



**Wood Buffalo Environmental Association**

# **OCTOBER 2017 MONTHLY REPORT**

CONTINUOUS MONITORING  
INTEGRATED MONITORING  
November 29, 2017

Operations, Data Collection,  
QA/QC, Data Validation and Reporting by:  
Wood Buffalo Environmental Association  
Fort McMurray, Alberta



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November 29, 2017

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**RE: Monthly Ambient Air Quality Monitoring Report October 2017  
Wood Buffalo Environmental Association**

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Enclosed is the October 2017 Ambient Air Quality Monitoring Report for the continuous ambient air quality monitoring stations of the Wood Buffalo Environmental Association regional air quality monitoring network.

The continuous ambient air quality monitoring network stations are:

AMS 1 - Fort McKay – Bertha Ganter  
AMS 2 - Mildred Lake  
AMS 3 - Lower Camp B (meteorology)  
AMS 4 - Buffalo Viewpoint  
AMS 5 - Mannix  
AMS 6 - Patricia McInnes  
AMS 7 - Athabasca Valley  
AMS 8 - Fort Chipewyan  
AMS 9 - Barge Landing  
AMS 11 - Lower Camp (air quality)  
AMS 13 - Fort McKay South  
AMS 14 - Anzac  
AMS 15 - Horizon  
AMS 16 - Muskeg River  
AMS 17 - Wapasu  
AMS 18 - Stony Mountain  
AMS 19 - Firebag  
AMS 20 - MacKay River  
AMS 21 - Conklin  
AMS 22 - Janvier  
AMS 23 - Fort Hills  
AMS 24 - Surmont  
AMS 25 - Waskōw ohci Pimâtisiwin  
AMS 500 - Christina Lake  
AMS 501 - Leismer  
AMS 505 - Sawbones Bay

This report is submitted by WBEA on behalf of its members and for some members to satisfy the requirements contained in their EPEA Approvals (as amended):





<b>Member</b>	<b>EPEA Approval No.</b>
Athabasca Oil Corporation	289664-00-00; 241311-00-00
Canadian Natural Resources Ltd.	149968-01-00; 20809-02-00
Cenovus Energy	48522-01-00
Connacher Oil and Gas Ltd.	240008-00-00
ConocoPhillips Canada	48263-01-00
Devon Canada Corporation	224816-00-00
Finning Canada Ltd.	Not Applicable
Fort Hills Energy Corporation	151469-01-00
Hammerstone Corporation	189942-00-00
Husky Oil Operations Ltd.	206355-01-00
Imperial Oil Ltd.	00046586-00-00
Inter Pipeline Offgas Ltd.	73203-02-00
MEG Energy Corporation	00216466-01-00
Nexen Energy ULC.	137467-01-00; 236394-00-00
PetroChina Canada Ltd.	254465-00-00
Suncor Energy Inc.	094-02-00; 80105-01-00
Sunshine Oilsands Ltd.	305529-00-00
Syncrude Canada Ltd.	026-02-00
Teck Resources Ltd.	EIA Application
Total E&P Canada Ltd.	228044-00-00

#### **Government and Non-Industrial Organizations**

Alberta Energy Regulator  
Alberta Environment & Parks  
Alberta Health Services  
Alberta Health & Wellness  
Environment Canada  
Health Canada  
Parks Canada  
Pembina Institute for Appropriate Development  
Regional Municipality of Wood Buffalo  
Saskatchewan Environment

#### **Aboriginal Communities**

Chipewyan Prairie Dene First Nation	Fort McKay Métis Local 63
Christina River Dene Nation Council	Fort McMurray First Nation 468
Fort McKay First Nation	Fort McMurray Métis Local 1935

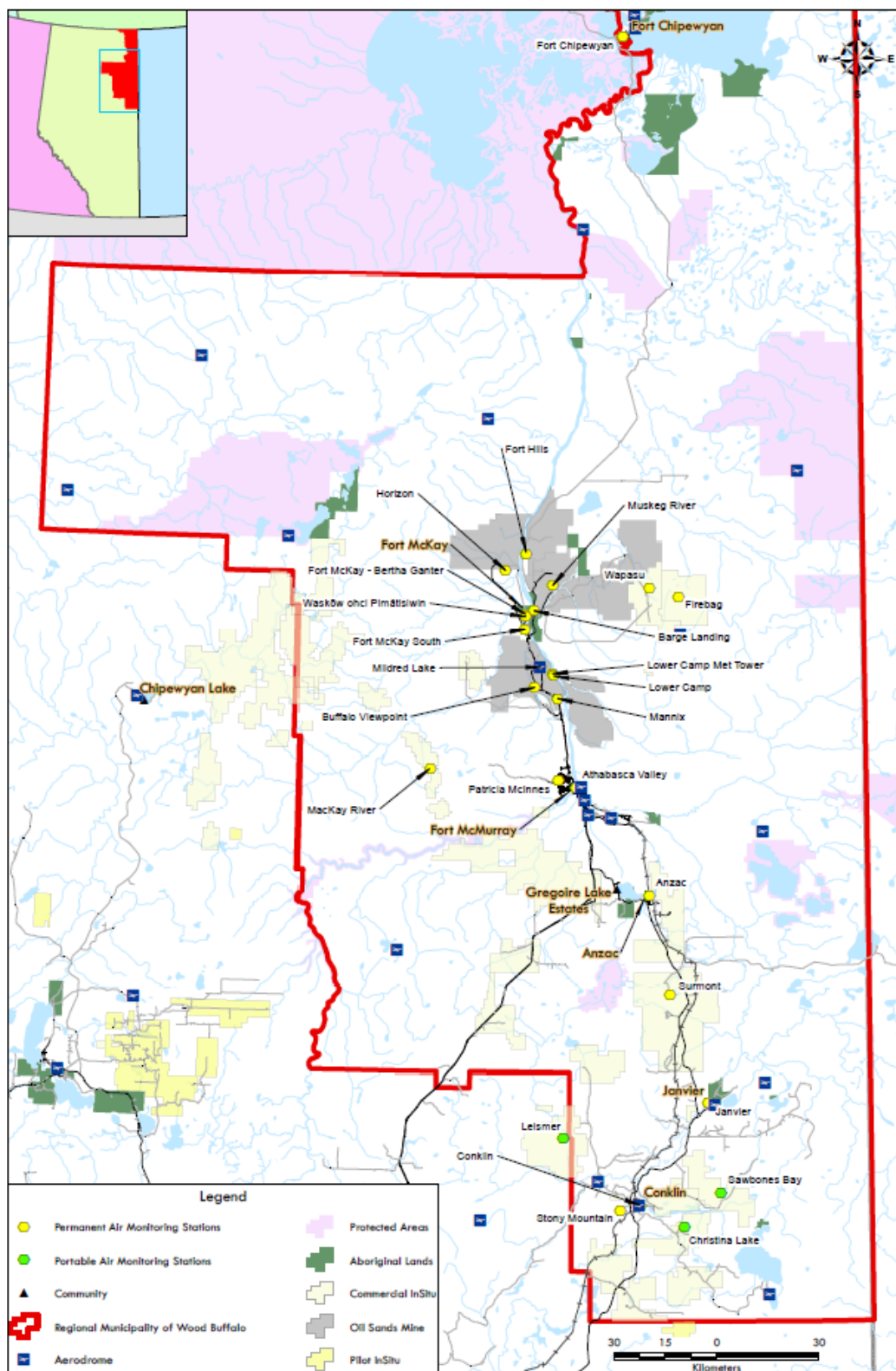


Figure 1: Map of WBEA Continuous Monitoring Network.

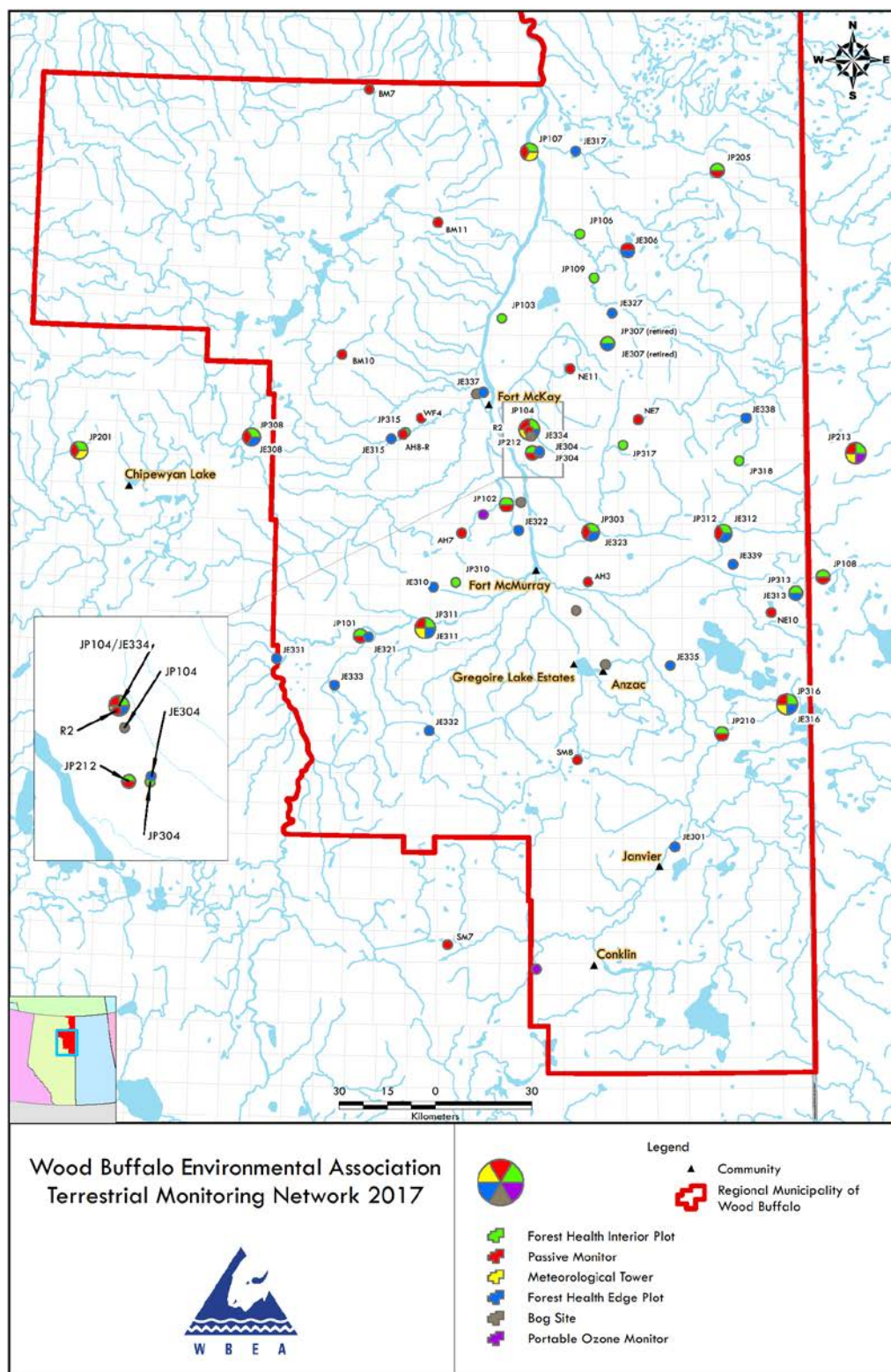


Figure 2: Map of WBEA Terrestrial Monitoring Network.

The following operational notes are provided as per the Air Monitoring Directive requirements.

### 1.0 Concentrations in Excess of Alberta Ambient Air Quality Objectives

There were no ambient concentrations in excess of the air quality objectives as indicated in the Air Monitoring Directive Section III.A.3 (a & b) for CO, H<sub>2</sub>S, NH<sub>3</sub>, NO<sub>2</sub>, PM<sub>2.5</sub>, O<sub>3</sub>, and SO<sub>2</sub>.

There were 4 1-hour objective exceedances reported in real-time that were found not to be in exceedance after data processing.

The following table provides the status of the incidents and final data averages.

Site	Parameter	Date / Time	Reference	Period	Concentration ppb or ug/m <sup>3</sup>		Status
					Reported	Final	
AMS 2 Mildred Lake	H <sub>2</sub> S	16Oct17, 12:00	330813	1hr	36	-	ret
AMS 9 Barge Landing	TRS	14Oct17, 06:00	330745	1hr	25	-	ret
AMS 13 Fort McKay South	TRS	14Oct17, 07:00	330744	1hr	23	-	ret
AMS 13 Fort McKay South	SO <sub>2</sub>	14Oct17, 06:00	330744	1hr	233	-	ret

\*status legend:

- late exceedance, raw values were not found to be in exceedance in real time, and/or were not reported, but final values were found to be an exceedance after data processing.
- exc exceedance, raw values reported in real time were confirmed to be in exceedance after data processing.
- nae not an exceedance, raw values reported in real time were found not in exceedance after data processing.
- ret retracted, reported exceedance was found to be not an exceedance after investigation of measurement system status and/or validation of raw data in conjunction with all associated measurement parameters.

### 1.1 Data Processing and Validation

Concentrations reported in near real-time were raw values. The final values were determined after processing of data for reporting. For all parameters except PM<sub>2.5</sub>, the final 5-minute data values were determined by subtracting from the raw 5-minute data values, the daily zero responses interpolated to the time of each raw 5-minute value. The final 5-minute data values were then rounded to one decimal place greater than the reporting precision indicated in the Air Monitoring Directive (AMD). The final 1-hour data values were calculated from final 5-minute data values and then rounded to reporting precision. The final 24-hour data values were calculated from final 1-hour values.

After data processing and validation, NO<sub>2</sub> concentrations were re-calculated from baseline-corrected NO<sub>x</sub> and NO concentrations. Specifically, the NO concentration was subtracted from the NO<sub>x</sub> concentration to determine the NO<sub>2</sub> concentration. In cases where the NO<sub>x</sub> and/or NO values exceeded the operating range of the analyzer, values reported for NO<sub>2</sub> were determined as the largest of either the difference between baseline-corrected NO<sub>x</sub> and NO values, or the NO<sub>2</sub> value reported by the data acquisition system with baseline correction applied.

## 1.2 Revisions to AEP Airdata Warehouse

Data from August and September 2017 was re-uploaded to the AEP Airdata Warehouse to include new parameters (NO, NO<sub>2</sub>, NO<sub>x</sub>, O<sub>3</sub>, and PM<sub>2.5</sub>) that were added to Buffalo Viewpoint AMS on August 1, 2017.

## 2.0 Operational Status

### Continuous Monitoring

In October 2017, there was 1 instance of a compliance monitoring instruments operating less than 90% of the time.

1. The total reduced sulphur (TRS) analyzer at Athabasca Valley AMS operated less than 90% of the time in October 2017, which is a contravention of the Air Monitoring Directive (2016, as amended), Chapter 6, Clause DQ 4-C.

Alberta Environment and Parks (AEP) conducted an audit of the analyzers at this air monitoring station on October 24<sup>th</sup> and found the TRS analyzer to be 11% above criteria. A post audit investigation was inconclusive in finding an analyzer or system fault. Subsequent investigations and review of data indicates that the change in analyzer performance was associated with the calibration cylinder change during the monthly calibration. Data has been invalidated from October 23<sup>rd</sup>, when the calibration cylinder was changed until October 31<sup>st</sup>, when a new calibration cylinder was installed and the TRS analyzer was verified with WBEA audit equipment.

In October 2017, the TRS analyzer at Athabasca Valley AMS operated for 75% of the reporting period. This incident was reported to Alberta Environment and Parks on November 23, 2017 (reference number 332125).

In October 2017, there were 2 incidents of a monitoring instrument not required for air quality compliance operating less than 90% of the time:

1. The 45m sonic wind sensors at AMS 3 – Lower Camp Met Tower did not record data for much of the month due to wiring issues. The wind sensors did not record data for 420 hours. Wiring issues were repaired on October 19.
2. The precipitation collector at Fort Chipewyan (AMS 8) had 187 hours of invalid data due to suspected sensor failure discovered during routine data validation. Troubleshooting to determine the cause will be conducted during the next routine visit to the station.

### Intermittent Monitoring

Results for integrated monitoring of precipitation, passive, PAH, VOC, PM<sub>2.5</sub>, and PM<sub>10</sub> for September 2017 are included with this report.

### 3.0 Monitoring Notes

#### General Network Notes

WBEA commissioned a portable Air Monitoring Station at the Athabasca Oil Leismer site, with data collection beginning on October 1, 2017. This station is equipped with ambient air quality analyzers for Sulphur Dioxide (SO<sub>2</sub>), Hydrogen Sulphide (H<sub>2</sub>S), Nitric Oxide (NO), Nitrogen Dioxide (NO<sub>2</sub>), and Total Oxides of Nitrogen (NO<sub>x</sub>). Temperature, wind speed and direction, and relative humidity are also continuously measured.

Alberta Environment and Parks (AEP) audited the Wood Buffalo Environmental Association's ambient monitoring network from October 16 through 27, 2017. As a result, two calibration periods were reported this month for all analyzers that were audited; one for the AEP audit and another for the monthly multi-point calibration.

The Ammonia (NH<sub>3</sub>) analyzer currently operates on a 0 to 2500 ppb operating range with a detection level of 5 ppb in the WBEA network. In data processing, values less than 5 ppb have been considered below detection levels and are reported as zero.

Monitoring notes for the continuous monitoring stations are provided on a station by station basis.

#### ***Station 1, Fort McKay - Bertha Ganter***

The NH<sub>3</sub> analyzer required additional time to stabilize to levels below ambient concentrations following the automated daily spans and routine monthly multipoint calibrations. Additional time for stabilization after exposure to high concentrations of NH<sub>3</sub> gas is an inherent behavior in the NH<sub>3</sub> analyzer operation resulting from the properties of the NH<sub>3</sub> gas. Data for 2 hours following the daily spans have been reported as invalid for a total of 62 hours this month.

Maintenance and cleaning of the sample manifold on October 12 interrupted the normal operation of the O<sub>3</sub>, SO<sub>2</sub>, THC, and TRS analyzers for 1 hour this reporting period.

Station operator activities affected the normal operation of the THC analyzer for 3 hours this reporting period.

Flat-lines in the output signal of the wind sensor resulted in 24 hours of invalid data this reporting period.

The temperature sensors at 2 and 10 m are independent sensors and are not an integrated delta-t system. Although reported values are representative of ambient temperatures, they may not be suitable as measurements of vertical temperature gradients.

### ***Station 2, Mildred Lake***

Maintenance and cleaning of the sample manifold on October 13 interrupted the normal operation of the H<sub>2</sub>S, SO<sub>2</sub>, and THC analyzers for 2 hours this reporting period.

Analyzer FID failure and maintenance to optimize gas flows on October 1 and 2 interrupted the routine operation of the THC analyzer for 27 hours. On October 6 the issue persisted, so maintenance to replace the analyzer resulted in 5 hours of downtime.

Flat-lines in the output signal of the wind sensor resulted in 27 hours of invalid data this reporting period.

### ***Station 3, Lower Camp - Meteorology***

Meteorological sensors at the 45m elevation did not record data for much of the month due to wiring issues. The temperature and relative humidity sensors did not record data for 32 hours, and the sonic wind sensors did not record data for 420 hours this reporting period. Repairs to the tower were completed on October 19.

Program changes to the data acquisition system interrupted the normal operation of all parameters for 1 hour this reporting period.

Unstable operation on October 1 affected the normal operation of the 167 meter vertical wind speed sensor for 1 hour this month.

Flat lines in output signals of the sonic wind sensors at 20, 45, 100, and 167 m elevations resulted in 5, 11, 26, and 26 hours of downtime for each respective sensor.

### ***Station 4, Buffalo Viewpoint***

Maintenance and cleaning of the sample manifold on October 26 interrupted the normal operation of the H<sub>2</sub>S and O<sub>3</sub> analyzers for 1 hour this reporting period.

Negative baseline drift throughout the month affected the normal operation of the PM<sub>2.5</sub> analyzer for 52 hours this reporting period.

Flat-lines in the output signal of the wind sensor resulted in 16 hours of invalid data this reporting period.

### ***Station 5, Mannix***

Replacement of the fuel gas cylinder on October 13 affected the normal operation of the THC analyzer for 1 hour.

Station operator activities on October 18 affected the normal operation of the THC analyzer for 1 hour.

Flat lines in output signals of the sonic wind sensors at 20, 45, 75, and 90 m elevations resulted in 21, 27, 39, and 20 hours of downtime for each respective sensor.

### ***Station 6, Patricia McInnes***

The NH<sub>3</sub> analyzer required additional time to stabilize to levels below ambient concentrations following the automated daily span and routine monthly multipoint calibration periods. Additional time for stabilization after exposure to high concentrations of the NH<sub>3</sub> gas is an inherent behavior in the NH<sub>3</sub> analyzer operation resulting from the properties of the NH<sub>3</sub> gas. Data for 1-2 hours following each daily span has been reported as invalid for a total of 40 hours this month.

An internal WBEA audit on October 6 interrupted the normal operation of the TRS analyzer for 4 hours.

Maintenance to verify the daily span response on October 18 interrupted the normal operation of the TRS analyzer for 3 hours.

Negative baseline drift throughout the month affected the normal operation of the PM2.5 analyzer for 10 hours this reporting period.

Replacement of the carrier gas cylinder on October 6 affected the normal operation of the THC analyzer for 2 hours.

### ***Station 7, Athabasca Valley***

Maintenance and cleaning of the sample manifold on October 23 interrupted the normal operation of the CO, NO<sub>2</sub>, O<sub>3</sub>, and THC analyzers for 1 hour this reporting period.

Calibration cylinder changeout and subsequent adjustments resulted in the TRS analyzer being outside of response criteria. The cylinder was changed and the TRS analyzer was adjusted and recalibrated; analyzer response was verified with WBEA audit equipment. Data for the TRS analyzer was invalidated for a total of 187 hours from October 23 to October 31.

Maintenance to verify the daily span response on October 27 interrupted the normal operation of the NO<sub>2</sub>, SO<sub>2</sub>, and THC analyzers for 4 hours.

Maintenance to verify the daily span response on October 30 interrupted the normal operation of the CO analyzer for 1 hour.

Negative baseline drift throughout the month affected the normal operation of the PM2.5 analyzer for 6 hours this reporting period.

A data collection error on October 30 interrupted the data collection of all parameters for 1 hour.

### ***Station 8, Fort Chipewyan***

Two instances of power interruption at the station this month, on October 2 and 5, affected the normal operation of all analyzers for 5 to 9 hours.

Maintenance to verify the daily span response on October 12 interrupted the normal operation of the O<sub>3</sub> analyzer for 1 hour.



During routine data validation, a noisy beta signal was identified on the PM<sub>2.5</sub> analyzer. Maintenance to remove the PM<sub>2.5</sub> analyzer from service and replace it with a backup unit on October 11 interrupted the normal operation of the analyzer for 2 hours.

Numerous instances of unstable operation due to baseline drift throughout the month affected the normal operation of the PM<sub>2.5</sub> analyzer for 33 hours.

The precipitation collector was found to be unresponsive, beginning on October 24, 2017. Data was invalidated back to the last precipitation event, resulting in 187 hours of invalid data.

Flat-lines in the output signal of the wind sensor resulted in 23 hours of invalid data this reporting period.

#### ***Station 9, Barge Landing***

No operational issues to report this month.

#### ***Station 11, Lower Camp***

Maintenance and cleaning of the sample manifold on October 27 interrupted the normal operation of the SO<sub>2</sub>, and THC analyzers for 1 hour this reporting period.

Maintenance to verify the analyzer response on October 4 interrupted the normal operation of the H<sub>2</sub>S analyzer for 2 hours.

Flat-lines in the output signal of the wind speed and direction sensors resulted in 5 and 18 hours of invalid data this reporting period, respectively.

#### ***Station 13, Fort McKay South***

Two instances of negative baseline drift affected the normal operation of the PM<sub>2.5</sub> analyzer for 5 hours this reporting period.

#### ***Station 14, Anzac***

A data collection error on October 6 interrupted the data collection of the NO<sub>2</sub>, O<sub>3</sub>, SO<sub>2</sub>, and THC analyzers for 1 hour.

Replacement of the carrier gas cylinder at the station on October 30 affected the normal operation of the THC analyzer for 2 hours.

A data collection error occurring October 1 and 2 interrupted the data collection of the surface leaf wetness sensor for 38 hours this reporting period.

Unstable operation on October 14 affected the normal operation of the surface leaf wetness sensor for 1 hour.

**Station 15, Horizon**

Flat-lines in the output signal of the wind sensor resulted in 32 hours of invalid data this reporting period.

**Station 16, Muskeg River**

Station temperature fluctuations on October 5 affected the normal operation of the THC analyzer for 6 hours.

Flat-lines in the output signal of the wind sensor resulted in 21 hours of invalid data this reporting period.

**Station 17, Wapasu**

Flat-lines in the output signal of the wind sensor resulted in 25 hours of invalid data this reporting period.

**Station 18, Stony Mountain**

Sample pump failure and maintenance to replace the pump on October 4 and 5 interrupted the routine operation of the SO<sub>2</sub> analyzer for 33 hours.

Maintenance to complete a SO<sub>2</sub> scrubber check resulted in 1 hour of invalid data this reporting period.

Maintenance to clean the tipping bucket on October 5 interrupted the normal operation of the precipitation collector for 3 hours.

Recovery time following a scrubber check on October 20 affected the normal operation of the TRS analyzer for 5 hours. Maintenance to replace the SO<sub>x</sub> scrubber on October 21 interrupted the normal operation of the TRS analyzer for 7 hours.

Flat-lines in the output signal of the wind sensor resulted in 1 hour of invalid data this reporting period.

**Station 19, Firebag**

Flat-lines in the output signal of the wind sensor resulted in 8 hours of invalid data this reporting period.

**Station 20, MacKay River**

A power outage at the station on October 10 affected the normal operation of the H<sub>2</sub>S and SO<sub>2</sub> analyzers for 1 hour. Following the power outage, flat-lines in the output signal of the H<sub>2</sub>S analyzer and subsequent maintenance to verify the daily span response interrupted the routine operation of the analyzer for an additional 25 hours.

Numerous instances of intermittent unstable operation due to baseline drift affected the normal operation of the H<sub>2</sub>S analyzer for a total of 7 hours this reporting period.

Flat-lines in the output signal of the wind sensor resulted in 20 hours of invalid data this reporting period.

**Station 21, Conklin**

Replacement of the fuel gas cylinder at the station on October 24 affected the normal operation of the THC analyzer for 2 hours.

Maintenance and cleaning of the sample manifold on October 18 interrupted the normal operation of the O<sub>3</sub>, SO<sub>2</sub>, THC, and TRS analyzers for 1 hour.

Two instances of unstable operation affected the normal operation of the THC analyzer for 9 hours.

Sample pump failure and maintenance to replace the pump on October 17 and 18 interrupted the routine operation of the NO<sub>2</sub> analyzer for 36 hours.

Flat-lines in the output signal of the wind sensor resulted in 2 hours of invalid data this reporting period.

**Station 22, Janvier**

Power outages at the station on October 18 and 28 affected the normal operation of all analyzers for 8 to 10 hours.

Maintenance to verify the daily span response on October 19 interrupted the normal operation of all gaseous analyzers for 1 to 2 hours.

Station operator activities affected the normal operation of the SO<sub>2</sub> analyzer for 3 hours this reporting period.

Two instances of unstable operation due to baseline drift throughout the month affected the normal operation of the THC analyzer for 40 hours this reporting period.

Negative baseline drift throughout the month affected the normal operation of the PM<sub>2.5</sub> analyzer for 40 hours this reporting period. Flat-lines in the output signal of the PM<sub>2.5</sub> analyzer followed by maintenance to complete flow and zero checks resulted in 19 hours of invalid data this reporting period.

Flat-lines in the output signal of the wind sensor resulted in 26 hours of invalid data this reporting period.

**Station 23, Fort Hills**

Maintenance and cleaning of the sample manifold on October 4 interrupted the normal operation of the TRS analyzer for 1 hour.

An internal WBEA audit on October 10 interrupted the normal operation of the TRS and THC analyzers for 2 hours.

Negative baseline drift throughout the month affected the normal operation of the PM<sub>2.5</sub> analyzer for 28 hours this reporting period.

Flat-lines in the output signal of the wind sensor resulted in 26 hours of invalid data this reporting period.

**Station 24, Surmont**

Numerous instances of intermittent unstable operation due to baseline drift throughout the month affected the normal operation of the THC analyzer for a total of 18 hours this reporting period.

**Station 25, Waskōw ohci Pimâtisiwin**

No operational issues to report this month.

**Station 500, Christina Lake**

Maintenance and cleaning of the sample manifold on October 13 interrupted the normal operation of the NO<sub>2</sub> and SO<sub>2</sub> analyzers for 1 hour.

Flat-lines in the output signal of the wind sensor resulted in 41 hours of invalid data this reporting period.

**Station 501, Leismer**

*Note: install calibration files are included with routine monthly calibration files, in the report section of this station. This station officially commenced operation on October 1, 2017.*

Maintenance and cleaning of the sample manifold on October 24 interrupted the normal operation of the H<sub>2</sub>S and SO<sub>2</sub> analyzers for 1 hour.

Three instances of unstable operation due to baseline drift throughout the month affected the normal operation of the H<sub>2</sub>S analyzer for 12 hours this reporting period.

Maintenance to verify the calibration points on October 16 interrupted the normal operation of the H<sub>2</sub>S analyzer for 4 hours.

**Station 505, Sawbones Bay.**

Maintenance and cleaning of the sample manifold on October 20 interrupted the normal operation of the NO<sub>2</sub>, SO<sub>2</sub>, and TRS analyzers for 1 hour.

Analyzer failure due to a depleted SOx scrubber on October 21 interrupted the normal operation of the H<sub>2</sub>S analyzer for 22 hours. Maintenance was completed on October 22 to replace the SOx scrubber and calibrate the H<sub>2</sub>S analyzer.

Flat-lines in the output signal of the wind sensor resulted in 23 hours of invalid data this reporting period.

If additional information is required, please contact either Mike Martineau at (780) 715 1770 ext. 222 or the Wood Buffalo Environmental Association at (780) 799 4420.

Yours sincerely,

**Wood Buffalo Environmental Association**

Mike Martineau  
Data Lead

Kendra Thomas  
Data Technician

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION  
MONTHLY AIR MONITORING SUMMARY  
for AMD SECTION III.B.1(c)

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APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
289664-00-00	10	2017					
241311-00-00	CONTINUOUS AMBIENT MONITORING						
20809-02-00							
149968-01-00							
48522-01-00							
240008-00-00			ONE-HOUR AVERAGE		24-HOUR AVERAGE		
48263-01-00	PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
151469-01-00	SO2(ppm)	1	99.87	0.019	0	0.005	0
224816-00-00	SO2(ppm)	2	99.06	0.030	0	0.009	0
189942-00-00	SO2(ppm)	4	100.00	0.049	0	0.012	0
206355-00-00	SO2(ppm)	5	100.00	0.072	0	0.013	0
46586-00-00	SO2(ppm)	6	100.00	0.014	0	0.005	0
73203-02-00	SO2(ppm)	7	99.19	0.010	0	0.003	0
216466-01-00	SO2(ppm)	8	99.06	0.006	0	0.001	0
137467-01-00	SO2(ppm)	11	99.87	0.085	0	0.012	0
236394-00-00	SO2(ppm)	13	100.00	0.026	0	0.006	0
80105-01-00	SO2(ppm)	14	99.87	0.004	0	0.001	0
254465-00-00	SO2(ppm)	15	100.00	0.014	0	0.002	0
094-02-00	SO2(ppm)	16	100.00	0.018	0	0.004	0
305529-00-00	SO2(ppm)	17	100.00	0.016	0	0.003	0
026-02-00	SO2(ppm)	18	95.43	0.003	0	0.001	0
228044-00-00	SO2(ppm)	19	100.00	0.023	0	0.002	0
	SO2(ppm)	20	99.87	0.008	0	0.003	0
	SO2(ppm)	21	99.87	0.002	0	0.001	0
	SO2(ppm)	22	98.25	0.002	0	0.001	0
	SO2(ppm)	23	100.00	0.012	0	0.003	0
	SO2(ppm)	24	100.00	0.011	0	0.003	0
	SO2(ppm)	25	100.00	0.015	0	0.003	0
	SO2(ppm)	500	99.87	0.057	0	0.017	0
	SO2(ppm)	502	99.87	0.032	0	0.008	0
	SO2(ppm)	505	99.87	0.066	0	0.016	0
	H2S(ppm)	2	98.79	0.002	0	0.001	0
	H2S(ppm)	4	99.87	0.005	0	0.001	0
	H2S(ppm)	5	100.00	0.005	0	0.002	0
	H2S(ppm)	11	99.73	0.007	0	0.001	0
	H2S(ppm)	17	100.00	0.001	0	0.000	0
	H2S(ppm)	19	100.00	0.001	0	0.000	0
	H2S(ppm)	20	95.56	0.002	0	0.001	0
	H2S(ppm)	24	100.00	0.001	0	0.000	0
	H2S(ppm)	25	100.00	0.001	0	0.001	0
	H2S(ppm)	500	100.00	0.002	0	0.000	0
	H2S(ppm)	502	97.72	0.001	0	0.000	0
	H2S(ppm)	505	97.04	0.002	0	0.000	0
	TRS(ppm)	1	99.87	0.002	0	0.001	0
	TRS(ppm)	6	99.06	0.002	0	0.001	0
	TRS(ppm)	7	74.87	0.002	0	0.001	0
	TRS(ppm)	9	100.00	0.002	0	0.001	0
	TRS(ppm)	13	100.00	0.002	0	0.001	0
	TRS(ppm)	14	100.00	0.001	0	0.000	0
	TRS(ppm)	15	100.00	0.001	0	0.000	0
	TRS(ppm)	18	98.39	0.000	0	0.000	0
	TRS(ppm)	21	99.87	0.000	0	0.000	0
	TRS(ppm)	22	98.66	0.000	0	0.000	0
	TRS(ppm)	23	99.60	0.001	0	0.001	0
	THC(ppm)	1	99.46	3.5	-	2.5	-
	THC(ppm)	2	94.22	5.2	-	2.8	-
	THC(ppm)	4	100.00	4.9	-	2.9	-
	THC(ppm)	5	99.73	5.3	-	3.1	-
	THC(ppm)	6	99.73	2.6	-	2.3	-
	THC(ppm)	7	99.33	2.9	-	2.6	-
	THC(ppm)	9	100.00	3.3	-	2.8	-
	THC(ppm)	11	99.87	5.2	-	2.7	-
	THC(ppm)	13	100.00	4.7	-	2.8	-
	THC(ppm)	14	99.60	2.5	-	2.1	-
	THC(ppm)	15	100.00	7.3	-	3.2	-
	THC(ppm)	16	99.19	4.1	-	3.1	-
	THC(ppm)	17	100.00	3.4	-	2.4	-
	THC(ppm)	18	100.00	2.1	-	1.9	-
	THC(ppm)	19	100.00	3.3	-	2.4	-
	THC(ppm)	20	100.00	3.1	-	2.7	-
	THC(ppm)	21	98.39	2.3	-	2.1	-
	THC(ppm)	22	97.85	2.1	-	2.0	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION  
 MONTHLY AIR MONITORING SUMMARY  
 for AMD SECTION III.B.1(c)

OCTOBER 2017

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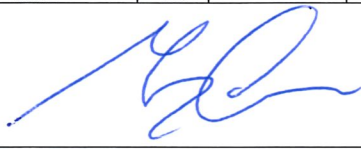
APPROVAL NUMBERS	REPORT DATE		CONTINUOUS AMBIENT MONITORING					
	MONTH	YEAR	STN. NO.	% TIME OPERATIONAL	ONE-HOUR AVERAGE		24-HOUR AVERAGE	
	10	2017			MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
289664-00-00								
241311-00-00								
20809-02-00								
149968-01-00								
48522-01-00								
240008-00-00	THC(ppm)	23	99.73	4.0	-	2.0	-	
48263-01-00	THC(ppm)	24	97.58	3.0	-	2.0	-	
151469-01-00	THC(ppm)	505	99.87	3.2	-	2.3	-	
224816-00-00	O3(ppm)	1	99.87	0.040	0	0.035	-	
189942-00-00	O3(ppm)	4	99.87	0.045	0	0.039	-	
206355-00-00	O3(ppm)	6	100.00	0.044	0	0.038	-	
46586-00-00	O3(ppm)	7	99.73	0.045	0	0.037	-	
73203-02-00	O3(ppm)	8	98.92	0.035	0	0.030	-	
216466-01-00	O3(ppm)	13	100.00	0.041	0	0.033	-	
137467-01-00	O3(ppm)	14	99.87	0.044	0	0.039	-	
236394-00-00	O3(ppm)	17	100.00	0.041	0	0.031	-	
80105-01-00	O3(ppm)	18	100.00	0.048	0	0.040	-	
254465-00-00	O3(ppm)	21	99.87	0.044	0	0.037	-	
094-02-00	O3(ppm)	22	98.66	0.053	0	0.043	-	
305529-00-00	NO2(ppm)	1	100.00	0.029	0	0.016	-	
026-02-00	NO2(ppm)	4	100.00	0.026	0	0.016	-	
228044-00-00	NO2(ppm)	6	100.00	0.025	0	0.014	-	
	NO2(ppm)	7	99.19	0.029	0	0.015	-	
	NO2(ppm)	8	98.79	0.008	0	0.003	-	
	NO2(ppm)	13	100.00	0.029	0	0.016	-	
	NO2(ppm)	14	99.87	0.017	0	0.005	-	
	NO2(ppm)	15	100.00	0.032	0	0.016	-	
	NO2(ppm)	16	100.00	0.031	0	0.018	-	
	NO2(ppm)	17	100.00	0.020	0	0.007	-	
	NO2(ppm)	18	99.87	0.010	0	0.003	-	
	NO2(ppm)	19	100.00	0.023	0	0.007	-	
	NO2(ppm)	20	100.00	0.021	0	0.010	-	
	NO2(ppm)	21	95.16	0.024	0	0.007	-	
	NO2(ppm)	22	98.52	0.007	0	0.003	-	
	NO2(ppm)	23	100.00	0.032	0	0.014	-	
	NO2(ppm)	24	100.00	0.016	0	0.006	-	
	NO2(ppm)	500	99.87	0.023	0	0.008	-	
	NO2(ppm)	501	100.00	0.013	0	0.004	-	
	NO2(ppm)	505	99.87	0.018	0	0.006	-	
	CO(ppm)	7	99.60	0.4	0	0.2	-	
	NH3(ppm)	1	91.67	0.000	0	0.000	-	
	NH3(ppm)	6	94.62	0.055	0	0.034	-	
	PM2.5(ug/m3)	1	100.00	35.1	-	15.0	0	
	PM2.5(ug/m3)	4	92.74	39.6	-	17.6	0	
	PM2.5(ug/m3)	6	98.66	66.0	-	19.1	0	
	PM2.5(ug/m3)	7	99.06	27.2	-	15.6	0	
	PM2.5(ug/m3)	8	94.62	58.3	-	16.4	0	
	PM2.5(ug/m3)	13	99.33	28.1	-	14.3	0	
	PM2.5(ug/m3)	14	100.00	10.9	-	6.0	0	
	PM2.5(ug/m3)	15	100.00	26.0	-	8.8	0	
	PM2.5(ug/m3)	16	100.00	43.3	-	12.6	0	
	PM2.5(ug/m3)	17	100.00	27.3	-	9.4	0	
	PM2.5(ug/m3)	18	100.00	13.1	-	6.0	0	
	PM2.5(ug/m3)	21	100.00	34.9	-	7.0	0	
	PM2.5(ug/m3)	22	90.99	28.2	-	5.0	0	
	PM2.5(ug/m3)	23	96.24	64.0	-	10.0	0	
	WIND	1	96.77	-	-	-	-	
	WIND	2	96.37	-	-	-	-	
	WIND	4	97.85	-	-	-	-	
	WIND	5	97.18	-	-	-	-	
	WIND	6	100.00	-	-	-	-	
	WIND	7	99.87	-	-	-	-	
	WIND	8	96.91	-	-	-	-	
	WIND	9	100.00	-	-	-	-	
	WIND	11	99.33	-	-	-	-	
	WIND	13	100.00	-	-	-	-	
	WIND	14	100.00	-	-	-	-	
	WIND	15	95.70	-	-	-	-	
	WIND	16	97.18	-	-	-	-	
	WIND	17	96.64	-	-	-	-	
	WIND	18	99.87	-	-	-	-	

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION  
 MONTHLY AIR MONITORING SUMMARY  
 for AMD SECTION III.B.1(c)

OCTOBER 2017

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APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
	10	2017					
289664-00-00	CONTINUOUS AMBIENT MONITORING						
241311-00-00				ONE-HOUR AVERAGE		24-HOUR AVERAGE	
20809-02-00	PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
149968-01-00	WIND	19	98.92	-	-	-	-
48522-01-00	WIND	20	97.31	-	-	-	-
240008-00-00	WIND	21	99.73	-	-	-	-
48263-01-00	WIND	22	96.51	-	-	-	-
151469-01-00	WIND	23	96.51	-	-	-	-
224816-00-00	WIND	24	100.00	-	-	-	-
189942-00-00	WIND	25	100.00	-	-	-	-
206355-00-00	WIND	500	94.49	-	-	-	-
46586-00-00	WIND	502	100.00	-	-	-	-
73203-02-00	WIND	505	96.91	-	-	-	-
216466-01-00							
137467-01-00							
236394-00-00							
80105-01-00							
254465-00-00							
094-02-00							
305529-00-00							
026-02-00							
228044-00-00	SIGNATURE OF ASSOCIATION REPRESENTATIVE				FOR ALBERTA ENVIRONMENT USE ONLY		





## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 1**  
**BERTHA GANTER FORT MCKAY**  
**OCTOBER 2017**

Operations, Data Collection,  
QA/QC, Data Validation and Reporting by:  
Wood Buffalo Environmental Association  
Fort McMurray, Alberta

November 29, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT McKAY - BERTHA GANTER (AMS 1)  
OCTOBER 2017

MONTHLY SUMMARY for  
AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	707	36	37	99.87	19	0	5	0
TRS(ppb) Average	707	36	37	99.87	2	0	1	0
THC(ppm) Average	703	37	41	99.46	3.5	-	2.5	-
NMHC(ppm) Average	703	37	41	99.46	0.569	-	0.241	-
CH4(ppm) Average	703	37	41	99.46	2.9	-	2.3	-
O3 (ppb) Average	707	36	37	99.87	40	0	35	-
NO2 (ppb) Average	704	40	40	100	29	0	16	-
NO (ppb) Average	704	40	40	100	54	-	17	-
NOX (ppb) Average	704	40	40	100	76	-	33	-
NH3 (ppb) Average	628	54	116	91.67	0	0	0	-
PM2.5 (ug/m3) Average	742	2	2	100	35.1	-	15	0
Wind Speed 10 m (km/h) Average	720	0	24	96.77	39	-	20	-
Wind Direction 10 m (deg) Average	720	0	24	96.77	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100	24.1	-	14.3	-
Temperature 10 m (C) Average	744	0	0	100	23.8	-	14.7	-
Relative Humidity (%) Average	744	0	0	100	99	-	98	-
Precipitation (mm) Total	744	0	0	100	2.4	-	12.8	-
Leaf Wetness (% of range) Average	744	0	0	100	68	-	19	-
Global Solar Radiation (W/m2) Average	744	0	0	100	464	-	123	-

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BERTHA GANTER FORT McKAY (AMS 1)  
OCTOBER 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	707	0.8	2	-	0	0	0	0	1	2	19
TRS (ppb) Average	707	0.4	0	-	0	0	0	0	0	1	2
THC (ppm) Average	703	2.06	0.2	-	1.9	1.9	1.9	2	2.1	2.4	3.5
NMHC(ppm) Average	703	0.031	0.075	-	0	0	0	0	0	0.1	0.569
CH4(ppm) Average	703	2.03	0.1	-	1.9	1.9	1.9	2	2.1	2.2	2.9
O3 (ppb) Average	707	18	10	-	0	2	11	19	26	31	40
NO2 (ppb) Average	704	4.6	6	-	0	0	0	2	7	12	29
NO (ppb) Average	704	2.4	6	-	0	0	0	0	1	8	54
NOX (ppb) Average	704	7	11	-	0	0	0	2	9	19	76
NH3 (ppb) Average	628	0	0	-	0	0	0	0	0	0	0
PM2.5 (ug/m3) Average	742	3.93	4.8	-	0.2	0.7	1	2.2	5.1	8.9	35.1
Wind Speed 10 m (km/h) Average	720	9.9	7	-	0	3	5	8	14	20	39
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	3.15	4.7	-	-6	-1.8	-0.3	2	5.5	9.5	24.1
Temperature 10 m (C) Average	744	3.43	4.6	-	-5.6	-1.3	-0.1	2.3	5.9	9.7	23.8
Relative Humidity (%) Average	744	74.5	17	-	27	51	64	76	89	95	99
Precipitation (mm) Total	744	-	-	24.22	-	-	-	-	-	-	-
Leaf Wetness (% of range) Average	744	1.8	7	-	-1	-1	0	0	1	4	68
Global Solar Radiation (W/m2) Average	744	53.6	95	-	0	0	0	0	65	208	464

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BERTHA GANTER Fort McKAY (AMS 1)  
OCTOBER 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
O3, SO2, THC, TRS	12 Oct 2017 12:00	12 Oct 2017 12:00	1	Maintenance - sample manifold cleaned
NH3	01 Oct 2017 08:00	31 Oct 2017 09:00	62	Stabilization after daily span
THC	12 Oct 2017 14:00	12 Oct 2017 15:00	2	Maintenance - technician on site
THC	17 Oct 2017 13:00	17 Oct 2017 13:00	1	Maintenance - technician on site
Wind Speed, Wind Direction	22 Oct 2017 03:00	22 Oct 2017 14:00	12	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	22 Oct 2017 16:00	23 Oct 2017 03:00	12	Flat line in sensor output signal - Sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb

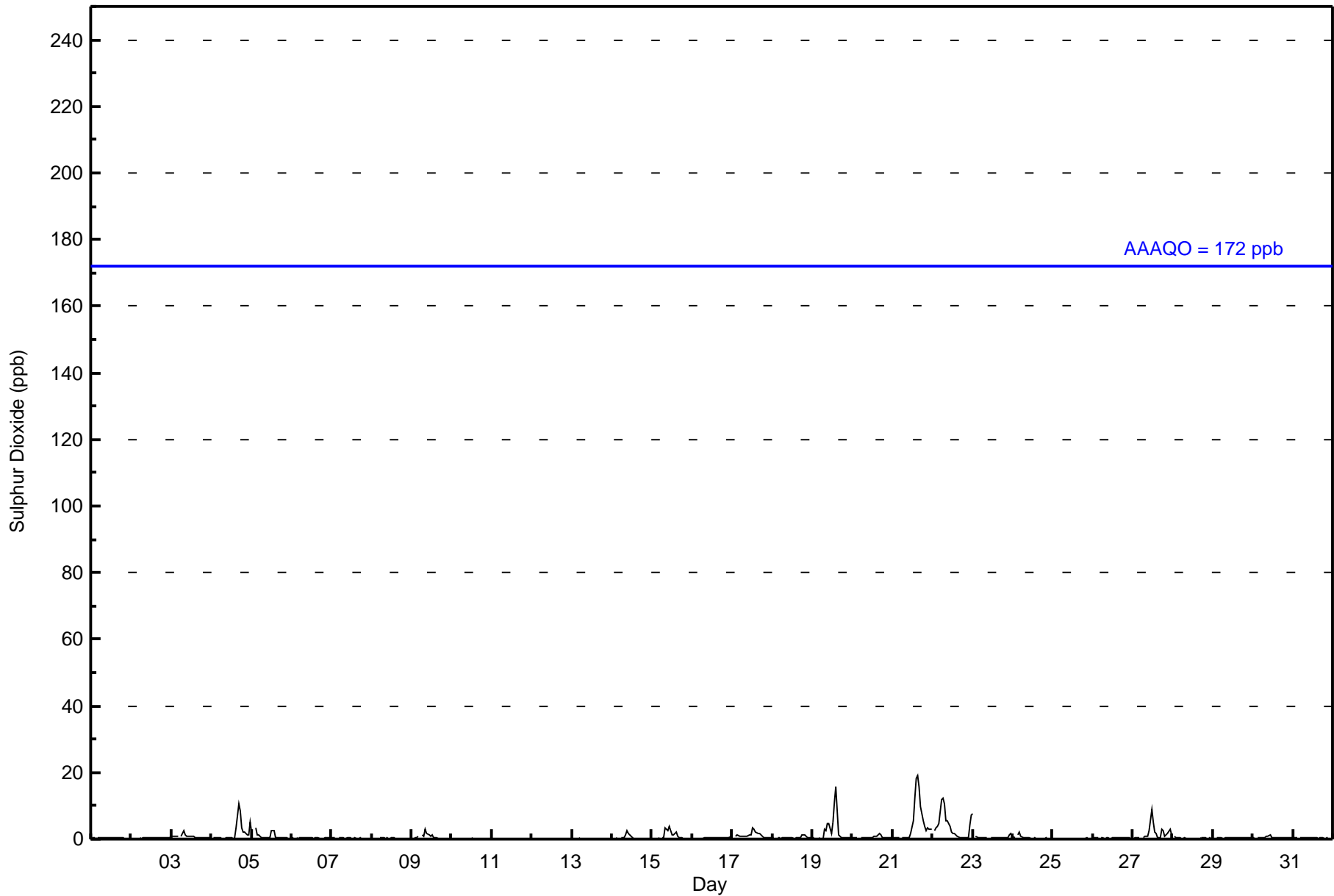
Fort McKay - Bertha Ganter - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 19 ppb on Oct 21 16:00      Maximum Daily Average: 4.6 ppb on Oct 21																	Hours in Service: 744 Hours of Data: 707 Hours of Missing Data: 37 Hours of Calibration: 36 Percent Operational Time: 99.9																															
Minimum Value: 0 ppb on Oct 15 22:00      Minimum Daily Average: 0.1 ppb on Oct 11 Maximum Diurnal Average: 1.5 ppb at hour 15      Minimum Diurnal Average: 0.3 ppb at hour 2 Monthly Average: 0.8 ppb      Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 2 P <sub>99</sub> = 11																																																
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																						
2-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0.4	1																						
3-Oct	1	1	1	1	1	Z	1	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.7	2																							
4-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	3	11	9	3	2	2	1	1	5	1.8	11																							
5-Oct	2	Z	3	1	1	1	0	0	0	0	1	3	2	0	0	0	0	0	0	0	0	0	0	0.9	3																							
6-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
7-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
8-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
9-Oct	0	0	0	0	1	Z	1	1	3	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0.6	3																							
10-Oct	Z	0	0	0	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
11-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
12-Oct	0	0	Z	0	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
13-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
14-Oct	0	0	0	0	Z	0	0	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0.4	2																							
15-Oct	0	0	0	0	0	Z	0	0	4	2	4	3	1	1	2	1	0	0	0	0	0	0	0	0.9	4																							
16-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0.4	1																							
17-Oct	1	Z	1	1	1	1	1	1	1	1	1	3	3	2	2	2	1	1	0	0	0	0	0	1.1	3																							
18-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0.4	1																							
19-Oct	0	0	0	Z	0	0	0	3	2	5	5	2	5	11	16	9	1	1	1	1	0	0	0	2.7	16																							
20-Oct	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	2	1	1	0	0	1	0	0	0.6	2																							
21-Oct	0	0	0	0	0	Z	0	0	0	0	2	6	12	18	19	16	10	6	4	2	4	3	3	4.6	19																							
22-Oct	Z	2	3	4	5	12	12	11	6	5	4	2	2	2	1	1	0	0	1	0	0	0	4	7	3.7	12																						
23-Oct	8	Z	1	1	0	0	0	0	0	C	C	0	0	0	0	0	0	0	0	0	0	1	2	0.8	8																							
24-Oct	1	1	Z	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2																							
25-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
26-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
27-Oct	0	0	0	0	0	Z	1	1	1	1	3	9	5	2	2	0	1	3	2	1	1	2	3	1	1.7	9																						
28-Oct	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
29-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
30-Oct	0	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
31-Oct	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
																								0.6	0.3	0.5	0.5	0.6	0.7	0.7	0.8	0.8	0.9	0.9	0.9	1.0	1.3	1.5	1.3	1.2	1.0	0.7	0.5	0.4	0.4	0.6	0.8	Diurnal Average
																								8	2	3	4	5	12	12	11	6	5	5	9	6	12	18	19	16	10	6	4	2	4	4	7	Diurnal Maximum
Z - zerospan      C - Calibration      M - Maintenance Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb      24-hr 48 ppb																																																



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort McKay - Bertha Ganter - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	697	98.59	98.59
11 - 20	10	1.41	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	97	19	4	6	5	4	12	49	101	46	36	37	51	61	77	72	677
11 - 20	0	0	0	0	1	0	0	5	0	0	0	0	0	0	0	1	7
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	97	19	4	6	6	4	12	54	101	46	36	37	51	61	77	73	684

Total Number of Valid Hours: 684

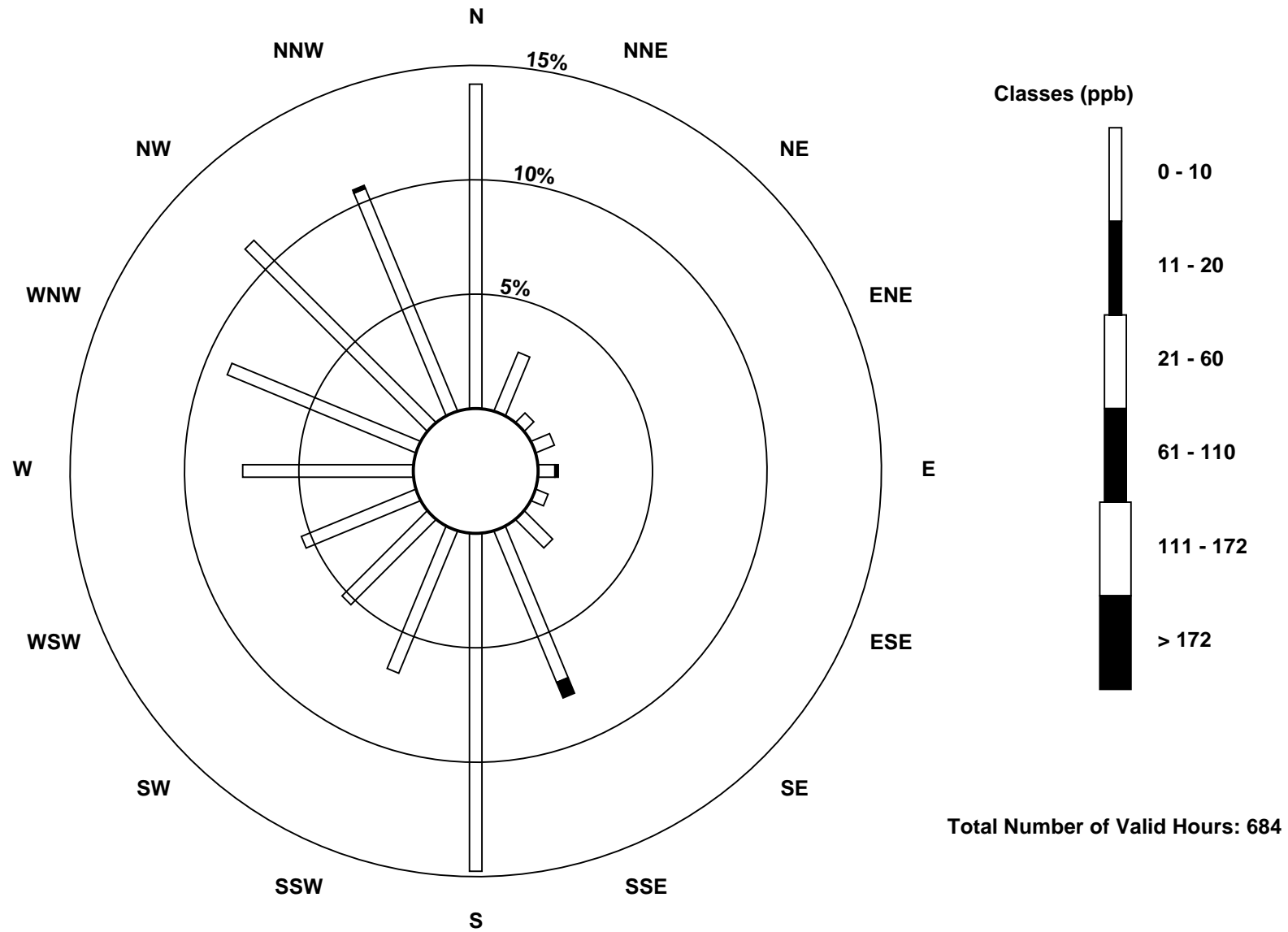
Total Number of Hours: 744

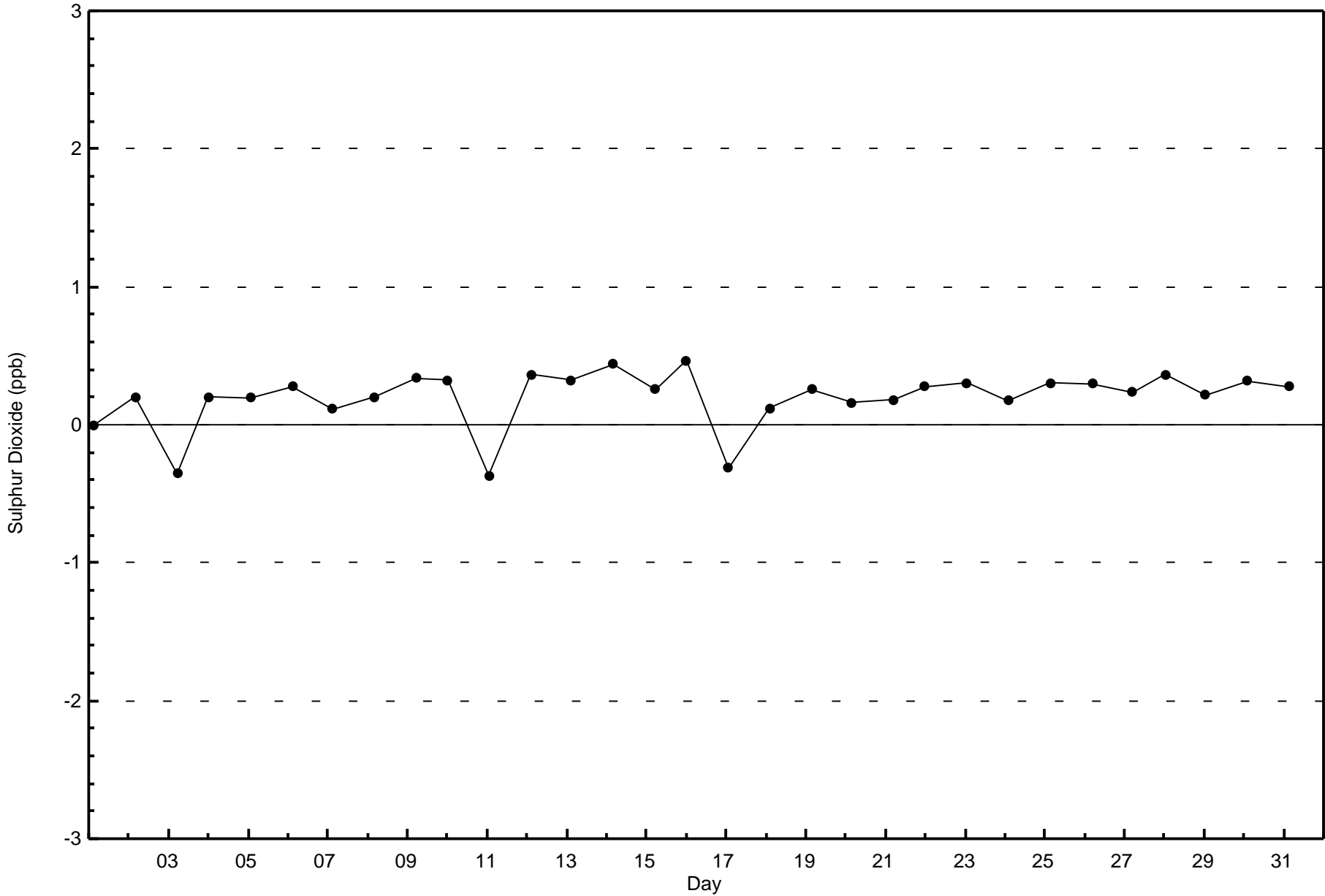


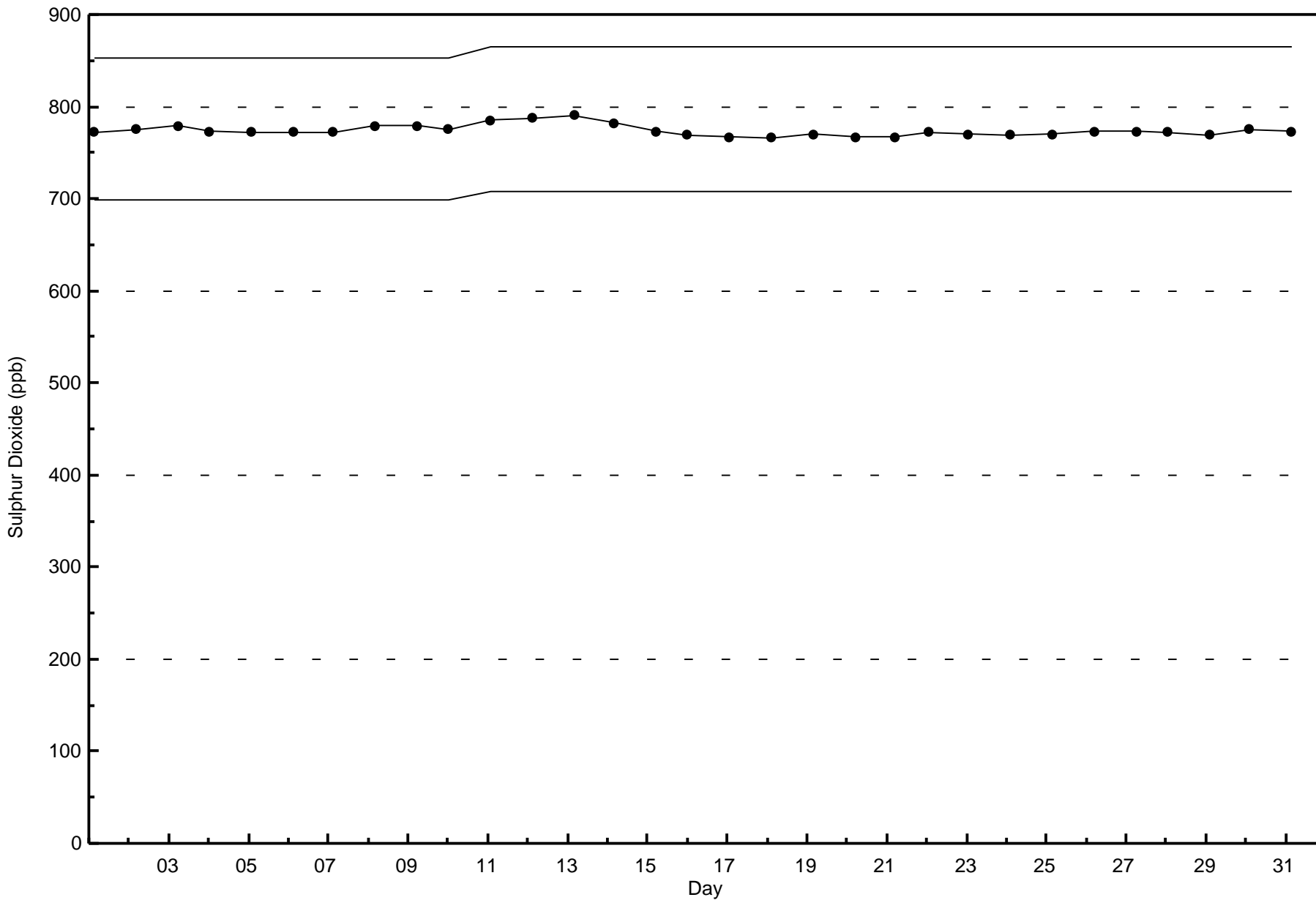


**Wood Buffalo Environmental Association**  
**Wind Rose Oct 2017**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort McKay - Bertha Ganter (AMS 1)**









Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb  
Fort McKay - Bertha Ganter - October 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 2 ppb on Oct 21 15:00	Maximum Daily Average: 0.8 ppb on Oct 21		Hours of Data:	707
Minimum Value: 0 ppb on Oct 10 08:00	Minimum Daily Average: 0.3 ppb on Oct 7		Hours of Missing Data:	37
Maximum Diurnal Average: 0.5 ppb at hour 11	Minimum Diurnal Average: 0.3 ppb at hour 20		Hours of Calibration:	36
Monthly Average: 0.4 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 1		Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
2-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0.3	0
3-Oct	0	0	0	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
4-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0.5	1
5-Oct	1	1	1	Z	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.5	1
6-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
7-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
8-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
9-Oct	0	0	0	0	1	0	1	Z	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1
10-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
11-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
12-Oct	0	0	0	0	Z	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
13-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
14-Oct	0	0	0	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
15-Oct	0	0	0	0	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.5	1
16-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
17-Oct	0	0	1	Z	1	1	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.6	1
18-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
19-Oct	0	0	0	0	0	Z	0	1	1	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0.4	1
20-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0.4	1
21-Oct	0	0	0	0	0	0	0	Z	0	0	0	1	1	1	2	2	1	1	1	1	1	1	1	1	0.8	2
22-Oct	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	0.7	1
23-Oct	1	1	0	Z	0	0	0	0	0	C	C	0	0	0	0	0	0	0	0	0	0	0	1	1	0.4	1
24-Oct	1	1	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
25-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
26-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
27-Oct	0	0	0	0	0	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
28-Oct	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
29-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
30-Oct	0	0	0	0	Z	0	0	0	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
31-Oct	0	0	0	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1

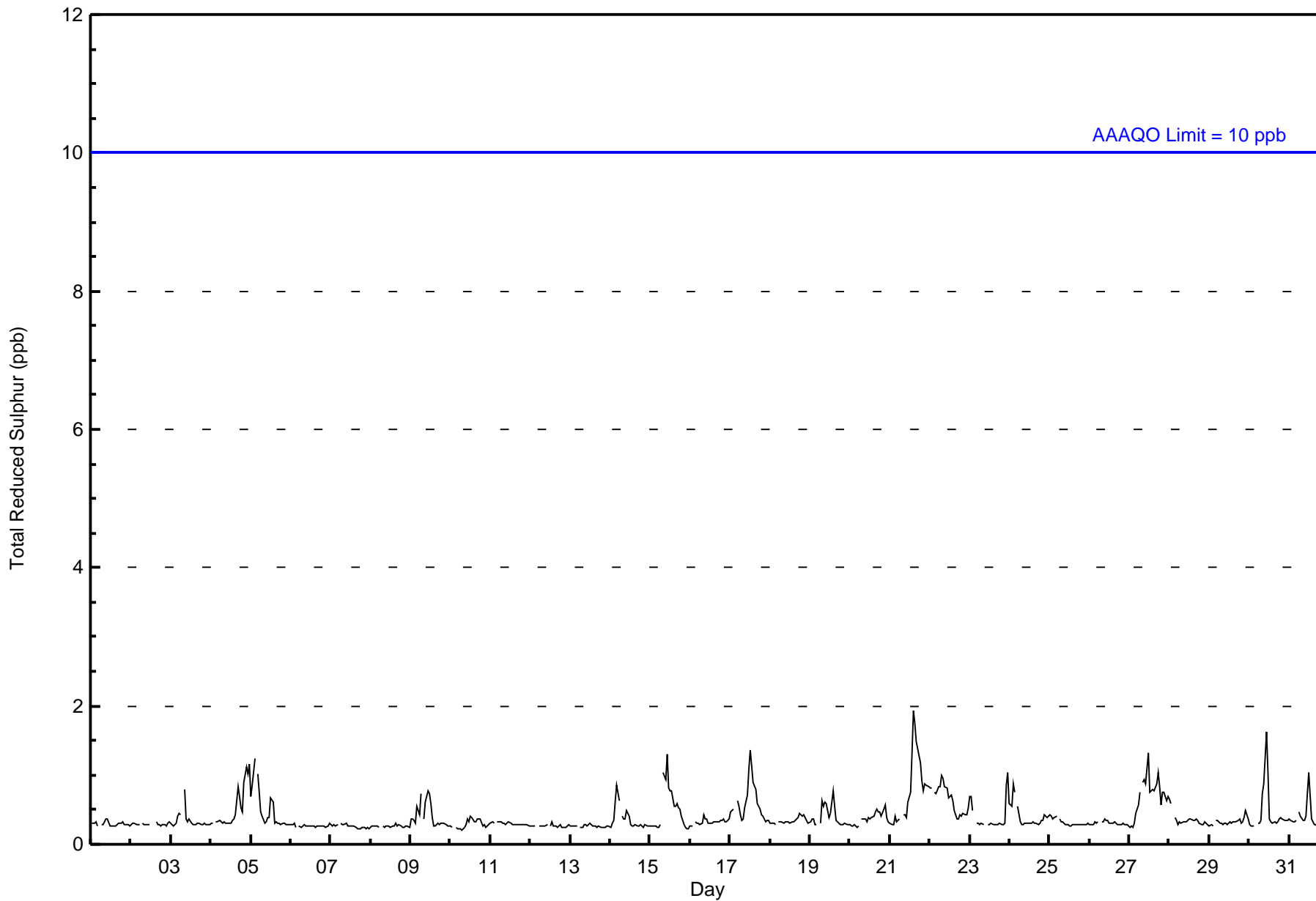
0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.3	0.4	0.4	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.4	Diurnal Average
1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	2	1	1	1	1	1	1	1	1	1	Diurnal Maximum

Z - zerospan      C - Calibration      M - Maintenance  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb      24-hr 3 ppb



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Total Reduced Sulphur (TRS) - ppb**  
**Fort McKay - Bertha Ganter - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb  
Fort McKay - Bertha Ganter - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	707	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Fort McKay - Bertha Ganter - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	93	20	6	6	6	5	11	53	102	45	37	40	50	60	78	72	684
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	93	20	6	6	6	5	11	53	102	45	37	40	50	60	78	72	684

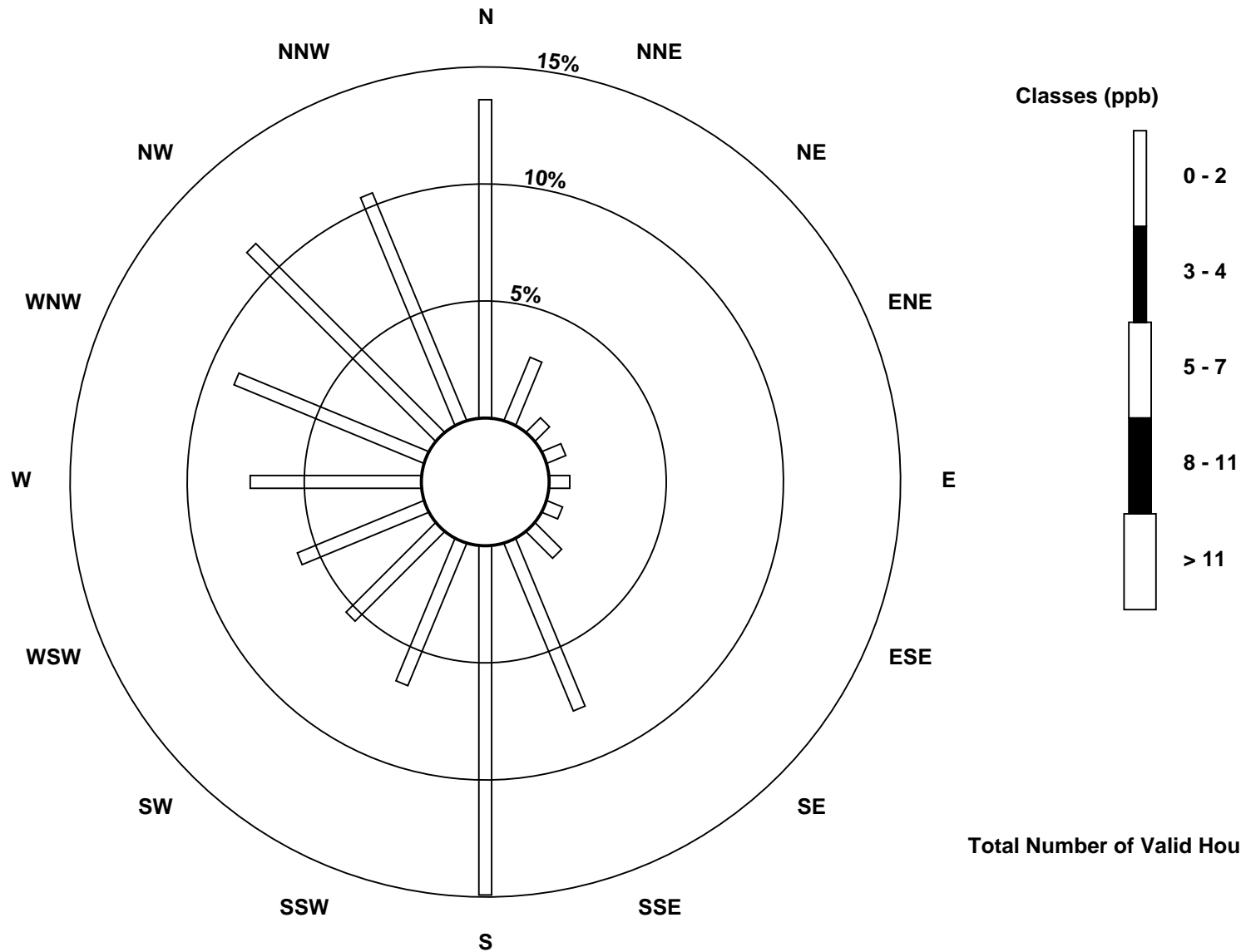
Total Number of Valid Hours: 684

Total Number of Hours: 744

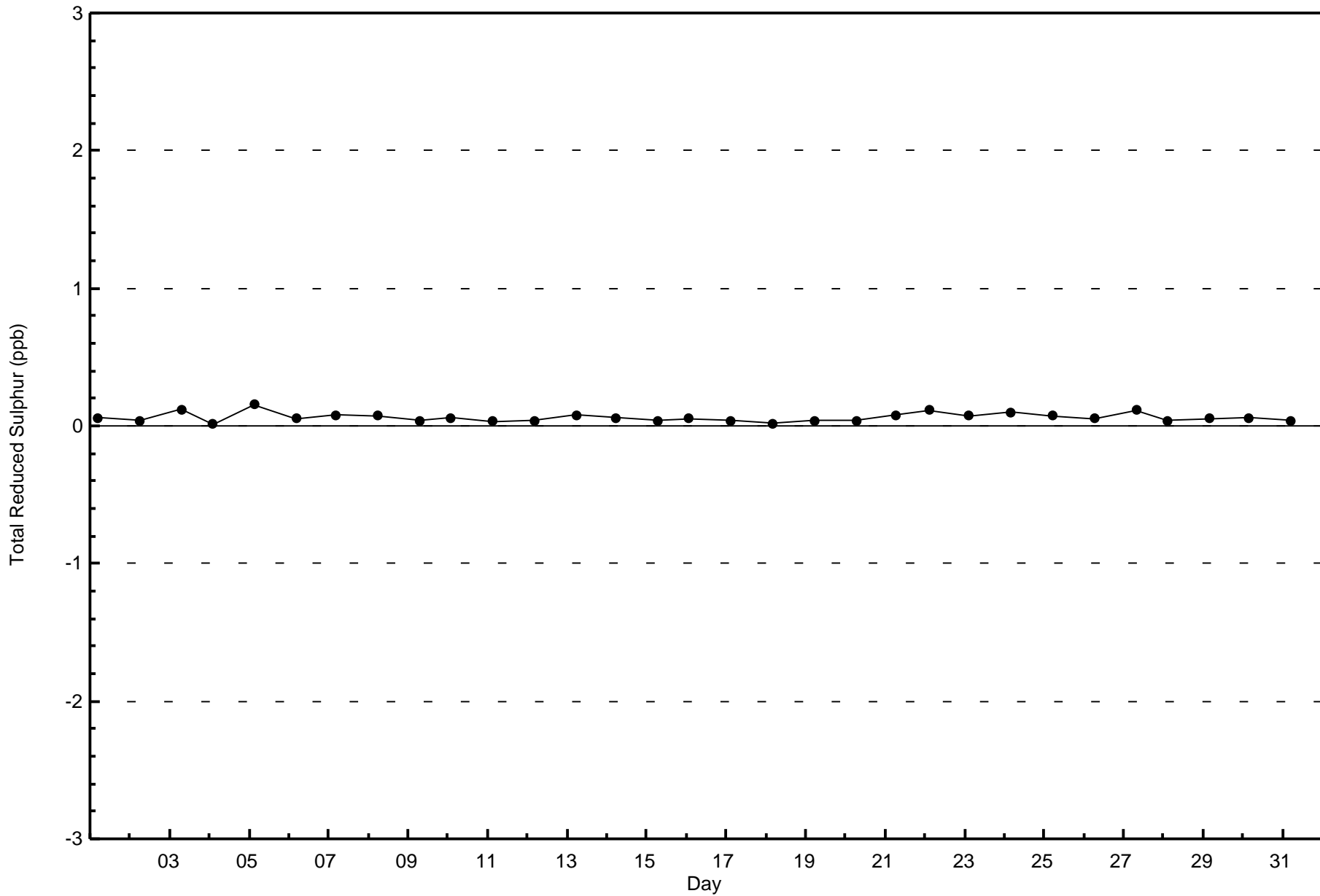


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Total Reduced Sulphur (TRS) - ppb  
Fort McKay - Bertha Ganter (AMS 1)







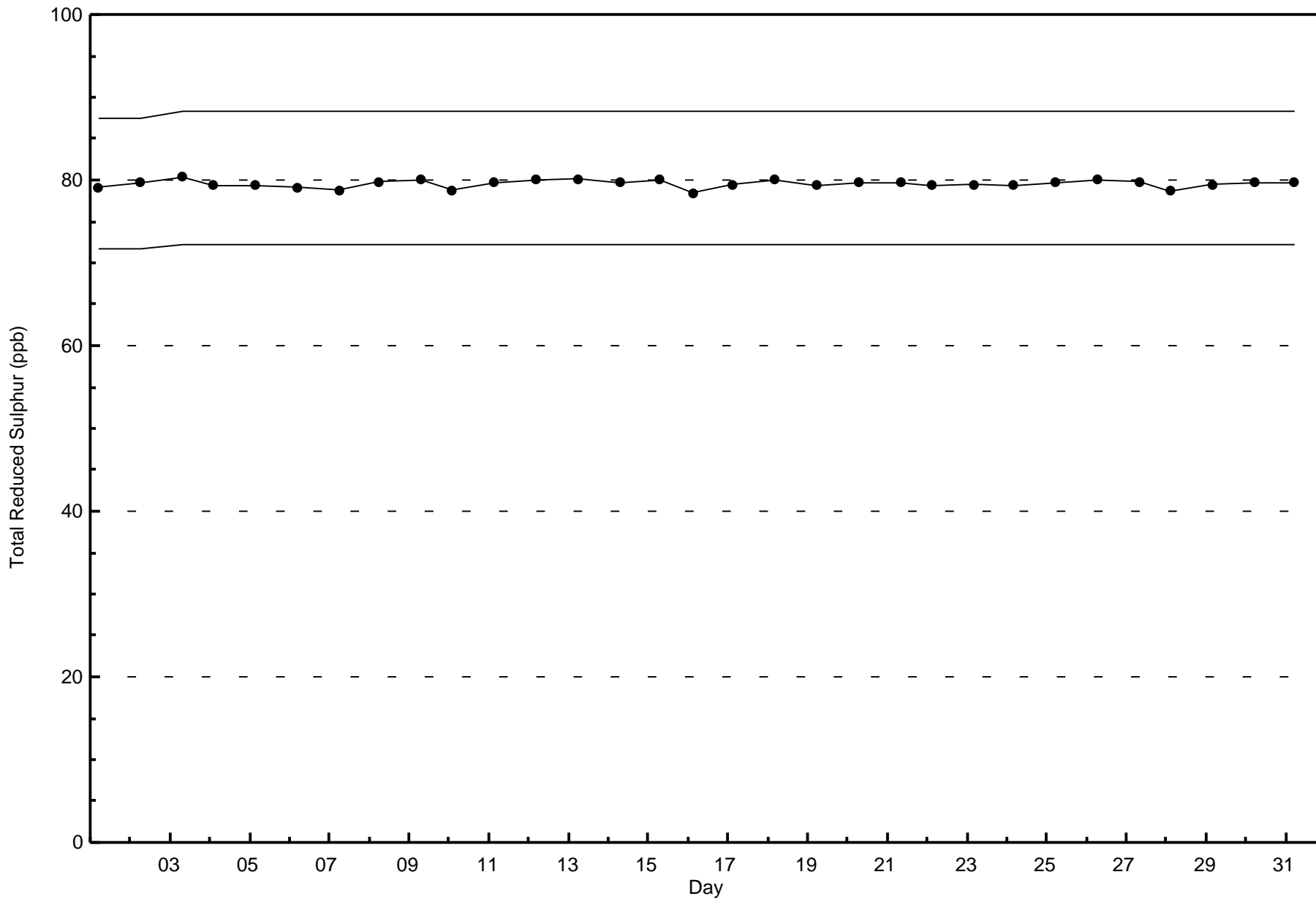


Wood Buffalo Environmental Association

Span Responses

Total Reduced Sulphur (TRS) - ppb

Fort McKay - Bertha Ganter - October 2017





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Total Hydrocarbons (THC) - ppm**

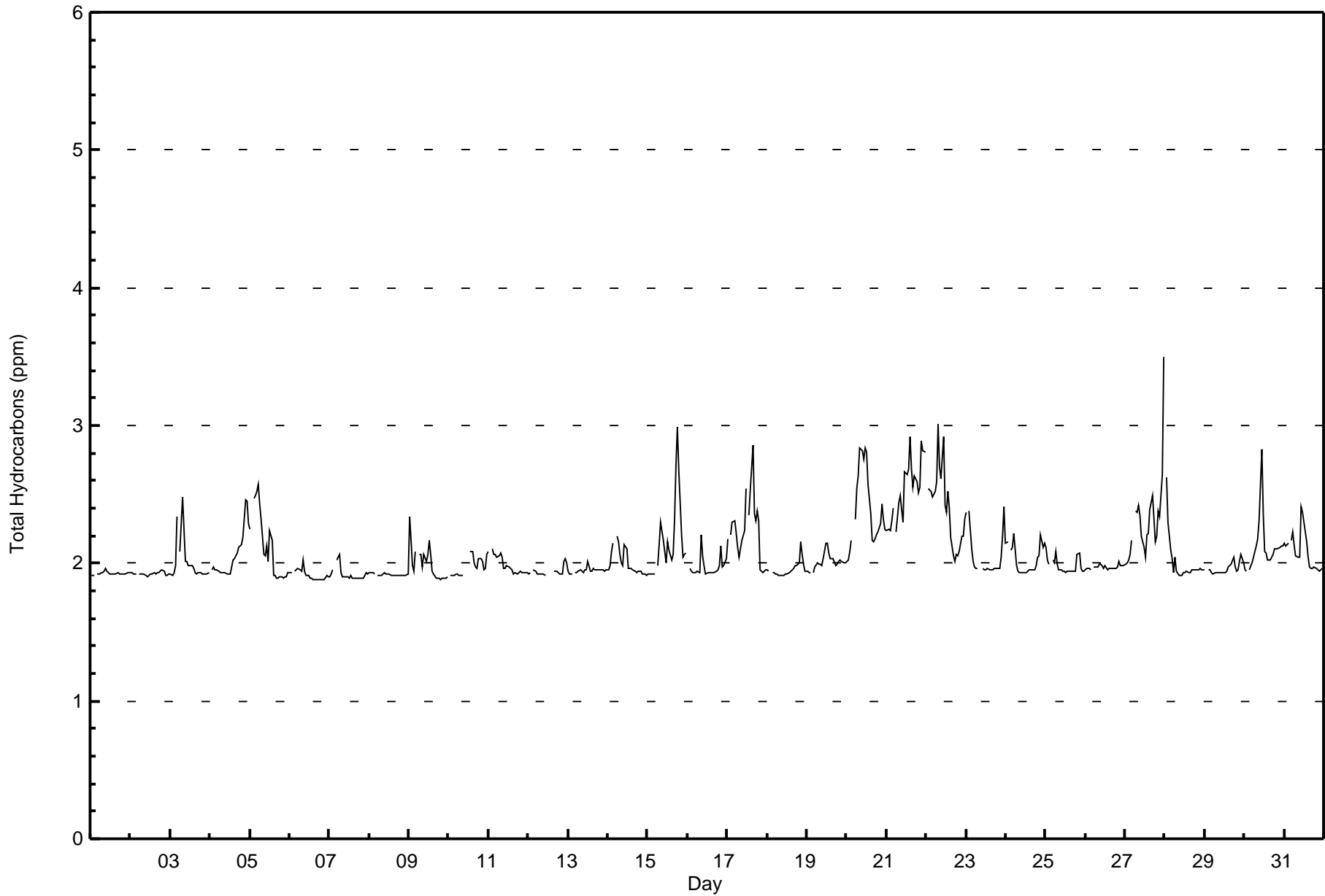
**Fort McKay - Bertha Ganter - October 2017**

Maximum Value: 3.5 ppm on Oct 28 00:00      Maximum Daily Average: 2.5 ppm on Oct 21																							Hours in Service: 744																										
Minimum Value: 1.9 ppm on Oct 6 19:00      Minimum Daily Average: 1.9 ppm on Oct 6																							Hours of Data: 703																										
Maximum Diurnal Average: 2.1 ppm at hour 11      Minimum Diurnal Average: 2.0 ppm at hour 17																							Hours of Missing Data: 41																										
Monthly Average: 2.06 ppm      Percentiles: $P_1 = 1.9$ $P_{10} = 1.9$ $Q_1 = 1.9$ Median = 2.0 $Q_3 = 2.1$ $P_{90} = 2.4$ $P_{99} = 2.8$																							Hours of Calibration: 37																										
																							Percent Operational Time: 99.5																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0																					
2-Oct	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0																			
3-Oct	1.9	1.9	1.9	2.0	2.3	Z	2.1	2.5	2.3	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.5																				
4-Oct	Z	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.5	2.4	2.3	2.0	2.0	2.0	2.0	2.5																				
5-Oct	2.3	Z	2.5	2.5	2.5	2.6	2.4	2.3	2.1	2.0	2.1	2.0	2.2	2.2	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.6																			
6-Oct	1.9	1.9	Z	1.9	1.9	2.0	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0																			
7-Oct	1.9	1.9	1.9	Z	2.0	2.0	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1																			
8-Oct	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0																		
9-Oct	2.3	2.2	2.0	1.9	2.1	Z	2.1	2.1	2.0	2.1	2.0	2.1	2.2	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.3																			
10-Oct	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	C	C	C	C	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1																		
11-Oct	2.1	Z	2.1	2.1	2.1	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1																		
12-Oct	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	M	1.9	M	M	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0																		
13-Oct	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	2.0	2.0	1.9	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	2.0																		
14-Oct	2.0	2.0	2.1	2.1	Z	2.2	2.2	2.1	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.2																		
15-Oct	1.9	1.9	1.9	1.9	1.9	Z	2.0	2.1	2.3	2.2	2.1	2.0	2.2	2.1	2.0	2.1	2.3	2.7	3.0	2.7	2.2	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	3.0																		
16-Oct	Z	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.2	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.2																	
17-Oct	2.2	Z	2.2	2.3	2.3	2.2	2.1	2.0	2.1	2.2	2.2	2.5	M	2.3	2.5	2.9	2.4	2.3	2.4	2.3	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.9																		
18-Oct	2.0	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.2	2.1	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.2																		
19-Oct	1.9	1.9	1.9	Z	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1																		
20-Oct	2.0	2.0	2.1	2.2	Z	2.3	2.5	2.6	2.8	2.8	2.8	2.8	2.8	2.6	2.4	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.3	2.2	2.4	2.0	2.0	2.0	2.0	2.4	2.8																		
21-Oct	2.2	2.3	2.2	2.3	2.4	Z	2.2	2.4	2.5	2.4	2.3	2.7	2.6	2.7	2.9	2.7	2.6	2.6	2.6	2.5	2.6	2.9	2.8	2.8	2.5	2.6	2.9	2.8	2.8	2.5	2.9																		
22-Oct	Z	2.5	2.5	2.5	2.5	2.5	2.6	3.0	2.7	2.6	2.9	2.4	2.4	2.5	2.4	2.2	2.1	2.0	2.1	2.1	2.1	2.2	2.2	2.3	2.4	2.0	2.0	2.0	2.0	2.4	3.0																		
23-Oct	2.4	Z	2.4	2.1	2.0	2.0	2.0	2.0	2.0	C	C	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.4																		
24-Oct	2.1	2.2	Z	2.1	2.1	2.2	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	2.0	2.1	2.2	2.1	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.2																		
25-Oct	2.1	2.0	2.0	Z	2.0	2.0	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0																		
26-Oct	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0																	
27-Oct	2.0	2.0	2.0	2.1	2.2	Z	2.4	2.4	2.4	2.4	2.2	2.1	2.0	2.2	2.2	2.4	2.5	2.3	2.2	2.2	2.4	2.3	2.6	3.5	2.3	2.3	2.6	3.5	2.3	3.5																			
28-Oct	Z	2.6	2.3	2.1	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	2.0	1.9	2.0	1.9	2.0	2.0	1.9	2.0	1.9	2.0	2.6																		
29-Oct	2.0	Z	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1																		
30-Oct	1.9	1.9	Z	1.9	2.0	2.0	2.1	2.1	2.2	2.3	2.8	2.4	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.8																		
31-Oct	2.1	2.1	2.1	Z	2.2	2.2	2.1	2.1	2.0	2.0	2.4	2.4	2.3	2.2	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.4																	
2.0																							2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	Diurnal Average		
2.4																							2.6	2.5	2.5	2.5	2.6	2.6	3.0	2.8	2.8	2.9	2.8	2.8	2.7	2.9	2.9	2.6	2.7	3.0	2.7	2.6	2.9	2.8	3.5	Diurnal Maximum			
Z - zerospan			C - Calibration			M - Maintenance																																											



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Fort McKay - Bertha Ganter - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Fort McKay - Bertha Ganter - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	482	68.56	68.56
2.1 - 3.0	220	31.29	99.86
3.1 - 10.0	1	0.14	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Fort McKay - Bertha Ganter - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 2.0	71	11	2	6	5	2	8	24	42	34	30	37	49	48	54	58	481
2.1 - 3.0	23	8	2	0	1	2	4	30	58	12	5	0	2	14	23	14	198
3.1 - 10.0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	94	19	4	6	6	4	12	54	101	46	35	37	51	62	77	72	680

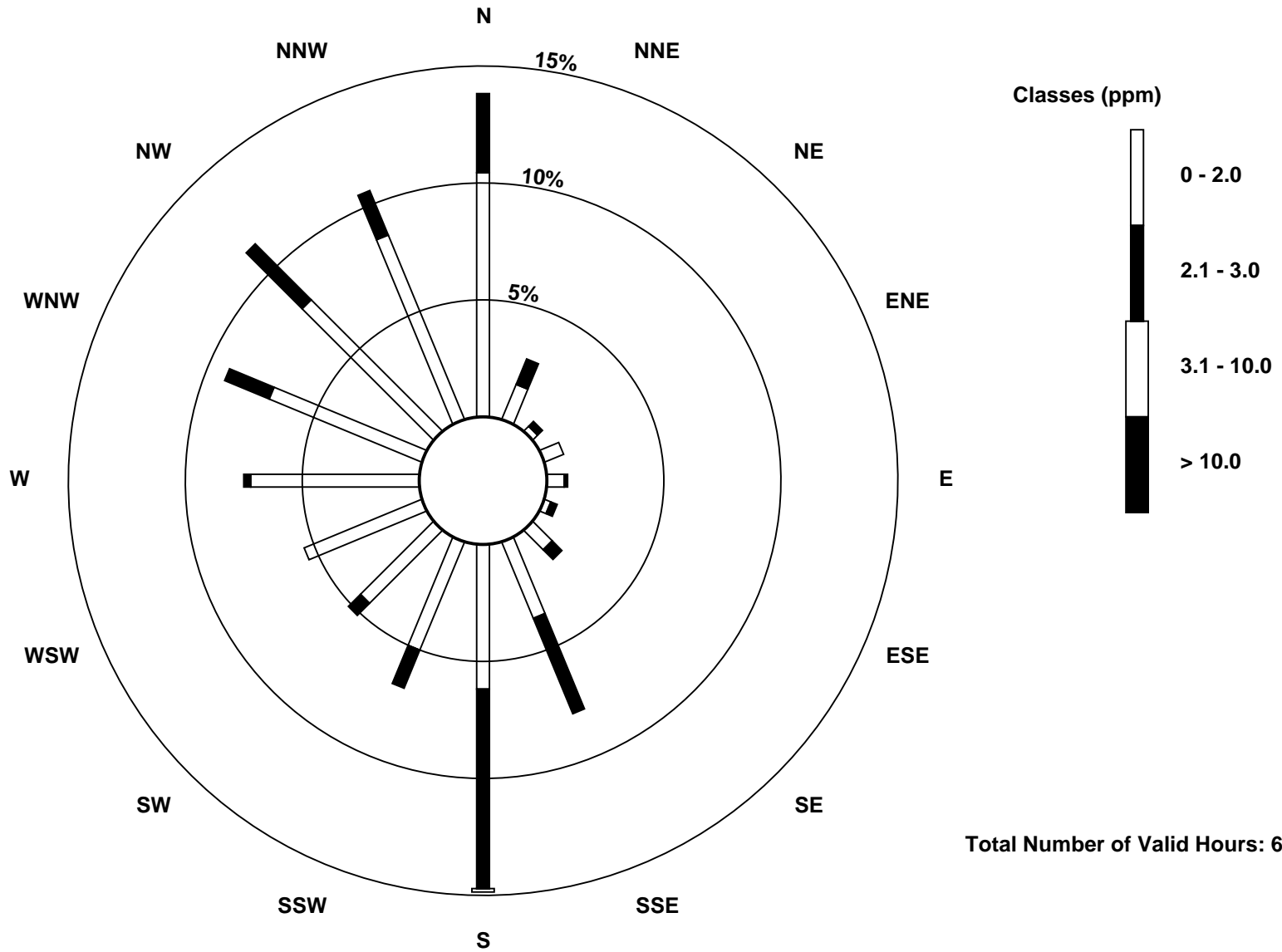
Total Number of Valid Hours: 680

Total Number of Hours: 744



Wood Buffalo Environmental Association  
 Wind Rose Oct 2017

Total Hydrocarbons (THC) - ppm  
 Fort McKay - Bertha Ganter (AMS 1)



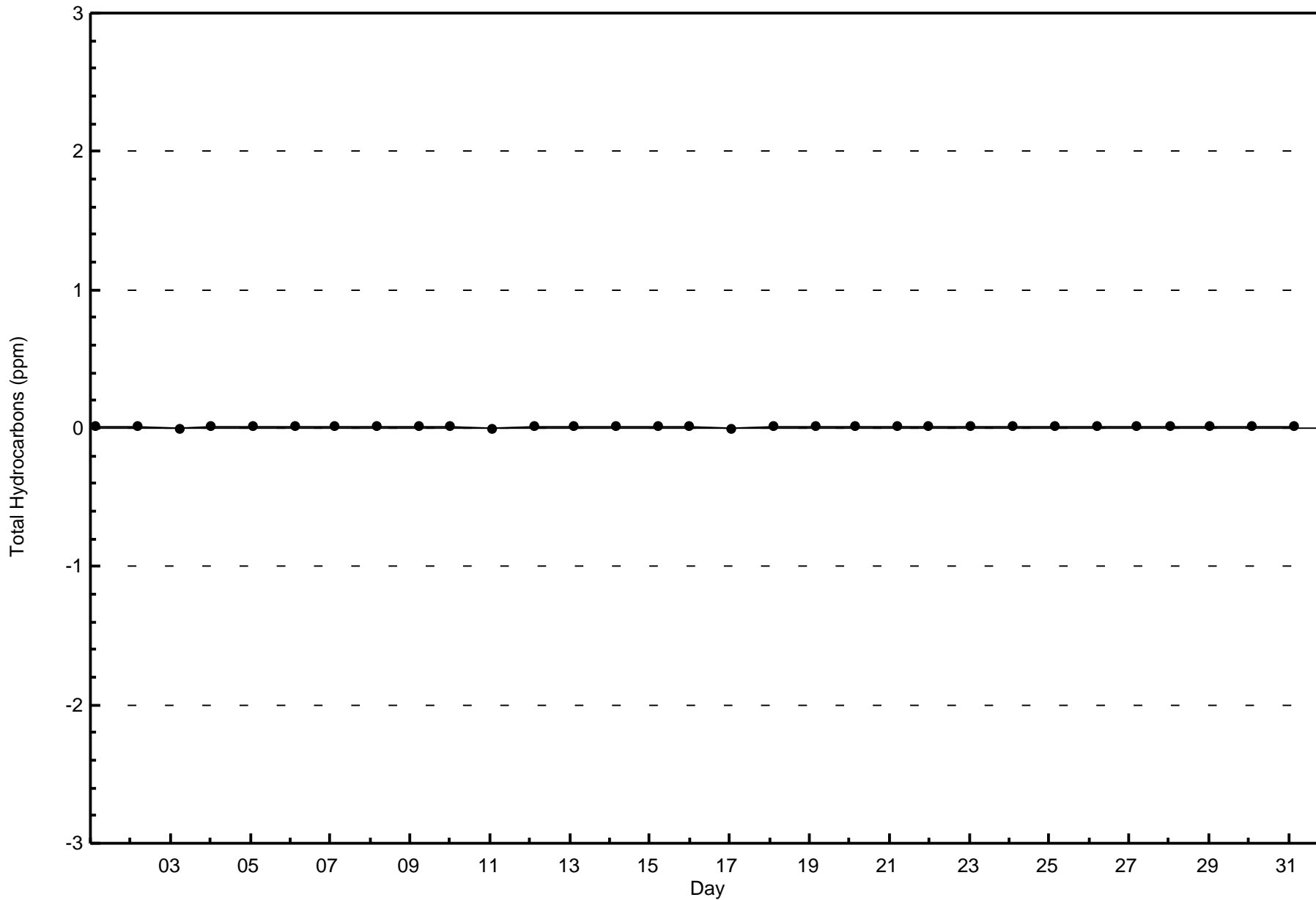


Wood Buffalo Environmental Association

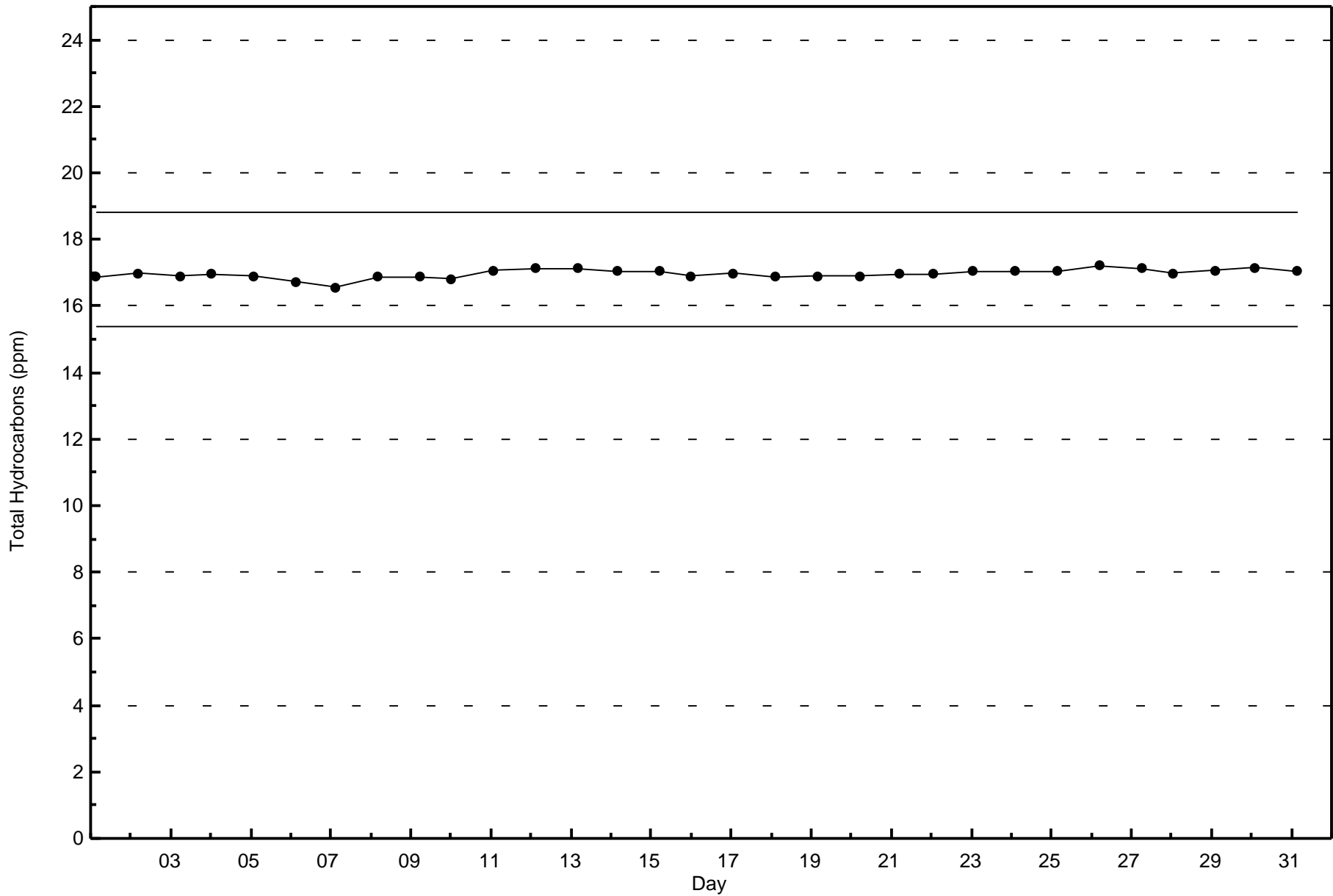
Zero Responses

Total Hydrocarbons (THC) - ppm

Fort McKay - Bertha Ganter - October 2017





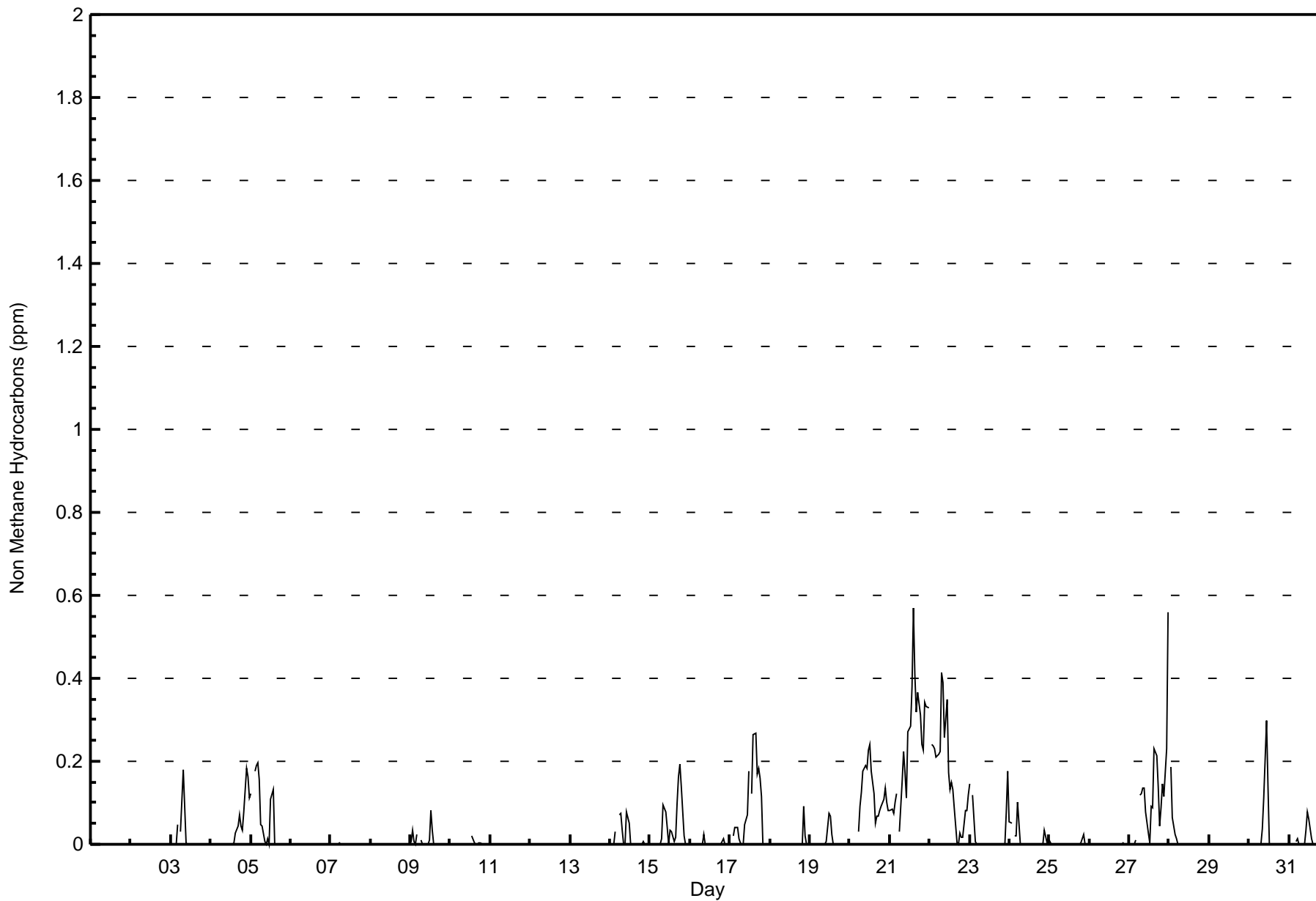






**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Fort McKay - Bertha Ganter - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm  
Fort McKay - Bertha Ganter - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.005	519	73.83	73.83
0.006 - 0.05	64	9.10	82.93
0.06 - 0.1	65	9.25	92.18
> 0.1	55	7.82	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



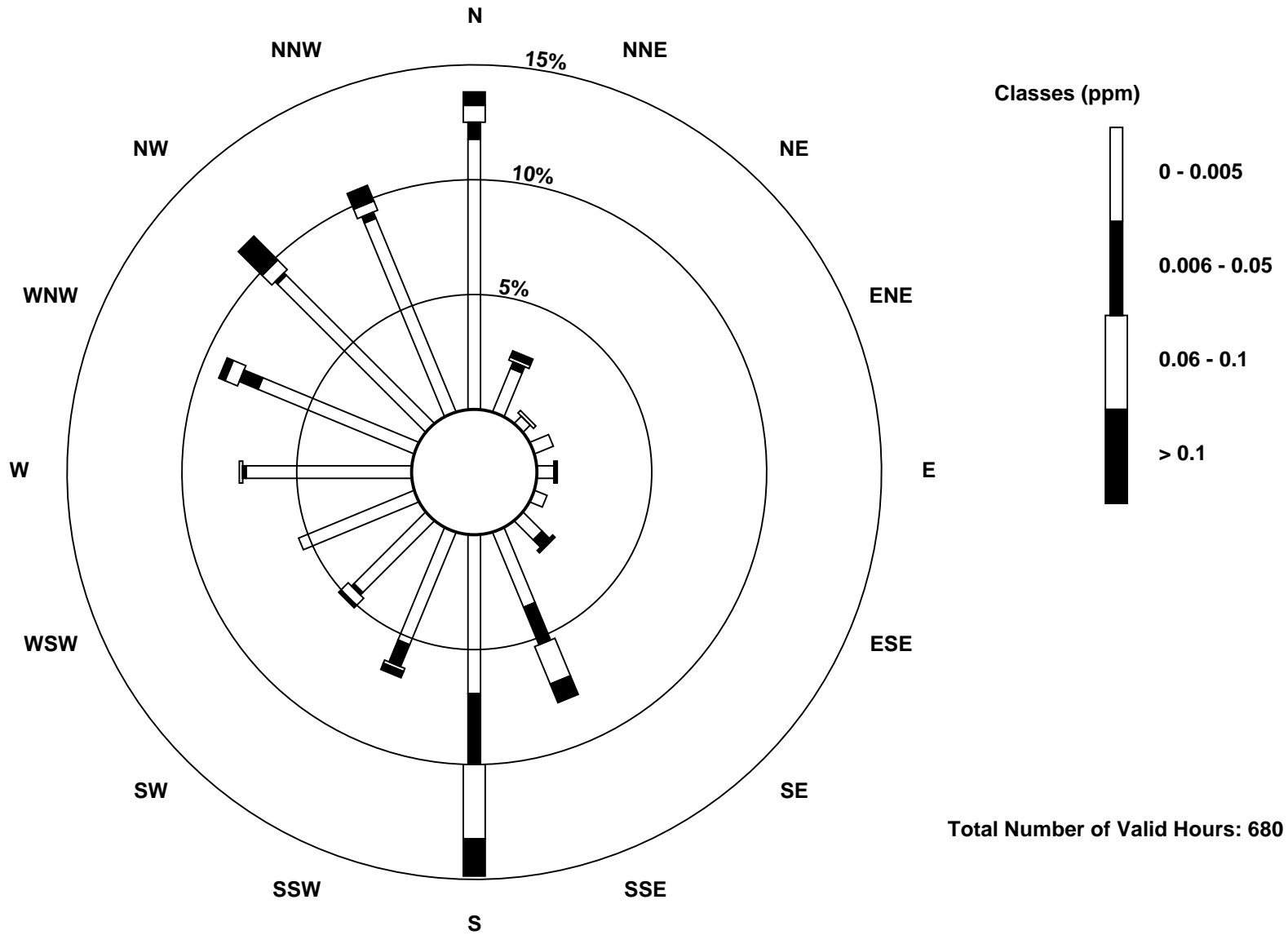
**Wood Buffalo Environmental Association  
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm  
Fort McKay - Bertha Ganter - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	80	14	3	6	5	4	8	24	47	36	30	37	49	50	62	62	517
0.006 - 0.05	5	2	0	0	0	0	3	12	21	7	1	0	1	6	1	2	61
0.06 - 0.1	5	1	1	0	0	0	0	12	22	1	3	0	1	4	4	3	57
> 0.1	4	2	0	0	1	0	1	6	11	2	1	0	0	2	10	5	45
<b>Totals</b>	94	19	4	6	6	4	12	54	101	46	35	37	51	62	77	72	680

Total Number of Valid Hours: 680

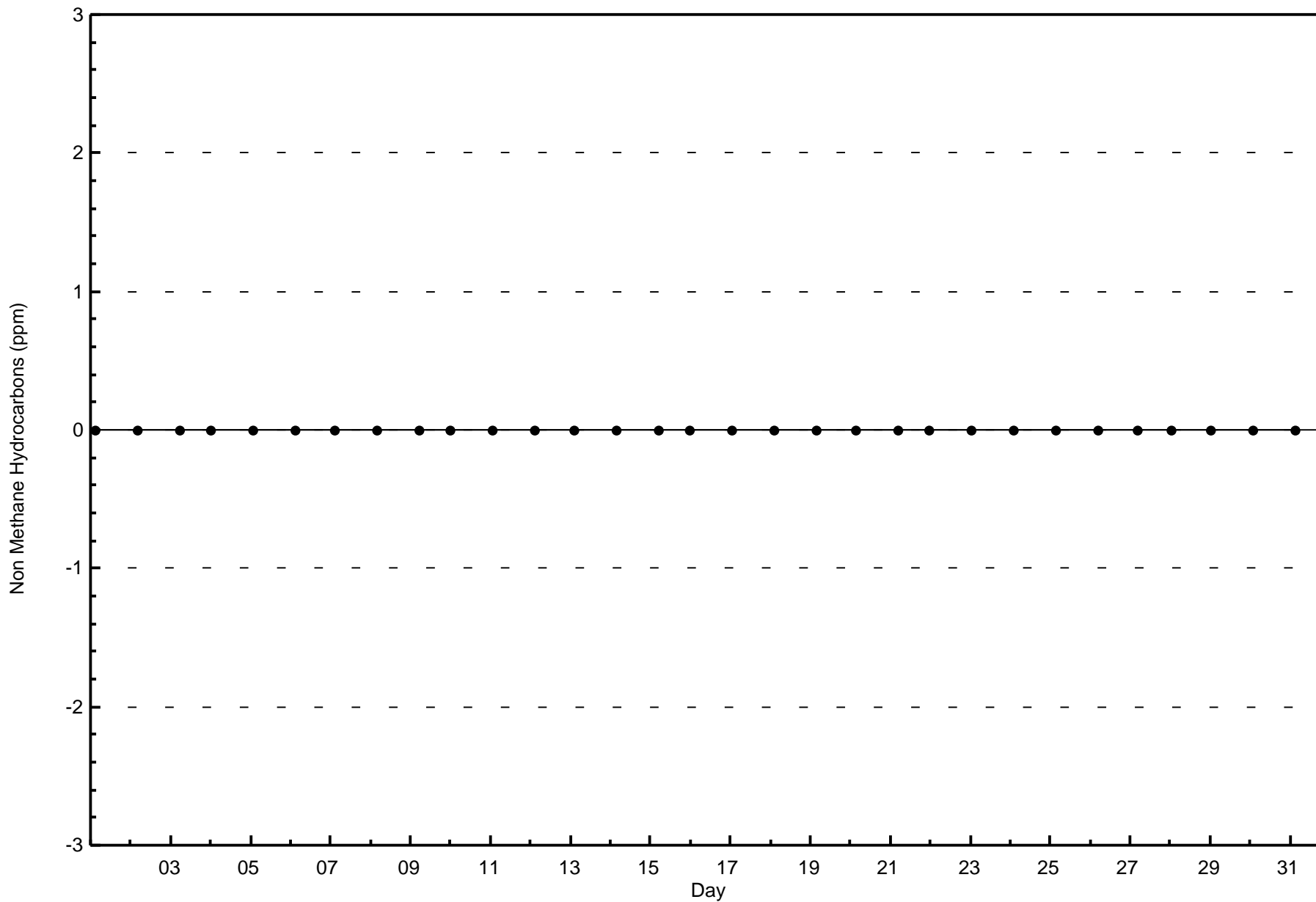
Total Number of Hours: 744

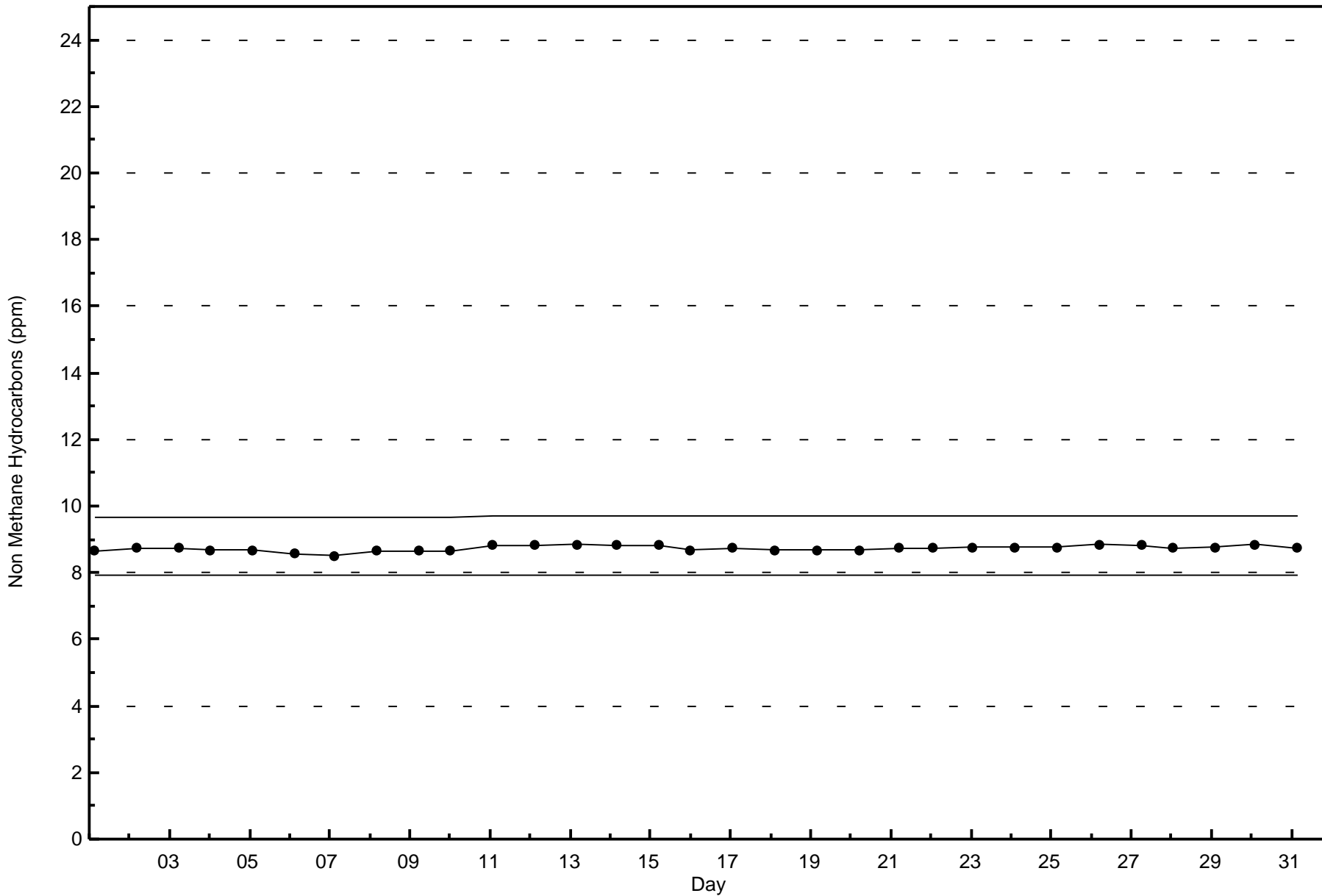




Wood Buffalo Environmental Association  
Zero Responses

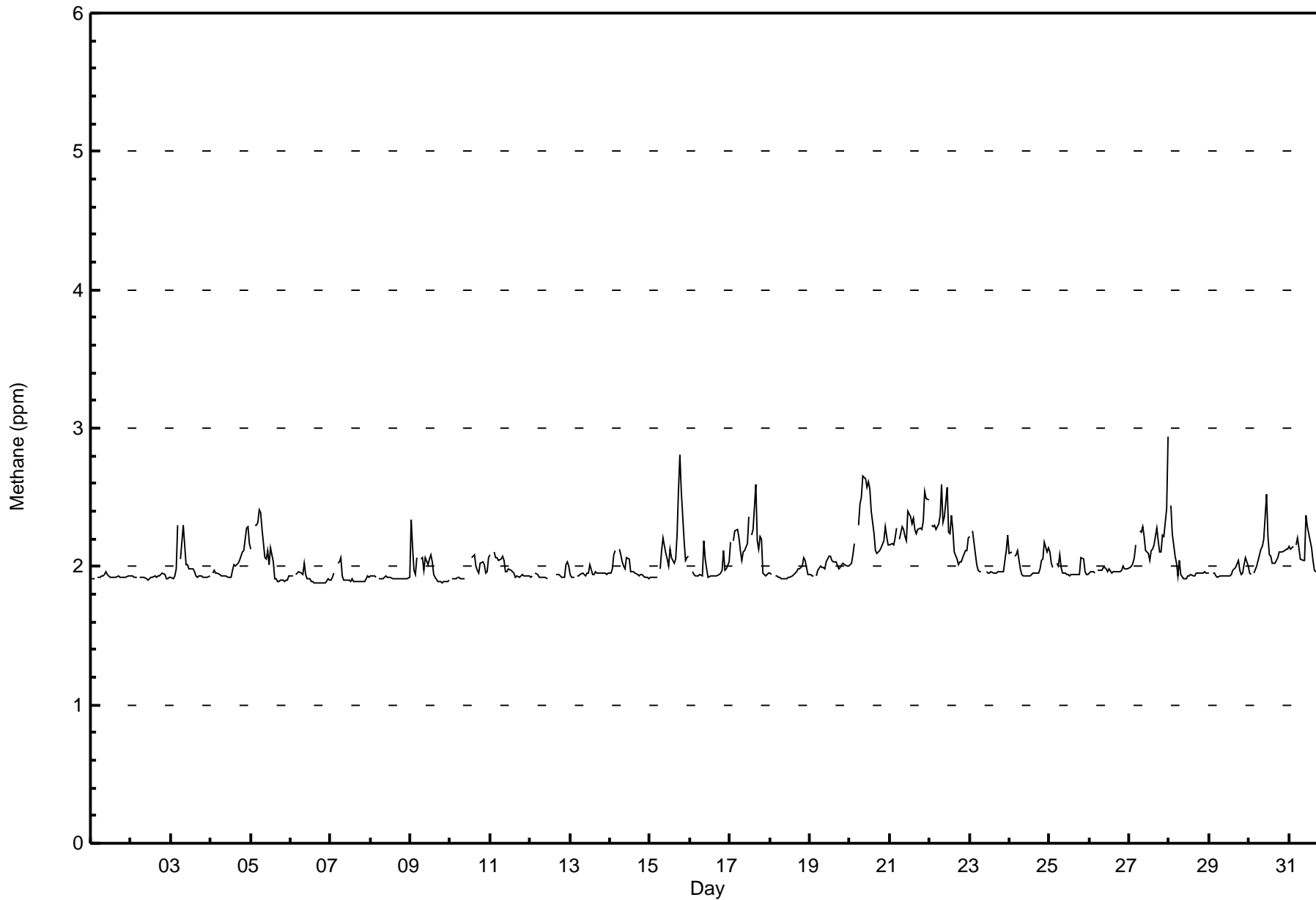
Non Methane Hydrocarbons (NMHC) - ppm  
Fort McKay - Bertha Ganter - October 2017













**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Fort McKay - Bertha Ganter - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	493	70.13	70.13
2.1 - 3.0	210	29.87	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Fort McKay - Bertha Ganter - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 2.0	71	11	2	6	5	2	8	28	45	35	30	37	49	48	54	59	490
2.1 - 3.0	23	8	2	0	1	2	4	26	56	11	5	0	2	14	23	13	190
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	94	19	4	6	6	4	12	54	101	46	35	37	51	62	77	72	680

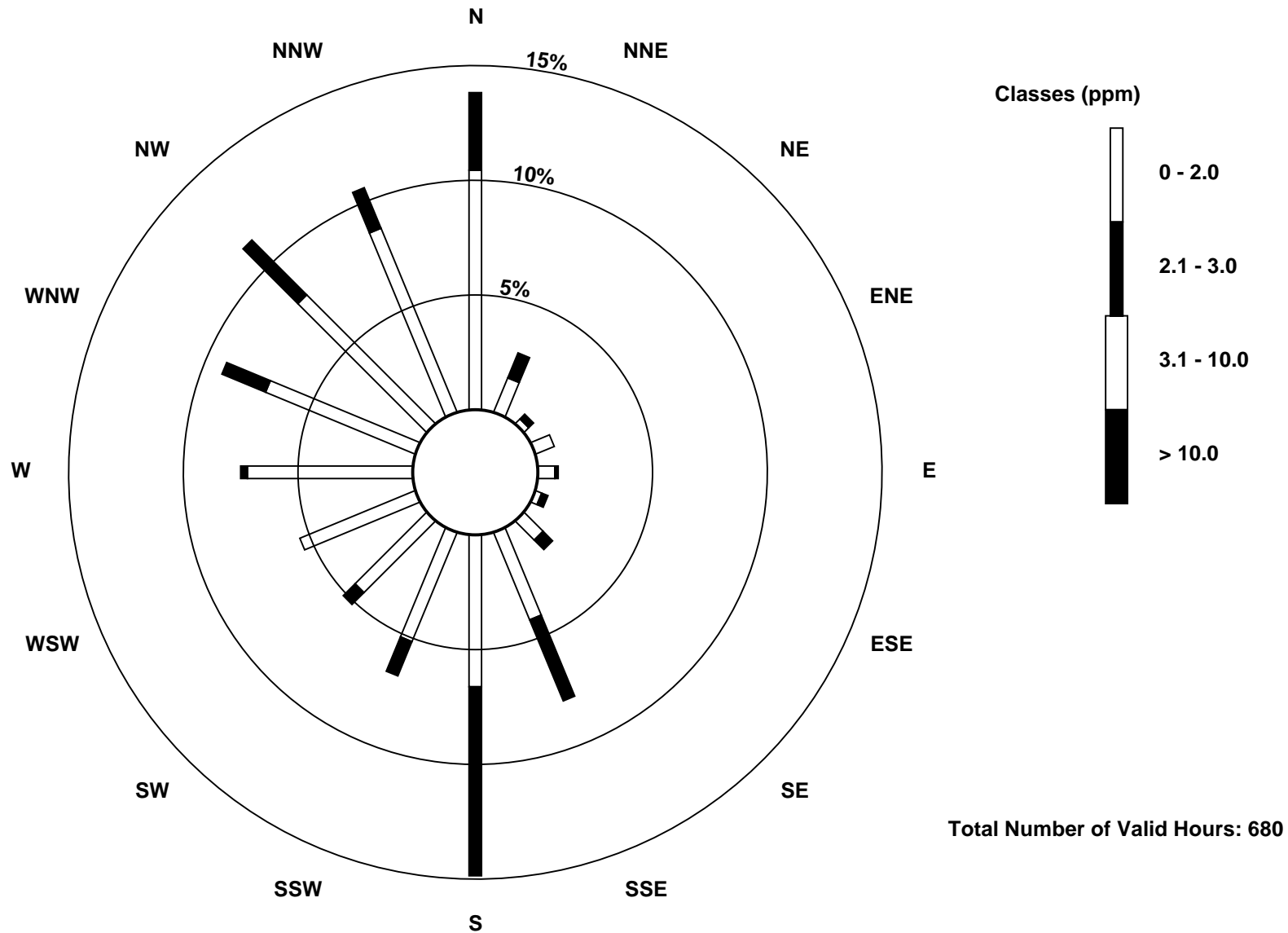
Total Number of Valid Hours: 680

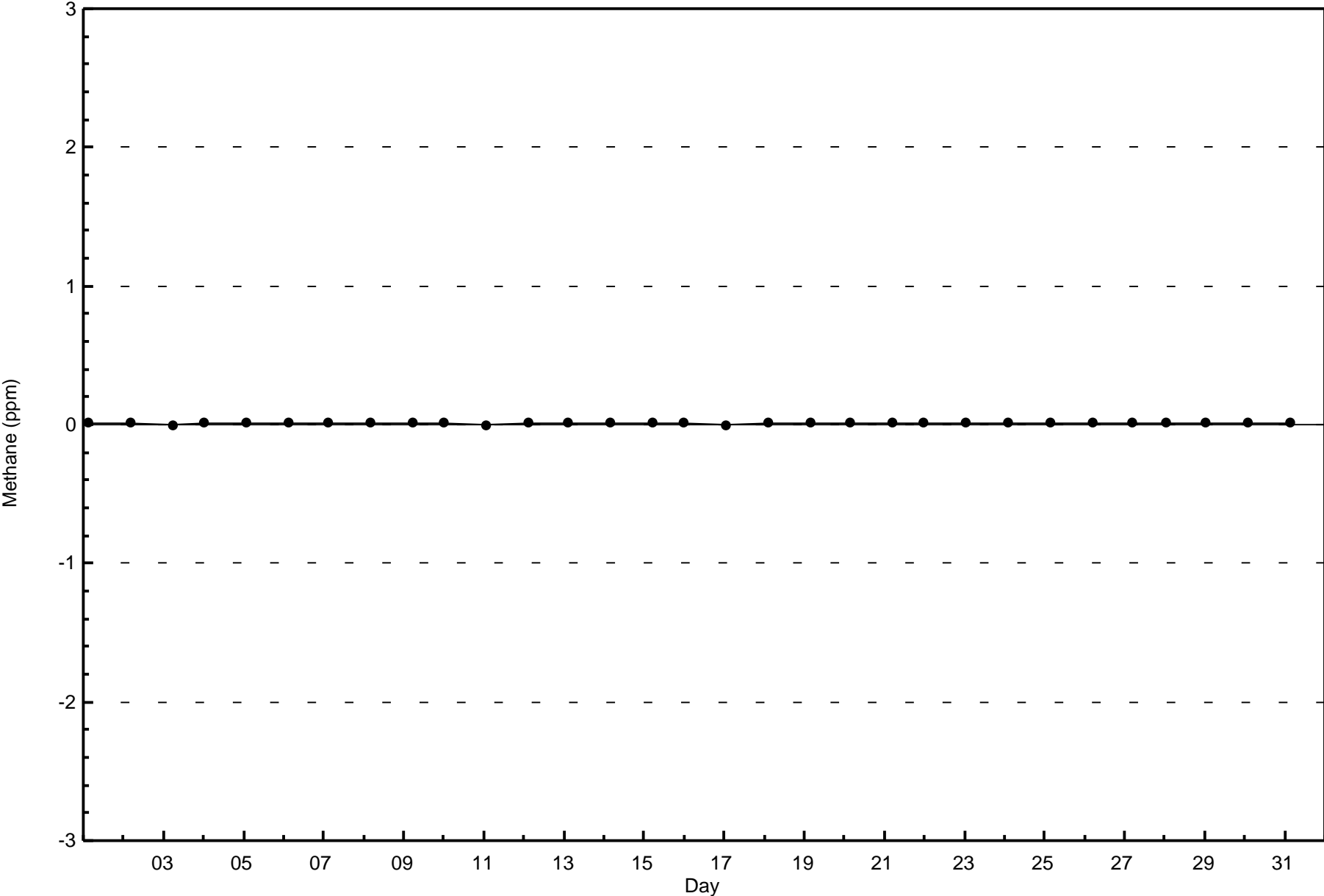
Total Number of Hours: 744

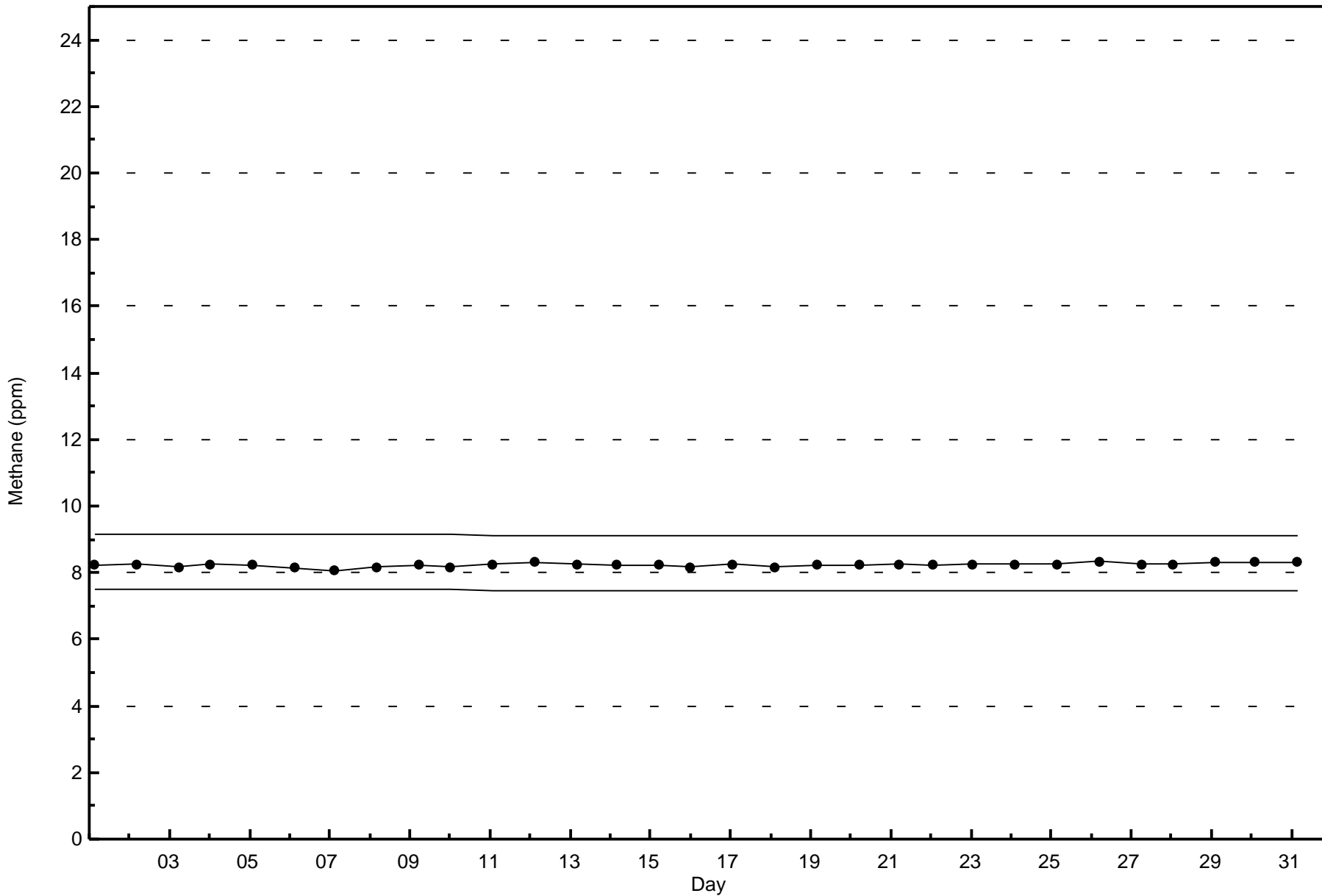


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Methane (CH<sub>4</sub>) - ppm  
Fort McKay - Bertha Ganter (AMS 1)



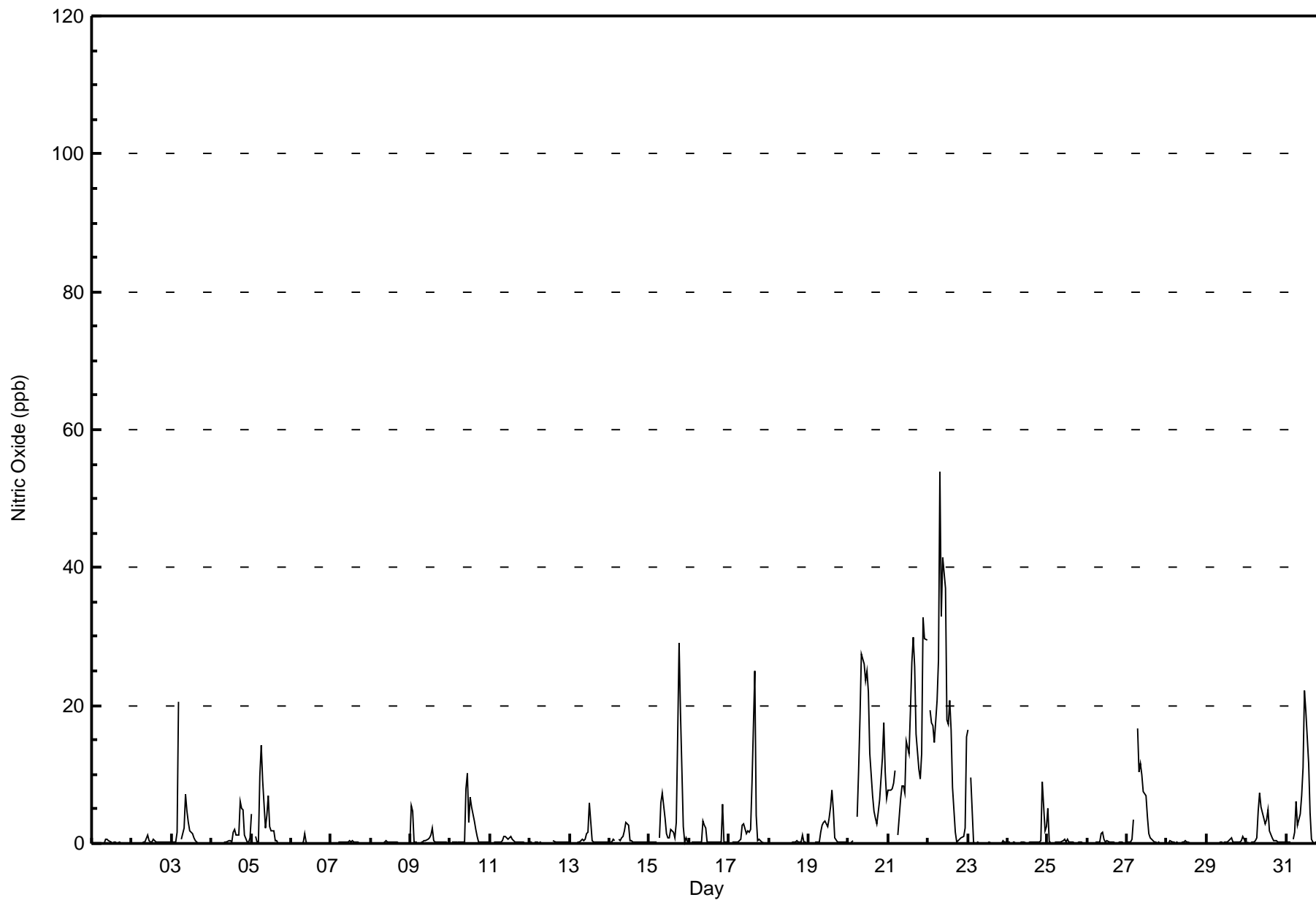






Maximum Value: 54 ppb on Oct 22 08:00																		Maximum Daily Average: 16.7 ppb on Oct 22																		Hours in Service: 744	
Minimum Value: 0 ppb on Oct 18 09:00																		Minimum Daily Average: 0.1 ppb on Oct 28																		Hours of Data: 704	
Maximum Diurnal Average: 4.7 ppb at hour 10																		Minimum Diurnal Average: 1.2 ppb at hour 4																		Hours of Missing Data: 40	
Monthly Average: 2.4 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 8 P <sub>99</sub> = 30																		Hours of Calibration: 40	
																																				Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24													
1-Oct	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1											
2-Oct	0	0	0	0	Z	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.2	1											
3-Oct	0	0	0	2	21	Z	1	2	7	5	3	2	1	1	0	0	0	0	0	0	0	0	0	2.0	21												
4-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	2	2	2	1	1	6	5	5	1	0	0	1.2	6												
5-Oct	4	Z	1	0	0	10	14	9	2	4	7	2	2	2	0	0	0	0	0	0	0	0	0	2.6	14												
6-Oct	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1												
7-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0												
8-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0												
9-Oct	5	5	0	0	0	Z	0	0	0	0	1	1	1	2	0	0	0	0	0	0	0	0	0	0.8	5												
10-Oct	Z	0	0	0	0	0	0	0	0	8	10	3	7	5	3	2	1	0	0	0	0	0	0	1.8	10												
11-Oct	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1												
12-Oct	0	0	Z	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0.1	0												
13-Oct	0	0	0	Z	0	0	0	1	0	1	1	2	6	0	0	0	0	0	0	0	0	0	0	0.6	6												
14-Oct	0	0	1	0	Z	1	0	1	1	2	3	3	0	0	0	0	0	0	0	0	0	0	0	0.6	3												
15-Oct	0	0	0	0	0	Z	1	6	7	4	1	1	1	2	2	1	3	16	29	19	2	0	1	4.2	29												
16-Oct	Z	0	0	0	0	0	0	0	3	3	2	0	0	0	0	0	0	0	0	0	6	0	0	0.7	6												
17-Oct	0	Z	0	0	0	0	0	1	3	3	1	2	2	2	9	25	4	0	1	0	0	0	0	2.4	25												
18-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	1												
19-Oct	0	0	0	Z	0	0	0	2	3	3	3	3	4	5	8	5	1	0	0	0	0	0	0	1.6	8												
20-Oct	0	0	0	0	Z	4	10	18	27	26	24	25	22	13	7	5	4	3	4	6	12	17	10	10.7	27												
21-Oct	8	8	8	9	11	Z	1	6	8	8	7	15	13	19	26	30	26	16	11	9	13	33	30	15.0	33												
22-Oct	Z	19	18	17	15	21	27	54	33	42	37	18	17	21	17	8	2	0	0	1	1	1	2	16.7	54												
23-Oct	16	Z	10	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	1.5	16												
24-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	2	2	0.7	9												
25-Oct	5	0	0	Z	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0.4	5												
26-Oct	0	0	0	0	Z	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2												
27-Oct	0	0	0	1	3	Z	17	10	12	10	8	7	4	1	1	1	0	0	0	0	0	0	0	3.3	17												
28-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0												
29-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0.2	1												
30-Oct	0	0	Z	0	0	0	1	5	7	5	4	3	3	5	2	1	0	0	0	0	0	0	0	1.7	7												
31-Oct	0	0	0	Z	1	2	6	3	4	7	11	22	19	12	4	1	0	0	0	0	0	0	0	4.0	22												
1.6 1.3 1.5 1.2 2.0 1.5 2.6 3.9 4.2 4.7 4.4 3.8 3.5 3.2 2.7 2.7 1.4 1.5 1.7 1.4 1.3 2.1 1.6 1.9																		Diurnal Average																			
16 19 18 17 21 21 27 54 33 42 37 25 22 21 26 30 26 16 29 19 13 33 30 29																		Diurnal Maximum																			
Z - zerospan		C - Calibration																																			







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb  
Fort McKay - Bertha Ganter - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	682	96.88	96.88
21 - 40	20	2.84	99.72
41 - 80	2	0.28	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Fort McKay - Bertha Ganter - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	95	17	6	6	5	4	12	53	101	45	35	37	50	60	72	68	666
21 - 40	1	2	0	0	1	0	0	1	0	1	0	0	0	1	5	3	15
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	96	19	6	6	6	4	12	54	101	46	35	37	50	61	77	71	681

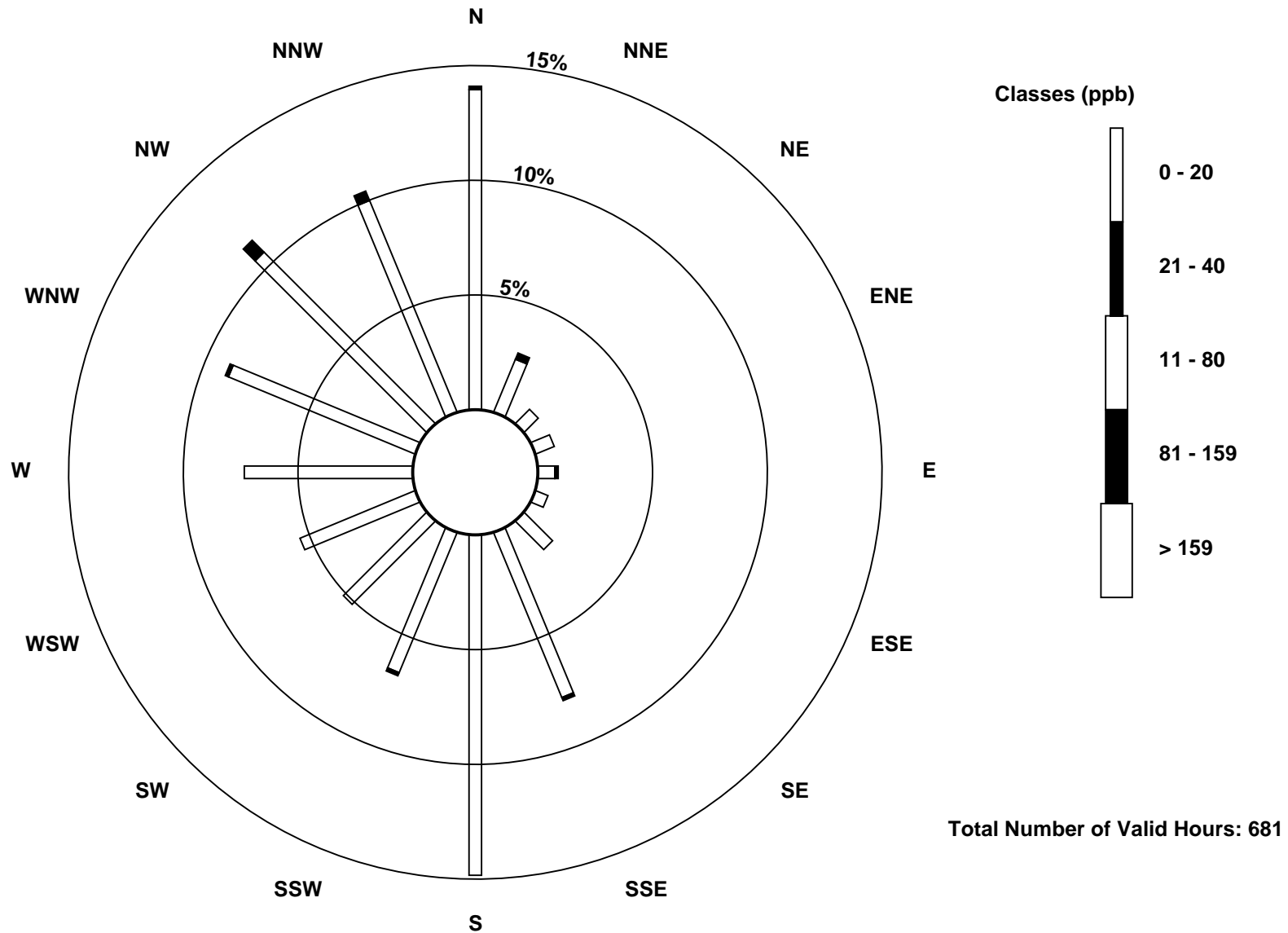
Total Number of Valid Hours: 681

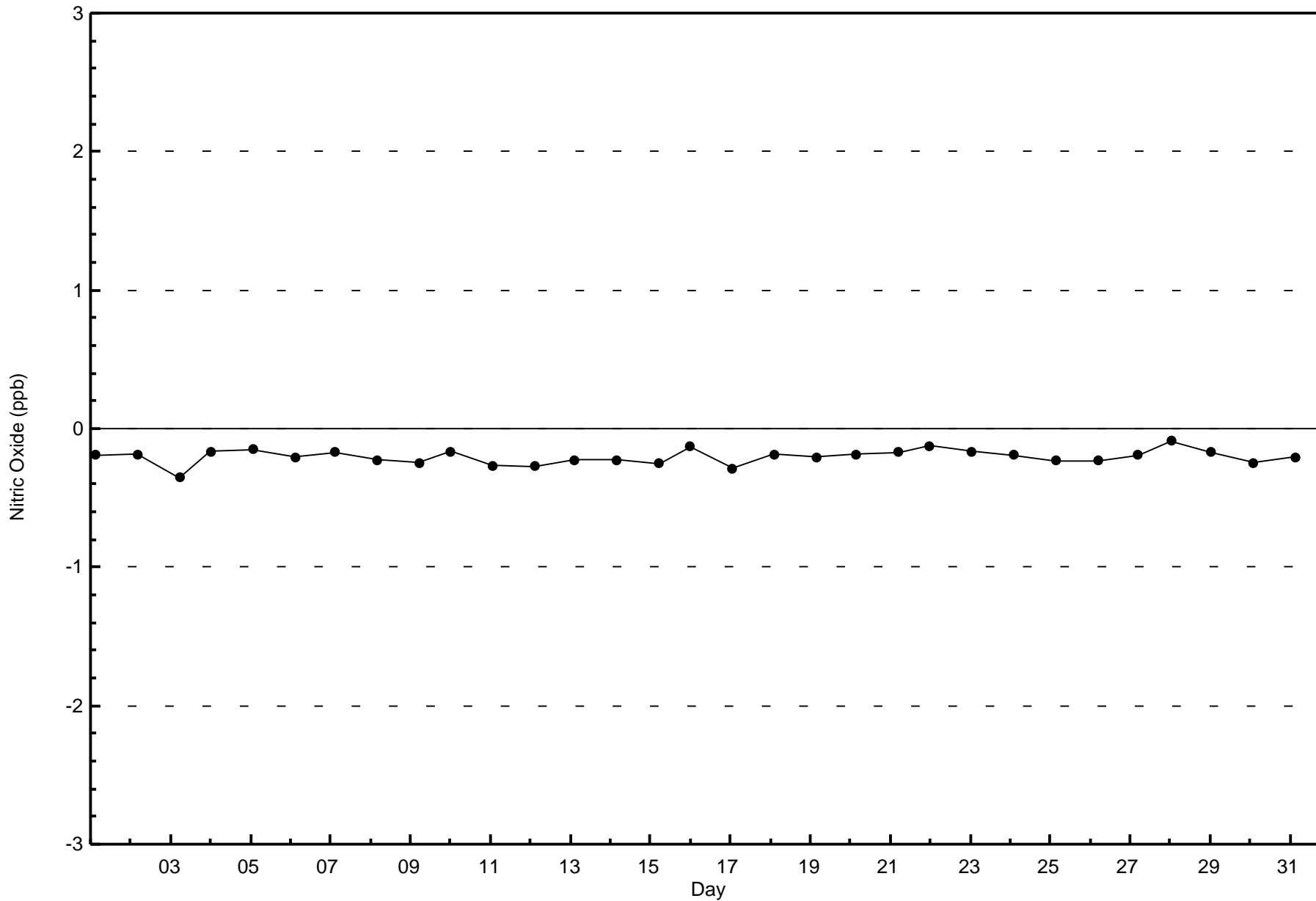
Total Number of Hours: 744

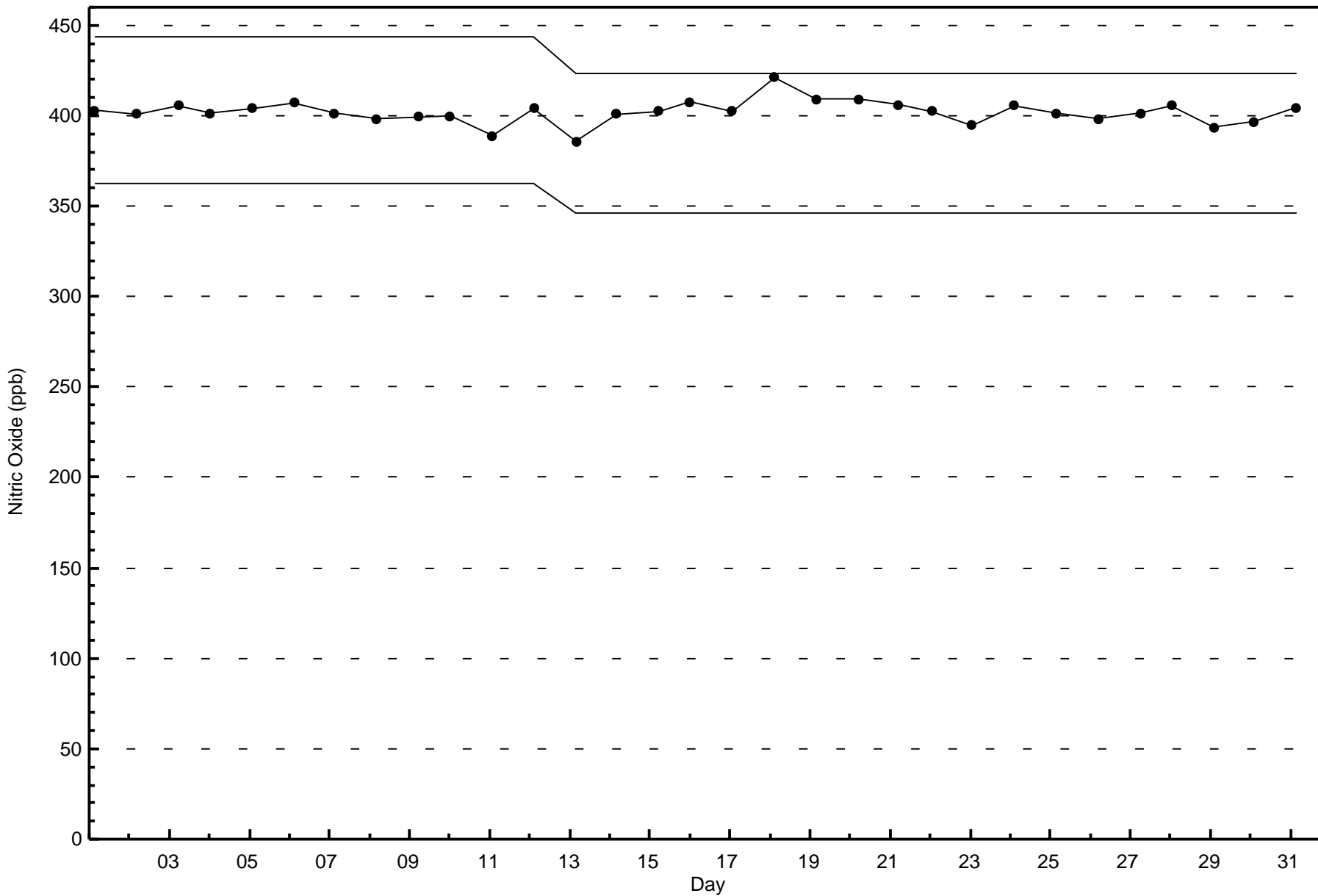


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitric Oxide (NO) - ppb  
Fort McKay - Bertha Ganter (AMS 1)









# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Nitrogen Dioxide (NO<sub>2</sub>) - ppb

## Fort McKay - Bertha Ganter - October 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 29 ppb on Oct 4 19:00	Maximum Daily Average: 15.9 ppb on Oct 22		Hours of Data:	704
Minimum Value: 0 ppb on Oct 1 03:00	Minimum Daily Average: 0.2 ppb on Oct 2		Hours of Missing Data:	40
Maximum Diurnal Average: 5.9 ppb at hour 7	Minimum Diurnal Average: 3.7 ppb at hour 2		Hours of Calibration:	40
Monthly Average: 4.6 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 2 Q <sub>3</sub> = 7 P <sub>90</sub> = 12 P <sub>99</sub> = 22		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	0	0	0	Z	0	0	0	0	2	1	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0.3	2	
2-Oct	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0.2	1	
3-Oct	0	0	1	8	20	Z	10	8	9	8	8	4	3	4	2	0	0	0	0	0	0	0	0	0	3.8	20	
4-Oct	Z	2	3	0	2	3	1	0	0	1	1	0	3	4	6	11	27	29	28	16	7	7	16	7.3	29		
5-Oct	24	Z	17	10	13	22	20	18	5	6	10	5	5	5	2	2	1	1	1	1	0	0	0	7.3	24		
6-Oct	1	1	Z	1	1	1	1	1	7	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.7	7		
7-Oct	1	1	1	Z	1	5	6	1	1	0	1	1	1	1	0	1	1	0	0	0	0	1	2	1	1.1	6	
8-Oct	1	1	1	1	Z	1	1	0	1	2	1	1	1	0	1	0	1	1	0	0	0	0	0	0.7	2		
9-Oct	19	22	6	2	3	Z	2	3	5	3	4	3	5	6	1	0	0	1	0	0	0	0	0	3.7	22		
10-Oct	Z	0	0	0	1	1	0	0	0	6	9	5	10	7	6	7	8	5	7	3	3	2	2	5	3.7	10	
11-Oct	6	Z	7	4	8	7	7	6	6	5	4	2	2	1	1	1	1	1	1	1	0	0	0	3.1	8		
12-Oct	0	0	Z	1	1	0	0	0	0	C	C	C	C	C	0	0	0	0	2	1	1	8	10	7	1.8	10	
13-Oct	1	0	0	Z	0	3	5	3	1	1	2	2	8	1	0	0	0	0	0	0	0	1	3	1.4	8		
14-Oct	1	4	10	9	Z	7	5	5	4	6	5	3	1	1	1	0	0	0	0	0	0	0	0	2.8	10		
15-Oct	0	0	0	0	0	Z	7	14	10	7	8	5	4	6	6	5	9	11	12	9	4	2	3	1	5.4	14	
16-Oct	Z	1	0	0	0	1	2	2	9	6	5	0	0	0	0	0	1	2	7	8	16	2	4	10	3.4	16	
17-Oct	12	Z	13	8	7	10	10	9	9	9	7	7	9	9	17	21	16	18	17	10	1	0	0	0	9.5	21	
18-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	2	10	8	8	11	8	3	1	2.3	11	
19-Oct	1	0	0	Z	1	2	4	12	6	5	5	4	6	8	12	12	6	2	3	4	4	3	2	2	4.4	12	
20-Oct	3	4	5	6	Z	6	9	10	8	8	8	9	10	12	10	8	10	11	10	7	9	8	6	6	7.9	12	
21-Oct	3	4	4	8	5	Z	10	11	12	10	9	12	12	16	22	22	22	21	20	19	18	20	20	20	13.9	22	
22-Oct	Z	19	19	18	19	19	20	22	19	22	22	17	15	17	16	12	8	7	13	12	13	13	13	13	15.9	22	
23-Oct	12	Z	11	7	2	1	2	2	C	C	C	C	0	2	0	0	1	2	1	0	1	14	10	9	4.0	14	
24-Oct	8	9	Z	8	7	5	2	0	0	0	0	0	0	0	1	1	0	4	7	10	21	16	19	5.1	21		
25-Oct	21	13	10	Z	12	9	8	6	3	1	2	0	1	0	0	0	0	1	8	7	1	0	0	0	4.5	21	
26-Oct	0	0	0	0	Z	3	9	7	12	9	3	1	2	0	1	1	1	1	1	3	7	2	0	0	2.7	12	
27-Oct	1	3	2	5	9	Z	10	10	8	7	6	6	5	4	4	5	6	6	5	4	4	5	5	4	5.3	10	
28-Oct	Z	6	9	4	2	0	5	1	0	0	0	1	0	1	0	1	1	1	1	1	1	1	1	0	1.7	9	
29-Oct	0	Z	1	2	1	1	0	0	0	0	0	0	0	1	3	4	6	16	7	4	4	13	18	8	3.9	18	
30-Oct	1	0	Z	1	7	14	17	19	15	13	12	10	9	9	5	5	5	7	10	6	6	7	6	8	8.3	19	
31-Oct	9	7	6	Z	9	9	13	12	8	7	8	12	13	6	7	3	3	3	3	3	3	1	1	1	1	6.2	13

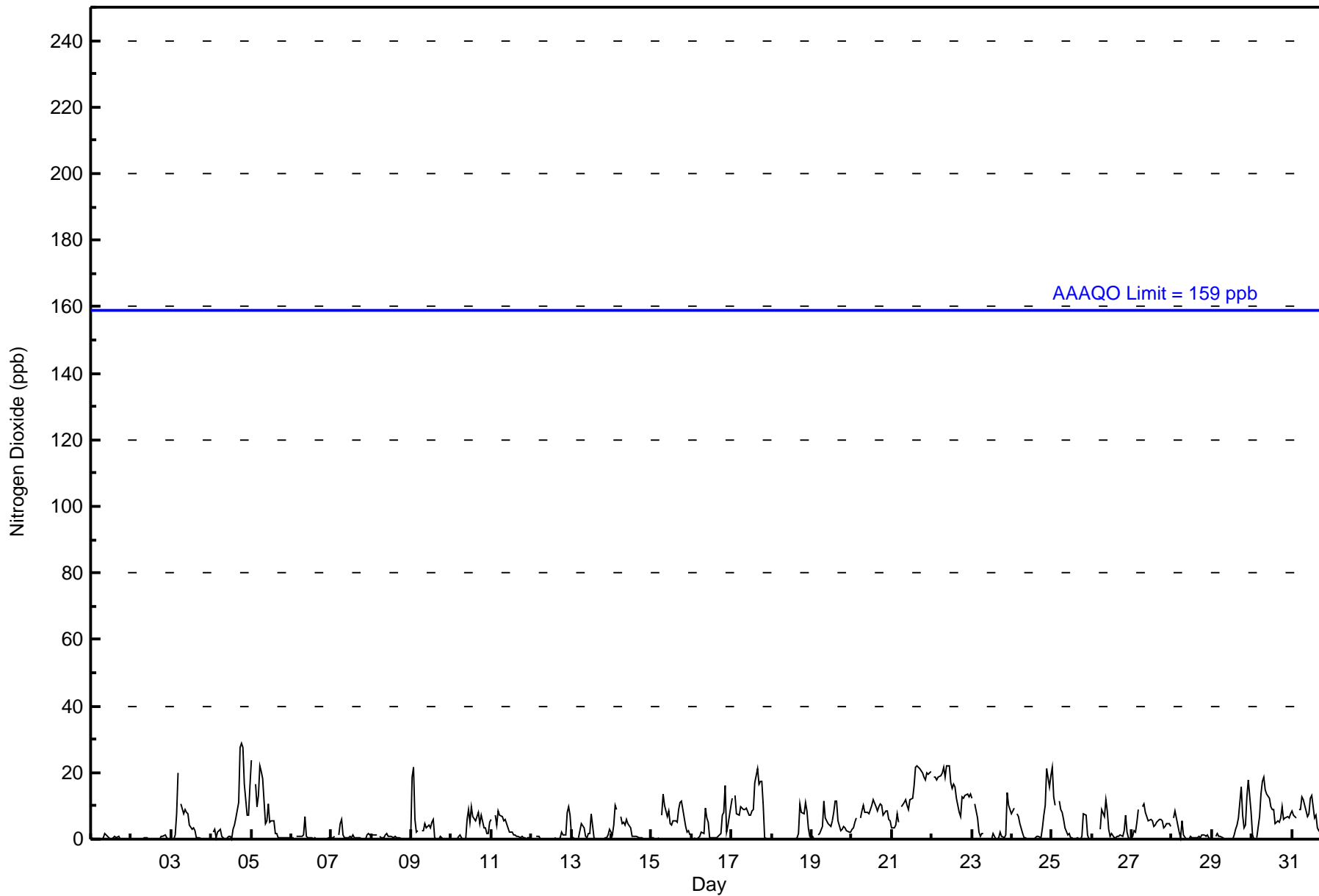
4.9	3.7	4.9	4.1	5.0	5.0	5.9	5.8	5.3	5.0	4.8	3.9	4.1	4.0	3.9	3.9	3.8	5.0	5.3	4.8	4.5	4.6	4.2	4.4	Diurnal Average
24	22	19	18	20	22	20	22	19	22	22	17	15	17	22	22	22	27	29	28	18	21	20	20	Diurnal Maximum

Z - zerospan      C - Calibration  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2017**







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay - Bertha Ganter - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	688	97.73	97.73
21 - 40	16	2.27	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay - Bertha Ganter - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	93	19	6	6	5	4	11	50	100	45	35	37	50	61	77	69	668
21 - 40	3	0	0	0	1	0	1	4	1	1	0	0	0	0	0	2	13
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	96	19	6	6	6	4	12	54	101	46	35	37	50	61	77	71	681

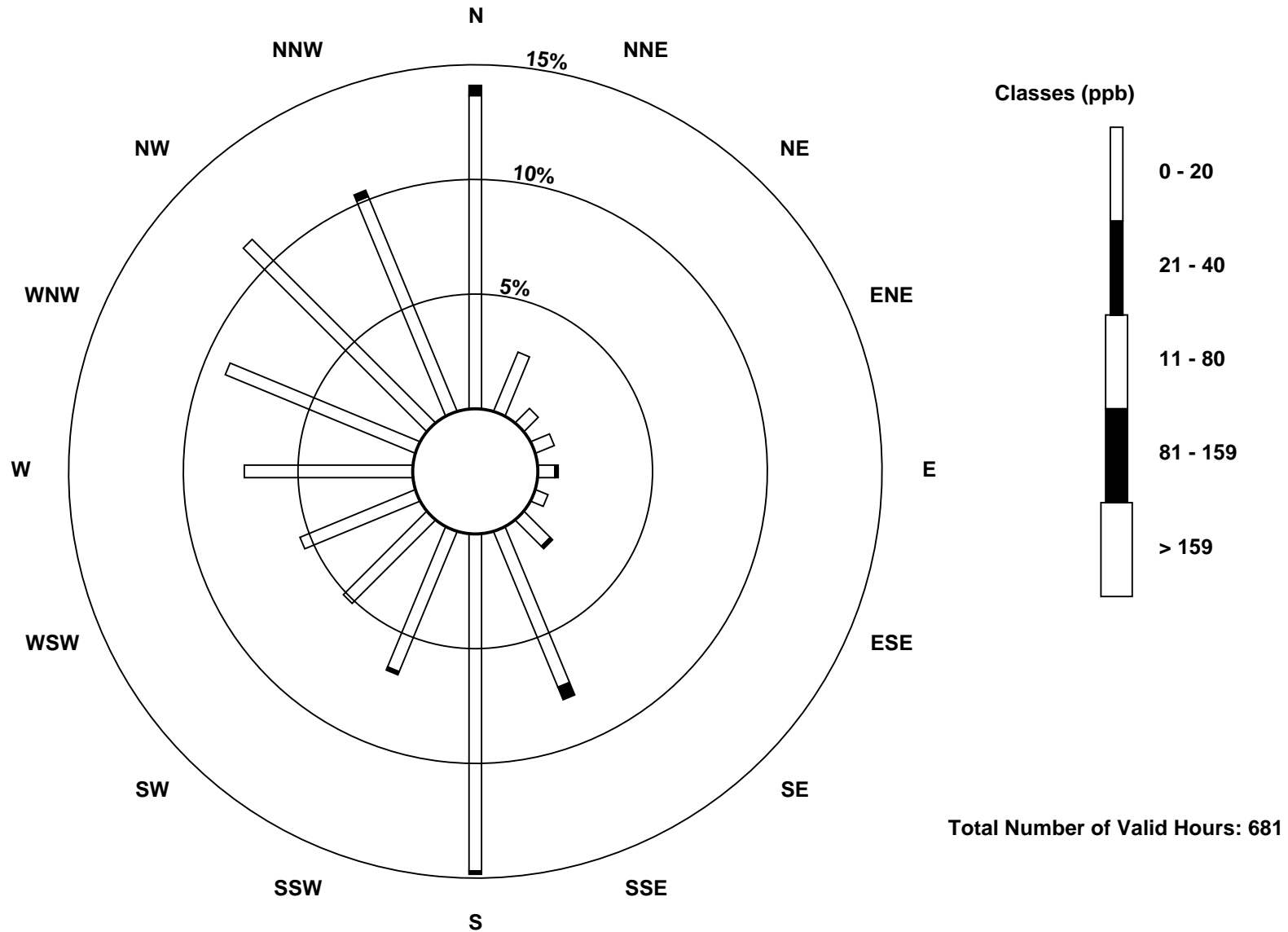
Total Number of Valid Hours: 681

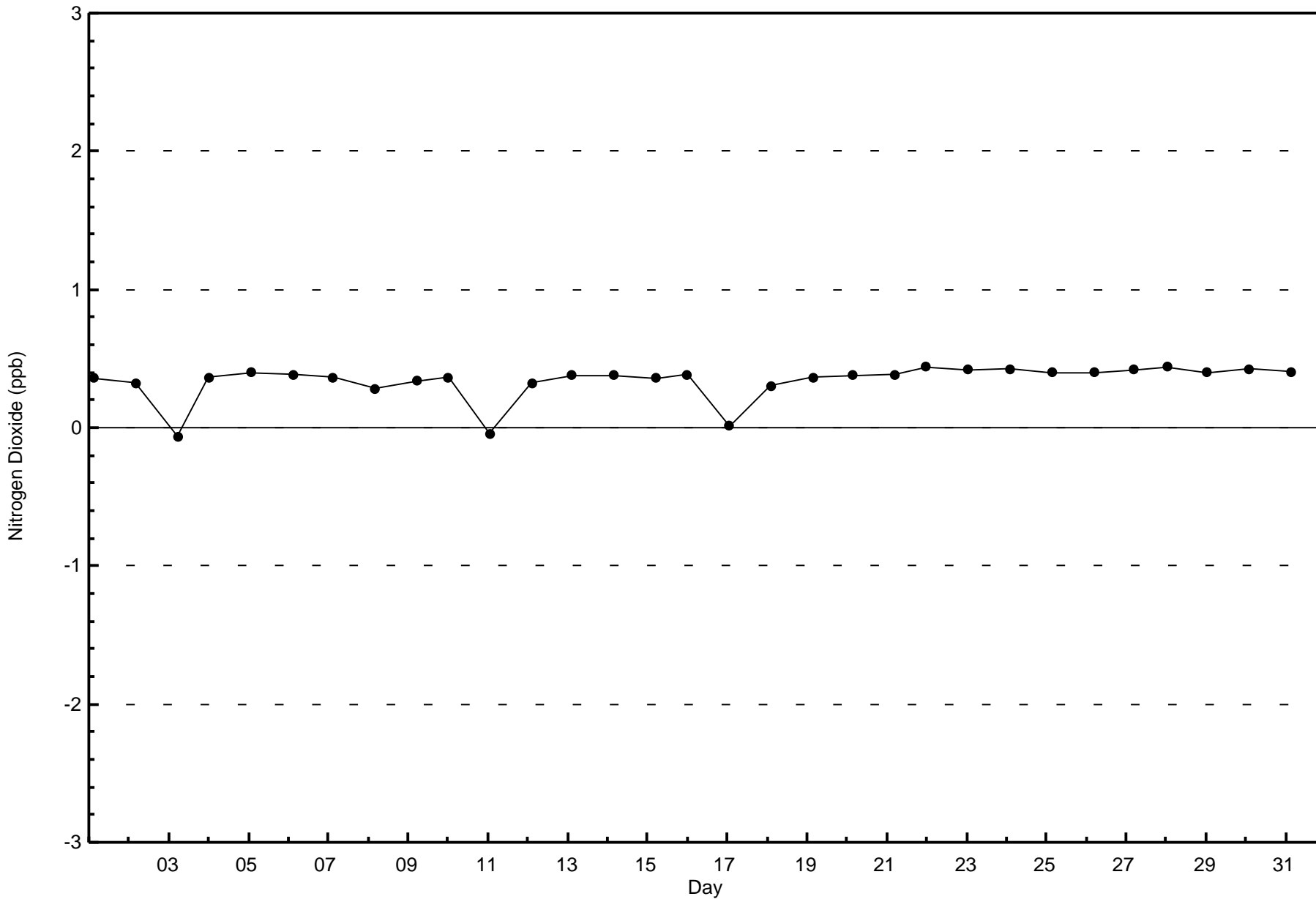
Total Number of Hours: 744

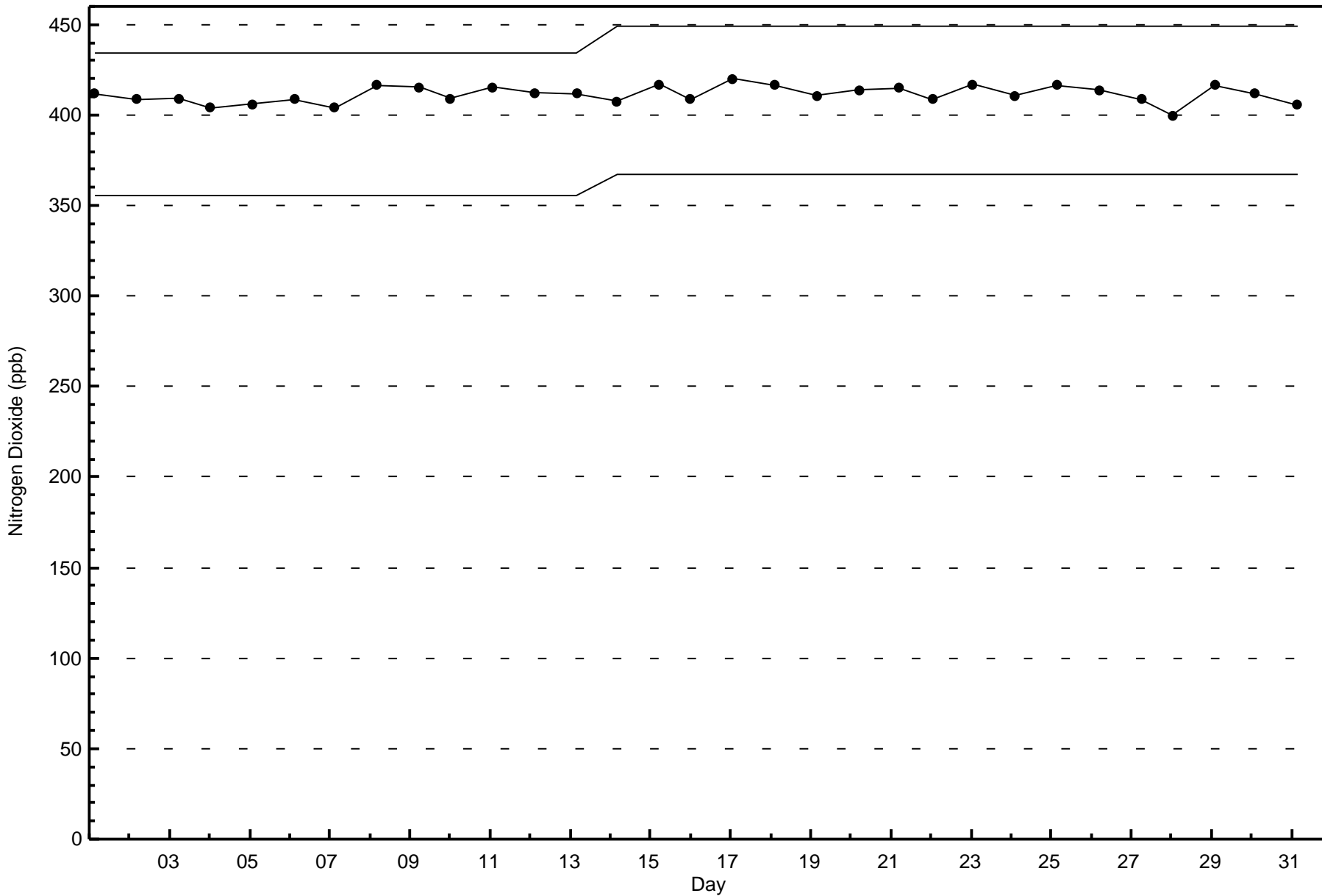


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay - Bertha Ganter (AMS 1)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb

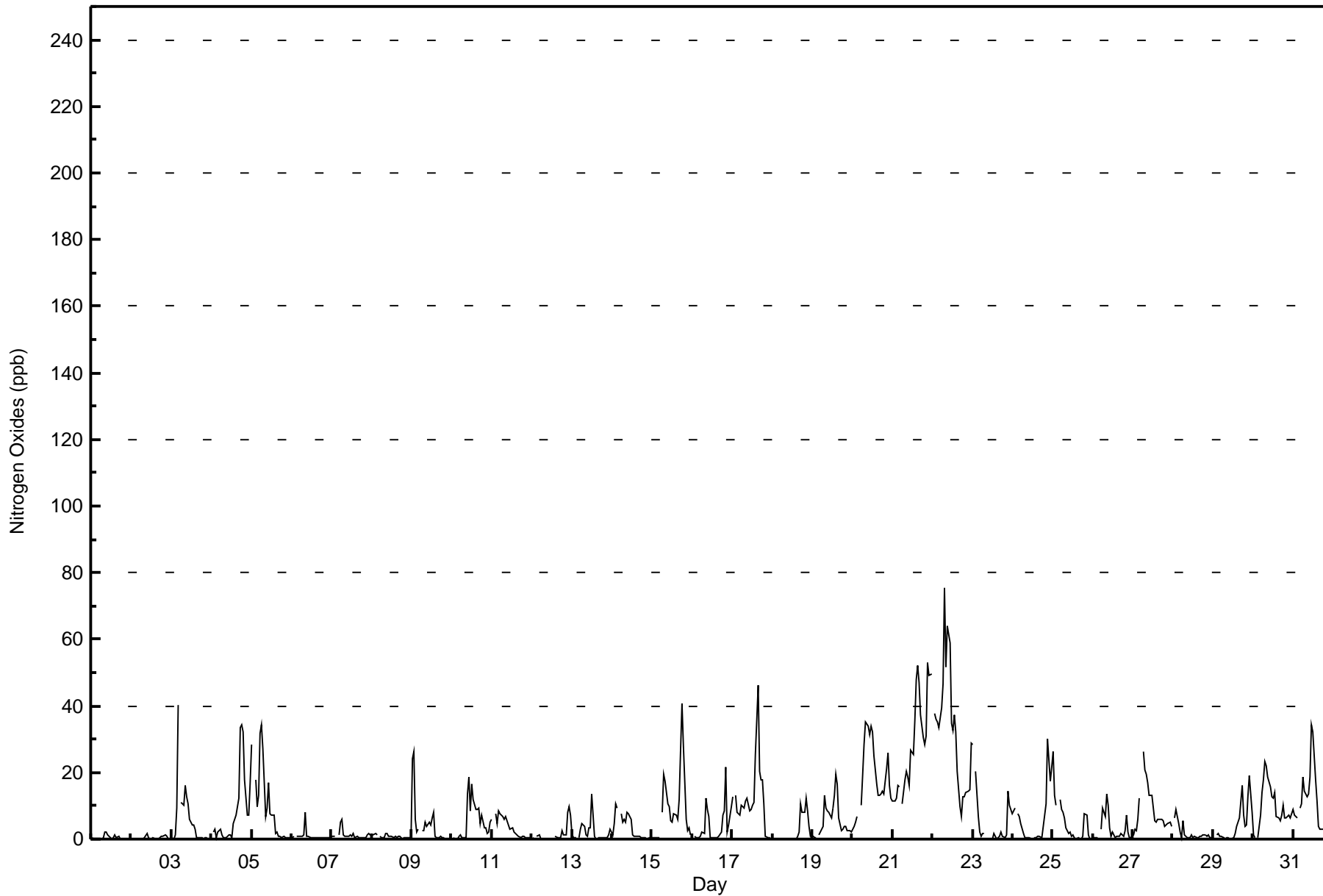
Fort McKay - Bertha Ganter - October 2017

Maximum Value: 76 ppb on Oct 22 08:00																	Maximum Daily Average: 32.6 ppb on Oct 22																	Hours in Service: 744	
Minimum Value: 0 ppb on Oct 18 09:00																	Minimum Daily Average: 0.4 ppb on Oct 2																	Hours of Data: 704	
Maximum Diurnal Average: 9.7 ppb at hour 8																	Minimum Diurnal Average: 5.0 ppb at hour 2																	Hours of Missing Data: 40	
Monthly Average: 7.0 ppb																	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 2 Q <sub>3</sub> = 9 P <sub>90</sub> = 19 P <sub>99</sub> = 49																	Hours of Calibration: 40	
																																		Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Oct	0	0	0	Z	0	0	0	0	2	2	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0.5	2									
2-Oct	0	0	0	0	Z	0	0	0	0	2	1	0	0	1	0	0	0	0	1	1	1	1	0	0	0.4	2									
3-Oct	0	0	1	9	40	Z	11	10	16	13	11	6	4	4	3	1	0	0	0	0	0	0	0	5.8	40										
4-Oct	Z	2	3	0	2	3	1	1	0	0	1	1	0	5	6	7	12	34	34	32	18	7	7	8.5	34										
5-Oct	28	Z	18	10	13	32	35	27	7	10	17	8	7	7	2	2	1	1	1	1	0	0	0	9.9	35										
6-Oct	1	1	Z	1	1	1	1	1	8	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.9	8										
7-Oct	1	1	1	Z	1	5	6	1	1	1	1	1	1	2	0	1	1	1	0	0	0	1	2	1	1.3	6									
8-Oct	1	1	1	1	Z	1	1	0	2	2	1	1	1	0	1	1	1	1	0	0	0	0	0	0.8	2										
9-Oct	24	26	6	2	3	Z	3	3	5	4	5	4	6	8	1	0	0	1	1	0	0	0	0	4.5	26										
10-Oct	Z	0	0	0	1	1	1	0	0	14	19	8	16	12	9	9	9	5	7	3	3	2	2	5.5	19										
11-Oct	6	Z	8	5	9	8	7	6	7	6	4	3	3	2	2	1	1	1	1	1	0	0	0	3.5	9										
12-Oct	0	0	Z	1	1	0	0	0	0	C	C	C	C	C	1	0	0	1	2	1	1	8	10	7	2.0	10									
13-Oct	1	0	0	Z	0	3	5	4	1	1	3	4	13	1	0	0	0	0	0	0	0	0	1	3	1.9	13									
14-Oct	1	4	11	9	Z	7	5	6	5	8	8	6	1	1	1	1	1	1	1	0	0	0	0	3.4	11										
15-Oct	0	0	0	0	0	Z	8	20	17	10	10	6	5	8	7	6	12	27	41	28	6	2	3	1	9.5	41									
16-Oct	Z	1	0	0	1	1	2	2	12	9	7	1	0	1	1	1	1	2	7	8	22	2	4	10	4.1	22									
17-Oct	13	Z	13	8	7	10	10	9	11	12	9	9	10	11	26	46	20	18	18	11	1	0	0	0	11.9	46									
18-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	2	11	8	8	12	9	4	1	2.4	12									
19-Oct	1	0	0	Z	1	2	4	13	9	8	8	6	9	13	19	16	6	3	3	4	4	3	2	2	6.0	19									
20-Oct	3	4	5	7	Z	10	19	28	35	34	31	34	32	25	17	13	13	14	15	14	21	26	16	12	18.6	35									
21-Oct	11	11	12	16	16	Z	11	18	20	19	16	27	25	35	48	52	47	37	31	28	31	53	49	50	28.9	53									
22-Oct	Z	38	36	35	33	40	47	76	52	64	59	35	32	37	32	20	10	7	13	13	14	14	15	29	32.6	76									
23-Oct	29	Z	21	7	2	1	2	2	C	C	C	C	0	2	0	0	1	2	1	1	1	14	10	9	5.5	29									
24-Oct	8	9	Z	8	7	5	2	0	0	0	0	0	0	0	1	1	1	4	7	11	30	18	22	5.8	30										
25-Oct	26	13	10	Z	12	9	8	6	4	2	2	1	1	0	0	1	0	0	1	8	7	1	0	0	4.9	26									
26-Oct	0	0	0	0	Z	3	9	7	13	10	3	1	2	1	1	1	1	2	1	3	7	2	0	0	3.0	13									
27-Oct	1	3	2	6	12	Z	26	21	20	17	13	13	9	5	5	6	6	6	5	4	4	5	5	4	8.6	26									
28-Oct	Z	6	9	5	2	0	6	1	0	0	0	1	1	1	0	0	1	1	1	1	1	1	1	0	1.8	9									
29-Oct	0	Z	1	2	1	1	0	0	0	0	0	0	0	2	4	5	6	16	7	4	4	13	19	8	4.1	19									
30-Oct	1	0	Z	1	7	14	18	23	22	19	16	13	12	14	7	6	5	7	10	6	6	7	6	8	9.9	23									
31-Oct	9	7	6	Z	9	11	19	14	13	14	18	34	32	18	12	4	3	3	3	3	3	1	1	1	10.2	34									
																								Diurnal Average											
																								Diurnal Maximum											
6.5 5.0 6.4 5.3 7.1 6.5 8.5 9.7 9.5 9.7 9.2 7.7 7.6 7.2 6.6 6.6 5.3 6.4 7.0 6.2 5.8 6.6 5.8 6.2																																			
29 38 36 35 40 40 47 76 52 64 59 35 32 37 48 52 47 37 41 32 31 53 49 50																																			
Z - zerospan C - Calibration																																			



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort McKay - Bertha Ganter - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	640	90.91	90.91
21 - 40	51	7.24	98.15
41 - 80	13	1.85	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744





**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort McKay - Bertha Ganter - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	88	16	6	6	5	4	11	45	95	41	34	37	50	60	70	64	632
21 - 40	8	3	0	0	0	0	1	8	6	5	1	0	0	1	4	4	41
11 - 80	0	0	0	0	1	0	0	1	0	0	0	0	0	0	3	3	8
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	96	19	6	6	6	4	12	54	101	46	35	37	50	61	77	71	681

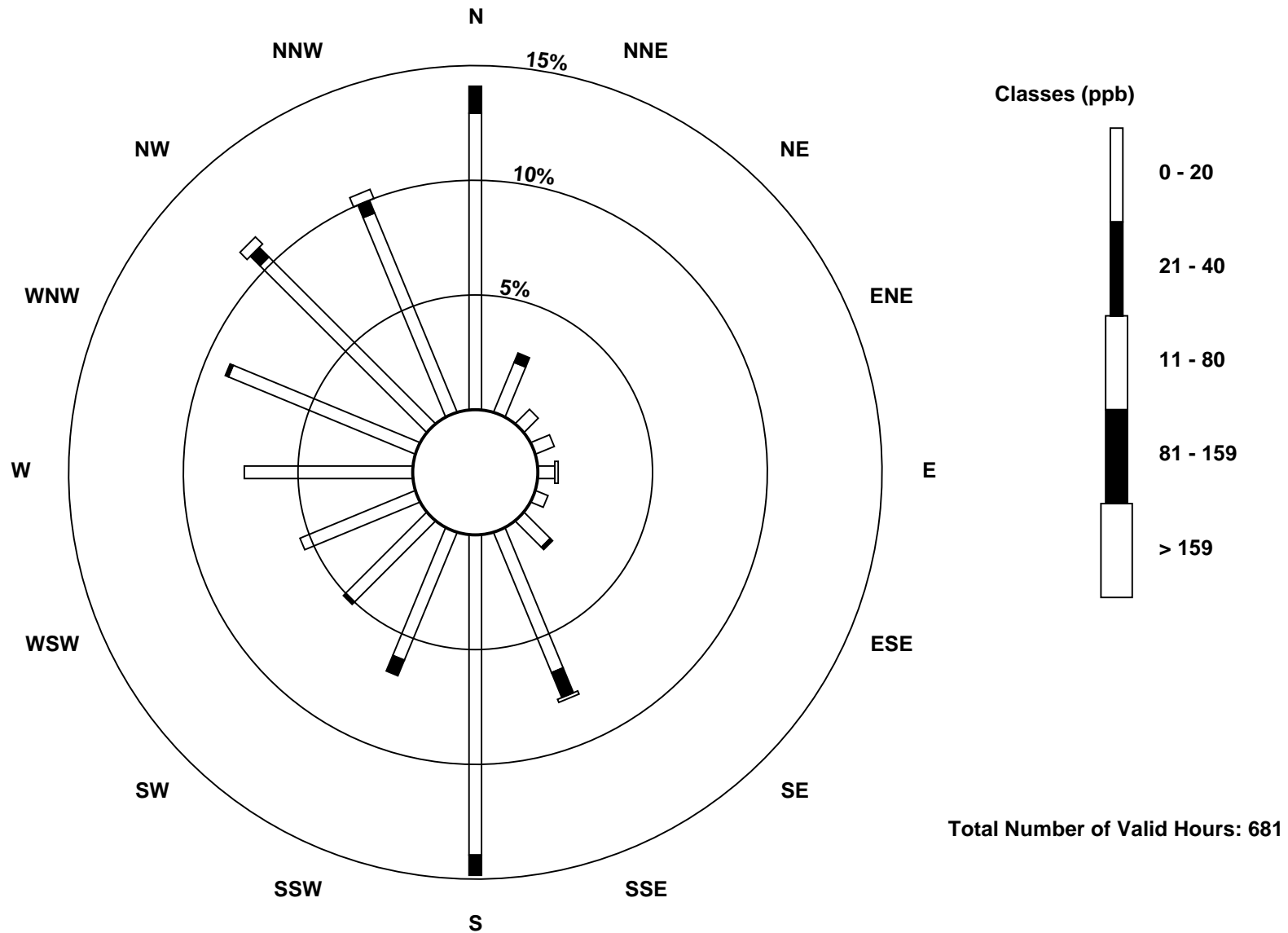
Total Number of Valid Hours: 681

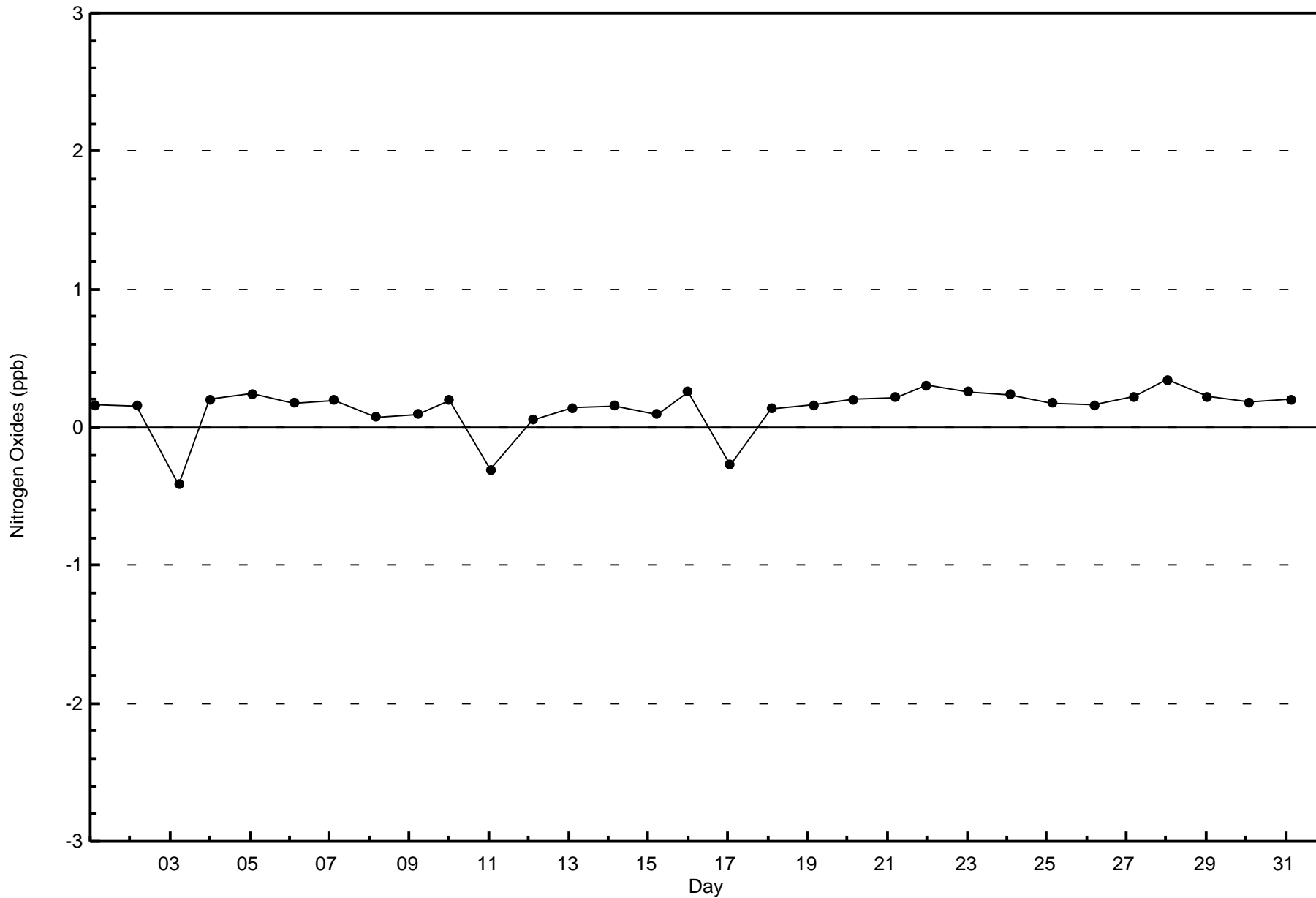
Total Number of Hours: 744

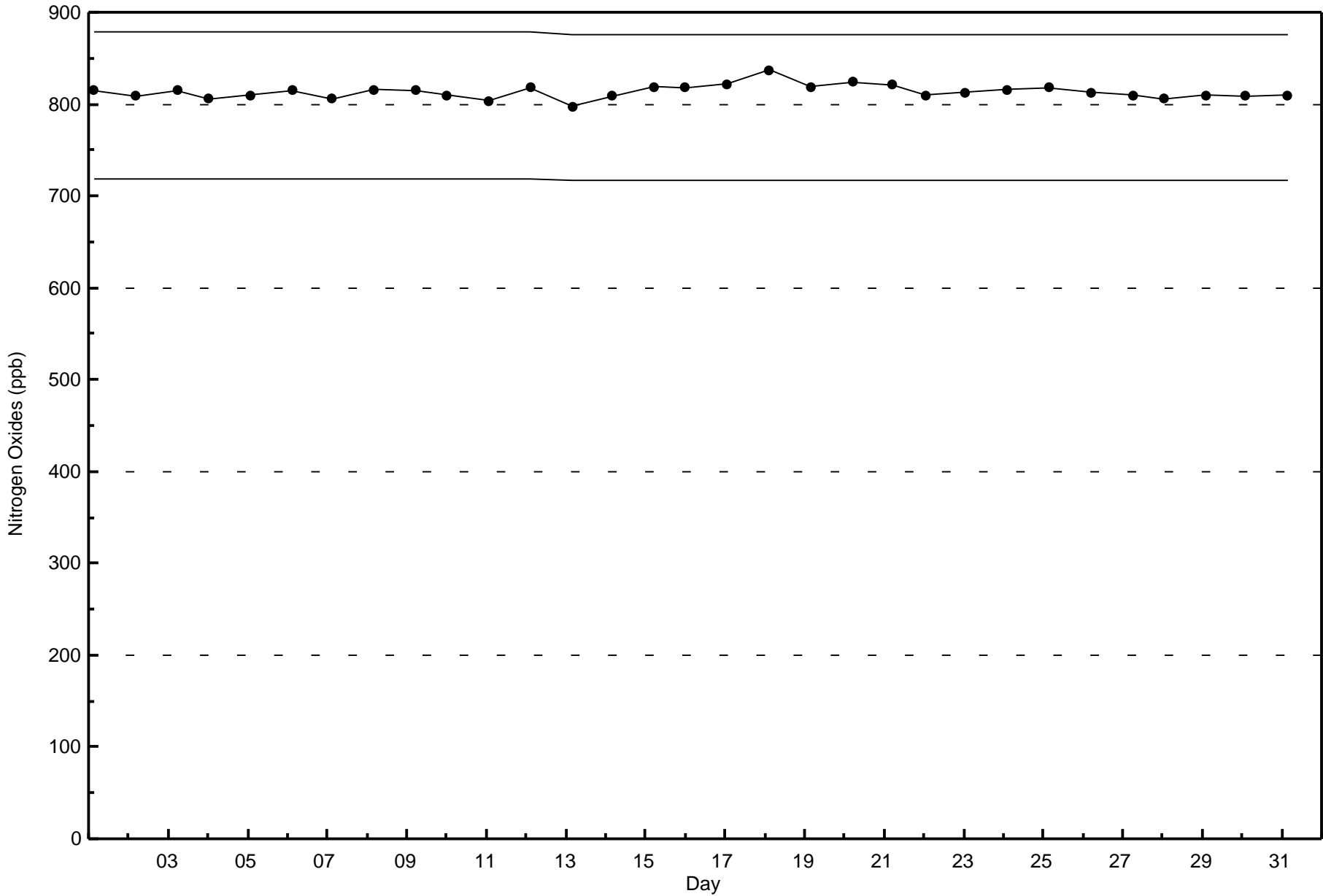


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort McKay - Bertha Ganter (AMS 1)









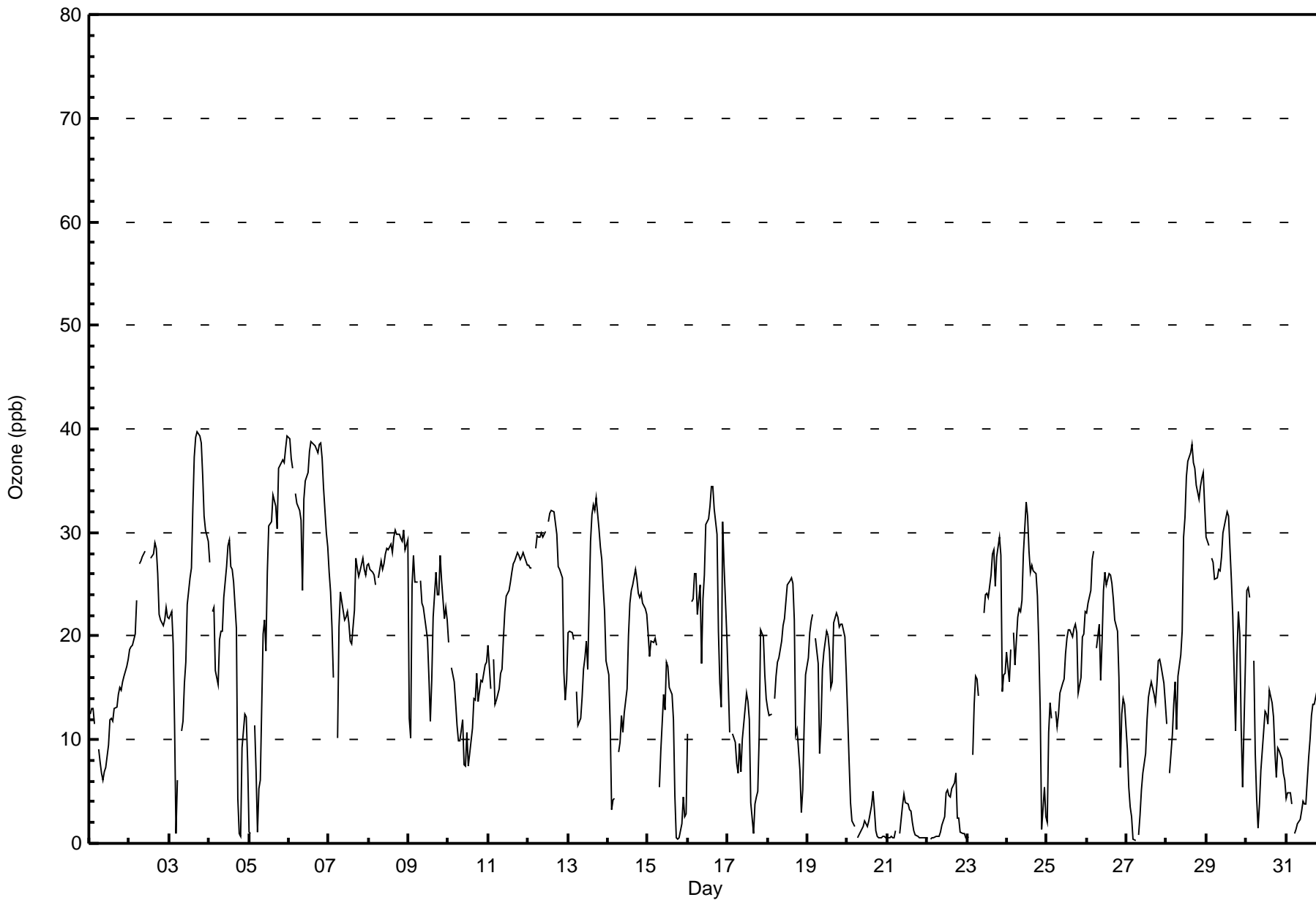
Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O<sub>3</sub>) - ppb

Fort McKay - Bertha Ganter - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 40 ppb on Oct 3 18:00 Maximum Daily Average: 35.1 ppb on Oct 6		Hours in Service: 744 Hours of Data: 707 Hours of Missing Data: 37 Hours of Calibration: 36 Percent Operational Time: 99.9																								
Minimum Value: 0 ppb on Oct 27 06:00 Maximum Diurnal Average: 22.1 ppb at hour 16 Monthly Average: 18.0 ppb		Minimum Daily Average: 1.6 ppb on Oct 21 Minimum Diurnal Average: 13.7 ppb at hour 6 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 11 Median = 19 Q <sub>3</sub> = 26 P <sub>90</sub> = 31 P <sub>99</sub> = 39																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	13	13	13	12	Z	9	8	7	6	7	7	10	12	12	12	13	13	14	15	15	16	16	17	18	12.0	18
2-Oct	19	19	19	20	23	Z	27	27	28	28	C	C	C	28	28	29	28	26	22	22	21	22	23	22	24.0	29
3-Oct	22	22	19	11	1	6	Z	11	12	16	17	23	26	27	32	37	39	40	39	39	36	32	30	29	24.6	40
4-Oct	27	Z	22	23	17	15	20	21	20	24	27	29	29	27	26	25	21	4	1	1	9	12	12	8	18.3	29
5-Oct	1	1	Z	11	7	1	5	6	20	22	19	26	31	31	34	33	33	30	36	37	37	37	38	39	23.3	39
6-Oct	39	37	36	Z	34	33	32	31	24	33	35	36	38	39	39	38	38	38	39	39	37	34	30	29	35.1	39
7-Oct	26	24	21	16	Z	10	21	24	23	22	22	22	21	20	19	22	28	27	26	26	28	26	26	27	22.9	28
8-Oct	27	26	26	26	25	Z	26	27	26	27	28	28	28	29	28	30	30	30	30	29	29	30	28	29	28.0	30
9-Oct	12	10	25	28	25	25	Z	25	23	23	21	20	16	12	16	22	26	24	24	28	25	22	23	21	21.6	28
10-Oct	19	Z	17	16	14	11	10	10	12	8	7	11	7	9	11	14	14	16	14	16	16	16	17	17	13.1	19
11-Oct	19	15	Z	18	13	14	15	16	17	20	22	24	24	25	26	27	27	28	28	27	28	28	28	27	22.5	28
12-Oct	27	27	27	Z	29	30	30	30	30	30	30	M	31	32	32	32	31	30	27	26	26	17	14	16	27.3	32
13-Oct	20	20	20	20	Z	15	11	12	14	17	18	20	17	29	32	33	32	33	30	29	27	25	22	18	22.4	33
14-Oct	16	11	3	4	4	Z	9	10	12	11	13	15	20	23	24	25	26	25	24	24	24	23	23	22	17.1	26
15-Oct	20	18	20	19	20	19	Z	5	9	14	13	18	17	15	14	12	5	1	0	0	2	4	3	3	10.9	20
16-Oct	11	Z	23	24	26	26	22	25	17	24	26	31	31	33	34	34	32	30	21	15	13	31	27	20	25.0	34
17-Oct	15	11	Z	11	10	8	7	10	7	10	13	15	14	12	4	1	4	4	5	10	21	20	16	14	10.4	21
18-Oct	13	12	12	Z	14	16	18	18	20	21	22	23	25	25	26	25	22	10	11	7	3	5	11	16	16.3	26
19-Oct	18	20	21	22	Z	20	17	9	11	17	18	20	20	19	15	16	21	22	22	21	21	21	20	16	18.6	22
20-Oct	12	8	4	2	2	Z	1	1	1	2	2	2	2	2	4	5	3	1	1	1	1	1	1	1	2.5	12
21-Oct	0	1	1	1	1	1	Z	1	2	4	5	4	4	3	3	2	1	1	1	1	1	1	1	1	1.6	5
22-Oct	1	Z	0	1	1	1	1	1	1	2	3	5	5	5	4	5	6	7	2	2	1	1	1	1	2.4	7
23-Oct	1	1	Z	9	13	16	16	14	C	C	22	24	24	24	26	28	28	25	28	30	28	15	16	16	19.2	30
24-Oct	19	16	19	Z	20	17	22	23	22	23	28	33	32	28	26	27	26	26	24	19	13	1	5	3	20.5	33
25-Oct	2	11	14	12	Z	13	11	12	14	15	16	18	20	21	21	20	21	21	20	15	16	20	20	22	16.3	22
26-Oct	22	23	24	27	28	Z	19	21	16	20	24	26	25	26	26	25	24	22	20	16	7	12	14	13	20.9	28
27-Oct	9	5	4	3	0	0	Z	1	3	5	7	9	12	14	15	16	14	14	15	18	18	17	15	14	9.8	18
28-Oct	12	Z	7	10	13	16	11	16	18	20	30	31	35	37	38	38	37	36	35	33	34	35	36	33	26.6	38
29-Oct	30	29	Z	27	27	26	26	26	26	28	30	31	32	32	28	25	22	11	18	22	20	11	5	17	23.9	32
30-Oct	24	25	24	Z	18	9	4	2	4	7	11	13	12	12	15	14	12	9	6	9	9	8	7	6	11.2	25
31-Oct	4	5	5	4	Z	1	1	2	2	3	4	4	4	8	10	12	13	13	14	16	20	23	24	25	9.5	25
16.1 15.8 16.4 14.4 15.4 13.7 14.9 14.3 14.8 16.7 18.0 19.6 20.5 21.1 21.6 22.1 21.9 19.9 19.3 19.1 18.9 18.3 17.9 17.5																								Diurnal Average		
39 37 36 28 34 33 32 31 30 33 35 36 38 39 39 38 39 40 39 39 37 37 38 39																								Diurnal Maximum		
Z - zerospan      C - Calibration      M - Maintenance Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																										





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	399	56.44	56.44
21 - 50	308	43.56	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	48	16	5	4	4	3	9	41	75	17	14	12	17	35	38	38	376
21 - 50	46	3	1	2	2	2	1	14	25	28	22	27	34	25	41	35	308
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	94	19	6	6	6	5	10	55	100	45	36	39	51	60	79	73	684

Total Number of Valid Hours: 684

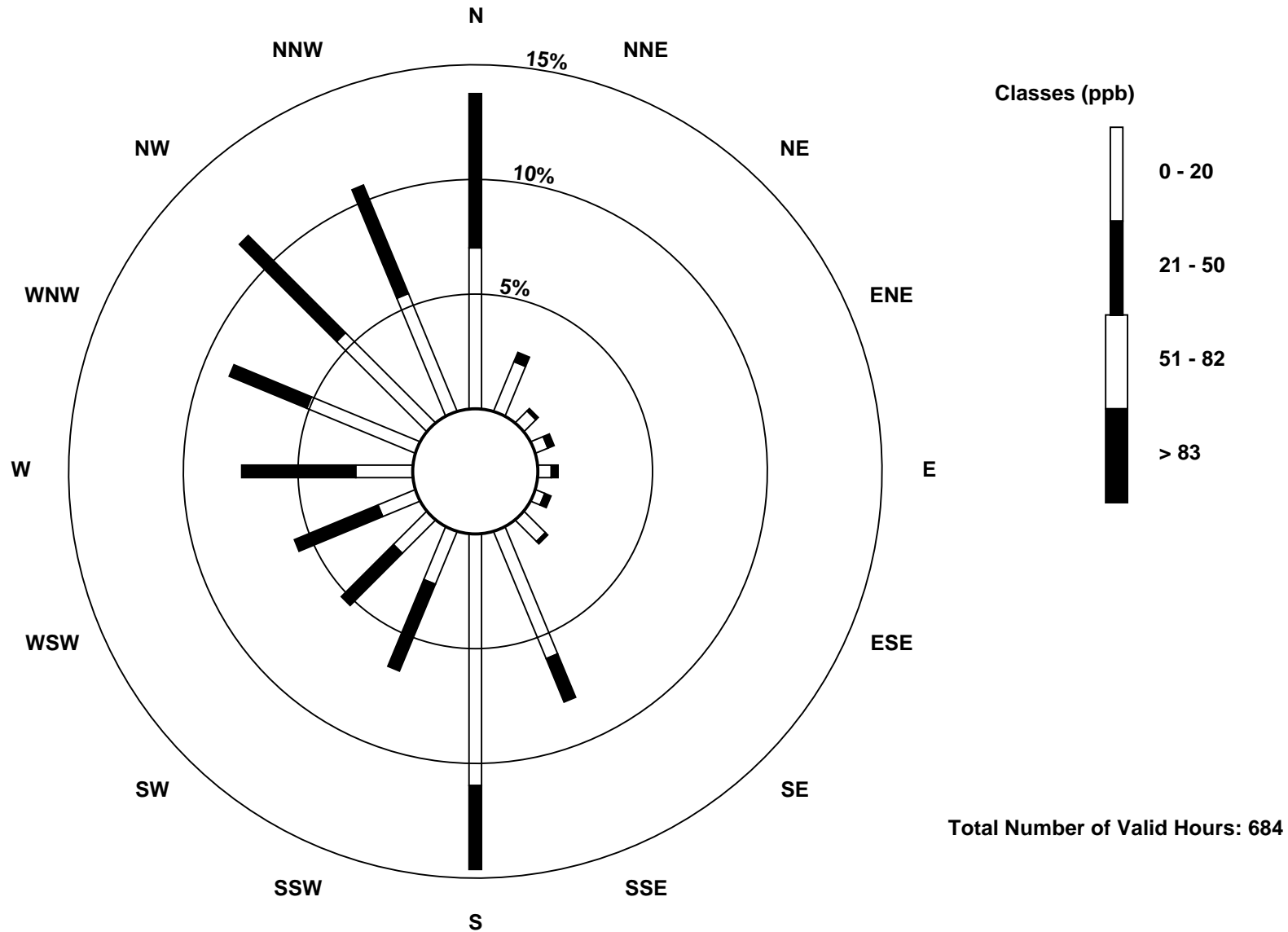
Total Number of Hours: 744

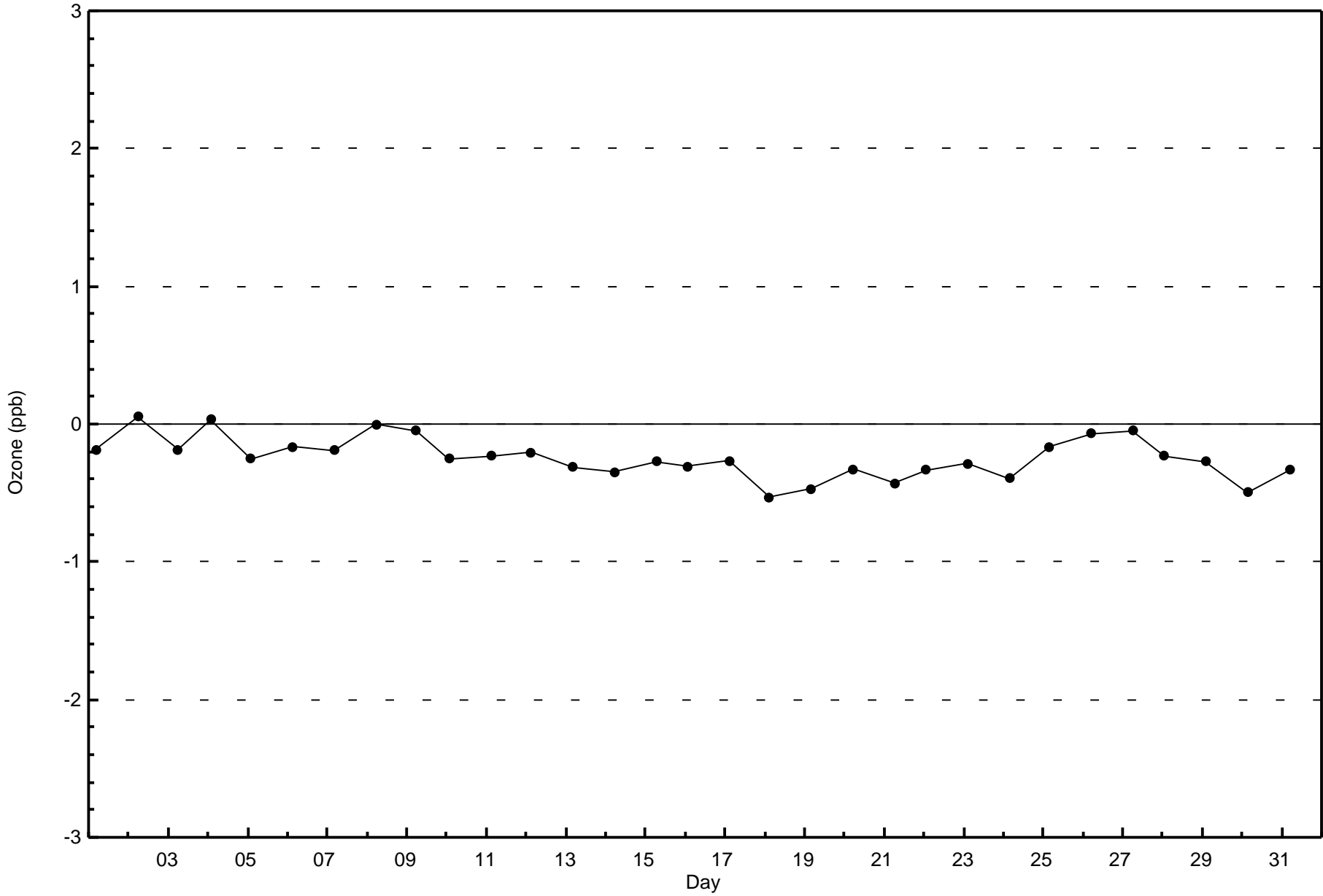


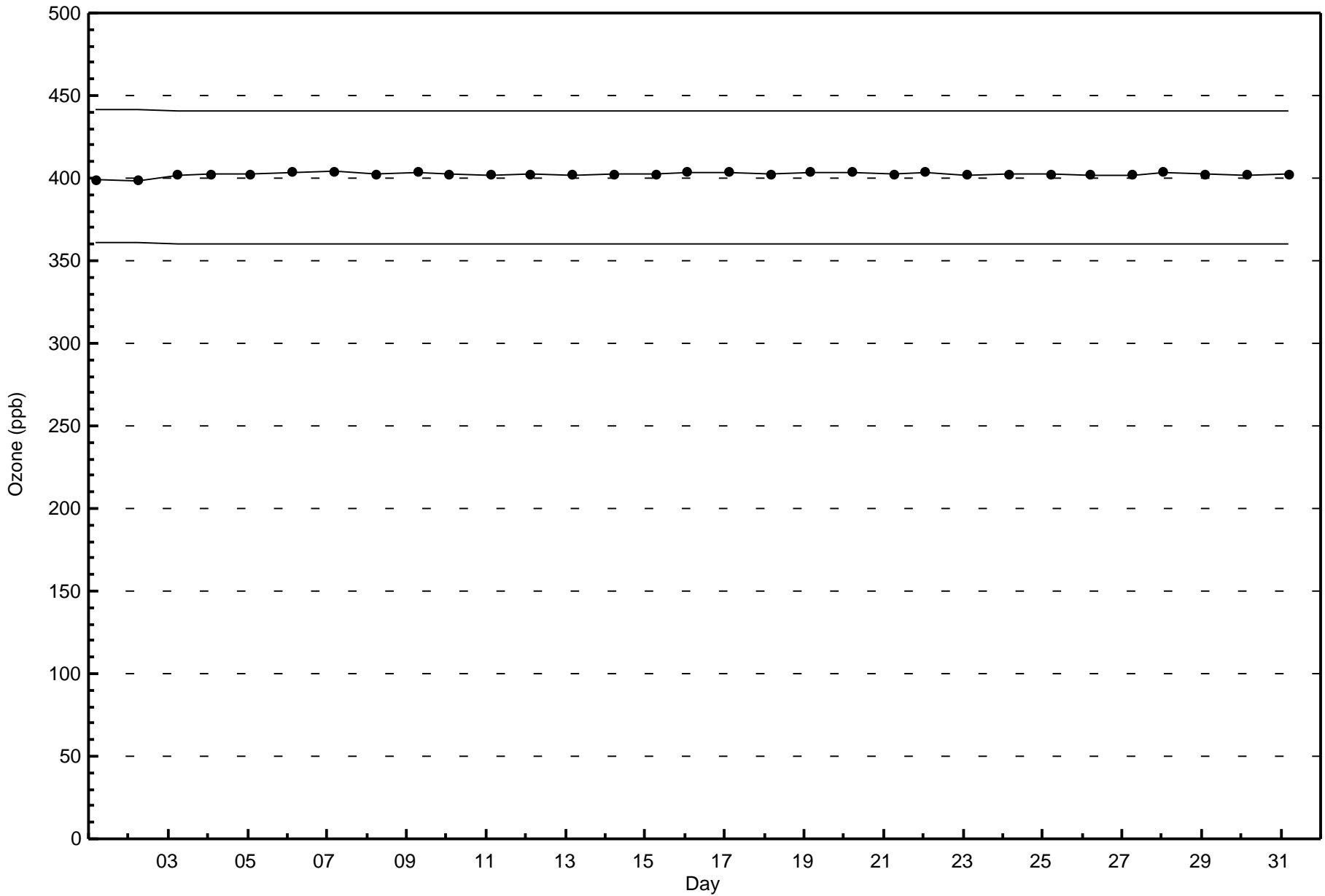


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Ozone (O<sub>3</sub>) - ppb  
Fort McKay - Bertha Ganter (AMS 1)









Wood Buffalo Environmental Association

Summary of Hour Averages

Particulate Matter 2.5 (PM<sub>2.5</sub>) - µg/m<sup>3</sup>

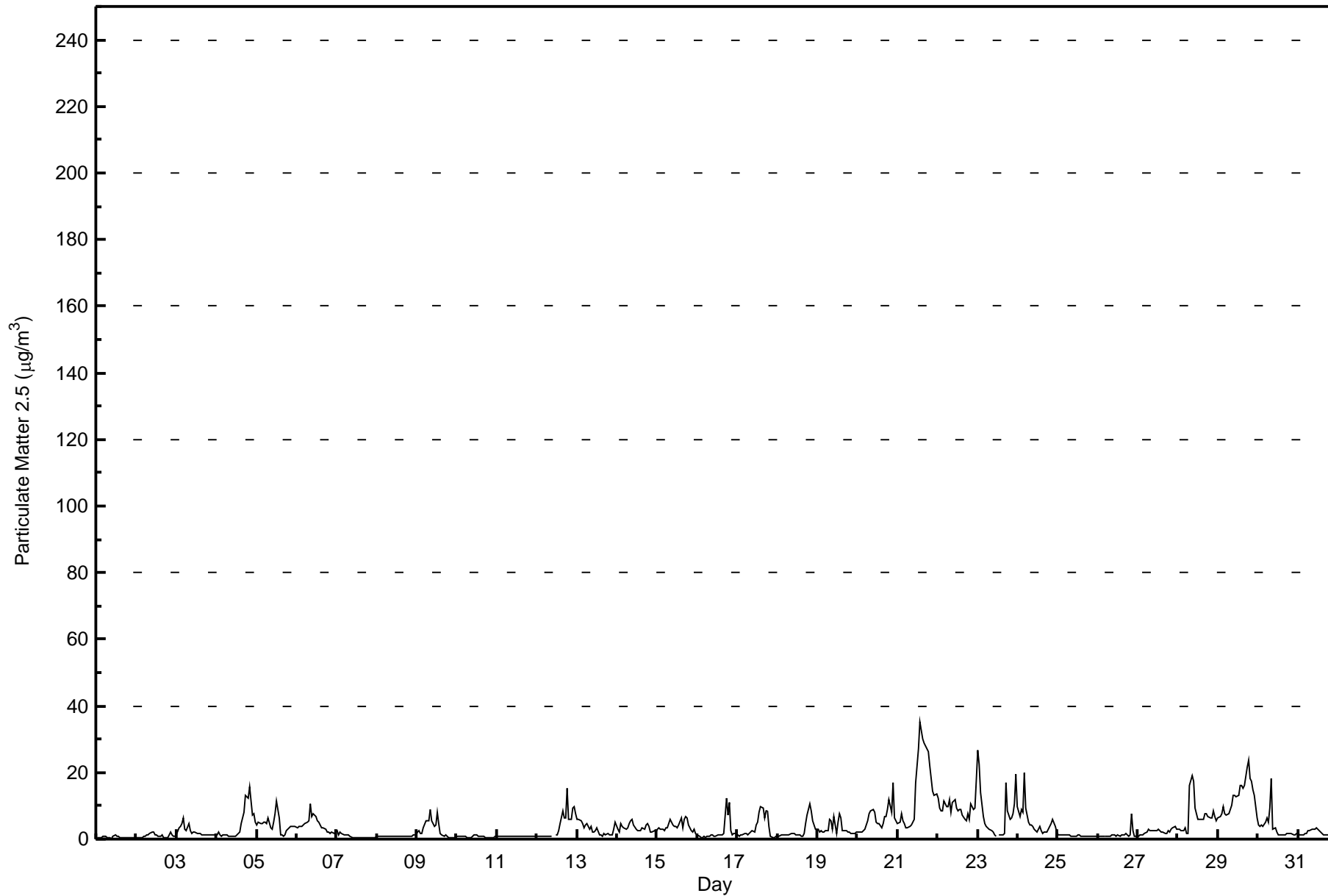
Fort McKay - Bertha Ganter - October 2017

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 35.1 µg/m <sup>3</sup> on Oct 21 14:00 Maximum Daily Average: 15.0 µg/m <sup>3</sup> on Oct 21		Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 2 Percent Operational Time: 100.0																																														
Minimum Value: 0.2 µg/m <sup>3</sup> on Oct 1 10:00 Maximum Diurnal Average: 5.4 µg/m <sup>3</sup> at hour 19 Monthly Average: 3.93 µg/m <sup>3</sup>		Minimum Daily Average: 0.5 µg/m <sup>3</sup> on Oct 1 Minimum Diurnal Average: 2.9 µg/m <sup>3</sup> at hour 4 Percentiles: P <sub>1</sub> = 0.3 P <sub>10</sub> = 0.7 Q <sub>1</sub> = 1.0 Median = 2.2 Q <sub>3</sub> = 5.1 P <sub>90</sub> = 8.9 P <sub>99</sub> = 26.2																																														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	0.3	0.3	0.5	0.6	0.7	0.7	0.3	0.3	0.4	0.2	1.0	1.3	1.0	1.0	0.4	0.3	0.4	0.3	0.4	0.4	0.3	0.4	0.4	0.3	0.5	1.3																						
2-Oct	0.4	0.3	0.3	0.5	0.8	0.8	1.1	1.3	1.9	2.2	2.0	1.2	1.2	1.0	0.7	1.3	0.6	0.5	0.5	0.6	2.2	1.1	0.7	0.8	1.0	2.2																						
3-Oct	1.1	3.3	3.7	4.6	6.3	2.9	2.7	4.6	2.8	1.9	2.2	2.1	1.9	1.7	1.6	1.3	1.3	1.2	1.1	1.2	1.2	1.2	1.1	1.2	2.3	6.3																						
4-Oct	1.2	2.0	1.3	0.9	1.1	1.5	1.4	0.9	0.8	0.7	0.9	0.9	1.3	1.7	2.2	4.8	8.0	13.1	12.8	12.4	15.8	7.0	7.4	5.2	4.4	15.8																						
5-Oct	4.1	5.3	4.9	4.6	5.0	5.0	4.6	6.2	3.2	3.2	5.1	7.5	11.5	6.5	1.1	1.5	0.9	1.1	2.6	3.4	3.9	4.0	4.0	4.0	4.3	11.5																						
6-Oct	3.5	3.8	3.8	3.9	4.4	4.6	5.0	5.7	10.4	7.0	7.4	6.7	5.3	5.2	4.3	3.3	3.5	3.0	2.3	2.0	1.7	2.1	1.8	2.3	4.3	10.4																						
7-Oct	2.7	1.4	2.0	1.8	1.3	1.2	1.4	1.3	0.9	0.5	0.4	0.4	0.3	0.4	0.3	0.4	0.5	0.5	0.4	0.4	0.4	0.5	0.6	0.6	0.9	2.7																						
8-Oct	0.6	0.7	0.7	0.7	0.7	0.8	0.8	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.9	0.8	0.8	0.7	0.7	0.7	0.8	0.9	1.2	1.4	0.8	1.4																					
9-Oct	2.0	2.5	1.8	1.8	3.3	5.7	5.4	5.6	9.0	5.4	3.8	4.4	8.3	4.7	1.9	1.2	0.8	1.2	1.0	0.5	0.5	0.5	0.6	0.6	3.0	9.0																						
10-Oct	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.5	1.0	1.4	1.1	1.2	1.1	1.0	0.8	0.7	0.6	0.6	0.4	0.5	0.5	0.6	0.6	0.7	1.4																						
11-Oct	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.9	1.0	1.0	0.9	1.0	1.0	0.9	0.9	1.0	0.9	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	1.0																						
12-Oct	0.8	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.9	0.9	C	1.1	1.1	2.7	4.8	8.4	6.2	6.5	15.3	6.1	6.0	9.2	9.8	7.7	4.0	15.3																						
13-Oct	6.1	6.1	5.6	4.5	3.3	4.0	4.5	3.1	3.9	2.0	2.1	2.4	3.6	1.4	1.1	1.0	1.5	1.5	1.5	1.3	1.4	1.2	2.9	5.0	3.0	6.1																						
14-Oct	2.8	2.1	4.7	4.0	3.4	3.1	3.3	4.5	5.4	6.1	4.2	3.0	2.7	2.4	2.4	3.5	2.9	4.3	4.7	3.7	2.3	2.2	2.3	2.1	3.4	6.1																						
15-Oct	2.9	3.5	3.1	2.8	2.7	3.2	3.4	4.6	5.9	4.3	4.0	4.0	3.5	4.1	6.4	3.5	6.0	6.9	6.3	4.4	2.5	2.2	3.1	1.8	4.0	6.9																						
16-Oct	1.4	0.9	0.6	0.6	0.7	0.6	0.7	0.8	1.3	1.1	0.9	1.0	1.1	1.2	1.2	1.4	1.5	12.2	7.2	11.2	2.7	1.2	1.7	1.7	2.3	12.2																						
17-Oct	1.5	1.0	1.2	1.5	1.7	1.7	1.4	1.5	2.0	2.3	2.2	4.4	5.1	7.8	9.9	9.1	6.4	8.6	8.7	3.6	0.8	0.5	0.6	0.8	3.5	9.9																						
18-Oct	0.9	1.0	1.2	1.3	1.4	1.4	1.4	1.4	1.5	1.6	1.5	1.5	1.3	1.1	0.9	1.0	1.8	4.6	7.1	10.4	8.3	5.7	4.0	3.1	2.7	10.4																						
19-Oct	2.8	2.3	2.3	2.2	2.2	2.4	2.7	5.9	5.4	2.8	6.9	1.8	4.9	7.7	6.4	2.5	2.6	2.5	2.1	2.2	1.8	1.7	1.7	2.1	3.2	7.7																						
20-Oct	2.1	2.2	2.3	2.1	3.0	4.1	5.5	7.8	8.5	8.9	8.1	5.1	4.7	4.6	3.6	4.5	6.9	7.0	8.9	11.9	8.1	17.0	6.2	5.7	6.2	17.0																						
21-Oct	4.7	5.2	7.6	5.7	4.6	3.6	3.5	4.0	4.1	5.2	5.8	16.9	27.0	35.1	32.7	30.2	29.0	28.1	26.5	21.9	18.1	14.2	13.1	13.7	15.0	35.1																						
22-Oct	12.4	9.3	8.5	8.7	11.4	9.9	9.7	12.0	8.1	10.8	11.7	9.2	8.3	8.7	8.7	7.2	5.8	5.7	7.8	6.0	10.4	8.9	9.3	17.8	9.4	17.8																						
23-Oct	26.6	22.6	13.9	6.9	4.7	3.6	3.2	2.9	2.6	2.0	1.1	1.0	C	1.2	1.2	1.2	1.6	17.1	8.7	6.0	6.5	7.8	10.6	19.7	7.5	26.6																						
24-Oct	9.9	6.7	8.7	8.2	19.7	9.4	5.2	4.2	4.2	4.0	3.2	2.3	3.0	4.0	2.6	1.9	2.3	2.2	2.8	3.8	4.8	6.0	4.0	2.0	5.2	19.7																						
25-Oct	1.2	1.2	1.2	1.3	1.2	1.1	1.2	1.2	1.0	0.9	0.8	1.0	1.1	1.1	1.0	0.9	0.9	0.8	0.8	1.0	1.0	0.8	0.7	0.7	1.0	1.3																						
26-Oct	0.8	0.8	0.9	0.8	0.9	0.9	1.0	1.0	1.2	1.4	1.1	1.0	1.1	1.0	1.1	1.2	1.2	1.5	0.9	1.1	7.4	2.5	0.9	0.8	1.4	7.4																						
27-Oct	0.8	1.1	1.1	1.3	1.6	2.2	2.9	2.4	2.5	2.7	2.4	2.4	2.8	2.6	2.2	2.0	1.8	1.8	2.4	2.1	3.1	3.5	3.6	2.9	2.3	3.6																						
28-Oct	2.8	3.0	2.4	2.6	3.4	1.7	1.6	16.2	19.0	17.3	9.2	7.6	5.7	6.0	5.8	6.1	7.7	7.6	6.9	6.4	6.3	8.3	6.7	5.5	6.9	19.0																						
29-Oct	6.2	6.8	7.6	9.6	7.6	7.2	7.6	8.7	10.3	13.1	13.3	12.8	13.3	16.0	16.0	15.3	16.0	21.4	23.7	18.3	17.6	14.8	13.2	6.3	12.6	23.7																						
30-Oct	4.3	3.8	4.3	3.9	4.9	6.3	5.1	9.4	18.0	3.0	3.3	2.1	1.3	1.4	1.1	1.1	1.1	1.7	1.9	1.5	1.5	1.5	1.5	1.5	3.6	18.0																						
31-Oct	1.6	1.5	1.4	1.4	1.5	1.7	2.7	2.7	2.9	2.9	2.9	3.3	3.2	2.2	1.7	1.3	1.4	1.3	1.2	1.1	0.9	0.9	0.9	0.9	1.8	3.3																						
																								3.5	3.3	3.2	2.9	3.4	3.0	3.0	4.0	4.5	3.8	3.7	3.6	4.3	4.4	4.1	3.9	4.0	5.4	5.4	4.7	4.5	4.2	3.7	3.9	Diurnal Average
																								26.6	22.6	13.9	9.6	19.7	9.9	9.7	16.2	19.0	17.3	13.3	16.9	27.0	35.1	32.7	30.2	29.0	28.1	26.5	21.9	18.1	17.0	13.2	19.7	Diurnal Maximum
C - Calibration																																																
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m <sup>3</sup>																																																



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Fort McKay - Bertha Ganter - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Fort McKay - Bertha Ganter - October 2017**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	384	51.75	51.75
6 - 15	143	19.27	71.02
16 - 25	21	2.83	73.85
26 - 80	8	1.08	74.93
> 81.0	0	0.00	74.93

Total Number of Valid Hours: 742

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Fort McKay - Bertha Ganter - October 2017**

Concentration Ranges ( $\mu\text{g}/\text{m}^3$ )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	39	12	4	2	3	5	11	35	76	35	23	30	30	37	26	16	384
6 - 15	16	1	1	1	1	0	1	14	23	6	6	2	3	8	28	11	122
16 - 25	2	1	0	0	0	0	0	4	4	1	2	2	0	0	2	1	19
26 - 80	1	0	0	0	1	0	0	3	0	0	0	0	0	0	0	2	7
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	58	14	5	3	5	5	12	56	103	42	31	34	33	45	56	30	532

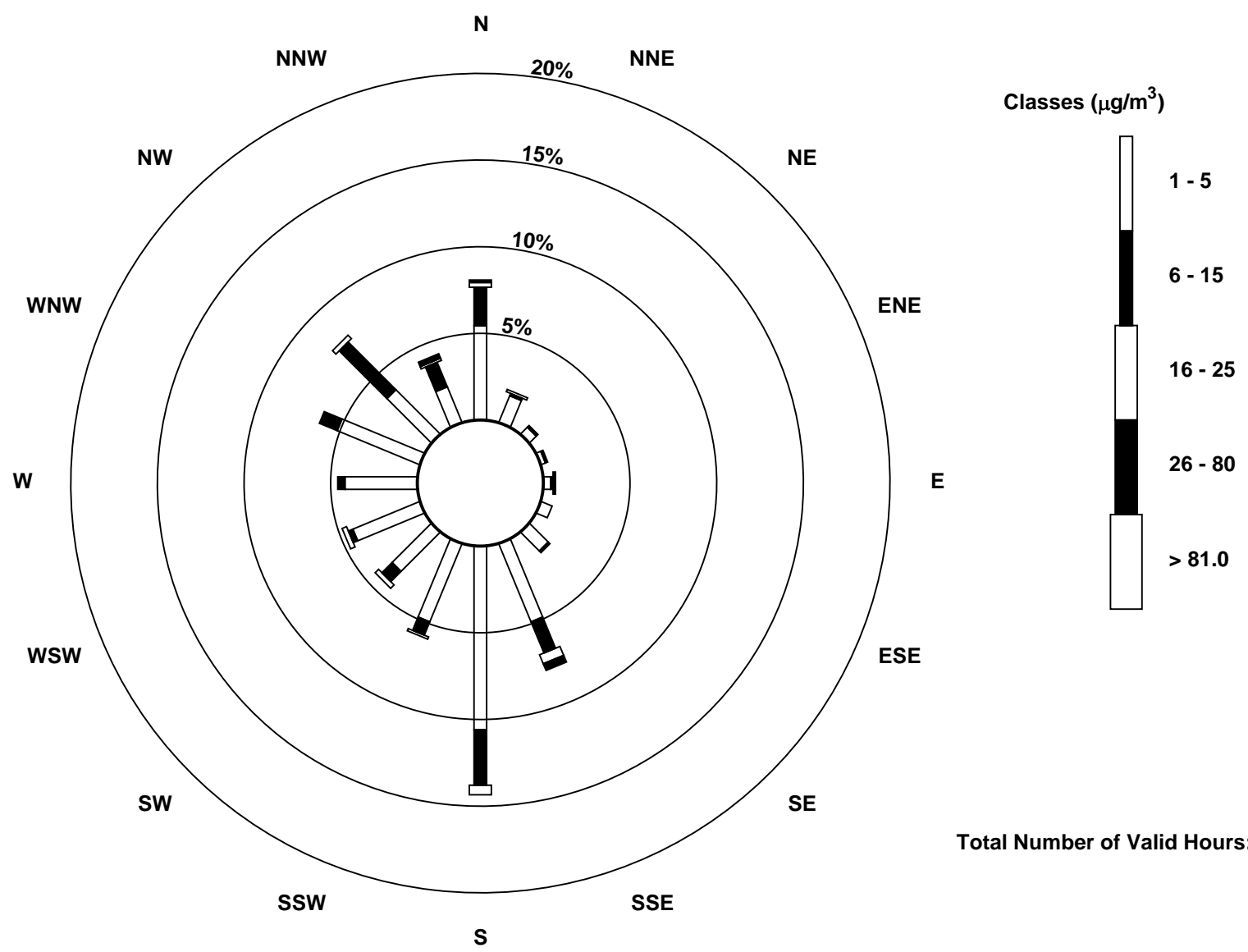
Total Number of Valid Hours: 718

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Fort McKay - Bertha Ganter (AMS 1)







# Wood Buffalo Environmental Association

## Summary of Hour Averages

### Ammonia (NH<sub>3</sub>) - ppb

### Fort McKay - Bertha Ganter - October 2017

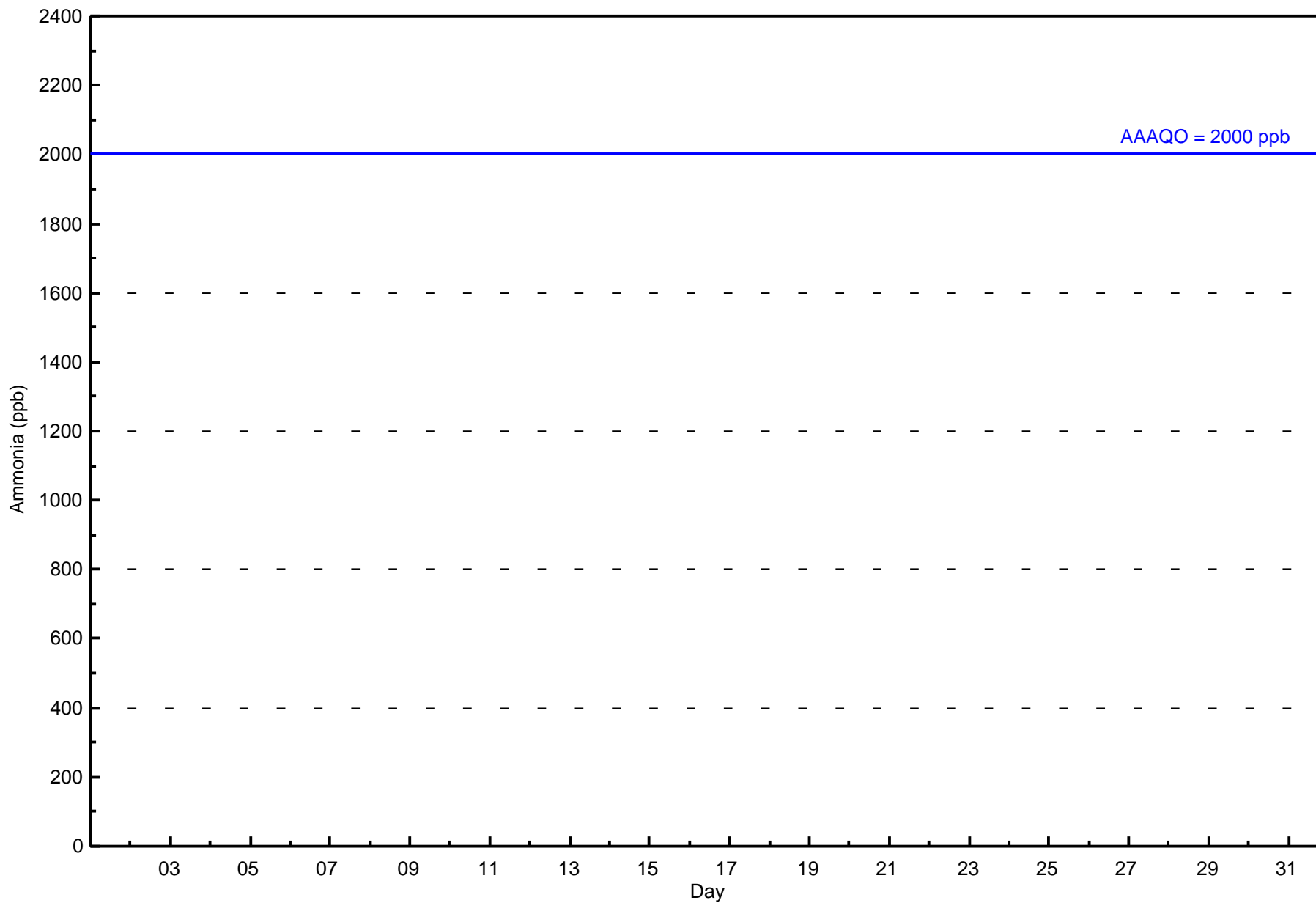
Number of Exceedences (AAAQO): 1-hr: 0 Maximum Value: 0 ppb on Oct 1 01:00 Maximum Daily Average: 0.0 ppb on Oct 1		Hours in Service: 744 Hours of Data: 628 Hours of Missing Data: 116 Hours of Calibration: 54 Percent Operational Time: 91.7																									
Minimum Value: 0 ppb on Oct 1 01:00 Maximum Diurnal Average: 0.0 ppb at hour 1 Monthly Average: 0.0 ppb		Minimum Daily Average: 0.0 ppb on Oct 1 Minimum Diurnal Average: 0.0 ppb at hour 1 Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 0																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
2-Oct	0	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
3-Oct	0	0	0	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
4-Oct	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
5-Oct	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
6-Oct	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
7-Oct	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
8-Oct	0	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
9-Oct	0	0	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
10-Oct	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
11-Oct	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
12-Oct	0	0	0	0	0	Z	RE	RE	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	--	0
13-Oct	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
14-Oct	0	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
15-Oct	0	0	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
16-Oct	0	0	0	Z	RE	RE	0	0	0	C	C	C	C	C	C	C	C	0	0	0	0	0	0	0	0	--	0
17-Oct	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
18-Oct	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
19-Oct	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
20-Oct	0	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
21-Oct	0	0	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
22-Oct	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
23-Oct	0	0	0	0	Z	RE	RE	0	C	C	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	--	0
24-Oct	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
25-Oct	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
26-Oct	0	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
27-Oct	0	0	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
28-Oct	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
29-Oct	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
30-Oct	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
31-Oct	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
0.0																								Diurnal Average			
0																								Diurnal Maximum			

Z - zerospan C - Calibration RE - Recovery  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 2000 ppb



Wood Buffalo Environmental Association  
Hourly Averages

Ammonia (NH<sub>3</sub>) - ppb  
Fort McKay - Bertha Ganter - October 2017





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ammonia (NH<sub>3</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	628	100.00	100.00
6 - 10	0	0.00	100.00
11 - 15	0	0.00	100.00
16 - 20	0	0.00	100.00
21 - 25	0	0.00	100.00
> 26	0	0.00	100.00

Total Number of Valid Hours: 628

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Ammonia (NH<sub>3</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	84	18	5	5	6	3	11	48	85	41	26	35	44	57	70	69	607
6 - 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	84	18	5	5	6	3	11	48	85	41	26	35	44	57	70	69	607

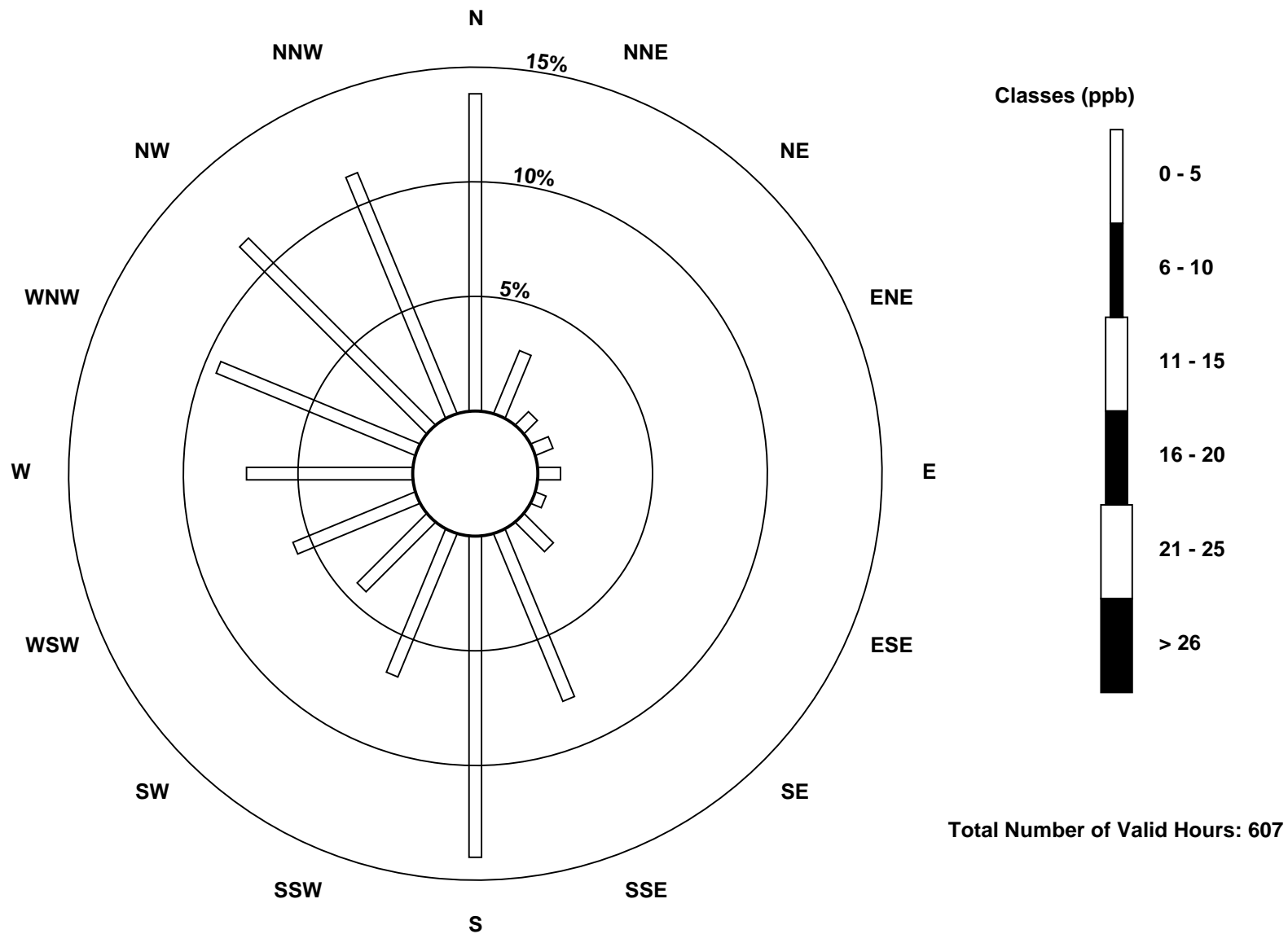
Total Number of Valid Hours: 607

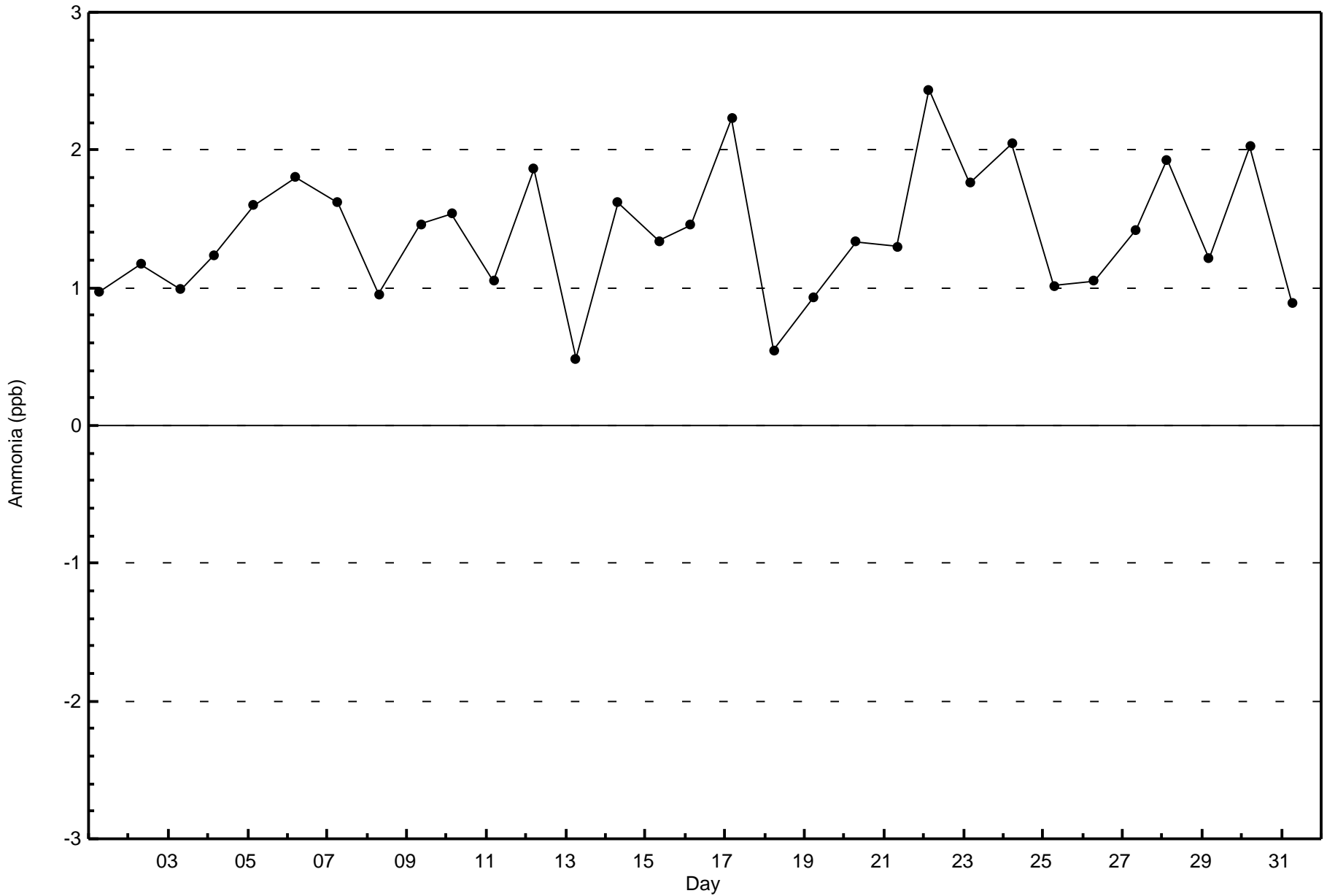
Total Number of Hours: 744

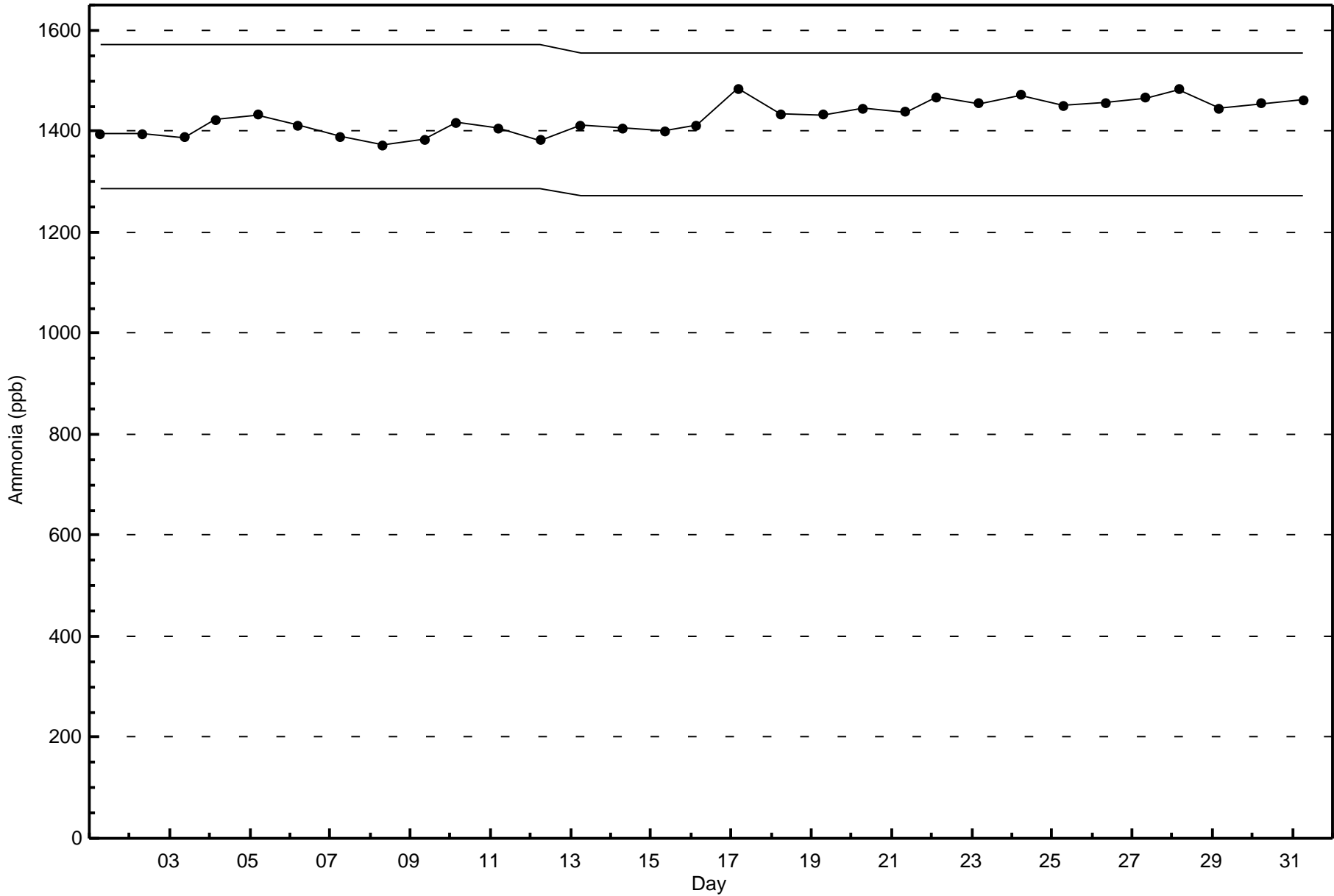


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Ammonia (NH<sub>3</sub>) - ppb  
Fort McKay - Bertha Ganter (AMS 1)









**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Ambient Temperature 10 m (AT 10m) - C**

**Fort McKay - Bertha Ganter - October 2017**

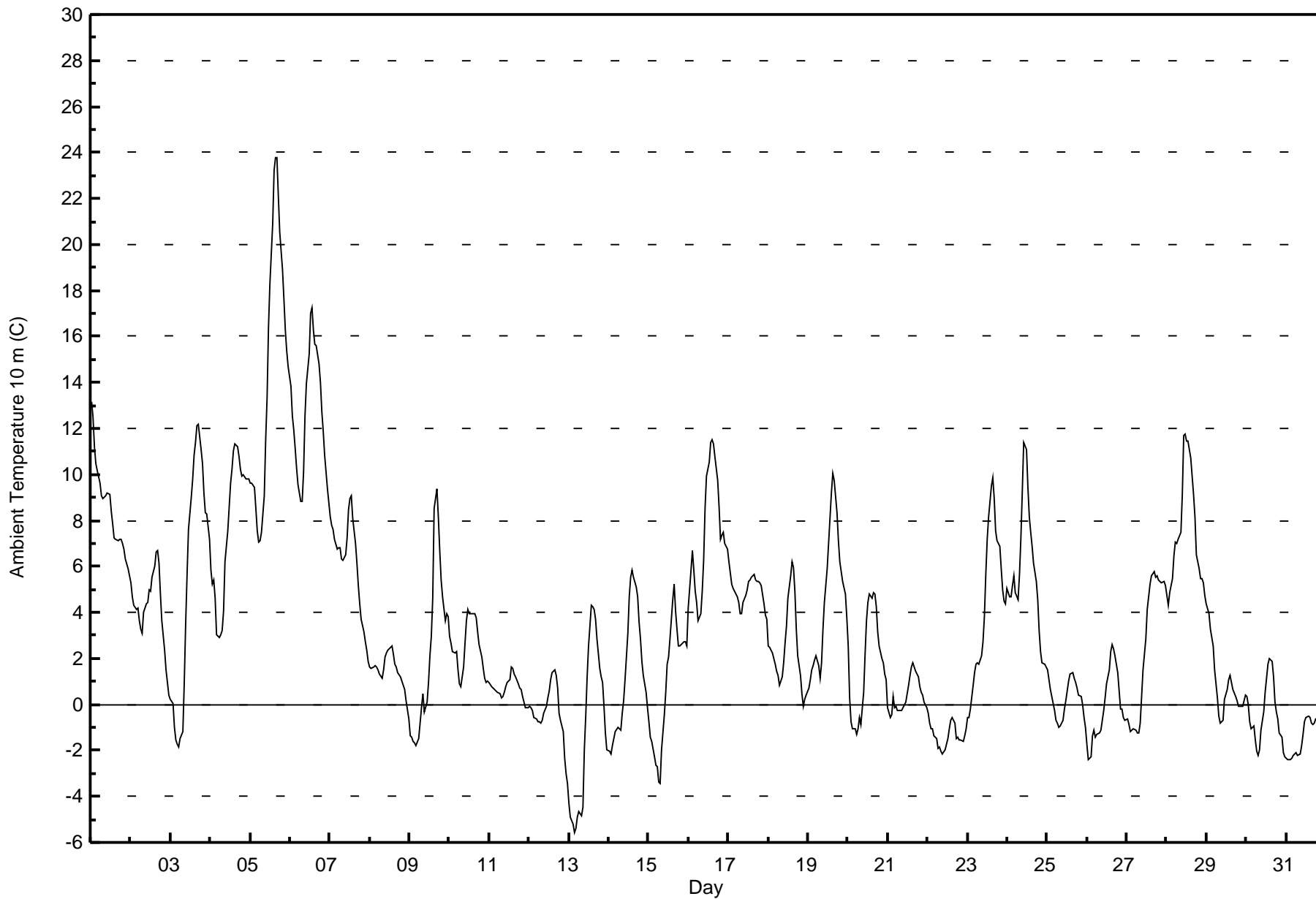
Maximum Value: 23.8 C on Oct 5 16:00      Maximum Daily Average: 14.7 C on Oct 5																				Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0						
Minimum Value: -5.6 C on Oct 13 04:00      Minimum Daily Average: -1.6 C on Oct 31 Maximum Diurnal Average: 6.2 C at hour 16      Minimum Diurnal Average: 1.4 C at hour 8 Monthly Average: 3.43 C      Percentiles: P <sub>1</sub> = -4.5 P <sub>10</sub> = -1.3 Q <sub>1</sub> = -0.1 Median = 2.3 Q <sub>3</sub> = 5.9 P <sub>90</sub> = 9.7 P <sub>99</sub> = 17.4																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	13.1	12.5	11.2	10.5	10.2	9.6	9.0	8.9	9.0	9.1	9.2	9.1	8.4	7.9	7.2	7.2	7.1	7.2	7.2	7.0	6.7	6.3	5.9	5.6	8.6	13.1
2-Oct	5.3	4.7	4.3	4.1	4.2	3.7	3.3	3.1	4.0	4.4	4.4	5.0	5.0	5.5	6.0	6.6	6.7	6.1	4.8	3.6	2.4	1.5	0.9	0.4	4.2	6.7
3-Oct	0.2	0.0	-1.0	-1.6	-1.7	-1.9	-1.5	-1.2	1.0	3.5	5.6	7.6	9.0	9.8	10.9	11.4	12.1	12.2	11.1	10.5	9.2	8.3	8.3	7.2	5.4	12.2
4-Oct	5.8	5.2	5.4	4.6	3.0	2.9	3.1	3.2	4.1	6.2	7.6	8.6	9.6	10.2	11.0	11.3	11.2	10.8	10.2	9.9	10.0	9.8	9.8	9.8	7.6	11.3
5-Oct	9.6	9.6	9.5	8.5	7.6	7.1	7.1	7.5	9.1	11.5	13.4	16.4	18.3	20.9	23.2	23.8	23.7	22.1	20.5	18.9	17.6	16.3	15.3	14.7	14.7	23.8
6-Oct	13.8	12.5	12.0	11.2	10.3	9.5	8.8	8.8	10.1	12.5	14.0	15.3	17.0	17.2	16.3	15.7	15.6	14.8	14.0	12.7	11.9	10.8	9.4	8.7	12.6	17.2
7-Oct	8.2	7.8	7.6	7.2	6.8	6.8	6.8	6.4	6.3	6.5	7.3	8.5	9.0	9.1	8.1	7.0	6.1	5.2	4.4	3.7	3.2	2.7	2.3	1.9	6.2	9.1
8-Oct	1.6	1.5	1.6	1.7	1.6	1.5	1.3	1.1	1.5	2.1	2.2	2.4	2.4	2.6	2.2	1.8	1.6	1.4	1.2	1.0	0.8	0.7	0.2	-0.6	1.5	2.6
9-Oct	-1.4	-1.4	-1.6	-1.7	-1.8	-1.5	-0.8	-0.2	0.4	-0.3	0.1	0.9	2.1	3.0	4.6	8.5	9.4	8.2	6.7	5.4	4.7	3.7	4.0	3.8	2.3	9.4
10-Oct	3.0	2.6	2.3	2.2	2.3	1.5	0.9	0.8	1.6	2.7	3.6	4.1	3.9	4.0	4.0	3.9	3.8	3.2	2.6	2.1	1.6	1.1	0.9	1.0	2.5	4.1
11-Oct	0.9	0.8	0.7	0.6	0.6	0.6	0.5	0.3	0.3	0.5	0.8	1.0	1.1	1.6	1.6	1.3	1.2	0.9	0.7	0.6	0.4	0.1	-0.1	-0.1	0.7	1.6
12-Oct	-0.1	-0.1	-0.2	-0.5	-0.6	-0.8	-0.8	-0.8	-0.7	-0.4	-0.1	0.3	0.6	1.1	1.4	1.5	1.3	0.7	-0.4	-0.7	-1.2	-2.4	-3.0	-3.5	-0.4	1.5
13-Oct	-4.3	-4.9	-5.2	-5.6	-5.4	-4.9	-4.7	-4.8	-4.5	-2.0	-0.5	1.2	2.6	4.3	4.3	4.1	3.7	2.9	1.6	1.2	0.9	-0.1	-1.2	-2.0	-1.0	4.3
14-Oct	-2.0	-2.1	-1.8	-1.5	-1.2	-1.0	-1.1	-1.1	-0.4	0.2	1.1	3.1	4.7	5.5	5.9	5.5	5.1	4.7	3.6	2.9	1.9	1.3	0.6	-0.1	1.4	5.9
15-Oct	-0.7	-1.4	-1.6	-2.3	-2.7	-2.7	-3.4	-3.4	-1.9	-0.4	0.5	1.7	2.1	2.8	4.5	5.2	4.1	3.3	2.5	2.5	2.7	2.7	2.7	2.6	0.8	5.2
16-Oct	4.2	5.9	6.7	5.8	4.9	4.4	3.6	3.9	4.9	6.3	8.5	9.9	10.5	11.4	11.5	11.4	10.8	9.7	8.6	7.2	7.4	7.5	7.0	6.7	7.4	11.5
17-Oct	6.2	5.7	5.2	5.0	4.8	4.7	4.4	4.0	4.0	4.4	4.7	5.0	5.3	5.4	5.5	5.6	5.4	5.4	5.3	5.3	5.2	4.4	3.9	3.7	4.9	6.2
18-Oct	2.5	2.5	2.2	2.0	1.7	1.4	1.2	0.8	1.2	1.8	2.7	3.4	4.6	5.6	6.2	6.0	4.9	3.3	2.1	1.3	0.5	-0.1	0.2	0.4	2.4	6.2
19-Oct	0.7	1.1	1.5	1.7	1.9	2.1	1.7	1.1	1.8	3.3	4.5	5.9	7.0	8.1	9.2	10.0	9.8	8.3	7.1	6.2	5.8	5.3	4.8	3.8	4.7	10.0
20-Oct	2.6	0.3	-0.7	-1.1	-1.0	-1.3	-1.0	-0.5	-0.9	0.5	2.2	3.7	4.4	4.8	4.6	4.8	4.8	4.2	3.2	2.5	2.0	1.8	1.3	1.1	1.8	4.8
21-Oct	-0.2	-0.5	-0.4	0.4	-0.1	-0.1	-0.3	-0.3	-0.3	-0.1	0.0	0.1	0.8	1.3	1.6	1.8	1.6	1.4	1.2	0.8	0.5	0.4	0.1	-0.2	0.4	1.8
22-Oct	-0.4	-0.8	-1.1	-1.1	-1.4	-1.5	-1.9	-1.9	-2.1	-2.1	-2.0	-1.7	-1.5	-1.0	-0.7	-0.6	-0.8	-1.5	-1.4	-1.6	-1.6	-1.6	-1.3	-1.1	-1.4	-0.4
23-Oct	-0.6	-0.6	-0.2	0.8	1.4	1.7	1.8	1.8	2.1	2.7	3.8	5.6	7.2	8.2	9.5	9.9	8.9	7.6	7.1	6.9	5.9	5.0	4.5	4.4	4.4	9.9
24-Oct	5.0	4.7	4.7	5.2	5.6	4.9	4.6	5.7	7.2	9.2	11.4	11.1	9.4	8.1	7.5	6.9	6.1	5.4	4.5	3.2	2.3	1.8	1.8	1.7	5.7	11.4
25-Oct	1.5	1.1	0.7	0.4	-0.2	-0.7	-0.8	-1.0	-0.9	-0.7	-0.2	0.1	0.6	1.0	1.3	1.4	1.2	1.0	0.7	0.4	0.4	0.0	-0.5	-1.0	0.2	1.5
26-Oct	-1.8	-2.4	-2.3	-1.3	-1.1	-1.4	-1.3	-1.2	-1.1	-0.7	-0.3	0.3	0.9	1.5	2.3	2.6	2.4	2.1	1.4	0.6	-0.2	-0.2	-0.6	-0.7	-0.1	2.6
27-Oct	-0.6	-0.9	-1.2	-1.1	-1.1	-1.1	-1.2	-1.2	-0.8	0.3	1.5	2.8	4.1	4.7	5.2	5.6	5.8	5.6	5.6	5.4	5.3	5.3	5.3	5.1	2.4	5.8
28-Oct	4.8	4.3	4.9	5.5	6.5	7.0	7.0	7.2	7.5	9.1	11.7	11.8	11.5	11.5	10.7	9.9	9.2	8.2	6.5	5.9	5.5	5.5	5.3	4.8	7.6	11.8
29-Oct	4.4	3.9	3.3	2.9	2.5	1.5	0.3	-0.5	-0.8	-0.8	-0.7	0.2	0.7	1.1	1.3	1.0	0.6	0.4	0.1	-0.1	-0.1	-0.1	-0.1	0.4	0.9	4.4
30-Oct	0.4	0.0	-0.7	-1.0	-0.9	-1.6	-2.0	-2.2	-1.9	-1.1	-0.3	0.5	1.1	1.7	2.0	1.9	1.2	0.1	-0.4	-0.6	-1.3	-1.4	-2.1	-2.2	-0.5	2.0
31-Oct	-2.3	-2.4	-2.4	-2.3	-2.2	-2.2	-2.1	-2.2	-2.1	-1.8	-1.3	-0.8	-0.6	-0.5	-0.6	-0.8	-0.9	-0.8	-0.6	-0.6	-1.2	-2.0	-2.6	-3.1	-1.6	-0.5
	2.6	2.2	2.0	1.9	1.8	1.6	1.4	1.4	1.9	2.8	3.7	4.6	5.2	5.7	6.1	6.2	5.9	5.3	4.6	4.0	3.5	3.0	2.7	2.4	Diurnal Average	
	13.8	12.5	12.0	11.2	10.3	9.6	9.0	8.9	10.1	12.5	14.0	16.4	18.3	20.9	23.2	23.8	23.7	22.1	20.5	18.9	17.6	16.3	15.3	14.7	Diurnal Maximum	





**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature 10 m (AT 10m) - C**  
**Fort McKay - Bertha Ganter - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature 10 m (AT 10m) - C  
Fort McKay - Bertha Ganter - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	197	26.48	26.48
0 - 10	483	64.92	91.40
10 - 20	58	7.80	99.19
> 20	6	0.81	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Ambient Temperature 2m (AT 2m) - C**

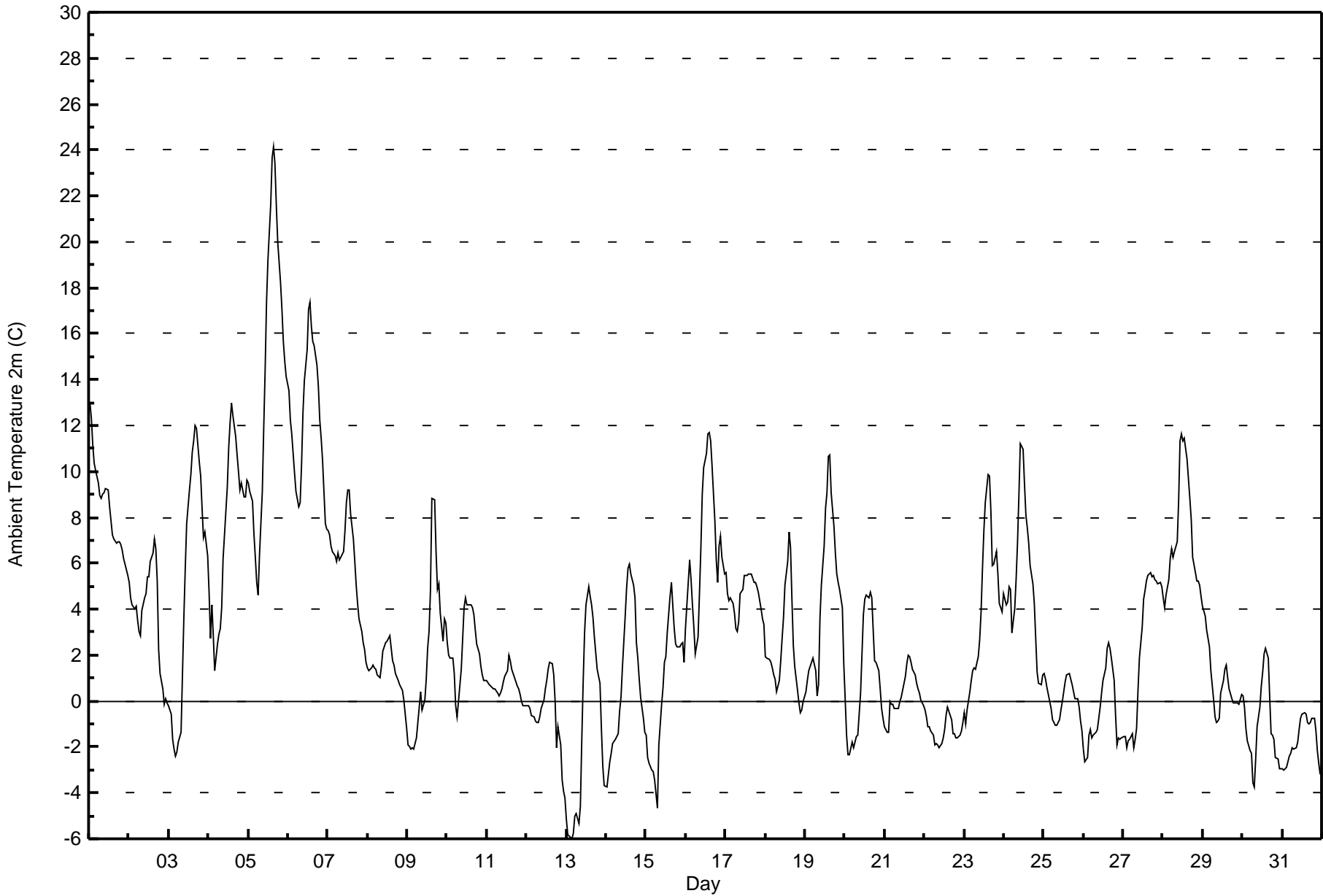
**Fort McKay - Bertha Ganter - October 2017**

Maximum Value: 24.1 C on Oct 5 16:00		Maximum Daily Average: 14.3 C on Oct 5		Hours in Service: 744																							
Minimum Value: -6.0 C on Oct 13 04:00		Minimum Daily Average: -1.7 C on Oct 31		Hours of Data: 744																							
Maximum Diurnal Average: 6.4 C at hour 15		Minimum Diurnal Average: 0.8 C at hour 7		Hours of Missing Data: 0																							
Monthly Average: 3.15 C		Percentiles: P <sub>1</sub> = -4.9 P <sub>10</sub> = -1.8 Q <sub>1</sub> = -0.3 Median = 2.0 Q <sub>3</sub> = 5.5 P <sub>90</sub> = 9.5 P <sub>99</sub> = 18.5		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	13.0	12.3	11.1	10.4	10.1	9.5	8.9	8.8	9.0	9.1	9.2	9.2	8.5	7.9	7.3	7.1	6.9	6.9	7.0	6.8	6.6	6.2	5.7	5.4	8.5	13.0	
2-Oct	5.2	4.5	4.2	4.0	4.1	3.5	3.0	2.9	3.9	4.5	4.7	5.4	5.4	6.1	6.5	7.1	6.6	5.2	2.2	1.2	0.5	-0.1	0.1	-0.1	3.8	7.1	
3-Oct	-0.2	-0.6	-1.7	-2.1	-2.4	-2.2	-1.8	-1.4	1.1	3.6	5.8	7.7	9.2	9.8	10.8	11.3	12.0	11.9	10.4	9.8	8.4	7.1	7.3	6.3	5.0	12.0	
4-Oct	4.8	2.7	4.2	2.8	1.4	2.5	2.9	3.2	4.1	6.2	8.3	9.3	11.0	12.1	13.0	12.4	11.5	10.7	10.0	9.2	9.5	8.9	8.9	9.6	7.5	13.0	
5-Oct	9.5	9.2	8.7	7.3	6.3	5.2	4.6	6.4	9.1	11.9	14.4	17.4	19.2	21.6	23.7	24.1	23.4	21.6	20.0	18.2	17.1	15.7	14.8	14.2	14.3	24.1	
6-Oct	13.5	12.2	11.7	10.8	9.9	9.2	8.5	8.7	10.3	12.5	14.0	15.3	17.1	17.4	16.4	15.7	15.5	14.6	13.7	12.3	11.4	10.5	7.8	7.5	12.3	17.4	
7-Oct	7.4	7.2	6.8	6.5	6.3	6.1	6.5	6.2	6.2	6.5	7.4	8.6	9.2	9.2	8.2	7.1	6.1	5.1	4.3	3.6	3.0	2.6	2.2	1.7	6.0	9.2	
8-Oct	1.5	1.3	1.5	1.5	1.5	1.4	1.1	1.0	1.5	2.2	2.4	2.6	2.6	2.8	2.3	1.8	1.6	1.2	0.9	0.7	0.6	0.5	0.0	-1.2	1.4	2.8	
9-Oct	-1.9	-1.9	-2.1	-2.0	-2.1	-1.6	-0.9	-0.3	0.4	-0.4	0.0	1.0	2.3	3.0	4.8	8.8	8.8	6.5	4.8	5.1	3.8	2.6	3.6	3.4	1.9	8.8	
10-Oct	2.6	2.0	1.9	1.9	1.2	-0.2	-0.7	0.0	1.4	2.7	4.1	4.5	4.2	4.2	4.2	4.1	3.8	3.1	2.5	2.0	1.5	1.1	0.9	0.9	2.2	4.5	
11-Oct	0.9	0.7	0.7	0.6	0.5	0.5	0.4	0.2	0.4	0.6	0.8	1.1	1.3	2.0	1.8	1.4	1.2	0.8	0.6	0.5	0.3	0.0	-0.2	-0.2	0.7	2.0	
12-Oct	-0.2	-0.2	-0.3	-0.6	-0.7	-0.9	-0.9	-0.9	-0.7	-0.3	0.1	0.5	0.9	1.4	1.7	1.6	1.1	0.0	-2.0	-1.1	-1.9	-3.4	-4.0	-4.2	-0.6	1.7	
13-Oct	-5.1	-5.8	-6.0	-6.0	-5.8	-5.0	-4.9	-5.3	-4.6	-1.7	0.9	3.0	4.2	5.0	4.6	4.2	3.7	2.8	1.4	1.1	0.8	-1.2	-2.9	-3.7	-1.1	5.0	
14-Oct	-3.7	-3.2	-2.7	-2.3	-1.8	-1.7	-1.6	-1.4	-0.4	0.2	1.4	3.7	4.9	5.8	6.0	5.5	5.0	4.5	2.6	1.9	1.0	0.1	-0.7	-1.4	0.9	6.0	
15-Oct	-1.5	-2.4	-2.7	-3.0	-3.0	-3.5	-4.1	-4.6	-1.9	-0.1	0.6	1.7	2.0	3.0	4.6	5.2	4.2	3.1	2.5	2.4	2.4	2.5	2.5	1.7	0.5	5.2	
16-Oct	3.2	5.1	6.1	5.3	4.2	3.2	2.1	2.8	4.7	6.6	9.0	10.2	10.8	11.6	11.7	11.3	10.3	7.9	6.1	5.2	6.7	7.2	6.3	5.6	6.8	11.7	
17-Oct	5.6	4.7	4.4	4.5	4.2	3.8	3.1	3.0	3.5	4.7	4.8	5.5	5.5	5.5	5.5	5.6	5.3	5.2	5.1	5.0	4.7	4.0	3.6	3.4	4.6	5.6	
18-Oct	2.0	1.9	1.8	1.7	1.4	1.2	1.0	0.4	0.9	1.7	2.7	3.6	5.0	6.1	7.4	6.7	4.4	2.4	1.5	0.4	-0.1	-0.5	-0.4	0.0	2.2	7.4	
19-Oct	0.4	0.9	1.3	1.5	1.7	1.9	1.3	0.2	0.7	3.6	5.0	6.8	8.4	9.0	10.6	10.7	9.1	7.6	6.4	5.5	5.1	4.8	4.1	1.6	4.5	10.7	
20-Oct	0.1	-1.5	-2.4	-2.3	-1.8	-2.0	-1.8	-1.6	-1.5	0.4	2.1	3.8	4.5	4.6	4.5	4.8	4.5	3.1	1.8	1.7	1.3	0.5	-0.3	-0.8	0.9	4.8	
21-Oct	-1.1	-1.4	-1.3	0.0	-0.2	-0.1	-0.3	-0.3	-0.3	0.0	0.2	0.5	1.1	1.6	2.0	1.9	1.7	1.4	1.1	0.8	0.5	0.4	0.1	-0.2	0.3	2.0	
22-Oct	-0.4	-0.7	-1.1	-1.1	-1.3	-1.5	-1.9	-1.8	-1.9	-2.0	-1.8	-1.6	-1.2	-0.6	-0.3	-0.4	-0.8	-1.4	-1.4	-1.6	-1.6	-1.5	-1.3	-1.0	-1.3	-0.3	
23-Oct	-0.5	-1.0	-0.4	0.4	0.9	1.3	1.4	1.4	1.9	2.7	3.9	5.8	7.5	8.6	9.8	9.8	8.3	5.9	5.9	6.5	5.5	4.2	4.1	3.9	4.1	9.8	
24-Oct	4.7	4.2	4.3	5.0	4.9	3.0	4.0	5.3	6.9	9.0	11.2	10.9	9.5	8.1	7.5	6.9	5.9	5.1	4.2	2.7	1.3	0.8	0.7	1.1	5.3	11.2	
25-Oct	1.2	1.0	0.6	0.3	-0.3	-0.8	-0.9	-1.1	-1.1	-0.8	-0.4	0.0	0.4	0.8	1.1	1.2	0.9	0.7	0.4	0.1	0.1	-0.2	-0.8	-1.3	0.0	1.2	
26-Oct	-2.1	-2.7	-2.5	-1.5	-1.2	-1.6	-1.5	-1.4	-1.2	-0.7	-0.3	0.3	0.9	1.5	2.3	2.6	2.3	1.9	0.9	-0.6	-1.9	-1.6	-1.7	-1.6	-0.5	2.6	
27-Oct	-1.6	-1.5	-2.0	-1.7	-1.7	-1.4	-2.1	-1.7	-1.2	0.5	1.9	3.2	4.4	4.8	5.2	5.5	5.6	5.4	5.4	5.3	5.2	5.1	5.2	5.0	2.2	5.6	
28-Oct	4.5	4.0	4.6	5.3	6.2	6.6	6.2	6.5	6.9	8.7	11.3	11.6	11.3	11.4	10.5	9.7	8.8	7.9	6.2	5.6	5.2	5.2	5.0	4.6	7.3	11.6	
29-Oct	4.1	3.7	3.1	2.7	2.3	1.3	0.1	-0.7	-1.0	-0.9	-0.7	0.3	0.9	1.4	1.6	1.0	0.5	0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.3	0.8	4.1	
30-Oct	0.2	-0.3	-1.2	-1.7	-2.2	-2.3	-3.6	-3.8	-2.5	-1.1	-0.3	0.6	1.3	2.1	2.3	1.9	0.2	-1.4	-1.5	-1.7	-2.5	-2.5	-3.0	-2.9	-1.1	2.3	
31-Oct	-3.0	-3.0	-2.9	-2.7	-2.4	-2.3	-2.0	-2.1	-2.1	-1.8	-1.3	-0.7	-0.6	-0.5	-0.6	-0.9	-1.0	-0.9	-0.8	-0.7	-1.3	-2.1	-2.7	-3.2	-1.7	-0.5	
		2.0	1.7	1.5	1.5	1.3	1.1	0.8	0.9	1.7	2.8	3.9	4.9	5.5	6.0	6.4	6.3	5.7	4.8	3.9	3.5	3.0	2.5	2.1	1.8	Diurnal Average	
		13.5	12.3	11.7	10.8	10.1	9.5	8.9	8.8	10.3	12.5	14.4	17.4	19.2	21.6	23.7	24.1	23.4	21.6	20.0	18.2	17.1	15.7	14.8	14.2	Diurnal Maximum	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature 2m (AT 2m) - C**  
**Fort McKay - Bertha Ganter - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C  
Fort McKay - Bertha Ganter - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	213	28.63	28.63
0 - 10	467	62.77	91.40
10 - 20	59	7.93	99.33
> 20	5	0.67	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %**

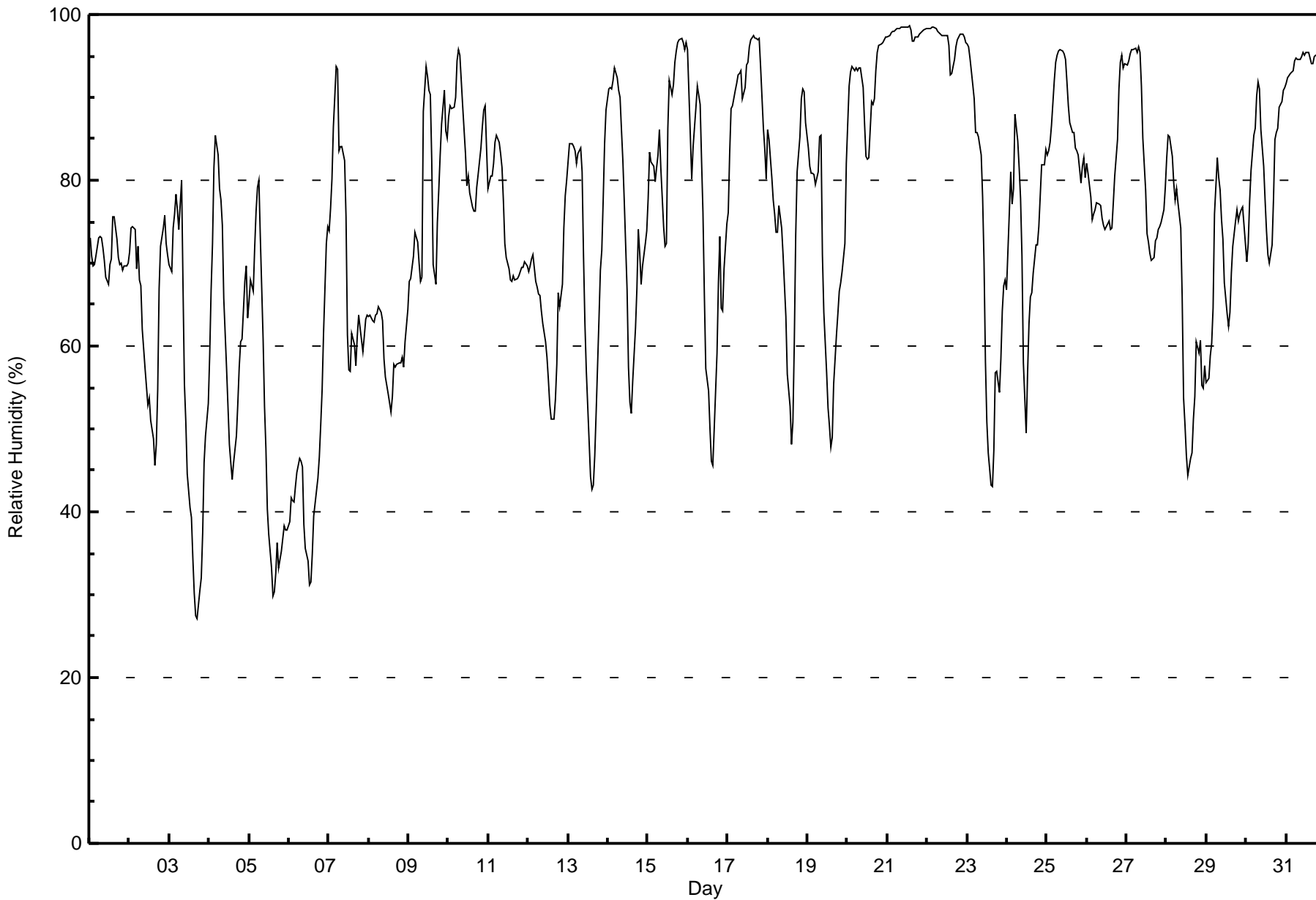
**Fort McKay - Bertha Ganter - October 2017**

Maximum Value: 99 % on Oct 21 14:00      Maximum Daily Average: 97.9 % on Oct 21																			Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Minimum Value: 27 % on Oct 3 18:00      Minimum Daily Average: 45.0 % on Oct 6 Maximum Diurnal Average: 82.6 % at hour 6      Minimum Diurnal Average: 63.9 % at hour 15 Monthly Average: 74.5 %      Percentiles: P <sub>1</sub> = 31 P <sub>10</sub> = 51 Q <sub>1</sub> = 64 Median = 76 Q <sub>3</sub> = 89 P <sub>90</sub> = 95 P <sub>99</sub> = 98																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	73	71	70	70	71	73	73	73	72	70	68	67	70	71	76	76	73	71	70	70	69	70	70	70	71.0	76
2-Oct	71	74	74	74	69	72	68	67	62	57	55	53	54	51	49	46	48	55	67	72	74	76	72	71	63.8	76
3-Oct	70	69	74	76	78	76	74	80	67	55	51	45	41	39	34	30	27	27	31	32	38	46	49	53	52.6	80
4-Oct	59	67	72	82	86	83	79	78	74	66	57	53	48	46	44	46	49	53	58	60	61	68	70	63	63.4	86
5-Oct	65	68	67	72	76	79	80	73	61	53	48	40	37	33	30	30	33	36	33	35	37	38	38	38	50.0	80
6-Oct	39	42	41	41	43	45	46	46	45	39	36	34	31	32	35	40	41	44	47	51	55	62	72	74	45.0	74
7-Oct	74	77	80	86	94	93	84	84	84	82	76	61	57	57	61	60	58	61	64	62	59	61	63	64	71.0	94
8-Oct	64	64	63	63	64	64	65	64	63	59	56	55	54	52	54	58	57	58	58	58	59	57	61	64	59.7	65
9-Oct	68	68	69	71	74	72	70	68	68	88	94	93	91	90	82	70	67	75	79	83	87	91	86	85	78.7	94
10-Oct	88	89	89	89	90	94	96	95	89	86	83	79	80	79	77	76	76	79	81	84	86	88	89	84	85.3	96
11-Oct	79	80	81	82	85	85	85	83	82	78	72	71	69	68	68	68	68	68	68	69	69	70	70	70	74.5	85
12-Oct	69	70	71	71	68	67	66	66	64	63	61	59	56	53	51	51	54	58	66	65	67	74	78	80	64.5	80
13-Oct	82	84	84	84	83	82	83	84	81	71	63	57	53	44	43	43	47	52	63	69	72	78	84	88	69.8	88
14-Oct	91	91	91	92	94	92	91	90	86	82	78	67	58	53	52	56	62	67	74	71	68	70	72	74	75.9	94
15-Oct	78	83	82	82	80	81	83	86	82	74	72	72	86	92	90	92	94	96	97	97	97	97	96	97	86.9	97
16-Oct	96	85	80	84	86	89	91	89	82	76	66	57	55	50	46	46	50	59	68	73	65	64	69	75	70.9	96
17-Oct	76	83	89	89	91	92	93	93	93	90	91	94	94	96	97	98	97	97	97	97	94	86	84	80	91.3	98
18-Oct	86	85	80	78	76	74	74	77	74	71	67	63	57	53	48	51	61	73	81	85	90	91	91	87	73.8	91
19-Oct	84	82	81	81	81	80	81	85	85	71	64	57	53	50	48	49	55	61	64	67	68	69	72	82	69.5	85
20-Oct	87	91	93	94	93	94	93	94	94	91	87	83	83	83	89	89	90	93	95	96	96	97	97	97	91.6	97
21-Oct	97	98	98	98	98	98	98	98	98	98	98	99	99	99	98	97	97	97	97	97	98	98	98	98	97.9	99
22-Oct	98	98	98	98	98	98	98	98	98	98	97	98	98	96	93	93	95	96	97	97	98	98	97	97	97.1	98
23-Oct	96	96	95	92	90	86	86	85	83	78	70	58	51	47	43	43	47	57	57	54	59	64	67	68	69.7	96
24-Oct	67	76	81	77	79	88	85	82	78	71	58	49	57	63	66	66	69	72	72	74	78	82	82	84	73.2	88
25-Oct	83	84	85	87	92	94	95	96	96	96	95	95	92	89	87	86	86	84	84	83	80	82	83	80	87.9	96
26-Oct	82	81	78	75	76	76	77	77	77	75	75	74	74	75	74	74	77	81	85	91	94	95	94	94	80.5	95
27-Oct	94	94	95	96	96	96	96	96	96	91	85	79	73	73	71	70	71	73	73	74	74	75	76	79	83.2	96
28-Oct	83	85	85	83	80	78	79	77	74	66	54	51	47	44	46	47	51	54	61	59	61	55	55	58	63.8	85
29-Oct	56	56	59	60	65	76	83	80	79	75	73	68	64	62	64	69	72	75	76	75	76	76	77	72	70.3	83
30-Oct	70	72	78	81	85	86	90	92	91	86	82	78	74	71	70	72	78	85	86	86	89	89	91	91	82.2	92
31-Oct	92	92	93	93	93	94	95	95	95	95	95	95	95	95	95	94	94	95	95	95	93	91	89	88	93.6	95
	77.9	79.3	79.9	80.6	81.7	82.6	82.4	82.3	79.8	75.9	71.8	67.8	66.1	64.7	63.9	64.0	65.9	69.4	72.3	73.7	74.5	76.0	77.2	77.6	Diurnal Average	
	98	98	98	98	98	98	98	98	98	98	98	99	99	99	98	98	97	97	97	97	98	98	98	98	Diurnal Maximum	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Fort McKay - Bertha Ganter - October 2017**





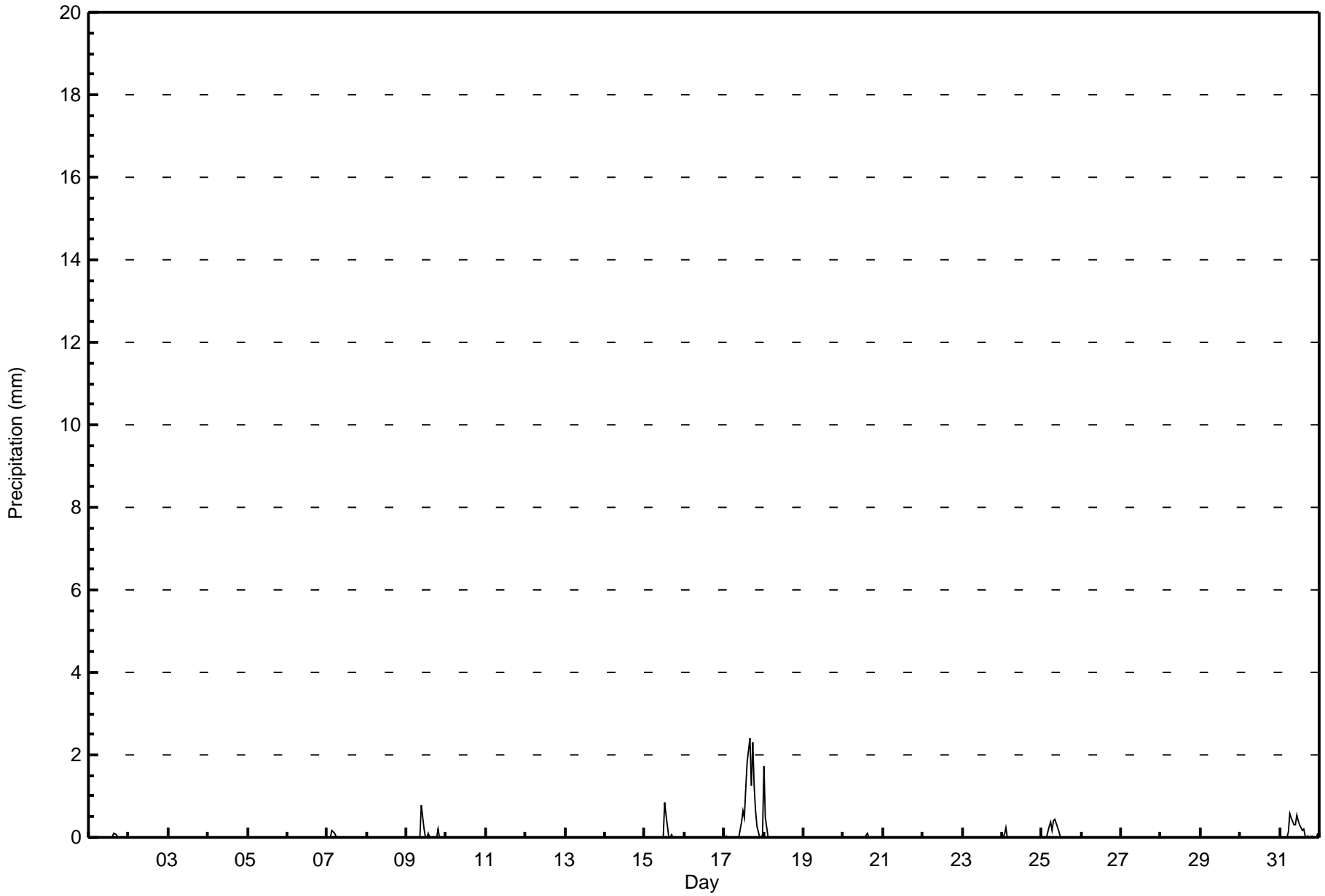
Maximum Value: 2.4 mm on Oct 17 16:00		Maximum Daily Total: 12.8 mm on Oct 17		Hours in Service: 744																							
Minimum Value: 0.0 mm on Oct 1 01:00		Minimum Daily Total: 0.0 mm on Oct 2		Hours of Data: 744																							
Maximum Diurnal Total: 2.5 mm at hour 16		Minimum Diurnal Total: 0.0 mm at hour 22		Hours of Missing Data: 0																							
Monthly Total: 24.22 mm		Percentiles: P <sub>1</sub> = 0.0 P <sub>10</sub> = 0.0 Q <sub>1</sub> = 0.0 Median = 0.0 Q <sub>3</sub> = 0.0 P <sub>90</sub> = 0.0 P <sub>99</sub> = 1.1		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	
2-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-Oct	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2
8-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	1.3	0.8	
10-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.6	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.8	
16-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17-Oct	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.7	0.5	1.2	1.8	2.4	1.3	2.3	1.2	0.7	0.3	0.0	0.0	0.1	12.8	2.4	
18-Oct	1.7	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	1.7		
19-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
20-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	
21-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24-Oct	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.2	
25-Oct	0.0	0.0	0.0	0.0	0.3	0.4	0.2	0.4	0.4	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.4	0.4	
26-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31-Oct	0.0	0.0	0.0	0.0	0.0	0.1	0.6	0.5	0.3	0.3	0.5	0.4	0.3	0.2	0.2	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.1	3.6	0.6	0.6	
																								Diurnal Average			
																								Diurnal Maximum			





**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Precipitation (PC) - mm**  
**Fort McKay - Bertha Ganter - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Precipitation (PC) - mm**  
**Fort McKay - Bertha Ganter - October 2017**

<b>Concentration Ranges (mm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	722	97.04	97.04
0.4 - 0.5	9	1.21	98.25
0.6 - 0.7	4	0.54	98.79
0.8 - 1.4	5	0.67	99.46
1.5 - 10	4	0.54	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



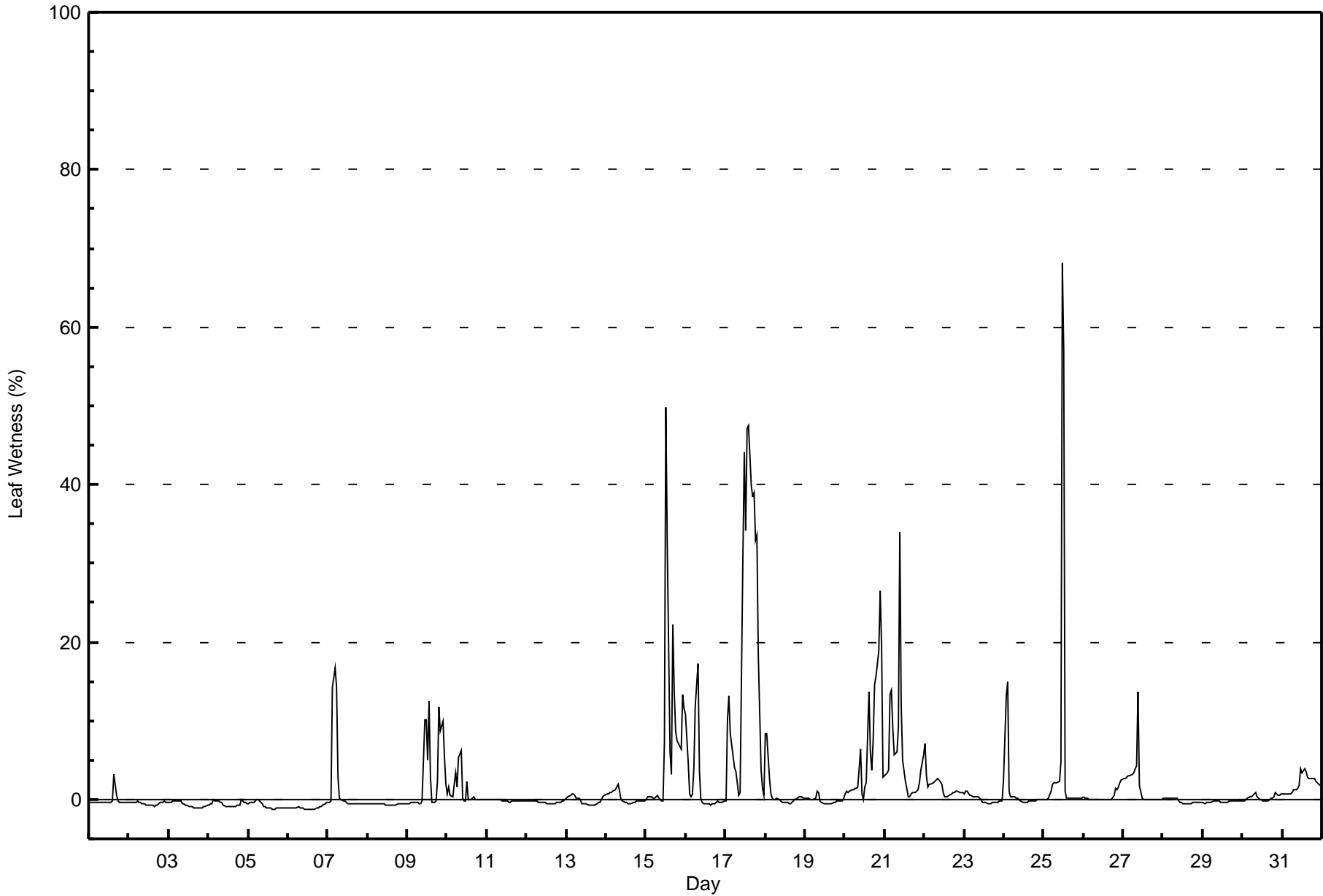
**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Leaf Wetness (LW) - %**

**Fort McKay - Bertha Ganter - October 2017**

Maximum Value: 68 % on Oct 25 12:00														Maximum Daily Average: 19.1 % on Oct 17														Hours in Service: 744			
Minimum Value: -1 % on Oct 6 14:00														Minimum Daily Average: -1.1 % on Oct 6														Hours of Data: 744			
Maximum Diurnal Average: 4.6 % at hour 13														Minimum Diurnal Average: 0.7 % at hour 24														Hours of Missing Data: 0			
Monthly Average: 1.8 %														Percentiles: P <sub>1</sub> = -1 P <sub>10</sub> = -1 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 4 P <sub>99</sub> = 36														Hours of Calibration: 0			
																												Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24							
1-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	-0.2	3					
2-Oct	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	-0.5	0					
3-Oct	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-0.7	0					
4-Oct	-1	-1	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	-0.6	0					
5-Oct	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-0.8	0					
6-Oct	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	-1.1	0					
7-Oct	0	0	0	14	17	14	3	0	0	0	0	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	1.7	17					
8-Oct	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-0.6	-1					
9-Oct	0	0	0	0	0	0	0	0	0	0	10	10	5	12	3	0	0	0	2	12	9	10	5	2	3.1	12					
10-Oct	1	2	1	0	2	3	2	5	6	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1.0	6					
11-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-0.2	0					
12-Oct	0	0	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	0	0	0	0	0	0	0	0	-0.4	0					
13-Oct	0	0	1	1	1	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0	-0.2	1					
14-Oct	1	1	1	1	1	1	2	2	1	0	0	0	-1	-1	0	0	0	0	0	0	0	0	0	0	0.2	2					
15-Oct	0	0	0	0	0	0	0	0	0	0	0	7	50	33	6	3	22	14	9	7	7	6	13	12	8.0	50					
16-Oct	11	5	1	0	1	4	12	17	3	0	0	-1	0	-1	-1	-1	-1	0	0	0	0	0	0	0	2.0	17					
17-Oct	0	10	13	8	6	4	3	2	1	1	31	44	34	47	47	40	38	39	33	34	18	4	1	0	19.1	47					
18-Oct	8	8	3	1	0	0	0	0	0	0	0	0	0	-1	-1	0	0	0	0	0	0	0	0	0	0.8	8					
19-Oct	0	0	0	0	0	0	0	1	1	0	0	-1	0	-1	-1	-1	0	0	0	0	0	0	0	0	-0.1	1					
20-Oct	1	1	1	1	1	1	1	1	2	6	1	0	2	2	14	6	4	8	15	16	19	27	19	3	6.3	27					
21-Oct	3	3	4	13	14	9	6	6	9	34	12	5	2	1	0	0	1	1	1	1	1	2	4	6	5.8	34					
22-Oct	7	3	2	2	2	2	2	3	3	2	2	1	0	0	0	1	1	1	1	1	1	1	1	1	1.6	7					
23-Oct	1	1	1	1	0	0	0	0	0	0	0	0	0	-1	-1	-1	0	0	0	0	0	0	0	0	0.0	1					
24-Oct	3	13	15	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.3	15					
25-Oct	0	0	0	0	1	2	2	2	2	2	5	68	57	1	0	0	0	0	0	0	0	0	0	0	6.0	68					
26-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	2	3	0.4	3					
27-Oct	3	3	3	3	3	3	3	4	4	14	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1.9	14					
28-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	0	0	0	0	0	0	0	-0.2	0					
29-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-0.3	0					
30-Oct	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.2	1					
31-Oct	1	1	1	1	1	1	1	1	1	1	2	4	3	4	4	3	3	3	3	3	2	2	2	2	2.0	4					
1.0														1.5														Diurnal Average			
11														13														Diurnal Maximum			





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Leaf Wetness (LW) - %**  
**Fort McKay - Bertha Ganter - October 2017**

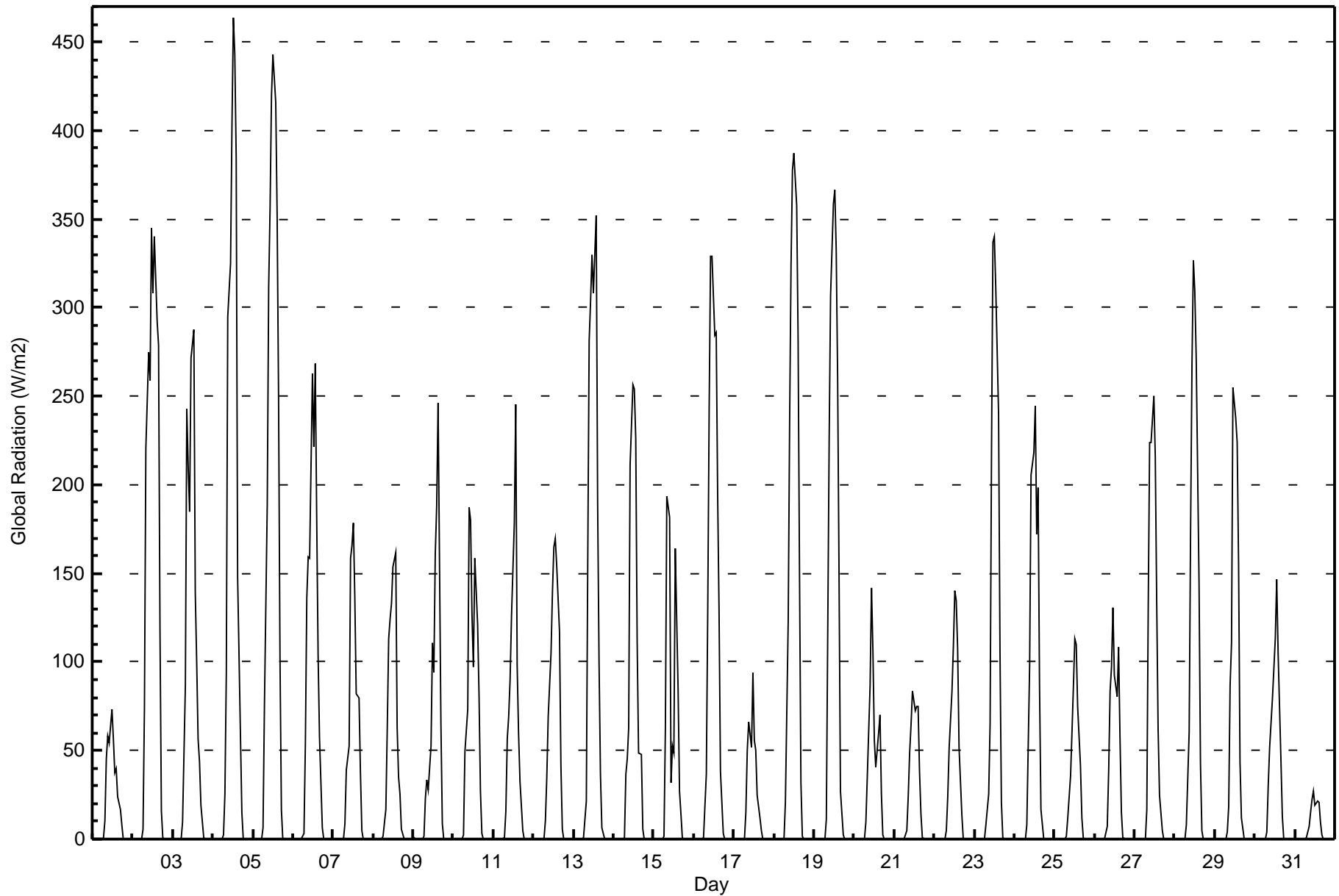
<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	99	29.55	29.55
0.4 - 0.5	23	6.87	36.42
0.6 - 0.7	19	5.67	42.09
0.8 - 1.4	46	13.73	55.82
1.5 - 10	101	30.15	85.97
> 10	45	13.43	99.40

Total Number of Valid Hours: 335

Total Number of Hours: 744



Maximum Value: 464 W/m2 on Oct 4 13:00																			Maximum Daily Average: 122.5 W/m2 on Oct 5						Hours in Service: 744	
Minimum Value: 0 W/m2 on Oct 1 01:00																			Minimum Daily Average: 6.1 W/m2 on Oct 31						Hours of Data: 744	
Maximum Diurnal Average: 206.5 W/m2 at hour 12																			Minimum Diurnal Average: 0.0 W/m2 at hour 3						Hours of Missing Data: 0	
Monthly Average: 53.6 W/m2																			Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 65 P <sub>90</sub> = 208 P <sub>99</sub> = 372						Hours of Calibration: 0	
																									Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	0	0	0	1	10	45	59	54	73	56	37	40	24	17	8	0	0	0	0	0	0	17.7	73
2-Oct	0	0	0	0	0	0	5	74	220	275	259	345	308	340	293	279	119	16	1	0	0	0	0	0	105.6	345
3-Oct	0	0	0	0	0	0	9	87	243	210	184	272	287	140	101	56	44	19	1	0	0	0	0	0	68.9	287
4-Oct	0	0	0	0	0	0	2	25	94	294	325	403	464	443	384	148	59	15	0	0	0	0	0	0	110.8	464
5-Oct	0	0	0	0	0	0	7	76	189	311	357	420	443	416	352	250	103	17	0	0	0	0	0	0	122.5	443
6-Oct	0	0	0	0	0	0	3	54	136	159	158	263	221	269	182	105	57	6	0	0	0	0	0	0	67.3	269
7-Oct	0	0	0	0	0	0	0	9	39	52	159	166	178	137	82	79	37	4	0	0	0	0	0	0	39.3	178
8-Oct	0	0	0	0	0	0	2	17	63	113	124	133	153	162	63	35	25	5	0	0	0	0	0	0	37.3	162
9-Oct	0	0	0	0	0	0	2	23	34	28	52	111	94	161	188	246	65	8	0	0	0	0	0	0	42.2	246
10-Oct	0	0	0	0	0	0	2	50	73	187	180	126	98	159	121	81	27	3	0	0	0	0	0	0	46.2	187
11-Oct	0	0	0	0	0	0	1	16	56	70	90	126	178	246	98	60	32	5	0	0	0	0	0	0	40.7	246
12-Oct	0	0	0	0	0	0	0	10	35	69	105	139	165	170	155	117	41	6	0	0	0	0	0	0	42.2	170
13-Oct	0	0	0	0	0	0	1	21	156	281	304	330	308	352	190	100	36	6	0	0	0	0	0	0	87.0	352
14-Oct	0	0	0	0	0	0	1	36	45	63	211	256	254	226	112	48	47	6	0	0	0	0	0	0	54.5	256
15-Oct	0	0	0	0	0	0	2	63	194	181	32	53	48	164	84	27	14	1	0	0	0	0	0	0	36.0	194
16-Oct	0	0	0	0	0	0	1	37	129	243	329	329	284	286	195	129	38	3	0	0	0	0	0	0	83.5	329
17-Oct	0	0	0	0	0	0	0	15	50	66	52	94	56	50	25	12	5	0	0	0	0	0	0	0	17.8	94
18-Oct	0	0	0	0	0	0	0	20	123	236	325	377	387	358	282	150	32	2	0	0	0	0	0	0	95.5	387
19-Oct	0	0	0	0	0	0	0	11	118	225	307	359	366	332	260	149	27	2	0	0	0	0	0	0	89.9	366
20-Oct	0	0	0	0	0	0	0	10	35	87	142	106	56	41	60	70	26	2	0	0	0	0	0	0	26.5	142
21-Oct	0	0	0	0	0	0	0	5	24	48	64	83	72	75	75	38	15	1	0	0	0	0	0	0	20.9	83
22-Oct	0	0	0	0	0	0	0	5	24	52	83	109	140	135	108	52	13	0	0	0	0	0	0	0	30.1	140
23-Oct	0	0	0	0	0	0	0	8	26	66	219	337	340	311	240	106	21	1	0	0	0	0	0	0	69.7	340
24-Oct	0	0	0	0	0	0	0	8	52	98	206	218	245	172	198	87	17	0	0	0	0	0	0	0	54.2	245
25-Oct	0	0	0	0	0	0	0	1	12	36	60	86	113	110	75	41	12	0	0	0	0	0	0	0	22.8	113
26-Oct	0	0	0	0	0	0	0	7	39	84	97	130	92	81	108	57	15	1	0	0	0	0	0	0	29.7	130
27-Oct	0	0	0	0	0	0	0	17	131	224	224	250	216	134	62	24	5	0	0	0	0	0	0	0	53.6	250
28-Oct	0	0	0	0	0	0	0	8	60	174	268	327	309	271	144	43	5	0	0	0	0	0	0	0	67.0	327
29-Oct	0	0	0	0	0	0	0	4	19	87	111	255	238	223	156	44	12	0	0	0	0	0	0	0	47.8	255
30-Oct	0	0	0	0	0	0	0	4	30	52	79	97	113	147	105	45	13	0	0	0	0	0	0	0	28.5	147
31-Oct	0	0	0	0	0	0	0	1	7	15	22	27	19	22	21	10	2	0	0	0	0	0	0	0	6.1	27
																			0.0 0.0 0.0 0.0 0.0 0.0 1.3 23.6 80.8 133.7 167.2 206.5 203.3 199.0 147.0 87.6 31.8 4.5 0.1 0.0 0.0 0.0 0.0 0.0 0.0						Diurnal Average	
																			0 0 0 0 0 0 9 87 243 311 357 420 464 443 384 279 119 19 1 0 0 0 0 0 0						Diurnal Maximum	





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Global Radiation (GR) - W/m2**  
**Fort McKay - Bertha Ganter - October 2017**

<b>Concentration Ranges (W/m2)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	474	63.71	63.71
21 - 100	123	16.53	80.24
101 - 300	114	15.32	95.56
301 - 600	33	4.44	100.00
601 - 900	0	0.00	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



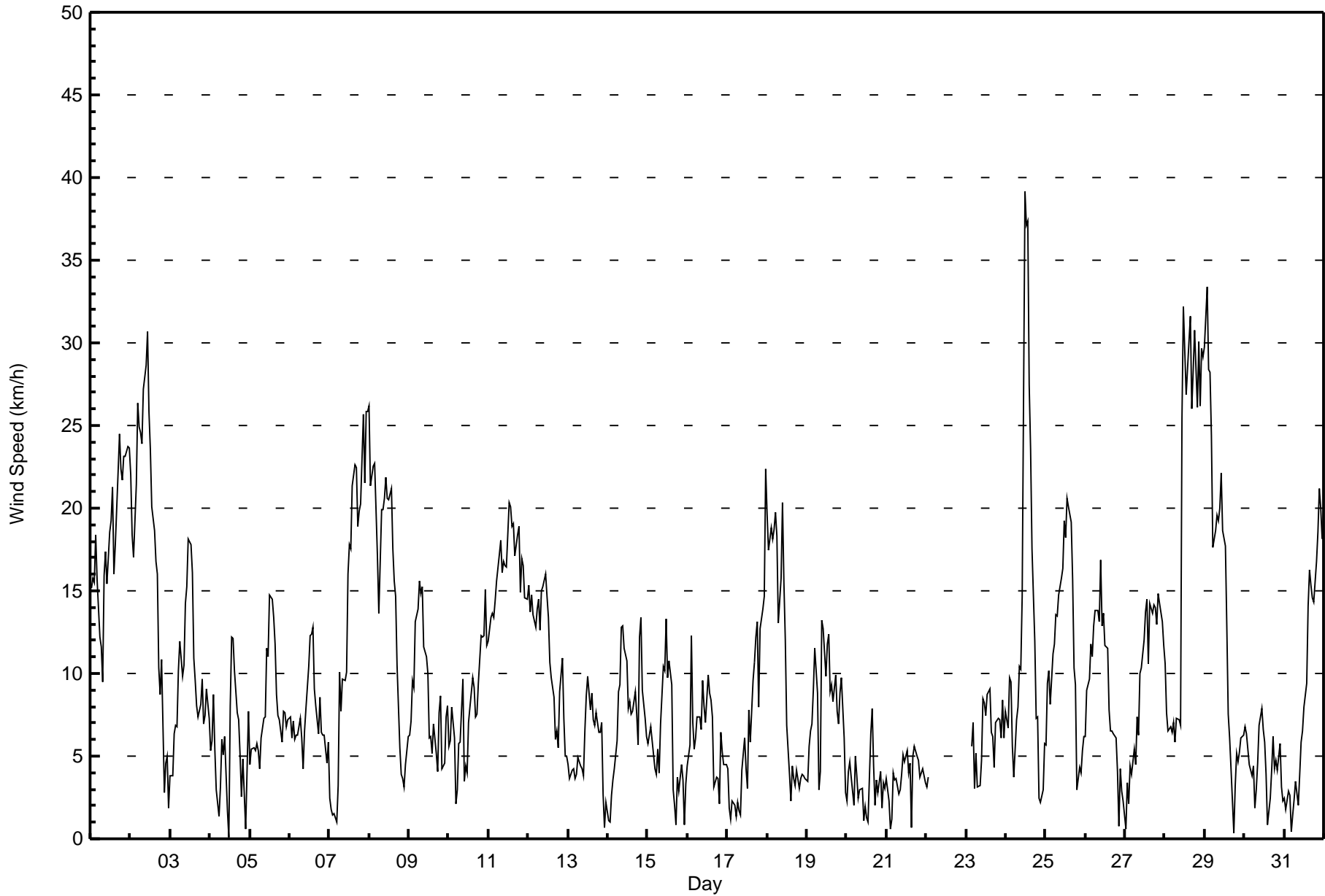


Maximum Speed: 39 km/h on Oct 24 12:00	Maximum Daily Speed Average: 17.3 km/h on Oct 1	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 4 12:00	Minimum Daily Speed Average: 1.3 km/h on Oct 21	Hours of Data: 720
Maximum Diurnal Speed Average: 5.7 km/h at hour 16	Minimum Diurnal Speed Average: 2.3 km/h at hour 10	Hours of Missing Data: 24
Monthly Average Velocity: 4.1 km/h 308.6 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 5 Median = 8 Q <sub>3</sub> = 14 P <sub>90</sub> = 20 P <sub>99</sub> = 30	Percent Operational Time: 96.8

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	NW15	NNW16	NNW16	NNW18	NNW16	NNW12	NNW12	WNW9	NW16	NW17	NNW15	NNW19	NNW19	NNW21	NNW16	NNW18	NNW22	NNW25	NNW22	NNW22	NNW23	NNW23	NNW24	NNW24	NNW17.3	NNW25
2-Oct	N22	NNW18	NNW17	NNW21	NNW26	NNW25	N25	N24	N27	N29	N31	N26	N24	N20	NNW19	NNW17	NNW16	NNW10	WNW9	WNW11	WSW3	W5	W5	WSW2	NNW17.0	N31
3-Oct	SW4	SSW4	S6	SSW7	SSW7	S10	S12	S10	S11	S14	S15	S18	S18	S16	SSW11	SSW10	WSW8	W7	W8	WNW10	W7	WNW7	WNW9	WNW7	SSW7.7	S18
4-Oct	WNW5	NW6	NNW9	NW5	W3	SW1	W3	W6	W5	WNW6	ENE0	ENE0	SSE8	SSE12	SSE12	SSE10	SSE8	SSE7	SE5	SSE3	S5	SW1	SSE4	S8	S2.1	SSE12
5-Oct	SSE4	S5	S6	SSW5	S6	SSW5	SSW4	S6	SSW7	S7	SSE12	SSE11	SSE15	S14	SSW13	SSW12	SW9	SW7	WSW7	WSW6	WSW8	W8	W7	W7	SSW6.7	SSE15
6-Oct	WSW7	WSW6	WSW7	WSW6	SW6	WSW6	WSW7	SSW6	S4	SW7	WSW8	WSW10	WSW12	WSW12	W13	W9	WSW8	WSW6	W9	W6	W6	W6	WNW5	WNW6	WSW7.1	W13
7-Oct	SW2	S2	SW1	WSW2	WNW1	NW3	N10	N8	N10	N10	NNW10	NNW16	NNW18	NNW18	NNW21	NNW23	NNW22	NNW19	NNW20	NNW20	NNW26	NNW22	NW26	NW26	NNW13.3	NW26
8-Oct	NW26	NW21	NW23	NW23	NW20	NNW17	NNW14	NW20	NW20	NW21	NW22	NW21	NW21	NW21	NW18	NW16	NW15	NW10	WNW5	W4	W4	WSW3	SSW4	SW6	NW14.7	NW26
9-Oct	SSW6	S7	S10	S9	SSE13	SSE14	S16	S15	S15	S12	S11	S10	S6	SW6	WSW5	WSW7	WSW5	SSW4	WNW8	SW9	W4	W5	W7	W8	SSW6.9	S16
10-Oct	WSW6	W6	W8	WNW6	SW2	WSW3	WNW6	W6	NW10	NNW4	NE4	NE4	N7	NNE8	NNE10	NNE9	NNE7	NNE8	NNE9	N12	N12	N12	N15	N12	N5.6	N15
11-Oct	N12	N13	N14	N13	N14	NNE16	N17	N18	N16	N17	NNE17	N16	N20	N20	N19	N19	N17	N18	N19	N15	N17	N17	N15	N14	N16.3	N20
12-Oct	N15	N14	N15	N14	N13	NNW14	NNW15	NNW13	NNW15	NNW15	NNW16	N15	NNW13	N11	N10	N9	N6	NNW7	WNW6	WNW9	NW11	NW7	WNW5	WNW5	NNW10.6	NNW16
13-Oct	WNW5	WNW4	WNW4	W4	WNW4	SSE4	S5	SSW4	SSW4	S4	SSE7	SE9	SE10	SSW8	SW9	WSW7	SW7	WSW8	SW6	WSW6	SW7	NNW3	W1	SSE2	SW3.7	SE10
14-Oct	WSW1	SE1	S3	S4	S4	S6	SSE9	S9	S13	S13	SSE12	S11	WSW8	WSW8	WSW8	WSW8	W9	WNW8	WNW6	WNW12	WNW13	WNW9	W7	W6	SW4.7	WNW13
15-Oct	WSW6	W6	W7	WSW5	SW4	S4	SSW5	S4	SSE7	SSE10	SSE10	S13	S10	SSE11	S9	S3	NE2	N1	NNW4	NNW3	WNW4	W4	NW1	WNW3	SSW3.4	S13
16-Oct	SW4	SW6	W12	W7	WSW5	S6	S7	SSW7	S7	S10	S8	SW7	SW10	SSW9	SW8	W7	W3	S4	SSW4	SW2	SSW6	SSW5	S5	S5	SW5.4	WNW12
17-Oct	S4	S2	S1	SE2	WNW2	NNE1	NE2	SE2	SSE1	SSE4	S6	SE4	NNW3	N8	N6	NNW10	NW11	NW12	NW13	WNW8	WNW13	NW14	WNW15	WNW22	NW4.4	WNW22
18-Oct	WNW20	WNW17	WNW19	WNW18	WNW19	NW20	NW18	WNW13	WNW16	NW20	NW15	NW12	WNW7	WNW4	E2	ENE4	E4	NE3	E4	ENE3	N4	NNW4	ESE4	E4	NW8.5	NW20
19-Oct	ENE4	E6	ESE7	ESE7	SE9	SSE12	SSE9	SSE3	SE4	SSE13	S13	SSE10	SSE12	SSE12	SSE9	SSE9	SE8	SSE10	SSE8	SSE7	SSE9	SSE10	SSE6	SE3	SSE7.7	SSE13
20-Oct	NW2	NNW4	NW5	NW4	NW2	NNW5	NNW4	NW2	NW3	NW3	N1	NNE2	WNW1	NNE1	WNW6	WNW8	W4	SW2	S4	S3	S4	SW2	NW3	NW3	WNW2.3	WNW8
21-Oct	N4	WNW2	SW1	NW1	N4	NNW4	WNW4	WNW3	NW3	S4	S5	SSE5	SSE5	SSE4	SSE5	E1	NNW5	N6	NNW5	NNW5	NW4	NW4	NW4	NW3	NW1.3	N6
22-Oct	SW3	SSE4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	NNW3	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	SSE4
23-Oct	AF	AF	AF	W6	WNW7	WSW3	SSE5	SW3	SW3	WSW5	WNW9	W8	W7	SW9	SW9	SW6	S6	S4	SSW7	SSW7	SSW7	S6	S8	S6	SW4.9	SW9
24-Oct	S8	S7	SSE10	S9	S6	WNW4	SW7	W8	W10	W10	WNW15	NW39	NW37	NW37	NW27	NW24	NW18	N12	N7	NNE7	NNE2	N2	NNE3	N6	NW9.0	NW39
25-Oct	N6	N9	N10	NNE8	N11	N12	N14	N13	N15	N16	N16	N19	N18	N21	NNW20	NNW19	NNW16	NNW10	WNW9	NNW3	WNW4	W4	W5	W6	N11.0	N21
26-Oct	SW6	SW9	SSW10	SSW12	SSW11	SSW13	S14	S14	S13	S17	S13	S14	SSW12	SSW12	SSW8	SSW7	S7	S6	SSW6	S4	W1	W4	W3	NNW2	SSW8.4	S17
27-Oct	ENE1	SSE3	S2	S4	S4	S5	S5	S7	S6	SSE10	SSE10	S12	S14	S15	S11	S14	S14	S14	S14	S13	S15	S14	S13	S12	S9.6	S15
28-Oct	S11	S8	SSW7	SSW7	SW6	W7	WSW6	SW7	WSW7	WSW7	NW25	NW32	NW30	NW27	NW30	NW32	NW26	NW28	NW31	NW26	NW30	NNW26	NNW30	NNW29	NW16.4	NW32
29-Oct	NNW30	NW33	NW28	NW28	NNW24	N18	N19	N20	N19	N20	N22	N19	N18	N13	NNE8	NNE6	N4	NW0	SSE3	SSW5	S5	S5	S6	S6	NNW11.8	NW33
30-Oct	SSW7	SSW6	SSW5	SSW4	SSW4	S4	SW2	S3	SSE5	S7	S8	S7	SSW6	SSW4	NNE1	N2	NW4	NW6	NW4	NNW5	NW4	NW6	NW3	WNW2	SW2.2	S8
31-Oct	WNW2	NNW2	NNW3	NW3	SE0	NW1	ESE2	ESE3	ENE2	N4	N6	NNE6	N8	N9	N14	N16	N15	N15	N14	N17	N19	N21	N20	N18	N8.7	N21

WNW4.4	NW3.9	WNW4.2	WNW4.0	NNW3.5	NNW2.6	NNW2.4	NNW2.7	NNW2.8	NNW2.3	NW2.9	NW4.2	NW4.3	NW4.3	NW4.8	NW5.7	NW5.6	NW4.7	NW4.9	NW4.7	NW5.1	NW5.1	NW4.7	NW4.8	Diurnal Average
NNW30	NW33	NW28	NW28	NNW26	NNW25	N25	N24	N27	N29	N31	NW39	NW37	NW37	NW30	NW32	NW26	NW28	NW31	NW26	NW30	NNW26	NNW30	NNW29	Diurnal Maximum

AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h  
Fort McKay - Bertha Ganter - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	223	30.97	30.97
6 - 11	253	35.14	66.11
12 - 19	165	22.92	89.03
20 - 28	64	8.89	97.92
29 - 38	14	1.94	99.86
> 38	1	0.14	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Fort McKay - Bertha Ganter - October 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	9	6	6	6	5	3	8	18	33	16	16	12	19	22	25	19	223
6 - 11	20	12	0	0	1	2	4	26	44	25	22	27	32	23	9	6	253
12 - 19	54	2	0	0	0	0	0	12	31	7	0	2	1	18	12	26	165
20 - 28	15	0	0	0	0	0	0	0	0	0	0	0	0	2	25	22	64
29 - 38	2	0	0	0	0	0	0	0	0	0	0	0	0	0	9	3	14
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
<b>Totals</b>	100	20	6	6	6	5	12	56	108	48	38	41	52	65	81	76	720

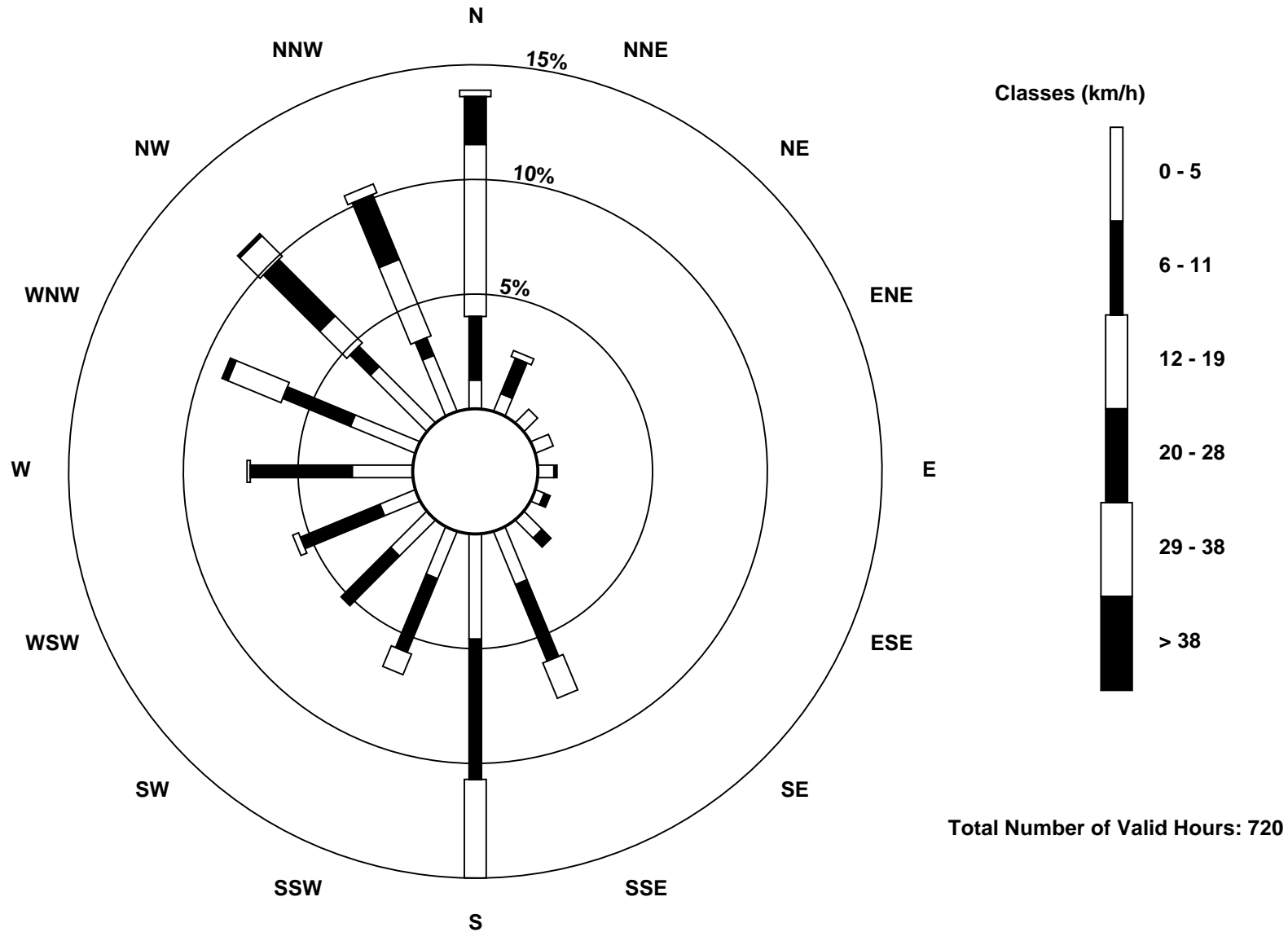
Total Number of Valid Hours: 720

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed (WS) - km/h  
Fort McKay - Bertha Ganter (AMS 1)





**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Speed (WS) - km/h**  
**Fort McKay - Bertha Ganter - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on Oct 24 11:00 Minimum Value: 0 km/h on Oct 30 05:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 O <sub>1</sub> = 1 Median = 2 O <sub>3</sub> = 3 P <sub>90</sub> = 5 P <sub>99</sub> = 7																		Hours in Service: 744 Hours of Data: 720 Hours of Missing Data: 24 Hours of Calibration: 0 Percent Operational Time: 96.8								
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	4	4	4	5	4	3	4	3	4	3	3	4	4	5	4	4	5	5	4	4	5	5	5	5	5	5
2-Oct	5	4	4	6	6	5	7	7	7	7	7	5	6	4	5	4	3	3	2	1	2	2	2	1	7	
3-Oct	2	1	1	1	2	2	2	2	4	4	3	5	5	4	4	3	4	3	3	3	2	3	2	2	5	
4-Oct	3	3	3	1	1	1	2	2	2	2	2	2	3	3	3	2	2	2	1	1	2	1	1	2	3	
5-Oct	1	3	2	1	1	1	2	1	2	2	2	3	3	4	4	4	3	3	3	2	3	3	3	3	4	
6-Oct	3	3	3	3	3	3	3	3	1	3	4	5	6	6	5	4	3	3	4	2	2	3	1	2	6	
7-Oct	2	1	1	2	1	2	2	2	2	2	3	4	4	3	4	5	5	6	6	5	5	4	5	4	6	
8-Oct	5	4	4	4	3	4	3	3	4	4	5	5	4	5	3	4	3	4	2	1	2	1	1	1	5	
9-Oct	1	1	2	2	4	3	3	3	3	3	3	3	2	2	3	3	2	2	7	3	2	2	3	3	7	
10-Oct	2	2	3	2	1	1	2	3	3	3	1	1	2	2	3	3	2	3	3	2	3	3	3	4	4	
11-Oct	3	3	3	3	3	4	4	4	4	5	4	4	4	5	5	4	3	4	3	3	3	3	4	4	5	
12-Oct	4	3	3	3	3	3	3	2	3	3	3	3	3	4	3	2	2	2	1	3	2	2	1	1	4	
13-Oct	1	1	1	2	1	1	1	1	1	1	2	2	2	3	3	3	3	3	2	2	2	2	1	1	3	
14-Oct	1	1	1	1	1	2	2	2	3	2	2	3	3	4	3	3	4	3	1	3	3	2	2	2	4	
15-Oct	2	2	1	2	2	1	1	2	2	2	3	2	3	3	2	2	1	1	1	1	1	2	2	1	3	
16-Oct	2	2	5	3	2	1	1	2	1	2	3	3	3	3	4	3	1	1	1	2	2	1	1	1	5	
17-Oct	2	1	1	1	1	1	1	1	1	1	1	1	2	2	1	3	2	2	2	2	4	4	5	6	6	
18-Oct	5	5	6	5	5	4	5	4	4	5	5	4	4	3	2	1	1	1	1	1	1	1	1	2	6	
19-Oct	2	2	2	3	2	3	3	2	3	3	3	3	2	2	2	2	2	2	2	1	2	2	2	1	3	
20-Oct	2	1	1	2	1	1	1	1	1	2	1	1	1	2	2	3	1	1	1	1	2	2	1	1	3	
21-Oct	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	2	1	2	1	1	1	1	2	1	2	
22-Oct	2	2	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	3	AF	AF	AF	AF	AF	AF	AF	AF	AF	3	
23-Oct	AF	AF	AF	1	2	1	1	1	1	2	3	3	3	3	4	2	1	1	2	2	2	1	2	2	4	
24-Oct	2	2	3	2	2	1	3	3	4	4	11	10	9	8	7	5	5	3	2	2	1	1	1	2	11	
25-Oct	2	2	2	2	2	3	3	2	3	3	3	4	4	4	3	3	4	2	3	3	4	1	2	2	4	
26-Oct	2	2	3	3	4	4	3	3	4	4	3	3	4	3	3	2	2	1	1	1	1	2	2	1	4	
27-Oct	1	1	1	1	1	2	2	1	2	2	2	3	3	3	2	3	3	3	4	3	3	3	3	2	4	
28-Oct	2	2	2	2	3	3	2	2	2	3	10	6	7	7	6	7	6	8	8	6	6	6	7	6	10	
29-Oct	7	8	6	6	7	4	5	5	4	5	5	4	4	4	2	2	2	1	2	1	1	1	1	2	8	
30-Oct	1	1	1	1	0	1	1	1	1	1	1	2	2	2	1	1	2	1	1	1	1	1	1	1	2	
31-Oct	1	1	1	1	1	1	1	1	1	1	1	2	2	2	3	3	2	2	2	4	4	4	4	5	5	
Diurnal Maximum																										
AF - Analyzer Failure																										



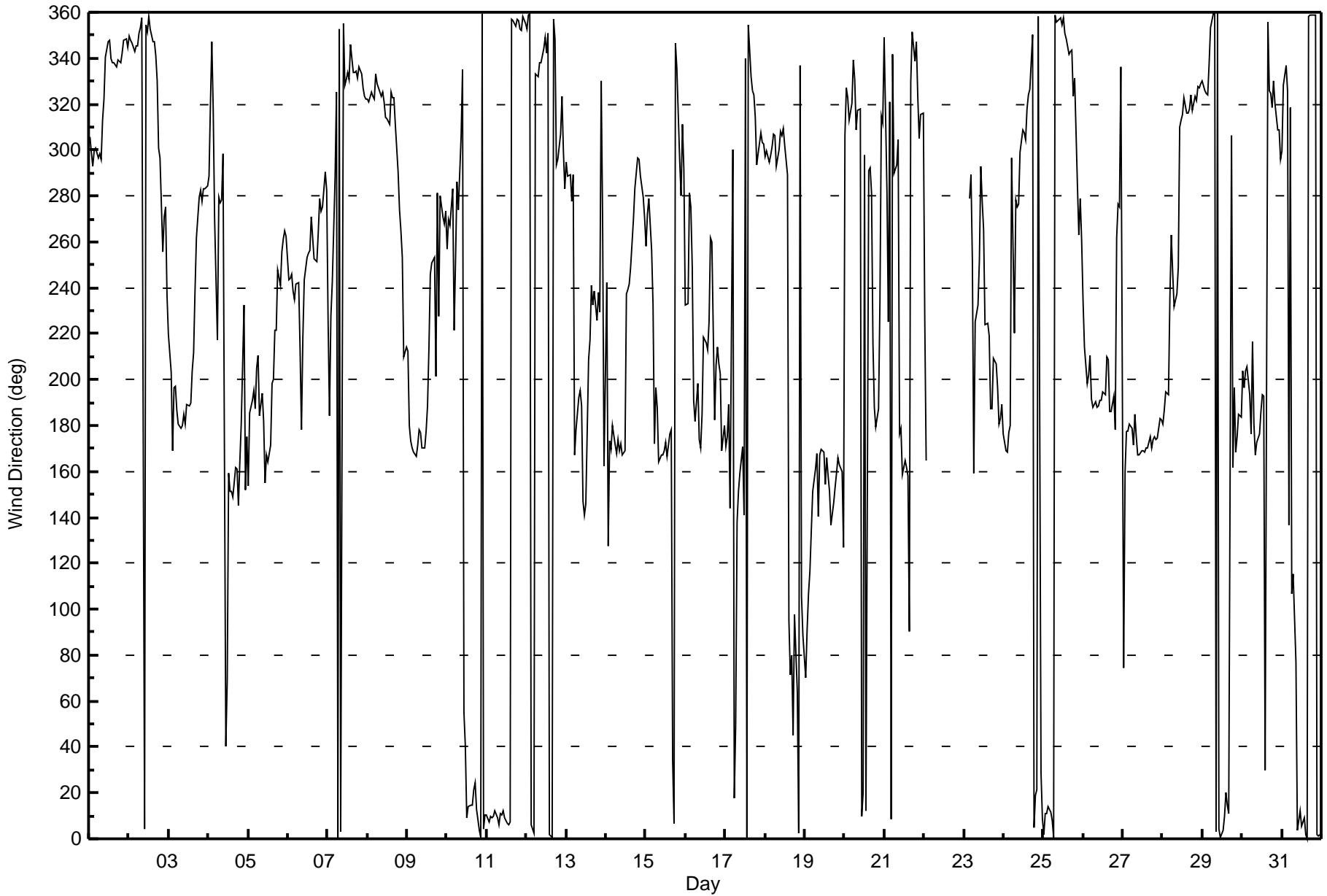
**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg**

**Fort McKay - Bertha Ganter - October 2017**

Direction of Maximum Speed: 309 deg on Oct 24 12:00																							Hours in Service:	744	
Direction of Maximum Daily Speed Average: 329.3 deg on Oct 1																							Hours of Data:	720	
Direction of Minimum Speed: 69 deg on Oct 4 12:00											Direction of Minimum Daily Speed Average: 1.3 deg on Oct 21												Hours of Missing Data:	24	
Monthly Average Direction: 285.4 deg																							Percent Operational Time:	96.8	
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	306	299	293	299	301	297	298	296	313	322	340	347	348	340	338	338	336	339	339	338	342	348	348	345	329.3
2-Oct	350	348	347	343	346	345	351	353	358	4	354	352	358	353	347	347	341	330	301	297	255	271	275	237	346.4
3-Oct	220	203	169	197	197	187	180	179	180	185	180	189	189	190	204	212	239	262	279	282	277	283	283	285	208.6
4-Oct	288	320	347	317	270	217	280	277	279	298	40	69	159	151	151	149	162	161	145	164	181	233	152	175	187.2
5-Oct	154	186	191	195	187	205	211	185	194	182	155	167	164	171	198	200	222	221	248	241	256	261	265	263	200.0
6-Oct	243	244	246	238	235	242	243	213	178	219	244	253	255	256	271	262	253	252	264	279	274	275	290	283	252.6
7-Oct	226	185	228	242	288	325	0	352	3	355	328	331	334	331	346	334	334	335	331	336	333	327	323	322	333.3
8-Oct	322	321	325	323	322	333	329	325	324	325	321	315	313	311	325	323	323	311	291	274	265	253	210	214	318.2
9-Oct	212	180	173	170	168	166	172	178	177	170	170	178	189	214	246	251	253	201	282	228	280	271	268	273	196.4
10-Oct	257	270	267	283	222	252	286	274	306	335	55	40	9	14	15	15	22	24	13	4	1	359	5	10	349.7
11-Oct	11	8	10	9	10	12	9	6	11	11	12	9	7	6	7	357	356	354	357	357	353	352	358	355	3.8
12-Oct	353	359	360	6	2	333	332	332	338	338	344	349	343	351	2	1	357	348	293	296	307	323	300	283	341.6
13-Oct	295	288	289	278	289	167	178	192	196	189	147	141	146	209	217	241	233	239	226	238	230	330	269	162	214.8
14-Oct	242	127	173	170	180	171	168	174	169	172	167	169	238	239	242	249	270	283	290	296	296	289	280	270	225.8
15-Oct	258	272	279	256	232	172	196	188	164	167	167	169	173	167	176	178	34	7	347	335	296	280	311	291	199.7
16-Oct	232	233	281	275	249	191	182	199	174	170	185	219	216	213	225	262	260	182	206	214	207	202	169	180	214.4
17-Oct	171	175	189	144	300	18	50	138	151	160	171	141	340	0	355	332	326	324	314	293	298	307	303	303	310.9
18-Oct	297	300	295	298	301	307	306	293	300	308	307	309	302	289	95	71	80	45	97	64	2	337	106	88	308.1
19-Oct	70	91	107	116	134	151	161	168	141	167	169	168	154	166	158	152	136	147	153	159	166	163	160	127	151.2
20-Oct	306	327	323	313	320	339	331	309	317	318	10	20	298	12	291	292	281	216	188	180	187	234	315	312	301.6
21-Oct	349	283	225	321	8	342	290	294	304	176	179	159	165	161	158	91	329	351	338	347	324	305	315	316	310.0
22-Oct	226	165	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	341	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
23-Oct	AF	AF	AF	279	289	251	159	225	233	252	293	278	265	224	224	219	187	187	209	207	196	181	183	189	225.5
24-Oct	176	169	168	177	180	296	220	278	275	276	299	309	308	305	318	324	326	350	5	19	22	358	29	9	306.5
25-Oct	2	11	11	14	11	8	1	359	356	357	358	355	357	351	348	342	343	344	323	332	284	263	279	261	350.6
26-Oct	234	214	199	202	211	192	188	190	188	189	191	191	195	194	210	208	186	186	193	178	262	277	275	336	198.4
27-Oct	74	160	178	177	181	179	172	185	175	167	167	169	169	169	170	170	175	170	174	175	174	174	183	182	173.3
28-Oct	181	187	194	193	236	263	246	232	238	249	310	313	316	323	316	316	318	324	317	323	322	328	327	329	311.0
29-Oct	330	326	325	324	338	353	359	359	3	360	4	1	4	10	20	15	11	306	162	197	169	175	185	184	346.2
30-Oct	204	197	204	206	193	176	216	181	167	173	176	186	193	193	30	355	326	324	318	330	320	309	309	296	219.7
31-Oct	300	329	337	326	137	318	107	115	77	4	8	12	6	9	2	0	358	359	359	359	359	2	1	2	1.6
303.1	304.0	303.1	298.1	303.1	301.6	295.6	289.5	303.7	294.6	312.9	309.5	308.6	304.2	314.2	317.2	319.3	321.6	311.1	310.7	307.9	313.1	314.0	311.4		
Diurnal Average																									
AF - Analyzer Failure																									
All monthly, daily, and diurnal averages have been calculated using vector methods																									







**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Direction (WD) - deg**  
**Fort McKay - Bertha Ganter - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 102 deg on Oct 4 12:00 Minimum Value: 9 deg on Oct 2 20:00 Percentiles: P <sub>1</sub> = 10 P <sub>10</sub> = 13 Q <sub>1</sub> = 14 Median = 18 Q <sub>3</sub> = 36 P <sub>90</sub> = 51 P <sub>99</sub> = 93																								Hours in Service: 744 Hours of Data: 720 Hours of Missing Data: 24 Hours of Calibration: 0 Percent Operational Time: 96.8	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	14	16	17	15	13	17	17	18	13	13	19	16	18	14	14	11	12	14	12	11	14	15	15	15	19
2-Oct	16	15	15	14	14	15	16	17	17	18	18	20	18	18	17	19	16	14	14	9	56	31	33	101	101
3-Oct	61	32	12	14	15	12	11	14	15	15	14	17	17	16	25	27	48	46	28	23	28	25	20	19	61
4-Oct	43	48	14	28	49	94	63	27	45	38	85	102	38	15	15	12	15	15	12	48	17	89	20	15	102
5-Oct	17	34	14	14	12	12	31	13	24	33	16	21	13	18	26	28	35	33	46	42	43	40	42	46	46
6-Oct	49	51	46	55	48	53	47	39	34	33	50	53	47	50	38	44	44	45	39	26	32	31	28	28	55
7-Oct	71	68	75	72	89	38	15	13	15	15	23	17	17	15	16	16	13	14	13	15	12	13	12	12	89
8-Oct	10	11	11	11	12	13	13	10	12	14	15	14	15	13	15	14	12	15	20	29	31	35	16	18	35
9-Oct	15	14	12	16	13	15	14	13	13	15	14	17	30	35	49	50	44	31	35	38	46	42	39	32	50
10-Oct	43	30	39	29	46	38	16	53	23	64	42	39	18	19	20	19	23	26	18	14	14	15	15	16	64
11-Oct	17	14	15	15	16	17	16	16	17	16	16	16	16	18	16	16	15	14	16	14	14	14	16	15	18
12-Oct	14	16	17	18	19	13	12	12	15	16	17	16	18	24	22	20	19	14	18	14	12	15	14	21	24
13-Oct	20	29	29	36	30	20	17	14	24	43	16	15	15	44	35	51	38	46	31	41	29	66	86	81	86
14-Oct	77	67	52	16	13	16	11	14	12	13	14	27	48	48	47	44	28	15	14	13	16	16	16	26	77
15-Oct	34	24	16	61	68	63	14	17	20	14	14	15	17	13	15	69	59	86	13	33	14	40	83	30	86
16-Oct	37	39	32	28	38	12	11	22	17	17	25	39	31	34	40	42	40	13	32	55	20	33	19	15	55
17-Oct	17	46	66	41	57	65	31	52	47	30	15	19	79	11	14	13	11	9	11	15	17	16	19	13	79
18-Oct	14	14	16	15	13	12	14	16	15	14	18	22	42	80	88	42	30	53	18	41	26	22	42	46	88
19-Oct	52	42	33	18	14	13	15	77	56	14	16	27	16	14	16	18	20	13	12	12	12	13	15	57	77
20-Oct	66	21	14	25	85	26	34	63	35	39	70	40	89	98	30	20	21	62	22	39	26	68	33	31	98
21-Oct	19	60	89	45	24	36	34	37	15	69	35	50	30	31	26	99	18	20	25	25	31	30	39	38	99
22-Oct	44	46	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	22	AF	AF	AF	AF	AF	AF	AF	AF	AF	46
23-Oct	AF	AF	AF	19	16	54	31	41	39	43	28	41	45	37	40	40	10	22	19	17	17	12	15	16	54
24-Oct	18	32	15	15	46	36	39	40	36	35	39	15	13	12	18	14	14	13	18	26	57	74	57	21	74
25-Oct	21	14	15	16	16	14	13	13	13	14	14	15	16	14	13	13	11	12	18	78	46	34	26	43	78
26-Oct	33	19	19	20	28	16	13	15	15	15	17	17	19	18	35	22	19	15	11	14	94	40	58	57	94
27-Oct	82	24	52	16	19	20	24	14	16	12	12	13	12	12	13	12	13	13	14	13	12	13	13	13	82
28-Oct	13	18	20	16	49	44	39	31	40	43	17	12	15	16	12	13	14	13	13	13	12	12	14	13	49
29-Oct	14	12	12	12	14	19	16	15	16	17	17	17	17	18	28	23	56	83	72	19	21	17	12	17	83
30-Oct	18	13	17	24	17	21	31	21	15	11	12	17	24	67	88	44	16	10	21	19	25	9	29	38	88
31-Oct	35	28	21	20	95	60	21	19	36	12	15	16	14	14	14	15	13	14	14	15	15	15	16	16	95
82 68 89 72 95 94 63 77 56 69 85 102 89 98 88 99 59 86 72 78 94 89 86 101																								Diurnal Maximum	
AF - Analyzer Failure																									



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Fort McKay - Bertha Ganter	Station number:	AMS 01
Calibration Date:	October 10, 2017	Last Cal Date:	September 27, 2017
Start time (MST):	9:15	End time (MST):	11:57
Reason:	Routine		

### Calibration Standards

Cal Gas Concentration	<u>49.3</u>	ppm	Cal Gas Exp Date	November 4, 2019
Cal Gas Cylinder #	<u>EY0000683</u>			
Calibrator Make/Model	API T700		Serial Number	2464
ZAG Make/Model	API T701		Serial Number	262

### Analyzer Information

Analyzer make: Thermo 43i

Analyzer serial #: JC1501301448

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Analyzer Range	0 - 1000 ppb		PMT voltage	-614	-614
Calculated slope	0.998615	0.995551	Lamp voltage	817	816
Calculated intercept	2.014120	2.351148	Pressure	685.7	685.1
Analyzer Background	15.1	15.3	Flow	0.503	0.502
Analyzer Coefficient	0.915	0.922	Intensity	91	91

### SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	-0.1	----
as found span	4930	80.6	793.0	785.9	1.009
calibrator zero	5998	0.0	0.0	-0.1	----
high point	4930	80.6	793.0	795.6	0.997
second point	4970	40.3	396.5	394.0	1.006
third point	4990	20.2	198.8	195.6	1.016
as left zero	5998	0.0	0.0	0.1	----
as left span	4930	80.6	793.0	793.0	1.000
Average Correction Factor					1.006
Corrected As found	786.00	Previous response	792.12	*% change	0.8%

\* = > +/-5% change initiates investigation

Notes:

Sample inlet filter replaced after as founds. Adjusted span.

Calibration Performed By:

Asad Hidayat



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

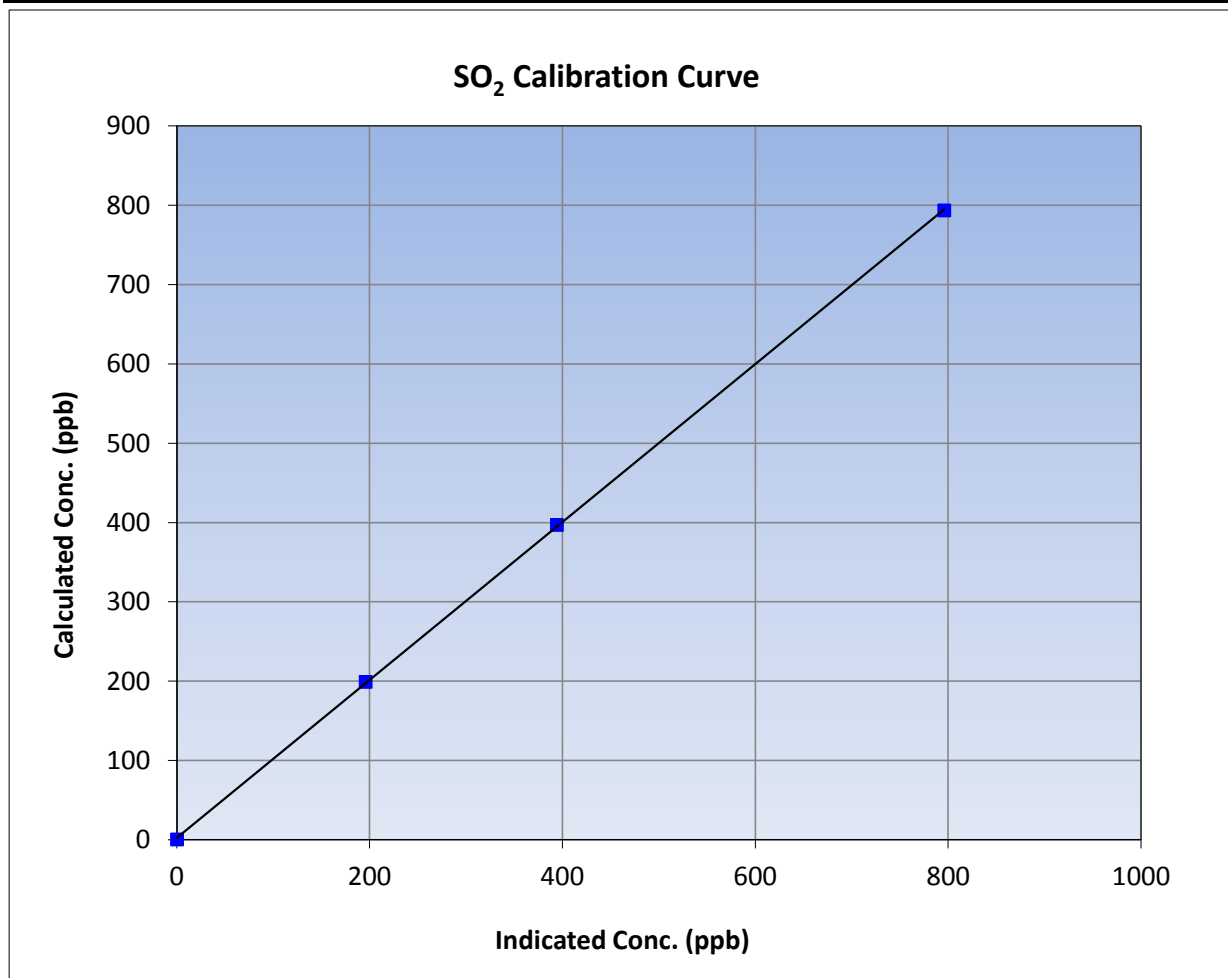
Version-03-2017

### Station Information

Calibration Date	October 10, 2017	Previous Calibration	September 27, 2017
Station Name	Fort McKay - Bertha Ganter	Station Number	AMS 01
Start Time (MST)	9:15	End Time (MST)	11:57
Analyzer make	Thermo 43i	Analyzer serial #	JC1501301448

### Calibration Data

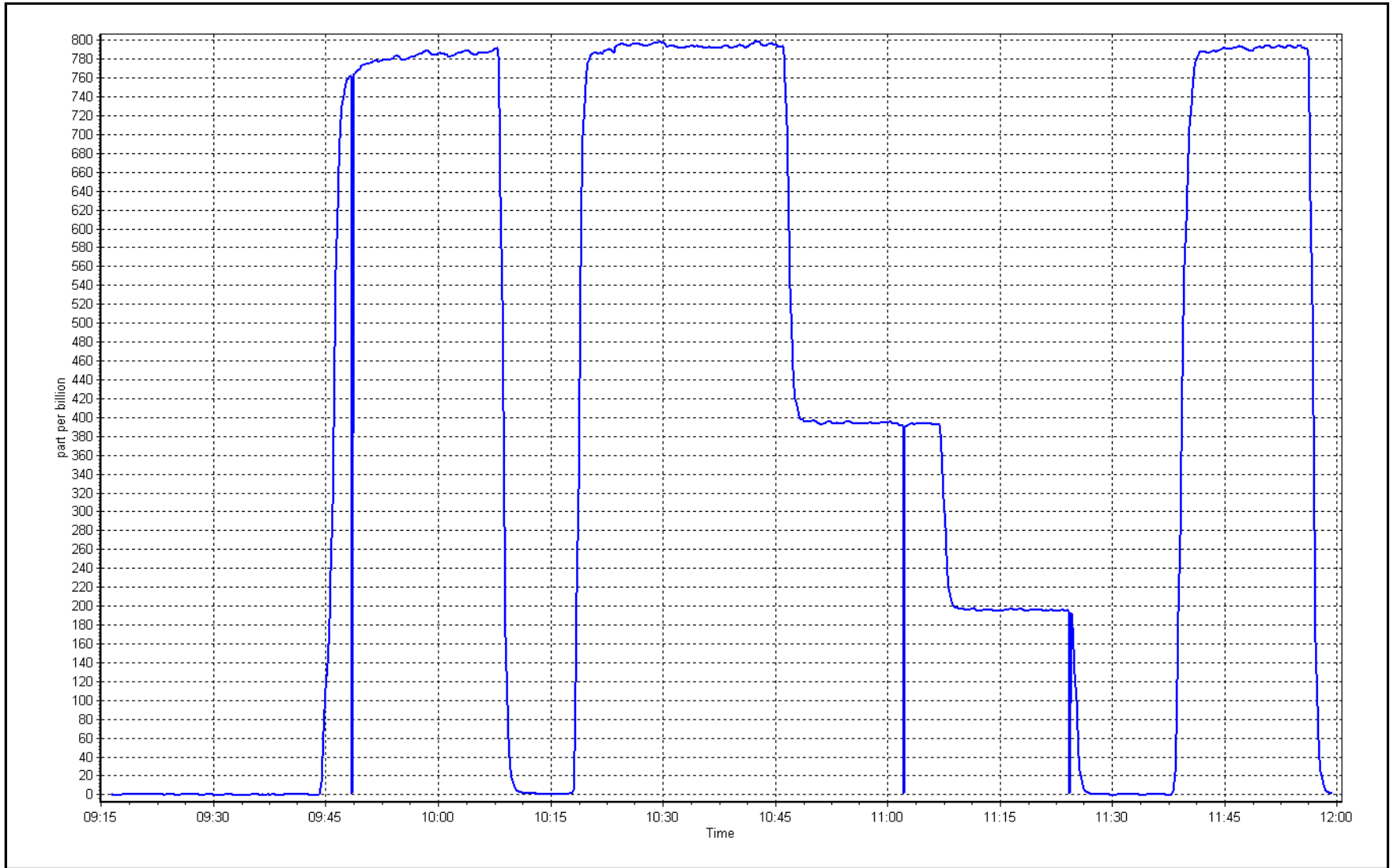
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits
0.0	-0.1	----	Correlation Coefficient	≥0.995
793.0	795.6	0.9968		
396.5	394.0	1.0064	Slope	0.90 - 1.10
198.8	195.6	1.0162		
			Intercept	+/-30



SO2 Calibration Plot

Date: October 10, 2017

Location: Fort McKay - Bertha Ganter





# Wood Buffalo Environmental Association

## TRS Calibration Report

Version-03-2017

### Station Information

Station Name:	Fort McKay - Bertha Ganter	Station number:	AMS 01
Calibration Date:	October 2, 2017	Last Cal Date:	September 11, 2017
Start time (MST):	12:18	End time (MST):	14:15
Reason:	Routine		

### Calibration Standards

Cal Gas Concentration	<u>4.94</u>	ppm	Cal Gas Exp Date	February 12, 2019
Cal Gas Cylinder #	<u>ET0005004</u>			
Calibrator Make/Model	API T700		Serial Number	2464
ZAG Make/Model	API 701H		Serial Number	587

### Analyzer Information

Analyzer make:		Thermo 43i-TLE	Analyzer serial #:		1218153461
	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>	
Analyzer Range	0 - 100 ppb		PMT voltage	-859	-860
Calculated slope	0.993436	0.991388	Lamp voltage	1125	1125
Calculated intercept	0.053714	0.206386	Pressure	676.6	680.5
Analyzer Background	1.7	1.7	Flow	0.444	0.447
Analyzer Coefficient	0.919	0.919	Intensity	80	80

### TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5005	0.0	0.0	0.0	----
as found span	4930	81.1	79.9	80.6	0.992
calibrator zero	5005	0.0	0.0	0.0	----
high point	4930	81.1	79.9	80.6	0.992
second point	4967	40.6	40.1	39.9	1.004
third point	4990	20.3	20.0	19.9	1.006
as left zero	5005	0.0	0.0	0.1	----
as left span	4930	81.1	79.9	80.2	0.997

SO2 Scrubber Check

Average Correction Factor				1.001
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Corrected As found	80.60	Previous response	80.42	*% change	-0.2%
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*\* = > +/-5% change initiates investigation*

Notes:

Sample inlet fitter replaced after as founds. No adjustments made.

Calibration Performed By: Asad Hidayat



# Wood Buffalo Environmental Association

## TRS Calibration Summary

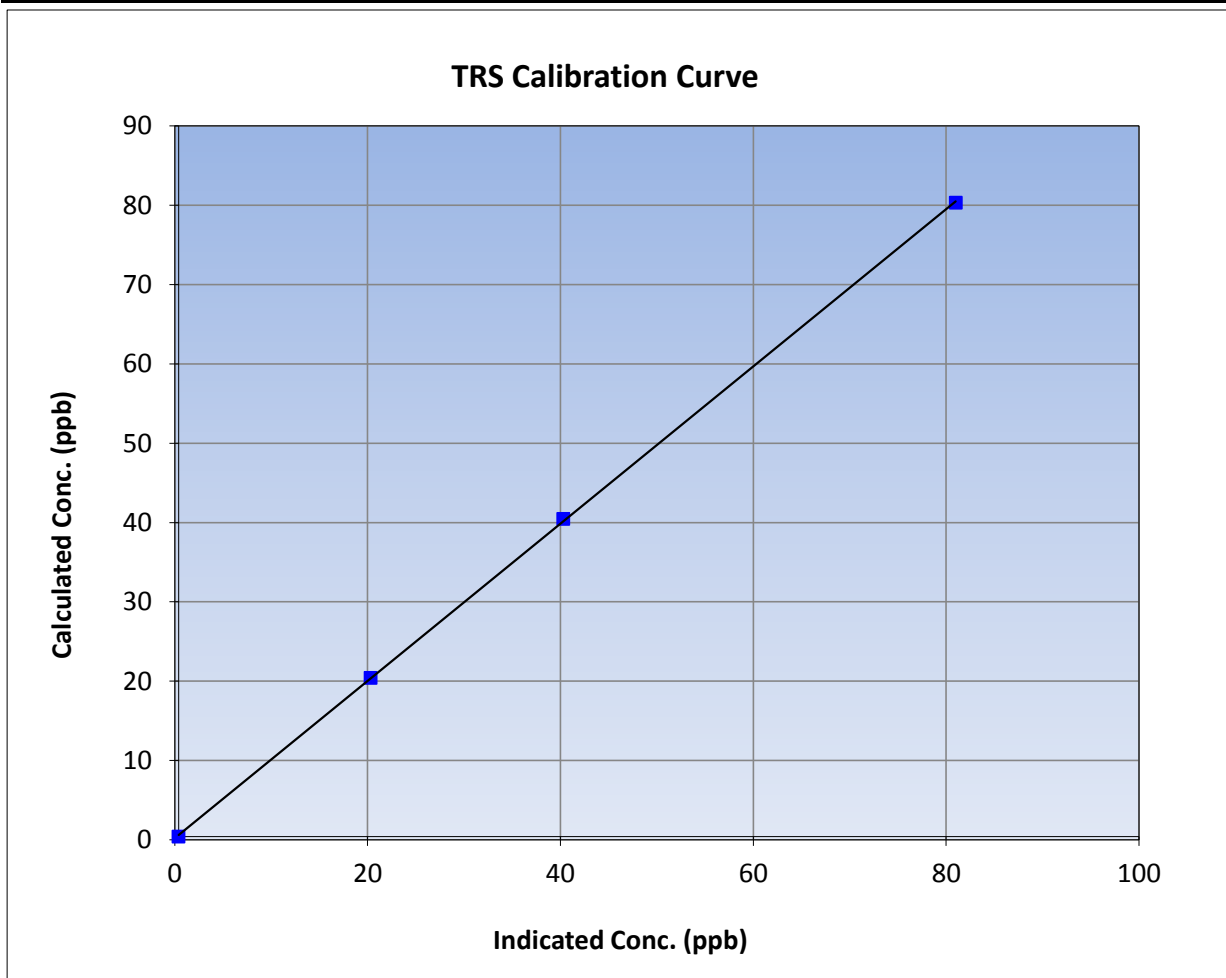
Version-03-2017

### Station Information

Calibration Date	October 2, 2017	Previous Calibration	September 11, 2017
Station Name	Fort McKay - Bertha Ganter	Station Number	AMS 01
Start Time (MST)	12:18	End Time (MST)	14:15
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153461

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.0	----	Correlation Coefficient	0.999954	≥0.995
79.9	80.6	0.9919			
40.1	39.9	1.0038	Slope	0.991388	0.90 - 1.10
20.0	19.9	1.0058			
			Intercept	0.206386	+/-3



TRS Calibration Plot

Date: October 2, 2017

Location: Fort McKay - Bertha Ganter





# Wood Buffalo Environmental Association

## THC / NMHC Calibration Report

Version-03-2017

### Station Information

Station Name:	Fort McKay - Bertha Ganter	Station number:	AMS 01
Calibration Date:	October 10, 2017	Last Cal Date:	September 12, 2017
Start time (MST):	9:15	End time (MST):	11:57
Reason:	Routine		

### Calibration Standards

Gas Cert Reference	EY0000683	Cal Gas Expiry Date	November-04-19
CH4 Cal Gas Conc.	<u>515.0</u> ppm	CH4 Equiv Conc.	1062.3 ppm
C3H8 Cal Gas Conc.	<u>199.0</u> ppm	Station temp.	21 Deg C
Calibrator Model	API T700	Serial Number	2464
ZAG make/model	API T701	Serial Number	262

### Analyzer Information

Analyzer make: Thermo 55i

Analyzer serial #: 1152430012

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
THC Range (ppm)	0 - 50 ppm		Column Temp	75.1	75.1
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
CH4 SP Ratio	1.70E-04	1.72E-04	Flame Temp	405.0	405.0
CH4 Retention time	12.0	12.2	Carrier Pressure	36.7	36.7
NMHC SP Ratio	3.91E-05	3.97E-05	Fuel Pressure	47.7	47.7
NMHC Peak Area	225145	221562	Air Pressure	39.0	39.0

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
THC Cal Slope	0.997074	0.999431
THC Cal Offset	0.045884	0.061296
CH4 Cal Slope	0.995111	0.999925
CH4 Cal Offset	0.031296	0.041909
NMHC Cal Slope	0.998903	0.998956
NMHC Cal Offset	0.014646	0.019686

Notes: Sample filter and pump replaced after as founds. N2 cylinder replaced after as founds. Adjusted span.

Calibration Performed By:

Asad Hidayat





# Wood Buffalo Environmental Association

## THC / NMHC Calibration Report

Version-02-2017

### THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i>
as found zero	5998	0.0	0.00	0.00	----
as found span	4931	80.6	17.08	16.85	1.014
calibrator zero	5998	0.0	0.00	0.00	----
high point	4931	80.6	17.08	17.07	1.001
second point	4969	40.3	8.55	8.43	1.014
third point	4989	20.2	4.28	4.18	1.024
as left zero	5998	0.0	0.00	0.00	----
as left span	4931	80.6	17.08	17.12	0.998
Average Correction Factor					1.013
Corrected As found	16.85	Prev response	17.09	*% change	1.4%

### NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i>
as found zero	5998	0	0.00	0.00	----
as found span	4931	80.6	8.80	8.67	1.015
calibrator zero	5998	0	0.00	0.00	----
high point	4931	80.6	8.80	8.80	1.000
second point	4969	40.3	4.40	4.37	1.008
third point	4989	20.2	2.21	2.18	1.014
as left zero	5998	0	0.00	0.00	----
as left span	4931	80.6	8.80	8.81	0.999
Average Correction Factor					1.007
Corrected As found	8.67	Prev response	8.80	*% change	1.5%

### CH4 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i>
as found zero	5998	0.0	0.00	0.00	----
as found span	4931	80.6	8.28	8.18	1.012
calibrator zero	5998	0.0	0.00	0.00	----
high point	4931	80.6	8.28	8.27	1.002
second point	4969	40.3	4.14	4.06	1.021
third point	4989	20.2	2.08	2.01	1.035
as left zero	5998	0.0	0.00	0.00	----
as left span	4931	80.6	8.28	8.31	0.997
Average Correction Factor					1.019
Corrected As found	8.18	Prev response	8.29	*% change	1.4%

\* = > +/-5% change initiates investigation



# Wood Buffalo Environmental Association

## THC Calibration Summary

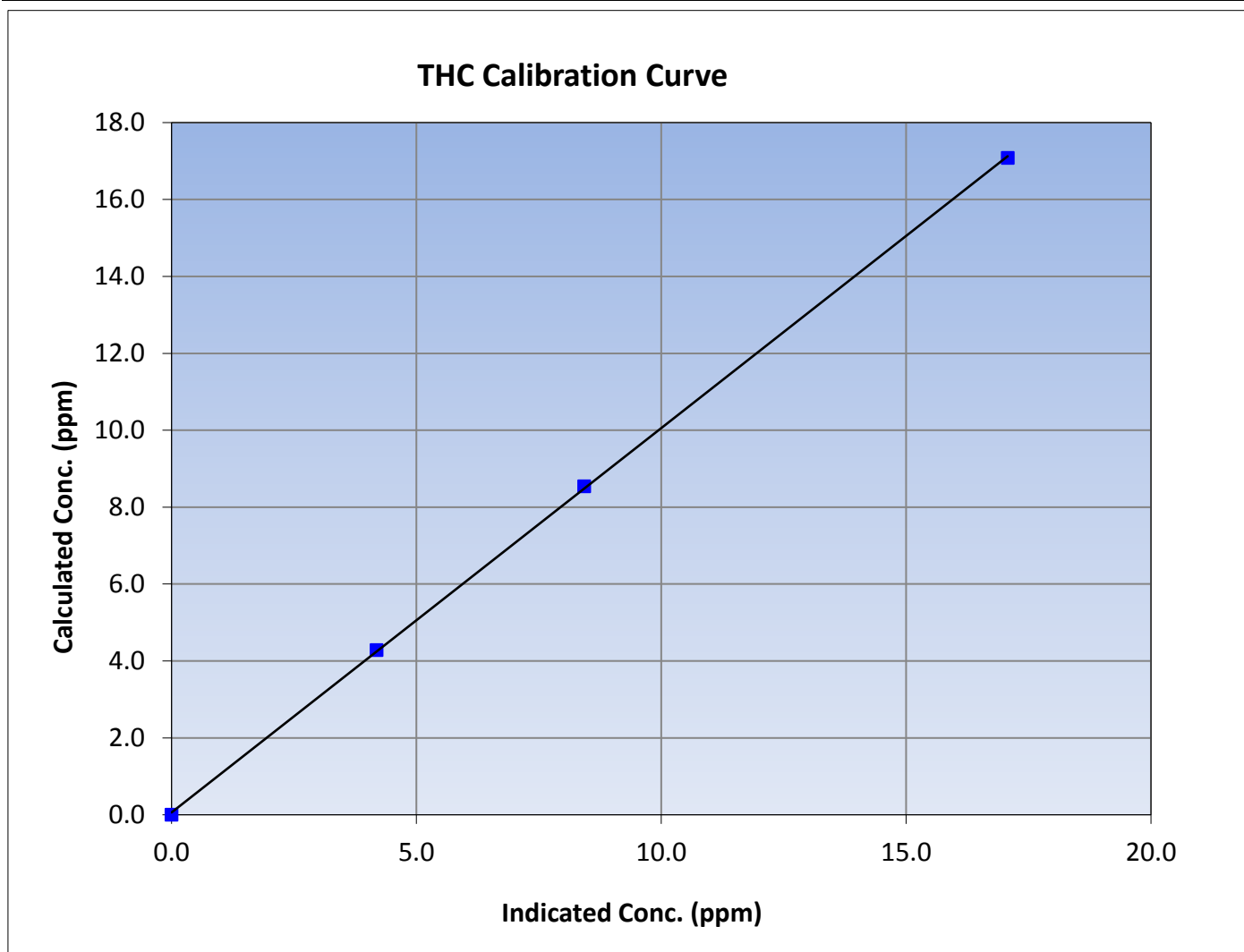
Version-02-2017

### Station Information

Calibration Date	October 10, 2017	Previous Calibration	September 12, 2017
Station Name	Fort McKay - Bertha Ganter	Station Number	AMS 01
Start Time (MST)	9:15	End Time (MST)	11:57
Analyzer make	Thermo 55i	Analyzer serial #	1152430012

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.00	0.00	----	Correlation Coefficient	0.999931	$\geq 0.995$			
17.08	17.07	1.0006						
8.55	8.43	1.0141				Slope	0.999431	0.90 - 1.10
4.28	4.18	1.0238						
			Intercept	0.061296	$\pm 0.5$			





# Wood Buffalo Environmental Association

## CH<sub>4</sub> Calibration Summary

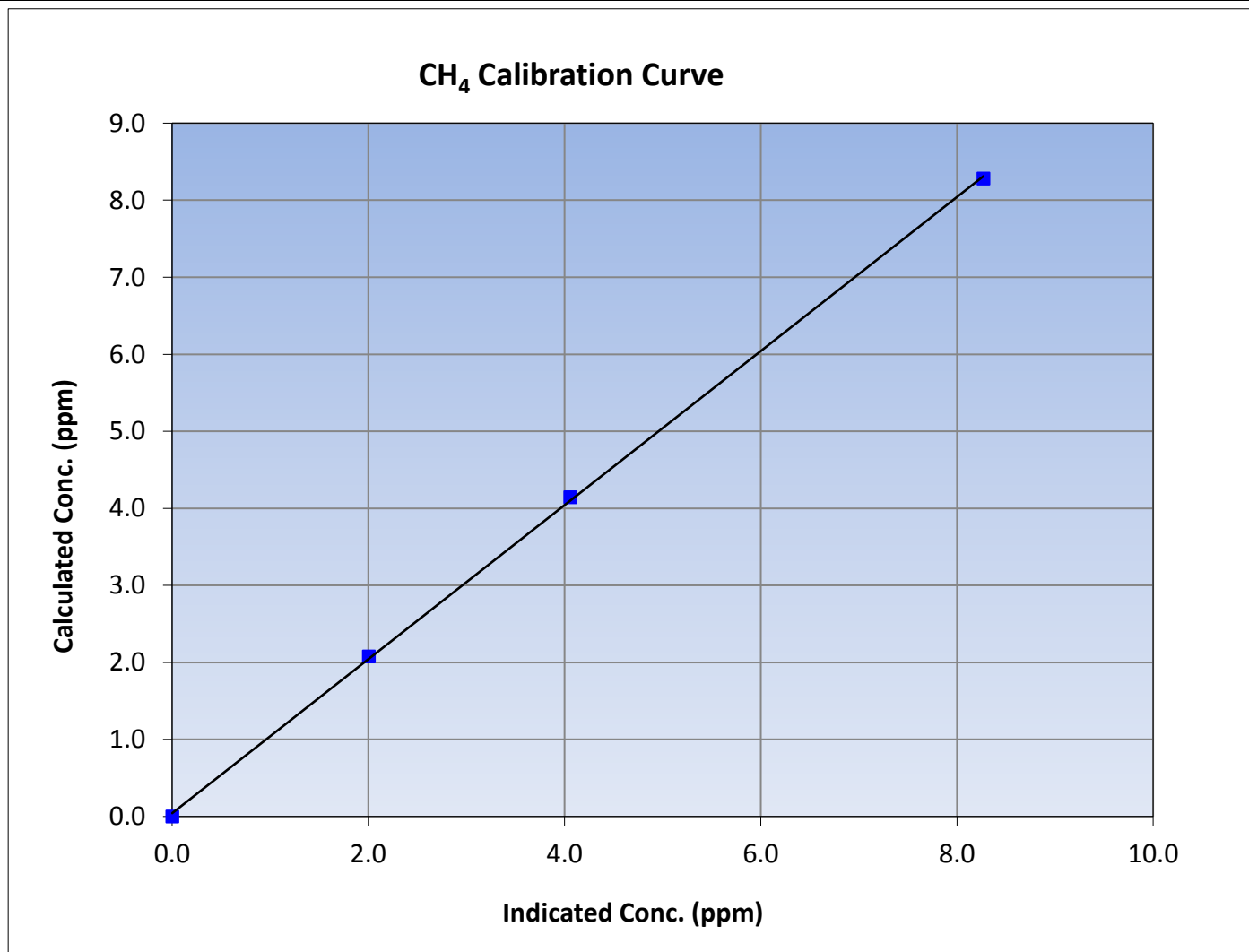
Version-02-2017

### Station Information

Calibration Date	October 10, 2017	Previous Calibration	September 12, 2017
Station Name	Fort McKay - Bertha Ganter	Station Number	AMS 01
Start Time (MST)	9:15	End Time (MST)	11:57
Analyzer make	Thermo 55i	Analyzer serial #	1152430012

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00	----	Correlation Coefficient	0.999861	$\geq 0.995$
8.28	8.27	1.0016			
4.14	4.06	1.0207			
2.08	2.01	1.0348			
			Slope	0.999925	0.90 - 1.10
			Intercept	0.041909	+/-0.5





# Wood Buffalo Environmental Association

## NMHC Calibration Summary

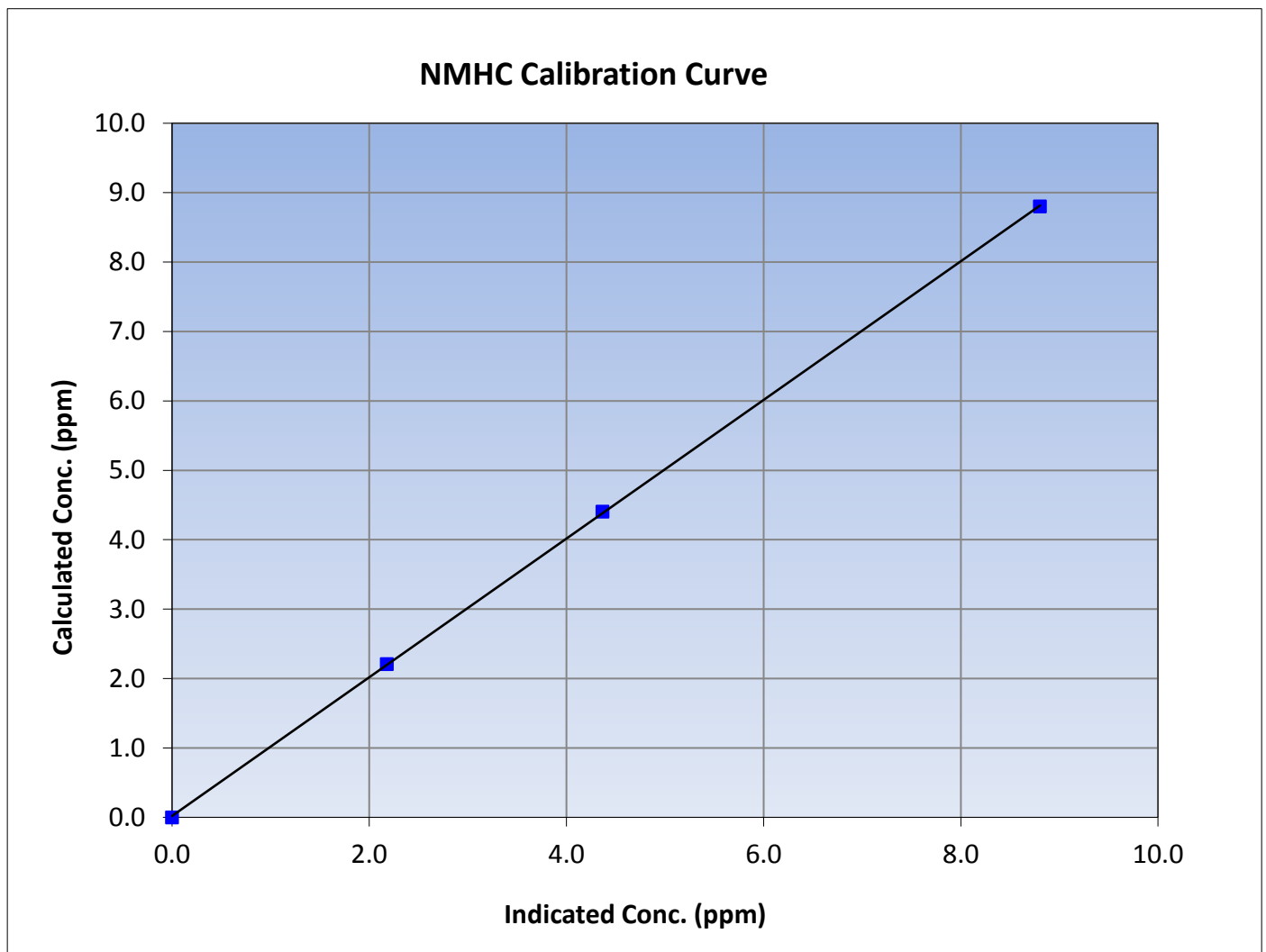
Version-02-2017

### Station Information

Calibration Date	October 10, 2017	Previous Calibration	September 12, 2017
Station Name	Fort McKay - Bertha Ganter	Station Number	AMS 01
Start Time (MST)	9:15	End Time (MST)	11:57
Analyzer make	Thermo 55i	Analyzer serial #	1152430012

### Calibration Data

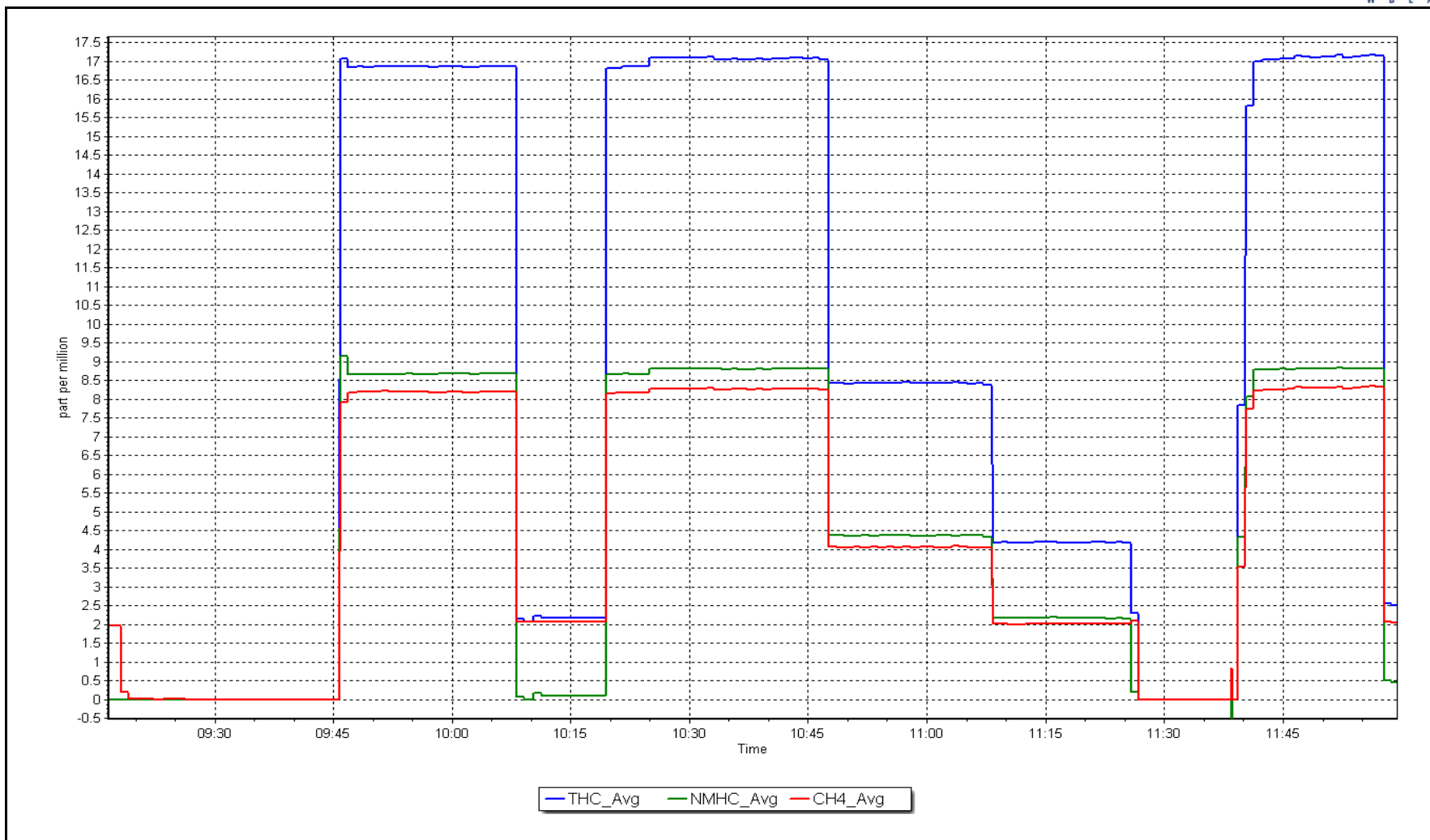
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.00	0.00	----	Correlation Coefficient	0.999973	$\geq 0.995$			
8.80	8.80	0.9997						
4.40	4.37	1.0082				Slope	0.998956	0.90 - 1.10
2.21	2.18	1.0137						
			Intercept	0.019686	$\pm 0.5$			



NMHC Calibration Plot

Date: October 10, 2017

Location: Fort McKay - Bertha Ganter





# Wood Buffalo Environmental Association

## O<sub>3</sub> Calibration Report

Version-03-2017

### Station Information

Station Name: Fort McKay - Bertha Ganter      Station number: AMS 01  
 Calibration Date: October 2, 2017      Last Cal Date: September 13, 2017  
 Start time (MST): 9:50      End time (MST): 12:18  
 Reason: Routine

### Calibration Standards

O<sub>3</sub> generation mode: Photometer      O<sub>3</sub> reference Date: Photometer  
 Calibrator Make/Model: API T700      Serial Number: 2464  
 ZAG Make/Model: API 701H      Serial Number: 262

### Analyzer Information

Analyzer make: API T400

Analyzer serial #: 1107

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Analyzer Range	0 - 500 ppb		Pressure	27.1	27.2
Calculated slope	0.998829	0.996753	Flow cell A	797.0	798.0
Calculated intercept	-0.319451	0.119733	Flow cell B	798.0	801.0
Analyzer Background	0.4	0.4	O <sub>3</sub> Measurement	3831.0	3831.3
Analyzer Coefficient	1.007	1.014	O <sub>3</sub> Reference	3830.0	3831.0

### O<sub>3</sub> Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.00	0.0	0.0	----
as found span	4893	940.00	400.0	398.1	1.005
calibrator zero	5996	0.00	0.0	0.0	----
high point	5000	940.00	400.0	401.2	0.997
second point	5001	781.30	200.0	200.6	0.997
third point	4999	672.60	100.0	100.0	1.000
as left zero	5996	0.0	0.0	0.4	----
as left span	5000	933.0	400.0	401.5	0.996
Average Correction Factor					0.998

Corrected As found      398.10      Previous response      400.79      \*% change      0.7%

\* = > +/-8% change initiates investigation

Notes:      Sample inlet filter replaced after as founds. Adjusted span.

Calibration Performed By:      Asad Hidayat



# Wood Buffalo Environmental Association

## O<sub>3</sub> Calibration Summary

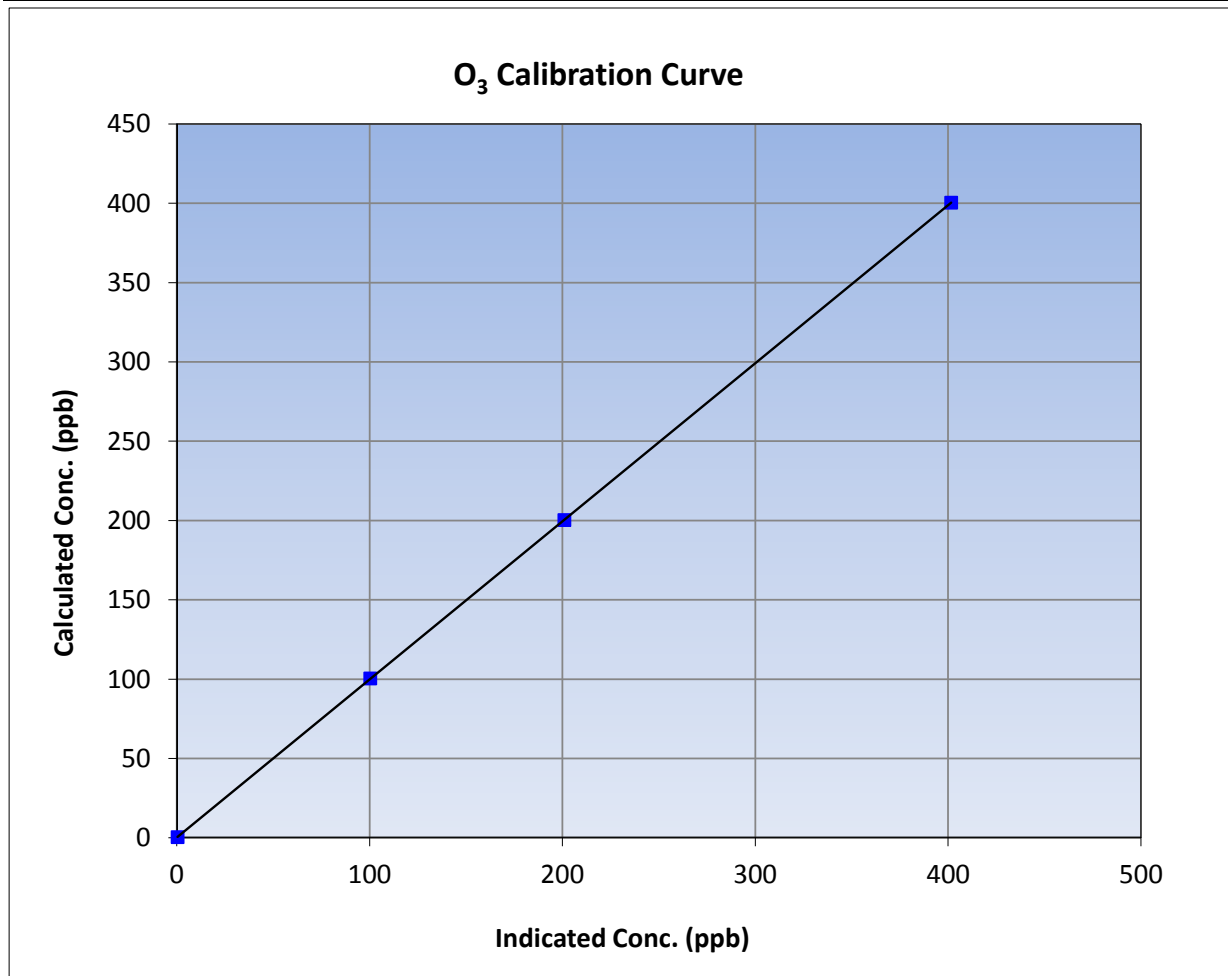
Version-03-2017

### Station Information

Calibration Date	October 2, 2017	Previous Calibration	September 13, 2017
Station Name	Fort McKay - Bertha Ganter	Station Number	AMS 01
Start Time (MST)	9:50	End Time (MST)	12:18
Analyzer make	API T400	Analyzer serial #	1107

### Calibration Data

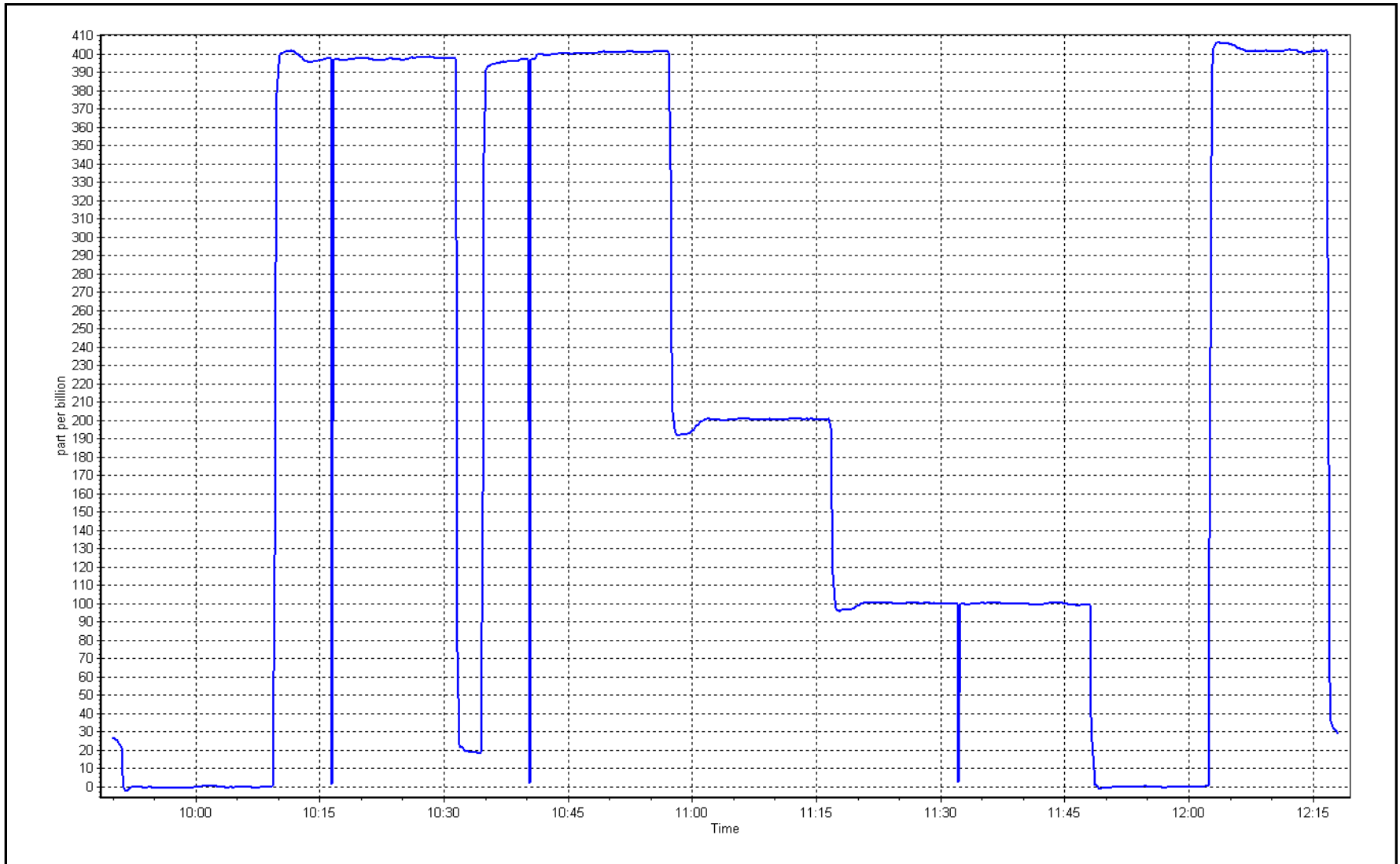
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	0.0	----	Correlation Coefficient	0.999999	≥0.995
400.0	401.2	0.9970			
200.0	200.6	0.9970	Slope	0.996753	0.90 - 1.10
100.0	100.0	1.0000			
			Intercept	0.119733	+/- 10



# O<sub>3</sub> Calibration Plot

Date: October 2, 2017

Location: Fort McKay - Bertha Ganter







# Wood Buffalo Environmental Association

## NO<sub>x</sub> - NO - NO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Fort McKay - Bertha Ganter	Station number:	AMS 01
Calibration Date:	October 12, 2017	Last Cal Date:	September 25, 2017
Start time (MST):	9:10	End time (MST):	14:07
Reason:	Routine		

### Calibration Standards

NO Gas Cylinder #	EY0000683	Cal Gas Expiry Date	November-04-19
NOX Cal Gas Conc.	<u>49.7</u> ppm	NO Cal Gas Conc.	<u>49.7</u> ppb
Calibrator Model	API T700	Serial Number	2464
ZAG make/model	API T701	Serial Number	262

### Analyzer Information

Analyzer make: Thermo 42i			Analyzer serial #: 1218153357		
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coefficient	1.174	1.160	NOX Range (ppb)	0 - 1000 ppb	
NOX coefficient	0.997	0.999	PMT Temperature	-2.7	-2.9
NO <sub>2</sub> coefficient	1.000	1.000	Reaction cell Press	172.6	173.2
NO bkgrnd	5.9	5.8	Sample Flow	0.585	0.585
NOX bkgrnd	6.0	6.0	PMT Voltage	-792.2	-792.2

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope	0.998276	0.998639
NO <sub>x</sub> Cal Offset	1.256402	1.778754
NO Cal Slope	0.995657	0.997753
NO Cal Offset	1.772247	2.037736
NO <sub>2</sub> Cal Slope	1.003159	0.999296
NO <sub>2</sub> Cal Offset	-0.007580	0.822883



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

Version-03-2017

### Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.3	0.1	----	----
as found span	4930	80.6	799.5	799.5	0.0	811.3	811.8	-0.5	0.9854	0.9848
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.3	0.1	----	----
high point	4930	80.6	799.5	799.5	0.0	799.7	800.2	-0.5	0.9997	0.9991
second point	4970	40.3	399.8	399.8	0.0	397.3	397.4	-0.1	1.0062	1.0059
third point	4990	20.1	199.4	199.4	0.0	196.6	196.3	0.3	1.0142	1.0157
as left zero	5997	0.0	0.0	0.0	0.0	0.1	-0.1	0.2	----	----
as left span	4930	80.6	799.5	394.9	404.6	792.5	391.7	400.8	1.0088	1.0082
<b>Average Correction Factor</b>									<b>1.0067</b>	<b>1.0069</b>

Corrected As found    NO<sub>x</sub> = 811.5 ppb  
 Previous Response    NO<sub>x</sub> = 799.6 ppb

NO = 812.1 ppb  
 NO = 801.2 ppb

\*Percent Change    NO<sub>x</sub> = -1.5%  
 \*Percent Change    NO = -1.3%  
 \* = > +/-5% change initiates investigation

### GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
1st NO ref point		0.0	796.3	794.8	1.5	1.0040	1.0059	----	----
1st NO2 (400 ppb O3)	394.9	399.9	794.6	394.9	399.6	1.0061	----	1.0008	99.9%
2nd NO2 (200 ppb O3)	594.5	200.3	794.3	594.5	199.8	1.0065	----	1.0025	99.8%
3rd NO2 (100 ppb O3)	693.9	100.9	792.7	693.9	98.8	1.0085	----	1.0213	97.9%
2nd NO ref point	----	0.0	791.6	790.8	0.8	1.0099	1.0110	----	----
<b>Average Correction Factor</b>						<b>1.0078</b>	<b>1.0084</b>	<b>1.0082</b>	<b>99.2%</b>

Notes:

Sample inlet filter replaced after as founds. Adjusted span only.

Calibration Performed By:

Asad Hidayat



# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

Version-03-2017

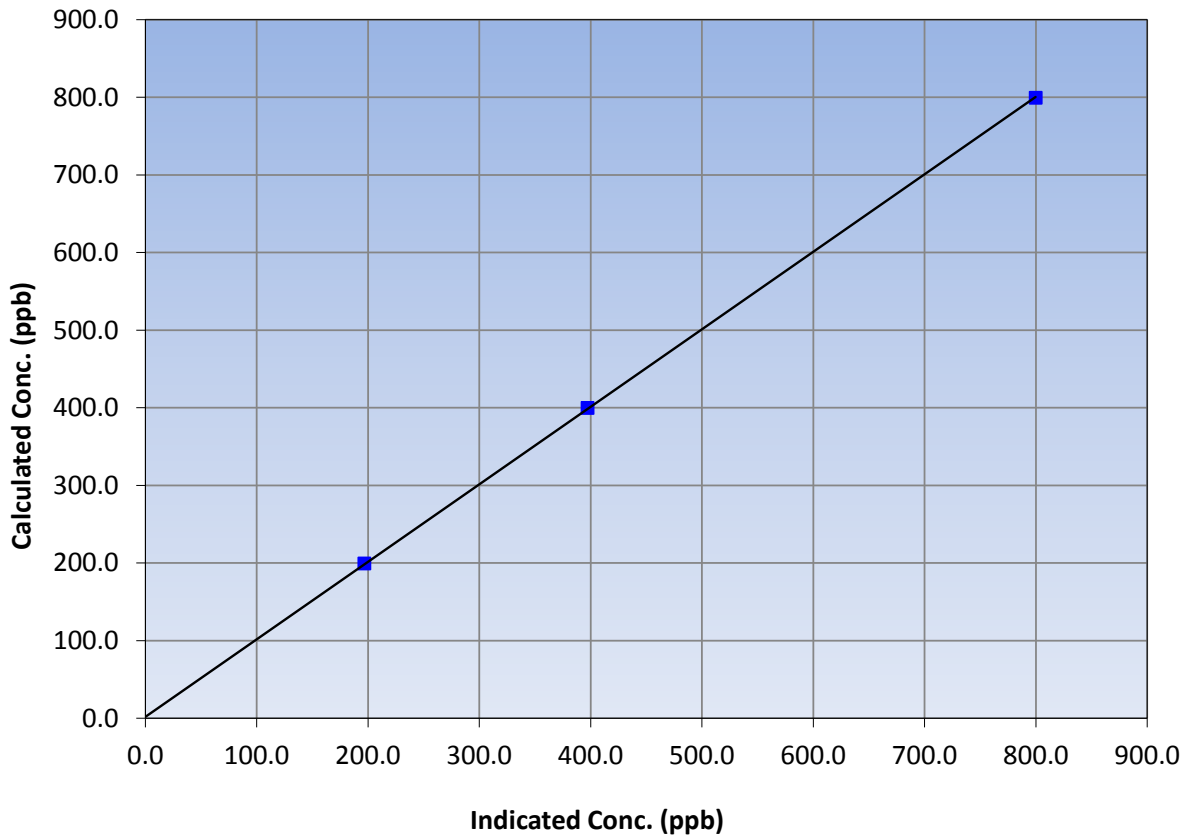
### Station Information

Calibration Date	October 12, 2017	Previous Calibration	September 25, 2017
Station Name	Fort McKay - Bertha Ganter	Station Number	AMS 01
Start Time (MST)	9:10	End Time (MST)	14:07
Analyzer make	Thermo 42i	Analyzer serial #	1218153357

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	-0.2	----	Correlation Coefficient	≥0.995	
799.5	799.7	0.9997			
399.8	397.3	1.0062			
199.4	196.6	1.0142			
			Slope	0.998639	0.90 - 1.10
			Intercept	1.778754	+/-20

NO<sub>x</sub> Calibration Curve





# Wood Buffalo Environmental Association

## NO Calibration Summary

Version-03-2017

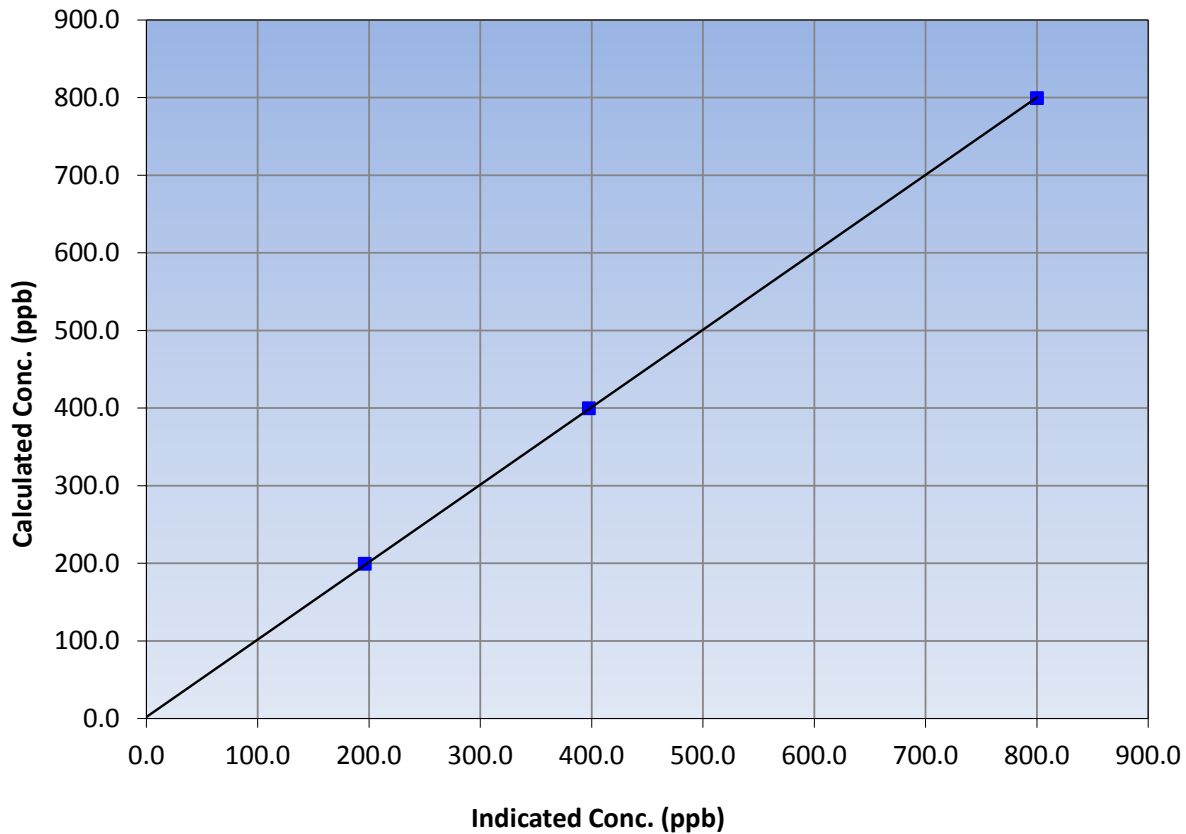
### Station Information

Calibration Date	October 12, 2017	Previous Calibration	September 25, 2017
Station Name	Fort McKay - Bertha Ganter	Station Number	AMS 01
Start Time (MST)	9:10	End Time (MST)	14:07
Analyzer make	Thermo 42i	Analyzer serial #	1218153357

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>
0.0	-0.3	----	Correlation Coefficient	≥0.995
799.5	800.2	0.9991		
399.8	397.4	1.0059	Slope	0.90 - 1.10
199.4	196.3	1.0157		
			Intercept	+/-20

NO Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

Version-03-2017

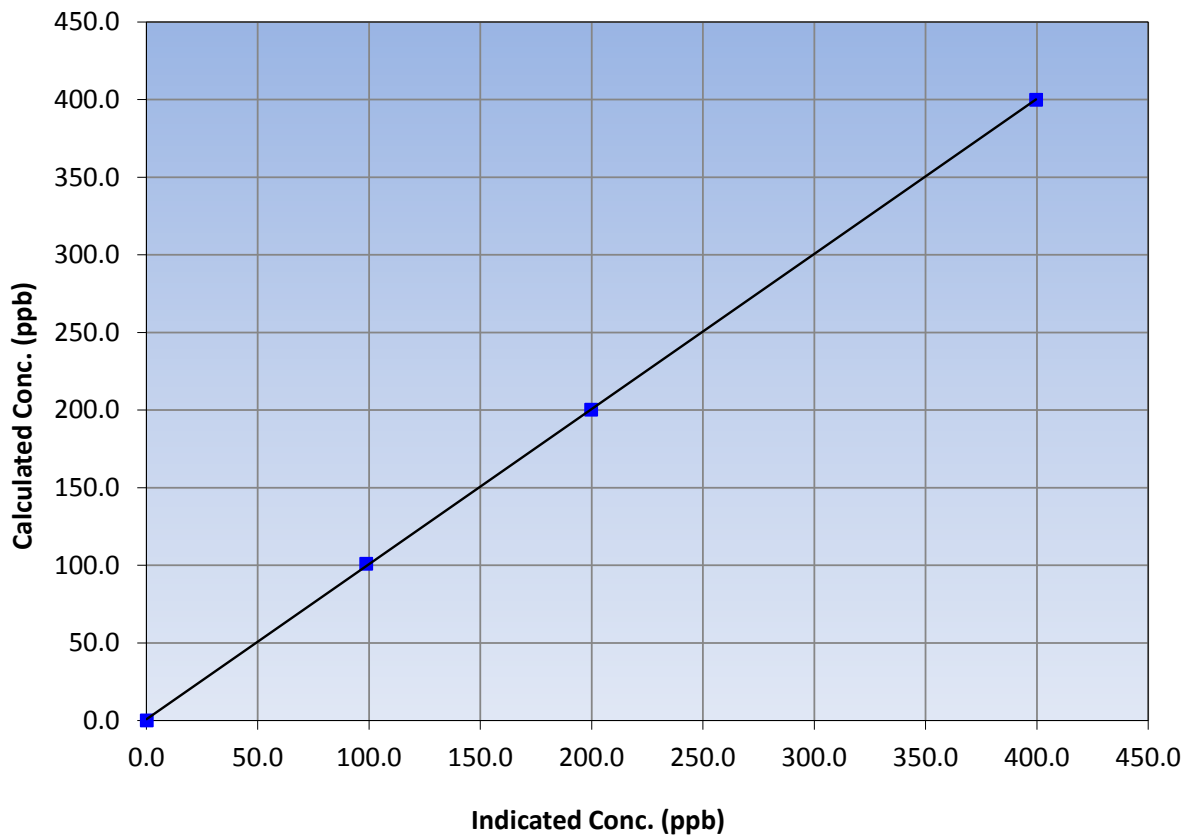
### Station Information

Calibration Date	October 12, 2017	Previous Calibration	September 25, 2017
Station Name	Fort McKay - Bertha Ganter	Station Number	AMS 01
Start Time (MST)	9:10	End Time (MST)	14:07
Analyzer make	Thermo 42i	Analyzer serial #	1218153357

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	0.1	----	Correlation Coefficient	≥0.995	
399.9	399.6	1.0008			
200.3	199.8	1.0025			
100.9	98.8	1.0213			
			Slope	0.999296	0.90 - 1.10
			Intercept	0.822883	+/-20

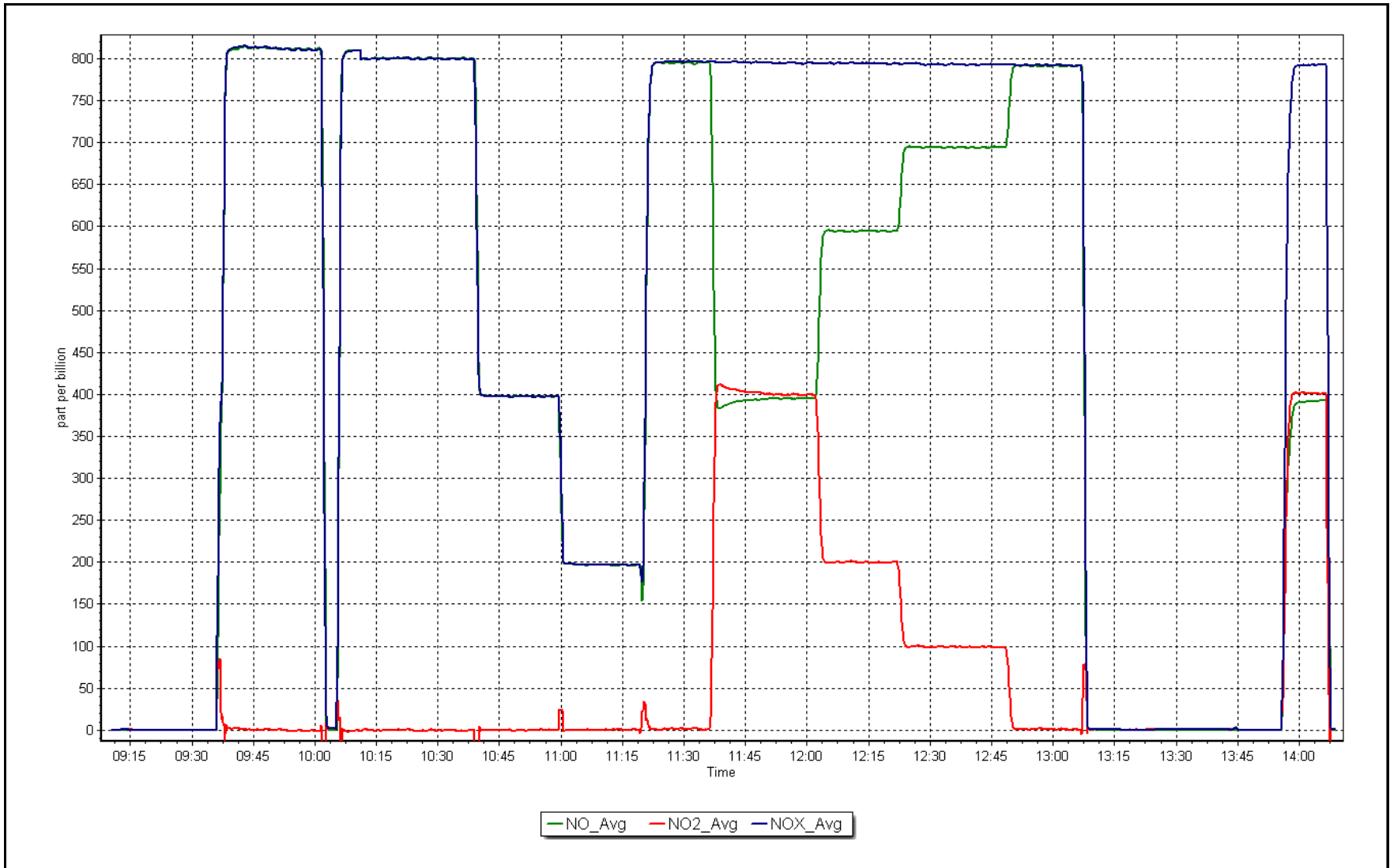
NO<sub>2</sub> Calibration Curve



NO<sub>x</sub> Calibration Plot

Date: October 12, 2017

Location: Fort McKay - Bertha Ganter





# Wood Buffalo Environmental Association

## TN - NO<sub>x</sub> - NH<sub>3</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Fort McKay - Bertha Ganter	Station number:	AMS 01
NOX Cal Date:	October 12, 2017	Last Cal Date:	September 25, 2017
Start time (MST):	9:10	End time (MST):	14:00
NH3 Cal Date:	October 16, 2017	Last Cal Date:	September 26, 2017
Start time (MST):	9:45	End time (MST):	14:25
Reason:	Routine		

### Calibration Standards

NOX Cal Gas Conc.	<u>49.7</u>	ppm	NO Gas Cylinder #	EY0000683
NO Cal Gas Conc.	<u>49.7</u>	ppm	NO Cal Gas Expiry	November-04-19
NH3 Cal Gas Conc.	<u>95.5</u>	ppm	NH3 Gas Cylinder #	LL23123
			NH3 Cal Gas Expiry	May-24-17
Calibrator Model	API T700		Serial Number	2464
ZAG make/model	API 701H		Serial Number	587

### Analyzer Information

Analyzer make:	API T201	Analyzer serial #:	152		
	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>	
NO coefficient	1.101	1.109	NH3 Range (ppb)	0 - 1000 ppb	
NOX coefficient	1.240	1.241	NOX Range (ppb)	0 - 1000 ppb	
NO2 coefficient	1.000	1.000	PMT Temperature	7.0	7.0
NH3 coefficient	0.904	0.896	Reaction cell Press	8.6	8.2
TN coefficient	1.246	1.243	Sample Flow	0.517	0.522
NO bkgrnd	0.1	0.1	PMT Voltage	645.0	645.0
NOX bkgrnd	0.1	0.1	Moly Temperature	314.6	316
TN bkgrnd	0.1	0.1	NH3 Conv Temp	825	825

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope	0.993338	0.997194
NO <sub>x</sub> Cal Offset	3.029259	1.633903
NO Cal Slope	0.997893	1.000242
NO Cal Offset	2.462863	2.245647
NO <sub>2</sub> Cal Slope	0.998136	1.000331
NO <sub>2</sub> Cal Offset	-0.044018	-1.034568
NH3 Cal Slope	1.004900	1.003738
NH3 Cal Offset	2.745423	3.270588
TN Cal Slope	0.989574	0.987053
TN Cal Offset	3.082568	3.846622



# Wood Buffalo Environmental Association

## TN - NOX - NH<sub>3</sub> Calibration Report

Version-03-2017

### Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated TN concentration (ppb) (Cc)	Calculated NOX concentration (ppb) (Cc)	Calculated NH3 concentration (ppb) (Cc)	Indicated TN concentration (ppb) (Ic)	Indicated NOX concentration (ppb) (Ic)	Indicated NH3 concentration (ppb) (Ic)	TN Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NH3 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.0	0.0	0.2	-1.5	1.7	----	----
as found NO	4930	80.6	799.5	799.5	----	791.3	793.3	-2.0	1.010	----
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.8	0.4	----	----
high NO point	4930	80.6	799.5	799.5	----	798.2	800.1	-1.9	1.002	----
NO/O3 point	4930	80.6	799.5	799.5	----	802.8	804.5	-1.7	0.996	----
as found NH3	4916	94.3	1797.4	NA	1797.4	1789.6	----	1761.3	1.004	1.021
first NH3	4916	94.3	1797.4	NA	1797.4	1818.6	----	1789.1	0.988	1.005
second NH3	4948	52.4	1000.8	NA	1000.8	1009.6	----	993.2	0.991	1.008
third NH3	4932	26.3	506.6	NA	506.6	504.7	----	496.7	1.004	1.020
<b>Average Correction Factor</b>									<b>0.9987</b>	<b>1.0107</b>

Corrected As found    TN = 791.1 ppb    NO<sub>x</sub> = 794.8 ppb    NH<sub>3</sub> = 1759.6 ppb

Previous Response    TN = 804.8 ppb    NO<sub>x</sub> = 801.8 ppb    NH<sub>3</sub> = 1785.9 ppb

NH<sub>3</sub> Previous Converter Efficiency = 90.4 %

NH<sub>3</sub> Current Converter Efficiency = 89.6 %

\*Percent Change    TN = 1.7%

\*Percent Change    NO<sub>x</sub> = 0.9%

\*Percent Change    NH<sub>3</sub> = 1.5%

\* = > +/-5% change initiates investigation





# Wood Buffalo Environmental Association

## NO<sub>x</sub> - NO - NO<sub>2</sub> Calibration Report

Version-03-2017

### Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO <sub>x</sub> concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated TN concentration (ppb) (Cc)	Indicated NO <sub>x</sub> concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated TN concentration (ppb) (Ic)	NO <sub>x</sub> Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.0	0.0	-0.8	-0.3	-0.4	----	----
as found span	4930	80.6	799.5	799.5	799.5	796.1	805.8	799.5	1.0042	0.9921
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.8	-0.3	-0.4	----	----
high point	4930	80.6	799.5	799.5	799.5	800.1	798.2	798.2	0.9992	1.0016
second point	4970	40.3	399.8	399.8	399.8	400.0	395.8	397.8	0.9994	1.0100
third point	4990	20.1	199.4	199.4	199.4	196.7	195.6	198.6	1.0137	1.0194
<b>Average Correction Factor</b>									<b>1.0041</b>	<b>1.0103</b>

Corrected As found	TN = 799.9 ppb	NO <sub>x</sub> = 796.9 ppb	NO = 806.1 ppb	*Percent Change	TN = 0.6%
Previous Response	TN = 804.8 ppb	NO <sub>x</sub> = 801.8 ppb	NO = 798.7 ppb	*Percent Change	NO <sub>x</sub> = 0.6%
				*Percent Change	NO = -0.9%
				<i>* = &gt; +/-5% change initiates investigation</i>	

### GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO <sub>2</sub> concentration (ppb) (Cc)	Indicated NO <sub>x</sub> concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO <sub>2</sub> concentration (ppb) (Ic)	NO <sub>x</sub> Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO <sub>2</sub> Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
1st NO ref point	----	0.0	804.5	801.4	3.0	0.9937	0.9976	----	----
1st NO <sub>2</sub> (400 ppb O <sub>3</sub> )	396.0	405.4	801.4	396.0	405.4	0.9976	----	1.0000	100.0%
2nd NO <sub>2</sub> (200 ppb O <sub>3</sub> )	596.5	204.9	803.5	596.5	207.0	0.9950	----	0.9899	101.0%
3rd NO <sub>2</sub> (100 ppb O <sub>3</sub> )	695.6	105.8	803.8	695.6	108.0	0.9946	----	0.9796	102.1%
2nd NO ref point	----	0.0	803.5	795.7	7.8	0.9950	1.0047	----	----
<b>Average Correction Factor</b>						<b>0.9955</b>	<b>1.0012</b>	<b>0.9898</b>	<b>101.0%</b>

**Notes:** Sample inlet filter replaced after as founds. Adjusted Nt and NO<sub>x</sub> channels. 3rd GPT point originally failed due to high imbalance between NO and NO<sub>x</sub> during 1st NO ref point. Purged out the gases from back of the calibrated and reattempted another high NO point, which was then used as a high NO reference. Adjusted NH<sub>3</sub>.

Calibration Performed By: Asad Hidayat



# Wood Buffalo Environmental Association

## TN Calibration Summary

Version-03-2017

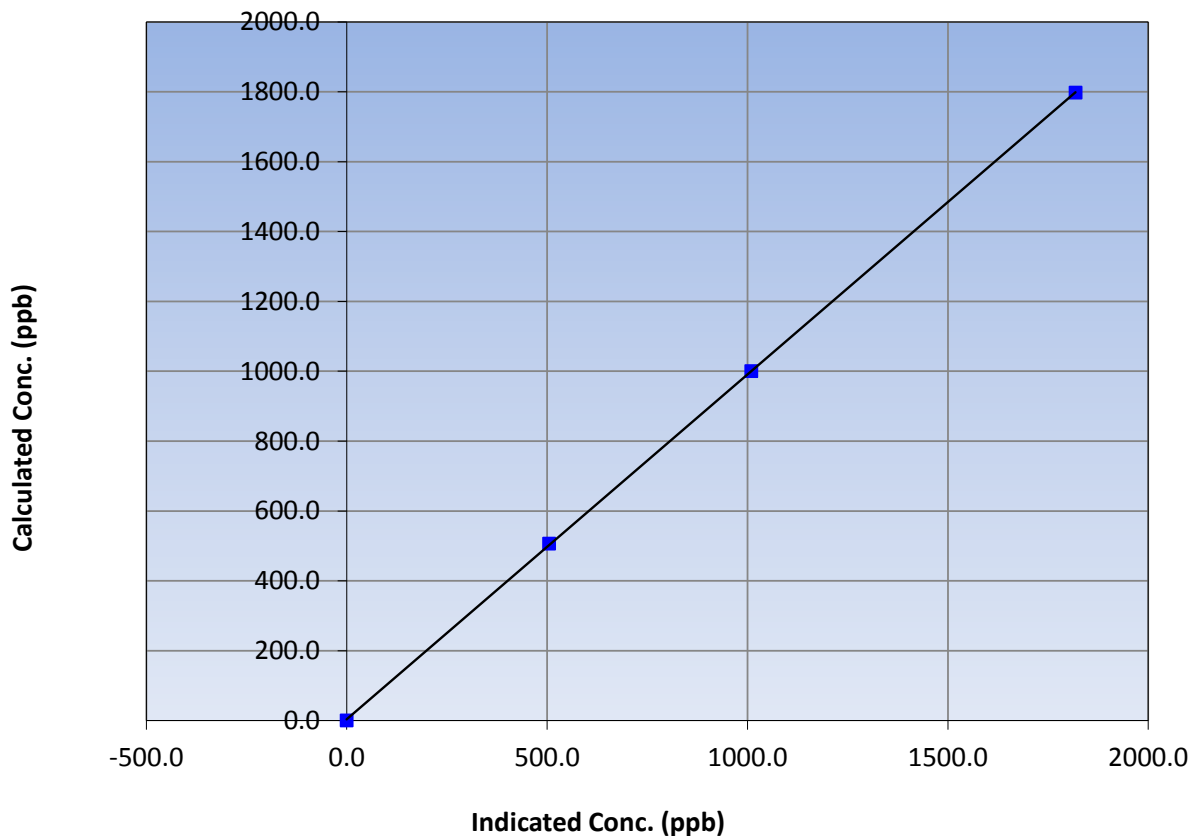
### Station Information

Calibration Date	October 16, 2017	Previous Calibration	September 26, 2017
Station Name	Fort McKay - Bertha Ganter	Station Number	AMS 01
Start Time (MST)	9:45	End Time (MST)	14:25
Analyzer make	API T201	Analyzer serial #	152

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	-0.4	----	Correlation Coefficient	≥0.995	
1797.4	1818.6	0.9884			
1000.8	1009.6	0.9912			
506.6	504.7	1.0037			
			Slope	0.987053	0.90 - 1.10
			Intercept	3.846622	+/-20

TN Calibration Curve





# Wood Buffalo Environmental Association

## NH<sub>3</sub> Calibration Summary

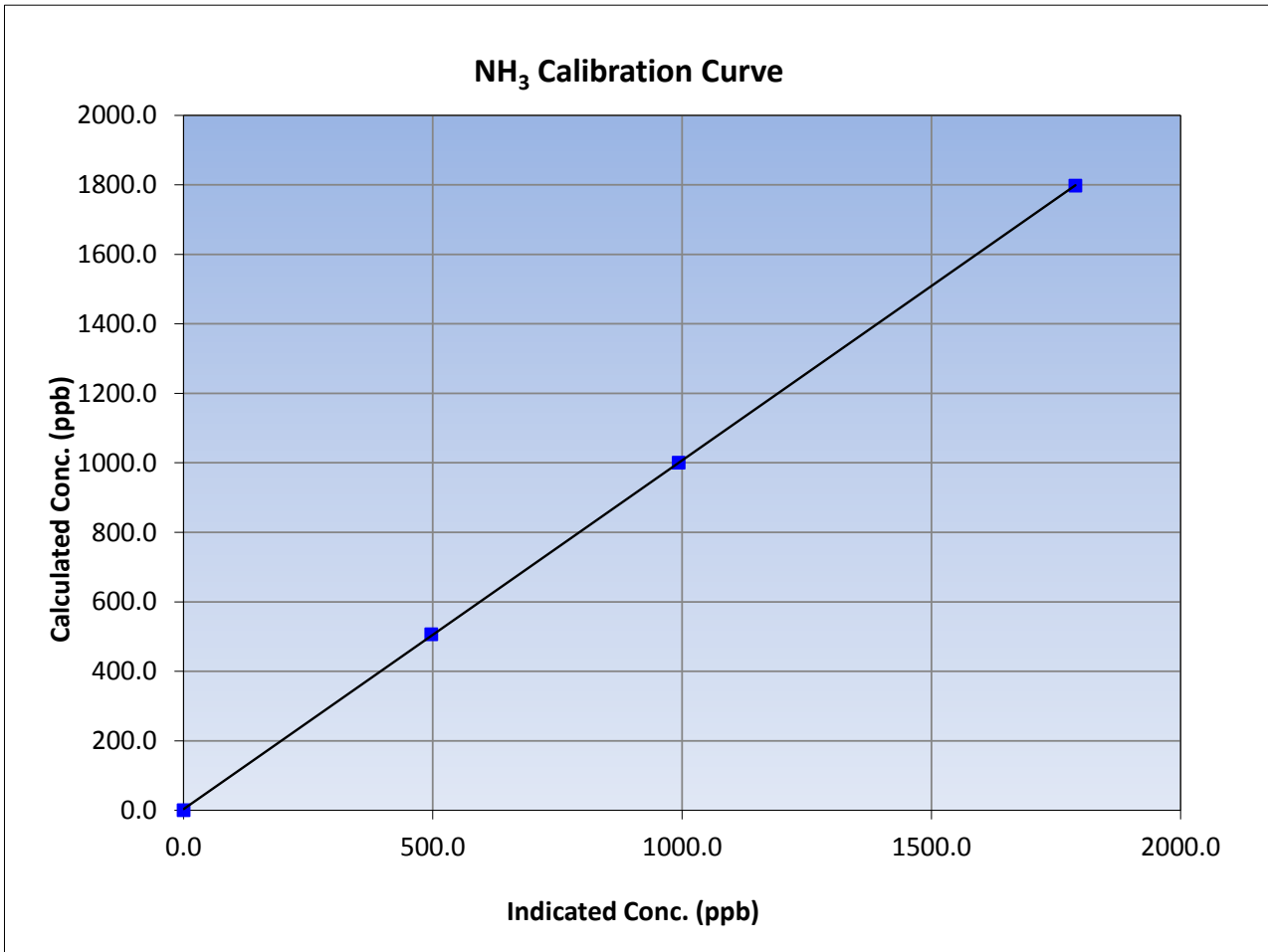
Version-03-2017

### Station Information

Calibration Date	October 16, 2017	Previous Calibration	September 26, 2017
Station Name	Fort McKay - Bertha Ganter	Station Number	AMS 01
Start Time (MST)	9:45	End Time (MST)	14:25
Analyzer make	API T201	Analyzer serial #	152

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	0.4	----	Correlation Coefficient	≥0.995	
1797.4	1789.1	1.0047			
1000.8	993.2	1.0076			
506.6	496.7	1.0198			
			Slope	1.003738	0.90 - 1.10
			Intercept	3.270588	+/-20





# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

Version-03-2017

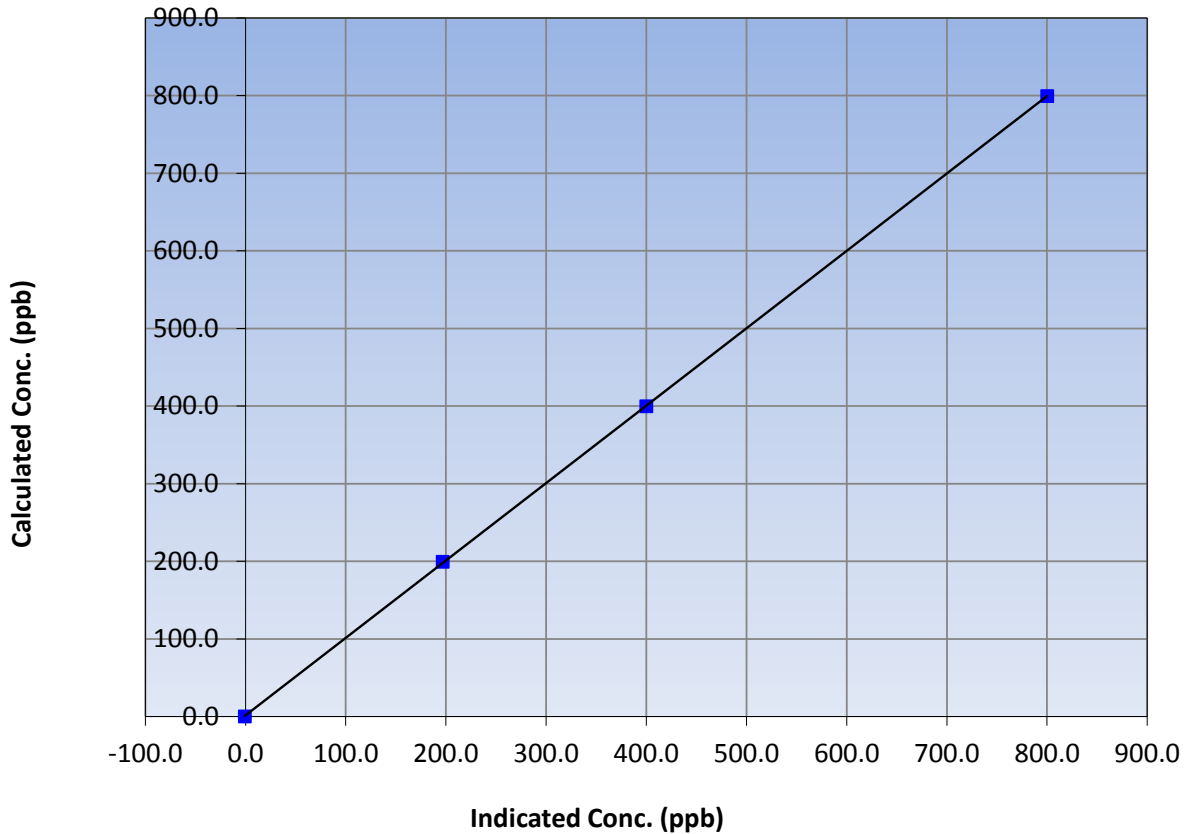
### Station Information

Calibration Date	October 12, 2017	Previous Calibration	September 25, 2017
Station Name	Fort McKay - Bertha Ganter	Station Number	AMS 01
Start Time (MST)	9:10	End Time (MST)	14:00
Analyzer make	API T201	Analyzer serial #	152

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	-0.8	----	Correlation Coefficient	≥0.995	
799.5	800.1	0.9992			
399.8	400.0	0.9994			
199.4	196.7	1.0137			
			Slope	0.997194	0.90 - 1.10
			Intercept	1.633903	+/-20

NO<sub>x</sub> Calibration Curve





# Wood Buffalo Environmental Association

## NO Calibration Summary

Version-03-2017

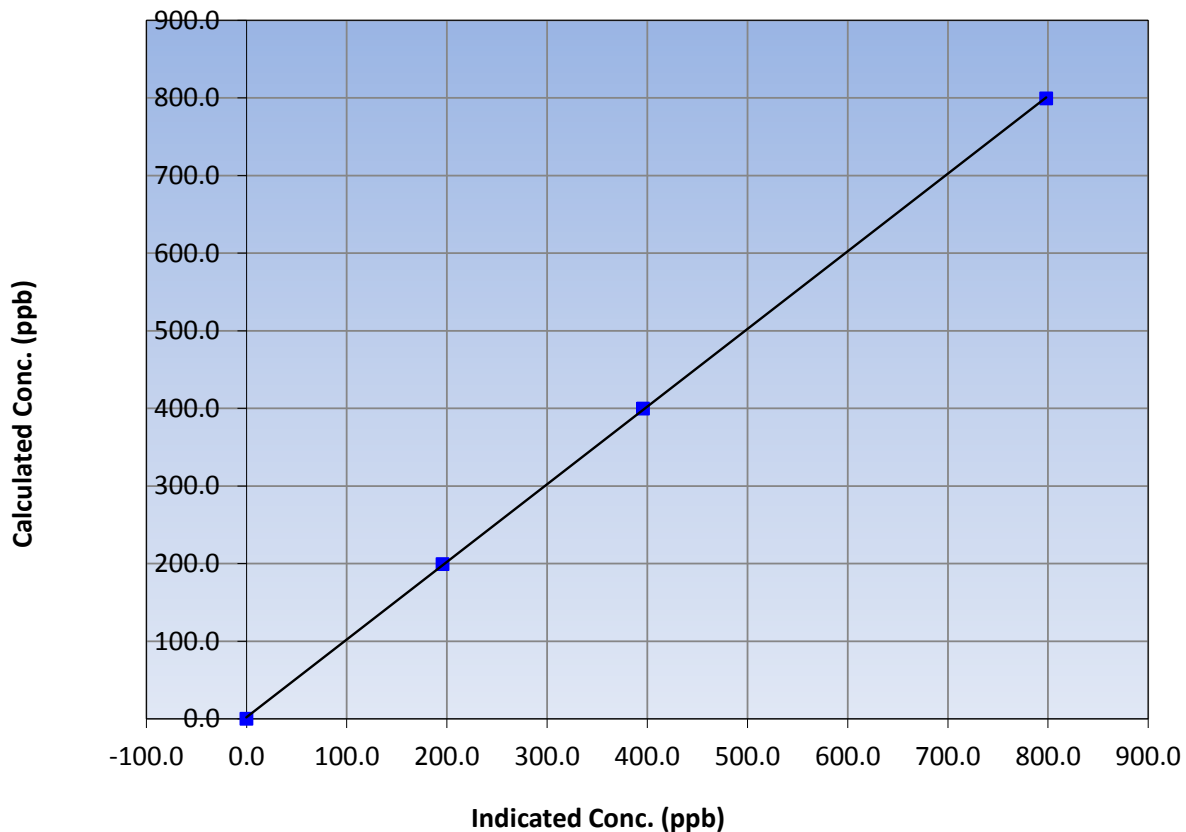
### Station Information

Calibration Date	October 12, 2017	Previous Calibration	September 25, 2017
Station Name	Fort McKay - Bertha Ganter	Station Number	AMS 01
Start Time (MST)	9:10	End Time (MST)	14:00
Analyzer make	API T201	Analyzer serial #	152

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	-0.3	----	Correlation Coefficient	≥0.995	
799.5	798.2	1.0016			
399.8	395.8	1.0100			
199.4	195.6	1.0194			
			Slope	1.000242	0.90 - 1.10
			Intercept	2.245647	+/-20

NO Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

Version-03-2017

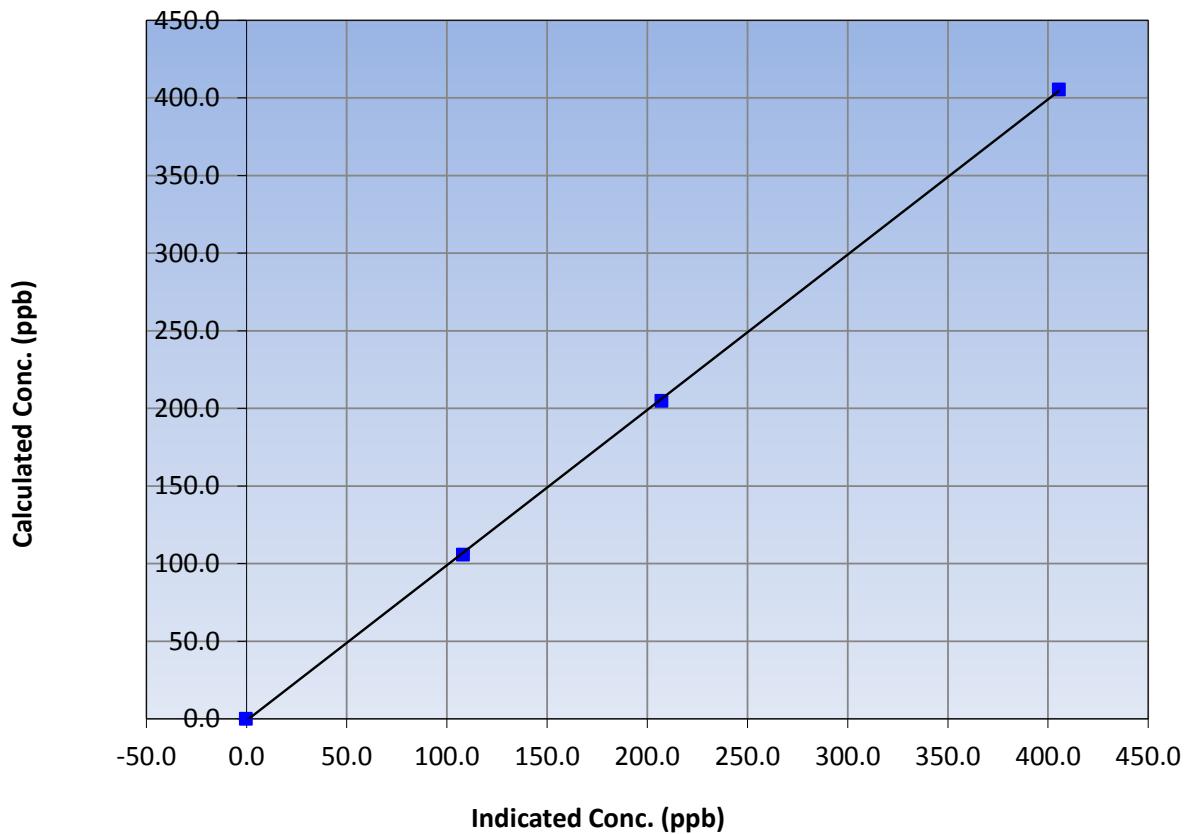
### Station Information

Calibration Date	October 12, 2017	Previous Calibration	September 25, 2017
Station Name	Fort McKay - Bertha Ganter	Station Number	AMS 01
Start Time (MST)	9:10	End Time (MST)	14:00
Analyzer make	API T201	Analyzer serial #	152

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	-0.4	----	Correlation Coefficient	≥0.995	
405.4	405.4	1.0000			
204.9	207.0	0.9899			
105.8	108.0	0.9796			
			Slope	1.000331	0.90 - 1.10
			Intercept	-1.034568	+/-20

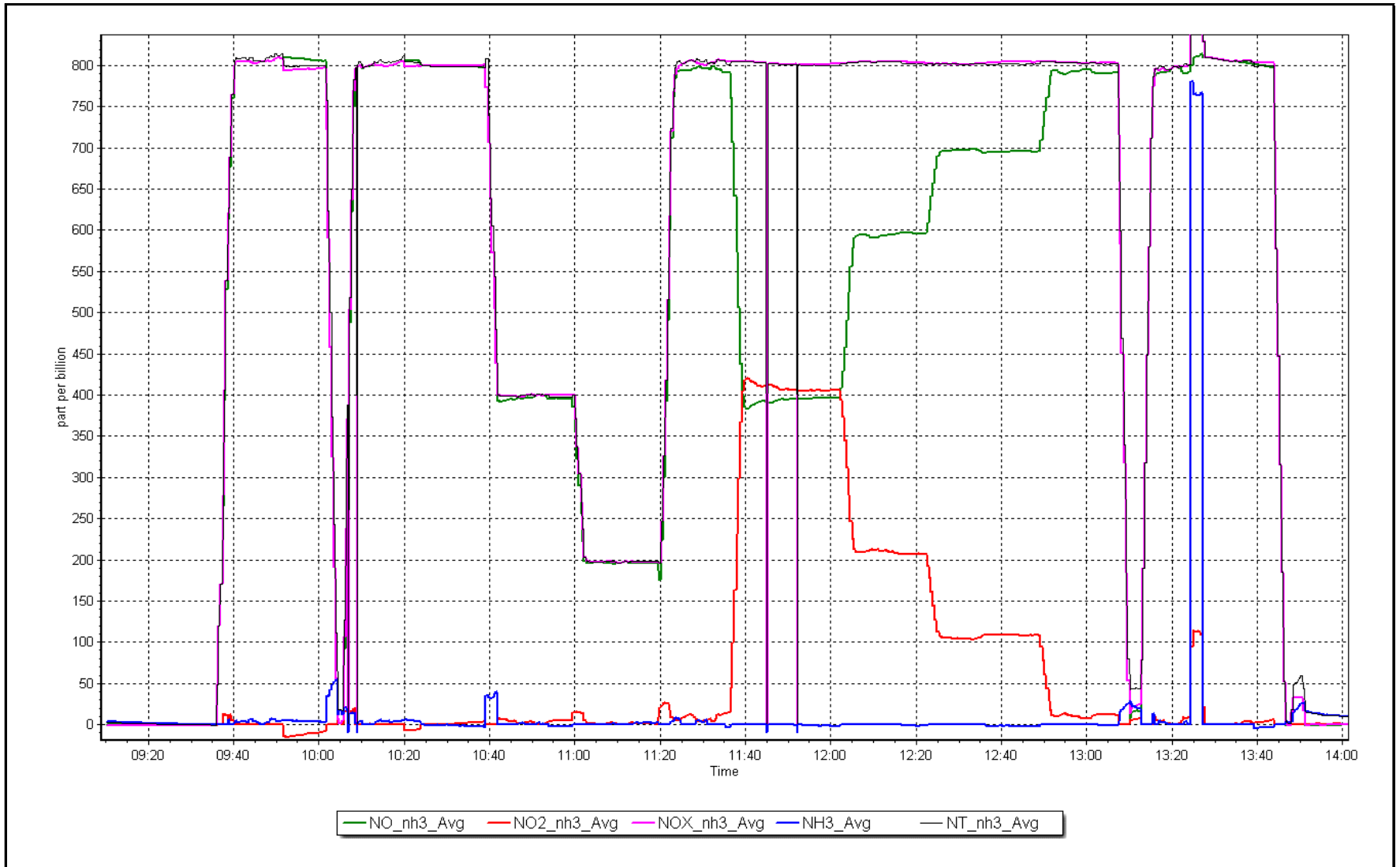
**NO<sub>2</sub> Calibration Curve**



# NO<sub>x</sub> Calibration Plot

Date: October 12, 2017

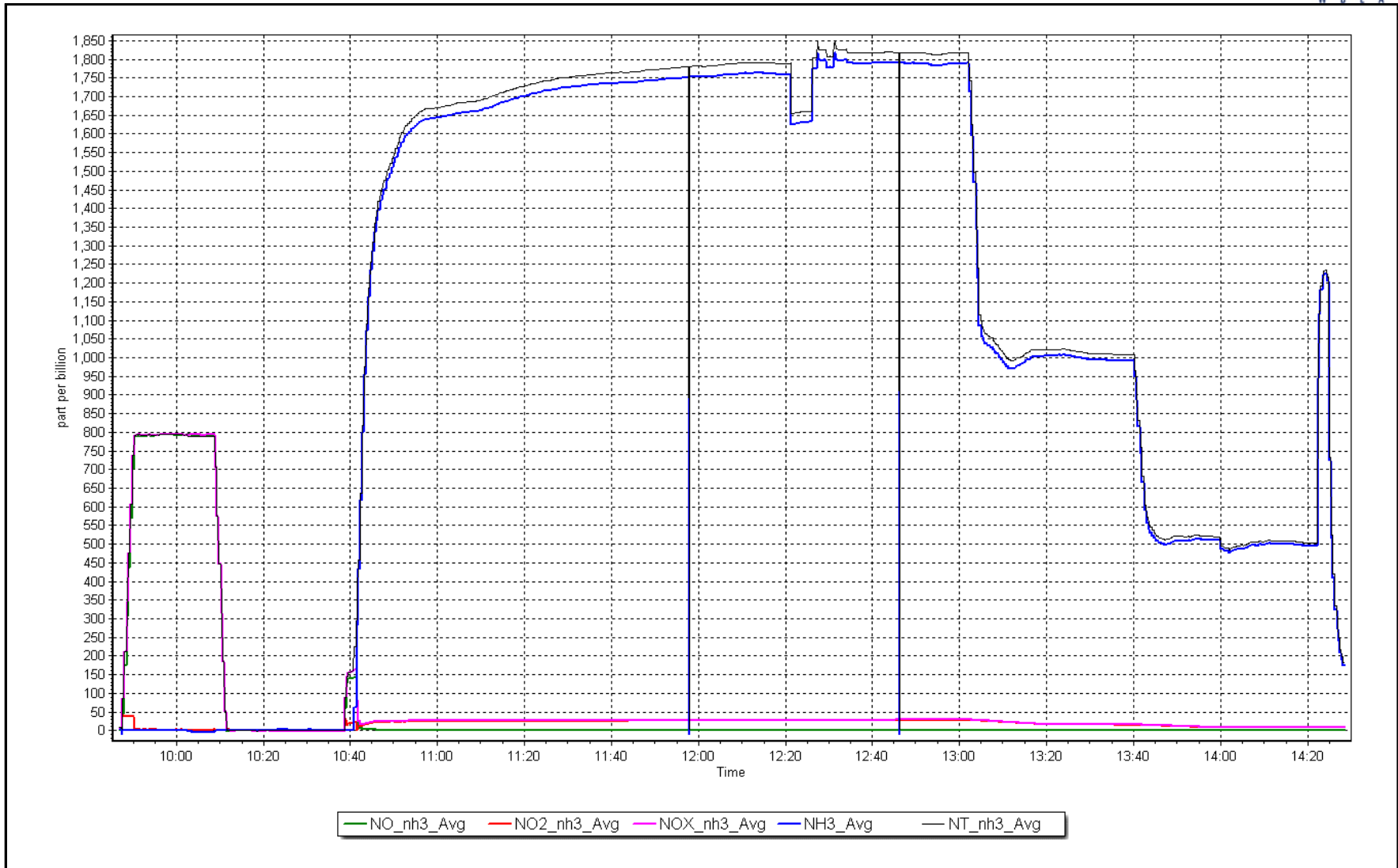
Location: Fort McKay - Bertha Ganter



# NH<sub>3</sub> Calibration Plot

Date: October 16, 2017

Location: Fort McKay - Bertha Ganter







# Wood Buffalo Environmental Association

## SHARP PM<sub>2.5</sub> CALIBRATION

Version-02-2017

### Station Information

Station Name:	Fort McKay - Bertha Ganter	Station number:	AMS 01
Calibration Date:	October 12, 2017	Last Cal Date:	September 13, 2017
Start time (MST):	10:20	End time (MST):	11:02
Sharp Model:	Thermo 5030 SHARP	S/N:	E-1486
Particulate Fraction:	PM2.5	C14 Source S/N:	5691
Flow Meter Make/Model:	Delta-Cal	S/N:	1019
Temp/RH standard:	Delta-Cal	S/N:	1019

### Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	(Limits)
T1 (°C)	0	-0.4	0	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	981	982.5	981	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	1006	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	0.5	-----	0.5	<input type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified	<input checked="" type="checkbox"/>			
Cyclone cleaning :	PM10 Cyclone	<input checked="" type="checkbox"/>	PM2.5 Cyclone	<input checked="" type="checkbox"/>	
Date Filter Tape Installed:					

### Quarterly Calibration Test

Leak Test: \_\_\_\_\_ Date of check: \_\_\_\_\_ Last Cal Date: September 13, 2017  
 Flow w/o adaptor: \_\_\_\_\_ Flow w/ adaptor: \_\_\_\_\_

**(Limit) 0.4 LPM**

Adjusted	Current Test	Previous Test	% Change
<input type="checkbox"/>	Foil S/N: _____	Foil S/N: <u>2582</u>	
Foil Calibration	Foil Mass: _____	Foil Mass: <u>1186</u>	
	Calibration Date: _____	Calibration Date: <u>September 13, 2017</u>	
<b>(Limit) +/- 5% of previous</b>	Correction Factor: _____	Correction Factor: <u>7228</u>	---

### Annual Calibration Test

Parameter	As found	Measured	As left	Adjusted	(Limits)
T2 (°C)				<input type="checkbox"/>	+/- 2 °C
T3 (°C)				<input type="checkbox"/>	+/- 2 °C
T4 (°C)				<input type="checkbox"/>	+/- 2 °C
RH (%)				<input type="checkbox"/>	+/- 10%
Date Sample Tube Cleaned:					
Date Pump Rebuilt/Replaced:					

Notes: Cyclone head cleaned. No adjustments made.

Calibration by: Asad Hidayat



## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

### **CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT**

#### **AMS 2 MILDRED LAKE OCTOBER 2017**

Operations, Data Collection,  
QA/QC, Data Validation and Reporting by:  
Wood Buffalo Environmental Association  
Fort McMurray, Alberta

November 29, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS 2)  
OCTOBER 2017

MONTHLY SUMMARY for  
AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	701	36	43	99.06	30	0	9	0
H2S (ppb) Average	698	37	46	98.79	2	0	1	0
THC (ppm) Average	665	36	79	94.22	5.2	-	2.8	-
Temperature (C) Average	744	0	0	100	23	-	14.3	-
Relative Humidity (%) Average	744	0	0	100	100	-	99	-
Wind Speed 10 m (km/h) Average	717	0	27	96.37	36	-	21	-
Wind Direction 10 m (deg) Average	717	0	27	96.37	-	-	-	-

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS 2)  
OCTOBER 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	701	1.8	4	-	0	0	0	0	1	6	30
H2S (ppb) Average	698	0.4	0	-	0	0	0	0	0	1	2
THC (ppm) Average	665	2.37	0.4	-	1.9	2.1	2.1	2.2	2.5	2.8	5.2
Temperature 2 m (C) Average	744	3.46	4.6	-	-4.7	-1.3	-0.1	2.3	6	10	23
Relative Humidity (%) Average	744	75.3	16	-	29	53	66	77	88	97	100
Wind Speed 10 m (km/h) Average	717	12	6	-	0	5	7	11	16	21	36
Wind Direction 10 m (deg) Average	717	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS 2)  
OCTOBER 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S, SO2, THC	26 Oct 2017 10:00	26 Oct 2017 16:00	7	Station power failure
H2S, THC	13 Oct 2017 14:00	13 Oct 2017 15:00	2	Maintenance - sample manifold cleaning
THC	01 Oct 2017 06:00	02 Oct 2017 10:00	29	Analyzer failure - FID failure
THC	06 Oct 2017 10:00	06 Oct 2017 14:00	5	Maintenance to replace analyzer
Wind Speed, Wind Direction	06 Sep 2017 19:00	06 Sep 2017 19:00	27	Flat line in sensor output signal - Sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb

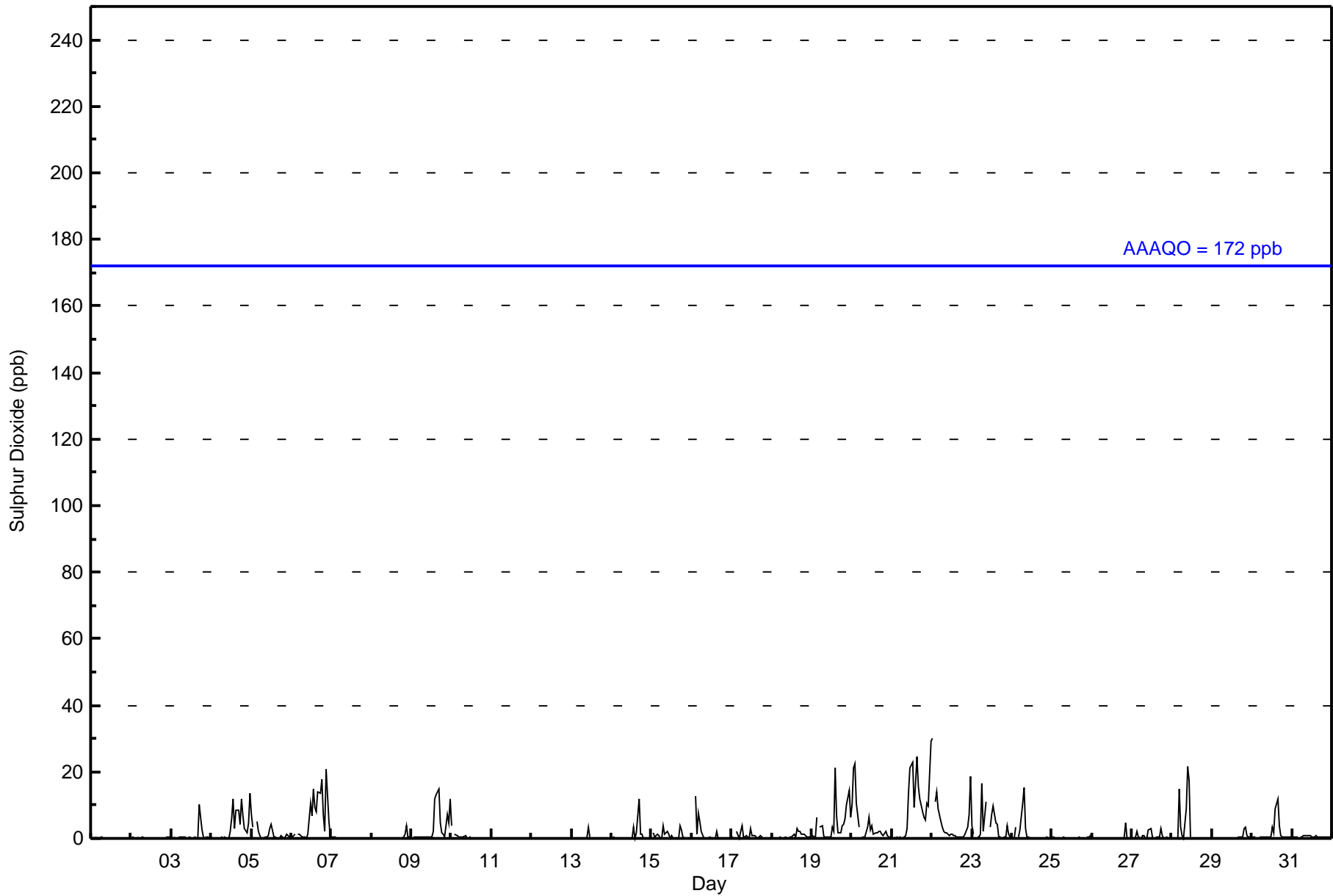
Mildred Lake - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 30 ppb on Oct 22 01:00										Maximum Daily Average: 9.2 ppb on Oct 21										Hours of Data: 701						
Minimum Value: 0 ppb on Oct 2 20:00										Minimum Daily Average: 0.0 ppb on Oct 11										Hours of Missing Data: 43						
Maximum Diurnal Average: 2.9 ppb at hour 16										Minimum Diurnal Average: 1.0 ppb at hour 8										Hours of Calibration: 36						
Monthly Average: 1.8 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 6 P <sub>99</sub> = 21										Percent Operational Time: 99.1						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
3-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	3	0	0	0	0	0	0.8	10
4-Oct	0	Z	0	0	0	0	0	0	0	0	2	6	12	3	8	9	4	12	7	3	2	5	14	0	3.8	14
5-Oct	7	4	Z	5	2	1	0	0	0	1	3	4	0	0	0	0	0	4	1	0	0	1	1	1	1.4	7
6-Oct	0	1	1	Z	1	1	0	0	0	1	11	7	15	9	8	14	14	18	7	2	21	5	1	6.0	21	
7-Oct	1	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
8-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	0	0	0.3	4
9-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	2	12	13	15	5	2	1	1	7	5	12	0	3.4	15
10-Oct	4	Z	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	4
11-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
12-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
13-Oct	0	0	0	0	Z	0	0	0	0	3	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0.2	3
14-Oct	0	1	0	0	0	Z	0	0	0	0	0	0	4	0	2	12	1	1	0	0	0	0	0	0	0.9	12
15-Oct	Z	2	1	1	1	0	0	4	1	2	1	0	0	0	0	0	4	2	0	0	0	0	0	0	0.9	4
16-Oct	0	Z	13	1	8	5	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1.4	13
17-Oct	0	0	Z	2	0	2	4	0	0	1	0	3	1	1	1	0	1	1	0	0	0	0	0	0	0.8	4
18-Oct	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	3	2	2	1	1	1	1	1	1	0	0.7	3
19-Oct	1	0	1	6	Z	4	4	1	0	0	0	3	2	21	7	2	2	4	4	6	10	14	6	0	4.3	21
20-Oct	10	21	22	11	3	Z	1	0	1	3	6	2	4	1	2	2	2	2	1	1	2	1	1	0	4.3	22
21-Oct	Z	0	0	0	0	0	0	1	1	3	14	21	23	9	17	25	16	12	8	7	5	10	10	29	9.2	29
22-Oct	30	Z	11	14	9	5	3	2	2	2	1	1	1	1	0	0	0	1	0	1	3	7	19	0	5.0	30
23-Oct	4	1	Z	1	0	1	17	2	11	C	C	4	7	10	5	4	1	0	0	0	4	1	0	0	3.5	17
24-Oct	0	0	3	Z	0	3	11	15	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.7	15
25-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.2	1
26-Oct	0	0	0	0	0	Z	0	0	0	PF	PF	PF	PF	PF	PF	PF	0	0	0	1	5	0	0	0	--	5
27-Oct	Z	0	0	2	0	0	1	1	0	0	3	3	1	0	0	0	0	3	1	0	0	0	0	0	0.7	3
28-Oct	0	Z	0	0	15	3	1	0	9	22	17	0	0	0	0	0	0	0	0	0	0	0	0	0	3.0	22
29-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	1	0	0	0.5	3
30-Oct	0	0	0	Z	0	0	0	0	0	0	0	1	3	2	9	12	4	1	1	0	0	0	0	0	1.6	12
31-Oct	0	0	0	0	Z	0	0	1	1	1	1	1	1	1	1	0	0	0	0	1	0	0	0	0	0.5	1
2.3 1.3 2.2 1.8 1.7 1.1 1.5 1.0 1.1 1.3 1.8 1.8 2.2 2.1 2.8 2.9 2.5 2.0 1.8 1.1 1.1 2.2 1.7 2.7																								Diurnal Average		
30 21 22 14 15 5 17 15 11 22 17 21 23 15 21 25 16 14 18 7 6 21 14 29																								Diurnal Maximum		
Z - zerospan										C - Calibration					PF - Power Failure											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																										



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Mildred Lake - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Mildred Lake - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	661	94.29	94.29
11 - 20	30	4.28	98.57
21 - 60	10	1.43	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 701

Total Number of Hours: 744





**Wood Buffalo Environmental Association  
Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Mildred Lake - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 10	86	64	17	6	4	18	17	56	61	29	33	53	21	44	53	78	640
11 - 20	2	0	0	1	0	1	0	5	0	1	0	1	4	12	0	0	27
21 - 60	0	0	0	0	0	2	1	2	1	0	0	0	2	0	0	0	8
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>88</b>	<b>64</b>	<b>17</b>	<b>7</b>	<b>4</b>	<b>21</b>	<b>18</b>	<b>63</b>	<b>62</b>	<b>30</b>	<b>33</b>	<b>54</b>	<b>27</b>	<b>56</b>	<b>53</b>	<b>78</b>	<b>675</b>

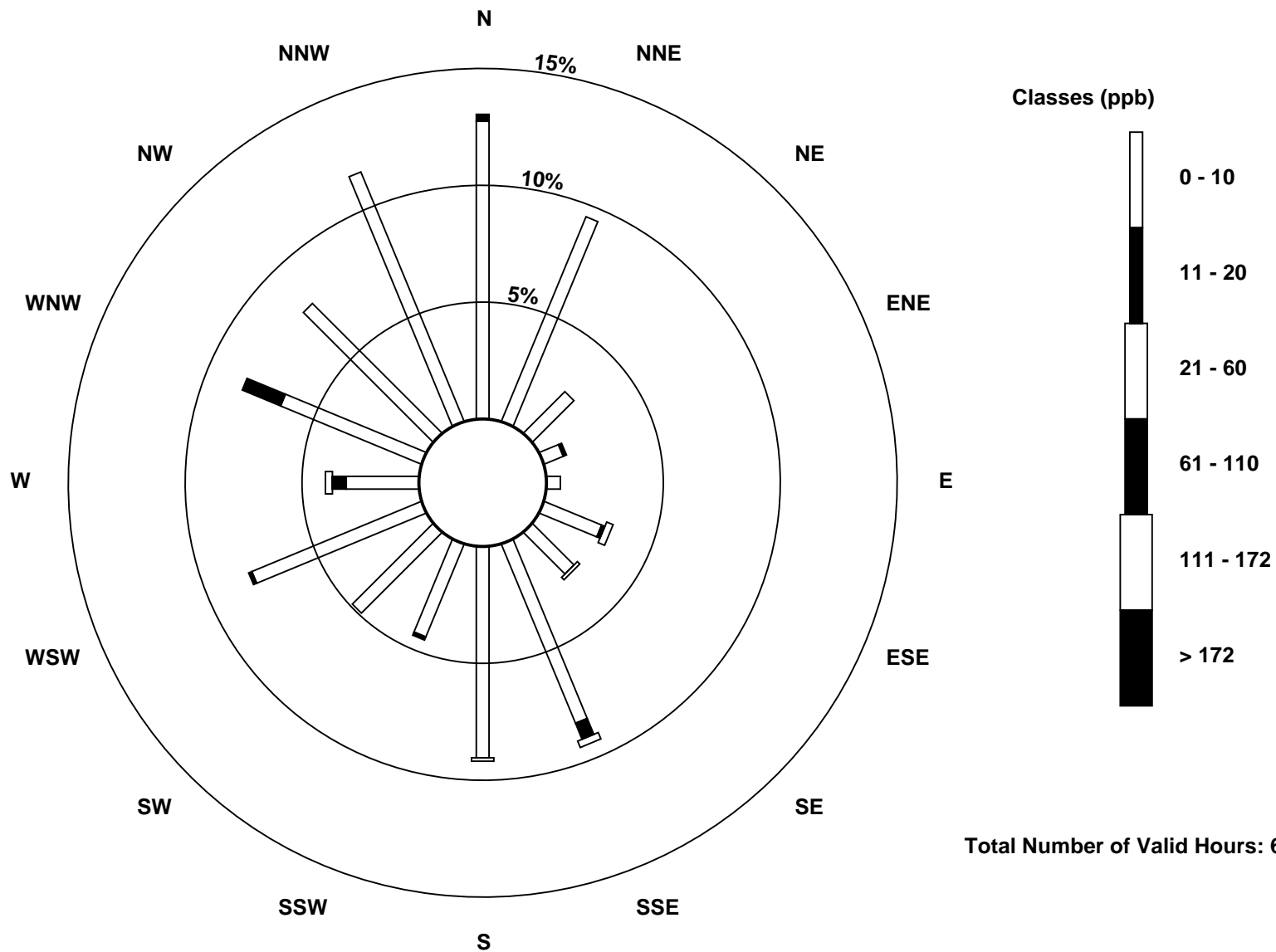
Total Number of Valid Hours: 675

Total Number of Hours: 744

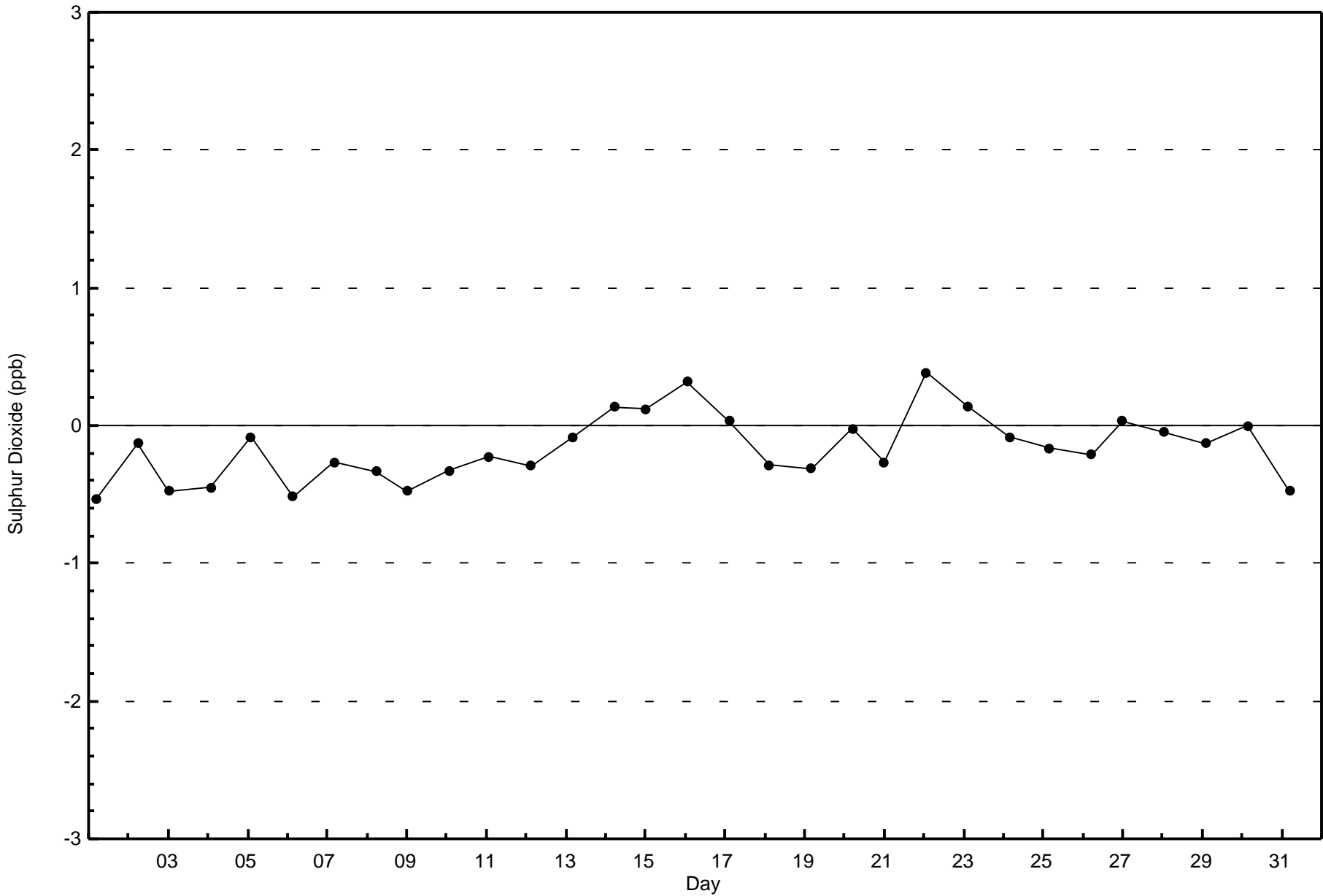


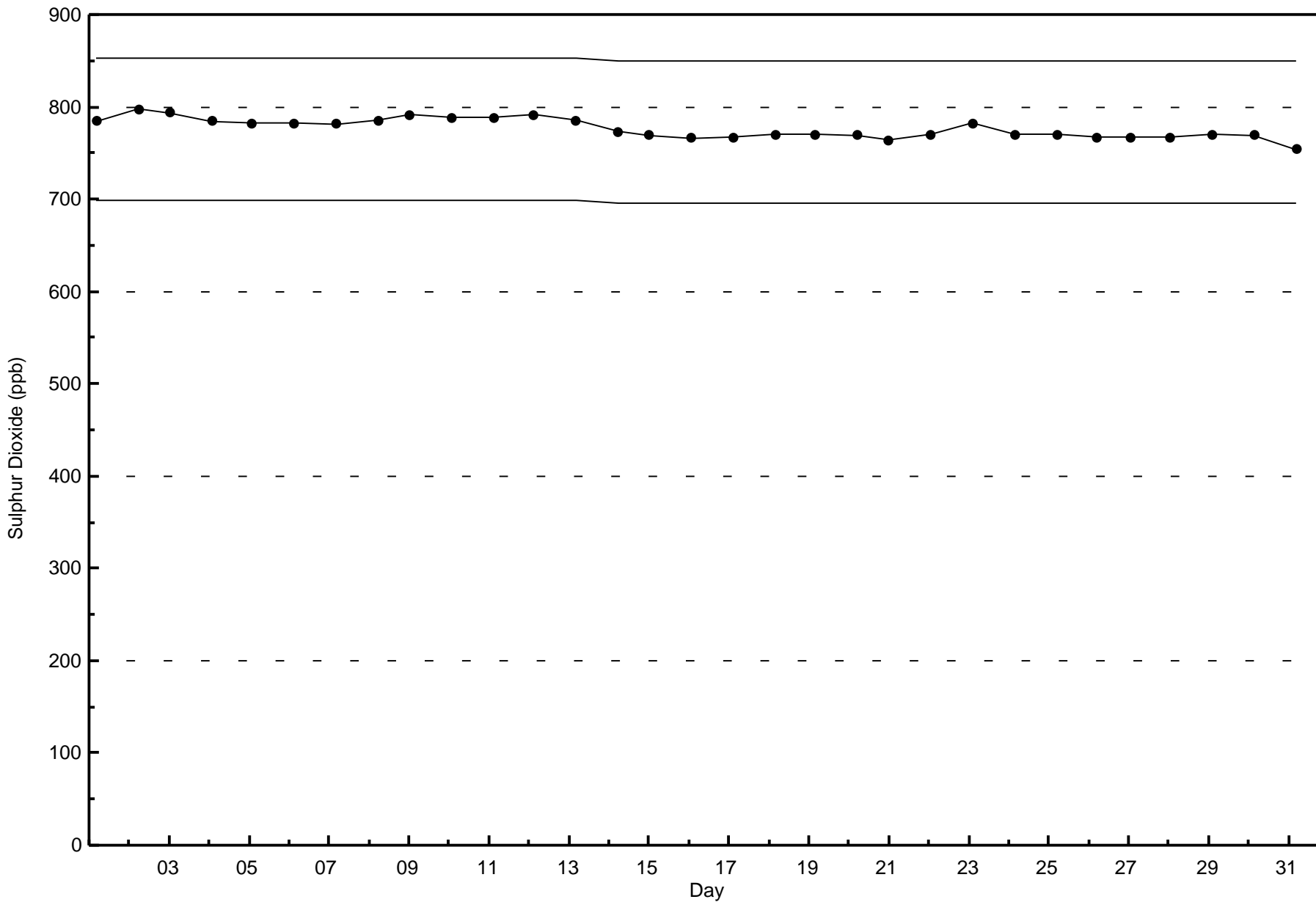
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Mildred Lake (AMS 2)



Total Number of Valid Hours: 675





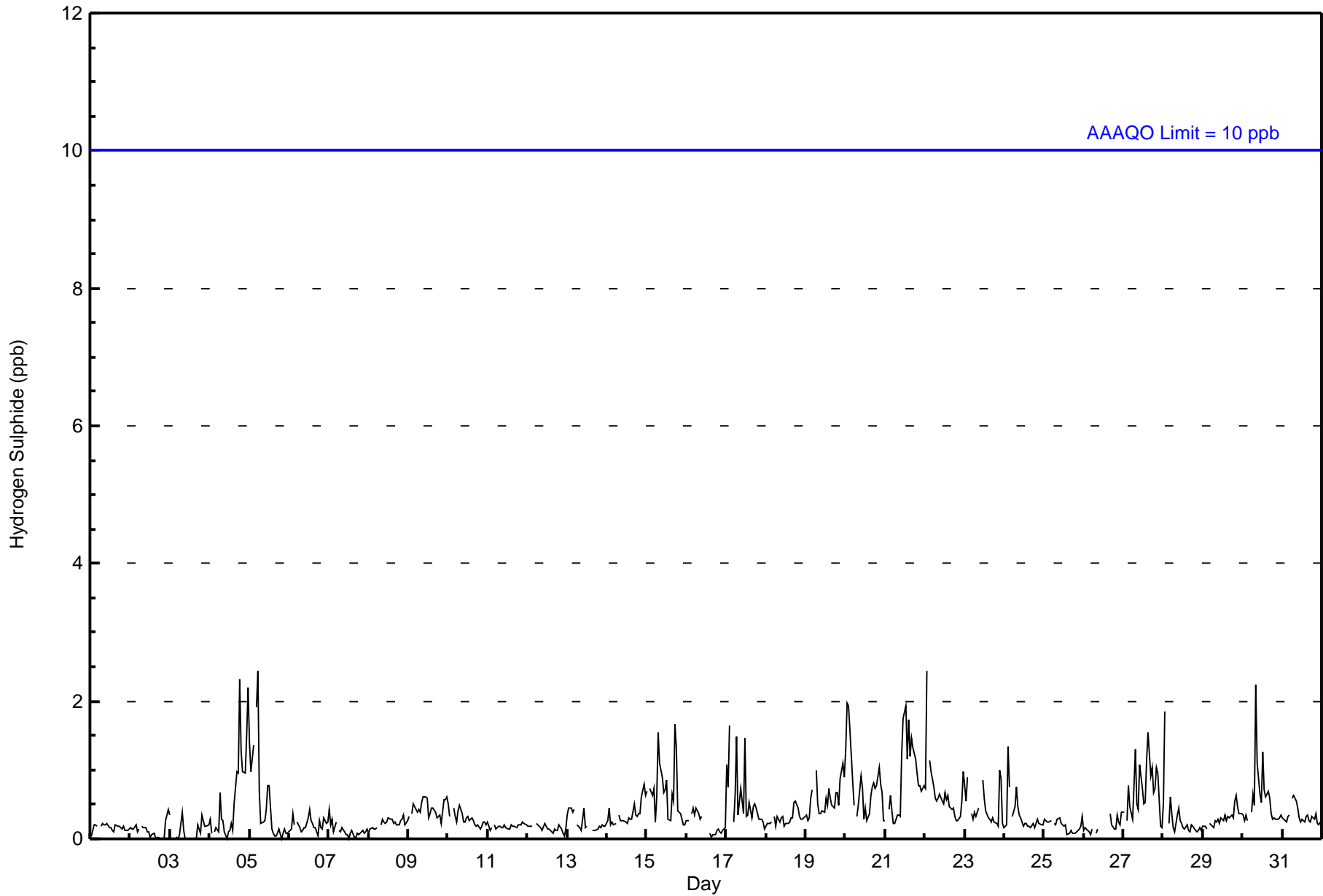


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 2 ppb on Oct 22 02:00	Maximum Daily Average: 0.9 ppb on Oct 21		Hours of Data:	698
Minimum Value: 0 ppb on Oct 2 16:00	Minimum Daily Average: 0.1 ppb on Oct 3		Hours of Missing Data:	46
Maximum Diurnal Average: 0.5 ppb at hour 2	Minimum Diurnal Average: 0.3 ppb at hour 14		Hours of Calibration:	37
Monthly Average: 0.4 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 2		Percent Operational Time:	98.8

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
2-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
3-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
4-Oct	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	2	1	1	1	2	2	0.6	2	
5-Oct	1	1	1	Z	2	2	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.5	2	
6-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
7-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
8-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
9-Oct	0	Z	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1
10-Oct	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
11-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
12-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
13-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	M	M	0	0	0	0	0	0	0	0	0	0	0.2	0	
14-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.3	1	
15-Oct	1	Z	1	1	1	0	1	2	1	1	1	1	1	0	0	1	1	2	1	0	0	0	0	0	0.7	2	
16-Oct	0	0	Z	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.2	0	
17-Oct	1	1	2	Z	0	1	1	0	1	1	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0.6	2	
18-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.3	1	
19-Oct	0	0	0	1	1	Z	1	1	0	0	0	0	1	0	1	1	0	0	1	1	0	1	1	1	0.6	1	
20-Oct	1	2	2	2	1	0	Z	0	0	1	1	0	0	0	0	1	1	1	1	1	1	1	1	0	0.8	2	
21-Oct	0	Z	0	1	0	0	0	0	0	0	1	2	2	1	2	1	1	1	1	1	1	1	1	1	0.9	2	
22-Oct	1	2	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	0.7	2	
23-Oct	1	1	1	Z	0	0	0	0	0	C	C	1	1	0	0	0	0	0	0	0	0	1	1	0	0.5	1	
24-Oct	0	0	1	1	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
25-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
26-Oct	0	0	0	0	0	0	Z	0	0	PF	PF	PF	PF	PF	PF	PF	0	0	0	0	0	0	0	0	--	0	
27-Oct	0	Z	0	1	0	0	1	1	0	0	1	1	0	1	1	2	1	1	1	1	1	1	0	0	0.7	2	
28-Oct	1	2	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2	
29-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.3	1	
30-Oct	0	0	0	0	Z	0	1	0	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.6	2	
31-Oct	0	0	0	0	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	

0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.4	0.4	0.4	Diurnal Average
1	2	2	2	2	2	2	1	2	2	1	1	2	2	1	2	2	1	2	2	1	1	1	2	2	Diurnal Maximum

Z - zerospan      C - Calibration      M - Maintenance      PF - Power Failure  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb      24-hr 3 ppb





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Mildred Lake - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	698	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 698

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Mildred Lake - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	85	64	17	8	4	21	18	64	60	28	36	50	28	58	53	78	672
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	85	64	17	8	4	21	18	64	60	28	36	50	28	58	53	78	672

Total Number of Valid Hours: 672

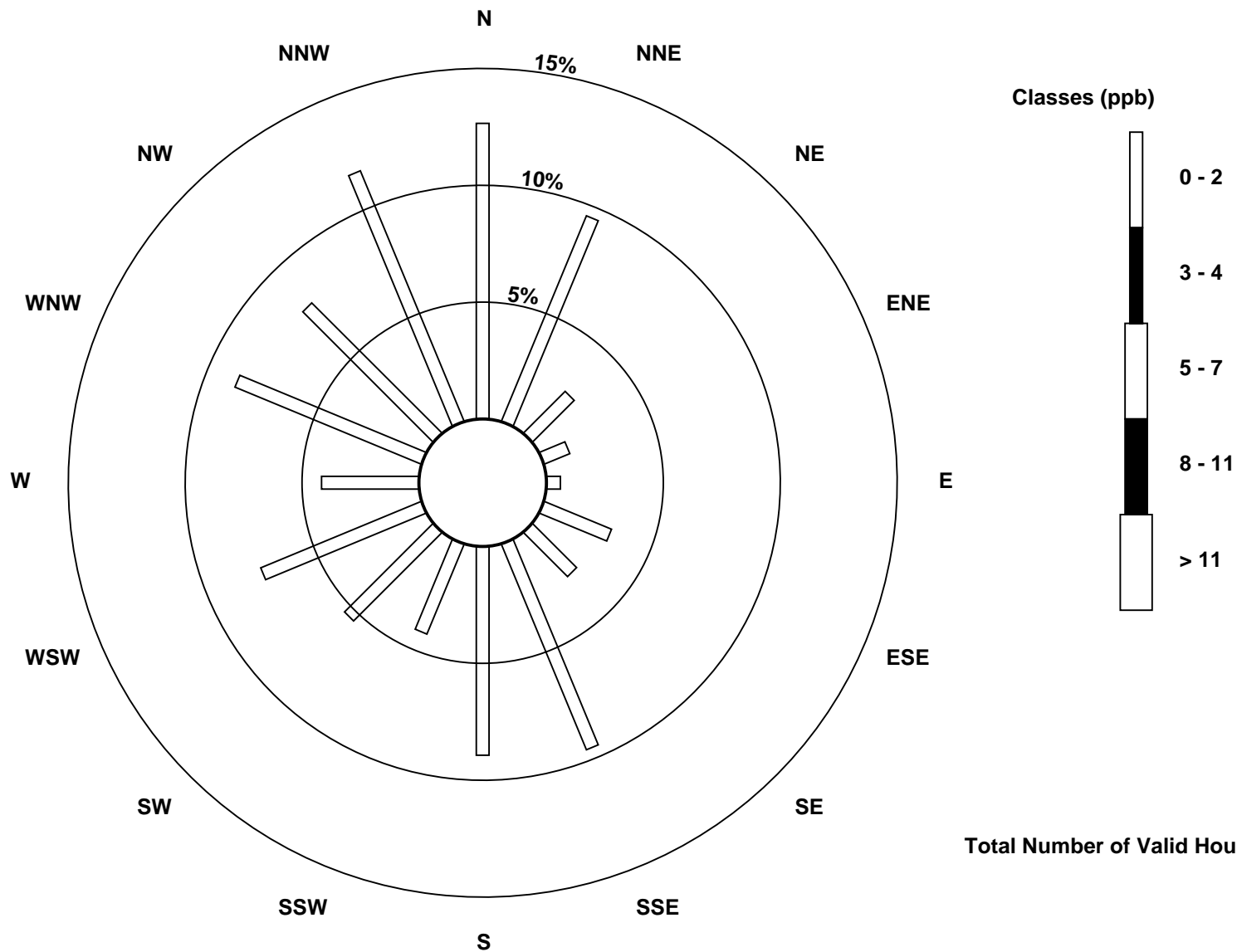
Total Number of Hours: 744

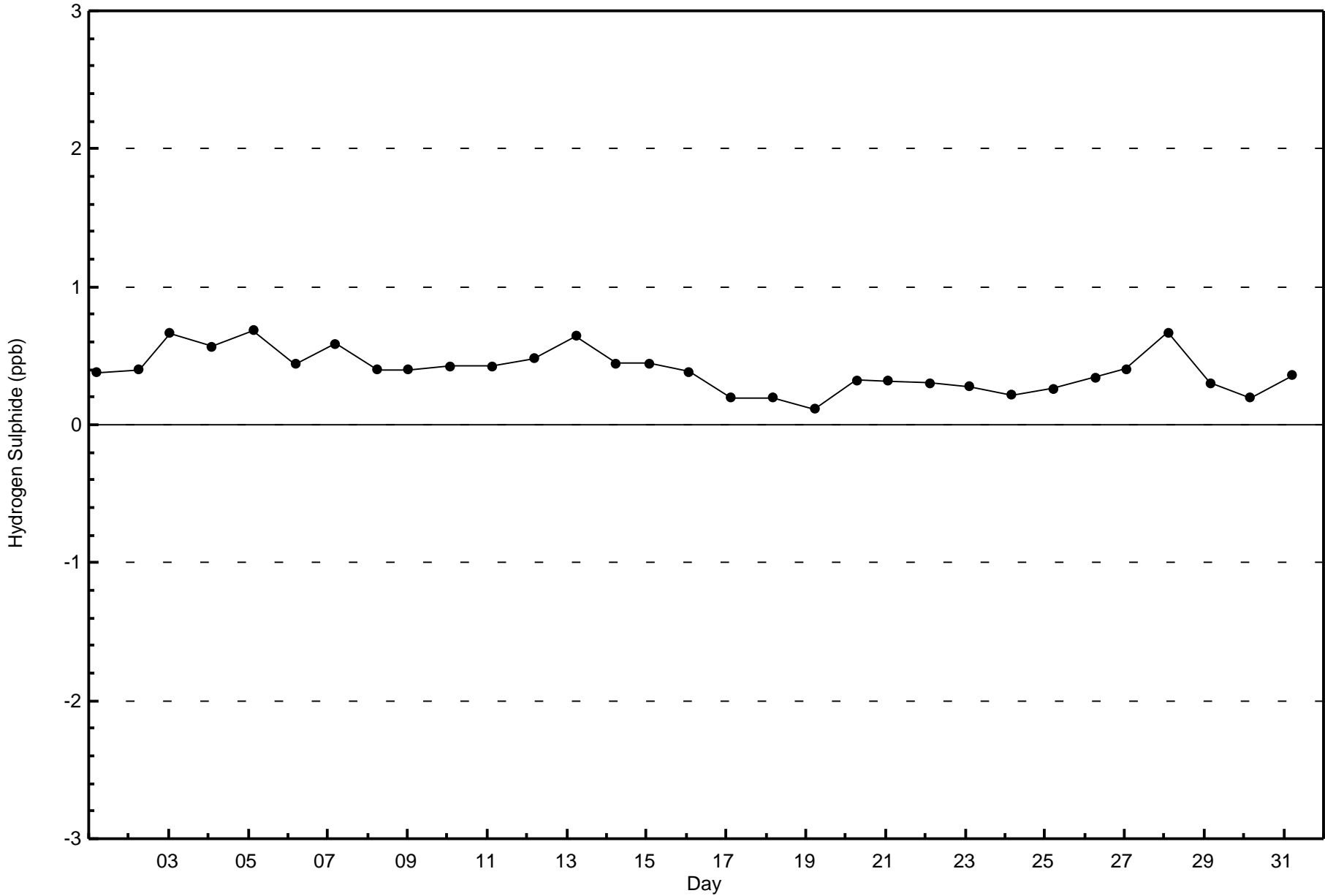


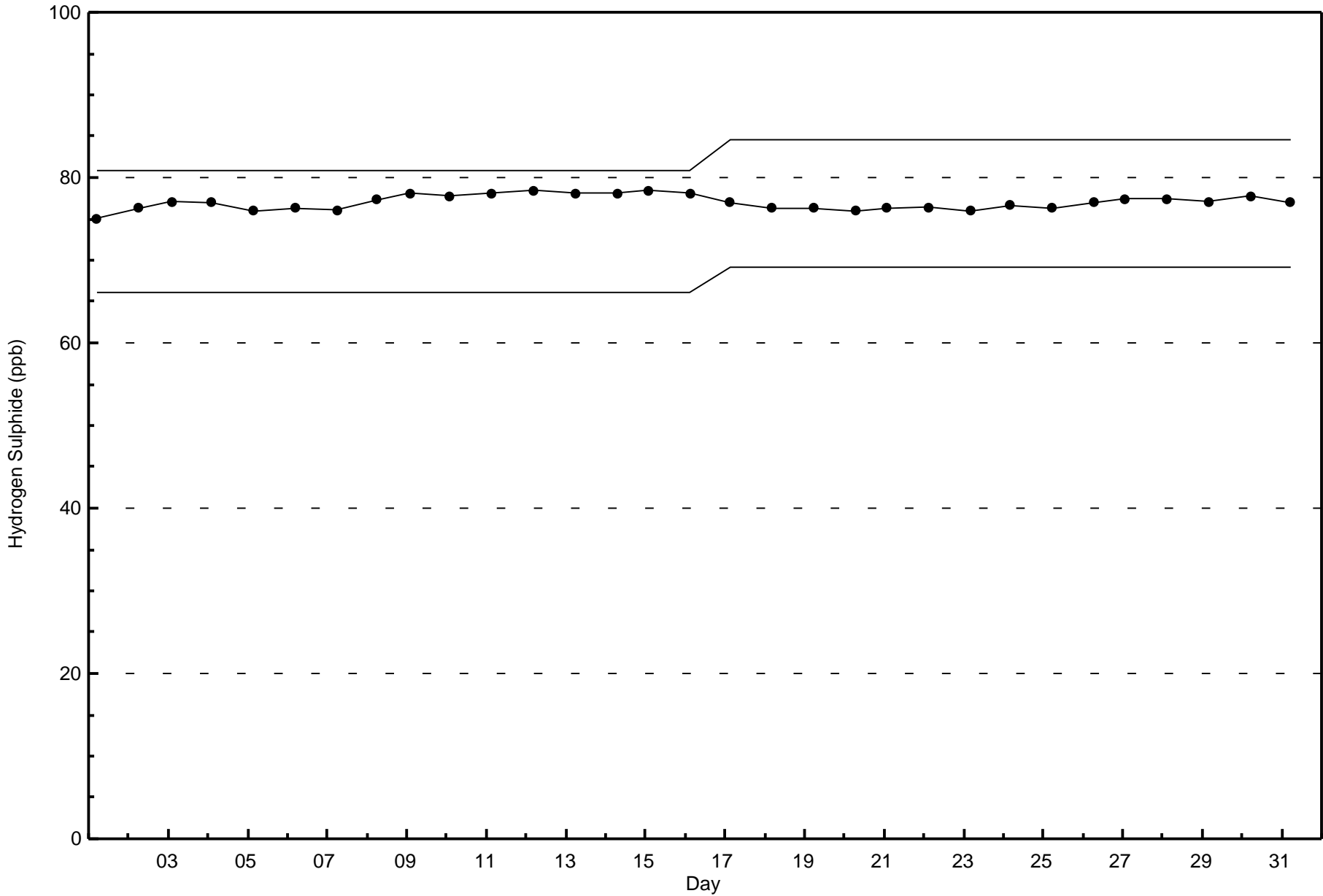


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Mildred Lake (AMS 2)









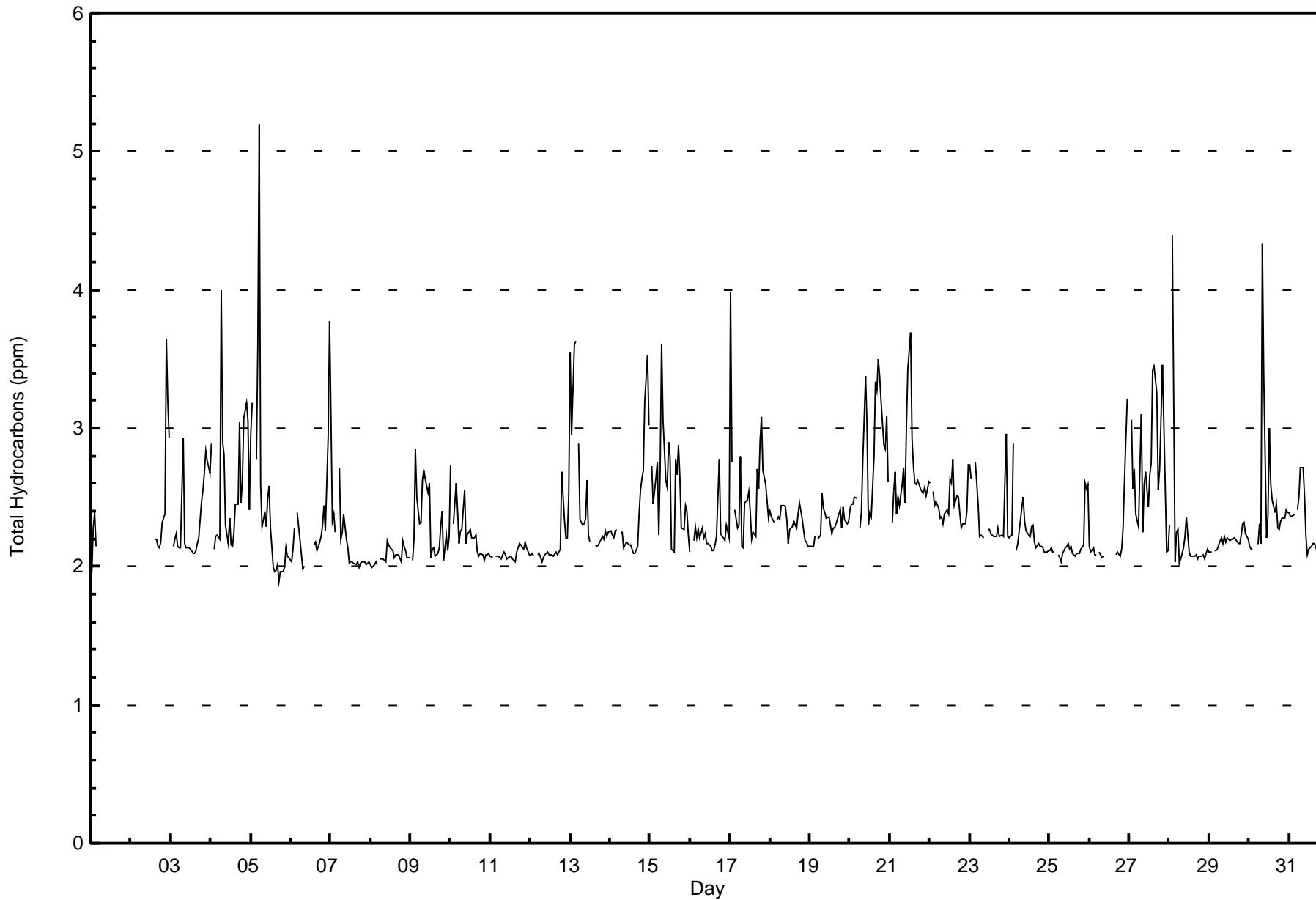
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Mildred Lake - October 2017

Maximum Value: 5.2 ppm on Oct 5 06:00      Maximum Daily Average: 2.8 ppm on Oct 20																								Hours in Service:	744		
Minimum Value: 1.9 ppm on Oct 5 18:00      Minimum Daily Average: 2.1 ppm on Oct 8																								Hours of Data:	665		
Maximum Diurnal Average: 2.5 ppm at hour 1      Minimum Diurnal Average: 2.2 ppm at hour 14																								Hours of Missing Data:	79		
Monthly Average: 2.37 ppm      Percentiles: P <sub>1</sub> = 2.0 P <sub>10</sub> = 2.1 Q <sub>1</sub> = 2.1 Median = 2.2 Q <sub>3</sub> = 2.5 P <sub>90</sub> = 2.8 P <sub>99</sub> = 3.7																								Hours of Calibration:	36		
																								Percent Operational Time:	94.2		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	2.0	2.3	2.4	2.1	Z	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	2.4		
2-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	C	C	C	C	2.2	2.2	2.1	2.1	2.2	2.3	2.4	3.6	3.2	2.9	--	3.6	
3-Oct	Z	2.1	2.2	2.2	2.1	2.1	2.1	2.9	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.5	2.6	2.7	2.8	2.8	2.7	2.3	2.9	
4-Oct	2.9	Z	2.1	2.2	2.2	2.2	4.0	2.9	2.8	2.3	2.2	2.3	2.2	2.1	2.2	2.4	2.4	3.0	2.5	2.6	3.1	3.2	3.0	2.4	2.6	4.0	
5-Oct	3.0	3.2	Z	2.8	3.6	5.2	2.6	2.3	2.4	2.3	2.5	2.6	2.3	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.1	2.1	2.1	2.5	5.2	
6-Oct	2.0	2.1	2.3	Z	2.4	2.3	2.1	2.0	2.0	M	M	M	M	M	2.2	2.2	2.1	2.2	2.2	2.3	2.4	2.3	2.9	3.8	2.3	3.8	
7-Oct	3.1	2.3	2.4	2.2	Z	2.7	2.2	2.3	2.4	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	3.1	
8-Oct	2.0	2.0	2.0	2.0	2.0	Z	2.1	2.1	2.0	2.0	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.2	2.1	2.1	2.1	2.1	2.1	2.2	
9-Oct	Z	2.0	2.2	2.9	2.5	2.3	2.3	2.6	2.7	2.6	2.5	2.6	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.4	2.0	2.2	2.1	2.2	2.3	2.9	
10-Oct	2.7	Z	2.3	2.6	2.4	2.2	2.3	2.3	2.6	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.2	2.7	
11-Oct	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.2	
12-Oct	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.7	2.3	2.2	2.2	2.5	2.2	2.7	
13-Oct	3.5	3.0	3.6	3.6	Z	2.9	2.3	2.3	2.3	2.4	2.6	2.2	2.2	M	M	2.2	2.1	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.5	3.6	
14-Oct	2.3	2.2	2.2	2.3	2.3	Z	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.4	2.6	2.6	2.7	3.2	3.5	3.0	2.4	3.5	
15-Oct	Z	2.7	2.4	2.6	2.8	2.2	2.7	3.6	3.1	2.6	2.6	2.9	2.8	2.1	2.1	2.8	2.7	2.9	2.6	2.3	2.3	2.4	2.4	2.2	2.6	3.6	
16-Oct	2.1	Z	2.2	2.3	2.2	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.8	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.8	
17-Oct	4.0	2.8	Z	2.4	2.3	2.3	2.8	2.1	2.1	2.5	2.5	2.5	2.4	2.2	2.2	2.2	2.7	2.6	2.9	3.1	2.7	2.6	2.5	2.3	2.6	4.0	
18-Oct	2.4	2.4	2.3	Z	2.3	2.4	2.3	2.4	2.4	2.4	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.3	2.3	2.2	2.2	2.1	2.3	2.5
19-Oct	2.1	2.1	2.2	2.2	Z	2.2	2.2	2.5	2.4	2.4	2.3	2.4	2.3	2.2	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.4	2.3	2.3	2.3	2.5	
20-Oct	2.4	2.5	2.4	2.5	2.5	Z	2.3	2.4	2.8	3.4	3.0	2.3	2.4	2.4	2.8	3.3	3.3	3.5	3.4	3.2	2.9	2.8	3.1	2.6	2.8	3.5	
21-Oct	Z	2.3	2.5	2.7	2.4	2.5	2.4	2.6	2.7	2.5	3.0	3.4	3.7	2.9	2.7	2.6	2.6	2.6	2.6	2.5	2.5	2.6	2.5	2.6	2.7	3.7	
22-Oct	2.6	Z	2.5	2.4	2.5	2.4	2.4	2.4	2.3	2.4	2.4	2.4	2.6	2.6	2.8	2.4	2.5	2.5	2.4	2.3	2.3	2.3	2.4	2.7	2.5	2.8	
23-Oct	2.7	2.6	Z	2.8	2.6	2.4	2.2	2.2	2.2	C	C	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.6	3.0	2.2	2.4	3.0	
24-Oct	2.2	2.2	2.9	Z	2.1	2.2	2.3	2.4	2.5	2.3	2.3	2.2	2.2	2.3	2.3	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.9	
25-Oct	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.6	2.6	2.6	2.2	2.6	
26-Oct	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	PF	PF	PF	PF	PF	PF	PF	PF	2.1	2.1	2.1	2.1	2.3	2.6	2.9	3.2	--	3.2
27-Oct	Z	3.1	2.6	2.7	2.4	2.3	2.7	3.1	2.2	2.6	2.7	2.4	2.7	2.7	3.4	3.5	3.2	2.6	2.7	3.1	3.5	3.0	2.1	2.1	2.8	3.5	
28-Oct	2.3	Z	4.4	2.0	2.2	2.3	2.0	2.1	2.1	2.2	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	4.4	
29-Oct	2.1	2.1	Z	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.3	
30-Oct	2.1	2.1	2.1	Z	2.2	2.2	2.3	2.2	4.3	3.4	2.2	2.4	3.0	2.6	2.5	2.4	2.4	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.5	4.3	
31-Oct	2.4	2.4	2.4	2.4	Z	2.4	2.5	2.7	2.7	2.5	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.7	
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan      C - Calibration      M - Maintenance      AF - Analyzer Failure      PF - Power Failure																											





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm  
Mildred Lake - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	42	6.32	6.32
2.1 - 3.0	584	87.82	94.14
3.1 - 10.0	39	5.86	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 665

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Mildred Lake - October 2017**

<b>Concentration</b> <b>Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	3	4	0	0	0	0	0	0	1	0	4	8	2	0	0	20	42
2.1 - 3.0	65	58	17	7	4	21	18	51	53	28	30	43	23	51	41	48	558
3.1 - 10.0	1	0	0	0	0	0	0	12	8	2	0	0	1	4	9	2	39
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	69	62	17	7	4	21	18	63	62	30	34	51	26	55	50	70	639

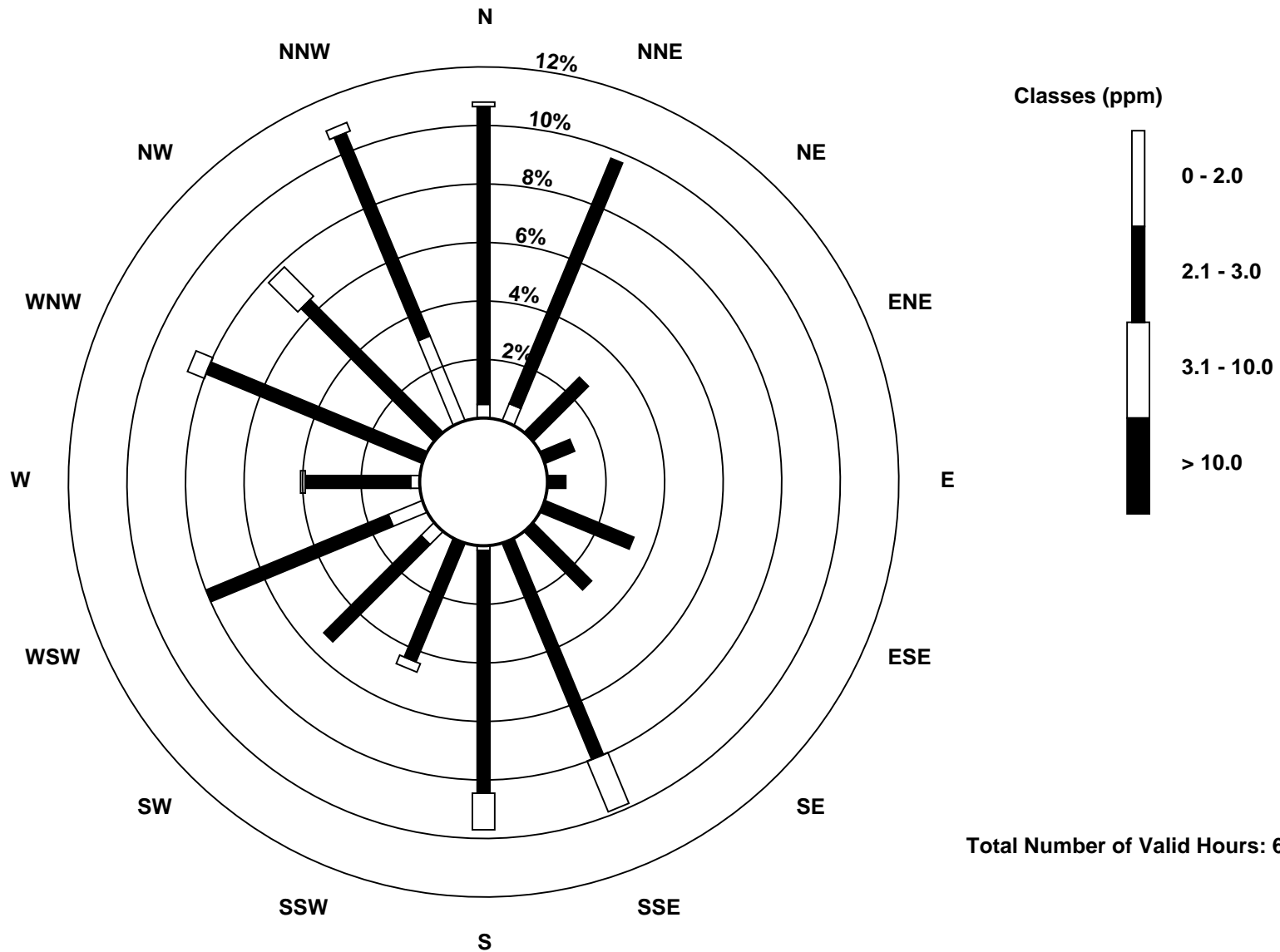
Total Number of Valid Hours: 639

Total Number of Hours: 744



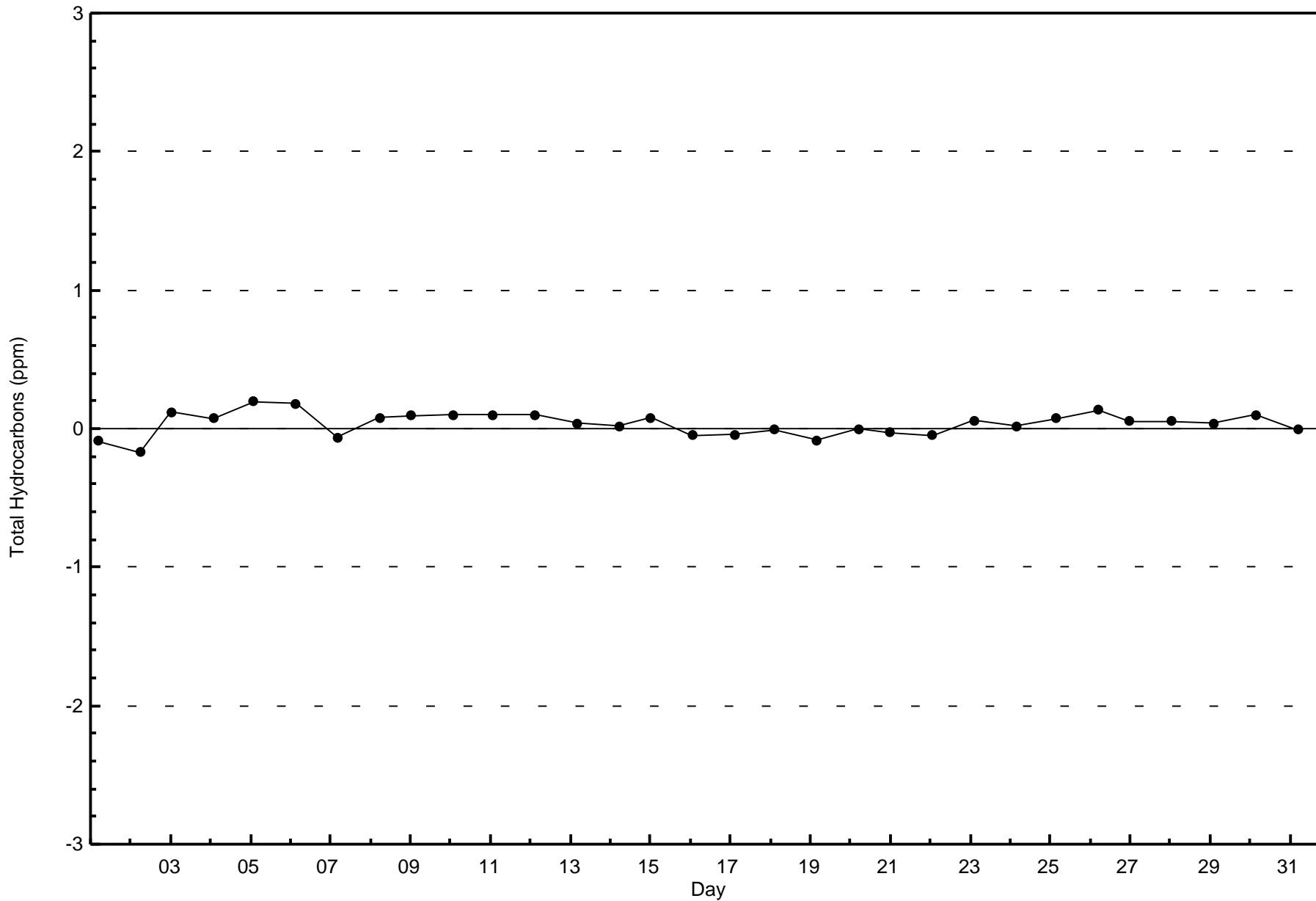
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

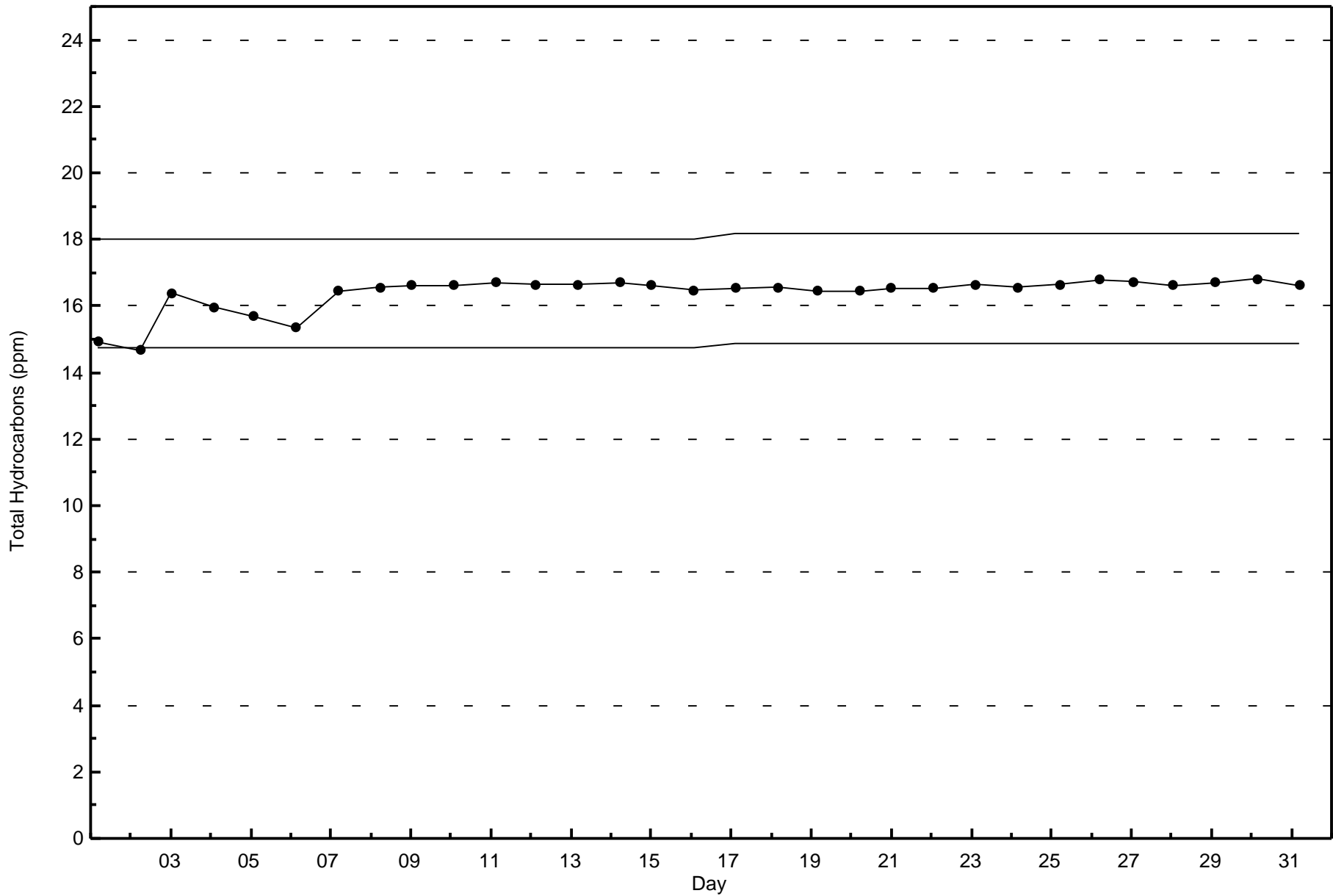
Total Hydrocarbons (THC) - ppm  
Mildred Lake (AMS 2)



Total Number of Valid Hours: 639









**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

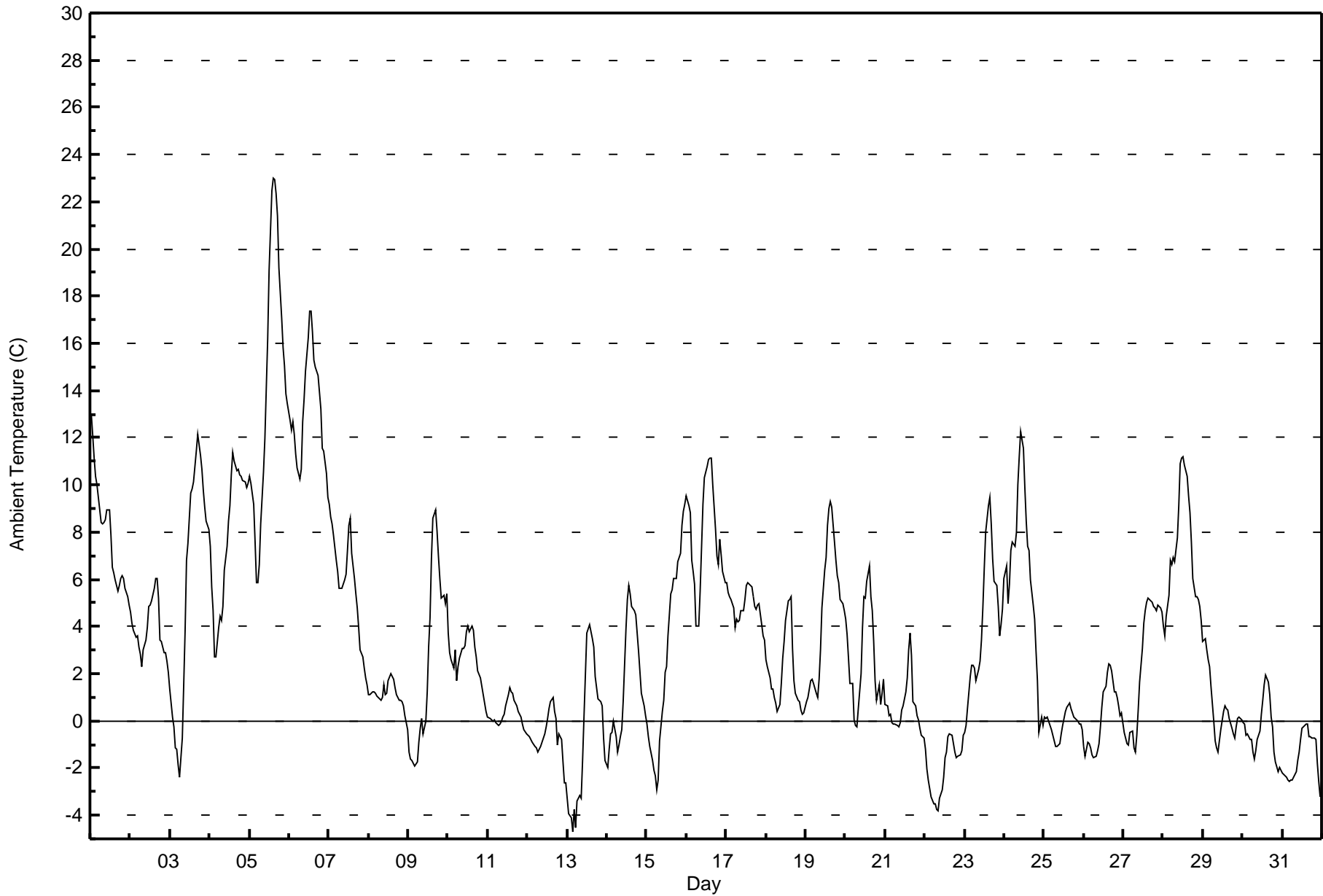
**Ambient Temperature (AT) - C**  
**Mildred Lake - October 2017**

Maximum Value: 23.0 C on Oct 5 15:00      Maximum Daily Average: 14.3 C on Oct 5		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Minimum Value: -4.7 C on Oct 13 04:00 Maximum Diurnal Average: 6.0 C at hour 15 Monthly Average: 3.46 C		Minimum Daily Average: -2.0 C on Oct 22 Minimum Diurnal Average: 1.4 C at hour 7 Percentiles: P <sub>1</sub> = -3.5 P <sub>10</sub> = -1.3 Q <sub>1</sub> = -0.1 Median = 2.3 Q <sub>3</sub> = 6.0 P <sub>90</sub> = 10.0 P <sub>99</sub> = 19.0																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	13.0	12.1	11.1	10.4	10.0	8.9	8.4	8.4	8.4	8.5	8.9	8.9	7.9	6.5	6.2	6.0	5.5	5.7	6.0	6.1	6.1	5.6	5.3	4.9	7.9	13.0
2-Oct	4.6	4.2	3.9	3.5	3.6	3.1	2.8	2.3	3.0	3.4	4.0	4.9	4.9	5.1	5.6	6.0	6.0	5.2	3.4	3.3	2.9	2.9	2.5	2.1	3.9	6.0
3-Oct	1.3	0.1	-0.3	-1.1	-1.2	-1.9	-2.4	-0.7	1.5	3.8	6.8	7.5	9.6	9.8	10.1	10.8	11.4	12.1	11.3	10.6	9.8	9.0	8.4	8.1	5.6	12.1
4-Oct	7.4	5.7	4.7	2.7	2.7	4.0	4.4	4.3	4.8	6.4	7.4	8.5	9.1	10.4	11.4	11.0	10.6	10.6	10.4	10.4	10.2	10.1	9.9	10.1	7.8	11.4
5-Oct	10.4	10.1	9.2	7.6	5.8	5.9	6.6	8.3	10.5	12.0	14.1	16.2	19.1	22.5	23.0	22.9	22.4	21.4	19.2	17.1	15.8	15.0	13.9	13.5	14.3	23.0
6-Oct	12.8	12.3	12.7	12.1	11.3	10.7	10.2	10.7	12.7	13.6	14.8	16.2	17.3	17.4	16.5	15.3	15.0	14.6	13.9	13.2	11.5	11.5	10.5	9.5	13.2	17.4
7-Oct	9.2	8.6	8.3	7.9	6.8	6.3	5.6	5.6	5.6	6.0	6.2	7.2	8.3	8.6	7.1	6.0	5.4	4.8	4.0	3.0	2.7	2.2	1.8	1.5	5.8	9.2
8-Oct	1.1	1.1	1.2	1.2	1.2	1.0	1.0	0.8	1.0	1.5	1.1	1.2	1.7	2.0	1.9	1.7	1.4	1.1	0.9	0.8	0.8	0.7	0.2	-0.4	1.1	2.0
9-Oct	-1.3	-1.6	-1.7	-1.8	-1.9	-1.7	-0.9	-0.3	0.1	-0.6	0.0	1.2	3.2	4.4	6.8	8.6	9.0	8.1	7.0	6.0	5.2	5.3	5.0	5.4	2.6	9.0
10-Oct	3.7	2.9	2.6	2.3	3.0	1.7	2.3	2.6	3.1	3.1	3.2	3.8	4.0	3.8	4.0	3.8	3.2	2.7	2.1	1.8	1.5	1.1	0.7	0.4	2.6	4.0
11-Oct	0.2	0.1	0.1	0.0	0.0	-0.1	-0.2	-0.1	0.0	0.2	0.3	0.6	1.1	1.4	1.3	1.2	0.9	0.6	0.4	0.3	0.1	-0.1	-0.4	-0.6	0.3	1.4
12-Oct	-0.6	-0.7	-0.8	-0.9	-1.1	-1.2	-1.3	-1.2	-1.1	-0.9	-0.6	-0.3	0.1	0.5	0.8	1.0	0.4	0.1	-1.0	-0.5	-0.8	-1.7	-2.7	-2.7	-0.7	1.0
13-Oct	-3.3	-3.9	-4.1	-4.7	-3.8	-4.5	-3.4	-3.2	-3.3	-1.7	0.1	1.9	3.7	4.1	3.8	3.5	3.1	1.9	0.9	0.9	0.8	0.7	-0.7	-1.7	-0.5	4.1
14-Oct	-2.0	-1.2	-0.5	-0.5	0.0	-0.7	-1.3	-1.0	-0.7	-0.4	0.8	3.9	5.2	5.7	5.4	4.8	4.7	4.5	3.7	2.9	2.1	1.2	0.6	0.2	1.6	5.7
15-Oct	-0.2	-0.6	-1.1	-1.7	-2.1	-2.3	-2.9	-2.5	-0.8	0.4	0.9	2.0	2.3	3.6	5.4	5.5	6.0	6.1	6.0	6.7	7.1	8.3	8.9	9.2	2.7	9.2
16-Oct	9.6	9.1	8.8	6.8	6.3	5.8	4.0	4.0	5.5	7.4	9.2	10.3	10.8	11.1	11.2	11.1	10.0	8.1	7.0	6.6	7.7	7.1	6.4	5.9	7.9	11.2
17-Oct	5.9	5.4	5.3	5.1	4.8	4.0	4.3	4.2	4.2	4.7	4.7	5.1	5.7	5.9	5.8	5.7	5.3	4.9	4.8	4.9	4.9	4.1	3.6	3.4	4.9	5.9
18-Oct	2.6	2.3	1.8	1.4	1.4	1.0	0.8	0.4	0.7	1.6	2.7	3.4	4.3	5.1	5.1	5.3	3.1	1.7	1.2	0.9	0.8	0.5	0.3	0.4	2.0	5.3
19-Oct	0.8	1.0	1.3	1.7	1.8	1.6	1.2	1.0	1.8	3.0	4.8	6.4	6.9	8.3	9.0	9.3	9.1	7.6	6.8	6.2	5.8	5.2	5.0	4.7	4.6	9.3
20-Oct	4.3	3.7	2.6	1.6	1.6	0.1	-0.2	-0.3	0.5	2.0	4.0	5.3	5.2	5.9	6.6	5.3	4.7	3.4	1.7	0.9	1.5	0.7	1.2	1.8	2.7	6.6
21-Oct	0.7	0.6	0.2	0.3	-0.1	-0.1	-0.2	-0.2	-0.2	-0.1	0.4	0.6	1.2	1.8	3.0	3.7	2.8	0.8	0.6	0.2	0.1	-0.3	-0.6	-0.7	0.6	3.7
22-Oct	-1.2	-2.0	-2.5	-2.9	-3.2	-3.5	-3.5	-3.7	-3.8	-3.3	-2.9	-2.4	-1.6	-1.3	-0.7	-0.6	-0.6	-1.0	-1.3	-1.5	-1.5	-1.4	-1.3	-0.6	-2.0	-0.6
23-Oct	-0.5	-0.2	0.5	1.9	2.3	2.3	2.3	1.7	2.2	2.5	3.4	4.8	6.5	8.0	9.1	9.5	8.3	6.9	5.9	5.7	4.9	3.6	4.1	4.7	4.2	9.5
24-Oct	6.0	6.6	5.0	5.8	7.2	7.6	7.4	8.0	10.0	11.2	12.3	11.5	9.9	8.5	7.4	7.2	6.0	4.9	4.3	2.9	1.7	-0.5	0.1	-0.2	6.3	12.3
25-Oct	0.2	0.1	0.2	0.0	-0.4	-0.6	-0.9	-1.1	-1.1	-0.9	-0.6	-0.2	0.1	0.4	0.6	0.7	0.5	0.3	0.2	0.1	0.0	-0.1	-0.1	-0.4	-0.1	0.7
26-Oct	-1.1	-1.5	-0.9	-1.0	-1.2	-1.4	-1.5	-1.5	-1.2	-0.9	-0.2	0.6	1.2	1.5	2.1	2.4	2.4	2.1	1.2	1.2	1.0	0.6	0.2	0.3	0.2	2.4
27-Oct	-0.5	-0.7	-1.0	-1.1	-0.5	-0.5	-1.2	-1.3	-0.6	0.4	1.6	3.0	4.1	4.7	5.0	5.2	5.1	5.0	4.9	4.8	4.7	4.9	4.8	4.6	2.3	5.2
28-Oct	4.0	3.6	4.5	5.3	6.8	6.6	6.9	6.7	7.8	9.1	10.9	11.1	11.2	10.8	10.4	9.5	8.8	7.6	6.0	5.3	5.3	5.2	4.9	4.3	7.2	11.2
29-Oct	3.4	3.5	3.0	2.6	2.3	1.5	0.0	-0.9	-1.2	-1.3	-0.9	-0.4	0.4	0.6	0.5	0.4	0.1	-0.3	-0.5	-0.7	-0.3	0.1	0.2	0.1	0.5	3.5
30-Oct	-0.1	-0.1	-0.6	-0.5	-0.8	-0.8	-1.3	-1.6	-1.3	-0.8	-0.4	0.3	0.9	1.5	1.9	1.7	1.1	0.2	-0.2	-1.3	-1.7	-2.2	-2.0	-2.1	-0.4	1.9
31-Oct	-2.2	-2.3	-2.4	-2.5	-2.6	-2.5	-2.5	-2.4	-2.2	-1.7	-1.3	-0.8	-0.3	-0.2	-0.1	-0.2	-0.7	-0.7	-0.7	-0.7	-0.8	-1.8	-2.6	-3.2	-1.6	-0.1
	2.8	2.5	2.3	2.0	1.9	1.6	1.4	1.5	2.1	2.8	3.7	4.6	5.3	5.8	6.0	6.0	5.5	4.9	4.2	3.8	3.5	3.1	2.8	2.7	Diurnal Average	
	13.0	12.3	12.7	12.1	11.3	10.7	10.2	10.7	12.7	13.6	14.8	16.2	19.1	22.5	23.0	22.9	22.4	21.4	19.2	17.1	15.8	15.0	13.9	13.5	Diurnal Maximum	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Mildred Lake - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C  
Mildred Lake - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	195	26.21	26.21
0 - 10	473	63.58	89.79
10 - 20	71	9.54	99.33
> 20	5	0.67	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %**

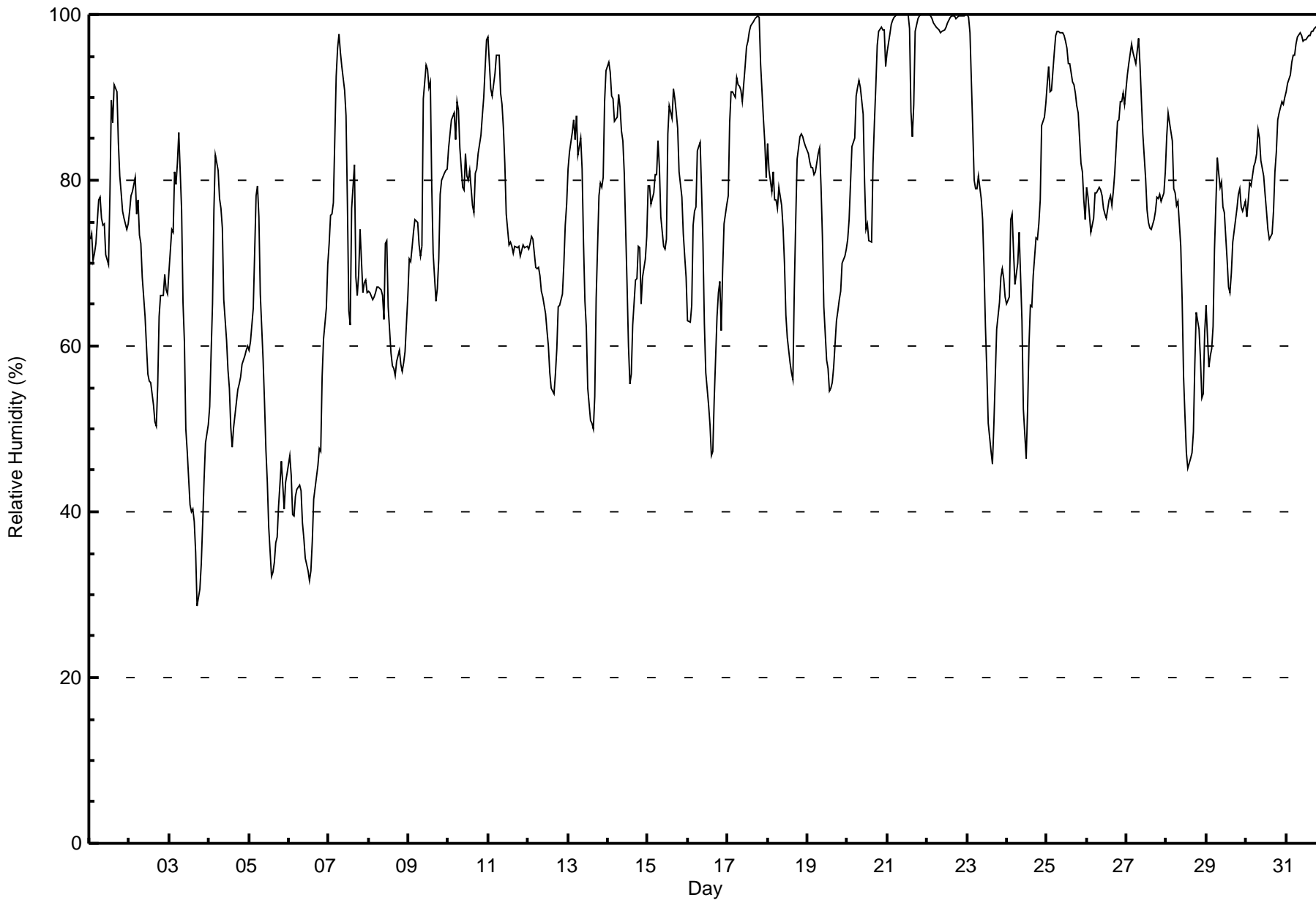
**Mildred Lake - October 2017**

Maximum Value: 100 % on Oct 21 07:00																			Maximum Daily Average: 99.2 % on Oct 22						Hours in Service: 744																			
Minimum Value: 29 % on Oct 3 18:00																			Minimum Daily Average: 44.2 % on Oct 6						Hours of Data: 744																			
Maximum Diurnal Average: 82.8 % at hour 7																			Minimum Diurnal Average: 66.7 % at hour 15						Hours of Missing Data: 0																			
Monthly Average: 75.3 %																			Percentiles: P <sub>1</sub> = 34 P <sub>10</sub> = 53 Q <sub>1</sub> = 66 Median = 77 Q <sub>3</sub> = 88 P <sub>90</sub> = 97 P <sub>99</sub> = 100						Hours of Calibration: 0																			
																									Percent Operational Time: 100.0																			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																				
1-Oct	73	74	70	71	72	78	78	75	75	75	71	70	78	90	87	91	91	85	81	79	76	76	74	75	77.6	91																		
2-Oct	76	78	79	80	76	78	73	72	68	64	60	57	56	56	53	51	50	55	64	66	66	69	67	66	65.8	80																		
3-Oct	69	74	74	81	79	82	86	76	65	60	50	47	41	40	40	39	35	29	31	34	39	44	48	50	54.8	86																		
4-Oct	53	59	65	76	83	81	78	77	74	66	61	57	55	50	48	50	53	55	55	56	58	59	59	60	62.0	83																		
5-Oct	60	60	65	71	78	79	76	66	58	53	48	44	38	32	33	34	36	37	41	46	43	40	43	45	51.1	79																		
6-Oct	47	44	40	40	42	43	43	43	39	37	34	33	32	33	36	42	43	46	48	47	56	61	65	70	44.2	70																		
7-Oct	72	76	76	77	93	96	98	95	94	91	88	77	64	62	77	82	68	66	69	74	66	68	68	67	77.6	98																		
8-Oct	67	66	66	66	67	67	67	67	66	63	72	73	65	59	58	57	57	58	59	58	57	58	59	66	63.2	73																		
9-Oct	71	70	72	74	75	75	72	71	72	90	94	93	91	92	79	71	65	67	70	78	80	81	81	81	77.8	94																		
10-Oct	84	86	87	88	85	90	89	84	79	79	83	80	80	81	77	76	81	81	83	85	88	90	94	97	84.5	97																		
11-Oct	97	91	90	91	93	95	95	90	89	86	82	76	72	73	72	71	72	72	72	71	72	72	72	72	80.8	97																		
12-Oct	72	72	73	73	70	69	70	68	67	66	64	62	60	57	55	54	57	60	65	65	66	70	75	77	66.1	77																		
13-Oct	81	83	86	87	85	88	83	85	81	72	66	62	55	51	51	50	54	66	78	80	79	80	89	93	74.4	93																		
14-Oct	94	93	90	90	87	88	90	89	86	85	81	67	60	55	57	62	68	68	72	72	65	68	70	73	76.3	94																		
15-Oct	79	79	77	78	81	81	85	82	76	72	72	73	86	89	87	91	90	88	86	81	78	74	71	68	80.1	91																		
16-Oct	63	63	65	75	76	77	84	85	79	72	63	57	53	51	47	47	54	64	66	68	62	69	75	77	66.2	85																		
17-Oct	78	87	91	91	90	92	92	91	91	89	94	96	97	98	99	99	99	100	100	100	94	87	85	80	92.5	100																		
18-Oct	84	81	79	81	78	78	77	79	77	74	70	64	61	58	57	56	67	75	83	85	86	85	85	84	75.1	86																		
19-Oct	83	82	81	82	81	81	83	84	79	73	65	58	57	55	55	56	58	63	64	66	67	70	71	72	70.2	84																		
20-Oct	73	75	80	84	85	90	91	92	91	88	80	74	75	73	73	82	87	91	96	98	99	98	98	94	86.1	99																		
21-Oct	95	98	99	99	100	100	100	100	100	100	100	100	100	98	88	85	89	98	100	100	100	100	100	100	97.9	100																		
22-Oct	100	100	100	99	99	98	98	98	98	98	98	99	99	99	100	100	100	100	100	100	100	100	100	100	99.2	100																		
23-Oct	100	100	98	86	80	79	79	81	78	75	69	62	57	51	47	46	50	56	62	65	68	69	68	66	70.5	100																		
24-Oct	65	66	75	76	71	68	70	74	68	63	52	46	52	60	65	65	69	73	73	75	78	87	88	89	69.5	89																		
25-Oct	92	94	91	91	95	97	98	98	98	98	97	97	96	94	94	92	92	90	89	88	82	81	78	75	91.5	98																		
26-Oct	79	78	74	75	75	78	79	79	79	78	77	76	75	78	78	77	79	81	87	87	90	90	90	89	80.3	90																		
27-Oct	93	94	95	96	95	94	96	97	94	90	86	80	76	75	74	74	75	76	78	78	78	77	78	81	84.7	97																		
28-Oct	85	88	87	85	79	78	77	77	72	65	56	51	47	45	47	47	50	58	64	62	58	54	54	62	64.6	88																		
29-Oct	65	57	59	60	62	72	83	81	79	80	77	76	70	67	66	69	73	75	77	78	79	77	76	78	72.3	83																		
30-Oct	76	77	80	79	82	82	83	86	85	82	80	78	76	74	73	74	76	81	83	87	88	89	89	90	81.4	90																		
31-Oct	91	92	93	94	95	95	96	97	98	97	97	97	97	97	98	98	98	98	98	98	97	96	95	94	96.1	98																		
																			78.0	78.7	79.2	80.6	80.9	82.2	82.8	81.9	79.2	76.9	73.7	70.4	68.4	67.5	66.7	67.4	68.8	71.3	74.0	75.1	74.7	75.4	76.3	77.1	Diurnal Average	
																			100	100	100	99	100	100	100	100	100	100	100	100	100	99	100	100	100	100	100	100	100	100	100	100	Diurnal Maximum	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Mildred Lake - October 2017**





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Mildred Lake - October 2017

Maximum Speed: 36 km/h on Oct 24 12:00	Maximum Daily Speed Average: 17.7 km/h on Oct 2	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 20 22:00	Minimum Daily Speed Average: 0.9 km/h on Oct 4	Hours of Data: 717
Maximum Diurnal Speed Average: 6.0 km/h at hour 17	Minimum Diurnal Speed Average: 2.6 km/h at hour 7	Hours of Missing Data: 27
Monthly Average Velocity: 4.3 km/h 314.5 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 5 Q <sub>1</sub> = 7 Median = 11 Q <sub>3</sub> = 16 P <sub>90</sub> = 21 P <sub>99</sub> = 31	Percent Operational Time: 96.4

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	NNW15	NW16	NW19	NW19	NW18	NNW21	NW16	NW14	NW15	NNW16	NNW19	N17	N16	NNW19	NNW18	NNW13	NNW16	NNW20	N19	N16	N19	N23	N28	N28	NNW17.4	N28
2-Oct	N27	N24	N22	N22	N23	N25	N24	N22	NNE22	NNE27	N25	N24	N24	N19	N19	N16	N16	NNW11	NNW7	NNW10	NNW8	NW9	WNW8	WNW8	N17.7	N27
3-Oct	W7	WSW9	SW6	S6	S9	S10	S9	S11	S12	S11	SSW14	SSW18	SW17	SW17	SW15	SW11	SW11	W10	NNW14	NNW16	NNW15	NNW16	NNW15	NNW14	SW8.8	SSW18
4-Oct	NNW13	NNW13	N7	N6	NNW5	NW5	NW7	NW8	NW8	NW7	NW4	SW3	SSE5	SSW3	SSE7	SE10	SSE9	SSE9	SSE10	SSE9	SSE10	S7	SSE7	SSE9	SSW0.9	NW13
5-Oct	SSE10	SSE11	SSE6	SSE6	SSE3	S6	SSW6	SSW8	SSW8	S9	S9	SSE9	SSE8	SW9	SW11	SW13	WSW11	WSW13	W11	WSW10	W11	WSW11	WSW10	WSW11	SW7.3	WSW13
6-Oct	WSW12	WSW12	WSW17	WSW14	WSW14	WSW13	WSW12	WSW11	WSW11	WSW13	WSW16	W18	W20	NNW22	NNW20	NNW17	NNW15	NNW14	NNW16	NNW16	NNW9	W13	NW3	NW8	W13.1	WNW22
7-Oct	W7	WSW4	SW6	W7	WNW8	N10	N7	N9	N10	N11	NNW9	NNW12	NNW14	NNW13	N16	N15	NNW22	N20	NNW23	NNW22	NNW24	NNW23	NNW25	NNW27	NNW13.1	NNW27
8-Oct	NNW25	NNW23	NNW23	NNW25	NNW24	NNW21	NNW16	NNW23	NNW22	NNW22	NW20	NW19	NW18	NW19	NW20	NW18	NNW17	NNW13	NNW9	NNW9	WNW7	WNW8	SW7	SSW10	NNW16.2	NNW25
9-Oct	SSW10	S11	S13	S14	S13	S14	SSE18	S16	S15	SSE15	SSE14	SSE14	S9	SW7	NNW12	NNW15	NNW17	W9	W9	W13	WSW12	NNW15	NNW14	NNW12	SW7.6	SSE18
10-Oct	WSW6	W6	NNW10	W6	WNW9	WSW7	NNW11	NNW11	NW12	NNW13	NNE7	NE7	NE6	NE10	NNE10	NNE10	NE8	NE9	NE8	NE7	NNE10	NNE10	NNE11	NNE12	N5.7	NNW13
11-Oct	NNE14	NNE14	NNE12	NNE13	NNE13	NNE15	NNE15	NNE17	NNE18	NNE17	NNE17	NNE19	NNE19	NNE17	NNE17	NNE17	NNE16	NNE17	N17	NNE16	NNE14	N15	N15	N13	NNE15.6	NNE19
12-Oct	N14	N13	NNE10	N11	N11	NNW13	NNW14	NNW15	NNW16	NNW16	N16	N15	N13	N14	N12	N10	N6	NNW6	NNW6	NNW9	NNW12	NNW11	NNW9	NNW7	N11.5	NNW16
13-Oct	NW7	NNW5	NNW6	NNW5	NNW6	S3	SW4	SW3	WSW5	WSW5	SW5	SSW9	SW8	SW12	SW11	WSW10	SW13	WSW14	WSW11	WSW11	WSW9	WSW8	SW5	SW2	WSW6.4	WSW14
14-Oct	ESE2	SSE5	S8	S6	SSW11	SSW11	S12	S14	S11	SSE12	S11	SW11	SW12	WSW13	WSW13	WSW17	W15	NNW13	NNW11	NW16	NW19	NW16	NW11	NNW11	WSW6.7	NW19
15-Oct	WNW8	W8	WNW9	W7	W7	SW7	S7	SSE9	SSE8	SSE11	SSE15	SSE16	SSE13	S13	S12	S10	S7	SSE6	SSE2	W3	S7	SW8	WSW6	WSW9	SSW6.1	SSE16
16-Oct	WSW13	WSW16	NNW21	NNW17	NNW14	NNW11	S6	SSW7	SSW9	SSW8	WSW10	WSW10	WSW12	WSW12	WSW12	WSW7	SW2	SSW5	SSW4	SSW4	WSW9	SW6	SSW3	S4	WSW7.7	WNW21
17-Oct	SSE5	SSE8	SSE6	E4	ESE5	ESE4	SSE6	SSE7	S6	SSE7	S8	SE7	ENE4	NNE6	N7	N7	NNW12	NNW15	NNW15	NW14	NW16	NW17	NW20	NW22	NW3.2	NW22
18-Oct	NW21	NNW21	NNW22	NNW21	NW21	NW22	NW20	NW16	NW17	NW15	NW13	NNW16	NW10	NW7	NNW5	SSW2	ESE4	ESE8	ESE8	ESE7	ESE10	ESE11	SE10	ESE16	NW7.2	NW22
19-Oct	ESE14	ESE12	ESE14	SE14	SSE21	SSE19	SSE15	SSE14	SSE16	SSE16	S12	S11	SSE11	SSE12	SE12	SE13	SE11	SE10	SE10	SE10	SE11	SE12	SSE17	SSE17	SSE13.0	SSE21
20-Oct	SSE14	SSE11	ESE4	SSE4	NE3	NNE3	N4	N6	N5	N4	N7	ESE6	N7	NE4	NW5	NNW11	NW6	WNW1	SSW3	S2	S4	NNE0	NNW4	N8	NNE1.3	SSE14
21-Oct	N6	N6	NNW5	NNE8	NNE7	NE6	NNE3	NNE4	ENE4	ESE4	SSE5	S5	SSE8	SSE7	ESE7	ESE6	N8	N11	NNE7	NNE6	NE6	ENE4	E5	AF	NE3.3	N11
22-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----
23-Oct	AF	AF	NNW11	NNW13	NNW13	NNW11	NNW12	W9	NNW12	NNW10	NNW12	NNW11	W8	W12	W10	W8	W8	WSW6	SW6	SW8	SSW7	SE6	S10	S10	W7.4	WNW13
24-Oct	SSW9	SSW10	SSE14	S13	SSW13	WSW11	W11	W15	NNW21	NNW22	NNW23	NW36	NW36	NW34	NW27	NNW23	NNW19	N10	NNE11	NE8	NE6	ENE3	E5	ENE5	NNW9.7	NW36
25-Oct	NNE5	NNE6	NE8	NE9	NE10	NNE9	NNE10	NNE13	N13	N13	N14	N18	N17	N16	N16	N17	N16	N13	N9	N7	NNW8	NW6	NNW8	NNW9	N10.4	N18
26-Oct	WSW9	WSW12	SW14	WSW16	WSW17	SW16	SSW16	SSW17	SSW17	SSW17	SSW12	SSW12	SW12	SW13	SW11	WSW11	SW10	WSW9	SW8	WSW9	NNW10	NNW12	NNW11	NW3	SW10.9	SSW17
27-Oct	E1	S2	SE4	SSE4	S6	S8	SE7	S7	S8	SSE11	SSE12	SSE14	SSE13	SSE15	SSE12	SSE15	SSE14	SSE16	S14	SSE17	SSE16	S16	S12	S11	SSE10.4	SSE17
28-Oct	S8	S8	SSW8	SW10	W11	WSW10	WSW12	WSW12	W12	W12	NNW17	NNW27	NNW29	NNW27	NNW28	NNW29	NNW30	NNW32	NNW30	NNW25	NNW28	NNW31	NNW30	NNW27	NW16.4	NNW32
29-Oct	NNW25	NNW33	NNW33	NNW31	NNW30	N23	N19	N21	NNE20	N21	N20	NNE17	NNE15	NNE15	NNE10	NNE9	NNE5	NE4	SE2	SE4	S4	S5	SSW7	SSW8	N12.8	NNW33
30-Oct	SSW8	SW8	SW9	SW10	SSW8	S8	S7	S8	S9	S11	S10	S8	SE5	S2	ESE2	ENE3	N6	N7	N6	N6	N7	N7	N7	NNE4	SSW2.1	S11
31-Oct	N4	N4	N6	NNE4	ENE3	NE3	ENE3	ESE5	ESE5	E4	NNE5	NNE7	NNE9	NNE10	NNE11	NNE12	N15	NNE13	N12	NNE13	N15	N17	N18	NNE19	NNE8.3	NNE19

NNW4.0	NW3.9	NNW4.3	NNW4.2	NNW4.3	NNW3.6	NNW2.6	NNW2.8	NNW3.1	NW2.6	NW3.3	NW3.8	NW4.5	NW5.3	NW5.6	NW5.2	NW6.0	NNW5.3	NNW5.0	NW5.1	NW5.0	NW5.5	NW4.9	NW4.5	Diurnal Average
N27	NNW33	NNW33	NNW31	NNW30	N25	N24	NNW23	NNE22	NNE27	N25	NW36	NW36	NW34	NNW28	NNW29	NNW30	NNW32	NNW30	NNW25	NNW28	NNW31	NNW30	N28	Diurnal Maximum

AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods

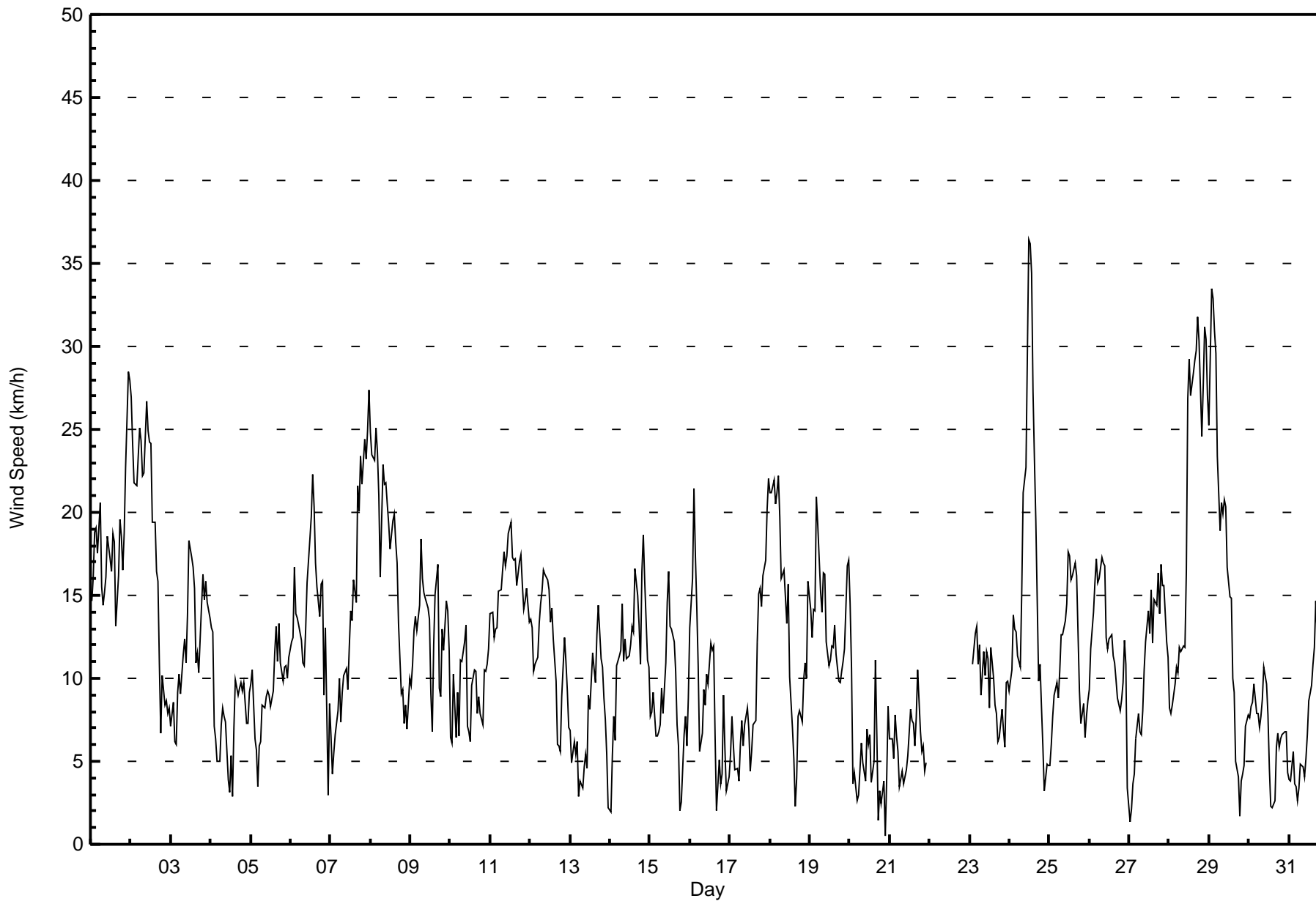




**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Speed (WS) - km/h**  
**Mildred Lake - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Oct 24 13:00 Minimum Value: 1 km/h on Oct 31 09:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 O <sub>1</sub> = 2 Median = 3 O <sub>3</sub> = 4 P <sub>90</sub> = 5 P <sub>99</sub> = 7																		Hours in Service: 744 Hours of Data: 717 Hours of Missing Data: 27 Hours of Calibration: 0 Percent Operational Time: 96.4							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	3	4	5	5	4	5	4	4	4	4	4	5	6	4	4	2	3	5	4	4	6	7	7	7	7
2-Oct	6	6	6	5	6	7	6	6	6	8	7	6	5	5	4	4	4	4	1	2	1	2	2	2	8
3-Oct	2	2	2	1	3	2	2	2	3	3	4	5	5	5	4	3	4	5	4	4	4	5	4	3	5
4-Oct	3	2	2	1	1	1	2	2	2	3	2	2	3	2	3	2	2	2	2	2	3	2	1	2	3
5-Oct	3	3	1	2	2	2	1	2	2	2	1	2	2	3	4	4	4	4	3	3	3	3	3	3	4
6-Oct	4	4	5	4	4	4	4	4	4	4	4	7	6	6	6	5	4	4	6	4	4	7	2	2	7
7-Oct	2	2	3	2	3	3	1	2	2	2	2	4	3	4	4	4	5	6	5	5	6	5	5	6	6
8-Oct	5	5	5	5	5	5	3	4	4	5	6	5	5	5	5	4	4	3	2	3	3	3	2	3	6
9-Oct	2	3	3	3	3	3	3	3	3	3	3	3	2	4	5	5	5	4	3	7	4	6	4	4	7
10-Oct	3	2	4	3	3	2	3	3	3	3	2	2	2	2	2	3	2	2	2	2	3	3	3	3	4
11-Oct	4	4	3	3	3	4	4	4	5	5	4	5	5	5	4	4	4	4	4	4	4	3	4	3	5
12-Oct	3	3	3	3	3	2	3	3	4	3	4	3	3	3	3	3	2	1	1	3	2	3	1	2	4
13-Oct	2	3	2	2	3	2	1	2	2	2	2	2	3	3	3	3	4	4	4	3	3	2	2	1	4
14-Oct	1	2	2	2	2	2	3	3	2	2	2	3	4	5	4	5	5	4	3	7	5	4	4	3	7
15-Oct	3	2	4	2	2	2	1	2	2	3	3	3	3	4	3	2	2	1	2	1	2	2	2	3	4
16-Oct	4	5	7	5	4	5	2	3	2	2	3	3	4	4	4	3	2	1	1	4	3	2	1	1	7
17-Oct	1	2	2	1	1	1	2	2	1	1	2	2	1	2	1	2	2	2	3	3	5	4	5	7	7
18-Oct	7	6	6	6	6	5	5	5	4	4	4	4	3	3	2	2	2	1	2	1	2	3	2	4	7
19-Oct	4	3	4	5	5	4	3	2	3	3	3	2	2	2	2	3	3	2	2	2	2	2	3	4	5
20-Oct	3	3	2	3	2	2	1	2	2	2	2	2	1	2	2	2	2	2	1	2	1	2	1	2	3
21-Oct	1	2	3	2	2	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	1	1	1	AF	3
22-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
23-Oct	AF	AF	4	3	4	4	4	3	3	3	4	3	3	4	4	3	2	2	2	2	2	2	2	3	4
24-Oct	3	3	3	3	4	4	4	7	5	6	8	9	10	8	7	5	5	3	3	3	3	2	1	1	10
25-Oct	1	1	2	2	3	2	2	3	3	3	3	4	4	3	4	4	5	2	2	1	2	2	4	3	5
26-Oct	3	4	4	6	6	5	3	4	4	3	4	3	4	4	3	4	3	3	2	3	4	3	2	4	6
27-Oct	2	1	1	1	1	2	1	1	2	2	2	3	3	2	3	4	3	3	3	3	3	3	3	2	4
28-Oct	2	2	2	2	6	5	4	3	4	3	6	6	7	6	6	7	8	8	7	6	6	7	6	6	8
29-Oct	6	7	7	6	6	6	6	5	6	6	6	4	4	4	3	2	2	1	1	1	1	1	1	2	7
30-Oct	2	2	2	3	2	1	2	1	1	2	2	2	2	2	2	1	2	1	1	1	1	1	1	1	3
31-Oct	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	3	3	2	3	3	4	5	5	5
Diurnal Maximum																									
7 7 7 6 6 7 6 7 6 8 8 9 10 8 7 7 8 8 7 7 6 7 7 7																									
AF - Analyzer Failure																									





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Mildred Lake - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	91	12.69	12.69
6 - 11	296	41.28	53.97
12 - 19	248	34.59	88.56
20 - 28	68	9.48	98.05
29 - 38	14	1.95	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 717

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Wind Speed (WS) - km/h  
Mildred Lake - October 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	5	9	4	8	5	9	4	8	9	7	7	3	1	2	5	5	91
6 - 11	32	22	14	0	0	8	10	29	39	19	23	28	20	25	14	13	296
12 - 19	35	32	0	0	0	4	4	28	16	9	11	26	7	27	23	26	248
20 - 28	19	3	0	0	0	0	0	1	0	0	0	0	1	9	9	26	68
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	11	14
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	91	66	18	8	5	21	18	66	64	35	41	57	29	63	54	81	717

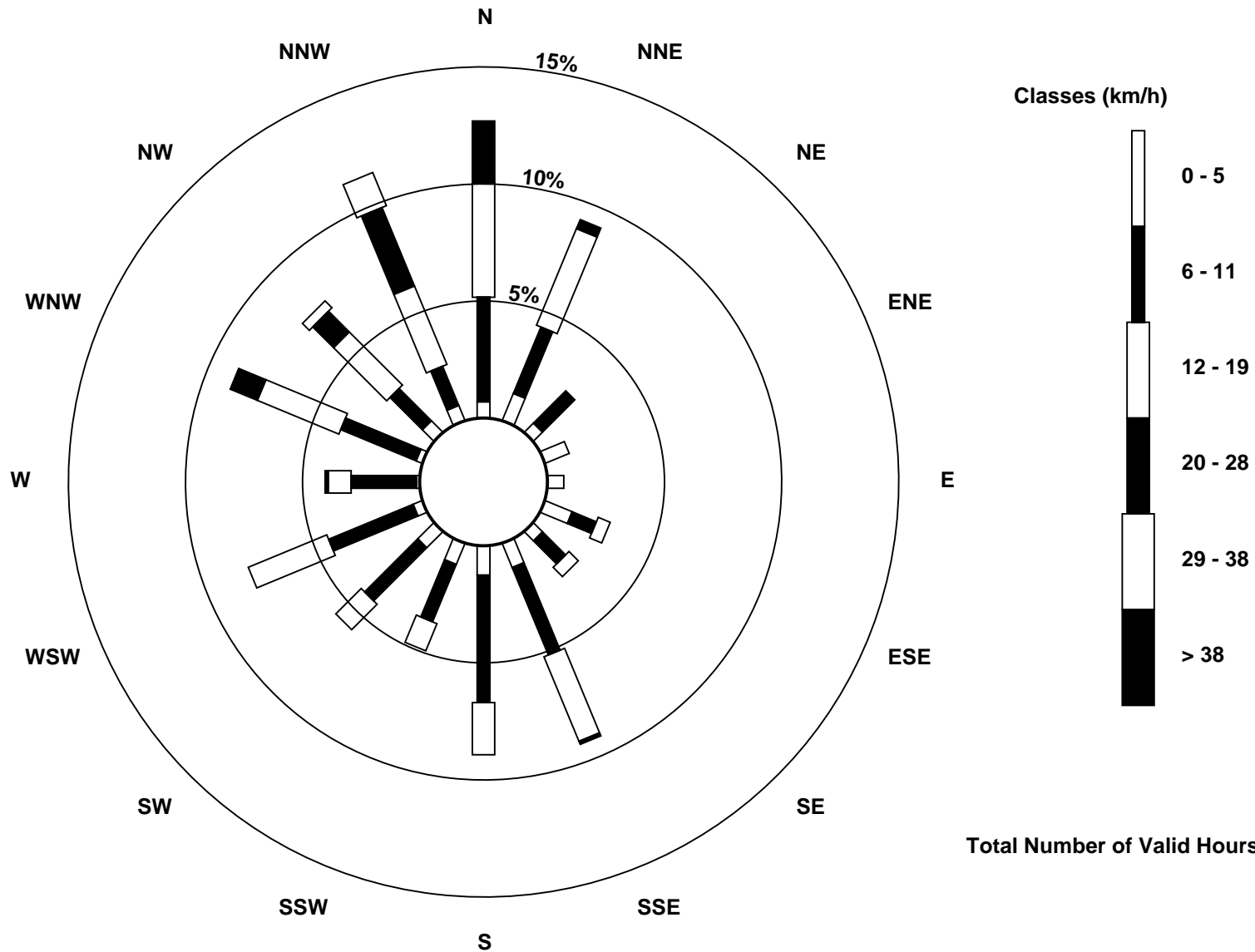
Total Number of Valid Hours: 717

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed (WS) - km/h  
Mildred Lake (AMS 2)





**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Wind Direction (WD) - deg**  
**Mildred Lake - October 2017**

Direction of Maximum Speed: 325 deg on Oct 24 12:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 358.4 deg on Oct 2	Hours of Data: 717
Direction of Minimum Speed: 20 deg on Oct 20 22:00	Hours of Missing Data: 27
Direction of Minimum Daily Speed Average: 0.9 deg on Oct 4	Percent Operational Time: 96.4
Monthly Average Direction: 284.5 deg	

Day	Hourly Period Ending At (MST)																								Daily Average	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	332	315	314	320	321	328	318	310	315	327	342	349	8	348	343	335	339	342	349	353	359	5	1	2	340.1	
2-Oct	3	4	6	4	3	3	7	8	12	15	11	1	356	3	354	351	351	341	333	333	332	309	299	290	358.4	
3-Oct	262	250	232	189	185	190	173	171	184	180	210	211	222	220	215	216	221	263	296	293	296	300	297	296	234.9	
4-Oct	323	337	4	349	345	326	312	324	326	316	310	232	155	193	162	138	150	161	155	160	166	187	153	160	206.1	
5-Oct	163	166	155	150	154	188	201	211	206	187	173	156	162	222	231	224	237	250	259	255	259	255	256	249	214.8	
6-Oct	248	252	258	253	247	247	244	237	237	243	246	259	262	284	282	294	289	291	287	294	282	281	324	312	267.8	
7-Oct	267	258	232	265	293	356	8	6	5	360	346	337	338	346	350	0	342	352	344	341	344	339	339	337	341.0	
8-Oct	337	336	336	336	336	339	342	336	335	335	315	315	313	319	323	325	333	337	345	307	300	293	236	210	327.1	
9-Oct	197	189	175	170	177	171	166	172	169	165	164	166	176	235	291	288	291	281	271	280	250	284	293	282	214.8	
10-Oct	257	266	293	267	288	250	296	297	311	338	19	43	45	47	27	32	49	46	40	41	23	23	25	23	356.1	
11-Oct	22	30	30	27	28	23	22	23	28	31	25	19	25	23	23	20	12	12	10	15	13	9	10	7	20.3	
12-Oct	9	7	14	9	2	347	339	346	344	348	351	356	352	353	353	358	5	344	345	322	334	348	341	333	351.1	
13-Oct	324	338	291	297	282	184	224	229	240	253	230	209	225	222	230	239	232	248	241	248	254	246	232	232	244.8	
14-Oct	111	159	178	180	196	193	186	177	178	166	177	216	236	247	243	255	281	296	300	318	314	309	306	300	243.7	
15-Oct	285	279	289	271	269	233	173	159	154	159	161	165	165	180	188	169	171	168	151	266	184	232	238	242	194.6	
16-Oct	252	254	285	296	293	300	172	203	210	209	242	242	252	241	243	245	232	201	198	210	245	226	196	169	248.9	
17-Oct	162	163	149	86	109	118	160	168	175	167	175	144	65	21	7	357	346	339	328	313	308	311	312	319	323.3	
18-Oct	310	300	301	303	311	315	316	304	310	312	310	329	311	313	333	198	108	122	121	115	118	116	124	119	314.6	
19-Oct	123	112	122	143	159	158	159	164	164	165	172	172	149	158	135	140	145	136	127	125	137	143	164	162	148.9	
20-Oct	164	155	121	152	55	17	1	2	355	6	4	114	6	34	307	332	324	285	199	177	169	20	345	3	19.2	
21-Oct	5	4	336	23	27	34	13	14	57	110	167	180	156	153	117	108	7	11	30	28	43	64	93	AF	50.0	
22-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
23-Oct	AF	AF	291	297	300	294	284	275	292	296	301	303	279	272	263	264	268	239	232	228	199	130	169	188	270.8	
24-Oct	211	196	160	176	206	252	270	281	292	296	300	325	326	326	326	330	344	357	17	40	37	69	82	71	312.5	
25-Oct	27	33	45	45	40	33	17	17	11	10	9	6	8	4	2	359	2	0	359	349	338	323	303	294	5.9	
26-Oct	237	241	235	241	245	221	200	205	207	203	210	210	223	227	229	237	236	241	228	246	285	296	295	322	231.8	
27-Oct	91	182	133	165	171	185	145	172	173	168	156	161	161	163	168	168	165	162	175	166	165	170	190	172	166.8	
28-Oct	171	170	201	218	266	250	257	258	271	272	302	329	330	328	333	334	333	332	340	331	340	338	340	335	320.5	
29-Oct	332	338	338	339	344	359	9	7	12	10	6	14	15	19	20	33	30	49	128	139	184	181	198	203	357.0	
30-Oct	205	214	226	235	210	171	184	179	171	169	187	172	146	180	121	71	10	3	349	352	356	357	6	18	196.4	
31-Oct	3	4	11	22	60	50	71	104	113	79	33	22	18	29	19	12	8	14	10	12	11	11	11	17	20.0	

308.8 304.6 303.1 305.2 301.5 303.6 297.3 293.1 299.4 308.5 304.5 314.4 320.4 313.6 316.4 321.7 325.6 327.7 328.8 320.0 320.9 321.3 323.1 321.3  
 Diurnal Average

AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

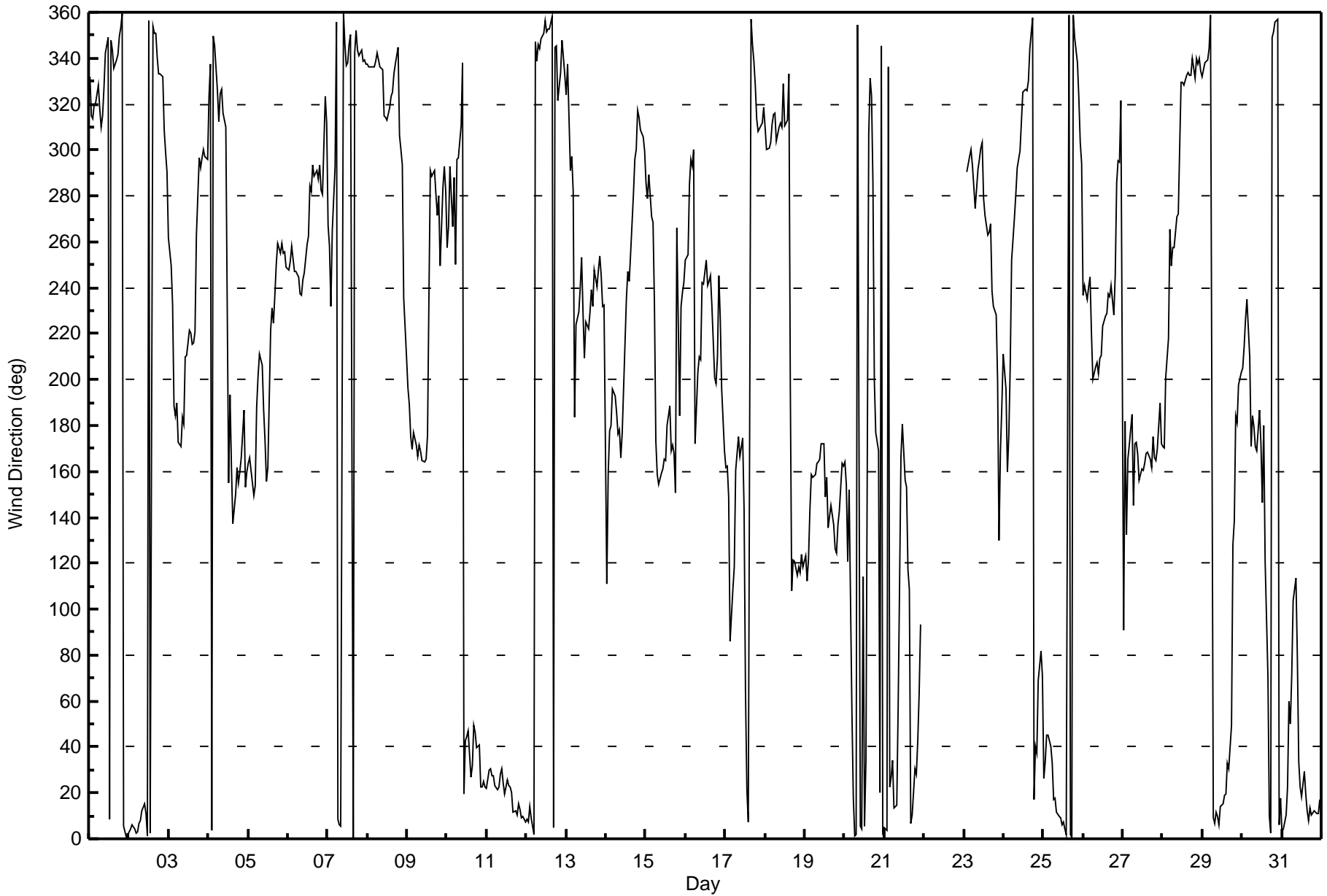
**Wind Direction (WD) - deg**  
**Mildred Lake - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 91 deg on Oct 30 15:00 Minimum Value: 8 deg on Oct 2 19:00 Percentiles: P <sub>1</sub> = 9 P <sub>10</sub> = 12 Q <sub>1</sub> = 14 Median = 17 Q <sub>3</sub> = 22 P <sub>90</sub> = 30 P <sub>99</sub> = 76																		Hours in Service: 744 Hours of Data: 717 Hours of Missing Data: 27 Hours of Calibration: 0 Percent Operational Time: 96.4								
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	14	17	17	15	16	13	16	17	16	14	13	14	17	14	12	10	10	11	12	15	15	16	18	17	18	
2-Oct	18	17	17	16	18	17	18	16	18	20	18	20	18	19	18	17	16	12	8	9	10	14	15	15	20	
3-Oct	24	17	24	15	13	12	14	14	16	18	18	17	21	20	18	19	29	31	17	17	16	16	15	16	31	
4-Oct	21	9	20	12	13	10	16	15	18	27	76	75	57	91	36	18	18	11	13	13	17	23	16	15	91	
5-Oct	12	12	18	17	47	19	10	19	19	16	16	21	28	25	24	21	25	23	21	23	21	21	24	23	47	
6-Oct	23	23	21	24	22	21	22	24	24	22	20	24	23	20	22	18	19	18	18	17	23	22	68	21	68	
7-Oct	21	39	41	23	29	18	13	13	13	16	18	14	15	18	16	15	11	15	12	12	12	12	11	11	41	
8-Oct	10	11	11	11	10	10	11	10	11	12	20	15	18	16	15	16	12	12	14	22	25	23	28	17	28	
9-Oct	12	14	16	15	19	16	12	14	13	12	13	14	17	42	23	20	18	27	20	33	22	24	18	22	42	
10-Oct	32	30	22	24	24	24	16	16	18	18	30	26	29	20	21	22	20	18	19	18	17	18	18	18	32	
11-Oct	16	16	16	17	15	17	17	17	18	19	17	18	18	20	19	18	17	16	15	15	16	15	15	16	20	
12-Oct	16	15	15	16	15	15	10	14	13	15	16	16	19	18	19	22	14	10	9	13	10	11	8	14	22	
13-Oct	23	48	16	17	42	42	21	36	47	35	41	22	30	22	24	24	25	20	23	23	23	26	42	67	67	
14-Oct	40	23	14	19	13	13	18	17	17	13	18	27	24	27	25	23	22	16	16	17	15	15	17	14	40	
15-Oct	22	21	23	22	32	25	15	12	19	16	14	11	13	19	15	14	20	19	73	35	24	22	36	20	73	
16-Oct	21	24	24	16	18	55	39	34	19	23	26	26	24	24	22	27	64	11	41	77	21	20	31	25	77	
17-Oct	12	12	17	23	15	26	15	12	15	12	17	25	37	17	12	12	13	8	11	15	16	16	15	15	37	
18-Oct	18	16	16	16	16	14	15	16	17	17	20	17	23	44	31	70	19	11	13	12	14	12	19	15	70	
19-Oct	18	17	17	21	15	14	13	11	13	12	17	19	20	21	19	19	18	16	14	14	16	16	10	11	21	
20-Oct	13	19	42	46	61	37	17	19	17	38	35	42	22	72	57	12	24	72	20	21	34	82	32	14	82	
21-Oct	9	41	37	17	15	18	22	18	30	29	30	35	25	24	32	20	17	13	19	23	20	27	15	AF	41	
22-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
23-Oct	AF	AF	21	16	16	17	23	25	18	17	20	21	33	26	29	26	21	27	18	20	24	26	18	17	33	
24-Oct	23	22	12	19	20	26	30	25	15	16	17	16	14	13	14	12	14	16	23	16	23	14	21	19	30	
25-Oct	17	18	16	15	16	18	15	14	15	14	15	15	15	13	14	15	14	13	16	10	12	19	25	30	30	
26-Oct	25	22	23	23	23	23	13	14	15	13	18	16	24	22	24	22	23	22	20	23	27	15	14	79	79	
27-Oct	83	41	28	21	12	16	18	21	19	14	14	14	15	11	11	11	10	12	17	11	11	15	14	14	83	
28-Oct	14	18	24	17	43	25	22	23	19	22	22	13	13	13	12	12	12	12	13	13	11	12	11	10	43	
29-Oct	12	11	11	12	11	18	16	17	17	16	19	17	18	20	22	19	19	18	58	28	22	16	14	18	58	
30-Oct	18	15	18	21	29	16	12	11	13	15	15	15	33	81	91	44	14	9	10	8	11	9	10	18	91	
31-Oct	12	9	13	16	20	20	20	10	12	20	20	17	13	16	15	13	13	15	13	14	16	16	15	16	20	
83 48 42 46 61 55 39 36 47 38 76 75 57 91 91 70 64 72 73 77 34 82 68 79																										
Diurnal Maximum																										
AF - Analyzer Failure																										



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Mildred Lake - October 2017**







# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Mildred Lake	Station number:	AMS 02
Calibration Date:	October 13, 2017	Last Cal Date:	September 11, 2017
Start time (MST):	12:11	End time (MST):	15:07
Reason:	Routine		

### Calibration Standards

Cal Gas Concentration	51.2	ppm	Cal Gas Exp Date	2/19/18
Calibrator Make/Model	API T700		Serial Number	1185
ZAG Make/Model	APT T701		Serial Number	4767

### Analyzer Information

Analyzer make:	Thermo 43i	Analyzer serial #:	JC1404901075		
	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>	
Analyzer Range	0 - 1000 ppb		PMT voltage	-653.4	-653.4
Calculated slope	0.991451	1.002325	Lamp voltage	801	805
Calculated intercept	2.183528	1.335035	Pressure	687.0	701.2
Analyzer Background	19.8	19.2	Flow	0.511	0.519
Analyzer Coefficient	0.951	0.932	Intensity	90	90

### SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5001	0.0	0.0	-0.1	----
as found span	4931	76.3	780.2	791.0	0.986
calibrator zero	5000	0.0	0.0	0.2	----
high point	4931	76.4	781.2	779.0	1.003
second point	4969	38.3	391.6	388.0	1.009
third point	4986	19.2	196.4	193.5	1.015
as left zero	5003	0.0	0.0	0.0	----
as left span	4932	76.4	781.0	775.0	1.008
Average Correction Factor					1.009

Corrected As found	791.08	Previous response	784.72	% change	-0.8%
--------------------	--------	-------------------	--------	----------	-------

\* = > +/-5% change initiates investigation

Notes: Slight adjustments to zero and span.

Calibration Performed By: Ryan Power



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

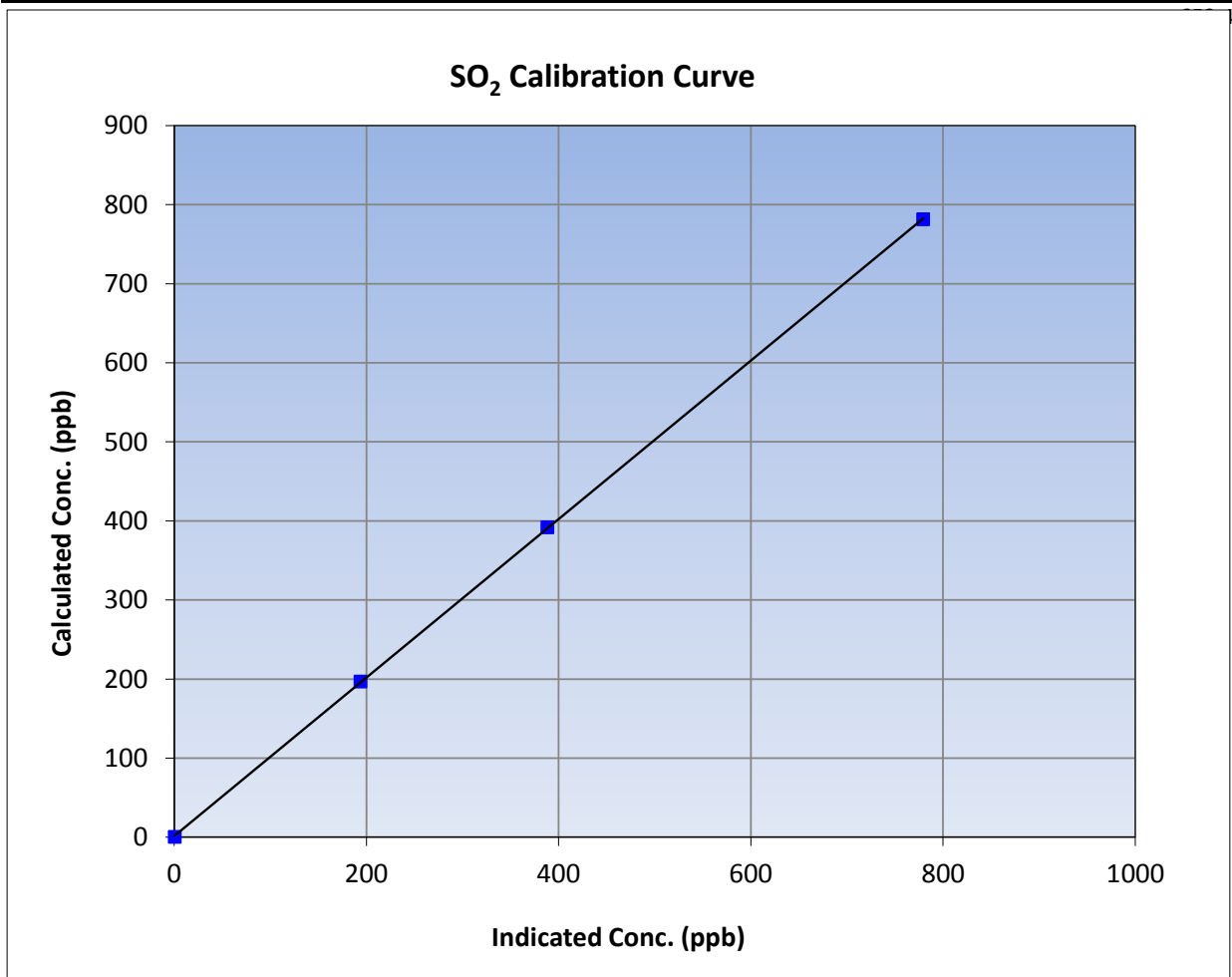
Version-03-2017

### Station Information

Calibration Date	October 13, 2017	Previous Calibration	September 11, 2017
Station Name	Mildred Lake	Station Number	AMS 02
Start Time (MST)	12:11	End Time (MST)	15:07
Analyzer make	Thermo 43i	Analyzer serial #	JC1404901075

### Calibration Data

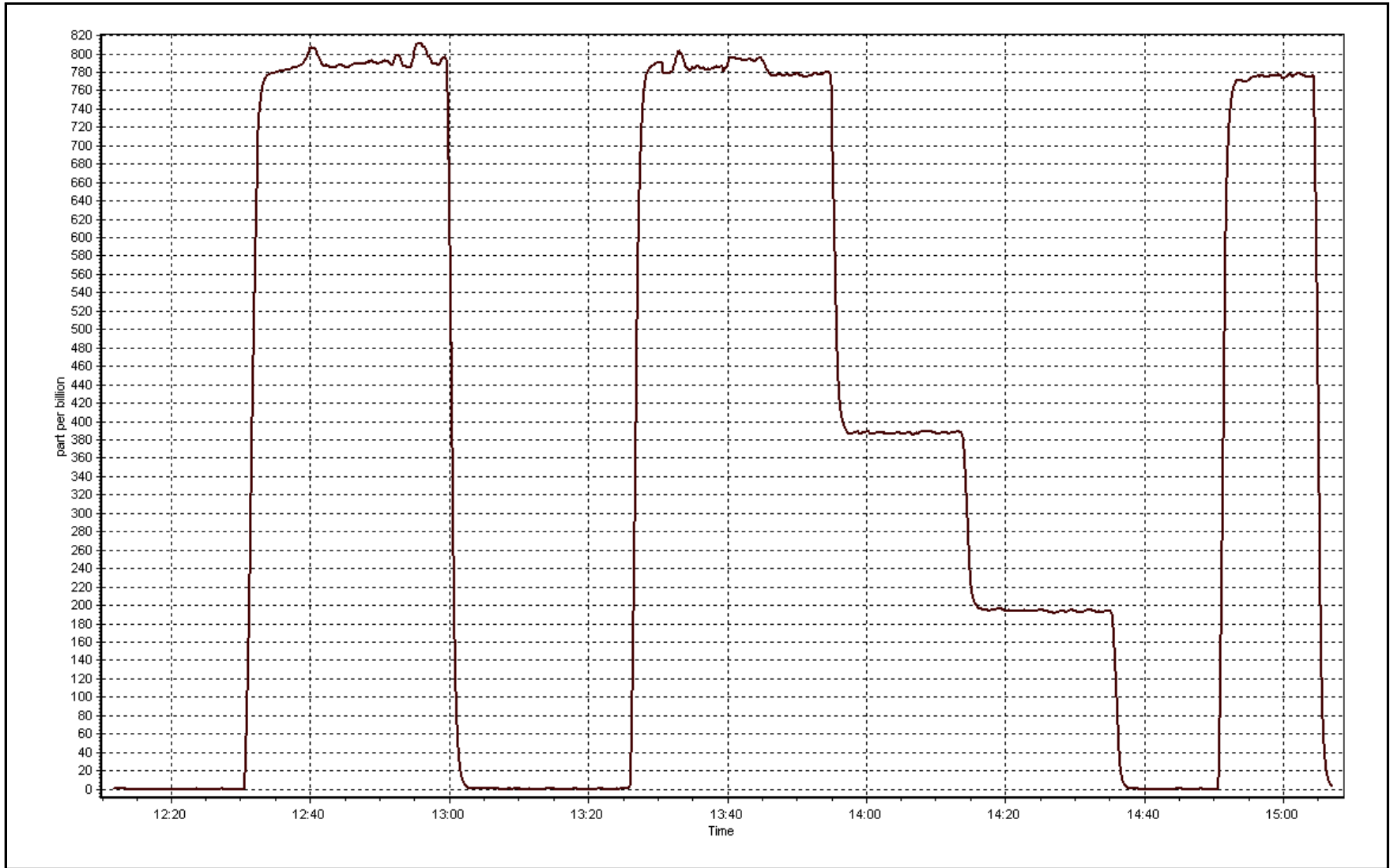
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.2	----	Correlation Coefficient	0.999981	≥0.995
781.2	779.0	1.0028			
391.6	388.0	1.0093	Slope	1.002325	0.90 - 1.10
196.4	193.5	1.0150			
			Intercept	1.335035	+/-30



SO2 Calibration Plot

Date: October 13, 2017

Location: Mildred Lake





# Wood Buffalo Environmental Association

## H<sub>2</sub>S Calibration Report

Version-06-2017

### Station Information

Station Name:	Mildred Lake	Station number:	AMS 02
Calibration Date:	October 16, 2017	Last Cal Date:	September 18, 2017
Start time (MST):	10:12	End time (MST):	13:48
Reason:	Routine		

### Calibration Standards

Cal Gas Concentration	<u>5.13</u>	ppm	Cal Gas Exp Date	December 12, 2019
Cal Gas Cylinder #	<u>EY0000363</u>			
Calibrator Make/Model	API T700		Serial Number	1185
ZAG Make/Model	API T701		Serial Number	825

### Analyzer Information

Analyzer make:		Analyzer serial #:			
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Analyzer Range	0 - 100 ppb		PMT voltage	-601	-601
Calculated slope	1.005170	0.999541	Lamp voltage	790	786
Calculated intercept	-0.087746	-0.091885	Pressure	553.9	552.7
Analyzer Background	17.0	16.9	Flow	0.973	0.973
Analyzer Coefficient	0.941	0.917	Intensity	86	88

### H<sub>2</sub>S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5002	0.0	0.0	0.3	----
as found span	4929	77.9	79.8	82.0	0.973
calibrator zero	5000	0.0	0.0	0.3	----
high point	4929	77.9	79.8	80.1	0.997
second point	4970	39.1	40.0	39.9	1.003
third point	4988	19.6	20.1	20.1	1.000
as left zero	4976	0.0	0.0	0.2	----
as left span	3926	62.3	80.1	80.0	1.002

SO<sub>2</sub> Scrubber Check

				Average Correction Factor	1.000
Corrected As found	81.68	Previous response	79.49	*% change	-2.7%

*\* = > +/-5% change initiates investigation*

Notes: Small adjustments to zero and span. Lost communications briefly during second point while changing ethernet cords config.

Calibration Performed By: Ryan Power



# Wood Buffalo Environmental Association

## H<sub>2</sub>S Calibration Summary

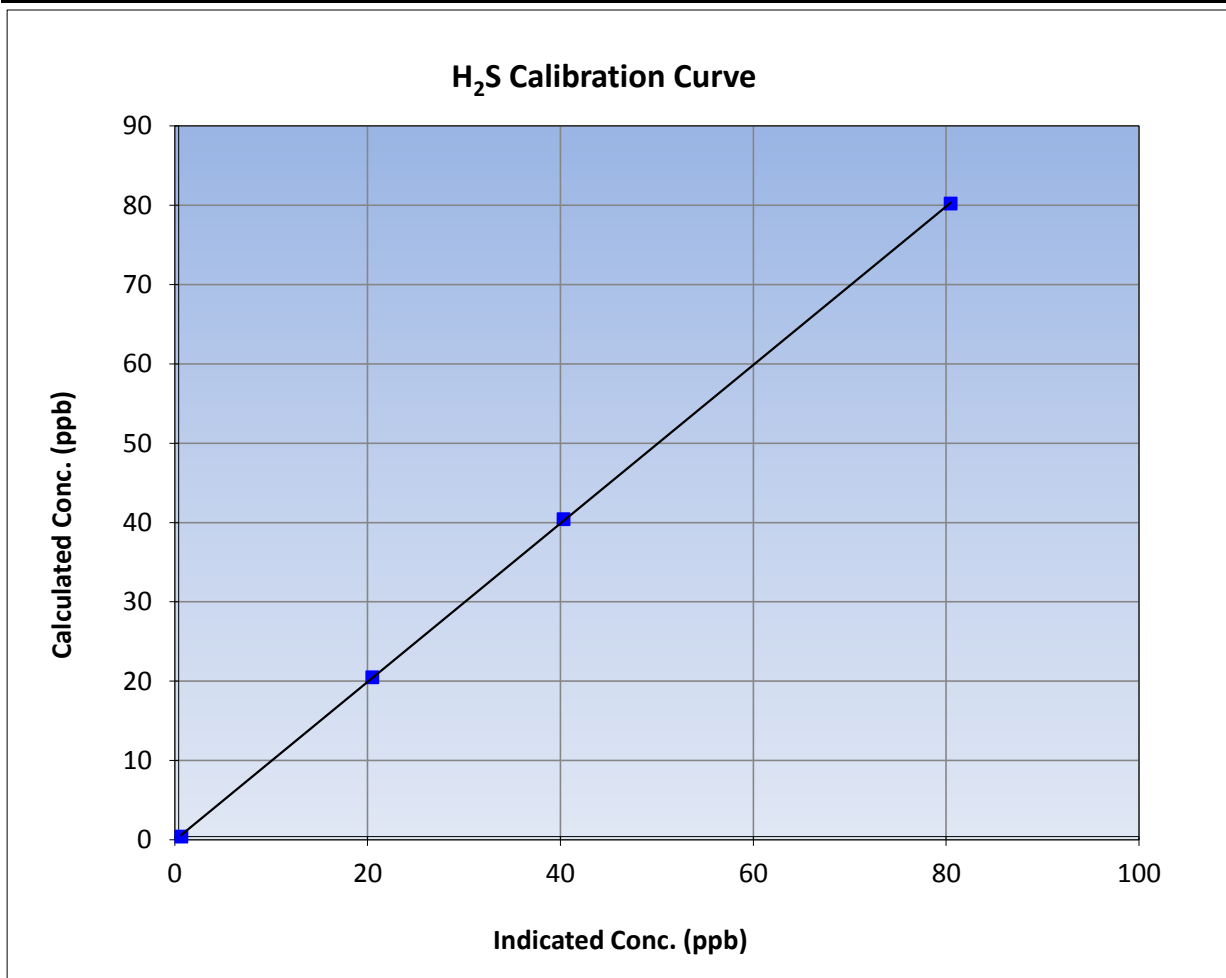
Version-03-2017

### Station Information

Calibration Date	October 16, 2017	Previous Calibration	September 18, 2017
Station Name	Mildred Lake	Station Number	AMS 02
Start Time (MST)	10:12	End Time (MST)	13:48
Analyzer make		Analyzer serial #	

### Calibration Data

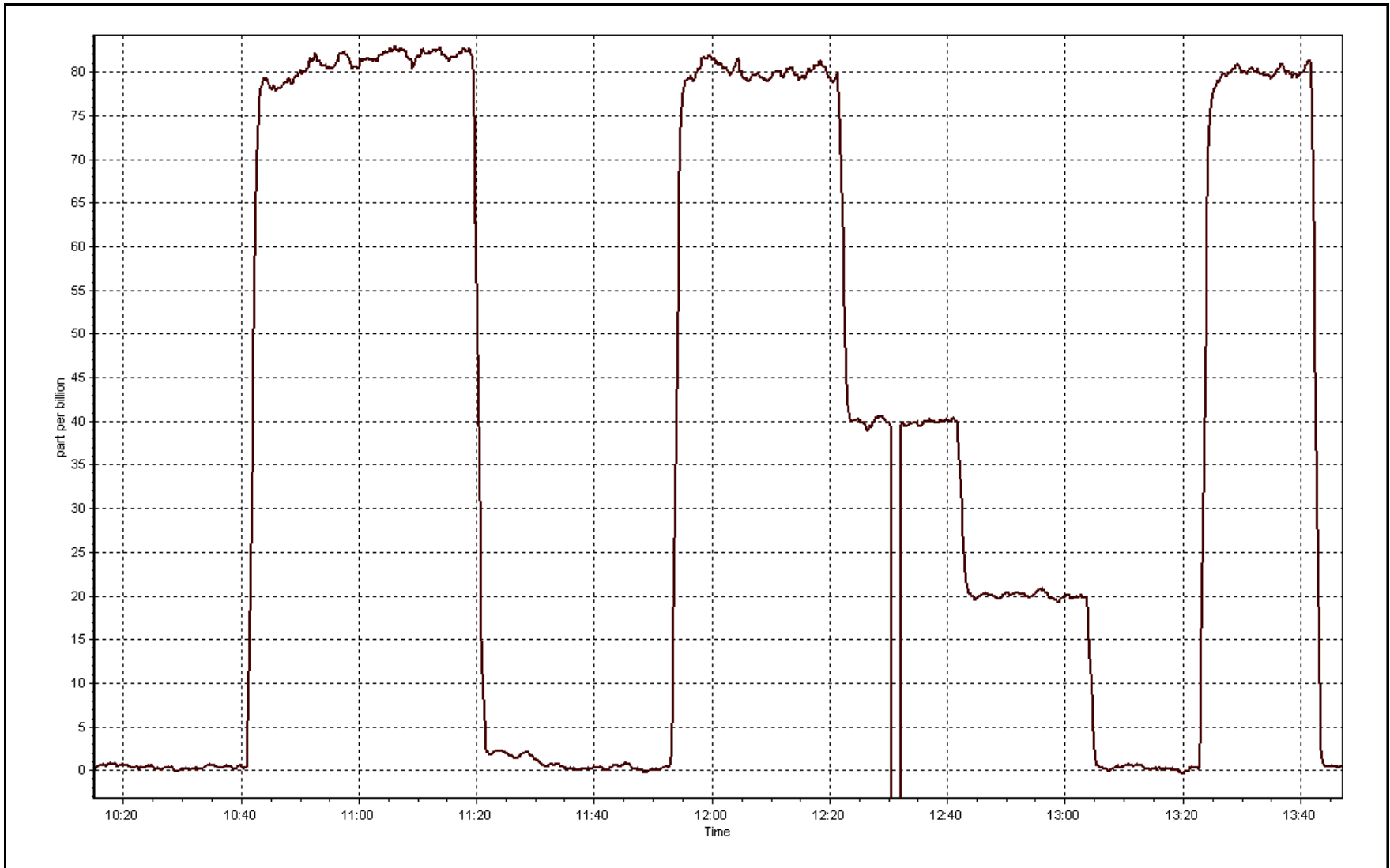
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.3	----	Correlation Coefficient	0.999967	≥0.995
79.8	80.1	0.9967			
40.0	39.9	1.0028	Slope	0.999541	0.90 - 1.10
20.1	20.1	1.0000			
			Intercept	-0.091885	+/-3



# H<sub>2</sub>S Calibration Plot

Date: October 16, 2017

Location: Mildred Lake





# Wood Buffalo Environmental Association

## THC Calibration Report

Version-03-2017

### Station Information

Station Name:	Mildred Lake	Station number:	AMS 02
Calibration Date:	October 2, 2017	Last Cal Date:	September 11, 2017
Start time (MST):	9:50	End time (MST):	13:13
Reason:	Maintenance		

### Calibration Standards

Gas Cert Reference	LL107930	Cal Gas Expiry Date	2/9/18
CH4 Cal Gas Conc.	509 ppm	CH4 Equiv Conc.	1081.0 ppm
C3H8 Cal Gas Conc.	208 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	1185
ZAG Make/Model	Teledyne API 701	Serial Number	4767

### Analyzer Information

Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1300156231
	<u>Start</u>	<u>Finish</u>	<u>Start</u>
Analyzer Range	0 - 25 ppm	Bias voltage supply	-301.3
Calculated slope	1.005879	Sample pressure	8.2
Calculated intercept	0.022029	Fuel pressure	21.8
Analyzer Background	0.35	Air pressure	33.1
Analyzer Coefficient	3.831	Flame temperature	142.8
			<u>Finish</u>
			-302.2
			8.2
			21.8
			33.1
			142.3

### THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5001	0.0	0.00	-0.14	----
as found span	4931	76.4	16.49	14.74	1.119
calibrator zero	5002	0.0	0.00	0.06	----
high point	4931	76.4	16.49	16.48	1.001
second point	4969	38.3	8.27	8.31	0.995
third point	4987	19.2	4.15	4.26	0.973
as left zero	5004	0.0	0.00	0.20	----
as left span	4932	76.4	16.49	16.37	1.007

Average Correction Factor				0.990	
Corrected As found	14.88	Previous response	16.37	*% change	10.1%

\* = > +/-5% change initiates investigation

Notes:

Nightly span was 10% out. Zero and span adjusted.

Calibration Performed By: Aswin Sasi Kumar



# Wood Buffalo Environmental Association

## THC Calibration Summary

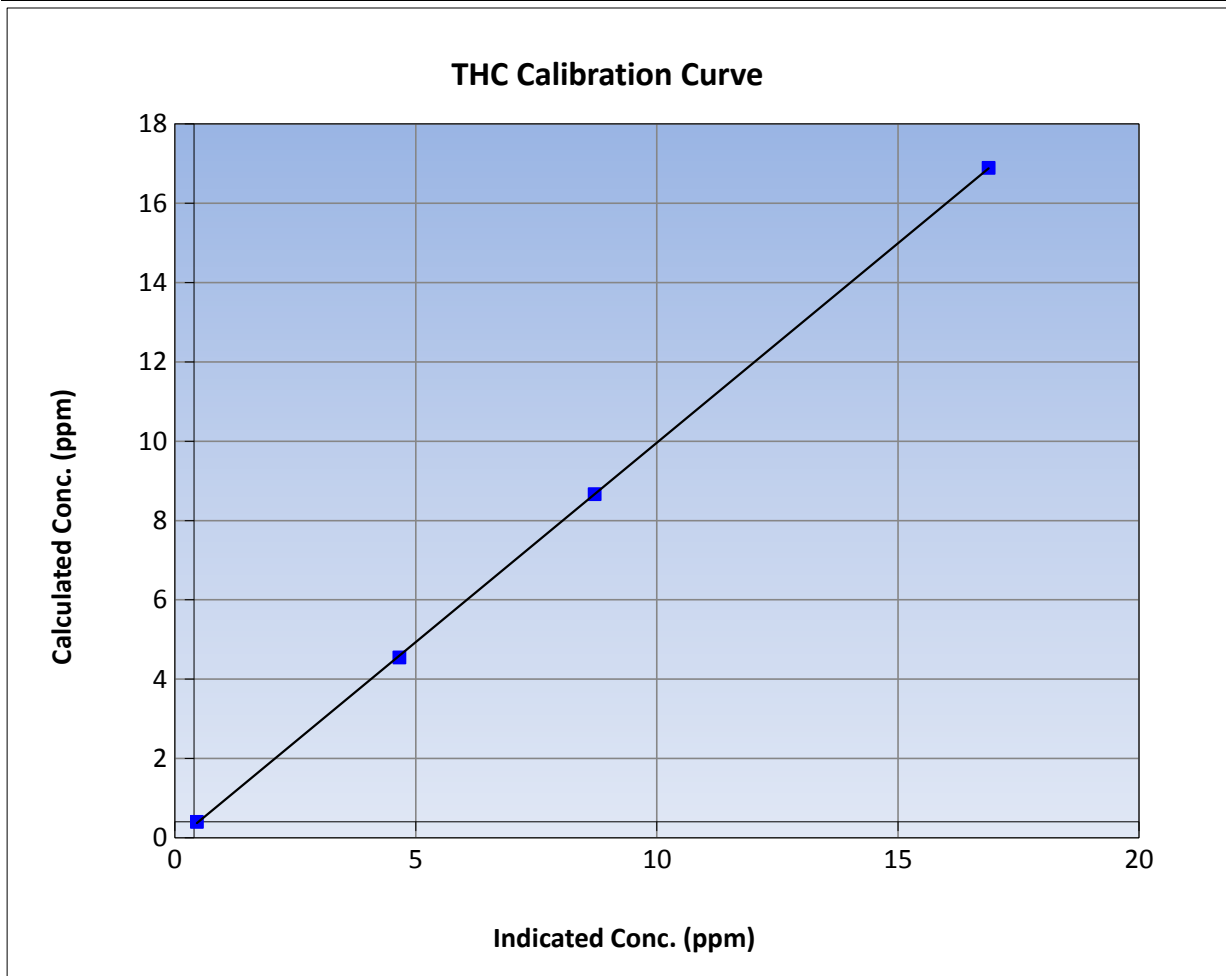
Version-03-2017

### Station Information

Calibration Date	October 2, 2017	Previous Calibration	September 11, 2017
Station Name	Mildred Lake	Station Number	AMS 02
Start Time (MST)	9:50	End Time (MST)	13:13
Analyzer make	Thermo 51i-LT	Analyzer serial #	1300156231

### Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (lc)	Correction factor (Cc/lc)	Statistical Evaluation	Limits	
0.0	0.1	----	Correlation Coefficient	0.999979	≥0.995
16.5	16.5	1.0008			
8.3	8.3	0.9949	Slope	1.005991	0.90 - 1.10
4.1	4.3	0.9730			
			Intercept	-0.095466	+/-1.5

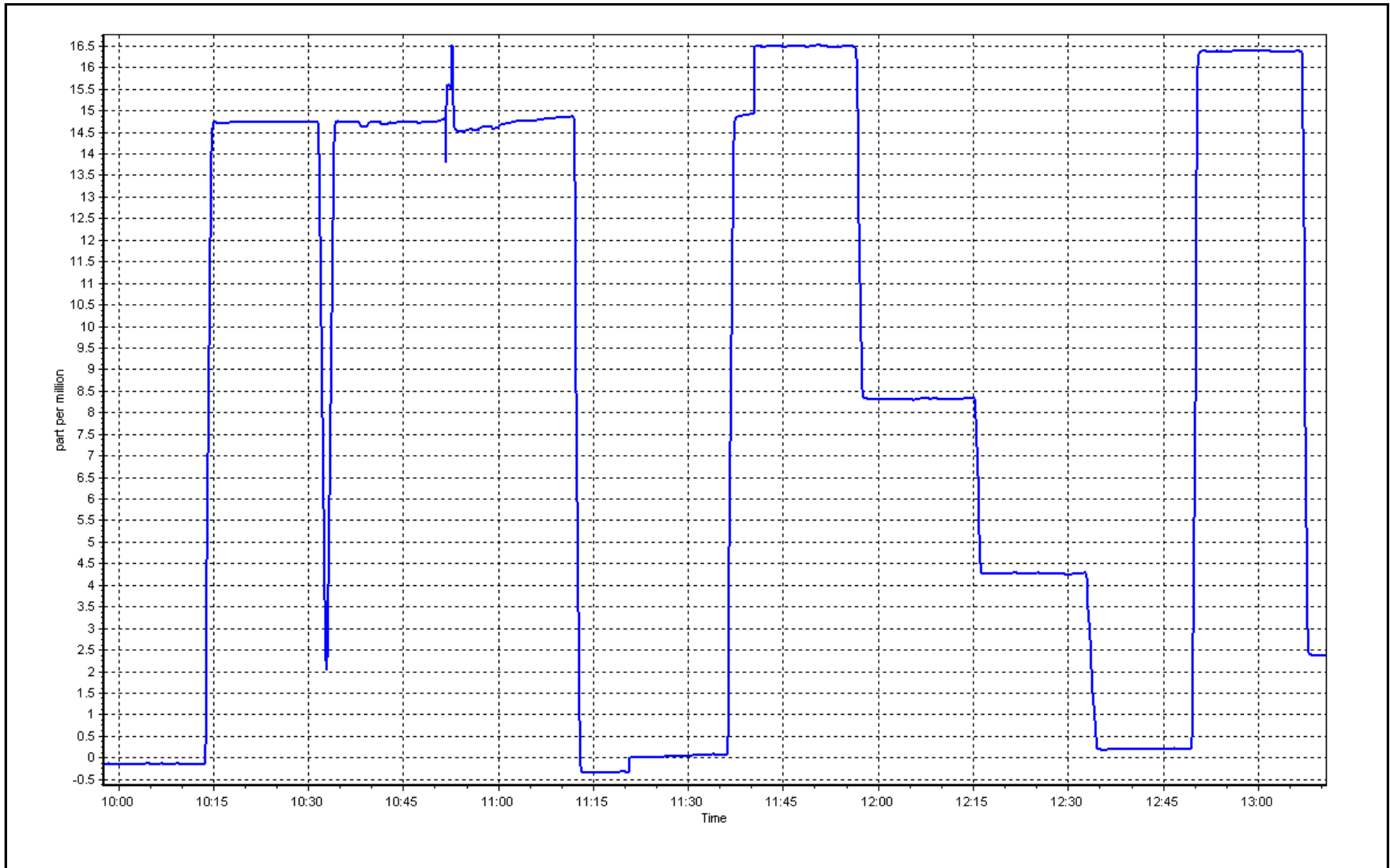




THC Calibration Plot

Date: October-17

Location: Mildred Lake





# Wood Buffalo Environmental Association

## THC Calibration Report

Version-03-2017

### Station Information

Station Name:	Mildred Lake	Station number:	AMS 02
Calibration Date:	October 6, 2017	Last Cal Date:	October 2, 2017
Start time (MST):	8:55	End time (MST):	10:25
Reason:	Removal		

### Calibration Standards

Gas Cert Reference	LL107930	Cal Gas Expiry Date	2/9/18
CH4 Cal Gas Conc.	509 ppm	CH4 Equiv Conc.	1081.0 ppm
C3H8 Cal Gas Conc.	208 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	1185
ZAG Make/Model	Teledyne API 701	Serial Number	4767

### Analyzer Information

Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1300156231		
	<b><u>Start</u></b>	<b><u>Finish</u></b>	<b><u>Start</u></b>	<b><u>Finish</u></b>	
Analyzer Range	0 - 25 ppm		Bias voltage supply	-302.2	NA
Calculated slope	1.005991	1.077320	Sample pressure	8.2	NA
Calculated intercept	-0.095466	-0.107233	Fuel pressure	21.8	NA
Analyzer Background	0.01	NA	Air pressure	33.1	NA
Analyzer Coefficient	4.153	NA	Flame temperature	142.3	NA

### THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5001	0.0	0.00	0.12	----
as found span	4931	76.4	16.49	15.43	1.069
calibrator zero	5002	0.0	0.00	0.12	----
high point	4931	76.4	16.49	15.43	1.069
second point	4969	38.3	8.27	7.75	1.067
third point	4987	19.2	4.15	3.94	1.053
as left zero					
as left span					

Average Correction Factor				1.063	
Corrected As found	15.30	Previous response	16.49	*% change	7.8%

\* = > +/-5% change initiates investigation

Notes:

Removal cal, detector counts had significantly dropped and was continuing to do so

Calibration Performed By: Ryan Power



# Wood Buffalo Environmental Association

## THC Calibration Summary

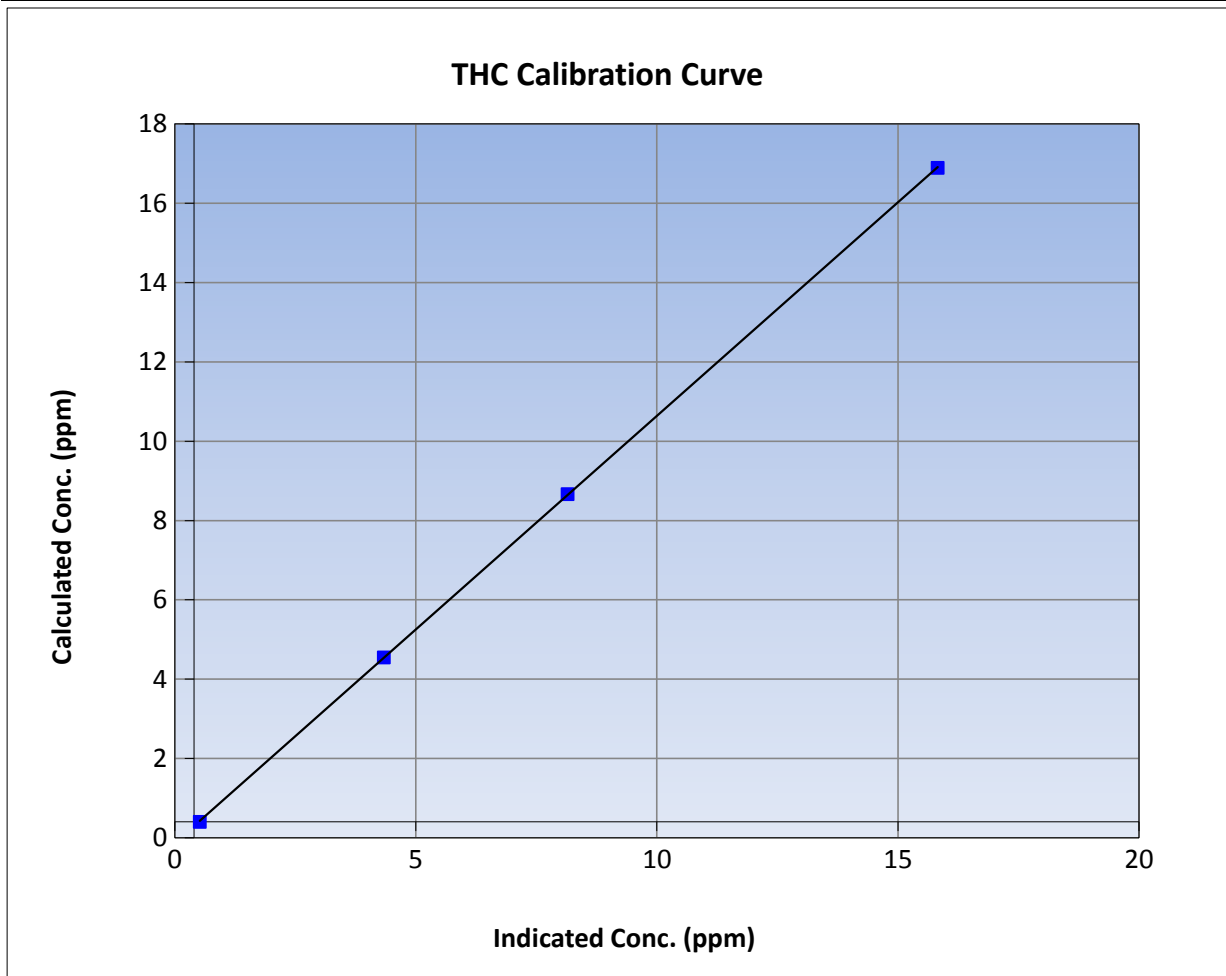
Version-03-2017

### Station Information

Calibration Date	October 6, 2017	Previous Calibration	October 2, 2017
Station Name	Mildred Lake	Station Number	AMS 02
Start Time (MST)	8:55	End Time (MST)	10:25
Analyzer make	Thermo 51i-LT	Analyzer serial #	1300156231

### Calibration Data

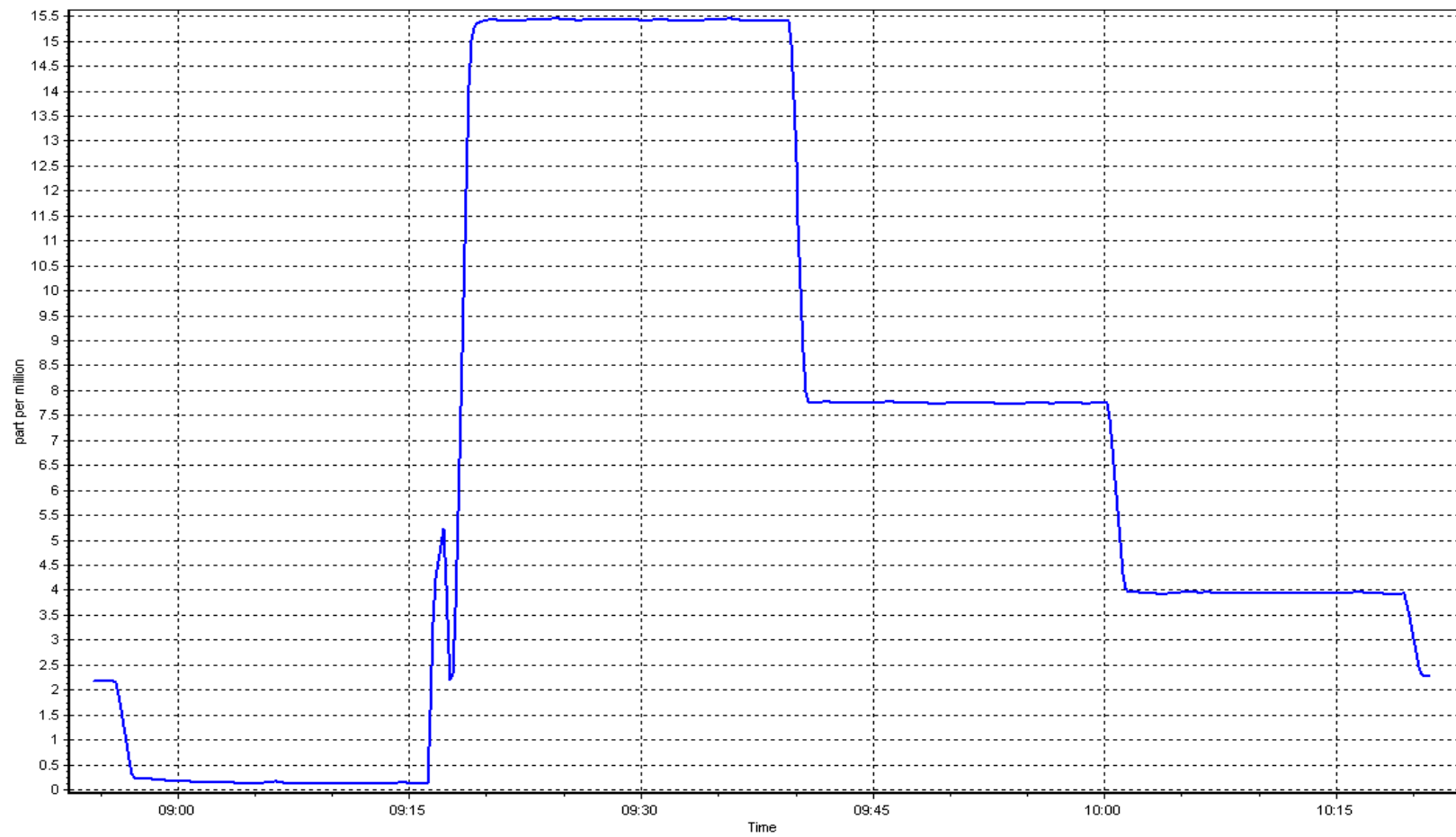
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (lc)	Correction factor (Cc/lc)	Statistical Evaluation	Limits	
0.0	0.1	----	Correlation Coefficient	0.999988	≥0.995
16.5	15.4	1.0693			
8.3	7.7	1.0672	Slope	1.077320	0.90 - 1.10
4.1	3.9	1.0531			
			Intercept	-0.107233	+/-1.5



THC Calibration Plot

Date: October-17

Location: Mildred Lake





# Wood Buffalo Environmental Association

## THC Calibration Report

Version-03-2017

### Station Information

Station Name:	Mildred Lake	Station number:	AMS 02
Calibration Date:	October 6, 2017	Last Cal Date:	NA
Start time (MST):	11:05	End time (MST):	13:20
Reason:	Install		

### Calibration Standards

Gas Cert Reference	LL107930	Cal Gas Expiry Date	2/9/18
CH4 Cal Gas Conc.	509 ppm	CH4 Equiv Conc.	1081.0 ppm
C3H8 Cal Gas Conc.	208 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	1185
ZAG Make/Model	Teledyne API 701	Serial Number	4767

### Analyzer Information

Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1410661326
	<u>Start</u>	<u>Finish</u>	<u>Start</u>
Analyzer Range	0 - 25 ppm	Bias voltage supply	NA
Calculated slope	NA	Sample pressure	8.5
Calculated intercept	NA	Fuel pressure	24.0
Analyzer Background	NA	Air pressure	37.4
Analyzer Coefficient	NA	Flame temperature	154.1

### THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero					
as found span					
calibrator zero	5002	0.0	0.00	-0.03	----
high point	4931	76.4	16.49	16.50	1.000
second point	4969	38.3	8.27	8.22	1.006
third point	4987	19.2	4.15	4.08	1.016
as left zero	5004	0.0	0.00	-0.09	----
as left span	4932	76.4	16.49	16.29	1.012
Average Correction Factor					1.007
Corrected As found	NA	Previous response	NA	*% change	NA

\* = > +/-5% change initiates investigation

Notes:

Install, looking good, so far...

Calibration Performed By: Ryan Power



# Wood Buffalo Environmental Association

## THC Calibration Summary

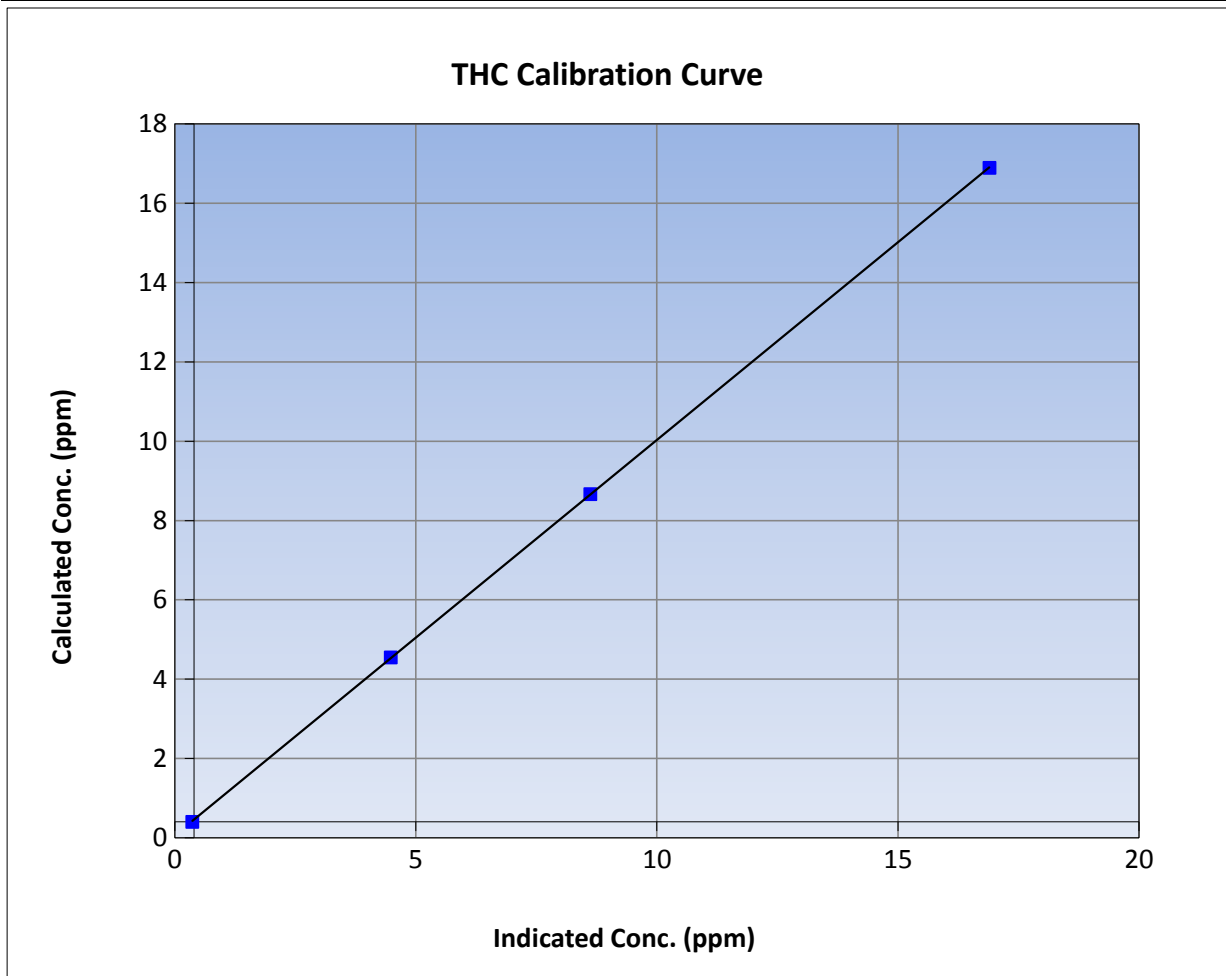
Version-03-2017

### Station Information

Calibration Date	October 6, 2017	Previous Calibration	NA
Station Name	Mildred Lake	Station Number	AMS 02
Start Time (MST)	11:05	End Time (MST)	13:20
Analyzer make	Thermo 51i-LT	Analyzer serial #	1410661326

### Calibration Data

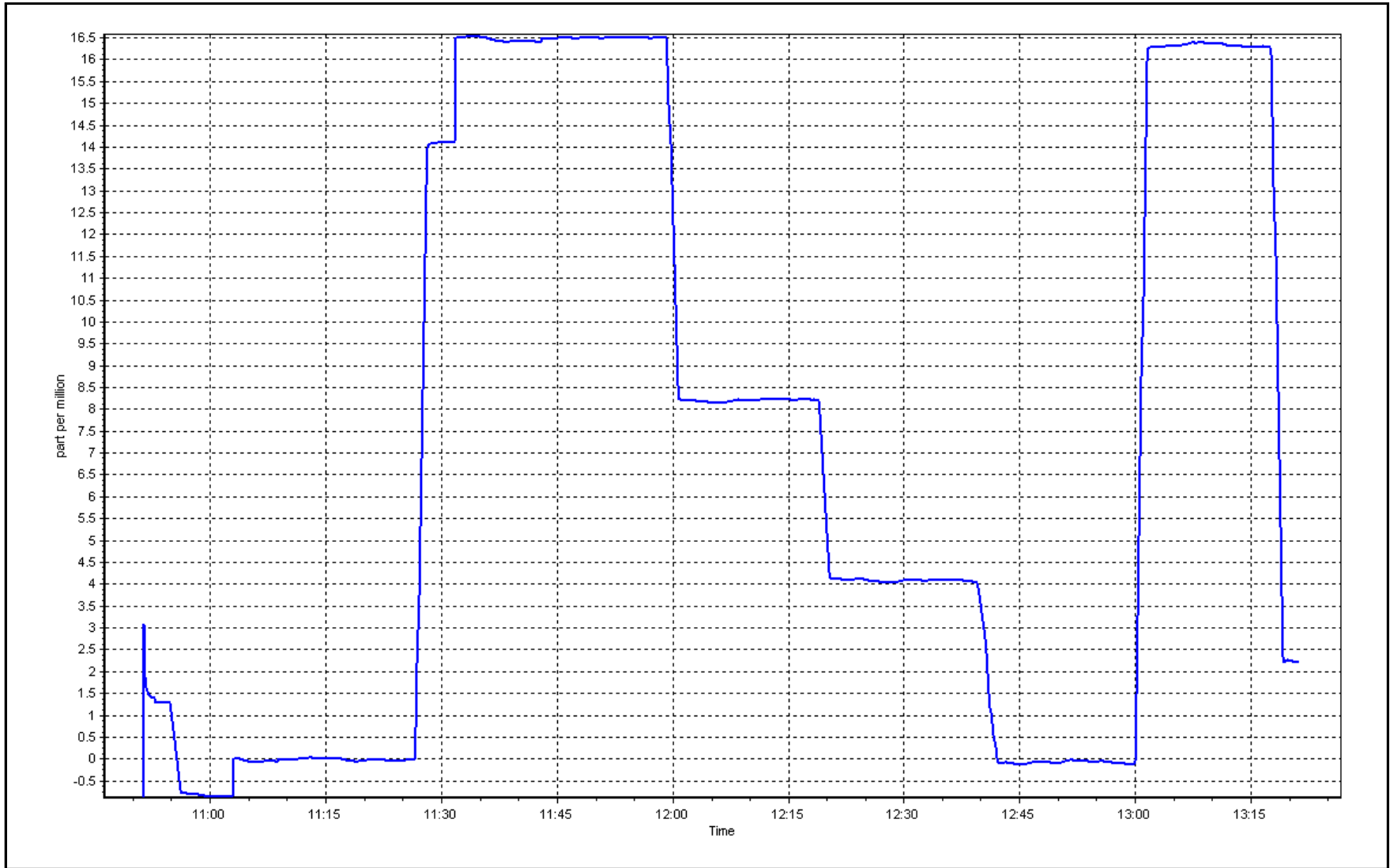
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (lc)	Correction factor (Cc/lc)	Statistical Evaluation	Limits	
0.0	0.0	----	Correlation Coefficient	0.999991	≥0.995
16.5	16.5	0.9997			
8.3	8.2	1.0058	Slope	0.997067	0.90 - 1.10
4.1	4.1	1.0162			
			Intercept	0.056485	+/-1.5



THC Calibration Plot

Date: October-17

Location: Mildred Lake





## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

### **AMS 3 LOWER CAMP METEOROLOGY OCTOBER 2017**

Operations, Data Collection,  
QA/QC, Data Validation and Reporting by:  
Wood Buffalo Environmental Association  
Fort McMurray, Alberta

November 29, 2017



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS 3)  
OCTOBER 2017

MONTHLY SUMMARY for  
AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
Temperature 20 m (C) Average	743	0	1	99.87	23.6	-	14.7	-
Temperature 45 m (C) Average	712	0	32	95.7	23.6	-	14.7	-
Temperature 100 m (C) Average	743	0	1	99.87	23.1	-	15.1	-
Temperature 167 m (C) Average	743	0	1	99.87	22.5	-	15.3	-
Relative Humidity 20 m (%) Average	743	0	1	99.87	100	-	97.0	-
Relative Humidity 45 m (%) Average	712	0	32	95.7	100	-	98.0	-
Relative Humidity 100 m (%) Average	743	0	1	99.87	100	-	98.0	-
Relative Humidity 167 m (%) Average	743	0	1	99.87	99	-	97.0	-
Wind Speed 20 m (km/h) Average	740	0	4	99.46	29	-	17.0	-
Wind Speed 45 m (km/h) Average	324	0	420	43.55	36	-	23.0	-
Wind Speed 100 m (km/h) Average	717	0	27	96.37	50	-	32.0	-
Wind Speed 167 m (km/h) Average	717	0	27	96.37	57	-	37.0	-
Wind Direction 20 m (deg) Average	740	0	4	99.46	-	-	-	-
Wind Direction 45 m (deg) Average	324	0	420	43.55	-	-	-	-
Wind Direction 100 m (deg) Average	717	0	27	96.37	-	-	-	-
Wind Direction 167 m (deg) Average	717	0	27	96.37	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	740	0	4	99.46	1	-	0.4	-
Vertical Wind Speed 45 m (km/h) Average	324	0	420	43.55	0.9	-	0.3	-
Vertical Wind Speed 100 m (km/h) Average	717	0	27	96.37	4.6	-	2.0	-
Vertical Wind Speed 167 m (km/h) Average	716	0	28	96.24	4.3	-	1.5	-

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS 3)  
OCTOBER 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
Temperature 20 m (C) Average	743	4.04	4.6	-	-4.5	-0.6	0.4	2.9	6.7	10.6	23.6
Temperature 45 m (C) Average	712	3.92	4.6	-	-4.5	-0.6	0.4	2.6	6.4	10.4	23.6
Temperature 100 m (C) Average	743	3.71	4.7	-	-4.9	-1.2	0.1	2.6	6.4	10.3	23.1
Temperature 167 m (C) Average	743	3.44	4.8	-	-4.8	-1.5	-0.3	2.4	6	10.1	22.5
Relative Humidity 20 m (%) Average	743	72.9	16	-	30	51	62	73	85	95	100
Relative Humidity 45 m (%) Average	712	73.2	16	-	30	52	63	73	85	96	100
Relative Humidity 100 m (%) Average	743	71.8	17	-	27	50	61	73	83	96	100
Relative Humidity 167 m (%) Average	743	71.8	17	-	26	51	60	73	83	96	99
Wind Speed 20 m (km/h) Average	740	9.9	6	-	0	3	5	9	14	18	29
Wind Speed 45 m (km/h) Average	324	13.1	8	-	1	3	6	12	19	26	36
Wind Speed 100 m (km/h) Average	717	19.3	10	-	1	7	11	19	26	33	50
Wind Speed 167 m (km/h) Average	717	22.5	12	-	1	8	13	22	31	39	57
Wind Direction 20 m (deg) Average	740	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	324	-	-	-	-	-	-	-	-	-	-
Wind Direction 100 m (deg) Average	717	-	-	-	-	-	-	-	-	-	-
Wind Direction 167 m (deg) Average	717	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	740	-0.12	0.4	-	-1.4	-0.7	-0.4	-0.1	0.1	0.3	1
Vertical Wind Speed 45 m (km/h) Average	324	0.04	0.3	-	-0.9	-0.3	-0.2	0.1	0.2	0.4	0.9
Vertical Wind Speed 100 m (km/h) Average	717	0.28	0.9	-	-2.9	-0.8	-0.1	0.2	0.8	1.3	4.6
Vertical Wind Speed 167 m (km/h) Average	716	0.33	0.8	-	-1.9	-0.7	-0.2	0.2	0.8	1.4	4.3

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS 3)  
OCTOBER 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
ALL PARAMETERS	02 Oct 2017 10:00	02 Oct 2017 10:00	1	Data collection error - program update
Temperature, Relative Humidity 45 m	03 Oct 2017 07:00	04 Oct 2017 13:00	31	Sensor wiring failure
Wind Speed. Wind Direction, Vertical Wind Speed 20 m	22 Oct 2017 07:00	22 Oct 2017 08:00	4	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 20 m	31 Oct 2017 14:00	31 Oct 2017 14:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 45 m	02 Oct 2017 10:00	19 Oct 2017 10:00	409	Sensor wiring failure
Wind Speed. Wind Direction, Vertical Wind Speed 45 m	22 Oct 2017 02:00	22 Oct 2017 10:00	9	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 45 m	31 Oct 2017 14:00	31 Oct 2017 15:00	2	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 100 m	11 Oct 2017 08:00	11 Oct 2017 08:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 100 m	21 Oct 2017 22:00	21 Oct 2017 22:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 100 m	22 Oct 2017 02:00	22 Oct 2017 03:00	2	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 100 m	22 Oct 2017 05:00	23 Oct 2017 02:00	22	Flat line in sensor output signal - Sensor frozen
Vertical Wind Speed 167 m	01 Oct 2017 01:00	01 Oct 2017 01:00	1	Intermittent unstable operation
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	11 Oct 2017 00:00	11 Oct 2017 17:00	18	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	22 Oct 2017 03:00	22 Oct 2017 10:00	8	Flat line in sensor output signal - Sensor frozen



# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Ambient Temperature 20 m (AT20m) - C

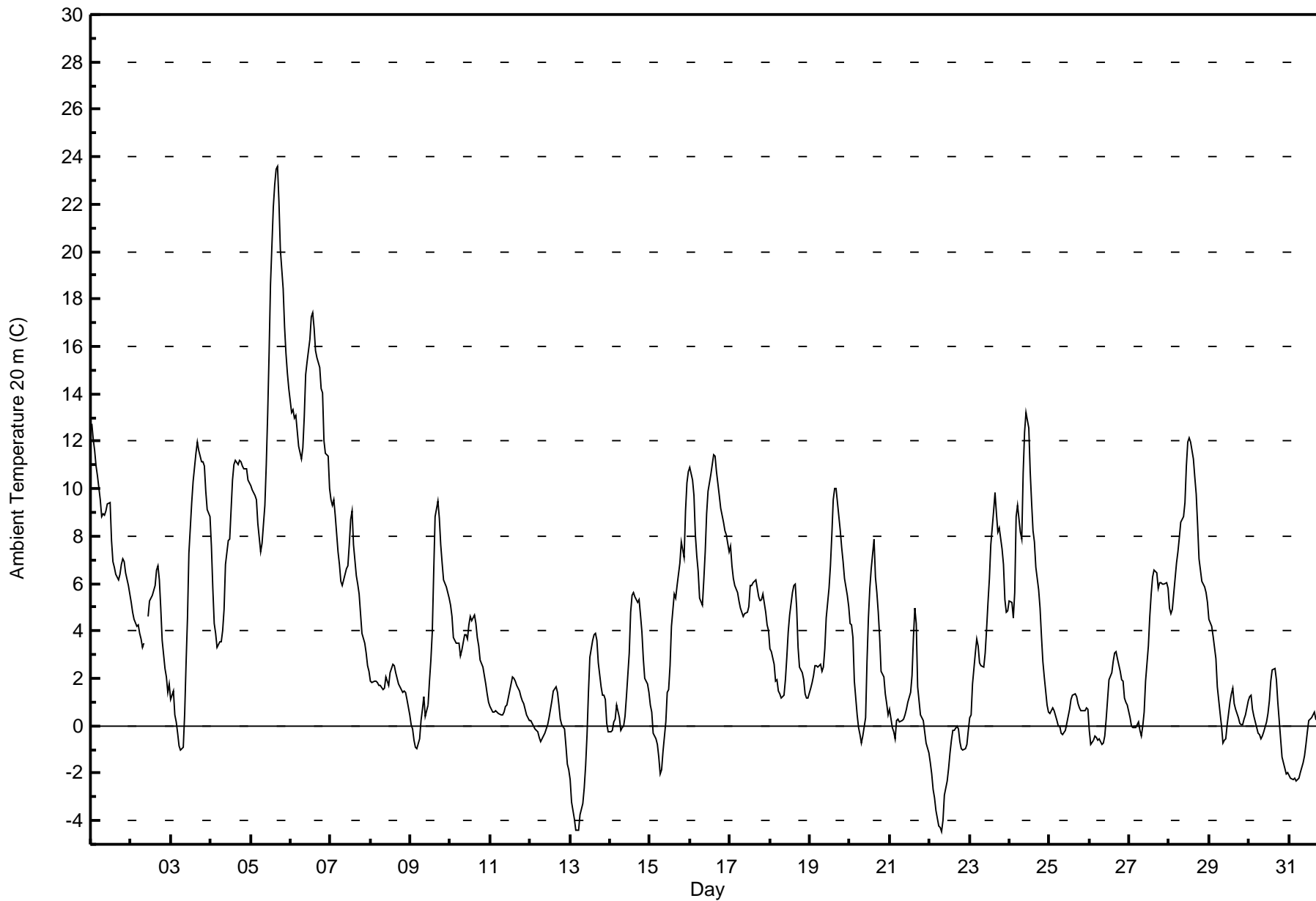
## Lower Camp Met Tower - October 2017

Maximum Value: 23.6 C on Oct 5 17:00		Maximum Daily Average: 14.7 C on Oct 5		Hours in Service: 744																																												
Minimum Value: -4.5 C on Oct 22 08:00		Minimum Daily Average: -1.8 C on Oct 22		Hours of Data: 743																																												
Maximum Diurnal Average: 6.5 C at hour 16		Minimum Diurnal Average: 2.1 C at hour 8		Hours of Missing Data: 1																																												
Monthly Average: 4.04 C		Percentiles: P <sub>1</sub> = -3.9 P <sub>10</sub> = -0.6 Q <sub>1</sub> = 0.4 Median = 2.9 Q <sub>3</sub> = 6.7 P <sub>90</sub> = 10.6 P <sub>99</sub> = 17.3		Hours of Calibration: 0																																												
				Percent Operational Time: 99.9																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	12.8	12.1	11.6	11.0	10.5	9.5	8.8	8.9	8.9	9.1	9.4	9.4	7.8	6.9	6.7	6.4	6.1	6.4	6.8	7.0	6.9	6.5	5.9	5.6	8.4	12.8																						
2-Oct	5.2	4.8	4.5	4.2	4.2	3.9	3.7	3.3	3.5	M	4.6	5.3	5.4	5.5	5.9	6.6	6.7	6.1	5.0	3.6	2.4	2.1	1.4	1.8	4.3	6.7																						
3-Oct	1.1	1.5	0.4	0.2	-0.3	-0.9	-1.0	-0.9	0.5	2.6	4.6	7.3	9.4	10.3	10.9	11.5	11.9	11.6	11.1	11.1	10.9	9.9	9.1	8.8	5.9	11.9																						
4-Oct	7.6	5.8	4.3	3.9	3.3	3.5	3.5	4.0	4.9	6.8	7.8	7.9	9.1	10.3	11.0	11.2	11.0	11.2	11.1	10.9	10.9	10.8	10.4	10.2	8.0	11.2																						
5-Oct	10.1	9.9	9.7	9.5	8.5	7.9	7.3	7.7	9.3	11.0	13.1	15.7	18.6	21.9	22.8	23.5	23.6	22.1	20.1	18.4	16.9	15.7	14.9	14.2	14.7	23.6																						
6-Oct	13.2	13.4	13.0	13.1	12.4	11.8	11.2	11.7	13.0	14.8	15.3	16.3	17.3	17.4	16.8	15.8	15.5	15.1	14.2	14.1	12.0	11.5	11.3	10.0	13.8	17.4																						
7-Oct	9.5	9.3	9.5	8.9	7.4	6.8	6.1	5.9	6.1	6.6	6.7	7.6	8.7	9.1	7.7	6.3	6.0	5.6	4.7	3.9	3.5	3.1	2.5	2.3	6.4	9.5																						
8-Oct	1.9	1.8	1.9	1.9	1.8	1.7	1.7	1.5	1.6	2.1	1.9	1.7	2.2	2.6	2.5	2.3	2.0	1.8	1.5	1.4	1.5	1.4	1.1	0.4	1.8	2.6																						
9-Oct	0.0	-0.2	-0.6	-0.9	-1.0	-0.5	0.2	0.7	1.2	0.4	0.9	1.9	2.8	4.0	6.5	8.8	9.5	8.7	7.6	6.9	6.1	5.9	5.6	5.4	3.3	9.5																						
10-Oct	5.1	4.6	3.7	3.5	3.5	3.5	3.0	3.2	3.8	3.9	3.6	4.3	4.6	4.5	4.7	4.3	3.7	3.4	2.8	2.5	2.1	1.8	1.3	1.0	3.4	5.1																						
11-Oct	0.8	0.6	0.6	0.6	0.6	0.5	0.5	0.4	0.6	0.8	0.9	1.2	1.8	2.1	2.0	1.9	1.7	1.5	1.2	1.1	1.0	0.7	0.5	0.2	1.0	2.1																						
12-Oct	0.2	0.1	0.0	-0.1	-0.2	-0.5	-0.7	-0.6	-0.4	-0.3	0.0	0.3	0.7	1.1	1.5	1.6	1.4	0.9	0.3	0.1	-0.2	-0.9	-1.6	-1.8	0.0	1.6																						
13-Oct	-2.3	-3.2	-3.9	-4.4	-4.4	-4.4	-3.8	-3.3	-2.6	-1.7	-0.4	1.4	2.9	3.6	3.8	3.9	3.6	2.7	1.7	1.3	1.3	1.1	0.1	-0.2	-0.3	3.9																						
14-Oct	-0.3	-0.2	0.1	0.3	0.9	0.3	-0.2	-0.1	0.0	0.4	1.2	3.1	4.8	5.5	5.6	5.5	5.2	5.3	4.7	4.0	2.8	2.0	1.8	1.4	2.3	5.6																						
15-Oct	0.8	0.6	-0.3	-0.5	-0.8	-1.3	-2.0	-1.9	-1.1	0.1	1.4	1.5	2.6	4.2	5.6	5.4	5.9	6.4	6.8	7.8	7.1	9.1	10.3	10.7	3.3	10.7																						
16-Oct	10.9	10.4	9.7	8.1	7.2	6.5	5.4	5.1	6.2	7.4	8.9	9.9	10.6	11.0	11.4	11.4	10.7	9.7	9.2	8.9	8.6	8.2	8.1	7.3	8.8	11.4																						
17-Oct	7.6	6.8	6.2	5.9	5.6	5.2	5.0	4.8	4.6	4.7	4.8	5.0	5.9	5.9	6.0	6.1	5.8	5.4	5.3	5.3	5.6	4.8	4.3	4.0	5.4	7.6																						
18-Oct	3.2	3.1	2.6	1.9	2.0	1.4	1.3	1.2	1.3	1.9	2.9	3.9	4.7	5.6	5.9	6.0	5.0	3.3	2.5	2.2	1.9	1.3	1.2	1.2	2.8	6.0																						
19-Oct	1.6	1.8	2.1	2.5	2.5	2.5	2.6	2.3	2.4	3.3	4.6	5.8	6.8	8.1	9.5	10.0	10.0	8.8	8.2	7.5	6.9	6.2	5.5	5.0	5.3	10.0																						
20-Oct	4.3	4.3	3.7	1.9	0.4	-0.1	-0.4	-0.7	-0.5	0.3	2.7	4.5	5.8	6.6	7.9	6.3	5.6	4.8	3.7	2.3	2.0	1.4	0.9	0.4	2.8	7.9																						
21-Oct	0.7	-0.1	-0.2	-0.5	0.2	0.3	0.1	0.2	0.3	0.4	0.7	1.0	1.4	2.1	3.7	5.0	4.3	1.7	0.5	0.3	0.2	-0.2	-0.7	-1.1	0.8	5.0																						
22-Oct	-1.6	-2.0	-2.7	-3.1	-3.6	-4.2	-4.3	-4.5	-4.0	-2.9	-2.3	-1.8	-1.2	-0.6	-0.2	-0.2	0.0	-0.1	-0.7	-1.0	-1.0	-1.0	-0.8	-0.2	-1.8	0.0																						
23-Oct	0.4	0.4	1.7	3.0	3.7	3.3	2.6	2.5	2.5	3.1	4.1	5.2	6.2	7.6	9.0	9.9	8.9	8.2	8.3	7.4	6.8	5.3	4.8	4.9	5.0	9.9																						
24-Oct	5.3	5.2	4.5	5.6	8.8	9.3	8.2	7.9	10.6	12.4	13.2	12.5	10.7	9.4	8.2	7.8	6.7	5.8	5.0	3.8	2.7	2.1	0.8	0.6	7.0	13.2																						
25-Oct	0.5	0.6	0.7	0.7	0.2	0.0	0.0	-0.3	-0.4	-0.2	0.1	0.4	0.7	1.1	1.3	1.4	1.3	0.9	0.7	0.6	0.6	0.6	0.8	0.7	0.5	1.4																						
26-Oct	-0.2	-0.8	-0.6	-0.4	-0.5	-0.6	-0.6	-0.8	-0.7	-0.4	0.3	1.1	1.9	2.2	2.7	3.1	3.1	2.8	2.3	2.0	1.9	1.2	1.0	0.8	0.9	3.1																						
27-Oct	0.3	0.0	-0.1	-0.1	-0.1	0.2	-0.2	-0.5	0.0	0.6	1.9	3.4	4.6	5.5	6.2	6.5	6.4	5.8	6.1	6.1	6.0	6.0	6.0	5.8	3.2	6.5																						
28-Oct	5.0	4.7	4.9	6.2	6.9	7.3	7.9	8.6	8.8	9.4	11.0	12.0	12.1	12.0	11.2	10.5	9.8	8.5	7.1	6.1	5.9	5.9	5.6	5.2	8.0	12.1																						
29-Oct	4.5	4.2	3.8	3.3	2.8	1.6	0.5	0.0	-0.7	-0.6	-0.6	0.1	1.0	1.3	1.6	0.9	0.7	0.3	0.1	0.0	0.1	0.3	0.5	1.1	1.1	4.5																						
30-Oct	1.2	1.3	0.7	0.4	-0.1	-0.3	-0.4	-0.5	-0.5	-0.3	0.1	0.5	1.1	1.9	2.3	2.4	1.9	1.0	0.2	-0.6	-1.3	-1.8	-2.0	-1.9	0.2	2.4																						
31-Oct	-2.1	-2.2	-2.3	-2.2	-2.3	-2.3	-2.2	-2.0	-1.6	-1.2	-0.8	-0.3	0.2	0.3	0.4	0.6	0.3	0.2	0.1	0.1	0.1	-0.7	-1.6	-2.3	-1.0	0.6																						
																								3.5	3.2	2.9	2.7	2.6	2.3	2.1	2.1	2.5	3.2	4.0	4.8	5.5	6.1	6.5	6.5	6.3	5.7	5.1	4.7	4.3	3.9	3.5	3.3	Diurnal Average
																								13.2	13.4	13.0	13.1	12.4	11.8	11.2	11.7	13.0	14.8	15.3	16.3	18.6	21.9	22.8	23.5	23.6	22.1	20.1	18.4	16.9	15.7	14.9	14.2	Diurnal Maximum
M - Maintenance																																																



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature 20 m (AT20m) - C**  
**Lower Camp Met Tower - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature 20 m (AT20m) - C  
Lower Camp Met Tower - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	128	17.23	17.23
0 - 10	530	71.33	88.56
10 - 20	79	10.63	99.19
> 20	6	0.81	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature 45 m (AT45m) - C

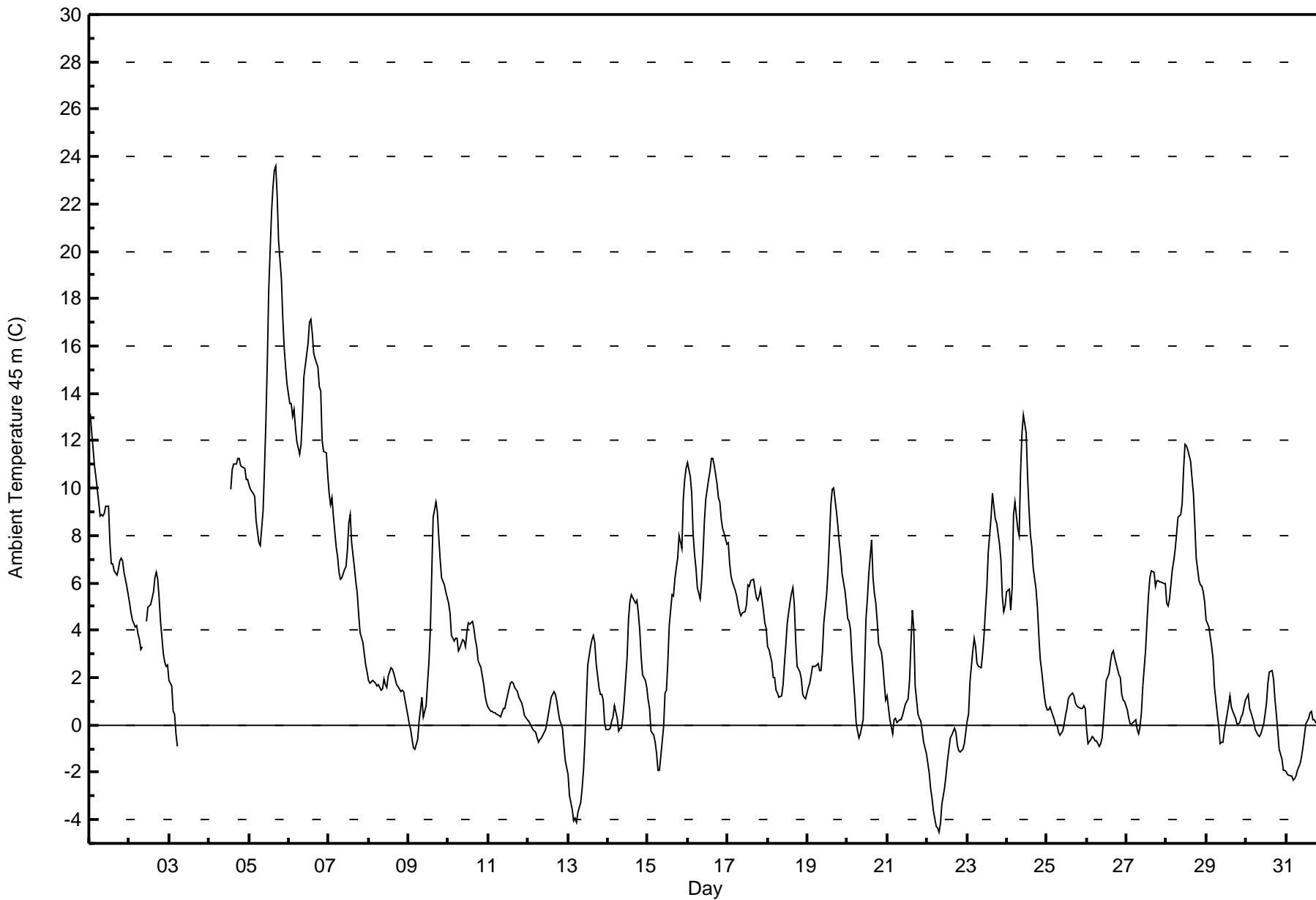
Lower Camp Met Tower - October 2017

Maximum Value: 23.6 C on Oct 5 17:00		Maximum Daily Average: 14.7 C on Oct 5		Hours in Service: 744																						
Minimum Value: -4.5 C on Oct 22 08:00		Minimum Daily Average: -2.0 C on Oct 22		Hours of Data: 712																						
Maximum Diurnal Average: 6.3 C at hour 16		Minimum Diurnal Average: 2.1 C at hour 8		Hours of Missing Data: 32																						
Monthly Average: 3.92 C		Percentiles: P <sub>1</sub> = -3.8 P <sub>10</sub> = -0.6 Q <sub>1</sub> = 0.4 Median = 2.6 Q <sub>3</sub> = 6.4 P <sub>90</sub> = 10.4 P <sub>99</sub> = 17.9		Hours of Calibration: 0																						
				Percent Operational Time: 95.7																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	13.1	12.4	11.7	10.9	10.5	9.4	8.8	8.9	8.8	8.9	9.3	9.3	7.7	6.8	6.8	6.5	6.4	6.6	6.9	7.1	6.9	6.4	5.9	5.5	8.4	13.1
2-Oct	5.2	4.7	4.4	4.1	4.2	3.8	3.6	3.2	3.3	M	4.4	4.9	5.0	5.1	5.6	6.2	6.5	6.1	5.4	4.4	3.0	2.7	2.5	2.5	4.4	6.5
3-Oct	1.9	1.6	0.6	0.5	-0.3	-0.9	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	1.9
4-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	11.2
5-Oct	10.2	10.0	9.8	9.7	8.6	8.2	7.7	7.6	9.1	10.8	12.9	15.4	18.4	21.6	22.7	23.4	23.6	22.3	20.4	18.8	17.2	15.9	15.1	14.4	14.7	23.6
6-Oct	13.5	13.5	13.1	13.4	12.6	12.0	11.5	11.9	13.1	14.7	15.2	16.1	17.0	17.1	16.5	15.7	15.5	15.1	14.3	14.1	12.0	11.5	11.5	10.5	13.8	17.1
7-Oct	9.8	9.3	9.6	8.8	7.5	7.1	6.5	6.2	6.2	6.6	6.7	7.4	8.5	8.9	7.7	6.6	6.1	5.6	4.7	3.9	3.5	3.0	2.5	2.2	6.4	9.8
8-Oct	1.9	1.8	1.9	1.8	1.8	1.7	1.7	1.5	1.5	2.0	1.7	1.6	2.1	2.4	2.4	2.1	1.9	1.7	1.5	1.4	1.5	1.4	1.0	0.4	1.7	2.4
9-Oct	0.0	-0.2	-0.6	-1.0	-1.0	-0.6	0.2	0.6	1.2	0.4	0.8	1.8	2.7	4.0	6.4	8.7	9.4	9.0	7.9	7.0	6.2	5.9	5.6	5.4	3.3	9.4
10-Oct	5.1	4.7	3.8	3.5	3.7	3.6	3.1	3.3	3.6	3.5	3.3	3.9	4.3	4.2	4.4	4.1	3.6	3.3	2.7	2.4	2.1	1.7	1.2	0.9	3.3	5.1
11-Oct	0.8	0.6	0.6	0.5	0.5	0.5	0.4	0.3	0.5	0.7	0.7	1.0	1.5	1.8	1.8	1.8	1.6	1.4	1.2	1.0	0.9	0.7	0.4	0.2	0.9	1.8
12-Oct	0.2	0.0	-0.1	-0.2	-0.3	-0.5	-0.7	-0.6	-0.6	-0.4	-0.2	0.1	0.4	0.8	1.2	1.4	1.3	1.0	0.6	0.2	-0.1	-0.8	-1.5	-1.8	0.0	1.4
13-Oct	-2.1	-3.0	-3.6	-4.1	-3.9	-4.1	-3.7	-3.3	-2.7	-1.9	-0.7	1.0	2.5	3.3	3.6	3.8	3.5	2.6	1.6	1.3	1.3	1.1	0.1	-0.2	-0.3	3.8
14-Oct	-0.2	-0.1	0.1	0.3	0.8	0.3	-0.2	-0.1	-0.1	0.3	1.1	2.8	4.4	5.2	5.5	5.4	5.2	5.3	4.7	4.0	2.9	2.1	1.9	1.6	2.2	5.5
15-Oct	1.0	0.7	-0.2	-0.4	-0.7	-1.2	-1.9	-1.9	-1.3	-0.1	1.3	1.4	2.6	4.2	5.5	5.4	6.2	6.6	7.1	8.0	7.4	9.5	10.4	10.9	3.4	10.9
16-Oct	11.0	10.5	9.8	8.0	7.2	6.7	5.8	5.3	6.1	7.2	8.6	9.5	10.3	10.7	11.2	11.2	10.9	10.2	9.6	9.4	8.7	8.3	8.1	7.6	8.8	11.2
17-Oct	7.7	6.8	6.2	6.0	5.7	5.5	5.1	4.8	4.6	4.7	4.8	5.1	5.9	5.9	6.1	6.1	5.7	5.4	5.2	5.4	5.7	4.9	4.3	4.1	5.5	7.7
18-Oct	3.3	3.2	2.6	2.0	2.0	1.4	1.3	1.2	1.2	1.7	2.6	3.4	4.3	5.2	5.6	5.8	5.1	3.5	2.5	2.3	1.9	1.3	1.1	1.1	2.7	5.8
19-Oct	1.6	1.8	2.1	2.5	2.5	2.5	2.6	2.3	2.3	3.0	4.3	5.5	6.5	7.8	9.3	9.9	10.0	9.0	8.4	7.7	7.1	6.4	5.7	5.1	5.2	10.0
20-Oct	4.5	4.4	4.0	2.9	1.1	0.1	-0.2	-0.5	-0.4	0.2	2.3	4.5	5.3	6.4	7.8	6.2	5.6	5.2	4.4	3.4	3.1	2.6	1.8	1.0	3.1	7.8
21-Oct	1.2	0.2	-0.1	-0.4	0.2	0.3	0.1	0.2	0.2	0.4	0.7	0.9	1.1	1.9	3.4	4.8	4.1	1.7	0.4	0.3	0.2	-0.3	-0.7	-1.2	0.8	4.8
22-Oct	-1.6	-2.1	-2.7	-3.1	-3.6	-4.3	-4.3	-4.5	-4.2	-3.3	-2.6	-2.1	-1.5	-1.0	-0.6	-0.5	-0.2	-0.3	-0.8	-1.1	-1.1	-1.0	-0.8	-0.3	-2.0	-0.2
23-Oct	0.1	0.5	1.8	3.1	3.7	3.3	2.6	2.5	2.4	3.0	3.8	4.8	5.8	7.3	8.8	9.8	9.2	8.7	8.5	7.6	7.0	5.5	4.8	5.0	5.0	9.8
24-Oct	5.6	5.7	4.9	5.8	8.9	9.4	8.3	8.0	10.7	12.3	13.1	12.3	10.5	9.1	8.0	7.5	6.6	5.8	5.0	3.8	2.8	2.3	1.2	0.8	7.0	13.1
25-Oct	0.7	0.7	0.7	0.6	0.2	0.0	0.0	-0.3	-0.4	-0.2	0.1	0.4	0.7	1.1	1.2	1.3	1.3	0.9	0.8	0.7	0.7	0.7	0.8	0.7	0.5	1.3
26-Oct	-0.2	-0.8	-0.6	-0.5	-0.6	-0.7	-0.6	-0.9	-0.8	-0.5	0.2	1.0	1.9	2.2	2.6	3.0	3.1	2.8	2.4	2.1	2.0	1.3	1.0	1.0	0.9	3.1
27-Oct	0.6	0.3	0.0	0.1	0.1	0.2	-0.2	-0.4	-0.1	0.5	1.7	3.2	4.4	5.5	6.2	6.5	6.4	5.9	6.1	6.1	6.0	6.0	6.0	6.0	3.2	6.5
28-Oct	5.2	5.0	5.3	6.5	6.9	7.4	8.1	8.8	8.9	9.4	10.8	11.8	11.8	11.6	11.1	10.4	9.8	8.5	7.0	6.1	5.9	5.8	5.6	5.2	8.0	11.8
29-Oct	4.4	4.2	3.7	3.3	2.8	1.6	0.4	0.0	-0.8	-0.7	-0.8	-0.3	0.5	0.8	1.2	0.8	0.6	0.3	0.1	0.0	0.1	0.3	0.5	1.1	1.0	4.4
30-Oct	1.2	1.3	0.7	0.5	0.1	-0.2	-0.3	-0.4	-0.5	-0.4	0.1	0.4	0.9	1.8	2.2	2.3	1.9	1.1	0.5	-0.2	-1.0	-1.5	-1.9	-1.9	0.3	2.3
31-Oct	-2.0	-2.1	-2.2	-2.2	-2.3	-2.3	-2.2	-1.9	-1.6	-1.3	-0.9	-0.4	0.1	0.3	0.5	0.6	0.2	0.2	0.1	0.1	0.1	-0.8	-1.7	-2.4	-1.0	0.6
																								Diurnal Average		
																								Diurnal Maximum		
3.5 3.2 2.9 2.8 2.6 2.3 2.2 2.1 2.4 2.9 3.6 4.4 5.0 5.7 6.2 6.3 6.1 5.6 5.0 4.6 4.2 3.8 3.4 3.2																										
13.5 13.5 13.1 13.4 12.6 12.0 11.5 11.9 13.1 14.7 15.2 16.1 18.4 21.6 22.7 23.4 23.6 22.3 20.4 18.8 17.2 15.9 15.1 14.4																										
M - Maintenance AF - Analyzer Failure																										



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature 45 m (AT45m) - C**  
**Lower Camp Met Tower - October 2017**







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature 45 m (AT45m) - C  
Lower Camp Met Tower - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	125	17.56	17.56
0 - 10	510	71.63	89.19
10 - 20	71	9.97	99.16
> 20	6	0.84	100.00

Total Number of Valid Hours: 712

Total Number of Hours: 744

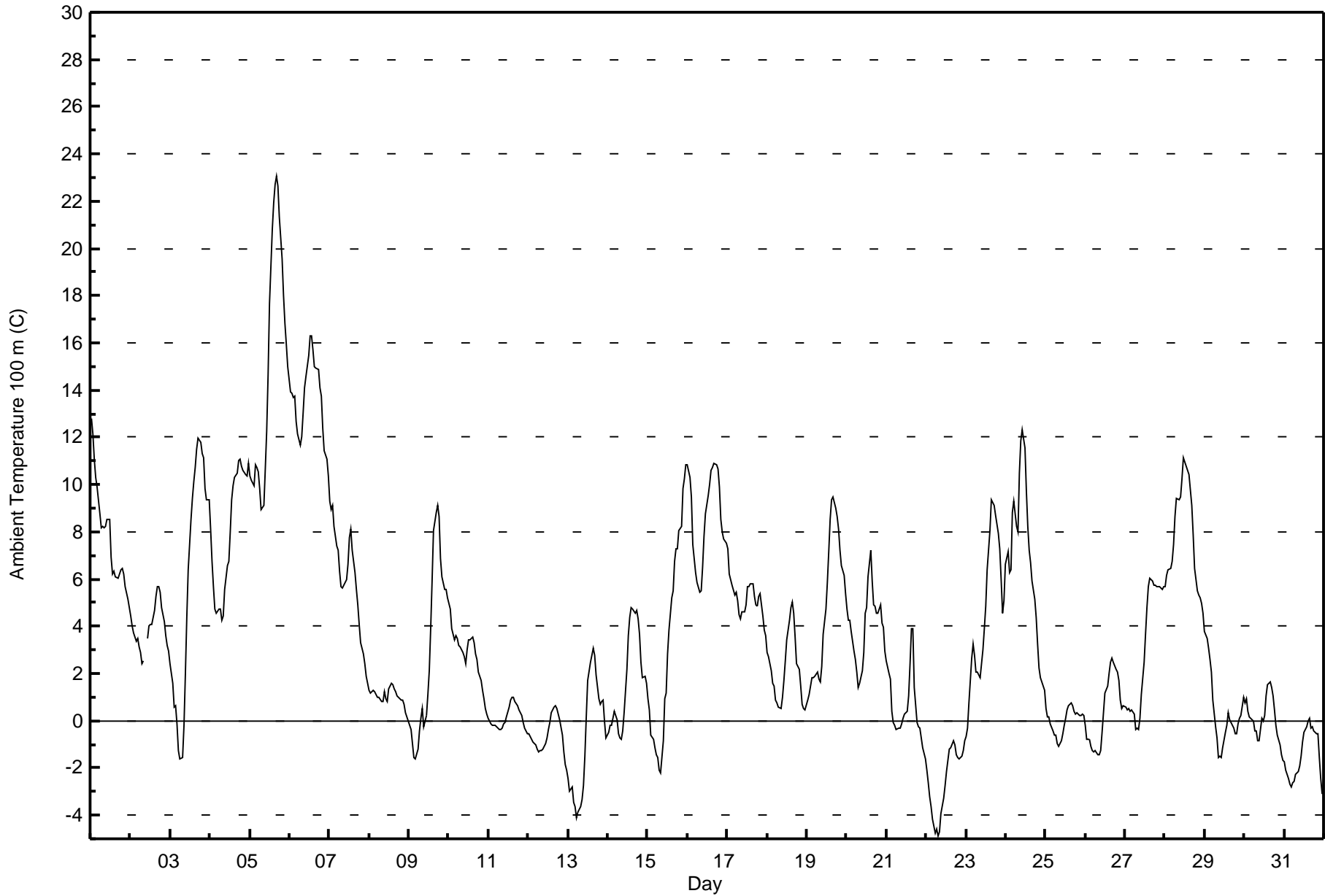


Maximum Value: 23.1 C on Oct 5 17:00		Maximum Daily Average: 15.1 C on Oct 5		Hours in Service: 744																						
Minimum Value: -4.9 C on Oct 22 08:00		Minimum Daily Average: -2.5 C on Oct 22		Hours of Data: 743																						
Maximum Diurnal Average: 5.8 C at hour 16		Minimum Diurnal Average: 1.9 C at hour 8		Hours of Missing Data: 1																						
Monthly Average: 3.71 C		Percentiles: P <sub>1</sub> = -3.9 P <sub>10</sub> = -1.2 Q <sub>1</sub> = 0.1 Median = 2.6 Q <sub>3</sub> = 6.4 P <sub>90</sub> = 10.3 P <sub>99</sub> = 18.4		Hours of Calibration: 0																						
				Percent Operational Time: 99.9																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	12.8	12.1	11.1	10.3	9.9	8.8	8.2	8.2	8.2	8.2	8.5	8.5	6.9	6.2	6.4	6.1	6.0	6.2	6.4	6.4	6.2	5.7	5.2	4.8	7.8	12.8
2-Oct	4.4	4.0	3.7	3.4	3.5	3.1	2.9	2.4	2.5	M	3.5	4.0	4.1	4.1	4.7	5.3	5.7	5.7	5.5	4.8	4.2	3.6	3.2	3.0	4.0	5.7
3-Oct	2.4	1.6	0.6	0.7	-0.1	-1.3	-1.6	-1.6	-0.2	2.0	4.4	6.4	8.5	9.4	10.1	10.7	11.5	12.0	11.8	11.3	11.1	9.8	9.4	9.3	5.8	12.0
4-Oct	8.1	6.7	5.7	4.7	4.5	4.7	4.7	4.2	4.4	5.5	6.5	6.7	8.0	9.3	9.9	10.3	10.5	11.0	11.1	10.8	10.6	10.4	10.4	10.9	7.9	11.1
5-Oct	10.3	10.2	10.0	10.8	10.7	10.5	9.8	8.9	9.1	10.7	12.3	14.6	17.6	20.8	22.0	22.7	23.1	22.6	21.3	19.6	18.0	16.8	15.9	15.0	15.1	23.1
6-Oct	13.9	13.9	13.7	13.7	12.7	12.1	11.7	12.0	13.0	14.1	14.6	15.5	16.3	16.3	15.7	15.0	14.9	14.9	14.1	13.7	12.4	11.4	11.1	10.4	13.6	16.3
7-Oct	9.3	8.9	9.1	8.2	7.4	7.2	6.3	5.7	5.6	5.9	5.9	6.6	7.8	8.1	7.2	6.3	5.6	4.9	4.1	3.3	2.8	2.4	1.9	1.6	5.9	9.3
8-Oct	1.3	1.2	1.3	1.2	1.1	1.0	1.0	0.8	0.8	1.2	0.9	0.8	1.3	1.6	1.6	1.4	1.2	1.1	0.9	0.9	0.9	0.7	0.3	0.0	1.0	1.6
9-Oct	-0.2	-0.4	-1.0	-1.6	-1.6	-1.2	-0.4	0.1	0.5	-0.3	0.2	1.1	2.1	3.9	5.9	8.1	8.8	9.1	8.6	6.8	6.1	5.6	5.6	5.2	3.0	9.1
10-Oct	5.0	4.7	3.9	3.4	3.6	3.5	3.2	3.1	2.9	2.7	2.4	3.0	3.4	3.4	3.5	3.3	2.9	2.6	2.0	1.7	1.3	0.9	0.5	0.3	2.8	5.0
11-Oct	0.1	-0.1	-0.2	-0.2	-0.2	-0.3	-0.3	-0.4	-0.3	-0.1	-0.1	0.2	0.6	0.9	1.0	1.0	0.8	0.7	0.5	0.3	0.2	-0.1	-0.3	-0.5	0.1	1.0
12-Oct	-0.6	-0.7	-0.8	-0.9	-1.0	-1.2	-1.3	-1.3	-1.3	-1.2	-1.0	-0.7	-0.4	0.0	0.3	0.6	0.6	0.5	0.3	0.0	-0.6	-1.3	-1.9	-2.1	-0.7	0.6
13-Oct	-2.4	-3.0	-2.8	-3.4	-3.6	-4.1	-3.9	-3.6	-3.3	-2.7	-1.5	0.1	1.7	2.5	2.8	3.0	2.8	1.9	0.9	0.7	0.8	0.9	0.0	-0.7	-0.7	3.0
14-Oct	-0.5	-0.2	-0.2	0.1	0.4	0.0	-0.6	-0.7	-0.8	-0.4	0.3	2.2	3.6	4.4	4.8	4.7	4.5	4.7	4.3	3.7	2.5	1.8	1.9	1.6	1.8	4.8
15-Oct	0.9	0.4	-0.6	-0.8	-1.2	-1.4	-1.6	-2.1	-2.2	-0.8	0.9	1.2	2.8	3.8	5.2	5.5	6.8	7.3	7.3	8.0	8.2	9.8	10.2	10.8	3.3	10.8
16-Oct	10.9	10.3	9.5	7.5	6.9	6.3	5.9	5.4	5.5	6.5	7.8	8.7	9.5	10.0	10.6	10.7	10.9	10.9	10.6	9.9	8.5	8.0	7.7	7.5	8.6	10.9
17-Oct	7.3	6.2	6.0	5.7	5.3	5.5	5.1	4.5	4.3	4.6	4.6	4.9	5.7	5.7	5.8	5.8	5.3	4.9	4.9	5.2	5.4	4.4	3.8	3.6	5.2	7.3
18-Oct	2.9	2.7	2.1	1.6	1.5	0.9	0.8	0.6	0.5	1.0	1.7	2.5	3.4	4.3	4.8	5.0	4.6	3.5	2.4	2.2	1.5	0.7	0.5	0.5	2.2	5.0
19-Oct	0.9	1.1	1.5	1.8	1.8	1.9	2.0	1.8	1.6	2.3	3.6	4.8	5.9	7.2	8.5	9.3	9.5	9.0	8.7	8.1	7.2	6.6	6.2	5.4	4.9	9.5
20-Oct	4.7	4.2	4.3	3.8	2.9	2.6	2.1	1.4	1.6	2.1	2.9	4.5	4.8	6.1	7.2	5.9	4.9	4.9	4.5	4.6	4.9	4.1	4.0	3.0	4.0	7.2
21-Oct	2.5	2.0	1.8	0.4	-0.1	-0.2	-0.4	-0.3	-0.3	-0.2	0.1	0.3	0.4	1.1	2.4	3.9	3.9	1.4	-0.1	-0.2	-0.3	-0.7	-1.1	-1.6	0.6	3.9
22-Oct	-2.1	-2.6	-3.2	-3.7	-4.2	-4.8	-4.6	-4.9	-4.7	-4.0	-3.3	-2.7	-2.1	-1.7	-1.2	-1.1	-0.9	-1.0	-1.4	-1.6	-1.6	-1.5	-1.3	-0.8	-2.5	-0.8
23-Oct	-0.6	-0.3	0.7	2.6	3.2	2.8	2.1	2.0	1.8	2.4	3.0	3.9	4.9	6.4	8.1	9.3	9.2	9.1	8.7	7.9	7.3	5.9	4.5	5.1	4.6	9.3
24-Oct	6.6	7.2	6.3	6.4	8.8	9.3	8.2	8.0	10.5	11.8	12.3	11.6	9.7	8.2	7.2	6.7	5.9	5.2	4.4	3.2	2.3	1.8	1.5	1.3	6.8	12.3
25-Oct	0.5	0.2	0.2	-0.1	-0.5	-0.6	-0.6	-1.0	-1.1	-0.9	-0.6	-0.2	0.1	0.5	0.6	0.8	0.6	0.4	0.3	0.4	0.2	0.2	0.3	0.2	0.0	0.8
26-Oct	-0.2	-0.8	-0.8	-1.1	-1.2	-1.3	-1.3	-1.5	-1.4	-1.2	-0.5	0.3	1.2	1.5	2.0	2.5	2.6	2.5	2.2	2.0	1.7	0.9	0.5	0.6	0.4	2.6
27-Oct	0.6	0.4	0.5	0.4	0.5	0.3	-0.3	-0.3	-0.4	0.1	1.1	2.5	3.6	4.8	5.7	6.0	5.9	5.7	5.8	5.7	5.7	5.7	5.5	5.7	3.0	6.0
28-Oct	5.7	6.2	6.4	6.5	6.8	7.4	8.6	9.4	9.3	9.5	10.2	11.2	11.0	10.8	10.4	9.7	9.1	7.9	6.4	5.5	5.3	5.2	4.9	4.5	7.8	11.2
29-Oct	3.8	3.5	3.0	2.6	2.1	0.9	-0.3	-0.7	-1.5	-1.5	-1.6	-1.2	-0.5	-0.2	0.3	0.0	-0.1	-0.3	-0.5	-0.5	-0.1	0.1	0.2	1.0	0.4	3.8
30-Oct	0.7	0.9	0.4	0.2	0.0	0.0	-0.4	-0.4	-0.9	-0.9	0.1	0.0	0.2	1.1	1.5	1.6	1.4	1.0	0.4	-0.2	-0.6	-1.0	-1.4	-1.7	0.1	1.6
31-Oct	-1.7	-2.1	-2.5	-2.7	-2.8	-2.6	-2.5	-2.3	-2.2	-1.9	-1.5	-0.9	-0.5	-0.3	0.0	0.1	-0.3	-0.3	-0.4	-0.5	-0.6	-1.5	-2.4	-3.1	-1.5	0.1
																								Diurnal Average		
																								Diurnal Maximum		
M - Maintenance																										



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature 100 m (AT100m) - C**  
**Lower Camp Met Tower - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature 100 m (AT100m) - C  
Lower Camp Met Tower - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	180	24.23	24.23
0 - 10	481	64.74	88.96
10 - 20	76	10.23	99.19
> 20	6	0.81	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744

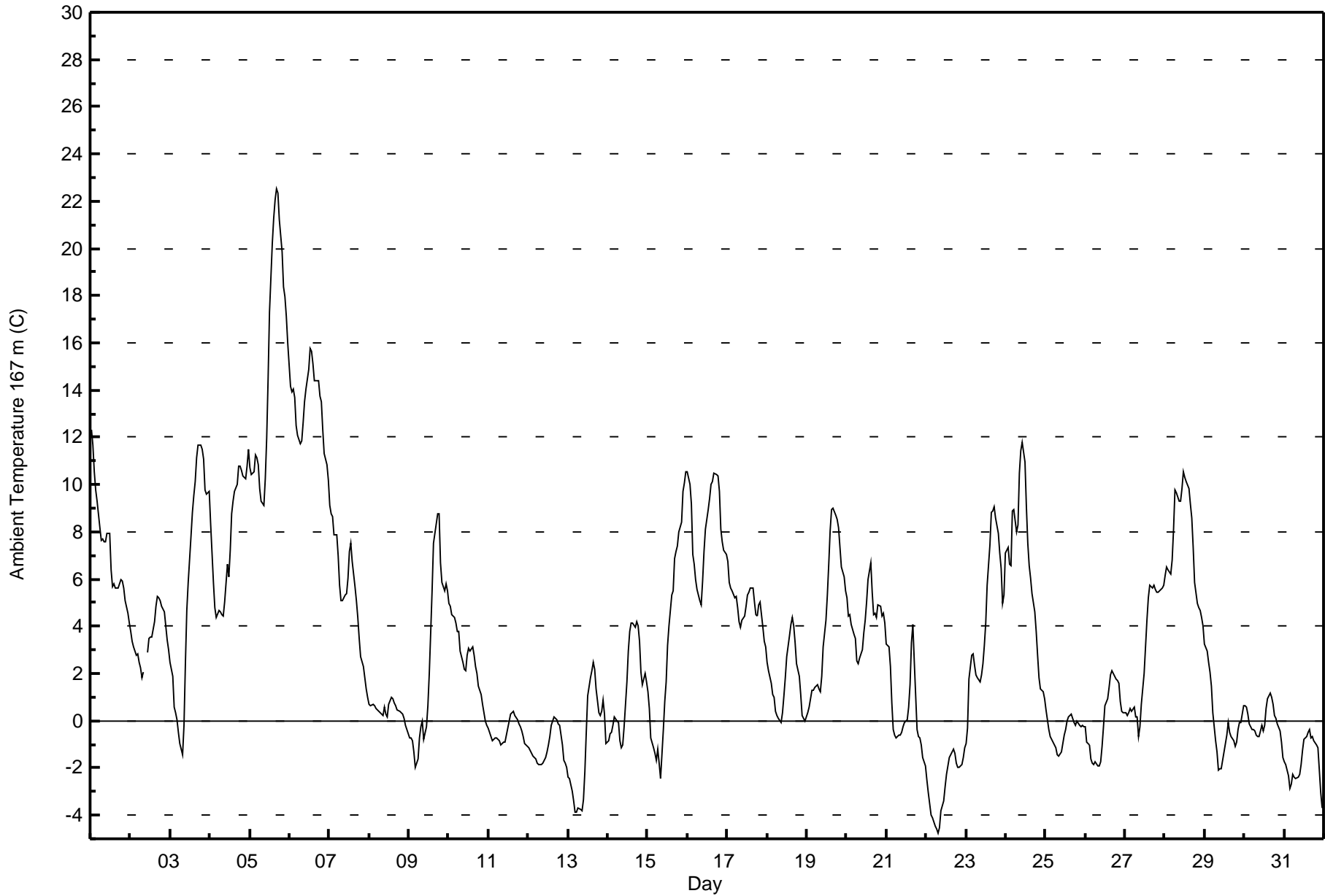


Maximum Value: 22.5 C on Oct 5 17:00		Maximum Daily Average: 15.3 C on Oct 5		Hours in Service: 744																																												
Minimum Value: -4.8 C on Oct 22 08:00		Minimum Daily Average: -2.7 C on Oct 22		Hours of Data: 743																																												
Maximum Diurnal Average: 5.3 C at hour 16		Minimum Diurnal Average: 1.7 C at hour 8		Hours of Missing Data: 1																																												
Monthly Average: 3.44 C		Percentiles: P <sub>1</sub> = -3.9 P <sub>10</sub> = -1.5 Q <sub>1</sub> = -0.3 Median = 2.4 Q <sub>3</sub> = 6.0 P <sub>90</sub> = 10.1 P <sub>99</sub> = 19.5		Hours of Calibration: 0																																												
				Percent Operational Time: 99.9																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	12.3	11.7	10.6	9.8	9.3	8.2	7.6	7.7	7.6	7.6	7.9	7.9	6.4	5.7	5.8	5.6	5.6	5.8	6.0	5.9	5.6	5.1	4.6	4.1	7.3	12.3																						
2-Oct	3.8	3.4	3.1	2.8	2.8	2.5	2.3	1.8	2.0	M	2.9	3.5	3.5	3.6	4.2	4.9	5.3	5.2	5.1	4.8	4.6	4.0	3.4	3.0	3.6	5.3																						
3-Oct	2.5	1.9	0.6	0.3	0.1	-0.5	-0.9	-1.4	-0.2	2.4	4.7	5.8	7.8	8.8	9.5	10.2	11.1	11.7	11.7	11.5	11.1	9.7	9.6	9.7	5.7	11.7																						
4-Oct	8.4	7.1	5.9	4.8	4.4	4.7	4.6	4.5	4.5	5.0	6.6	6.1	7.2	8.7	9.3	9.7	10.0	10.8	10.8	10.6	10.4	10.2	10.8	11.5	7.8	11.5																						
5-Oct	10.7	10.5	10.5	11.3	11.1	10.8	9.8	9.3	9.1	10.3	11.9	14.5	17.3	20.2	21.3	22.1	22.5	22.3	21.2	19.8	18.4	18.0	17.1	16.0	15.3	22.5																						
6-Oct	14.2	13.9	14.1	13.7	12.5	12.1	11.7	11.8	12.6	13.5	14.0	14.9	15.7	15.7	15.1	14.4	14.4	14.4	13.7	13.5	12.3	11.3	10.9	10.2	13.4	15.7																						
7-Oct	9.1	8.7	8.6	7.9	7.8	7.0	5.7	5.1	5.1	5.3	5.4	6.1	7.2	7.5	6.7	5.7	5.1	4.4	3.5	2.7	2.3	1.8	1.3	1.0	5.5	9.1																						
8-Oct	0.7	0.7	0.7	0.6	0.5	0.4	0.4	0.3	0.2	0.6	0.3	0.2	0.7	1.0	0.9	0.8	0.6	0.5	0.4	0.3	0.3	0.1	-0.2	-0.6	0.4	1.0																						
9-Oct	-0.7	-0.7	-0.9	-1.3	-1.9	-1.6	-0.7	-0.3	0.0	-0.8	-0.3	0.6	2.0	3.7	5.5	7.5	8.3	8.8	8.8	6.7	5.8	5.5	5.8	5.5	2.7	8.8																						
10-Oct	5.0	4.8	4.5	4.4	4.2	3.8	3.8	3.0	2.5	2.2	2.1	2.8	3.1	2.9	3.1	2.8	2.3	2.0	1.4	1.1	0.7	0.4	0.0	-0.2	2.6	5.0																						
11-Oct	-0.3	-0.7	-0.8	-0.8	-0.7	-0.7	-0.9	-1.0	-1.0	-0.9	-0.9	-0.6	0.0	0.3	0.3	0.4	0.2	0.0	-0.1	-0.3	-0.4	-0.7	-0.9	-1.1	-0.5	0.4																						
12-Oct	-1.2	-1.3	-1.4	-1.5	-1.6	-1.8	-1.9	-1.8	-1.8	-1.8	-1.6	-1.3	-1.0	-0.7	-0.2	0.2	0.1	0.0	-0.1	-0.2	-1.0	-1.7	-1.8	-2.0	-1.1	0.2																						
13-Oct	-2.4	-2.4	-3.0	-3.4	-3.9	-3.9	-3.7	-3.7	-3.8	-3.3	-2.2	-0.5	1.0	1.8	2.1	2.4	2.2	1.3	0.4	0.2	0.4	0.9	0.3	-1.0	-1.0	2.4																						
14-Oct	-0.9	-0.6	-0.5	-0.2	0.2	0.0	-0.1	-0.8	-1.2	-1.0	-0.2	1.6	2.9	3.8	4.2	4.1	4.0	4.2	4.0	3.3	2.0	1.6	2.0	1.6	1.4	4.2																						
15-Oct	1.2	0.5	-0.7	-1.1	-1.4	-1.7	-1.2	-1.8	-2.4	-0.4	0.8	1.6	3.2	4.0	5.3	5.5	6.9	7.2	7.4	8.0	8.4	9.7	10.1	10.5	3.3	10.5																						
16-Oct	10.5	10.0	9.2	7.0	6.6	6.0	5.5	5.1	4.9	5.9	7.1	8.1	8.9	9.4	10.0	10.2	10.5	10.4	10.4	9.7	8.1	7.6	7.2	7.0	8.1	10.5																						
17-Oct	6.7	5.8	5.6	5.5	5.2	5.3	4.8	4.2	4.0	4.3	4.5	4.9	5.3	5.5	5.6	5.6	5.1	4.5	4.4	4.9	5.0	4.0	3.4	3.1	4.9	6.7																						
18-Oct	2.5	2.1	1.6	1.1	1.0	0.4	0.2	0.1	-0.1	0.4	1.1	1.8	2.7	3.6	4.1	4.4	4.0	3.3	2.4	1.9	1.1	0.2	0.1	0.0	1.7	4.4																						
19-Oct	0.4	0.6	1.0	1.3	1.3	1.4	1.5	1.3	1.2	1.9	3.1	4.2	5.3	6.7	8.1	8.9	9.0	8.7	8.5	8.2	7.3	6.5	6.1	5.5	4.5	9.0																						
20-Oct	5.2	4.4	4.5	4.1	3.7	3.5	2.5	2.4	2.7	3.0	3.7	4.2	5.0	6.0	6.7	5.4	4.5	4.6	4.4	4.9	4.8	4.4	4.5	4.1	4.3	6.7																						
21-Oct	3.2	3.1	2.3	0.7	-0.4	-0.6	-0.7	-0.6	-0.6	-0.5	-0.3	-0.1	0.0	0.6	1.5	3.3	4.1	2.5	-0.4	-0.7	-0.7	-1.1	-1.5	-1.9	0.5	4.1																						
22-Oct	-2.5	-3.0	-3.5	-4.0	-4.1	-4.4	-4.6	-4.8	-4.5	-3.8	-3.4	-2.8	-2.2	-1.9	-1.6	-1.5	-1.2	-1.4	-1.8	-2.0	-2.0	-1.8	-1.5	-1.2	-2.7	-1.2																						
23-Oct	-1.0	-0.3	1.8	2.8	2.8	2.4	1.9	1.8	1.7	1.9	2.4	3.2	4.1	5.7	7.5	8.8	8.9	9.1	8.6	7.9	7.1	6.5	5.0	5.3	4.4	9.1																						
24-Oct	7.1	7.3	6.6	6.6	8.9	9.0	8.0	8.3	10.5	11.4	11.8	11.0	9.0	7.5	6.6	6.0	5.4	4.6	3.8	2.8	1.8	1.3	1.2	0.9	6.6	11.8																						
25-Oct	0.4	0.1	-0.4	-0.7	-0.9	-1.0	-1.1	-1.4	-1.5	-1.3	-1.0	-0.6	-0.4	0.0	0.2	0.3	0.1	-0.1	-0.2	0.0	-0.2	-0.2	-0.2	-0.2	-0.4	0.4																						
26-Oct	-0.3	-0.9	-1.0	-1.6	-1.8	-1.9	-1.7	-1.9	-1.9	-1.8	-1.1	-0.3	0.6	1.0	1.4	1.9	2.1	2.0	1.8	1.7	1.6	0.8	0.4	0.3	0.0	2.1																						
27-Oct	0.3	0.2	0.3	0.5	0.4	0.6	0.2	0.2	-0.7	-0.2	0.7	2.0	3.1	4.2	5.2	5.7	5.6	5.7	5.6	5.4	5.4	5.5	5.6	5.7	2.8	5.7																						
28-Oct	6.2	6.5	6.4	6.2	6.8	8.1	9.8	9.7	9.3	9.3	9.8	10.6	10.3	10.1	9.8	9.2	8.6	7.3	5.8	5.0	4.8	4.7	4.4	4.0	7.6	10.6																						
29-Oct	3.2	2.9	2.5	2.1	1.5	0.3	-0.8	-1.3	-2.1	-2.1	-2.1	-1.7	-0.9	-0.6	-0.1	-0.5	-0.6	-0.9	-1.1	-0.9	-0.4	-0.1	-0.1	0.6	-0.1	3.2																						
30-Oct	0.6	0.6	0.3	-0.2	-0.4	-0.4	-0.5	-0.6	-0.7	-0.7	-0.2	-0.4	-0.2	0.5	0.9	1.2	1.0	0.7	0.2	0.1	-0.1	-0.4	-0.9	-1.6	0.0	1.2																						
31-Oct	-1.8	-1.9	-2.3	-2.9	-2.7	-2.3	-2.4	-2.5	-2.4	-2.3	-1.8	-1.3	-0.8	-0.7	-0.5	-0.4	-0.8	-0.7	-0.8	-1.0	-1.1	-2.1	-3.0	-3.7	-1.7	-0.4																						
																								3.3	3.1	2.8	2.4	2.3	2.1	1.9	1.7	1.7	2.1	2.8	3.4	4.1	4.7	5.1	5.3	5.3	5.1	4.7	4.4	4.0	3.6	3.3	3.1	Diurnal Average
																								14.2	13.9	14.1	13.7	12.5	12.1	11.7	11.8	12.6	13.5	14.0	14.9	17.3	20.2	21.3	22.1	22.5	22.3	21.2	19.8	18.4	18.0	17.1	16.0	Diurnal Maximum
M - Maintenance																																																



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature 167 m (AT167m) - C**  
**Lower Camp Met Tower - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature 167 m (AT167m) - C  
Lower Camp Met Tower - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	218	29.34	29.34
0 - 10	450	60.57	89.91
10 - 20	69	9.29	99.19
> 20	6	0.81	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity 20m (RH20m) - %

Lower Camp Met Tower - October 2017

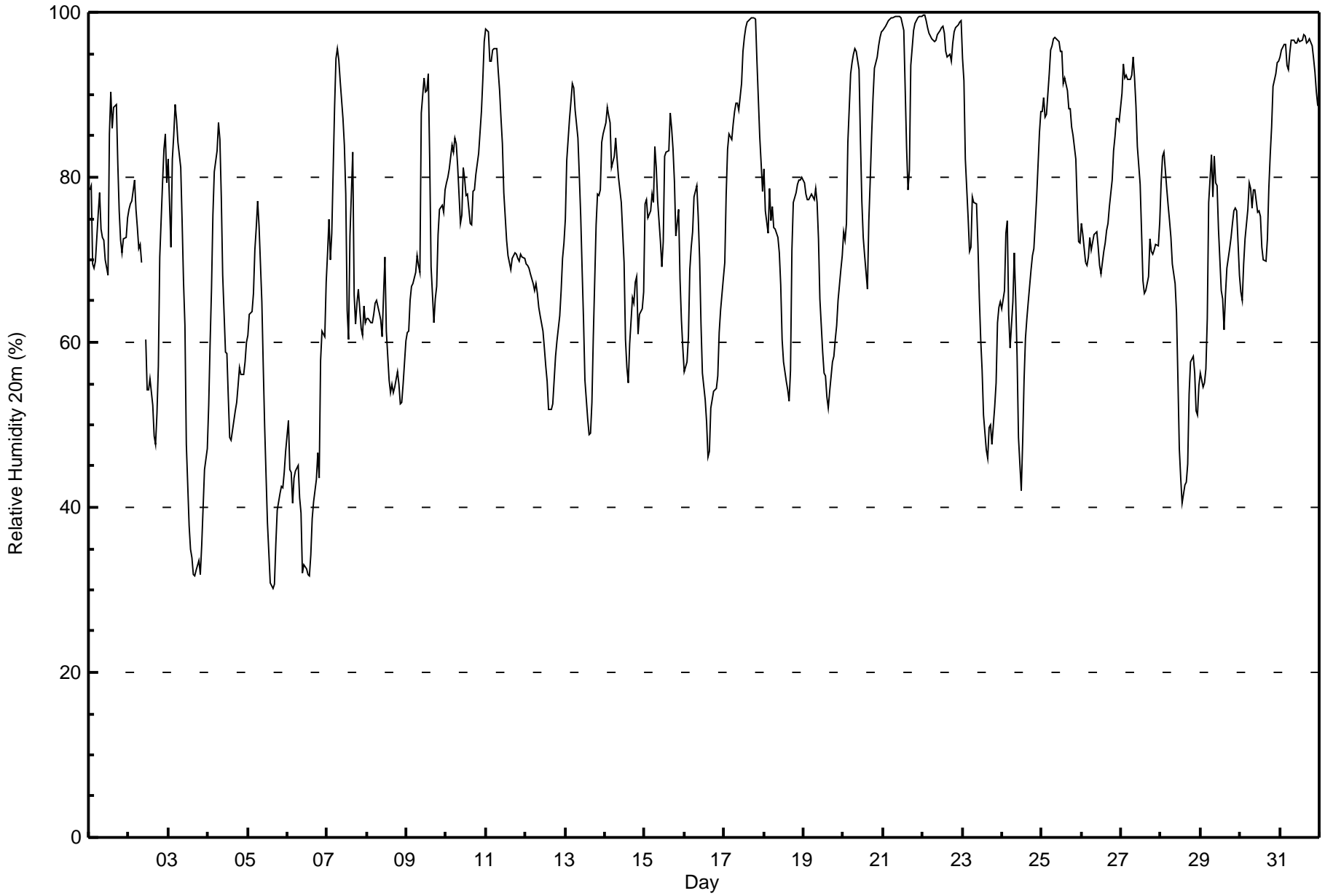
Maximum Value: 100 % on Oct 22 02:00																			Maximum Daily Average: 97.3 % on Oct 22						Hours in Service: 744	
Minimum Value: 30 % on Oct 5 16:00																			Minimum Daily Average: 43.7 % on Oct 6						Hours of Data: 743	
Maximum Diurnal Average: 81.2 % at hour 7																			Minimum Diurnal Average: 64.0 % at hour 15						Hours of Missing Data: 1	
Monthly Average: 72.9 %																			Percentiles: P <sub>1</sub> = 32 P <sub>10</sub> = 51 Q <sub>1</sub> = 62 Median = 73 Q <sub>3</sub> = 85 P <sub>90</sub> = 95 P <sub>99</sub> = 99						Hours of Calibration: 0	
																									Percent Operational Time: 99.9	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	78	79	70	69	70	76	78	74	73	72	70	68	85	90	86	88	89	82	76	72	71	73	73	75	76.5	90
2-Oct	76	77	77	80	76	74	71	72	70	M	60	54	54	56	52	49	48	51	57	70	79	83	85	79	67.5	85
3-Oct	82	72	82	85	89	87	84	81	75	67	62	48	38	35	34	32	32	34	32	35	40	44	47	56.2	89	
4-Oct	52	60	67	75	81	83	87	85	78	68	59	59	53	49	48	49	52	53	55	57	56	56	58	60	62.4	87
5-Oct	61	63	64	66	71	74	77	74	65	57	50	44	38	31	30	30	31	36	40	42	42	42	44	47	50.8	77
6-Oct	51	45	44	41	44	44	45	41	39	32	33	33	32	32	34	39	41	43	47	44	58	61	61	67	43.7	67
7-Oct	71	75	70	73	88	94	96	94	92	87	84	78	64	60	73	83	66	62	65	67	62	61	64	62	74.6	96
8-Oct	63	63	62	62	63	65	65	64	63	61	66	70	61	56	54	55	54	55	57	55	53	53	55	60	59.7	70
9-Oct	61	61	65	67	67	69	71	69	69	88	92	90	90	92	82	69	62	65	67	73	76	77	76	79	74.0	92
10-Oct	79	80	81	84	83	85	84	81	74	75	81	80	78	78	74	74	78	78	80	83	85	88	92	96	81.4	96
11-Oct	98	98	94	94	95	96	96	93	90	87	84	78	72	70	70	69	70	71	71	70	70	71	70	70	81.1	98
12-Oct	70	69	69	68	67	66	67	66	64	63	61	59	57	55	52	52	53	55	58	60	63	66	70	72	62.7	72
13-Oct	75	82	87	89	91	91	88	85	80	75	69	63	55	51	49	49	53	61	74	78	78	78	84	85	73.8	91
14-Oct	87	89	87	87	81	82	85	82	80	78	77	70	60	57	55	60	65	65	67	68	61	63	64	66	72.4	89
15-Oct	77	77	75	76	78	77	84	81	77	72	69	72	83	83	83	88	86	83	79	73	76	68	63	59	76.7	88
16-Oct	56	58	61	69	72	73	78	79	75	70	62	56	53	50	46	47	52	54	54	54	56	61	64	68	61.2	79
17-Oct	70	78	83	85	85	86	88	89	89	88	91	95	97	98	99	99	99	99	99	99	94	85	82	78	89.9	99
18-Oct	81	76	73	79	75	76	74	74	73	71	67	60	58	55	54	53	57	71	77	78	79	80	80	80	70.8	81
19-Oct	79	78	77	77	78	78	77	79	77	73	65	59	56	56	53	52	54	58	58	60	62	65	69	71	67.1	79
20-Oct	73	72	74	84	92	94	95	96	95	93	85	77	73	71	67	75	80	85	90	93	94	96	97	98	85.3	98
21-Oct	98	98	99	99	99	99	99	99	100	100	100	99	98	91	84	78	81	94	98	99	99	99	99	100	96.1	100
22-Oct	100	100	99	98	97	97	97	96	97	97	98	98	98	97	95	95	95	94	96	98	98	99	99	99	97.3	100
23-Oct	94	92	82	75	71	72	78	77	77	72	65	60	57	51	47	46	50	50	48	52	55	62	64	65	65.1	94
24-Oct	64	66	73	75	63	59	65	71	65	58	48	42	48	55	61	63	65	69	71	71	74	78	85	88	65.8	88
25-Oct	88	90	87	88	92	95	96	97	97	97	96	95	95	91	92	90	88	88	86	85	82	77	72	72	89.1	97
26-Oct	74	73	70	69	70	73	71	73	73	73	71	69	68	71	72	74	74	76	80	83	85	87	87	87	75.2	87
27-Oct	90	94	92	92	92	92	92	95	92	89	84	79	73	67	66	66	68	73	71	71	71	72	72	75	80.3	95
28-Oct	79	83	83	79	77	75	73	70	67	64	56	47	44	41	43	43	45	54	58	58	56	52	51	55	60.4	83
29-Oct	56	55	55	57	63	77	83	78	82	79	79	74	66	65	62	66	69	71	73	74	76	76	76	68	70.0	83
30-Oct	66	65	69	73	76	79	79	76	78	79	76	76	75	72	70	70	73	79	83	86	91	93	94	94	77.9	94
31-Oct	95	95	96	96	94	93	95	97	97	96	96	97	97	97	97	97	96	97	97	96	94	93	90	89	95.2	97
																			75.6 76.2 76.4 77.8 78.7 80.0 81.2 80.2 78.1 76.1 72.8 69.4 67.0 65.3 64.0 64.5 65.3 67.9 69.8 71.0 72.1 72.7 73.7 74.5						Diurnal Average	
																			100 100 99 99 99 99 99 99 100 100 100 99 98 98 99 99 99 99 99 99 99 99 99 100						Diurnal Maximum	
M - Maintenance																										





**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Relative Humidity 20m (RH20m) - %**  
**Lower Camp Met Tower - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Relative Humidity 20m (RH20m) - %  
Lower Camp Met Tower - October 2017**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	24	3.23	3.23
40 - 60	134	18.03	21.27
60 - 80	340	45.76	67.03
80 - 100	245	32.97	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Relative Humidity 45m (RH45m) - %

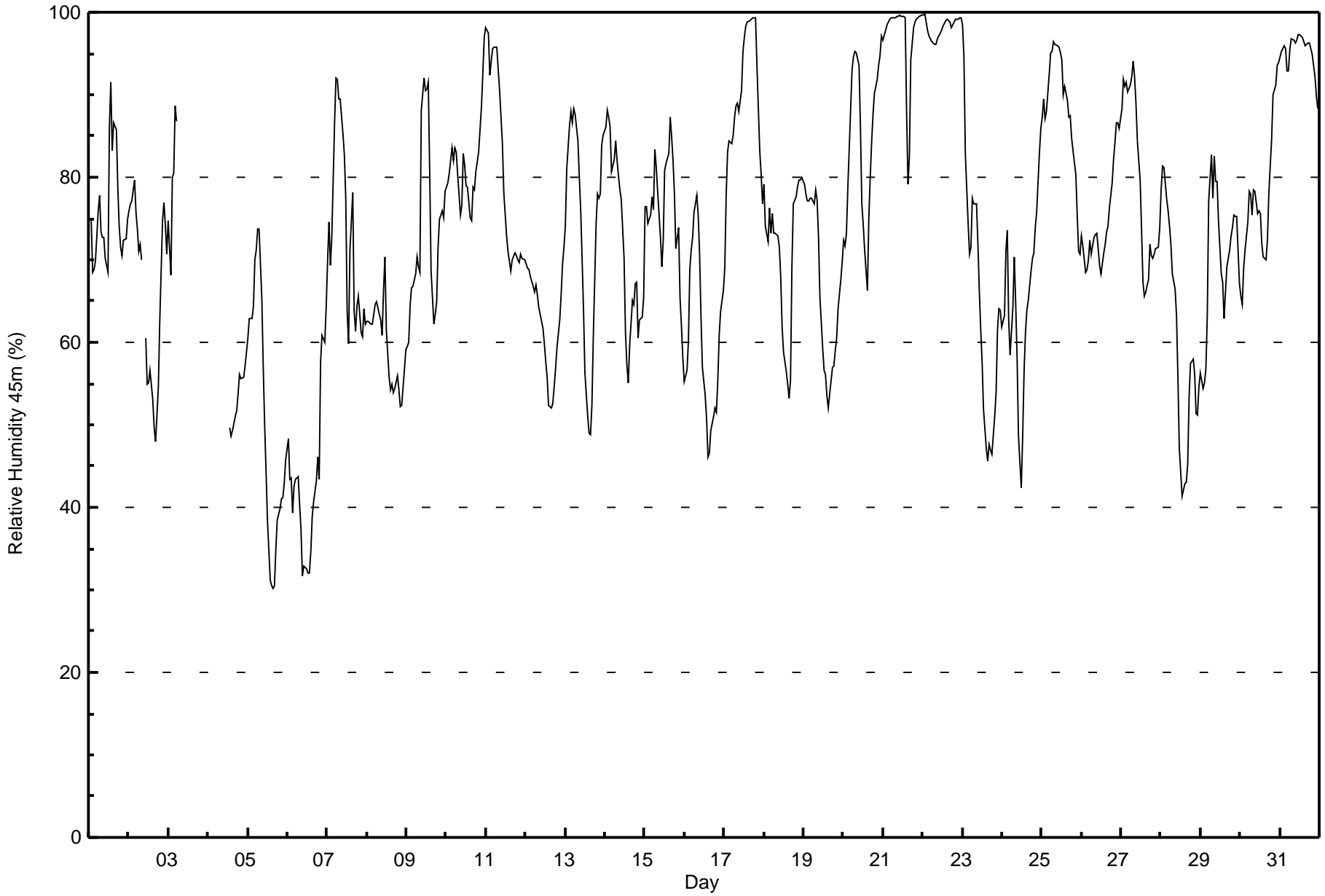
## Lower Camp Met Tower - October 2017

Maximum Value: 100 % on Oct 22 02:00																								Maximum Daily Average: 98.2 % on Oct 22																								Hours in Service: 744	
Minimum Value: 30 % on Oct 5 16:00																								Minimum Daily Average: 43.0 % on Oct 6																								Hours of Data: 712	
Maximum Diurnal Average: 80.2 % at hour 7																								Minimum Diurnal Average: 65.2 % at hour 15																								Hours of Missing Data: 32	
Monthly Average: 73.2 %																								Percentiles: P <sub>1</sub> = 32 P <sub>10</sub> = 52 Q <sub>1</sub> = 63 Median = 73 Q <sub>3</sub> = 85 P <sub>90</sub> = 96 P <sub>99</sub> = 99																								Hours of Calibration: 0	
Percent Operational Time: 95.7																																																	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	75	75	69	69	70	76	78	73	73	73	70	68	86	92	83	87	86	79	74	72	70	72	72	75	75.7	92																							
2-Oct	76	77	77	80	76	74	71	72	70	M	61	55	55	57	53	50	48	51	55	63	75	77	74	71	65.9	80																							
3-Oct	75	68	80	81	89	87	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	89																							
4-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	59																							
5-Oct	60	63	63	64	70	71	74	74	65	57	50	44	38	31	31	30	31	35	38	40	41	41	43	46	50.0	74																							
6-Oct	48	43	44	39	43	43	44	40	37	32	33	33	32	35	39	41	43	46	43	58	61	60	64	43.0	64																								
7-Oct	70	75	69	73	87	92	92	90	89	85	83	77	64	60	71	78	64	61	64	66	61	61	64	62	73.2	92																							
8-Oct	63	63	62	62	63	65	65	63	63	61	66	70	61	56	54	55	54	54	56	54	52	52	55	59	59.6	70																							
9-Oct	59	60	64	67	67	68	70	69	69	88	92	90	91	92	81	69	62	63	65	72	75	76	75	78	73.4	92																							
10-Oct	79	79	80	83	82	84	83	80	75	77	83	81	79	79	75	75	79	79	81	83	86	88	93	97	81.7	97																							
11-Oct	98	98	92	94	96	96	96	93	91	87	84	78	73	71	70	69	70	71	71	70	70	71	70	70	81.1	98																							
12-Oct	69	69	69	68	67	66	67	66	64	63	62	60	58	56	52	52	53	55	57	59	63	66	70	72	62.5	72																							
13-Oct	74	81	86	88	87	88	88	84	80	76	70	64	56	51	49	49	52	61	74	78	78	78	84	85	73.4	88																							
14-Oct	86	88	87	86	81	82	84	82	80	78	77	70	61	57	55	60	65	65	67	67	61	63	63	65	72.2	88																							
15-Oct	76	76	74	75	78	76	83	81	78	73	69	72	81	82	83	87	85	82	78	71	74	65	62	58	75.9	87																							
16-Oct	55	57	60	69	71	73	76	78	75	71	63	57	53	51	46	47	49	51	52	52	55	61	64	66	60.5	78																							
17-Oct	69	78	83	84	84	85	87	89	89	88	91	95	97	98	99	99	99	99	99	99	99	94	83	80	77	89.4	99																						
18-Oct	79	74	72	76	73	76	73	73	73	71	68	62	59	56	55	53	55	69	77	78	79	80	80	80	70.5	80																							
19-Oct	79	78	77	77	77	77	77	78	77	73	66	59	57	56	54	52	54	57	57	59	61	64	68	70	66.8	79																							
20-Oct	72	72	73	79	88	93	95	95	95	93	86	77	74	71	66	75	80	84	88	90	92	93	95	97	84.4	97																							
21-Oct	97	98	98	99	99	99	99	99	100	100	100	100	99	99	88	79	82	94	98	99	99	99	99	100	96.8	100																							
22-Oct	100	100	99	98	97	96	96	96	96	97	97	98	98	99	99	99	99	98	99	99	99	99	99	99	98.2	100																							
23-Oct	99	95	83	74	71	71	77	77	77	72	66	61	58	52	47	46	48	47	46	51	54	61	64	64	65.0	99																							
24-Oct	62	63	71	74	63	58	64	70	65	58	49	42	49	56	61	64	65	69	70	71	74	76	83	86	65.1	86																							
25-Oct	87	89	87	88	93	95	95	96	96	96	96	95	94	90	91	89	87	87	85	83	80	75	71	71	88.3	96																							
26-Oct	73	72	68	69	70	72	71	73	73	73	71	69	68	71	72	73	74	76	79	82	84	87	87	86	74.8	87																							
27-Oct	88	92	91	92	90	91	92	94	92	89	84	80	74	67	66	66	68	72	70	70	71	71	72	74	79.8	94																							
28-Oct	79	81	81	77	76	74	72	68	66	63	56	47	44	41	43	43	45	53	57	58	56	51	51	55	60.0	81																							
29-Oct	56	54	55	57	63	77	83	77	83	80	80	75	68	67	63	66	69	71	73	74	75	75	75	67	70.2	83																							
30-Oct	66	65	69	71	74	78	78	75	78	78	76	76	76	72	70	70	72	78	81	85	90	91	94	94	77.4	94																							
31-Oct	95	95	96	96	93	93	95	97	97	96	97	97	97	97	96	96	96	96	96	95	93	92	90	88	95.0	97																							
																								75.5	75.9	76.1	77.0	77.9	79.3	80.2	79.5	78.2	76.7	73.9	70.9	69.0	66.9	65.2	65.5	66.1	68.4	70.3	71.3	72.5	72.9	73.8	74.5	Diurnal Average	
																								100	100	99	99	99	99	99	99	100	100	100	100	100	99	99	99	99	99	99	99	99	99	100	Diurnal Maximum		
M - Maintenance																								AF - Analyzer Failure																									



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Relative Humidity 45m (RH45m) - %**  
**Lower Camp Met Tower - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Relative Humidity 45m (RH45m) - %  
Lower Camp Met Tower - October 2017**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	17	2.39	2.39
40 - 60	129	18.12	20.51
60 - 80	334	46.91	67.42
80 - 100	232	32.58	100.00

Total Number of Valid Hours: 712

Total Number of Hours: 744



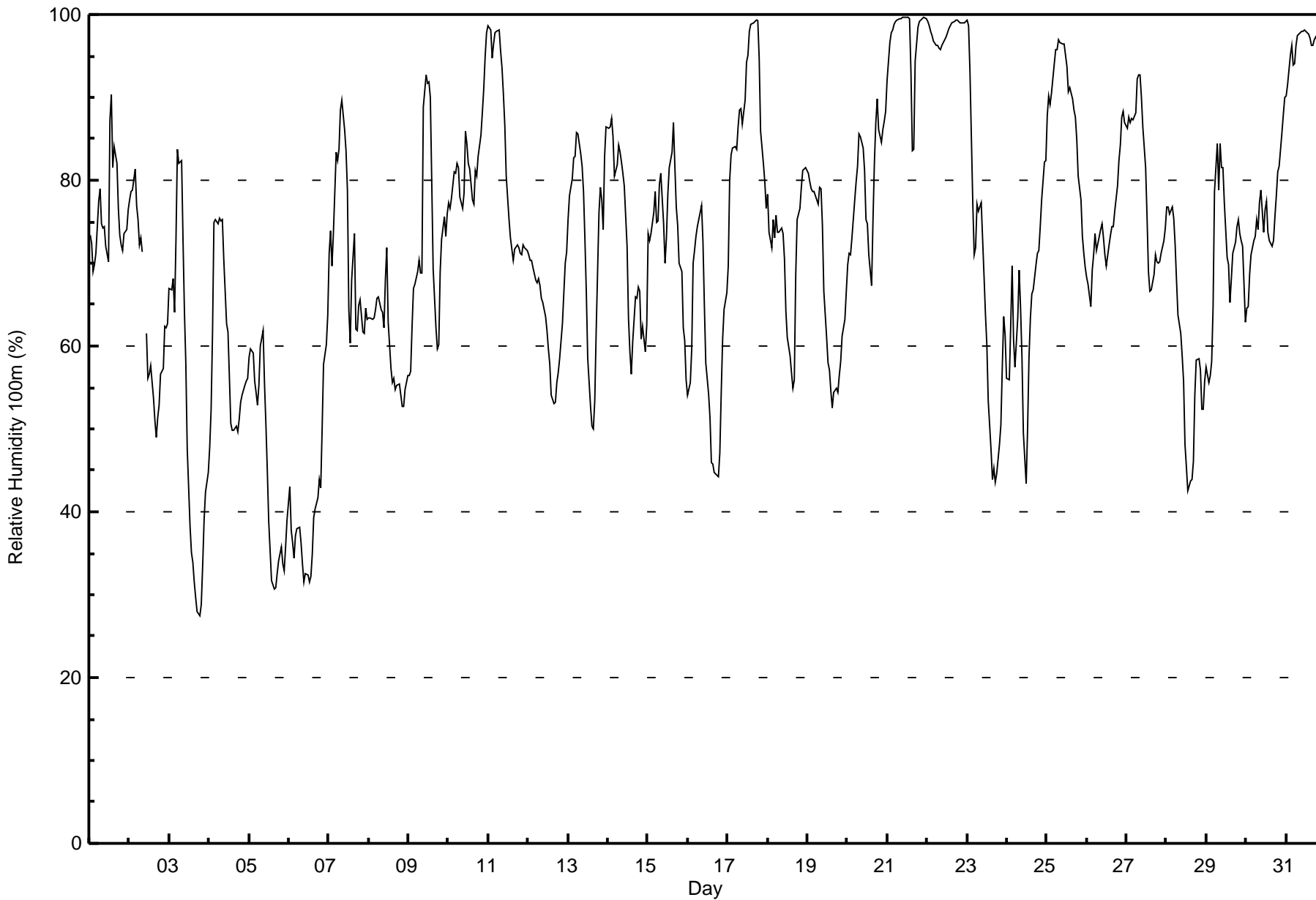
**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity 100m (RH100m) - %**

**Lower Camp Met Tower - October 2017**

Maximum Value: 100 % on Oct 21 23:00																			Maximum Daily Average: 98.0 % on Oct 22						Hours in Service: 744																			
Minimum Value: 27 % on Oct 3 19:00																			Minimum Daily Average: 40.4 % on Oct 6						Hours of Data: 743																			
Maximum Diurnal Average: 78.4 % at hour 8																			Minimum Diurnal Average: 65.0 % at hour 16						Hours of Missing Data: 1																			
Monthly Average: 71.8 %																			Percentiles: P <sub>1</sub> = 32 P <sub>10</sub> = 50 Q <sub>1</sub> = 61 Median = 73 Q <sub>3</sub> = 83 P <sub>90</sub> = 96 P <sub>99</sub> = 99						Hours of Calibration: 0																			
																									Percent Operational Time: 99.9																			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																				
1-Oct	73	72	69	70	71	77	79	75	74	74	72	70	87	90	81	84	82	77	73	72	72	74	74	76	75.9	90																		
2-Oct	78	79	79	81	77	75	72	73	71	M	61	56	57	58	54	51	49	51	53	57	57	62	62	63	64.2	81																		
3-Oct	67	67	68	64	73	84	82	82	73	64	58	48	38	35	34	32	30	28	27	29	34	39	42	45	51.8	84																		
4-Oct	48	52	61	75	75	75	75	75	75	71	63	62	56	51	50	50	50	50	51	53	54	55	56	56	60.0	75																		
5-Oct	59	60	59	56	54	53	55	60	62	55	50	45	39	32	31	31	31	33	34	36	34	33	36	39	44.8	62																		
6-Oct	43	38	36	34	37	38	38	36	34	32	32	32	32	32	35	39	40	42	44	43	50	58	60	64	40.4	64																		
7-Oct	71	74	70	74	83	82	84	88	90	86	84	79	64	60	68	74	62	62	65	66	62	61	65	63	72.4	90																		
8-Oct	63	63	63	63	64	66	66	64	64	62	68	72	63	57	56	56	55	55	55	54	53	53	55	56	60.3	72																		
9-Oct	56	57	62	67	67	69	70	69	69	89	93	92	92	90	80	69	62	60	60	69	73	76	73	76	72.5	93																		
10-Oct	77	77	78	81	81	82	81	78	77	79	86	84	82	81	78	77	81	81	83	85	88	91	95	98	82.5	98																		
11-Oct	99	98	95	96	98	98	98	96	94	90	87	81	75	73	72	70	72	72	72	71	71	72	72	71	83.0	99																		
12-Oct	71	70	70	69	68	68	68	67	66	65	64	62	60	58	54	53	53	56	57	58	63	66	70	71	63.7	71																		
13-Oct	75	78	80	83	83	86	86	83	82	79	73	66	58	53	50	50	53	62	76	79	78	74	83	86	73.2	86																		
14-Oct	86	86	87	85	80	82	84	83	82	81	79	72	63	59	57	61	66	66	67	67	61	62	59	63	72.5	87																		
15-Oct	74	73	74	76	79	75	75	80	81	75	70	73	78	81	83	87	82	77	75	70	69	62	61	56	74.3	87																		
16-Oct	54	56	60	70	71	73	74	76	77	73	65	58	54	51	46	46	45	44	44	47	54	61	64	66	59.6	77																		
17-Oct	70	80	83	84	84	84	87	89	89	87	90	94	95	98	99	99	99	99	99	99	95	86	82	80	77	88.6	99																	
18-Oct	78	74	72	75	73	76	74	74	74	74	71	64	61	59	57	55	56	69	75	77	79	81	81	82	71.2	82																		
19-Oct	81	80	79	79	79	78	77	79	79	75	67	61	58	57	55	53	54	55	54	56	58	61	63	67	66.8	81																		
20-Oct	70	71	71	73	78	80	82	86	85	84	81	75	75	71	67	75	82	87	90	86	85	86	87	88	79.8	90																		
21-Oct	92	97	98	98	99	99	99	99	100	100	100	100	100	99	93	84	84	94	98	99	99	99	100	100	97.0	100																		
22-Oct	99	99	98	97	97	96	96	96	96	96	97	97	98	98	99	99	99	99	99	99	99	99	99	99	99	98.0	99																	
23-Oct	99	99	93	77	71	72	77	76	77	73	68	64	60	53	47	44	45	44	44	48	51	57	64	61	65.3	99																		
24-Oct	56	56	63	70	61	57	63	69	65	59	50	43	50	59	63	66	67	70	71	72	74	78	82	82	64.4	82																		
25-Oct	88	90	89	90	94	96	96	97	97	97	96	95	94	91	91	90	88	88	85	80	78	73	71	69	88.5	97																		
26-Oct	68	67	65	69	71	74	71	73	74	75	73	71	70	72	73	74	74	76	79	82	84	88	88	87	75.0	88																		
27-Oct	86	88	87	87	87	88	92	93	93	90	86	81	76	69	67	67	69	71	70	70	70	71	73	74	79.4	93																		
28-Oct	77	77	76	77	75	72	68	64	61	59	56	48	45	43	44	44	46	54	58	59	57	52	52	56	59.1	77																		
29-Oct	58	56	56	58	65	79	84	79	84	82	81	77	71	70	65	68	71	73	74	75	74	73	72	63	71.1	84																		
30-Oct	65	65	69	71	73	73	75	74	77	79	74	76	77	74	73	72	73	76	78	81	82	86	88	90	75.8	90																		
31-Oct	90	92	95	96	94	94	96	97	98	98	98	98	98	98	97	96	96	97	97	97	95	94	92	91	95.6	98																		
																			73.3	73.8	74.4	75.7	76.2	77.4	78.3	78.4	78.0	76.6	73.9	70.9	68.6	66.9	65.1	65.0	65.1	66.6	68.1	68.8	69.1	70.3	71.6	72.1	Diurnal Average	
																			99	99	98	98	99	99	99	99	100	100	100	100	100	100	99	99	99	99	99	99	99	100	100	Diurnal Maximum		
M - Maintenance																																												





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Relative Humidity 100m (RH100m) - %  
Lower Camp Met Tower - October 2017**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	37	4.98	4.98
40 - 60	139	18.71	23.69
60 - 80	334	44.95	68.64
80 - 100	233	31.36	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744





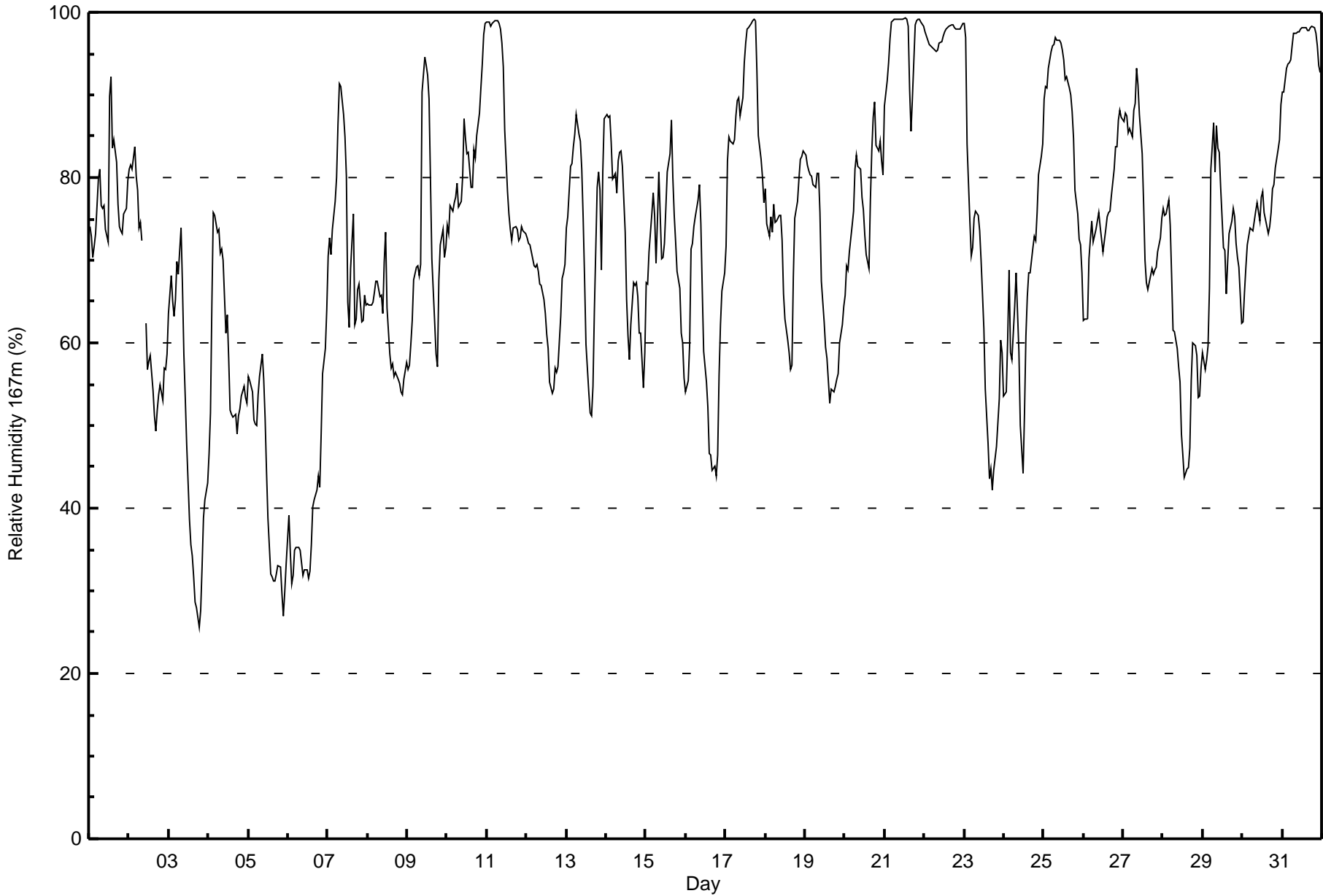
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity 167m (RH167m) - %

Lower Camp Met Tower - October 2017

Maximum Value: 99 % on Oct 21 13:00																			Maximum Daily Average: 97.2 % on Oct 22																			Hours in Service: 744	
Minimum Value: 26 % on Oct 3 19:00																			Minimum Daily Average: 39.4 % on Oct 6																			Hours of Data: 743	
Maximum Diurnal Average: 78.0 % at hour 9																			Minimum Diurnal Average: 65.8 % at hour 17																			Hours of Missing Data: 1	
Monthly Average: 71.8 %																			Percentiles: P <sub>1</sub> = 31 P <sub>10</sub> = 51 Q <sub>1</sub> = 60 Median = 73 Q <sub>3</sub> = 83 P <sub>90</sub> = 96 P <sub>99</sub> = 99																			Hours of Calibration: 0	
																																						Percent Operational Time: 99.9	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24															
1-Oct	74	73	70	72	73	80	81	77	76	77	74	72	90	92	84	85	82	77	74	74	73	76	76	80	77.5	92													
2-Oct	81	81	81	84	80	79	74	75	72	M	62	57	58	58	54	51	49	52	54	55	53	57	57	59	64.5	84													
3-Oct	64	68	65	63	65	70	68	74	67	59	53	48	39	36	34	32	29	28	26	28	33	39	41	43	48.7	74													
4-Oct	47	51	65	76	75	73	74	71	71	70	61	63	58	52	51	51	49	51	52	54	55	53	53	59.5	76														
5-Oct	56	55	54	51	50	50	54	56	59	56	51	44	39	32	32	31	31	32	33	33	30	27	30	33	42.4	59													
6-Oct	39	35	31	32	35	35	35	35	33	32	32	33	32	32	36	40	41	42	44	43	49	56	59	64	39.4	64													
7-Oct	71	73	71	74	77	80	86	91	91	88	85	80	65	62	69	76	62	63	66	67	63	63	66	65	73.0	91													
8-Oct	65	65	65	65	66	68	67	66	66	64	70	73	64	59	57	57	56	56	56	55	54	54	56	58	61.7	73													
9-Oct	57	57	60	63	68	69	69	68	70	90	95	94	92	90	80	70	62	59	57	68	72	74	70	72	71.8	95													
10-Oct	74	73	77	76	77	78	79	76	77	80	87	85	83	83	79	79	83	82	85	88	91	94	97	99	82.6	99													
11-Oct	99	99	98	99	99	99	99	99	98	96	93	86	78	76	74	72	74	74	74	72	73	74	74	73	85.5	99													
12-Oct	73	72	72	71	69	69	70	69	67	67	65	64	61	59	55	54	54	57	56	57	63	68	68	70	64.6	73													
13-Oct	74	75	81	82	84	85	88	85	84	81	75	68	60	54	52	51	55	64	79	81	78	69	81	87	73.9	88													
14-Oct	88	87	87	84	80	81	78	82	83	83	81	73	65	61	58	62	67	67	67	66	61	61	55	59	72.4	88													
15-Oct	67	67	71	76	78	75	70	75	81	70	70	72	76	81	83	87	80	75	72	69	67	61	60	56	72.4	87													
16-Oct	54	55	60	71	72	74	75	77	79	74	66	59	55	52	47	46	45	45	44	46	56	62	66	68	60.5	79													
17-Oct	72	82	85	84	84	85	87	89	90	87	90	94	96	98	98	99	99	99	99	99	93	85	82	80	77	88.9	99												
18-Oct	79	74	73	75	73	77	75	75	76	75	72	66	63	60	59	57	57	68	75	77	80	82	82	83	72.2	83													
19-Oct	83	82	81	80	80	79	79	81	80	76	67	62	60	58	55	53	54	54	55	56	56	60	62	64	67.4	83													
20-Oct	66	69	69	71	74	76	81	83	81	81	78	76	73	71	69	77	83	87	89	84	83	84	82	80	77.9	89													
21-Oct	89	92	94	97	99	99	99	99	99	99	99	99	99	99	98	91	86	90	99	99	99	99	99	98	96.7	99													
22-Oct	98	97	97	96	96	96	95	95	95	96	96	97	98	98	98	98	99	98	98	98	98	98	98	99	97.2	99													
23-Oct	99	97	84	75	70	72	75	76	75	74	70	66	62	54	48	44	45	42	45	48	50	53	60	59	64.2	99													
24-Oct	54	54	61	69	59	58	64	68	64	59	50	44	52	61	66	68	68	72	73	72	76	80	83	84	64.9	84													
25-Oct	89	91	91	93	95	96	96	97	97	97	96	95	94	92	92	91	90	88	85	78	76	73	72	68	88.9	97													
26-Oct	63	63	63	70	73	75	72	74	75	76	74	73	71	74	75	76	76	78	81	84	84	87	88	87	75.4	88													
27-Oct	87	88	87	85	86	85	88	89	93	91	88	83	77	70	67	66	68	69	68	69	69	71	73	75	78.9	93													
28-Oct	76	75	76	77	74	68	61	61	59	57	55	49	46	44	45	45	47	55	60	60	58	53	54	57	58.9	77													
29-Oct	59	57	58	60	67	81	87	81	86	84	83	79	72	71	66	70	73	75	76	75	72	70	69	62	72.1	87													
30-Oct	62	66	69	72	74	74	74	75	76	77	75	78	78	76	75	73	74	76	79	79	81	83	85	89	75.8	89													
31-Oct	90	90	93	94	94	94	96	97	98	98	98	98	98	98	98	98	98	98	98	98	98	96	94	93	96.0	98													
																			72.4 73.1 73.8 75.3 75.7 76.7 77.3 77.9 78.0 77.1 74.6 71.9 69.5 67.8 66.2 66.1 65.8 66.8 68.3 68.4 68.8 69.7 70.6 71.4																			Diurnal Average	
																			99 99 98 99 99 99 99 99 99 99 99 99 99 99 98 99 99 99 99 99 99 99 99 99 99																			Diurnal Maximum	
M - Maintenance																																							





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Relative Humidity 167m (RH167m) - %  
Lower Camp Met Tower - October 2017**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	37	4.98	4.98
40 - 60	148	19.92	24.90
60 - 80	318	42.80	67.70
80 - 100	240	32.30	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



Maximum Speed: 29 km/h on Oct 24 13:00	Maximum Daily Speed Average: 13.4 km/h on Oct 19	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 27 01:00	Minimum Daily Speed Average: 1.3 km/h on Oct 21	Hours of Data: 740
Maximum Diurnal Speed Average: 4.5 km/h at hour 15	Minimum Diurnal Speed Average: 1.4 km/h at hour 7	Hours of Missing Data: 4
Monthly Average Velocity: 2.8 km/h 292.3 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 5 Median = 9 Q <sub>3</sub> = 14 P <sub>90</sub> = 18 P <sub>99</sub> = 22	Percent Operational Time: 99.5

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	NW10	NW11	NW13	NW13	NW12	NW13	NW11	NW12	NW12	NW13	NNW11	NNW14	N10	NNW10	NNW11	NNW9	NW10	NNW12	NNW12	NNW16	N20	N19	NNW19	N21	NNW12.6	N21	
2-Oct	NNW23	NNW19	NNW18	N17	NNW17	NNW17	N20	N18	N19	M	N17	NNW17	NNW15	N15	N14	NNW11	NNW12	NW8	NW5	N4	N2	SE1	E1	W2	NNW12.5	NNW23	
3-Oct	SSE3	S6	SSE6	SE9	SSE11	SSE12	SSE13	SE9	SE10	SE12	SSE16	S14	SSW15	SW16	SW15	SSW11	S10	SE5	W5	W16	WNW10	NNW7	NNW9	NNW7	S5.8	SW16	
4-Oct	NNW7	N5	NNW4	NW3	NW2	NNW2	N2	N3	N3	N2	NE3	SW7	SW3	SSE2	SE5	SE8	SSE8	SSE9	SSE11	SSE8	SSE5	SSE5	SSE6	SSE11	SSE2.0	SSE11	
5-Oct	SE7	SE7	SE7	SE8	SE6	SE6	SE7	SE4	SE5	SSE9	SSE10	SE9	SE8	SW12	SW18	SW17	SW13	W13	WSW12	W10	W12	W16	W16	W16	SSW6.2	SW18	
6-Oct	WSW6	W12	WSW8	W13	W16	W14	WSW12	W8	SSW3	WSW14	WSW15	WSW19	W22	W20	W20	W18	W14	W12	W14	W11	W11	W9	NW4	NNW3	W12.1	W22	
7-Oct	NW0	S2	SSW4	WSW4	NW5	NNW6	NNW4	NNW7	NNW6	NNW5	NNW7	NW5	NNW8	N7	NNW11	NNW9	NNW15	NNW13	NNW16	NNW14	NNW16	NNW17	NW18	NW21	NNW8.5	NW21	
8-Oct	NW19	NW18	NW17	NW18	NW16	NNW14	NNW12	NW14	NW15	NW15	NW18	NNW17	NW14	NW17	NW17	NNW12	NNW12	NW10	NNW7	NW7	WNW8	W11	SW8	SSW7	NW12.5	NW19	
9-Oct	SSW7	S11	SSE16	SSE19	SSE22	SSE21	SSE14	SSE11	SSE13	SSE12	SSE10	SSE14	SE7	SE6	W8	W13	W14	WSW10	W7	W14	WSW12	W13	W14	W16	SSW7.5	SSE22	
10-Oct	W13	W15	W17	W13	NW2	W7	WNW8	W10	NW10	NNW8	N5	N4	N3	NNE5	NNE7	NNE8	NE5	NE7	NNE5	NNE6	NNE8	NNE9	NNE7	N9	NNW5.2	W17	
11-Oct	N9	N11	N9	N9	N9	N10	N10	NNE11	NNE12	NNE12	NNE13	NNE14	N14	N13	N12	NNE13	N12	N13	N14	N11	N10	N10	N10	N10	N11.2	N14	
12-Oct	N13	N12	N10	N8	NNW8	NNW8	NW10	NNW11	NNW11	NNW11	NNW11	NNW12	NNW10	NW10	NNW8	N8	NNW6	NW4	NW4	NW4	NNW6	NNW7	NNW4	NW3	NNW8.1	N13	
13-Oct	NW4	NNW3	N2	N3	N3	ESE2	SE5	SE4	S4	SW7	WSW6	WSW7	WSW8	WSW11	WSW11	SW10	SW14	WSW15	WSW11	WSW13	SW14	SW13	SW9	S3	SW6.0	WSW15	
14-Oct	SE5	SE7	ESE5	E4	S7	S13	SSE15	SSE18	SSE15	SSE18	SSE15	S9	WSW12	WSW15	WSW15	WSW17	W15	WNW12	WNW13	NW14	NW15	NW14	WNW13	WNW6	SW5.7	SSE18	
15-Oct	W7	W11	NW4	N2	WSW1	SE6	SE7	SE8	ESE5	SE11	SE11	SE3	SSE12	SSE20	SSE17	SE13	SE14	SE10	SE8	SSE12	SE10	S6	SSW5	SW12	SSE6.6	SSE20	
16-Oct	WSW13	WSW16	WNW21	WNW19	WNW12	WNW6	SSE3	S6	SSW6	S6	WSW10	WSW11	W13	W13	W11	W6	WSW4	S2	SSE2	SSW5	SW10	SSW3	SSW3	SSE3	WSW6.9	WNW21	
17-Oct	SSE8	SSE9	SE5	NE3	SSE1	ESE2	SSE5	SSE8	SE6	SSE10	SSE10	SSE3	NNW3	N3	N4	NNW4	NNW8	NNW9	NNW10	NNW11	NW14	NW15	NW18	NW19	WNW2.3	NW19	
18-Oct	NW19	WNW25	WNW25	WNW22	NW20	NW18	NW16	WNW17	WNW18	NW14	WNW15	NW11	WNW8	W4	WSW5	SW2	ESE3	SE7	SE9	ESE8	SE10	ESE8	SE10	SE13	WNW6.9	WNW25	
19-Oct	SE15	SE11	SE12	SE15	SE18	SE17	SSE22	SSE14	SE9	SSE15	SSE11	SSE11	SSE12	SSE12	SE11	SE16	SE14	SE12	SE14	SE14	SE17	SE15	SE7	SE9	SE13.4	SSE22	
20-Oct	E2	ESE9	E4	N4	NNW6	NNW4	NNW2	NW3	NNW2	NNW4	N4	N5	N5	WNW2	SSE5	NNW6	NW5	NNW1	SSE2	SE1	SSE2	NW1	NE1	WNW2	N1.6	ESE9	
21-Oct	WNW2	WNW3	NNW3	NNW5	N4	N4	ENE3	NNE2	ENE2	ESE3	SSE1	S4	SE7	SE8	SE4	SE3	NNW5	NNW6	NNE4	N3	NNE4	ENE3	E3	SE4	ENE1.3	SE8	
22-Oct	SE3	E3	ENE4	WNW2	ENE2	NE4	AF	AF	NE4	NNW5	N6	NNW6	N7	NNW7	N7	N5	NNW5	NNW5	NNW5	NNW5	NNW3	N3	N1	SE2	S4	N2.7	NNW7
23-Oct	SSE6	SSE6	W5	WNW11	WNW16	WNW14	W13	W12	W12	WNW11	NW10	W10	WSW9	W12	WSW12	WSW8	WSW6	SW9	SW17	SW14	S7	SE11	ESE8	ESE7	WSW6.8	SW17	
24-Oct	SE11	SSE17	SE13	SSE9	S13	WSW11	WSW10	W13	WNW19	WNW22	WNW23	NW27	NW29	NW25	NNW23	NNW16	NNW14	NNW9	N7	NNE8	N3	NNW1	SE1	NNE2	WNW7.1	NW29	
25-Oct	NNW3	NE1	NE5	NNE6	NE7	NNE7	N7	N10	N10	N9	N11	N13	N13	N11	NNW9	NNW11	NNW12	NNW8	NNW7	NNW6	NW3	NW5	WNW4	WSW6	N6.8	N13	
26-Oct	SW13	SW15	SW16	SW16	SW19	SSW12	S12	S14	S14	S14	S10	SSW10	SSW9	SW11	SSW9	SW8	SW6	SSW5	SSW4	WSW8	W9	NNW2	NW4	W3	SSW9.0	SW19	
27-Oct	SSW0	SE4	SE6	SE4	SE5	SE7	SE7	SE6	SE7	SSE15	SSE12	SSE11	SSE9	SSE21	SSE16	SSE23	SSE20	SSE21	SSE23	SSE21	SSE18	SSE21	SSE19	SSE18	SSE13.0	SSE23	
28-Oct	SE15	SE13	SE9	S6	WSW9	WSW14	W16	W17	W18	W17	WNW12	NW18	NW20	NW20	NW20	NW22	NW23	NW23	NW24	NW21	NW19	NW21	NNW20	NNW19	NW12.1	NW24	
29-Oct	NW20	NW23	NNW23	NNW21	NNW17	N16	N16	N16	N15	N13	N14	N14	N15	N12	N9	NNE7	NE5	NE3	SE2	ESE2	SE5	SE5	SE7	SSW7	NNW9.3	NNW23	
30-Oct	S5	SSW8	S4	SSE8	SSE9	SE9	SSE8	SSE12	SSE10	SSE11	S11	SSE9	SE7	SE4	E2	WNW2	NNW4	N4	NNW3	NNW3	NW3	NNW2	WNW2	W1	SSE3.6	SSE12	
31-Oct	NW2	NW2	NW2	NNW1	NE1	NW2	NW1	NE1	ESE1	N2	N4	N5	N5	AF	N7	N8	N11	N9	NNW7	N9	N10	N13	N15	N15	N5.7	N15	

WNW2.3	W2.3	WNW2.4	WNW2.9	WNW2.5	WNW2.1	W1.4	W1.8	WNW1.8	WSW1.6	WNW2.2	WNW3.5	WNW4.0	WNW4.0	WNW4.5	WNW3.6	NW3.1	WNW2.9	WNW3.4	WNW3.1	NW3.0	NW3.0	WNW2.6	Diurnal Average					
NNW23	WNW25	WNW25	WNW22	SSE22	SSE21	SSE22	N18	N19	WNW22	WNW23	NW27	NW29	NW25	NW23	SSE23	NW23	NW23	NW24	SSE21	N20	NNW21	NNW20	N21	Diurnal Maximum				

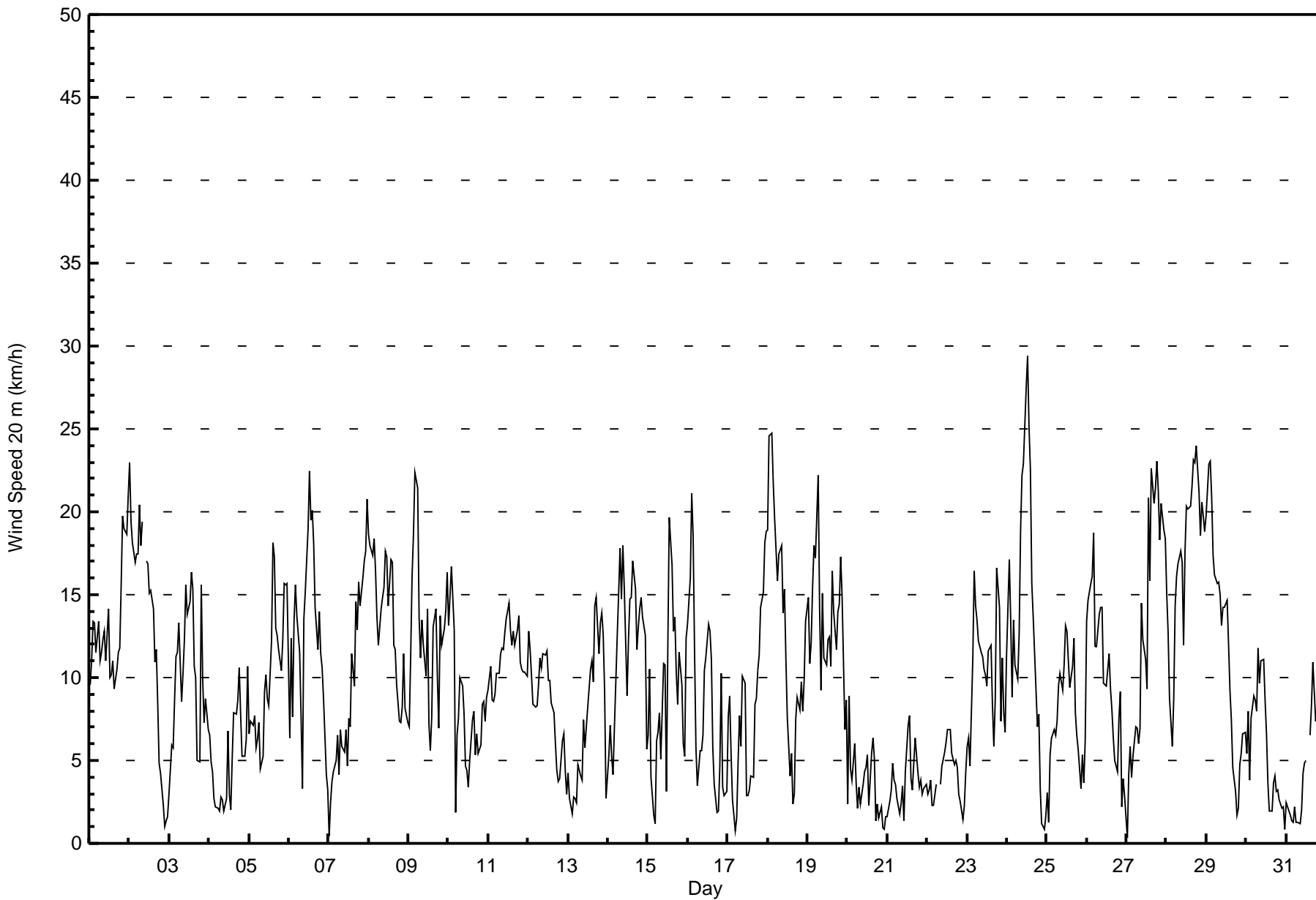
M - Maintenance                      AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Speed 20 m (WS20m) - km/h**  
**Lower Camp Met Tower - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on Oct 24 13:00 Minimum Value: 1 km/h on Oct 31 01:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 5 P <sub>90</sub> = 6 P <sub>99</sub> = 9																		Hours in Service: 744 Hours of Data: 740 Hours of Missing Data: 4 Hours of Calibration: 0 Percent Operational Time: 99.5							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	4	5	5	6	4	7	5	5	5	5	5	6	4	4	5	4	4	5	5	7	9	8	8	8	9
2-Oct	9	8	8	7	7	7	8	8	7	M	7	7	6	6	6	5	4	3	2	1	1	1	1	2	9
3-Oct	2	2	2	4	4	3	4	4	3	5	5	4	6	6	6	5	3	2	4	6	5	4	3	3	6
4-Oct	2	2	2	2	1	1	1	1	1	1	2	3	2	2	3	3	3	3	3	4	3	3	3	4	4
5-Oct	3	4	3	4	2	2	2	2	3	3	3	3	3	7	6	6	4	4	3	3	4	4	4	5	7
6-Oct	5	4	5	5	4	4	3	2	4	5	5	7	7	7	8	7	5	4	6	5	5	6	3	1	8
7-Oct	1	1	2	3	3	2	2	3	2	2	3	3	3	3	4	4	6	5	6	5	7	7	6	8	8
8-Oct	6	6	6	6	6	5	5	6	5	6	7	6	5	6	6	5	5	3	3	3	4	4	3	3	7
9-Oct	2	3	4	4	5	5	5	4	5	4	5	5	5	3	5	6	5	3	2	6	3	4	5	5	6
10-Oct	4	4	5	6	2	4	4	4	4	3	2	2	2	2	3	4	3	3	3	3	4	4	3	3	6
11-Oct	4	3	3	4	3	4	4	5	5	5	5	6	6	6	5	5	4	5	5	4	4	4	4	4	6
12-Oct	4	5	5	4	4	3	3	4	4	4	4	5	4	4	4	3	2	1	1	2	2	2	2	2	5
13-Oct	1	1	1	1	1	1	2	2	2	3	3	3	3	4	4	3	5	4	3	3	3	3	4	2	5
14-Oct	1	2	2	2	3	3	4	5	5	5	5	4	4	5	5	5	5	5	4	5	5	5	4	4	5
15-Oct	4	4	3	2	2	2	2	5	3	5	5	3	5	6	4	4	4	3	2	1	2	3	3	3	6
16-Oct	4	6	8	8	4	4	1	3	3	3	4	4	5	4	4	3	1	1	1	5	3	2	1	2	8
17-Oct	2	1	3	1	1	1	2	4	2	2	3	2	1	2	2	2	3	3	4	4	5	5	6	6	6
18-Oct	7	8	9	7	7	6	5	6	7	5	5	4	4	3	3	2	2	3	2	3	3	3	3	5	9
19-Oct	5	4	5	6	6	6	7	5	5	5	4	3	3	4	4	5	4	3	4	4	4	5	5	4	7
20-Oct	2	5	2	2	1	1	1	2	2	2	3	2	2	2	3	3	2	1	1	1	2	1	1	1	5
21-Oct	1	1	1	2	2	2	1	1	1	2	1	2	3	3	2	2	1	2	2	2	2	1	1	1	3
22-Oct	1	1	2	1	1	4	AF	AF	2	2	2	2	2	3	3	2	2	2	2	2	1	1	1	2	4
23-Oct	2	2	4	5	6	5	4	4	4	4	4	4	4	5	4	2	1	3	3	3	3	2	3	2	6
24-Oct	5	4	4	6	4	5	3	4	7	8	9	10	11	9	8	6	6	3	3	3	3	1	1	1	11
25-Oct	1	1	3	3	3	2	3	3	3	4	4	4	5	5	3	4	5	3	2	2	2	2	2	3	5
26-Oct	2	3	4	6	6	5	3	3	3	3	3	3	3	4	4	3	2	2	2	2	4	2	2	2	6
27-Oct	1	2	1	1	1	2	3	3	4	3	4	4	5	5	4	6	5	5	5	5	4	5	4	4	6
28-Oct	4	4	3	3	5	5	5	5	5	5	5	7	7	8	7	8	8	8	9	7	7	8	8	8	9
29-Oct	7	8	8	8	7	6	6	6	6	5	6	5	6	5	4	3	2	1	1	1	1	1	2	3	8
30-Oct	2	3	2	2	2	3	3	3	3	3	2	3	3	2	1	1	1	1	1	1	2	1	1	1	3
31-Oct	1	1	1	1	1	1	1	1	1	1	1	2	2	AF	2	3	4	3	3	3	4	5	5	5	5
Diurnal Maximum																								9	
M - Maintenance AF - Analyzer Failure																									





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed 20 m (WS20m) - km/h  
Lower Camp Met Tower - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	201	27.16	27.16
6 - 11	261	35.27	62.43
12 - 19	234	31.62	94.05
20 - 28	43	5.81	99.86
29 - 38	1	0.14	100.00
> 38	0	0.00	100.00

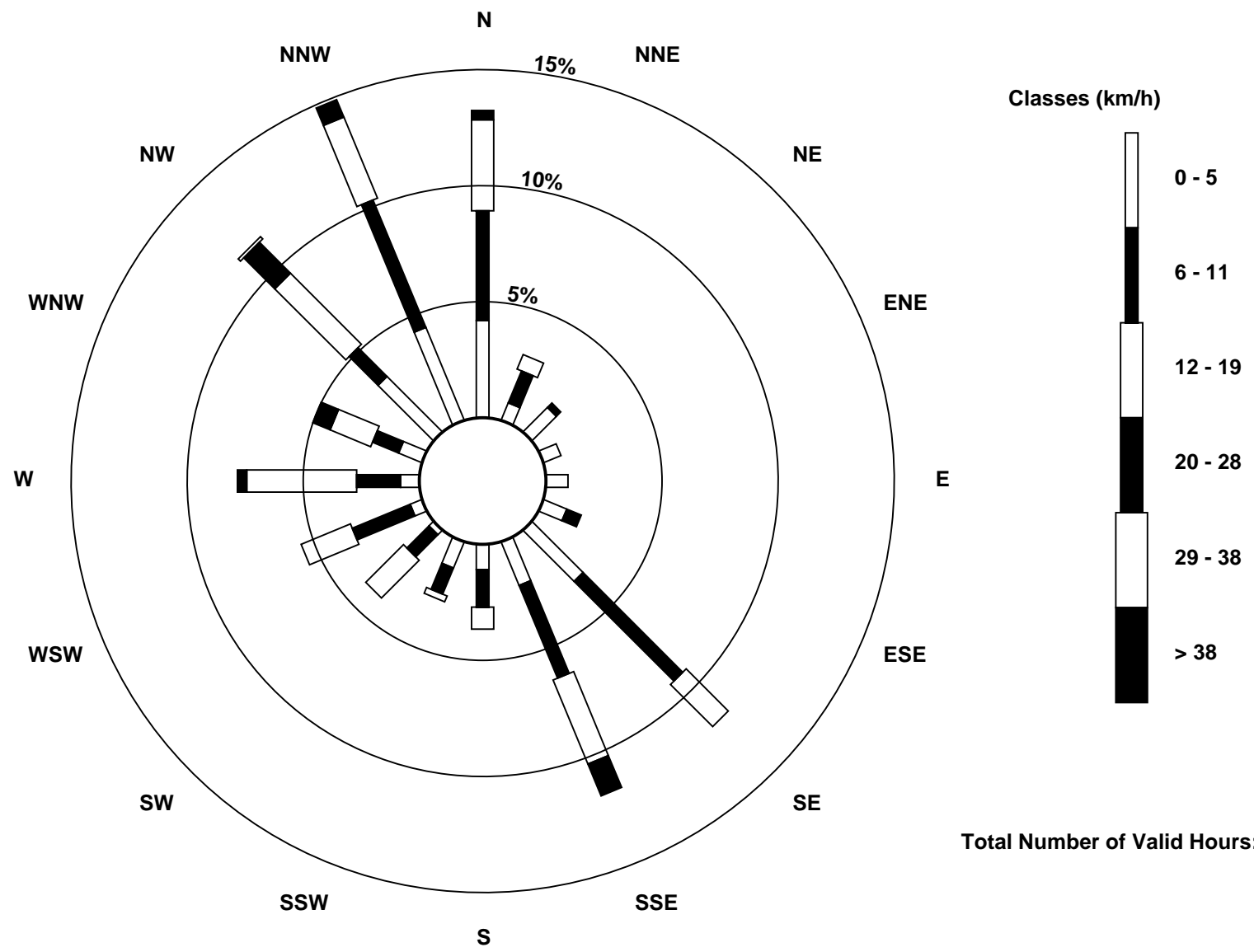
Total Number of Valid Hours: 740

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed 20 m (WS20m) - km/h  
Lower Camp Met Tower (AMS 3)







# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Wind Speed 45 m (WS45m) - km/h

## Lower Camp Met Tower - October 2017

Maximum Speed: 36 km/h on Oct 24 13:00	Maximum Daily Speed Average: 17.5 km/h on Oct 1	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 20 23:00	Minimum Daily Speed Average: 1.9 km/h on Oct 20	Hours of Data: 324
Maximum Diurnal Speed Average: 6.1 km/h at hour 6	Minimum Diurnal Speed Average: 1.4 km/h at hour 2	Hours of Missing Data: 420
Monthly Average Velocity: 3.7 km/h 325.0 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 6 Median = 12 Q <sub>3</sub> = 19 P <sub>90</sub> = 26 P <sub>99</sub> = 31	Percent Operational Time: 43.6

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	NNW14	NW16	NW19	NW18	NW16	NNW18	NW15	NW17	NW17	NW17	NNW16	N20	NNE15	N14	NNW16	NNW14	NNW15	NNW17	NNW17	N23	N28	N27	N26	N30	NNW17.5	N30	
2-Oct	N33	N27	N26	N24	N25	N25	N28	N26	N27	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	N33	
3-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
4-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
5-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
6-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
7-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
8-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
9-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
10-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
11-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
12-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
13-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
14-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
15-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
16-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
17-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
18-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
19-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	SSE12	SSE13	SSE14	SSE15	SE14	SE22	SE19	SE17	SE20	SE21	SE25	SE23	SE12	SE14	----	SE25
20-Oct	ESE5	ESE13	ESE8	N3	N7	N6	N3	N5	N4	N5	N6	N6	N8	NW3	SSE7	NNW9	NW6	NW2	SSE2	SE3	SSE4	NNW1	NW1	NW2	NNE1.9	ESE13	
21-Oct	NNW3	NW3	N5	N8	N6	NNE5	ENE4	NE3	E3	ESE4	SSE2	S5	SE8	SSE9	SE5	SE4	NNW7	NNW9	NNE6	NNE5	NE6	ENE4	E5	ESE4	NE2.2	NNW9	
22-Oct	SE3	AF	AF	AF	AF	AF	AF	AF	AF	AF	N7	N8	N9	N9	N9	N7	NNW6	NNW6	NNW6	N4	N3	NNE2	SE3	SSW5	----	N9	
23-Oct	SSE7	SSE7	W9	NNW16	NNW22	NNW20	W19	W17	W16	NNW15	NW13	W13	W12	W15	WSW16	W11	WSW8	SW13	SW20	SW18	S9	SE14	ESE11	SE9	WSW9.5	WNW22	
24-Oct	SSE14	SSE19	SSE17	SSE12	SSW16	WSW15	W14	W18	NNW25	NNW29	NNW29	NW36	NW36	NW31	NW28	NNW21	NNW18	N13	NNE11	NNE12	NNE5	NNE1	E2	ENE4	NW9.2	NW36	
25-Oct	N4	NE2	NE8	NE10	NE11	NNE11	NNE11	N13	N15	N14	N15	N19	N18	N16	NNW14	NNW15	N18	NNW12	NNW10	NNW8	NW5	NW7	NNW5	W9	N10.0	N19	
26-Oct	WSW16	SW18	SW20	SW20	SW23	SW15	S14	S15	S16	S15	S11	SSW12	SSW12	SW15	SW12	SW10	SW9	SW7	SW7	WSW11	W13	NW4	NW5	NNW5	SW11.2	SW23	
27-Oct	SW1	SSE5	SE8	SSE5	SE7	SSE9	SE11	SSE10	SSE9	SSE17	SSE16	SSE15	SSE12	S23	S17	S25	SSE22	SSE27	SSE26	SSE24	SSE21	SSE24	SSE21	SSE21	SSE15.6	SSE27	
28-Oct	SSE20	SSE18	SSE11	SSW7	WSW13	W21	W22	W24	W24	W23	NNW15	NW22	NNW26	NNW26	NNW26	NNW27	NNW29	NNW28	NNW30	NW26	NNW24	NNW27	NNW26	NNW26	NW15.6	NNW30	
29-Oct	NNW25	NNW30	NNW30	NNW27	NNW24	N23	N22	N22	N21	N18	N20	N20	N21	N17	NNE13	NE12	NE7	NE5	SE2	SE3	SSE6	SE7	SSE8	SW9	N12.9	NNW30	
30-Oct	SSW6	SW11	SSW6	S8	SSE11	SSE11	SSE10	S13	SSE12	SSE14	S12	SSE10	SSE8	SE4	E2	NW2	N6	N7	N6	N6	N4	N4	NNW3	N1	SSE3.8	SSE14	
31-Oct	NNW2	N2	N2	N2	NE2	NNW2	NNE1	E3	ESE2	NNE3	N5	N6	N8	AF	AF	NNE12	N16	N13	N11	N13	N15	N19	N21	N21	N7.9	N21	

NNW1.7	W1.4	NW2.8	NW4.6	NW5.5	NW6.1	NW5.0	NW5.3	NW5.7	NNW5.1	NW4.4	NNW5.9	NNW6.0	NW4.6	NW4.4	NNW4.2	NNW5.5	NNW4.0	NW2.5	NNW2.5	N1.9	NE2.7	NNE2.7	N1.8	Diurnal Average
N33	NNW30	NNW30	NNW27	N25	N25	N28	N26	N27	NNW29	NNW29	NW36	NW36	NW31	NW28	NNW27	NNW29	NNW28	NNW30	NW26	N28	NNW27	N26	N30	Diurnal Maximum

AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Speed 45 m (WS45m) - km/h**  
**Lower Camp Met Tower - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 11 km/h on Oct 24 13:00	Hours of Data: 324
Minimum Value: 1 km/h on Oct 31 07:00	Hours of Missing Data: 420
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 5 P <sub>90</sub> = 7 P <sub>99</sub> = 9	Hours of Calibration: 0
	Percent Operational Time: 43.6

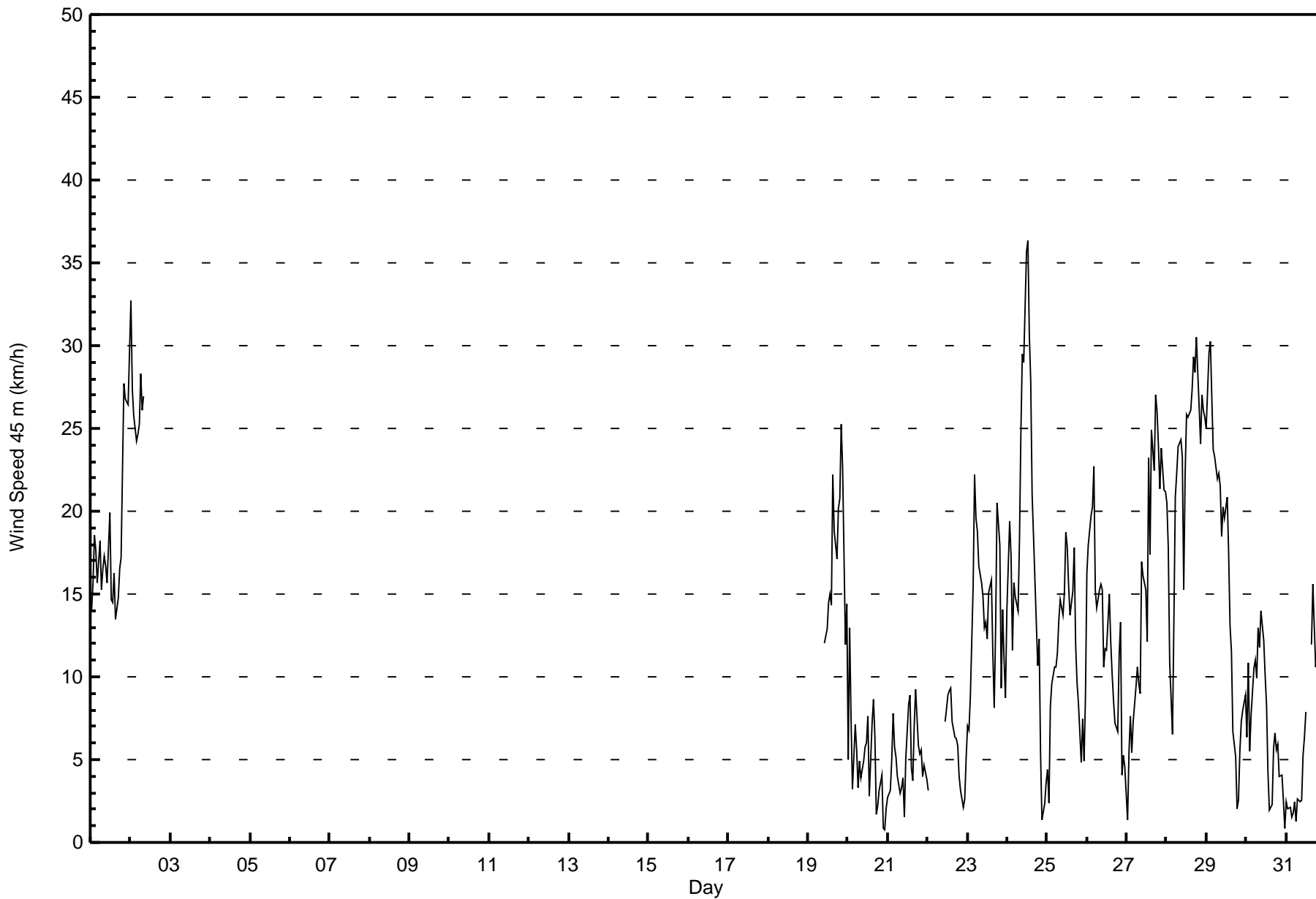
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	4	5	6	6	4	7	5	5	5	4	5	7	5	5	6	4	4	5	5	8	9	9	9	8	9
2-Oct	9	9	8	8	8	8	10	9	8	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	10
3-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
4-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
5-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
6-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
7-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
8-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
9-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
10-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
11-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
12-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
13-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
14-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
15-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
16-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
17-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
18-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
19-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	4	4	3	5	5	5	4	3	4	5	3	5	7	4	7
20-Oct	3	5	3	2	2	1	2	2	2	2	3	2	2	3	3	4	2	1	1	2	2	1	1	1	5
21-Oct	1	1	1	2	2	2	2	2	2	2	1	2	3	3	2	2	2	2	2	2	2	2	1	1	3
22-Oct	1	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	2	2	3	3	3	2	2	2	2	2	1	1	2	3
23-Oct	3	2	5	5	5	5	4	4	3	4	5	4	4	5	4	2	1	3	3	3	4	2	3	3	5
24-Oct	5	4	3	6	4	6	3	4	7	9	9	11	11	9	9	6	6	4	3	3	3	1	1	2	11
25-Oct	2	1	3	3	3	2	3	3	4	4	5	5	5	4	4	5	4	3	2	2	2	2	2	4	5
26-Oct	2	2	4	6	6	5	3	3	3	3	3	2	3	4	4	2	3	3	3	2	5	3	2	2	6
27-Oct	1	1	1	2	2	2	3	3	4	2	4	4	5	5	4	6	5	5	5	5	4	5	5	4	6
28-Oct	3	4	3	2	6	5	5	4	4	4	5	7	8	8	8	8	8	8	9	7	7	9	8	9	9
29-Oct	8	8	9	8	8	7	7	7	6	6	6	5	7	5	4	4	2	2	1	1	1	1	2	4	9
30-Oct	2	4	3	3	2	3	3	3	3	4	2	3	3	2	1	1	2	1	1	1	1	1	1	1	4
31-Oct	1	1	1	1	1	1	1	2	1	1	1	2	2	AF	AF	3	3	3	3	3	4	5	5	5	5
Diurnal Maximum																									

AF - Analyzer Failure



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Wind Speed 45 m (WS45m) - km/h**  
**Lower Camp Met Tower - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed 45 m (WS45m) - km/h  
Lower Camp Met Tower - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	71	21.91	21.91
6 - 11	79	24.38	46.30
12 - 19	97	29.94	76.23
20 - 28	66	20.37	96.61
29 - 38	11	3.40	100.00
> 38	0	0.00	100.00

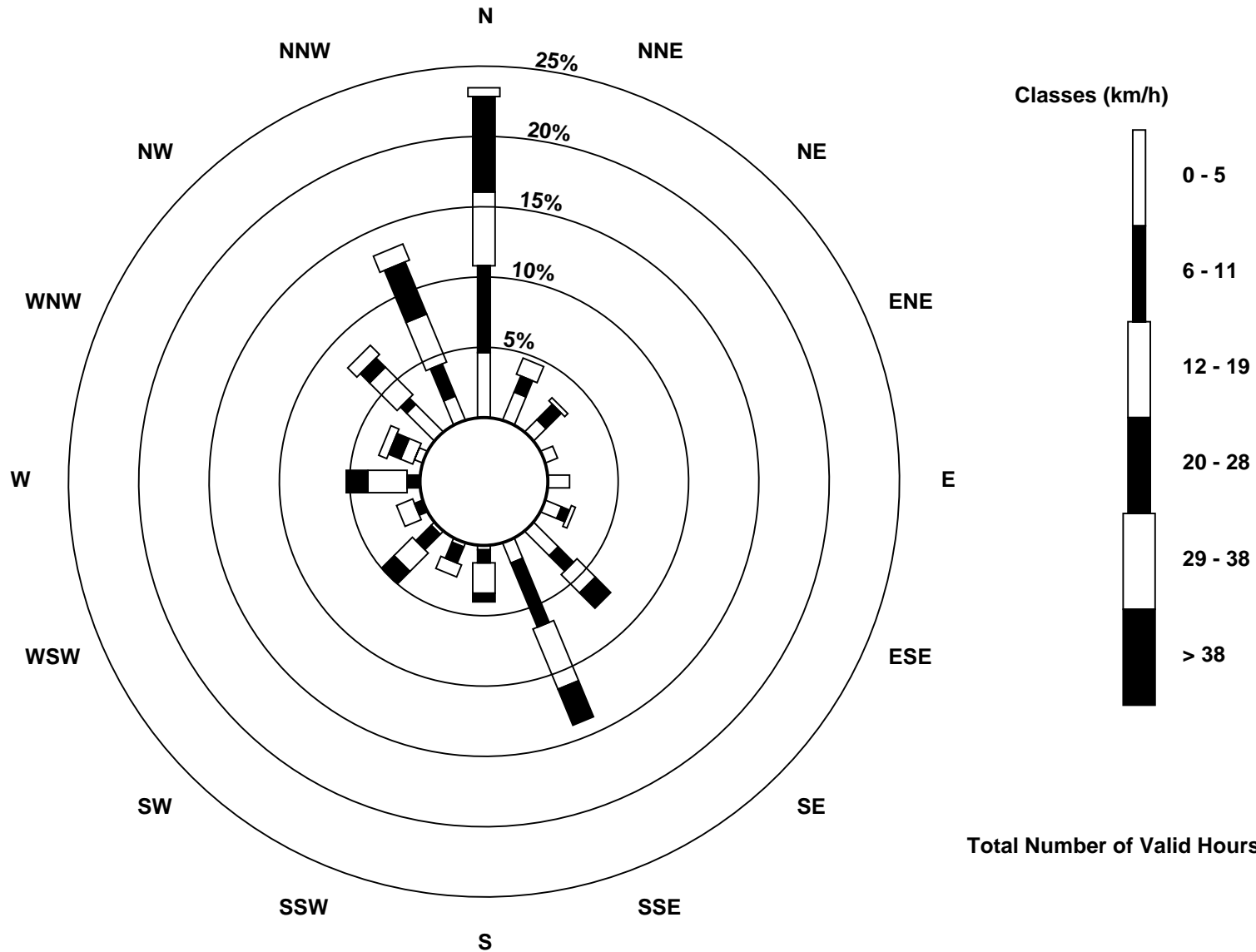
Total Number of Valid Hours: 324

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed 45 m (WS45m) - km/h  
Lower Camp Met Tower (AMS 3)





Maximum Speed: 50 km/h on Oct 24 13:00	Maximum Daily Speed Average: 27.2 km/h on Oct 2	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 29 20:00	Minimum Daily Speed Average: 1.5 km/h on Oct 20	Hours of Data: 717
Maximum Diurnal Speed Average: 8.4 km/h at hour 20	Minimum Diurnal Speed Average: 3.6 km/h at hour 10	Hours of Missing Data: 27
Monthly Average Velocity: 6.6 km/h 287.0 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 7 Q <sub>1</sub> = 11 Median = 19 Q <sub>3</sub> = 26 P <sub>90</sub> = 33 P <sub>99</sub> = 43	Percent Operational Time: 96.4

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	NNW23	NNW25	NNW28	NW26	NW23	NW26	NW22	NNW24	NNW23	NW23	NNW24	NNW28	N22	NNW22	NNW25	NNW22	NW24	NNW27	NNW28	NNW34	N39	N39	NNW39	N42	NNW25.8	N42
2-Oct	NNW47	NNW40	NNW38	N35	N37	NNW38	N40	N37	N38	M	N37	NNW34	NNW31	N30	N28	NNW22	NNW23	NNW18	NW14	NW18	NW16	NNW11	NNW8	W9	NNW27.2	NNW47
3-Oct	WSW11	SW13	S7	S8	SSE14	SSE17	SSE19	SE20	SSE19	SSE22	SSE18	S18	SSW23	SW26	SSW26	SSW17	SSW14	SSW5	W18	W34	NNW28	NNW21	NNW25	NNW22	SW10.9	W34
4-Oct	NW18	NNW15	N17	NNW11	NNW13	NW9	NNW10	NW11	NW7	NW4	NNE3	SW8	SW5	S2	SE8	SE12	SE16	SSE16	SE22	SE18	SE14	SE13	SE15	SE19	SE1.9	SE22
5-Oct	SE17	SE17	SSE15	SSE12	SSE9	S9	S9	S6	SE8	SSE9	SSE13	SE15	SE13	SW19	SW27	SW27	SW24	WSW27	WSW28	WSW26	WSW30	WSW34	WSW33	WSW33	SSW14.2	WSW34
6-Oct	WSW19	WSW27	WSW19	WSW29	WSW31	WSW29	WSW25	WSW18	SW12	WSW23	WSW26	WSW33	WSW39	W36	W37	W33	W28	W27	W30	W25	W24	W23	NNW9	NW7	WSW24.7	WSW39
7-Oct	WSW7	SW10	SW9	WSW13	W16	NNW18	N12	N16	N14	N13	NNW14	NW8	NW15	NNW14	NNW26	NNW22	NW30	NNW27	NW31	NNW29	NNW31	NNW33	NW35	NW39	NNW17.9	NW39
8-Oct	NW36	NW34	NW32	NW34	NW31	NW27	NNW25	NW28	NW28	NW28	NNW30	NNW28	NNW24	NNW28	NW29	NW24	NW23	NW18	NW16	NNW14	W15	W19	SW15	SW17	NW23.0	NW36
9-Oct	SSW13	S20	SSE23	SSE24	SSE30	SSE29	SE27	SSE21	SSE24	SSE22	SE22	SSE23	SE19	SSW7	WSW17	W26	W29	WSW22	WSW19	W25	WSW24	W26	W31	W32	SSW14.3	W32
10-Oct	WSW26	WSW29	W32	W29	W14	WSW21	W23	W24	NNW19	NNW14	N7	N6	N6	NNE11	N15	NNE15	NE10	NNE14	NNE12	NNE12	NNE18	N18	N16	N17	NW9.7	W32
11-Oct	N19	N20	N19	N19	N18	N21	N22	AF	NNE25	NNE25	NNE27	NNE27	N30	N28	N26	N27	N23	N25	N26	N22	N20	N20	N21	N21	N22.9	N30
12-Oct	N24	N24	N20	N17	N17	NNW17	NW20	NNW21	NNW20	NNW22	NNW21	NNW19	NNW17	NW17	NNW15	N15	NNW14	NNW9	NNW8	NW12	NW16	NNW17	NNW12	NW10	NNW16.4	N24
13-Oct	NW9	NW9	W7	W8	W9	SW4	SSW3	SSW4	SW6	SW9	WSW8	WSW9	WSW10	WSW14	SW15	SW14	SW23	SW23	SW17	SW20	SW20	SW21	SW19	SSW6	WSW11.1	SW23
14-Oct	S6	SSE9	SE9	S7	SSW14	S20	S24	SSE25	SSE19	SSE22	SSE17	S11	SW17	WSW21	SW20	WSW28	WSW28	W23	W24	NNW29	NNW28	NNW30	NNW31	NNW21	WSW12.0	NNW31
15-Oct	WSW21	WSW25	W16	WSW10	WSW9	SSW7	SSE12	SE16	SE15	SE24	SSE23	SE13	SE22	SSE25	S21	SSW19	S14	SSE13	S11	NNW10	S9	SW20	SW18	SW25	S12.2	WSW25
16-Oct	WSW27	WSW33	W41	NNW34	W24	W13	SW12	SW16	SW12	SSW8	WSW16	WSW18	WSW22	WSW20	WSW12	WSW11	SSW14	SSW13	SSW13	SW21	SW13	SW9	S8	WSW16.3	W41	
17-Oct	S11	SSE10	SSE13	ESE6	SE7	SE12	SSE13	SSE14	SSE8	SSE8	SSE14	ESE10	NE4	NNE7	N9	NNW10	NNW19	NW19	NW22	NNW25	NNW27	NNW29	NNW34	NNW33	NNW4.7	NNW34
18-Oct	NNW36	NNW43	NNW45	NNW41	NNW34	NNW32	NNW29	NNW33	NNW32	NNW23	NNW23	NW17	NNW11	W6	WSW6	SW3	ESE3	SE15	SE20	SE19	SE21	SE17	SE18	SE25	NNW11.6	NNW45
19-Oct	SE27	SE21	SE24	SE29	SE35	SE36	SE41	SE29	SE22	SE24	SSE14	SE14	SE14	SE17	SE20	SE30	SE25	SE27	SE32	SE31	SE34	SE35	SE28	SE29	SE26.5	SE41
20-Oct	SE21	SE20	SE16	SE10	ESE7	NE3	NNE2	N5	NNW4	N2	NNW7	NE2	NNW8	ENE2	SE11	NW8	NW9	W4	SW3	SSW3	SSE7	WSW3	NNW5	NNW11	ESE1.5	SE21
21-Oct	NNW10	NNW9	NW8	N14	N10	N7	NE4	NNE5	ENE4	ESE5	SSE2	SSE5	SE10	SE8	ESE6	ESE5	N8	N15	N8	N7	NNE6	AF	NE4	E3	NNE3.7	N15
22-Oct	SE2	AF	AF	NNE5	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	NNE5
23-Oct	AF	AF	W19	W24	NNW33	NNW28	W26	W24	W22	NNW21	NNW18	W17	WSW15	WSW19	WSW19	WSW16	SW13	SW20	SW29	SW28	SSW16	SSE18	SE12	SSE10	WSW16.7	NNW33
24-Oct	S13	S18	SSE26	SSE21	SSW23	WSW23	WSW24	WSW29	W38	NNW41	NNW39	NW49	NW50	NW43	NNW38	NNW31	NNW28	NNW21	N16	NNE19	NNE11	NE5	ENE12	E13	NNW14.4	NW50
25-Oct	NE7	NNE6	NNE13	NE13	NE16	NNE16	NNE17	N19	N21	N21	N23	N27	N26	N23	NNW22	NNW25	NNW27	NNW21	NNW16	NNW15	NNW10	NNW13	W7	WSW12	N15.3	NNW27
26-Oct	SW21	SW24	SW30	SW28	SW28	SSW20	S17	S19	S19	S19	S12	S13	SSW16	SW22	SSW18	SW14	SW14	SW14	SW17	WSW17	WSW22	W11	W11	W8	SW16.5	SW30
27-Oct	W7	SW5	SSE4	SSE8	SSE8	SSE10	SE17	SSE17	SSE13	SSE15	SE19	SE23	SSE18	SSE28	SSE23	SSE33	SSE29	SSE31	SSE31	SSE30	SSE28	SSE29	SSE22	SSE22	SSE19.0	SSE33
28-Oct	SSE21	SSE18	SSW11	SW15	WSW24	WSW31	WSW36	WSW36	WSW34	W32	W23	NW31	NW36	NW37	NW37	NW40	NW42	NW40	NW43	NW39	NW35	NW39	NNW39	NNW38	NNW24.7	NW43
29-Oct	NW36	NW42	NW44	NW40	NNW34	NNW33	N30	N32	N31	N26	N26	N27	N29	N23	N18	NNE14	NNE9	NNE8	E3	SE1	S5	SSE7	S6	SW16	NNW18.7	NW44
30-Oct	SSW15	SW22	SW17	SSW10	S7	SSE9	SSE11	S10	SSE12	SSE13	SSE10	SSE12	SE11	SSE3	E2	NW3	NNW9	N13	NNW10	NNW12	NNW12	NNW10	NNW10	N5	SSW2.7	SW22
31-Oct	NNW6	NNW7	N5	NNE3	ENE2	NE2	ESE3	ESE6	SE7	ENE4	NNE6	NNE7	N11	NNE12	NNE14	NNE18	N21	NNE18	N17	N18	N21	NNE26	N27	N25	NNE10.7	N27

W7.2 W8.3 W7.5 NNW7.3 W7.1 W6.0 W4.6 W5.4 NNW4.6 W3.6 NNW4.5 NNW5.5 NNW6.6 NNW7.5 NNW8.1 NNW7.1 NNW8.2 NNW7.0 NNW7.1 NNW8.4 NNW8.1 NNW8.1 NNW7.8 NNW6.7	Diurnal Average
NNW47 NNW43 NNW45 NNW41 NNW37 NNW38 SE41 N37 W38 NNW41 NNW39 NW49 NW50 NW43 NW38 NW40 NW42 NW40 NW43 NW39 N39 NNW39 NNW39 N42	Diurnal Maximum

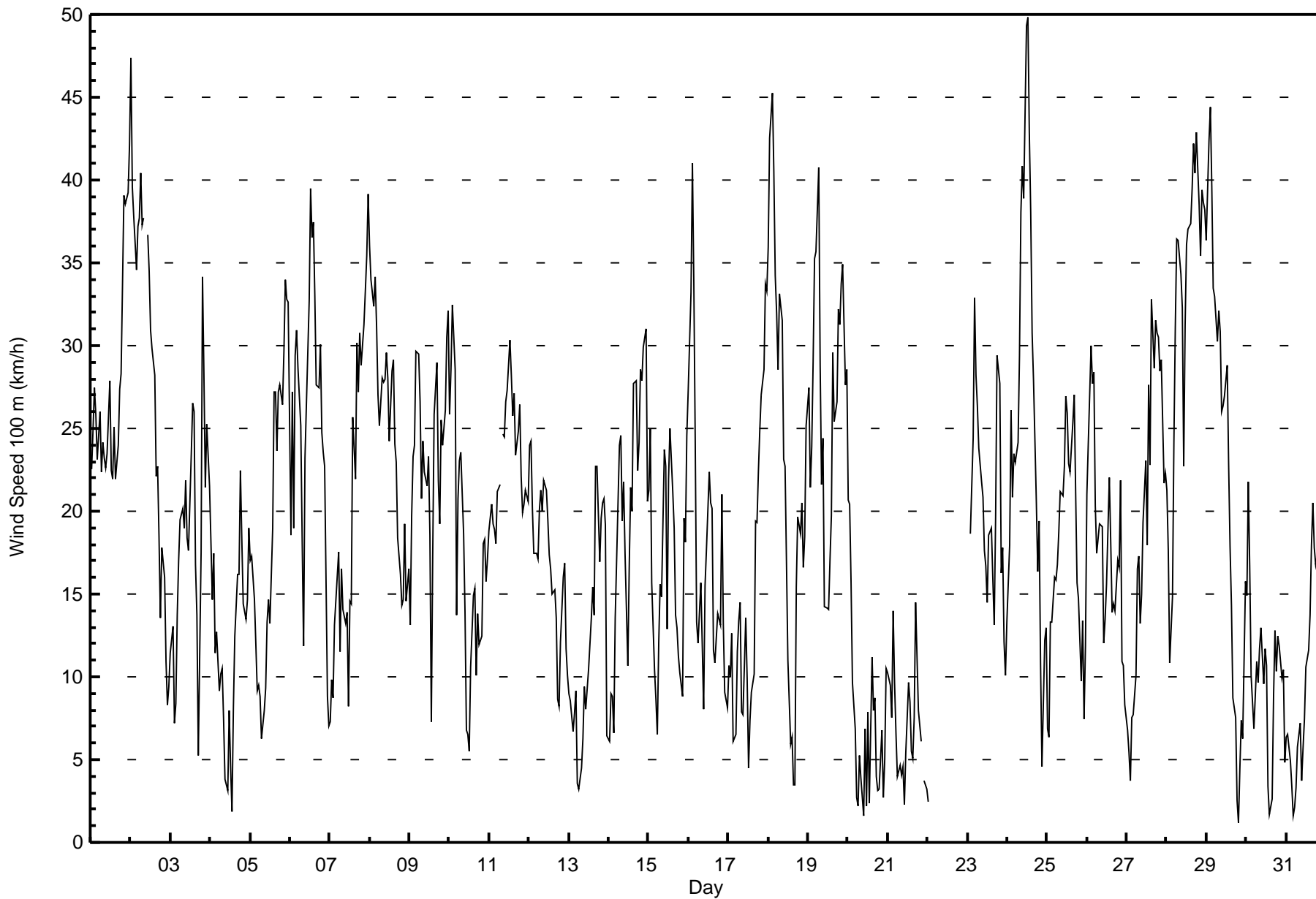
M - Maintenance AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Speed 100 m (WS100m) - km/h**  
**Lower Camp Met Tower - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on Oct 24 13:00 Minimum Value: 0 km/h on Oct 31 02:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 5 P <sub>90</sub> = 6 P <sub>99</sub> = 8																		Hours in Service: 744 Hours of Data: 717 Hours of Missing Data: 27 Hours of Calibration: 0 Percent Operational Time: 96.4							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	5	4	5	6	4	7	4	4	4	3	5	7	4	5	5	5	5	6	5	7	8	7	8	8	8
2-Oct	8	8	7	6	8	7	9	7	6	M	7	7	6	6	5	5	4	4	2	2	3	2	2	3	9
3-Oct	3	3	2	2	3	3	2	3	3	3	4	4	6	6	6	6	4	2	8	6	6	6	5	4	8
4-Oct	3	3	2	2	2	1	2	2	2	2	2	3	2	2	3	2	3	2	3	2	3	2	3	3	3
5-Oct	3	4	2	2	2	2	2	2	2	3	2	1	4	7	4	5	5	4	2	2	2	2	1	2	7
6-Oct	5	2	5	4	3	2	3	3	5	4	3	7	6	6	7	8	3	3	9	5	4	8	6	2	9
7-Oct	2	4	3	6	4	3	2	3	3	3	4	3	5	3	4	5	6	6	6	6	7	7	6	7	7
8-Oct	6	6	6	5	5	6	7	6	5	5	6	5	5	5	5	5	4	2	3	3	4	2	3	2	7
9-Oct	3	3	4	5	5	5	4	5	6	4	5	4	5	3	7	6	4	3	3	6	3	5	4	4	7
10-Oct	3	2	2	5	5	4	5	3	4	2	2	1	2	2	2	3	3	3	3	3	3	3	3	2	5
11-Oct	3	2	3	3	3	3	4	AF	4	4	4	5	4	5	4	4	4	4	3	3	3	3	4	4	5
12-Oct	4	4	5	4	4	3	3	4	4	4	4	4	4	4	4	3	3	2	1	3	2	3	1	3	5
13-Oct	2	2	2	1	1	2	1	1	2	2	2	2	2	3	2	3	6	3	2	2	2	3	2	4	6
14-Oct	2	3	2	3	4	4	4	5	5	4	5	4	3	3	4	4	4	5	3	6	5	5	3	6	6
15-Oct	3	3	5	5	4	3	3	2	4	2	6	5	5	6	4	3	3	3	2	3	3	3	5	2	6
16-Oct	4	4	8	9	5	7	4	6	5	3	3	3	2	2	3	3	1	3	3	6	2	4	3	3	9
17-Oct	2	2	2	2	2	2	2	3	2	2	3	1	1	2	1	2	2	3	4	4	6	6	7	6	7
18-Oct	7	6	7	7	7	5	5	5	7	6	4	4	4	4	3	2	3	2	3	3	3	4	3	5	7
19-Oct	4	5	5	5	4	5	5	5	4	3	4	3	2	3	4	3	3	3	3	3	2	2	4	2	5
20-Oct	5	6	4	4	4	2	1	3	3	2	2	2	2	3	3	3	2	1	1	2	2	2	1	3	6
21-Oct	1	2	2	2	2	2	2	1	1	1	1	3	2	2	2	2	3	1	2	2	1	AF	1	1	3
22-Oct	1	AF	AF	4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	4
23-Oct	AF	AF	5	5	5	5	3	2	3	4	4	4	4	5	4	2	2	4	2	2	5	3	3	3	5
24-Oct	4	5	4	5	6	5	3	4	7	8	9	10	11	9	8	6	7	3	4	3	4	3	1	2	11
25-Oct	2	2	3	3	3	2	2	2	2	3	3	4	4	4	3	4	6	3	4	2	2	2	3	5	6
26-Oct	3	2	3	6	5	6	4	4	4	4	4	3	4	5	5	2	2	2	2	2	4	4	3	2	6
27-Oct	2	2	3	3	3	3	1	3	3	2	3	3	4	5	5	7	5	5	5	4	5	6	4	5	7
28-Oct	4	4	3	2	6	4	4	3	3	3	6	7	7	8	7	8	8	9	11	7	8	8	8	10	11
29-Oct	8	8	9	8	7	6	6	6	5	5	4	5	5	5	3	3	2	2	2	1	1	2	2	4	9
30-Oct	5	4	5	4	2	3	2	2	2	3	2	2	2	2	1	2	3	1	1	1	1	2	1	1	5
31-Oct	1	0	1	1	1	1	1	3	2	1	1	1	2	1	2	2	2	2	2	2	3	3	4	3	4
Diurnal Maximum																									
M - Maintenance AF - Analyzer Failure																									







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed 100 m (WS100m) - km/h  
Lower Camp Met Tower - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	50	6.97	6.97
6 - 11	130	18.13	25.10
12 - 19	201	28.03	53.14
20 - 28	206	28.73	81.87
29 - 38	101	14.09	95.96
> 38	29	4.04	100.00

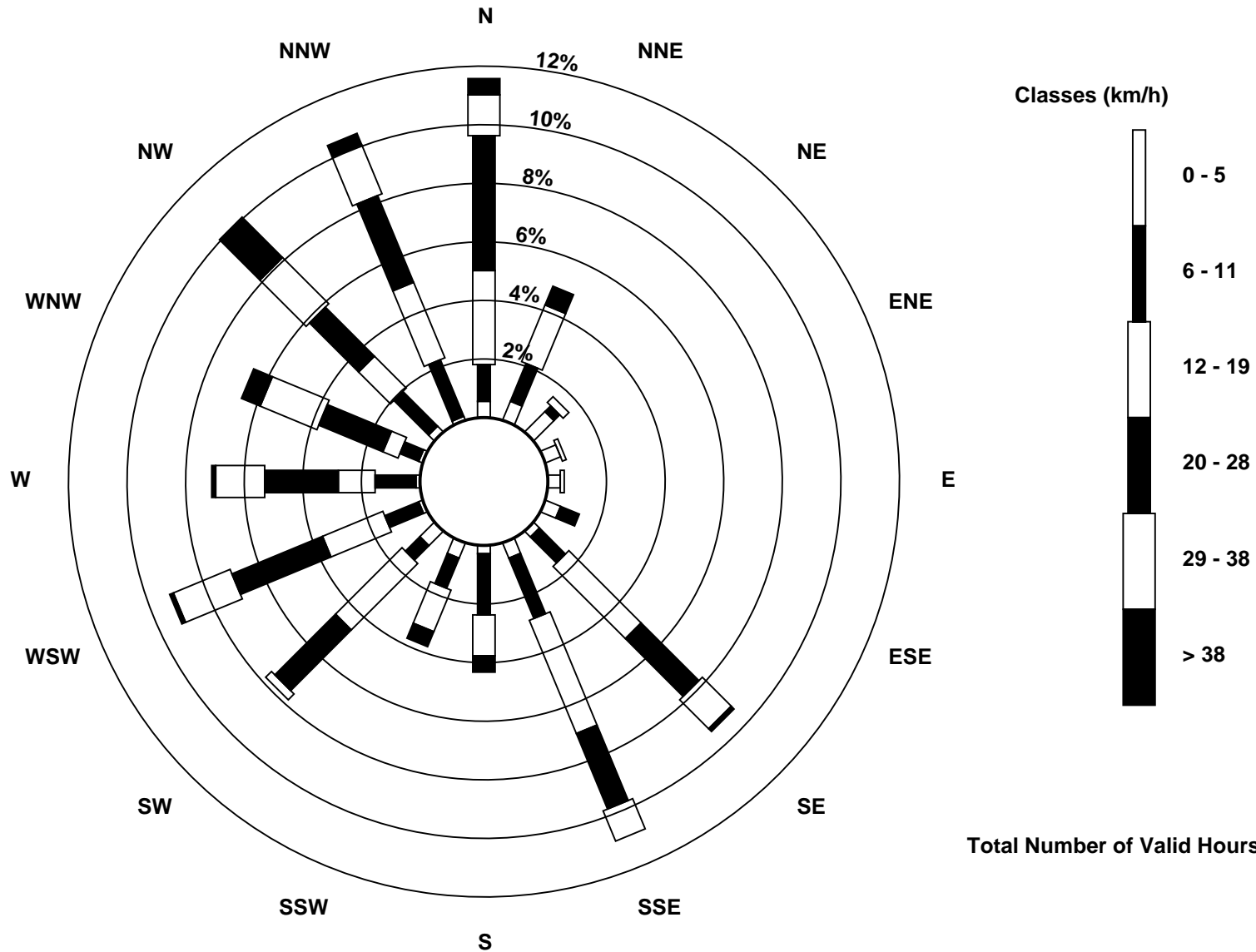
Total Number of Valid Hours: 717

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed 100 m (WS100m) - km/h  
Lower Camp Met Tower (AMS 3)





Maximum Speed: 57 km/h on Oct 24 13:00	Maximum Daily Speed Average: 31.6 km/h on Oct 6	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 22 22:00	Minimum Daily Speed Average: 0.4 km/h on Oct 4	Hours of Data: 717
Maximum Diurnal Speed Average: 11.8 km/h at hour 2	Minimum Diurnal Speed Average: 5.9 km/h at hour 11	Hours of Missing Data: 27
Monthly Average Velocity: 9.2 km/h 283.5 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 8 Q <sub>1</sub> = 13 Median = 22 Q <sub>3</sub> = 31 P <sub>90</sub> = 39 P <sub>99</sub> = 50	Percent Operational Time: 96.4

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	NW27	WNW30	WNW32	NW29	NW26	NW29	NW26	WNW28	WNW27	NW26	NNW28	NNW32	N26	NNW25	NNW29	NNW29	NNW30	NNW36	NNW36	N39	N44	N44	N46	N48	NNW30.4	N48
2-Oct	N54	N46	N43	N39	N41	N43	N46	N41	N41	M	N39	N38	NNW35	N31	N31	NNW25	NNW25	NNW22	NNW15	NW24	NW25	WNW18	WNW18	WNW13	NNW31.5	N54
3-Oct	W16	WSW19	SW11	SW13	SSW13	S15	S16	SSE20	S17	S20	S18	SSW21	SSW27	SSW28	SSW30	SW22	SSW22	WSW11	W28	W41	WNW39	NW32	WNW37	WNW34	WSW16.0	W41
4-Oct	NW27	NNW22	N26	N18	N20	NNW14	NW13	NW16	NW13	WNW6	N3	WSW8	SW5	SW2	SE8	SE13	SE17	SSE17	SSE22	SSE20	SSE15	SSE13	SSE14	SSE16	NNW0.4	NW27
5-Oct	SSE18	SSE21	S12	SSW11	SSW12	SW13	SW15	SW12	SSW7	S8	SSE11	SSE13	SSE13	SW22	SW29	SW29	SW27	WSW35	WSW34	WSW38	W42	W45	WSW46	WSW47	WSW19.6	WSW47
6-Oct	WSW32	WSW38	WSW29	WSW40	WSW41	WSW40	WSW37	WSW27	SW19	WSW29	WSW34	WSW39	WSW45	W41	W42	W37	W30	W32	W36	W33	W27	W31	WNW11	WNW9	WSW31.6	WSW45
7-Oct	WSW14	WSW15	SW11	WSW17	WNW20	N21	N13	N20	N18	N16	NNW16	NW10	NW18	NNW16	NNW30	N26	NNW35	NNW31	NNW36	NNW33	NNW36	NNW39	NW41	NW45	NNW21.2	NW45
8-Oct	NW41	NW39	NW37	NW39	NW36	NNW32	NNW30	NW33	NW32	NW31	NW32	NNW30	NW26	WNW31	NW32	NW27	NW25	NW21	NW19	WNW16	W15	W20	SW15	SW17	NW25.8	NW41
9-Oct	SSW15	S22	S29	S31	S35	SSE32	SSE29	SSE24	SSE27	SSE25	SSE24	SSE24	SSE18	WSW13	W22	W30	W33	W28	WSW29	W30	WSW33	W36	W38	W37	SW18.0	W38
10-Oct	W33	W35	W34	W33	W21	W25	WNW27	WNW27	WNW21	NNW15	N7	N7	N6	NNE11	NNE15	NNE15	NE12	NNE16	NNE16	NNE15	NNE20	NNE19	NNE18	AF	NW12.3	W35
11-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	N28	N29	N25	N22	N22	N24	N23	----	N29
12-Oct	N26	N27	N22	N19	N20	NNW21	NNW24	NNW25	NNW23	NNW25	NNW24	NNW22	NNW20	NNW17	NNW17	N17	NNW16	N10	N12	NW16	NW22	NNW19	N9	NW11	NNW18.6	N27
13-Oct	NW14	NW13	W9	WNW9	W9	WSW8	WSW6	WSW9	WSW9	WSW11	WSW9	SW10	WSW11	WSW15	SW17	SW14	SW24	SW25	SW20	WSW24	WSW24	WSW22	WSW25	SW13	WSW13.5	SW25
14-Oct	SW10	SSW10	S9	SSW14	SSW26	SSW30	SSW29	S30	S25	SSE21	S18	SSW13	SW19	WSW24	WSW22	WSW32	W31	W27	WNW27	WNW36	WNW36	NW40	NW37	WNW26	WSW16.4	WNW40
15-Oct	W25	W31	W23	WSW18	WSW16	SW10	SW10	SSE15	SSE15	SSE22	SSE26	SSE20	SSE28	S30	SSW26	S19	SSW17	SSW14	SSW17	SSW21	SSW20	SW27	SW27	SW32	WSW16.7	SW32
16-Oct	WSW37	WSW44	W50	WNW40	W31	W19	SW14	SW19	SW16	SW11	WSW18	WSW20	WSW24	WSW23	WSW22	WSW14	WSW15	SW16	SW15	SW17	SW26	SW18	SW13	S9	WSW20.4	W50
17-Oct	S10	S9	SSE13	ESE9	SE10	SSE14	SSE13	SSE17	S9	S10	SSE16	SE13	E7	NE8	NNE10	N11	NNW20	NNW25	NW28	NW33	WNW34	WNW35	WNW41	WNW40	WNW5.8	WNW41
18-Oct	WNW43	WNW47	WNW50	WNW47	WNW41	WNW37	WNW34	WNW37	WNW35	WNW25	WNW23	NW18	WNW11	W6	WSW7	WSW4	ESE2	SE18	SE21	SE22	SE26	SE22	SE23	SE30	WNW12.9	WNW50
19-Oct	SE31	SE27	SE28	SE33	SE40	SE41	SSE42	SSE29	SSE24	SSE24	SSE14	SSE12	SE14	SE17	SE21	SE31	SE30	SE31	SE33	SE31	SE40	SE41	SE32	SE34	SE29.0	SSE42
20-Oct	SE30	SE28	SE24	SE19	SE16	SE11	SE9	ESE9	SE8	SSE8	ENE5	ESE7	NNE4	ESE7	SE11	WNW8	WNW11	WNW6	WSW5	WSW6	SSW5	W10	NW14	NW20	SSE4.9	SE30
21-Oct	NNW14	N11	NNW7	NNE13	NNE11	N7	NNE4	N6	NE4	SE4	SSE3	SSE6	SSE9	SSE8	ESE6	E6	NE4	NNE10	N9	N8	N6	N4	N4	NE2	NNE3.9	NNW14
22-Oct	SSE2	ESE2	AF	AF	AF	AF	AF	AF	AF	AF	NNW8	N8	N10	N11	N11	N8	NNW10	NW8	NNW8	N6	NNW3	N1	S4	SSW9	----	NNW11
23-Oct	SSW9	WSW15	W26	WNW30	WNW39	WNW31	W30	W25	W25	WNW24	WNW21	W18	WSW17	WSW22	WSW23	WSW20	WSW19	WSW29	WSW39	WSW36	SW23	S17	S14	SSW18	WSW20.8	WNW39
24-Oct	SSW24	SSW26	S31	S30	SSW32	WSW31	W32	W41	W50	WNW48	WNW44	NW56	NW57	NW49	NW43	NNW34	NNW34	N25	N20	NNE25	NNE16	NE9	NE16	ENE14	WNW18.7	NW57
25-Oct	NE12	NNE12	NE18	NE17	NE22	NE21	NNE21	NNE22	N25	N25	N27	N31	N30	N28	N27	NNW31	N32	NNW26	NNW21	NNW18	NNW13	WNW15	W9	W14	N19.0	N32
26-Oct	WSW26	WSW33	SW37	SW32	SW32	SSW25	SSW27	SSW26	S22	SSW16	SSW18	SSW21	SW27	SW23	WSW17	SW18	SW17	SW21	WSW24	W30	W21	W18	W13	SW21.7	SW37	
27-Oct	W4	WSW7	WSW2	S5	S8	S13	SSE16	SSE18	SSE17	SSE15	SSE17	SSE24	SSE17	SSE26	SSE33	SSE30	SSE31	SSE35	SSE34	SSE32	S33	S27	S24	SSE19.8	SSE35	
28-Oct	SSW19	SSW15	SW16	WSW22	WSW34	W38	W46	W43	W39	W35	WNW28	NW35	NW40	NW41	NW42	NW44	NW48	NW45	NW49	NW44	NW41	NW44	NNW45	NNW45	WNW31.0	NW49
29-Oct	NW43	NW49	NNW51	NW46	NNW39	NNW38	N34	N36	N35	N29	N28	N29	N30	N23	N18	NNE16	NNE9	NNE8	ENE2	SW2	SW6	SSW6	SSW11	SW17	NNW21.2	NNW51
30-Oct	SW25	SW26	SW25	SW17	SW11	SSW9	S11	SSW11	S9	S11	S8	S10	SSE8	S3	E2	NNW2	NNW7	N12	N14	NNW14	N13	NNE13	NNE14	NE9	WSW3.8	SW26
31-Oct	NE5	NNE6	NNE7	NE4	ESE4	SSE2	SE7	SE8	SE10	ESE8	E8	ENE10	NNE12	NNE14	NNE18	NNE22	NNE23	NNE22	NNE20	NNE22	N24	N29	N31	N28	NNE11.6	N31

W10.6	W11.8	W10.9	W10.7	W10.5	W9.3	W8.4	W8.3	W7.4	W6.4	WNW5.9	WNW6.4	WNW7.6	WNW8.7	WNW9.3	WNW8.3	WNW9.6	WNW9.0	WNW9.1	WNW11.1	WNW11.1	WNW11.1	WNW10.9	WNW9.9	Diurnal Average
N54	NNW49	NNW51	WNW47	N41	N43	N46	W43	W50	WNW48	WNW44	NW56	NW57	NW49	NW43	NW44	NW48	NW45	NW49	NW44	N44	W45	WSW46	N48	Diurnal Maximum

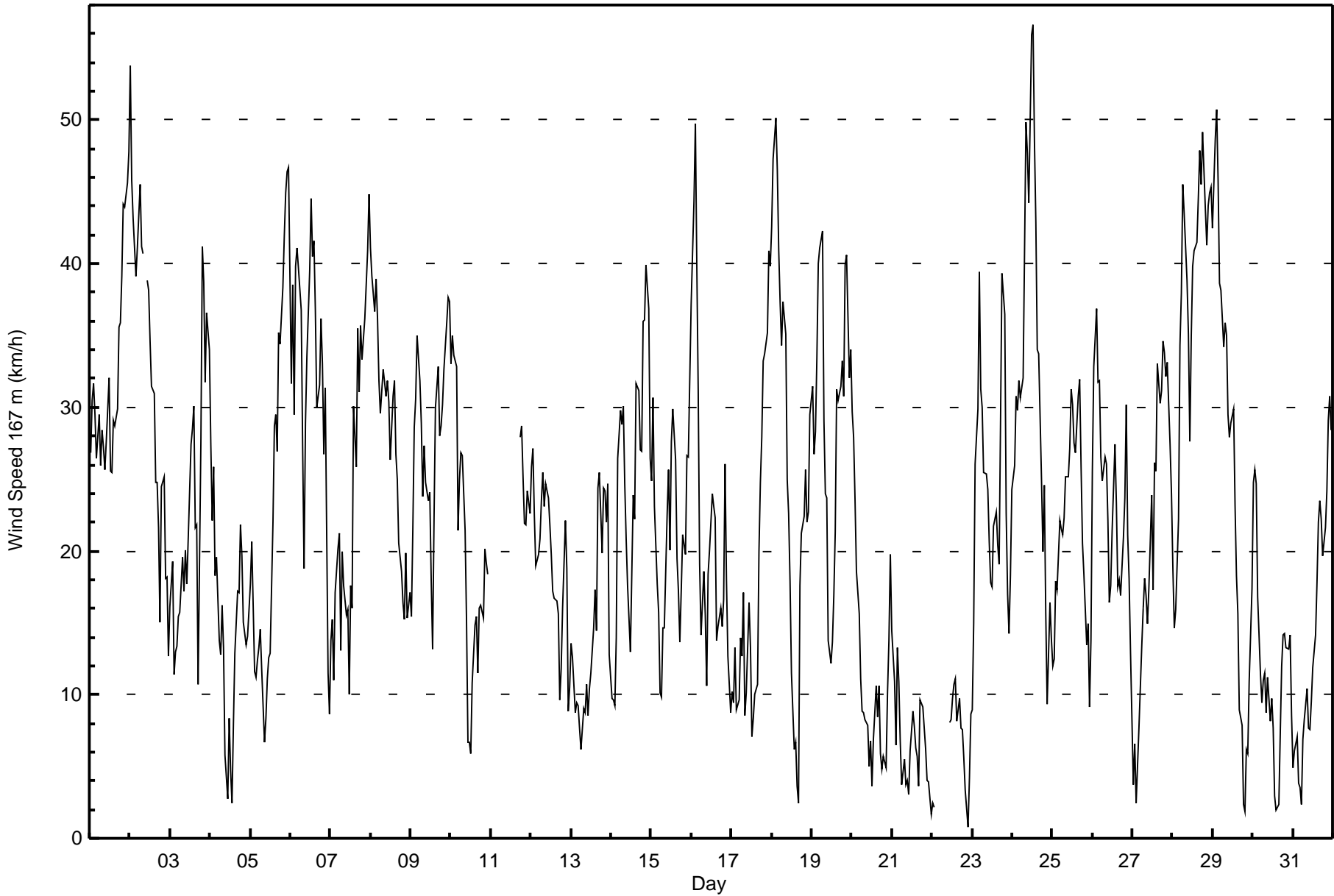
M - Maintenance      AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Speed 167 m (WS167m) - km/h**  
**Lower Camp Met Tower - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on Oct 24 13:00 Minimum Value: 1 km/h on Oct 21 17:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 5 P <sub>90</sub> = 6 P <sub>99</sub> = 8																		Hours in Service: 744 Hours of Data: 716 Hours of Missing Data: 28 Hours of Calibration: 0 Percent Operational Time: 96.2							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	UO	4	6	7	4	7	4	4	4	3	5	7	4	4	5	6	5	6	5	6	8	7	9	8	9
2-Oct	7	7	7	7	7	7	9	8	6	M	7	7	6	6	5	5	4	4	1	4	3	2	2	3	9
3-Oct	2	2	3	2	2	2	2	3	3	4	3	4	5	6	5	5	5	3	8	4	7	6	5	5	8
4-Oct	3	3	3	3	3	2	2	2	2	2	2	3	2	2	3	3	2	3	3	3	2	3	2	2	3
5-Oct	3	3	2	2	2	2	2	2	2	2	2	3	5	4	5	5	4	3	3	2	3	1	2	2	5
6-Oct	4	2	7	4	3	2	4	4	5	5	3	7	4	3	4	7	3	2	9	3	4	9	8	1	9
7-Oct	2	3	3	6	5	3	3	3	4	4	3	3	4	4	3	5	6	5	6	6	8	7	6	6	8
8-Oct	6	5	5	5	5	5	6	5	5	5	5	5	6	5	5	4	4	2	3	3	4	2	2	2	6
9-Oct	2	3	2	3	3	4	5	5	5	4	5	4	5	4	6	5	3	2	4	7	3	5	2	3	7
10-Oct	2	2	2	3	4	2	2	2	4	3	2	1	2	2	2	3	3	3	2	2	3	3	3	AF	4
11-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	3	4	3	3	3	3	3	4
12-Oct	4	5	5	4	4	3	2	4	4	4	4	4	4	4	4	3	2	2	2	3	2	4	3	1	5
13-Oct	2	3	2	1	2	3	2	1	1	2	2	1	2	3	3	3	5	3	2	2	2	3	2	4	5
14-Oct	2	2	3	5	4	3	3	2	4	3	4	4	3	4	4	4	3	5	3	7	6	5	4	4	7
15-Oct	2	2	4	4	4	4	2	3	4	3	5	4	5	4	5	2	4	2	4	4	4	3	3	4	5
16-Oct	5	5	6	7	4	7	3	4	4	3	3	3	2	2	3	3	1	2	2	8	3	4	3	2	8
17-Oct	1	2	3	3	2	2	2	4	2	2	2	3	1	2	1	1	3	2	4	4	6	6	7	6	7
18-Oct	7	6	6	5	7	6	5	4	7	5	3	5	4	4	3	2	2	3	3	3	3	3	3	5	7
19-Oct	4	5	5	5	4	4	7	6	3	3	4	3	2	2	4	2	3	3	5	6	2	2	4	2	7
20-Oct	3	4	3	6	4	3	4	4	5	5	3	3	2	3	2	2	2	1	1	2	2	2	3	3	6
21-Oct	1	4	1	2	2	2	2	1	1	2	1	3	1	2	2	2	1	4	2	1	1	2	1	1	4
22-Oct	1	2	AF	AF	AF	AF	AF	AF	AF	AF	3	2	2	2	2	2	2	2	3	1	1	2	3	3	3
23-Oct	3	3	3	3	4	5	3	2	2	4	5	3	4	4	4	2	2	3	2	3	6	2	3	5	6
24-Oct	6	6	3	5	6	5	3	4	5	9	10	10	11	9	8	5	6	4	4	2	4	3	1	2	11
25-Oct	2	2	3	3	2	2	3	3	3	3	4	4	4	4	3	3	6	3	4	1	2	2	4	7	7
26-Oct	4	2	3	6	6	5	5	4	4	3	4	4	4	4	4	3	3	2	2	3	3	5	3	2	6
27-Oct	1	2	2	2	2	2	2	2	2	2	4	4	4	4	4	5	4	4	4	3	3	4	2	2	5
28-Oct	3	3	4	3	6	3	2	2	3	3	5	7	7	7	7	8	8	8	11	8	8	8	8	9	11
29-Oct	8	8	9	8	8	6	6	6	5	5	4	5	5	4	4	3	1	2	2	2	1	1	2	2	9
30-Oct	2	2	3	3	2	2	1	2	1	3	1	2	2	1	1	1	3	1	1	1	1	1	1	2	3
31-Oct	1	1	1	1	1	1	2	3	1	2	2	1	2	2	3	2	3	2	2	3	3	4	4	3	4
Diurnal Maximum																									
M - Maintenance      AF - Analyzer Failure      UO - Unstable Operation																									





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed 167 m (WS167m) - km/h  
Lower Camp Met Tower - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	34	4.74	4.74
6 - 11	118	16.46	21.20
12 - 19	162	22.59	43.79
20 - 28	180	25.10	68.90
29 - 38	143	19.94	88.84
> 38	80	11.16	100.00

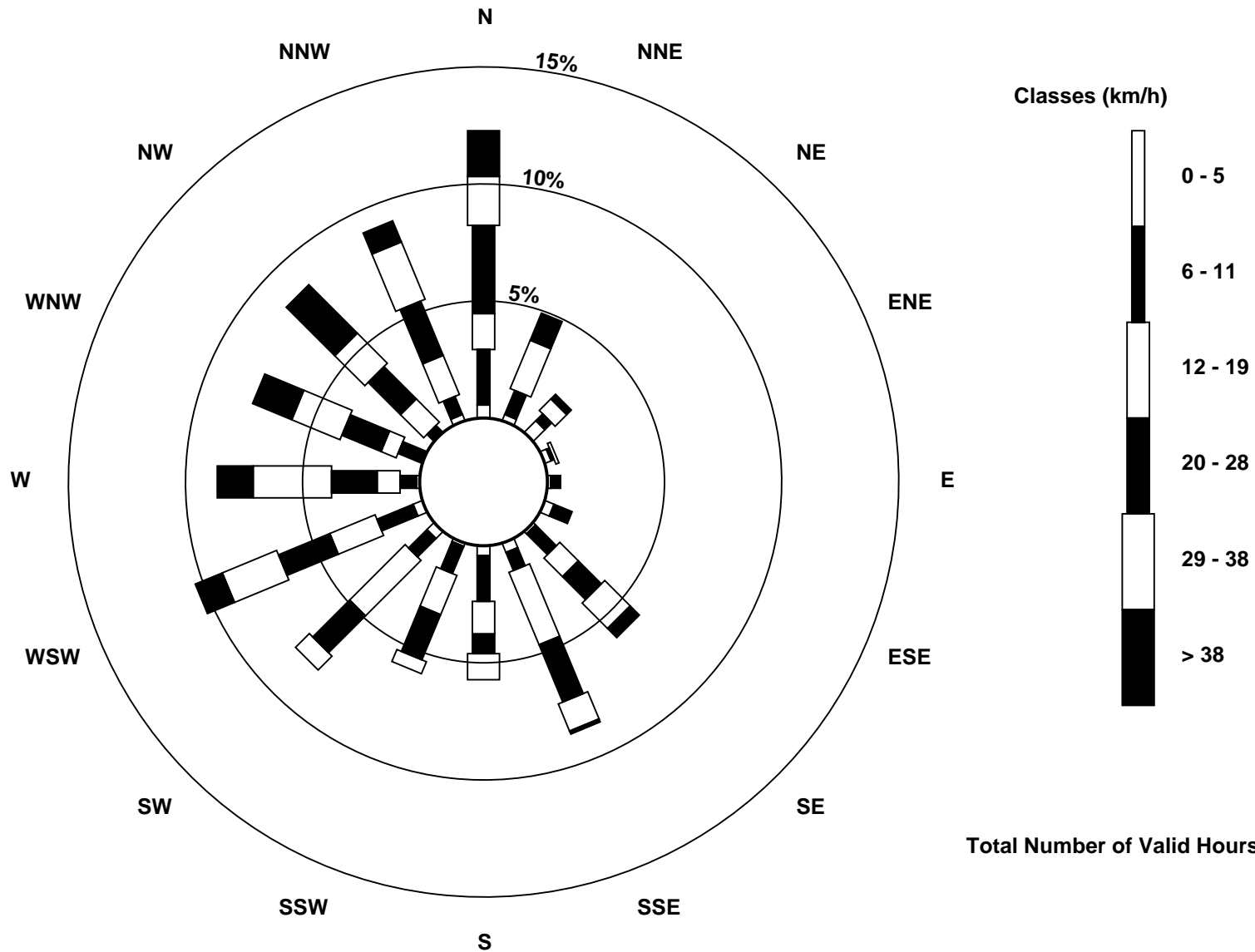
Total Number of Valid Hours: 717

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed 167 m (WS167m) - km/h  
Lower Camp Met Tower (AMS 3)





**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Wind Direction 20 m (WD20m) - deg**  
**Lower Camp Met Tower - October 2017**

Direction of Maximum Speed: 319 deg on Oct 24 13:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 139.9 deg on Oct 19	Hours of Data: 740
Direction of Minimum Speed: 210 deg on Oct 27 01:00	Hours of Missing Data: 4
Direction of Minimum Daily Speed Average: 1.3 deg on Oct 21	Percent Operational Time: 99.5
Monthly Average Direction: 307.2 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	322	313	315	318	320	323	313	304	305	315	332	344	3	342	335	328	324	331	336	346	349	350	348	350	332.1
2-Oct	348	346	348	350	347	345	352	354	354	M	356	348	346	358	350	343	345	326	321	350	359	133	79	264	348.5
3-Oct	155	178	150	146	152	154	156	124	139	142	152	182	209	216	214	211	177	142	260	276	300	333	338	343	184.7
4-Oct	347	360	337	306	320	342	355	354	350	9	42	231	217	153	142	144	148	152	153	153	162	166	148	147	150.4
5-Oct	138	138	140	144	140	141	137	129	139	148	150	145	142	226	226	221	216	259	258	261	268	267	269	264	210.8
6-Oct	254	259	257	267	262	263	258	263	202	252	255	257	262	275	275	280	272	273	270	281	268	269	304	330	266.4
7-Oct	326	188	209	246	317	342	339	348	342	342	330	324	328	349	333	342	327	341	327	331	329	331	325	326	329.5
8-Oct	324	323	323	323	325	327	338	325	324	322	308	303	313	310	314	331	328	323	333	308	282	270	233	211	315.1
9-Oct	196	174	165	159	159	160	150	150	159	157	148	154	139	139	260	275	273	253	259	276	246	271	277	269	196.5
10-Oct	270	272	270	271	319	278	295	278	304	346	360	4	1	24	14	17	36	36	28	24	18	12	13	359	327.1
11-Oct	359	1	7	10	6	3	5	14	16	19	12	15	10	11	11	12	0	359	355	355	358	350	350	352	4.9
12-Oct	353	3	6	355	347	332	322	330	333	335	341	330	338	326	340	352	331	317	314	326	338	338	330	317	338.9
13-Oct	326	330	351	349	7	110	128	144	187	230	255	253	248	245	245	228	218	238	238	237	234	234	235	176	236.0
14-Oct	146	135	118	100	184	173	166	162	160	150	158	183	238	249	240	258	268	285	285	308	313	304	297	299	224.3
15-Oct	277	271	320	355	239	142	144	142	108	143	146	125	153	157	158	143	146	141	137	149	129	174	204	228	157.3
16-Oct	247	254	282	294	283	298	153	181	208	178	250	253	269	260	262	267	245	190	153	197	229	197	195	154	252.7
17-Oct	168	156	139	41	158	119	149	147	141	149	153	148	330	353	355	334	331	327	319	309	306	310	304	304	299.6
18-Oct	305	298	299	301	305	312	311	298	299	308	297	313	292	262	245	235	110	127	129	115	127	122	129	134	298.1
19-Oct	133	127	127	141	144	143	148	152	146	150	156	151	152	149	137	137	132	126	130	135	134	133	131	134	139.9
20-Oct	94	105	97	355	344	332	328	324	332	336	3	358	357	296	162	334	316	342	147	131	161	313	50	296	0.2
21-Oct	284	299	345	345	354	4	66	28	78	118	147	171	141	144	138	138	332	340	12	11	32	62	84	128	57.6
22-Oct	133	99	78	302	62	45	AF	AF	51	343	350	347	351	347	350	2	335	329	330	347	349	2	132	190	0.1
23-Oct	160	147	270	288	298	289	266	269	268	290	306	269	258	260	252	255	240	235	232	233	179	130	111	114	254.8
24-Oct	143	149	145	151	190	239	257	259	282	294	297	319	319	320	317	336	335	346	2	28	5	348	141	24	302.3
25-Oct	336	51	41	33	35	29	8	358	355	354	353	351	352	350	337	337	342	337	333	327	305	309	293	256	348.9
26-Oct	232	229	225	223	228	213	186	179	178	175	177	193	207	215	211	225	217	213	212	242	268	334	313	272	213.3
27-Oct	210	134	132	141	132	142	135	143	144	152	148	149	152	163	164	163	161	151	160	158	156	156	158	154	154.4
28-Oct	145	146	143	173	252	256	264	261	261	262	284	319	324	326	322	322	322	321	326	319	326	326	329	334	305.8
29-Oct	324	326	327	328	341	349	356	354	356	352	357	354	358	358	5	29	44	48	139	120	136	131	142	207	348.5
30-Oct	183	213	189	153	151	142	159	162	150	153	177	158	143	140	87	298	344	349	346	344	319	335	302	270	162.6
31-Oct	319	314	323	335	36	313	318	56	106	9	353	350	349	AF	358	359	355	358	347	358	358	360	356	354	354.3

289.5 270.9 295.2 296.8 285.3 284.8 260.3 271.5 290.4 245.5 290.9 299.5 301.8 284.3 285.7 295.1 299.4 306.3 293.5 295.1 297.1 307.7 308.5 296.1  
 Diurnal Average

M - Maintenance AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods

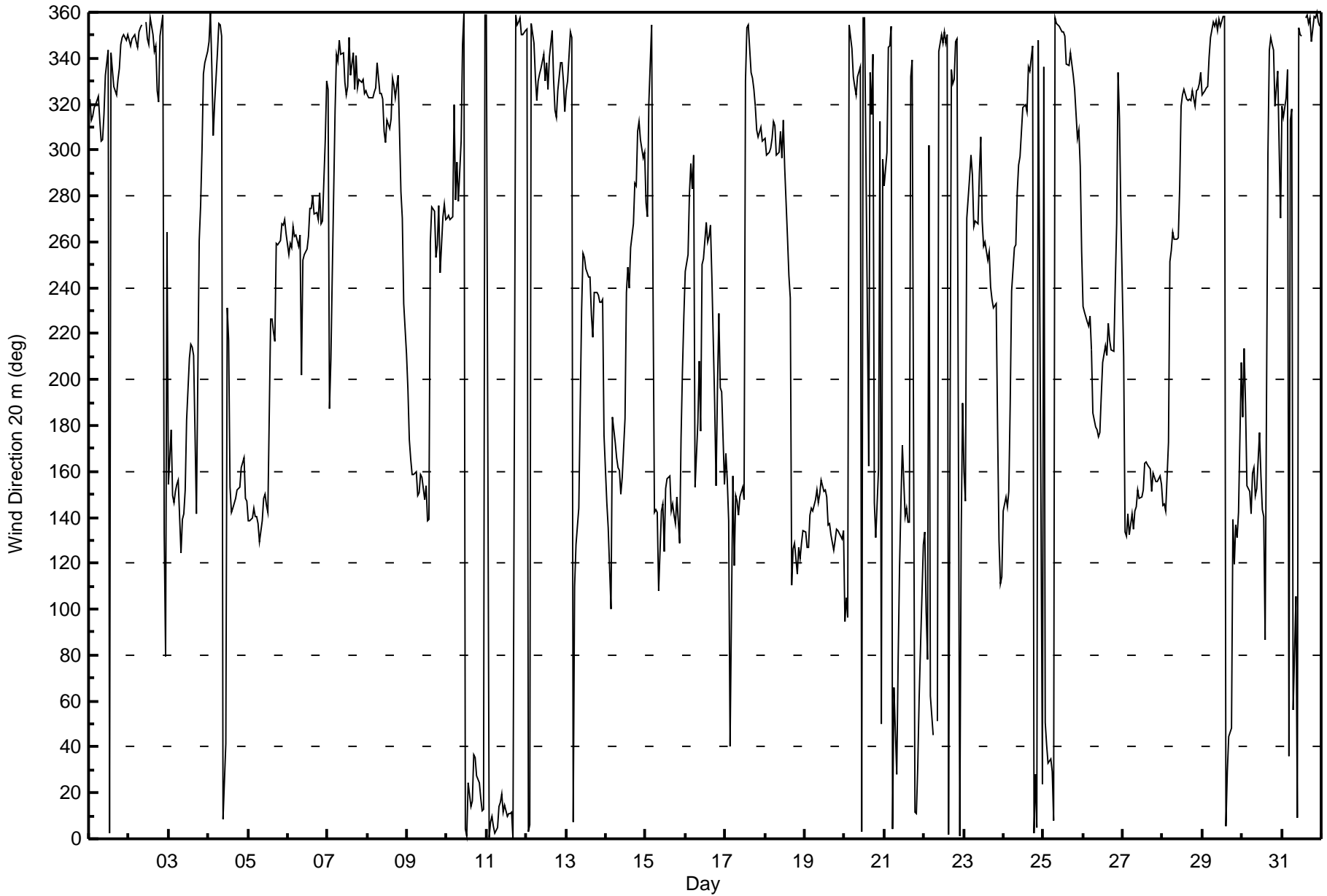




**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Direction 20 m (WD20m) - deg**  
**Lower Camp Met Tower - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 102 deg on Oct 15 05:00 Minimum Value: 7 deg on Oct 27 19:00 Percentiles: P <sub>1</sub> = 8 P <sub>10</sub> = 12 Q <sub>1</sub> = 16 Median = 19 Q <sub>3</sub> = 26 P <sub>90</sub> = 43 P <sub>99</sub> = 77		Hours in Service: 744 Hours of Data: 740 Hours of Missing Data: 4 Hours of Calibration: 0 Percent Operational Time: 99.5																							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	18	18	18	19	19	19	20	20	19	19	20	22	26	24	19	18	16	18	19	19	19	19	21	19	26
2-Oct	17	19	18	20	19	19	19	19	19	M	22	21	21	24	23	23	19	16	22	15	53	77	64	80	80
3-Oct	43	29	17	15	13	13	12	32	18	18	14	16	11	12	10	16	16	30	55	18	29	25	19	22	55
4-Oct	22	20	30	51	28	40	33	28	54	79	62	27	57	78	37	17	16	13	11	35	59	54	33	14	79
5-Oct	20	28	17	15	14	11	14	17	20	12	11	17	23	25	13	11	13	15	14	14	13	13	13	14	28
6-Oct	67	14	32	22	13	13	12	15	62	18	17	17	18	21	20	19	18	17	16	20	18	43	35	35	67
7-Oct	94	42	20	44	45	17	19	20	19	22	18	32	23	23	19	19	16	18	16	18	17	18	15	16	94
8-Oct	15	15	14	15	15	16	18	15	16	15	19	17	18	18	17	17	17	15	16	20	22	16	27	10	27
9-Oct	9	12	9	8	8	10	18	19	18	17	23	15	44	23	46	20	18	16	14	28	12	19	18	15	46
10-Oct	14	14	14	33	89	46	36	20	22	23	29	31	43	29	26	28	30	23	25	22	24	22	24	19	89
11-Oct	20	18	22	23	21	20	22	23	22	23	23	22	24	24	23	21	21	18	18	17	18	18	19	18	24
12-Oct	19	22	23	21	21	20	15	16	20	20	20	19	22	22	24	26	18	11	20	27	17	16	16	43	43
13-Oct	16	27	41	20	24	26	15	30	34	18	30	24	22	18	17	14	11	14	16	9	10	10	20	33	41
14-Oct	20	13	26	26	22	11	12	11	12	11	13	35	17	19	14	17	17	19	15	19	14	16	16	58	58
15-Oct	35	22	59	76	102	29	18	35	51	24	22	98	18	10	10	14	9	10	13	9	7	29	31	11	102
16-Oct	14	16	23	18	19	43	33	42	27	34	18	17	18	17	18	17	23	29	40	48	10	35	30	26	48
17-Oct	10	8	27	35	92	65	19	28	20	12	13	36	22	24	16	17	16	15	15	16	15	15	15	15	92
18-Oct	16	15	16	16	16	15	15	16	16	20	19	23	30	75	29	83	60	15	14	16	18	19	19	17	83
19-Oct	17	22	20	17	15	16	14	15	25	14	16	16	10	15	17	15	13	13	13	14	12	15	56	29	56
20-Oct	73	30	30	33	19	31	53	40	75	37	36	22	25	68	43	33	16	40	18	58	58	68	78	54	78
21-Oct	60	28	21	18	28	29	30	51	28	23	49	34	19	15	41	57	21	15	30	34	29	36	24	24	60
22-Oct	40	35	27	45	61	45	AF	AF	36	28	28	27	26	22	32	33	26	23	19	44	32	56	42	28	61
23-Oct	25	20	75	21	16	21	16	16	17	20	24	22	23	23	15	14	13	9	8	7	37	11	21	26	75
24-Oct	14	9	12	51	23	35	24	18	16	18	20	20	17	16	16	17	17	19	24	19	50	68	72	54	72
25-Oct	31	53	20	22	20	20	19	17	17	20	17	17	16	17	17	16	18	17	17	12	29	16	43	35	53
26-Oct	7	8	10	11	12	20	13	10	12	11	15	13	18	16	13	12	14	18	23	15	26	76	38	40	76
27-Oct	91	15	11	34	20	14	22	22	19	8	14	20	25	8	10	8	7	9	7	7	9	9	8	8	91
28-Oct	10	14	16	24	29	16	15	13	12	14	28	17	17	16	16	15	16	14	15	15	16	15	16	17	29
29-Oct	16	16	16	17	20	21	20	19	20	19	18	20	20	22	23	21	25	25	50	42	16	14	13	20	50
30-Oct	21	14	45	15	13	14	12	10	11	16	11	20	19	37	50	55	16	16	13	17	32	26	23	72	72
31-Oct	16	24	36	32	34	23	32	57	66	26	17	17	15	AF	17	16	16	16	17	16	18	18	18	16	66
94 53 75 76 102 65 53 57 75 79 62 98 57 78 50 83 60 40 55 58 59 77 78 80																									
Diurnal Maximum																									
M - Maintenance AF - Analyzer Failure																									





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 45 m (WD45m) - deg

Lower Camp Met Tower - October 2017

Direction of Maximum Speed: 324 deg on Oct 24 13:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 338.4 deg on Oct 1	Hours of Data: 324
Direction of Minimum Speed: 324 deg on Oct 20 23:00	Hours of Missing Data: 420
Direction of Minimum Daily Speed Average: 1.9 deg on Oct 20	Percent Operational Time: 43.6
Monthly Average Direction: 320.1 deg	

Day	Hourly Period Ending At (MST)																								Daily Average	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	327	314	319	323	324	327	316	307	308	321	339	351	13	352	342	334	331	338	343	352	356	358	354	359	338.4	
2-Oct	356	353	354	359	356	351	360	2	3	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
3-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
4-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
5-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
6-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
7-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
8-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
9-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
10-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
11-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
12-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
13-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
14-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
15-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
16-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
17-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
18-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
19-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	161	153	155	152	143	143	138	134	138	141	143	142	140	142	--
20-Oct	122	119	118	7	2	352	356	350	356	352	3	358	359	319	164	340	322	309	159	139	163	347	324	315	17.9	
21-Oct	335	319	354	1	7	20	66	37	82	121	150	175	146	149	140	138	343	348	19	18	38	65	84	118	50.1	
22-Oct	138	AF	AF	AF	AF	AF	AF	AF	AF	AF	359	354	1	356	359	9	348	334	340	353	356	12	133	194	--	
23-Oct	163	160	268	289	302	293	268	271	270	293	309	271	263	263	255	259	242	233	233	234	190	136	117	135	257.6	
24-Oct	156	159	151	159	197	245	261	262	285	297	300	323	324	326	322	343	342	354	13	33	18	16	99	64	308.1	
25-Oct	355	42	44	37	40	33	17	6	6	3	1	359	1	359	347	346	351	346	345	337	321	309	294	259	358.0	
26-Oct	237	234	230	227	232	216	190	185	185	181	183	195	210	219	215	232	225	222	222	247	270	318	311	283	220.4	
27-Oct	226	152	141	154	142	149	143	150	152	157	152	151	156	170	170	169	167	155	165	164	163	163	166	163	160.3	
28-Oct	152	152	155	201	257	259	266	262	263	263	287	326	331	333	329	328	329	328	328	331	324	332	334	336	340	309.4
29-Oct	331	333	334	335	348	357	4	4	7	2	6	2	5	6	13	36	46	49	134	128	151	144	153	214	357.1	
30-Oct	195	218	202	169	160	149	164	170	154	156	182	161	149	143	93	311	352	4	352	354	349	358	346	353	165.5	
31-Oct	348	359	0	8	44	334	19	87	115	26	359	359	359	AF	AF	14	5	7	355	7	8	10	4	3	6.7	

315.3	270.1	318.2	318.2	311.5	311.3	309.6	302.5	308.1	292.4	318.1	333.6	341.5	320.4	316.9	337.5	338.1	342.4	325.5	335.7	1.0	34.5	21.2	356.5
Diurnal Average																							

AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods



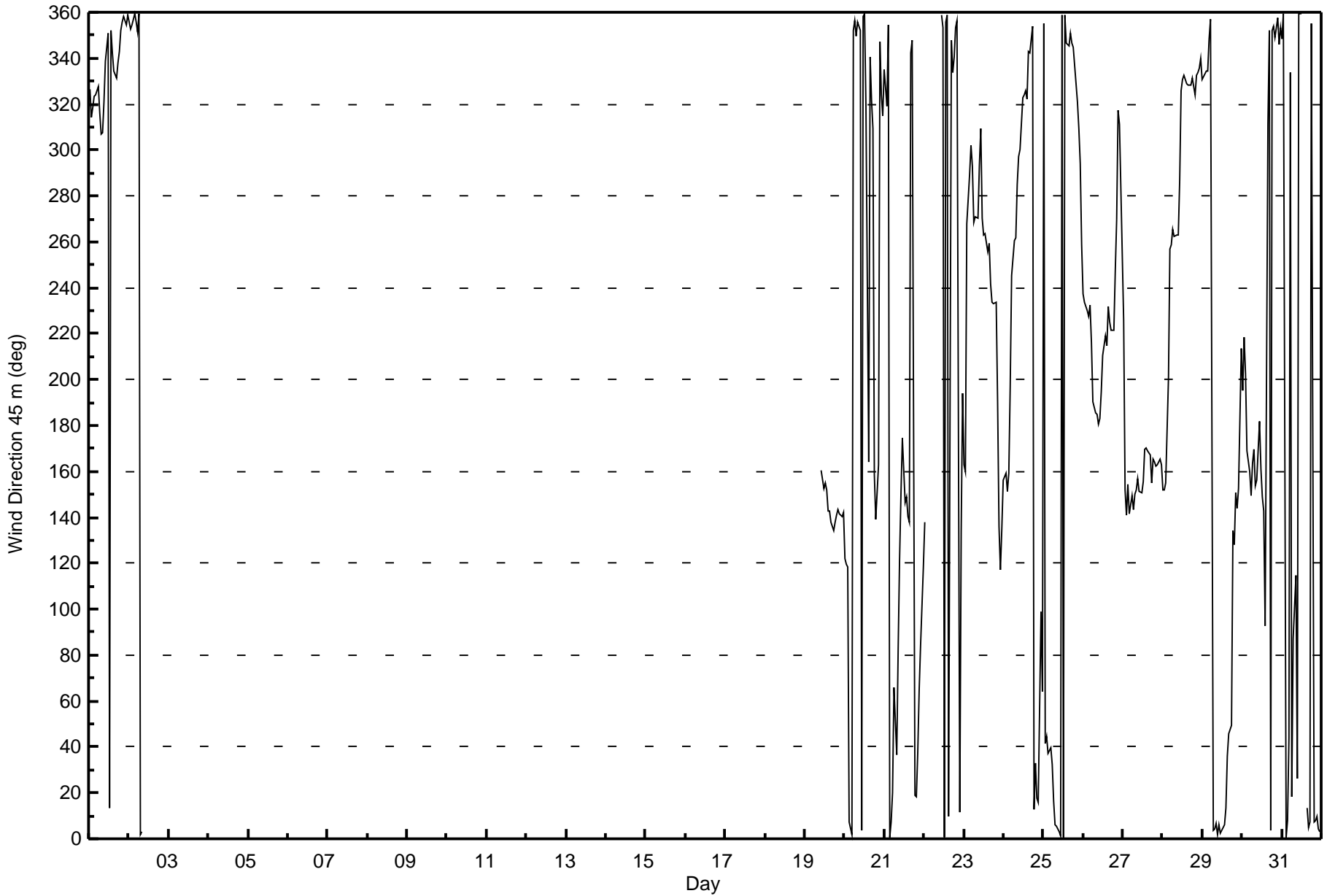
**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Direction 45 m (WD45m) - deg**  
**Lower Camp Met Tower - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 74 deg on Oct 24 22:00	Hours of Data: 324
Minimum Value: 5 deg on Oct 27 10:00	Hours of Missing Data: 420
Percentiles: P <sub>1</sub> = 6 P <sub>10</sub> = 8 Q <sub>1</sub> = 12 Median = 15 Q <sub>3</sub> = 21 P <sub>90</sub> = 35 P <sub>99</sub> = 71	Hours of Calibration: 0
	Percent Operational Time: 43.6

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	14	13	14	15	14	14	15	14	13	13	15	18	20	22	15	13	11	14	14	15	14	15	16	14	22
2-Oct	14	15	14	15	15	14	15	14	14	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	15
3-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
4-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
5-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
6-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
7-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
8-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
9-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
10-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
11-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
12-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
13-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
14-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
15-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
16-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
17-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
18-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
19-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	13	13	8	13	13	10	9	8	8	9	6	8	25	15	25
20-Oct	55	18	16	53	18	19	40	27	48	25	25	17	17	69	38	28	12	28	36	39	30	72	73	73	
21-Oct	41	29	16	11	21	21	23	37	24	21	43	32	17	13	31	54	16	12	22	23	22	26	16	25	54
22-Oct	34	AF	AF	AF	AF	AF	AF	AF	AF	AF	21	19	20	18	29	29	25	19	17	40	30	44	37	25	44
23-Oct	22	21	43	15	11	17	11	11	11	16	20	17	17	16	11	9	11	7	7	6	35	8	16	22	43
24-Oct	13	10	8	28	20	30	18	14	13	14	15	17	14	14	14	14	15	15	20	13	35	74	37	35	74
25-Oct	30	40	15	16	15	13	14	12	12	14	13	13	12	14	13	13	13	13	14	9	24	13	37	21	40
26-Oct	6	6	9	10	11	20	9	7	9	8	12	10	18	15	13	10	14	15	16	10	17	55	33	26	55
27-Oct	66	13	8	22	15	10	12	13	16	5	10	14	20	6	8	7	6	8	7	7	8	7	7	6	66
28-Oct	6	7	14	23	20	9	10	8	8	8	26	15	14	14	14	13	13	13	13	13	13	13	14	14	26
29-Oct	15	13	12	14	17	17	15	15	16	14	14	16	15	15	17	16	18	17	49	33	12	10	11	16	49
30-Oct	17	13	37	17	8	8	9	6	9	14	7	20	15	31	50	55	12	11	9	10	26	12	24	72	72
31-Oct	17	24	29	32	27	17	24	36	45	25	13	12	12	AF	AF	13	11	11	13	11	14	14	13	12	45
Diurnal Maximum																									

AF - Analyzer Failure





**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Wind Direction 100 m (WD100m) - deg**  
**Lower Camp Met Tower - October 2017**

Direction of Maximum Speed: 311 deg on Oct 24 13:00		Hours in Service: 744
Direction of Maximum Daily Speed Average: 344.2 deg on Oct 2		Hours of Data: 717
Direction of Minimum Speed: 128 deg on Oct 29 20:00	Direction of Minimum Daily Speed Average: 1.5 deg on Oct 20	Hours of Missing Data: 27
Monthly Average Direction: 286.7 deg		Percent Operational Time: 96.4

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	313	300	303	308	310	314	304	296	298	311	331	341	2	343	335	331	325	333	337	345	349	351	348	350	329.0
2-Oct	348	346	348	351	349	345	351	354	355	M	357	348	342	355	350	341	343	331	324	317	318	293	292	264	344.2
3-Oct	249	233	187	186	160	152	151	141	148	151	162	184	208	214	213	210	194	208	266	269	286	307	303	298	215.8
4-Oct	320	328	354	348	347	320	300	315	311	313	16	231	229	186	135	133	140	149	141	143	144	146	144	145	214.0
5-Oct	143	145	147	154	167	182	191	171	147	155	147	139	141	222	221	218	218	244	249	244	251	253	249	246	213.6
6-Oct	242	246	243	249	247	248	243	240	227	239	244	248	253	264	264	270	263	263	271	259	260	292	321	254.9	
7-Oct	255	230	222	245	281	344	353	357	352	352	330	319	322	344	327	346	326	340	326	332	328	328	321	322	325.9
8-Oct	320	319	319	318	321	326	335	322	319	318	302	296	306	301	307	325	321	315	326	303	272	259	228	216	310.1
9-Oct	197	176	166	161	159	154	146	149	150	148	145	150	142	211	258	263	263	254	248	267	242	261	268	259	202.1
10-Oct	253	254	265	259	266	257	273	276	295	336	359	3	5	19	10	20	34	31	30	24	14	11	11	3	314.1
11-Oct	5	5	8	9	9	8	10	AF	18	19	12	14	10	10	10	0	357	355	358	359	354	353	356	6.0	
12-Oct	356	4	6	0	355	332	322	331	334	335	338	330	333	324	337	352	334	341	342	309	322	337	334	324	339.2
13-Oct	310	305	268	266	260	229	195	205	214	230	247	242	238	238	234	224	217	232	233	234	236	235	230	201	236.6
14-Oct	186	161	145	181	198	184	174	166	164	152	159	190	229	240	233	249	258	275	274	299	301	296	299	286	236.7
15-Oct	258	255	263	258	250	192	159	146	133	142	148	142	155	165	173	156	170	163	172	199	189	217	219	229	186.9
16-Oct	239	246	268	283	272	279	223	216	220	207	239	242	255	245	250	258	240	211	211	198	229	220	219	170	243.2
17-Oct	174	164	148	102	124	146	150	153	159	165	156	121	55	19	356	344	331	325	315	302	296	299	294	297	292.1
18-Oct	295	289	289	290	295	301	300	290	293	296	293	309	287	272	241	231	102	132	134	132	129	125	130	130	283.8
19-Oct	132	126	129	137	141	141	144	145	140	144	154	143	141	139	133	135	131	135	139	139	138	137	139	138	138.2
20-Oct	140	135	136	135	117	56	12	358	346	6	345	56	343	66	144	311	305	272	229	201	158	254	300	342	121.1
21-Oct	334	336	304	2	10	11	39	20	65	119	155	159	141	141	115	108	355	352	357	355	16	AF	43	81	19.6
22-Oct	144	AF	AF	30	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
23-Oct	AF	AF	259	276	289	284	259	264	259	284	293	262	251	251	244	247	235	234	232	231	213	151	137	168	252.0
24-Oct	189	180	157	162	202	238	257	256	273	284	287	311	311	313	310	330	332	346	2	22	15	48	57	79	295.3
25-Oct	38	29	33	34	37	30	13	4	0	359	358	354	355	353	344	339	344	342	344	333	320	294	274	251	353.4
26-Oct	236	233	228	224	225	213	189	186	184	176	182	191	207	216	213	231	228	226	225	245	257	271	271	269	220.5
27-Oct	259	216	149	156	155	163	143	152	157	152	143	142	147	158	156	156	155	151	157	155	155	157	168	162	155.8
28-Oct	160	163	193	232	250	249	251	249	256	259	279	315	318	320	318	317	317	316	321	314	323	322	325	330	296.7
29-Oct	322	323	324	324	338	348	356	355	359	353	358	352	356	356	5	25	27	33	84	128	191	160	183	222	344.1
30-Oct	210	224	222	211	190	164	162	178	155	154	165	151	143	148	88	315	343	352	347	337	341	344	346	0	205.6
31-Oct	341	345	9	25	71	41	108	118	128	74	27	25	8	17	17	12	7	13	360	7	11	15	11	0	14.0

280.1 271.2 275.5 281.5 277.7 278.6 262.7 261.9 283.3 265.6 297.8 303.0 301.3 291.6 289.4 300.1 299.7 300.2 288.5 290.2 289.6 290.6 296.8 289.5  
 Diurnal Average

M - Maintenance AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

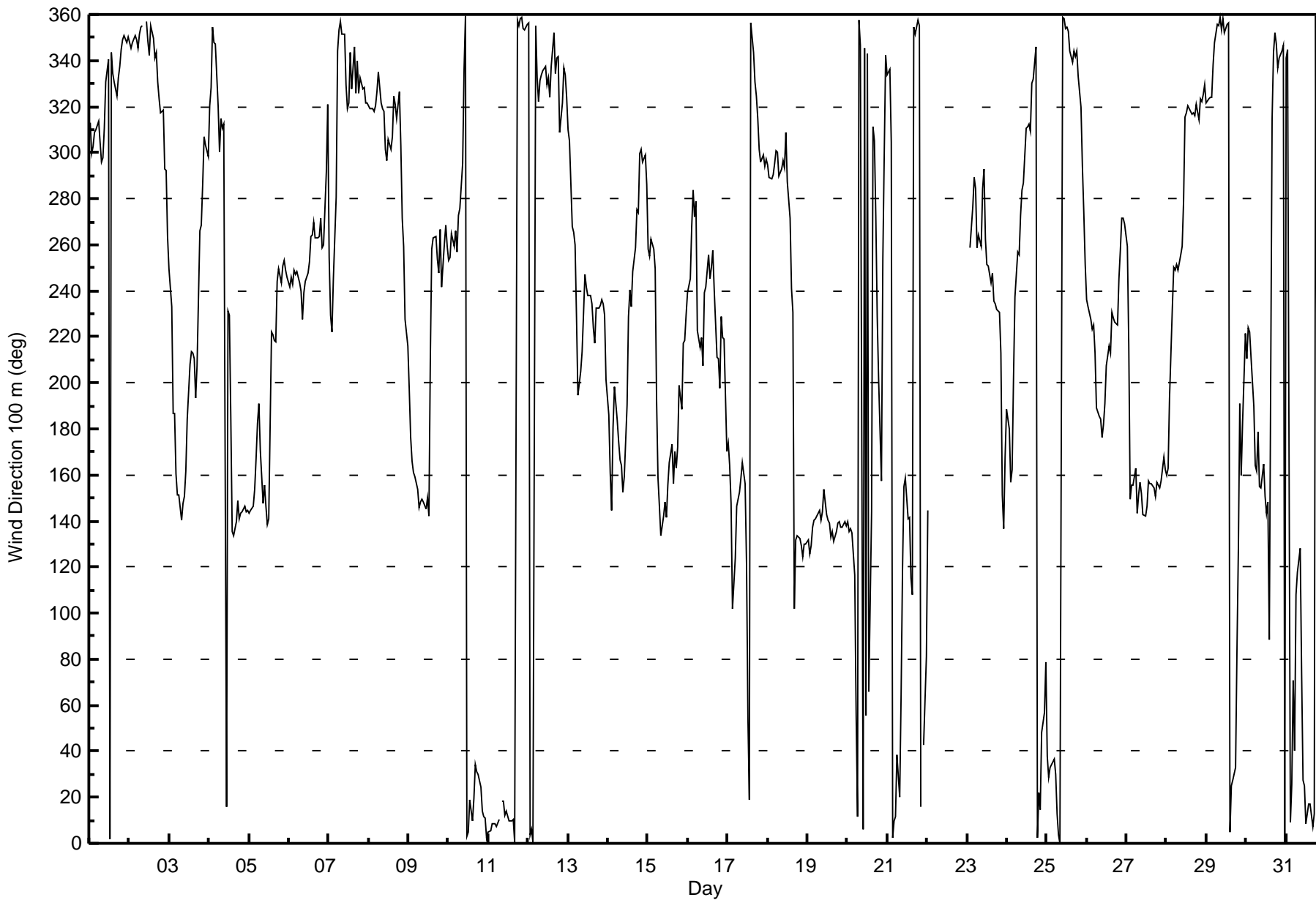
**Wind Direction 100 m (WD100m) - deg**  
**Lower Camp Met Tower - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 92 deg on Oct 20 10:00 Minimum Value: 2 deg on Oct 19 22:00 Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 5 Q <sub>1</sub> = 7 Median = 9 Q <sub>3</sub> = 12 P <sub>90</sub> = 20 P <sub>99</sub> = 63																		Hours in Service: 744 Hours of Data: 717 Hours of Missing Data: 27 Hours of Calibration: 0 Percent Operational Time: 96.4							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	10	7	9	10	9	9	11	8	9	9	11	16	10	17	12	9	8	9	9	9	9	9	10	9	17
2-Oct	8	9	9	9	9	9	9	8	8	M	10	12	13	12	12	13	10	6	4	7	5	11	15	12	15
3-Oct	11	11	17	13	8	8	5	9	8	9	12	12	10	8	7	12	10	19	14	6	11	13	9	12	19
4-Oct	11	8	14	12	10	13	10	8	14	42	68	22	36	87	19	7	4	7	4	8	7	10	7	6	87
5-Oct	5	10	10	9	7	11	15	7	15	12	7	6	34	19	8	7	10	6	3	4	2	2	2	3	34
6-Oct	8	4	6	5	4	4	5	6	15	7	6	7	6	10	9	9	6	3	7	10	5	11	39	19	39
7-Oct	23	12	13	13	20	9	10	9	8	12	11	19	14	12	12	12	9	10	9	12	10	12	8	8	23
8-Oct	7	7	8	7	8	10	10	8	8	9	16	8	11	10	9	10	8	7	8	14	19	6	18	5	19
9-Oct	10	5	8	7	5	7	7	10	9	8	9	7	10	38	15	8	5	8	5	25	6	10	7	5	38
10-Oct	3	4	5	10	18	8	8	8	13	15	12	13	23	13	10	15	15	10	11	11	8	8	10	6	23
11-Oct	6	6	7	9	9	8	9	AF	8	10	8	9	8	10	9	8	10	7	7	7	8	8	8	8	10
12-Oct	8	9	11	10	11	12	7	9	11	11	11	12	13	13	15	16	10	10	6	15	9	7	9	10	16
13-Oct	8	11	17	7	6	32	16	20	13	9	14	10	13	10	8	10	7	6	7	3	5	7	4	24	32
14-Oct	19	12	23	26	10	6	10	10	9	7	10	29	9	10	8	8	7	12	8	13	8	7	5	9	29
15-Oct	9	4	14	32	44	39	10	9	11	5	9	12	10	8	9	7	9	7	12	11	15	5	8	5	44
16-Oct	5	5	17	10	11	27	12	12	18	24	9	6	5	8	9	4	7	6	7	27	5	11	13	14	27
17-Oct	5	9	6	17	20	7	7	8	14	11	9	13	34	21	12	9	7	7	8	9	8	9	8	8	34
18-Oct	9	7	7	7	9	8	9	6	8	12	11	15	24	55	24	46	61	5	5	5	6	9	11	7	61
19-Oct	7	11	9	6	4	5	4	6	8	7	10	10	5	7	6	5	5	4	3	4	2	2	3	2	11
20-Oct	10	9	8	13	53	49	59	39	58	92	35	63	15	77	20	26	10	9	21	29	38	33	31	11	92
21-Oct	6	8	23	13	9	13	17	17	25	17	22	28	9	10	19	43	15	5	12	12	15	AF	31	36	43
22-Oct	42	AF	AF	74	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	74
23-Oct	AF	AF	13	9	6	14	5	9	7	13	17	12	10	10	8	9	6	3	3	2	25	7	14	17	25
24-Oct	21	20	5	11	16	18	9	9	9	9	12	14	11	10	10	9	10	10	15	7	13	20	6	10	21
25-Oct	32	11	9	11	9	9	9	7	6	7	6	7	7	9	8	7	8	6	9	6	14	8	33	13	33
26-Oct	3	3	5	6	6	16	11	9	10	7	15	12	15	10	11	6	8	5	6	8	8	19	15	9	19
27-Oct	9	13	37	30	18	14	5	7	8	6	5	5	10	5	6	5	4	6	5	5	5	8	7	6	37
28-Oct	5	8	24	8	7	4	4	4	6	4	22	11	10	9	10	8	9	9	10	9	10	8	9	9	24
29-Oct	11	9	8	9	14	13	9	8	10	9	6	9	8	9	11	9	16	13	65	74	14	11	16	12	74
30-Oct	10	6	9	14	15	15	13	8	7	9	8	11	7	33	38	40	4	3	6	4	5	6	6	13	40
31-Oct	6	6	9	16	39	25	25	11	13	32	22	11	9	8	8	7	9	8	8	8	11	8	8	12	39
42 20 37 74 53 49 59 39 58 92 68 63 36 87 38 46 61 19 65 74 38 33 39 36																									
Diurnal Maximum																									
M - Maintenance AF - Analyzer Failure																									



Wood Buffalo Environmental Association  
Hourly Averages

Wind Direction 100 m (WD100m) - deg  
Lower Camp Met Tower - October 2017







Maximum Value: 1.0 km/h on Oct 27 16:00		Maximum Daily Average: 0.4 km/h on Oct 27		Hours in Service: 744																						
Minimum Value: -1.4 km/h on Oct 24 13:00		Minimum Daily Average: -0.5 km/h on Oct 28		Hours of Data: 740																						
Maximum Diurnal Average: 0.0 km/h at hour 7		Minimum Diurnal Average: -0.2 km/h at hour 12		Hours of Missing Data: 4																						
Monthly Average: -0.12 km/h		Percentiles: P <sub>1</sub> = -1.1 P <sub>10</sub> = -0.7 Q <sub>1</sub> = -0.4 Median = -0.1 Q <sub>3</sub> = 0.1 P <sub>90</sub> = 0.3 P <sub>99</sub> = 0.8		Hours of Calibration: 0																						
				Percent Operational Time: 99.5																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	-0.3	-0.5	-0.6	-0.8	-0.6	-0.6	-0.5	-0.5	-0.5	-0.8	-0.2	-0.7	-0.2	-0.3	-0.4	-0.3	-0.5	-0.3	-0.2	-0.4	-0.9	-0.7	-0.6	-0.9	-0.5	-0.2
2-Oct	-0.7	-0.5	-0.6	-0.6	-0.5	-0.3	-0.8	-0.7	-0.9	M	-0.5	-0.5	-0.2	-0.4	-0.5	-0.3	-0.4	-0.2	-0.1	-0.1	0.0	0.2	0.2	0.1	-0.4	0.2
3-Oct	0.3	0.3	0.2	0.6	0.5	0.5	0.2	-0.1	0.0	0.3	0.1	0.5	0.1	0.1	0.0	-0.1	0.5	0.3	-0.1	-0.9	-0.3	-0.1	-0.2	0.0	0.1	0.6
4-Oct	-0.2	-0.1	-0.1	-0.1	0.0	-0.1	0.0	0.0	0.0	0.2	0.2	-0.3	0.3	0.1	0.4	0.4	0.2	0.0	0.2	0.2	0.1	0.3	0.2	0.1	0.1	0.4
5-Oct	0.2	-0.1	0.3	0.3	0.3	0.2	0.4	0.3	0.2	0.2	0.2	0.4	0.3	-0.2	-0.4	-0.3	-0.2	-0.5	-0.4	-0.4	-0.6	-0.9	-0.8	-0.8	-0.1	0.4
6-Oct	-0.3	-0.6	-0.3	-0.6	-0.7	-0.6	-0.4	-0.4	0.2	-0.4	-0.6	-0.7	-1.0	-1.0	-0.9	-0.9	-0.7	-0.4	-0.6	-0.6	-0.5	-0.3	-0.1	-0.1	-0.5	0.2
7-Oct	0.2	0.2	0.1	0.1	0.0	0.0	0.0	-0.1	-0.1	0.1	0.0	0.0	-0.1	-0.1	-0.3	-0.1	-0.6	-0.2	-0.5	-0.5	-0.5	-0.7	-0.6	-0.8	-0.2	0.2
8-Oct	-0.6	-0.9	-0.8	-0.7	-0.6	-0.3	-0.2	-0.5	-0.5	-0.9	-0.8	-0.9	-0.7	-0.7	-0.7	-0.1	-0.3	-0.4	-0.1	-0.3	-0.4	-0.6	-0.2	0.0	-0.5	0.0
9-Oct	0.0	0.7	0.9	0.7	0.8	0.6	0.6	0.5	0.6	0.4	0.4	0.4	0.2	0.2	-0.3	-0.7	-0.7	-0.3	-0.2	-0.6	-0.2	-0.7	-0.5	-0.8	0.1	0.9
10-Oct	-0.6	-0.6	-0.9	-0.5	0.0	-0.2	-0.2	-0.4	-0.3	-0.3	-0.1	-0.2	0.2	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	0.0	-0.1	-0.1	-0.3	-0.2	0.2
11-Oct	-0.3	-0.4	0.0	-0.1	-0.2	-0.3	0.0	0.0	0.1	-0.1	-0.1	-0.4	-0.2	0.0	0.1	-0.2	-0.2	-0.5	-0.5	-0.5	-0.4	-0.3	-0.2	-0.3	-0.2	0.1
12-Oct	-0.6	-0.4	-0.4	-0.1	-0.1	-0.1	-0.2	-0.3	-0.3	-0.2	-0.2	-0.3	-0.4	-0.2	-0.2	-0.2	-0.1	0.0	-0.1	0.0	-0.1	0.0	0.0	0.0	-0.2	0.0
13-Oct	-0.2	-0.1	0.0	-0.1	0.0	0.2	0.3	0.3	0.1	0.0	-0.1	-0.2	-0.4	-0.3	-0.2	-0.1	-0.2	-0.3	-0.3	-0.3	-0.2	-0.2	-0.2	0.3	-0.1	0.3
14-Oct	0.3	0.2	0.1	0.0	0.5	0.7	0.8	0.8	0.6	0.3	0.3	0.1	-0.2	-0.5	-0.4	-0.5	-0.6	-0.4	-0.7	-0.7	-0.7	-0.5	-0.4	-0.1	-0.1	0.8
15-Oct	0.0	-0.4	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.1	0.4	0.3	0.0	0.4	0.6	0.6	0.1	0.3	0.2	0.2	0.6	0.5	0.3	0.0	-0.2	0.6
16-Oct	-0.3	-0.5	-0.9	-0.7	-0.6	-0.3	0.3	0.2	0.1	0.3	-0.3	-0.3	-0.8	-0.6	-0.4	-0.3	0.0	0.2	0.2	0.2	-0.2	0.2	0.1	0.2	-0.2	0.3
17-Oct	0.6	0.4	0.2	0.0	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	-0.1	0.0	-0.1	0.1	0.0	-0.3	-0.3	-0.4	-0.8	-0.6	-0.8	-0.9	-0.1	0.6
18-Oct	-0.8	-1.4	-1.1	-1.0	-1.0	-0.8	-0.6	-0.6	-0.8	-0.5	-0.7	-0.5	-0.4	0.1	-0.2	0.0	0.2	0.1	0.2	0.0	0.0	0.3	0.0	0.3	-0.4	0.3
19-Oct	0.2	0.0	0.2	0.1	0.2	0.2	0.3	0.6	0.3	0.2	0.2	0.3	0.2	0.2	0.4	0.2	0.1	0.0	-0.1	0.1	0.1	0.0	0.1	0.0	0.2	0.6
20-Oct	0.2	-0.2	-0.2	0.0	-0.3	-0.1	0.0	-0.2	0.0	-0.1	0.0	-0.3	0.0	0.0	0.1	-0.3	-0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.0	0.0	0.2
21-Oct	0.0	-0.1	-0.1	-0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.4	0.2	0.4	0.1	-0.1	0.0	-0.1	0.1	-0.1	0.1	0.2	0.1	0.1	0.4
22-Oct	0.2	0.2	0.0	0.0	0.1	0.7	AF	AF	0.2	-0.2	-0.1	-0.1	-0.3	-0.2	-0.2	-0.2	-0.1	-0.1	0.0	0.1	0.1	0.1	0.2	0.2	0.0	0.7
23-Oct	0.3	0.5	0.0	-0.4	-0.6	-0.5	-0.6	-0.5	-0.5	-0.4	-0.5	-0.4	-0.2	-0.6	-0.5	-0.3	-0.1	-0.1	-0.4	-0.3	0.2	0.0	-0.3	0.1	-0.3	0.5
24-Oct	0.6	0.6	0.3	0.4	0.5	-0.3	-0.3	-0.4	-1.2	-1.0	-1.2	-0.9	-1.4	-1.4	-1.1	-0.2	-0.2	-0.2	0.0	0.1	0.0	0.0	0.1	0.0	-0.3	0.6
25-Oct	-0.1	0.1	0.1	0.0	0.1	0.1	0.0	-0.4	-0.4	-0.3	-0.5	-0.6	-0.4	-0.3	0.0	0.0	-0.2	0.0	0.0	0.0	-0.1	-0.2	-0.1	0.0	-0.1	0.1
26-Oct	-0.2	-0.3	-0.3	-0.2	-0.4	-0.1	0.2	0.5	0.4	0.5	0.4	0.1	0.0	0.0	0.1	-0.1	-0.1	0.1	0.2	-0.1	-0.4	0.0	-0.2	0.0	0.0	0.5
27-Oct	0.1	0.2	0.3	0.2	0.2	0.1	0.1	0.1	0.0	0.1	0.2	0.0	0.3	0.8	0.9	1.0	0.9	0.2	0.7	0.8	0.6	0.7	0.8	0.5	0.4	1.0
28-Oct	0.2	0.4	0.3	0.4	-0.3	-0.4	-0.9	-0.7	-0.9	-0.8	-0.6	-0.7	-0.8	-0.7	-0.7	-0.9	-1.1	-1.1	-1.0	-0.9	-0.5	-0.6	-0.3	-0.3	-0.5	0.4
29-Oct	-0.8	-0.7	-0.6	-0.6	-0.5	-0.3	-0.5	-0.6	-0.3	-0.4	-0.6	-0.6	-0.5	-0.4	-0.2	0.0	0.0	0.1	0.2	0.1	0.3	0.1	0.3	0.2	-0.3	0.3
30-Oct	0.5	0.1	0.2	0.6	0.6	0.2	0.4	0.9	0.3	0.3	0.7	0.5	0.4	0.3	0.1	0.0	0.1	-0.1	0.0	-0.1	0.0	0.0	0.0	0.1	0.2	0.9
31-Oct	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	-0.2	-0.3	-0.1	AF	-0.1	0.0	-0.3	-0.3	-0.1	-0.2	-0.2	-0.6	-0.7	-0.7	-0.2	0.1
																								Diurnal Average		
																								Diurnal Maximum		
																								M - Maintenance AF - Analyzer Failure		



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Vertical Wind Speed 20 m (VW20m) - km/h**  
**Lower Camp Met Tower - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 5.4 km/h on Oct 24 12:00 Minimum Value: 0.1 km/h on Oct 31 01:00 Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.5 Q <sub>1</sub> = 1.0 Median = 1.7 Q <sub>3</sub> = 2.4 P <sub>90</sub> = 3.2 P <sub>99</sub> = 4.5																								Hours in Service: 744 Hours of Data: 740 Hours of Missing Data: 4 Hours of Calibration: 0 Percent Operational Time: 99.5	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	1.9	2.4	3.0	2.8	2.4	3.0	2.5	2.7	2.7	2.6	2.5	3.3	2.6	2.5	2.5	2.0	2.1	2.6	2.7	3.6	4.4	4.1	4.4	4.5	4.5
2-Oct	5.0	4.1	3.9	3.9	3.8	3.9	4.5	4.1	4.3	M	4.1	3.8	3.5	3.7	3.2	2.5	2.6	1.7	0.6	0.5	0.3	0.3	0.4	0.5	5.0
3-Oct	0.6	1.1	0.8	1.0	1.6	1.7	2.1	2.1	2.1	2.6	2.4	1.8	1.9	1.8	1.9	1.4	1.2	0.7	1.6	2.9	2.4	1.7	1.9	1.5	2.9
4-Oct	1.2	0.8	0.7	0.4	0.3	0.2	0.3	0.5	0.8	1.2	1.5	1.5	1.4	1.5	1.6	1.5	1.3	1.4	1.4	1.4	1.0	1.1	1.0	1.3	1.6
5-Oct	1.2	1.6	1.2	1.2	1.0	0.7	0.8	0.8	1.1	1.5	1.8	2.0	2.0	1.8	2.0	1.8	1.4	1.9	1.6	1.4	1.8	2.3	2.4	2.4	2.4
6-Oct	1.3	1.9	1.7	2.2	2.2	2.1	1.5	1.1	1.2	2.4	2.6	3.2	3.8	3.6	4.0	3.5	2.6	2.1	2.6	2.3	1.8	2.0	1.0	0.3	4.0
7-Oct	0.6	0.5	0.6	1.4	1.4	1.2	0.7	1.5	1.3	1.4	1.6	1.2	1.8	1.7	2.3	2.1	3.0	2.8	3.0	2.9	3.2	3.4	3.3	3.9	3.9
8-Oct	3.7	3.3	3.1	3.4	3.1	2.7	2.7	2.8	2.8	2.9	3.4	3.1	2.7	3.2	3.1	2.5	2.4	1.8	1.4	1.3	1.6	2.0	1.3	0.9	3.7
9-Oct	0.8	1.1	1.5	2.0	2.4	2.4	2.7	2.2	2.3	2.3	2.2	2.4	2.1	1.0	1.8	2.6	2.6	1.2	0.9	2.5	1.6	2.2	2.7	2.6	2.7
10-Oct	2.1	2.2	2.7	2.2	1.0	1.7	2.0	1.8	2.1	1.9	1.4	1.4	1.3	1.5	2.0	2.1	1.5	1.6	1.4	1.4	2.3	2.2	1.9	1.9	2.7
11-Oct	2.1	2.4	2.2	2.2	2.1	2.3	2.6	3.0	3.0	3.0	3.4	3.4	3.6	3.4	3.0	3.2	2.7	2.8	3.0	2.4	2.3	2.2	2.2	2.3	3.6
12-Oct	2.7	2.7	2.4	2.0	2.0	1.7	1.7	2.3	2.2	2.4	2.6	2.4	2.1	2.2	2.0	1.9	1.3	0.5	0.3	0.6	1.2	1.4	0.8	0.6	2.7
13-Oct	0.5	0.4	0.3	0.2	0.3	0.3	0.6	0.6	0.8	1.2	1.5	1.6	1.5	1.7	1.7	1.1	1.5	1.8	1.4	1.3	1.4	1.3	1.0	0.6	1.8
14-Oct	0.6	0.7	0.9	0.9	1.1	1.3	1.6	2.1	2.1	2.6	2.1	1.7	1.9	2.3	1.8	2.7	2.7	2.3	2.2	2.6	2.6	2.6	2.3	1.4	2.7
15-Oct	1.6	2.1	1.5	1.2	1.1	1.0	1.0	1.6	1.6	2.6	2.1	1.1	1.8	2.4	2.0	1.8	1.4	1.0	0.8	0.9	0.7	0.8	0.9	1.3	2.6
16-Oct	2.1	2.8	3.9	3.4	2.1	1.4	0.6	0.9	1.0	1.2	1.9	2.1	2.4	2.2	2.0	1.1	0.2	0.4	0.4	0.9	1.1	0.8	0.6	0.5	3.9
17-Oct	0.6	0.7	0.8	0.5	0.4	0.5	0.7	1.2	1.0	1.1	1.3	0.6	0.5	0.7	0.6	0.8	1.6	1.7	1.9	2.1	2.5	2.7	3.1	3.3	3.3
18-Oct	3.4	4.2	4.5	3.8	3.5	3.2	2.9	3.1	3.2	2.7	2.7	2.3	1.8	1.5	1.3	0.8	0.3	1.2	1.3	1.4	1.7	1.7	1.9	2.6	4.5
19-Oct	2.7	2.2	2.5	2.8	3.2	3.4	3.8	2.7	2.2	2.6	1.8	1.9	1.8	2.0	2.3	2.9	2.3	1.9	2.3	2.4	2.6	2.7	1.9	2.2	3.8
20-Oct	1.2	1.9	1.0	0.5	0.8	0.6	0.4	0.6	0.6	0.8	1.3	0.9	1.5	1.2	1.1	1.5	0.9	0.2	0.2	0.3	0.2	0.2	0.3	0.3	1.9
21-Oct	0.2	0.2	0.4	0.8	0.8	0.8	0.6	0.6	0.6	0.7	0.6	1.0	1.4	1.3	1.3	0.9	0.8	1.2	1.1	1.0	1.0	0.8	0.9	0.7	1.4
22-Oct	0.7	0.9	1.0	0.8	0.9	2.5	AF	AF	1.4	1.3	1.5	1.5	1.6	1.7	1.8	1.3	1.1	1.0	0.9	0.9	0.8	0.6	0.5	0.6	2.5
23-Oct	0.9	0.8	1.6	2.4	3.1	2.7	2.3	2.1	2.0	2.2	2.2	2.1	2.1	2.2	1.8	1.2	0.4	0.8	1.5	1.2	1.0	1.2	1.4	1.4	3.1
24-Oct	1.7	1.8	1.4	1.5	1.7	1.6	1.7	2.2	3.4	4.1	4.2	5.4	5.3	4.7	3.9	3.2	2.9	2.0	1.7	1.8	0.9	0.2	0.3	0.4	5.4
25-Oct	0.4	0.4	1.3	1.5	1.6	1.5	1.7	2.0	2.1	2.1	2.1	2.6	2.6	2.3	2.1	2.2	2.6	1.8	1.3	0.9	0.6	0.9	0.7	1.1	2.6
26-Oct	1.1	1.3	1.7	1.9	2.1	1.7	1.5	1.5	1.7	1.6	1.3	1.3	1.4	1.6	1.3	1.0	0.9	0.8	0.8	0.9	1.6	1.2	1.1	0.5	2.1
27-Oct	0.3	0.4	0.5	0.5	0.6	1.0	1.5	1.1	1.2	1.5	2.1	2.4	2.0	2.0	1.7	2.2	2.0	2.6	2.1	2.1	2.1	2.2	1.9	1.8	2.6
28-Oct	1.9	1.7	1.4	0.8	1.8	2.5	2.6	2.4	2.5	2.6	2.4	3.4	3.8	3.8	3.7	3.7	4.3	4.1	4.4	3.8	3.6	4.1	3.9	3.7	4.4
29-Oct	3.6	4.5	4.5	4.2	3.7	3.6	3.4	3.5	3.3	2.9	2.9	3.1	3.2	2.9	2.3	1.8	1.1	0.7	0.4	0.4	0.5	0.7	0.8	0.9	4.5
30-Oct	1.1	1.4	1.1	0.9	0.9	0.9	1.0	1.1	1.4	1.8	1.1	1.4	1.4	1.0	0.8	0.5	0.6	0.6	0.4	0.4	0.3	0.2	0.2	0.2	1.8
31-Oct	0.1	0.2	0.2	0.2	0.3	0.3	0.2	0.4	0.6	0.5	0.8	1.0	1.0	AF	1.2	1.7	2.2	1.8	1.5	1.7	2.3	2.8	3.0	3.1	3.1
5.0 4.5 4.5 4.2 3.8 3.9 4.5 4.1 4.3 4.1 4.2 5.4 5.3 4.7 4.0 3.7 4.3 4.1 4.4 3.8 4.4 4.1 4.4 4.5																								Diurnal Maximum	
M - Maintenance AF - Analyzer Failure																									



Maximum Value: 0.9 km/h on Oct 24 01:00      Maximum Daily Average: 0.3 km/h on Oct 27																								Hours in Service: 744 Hours of Data: 324			
Minimum Value: -0.9 km/h on Oct 24 13:00      Minimum Daily Average: -0.3 km/h on Oct 1 Maximum Diurnal Average: 0.2 km/h at hour 1      Minimum Diurnal Average: -0.1 km/h at hour 9 Monthly Average: 0.04 km/h      Percentiles: P <sub>1</sub> = -0.7 P <sub>10</sub> = -0.3 Q <sub>1</sub> = -0.2 Median = 0.1 Q <sub>3</sub> = 0.2 P <sub>90</sub> = 0.4 P <sub>99</sub> = 0.7																								Hours of Missing Data: 420 Hours of Calibration: 0 Percent Operational Time: 43.6			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	-0.3	-0.3	-0.3	-0.3	-0.3	-0.5	-0.3	-0.2	-0.3	-0.6	0.2	-0.3	-0.2	-0.4	-0.2	-0.3	-0.4	0.0	0.0	-0.1	-0.4	-0.3	0.1	-0.5	-0.3	0.2	
2-Oct	-0.3	0.1	0.0	-0.2	0.2	0.1	-0.1	-0.2	-0.3	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	0.2
3-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
4-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
5-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
6-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
7-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
8-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
9-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
10-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
11-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
12-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
13-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
14-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
15-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
16-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
17-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
18-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
19-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.3	0.4	0.3	0.4	0.6	0.3	0.4	0.3	0.5	0.5	0.5	0.5	0.5	0.3	--	0.6	
20-Oct	0.4	-0.1	-0.1	0.1	-0.3	0.1	0.0	-0.1	0.1	0.0	0.1	-0.3	0.0	0.1	0.3	-0.2	-0.2	0.1	0.2	0.3	0.2	0.2	0.1	0.1	0.1	0.4	
21-Oct	0.0	0.0	0.0	-0.2	0.1	0.1	0.0	0.2	0.1	0.2	0.1	0.2	0.4	0.3	0.5	0.3	0.0	0.1	0.0	0.2	0.0	0.3	0.1	0.3	0.1	0.5	
22-Oct	0.2	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.1	0.0	-0.2	0.1	-0.1	-0.1	-0.1	0.0	0.0	0.2	0.1	0.2	0.3	0.2	--	0.3	
23-Oct	0.3	0.4	0.5	-0.1	-0.4	-0.4	-0.3	-0.2	-0.2	-0.1	-0.3	-0.2	0.1	-0.1	-0.1	-0.1	0.0	0.0	0.0	0.2	0.1	0.1	-0.3	0.3	0.0	0.5	
24-Oct	0.9	0.6	0.5	0.4	0.2	-0.2	-0.3	-0.2	-0.7	-0.4	-0.6	-0.5	-0.9	-0.7	-0.7	0.0	-0.2	0.1	0.1	0.2	0.2	0.1	0.2	0.2	-0.1	0.9	
25-Oct	0.0	0.2	0.1	0.1	0.4	0.2	0.1	-0.1	-0.1	0.0	-0.1	-0.2	-0.2	0.0	0.2	0.0	-0.1	0.1	0.0	0.0	-0.1	-0.2	-0.1	0.3	0.0	0.4	
26-Oct	0.2	0.0	-0.1	-0.1	0.1	-0.2	0.0	0.0	0.1	0.0	0.2	-0.1	-0.1	0.0	-0.1	0.0	0.0	0.1	0.1	0.2	0.1	0.2	-0.4	-0.1	0.0	0.2	
27-Oct	0.2	0.3	0.4	0.2	0.3	0.3	0.1	0.2	0.1	0.1	0.2	0.1	0.3	0.1	0.7	0.5	0.6	0.3	0.2	0.6	0.7	0.5	0.5	0.3	0.3	0.7	
28-Oct	0.6	0.6	0.7	0.2	0.3	-0.1	-0.5	-0.3	-0.4	-0.3	-0.3	-0.5	-0.5	-0.1	-0.2	-0.6	-0.7	-0.7	-0.6	-0.7	-0.2	-0.4	-0.2	-0.1	-0.2	0.7	
29-Oct	-0.4	-0.5	-0.2	-0.2	-0.4	0.0	-0.2	0.1	0.2	0.0	-0.2	0.0	0.1	-0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.0	0.3	
30-Oct	0.4	0.2	0.3	0.5	0.7	0.3	0.4	0.7	0.3	0.4	0.3	0.4	0.4	0.2	0.2	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.0	0.1	0.3	0.7	
31-Oct	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.2	0.1	0.1	0.0	0.0	0.0	AF	AF	-0.2	0.0	0.0	0.1	0.1	0.0	-0.1	-0.3	-0.2	0.0	0.2	
																								Diurnal Average			
																								Diurnal Maximum			
AF - Analyzer Failure																											



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Vertical Wind Speed 45 m (VW45m) - km/h**  
**Lower Camp Met Tower - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 5.8 km/h on Oct 24 13:00	Hours of Data: 324
Minimum Value: 0.1 km/h on Oct 31 01:00	Hours of Missing Data: 420
Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.5 Q <sub>1</sub> = 0.9 Median = 1.7 Q <sub>3</sub> = 2.5 P <sub>90</sub> = 4.1 P <sub>99</sub> = 4.8	Hours of Calibration: 0
	Percent Operational Time: 43.6

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	2.1	2.4	3.2	3.0	2.6	3.0	2.6	2.8	2.5	2.6	2.9	3.5	2.8	2.7	2.8	2.3	2.3	3.0	3.0	3.7	4.4	4.4	4.6	4.8	4.8
2-Oct	5.1	4.7	4.2	4.1	4.1	4.3	4.6	4.3	4.2	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	5.1
3-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
4-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
5-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
6-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
7-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
8-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
9-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
10-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
11-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
12-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
13-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
14-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
15-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
16-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
17-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
18-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
19-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	1.8	1.9	1.5	1.9	2.2	2.5	2.0	1.6	2.1	2.3	1.9	2.2	2.0	2.4	2.5
20-Oct	1.8	2.1	1.2	0.6	1.0	0.6	0.4	0.7	0.8	0.9	1.3	0.8	1.4	1.3	1.2	1.7	0.9	0.2	0.2	0.2	0.3	0.2	0.3	0.5	2.1
21-Oct	0.2	0.3	0.4	0.9	0.9	0.8	0.6	0.7	0.6	0.7	0.6	1.0	1.4	1.2	1.5	0.9	0.8	1.4	1.1	1.0	1.0	0.9	0.8	0.8	1.5
22-Oct	0.9	AF	AF	AF	AF	AF	AF	AF	AF	AF	1.5	1.5	1.6	1.8	1.8	1.3	1.1	1.1	1.1	0.9	0.8	0.6	0.6	0.8	1.8
23-Oct	1.0	0.9	1.8	2.7	3.1	2.5	2.2	2.1	2.0	2.5	2.4	2.4	2.1	2.2	1.7	1.2	0.5	0.9	1.7	1.5	1.1	0.9	1.4	1.6	3.1
24-Oct	1.5	1.4	1.2	1.8	2.2	1.8	1.9	2.2	3.9	4.4	4.6	5.7	5.8	5.2	4.5	3.6	3.2	2.2	1.7	1.7	1.0	0.4	0.5	0.5	5.8
25-Oct	0.5	0.4	1.3	1.7	1.7	1.5	1.6	1.9	2.0	2.1	2.2	2.6	2.6	2.4	2.3	2.6	2.8	2.0	1.5	1.0	0.7	1.0	0.8	1.2	2.8
26-Oct	1.1	1.4	2.0	2.3	2.5	2.0	1.8	2.0	2.2	2.0	1.7	1.7	1.8	2.0	1.7	1.1	1.1	1.0	1.1	0.8	1.7	1.5	1.3	0.6	2.5
27-Oct	0.4	0.5	0.4	0.5	0.6	1.1	1.5	1.1	1.2	1.2	1.9	2.5	2.3	2.1	2.1	2.8	2.2	2.3	2.2	2.2	2.1	2.2	1.9	1.8	2.8
28-Oct	1.4	1.4	1.3	1.0	1.9	2.3	2.7	2.4	2.2	2.3	2.8	3.6	4.3	4.2	4.1	4.4	4.5	4.4	4.9	4.1	4.0	4.4	4.4	4.4	4.9
29-Oct	4.2	5.0	5.1	4.5	4.0	3.7	3.3	3.6	3.4	3.0	2.8	3.2	3.2	2.7	2.4	1.9	1.0	0.6	0.5	0.4	0.6	0.6	0.9	1.1	5.1
30-Oct	1.4	1.8	1.3	1.2	1.1	0.8	1.0	1.0	1.2	1.5	1.1	1.5	1.4	1.1	0.9	0.5	0.8	0.7	0.4	0.3	0.3	0.3	0.3	0.2	1.8
31-Oct	0.1	0.2	0.3	0.2	0.3	0.3	0.3	0.6	0.7	0.6	0.8	0.8	1.1	AF	AF	2.3	2.1	1.7	1.7	1.7	2.3	2.8	3.0	2.8	3.0
	5.1	5.0	5.1	4.5	4.1	4.3	4.6	4.3	4.2	4.4	4.6	5.7	5.8	5.2	4.5	4.4	4.5	4.4	4.9	4.1	4.4	4.4	4.6	4.8	
	Diurnal Maximum																								

AF - Analyzer Failure



Maximum Value: 4.6 km/h on Oct 19 08:00		Maximum Daily Average: 2.0 km/h on Oct 19		Hours in Service: 744																							
Minimum Value: -2.9 km/h on Oct 31 22:00		Minimum Daily Average: -0.7 km/h on Oct 8		Hours of Data: 717																							
Maximum Diurnal Average: 0.5 km/h at hour 8		Minimum Diurnal Average: 0.0 km/h at hour 23		Hours of Missing Data: 27																							
Monthly Average: 0.28 km/h		Percentiles: P <sub>1</sub> = -1.7 P <sub>10</sub> = -0.8 Q <sub>1</sub> = -0.1 Median = 0.2 Q <sub>3</sub> = 0.8 P <sub>90</sub> = 1.3 P <sub>99</sub> = 2.8		Hours of Calibration: 0																							
				Percent Operational Time: 96.4																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	-0.7	-0.8	-0.8	-0.6	-0.6	-1.0	-0.8	-0.4	-0.4	-0.6	-0.5	-0.7	0.3	-0.2	-0.9	-0.6	-1.0	-0.7	-0.5	-0.8	-0.5	0.5	0.3	0.0	-0.5	0.5	
2-Oct	-0.7	-0.5	-0.2	0.0	0.3	-0.8	-0.1	0.4	-0.4	M	0.5	0.1	-0.9	0.0	-0.1	-0.4	-0.5	-0.6	-0.2	-0.6	-0.5	-0.3	0.0	0.1	-0.2	0.5	
3-Oct	0.3	0.5	0.2	0.4	1.1	1.5	1.3	0.4	1.1	1.6	1.0	0.5	0.5	0.7	0.7	0.5	0.5	0.2	-0.1	-0.5	0.8	0.0	-0.8	0.2	0.5	1.6	
4-Oct	-0.4	-0.2	-0.1	0.0	-0.1	-0.2	-0.3	-0.1	-0.1	-0.2	0.2	1.1	0.2	0.3	0.1	0.9	0.9	1.1	1.5	1.4	1.9	0.9	1.0	0.9	0.5	0.5	1.9
5-Oct	0.9	0.4	1.0	1.3	0.6	0.1	0.1	0.3	0.6	0.6	0.5	0.8	0.7	0.4	1.0	1.5	0.9	0.7	0.5	0.3	0.3	0.1	0.2	1.0	0.6	1.5	
6-Oct	0.6	1.0	0.8	0.8	0.3	0.3	0.5	0.2	0.5	1.1	0.7	0.9	0.6	-0.4	-0.1	-0.6	-0.2	-0.1	-0.1	-0.5	0.4	0.9	0.0	-0.1	0.3	1.1	
7-Oct	0.3	1.1	0.3	1.6	0.2	-0.2	0.0	0.3	0.7	1.1	-0.4	0.0	-0.1	0.1	-1.0	0.1	-0.9	-0.6	-0.9	-0.8	-0.8	-1.0	-1.2	-1.3	-0.1	1.6	
8-Oct	-1.5	-1.3	-1.2	-1.3	-1.1	-0.5	-0.7	-0.9	-1.0	-1.0	-0.8	-0.6	-0.5	-0.9	-1.0	-0.9	-0.9	-0.7	-0.5	-0.4	0.0	0.0	0.3	0.6	-0.7	0.6	
9-Oct	0.6	0.4	0.6	1.2	1.1	2.1	3.1	2.3	2.6	2.5	2.8	2.3	2.2	0.0	-0.1	0.0	-0.1	0.2	0.4	-0.1	0.5	-0.1	-0.7	-0.2	1.0	3.1	
10-Oct	-0.2	0.0	-0.1	0.8	1.9	1.9	1.8	0.1	-0.2	0.1	-0.4	-0.3	0.1	0.6	0.3	0.7	0.1	0.3	0.3	0.1	0.2	0.1	0.2	0.1	0.4	1.9	
11-Oct	0.5	0.1	0.2	0.6	0.4	0.3	0.8	AF	0.6	0.1	-0.4	0.1	0.3	0.9	0.9	0.0	0.3	0.3	-0.1	0.2	0.2	0.2	0.1	0.0	0.3	0.9	
12-Oct	-0.1	0.1	0.5	0.6	0.3	-0.5	-0.4	-0.7	-0.7	-0.6	-0.9	-0.1	-0.7	-0.2	-0.3	0.1	-0.1	0.2	0.0	0.0	-0.7	-0.3	0.0	-0.1	-0.2	0.6	
13-Oct	-0.3	0.0	0.1	0.0	0.0	0.2	0.1	0.2	0.2	0.4	-0.2	0.0	-0.5	0.5	0.3	0.9	0.9	1.0	0.8	0.9	0.8	1.3	1.4	0.4	0.4	1.4	
14-Oct	0.2	0.3	0.1	0.8	1.0	0.7	0.8	1.2	1.6	1.6	1.2	0.7	1.0	0.5	0.7	0.7	0.0	0.0	-1.1	-1.1	-1.0	-0.6	-0.8	0.8	0.4	1.6	
15-Oct	2.2	2.0	2.2	1.3	0.7	0.0	0.5	1.4	1.9	2.4	1.9	1.3	1.5	1.4	0.5	0.9	0.5	0.5	0.0	0.0	0.1	0.4	0.5	1.0	1.1	2.4	
16-Oct	1.2	1.2	-0.1	-0.7	-0.4	-0.2	1.1	0.8	0.8	0.5	0.7	0.6	0.1	0.4	0.5	0.1	0.5	0.4	0.1	0.9	1.0	1.0	0.3	0.5	0.5	1.2	
17-Oct	0.4	0.5	1.3	0.4	0.4	1.1	0.9	0.9	0.6	0.1	0.8	0.3	0.1	0.0	0.0	-0.1	-0.5	-0.6	-0.6	-0.7	-1.0	-1.2	-0.7	-1.4	0.1	1.3	
18-Oct	-1.5	-1.4	-1.4	-1.4	-0.8	-1.4	-1.2	-1.1	-0.9	0.0	-0.4	-0.2	0.1	0.8	0.1	0.1	0.2	1.1	1.1	0.8	0.8	0.6	1.0	1.3	-0.1	1.3	
19-Oct	1.4	0.7	1.1	2.0	2.0	2.1	3.1	4.6	2.8	2.6	1.4	1.4	0.8	1.1	1.7	1.4	1.2	1.4	2.4	2.4	1.7	2.5	3.3	3.3	2.0	4.6	
20-Oct	2.7	0.0	0.3	0.8	0.3	0.2	0.2	0.2	0.1	0.2	-0.2	0.2	0.0	0.2	1.6	0.1	-0.4	0.0	0.2	0.3	0.7	0.1	0.0	0.0	0.3	2.7	
21-Oct	-0.1	-0.1	-0.2	-0.1	0.2	0.7	0.0	0.5	0.1	0.4	0.0	0.7	0.9	0.3	0.8	0.4	0.1	0.0	0.3	0.2	-0.1	AF	0.0	0.7	0.2	0.9	
22-Oct	0.3	AF	AF	2.0	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	2.0	
23-Oct	AF	AF	2.2	0.7	-1.0	-0.7	0.3	0.2	0.3	-0.2	-0.6	0.3	0.5	0.3	0.4	0.5	0.4	0.8	1.5	1.3	0.8	0.3	-0.3	1.1	0.4	2.2	
24-Oct	1.0	0.5	1.2	1.3	0.5	0.8	-0.3	0.1	-0.9	-1.0	-1.2	-1.7	-2.0	-1.7	-1.0	-1.2	-0.7	-0.1	0.3	0.3	0.2	0.0	0.3	0.7	-0.2	1.3	
25-Oct	0.3	0.3	0.2	0.4	0.3	0.1	0.1	-0.1	-0.1	0.0	0.1	0.0	0.2	0.0	-0.2	-0.7	-0.3	-0.2	-0.3	-0.3	-0.1	-0.4	0.1	0.8	0.0	0.8	
26-Oct	1.0	1.0	1.0	1.2	1.3	0.8	0.4	0.4	0.1	-0.2	0.5	0.1	0.4	0.9	0.7	0.7	0.9	0.7	0.9	0.5	1.0	0.9	-1.0	-0.2	0.6	1.3	
27-Oct	0.1	0.2	0.2	0.5	0.5	0.8	1.3	1.5	0.5	0.6	1.1	2.4	2.1	0.7	1.9	1.6	1.6	2.8	1.4	1.5	1.8	1.4	0.8	0.6	1.2	2.8	
28-Oct	0.9	1.2	0.5	1.3	1.2	1.1	0.5	0.8	0.1	0.2	-0.4	-1.2	-1.4	-1.2	-1.3	-1.3	-1.7	-1.6	-1.4	-1.4	-1.1	-1.0	-1.3	-1.1	-0.4	1.3	
29-Oct	-1.1	-1.4	-1.6	-1.7	-0.7	-0.7	0.4	0.5	0.4	0.3	-0.3	0.3	0.3	-0.2	0.5	0.2	0.6	0.1	0.1	0.1	0.1	0.2	0.1	1.3	-0.1	1.3	
30-Oct	1.1	1.7	1.5	0.6	0.2	0.4	1.0	0.4	1.0	1.4	0.9	1.2	1.2	0.3	0.4	0.1	0.1	0.0	0.0	-0.2	-0.1	-0.1	-0.1	0.1	0.5	1.7	
31-Oct	-0.1	0.1	0.3	0.2	0.2	0.1	0.3	0.6	0.4	0.3	0.2	0.1	0.1	0.3	0.4	0.4	-0.1	0.3	0.1	0.0	-1.3	-2.9	-2.7	-2.0	-0.2	0.6	
																								Diurnal Average			
																								Diurnal Maximum			
M - Maintenance																								AF - Analyzer Failure			



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Vertical Wind Speed 100 m (VW100m) - km/h**  
**Lower Camp Met Tower - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 6.0 km/h on Oct 24 12:00 Minimum Value: 0.1 km/h on Oct 31 01:00 Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.7 Q <sub>1</sub> = 1.1 Median = 1.7 Q <sub>3</sub> = 2.5 P <sub>90</sub> = 3.4 P <sub>99</sub> = 5.0																								Hours in Service: 744 Hours of Data: 717 Hours of Missing Data: 27 Hours of Calibration: 0 Percent Operational Time: 96.4	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	2.0	2.2	3.1	3.4	2.7	3.0	2.6	2.4	2.4	2.3	3.1	3.9	2.4	2.6	2.8	2.6	2.4	3.4	3.2	3.9	4.2	4.6	5.1	5.1	5.1
2-Oct	5.0	4.7	4.4	4.1	4.6	4.5	4.5	4.2	3.8	M	4.0	3.9	4.0	3.2	3.1	2.9	2.6	1.5	0.4	0.9	0.7	0.8	1.2	1.0	5.0
3-Oct	1.1	1.6	1.0	0.9	1.2	1.5	1.5	2.4	2.0	2.1	1.8	2.0	3.1	3.1	3.0	2.0	1.2	1.0	2.5	2.9	3.1	3.0	2.6	2.5	3.1
4-Oct	1.6	0.9	1.1	0.6	0.8	0.5	0.8	0.9	0.9	1.3	2.1	2.2	2.4	1.9	1.5	1.3	1.1	1.2	1.3	1.4	1.5	1.9	0.9	1.1	2.4
5-Oct	1.3	1.8	1.1	0.9	0.8	0.7	0.7	0.6	0.7	1.0	1.2	1.2	1.7	2.5	2.9	2.9	2.2	1.7	0.9	1.2	0.9	0.8	1.0	1.1	2.9
6-Oct	1.8	1.4	1.5	1.8	1.3	1.4	1.3	1.4	2.2	2.6	2.3	2.9	2.9	3.3	3.4	3.1	1.7	1.2	2.5	2.6	1.1	2.4	1.0	0.5	3.4
7-Oct	1.2	1.0	0.8	1.9	1.9	1.1	0.9	1.8	1.6	1.9	1.7	1.7	2.4	2.1	2.1	2.4	3.1	3.2	3.5	3.4	4.0	3.7	3.7	4.5	4.5
8-Oct	3.5	3.4	3.3	3.5	3.5	3.4	3.4	2.9	3.1	3.1	3.2	3.1	3.0	3.3	3.2	2.6	2.3	1.6	1.2	1.4	1.5	1.5	1.6	0.6	3.5
9-Oct	0.9	0.8	1.3	2.1	2.0	2.9	2.7	2.7	3.1	2.5	2.5	2.6	2.1	1.3	1.9	2.4	2.1	0.7	0.7	2.2	1.4	2.3	2.3	1.4	3.1
10-Oct	1.2	1.1	1.4	1.6	1.7	1.4	2.0	1.5	2.4	2.0	1.1	1.2	1.5	1.8	1.8	2.2	1.8	1.9	1.7	1.5	2.2	2.0	2.1	1.5	2.4
11-Oct	1.6	2.0	2.3	2.5	2.4	2.6	2.2	AF	2.8	3.4	3.2	3.3	3.4	3.5	3.2	3.0	2.4	2.5	2.4	2.4	2.1	2.2	2.3	2.1	3.5
12-Oct	2.3	2.5	2.4	2.1	2.4	2.0	1.9	2.3	2.2	2.8	2.8	3.1	2.8	3.0	2.6	1.9	1.4	0.7	0.6	0.7	1.5	1.3	0.5	0.7	3.1
13-Oct	0.7	0.6	0.5	0.5	0.6	0.4	0.5	0.8	1.0	1.6	1.6	1.7	1.8	2.2	1.9	1.7	1.7	1.6	1.4	1.2	1.4	1.0	0.8	1.3	2.2
14-Oct	1.0	1.0	1.2	1.2	1.3	1.1	1.4	2.3	2.4	2.1	2.1	2.1	2.8	2.6	2.3	2.1	2.2	2.8	2.3	2.6	2.8	2.6	1.5	1.6	2.8
15-Oct	1.7	1.4	2.1	2.3	2.0	1.8	0.9	1.4	1.8	1.7	1.9	1.5	2.1	2.4	2.1	1.5	1.0	1.0	1.0	1.3	1.0	1.4	1.8	1.8	2.4
16-Oct	2.2	2.4	3.9	3.6	2.9	2.1	1.5	1.2	1.3	1.6	1.7	1.4	1.5	1.5	1.6	0.6	0.4	0.6	0.6	1.4	1.3	1.3	1.0	0.6	3.9
17-Oct	0.6	0.8	0.9	0.6	0.8	1.0	0.9	1.3	1.0	0.9	1.1	0.7	0.5	0.4	0.4	0.5	1.2	1.7	1.9	2.1	2.7	2.9	3.4	3.6	3.6
18-Oct	3.6	3.8	3.8	3.6	3.9	3.5	3.2	2.7	2.8	3.1	2.8	2.9	2.6	2.2	2.0	1.3	0.4	0.7	1.1	1.1	1.4	1.9	1.8	2.6	3.9
19-Oct	2.7	2.9	2.7	2.7	2.5	2.6	3.1	2.5	2.2	1.9	1.9	1.8	1.4	1.5	1.6	1.9	1.7	1.0	1.6	1.6	0.9	0.9	1.1	0.8	3.1
20-Oct	2.1	2.0	1.9	1.3	1.3	0.8	0.8	1.1	1.4	0.9	1.2	1.1	0.9	0.9	1.0	1.4	0.7	0.2	0.3	0.4	0.6	0.4	0.4	0.8	2.1
21-Oct	0.2	0.3	0.3	0.6	1.0	1.3	0.5	0.8	0.5	0.9	0.5	1.1	1.0	0.9	1.2	0.7	0.4	0.7	1.2	1.1	1.3	AF	1.0	1.0	1.3
22-Oct	1.2	AF	AF	2.1	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2.1
23-Oct	AF	AF	2.1	2.5	2.4	1.6	1.7	1.6	1.8	2.4	2.5	2.4	2.1	1.9	1.5	0.9	0.7	0.8	1.4	1.1	1.0	1.3	1.6	1.7	2.5
24-Oct	1.3	1.3	1.6	2.3	2.5	2.2	1.7	2.3	4.0	4.3	4.8	6.0	5.8	5.2	4.6	3.2	3.4	2.1	1.9	1.6	1.1	0.7	0.5	0.6	6.0
25-Oct	0.5	0.6	1.6	2.1	1.9	1.7	1.6	1.4	1.5	1.7	1.9	2.4	2.4	2.5	2.3	2.2	2.8	1.8	1.5	0.6	0.8	0.7	1.3	1.6	2.8
26-Oct	1.0	1.2	1.8	2.5	2.9	2.3	1.6	1.7	2.0	1.9	1.8	1.6	2.1	2.2	2.0	1.5	1.7	0.9	1.0	1.4	1.7	2.3	1.7	0.9	2.9
27-Oct	0.5	0.5	0.3	0.6	0.6	0.9	1.0	1.1	1.4	1.1	1.6	1.7	2.0	1.9	2.4	2.7	2.2	2.5	2.3	2.4	2.3	2.4	1.6	1.6	2.7
28-Oct	1.4	1.4	1.3	1.4	1.7	1.7	1.8	1.7	1.6	1.7	2.8	3.8	4.1	4.0	3.9	4.3	4.3	3.9	4.7	3.9	4.4	4.3	4.5	4.7	4.7
29-Oct	4.5	5.0	5.1	4.7	4.0	3.7	3.5	3.4	3.1	3.2	2.5	3.1	2.9	2.3	2.5	1.9	1.3	0.3	0.5	0.4	0.6	0.7	0.8	1.1	5.1
30-Oct	1.9	1.9	1.7	1.4	0.9	0.8	1.0	0.8	1.1	1.4	1.2	1.4	1.0	0.9	0.8	0.5	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.3	1.9
31-Oct	0.1	0.2	0.6	0.4	0.3	0.3	0.4	0.8	0.7	0.8	0.8	0.8	0.7	1.0	1.4	1.5	1.9	1.6	1.2	1.7	2.1	2.4	2.6	2.2	2.6
Diurnal Maximum																									
M - Maintenance      AF - Analyzer Failure																									



Maximum Value: 4.3 km/h on Oct 15 03:00      Maximum Daily Average: 1.5 km/h on Oct 19																								Hours in Service: 744 Hours of Data: 716			
Minimum Value: -1.9 km/h on Oct 24 13:00      Minimum Daily Average: -0.6 km/h on Oct 8																								Hours of Missing Data: 28 Hours of Calibration: 0			
Maximum Diurnal Average: 0.6 km/h at hour 5      Minimum Diurnal Average: 0.2 km/h at hour 17																								Percent Operational Time: 96.2			
Monthly Average: 0.33 km/h      Percentiles: P <sub>1</sub> = -1.4 P <sub>10</sub> = -0.7 Q <sub>1</sub> = -0.2 Median = 0.2 Q <sub>3</sub> = 0.8 P <sub>90</sub> = 1.4 P <sub>99</sub> = 3.1																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	UO	-0.9	-0.6	-0.6	-0.5	-0.9	-1.0	-0.6	-0.7	-0.8	-0.7	-0.6	0.4	-0.1	-0.7	-0.6	-1.0	-0.5	-0.3	-0.4	-0.2	0.9	0.9	0.4	-0.4	0.9	
2-Oct	0.0	-0.1	0.4	1.0	0.8	0.0	0.6	1.1	0.6	M	1.3	0.2	-0.6	0.2	-0.2	-0.4	-0.1	-0.4	-0.4	-0.7	-0.7	-0.1	-0.2	-0.2	0.1	1.3	
3-Oct	0.1	0.3	0.6	0.6	1.2	0.8	0.4	-0.5	-0.1	0.3	0.9	0.9	1.4	1.3	1.7	1.0	1.3	0.1	-0.1	-0.1	1.0	0.6	-0.3	0.9	0.6	1.7	
4-Oct	-0.8	-0.6	0.1	0.1	0.1	-0.4	-0.5	-0.6	-0.8	-0.3	0.9	-0.1	-0.5	-0.4	0.5	0.5	0.8	1.2	1.0	1.8	0.3	0.6	0.3	-0.4	0.1	1.8	
5-Oct	0.5	0.0	0.2	0.7	0.5	0.4	0.4	0.6	0.4	0.2	-0.1	0.1	0.2	0.8	1.3	2.1	1.5	0.9	0.2	0.3	0.4	-0.1	0.1	1.1	0.5	2.1	
6-Oct	1.3	1.6	1.4	1.2	0.5	0.2	0.6	0.4	0.8	1.4	1.0	1.3	0.9	-0.3	0.3	-0.2	-0.3	-0.2	0.0	-0.4	0.1	1.3	0.0	-0.3	0.5	1.6	
7-Oct	1.0	1.5	0.3	1.7	0.4	-0.3	-0.1	0.3	1.0	1.5	-0.4	-0.2	-0.1	0.0	-1.0	0.4	-0.8	0.0	-0.2	-0.3	-0.2	-0.6	-1.0	-1.3	0.1	1.7	
8-Oct	-1.5	-0.9	-0.9	-0.8	-0.9	-0.5	-0.5	-0.6	-0.6	-1.0	-0.3	-0.6	-0.4	-1.0	-0.9	-0.6	-1.0	-0.9	-0.6	-0.6	0.1	0.0	0.3	0.9	-0.6	0.9	
9-Oct	1.2	-0.3	-0.8	0.0	0.4	1.0	2.3	1.6	1.7	2.1	2.3	1.2	1.3	-0.1	-0.1	0.3	0.0	0.2	0.2	-0.2	0.5	-0.1	-0.6	-0.2	0.6	2.3	
10-Oct	-0.3	-0.3	-0.5	0.6	2.7	2.2	1.8	0.1	-0.2	0.1	-0.6	-0.8	-0.2	0.5	0.1	0.8	0.2	0.5	0.3	0.2	0.3	0.3	0.2	AF	0.3	2.7	
11-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	-0.4	0.5	0.6	0.6	0.7	0.4	0.3	--	0.7
12-Oct	0.4	0.2	0.5	0.8	0.3	-0.4	-0.2	-0.4	-0.6	-0.5	-0.8	-0.2	-0.7	0.0	-0.5	0.2	-0.4	0.2	0.0	0.0	-0.8	-0.1	0.0	-0.1	-0.1	0.8	
13-Oct	-0.4	0.2	-0.1	-0.2	0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.1	-0.6	0.2	0.3	1.3	1.3	1.0	0.8	0.7	0.2	0.7	1.7	1.6	0.4	1.7	
14-Oct	0.4	0.1	0.1	1.8	3.9	3.1	2.3	0.7	0.6	0.7	0.4	0.9	0.8	0.4	0.8	0.8	-0.1	0.2	-0.9	-1.1	-1.0	-0.6	-0.7	1.1	0.6	3.9	
15-Oct	2.7	2.3	4.3	2.4	1.2	-0.5	0.2	0.3	1.6	1.2	1.5	1.1	0.7	0.9	1.6	0.0	1.2	0.6	0.7	0.4	1.1	0.9	1.1	1.3	1.2	4.3	
16-Oct	1.4	1.7	0.6	-1.0	-0.2	0.0	1.1	1.1	1.0	0.4	1.0	0.8	0.2	0.9	0.5	0.1	0.5	1.1	0.8	1.4	1.4	1.5	0.5	0.2	0.7	1.7	
17-Oct	0.0	0.1	0.8	0.5	0.3	0.7	0.3	0.4	0.2	-0.3	0.1	0.3	0.0	-0.1	0.0	-0.1	-0.4	-0.6	-0.4	-0.8	-1.1	-1.1	-1.1	-1.7	-0.2	0.8	
18-Oct	-1.1	-1.2	-1.4	-1.3	-0.7	-1.2	-1.3	-1.0	-0.9	0.4	0.1	-0.2	0.2	0.8	-0.2	-0.3	-0.1	1.0	0.7	0.4	0.9	0.6	1.0	1.1	-0.2	1.1	
19-Oct	1.3	0.8	1.0	1.6	1.4	1.5	2.3	4.0	3.1	2.3	0.5	0.6	0.0	0.3	1.5	0.6	0.7	0.8	1.4	1.0	1.0	2.1	3.0	3.3	1.5	4.0	
20-Oct	2.9	0.1	-0.2	0.8	0.3	0.4	0.5	0.6	0.4	0.1	-0.1	0.1	-0.2	0.4	1.2	-0.1	-0.6	-0.3	0.1	0.0	0.0	-0.2	-0.4	-0.6	0.2	2.9	
21-Oct	-0.1	0.1	0.0	0.1	0.2	0.4	0.0	0.5	0.0	0.3	-0.1	0.6	0.4	-0.1	0.3	0.0	0.0	0.0	0.0	0.1	-0.2	0.3	-0.3	0.4	0.1	0.6	
22-Oct	0.0	0.3	AF	AF	AF	AF	AF	AF	AF	AF	1.1	0.2	0.1	0.3	0.1	-0.1	0.2	-0.7	-0.9	0.4	0.0	0.2	0.6	0.8	--	1.1	
23-Oct	0.9	1.1	2.7	0.9	-1.1	-0.7	0.3	-0.1	0.3	-0.2	-0.4	0.4	0.4	0.3	0.3	0.5	0.4	0.7	1.6	1.7	1.3	-0.3	-0.4	1.9	0.5	2.7	
24-Oct	2.7	1.4	-0.1	0.7	2.0	1.0	-0.1	0.2	-0.5	-0.3	-1.0	-1.3	-1.9	-1.4	-0.1	-0.9	-0.4	0.1	0.3	0.6	0.2	0.0	0.4	0.6	0.1	2.7	
25-Oct	0.3	0.6	0.2	0.4	0.5	0.3	0.2	0.1	0.1	0.2	0.1	0.2	0.3	0.4	0.1	0.0	0.0	0.3	-0.2	-0.2	-0.1	-0.4	0.5	0.7	0.2	0.7	
26-Oct	0.9	1.3	1.7	1.7	1.8	1.7	1.5	1.7	1.4	0.5	0.8	0.8	1.5	1.9	1.3	0.9	1.2	1.1	1.3	0.4	2.0	2.3	-1.2	-0.3	1.2	2.3	
27-Oct	0.1	0.2	0.0	0.4	0.3	0.2	0.4	0.8	-0.1	0.0	0.3	2.2	1.7	0.5	1.1	0.3	0.4	1.2	0.3	0.2	0.5	0.0	0.7	0.0	0.5	2.2	
28-Oct	0.8	0.7	0.8	1.5	2.1	1.4	0.8	0.7	0.2	0.1	-0.1	-0.6	-0.8	-0.7	-1.1	-1.0	-1.4	-1.4	-0.9	-1.1	-0.5	-0.6	-0.7	-0.7	-0.1	2.1	
29-Oct	-0.4	-0.6	-1.0	-1.4	-0.1	0.0	0.8	1.2	0.7	0.8	-0.4	0.6	0.4	0.0	0.6	0.2	0.5	0.1	-0.1	0.1	0.0	0.2	0.8	1.8	0.2	1.8	
30-Oct	3.1	1.8	2.8	1.3	0.5	0.3	0.6	1.0	0.2	0.4	0.4	0.2	0.5	0.1	-0.2	-0.2	0.1	0.0	0.0	0.0	0.2	0.1	0.2	0.0	0.6	3.1	
31-Oct	-0.1	0.1	0.2	0.0	0.1	0.1	0.2	0.4	0.4	1.0	0.4	0.1	0.2	0.5	0.7	0.7	0.7	0.8	0.4	0.4	0.6	0.5	0.3	0.1	0.4	1.0	
																								Diurnal Average			
																								Diurnal Maximum			
0.6   0.4   0.5   0.5   0.6   0.4   0.5   0.5   0.5   0.4   0.4   0.3   0.3   0.2   0.2   0.3   0.2   0.2   0.2   0.2   0.2   0.2   0.3   0.3   0.2   0.4																								Diurnal Average			
3.1   2.3   4.3   2.4   3.9   3.1   2.3   4.0   3.1   2.3   2.3   2.2   1.7   1.9   1.7   2.1   1.5   1.2   1.6   1.8   2.0   2.3   3.0   3.3																								Diurnal Maximum			
M - Maintenance      AF - Analyzer Failure      UO - Unstable Operation																											



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Vertical Wind Speed 167 m (VW167m) - km/h**  
**Lower Camp Met Tower - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 6.1 km/h on Oct 24 12:00	Hours of Data: 716
Minimum Value: 0.2 km/h on Oct 30 18:00	Hours of Missing Data: 28
Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.6 Q <sub>1</sub> = 1.0 Median = 1.6 Q <sub>3</sub> = 2.4 P <sub>90</sub> = 3.2 P <sub>99</sub> = 4.9	Hours of Calibration: 0
	Percent Operational Time: 96.2

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	UO	2.0	3.2	3.3	2.9	2.9	2.6	2.3	2.3	2.1	2.8	4.0	2.5	2.8	2.7	2.6	2.5	3.2	2.5	3.6	4.3	4.6	5.0	5.1	5.1
2-Oct	4.8	4.5	4.2	4.2	4.8	4.4	4.5	4.4	4.1	M	4.3	4.0	3.8	3.6	3.0	2.8	2.9	1.2	0.4	0.8	0.8	0.7	1.0	1.1	4.8
3-Oct	0.9	1.4	1.2	1.1	0.9	1.0	1.1	1.8	1.2	1.1	1.0	1.5	3.1	3.0	3.2	1.9	2.0	1.6	2.1	2.1	3.1	3.1	2.4	2.8	3.2
4-Oct	1.8	1.2	1.4	0.8	1.2	0.9	0.6	0.9	0.9	1.2	2.0	2.3	2.0	1.8	1.5	1.4	1.3	1.0	1.4	1.4	1.7	1.9	1.0	1.3	2.3
5-Oct	1.4	1.7	0.7	0.8	0.9	0.9	0.8	0.7	0.4	0.7	0.9	1.1	1.7	2.7	3.0	2.9	2.1	1.8	0.7	0.7	0.7	0.6	1.0	0.7	3.0
6-Oct	1.7	1.2	1.7	1.8	1.2	1.6	1.6	1.8	2.2	2.5	2.0	2.5	2.4	2.6	3.1	2.7	1.7	1.1	1.9	1.8	0.8	2.0	1.0	0.6	3.1
7-Oct	1.0	0.9	0.9	1.7	1.9	1.4	0.9	2.0	2.0	2.3	1.3	1.8	2.3	2.1	1.8	2.6	2.7	3.2	3.3	3.3	3.7	3.4	3.7	4.2	4.2
8-Oct	3.6	3.2	3.3	3.6	3.3	3.2	3.1	2.7	2.9	3.1	3.2	3.2	3.1	3.5	3.2	2.5	2.2	1.4	1.1	1.5	1.7	1.5	1.7	0.7	3.6
9-Oct	0.5	0.7	0.7	0.8	1.0	2.4	3.0	3.0	3.1	2.8	2.8	2.4	1.9	1.6	1.7	2.2	1.7	0.6	0.6	2.5	1.3	1.6	1.1	1.0	3.1
10-Oct	1.0	1.0	0.9	1.9	1.8	1.4	1.4	1.5	2.5	1.9	1.2	1.1	1.6	1.9	2.2	2.3	1.9	1.6	1.5	1.3	1.9	1.9	2.0	AF	2.5
11-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2.8	2.5	2.6	2.3	2.2	2.3	2.1	2.8
12-Oct	2.3	2.4	2.4	2.4	2.5	1.6	1.6	2.1	2.3	2.8	2.6	2.8	2.7	2.6	2.6	2.2	1.2	0.8	0.8	0.6	1.4	1.0	0.7	0.7	2.8
13-Oct	0.7	0.8	0.6	0.5	0.6	0.6	0.5	0.7	0.8	1.2	1.2	1.4	1.8	2.2	1.7	1.9	1.4	1.3	1.3	1.2	1.3	1.1	1.0	1.5	2.2
14-Oct	1.3	0.7	1.2	1.5	1.3	0.9	1.1	1.3	1.2	1.5	1.2	2.2	2.6	2.5	2.1	1.9	2.0	2.9	2.2	2.4	2.9	2.4	0.9	1.3	2.9
15-Oct	1.4	1.0	1.6	2.3	2.4	2.1	0.6	1.3	1.7	1.3	1.6	1.8	2.0	1.3	1.4	1.0	0.9	0.7	0.9	1.6	1.4	1.3	2.0	1.9	2.4
16-Oct	2.0	2.2	3.7	3.3	2.7	2.3	1.4	1.3	1.3	1.5	1.7	1.1	1.2	1.5	1.6	0.7	0.4	0.6	0.3	1.6	1.4	1.4	1.0	0.4	3.7
17-Oct	0.4	0.3	1.0	0.8	0.8	1.1	0.8	0.9	0.7	0.6	0.8	0.8	0.6	0.4	0.4	0.4	0.7	1.2	1.7	1.9	2.6	3.1	3.5	3.5	3.5
18-Oct	3.9	3.7	3.7	3.3	3.7	3.9	3.1	2.5	2.7	3.6	3.3	3.1	2.6	2.2	2.3	1.2	0.5	1.0	1.0	1.4	1.3	1.9	2.0	2.6	3.9
19-Oct	2.7	2.7	2.8	2.8	2.4	2.4	3.5	3.1	2.3	2.0	1.7	1.7	1.6	1.7	1.5	1.8	1.6	1.4	2.1	1.7	1.2	1.0	1.2	0.9	3.5
20-Oct	1.4	1.8	1.6	1.5	1.0	1.3	1.2	1.7	1.8	1.4	1.4	1.5	0.8	1.1	0.9	1.4	0.7	0.3	0.2	0.3	0.3	0.5	0.9	0.9	1.8
21-Oct	0.3	0.3	0.4	0.6	0.9	1.6	0.7	0.8	0.5	0.9	0.6	1.1	1.0	1.0	1.1	0.7	0.4	0.5	1.0	1.1	1.3	1.3	1.1	1.0	1.6
22-Oct	1.0	1.2	AF	AF	AF	AF	AF	AF	AF	AF	2.8	1.7	1.4	1.5	1.7	1.6	1.3	1.3	2.0	1.5	1.1	1.2	1.1	1.5	2.8
23-Oct	1.4	1.5	2.0	2.2	1.9	1.3	1.7	1.7	1.7	2.4	2.8	2.3	1.8	1.5	1.3	1.0	0.8	0.6	1.2	1.1	0.9	0.8	1.2	1.5	2.8
24-Oct	2.0	1.7	1.2	1.5	2.9	2.5	1.5	1.9	2.9	4.5	4.9	6.1	5.9	5.4	4.9	2.9	3.2	2.1	1.8	1.2	1.2	0.8	0.5	0.5	6.1
25-Oct	0.5	0.6	1.5	1.8	1.6	1.4	1.6	1.6	1.7	2.0	2.1	2.3	2.5	2.4	2.0	1.7	2.2	1.4	1.6	0.6	0.7	0.7	1.6	1.5	2.5
26-Oct	0.9	0.9	1.7	2.5	3.0	2.4	1.3	1.3	1.4	1.1	1.5	1.3	2.1	2.3	2.2	1.6	1.7	1.2	1.0	1.7	1.7	2.5	1.7	1.0	3.0
27-Oct	0.7	0.3	0.2	0.5	0.6	0.6	1.0	0.8	1.0	0.9	1.5	2.0	2.1	1.5	2.0	2.1	1.8	2.3	1.7	1.7	1.6	1.3	1.0	0.8	2.3
28-Oct	1.1	1.4	1.9	1.3	1.1	1.3	1.2	1.3	1.7	1.8	2.8	4.0	4.2	3.7	3.8	4.3	4.6	3.9	4.6	4.0	4.2	4.3	4.1	4.5	4.6
29-Oct	4.3	4.7	4.7	4.7	4.0	3.6	3.4	3.7	3.2	3.2	2.7	2.9	3.2	2.7	2.8	1.7	1.2	0.4	0.5	0.8	0.9	0.5	1.1	1.2	4.7
30-Oct	1.0	1.4	1.2	1.2	1.1	0.7	0.8	1.0	0.6	0.7	0.7	0.9	0.9	0.9	0.8	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	1.4
31-Oct	0.2	0.3	0.4	0.3	0.4	0.3	0.4	0.9	0.5	1.0	0.8	0.6	0.7	1.1	1.3	1.5	1.7	1.7	1.4	1.7	2.0	2.5	2.7	2.5	2.7
	4.8	4.7	4.7	4.7	4.8	4.4	4.5	4.4	4.1	4.5	4.9	6.1	5.9	5.4	4.9	4.3	4.6	3.9	4.6	4.0	4.3	4.6	5.0	5.1	

Diurnal Maximum

M - Maintenance      AF - Analyzer Failure      UO - Unstable Operation





## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

### **AMS 4 BUFFALO VIEWPOINT OCTOBER 2017**

Operations, Data Collection,  
QA/QC, Data Validation and Reporting by:  
Wood Buffalo Environmental Association  
Fort McMurray, Alberta

November 29, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BUFFALO VIEWPOINT (AMS 4)  
OCTOBER 2017

MONTHLY SUMMARY for  
AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	705	39	39	100	49	0	12	0
H2S (ppb) Average	706	37	38	99.87	5	0	1	0
THC (ppm) Average	706	38	38	100	4.9	-	2.9	-
O3(ppb) Average	708	35	36	99.87	45	0	39	-
NO2(ppb) Average	705	39	39	100	26	0	16	0
NO(ppb) Average	705	39	39	100	55	-	26	-
NOX(ppb) Average	705	39	39	100	73	-	42	-
PM2.5(ug/m3) Average	688	2	56	92.74	39.6	-	17.6	-
Temperature (C) Average	744	0	0	100	23.1	-	14.6	-
Relative Humidity (%) Average	744	0	0	100	99	-	98	-
Wind Speed 10 m (km/h) Average	728	0	16	97.85	39	-	23	-
Wind Direction 10 m (deg) Average	728	0	16	97.85	-	-	-	-

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BUFFALO VIEWPOINT (AMS 4)  
OCTOBER 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	705	0.9	4	-	0	0	0	0	0	1	49
H2S (ppb) Average	706	0.2	0	-	0	0	0	0	0	0	5
THC (ppm) Average	706	2.28	0.2	-	2.1	2.2	2.2	2.2	2.3	2.5	4.9
O3(ppb) Average	708	22.1	10	-	2	7	16	23	29	35	45
NO2(ppb) Average	705	4.2	5	-	0	0	1	2	6	12	26
NO(ppb) Average	705	2.3	6	-	0	0	0	0	1	5	55
NOX(ppb) Average	705	6.5	11	-	0	1	1	3	7	18	73
PM2.5(ug/m3) Average	688	2.8	4.3	-	0	0.4	0.7	1.3	2.9	7	39.6
Temperature 2 m (C) Average	744	3.42	4.8	-	-4.9	-1.6	-0.2	2.4	6.1	9.9	23.1
Relative Humidity (%) Average	744	74.7	16	-	27	52	66	76	87	96	99
Wind Speed 10 m (km/h) Average	705	13.6	7	-	1	6	8	12	18	26	39
Wind Direction 10 m (deg) Average	705	0	0	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BUFFALO VIEWPOINT (AMS 4)  
OCTOBER 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S, O3	26 Oct 2017 09:00	26 Oct 2017 09:00	1	Maintenance - manifold cleaning
PM2.5	01 Oct 2017 07:00	01 Oct 2017 07:00	1	Unstable operation - excessive baseline drift
PM2.5	04 Oct 2017 14:00	04 Oct 2017 15:00	2	Unstable operation - excessive baseline drift
PM2.5	06 Oct 2017 20:00	06 Oct 2017 21:00	2	Unstable operation - excessive baseline drift
PM2.5	07 Oct 2017 13:00	07 Oct 2017 15:00	3	Unstable operation - excessive baseline drift
PM2.5	07 Oct 2017 17:00	07 Oct 2017 17:00	1	Unstable operation - excessive baseline drift
PM2.5	13 Oct 2017 14:00	13 Oct 2017 17:00	4	Unstable operation - excessive baseline drift
PM2.5	16 Oct 2017 02:00	16 Oct 2017 06:00	5	Unstable operation - excessive baseline drift
PM2.5	16 Oct 2017 13:00	16 Oct 2017 19:00	7	Unstable operation - excessive baseline drift
PM2.5	18 Oct 2017 10:00	18 Oct 2017 16:00	7	Unstable operation - excessive baseline drift
PM2.5	19 Oct 2017 17:00	19 Oct 2017 17:00	1	Unstable operation - excessive baseline drift
PM2.5	23 Oct 2017 16:00	23 Oct 2017 18:00	3	Unstable operation - excessive baseline drift
PM2.5	24 Oct 2017 02:00	24 Oct 2017 02:00	1	Unstable operation - excessive baseline drift
PM2.5	24 Oct 2017 11:00	24 Oct 2017 11:00	1	Unstable operation - excessive baseline drift
PM2.5	24 Oct 2017 14:00	24 Oct 2017 17:00	4	Unstable operation - excessive baseline drift
PM2.5	24 Oct 2017 19:00	24 Oct 2017 20:00	2	Unstable operation - excessive baseline drift
PM2.5	28 Oct 2017 13:00	28 Oct 2017 22:00	10	Unstable operation - excessive baseline drift
Wind Speed, Wind Direction	21 Oct 2017 23:00	22 Oct 2017 12:00	14	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	31 Oct 2017 02:00	31 Oct 2017 02:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	31 Oct 2017 06:00	31 Oct 2017 06:00	1	Flat line in sensor output signal - Sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb

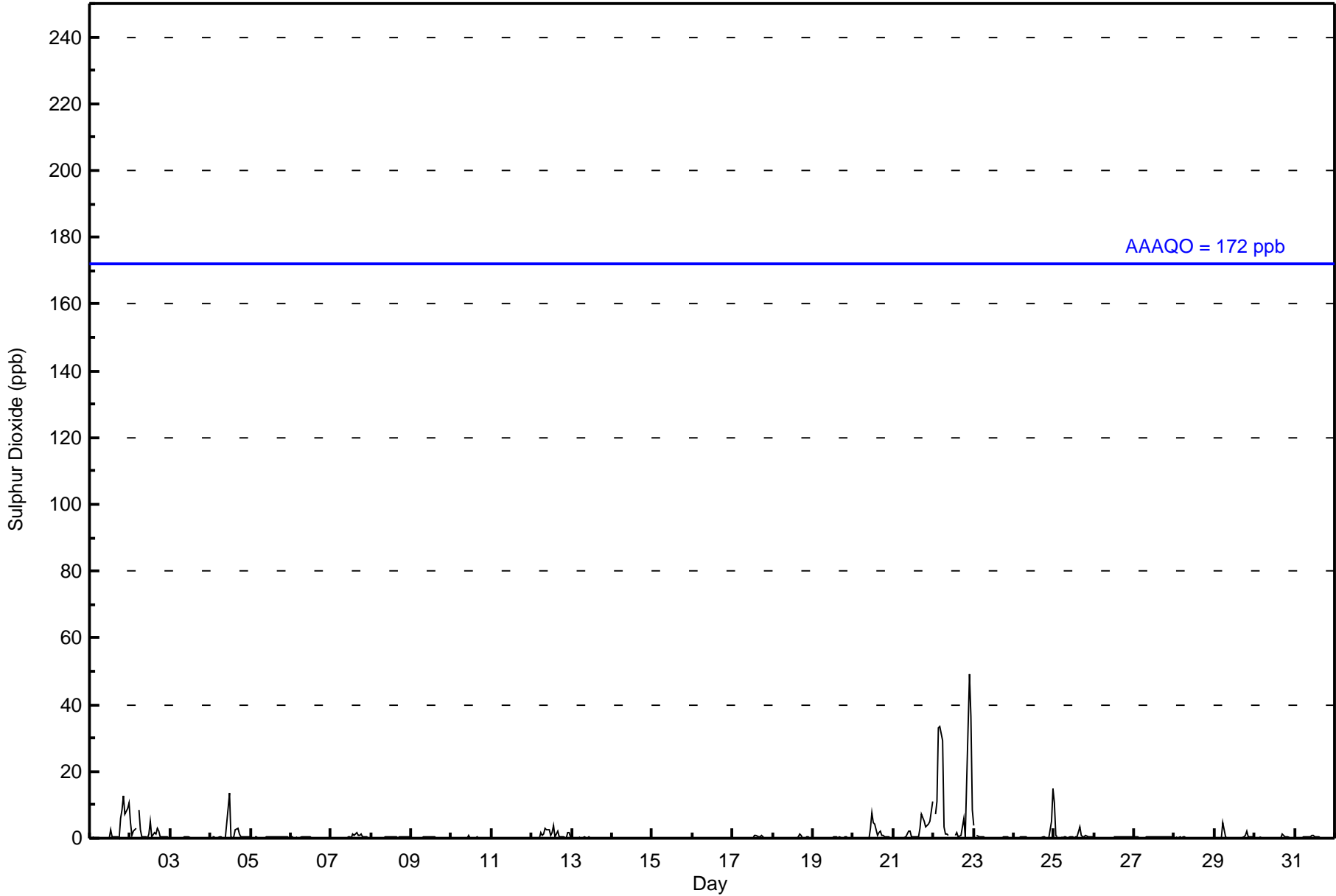
Buffalo Viewpoint - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 49 ppb on Oct 22 22:00										Maximum Daily Average: 12.3 ppb on Oct 22										Hours of Data: 705						
Minimum Value: 0 ppb on Oct 31 23:00										Minimum Daily Average: 0.1 ppb on Oct 15										Hours of Missing Data: 39						
Maximum Diurnal Average: 2.2 ppb at hour 22										Minimum Diurnal Average: 0.3 ppb at hour 8										Hours of Calibration: 39						
Monthly Average: 0.9 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 13										Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	2	0	0	0	0	0	6	9	13	7	9	11	2.6	13
2-Oct	5	1	2	3	Z	9	3	1	0	0	0	1	5	0	2	1	3	2	0	0	0	0	0	0	1.7	9
3-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-Oct	Z	0	0	0	0	0	0	0	0	0	9	14	0	0	0	2	3	1	1	0	0	0	0	0	1.5	14
5-Oct	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
6-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
7-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	2	1	1	1	1	1	0	0	0	0	0.4	2
8-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
9-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
10-Oct	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
11-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
12-Oct	0	0	Z	0	0	2	1	1	3	3	3	1	2	4	1	2	0	0	0	0	0	2	2	0	1.1	4
13-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
14-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
15-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
16-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
17-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0.2	1
18-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.2	1
19-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
20-Oct	0	0	0	0	Z	0	0	0	0	0	3	8	5	4	1	2	2	1	1	0	0	0	0	0	1.2	8
21-Oct	0	0	0	0	0	Z	0	0	1	2	2	0	0	0	0	0	3	7	5	4	4	4	5	11	2.2	11
22-Oct	Z	7	11	33	34	29	3	1	1	1	C	C	C	1	2	1	1	3	6	1	17	49	36	9	12.3	49
23-Oct	4	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	4
24-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	15	1.0	15	
25-Oct	11	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	1	0	0	0	0	0.9	11
26-Oct	0	0	0	0	Z	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
27-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.3	1
28-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
29-Oct	0	Z	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0.5	5
30-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.2	1
31-Oct	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
0.9 0.5 0.7 1.6 1.5 1.9 0.4 0.3 0.3 0.4 0.8 1.0 0.6 0.5 0.4 0.6 0.7 0.7 0.8 0.7 1.3 2.2 2.0 1.6																								Diurnal Average		
11 7 11 33 34 29 3 1 3 3 9 14 5 4 2 3 3 7 6 9 17 49 36 15																								Diurnal Maximum		
Z - zerospan C - Calibration																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																										



Wood Buffalo Environmental Association  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Buffalo Viewpoint - October 2017





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Buffalo Viewpoint - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	692	98.16	98.16
11 - 20	8	1.13	99.29
21 - 60	5	0.71	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Buffalo Viewpoint - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 10	67	60	21	4	5	1	43	103	34	27	45	52	58	40	59	65	684
11 - 20	2	0	1	1	0	0	0	0	0	0	0	0	0	0	2	0	6
21 - 60	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	2
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>69</b>	<b>60</b>	<b>22</b>	<b>5</b>	<b>5</b>	<b>1</b>	<b>43</b>	<b>103</b>	<b>35</b>	<b>27</b>	<b>45</b>	<b>52</b>	<b>59</b>	<b>40</b>	<b>61</b>	<b>65</b>	<b>692</b>

Total Number of Valid Hours: 692

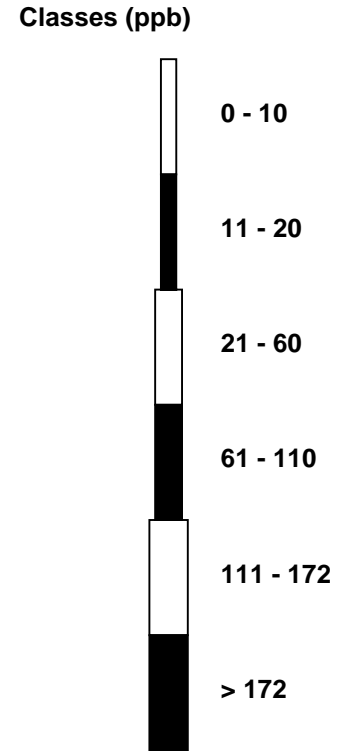
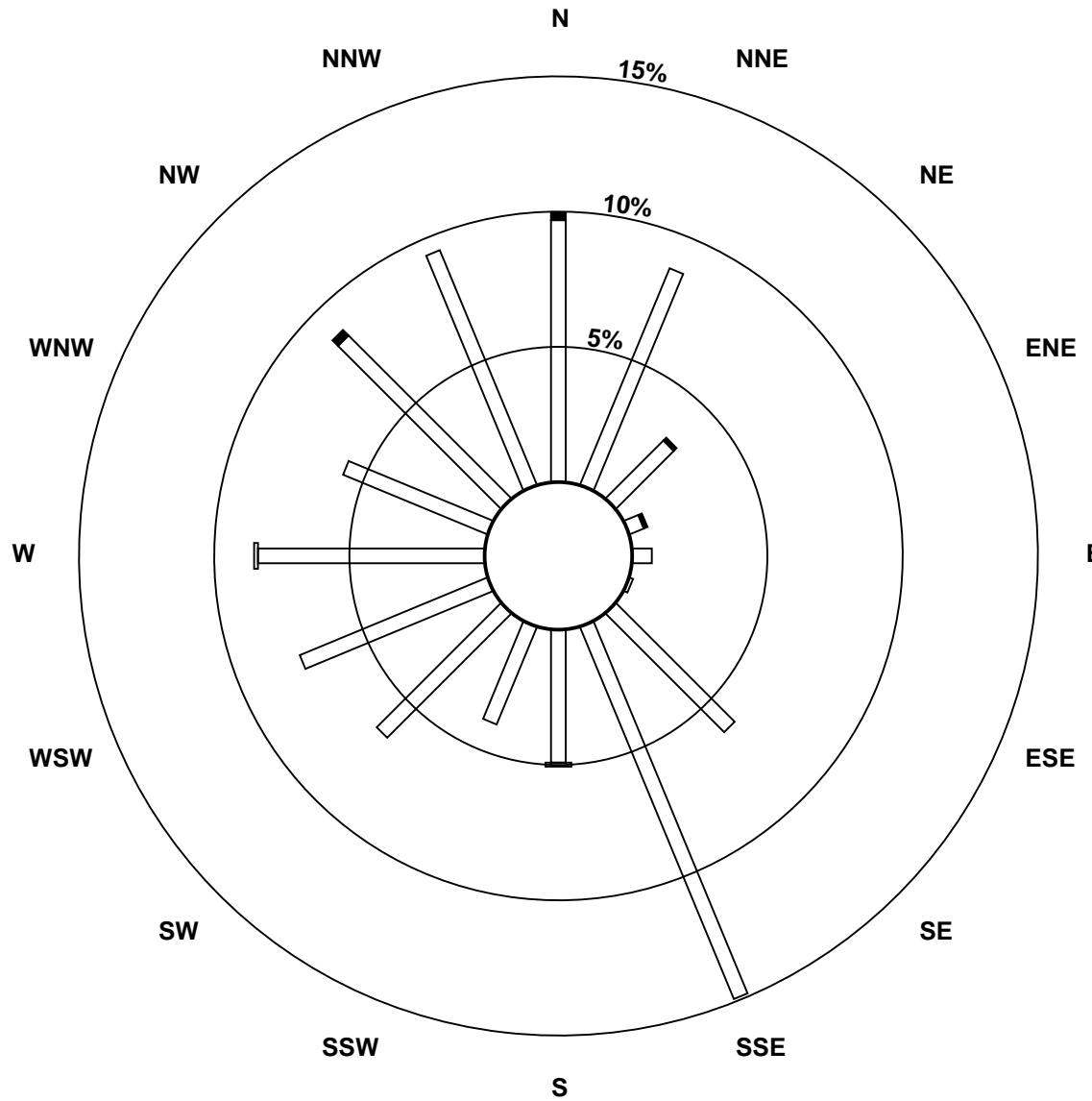
Total Number of Hours: 744



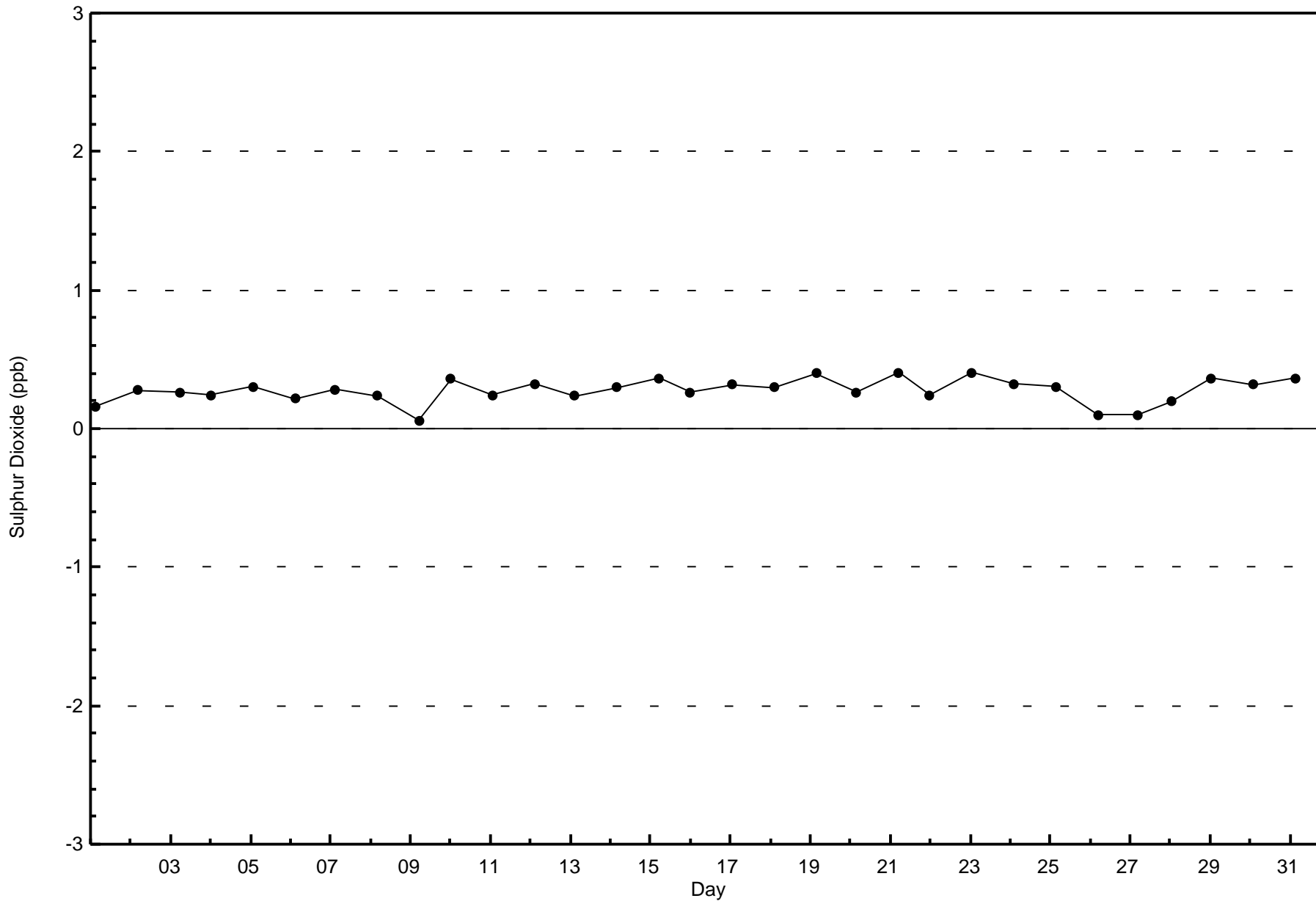


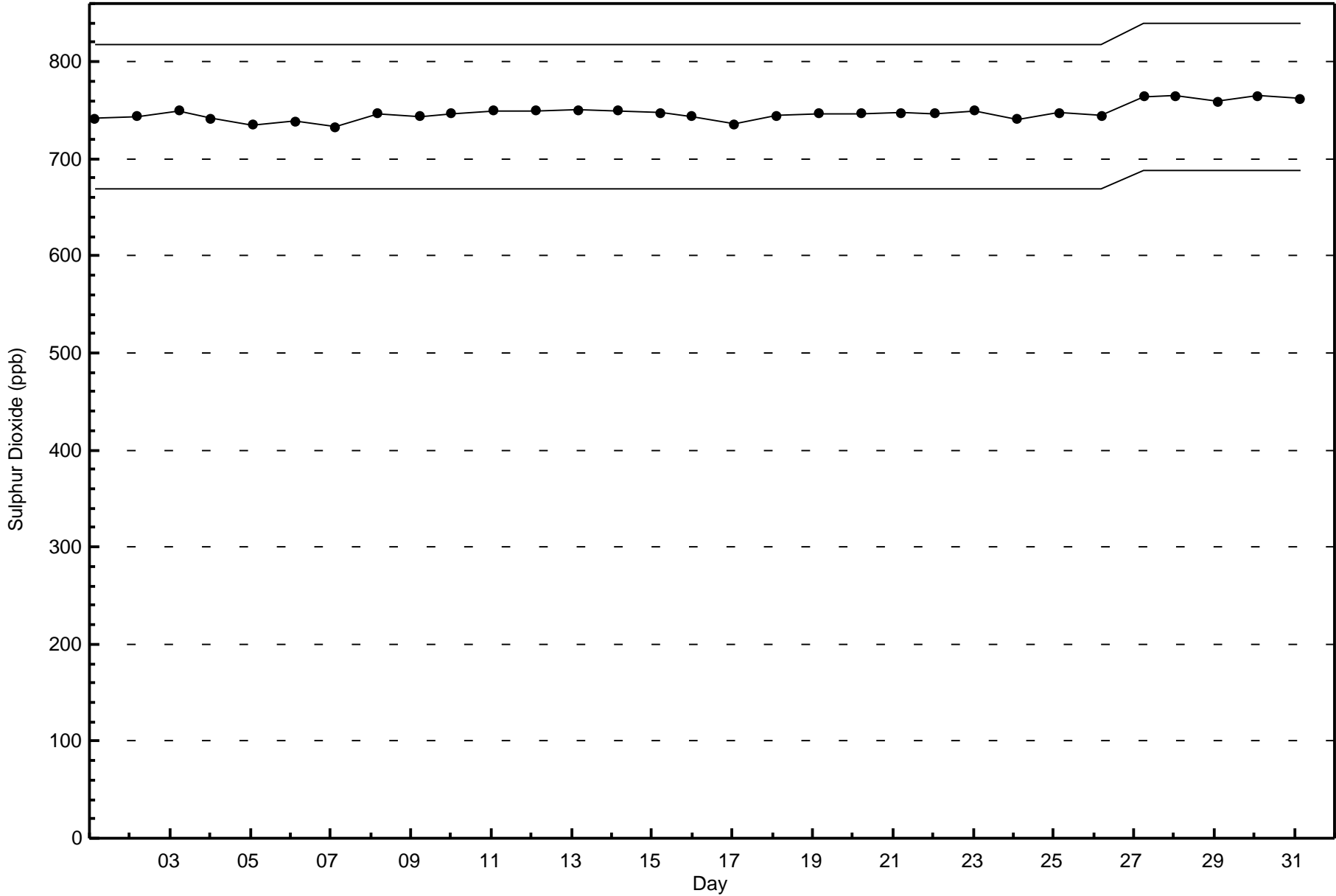
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Buffalo Viewpoint (AMS 4)



Total Number of Valid Hours: 692







**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**

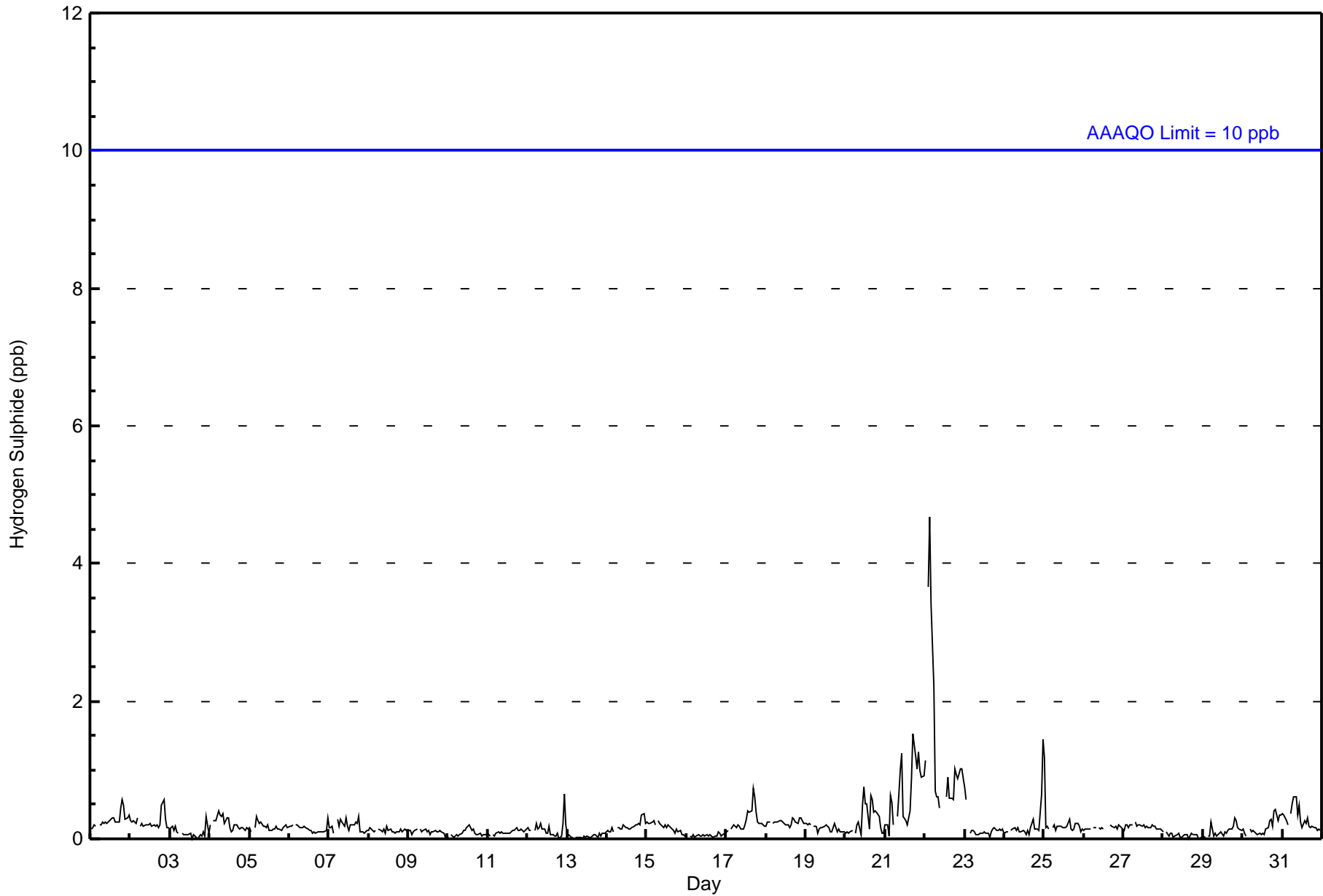
**Buffalo Viewpoint - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																						
Maximum Value: 5 ppb on Oct 22 04:00										Maximum Daily Average: 1.3 ppb on Oct 22										Hours of Data: 706																												
Minimum Value: 0 ppb on Oct 3 14:00										Minimum Daily Average: 0.0 ppb on Oct 13										Hours of Missing Data: 38																												
Maximum Diurnal Average: 0.3 ppb at hour 4										Minimum Diurnal Average: 0.2 ppb at hour 13										Hours of Calibration: 37																												
Monthly Average: 0.2 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 1										Percent Operational Time: 99.9																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.3	1																						
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.2	1																						
3-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
4-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
5-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
6-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
7-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
8-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
9-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
10-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
11-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
12-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.1	1																						
13-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																						
14-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
15-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
16-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																						
17-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.3	1																						
18-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
19-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
20-Oct	0	0	0	0	0	Z	0	0	0	0	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0.3	1																						
21-Oct	0	0	0	1	1	0	Z	0	1	1	1	0	0	0	0	0	1	2	1	1	1	1	1	1	0.7	2																						
22-Oct	1	Z	4	5	3	2	1	1	1	0	C	C	C	1	1	1	1	1	1	1	1	1	1	1	1.3	5																						
23-Oct	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
24-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.2	1																						
25-Oct	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
26-Oct	0	0	0	0	0	Z	0	0	M	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0.2	0																						
27-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
28-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
29-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
30-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
31-Oct	0	0	0	0	Z	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
0.2																								0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	Diurnal Average	
1																								1	4	5	3	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	Diurnal Maximum	
Z - zerospan C - Calibration M - Maintenance																																																
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																																																



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Buffalo Viewpoint - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Buffalo Viewpoint - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	703	99.58	99.58
3 - 4	2	0.28	99.86
5 - 7	1	0.14	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Buffalo Viewpoint - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	69	62	20	5	5	1	44	100	38	29	45	51	59	39	62	64	693
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	69	62	20	5	5	1	44	100	38	29	45	51	59	39	62	64	693

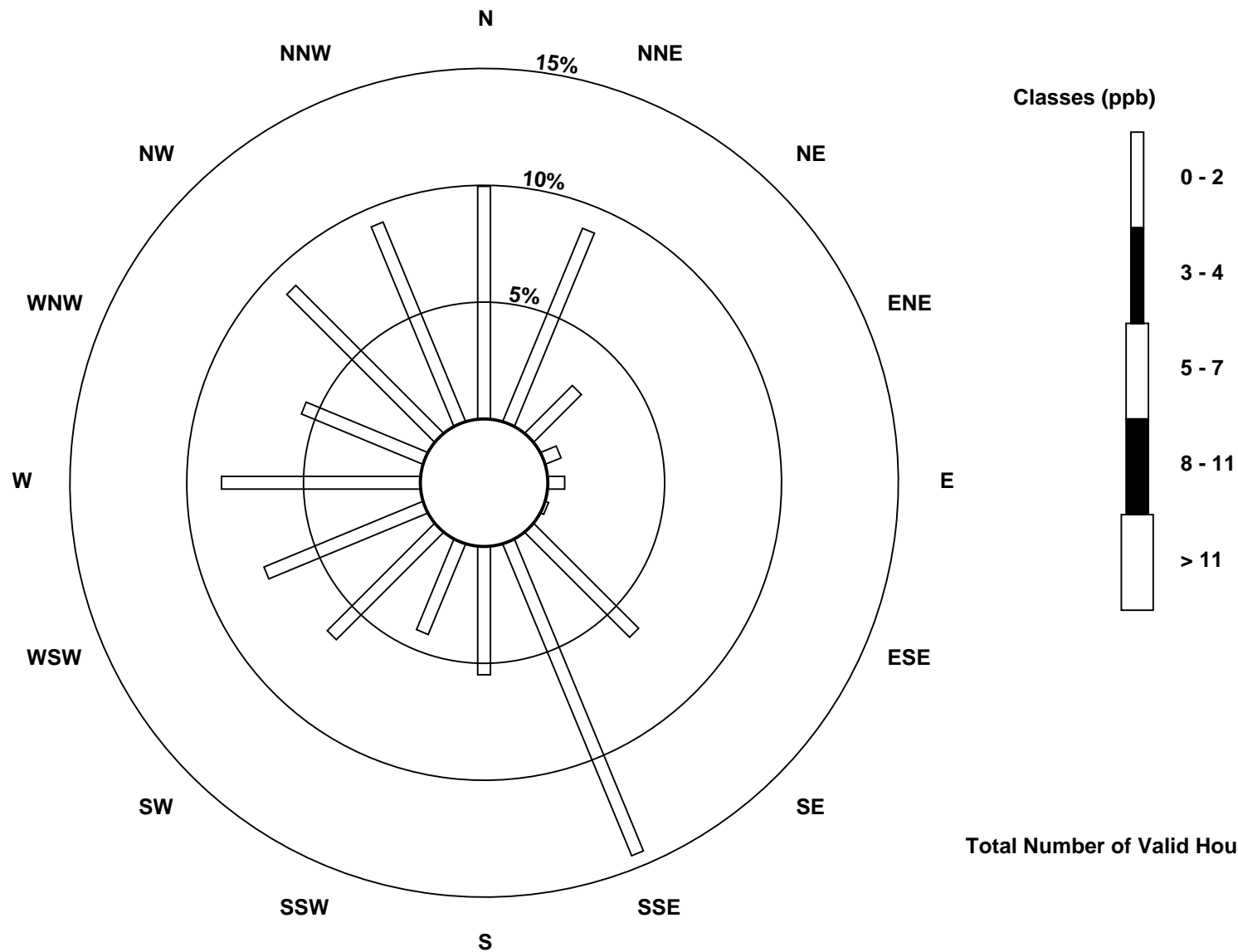
Total Number of Valid Hours: 693

Total Number of Hours: 744

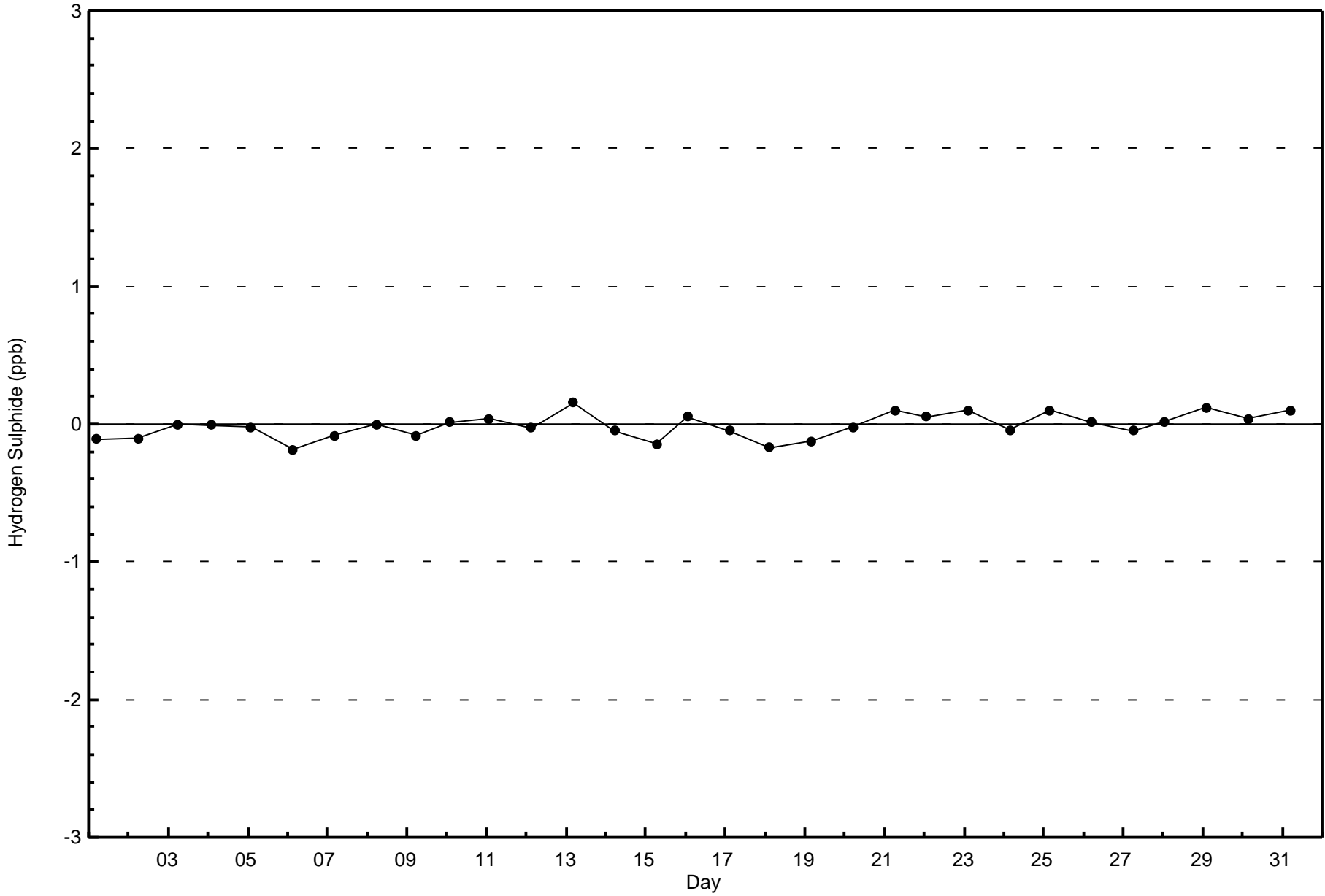


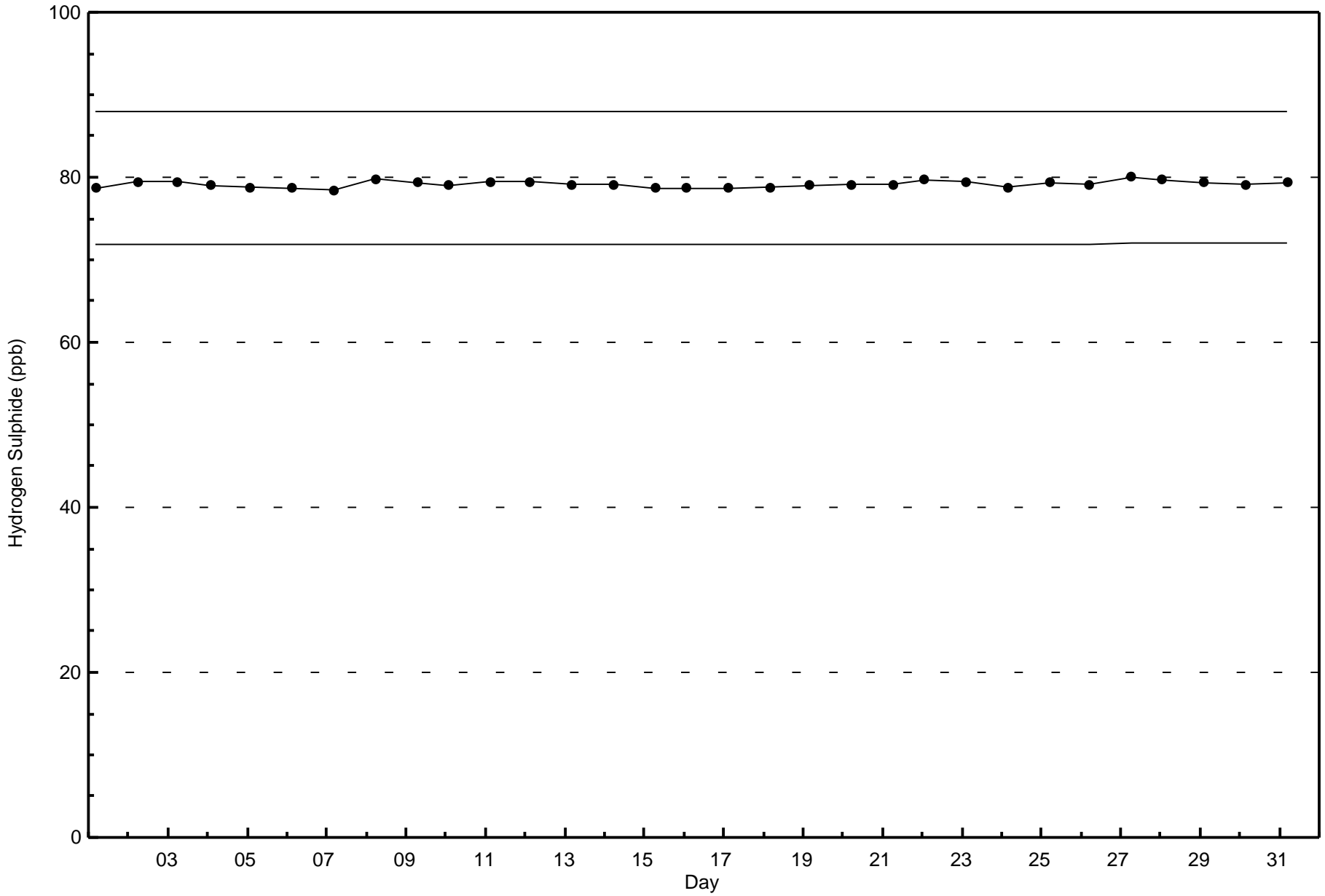
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Buffalo Viewpoint (AMS 4)











# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Total Hydrocarbons (THC) - ppm

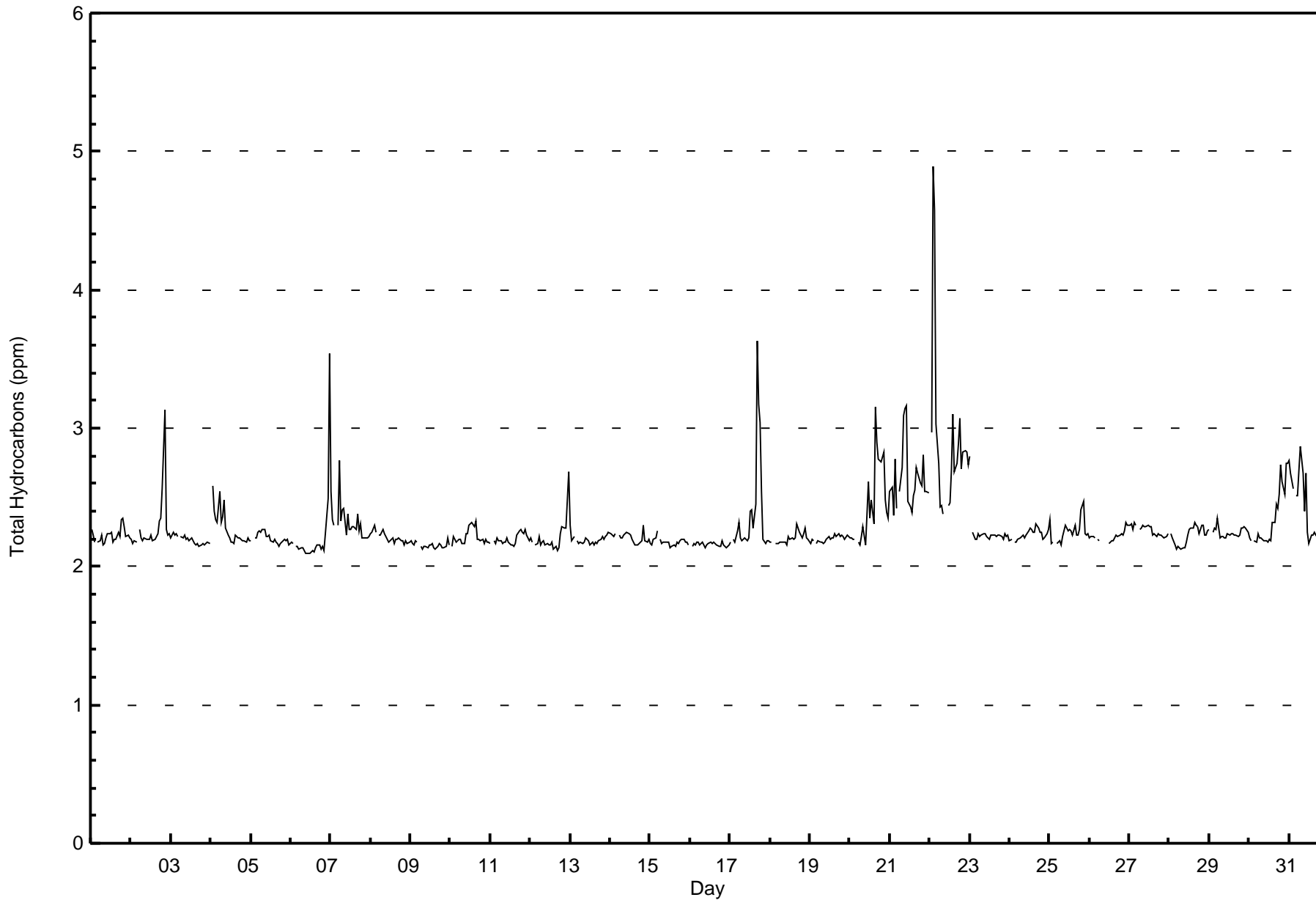
## Buffalo Viewpoint - October 2017

Maximum Value: 4.9 ppm on Oct 22 03:00																Maximum Daily Average: 2.9 ppm on Oct 22																Hours in Service: 744	
Minimum Value: 2.1 ppm on Oct 6 10:00																Minimum Daily Average: 2.2 ppm on Oct 9																Hours of Data: 706	
Maximum Diurnal Average: 2.3 ppm at hour 3																Minimum Diurnal Average: 2.2 ppm at hour 13																Hours of Missing Data: 38	
Monthly Average: 2.28 ppm																Percentiles: P <sub>1</sub> = 2.1 P <sub>10</sub> = 2.2 Q <sub>1</sub> = 2.2 Median = 2.2 Q <sub>3</sub> = 2.3 P <sub>90</sub> = 2.5 P <sub>99</sub> = 3.1																Hours of Calibration: 38	
																																Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24									
1-Oct	2.3	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.3	2.2	2.2	2.2									
2-Oct	2.2	2.2	2.2	2.2	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.6	3.1	2.3	2.2	2.2									
3-Oct	2.2	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2									
4-Oct	Z	2.6	2.4	2.3	2.3	2.5	2.3	2.4	2.5	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2									
5-Oct	2.2	Z	2.2	2.2	2.2	2.3	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2									
6-Oct	2.2	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.2	2.5	3.5									
7-Oct	2.5	2.3	2.3	Z	2.3	2.8	2.3	2.4	2.4	2.2	2.4	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2									
8-Oct	2.2	2.2	2.3	2.3	Z	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2									
9-Oct	2.2	2.2	2.2	2.2	2.2	Z	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.2	2.2									
10-Oct	Z	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2									
11-Oct	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.3	2.3	2.3	2.2	2.3	2.2	2.2	2.2									
12-Oct	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.3	2.5	2.7	2.2									
13-Oct	2.3	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2									
14-Oct	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2									
15-Oct	2.2	2.2	2.2	2.2	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2									
16-Oct	Z	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.1	2.2									
17-Oct	2.2	Z	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.4	2.3	2.4	3.6	3.2	3.0	2.5	2.2	2.2	2.2	2.2									
18-Oct	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.3	2.2	2.2									
19-Oct	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2									
20-Oct	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.2	2.4	2.6	2.4	2.5	2.3	3.2	2.9	2.8	2.8	2.8	2.8	2.5	2.4	2.4								
21-Oct	2.5	2.6	2.4	2.8	2.4	Z	2.5	2.7	3.1	3.1	3.2	2.5	2.4	2.4	2.5	2.6	2.7	2.7	2.6	2.6	2.8	2.5	2.5	2.5									
22-Oct	Z	3.0	4.9	4.6	3.0	2.7	2.4	2.4	2.4	C	C	2.4	2.5	2.7	3.1	2.7	2.7	2.9	3.1	2.7	2.8	2.8	2.8	2.7									
23-Oct	2.8	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2									
24-Oct	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.3									
25-Oct	2.3	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.3	2.2	2.2	2.3	2.4	2.5	2.2	2.2	2.2									
26-Oct	2.2	2.2	2.2	2.2	Z	2.2	2.2	C	C	C	C	C	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3									
27-Oct	2.3	2.3	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2									
28-Oct	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.2	2.2	2.3									
29-Oct	2.3	Z	2.2	2.3	2.3	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2									
30-Oct	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.5	2.7	2.6	2.5	2.7	2.8									
31-Oct	2.8	2.7	2.6	Z	2.5	2.5	2.7	2.9	2.7	2.4	2.7	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2									
																								Diurnal Average									
																								Diurnal Maximum									
																								2.3									
																								2.8									
																								2.3									
																								3.0									
																								4.9									
																								4.6									
																								3.0									
																								2.8									
																								2.7									
																								2.9									
																								3.1									
																								3.1									
																								3.2									
																								2.6									
																								2.5									
																								2.7									
																								3.1									
																								3.2									
																								3.6									
																								3.2									
																								3.1									
																								2.8									
																								3.1									
																								2.8									
																								2.8									
																								3.5									
Z - zerospan																																	
C - Calibration																																	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Buffalo Viewpoint - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm  
Buffalo Viewpoint - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	0	0.00	0.00
2.1 - 3.0	694	98.30	98.30
3.1 - 10.0	12	1.70	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm  
Buffalo Viewpoint - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	68	60	21	5	5	1	42	102	35	27	45	52	59	39	59	63	683
3.1 - 10.0	2	0	1	0	0	0	1	1	0	0	0	0	0	1	2	2	10
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	70	60	22	5	5	1	43	103	35	27	45	52	59	40	61	65	693

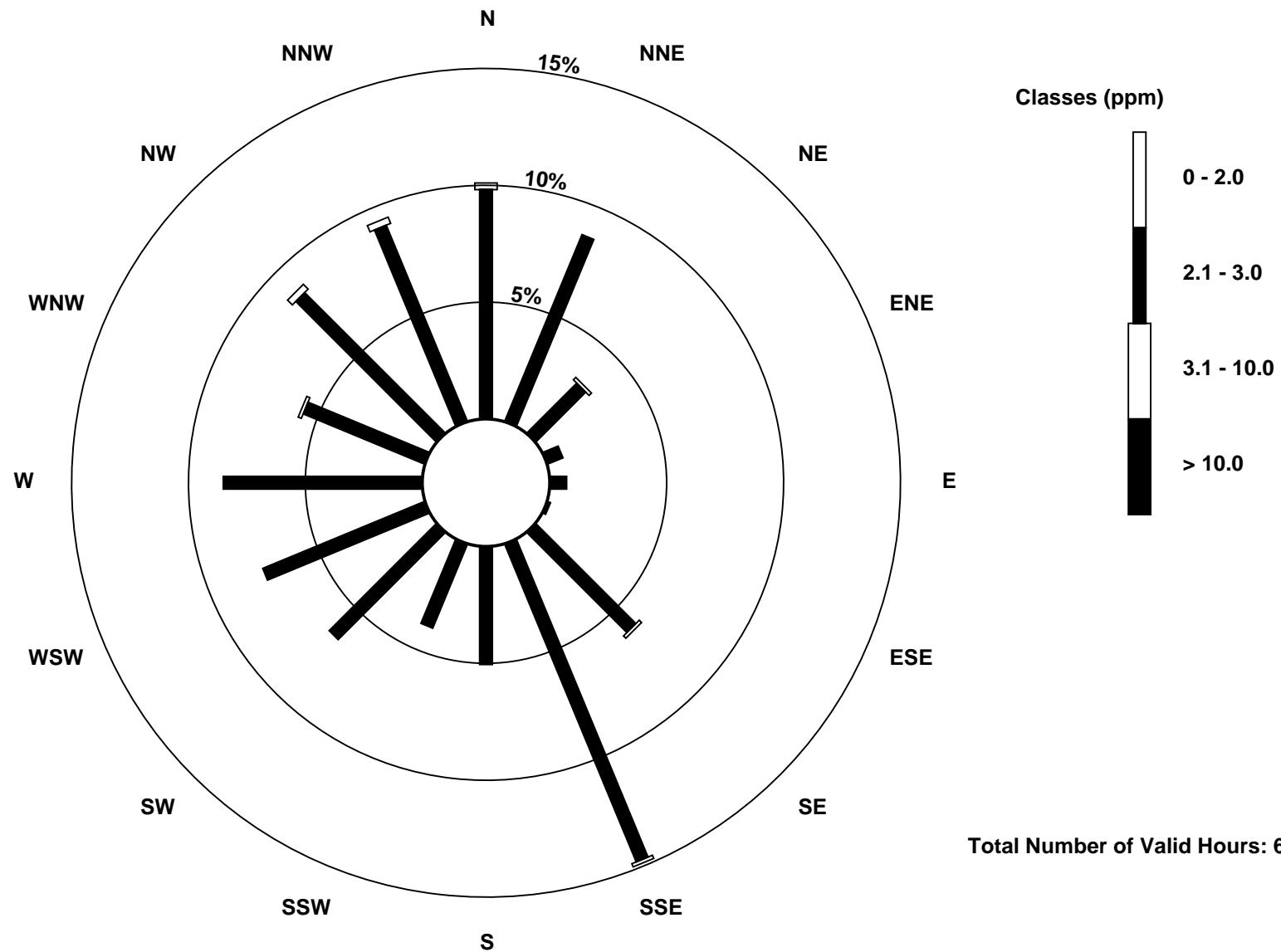
Total Number of Valid Hours: 693

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

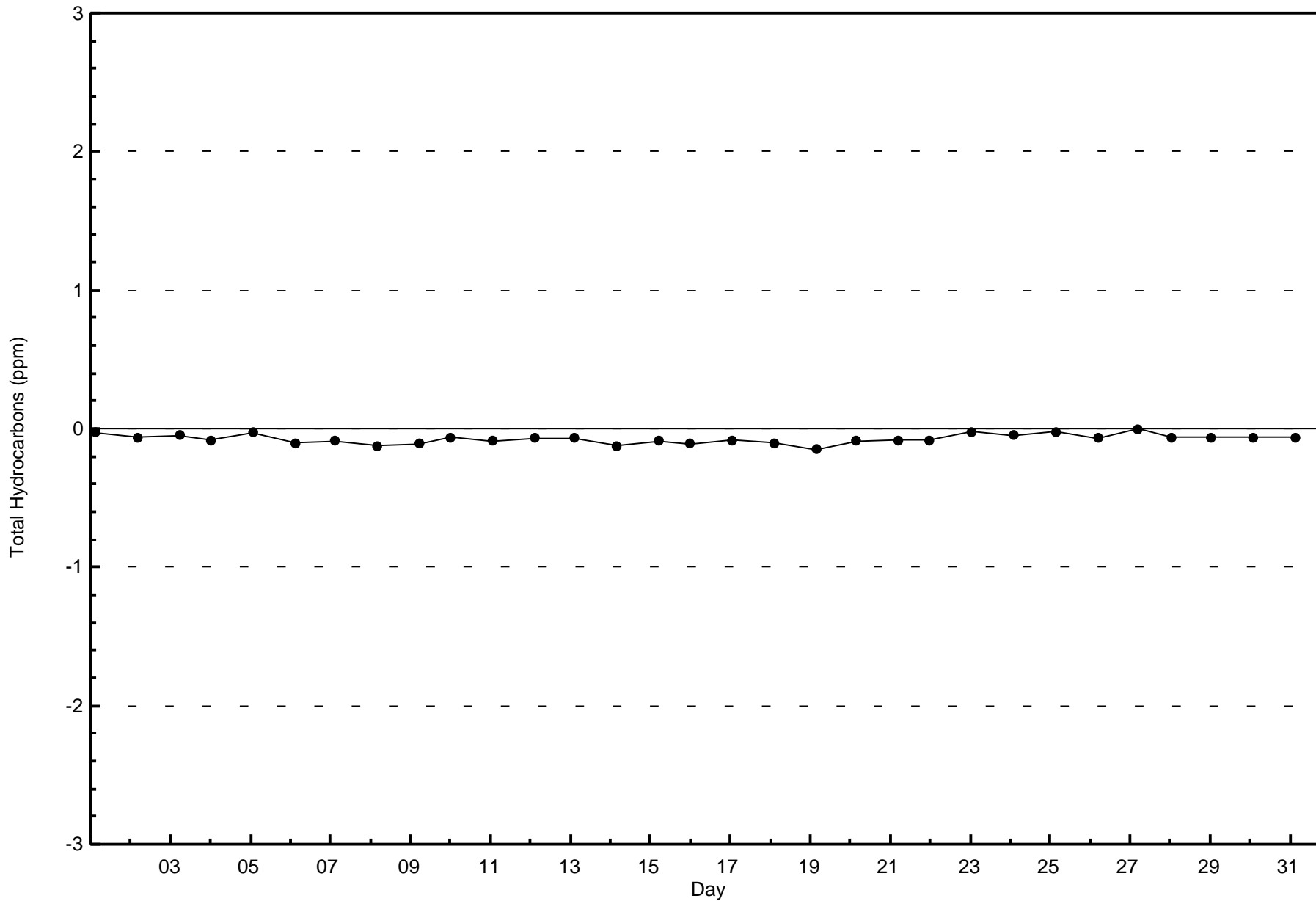
Total Hydrocarbons (THC) - ppm  
Buffalo Viewpoint (AMS 4)



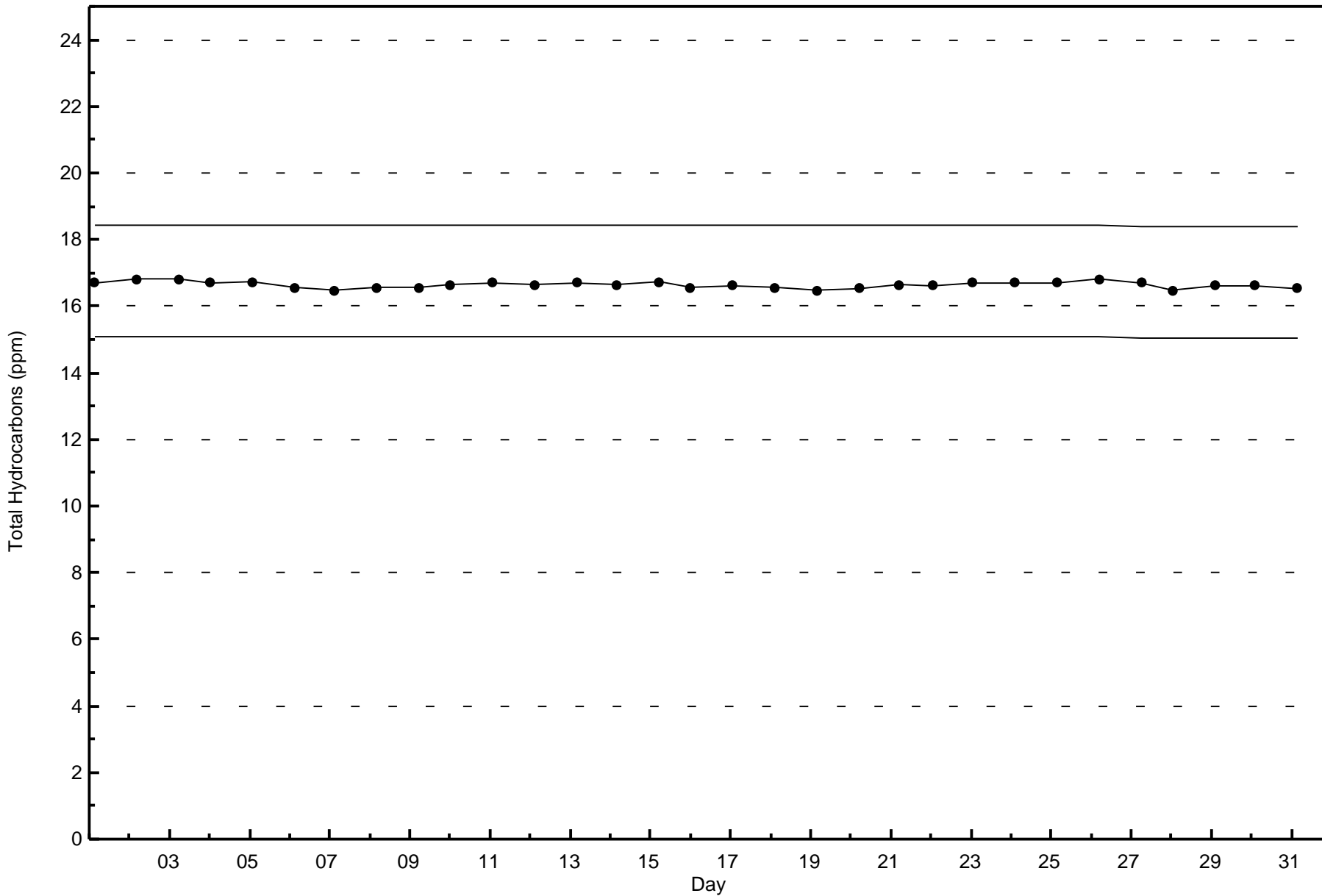


Wood Buffalo Environmental Association  
Zero Responses

Total Hydrocarbons (THC) - ppm  
Buffalo Viewpoint - October 2017







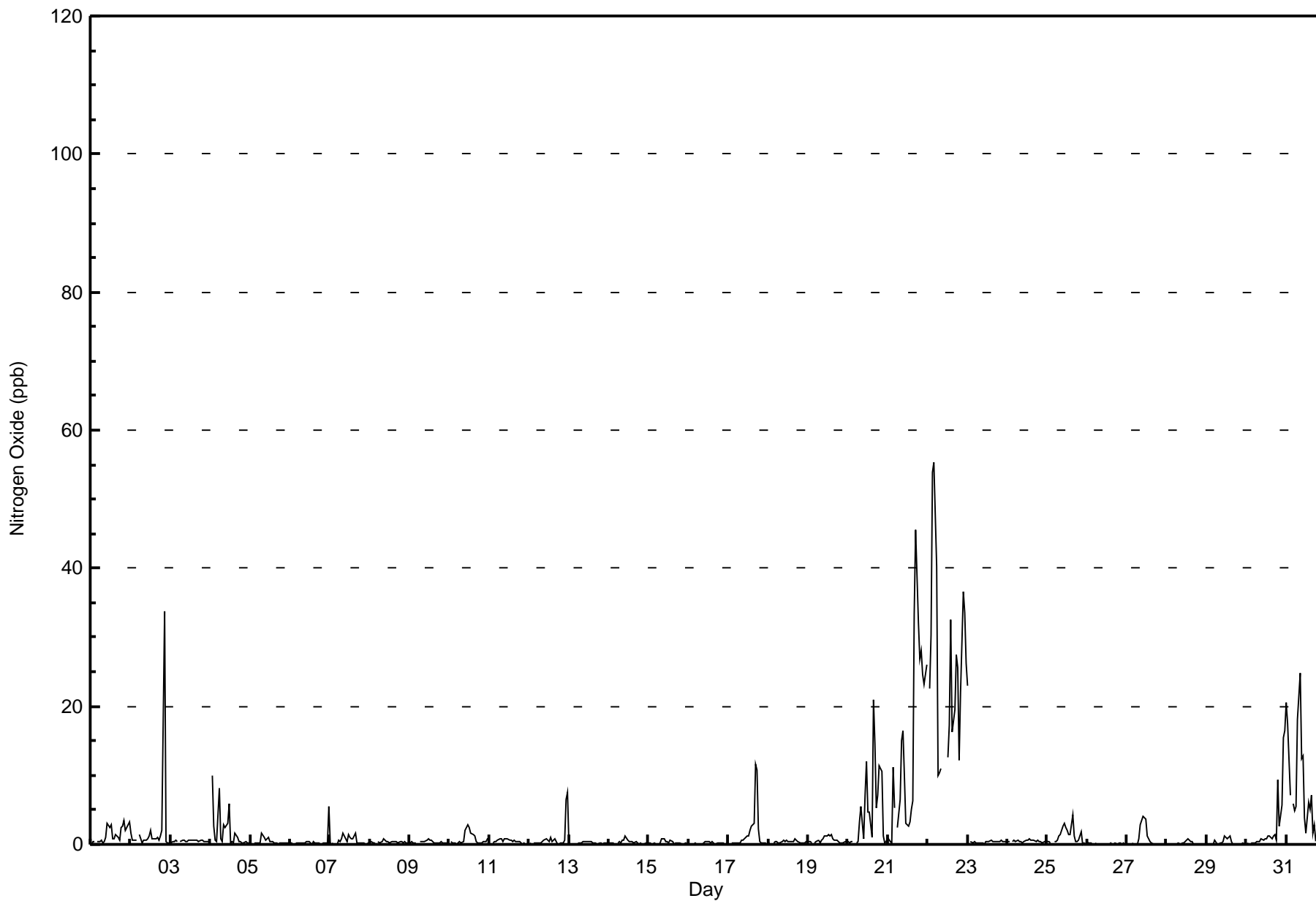


Maximum Value: 55 ppb on Oct 22 05:00		Maximum Daily Average: 25.8 ppb on Oct 22		Hours in Service: 744																																												
Minimum Value: 0 ppb on Oct 6 04:00		Minimum Daily Average: 0.1 ppb on Oct 26		Hours of Data: 705																																												
Maximum Diurnal Average: 3.5 ppb at hour 21		Minimum Diurnal Average: 0.9 ppb at hour 7		Hours of Missing Data: 39																																												
Monthly Average: 2.3 ppb		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 5 P <sub>99</sub> = 33		Hours of Calibration: 39																																												
				Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	0	0	0	Z	0	0	1	0	0	1	3	2	3	1	1	1	1	1	2	3	3	2	3	3	1.4	3																						
2-Oct	2	1	1	1	Z	1	1	0	1	1	1	1	2	1	1	1	1	1	1	2	34	0	0	0	2.3	34																						
3-Oct	0	0	0	1	0	Z	1	1	1	0	0	1	1	1	1	1	1	0	1	1	0	1	0	0	0.5	1																						
4-Oct	Z	10	3	1	0	8	1	0	3	2	3	6	0	0	0	2	1	0	0	0	0	0	0	0	1.9	10																						
5-Oct	0	Z	0	0	0	0	0	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2																						
6-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0.4	6																						
7-Oct	0	0	0	Z	0	1	0	1	2	1	0	1	1	1	1	2	0	0	0	0	0	0	0	0	0.5	2																						
8-Oct	0	0	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
9-Oct	0	0	0	0	0	Z	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1																						
10-Oct	Z	0	0	0	0	0	0	0	0	2	2	3	2	2	1	1	0	0	0	0	0	0	0	1	0.8	3																						
11-Oct	1	Z	0	0	0	1	1	1	0	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0.5	1																						
12-Oct	0	0	Z	0	0	0	0	0	0	1	1	1	0	1	0	1	0	0	0	0	0	1	7	7	0.9	7																						
13-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
14-Oct	0	0	0	0	Z	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
15-Oct	0	0	0	0	0	Z	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1																						
16-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
17-Oct	0	Z	0	0	0	0	0	0	1	1	1	1	1	2	3	3	12	11	2	0	0	0	0	0	1.7	12																						
18-Oct	0	0	Z	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0.4	1																						
19-Oct	0	0	0	Z	0	0	1	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.6	1																						
20-Oct	0	0	0	0	Z	0	0	3	5	1	7	12	5	5	1	21	15	5	7	11	11	1	0	0	4.9	21																						
21-Oct	1	0	0	11	5	Z	2	7	15	17	10	3	3	3	5	6	33	46	32	27	28	25	23	26	14.3	46																						
22-Oct	Z	23	30	54	55	40	10	10	11	C	C	C	13	17	33	16	19	27	26	12	22	37	34	26	25.8	55																						
23-Oct	23	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	1.3	23																						
24-Oct	1	0	Z	0	1	1	1	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	1	0.5	1																						
25-Oct	0	0	0	Z	0	0	1	1	1	3	3	2	2	1	2	4	1	0	0	1	2	0	0	0	1.2	4																						
26-Oct	0	0	0	0	Z	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
27-Oct	0	0	0	0	0	Z	0	1	3	3	4	4	1	1	0	0	0	0	0	0	0	0	0	0	0.8	4																						
28-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.1	1																						
29-Oct	0	Z	0	0	0	1	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1																						
30-Oct	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	9	3	6	16	17	2.7	17																						
31-Oct	21	18	7	Z	6	5	6	18	25	12	13	4	2	6	5	7	2	3	1	1	1	0	0	1	7.0	25																						
																								2.0	2.1	1.7	2.8	2.7	2.3	0.9	1.6	2.5	1.8	2.0	1.8	1.4	1.7	2.0	2.3	3.0	3.2	2.5	2.3	3.5	2.4	2.8	2.9	Diurnal Average
																								23	23	30	54	55	40	10	18	25	17	13	12	13	17	33	21	33	46	32	27	34	37	34	26	Diurnal Maximum
Z - zerospan																								C - Calibration																								



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Oxide (NO) - ppb**  
**Buffalo Viewpoint - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Oxide (NO) - ppb  
Buffalo Viewpoint - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	680	96.45	96.45
21 - 40	22	3.12	99.57
41 - 80	3	0.43	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Oxide (NO) - ppb  
Buffalo Viewpoint - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	67	57	19	5	5	1	43	102	33	26	45	52	58	39	58	65	675
21 - 40	3	2	3	0	0	0	0	1	2	1	0	0	1	1	3	0	17
11 - 80	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	70	60	22	5	5	1	43	103	35	27	45	52	59	40	61	65	693

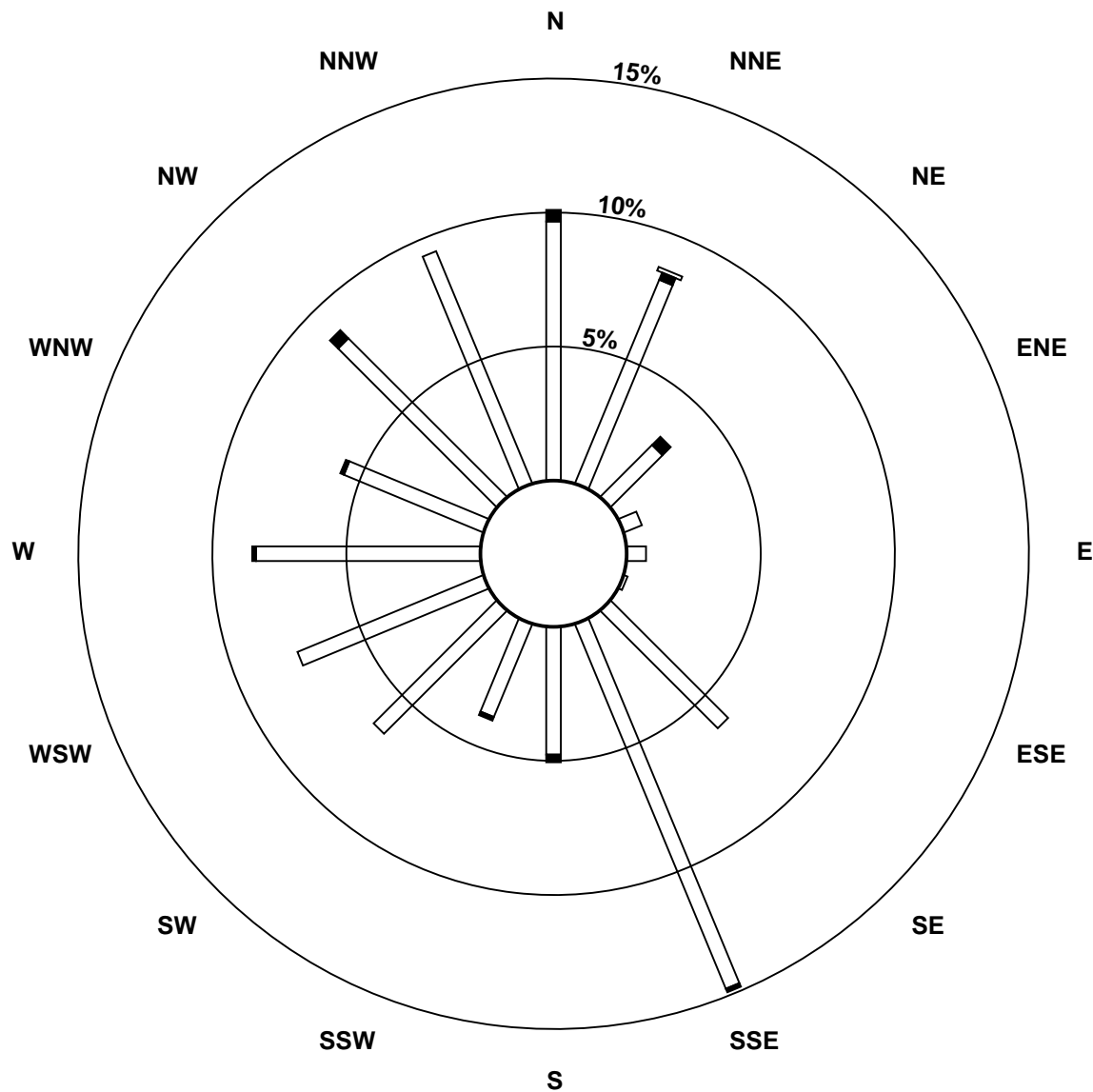
Total Number of Valid Hours: 693

Total Number of Hours: 744

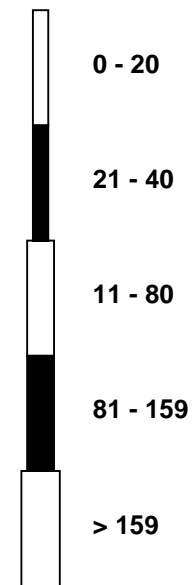


**Wood Buffalo Environmental Association**  
**Wind Rose Oct 2017**

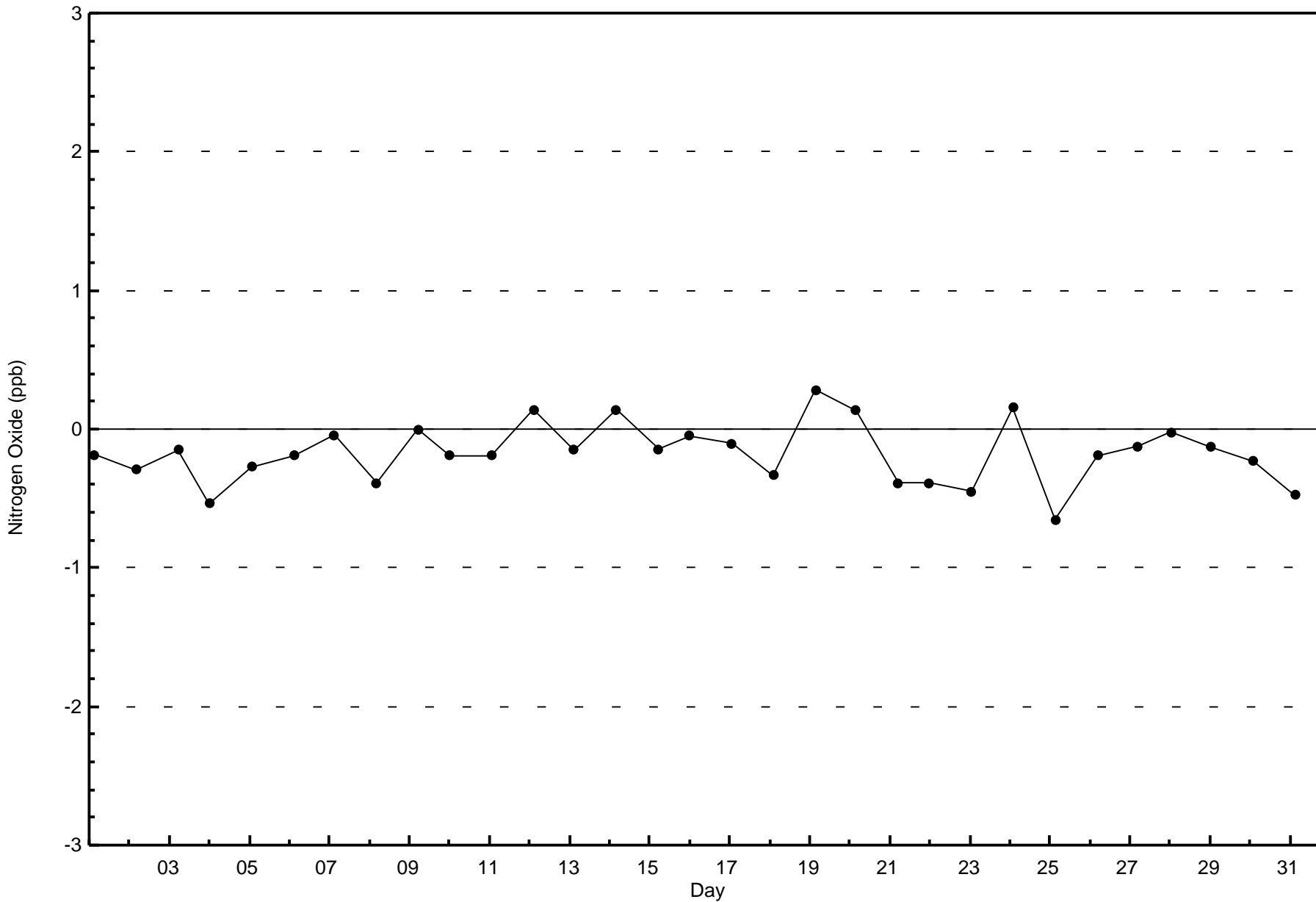
**Nitrogen Oxide (NO) - ppb**  
**Buffalo Viewpoint (AMS 4)**

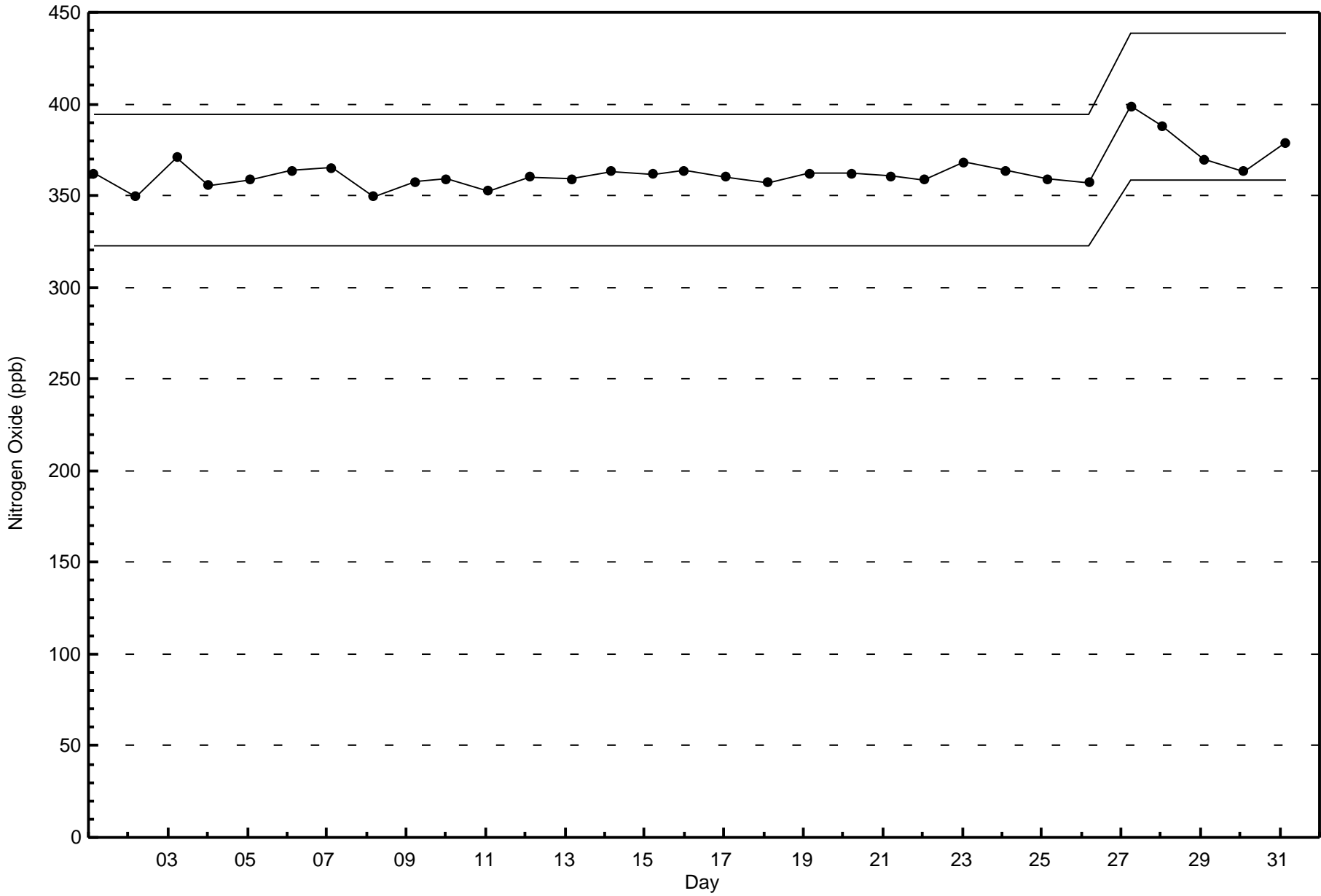


Classes (ppb)



Total Number of Valid Hours: 693









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Buffalo Viewpoint - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0											Hours in Service: 744															
Maximum Value: 26 ppb on Oct 4 02:00											Maximum Daily Average: 16.4 ppb on Oct 22											Hours of Data: 705				
Minimum Value: 0 ppb on Oct 1 03:00											Minimum Daily Average: 0.4 ppb on Oct 3											Hours of Missing Data: 39				
Maximum Diurnal Average: 5.7 ppb at hour 21											Minimum Diurnal Average: 2.6 ppb at hour 13											Hours of Calibration: 39				
Monthly Average: 4.2 ppb											Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 6 P <sub>90</sub> = 12 P <sub>99</sub> = 20											Percent Operational Time: 100.0				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	1	1	0	Z	0	1	2	0	0	1	3	3	3	2	2	4	5	4	6	5	7	5	7	8	3.0	8
2-Oct	6	2	3	2	Z	8	4	1	1	1	2	3	3	1	2	1	3	3	10	13	26	3	1	1	4.4	26
3-Oct	0	0	0	1	2	Z	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
4-Oct	Z	26	19	10	6	15	6	4	11	5	5	6	0	0	0	6	8	3	2	2	2	2	3	6.2	26	
5-Oct	2	Z	2	1	4	4	5	6	2	1	1	2	0	0	0	0	0	0	1	0	0	1	1	1	1.6	6
6-Oct	1	1	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	22	1.3	22
7-Oct	3	1	1	Z	1	10	6	11	11	4	3	5	3	2	2	4	1	3	2	2	4	4	5	5	4.0	11
8-Oct	5	5	6	5	Z	6	7	6	6	3	1	1	1	1	1	2	2	2	0	0	0	0	0	0	2.7	7
9-Oct	0	0	0	1	2	Z	2	1	2	2	2	2	2	2	1	1	0	1	1	0	0	0	0	1	1.0	2
10-Oct	Z	1	1	1	0	1	0	1	1	5	6	7	7	7	5	6	2	4	2	3	2	1	1	2	2.7	7
11-Oct	3	Z	1	2	1	2	2	2	2	3	3	2	1	2	1	1	5	6	6	6	5	7	4	3	3.1	7
12-Oct	4	3	Z	3	3	5	4	5	4	4	4	3	4	6	3	5	3	3	6	8	9	17	24	26	6.7	26
13-Oct	11	2	1	Z	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.3	11
14-Oct	1	1	1	1	Z	1	1	2	3	3	3	1	1	1	1	1	1	1	1	4	1	1	1	1	1.6	4
15-Oct	1	1	1	1	1	Z	2	3	3	2	3	4	2	2	2	2	1	1	1	1	1	1	1	1	1.6	4
16-Oct	Z	1	0	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	4	5	1	1	1	1	1.1	5
17-Oct	2	Z	1	5	12	7	6	4	4	5	6	6	7	9	11	14	20	22	20	7	1	1	1	1	7.4	22
18-Oct	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	6	9	6	3	7	9	7	7	7	2.8	9
19-Oct	3	3	3	Z	1	2	1	2	2	2	2	2	3	3	3	3	3	8	3	3	3	2	2	2	2.6	8
20-Oct	2	2	2	2	Z	4	6	13	12	2	6	14	8	9	3	14	15	15	15	14	11	6	3	3	7.9	15
21-Oct	7	7	3	10	12	Z	10	11	12	13	13	6	5	5	6	11	19	20	19	18	18	18	18	18	12.2	20
22-Oct	Z	17	18	19	18	16	13	12	10	C	C	C	11	16	19	17	18	20	19	17	17	19	18	16	16.4	20
23-Oct	14	Z	3	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.8	14
24-Oct	1	1	Z	1	1	1	2	1	1	1	1	1	2	2	3	7	3	5	3	1	2	4	7	7	2.3	7
25-Oct	8	3	3	Z	3	3	7	5	7	9	8	6	5	5	6	12	7	4	5	10	19	3	2	2	6.2	19
26-Oct	1	1	2	1	Z	2	1	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2
27-Oct	0	0	2	1	2	Z	4	5	5	3	3	3	2	2	2	3	3	4	3	2	2	2	2	2	2.5	5
28-Oct	Z	2	1	1	0	0	0	0	1	0	0	1	2	4	4	6	5	6	2	7	8	7	5	6	3.0	8
29-Oct	8	Z	8	8	8	6	3	3	3	2	2	3	2	3	6	4	5	4	2	2	3	4	3	1	4.1	8
30-Oct	1	0	Z	1	0	2	1	3	2	3	2	2	3	3	4	4	12	17	11	20	16	17	20	21	7.2	21
31-Oct	19	20	18	Z	16	14	14	14	14	10	12	5	3	9	9	11	8	10	5	8	10	9	8	6	11.0	20
4.0 3.9 3.9 3.2 3.8 4.4 3.7 4.1 4.1 3.1 3.3 3.2 2.6 3.2 3.2 4.5 5.2 5.7 5.2 5.3 5.7 4.6 4.6 5.3																								Diurnal Average		
19 26 19 19 18 16 14 14 14 13 13 14 11 16 19 17 20 22 20 20 26 19 24 26																								Diurnal Maximum		
Z - zerospan C - Calibration																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										



Wood Buffalo Environmental Association  
Hourly Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Buffalo Viewpoint - October 2017





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Buffalo Viewpoint - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	698	99.01	99.01
21 - 40	7	0.99	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Buffalo Viewpoint - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	70	60	21	5	5	1	43	103	35	27	45	52	59	40	57	63	686
21 - 40	0	0	1	0	0	0	0	0	0	0	0	0	0	0	4	2	7
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	70	60	22	5	5	1	43	103	35	27	45	52	59	40	61	65	693

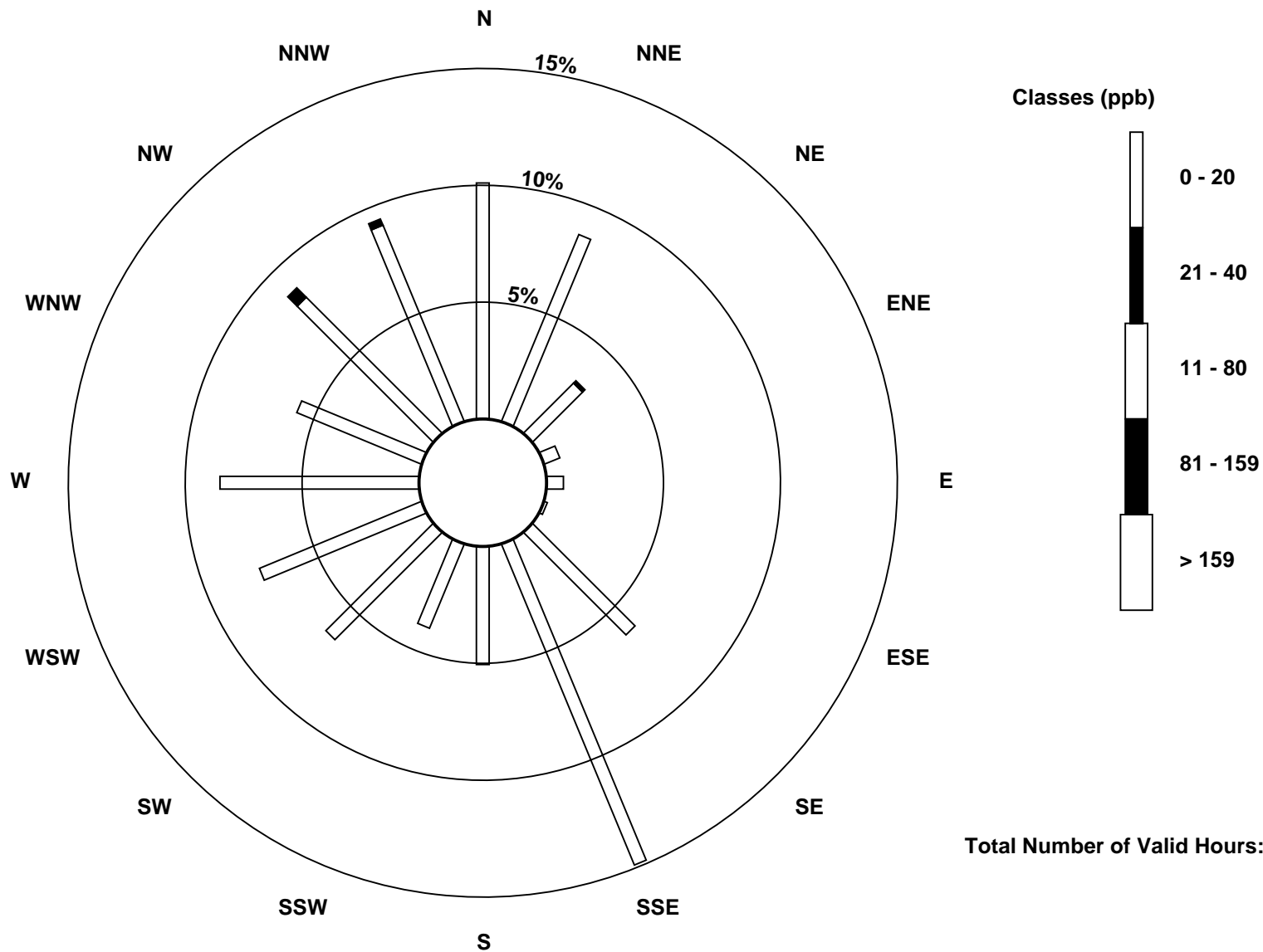
Total Number of Valid Hours: 693

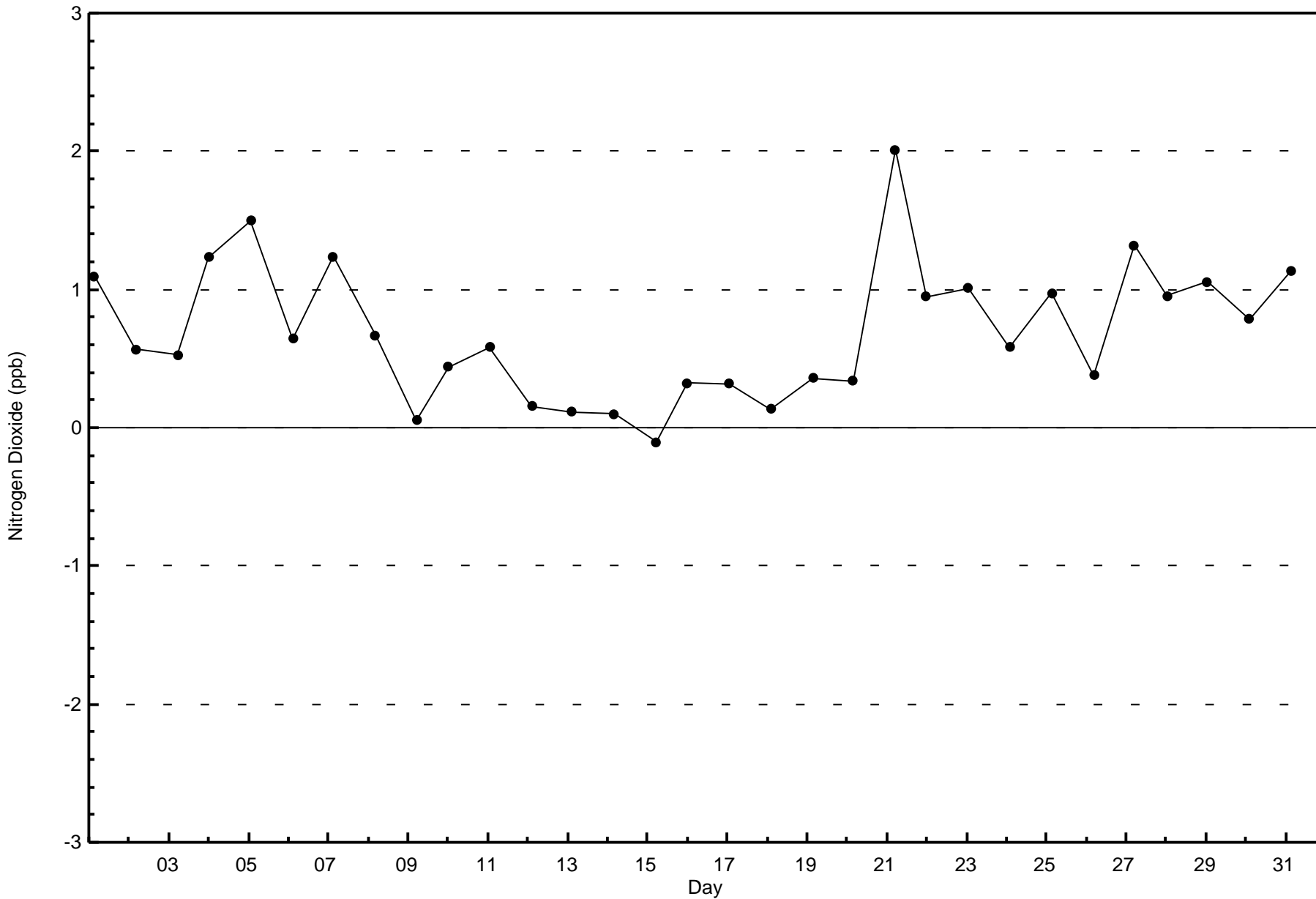
Total Number of Hours: 744

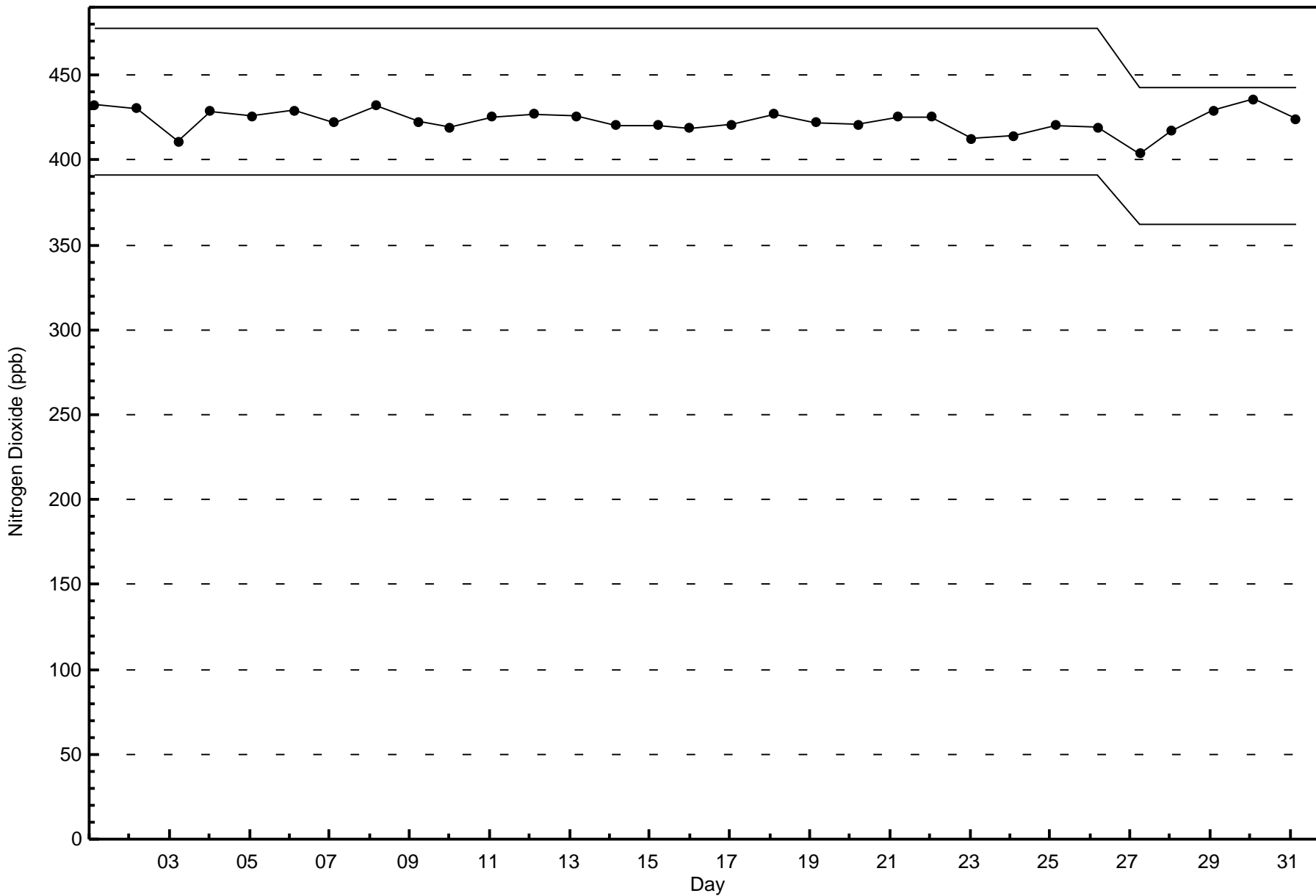


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Buffalo Viewpoint (AMS 4)









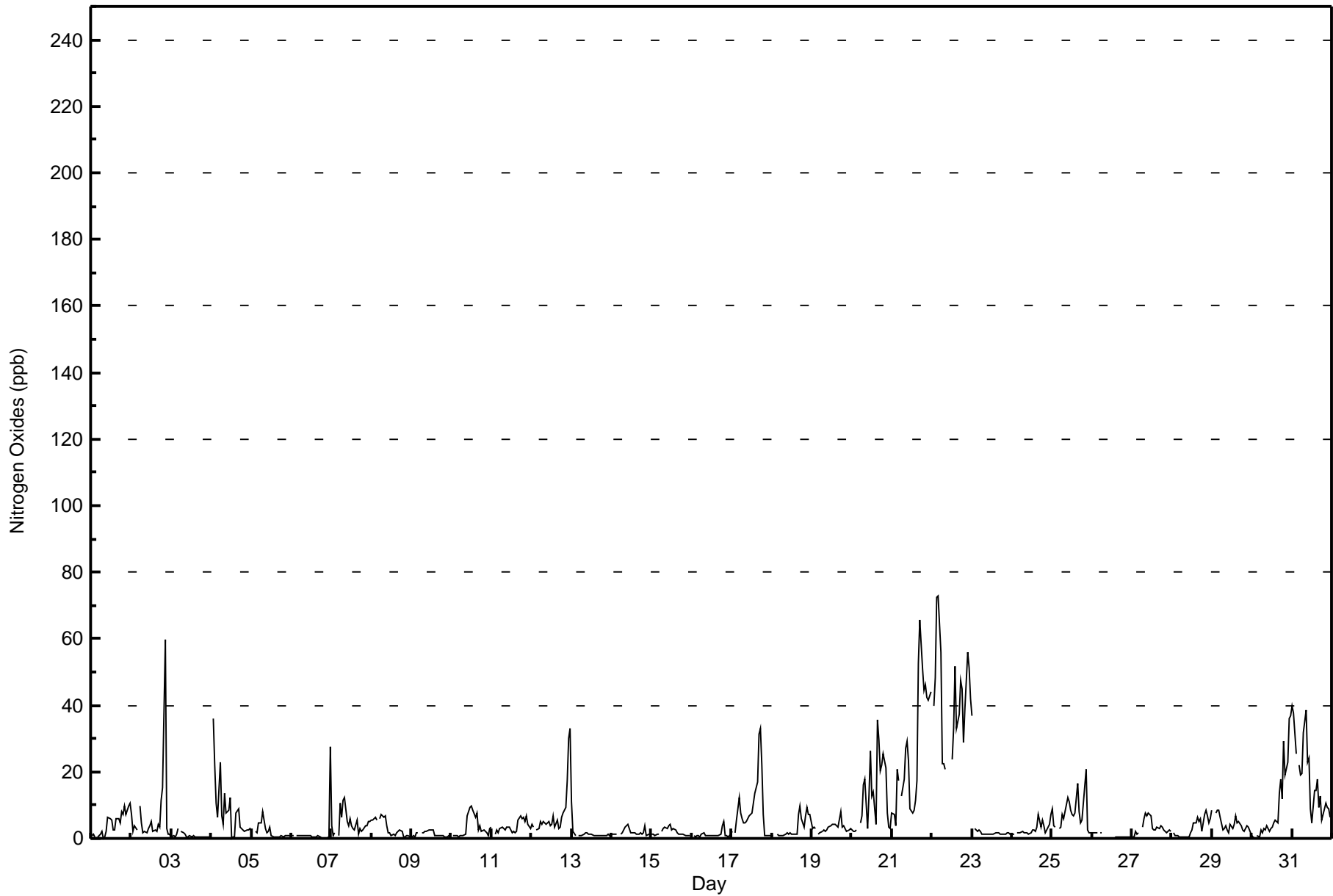
Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Buffalo Viewpoint - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 73 ppb on Oct 22 05:00										Maximum Daily Average: 42.1 ppb on Oct 22										Hours of Data: 705						
Minimum Value: 0 ppb on Oct 26 13:00										Minimum Daily Average: 0.7 ppb on Oct 26										Hours of Missing Data: 39						
Maximum Diurnal Average: 9.2 ppb at hour 21										Minimum Diurnal Average: 4.1 ppb at hour 13										Hours of Calibration: 39						
Monthly Average: 6.5 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 O <sub>1</sub> = 1 Median = 3 O <sub>3</sub> = 7 P <sub>90</sub> = 18 P <sub>99</sub> = 51										Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	1	1	0	Z	0	1	2	0	0	2	6	6	5	3	3	6	6	5	8	7	10	7	10	11	4.4	11
2-Oct	7	2	4	3	Z	10	5	2	2	2	3	4	5	2	2	2	4	4	12	15	60	3	1	1	6.7	60
3-Oct	1	1	1	1	3	Z	2	2	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0.8	3
4-Oct	Z	36	22	11	6	23	7	4	14	8	8	12	0	0	0	8	9	3	3	3	2	2	2	3	8.1	36
5-Oct	2	Z	2	1	4	5	5	8	3	2	2	3	1	0	0	0	0	0	1	1	1	1	1	1	1.9	8
6-Oct	1	1	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	27	1.7	27
7-Oct	4	1	2	Z	1	11	6	11	12	5	4	6	4	3	3	5	1	3	2	2	4	4	5	5	4.5	12
8-Oct	6	5	7	5	Z	6	7	6	7	4	2	2	1	1	1	2	2	3	2	1	1	1	1	1	3.1	7
9-Oct	1	1	1	2	2	Z	2	2	2	2	3	3	3	2	1	1	1	1	1	1	1	1	1	1	1.3	3
10-Oct	Z	1	1	1	0	1	1	1	1	7	8	9	10	9	6	8	2	4	2	3	2	1	1	3	3.5	10
11-Oct	3	Z	1	2	2	3	3	3	3	3	3	3	2	2	2	2	5	7	6	6	5	7	4	3	3.6	7
12-Oct	4	3	Z	3	3	5	4	5	5	4	5	4	4	7	3	5	3	3	6	8	9	17	30	33	7.6	33
13-Oct	11	2	1	Z	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.5	11
14-Oct	1	1	1	1	Z	1	2	2	3	4	4	2	2	2	2	1	2	1	2	4	1	1	1	1	1.9	4
15-Oct	1	1	1	1	1	Z	2	3	3	3	4	4	2	3	2	2	1	1	1	1	1	1	1	1	1.9	4
16-Oct	Z	1	0	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	4	5	1	1	1	1	1.2	5
17-Oct	2	Z	2	5	12	7	6	5	5	5	7	7	8	11	13	17	31	33	22	7	1	1	1	1	9.1	33
18-Oct	1	1	Z	1	1	1	1	1	1	2	1	2	1	1	1	1	7	10	6	3	7	9	7	7	3.2	10
19-Oct	3	4	3	Z	1	2	2	2	2	3	3	4	4	4	4	4	3	8	3	4	3	2	2	3	3.2	8
20-Oct	2	2	2	3	Z	5	7	16	18	3	13	26	13	14	4	35	30	20	22	25	21	8	3	3	12.8	35
21-Oct	8	7	4	21	18	Z	13	18	27	29	23	9	8	8	11	17	53	66	51	45	46	42	41	44	26.5	66
22-Oct	Z	40	48	73	73	56	22	22	21	C	C	C	24	33	52	33	37	47	45	29	39	56	51	42	42.1	73
23-Oct	37	Z	3	2	2	2	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	1	1	3.1	37
24-Oct	1	1	Z	2	2	2	2	2	2	1	1	2	3	3	2	4	7	3	6	4	2	3	4	7	2.8	7
25-Oct	9	4	4	Z	3	3	7	6	8	12	11	8	7	7	7	17	8	5	5	11	21	3	2	2	7.4	21
26-Oct	2	2	2	1	Z	2	1	C	C	C	C	C	0	0	0	0	0	0	0	1	1	0	0	0	0.7	2
27-Oct	0	0	2	1	2	Z	4	6	7	7	7	7	3	3	3	3	3	4	3	2	2	2	2	2	3.3	7
28-Oct	Z	2	1	1	0	0	0	0	1	0	1	2	2	5	5	6	5	6	2	7	8	7	5	6	3.1	8
29-Oct	8	Z	8	8	8	6	2	3	4	3	2	4	3	4	7	4	5	4	3	2	3	4	3	1	4.3	8
30-Oct	1	0	Z	1	1	3	2	3	3	4	2	3	3	5	5	5	14	18	12	29	19	23	36	37	9.9	37
31-Oct	40	38	25	Z	22	19	20	32	39	23	24	9	5	15	14	18	9	13	6	9	11	9	9	7	18.0	40
6.0 6.1 5.6 6.1 6.6 6.7 4.5 5.7 6.6 4.9 5.3 5.0 4.1 4.8 5.2 6.8 8.2 8.9 7.7 7.6 9.2 7.0 7.4 8.2																								Diurnal Average		
40 40 48 73 73 56 22 32 39 29 24 26 24 33 52 35 53 66 51 45 60 56 51 44																								Diurnal Maximum		
Z - zerospan C - Calibration																										







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Buffalo Viewpoint - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	643	91.21	91.21
21 - 40	43	6.10	97.31
41 - 80	19	2.70	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Buffalo Viewpoint - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	65	50	16	4	5	1	40	100	31	26	45	52	57	39	53	58	642
21 - 40	3	7	3	1	0	0	3	3	3	0	0	0	1	1	6	7	38
11 - 80	2	3	3	0	0	0	0	0	1	1	0	0	1	0	2	0	13
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	70	60	22	5	5	1	43	103	35	27	45	52	59	40	61	65	693

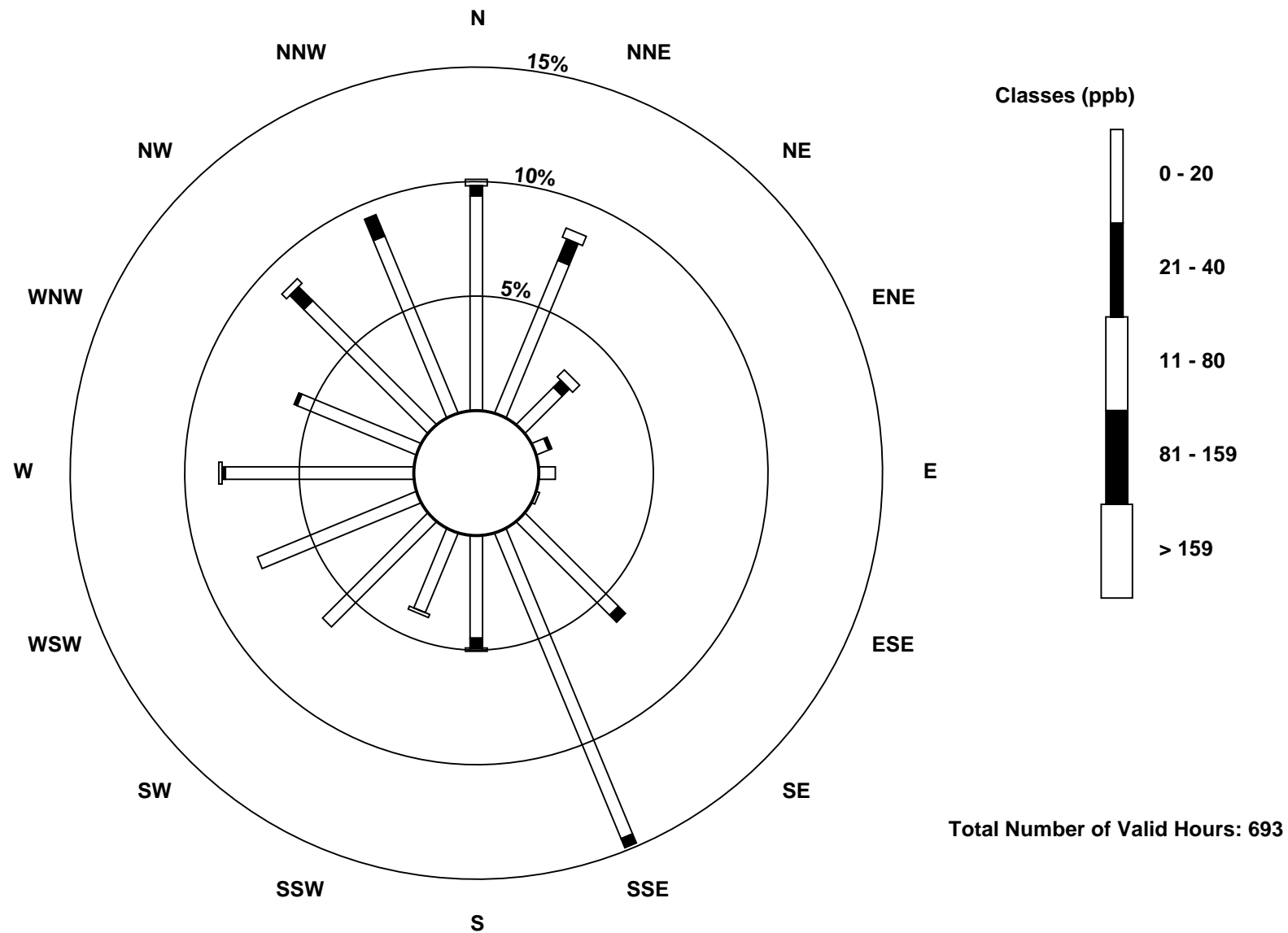
Total Number of Valid Hours: 693

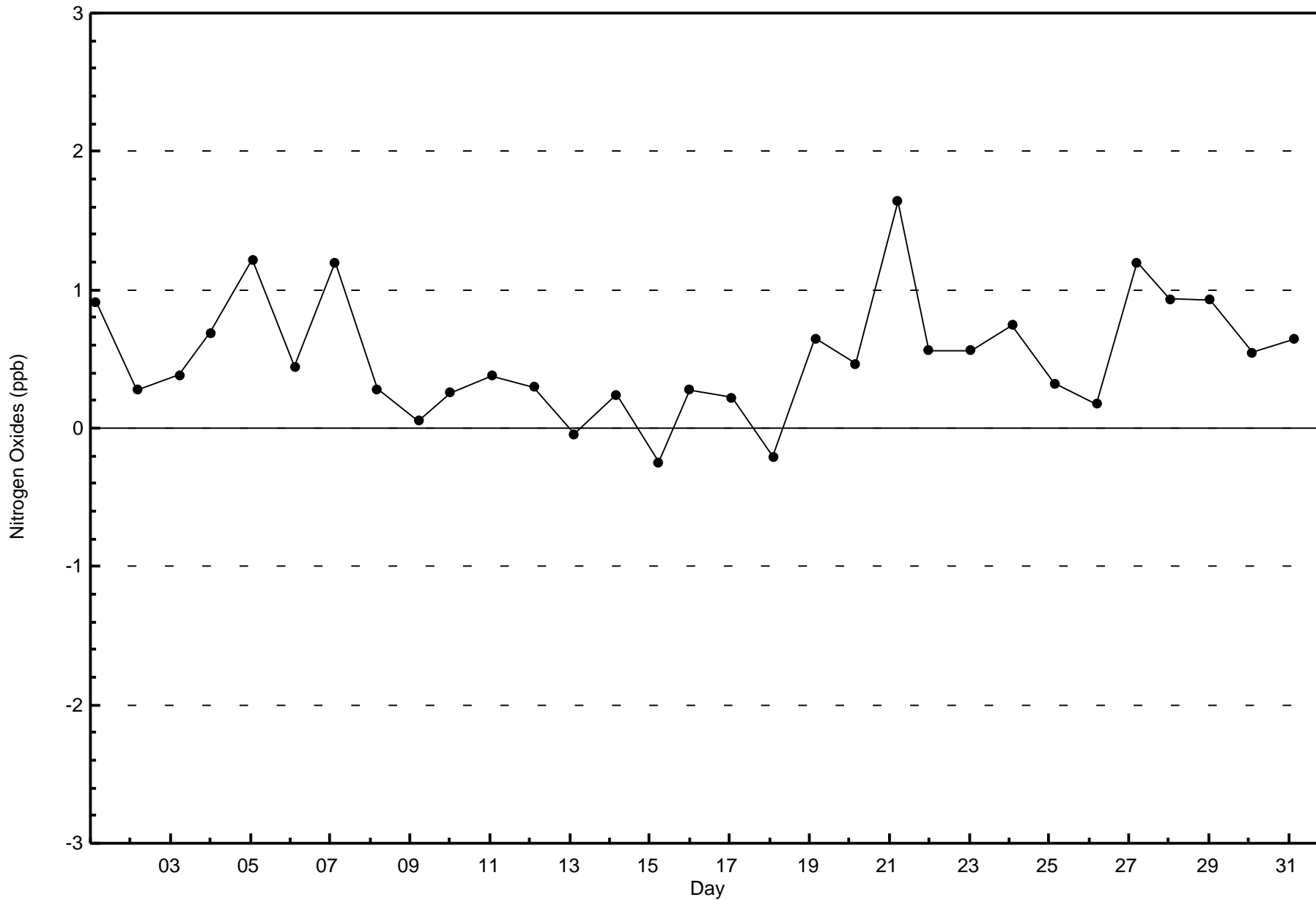
Total Number of Hours: 744

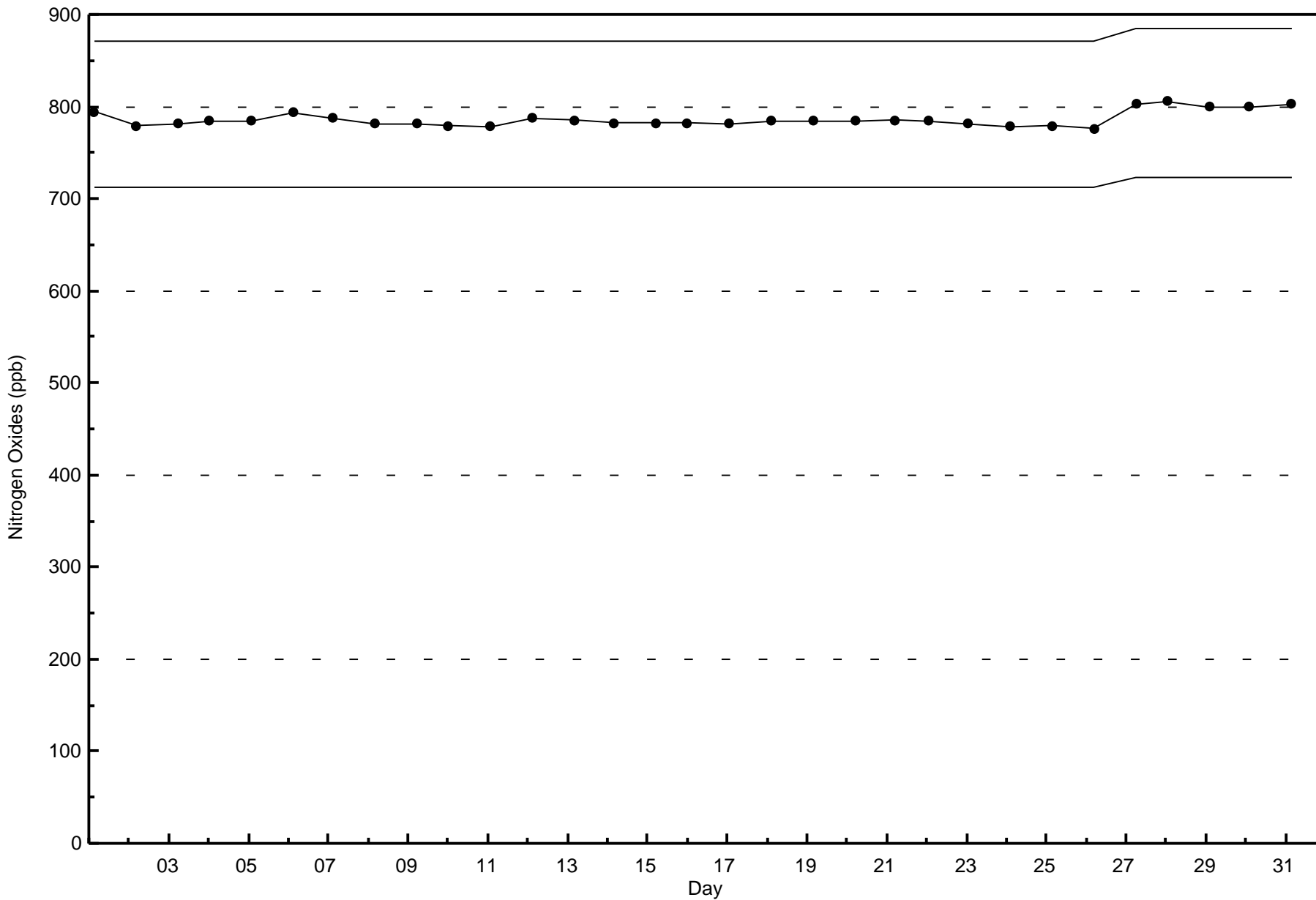


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Buffalo Viewpoint (AMS 4)









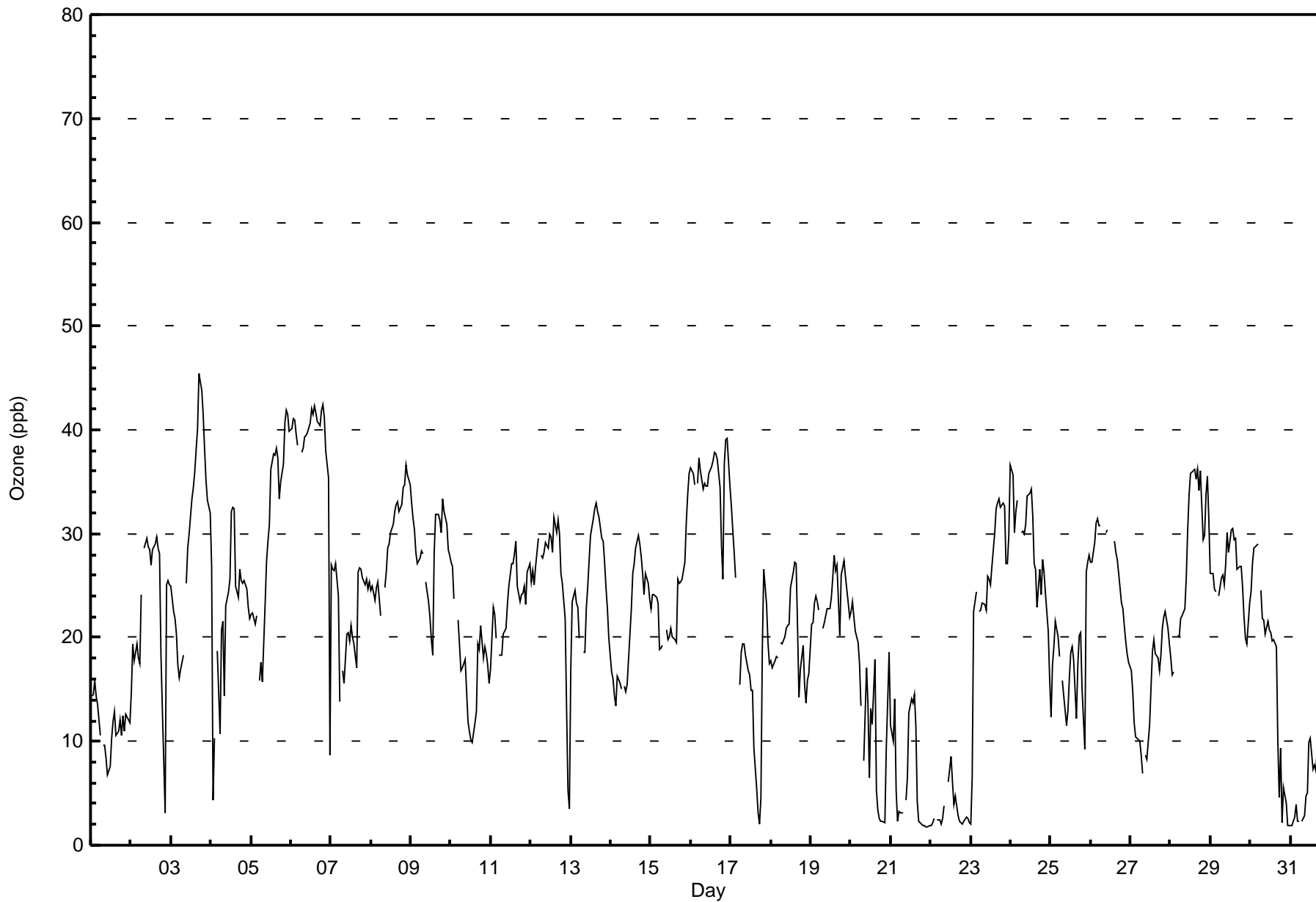
# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Ozone (O<sub>3</sub>) - ppb

## Buffalo Viewpoint - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 45 ppb on Oct 3 18:00      Maximum Daily Average: 38.8 ppb on Oct 6		Hours in Service: 744 Hours of Data: 708																								
Minimum Value: 2 ppb on Oct 21 22:00 Maximum Diurnal Average: 25.1 ppb at hour 15 Monthly Average: 22.1 ppb		Minimum Daily Average: 3.4 ppb on Oct 22 Minimum Diurnal Average: 17.5 ppb at hour 6 Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 7 Q <sub>1</sub> = 16 Median = 23 Q <sub>3</sub> = 29 P <sub>90</sub> = 35 P <sub>99</sub> = 42																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	14	14	16	14	14	11	Z	10	10	8	7	8	10	12	13	11	11	12	11	13	11	13	12	12	11.5	16
2-Oct	15	19	18	19	18	17	24	Z	29	30	29	28	27	28	29	30	29	28	18	13	3	25	25	25	22.9	30
3-Oct	25	23	22	20	17	16	17	18	Z	25	29	30	33	34	36	38	40	45	44	41	38	35	33	32	30.1	45
4-Oct	27	4	10	Z	19	11	21	22	14	23	24	26	32	33	32	25	24	27	25	25	25	23	22	22.6	33	
5-Oct	22	22	21	22	Z	16	18	16	23	27	29	31	36	38	38	38	37	33	35	37	41	42	42	40	30.6	42
6-Oct	40	41	41	40	39	Z	38	38	39	39	40	41	42	42	42	42	41	40	42	42	41	38	35	9	38.8	42
7-Oct	27	27	26	27	24	14	Z	17	16	20	20	20	21	20	19	17	26	27	27	26	25	26	25	25	22.7	27
8-Oct	25	25	24	25	25	24	22	Z	25	26	29	29	30	31	32	33	33	32	33	34	35	37	36	35	29.5	37
9-Oct	33	32	30	28	27	28	28	28	Z	25	23	22	20	18	28	32	32	31	30	33	32	31	29	28	28.2	33
10-Oct	27	27	24	Z	22	19	17	17	18	15	12	11	10	10	12	13	19	19	21	18	19	18	17	16	17.4	27
11-Oct	17	23	22	20	Z	18	18	20	21	21	23	25	27	27	28	29	25	23	24	24	25	23	26	27	23.4	29
12-Oct	25	26	25	27	30	Z	28	28	28	29	29	30	30	28	32	30	31	30	26	25	22	13	5	4	25.3	32
13-Oct	17	23	25	23	23	20	Z	19	19	23	25	27	30	31	32	33	32	32	30	29	27	25	23	20	25.5	33
14-Oct	17	16	14	13	16	16	15	Z	15	15	15	20	23	26	27	29	30	29	28	26	24	26	25	24	21.3	30
15-Oct	23	24	24	24	23	19	19	19	Z	21	20	20	21	20	20	20	26	25	25	26	27	31	34	36	23.7	36
16-Oct	36	36	35	Z	35	37	36	34	35	35	35	36	36	37	38	38	37	34	29	26	37	39	39	35	35.4	39
17-Oct	33	30	28	26	Z	16	19	19	19	18	17	16	15	15	9	5	3	2	5	19	27	23	19	17	17.5	33
18-Oct	18	17	18	18	18	Z	19	19	20	21	21	21	25	26	27	27	21	14	17	19	15	14	16	17	19.5	27
19-Oct	21	21	23	24	23	23	Z	21	21	22	23	23	24	26	28	27	27	20	26	27	27	26	23	22	23.8	28
20-Oct	23	23	22	21	20	18	13	Z	8	17	14	6	13	12	18	5	3	3	2	2	2	9	14	19	12.5	23
21-Oct	12	10	14	5	2	3	3	3	Z	4	7	13	14	14	14	12	4	2	2	2	2	2	2	2	6.4	14
22-Oct	2	2	3	Z	2	2	2	3	4	C	6	7	8	6	4	5	3	2	2	2	2	3	3	2	3.4	8
23-Oct	2	6	22	24	Z	23	23	23	23	23	26	26	25	27	30	32	33	33	33	33	33	27	27	30	25.4	33
24-Oct	37	36	30	32	33	Z	30	30	30	31	34	34	34	32	27	27	23	27	24	28	26	24	21	16	28.9	37
25-Oct	12	17	19	22	20	18	Z	16	14	12	13	16	19	19	18	12	17	20	20	15	9	26	27	28	17.9	28
26-Oct	27	27	29	31	31	31	31	Z	M	30	30	C	C	C	29	28	28	26	23	23	21	20	19	18	26.4	31
27-Oct	17	15	12	10	10	10	9	7	Z	9	8	12	15	19	20	18	18	17	18	21	22	23	21	19	15.2	23
28-Oct	18	16	17	Z	20	20	22	22	23	26	30	34	36	36	36	35	36	34	36	29	30	34	36	32	28.6	36
29-Oct	26	26	25	24	Z	24	26	26	25	27	30	28	30	30	29	30	27	27	27	25	22	20	19	23	26.0	30
30-Oct	24	27	29	29	29	Z	25	22	22	20	22	21	20	20	20	19	10	5	9	2	6	4	2	2	16.8	29
31-Oct	2	2	3	4	2	2	Z	2	3	5	5	10	10	7	8	7	9	9	12	11	11	15	17	21	7.8	21
21.4 21.3 21.6 22.1 20.9 17.5 20.9 19.2 20.2 21.6 21.7 22.4 24.0 24.1 25.1 24.1 23.7 22.9 22.7 22.5 22.2 23.1 22.4 21.1																								Diurnal Average		
40 41 41 40 39 37 38 38 39 39 40 41 42 42 42 42 41 45 44 42 41 42 42 40																								Diurnal Maximum		
Z - zerospan      C - Calibration      M - Maintenance																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																										







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Buffalo Viewpoint - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	290	40.96	40.96
21 - 50	418	59.04	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb  
Buffalo Viewpoint - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	37	39	20	5	1	0	25	49	16	5	3	1	8	17	28	22	276
21 - 50	31	22	2	0	4	0	19	52	21	24	42	52	51	22	33	43	418
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	68	61	22	5	5	0	44	101	37	29	45	53	59	39	61	65	694

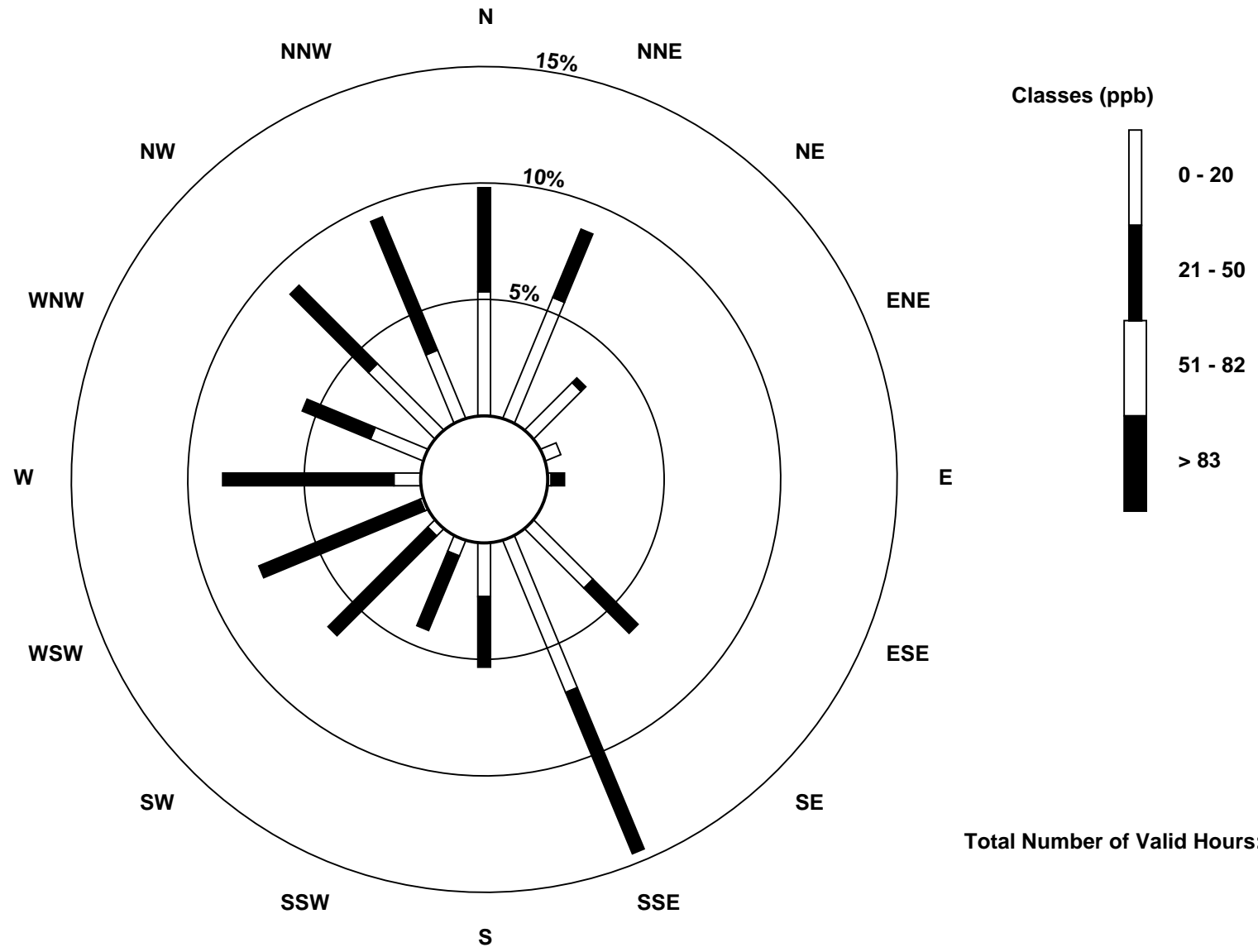
Total Number of Valid Hours: 694

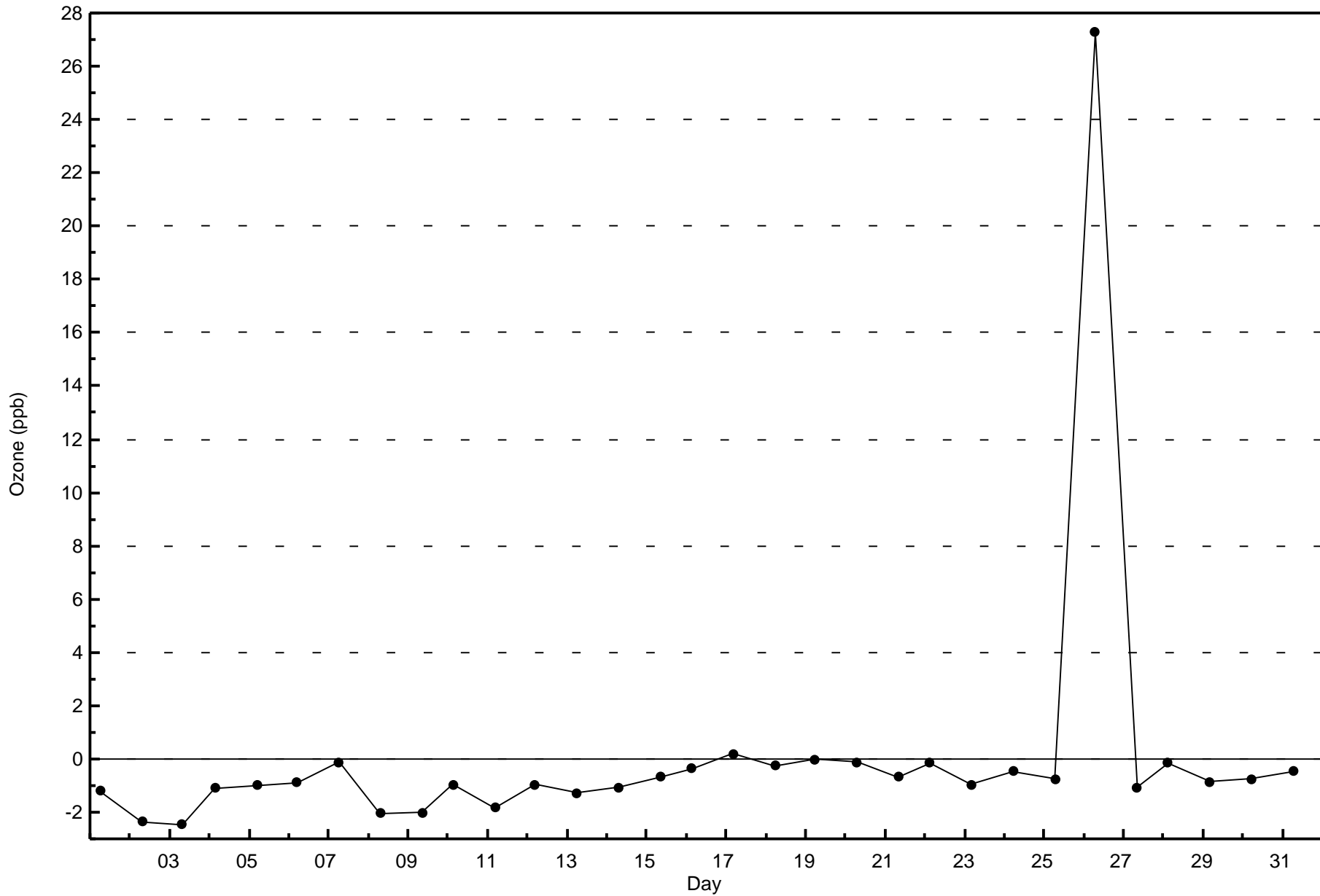
Total Number of Hours: 744

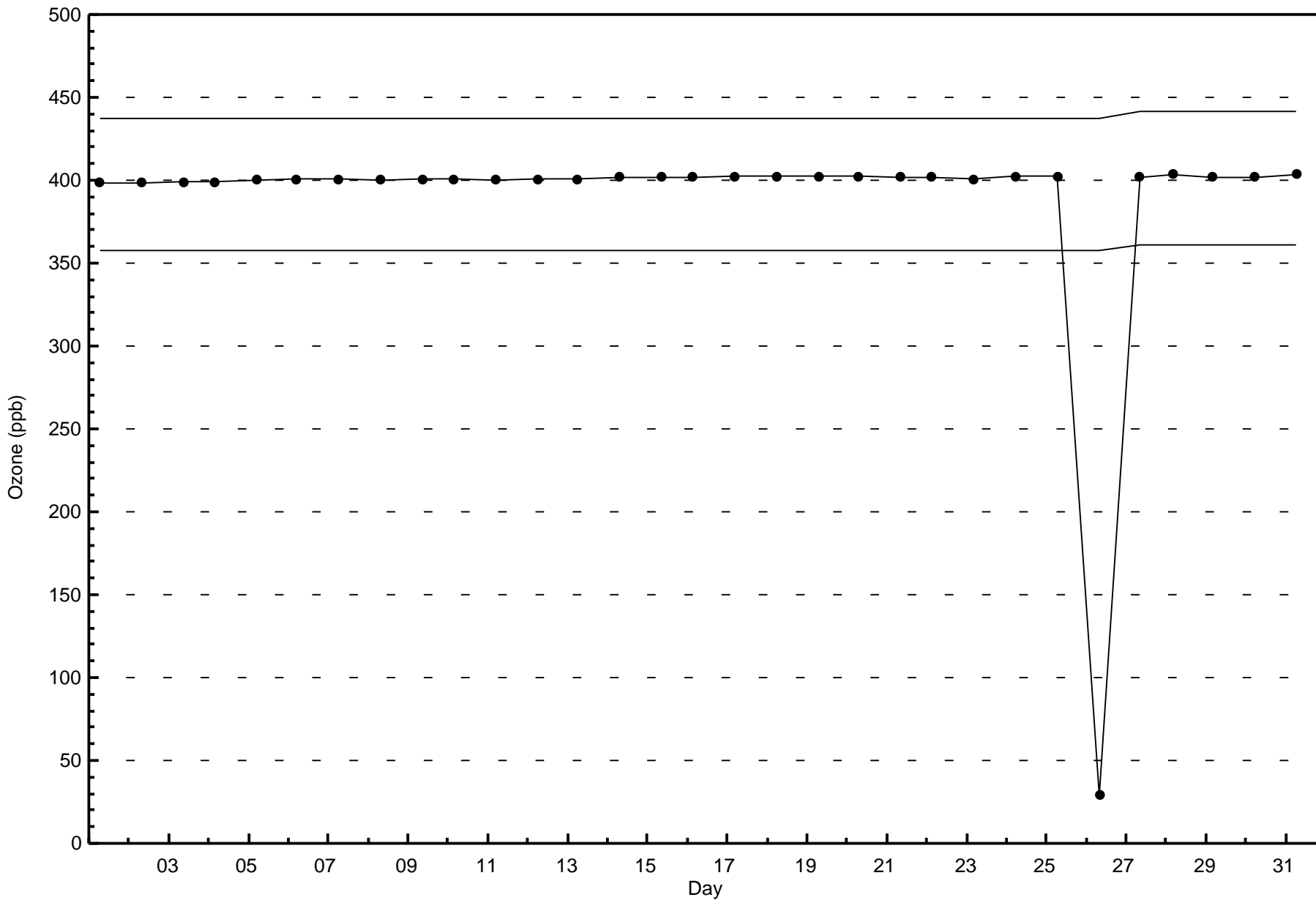


**Wood Buffalo Environmental Association**  
**Wind Rose Oct 2017**

**Ozone (O<sub>3</sub>) - ppb**  
**Buffalo Viewpoint (AMS 4)**









# Wood Buffalo Environmental Association

## Summary of Hour Averages

PM2.5 (PM<sub>2.5</sub>) - µg/m<sup>3</sup>

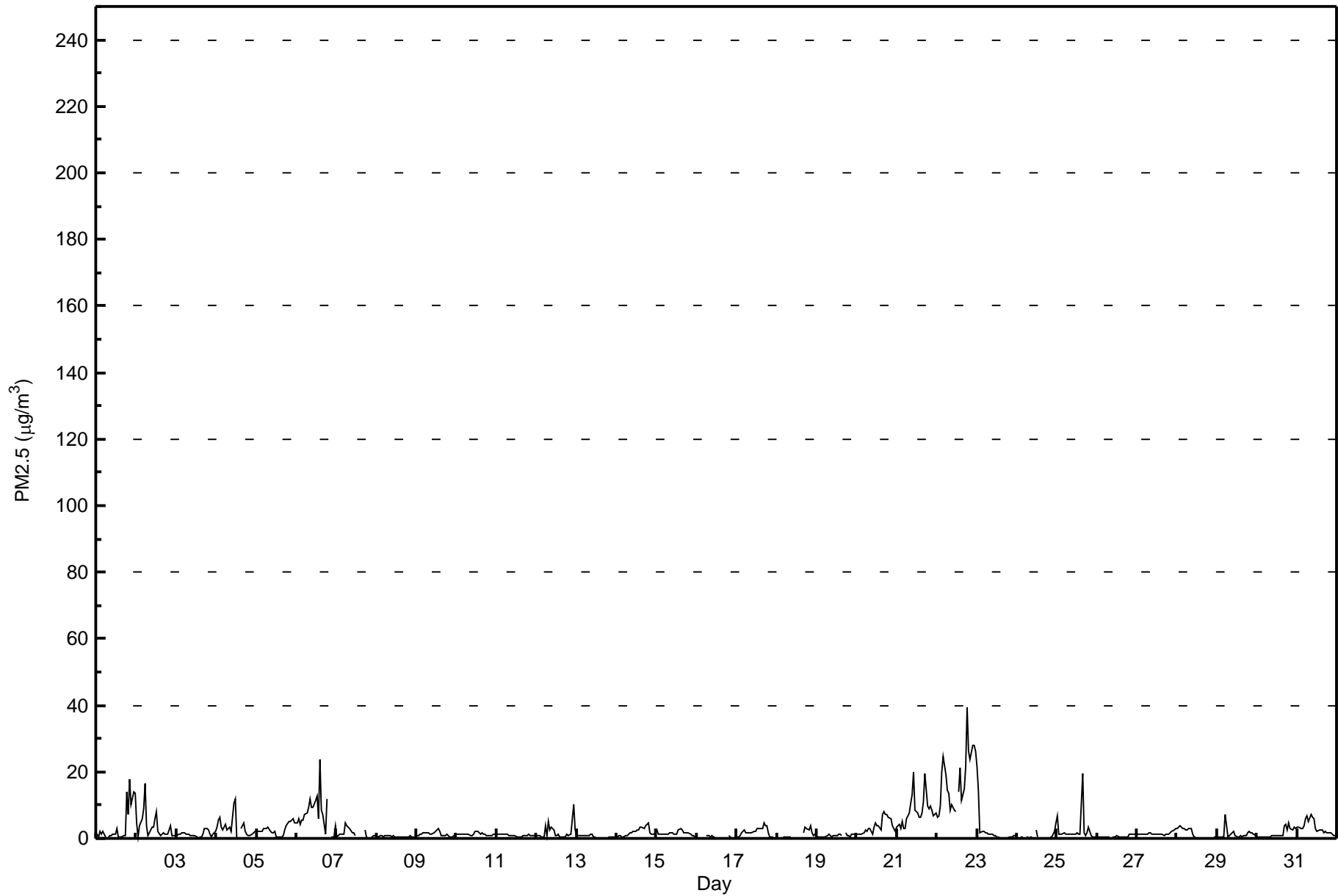
Buffalo Viewpoint - October 2017

Number of Exceedences (AAAQO): 24-hr: 0		Maximum Value: 39.6 µg/m <sup>3</sup> on Oct 22 19:00		Maximum Daily Average: 17.6 µg/m <sup>3</sup> on Oct 22		Hours in Service: 744		Hours of Data: 688		Hours of Missing Data: 56		Hours of Calibration: 2		Percent Operational Time: 92.7																																			
Minimum Value: 0.0 µg/m <sup>3</sup> on Oct 7 21:00		Maximum Diurnal Average: 4.3 µg/m <sup>3</sup> at hour 19		Monthly Average: 2.80 µg/m <sup>3</sup>		Minimum Daily Average: 0.6 µg/m <sup>3</sup> on Oct 8		Minimum Diurnal Average: 1.9 µg/m <sup>3</sup> at hour 3		Percentiles: P <sub>1</sub> = 0.1 P <sub>10</sub> = 0.4 Q <sub>1</sub> = 0.7 Median = 1.3 Q <sub>3</sub> = 2.9 P <sub>90</sub> = 7.0 P <sub>99</sub> = 23.5																																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	1.4	0.3	2.1	1.3	2.0	0.4	UO	0.6	0.8	0.8	1.3	1.3	2.9	0.5	0.3	0.6	1.0	1.0	13.8	7.2	17.8	10.3	13.9	13.4	4.1	17.8																							
2-Oct	4.8	0.5	3.7	5.8	8.8	16.6	3.8	0.7	1.5	3.5	3.6	5.7	7.9	2.2	0.9	1.1	1.6	1.2	1.4	1.3	4.0	0.7	0.7	0.8	3.5	16.6																							
3-Oct	0.8	1.2	1.3	1.5	1.6	1.5	1.4	1.3	0.9	0.7	0.7	0.3	0.2	0.3	0.4	1.3	2.8	2.8	2.7	1.3	0.6	1.4	1.9	1.2	2.8																								
4-Oct	3.3	5.7	6.2	3.4	2.4	4.2	2.5	2.9	3.4	2.3	10.5	12.0	0.1	UO	UO	3.0	4.5	2.0	1.3	1.0	1.0	1.2	1.7	1.9	3.5	12.0																							
5-Oct	1.9	2.0	2.2	2.2	3.1	3.1	3.0	3.5	2.2	1.8	1.5	2.2	0.5	0.4	0.3	0.4	0.7	2.7	4.0	5.1	5.2	5.5	5.8	4.5	2.7	5.8																							
6-Oct	4.7	6.0	4.2	5.6	5.4	7.1	7.5	9.3	11.8	9.3	9.2	11.5	12.6	6.1	23.8	8.6	7.2	1.2	11.8	UO	UO	0.4	0.5	3.9	7.6	23.8																							
7-Oct	0.6	0.9	1.2	1.1	1.1	4.6	3.9	3.4	3.0	1.6	1.5	0.9	UO	UO	UO	9.7	UO	2.7	0.6	0.1	0.0	0.5	0.7	0.7	2.0	9.7																							
8-Oct	0.6	0.6	0.7	0.6	0.6	0.8	0.8	0.8	0.9	0.6	0.7	0.6	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.7	0.4	0.6	0.6	0.6	0.6	0.9																						
9-Oct	0.7	1.0	1.3	1.5	1.5	1.6	1.7	1.7	1.1	1.3	1.6	2.1	2.5	2.9	2.3	1.0	0.9	1.0	1.2	0.7	0.5	0.6	0.6	1.3	1.3	2.9																							
10-Oct	1.3	1.4	1.4	1.3	1.2	1.2	1.2	1.1	0.9	0.7	1.3	2.1	2.0	1.9	1.3	1.5	1.2	1.2	1.0	1.0	0.9	1.0	1.1	1.2	1.3	2.1																							
11-Oct	1.2	1.2	1.1	1.1	1.3	1.4	1.2	0.9	0.9	0.9	0.7	0.7	0.6	0.4	0.4	0.6	0.7	0.7	0.7	1.3	0.9	0.9	0.8	0.7	0.9	1.4																							
12-Oct	0.8	0.7	0.8	0.5	0.6	3.9	0.9	4.9	2.7	3.3	2.5	0.7	0.8	1.1	0.4	0.6	0.3	0.4	1.4	1.0	1.4	6.0	10.2	2.6	2.0	10.2																							
13-Oct	1.2	0.9	0.9	0.8	0.8	0.8	0.7	0.9	1.3	1.2	0.4	0.2	0.1	UO	UO	UO	UO	0.1	0.1	0.3	0.5	0.5	0.6	0.6	0.7	1.3																							
14-Oct	0.6	0.6	0.7	0.6	0.6	0.7	0.9	1.3	1.6	1.7	2.0	1.9	2.4	2.6	3.4	3.3	3.2	3.8	4.3	4.6	1.7	1.2	1.3	1.8	1.9	4.6																							
15-Oct	2.5	1.5	1.1	1.2	1.3	1.3	1.3	1.4	1.5	1.5	1.1	1.2	1.5	2.4	2.8	2.7	1.9	1.8	1.7	1.5	1.2	0.9	0.7	0.5	1.5	2.8																							
16-Oct	0.4	UO	UO	UO	UO	UO	0.7	0.7	0.6	0.7	0.3	0.4	UO	UO	UO	UO	UO	UO	UO	1.0	0.2	0.1	0.1	0.1	--	1.0																							
17-Oct	0.3	0.4	0.9	1.8	2.6	1.8	1.6	1.6	1.7	1.7	2.0	2.3	3.0	3.1	2.8	2.8	4.6	3.8	3.8	1.8	0.6	0.2	0.1	0.1	1.9	4.6																							
18-Oct	0.1	0.1	0.1	0.2	0.5	0.6	0.6	0.5	0.5	UO	UO	UO	UO	UO	UO	UO	1.7	3.5	3.0	2.6	3.7	1.8	1.0	1.2	--	3.7																							
19-Oct	0.4	0.4	0.5	0.5	0.4	0.4	0.7	1.2	0.9	0.6	0.8	0.9	0.8	1.2	1.1	0.8	UO	1.8	0.8	0.7	0.6	1.1	1.3	1.3	0.8	1.8																							
20-Oct	1.3	1.3	1.3	1.4	1.6	2.4	2.1	3.1	2.9	1.3	3.5	4.6	3.9	3.6	2.3	7.3	8.3	7.1	7.2	6.2	5.8	3.9	3.0	2.2	3.6	8.3																							
21-Oct	3.5	4.3	2.8	5.1	2.9	2.9	5.7	7.4	10.6	13.1	20.1	8.6	7.6	6.3	6.2	7.4	11.0	19.5	9.5	9.1	9.9	8.4	6.7	7.7	8.2	20.1																							
22-Oct	6.5	6.9	9.9	19.9	24.7	18.9	14.2	13.8	8.5	10.2	8.4	7.9	C	14.0	21.3	11.3	14.8	21.7	39.6	26.2	23.6	28.1	27.9	26.1	17.6	39.6																							
23-Oct	21.6	14.6	1.8	2.1	2.1	1.6	1.6	1.4	1.4	1.2	0.9	0.8	0.6	0.3	0.1	UO	UO	UO	UO	0.2	0.3	0.4	0.5	0.6	0.7	2.6	21.6																						
24-Oct	0.3	UO	0.2	0.5	0.2	0.2	0.2	0.2	0.3	0.4	UO	2.6	0.5	UO	UO	UO	UO	0.2	UO	UO	0.3	0.4	2.1	4.8	--	4.8																							
25-Oct	6.6	1.2	1.3	1.4	1.5	1.4	1.4	1.1	1.1	1.1	1.1	1.1	1.5	1.1	1.3	19.7	1.9	0.8	1.9	3.4	1.0	0.6	0.5	0.5	2.3	19.7																							
26-Oct	0.5	0.5	0.5	0.6	0.6	0.6	0.5	0.6	C	0.6	0.5	0.6	0.7	0.5	0.3	0.4	0.5	0.5	0.6	1.1	1.2	1.2	1.1	1.1	0.7	1.2																							
27-Oct	1.1	1.1	1.4	1.2	1.3	1.4	1.4	1.7	1.8	1.3	1.2	1.3	1.1	1.1	1.1	1.1	1.0	1.2	1.3	1.3	1.5	2.2	2.7	2.9	1.4	2.9																							
28-Oct	3.1	3.4	3.6	3.1	2.9	2.6	2.6	3.0	2.8	1.5	0.6	0.2	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	0.3	0.3	--	3.6																						
29-Oct	0.4	0.2	0.3	0.3	0.4	7.0	0.3	0.9	1.3	1.5	1.9	0.7	0.4	0.5	0.7	0.5	0.7	1.1	1.6	2.0	1.6	1.6	1.4	0.8	1.2	7.0																							
30-Oct	0.6	0.5	0.4	0.4	0.4	0.6	0.5	0.5	0.5	0.7	0.8	1.0	0.7	0.6	0.9	1.0	3.9	4.2	2.6	4.6	3.1	2.6	3.3	3.1	1.6	4.6																							
31-Oct	3.4	3.5	2.9	2.8	4.0	6.1	6.7	5.0	7.0	6.4	6.1	2.8	2.3	2.7	2.4	2.4	1.9	2.0	1.7	1.8	1.7	1.1	0.9	0.7	3.3	7.0																							
																								2.5	2.2	1.9	2.3	2.6	3.3	2.4	2.5	2.6	2.5	3.0	2.7	2.2	2.3	3.2	3.5	3.1	3.2	4.3	3.2	3.2	2.8	3.0	2.9	Diurnal Average	
																								21.6	14.6	9.9	19.9	24.7	18.9	14.2	13.8	11.8	13.1	20.1	12.0	12.6	14.0	23.8	19.7	14.8	21.7	39.6	26.2	23.6	28.1	27.9	26.1	Diurnal Maximum	
C - Calibration																								UO - Unstable Operation																									
Alberta Ambient Air Quality Objectives (AAAQO):																								24-hr		30		µg/m <sup>3</sup>																					



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**PM2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Buffalo Viewpoint - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**PM2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Buffalo Viewpoint - October 2017**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	335	48.69	48.69
6 - 15	73	10.61	59.30
16 - 25	13	1.89	61.19
26 - 80	5	0.73	61.92
> 81.0	0	0.00	61.92

Total Number of Valid Hours: 688

Total Number of Hours: 744





**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**PM2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**Buffalo Viewpoint - October 2017**

Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	37	35	17	2	4	1	26	73	17	8	8	22	31	16	22	15	334
6 - 15	9	3	6	2	0	0	6	4	2	0	2	10	5	2	3	7	61
16 - 25	4	1	0	0	0	0	0	1	1	0	0	0	1	0	2	0	10
26 - 80	1	1	0	0	0	0	0	0	1	1	0	0	1	0	0	0	5
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	51	40	23	4	4	1	32	78	21	9	10	32	38	18	27	22	410

Total Number of Valid Hours: 672

Total Number of Hours: 744





**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

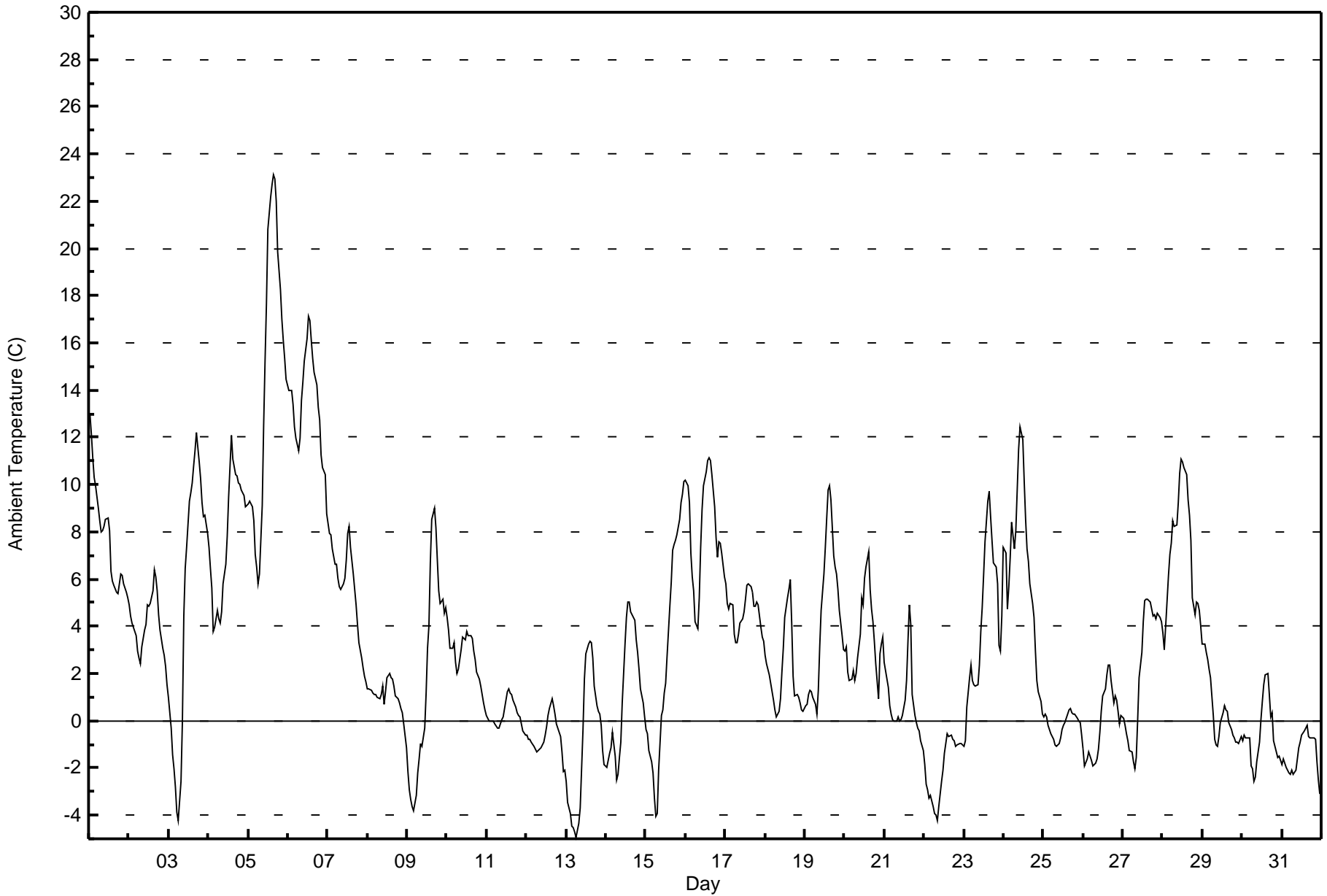
**Ambient Temperature (AT) - C**  
**Buffalo Viewpoint - October 2017**

Maximum Value: 23.1 C on Oct 5 16:00		Maximum Daily Average: 14.6 C on Oct 5		Hours in Service: 744																							
Minimum Value: -4.9 C on Oct 13 07:00		Minimum Daily Average: -2.0 C on Oct 22		Hours of Data: 744																							
Maximum Diurnal Average: 6.0 C at hour 16		Minimum Diurnal Average: 1.2 C at hour 7		Hours of Missing Data: 0																							
Monthly Average: 3.42 C		Percentiles: P <sub>1</sub> = -4.0 P <sub>10</sub> = -1.6 Q <sub>1</sub> = -0.2 Median = 2.4 Q <sub>3</sub> = 6.1 P <sub>90</sub> = 9.9 P <sub>99</sub> = 19.0		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	13.0	12.1	11.1	10.3	9.9	9.0	8.5	8.0	8.1	8.2	8.5	8.6	8.1	6.3	5.9	5.8	5.4	5.4	5.8	6.2	6.1	5.8	5.5	5.2	7.8	13.0	
2-Oct	4.9	4.4	4.2	3.8	3.6	3.0	2.7	2.4	3.1	3.9	4.1	4.9	4.9	4.9	5.5	6.4	6.1	5.5	4.5	3.9	3.1	2.8	2.3	1.5	4.0	6.4	
3-Oct	1.0	-0.3	-1.5	-2.1	-2.8	-3.8	-4.2	-2.6	0.0	4.4	6.4	7.4	9.3	9.7	10.1	10.8	11.4	12.2	10.9	10.3	9.3	8.6	8.7	7.9	5.0	12.2	
4-Oct	7.3	6.5	5.6	3.8	4.0	4.7	4.3	4.1	4.6	5.8	6.6	7.8	9.5	10.8	12.1	11.1	10.4	10.4	10.1	10.0	9.8	9.6	9.0	9.1	7.8	12.1	
5-Oct	9.2	9.3	9.1	8.5	7.1	6.5	5.8	6.2	9.1	12.5	15.2	17.7	20.8	22.2	22.7	23.1	23.0	22.0	19.9	18.3	17.0	16.1	15.4	14.5	14.6	23.1	
6-Oct	14.0	14.0	14.0	13.4	12.4	12.0	11.4	12.0	13.6	14.3	15.2	16.2	17.1	16.9	16.1	15.3	14.8	14.2	13.3	12.8	11.2	10.7	10.4	8.8	13.5	17.1	
7-Oct	8.4	8.0	7.9	7.3	6.6	6.6	6.0	5.7	5.6	5.8	6.0	6.8	7.9	8.2	7.3	6.2	5.6	4.9	4.1	3.3	2.7	2.2	1.9	1.7	5.7	8.4	
8-Oct	1.3	1.4	1.3	1.2	1.1	1.1	1.0	0.9	1.1	1.5	0.7	1.2	1.8	2.0	1.8	1.7	1.4	1.1	0.9	0.7	0.5	0.4	-0.1	-1.1	1.0	2.0	
9-Oct	-2.1	-2.9	-3.4	-3.6	-3.8	-3.2	-2.2	-1.6	-1.0	-1.1	-0.3	1.2	3.1	4.0	6.7	8.5	9.0	8.2	6.8	5.5	5.0	5.2	4.6	4.8	2.0	9.0	
10-Oct	4.4	3.8	3.0	3.0	3.3	2.5	2.0	2.2	3.0	3.5	3.5	3.4	3.8	3.6	3.6	3.5	3.0	2.6	2.0	1.8	1.5	1.1	0.8	0.4	2.7	4.4	
11-Oct	0.2	0.0	0.0	0.0	0.0	-0.1	-0.3	-0.3	-0.1	0.1	0.1	0.5	1.2	1.3	1.2	1.1	0.9	0.6	0.3	0.2	0.1	-0.1	-0.4	-0.6	0.2	1.3	
12-Oct	-0.6	-0.8	-0.8	-0.9	-1.1	-1.2	-1.3	-1.3	-1.2	-1.2	-0.9	-0.6	-0.3	0.2	0.5	1.0	0.6	0.3	-0.2	-0.3	-0.7	-1.3	-2.1	-2.1	-0.7	1.0	
13-Oct	-2.6	-3.5	-3.9	-4.4	-4.5	-4.7	-4.9	-4.3	-3.7	-2.0	-0.4	1.8	2.9	3.2	3.4	3.3	2.6	1.5	0.6	0.4	0.3	-0.2	-1.3	-1.8	-0.9	3.4	
14-Oct	-2.0	-1.7	-1.4	-1.1	-0.5	-1.5	-2.5	-2.3	-1.6	-0.9	0.7	3.3	4.4	5.0	5.0	4.6	4.4	4.3	3.5	2.9	2.2	1.3	0.7	0.2	1.1	5.0	
15-Oct	-0.4	-0.6	-1.3	-1.7	-2.2	-3.3	-4.0	-3.9	-2.1	0.2	0.5	1.2	1.6	2.7	4.9	5.8	7.2	7.4	7.6	7.9	8.5	9.2	9.6	10.1	2.7	10.1	
16-Oct	10.2	9.9	9.3	7.1	6.1	5.5	4.2	3.9	5.2	7.3	8.9	10.0	10.6	11.0	11.1	11.0	10.5	9.1	7.8	6.9	7.6	7.5	7.1	6.1	8.1	11.1	
17-Oct	5.8	5.0	4.7	5.0	4.9	3.7	3.3	3.3	3.7	4.1	4.3	4.6	5.2	5.7	5.8	5.7	5.4	4.9	4.9	5.0	4.9	3.9	3.6	3.3	4.6	5.8	
18-Oct	2.8	2.4	1.9	1.6	1.2	0.9	0.4	0.2	0.4	1.0	2.1	3.0	4.4	5.2	5.6	6.0	4.1	1.9	1.0	1.1	1.0	0.8	0.5	0.4	2.1	6.0	
19-Oct	0.6	0.7	1.1	1.3	1.3	1.0	0.7	0.3	1.3	3.1	4.6	6.2	7.3	8.6	9.8	10.0	9.3	7.0	6.5	6.2	5.5	4.7	3.6	3.0	4.3	10.0	
20-Oct	2.9	3.1	2.1	1.7	1.7	2.1	1.7	2.0	2.6	3.7	5.2	4.9	6.0	6.5	7.2	5.5	4.7	4.2	3.4	2.4	0.9	2.8	3.3	3.5	3.5	7.2	
21-Oct	2.5	1.8	1.4	0.6	0.3	0.0	0.0	0.0	0.2	0.0	0.1	0.2	0.9	1.7	3.4	4.9	4.1	1.1	0.2	-0.1	-0.3	-0.5	-0.9	-1.2	0.8	4.9	
22-Oct	-1.8	-2.7	-2.9	-3.3	-3.2	-3.7	-3.9	-4.0	-4.2	-3.6	-2.6	-2.1	-1.4	-1.0	-0.5	-0.7	-0.6	-0.8	-0.8	-1.1	-1.0	-1.0	-1.0	-1.0	-2.0	-0.5	
23-Oct	-1.1	-0.8	0.6	1.8	2.4	1.7	1.5	1.5	2.3	3.8	4.8	6.1	7.6	9.3	9.7	8.6	7.6	6.7	6.5	5.8	3.2	2.9	4.4	4.1	9.7		
24-Oct	7.3	7.1	4.8	5.7	6.9	8.4	7.3	8.0	9.8	11.5	12.5	11.9	10.2	8.5	7.3	6.8	5.8	5.0	4.4	3.0	1.7	1.2	0.8	0.3	6.5	12.5	
25-Oct	0.2	0.3	0.2	-0.2	-0.5	-0.7	-0.8	-1.0	-1.1	-1.0	-0.7	-0.4	-0.2	-0.1	0.1	0.5	0.5	0.4	0.3	0.3	0.1	0.0	-0.1	-0.6	-0.2	0.5	
26-Oct	-1.2	-1.9	-1.6	-1.4	-1.5	-1.7	-1.9	-1.8	-1.6	-1.2	-0.5	0.4	1.1	1.3	1.9	2.4	2.3	1.7	0.8	1.0	0.9	0.4	-0.1	0.2	-0.1	2.4	
27-Oct	0.1	-0.2	-0.5	-0.9	-1.3	-1.3	-1.7	-2.0	-1.5	0.1	1.8	2.9	4.2	5.1	5.1	5.1	5.0	4.7	4.5	4.5	4.3	4.6	4.4	4.2	2.1	5.1	
28-Oct	3.7	3.0	4.0	6.1	7.0	7.5	8.5	8.2	8.3	9.2	10.5	11.1	10.9	10.7	10.4	9.4	8.7	7.6	5.2	4.5	5.0	4.9	4.6	4.0	7.2	11.1	
29-Oct	3.3	3.3	2.9	2.6	2.2	1.8	0.2	-0.8	-1.0	-1.1	-0.7	-0.1	0.3	0.6	0.4	0.4	-0.1	-0.4	-0.6	-0.7	-0.9	-0.9	-0.9	-0.6	0.4	3.3	
30-Oct	-0.9	-0.6	-0.7	-0.7	-0.7	-1.9	-2.1	-2.6	-2.4	-1.7	-0.9	0.0	0.8	1.5	1.9	2.0	1.1	0.2	0.4	-0.8	-1.1	-1.5	-1.5	-1.7	-0.6	2.0	
31-Oct	-1.9	-1.6	-2.0	-2.1	-2.2	-2.2	-2.1	-2.3	-2.1	-1.6	-1.2	-0.9	-0.6	-0.4	-0.3	-0.2	-0.7	-0.7	-0.7	-0.7	-0.8	-1.7	-2.5	-3.1	-1.4	-0.2	
		2.9	2.5	2.2	2.0	1.9	1.6	1.2	1.2	1.9	2.8	3.7	4.4	5.2	5.6	6.0	6.0	5.6	5.0	4.3	3.9	3.6	3.2	2.9	2.6	Diurnal Average	
		14.0	14.0	14.0	13.4	12.4	12.0	11.4	12.0	13.6	14.3	15.2	17.7	20.8	22.2	22.7	23.1	23.0	22.0	19.9	18.3	17.0	16.1	15.4	14.5	Diurnal Maximum	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Buffalo Viewpoint - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C  
Buffalo Viewpoint - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	201	27.02	27.02
0 - 10	473	63.58	90.59
10 - 20	64	8.60	99.19
> 20	6	0.81	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



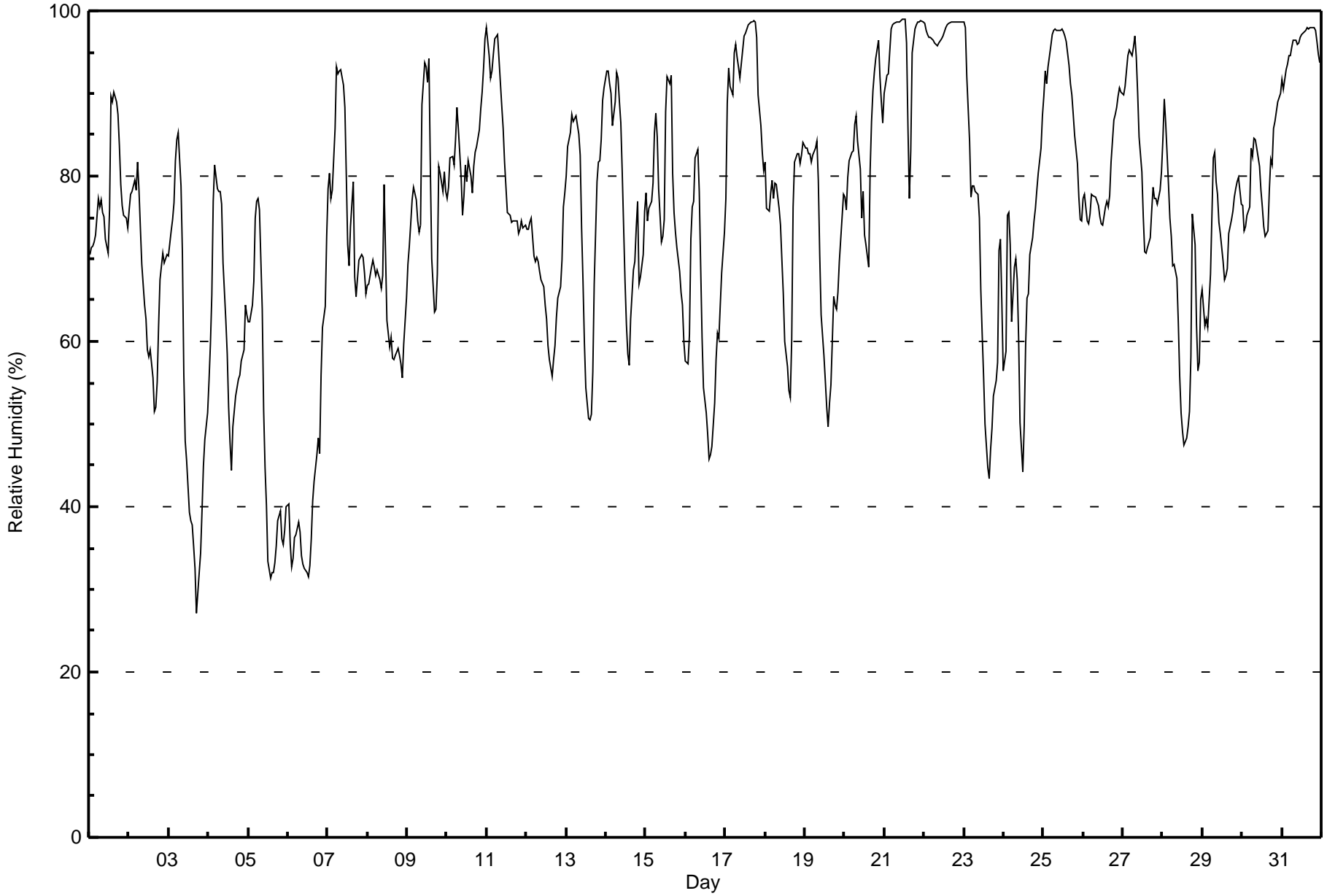
**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %**

**Buffalo Viewpoint - October 2017**

Maximum Value: 99 % on Oct 21 12:00																			Maximum Daily Average: 97.6 % on Oct 22						Hours in Service: 744																				
Minimum Value: 27 % on Oct 3 18:00																			Minimum Daily Average: 41.7 % on Oct 6						Hours of Data: 744																				
Maximum Diurnal Average: 82.6 % at hour 7																			Minimum Diurnal Average: 66.6 % at hour 15						Hours of Missing Data: 0																				
Monthly Average: 74.7 %																			Percentiles: P <sub>1</sub> = 33 P <sub>10</sub> = 52 Q <sub>1</sub> = 66 Median = 76 Q <sub>3</sub> = 87 P <sub>90</sub> = 96 P <sub>99</sub> = 99						Hours of Calibration: 0																				
																			Percent Operational Time: 100.0																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																					
1-Oct	70	71	72	72	73	77	76	77	76	75	72	71	76	90	89	90	89	88	84	79	76	75	75	74	77.8	90																			
2-Oct	76	78	78	80	78	82	78	74	69	64	63	59	58	59	56	52	52	55	62	67	71	70	70	70	67.5	82																			
3-Oct	70	73	75	77	82	84	85	79	71	56	48	46	39	38	38	35	33	27	32	34	40	45	48	51	54.5	85																			
4-Oct	55	60	66	77	81	78	78	78	77	70	63	58	52	48	44	50	53	54	55	56	58	59	64	63	62.4	81																			
5-Oct	62	62	64	67	75	77	77	76	64	52	45	40	33	31	32	32	33	35	38	39	36	35	37	40	49.4	77																			
6-Oct	40	35	33	34	36	37	38	37	34	33	33	32	31	33	36	41	43	46	48	46	56	62	64	73	41.7	73																			
7-Oct	78	80	77	78	86	93	92	93	93	91	88	80	72	69	74	79	68	65	68	70	71	70	68	66	77.9	93																			
8-Oct	67	67	69	70	69	68	69	68	66	68	79	71	63	59	60	58	58	58	59	58	57	56	60	65	64.2	79																			
9-Oct	69	71	74	77	79	77	75	73	74	89	94	93	91	94	81	70	64	64	68	81	80	78	81	78	78.2	94																			
10-Oct	77	79	82	82	81	84	88	86	80	75	78	81	79	82	80	78	81	83	84	86	88	90	93	97	83.1	97																			
11-Oct	98	95	92	93	95	97	97	94	91	88	86	82	76	75	75	74	75	75	75	73	74	75	74	74	83.3	98																			
12-Oct	73	74	74	75	70	70	70	70	69	68	67	64	63	60	58	56	58	60	63	65	67	70	76	78	67.3	78																			
13-Oct	80	84	85	87	87	87	87	85	83	74	67	60	54	51	50	51	56	67	79	82	82	84	89	91	75.1	91																			
14-Oct	93	93	91	90	86	89	93	92	89	86	81	67	62	58	57	63	69	70	74	77	67	68	70	76	77.5	93																			
15-Oct	78	75	76	77	79	85	88	85	79	72	73	75	88	92	91	92	80	76	73	71	69	66	64	60	77.6	92																			
16-Oct	58	57	61	72	76	77	82	83	78	69	61	54	51	49	46	46	47	53	58	61	60	64	68	73	62.8	83																			
17-Oct	77	89	93	91	90	95	96	94	93	92	95	97	97	98	98	99	99	99	99	99	97	90	86	83	81	92.8	99																		
18-Oct	82	76	76	78	79	77	79	79	76	74	70	66	60	57	54	53	60	76	82	83	83	81	83	84	73.7	84																			
19-Oct	83	83	83	83	82	82	83	84	80	70	63	58	55	52	50	52	55	65	64	64	66	70	75	78	70.1	84																			
20-Oct	77	76	80	82	83	83	86	87	84	81	75	78	73	72	69	81	87	90	93	94	96	92	89	86	83.1	96																			
21-Oct	90	92	92	95	98	98	98	99	99	99	99	99	99	96	86	77	83	95	98	98	99	99	99	99	95.2	99																			
22-Oct	98	98	97	97	97	96	96	96	96	96	97	97	97	98	98	99	99	99	99	99	99	99	99	99	97.6	99																			
23-Oct	99	98	92	84	77	79	79	78	78	75	66	61	56	50	45	43	47	50	53	55	58	71	72	65	68.0	99																			
24-Oct	56	59	75	76	72	62	69	70	67	60	50	44	50	59	65	66	71	73	75	76	78	80	83	87	67.7	87																			
25-Oct	90	93	91	93	96	97	98	98	98	98	98	98	98	97	96	93	91	90	87	85	81	77	75	75	91.3	98																			
26-Oct	77	78	75	74	75	78	78	77	77	76	75	74	74	76	77	76	78	82	87	88	88	90	91	90	79.6	91																			
27-Oct	90	91	93	95	95	95	96	97	94	90	85	80	75	71	71	71	73	76	79	77	77	77	78	81	83.5	97																			
28-Oct	84	89	86	79	75	73	69	69	68	62	56	51	49	47	48	50	51	58	76	72	62	56	57	65	64.8	89																			
29-Oct	66	62	63	62	65	68	82	83	79	78	74	73	70	67	68	69	73	75	76	77	79	79	80	77	72.7	83																			
30-Oct	76	73	74	75	76	83	82	85	84	83	81	78	76	74	73	73	78	82	81	86	87	89	89	90	80.5	90																			
31-Oct	92	91	93	94	95	95	96	97	96	96	96	97	97	97	98	98	98	98	98	98	98	96	95	94	95.8	98																			
																			76.9	77.5	78.5	79.5	80.3	81.4	82.6	82.0	79.4	76.2	73.4	70.5	68.2	67.8	66.6	66.7	67.7	70.4	73.1	74.1	73.9	74.5	75.8	76.7	Diurnal Average		
																			99	98	97	97	98	98	98	99	99	99	99	99	99	99	98	98	99	99	99	99	99	99	99	99	99	Diurnal Maximum	





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Buffalo Viewpoint - October 2017

Maximum Speed: 39 km/h on Oct 24 13:00	Maximum Daily Speed Average: 22.0 km/h on Oct 1	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 17 13:00	Minimum Daily Speed Average: 1.3 km/h on Oct 4	Hours of Data: 728
Maximum Diurnal Speed Average: 6.8 km/h at hour 16	Minimum Diurnal Speed Average: 2.8 km/h at hour 7	Hours of Missing Data: 16
Monthly Average Velocity: 5.1 km/h 311.2 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 6 Q <sub>1</sub> = 8 Median = 12 Q <sub>3</sub> = 18 P <sub>90</sub> = 26 P <sub>99</sub> = 33	Percent Operational Time: 97.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	NW18	NW19	NW20	NW20	NW20	NW21	NW20	NW21	NW20	NW21	NW17	NW20	NNW20	NNW24	NNW23	NNW21	NNW24	NNW25	NNW24	NNW26	N31	N32	N30	N34	NNW22.0	N34
2-Oct	N31	N34	N26	N28	N31	N28	N33	N31	N33	N37	N34	N30	N26	NNE23	N19	N19	N18	NNW15	NW9	NW12	NW10	NNW10	NNW10	WSW5	N21.8	N37
3-Oct	WSW7	SW6	SSE7	SSE7	S10	S10	SSE10	SSE11	SSE10	S11	SSW14	SSW17	SW18	SW18	SSW16	SSW10	SW8	WSW14	W15	W21	W17	WNW15	WNW15	WNW14	SW8.9	W21
4-Oct	NW13	NNW14	NNW13	N11	N11	NNW8	WNW6	NW9	NW8	WNW7	NW6	NW6	WSW3	SSW6	SSW5	SE9	SE7	SSE7	SSE8	S8	SSE8	SSE9	SE8	SSE9	WNW1.3	NNW14
5-Oct	SSE10	SSE10	SSE8	SSE8	SE9	SE7	SSE8	SE6	SW6	S5	SE6	SE6	SW12	SSW13	SW16	SW16	SW13	WSW15	WSW14	WSW13	WSW15	WSW15	WSW14	WSW14	SSW8.2	SW16
6-Oct	WSW13	WSW16	WSW14	WSW17	WSW15	WSW17	WSW14	WSW11	SW13	WSW17	WSW16	WSW25	W26	W20	W30	W19	W16	W13	W20	W13	WSW8	W12	WNW7	NNW7	W15.2	W30
7-Oct	WSW4	SSW3	SSW2	W11	WNW12	NNW11	N10	NNE16	NNE16	N14	NNW11	NNW11	NNW13	NNW13	NNW21	N23	NNW27	NNW26	NNW27	NNW27	NNW26	NNW27	NNW26	NNW29	NNW15.5	NNW29
8-Oct	NNW26	NNW23	NNW22	NNW23	NNW23	NNW25	NNW22	NNW25	NNW23	NW21	NW23	NW22	NW22	NW23	NW21	NW21	NW17	NW13	NW11	WNW9	W9	W9	SW8	SSW7	NW17.2	NNW26
9-Oct	S6	SSE9	SSE11	SSE11	SSE12	SSE12	SSE12	S13	SSE11	SSE12	SSE13	SSE12	SSE8	SSW6	W13	W18	W16	WSW10	SW11	W13	SW13	W19	W17	WSW14	SSW8.1	W19
10-Oct	WSW12	WSW13	W19	W19	W14	W13	WNW10	W15	WNW14	NW15	N8	NE6	NE4	NE8	NNE10	NNE12	NE10	NE11	NE12	NE12	NNE16	NNE16	NNE16	NNE16	NNW6.4	W19
11-Oct	NNE18	NNE19	NNE18	NNE18	NNE19	NNE21	NNE23	NNE23	NNE24	NNE23	NNE24	NNE24	NNE26	NNE24	NNE23	NNE23	N23	N22	N21	N19	N19	N19	N21	N19	NNE21.2	NNE26
12-Oct	N19	N21	N18	N18	N20	N18	NNW17	N17	N16	N20	NNW16	NNW15	NNW14	NNW11	NNW13	NNW11	NNE10	N9	NNW7	NW12	NW15	NNW14	NW7	NW8	NNW13.8	N21
13-Oct	WNW9	WNW7	WSW6	WSW6	WSW8	SSW4	SSE5	SSW5	SW6	WSW9	W7	WSW8	SW10	WSW12	WSW10	SW10	SW13	WSW12	SW10	SW9	SW10	SW8	S7	S6	SW7.2	SW13
14-Oct	SSE7	SSE8	SSE7	SSE7	S8	SSE8	SSE9	SSE11	SSE10	SSE10	SSE9	SW11	SW12	WSW14	WSW13	WSW16	W16	W15	W13	WNW14	NW20	NW17	NW11	W13	WSW6.2	NW20
15-Oct	W14	W17	WNW11	W10	SW5	SSE7	SSE8	SSE9	SSE8	SSE11	SSE12	SSE13	S12	S13	S10	S8	SSW12	SSW12	SSW12	SSW11	SW13	SW14	SW13	SSW8.4	W17	
16-Oct	WSW16	WSW23	W29	WNW18	W14	W11	S8	SSW7	SSW7	SW8	WSW12	W13	W15	WSW12	WSW13	WSW9	SW6	S5	SSE6	SSW6	SW11	SW9	SW7	SSE5	WSW9.5	W29
17-Oct	SSE5	SE5	SE6	SE5	SSE2	SSE5	S7	SSE8	SSE6	SSE6	SSE7	SE6	S1	NE6	N9	N7	NNW12	NW14	NW17	NW17	NW22	NW25	NW26	WNW25	NW4.4	NW26
18-Oct	WNW25	WNW29	WNW29	WNW27	NW29	NW29	NW22	WNW21	WNW21	NW20	NW17	NW14	WNW11	NW9	NW6	NNW2	E5	SE7	SE7	SE8	SE9	SE12	SE11	SE14	WNW9.8	NW29
19-Oct	SE17	SE15	SE15	SE13	SSE12	SSE15	SSE15	SSE12	S12	S12	S9	SE9	SE11	SE12	SE13	SE13	SE10	SE10	SSE11	SSE11	SSE13	SE12	SSE10	SSE10	SSE11.8	SE17
20-Oct	SSE11	SSE13	SSE8	SSE6	SE4	SE5	SE6	ESE3	SE3	SE10	E5	NNE7	NE7	ENE7	S5	WNW9	W5	WSW3	S5	SSE4	S7	W10	WNW10	NW7	SSE2.2	SSE13
21-Oct	N4	WNW2	WNW7	NNE8	NNE8	NNE6	NE3	ENE2	NE2	SE4	SSE4	SE4	SE7	SE8	SE5	SSE5	NE6	NNE10	NNE9	NNE5	NE4	NE4	AF	AF	NE2.9	NNE10
22-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	N8	N10	N9	NNE8	NNW8	NW8	N5	NNE4	NW2	W1	S4	SSW8	----	N10
23-Oct	S7	SW5	W15	W17	WNW14	W9	W14	W16	W17	W12	WNW15	W14	W13	W17	W14	WSW12	WSW10	SW9	SW11	SW12	SSW9	SE11	SSE11	S9	WSW9.5	W17
24-Oct	SW14	S11	SSE12	SSE14	SSE10	WSW11	W11	W28	W28	WNW27	WNW27	NW37	NW39	NW33	NW30	NNW28	NNW22	NNW17	NNE15	NNE14	NE11	E3	E6	ENE6	NW11.2	NW39
25-Oct	NE6	NE7	NE11	NE15	NE13	NE12	NNE14	NNE18	N18	N20	N22	N26	N25	N23	N26	N29	N26	N21	N17	NNW11	NW8	WNW8	W9	WSW10	N14.4	N29
26-Oct	SW11	SW12	SW14	SW16	SW16	SSW14	SSW13	SSW16	SSW17	SSW14	SSW13	SSW15	SW16	SW14	SW13	WSW8	SW8	SW8	S7	SW10	W8	WNW11	WNW9	WNW11	SW10.9	SSW17
27-Oct	W6	S3	SE6	S6	SSE6	SSE6	SSE6	SSE7	S7	SSE8	SSE9	SSE12	SSE12	SSE12	SSE11	SSE12	SSE12	SSE13	SSE13	SSE13	SSE15	S13	SSE12	SSE9.3	SSE15	
28-Oct	SSE9	SSE7	SSW6	WSW11	W22	W18	WSW18	WSW16	WSW13	W18	WNW20	NW28	NW26	NNW26	NNW26	NNW28	NNW29	NW30	NNW28	NNW28	NNW27	NNW32	NNW31	NNW33	NW17.6	NNW33
29-Oct	NNW33	NNW30	NNW29	NNW29	NNW28	NNW31	N27	N28	N29	N28	N29	NNE24	N20	NNE19	NNE15	NNE12	NNE9	E4	S3	S5	SSE7	SSE7	S6	SSE6	N15.1	NNW33
30-Oct	SSE7	S8	S8	SSW7	S5	SE8	SSE7	SSE8	SSE7	SSE7	S8	SSE6	SE4	SE4	ENE3	N3	NNE5	N6	N8	NNW7	N7	NNE8	NNE5	NE3	SE1.9	N8
31-Oct	N2	AF	NNE5	NNE5	NE2	AF	SSE1	SE4	SSE4	SE4	ENE5	NE8	NNE9	NNE11	NNE12	NNE15	NNE19	NNE17	NNE17	NNE16	NNE19	NNE24	NNE25	NNE24	NNE10.2	NNE25

WNW4.4	WNW4.4	WNW4.5	WNW4.9	NW5.2	NW4.6	NW2.8	WNW3.4	NW3.8	NW4.2	NW5.0	NW5.9	NW6.2	NW5.7	NW6.5	NW6.8	NW6.6	NW6.0	NW5.2	NW5.5	NW5.4	NW6.0	NW5.1	NW4.7	Diurnal Average
NNW33	N34	NNW29	NNW29	N31	NNW31	N33	N31	N33	N37	N34	NW37	NW39	NW33	NW30	N29	NNW29	NW30	NNW28	NNW28	N31	N32	NNW31	N34	Diurnal Maximum

AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods





**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Speed (WS) - km/h**  
**Buffalo Viewpoint - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Oct 24 13:00	Hours in Service: 744 Hours of Data: 728 Hours of Missing Data: 16 Hours of Calibration: 0 Percent Operational Time: 97.9
Minimum Value: 1 km/h on Oct 29 21:00	
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 O <sub>1</sub> = 2 Median = 3 O <sub>3</sub> = 4 P <sub>90</sub> = 6 P <sub>99</sub> = 7	

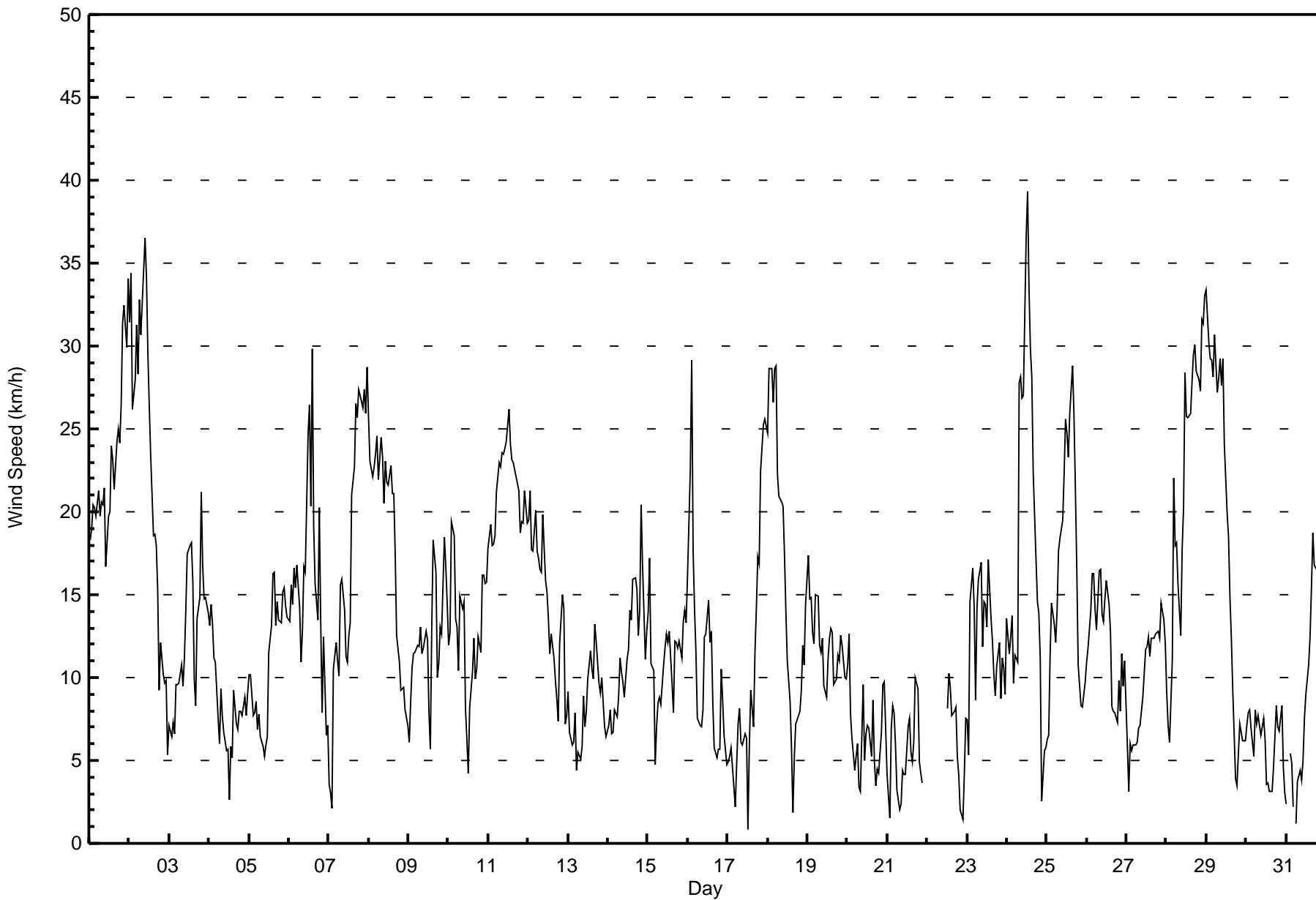
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	4	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5	5	5	6	7	8	7	8	7	8
2-Oct	9	8	6	6	8	6	8	6	8	7	7	7	6	6	4	5	5	4	2	2	2	2	1	1	9
3-Oct	2	1	1	1	1	2	2	2	2	3	4	5	5	5	4	3	3	3	3	4	3	3	4	3	5
4-Oct	3	3	3	2	2	2	3	2	2	2	3	2	2	2	2	3	2	2	2	2	2	2	2	2	3
5-Oct	2	2	1	1	1	1	1	1	1	1	1	2	3	3	4	4	4	4	4	3	4	3	3	4	4
6-Oct	3	4	4	4	4	4	4	3	3	4	5	8	5	5	8	6	4	3	8	2	3	5	2	1	8
7-Oct	1	2	2	3	3	4	4	3	4	3	3	3	4	3	5	5	6	7	6	7	6	6	6	7	7
8-Oct	7	5	5	5	6	6	5	6	6	5	5	5	5	5	5	5	4	3	3	3	3	3	2	2	7
9-Oct	1	2	3	3	3	3	3	4	3	3	3	3	2	2	3	4	4	2	2	8	2	5	3	4	8
10-Oct	3	3	3	3	3	3	3	4	3	4	3	2	1	2	2	3	3	4	3	3	3	4	3	3	4
11-Oct	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	5
12-Oct	4	4	4	4	4	5	4	4	4	5	4	4	4	3	3	3	3	2	2	3	4	4	2	2	5
13-Oct	2	2	1	1	2	1	1	1	2	2	2	2	3	3	3	3	3	3	2	2	2	2	1	1	3
14-Oct	1	1	1	1	2	2	2	3	3	2	2	3	3	4	4	4	4	4	2	3	5	4	3	3	5
15-Oct	2	3	3	3	1	2	2	2	2	3	3	3	3	3	3	2	3	3	3	3	2	3	3	4	4
16-Oct	4	6	7	5	3	3	1	1	2	3	3	3	4	3	3	2	1	1	1	2	3	2	1	1	7
17-Oct	1	1	1	1	2	1	2	2	2	1	2	2	1	2	2	2	3	3	4	4	7	7	6	6	7
18-Oct	6	7	7	6	7	7	5	5	5	5	4	4	3	3	2	2	1	1	1	2	3	4	3	4	7
19-Oct	5	4	5	4	4	4	4	3	3	3	3	2	3	3	3	3	2	2	2	2	3	3	2	2	5
20-Oct	3	3	3	1	3	1	2	2	3	3	2	2	2	4	2	3	2	1	1	2	1	2	2	2	4
21-Oct	2	2	2	2	2	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	2	2	AF	AF	2
22-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	2	3	3	2	2	1	1	2	2	2	2	3
23-Oct	2	2	5	3	4	2	3	2	3	3	4	3	3	4	3	4	2	2	3	2	2	2	2	2	5
24-Oct	4	3	3	3	4	3	4	6	5	7	8	9	10	8	7	7	6	4	4	3	4	2	1	1	10
25-Oct	3	2	3	4	3	3	3	4	3	4	4	5	5	4	5	6	5	4	5	3	2	2	3	2	6
26-Oct	2	2	4	4	5	4	3	4	4	4	3	4	4	3	3	2	2	2	2	3	4	2	2	2	5
27-Oct	4	2	1	1	1	1	1	1	2	2	2	3	3	3	3	3	3	3	3	3	3	4	3	3	4
28-Oct	3	2	2	4	6	6	4	4	3	3	5	7	6	6	6	7	7	7	7	6	7	8	8	8	8
29-Oct	7	8	7	6	6	7	6	5	6	6	6	6	4	4	3	3	3	1	2	1	1	1	1	2	8
30-Oct	1	1	2	2	1	2	1	1	2	2	2	2	1	1	2	1	1	1	2	1	2	2	1	2	2
31-Oct	1	AF	1	1	1	AF	1	1	1	1	2	2	2	3	3	3	3	3	3	3	4	5	5	6	6
9 8 7 6 8 7 8 6 8 7 8 9 10 8 8 7 7 7 8 8 8 8 8 8 8																									
Diurnal Maximum																									

AF - Analyzer Failure



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Buffalo Viewpoint - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h  
Buffalo Viewpoint - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	73	10.03	10.03
6 - 11	266	36.54	46.57
12 - 19	237	32.55	79.12
20 - 28	115	15.80	94.92
29 - 38	36	4.95	99.86
> 38	1	0.14	100.00

Total Number of Valid Hours: 728

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Wind Speed (WS) - km/h  
Buffalo Viewpoint - October 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	4	6	7	3	4	1	12	10	10	5	2	4	2	1	1	1	73
6 - 11	13	14	11	2	1	0	25	71	22	12	23	16	12	18	16	10	266
12 - 19	16	26	5	0	0	0	9	28	6	15	22	34	37	12	15	12	237
20 - 28	23	17	0	0	0	0	0	0	0	0	0	2	7	8	24	34	115
29 - 38	16	0	0	0	0	0	0	0	0	0	0	0	2	2	6	10	36
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
<b>Totals</b>	72	63	23	5	5	1	46	109	38	32	47	56	60	41	63	67	728

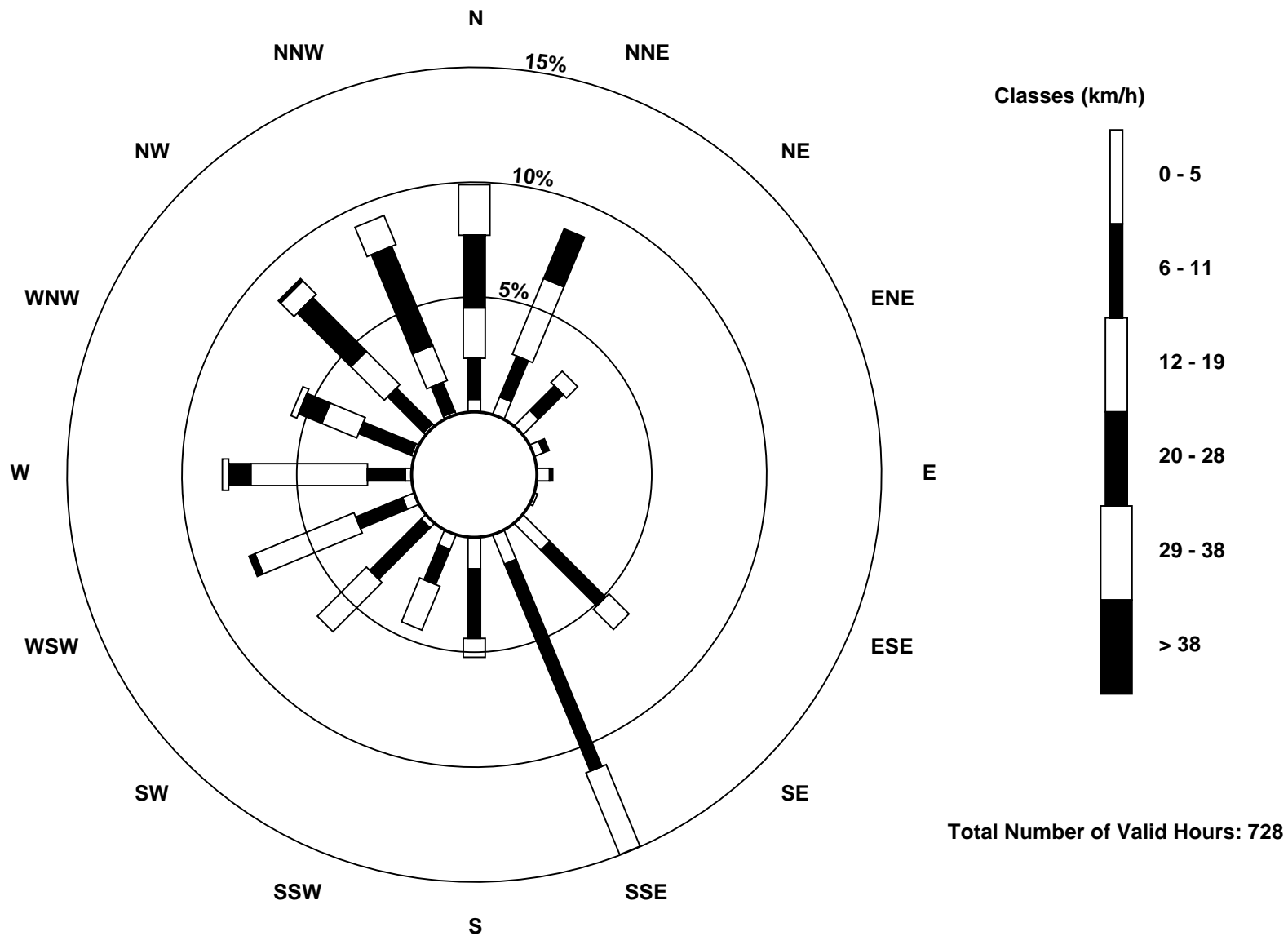
Total Number of Valid Hours: 728

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed (WS) - km/h  
Buffalo Viewpoint (AMS 4)





**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Wind Direction (WD) - deg**  
**Buffalo Viewpoint - October 2017**

Direction of Maximum Speed: 323 deg on Oct 24 13:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 332.9 deg on Oct 1	Hours of Data: 728
Direction of Minimum Speed: 170 deg on Oct 17 13:00	Hours of Missing Data: 16
Direction of Minimum Daily Speed Average: 1.3 deg on Oct 4	Percent Operational Time: 97.9
Monthly Average Direction: 272.3 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	319	313	308	311	312	316	320	307	310	323	325	326	343	336	337	335	334	334	343	344	353	358	359	357	332.9
2-Oct	359	3	5	4	358	356	4	3	6	5	4	4	359	12	3	5	356	347	320	317	319	296	285	248	357.3
3-Oct	240	215	161	164	169	170	162	153	164	189	208	213	217	220	211	210	218	257	276	269	277	290	300	289	226.6
4-Oct	314	327	348	10	6	342	302	315	313	292	310	306	253	208	197	131	144	157	164	169	162	163	144	156	295.0
5-Oct	161	166	153	152	143	168	167	139	147	182	139	135	218	212	221	218	224	249	254	243	250	253	247	244	210.5
6-Oct	241	246	242	251	250	254	244	237	235	243	253	258	266	276	267	281	279	268	266	265	240	266	301	330	259.6
7-Oct	258	208	212	274	297	329	359	14	15	10	336	321	317	334	336	360	341	341	342	335	334	336	335	335	337.9
8-Oct	332	332	325	327	329	333	334	333	332	323	310	315	314	317	311	319	321	325	308	297	261	261	219	208	318.9
9-Oct	175	164	162	158	160	164	167	171	168	162	162	167	167	210	271	274	273	251	226	271	235	260	265	254	211.9
10-Oct	247	249	265	261	270	267	285	273	300	323	4	36	39	54	33	30	44	41	34	35	22	21	26	20	338.4
11-Oct	18	23	25	23	25	21	22	21	24	27	24	17	17	17	14	12	10	7	0	7	8	3	4	5	15.7
12-Oct	4	4	7	8	5	351	337	349	351	357	345	334	334	334	334	331	14	360	337	313	318	331	323	309	346.6
13-Oct	303	284	240	245	243	192	148	203	231	258	275	245	231	247	243	226	223	237	231	230	229	214	182	173	233.8
14-Oct	149	153	158	168	191	159	156	156	155	165	221	235	250	239	257	265	276	275	302	315	316	306	274	240.5	
15-Oct	263	266	284	278	221	149	149	155	149	154	157	161	169	170	171	175	208	206	205	204	204	216	217	236	200.9
16-Oct	243	254	275	292	277	268	186	200	205	225	257	260	261	243	256	258	230	178	167	194	228	221	217	147	246.9
17-Oct	158	141	138	134	164	165	169	164	164	160	160	130	170	42	5	354	333	320	316	312	305	306	305	301	304.7
18-Oct	300	300	297	299	305	312	308	298	295	307	304	304	295	309	311	330	101	137	141	133	136	129	134	133	299.6
19-Oct	141	131	133	138	149	154	158	165	171	171	175	145	125	130	127	137	145	140	149	148	147	146	149	151	146.4
20-Oct	156	159	165	164	145	137	136	113	134	132	80	31	37	70	190	298	279	248	179	167	176	268	296	318	161.3
21-Oct	2	289	296	22	30	20	53	57	44	131	166	140	141	132	130	149	40	30	28	19	40	40	AF	AF	54.6
22-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	11	9	3	17	331	317	349	14	325	259	177	195	--
23-Oct	177	219	264	278	287	262	260	264	266	272	294	278	274	265	259	257	241	223	219	219	200	142	148	169	250.9
24-Oct	216	187	153	164	159	254	276	263	268	287	294	316	323	320	315	328	331	339	12	32	34	81	89	71	305.9
25-Oct	36	40	47	48	37	37	18	16	10	8	7	6	5	1	1	358	2	6	6	341	313	287	264	255	5.6
26-Oct	233	229	225	226	231	212	196	200	197	195	202	206	214	216	221	238	227	222	190	230	277	282	297	296	223.0
27-Oct	271	183	138	179	160	165	149	166	171	161	149	157	159	162	168	163	164	155	168	164	163	167	169	165	164.2
28-Oct	160	156	193	256	267	265	253	244	242	265	291	320	324	329	331	331	330	326	331	332	332	330	331	328	311.2
29-Oct	333	331	329	333	334	348	11	9	6	5	8	12	10	14	25	28	33	87	179	173	148	156	170	161	357.7
30-Oct	157	185	182	198	190	141	158	149	152	161	169	166	137	137	67	9	20	2	5	346	3	13	13	35	135.1
31-Oct	354	AF	27	29	51	AF	158	144	158	132	60	39	25	31	26	16	13	16	12	15	14	13	16	17	21.4
295.6 292.1 294.7 301.9 304.9 307.5 312.3 301.5 307.3 313.3 315.8 315.9 314.6 317.9 312.7 324.6 324.2 320.6 316.2 308.5 310.7 309.4 311.8 309.4																									
Diurnal Average																									

AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Direction (WD) - deg**  
**Buffalo Viewpoint - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 89 deg on Oct 4 13:00	Hours of Data: 728
Minimum Value: 6 deg on Oct 29 21:00	Hours of Missing Data: 16
Percentiles: P <sub>1</sub> = 9 P <sub>10</sub> = 14 Q <sub>1</sub> = 16 Median = 18 Q <sub>3</sub> = 22 P <sub>90</sub> = 27 P <sub>99</sub> = 65	Hours of Calibration: 0
	Percent Operational Time: 97.9

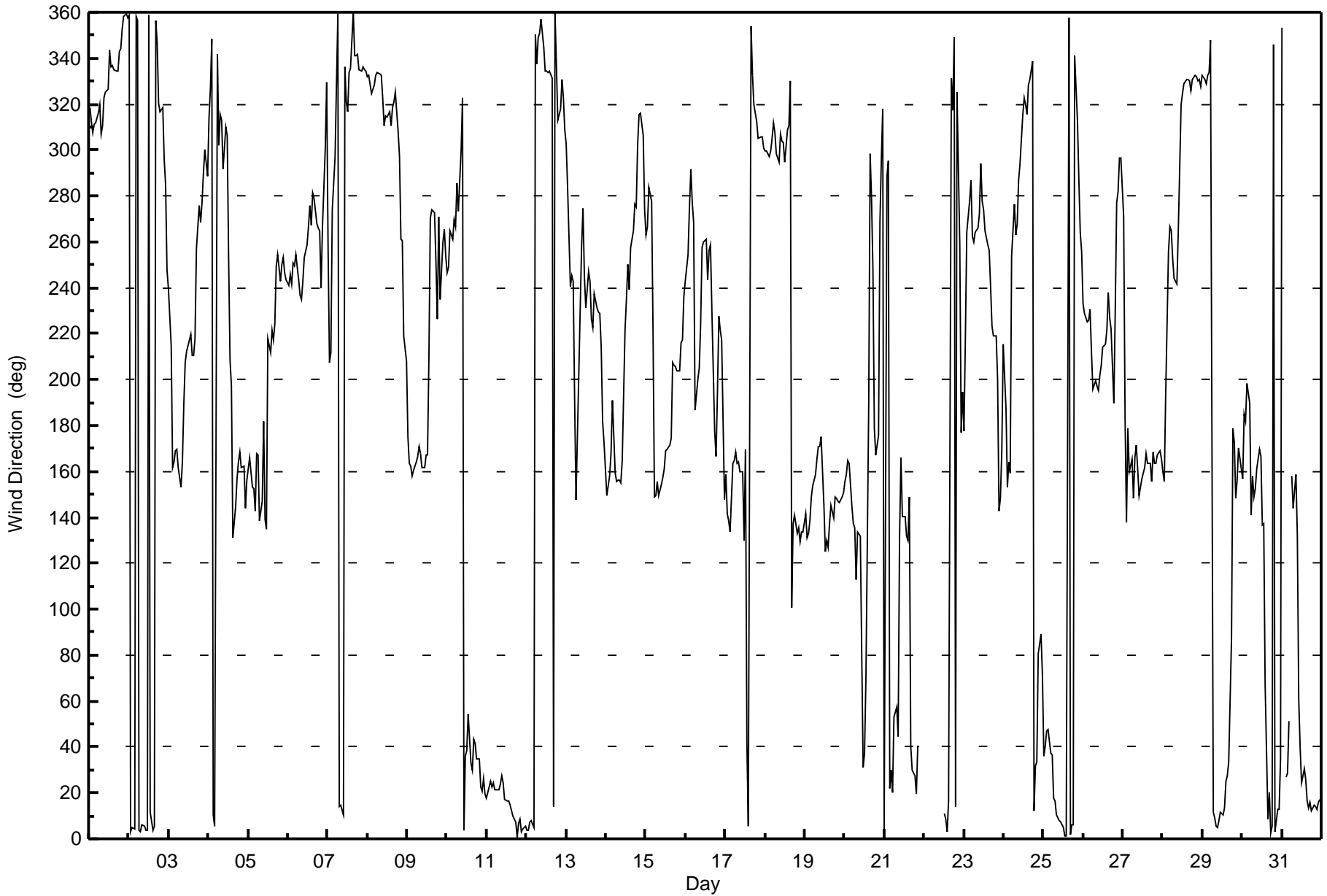
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	16	19	18	18	19	19	18	17	17	16	19	18	21	16	17	16	16	14	19	19	22	21	21	22	22
2-Oct	22	21	21	22	23	23	22	21	20	23	27	26	27	22	25	26	26	24	20	14	17	14	13	27	27
3-Oct	18	18	18	10	12	15	12	16	20	22	19	17	17	16	16	19	30	15	13	9	13	15	17	17	30
4-Oct	17	15	25	25	20	19	36	18	19	19	47	51	89	41	51	18	20	21	20	18	18	15	14	17	89
5-Oct	16	16	13	19	7	17	14	12	17	31	28	26	23	18	16	15	22	16	15	15	14	14	15	16	31
6-Oct	16	16	16	15	16	15	17	16	17	17	17	17	13	19	14	16	15	10	12	11	23	22	35	28	35
7-Oct	48	67	75	17	19	20	21	18	18	20	17	20	22	22	20	25	18	22	21	19	18	21	19	19	75
8-Oct	19	18	18	18	18	19	19	19	18	19	17	19	19	18	19	18	19	19	24	23	14	17	18	20	24
9-Oct	17	19	20	19	20	20	22	20	21	20	20	20	19	39	16	15	12	17	13	42	15	16	12	15	42
10-Oct	16	15	10	12	13	15	16	12	20	19	31	33	43	17	17	18	17	16	16	17	16	17	16	17	43
11-Oct	18	16	15	16	16	17	17	17	17	15	16	18	18	18	19	20	21	23	24	21	22	24	23	24	24
12-Oct	24	24	23	22	23	25	20	25	27	25	24	22	21	24	22	24	21	27	22	18	18	18	20	17	27
13-Oct	15	24	16	19	16	46	12	27	27	16	23	27	27	21	23	20	16	17	16	13	13	12	12	12	46
14-Oct	9	9	14	21	18	20	19	19	21	20	26	18	21	23	17	16	15	14	12	19	17	16	18	19	26
15-Oct	11	10	16	15	34	20	10	17	19	21	20	21	22	21	21	26	16	16	16	15	17	14	15	16	34
16-Oct	17	15	21	17	14	22	20	21	24	28	20	18	19	20	20	18	22	15	10	35	15	20	17	22	35
17-Oct	20	19	14	15	33	23	18	19	19	18	23	16	85	25	21	22	20	16	18	17	17	18	18	18	85
18-Oct	18	18	17	18	18	17	18	17	18	19	19	19	23	29	31	71	18	13	18	17	22	18	20	19	71
19-Oct	20	19	19	21	21	21	20	21	24	23	27	28	18	19	16	21	19	17	19	18	18	18	17	18	28
20-Oct	20	20	22	21	61	20	20	44	61	23	53	21	25	34	39	28	31	14	30	21	17	21	15	22	61
21-Oct	49	66	19	26	14	20	24	48	53	27	37	45	24	22	25	21	14	9	14	28	24	34	AF	AF	66
22-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	22	20	28	21	25	16	32	22	31	37	25	18	37
23-Oct	17	39	15	15	18	16	12	8	10	14	19	19	19	14	18	15	14	22	14	11	18	14	15	23	39
24-Oct	16	28	19	20	35	28	22	10	12	17	19	18	18	18	18	17	17	18	24	13	14	39	15	13	39
25-Oct	25	17	16	15	15	15	16	16	20	20	19	21	23	25	25	25	24	20	21	23	17	20	15	16	25
26-Oct	11	12	14	16	16	22	17	17	17	19	18	17	16	15	16	18	16	13	20	20	41	15	16	15	41
27-Oct	50	42	15	22	19	18	16	15	19	20	20	21	21	21	20	19	19	20	20	19	19	20	20	18	50
28-Oct	25	29	36	20	13	15	15	15	17	11	22	17	18	17	18	17	18	18	19	15	17	18	17	17	36
29-Oct	16	18	18	17	17	23	18	18	20	20	18	17	17	16	15	15	15	31	23	23	6	13	18	14	31
30-Oct	13	9	15	25	26	16	16	12	17	22	22	25	32	40	43	24	13	17	17	15	21	11	20	17	43
31-Oct	18	AF	12	15	17	AF	71	20	21	24	20	18	13	15	13	15	17	15	17	16	18	18	16	17	71
50 67 75 26 61 46 71 48 61 31 53 51 89 41 51 71 31 31 32 42 41 39 35 28																									
Diurnal Maximum																									

AF - Analyzer Failure



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Buffalo Viewpoint - October 2017**







# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Buffalo Viewpoint	Station number:	AMS 04
Calibration Date:	October 26, 2017	Last Cal Date:	September 25, 2017
Start time (MST):	7:00	End time (MST):	11:37
Reason:	Routine		

### Calibration Standards

Cal Gas Concentration	<u>49</u>	ppm	Cal Gas Exp Date	August 18, 2020
Cal Gas Cylinder #	<u>LL28372</u>			
Calibrator Make/Model	API T700		Serial Number	3060
ZAG Make/Model	API 701		Serial Number	4297

### Analyzer Information

Analyzer make: Thermo 43i

Analyzer serial #: JC1327300932

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Analyzer Range	0 - 1000 ppb		PMT voltage	-576.1	-576.1
Calculated slope	1.002076	1.000085	Lamp voltage	836	836
Calculated intercept	1.223337	0.214310	Pressure	702.4	702.4
Analyzer Background	11.1	11.2	Flow	0.511	0.511
Analyzer Coefficient	0.953	0.965	Intensity	85	85

### SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5008	0.0	0.0	0.2	----
as found span	4932	78.7	769.6	756.9	1.017
calibrator zero	5000	0.0	0.0	0.5	----
high point	4932	78.7	769.6	769.7	1.000
second point	4975	39.3	384.0	383.4	1.002
third point	4997	19.7	192.4	191.5	1.005
as left zero	5008	0.0	0.0	0.4	----
as left span	4932	78.7	769.6	777.3	0.990

Average Correction Factor				1.002	
Corrected As found	756.70	Previous response	766.80	*% change	1.3%

\* = > +/-5% change initiates investigation

Notes:

No maintenance done; span adjusted

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

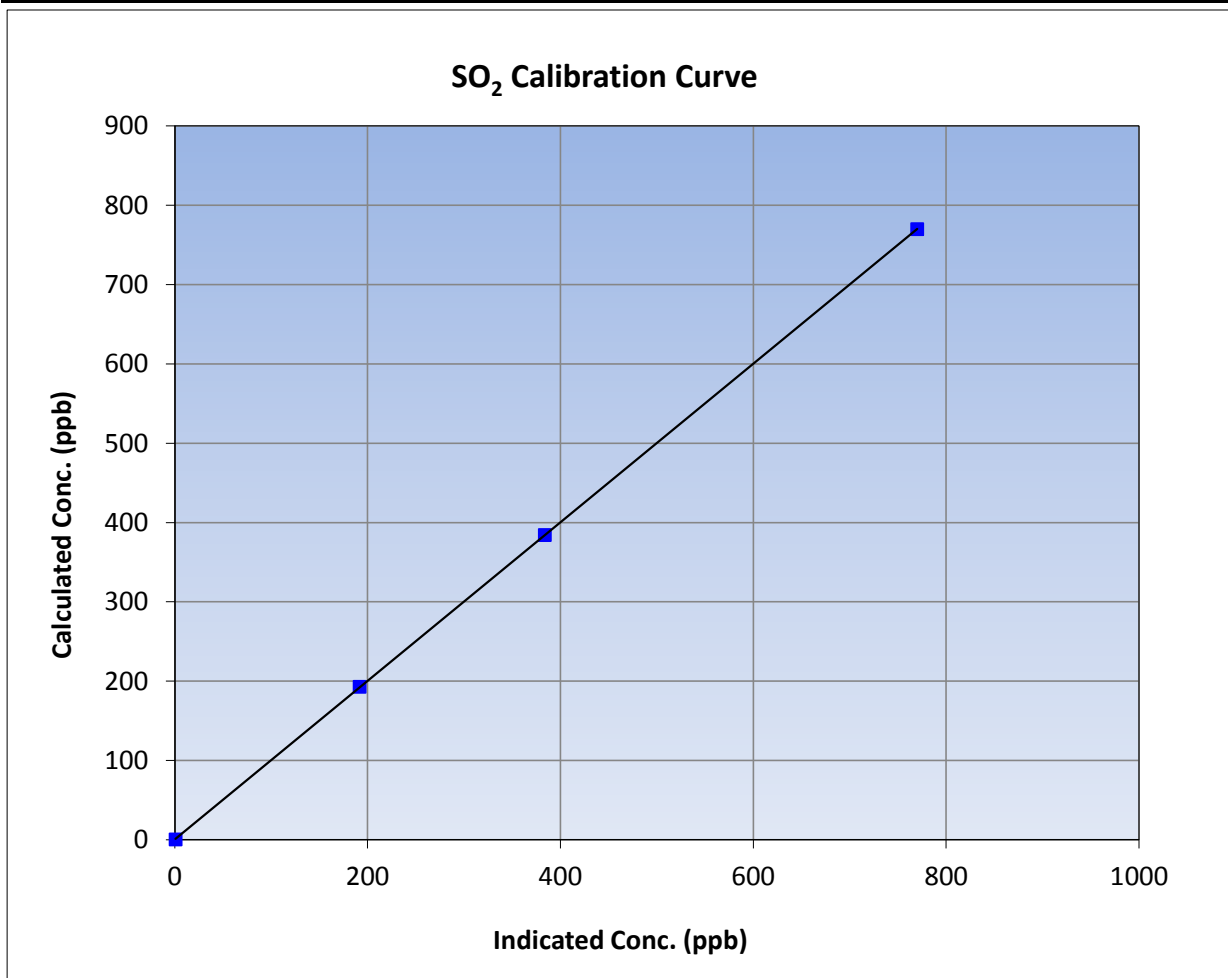
Version-03-2017

### Station Information

Calibration Date	October 26, 2017	Previous Calibration	September 25, 2017
Station Name	Buffalo Viewpoint	Station Number	AMS 04
Start Time (MST)	7:00	End Time (MST)	11:37
Analyzer make	Thermo 43i	Analyzer serial #	JC1327300932

### Calibration Data

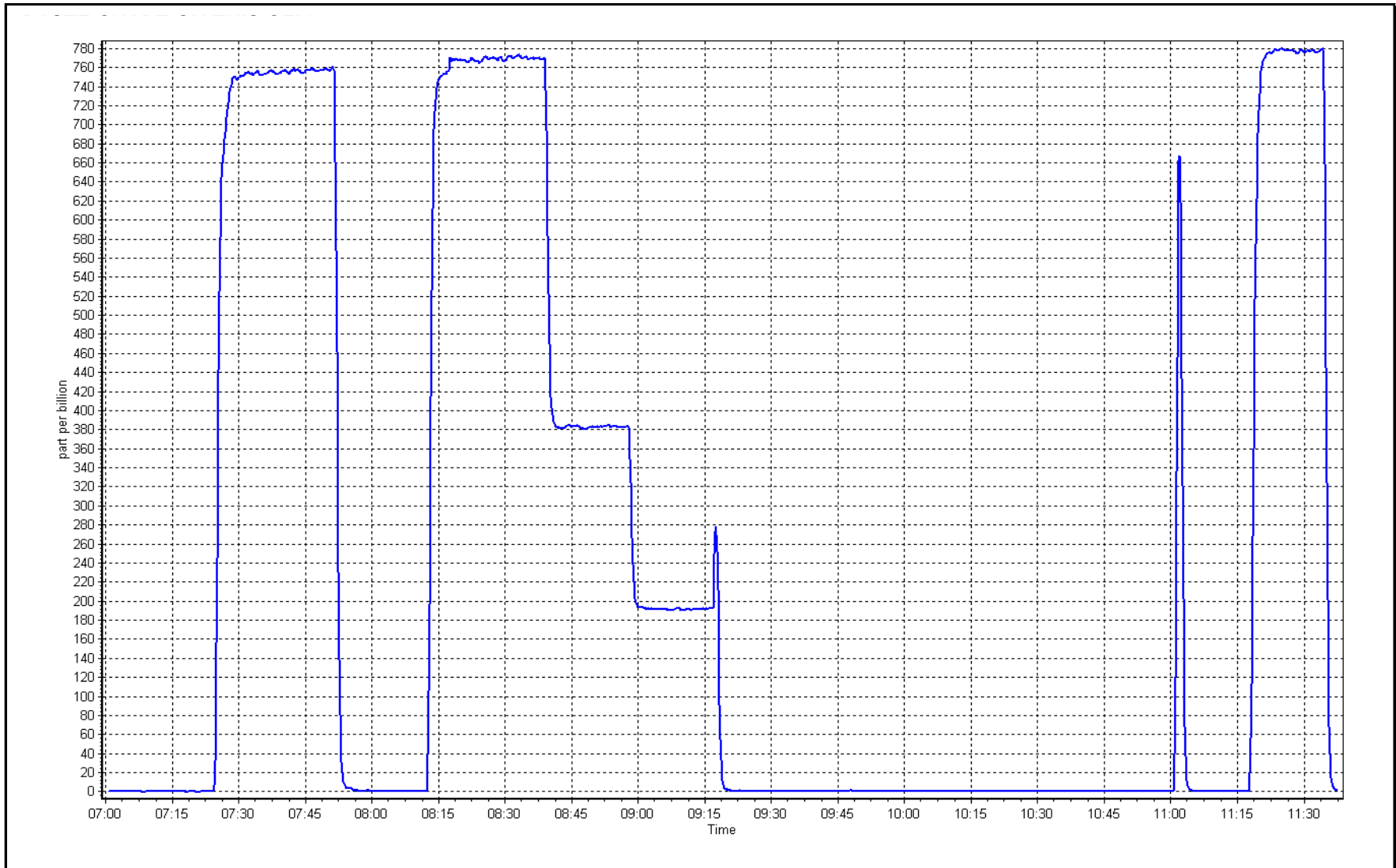
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits
0.0	0.5	----	Correlation Coefficient	≥0.995
769.6	769.7	0.9999		
384.0	383.4	1.0017	Slope	0.90 - 1.10
192.4	191.5	1.0048		
			Intercept	+/-30



SO2 Calibration Plot

Date: October 26, 2017

Location: Buffalo Viewpoint







# Wood Buffalo Environmental Association

## H<sub>2</sub>S Calibration Summary

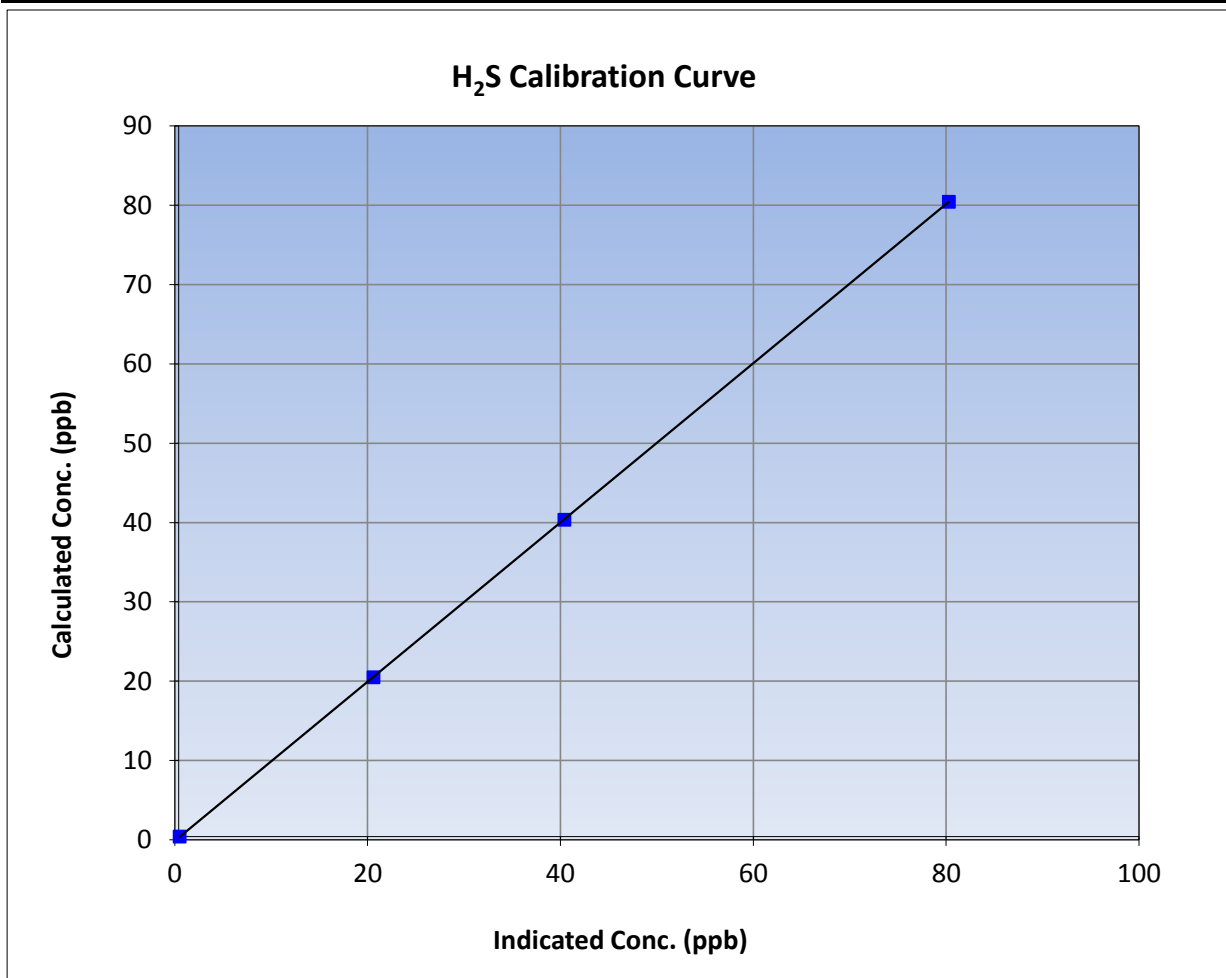
Version-03-2017

### Station Information

Calibration Date	October 26, 2017	Previous Calibration	September 26, 2017
Station Name	Buffalo Viewpoint	Station Number	AMS 04
Start Time (MST)	13:43	End Time (MST)	15:40
Analyzer make	Thermo 450i	Analyzer serial #	1336160094

### Calibration Data

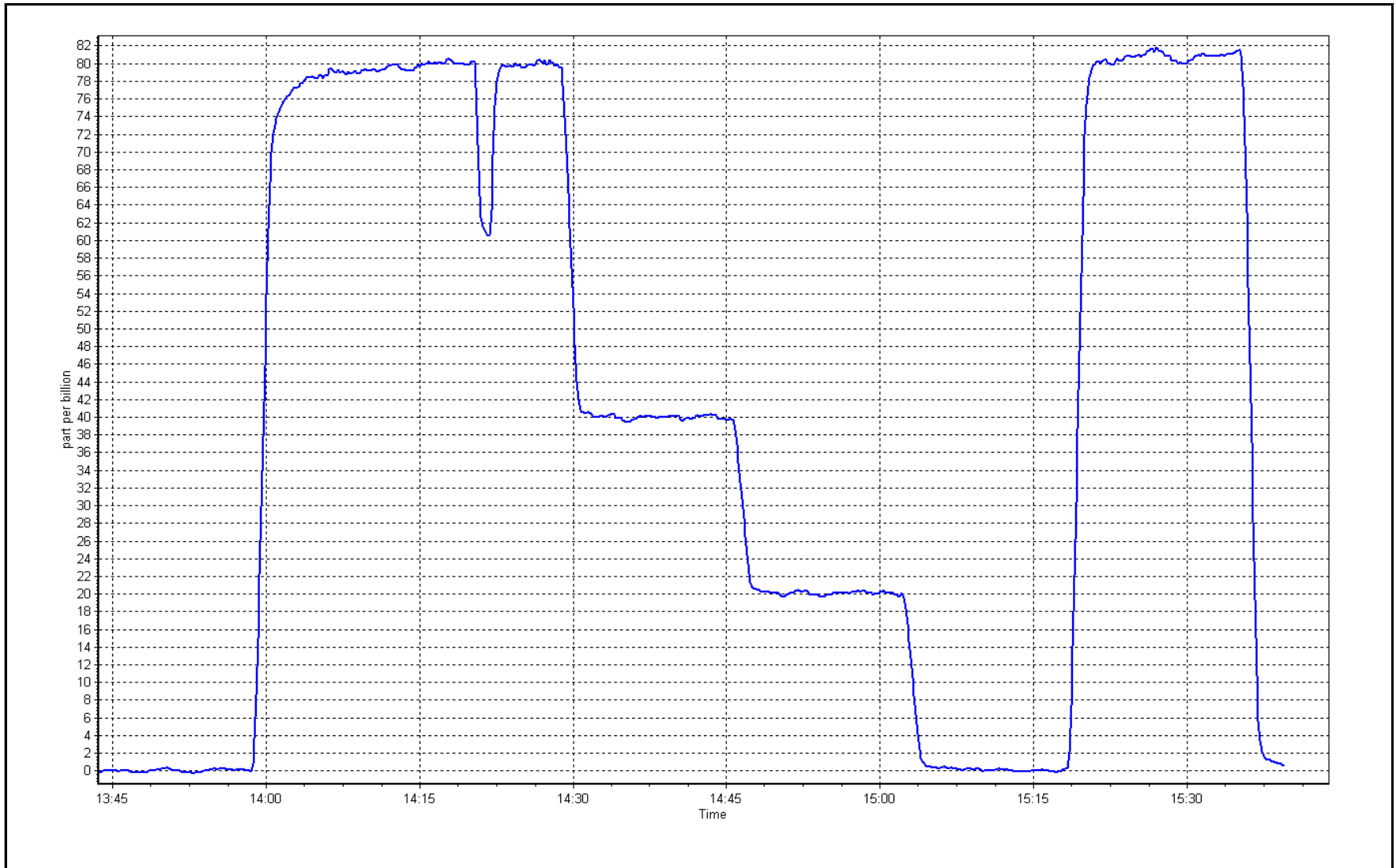
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.1	----	Correlation Coefficient	0.999998	≥0.995
80.1	79.9	1.0020			
40.0	40.0	0.9989	Slope	1.003587	0.90 - 1.10
20.1	20.2	0.9938			
			Intercept	-0.152047	+/-3



H<sub>2</sub>S Calibration Plot

Date: October 26, 2017

Location: Buffalo Viewpoint





# Wood Buffalo Environmental Association

## THC Calibration Report

Version-03-2017

### Station Information

Station Name:	Buffalo Viewpoint	Station number:	AMS 04
Calibration Date:	October 26, 2017	Last Cal Date:	September 25, 2017
Start time (MST):	7:00	End time (MST):	11:37
Reason:	Routine		

### Calibration Standards

Gas Cert Reference	LL28372	Cal Gas Expiry Date	August-18-20
CH4 Cal Gas Conc.	<u>501.0</u> ppm	CH4 Equiv Conc.	1053.8 ppm
C3H8 Cal Gas Conc.	<u>201.0</u> ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	3060
ZAG Make/Model	API 701	Serial Number	4297

### Analyzer Information

Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1170050149
	<u>Start</u>	<u>Finish</u>	<u>Start</u>
Analyzer Range	0 - 25 ppm	Bias voltage supply	-286.8
Calculated slope	0.995588	Sample pressure	8.7
Calculated intercept	0.048708	Fuel pressure	19.3
Analyzer Background	3.410	Air pressure	34.6
Analyzer Coefficient	3.856	Flame temperature	147.7

### THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5008	0.0	0.00	-0.01	----
as found span	4932	78.7	16.55	16.73	0.989
calibrator zero	5000	0.0	0.00	-0.06	----
high point	4932	78.7	16.55	16.59	0.998
second point	4975	39.3	8.26	8.18	1.010
third point	4997	19.7	4.14	4.04	1.024
as left zero	5008	0.0	0.00	-0.05	----
as left span	4932	78.7	16.55	16.58	0.998

Average Correction Factor				1.011
Corrected As found	16.74	Previous response	16.58	*% change
				-1.0%

\* = > +/-5% change initiates investigation

Notes:

Hydrogen changed out, Span adjusted

Calibration Performed By: Melissa Lemay



# Wood Buffalo Environmental Association

## THC Calibration Summary

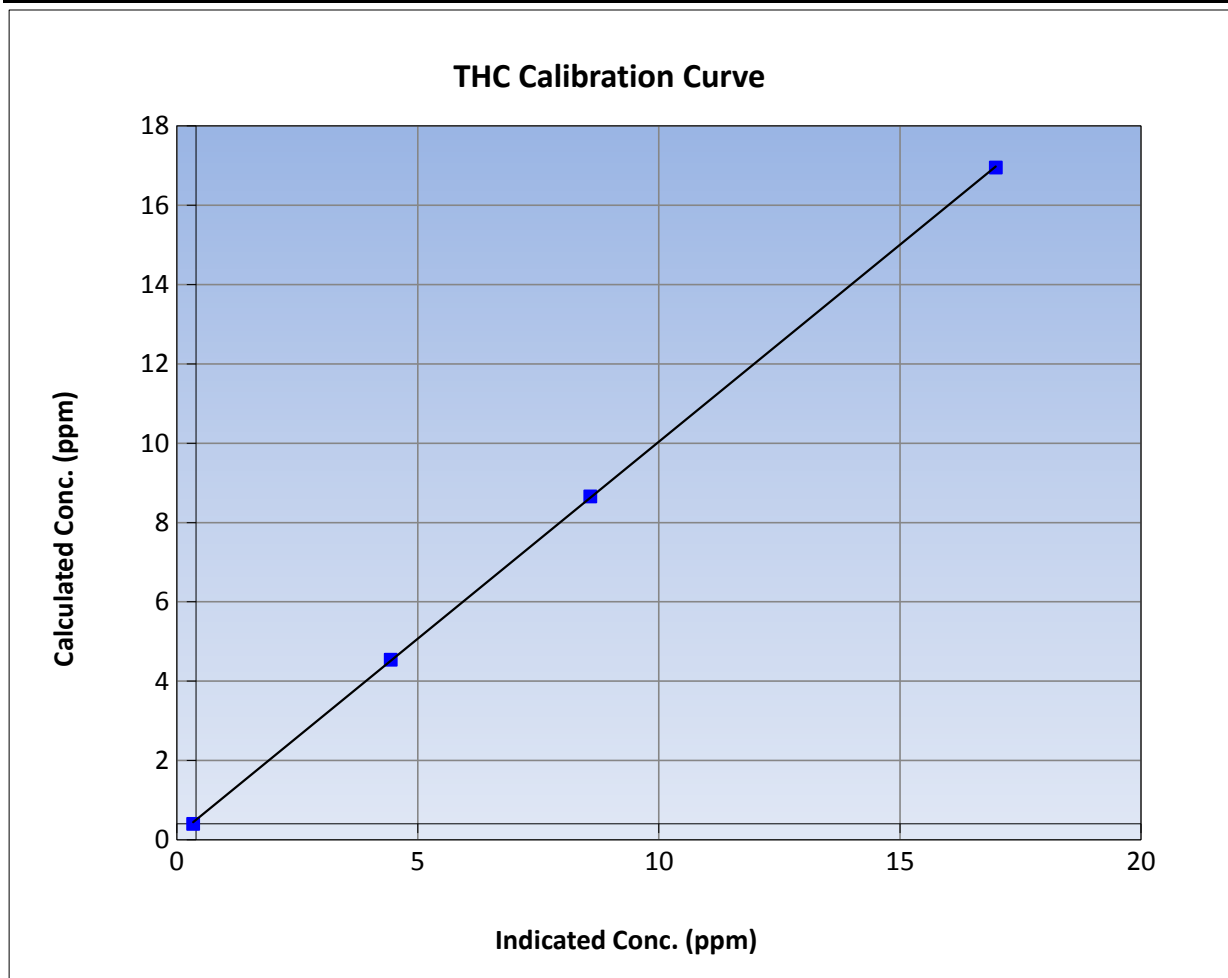
Version-03-2017

### Station Information

Calibration Date	October 26, 2017	Previous Calibration	September 25, 2017
Station Name	Buffalo Viewpoint	Station Number	AMS 04
Start Time (MST)	8:00	End Time (MST)	11:37
Analyzer make	Thermo 51i-LT	Analyzer serial #	1170050149

### Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	-0.1	----	Correlation Coefficient	0.999972	≥0.995
16.6	16.6	0.9976			
8.3	8.2	1.0096	Slope	0.993181	0.90 - 1.10
4.1	4.0	1.0242			
			Intercept	0.098365	+/-1.5

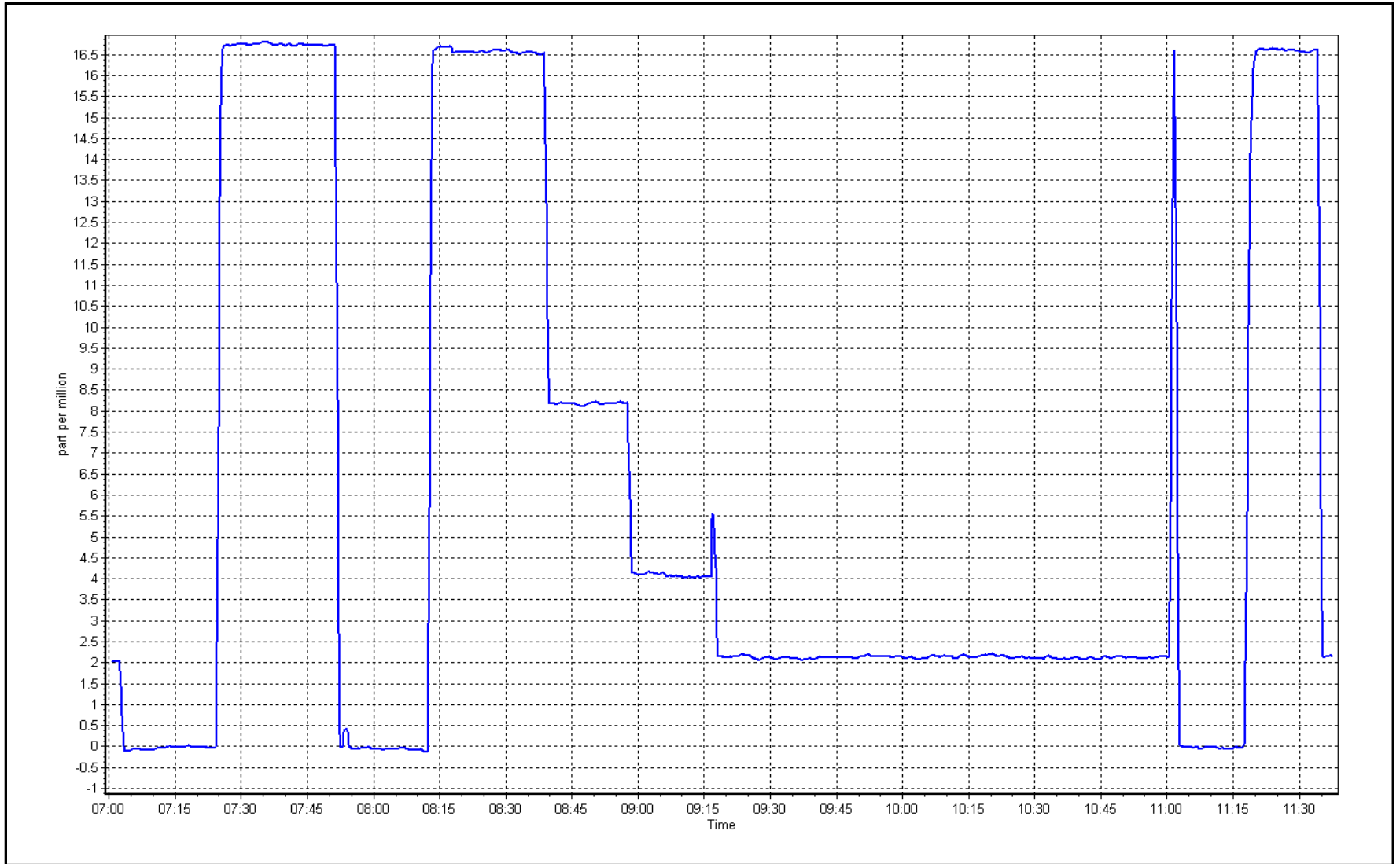




THC Calibration Plot

Date: October 26, 2017

Location: Buffalo Viewpoint





# Wood Buffalo Environmental Association

## O<sub>3</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Buffalo Viewpoint	Station number:	AMS 04
Calibration Date:	October 26, 2017	Last Cal Date:	September 6, 2017
Start time (MST):	11:35	End time (MST):	13:45
Reason:	Routine		

### Calibration Standards

O3 generation mode:	Photometer	O3 reference Date:	Photometer
Calibrator Make/Model:	API T700	Serial Number:	3060
ZAG Make/Model:	API T701	Serial Number:	60

### Analyzer Information

Analyzer make: API T400

Analyzer serial #: 2961

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Analyzer Range	0 - 500 ppb		Pressure	26.8	26.8
Calculated slope	0.998541	0.987315	Flow	811	811
Calculated intercept	1.827667	2.167252	O3 Measure	4031.7	4031.7
Analyzer Background	-1.3	-1.3			
Analyzer Coefficient	1.041	1.041			

### O<sub>3</sub> Calibration Data

Set Point	Total air flow rate (sccm)	Calibrator Lamp Voltage Drive	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5002	0.0	0.0	-0.5	----
as found span	5023	1014.4	399.0	402.7	0.991
calibrator zero	5002	0.0	0.0	-0.5	----
high point	5023	1007.1	399.0	402.7	0.991
second point	5024	848.3	200.0	199.7	1.002
third point	5025	741.1	100.0	97.3	1.028
as left zero	5002	0.0	0.0	0.6	----
as left span	5023	1019.4	399.0	403.0	0.990
Average Correction Factor					1.007

Corrected As found	403.20	Previous response	397.76	*% change	-1.4%
--------------------	--------	-------------------	--------	-----------	-------

\* = > +/-8% change initiates investigation

Notes:

No maintenance done, No adjustments

Calibration Performed By: Melissa Lemay



# Wood Buffalo Environmental Association

## O<sub>3</sub> Calibration Summary

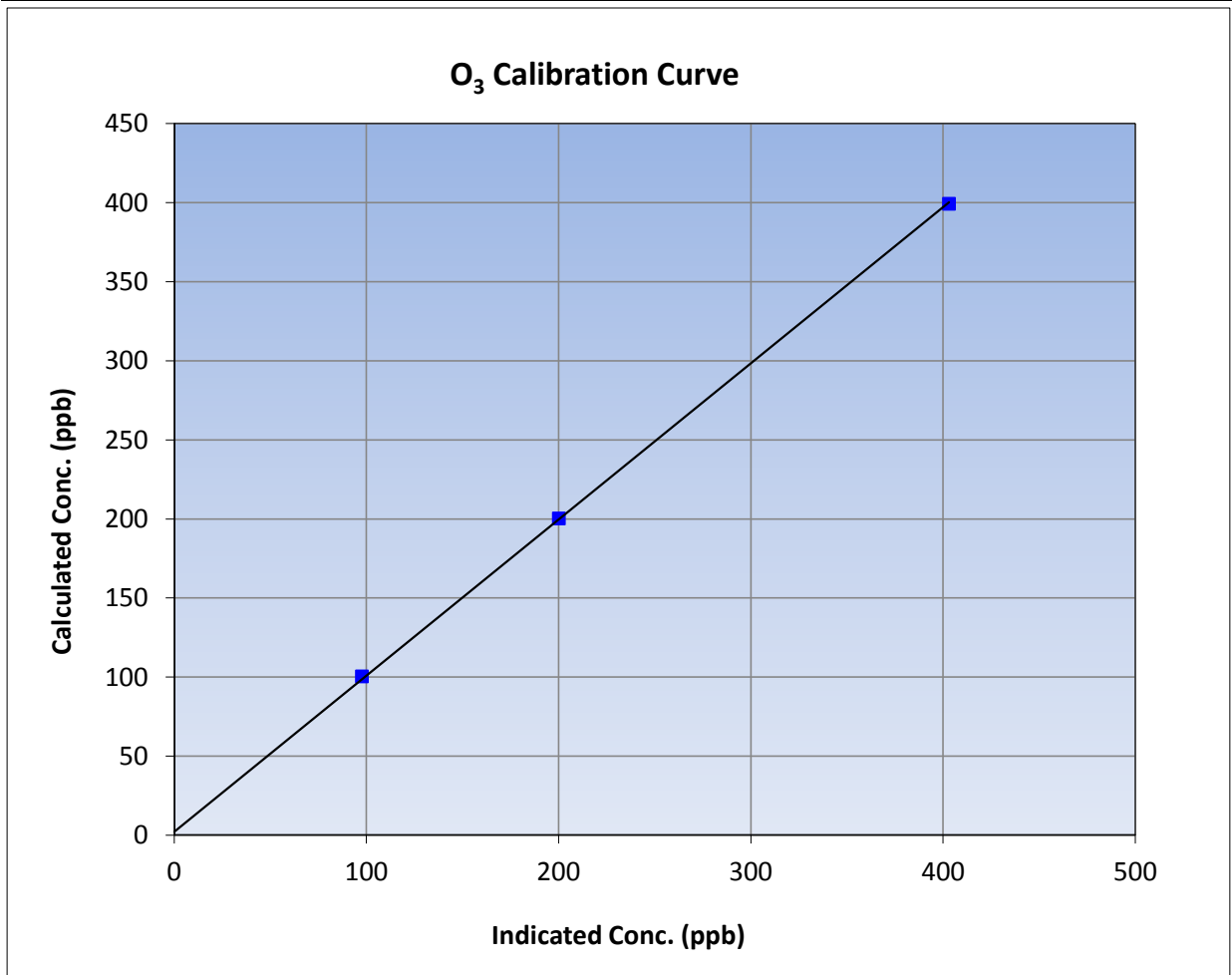
Version-03-2017

### Station Information

Calibration Date	October 26, 2017	Previous Calibration	September 6, 2017
Station Name	Buffalo Viewpoint	Station Number	AMS 04
Start Time (MST)	11:35	End Time (MST)	13:45
Analyzer make	API T400	Analyzer serial #	2961

### Calibration Data

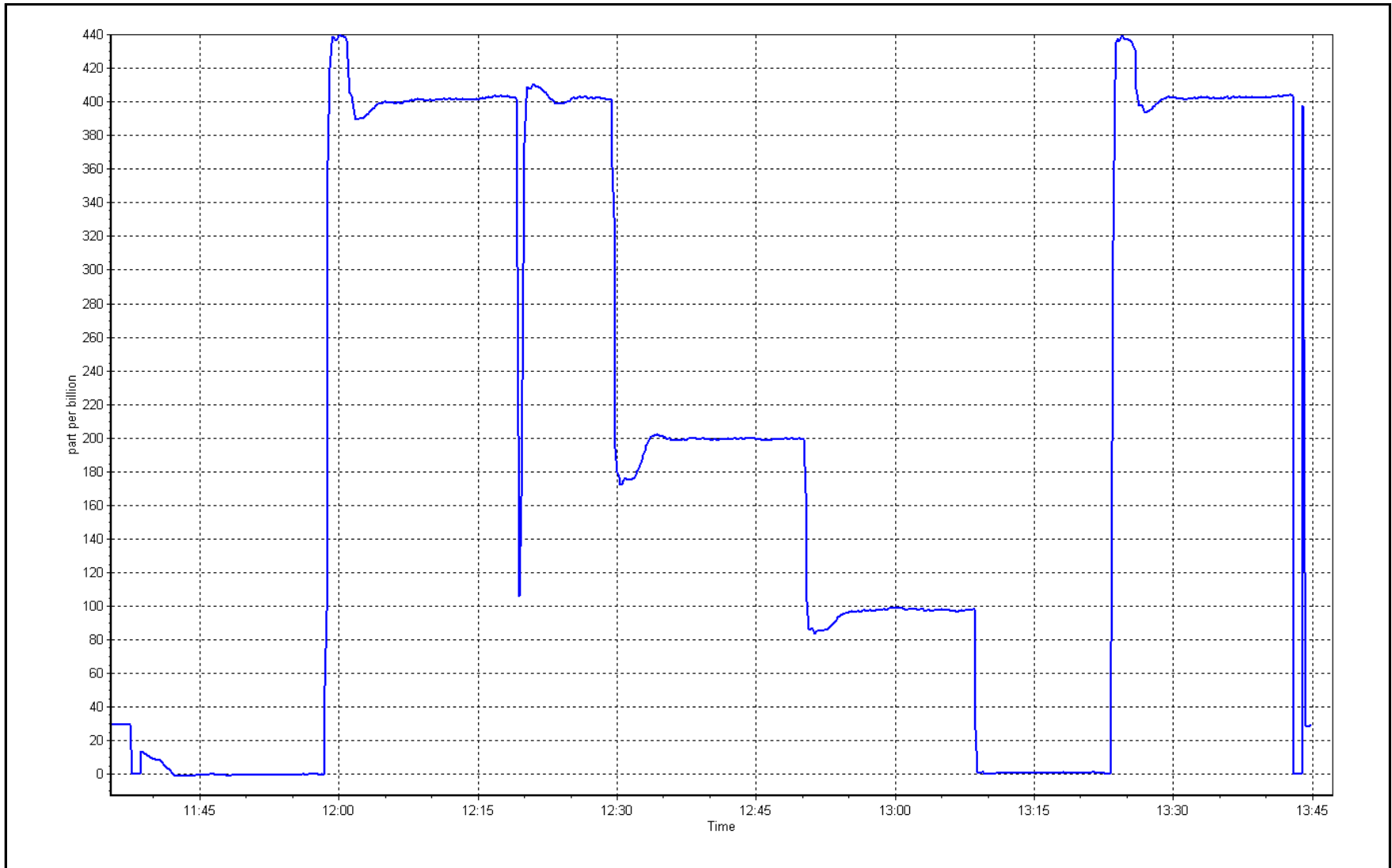
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	-0.5	----	Correlation Coefficient	0.999920	≥0.995
399.0	402.7	0.9908			
200.0	199.7	1.0015	Slope	0.987315	0.90 - 1.10
100.0	97.3	1.0277			
			Intercept	2.167252	+/- 10



O<sub>3</sub> Calibration Plot

Date: October 26, 2017

Location: Buffalo Viewpoint





# Wood Buffalo Environmental Association

## NO<sub>x</sub> - NO - NO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Buffalo Viewpoint	Station number:	AMS 04
Calibration Date:	October 26, 2017	Last Cal Date:	September 25, 2017
Start time (MST):	7:00	End time (MST):	11:39
Reason:	Routine		

### Calibration Standards

NO Gas Cylinder #	LL28372	Cal Gas Expiry Date	August-18-20
NOX Cal Gas Conc.	<u>50.9</u> ppb	NO Cal Gas Conc.	<u>50.9</u> ppb
Calibrator Model	API T700	Serial Number	3060
ZAG make/model	API T701	Serial Number	60

### Analyzer Information

Analyzer make: API T200		Analyzer serial #: 1035	
	<u>Start</u>	<u>Finish</u>	
NO coefficient	1.202	1.235	NOX Range (ppb) 0 - 1000 ppb
NOX coefficient	1.198	1.229	PMT Temperature 7.4 7.4
NO2 coefficient	1.000	1.000	Reaction cell Press 4.5 4.5
NO bkgrnd	-0.1	-0.2	Sample Flow 496 496
NOX bkgrnd	1.4	0.1	PMT Voltage 750 750

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope	1.003584	1.003058
NO <sub>x</sub> Cal Offset	0.871532	0.652839
NO Cal Slope	0.997091	1.001070
NO Cal Offset	1.930923	1.719810
NO <sub>2</sub> Cal Slope	0.996230	0.999173
NO <sub>2</sub> Cal Offset	0.725294	0.385937



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

Version-03-2017

### Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5008	0.0	0.0	0.0	0.0	-0.5	0.0	-0.5	----	----
as found span	4932	78.7	799.5	799.5	0.0	774.6	775.0	-0.5	1.0321	1.0316
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
high point	4932	78.7	799.5	799.5	0.0	797.0	798.1	-1.1	1.0031	1.0017
second point	4975	39.3	398.9	398.9	0.0	395.8	394.8	1.1	1.0079	1.0105
third point	4997	19.7	199.9	199.9	0.0	198.6	197.0	1.5	1.0064	1.0146
as left zero	5008	0.0	0.0	0.0	0.0	0.4	0.3	0.1	----	----
as left span	4932	78.7	799.5	404.8	394.7	805.0	388.7	415.8	0.9931	1.0414
<b>Average Correction Factor</b>									<b>1.0058</b>	<b>1.0089</b>

Corrected As found	NO <sub>x</sub> = 775.1 ppb	NO = 775.0 ppb		*Percent Change	NO <sub>x</sub> = 2.7%
Previous Response	NO <sub>x</sub> = 795.7 ppb	NO = 799.9 ppb		*Percent Change	NO = 3.2%
<i>* = &gt; +/-5% change initiates investigation</i>					

### GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
1st NO ref point		0.0	797.8	802.7	-4.9	1.0021	0.9960	----	----
1st NO2 (400 ppb O3)	404.8	397.9	803.3	404.8	398.5	0.9952	----	0.9985	100.2%
2nd NO2 (200 ppb O3)	626.9	175.8	800.5	626.9	173.6	0.9987	----	1.0127	98.7%
3rd NO2 (100 ppb O3)	717.8	84.9	803.3	717.8	85.5	0.9952	----	0.9930	100.7%
2nd NO ref point	----	0.0	799.8	806.6	-7.0	0.9996	0.9911	----	----
<b>Average Correction Factor</b>						<b>0.9972</b>	<b>0.9935</b>	<b>1.0014</b>	<b>99.9%</b>

Notes: No maintenance done, zero and span adjusted

Calibration Performed By: Melissa Lemay



# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

Version-03-2017

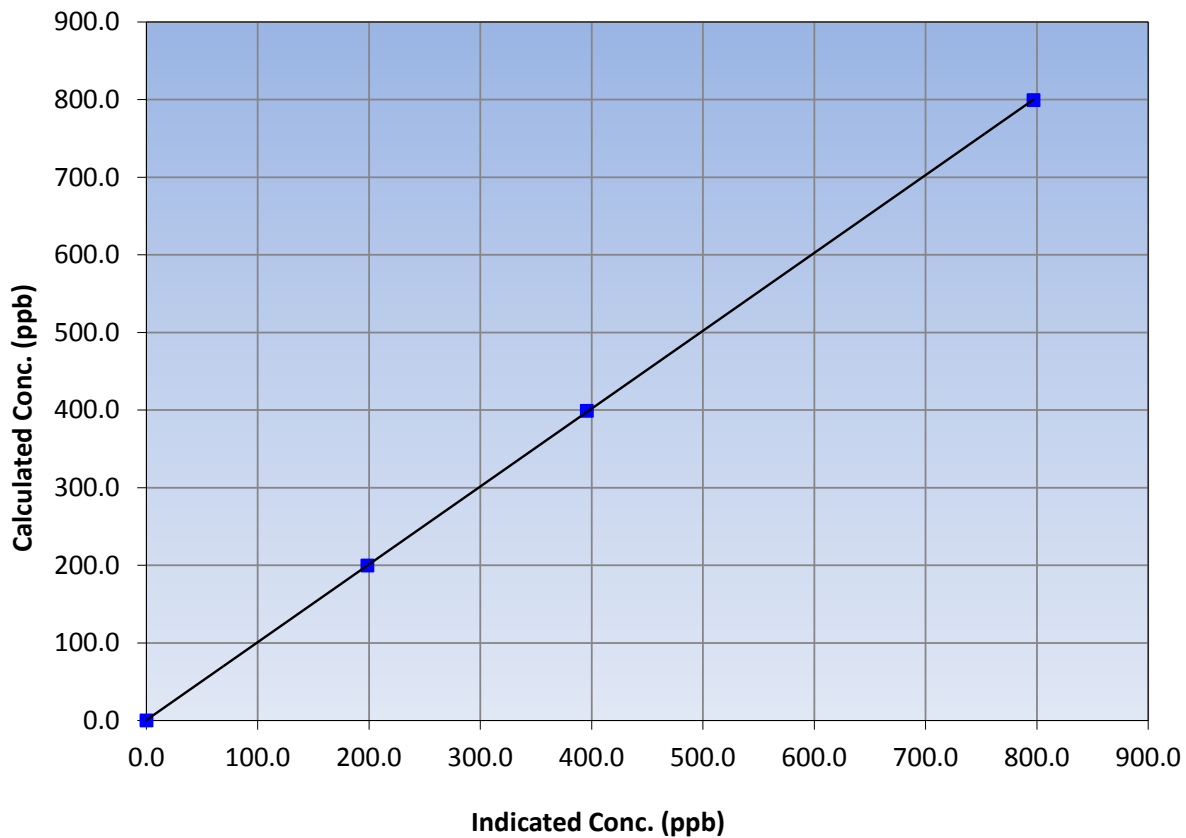
### Station Information

Calibration Date	October 26, 2017	Previous Calibration	September 25, 2017
Station Name	Buffalo Viewpoint	Station Number	AMS 04
Start Time (MST)	7:00	End Time (MST)	11:39
Analyzer make	API T200	Analyzer serial #	1035

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	0.0	----	Correlation Coefficient	≥0.995	
799.5	797.0	1.0031			
398.9	395.8	1.0079			
199.9	198.6	1.0064			
			Slope	1.003058	0.90 - 1.10
			Intercept	0.652839	+/-20

NO<sub>x</sub> Calibration Curve





# Wood Buffalo Environmental Association

## NO Calibration Summary

Version-03-2017

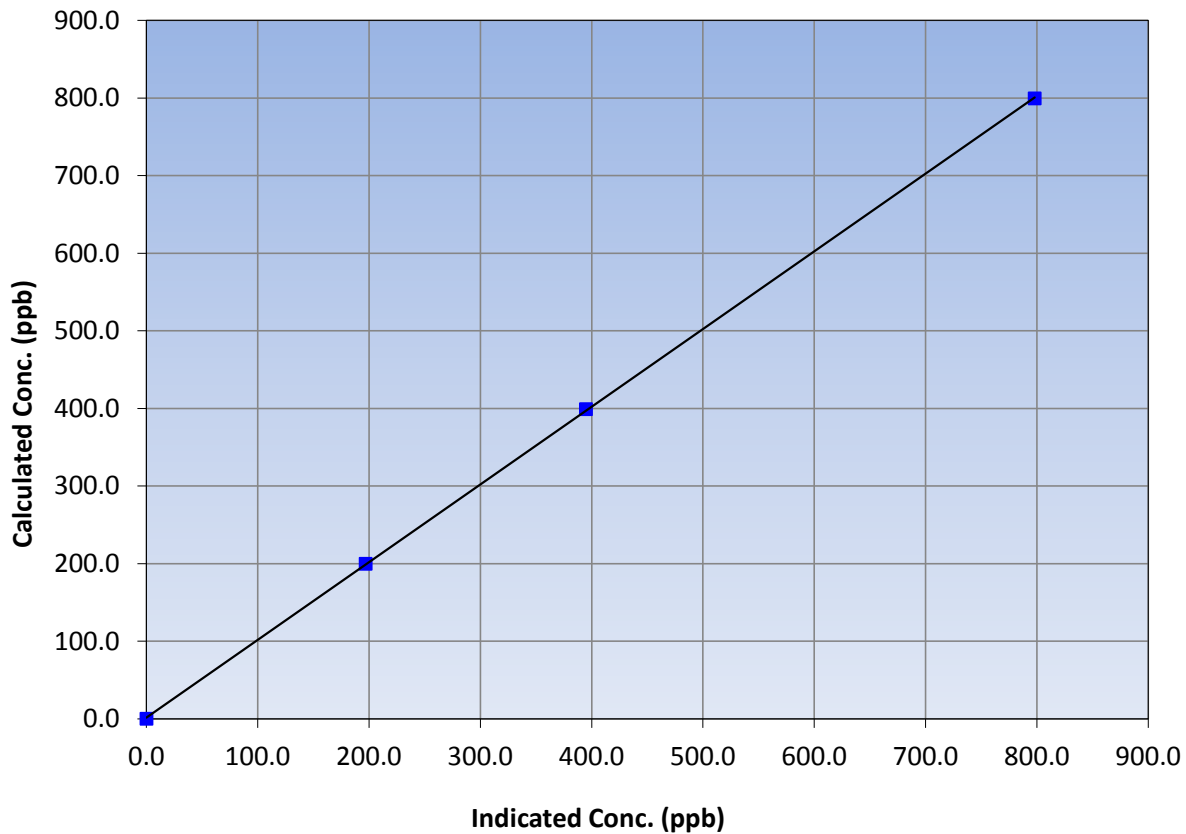
### Station Information

Calibration Date	October 26, 2017	Previous Calibration	September 25, 2017
Station Name	Buffalo Viewpoint	Station Number	AMS 04
Start Time (MST)	7:00	End Time (MST)	11:39
Analyzer make	API T200	Analyzer serial #	1035

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.0	----	Correlation Coefficient	≥0.995	
799.5	798.1	1.0017			
398.9	394.8	1.0105			
199.9	197.0	1.0146			
			Slope	1.001070	0.90 - 1.10
			Intercept	1.719810	+/-20

NO Calibration Curve







# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

Version-03-2017

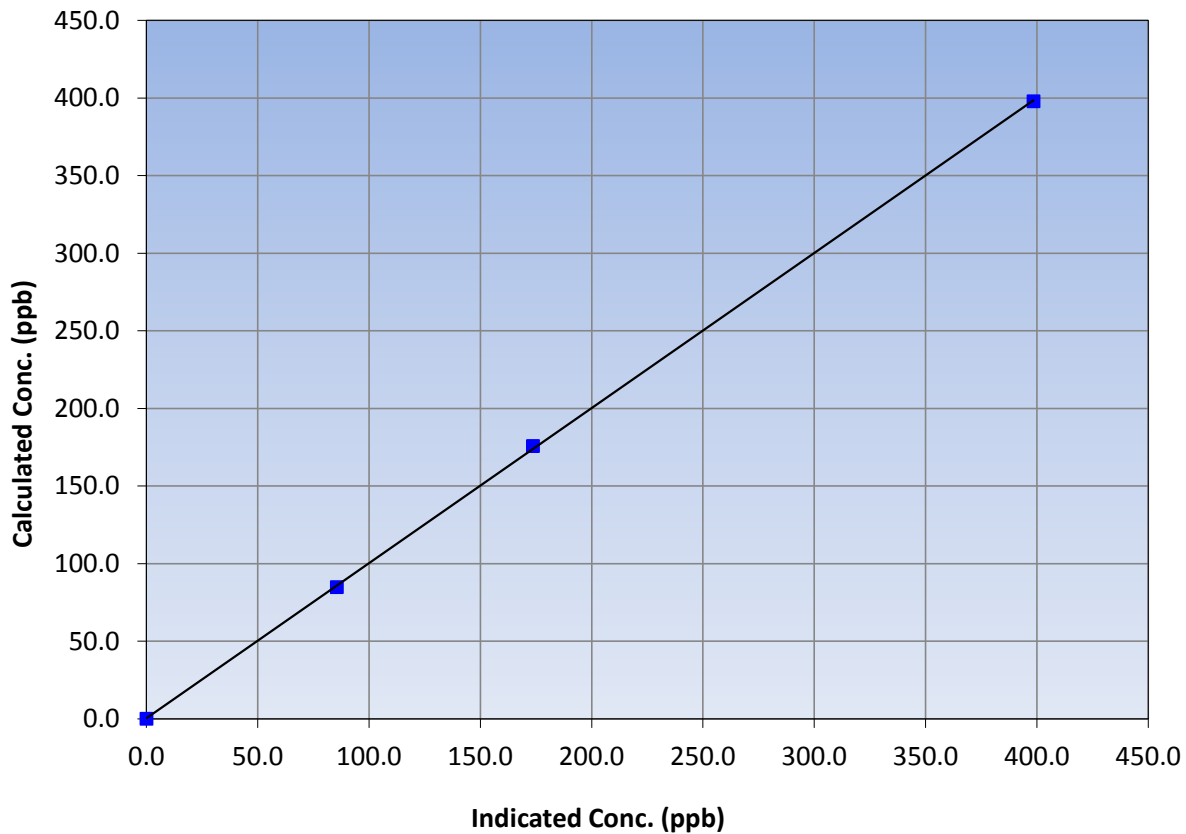
### Station Information

Calibration Date	October 26, 2017	Previous Calibration	September 25, 2017
Station Name	Buffalo Viewpoint	Station Number	AMS 04
Start Time (MST)	7:00	End Time (MST)	11:39
Analyzer make	API T200	Analyzer serial #	1035

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	0.0	----	Correlation Coefficient	≥0.995	
397.9	398.5	0.9985			
175.8	173.6	1.0127			
84.9	85.5	0.9930			
			Slope	0.999173	0.90 - 1.10
			Intercept	0.385937	+/-20

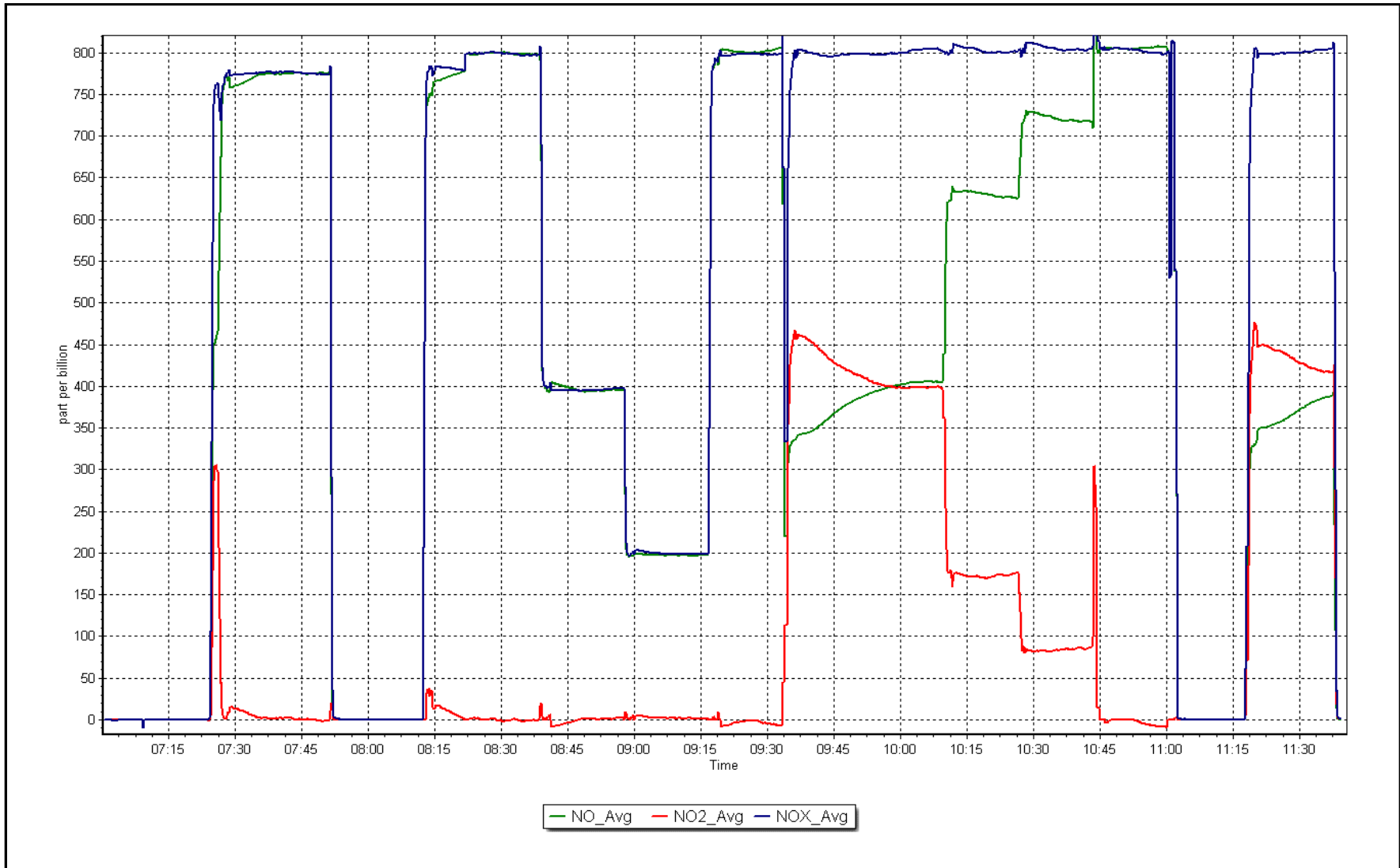
**NO<sub>2</sub> Calibration Curve**



NO<sub>x</sub> Calibration Plot

Date: October 26, 2017

Location: Buffalo Viewpoint





# Wood Buffalo Environmental Association

## SHARP PM<sub>2.5</sub> CALIBRATION

Version-02-2017

### Station Information

Station Name:	Buffalo Viewpoint	Station number:	AMS 04
Calibration Date:	October 26, 2017	Last Cal Date:	September 26, 2017
Start time (MST):	8:32	End time (MST):	8:53
Sharp Model:	Thermo 5030	S/N:	4173
Particulate Fraction:	PM2.5	C14 Source S/N:	E-803
Flow Meter Make/Model:	Delta Cal	S/N:	1450
Temp/RH standard:	Delta Cal	S/N:	1450

3

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<b>(Limits)</b>
T1 (°C)	0	-1.6	-1	<input checked="" type="checkbox"/>	+/- 2 °C
P3 (hPa)	983	982	983	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	1008	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	0.2	-----	0.2	<input type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified	<input checked="" type="checkbox"/>			
Cyclone cleaning :	PM10 Cyclone	<input checked="" type="checkbox"/>	PM2.5 Cyclone	<input checked="" type="checkbox"/>	
Date Filter Tape Installed:					

### Quarterly Calibration Test

Leak Test: Date of check: \_\_\_\_\_ Last Cal Date: August 4, 2017  
 Flow w/o adaptor: \_\_\_\_\_ Flow w/ adaptor: \_\_\_\_\_

**(Limit) 0.4 LPM**

<u>Adjusted</u>	<u>Current Test</u>	<u>Previous Test</u>	<u>% Change</u>
<input type="checkbox"/>	Foil S/N: _____	Foil S/N: <u>8061</u>	
Foil Calibration	Foil Mass: _____	Foil Mass: <u>1159</u>	
	Calibration Date: _____	Calibration Date: <u>August 26, 2017</u>	
<b>(Limit) +/- 5% of previous</b>	Correction Factor: _____	Correction Factor: <u>7058</u>	---

### Annual Calibration Test

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<b>(Limits)</b>
T2 (°C)				<input type="checkbox"/>	+/- 2 °C
T3 (°C)				<input type="checkbox"/>	+/- 2 °C
T4 (°C)				<input type="checkbox"/>	+/- 2 °C
RH (%)				<input type="checkbox"/>	+/- 10%
Date Sample Tube Cleaned:					
Date Pump Rebuilt/Replaced:					

Notes: cyclone head cleaned; T1 adjusted

Calibration by: Melissa Lemay



## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

### **CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT**

### **AMS 5 MANNIX OCTOBER 2017**

Operations, Data Collection,  
QA/QC, Data Validation and Reporting by:  
Wood Buffalo Environmental Association  
Fort McMurray, Alberta

November 29, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)  
OCTOBER 2017

MONTHLY SUMMARY for  
AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	707	37	37	100	72	0	13	0
H2S (ppb) Average	706	38	38	100	5	0	2	0
THC (ppm) Average	705	37	39	99.73	5.3	-	3.1	-
Temperature 2 m (C) Average	744	0	0	100	23.3	-	14.2	-
Temperature 20 m (C) Average	744	0	0	100	22.8	-	14.7	-
Temperature 45 m (C) Average	744	0	0	100	22.6	-	15	-
Temperature 75 m (C) Average	744	0	0	100	22.3	-	15.1	-
Temperature 90 m (C) Average	744	0	0	100	22.2	-	15.1	-
Relative Humidity 2 m (%) Average	744	0	0	100	98	-	95	-
Relative Humidity 20 m (%) Average	744	0	0	100	98	-	96	-
Relative Humidity 45 m (%) Average	744	0	0	100	99	-	97	-
Relative Humidity 75 m (%) Average	744	0	0	100	98	-	96	-
Relative Humidity 90 m (%) Average	744	0	0	100	98	-	96	-
Wind Speed 20 m (km/h) Average	723	0	21	97.18	42	-	23	-
Wind Speed 45 m (km/h) Average	717	0	27	96.37	53	-	30	-
Wind Speed 75 m (km/h) Average	705	0	39	94.76	57	-	35	-
Wind Speed 90 m (km/h) Average	724	0	20	97.31	61	-	37	-
Wind Direction 20 m (deg) Average	723	0	21	97.18	-	-	-	-
Wind Direction 45 m (deg) Average	717	0	27	96.37	-	-	-	-
Wind Direction 75 m (deg) Average	705	0	39	94.76	-	-	-	-
Wind Direction 90 m (deg) Average	724	0	20	97.31	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	723	0	21	97.18	1.5	-	0.9	-
Vertical Wind Speed 45 m (km/h) Average	717	0	27	96.37	2.3	-	1.2	-
Vertical Wind Speed 75 m (km/h) Average	705	0	39	94.76	1.9	-	0.6	-
Vertical Wind Speed 90 m (km/h) Average	724	0	20	97.31	1.7	-	0.4	-

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)  
OCTOBER 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	707	2.1	6	-	0	0	0	0	1	5	72
H2S (ppb) Average	706	0.4	1	-	0	0	0	0	0	1	5
THC (ppm) Average	705	2.38	0.4	-	2.1	2.1	2.2	2.2	2.4	2.8	5.3
Temperature 2 m (C) Average	744	3.24	4.7	-	-5.3	-1.8	-0.2	2.1	5.8	9.6	23.3
Temperature 20 m (C) Average	744	3.45	4.7	-	-5.1	-1.4	-0.2	2.5	6	10	22.8
Temperature 45 m (C) Average	744	3.36	4.8	-	-5	-1.5	-0.3	2.4	5.9	9.9	22.6
Temperature 75 m (C) Average	744	3.23	4.8	-	-4.7	-1.6	-0.5	2.2	5.8	9.9	22.3
Temperature 90 m (C) Average	744	3.19	4.7	-	-4.5	-1.7	-0.6	2.1	5.7	9.8	22.2
Relative Humidity 2 m (%) Average	744	75.3	16	-	29	53	66	78	88	95	98
Relative Humidity 20 m (%) Average	744	72.9	16	-	28	51	63	75	84	95	98
Relative Humidity 45 m (%) Average	744	72.7	16	-	26	51	62	74	84	95	99
Relative Humidity 75 m (%) Average	744	72.5	16	-	26	51	62	74	84	95	98
Relative Humidity 90 m (%) Average	744	72.5	16	-	26	51	62	74	84	95	98
Wind Speed 20 m (km/h) Average	723	13.9	7	-	0	5	9	13	17	25	42
Wind Speed 45 m (km/h) Average	717	18.8	9	-	1	8	12	18	23	32	53
Wind Speed 75 m (km/h) Average	705	21.4	10	-	1	8	14	21	27	36	57
Wind Speed 90 m (km/h) Average	724	22.7	11	-	1	8	15	22	29	38	61
Wind Direction 20 m (deg) Average	723	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	717	-	-	-	-	-	-	-	-	-	-
Wind Direction 75 m (deg) Average	705	-	-	-	-	-	-	-	-	-	-
Wind Direction 90 m (deg) Average	724	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	723	-0.09	0.5	-	-1.5	-0.7	-0.5	-0.2	0.3	0.7	1.5
Vertical Wind Speed 45 m (km/h) Average	717	-0.14	0.9	-	-2.6	-1.4	-0.7	-0.2	0.5	1.2	2.3
Vertical Wind Speed 75 m (km/h) Average	705	0.09	0.4	-	-1.6	-0.4	-0.1	0.1	0.3	0.6	1.9
Vertical Wind Speed 90 m (km/h) Average	724	0.16	0.4	-	-1.3	-0.4	-0.1	0.2	0.4	0.7	1.7

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)  
OCTOBER 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC	13 Oct 2017 13:00	13 Oct 2017 13:00	1	Maintenance - confirm analyzer response
THC	18 Oct 2017 17:00	18 Oct 2017 17:00	1	Maintenance - technician on site
Wind Speed, Wind Direction, Vertical Wind Speed 20 m	11 Oct 2017 05:00	11 Oct 2017 13:00	9	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 20 m	22 Oct 2017 06:00	22 Oct 2017 10:00	5	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 20 m	31 Oct 2017 15:00	31 Oct 2017 16:00	2	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 20 m	31 Oct 2017 18:00	31 Oct 2017 22:00	5	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 45 m	11 Oct 2017 03:00	11 Oct 2017 15:00	13	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 45 m	21 Oct 2017 23:00	22 Oct 2017 11:00	13	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 45 m	22 Oct 2017 13:00	22 Oct 2017 13:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 75 m	11 Oct 2017 02:00	11 Oct 2017 19:00	18	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 75 m	22 Oct 2017 06:00	23 Oct 2017 02:00	21	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 90 m	11 Oct 2017 03:00	11 Oct 2017 19:00	17	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 90 m	22 Oct 2017 05:00	22 Oct 2017 05:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 90 m	22 Oct 2017 10:00	22 Oct 2017 11:00	2	Flat line in sensor output signal - Sensor frozen



# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Sulphur Dioxide (SO<sub>2</sub>) - ppb

## Mannix - October 2017

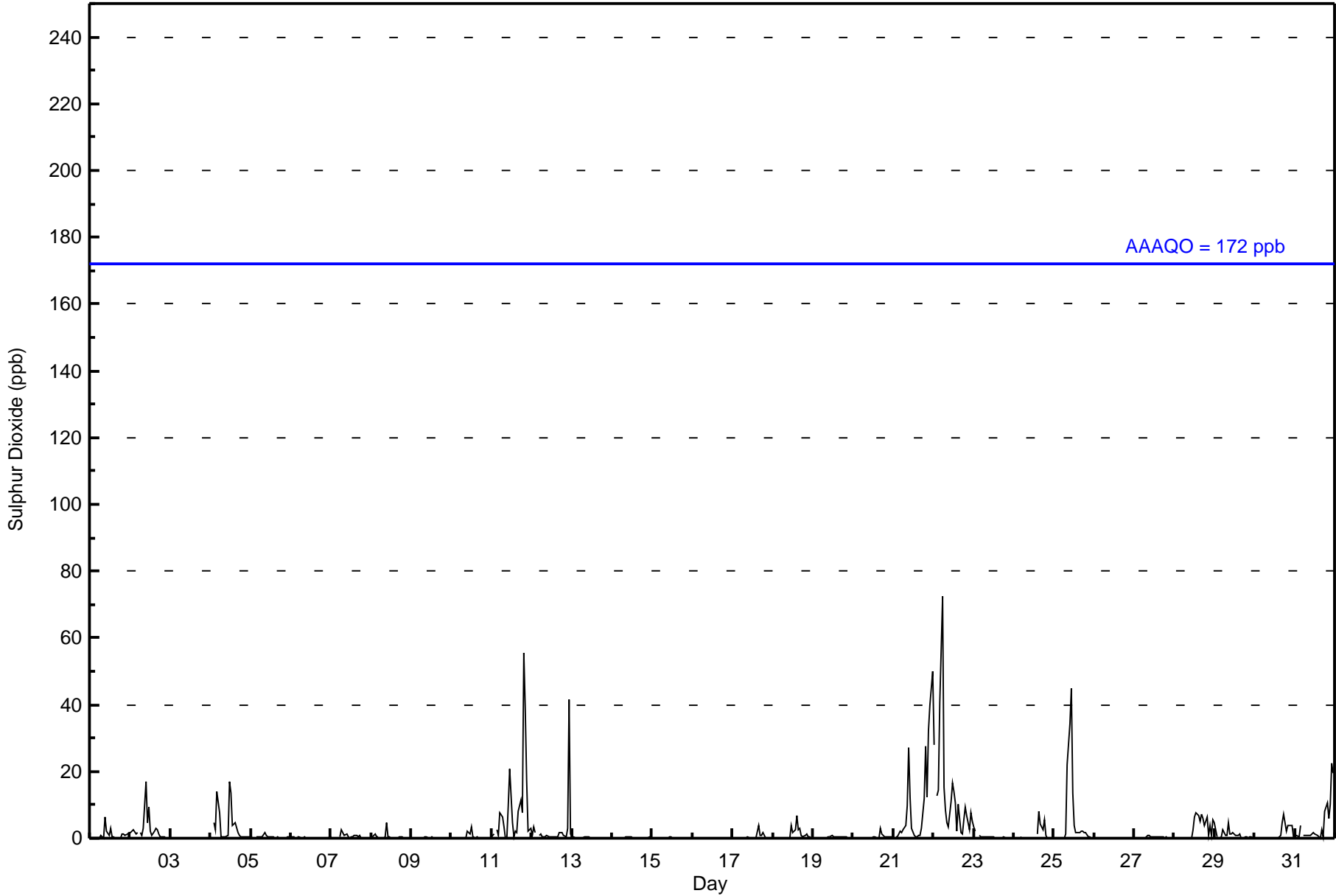
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744										Daily Average		Daily Maximum																											
Maximum Value: 72 ppb on Oct 22 06:00										Maximum Daily Average: 13.2 ppb on Oct 22										Hours of Data: 707		Hours of Missing Data: 37																											
Minimum Value: 0 ppb on Oct 6 21:00										Minimum Daily Average: 0.1 ppb on Oct 16										Hours of Calibration: 37		Percent Operational Time: 100.0																											
Maximum Diurnal Average: 4.0 ppb at hour 23										Minimum Diurnal Average: 0.5 ppb at hour 2																																							
Monthly Average: 2.1 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 5 P <sub>99</sub> = 39																																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	0	0	0	0	Z	0	1	0	0	6	2	1	3	1	0	0	0	0	0	1	1	1	1	2	0.9	6																							
2-Oct	2	2	2	1	2	Z	2	1	3	17	5	9	2	1	2	3	3	1	0	0	0	0	0	0	2.6	17																							
3-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
4-Oct	0	Z	5	2	14	8	1	0	0	1	1	17	13	4	4	4	2	1	1	0	0	0	0	0	3.5	17																							
5-Oct	0	0	Z	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	2																								
6-Oct	0	0	0	Z	0	0	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	1	0.2	1																								
7-Oct	0	0	0	0	Z	0	3	2	1	1	1	0	0	0	1	1	1	1	0	0	0	0	0	0.5	3																								
8-Oct	0	1	1	0	0	Z	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	5																								
9-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																								
10-Oct	0	Z	0	0	0	0	0	0	0	2	2	1	3	0	0	0	0	0	0	0	0	0	0	0.4	3																								
11-Oct	0	1	Z	3	1	8	6	3	0	0	10	21	5	0	2	2	8	12	8	56	39	18	2	3	9.0	56																							
12-Oct	1	4	2	Z	1	1	0	0	0	1	0	0	0	0	0	0	2	2	2	1	1	3	42	1	2.8	42																							
13-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
14-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	1																							
15-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
16-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
17-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	4	1	1	2	1	0	0	0	0	0.4	4																							
18-Oct	0	0	0	Z	0	0	0	0	0	0	0	4	2	3	7	2	3	1	1	1	1	0	0	0	1.1	7																							
19-Oct	0	0	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
20-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	3	1	1	1	1	0	1	0.4	3																								
21-Oct	Z	0	0	1	2	2	2	4	10	27	12	3	1	0	0	1	1	3	12	28	12	32	40	50	10.6	50																							
22-Oct	28	Z	13	14	41	72	15	9	5	3	11	16	14	11	2	10	2	1	6	9	7	3	8	5	13.2	72																							
23-Oct	3	2	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3																							
24-Oct	0	0	0	Z	0	0	0	0	0	0	0	C	C	C	1	8	4	2	5	1	0	0	0	0	1.2	8																							
25-Oct	0	0	0	0	Z	0	0	1	22	34	45	13	4	2	2	2	2	2	2	2	0	0	0	0	5.8	45																							
26-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
27-Oct	Z	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
28-Oct	0	Z	0	0	0	0	0	0	0	0	3	6	8	7	5	7	6	4	7	1	4	1	6	2.8	8																								
29-Oct	5	1	Z	0	0	2	1	1	5	1	1	2	1	1	1	1	0	0	0	0	0	0	0	0	1.0	5																							
30-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	5	7	5	2	4	4	4	1	1.5	7																							
31-Oct	1	1	0	4	Z	1	1	1	1	1	1	2	1	1	0	0	2	1	8	10	6	10	23	19	4.1	23																							
																								1.7	0.5	1.0	1.1	2.5	3.7	1.1	0.8	1.7	3.4	3.1	3.3	2.0	1.2	1.0	1.5	1.5	1.4	1.8	3.9	2.4	2.5	4.0	2.9	Diurnal Average	
																								28	4	13	14	41	72	15	9	22	34	45	21	14	11	7	10	8	12	12	56	39	32	42	50	Diurnal Maximum	
Z - zerospan C - Calibration																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																																																	





Wood Buffalo Environmental Association  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Mannix - October 2017





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Mannix - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	673	95.19	95.19
11 - 20	18	2.55	97.74
21 - 60	15	2.12	99.86
61 - 110	1	0.14	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Mannix - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 10	24	28	9	4	4	14	69	88	27	41	42	58	61	52	56	78	655
11 - 20	7	1	0	0	0	0	0	0	1	0	1	1	0	1	0	5	17
21 - 60	8	0	0	0	0	0	0	1	1	0	0	0	1	0	1	2	14
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>39</b>	<b>29</b>	<b>9</b>	<b>4</b>	<b>4</b>	<b>14</b>	<b>69</b>	<b>89</b>	<b>29</b>	<b>41</b>	<b>43</b>	<b>59</b>	<b>62</b>	<b>53</b>	<b>57</b>	<b>85</b>	<b>686</b>

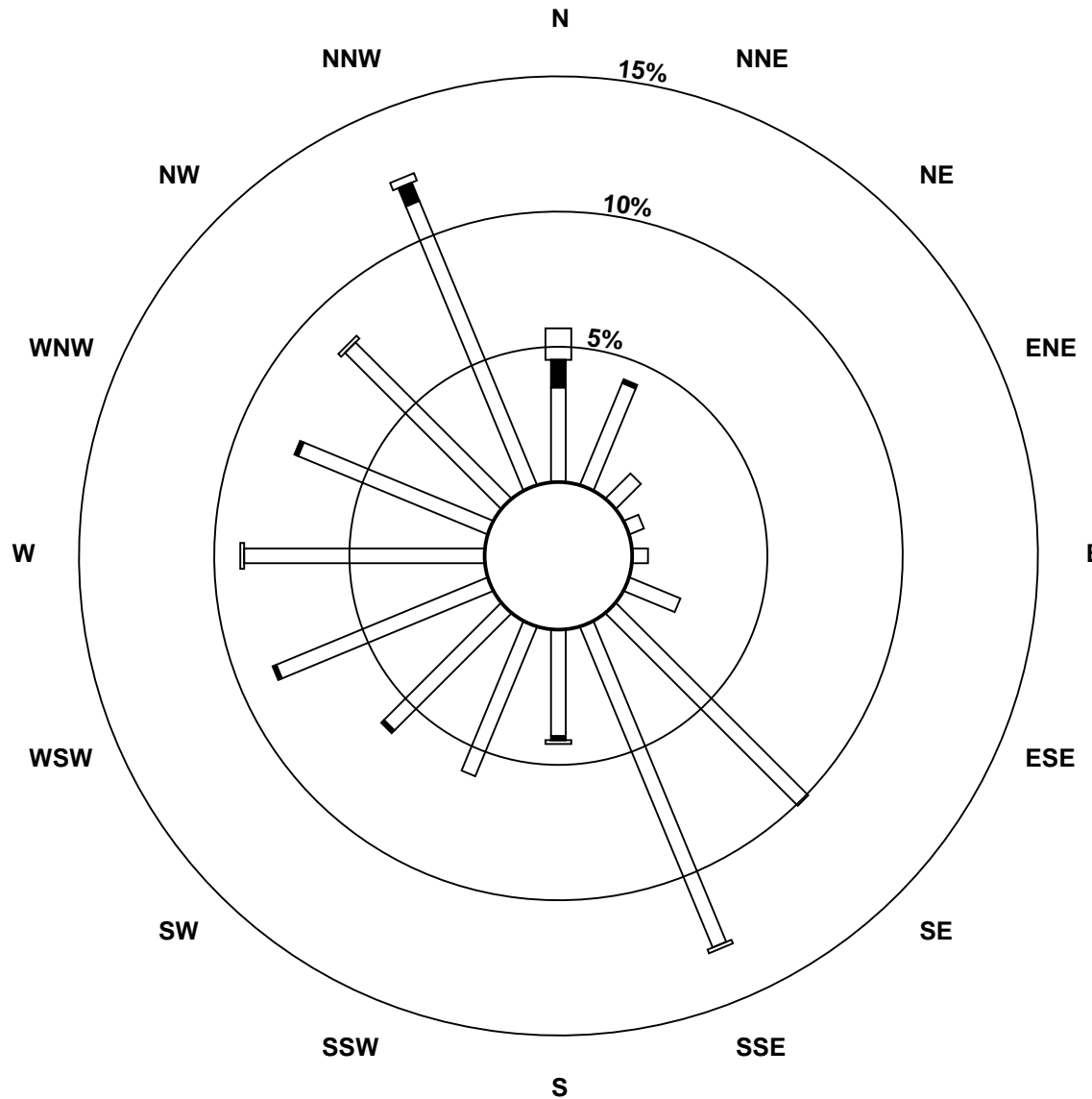
Total Number of Valid Hours: 686

Total Number of Hours: 744

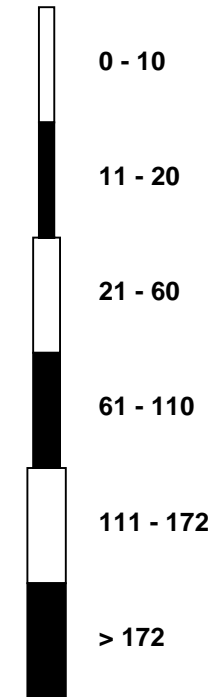


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

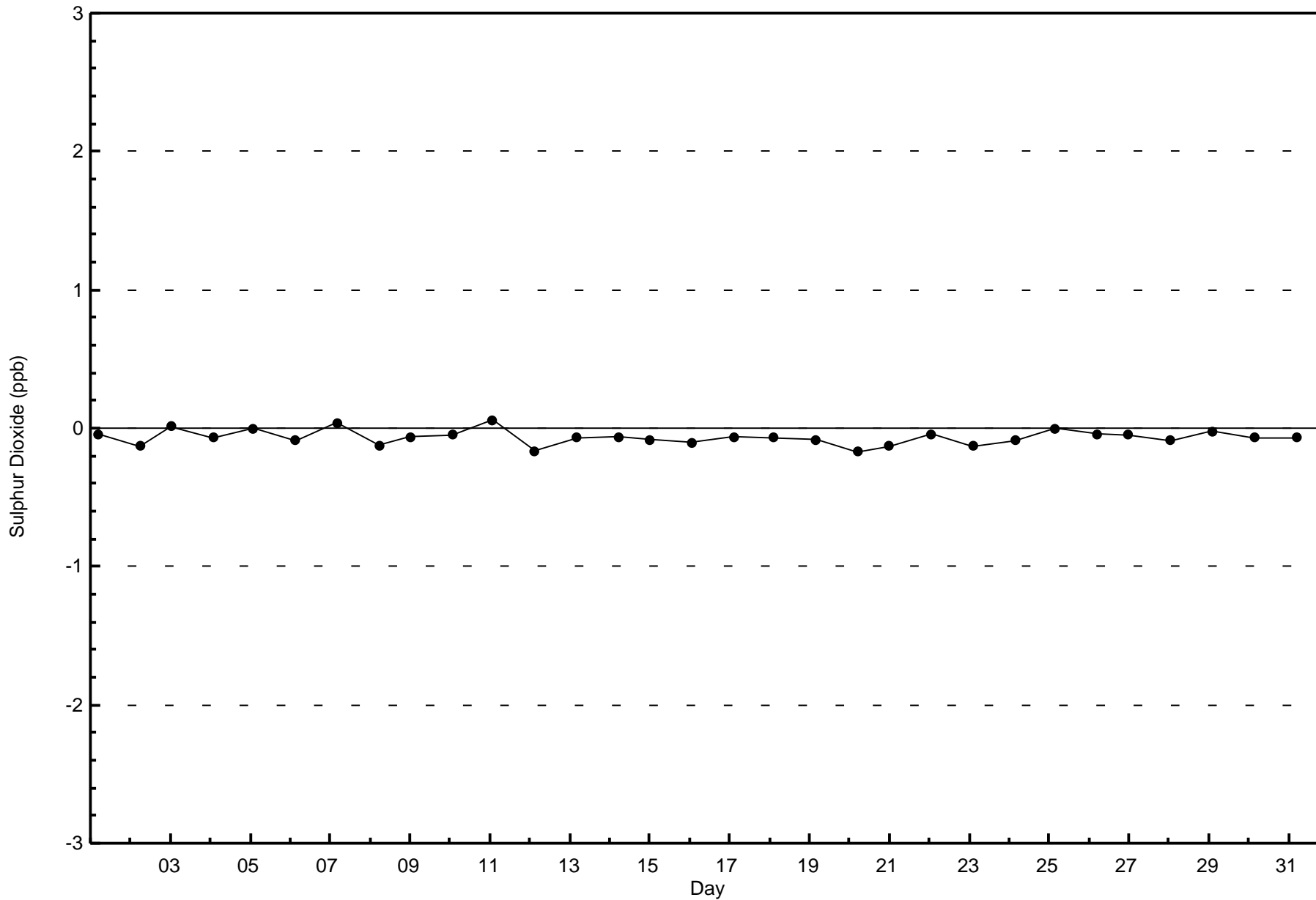
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Mannix (AMS 5)

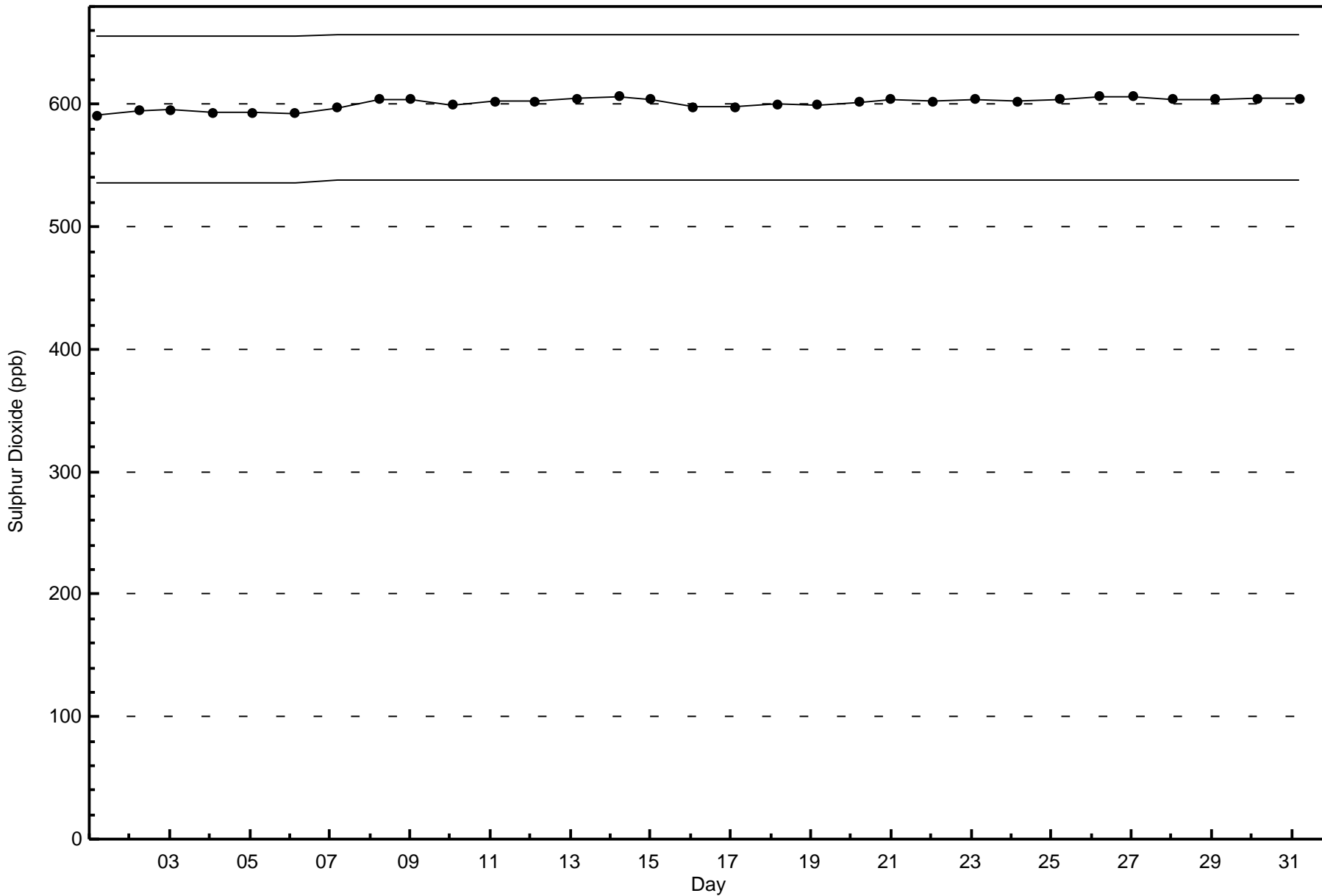


Classes (ppb)



Total Number of Valid Hours: 686





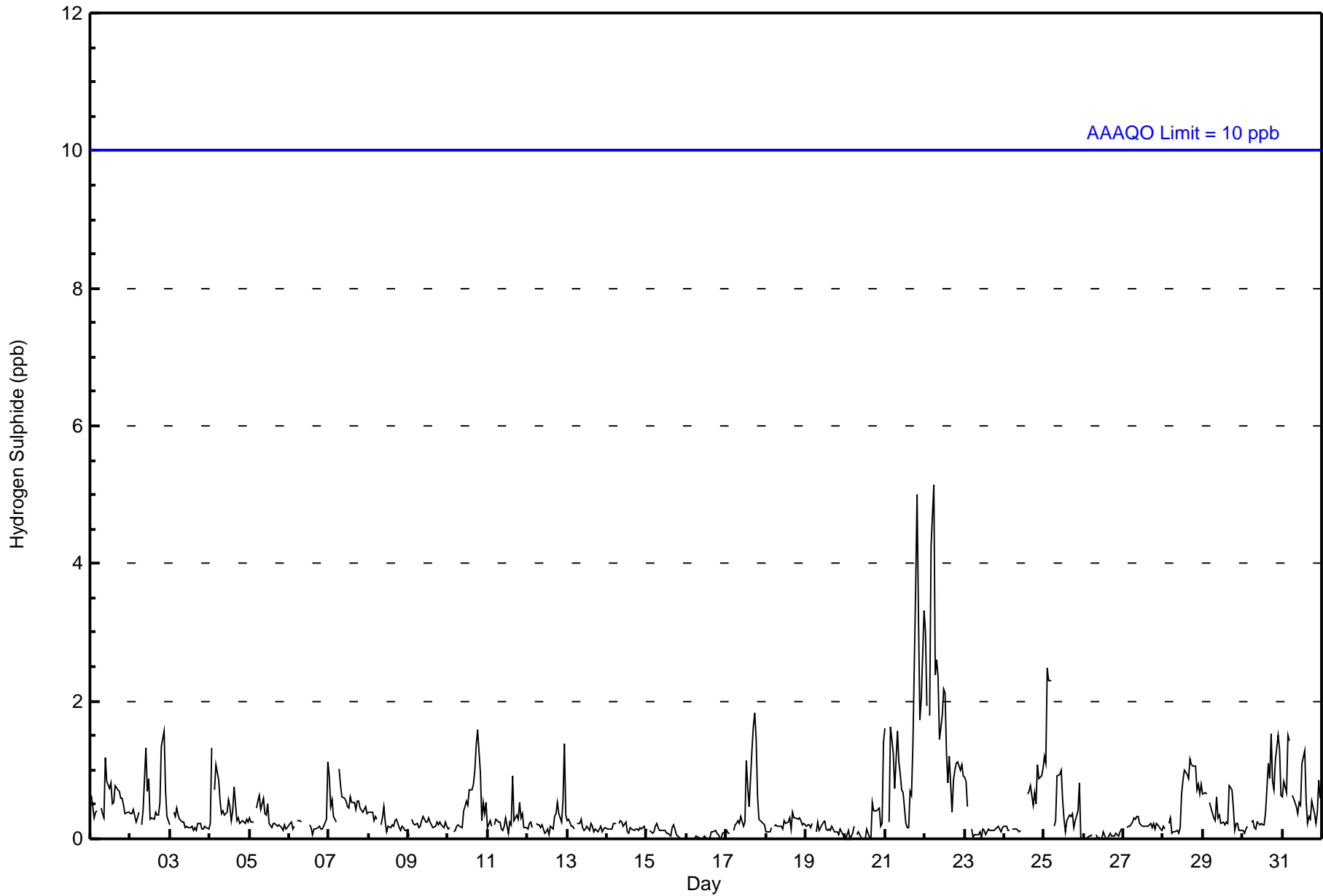


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 5 ppb on Oct 22 06:00	Maximum Daily Average: 1.8 ppb on Oct 22		Hours of Data:	706
Minimum Value: 0 ppb on Oct 15 21:00	Minimum Daily Average: 0.0 ppb on Oct 16		Hours of Missing Data:	38
Maximum Diurnal Average: 0.6 ppb at hour 5	Minimum Diurnal Average: 0.3 ppb at hour 15		Hours of Calibration:	38
Monthly Average: 0.4 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 3		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	1	0	0	0	0	Z	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.6	1
2-Oct	0	0	0	0	0	0	Z	0	0	1	1	1	0	0	0	0	0	0	1	1	2	1	0	0	0.5	2
3-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-Oct	0	1	Z	1	1	1	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0.5	1
5-Oct	0	0	0	Z	0	1	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
6-Oct	0	0	0	0	Z	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1
7-Oct	1	0	1	0	0	Z	1	1	1	1	1	0	0	1	1	1	0	1	1	0	0	0	0	0	0.5	1
8-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
9-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
10-Oct	0	0	Z	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	2	1	0	1	0	1	0.5	2
11-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0.3	1
12-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0.3	1
13-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
14-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
15-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
16-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
17-Oct	0	0	0	Z	0	0	0	0	0	0	0	1	1	0	1	2	2	1	1	0	0	0	0	0	0.5	2
18-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
19-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
20-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0.2	1
21-Oct	2	Z	0	2	1	1	1	2	1	1	1	1	0	0	0	1	1	1	4	5	3	2	2	3	1.5	5
22-Oct	3	2	Z	2	4	5	2	3	2	1	2	2	2	1	1	1	0	1	1	1	1	1	1	1	1.8	5
23-Oct	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
24-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	C	C	C	1	1	1	0	1	1	1	1	1	0.5	1
25-Oct	1	1	2	2	2	Z	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0.7	2
26-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
27-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
28-Oct	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
29-Oct	1	1	1	Z	1	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.4	1
30-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	2	1	1	1	1	1	1	0.5	2
31-Oct	1	1	1	1	1	Z	1	1	0	0	1	0	1	1	1	0	0	0	1	0	0	0	1	1	0.6	1

0.4	0.4	0.4	0.4	0.6	0.5	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.3	0.3	0.4	0.4	0.5	0.5	0.5	0.5	0.4	0.4	0.5	Diurnal Average
3	2	2	2	4	5	2	3	2	1	2	2	2	2	1	1	1	2	2	4	5	3	2	2	3	Diurnal Maximum

Z - zerospan      C - Calibration  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb    24-hr 3 ppb







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Mannix - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	698	98.87	98.87
3 - 4	6	0.85	99.72
5 - 7	2	0.28	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Mannix - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	37	29	9	4	4	14	67	90	29	40	40	65	61	52	56	82	679
3 - 4	2	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	5
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	39	29	9	4	4	14	67	90	30	40	40	65	62	52	56	84	685

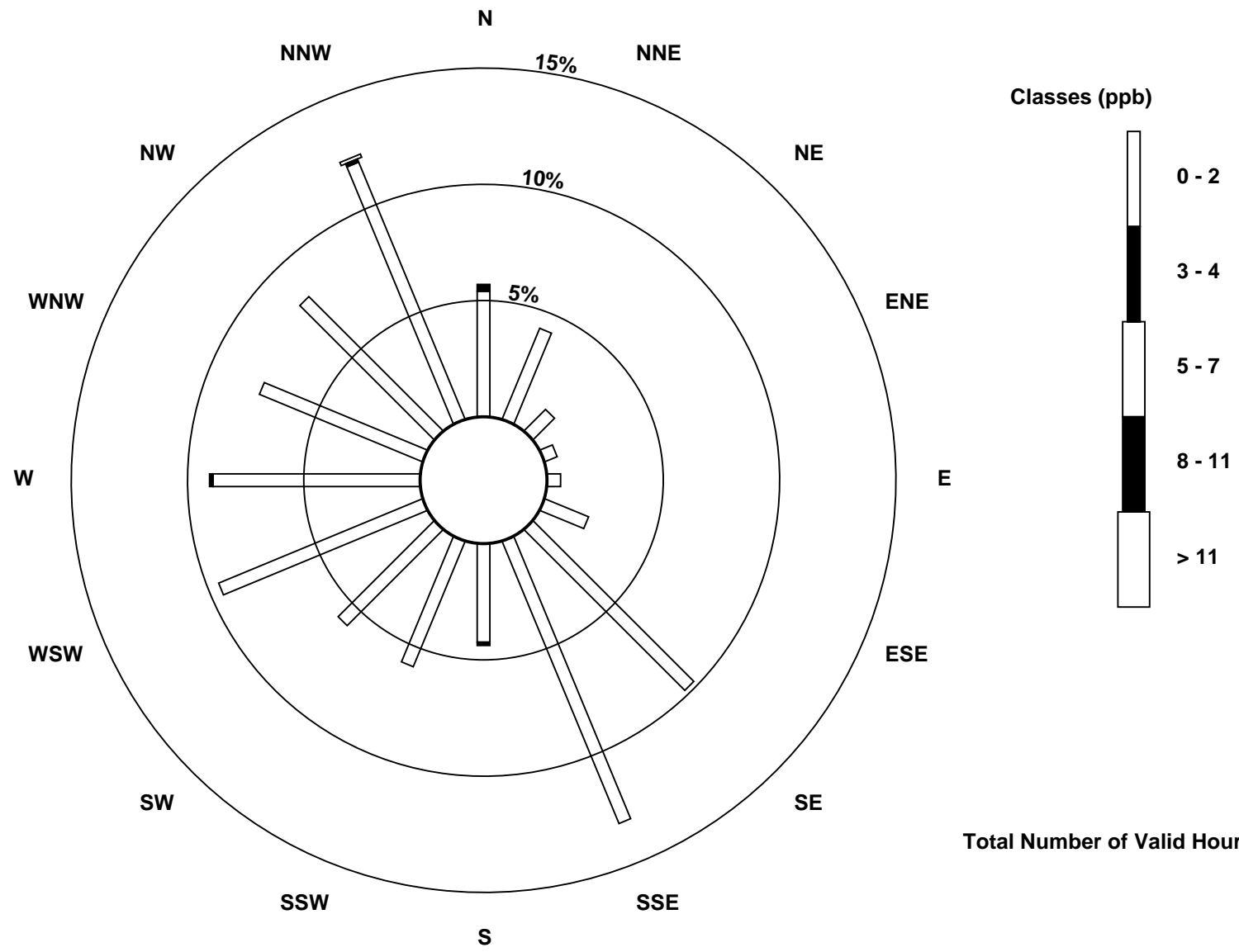
Total Number of Valid Hours: 685

Total Number of Hours: 744

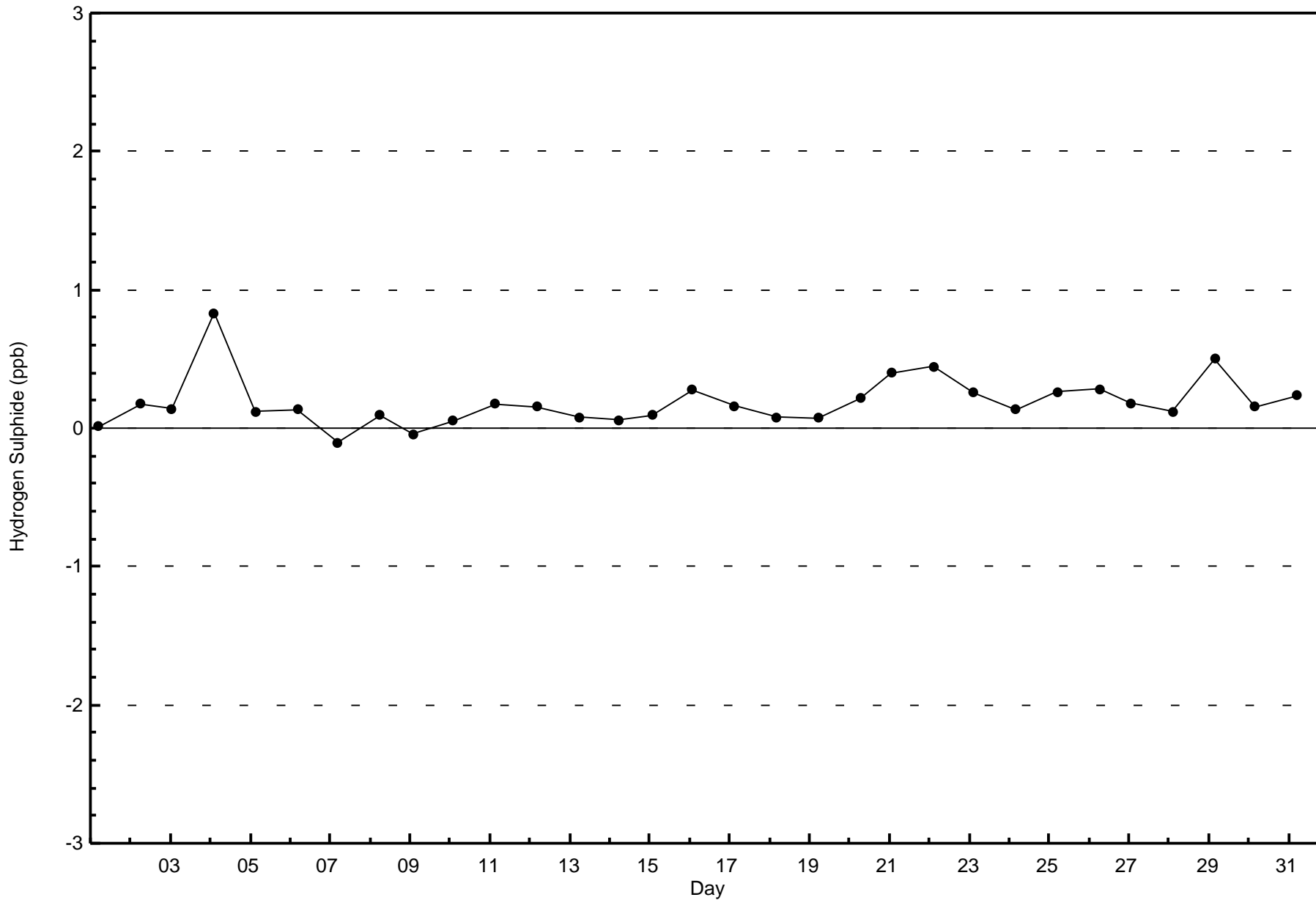


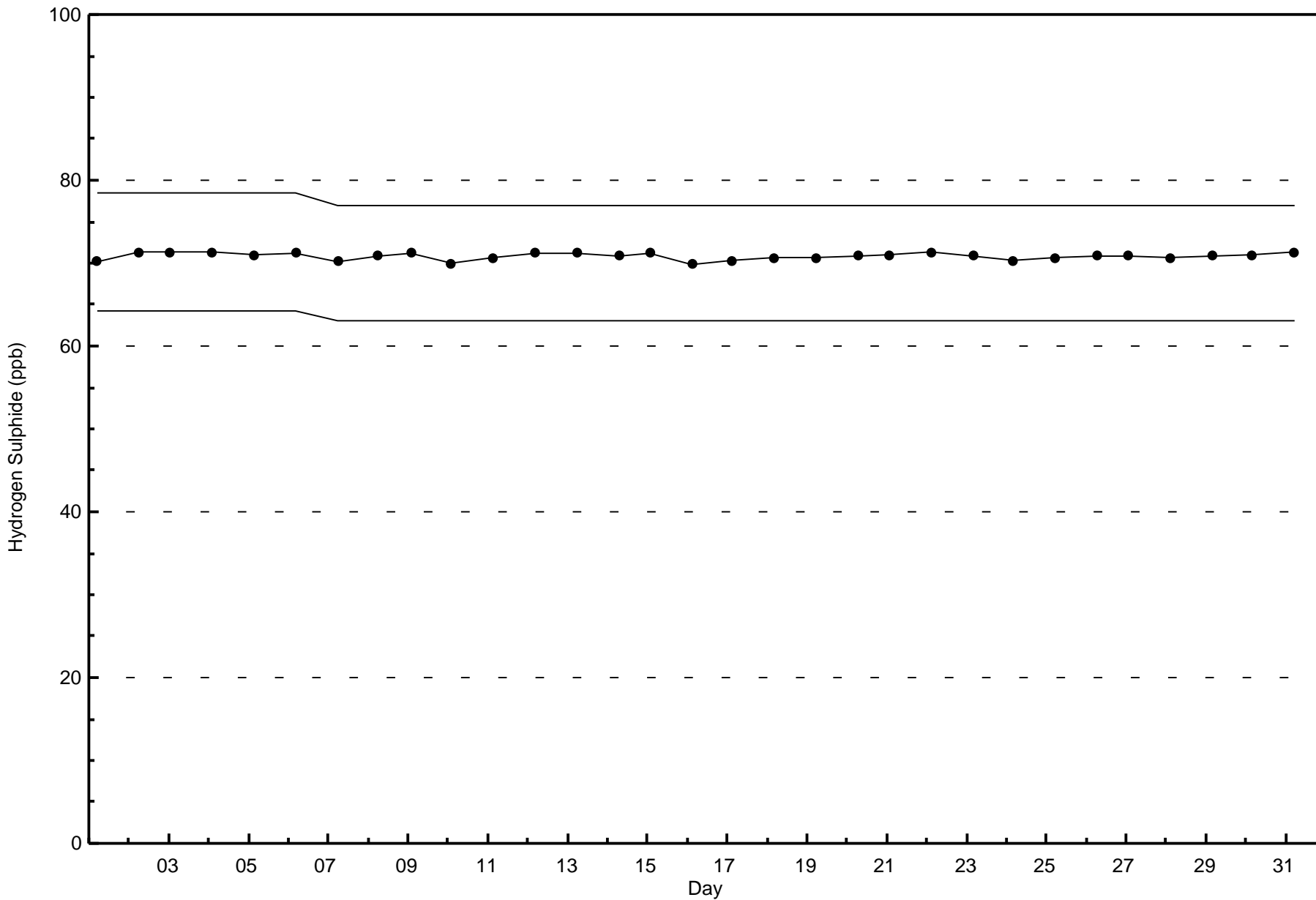
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Mannix (AMS 5)



Total Number of Valid Hours: 685







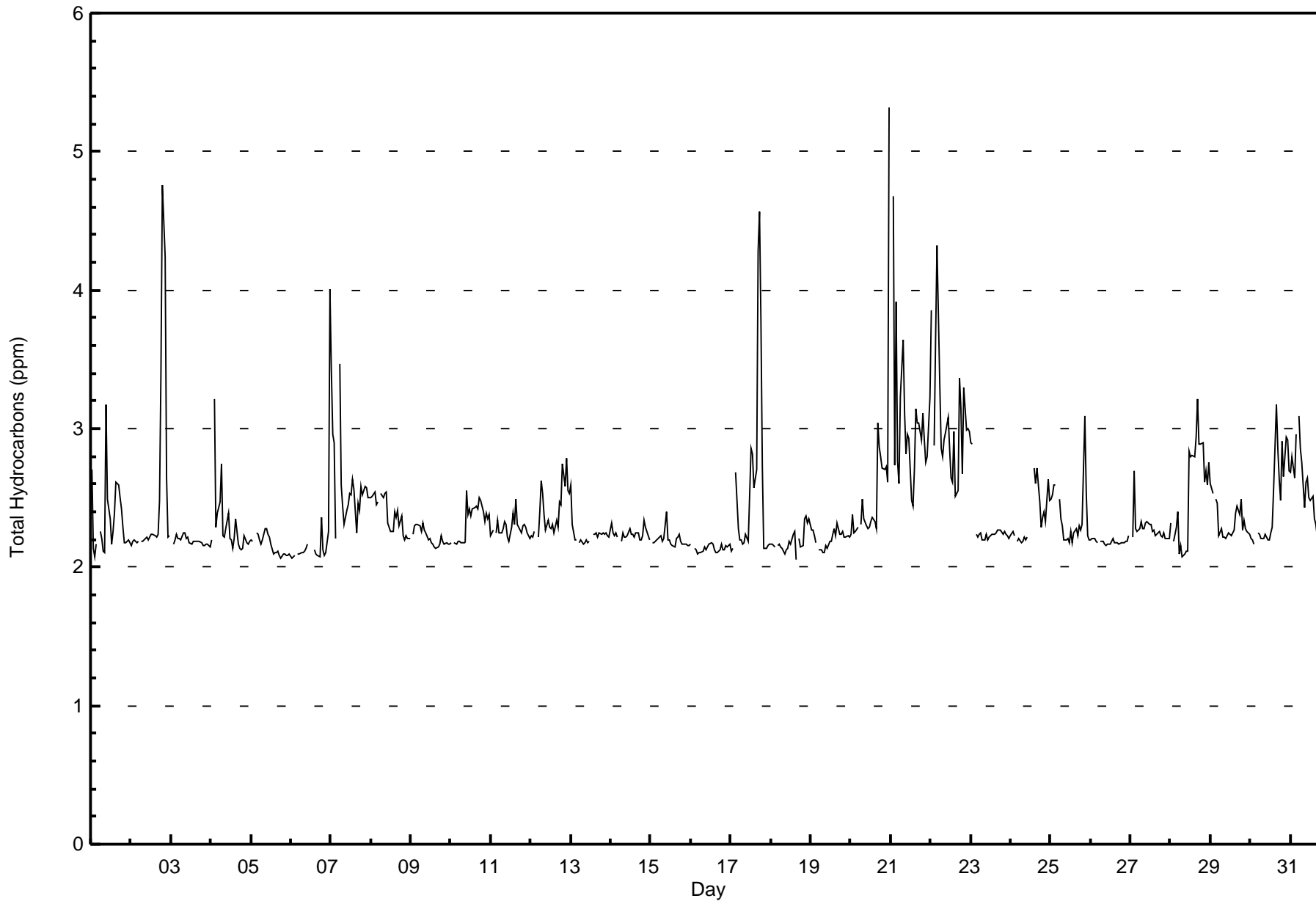
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Mannix - October 2017

Maximum Value: 5.3 ppm on Oct 21 00:00      Maximum Daily Average: 3.1 ppm on Oct 22 Minimum Value: 2.1 ppm on Oct 18 16:00      Minimum Daily Average: 2.1 ppm on Oct 16 Maximum Diurnal Average: 2.5 ppm at hour 24      Minimum Diurnal Average: 2.3 ppm at hour 9 Monthly Average: 2.38 ppm      Percentiles: P <sub>1</sub> = 2.1 P <sub>10</sub> = 2.1 Q <sub>1</sub> = 2.2 Median = 2.2 Q <sub>3</sub> = 2.4 P <sub>90</sub> = 2.8 P <sub>99</sub> = 4.2																							Hours in Service: 744 Hours of Data: 705 Hours of Missing Data: 39 Hours of Calibration: 37 Percent Operational Time: 99.7				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	2.7	2.1	2.1	2.2	Z	2.3	2.2	2.1	2.1	3.2	2.5	2.3	2.2	2.3	2.4	2.6	2.6	2.5	2.4	2.3	2.2	2.2	2.2	2.2	2.3	3.2	
2-Oct	2.2	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.5	3.4	4.8	4.2	2.6	2.2	2.2	2.5	4.8	
3-Oct	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.3	
4-Oct	2.2	Z	3.2	2.3	2.4	2.5	2.7	2.2	2.2	2.3	2.4	2.2	2.2	2.1	2.2	2.3	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.3	3.2	
5-Oct	2.2	2.2	Z	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	
6-Oct	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.2	C	C	C	2.1	2.1	2.1	2.1	2.4	2.1	2.1	2.1	2.3	4.0	2.2	4.0	
7-Oct	3.4	3.0	2.9	2.2	Z	3.5	2.6	2.4	2.3	2.4	2.5	2.5	2.6	2.6	2.2	2.5	2.4	2.6	2.5	2.6	2.6	2.5	2.5	2.5	2.6	3.5	
8-Oct	2.5	2.5	2.5	2.4	2.5	Z	2.5	2.5	2.5	2.5	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.3	2.4	2.2	2.2	2.2	2.2	2.2	2.4	2.5	
9-Oct	Z	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	
10-Oct	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.6	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.4	2.3	2.4	2.3	2.4	2.3	2.6	
11-Oct	2.2	2.3	Z	2.2	2.3	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.3	2.4	2.3	2.5	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.2	2.3	2.5	
12-Oct	2.2	2.2	2.3	Z	2.2	2.4	2.6	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.5	2.4	2.7	2.6	2.8	2.6	2.5	2.4	2.8	
13-Oct	2.6	2.3	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	M	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.6	
14-Oct	2.3	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.3	
15-Oct	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	
16-Oct	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.1	2.2	2.1	2.2	
17-Oct	2.1	2.1	Z	2.7	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.5	2.9	2.8	2.6	2.7	4.3	4.6	3.8	2.7	2.1	2.1	2.2	2.2	2.6	4.6	
18-Oct	2.2	2.2	2.1	Z	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.1	M	2.2	2.1	2.2	2.4	2.4	2.3	2.3	2.2	2.4	
19-Oct	2.3	2.3	2.2	2.2	Z	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.3	2.2	2.3	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.3	
20-Oct	2.2	2.4	2.2	2.3	2.3	Z	2.3	2.5	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.3	3.0	2.9	2.8	2.7	2.7	2.7	2.6	5.3	2.6	5.3	
21-Oct	Z	4.7	2.7	3.9	2.8	2.6	3.2	3.6	3.1	2.8	3.0	2.9	2.5	2.4	2.7	3.1	3.0	3.0	2.9	3.1	2.9	2.8	2.8	3.2	3.0	4.7	
22-Oct	3.9	Z	2.9	3.6	4.3	3.3	2.9	2.8	2.9	3.0	3.1	2.8	2.6	2.6	3.0	2.5	2.6	3.4	3.1	2.7	3.3	3.0	3.0	3.0	3.1	4.3	
23-Oct	2.9	2.9	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.3	2.2	2.2	2.2	2.3	2.9	
24-Oct	2.2	2.3	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	C	C	C	2.7	2.6	2.7	2.5	2.3	2.4	2.3	2.6	2.5	2.4	2.7	
25-Oct	2.5	2.5	2.6	2.6	Z	2.5	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.3	2.3	2.3	3.1	2.5	2.2	2.2	2.4	3.1	
26-Oct	2.2	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	
27-Oct	Z	2.2	2.7	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.7	
28-Oct	2.3	Z	2.2	2.3	2.4	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.8	2.8	2.8	2.8	2.9	3.2	2.9	2.9	2.9	2.6	2.7	2.6	2.8	2.5	3.2
29-Oct	2.6	2.5	Z	2.5	2.5	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.4	2.5	2.3	2.3	2.3	2.3	2.2	2.3	2.6
30-Oct	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.6	3.2	2.9	2.6	2.5	2.9	2.7	2.9	2.9	2.7	2.5	3.2
31-Oct	2.7	2.8	2.6	3.0	Z	3.1	2.9	2.8	2.4	2.6	2.6	2.5	2.5	2.5	2.3	2.3	2.2	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.5	3.1	
																							Diurnal Average				
																							Diurnal Maximum				
Z - zerospan      C - Calibration      M - Maintenance																											





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Mannix - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	0	0.00	0.00
2.1 - 3.0	673	95.46	95.46
3.1 - 10.0	32	4.54	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744





**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Mannix - October 2017**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	38	29	9	3	4	12	69	88	28	41	42	58	61	46	48	77	653
3.1 - 10.0	1	0	0	1	0	1	0	1	1	0	1	0	1	7	9	8	31
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	39	29	9	4	4	13	69	89	29	41	43	58	62	53	57	85	684

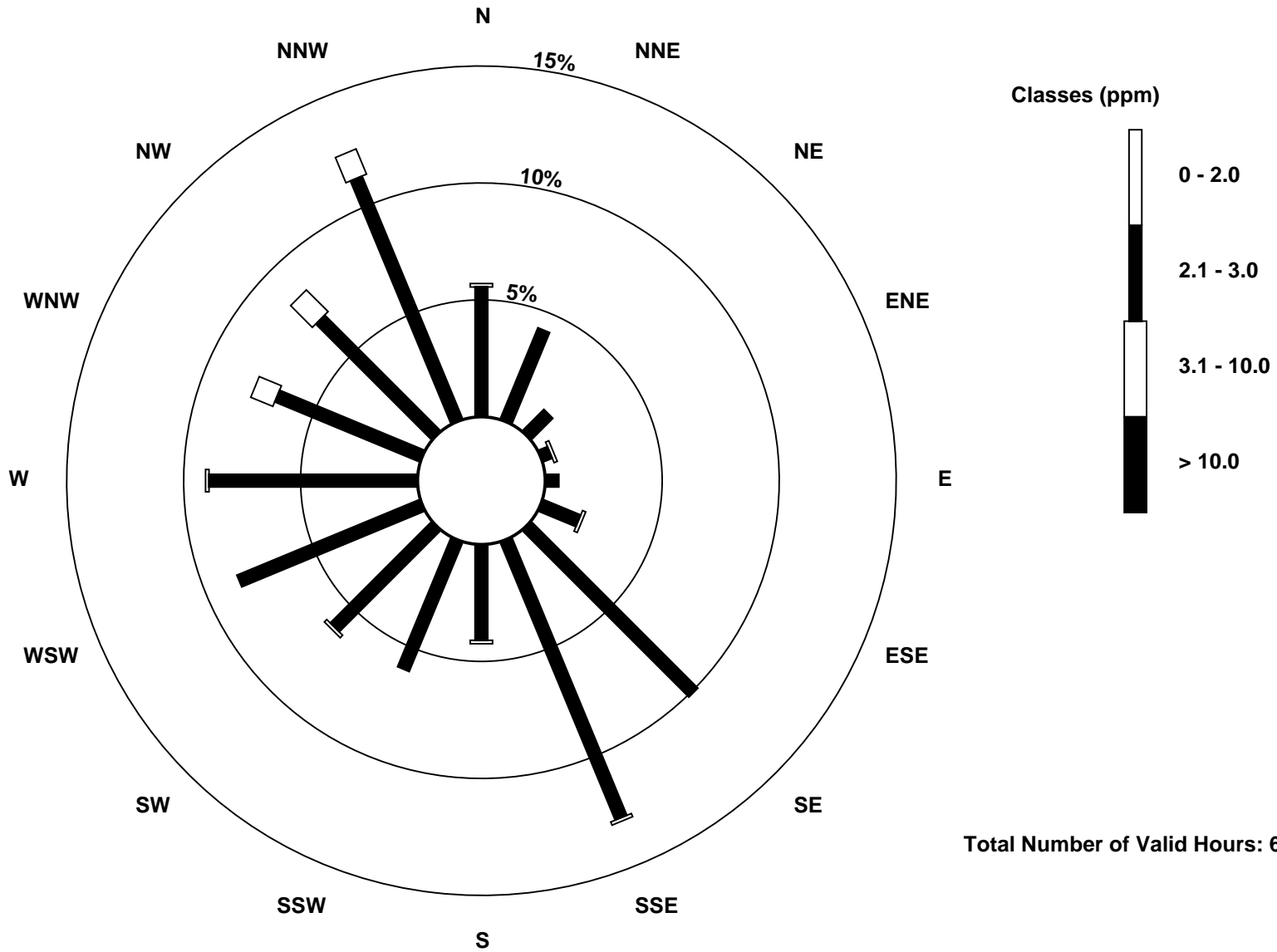
Total Number of Valid Hours: 684

Total Number of Hours: 744

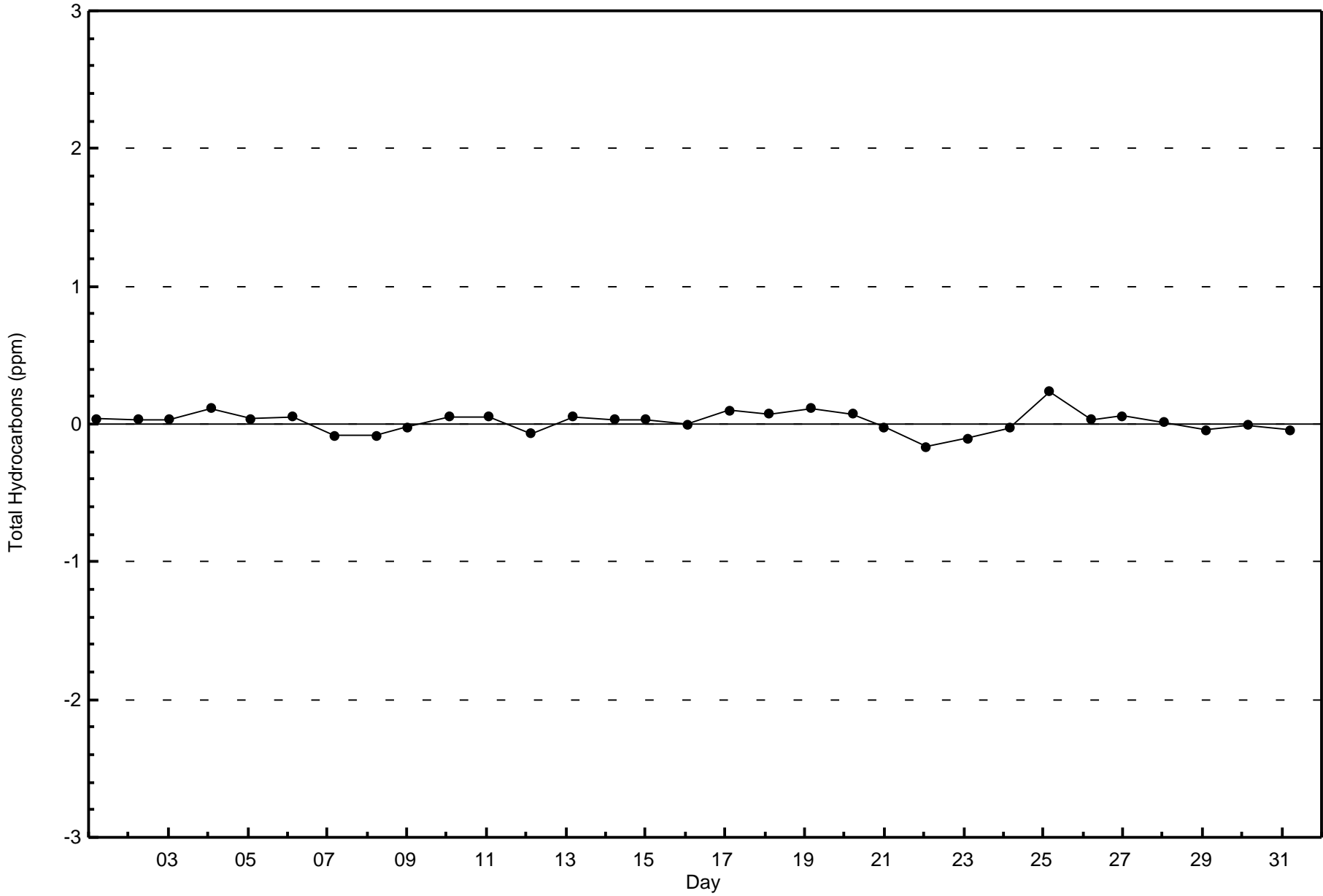


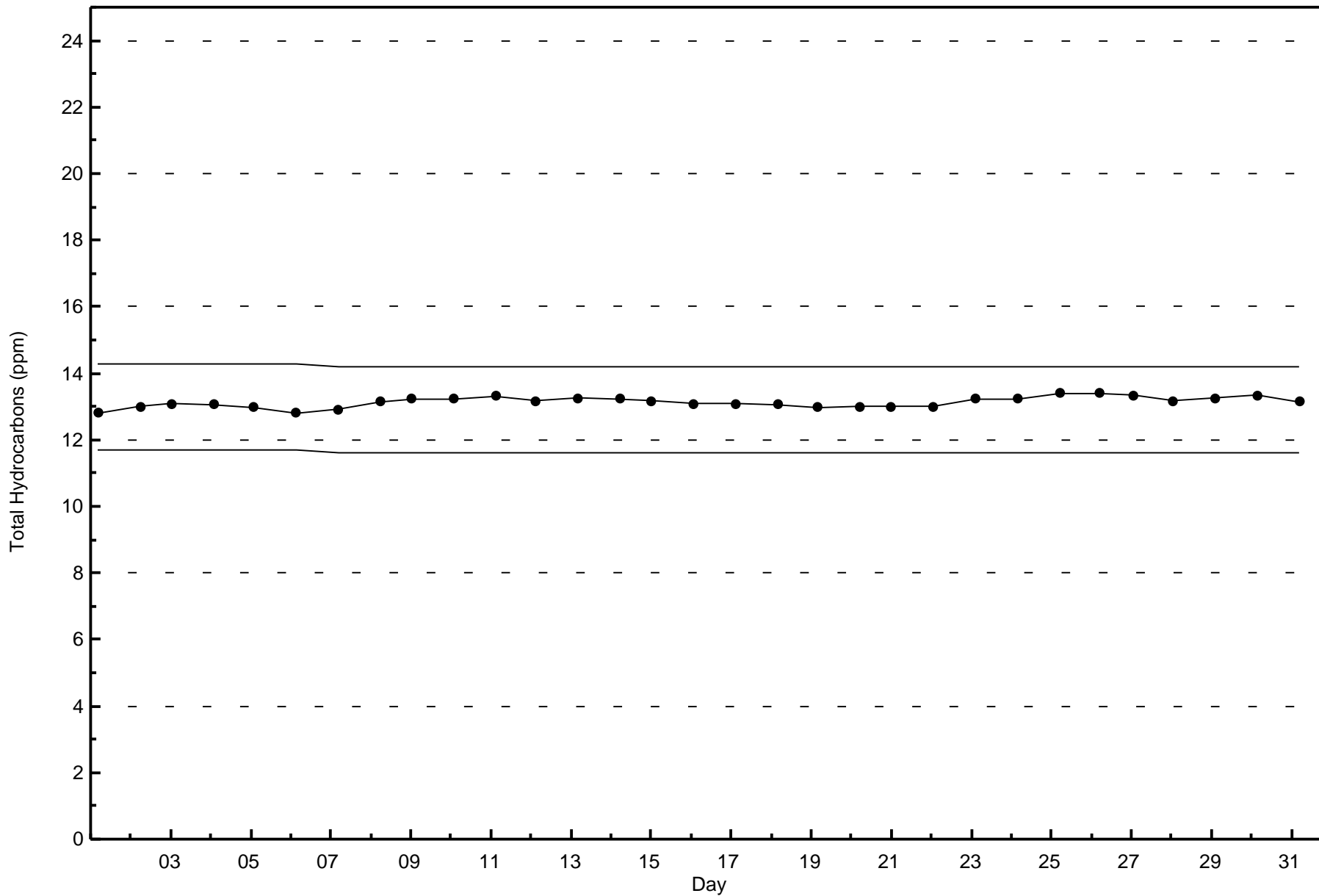
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Total Hydrocarbons (THC) - ppm  
Mannix (AMS 5)



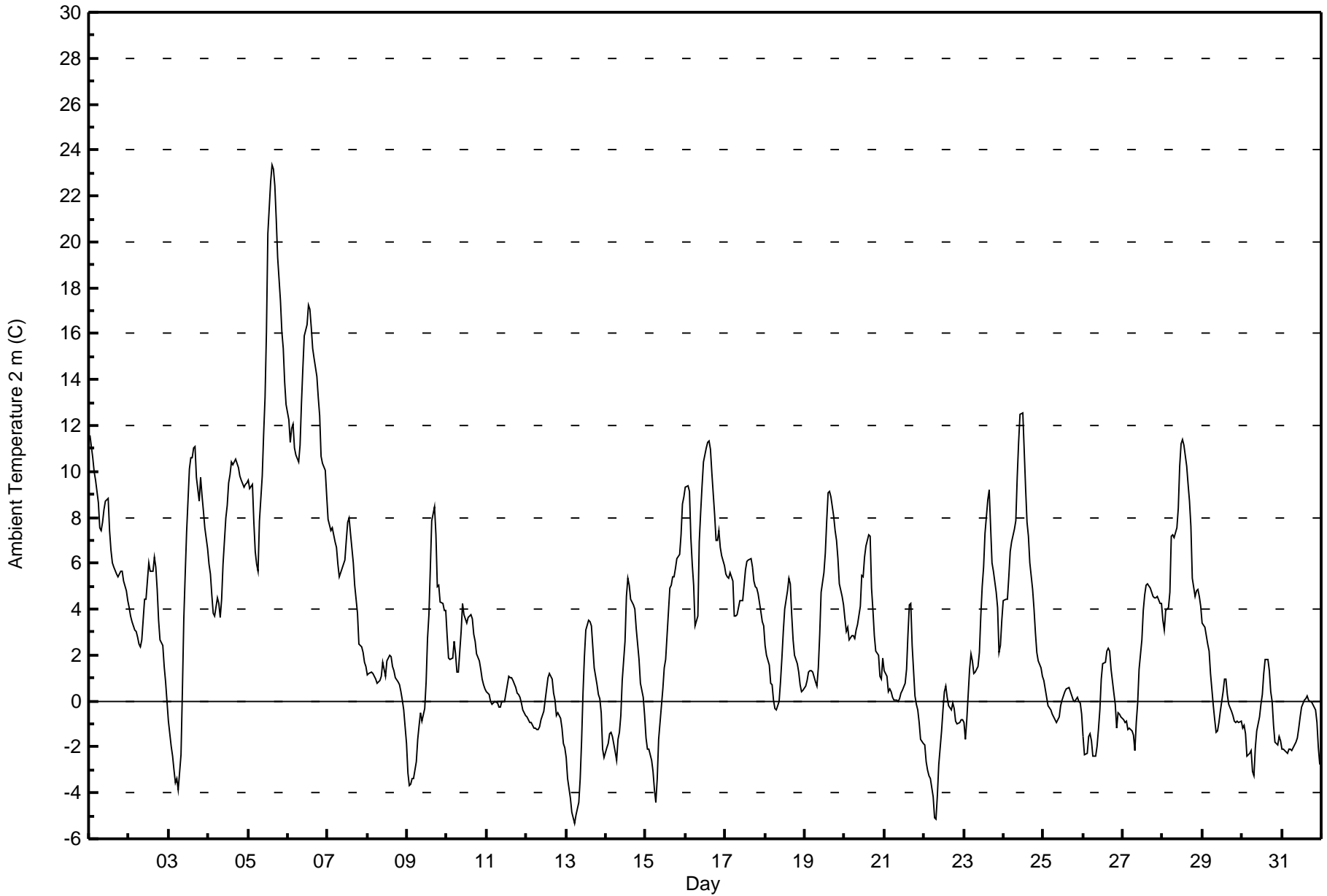
Total Number of Valid Hours: 684







Maximum Value: 23.3 C on Oct 5 15:00		Maximum Daily Average: 14.2 C on Oct 5		Hours in Service: 744																							
Minimum Value: -5.3 C on Oct 13 06:00		Minimum Daily Average: -1.7 C on Oct 22		Hours of Data: 744																							
Maximum Diurnal Average: 6.0 C at hour 15		Minimum Diurnal Average: 1.0 C at hour 7		Hours of Missing Data: 0																							
Monthly Average: 3.24 C		Percentiles: P <sub>1</sub> = -4.4 P <sub>10</sub> = -1.8 Q <sub>1</sub> = -0.2 Median = 2.1 Q <sub>3</sub> = 5.8 P <sub>90</sub> = 9.6 P <sub>99</sub> = 18.4		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	11.6	11.1	10.6	10.0	9.6	8.7	7.6	7.4	7.8	8.4	8.7	8.8	7.4	6.6	6.0	5.8	5.5	5.4	5.5	5.6	5.6	5.2	4.8	4.4	7.4	11.6	
2-Oct	4.1	3.7	3.4	3.1	3.0	2.8	2.5	2.4	2.7	4.5	4.4	5.2	6.0	5.7	5.7	6.3	5.8	4.9	3.5	2.7	2.4	1.5	0.8	-0.1	3.6	6.3	
3-Oct	-0.9	-1.9	-2.4	-3.0	-3.6	-3.4	-3.8	-2.3	0.5	3.6	5.5	7.4	10.1	10.6	10.6	11.0	11.1	9.8	8.7	9.8	9.0	8.3	7.5	6.6	4.5	11.1	
4-Oct	5.9	5.5	4.6	3.8	3.7	4.5	4.3	3.6	4.4	6.0	7.9	8.5	9.5	9.9	10.4	10.3	10.5	10.3	10.2	9.8	9.6	9.3	9.4	9.5	7.6	10.5	
5-Oct	9.6	9.2	9.4	7.8	6.5	6.0	5.7	7.9	9.8	11.6	13.2	16.1	20.4	22.6	23.3	23.2	22.4	21.0	19.4	17.4	16.1	15.3	13.9	12.9	14.2	23.3	
6-Oct	12.2	11.3	11.9	12.1	11.0	10.7	10.4	11.1	13.0	14.5	15.9	16.4	17.2	17.1	16.3	15.4	14.9	14.2	13.2	12.4	10.7	10.3	10.1	9.0	13.0	17.2	
7-Oct	7.9	7.7	7.4	7.5	6.9	6.7	6.0	5.4	5.6	6.0	6.1	7.0	7.8	8.0	7.3	6.0	5.0	4.5	3.8	2.5	2.3	2.1	1.7	1.5	5.5	8.0	
8-Oct	1.2	1.2	1.3	1.2	1.1	1.0	0.8	0.9	1.1	1.7	1.4	1.1	1.7	2.0	1.9	1.5	1.3	1.0	0.9	0.7	0.4	0.1	-0.4	-1.8	1.0	2.0	
9-Oct	-3.1	-3.7	-3.6	-3.4	-3.4	-2.6	-1.7	-1.1	-0.5	-0.9	-0.3	0.9	2.7	3.8	5.8	7.9	8.5	7.3	5.0	5.0	4.3	4.3	3.9	4.0	1.6	8.5	
10-Oct	2.9	1.9	1.8	1.8	2.6	2.1	1.3	1.3	3.0	4.3	3.7	3.6	3.4	3.7	3.7	3.6	2.9	2.6	2.1	1.7	1.4	0.9	0.7	0.6	2.4	4.3	
11-Oct	0.4	0.3	0.0	-0.1	-0.1	0.0	-0.1	-0.3	-0.2	0.0	0.0	0.0	0.7	1.1	1.0	1.0	0.9	0.6	0.3	0.3	0.2	-0.1	-0.4	-0.6	0.2	1.1	
12-Oct	-0.7	-0.8	-0.9	-1.0	-1.2	-1.2	-1.3	-1.2	-1.1	-0.8	-0.4	0.0	0.5	1.0	1.2	1.0	0.3	0.0	-0.6	-0.5	-0.8	-1.2	-1.9	-2.0	-0.6	1.2	
13-Oct	-2.5	-3.4	-4.2	-4.8	-5.1	-5.3	-5.0	-4.4	-3.4	-1.8	0.3	2.0	3.1	3.5	3.5	3.3	2.4	1.4	0.7	0.3	0.1	-0.5	-2.1	-2.4	-1.0	3.5	
14-Oct	-2.0	-1.9	-1.4	-1.4	-1.6	-2.2	-2.6	-1.7	-1.3	-0.6	0.9	2.6	4.6	5.4	5.0	4.5	4.2	4.0	3.2	2.5	1.8	0.8	0.2	-0.6	0.9	5.4	
15-Oct	-1.6	-2.1	-2.1	-2.6	-3.1	-3.9	-4.4	-3.4	-1.7	-0.2	0.5	1.4	1.8	2.8	4.9	5.1	5.4	5.4	5.8	6.2	6.4	7.2	8.6	8.9	1.9	8.9	
16-Oct	9.3	9.4	9.1	7.1	5.9	5.0	3.2	3.7	6.9	8.2	9.4	10.4	11.0	11.3	11.3	11.0	9.9	8.1	7.0	7.0	7.4	6.7	6.3	5.9	8.0	11.3	
17-Oct	5.6	5.4	5.3	5.6	5.2	3.7	3.7	3.8	4.1	4.4	4.3	5.1	5.7	6.1	6.1	6.2	5.9	5.2	5.0	4.9	4.7	3.9	3.4	3.3	4.9	6.2	
18-Oct	2.4	2.0	1.6	0.8	0.7	0.1	-0.3	-0.4	0.0	0.8	1.9	3.0	4.0	4.8	5.3	5.1	3.8	2.6	2.0	1.6	1.3	0.7	0.4	0.4	1.9	5.3	
19-Oct	0.7	0.9	1.3	1.3	1.3	1.2	0.8	0.7	1.5	2.9	4.7	5.6	6.4	7.9	9.1	9.1	8.9	8.0	7.4	7.0	6.2	5.1	4.5	4.2	4.4	9.1	
20-Oct	3.6	3.0	3.2	2.7	2.8	2.9	2.7	3.1	3.4	4.2	5.5	5.4	6.3	6.8	7.2	7.2	4.9	4.0	2.9	2.1	2.0	1.1	0.9	1.9	3.7	7.2	
21-Oct	1.3	1.1	0.4	0.5	0.4	0.1	0.0	0.0	0.0	0.1	0.3	0.5	0.8	1.4	2.9	4.2	4.2	2.4	0.3	-0.1	-0.4	-1.0	-1.7	-1.9	0.7	4.2	
22-Oct	-1.9	-2.6	-3.0	-3.3	-3.4	-4.2	-5.1	-5.2	-4.1	-2.8	-1.3	-0.4	0.4	0.7	0.2	-0.2	-0.4	-0.1	-0.3	-0.9	-1.0	-0.9	-0.8	-0.8	-1.7	0.7	
23-Oct	-0.9	-1.7	-0.8	1.4	2.1	1.7	1.2	1.3	1.5	2.1	3.7	5.0	5.8	7.3	8.8	9.2	7.6	6.0	5.6	4.8	4.1	2.1	2.4	3.5	3.5	9.2	
24-Oct	4.4	4.4	4.4	5.4	6.5	6.9	7.5	7.9	9.7	11.3	12.5	12.6	10.9	9.3	7.8	7.2	6.0	4.9	4.0	3.0	2.1	1.7	1.4	1.1	6.4	12.6	
25-Oct	0.9	0.5	0.2	-0.2	-0.4	-0.6	-0.7	-0.8	-0.9	-0.7	-0.2	0.1	0.2	0.4	0.5	0.6	0.4	0.2	0.0	0.0	0.2	0.0	-0.1	-0.6	0.0	0.9	
26-Oct	-1.5	-2.3	-2.3	-1.6	-1.4	-1.7	-2.4	-2.4	-2.0	-1.2	-0.4	1.0	1.6	1.7	2.2	2.3	2.2	1.4	0.3	-0.1	-1.2	-0.5	-0.6	-0.7	-0.4	2.3	
27-Oct	-0.8	-0.9	-0.9	-1.2	-1.2	-1.3	-1.5	-2.2	-0.9	-0.1	1.4	2.7	4.0	4.6	5.0	5.1	4.9	4.7	4.6	4.5	4.5	4.6	4.3	4.3	2.0	5.1	
28-Oct	3.5	3.1	4.0	4.1	4.7	7.2	7.2	7.1	7.5	8.4	10.2	11.2	11.4	11.1	10.2	9.4	8.7	7.6	5.3	4.6	4.8	4.8	4.5	4.1	6.9	11.4	
29-Oct	3.4	3.2	2.9	2.5	2.2	1.2	-0.2	-0.8	-1.4	-1.3	-0.9	-0.5	0.4	1.0	1.0	0.3	-0.2	-0.5	-0.6	-0.9	-0.9	-0.9	-0.9	-0.9	0.3	3.4	
30-Oct	-1.2	-1.1	-1.4	-2.4	-2.3	-2.1	-3.0	-3.3	-2.1	-1.3	-0.7	-0.2	0.3	1.2	1.8	1.8	1.3	0.4	0.0	-1.1	-1.8	-1.9	-1.6	-1.8	-0.9	1.8	
31-Oct	-2.1	-2.1	-2.2	-2.3	-2.1	-2.1	-2.1	-2.0	-1.8	-1.6	-1.2	-0.7	-0.2	0.0	0.1	0.2	0.1	0.0	0.0	-0.3	-0.4	-1.0	-2.0	-2.8	-1.2	0.2	
		2.3	2.0	1.9	1.7	1.5	1.4	1.0	1.2	2.0	2.9	3.8	4.6	5.4	5.8	6.0	5.9	5.5	4.8	4.0	3.6	3.3	2.9	2.5	2.2	Diurnal Average	
		12.2	11.3	11.9	12.1	11.0	10.7	10.4	11.1	13.0	14.5	15.9	16.4	20.4	22.6	23.3	23.2	22.4	21.0	19.4	17.4	16.1	15.3	13.9	12.9	Diurnal Maximum	





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature 2 m (AT2m) - C  
Mannix - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	207	27.82	27.82
0 - 10	472	63.44	91.26
10 - 20	59	7.93	99.19
> 20	6	0.81	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



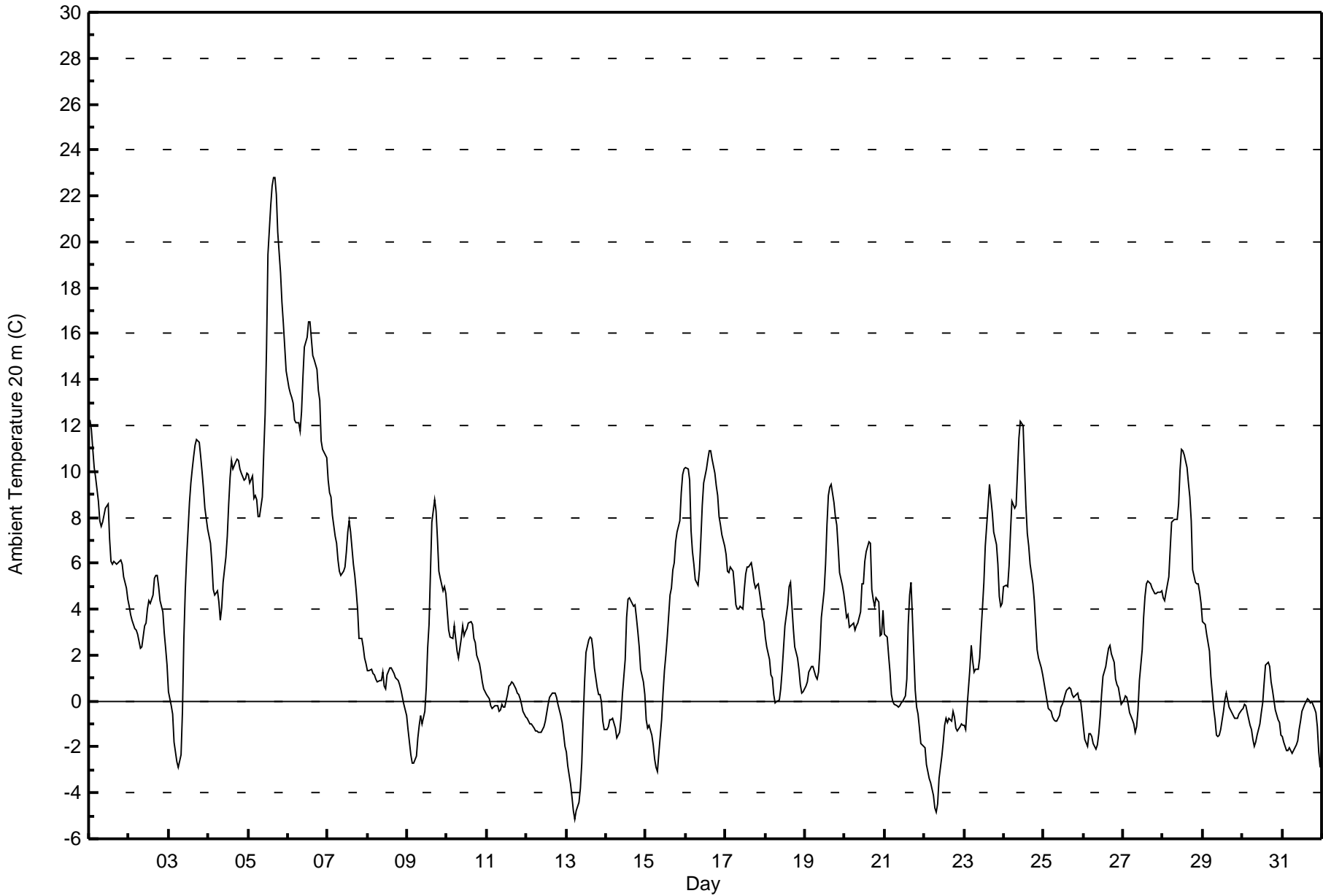
Maximum Value: 22.8 C on Oct 5 17:00		Maximum Daily Average: 14.7 C on Oct 5		Hours in Service: 744																							
Minimum Value: -5.1 C on Oct 13 06:00		Minimum Daily Average: -2.1 C on Oct 22		Hours of Data: 744																							
Maximum Diurnal Average: 5.8 C at hour 16		Minimum Diurnal Average: 1.4 C at hour 8		Hours of Missing Data: 0																							
Monthly Average: 3.45 C		Percentiles: P <sub>1</sub> = -4.2 P <sub>10</sub> = -1.4 Q <sub>1</sub> = -0.2 Median = 2.5 Q <sub>3</sub> = 6.0 P <sub>90</sub> = 10.0 P <sub>99</sub> = 18.5		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	12.2	11.8	11.0	10.2	9.8	8.7	7.8	7.6	7.8	8.1	8.4	8.6	7.0	6.1	6.0	6.1	5.9	6.0	6.1	6.1	6.0	5.4	4.9	4.4	7.6	12.2	
2-Oct	4.2	3.7	3.5	3.1	3.1	2.9	2.6	2.3	2.3	3.3	3.4	4.0	4.4	4.2	4.6	5.3	5.5	5.5	5.0	4.4	3.9	3.0	2.3	1.6	3.7	5.5	
3-Oct	0.4	-0.2	-0.6	-1.8	-2.2	-2.6	-2.9	-2.4	-0.5	2.7	4.8	6.3	8.7	9.5	10.1	10.6	11.2	11.4	11.3	10.6	10.0	9.2	8.4	7.5	5.0	11.4	
4-Oct	7.2	6.9	6.0	4.9	4.6	4.8	4.3	3.5	4.1	5.2	6.3	7.2	8.6	9.7	10.5	10.1	10.4	10.6	10.5	10.1	9.9	9.6	9.7	9.9	7.7	10.6	
5-Oct	9.9	9.5	9.8	8.8	9.0	8.8	8.0	8.0	8.9	10.8	12.5	15.4	19.4	21.6	22.4	22.8	22.8	22.0	20.4	18.6	17.4	16.5	15.4	14.4	14.7	22.8	
6-Oct	13.7	13.4	13.2	13.0	12.2	12.1	12.1	11.8	12.6	14.1	15.4	15.9	16.5	16.5	15.8	15.0	14.9	14.4	13.5	13.1	11.3	10.9	10.7	10.6	13.5	16.5	
7-Oct	9.6	9.1	8.9	8.1	7.2	6.9	6.1	5.6	5.5	5.7	5.8	6.5	7.4	7.8	7.3	6.0	5.5	4.8	4.0	2.7	2.7	2.4	1.9	1.6	5.8	9.6	
8-Oct	1.3	1.3	1.4	1.2	1.1	1.0	0.9	0.9	0.9	1.3	0.7	0.5	1.2	1.4	1.5	1.3	1.2	1.0	0.9	0.7	0.4	0.1	-0.1	-0.7	0.9	1.5	
9-Oct	-1.2	-1.8	-2.4	-2.7	-2.7	-2.4	-1.6	-1.0	-0.6	-1.0	-0.5	0.6	2.3	3.4	5.6	7.8	8.8	8.3	7.1	5.6	5.3	4.8	5.0	4.7	2.1	8.8	
10-Oct	3.9	3.1	2.8	2.7	3.3	2.7	2.1	1.8	2.7	3.3	2.9	3.0	3.1	3.4	3.4	3.3	2.7	2.5	2.0	1.6	1.2	0.8	0.6	0.4	2.5	3.9	
11-Oct	0.3	0.1	-0.2	-0.3	-0.3	-0.2	-0.2	-0.4	-0.4	-0.2	-0.2	-0.2	0.3	0.7	0.7	0.8	0.8	0.5	0.3	0.3	0.1	-0.1	-0.5	-0.7	0.0	0.8	
12-Oct	-0.7	-0.9	-1.0	-1.0	-1.2	-1.3	-1.3	-1.3	-1.4	-1.4	-1.1	-0.8	-0.5	-0.1	0.2	0.4	0.4	0.3	0.2	-0.1	-0.6	-0.9	-1.4	-2.0	-0.7	0.4	
13-Oct	-2.2	-2.8	-3.6	-4.2	-4.8	-5.1	-4.8	-4.4	-3.8	-2.7	-0.8	0.8	2.1	2.7	2.8	2.7	2.2	1.5	0.6	0.3	0.3	0.0	-0.9	-1.2	-1.1	2.8	
14-Oct	-1.3	-1.1	-0.8	-0.8	-0.8	-1.2	-1.6	-1.5	-1.4	-0.8	0.3	1.8	3.6	4.4	4.5	4.4	4.2	4.2	3.6	3.0	2.3	1.4	0.9	0.3	1.2	4.5	
15-Oct	-0.8	-1.2	-1.1	-1.5	-1.9	-2.5	-2.9	-3.1	-2.3	-0.8	0.4	1.3	2.0	2.8	4.6	4.9	5.7	6.0	6.9	7.4	7.9	9.1	9.8	10.1	2.5	10.1	
16-Oct	10.2	10.1	9.6	7.4	6.5	5.9	5.3	5.0	5.7	7.0	8.5	9.5	10.1	10.5	10.9	10.9	10.6	9.9	9.4	8.9	8.0	7.7	7.3	6.8	8.4	10.9	
17-Oct	6.4	5.6	5.6	5.8	5.6	5.0	4.2	4.0	4.0	4.1	4.0	4.9	5.5	5.8	5.9	6.0	5.7	5.1	4.9	5.1	5.1	4.2	3.7	3.5	5.0	6.4	
18-Oct	2.8	2.4	1.8	1.2	1.0	0.3	-0.1	0.0	0.0	0.5	1.4	2.3	3.3	4.2	5.0	5.2	4.1	3.1	2.4	1.9	1.4	0.7	0.4	0.4	1.9	5.2	
19-Oct	0.6	0.9	1.3	1.4	1.5	1.5	1.1	0.9	1.2	2.2	3.7	4.8	6.0	7.6	9.0	9.3	9.5	8.7	8.1	7.7	6.7	5.6	5.0	4.7	4.5	9.5	
20-Oct	4.2	3.6	3.7	3.2	3.3	3.4	3.1	3.3	3.4	3.9	5.1	5.1	6.1	6.5	6.9	6.8	4.9	4.5	4.1	4.5	4.3	2.9	2.9	4.0	4.3	6.9	
21-Oct	2.9	2.8	2.0	1.3	0.3	0.0	-0.2	-0.2	-0.2	-0.2	-0.1	0.0	0.2	1.0	3.3	4.6	5.1	3.6	0.5	-0.3	-0.6	-1.2	-1.9	-2.0	0.9	5.1	
22-Oct	-2.0	-2.8	-3.1	-3.4	-3.6	-4.1	-4.7	-4.8	-4.5	-3.4	-2.4	-1.8	-1.0	-0.7	-0.9	-0.7	-0.9	-0.4	-0.7	-1.2	-1.3	-1.1	-1.0	-1.0	-2.1	-0.4	
23-Oct	-1.1	-1.2	-0.3	1.4	2.4	1.8	1.3	1.4	1.4	1.8	3.0	4.1	5.2	6.8	8.5	9.4	8.8	8.2	7.4	6.8	6.0	4.6	4.2	4.2	4.0	9.4	
24-Oct	5.0	5.0	5.0	5.9	7.4	8.7	8.4	8.5	10.0	11.4	12.2	12.0	10.2	8.5	7.3	6.7	6.0	5.1	4.3	3.3	2.2	1.9	1.4	1.1	6.6	12.2	
25-Oct	0.8	0.4	0.0	-0.3	-0.5	-0.7	-0.8	-0.8	-0.9	-0.7	-0.3	-0.2	0.0	0.3	0.5	0.6	0.5	0.3	0.2	0.2	0.4	0.0	0.0	-0.5	-0.1	0.8	
26-Oct	-1.1	-1.7	-1.9	-1.4	-1.4	-1.6	-1.9	-2.1	-1.9	-1.4	-0.7	0.3	1.1	1.5	1.9	2.3	2.4	2.1	1.7	0.9	0.7	0.6	0.2	-0.1	-0.1	2.4	
27-Oct	0.1	0.2	0.2	-0.1	-0.5	-0.8	-1.0	-1.4	-1.1	-0.4	0.9	2.2	3.6	4.5	5.1	5.2	5.1	4.9	4.8	4.6	4.7	4.8	4.7	4.8	2.3	5.2	
28-Oct	4.5	4.3	4.7	5.4	6.6	7.8	7.9	7.9	7.9	8.6	10.0	11.0	10.9	10.7	10.2	9.5	8.9	7.9	5.7	5.1	5.1	5.1	4.7	4.2	7.3	11.0	
29-Oct	3.5	3.3	2.9	2.5	2.2	1.1	-0.3	-0.8	-1.5	-1.6	-1.5	-1.2	-0.5	0.0	0.4	0.0	-0.2	-0.5	-0.7	-0.8	-0.7	-0.8	-0.6	-0.4	0.2	3.5	
30-Oct	-0.3	-0.1	-0.2	-0.5	-1.0	-1.3	-1.7	-2.0	-1.8	-1.5	-1.0	-0.5	-0.1	0.8	1.6	1.7	1.5	0.9	0.5	0.0	-0.4	-0.8	-0.9	-1.5	-0.4	1.7	
31-Oct	-1.5	-1.8	-2.2	-2.1	-2.0	-2.1	-2.3	-2.1	-1.9	-1.7	-1.3	-0.9	-0.4	-0.1	0.0	0.1	0.0	-0.1	0.0	-0.3	-0.5	-1.1	-2.2	-2.9	-1.2	0.1	
		2.9	2.7	2.5	2.2	2.1	1.9	1.5	1.4	1.8	2.5	3.2	3.9	4.7	5.2	5.7	5.8	5.6	5.2	4.7	4.2	3.8	3.4	3.1	2.8	Diurnal Average	
		13.7	13.4	13.2	13.0	12.2	12.1	12.1	11.8	12.6	14.1	15.4	15.9	19.4	21.6	22.4	22.8	22.8	22.0	20.4	18.6	17.4	16.5	15.4	14.4	Diurnal Maximum	





**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature 20 m (AT20m) - C**  
**Mannix - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature 20 m (AT20m) - C  
Mannix - October 2017**

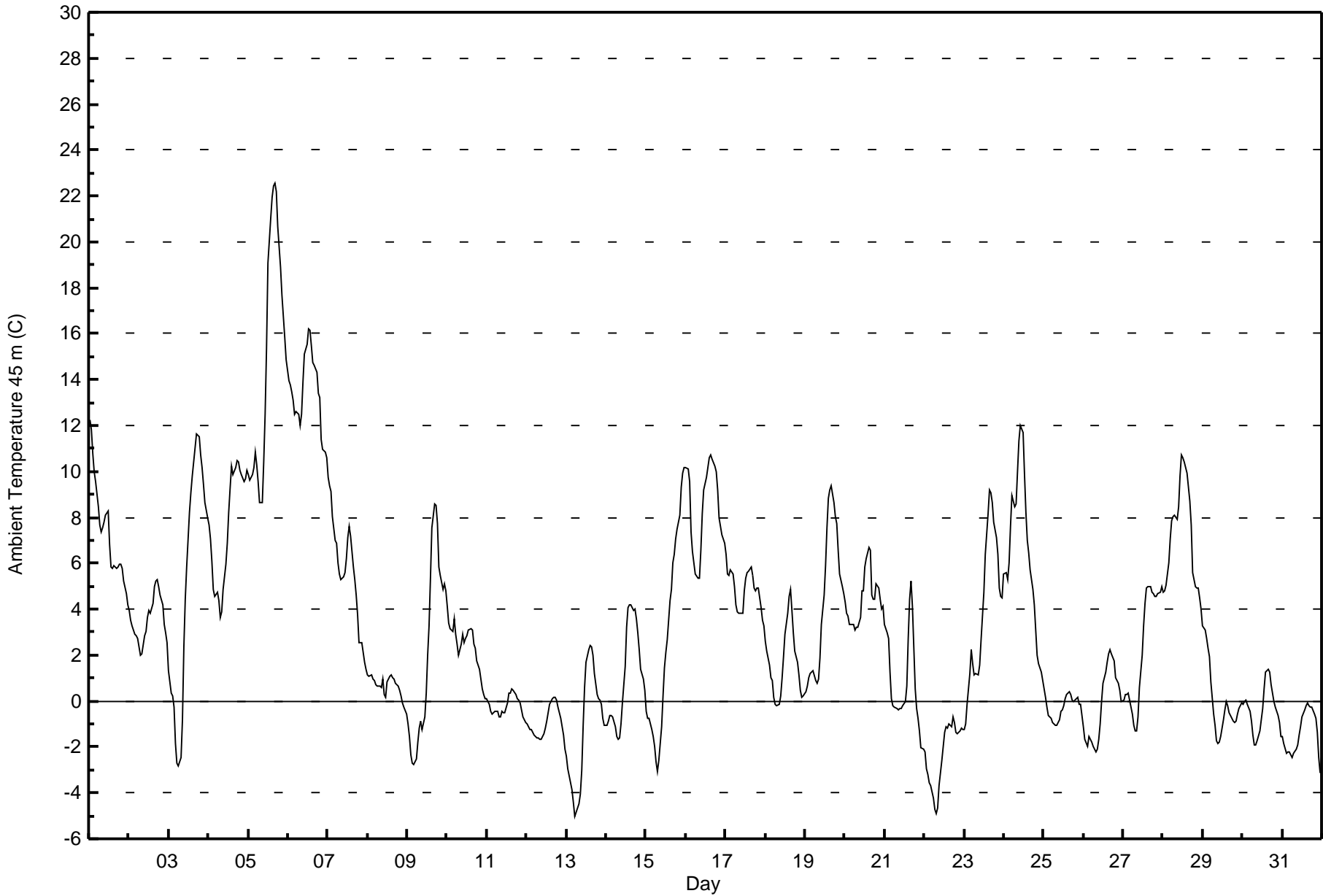
<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	211	28.36	28.36
0 - 10	460	61.83	90.19
10 - 20	67	9.01	99.19
> 20	6	0.81	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Value: 22.6 C on Oct 5 17:00		Maximum Daily Average: 15.0 C on Oct 5		Hours in Service: 744																							
Minimum Value: -5.0 C on Oct 13 06:00		Minimum Daily Average: -2.3 C on Oct 22		Hours of Data: 744																							
Maximum Diurnal Average: 5.5 C at hour 16		Minimum Diurnal Average: 1.4 C at hour 8		Hours of Missing Data: 0																							
Monthly Average: 3.36 C		Percentiles: P <sub>1</sub> = -4.2 P <sub>10</sub> = -1.5 Q <sub>1</sub> = -0.3 Median = 2.4 Q <sub>3</sub> = 5.9 P <sub>90</sub> = 9.9 P <sub>99</sub> = 17.6		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	12.3	11.8	10.8	10.0	9.5	8.5	7.7	7.4	7.5	7.8	8.1	8.3	6.8	5.8	5.8	5.9	5.8	5.9	6.0	5.9	5.8	5.2	4.7	4.2	7.4	12.3	
2-Oct	3.9	3.5	3.3	2.9	2.9	2.7	2.4	2.0	2.1	2.8	3.0	3.6	4.0	3.8	4.3	5.0	5.2	5.3	5.0	4.6	4.2	3.4	3.0	2.5	3.6	5.3	
3-Oct	1.3	0.4	0.2	-0.3	-1.9	-2.7	-2.8	-2.4	-0.8	2.4	4.4	5.9	8.2	9.1	9.8	10.4	11.0	11.6	11.5	10.7	10.2	9.4	8.6	8.0	5.1	11.6	
4-Oct	7.7	7.0	6.1	4.8	4.6	4.7	4.4	3.6	3.9	4.9	6.0	6.9	8.2	9.3	10.2	9.9	10.2	10.5	10.4	10.0	9.9	9.6	9.7	10.0	7.6	10.5	
5-Oct	9.9	9.6	9.9	10.2	10.8	10.3	9.6	8.6	8.7	10.4	12.5	15.3	19.1	21.0	22.0	22.4	22.6	22.2	20.7	18.9	17.7	16.8	15.8	14.8	15.0	22.6	
6-Oct	14.0	13.8	13.4	13.1	12.5	12.6	12.5	12.0	12.5	13.9	15.1	15.6	16.2	16.2	15.4	14.7	14.6	14.3	13.4	13.2	11.4	10.9	10.8	10.6	13.5	16.2	
7-Oct	9.7	9.4	9.1	8.0	7.0	6.9	6.0	5.5	5.3	5.4	5.6	6.2	7.1	7.6	7.2	5.8	5.3	4.6	3.8	2.5	2.5	2.1	1.7	1.4	5.7	9.7	
8-Oct	1.1	1.1	1.1	1.0	0.9	0.7	0.6	0.6	0.6	1.0	0.3	0.2	0.8	1.1	1.1	1.0	0.9	0.8	0.7	0.4	0.2	-0.1	-0.3	-0.6	0.6	1.1	
9-Oct	-1.0	-1.5	-2.3	-2.7	-2.8	-2.5	-1.8	-1.2	-0.9	-1.2	-0.7	0.3	2.0	3.3	5.3	7.6	8.6	8.5	7.8	5.8	5.5	4.9	5.1	4.8	2.1	8.6	
10-Oct	4.1	3.4	3.1	3.0	3.6	2.9	2.5	2.0	2.5	2.9	2.6	2.7	2.9	3.1	3.2	3.1	2.5	2.3	1.7	1.4	1.0	0.5	0.3	0.1	2.4	4.1	
11-Oct	0.1	-0.1	-0.4	-0.6	-0.5	-0.4	-0.4	-0.7	-0.7	-0.4	-0.5	-0.5	-0.1	0.3	0.4	0.5	0.5	0.3	0.1	0.1	-0.1	-0.4	-0.7	-0.9	-0.2	0.5	
12-Oct	-1.0	-1.1	-1.2	-1.3	-1.5	-1.5	-1.6	-1.6	-1.7	-1.6	-1.4	-1.2	-0.9	-0.5	-0.2	0.1	0.2	0.2	0.1	-0.3	-0.8	-1.1	-1.5	-2.1	-1.0	0.2	
13-Oct	-2.4	-2.9	-3.5	-3.9	-4.4	-5.0	-4.9	-4.5	-4.0	-3.0	-1.1	0.6	1.7	2.3	2.4	2.4	2.0	1.2	0.3	0.1	0.1	-0.1	-0.8	-1.0	-1.2	2.4	
14-Oct	-1.0	-0.9	-0.7	-0.6	-0.7	-1.1	-1.5	-1.6	-1.6	-1.0	-0.1	1.5	3.2	4.1	4.2	4.2	3.9	4.0	3.6	3.0	2.3	1.4	0.9	0.5	1.1	4.2	
15-Oct	-0.4	-0.8	-0.8	-1.3	-1.5	-2.0	-2.7	-3.1	-2.6	-1.1	0.2	1.5	2.1	2.7	4.4	4.8	6.0	6.4	7.0	7.5	8.1	9.3	9.9	10.1	2.7	10.1	
16-Oct	10.2	10.1	9.6	7.3	6.5	6.0	5.5	5.3	5.4	6.6	8.2	9.2	9.7	10.1	10.6	10.7	10.6	10.2	10.0	9.2	8.0	7.6	7.3	6.9	8.4	10.7	
17-Oct	6.4	5.5	5.4	5.7	5.5	5.0	4.2	3.9	3.8	3.8	3.8	4.8	5.3	5.6	5.7	5.9	5.5	4.9	4.8	4.9	4.9	4.1	3.5	3.3	4.8	6.4	
18-Oct	2.6	2.2	1.6	1.0	0.9	0.2	-0.2	-0.2	-0.2	0.3	1.0	1.9	2.9	3.8	4.6	4.9	4.0	3.0	2.2	1.7	1.2	0.5	0.1	0.2	1.7	4.9	
19-Oct	0.4	0.6	1.0	1.2	1.3	1.3	0.9	0.8	1.0	1.9	3.3	4.6	5.9	7.5	8.8	9.2	9.4	8.6	8.1	7.8	6.6	5.5	5.0	4.7	4.4	9.4	
20-Oct	4.3	3.8	3.7	3.3	3.3	3.4	3.1	3.2	3.2	3.7	4.8	4.8	5.8	6.2	6.7	6.5	4.6	4.5	4.5	5.1	4.9	4.4	4.0	4.1	4.4	6.7	
21-Oct	3.3	2.9	2.7	1.3	0.1	-0.2	-0.3	-0.3	-0.4	-0.3	-0.3	-0.2	0.0	0.7	2.7	4.4	5.2	4.1	0.5	-0.3	-0.8	-1.3	-2.0	-2.1	0.8	5.2	
22-Oct	-2.2	-2.9	-3.2	-3.6	-3.7	-4.2	-4.7	-4.9	-4.6	-3.7	-2.6	-2.0	-1.3	-1.1	-1.2	-1.0	-1.1	-0.7	-0.9	-1.4	-1.4	-1.3	-1.2	-1.2	-2.3	-0.7	
23-Oct	-1.2	-1.0	-0.2	1.2	2.3	1.6	1.1	1.2	1.1	1.6	2.7	3.7	4.8	6.4	8.2	9.2	9.1	8.6	7.8	7.1	6.4	4.9	4.5	4.5	4.0	9.2	
24-Oct	5.6	5.6	5.3	6.0	7.6	9.0	8.5	8.6	10.0	11.3	12.0	11.7	9.9	8.2	7.0	6.4	5.7	4.9	4.2	3.1	2.0	1.6	1.3	0.9	6.5	12.0	
25-Oct	0.6	0.2	-0.3	-0.6	-0.7	-0.9	-1.0	-1.0	-1.0	-0.8	-0.4	-0.2	0.1	0.3	0.4	0.3	0.1	0.0	0.1	0.2	0.2	-0.2	-0.1	-0.6	-0.3	0.6	
26-Oct	-1.1	-1.7	-2.0	-1.6	-1.6	-1.8	-2.0	-2.2	-2.1	-1.7	-1.0	0.0	0.8	1.3	1.7	2.1	2.3	2.1	1.8	1.0	0.9	0.8	0.4	0.0	-0.2	2.3	
27-Oct	0.0	0.3	0.3	0.3	0.1	-0.6	-1.1	-1.3	-1.3	-0.7	0.6	2.0	3.3	4.3	4.9	5.0	5.0	4.8	4.7	4.5	4.6	4.7	4.8	5.0	2.3	5.0	
28-Oct	4.7	4.8	5.1	6.0	7.0	7.9	8.0	8.1	7.9	8.5	9.8	10.7	10.6	10.4	10.0	9.3	8.7	7.7	5.6	5.0	5.0	4.9	4.5	4.0	7.3	10.7	
29-Oct	3.3	3.1	2.7	2.3	2.0	0.8	-0.5	-1.1	-1.7	-1.9	-1.8	-1.5	-0.8	-0.4	0.0	-0.2	-0.5	-0.7	-0.9	-0.9	-0.9	-0.6	-0.3	-0.1	0.0	3.3	
30-Oct	-0.2	0.0	0.0	-0.2	-0.5	-0.9	-1.5	-1.9	-1.9	-1.7	-1.3	-0.8	-0.3	0.6	1.3	1.4	1.3	0.7	0.4	0.0	-0.3	-0.7	-0.9	-1.6	-0.4	1.4	
31-Oct	-1.5	-1.8	-2.2	-2.2	-2.2	-2.4	-2.4	-2.3	-2.1	-1.9	-1.5	-1.1	-0.7	-0.4	-0.2	-0.1	-0.2	-0.3	-0.3	-0.6	-0.7	-1.3	-2.4	-3.1	-1.4	-0.1	
		3.0	2.7	2.5	2.3	2.1	1.9	1.5	1.4	1.5	2.2	2.9	3.7	4.4	4.9	5.4	5.5	5.5	5.2	4.7	4.2	3.8	3.4	3.1	2.8	Diurnal Average	
		14.0	13.8	13.4	13.1	12.5	12.6	12.5	12.0	12.5	13.9	15.1	15.6	19.1	21.0	22.0	22.4	22.6	22.2	20.7	18.9	17.7	16.8	15.8	14.8	Diurnal Maximum	





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature 45 m (AT45m) - C  
Mannix - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	226	30.38	30.38
0 - 10	447	60.08	90.46
10 - 20	65	8.74	99.19
> 20	6	0.81	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Summary of Hour Averages

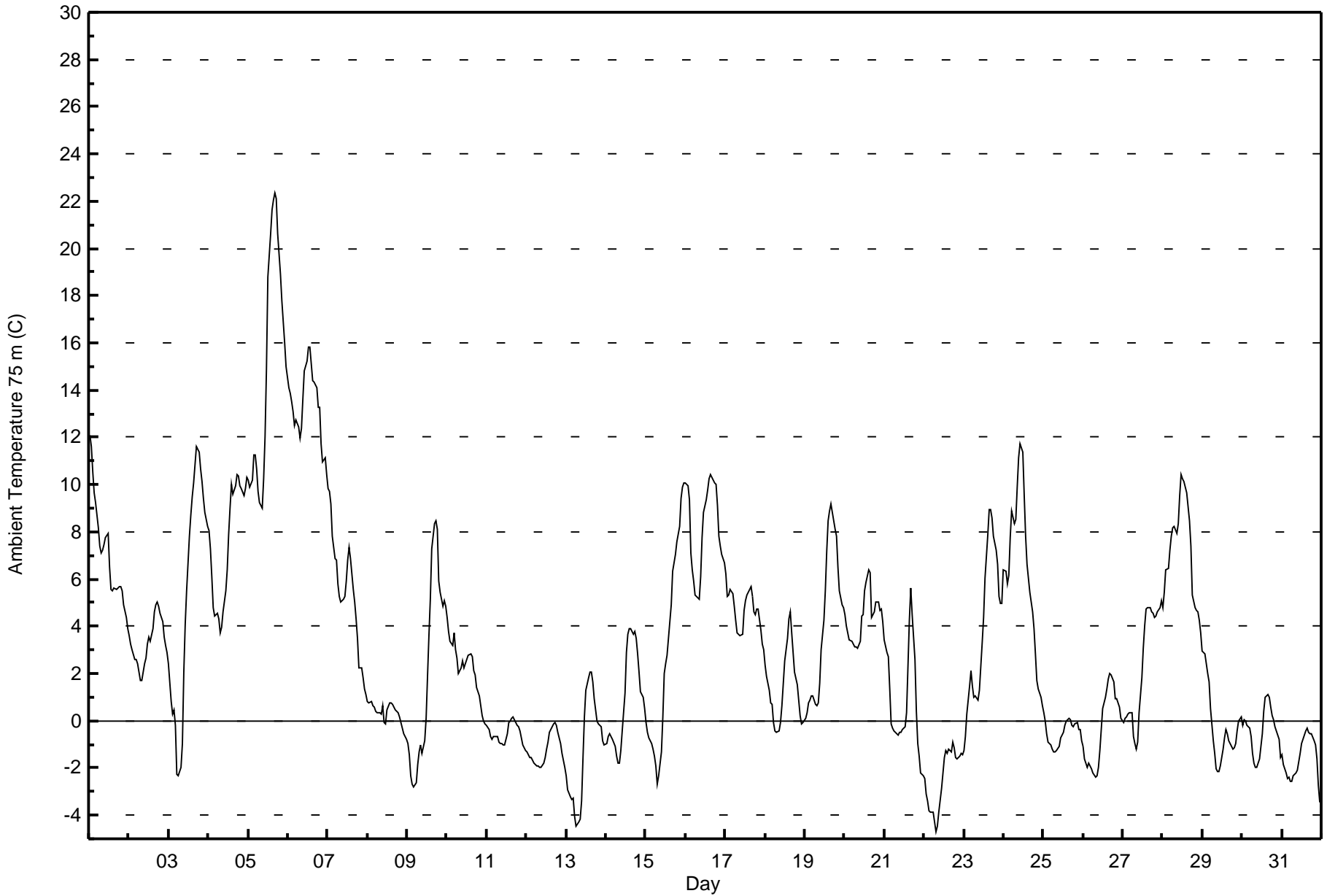
Mannix - October 2017

Maximum Value: 22.3 C on Oct 5 17:00		Maximum Daily Average: 15.1 C on Oct 5		Hours in Service: 744																																												
Minimum Value: -4.7 C on Oct 22 08:00		Minimum Daily Average: -2.5 C on Oct 22		Hours of Data: 744																																												
Maximum Diurnal Average: 5.3 C at hour 16		Minimum Diurnal Average: 1.3 C at hour 8		Hours of Missing Data: 0																																												
Monthly Average: 3.23 C		Percentiles: P <sub>1</sub> = -3.9 P <sub>10</sub> = -1.6 Q <sub>1</sub> = -0.5 Median = 2.2 Q <sub>3</sub> = 5.8 P <sub>90</sub> = 9.9 P <sub>99</sub> = 17.3		Hours of Calibration: 0																																												
				Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	12.1	11.6	10.5	9.7	9.2	8.2	7.4	7.1	7.2	7.4	7.8	8.0	6.5	5.5	5.5	5.6	5.6	5.6	5.7	5.7	5.5	4.9	4.4	3.9	7.1	12.1																						
2-Oct	3.6	3.2	3.0	2.6	2.6	2.4	2.1	1.7	1.7	2.4	2.6	3.3	3.6	3.4	3.9	4.6	4.9	5.0	4.8	4.5	4.2	3.5	3.2	2.9	3.3	5.0																						
3-Oct	2.4	0.8	0.3	0.5	-0.2	-2.3	-2.3	-2.0	-1.0	2.1	4.1	5.5	7.8	8.7	9.5	10.1	10.8	11.6	11.4	10.6	10.1	9.4	8.8	8.2	5.2	11.6																						
4-Oct	8.0	7.3	6.1	4.8	4.4	4.6	4.3	3.7	3.9	4.6	5.5	6.4	7.8	9.0	10.0	9.6	9.9	10.4	10.4	10.0	9.8	9.6	9.8	10.3	7.5	10.4																						
5-Oct	10.2	9.9	10.2	11.2	11.2	10.6	9.7	9.2	9.0	10.2	12.0	14.9	18.8	20.7	21.6	22.1	22.3	22.1	20.6	18.9	17.8	16.9	16.0	15.0	15.1	22.3																						
6-Oct	14.1	13.8	13.5	13.1	12.5	12.8	12.4	12.0	12.4	13.6	14.8	15.2	15.8	15.8	15.1	14.4	14.4	14.1	13.2	13.3	11.7	11.0	11.1	10.5	13.4	15.8																						
7-Oct	9.8	9.7	9.2	7.8	6.9	6.8	5.8	5.3	5.0	5.1	5.3	5.9	6.8	7.3	6.9	5.6	5.0	4.3	3.5	2.3	2.2	1.8	1.4	1.1	5.4	9.8																						
8-Oct	0.8	0.8	0.8	0.6	0.6	0.4	0.3	0.3	0.3	0.6	0.0	-0.2	0.5	0.7	0.8	0.7	0.6	0.4	0.4	0.1	-0.1	-0.3	-0.6	-0.8	0.3	0.8																						
9-Oct	-1.0	-1.4	-2.3	-2.7	-2.8	-2.6	-1.9	-1.3	-1.0	-1.4	-0.9	0.1	1.9	3.6	5.1	7.3	8.3	8.4	8.1	5.9	5.4	4.9	5.1	4.9	2.1	8.4																						
10-Oct	4.4	3.8	3.4	3.2	3.7	3.0	2.7	2.0	2.2	2.5	2.2	2.4	2.6	2.8	2.8	2.7	2.1	1.9	1.4	1.0	0.7	0.2	0.0	-0.1	2.2	4.4																						
11-Oct	-0.2	-0.4	-0.7	-0.8	-0.7	-0.6	-0.7	-0.9	-1.0	-1.0	-1.0	-1.0	-0.6	-0.1	0.0	0.1	0.1	-0.1	-0.2	-0.3	-0.4	-0.7	-1.0	-1.2	-0.6	0.1																						
12-Oct	-1.3	-1.4	-1.5	-1.6	-1.8	-1.8	-1.9	-1.9	-2.0	-2.0	-1.8	-1.6	-1.2	-0.9	-0.5	-0.3	-0.1	-0.1	-0.2	-0.5	-1.0	-1.4	-1.6	-2.0	-1.3	-0.1																						
13-Oct	-2.3	-2.9	-3.2	-3.3	-3.3	-4.0	-4.4	-4.3	-4.1	-3.4	-1.5	0.2	1.3	1.8	2.0	2.1	1.7	0.9	0.0	-0.1	-0.2	-0.3	-0.9	-1.0	-1.2	2.1																						
14-Oct	-1.0	-0.7	-0.6	-0.6	-0.8	-1.1	-1.5	-1.8	-1.8	-1.2	-0.4	1.2	2.9	3.7	3.9	3.9	3.6	3.8	3.5	2.8	2.0	1.2	1.0	0.5	0.9	3.9																						
15-Oct	0.0	-0.5	-0.7	-1.0	-1.2	-1.5	-1.9	-2.7	-2.3	-1.3	0.1	2.0	2.4	2.8	4.2	4.9	6.3	6.7	7.5	7.6	8.2	9.4	9.9	10.1	2.9	10.1																						
16-Oct	10.1	9.9	9.4	7.1	6.4	5.9	5.3	5.2	5.1	6.1	7.7	8.8	9.4	9.8	10.2	10.4	10.3	10.1	10.0	9.1	7.8	7.4	7.0	6.7	8.1	10.4																						
17-Oct	6.2	5.3	5.3	5.6	5.4	4.9	4.3	3.7	3.6	3.6	3.7	4.6	5.1	5.3	5.4	5.7	5.3	4.6	4.5	4.7	4.7	3.8	3.3	3.0	4.6	6.2																						
18-Oct	2.4	1.9	1.3	0.8	0.7	-0.1	-0.4	-0.5	-0.5	-0.1	0.7	1.6	2.6	3.5	4.3	4.6	3.7	2.9	2.0	1.5	0.9	0.2	-0.1	-0.1	1.4	4.6																						
19-Oct	0.1	0.4	0.7	0.9	1.0	1.1	0.7	0.6	0.7	1.6	3.0	4.3	5.5	7.2	8.4	8.9	9.2	8.5	8.1	7.8	6.5	5.5	4.9	4.8	4.2	9.2																						
20-Oct	4.5	4.0	3.7	3.4	3.4	3.3	3.1	3.1	3.1	3.4	4.4	4.5	5.5	5.8	6.4	6.3	4.4	4.5	4.6	5.1	5.0	4.7	4.7	4.2	4.4	6.4																						
21-Oct	3.4	2.9	2.7	1.4	-0.1	-0.3	-0.5	-0.5	-0.6	-0.5	-0.5	-0.4	-0.2	0.3	2.3	4.3	5.6	4.5	2.6	0.4	-1.0	-1.5	-2.2	-2.3	0.8	5.6																						
22-Oct	-2.5	-3.1	-3.4	-3.8	-3.9	-3.9	-4.3	-4.7	-4.5	-3.8	-2.9	-2.2	-1.6	-1.3	-1.4	-1.2	-1.3	-0.9	-1.1	-1.6	-1.6	-1.5	-1.4	-1.4	-2.5	-0.9																						
23-Oct	-1.2	-0.7	0.3	1.5	2.1	1.5	1.0	1.1	0.9	1.3	2.3	3.3	4.4	6.0	7.9	8.9	8.9	8.6	7.8	7.2	6.6	5.2	5.0	5.0	3.9	8.9																						
24-Oct	6.4	6.4	5.8	6.2	7.8	8.9	8.4	8.5	9.9	11.1	11.7	11.4	9.5	7.8	6.7	6.1	5.4	4.6	3.9	2.8	1.7	1.4	1.0	0.7	6.4	11.7																						
25-Oct	0.3	0.0	-0.6	-0.9	-1.0	-1.2	-1.3	-1.3	-1.3	-1.1	-0.7	-0.6	-0.5	-0.2	0.0	0.1	0.0	-0.2	-0.2	-0.1	-0.1	-0.4	-0.4	-0.8	-0.5	0.3																						
26-Oct	-1.1	-1.6	-2.0	-1.8	-1.9	-2.0	-2.2	-2.4	-2.4	-2.0	-1.3	-0.3	0.5	1.0	1.4	1.8	2.0	1.9	1.7	0.9	0.9	0.8	0.6	0.1	-0.3	2.0																						
27-Oct	-0.1	0.1	0.2	0.3	0.3	0.3	-0.7	-1.0	-1.2	-0.9	0.3	1.8	3.1	4.0	4.7	4.8	4.8	4.6	4.6	4.4	4.4	4.6	4.8	5.1	2.2	5.1																						
28-Oct	4.8	5.4	6.4	6.4	7.2	7.8	8.2	8.2	7.9	8.3	9.5	10.4	10.3	10.1	9.7	9.0	8.4	7.4	5.3	4.8	4.7	4.6	4.2	3.7	7.2	10.4																						
29-Oct	3.0	2.8	2.4	2.0	1.7	0.5	-0.8	-1.4	-2.1	-2.2	-2.1	-1.9	-1.2	-0.7	-0.4	-0.5	-0.9	-1.1	-1.2	-1.2	-1.0	-0.5	0.0	0.2	-0.3	3.0																						
30-Oct	-0.2	0.1	0.0	-0.2	-0.3	-0.7	-1.4	-1.8	-1.9	-2.0	-1.6	-1.1	-0.6	0.4	1.0	1.1	1.0	0.6	0.2	0.0	-0.3	-0.6	-0.8	-1.6	-0.4	1.1																						
31-Oct	-1.5	-1.9	-2.2	-2.5	-2.4	-2.6	-2.6	-2.4	-2.2	-2.1	-1.7	-1.4	-1.0	-0.6	-0.5	-0.3	-0.5	-0.5	-0.5	-0.9	-1.0	-1.6	-2.7	-3.5	-1.6	-0.3																						
																								3.0	2.8	2.5	2.3	2.2	1.9	1.5	1.3	1.4	1.9	2.6	3.4	4.1	4.6	5.1	5.3	5.2	5.0	4.6	4.1	3.7	3.3	3.0	2.8	Diurnal Average
																								14.1	13.8	13.5	13.1	12.5	12.8	12.4	12.0	12.4	13.6	14.8	15.2	18.8	20.7	21.6	22.1	22.3	22.1	20.6	18.9	17.8	16.9	16.0	15.0	Diurnal Maximum



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature 75 m (AT75m) - C**  
**Mannix - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature 75 m (AT75m) - C  
Mannix - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	247	33.20	33.20
0 - 10	428	57.53	90.73
10 - 20	63	8.47	99.19
> 20	6	0.81	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744





Summary of Hour Averages

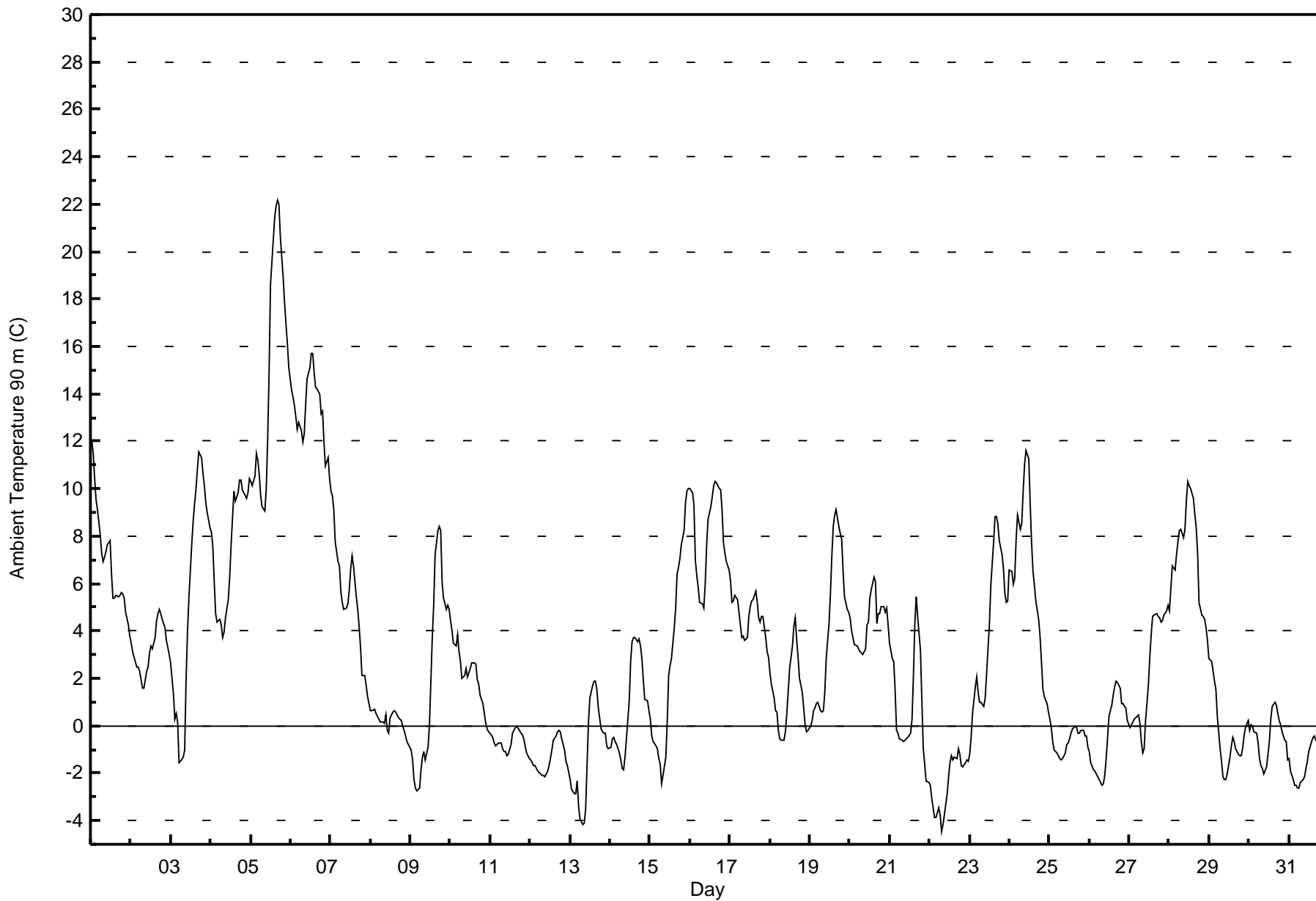
Mannix - October 2017

Maximum Value: 22.2 C on Oct 5 17:00		Maximum Daily Average: 15.1 C on Oct 5		Hours in Service: 744																																												
Minimum Value: -4.5 C on Oct 22 08:00		Minimum Daily Average: -2.4 C on Oct 22		Hours of Data: 744																																												
Maximum Diurnal Average: 5.2 C at hour 16		Minimum Diurnal Average: 1.3 C at hour 8		Hours of Missing Data: 0																																												
Monthly Average: 3.19 C		Percentiles: P <sub>1</sub> = -3.8 P <sub>10</sub> = -1.7 Q <sub>1</sub> = -0.6 Median = 2.1 Q <sub>3</sub> = 5.7 P <sub>90</sub> = 9.8 P <sub>99</sub> = 17.5		Hours of Calibration: 0																																												
				Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	12.0	11.5	10.4	9.6	9.1	8.1	7.3	6.9	7.1	7.3	7.6	7.8	6.4	5.4	5.4	5.5	5.4	5.5	5.6	5.6	5.4	4.8	4.3	3.8	7.0	12.0																						
2-Oct	3.5	3.1	2.9	2.5	2.5	2.3	1.9	1.6	1.6	2.3	2.5	3.1	3.4	3.2	3.7	4.4	4.7	4.9	4.7	4.5	4.2	3.6	3.3	3.0	3.2	4.9																						
3-Oct	2.6	1.4	0.3	0.5	0.1	-1.6	-1.5	-1.3	-1.0	2.0	4.0	5.4	7.6	8.6	9.4	10.0	10.8	11.5	11.3	10.6	10.1	9.4	9.0	8.3	5.3	11.5																						
4-Oct	8.2	7.6	6.1	4.7	4.4	4.5	4.3	3.7	4.0	4.5	5.3	6.3	7.6	8.7	9.9	9.5	9.8	10.4	10.4	10.0	9.8	9.6	9.9	10.4	7.5	10.4																						
5-Oct	10.3	10.1	10.6	11.5	11.2	10.6	9.7	9.3	9.0	10.0	12.1	15.0	18.6	20.5	21.5	21.9	22.2	22.0	20.6	18.9	17.8	17.0	16.1	15.1	15.1	22.2																						
6-Oct	14.1	13.9	13.5	13.1	12.5	12.8	12.4	12.0	12.3	13.5	14.7	15.1	15.7	15.7	15.0	14.3	14.2	14.0	13.2	13.3	12.0	11.0	11.3	10.4	13.3	15.7																						
7-Oct	9.9	9.7	9.1	7.8	6.9	6.8	5.7	5.2	4.9	5.0	5.2	5.8	6.7	7.2	6.7	5.5	4.9	4.2	3.3	2.1	2.1	1.7	1.2	0.9	5.4	9.9																						
8-Oct	0.7	0.6	0.7	0.5	0.4	0.3	0.2	0.2	0.1	0.5	-0.2	-0.3	0.3	0.6	0.6	0.6	0.5	0.3	0.2	0.0	-0.2	-0.4	-0.7	-0.9	0.2	0.7																						
9-Oct	-1.1	-1.4	-2.2	-2.6	-2.7	-2.6	-1.9	-1.3	-1.1	-1.5	-0.9	0.0	1.9	3.7	5.1	7.2	8.2	8.4	8.2	6.0	5.4	4.9	5.1	4.9	2.1	8.4																						
10-Oct	4.5	4.0	3.5	3.4	3.8	3.1	2.7	2.0	2.1	2.4	2.1	2.3	2.4	2.6	2.7	2.6	2.0	1.8	1.3	0.9	0.5	0.1	-0.2	-0.2	2.2	4.5																						
11-Oct	-0.3	-0.5	-0.7	-0.9	-0.8	-0.7	-0.7	-1.0	-1.1	-1.1	-1.2	-1.2	-0.8	-0.3	-0.2	-0.1	0.0	-0.2	-0.3	-0.4	-0.6	-0.8	-1.2	-1.4	-0.7	0.0																						
12-Oct	-1.4	-1.6	-1.7	-1.7	-1.9	-2.0	-2.0	-2.1	-2.1	-2.1	-1.9	-1.7	-1.4	-1.0	-0.6	-0.4	-0.3	-0.2	-0.3	-0.6	-1.1	-1.5	-1.7	-2.0	-1.4	-0.2																						
13-Oct	-2.2	-2.7	-2.9	-2.8	-2.3	-3.4	-3.9	-4.2	-4.1	-3.5	-1.7	0.1	1.2	1.7	1.9	1.9	1.5	0.8	-0.1	-0.2	-0.3	-0.3	-0.9	-1.0	-1.1	1.9																						
14-Oct	-0.9	-0.6	-0.5	-0.7	-0.8	-1.1	-1.5	-1.8	-1.8	-1.3	-0.5	1.1	2.7	3.5	3.7	3.7	3.5	3.7	3.4	2.8	1.9	1.1	1.0	0.6	0.9	3.7																						
15-Oct	0.3	-0.4	-0.7	-0.8	-1.0	-1.4	-1.6	-2.5	-2.1	-1.3	0.2	2.1	2.5	2.8	4.1	5.0	6.4	6.7	7.1	7.6	8.3	9.4	9.9	10.0	2.9	10.0																						
16-Oct	10.0	9.9	9.3	7.0	6.3	5.8	5.2	5.1	5.0	5.9	7.6	8.7	9.2	9.6	10.1	10.3	10.2	10.0	10.0	9.0	7.7	7.3	6.9	6.6	8.0	10.3																						
17-Oct	6.1	5.2	5.3	5.5	5.3	4.8	4.2	3.7	3.8	3.6	3.7	4.6	5.0	5.2	5.3	5.7	5.2	4.5	4.4	4.6	4.6	3.7	3.1	2.9	4.6	6.1																						
18-Oct	2.2	1.8	1.2	0.7	0.6	-0.2	-0.5	-0.6	-0.6	-0.2	0.5	1.5	2.4	3.4	4.2	4.5	3.7	2.9	2.0	1.4	0.8	0.1	-0.2	-0.2	1.3	4.5																						
19-Oct	0.0	0.2	0.6	0.8	0.9	1.0	0.6	0.6	0.6	1.4	2.9	4.3	5.6	7.1	8.4	8.9	9.1	8.4	8.1	7.9	6.5	5.5	4.9	4.8	4.1	9.1																						
20-Oct	4.5	4.0	3.7	3.4	3.4	3.2	3.1	3.1	3.0	3.3	4.3	4.4	5.4	5.7	6.3	6.1	4.3	4.7	4.7	5.0	5.0	4.8	5.0	4.3	4.4	6.3																						
21-Oct	3.5	2.8	2.7	1.5	-0.2	-0.3	-0.5	-0.6	-0.7	-0.6	-0.5	-0.5	-0.3	0.3	2.1	4.3	5.4	4.6	3.2	1.1	-1.0	-1.6	-2.3	-2.4	0.8	5.4																						
22-Oct	-2.5	-3.1	-3.4	-3.9	-3.9	-3.5	-3.7	-4.5	-4.1	-3.8	-2.9	-2.2	-1.5	-1.2	-1.4	-1.3	-1.4	-1.0	-1.2	-1.7	-1.7	-1.6	-1.4	-1.5	-2.4	-1.0																						
23-Oct	-1.2	-0.5	0.5	1.7	2.0	1.4	1.0	1.0	0.8	1.2	2.2	3.2	4.2	5.9	7.7	8.8	8.8	8.5	7.8	7.2	6.6	5.6	5.2	5.3	4.0	8.8																						
24-Oct	6.6	6.5	6.0	6.2	7.9	8.9	8.3	8.5	9.9	11.0	11.6	11.2	9.4	7.7	6.5	5.9	5.3	4.5	3.8	2.7	1.6	1.2	0.9	0.5	6.4	11.6																						
25-Oct	0.3	-0.1	-0.7	-1.0	-1.1	-1.3	-1.4	-1.4	-1.4	-1.2	-0.8	-0.7	-0.6	-0.3	-0.1	0.0	-0.1	-0.3	-0.3	-0.2	-0.2	-0.4	-0.5	-0.9	-0.6	0.3																						
26-Oct	-1.1	-1.6	-1.9	-1.9	-2.0	-2.2	-2.3	-2.5	-2.5	-2.1	-1.4	-0.5	0.4	0.9	1.3	1.7	1.9	1.8	1.6	0.9	0.9	0.8	0.8	0.2	-0.4	1.9																						
27-Oct	-0.1	0.0	0.2	0.3	0.3	0.5	0.1	-0.7	-1.1	-1.0	0.2	1.7	2.9	3.9	4.6	4.7	4.7	4.6	4.5	4.4	4.4	4.7	4.8	5.1	2.2	5.1																						
28-Oct	4.9	5.8	6.8	6.5	7.2	7.8	8.2	8.3	7.9	8.3	9.4	10.3	10.1	10.0	9.6	8.9	8.3	7.3	5.2	4.7	4.6	4.5	4.1	3.6	7.2	10.3																						
29-Oct	2.8	2.7	2.3	1.9	1.5	0.4	-1.0	-1.5	-2.2	-2.3	-2.3	-2.0	-1.3	-0.9	-0.5	-0.7	-1.0	-1.2	-1.3	-1.2	-1.0	-0.5	-0.1	0.2	-0.4	2.8																						
30-Oct	-0.2	0.1	0.0	-0.3	-0.3	-0.7	-1.4	-1.7	-1.8	-2.0	-1.7	-1.2	-0.7	0.3	0.8	1.0	0.9	0.5	0.2	0.0	-0.3	-0.6	-0.7	-1.4	-0.5	1.0																						
31-Oct	-1.4	-1.9	-2.3	-2.5	-2.5	-2.6	-2.6	-2.4	-2.2	-2.1	-1.8	-1.5	-1.1	-0.7	-0.5	-0.4	-0.6	-0.6	-0.7	-1.0	-1.2	-1.7	-2.9	-3.6	-1.7	-0.4																						
																								3.0	2.8	2.5	2.3	2.2	1.9	1.6	1.3	1.4	1.8	2.5	3.3	4.0	4.5	4.9	5.2	5.1	4.9	4.5	4.1	3.6	3.3	3.0	2.8	Diurnal Average
																								14.1	13.9	13.5	13.1	12.5	12.8	12.4	12.0	12.3	13.5	14.7	15.1	18.6	20.5	21.5	21.9	22.2	22.0	20.6	18.9	17.8	17.0	16.1	15.1	Diurnal Maximum



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature 90 m (AT90m) - C**  
**Mannix - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature 90 m (AT90m) - C  
Mannix - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	251	33.74	33.74
0 - 10	427	57.39	91.13
10 - 20	60	8.06	99.19
> 20	6	0.81	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %**

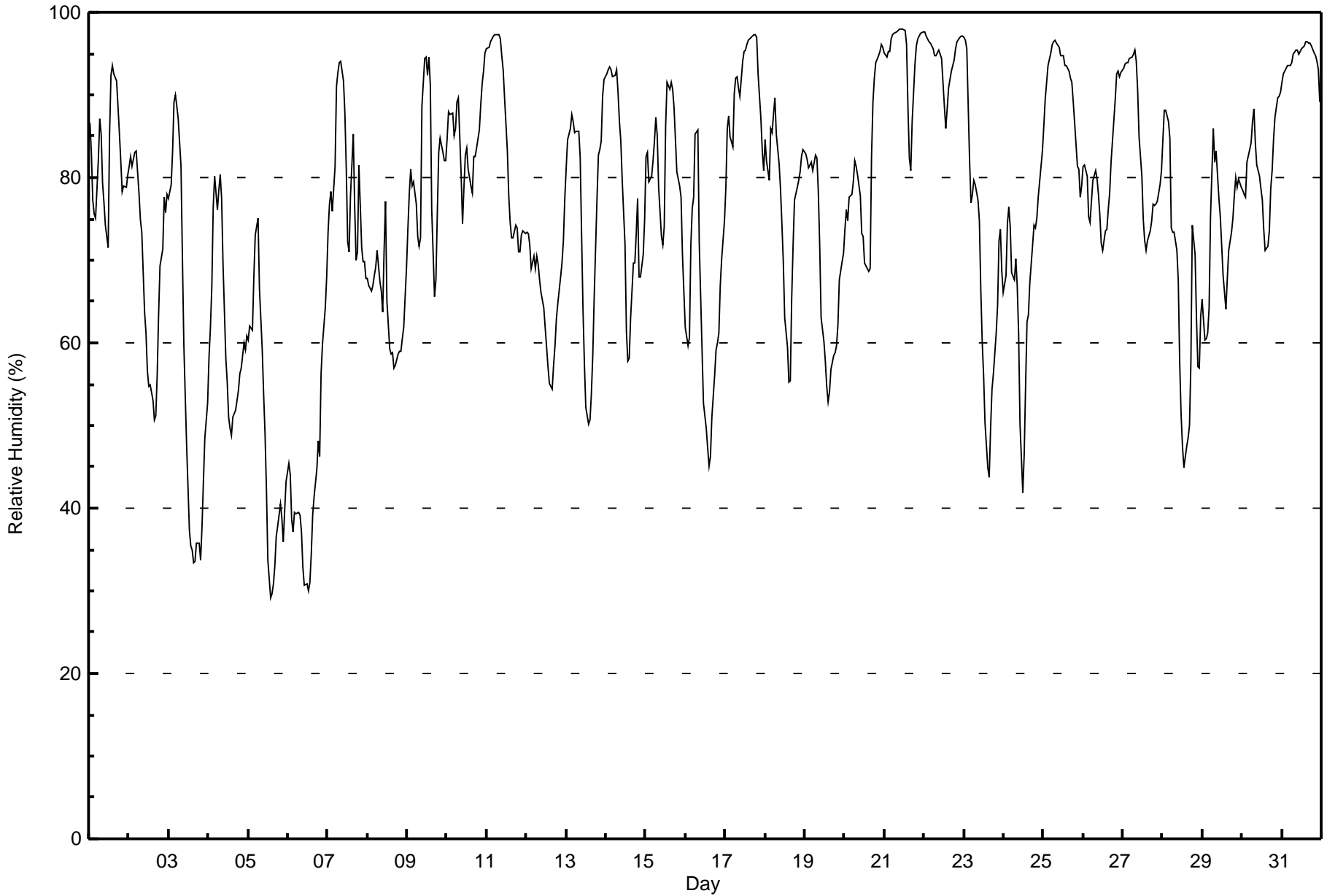
**Mannix - October 2017**

Maximum Value: 98 % on Oct 21 12:00																		Maximum Daily Average: 94.7 % on Oct 21																		Hours in Service: 744	
Minimum Value: 29 % on Oct 5 14:00																		Minimum Daily Average: 42.4 % on Oct 6																		Hours of Data: 744	
Maximum Diurnal Average: 83.5 % at hour 7																		Minimum Diurnal Average: 66.2 % at hour 15																		Hours of Missing Data: 0	
Monthly Average: 75.3 %																		Percentiles: P <sub>1</sub> = 33 P <sub>10</sub> = 53 Q <sub>1</sub> = 66 Median = 78 Q <sub>3</sub> = 88 P <sub>90</sub> = 95 P <sub>99</sub> = 98																		Hours of Calibration: 0	
																																				Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24													
1-Oct	87	83	77	76	75	82	87	85	79	77	74	71	85	92	94	92	92	89	85	82	78	79	79	80	82.6	94											
2-Oct	81	82	81	83	83	81	78	75	73	64	61	57	55	55	53	51	51	56	63	69	71	78	76	78	69.0	83											
3-Oct	77	79	83	89	90	89	87	81	70	60	54	48	37	35	35	33	34	36	36	34	38	43	48	53	57.1	90											
4-Oct	58	62	67	76	80	76	78	80	77	69	58	55	51	50	49	51	52	53	54	56	57	60	59	61	62.1	80											
5-Oct	60	62	61	68	73	74	75	67	59	54	49	42	34	29	30	31	33	37	38	40	39	36	40	43	48.9	75											
6-Oct	45	44	39	37	40	39	40	39	37	33	31	31	30	31	34	39	41	45	48	46	56	60	64	68	42.4	68											
7-Oct	73	77	78	76	81	91	93	94	94	92	88	81	72	71	78	85	77	70	71	82	71	70	70	68	79.3	94											
8-Oct	68	67	66	67	68	69	71	67	66	64	71	77	65	59	59	59	57	57	59	59	59	61	62	69	64.4	77											
9-Oct	74	78	81	79	80	77	73	72	73	89	94	95	92	95	91	76	66	68	76	83	85	83	82	82	80.9	95											
10-Oct	85	88	88	88	85	86	89	90	80	74	79	83	84	81	79	78	83	83	84	86	89	91	93	95	84.9	95											
11-Oct	96	96	96	97	97	97	97	97	97	95	93	90	83	78	75	73	73	74	74	71	71	73	74	73	84.9	97											
12-Oct	73	73	72	69	70	69	70	69	68	66	64	62	60	57	55	54	57	60	63	65	68	70	72	78	66.0	78											
13-Oct	81	84	86	88	87	85	86	86	82	73	64	57	52	50	51	54	59	66	77	83	83	84	90	92	75.0	92											
14-Oct	93	93	93	93	92	92	93	90	87	84	80	72	61	58	58	63	70	70	73	77	68	68	71	75	78.1	93											
15-Oct	83	83	79	80	82	84	87	85	79	73	72	74	86	91	91	92	91	89	85	81	79	78	71	66	81.7	92											
16-Oct	62	60	61	72	76	78	85	86	72	66	59	53	50	47	45	46	51	56	59	60	61	67	70	75	63.2	86											
17-Oct	79	86	87	85	84	90	92	92	91	90	94	95	95	96	97	97	97	97	97	97	93	87	83	81	91.0	97											
18-Oct	85	82	80	86	85	88	90	85	82	79	74	70	63	59	55	55	65	72	77	79	80	81	83	83	76.6	90											
19-Oct	83	82	81	82	82	81	83	82	78	72	63	60	58	55	53	54	57	58	59	60	62	68	70	71	68.8	83											
20-Oct	74	76	75	78	78	79	82	81	80	78	73	73	70	69	69	69	83	89	92	94	95	95	96	96	81.0	96											
21-Oct	95	95	95	95	97	97	97	98	98	98	98	98	98	96	88	82	81	87	94	96	97	97	97	98	94.7	98											
22-Oct	98	97	97	96	96	96	95	95	95	96	94	92	89	86	88	91	93	94	94	96	96	97	97	97	94.3	98											
23-Oct	97	97	96	82	77	78	80	79	77	75	67	60	56	50	45	44	50	54	56	61	65	72	74	69	69.2	97											
24-Oct	66	68	74	76	74	68	68	70	67	61	50	42	47	55	63	63	67	72	74	74	75	78	81	83	67.4	83											
25-Oct	86	90	91	94	95	96	97	97	96	96	95	95	95	94	93	93	92	92	89	87	81	81	78	79	90.8	97											
26-Oct	81	82	80	75	75	77	80	81	80	78	75	72	71	73	74	76	78	82	87	90	93	93	92	93	80.7	93											
27-Oct	93	94	94	94	94	94	95	95	94	90	85	80	75	72	71	72	74	75	77	77	77	77	79	81	83.7	95											
28-Oct	85	88	88	87	85	74	73	73	71	67	58	51	47	45	48	48	50	58	74	71	63	57	57	63	65.9	88											
29-Oct	65	60	60	61	64	75	86	82	83	80	78	75	68	66	64	68	71	73	75	78	80	79	80	79	73.0	86											
30-Oct	78	78	78	82	83	84	87	88	84	81	80	79	77	74	71	72	74	79	81	85	87	90	90	90	81.3	90											
31-Oct	92	93	93	94	94	94	94	95	95	96	95	95	96	96	96	96	96	96	96	95	95	94	93	89	94.5	96											
																		79.1 79.9 80.0 80.8 81.4 82.0 83.5 82.5 79.6 76.4 73.2 70.5 67.8 66.7 66.2 66.4 68.1 70.4 73.2 74.5 74.6 75.7 76.4 77.7																		Diurnal Average	
																		98 97 97 97 97 97 97 97 98 98 98 98 98 98 96 97 97 97 97 97 97 97 97 97 98																		Diurnal Maximum	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Mannix - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Relative Humidity (RH) - %**  
**Mannix - October 2017**

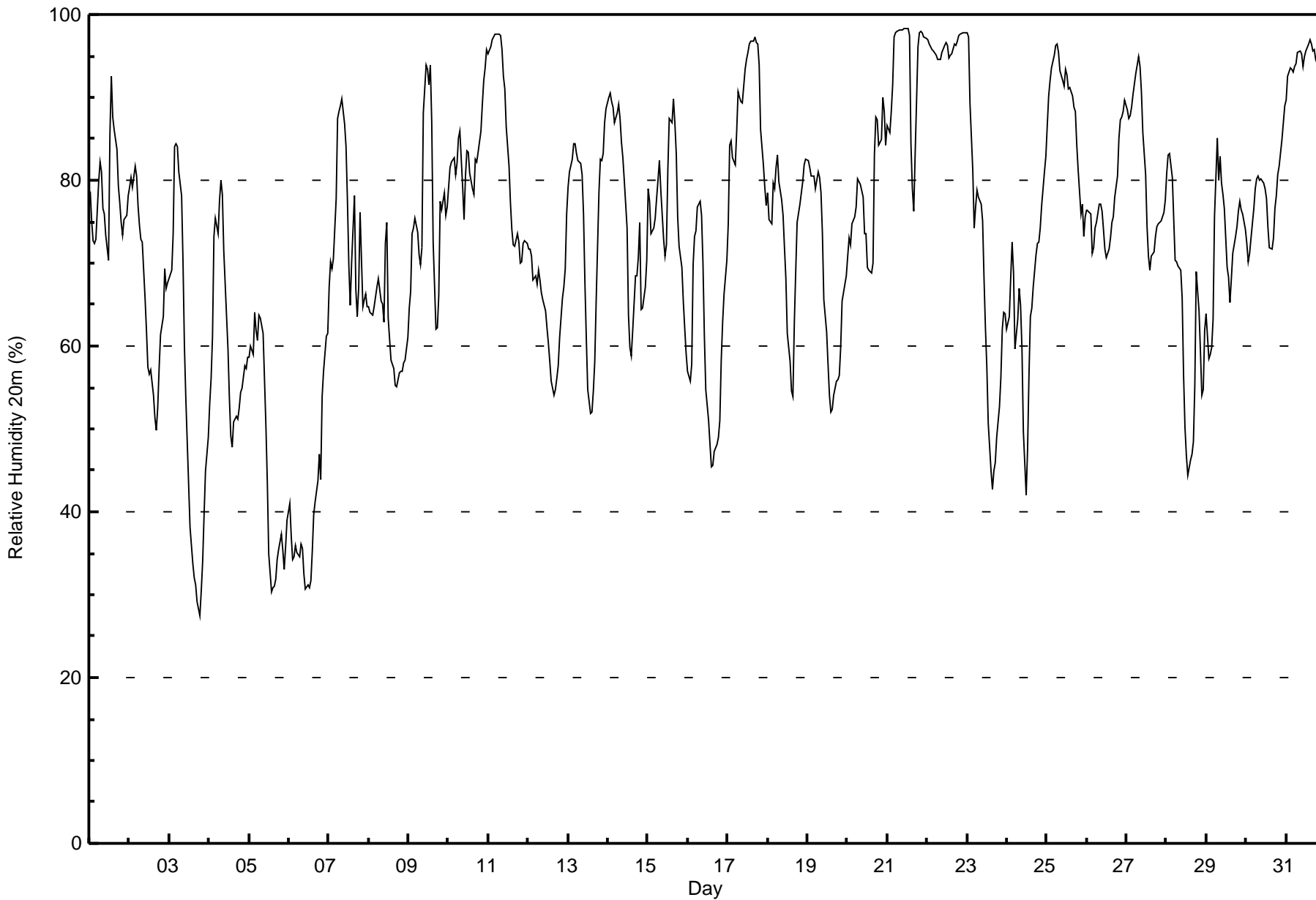
<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	33	4.44	4.44
40 - 60	103	13.84	18.28
60 - 80	284	38.17	56.45
80 - 100	324	43.55	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Value: 98 % on Oct 21 13:00      Maximum Daily Average: 96.1 % on Oct 22																			Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Minimum Value: 28 % on Oct 3 19:00      Minimum Daily Average: 40.2 % on Oct 6 Maximum Diurnal Average: 80.2 % at hour 7      Minimum Diurnal Average: 65.5 % at hour 16 Monthly Average: 72.9 %      Percentiles: P <sub>1</sub> = 31 P <sub>10</sub> = 51 Q <sub>1</sub> = 63 Median = 75 Q <sub>3</sub> = 84 P <sub>90</sub> = 95 P <sub>99</sub> = 98																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	79	75	73	72	73	80	82	81	77	76	73	70	86	93	88	86	84	79	77	75	73	75	76	78	78.4	93
2-Oct	79	80	79	82	81	77	75	73	73	66	62	57	57	57	54	51	50	53	57	61	64	69	67	68	66.3	82
3-Oct	68	69	74	84	84	84	81	78	70	60	54	49	38	36	34	32	31	29	28	31	34	40	45	49	53.4	84
4-Oct	53	56	61	73	75	74	78	80	78	71	64	60	54	49	48	51	51	51	53	54	55	58	57	59	60.9	80
5-Oct	59	60	59	64	62	61	64	63	61	56	50	43	35	30	31	31	32	34	35	37	35	33	36	39	46.3	64
6-Oct	41	37	34	34	36	35	35	36	36	33	31	31	31	32	35	40	41	44	47	44	54	57	61	62	40.2	62
7-Oct	67	70	69	71	78	87	88	89	90	87	84	78	70	65	70	78	67	64	67	76	65	66	66	65	74.0	90
8-Oct	65	64	64	65	66	67	68	65	65	63	72	75	63	58	58	57	55	55	57	57	57	58	58	61	62.3	75
9-Oct	65	67	73	74	75	74	71	70	72	88	94	93	92	94	87	72	62	62	66	77	76	78	76	77	76.5	94
10-Oct	79	82	82	83	81	82	85	86	79	75	81	84	83	81	79	78	83	82	83	86	89	92	94	96	83.5	96
11-Oct	95	96	97	97	98	98	98	97	96	93	91	86	82	77	74	72	72	74	73	70	70	72	73	72	84.3	98
12-Oct	72	72	71	68	69	67	69	68	67	66	64	62	60	58	56	54	55	56	58	61	66	67	69	76	64.6	76
13-Oct	79	81	83	84	84	83	82	82	81	76	68	61	55	52	52	55	58	65	79	82	82	83	87	89	74.3	89
14-Oct	90	90	89	89	87	88	89	87	85	83	80	74	64	60	59	62	69	68	71	75	64	65	67	70	76.0	90
15-Oct	79	77	74	74	75	78	80	82	79	73	71	72	81	87	87	90	87	83	76	72	69	65	62	59	76.4	90
16-Oct	57	56	58	70	73	74	77	77	76	70	61	55	51	48	45	46	47	48	49	51	58	63	66	70	60.3	77
17-Oct	75	84	85	83	82	86	91	90	89	89	93	95	95	96	97	97	97	97	96	94	86	82	79	77	89.0	97
18-Oct	79	75	75	80	79	82	83	80	78	76	72	68	61	58	55	54	63	69	75	77	78	80	82	83	73.3	83
19-Oct	82	82	81	81	81	79	81	80	79	74	66	62	58	54	52	52	54	56	56	56	60	65	68	69	67.7	82
20-Oct	71	73	72	75	76	77	80	80	79	78	74	74	69	69	69	70	83	88	87	84	85	90	88	84	78.1	90
21-Oct	87	86	88	92	97	98	98	98	98	98	98	98	98	97	84	79	76	83	96	98	98	98	97	97	93.3	98
22-Oct	97	96	96	96	96	95	95	95	95	95	96	97	96	95	95	95	96	96	97	97	98	98	98	98	96.1	98
23-Oct	98	97	89	81	74	77	79	78	77	75	68	62	58	51	45	43	45	46	49	53	56	62	64	64	66.3	98
24-Oct	62	64	68	73	69	60	63	67	65	60	50	42	48	57	64	65	67	71	72	72	74	77	81	83	65.5	83
25-Oct	87	90	92	94	95	96	96	95	93	92	91	93	93	91	91	90	89	88	84	81	76	77	73	76	88.5	96
26-Oct	76	76	76	71	72	74	75	77	77	76	74	72	71	72	73	75	76	78	80	85	87	88	88	90	77.5	90
27-Oct	88	87	88	89	90	93	94	95	94	91	86	81	74	71	69	71	71	73	74	75	75	75	76	78	81.6	95
28-Oct	81	83	83	80	75	70	70	70	69	66	57	50	47	44	46	47	48	55	69	64	59	54	55	62	62.7	83
29-Oct	64	58	59	60	63	76	85	80	83	80	78	77	70	68	65	68	71	73	74	76	77	76	76	74	72.2	85
30-Oct	72	70	71	73	77	79	80	81	80	80	80	80	79	78	74	72	72	73	77	78	81	82	85	87	77.9	89
31-Oct	90	93	94	93	93	94	94	95	96	95	94	95	96	96	97	96	96	96	95	94	94	93	91	88	94.0	97
																			75.3 75.7 76.0 77.5 77.9 78.8 80.2 79.9 78.5 76.1 73.4 70.8 68.1 66.8 65.5 65.5 66.1 67.5 69.6 70.9 70.9 72.3 73.0 74.2				Diurnal Average			
																			98 97 97 97 98 98 98 98 98 98 98 98 98 98 97 97 97 97 97 97 98 98 98 98 98				Diurnal Maximum			







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Relative Humidity 20m (RH20m) - %**  
**Mannix - October 2017**

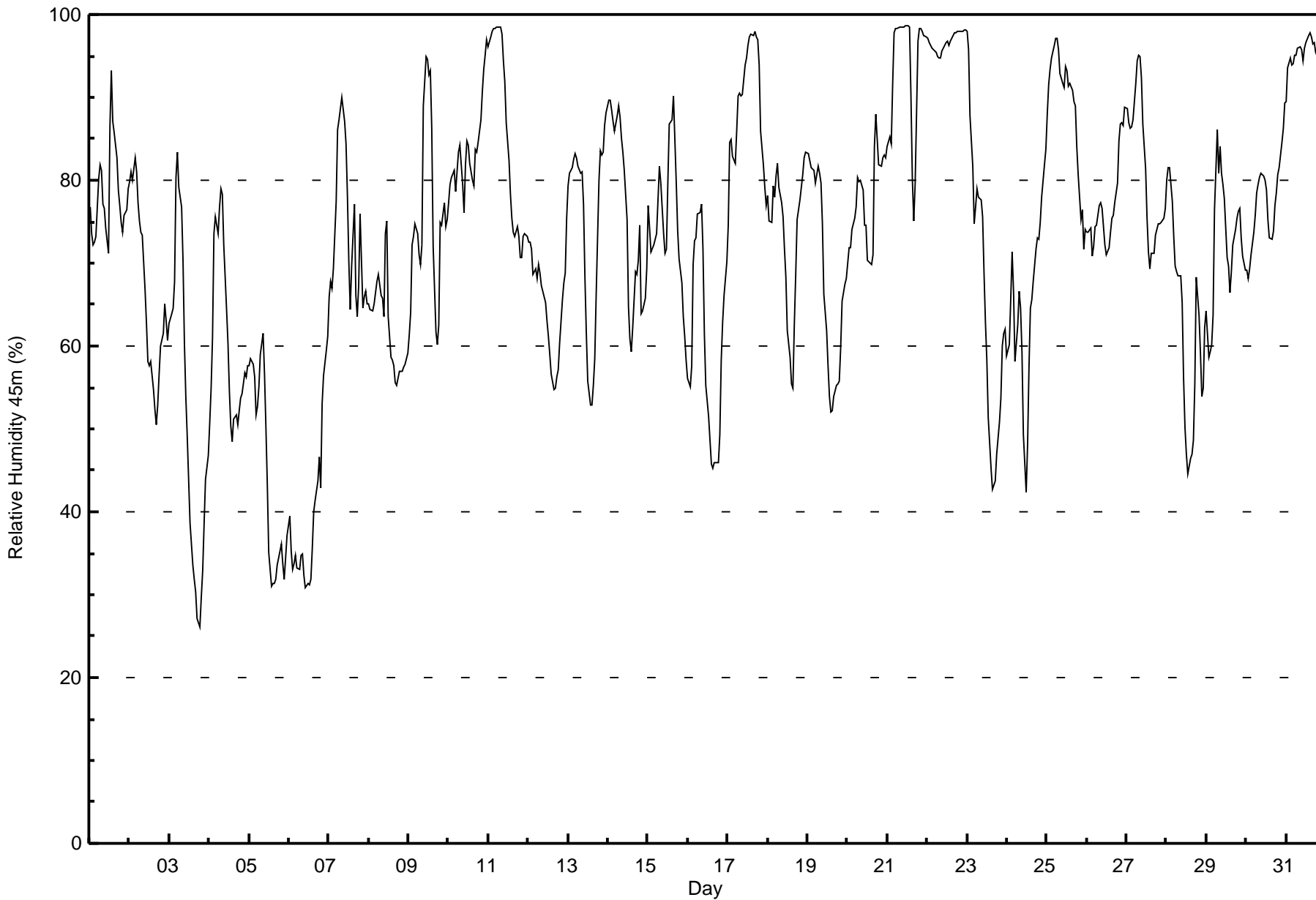
<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	37	4.97	4.97
40 - 60	117	15.73	20.70
60 - 80	330	44.35	65.05
80 - 100	260	34.95	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Value: 99 % on Oct 21 13:00																			Maximum Daily Average: 96.7 % on Oct 22						Hours in Service: 744																			
Minimum Value: 26 % on Oct 3 19:00																			Minimum Daily Average: 39.6 % on Oct 6						Hours of Data: 744																			
Maximum Diurnal Average: 79.6 % at hour 7																			Minimum Diurnal Average: 65.9 % at hour 16						Hours of Missing Data: 0																			
Monthly Average: 72.7 %																			Percentiles: P <sub>1</sub> = 31 P <sub>10</sub> = 51 Q <sub>1</sub> = 62 Median = 74 Q <sub>3</sub> = 84 P <sub>90</sub> = 95 P <sub>99</sub> = 98						Hours of Calibration: 0																			
																			Percent Operational Time: 100.0																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																				
1-Oct	77	73	72	73	73	80	82	81	77	77	74	71	86	93	87	86	83	79	77	75	74	76	76	79	78.4	93																		
2-Oct	80	81	80	83	81	77	75	74	73	67	63	58	58	58	55	52	50	53	57	60	62	65	63	61	66.0	83																		
3-Oct	63	64	65	68	80	83	79	77	70	60	54	49	39	36	34	32	30	27	26	30	33	38	44	47	51.2	83																		
4-Oct	51	55	61	73	76	74	77	79	78	72	64	60	55	50	49	51	52	51	52	54	54	57	56	58	60.8	79																		
5-Oct	58	58	58	56	52	53	55	59	61	57	50	43	35	31	31	31	32	34	34	36	34	32	34	37	44.3	61																		
6-Oct	39	35	33	34	35	33	33	35	35	32	31	31	31	32	36	40	41	44	47	43	53	56	60	61	39.6	61																		
7-Oct	66	68	67	69	77	86	87	89	90	87	84	78	70	64	70	77	66	63	67	76	65	66	67	65	73.6	90																		
8-Oct	65	64	64	65	66	68	69	66	66	64	73	75	64	59	58	58	56	55	57	57	57	57	58	59	62.5	75																		
9-Oct	61	64	72	73	75	74	71	70	72	89	95	95	93	93	86	72	62	60	62	75	75	77	74	75	75.7	95																		
10-Oct	77	79	80	81	79	81	83	84	79	76	82	85	84	82	80	79	84	83	84	87	91	93	95	97	83.7	97																		
11-Oct	96	97	98	98	98	98	98	98	98	94	92	87	82	78	75	74	73	74	73	71	71	73	74	73	85.3	98																		
12-Oct	73	73	72	69	69	68	70	69	67	67	65	63	61	59	57	55	55	56	57	60	66	68	69	75	65.1	75																		
13-Oct	79	81	81	83	83	83	82	81	81	77	68	61	56	53	53	55	59	66	80	83	83	83	87	88	74.4	88																		
14-Oct	90	90	88	87	86	88	89	88	85	83	81	75	65	61	59	62	69	69	70	75	64	64	66	69	76.0	90																		
15-Oct	77	74	71	72	73	74	78	82	80	74	71	72	80	87	87	90	85	80	74	71	68	64	61	58	75.0	90																		
16-Oct	56	55	58	70	73	73	76	76	77	72	62	55	52	49	46	45	46	46	46	49	58	63	66	70	59.9	77																		
17-Oct	75	85	85	83	82	86	90	90	90	90	94	95	96	97	98	97	98	97	97	94	86	82	79	77	89.3	98																		
18-Oct	78	75	75	79	78	81	82	79	77	76	72	68	62	59	55	55	63	69	75	78	79	81	83	83	73.4	83																		
19-Oct	83	82	81	81	81	80	82	81	80	75	66	62	58	54	52	52	54	55	55	56	60	65	67	68	68.0	83																		
20-Oct	70	72	72	74	75	77	80	80	80	79	75	75	70	70	70	71	84	88	85	82	82	83	83	83	77.4	88																		
21-Oct	84	85	84	92	98	98	98	98	98	99	99	99	99	99	90	80	75	80	97	98	98	98	97	97	93.4	99																		
22-Oct	97	97	96	96	96	95	95	95	95	96	96	97	97	96	97	97	98	98	98	98	98	98	98	98	96.7	98																		
23-Oct	98	96	88	82	75	77	79	78	78	76	69	63	58	51	45	43	43	44	47	51	54	60	62	62	65.7	98																		
24-Oct	59	60	66	71	67	58	63	67	65	59	49	42	48	58	65	66	68	72	73	73	75	78	82	84	65.2	84																		
25-Oct	88	92	93	95	96	97	97	96	93	92	91	94	93	91	92	91	90	89	84	81	75	76	72	74	88.8	97																		
26-Oct	74	74	74	71	72	74	75	77	77	77	74	72	71	72	74	75	76	77	80	85	87	87	87	89	77.1	89																		
27-Oct	89	87	86	86	87	92	94	95	95	92	87	81	75	71	69	71	71	73	74	75	75	75	75	77	81.4	95																		
28-Oct	80	82	81	77	73	70	69	68	68	65	56	50	47	45	46	47	49	55	68	64	59	54	55	62	62.2	82																		
29-Oct	64	59	59	60	64	76	86	81	84	81	80	78	71	70	67	69	72	74	75	76	77	73	71	69	72.3	86																		
30-Oct	69	68	69	71	74	76	78	80	80	81	81	80	79	75	73	73	74	77	78	81	82	85	86	89	77.4	89																		
31-Oct	90	94	95	94	94	95	95	96	96	96	94	96	97	97	98	97	96	97	95	95	95	94	92	88	94.8	98																		
																			74.3	74.8	75.1	76.3	77.0	78.2	79.6	79.6	78.9	76.8	74.0	71.3	68.7	67.4	66.2	65.9	66.2	67.2	69.3	70.5	70.5	71.7	72.2	73.4	Diurnal Average	
																			98	97	98	98	98	98	98	98	98	99	99	99	99	99	98	97	98	98	98	98	98	98	98	98	Diurnal Maximum	





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Relative Humidity 45m (RH45m) - %**  
**Mannix - October 2017**

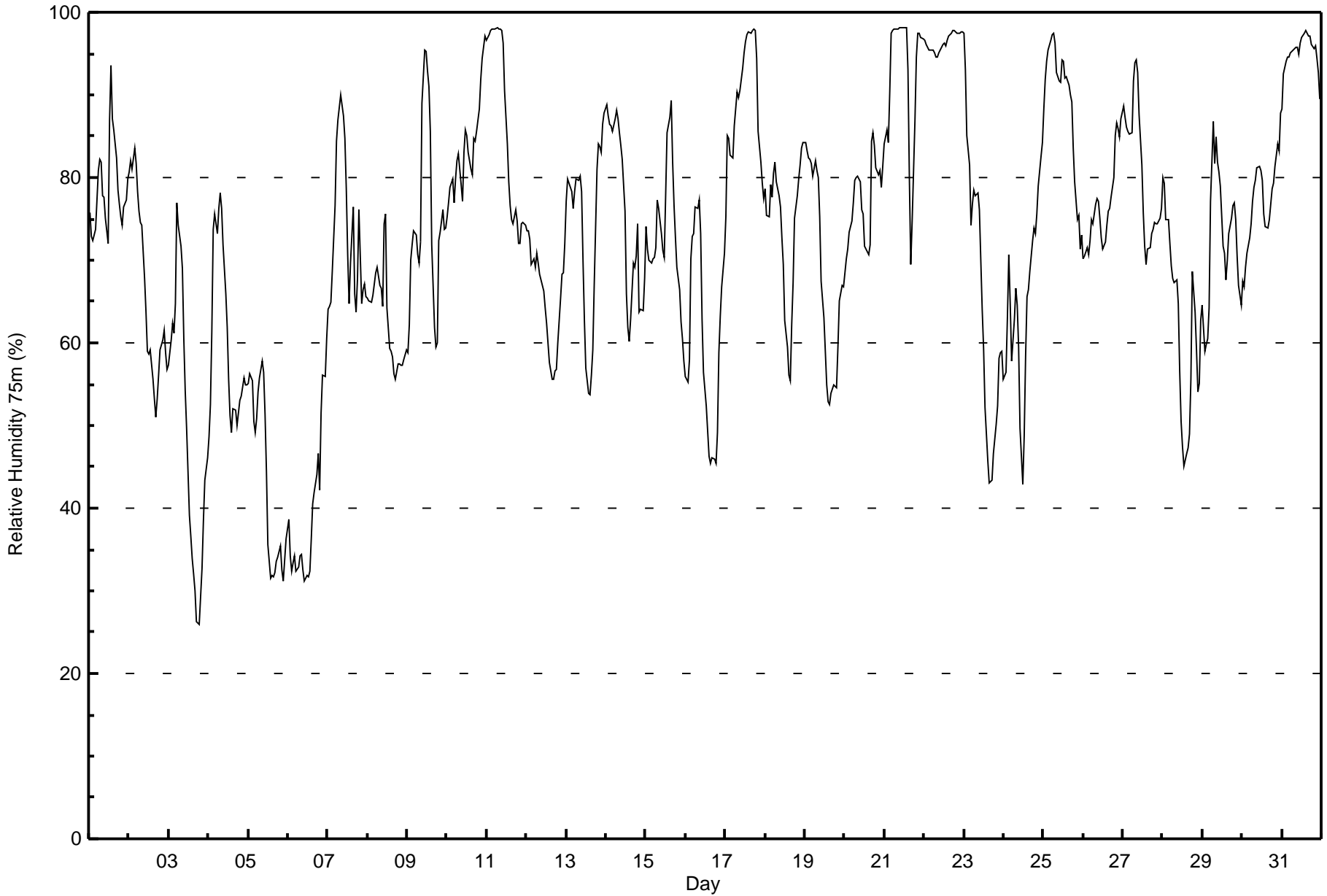
<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	38	5.11	5.11
40 - 60	123	16.53	21.64
60 - 80	326	43.82	65.46
80 - 100	257	34.54	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Value: 98 % on Oct 21 13:00      Maximum Daily Average: 96.4 % on Oct 22																			Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Minimum Value: 26 % on Oct 3 19:00      Minimum Daily Average: 39.2 % on Oct 6 Maximum Diurnal Average: 79.0 % at hour 8      Minimum Diurnal Average: 66.3 % at hour 17 Monthly Average: 72.5 %      Percentiles: P <sub>1</sub> = 32 P <sub>10</sub> = 51 Q <sub>1</sub> = 62 Median = 74 Q <sub>3</sub> = 84 P <sub>90</sub> = 95 P <sub>99</sub> = 98																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	76	73	72	73	74	81	82	82	78	78	75	72	87	94	87	86	82	78	77	75	74	76	77	80	78.7	94
2-Oct	81	82	81	84	82	78	76	75	74	68	64	59	59	59	56	53	51	53	56	59	60	62	59	57	66.1	84
3-Oct	57	60	62	61	65	77	74	72	69	60	54	50	39	37	34	32	30	26	26	29	33	38	43	46	49.0	77
4-Oct	49	53	61	74	76	73	76	78	76	72	66	62	56	51	49	52	50	52	52	53	54	56	55	55	60.4	78
5-Oct	55	56	55	51	49	51	54	56	58	56	51	44	36	32	32	32	32	34	34	35	33	31	34	36	43.2	58
6-Oct	39	34	32	33	34	32	33	34	34	33	31	32	32	32	36	41	42	44	47	42	52	56	56	60	39.2	60
7-Oct	64	64	65	69	77	84	87	88	90	88	85	79	71	65	70	76	66	64	68	76	65	66	67	66	73.2	90
8-Oct	65	65	65	66	67	68	69	67	67	64	74	76	64	59	59	58	56	56	58	57	57	57	58	59	63.1	76
9-Oct	59	62	70	72	73	73	71	70	72	89	95	95	93	91	86	72	62	59	60	72	73	76	74	74	74.7	95
10-Oct	75	77	79	80	77	80	82	83	79	77	83	86	85	83	81	80	85	84	86	88	92	94	96	97	83.7	97
11-Oct	97	97	98	98	98	98	98	98	98	98	96	90	84	79	77	75	74	76	75	72	72	74	75	74	86.3	98
12-Oct	74	74	73	70	70	69	71	70	68	68	66	64	62	60	58	56	56	57	57	60	65	68	68	72	65.6	74
13-Oct	77	80	79	78	76	78	80	80	80	78	70	63	57	54	54	56	59	67	81	84	84	83	87	88	73.9	88
14-Oct	89	87	86	86	86	87	88	87	85	84	82	76	66	62	60	63	70	69	71	74	64	64	64	68	75.8	89
15-Oct	74	71	70	70	70	70	72	77	76	73	71	70	78	85	87	89	82	77	73	69	66	63	60	58	73.0	89
16-Oct	56	55	58	70	73	73	77	76	77	73	63	56	52	49	46	45	46	46	45	49	59	63	67	71	60.3	77
17-Oct	75	85	85	83	82	86	88	90	90	91	93	95	96	97	98	98	98	98	98	94	86	82	79	77	89.4	98
18-Oct	79	75	75	79	78	81	82	80	78	76	73	69	63	60	56	55	62	67	75	78	80	82	84	84	73.7	84
19-Oct	84	83	82	82	82	80	82	81	80	75	67	63	59	55	53	53	54	55	55	55	60	65	67	67	68.3	84
20-Oct	69	70	71	73	75	77	80	80	80	80	76	76	72	71	71	72	84	85	84	81	80	81	79	81	77.0	85
21-Oct	84	86	84	90	98	98	98	98	98	98	98	98	98	98	93	80	69	75	87	95	98	97	97	97	92.2	98
22-Oct	97	96	96	96	95	95	95	95	95	95	96	96	96	96	97	97	98	98	98	98	97	98	98	98	96.4	98
23-Oct	97	93	85	82	74	77	79	78	78	76	70	64	59	52	46	43	43	43	47	50	52	58	59	59	65.2	97
24-Oct	56	57	63	71	65	58	63	67	65	59	50	43	49	58	66	67	69	72	74	73	76	79	83	84	65.1	84
25-Oct	88	92	94	95	97	97	97	96	93	92	91	94	94	92	92	91	90	89	84	79	75	75	71	73	88.9	97
26-Oct	70	70	72	71	72	75	74	77	77	77	75	73	71	72	74	76	76	78	80	85	87	86	85	87	76.7	87
27-Oct	89	87	86	86	85	86	92	94	94	93	88	82	76	72	69	71	71	73	74	75	74	74	75	76	80.9	94
28-Oct	80	79	75	75	72	69	68	67	68	65	57	51	47	45	47	47	49	56	69	64	59	54	55	63	61.6	80
29-Oct	65	59	60	60	64	77	87	82	85	82	81	79	72	71	68	70	73	75	77	77	75	71	67	65	72.5	87
30-Oct	67	67	69	71	73	74	77	79	80	81	81	81	80	76	74	74	75	77	79	79	81	84	83	88	77.1	88
31-Oct	88	93	94	95	95	95	95	95	96	96	95	96	97	98	98	98	97	97	96	96	96	94	93	90	95.0	98
	73.3	73.7	74.2	75.5	75.9	77.4	78.9	79.0	78.7	77.2	74.8	72.1	69.3	67.9	66.8	66.4	66.3	67.1	68.9	70.2	70.3	71.3	71.4	72.6	Diurnal Average	
	97	97	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	Diurnal Maximum	





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Relative Humidity 75m (RH75m) - %**  
**Mannix - October 2017**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	37	4.97	4.97
40 - 60	132	17.74	22.72
60 - 80	332	44.62	67.34
80 - 100	243	32.66	100.00

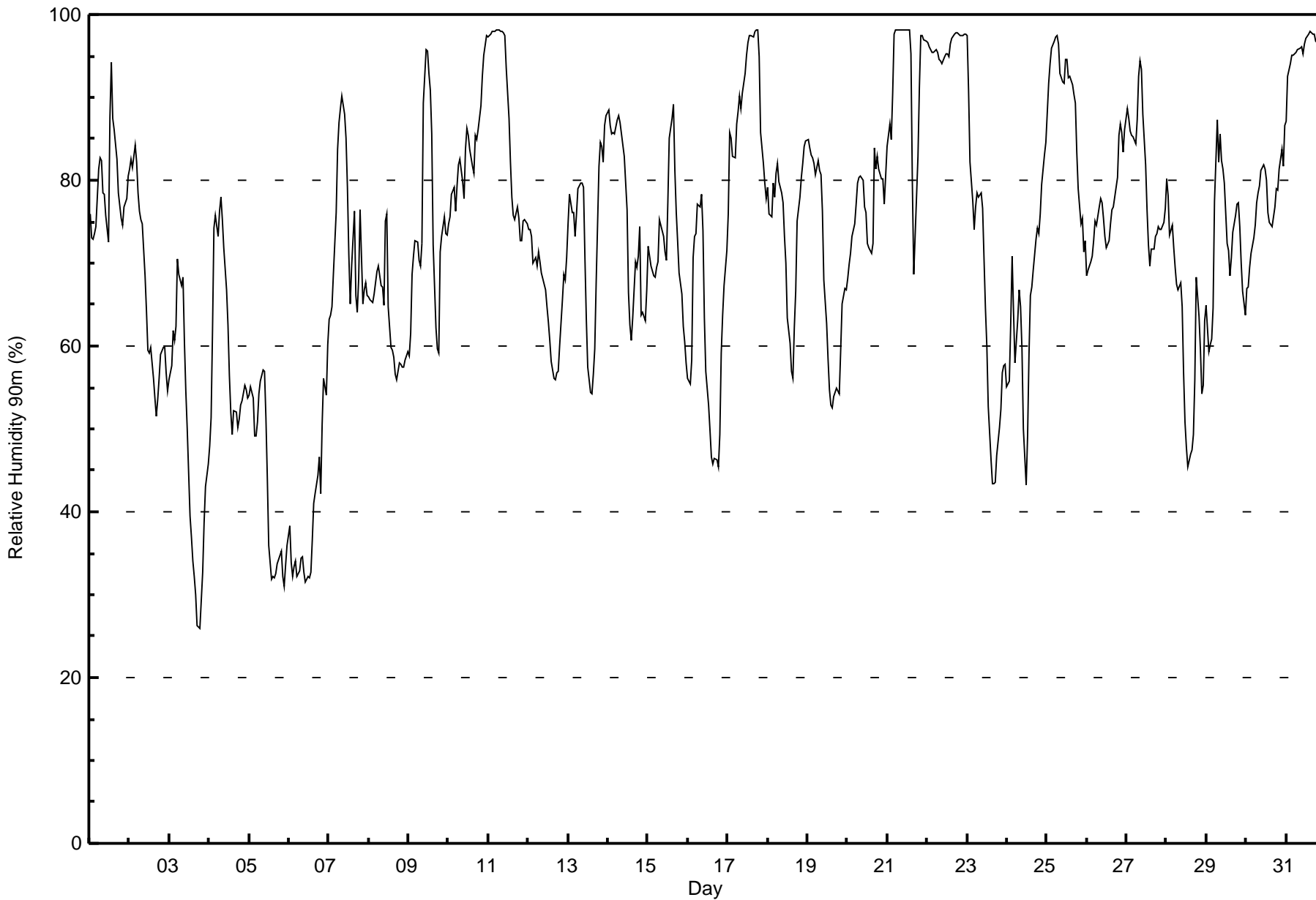
Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Value: 98 % on Oct 21 13:00      Maximum Daily Average: 96.2 % on Oct 22																			Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																																																																																																	
Minimum Value: 26 % on Oct 3 19:00      Minimum Daily Average: 39.2 % on Oct 6 Maximum Diurnal Average: 78.9 % at hour 8      Minimum Diurnal Average: 66.5 % at hour 17 Monthly Average: 72.5 %      Percentiles: P <sub>1</sub> = 32 P <sub>10</sub> = 51 Q <sub>1</sub> = 62 Median = 74 Q <sub>3</sub> = 84 P <sub>90</sub> = 95 P <sub>99</sub> = 98																																																																																																																				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																																																																																										
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																																																																																												
1-Oct	76	73	73	74	74	81	83	82	79	78	76	73	88	94	87	86	83	79	77	75	75	77	78	80	79.2	94																																																																																										
2-Oct	81	83	82	84	82	79	76	75	75	68	64	60	59	60	56	54	51	53	56	59	60	60	57	55	66.2	84																																																																																										
3-Oct	56	58	62	61	62	70	69	67	68	61	55	50	39	37	34	32	30	26	26	29	33	39	43	46	48.0	70																																																																																										
4-Oct	48	51	62	74	76	73	76	78	75	72	67	63	56	52	49	52	50	51	53	53	55	55	54	54	60.3	78																																																																																										
5-Oct	54	55	54	49	49	51	54	56	57	57	51	44	36	32	32	32	33	34	34	35	32	31	34	36	43.0	57																																																																																										
6-Oct	38	34	32	33	34	32	33	34	35	33	31	32	32	33	37	41	42	44	47	42	50	56	54	60	39.2	60																																																																																										
7-Oct	63	64	65	69	76	84	87	89	90	88	85	79	71	65	70	76	66	64	68	76	65	67	68	66	73.4	90																																																																																										
8-Oct	66	66	65	66	68	69	70	67	67	65	75	76	65	60	60	59	57	56	58	58	57	57	58	59	63.5	76																																																																																										
9-Oct	59	61	69	71	73	73	70	70	72	89	96	96	93	91	86	72	62	60	59	71	73	76	74	73	74.5	96																																																																																										
10-Oct	75	76	78	79	76	79	82	83	80	78	84	86	85	84	82	81	85	85	86	89	93	95	96	98	83.9	98																																																																																										
11-Oct	97	98	98	98	98	98	98	98	98	98	97	94	87	82	78	76	75	77	75	73	73	75	75	75	87.1	98																																																																																										
12-Oct	74	74	73	70	71	70	71	70	69	68	67	65	63	61	58	56	56	57	57	60	66	69	68	71	65.9	74																																																																																										
13-Oct	75	78	76	76	73	76	79	80	80	79	71	63	57	54	54	57	60	68	82	85	84	82	87	88	73.4	88																																																																																										
14-Oct	89	87	86	86	86	87	88	87	86	84	83	76	66	62	61	63	70	69	71	74	64	64	63	67	75.8	89																																																																																										
15-Oct	72	71	70	68	68	70	70	75	74	73	71	70	77	85	87	89	81	76	72	69	66	62	60	58	72.4	89																																																																																										
16-Oct	56	55	58	71	73	74	77	77	78	74	63	57	53	50	47	46	46	46	45	49	59	64	67	71	60.7	78																																																																																										
17-Oct	76	86	85	83	83	87	88	90	89	90	93	95	97	97	97	97	98	98	98	95	86	82	80	78	89.5	98																																																																																										
18-Oct	79	76	76	80	78	81	82	80	79	77	73	70	63	60	57	56	62	67	75	78	80	82	84	85	74.2	85																																																																																										
19-Oct	85	84	83	83	82	81	82	81	81	76	68	63	59	55	53	53	54	55	55	54	60	65	67	67	68.5	85																																																																																										
20-Oct	68	70	71	73	75	77	80	80	80	80	77	76	72	72	71	72	84	81	83	81	80	80	77	81	76.8	84																																																																																										
21-Oct	84	87	85	91	98	98	98	98	98	98	98	98	98	98	95	80	69	73	83	91	98	97	97	97	91.9	98																																																																																										
22-Oct	97	96	96	95	95	96	96	95	94	94	95	95	95	95	96	97	98	98	98	98	97	98	98	98	96.2	98																																																																																										
23-Oct	97	91	82	78	74	77	78	78	78	77	71	65	60	53	46	43	43	44	47	50	52	57	58	58	64.8	97																																																																																										
24-Oct	55	56	63	71	64	58	63	67	65	60	50	43	49	59	66	67	69	73	74	74	76	80	83	85	65.4	85																																																																																										
25-Oct	88	92	94	96	97	97	97	97	93	92	92	95	95	92	93	92	90	89	83	79	75	75	71	73	89.0	97																																																																																										
26-Oct	68	69	70	71	73	75	75	77	78	77	75	73	72	73	75	76	77	78	80	85	87	86	83	86	76.7	87																																																																																										
27-Oct	89	87	86	85	85	84	87	93	94	93	88	82	77	72	70	72	72	73	74	74	74	74	75	77	80.7	94																																																																																										
28-Oct	80	78	73	75	72	69	67	67	68	65	57	51	48	45	47	47	49	56	68	64	59	54	55	63	61.6	80																																																																																										
29-Oct	65	59	60	61	65	77	87	82	86	82	81	80	72	72	68	71	74	76	77	77	74	70	67	64	72.8	87																																																																																										
30-Oct	67	67	70	71	73	75	77	78	79	81	82	81	80	76	75	74	76	77	79	79	81	84	82	87	77.1	87																																																																																										
31-Oct	87	93	94	95	95	95	96	96	96	96	95	96	97	98	98	98	98	98	97	96	97	95	94	90	95.3	98																																																																																										
																			73.0				73.3				73.9				75.3				75.8				77.2				78.7				78.9				78.7				77.6				75.2				72.5				69.8				68.4				67.3				66.7				66.5				67.1				68.9				70.2				70.3				71.2				71.2				72.3				Diurnal Average	
																			97				98				98				98				98				98				98				98				98				98				98				98				98				98				98				98				98				98				98				98				98				Diurnal Maximum													







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Relative Humidity 90m (RH90m) - %**  
**Mannix - October 2017**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	37	4.97	4.97
40 - 60	134	18.01	22.98
60 - 80	325	43.68	66.67
80 - 100	248	33.33	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 42 km/h on Oct 24 13:00	Maximum Daily Speed Average: 20.0 km/h on Oct 1	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 30 15:00	Minimum Daily Speed Average: 1.3 km/h on Oct 4	Hours of Data: 723
Maximum Diurnal Speed Average: 6.2 km/h at hour 15	Minimum Diurnal Speed Average: 3.4 km/h at hour 7	Hours of Missing Data: 21
Monthly Average Velocity: 4.8 km/h 278.5 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 5 Q <sub>1</sub> = 9 Median = 13 Q <sub>3</sub> = 17 P <sub>90</sub> = 25 P <sub>99</sub> = 35	Percent Operational Time: 97.2

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	WNW16	WNW20	WNW22	WNW24	WNW23	WNW23	WNW21	WNW21	WNW21	WNW19	NW19	NNW19	N18	NNW17	NW19	NW17	NW19	NW22	NNW21	NNW23	NNW27	NNW29	NNW28	NNW30	NW20.0	NNW30	
2-Oct	NNW31	NNW31	NNW28	NNW27	NNW25	NNW28	NNW29	NNW31	NNW28	N28	NNW29	NNW23	NNW22	NNW22	NNW20	NNW17	NNW16	NNW13	NW8	WNW10	WNW9	W11	W12	WSW12	NNW19.7	NNW31	
3-Oct	WSW12	SSW7	SSE8	SSE11	SSE11	SSE12	SSE12	SSE16	SSE16	SSE16	S14	S16	SSW20	SSW19	SSW18	SSW12	S12	S6	W8	W23	W22	W23	W20	W18	SSW10.4	W23	
4-Oct	WNW14	NW13	NNW11	N12	N11	NNW9	W7	WSW9	W10	W10	W6	WSW5	SW2	SSE3	SE6	SE10	SE8	SE9	SE10	SE10	SE9	SSE7	SE8	SE9	SW1.3	WNW14	
5-Oct	SE10	SSE10	SE7	SE7	SSE10	SSE11	SSE11	SSE9	SE7	SE7	SE7	SE7	S10	SSW13	SSW18	SSW19	SSW15	SW16	WSW17	WSW17	WSW16	WSW14	WSW12	WSW13	SSW8.9	SSW19	
6-Oct	WSW12	WSW10	SW15	WSW16	SW13	WSW14	SW11	SW8	SSW11	SW16	WSW20	WSW23	WSW30	WSW27	WSW32	W22	W15	W13	W20	WSW13	WSW11	W14	W4	NW4	WSW15.1	WSW32	
7-Oct	SW5	SSW3	SW4	WSW8	W12	NW8	NNW8	NNW14	NNW14	NNW14	NNW13	NW10	WNW11	NW11	NNW14	NNW18	NW23	NNW21	NW26	NW23	NW28	NW24	NW29	NW30	NW14.2	NW30	
8-Oct	NW28	NW29	NW28	NW30	NW29	NW25	NW20	NW25	NW26	NW24	WNW26	WNW25	WNW24	WNW25	WNW24	WNW21	WNW18	WNW16	WNW12	W12	WSW9	WSW10	SW7	SSW9	WNW19.4	NW30	
9-Oct	S9	SSE12	SSE13	SSE13	SSE14	SE16	SE17	SSE16	SE15	SE16	SSE17	SSE18	SSE13	S7	W7	W18	W21	WSW11	SW11	WSW17	WSW13	WSW14	W13	WSW10	S9.0	W21	
10-Oct	WSW11	WSW11	WSW16	WSW15	W10	W11	W12	WSW10	NNW15	NW15	NNW8	NE6	NE5	NNE8	NNE9	NNE10	NE9	NNE10	NNE11	NNE11	NNE15	NNE16	NNE15	NNE12	NNW5.8	WSW16	
11-Oct	N17	N14	N16	N17	AF	AF	AF	AF	AF	AF	AF	AF	AF	NNE24	NNE24	NNE19	N20	N15	N17	N21	N20	N14	N14	N13	----	NNE24	
12-Oct	NNW15	N16	N16	N16	NNW14	NW14	NW17	NW17	NW16	NNW16	NW16	NW16	NNW14	NW13	NNW11	NW12	NNW11	NNW9	NNW9	WNW9	WNW13	NNW12	NW6	W11	NNW12.5	NW17	
13-Oct	W11	W11	W11	W11	WSW11	SW6	SW4	SW5	SSW5	SW6	SW4	WSW7	WSW8	SW11	SW12	SSW12	SSW13	SW13	SSW13	SSW8	SW9	SSW9	SSW8	SSW4	SW8.0	SW13	
14-Oct	SSE5	SSE8	SSE10	SSE10	SSE10	SSE13	SSE15	SSE16	SSE18	SSE16	SSE14	SSE14	SSE9	SW13	SW16	SW18	WSW18	WSW16	W15	W14	WNW17	WNW24	WNW20	WNW17	WSW14	SW8.9	WNW24
15-Oct	WSW12	WSW12	WSW11	WSW10	WSW12	SE7	SSE10	SSE13	SE12	SSE14	SSE13	SE13	SE13	SE13	SE16	SE14	SE11	SSE11	S10	S10	S10	SSW13	SSW14	SW13	S9.4	SSE16	
16-Oct	SW18	SW23	W33	W26	W19	WSW11	SSW8	SSW8	S6	SSW5	SW12	WSW10	SW16	SW16	WSW13	WSW9	SSW6	S8	S8	SSW11	SW13	SSW8	S5	SSE9	SW10.7	W33	
17-Oct	SSE7	SSE6	SE7	ESE5	SE9	SE7	SSE9	SSE12	SSE8	SSE8	SSE10	ESE6	NE5	NNE6	N9	NNW7	NW10	NW17	WNW17	WNW20	WNW25	WNW27	WNW31	WNW29	W4.5	WNW31	
18-Oct	W32	W35	W37	W34	WNW31	WNW32	WNW27	W25	W25	W22	WNW21	WNW17	W13	WNW9	WNW4	WNW3	ESE7	SE10	SE12	SE12	ESE14	ESE15	ESE16	ESE15	W11.2	W37	
19-Oct	ESE18	ESE17	ESE18	SE20	SE17	SE20	SE17	SE16	SE16	SE16	SSE13	SE10	SE10	SE10	SE14	SE17	SE15	SE16	SE17	SE15	SE20	SE17	SE16	SE17	SE15.8	SE20	
20-Oct	SE13	SE14	SE15	SE12	SE9	ESE8	SE10	E11	SE8	SE10	E8	ESE8	ENE4	E11	SE7	SSW5	WNW11	W7	WSW3	W2	S5	SW5	WNW5	NNW5	SE4.8	SE15	
21-Oct	NNW8	NW6	WNW10	NNW7	NNE7	N6	NW3	NNW4	NNW2	SSE3	S5	SSE4	SE6	SE6	E6	ENE4	N3	N6	N9	NNW5	NNW5	N4	NNW3	W1	N2.3	WNW10	
22-Oct	S2	SSE1	N1	WNW2	N2	AF	AF	AF	AF	AF	NNW4	NNW7	NNW8	NNW10	NW11	NNW8	NW9	WNW8	NNW5	NNW4	WNW3	W2	S4	S6	NW3.8	NW11	
23-Oct	S7	SSW7	WSW10	W18	W22	WSW12	WSW14	WSW12	WSW9	W12	W18	W15	W12	WSW17	WSW17	WSW12	SW11	SW10	SW13	SSW11	SSE8	SSE14	SSE13	S13	WSW10.2	W22	
24-Oct	SSE11	SSE12	SE14	SSE17	SSE16	SW12	W13	W24	W35	W35	W33	WNW38	WNW42	WNW39	WNW30	WNW29	NW23	NNW14	NNW12	NNE14	NNE14	NE11	NE10	ENE10	WNW11.7	WNW42	
25-Oct	NE9	NE10	NNE12	NNE12	NNE13	NNE11	NNE14	N18	N22	N25	N24	N14	N19	N18	NNW17	NNW18	NNW19	NNW19	NNW16	NNW15	NNW11	NW11	W11	W12	WSW10	N12.9	N25
26-Oct	SW11	SW12	SW13	SW20	SW19	SSW16	S12	S15	S16	S15	S15	S14	SSW14	SSW16	SSW14	SW9	SW10	SW9	SW10	SW8	WSW6	W11	W12	WSW1	SSW11.5	SW20	
27-Oct	S2	SSW4	SE3	S6	SSE9	SSE11	SE8	SSE10	SSE11	SE11	SE12	SE15	SSE17	SSE17	SSE14	SE16	SSE15	SE16	SSE17	SSE18	SSE16	SSE17	SSE14	SSE17	SSE12.2	SSE18	
28-Oct	SSE14	SSE15	SSE11	S4	WSW5	WSW15	WSW15	WSW20	WSW18	WSW16	W18	WNW26	WNW32	NW30	NW30	NW31	NW32	NW31	NW31	NW30	NW31	NW35	NW27	NW28	WNW17.5	NW35	
29-Oct	NW31	NW34	NW33	NW33	NW27	NNW22	NNW23	NNW25	NNW21	NNW22	NNW20	NNW18	NNW20	NNW18	N14	N11	NNE10	NNE4	ESE2	SSW4	SSE5	S8	SSW7	S8	NNW14.1	NW34	
30-Oct	S7	SSW10	SSW12	SSW8	SE7	SE9	SSE10	SSE11	SSE12	SSE13	SSE12	SSE10	SE7	SE5	NNE0	SE2	NNW3	N6	NNW8	N10	NNW9	N7	NNE7	NNE6	SSE2.9	SSE13	
31-Oct	NNW3	N3	N5	NW1	SSE2	SSE2	SE6	SE7	SE8	ESE7	ENE9	NE9	NNE7	NNE9	AF	AF	N15	AF	AF	AF	AF	AF	AF	N12	NNE21	----	NNE21

W4.7	W4.6	W5.1	W5.6	W5.1	W4.1	WSW3.4	WSW3.7	WSW4.0	W3.6	W4.2	WNW4.2	W5.7	WNW5.7	WNW6.2	WNW5.7	WNW5.7	WNW5.0	WNW5.1	WNW5.7	WNW5.5	W5.7	WNW5.0	W4.1	Diurnal Average
W32	W35	W37	W34	WNW31	WNW32	NNW29	NNW31	W35	W35	W33	WNW38	WNW42	WNW39	WSW32	NW31	NW32	NW31	NW31	NW30	NW31	NW35	WNW31	NNW30	Diurnal Maximum

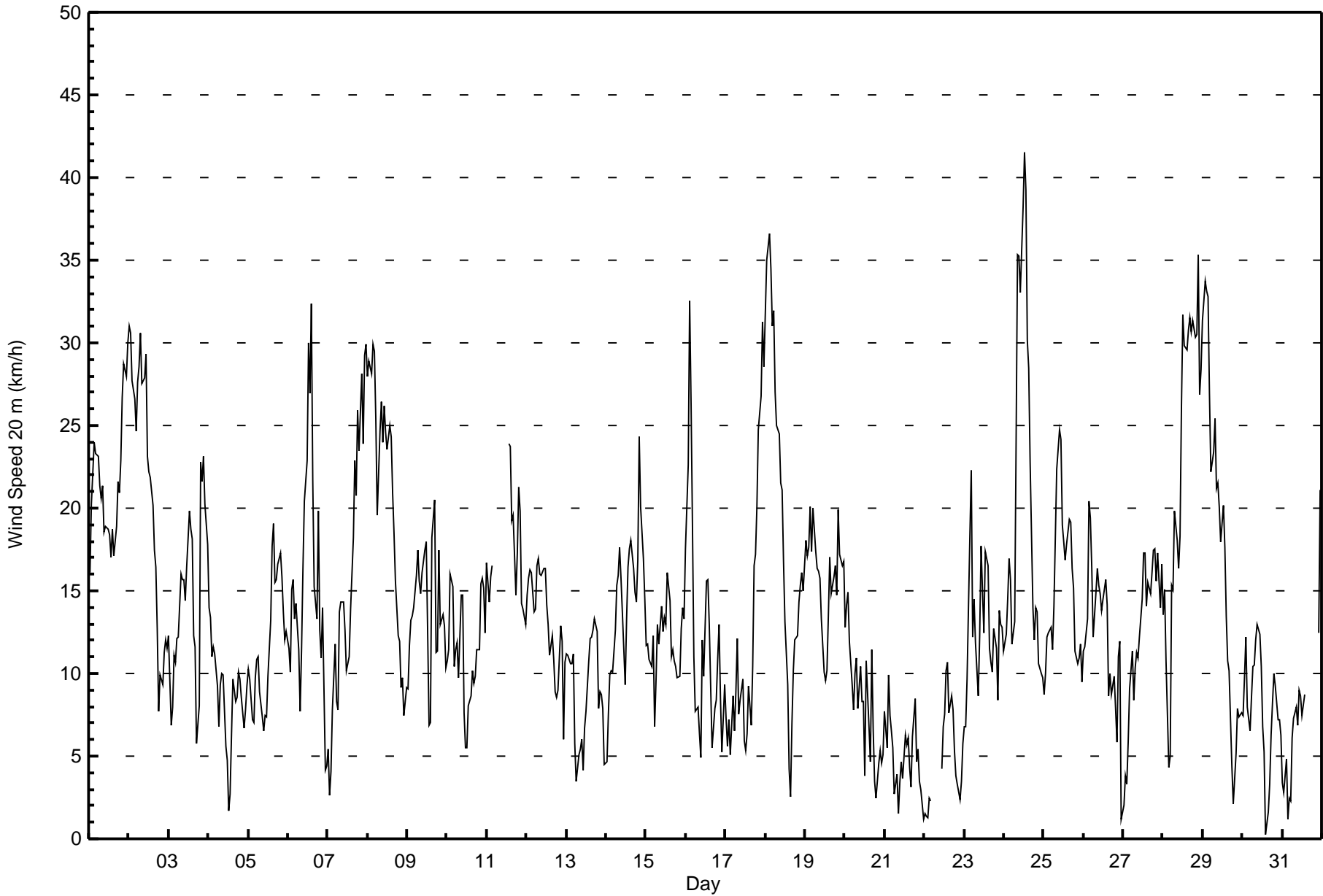
AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Speed 20 m (WS20m) - km/h**  
**Mannix - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on Oct 24 08:00 Minimum Value: 1 km/h on Oct 31 04:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 5 P <sub>90</sub> = 7 P <sub>99</sub> = 9														Hours in Service: 744 Hours of Data: 723 Hours of Missing Data: 21 Hours of Calibration: 0 Percent Operational Time: 97.2																																	
Day	Hourly Period Ending At (MST)																								Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Oct	5	5	5	6	5	5	5	5	5	6	5	6	7	5	5	5	5	6	6	7	8	9	9	9	9																						
2-Oct	10	10	9	8	7	9	9	9	8	10	9	7	6	7	6	6	5	4	2	2	2	1	1	1	10																						
3-Oct	2	1	2	2	2	3	3	3	4	5	5	6	7	6	6	5	4	2	5	4	3	3	2	3	7																						
4-Oct	3	3	3	4	3	3	2	1	1	2	2	3	2	2	3	3	2	2	2	2	2	2	2	2	4																						
5-Oct	2	2	2	1	2	1	1	1	2	2	2	3	5	5	6	6	5	5	4	4	3	3	2	2	6																						
6-Oct	3	2	4	4	2	2	2	2	3	5	5	6	8	8	9	7	4	3	11	3	3	7	4	2	11																						
7-Oct	2	2	3	3	3	3	2	4	4	4	4	3	3	4	5	5	7	7	7	6	7	6	7	8	8																						
8-Oct	7	7	7	7	7	6	7	6	7	6	6	6	5	6	5	5	5	4	3	3	3	2	2	2	7																						
9-Oct	1	2	2	3	3	4	4	4	3	4	4	4	3	3	3	5	4	2	2	8	3	3	4	2	8																						
10-Oct	1	2	3	2	3	2	2	2	3	4	3	2	2	2	2	4	2	3	3	3	4	4	4	3	4																						
11-Oct	4	4	4	5	AF	AF	AF	AF	AF	AF	AF	AF	AF	6	6	5	6	5	5	5	5	6	4	5	6																						
12-Oct	5	5	6	6	4	4	4	4	4	4	5	5	4	4	4	3	3	2	2	3	3	3	2	1	6																						
13-Oct	2	2	1	1	1	3	1	1	1	2	2	2	3	4	4	4	5	3	3	2	2	3	1	1	5																						
14-Oct	1	1	2	2	2	2	3	3	4	3	3	3	4	4	5	5	4	3	2	3	5	4	3	2	5																						
15-Oct	2	2	2	1	1	2	2	3	3	4	3	3	3	5	4	2	2	2	3	3	2	3	4	4	5																						
16-Oct	4	5	8	6	3	5	2	2	2	2	4	3	4	4	3	3	1	1	1	4	4	2	1	1	8																						
17-Oct	2	1	2	3	2	2	2	3	2	3	3	2	2	2	2	3	3	4	4	4	7	7	7	6	7																						
18-Oct	7	7	7	6	7	8	6	5	4	5	5	3	3	4	2	2	3	3	4	4	5	5	5	5	8																						
19-Oct	6	5	6	6	5	5	5	4	4	4	4	3	3	3	5	4	4	5	4	5	5	4	4	4	6																						
20-Oct	3	2	4	3	4	3	3	4	3	3	3	2	2	4	3	3	3	2	2	2	1	1	2	1	4																						
21-Oct	2	2	2	3	2	2	2	2	1	2	2	2	2	2	2	2	1	2	2	2	2	2	1	1	3																						
22-Oct	1	1	2	2	2	AF	AF	AF	AF	AF	2	2	2	3	3	3	2	2	1	2	2	1	2	2	3																						
23-Oct	2	1	2	5	4	4	3	3	3	3	4	4	4	4	5	3	2	2	2	2	2	3	3	5																							
24-Oct	2	3	3	4	5	4	4	11	5	6	7	10	10	9	8	7	7	4	4	5	4	2	2	2	11																						
25-Oct	2	2	3	3	3	3	3	5	5	6	7	6	5	5	5	5	5	4	4	3	3	3	3	2	7																						
26-Oct	2	2	3	8	6	7	4	5	5	5	5	5	5	5	5	3	3	3	3	1	2	2	2	2	8																						
27-Oct	2	1	2	2	2	2	2	3	2	2	3	4	4	3	3	4	4	5	4	4	3	4	3	3	5																						
28-Oct	2	2	4	2	4	4	3	4	4	3	5	8	8	8	7	8	8	7	9	7	7	9	7	7	9																						
29-Oct	7	8	8	8	8	7	6	7	7	7	6	6	6	5	4	3	3	2	1	1	1	2	2	2	8																						
30-Oct	2	3	3	2	1	2	1	2	2	3	3	3	2	2	1	1	1	2	2	2	1	2	1	2	3																						
31-Oct	1	1	1	1	1	1	1	2	2	2	2	2	2	2	AF	AF	5	AF	AF	AF	AF	AF	4	5	5																						
Diurnal Maximum																								10	10	9	8	8	9	9	11	8	10	9	10	10	9	9	8	8	7	11	8	8	9	9	9
AF - Analyzer Failure																																															





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed 20 m (WS20m) - km/h  
Mannix - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	73	10.10	10.10
6 - 11	239	33.06	43.15
12 - 19	273	37.76	80.91
20 - 28	93	12.86	93.78
29 - 38	43	5.95	99.72
> 38	2	0.28	100.00

Total Number of Valid Hours: 723

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Wind Speed 20 m (WS20m) - km/h**  
**Mannix - October 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	6	2	2	2	0	3	2	8	7	7	7	4	4	5	3	11	73
6 - 11	9	14	7	2	4	5	36	38	15	18	15	23	17	8	10	18	239
12 - 19	19	11	0	0	0	7	30	49	9	17	20	34	23	12	13	29	273
20 - 28	7	3	0	0	0	0	3	0	0	1	1	6	12	22	16	22	93
29 - 38	0	0	0	0	0	0	0	0	0	0	0	2	8	8	18	7	43
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
<b>Totals</b>	41	30	9	4	4	15	71	95	31	43	43	69	64	57	60	87	723

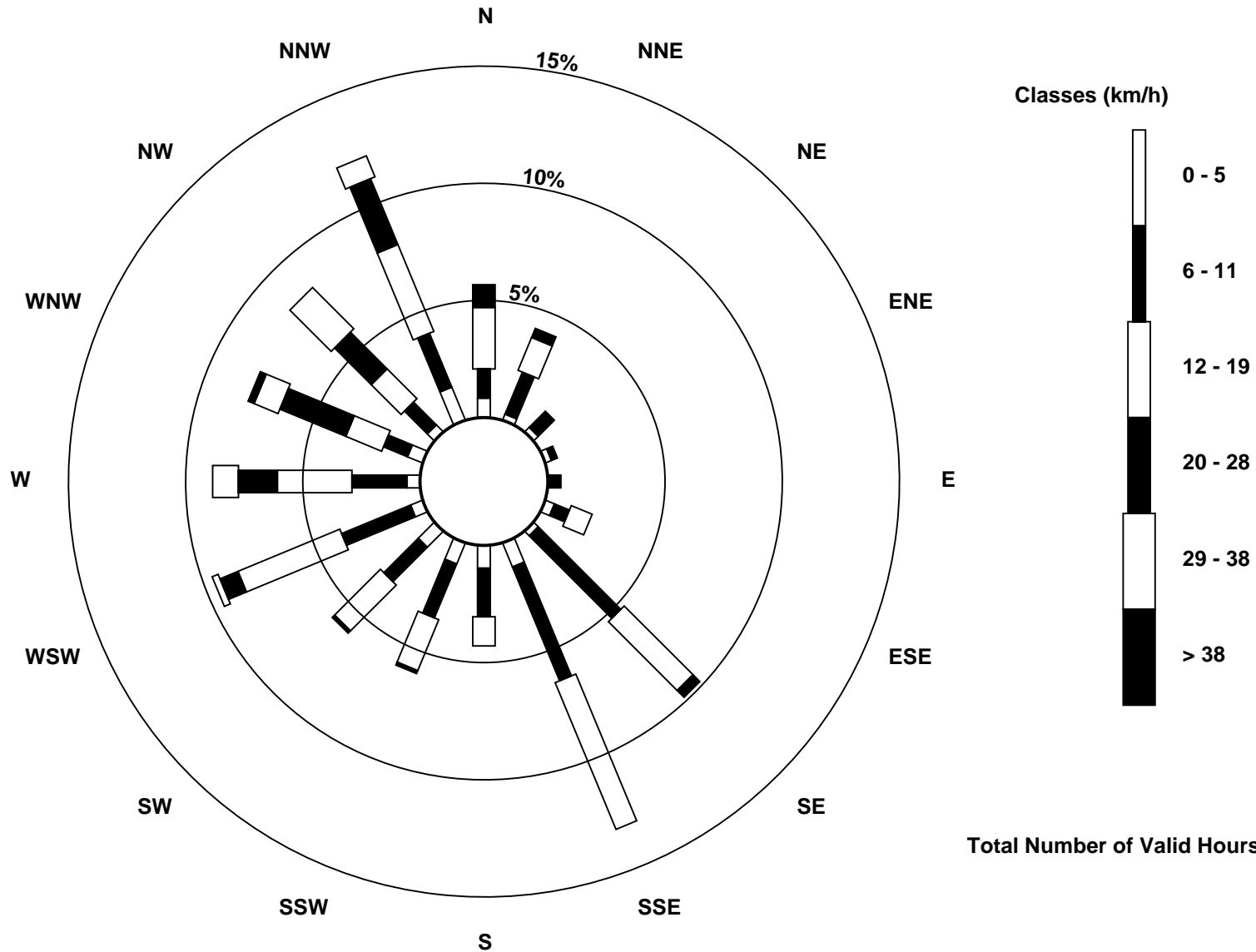
Total Number of Valid Hours: 723

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed 20 m (WS20m) - km/h  
Mannix (AMS 5)







Maximum Speed: 53 km/h on Oct 24 13:00	Maximum Daily Speed Average: 27.1 km/h on Oct 2	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 30 15:00	Minimum Daily Speed Average: 1.4 km/h on Oct 4	Hours of Data: 717
Maximum Diurnal Speed Average: 8.3 km/h at hour 4	Minimum Diurnal Speed Average: 4.6 km/h at hour 10	Hours of Missing Data: 27
Monthly Average Velocity: 6.7 km/h 271.9 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 8 Q <sub>1</sub> = 12 Median = 18 Q <sub>3</sub> = 23 P <sub>90</sub> = 32 P <sub>99</sub> = 42	Percent Operational Time: 96.4

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	WNW23	WNW28	WNW29	WNW32	WNW31	WNW31	WNW28	WNW26	WNW27	WNW24	NW25	NW25	NNW24	NNW23	NW26	NW23	NW26	NW29	NW29	NNW31	NNW36	NNW38	NNW38	NNW39	NW26.9	NNW39	
2-Oct	NNW41	NNW41	NNW37	NNW35	NNW33	NNW37	NNW39	NNW40	NNW37	N38	NNW40	NNW30	NNW28	NNW28	NNW27	NNW22	NNW22	NW17	NW13	WNW16	NW14	W16	W18	W16	NNW27.1	NNW41	
3-Oct	WSW16	SW12	S11	SSE13	SSE16	SSE18	SSE19	SSE22	SSE20	SSE21	S21	S24	S29	SSW27	SSW26	SSW18	S19	SSW10	W12	W27	W27	W28	W25	W24	SSW14.7	S29	
4-Oct	WNW22	NW21	NNW17	NNW18	NNW16	NNW14	W10	W12	W11	W10	WSW6	WSW5	WSW3	S2	SE6	ESE11	SE10	SE13	SE15	SE14	SE13	SSE11	SE11	SE15	WSW1.4	WNW22	
5-Oct	SE16	SSE15	SSE12	SSE13	SE14	S14	S14	WSE12	SE9	SE8	ESE8	SE9	S14	SSW19	SSW24	SSW27	SSW22	SW22	WSW24	SW25	SW24	WSW21	SW20	SW20	SSW13.7	SSW27	
6-Oct	SW19	SW17	SW23	SW22	SW20	SW21	SW17	SW14	SSW18	SW21	SW25	WSW28	WSW35	WSW31	WSW37	WSW25	W18	WSW17	WSW25	WSW18	SW17	WSW18	WSW7	NW6	WSW20.1	WSW37	
7-Oct	WSW6	SSW6	SSW7	WSW11	W16	NW13	NNW12	NNW20	NNW20	NNW19	NNW17	NW14	WNW14	NW14	NW19	NNW26	NW30	NNW29	NW33	NW31	NW37	NW31	NW38	NW40	NW19.1	NW40	
8-Oct	NW37	NW37	NW36	NW39	NW38	NW32	NW26	NW31	NW34	NW31	WNW32	WNW30	WNW29	WNW32	WNW30	WNW27	WNW24	WNW20	WNW16	W14	WSW12	SW12	SSW11	SSW14	WNW24.6	NW39	
9-Oct	S16	SSE18	SSE19	SSE19	SE20	SE21	SE23	SE21	SE19	SE20	SE22	SSE22	SSE15	S10	WSW10	WSW22	WSW24	WSW17	SW20	WSW24	SW19	WSW19	WSW18	WSW16	S12.7	WSW24	
10-Oct	SW17	WSW18	WSW23	WSW22	W16	W17	W18	W15	W19	WNW18	NNW9	NNE6	NNE6	NNE9	NNE10	NNE13	NNE11	NNE12	NNE15	NNE14	N20	NNE20	N19	N16	NW8.0	WSW23	
11-Oct	N22	N19	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	NNE24	N26	N20	NNW23	N28	N27	N19	NNW18	NNW17	----	N28	
12-Oct	NNW21	NNW22	N22	N22	NNW19	NW18	NW21	NW22	NW20	NNW21	NW21	NW22	NW17	NW17	NNW14	NW15	NNW15	NNW12	NNW13	WNW12	WNW18	NW17	NW8	W13	NW16.6	N22	
13-Oct	W14	W14	W14	W15	W14	WSW9	WSW5	SW8	SSW7	SW7	SW5	SW7	WSW9	SW13	SSW15	S17	SSW19	SSW18	SSW17	SSW12	SW13	SSW14	SSW13	SSW10	SW10.7	SSW19	
14-Oct	S6	SSE12	S15	S15	S15	SSE18	SSE22	SSE21	SSE22	SSE20	SSE17	SSE11	SSW17	SW20	SSW22	WSW23	WSW21	WSW19	W19	W23	WNW32	WNW28	WNW24	WSW19	SW12.1	WNW32	
15-Oct	WSW19	WSW18	WSW17	WSW16	WSW17	S10	SE15	SSE19	SE15	SE17	SE17	SE19	SE19	SE22	SSE19	SSE15	SSE16	SSE16	S19	S18	S18	SSW22	SSW22	SSW20	S13.9	SSE22	
16-Oct	SW25	SW29	WSW40	W32	W24	WSW16	SSW11	SSW13	S11	SSW6	SW14	SW11	SW19	SW16	SW13	SSW9	S14	S14	S17	SW18	SSW14	S9	SSE13	SW14.7	WSW40		
17-Oct	SSE12	SE9	ESE10	ESE7	SE12	SE10	SSE14	SSE17	SSE11	SSE11	SE13	ESE8	NE6	NNE8	N12	NNW10	NW14	NW21	WNW23	WNW27	W31	W34	W38	W35	W5.6	W38	
18-Oct	W38	W41	W42	W41	W39	WNW41	WNW35	W30	W28	W26	W26	W19	W15	WNW11	WNW6	WNW3	ESE8	SE14	SE15	ESE15	ESE16	ESE18	ESE17	ESE17	W13.6	W42	
19-Oct	ESE20	ESE20	ESE20	ESE23	ESE21	SE25	SE22	SE22	SE20	SE19	SSE15	SE11	ESE11	ESE11	ESE14	ESE21	ESE17	ESE20	SE22	ESE19	ESE25	SE22	SE22	ESE22	SE19.2	SE25	
20-Oct	SE17	SE18	SE19	SE15	ESE12	ESE10	SE13	E14	ESE10	SE12	E9	E9	ENE4	E12	ESE8	SSW6	W15	W10	WSW6	W6	SSW4	WSW11	WNW12	NW9	SE5.1	SE19	
21-Oct	NNW12	NW10	WNW14	NNW11	N9	NNW8	NW3	NNW5	NNW2	SSE4	S6	SE4	SE7	SE6	E7	ENE4	NNE2	N7	N13	NNW8	NNW7	N4	AF	AF	NNW3.5	WNW14	
22-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	NW7	AF	NW12	NW12	NNW9	NW11	WNW9	NNW7	NNW5	WNW4	W3	S5	S9	----	NW12
23-Oct	S9	SSW11	WSW17	W24	W27	WSW16	WSW21	WSW17	WSW12	WSW15	W20	W17	WSW14	WSW20	WSW19	WSW15	SW17	SW16	SW21	SSW20	S14	SSE21	S21	S21	SW14.4	W27	
24-Oct	S18	SSE20	SE23	SSE24	SSE23	SW17	WSW18	WSW29	WSW41	W40	W39	WNW49	WNW53	WNW48	WNW38	WNW36	NW30	NW19	NNW17	N19	NNE18	NE13	NE13	NE11	WNW14.6	WNW53	
25-Oct	NNE11	NNE13	NNE16	NNE16	NNE14	N18	N23	N30	N33	N32	NNW26	NNW24	NNW24	NNW24	NW26	NNW26	NNW22	NNW21	NNW16	WNW14	W13	W15	WSW13	NNW17.5	N33		
26-Oct	SW17	SW18	SW20	SW28	SW25	SSW23	S20	S24	S26	S23	S23	S21	SSW22	SSW23	SSW21	SW12	SW14	SW14	SSW16	SW12	WSW11	W16	W17	W5	SSW17.1	SW28	
27-Oct	SW1	SW5	SE1	SSE7	SSE12	SSE17	SE12	SSE16	SSE15	SE13	SE14	SE18	SSE20	SSE21	SE17	SE20	SE19	SE22	SE23	SE22	SE21	SSE24	SSE20	SSE24	SSE15.8	SSE24	
28-Oct	SSE20	SSE22	SSE16	SSW8	WSW11	WSW22	WSW22	SW28	SW25	WSW23	W22	WNW34	WNW40	NW38	NW38	NW39	WNW40	NW39	NW40	WNW39	NW40	NW46	NW35	NW37	WNW23.2	NW46	
29-Oct	NW41	NW44	NW43	NW42	NW35	NNW29	NNW31	NNW34	NNW28	NNW29	NNW26	NNW24	NNW27	NNW23	N17	N14	NNE13	NNE6	ESE2	S6	S8	S10	SSW12	S14	NNW18.5	NW44	
30-Oct	S14	SSW18	SSW20	SSW15	S10	SSE12	SSE16	SSE16	SSE15	SSE16	SSE15	SSE12	SE7	SE5	N1	ESE1	NNW4	NNW10	NNW12	NNW13	NNW12	N12	N11	NNE8	SSE3.8	SSW20	
31-Oct	N5	N4	N6	NW2	SE2	SSE3	SE7	SE9	SE11	E8	ENE11	NE10	NNE9	NNE11	NNE12	N17	N21	N20	N21	N25	N23	N27	N26	N34	NNE10.6	N34	

W7.3	W7.3	W8.1	W8.3	W7.5	WSW6.2	WSW5.2	WSW5.3	WSW5.3	W4.6	W5.3	W5.5	W7.2	W7.5	W7.9	WNW7.2	WNW7.6	WNW6.9	WNW7.1	WNW7.9	WNW7.9	W8.0	W7.6	W6.2	Diurnal Average
NNW41	NW44	NW43	NW42	W39	WNW41	NNW39	NNW40	WSW41	W40	NNW40	WNW49	WNW53	WNW48	WNW38	NW39	WNW40	NW39	NW40	WNW39	NW40	NW46	W38	NW40	Diurnal Maximum

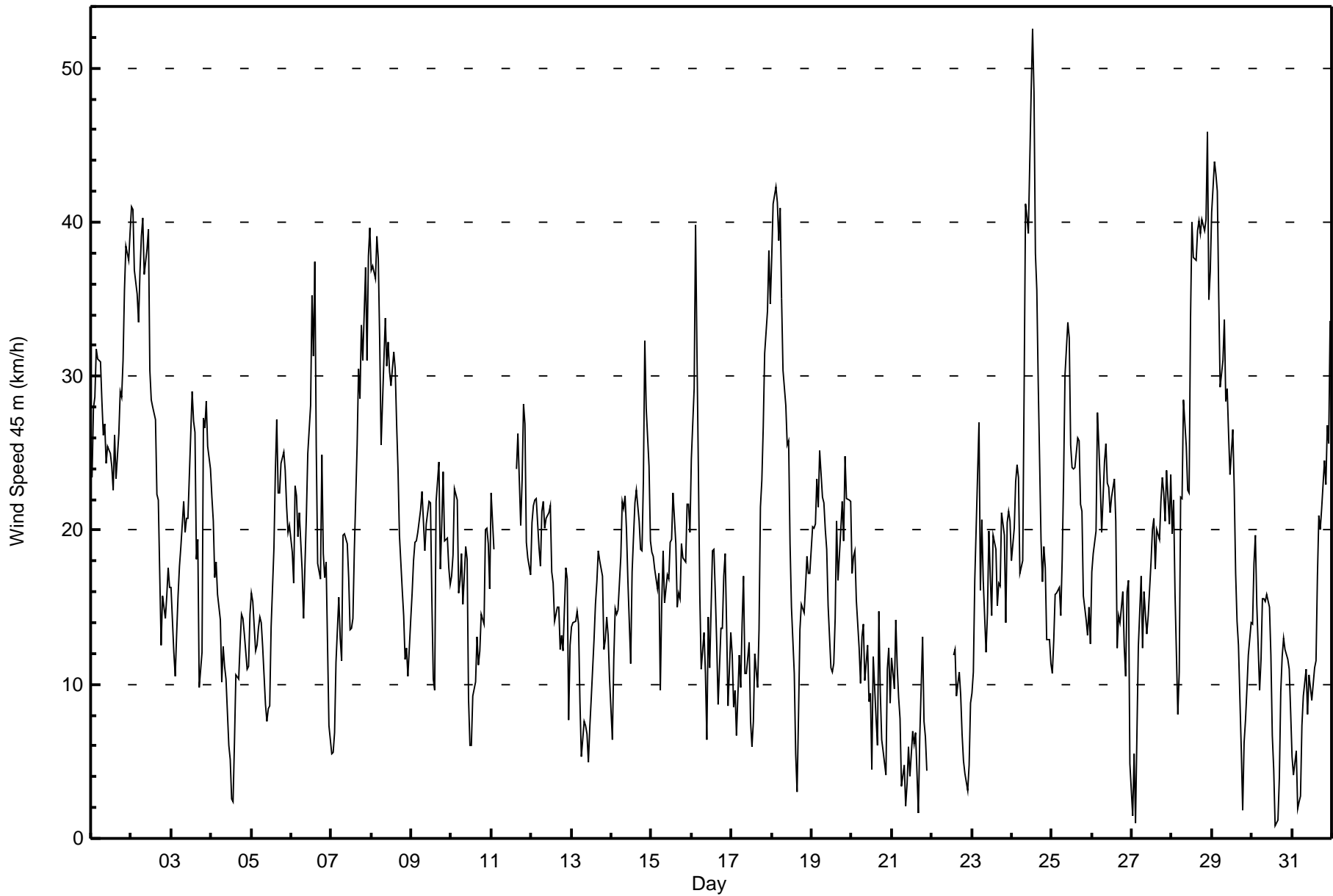
AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Speed 45 m (WS45m) - km/h**  
**Mannix - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on Oct 24 08:00 Minimum Value: 1 km/h on Oct 13 05:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 5 P <sub>90</sub> = 6 P <sub>99</sub> = 9																		Hours in Service: 744 Hours of Data: 717 Hours of Missing Data: 27 Hours of Calibration: 0 Percent Operational Time: 96.4							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	5	4	4	6	5	5	4	4	4	5	5	5	7	5	5	4	5	6	5	7	8	9	8	8	9
2-Oct	9	8	8	8	7	8	9	8	7	10	8	7	6	6	6	5	4	3	2	2	3	1	1	1	10
3-Oct	1	2	1	2	2	3	3	3	3	4	4	5	6	5	5	4	4	3	6	4	3	3	2	2	6
4-Oct	2	2	3	4	3	3	2	1	1	2	2	3	2	3	3	3	2	2	2	2	2	2	2	2	4
5-Oct	2	2	3	2	1	1	1	1	1	2	2	2	6	4	6	6	4	5	4	3	3	3	2	2	6
6-Oct	3	2	3	4	2	2	2	2	3	5	5	7	8	7	8	7	4	2	10	3	3	7	5	3	10
7-Oct	2	2	4	2	3	3	2	4	4	4	3	3	4	3	6	5	6	6	7	5	6	6	7	7	7
8-Oct	7	7	7	6	7	6	6	5	6	6	6	5	4	5	4	4	4	3	3	3	3	2	2	1	7
9-Oct	1	2	3	3	4	3	4	4	4	4	4	3	2	3	3	4	4	3	2	8	3	3	4	2	8
10-Oct	1	2	2	2	3	2	1	2	3	3	4	2	2	2	2	4	3	3	3	3	3	4	4	4	4
11-Oct	4	4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	5	7	4	5	5	5	7	4	5	7
12-Oct	5	5	7	6	4	4	4	4	4	4	5	4	4	3	3	3	2	2	2	3	3	3	2	1	7
13-Oct	2	2	1	1	1	4	1	1	1	2	2	2	3	4	3	3	4	3	3	3	2	2	2	2	4
14-Oct	1	1	2	1	1	2	3	3	3	3	3	3	4	5	5	5	4	3	2	3	5	4	4	2	5
15-Oct	2	1	2	1	1	2	2	3	2	3	3	3	4	5	4	2	2	2	3	2	2	3	3	3	5
16-Oct	4	6	8	6	3	5	2	2	2	2	4	3	4	3	4	3	2	1	1	4	3	2	2	2	8
17-Oct	2	1	2	3	2	2	2	3	2	4	4	2	2	2	2	3	3	3	4	4	8	6	6	5	8
18-Oct	6	6	6	5	7	7	5	4	4	5	5	3	3	4	3	2	4	3	4	4	5	5	5	5	7
19-Oct	5	5	6	6	5	5	5	4	4	3	4	2	3	3	4	4	5	5	4	5	5	4	4	5	6
20-Oct	2	2	4	3	4	4	4	4	3	4	3	2	2	4	3	3	3	1	2	3	2	1	4	1	4
21-Oct	3	3	2	3	3	2	1	2	1	2	2	2	2	2	2	2	1	4	2	2	1	1	AF	AF	4
22-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	AF	2	3	3	2	1	1	1	2	2	2	2	3
23-Oct	2	1	1	5	4	3	3	3	3	3	4	4	4	4	5	3	2	2	2	2	2	2	2	2	5
24-Oct	3	3	3	4	5	4	4	11	5	5	8	10	10	8	8	7	6	4	4	6	4	2	2	2	11
25-Oct	2	2	3	3	3	3	3	5	4	5	8	6	5	5	5	4	5	4	4	3	2	3	3	2	8
26-Oct	2	2	3	8	7	6	3	4	4	4	4	4	5	4	5	3	3	2	3	2	2	2	2	4	8
27-Oct	1	2	1	2	4	2	2	3	2	2	3	3	3	3	3	5	4	5	4	4	3	5	2	2	5
28-Oct	2	1	4	3	6	4	3	4	3	3	4	7	7	7	6	8	8	7	9	6	7	9	7	6	9
29-Oct	6	8	8	8	8	8	6	7	6	6	5	5	5	5	4	3	3	3	2	2	1	1	1	1	8
30-Oct	1	2	2	2	2	3	1	1	2	2	2	3	2	2	1	1	2	2	2	2	2	3	2	3	3
31-Oct	2	1	1	1	1	1	2	3	2	3	2	2	2	3	3	2	3	3	4	3	3	5	7	6	7
Diurnal Maximum																									
AF - Analyzer Failure																									





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed 45 m (WS45m) - km/h  
Mannix - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	34	4.74	4.74
6 - 11	117	16.32	21.06
12 - 19	269	37.52	58.58
20 - 28	196	27.34	85.91
29 - 38	69	9.62	95.54
> 38	32	4.46	100.00

Total Number of Valid Hours: 717

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Wind Speed 45 m (WS45m) - km/h  
Mannix - October 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	3	1	0	2	0	2	4	2	2	1	3	3	2	2	2	5	34
6 - 11	4	11	3	1	4	11	14	6	13	12	4	11	4	5	5	9	117
12 - 19	12	12	2	0	2	11	27	39	19	19	25	28	28	9	16	20	269
20 - 28	16	2	0	0	0	9	19	20	10	14	20	18	14	14	14	26	196
29 - 38	5	0	0	0	0	0	0	0	1	0	1	4	6	15	22	15	69
> 38	0	0	0	0	0	0	0	0	0	0	0	2	6	7	11	6	32
<b>Totals</b>	40	26	5	3	6	33	64	67	45	46	53	66	60	52	70	81	717

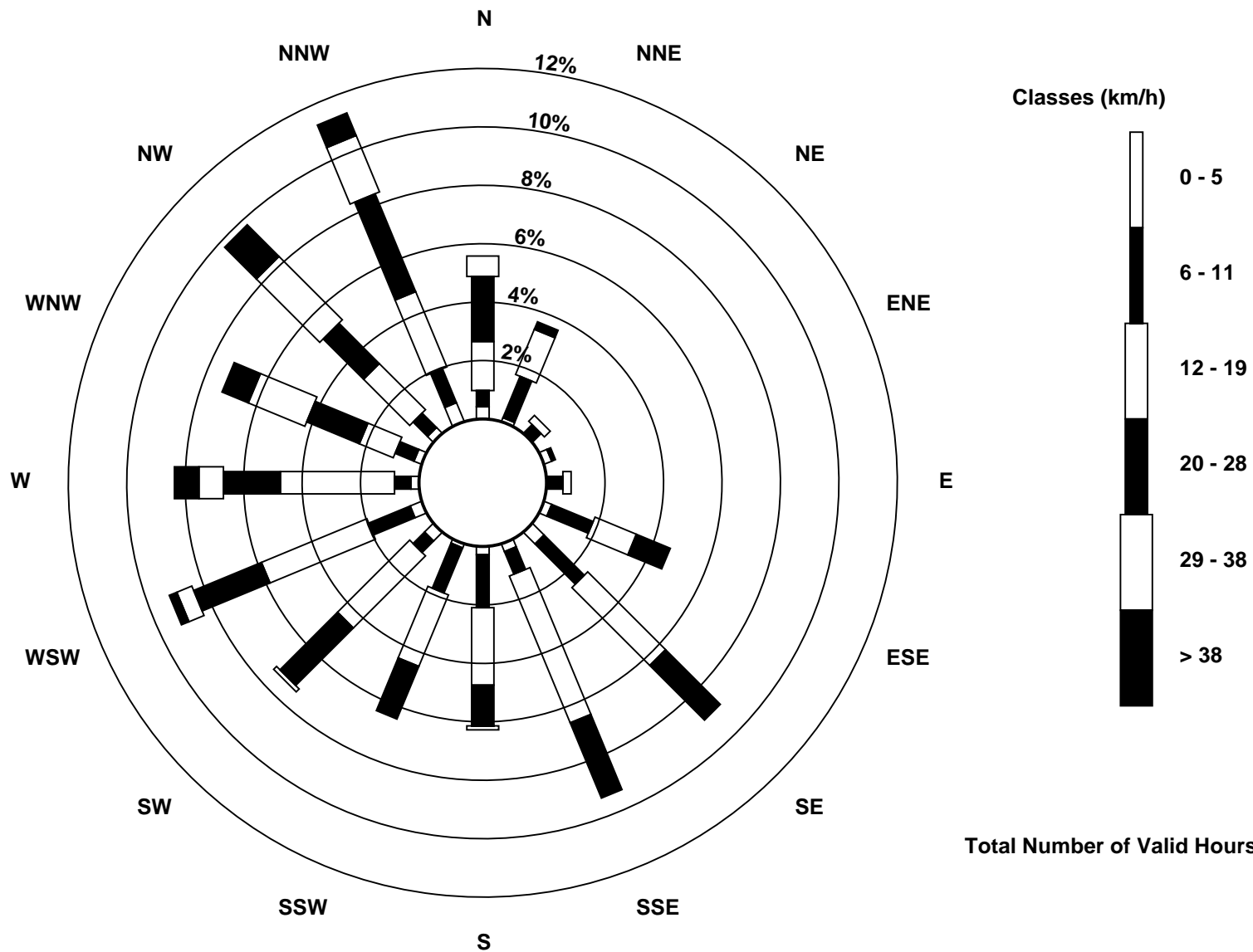
Total Number of Valid Hours: 717

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed 45 m (WS45m) - km/h  
Mannix (AMS 5)





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 75 m (WS75m) - km/h

Mannix - October 2017

Maximum Speed: 57 km/h on Oct 24 13:00	Maximum Daily Speed Average: 31.1 km/h on Oct 2	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 31 04:00	Minimum Daily Speed Average: 1.0 km/h on Oct 4	Hours of Data: 705
Maximum Diurnal Speed Average: 10.1 km/h at hour 4	Minimum Diurnal Speed Average: 5.0 km/h at hour 10	Hours of Missing Data: 39
Monthly Average Velocity: 8.0 km/h 272.5 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 8 Q <sub>1</sub> = 14 Median = 21 Q <sub>3</sub> = 27 P <sub>90</sub> = 36 P <sub>99</sub> = 47	Percent Operational Time: 94.8

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	WNW27	WNW31	WNW31	WNW34	WNW34	WNW33	WNW31	WNW29	WNW29	WNW26	NW28	NNW28	NNW27	NNW26	NW30	NW26	NW30	NW33	NW34	NNW36	NNW41	NNW44	NNW43	NNW44	NW30.0	NNW44	
2-Oct	NNW47	NNW47	NNW42	NNW40	NNW38	NNW42	NNW45	NNW46	NNW41	N43	NNW44	NNW34	NNW31	NNW31	NNW30	NNW24	NNW25	NW20	NW15	NW19	NW18	WNW19	W22	W19	NNW31.1	NNW47	
3-Oct	W19	SW16	SSW11	SSW12	S16	SSE24	S23	SSE27	SSE24	S24	S23	S25	S32	SSW29	SSW30	SSW21	S23	SSW12	W15	W32	W31	W33	W30	W28	SSW17.0	W33	
4-Oct	WNW28	NW25	NNW22	N23	N20	NNW18	WNW11	WNW13	WNW12	W10	W6	WSW5	WSW3	S2	SE5	ESE8	SE12	SE16	SE19	SE19	SE18	SSE16	SE15	SE19	WNW1.0	WNW28	
5-Oct	SE22	SSE22	SSE17	SSW14	S15	SSW15	S13	S10	SSE9	SE8	SE9	SE9	S15	SSW20	SSW26	SSW30	SSW25	SW26	WSW29	SW31	WSW30	WSW27	WSW27	SW26	SSW16.7	SW31	
6-Oct	SW24	SW22	SW29	WSW27	SW24	WSW26	SW22	SW19	SSW22	SW24	SW27	WSW31	WSW38	WSW34	WSW40	WSW27	W19	WSW19	WSW28	WSW23	WSW23	WSW23	WSW12	NW8	WSW23.9	WSW40	
7-Oct	WSW5	SSW7	SW8	WSW14	W19	NW17	NNW13	NNW23	NNW23	NNW22	NNW19	NW15	NNW15	NW16	NW21	NNW30	NW34	NNW33	NW37	NW35	NW41	NW35	NW42	NW43	NW21.6	NW43	
8-Oct	NW42	NW41	NW39	NW43	NW41	NW36	NW29	NW33	NW37	NW33	WNW34	WNW32	WNW31	WNW34	WNW32	WNW29	WNW25	WNW21	WNW17	W15	WSW13	WSW14	SSW12	SSW16	WNW26.6	NW43	
9-Oct	S19	SSE24	SSE26	SSE26	SSE27	SE27	SE29	SE25	SE23	SE25	SSE26	SSE25	SSE18	SSW14	WSW13	WSW24	WSW26	WSW21	SW26	WSW28	SW24	WSW25	WSW22	WSW22	S15.7	SE29	
10-Oct	WSW22	WSW26	WSW29	WSW27	W21	W22	W23	W20	W21	NW19	NNW10	NNE6	NNE7	NNE10	NNE11	NNE15	NNE13	NNE15	NNE17	NNE16	N22	NNE24	NNE22	N19	NW9.7	WSW29	
11-Oct	N24	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	N32	N31	N22	NNW21	NNW19	----	N32	
12-Oct	NNW24	N25	N25	N25	NNW21	NW20	NW23	NW24	NNW23	NNW23	NW23	NW24	NW19	NW18	NNW15	NW16	NNW17	NNW14	NNW16	WNW14	WNW20	NNW19	NNW8	NNW13	NNW18.7	N25	
13-Oct	WNW17	WNW17	W17	W17	W17	W11	W8	WSW9	SW8	SW7	SW5	SW7	WSW9	SW14	SSW16	S18	SSW21	SSW20	SSW19	SW15	SW16	SSW18	SSW16	SSW14	SW11.9	SSW21	
14-Oct	SSW9	S13	S18	S17	S18	SSE22	SSE28	SSE27	SSE26	SSE24	SSE19	SSE19	S13	SSW18	SW21	SW24	WSW25	WSW23	W21	W22	W28	WNW36	WNW32	WNW29	W23	SW14.2	WNW36
15-Oct	WSW24	WSW23	W21	W20	WSW20	SSW11	SSE16	SSE24	SSE19	SSE20	SSE22	SE25	SE26	SSE28	SSE23	SE19	S20	S21	S25	S25	SSW24	SSW27	SSW27	SW24	S17.4	SSE28	
16-Oct	SW29	SW34	WSW45	W34	W27	WSW19	SW12	SSW15	SSW13	SSW7	SW16	SW12	SW20	SW20	WSW18	SW14	SW10	SSW16	S14	SSW20	SW22	SSW17	S11	SSE15	SW17.0	WSW45	
17-Oct	SSE14	SSE11	SE10	ESE6	SE14	SSE13	SSE18	SSE21	SSE15	SSE13	SE15	ESE7	ENE7	NNE9	N13	N12	NW16	NW24	WNW26	WNW31	WNW35	WNW37	W41	W37	W5.7	W41	
18-Oct	W40	W44	W45	W43	W42	WNW44	WNW38	W33	W30	W27	W27	W20	W16	WNW11	WNW6	WNW3	ESE6	SE12	SE14	ESE13	ESE12	ESE13	ESE13	ESE13	W15.6	W45	
19-Oct	ESE15	ESE15	ESE16	ESE20	SE21	SE26	SE26	SE27	SE23	SE21	SSE16	SE11	SE9	SE10	ESE11	SE19	ESE15	SE18	SE24	SE21	SE24	SE21	SE23	SE21	SE18.7	SE27	
20-Oct	SE14	SE15	SE17	ESE13	ESE11	ESE9	ESE10	ESE10	ESE10	SE12	E8	E8	ENE5	E11	ESE7	SSW6	WNW16	W11	W7	WNW7	WSW5	WSW14	WNW18	NW12	SE3.2	WNW18	
21-Oct	NW9	NW12	WNW15	NNW13	N11	N9	NW4	NNW5	N2	SE3	S6	SSE4	SE6	SE6	E6	E4	SSW1	N2	NNE13	N12	N7	N4	NNW3	NNW2	N3.4	WNW15	
22-Oct	SSE2	E2	NE3	WNW3	NNE4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	NNE4	
23-Oct	AF	AF	W22	W28	W30	W19	WSW25	WSW21	WSW15	W17	W21	W18	WSW16	WSW21	WSW20	WSW17	SW20	SW20	SW26	SW25	S17	SSE24	S29	S27	WSW18.2	W30	
24-Oct	S22	S26	SSE32	SSE31	S29	SW20	W22	WSW34	W46	W44	W42	WNW52	WNW57	WNW52	WNW41	WNW38	NW33	NNW22	NNW20	N23	NNE21	NE15	NE15	NE13	WNW16.2	WNW57	
25-Oct	NNE15	NNE18	NNE20	NNE19	NNE20	NNE18	NNE21	N27	N35	N38	N37	N30	N28	NNW28	NNW28	NNW30	NNW30	NNW26	NNW26	NNW19	NNW16	WNW15	W17	WSW14	N20.9	N38	
26-Oct	SW21	SW25	SW26	SW32	SW29	SSW26	S24	S29	S31	S26	S26	S24	SSW26	SSW27	SSW24	SW15	SW17	SW17	SW20	SW17	WSW16	W21	W21	W10	SSW20.5	SW32	
27-Oct	WSW4	WSW7	W2	SSE5	SSE11	SSE21	SSE16	SSE22	SSE19	SSE16	SE17	SE21	SSE22	SSE23	SE21	SE24	SE23	SE27	SE29	SE28	SE26	SSE30	SSE26	SSE29	SSE18.7	SSE30	
28-Oct	SSE25	SSE24	S17	WSW13	WSW16	WSW27	WSW28	WSW35	WSW31	WSW27	W25	WNW37	WNW43	NW41	NW42	NW44	NW44	NW44	NW44	NW44	NW43	NW46	NW51	NW41	NW42	WNW26.9	NW51
29-Oct	NW44	NW49	NW48	NW47	NW40	NNW33	NNW35	NNW38	NNW32	NNW33	NNW29	NNW26	NNW29	NNW25	N19	N15	NNE14	NNE8	ESE2	SSW7	S8	SSW7	SW13	SSW18	NNW21.1	NW49	
30-Oct	SSW17	SSW23	SW23	SSW18	SSW13	SSE9	S18	SSE17	SSE18	SSE18	SSE17	SSE13	SE6	SSE2	NNE2	E1	NNW4	NNW11	N13	NNW15	N14	N14	N15	NNE11	S3.9	SW23	
31-Oct	NNE8	N5	NNE6	N1	ESE2	SSE3	SE7	ESE7	SE10	E6	ENE10	NE11	NNE11	NNE14	NNE15	NNE20	N24	N23	N24	N27	N26	N30	N29	N37	NNE12.4	N37	

W9.2	W9.7	W9.8	W10.1	W8.9	W7.7	WSW6.5	WSW6.6	WSW6.2	W5.0	W5.4	W5.8	W7.6	W8.2	W8.6	WNW8.2	WNW8.5	WNW8.0	W8.3	WNW9.5	WNW9.8	WNW10.0	WNW9.6	W8.0	Diurnal Average	
NNW47	NW49	NW48	NW47	W42	WNW44	NNW45	NNW46	WSW46	W44	NNW44	WNW52	WNW57	WNW52	NW42	NW44	NW44	NW44	NW44	NW44	NW43	NW46	NW51	NNW43	NNW44	Diurnal Maximum

AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods

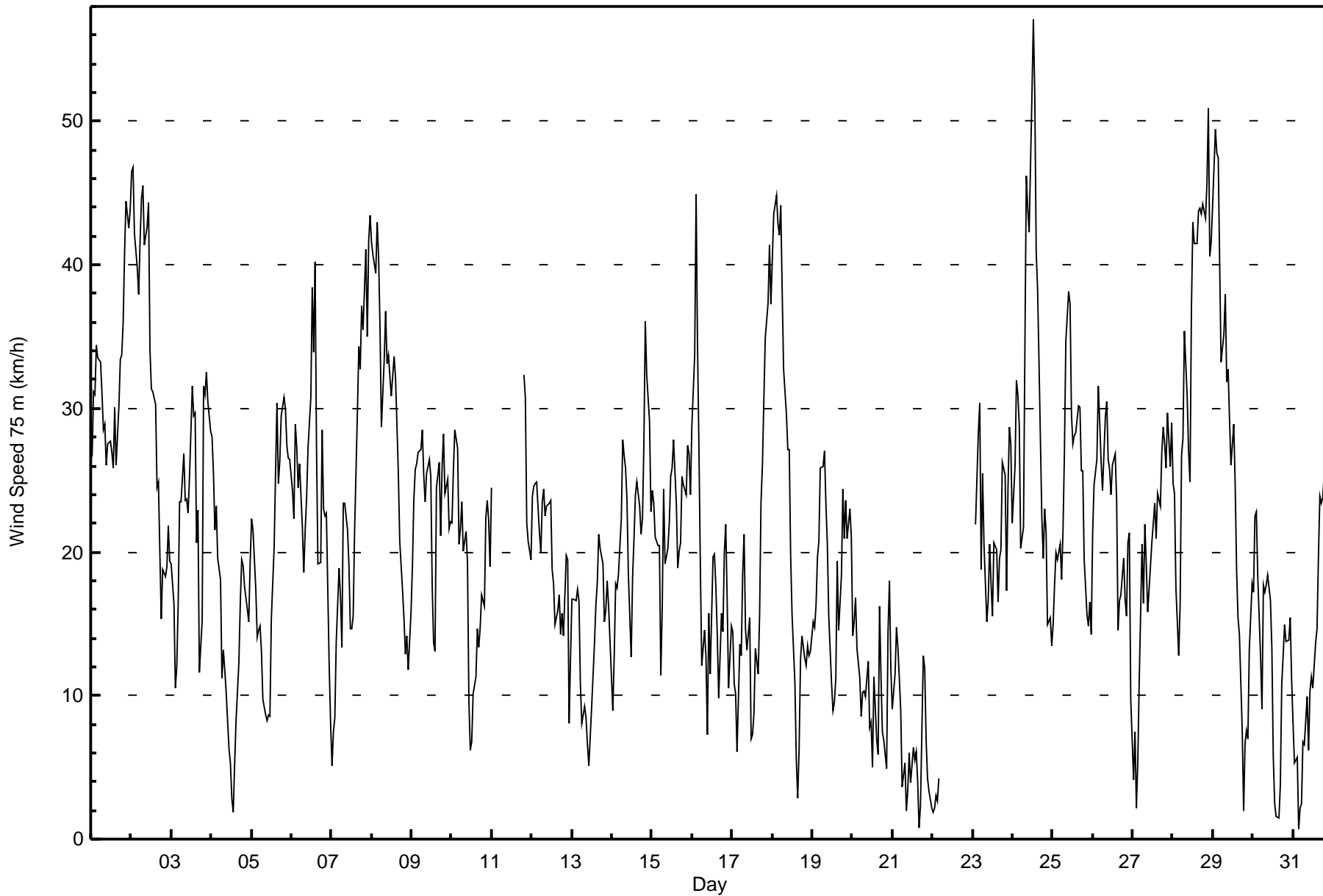


**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Speed 75 m (WS75m) - km/h**  
**Mannix - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on Oct 24 08:00 Minimum Value: 1 km/h on Oct 3 00:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 O <sub>1</sub> = 2 Median = 3 O <sub>3</sub> = 5 P <sub>90</sub> = 7 P <sub>99</sub> = 9																		Hours in Service: 744 Hours of Data: 705 Hours of Missing Data: 39 Hours of Calibration: 0 Percent Operational Time: 94.8							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	4	4	4	6	4	4	4	4	4	5	4	5	7	4	5	4	5	6	5	7	8	9	8	8	9
2-Oct	9	9	9	8	8	8	9	7	7	10	7	7	6	6	5	5	4	3	2	2	3	1	1	1	10
3-Oct	1	3	1	2	3	2	2	2	3	4	3	4	6	5	5	4	3	6	4	4	3	2	3	6	
4-Oct	3	2	4	4	4	3	2	1	1	1	2	2	2	3	3	2	2	2	2	2	2	2	3	4	
5-Oct	2	2	4	2	1	1	1	1	1	2	3	3	5	4	6	5	4	5	4	3	3	3	2	6	
6-Oct	3	3	3	4	3	3	3	2	2	5	5	7	7	7	8	7	3	2	10	4	3	6	6	3	10
7-Oct	2	2	3	3	3	3	2	4	4	4	3	3	4	3	6	4	6	6	7	5	6	6	6	7	7
8-Oct	6	7	7	6	6	5	6	5	5	6	6	4	4	4	4	4	4	3	3	3	3	2	2	2	7
9-Oct	1	2	2	3	4	4	3	4	4	4	3	4	2	3	4	4	4	3	1	8	3	3	5	2	8
10-Oct	1	2	2	2	3	3	2	2	3	3	3	2	3	2	2	4	3	3	3	3	3	3	3	3	4
11-Oct	3	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	5	5	7	4	5	7
12-Oct	5	5	7	6	4	4	3	4	4	4	4	4	4	3	3	3	2	2	2	3	3	3	3	2	7
13-Oct	1	1	1	1	1	3	1	1	1	2	2	2	3	4	3	3	4	3	3	2	2	2	2	2	4
14-Oct	1	2	2	2	2	3	4	3	3	2	3	3	4	5	5	5	4	3	2	3	5	4	5	2	5
15-Oct	1	1	2	1	1	2	2	3	2	3	3	3	5	6	4	3	2	2	3	2	2	3	3	3	6
16-Oct	4	6	7	6	3	5	2	3	2	2	4	3	3	3	4	3	2	1	1	4	3	2	2	3	7
17-Oct	2	1	3	3	3	2	2	3	3	5	4	3	2	2	2	3	3	3	4	3	7	6	6	5	7
18-Oct	6	6	6	5	6	7	5	4	4	5	4	3	3	4	3	2	3	4	6	5	4	4	5	5	7
19-Oct	6	5	7	8	7	7	5	4	4	4	4	3	3	4	5	6	6	7	7	7	7	7	6	7	8
20-Oct	4	5	7	5	5	4	4	3	5	5	3	3	2	4	3	3	2	1	1	3	3	1	3	3	7
21-Oct	2	2	3	3	3	3	1	2	1	2	2	2	2	2	2	2	1	3	2	3	1	1	1	1	3
22-Oct	1	2	2	2	2	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2
23-Oct	AF	AF	4	4	4	3	3	2	3	2	4	3	4	4	5	3	2	2	2	2	3	2	2	2	5
24-Oct	4	3	3	4	5	5	4	11	5	6	8	11	10	7	8	6	6	5	4	6	5	2	2	2	11
25-Oct	3	2	3	3	2	2	3	4	3	4	7	6	5	5	4	4	5	4	3	3	2	3	2	3	7
26-Oct	3	2	3	8	6	6	3	4	4	4	4	4	5	4	4	3	3	2	3	2	2	2	2	4	8
27-Oct	2	2	2	2	4	2	2	2	2	2	3	3	4	3	3	5	4	4	4	3	3	5	2	2	5
28-Oct	2	2	3	4	6	3	3	4	3	3	4	7	7	7	6	8	8	7	10	6	7	8	7	7	10
29-Oct	6	7	8	8	9	8	6	7	6	7	5	5	5	4	4	3	3	3	2	2	1	2	2	1	9
30-Oct	1	2	2	2	3	3	1	1	1	2	2	3	3	2	1	1	1	2	2	2	1	2	2	3	3
31-Oct	2	1	2	1	1	1	4	2	3	3	2	2	2	2	3	2	3	3	3	3	3	4	7	6	7
Diurnal Maximum																								9	
AF - Analyzer Failure																									







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed 75 m (WS75m) - km/h  
Mannix - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	37	5.25	5.25
6 - 11	85	12.06	17.30
12 - 19	195	27.66	44.96
20 - 28	233	33.05	78.01
29 - 38	100	14.18	92.20
> 38	55	7.80	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Wind Speed 75 m (WS75m) - km/h**  
**Mannix - October 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	5	2	1	1	3	2	2	5	1	1	1	5	1	3	1	3	37
6 - 11	3	10	1	3	4	13	11	4	4	8	5	3	7	4	2	3	85
12 - 19	9	14	3	0	0	10	18	22	15	21	14	16	14	13	14	12	195
20 - 28	15	8	0	0	0	1	24	31	16	16	26	32	24	7	11	22	233
29 - 38	9	0	0	0	0	0	1	5	4	4	6	8	9	23	14	17	100
> 38	1	0	0	0	0	0	0	0	0	0	0	3	8	6	24	13	55
<b>Totals</b>	42	34	5	4	7	26	56	67	40	50	52	67	63	56	66	70	705

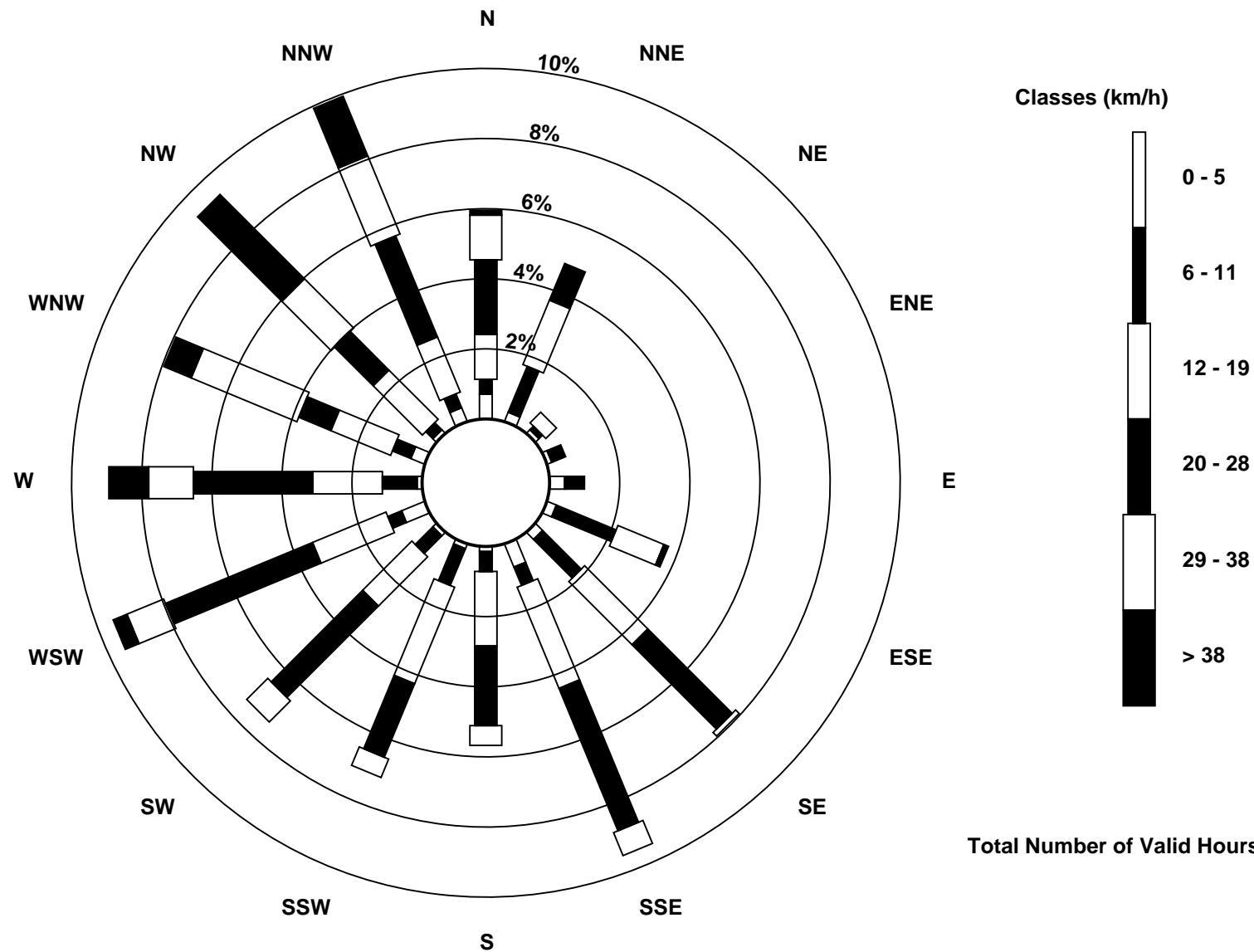
Total Number of Valid Hours: 705

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed 75 m (WS75m) - km/h  
Mannix (AMS 5)





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 90 m (WS90m) - km/h

Mannix - October 2017

Maximum Speed: 61 km/h on Oct 24 13:00	Maximum Daily Speed Average: 33.5 km/h on Oct 2	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 31 04:00	Minimum Daily Speed Average: 1.1 km/h on Oct 4	Hours of Data: 724
Maximum Diurnal Speed Average: 11.1 km/h at hour 4	Minimum Diurnal Speed Average: 5.8 km/h at hour 10	Hours of Missing Data: 20
Monthly Average Velocity: 8.8 km/h 275.7 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 8 Q <sub>1</sub> = 15 Median = 22 Q <sub>3</sub> = 29 P <sub>90</sub> = 38 P <sub>99</sub> = 50	Percent Operational Time: 97.3

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	WNW29	WNW33	WNW33	WNW37	WNW36	WNW35	WNW33	WNW30	WNW31	WNW28	NW29	NNW30	NNW28	NNW28	NW32	NW28	NW33	NW36	NNW37	NNW39	NNW44	NNW48	NNW46	NNW47	NW32.2	NNW48
2-Oct	NNW50	NNW50	NNW45	NNW43	NNW40	NNW45	NNW48	NNW48	NNW44	N45	NNW47	NNW36	NNW33	NNW33	NNW32	NNW26	NNW27	NNW22	NW17	NW20	NNW21	NNW21	NNW24	NNW21	NNW33.5	NNW50
3-Oct	W20	WSW19	SSW12	SSW13	S15	SSE23	S23	S28	S25	S25	S23	S25	SSW32	SSW30	SSW30	SSW22	S24	SW13	W17	W35	W35	W36	W34	W32	SW18.2	W36
4-Oct	WNW31	NW28	NNW24	N25	N21	NNW20	NW12	WNW14	WNW13	W10	W7	WSW6	WSW3	SSW2	SE6	ESE10	SE14	SSE18	SSE21	SSE21	SSE18	SE17	SE17	SE20	WNW1.1	WNW31
5-Oct	SSE24	SSE24	S19	SSW15	SSW16	SSW14	SSW9	S8	SSE9	SE10	SE11	S16	SSW21	SSW26	SSW31	SSW25	WSW28	WSW32	WSW34	WSW33	WSW31	WSW30	WSW30	SSW18.2	WSW34	
6-Oct	WSW27	WSW25	SW32	WSW30	WSW27	WSW29	SW24	SW21	SW23	SW25	WSW28	WSW32	WSW40	WSW35	WSW41	W29	W20	W21	WSW30	WSW25	WSW25	WSW25	WSW15	NW9	WSW25.9	WSW41
7-Oct	WSW5	SSW8	SW9	W15	WNW21	NW19	NNW14	NNW25	NNW25	NNW23	NNW20	NW16	WNW15	NW16	NW23	NNW32	NW36	NNW35	NW39	NW38	NW44	NW37	NW45	NW46	NW23.2	NW46
8-Oct	NW45	NW43	NW42	NW46	NW43	NW38	NW31	NW36	NW39	NW35	WNW35	WNW34	WNW33	WNW35	WNW34	WNW31	WNW27	WNW22	WNW18	W16	WSW14	WSW15	SW12	SSW16	WNW28.3	NW46
9-Oct	S19	SSE25	SSE28	SSE29	SSE30	SE30	SE31	SE28	SSE26	SSE28	SSE28	SSE27	S18	SW15	W15	WSW26	WSW28	WSW23	WSW28	WSW31	SW27	WSW28	WSW24	WSW25	SSW17.2	WSW31
10-Oct	WSW24	WSW29	W32	W30	W24	W25	W27	W23	WNW23	NW20	NNW10	NNE6	NNE7	NNE10	NNE11	NNE15	NNE14	NNE15	NNE18	NNE17	N23	NNE25	NNE23	NNE20	NW11.0	W32
11-Oct	N26	N22	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	N33	N32	N23	NNW22	NNW21	----	N33
12-Oct	NNW26	N26	N26	N26	NNW23	NNW21	NW25	NW26	NNW24	NNW24	NNW25	NNW20	NW19	NNW15	NW17	NNW18	NNW15	NNW17	NW15	WNW21	NNW21	N8	WNW12	NNW19.8	N26	
13-Oct	WNW17	WNW18	WNW18	WNW17	WNW14	W12	W9	WSW10	WSW10	SW7	SW6	SW7	WSW10	SW14	SW17	SSW18	SSW22	SW21	SW20	SW17	SW17	SW19	SW18	SW16	WSW12.3	SSW22
14-Oct	SSW11	SSW14	SSW19	S19	S20	S23	S29	SSE29	SSE27	SSE25	S19	S13	SSW19	SW22	SW25	WSW26	WSW24	W23	W25	WNW31	WNW39	WNW36	WNW32	W25	SSW15.7	WNW39
15-Oct	W27	WSW26	W23	W23	W22	SW12	SSE14	SSE24	SSE21	SSE22	SSE24	SE28	SE28	SE30	S25	S21	S21	S22	S27	SSW27	SSW26	SSW30	SSW29	SSW26	SSW18.7	SSE30
16-Oct	SW31	WSW36	WSW47	W37	W30	W21	SW13	SSW15	SSW14	SW8	SW16	WSW12	SW20	SW20	WSW18	SW15	SW11	SSW17	SSW15	SSW21	SW23	SSW18	SSW11	SSE15	SW18.2	WSW47
17-Oct	S15	SSE12	SE12	ESE9	SE15	SSE14	SSE20	SSE23	S17	SSE14	SSE17	ESE10	ENE8	NE8	NNE13	N12	NW17	NW25	WNW28	WNW34	WNW38	WNW40	WNW45	WNW40	W6.1	WNW45
18-Oct	W43	W47	W48	W46	WNW45	WNW47	WNW41	W35	W31	W29	WNW29	WNW21	W16	WNW11	WNW6	WNW3	ESE7	ESE14	SE17	ESE16	ESE18	ESE21	ESE19	ESE20	W15.4	W48
19-Oct	ESE23	ESE24	ESE23	ESE25	SE24	SE29	SE28	SE29	SE25	SE21	SSE16	SE12	SE11	SE12	ESE14	SE22	ESE18	SE23	SE28	SE25	SE27	SE24	SE26	SE23	SE21.8	SE29
20-Oct	ESE17	ESE18	ESE19	ESE16	ESE16	ESE12	ESE13	ESE16	ESE13	SE15	ESE10	E10	ENE5	E13	ESE8	SSW6	WNW17	WNW14	W8	WNW7	WSW6	W17	WNW22	NW14	SE4.2	WNW22
21-Oct	NW9	NW12	WNW15	NNW14	N12	N9	NW4	NNW5	NNE1	SE4	S6	SSE5	SE7	SE6	E7	ESE4	SW3	NNW1	NNE9	NNE11	N7	N4	NNW3	WNW2	N2.9	WNW15
22-Oct	SE2	ESE3	NE3	WNW2	AF	N8	NNE10	NNE8	NE5	AF	AF	NNW7	NNW9	NNW12	NW12	NNW10	NW12	WNW10	NNW7	NNW5	WNW4	W3	S5	S10	NNW4.4	NW12
23-Oct	SSW10	WSW17	W25	W32	W33	W21	WSW27	W22	WSW17	W18	W22	W18	WSW16	WSW21	WSW21	WSW17	SW21	SW22	SW29	SW28	SSW19	S25	S31	SSW30	WSW19.5	W33
24-Oct	SSW24	S28	SSE35	SSE33	S30	SW22	W24	W38	W50	W47	W45	WNW55	WNW61	WNW55	WNW43	WNW41	NW35	NNW24	NNW21	NNE24	NNE23	NE15	NE16	NE14	WNW18.1	WNW61
25-Oct	NNE16	NNE19	NNE22	NNE20	NNE22	NNE19	NNE23	N28	N36	N40	N39	N32	N29	NNW30	NNW31	NNW33	NNW33	NNW28	NNW28	NNW21	NW17	WNW16	W18	WSW15	N22.4	N40
26-Oct	SW23	SW27	SW30	SW33	SW30	SSW27	S25	S31	S32	S27	S26	SSW25	SSW27	SSW28	SSW24	SW15	SW18	SW18	SW21	WSW19	WSW18	W24	W25	W13	SW21.9	SW33
27-Oct	WSW6	WSW9	W3	SSE5	SSE10	SSE20	SSE17	SSE22	SSE22	SSE17	SE18	SSE22	SSE23	SSE24	SE22	SE26	SSE25	SE29	SSE31	SSE30	SSE28	SSE32	SSE28	S30	SSE19.7	SSE32
28-Oct	S26	S22	SSW17	WSW15	WSW19	WSW29	WSW31	WSW39	WSW33	WSW29	W27	WNW40	WNW46	NW44	NW45	NW47	NW47	NW47	NW48	NW47	NW49	NW55	NW44	NW45	WNW29.9	NW55
29-Oct	NW47	NW53	NW51	NW51	NW43	NNW36	NNW37	NNW40	N34	NNW34	NNW31	NNW28	NNW30	NNW26	N19	N16	NNE15	NNE8	ESE2	SSW7	SSW7	SW6	SW13	SW18	NNW22.7	NW53
30-Oct	SSW19	SW24	SW24	SW19	SSW14	S9	S17	S15	SSE16	SSE19	SSE17	SSE14	SE6	SSE2	N2	E2	NNW3	N11	N13	NNW15	N14	N15	N17	NNE12	SSW4.0	SW24
31-Oct	NNE10	N6	NNE5	ENE1	ESE3	SSE3	SE7	ESE8	ESE11	ESE9	E12	NE12	NE11	NNE14	NNE16	NNE21	N25	NNE25	N24	N27	N27	N30	N30	N38	NNE12.8	N38

W10.1	W10.5	W11.1	W11.1	W10.4	W8.4	WSW7.2	WSW7.3	WSW6.9	W5.8	W6.0	WNW6.2	W8.1	W8.8	WNW9.2	WNW8.7	WNW9.4	WNW8.9	W9.9	WNW10.8	WNW10.7	WNW10.9	WNW10.4	W9.0	Diurnal Average
NNW50	NNW53	NNW51	NNW51	WNW45	WNW47	NNW48	NNW48	W50	W47	NNW47	WNW55	WNW61	WNW55	NW45	NW47	NW47	NW47	NW48	NW47	NW49	NW55	NNW46	NNW47	Diurnal Maximum

AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods

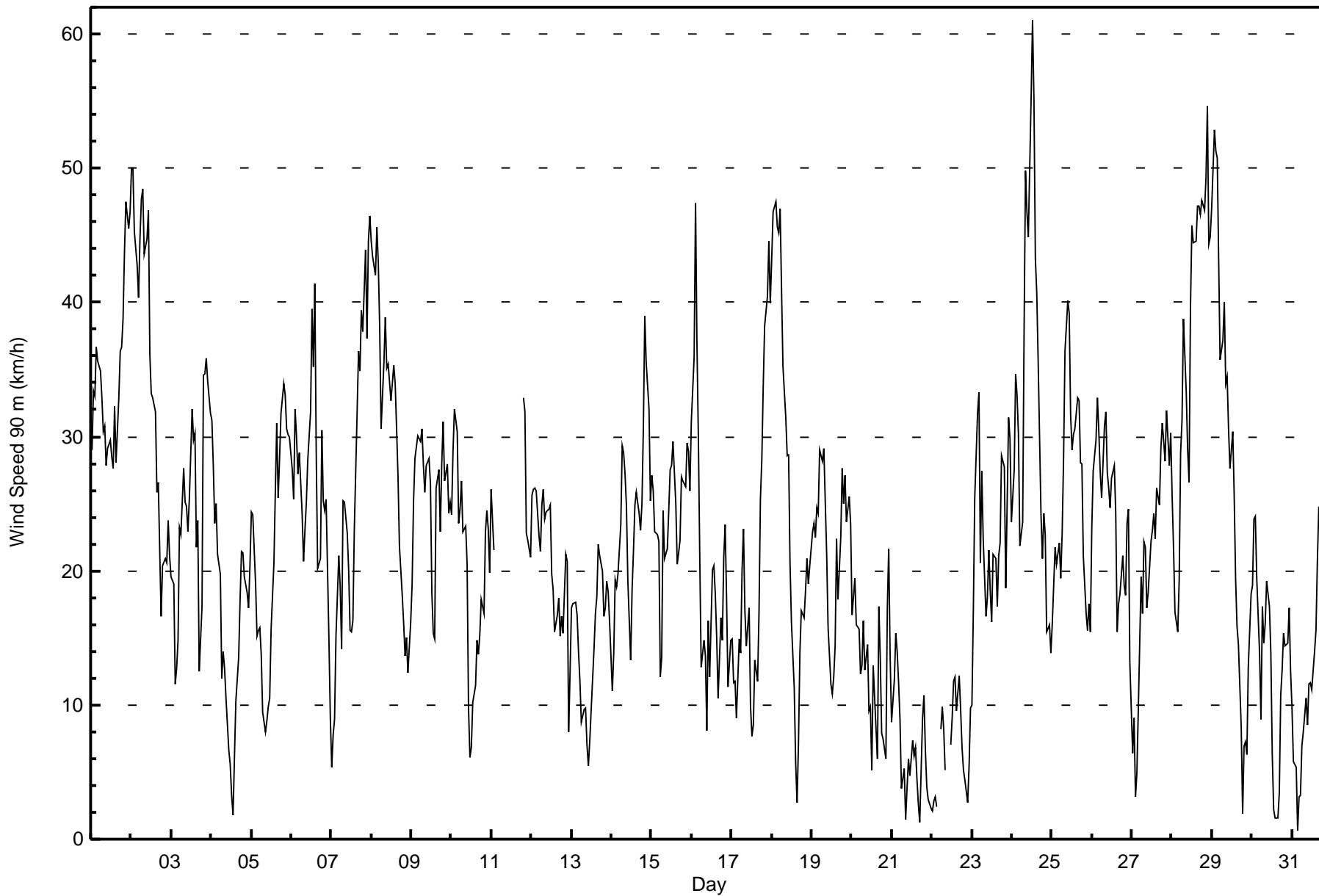


**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Speed 90 m (WS90m) - km/h**

**Mannix - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on Oct 24 08:00 Minimum Value: 0 km/h on Oct 31 04:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 6 P <sub>99</sub> = 9																		Hours in Service: 744 Hours of Data: 724 Hours of Missing Data: 20 Hours of Calibration: 0 Percent Operational Time: 97.3							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	5	4	4	6	4	5	4	4	4	5	4	5	7	5	4	4	5	6	5	7	9	9	8	9	9
2-Oct	9	9	9	8	8	7	9	8	7	10	7	7	6	6	5	5	4	3	2	2	3	2	1	0	10
3-Oct	1	2	1	2	2	2	2	2	2	4	3	4	6	5	5	4	3	3	7	4	4	3	2	3	7
4-Oct	4	2	4	4	4	3	3	1	1	1	3	2	2	3	3	2	2	1	2	2	2	2	2	3	4
5-Oct	2	2	4	2	1	1	1	1	1	1	2	2	5	4	6	5	4	6	4	3	3	3	2	2	6
6-Oct	3	3	3	4	3	3	3	2	2	5	5	7	8	7	8	8	3	2	10	4	2	6	6	3	10
7-Oct	2	2	3	3	3	3	2	4	3	4	3	4	4	4	6	4	6	6	7	4	6	6	6	6	7
8-Oct	6	7	7	6	6	5	6	5	5	6	6	4	4	4	5	4	4	3	3	3	3	2	2	2	7
9-Oct	1	2	2	3	3	3	3	4	4	3	3	4	2	2	4	4	4	3	2	8	3	4	5	2	8
10-Oct	1	2	2	2	4	3	2	2	3	3	4	2	3	2	2	3	3	3	3	4	3	3	3	4	4
11-Oct	3	4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	5	6	7	4	5	7
12-Oct	5	5	7	6	4	3	3	4	4	4	4	4	4	3	3	3	2	2	2	3	3	3	4	2	7
13-Oct	2	1	1	2	1	2	2	2	1	2	2	2	3	4	3	3	4	3	3	2	2	2	1	2	4
14-Oct	1	2	2	2	2	2	4	3	2	2	3	3	4	5	5	4	3	2	3	5	4	5	2	5	5
15-Oct	1	1	2	1	1	3	2	2	2	2	2	3	5	6	4	3	2	2	3	2	2	3	3	3	6
16-Oct	4	6	8	6	3	6	2	3	2	2	4	3	3	3	3	3	2	1	1	5	3	3	3	2	8
17-Oct	2	1	2	3	2	2	2	3	3	4	4	2	2	2	2	3	4	3	4	4	7	6	6	5	7
18-Oct	6	7	6	5	7	7	5	4	4	5	4	3	3	4	3	2	3	4	4	4	5	5	5	5	7
19-Oct	5	5	6	6	6	6	4	3	4	3	3	2	3	3	4	5	5	5	5	5	6	5	5	6	6
20-Oct	4	4	5	3	4	4	3	4	4	4	3	3	2	3	3	3	1	1	1	3	4	2	3	4	5
21-Oct	2	2	4	2	3	3	1	2	1	2	2	2	2	2	2	1	1	2	2	2	2	1	1	1	4
22-Oct	1	1	2	2	AF	4	3	3	2	AF	AF	2	2	2	3	3	1	2	1	1	2	2	2	2	4
23-Oct	4	4	2	4	4	3	3	2	4	3	4	4	4	4	5	3	2	3	2	2	4	3	2	2	5
24-Oct	4	3	3	5	5	5	4	11	6	6	9	11	10	7	8	7	6	5	4	6	5	2	2	2	11
25-Oct	3	1	2	3	2	2	3	4	3	4	7	6	5	5	4	4	5	4	3	3	2	2	2	3	7
26-Oct	3	2	3	8	7	6	3	4	3	3	3	4	4	4	4	3	3	2	2	2	2	2	2	4	8
27-Oct	2	2	2	2	3	2	2	2	2	2	3	3	4	3	3	5	3	4	4	3	3	4	2	2	5
28-Oct	2	2	3	4	6	3	4	4	3	3	4	7	7	7	6	8	8	8	10	7	6	8	7	7	10
29-Oct	5	7	8	8	9	8	6	7	6	7	5	5	5	4	4	3	3	3	1	2	1	2	2	1	9
30-Oct	1	2	2	2	4	2	1	2	2	1	2	3	2	1	1	1	1	2	2	1	1	2	2	3	4
31-Oct	3	1	3	0	1	1	3	2	2	3	2	1	1	2	3	2	3	3	3	2	3	4	7	6	7
Diurnal Maximum																								9	
AF - Analyzer Failure																									





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed 90 m (WS90m) - km/h  
Mannix - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	36	4.97	4.97
6 - 11	81	11.19	16.16
12 - 19	180	24.86	41.02
20 - 28	230	31.77	72.79
29 - 38	127	17.54	90.33
> 38	70	9.67	100.00

Total Number of Valid Hours: 724

Total Number of Hours: 744





**Wood Buffalo Environmental Association  
Frequency Distribution**

**Wind Speed 90 m (WS90m) - km/h  
Mannix - October 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	2	2	1	3	1	4	2	4	1	1	1	2	2	4	1	5	36
6 - 11	6	11	1	1	2	9	8	2	4	8	7	7	4	4	2	5	81
12 - 19	8	13	4	0	2	15	8	17	11	22	18	15	11	15	13	8	180
20 - 28	13	12	0	0	0	6	17	30	21	15	19	24	23	12	9	29	230
29 - 38	9	0	0	0	0	0	5	9	6	6	7	18	16	22	12	17	127
> 38	3	0	0	0	0	0	0	0	0	0	0	4	7	14	26	16	70
<b>Totals</b>	41	38	6	4	5	34	40	62	43	52	52	70	63	71	63	80	724

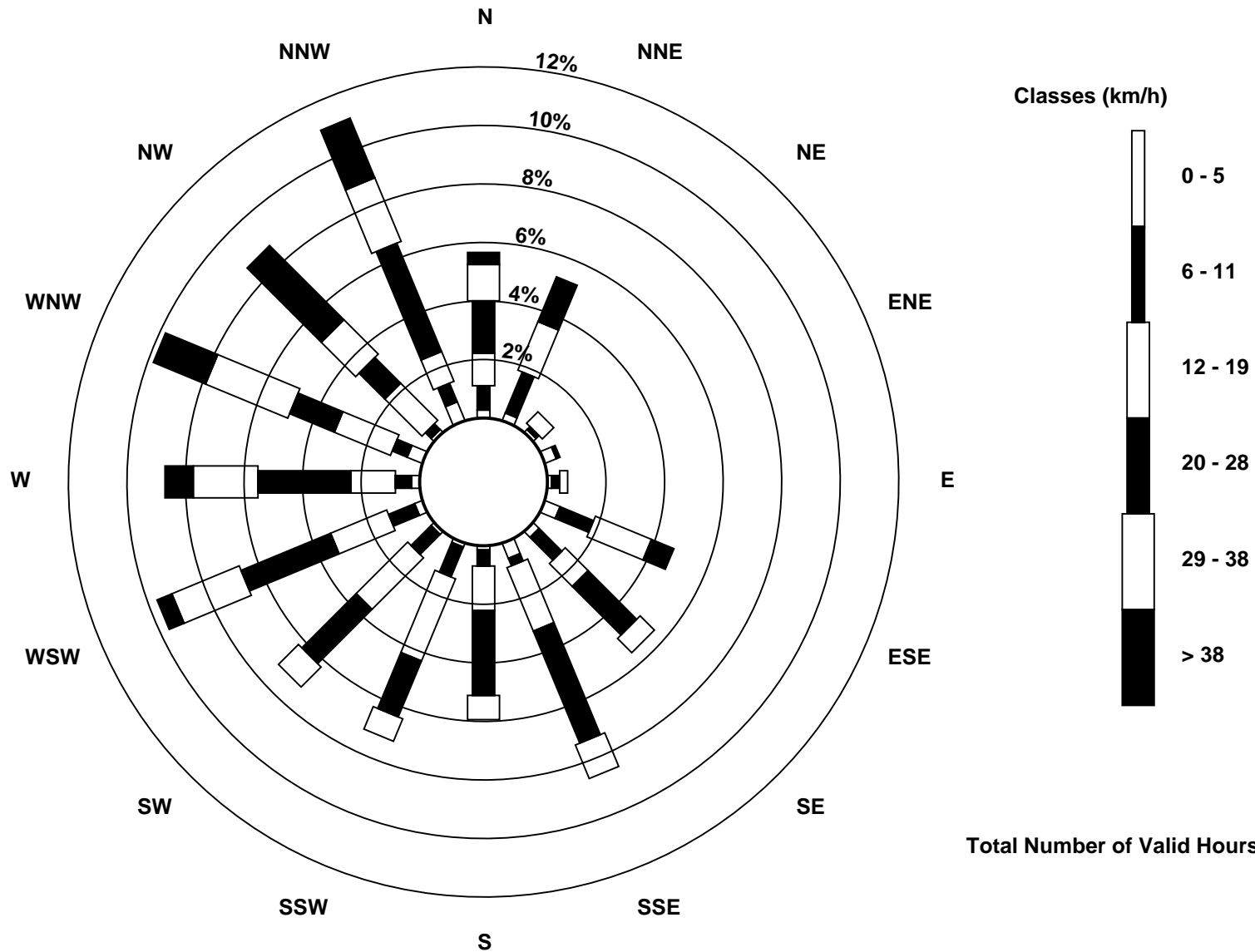
Total Number of Valid Hours: 724

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed 90 m (WS90m) - km/h  
Mannix (AMS 5)





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 20 m (WD20m) - deg

Mannix - October 2017

Direction of Maximum Speed: 302 deg on Oct 24 13:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 317.0 deg on Oct 1	Hours of Data: 723
Direction of Minimum Speed: 13 deg on Oct 30 15:00	Hours of Missing Data: 21
Direction of Minimum Daily Speed Average: 1.3 deg on Oct 4	Percent Operational Time: 97.2
Monthly Average Direction: 274.6 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	296	291	289	294	293	298	295	287	289	302	317	329	350	335	326	317	317	321	327	337	342	343	343	344	317.0
2-Oct	343	343	342	344	341	341	344	344	348	354	346	346	338	345	343	341	338	328	315	301	295	267	265	253	337.3
3-Oct	243	198	162	162	154	153	160	155	161	168	172	179	198	199	202	206	185	181	267	266	272	273	266	264	207.2
4-Oct	288	307	345	349	351	343	270	257	261	263	265	254	221	162	128	127	137	144	141	145	142	148	136	137	230.7
5-Oct	143	152	148	145	150	160	158	155	142	132	126	126	186	203	210	210	202	236	241	237	240	244	243	237	197.2
6-Oct	237	242	232	243	236	238	230	214	207	229	237	243	254	256	257	263	268	260	259	252	238	263	261	316	247.4
7-Oct	229	206	217	249	277	309	346	340	343	343	332	322	297	321	328	344	326	334	317	324	317	319	314	314	319.7
8-Oct	317	313	312	314	313	317	321	314	314	313	294	288	290	292	293	296	300	290	289	268	252	238	214	202	300.4
9-Oct	177	162	155	153	151	144	141	149	146	145	151	153	158	183	261	260	259	244	226	258	238	249	260	246	189.7
10-Oct	239	250	256	255	265	265	273	258	283	305	348	44	41	32	25	28	37	26	31	21	16	19	18	16	332.5
11-Oct	6	10	6	7	AF	AF	AF	AF	AF	AF	AF	AF	AF	14	12	20	8	359	353	10	10	7	353	351	--
12-Oct	341	350	3	1	337	326	315	322	326	333	324	325	327	323	337	312	341	332	333	291	289	329	317	276	328.0
13-Oct	277	272	260	261	251	236	219	214	201	235	227	244	249	229	219	198	202	216	212	213	219	212	212	207	229.2
14-Oct	150	159	166	162	164	161	162	155	158	159	163	163	215	236	232	242	249	262	270	282	290	288	283	258	220.0
15-Oct	250	244	251	253	241	167	147	153	144	150	150	147	147	159	164	150	153	154	179	185	190	204	208	215	180.5
16-Oct	230	236	260	277	267	252	200	194	189	196	234	242	229	228	241	240	213	184	169	192	219	203	175	157	230.8
17-Oct	166	148	128	119	139	143	157	163	163	153	151	112	52	22	8	340	319	309	294	290	287	286	283	284	275.2
18-Oct	281	278	278	277	286	291	288	280	276	281	286	283	280	294	297	301	120	130	129	129	112	112	118	119	275.7
19-Oct	120	113	123	128	129	133	137	141	140	143	151	136	126	127	127	129	127	128	130	128	130	133	133	131	130.8
20-Oct	136	136	133	138	132	119	133	100	131	135	99	103	76	89	126	211	285	267	245	267	178	226	291	331	134.3
21-Oct	338	305	289	338	12	349	311	346	344	160	177	150	136	129	89	75	8	5	353	334	347	356	347	267	353.9
22-Oct	178	150	11	288	10	AF	AF	AF	AF	AF	327	331	334	330	323	336	317	295	334	332	294	278	186	191	317.2
23-Oct	173	195	246	269	275	253	246	256	244	261	273	277	261	257	256	244	231	221	217	211	166	159	168	169	239.1
24-Oct	162	157	146	157	168	214	265	262	263	270	278	300	302	302	298	303	318	331	346	16	24	45	51	59	290.3
25-Oct	45	41	27	26	30	24	16	9	5	5	2	354	351	347	339	330	334	333	340	335	305	274	268	251	351.7
26-Oct	226	221	219	220	221	208	181	184	185	177	182	191	199	207	204	221	223	222	215	232	237	262	266	248	210.3
27-Oct	177	193	125	177	159	165	139	152	151	145	143	145	153	152	148	143	148	138	151	150	149	155	163	162	151.5
28-Oct	157	155	159	178	237	248	250	241	241	244	274	302	301	311	311	310	307	312	311	307	314	312	318	310	294.0
29-Oct	310	314	315	316	322	341	342	343	346	344	346	341	344	343	356	6	20	32	108	197	167	174	192	185	332.2
30-Oct	182	206	212	193	146	146	160	156	151	151	158	150	130	143	13	124	348	350	348	351	347	351	14	18	153.6
31-Oct	333	2	8	315	159	155	144	136	138	102	78	51	28	24	AF	AF	5	AF	AF	AF	AF	AF	3	14	--

271.6 269.4 272.8 276.8 269.3 262.9 251.5 250.4 251.8 260.7 272.3 284.6 281.0 289.9 287.4 289.6 299.6 292.9 286.9 285.6 287.8 280.9 283.8 278.4

Diurnal Average

AF - Analyzer Failure

All monthly, daily, and diurnal averages have been calculated using vector methods



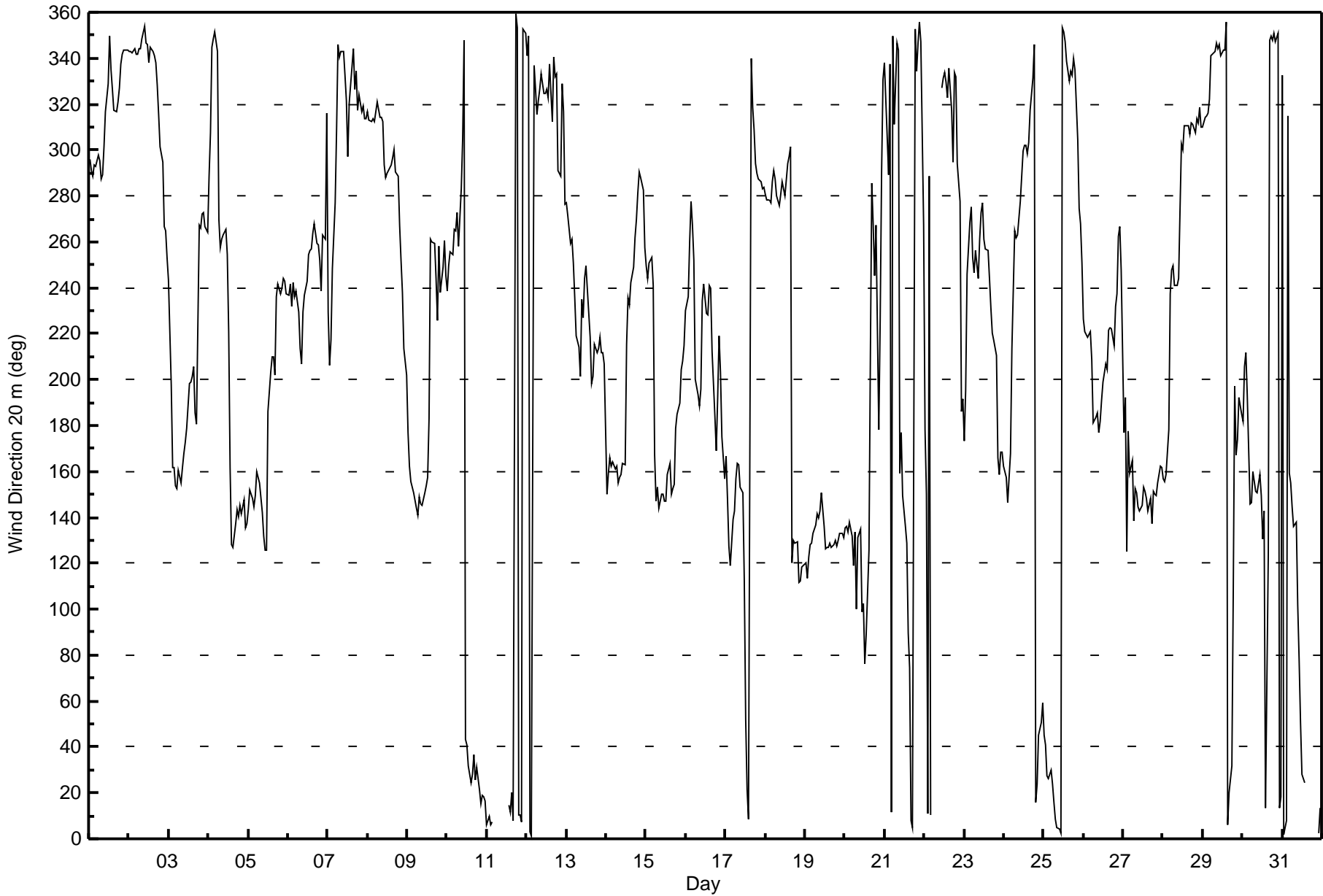
**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Direction 20 m (WD20m) - deg**  
**Mannix - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 106 deg on Oct 30 15:00	Hours of Data: 723
Minimum Value: 4 deg on Oct 5 07:00	Hours of Missing Data: 21
Percentiles: P <sub>1</sub> = 6 P <sub>10</sub> = 8 Q <sub>1</sub> = 10 Median = 12 Q <sub>3</sub> = 15 P <sub>90</sub> = 25 P <sub>99</sub> = 73	Hours of Calibration: 0
	Percent Operational Time: 97.2

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	11	9	9	11	10	11	10	9	9	11	13	15	19	17	12	12	11	12	12	13	13	13	14	12	19
2-Oct	13	13	13	13	14	14	14	13	14	15	14	16	17	14	15	15	13	13	10	9	16	9	5	7	17
3-Oct	6	19	10	6	7	9	8	7	10	13	14	16	16	14	14	15	23	25	6	7	6	5	10	25	
4-Oct	11	9	20	16	18	21	33	9	7	11	36	51	75	68	36	14	10	8	9	12	14	9	9	75	
5-Oct	9	11	15	9	8	5	4	6	9	12	8	12	36	19	15	15	14	14	9	8	9	9	8	36	
6-Oct	9	10	10	9	9	8	11	13	12	14	12	13	12	15	12	13	11	8	9	11	8	10	84	31	84
7-Oct	10	70	65	18	13	28	13	14	12	12	12	17	20	21	15	13	14	16	12	13	12	12	10	11	70
8-Oct	11	10	11	10	10	11	12	10	11	11	15	10	11	10	11	11	10	11	10	15	22	12	18	12	22
9-Oct	8	10	8	8	9	12	9	14	9	9	8	8	10	25	21	10	9	10	8	34	11	11	13	12	34
10-Oct	8	7	7	10	8	9	8	16	10	16	34	36	19	17	16	17	14	13	12	14	11	11	11	13	36
11-Oct	10	13	10	11	AF	AF	AF	AF	AF	AF	AF	AF	AF	11	12	13	14	15	14	12	11	17	15	17	17
12-Oct	15	17	19	19	15	17	11	13	14	14	14	15	15	17	19	19	13	13	11	25	9	17	31	9	31
13-Oct	7	8	8	7	6	27	17	13	13	20	35	24	26	23	18	16	15	15	12	11	11	11	9	9	35
14-Oct	11	9	7	8	7	8	9	9	8	7	10	27	18	17	11	12	11	10	8	10	10	9	10	12	27
15-Oct	7	7	8	8	8	24	9	8	12	10	10	9	20	22	12	10	6	8	15	13	12	12	12	13	24
16-Oct	11	10	17	8	11	21	17	13	17	34	18	17	13	13	14	12	11	9	25	15	13	22	8	34	
17-Oct	11	14	8	15	11	9	12	9	12	12	14	19	21	16	9	18	14	9	11	9	10	9	9	9	21
18-Oct	9	9	8	8	10	9	9	9	8	10	11	13	14	29	45	61	23	8	10	9	13	11	14	11	61
19-Oct	13	12	12	9	8	8	9	9	9	9	12	11	11	10	9	7	8	8	8	9	8	7	8	8	13
20-Oct	8	6	8	10	17	17	11	11	16	20	20	23	65	18	28	43	9	9	34	57	36	16	35	13	65
21-Oct	18	22	10	33	22	19	44	25	71	38	30	44	19	22	15	18	29	12	11	20	18	27	30	74	74
22-Oct	62	64	95	46	76	AF	AF	AF	AF	AF	37	26	24	23	25	28	14	14	27	35	36	49	23	18	95
23-Oct	23	17	13	10	7	16	10	13	13	10	11	13	18	13	12	13	9	9	9	10	28	7	9	10	28
24-Oct	14	16	9	10	13	24	15	11	7	9	10	12	12	10	11	12	14	14	16	14	11	13	9	12	24
25-Oct	14	13	11	11	10	10	10	10	11	11	12	14	13	14	14	11	12	11	12	14	14	11	13	15	15
26-Oct	10	10	11	14	13	20	14	13	13	13	14	15	16	14	14	15	13	10	11	8	17	7	6	94	94
27-Oct	53	29	22	30	15	6	9	11	7	9	9	10	9	8	8	10	8	9	10	7	8	11	9	7	53
28-Oct	8	6	14	31	59	10	10	9	10	10	15	12	11	11	10	10	10	10	13	11	10	10	11	12	59
29-Oct	10	11	11	10	15	13	12	12	15	14	13	14	13	14	19	14	15	31	51	18	11	12	13	12	51
30-Oct	12	11	9	15	12	7	6	6	6	8	9	10	13	18	106	35	22	14	12	7	9	12	9	11	106
31-Oct	36	24	24	25	48	44	14	13	10	22	11	15	11	10	AF	AF	10	AF	AF	AF	AF	AF	16	13	48
Diurnal Maximum																									
62 70 95 46 76 44 44 25 71 38 37 51 75 68 106 61 29 31 51 57 36 49 84 94																									

AF - Analyzer Failure





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 45 m (WD45m) - deg

Mannix - October 2017

Direction of Maximum Speed: 297 deg on Oct 24 13:00																							Hours in Service: 744		
Direction of Maximum Daily Speed Average: 332.5 deg on Oct 2																							Hours of Data: 717		
Direction of Minimum Speed: 3 deg on Oct 30 15:00											Direction of Minimum Daily Speed Average: 1.4 deg on Oct 4												Hours of Missing Data: 27		
Monthly Average Direction: 274.3 deg																							Percent Operational Time: 96.4		
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	291	287	283	289	288	293	290	282	284	297	312	324	343	330	320	313	313	317	322	332	335	338	338	338	312.1
2-Oct	338	338	336	339	336	336	340	341	344	349	342	341	332	340	338	334	333	323	314	303	304	274	271	266	332.5
3-Oct	250	215	174	167	150	149	160	153	158	166	170	172	191	193	195	198	181	193	261	260	267	269	265	266	202.6
4-Oct	287	306	339	345	347	338	281	269	266	261	258	248	241	179	130	118	133	142	137	142	138	147	132	132	251.3
5-Oct	143	152	155	162	168	174	169	159	146	132	123	124	183	195	204	204	197	232	237	233	236	240	236	232	197.7
6-Oct	232	235	228	236	232	235	228	217	206	225	232	238	248	251	250	257	261	255	253	249	232	255	255	314	241.3
7-Oct	245	202	207	251	273	310	341	339	339	338	329	316	293	317	323	340	321	329	314	318	313	314	310	309	315.5
8-Oct	312	309	308	310	309	312	316	310	310	308	288	283	284	287	287	291	294	287	285	262	248	235	209	197	295.5
9-Oct	175	157	149	148	146	139	136	143	142	141	146	150	156	188	256	254	254	242	224	252	232	244	253	238	186.7
10-Oct	232	239	254	251	263	259	269	260	278	301	338	28	28	22	15	19	28	20	23	13	8	12	11	10	318.3
11-Oct	0	3	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	14	2	353	348	5	5	360	345	345	--
12-Oct	336	346	357	355	333	322	312	318	322	329	321	322	322	319	332	309	335	327	330	292	287	326	325	278	324.9
13-Oct	276	273	264	269	260	251	241	227	207	231	220	236	242	222	212	191	194	209	208	211	215	206	204	200	225.8
14-Oct	172	167	170	169	170	160	159	150	152	154	160	163	209	231	228	237	244	256	264	277	286	284	282	258	216.7
15-Oct	248	245	253	254	244	190	146	150	143	146	146	142	140	155	162	151	160	163	178	184	190	203	206	213	182.2
16-Oct	227	233	254	272	262	253	209	196	191	196	231	235	223	223	236	231	213	188	172	187	215	200	182	157	224.7
17-Oct	164	149	123	111	133	142	152	159	161	150	144	104	50	18	3	339	316	304	291	285	281	281	277	278	265.6
18-Oct	275	273	272	273	280	286	282	275	271	276	280	279	274	287	287	298	113	124	124	123	106	106	110	112	270.9
19-Oct	113	107	115	120	123	127	132	137	135	138	147	131	122	121	118	122	120	121	126	123	123	126	126	123	124.8
20-Oct	126	126	124	127	122	112	124	97	121	126	95	94	66	80	121	204	280	270	245	281	211	242	282	319	130.0
21-Oct	328	304	282	334	4	348	306	336	341	155	174	144	134	126	79	73	12	356	355	344	342	349	AF	AF	344.6
22-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	318	AF	325	320	332	313	291	327	331	289	272	180	186	--
23-Oct	173	211	252	266	272	255	243	252	243	257	269	271	255	250	249	238	229	222	216	211	176	157	170	171	232.8
24-Oct	169	162	146	154	168	214	258	255	257	265	272	294	297	297	292	299	314	326	342	8	15	34	39	51	282.1
25-Oct	31	29	19	19	23	19	9	3	359	358	357	348	347	343	334	326	330	329	335	329	302	274	264	250	346.0
26-Oct	224	219	216	214	216	201	177	179	179	173	177	185	192	201	197	216	218	220	213	230	248	262	263	266	206.0
27-Oct	225	222	138	155	152	162	141	147	149	141	140	142	147	147	143	139	145	134	146	145	145	150	159	159	148.0
28-Oct	157	154	161	211	247	245	245	236	236	241	269	297	296	306	307	306	302	306	307	303	310	308	314	305	287.2
29-Oct	306	311	311	313	318	335	338	339	342	340	342	336	338	339	350	359	14	25	102	190	171	181	200	191	326.3
30-Oct	185	203	211	199	170	148	161	156	148	148	154	148	124	141	3	104	338	343	344	339	342	352	4	16	167.0
31-Oct	350	360	4	310	142	160	132	125	128	97	72	42	23	17	14	7	360	5	3	359	0	358	356	6	13.9
265.0 260.9 259.9 266.5 262.9 257.7 245.0 241.4 245.8 259.7 266.4 279.3 272.3 276.4 277.5 287.8 291.5 289.2 284.2 283.5 285.8 280.6 277.5 271.1																									
Diurnal Average																									
AF - Analyzer Failure																									
All monthly, daily, and diurnal averages have been calculated using vector methods																									



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 97 deg on Oct 4 14:00			Hours of Data:	717
Minimum Value: 3 deg on Oct 15 01:00			Hours of Missing Data:	27
Percentiles: P <sub>1</sub> = 4 P <sub>10</sub> = 6 Q <sub>1</sub> = 7 Median = 9 Q <sub>3</sub> = 12 P <sub>90</sub> = 20 P <sub>99</sub> = 60			Hours of Calibration:	0
			Percent Operational Time:	96.4

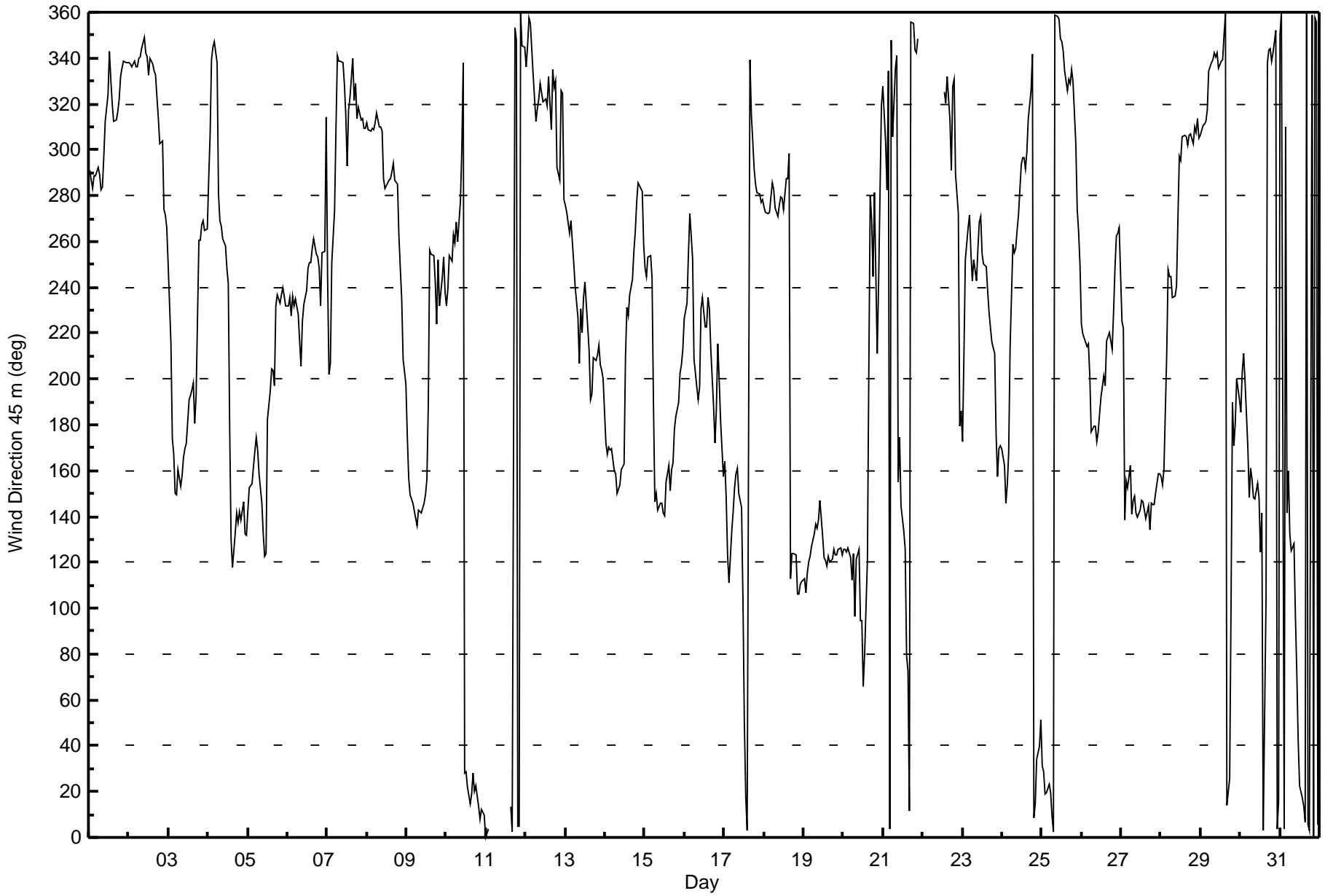
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	8	7	7	9	7	7	7	7	7	8	10	13	16	14	9	9	8	9	9	10	10	10	11	10	16	
2-Oct	10	10	10	10	10	10	10	9	10	11	10	13	14	11	11	11	10	10	7	6	9	8	3	4	14	
3-Oct	5	14	9	8	6	6	5	5	6	9	8	9	10	10	9	10	8	16	17	5	6	4	4	6	17	
4-Oct	10	6	18	13	13	15	27	8	8	9	32	45	60	97	37	13	9	5	6	6	7	10	9	7	97	
5-Oct	6	9	9	15	7	6	4	6	8	12	7	12	31	15	12	13	10	12	6	5	6	6	5	5	31	
6-Oct	6	7	7	7	7	6	8	7	7	12	9	11	10	12	10	12	9	6	7	8	4	9	70	23	70	
7-Oct	17	26	19	12	10	23	11	12	9	8	9	13	17	18	12	9	12	13	9	9	9	9	7	8	26	
8-Oct	9	8	8	8	8	8	10	8	8	9	13	8	8	8	9	10	8	9	8	13	20	9	17	9	20	
9-Oct	5	9	6	6	6	10	7	11	7	8	6	5	7	24	15	8	7	7	5	31	8	9	12	9	31	
10-Oct	5	4	4	6	5	6	5	10	8	14	31	28	18	13	12	15	11	10	8	10	8	7	8	10	31	
11-Oct	6	9	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	10	11	11	11	8	8	13	11	13	13	
12-Oct	11	14	16	15	11	14	8	10	12	11	11	11	13	14	14	16	8	10	7	23	7	15	30	7	30	
13-Oct	6	7	5	3	3	13	12	8	10	17	26	21	23	19	16	13	12	12	8	8	8	8	4	4	26	
14-Oct	11	11	5	6	5	6	7	7	6	5	8	24	14	15	9	10	8	8	6	8	8	6	9	10	24	
15-Oct	3	6	4	5	6	23	5	5	10	7	8	8	15	17	8	8	8	6	9	7	7	7	7	10	23	
16-Oct	8	9	15	7	8	12	16	10	11	27	16	15	10	12	11	12	8	8	10	24	11	9	15	4	27	
17-Oct	8	15	6	14	12	7	7	5	9	10	13	17	21	13	6	15	11	6	9	7	8	7	7	7	21	
18-Oct	8	7	6	7	8	7	7	7	7	8	8	11	11	21	35	60	24	6	9	8	11	10	12	10	60	
19-Oct	11	11	11	8	6	7	7	7	7	7	9	10	9	10	8	6	8	7	7	9	6	5	6	5	11	
20-Oct	5	5	7	8	11	14	9	11	15	19	20	20	52	19	25	41	6	5	13	50	40	9	16	12	52	
21-Oct	12	13	8	27	18	13	39	19	47	42	27	39	19	20	15	21	42	14	6	16	13	18	AF	AF	47	
22-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	20	AF	19	23	25	12	11	22	27	26	42	18	12	42
23-Oct	19	22	6	7	6	13	7	10	9	7	10	13	15	11	10	10	6	7	5	5	26	8	6	6	26	
24-Oct	11	17	5	8	9	20	11	8	6	8	10	11	10	8	9	11	12	11	14	10	9	11	7	9	20	
25-Oct	12	9	8	8	8	9	7	7	6	7	8	11	10	10	11	8	9	8	8	11	11	10	10	13	13	
26-Oct	7	5	7	11	10	16	8	6	7	7	8	9	10	10	9	12	10	7	6	7	11	4	3	23	23	
27-Oct	84	20	85	24	11	5	8	7	5	7	7	8	7	6	7	8	6	7	8	6	6	8	6	5	85	
28-Oct	6	4	10	26	25	6	6	6	7	7	14	10	8	8	8	8	8	9	11	9	8	8	9	10	26	
29-Oct	7	8	8	8	12	11	8	9	12	9	10	11	9	11	16	11	11	24	59	10	7	11	10	8	59	
30-Oct	8	6	4	8	15	8	5	6	5	7	6	10	12	26	91	49	21	10	6	6	5	9	7	10	91	
31-Oct	21	12	12	15	51	43	9	9	7	19	12	12	10	8	9	7	6	6	6	5	6	7	10	7	51	
84 26 85 27 51 43 39 19 47 42 32 45 60 97 91 60 42 24 59 50 40 42 70 23																										
Diurnal Maximum																										

AF - Analyzer Failure



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Wind Direction 45 m (WD45m) - deg**  
**Mannix - October 2017**







**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction 75 m (WD75m) - deg**

**Mannix - October 2017**

Direction of Maximum Speed: 298 deg on Oct 24 13:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 335.3 deg on Oct 2	Hours of Data: 705
Direction of Minimum Speed: 8 deg on Oct 31 04:00	Hours of Missing Data: 39
Direction of Minimum Daily Speed Average: 1.0 deg on Oct 4	Percent Operational Time: 94.8
Monthly Average Direction: 272.0 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	293	288	285	291	290	295	292	285	286	300	316	327	344	333	324	317	317	320	326	335	338	342	340	340	315.2
2-Oct	340	340	339	341	339	339	342	344	347	352	345	343	335	342	340	336	335	325	319	309	314	284	280	278	335.3
3-Oct	266	234	196	195	169	155	170	164	162	169	172	174	191	194	196	199	184	210	262	262	270	274	273	273	209.4
4-Oct	294	314	345	351	352	342	299	288	287	272	260	257	244	186	131	116	135	144	141	145	141	149	137	136	283.2
5-Oct	146	157	168	192	191	196	189	186	163	144	128	130	183	194	205	204	198	233	238	236	240	242	237	234	205.2
6-Oct	233	236	229	237	235	239	232	223	212	228	234	239	249	251	252	258	262	256	255	254	238	255	254	311	242.9
7-Oct	247	196	215	258	277	316	342	344	343	341	332	317	297	321	324	343	324	331	317	321	317	317	313	312	318.7
8-Oct	314	312	311	312	311	315	319	313	313	310	290	285	286	289	290	292	295	290	289	264	250	238	211	198	298.0
9-Oct	178	158	152	150	148	141	136	143	145	143	147	151	163	211	258	255	255	247	232	254	232	245	254	241	188.5
10-Oct	239	240	257	255	268	262	271	265	281	305	339	22	22	24	16	21	29	22	24	17	10	14	13	11	316.3
11-Oct	4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	7	7	2	347	347	--
12-Oct	341	350	1	358	337	325	316	321	326	331	325	325	326	322	334	314	338	332	336	300	293	332	344	291	329.7
13-Oct	284	285	275	281	279	268	266	248	227	233	223	232	242	223	212	191	195	209	211	215	218	210	209	208	232.5
14-Oct	196	188	183	179	177	167	162	152	154	156	163	171	208	232	228	237	246	259	266	279	289	288	289	267	220.1
15-Oct	254	252	260	262	254	213	157	157	153	149	147	140	141	158	166	163	174	176	183	190	196	207	209	216	188.2
16-Oct	229	235	255	274	265	258	218	204	202	205	232	235	223	223	237	231	217	196	187	192	217	202	189	161	227.8
17-Oct	166	150	127	111	136	148	147	158	164	154	145	107	59	29	10	350	323	307	296	289	283	282	279	280	263.7
18-Oct	277	275	274	274	281	287	285	277	274	278	280	281	275	289	285	293	112	125	125	122	110	111	112	113	274.4
19-Oct	114	111	118	122	126	128	133	137	136	139	148	134	124	124	121	126	123	124	130	128	126	126	127	126	127.8
20-Oct	124	124	124	123	119	112	120	102	121	127	98	95	63	79	119	203	284	281	261	285	243	256	287	311	135.0
21-Oct	316	305	287	339	4	354	307	337	359	142	170	147	133	126	82	91	213	5	14	8	352	1	340	296	349.8
22-Oct	149	85	45	297	28	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
23-Oct	AF	AF	263	271	275	263	247	256	248	261	271	271	255	251	247	240	232	228	221	215	190	168	178	182	237.6
24-Oct	187	174	152	156	174	219	259	256	259	267	273	295	298	298	294	301	316	330	346	11	15	34	41	53	281.4
25-Oct	31	28	20	23	28	24	13	6	1	1	0	352	351	346	338	331	334	333	338	332	307	282	269	255	350.3
26-Oct	229	224	218	214	215	202	179	181	181	175	179	187	193	202	199	218	221	224	217	234	253	265	267	271	209.4
27-Oct	253	242	262	159	152	163	153	152	155	147	142	143	147	148	143	139	146	137	146	146	146	151	162	164	151.0
28-Oct	164	164	186	237	251	247	247	238	238	246	272	299	298	307	309	308	304	308	310	306	312	310	316	307	287.7
29-Oct	309	313	314	315	320	336	342	343	347	344	346	338	341	342	354	2	18	28	103	194	185	206	218	205	328.8
30-Oct	197	210	217	207	193	165	173	167	155	150	157	152	125	150	12	82	341	348	350	341	350	0	7	22	181.4
31-Oct	19	3	19	8	122	157	126	120	125	100	78	49	30	25	21	12	5	10	7	3	4	1	359	7	17.4

269.5 261.0 262.4 271.2 267.7 262.5 248.9 243.9 246.6 260.3 266.8 279.2 274.1 276.5 277.9 282.2 285.6 285.0 278.3 284.6 286.6 282.8 281.4 275.3  
Diurnal Average

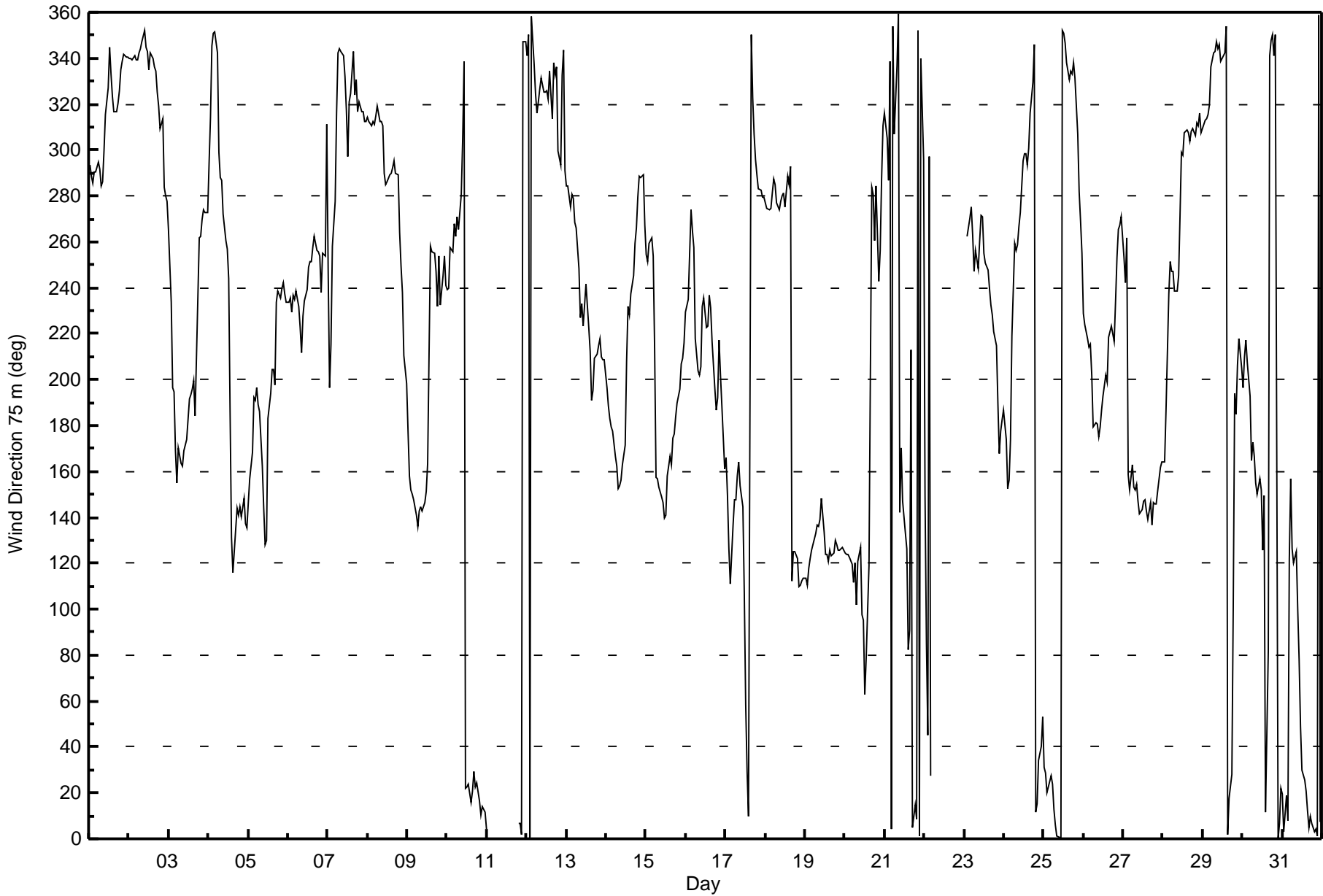
AF - Analyzer Failure  
All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Direction 75 m (WD75m) - deg**  
**Mannix - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 101 deg on Oct 4 14:00 Minimum Value: 2 deg on Oct 13 04:00 Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 5 Q <sub>1</sub> = 6 Median = 8 Q <sub>3</sub> = 12 P <sub>90</sub> = 18 P <sub>99</sub> = 64																		Hours in Service: 744 Hours of Data: 705 Hours of Missing Data: 39 Hours of Calibration: 0 Percent Operational Time: 94.8							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	7	5	6	8	6	6	6	6	6	7	9	12	14	13	8	8	7	8	8	9	8	8	9	9	14
2-Oct	9	8	8	9	9	9	8	7	8	10	9	12	14	9	9	9	9	8	5	6	7	8	3	4	14
3-Oct	7	10	12	9	11	5	4	5	6	8	7	8	9	8	7	8	8	16	15	5	6	4	4	5	16
4-Oct	10	6	16	10	10	12	27	8	11	12	28	35	60	101	41	16	8	3	4	5	6	7	8	7	101
5-Oct	3	9	6	13	7	6	6	9	8	15	9	14	27	14	11	11	9	12	5	4	5	5	4	4	27
6-Oct	5	6	6	6	6	6	8	7	6	11	9	10	8	11	9	11	9	6	6	7	3	11	27	18	27
7-Oct	33	20	17	10	10	19	11	10	7	6	8	13	17	17	12	8	10	12	8	7	8	8	7	7	33
8-Oct	7	6	7	6	7	7	8	7	7	8	13	7	7	7	8	8	7	8	8	13	18	8	16	7	18
9-Oct	5	7	4	4	4	8	5	9	6	6	5	6	7	22	12	7	6	6	5	30	7	8	12	7	30
10-Oct	5	3	4	6	5	5	4	8	8	12	27	26	16	9	11	14	9	8	7	8	6	6	6	8	27
11-Oct	4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	6	6	13	10	13	13
12-Oct	10	13	14	14	10	13	7	9	11	9	10	9	12	12	15	15	7	8	5	23	7	15	26	8	26
13-Oct	4	5	4	2	3	8	5	7	15	15	26	19	21	17	15	13	10	11	6	6	6	8	4	4	26
14-Oct	10	14	7	4	5	6	6	6	5	4	8	20	13	15	9	10	8	7	5	8	7	5	8	10	20
15-Oct	4	4	4	6	10	21	4	4	9	6	6	7	12	13	7	7	6	5	7	5	6	6	6	9	21
16-Oct	8	8	14	6	8	10	16	11	11	27	14	15	10	12	9	11	8	6	12	23	10	8	12	5	27
17-Oct	7	14	10	16	13	3	5	5	6	8	13	19	17	10	6	11	11	5	8	6	7	6	6	6	19
18-Oct	8	7	6	6	7	6	6	6	6	7	7	10	10	19	31	65	22	8	10	12	14	14	14	13	65
19-Oct	13	14	13	10	8	7	7	5	6	6	9	11	11	13	12	8	11	9	8	10	7	8	7	7	14
20-Oct	8	9	10	11	13	16	12	15	14	16	22	20	33	18	22	42	4	6	17	46	37	5	12	7	46
21-Oct	11	7	6	26	13	11	36	17	43	50	21	37	18	20	16	28	71	62	5	18	13	21	28	48	71
22-Oct	60	43	52	68	19	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	68
23-Oct	AF	AF	13	6	6	13	5	8	8	7	10	13	12	10	10	9	5	7	4	4	21	9	5	5	21
24-Oct	7	17	5	8	9	17	10	8	6	7	9	10	9	7	8	11	11	10	14	8	7	10	6	8	17
25-Oct	10	6	6	6	6	7	6	6	4	5	7	10	8	9	9	6	7	6	6	9	10	9	9	12	12
26-Oct	6	4	5	10	9	16	6	5	6	7	8	8	9	8	8	11	9	6	5	7	9	3	3	8	16
27-Oct	33	12	79	38	20	6	6	6	4	6	6	7	7	6	6	7	6	6	6	5	5	6	5	4	79
28-Oct	5	5	16	15	10	5	5	5	6	6	13	10	7	7	7	7	8	7	10	8	7	7	7	9	16
29-Oct	6	7	7	7	11	10	7	8	11	8	8	9	8	9	13	11	10	16	51	10	8	15	7	8	51
30-Oct	7	5	5	6	11	19	5	6	5	5	5	9	16	65	81	42	22	10	6	5	6	6	5	9	81
31-Oct	11	8	11	67	24	38	12	12	8	17	13	11	8	6	6	7	5	5	6	4	5	5	9	6	67
60 43 79 68 24 38 36 17 43 50 28 37 60 101 81 65 71 62 51 46 37 21 28 48																									
Diurnal Maximum																									
AF - Analyzer Failure																									





Summary of Hour Standard Deviations

Mannix - October 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 99 deg on Oct 4 14:00			Hours of Data:	724
Minimum Value: 3 deg on Oct 14 00:00			Hours of Missing Data:	20
Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 5 Q <sub>1</sub> = 6 Median = 8 Q <sub>3</sub> = 11 P <sub>90</sub> = 18 P <sub>99</sub> = 67			Hours of Calibration:	0
			Percent Operational Time:	97.3

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	8	5	5	8	5	5	5	6	6	7	8	11	14	12	6	7	6	7	7	8	8	8	9	8	14
2-Oct	8	8	7	9	8	8	8	7	7	9	8	12	13	9	9	9	8	7	4	6	6	7	3	4	13
3-Oct	5	9	11	8	12	6	7	6	5	7	6	8	9	8	7	8	8	14	14	5	6	4	4	5	14
4-Oct	10	6	15	10	9	11	26	8	10	13	24	37	51	99	41	11	8	3	4	5	6	7	5	99	
5-Oct	3	10	8	8	6	4	5	8	10	16	8	11	26	13	11	10	9	11	4	4	5	5	3	3	26
6-Oct	4	5	5	5	5	6	7	6	6	10	8	9	8	10	9	11	8	6	6	7	4	10	17	17	17
7-Oct	37	17	17	9	12	18	11	9	7	6	7	12	16	16	12	7	10	11	7	7	7	8	6	6	37
8-Oct	6	6	7	6	6	6	7	6	7	7	13	6	7	6	7	8	6	7	8	13	16	8	15	7	16
9-Oct	5	6	4	4	4	8	4	8	6	5	5	6	8	19	11	7	6	6	4	28	6	8	12	7	28
10-Oct	5	4	4	7	4	5	3	7	7	12	25	26	16	10	10	13	8	7	6	8	5	5	5	8	26
11-Oct	4	7	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	6	6	13	9	12	13
12-Oct	9	13	13	13	9	12	6	8	11	9	10	9	11	11	14	15	6	8	5	22	7	16	24	10	24
13-Oct	5	4	3	6	4	6	7	8	14	13	21	19	19	15	13	13	10	10	6	6	6	9	3	3	21
14-Oct	8	12	8	4	4	6	6	6	4	4	7	19	12	15	8	9	8	7	5	7	6	5	8	9	19
15-Oct	5	3	4	6	13	19	4	5	10	6	5	6	12	10	6	6	5	5	7	4	6	5	6	8	19
16-Oct	7	8	13	6	7	9	15	11	10	24	12	13	9	11	8	10	8	6	12	22	9	7	10	5	24
17-Oct	7	15	9	10	14	4	6	6	6	7	14	13	17	9	7	10	11	4	8	6	6	6	6	6	17
18-Oct	7	6	6	6	6	6	5	6	6	7	7	9	9	18	30	71	17	6	7	8	9	9	9	8	71
19-Oct	8	8	9	7	6	6	6	4	5	6	9	10	9	11	8	5	7	7	7	9	6	6	5	5	11
20-Oct	5	6	7	7	8	10	8	9	10	12	18	18	32	17	19	41	4	5	16	46	31	4	10	5	46
21-Oct	8	6	6	24	11	13	36	20	68	35	20	34	17	18	15	36	45	89	7	18	15	29	35	46	89
22-Oct	51	30	43	86	AF	41	29	39	32	AF	AF	19	16	17	28	22	10	12	18	30	24	46	14	10	86
23-Oct	18	13	5	5	6	12	5	8	8	7	10	13	12	9	9	9	5	6	4	4	19	10	5	5	19
24-Oct	6	17	5	8	10	16	9	7	5	7	8	9	8	7	10	10	9	13	7	7	9	5	9	17	17
25-Oct	10	5	5	5	5	6	6	6	3	5	6	9	8	8	9	5	6	6	5	9	9	9	9	12	12
26-Oct	6	3	5	9	8	15	6	5	5	6	8	8	8	8	8	9	9	6	5	6	8	3	4	5	15
27-Oct	15	8	67	46	24	5	5	5	4	6	5	7	6	5	5	6	5	5	6	4	4	4	5	4	67
28-Oct	5	7	16	12	9	5	5	4	6	6	12	9	6	7	6	7	7	7	10	8	6	7	6	8	16
29-Oct	5	6	6	6	9	10	7	7	10	8	8	8	7	9	13	11	10	13	50	11	9	16	6	7	50
30-Oct	5	4	5	6	9	21	5	7	5	5	5	9	16	67	79	36	32	10	6	5	7	5	4	8	79
31-Oct	11	6	19	49	17	30	10	9	6	10	12	11	8	6	6	7	5	5	6	4	5	5	8	6	49
	51	30	67	86	24	41	36	39	68	35	25	37	51	99	79	71	45	89	50	46	31	46	35	46	

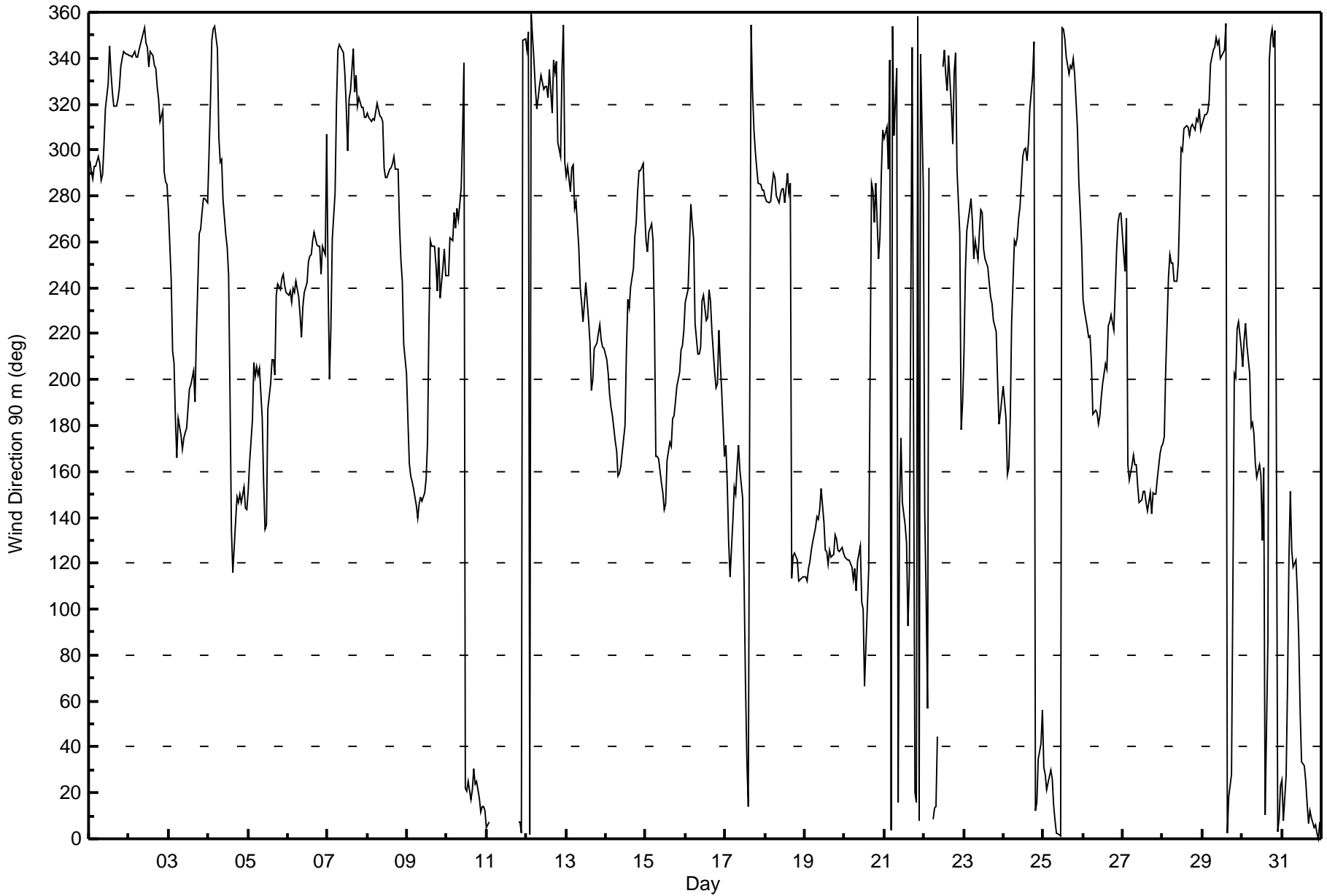
Diurnal Maximum

AF - Analyzer Failure



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Wind Direction 90 m (WD90m) - deg**  
**Mannix - October 2017**





Maximum Value: 1.5 km/h on Oct 31 23:00      Maximum Daily Average: 0.9 km/h on Oct 19																								Hours in Service: 744 Hours of Data: 723		
Minimum Value: -1.5 km/h on Oct 24 14:00      Minimum Daily Average: -0.6 km/h on Oct 28																								Hours of Missing Data: 21 Hours of Calibration: 0		
Maximum Diurnal Average: 0.0 km/h at hour 10      Minimum Diurnal Average: -0.2 km/h at hour 15																								Percent Operational Time: 97.2		
Monthly Average: -0.09 km/h      Percentiles: P <sub>1</sub> = -1.1 P <sub>10</sub> = -0.7 Q <sub>1</sub> = -0.5 Median = -0.2 Q <sub>3</sub> = 0.3 P <sub>90</sub> = 0.7 P <sub>99</sub> = 1.1																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	-0.3	-0.5	-0.7	-0.7	-0.7	-0.8	-0.7	-0.5	-0.7	-0.4	-0.5	-0.5	-0.5	-0.4	-0.7	-0.5	-0.6	-0.8	-0.7	-0.6	-0.7	-0.7	-0.6	-0.9	-0.6	-0.3
2-Oct	-0.9	-0.7	-0.6	-0.7	-0.6	-0.8	-0.7	-0.8	-0.9	-0.3	-0.7	-0.5	-0.6	-0.6	-0.6	-0.5	-0.4	-0.4	-0.3	-0.3	-0.1	-0.2	-0.3	-0.3	-0.5	-0.1
3-Oct	-0.5	-0.1	0.2	0.2	0.5	0.7	0.6	0.9	0.5	0.4	0.2	-0.1	-0.5	-0.5	-0.3	-0.2	-0.1	0.0	-0.1	-0.4	-0.5	-0.4	-0.4	-0.5	0.0	0.9
4-Oct	-0.4	-0.5	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.2	0.0	0.0	0.3	0.3	0.3	0.7	0.5	0.5	0.7	0.6	0.4	0.5	0.6	0.1	0.7	0.6
5-Oct	0.6	0.5	0.5	0.3	0.4	0.3	0.4	0.3	0.3	0.4	0.4	0.3	0.1	0.0	-0.5	-0.6	-0.4	-0.6	-0.7	-0.6	-0.6	-0.5	-0.4	-0.5	0.0	0.6
6-Oct	-0.4	-0.4	-0.5	-0.6	-0.5	-0.7	-0.5	-0.2	-0.4	-0.6	-0.7	-0.8	-1.1	-0.7	-1.0	-0.4	-0.3	-0.3	-0.4	-0.4	-0.4	-0.2	-0.1	-0.1	-0.5	-0.1
7-Oct	-0.1	0.0	-0.1	-0.2	-0.3	-0.1	-0.1	-0.2	-0.3	-0.5	-0.3	-0.1	-0.1	-0.3	-0.3	-0.4	-0.8	-0.5	-0.8	-0.8	-0.9	-0.8	-0.9	-0.9	-0.4	0.0
8-Oct	-0.7	-0.8	-0.8	-0.9	-1.0	-0.9	-0.6	-0.8	-0.9	-0.6	-0.7	-0.8	-0.5	-0.6	-0.6	-0.5	-0.4	-0.5	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.6	-0.2
9-Oct	0.0	0.5	0.7	0.8	0.8	0.7	0.8	0.7	0.7	0.7	1.0	0.9	0.6	0.1	0.0	-0.4	-0.5	-0.5	-0.4	-0.8	-0.3	-0.5	-0.3	-0.4	0.2	1.0
10-Oct	-0.4	-0.4	-0.6	-0.5	-0.3	-0.4	-0.3	-0.3	-0.3	-0.3	0.1	0.5	0.2	0.3	0.2	0.2	0.7	0.4	0.4	0.2	0.0	0.0	0.1	0.1	0.0	0.7
11-Oct	-0.3	0.1	-0.1	-0.4	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.0	-0.2	0.3	0.1	0.0	-0.4	0.0	0.1	0.0	-0.4	-0.1	--	0.3
12-Oct	-0.2	-0.2	0.0	0.0	-0.3	-0.3	-0.5	-0.5	-0.5	-0.4	-0.4	-0.4	-0.5	-0.2	-0.1	-0.4	-0.3	-0.3	-0.2	-0.2	-0.3	-0.2	0.0	-0.1	-0.3	0.0
13-Oct	-0.3	-0.2	-0.3	-0.3	-0.5	-0.2	-0.1	-0.1	-0.1	-0.1	0.1	-0.5	-0.1	-0.3	-0.6	-0.3	-0.3	-0.3	-0.5	-0.2	-0.3	-0.2	-0.2	-0.1	-0.2	0.1
14-Oct	0.2	0.3	0.3	0.5	0.4	0.5	0.6	0.8	0.8	0.7	0.4	0.3	-0.4	-0.5	-0.5	-0.6	-0.6	-0.3	-0.2	-0.3	-0.7	-0.5	-0.3	-0.4	0.0	0.8
15-Oct	-0.6	-0.6	-0.4	-0.4	-0.6	0.1	0.5	0.7	0.6	0.8	0.7	0.6	0.6	0.9	0.4	0.6	0.7	0.7	0.0	-0.1	-0.2	-0.3	-0.5	-0.5	0.2	0.9
16-Oct	-0.6	-0.9	-1.0	-0.5	-0.5	-0.4	-0.3	-0.1	0.1	0.2	-0.1	-0.2	-0.7	-0.6	-0.3	-0.2	-0.1	-0.1	0.1	-0.1	-0.3	-0.1	0.1	0.5	-0.3	0.5
17-Oct	0.3	0.4	0.5	0.4	0.5	0.4	0.4	0.4	0.2	0.6	0.5	0.5	0.3	-0.1	-0.2	-0.2	-0.5	-0.4	-0.6	-0.6	-0.5	-0.7	-0.8	0.1	0.6	
18-Oct	-0.7	-0.7	-1.0	-0.9	-0.9	-1.2	-1.0	-0.5	-0.5	-0.5	-0.6	-0.3	-0.3	-0.3	0.3	0.2	0.6	0.6	0.8	0.4	1.4	1.1	1.2	1.4	-0.1	1.4
19-Oct	1.4	1.5	1.4	1.0	0.9	1.0	0.8	0.8	0.8	1.0	0.7	0.6	0.5	0.4	0.6	0.8	0.9	0.9	0.9	0.8	0.9	0.7	0.8	0.8	0.9	1.5
20-Oct	0.7	0.7	0.8	0.6	0.5	0.7	0.7	0.9	0.6	0.6	0.8	0.7	0.1	0.8	0.6	0.0	-0.2	-0.1	0.0	0.0	0.1	0.0	-0.1	-0.1	0.4	0.9
21-Oct	-0.1	-0.1	-0.2	0.0	0.3	-0.1	0.1	0.0	0.0	0.2	0.2	0.1	0.6	0.3	0.7	0.3	0.0	0.0	-0.3	-0.1	0.0	0.0	0.1	0.1	0.1	0.7
22-Oct	0.4	0.2	0.1	0.1	0.0	AF	AF	AF	AF	AF	0.4	-0.1	0.2	-0.3	-0.4	-0.2	-0.2	-0.2	-0.2	0.0	0.0	0.0	0.1	0.0	0.4	
23-Oct	0.0	-0.1	-0.3	-0.4	-0.4	-0.6	-0.6	-0.3	-0.2	-0.2	-0.5	-0.2	-0.2	-0.3	-0.6	-0.3	-0.4	-0.4	-0.5	-0.4	0.3	0.7	0.3	0.3	-0.2	0.7
24-Oct	0.3	0.5	0.8	0.8	0.4	-0.4	-0.5	-0.8	-0.8	-0.7	-0.8	-1.2	-1.3	-1.5	-0.9	-0.9	-0.7	-0.4	-0.1	0.1	0.2	0.2	0.3	0.5	-0.3	0.8
25-Oct	0.4	0.3	0.4	0.3	0.3	0.0	0.0	-0.2	-0.5	-0.4	-0.4	-0.5	-0.3	-0.1	-0.6	-0.6	-0.5	-0.6	-0.3	-0.4	-0.2	-0.1	-0.2	-0.3	-0.2	0.4
26-Oct	-0.4	-0.4	-0.5	-0.8	-0.7	-0.4	-0.1	-0.2	-0.2	-0.1	0.0	-0.1	-0.2	-0.4	-0.4	-0.2	-0.3	-0.3	-0.3	-0.3	-0.2	-0.2	-0.3	0.0	-0.3	0.0
27-Oct	0.1	0.0	0.2	-0.1	0.3	0.4	0.6	0.5	0.5	0.7	0.9	0.7	0.9	0.9	0.8	0.9	0.8	1.0	0.9	0.9	0.9	0.8	0.5	0.6	0.6	1.0
28-Oct	0.7	0.8	0.5	0.0	-0.1	-0.7	-0.7	-0.9	-0.8	-0.8	-0.6	-0.8	-1.1	-1.0	-1.0	-0.9	-1.1	-1.1	-1.2	-0.8	-0.9	-1.0	-0.7	-0.9	-0.6	0.8
29-Oct	-1.0	-0.9	-1.0	-1.2	-0.7	-0.6	-0.7	-0.7	-0.3	-0.6	-0.6	-0.4	-0.5	-0.5	0.0	-0.1	0.2	0.4	0.2	0.0	0.2	0.0	-0.1	-0.1	-0.4	0.4
30-Oct	0.0	-0.1	-0.5	-0.1	0.3	0.4	0.5	0.6	0.6	0.7	0.7	0.5	0.3	0.3	0.1	0.2	0.0	-0.1	-0.1	-0.1	-0.2	-0.1	0.0	0.0	0.2	0.7
31-Oct	0.0	0.0	0.0	0.0	0.2	0.2	0.3	0.6	0.3	0.5	0.6	0.3	0.1	0.2	AF	AF	-0.1	AF	AF	AF	AF	AF	1.5	1.1	--	1.5
																								Diurnal Average		
																								Diurnal Maximum		
AF - Analyzer Failure																										



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Vertical Wind Speed 20 m (VW20m) - km/h**  
**Mannix - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.7 km/h on Oct 2 02:00 Minimum Value: 0.1 km/h on Oct 31 04:00 Percentiles: P <sub>1</sub> = 0.3 P <sub>10</sub> = 0.6 Q <sub>1</sub> = 1.0 Median = 1.5 Q <sub>3</sub> = 2.3 P <sub>90</sub> = 3.0 P <sub>99</sub> = 4.3																								Hours in Service: 744 Hours of Data: 723 Hours of Missing Data: 21 Hours of Calibration: 0 Percent Operational Time: 97.2	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	1.9	2.3	2.5	2.9	2.8	2.7	2.4	2.4	2.3	2.3	2.5	2.7	2.8	2.5	2.6	2.2	2.6	2.9	2.9	3.5	3.9	4.3	4.1	4.3	4.3
2-Oct	4.7	4.7	4.3	3.9	3.9	4.0	4.3	4.3	4.0	4.7	4.4	3.6	3.2	3.3	3.1	2.7	2.5	1.8	0.8	0.9	1.0	0.5	0.4	0.5	4.7
3-Oct	0.5	0.4	0.4	0.6	0.7	1.2	1.1	1.5	1.7	2.1	2.3	2.6	3.0	2.7	2.7	2.0	1.8	0.8	0.9	1.7	1.5	1.4	1.2	1.3	3.0
4-Oct	1.3	1.3	1.5	1.7	1.5	1.5	0.9	0.7	0.7	1.3	1.6	1.9	1.6	1.5	1.5	1.3	1.0	0.8	1.1	1.0	1.0	0.8	0.9	1.0	1.9
5-Oct	1.1	1.0	1.0	0.5	0.5	0.4	0.4	0.5	0.8	1.1	1.1	1.3	2.0	2.3	2.4	2.8	2.2	2.0	2.0	1.8	1.8	1.6	1.2	1.1	2.8
6-Oct	1.2	1.0	1.7	1.8	1.2	1.2	1.1	1.0	1.6	2.1	2.6	3.0	3.4	3.0	3.3	2.4	1.3	1.3	2.1	1.4	1.0	1.3	0.7	0.4	3.4
7-Oct	0.2	0.3	0.5	0.9	1.2	1.3	1.0	2.1	2.2	2.0	1.8	1.4	1.5	1.6	2.0	2.8	3.0	3.1	3.3	3.1	3.5	3.1	3.4	3.7	3.7
8-Oct	3.5	3.3	3.2	3.5	3.3	2.9	2.5	2.8	3.2	2.8	2.9	2.6	2.6	2.6	2.6	2.4	2.1	1.7	1.4	1.2	1.0	1.1	0.8	0.8	3.5
9-Oct	0.7	0.7	1.1	1.3	1.5	1.7	2.0	1.8	1.7	1.8	1.8	1.7	1.3	1.1	1.1	1.9	1.9	1.1	1.0	2.3	1.5	1.6	1.0	1.2	2.3
10-Oct	0.8	0.9	1.3	1.2	0.8	0.9	0.8	0.9	1.6	1.8	1.4	1.2	1.0	1.2	1.3	1.5	1.4	1.4	1.5	1.6	2.0	2.1	2.0	1.8	2.1
11-Oct	2.2	2.0	2.2	2.4	AF	AF	AF	AF	AF	AF	AF	AF	AF	3.2	3.0	2.6	2.8	2.6	2.8	3.0	2.9	2.2	2.4	2.3	3.2
12-Oct	2.3	2.4	2.5	2.6	2.1	1.9	2.0	2.2	2.2	2.3	2.2	2.3	2.1	2.0	1.8	1.4	1.5	1.1	1.1	1.0	1.4	1.6	0.6	0.6	2.6
13-Oct	0.7	0.7	0.5	0.5	0.8	0.7	0.5	0.6	0.7	1.1	1.4	1.3	1.5	1.7	1.7	1.8	1.8	1.7	1.6	1.1	1.1	1.1	0.7	0.5	1.8
14-Oct	0.2	0.5	0.8	0.7	0.8	0.9	1.3	1.6	1.6	1.4	1.7	1.5	1.8	2.1	2.1	2.2	2.0	1.5	1.1	1.6	2.7	2.2	1.7	0.8	2.7
15-Oct	1.0	0.9	1.1	0.7	0.6	0.4	0.8	1.2	1.3	1.5	1.3	1.2	1.5	1.9	1.8	1.1	0.9	0.8	1.6	1.5	1.3	1.7	2.0	1.7	2.0
16-Oct	2.0	2.8	3.8	2.3	1.6	1.3	0.7	1.0	1.3	1.3	1.9	1.5	1.8	1.8	1.7	1.2	0.5	0.7	0.6	1.3	1.7	1.2	0.6	0.5	3.8
17-Oct	0.7	0.6	0.8	0.8	0.9	0.5	0.8	1.2	0.9	1.0	1.1	0.9	0.8	0.8	1.0	0.8	1.3	1.8	2.0	2.2	2.7	3.1	3.1	2.9	3.1
18-Oct	2.9	3.3	3.1	2.9	3.4	3.4	2.9	2.4	1.9	2.3	2.4	1.9	1.6	1.4	1.4	1.0	0.9	1.2	1.4	1.5	2.1	2.4	2.1	2.4	3.4
19-Oct	2.5	2.5	2.5	2.5	2.1	2.4	2.0	2.0	2.0	1.7	1.5	1.4	1.3	1.4	1.6	1.9	1.7	1.9	1.9	1.9	2.3	2.0	2.0	1.9	2.5
20-Oct	1.2	1.2	1.7	1.2	1.3	1.3	1.2	1.5	1.2	1.5	1.5	1.1	1.3	1.5	1.1	0.8	1.1	0.4	0.2	0.2	0.3	0.3	0.4	0.4	1.7
21-Oct	0.6	0.5	0.6	1.0	1.2	0.9	0.6	0.7	0.7	0.7	0.9	1.0	1.2	1.2	1.3	0.8	0.2	0.5	1.1	0.8	0.9	0.9	0.7	0.6	1.3
22-Oct	0.6	0.5	0.6	0.6	0.7	AF	AF	AF	AF	AF	1.1	1.2	1.5	1.6	1.4	1.1	1.1	0.9	0.8	0.7	0.7	0.6	0.6	0.9	1.6
23-Oct	0.8	0.5	0.9	1.5	1.9	1.2	1.9	1.4	1.3	1.5	1.7	1.8	1.8	2.1	1.9	1.6	0.9	0.8	1.3	1.3	1.1	0.8	1.2	1.3	2.1
24-Oct	1.1	1.3	1.5	1.6	1.8	1.8	1.5	2.4	3.0	3.0	3.4	4.4	4.6	4.2	3.3	3.2	2.9	2.0	1.8	1.9	1.8	1.2	1.1	1.1	4.6
25-Oct	1.3	1.4	1.7	1.7	1.7	1.4	1.8	2.3	3.0	3.6	3.5	2.9	2.8	2.9	2.6	2.5	2.7	2.1	2.3	1.5	1.1	0.9	1.0	0.9	3.6
26-Oct	1.1	1.4	1.5	2.7	2.5	2.4	1.8	2.3	2.5	2.3	2.3	2.3	2.3	2.2	1.2	1.4	1.0	1.1	0.7	0.6	0.8	0.5	0.3	2.7	
27-Oct	0.3	0.3	0.3	0.6	0.6	0.7	0.9	0.9	0.9	1.2	1.5	1.7	1.7	1.7	1.3	2.0	1.5	1.9	1.8	1.7	1.5	1.9	1.2	1.3	2.0
28-Oct	1.0	0.9	0.9	0.8	1.2	2.0	1.8	2.2	2.1	2.0	2.0	3.0	3.5	3.5	3.2	3.5	3.4	3.5	3.4	3.5	3.6	4.0	3.4	3.4	4.0
29-Oct	3.4	4.1	3.9	3.9	3.7	3.2	3.3	3.6	3.3	3.2	2.9	2.7	3.0	2.6	2.2	1.6	1.4	1.0	0.6	0.5	0.5	0.8	0.7	0.7	4.1
30-Oct	0.8	1.3	1.3	0.9	0.6	0.8	0.6	0.7	0.9	1.2	1.2	1.1	0.8	0.8	0.8	0.5	0.3	0.8	0.9	0.8	0.6	0.7	0.7	0.8	1.3
31-Oct	0.4	0.2	0.4	0.1	0.3	0.5	0.6	1.0	1.0	0.9	1.1	1.1	1.0	1.1	AF	AF	2.1	AF	AF	AF	AF	AF	2.9	3.2	3.2
4.7 4.7 4.3 3.9 3.9 4.0 4.3 4.3 4.0 4.7 4.4 4.4 4.6 4.2 3.3 3.5 3.4 3.5 3.4 3.5 3.4 3.5 3.9 4.3 4.1 4.3																									
Diurnal Maximum																									
AF - Analyzer Failure																									



Summary of Hour Averages

Mannix - October 2017

Maximum Value: 2.3 km/h on Oct 15 14:00      Maximum Daily Average: 1.2 km/h on Oct 27																								Hours in Service: 744 Hours of Data: 717		
Minimum Value: -2.6 km/h on Oct 2 00:00      Minimum Daily Average: -1.5 km/h on Oct 2 Maximum Diurnal Average: 0.1 km/h at hour 10      Minimum Diurnal Average: -0.3 km/h at hour 20 Monthly Average: -0.14 km/h      Percentiles: P <sub>1</sub> = -2.2 P <sub>10</sub> = -1.4 Q <sub>1</sub> = -0.7 Median = -0.2 Q <sub>3</sub> = 0.5 P <sub>90</sub> = 1.2 P <sub>99</sub> = 1.7																								Hours of Missing Data: 27 Hours of Calibration: 0 Percent Operational Time: 96.4		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	-0.7	-0.9	-0.9	-1.0	-1.1	-1.4	-1.1	-0.9	-1.1	-0.6	-1.0	-1.1	-1.3	-1.1	-1.5	-0.7	-1.0	-1.4	-1.4	-1.7	-1.9	-1.9	-1.9	-2.6	-1.3	-0.6
2-Oct	-2.2	-2.3	-2.1	-2.0	-2.1	-1.8	-2.3	-2.4	-2.3	-1.3	-2.4	-1.5	-1.5	-1.7	-1.8	-1.4	-1.2	-0.9	-0.7	-0.6	-0.5	-0.5	-0.5	-0.4	-1.5	-0.4
3-Oct	-0.4	0.0	0.4	0.5	1.0	1.5	1.3	1.7	1.3	1.5	1.1	1.0	0.6	0.6	0.4	0.1	0.6	0.1	-0.2	-0.5	-0.6	-0.7	-0.5	-0.5	0.4	1.7
4-Oct	-0.8	-1.1	-0.7	-0.9	-0.8	-1.0	-0.4	-0.4	-0.4	-0.2	0.2	-0.1	0.4	0.3	0.3	0.7	0.6	0.9	1.0	1.2	1.1	0.8	0.8	1.1	0.1	1.2
5-Oct	1.2	1.2	0.9	0.5	0.6	0.5	0.6	0.5	0.6	0.5	0.2	0.3	0.9	0.7	0.1	0.1	-0.4	-0.5	-0.4	-0.5	-0.4	-0.2	-0.3	0.3	1.2	
6-Oct	-0.2	-0.3	-0.2	-0.4	-0.4	-0.5	-0.3	-0.1	-0.2	-0.3	-0.3	-0.3	-0.8	-0.2	-0.8	-0.3	-0.2	-0.4	-0.4	-0.3	-0.2	-0.4	-0.2	-0.2	-0.3	-0.1
7-Oct	0.0	0.1	0.1	-0.2	-0.4	-0.4	-0.6	-0.7	-1.2	-1.4	-0.8	-0.3	-0.3	-0.7	-0.8	-1.6	-1.9	-1.5	-1.5	-1.9	-1.6	-1.0	-1.5	-1.6	-0.9	0.1
8-Oct	-1.5	-1.7	-1.4	-2.0	-1.9	-1.5	-1.0	-1.4	-1.7	-1.1	-1.0	-1.0	-0.9	-1.1	-0.9	-0.7	-0.7	-0.7	-0.4	-0.2	-0.2	-0.1	0.1	0.1	-1.0	0.1
9-Oct	0.5	1.2	1.4	1.4	1.5	1.6	1.5	1.3	1.4	1.4	1.7	1.7	1.2	0.3	-0.1	-0.4	-0.5	-0.4	-0.3	-0.7	-0.2	-0.3	-0.4	-0.3	0.6	1.7
10-Oct	-0.3	-0.6	-0.7	-0.6	-0.5	-0.4	-0.6	-0.4	-0.6	-0.6	-0.2	0.3	-0.1	0.1	0.0	0.0	0.4	0.0	-0.1	-0.3	-0.7	-0.7	-0.6	-0.5	-0.3	0.4
11-Oct	-1.1	-0.3	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.2	-0.9	-0.2	-0.7	-0.8	-0.8	-0.5	-0.8	-0.3	--	0.2
12-Oct	-0.8	-0.9	-0.6	-0.7	-0.8	-0.7	-1.0	-0.8	-0.9	-1.0	-1.1	-1.0	-0.7	-0.6	-0.3	-0.6	-0.9	-0.8	-0.8	-0.4	-0.5	-0.8	-0.2	-0.2	-0.7	-0.2
13-Oct	-0.6	-0.6	-0.5	-0.5	-0.3	0.0	0.0	-0.1	0.0	0.3	0.2	-0.2	0.1	0.2	-0.3	0.4	0.5	0.2	0.0	0.0	0.0	0.0	-0.1	0.1	0.0	0.5
14-Oct	0.2	0.7	0.8	0.8	0.8	1.2	1.4	1.5	1.6	1.5	1.2	0.8	-0.2	-0.1	-0.2	-0.3	-0.4	-0.4	-0.2	-0.8	-1.2	-1.0	-0.7	-0.5	0.3	1.6
15-Oct	-0.5	-0.5	-0.4	-0.6	-0.5	0.2	1.1	1.5	1.2	1.4	1.2	1.2	1.3	2.3	1.3	1.4	1.2	1.1	0.7	0.5	0.3	0.0	-0.2	-0.1	0.6	2.3
16-Oct	-0.2	-0.4	-0.7	-0.6	-0.5	-0.4	-0.1	0.2	0.3	0.5	0.4	0.2	-0.4	-0.2	-0.2	0.0	0.0	0.2	0.6	0.5	-0.1	0.2	0.3	0.9	0.0	0.9
17-Oct	0.7	0.6	0.7	0.6	0.7	0.8	0.9	1.2	0.6	0.9	0.9	0.5	0.3	0.0	-0.5	-0.4	-0.4	-1.1	-0.8	-0.9	-0.8	-0.9	-0.9	-0.6	0.1	1.2
18-Oct	-0.8	-0.9	-1.1	-1.2	-1.1	-1.7	-1.4	-0.6	-0.7	-0.6	-0.9	-0.3	-0.5	-0.6	0.2	0.2	0.7	0.9	0.9	0.3	1.6	1.2	1.2	1.8	-0.1	1.8
19-Oct	1.4	1.3	1.7	1.0	1.0	1.5	1.5	1.3	1.4	1.6	1.2	0.7	0.4	0.2	0.4	0.9	1.2	0.9	1.3	1.2	1.2	1.3	1.1	1.0	1.1	1.7
20-Oct	1.1	1.0	1.0	0.8	0.8	1.1	1.1	1.0	1.0	1.0	0.9	0.6	-0.1	0.7	0.9	0.2	-0.5	-0.2	0.0	-0.1	0.1	-0.1	-0.5	-0.4	0.5	1.1
21-Oct	-0.4	-0.5	-0.3	-0.4	0.0	-0.5	0.1	-0.3	0.1	0.5	0.6	0.1	0.8	0.6	0.4	0.3	0.0	-0.1	-0.6	-0.3	-0.2	-0.1	AF	AF	0.0	0.8
22-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.4	AF	-0.8	-0.6	-0.4	-0.4	0.0	-0.3	0.0	0.1	0.0	0.2	0.4	--	0.4
23-Oct	0.3	0.0	-0.4	-0.4	-0.6	-0.5	-0.4	-0.2	-0.4	-0.1	-0.7	-0.3	-0.1	-0.2	-0.3	0.1	-0.3	-0.3	-0.2	-0.1	0.7	1.4	1.0	0.9	0.0	1.4
24-Oct	0.8	1.2	1.8	1.6	1.2	-0.2	-0.4	-0.7	-0.8	-0.7	-0.8	-1.7	-1.7	-1.9	-1.2	-1.2	-1.3	-1.1	-0.7	-0.5	-0.6	-0.2	-0.1	0.3	-0.4	1.8
25-Oct	0.2	-0.1	-0.2	-0.2	-0.2	-0.3	-0.7	-1.0	-1.4	-1.6	-1.3	-1.0	-1.0	-0.8	-1.4	-1.6	-1.4	-1.5	-1.5	-1.0	-0.4	-0.3	-0.3	-0.3	-0.8	0.2
26-Oct	-0.2	-0.2	-0.2	-0.3	-0.1	0.2	0.8	0.9	0.9	1.0	0.9	0.8	0.4	0.1	0.0	0.1	-0.1	-0.1	-0.1	-0.2	-0.2	-0.1	-0.4	0.0	0.2	1.0
27-Oct	0.0	0.0	0.1	0.3	0.8	1.0	1.0	1.2	1.0	1.1	1.4	1.3	1.6	1.6	1.4	1.6	1.6	1.5	1.7	1.8	1.8	1.8	1.3	1.4	1.2	1.8
28-Oct	1.2	1.7	0.9	0.0	0.0	-0.6	-0.6	-0.6	-0.5	-0.4	-0.5	-1.2	-1.6	-1.7	-1.6	-1.6	-1.5	-1.7	-1.9	-1.5	-1.9	-1.9	-1.3	-1.3	-0.8	1.7
29-Oct	-2.0	-2.0	-2.1	-2.2	-1.5	-1.8	-1.8	-2.1	-1.2	-1.8	-1.5	-1.1	-1.8	-1.4	-0.5	-0.4	-0.3	0.1	0.1	0.3	0.4	0.2	0.0	0.1	-1.0	0.4
30-Oct	0.4	0.0	-0.2	0.2	0.5	0.7	1.1	1.2	1.1	1.2	1.3	0.9	0.4	0.4	0.2	0.5	-0.2	-0.4	-0.3	-0.6	-0.7	-0.4	-0.5	-0.3	0.3	1.3
31-Oct	-0.1	-0.1	-0.2	0.0	0.3	0.1	0.5	0.9	0.4	0.7	0.3	0.0	-0.2	-0.3	-0.2	-0.6	-0.9	-0.7	-0.9	-1.2	-0.8	-1.2	-0.5	-1.1	-0.2	0.9
																								Diurnal Average		
																								Diurnal Maximum		
AF - Analyzer Failure																										





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 5.3 km/h on Oct 2 01:00 Minimum Value: 0.1 km/h on Oct 20 19:00 Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.6 Q <sub>1</sub> = 1.0 Median = 1.6 Q <sub>3</sub> = 2.3 P <sub>90</sub> = 3.3 P <sub>99</sub> = 4.6																								Hours in Service: 744 Hours of Data: 717 Hours of Missing Data: 27 Hours of Calibration: 0 Percent Operational Time: 96.4				
Day	Hourly Period Ending At (MST)																								Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Oct	1.7	2.0	2.4	2.6	2.5	2.4	2.2	2.2	2.3	2.4	2.7	3.4	2.9	2.7	3.0	2.7	3.0	3.4	3.3	4.0	4.5	4.7	4.8	4.8	4.8			
2-Oct	5.3	5.1	4.6	4.3	4.3	4.7	4.6	4.7	4.2	5.2	4.7	4.0	3.6	3.7	3.2	2.8	2.6	1.9	0.9	0.9	1.2	0.3	0.3	0.2	5.3			
3-Oct	0.2	0.4	0.4	0.5	0.7	1.3	1.0	1.3	1.8	2.2	2.1	2.4	3.1	2.8	2.5	1.9	1.6	1.0	1.4	2.0	1.8	1.5	1.2	1.0	3.1			
4-Oct	1.1	1.1	1.6	1.8	1.6	1.6	0.8	0.4	0.6	1.3	2.2	2.3	2.1	1.9	1.9	1.5	1.1	0.7	1.1	1.0	1.1	0.9	0.9	0.9	2.3			
5-Oct	1.1	1.0	1.0	0.5	0.6	0.5	0.4	0.4	0.7	1.2	1.0	1.3	2.3	2.6	2.4	2.8	2.3	2.0	1.8	1.7	1.6	1.4	1.1	1.1	2.8			
6-Oct	1.2	1.1	1.8	1.7	1.3	1.2	1.3	0.9	1.5	2.3	2.7	3.4	3.6	3.3	3.5	2.6	1.6	1.3	2.2	1.0	0.7	1.5	0.8	0.7	3.6			
7-Oct	0.4	0.3	0.6	0.9	1.2	1.5	1.0	2.5	2.2	2.1	2.0	1.9	1.6	1.8	2.3	2.8	3.3	3.4	3.6	3.3	4.0	3.5	3.9	4.0	4.0			
8-Oct	4.0	3.7	3.6	3.8	3.4	3.4	3.0	3.1	3.5	3.2	3.0	2.6	2.4	2.6	2.6	2.5	2.2	1.6	1.3	1.2	1.0	1.0	0.8	0.5	4.0			
9-Oct	0.5	0.9	1.4	1.5	1.8	2.1	2.2	2.1	2.1	2.2	2.0	1.8	1.3	1.1	1.3	2.1	2.0	0.8	0.5	2.1	1.7	1.7	1.1	1.1	2.2			
10-Oct	0.6	0.8	0.8	0.8	0.8	0.7	0.7	0.9	1.6	2.0	1.8	1.5	1.2	1.5	1.6	1.7	1.5	1.6	1.8	1.7	2.0	2.1	2.0	1.9	2.1			
11-Oct	2.0	2.1	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	3.1	2.8	2.8	3.0	3.0	2.9	2.4	2.5	2.6	3.1			
12-Oct	2.7	2.8	2.9	2.6	2.2	2.3	2.3	2.5	2.5	2.7	2.6	2.5	2.4	2.3	2.1	1.6	1.5	1.1	1.0	0.9	1.2	2.0	0.6	0.5	2.9			
13-Oct	0.9	0.9	0.4	0.3	0.2	0.5	0.4	0.4	0.6	1.5	1.8	1.9	2.1	2.2	1.9	1.6	1.8	1.7	1.4	1.1	1.1	1.0	0.4	0.3	2.2			
14-Oct	0.2	0.5	0.7	0.7	0.9	0.8	1.3	1.8	1.7	1.4	1.8	1.8	2.0	2.2	2.2	2.2	2.0	1.4	1.1	1.6	2.7	2.1	1.6	0.7	2.7			
15-Oct	0.5	0.6	0.6	0.5	0.3	0.5	0.7	1.3	1.3	1.6	1.5	1.2	2.0	2.2	1.9	1.3	1.0	0.9	1.6	1.5	1.3	1.6	1.8	1.9	2.2			
16-Oct	2.3	3.3	4.1	2.2	1.7	1.3	0.9	1.1	1.2	1.6	2.3	1.9	1.8	1.9	1.9	1.2	0.3	0.4	0.4	1.4	1.7	1.2	0.7	0.5	4.1			
17-Oct	0.6	0.7	0.8	1.1	1.0	0.6	0.7	1.1	1.0	1.2	1.1	1.1	1.0	0.8	0.7	0.8	1.4	2.0	1.9	2.1	2.9	3.1	3.2	3.3	3.3			
18-Oct	3.0	3.4	3.3	3.0	3.5	3.3	2.7	2.4	2.3	2.5	2.4	2.1	1.8	1.7	1.8	1.2	0.9	1.1	1.6	1.8	2.7	2.9	2.6	2.9	3.5			
19-Oct	3.1	3.1	3.2	2.9	2.1	2.6	2.5	2.4	2.3	2.0	1.8	1.7	1.6	1.6	1.8	1.9	1.9	2.1	2.1	2.0	2.4	2.0	1.9	1.7	3.2			
20-Oct	1.1	1.1	1.9	1.3	1.8	1.7	1.4	1.9	1.6	2.0	1.8	1.4	1.6	1.8	1.3	0.9	0.9	0.2	0.1	0.3	0.3	0.4	0.4	0.6	2.0			
21-Oct	0.4	0.7	0.3	1.0	1.4	0.9	0.8	0.9	0.8	1.0	1.2	1.3	1.6	1.6	1.4	0.9	0.3	0.4	0.8	1.0	1.1	1.1	AF	AF	1.6			
22-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	1.9	AF	1.9	1.5	1.1	1.1	0.9	0.9	1.0	0.8	0.6	0.7	0.7	1.9
23-Oct	0.9	0.6	0.7	1.6	1.9	1.1	1.6	1.3	1.5	1.6	1.8	2.0	2.1	2.2	2.2	1.8	0.8	0.6	0.9	1.1	1.0	0.8	1.1	1.2	2.2			
24-Oct	1.0	1.2	1.6	1.8	2.0	2.1	1.8	3.0	3.3	3.4	3.8	4.5	4.9	4.5	3.6	3.4	3.1	2.2	2.0	2.0	2.0	1.1	1.0	1.0	4.9			
25-Oct	1.5	1.5	2.0	1.8	1.8	1.5	1.7	2.2	2.6	3.0	3.6	3.1	3.0	3.1	3.0	2.6	2.9	2.6	2.2	1.6	1.2	0.9	0.8	0.8	3.6			
26-Oct	0.8	1.1	1.6	2.8	2.6	2.5	1.7	2.0	2.3	2.1	2.0	2.2	2.3	2.2	2.2	1.5	1.5	1.0	1.1	0.7	0.8	0.7	0.4	0.5	2.8			
27-Oct	0.4	0.5	0.3	0.4	0.6	0.5	0.9	0.7	0.9	1.3	1.7	1.9	2.1	1.9	1.6	2.3	1.7	2.0	2.0	2.0	1.7	1.9	1.2	1.2	2.3			
28-Oct	1.0	0.7	1.0	1.3	1.5	2.0	1.8	2.0	1.8	2.0	2.4	3.1	3.5	3.7	3.5	3.8	3.5	3.8	3.9	3.7	3.9	4.4	4.0	3.9	4.4			
29-Oct	3.7	4.7	4.3	4.3	4.3	3.7	3.4	3.8	3.6	3.4	3.1	2.9	3.0	2.7	2.3	1.7	1.7	1.3	0.6	0.4	0.4	0.4	0.4	0.5	4.7			
30-Oct	0.5	0.8	0.8	0.7	0.8	0.8	0.5	0.6	0.9	1.2	1.3	1.3	0.9	0.9	1.1	0.7	0.2	0.7	0.7	0.8	0.6	0.5	0.8	0.8	1.3			
31-Oct	0.6	0.3	0.4	0.2	0.4	0.5	0.8	1.1	1.0	1.0	1.1	1.1	1.1	1.1	1.2	1.4	1.8	1.8	1.6	1.9	2.1	2.2	3.0	3.3	3.3			
Diurnal Maximum																												
5.3 5.1 4.6 4.3 4.3 4.7 4.6 4.7 4.2 5.2 4.7 4.5 4.9 4.5 3.6 3.8 3.5 3.8 3.9 4.0 4.5 4.7 4.8 4.8																												
AF - Analyzer Failure																												



Summary of Hour Averages

Mannix - October 2017

Maximum Value: 1.9 km/h on Oct 15 14:00		Maximum Daily Average: 0.6 km/h on Oct 27		Hours in Service: 744																							
Minimum Value: -1.6 km/h on Oct 2 08:00		Minimum Daily Average: -0.7 km/h on Oct 2		Hours of Data: 705																							
Maximum Diurnal Average: 0.3 km/h at hour 10		Minimum Diurnal Average: 0.0 km/h at hour 20		Hours of Missing Data: 39																							
Monthly Average: 0.09 km/h		Percentiles: P <sub>1</sub> = -1.1 P <sub>10</sub> = -0.4 Q <sub>1</sub> = -0.1 Median = 0.1 Q <sub>3</sub> = 0.3 P <sub>90</sub> = 0.6 P <sub>99</sub> = 1.1		Hours of Calibration: 0																							
				Percent Operational Time: 94.8																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	0.4	0.3	0.5	0.3	0.3	-0.3	0.2	0.3	0.1	0.5	-0.1	0.0	-0.7	-0.2	-0.6	0.5	0.1	-0.1	-0.4	-0.7	-0.9	-1.0	-0.9	-1.3	-0.2	0.5	
2-Oct	-1.1	-1.1	-0.8	-0.7	-1.1	-1.1	-1.4	-1.6	-1.4	0.0	-1.4	-0.5	-0.6	-1.2	-1.0	-0.8	-0.6	-0.3	-0.3	0.0	0.1	0.1	0.0	0.1	-0.7	0.1	
3-Oct	0.1	0.1	0.0	0.1	0.4	1.4	0.7	0.8	0.8	0.9	0.7	0.5	0.2	0.3	0.0	-0.1	0.2	-0.1	0.2	0.4	0.2	0.1	0.3	0.2	0.4	1.4	
4-Oct	0.2	-0.3	-0.1	-0.2	-0.3	-0.5	-0.1	-0.1	0.0	0.1	0.2	-0.2	0.3	0.2	-0.1	0.4	-0.1	0.5	0.4	0.7	0.6	0.7	0.2	0.4	0.1	0.7	
5-Oct	0.9	1.0	0.5	0.0	0.1	0.1	0.2	0.0	0.1	0.2	-0.3	-0.1	0.8	0.5	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.1	0.0	0.1	0.0	0.2	1.0	
6-Oct	0.1	-0.1	0.1	0.0	-0.2	-0.2	-0.2	0.1	-0.1	-0.1	0.3	0.3	-0.1	0.5	0.1	0.5	0.3	0.1	0.2	0.2	-0.1	-0.1	0.0	0.1	0.1	0.5	
7-Oct	0.1	0.1	0.1	0.1	0.2	0.1	-0.3	-0.1	-0.8	-1.0	-0.3	0.3	0.4	-0.1	0.0	-1.0	-0.6	-0.5	-0.2	-0.6	0.1	0.4	-0.1	-0.1	-0.2	0.4	
8-Oct	-0.1	-0.1	0.1	-0.4	-0.1	0.0	0.1	0.0	-0.3	0.2	0.3	0.1	0.3	-0.1	0.4	0.5	0.3	0.1	0.3	0.1	0.0	0.0	0.1	-0.1	0.1	0.5	
9-Oct	0.2	0.9	1.0	0.9	1.0	0.6	0.2	0.4	0.6	0.4	0.9	1.1	0.8	0.0	0.2	0.0	0.2	0.0	-0.1	-0.1	0.1	0.0	0.1	0.0	0.4	1.1	
10-Oct	-0.2	-0.5	-0.2	-0.2	0.1	0.0	0.0	0.0	0.2	0.1	0.0	0.4	-0.2	0.1	0.2	0.3	0.4	0.2	-0.3	-0.2	-0.4	-0.4	-0.5	-0.2	0.0	0.4	
11-Oct	-0.9	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	-0.4	-0.5	0.2	0.2	0.5	--	0.5
12-Oct	0.2	0.1	0.1	0.1	-0.1	0.0	-0.1	-0.2	-0.2	-0.4	-0.4	-0.5	-0.1	-0.1	0.3	0.0	-0.5	-0.4	-0.4	0.1	0.3	-0.3	0.1	0.2	-0.1	0.3	
13-Oct	-0.3	-0.3	-0.1	0.0	0.1	0.4	0.2	0.0	0.0	0.5	0.1	0.0	0.5	0.2	-0.4	0.4	0.3	0.2	0.0	0.0	0.0	0.0	-0.2	0.0	0.1	0.5	
14-Oct	0.0	0.2	0.3	0.4	0.5	0.6	0.8	1.0	1.0	0.9	0.6	0.6	-0.3	0.4	-0.1	0.0	0.0	0.1	0.4	0.1	0.0	0.1	0.3	0.1	0.3	1.0	
15-Oct	-0.1	-0.1	0.1	-0.2	-0.1	0.1	0.7	1.1	0.7	0.8	0.6	0.2	0.4	1.9	0.7	1.1	0.6	0.7	0.4	0.2	0.0	-0.3	-0.3	-0.1	0.4	1.9	
16-Oct	-0.1	0.1	0.6	0.6	0.2	0.0	-0.1	0.0	0.1	0.4	0.6	0.5	-0.1	0.1	0.2	0.3	0.0	0.0	0.2	0.2	-0.1	0.1	0.2	0.5	0.2	0.6	
17-Oct	0.5	0.3	-0.1	0.6	0.1	0.6	0.6	0.9	0.4	0.6	0.4	0.3	0.3	0.2	-0.1	-0.1	0.0	0.1	0.3	0.4	0.7	0.8	0.8	0.7	0.4	0.9	
18-Oct	0.7	1.0	0.3	0.3	0.5	0.0	0.2	0.7	0.5	0.4	0.2	0.6	-0.2	-0.2	0.4	0.2	0.2	0.0	-0.2	-0.9	1.0	0.8	0.5	1.0	0.3	1.0	
19-Oct	0.6	0.5	0.6	-0.4	-0.3	0.0	0.0	0.1	0.3	0.5	0.7	0.1	-0.4	-0.4	-0.5	-0.4	0.2	-0.4	0.1	0.0	-0.3	-0.4	-0.4	-0.5	0.0	0.7	
20-Oct	-0.2	-0.3	-0.3	-0.2	0.0	0.7	0.3	0.9	0.7	0.2	0.8	0.2	-0.1	0.2	0.5	0.2	0.0	0.0	0.1	0.1	0.1	0.2	0.1	-0.1	0.2	0.9	
21-Oct	0.2	-0.1	0.3	-0.1	0.1	-0.1	0.4	-0.2	0.1	0.4	0.3	0.0	0.3	0.4	0.2	0.2	0.1	0.1	0.0	-0.1	-0.1	-0.1	0.0	0.6	0.1	0.6	
22-Oct	0.4	0.3	0.0	0.0	0.2	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	0.4	
23-Oct	AF	AF	-0.2	0.3	0.4	-0.1	0.0	0.3	0.0	0.4	-0.1	0.3	0.1	0.1	0.2	0.2	-0.1	-0.2	-0.1	-0.2	0.4	0.9	0.6	0.4	0.2	0.9	
24-Oct	0.2	0.7	1.2	0.9	0.4	-0.1	0.1	0.0	0.3	0.7	0.9	0.3	0.7	0.2	0.6	0.4	0.1	-0.5	-0.1	-0.1	-0.1	-0.5	-0.2	-0.1	0.1	0.3	1.2
25-Oct	0.1	-0.1	-0.2	-0.1	-0.2	-0.1	-0.4	-0.6	-0.9	-1.1	-0.8	0.1	-0.1	0.3	-0.5	-0.7	-0.8	-1.1	-0.9	-0.6	0.2	0.1	0.1	-0.1	-0.4	0.3	
26-Oct	-0.1	-0.1	-0.1	-0.2	0.0	0.0	0.3	0.3	0.3	0.6	0.3	0.4	0.3	0.0	-0.2	0.1	0.0	0.1	0.0	-0.1	0.2	0.4	0.0	0.2	0.1	0.6	
27-Oct	0.0	0.1	0.0	0.2	0.4	0.6	0.8	0.9	0.7	0.6	0.7	0.5	0.7	0.7	0.5	0.5	0.8	0.3	1.1	1.0	1.1	1.1	0.8	0.7	0.6	1.1	
28-Oct	0.6	0.8	0.3	0.1	0.5	-0.2	0.0	-0.2	0.0	0.1	0.3	0.4	0.3	0.0	0.0	0.1	0.4	0.4	-0.2	0.2	0.0	0.0	0.2	0.5	0.2	0.8	
29-Oct	-0.3	-0.2	-0.2	-0.3	0.1	-0.9	-1.1	-1.2	-0.5	-0.9	-0.5	-0.5	-1.1	-0.9	0.1	0.1	-0.3	0.0	0.1	0.2	0.2	0.0	-0.1	-0.2	-0.3	0.2	
30-Oct	0.0	-0.1	-0.1	0.0	0.2	0.3	0.5	0.6	0.6	0.8	0.9	0.6	0.0	0.1	0.3	0.6	-0.1	-0.1	0.2	-0.1	-0.4	-0.1	-0.4	-0.1	0.2	0.9	
31-Oct	0.0	0.1	0.0	0.1	0.2	0.0	0.0	0.3	-0.4	0.6	0.0	-0.1	-0.1	-0.1	-0.1	-0.3	-0.3	-0.4	-0.5	-0.6	-0.3	-0.5	0.4	-0.5	-0.1	0.6	
																								Diurnal Average			
																								Diurnal Maximum			
																								0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.2 0.1 0.3 0.2 0.2 0.1 0.1 0.0 0.1 0.0 0.0 0.0 0.0 0.0 0.1 0.1 0.1 0.1			
																								0.9 1.0 1.2 0.9 1.0 1.4 0.8 1.1 1.0 0.9 0.9 1.1 0.8 1.9 0.7 1.1 0.8 0.7 1.1 1.0 1.1 1.1 0.8 1.0			
AF - Analyzer Failure																											



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Vertical Wind Speed 75 m (VW75m) - km/h**  
**Mannix - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 5.0 km/h on Oct 2 10:00 Minimum Value: 0.2 km/h on Oct 20 19:00 Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.5 Q <sub>1</sub> = 0.9 Median = 1.6 Q <sub>3</sub> = 2.3 P <sub>90</sub> = 3.3 P <sub>99</sub> = 4.4																								Hours in Service: 744 Hours of Data: 705 Hours of Missing Data: 39 Hours of Calibration: 0 Percent Operational Time: 94.8	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	1.5	1.6	2.4	2.5	2.3	2.3	2.0	2.2	2.1	2.3	2.7	3.1	2.7	2.6	2.7	2.6	2.8	3.1	3.2	3.8	4.3	4.7	4.5	4.7	4.7
2-Oct	5.0	4.7	4.5	4.4	4.1	4.4	4.2	4.1	4.0	5.0	4.2	3.9	3.5	3.3	3.2	2.7	2.4	1.7	0.8	0.9	1.3	0.3	0.3	0.3	5.0
3-Oct	0.2	0.3	0.6	0.6	0.5	0.8	0.8	0.9	1.5	2.0	2.1	2.4	3.1	2.7	2.3	1.7	1.4	1.4	1.7	2.2	2.0	1.6	1.3	1.1	3.1
4-Oct	1.1	0.6	1.4	1.7	1.6	1.4	0.8	0.5	0.6	1.0	2.4	2.6	2.3	2.1	2.0	2.0	1.0	0.5	0.6	0.8	0.9	0.7	0.9	0.8	2.6
5-Oct	0.7	0.9	0.9	0.4	0.6	0.5	0.5	0.4	0.5	1.0	1.0	1.3	2.6	2.8	2.4	2.7	2.3	1.9	1.7	1.6	1.5	1.3	1.1	1.0	2.8
6-Oct	1.3	1.2	1.8	1.8	1.4	1.4	1.7	1.1	1.4	2.4	3.0	3.5	3.5	3.3	3.6	2.7	1.8	1.4	2.1	0.9	0.6	1.6	0.8	0.7	3.6
7-Oct	0.5	0.5	0.7	0.9	1.0	1.4	1.0	2.4	2.0	1.8	1.8	1.9	1.8	1.9	2.3	2.4	2.9	3.0	3.3	2.8	3.7	3.2	3.4	3.6	3.7
8-Oct	3.3	3.2	3.3	3.2	3.1	3.1	2.8	2.8	3.1	3.1	2.7	2.5	2.5	2.5	2.6	2.4	2.0	1.7	1.3	1.2	1.0	1.1	0.8	0.5	3.3
9-Oct	0.3	0.7	1.2	1.3	1.5	1.8	1.7	2.1	2.0	2.1	1.8	1.5	1.2	1.1	1.4	2.0	2.2	0.9	0.4	2.1	1.7	1.7	1.2	1.1	2.2
10-Oct	0.5	0.6	0.8	0.9	0.9	0.7	0.8	0.9	1.7	2.0	1.7	1.5	1.2	1.5	1.7	1.7	1.4	1.5	1.5	1.7	1.8	1.8	1.7	1.9	2.0
11-Oct	1.5	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	3.3	2.8	2.4	2.6	2.6	3.3
12-Oct	2.7	2.8	2.7	2.7	2.3	2.2	2.1	2.5	2.5	2.4	2.5	2.3	2.4	2.3	2.2	1.6	1.2	0.9	0.7	0.9	1.0	1.9	0.7	0.5	2.8
13-Oct	0.7	0.6	0.3	0.3	0.2	0.5	0.4	0.3	0.5	1.5	1.8	2.0	2.3	2.2	2.0	1.7	1.5	1.5	1.2	0.9	1.0	0.8	0.4	0.2	2.3
14-Oct	0.2	0.5	0.7	0.8	1.0	0.8	1.0	1.6	1.5	1.2	1.8	1.9	2.1	2.3	2.2	2.0	2.1	1.6	1.2	1.6	2.5	2.0	1.4	0.7	2.5
15-Oct	0.4	0.5	0.5	0.3	0.3	0.4	0.4	1.0	1.0	1.4	1.3	1.1	2.2	2.4	1.7	1.3	1.0	1.0	1.3	1.3	1.2	1.6	1.9	1.9	2.4
16-Oct	2.5	3.3	4.1	2.4	1.8	1.3	1.1	1.4	1.2	1.6	2.3	2.1	1.9	2.0	1.8	1.1	0.4	0.3	0.4	1.3	1.7	1.3	0.8	0.5	4.1
17-Oct	0.4	0.5	1.2	1.6	1.2	0.4	0.6	0.9	0.8	1.0	1.1	1.5	0.9	0.7	0.6	0.5	1.3	1.7	1.7	1.9	2.7	2.9	3.1	3.2	3.2
18-Oct	3.4	3.6	3.5	3.1	3.6	3.3	2.5	2.4	2.3	2.5	2.2	2.4	1.9	2.0	1.9	1.3	1.3	1.6	1.9	2.1	3.6	3.8	3.3	3.6	3.8
19-Oct	3.7	4.0	3.7	3.1	2.4	2.7	2.4	2.0	2.2	1.9	1.9	1.7	1.7	1.8	2.0	2.1	2.3	2.4	2.1	2.1	2.7	2.4	2.2	2.1	4.0
20-Oct	1.8	1.9	2.1	1.9	2.2	2.2	2.0	2.7	2.0	2.2	2.2	1.9	1.9	2.2	1.7	1.0	0.6	0.2	0.2	0.4	0.2	0.4	0.4	0.6	2.7
21-Oct	0.5	0.5	0.4	1.1	1.1	0.8	0.9	1.1	0.7	1.1	1.2	1.5	1.6	1.9	1.4	0.9	0.4	0.4	0.5	0.8	0.8	1.1	0.9	0.9	1.9
22-Oct	0.8	0.7	0.6	0.7	0.9	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.9
23-Oct	AF	AF	0.6	1.6	1.8	1.1	1.1	1.1	1.3	1.5	1.9	2.2	2.1	2.2	2.2	1.6	1.1	0.7	0.9	1.0	1.0	0.6	1.1	0.9	2.2
24-Oct	1.1	1.0	1.2	1.6	2.0	2.3	2.1	3.3	3.5	3.7	3.7	4.3	4.7	4.2	3.5	3.2	2.8	2.1	2.0	1.7	1.9	1.0	0.7	0.8	4.7
25-Oct	1.0	0.9	1.5	1.5	1.5	1.4	1.5	2.2	1.9	2.8	3.5	3.3	2.9	3.1	2.8	2.3	2.8	2.1	1.8	1.3	1.2	0.8	0.8	0.8	3.5
26-Oct	0.7	0.8	1.2	2.6	2.7	2.4	1.7	1.8	2.2	2.1	2.0	2.2	2.2	2.0	2.0	1.6	1.4	1.1	1.1	0.8	1.0	0.7	0.5	0.5	2.7
27-Oct	0.6	0.5	0.3	0.5	0.4	0.3	0.3	0.5	0.8	0.9	1.3	1.7	2.1	1.8	1.5	2.1	1.6	1.7	1.8	1.8	1.6	1.5	1.0	1.0	2.1
28-Oct	0.8	0.6	1.0	1.7	1.9	1.9	1.7	1.6	1.6	1.6	2.4	3.1	3.3	3.3	3.1	3.3	3.5	3.6	3.2	3.5	3.6	3.9	3.6	3.6	3.9
29-Oct	3.2	4.2	3.9	3.8	3.9	3.5	3.3	3.4	3.6	3.4	2.9	2.8	2.9	2.4	2.3	1.8	1.4	1.3	0.7	0.5	0.3	0.4	0.3	0.3	4.2
30-Oct	0.4	0.4	0.7	0.7	0.8	0.9	0.4	0.4	0.5	0.9	1.1	1.1	1.0	0.9	1.1	0.9	0.2	0.6	0.7	0.7	0.6	0.5	0.7	0.6	1.1
31-Oct	0.7	0.4	0.3	0.2	0.5	0.4	0.8	1.4	1.2	1.5	1.3	1.0	0.9	1.0	1.0	1.2	1.5	1.6	1.3	1.6	1.9	2.0	2.8	3.0	3.0
5.0 4.7 4.5 4.4 4.1 4.4 4.2 4.1 4.0 5.0 4.2 4.3 4.7 4.2 3.6 3.3 3.5 3.6 3.3 3.8 4.3 4.7 4.5 4.7																									
Diurnal Maximum																									
AF - Analyzer Failure																									



Maximum Value: 1.7 km/h on Oct 31 23:00      Maximum Daily Average: 0.4 km/h on Oct 12																								Hours in Service: 744 Hours of Data: 724		
Minimum Value: -1.3 km/h on Oct 18 20:00      Minimum Daily Average: -0.3 km/h on Oct 26 Maximum Diurnal Average: 0.3 km/h at hour 10      Minimum Diurnal Average: 0.1 km/h at hour 4 Monthly Average: 0.16 km/h      Percentiles: P <sub>1</sub> = -0.7 P <sub>10</sub> = -0.4 Q <sub>1</sub> = -0.1 Median = 0.2 Q <sub>3</sub> = 0.4 P <sub>90</sub> = 0.7 P <sub>99</sub> = 1.2																								Hours of Missing Data: 20 Hours of Calibration: 0 Percent Operational Time: 97.3		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0.7	0.3	0.5	0.4	0.4	-0.1	0.3	0.2	0.2	0.9	0.4	0.8	0.1	0.4	-0.1	0.9	0.5	0.5	0.3	0.2	0.3	0.3	0.6	0.2	0.4	0.9
2-Oct	0.2	0.4	0.4	0.6	0.1	-0.1	0.0	-0.2	-0.3	1.5	-0.2	0.6	0.3	-0.3	-0.3	-0.1	0.0	0.1	0.0	0.3	0.5	0.1	0.0	0.0	0.1	1.5
3-Oct	0.1	0.1	-0.2	-0.2	-0.1	0.7	0.0	0.1	0.2	0.3	0.2	0.0	-0.4	-0.4	-0.7	-0.5	-0.4	-0.3	0.2	0.2	0.0	-0.1	0.2	0.1	0.0	0.7
4-Oct	0.5	0.0	0.7	0.6	0.4	0.1	0.0	-0.1	0.1	0.1	0.1	-0.2	0.1	0.0	0.0	0.2	0.3	0.4	0.6	0.7	0.5	0.3	0.7	0.3	0.7	
5-Oct	0.6	0.5	0.2	-0.2	-0.3	-0.3	-0.2	-0.2	-0.2	0.1	-0.1	0.1	0.7	0.0	-0.5	0.2	-0.5	-0.4	-0.4	-0.5	-0.3	-0.2	-0.2	-0.4	-0.1	0.7
6-Oct	-0.2	-0.4	-0.3	-0.5	-0.5	-0.4	-0.5	-0.2	-0.5	-0.6	0.1	0.0	-0.6	0.2	-0.3	0.2	0.2	0.0	0.0	0.1	-0.2	-0.2	0.0	0.2	-0.2	0.2
7-Oct	0.1	0.0	0.0	0.0	0.3	0.5	0.2	0.7	0.1	-0.2	0.2	0.5	0.6	0.3	0.5	0.0	0.0	0.3	0.5	0.0	0.9	0.9	0.5	0.6	0.3	0.9
8-Oct	0.5	0.4	0.7	0.2	0.5	0.4	0.5	0.4	0.2	0.8	0.4	0.2	0.3	0.0	0.7	0.6	0.6	0.2	0.3	0.0	-0.1	-0.2	0.0	-0.4	0.3	0.8
9-Oct	-0.1	0.3	0.5	0.3	0.6	0.7	0.7	0.3	0.4	0.3	0.5	0.7	0.3	-0.2	0.0	-0.2	0.0	-0.1	-0.4	-0.3	-0.3	-0.1	0.0	-0.2	0.2	0.7
10-Oct	-0.3	-0.7	-0.4	-0.4	0.0	-0.1	-0.1	0.0	0.1	0.3	0.3	0.6	0.0	0.4	0.7	0.9	1.0	0.8	0.4	0.4	0.5	0.2	0.5	0.2	0.2	1.0
11-Oct	0.4	1.1	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.9	0.7	1.3	1.1	1.6	--	1.6
12-Oct	1.0	1.0	1.2	1.1	0.6	0.3	0.3	0.2	0.4	0.2	0.0	0.0	0.4	0.2	0.8	0.3	0.0	-0.1	0.1	0.2	0.5	0.2	0.3	0.3	0.4	1.2
13-Oct	-0.3	-0.2	-0.2	0.0	0.1	0.4	0.2	0.0	0.0	0.5	0.0	-0.1	0.4	-0.1	-0.6	0.1	-0.2	-0.1	-0.3	-0.2	-0.2	-0.2	-0.4	-0.1	-0.1	0.5
14-Oct	-0.2	-0.1	-0.2	-0.1	0.0	0.1	0.1	0.5	0.3	0.3	0.2	0.3	-0.7	0.3	-0.5	-0.3	-0.2	0.0	0.2	0.1	0.2	0.3	0.6	0.0	0.0	0.6
15-Oct	-0.2	-0.2	0.0	-0.3	-0.2	-0.1	0.1	0.4	0.3	0.4	0.4	0.4	0.8	1.4	0.2	0.5	0.1	0.1	-0.2	-0.4	-0.5	-0.8	-0.7	-0.5	0.0	1.4
16-Oct	-0.5	-0.5	0.2	0.4	0.0	-0.1	-0.3	-0.3	-0.2	0.4	0.2	0.4	-0.4	-0.1	-0.1	0.1	-0.1	-0.4	-0.2	-0.3	-0.4	-0.3	-0.1	0.1	-0.1	0.4
17-Oct	0.1	0.2	0.0	0.6	0.0	0.4	0.4	0.4	0.1	0.4	0.4	0.2	0.6	0.4	0.4	0.3	0.3	0.5	0.3	0.5	0.6	0.6	0.6	0.6	0.4	0.6
18-Oct	0.4	0.6	0.1	0.0	0.2	-0.2	0.1	0.5	0.3	0.3	0.1	0.6	-0.3	-0.2	0.5	0.2	0.2	-0.2	-0.5	-1.3	0.7	0.5	0.2	0.7	0.1	0.7
19-Oct	0.4	0.2	0.3	-0.7	-0.5	0.2	0.4	0.6	0.5	0.6	0.5	0.1	-0.5	-0.7	-0.7	-0.7	-0.1	-0.6	0.4	0.2	-0.5	-0.4	-0.6	-0.9	-0.1	0.6
20-Oct	-0.5	-0.8	-0.7	-0.6	-0.1	0.7	0.3	0.7	0.7	0.2	0.8	0.3	-0.1	0.3	0.6	0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.2	0.1	0.1	0.8
21-Oct	0.4	0.0	0.4	0.3	0.6	0.3	0.4	-0.1	0.3	0.4	0.2	-0.1	0.2	0.3	0.3	0.2	0.0	0.2	0.3	0.3	0.1	0.0	0.1	0.4	0.2	0.6
22-Oct	0.2	0.3	0.1	-0.2	AF	0.5	0.5	1.1	0.1	AF	AF	0.2	0.5	0.2	0.3	0.2	0.2	0.6	0.2	0.2	0.3	0.0	0.0	-0.2	0.2	1.1
23-Oct	-0.3	-0.2	-0.1	0.2	0.2	-0.2	0.0	0.3	-0.1	0.4	-0.3	0.2	0.0	-0.2	0.0	0.0	-0.4	-0.4	-0.6	-0.6	-0.1	0.1	-0.2	-0.4	-0.1	0.4
24-Oct	-0.4	-0.1	0.6	0.3	-0.2	-0.5	0.0	-0.1	-0.1	0.4	0.6	0.6	1.2	0.5	1.0	0.9	0.7	0.1	0.8	0.8	0.3	0.3	0.3	0.4	0.3	1.2
25-Oct	0.6	0.5	0.6	0.5	0.6	0.6	0.4	0.3	0.1	0.1	0.4	1.4	1.2	1.5	0.5	0.0	0.0	-0.5	-0.2	-0.2	0.4	0.1	0.0	-0.1	0.4	1.5
26-Oct	-0.3	-0.4	-0.5	-0.8	-0.6	-0.6	-0.2	-0.3	-0.5	0.0	-0.2	-0.1	-0.2	-0.5	-0.6	-0.1	-0.2	-0.1	-0.3	-0.3	0.1	0.3	-0.1	0.3	-0.3	0.3
27-Oct	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.4	0.1	0.4	0.6	0.4	0.4	0.4	0.4	0.7	0.6	0.7	0.7	0.8	0.9	0.7	0.1	-0.1	0.4	0.9
28-Oct	-0.1	0.1	-0.1	0.0	0.5	-0.4	-0.3	-0.6	-0.3	-0.1	0.3	0.7	0.6	0.5	0.6	0.7	1.0	1.0	0.3	0.9	0.6	0.6	0.7	1.0	0.3	1.0
29-Oct	0.4	0.8	0.3	0.4	0.9	0.0	0.0	-0.1	0.7	0.3	0.3	0.1	-0.3	-0.1	0.8	0.9	0.3	0.3	0.1	0.1	0.0	-0.1	-0.2	-0.4	0.2	0.9
30-Oct	-0.3	-0.3	-0.3	-0.2	-0.1	0.0	0.0	0.1	0.0	0.3	0.4	0.3	0.0	0.1	0.4	0.7	0.0	0.3	0.7	0.3	0.2	0.5	0.3	0.4	0.2	0.7
31-Oct	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.4	-0.7	0.7	0.2	0.2	0.2	0.4	0.4	0.4	0.6	0.5	0.4	0.3	0.7	0.4	1.7	0.9	0.4	1.7
																								Diurnal Average		
																								Diurnal Maximum		
AF - Analyzer Failure																										



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Vertical Wind Speed 90 m (VW90m) - km/h**  
**Mannix - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 5.0 km/h on Oct 2 10:00 Minimum Value: 0.2 km/h on Oct 20 19:00 Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.5 Q <sub>1</sub> = 0.9 Median = 1.6 Q <sub>3</sub> = 2.3 P <sub>90</sub> = 3.2 P <sub>99</sub> = 4.3																								Hours in Service: 744 Hours of Data: 724 Hours of Missing Data: 20 Hours of Calibration: 0 Percent Operational Time: 97.3	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	2.9	1.6	2.5	2.5	2.3	2.2	2.0	2.2	2.1	2.4	2.5	3.1	2.8	2.4	2.4	2.6	2.7	3.1	3.1	3.5	4.2	4.5	4.4	4.7	4.7
2-Oct	4.9	4.6	4.3	4.3	4.1	4.2	4.0	4.0	4.0	5.0	4.0	4.1	3.4	3.3	3.0	2.8	2.4	1.7	0.7	0.9	1.2	0.4	0.2	0.3	5.0
3-Oct	0.2	0.3	0.6	0.7	0.4	0.7	0.8	0.8	1.5	1.9	2.1	2.5	3.2	2.8	2.3	1.7	1.4	1.5	1.9	2.4	2.1	1.5	1.3	1.2	3.2
4-Oct	1.1	0.5	1.5	1.6	1.7	1.4	0.7	0.6	0.6	1.0	2.5	2.8	2.4	2.2	2.1	1.9	0.8	0.4	0.5	0.8	1.0	0.8	0.8	0.7	2.8
5-Oct	0.7	0.9	0.9	0.3	0.6	0.5	0.4	0.5	0.5	0.9	0.9	1.3	2.7	2.8	2.7	2.9	2.4	1.9	1.7	1.5	1.5	1.3	1.1	1.0	2.9
6-Oct	1.3	1.3	1.9	1.8	1.5	1.5	1.9	1.2	1.5	2.5	3.2	3.7	3.5	3.5	3.7	2.8	2.0	1.5	2.2	0.9	0.5	1.7	0.9	0.7	3.7
7-Oct	0.7	0.6	0.8	0.9	1.0	1.4	1.1	2.4	2.0	1.8	1.7	2.0	1.8	2.0	2.3	2.3	2.7	2.8	3.2	2.6	3.6	3.2	3.3	3.5	3.6
8-Oct	3.3	3.1	3.3	3.1	3.0	2.9	2.8	2.8	3.0	3.1	2.7	2.6	2.5	2.5	2.8	2.4	2.1	1.7	1.4	1.3	1.0	1.1	0.9	0.5	3.3
9-Oct	0.3	0.6	1.2	1.3	1.5	1.8	1.7	2.3	2.1	2.1	1.8	1.5	1.3	1.2	1.4	2.1	2.2	1.0	0.4	2.2	1.8	1.8	1.3	1.1	2.3
10-Oct	0.5	0.5	0.8	0.9	0.9	0.6	0.8	1.0	1.7	1.9	1.8	1.5	1.2	1.6	1.7	1.7	1.4	1.5	1.5	1.5	1.8	1.6	1.7	1.9	1.9
11-Oct	1.4	1.9	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	3.3	3.1	2.8	2.6	2.8	3.3
12-Oct	2.6	2.8	2.7	2.7	2.3	2.1	2.0	2.4	2.5	2.4	2.4	2.2	2.5	2.3	2.3	1.6	1.2	0.8	0.7	1.0	1.0	1.8	0.7	0.6	2.8
13-Oct	0.5	0.5	0.4	0.4	0.2	0.6	0.4	0.3	0.4	1.5	1.8	2.1	2.4	2.3	2.2	1.7	1.5	1.6	1.2	0.9	1.0	0.8	0.4	0.2	2.4
14-Oct	0.3	0.5	0.6	0.9	1.1	0.8	0.8	1.5	1.4	1.3	1.9	2.0	2.2	2.6	2.3	2.1	2.1	1.7	1.2	1.6	2.5	2.0	1.6	0.7	2.6
15-Oct	0.4	0.5	0.6	0.3	0.3	0.4	0.4	0.8	1.0	1.2	1.4	1.2	2.4	2.8	1.7	1.4	1.1	1.2	1.3	1.3	1.2	1.7	2.0	2.1	2.8
16-Oct	2.7	3.4	4.1	2.4	1.9	1.4	1.2	1.5	1.2	1.7	2.3	2.2	2.1	2.2	1.9	1.2	0.4	0.3	0.4	1.4	1.8	1.4	0.8	0.5	4.1
17-Oct	0.5	0.4	0.9	1.4	1.0	0.5	0.5	0.9	0.7	1.0	1.0	1.2	0.8	0.6	0.5	0.5	1.2	1.5	1.7	2.0	2.7	3.0	3.1	3.3	3.3
18-Oct	3.4	3.6	3.5	3.1	3.6	3.3	2.5	2.5	2.2	2.5	2.2	2.5	1.9	2.0	2.0	1.4	1.1	1.2	1.8	2.0	3.1	3.2	3.0	3.1	3.6
19-Oct	3.3	3.3	3.4	2.9	2.2	2.5	2.3	2.1	2.3	2.0	2.0	1.8	1.7	1.7	1.9	1.6	2.1	2.3	2.1	1.9	2.4	2.0	1.8	1.6	3.4
20-Oct	1.4	1.5	1.9	1.8	2.1	2.0	1.8	2.2	2.0	2.1	2.0	1.6	2.0	1.8	1.6	1.1	0.5	0.2	0.2	0.4	0.3	0.5	0.5	0.7	2.2
21-Oct	0.5	0.6	0.5	1.1	1.1	0.9	1.0	1.2	0.7	1.1	1.2	1.5	1.7	1.9	1.1	0.9	0.4	0.4	0.5	0.7	0.8	1.1	0.8	0.9	1.9
22-Oct	0.8	0.6	0.6	1.3	AF	2.5	2.3	2.7	1.2	AF	AF	1.6	1.7	1.6	1.5	1.1	1.0	1.0	1.2	1.2	1.0	0.8	0.8	0.6	2.7
23-Oct	1.0	0.8	0.6	1.6	1.8	1.2	1.1	1.1	1.4	1.5	1.9	2.3	2.3	2.2	2.4	1.8	1.1	0.8	1.0	1.0	1.0	0.6	1.1	0.9	2.4
24-Oct	1.2	1.0	1.3	1.6	2.2	2.6	2.2	3.4	3.6	3.8	3.9	4.2	4.5	4.3	3.6	3.3	2.7	2.0	2.0	1.6	1.9	1.0	0.7	0.8	4.5
25-Oct	0.8	0.7	1.4	1.3	1.4	1.2	1.4	2.1	1.8	2.7	3.7	3.6	3.1	3.1	2.7	2.2	2.6	2.0	1.6	1.2	1.2	0.8	0.8	0.9	3.7
26-Oct	0.8	0.7	1.1	2.8	2.8	2.5	1.9	1.9	2.2	2.2	2.2	2.3	2.3	2.2	2.1	1.6	1.6	1.3	1.2	0.9	1.0	0.8	0.5	0.5	2.8
27-Oct	0.6	0.5	0.3	0.4	0.3	0.3	0.2	0.4	0.7	1.0	1.2	1.8	2.3	1.8	1.5	2.2	1.7	1.6	1.7	1.8	1.5	1.6	1.1	0.9	2.3
28-Oct	0.6	0.7	1.1	1.8	2.1	1.9	1.8	1.4	1.6	1.6	2.5	3.2	3.2	3.3	3.0	3.1	3.5	3.5	3.2	3.6	3.3	3.8	3.3	3.5	3.8
29-Oct	3.1	4.0	3.8	3.6	3.9	3.6	3.4	3.4	3.8	3.5	2.9	2.7	2.8	2.5	2.3	2.0	1.4	1.3	0.7	0.6	0.4	0.4	0.3	0.3	4.0
30-Oct	0.4	0.4	0.8	0.8	0.9	1.0	0.3	0.4	0.4	0.8	1.0	1.1	0.9	0.8	1.2	0.9	0.3	0.6	0.8	0.7	0.7	0.6	0.6	0.5	1.2
31-Oct	0.6	0.4	0.3	0.2	0.5	0.3	0.7	1.4	1.1	1.3	1.0	0.9	0.9	0.9	0.8	1.1	1.6	1.6	1.3	1.7	2.0	1.9	3.1	3.3	3.3
4.9 4.6 4.3 4.3 4.1 4.2 4.0 4.0 4.0 5.0 4.0 4.2 4.5 4.3 3.7 3.3 3.5 3.5 3.2 3.6 4.2 4.5 4.4 4.7																									
Diurnal Maximum																									
AF - Analyzer Failure																									



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Mannix	Station number:	AMS 05
Calibration Date:	October 6, 2017	Last Cal Date:	September 15, 2017
Start time (MST):	10:45	End time (MST):	13:51
Reason:	Routine		

### Calibration Standards

Cal Gas Concentration	<u>49.2</u>	ppm	Cal Gas Exp Date	November 4, 2019
Cal Gas Cylinder #	<u>EY0000646</u>			
Calibrator Make/Model	Sabio 4010		Serial Number	14300410
ZAG Make/Model	API 701		Serial Number	146

### Analyzer Information

Analyzer make: Thermo 43i

Analyzer serial #: 108841399

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Analyzer Range	0 - 1000 ppb		PMT voltage	-634	-635
Calculated slope	1.000275	1.000926	Lamp voltage	819	817
Calculated intercept	0.861264	0.950244	Pressure	678.8	684.2
Analyzer Background	7.2	7.2	Flow	0.458	0.463
Analyzer Coefficient	0.911	0.920	Intensity	91	90

### SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	4998	0.0	0.0	0.0	----
as found span	4935	61.0	600.7	593.3	1.013
calibrator zero	4998	0.0	0.0	-0.2	----
high point	4933	61.0	601.0	600.2	1.001
second point	4969	30.6	301.1	298.4	1.009
third point	4981	15.2	149.7	148.6	1.007
as left zero	4998	0.0	0.0	0.2	----
as left span	4933	61.0	601.0	599.3	1.003

Average Correction Factor				1.006
Corrected As found	593.30	Previous response	599.69	*% change 1.1%

\* = > +/-5% change initiates investigation

Notes:

Changed inlet filter after asfound. Adjusted the span.

Calibration Performed By: Jayme Marcoux



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

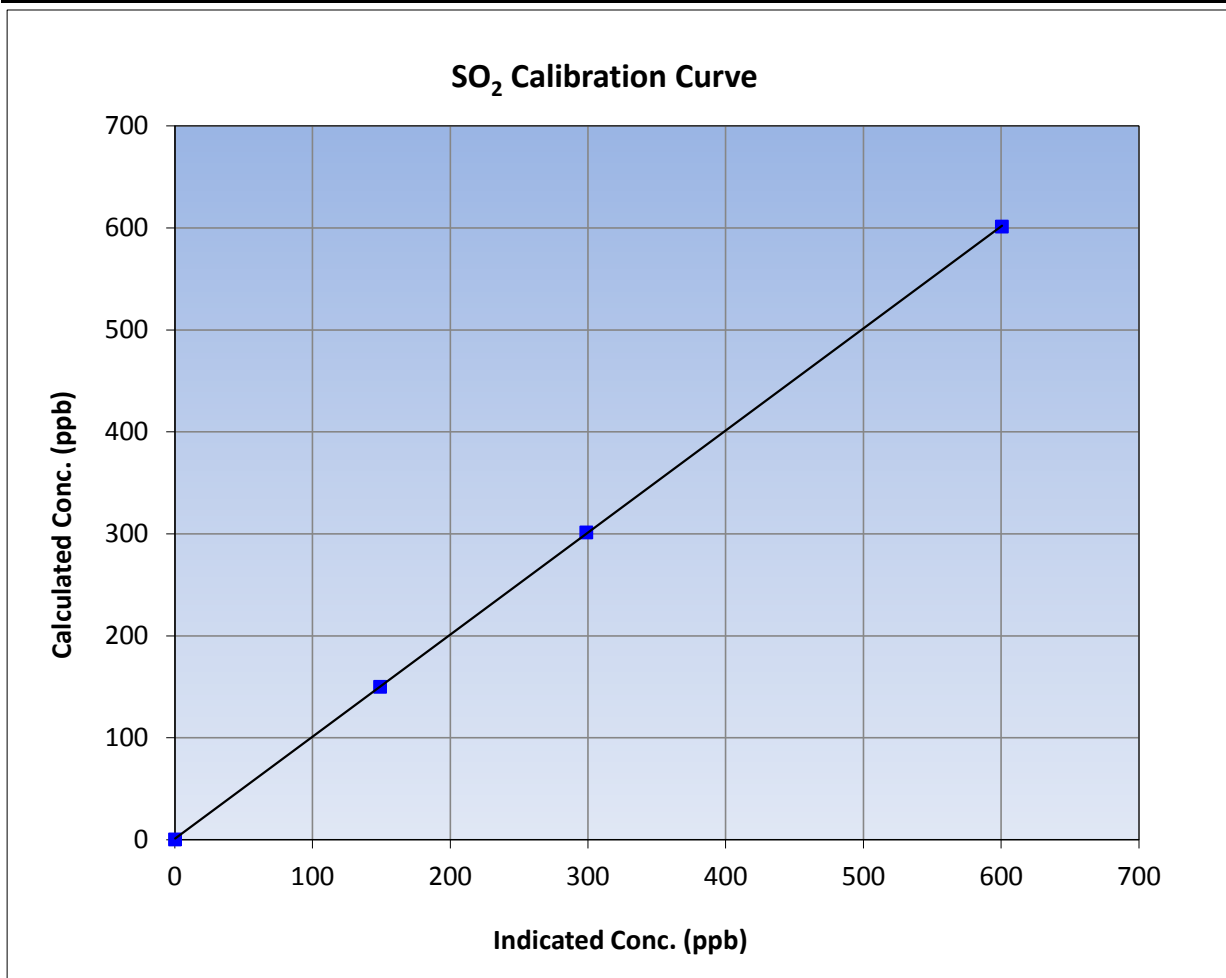
Version-03-2017

### Station Information

Calibration Date	October 6, 2017	Previous Calibration	September 15, 2017
Station Name	Mannix	Station Number	AMS 05
Start Time (MST)	8:25	End Time (MST)	13:51
Analyzer make	Thermo 43i	Analyzer serial #	108841399

### Calibration Data

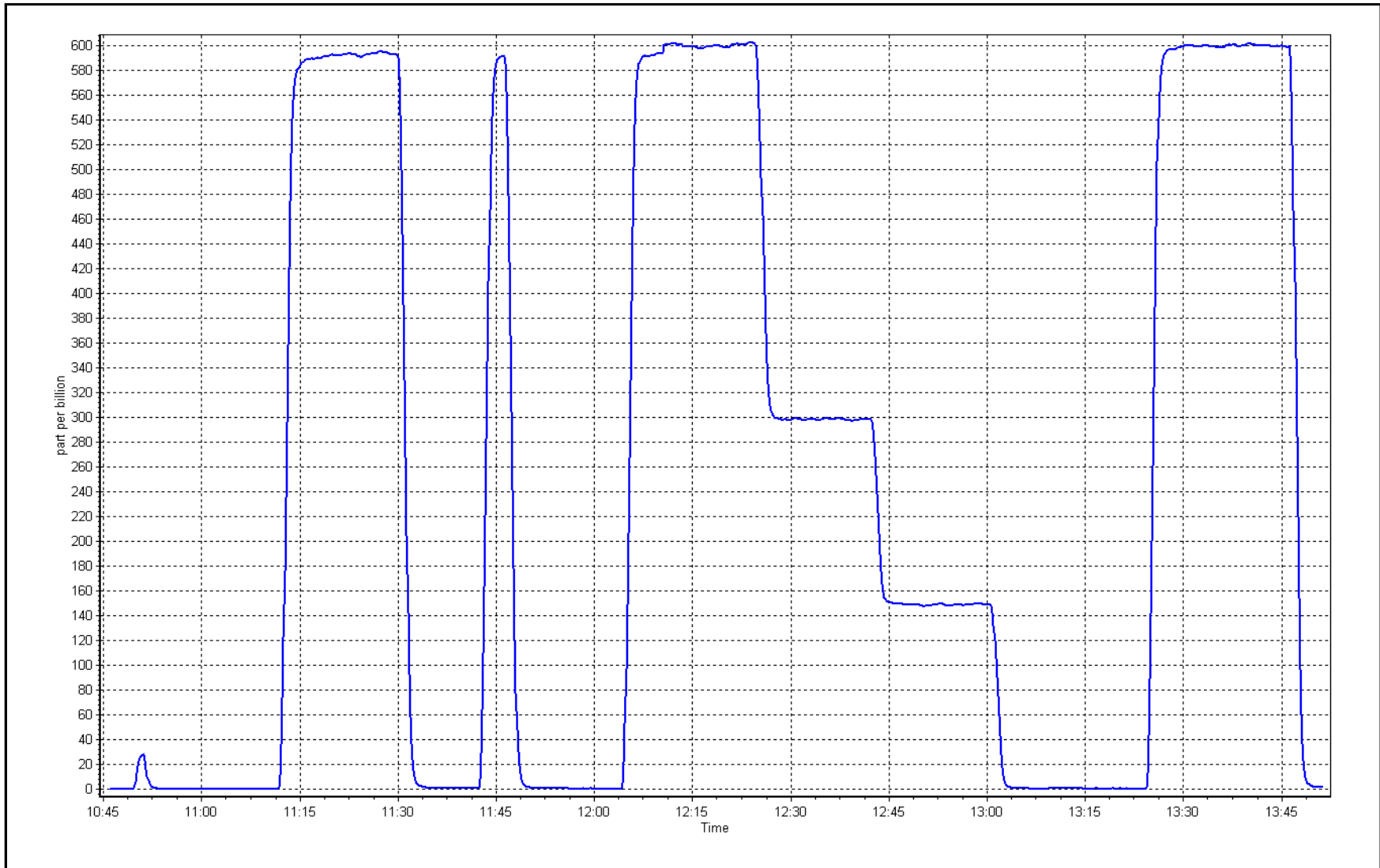
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits
0.0	-0.2	----	Correlation Coefficient	≥0.995
601.0	600.2	1.0013		
301.1	298.4	1.0091	Slope	0.90 - 1.10
149.7	148.6	1.0073		
			Intercept	+/-30



SO2 Calibration Plot

Date: October 6, 2017

Location: Mannix









# Wood Buffalo Environmental Association

## H<sub>2</sub>S Calibration Summary

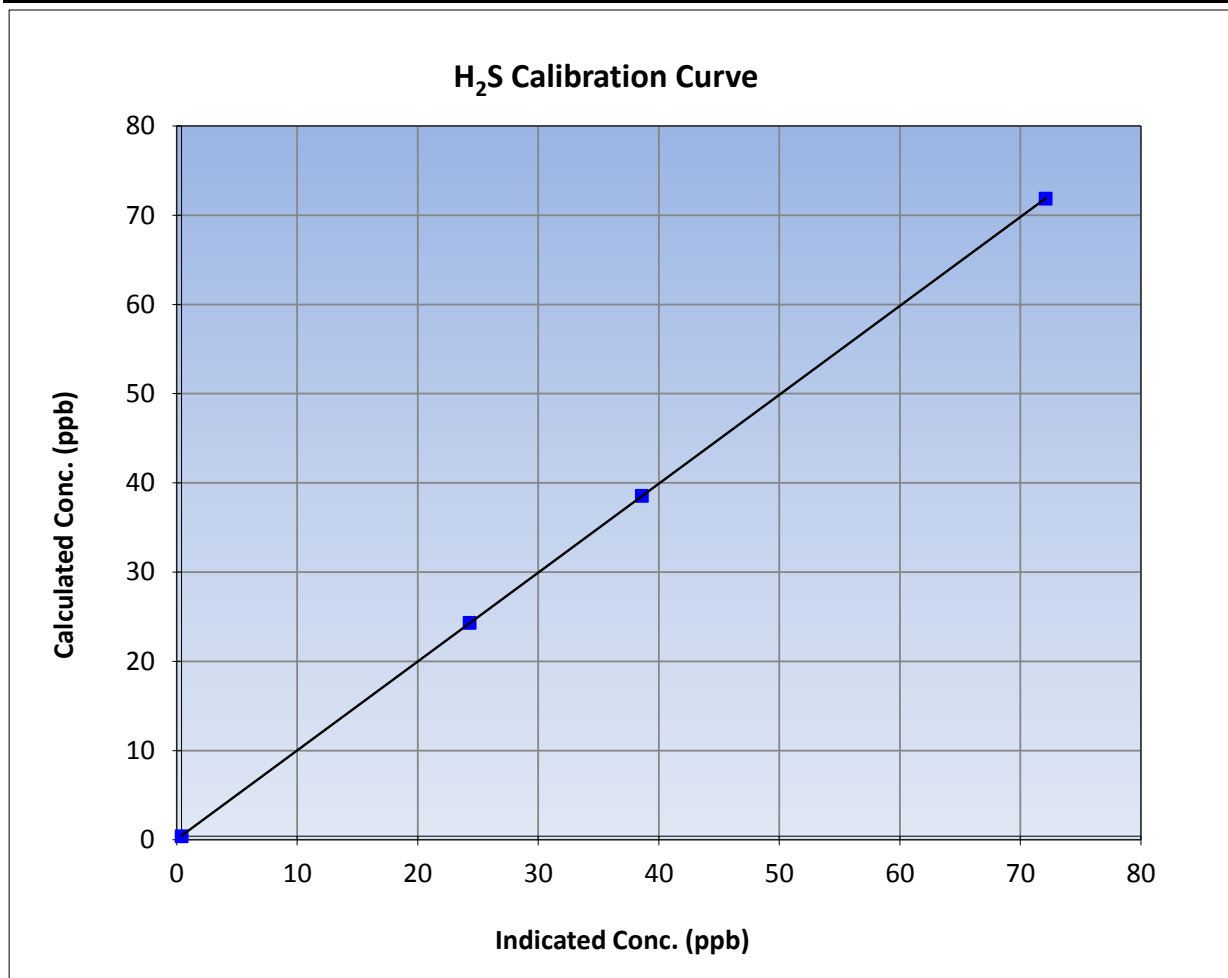
Version-03-2017

### Station Information

Calibration Date	October 6, 2017	Previous Calibration	September 15, 2017
Station Name	Mannix	Station Number	AMS 05
Start Time (MST)	8:06	End Time (MST)	11:45
Analyzer make	Thermo 430i	Analyzer serial #	815129108

### Calibration Data

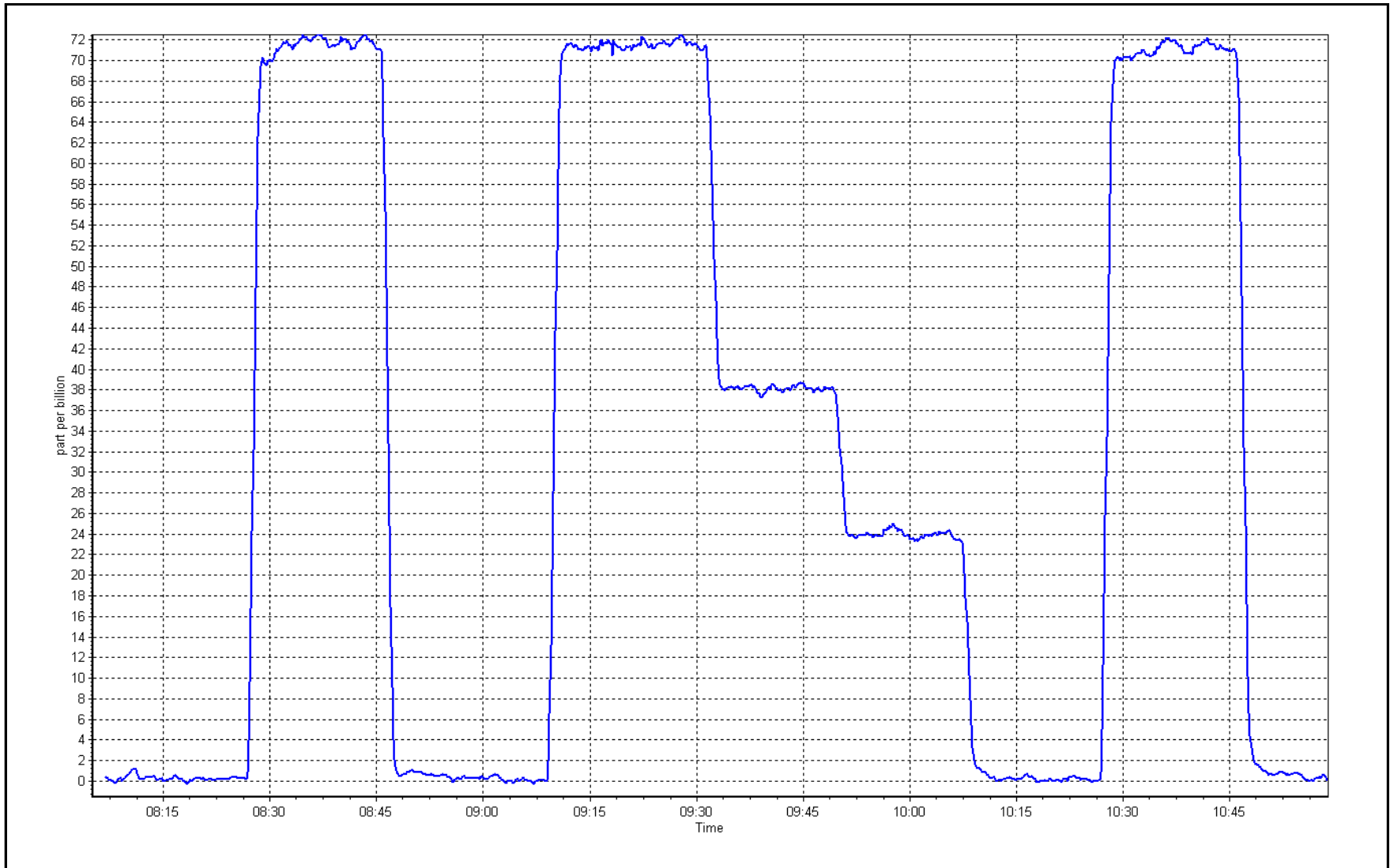
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	≥0.995
71.5	71.7	0.9966		
38.2	38.2	0.9988	Slope	0.90 - 1.10
23.9	23.9	1.0004		
			Intercept	+/-3



# H<sub>2</sub>S Calibration Plot

Date: October 6, 2017

Location: Mannix





# Wood Buffalo Environmental Association

## THC Calibration Report

Version-03-2017

### Station Information

Station Name:	Mannix	Station number:	AMS 05
Calibration Date:	October 6, 2017	Last Cal Date:	September 15, 2017
Start time (MST):	10:45	End time (MST):	13:49
Reason:	Routine		

### Calibration Standards

Gas Cert Reference	EY0000646	Cal Gas Expiry Date	November 4, 2019
CH4 Cal Gas Conc.	<u>514.0</u> ppm	CH4 Equiv Conc.	1064.0 ppm
C3H8 Cal Gas Conc.	<u>200.0</u> ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4080	Serial Number	14300410
ZAG Make/Model	Teledyne API 701	Serial Number	146

### Analyzer Information

Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1317958295
	<u>Start</u>	<u>Finish</u>	<u>Start</u>
Analyzer Range	0 - 25 ppm	Bias voltage supply	-296
Calculated slope	0.995842	Sample pressure	9.4
Calculated intercept	0.057141	Fuel pressure	20.2
Analyzer Background	3.38	Air pressure	42.3
Analyzer Coefficient	3.596	Flame temperature	161.5

### THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	4997	0.0	0.00	0.07	----
as found span	4935	61.0	12.99	12.67	1.026
calibrator zero	4997	0.0	0.00	0.00	----
high point	4935	61.0	12.99	13.00	0.999
second point	4969	30.6	6.51	6.43	1.013
third point	4983	15.2	3.24	3.23	1.003
as left zero	4997	0.0	0.00	0.08	----
as left span	4933	61.0	13.00	12.98	1.001
Average Correction Factor					1.005
Corrected As found	12.59	Previous response	12.99	*% change	3.1%

\* = > +/-5% change initiates investigation

Notes: Changed inlet filter after as founds. Adjusted the zero and the span.

Calibration Performed By: Jayme Marcoux



# Wood Buffalo Environmental Association

## THC Calibration Summary

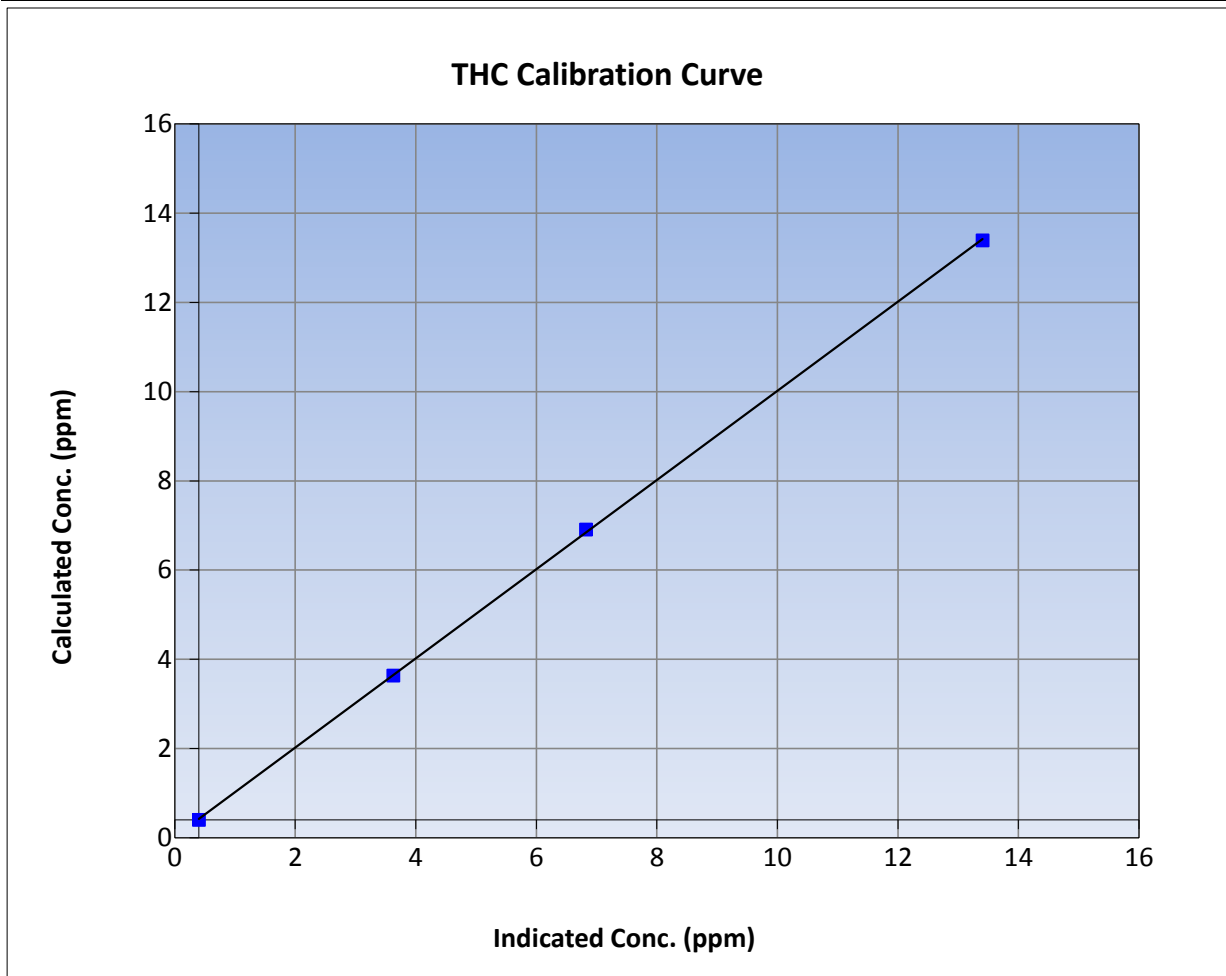
Version-03-2017

### Station Information

Calibration Date	October 6, 2017	Previous Calibration	September 15, 2017
Station Name	Mannix	Station Number	AMS 05
Start Time (MST)	10:45	End Time (MST)	13:49
Analyzer make	Thermo 51i-LT	Analyzer serial #	1317958295

### Calibration Data

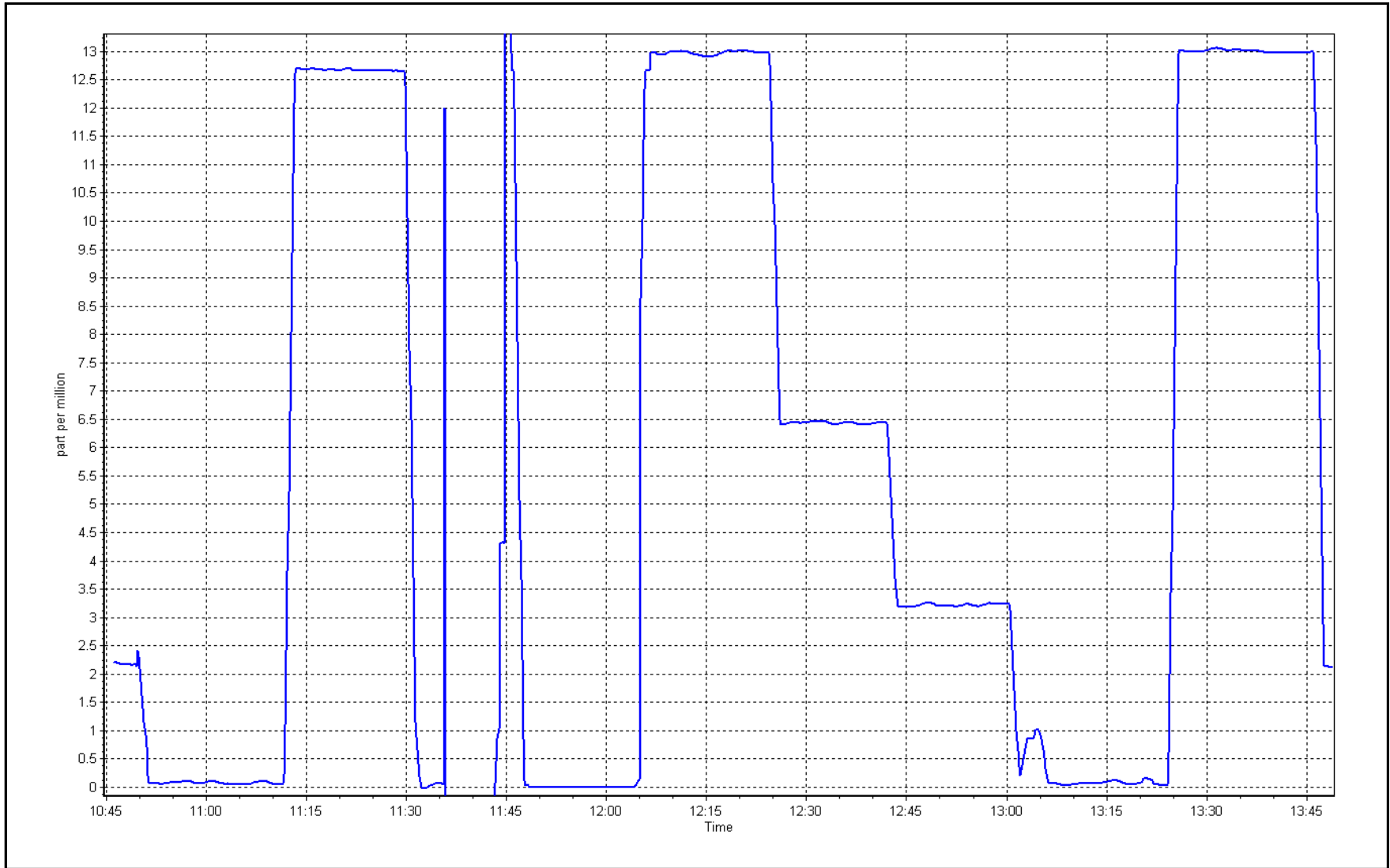
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (lc)	Correction factor (Cc/lc)	Statistical Evaluation	Limits	
0.0	0.0	----	Correlation Coefficient	0.999937	≥0.995
13.0	13.0	0.9990			
6.5	6.4	1.0133	Slope	0.999430	0.90 - 1.10
3.2	3.2	1.0030			
			Intercept	0.023759	+/-1.5



THC Calibration Plot

Date: October 6, 2017

Location: Mannix





## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 6**  
**PATRICIA MCINNES**  
**OCTOBER 2017**

Operations, Data Collection,  
QA/QC, Data Validation and Reporting by:  
Wood Buffalo Environmental Association  
Fort McMurray, Alberta

November 29, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)  
OCTOBER 2017

MONTHLY SUMMARY for  
AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	705	39	39	100	14	0	5	0
TRS (ppb) Average	697	40	47	99.06	2	0	1	0
THC (ppm) Average	704	38	40	99.73	2.6	-	2.3	-
NMHC(ppm) Average	704	38	40	99.73	0.184	-	0.052	-
CH4(ppm) Average	704	38	40	99.73	2.5	-	2.3	-
O3 (ppb) Average	707	37	37	100	44	0	38	-
NO2 (ppb) Average	700	44	44	100	25	0	14	-
NO (ppb) Average	700	44	44	100	39	-	29	-
NOX (ppb) Average	700	44	44	100	60	-	43	-
NH3 (ppb) Average	648	56	96	94.62	55	0	34	-
PM2.5 (ug/m3) Average	729	5	15	98.66	66	-	19.1	0
Temperature 2 m (C) Average	744	0	0	100	22.6	-	14.6	-
Relative Humidity (%) Average	744	0	0	100	99	-	94	-
Wind Speed 10 m (km/h) Average	744	0	0	100	40	-	22	-
Wind Direction 10 m (deg) Average	744	0	0	100	-	-	-	-

Note : Operational time includes periods of data collection and instrument calibration



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)  
OCTOBER 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	705	0.5	1	-	0	0	0	0	0	1	14
TRS (ppb) Average	697	0.3	0	-	0	0	0	0	0	0	2
THC (ppm) Average	704	1.93	0.1	-	1.8	1.9	1.9	1.9	1.9	2	2.6
NMHC(ppm) Average	704	0.003	0.015	-	0	0	0	0	0	0	0.184
CH4(ppm) Average	704	1.93	0.1	-	1.8	1.9	1.9	1.9	1.9	2	2.5
O3 (ppb) Average	707	23.1	9	-	3	10	17	24	30	35	44
NO2 (ppb) Average	700	4	5	-	0	0	1	2	6	11	25
NO (ppb) Average	700	2.6	6	-	0	0	0	1	1	6	39
NOX (ppb) Average	700	6.6	10	-	0	0	1	3	7	17	60
NH3 (ppb) Average	648	2.1	8	-	0	0	0	0	0	0	55
PM2.5 (ug/m3) Average	729	3.2	5.6	-	0.1	0.4	0.9	1.6	3.4	5.9	66
Temperature 2 m (C) Average	744	3.32	4.9	-	-7.4	-1.7	-0.4	2.3	6.6	10	22.6
Relative Humidity (%) Average	744	73.9	16	-	26	49	64	76	86	94	99
Wind Speed 10 m (km/h) Average	744	12.7	7	-	1	5	8	11	17	22	40
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)  
OCTOBER 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS	06 Oct 2017 13:00	06 Oct 2017 16:00	4	Maintenance - WBEA internal audit
TRS	18 Oct 2017 10:00	18 Oct 2017 12:00	3	Maintenance - confirmed calibration points
THC	06 Oct 2017 14:00	06 Oct 2017 15:00	2	Maintenance - replaced carrier gas
NH3	01 Oct 2017 06:00	31 Oct 2017 07:00	40	Stabilization after daily span
PM2.5	01 Oct 2017 12:00	01 Oct 2017 13:00	2	Unstable operation - excessive baseline drift
PM2.5	10 Oct 2017 11:00	10 Oct 2017 11:00	1	Unstable operation - excessive baseline drift
PM2.5	17 Oct 2017 22:00	17 Oct 2017 23:00	2	Unstable operation - excessive baseline drift
PM2.5	18 Oct 2017 11:00	18 Oct 2017 15:00	5	Unstable operation - excessive baseline drift



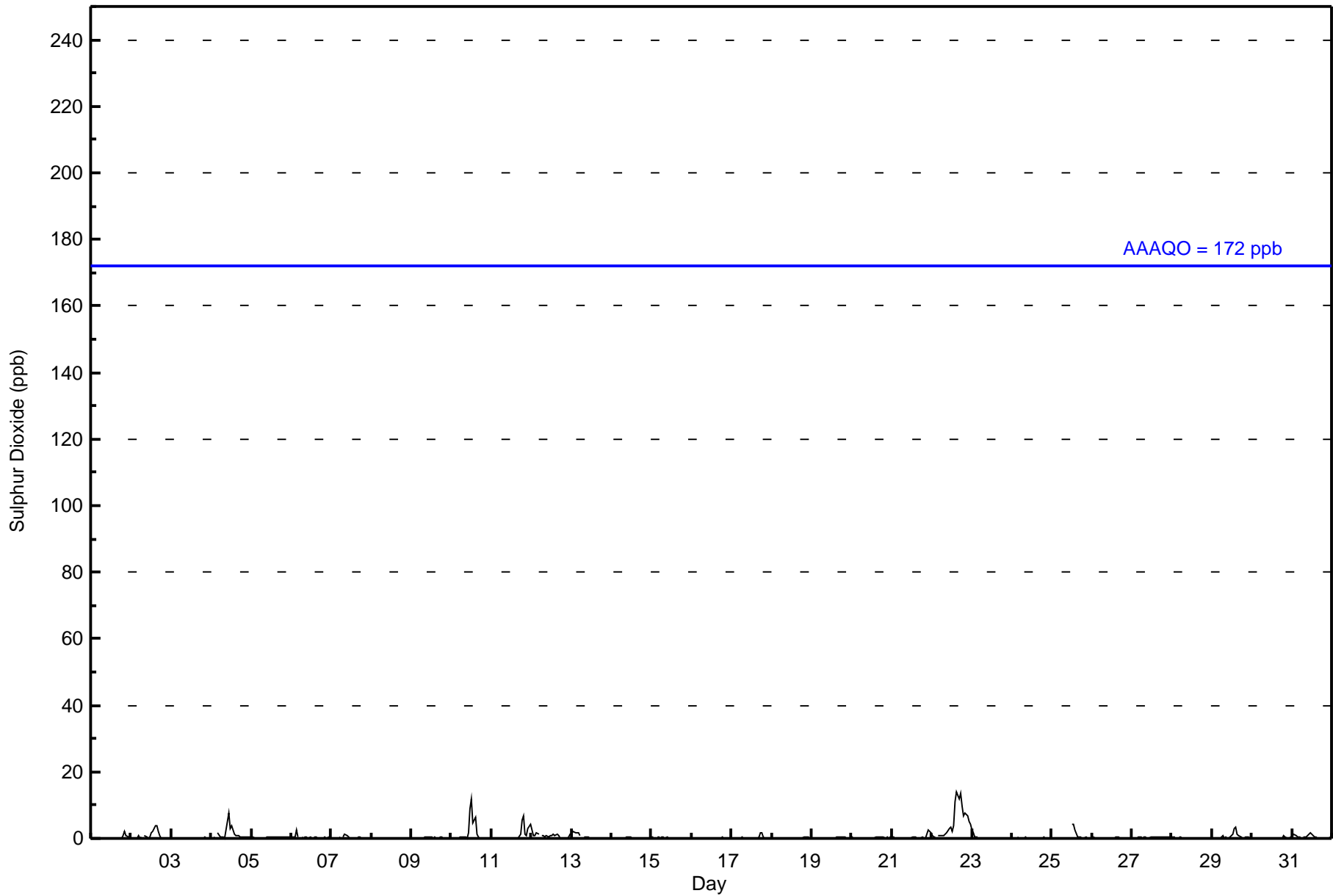
Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb

Patricia McInnes - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																						
Maximum Value: 14 ppb on Oct 22 16:00										Maximum Daily Average: 4.8 ppb on Oct 22										Hours of Data: 705																												
Minimum Value: 0 ppb on Oct 3 09:00										Minimum Daily Average: 0.1 ppb on Oct 3										Hours of Missing Data: 39																												
Maximum Diurnal Average: 1.1 ppb at hour 15										Minimum Diurnal Average: 0.2 ppb at hour 6										Hours of Calibration: 39																												
Monthly Average: 0.5 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 8										Percent Operational Time: 100.0																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0.3	2																						
2-Oct	0	0	0	0	1	0	0	Z	1	1	0	0	2	2	4	4	2	1	0	0	0	0	0	0	0.8	4																						
3-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
4-Oct	0	0	0	Z	2	1	0	0	0	3	7	3	4	2	1	1	1	1	0	0	0	0	0	0	1.2	7																						
5-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																						
6-Oct	0	0	1	2	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2																						
7-Oct	0	0	0	0	0	0	Z	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0.3	1																						
8-Oct	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
9-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
10-Oct	0	0	0	Z	0	0	0	0	0	0	2	9	12	5	6	1	1	0	0	0	0	0	0	0	1.6	12																						
11-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	5	7	1	1	3	4	1.0	7																						
12-Oct	2	1	1	2	1	Z	1	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	0.8	2																						
13-Oct	1	2	2	2	2	1	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2																						
14-Oct	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
15-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
16-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
17-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0.3	2																						
18-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	1																						
19-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
20-Oct	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0.2	1																						
21-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	2	0.4	3																						
22-Oct	1	1	0	Z	1	1	1	1	1	2	3	3	2	4	11	14	12	14	10	7	8	7	5	4	4.8	14																						
23-Oct	3	2	0	0	Z	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.3	3																						
24-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
25-Oct	0	0	0	0	0	0	Z	0	0	C	C	C	4	4	3	0	0	0	0	0	0	0	0	0	0.7	4																						
26-Oct	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
27-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																						
28-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
29-Oct	0	0	0	0	Z	0	1	0	0	0	0	0	1	3	3	1	1	0	0	0	0	0	0	0	0.6	3																						
30-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.1	1																						
31-Oct	0	1	1	1	1	0	Z	0	0	1	1	2	1	0	0	0	0	0	0	0	0	0	0	1	0.5	2																						
																								0.3	0.3	0.3	0.3	0.4	0.2	0.2	0.2	0.3	0.4	0.6	0.8	1.0	0.8	1.1	0.9	0.7	0.7	0.7	0.6	0.5	0.5	0.5	0.5	Diurnal Average
																								3	2	2	2	2	1	1	1	1	3	7	9	12	5	11	14	12	14	10	7	8	7	5	4	Diurnal Maximum
Z - zerospan C - Calibration																																																
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																																																





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Patricia McInnes - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	700	99.29	99.29
11 - 20	5	0.71	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Patricia McInnes - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	76	27	12	6	6	42	47	13	37	56	93	59	32	64	77	53	700
11 - 20	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	78	27	12	6	6	42	47	13	37	56	93	59	32	64	77	56	705

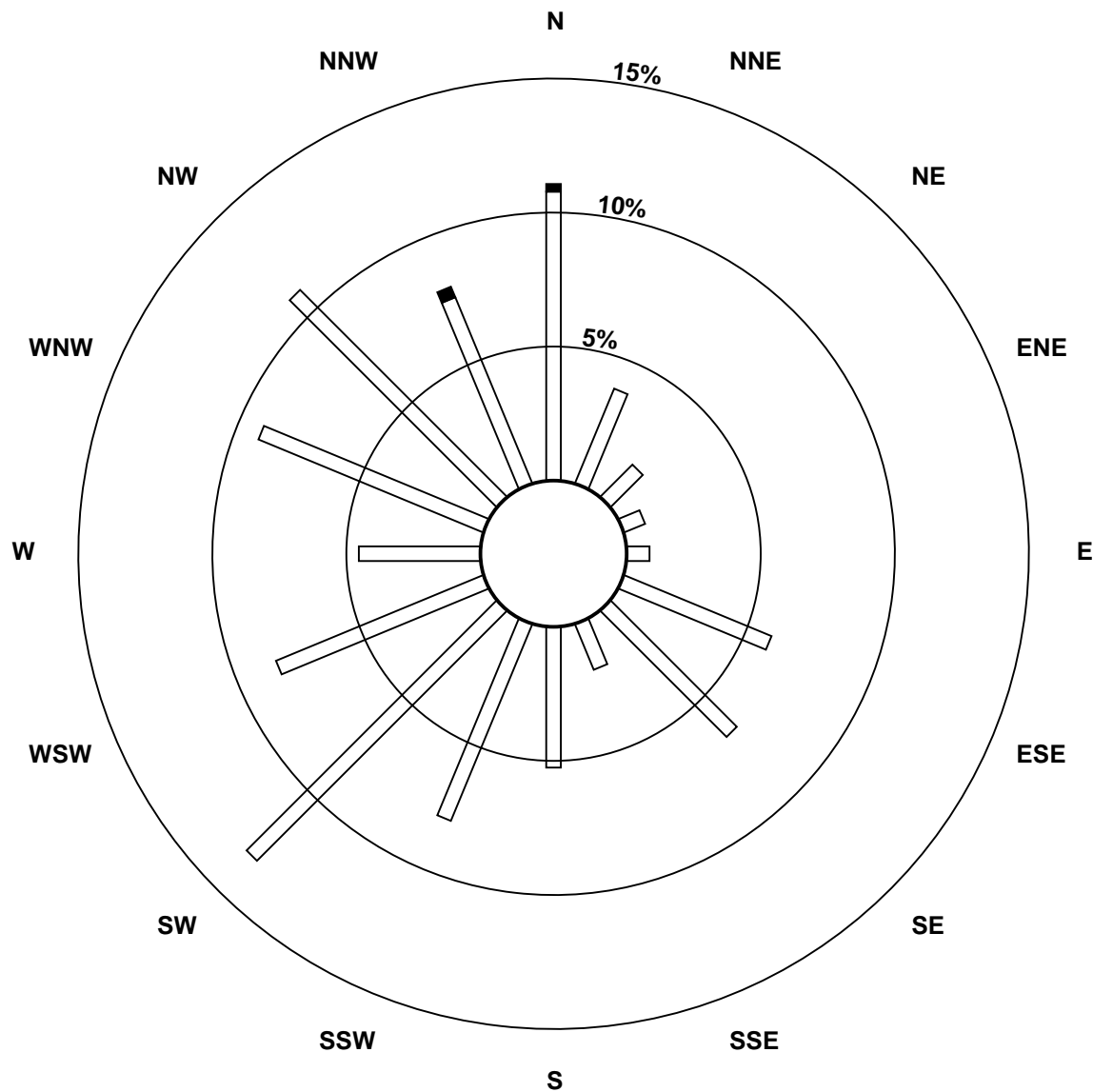
Total Number of Valid Hours: 705

Total Number of Hours: 744

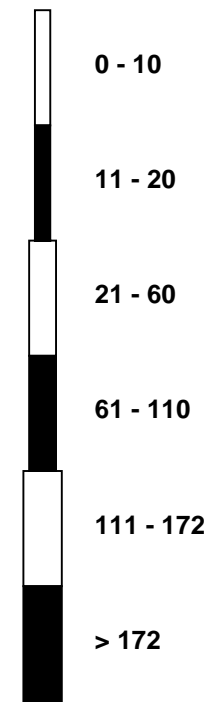


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

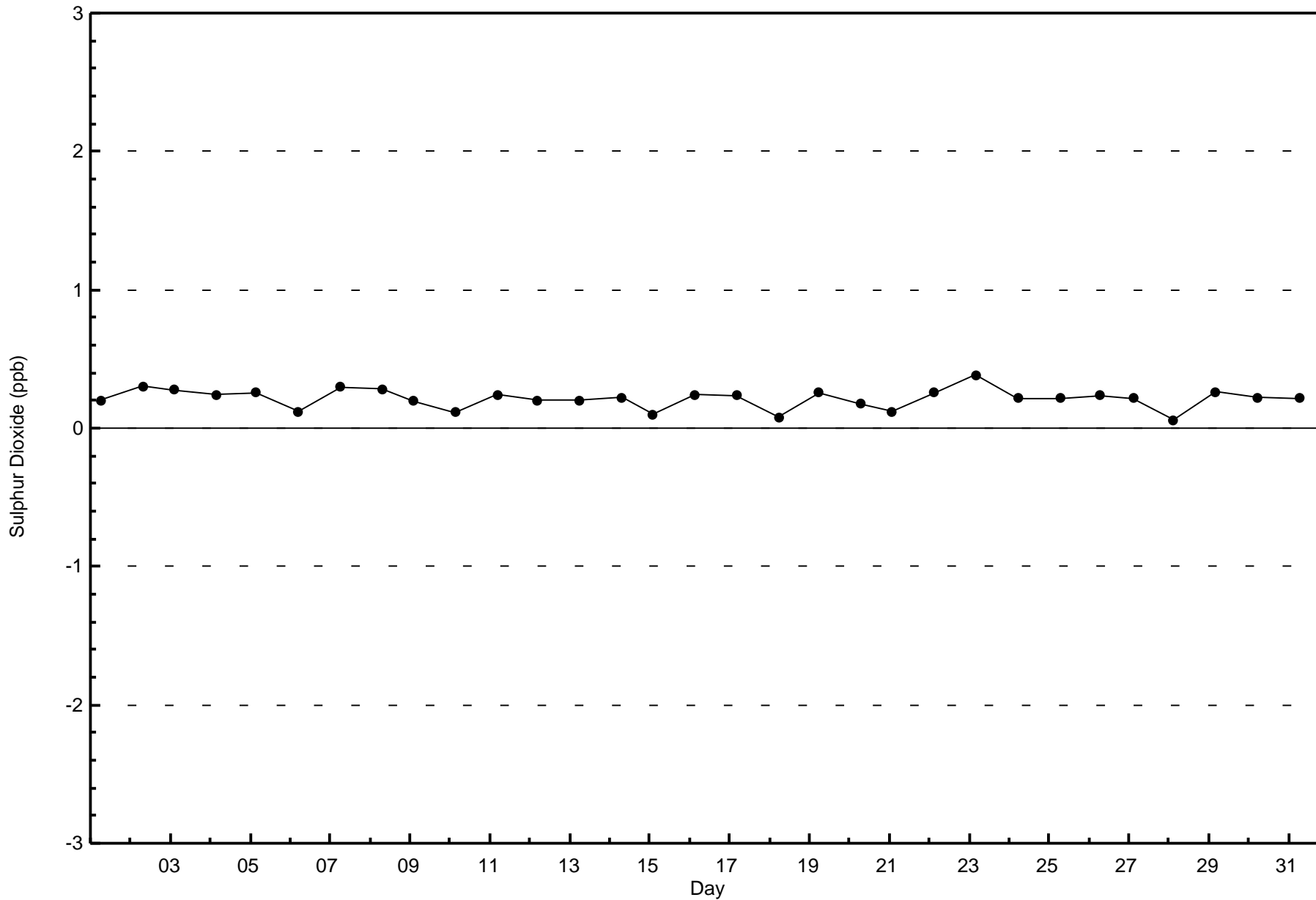
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Patricia McInnes (AMS 6)



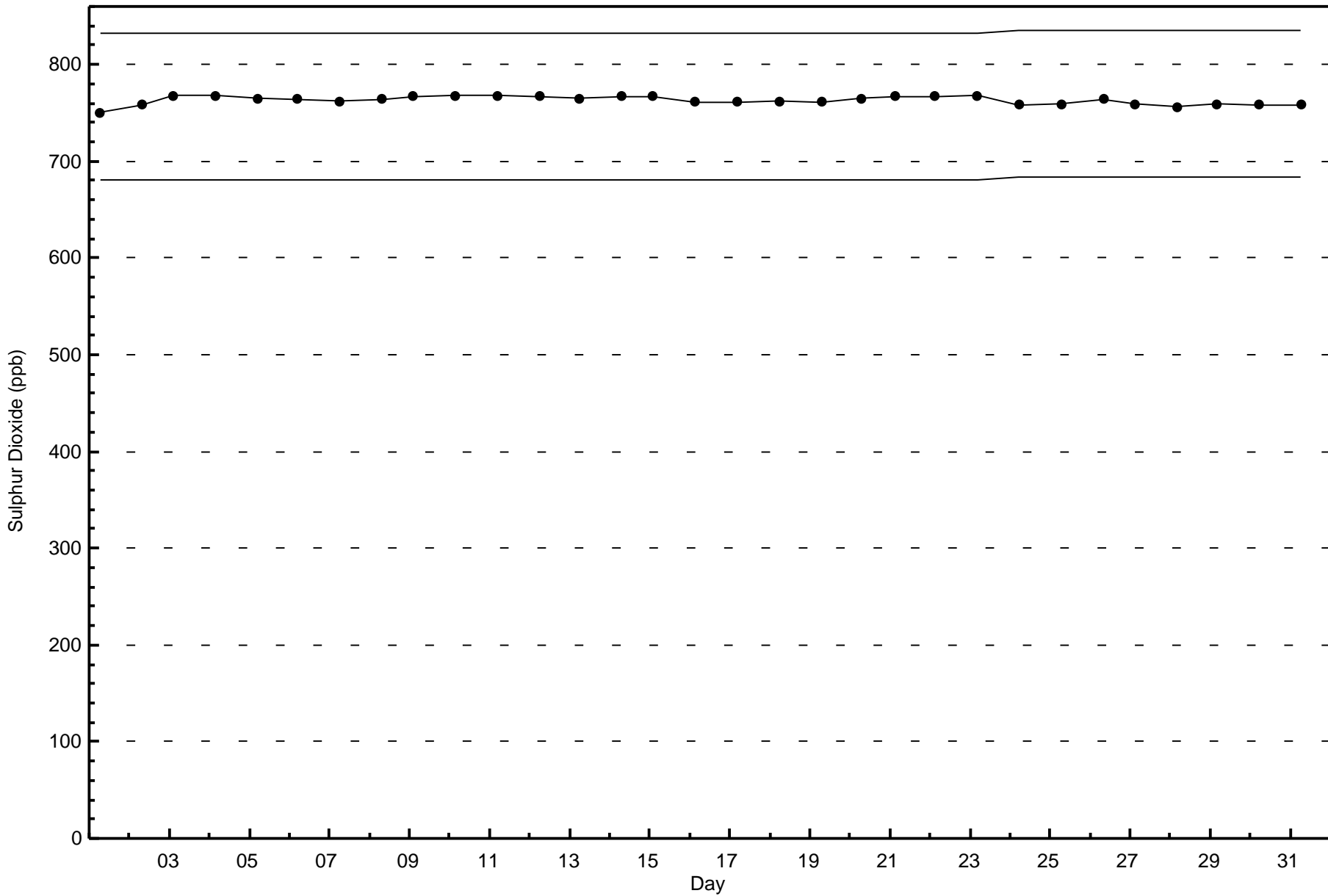
Classes (ppb)



Total Number of Valid Hours: 705









Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

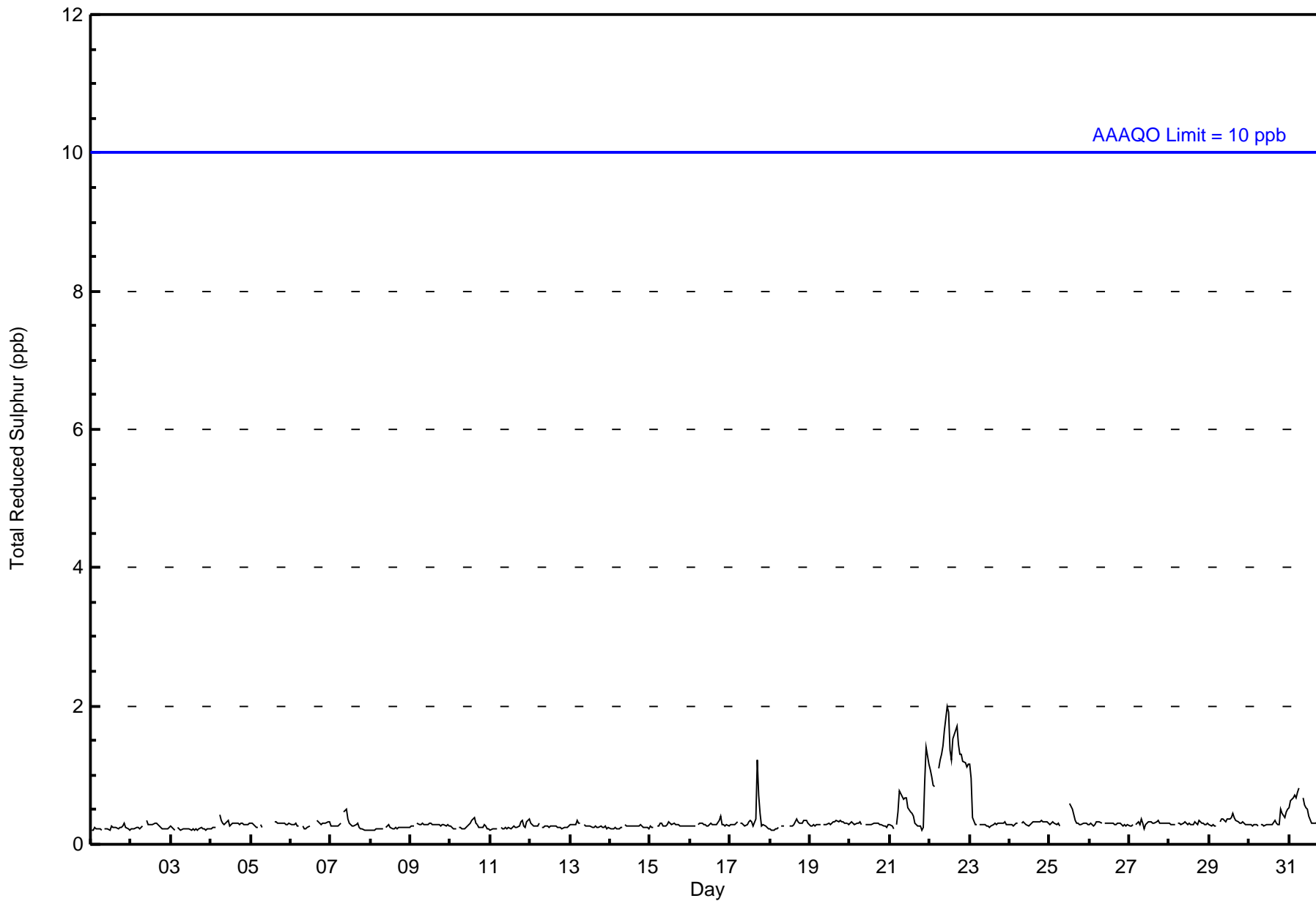
Patricia McInnes - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 2 ppb on Oct 22 11:00      Maximum Daily Average: 1.3 ppb on Oct 22																	Hours in Service: 744 Hours of Data: 697 Hours of Missing Data: 47 Hours of Calibration: 40 Percent Operational Time: 99.1										
Minimum Value: 0 ppb on Oct 1 07:00      Minimum Daily Average: 0.2 ppb on Oct 3 Maximum Diurnal Average: 0.4 ppb at hour 17      Minimum Diurnal Average: 0.3 ppb at hour 5 Monthly Average: 0.3 ppb      Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 1																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Oct	0	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
3-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
5-Oct	0	0	0	0	0	Z	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	--	0
6-Oct	0	0	0	0	0	0	Z	0	0	0	0	M	M	M	M	0	0	0	0	0	0	0	0	0	0	0.3	0
7-Oct	0	0	0	0	0	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
8-Oct	0	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
9-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
10-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
11-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
12-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
13-Oct	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
14-Oct	0	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
15-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
16-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
17-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.4	1
18-Oct	0	0	0	0	0	0	Z	0	0	M	M	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
19-Oct	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
20-Oct	0	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
21-Oct	0	0	0	Z	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0.5	1
22-Oct	1	1	1	1	Z	1	1	1	1	2	2	2	1	1	2	2	2	1	1	1	1	1	1	1	1	1.3	2
23-Oct	1	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
24-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
25-Oct	0	0	0	0	0	0	0	Z	0	C	C	C	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1
26-Oct	0	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
27-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
28-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
29-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
30-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.3	1
31-Oct	1	1	1	1	1	1	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.3 0.4 0.4 0.4 0.4 0.3 0.3 0.3 0.3 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3																								Diurnal Average			
1 1 1 1 1 1 1 1 1 1 2 2 2 1 1 2 2 2 1 1 1 1 1 1 1 1																								Diurnal Maximum			
Z - zerospan      C - Calibration      M - Maintenance Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb      24-hr 3 ppb																											



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Total Reduced Sulphur (TRS) - ppb**  
**Patricia McInnes - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Patricia McInnes - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	697	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 697

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

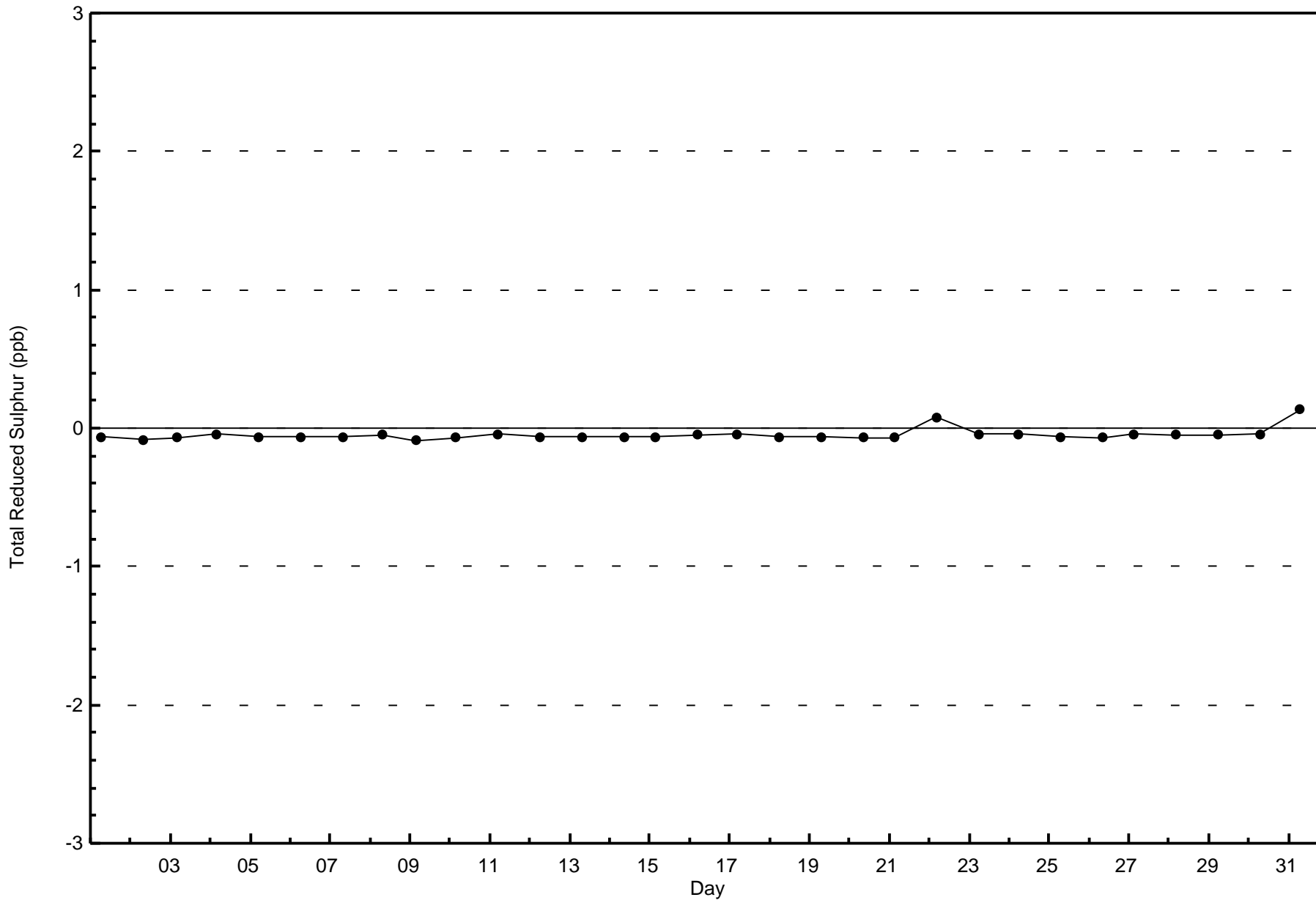
**Total Reduced Sulphur (TRS) - ppb**  
**Patricia McInnes - October 2017**

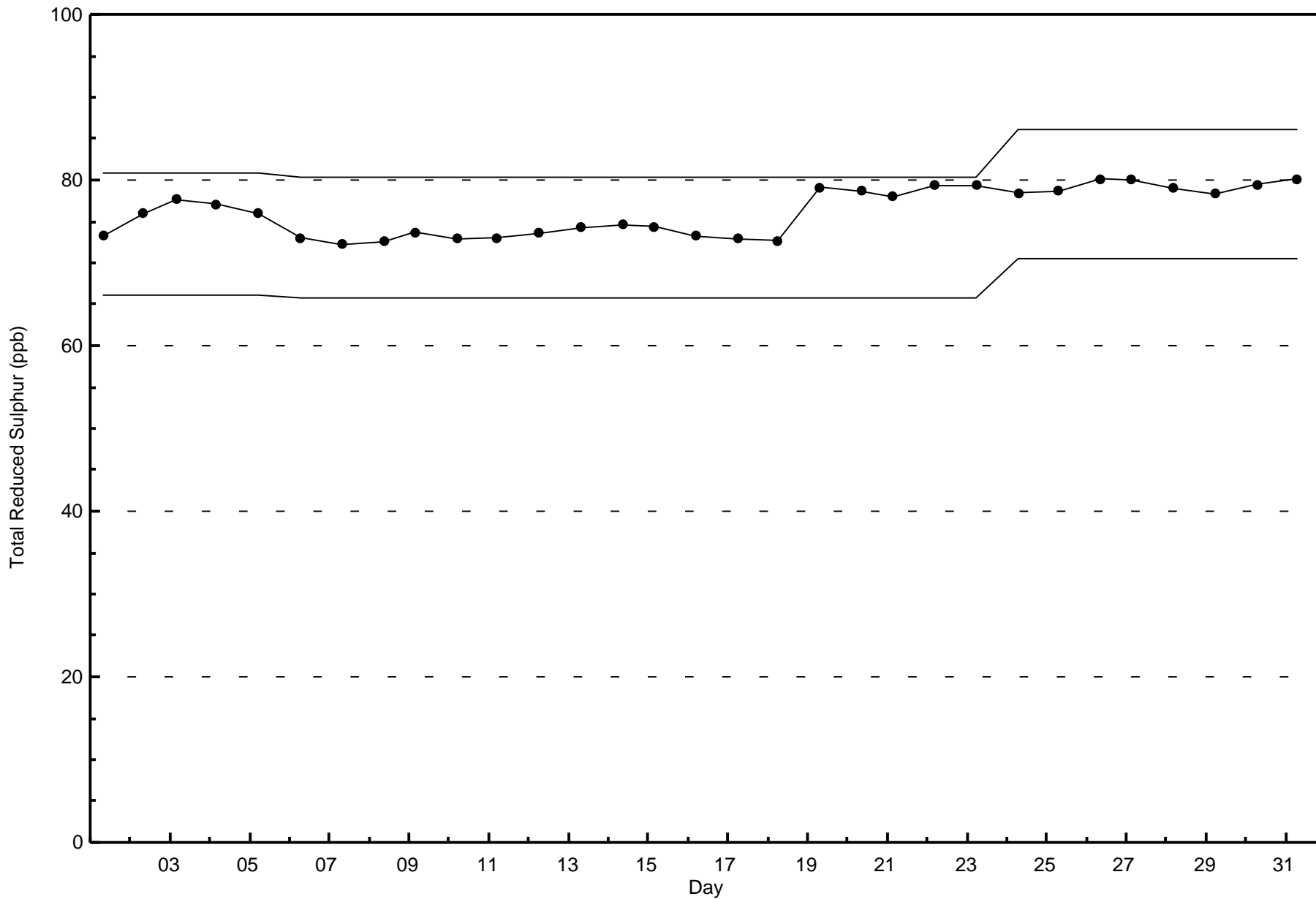
<b>Concentration</b> <b>Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	77	27	12	6	7	42	47	12	38	54	89	57	33	63	77	56	697
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	77	27	12	6	7	42	47	12	38	54	89	57	33	63	77	56	697

Total Number of Valid Hours: 697

Total Number of Hours: 744







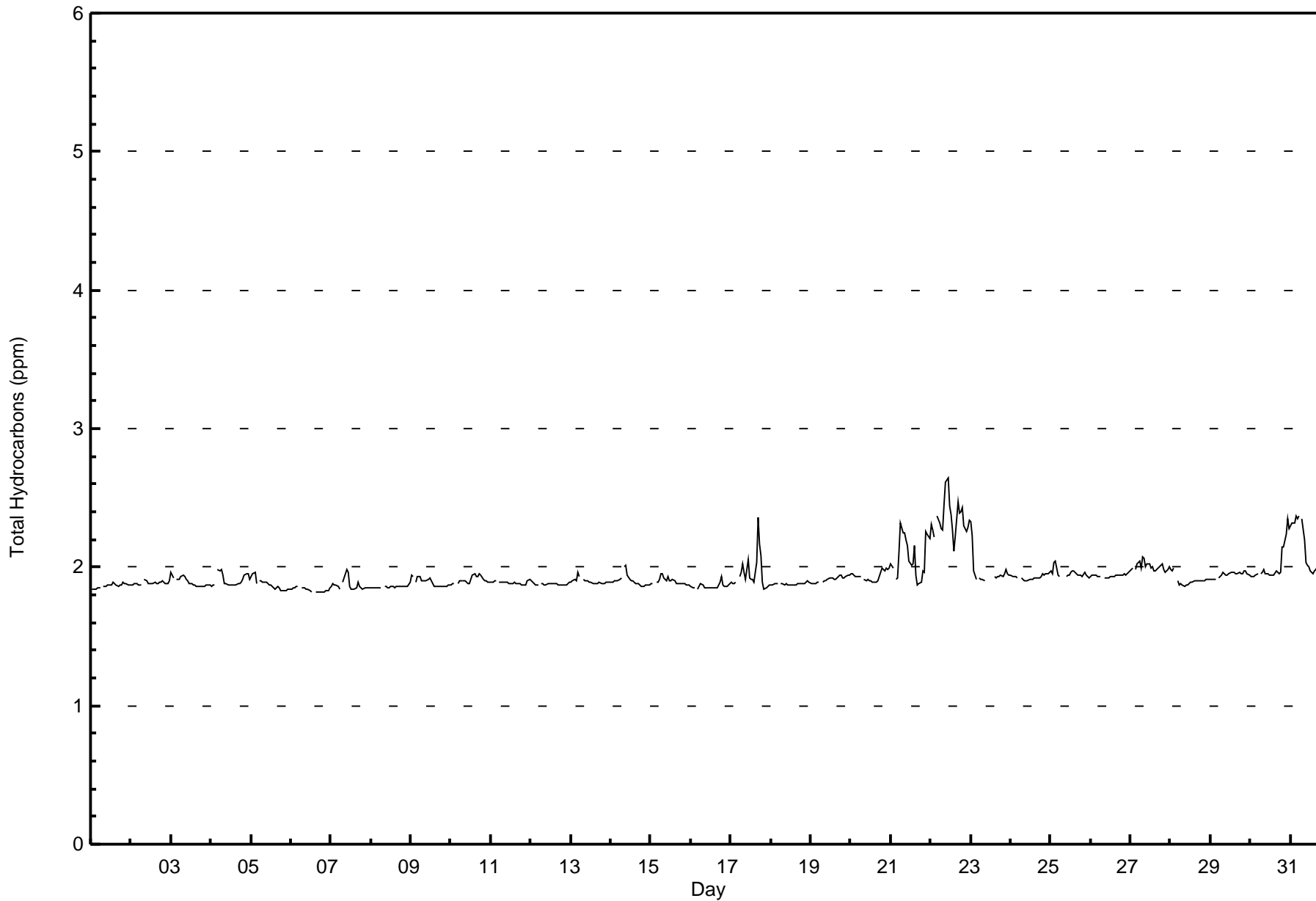






**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Patricia McInnes - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Patricia McInnes - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	650	92.33	92.33
2.1 - 3.0	54	7.67	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Patricia McInnes - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	66	25	11	5	5	37	47	13	33	53	92	57	31	62	68	45	650
2.1 - 3.0	14	1	1	1	1	5	0	0	4	3	1	1	0	2	9	11	54
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	80	26	12	6	6	42	47	13	37	56	93	58	31	64	77	56	704

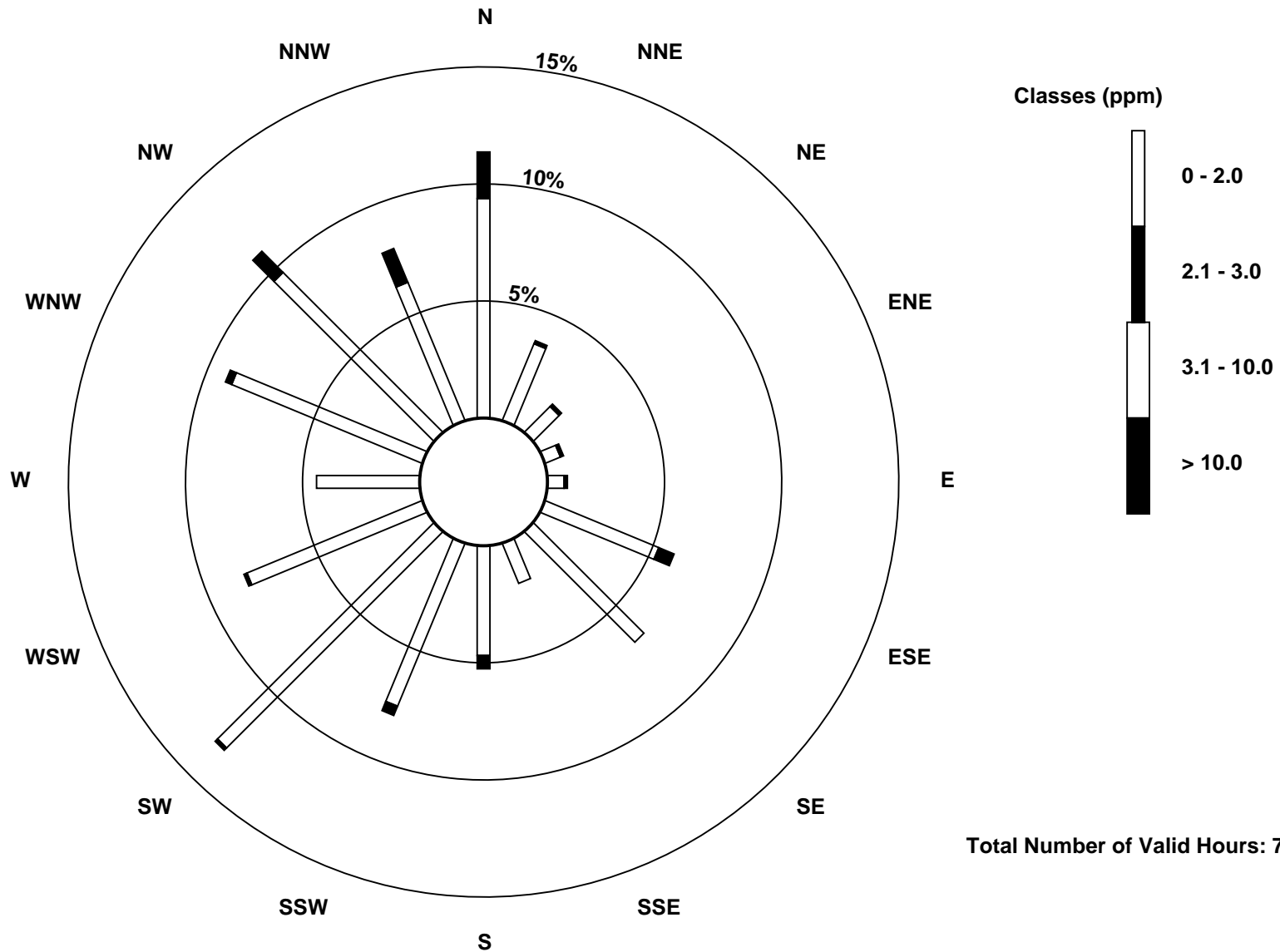
Total Number of Valid Hours: 704

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

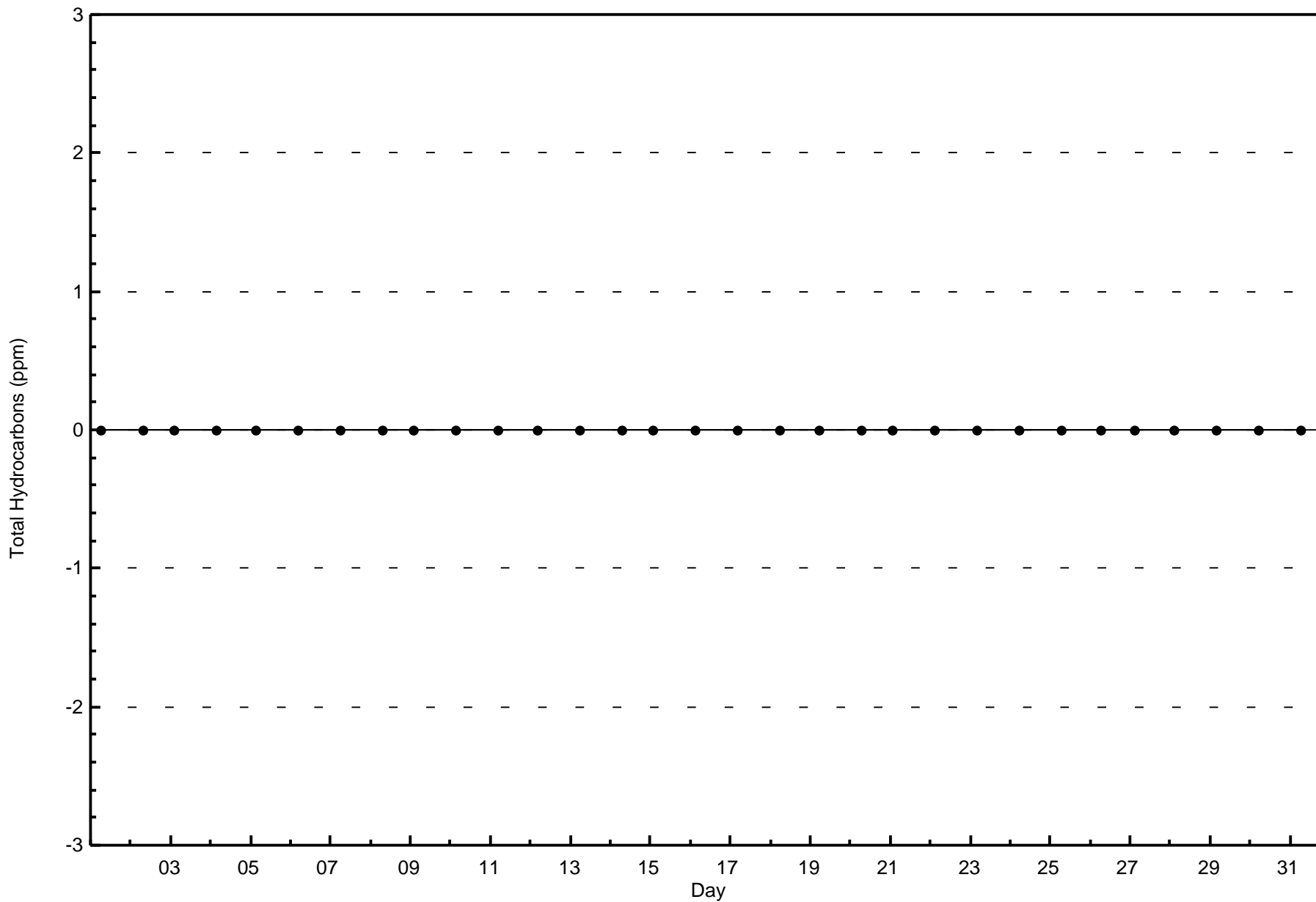
Total Hydrocarbons (THC) - ppm  
Patricia McInnes (AMS 6)

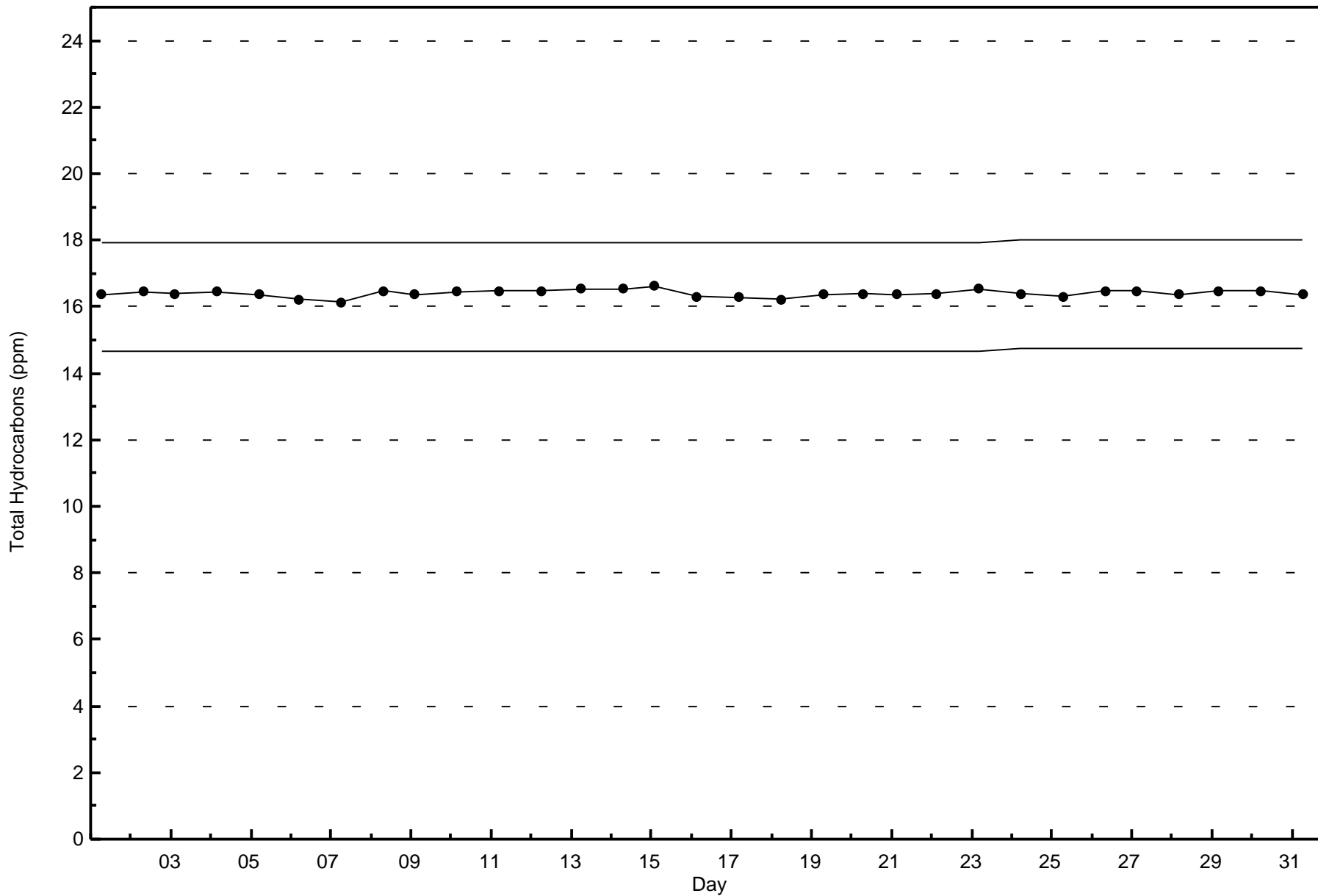




Wood Buffalo Environmental Association  
Zero Responses

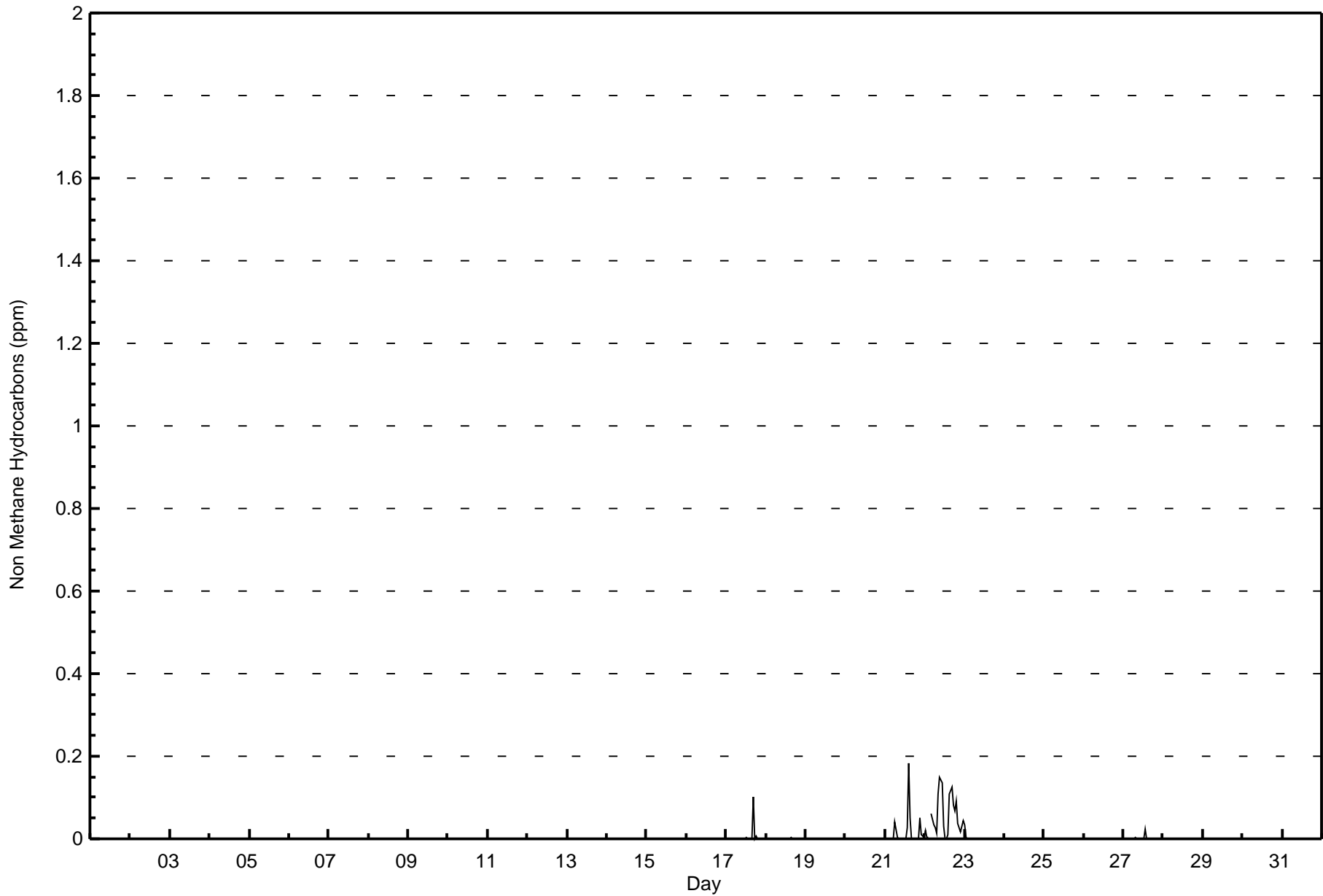
Total Hydrocarbons (THC) - ppm  
Patricia McInnes - October 2017













**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm  
Patricia McInnes - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.005	675	95.88	95.88
0.006 - 0.05	18	2.56	98.44
0.06 - 0.1	10	1.42	99.86
> 0.1	1	0.14	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm  
Patricia McInnes - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	69	26	10	6	6	42	46	13	36	54	93	57	31	63	74	49	675
0.006 - 0.05	6	0	1	0	0	0	1	0	1	2	0	1	0	1	2	3	18
0.06 - 0.1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	10
> 0.1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
<b>Totals</b>	80	26	12	6	6	42	47	13	37	56	93	58	31	64	77	56	704

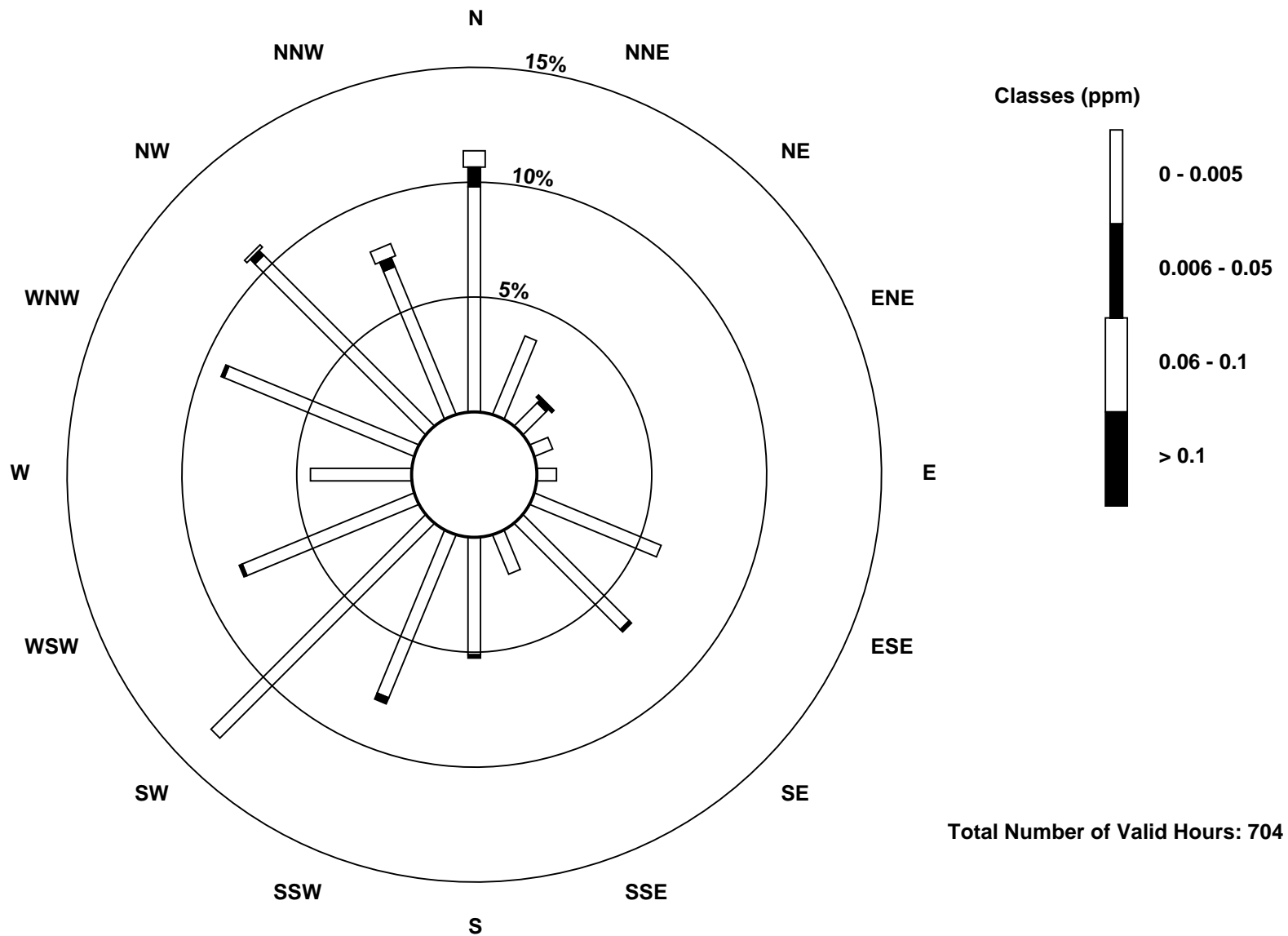
Total Number of Valid Hours: 704

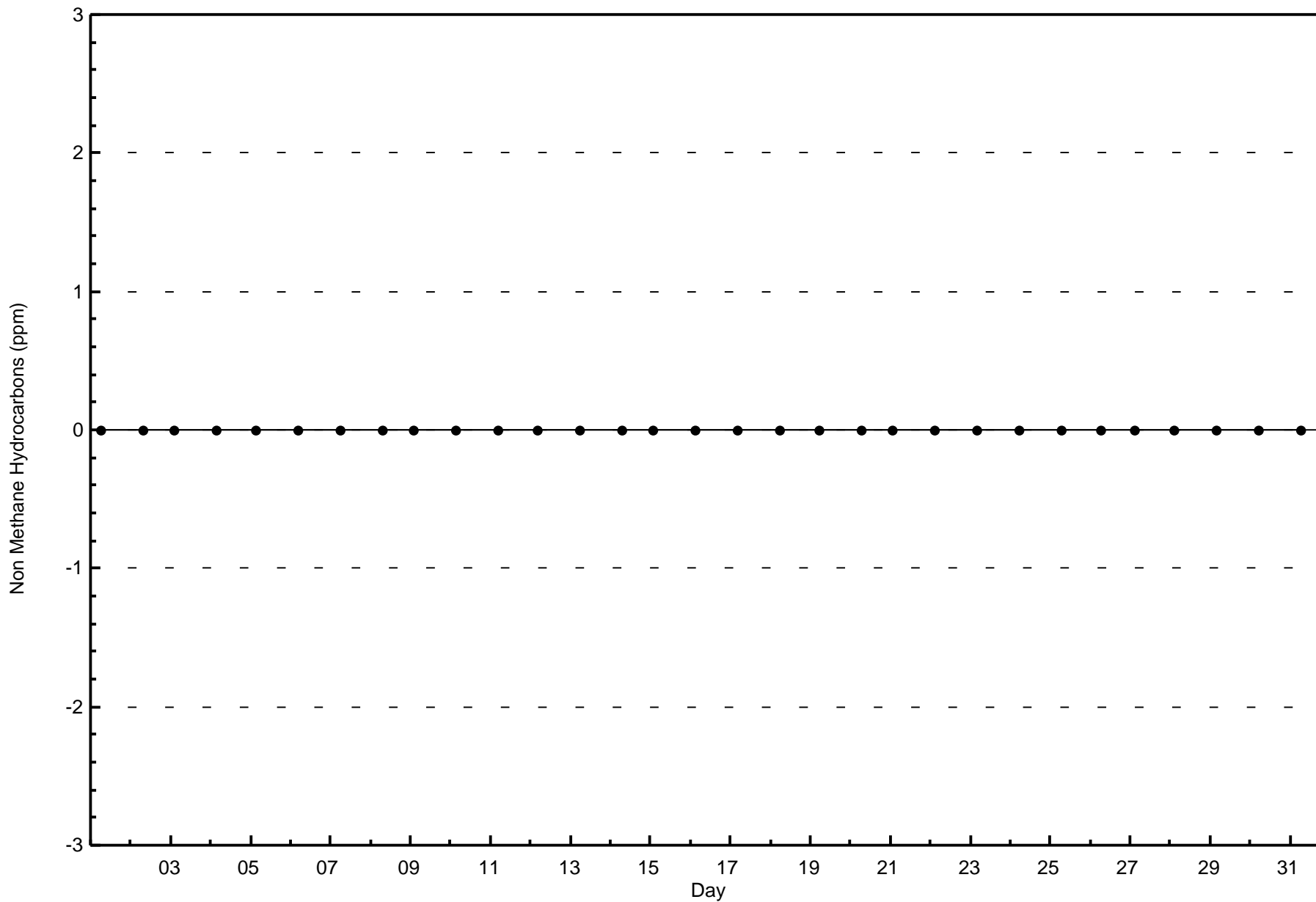
Total Number of Hours: 744

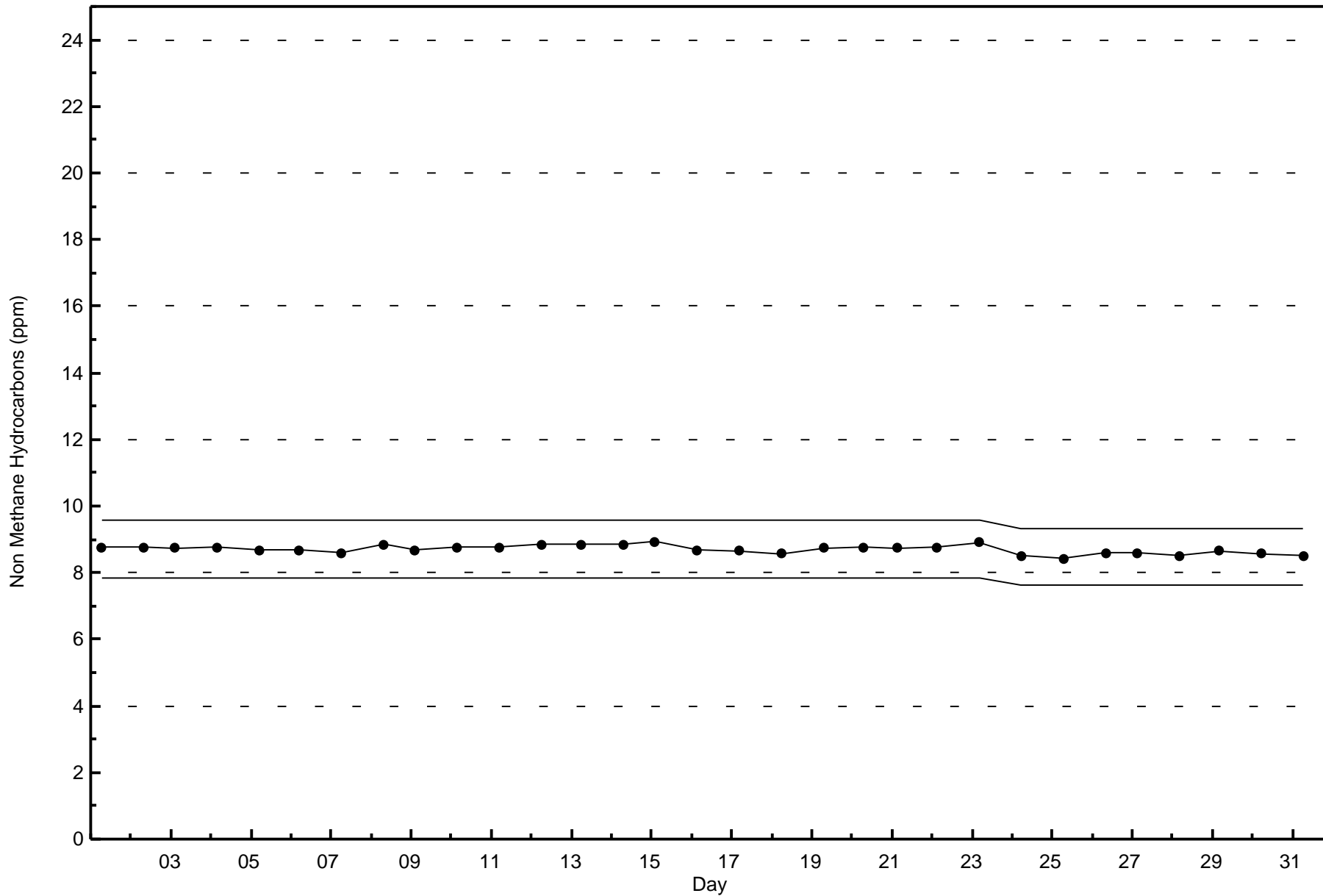


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

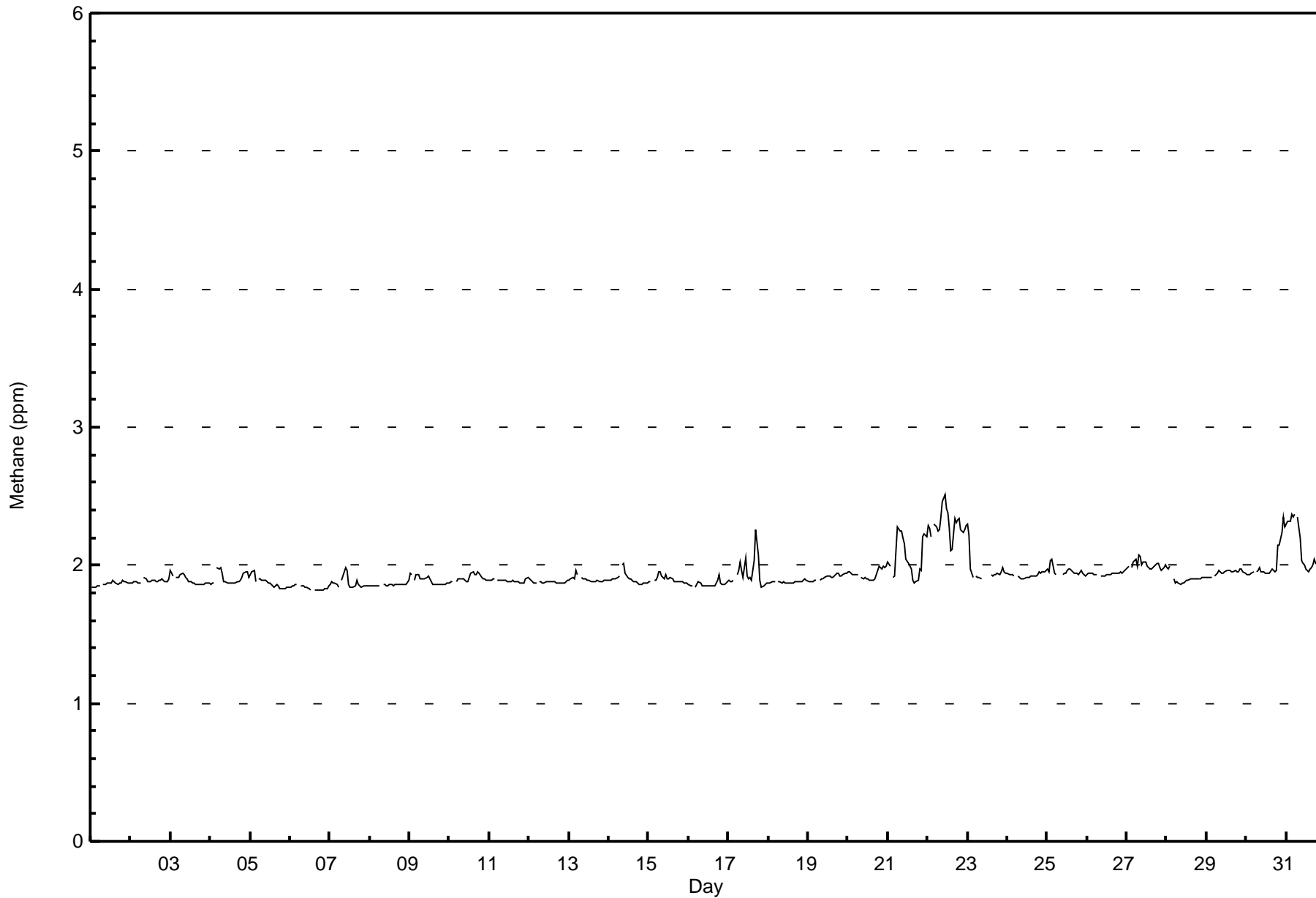
Non Methane Hydrocarbons (NMHC) - ppm  
Patricia McInnes (AMS 6)















**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Patricia McInnes - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	651	92.47	92.47
2.1 - 3.0	53	7.53	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Patricia McInnes - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 2.0	66	25	12	5	5	37	47	13	33	53	92	57	31	62	68	45	651
2.1 - 3.0	14	1	0	1	1	5	0	0	4	3	1	1	0	2	9	11	53
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	80	26	12	6	6	42	47	13	37	56	93	58	31	64	77	56	704

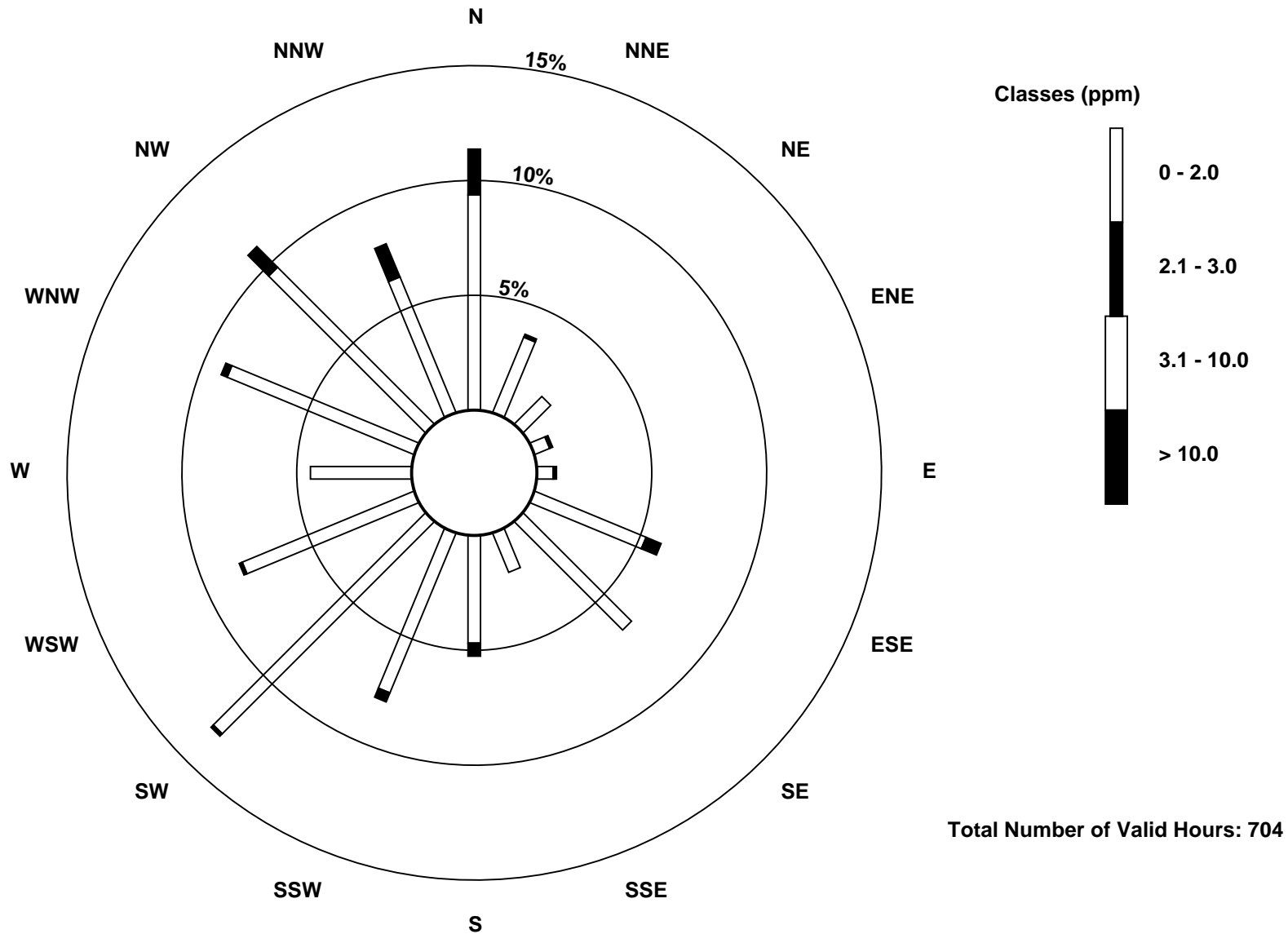
Total Number of Valid Hours: 704

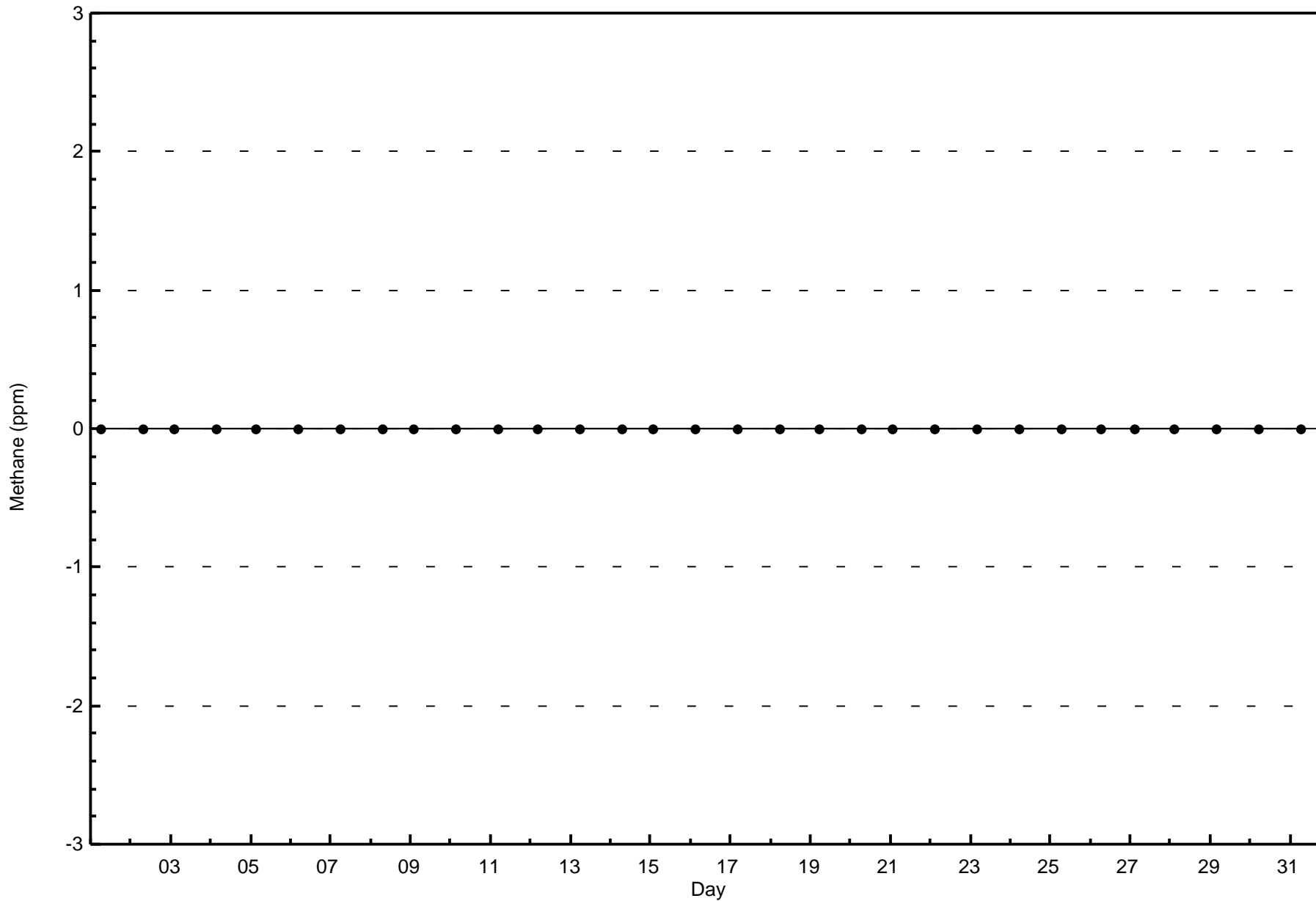
Total Number of Hours: 744

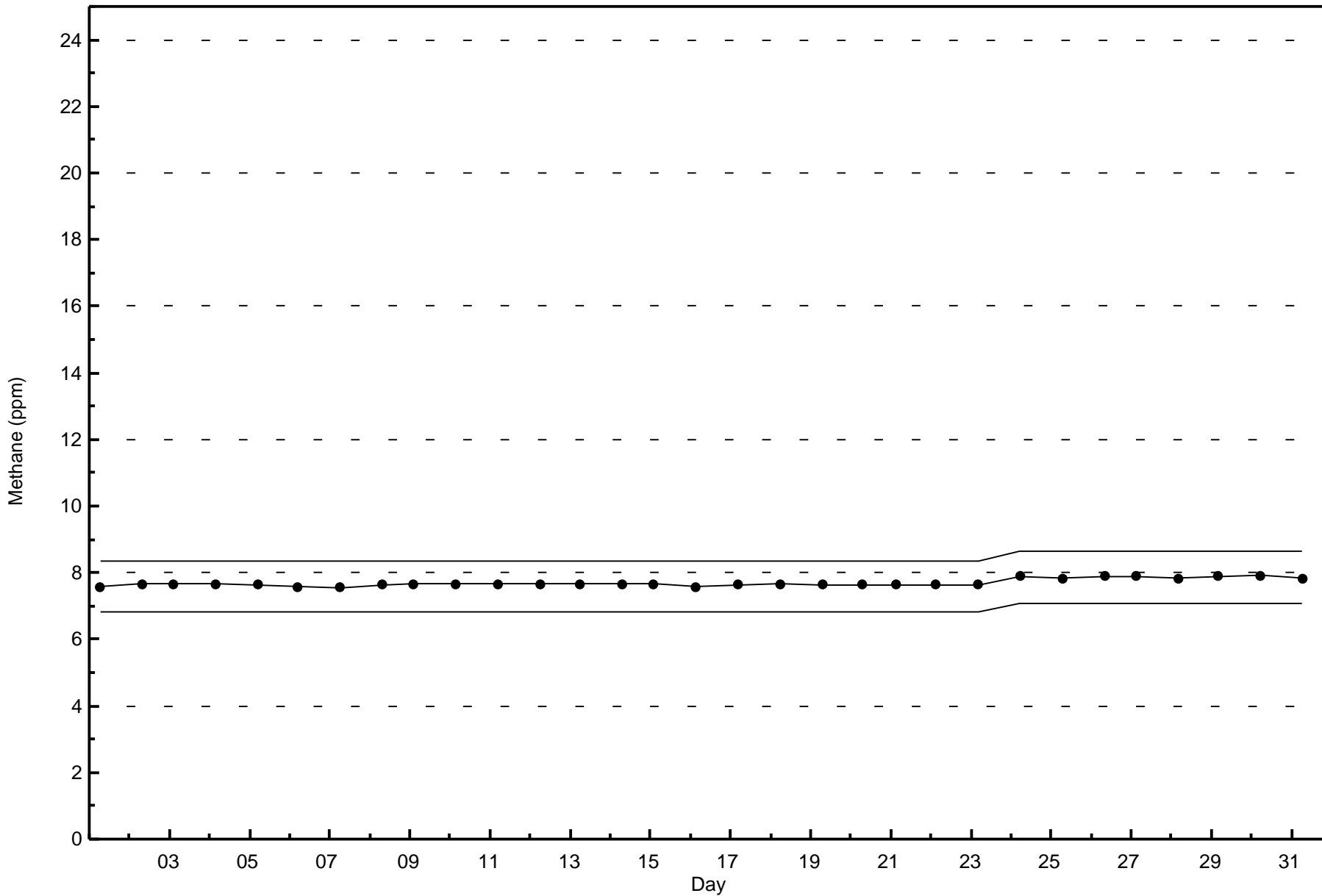


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Methane (CH<sub>4</sub>) - ppm  
Patricia McInnes (AMS 6)









Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O<sub>3</sub>) - ppb

Patricia McInnes - October 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 44 ppb on Oct 3 19:00	Maximum Daily Average: 37.9 ppb on Oct 6		Hours of Data:	707
Minimum Value: 3 ppb on Oct 31 01:00	Minimum Daily Average: 5.2 ppb on Oct 22		Hours of Missing Data:	37
Maximum Diurnal Average: 26.4 ppb at hour 15	Minimum Diurnal Average: 18.3 ppb at hour 7		Hours of Calibration:	37
Monthly Average: 23.1 ppb	Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 10 Q <sub>1</sub> = 17 Median = 24 Q <sub>3</sub> = 30 P <sub>90</sub> = 35 P <sub>99</sub> = 42		Percent Operational Time:	100.0

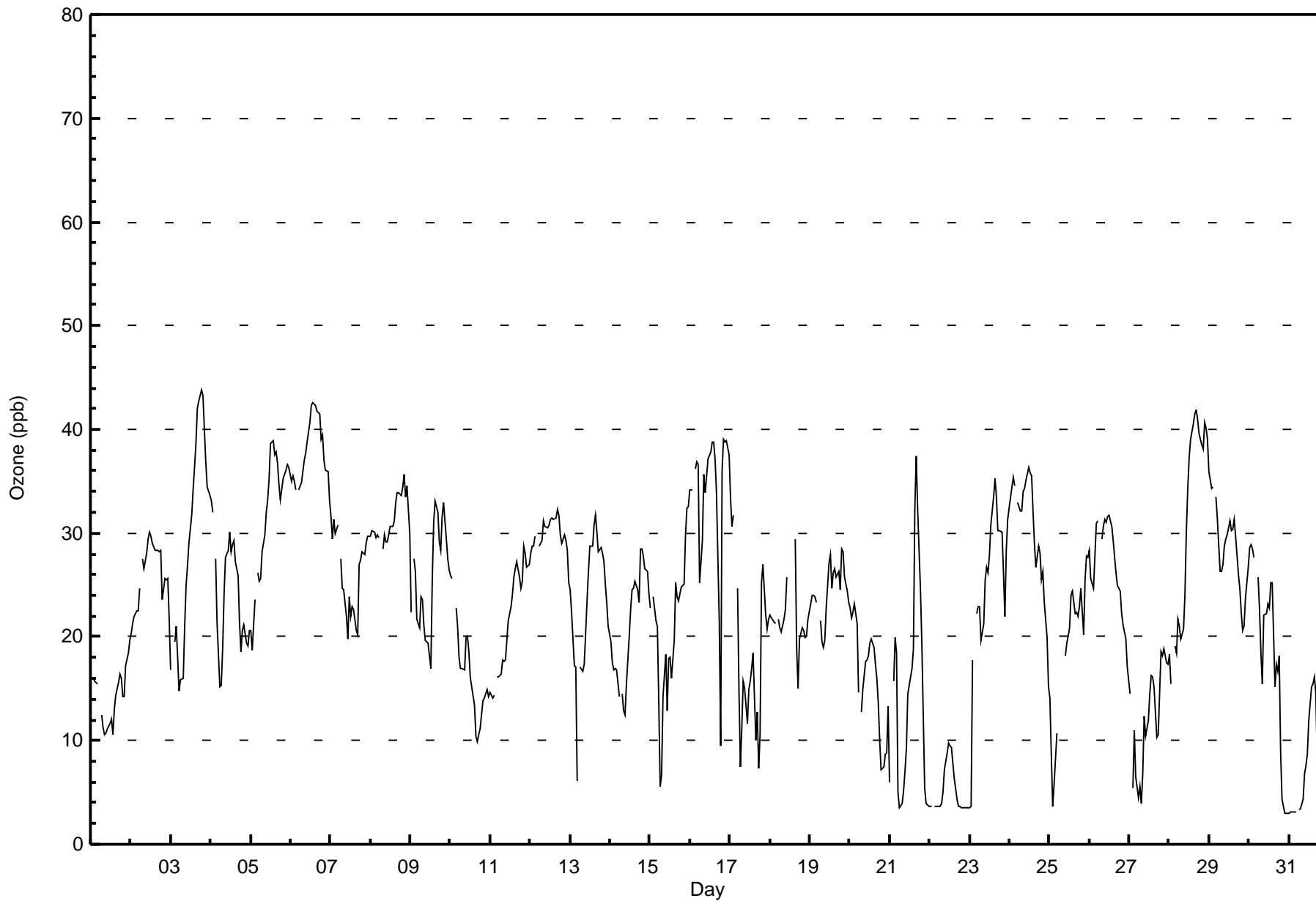
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	16	16	16	16	15	Z	12	11	11	11	11	12	12	11	13	14	16	16	16	14	14	17	18	20	14.3	20
2-Oct	20	21	22	23	23	25	Z	27	27	28	29	30	30	29	28	28	28	28	28	24	26	26	26	22	26.0	30
3-Oct	17	Z	20	21	18	15	16	16	21	25	27	29	32	34	36	39	42	43	44	43	40	37	34	34	29.6	44
4-Oct	33	32	Z	28	21	15	15	19	24	28	28	30	28	29	29	27	26	21	19	21	21	19	19	21	24.1	33
5-Oct	21	19	24	Z	26	25	26	28	30	32	33	35	39	39	38	38	37	35	33	35	36	36	37	36	32.0	39
6-Oct	35	35	35	34	Z	34	35	36	37	38	39	41	42	43	42	42	42	41	39	39	37	36	36	33	37.9	43
7-Oct	32	29	31	30	31	Z	27	25	25	22	20	24	22	23	23	21	20	27	27	28	28	29	30	30	26.2	32
8-Oct	30	30	30	30	30	30	Z	29	30	29	29	30	31	31	31	33	34	34	34	34	36	33	35	30	31.3	36
9-Oct	22	Z	27	26	22	21	24	24	21	20	19	18	17	26	31	33	32	29	28	32	33	29	28	26	25.6	33
10-Oct	26	26	Z	23	21	18	17	17	17	20	20	19	16	15	13	10	10	11	11	14	14	15	15	14	16.6	26
11-Oct	15	14	14	Z	16	16	16	18	18	18	20	22	23	24	26	27	27	26	25	25	29	28	27	27	21.7	29
12-Oct	28	29	29	30	Z	29	29	29	31	31	30	31	31	32	31	31	32	32	30	29	30	29	28	25	29.9	32
13-Oct	25	22	17	17	6	Z	17	17	17	20	24	26	29	29	31	32	30	28	29	28	27	25	23	21	23.5	32
14-Oct	20	17	17	17	17	14	Z	15	13	12	15	20	23	24	25	25	23	29	28	28	27	26	24	24	21.0	29
15-Oct	23	Z	24	22	21	14	5	7	14	18	13	18	18	16	20	25	24	23	24	25	25	30	32	33	20.6	33
16-Oct	34	34	Z	36	37	37	25	29	36	34	36	37	38	39	39	37	34	21	9	36	39	39	39	38	34.0	39
17-Oct	33	31	32	Z	25	15	7	11	16	15	12	15	16	17	18	10	13	7	11	25	27	22	21	22	18.3	33
18-Oct	22	22	21	21	Z	22	21	21	22	23	26	C	C	C	C	29	19	15	20	21	21	20	20	22	21.4	29
19-Oct	23	24	24	24	23	Z	22	20	19	20	23	27	28	25	26	27	26	26	25	28	28	26	24	23	24.4	28
20-Oct	23	22	22	23	21	15	Z	13	15	18	18	18	19	20	19	17	16	14	10	7	8	9	9	13	16.0	23
21-Oct	6	Z	16	20	18	5	4	4	5	7	9	15	16	17	19	32	37	32	25	19	12	5	4	4	14.4	37
22-Oct	4	4	Z	4	4	4	4	4	5	7	9	10	9	9	8	6	4	4	4	4	4	4	3	3	5.2	10
23-Oct	4	4	18	Z	22	23	23	20	21	26	27	26	28	31	33	35	33	30	30	30	26	22	28	31	24.8	35
24-Oct	32	34	35	35	Z	33	32	32	34	34	35	36	36	35	32	29	27	29	28	25	26	23	20	15	30.4	36
25-Oct	14	9	4	6	11	Z	20	C	C	18	19	20	21	24	24	22	22	22	23	25	20	26	28	28	19.3	28
26-Oct	28	26	25	28	31	31	Z	29	31	31	31	32	32	31	29	28	26	25	24	22	21	21	20	17	26.9	32
27-Oct	14	Z	5	11	7	4	6	4	7	12	10	12	15	16	16	15	10	11	15	19	18	19	18	17	12.2	19
28-Oct	18	15	Z	19	18	22	21	20	21	24	30	34	37	39	41	41	42	41	40	38	38	41	40	39	31.3	42
29-Oct	36	34	34	Z	33	31	26	26	27	29	29	30	31	30	30	31	30	26	25	22	21	21	24	27	28.5	36
30-Oct	29	29	29	28	Z	26	23	18	15	22	22	23	23	25	25	15	17	17	18	9	4	3	3	3	18.5	29
31-Oct	3	3	3	3	3	Z	3	3	4	7	8	9	12	15	15	16	15	8	15	15	15	16	20	23	10.2	23
22.1 22.4 22.1 22.0 20.0 20.9 18.3 19.0 20.4 21.9 22.6 24.2 25.1 25.9 26.4 26.4 25.7 24.1 23.7 24.7 24.2 23.6 23.7 23.2																								Diurnal Average		
36 35 35 36 37 37 35 36 37 38 39 41 42 43 42 42 42 43 44 43 40 41 40 39																								Diurnal Maximum		

Z - zerospan C - Calibration  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ozone (O<sub>3</sub>) - ppb**  
**Patricia McInnes - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Patricia McInnes - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	262	37.06	37.06
21 - 50	445	62.94	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744





**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Patricia McInnes - October 2017**

<b>Concentration</b> <b>Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	42	22	10	5	4	17	32	8	21	19	10	9	4	14	17	28	262
21 - 50	39	5	1	1	2	24	17	6	14	35	85	47	33	48	59	29	445
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	81	27	11	6	6	41	49	14	35	54	95	56	37	62	76	57	707

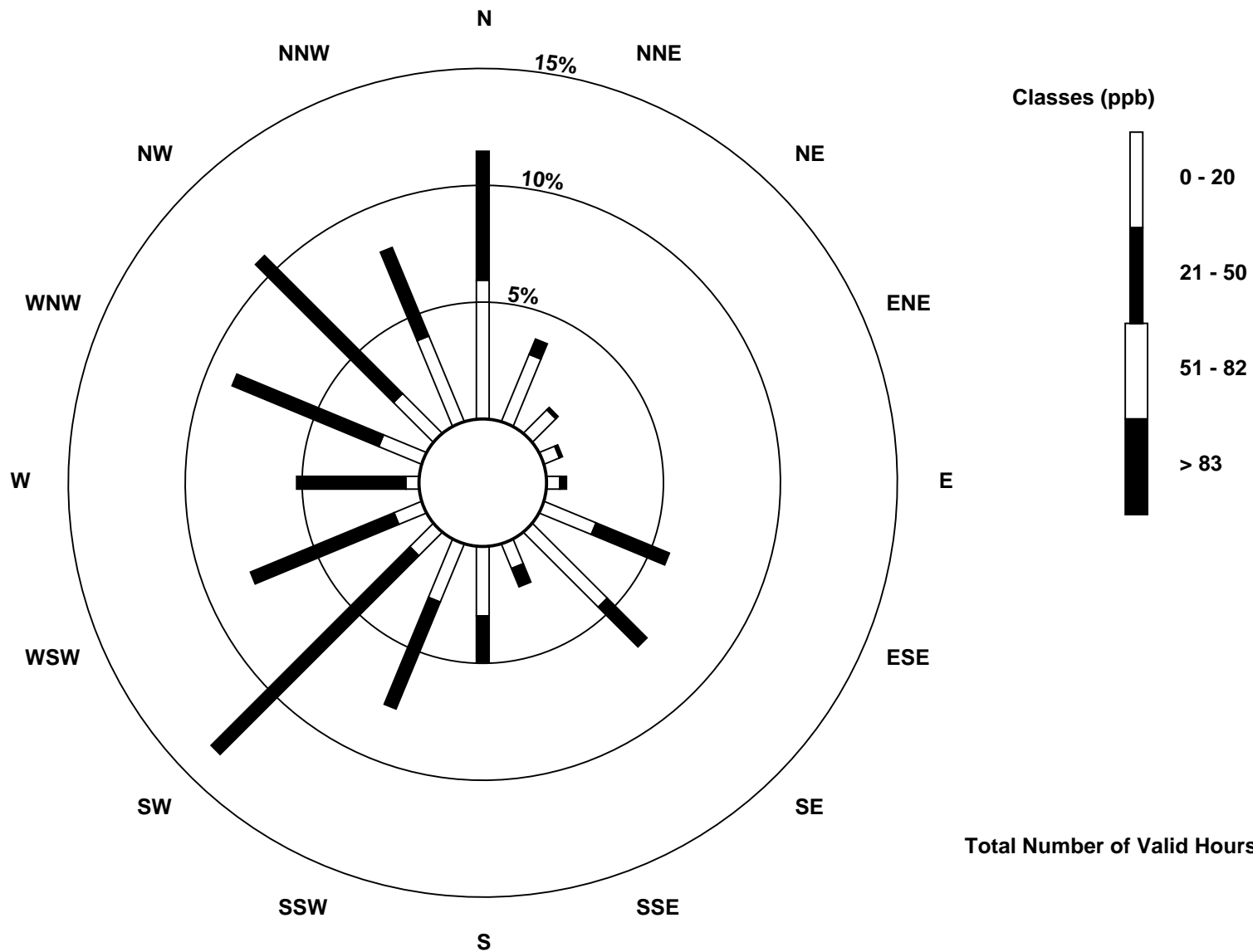
Total Number of Valid Hours: 707

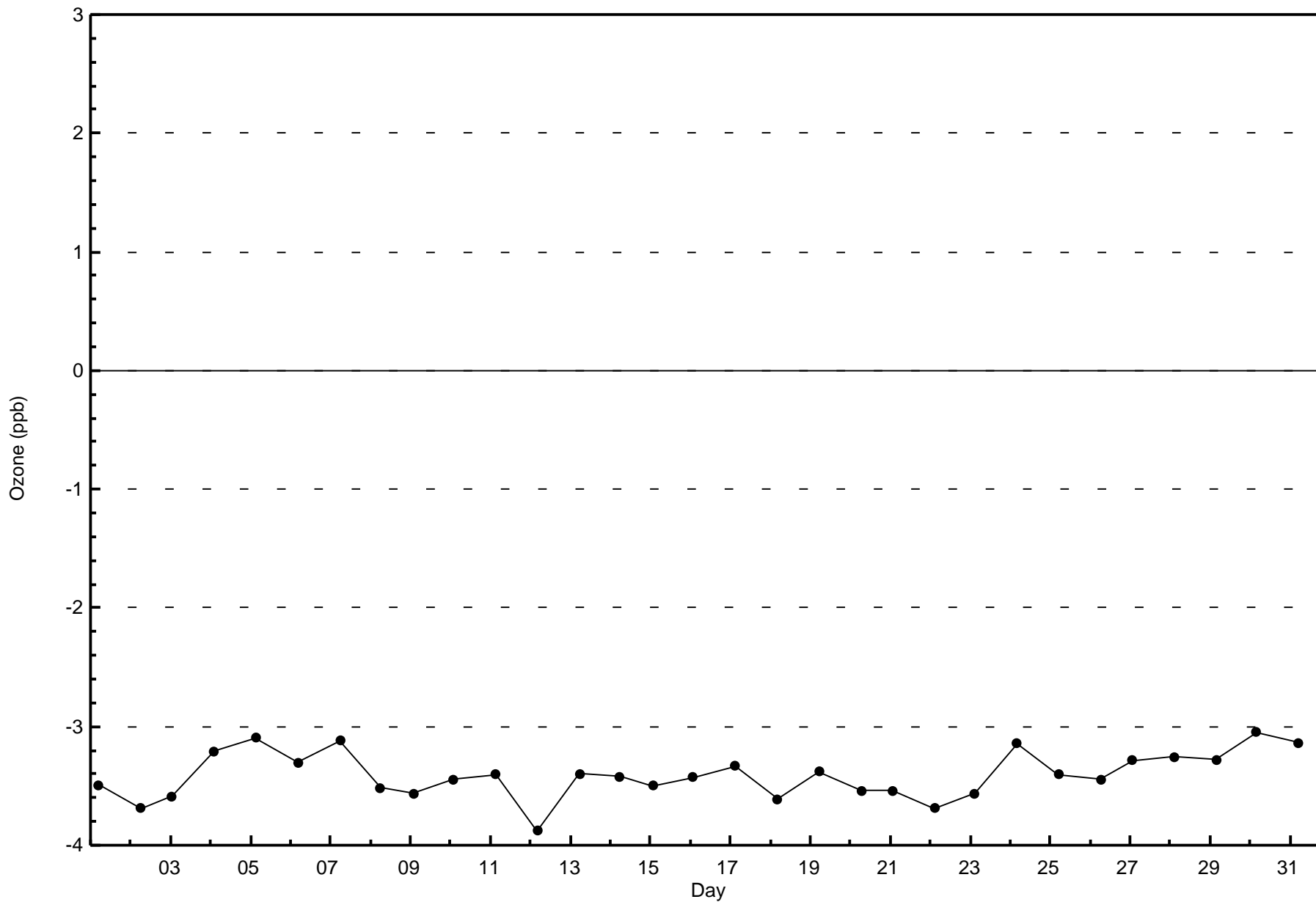
Total Number of Hours: 744

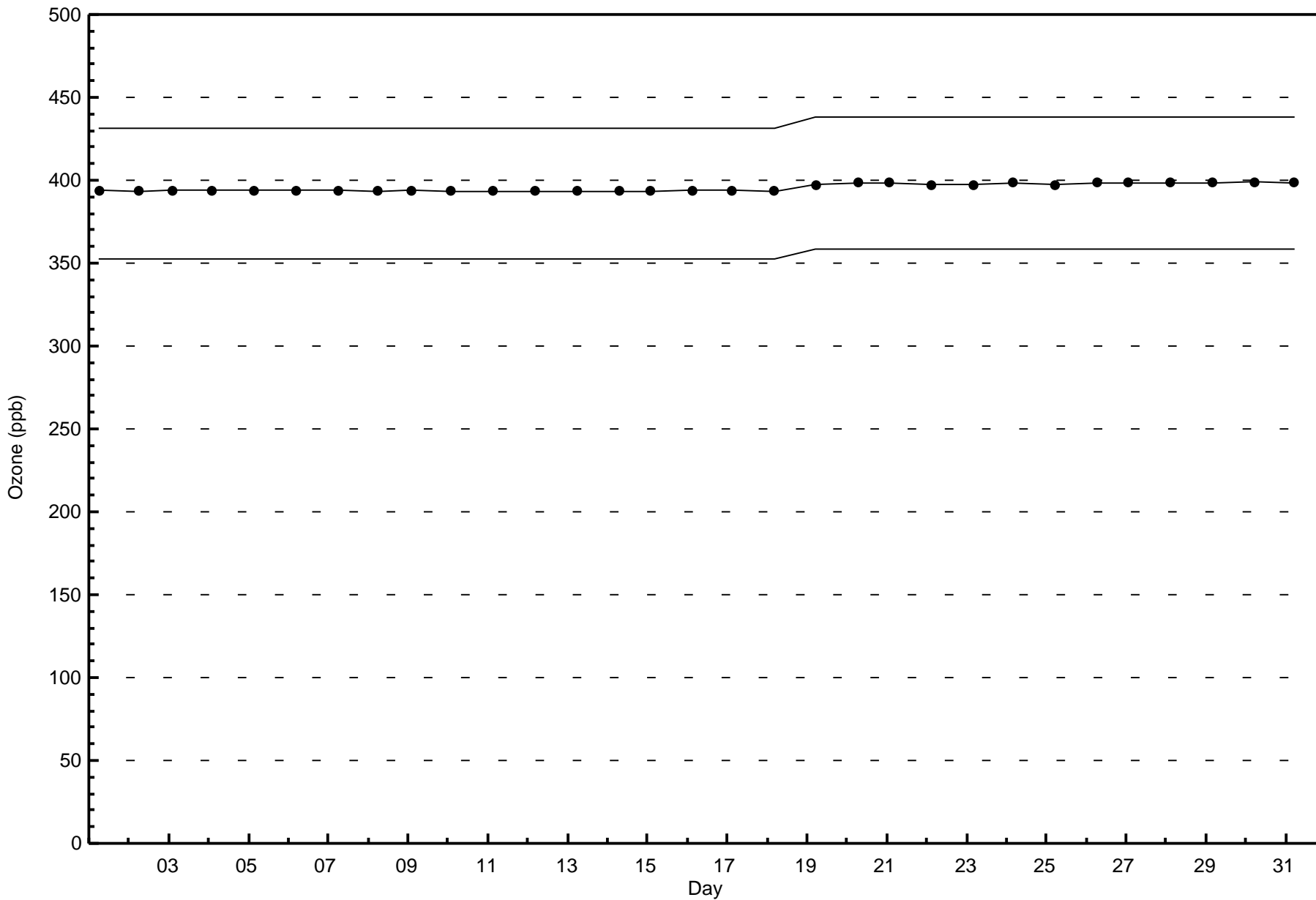


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Ozone (O<sub>3</sub>) - ppb  
Patricia McInnes (AMS 6)







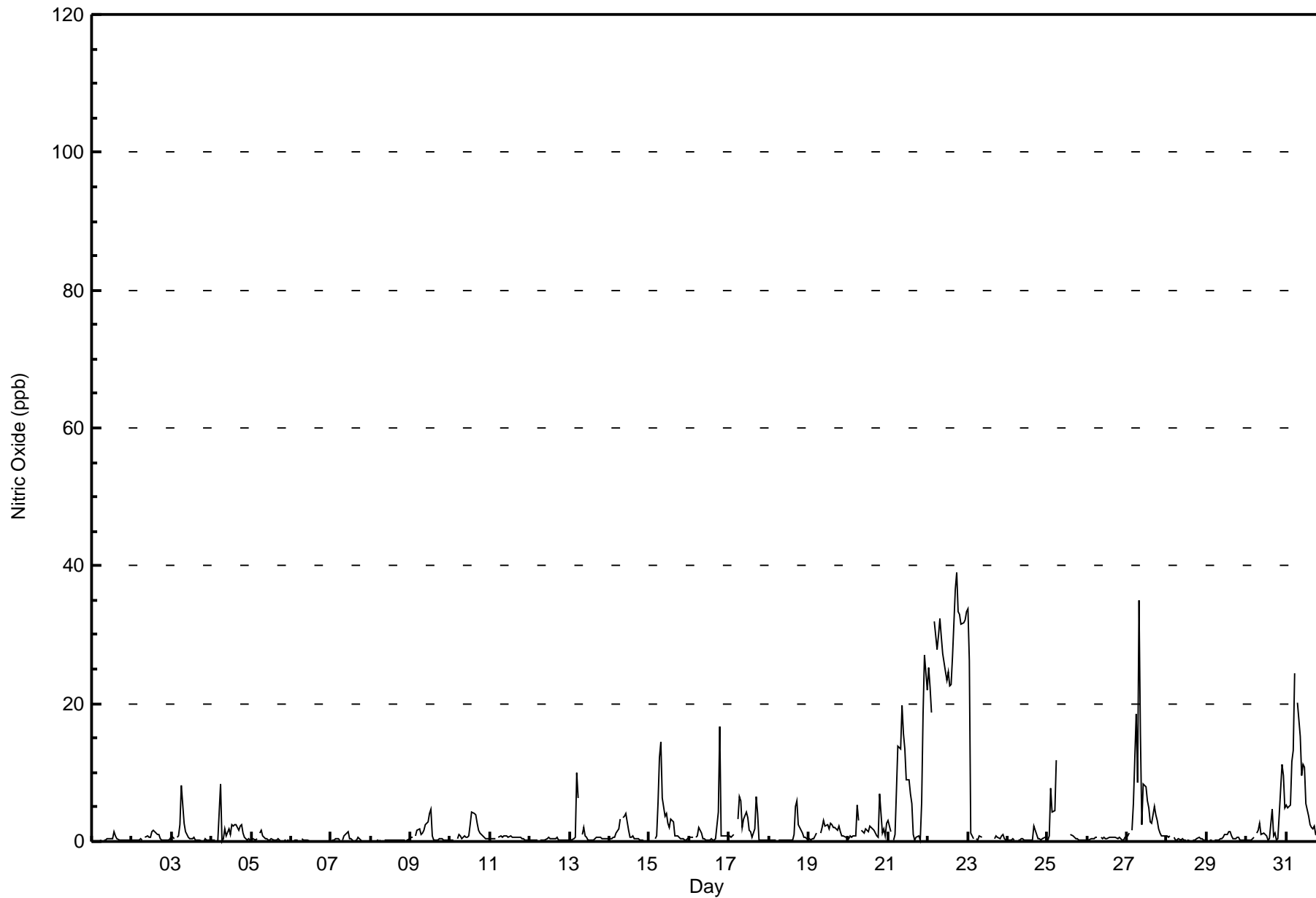


Maximum Value: 39 ppb on Oct 22 18:00		Maximum Daily Average: 28.7 ppb on Oct 22		Hours in Service: 744																						
Minimum Value: 0 ppb on Oct 6 14:00		Minimum Daily Average: 0.1 ppb on Oct 6		Hours of Data: 700																						
Maximum Diurnal Average: 5.2 ppb at hour 8		Minimum Diurnal Average: 1.0 ppb at hour 4		Hours of Missing Data: 44																						
Monthly Average: 2.6 ppb		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 1 P <sub>90</sub> = 6 P <sub>99</sub> = 33		Hours of Calibration: 44																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.3	1
2-Oct	0	0	0	0	0	0	0	Z	1	1	1	1	1	2	1	1	1	0	0	0	0	0	0	0	0.5	2
3-Oct	1	0	Z	1	1	2	8	3	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1.0	8
4-Oct	0	0	0	Z	0	8	0	0	2	1	2	1	2	2	3	2	2	2	2	1	1	0	0	0	1.5	8
5-Oct	0	0	0	0	Z	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
6-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
7-Oct	0	0	0	0	0	0	Z	0	1	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0.3	1
8-Oct	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
9-Oct	1	1	Z	1	2	2	1	1	2	2	3	4	5	1	0	0	0	0	0	0	0	0	0	0	1.2	5
10-Oct	0	0	0	Z	0	1	1	0	1	1	1	1	3	4	4	4	3	2	1	1	1	0	0	0	1.3	4
11-Oct	0	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.6	1
12-Oct	0	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0.2	1
13-Oct	0	0	0	1	10	6	Z	1	2	1	1	0	0	0	1	1	1	1	1	0	0	0	0	0	1.2	10
14-Oct	0	0	1	1	1	2	3	Z	3	4	4	2	1	1	1	0	1	0	0	0	0	0	0	0	1.1	4
15-Oct	0	0	Z	0	1	6	12	14	6	4	4	3	2	3	3	1	1	1	1	0	0	0	0	0	2.7	14
16-Oct	1	1	1	Z	1	1	2	1	0	0	0	0	0	0	0	0	0	4	17	1	1	1	1	1	1.5	17
17-Oct	1	1	1	1	Z	3	7	6	2	3	4	4	2	1	1	2	7	4	0	0	0	0	0	0	2.1	7
18-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	5	6	2	2	1	1	1	0	0	0.9	6
19-Oct	0	0	0	0	1	1	Z	1	2	3	2	2	2	3	2	2	2	2	2	1	1	1	1	0	1.5	3
20-Oct	0	1	1	1	1	5	3	Z	2	1	2	2	1	2	2	2	1	1	1	7	1	2	1	3	1.8	7
21-Oct	3	1	Z	0	1	7	14	13	20	16	13	9	9	7	5	1	0	1	1	0	6	19	27	22	8.5	27
22-Oct	25	22	19	Z	32	28	30	32	30	27	25	23	25	23	23	27	37	39	33	33	31	32	32	33	28.7	39
23-Oct	34	26	1	0	Z	0	0	1	1	C	C	C	C	C	C	C	0	1	1	0	1	1	0	0	--	34
24-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	1	0	0.4	2
25-Oct	0	1	8	4	5	12	Z	1	C	C	C	C	C	C	1	1	1	1	0	0	0	0	0	0	--	12
26-Oct	0	0	0	0	0	1	1	Z	1	0	1	0	0	1	1	1	1	1	0	1	0	0	0	1	0.4	1
27-Oct	1	1	Z	2	6	19	9	35	16	2	8	8	6	5	3	3	5	4	3	2	1	1	1	1	6.1	35
28-Oct	1	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.3	1
29-Oct	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	2	1	0	0	1	1	0	0	0	0	0.5	2
30-Oct	0	0	0	0	1	Z	1	2	3	1	1	1	1	0	0	5	1	1	0	0	4	11	10	5	2.1	11
31-Oct	5	5	5	12	13	24	Z	20	15	10	11	11	5	4	2	2	2	2	1	1	0	0	0	0	6.6	24
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration																										



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitric Oxide (NO) - ppb**  
**Patricia McInnes - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Patricia McInnes - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	672	96.00	96.00
21 - 40	28	4.00	100.00
11 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 700

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Patricia McInnes - October 2017**

<b>Concentration</b> <b>Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 20	63	27	12	6	5	41	47	13	36	54	92	59	30	63	74	50	672
21 - 40	12	0	0	0	1	1	0	0	1	2	1	0	0	1	3	6	28
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	75	27	12	6	6	42	47	13	37	56	93	59	30	64	77	56	700

Total Number of Valid Hours: 700

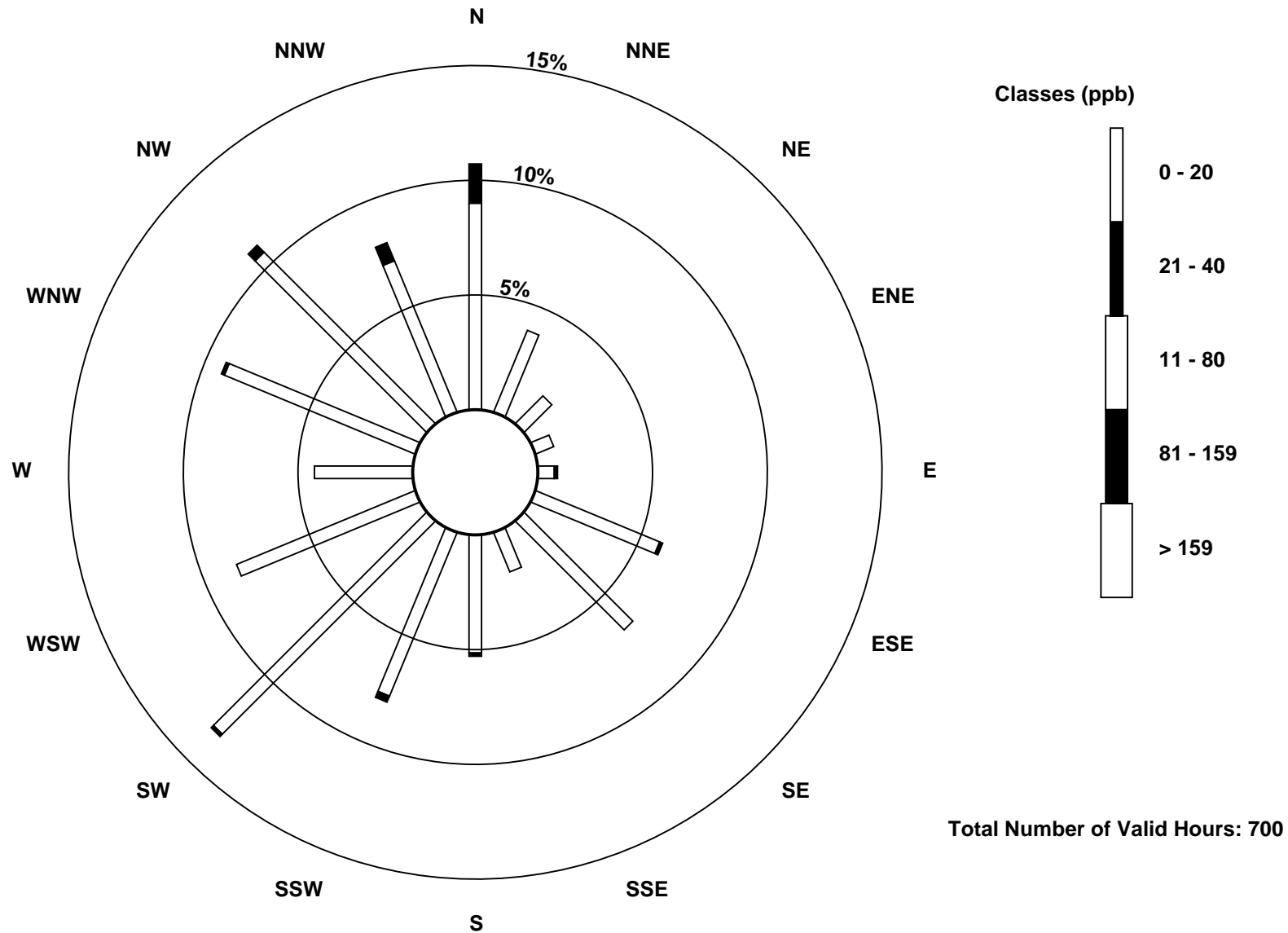
Total Number of Hours: 744

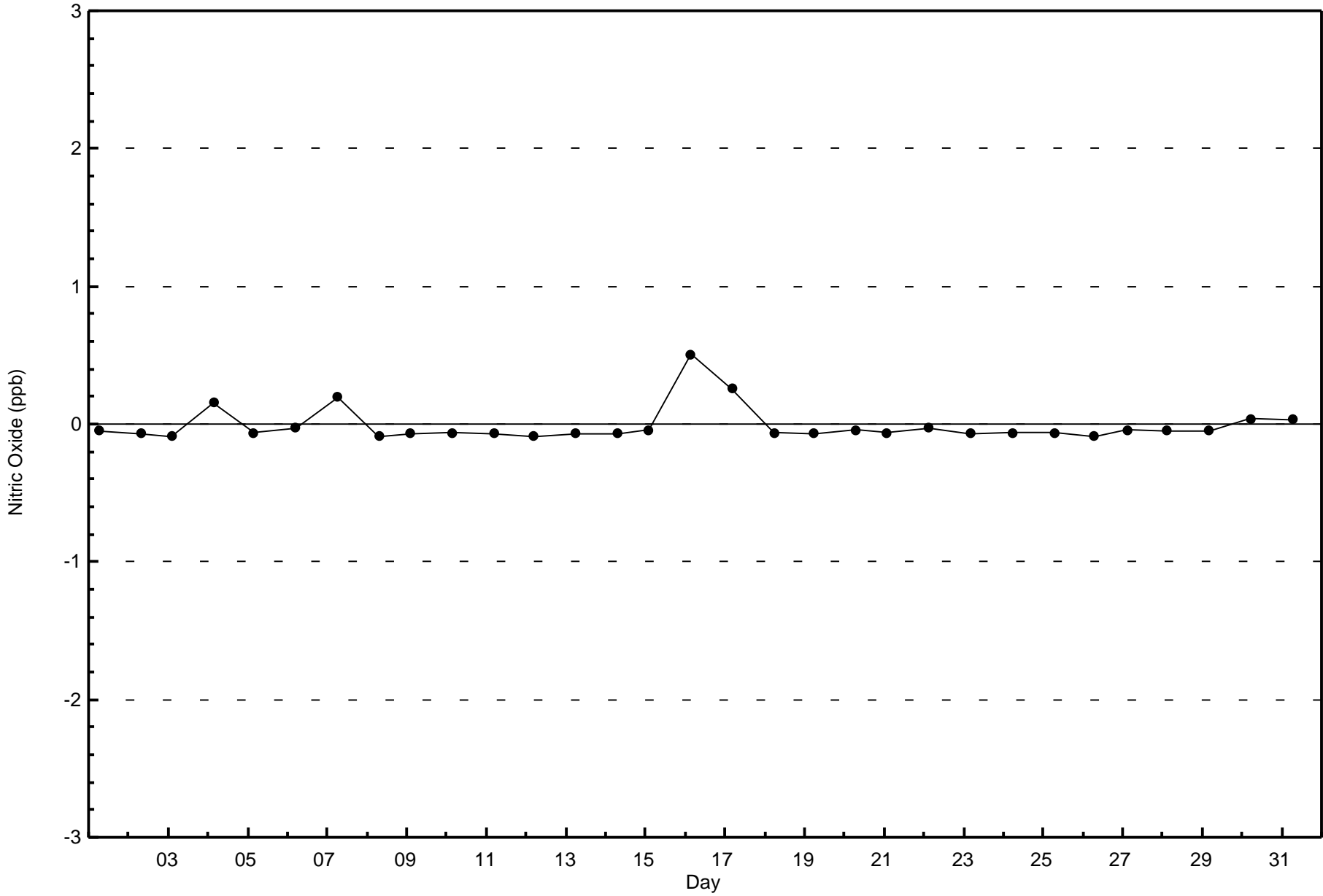


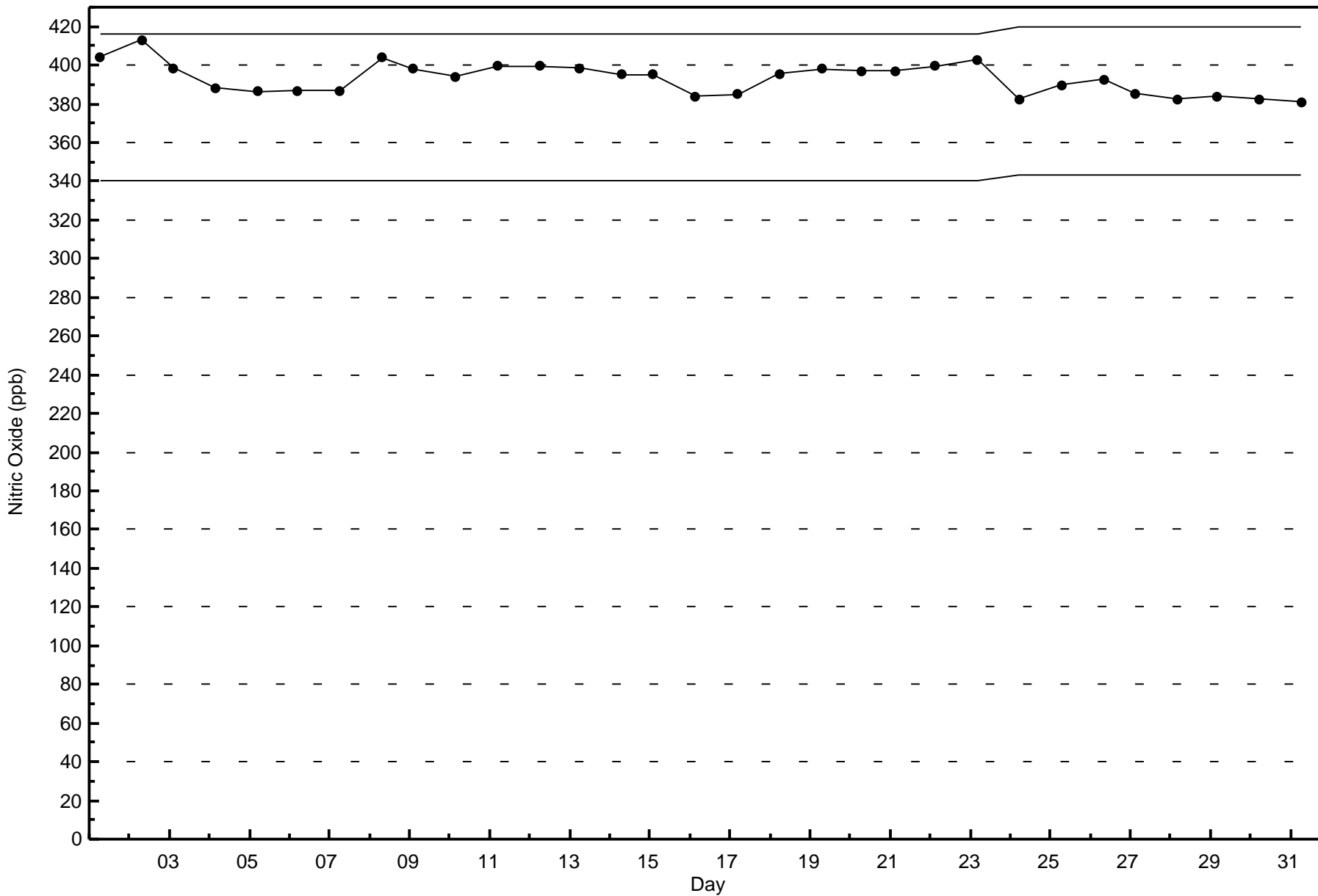


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitric Oxide (NO) - ppb  
Patricia McInnes (AMS 6)









# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Nitrogen Dioxide (NO<sub>2</sub>) - ppb

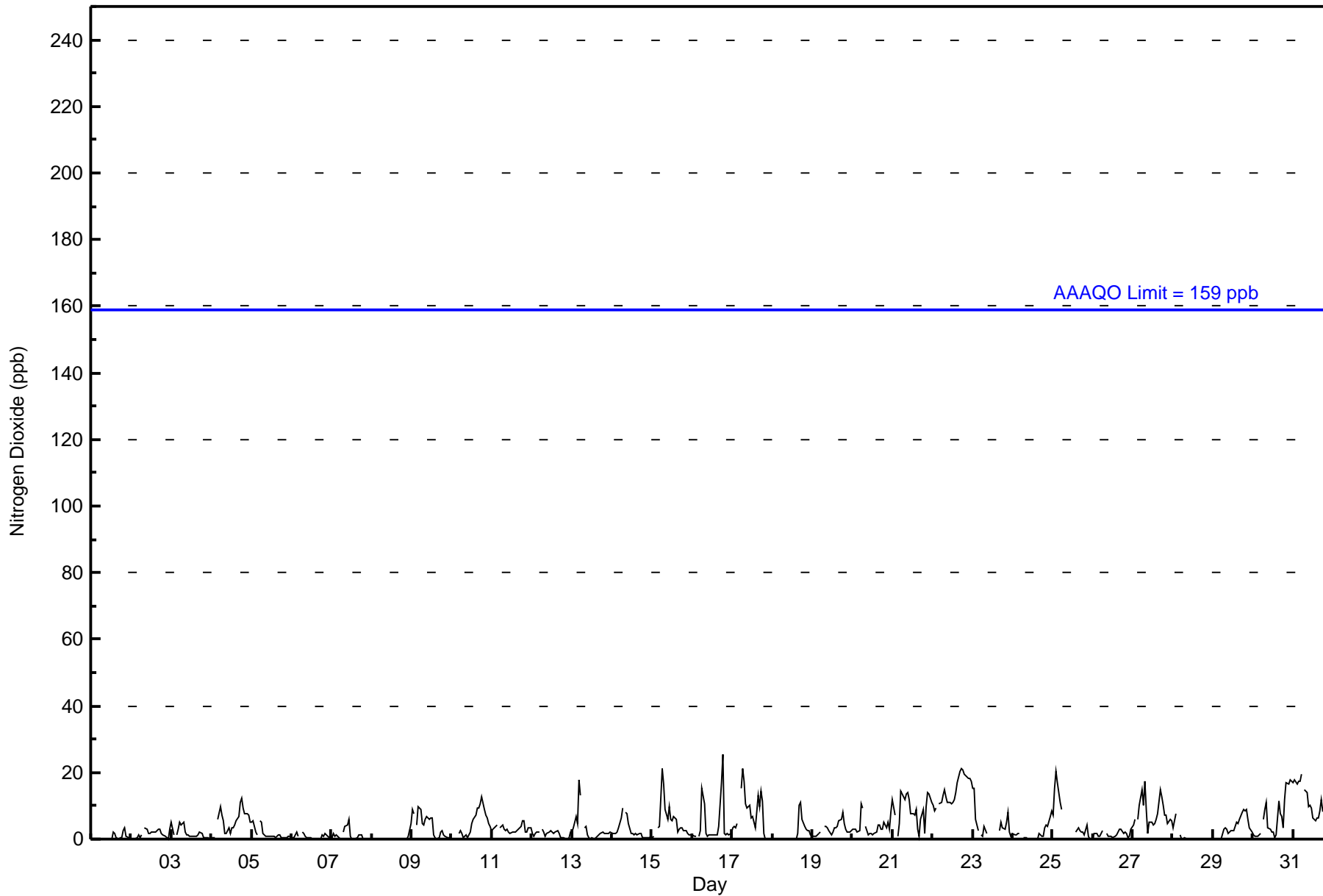
## Patricia McInnes - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																	
Maximum Value: 25 ppb on Oct 16 19:00										Maximum Daily Average: 14.4 ppb on Oct 22										Hours of Data: 700							
Minimum Value: 0 ppb on Oct 1 02:00										Minimum Daily Average: 0.3 ppb on Oct 8										Hours of Missing Data: 44							
Maximum Diurnal Average: 6.5 ppb at hour 6										Minimum Diurnal Average: 2.6 ppb at hour 12										Hours of Calibration: 44							
Monthly Average: 4.0 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 6 P <sub>90</sub> = 11 P <sub>99</sub> = 20										Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	2	2	0	0	0	1	3	3	1	0	0	0.5	3	
2-Oct	0	0	0	1	1	1	1	Z	3	3	2	2	2	2	2	3	3	3	2	1	1	1	0	3	1.6	3	
3-Oct	5	1	Z	1	3	5	4	5	2	1	1	1	1	1	1	1	1	2	2	0	1	0	0	0	1.7	5	
4-Oct	0	0	1	Z	6	10	7	5	2	2	4	2	4	3	4	6	7	11	12	9	8	8	7	5	5.3	12	
5-Oct	5	6	2	1	Z	6	5	2	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1.7	6	
6-Oct	1	1	1	2	1	Z	2	2	1	1	1	0	0	0	0	0	0	0	1	1	2	1	1	1	0.8	2	
7-Oct	1	2	1	1	0	0	Z	2	4	4	6	1	0	0	0	1	1	1	1	0	0	0	0	0	1.1	6	
8-Oct	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	0.3	5	
9-Oct	9	8	Z	4	10	9	5	4	6	7	6	6	6	1	0	0	0	2	3	1	1	1	0	0	3.9	10	
10-Oct	0	0	0	Z	2	3	2	1	1	1	1	2	5	6	7	9	9	11	13	9	7	6	5	4	4.4	13	
11-Oct	3	3	4	4	Z	3	4	3	2	3	2	2	2	2	2	3	3	4	5	6	2	2	3	3	3.1	6	
12-Oct	2	1	2	2	2	Z	3	2	1	2	2	3	2	2	2	3	2	0	1	0	0	0	1	2	1.6	3	
13-Oct	2	3	7	5	18	13	Z	4	4	1	1	0	0	0	1	1	2	2	2	2	2	2	2	2	3.1	18	
14-Oct	2	2	2	2	3	6	9	Z	8	8	5	2	2	1	2	1	2	2	1	1	1	1	1	1	2.6	9	
15-Oct	1	1	Z	3	4	12	21	17	9	6	10	6	5	7	6	2	3	4	3	2	3	2	1	1	5.6	21	
16-Oct	1	1	1	Z	1	3	15	11	2	1	1	1	1	1	1	1	4	17	25	2	1	2	1	2	4.2	25	
17-Oct	4	4	3	5	Z	15	21	17	11	9	10	7	7	5	4	13	10	15	12	2	0	0	0	0	7.5	21	
18-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	2	10	11	6	4	3	3	2	1	1.8	11	
19-Oct	1	1	1	1	2	2	Z	4	4	4	3	1	2	4	3	4	6	6	8	5	3	2	2	2	3.0	8	
20-Oct	3	3	3	2	3	11	9	Z	4	1	2	2	1	2	2	4	4	3	3	5	4	5	3	8	3.8	11	
21-Oct	12	7	Z	1	5	15	14	12	14	14	12	8	8	7	9	3	1	6	9	2	10	14	14	11	8.9	15	
22-Oct	10	9	9	Z	11	11	13	15	13	11	11	10	11	12	14	17	20	21	21	20	19	18	18	17	14.4	21	
23-Oct	15	15	6	3	Z	1	1	4	2	C	C	C	C	C	C	C	3	5	3	3	5	8	2	1	--	15	
24-Oct	2	1	1	2	2	Z	0	1	0	0	0	0	0	0	0	0	2	1	1	3	4	4	7	8	1.6	8	
25-Oct	7	15	20	17	11	9	Z	8	C	C	C	C	C	C	C	2	3	3	2	2	1	4	1	0	0	--	20
26-Oct	0	2	2	1	1	2	3	Z	2	1	1	1	1	1	1	2	3	3	2	2	2	1	1	3	1.5	3	
27-Oct	4	6	Z	6	10	15	10	18	9	2	5	5	4	5	6	8	15	13	10	7	7	5	6	6	7.8	18	
28-Oct	3	5	8	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	8	
29-Oct	0	0	0	0	Z	0	3	3	3	2	2	3	3	4	5	5	6	8	9	9	9	9	6	4	2	3.6	9
30-Oct	1	1	1	1	2	Z	6	9	11	4	3	2	2	1	1	12	8	7	4	12	17	17	18	17	6.7	18	
31-Oct	17	18	17	17	17	20	Z	15	14	10	10	9	6	6	6	6	8	12	8	9	5	6	4	2	10.6	20	
3.5 3.7 3.5 3.1 4.4 6.5 6.4 6.2 4.4 3.3 3.4 2.6 2.6 2.6 2.8 3.7 4.4 5.6 5.5 3.8 3.9 3.7 3.4 3.5																								Diurnal Average			
17 18 20 17 18 20 21 18 14 14 12 10 11 12 14 17 20 21 25 20 19 18 18 17																								Diurnal Maximum			
Z - zerospan C - Calibration																											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																											



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Patricia McInnes - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Patricia McInnes - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	695	99.29	99.29
21 - 40	5	0.71	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 700

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Patricia McInnes - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 20	74	27	12	6	6	42	47	12	35	56	93	59	30	64	77	55	695
21 - 40	1	0	0	0	0	0	0	1	2	0	0	0	0	0	0	1	5
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>75</b>	<b>27</b>	<b>12</b>	<b>6</b>	<b>6</b>	<b>42</b>	<b>47</b>	<b>13</b>	<b>37</b>	<b>56</b>	<b>93</b>	<b>59</b>	<b>30</b>	<b>64</b>	<b>77</b>	<b>56</b>	<b>700</b>

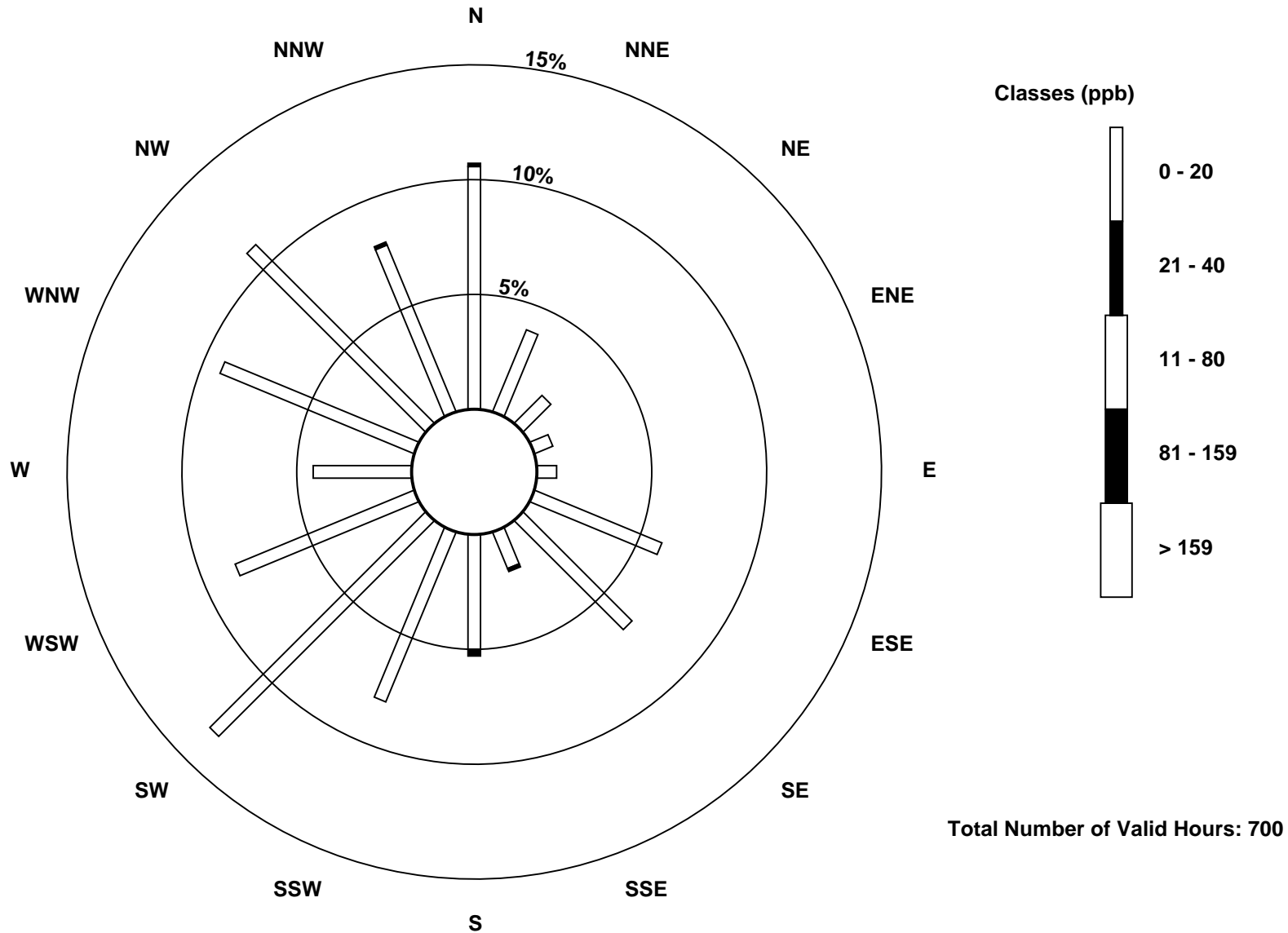
Total Number of Valid Hours: 700

Total Number of Hours: 744

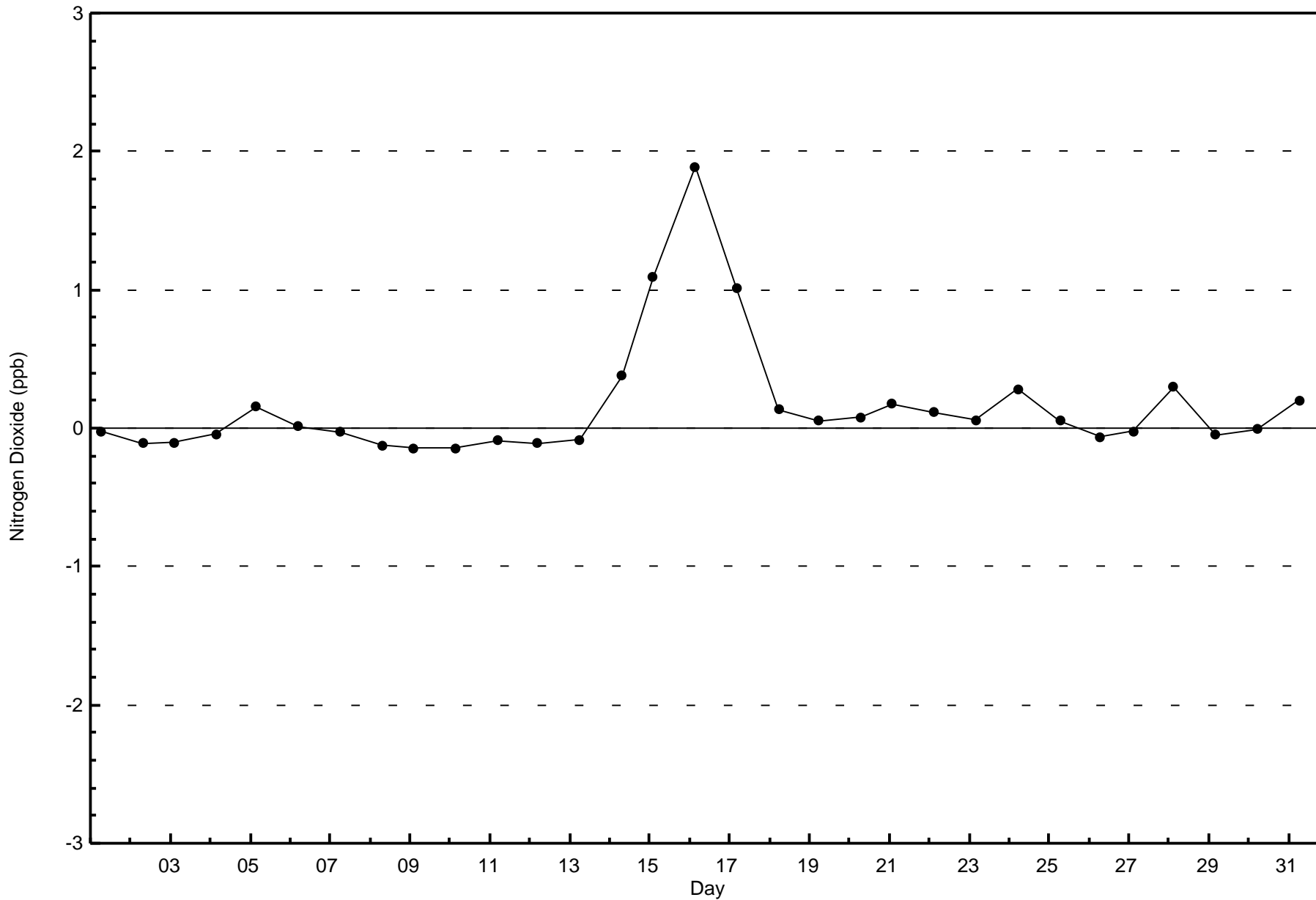


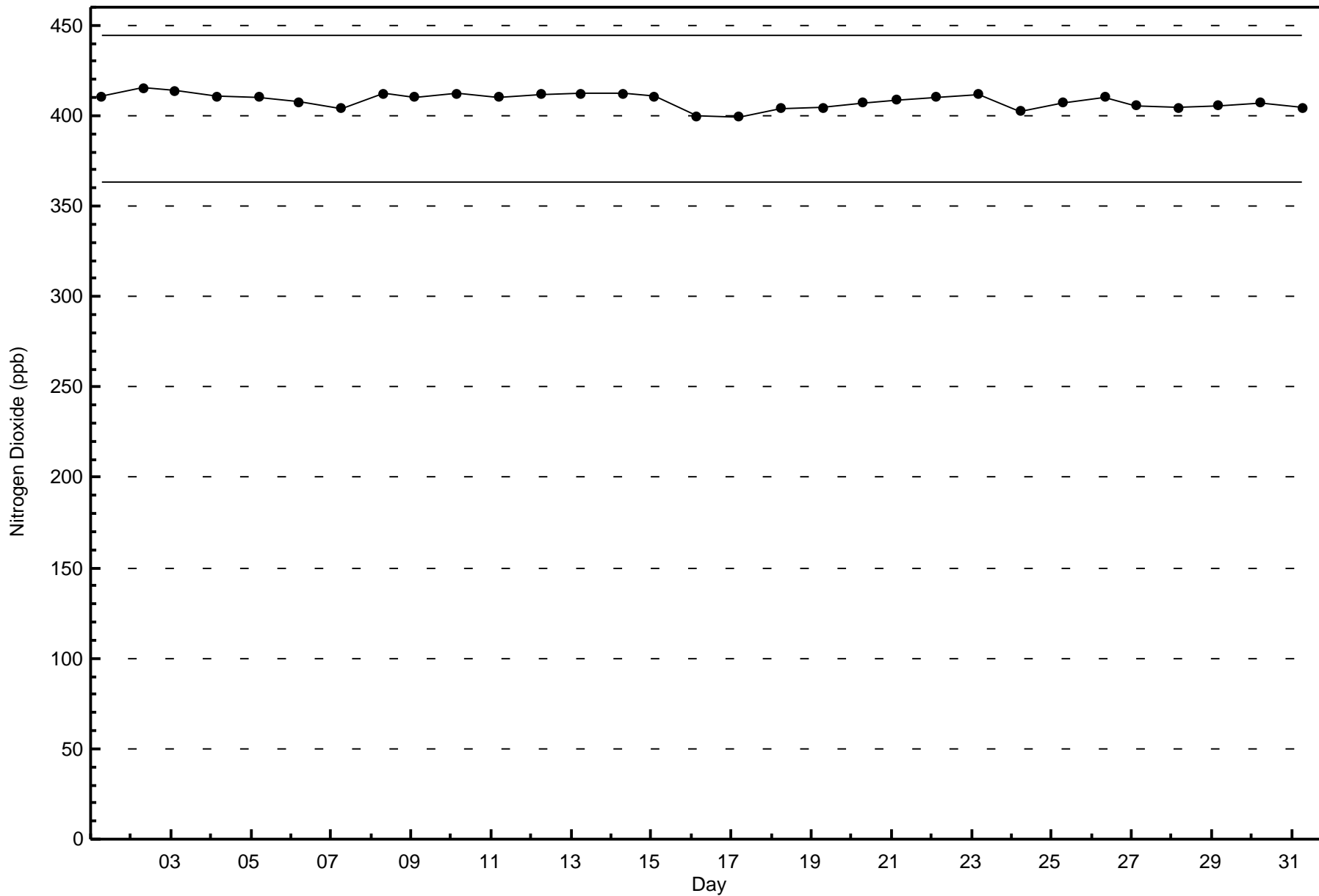
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Patricia McInnes (AMS 6)











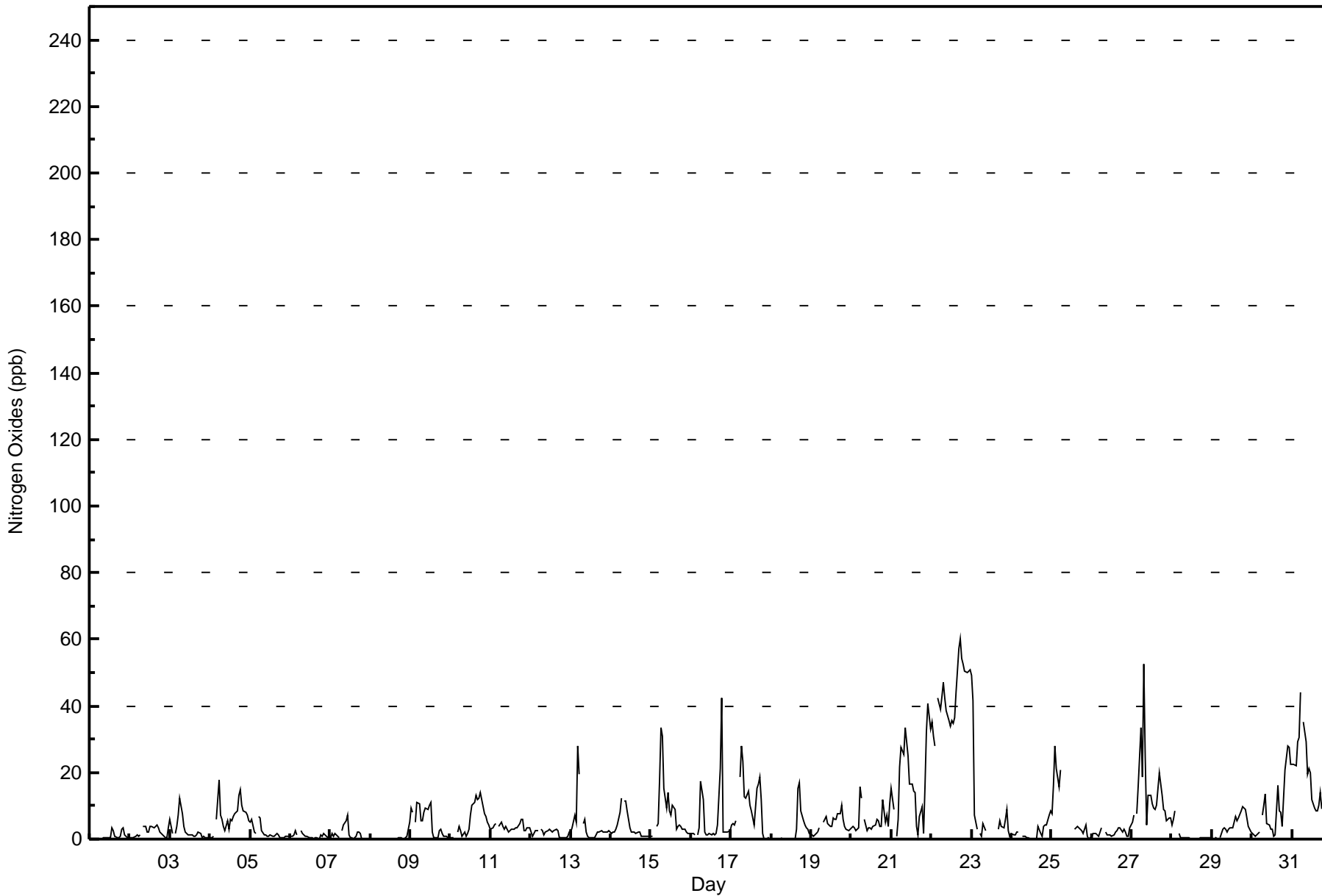
# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Nitrogen Oxides (NO<sub>x</sub>) - ppb

Patricia McInnes - October 2017

Maximum Value: 60 ppb on Oct 22 18:00		Maximum Daily Average: 43.1 ppb on Oct 22		Hours in Service: 744																																													
Minimum Value: 0 ppb on Oct 8 00:00		Minimum Daily Average: 0.4 ppb on Oct 8		Hours of Data: 700																																													
Maximum Diurnal Average: 11.6 ppb at hour 6		Minimum Diurnal Average: 4.2 ppb at hour 4		Hours of Missing Data: 44																																													
Monthly Average: 6.6 ppb		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 3 Q <sub>3</sub> = 7 P <sub>90</sub> = 17 P <sub>99</sub> = 51		Hours of Calibration: 44																																													
				Percent Operational Time: 100.0																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	1	3	2	1	0	0	1	3	4	1	1	0	0.9	4																							
2-Oct	0	0	0	1	1	1	1	Z	4	4	2	2	4	4	4	4	4	3	2	2	1	1	0	3	2.1	4																							
3-Oct	6	2	Z	2	4	7	12	8	4	2	2	1	1	1	1	1	1	2	2	0	1	1	0	0	2.7	12																							
4-Oct	0	0	1	Z	6	18	7	6	4	3	5	3	6	6	7	8	8	13	15	10	8	8	7	5	6.7	18																							
5-Oct	5	6	2	2	Z	7	6	3	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	2.0	7																							
6-Oct	1	1	1	2	1	Z	2	2	1	1	1	0	0	0	0	0	0	0	1	1	2	1	0	1	0.9	2																							
7-Oct	1	2	1	2	1	0	Z	2	4	6	7	1	0	0	0	1	2	2	2	0	0	0	0	0	1.5	7																							
8-Oct	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	0.4	5																							
9-Oct	9	8	Z	5	11	10	6	6	8	9	9	10	11	2	0	0	1	3	3	2	1	1	0	0	5.0	11																							
10-Oct	0	0	0	Z	2	4	3	1	2	1	2	3	7	10	11	13	12	12	14	10	8	7	5	4	5.7	14																							
11-Oct	3	4	4	5	Z	4	5	4	3	4	3	2	3	3	3	3	3	5	6	6	3	3	3	3	3.6	6																							
12-Oct	2	1	2	2	2	Z	3	2	1	2	3	3	3	2	2	3	3	1	1	0	0	0	1	2	1.8	3																							
13-Oct	2	4	7	5	28	19	Z	5	6	2	1	0	0	1	1	1	2	2	3	2	2	2	2	2	4.3	28																							
14-Oct	2	2	2	3	4	8	12	Z	11	12	9	4	2	2	2	2	2	2	1	1	1	1	1	1	3.7	12																							
15-Oct	1	1	Z	4	5	18	34	31	15	9	14	8	7	10	9	3	4	4	4	3	3	2	2	2	8.3	34																							
16-Oct	2	2	1	Z	1	3	17	12	2	1	1	2	1	2	1	2	4	21	42	2	2	2	2	3	5.6	42																							
17-Oct	4	5	4	6	Z	19	28	23	13	12	14	10	8	6	4	15	17	19	12	2	0	0	0	0	9.6	28																							
18-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	3	15	17	8	6	4	3	3	2	2.8	17																							
19-Oct	1	1	1	2	2	4	Z	5	6	7	5	4	4	6	6	6	8	8	10	6	4	3	3	3	4.4	10																							
20-Oct	3	4	3	3	4	16	12	Z	6	3	3	3	3	4	4	6	5	4	4	12	5	7	4	11	5.6	16																							
21-Oct	15	9	Z	1	6	22	27	25	33	29	25	17	16	14	14	4	1	7	10	2	15	32	41	33	17.3	41																							
22-Oct	35	31	28	Z	42	39	43	47	42	38	36	34	36	35	37	44	57	60	54	52	51	50	50	51	43.1	60																							
23-Oct	49	41	7	3	Z	2	1	5	2	C	C	C	C	C	C	C	3	6	4	3	6	9	2	1	--	49																							
24-Oct	2	1	1	2	2	Z	1	1	1	0	0	0	0	0	0	0	4	2	1	4	4	4	7	9	2.0	9																							
25-Oct	8	16	28	21	16	21	Z	9	C	C	C	C	C	C	C	3	4	3	3	2	2	4	1	0	0	--	28																						
26-Oct	0	2	2	1	1	2	3	Z	2	1	1	1	1	1	2	3	3	4	2	3	2	1	1	4	1.9	4																							
27-Oct	5	7	Z	7	16	34	19	52	24	4	13	13	10	9	9	10	20	17	13	9	8	6	6	6	13.9	52																							
28-Oct	4	6	9	Z	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1.1	9																							
29-Oct	0	0	0	0	Z	0	3	4	3	2	3	4	4	5	7	5	6	8	10	9	9	6	4	2	4.1	10																							
30-Oct	2	1	1	1	2	Z	7	10	14	5	4	3	3	1	1	16	9	8	4	12	21	28	27	22	8.8	28																							
31-Oct	22	22	22	29	31	44	Z	35	29	19	21	20	12	9	9	8	10	14	9	10	6	6	4	2	17.2	44																							
																								6.0	5.8	5.0	4.2	7.3	11.6	10.2	11.5	8.1	6.2	6.5	5.2	5.0	4.8	4.7	5.6	6.8	8.0	7.7	5.6	5.7	6.0	5.8	5.8	Diurnal Average	
																								49	41	28	29	42	44	43	52	42	38	36	34	36	35	37	44	57	60	54	52	51	50	50	51	Diurnal Maximum	
Z - zerospan		C - Calibration																																															





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Patricia McInnes - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	640	91.43	91.43
21 - 40	41	5.86	97.29
41 - 80	19	2.71	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 700

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Patricia McInnes - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	61	25	10	5	4	38	46	11	28	53	92	58	30	62	70	47	640
21 - 40	9	2	2	1	1	3	1	2	7	1	0	1	0	1	5	5	41
11 - 80	5	0	0	0	1	1	0	0	2	2	1	0	0	1	2	4	19
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	75	27	12	6	6	42	47	13	37	56	93	59	30	64	77	56	700

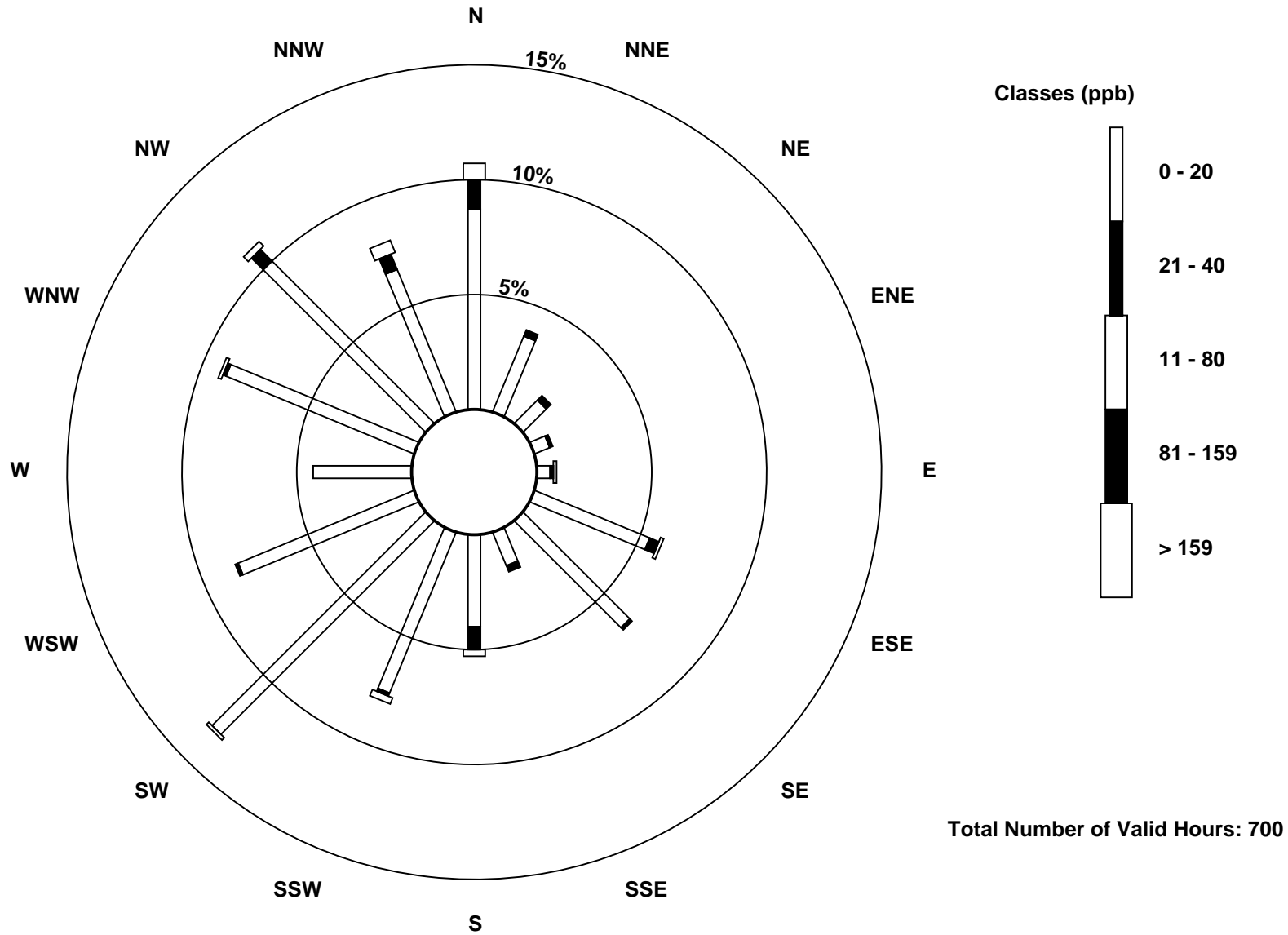
Total Number of Valid Hours: 700

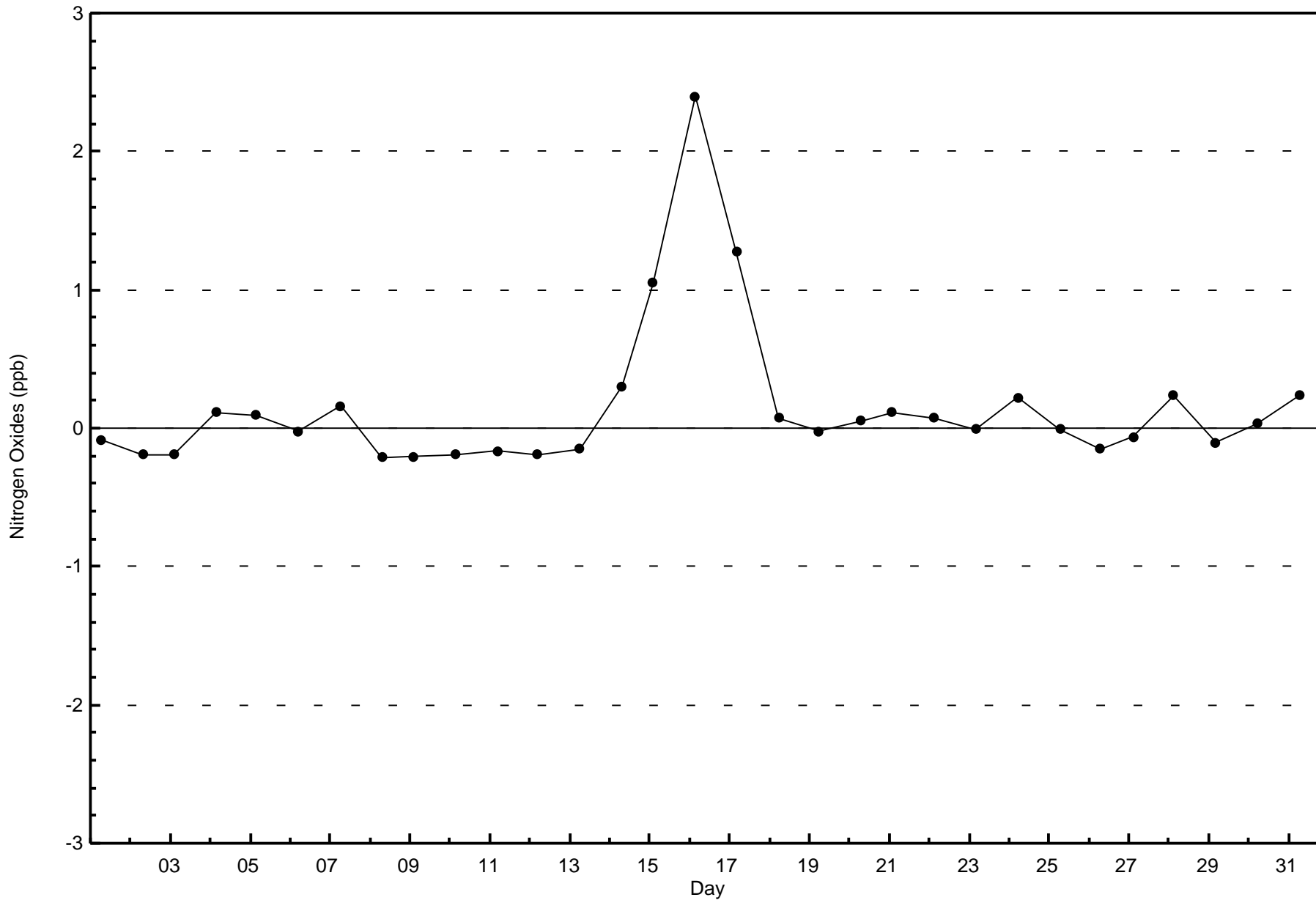
Total Number of Hours: 744



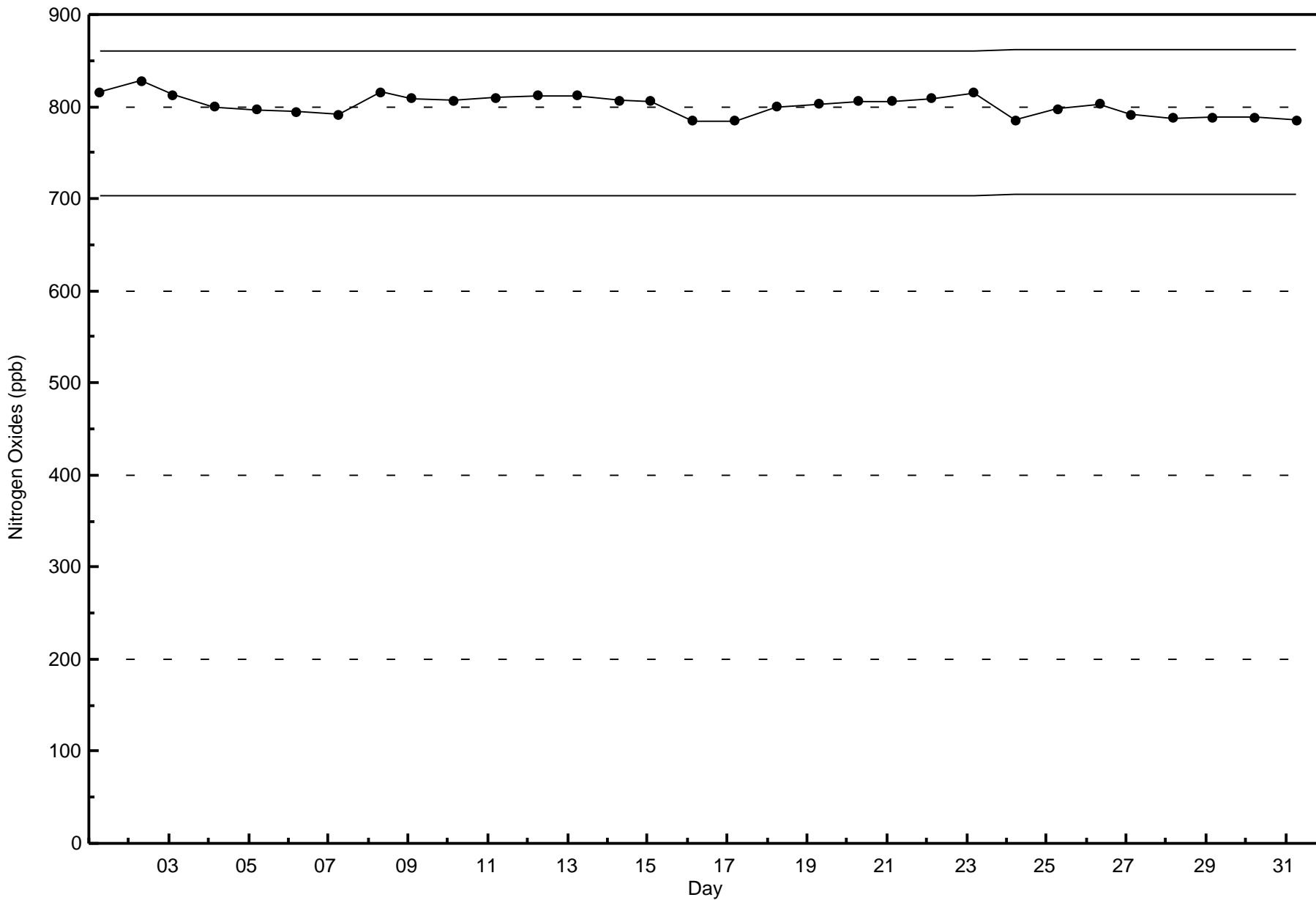
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Patricia McInnes (AMS 6)











# Wood Buffalo Environmental Association

## Summary of Hour Averages

Ammonia (NH<sub>3</sub>) - ppb

Patricia McInnes - October 2017

Number of Exceedences (AAAQO): 1-hr: 0	Maximum Value: 55 ppb on Oct 16 12:00	Maximum Daily Average: 33.8 ppb on Oct 16	Hours in Service: 744
Minimum Value: 0 ppb on Oct 1 01:00	Maximum Diurnal Average: 3.2 ppb at hour 22	Minimum Daily Average: 0.0 ppb on Oct 1	Hours of Data: 648
Monthly Average: 2.1 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 41	Minimum Diurnal Average: 0.0 ppb at hour 2	Hours of Missing Data: 96
			Hours of Calibration: 56
			Percent Operational Time: 94.6

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
2-Oct	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
3-Oct	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
4-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
5-Oct	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
6-Oct	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
7-Oct	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
8-Oct	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
9-Oct	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
10-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
11-Oct	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
12-Oct	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
13-Oct	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
14-Oct	0	0	0	0	0	Z	RE	RE	RE	0	0	12	16	15	15	14	12	0	0	11	17	16	17	14	8.0	17
15-Oct	Z	RE	RE	11	16	14	0	0	13	11	0	0	0	0	15	21	26	29	31	40	43	42	39	16.7	43	
16-Oct	41	Z	RE	40	33	24	18	12	27	38	48	55	49	53	40	34	27	18	31	35	34	35	31	20	33.8	55
17-Oct	14	0	Z	RE	RE	0	16	17	19	20	10	0	0	0	0	0	0	0	0	0	0	0	0	0	4.6	20
18-Oct	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
19-Oct	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
20-Oct	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
21-Oct	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
22-Oct	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
23-Oct	0	0	Z	RE	0	0	0	0	0	0	C	C	C	C	C	C	C	C	C	C	C	C	C	C	--	0
24-Oct	C	0	0	Z	RE	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
25-Oct	0	0	0	0	Z	RE	0	0	0	C	C	C	C	C	C	C	C	0	0	0	0	0	0	0	--	0
26-Oct	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
27-Oct	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
28-Oct	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
29-Oct	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
30-Oct	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
31-Oct	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0

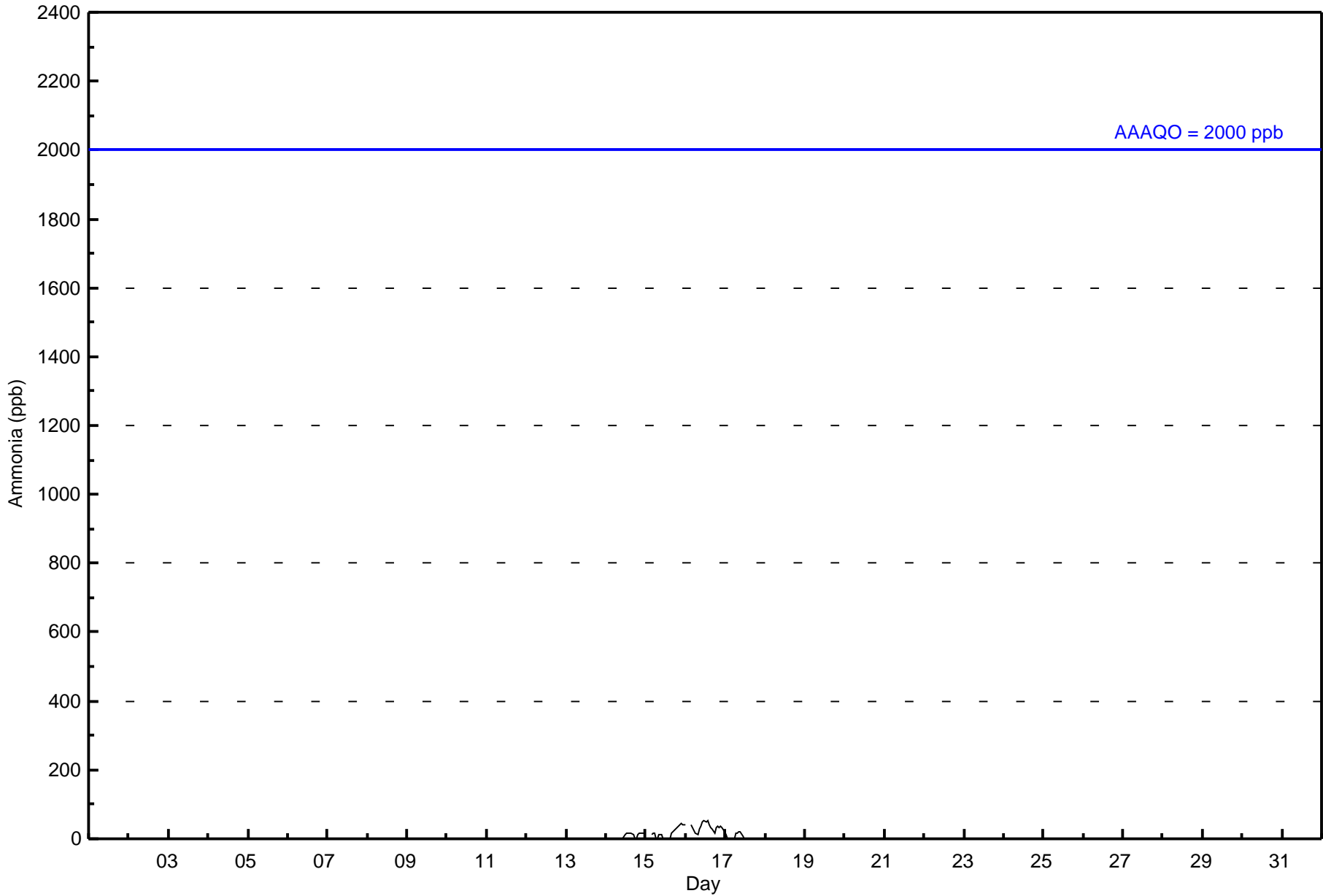
2.2	0.0	0.0	2.5	2.6	2.0	1.4	1.0	2.0	2.4	2.0	2.3	2.3	2.3	1.9	2.2	2.1	1.4	2.0	2.6	3.0	3.2	3.0	2.5	Diurnal Average
41	0	0	40	33	24	18	17	27	38	48	55	49	53	40	34	27	26	31	35	40	43	42	39	Diurnal Maximum

Z - zerospan      C - Calibration      RE - Recovery  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 2000 ppb



Wood Buffalo Environmental Association  
Hourly Averages

Ammonia (NH<sub>3</sub>) - ppb  
Patricia McInnes - October 2017





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ammonia (NH<sub>3</sub>) - ppb**  
**Patricia McInnes - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	595	91.82	91.82
6 - 10	1	0.15	91.98
11 - 15	14	2.16	94.14
16 - 20	12	1.85	95.99
21 - 25	2	0.31	96.30
> 26	24	3.70	100.00

Total Number of Valid Hours: 648

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

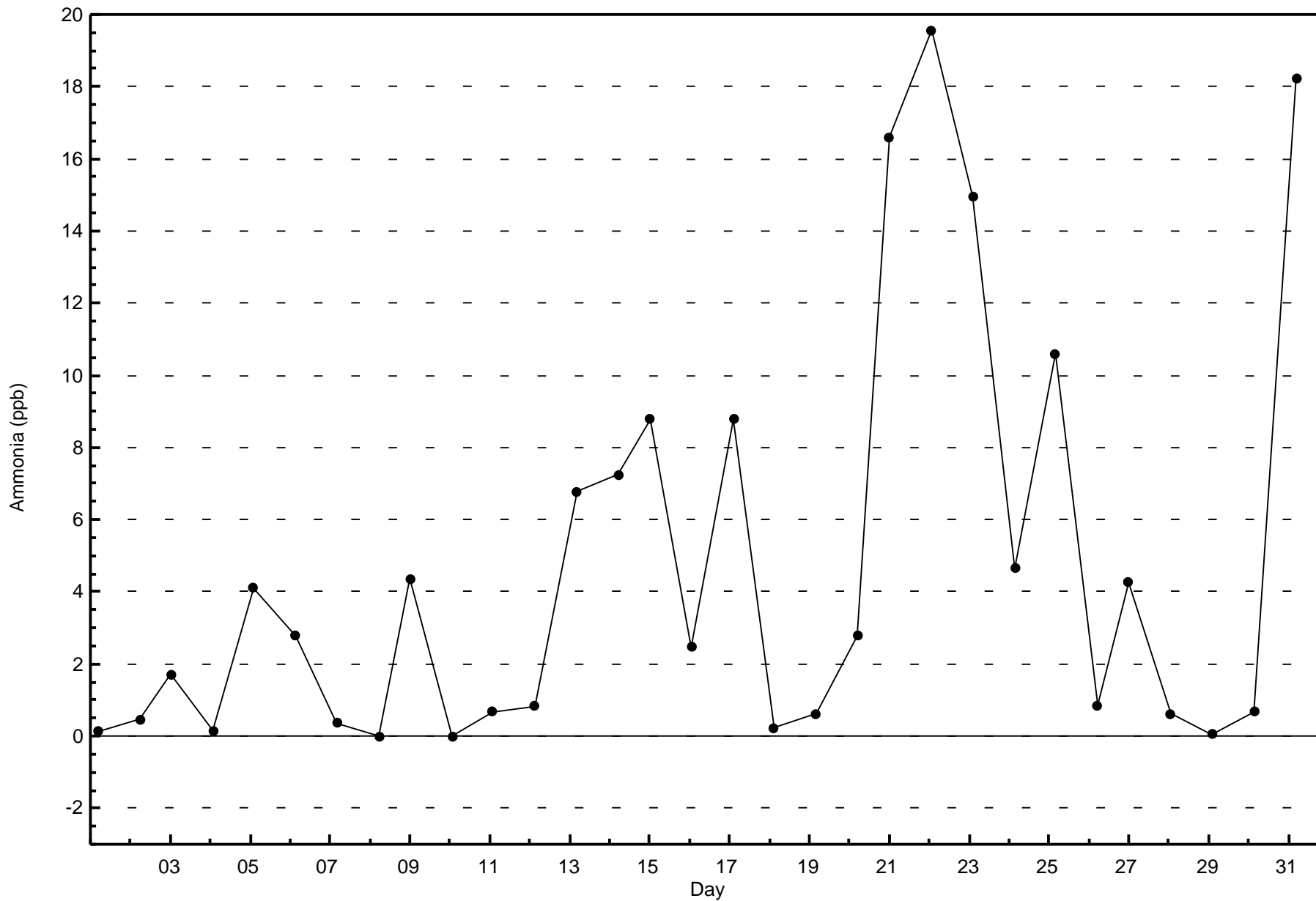
**Ammonia (NH<sub>3</sub>) - ppb**  
**Patricia McInnes - October 2017**

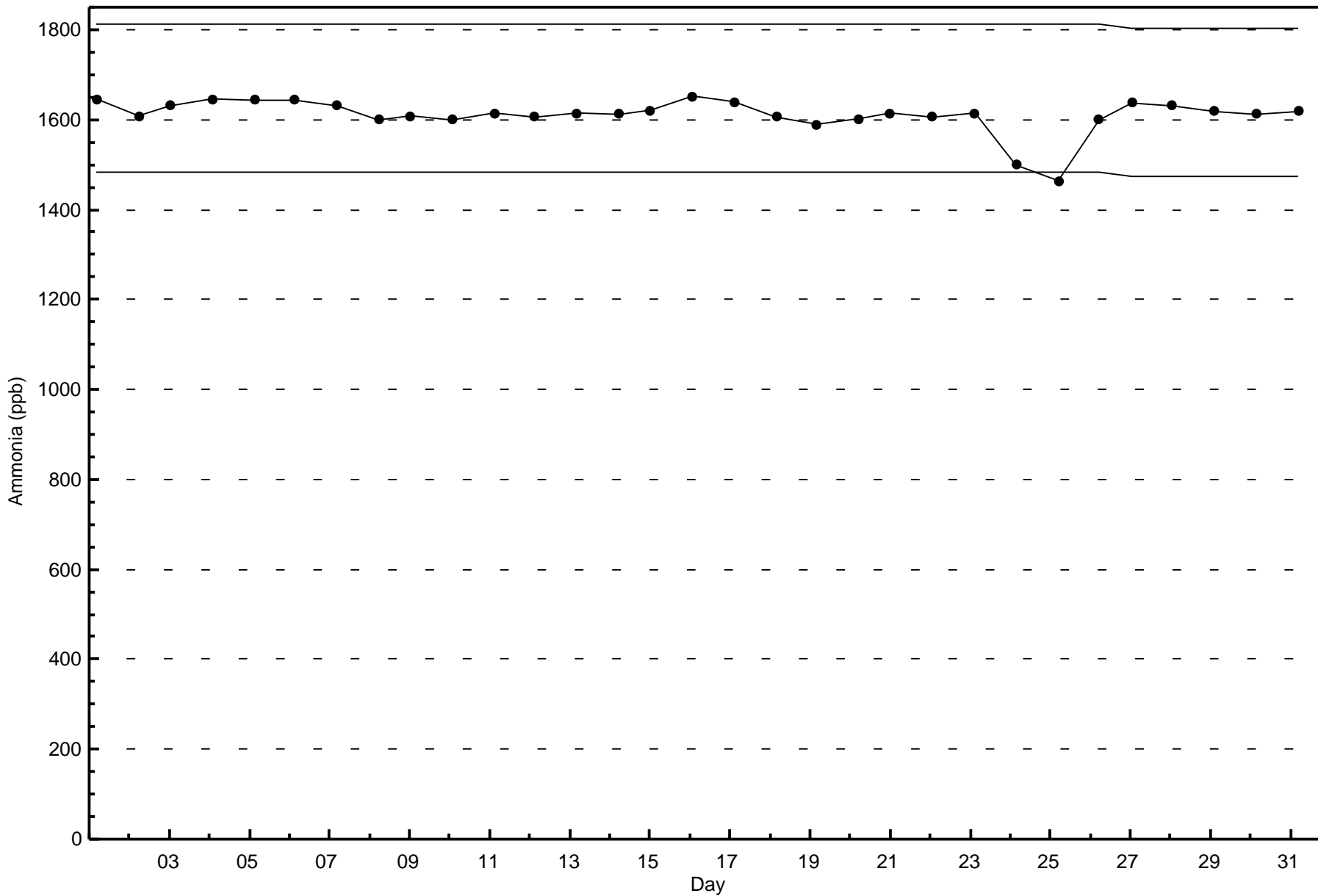
<b>Concentration</b> <b>Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 5	73	28	10	6	5	37	44	7	23	41	66	42	29	58	72	54	595
6 - 10	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
11 - 15	0	0	0	0	0	0	1	2	0	3	4	3	0	1	0	0	14
16 - 20	0	0	0	0	0	0	0	3	4	0	2	0	0	2	1	0	12
21 - 25	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	2
> 26	0	0	0	0	0	0	0	0	1	4	14	3	1	1	0	0	24
<b>Totals</b>	<b>73</b>	<b>28</b>	<b>10</b>	<b>6</b>	<b>5</b>	<b>38</b>	<b>45</b>	<b>12</b>	<b>28</b>	<b>49</b>	<b>86</b>	<b>49</b>	<b>30</b>	<b>62</b>	<b>73</b>	<b>54</b>	<b>648</b>

Total Number of Valid Hours: 648

Total Number of Hours: 744











Summary of Hour Averages

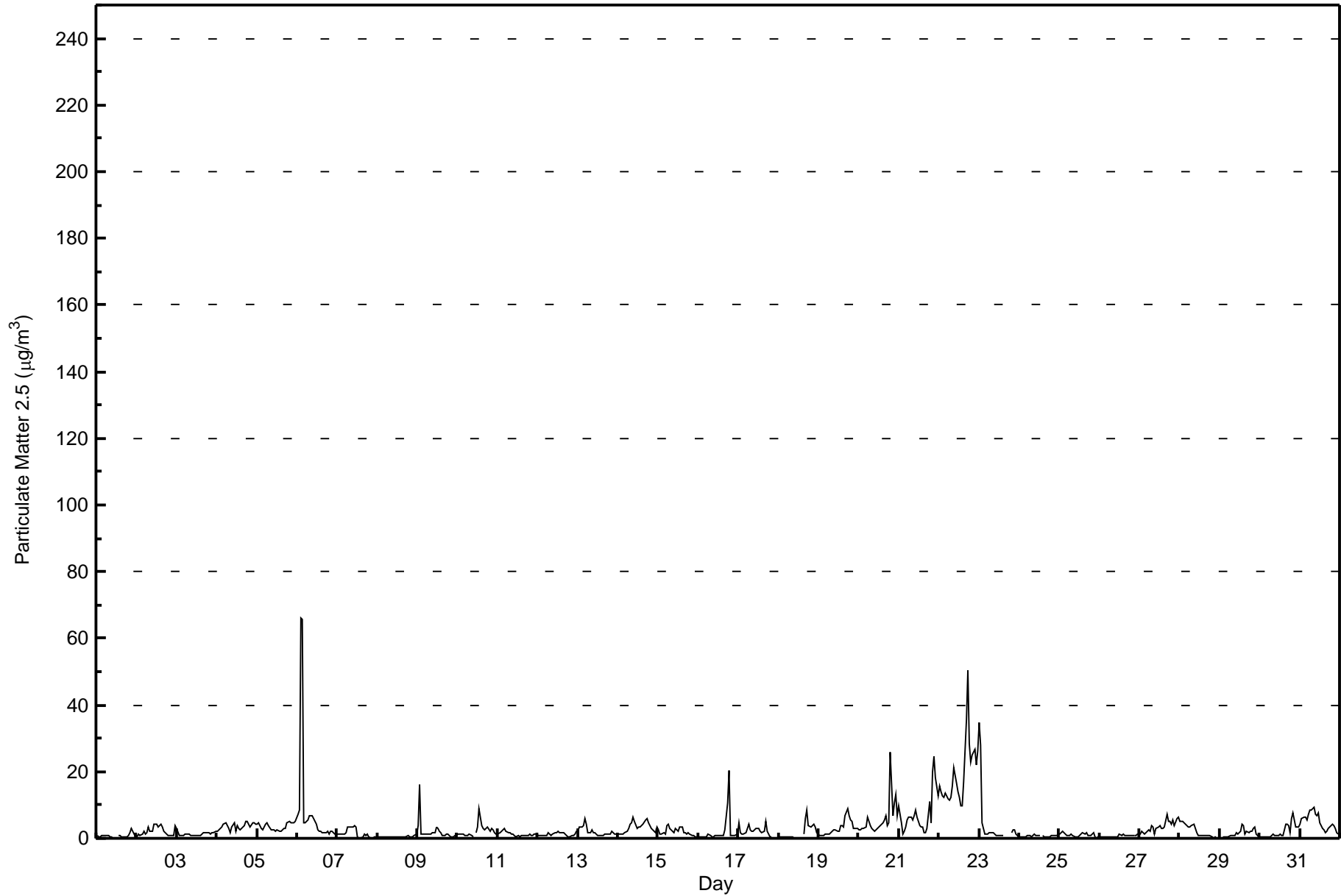
Patricia McInnes - October 2017

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 66.0 µg/m <sup>3</sup> on Oct 6 03:00 Minimum Value: 0.1 µg/m <sup>3</sup> on Oct 18 10:00 Maximum Diurnal Average: 4.5 µg/m <sup>3</sup> at hour 18 Monthly Average: 3.20 µg/m <sup>3</sup>		Maximum Daily Average: 19.1 µg/m <sup>3</sup> on Oct 22 Minimum Daily Average: 0.4 µg/m <sup>3</sup> on Oct 8 Minimum Diurnal Average: 2.3 µg/m <sup>3</sup> at hour 15 Percentiles: P <sub>1</sub> = 0.1 P <sub>10</sub> = 0.4 Q <sub>1</sub> = 0.9 Median = 1.6 Q <sub>3</sub> = 3.4 P <sub>90</sub> = 5.9 P <sub>99</sub> = 28.0		Hours in Service: 744 Hours of Data: 729 Hours of Missing Data: 15 Hours of Calibration: 5 Percent Operational Time: 98.7																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0.7	0.6	0.5	0.9	1.0	0.9	0.7	0.7	0.5	0.3	0.2	UO	UO	1.0	0.7	0.4	0.3	0.3	0.3	0.8	1.6	2.8	1.3	0.6	0.8	2.8
2-Oct	0.5	1.1	0.7	1.3	2.0	1.3	1.9	3.5	2.0	1.9	4.0	4.0	4.2	3.4	4.2	3.3	2.3	1.7	1.1	1.0	0.8	0.8	0.8	3.9	2.2	4.2
3-Oct	3.0	1.1	1.0	0.9	1.0	1.2	1.2	1.4	1.0	1.0	1.0	0.8	0.9	1.0	1.1	1.1	1.6	1.7	1.8	1.5	1.5	1.6	1.8	2.2	1.3	3.0
4-Oct	2.2	2.4	3.0	3.2	4.4	4.5	3.9	3.1	1.9	3.3	4.7	2.3	4.0	3.0	2.4	2.8	3.8	5.0	5.0	4.4	3.3	4.5	4.7	4.0	3.6	5.0
5-Oct	4.3	4.6	2.8	2.5	3.4	4.3	4.9	3.8	2.7	2.4	2.7	2.2	2.4	2.3	2.2	2.6	2.9	3.1	4.6	5.1	4.7	4.6	4.6	4.9	3.5	5.1
6-Oct	7.0	8.4	66.0	65.6	4.5	4.5	5.5	6.8	6.8	6.8	5.7	4.3	2.5	1.9	2.2	1.9	1.7	1.5	2.2	1.3	2.0	2.1	1.1	1.3	8.9	66.0
7-Oct	1.3	1.5	1.2	1.1	1.2	1.6	3.3	3.5	3.2	3.6	3.8	3.4	0.5	0.1	0.1	0.3	1.2	0.9	1.2	0.2	0.1	0.2	0.2	0.3	1.4	3.8
8-Oct	0.4	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.2	0.3	0.4	0.4	0.5	0.5	0.7	0.5	0.5	0.6	0.7	1.1	0.4	1.1
9-Oct	3.9	15.9	1.4	1.1	1.2	1.5	1.2	1.2	1.4	1.6	1.8	3.4	3.0	2.2	1.6	0.9	0.8	1.2	1.2	1.0	0.6	0.6	0.6	0.8	2.1	15.9
10-Oct	1.2	1.2	1.2	1.1	1.0	1.0	1.0	1.5	0.8	0.6	UO	1.9	3.2	8.8	3.9	3.2	2.5	3.1	3.6	2.2	2.9	2.5	1.8	1.4	2.2	8.8
11-Oct	1.2	1.5	2.0	2.5	3.1	2.2	1.8	1.8	1.2	1.1	0.8	0.6	0.7	0.6	0.7	0.8	0.7	0.8	1.1	1.1	0.8	0.7	1.1	1.1	1.2	3.1
12-Oct	0.7	0.7	0.7	0.7	0.7	0.9	1.7	1.4	1.0	1.4	1.5	1.9	2.0	1.6	1.5	1.9	1.3	0.6	0.6	0.6	0.8	0.8	1.3	2.2	1.2	2.2
13-Oct	2.3	3.3	3.4	3.7	5.9	4.2	1.7	1.6	2.4	1.7	1.8	1.1	0.8	0.7	0.7	1.0	1.3	1.3	1.3	1.5	2.0	1.8	1.5	1.4	2.0	5.9
14-Oct	1.2	1.2	1.1	1.3	1.6	2.3	3.0	4.1	4.5	6.3	5.1	2.8	3.4	3.2	3.7	4.3	5.6	6.0	4.9	3.8	2.8	2.7	1.9	3.4	3.3	6.3
15-Oct	2.4	1.4	1.2	1.5	1.4	3.8	4.4	2.8	2.7	1.8	3.0	2.4	2.2	3.3	3.5	1.8	1.7	1.3	1.6	1.1	1.0	0.7	0.6	0.5	2.0	4.4
16-Oct	0.4	0.4	0.4	0.4	0.4	0.6	1.4	1.0	0.5	0.6	0.8	0.9	0.9	0.8	0.9	1.0	2.7	10.6	20.5	1.1	0.7	0.7	1.0	1.3	2.1	20.5
17-Oct	4.8	1.5	1.4	1.4	1.7	3.0	4.1	2.7	2.3	2.3	3.0	3.0	3.0	1.9	1.5	2.1	5.2	2.2	1.2	0.6	0.4	UO	UO	0.2	2.3	5.2
18-Oct	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.2	0.1	UO	UO	UO	UO	UO	1.5	5.7	8.3	4.0	3.3	3.8	4.1	3.3	1.6	2.1	8.3
19-Oct	0.9	0.8	1.0	1.0	1.1	1.4	1.4	1.8	2.0	2.4	2.8	2.2	2.1	3.9	3.6	3.5	6.8	8.8	6.7	5.6	5.2	3.1	2.9	3.0	3.1	8.8
20-Oct	2.6	2.7	2.8	3.0	3.3	6.2	5.0	3.7	2.8	2.3	2.7	3.1	3.2	3.7	4.6	5.5	6.8	3.9	4.7	25.7	7.0	10.5	13.3	6.9	5.7	25.7
21-Oct	9.9	4.9	1.4	1.9	3.3	5.6	6.1	6.3	5.3	6.8	8.5	6.5	3.9	3.3	3.4	1.9	1.7	3.0	11.1	4.6	20.0	24.6	18.1	12.8	7.3	24.6
22-Oct	15.7	13.9	12.8	12.3	13.4	12.0	11.6	12.2	15.8	21.0	16.7	13.9	12.1	9.9	9.9	16.8	35.7	50.6	28.3	23.0	25.1	26.6	21.8	26.3	19.1	50.6
23-Oct	34.7	28.2	4.5	1.4	1.3	1.4	1.5	1.8	1.7	1.1	0.9	1.0	0.9	0.8	0.7	C	C	C	C	1.6	2.5	2.5	1.3	0.7	4.5	34.7
24-Oct	0.6	0.5	0.5	0.5	0.6	0.7	0.7	0.6	0.7	1.1	0.9	1.0	1.0	C	1.0	0.6	0.3	0.5	0.5	0.9	0.8	0.9	0.9	1.2	0.7	1.2
25-Oct	1.3	1.6	2.1	1.6	1.0	0.8	0.7	1.1	1.0	0.5	0.4	0.9	1.4	1.9	1.2	1.8	1.0	1.0	1.0	1.0	1.6	0.3	0.2	0.2	1.0	2.1
26-Oct	0.3	0.4	0.4	0.4	0.4	0.5	0.6	0.6	0.5	0.4	0.4	0.5	1.4	0.8	1.4	0.7	0.7	0.8	0.8	1.0	0.9	0.9	0.9	1.1	0.7	1.4
27-Oct	1.1	2.0	1.6	1.2	1.8	2.4	2.0	3.7	3.3	1.5	2.9	3.6	3.8	3.0	2.8	3.3	7.3	5.3	5.2	4.2	5.3	4.0	5.9	6.5	3.5	7.3
28-Oct	5.2	5.1	5.1	4.2	4.0	3.3	3.2	3.7	4.3	2.8	1.6	1.0	0.9	0.9	0.8	0.8	0.9	0.9	0.9	0.4	0.1	0.2	0.2	0.1	2.1	5.2
29-Oct	0.1	0.1	0.3	0.3	0.4	0.4	0.8	0.7	0.6	0.9	1.7	1.3	2.2	4.4	3.9	1.4	2.0	1.8	2.0	2.3	2.8	3.4	1.2	0.6	1.5	4.4
30-Oct	0.4	0.2	0.3	0.3	0.3	0.3	0.5	0.8	1.1	0.7	0.8	1.0	1.2	0.8	0.9	4.0	4.3	3.9	1.6	5.7	7.6	3.6	3.6	3.5	2.0	7.6
31-Oct	4.2	5.8	6.3	6.3	5.7	7.1	8.6	8.5	9.3	7.3	6.8	7.5	4.6	2.9	2.5	1.8	2.2	2.9	3.2	4.1	3.7	3.0	1.6	1.4	4.9	9.3
																								Diurnal Average		
																								Diurnal Maximum		
3.7 3.7 4.1 4.0 2.3 2.6 2.7 2.8 2.7 2.8 3.0 2.7 2.5 2.5 2.3 2.4 3.7 4.5 4.1 3.6 3.6 3.8 3.3 3.1 34.7 28.2 66.0 65.6 13.4 12.0 11.6 12.2 15.8 21.0 16.7 13.9 12.1 9.9 9.9 16.8 35.7 50.6 28.3 25.7 25.1 26.6 21.8 26.3																										
C - Calibration UO - Unstable Operation Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m <sup>3</sup>																										



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Patricia McInnes - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Patricia McInnes - October 2017**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	415	56.93	56.93
6 - 15	61	8.37	65.29
16 - 25	13	1.78	67.08
26 - 80	10	1.37	68.45
> 81.0	0	0.00	68.45

Total Number of Valid Hours: 729

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Patricia McInnes - October 2017**

Concentration Ranges ( $\mu\text{g}/\text{m}^3$ )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	44	22	8	6	4	31	45	12	26	37	53	36	23	19	21	28	415
6 - 15	7	3	1	0	3	10	5	2	3	1	7	6	1	1	1	10	61
16 - 25	6	0	1	0	0	0	0	0	3	0	0	0	0	0	2	1	13
26 - 80	1	0	0	0	0	0	0	0	0	3	2	1	0	1	0	2	10
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	58	25	10	6	7	41	50	14	32	41	62	43	24	21	24	41	499

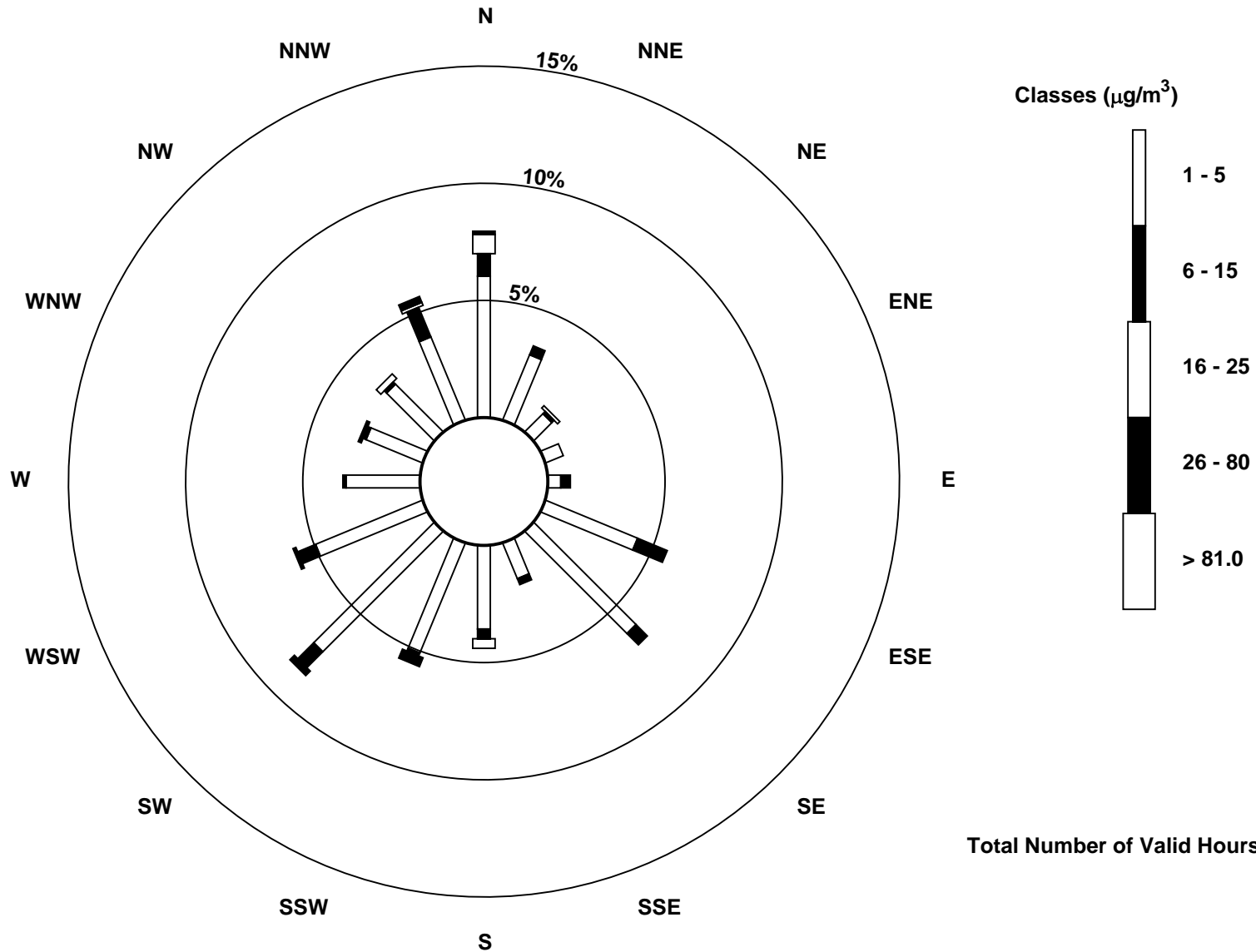
Total Number of Valid Hours: 729

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Patricia McInnes (AMS 6)





**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

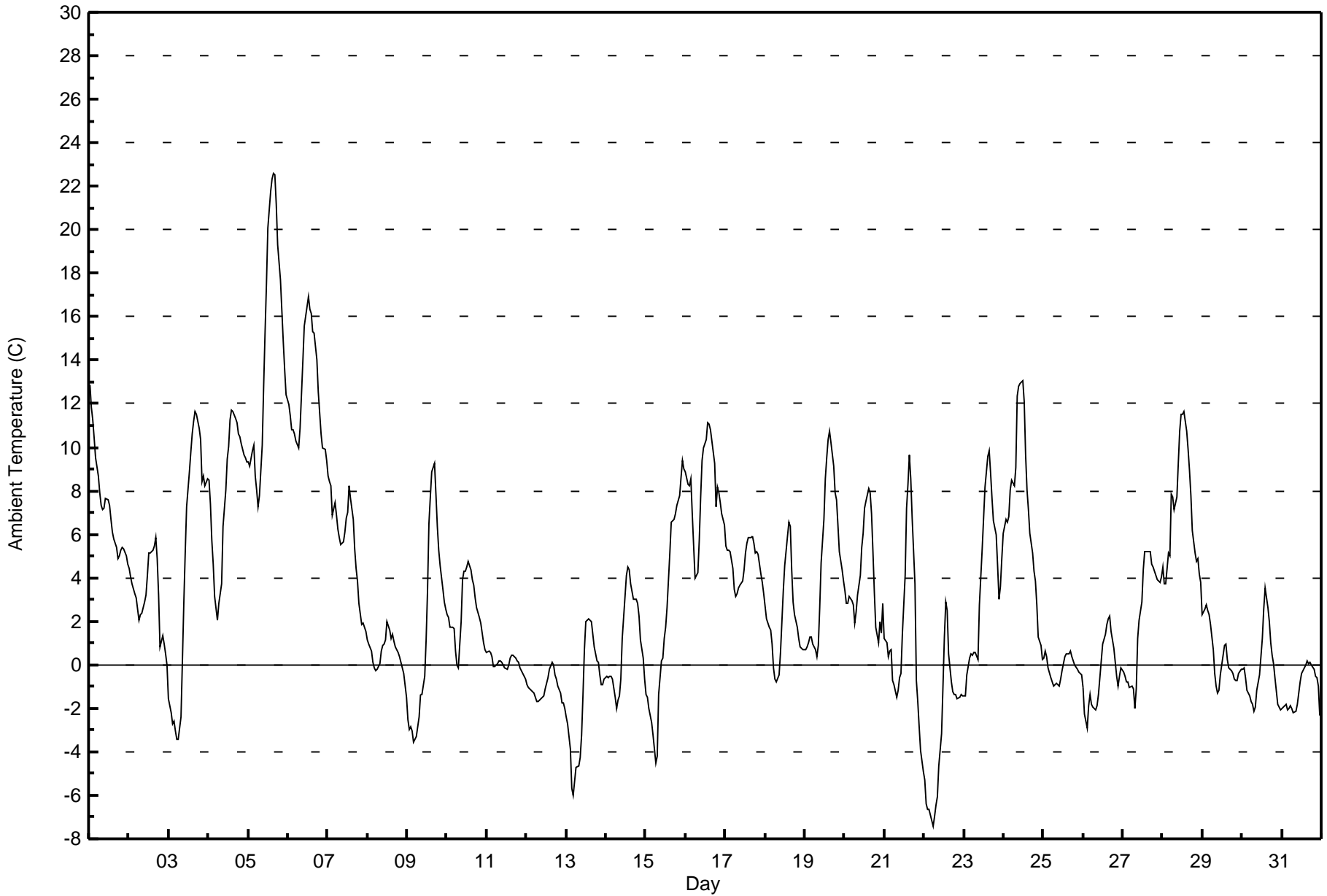
**Ambient Temperature (AT) - C**  
**Patricia McInnes - October 2017**

Maximum Value: 22.6 C on Oct 5 16:00      Maximum Daily Average: 14.6 C on Oct 5																								Hours in Service: 744 Hours of Data: 744		
Minimum Value: -7.4 C on Oct 22 06:00      Minimum Daily Average: -3.0 C on Oct 22 Maximum Diurnal Average: 6.4 C at hour 15      Minimum Diurnal Average: 0.9 C at hour 7 Monthly Average: 3.32 C      Percentiles: P <sub>1</sub> = -6.1 P <sub>10</sub> = -1.7 Q <sub>1</sub> = -0.4 Median = 2.3 Q <sub>3</sub> = 6.6 P <sub>90</sub> = 10.0 P <sub>99</sub> = 18.6																								Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	12.9	11.8	11.2	10.4	9.5	8.7	7.9	7.3	7.1	7.2	7.6	7.6	7.3	6.7	6.1	5.8	5.4	4.9	5.0	5.2	5.4	5.3	5.0	4.6	7.3	12.9
2-Oct	4.4	4.1	3.7	3.2	3.1	2.6	2.1	2.3	2.4	2.9	3.2	4.1	5.2	5.2	5.3	5.5	5.8	4.9	3.2	0.8	1.3	1.0	0.5	0.0	3.2	5.8
3-Oct	-1.5	-2.2	-2.7	-2.6	-3.0	-3.4	-3.4	-2.4	0.2	2.8	5.2	7.3	8.8	9.8	10.6	11.2	11.7	11.5	10.9	10.3	8.4	8.7	8.2	8.6	4.7	11.7
4-Oct	8.5	7.4	5.7	4.6	3.1	2.1	2.8	3.3	3.7	6.4	8.0	9.5	10.0	11.3	11.7	11.6	11.3	11.1	10.6	10.5	10.2	9.6	9.5	9.3	8.0	11.7
5-Oct	9.3	9.2	9.8	10.1	8.7	8.0	7.3	7.8	10.1	12.8	15.3	17.5	20.1	21.7	22.4	22.6	22.5	21.2	19.3	17.7	16.3	14.8	13.6	12.4	14.6	22.6
6-Oct	12.0	11.4	10.8	10.8	10.6	10.3	10.0	10.9	12.4	14.0	15.5	16.5	16.9	16.3	16.2	15.3	15.2	14.0	12.5	11.6	10.6	10.0	9.9	9.4	12.6	16.9
7-Oct	8.7	8.4	8.2	6.9	7.5	6.9	6.3	5.9	5.5	5.6	6.1	6.8	7.0	8.3	7.6	6.7	5.4	4.4	3.9	2.8	1.9	1.9	1.7	1.5	5.7	8.7
8-Oct	1.2	1.0	0.6	0.1	-0.1	-0.3	-0.2	0.0	0.7	0.9	0.9	1.1	2.0	1.6	1.2	1.4	1.1	0.8	0.6	0.4	0.1	-0.2	-0.4	-1.5	0.5	2.0
9-Oct	-2.5	-3.0	-2.9	-3.1	-3.5	-3.3	-2.9	-2.4	-1.4	-1.3	-0.5	1.2	3.4	6.5	7.7	8.9	9.3	7.8	6.4	5.3	4.5	3.5	2.9	2.6	1.8	9.3
10-Oct	2.3	2.2	1.7	1.7	1.7	0.7	0.0	-0.1	2.0	3.9	4.3	4.3	4.5	4.8	4.3	3.9	3.7	3.1	2.6	2.2	1.9	1.5	1.0	0.7	2.4	4.8
11-Oct	0.5	0.6	0.6	0.4	-0.1	-0.1	0.0	0.2	0.2	0.1	0.0	-0.2	-0.2	0.0	0.3	0.4	0.4	0.3	0.2	0.1	-0.1	-0.3	-0.4	-0.7	0.1	0.6
12-Oct	-0.9	-1.0	-1.1	-1.2	-1.3	-1.5	-1.7	-1.7	-1.6	-1.6	-1.4	-1.1	-0.9	-0.6	-0.2	0.1	0.0	-0.5	-0.7	-1.0	-1.3	-1.8	-1.8	-2.0	-1.1	0.1
13-Oct	-2.4	-2.7	-3.9	-5.7	-6.0	-5.4	-4.7	-4.7	-4.3	-3.2	-1.3	0.7	2.0	2.1	2.1	2.0	1.4	0.8	0.2	0.1	-0.5	-0.9	-0.9	-0.6	-1.5	2.1
14-Oct	-0.6	-0.6	-0.5	-0.5	-0.7	-1.5	-2.0	-1.6	-1.4	-0.6	1.2	3.1	4.1	4.5	4.4	3.7	3.0	3.0	3.0	2.8	2.2	1.1	0.3	-0.6	1.1	4.5
15-Oct	-1.3	-1.5	-2.0	-2.7	-3.3	-3.9	-4.5	-4.2	-1.3	0.2	0.3	1.2	1.7	2.6	5.2	6.6	6.6	6.7	6.9	7.3	7.8	8.6	9.4	9.0	2.3	9.4
16-Oct	8.8	8.3	8.2	8.5	6.9	5.5	4.0	4.2	5.7	7.7	9.4	10.0	10.4	11.2	11.0	10.8	10.3	9.3	7.3	8.1	7.9	7.5	6.9	6.4	8.1	11.2
17-Oct	5.4	5.3	5.3	5.2	4.4	3.5	3.2	3.3	3.6	3.6	3.8	4.4	5.1	5.6	5.8	5.9	5.9	5.6	5.2	5.2	5.1	4.2	3.8	3.2	4.6	5.9
18-Oct	2.7	2.1	1.7	1.6	0.9	-0.1	-0.7	-0.8	-0.5	0.6	2.0	3.4	4.6	5.9	6.6	6.3	4.3	2.9	2.3	1.8	1.2	0.9	0.7	0.7	2.1	6.6
19-Oct	0.7	0.8	1.0	1.3	1.3	1.0	0.7	0.4	0.9	2.6	4.7	6.7	8.6	9.5	10.3	10.7	10.2	9.2	7.9	7.6	6.5	5.2	4.4	3.8	4.8	10.7
20-Oct	3.4	2.8	2.8	3.2	2.9	2.8	1.9	2.4	3.2	4.1	5.4	6.1	7.2	7.5	8.1	7.9	6.9	5.2	3.4	1.7	1.0	2.0	1.5	2.8	4.0	8.1
21-Oct	1.2	1.0	0.4	0.6	0.7	-0.7	-0.9	-1.5	-1.2	-0.6	-0.4	1.4	4.1	7.2	8.3	9.6	8.6	6.7	3.7	-0.7	-1.7	-2.8	-4.0	-4.9	1.4	9.6
22-Oct	-5.3	-6.4	-6.7	-6.6	-6.9	-7.4	-7.0	-6.5	-6.1	-4.7	-3.2	-1.0	1.3	2.9	2.5	0.5	-0.8	-1.2	-1.4	-1.4	-1.6	-1.5	-1.3	-1.4	-3.0	2.9
23-Oct	-1.4	-1.5	-0.4	0.3	0.5	0.5	0.6	0.6	0.2	2.8	4.0	5.3	6.7	8.1	9.6	9.9	8.8	7.6	6.6	6.0	4.5	3.0	3.6	4.9	3.8	9.9
24-Oct	6.0	6.7	6.6	6.8	8.0	8.5	8.3	9.1	12.4	12.8	13.0	13.1	12.1	9.7	8.0	7.1	6.0	5.1	4.3	3.8	2.8	1.3	0.9	0.3	7.2	13.1
25-Oct	0.3	0.6	0.4	-0.2	-0.6	-0.8	-1.0	-0.9	-0.9	-1.0	-0.7	-0.3	0.1	0.4	0.5	0.5	0.6	0.3	0.2	0.0	-0.2	-0.3	-0.4	-0.5	-0.2	0.6
26-Oct	-1.0	-2.3	-2.9	-1.9	-1.4	-1.8	-2.0	-2.1	-1.9	-1.4	-0.6	0.2	1.0	1.4	1.8	2.1	2.3	1.6	0.8	0.1	-0.5	-1.0	-0.5	-0.2	-0.4	2.3
27-Oct	-0.3	-0.5	-0.8	-0.8	-1.0	-1.0	-1.1	-2.0	-1.1	1.2	2.1	2.9	4.4	5.2	5.2	5.2	5.2	4.6	4.5	4.3	4.1	3.9	3.8	4.1	2.2	5.2
28-Oct	4.5	3.7	3.7	5.2	5.0	7.8	7.7	7.1	7.7	9.3	10.7	11.5	11.5	11.6	10.7	9.9	8.9	7.8	6.2	5.2	4.8	4.9	4.2	3.8	7.2	11.6
29-Oct	2.3	2.6	2.7	2.5	2.3	1.9	0.7	-0.4	-1.0	-1.3	-1.1	-0.4	0.4	0.9	1.0	0.3	-0.1	-0.3	-0.4	-0.7	-0.7	-0.7	-0.4	-0.2	0.4	2.7
30-Oct	-0.2	-0.1	-0.6	-1.2	-1.4	-1.7	-1.8	-2.1	-1.9	-1.2	-0.4	0.4	1.2	2.5	3.6	2.6	2.0	1.0	0.5	0.0	-0.6	-1.8	-2.0	-2.1	-0.2	3.6
31-Oct	-2.0	-2.0	-1.8	-2.0	-2.0	-1.9	-2.0	-2.2	-2.1	-1.8	-1.3	-0.8	-0.4	-0.2	0.0	0.2	0.1	0.1	0.0	-0.2	-0.5	-0.6	-1.0	-2.3	-1.1	0.2
	2.4	2.1	1.9	1.8	1.5	1.1	0.9	0.9	1.7	2.7	3.6	4.6	5.5	6.1	6.4	6.3	5.9	5.2	4.4	3.8	3.2	2.8	2.5	2.3	Diurnal Average	
	12.9	11.8	11.2	10.8	10.6	10.3	10.0	10.9	12.4	14.0	15.5	17.5	20.1	21.7	22.4	22.6	22.5	21.2	19.3	17.7	16.3	14.8	13.6	12.4	Diurnal Maximum	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Patricia McInnes - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C  
Patricia McInnes - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	219	29.44	29.44
0 - 10	451	60.62	90.05
10 - 20	68	9.14	99.19
> 20	6	0.81	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %**

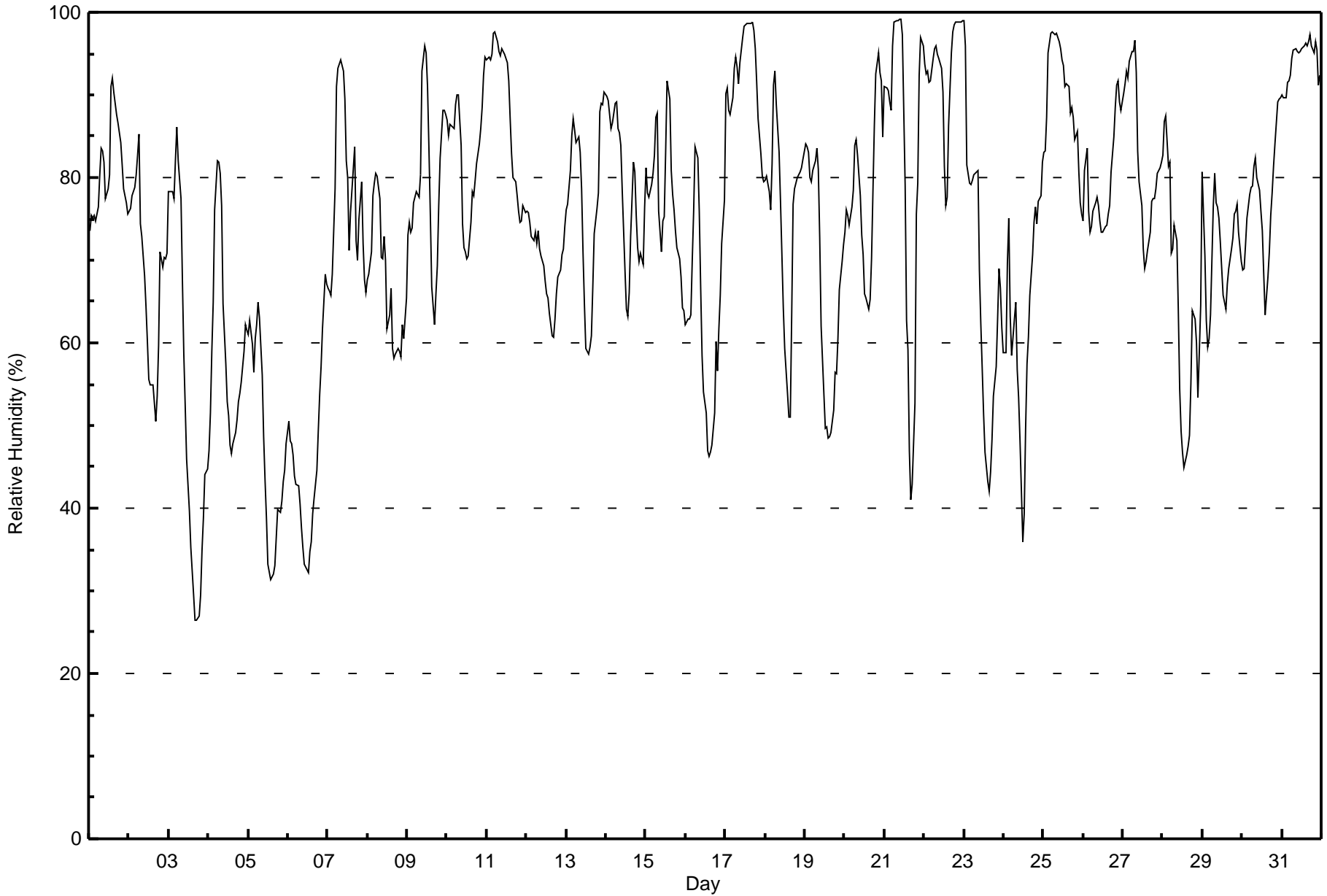
**Patricia McInnes - October 2017**

Maximum Value: 99 % on Oct 21 11:00																			Maximum Daily Average: 94.2 % on Oct 31						Hours in Service: 744																				
Minimum Value: 26 % on Oct 3 17:00																			Minimum Daily Average: 45.3 % on Oct 6						Hours of Data: 744																				
Maximum Diurnal Average: 83.0 % at hour 7																			Minimum Diurnal Average: 64.4 % at hour 16						Hours of Missing Data: 0																				
Monthly Average: 73.9 %																			Percentiles: P <sub>1</sub> = 32 P <sub>10</sub> = 49 Q <sub>1</sub> = 64 Median = 76 Q <sub>3</sub> = 86 P <sub>90</sub> = 94 P <sub>99</sub> = 99						Hours of Calibration: 0																				
																									Percent Operational Time: 100.0																				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																					
1-Oct	74	75	75	75	75	76	80	84	83	82	77	79	80	91	92	90	88	87	85	84	82	79	77	76	81.1	92																			
2-Oct	76	76	78	79	80	83	85	74	73	68	64	60	56	55	55	53	51	54	60	71	69	70	70	71	67.9	85																			
3-Oct	78	78	78	77	82	86	82	77	68	59	52	46	40	35	32	29	26	26	27	29	35	39	44	45	53.0	86																			
4-Oct	47	51	59	65	76	82	82	80	77	65	57	53	51	48	47	48	49	51	53	54	55	59	62	61	59.7	82																			
5-Oct	61	63	60	56	61	62	65	63	56	49	43	39	33	31	32	32	33	37	40	40	41	43	45	48	47.1	65																			
6-Oct	50	48	48	46	44	43	43	41	38	35	33	33	32	35	36	39	41	45	49	54	57	62	68	67	45.3	68																			
7-Oct	67	66	66	68	79	91	93	94	94	93	89	82	80	71	76	81	84	72	70	75	80	72	68	66	78.2	94																			
8-Oct	68	68	71	78	79	80	80	77	70	70	73	70	62	63	67	59	58	59	59	59	58	62	60	65	67.4	80																			
9-Oct	73	75	73	74	77	78	78	78	80	93	96	95	91	83	76	67	62	66	69	77	82	88	88	88	79.5	96																			
10-Oct	87	85	86	86	86	89	90	90	84	74	72	71	70	71	75	78	78	80	82	84	86	89	92	95	82.4	95																			
11-Oct	94	95	94	95	97	98	96	95	95	96	95	95	94	92	87	83	80	80	78	76	75	75	77	76	88.2	98																			
12-Oct	76	76	75	73	72	73	72	74	71	71	69	67	66	65	64	61	61	63	66	68	69	71	71	74	69.5	76																			
13-Oct	76	77	81	85	87	86	84	85	83	79	71	65	59	59	59	61	67	73	76	78	88	89	89	90	77.0	90																			
14-Oct	90	89	88	86	87	89	89	86	85	84	79	69	64	63	66	73	82	81	75	71	70	71	70	76	78.4	90																			
15-Oct	81	78	78	79	81	83	87	88	76	71	75	75	83	92	90	81	78	76	74	72	70	68	64	64	77.6	92																			
16-Oct	62	63	63	63	70	76	84	82	76	67	58	54	51	47	46	47	48	52	60	57	62	66	72	77	62.6	84																			
17-Oct	90	91	88	88	90	93	95	93	91	94	97	98	98	99	99	99	99	98	96	92	87	83	80	79	92.3	99																			
18-Oct	80	80	78	76	82	91	93	89	83	77	71	64	59	54	51	51	63	77	79	80	80	81	81	82	75.1	93																			
19-Oct	84	84	83	80	79	81	82	84	81	73	62	54	50	50	49	49	49	52	56	56	61	66	70	72	66.9	84																			
20-Oct	73	76	75	74	76	78	84	85	83	78	73	71	66	65	64	65	70	78	86	93	95	93	92	85	78.3	95																			
21-Oct	91	91	91	89	88	96	99	99	99	99	99	97	79	63	59	47	41	43	53	76	79	92	97	96	81.8	99																			
22-Oct	94	93	93	92	92	94	96	96	95	94	93	90	81	77	78	86	95	98	99	99	99	99	99	99	92.9	99																			
23-Oct	99	96	81	79	79	80	80	80	81	69	62	57	51	47	43	42	44	48	54	57	63	69	67	62	66.3	99																			
24-Oct	59	59	70	75	63	58	63	65	57	53	48	36	39	50	57	61	66	71	75	76	74	77	78	82	63.0	82																			
25-Oct	83	83	87	95	97	98	98	97	97	96	96	94	94	91	91	91	88	88	87	85	86	81	77	76	89.8	98																			
26-Oct	75	81	84	76	73	74	76	77	78	77	75	73	73	74	74	76	77	81	85	88	91	92	89	88	79.4	92																			
27-Oct	90	91	93	92	94	95	95	97	93	83	79	77	71	69	70	71	73	77	77	77	79	81	81	82	82.9	97																			
28-Oct	83	87	88	81	82	71	71	74	72	64	54	49	47	45	46	48	49	55	64	63	60	53	59	65	63.7	88																			
29-Oct	81	70	63	59	60	63	77	81	77	77	75	72	66	65	64	67	69	71	73	76	76	77	73	70	70.9	81																			
30-Oct	69	69	72	75	78	79	79	81	82	80	78	76	74	68	63	68	71	75	78	81	84	89	89	90	77.1	90																			
31-Oct	90	90	90	91	92	92	94	95	96	95	95	95	96	96	96	96	96	97	96	95	96	95	91	92	94.2	97																			
																			77.4	77.6	77.6	77.8	79.3	81.3	83.0	82.6	79.8	76.2	73.0	69.6	66.4	64.9	64.6	64.4	65.7	68.0	70.3	72.3	73.8	75.1	75.5	76.1	Diurnal Average		
																			99	96	94	95	97	98	99	99	99	99	99	98	98	99	99	99	99	99	99	99	99	99	99	99	99	Diurnal Maximum	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Patricia McInnes - October 2017**





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Patricia McInnes - October 2017

Maximum Speed: 40 km/h on Oct 24 13:00	Maximum Daily Speed Average: 20.6 km/h on Oct 2	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 31 02:00	Minimum Daily Speed Average: 0.9 km/h on Oct 4	Hours of Data: 744
Maximum Diurnal Speed Average: 7.3 km/h at hour 14	Minimum Diurnal Speed Average: 3.7 km/h at hour 8	Hours of Missing Data: 0
Monthly Average Velocity: 5.4 km/h 293.1 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 5 Q <sub>1</sub> = 8 Median = 11 Q <sub>3</sub> = 17 P <sub>90</sub> = 22 P <sub>99</sub> = 31	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	WNW14WNW18WNW17WNW18WNW16	NW18	NW17	NW19WNW18	NW21	NW20	NW19	NW20	NNW19	NNW21	NNW18	NNW22	NW21	NNW20	NNW19	NNW22	N25	N27	N29							NW18.9	N29
2-Oct	N31	N32	N28	N31	NNW27	NNW27	N25	N30	N29	N30	N30	N27	NNW23	NNW25	NNW23	N18	N17	NNW14	WNW6	WNW8	WNW9	WNW9	WNW10	W5	NNW20.6	N32	
3-Oct	S5	SSW8	SSW6	SW11	SSW8	SSW9	SSW9	S8	SSW11	SSW16	SSW15	SSW16	SSW22	SSW21	SW17	SW16	SSW16	SW9	WSW8	W16	W12	WNW16	WNW17	WNW17	SW10.8	SSW22	
4-Oct	WNW16	NW12	NW11	NNW10	NNW7	WNW7	WNW6	WNW8	NW5	NNW4	ESE1	ESE4	ENE7	E7	E8	ESE9	SE9	SE8	SE8	SE7	SE6	SE5	SE4	SE6	NNE0.9	WNW16	
5-Oct	SSE5	S6	SSW9	SW11	SSW6	SSW7	SW8	SW10	SW9	SW11	SW11	SW15	SW16	SW18	SW21	SW21	SSW16	SW11	WSW14	WSW14	WSW15	WSW14	SW13	SW12	SW11.7	SW21	
6-Oct	WSW14	WSW15	SW14	WSW14	SW13	SW12	SW12	SW13	SW15	WSW17	SW19	WSW26	W25	WSW23	W23	W21	W15	W12	W10	W9	SW9	W10	W7	SW10	WSW14.1	WSW26	
7-Oct	SW9	SSW3	SW10	SW8	W14	WNW13	NNW15	NNW14	N12	NNW14	NNW12	NW13	WNW10	NW16	NW16	NW16	NNW19	NNW20	NNW20	NNW22	NW21	NNW22	NW23	NW19	NW13.0	NW23	
8-Oct	NW20	NW23	NW21	NW19	NW19	NW19	NW18	NW16	NW19	NW22	NW23	NW23	NW24	WNW22	WNW21	WNW20	WNW17	NW10	WNW10	W9	WNW9	WSW7	SW7	SSW5	NW16.0	NW24	
9-Oct	S5	S6	S8	SSE8	SSE8	SE9	SE11	SE12	SE10	SE9	SE8	SE7	ESE7	W14	W15	W16	WNW11	WSW8	WSW9	WNW21	WSW11	SW12	WSW12	WSW14	SW5.2	WNW21	
10-Oct	WSW14	WSW16	WSW15	W12	W8	WSW9	WSW11	WSW10	SW7	WNW10	NNW12	N9	N7	NNE10	NNE12	NNE11	NNE12	NNE13	NNE11	N12	NNE13	NNE13	NNE13	N14	NNW6.0	WSW16	
11-Oct	N14	N13	N12	N12	N16	N16	N17	N18	N17	N19	N21	N22	N22	N22	N21	N22	N20	N18	N19	N19	N17	N15	N15	N18	N17.6	N22	
12-Oct	N18	N16	N14	N13	N11	NNW12	NW11	NW12	NW15	NNW14	NNW14	NW15	NW13	NW13	NW11	NNW11	NW10	WNW8	WNW7	WNW8	WNW10	WNW10	NW9	WNW7	NNW11.1	N18	
13-Oct	WNW9	WNW4	SSW1	SW4	SE3	SSW4	SW6	SSW5	S7	SSW10	SW12	SW13	SW13	SW14	SSW14	SSW12	SSW12	SW10	SW9	SW10	SW8	SW8	SSW7	SW8.1	SW14		
14-Oct	SW8	SSW8	SSW9	SSW7	SSW8	S7	S7	SSE7	SSE8	SSE8	S9	SW14	SW17	SW18	SW18	WSW16	SW12	WSW9	W9	WNW15	NW16	WNW15	WNW12	WSW11	SW8.4	SW18	
15-Oct	WSW13	W13	WSW10	WSW7	SW10	SSW6	S5	S6	SE6	SE7	SE7	SE12	SE9	SE8	S8	SSW12	SSW11	SSW10	SSW11	SW11	SW10	SW11	SW14	SW15	SSW7.4	SW15	
16-Oct	SW15	SW14	WSW21	WNW25	W13	WSW10	S6	SSW8	SW10	SSW11	SW13	SW15	SW15	SW16	WSW13	WSW10	SW7	S4	S5	SW14	SW12	SSW9	SSW7	S6	SW10.4	WNW25	
17-Oct	SSE4	SE5	ESE5	ESE5	SE7	SE5	S4	SSE5	S5	SSE6	ESE6	E5	NNE4	NNE6	N11	NNW10	NNW7	NW15	NW18	NW22	WNW23	WNW27	WNW31	WNW32	NW5.7	WNW32	
18-Oct	WNW30	WNW31	WNW29	WNW29	WNW27	WNW26	WNW20	WNW17	WNW17	WNW19	NW17	WNW13	WNW12	NW8	WNW3	ESE3	ESE7	ESE8	ESE11	ESE11	ESE16	ESE18	ESE17	ESE19	WNW7.9	WNW31	
19-Oct	ESE19	ESE17	ESE18	SE18	SE18	SE17	SE16	SE13	SE11	SE11	SSE8	S8	SSE8	ESE10	ESE13	ESE15	ESE15	SE15	SE10	ESE12	ESE12	ESE12	SE10	ESE9	SE12.7	ESE19	
20-Oct	ESE9	ESE9	ESE9	ESE11	ESE11	ESE6	ESE6	SE5	SE9	SE13	ESE10	E8	NE7	ENE8	ENE6	NNE3	NNW4	WNW6	W4	SSW2	WSW5	SW5	W4	NNW3	ESE3.9	SE13	
21-Oct	SW2	WSW5	W6	WNW8	NNW4	N5	NNW3	WNW3	ENE3	ESE2	SSW4	ESE3	ENE6	NE4	NE5	WSW8	WSW11	WSW7	SW6	WSW2	NE2	N4	N4	NNW3	WNW1.7	WSW11	
22-Oct	N3	NW2	WSW4	NNW1	N6	NNW5	NNW5	N5	N5	N5	N6	N8	N11	N11	N12	NNW11	NNW10	NNW9	N8	NW5	NW3	WNW2	S3	SSW6	NNW4.9	N12	
23-Oct	SSW6	SW7	WSW9	WSW9	WSW9	WSW12	WSW11	SW7	SW8	W10	W15	WNW14	W14	W17	W16	W13	WSW10	SW9	SW9	SW10	SSW8	S8	S9	SSW10	WSW9.2	W17	
24-Oct	SSW9	S10	S11	S10	SSW15	SW16	WSW18	W16	W31	WNW36	WNW30	NW38	NW40	NW33	NW29	NW26	NW22	NNW17	NW9	N9	NNE14	NNE10	NE8	NNE4	WNW13.3	NW40	
25-Oct	N4	NE7	NE8	NE9	NE10	NE9	NNE11	NNE14	N14	N20	N21	N22	N23	N21	N21	NNW21	NNW22	NNW18	NNW16	NNW12	NW9	NW10	WNW10	W9	N12.7	N23	
26-Oct	WSW9	SW9	SW8	SW15	SW21	SW17	SSW12	SSW14	SSW15	SSW18	SSW17	SW22	SW21	SW19	SSW18	SW16	SW11	SW10	WSW13	WSW12	WSW11	WSW13	W12	WSW5	SW13.4	SW22	
27-Oct	SSW5	SSW1	ESE3	SSW6	S4	S5	S5	ESE5	S6	S7	SE7	SE8	ESE9	SE8	SE11	SE10	SE7	SE10	SE9	SE9	SE8	SE10	SE7	SSE9	SE6.3	SE11	
28-Oct	S8	SE5	S5	SW11	SW12	W18	WSW19	WSW18	WSW19	WSW19	W22	WNW26	NW30	NW28	NW27	NW27	NW27	NW29	NW29	NW30	NW25	NW32	NW29	NW28	WNW18.4	NW32	
29-Oct	NW23	NW22	NW29	NW28	NW28	NNW30	NNW28	N26	N25	N28	NNW25	N21	N22	N19	N17	N12	NNE9	NNE6	NE5	WSW3	SW7	SW7	SW8	SW9	NNW15.1	NNW30	
30-Oct	SSW9	SW10	SW12	SW13	SW14	SW11	SSW9	SSW7	S4	S7	S8	S9	SSW5	W5	WSW4	ENE7	NNE5	NNW6	NNW7	NNW7	NNW6	NW6	NW7	NW6	SW3.9	SW14	
31-Oct	NW4	NNW1	NNE2	S2	S3	E4	E5	ESE6	ESE6	ESE7	E5	NE6	NNE8	NE9	NNE10	NNE10	NNE12	N12	NNE12	N12	N13	N13	N15	N19	NNE6.4	N19	

W5.0	W4.8	W5.1	W5.6	W4.9	W5.1	WNW4.2	WNW3.7	WNW4.0	WNW5.1	WNW5.6	WNW6.3	WNW6.9	WNW7.3	WNW6.9	WNW6.5	NW5.5	NW5.2	WNW5.0	WNW6.3	WNW5.2	WNW5.5	WNW5.6	WNW5.2		Diurnal Average
N31	N32	WNW29	N31	NW28	NNW30	NNW28	N30	W31	WNW36	WNW30	NW38	NW40	NW33	NW29	NW27	NW27	NW29	NW29	NW30	NW25	NW32	WNW31	WNW32		Diurnal Maximum

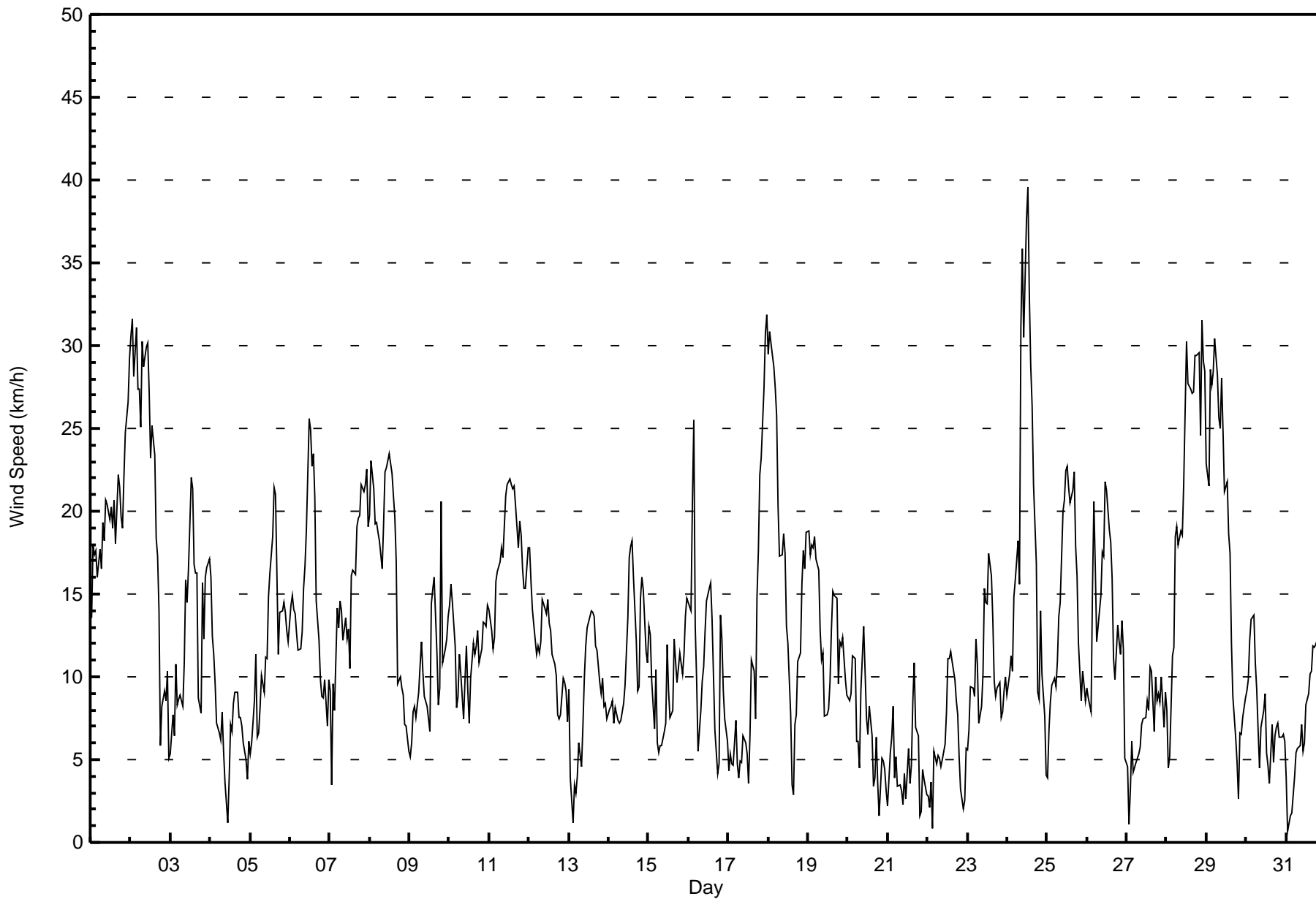
All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Speed (WS) - km/h**  
**Patricia McInnes - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Oct 9 20:00 Minimum Value: 1 km/h on Oct 22 22:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 2 Q <sub>3</sub> = 4 P <sub>90</sub> = 6 P <sub>99</sub> = 8																	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	4	4	4	4	3	4	4	4	4	4	5	4	4	4	5	4	5	5	4	4	5	6	8	8	8
2-Oct	7	7	7	8	7	6	7	7	6	6	6	6	5	6	5	4	4	5	1	2	1	1	1	2	8
3-Oct	2	2	2	3	2	2	2	2	3	3	4	6	6	6	5	4	3	4	2	3	2	4	3	3	6
4-Oct	3	3	2	2	2	1	1	1	2	2	2	2	3	3	2	2	2	1	1	1	1	1	1	2	3
5-Oct	1	1	2	2	2	1	2	2	2	3	3	3	4	4	5	5	4	2	2	2	2	2	2	2	5
6-Oct	2	3	2	2	2	2	2	2	3	3	4	7	6	5	6	6	3	4	4	2	1	6	3	3	7
7-Oct	2	2	3	2	6	3	3	3	3	2	3	4	4	3	4	4	5	5	7	6	6	6	5	5	7
8-Oct	4	5	4	4	4	4	4	3	5	5	5	4	5	5	4	4	4	3	2	2	3	2	2	1	5
9-Oct	1	1	2	2	1	2	2	2	2	2	1	2	1	6	4	4	3	1	2	10	3	2	2	2	10
10-Oct	2	2	3	2	2	1	2	2	2	5	2	3	3	3	3	2	3	2	2	2	3	3	3	3	5
11-Oct	2	3	2	2	3	3	3	3	3	4	4	5	4	4	4	4	4	4	4	4	3	3	3	3	5
12-Oct	4	3	3	3	3	2	2	3	3	3	3	3	3	2	2	2	2	1	1	1	2	1	2	1	4
13-Oct	2	2	1	1	1	1	1	2	1	2	2	2	3	3	3	3	3	3	2	2	2	1	1	1	3
14-Oct	2	2	2	2	2	1	2	2	2	2	3	3	4	4	4	4	3	2	2	3	4	4	3	2	4
15-Oct	2	2	1	2	2	2	1	1	2	2	1	3	3	2	3	2	2	2	2	2	2	3	3	3	3
16-Oct	3	3	6	7	3	2	2	1	2	2	3	3	3	4	4	2	1	1	3	3	4	3	3	2	7
17-Oct	1	1	1	2	2	1	1	1	1	1	1	2	1	2	2	2	2	4	3	5	7	6	6	7	7
18-Oct	6	7	7	7	6	5	4	4	4	4	4	4	3	3	2	2	2	1	3	3	3	4	4	4	7
19-Oct	5	4	4	4	4	4	4	3	2	3	2	2	2	2	3	3	3	3	2	2	3	3	3	2	5
20-Oct	2	2	3	3	3	2	2	2	3	3	3	3	2	2	3	1	1	2	1	2	2	2	2	3	3
21-Oct	1	1	1	3	3	2	1	1	1	1	2	1	2	1	2	5	2	1	1	1	2	1	1	2	5
22-Oct	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	1	1	1	2	1	2
23-Oct	1	2	1	1	2	2	3	1	1	4	3	3	4	5	3	2	2	1	1	1	1	1	1	2	5
24-Oct	3	2	2	2	3	4	3	7	7	8	7	10	8	7	6	6	5	4	2	3	3	2	2	2	10
25-Oct	1	1	2	2	2	2	2	2	3	4	4	5	5	4	4	4	5	4	3	3	1	2	2	2	5
26-Oct	2	1	1	5	5	6	3	3	3	4	4	4	4	5	4	5	2	3	3	2	2	1	2	3	6
27-Oct	1	1	2	2	1	1	2	1	1	1	1	1	2	2	2	2	2	3	1	2	1	2	2	2	3
28-Oct	2	2	2	3	2	3	3	3	3	3	6	7	7	7	6	6	6	6	8	8	5	8	6	6	8
29-Oct	6	5	8	7	7	7	8	6	6	6	5	5	5	4	4	3	2	2	1	2	1	1	1	1	8
30-Oct	1	2	2	2	2	3	1	2	1	1	2	2	2	2	2	1	1	1	1	1	1	1	1	1	3
31-Oct	1	1	1	1	1	2	1	1	1	2	1	1	2	1	2	2	2	2	2	2	2	2	4	4	4
Diurnal Maximum																									





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h  
Patricia McInnes - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	99	13.31	13.31
6 - 11	289	38.84	52.15
12 - 19	236	31.72	83.87
20 - 28	91	12.23	96.10
29 - 38	28	3.76	99.87
> 38	1	0.13	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Wind Speed (WS) - km/h  
Patricia McInnes - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 5	8	5	4	1	4	9	7	4	14	10	3	7	4	4	5	10	99
6 - 11	10	12	8	5	3	21	34	10	24	31	46	26	10	23	13	13	289
12 - 19	36	11	0	0	0	13	9	0	0	16	44	25	19	21	26	16	236
20 - 28	22	0	0	0	0	0	0	0	0	2	5	3	4	11	26	18	91
29 - 38	7	0	0	0	0	0	0	0	0	0	0	0	1	8	10	2	28
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
<b>Totals</b>	<b>83</b>	<b>28</b>	<b>12</b>	<b>6</b>	<b>7</b>	<b>43</b>	<b>50</b>	<b>14</b>	<b>38</b>	<b>59</b>	<b>98</b>	<b>61</b>	<b>38</b>	<b>67</b>	<b>81</b>	<b>59</b>	<b>744</b>

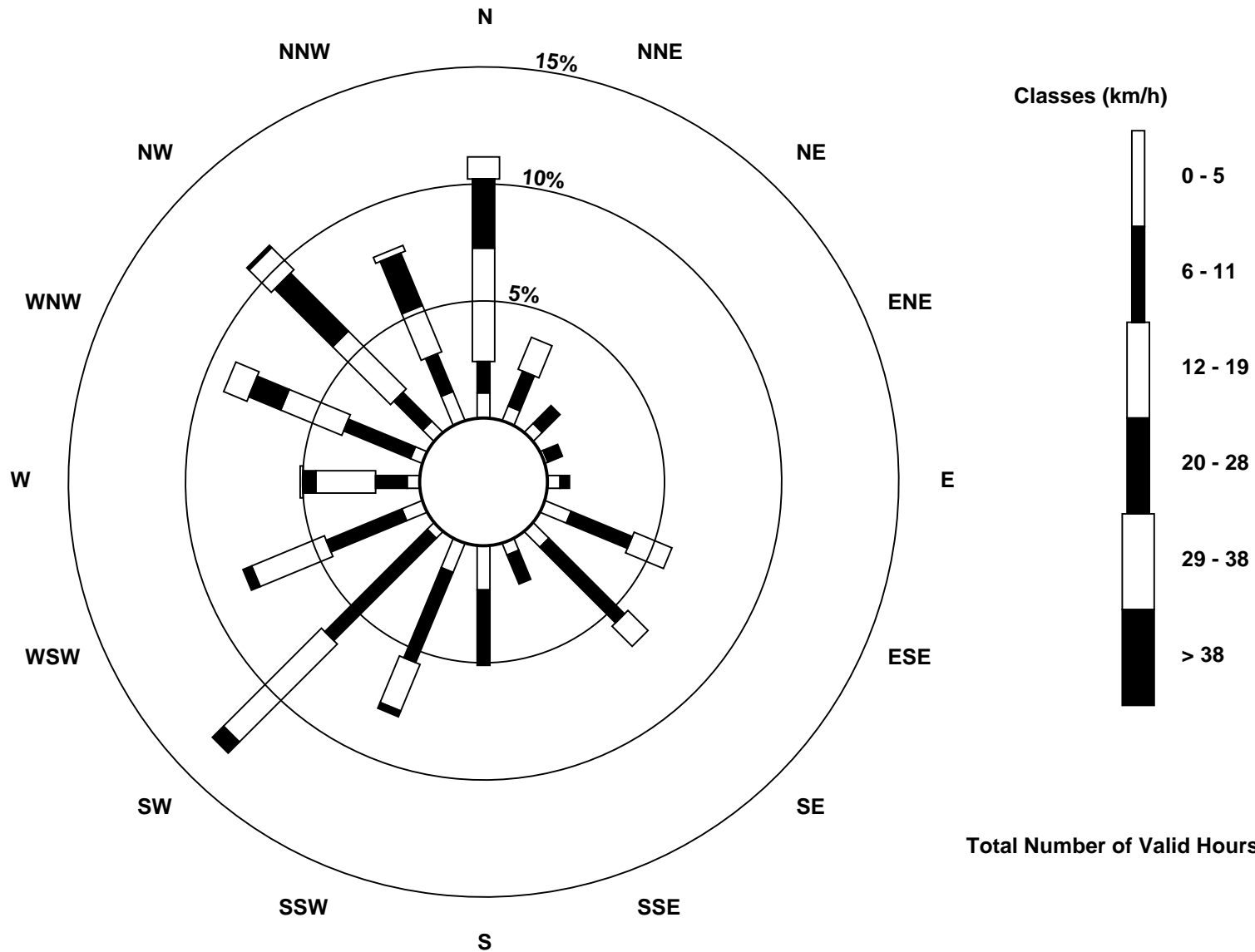
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed (WS) - km/h  
Patricia McInnes (AMS 6)







**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Wind Direction (WD) - deg**  
**Patricia McInnes - October 2017**

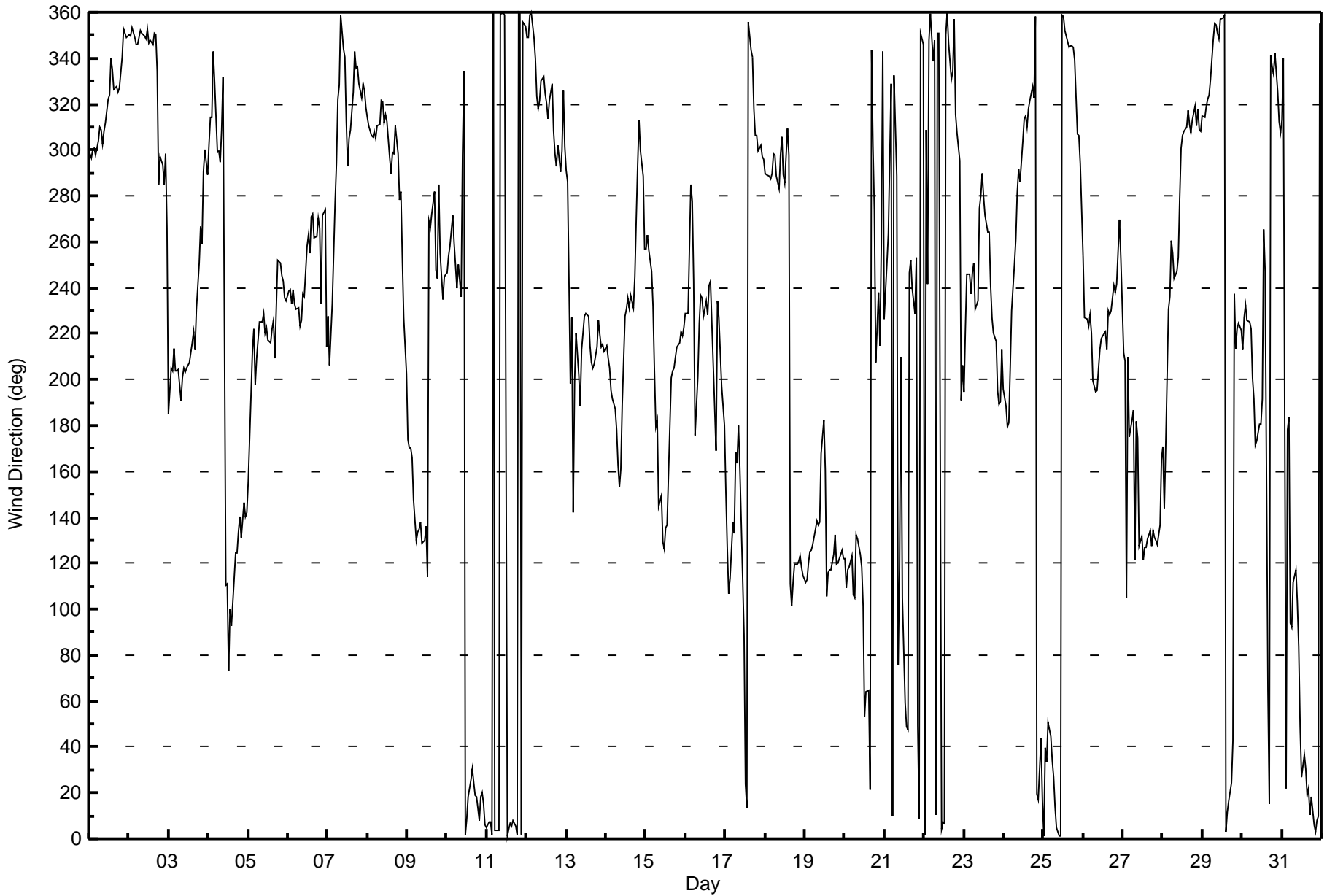
Direction of Maximum Speed: 313 deg on Oct 24 13:00 Direction of Maximum Daily Speed Average: 344.2 deg on Oct 2																							Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0		
Direction of Minimum Speed: 340 deg on Oct 31 02:00											Direction of Minimum Daily Speed Average: 0.9 deg on Oct 4												Percent Operational Time: 100.0		
Monthly Average Direction: 280.3 deg																									
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	298	297	300	301	298	304	310	309	303	308	312	322	324	340	335	327	328	325	327	334	341	353	349	350	322.9
2-Oct	350	350	353	349	346	346	349	352	351	349	349	353	347	348	346	351	350	334	285	297	294	285	299	266	344.2
3-Oct	185	205	204	214	204	204	204	191	201	205	203	205	208	212	216	221	213	231	251	267	259	290	300	289	225.8
4-Oct	303	314	314	343	330	299	300	295	309	332	110	111	73	100	93	103	125	125	134	140	131	146	140	142	32.2
5-Oct	156	175	212	222	198	209	217	225	225	229	220	223	217	216	222	226	209	230	252	251	245	243	236	234	224.6
6-Oct	239	239	233	239	233	231	232	224	226	238	236	258	263	255	271	272	262	262	270	266	233	271	274	214	248.8
7-Oct	228	206	220	233	277	294	322	328	359	344	341	312	293	305	309	325	343	336	336	329	323	329	326	319	318.2
8-Oct	314	311	306	306	308	305	310	311	322	321	312	315	312	297	290	299	298	311	298	278	282	253	227	202	304.0
9-Oct	174	170	170	166	148	130	133	135	138	129	130	136	114	269	266	272	282	248	244	285	255	235	245	246	215.5
10-Oct	247	254	258	271	259	249	240	250	236	298	335	2	8	19	26	30	25	19	19	8	18	20	15	6	332.5
11-Oct	5	7	8	2	360	4	4	4	360	359	360	359	1	4	6	5	8	6	2	360	360	2	356	354	2.2
12-Oct	349	349	359	360	349	340	324	318	322	330	332	325	320	313	322	329	308	299	293	302	291	300	326	302	326.6
13-Oct	291	286	198	227	142	199	220	202	188	213	220	228	229	227	215	208	205	207	214	226	220	214	215	213	218.4
14-Oct	215	209	205	195	192	187	178	163	153	161	189	227	231	235	231	237	231	245	269	293	313	300	289	257	233.8
15-Oct	257	263	256	247	232	204	179	182	144	150	129	126	136	137	179	201	204	205	210	214	216	221	219	223	204.7
16-Oct	229	229	257	285	277	243	176	201	225	236	236	227	234	228	241	243	225	188	169	234	227	212	197	180	234.8
17-Oct	151	127	107	113	138	133	169	163	180	161	114	88	24	13	356	343	341	318	306	306	299	302	297	296	308.7
18-Oct	290	289	289	287	290	298	298	289	283	298	305	289	286	310	298	111	102	111	119	120	121	123	118	114	289.2
19-Oct	112	113	120	125	125	128	135	138	137	138	168	182	160	106	116	117	117	124	132	119	120	122	126	122	126.3
20-Oct	122	109	117	119	123	106	105	132	130	124	118	101	53	64	65	21	344	302	274	207	238	214	259	343	111.1
21-Oct	226	251	264	296	329	10	332	288	76	118	210	105	59	49	47	246	252	240	229	254	49	9	351	346	288.4
22-Oct	2	309	242	348	359	339	348	11	351	351	4	7	6	350	360	347	331	334	357	315	308	295	191	206	345.1
23-Oct	195	222	246	246	237	247	251	230	234	275	280	290	279	272	264	264	241	227	220	216	195	189	190	213	245.8
24-Oct	196	188	179	181	205	230	250	261	281	291	286	304	313	315	310	318	322	327	323	358	20	17	44	17	296.7
25-Oct	1	40	34	50	44	34	27	14	5	1	359	358	352	350	345	345	345	345	345	339	307	306	294	274	355.2
26-Oct	254	227	226	223	228	221	200	195	195	204	213	218	219	221	213	230	228	230	241	238	242	255	270	253	224.1
27-Oct	211	208	105	210	175	182	187	122	182	175	127	132	122	127	127	131	134	127	134	131	130	128	137	166	143.2
28-Oct	171	144	170	231	236	260	255	244	247	253	279	301	306	308	310	317	311	308	313	319	311	318	309	308	294.6
29-Oct	315	314	319	322	324	331	348	355	355	351	348	357	358	359	3	11	16	25	43	238	214	222	224	222	339.0
30-Oct	213	227	233	226	225	222	201	192	172	173	181	180	192	265	247	65	15	341	336	333	342	325	312	307	235.0
31-Oct	313	340	22	178	184	94	92	112	117	103	84	49	27	37	30	19	22	10	18	6	3	8	10	355	26.0
278.5 279.9 276.0 275.9 272.7 280.5 282.6 283.8 283.7 293.3 295.8 299.1 302.8 301.9 302.6 303.5 307.7 308.3 301.6 298.4 295.5 299.5 297.8 287.7																								Diurnal Average	
All monthly, daily, and diurnal averages have been calculated using vector methods																									



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Direction (WD) - deg**  
**Patricia McInnes - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 94 deg on Oct 4 11:00 Minimum Value: 5 deg on Oct 21 18:00 Percentiles: P <sub>1</sub> = 7 P <sub>10</sub> = 10 Q <sub>1</sub> = 12 Median = 14 Q <sub>3</sub> = 17 P <sub>90</sub> = 26 P <sub>99</sub> = 74																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	14	11	11	10	13	12	11	10	11	11	11	11	12	13	11	11	12	11	10	10	13	17	17	17	17
2-Oct	17	16	16	15	15	14	14	18	16	16	15	17	16	17	17	14	18	12	17	15	8	11	7	45	45
3-Oct	30	15	19	15	13	13	13	16	17	15	16	16	17	15	16	14	14	17	28	11	9	15	8	10	30
4-Oct	12	9	14	14	20	8	11	8	47	54	94	63	36	35	19	14	13	13	11	12	12	14	36	20	94
5-Oct	14	18	17	11	18	15	17	10	15	18	18	18	16	16	13	14	14	21	9	10	9	9	8	9	21
6-Oct	9	9	10	9	10	9	9	10	11	13	14	15	14	16	15	14	13	11	21	26	11	35	36	20	36
7-Oct	12	42	15	14	19	15	9	11	16	13	14	14	19	18	20	21	15	14	14	13	12	12	12	12	42
8-Oct	12	12	11	12	10	10	10	11	14	11	12	13	16	12	12	12	12	14	12	14	15	12	23	17	23
9-Oct	9	17	14	11	11	14	12	11	13	12	14	17	18	34	14	13	14	14	8	29	21	10	10	8	34
10-Oct	8	9	11	11	16	14	9	9	14	35	16	19	26	21	17	14	14	11	11	12	12	13	12	14	35
11-Oct	13	12	12	14	15	14	14	14	15	15	15	16	14	14	14	15	14	15	16	14	14	16	15	14	16
12-Oct	14	14	15	15	14	13	12	10	12	13	14	12	15	11	14	15	13	8	10	7	10	9	12	16	16
13-Oct	9	45	87	55	25	22	11	31	13	14	12	17	19	18	19	15	14	14	14	12	11	11	10	11	87
14-Oct	12	13	14	14	13	15	15	17	12	12	22	17	16	15	13	13	11	11	8	11	12	13	14	9	22
15-Oct	6	8	8	14	14	26	16	11	22	26	13	12	15	13	28	13	12	12	12	11	10	12	12	10	28
16-Oct	11	11	17	14	12	14	36	16	14	15	18	16	20	15	12	14	15	21	24	12	13	14	35	18	36
17-Oct	15	14	18	21	15	15	22	13	15	14	20	23	30	14	15	11	32	10	10	10	11	11	11	11	32
18-Oct	12	12	12	12	12	10	11	12	13	12	13	25	19	33	79	75	11	11	13	12	12	12	12	12	79
19-Oct	13	13	13	14	13	13	14	14	13	14	24	20	32	21	15	12	12	11	11	12	14	14	15	14	32
20-Oct	12	10	12	15	13	19	39	43	20	17	21	28	35	22	32	30	18	15	26	79	20	17	35	71	79
21-Oct	43	28	8	9	59	32	26	17	48	63	38	47	22	44	30	54	11	5	7	70	29	20	26	22	70
22-Oct	19	65	42	71	18	12	14	13	16	18	16	15	16	16	20	18	18	15	15	25	45	46	51	18	71
23-Oct	16	12	14	9	9	11	10	9	10	24	17	19	18	14	15	14	13	9	10	10	15	7	12	13	24
24-Oct	18	18	12	14	17	19	10	15	13	12	12	17	15	13	13	13	11	11	11	25	14	15	14	18	25
25-Oct	25	12	11	13	11	11	10	10	13	16	15	19	16	16	15	12	12	12	12	14	12	10	14	14	25
26-Oct	12	13	17	12	13	16	13	12	13	14	15	11	12	12	14	16	12	16	9	12	10	7	9	49	49
27-Oct	16	88	34	12	17	17	19	17	14	18	14	13	16	14	11	15	19	14	11	11	10	12	15	17	88
28-Oct	19	55	33	11	15	10	9	11	11	12	15	14	14	12	11	12	12	11	12	12	11	12	11	11	55
29-Oct	13	11	12	12	12	12	17	16	16	16	14	17	16	17	16	15	13	18	21	68	12	17	12	10	68
30-Oct	11	12	9	9	8	13	11	19	19	14	12	11	21	34	66	21	23	9	7	13	14	10	9	7	66
31-Oct	19	76	37	63	27	21	11	12	15	13	22	16	13	11	10	11	11	12	10	13	13	13	17	16	76
Diurnal Maximum																									







# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

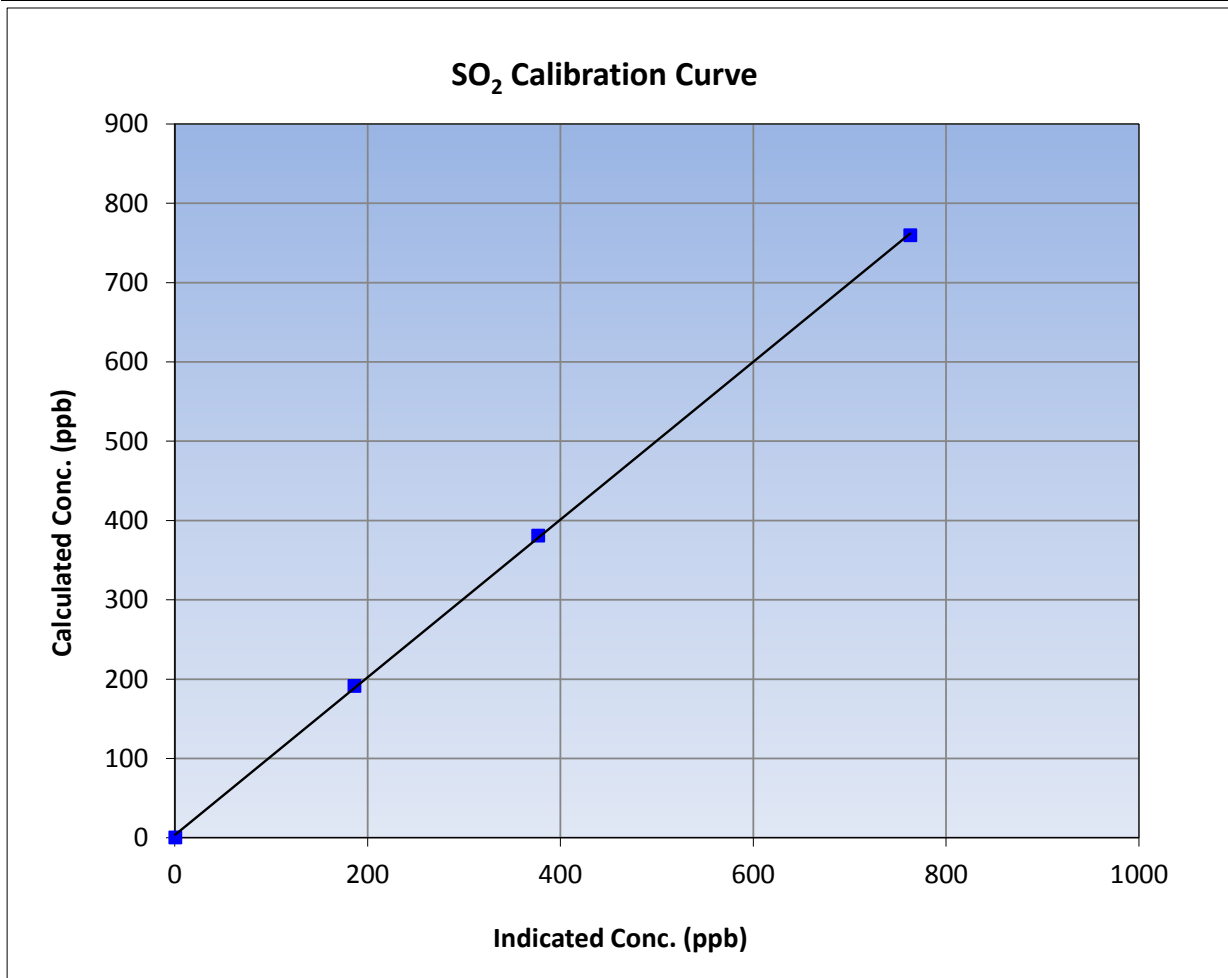
Version-03-2017

### Station Information

Calibration Date	October 23, 2017	Previous Calibration	September 25, 2017
Station Name	Patricia McInnes	Station Number	AMS 06
Start Time (MST)	9:13	End Time (MST)	13:24
Analyzer make	Thermo 43i	Analyzer serial #	1008841397

### Calibration Data

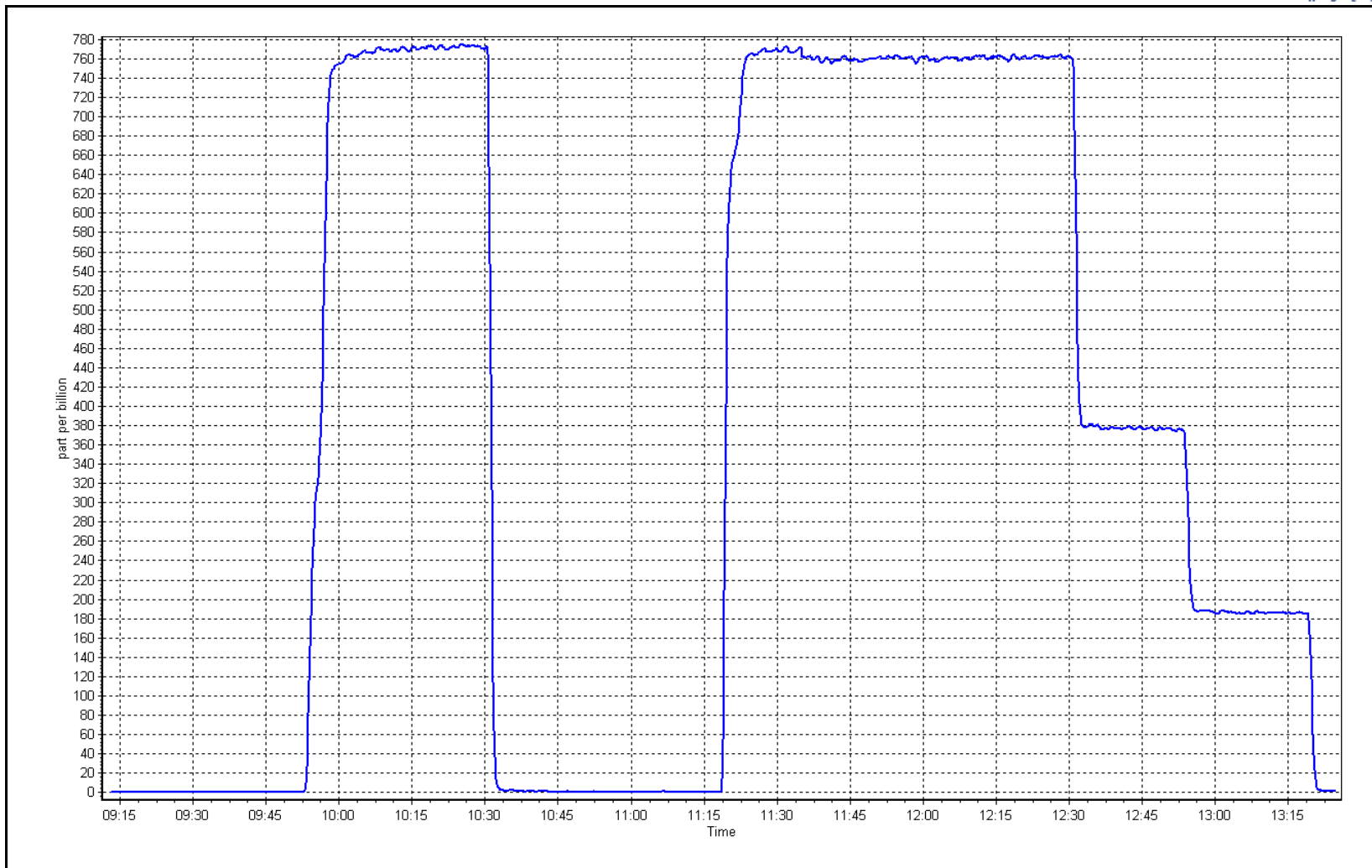
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Serial Number	<u>Limits</u>	
0.0	0.2	----	Serial Number	0.999898	≥0.995
759.5	762.4	0.9962	Slope	0.994548	0.90 - 1.10
380.5	376.5	1.0107	Intercept	3.310381	+/-30
191.2	186.1	1.0273			



SO2 Calibration Plot

Date: October 23, 2017

Location: Patricia McInnes







# Wood Buffalo Environmental Association

## TRS Calibration Summary

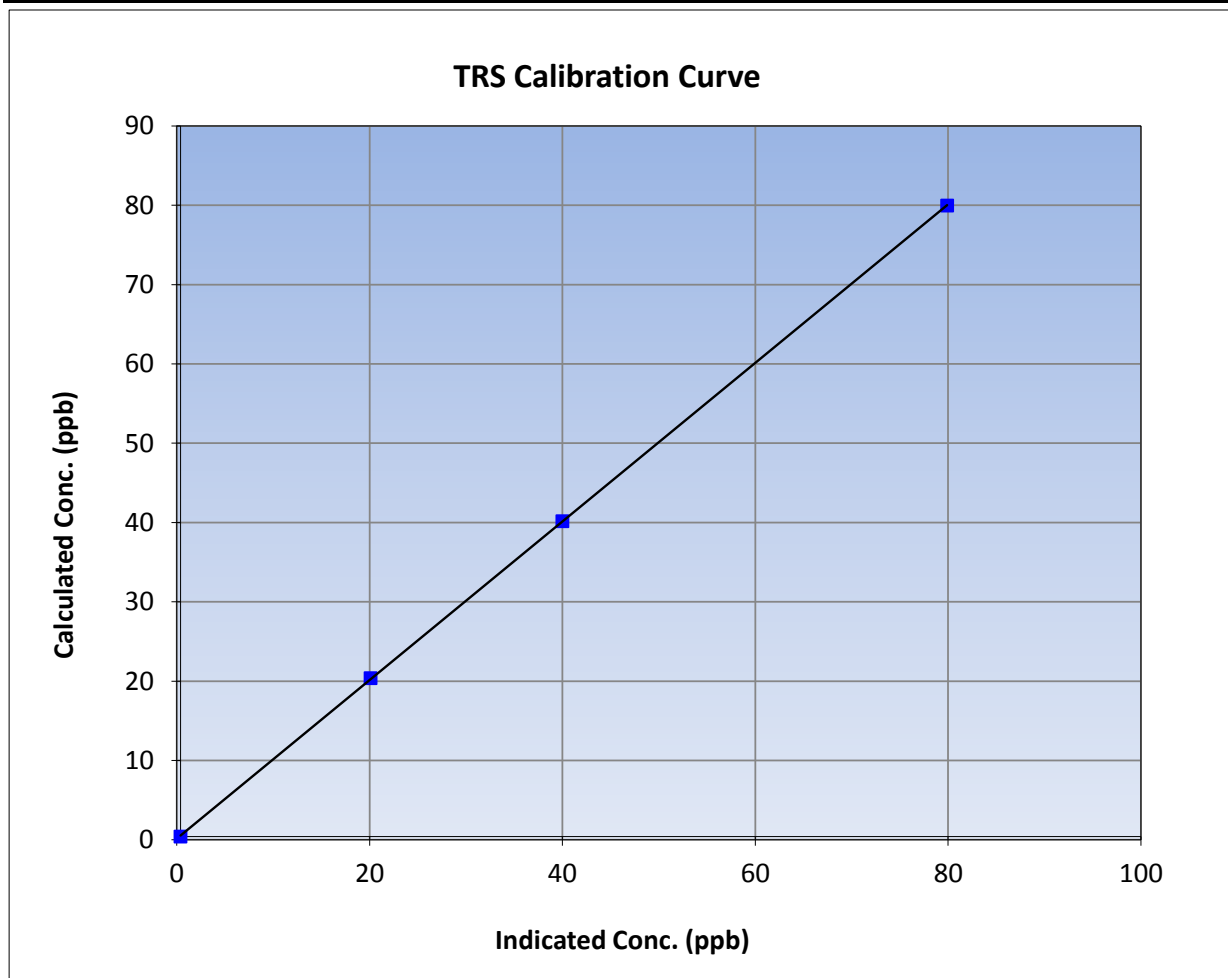
Version-03-2017

### Station Information

Calibration Date	October 5, 2017	Previous Calibration	September 12, 2017
Station Name	Patricia McInnes	Station Number	AMS 06
Start Time (MST)	8:37	End Time (MST)	13:13
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153358

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.0	----	Correlation Coefficient	0.999987	≥0.995
79.6	79.5	1.0008			
39.8	39.6	1.0047	Slope	0.999846	0.90 - 1.10
20.0	19.7	1.0141			
			Intercept	0.136257	+/-3

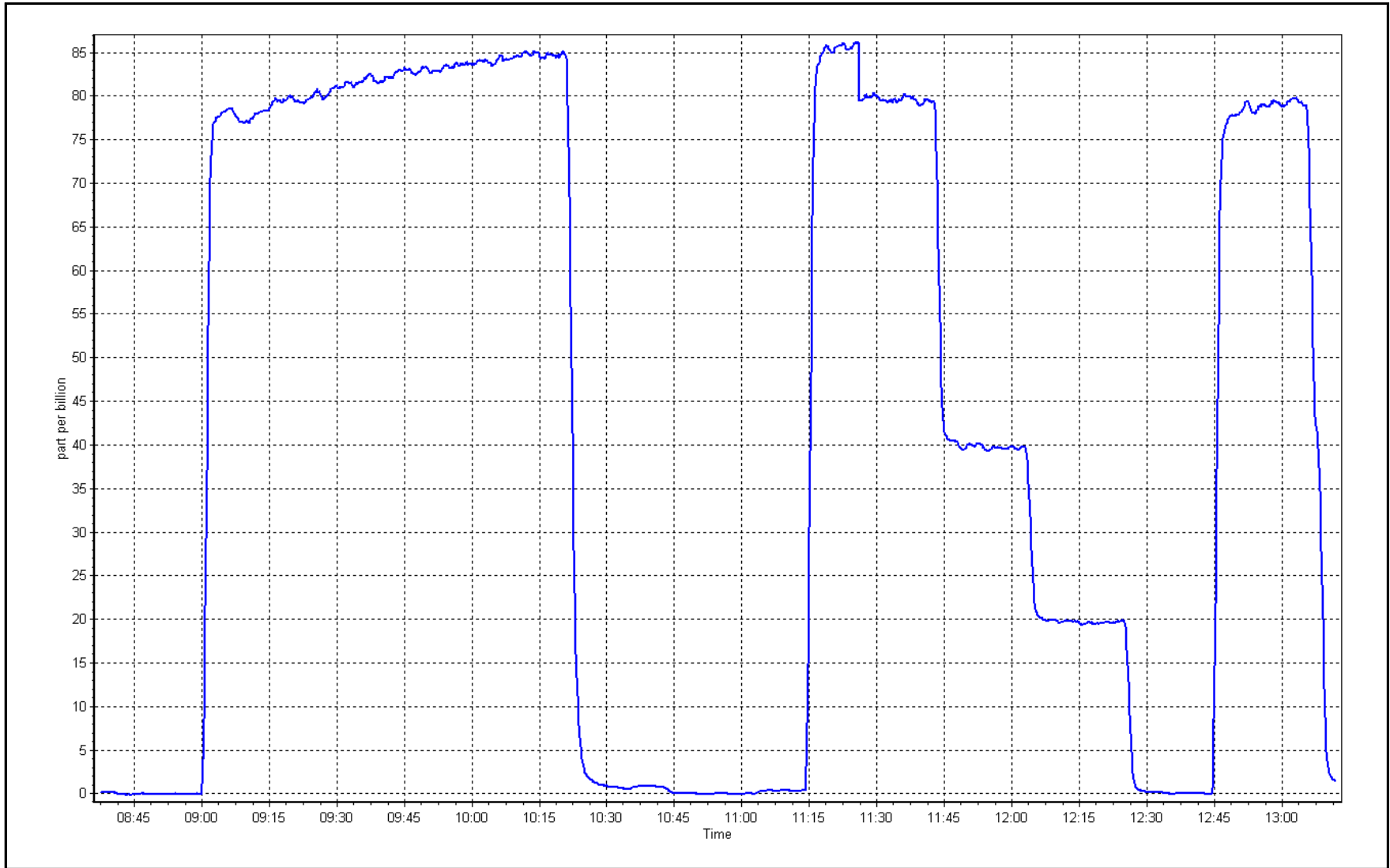




TRS Calibration Plot

Date: October 5, 2017

Location: Patricia McInnes







# Wood Buffalo Environmental Association

## TRS Calibration Summary

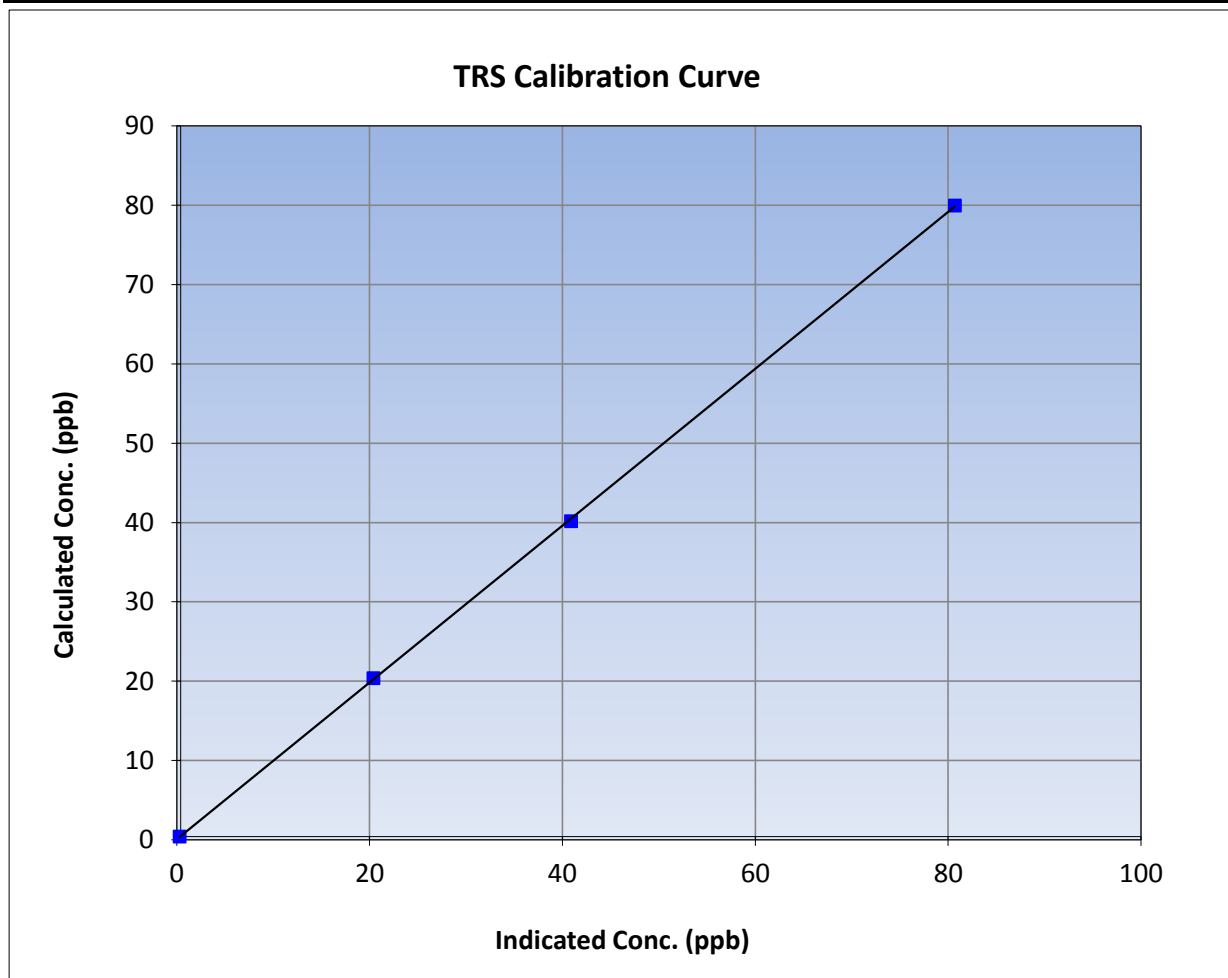
Version-03-2017

### Station Information

Calibration Date	October 18, 2017	Previous Calibration	October 5, 2017
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:30	End Time (MST)	11:27
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153358

### Calibration Data

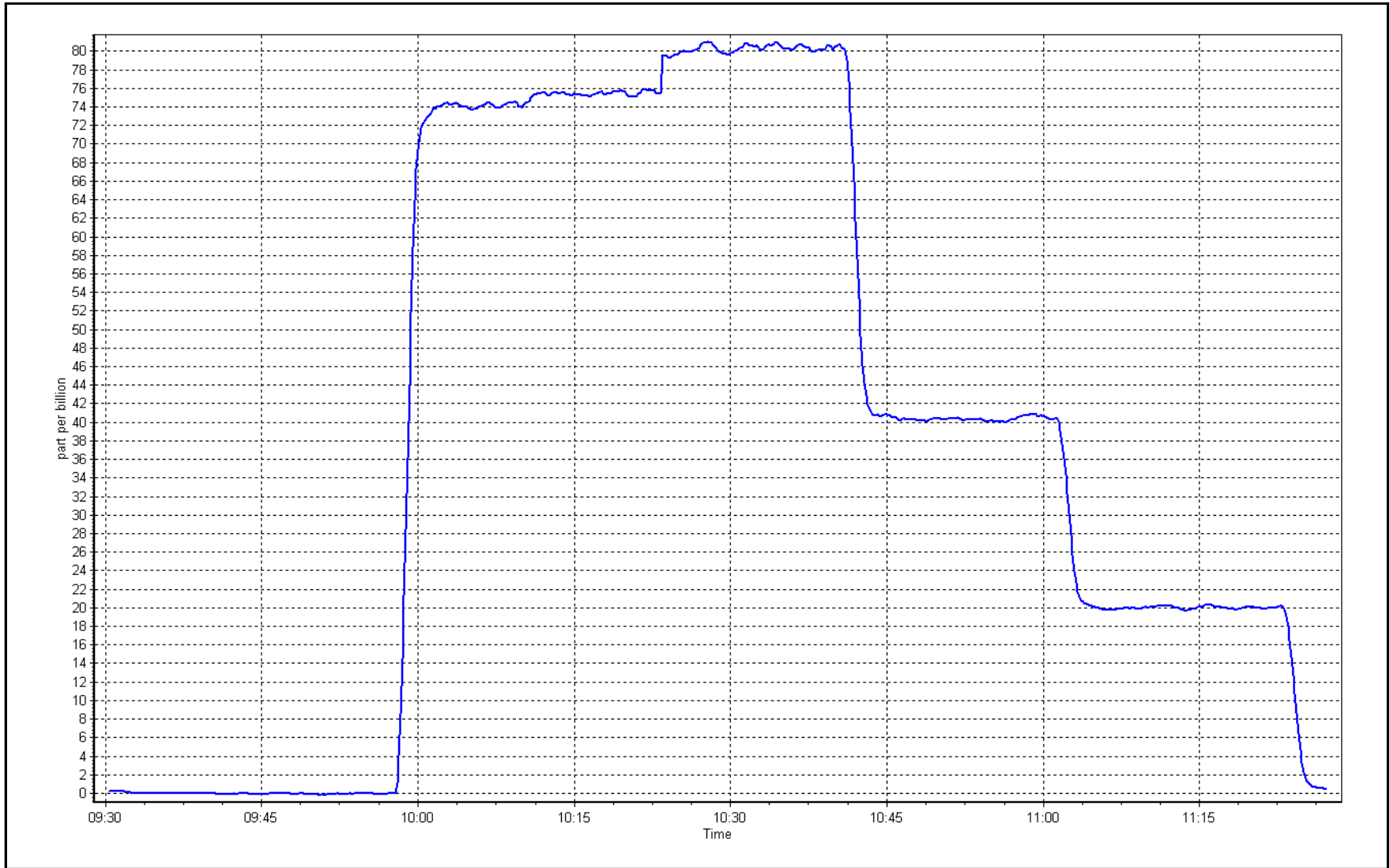
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	-0.1	----	Correlation Coefficient	0.999962	≥0.995
79.6	80.3	0.9908			
39.8	40.5	0.9824	Slope	0.988604	0.90 - 1.10
20.0	20.0	0.9989			
			Intercept	0.057564	+/-3



TRS Calibration Plot

Date: October 18, 2017

Location: Patricia McInnes





# Wood Buffalo Environmental Association

## THC / NMHC Calibration Report

Version-03-2017

### Station Information

Station Name:	Patricia McInnes	Station number:	AMS 06
Calibration Date:	October 23, 2017	Last Cal Date:	September 25, 2017
Start time (MST):	11:00	End time (MST):	13:26
Reason:	Routine		

### Calibration Standards

Gas Cert Reference	LL87837	Cal Gas Expiry Date	August 18, 2020
CH4 Cal Gas Conc.	<u>513.0</u> ppm	CH4 Equiv Conc.	1068.5 ppm
C3H8 Cal Gas Conc.	<u>202.0</u> ppm	Station temp.	21 Deg C
Calibrator Model	API T700	Serial Number	2449
ZAG make/model	API T701	Serial Number	260

### Analyzer Information

Analyzer make: Thermo 55i

Analyzer serial #: 1331259521

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
THC Range (ppm)	0 - 50 ppm		Column Temp	75.0	75.0
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
CH4 SP Ratio	2.12E-04	2.17E-04	Flame Temp	405.0	405.0
CH4 Retention time	8.1	12.3	Carrier Pressure	35.8	35.8
NMHC SP Ratio	4.79E-05	4.61E-05	Fuel Pressure	42.3	42.3
NMHC Peak Area	178860	186509	Air Pressure	37.4	37.4

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
THC Cal Slope	0.995349	0.999112
THC Cal Offset	0.000000	0.057051
CH4 Cal Slope	1.024737	0.998153
CH4 Cal Offset	0.000000	0.039228
NMHC Cal Slope	0.969558	0.999930
NMHC Cal Offset	0.000000	0.018312

Notes: Small adjustment to span, long points as an NH3 cal ran as well. No As Lefts as NH3 cal continued

Calibration Performed By:

Ryan Power



# Wood Buffalo Environmental Association

## THC / NMHC Calibration Report

Version-02-2017

### THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i>
as found zero	5537	0.0	0.00	0.00	----
as found span	5458	85.5	16.48	16.63	0.991
calibrator zero	5537	0.0	0.00	0.00	----
high point	5457	85.4	16.46	16.45	1.001
second point	5502	42.8	8.25	8.16	1.010
third point	5526	21.5	4.14	4.04	1.026
as left zero					
as left span					
Average Correction Factor					1.012
Corrected As found	16.63	Prev response	16.56	*% change	-0.5%

### NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i>
as found zero	5537	0	0.00	0.00	----
as found span	5458	85.5	8.57	8.91	0.961
calibrator zero	5537	0	0.00	0.00	----
high point	5457	85.4	8.56	8.55	1.001
second point	5502	42.8	4.29	4.27	1.004
third point	5526	21.5	2.15	2.11	1.020
as left zero					
as left span					
Average Correction Factor					1.009
Corrected As found	8.91	Prev response	8.84	*% change	-0.8%

### CH4 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i>
as found zero	5537	0.0	0.00	0.00	----
as found span	5458	85.5	7.91	7.72	1.025
calibrator zero	5537	0.0	0.00	0.00	----
high point	5457	85.4	7.90	7.90	1.000
second point	5502	42.8	3.96	3.89	1.017
third point	5526	21.5	1.99	1.92	1.033
as left zero					
as left span					
Average Correction Factor					1.017
Corrected As found	7.72	Prev response	7.72	*% change	0.0%

\* = > +/-5% change initiates investigation



# Wood Buffalo Environmental Association

## THC Calibration Summary

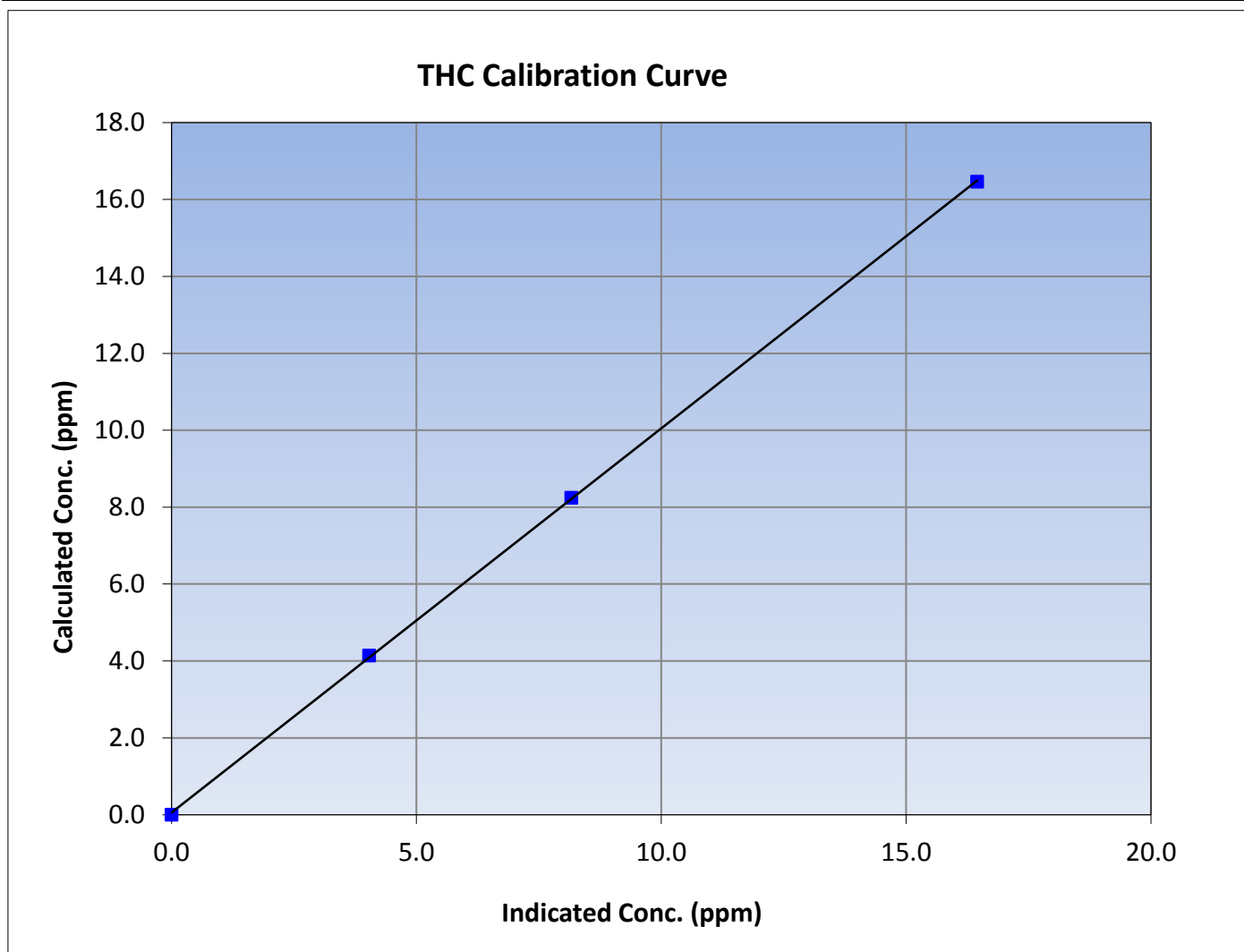
Version-02-2017

### Station Information

Calibration Date	October 23, 2017	Previous Calibration	September 25, 2017
Station Name	Patricia McInnes	Station Number	AMS 06
Start Time (MST)	11:00	End Time (MST)	13:26
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.00	0.00	----	Correlation Coefficient	0.999945	$\geq 0.995$			
16.46	16.45	1.0007						
8.25	8.16	1.0105				Slope	0.999112	0.90 - 1.10
4.14	4.04	1.0260						
			Intercept	0.057051	$\pm 0.5$			





# Wood Buffalo Environmental Association

## CH<sub>4</sub> Calibration Summary

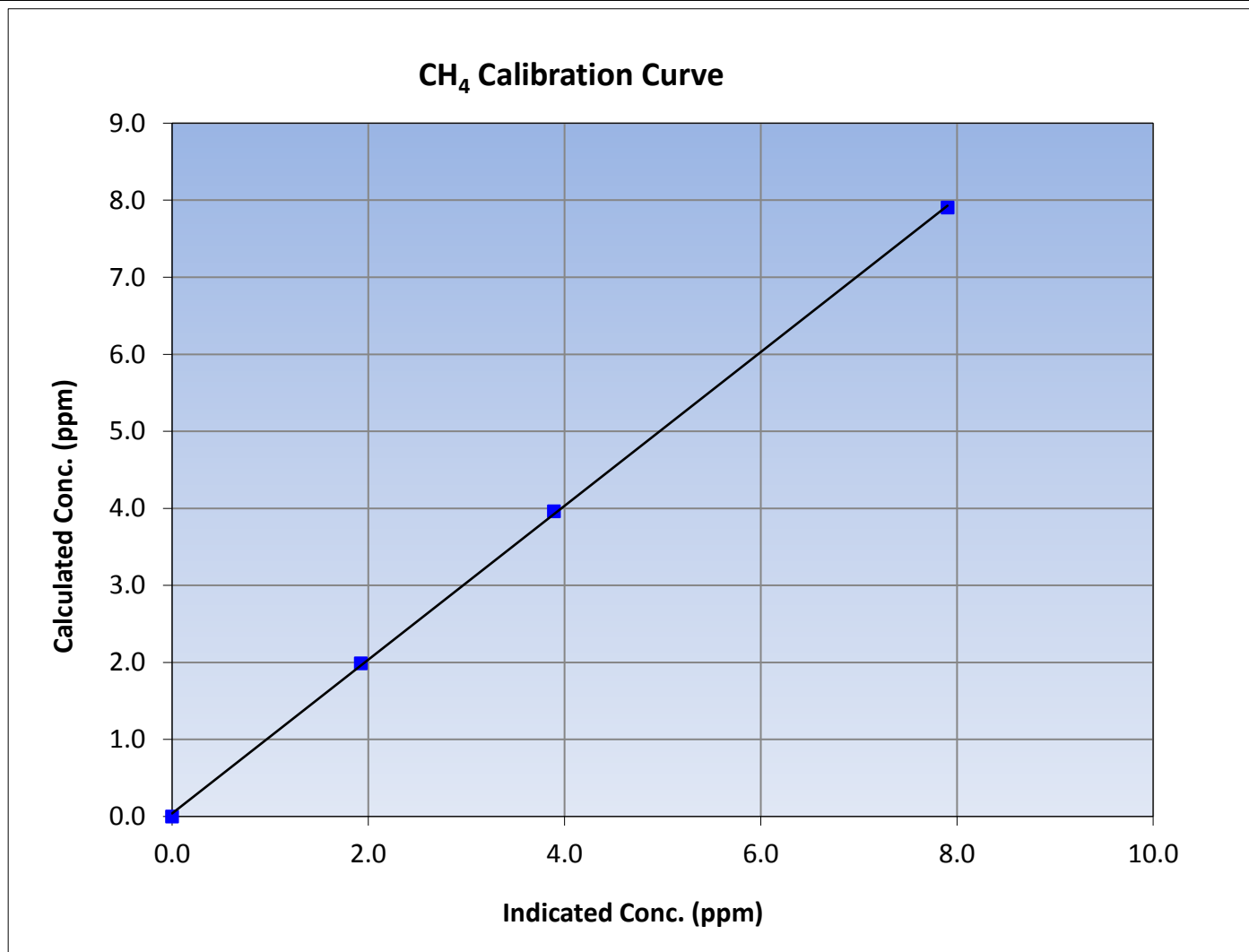
Version-02-2017

### Station Information

Calibration Date	October 23, 2017	Previous Calibration	September 25, 2017
Station Name	Patricia McInnes	Station Number	AMS 06
Start Time (MST)	11:00	End Time (MST)	13:26
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.00	0.00	----	Correlation Coefficient	0.999879	<i>≥0.995</i>			
7.90	7.90	1.0001						
3.96	3.89	1.0172				Slope	0.998153	<i>0.90 - 1.10</i>
1.99	1.92	1.0334						
			Intercept	0.039228	<i>+/-0.5</i>			







# Wood Buffalo Environmental Association

## NMHC Calibration Summary

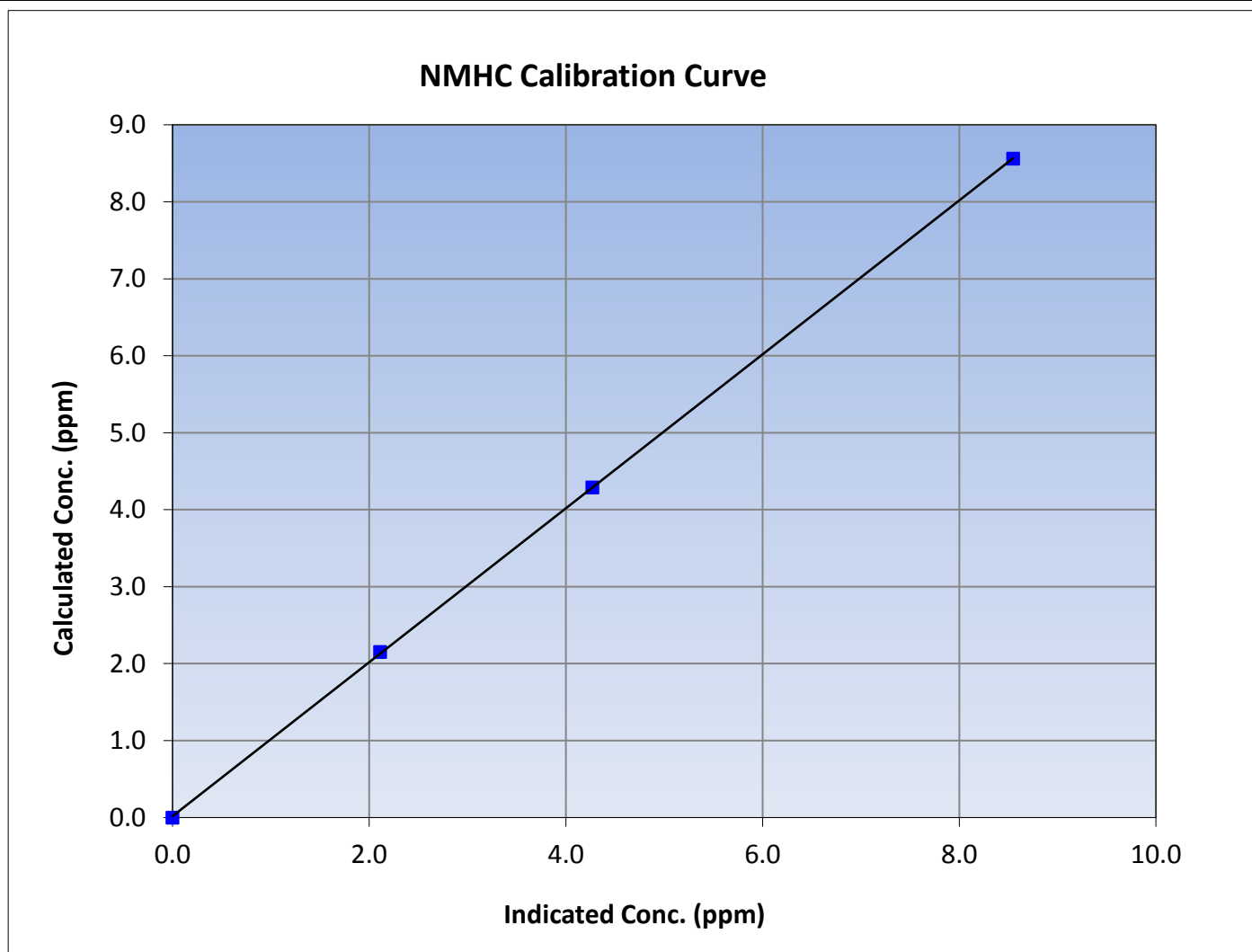
Version-02-2017

### Station Information

Calibration Date	October 23, 2017	Previous Calibration	September 25, 2017
Station Name	Patricia McInnes	Station Number	AMS 06
Start Time (MST)	11:00	End Time (MST)	13:26
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

### Calibration Data

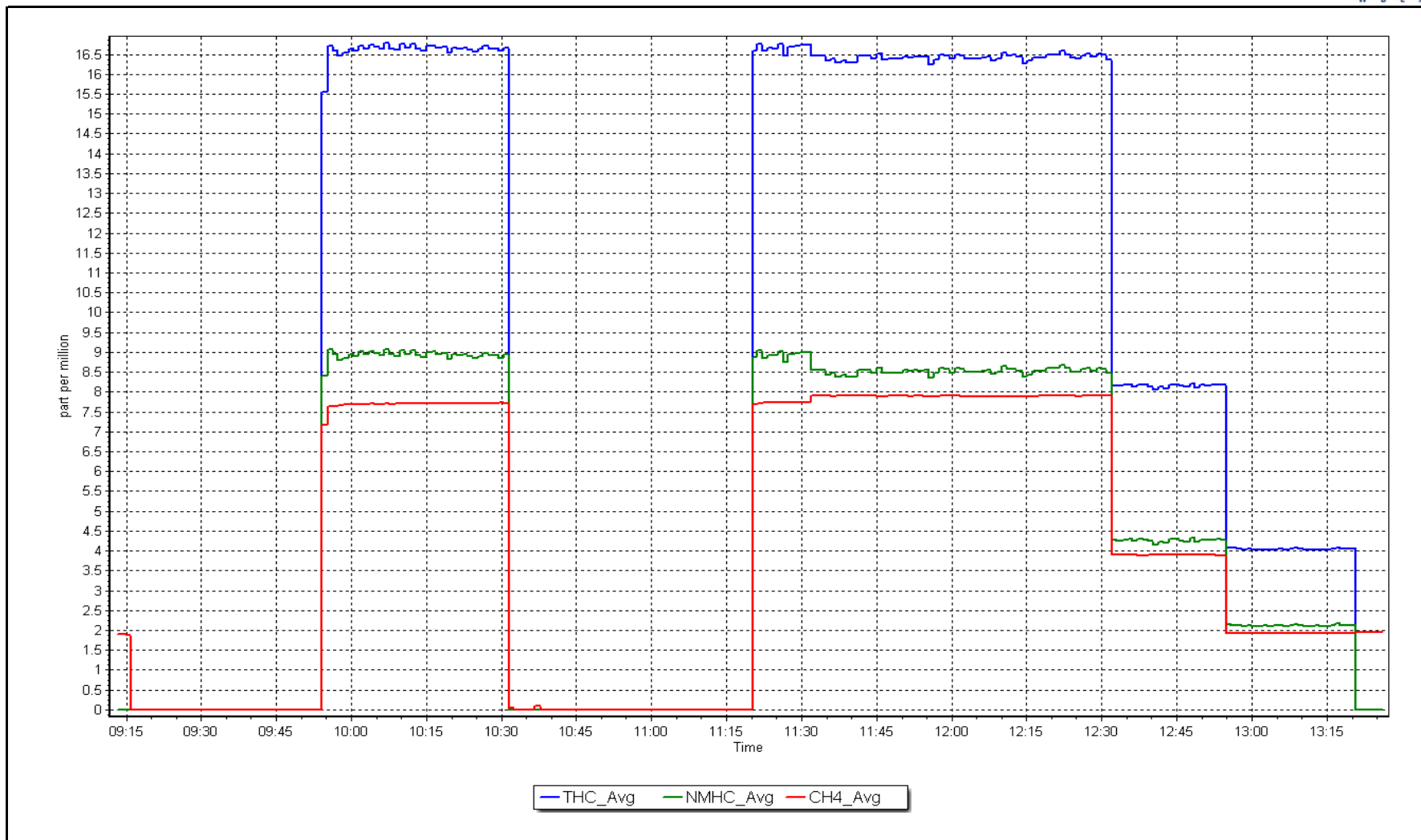
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.00	0.00	----	Correlation Coefficient	0.999977	$\geq 0.995$			
8.56	8.55	1.0013						
4.29	4.27	1.0044				Slope	0.999930	0.90 - 1.10
2.15	2.11	1.0199						
			Intercept	0.018312	$\pm 0.5$			



NMHC Calibration Plot

Date: October 23, 2017

Location: Patricia McInnes







# Wood Buffalo Environmental Association

## O<sub>3</sub> Calibration Summary

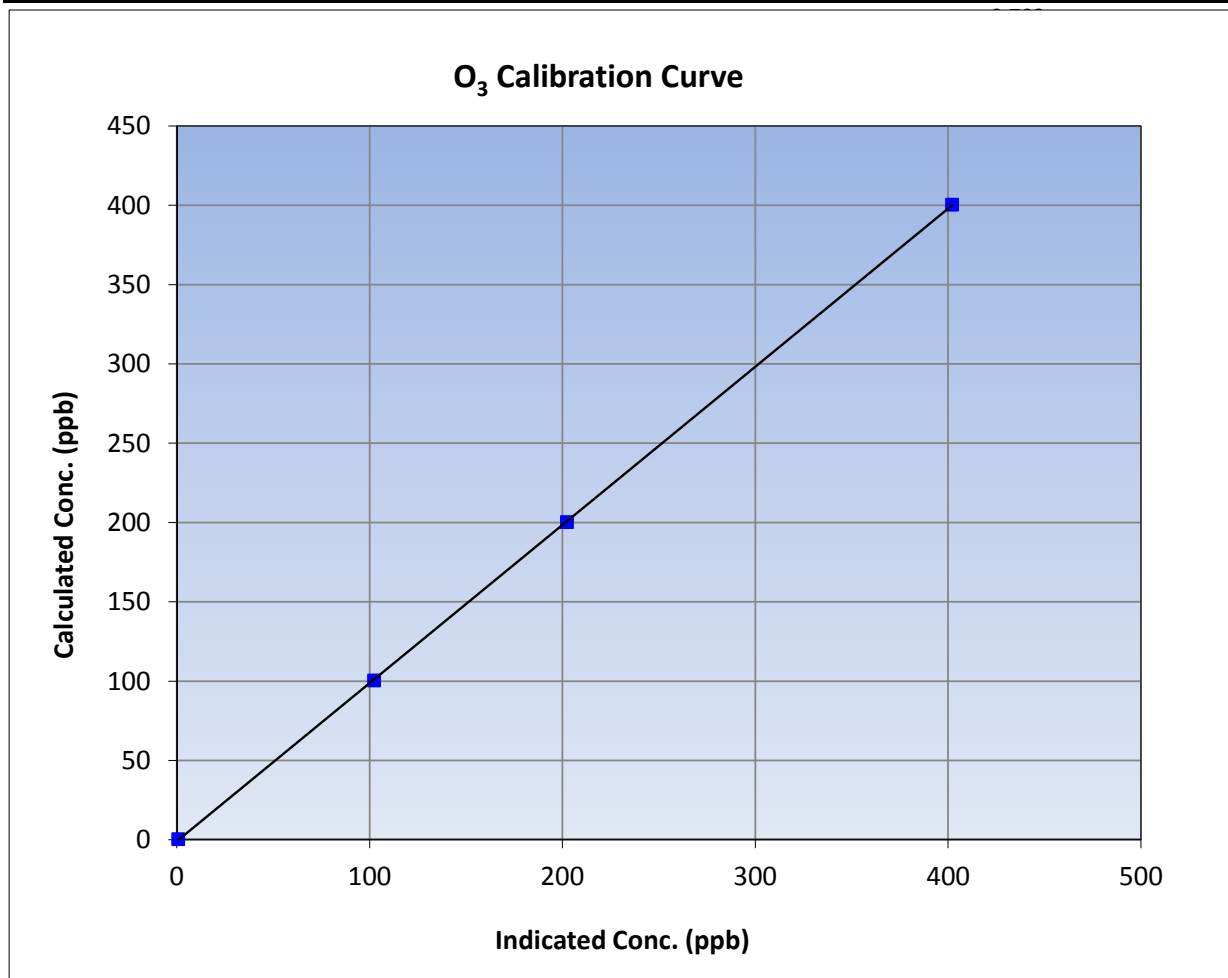
Version-03-2017

### Station Information

Calibration Date	October 18, 2017	Previous Calibration	September 20, 2017
Station Name	Patricia McInnes	Station Number	AMS 06
Start Time (MST)	11:24	End Time (MST)	14:52
Analyzer make	Thermo 49i	Analyzer serial #	1300156234

### Calibration Data

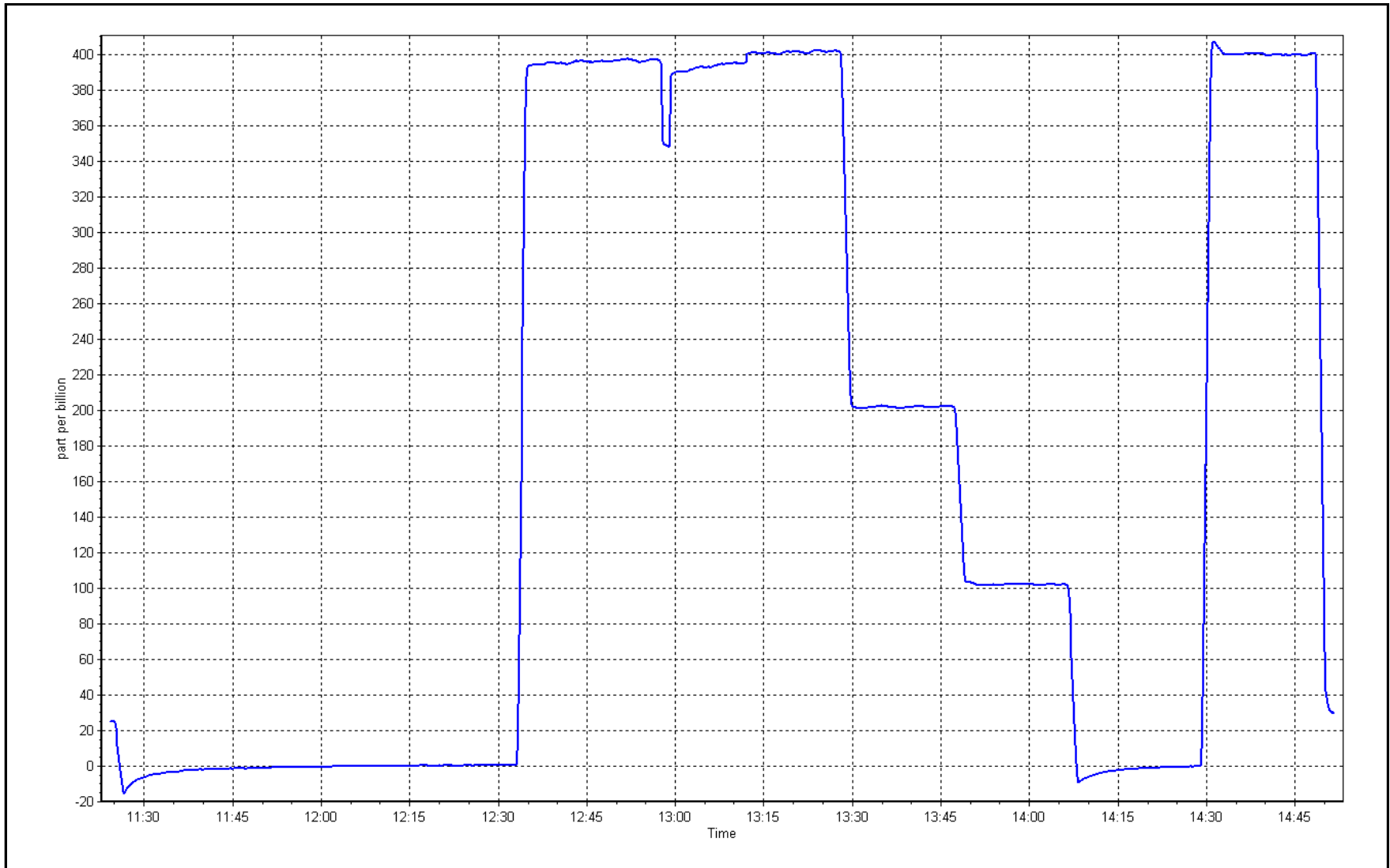
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>
0.0	0.3	----	Correlation Coefficient	≥0.995
400.0	401.7	0.9958		
200.0	202.0	0.9901	Slope	0.90 - 1.10
100.0	101.9	0.9814		
			Intercept	+/- 10



O<sub>3</sub> Calibration Plot

Date: October 18, 2017

Location: Patricia McInnes





# Wood Buffalo Environmental Association

## NO<sub>x</sub> - NO - NO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Patricia McInnes	Station number:	AMS 06
Calibration Date:	October 23, 2017	Last Cal Date:	September 25, 2017
Start time (MST):	9:13	End time (MST):	15:18
Reason:	Routine		

### Calibration Standards

NO Gas Cylinder #	LL57837	Cal Gas Expiry Date	August 18, 2020
NOX Cal Gas Conc.	<u>51.6</u> ppb	NO Cal Gas Conc.	<u>51.6</u> ppb
Calibrator Model	API T700	Serial Number	2449
ZAG make/model	API T701	Serial Number	260

### Analyzer Information

Analyzer make: Thermo 42i			Analyzer serial #: 1218153460		
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coefficient	1.015	1.005	NOX Range (ppb)	0 - 1000 ppb	
NOX coefficient	1.001	1.001	PMT Temperature	-3.0	-3.0
NO2 coefficient	1.000	1.000	Reaction cell Press	182.4	185.3
NO bkgrnd	2.8	2.7	Sample Flow	0.744	0.759
NOX bkgrnd	3.0	3.0	PMT Voltage	-772.6	-772.6

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope	0.997185	1.001114
NO <sub>x</sub> Cal Offset	-0.299156	1.792242
NO Cal Slope	0.997310	1.001333
NO Cal Offset	0.000000	1.891587
NO <sub>2</sub> Cal Slope	1.000026	0.999715
NO <sub>2</sub> Cal Offset	0.195175	0.774997



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

Version-03-2017

### Dilution Calibration Data

Set Point	Total flow rate (sccm)	9/18/17	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5500	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	----	----
as found span	5544	85.5	795.8	795.8	0.0	810.8	809.9	0.9	0.9815	0.9826
calibrator zero	5500	0.0	0.0	0.0	0.0	0.2	0.0	0.2	----	----
high point	5544	85.4	794.8	794.8	0.0	793.3	792.9	0.3	1.0020	1.0025
second point	5544	42.8	398.4	398.4	0.0	394.7	394.8	0.0	1.0093	1.0090
third point	5544	21.5	200.1	200.1	0.0	196.4	196.2	0.2	1.0189	1.0199
as left zero										
as left span										
<b>Average Correction Factor</b>									<b>1.0100</b>	<b>1.0105</b>

Corrected As found	NO <sub>x</sub> = 810.8 ppb	NO = 810.0 ppb		*Percent Change	NO <sub>x</sub> = -1.5%
Previous Response	NO <sub>x</sub> = 798.3 ppb	NO = 797.9 ppb		*Percent Change	NO = -1.5%

\* = > +/-5% change initiates investigation

### GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
1st NO ref point		0.0	790.2	788.4	1.8	1.0059	1.0082	----	----
1st NO2 (400 ppb O3)	390.1	398.3	788.2	390.1	398.1	1.0084	----	1.0005	99.9%
2nd NO2 (200 ppb O3)	585.9	202.5	787.3	585.9	201.4	1.0096	----	1.0055	99.5%
3rd NO2 (100 ppb O3)	685.2	103.2	786.7	685.2	101.4	1.0104	----	1.0178	98.3%
2nd NO ref point	----	0.0	785.6	784.2	1.4	1.0118	1.0136	----	----
<b>Average Correction Factor</b>						<b>1.0100</b>	<b>1.0109</b>	<b>1.0079</b>	<b>99.2%</b>

**Notes:** Long points as an NH3 cal ran as well. No As Lefts as NH3 cal was continued.

Calibration Performed By: Ryan Power



# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

Version-03-2017

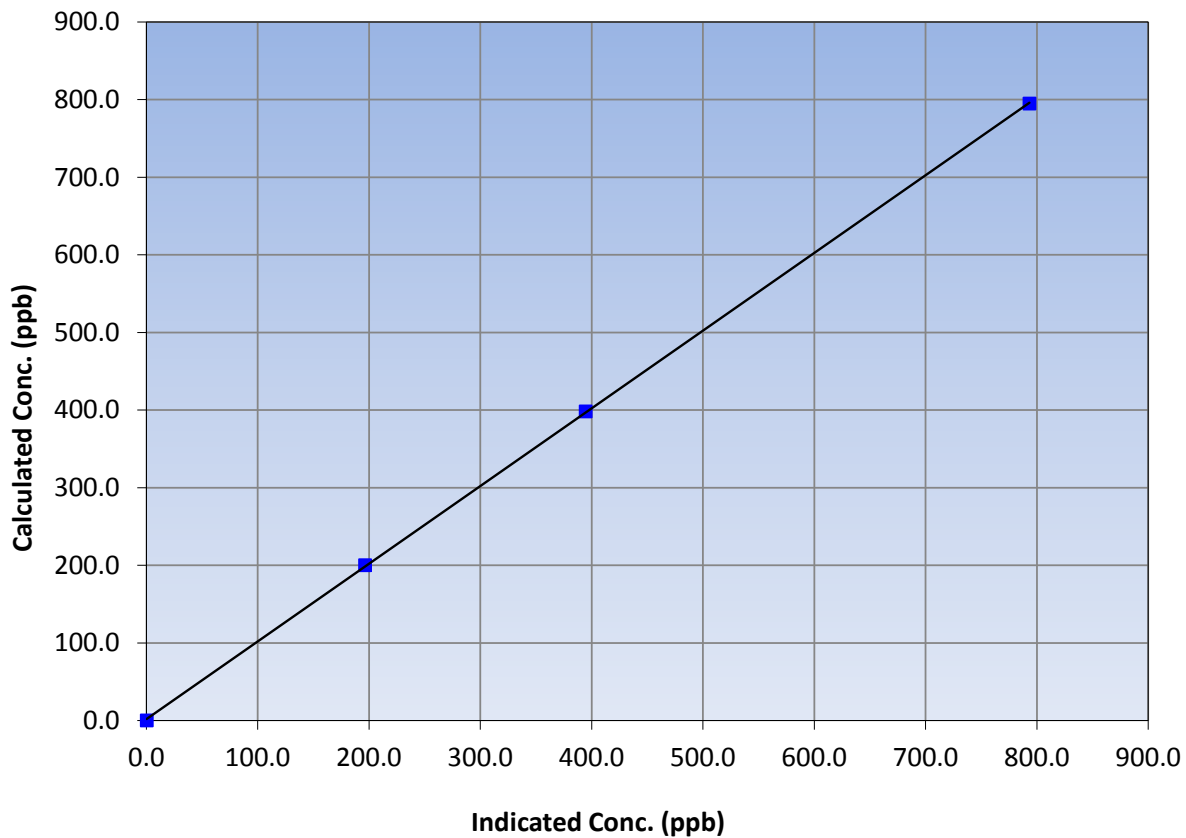
### Station Information

Calibration Date	October 23, 2017	Previous Calibration	September 25, 2017
Station Name	September 25, 2017	Station Number	9/18/17
Start Time (MST)	11:00	End Time (MST)	
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.2	----	Correlation Coefficient	≥0.995	
794.8	793.3	1.0020			
398.4	394.7	1.0093			
200.1	196.4	1.0189			
			Slope	1.001114	0.90 - 1.10
			Intercept	1.792242	+/-20

NO<sub>x</sub> Calibration Curve







# Wood Buffalo Environmental Association

## NO Calibration Summary

Version-03-2017

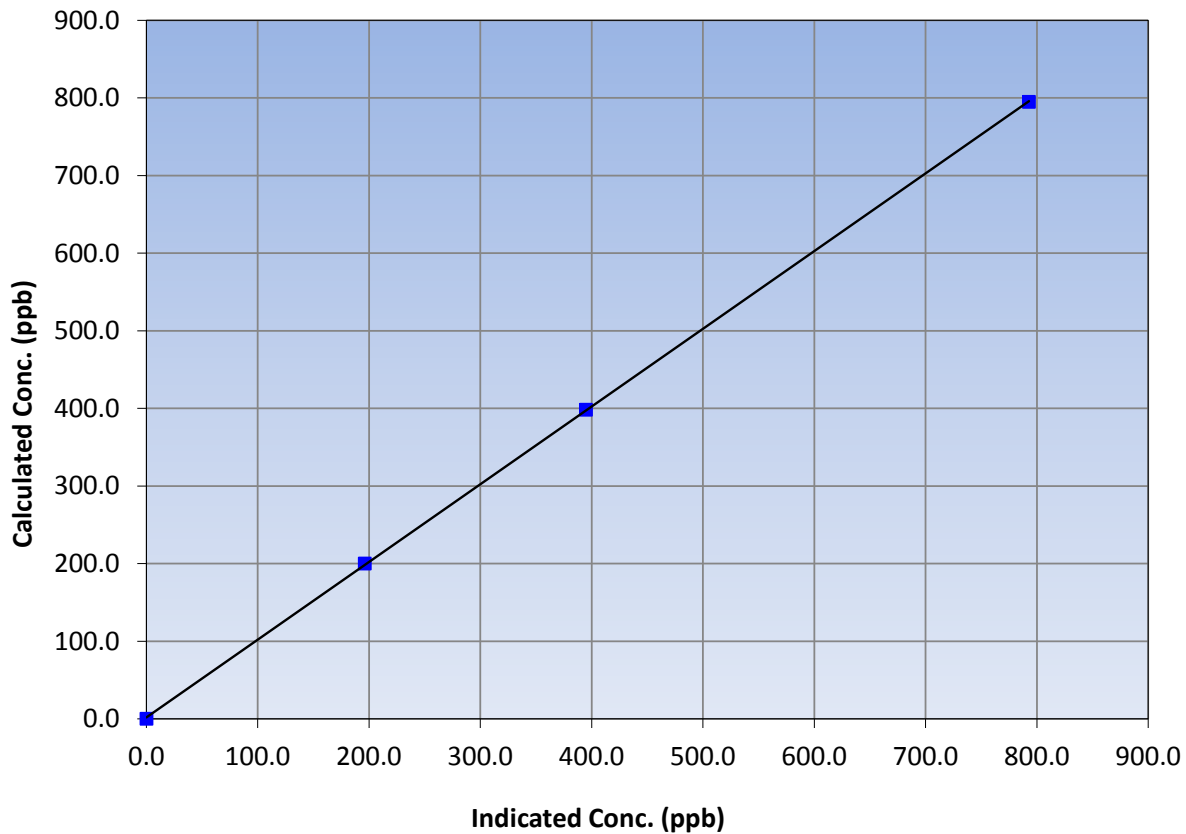
### Station Information

Calibration Date	October 23, 2017	Previous Calibration	September 25, 2017
Station Name	September 25, 2017	Station Number	9/18/17
Start Time (MST)	11:00	End Time (MST)	
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.0	----	Correlation Coefficient	≥0.995	
794.8	792.9	1.0025			
398.4	394.8	1.0090			
200.1	196.2	1.0199			
			Slope	1.001333	0.90 - 1.10
			Intercept	1.891587	+/-20

NO Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

Version-03-2017

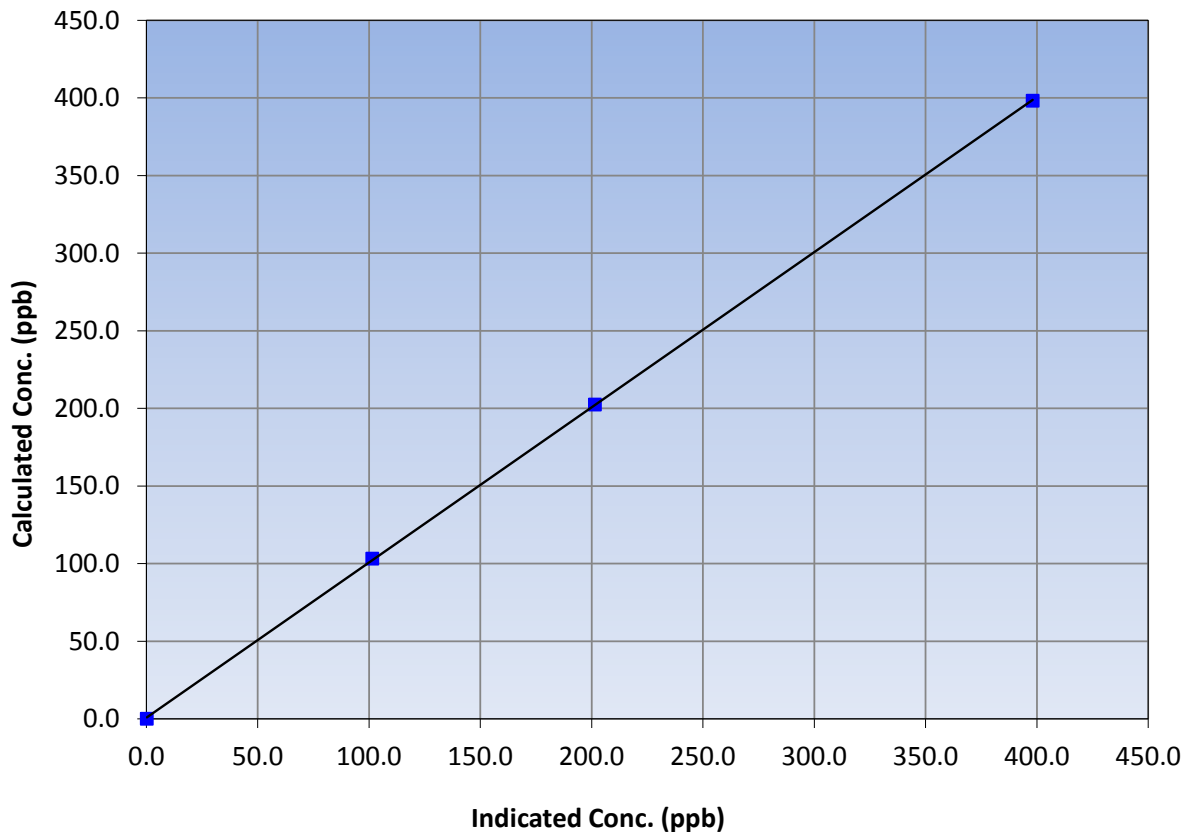
### Station Information

Calibration Date	October 23, 2017	Previous Calibration	September 25, 2017
Station Name	September 25, 2017	Station Number	9/18/17
Start Time (MST)	11:00	End Time (MST)	
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	0.2	----	Correlation Coefficient	≥0.995	
398.3	398.1	1.0005			
202.5	201.4	1.0055			
103.2	101.4	1.0178			
			Slope	0.999715	0.90 - 1.10
			Intercept	0.774997	+/-20

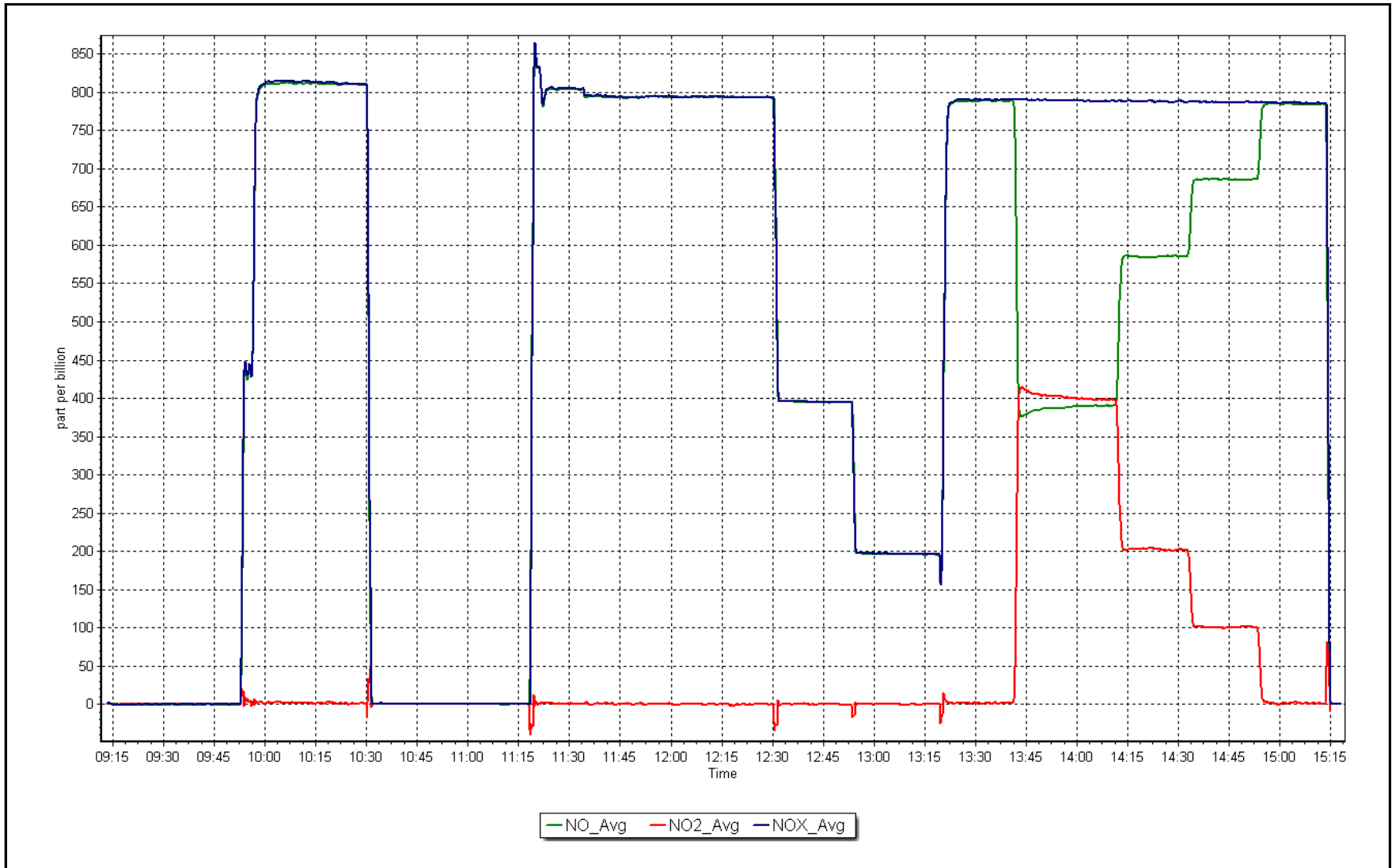
NO<sub>2</sub> Calibration Curve



NO<sub>x</sub> Calibration Plot

Date: October 23, 2017

Location: Patricia McInnes





# Wood Buffalo Environmental Association

## SHARP PM<sub>2.5</sub> CALIBRATION

Version-02-2017

### Station Information

Station Name:	Patricia McInnes	Station number:	AMS 06
Calibration Date:	October 23, 2017	Last Cal Date:	September 25, 2017
Start time (MST):	15:20	End time (MST):	18:30
Sharp Model:	Thermo SHARP 5030	S/N:	E-1475
Particulate Fraction:	PM2.5	C14 Source S/N:	5680
Flow Meter Make/Model:	Delta Cal	S/N:	1451
Temp/RH standard:	Delta Cal	S/N:	1451

### Monthly Calibration Test

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<b>(Limits)</b>
T1 (°C)	9	9.6	9	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	980	977	980	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	991.8	1000	<input checked="" type="checkbox"/> x	+/- 50 LPH
Nephelometer zero	-0.4	-----	0	<input checked="" type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified	<input checked="" type="checkbox"/>			
Cyclone cleaning :	PM10 Cyclone	<input checked="" type="checkbox"/>	PM2.5 Cyclone	<input checked="" type="checkbox"/>	
Date Filter Tape Installed:					

### Quarterly Calibration Test

Leak Test:	Date of check:	<u>August 10, 2017</u>	Last Cal Date:	<u>June 7, 2017</u>
	Flow w/o adaptor:	<u>16.58</u>	Flow w/ adaptor:	<u>16.44</u>

**(Limit) 0.4 LPM**

<u>Adjusted</u>	<u>Current Test</u>	<u>Previous Test</u>	<u>% Change</u>
<input checked="" type="checkbox"/>	Foil S/N: <u>2597</u>	Foil S/N: <u>2597</u>	
	Foil Mass: <u>1167</u>	Foil Mass: <u>1167</u>	
	Calibration Date: <u>October 23, 2017</u>	Calibration Date: <u>August 10, 2017</u>	
<b>(Limit) +/- 5% of previous</b>	Correction Factor: <u>6941</u>	Correction Factor: <u>6887</u>	0.78%

### Annual Calibration Test

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<b>(Limits)</b>
T2 (°C)				<input type="checkbox"/>	+/- 2 °C
T3 (°C)				<input type="checkbox"/>	+/- 2 °C
T4 (°C)				<input type="checkbox"/>	+/- 2 °C
RH (%)				<input type="checkbox"/>	+/- 10%

Date Sample Tube Cleaned:

Date Pump Rebuilt/Replaced:

Notes: Cyclone head cleaned. Tried to zero nephelometer, but multiple attempts kept coming back to -0.4, carried out foil test, zeroed fine. Flow with a small adjustment

Calibration by: Ryan Power



# Wood Buffalo Environmental Association

## TN - NO<sub>x</sub> - NH<sub>3</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Patricia McInnes	Station number:	AMS 06
NOX Cal Date:	October 23, 2017	Last Cal Date:	September 25, 2017
Start time (MST):	9:13	End time (MST):	
NH3 Cal Date:	October 23, 2017	Last Cal Date:	September 19, 2017
Start time (MST):	9:13	End time (MST):	
Reason:	Cylinder Change		

### Calibration Standards

NOX Cal Gas Conc.	<u>51.6</u>	ppb	NO Gas Cylinder #	LL87837
NO Cal Gas Conc.	<u>51.6</u>	ppb	NO Cal Gas Expiry	August 18, 2020
NH3 Cal Gas Conc.	<u>95.4</u>	ppm	NH3 Gas Cylinder #	SA25992
			NH3 Cal Gas Expiry	May 24, 2017
Calibrator Model	API T700		Serial Number	2449
ZAG make/model	API T701		Serial Number	260

### Analyzer Information

Analyzer make:	API T201	Analyzer serial #:	215		
Converter make:	API 501	Converter serial #:	217		
	<u>Start</u>	<u>Finish</u>			
NO coefficient	1.398		NH3 Range (ppb)	<u>Start</u>	<u>Finish</u>
NOX coefficient	1.466		NOX Range (ppb)	0 - 1000	ppb
NO2 coefficient	1.000		PMT Temperature	7.0	
NH3 coefficient	1.029		Reaction cell Press	4.4	
TN coefficient	1.441		Sample Flow	556	
NO bkgrnd	0.00		PMT Voltage	693	
NOX bkgrnd	0.000		Moly Temperature	315.8	
TN bkgrnd	0.9		NH3 Conv Temp	825	

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope	0.968394	0.999277
NO <sub>x</sub> Cal Offset	2.324145	2.860662
NO Cal Slope	0.990816	0.999960
NO Cal Offset	2.576123	3.599406
NO <sub>2</sub> Cal Slope	1.006439	1.002359
NO <sub>2</sub> Cal Offset	-0.208343	0.977291
NH3 Cal Slope	0.995822	1.011579
NH3 Cal Offset	2.323278	0.000000
TN Cal Slope	0.987104	1.005318
TN Cal Offset	2.275247	-0.201064



# Wood Buffalo Environmental Association

## TN - NOX - NH<sub>3</sub> Calibration Report

Version-03-2017

### Dilution Calibration Data

Set Point	Total flow rate (sccm)	Source gas flow rate (sccm)	Calculated TN concentration (ppb) (Cc)	Calculated NOX concentration (ppb) (Cc)	Calculated NH3 concentration (ppb) (Cc)	Indicated TN concentration (ppb) (Ic)	Indicated NOX concentration (ppb) (Ic)	Indicated NH3 concentration (ppb) (Ic)	TN Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NH3 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5543	0.0	0.0	0.0	0.0	-0.4	0.0	-0.4	----	----
as found NO	5544	85.5	795.8	795.8	----	801.3	815.0	-13.7	0.993	----
calibrator zero	5543	0.0	0.0	0.0	0.0	0.2	0.3	0.0	----	----
high NO point	5543	85.5	795.9	795.9	----	795.0	795.5	-0.4	1.001	----
NO/O3 point	5543	84.2	783.8	783.8	----	791.7	792.5	-0.7	0.990	----
as found NH3	4544	85.1	1786.7	NA	1786.7	1777.4	----	1766.2	1.005	1.012
first NH3	4544	85.1	1786.7	NA	1786.7	1777.4	----	1766.2	1.005	1.012
second NH3										
third NH3										

									Average Correction Factor	0.9956	1.0116
--	--	--	--	--	--	--	--	--	---------------------------	--------	--------

Corrected As found      TN = 801.7 ppb      NO<sub>x</sub> = 815.0 ppb      NH3 = 1766.6 ppb

Previous Response      TN = 803.9 ppb      NO<sub>x</sub> = 819.4 ppb      NH3 = 1791.8 ppb

NH3 Previous Converter Efficiency = 102.9 %

NH3 Current Converter Efficiency = %

\*Percent Change      TN = 0.3%

\*Percent Change      NO<sub>x</sub> = 0.5%

\*Percent Change      NH3 = 1.4%

\* = > +/-5% change initiates investigation



# Wood Buffalo Environmental Association

## NO<sub>x</sub> - NO - NO<sub>2</sub> Calibration Report

Version-03-2017

### Dilution Calibration Data

Set Point	Total flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO <sub>x</sub> concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated TN concentration (ppb) (Cc)	Indicated NO <sub>x</sub> concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated TN concentration (ppb) (Ic)	NO <sub>x</sub> Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5543	0.0	0.0	0.0	0.0	0.0	0.0	-0.4	----	----
as found span	5544	85.5	795.8	795.8	795.8	815.0	794.6	801.3	0.9764	1.0015
calibrator zero	5543	0.0	0.0	0.0	0.0	0.3	0.1	0.2	----	----
high point	5544	85.5	795.8	795.8	795.8	795.5	794.9	795.0	1.0004	1.0011
second point	5544	42.8	398.4	398.4	398.4	392.8	390.2	393.0	1.0141	1.0209
third point	5544	21.5	200.1	200.1	200.1	195.2	194.7	193.4	1.0251	1.0278
<b>Average Correction Factor</b>									<b>1.0132</b>	<b>1.0166</b>

Corrected As found	TN = 801.7 ppb	NO <sub>x</sub> = 815.0 ppb	NO = 794.6 ppb	*Percent Change	TN = 0.3%
Previous Response	TN = 803.9 ppb	NO <sub>x</sub> = 819.4 ppb	NO = 800.6 ppb	*Percent Change	NO <sub>x</sub> = 0.5%
				*Percent Change	NO = 0.8%

*\* = > +/-5% change initiates investigation*

### GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO <sub>2</sub> concentration (ppb) (Cc)	Indicated NO <sub>x</sub> concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO <sub>2</sub> concentration (ppb) (Ic)	NO <sub>x</sub> Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO <sub>2</sub> Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
1st NO ref point	----	0.0	792.5	795.9	-3.4	1.0041	0.9998	----	----
1st NO <sub>2</sub> (400 ppb O <sub>3</sub> )	386.2	409.7	794.6	386.2	408.3	1.0015	----	1.0034	99.7%
2nd NO <sub>2</sub> (200 ppb O <sub>3</sub> )	588.0	207.9	793.9	588.0	206.0	1.0024	----	1.0092	99.1%
3rd NO <sub>2</sub> (100 ppb O <sub>3</sub> )	691.2	104.7	793.4	691.2	102.2	1.0030	----	1.0245	97.6%
2nd NO ref point	----	0.0	801.2	797.7	3.6	0.9932	0.9976	----	----
<b>Average Correction Factor</b>						<b>1.0000</b>	<b>0.9987</b>	<b>1.0124</b>	<b>98.8%</b>

**Notes:**

CalGas change after NH<sub>3</sub> As Finds. Span adjusted.

Calibration Performed By:

Ryan Power



# Wood Buffalo Environmental Association

## TN Calibration Summary

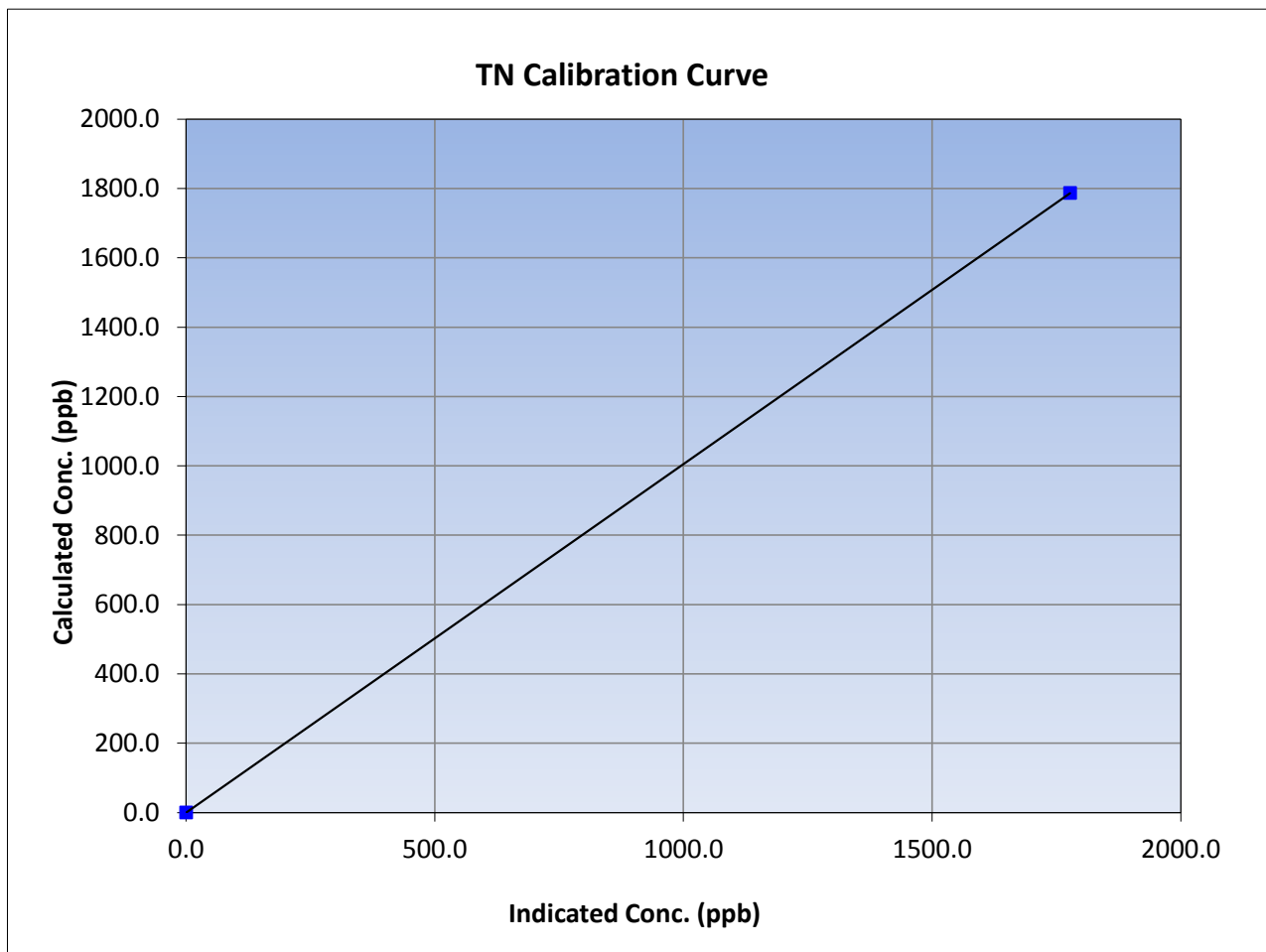
Version-03-2017

### Station Information

Calibration Date	October 23, 2017	Previous Calibration	September 25, 2017
Station Name	Patricia McInnes	Station Number	AMS 06
Start Time (MST)	9:13	End Time (MST)	0:00
Analyzer make	API T201	Analyzer serial #	215

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	0.2	----	Correlation Coefficient	1.000000	
1786.7	1777.4	1.0052			≥0.995
			Slope	1.005318	0.90 - 1.10
			Intercept	-0.201064	+/-20







# Wood Buffalo Environmental Association

## NH<sub>3</sub> Calibration Summary

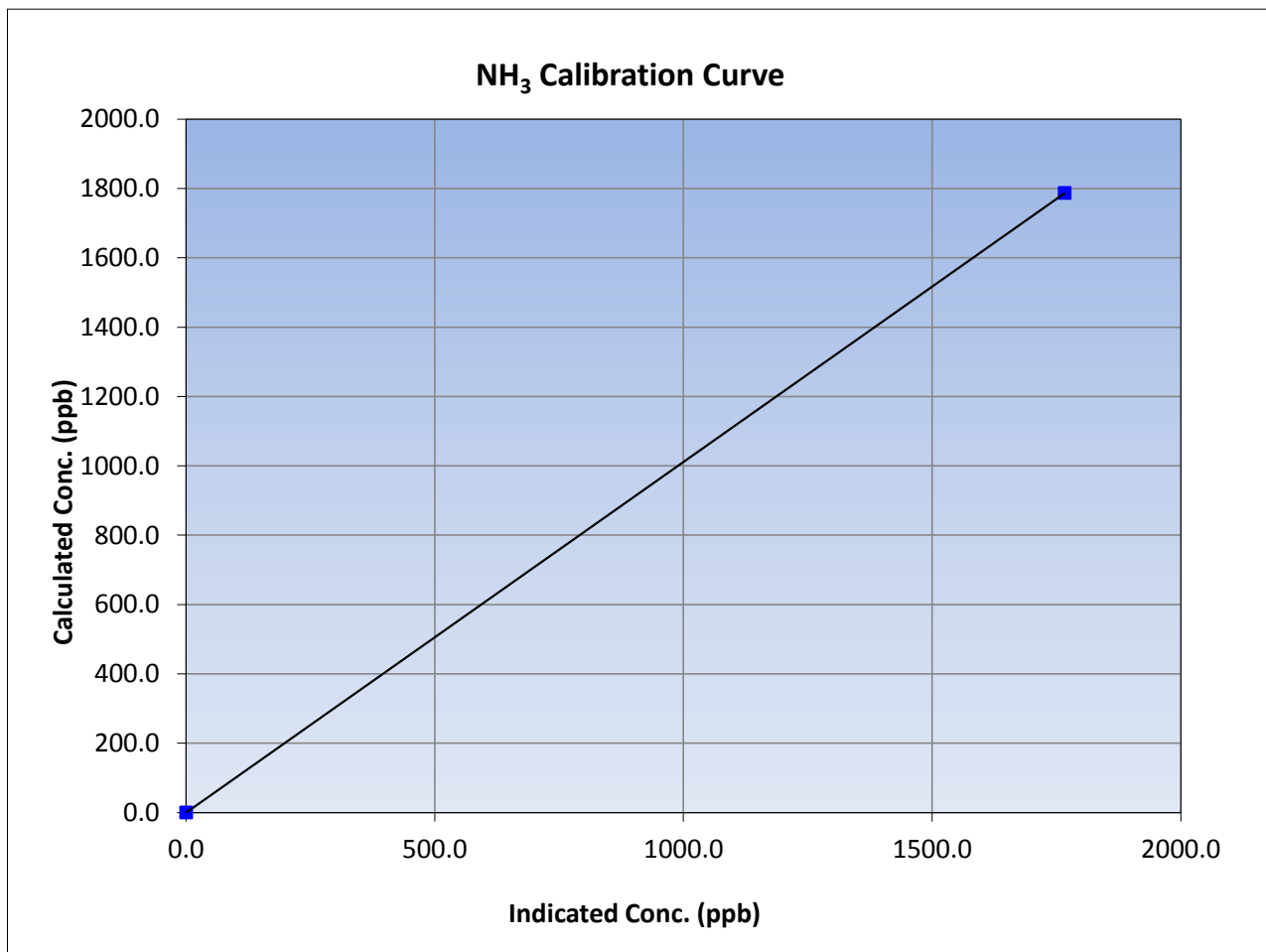
Version-03-2017

### Station Information

Calibration Date	October 23, 2017	Previous Calibration	September 25, 2017
Station Name	Patricia McInnes	Station Number	AMS 06
Start Time (MST)	9:13	End Time (MST)	0:00
Analyzer make	API T201	Analyzer serial #	215

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	0.0	----	Correlation Coefficient	1.000000	
1786.7	1766.2	1.0116			≥0.995
			Slope	1.011579	0.90 - 1.10
			Intercept	0.000000	+/-20





# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

Version-03-2017

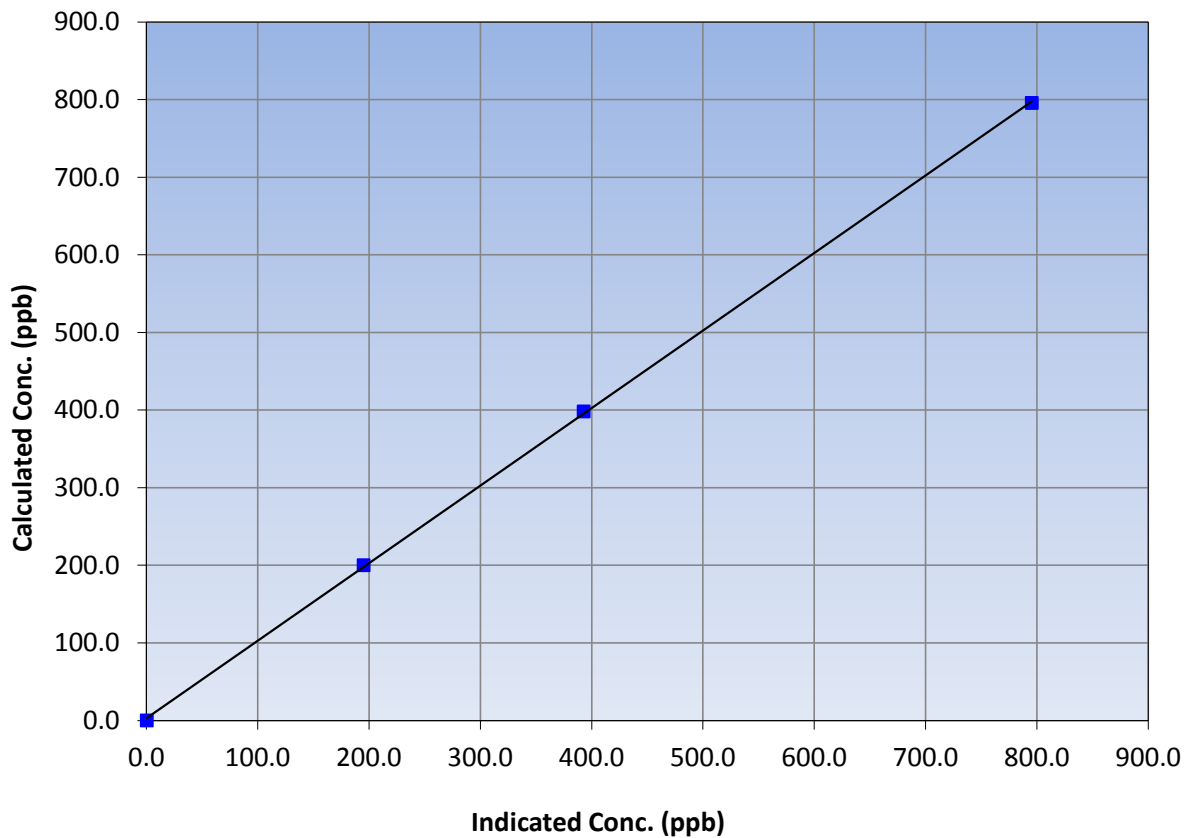
### Station Information

Calibration Date	October 23, 2017	Previous Calibration	September 25, 2017
Station Name	Patricia McInnes	Station Number	AMS 06
Start Time (MST)	9:13	End Time (MST)	
Analyzer make	API T201	Analyzer serial #	215

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	0.3	----	Correlation Coefficient	≥0.995	
795.8	795.5	1.0004			
398.4	392.8	1.0141			
200.1	195.2	1.0251			
			Slope	0.999277	0.90 - 1.10
			Intercept	2.860662	+/-20

NO<sub>x</sub> Calibration Curve





# Wood Buffalo Environmental Association

## NO Calibration Summary

Version-03-2017

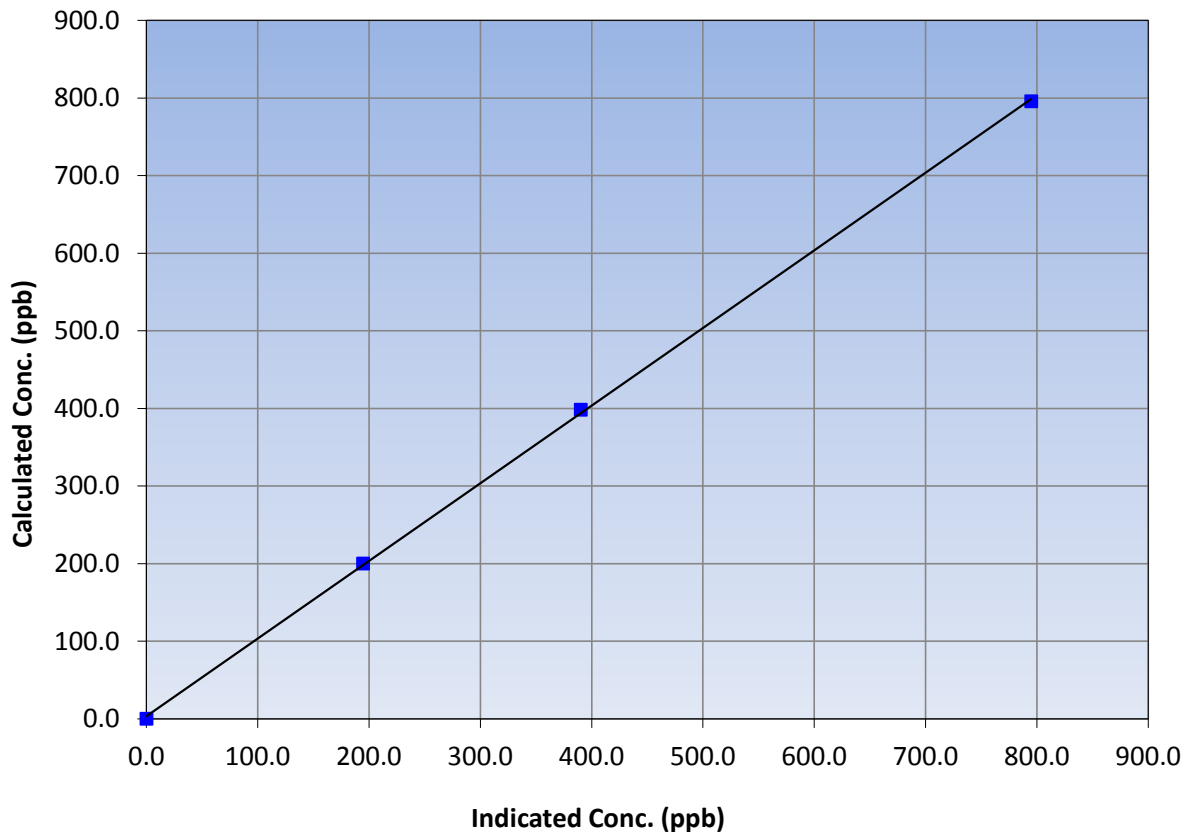
### Station Information

Calibration Date	October 23, 2017	Previous Calibration	September 25, 2017
Station Name	Patricia McInnes	Station Number	AMS 06
Start Time (MST)	9:13	End Time (MST)	
Analyzer make	API T201	Analyzer serial #	215

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	0.1	----	Correlation Coefficient	≥0.995	
795.8	794.9	1.0011			
398.4	390.2	1.0209			
200.1	194.7	1.0278			
			Slope	0.999960	0.90 - 1.10
			Intercept	3.599406	+/-20

NO Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

Version-03-2017

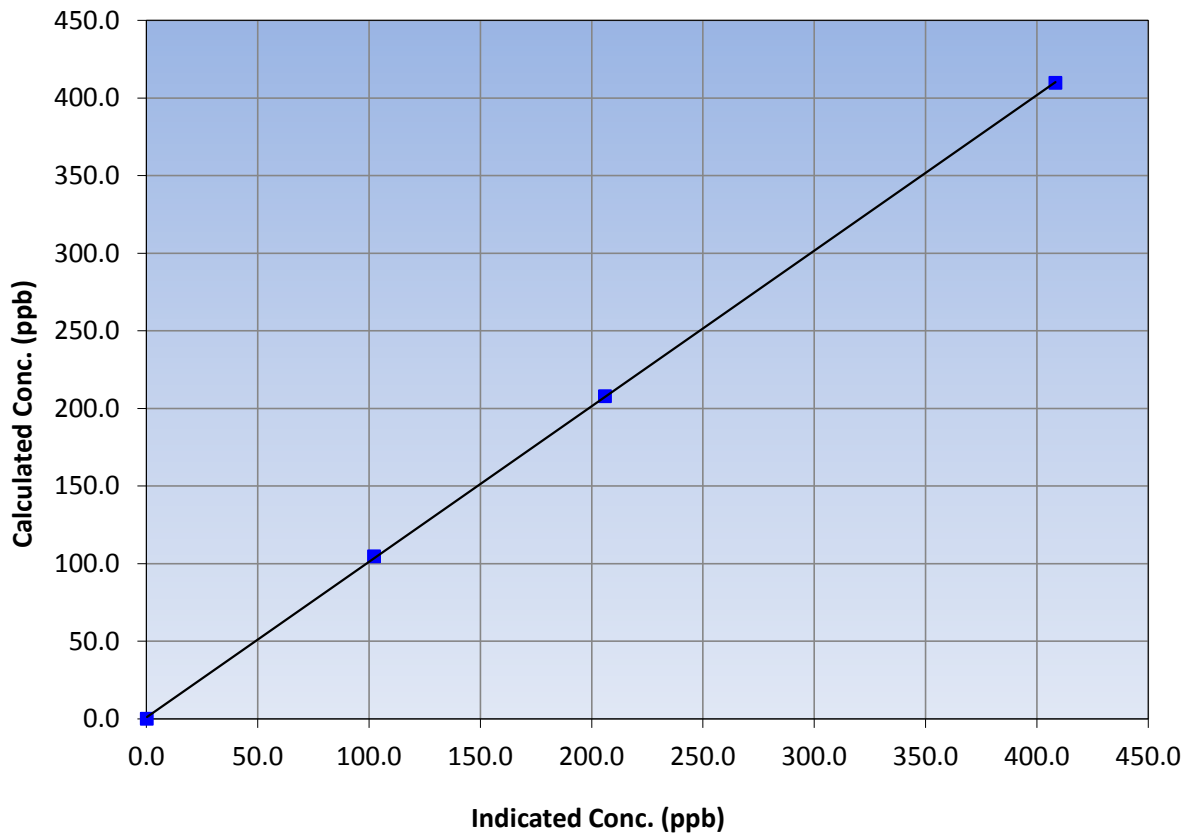
### Station Information

Calibration Date	October 23, 2017	Previous Calibration	September 25, 2017
Station Name	Patricia McInnes	Station Number	AMS 06
Start Time (MST)	9:13	End Time (MST)	
Analyzer make	API T201	Analyzer serial #	215

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>
0.0	0.2	----	Correlation Coefficient	≥0.995
409.7	408.3	1.0034		
207.9	206.0	1.0092		
104.7	102.2	1.0245		
			Slope	0.90 - 1.10
			Intercept	+/-20

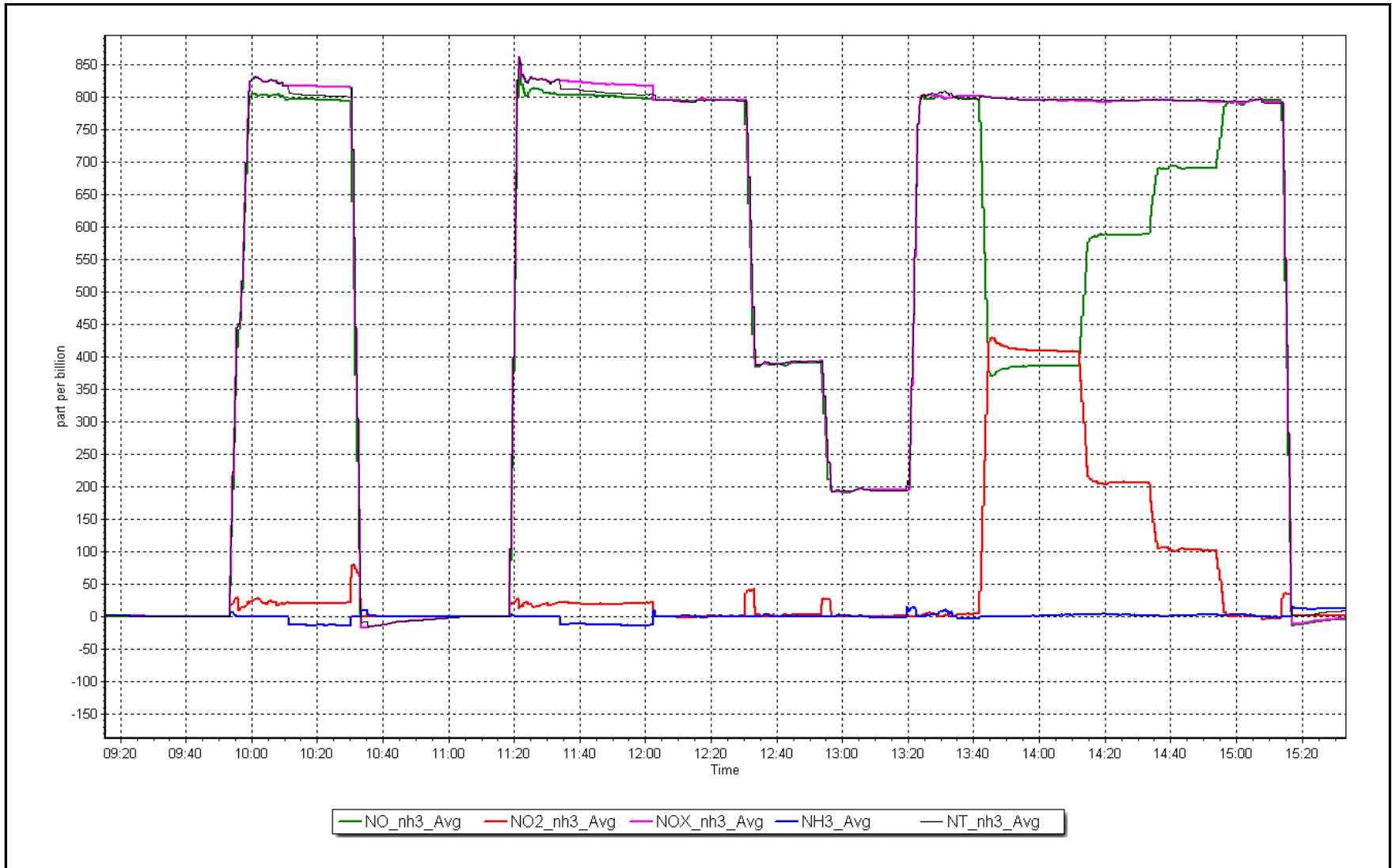
**NO<sub>2</sub> Calibration Curve**



NO<sub>x</sub> Calibration Plot

Date: October 23, 2017

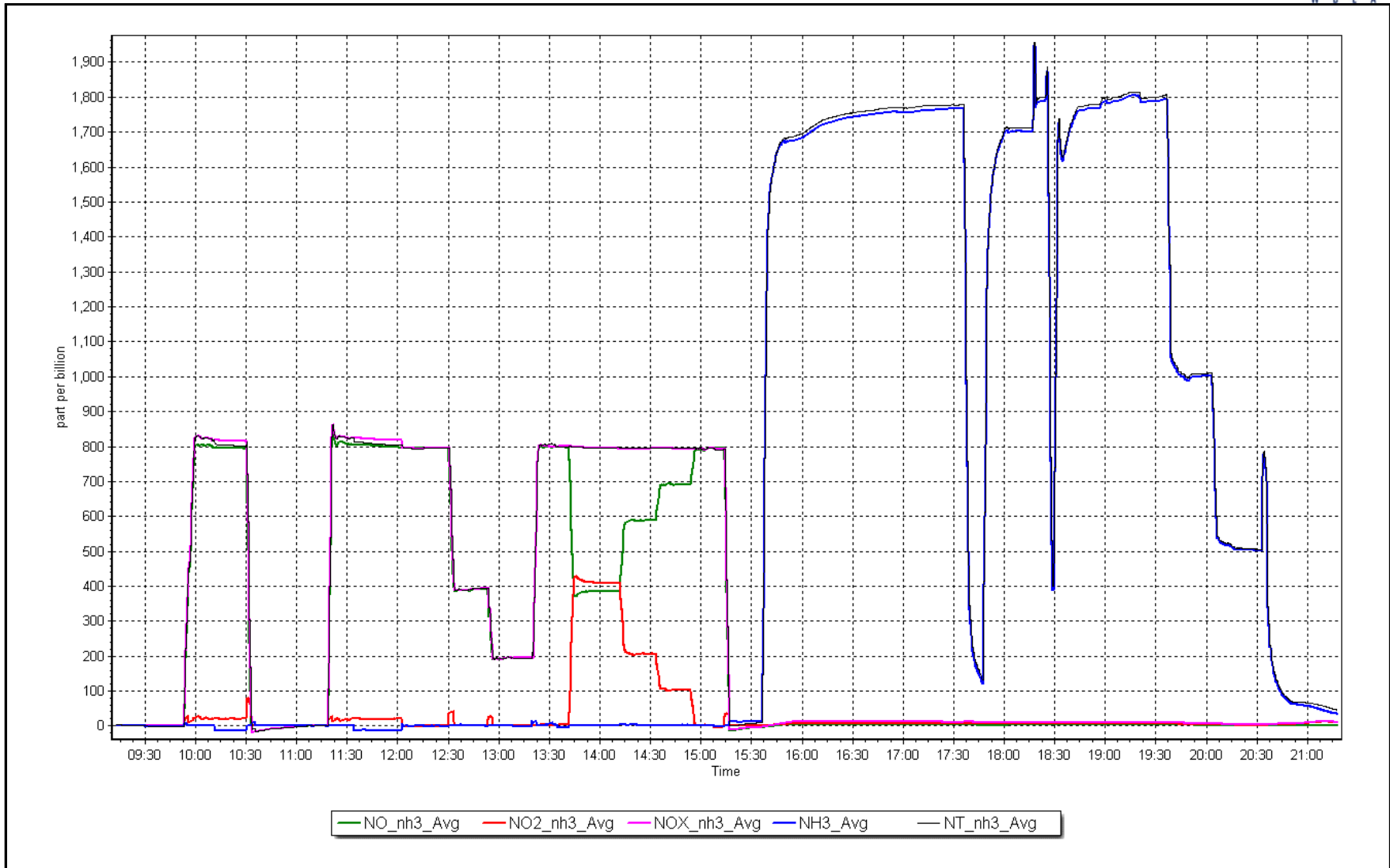
Location: Patricia McInnes



# NH<sub>3</sub> Calibration Plot

Date: October 23, 2017

Location: Patricia McInnes





# Wood Buffalo Environmental Association

## TN - NO<sub>x</sub> - NH<sub>3</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Patricia McInnes	Station number:	AMS 06
NOX Cal Date:	October 23, 2017	Last Cal Date:	September 25, 2017
Start time (MST):	9:13	End time (MST):	21:20
NH3 Cal Date:	October 23, 2017	Last Cal Date:	September 19, 2017
Start time (MST):	9:13	End time (MST):	21:20
Reason:	Cylinder Change		

### Calibration Standards

NOX Cal Gas Conc.	<u>51.6</u>	ppb	NO Gas Cylinder #	LL87837
NO Cal Gas Conc.	<u>51.6</u>	ppb	NO Cal Gas Expiry	August 18, 2020
NH3 Cal Gas Conc.	<u>72.9</u>	ppm	NH3 Gas Cylinder #	LL84697
			NH3 Cal Gas Expiry	September 26, 2018
Calibrator Model	API T700		Serial Number	2449
ZAG make/model	API T701		Serial Number	260

### Analyzer Information

Analyzer make:	API T201	Analyzer serial #:	215	
Converter make:	API 501	Converter serial #:	217	
	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
NO coefficient	1.398	1.401	NH3 Range (ppb)	0 - 2000 ppb
NOX coefficient	1.466	1.432	NOX Range (ppb)	0 - 1000 ppb
NO2 coefficient	1.000	1.000	PMT Temperature	7.0      7.0
NH3 coefficient	1.029	0.989	Reaction cell Press	4.4      4.4
TN coefficient	1.441	1.435	Sample Flow	556      547
NO bkgnd	0.00	0.0	PMT Voltage	693      693
NOX bkgnd	0.000	0.0	Moly Temperature	315.8      316.3
TN bkgnd	0.9	0.9	NH3 Conv Temp	825      825

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope	0.968394	0.999277
NO <sub>x</sub> Cal Offset	2.324145	2.860662
NO Cal Slope	0.990816	0.999960
NO Cal Offset	2.576123	3.599406
NO <sub>2</sub> Cal Slope	1.006439	1.002359
NO <sub>2</sub> Cal Offset	-0.208343	0.977291
NH3 Cal Slope	1.011579	0.997381
NH3 Cal Offset	0.000000	-2.949937
TN Cal Slope	1.005318	0.991350
TN Cal Offset	-0.201064	-3.209489



# Wood Buffalo Environmental Association

## TN - NO<sub>x</sub> - NH<sub>3</sub> Calibration Report

Version-03-2017

### Dilution Calibration Data

Set Point	Total flow rate (sccm)	Source gas flow rate (sccm)	Calculated TN concentration (ppb) (Cc)	Calculated NO <sub>x</sub> concentration (ppb) (Cc)	Calculated NH <sub>3</sub> concentration (ppb) (Cc)	Indicated TN concentration (ppb) (Ic)	Indicated NO <sub>x</sub> concentration (ppb) (Ic)	Indicated NH <sub>3</sub> concentration (ppb) (Ic)	TN Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NH <sub>3</sub> Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5543	0.0	0.0	0.0	0.0	-0.4	0.0	-0.4	----	----
as found NO	5544	85.5	795.8	795.8	----	801.3	815.0	-13.7	0.993	----
calibrator zero	5543	0.0	0.0	0.0	0.0	0.2	0.3	0.0	----	----
high NO point	5543	85.5	795.9	795.9	----	795.0	795.5	-0.4	1.001	----
NO/O <sub>3</sub> point	5543	84.2	783.8	783.8	----	791.7	792.5	-0.7	0.990	----
as found NH <sub>3</sub>	3535	86.6	1785.9	NA	1785.9	1712.0	----	1701.1	1.043	1.050
first NH <sub>3</sub>	3535	86.6	1785.9	NA	1785.9	1802.0	----	1791.0	0.991	0.997
second NH <sub>3</sub>	3538	48.2	993.2	NA	993.2	1009.0	----	1002.3	0.984	0.991
third NH <sub>3</sub>	3537	24.1	496.7	NA	496.7	506.1	----	502.9	0.981	0.988
<b>Average Correction Factor</b>									<b>0.9956</b>	<b>0.9919</b>

Corrected As found    TN = 801.7 ppb    NO<sub>x</sub> = 815.0 ppb    NH<sub>3</sub> = 1701.5 ppb

Previous Response    TN = 791.8 ppb    NO<sub>x</sub> = 819.4 ppb    NH<sub>3</sub> = 1765.5 ppb

NH<sub>3</sub> Previous Converter Efficiency = 102.9 %

NH<sub>3</sub> Current Converter Efficiency = 98.9 %

\*Percent Change    TN = -1.2%

\*Percent Change    NO<sub>x</sub> = 0.5%

\*Percent Change    NH<sub>3</sub> = 3.8%

\* = > +/-5% change initiates investigation





# Wood Buffalo Environmental Association

## NO<sub>x</sub> - NO - NO<sub>2</sub> Calibration Report

Version-03-2017

### Dilution Calibration Data

Set Point	Total flow rate (sccm)	Source gas flow rate (sccm)	Calculated NO <sub>x</sub> concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated TN concentration (ppb) (Cc)	Indicated NO <sub>x</sub> concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated TN concentration (ppb) (Ic)	NO <sub>x</sub> Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5543	0.0	0.0	0.0	0.0	0.0	0.0	-0.4	----	----
as found span	5544	85.5	795.8	795.8	795.8	815.0	794.6	801.3	0.9764	1.0015
calibrator zero	5543	0.0	0.0	0.0	0.0	0.3	0.1	0.2	----	----
high point	5544	85.5	795.8	795.8	795.8	795.5	794.9	795.0	1.0004	1.0011
second point	5544	42.8	398.4	398.4	398.4	392.8	390.2	393.0	1.0141	1.0209
third point	5544	21.5	200.1	200.1	200.1	195.2	194.7	193.4	1.0251	1.0278
<b>Average Correction Factor</b>									<b>1.0132</b>	<b>1.0166</b>

Corrected As found      TN = 801.7 ppb      NO<sub>x</sub> = 815.0 ppb      NO = 794.6 ppb  
 Previous Response      TN = 791.8 ppb      NO<sub>x</sub> = 819.4 ppb      NO = 800.6 ppb

\*Percent Change      TN = -1.2%  
 \*Percent Change      NO<sub>x</sub> = 0.5%  
 \*Percent Change      NO = 0.8%  
 \* = > +/-5% change initiates investigation

### GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO <sub>2</sub> concentration (ppb) (Cc)	Indicated NO <sub>x</sub> concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO <sub>2</sub> concentration (ppb) (Ic)	NO <sub>x</sub> Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO <sub>2</sub> Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
1st NO ref point	----	0.0	792.5	795.9	-3.4	1.0041	0.9998	----	----
1st NO <sub>2</sub> (400 ppb O <sub>3</sub> )	386.2	409.7	794.6	386.2	408.3	1.0015	----	1.0034	99.7%
2nd NO <sub>2</sub> (200 ppb O <sub>3</sub> )	588.0	207.9	793.9	588.0	206.0	1.0024	----	1.0092	99.1%
3rd NO <sub>2</sub> (100 ppb O <sub>3</sub> )	691.2	104.7	793.4	691.2	102.2	1.0030	----	1.0245	97.6%
2nd NO ref point	----	0.0	801.2	797.7	3.6	0.9932	0.9976	----	----
<b>Average Correction Factor</b>						<b>1.0000</b>	<b>0.9987</b>	<b>1.0124</b>	<b>98.8%</b>

**Notes:**

2nd GPT point used for reference. NH<sub>3</sub> cal gas changed after NH<sub>3</sub> As Found

Calibration Performed By:

Ryan Power



# Wood Buffalo Environmental Association

## TN Calibration Summary

Version-03-2017

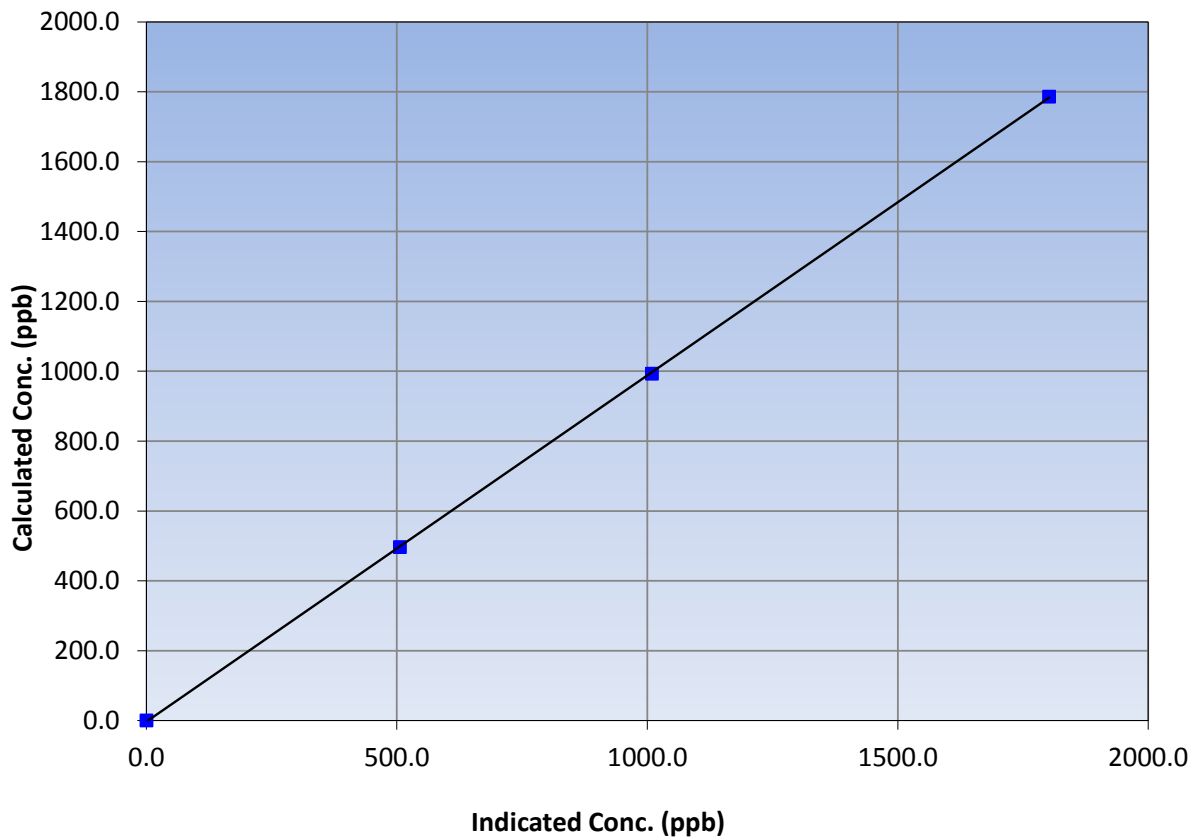
### Station Information

Calibration Date	October 23, 2017	Previous Calibration	September 25, 2017
Station Name	Patricia McInnes	Station Number	AMS 06
Start Time (MST)	9:13	End Time (MST)	21:20
Analyzer make	API T201	Analyzer serial #	215

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	0.2	----	Correlation Coefficient	≥0.995	
1785.9	1802.0	0.9911			
993.2	1009.0	0.9843			
496.7	506.1	0.9815			
			Slope	0.991350	0.90 - 1.10
			Intercept	-3.209489	+/-20

**TN Calibration Curve**





# Wood Buffalo Environmental Association

## NH<sub>3</sub> Calibration Summary

Version-03-2017

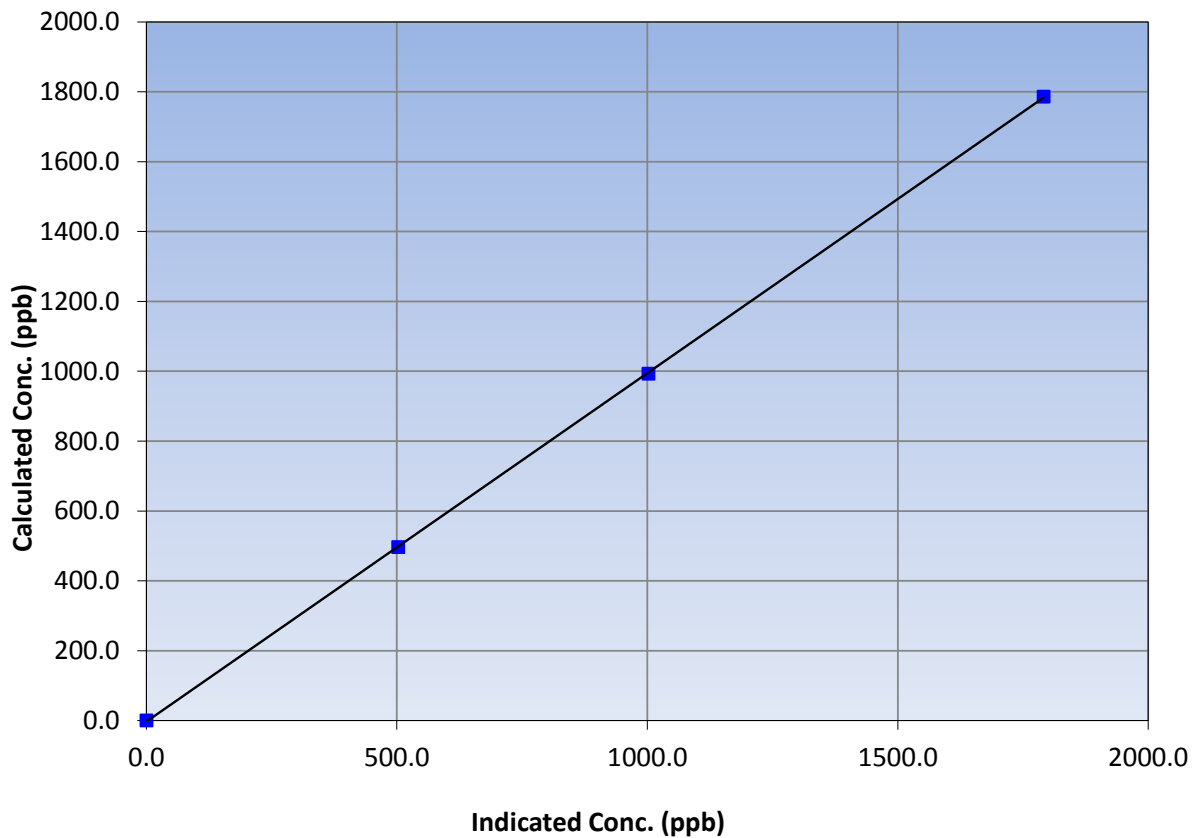
### Station Information

Calibration Date	October 23, 2017	Previous Calibration	September 25, 2017
Station Name	Patricia McInnes	Station Number	AMS 06
Start Time (MST)	9:13	End Time (MST)	21:20
Analyzer make	API T201	Analyzer serial #	215

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>
0.0	0.0	----	Correlation Coefficient Slope Intercept	≥0.995 0.90 - 1.10 +/-20
1785.9	1791.0	0.9971		
993.2	1002.3	0.9909		
496.7	502.9	0.9877		
			0.999982	
			0.997381	
			-2.949937	

NH<sub>3</sub> Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

Version-03-2017

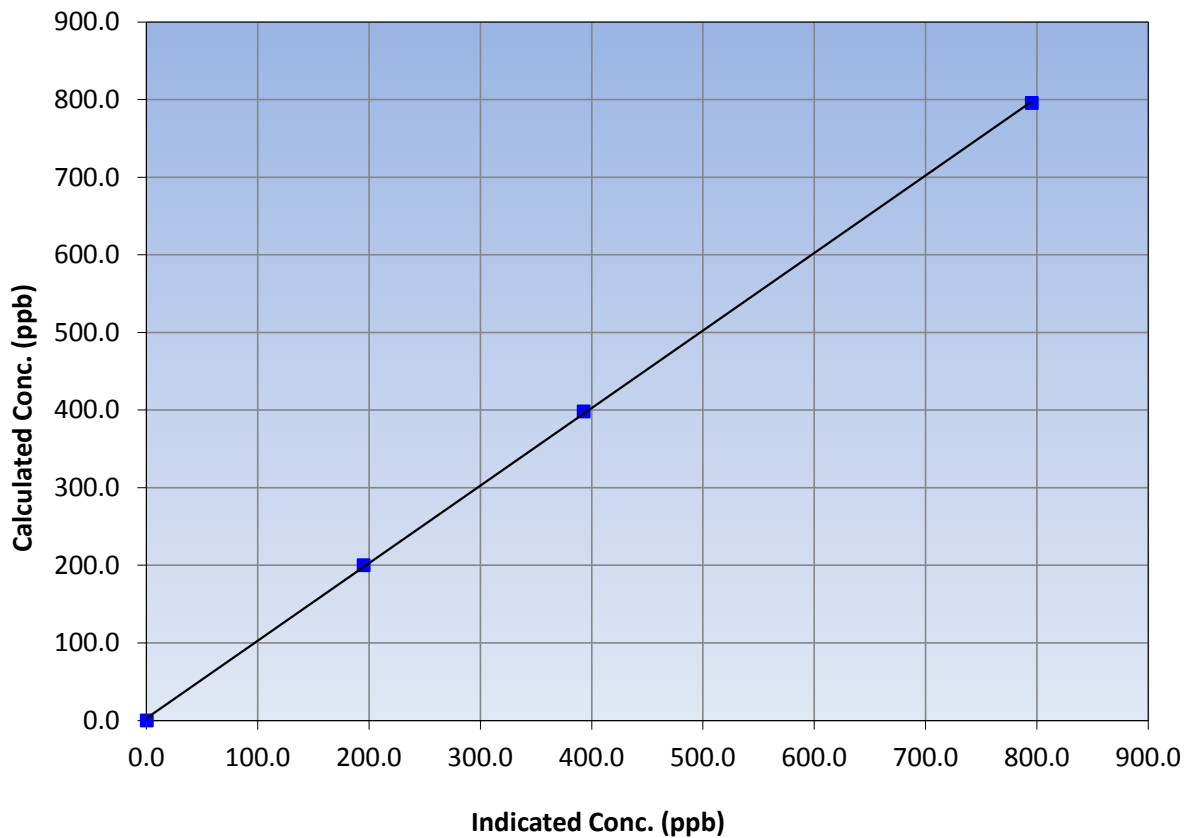
### Station Information

Calibration Date	October 23, 2017	Previous Calibration	September 25, 2017
Station Name	Patricia McInnes	Station Number	AMS 06
Start Time (MST)	9:13	End Time (MST)	21:20
Analyzer make	API T201	Analyzer serial #	215

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	0.3	----	Correlation Coefficient	≥0.995	
795.8	795.5	1.0004			
398.4	392.8	1.0141			
200.1	195.2	1.0251			
			Slope	0.999277	0.90 - 1.10
			Intercept	2.860662	+/-20

**NO<sub>x</sub> Calibration Curve**





# Wood Buffalo Environmental Association

## NO Calibration Summary

Version-03-2017

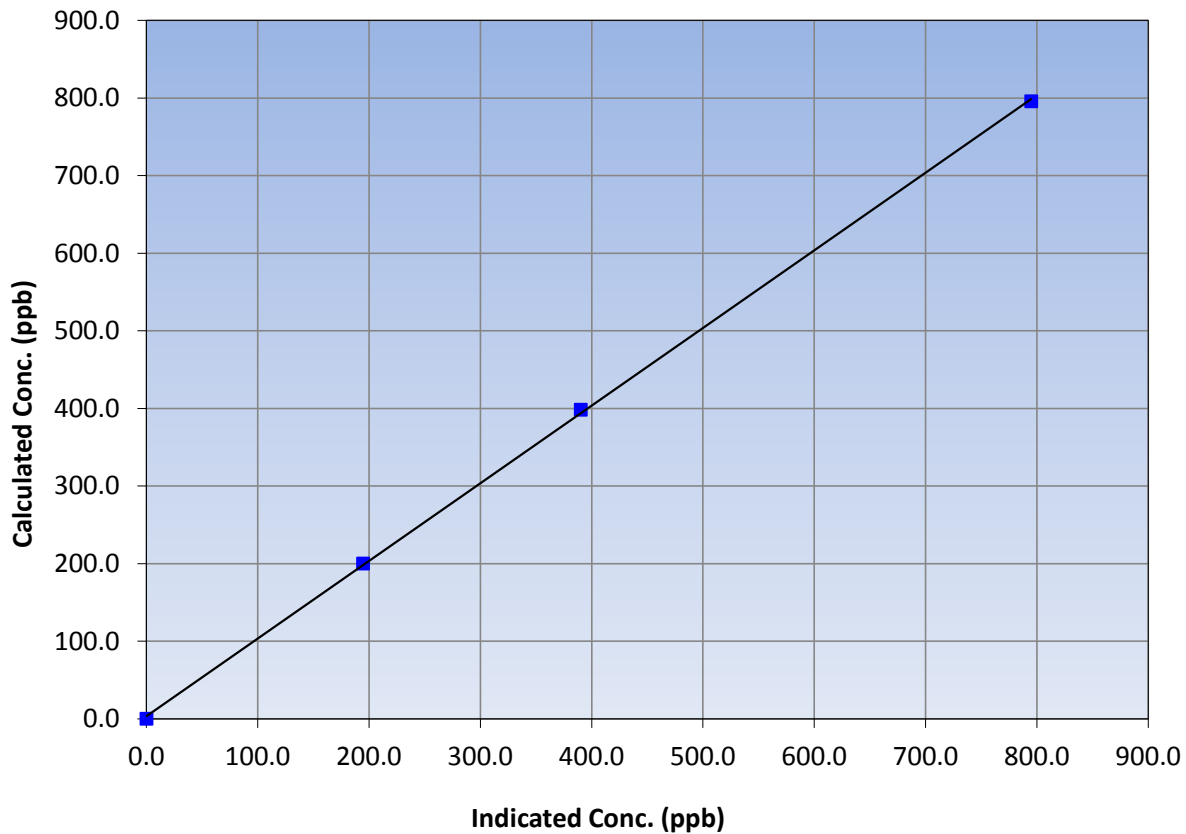
### Station Information

Calibration Date	October 23, 2017	Previous Calibration	September 25, 2017
Station Name	Patricia McInnes	Station Number	AMS 06
Start Time (MST)	9:13	End Time (MST)	21:20
Analyzer make	API T201	Analyzer serial #	215

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	0.1	----	Correlation Coefficient	≥0.995	
795.8	794.9	1.0011			
398.4	390.2	1.0209			
200.1	194.7	1.0278			
			Slope	0.999960	0.90 - 1.10
			Intercept	3.599406	+/-20

NO Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

Version-03-2017

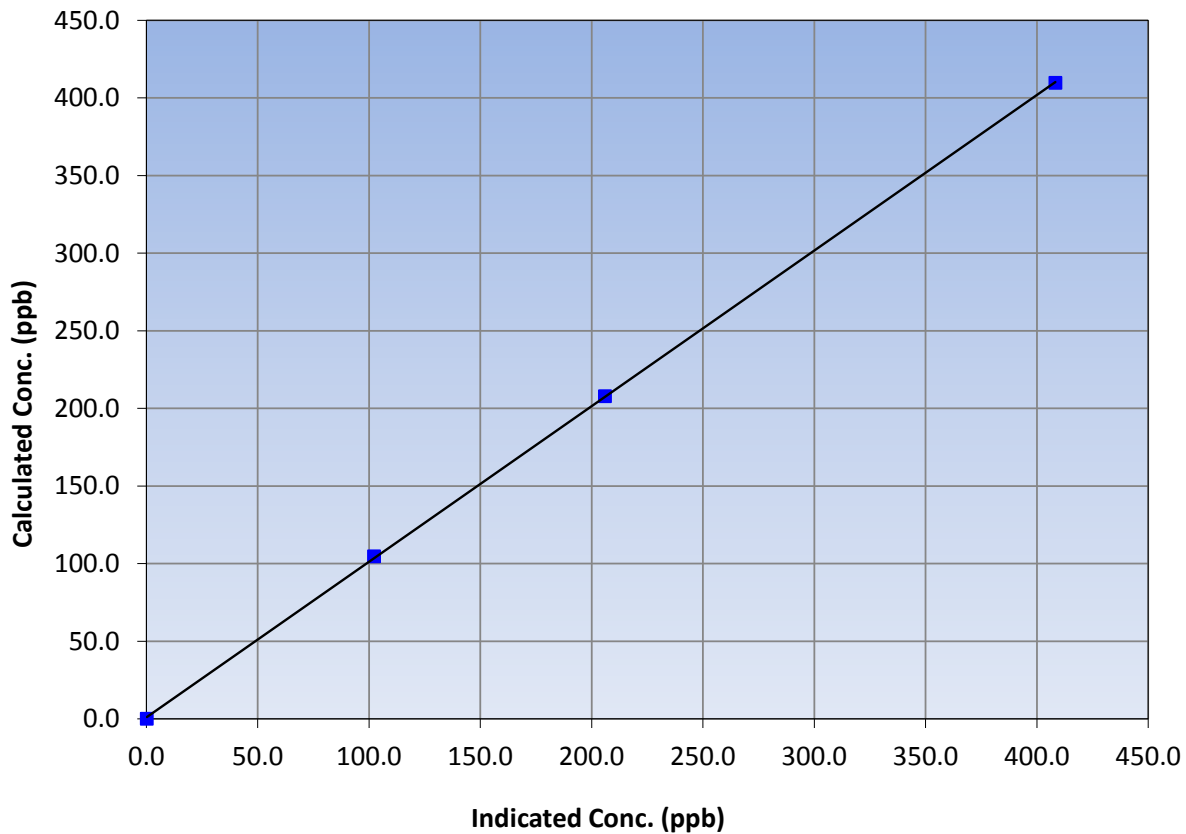
### Station Information

Calibration Date	October 23, 2017	Previous Calibration	September 25, 2017
Station Name	Patricia McInnes	Station Number	AMS 06
Start Time (MST)	9:13	End Time (MST)	21:20
Analyzer make	API T201	Analyzer serial #	215

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>
0.0	0.2	----	Correlation Coefficient	≥0.995
409.7	408.3	1.0034		
207.9	206.0	1.0092		
104.7	102.2	1.0245		
			Slope	0.99 - 1.10
			Intercept	0.977291 +/-20

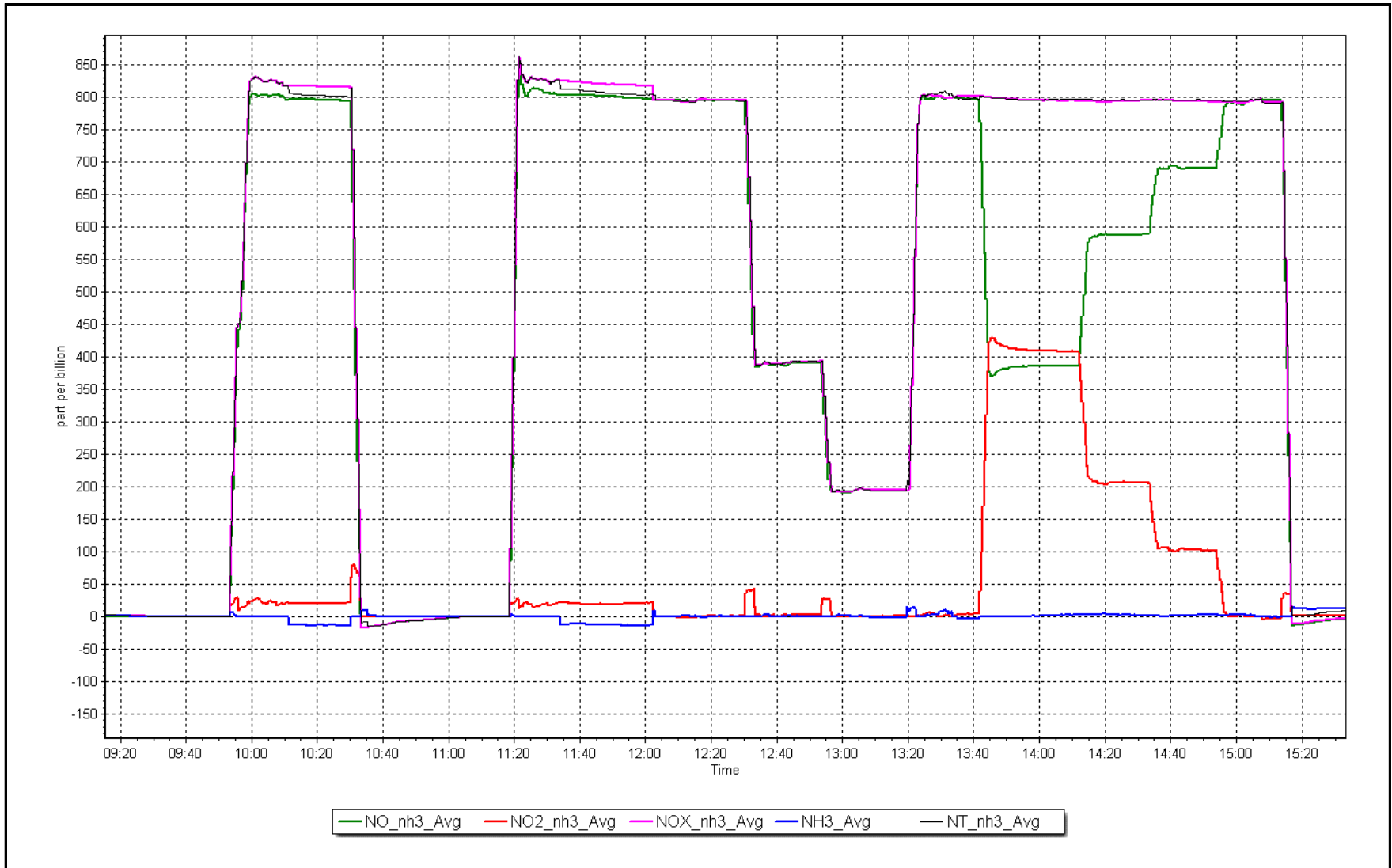
**NO<sub>2</sub> Calibration Curve**



NO<sub>x</sub> Calibration Plot

Date: October 23, 2017

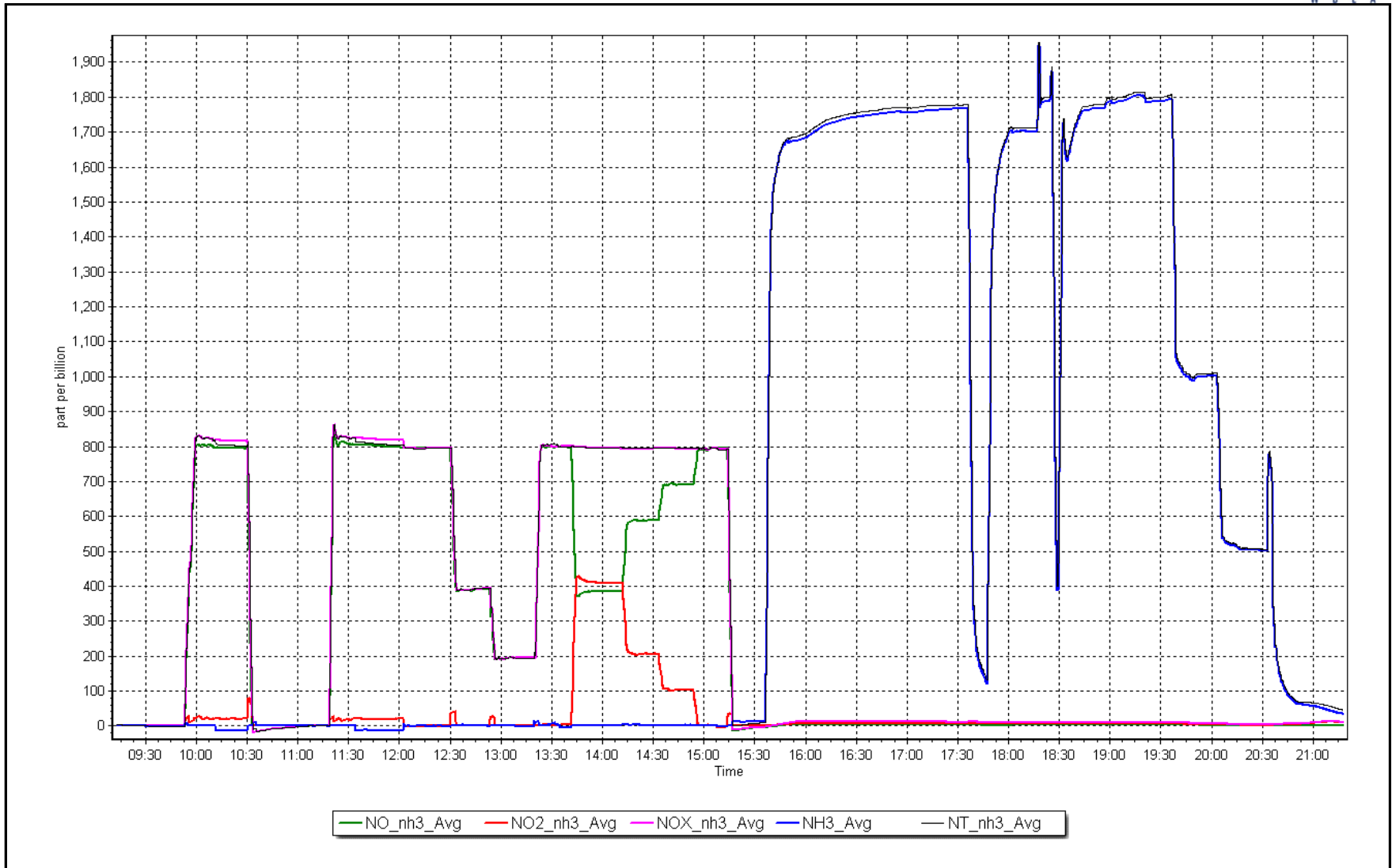
Location: Patricia McInnes



NH<sub>3</sub> Calibration Plot

Date: October 23, 2017

Location: Patricia McInnes







## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

### **AMS 7 ATHABASCA VALLEY OCTOBER 2017**

Operations, Data Collection,  
QA/QC, Data Validation and Reporting by:  
Wood Buffalo Environmental Association  
Fort McMurray, Alberta

November 29, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)  
OCTOBER 2017

MONTHLY SUMMARY for  
AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	699	39	45	99.19	10	0	3	0
TRS (ppb) Average	521	36	223	74.87	2	0	1	0
THC (ppm) Average	701	38	43	99.33	2.9	-	2.6	-
NMHC (ppm) Average	701	38	43	99.33	0.412	-	0.286	-
CH4(ppm) Average	701	38	43	99.33	2.6	-	2.3	-
O3 (ppb) Average	705	37	39	99.73	45	0	37	-
NO2 (ppb) Average	699	39	45	99.19	29	0	15	-
NO (ppb) Average	699	39	45	99.19	105	-	26	-
NOX (ppb) Average	699	39	45	99.19	134	-	41	-
PM2.5 (ug/m3) Average	733	4	11	99.06	27.2	-	15.6	0
CO(ppm) Average	704	37	40	99.6	0.4	0	0.2	-
Temperature 2 m (C) Average	743	0	1	99.87	23.5	-	14.8	-
Barometric Pressure (inHg) Average	743	0	1	99.87	29.4	-	29.3	-
Relative Humidity (%) Average	743	0	1	99.87	99	-	94	-
Wind Speed 10 m (km/h) Average	743	0	1	99.87	45	-	24	-
Wind Direction 10 m (deg) Average	743	0	1	99.87	-	-	-	-

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)  
OCTOBER 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	699	0.5	1	-	0	0	0	0	0	1	10
TRS (ppb) Average	521	0.4	0	-	0	0	0	0	0	1	2
THC (ppm) Average	701	1.99	0.2	-	1.9	1.9	1.9	1.9	2	2.1	2.9
NMHC (ppm) Average	701	0.019	0.067	-	0	0	0	0	0	0	0.412
CH4(ppm) Average	701	1.97	0.1	-	1.9	1.9	1.9	1.9	2	2.1	2.6
O3 (ppb) Average	705	21.7	10	-	4	7	14	22	30	35	45
NO2 (ppb) Average	699	6.5	5	-	0	1	3	5	9	14	29
NO (ppb) Average	699	4.1	9	-	0	0	0	1	4	13	105
NOX (ppb) Average	699	10.6	13	-	0	1	3	6	13	28	134
PM2.5 (ug/m3) Average	733	4.68	3.2	-	0	2.4	3	3.9	5.3	7.3	27.2
CO(ppm) Average	704	0.11	0	-	0	0.1	0.1	0.1	0.1	0.2	0.4
Temperature 2 m (C) Average	743	3.99	4.7	-	-5.1	-0.8	0.6	2.9	6.4	10.6	23.5
Barometric Pressure (inHg) Average	743	28.85	0.3	-	28.2	28.4	28.6	28.9	29.1	29.2	29.4
Relative Humidity (%) Average	743	73.5	16	-	26	51	64	75	85	93	99
Wind Speed 10 m (km/h) Average	743	11.9	8	-	0	3	6	10	16	23	45
Wind Direction 10 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)  
OCTOBER 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
ALL PARAMETERS	31 Oct 2017 10:00	31 Oct 2017 10:00	1	DAS collection error
CO, NOX, O3, THC	23 Oct 2017 10:00	23 Oct 2017 10:00	1	Maintenance - sample manifold cleaned
NOX, SO2, THC	27 Oct 2017 09:00	27 Oct 2017 10:00	2	Maintenance - reinitiated daily QA check
NOX, SO2, THC	27 Oct 2017 14:00	27 Oct 2017 15:00	2	Maintenance - reinitiated daily QA check
CO	30 Oct 2017 11:00	30 Oct 2017 11:00	1	Maintenance - reinitiated daily QA check
PM2.5	01 Oct 2017 01:00	01 Oct 2017 01:00	1	Unstable operation - excessive baseline drift
PM2.5	23 Oct 2017 13:00	23 Oct 2017 13:00	1	Unstable operation - excessive baseline drift
PM2.5	28 Oct 2017 13:00	28 Oct 2017 16:00	4	Unstable operation - excessive baseline drift
TRS	06 Oct 2017 09:00	06 Oct 2017 10:00	2	Maintenance - WBEA internal audit
TRS	23 Oct 2017 13:00	24 Oct 2017 10:00	22	Analyzer failure - failed AEP audit
TRS	24 Oct 2017 14:00	25 Oct 2017 09:00	20	Analyzer failure - failed AEP audit
TRS	25 Oct 2017 10:00	25 Oct 2017 18:00	9	Maintenance - troubleshooting to identify the cause of the failed audit
TRS	25 Oct 2017 19:00	26 Oct 2017 10:00	16	Analyzer failure - failed AEP audit
TRS	26 Oct 2017 11:00	26 Oct 2017 16:00	6	Maintenance - troubleshooting to identify the cause of the failed audit
TRS	26 Oct 2017 17:00	30 Oct 2017 11:00	91	Analyzer failure - failed AEP audit
TRS	30 Oct 2017 12:00	31 Oct 2017 08:00	21	Maintenance - troubleshooting to identify the cause of the failed audit



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Athabasca Valley - October 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 10 ppb on Oct 10 13:00	Maximum Daily Average: 3.2 ppb on Oct 22		Hours of Data:	699
Minimum Value: 0 ppb on Oct 10 23:00	Minimum Daily Average: 0.1 ppb on Oct 11		Hours of Missing Data:	45
Maximum Diurnal Average: 0.9 ppb at hour 13	Minimum Diurnal Average: 0.3 ppb at hour 5		Hours of Calibration:	39
Monthly Average: 0.5 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 6		Percent Operational Time:	99.2

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	1	2	2	2	0.6	2
2-Oct	2	3	3	4	Z	2	2	1	0	0	1	1	2	2	3	2	2	1	1	0	0	0	0	0	1.5	4
3-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
4-Oct	Z	0	0	0	0	0	0	C	C	C	C	9	5	2	1	1	1	1	1	1	1	1	1	1	1.5	9
5-Oct	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
6-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
7-Oct	0	0	0	Z	0	0	0	0	1	1	1	0	0	0	1	1	1	1	1	1	0	0	0	0	0.4	1
8-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
9-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
10-Oct	Z	0	0	0	0	0	0	0	0	0	0	3	10	5	2	0	0	0	0	0	0	0	0	0	1.0	10
11-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1	1
12-Oct	1	0	Z	0	0	1	1	2	1	1	1	1	1	2	2	2	1	0	0	0	0	0	3	1.0	3	
13-Oct	2	1	1	Z	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
14-Oct	0	0	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
15-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
16-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
17-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.2	1
18-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.2	1
19-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
20-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
21-Oct	0	0	0	0	0	Z	3	2	1	1	1	1	1	1	0	0	0	0	0	1	2	2	3	2	0.9	3
22-Oct	Z	2	1	1	1	1	1	1	1	1	2	3	1	2	5	7	9	7	6	5	6	5	4	3	3.2	9
23-Oct	2	Z	1	1	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
24-Oct	0	0	Z	0	0	0	0	1	0	C	C	C	C	0	0	0	0	0	1	0	0	0	0	0	0.3	1
25-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	2	2	3	5	3	1	0	0	0	0.9	5
26-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0.3	1
27-Oct	0	0	0	0	0	Z	0	0	M	M	0	0	0	M	M	1	0	0	0	0	0	0	0	0	0.3	1
28-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
29-Oct	0	Z	0	0	0	1	1	1	1	0	0	1	3	3	2	1	0	0	0	0	0	0	0	0	0.8	3
30-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0.3	1
31-Oct	0	0	0	Z	1	1	0	0	0	DF	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1

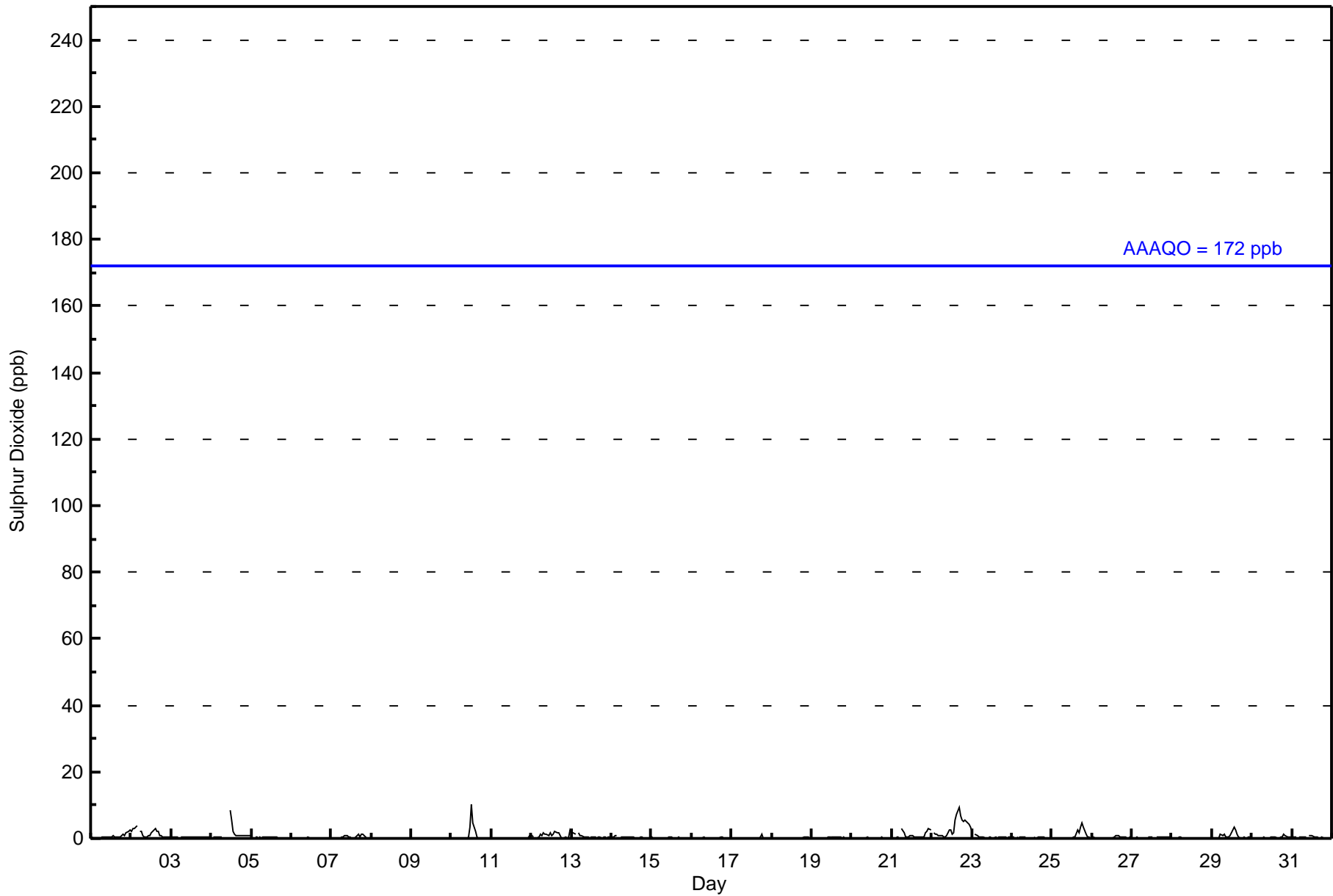
0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.3	0.3	0.4	0.8	0.9	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.5	0.5	0.6	Diurnal Average
2	3	3	4	2	2	3	2	1	1	2	9	10	5	5	7	9	7	6	5	6	5	4	3	Diurnal Maximum	

Z - zerospan      C - Calibration      M - Maintenance      DF - DAS Failure  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb      24-hr 48 ppb



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Athabasca Valley - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Athabasca Valley - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	699	100.00	100.00
11 - 20	0	0.00	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 699

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Athabasca Valley - October 2017**

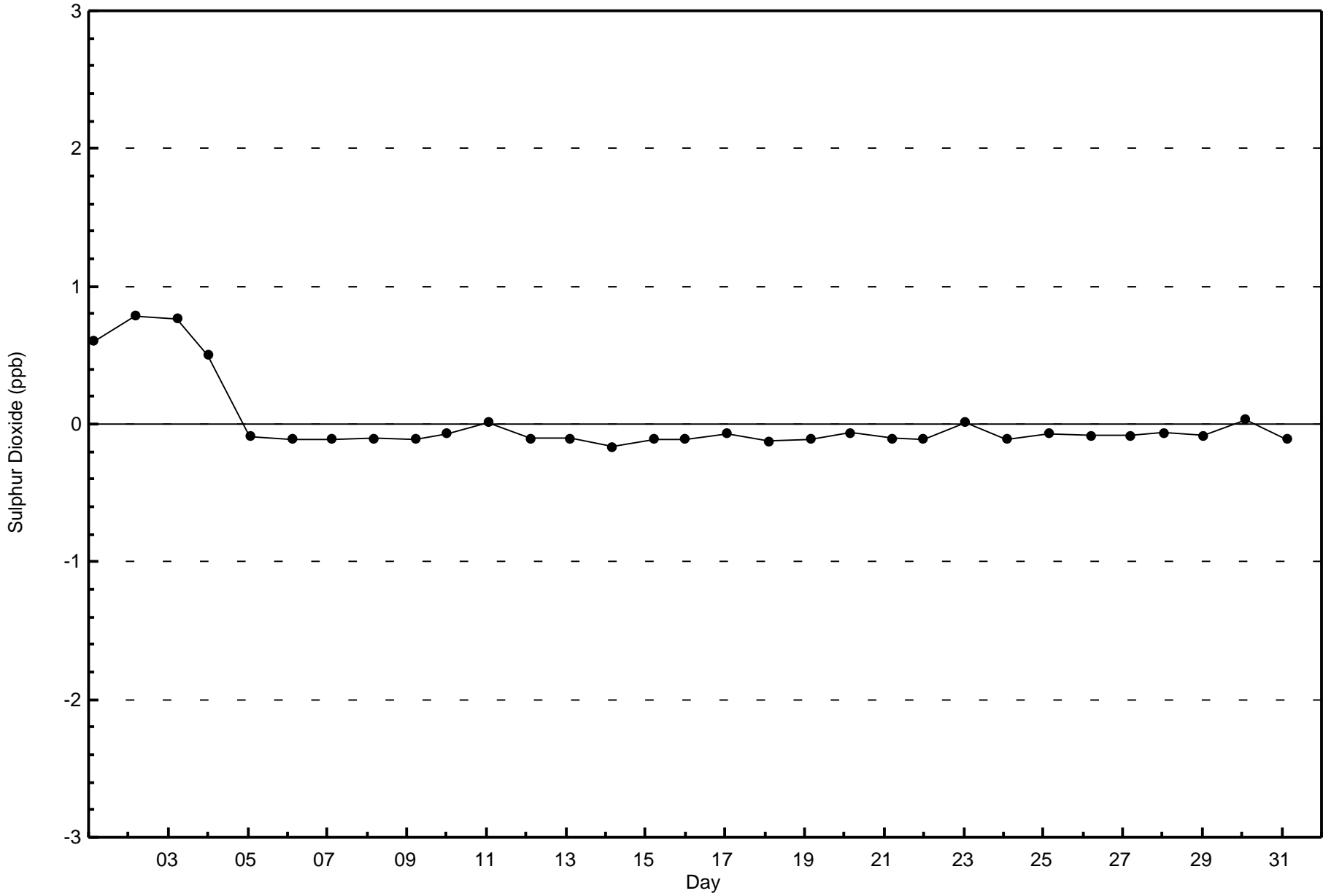
<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 10	52	22	8	5	15	22	140	32	21	33	65	31	26	56	77	94	699
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>52</b>	<b>22</b>	<b>8</b>	<b>5</b>	<b>15</b>	<b>22</b>	<b>140</b>	<b>32</b>	<b>21</b>	<b>33</b>	<b>65</b>	<b>31</b>	<b>26</b>	<b>56</b>	<b>77</b>	<b>94</b>	<b>699</b>

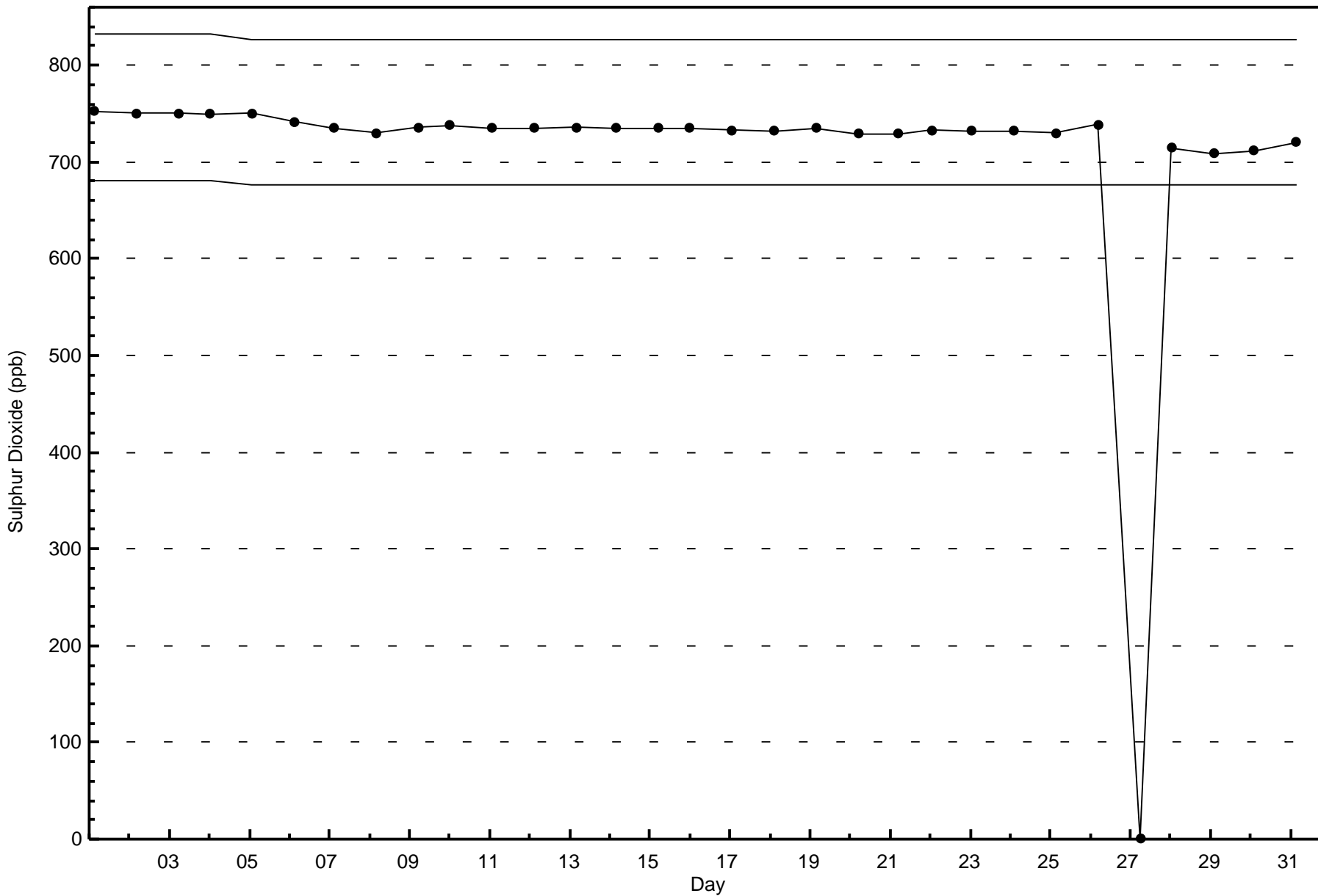
Total Number of Valid Hours: 699

Total Number of Hours: 744











Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

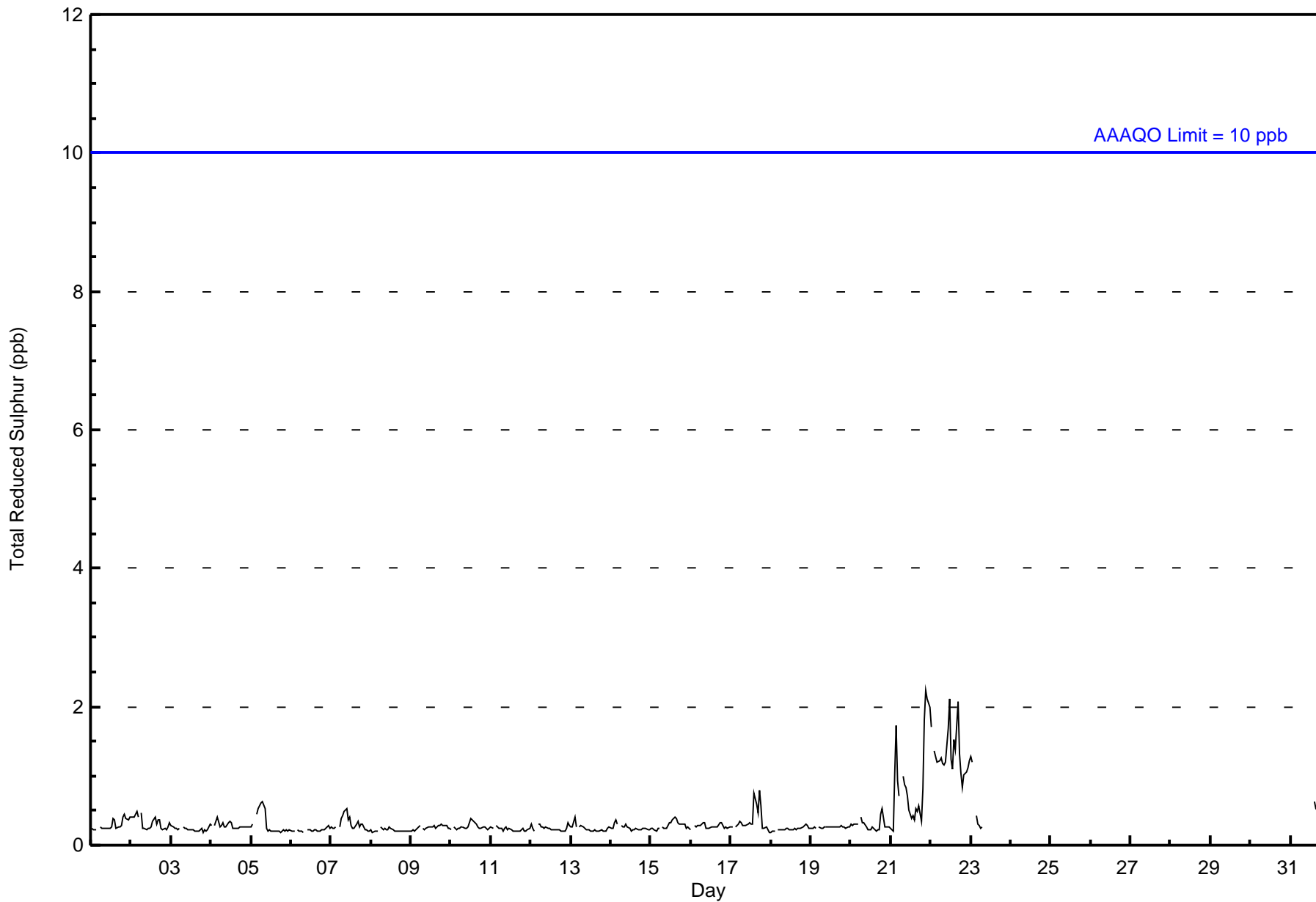
Athabasca Valley - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																							
Maximum Value: 2 ppb on Oct 21 22:00										Maximum Daily Average: 1.3 ppb on Oct 22										Hours of Data: 521																													
Minimum Value: 0 ppb on Oct 18 01:00										Minimum Daily Average: 0.2 ppb on Oct 8										Hours of Missing Data: 223																													
Maximum Diurnal Average: 0.4 ppb at hour 4										Minimum Diurnal Average: 0.3 ppb at hour 2										Hours of Calibration: 36																													
Monthly Average: 0.4 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 2										Percent Operational Time: 74.9																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
3-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
4-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
5-Oct	0	0	Z	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
6-Oct	0	0	0	Z	0	0	0	0	M	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
7-Oct	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
8-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
9-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
10-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
11-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
12-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
13-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
14-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
15-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
16-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
17-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0.4	1																							
18-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
19-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
20-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.3	1																							
21-Oct	0	0	1	2	1	1	Z	1	1	1	1	1	0	0	0	1	0	1	0	1	2	2	2	2	0.9	2																							
22-Oct	2	Z	1	1	1	1	1	1	1	1	2	2	1	1	2	1	2	1	1	1	1	1	1	1	1.3	2																							
23-Oct	1	1	Z	0	0	0	0	0	C	C	C	C	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	1																							
24-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	C	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--																							
25-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	M	M	M	M	M	M	M	M	AF	AF	AF	AF	--	--																							
26-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	M	M	M	M	M	M	M	M	AF	AF	AF	AF	--	--																							
27-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--																							
28-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--																							
29-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--																							
30-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	M	M	M	M	M	M	M	M	M	M	M	--	--																							
31-Oct	M	M	M	M	M	M	M	M	C	C	C	C	C	C	1	1	1	1	1	1	1	1	1	1	--	1																							
																								0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.4	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	Diurnal Average		
																								2	1	1	2	1	1	1	1	1	1	2	2	1	1	2	1	2	1	1	1	2	2	2	2	Diurnal Maximum	
Z - zerospan C - Calibration M - Maintenance AF - Analyzer Failure																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																																																	



Wood Buffalo Environmental Association  
Hourly Averages

Total Reduced Sulphur (TRS) - ppb  
Athabasca Valley - October 2017





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb  
Athabasca Valley - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	521	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 521

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb  
Athabasca Valley - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	40	10	5	4	7	17	102	23	12	26	58	22	19	48	54	74	521
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	40	10	5	4	7	17	102	23	12	26	58	22	19	48	54	74	521

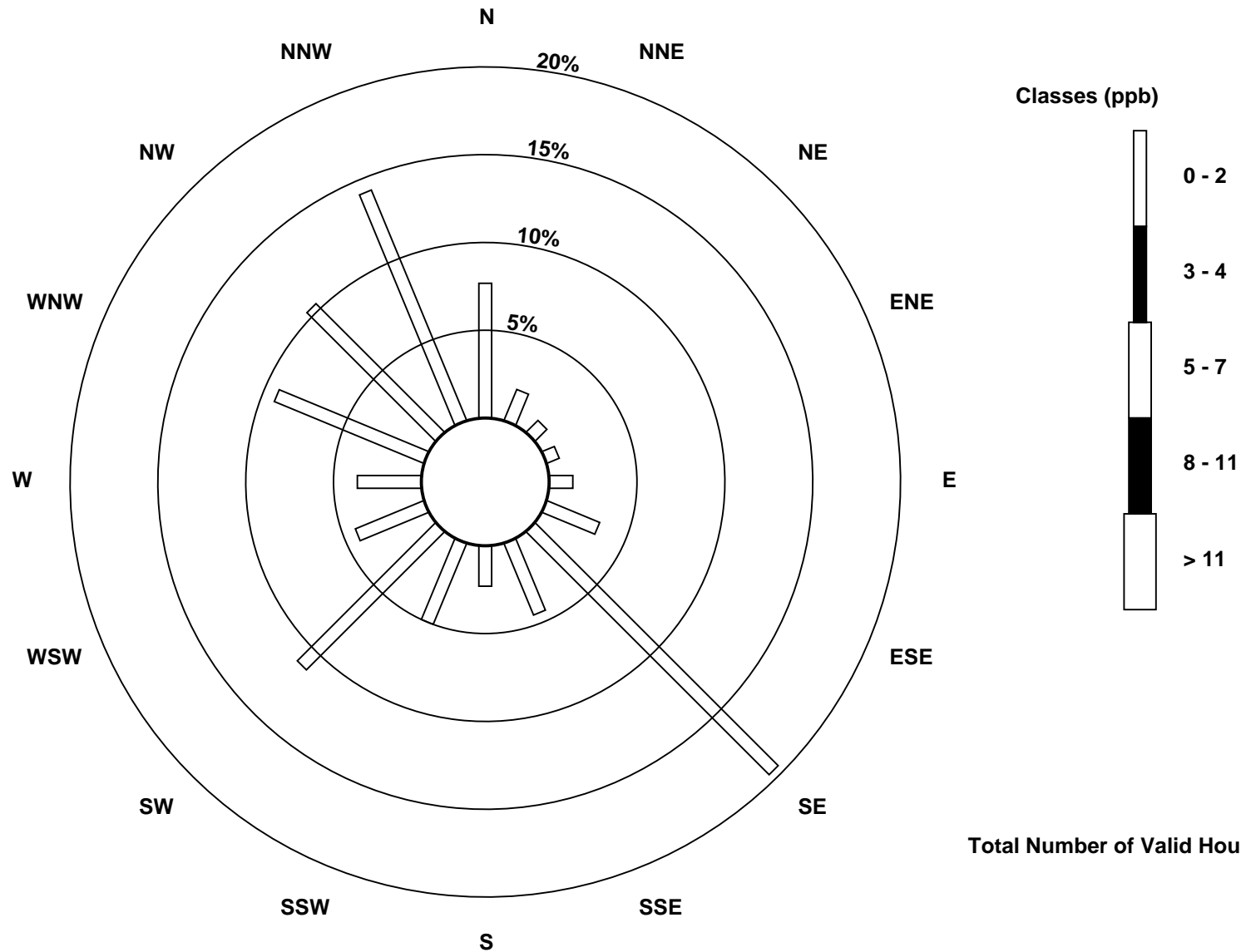
Total Number of Valid Hours: 521

Total Number of Hours: 744



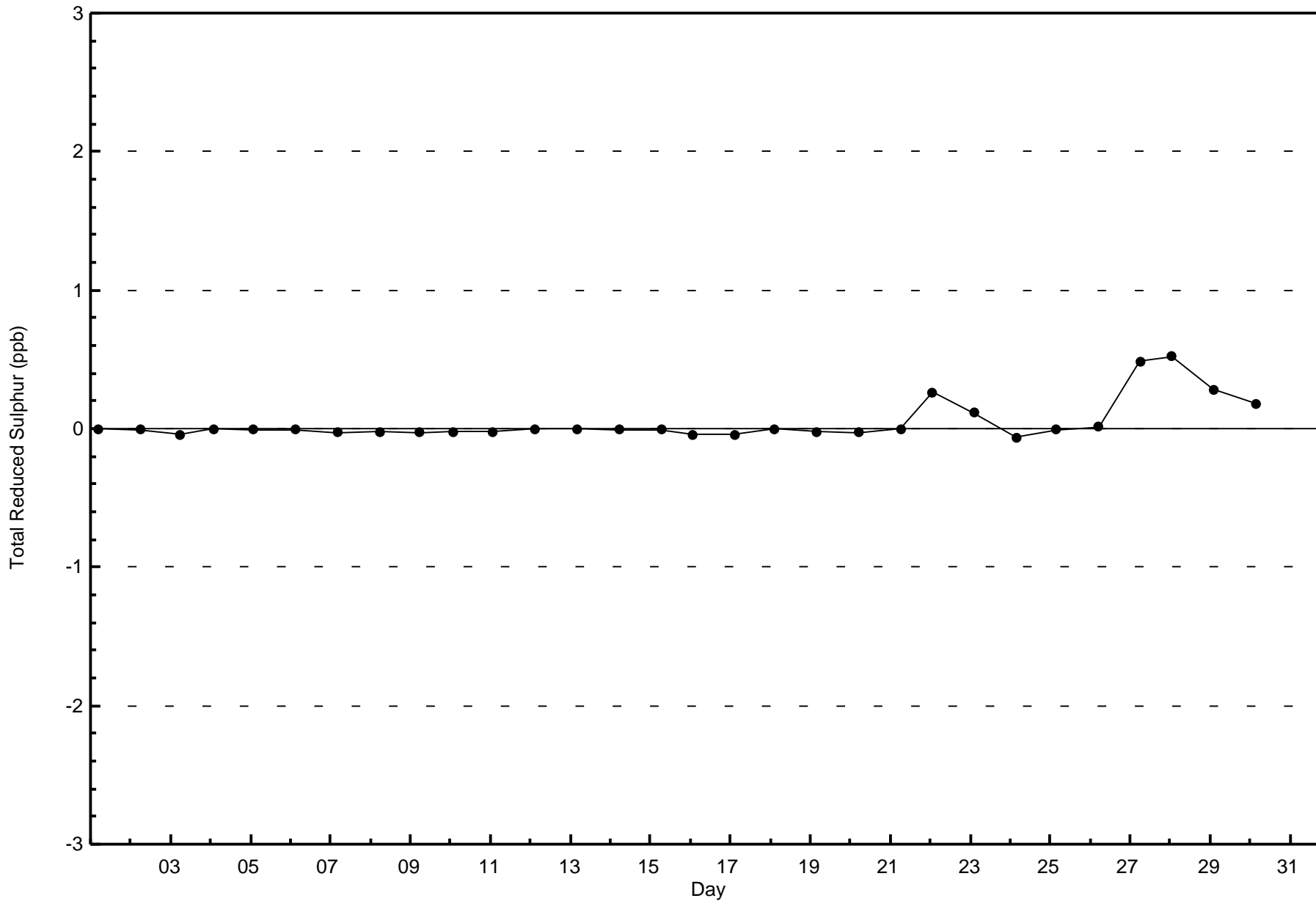
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

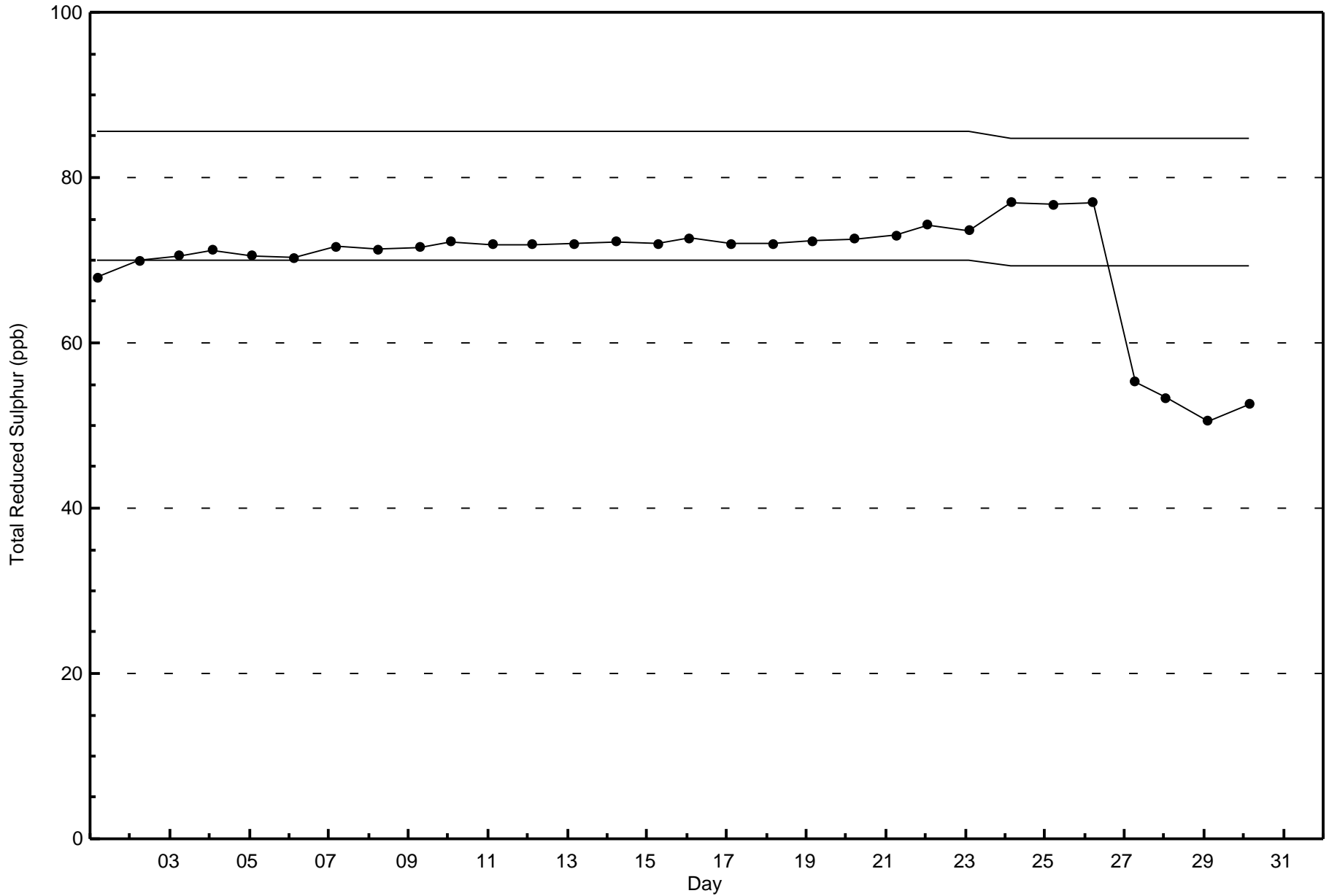
Total Reduced Sulphur (TRS) - ppb  
Athabasca Valley (AMS 7)



Total Number of Valid Hours: 521









Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

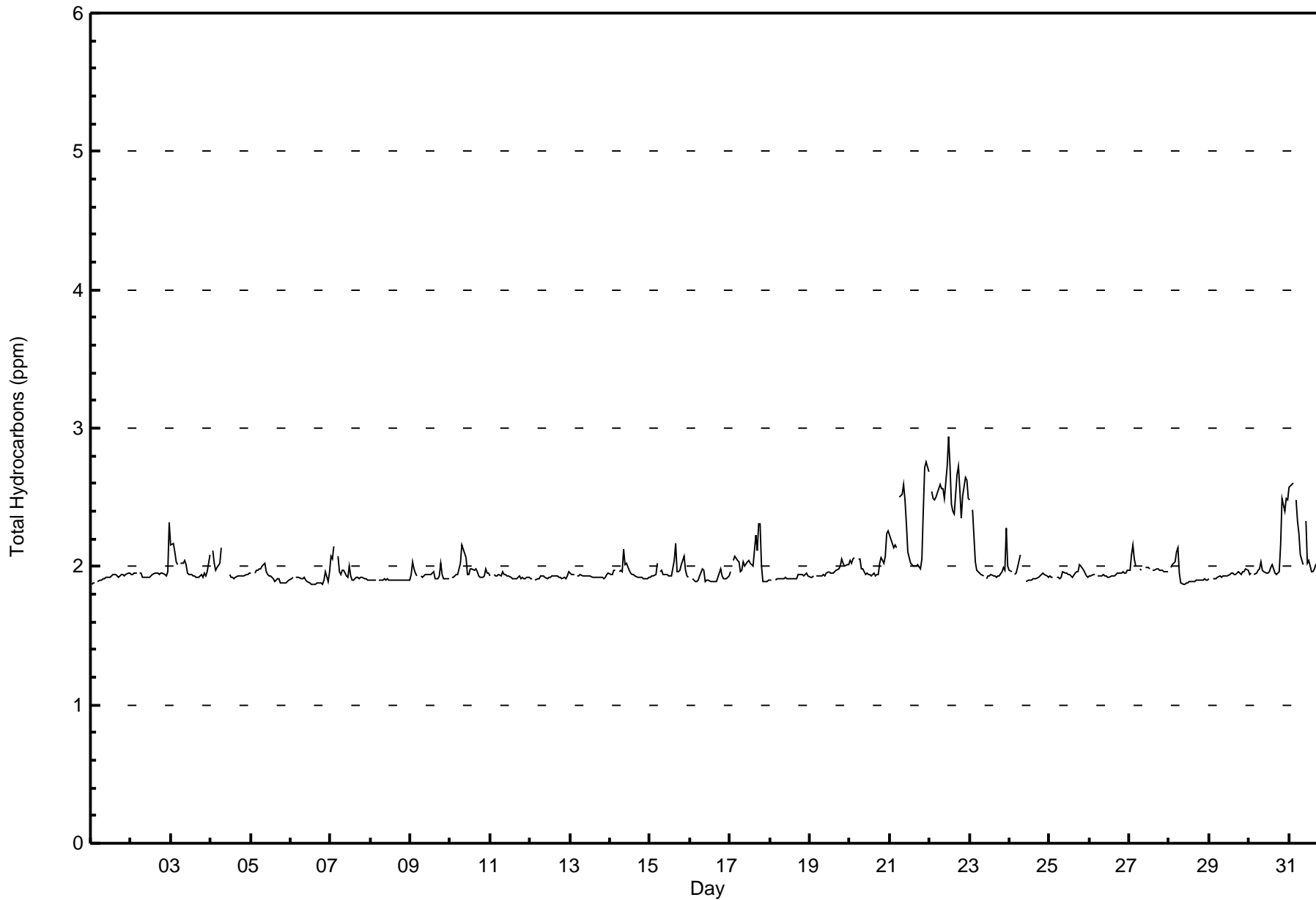
Athabasca Valley - October 2017

Maximum Value: 2.9 ppm on Oct 22 12:00																				Maximum Daily Average: 2.6 ppm on Oct 22					Hours in Service: 744			
Minimum Value: 1.9 ppm on Oct 28 09:00																				Minimum Daily Average: 1.9 ppm on Oct 6					Hours of Data: 701			
Maximum Diurnal Average: 2.0 ppm at hour 3																				Minimum Diurnal Average: 2.0 ppm at hour 14					Hours of Missing Data: 43			
Monthly Average: 1.99 ppm																				Percentiles: P <sub>1</sub> = 1.9 P <sub>10</sub> = 1.9 Q <sub>1</sub> = 1.9 Median = 1.9 Q <sub>3</sub> = 2.0 P <sub>90</sub> = 2.1 P <sub>99</sub> = 2.7					Hours of Calibration: 38			
																									Percent Operational Time: 99.3			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Oct	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0		
2-Oct	1.9	1.9	2.0	1.9	Z	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0	2.0	2.0	1.9	1.9	2.0	2.3	2.0	2.3		
3-Oct	2.2	2.2	2.1	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.0	2.2		
4-Oct	Z	2.1	2.0	2.0	2.0	2.0	2.1	C	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.1		
5-Oct	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0		
6-Oct	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	1.9	2.0		
7-Oct	2.1	2.1	2.1	Z	2.1	2.0	1.9	2.0	2.0	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1		
8-Oct	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9		
9-Oct	1.9	2.0	2.0	2.0	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0		
10-Oct	Z	1.9	1.9	1.9	1.9	2.0	2.0	2.2	2.1	2.1	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	2.2		
11-Oct	1.9	Z	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0		
12-Oct	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0		
13-Oct	2.0	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0		
14-Oct	1.9	1.9	2.0	2.0	Z	2.0	2.0	2.0	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1		
15-Oct	1.9	1.9	1.9	1.9	2.0	Z	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.2	2.0	2.0	2.0	2.0	2.1	2.0	1.9	1.9	1.9	2.0	2.2		
16-Oct	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0		
17-Oct	2.0	Z	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.1	2.3	2.3	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.3		
18-Oct	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9		
19-Oct	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.1		
20-Oct	2.0	2.0	2.1	2.1	Z	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	2.0	2.1	2.0	2.1	2.2	2.3	2.0	2.3		
21-Oct	2.2	2.2	2.1	2.2	2.1	Z	2.5	2.5	2.6	2.5	2.3	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.4	2.7	2.8	2.7	2.3	2.8		
22-Oct	Z	2.5	2.5	2.5	2.5	2.6	2.6	2.6	2.6	2.5	2.7	2.9	2.7	2.5	2.4	2.4	2.7	2.7	2.6	2.3	2.5	2.6	2.6	2.5	2.6	2.9		
23-Oct	2.5	Z	2.4	2.0	2.0	2.0	2.0	1.9	1.9	M	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.3	2.0	2.0	2.0	2.5		
24-Oct	2.0	2.0	Z	1.9	2.0	2.0	2.1	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	2.1		
25-Oct	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	2.0	1.9	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0		
26-Oct	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	1.9	2.0	2.0	1.9	2.0		
27-Oct	2.0	2.1	2.2	2.1	2.0	Z	2.0	2.0	M	M	2.0	2.0	2.0	M	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2		
28-Oct	Z	2.0	2.0	2.0	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1		
29-Oct	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	2.0	2.0	2.0	1.9	2.0		
30-Oct	1.9	2.0	Z	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.2	2.5	2.4	2.5	2.5	2.1	2.5		
31-Oct	2.6	2.6	2.6	Z	2.5	2.3	2.2	2.1	2.0	DF	2.3	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.1	2.6		
																								Diurnal Average				
																								Diurnal Maximum				
Z - zerospan      C - Calibration      M - Maintenance      DF - DAS Failure																												



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Athabasca Valley - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Athabasca Valley - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	609	86.88	86.88
2.1 - 3.0	92	13.12	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 701

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm  
Athabasca Valley - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	48	19	6	4	8	11	124	29	17	31	63	30	22	52	72	73	609
2.1 - 3.0	4	3	2	1	7	10	17	3	4	2	2	1	4	4	7	21	92
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	52	22	8	5	15	21	141	32	21	33	65	31	26	56	79	94	701

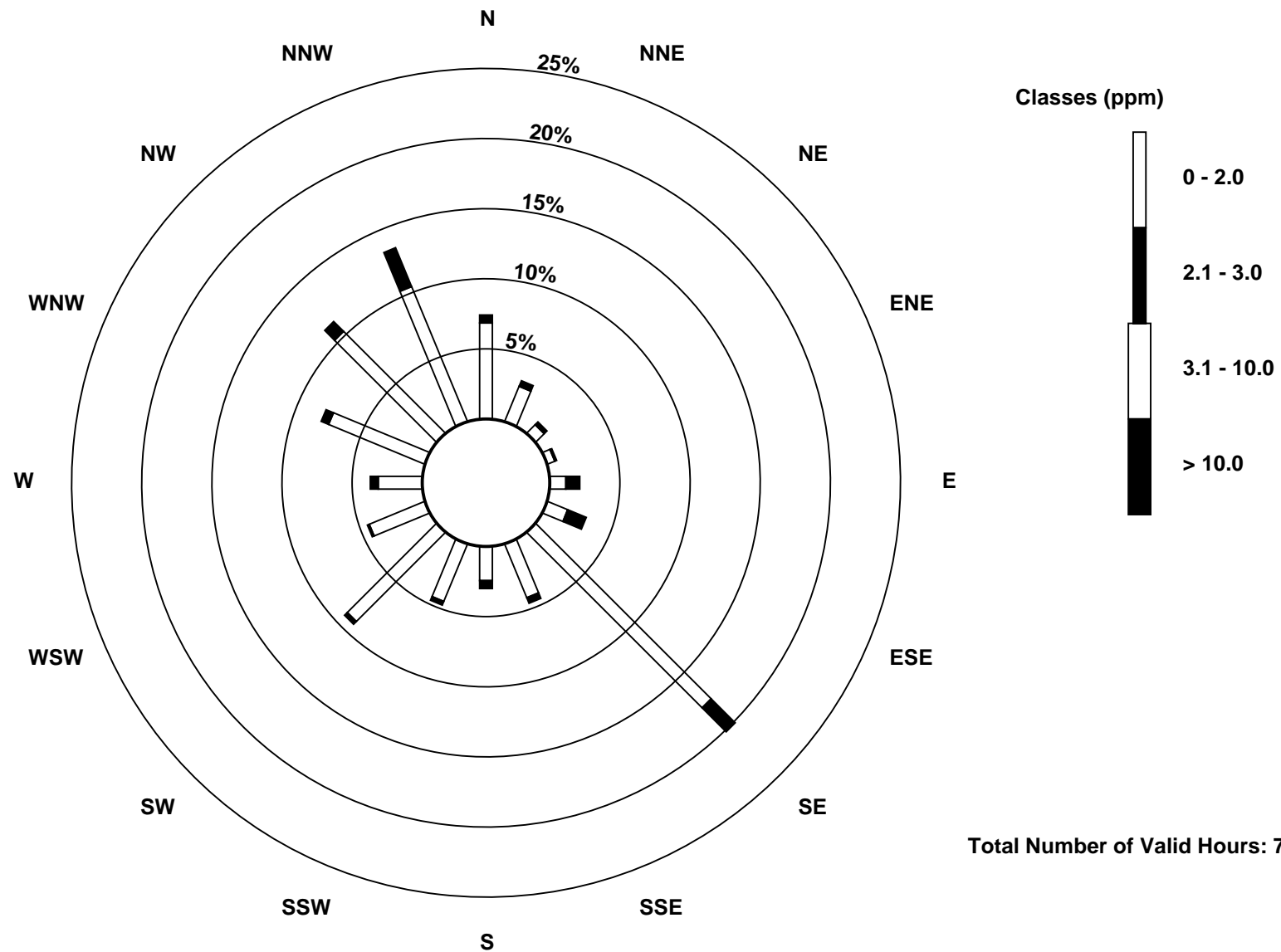
Total Number of Valid Hours: 701

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Total Hydrocarbons (THC) - ppm  
Athabasca Valley (AMS 7)

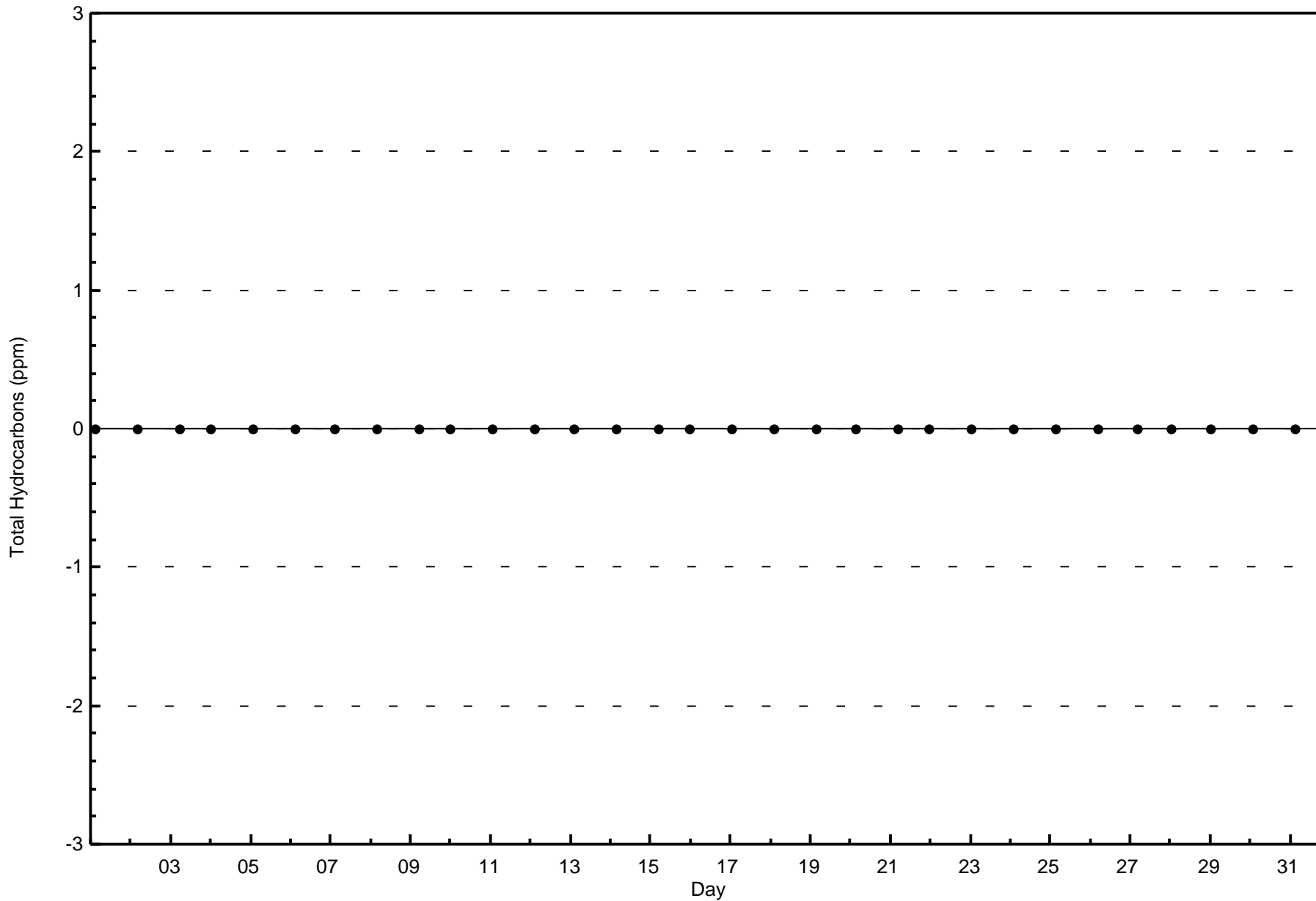


Total Number of Valid Hours: 701

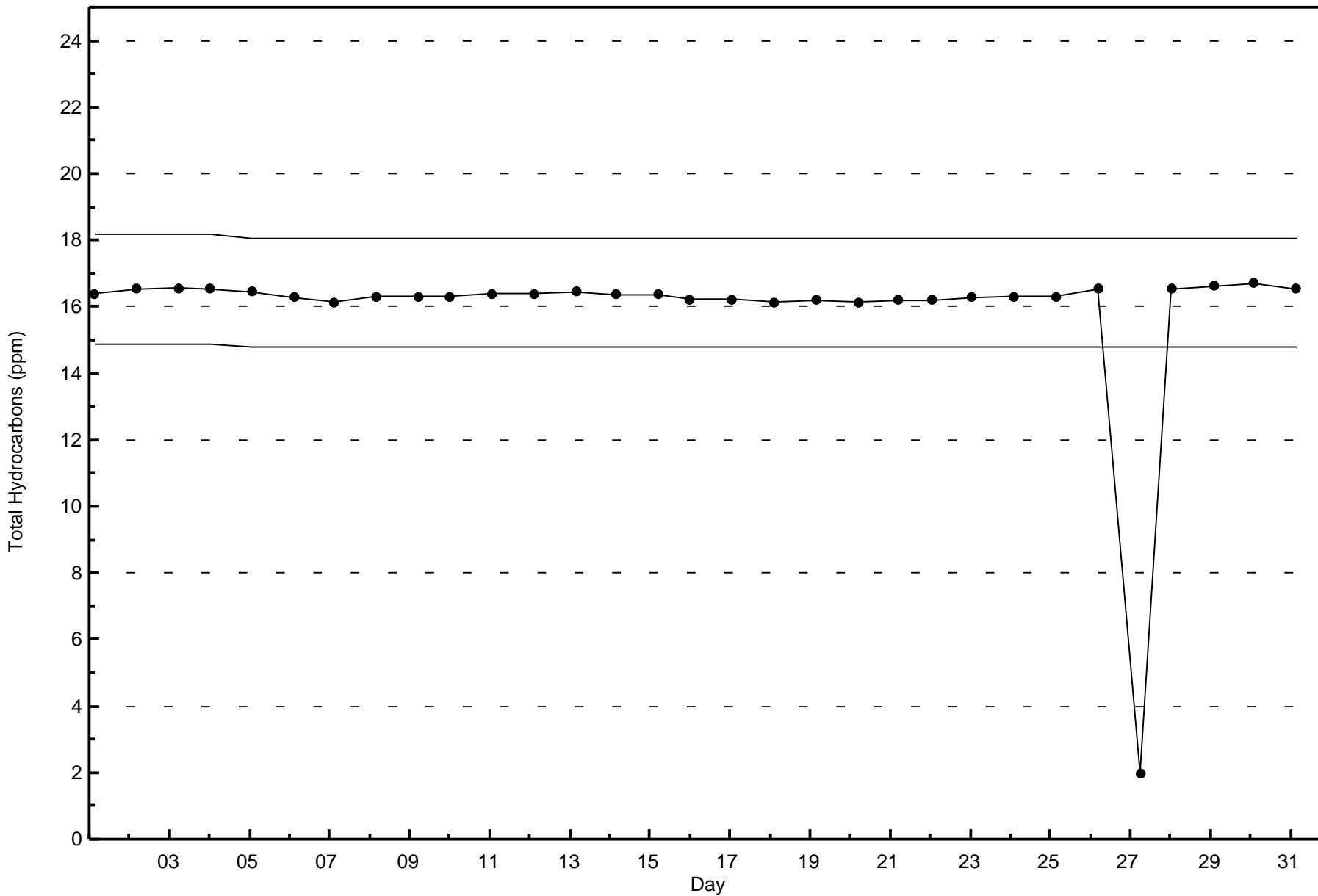


Wood Buffalo Environmental Association  
Zero Responses

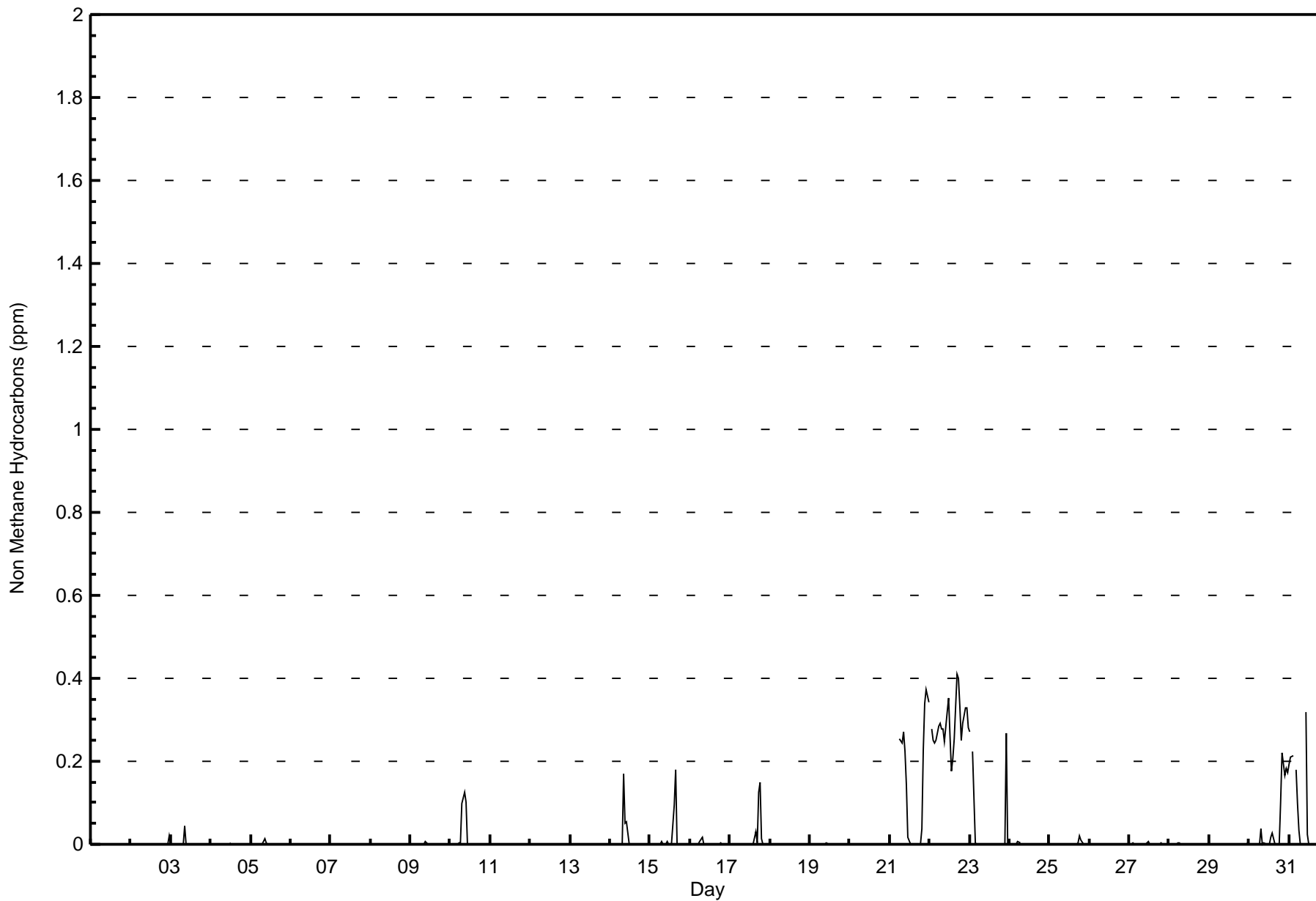
Total Hydrocarbons (THC) - ppm  
Athabasca Valley - October 2017













**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm  
Athabasca Valley - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.005	626	89.30	89.30
0.006 - 0.05	21	3.00	92.30
0.06 - 0.1	9	1.28	93.58
> 0.1	45	6.42	100.00

Total Number of Valid Hours: 701

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm  
Athabasca Valley - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	49	18	6	4	9	19	123	31	18	33	63	30	23	52	72	76	626
0.006 - 0.05	1	1	0	0	3	0	11	0	0	0	0	0	0	1	1	3	21
0.06 - 0.1	0	0	0	0	0	2	2	0	1	0	0	1	0	0	1	2	9
> 0.1	2	3	2	1	3	0	5	1	2	0	2	0	3	3	5	13	45
<b>Totals</b>	52	22	8	5	15	21	141	32	21	33	65	31	26	56	79	94	701

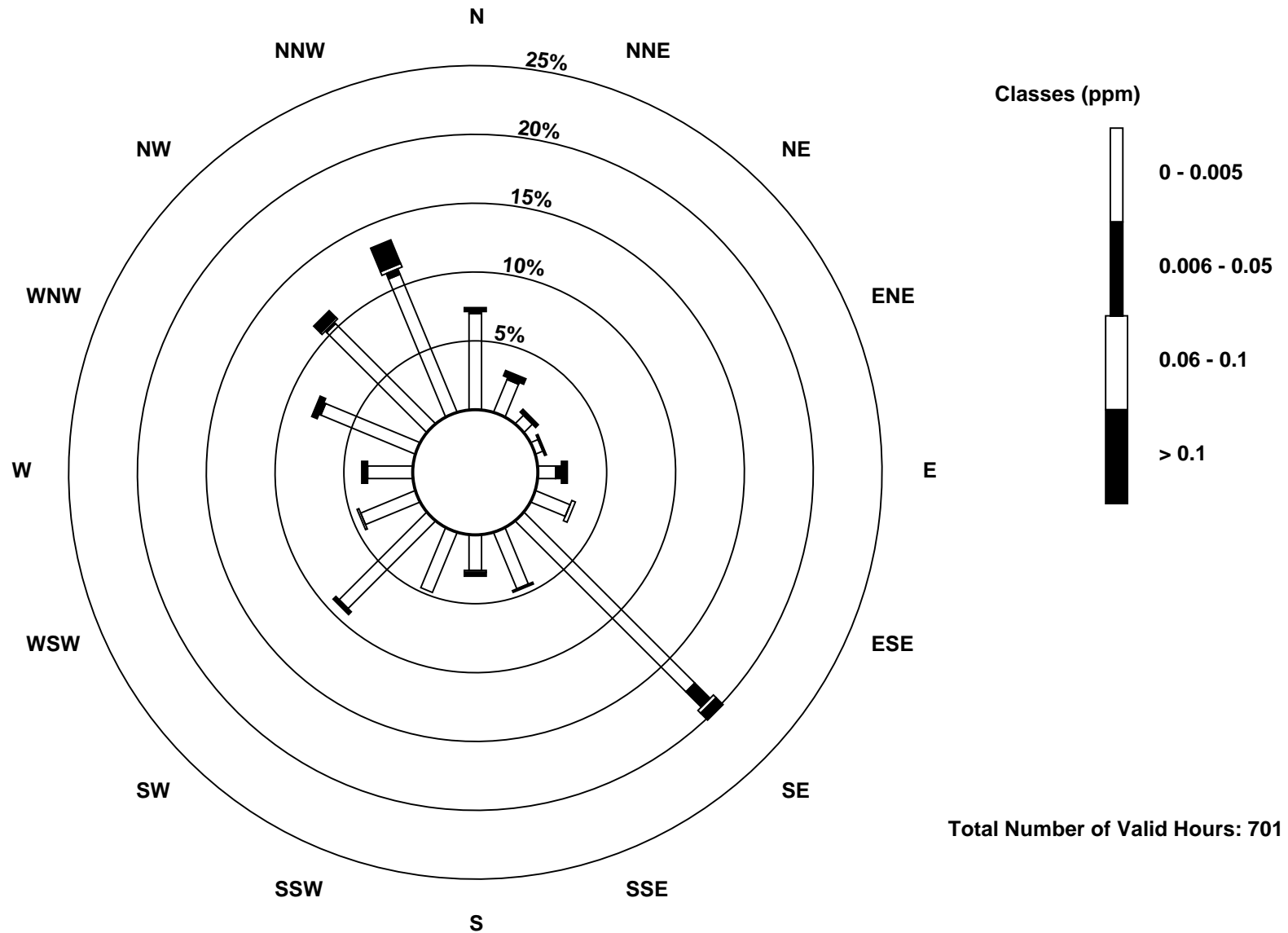
Total Number of Valid Hours: 701

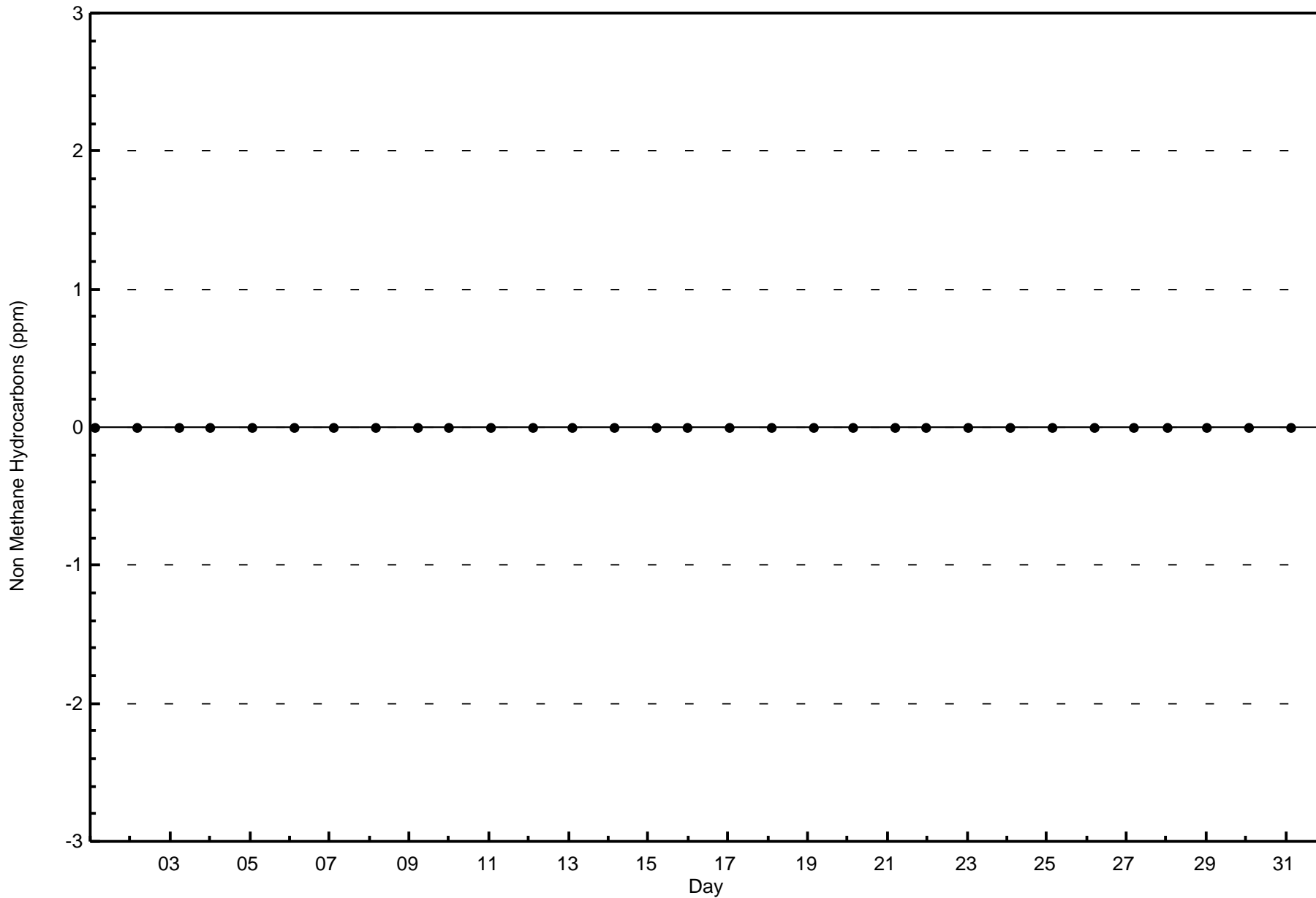
Total Number of Hours: 744

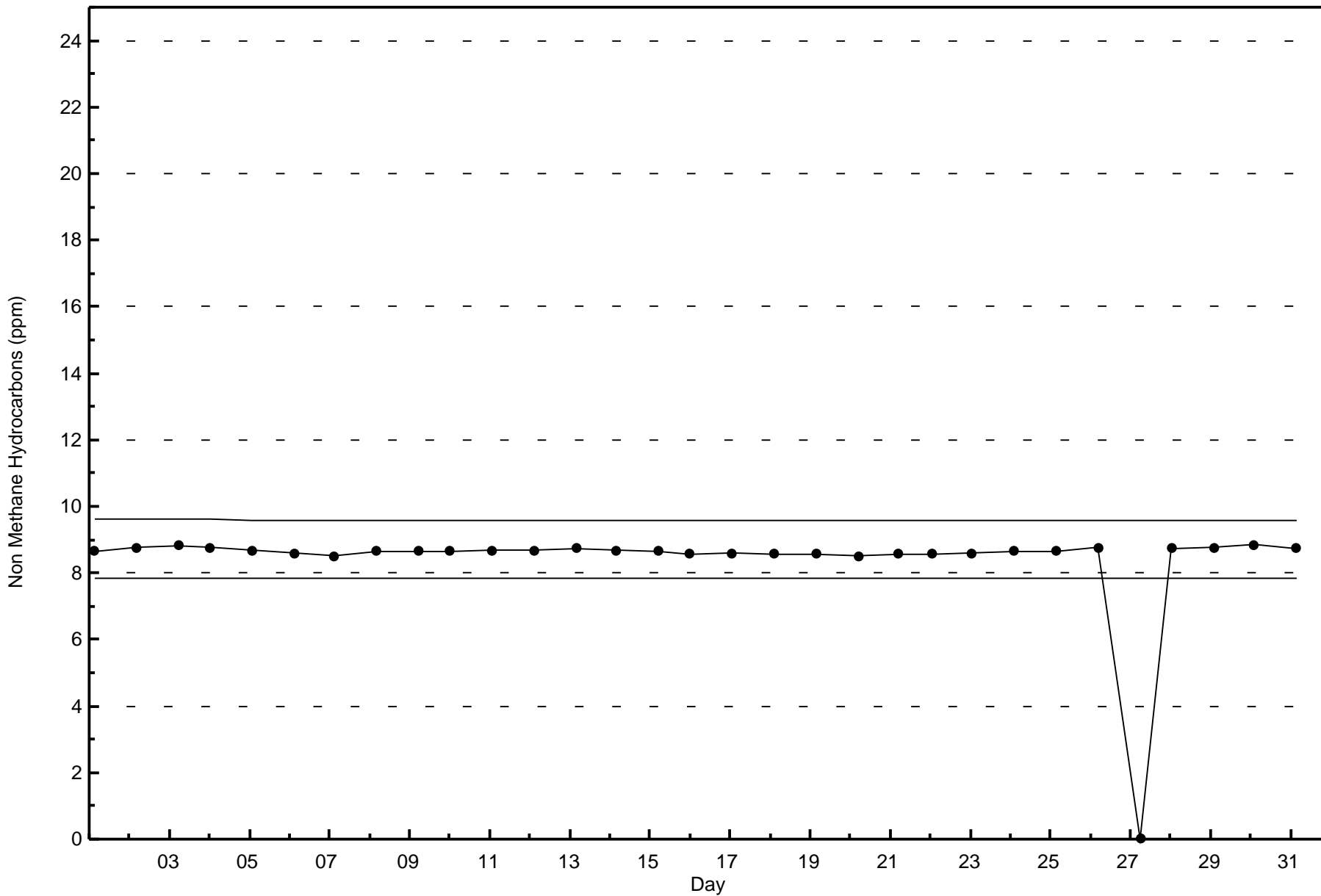


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Non Methane Hydrocarbons (NMHC) - ppm  
Athabasca Valley (AMS 7)











Wood Buffalo Environmental Association

Summary of Hour Averages

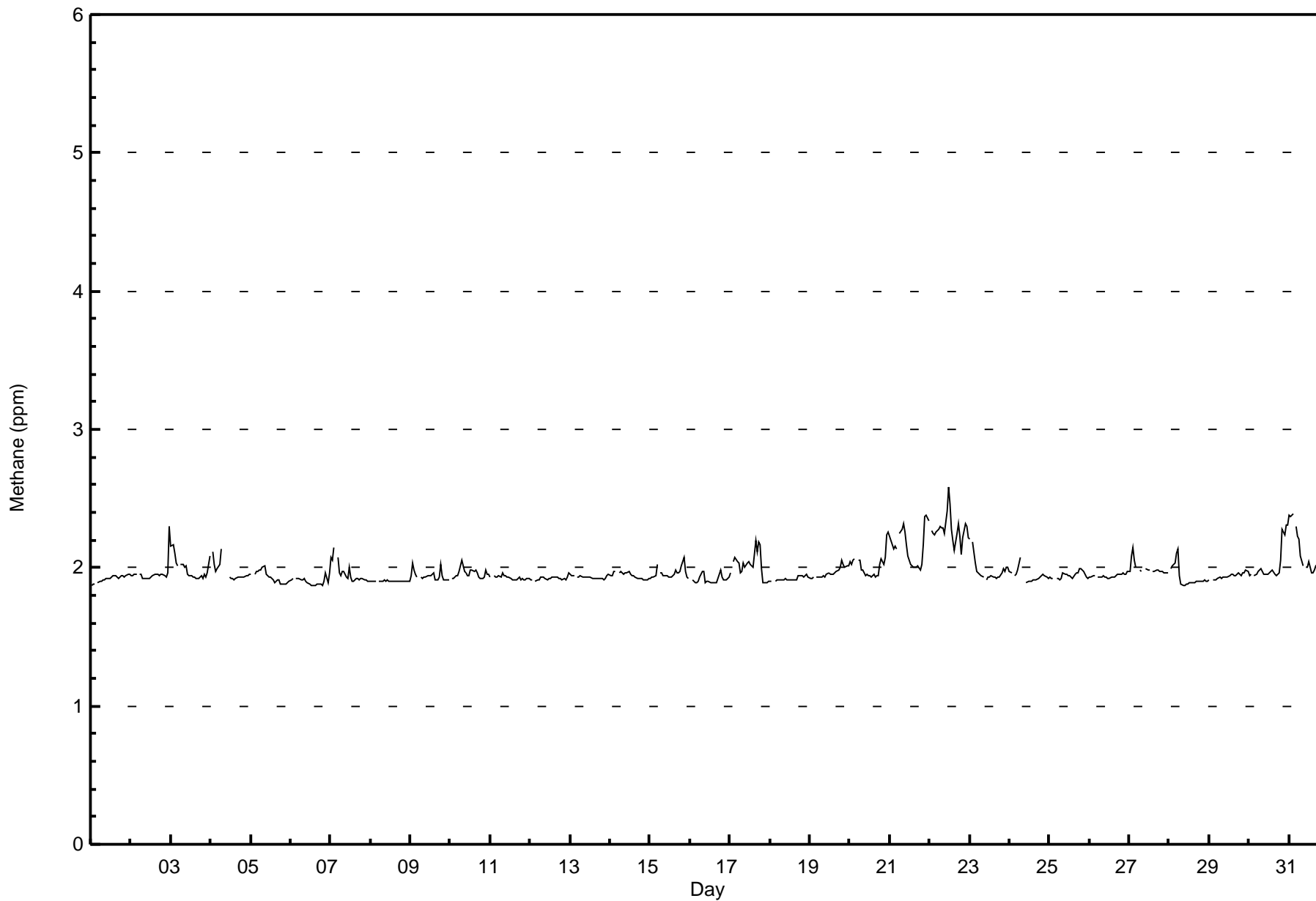
Methane (CH<sub>4</sub>) - ppm

Athabasca Valley - October 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 2.6 ppm on Oct 22 12:00	Maximum Daily Average: 2.3 ppm on Oct 22		Hours of Data:	701
Minimum Value: 1.9 ppm on Oct 28 09:00	Minimum Daily Average: 1.9 ppm on Oct 6		Hours of Missing Data:	43
Maximum Diurnal Average: 2.0 ppm at hour 3	Minimum Diurnal Average: 1.9 ppm at hour 15		Hours of Calibration:	38
Monthly Average: 1.97 ppm	Percentiles: P <sub>1</sub> = 1.9 P <sub>10</sub> = 1.9 Q <sub>1</sub> = 1.9 Median = 1.9 Q <sub>3</sub> = 2.0 P <sub>90</sub> = 2.1 P <sub>99</sub> = 2.4		Percent Operational Time:	99.3

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0
2-Oct	1.9	1.9	2.0	1.9	Z	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0	2.0	2.0	1.9	1.9	2.0	2.3	2.0	2.3
3-Oct	2.2	2.2	2.1	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.0	2.2	
4-Oct	Z	2.1	2.0	2.0	2.0	2.0	2.1	C	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1	
5-Oct	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
6-Oct	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	1.9	
7-Oct	2.1	2.1	2.1	Z	2.1	2.0	1.9	2.0	2.0	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
8-Oct	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
9-Oct	1.9	2.0	2.0	2.0	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	2.0	
10-Oct	Z	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.1	
11-Oct	1.9	Z	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
12-Oct	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	
13-Oct	2.0	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	
14-Oct	1.9	1.9	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
15-Oct	1.9	1.9	1.9	1.9	2.0	Z	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	1.9	1.9	2.1	
16-Oct	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	
17-Oct	2.0	Z	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.1	2.2	2.2	2.2	2.0	1.9	1.9	1.9	1.9	2.0	
18-Oct	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
19-Oct	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.1	
20-Oct	2.0	2.0	2.1	2.1	Z	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	2.0	2.1	2.0	2.1	2.2	2.3	2.0	
21-Oct	2.2	2.2	2.1	2.2	2.1	Z	2.2	2.3	2.3	2.3	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.4	2.4	2.3	2.2	
22-Oct	Z	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.4	2.6	2.5	2.3	2.2	2.1	2.3	2.3	2.2	2.1	2.2	2.3	2.3	2.2	2.3	
23-Oct	2.2	Z	2.2	2.0	2.0	2.0	2.0	1.9	1.9	M	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.2	
24-Oct	2.0	2.0	Z	1.9	2.0	2.0	2.1	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	
25-Oct	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	2.0	1.9	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	
26-Oct	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	1.9	2.0	2.0	1.9	
27-Oct	2.0	2.1	2.1	2.1	2.0	Z	2.0	2.0	M	M	2.0	2.0	2.0	M	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
28-Oct	Z	2.0	2.0	2.0	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
29-Oct	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	2.0	2.0	2.0	1.9	
30-Oct	1.9	2.0	Z	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.1	2.3	2.2	2.3	2.3	2.0	
31-Oct	2.4	2.4	2.4	Z	2.3	2.2	2.2	2.1	2.0	DF	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.1	
																								Diurnal Average		
																								Diurnal Maximum		

Z - zerospan      C - Calibration      M - Maintenance      DF - DAS Failure





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Athabasca Valley - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	616	87.87	87.87
2.1 - 3.0	85	12.13	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 701

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm  
Athabasca Valley - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	48	19	6	4	9	12	127	29	18	31	63	30	22	52	72	74	616
2.1 - 3.0	4	3	2	1	6	9	14	3	3	2	2	1	4	4	7	20	85
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	52	22	8	5	15	21	141	32	21	33	65	31	26	56	79	94	701

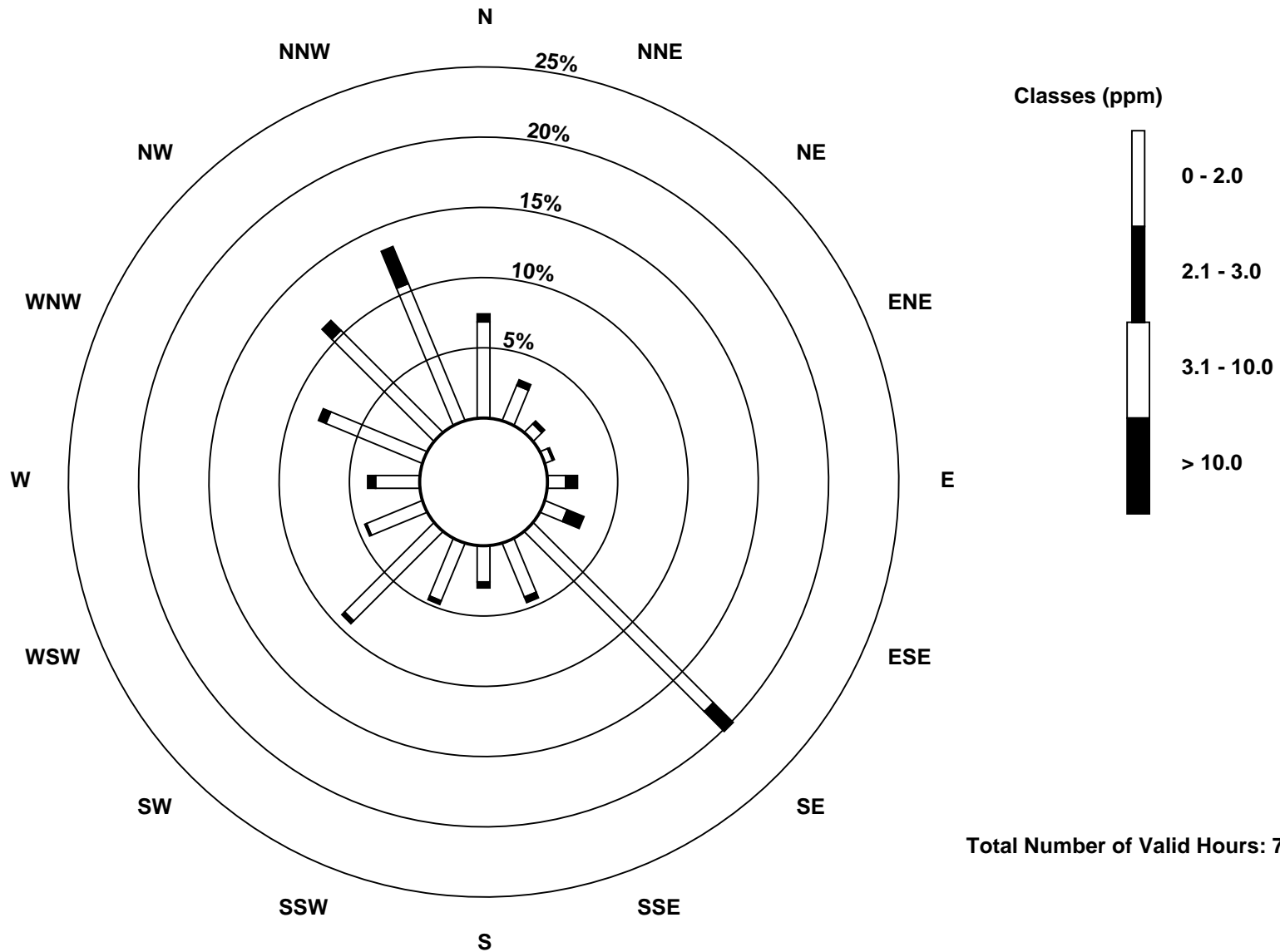
Total Number of Valid Hours: 701

Total Number of Hours: 744

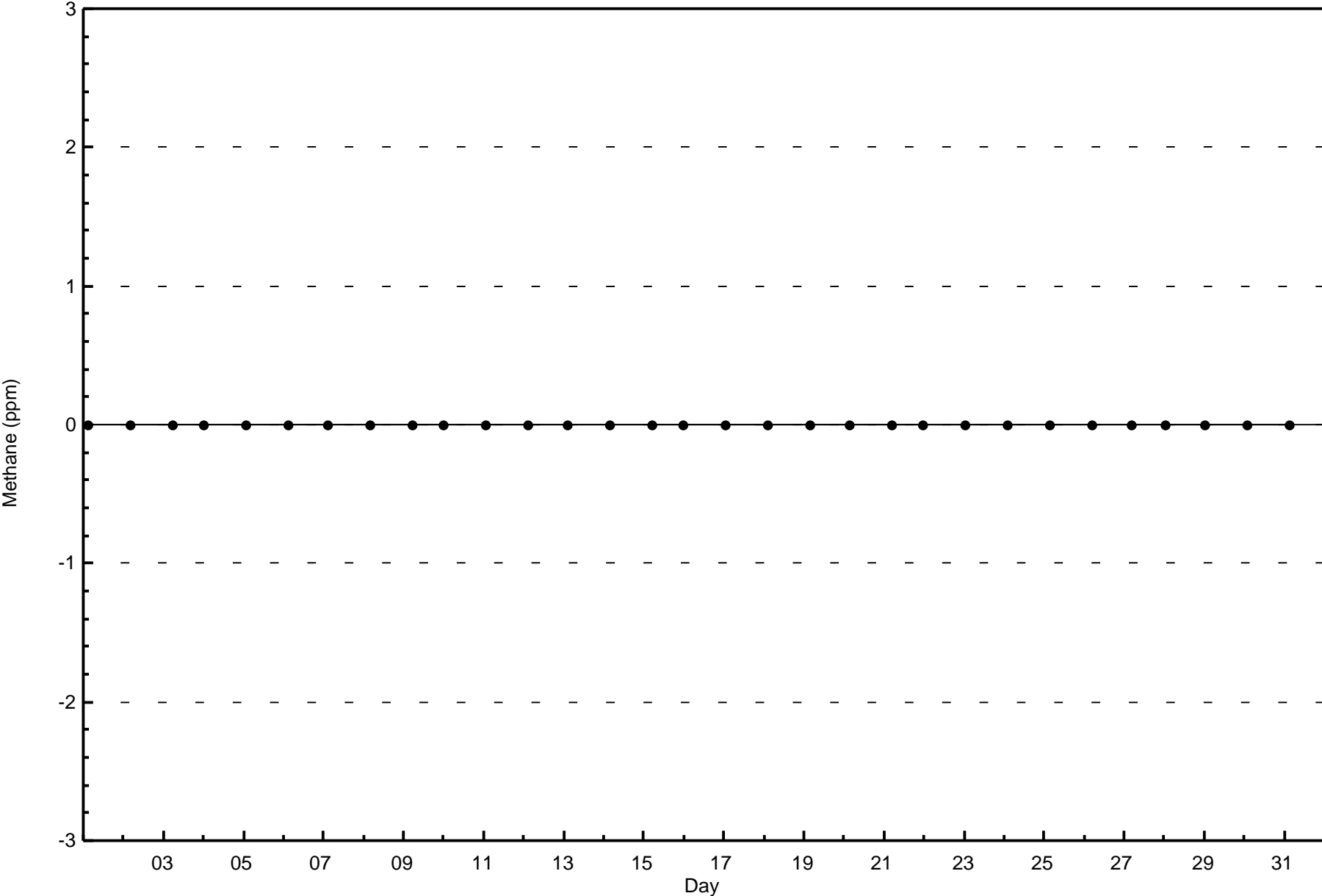


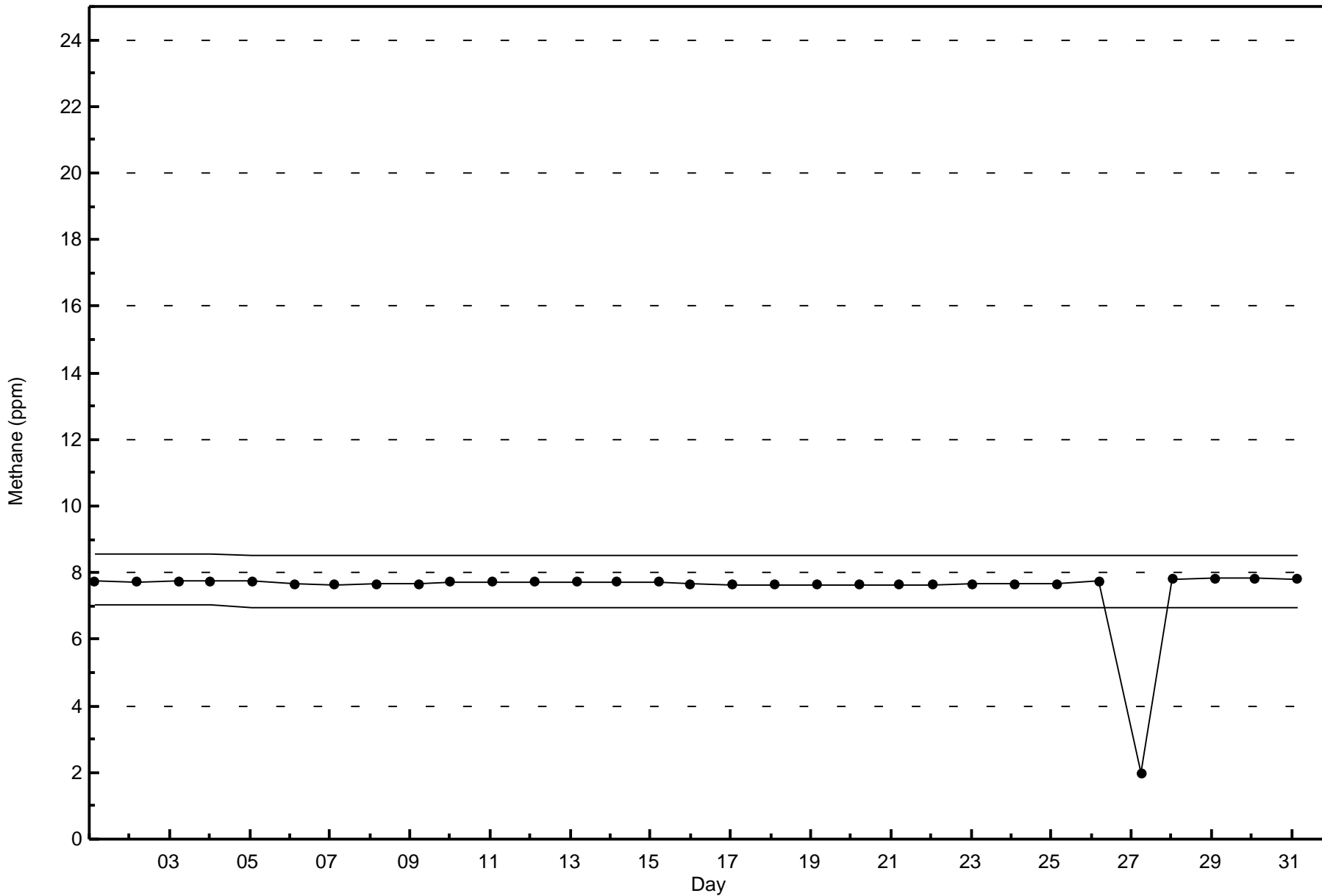
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Methane (CH<sub>4</sub>) - ppm  
Athabasca Valley (AMS 7)



Total Number of Valid Hours: 701







Wood Buffalo Environmental Association

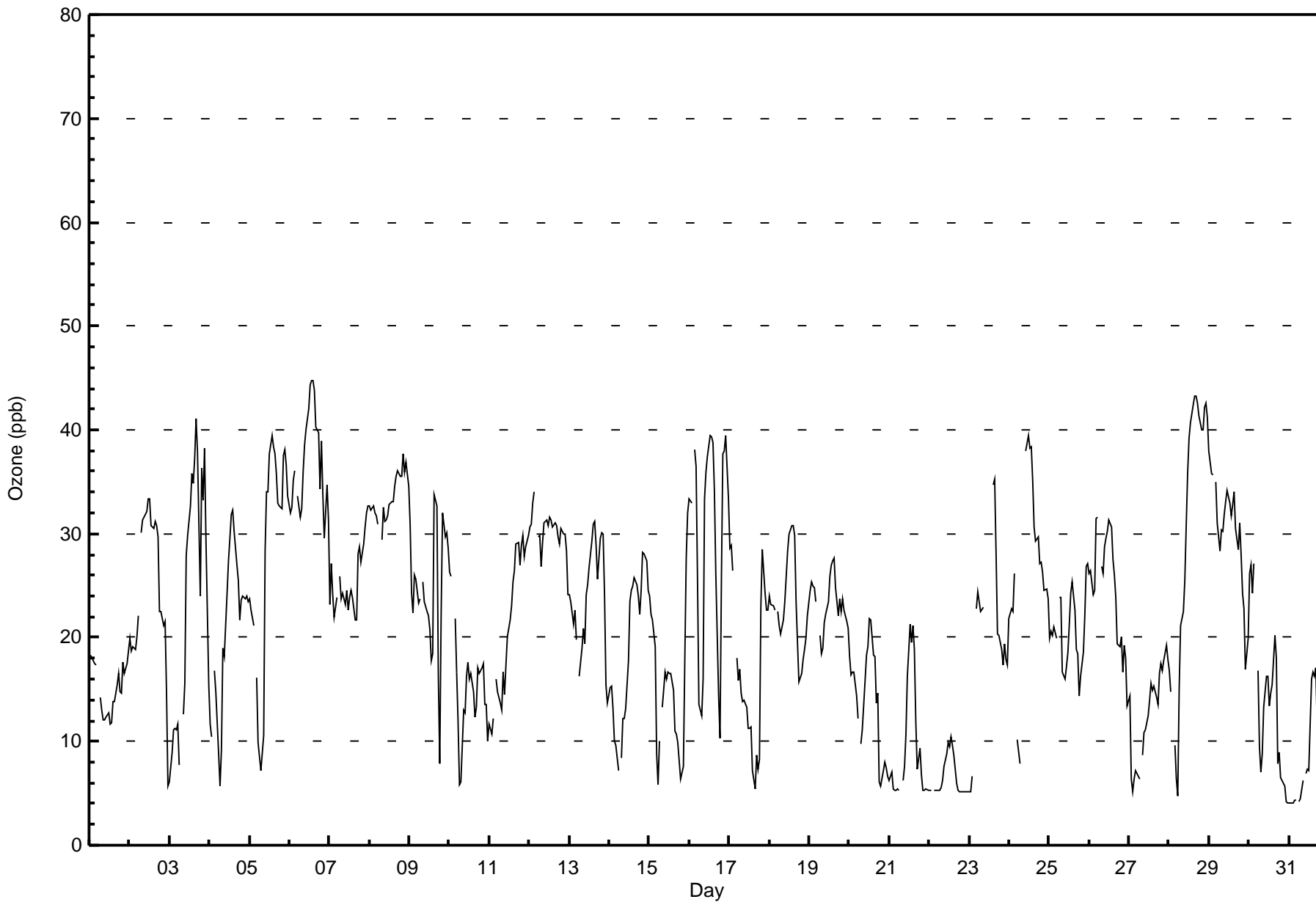
Summary of Hour Averages

Ozone (O<sub>3</sub>) - ppb

Athabasca Valley - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 45 ppb on Oct 6 14:00      Maximum Daily Average: 37.0 ppb on Oct 6		Hours in Service: 744 Hours of Data: 705																																															
Minimum Value: 4 ppb on Oct 31 02:00 Maximum Diurnal Average: 26.1 ppb at hour 15 Monthly Average: 21.7 ppb		Hours of Missing Data: 39 Hours of Calibration: 37 Percent Operational Time: 99.7																																															
Minimum Daily Average: 6.5 ppb on Oct 22 Minimum Diurnal Average: 15.2 ppb at hour 7 Percentiles: P <sub>1</sub> = 4 P <sub>10</sub> = 7 Q <sub>1</sub> = 14 Median = 22 Q <sub>3</sub> = 30 P <sub>90</sub> = 35 P <sub>99</sub> = 42																																																	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	18	18	18	18	17	Z	14	13	12	12	12	13	12	12	14	14	15	16	15	15	18	17	18	19	15.1	19																							
2-Oct	20	19	19	19	20	22	Z	30	31	32	32	33	33	31	30	31	31	30	22	23	21	22	15	6	24.9	33																							
3-Oct	6	9	11	11	11	12	8	Z	13	16	28	30	33	36	35	37	41	38	24	36	33	38	29	15	23.9	41																							
4-Oct	12	10	Z	17	15	9	6	9	19	18	24	27	30	32	32	30	27	26	22	24	24	24	24	23	21.0	32																							
5-Oct	24	23	21	Z	16	10	9	7	11	28	34	34	38	39	38	38	36	33	33	32	38	38	37	34	28.2	39																							
6-Oct	32	33	35	36	Z	34	32	32	36	39	40	42	44	45	45	44	40	40	34	39	34	30	35	31	37.0	45																							
7-Oct	23	27	24	22	24	Z	26	24	24	23	25	23	24	25	24	22	22	28	29	27	29	31	32	33	25.6	33																							
8-Oct	33	32	33	32	32	31	Z	29	33	31	31	32	33	33	33	35	36	36	36	36	38	36	37	35	33.5	38																							
9-Oct	31	24	22	26	26	23	24	Z	25	23	23	22	21	18	18	34	33	16	8	22	32	30	30	29	24.3	34																							
10-Oct	26	26	Z	22	17	12	6	6	13	13	16	18	16	17	15	12	13	17	17	17	17	14	14	10	15.3	26																							
11-Oct	12	11	12	Z	16	15	14	13	17	14	17	20	22	23	25	27	29	29	27	29	30	28	29	30	21.2	30																							
12-Oct	31	31	33	34	Z	30	30	27	29	31	31	31	32	31	31	31	31	30	29	30	30	30	28	24	30.2	34																							
13-Oct	24	23	21	23	20	Z	16	19	21	19	24	25	27	29	31	31	29	26	30	30	30	24	16	14	24.0	31																							
14-Oct	15	15	13	10	10	7	Z	8	12	12	13	18	24	25	25	26	25	24	22	25	28	28	27	25	19.0	28																							
15-Oct	24	22	22	19	9	6	10	Z	13	17	16	17	17	17	15	11	11	10	8	6	8	18	28	32	15.4	32																							
16-Oct	33	33	Z	38	36	26	14	12	16	33	36	37	39	39	39	34	26	14	10	26	38	38	39	33	30.1	39																							
17-Oct	29	29	26	Z	18	16	17	15	14	14	13	11	11	11	7	5	9	7	8	23	28	24	23	23	16.6	29																							
18-Oct	24	23	23	23	Z	22	21	20	22	23	26	28	30	31	31	30	23	20	16	17	18	19	20	22	23.1	31																							
19-Oct	24	25	25	25	23	Z	20	18	19	21	22	23	26	27	27	28	25	22	24	22	24	23	21	21	23.4	28																							
20-Oct	18	16	17	17	14	12	Z	10	11	16	18	19	22	22	18	18	14	15	6	6	7	8	7	7	13.8	22																							
21-Oct	6	7	5	5	5	5	5	Z	6	8	11	16	21	20	21	19	12	7	9	7	5	5	5	5	9.5	21																							
22-Oct	5	5	Z	5	5	5	5	6	6	8	9	10	9	10	10	9	6	5	5	5	5	5	5	5	6.5	10																							
23-Oct	5	5	7	Z	23	24	23	23	23	M	29	C	C	C	35	35	28	20	20	19	17	19	18	17	20.6	35																							
24-Oct	22	23	22	26	Z	10	8	C	C	C	38	39	38	38	35	31	29	30	27	27	26	25	25	24	27.2	39																							
25-Oct	20	21	20	21	20	Z	24	24	17	16	17	19	21	24	25	23	19	18	14	16	19	22	27	27	20.6	27																							
26-Oct	26	26	24	25	31	32	Z	27	26	29	30	30	31	31	28	26	24	19	19	20	17	19	18	13	24.8	32																							
27-Oct	14	6	5	6	7	7	6	Z	9	11	11	12	14	16	15	15	14	14	17	17	17	18	19	18	12.6	19																							
28-Oct	17	15	Z	10	6	5	15	21	22	25	31	36	39	41	42	43	43	43	41	40	40	42	43	41	30.5	43																							
29-Oct	38	36	36	Z	35	31	28	30	30	32	33	34	33	32	33	34	31	28	31	28	24	23	17	20	30.3	38																							
30-Oct	26	27	24	27	Z	17	10	7	9	13	16	16	13	15	15	20	18	8	9	6	6	6	4	4	13.8	27																							
31-Oct	4	4	4	4	4	Z	4	5	6	DF	7	7	7	16	17	16	17	11	11	18	13	12	20	22	10.4	22																							
																								20.7	20.2	20.2	20.0	17.7	16.9	15.2	17.4	18.2	20.7	23.0	24.1	25.3	26.1	26.1	26.1	24.4	21.9	20.1	22.2	23.0	23.0	22.9	21.3	Diurnal Average	
																								38	36	36	38	36	34	32	32	36	39	40	42	44	45	45	44	43	43	41	40	40	42	43	41	Diurnal Maximum	
Z - zerospan      C - Calibration      M - Maintenance      DF - DAS Failure																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																																																	







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb  
Athabasca Valley - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	321	45.53	45.53
21 - 50	384	54.47	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

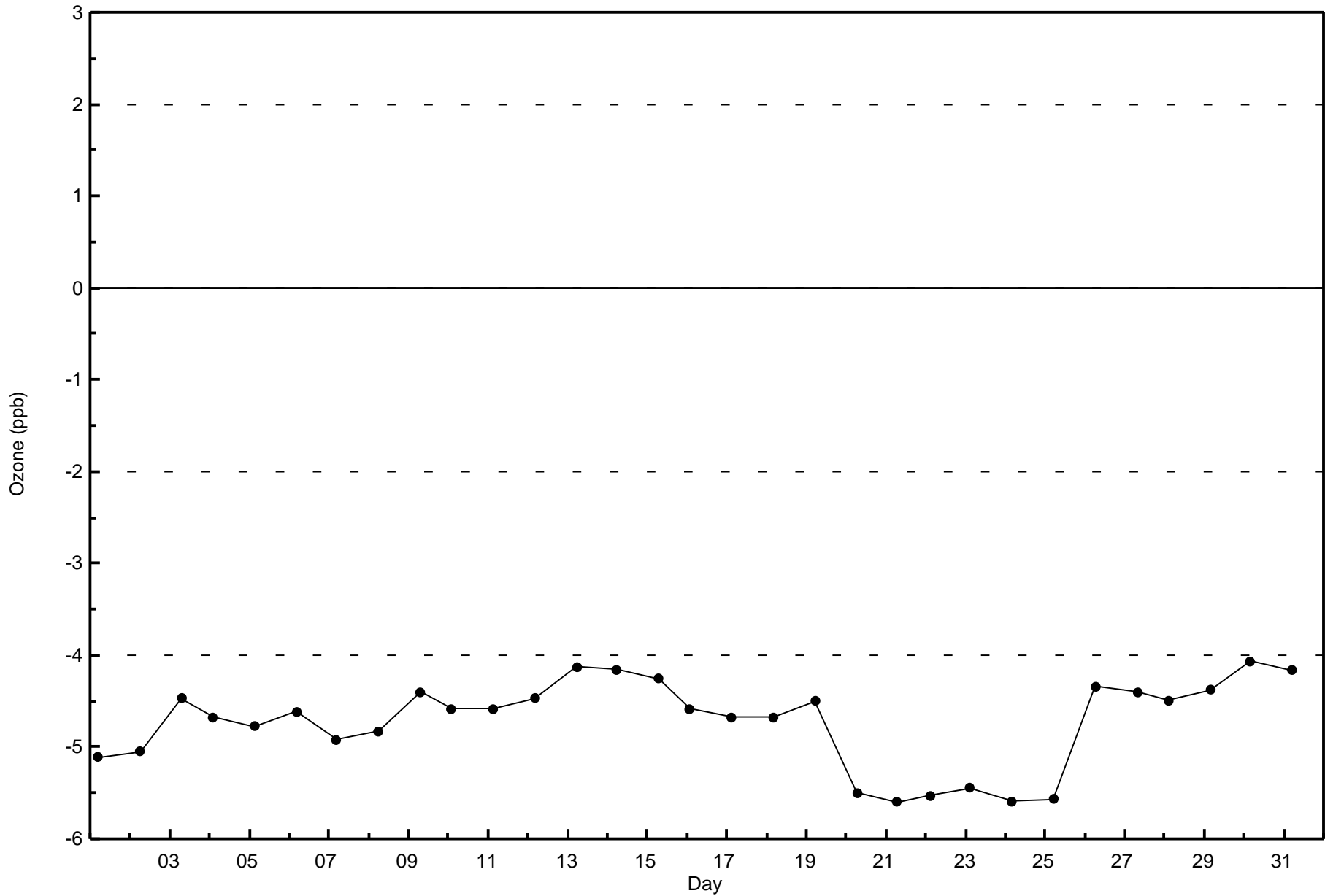
**Ozone (O<sub>3</sub>) - ppb**  
**Athabasca Valley - October 2017**

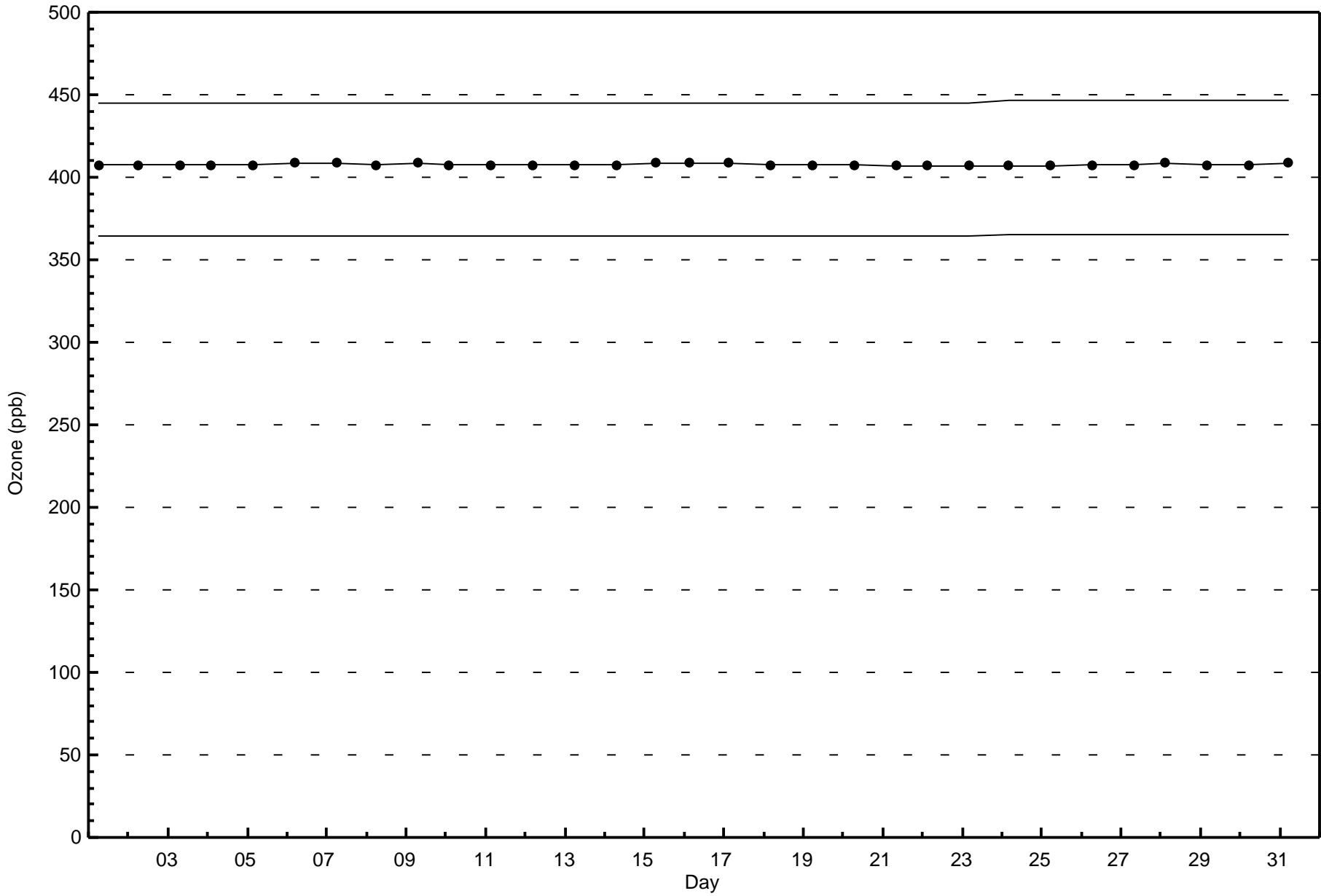
<b>Concentration</b> <b>Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	28	13	6	1	10	15	99	21	12	14	10	1	3	12	22	54	321
21 - 50	27	6	3	4	5	7	46	13	8	20	60	27	20	42	58	38	384
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	55	19	9	5	15	22	145	34	20	34	70	28	23	54	80	92	705

Total Number of Valid Hours: 705

Total Number of Hours: 744









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

Athabasca Valley - October 2017

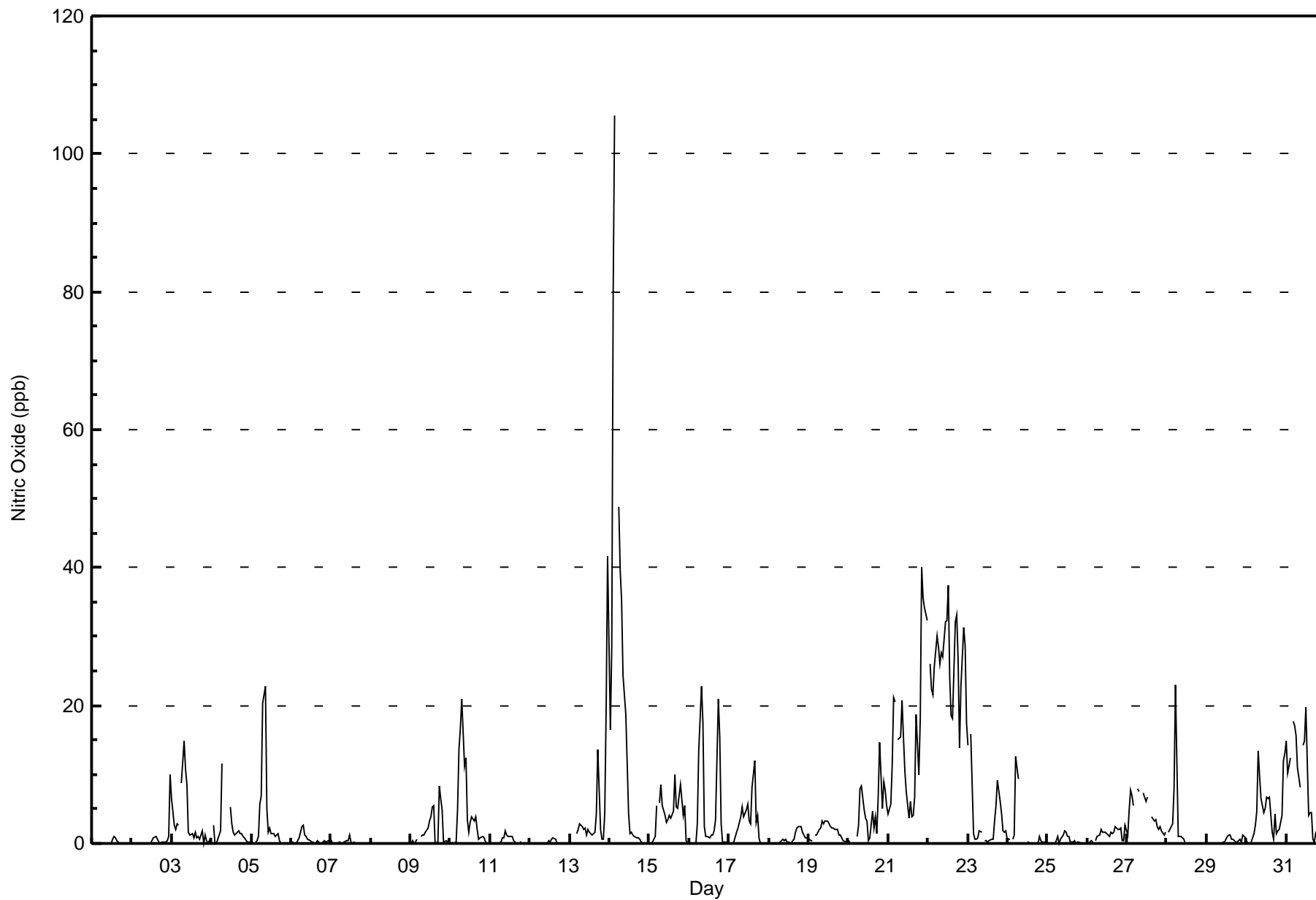
Maximum Value: 105 ppb on Oct 14 04:00																		Maximum Daily Average: 26.2 ppb on Oct 22						Hours in Service: 744		
Minimum Value: 0 ppb on Oct 1 07:00																		Minimum Daily Average: 0.0 ppb on Oct 8						Hours of Data: 699		
Maximum Diurnal Average: 7.7 ppb at hour 8																		Minimum Diurnal Average: 2.3 ppb at hour 1						Hours of Missing Data: 45		
Monthly Average: 4.1 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 4 P <sub>90</sub> = 13 P <sub>99</sub> = 36						Hours of Calibration: 39		
																								Percent Operational Time: 99.2		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.1	1
2-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	10	0.7	10
3-Oct	7	3	2	3	3	Z	9	15	11	8	2	1	1	1	2	1	1	1	2	0	1	0	0	1	3.2	15
4-Oct	Z	3	0	0	1	2	12	C	C	C	C	5	3	2	1	1	2	2	1	1	1	0	0	0	1.9	12
5-Oct	0	Z	0	0	1	6	7	20	23	5	2	2	1	1	1	1	1	0	0	0	0	0	0	0	3.2	23
6-Oct	0	0	Z	0	0	1	2	3	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3
7-Oct	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
8-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
9-Oct	0	0	0	0	1	Z	1	1	1	2	2	3	4	5	6	0	0	8	7	5	0	0	0	0	2.1	8
10-Oct	Z	0	0	0	5	14	17	21	11	12	3	2	3	4	3	4	2	1	1	1	1	0	0	0	4.6	21
11-Oct	0	Z	0	0	0	0	0	1	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	2
12-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0.1	1
13-Oct	0	0	0	Z	1	2	3	3	2	2	1	2	2	1	1	2	4	14	2	1	1	4	20	42	4.7	42
14-Oct	17	29	80	105	Z	49	40	35	24	22	19	4	1	2	1	1	1	1	0	0	0	0	0	0	18.7	105
15-Oct	0	0	0	1	5	Z	6	9	5	4	3	3	4	4	5	10	5	5	7	8	4	6	0	0	4.1	10
16-Oct	Z	0	0	0	0	3	13	23	17	2	1	1	1	1	2	3	21	16	3	0	0	0	0	0	4.8	23
17-Oct	0	Z	0	0	2	2	3	4	5	4	5	6	3	3	8	12	3	4	1	0	0	0	0	0	2.8	12
18-Oct	0	0	Z	0	0	0	0	0	1	0	1	0	0	0	1	2	2	2	2	2	2	1	1	1	0.7	2
19-Oct	1	0	0	Z	1	1	2	2	3	3	3	3	3	2	2	2	2	2	1	1	1	0	0	0	1.7	3
20-Oct	0	0	0	0	Z	1	3	8	8	5	4	3	0	1	5	2	4	1	7	15	5	9	8	6	4.1	15
21-Oct	4	6	11	21	20	Z	15	15	21	16	11	8	4	6	4	4	7	19	10	18	40	36	34	32	15.7	40
22-Oct	Z	26	22	21	26	30	29	26	28	27	32	32	37	24	18	18	32	33	27	14	23	31	29	17	26.2	37
23-Oct	14	Z	16	1	1	1	1	2	2	M	0	0	0	0	1	3	6	9	6	4	2	2	2	2	3.3	16
24-Oct	1	1	Z	1	1	13	9	C	C	C	C	0	0	0	0	0	0	0	0	1	0	0	0	0	1.4	13
25-Oct	0	0	0	Z	0	0	1	0	1	1	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0.4	2
26-Oct	0	0	0	0	Z	0	1	1	2	2	2	2	1	1	2	1	2	2	2	2	2	0	0	3	1.3	3
27-Oct	1	5	8	7	5	Z	8	8	M	M	7	6	7	M	M	4	3	3	2	2	2	2	1	2	4.4	8
28-Oct	Z	2	2	3	8	23	12	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2.3	23
29-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	1	0	1	1	0.4	1
30-Oct	0	0	Z	0	1	3	5	13	10	6	4	5	7	7	7	2	1	4	1	2	2	4	12	13	4.7	13
31-Oct	15	10	12	Z	18	17	16	11	8	DF	14	15	20	4	5	5	1	0	1	0	0	0	0	0	7.8	20
																		Diurnal Average								
																		Diurnal Maximum								
																		2.3		17						
																		3.3		29						
																		6.0		80						
																		6.6		105						
																		3.9		26						
																		6.4		49						
																		6.8		40						
																		7.7		35						
																		6.7		28						
																		4.9		27						
																		4.2		32						
																		3.5		32						
																		3.5		37						
																		2.5		24						
																		2.6		18						
																		2.4		18						
																		2.6		32						
																		4.2		33						
																		3.3		27						
																		2.7		18						
																		2.9		40						
																		3.2		36						
																		3.6		34						
																		4.2		42						

Z - zerospan      C - Calibration      M - Maintenance      DF - DAS Failure



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitric Oxide (NO) - ppb**  
**Athabasca Valley - October 2017**







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb  
Athabasca Valley - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	660	94.42	94.42
21 - 40	35	5.01	99.43
41 - 80	3	0.43	99.86
81 - 159	1	0.14	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 699

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitric Oxide (NO) - ppb  
Athabasca Valley - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	50	19	6	5	15	20	131	29	19	33	64	31	26	54	75	83	660
21 - 40	2	3	2	0	0	1	8	0	2	0	1	0	0	1	4	11	35
11 - 80	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	3
81 - 159	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	52	22	8	5	15	21	140	32	21	33	65	31	26	55	79	94	699

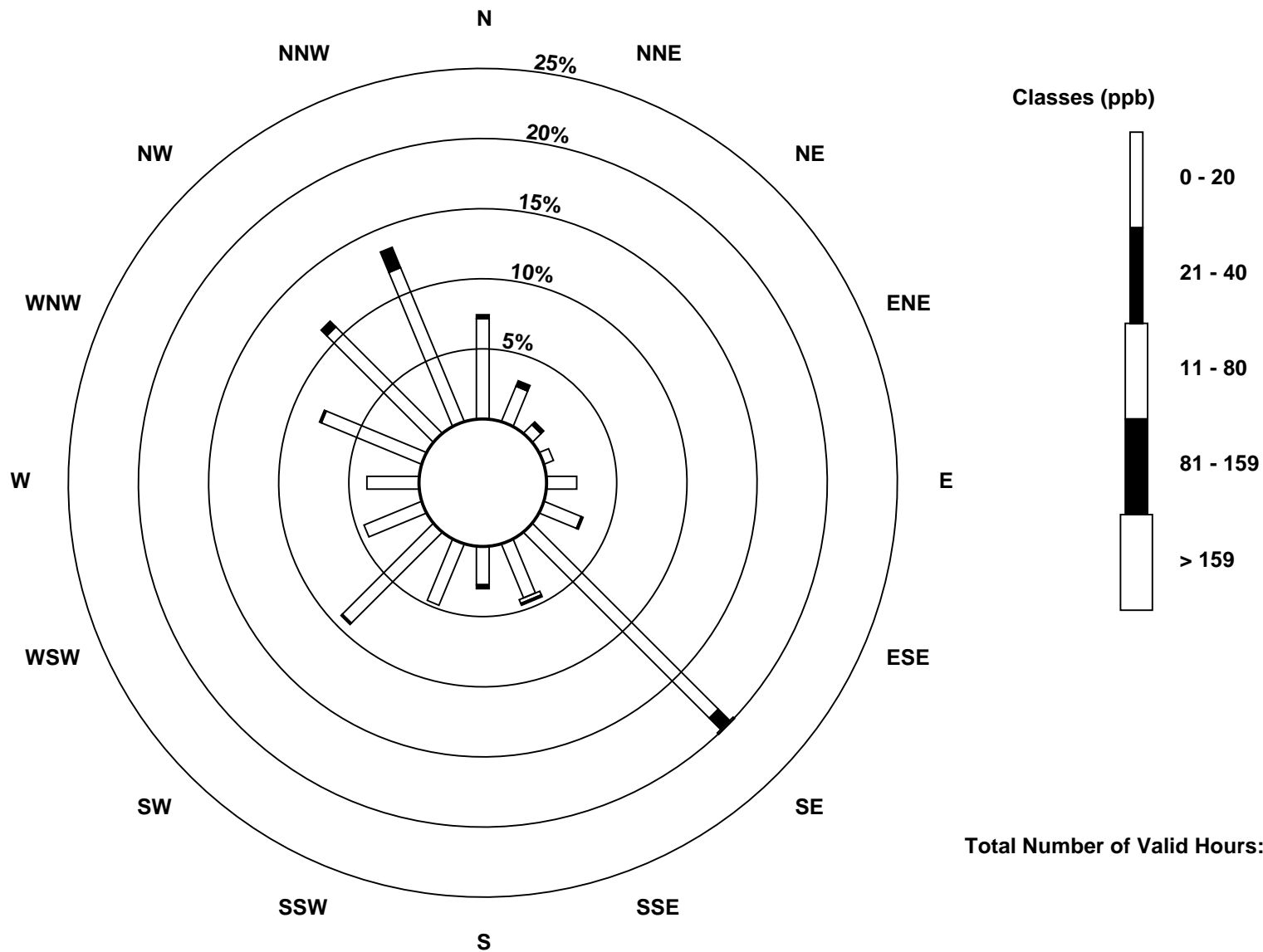
Total Number of Valid Hours: 699

Total Number of Hours: 744

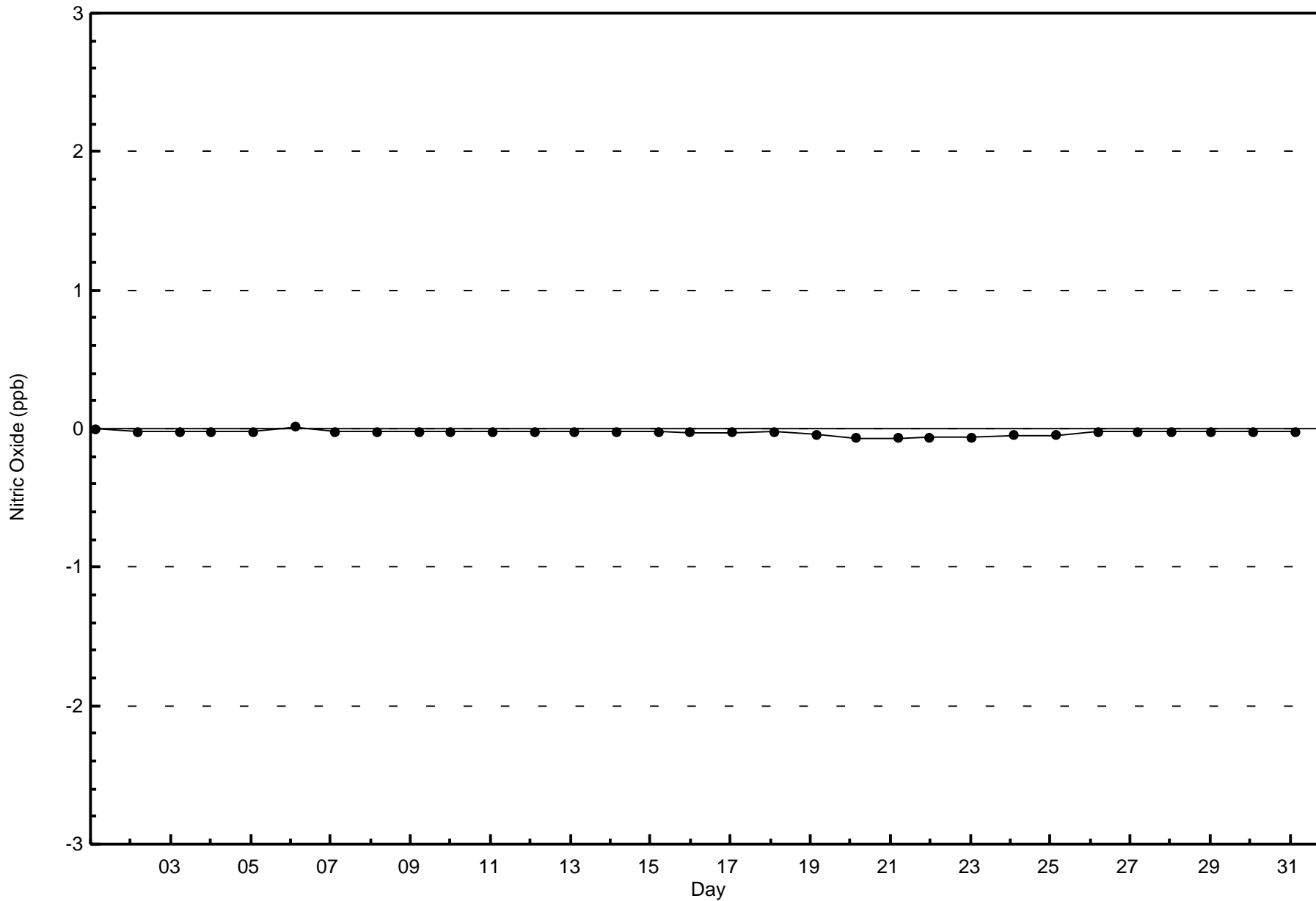


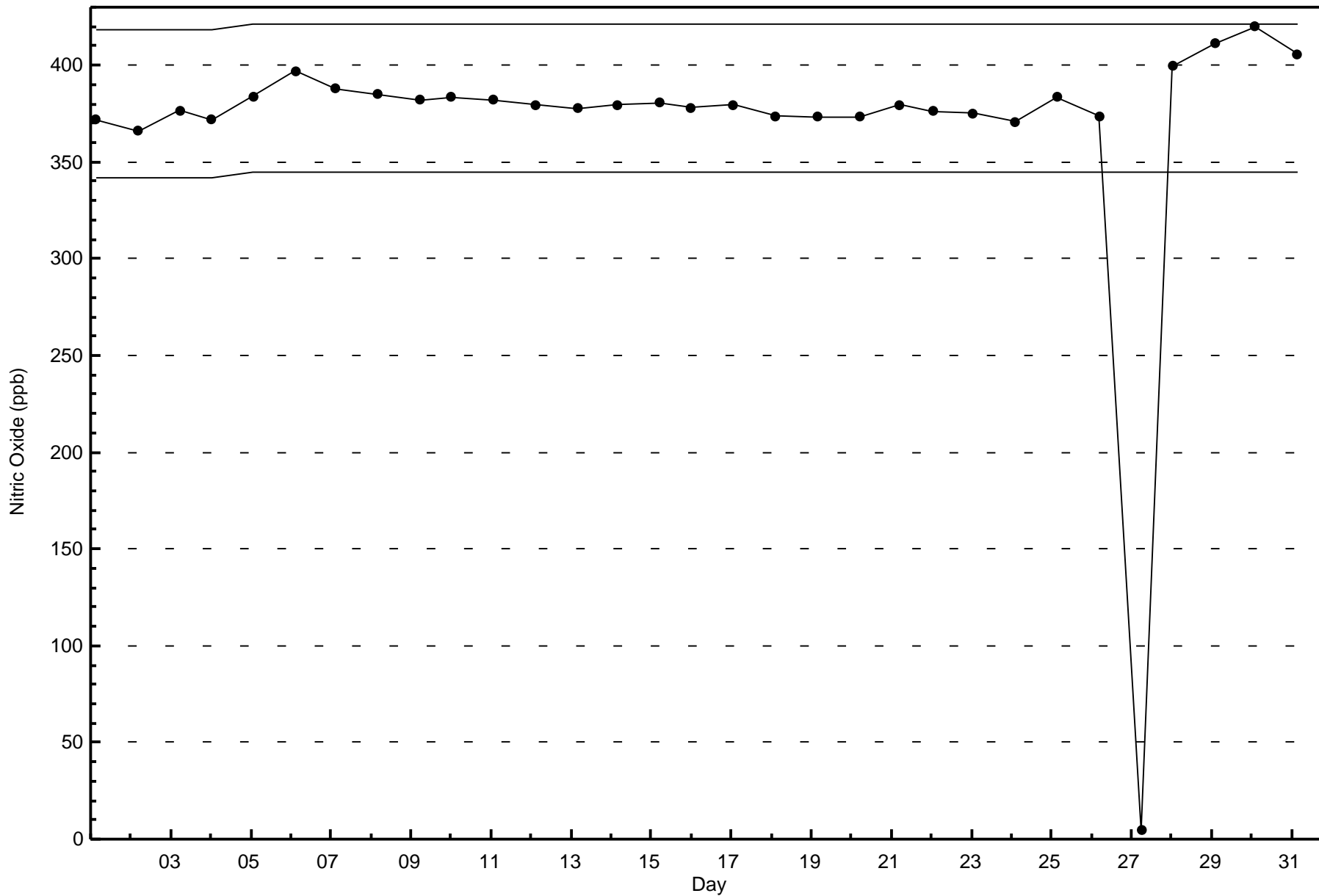
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitric Oxide (NO) - ppb  
Athabasca Valley (AMS 7)



Total Number of Valid Hours: 699







# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Nitrogen Dioxide (NO<sub>2</sub>) - ppb

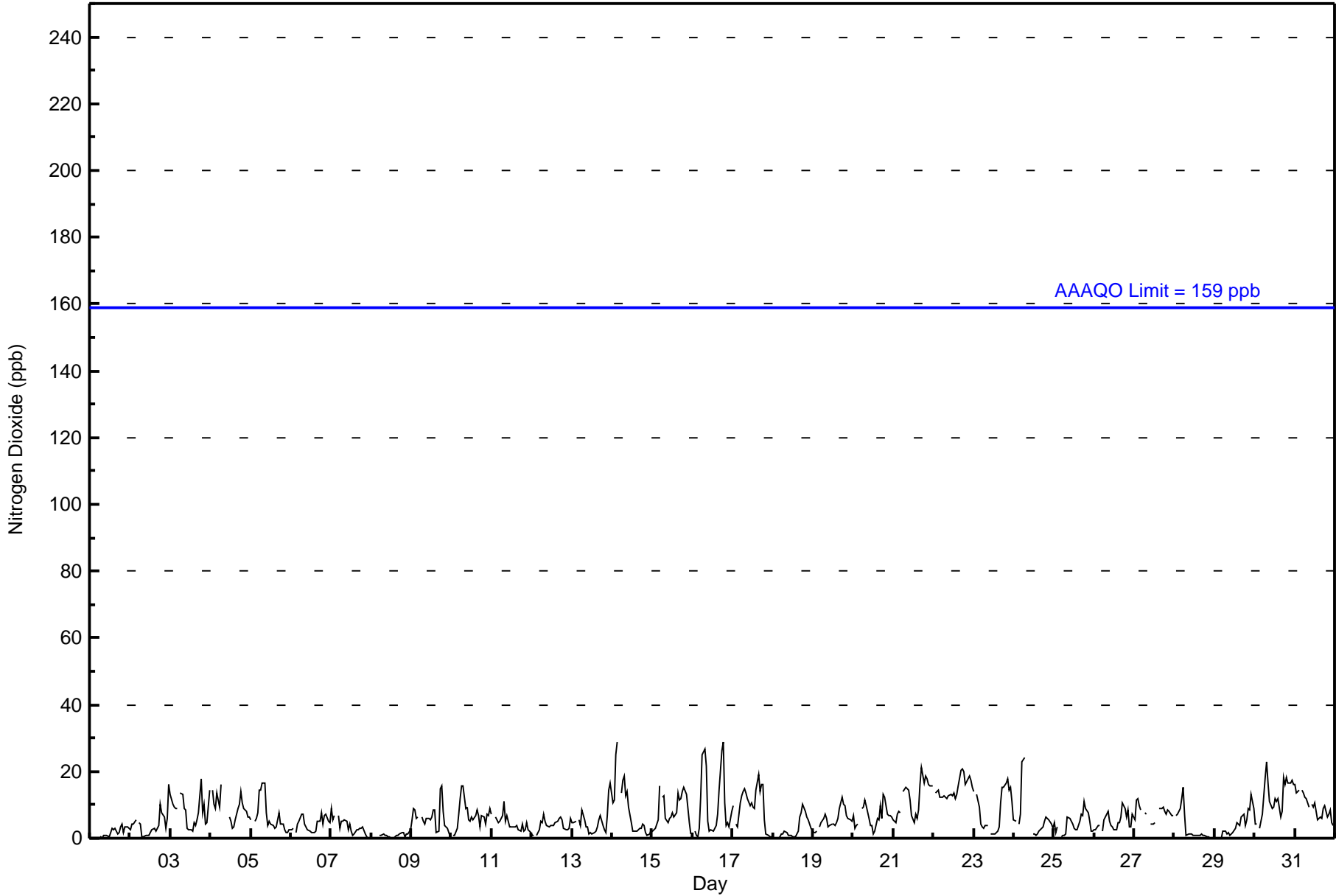
## Athabasca Valley - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 744																																			
Maximum Value: 29 ppb on Oct 16 19:00														Maximum Daily Average: 14.8 ppb on Oct 22																																			
Minimum Value: 0 ppb on Oct 1 01:00														Minimum Daily Average: 0.8 ppb on Oct 8																																			
Maximum Diurnal Average: 10.0 ppb at hour 19														Minimum Diurnal Average: 3.9 ppb at hour 14																																			
Monthly Average: 6.5 ppb														Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 3 Median = 5 Q <sub>3</sub> = 9 P <sub>90</sub> = 14 P <sub>99</sub> = 24																																			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	0	0	0	Z	0	0	0	0	1	1	1	1	2	3	3	3	1	2	4	4	2	4	3	3	1.6	4																							
2-Oct	3	4	4	6	Z	5	4	1	0	1	1	1	2	3	3	2	3	4	10	8	6	3	6	16	4.1	16																							
3-Oct	13	10	9	9	9	Z	14	13	9	9	3	3	3	2	5	4	5	8	18	8	10	4	5	14	8.0	18																							
4-Oct	Z	14	10	9	14	10	16	C	C	C	C	7	5	3	3	5	9	10	14	10	9	8	6	6	8.9	16																							
5-Oct	5	Z	5	6	8	14	14	17	16	8	4	5	4	4	3	4	5	8	4	4	3	2	2	2	6.4	17																							
6-Oct	2	3	Z	2	4	5	7	7	4	3	3	2	2	2	2	2	5	5	8	4	7	7	5	5	4.1	8																							
7-Oct	9	6	7	Z	7	3	5	5	6	5	3	4	2	1	1	3	3	3	3	4	1	1	0	0	3.5	9																							
8-Oct	0	0	0	0	Z	1	1	1	1	1	1	0	0	0	0	1	1	1	2	2	0	1	1	3	0.8	3																							
9-Oct	6	9	8	6	6	Z	7	5	4	6	6	5	6	9	9	2	2	15	16	8	4	3	2	0	6.2	16																							
10-Oct	Z	1	1	3	7	12	16	16	9	9	5	5	6	6	7	8	7	3	7	7	4	7	7	9	7.0	16																							
11-Oct	7	Z	6	6	5	5	7	11	5	7	5	3	4	4	3	4	2	2	4	2	3	5	3	2	4.5	11																							
12-Oct	1	1	Z	1	3	5	5	7	5	4	4	4	4	4	5	5	6	6	5	3	3	3	3	6	3.9	7																							
13-Oct	5	5	5	Z	6	4	8	6	3	3	1	2	1	2	2	3	5	7	4	3	2	7	14	16	5.0	16																							
14-Oct	11	12	25	29	Z	13	18	19	13	14	9	5	2	2	2	2	3	3	4	4	2	1	1	3	8.5	29																							
15-Oct	2	3	3	5	16	Z	12	13	6	5	6	6	8	6	8	14	11	12	14	15	13	9	5	1	8.3	16																							
16-Oct	Z	2	1	0	3	12	25	27	22	5	2	2	2	3	4	7	15	26	29	10	4	5	4	8	9.5	29																							
17-Oct	10	Z	4	3	11	13	14	15	13	12	10	11	9	9	14	19	14	16	16	5	1	1	0	0	9.6	19																							
18-Oct	0	0	Z	0	0	1	1	2	2	1	1	1	1	1	1	2	6	8	10	8	6	6	4	3	2.8	10																							
19-Oct	2	2	2	Z	3	5	6	7	6	4	4	4	4	4	5	6	9	12	10	10	7	6	5	5	5.5	12																							
20-Oct	7	3	4	4	Z	9	9	11	10	6	4	4	1	2	6	6	10	6	13	12	7	7	7	7	6.7	13																							
21-Oct	6	5	7	8	8	Z	14	15	15	14	11	7	5	7	6	9	16	21	17	19	18	16	16	16	11.9	21																							
22-Oct	Z	14	14	14	12	12	13	12	12	13	13	13	14	12	13	16	20	21	20	16	17	19	17	15	14.8	21																							
23-Oct	14	Z	13	9	4	3	3	4	4	M	1	1	1	1	2	4	10	15	15	17	18	14	15	11	8.2	18																							
24-Oct	6	5	Z	4	7	23	24	C	C	C	C	1	1	1	1	2	3	3	5	6	6	5	4	3	5.8	24																							
25-Oct	5	2	4	Z	1	1	1	1	7	6	5	4	3	3	3	5	7	7	11	9	8	5	2	2	4.3	11																							
26-Oct	3	3	4	4	Z	2	5	7	8	5	4	3	3	3	5	5	7	10	9	6	8	4	3	7	5.1	10																							
27-Oct	5	12	12	10	8	Z	8	7	M	M	4	4	5	M	M	9	9	10	8	7	8	8	7	7	7.8	12																							
28-Oct	Z	7	7	9	12	15	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	3.1	15																							
29-Oct	0	Z	0	0	0	2	2	1	2	1	1	2	3	5	4	4	7	7	4	6	9	9	13	9	3.9	13																							
30-Oct	4	4	Z	3	7	13	18	23	17	11	9	9	12	11	12	6	8	18	16	18	17	16	18	16	12.5	23																							
31-Oct	16	14	14	Z	14	14	12	12	9	DF	10	9	11	5	6	7	6	9	10	6	7	9	5	4	9.5	16																							
																								5.4	5.3	6.6	6.0	6.7	7.7	9.6	9.2	7.5	5.9	4.5	4.2	4.0	3.9	4.6	5.4	7.0	9.0	10.0	7.8	6.8	6.2	5.9	6.4	Diurnal Average	
																								16	14	25	29	16	23	25	27	22	14	13	13	14	12	14	19	20	26	29	19	18	19	18	16	Diurnal Maximum	
Z - zerospan C - Calibration M - Maintenance DF - DAS Failure																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																																																	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Athabasca Valley - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Athabasca Valley - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	687	98.28	98.28
21 - 40	12	1.72	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 699

Total Number of Hours: 744





**Wood Buffalo Environmental Association  
Frequency Distribution**

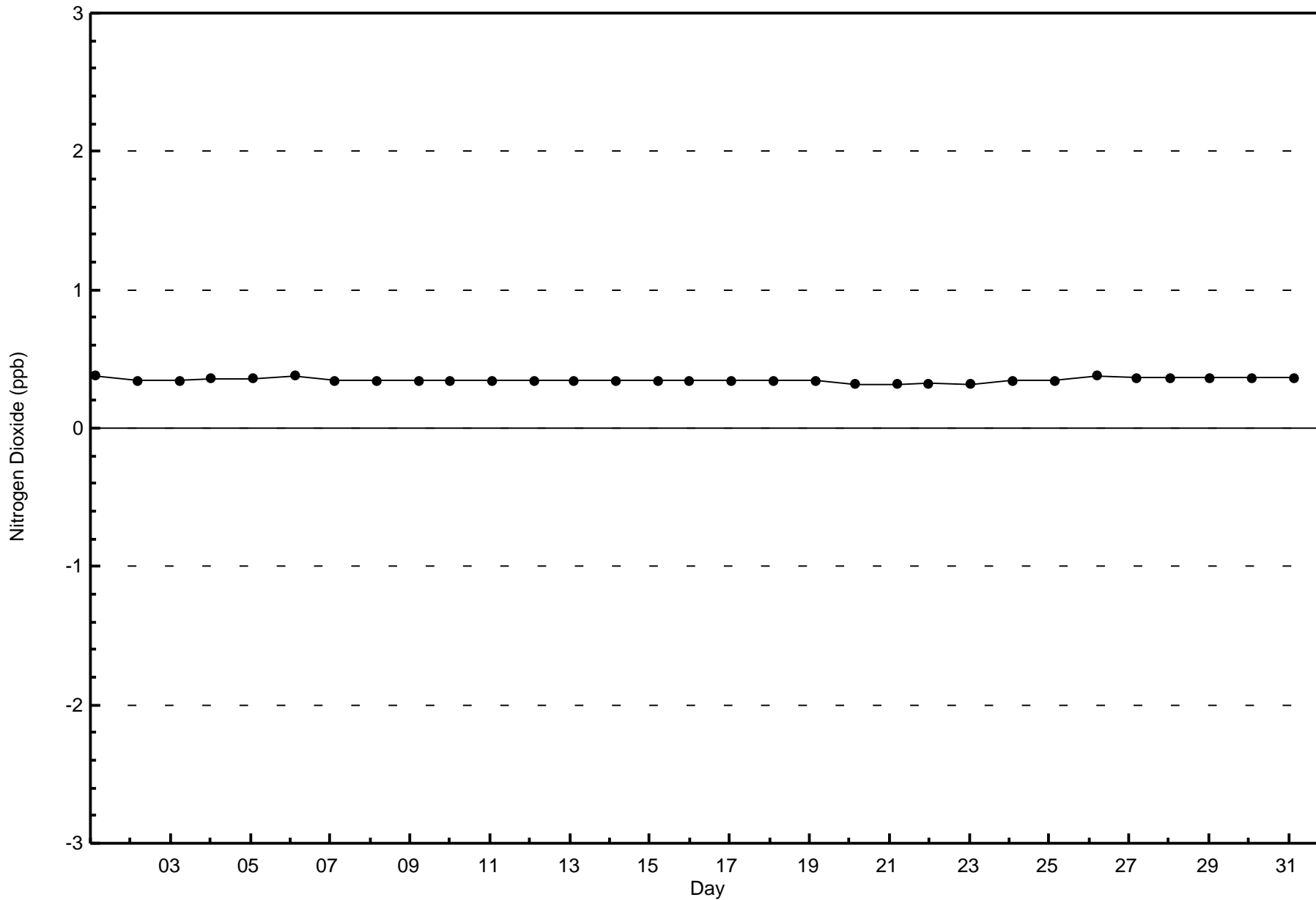
**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Athabasca Valley - October 2017**

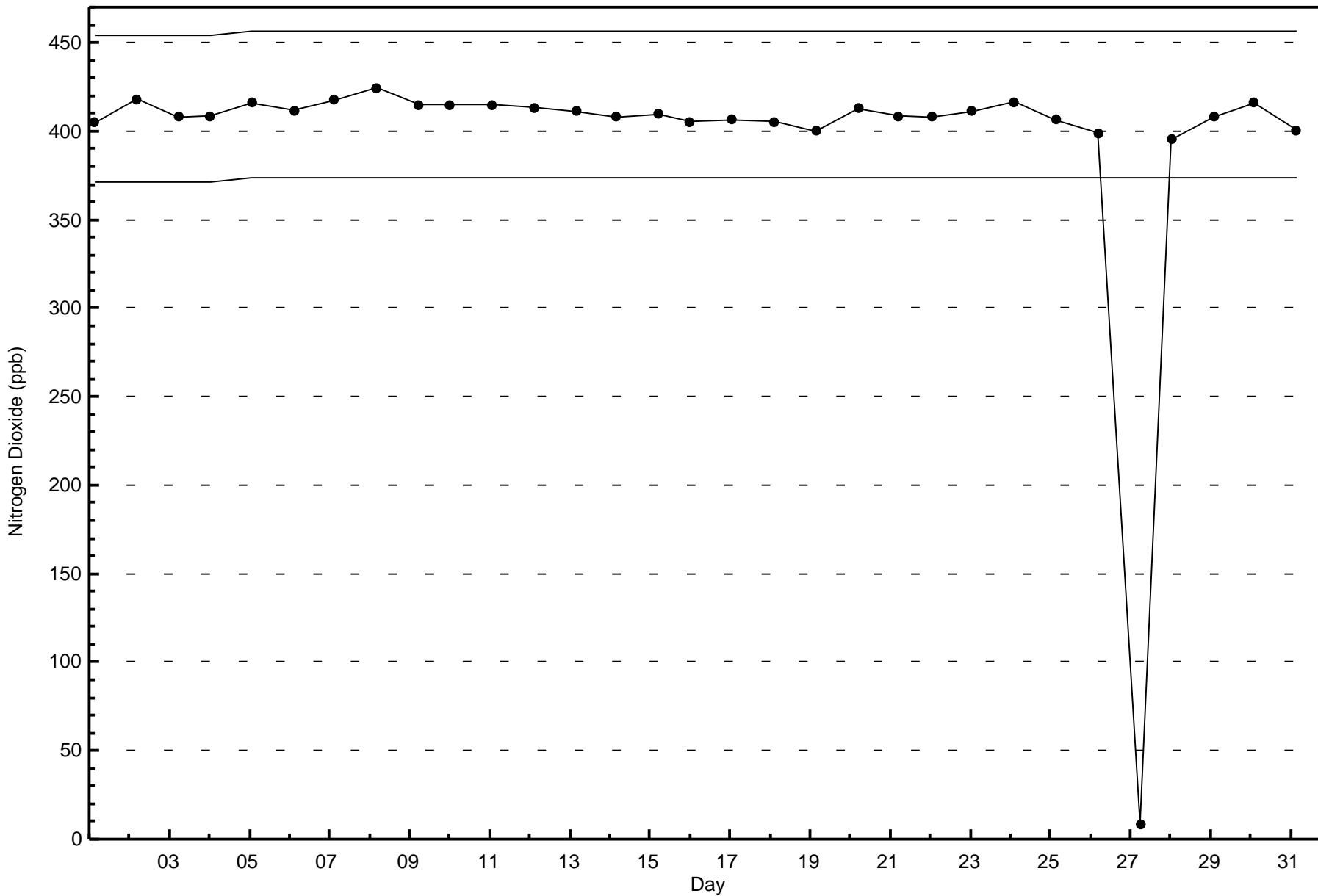
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	52	22	8	5	14	20	135	30	20	33	65	31	26	54	79	93	687
21 - 40	0	0	0	0	1	1	5	2	1	0	0	0	0	1	0	1	12
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	52	22	8	5	15	21	140	32	21	33	65	31	26	55	79	94	699

Total Number of Valid Hours: 699

Total Number of Hours: 744









**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

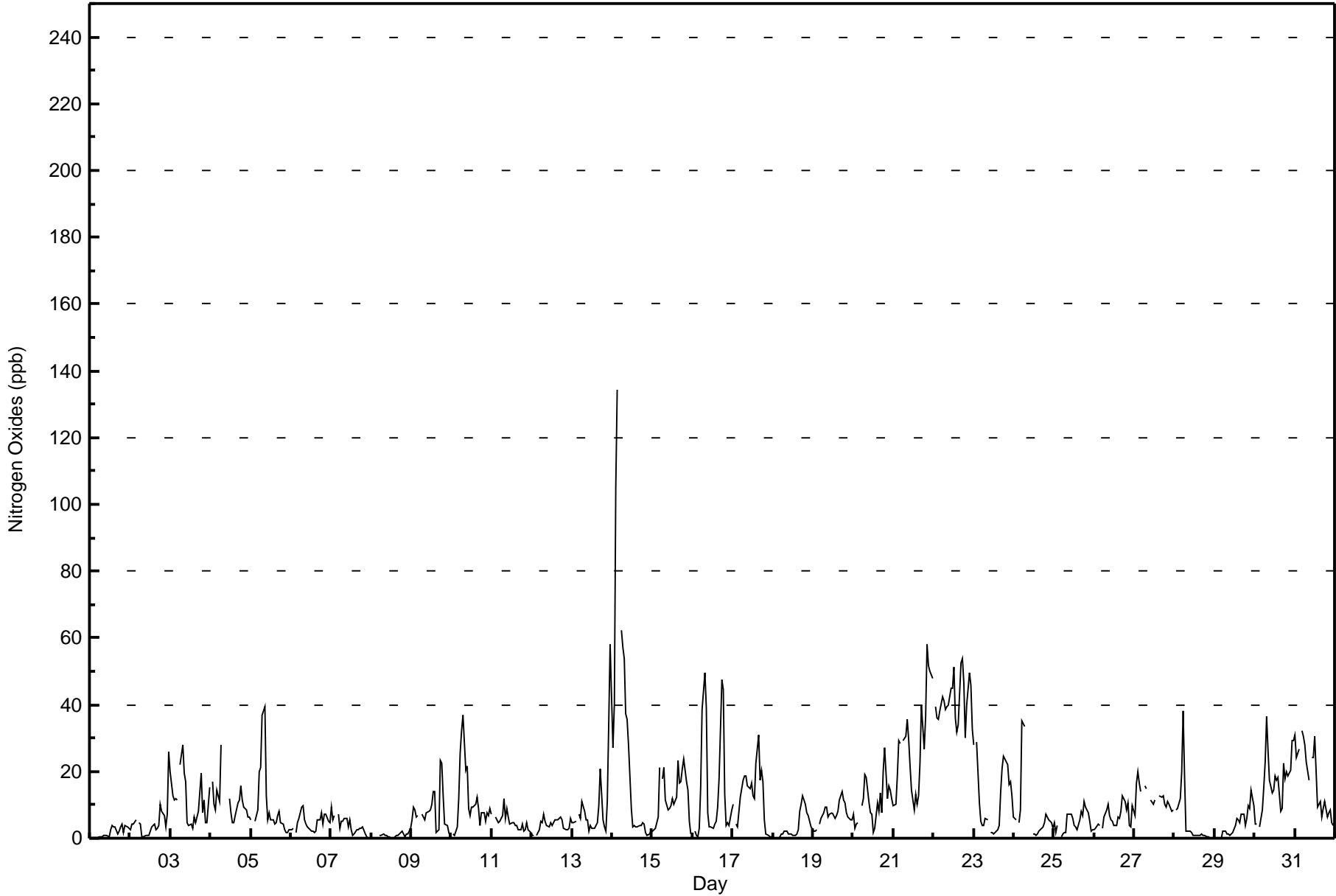
**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Athabasca Valley - October 2017**

Maximum Value: 134 ppb on Oct 14 04:00		Maximum Daily Average: 41.1 ppb on Oct 22		Hours in Service: 744																																													
Minimum Value: 0 ppb on Oct 18 04:00		Minimum Daily Average: 0.8 ppb on Oct 8		Hours of Data: 699																																													
Maximum Diurnal Average: 16.9 ppb at hour 8		Minimum Diurnal Average: 6.4 ppb at hour 14		Hours of Missing Data: 45																																													
Monthly Average: 10.6 ppb		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 3 Median = 6 Q <sub>3</sub> = 13 P <sub>90</sub> = 28 P <sub>99</sub> = 52		Hours of Calibration: 39																																													
				Percent Operational Time: 99.2																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	0	0	0	Z	0	0	0	0	1	1	1	1	3	4	3	3	1	2	3	4	2	4	3	3	1.7	4																							
2-Oct	3	4	4	6	Z	5	4	1	0	1	1	1	2	3	4	3	3	4	10	8	7	3	7	26	4.8	26																							
3-Oct	20	13	11	12	12	Z	22	28	20	17	5	4	4	3	6	5	6	8	20	8	12	5	5	15	11.3	28																							
4-Oct	Z	17	10	9	14	11	28	C	C	C	C	12	8	5	5	7	11	12	16	11	9	8	6	6	10.8	28																							
5-Oct	5	Z	5	7	9	20	21	37	39	13	5	8	6	5	4	5	7	8	4	4	3	2	2	2	9.6	39																							
6-Oct	3	3	Z	2	5	6	9	10	6	4	3	3	2	2	2	2	5	5	8	4	7	7	5	5	4.7	10																							
7-Oct	9	5	7	Z	7	3	5	5	6	6	3	5	2	1	1	3	2	3	3	3	1	1	0	0	3.6	9																							
8-Oct	0	0	0	0	Z	1	1	1	1	1	1	0	0	0	0	1	1	1	2	1	0	1	1	3	0.8	3																							
9-Oct	5	9	8	6	7	Z	7	6	5	7	8	9	10	14	14	2	2	23	22	13	4	4	2	1	8.3	23																							
10-Oct	Z	1	1	3	12	25	32	37	20	22	9	7	9	9	10	12	9	4	8	8	5	8	7	9	11.6	37																							
11-Oct	7	Z	6	6	5	5	7	12	6	9	6	4	4	4	4	4	2	2	4	2	3	4	3	2	4.9	12																							
12-Oct	1	1	Z	1	3	5	4	7	5	4	4	4	4	5	5	6	6	6	5	3	3	2	3	6	4.1	7																							
13-Oct	5	5	5	Z	7	6	11	8	5	6	2	4	3	3	4	5	10	21	6	3	2	11	34	58	9.7	58																							
14-Oct	27	40	105	134	Z	62	57	54	37	35	28	9	3	4	4	3	4	4	5	4	2	1	1	3	27.2	134																							
15-Oct	2	2	3	6	21	Z	18	21	11	9	9	10	12	10	12	23	17	17	21	24	17	14	5	1	12.5	24																							
16-Oct	Z	2	1	0	3	15	38	50	39	8	3	3	3	4	5	9	18	47	44	13	4	5	4	8	14.3	50																							
17-Oct	10	Z	4	4	12	15	17	19	19	16	15	16	13	12	22	31	17	20	17	5	1	1	0	0	12.5	31																							
18-Oct	0	0	Z	0	0	1	1	2	2	1	1	1	1	1	1	3	8	10	13	10	8	7	5	4	3.5	13																							
19-Oct	2	2	3	Z	4	6	8	9	9	6	7	8	7	6	7	8	11	14	11	11	8	6	6	5	7.2	14																							
20-Oct	7	3	4	4	Z	10	12	19	18	11	8	7	2	3	11	8	13	8	20	27	12	16	14	12	10.8	27																							
21-Oct	10	10	19	29	28	Z	29	31	36	30	22	14	8	13	10	13	23	40	26	37	58	52	50	48	27.6	58																							
22-Oct	Z	40	36	36	38	42	41	38	39	40	45	45	51	36	32	34	53	54	47	30	40	50	46	33	41.1	54																							
23-Oct	28	Z	29	11	5	4	4	6	6	M	2	2	1	2	3	4	14	21	25	23	22	16	17	13	11.6	29																							
24-Oct	6	6	Z	5	8	35	33	C	C	C	C	1	1	1	1	2	3	3	5	7	7	6	5	3	7.2	35																							
25-Oct	5	2	4	Z	1	1	2	2	7	7	7	6	4	3	3	5	8	7	11	9	8	5	2	2	4.8	11																							
26-Oct	3	3	4	4	Z	3	6	9	10	7	5	5	4	4	6	6	8	13	11	8	11	4	4	10	6.4	13																							
27-Oct	7	16	20	17	14	Z	16	15	M	M	12	10	12	M	M	13	12	13	10	9	11	10	8	8	12.2	20																							
28-Oct	Z	8	9	12	20	38	19	2	2	2	2	1	1	1	1	1	1	1	1	1	1	0	0	0	5.4	38																							
29-Oct	0	Z	0	0	0	2	2	1	1	1	1	2	4	6	6	5	7	7	4	6	10	9	14	10	4.3	14																							
30-Oct	4	4	Z	3	8	15	23	36	26	18	14	14	18	17	18	8	9	22	18	20	19	21	29	29	17.2	36																							
31-Oct	31	24	27	Z	32	31	28	23	17	DF	24	24	31	9	10	11	7	9	11	6	8	8	5	4	17.3	32																							
																								7.7	8.5	12.5	12.7	10.6	14.2	16.4	16.9	14.1	10.7	8.7	7.7	7.5	6.4	7.2	7.8	9.6	13.2	13.3	10.5	9.7	9.4	9.5	10.6	Diurnal Average	
																								31	40	105	134	38	62	57	54	39	40	45	45	51	36	32	34	53	54	47	37	58	52	50	58	Diurnal Maximum	
Z - zerospan																								C - Calibration				M - Maintenance				DF - DAS Failure																	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Athabasca Valley - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Athabasca Valley - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	596	85.26	85.26
21 - 40	80	11.44	96.71
41 - 80	21	3.00	99.71
81 - 159	2	0.29	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 699

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Athabasca Valley - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	48	18	6	4	10	16	110	26	15	28	62	30	23	50	73	77	596
21 - 40	3	4	2	1	5	5	24	3	5	5	3	1	3	4	3	9	80
11 - 80	1	0	0	0	0	0	6	1	1	0	0	0	0	1	3	8	21
81 - 159	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	52	22	8	5	15	21	140	32	21	33	65	31	26	55	79	94	699

Total Number of Valid Hours: 699

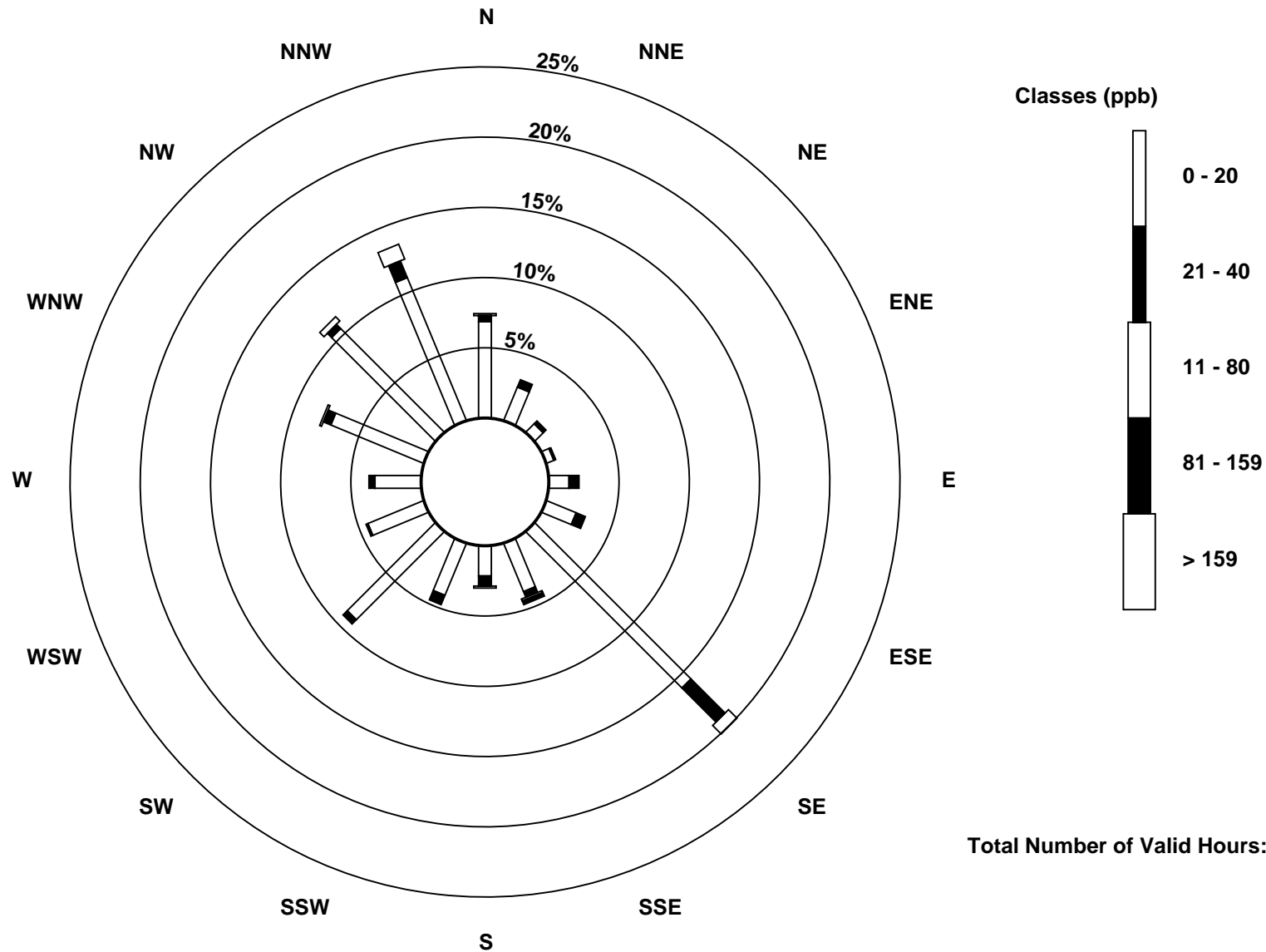
Total Number of Hours: 744



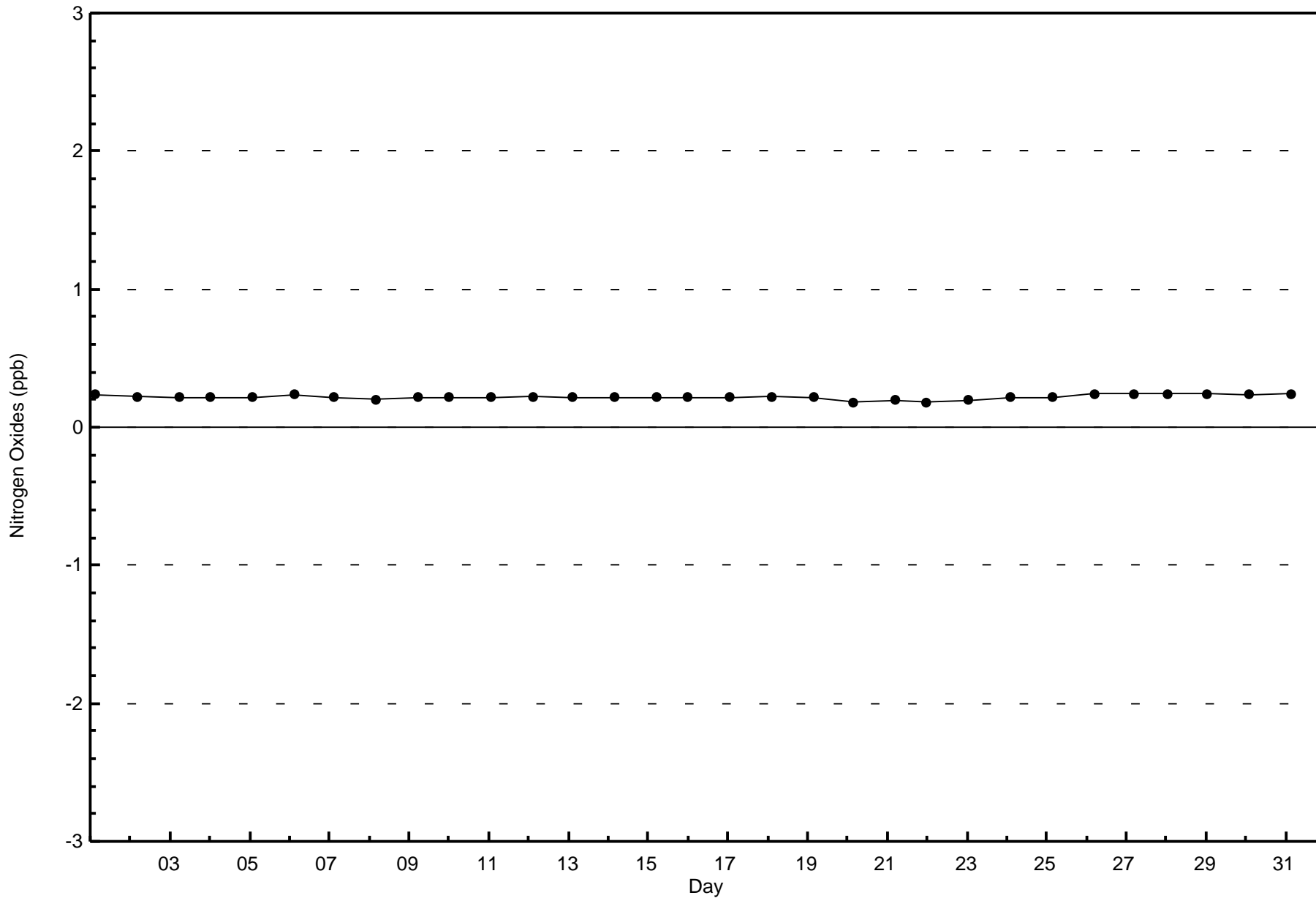


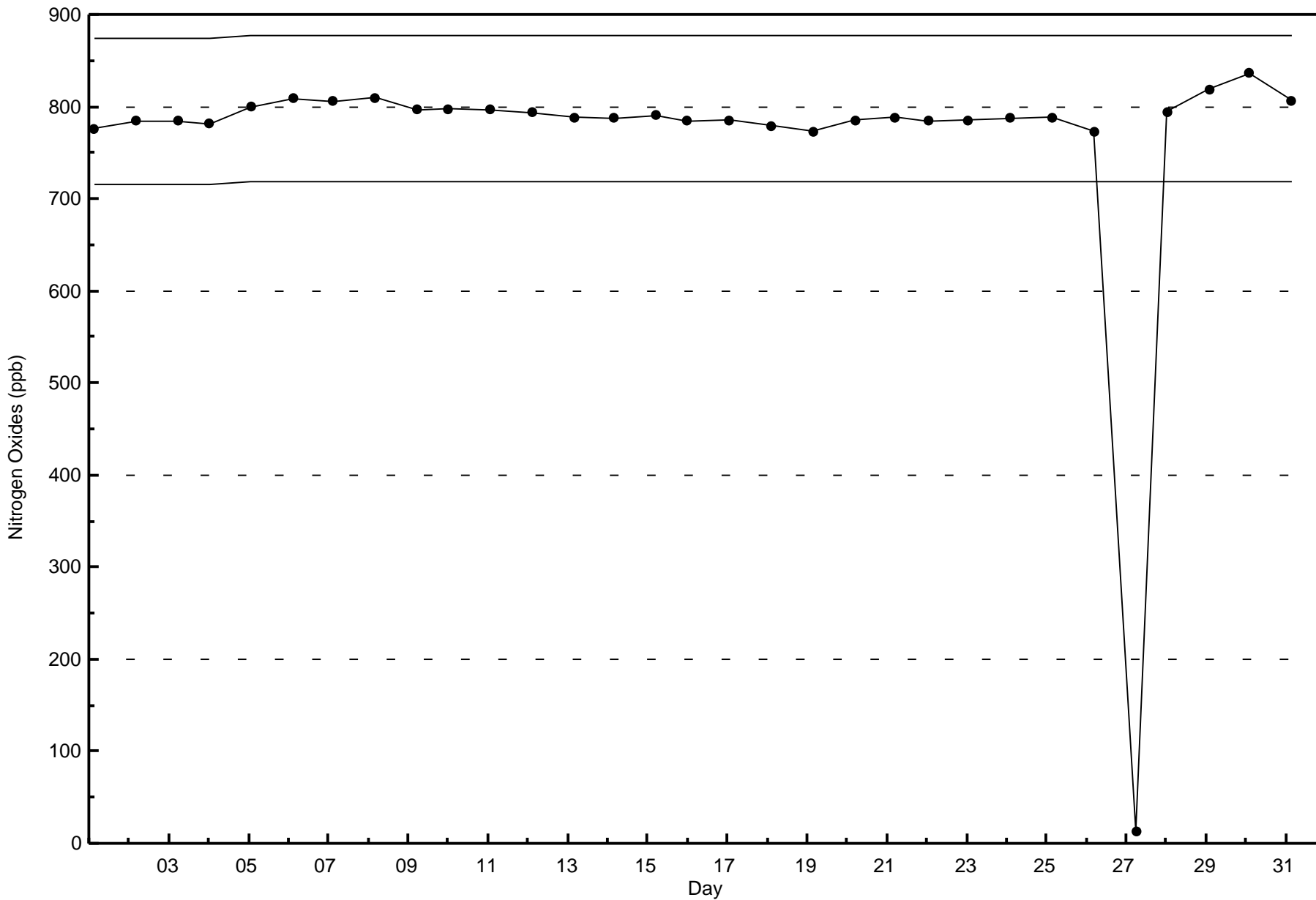
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Athabasca Valley (AMS 7)



Total Number of Valid Hours: 699





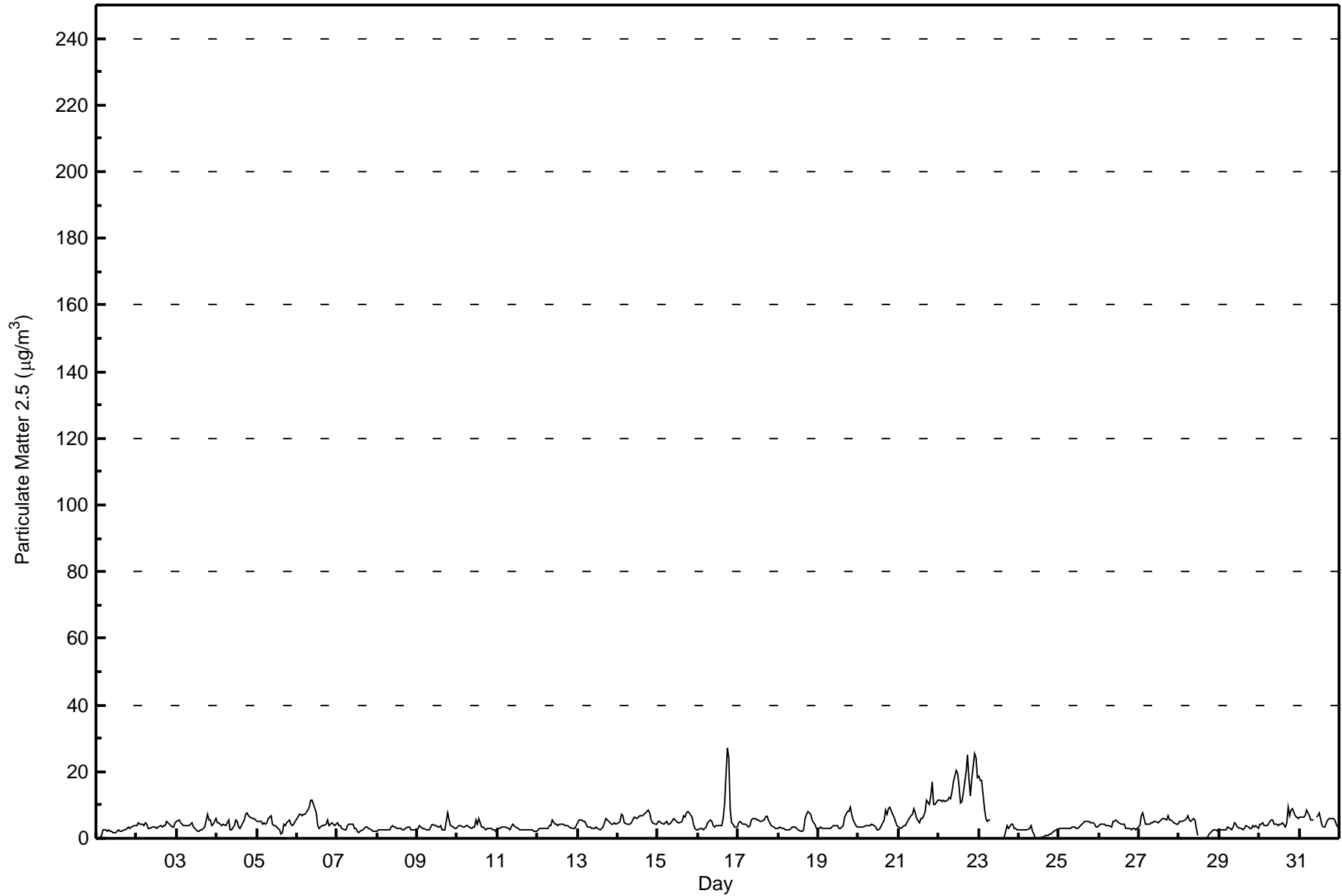


Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 27.2 µg/m <sup>3</sup> on Oct 16 18:00 Maximum Daily Average: 15.6 µg/m <sup>3</sup> on Oct 22		Hours in Service: 744 Hours of Data: 733 Hours of Missing Data: 11 Hours of Calibration: 4 Percent Operational Time: 99.1																									
Minimum Value: 0.0 µg/m <sup>3</sup> on Oct 1 02:00 Maximum Diurnal Average: 6.4 µg/m <sup>3</sup> at hour 18 Monthly Average: 4.68 µg/m <sup>3</sup>		Minimum Daily Average: 1.7 µg/m <sup>3</sup> on Oct 24 Minimum Diurnal Average: 3.7 µg/m <sup>3</sup> at hour 14 Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 2.4 Q <sub>1</sub> = 3.0 Median = 3.9 Q <sub>3</sub> = 5.3 P <sub>90</sub> = 7.3 P <sub>99</sub> = 19.7																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	UO	0.0	0.2	0.9	2.4	2.4	2.3	2.4	2.2	2.2	1.9	1.8	2.1	2.4	2.3	2.1	2.4	2.7	3.1	3.4	3.0	3.6	3.6	3.7	2.3	3.7	
2-Oct	3.8	4.6	4.4	4.2	3.9	4.6	4.3	3.0	3.0	3.2	3.3	3.3	3.1	3.5	3.9	3.4	3.8	3.8	5.0	4.7	3.8	3.3	3.3	4.5	3.8	5.0	
3-Oct	5.3	5.5	4.6	4.2	4.0	3.6	3.8	3.9	4.2	4.9	3.2	2.8	2.3	2.0	2.4	2.6	3.0	3.3	7.4	5.4	5.4	4.0	4.3	6.0	4.1	7.4	
4-Oct	4.6	4.6	4.0	3.9	4.2	4.0	4.7	5.7	2.6	2.5	3.9	5.6	5.0	3.3	3.0	3.9	5.7	7.1	7.5	7.0	6.4	5.9	5.9	5.5	4.8	7.5	
5-Oct	5.1	5.0	5.0	4.3	4.5	4.4	4.8	5.9	6.9	4.4	3.9	4.0	3.4	2.4	1.4	1.9	4.4	4.0	4.7	5.4	4.1	3.9	4.4	4.9	4.3	6.9	
6-Oct	6.4	7.3	7.2	6.9	7.1	7.3	8.5	9.5	11.5	11.5	10.3	7.5	4.0	2.9	3.2	3.9	4.0	4.1	5.5	3.8	4.3	4.7	3.8	4.1	6.2	11.5	
7-Oct	4.7	4.0	4.0	3.1	2.5	2.7	3.8	4.2	4.4	4.2	2.9	3.2	2.3	1.8	1.9	2.7	2.9	3.5	3.3	3.1	2.7	2.2	2.1	2.1	3.1	4.7	
8-Oct	2.2	2.4	2.4	2.4	2.4	2.4	2.4	2.4	3.3	3.8	3.5	3.6	3.0	2.9	2.9	2.6	2.7	3.1	3.3	3.2	2.6	2.5	2.4	2.6	2.8	3.8	
9-Oct	3.1	3.8	3.4	2.9	3.0	2.7	2.6	2.6	3.4	4.0	3.9	3.7	3.4	3.5	3.7	2.7	2.4	5.0	7.6	5.4	3.7	3.2	3.0	3.0	3.6	7.6	
10-Oct	3.6	4.0	3.9	3.6	3.4	3.6	3.6	3.6	2.8	3.4	3.5	5.3	4.4	5.9	3.4	3.6	2.8	2.7	3.1	3.2	2.9	2.6	2.5	2.3	3.5	5.9	
11-Oct	2.9	3.2	3.3	3.2	3.6	3.2	2.8	2.4	3.5	4.3	3.8	3.5	3.1	2.7	2.5	2.4	2.3	2.6	2.7	2.7	2.4	2.5	2.3	2.3	2.9	4.3	
12-Oct	2.7	3.1	3.2	3.0	3.0	3.1	2.9	3.8	3.8	5.3	4.3	4.4	3.9	4.4	4.3	4.1	3.9	3.8	3.7	3.3	3.2	3.1	3.0	3.7	3.6	5.3	
13-Oct	4.7	5.3	5.7	5.0	4.9	4.1	3.5	3.4	3.0	3.0	3.0	3.2	2.8	2.6	3.0	3.3	4.8	5.9	4.9	4.6	4.2	4.2	4.6	4.3	4.1	5.9	
14-Oct	4.5	5.0	7.1	6.6	4.6	4.3	4.3	4.4	4.7	5.7	6.5	6.0	6.2	6.8	6.6	6.8	7.7	8.2	8.4	7.4	5.4	4.6	4.1	4.2	5.8	8.4	
15-Oct	4.9	5.0	4.7	4.3	4.7	5.0	4.2	4.1	4.8	6.1	5.6	5.1	4.5	4.7	5.0	6.9	6.3	7.5	8.0	7.8	6.4	4.4	2.9	2.4	5.2	8.0	
16-Oct	2.6	2.8	2.8	2.7	2.8	3.5	4.5	5.3	5.1	3.7	3.6	3.6	3.7	3.7	4.0	5.9	10.3	27.2	24.2	8.4	4.6	4.0	3.4	3.4	6.1	27.2	
17-Oct	4.8	5.1	4.8	4.3	4.1	3.9	3.6	3.7	5.6	6.0	5.8	5.6	5.3	5.0	5.2	5.3	6.5	7.0	5.7	4.5	4.0	3.5	3.1	3.0	4.8	7.0	
18-Oct	3.0	3.2	3.2	2.8	2.5	2.7	2.4	2.4	3.2	3.5	3.4	3.1	2.6	2.1	2.0	2.7	5.9	7.1	8.2	7.1	5.5	4.8	4.2	3.2	3.8	8.2	
19-Oct	3.2	3.3	3.2	3.0	2.9	2.8	2.9	2.9	3.2	3.6	3.8	3.9	2.9	2.9	3.6	4.0	6.2	8.0	8.0	9.3	7.3	5.3	3.6	3.3	4.3	9.3	
20-Oct	3.4	3.4	3.4	3.4	3.7	3.6	3.8	4.0	4.2	3.7	3.5	2.6	2.5	3.1	4.7	5.4	8.7	7.0	8.8	9.2	7.1	6.3	4.9	4.0	4.8	9.2	
21-Oct	3.4	3.0	3.6	3.8	3.7	4.6	5.4	7.0	7.1	8.7	7.6	5.7	4.7	6.1	5.8	6.6	7.9	11.5	10.2	12.5	17.0	10.1	10.4	11.2	7.4	17.0	
22-Oct	11.5	11.5	11.0	11.5	10.9	11.5	12.1	11.9	13.8	16.8	20.4	19.3	15.6	10.4	10.8	13.7	20.0	25.0	17.8	12.5	17.6	25.4	24.0	18.4	15.6	25.4	
23-Oct	18.5	17.5	17.2	9.0	5.8	5.2	5.5	5.7	C	C	C	1.5	UO	0.0	0.0	0.4	2.0	3.8	2.8	4.1	4.3	3.2	2.8	2.6	5.6	18.5	
24-Oct	2.6	2.5	2.5	2.4	2.4	2.8	3.0	3.8	2.2	1.2	0.0	C	0.5	0.1	0.3	0.4	0.9	0.9	1.3	1.4	1.8	2.1	2.3	2.7	1.7	3.8	
25-Oct	3.0	3.0	3.1	3.0	3.0	3.0	3.0	3.1	3.3	3.2	2.8	2.9	3.3	3.6	4.2	4.9	4.9	4.9	4.9	5.2	4.9	4.5	4.1	3.5	3.3	3.7	5.2
26-Oct	3.8	4.2	4.3	4.1	3.8	3.6	3.7	3.5	5.1	5.2	5.3	4.9	4.6	4.3	4.1	4.0	3.2	3.2	2.9	2.5	2.8	2.8	2.7	2.8	3.8	5.3	
27-Oct	4.0	6.7	7.5	5.9	4.2	4.3	4.4	4.7	4.8	5.2	5.2	4.8	5.0	5.4	5.8	5.9	5.7	6.6	5.5	5.3	5.0	4.8	4.3	4.4	5.2	7.5	
28-Oct	4.9	5.2	5.2	5.4	5.8	6.7	5.5	4.9	5.8	5.7	3.1	0.6	UO	UO	UO	UO	0.0	0.3	1.4	2.1	2.3	2.6	2.4	2.3	3.6	6.7	
29-Oct	2.4	2.6	2.6	2.8	2.7	3.4	3.1	2.6	3.2	4.5	4.2	3.5	3.0	2.9	2.7	2.9	3.7	3.6	2.9	3.1	3.6	3.4	3.9	2.9	3.2	4.5	
30-Oct	4.1	4.3	4.7	3.9	4.0	4.4	5.3	5.4	5.7	4.4	4.1	3.7	4.1	4.1	4.5	3.5	4.9	9.2	6.8	8.7	8.8	6.9	6.5	5.9	5.3	9.2	
31-Oct	6.5	6.4	6.3	6.8	8.6	7.6	6.7	5.6	5.6	DF	6.2	6.9	7.4	4.0	3.3	3.3	4.6	5.5	5.8	5.9	6.0	5.6	4.3	3.2	5.7	8.6	
																								Diurnal Average			
																								Diurnal Maximum			
4.7 4.8 4.8 4.3 4.2 4.2 4.3 4.4 4.7 5.0 4.7 4.5 4.1 3.7 3.7 4.1 5.0 6.4 6.3 5.5 5.3 4.8 4.5 4.3																								Diurnal Average			
18.5 17.5 17.2 11.5 10.9 11.5 12.1 11.9 13.8 16.8 20.4 19.3 15.6 10.4 10.8 13.7 20.0 27.2 24.2 12.5 17.6 25.4 24.0 18.4																								Diurnal Maximum			
C - Calibration      DF - DAS Failure      UO - Unstable Operation Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m <sup>3</sup>																											



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Athabasca Valley - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Athabasca Valley - October 2017**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	557	75.99	75.99
6 - 15	143	19.51	95.50
16 - 25	16	2.18	97.68
26 - 80	1	0.14	97.82
> 81.0	0	0.00	97.82

Total Number of Valid Hours: 733

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**Athabasca Valley - October 2017**

Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	45	18	7	3	11	17	114	25	18	27	57	18	17	48	60	72	557
6 - 15	9	4	2	2	5	7	38	8	1	7	15	12	6	6	5	16	143
16 - 25	1	0	0	0	0	0	3	1	2	0	0	0	0	0	2	7	16
26 - 80	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	55	22	9	5	16	24	156	34	21	34	72	30	23	54	67	95	717

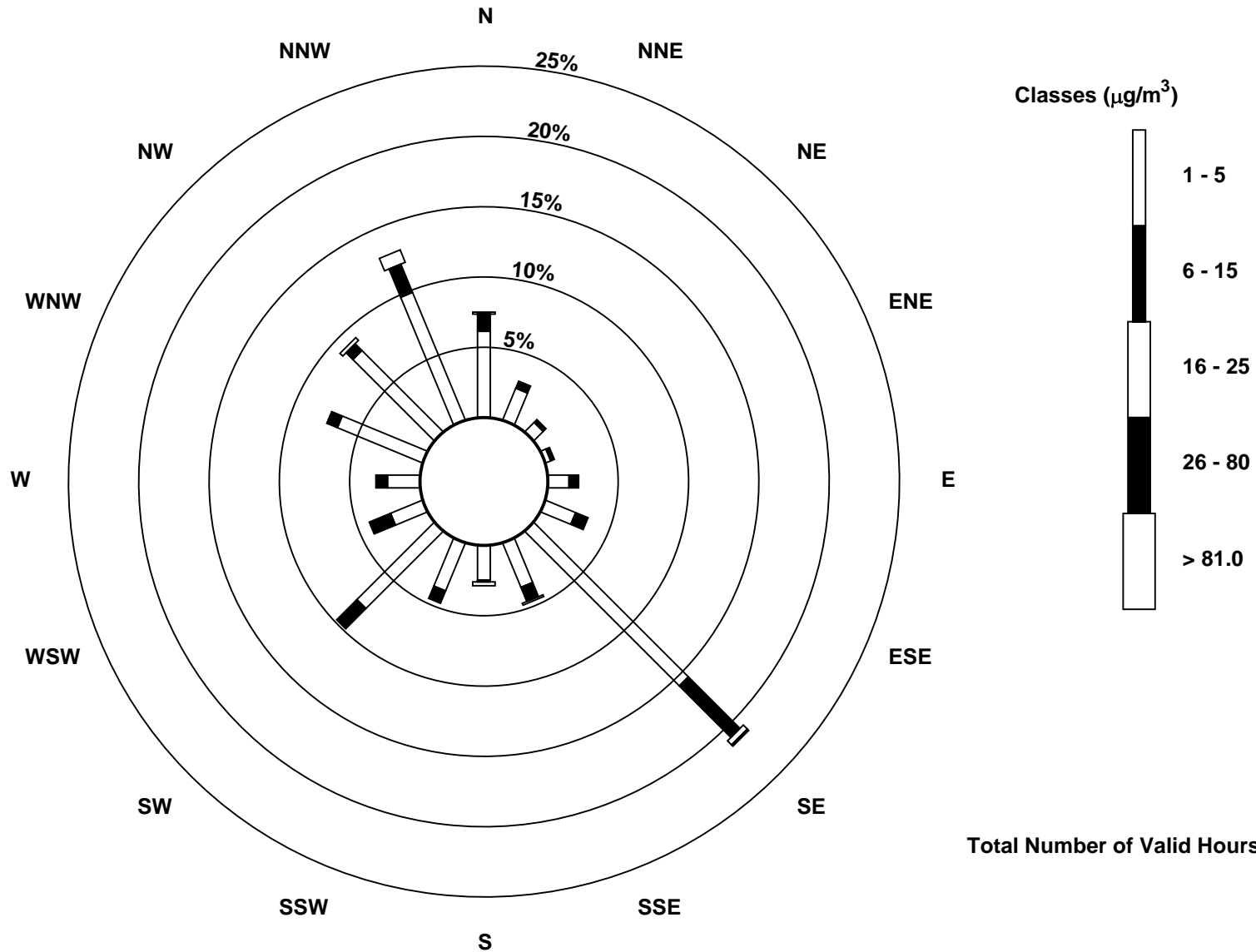
Total Number of Valid Hours: 733

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Athabasca Valley (AMS 7)



Total Number of Valid Hours: 733

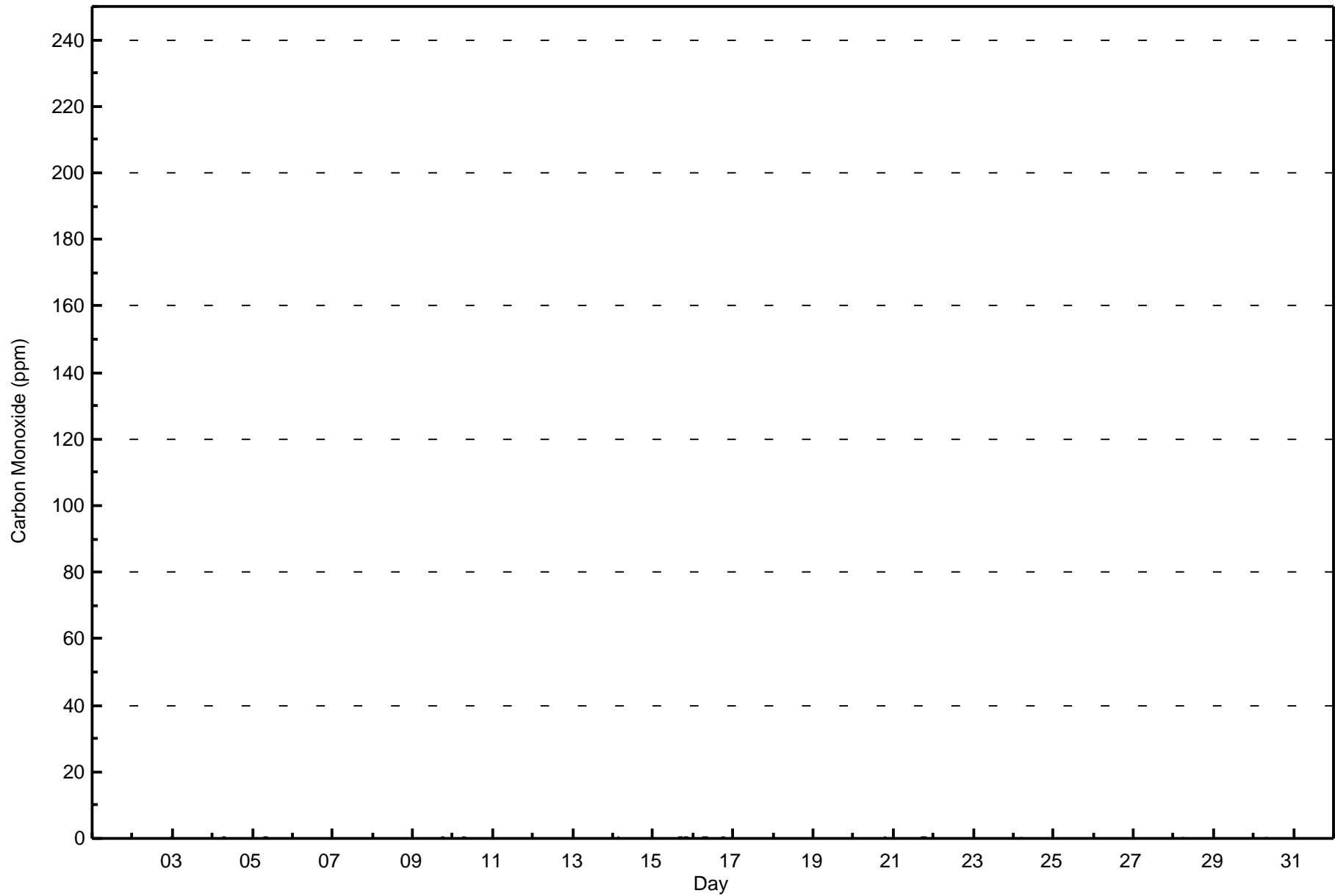






**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Carbon Monoxide (CO) - ppm**  
**Athabasca Valley - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Carbon Monoxide (CO) - ppm  
Athabasca Valley - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	703	99.86	99.86
0.4 - 0.5	1	0.14	100.00
0.6 - 0.7	0	0.00	100.00
0.8 - 1.4	0	0.00	100.00
1.5 - 10	0	0.00	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Carbon Monoxide (CO) - ppm  
Athabasca Valley - October 2017**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.3	51	22	9	5	15	21	144	33	21	32	70	30	26	56	79	89	703
0.4 - 0.5	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
0.6 - 0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.8 - 1.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.5 - 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	51	22	9	5	15	21	145	33	21	32	70	30	26	56	79	89	704

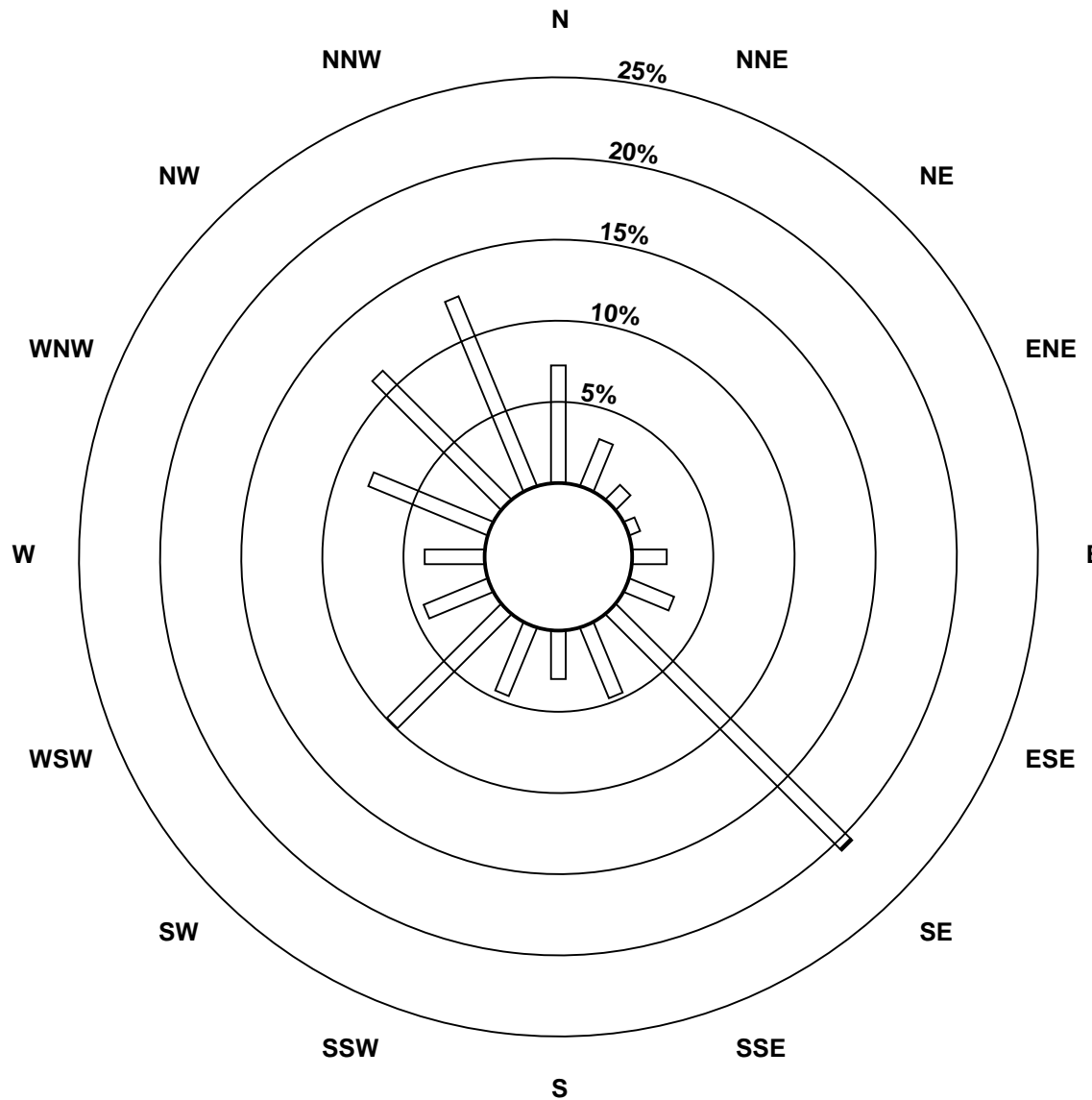
Total Number of Valid Hours: 704

Total Number of Hours: 744

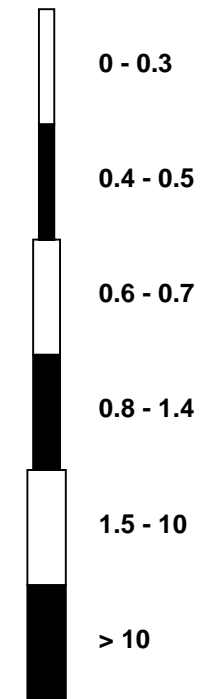


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

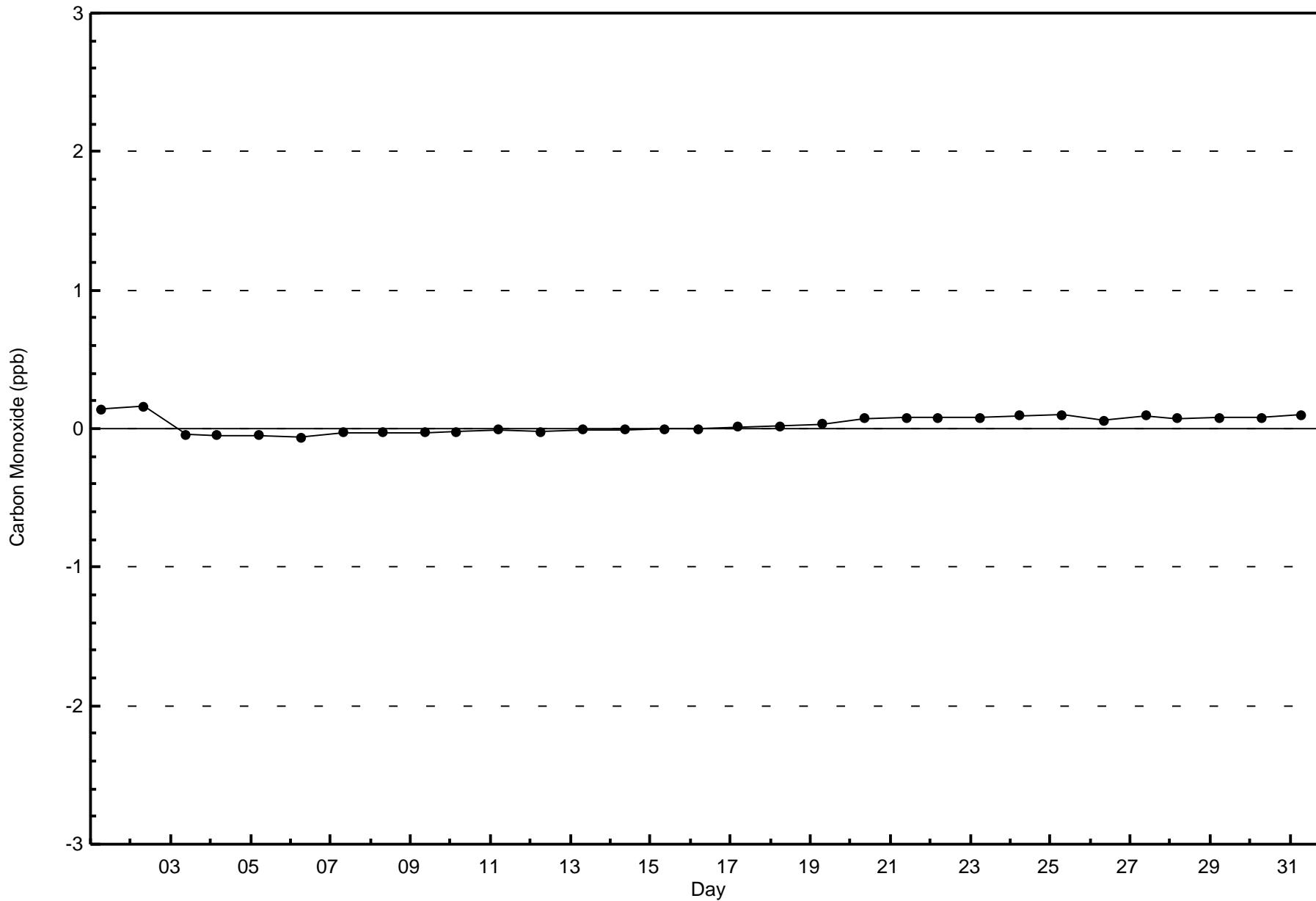
Carbon Monoxide (CO) - ppm  
Athabasca Valley (AMS 7)

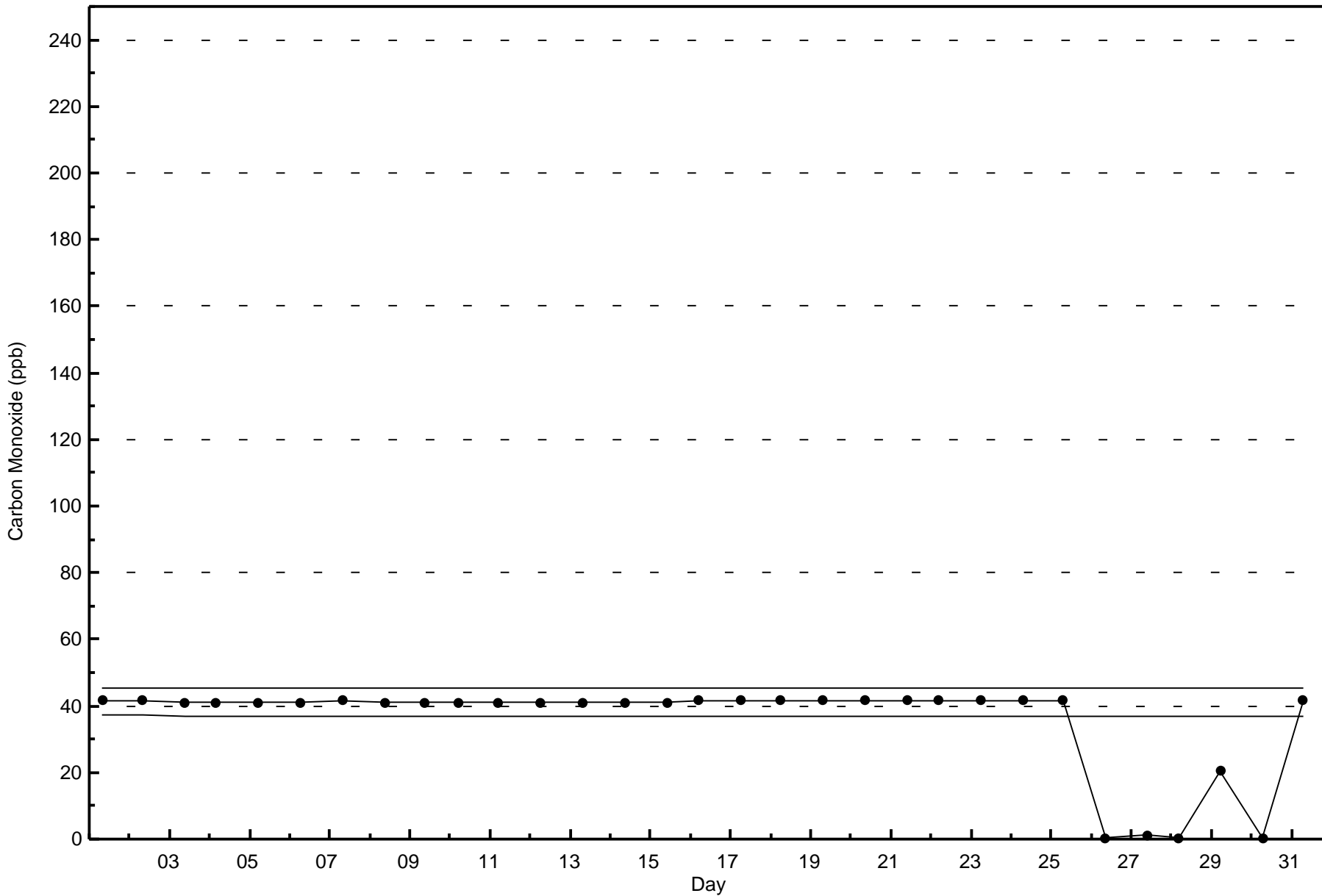


Classes (ppm)



Total Number of Valid Hours: 704







**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Ambient Temperature (AT) - C**  
**Athabasca Valley - October 2017**

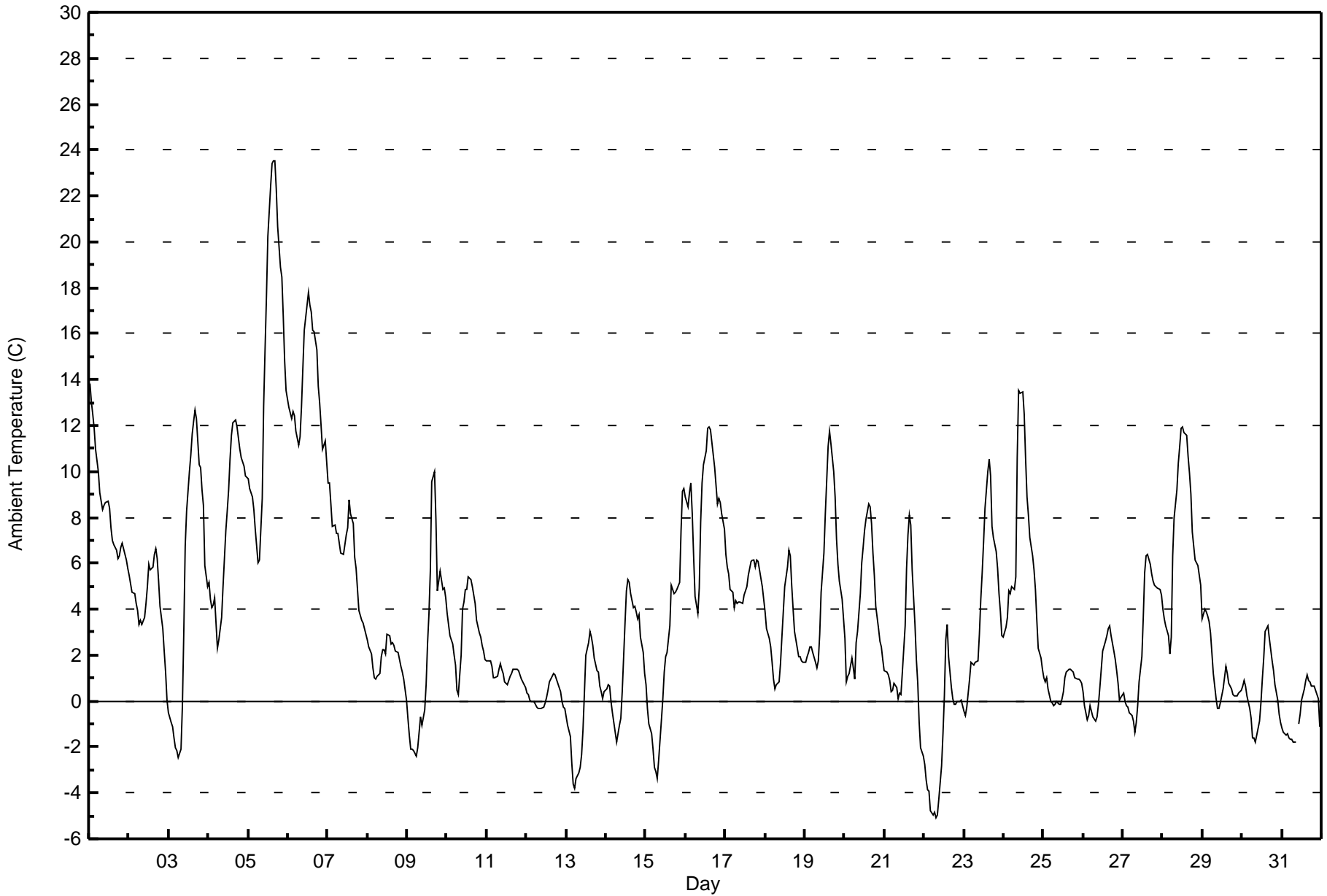
Maximum Value: 23.5 C on Oct 5 17:00      Maximum Daily Average: 14.8 C on Oct 5		Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9																								
Minimum Value: -5.1 C on Oct 22 08:00 Maximum Diurnal Average: 7.0 C at hour 16 Monthly Average: 3.99 C		Minimum Daily Average: -1.6 C on Oct 22 Minimum Diurnal Average: 1.5 C at hour 7 Percentiles: P <sub>1</sub> = -3.9 P <sub>10</sub> = -0.8 Q <sub>1</sub> = 0.6 Median = 2.9 Q <sub>3</sub> = 6.4 P <sub>90</sub> = 10.6 P <sub>99</sub> = 19.8																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	13.8	13.0	12.5	11.9	10.9	10.0	9.1	8.7	8.4	8.5	8.6	8.7	8.4	7.6	7.0	6.8	6.6	6.2	6.3	6.7	6.9	6.6	6.1	5.8	8.5	13.8
2-Oct	5.5	5.1	4.7	4.6	4.2	3.9	3.4	3.5	3.4	3.7	4.2	5.0	6.0	5.7	5.8	6.4	6.6	6.2	5.2	4.2	3.1	2.2	1.2	0.1	4.3	6.6
3-Oct	-0.5	-0.9	-1.1	-1.6	-2.0	-2.2	-2.5	-2.1	-0.2	3.0	6.8	8.3	10.0	10.7	11.6	12.2	12.7	12.3	10.3	10.2	9.2	8.5	5.9	5.0	5.1	12.7
4-Oct	5.1	4.5	4.1	4.2	4.5	2.3	2.7	3.1	3.6	5.0	7.4	8.3	9.2	10.5	11.6	12.1	12.2	11.9	11.5	11.0	10.6	10.3	9.8	9.8	7.7	12.2
5-Oct	9.7	9.3	8.9	8.3	7.5	6.8	6.0	6.1	8.8	12.9	15.3	17.6	20.2	22.4	23.4	23.5	23.5	22.3	20.7	18.9	18.5	16.7	14.8	13.6	14.8	23.5
6-Oct	12.8	12.5	12.3	12.6	12.4	11.7	11.2	11.5	12.8	14.5	16.2	17.3	17.8	17.2	16.9	16.1	16.1	15.3	13.7	13.0	12.0	10.9	11.3	10.4	13.7	17.8
7-Oct	9.5	9.5	8.6	7.6	7.7	7.3	7.3	6.9	6.5	6.4	6.8	7.2	7.5	8.8	8.1	7.7	6.3	5.8	4.9	3.9	3.5	3.4	3.1	2.9	6.6	9.5
8-Oct	2.7	2.4	2.1	1.4	1.0	1.0	1.1	1.2	2.0	2.2	2.3	2.1	2.9	2.8	2.5	2.6	2.5	2.2	2.1	1.8	1.5	1.2	0.9	0.0	1.9	2.9
9-Oct	-0.8	-1.5	-2.1	-2.1	-2.1	-2.4	-2.0	-1.4	-0.7	-1.0	-0.4	0.7	2.5	3.8	5.6	9.6	10.0	7.9	4.8	5.2	5.6	4.8	4.9	4.5	2.2	10.0
10-Oct	3.8	3.3	2.9	2.5	2.0	1.6	0.5	0.3	2.0	4.0	4.3	4.8	4.9	5.4	5.3	5.0	4.6	4.2	3.5	3.0	2.8	2.4	2.2	1.8	3.2	5.4
11-Oct	1.8	1.7	1.8	1.5	1.0	1.0	1.1	1.4	1.6	1.4	1.2	0.8	0.7	0.9	1.1	1.2	1.4	1.4	1.4	1.3	1.1	0.9	0.8	0.6	1.2	1.8
12-Oct	0.3	0.3	0.1	0.0	0.0	-0.1	-0.3	-0.3	-0.3	-0.3	-0.2	-0.1	0.2	0.5	0.8	1.1	1.2	1.1	1.0	0.8	0.4	0.0	-0.2	-0.3	0.2	1.2
13-Oct	-0.7	-1.1	-1.5	-2.7	-3.6	-3.8	-3.4	-3.1	-2.9	-2.3	-1.2	0.4	2.0	2.6	3.0	2.8	2.4	1.9	1.3	1.2	0.6	0.4	0.1	0.4	-0.3	3.0
14-Oct	0.5	0.7	0.6	0.0	-0.5	-1.3	-1.8	-1.4	-1.1	-0.7	0.4	3.4	4.8	5.3	5.2	4.7	4.1	4.1	3.9	3.6	3.8	2.8	2.1	1.2	1.8	5.3
15-Oct	0.7	-0.3	-1.0	-1.4	-2.1	-2.9	-3.1	-3.4	-2.6	-0.8	0.1	1.3	1.9	2.1	3.3	5.0	4.9	4.7	4.7	4.9	5.2	7.4	9.2	9.2	2.0	9.2
16-Oct	8.9	8.5	9.1	9.5	8.2	6.3	4.5	3.9	4.9	7.8	9.5	10.3	10.9	11.9	11.9	11.8	11.3	10.2	9.4	8.6	8.8	8.6	8.2	7.5	8.8	11.9
17-Oct	6.4	5.9	5.5	4.8	4.7	4.1	4.4	4.3	4.3	4.3	4.3	4.6	4.8	5.0	5.5	6.1	6.1	6.1	5.8	6.1	6.1	5.4	5.0	4.5	5.2	6.4
18-Oct	3.9	3.2	2.7	2.4	1.7	1.0	0.5	0.7	0.8	1.6	2.8	3.9	5.0	5.8	6.6	6.3	5.1	4.0	3.0	2.3	2.0	1.9	1.7	1.7	2.9	6.6
19-Oct	1.7	1.9	2.1	2.4	2.4	2.1	1.7	1.5	1.8	2.9	4.7	6.5	8.2	9.6	11.1	11.7	11.2	10.0	8.9	7.1	5.9	5.2	4.4	3.6	5.4	11.7
20-Oct	2.7	0.8	1.1	1.2	1.9	1.4	0.9	2.6	3.0	4.6	6.0	6.7	7.4	7.9	8.6	8.5	7.7	6.4	5.5	4.1	3.1	2.6	2.3	1.8	4.1	8.6
21-Oct	1.3	1.3	1.1	0.9	0.4	0.5	0.8	0.6	0.1	0.3	0.3	1.3	3.3	5.8	7.2	8.1	7.7	5.7	3.4	1.8	0.8	-0.9	-2.1	-2.4	2.0	8.1
22-Oct	-2.7	-3.4	-3.9	-3.9	-4.8	-5.0	-4.9	-5.1	-5.0	-4.3	-2.8	-1.4	0.2	2.7	3.3	1.9	0.6	0.1	-0.1	-0.2	0.0	0.0	0.0	-0.2	-1.6	3.3
23-Oct	-0.4	-0.6	-0.2	1.0	1.7	1.6	1.6	1.7	1.8	2.9	4.5	5.6	6.9	8.4	10.0	10.5	9.8	7.6	7.1	6.5	5.8	4.7	3.9	2.8	4.4	10.5
24-Oct	2.8	3.2	3.7	4.8	4.7	5.0	4.9	5.4	10.6	13.5	13.4	13.4	12.5	10.5	8.9	8.1	7.1	6.3	5.7	4.9	3.5	2.3	1.9	1.4	6.6	13.5
25-Oct	1.0	0.8	1.0	0.5	0.0	-0.1	-0.2	-0.1	-0.1	-0.2	-0.1	0.1	0.4	1.0	1.2	1.4	1.4	1.3	1.2	1.0	1.0	1.0	0.9	0.8	0.6	1.4
26-Oct	0.4	-0.2	-0.8	-0.7	-0.2	-0.5	-0.7	-0.9	-0.7	-0.1	0.6	1.4	2.2	2.6	2.9	3.1	3.3	2.8	2.2	1.8	1.3	0.8	0.0	0.1	0.9	3.3
27-Oct	0.3	0.0	-0.2	-0.3	-0.5	-0.6	-0.9	-1.4	-0.9	-0.2	0.8	1.9	3.7	5.6	6.3	6.4	6.0	5.5	5.2	5.0	5.0	4.9	4.9	4.6	2.5	6.4
28-Oct	4.0	3.6	3.3	2.8	2.1	2.8	6.3	8.0	9.2	10.4	11.1	11.9	11.9	11.7	11.6	10.6	9.9	9.0	7.4	6.2	6.0	5.9	5.5	5.0	7.3	11.9
29-Oct	3.6	4.0	3.9	3.7	3.4	3.0	1.2	0.6	0.1	-0.3	-0.3	-0.1	0.5	1.0	1.5	1.2	0.7	0.5	0.3	0.2	0.2	0.2	0.3	0.5	1.2	4.0
30-Oct	0.7	0.9	0.6	0.2	-0.4	-0.8	-1.6	-1.6	-1.8	-1.5	-0.9	-0.1	0.9	1.9	3.0	3.3	2.7	2.2	1.8	1.3	0.7	0.0	-0.5	-1.0	0.4	3.3
31-Oct	-1.2	-1.4	-1.5	-1.4	-1.6	-1.7	-1.7	-1.8	-1.8	DF	-1.0	-0.6	0.0	0.5	0.9	1.1	0.9	0.8	0.6	0.6	0.5	0.3	0.1	-1.1	-0.4	1.1
																								Diurnal Average		
																								Diurnal Maximum		
3.2 2.8 2.6 2.4 2.1 1.7 1.5 1.6 2.2 3.3 4.0 4.9 5.7 6.4 6.8 7.0 6.7 6.0 5.2 4.7 4.4 3.9 3.5 3.0 13.8 13.0 12.5 12.6 12.4 11.7 11.2 11.5 12.8 14.5 16.2 17.6 20.2 22.4 23.4 23.5 23.5 22.3 20.7 18.9 18.5 16.7 14.8 13.6																										
DF - DAS Failure																										





**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Athabasca Valley - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C  
Athabasca Valley - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	130	17.50	17.50
0 - 10	528	71.06	88.56
10 - 20	78	10.50	99.06
> 20	7	0.94	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

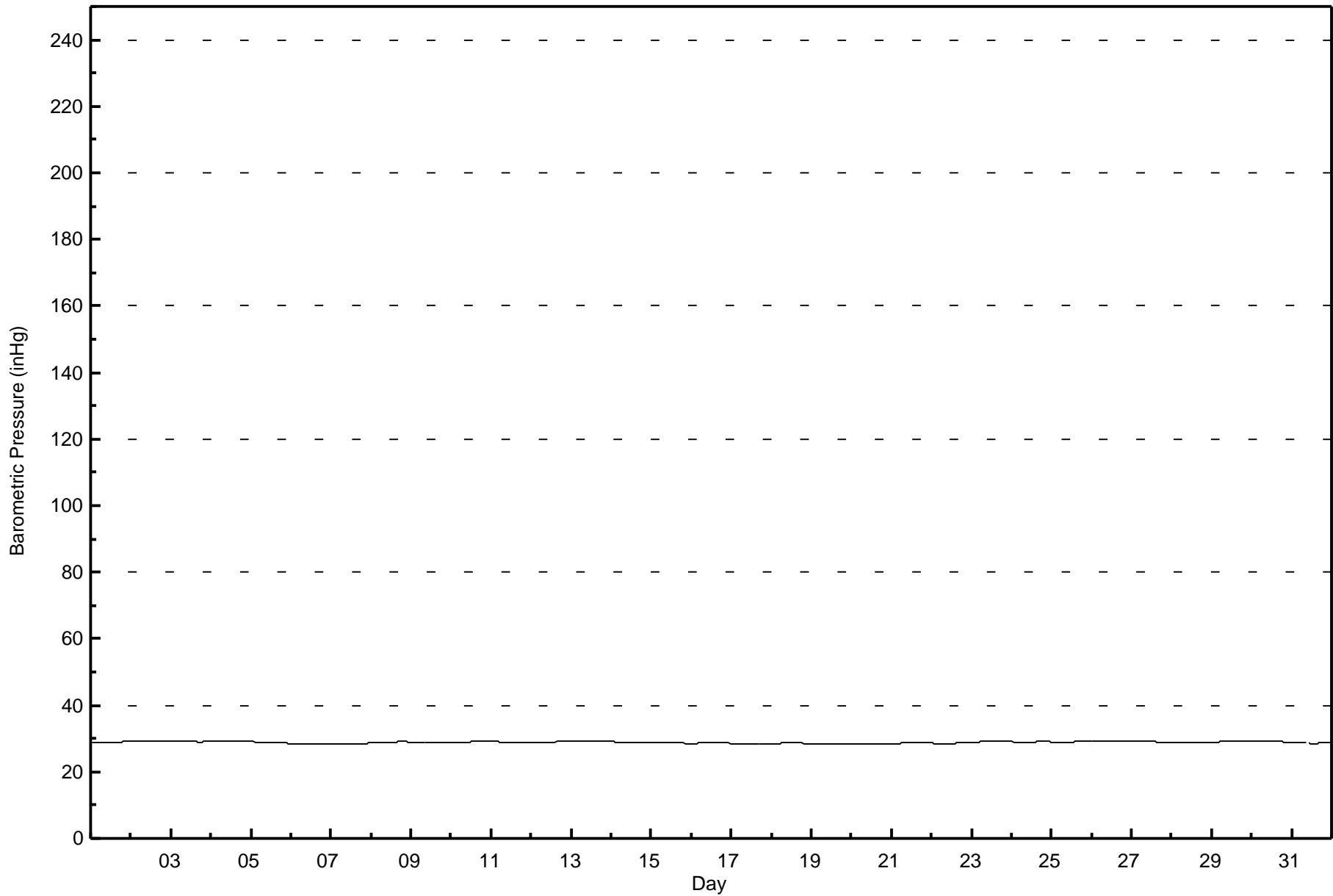
**Barometric Pressure (BP) - inHg**  
**Athabasca Valley - October 2017**

Maximum Value: 29.4 inHg on Oct 29 20:00      Maximum Daily Average: 29.3 inHg on Oct 2																						Hours in Service: 744 Hours of Data: 743				
Minimum Value: 28.2 inHg on Oct 7 03:00      Minimum Daily Average: 28.3 inHg on Oct 6 Maximum Diurnal Average: 28.9 inHg at hour 22      Minimum Diurnal Average: 28.8 inHg at hour 15 Monthly Average: 28.85 inHg      Percentiles: P <sub>1</sub> = 28.2 P <sub>10</sub> = 28.4 Q <sub>1</sub> = 28.6 Median = 28.9 Q <sub>3</sub> = 29.1 P <sub>90</sub> = 29.2 P <sub>99</sub> = 29.4																						Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	28.9	29.1
2-Oct	29.1	29.2	29.2	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.3	29.4
3-Oct	29.4	29.4	29.4	29.4	29.3	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.2	29.4
4-Oct	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.3	29.3	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.3
5-Oct	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.8	28.8	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.8	29.1
6-Oct	28.5	28.5	28.5	28.5	28.5	28.4	28.4	28.4	28.4	28.4	28.3	28.3	28.3	28.3	28.3	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.3	28.5	
7-Oct	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.4	28.4	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.3	28.6
8-Oct	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	29.0
9-Oct	29.0	29.0	29.0	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	29.0
10-Oct	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.1
11-Oct	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1
12-Oct	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.1
13-Oct	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2
14-Oct	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	29.0
15-Oct	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.8	28.8	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.5	28.8	29.0
16-Oct	28.5	28.5	28.5	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7
17-Oct	28.6	28.6	28.5	28.5	28.5	28.5	28.5	28.4	28.4	28.4	28.4	28.3	28.3	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.3	28.3	28.3	28.3	28.4	28.6
18-Oct	28.4	28.4	28.5	28.5	28.5	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.6	28.7	28.6
19-Oct	28.5	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.5
20-Oct	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.3	28.4	28.4	28.4	28.3	28.3	28.3	28.4	28.4	28.4	28.4	28.4	28.4	28.5	28.5	28.5	28.4	28.5
21-Oct	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7
22-Oct	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.6	28.8
23-Oct	28.9	28.9	28.9	29.0	29.0	29.0	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.2
24-Oct	29.1	29.0	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	28.9	29.1
25-Oct	29.0	29.0	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.9	28.9	28.9	29.0	29.0	29.1	29.1	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.4	29.4	29.1
26-Oct	29.4	29.4	29.4	29.4	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.4
27-Oct	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.8	28.8	28.8	29.0	29.2
28-Oct	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.9	28.9	28.7	28.9
29-Oct	28.9	28.9	29.0	29.0	29.0	29.0	29.1	29.1	29.2	29.2	29.3	29.3	29.3	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.3	29.4
30-Oct	29.4	29.4	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.4
31-Oct	28.9	28.9	28.8	28.8	28.7	28.7	28.7	28.7	28.6	DF	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.9
																								Diurnal Average		
																								Diurnal Maximum		
DF - DAS Failure																										



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Barometric Pressure (BP) - inHg**  
**Athabasca Valley - October 2017**





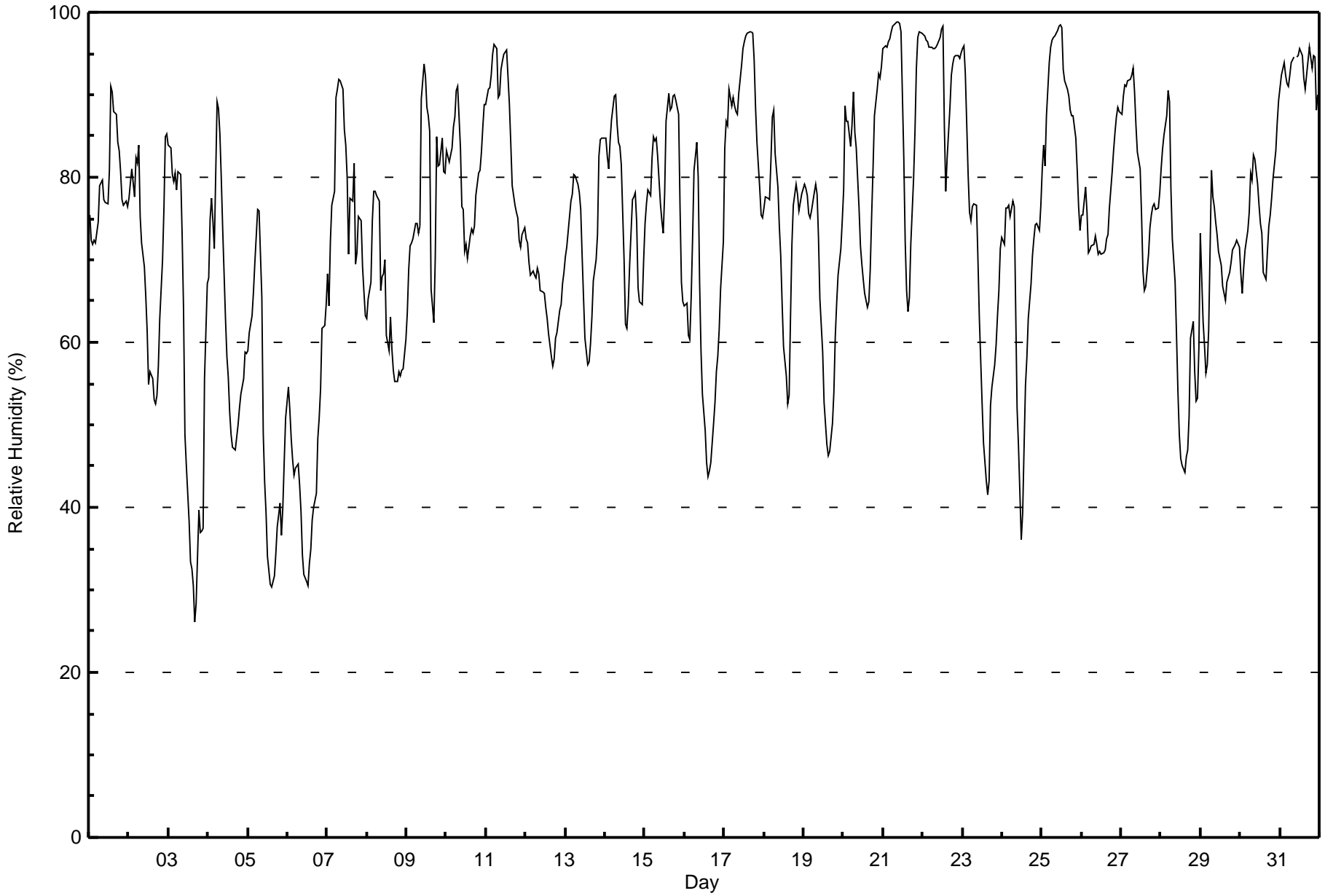
**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %**

**Athabasca Valley - October 2017**

Maximum Value: 99 % on Oct 21 10:00																			Maximum Daily Average: 93.8 % on Oct 22						Hours in Service: 744																				
Minimum Value: 26 % on Oct 3 17:00																			Minimum Daily Average: 44.8 % on Oct 6						Hours of Data: 743																				
Maximum Diurnal Average: 83.0 % at hour 7																			Minimum Diurnal Average: 63.8 % at hour 16						Hours of Missing Data: 1																				
Monthly Average: 73.5 %																			Percentiles: P <sub>1</sub> = 31 P <sub>10</sub> = 51 Q <sub>1</sub> = 64 Median = 75 Q <sub>3</sub> = 85 P <sub>90</sub> = 93 P <sub>99</sub> = 98						Hours of Calibration: 0																				
																			Percent Operational Time: 99.9																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																					
1-Oct	75	72	72	72	72	75	79	79	80	77	77	77	81	91	90	88	88	84	83	81	77	77	77	76	79.2	91																			
2-Oct	77	79	81	78	82	82	84	75	72	69	66	61	55	56	56	53	53	54	57	63	70	76	85	85	69.6	85																			
3-Oct	84	84	80	80	81	78	81	80	73	64	49	45	38	33	33	30	26	28	40	37	37	37	56	67	55.9	84																			
4-Oct	68	75	78	75	71	89	88	85	80	74	63	58	56	52	49	47	48	50	52	54	56	59	59	63.8	89																				
5-Oct	59	61	63	66	70	73	76	76	65	49	43	39	34	31	30	41	32	34	38	41	37	40	46	51	49.4	76																			
6-Oct	55	52	48	46	44	45	45	43	39	34	32	31	30	33	35	38	40	42	48	51	54	62	62	65	44.8	65																			
7-Oct	68	64	72	77	78	90	91	92	92	91	86	84	80	71	77	77	82	69	71	75	75	69	66	63	77.5	92																			
8-Oct	63	65	67	75	78	78	78	77	66	68	68	70	61	59	63	59	57	55	55	56	56	57	57	60	64.6	78																			
9-Oct	64	69	72	72	73	74	74	73	74	89	94	92	88	87	86	66	62	70	85	81	82	85	81	81	78.1	94																			
10-Oct	83	83	82	84	86	87	91	91	84	76	76	71	72	70	73	74	73	74	78	80	81	83	86	89	80.2	91																			
11-Oct	89	91	91	92	95	96	96	90	90	93	94	95	95	92	89	84	79	77	76	75	72	72	73	74	86.2	96																			
12-Oct	73	72	70	68	69	68	68	69	68	66	66	66	64	63	61	58	57	58	61	61	64	64	67	68	65.4	73																			
13-Oct	70	71	75	77	78	80	80	79	78	76	70	66	61	57	58	60	63	67	70	73	82	85	85	85	72.8	85																			
14-Oct	85	83	81	84	87	90	90	87	84	84	82	70	62	62	65	69	77	78	78	75	67	65	65	70	76.5	90																			
15-Oct	74	77	78	78	82	85	84	85	82	77	75	73	78	87	90	88	89	90	90	89	88	76	67	65	81.2	90																			
16-Oct	64	65	61	60	66	73	81	84	80	67	59	54	49	45	44	44	45	50	53	57	58	61	66	72	60.8	84																			
17-Oct	84	87	86	91	89	90	89	88	88	90	94	96	96	97	97	98	98	98	94	89	84	79	75	75	89.6	98																			
18-Oct	76	78	78	77	82	87	88	83	79	74	70	65	59	56	53	54	63	72	77	79	78	76	77	78	73.3	88																			
19-Oct	79	79	78	76	75	76	78	79	78	73	65	59	53	50	48	46	47	50	54	61	65	68	71	75	65.9	79																			
20-Oct	78	89	87	87	84	87	90	85	84	76	72	70	68	66	64	65	69	75	81	87	91	93	92	93	80.5	93																			
21-Oct	96	96	96	96	97	98	98	99	99	99	99	98	82	72	66	64	66	72	80	86	93	97	98	98	89.2	99																			
22-Oct	97	97	97	96	96	96	96	96	96	96	97	98	98	86	78	82	89	92	94	95	95	95	94	95	93.8	98																			
23-Oct	96	96	93	80	76	75	76	77	77	70	63	58	53	48	43	42	43	52	55	57	60	63	66	71	66.2	96																			
24-Oct	73	72	76	76	77	75	77	76	64	52	47	36	39	47	55	58	63	67	71	72	74	74	74	77	65.6	77																			
25-Oct	81	84	81	88	94	96	97	97	97	98	98	98	93	92	91	90	88	88	88	87	85	81	77	74	89.6	98																			
26-Oct	75	75	79	76	71	71	72	72	73	72	71	71	71	71	71	73	73	76	81	83	85	87	88	88	76.1	88																			
27-Oct	88	90	91	91	92	92	92	93	90	86	83	81	75	69	66	67	71	74	75	77	77	76	76	78	81.3	93																			
28-Oct	81	83	85	88	91	89	79	73	67	61	54	49	46	45	44	46	47	51	61	63	56	53	53	59	63.5	91																			
29-Oct	73	63	60	56	57	62	81	78	76	75	73	71	69	67	66	65	67	69	70	71	72	72	72	72	69.0	81																			
30-Oct	68	66	69	71	74	76	80	80	83	82	79	77	74	73	68	68	71	74	75	77	80	83	87	89	76.0	89																			
31-Oct	91	92	94	92	91	91	92	94	95	DF	95	95	96	95	92	91	92	94	96	93	95	95	88	90	93.0	96																			
																			77.0	77.7	78.1	78.2	79.2	81.4	83.0	81.7	79.1	75.3	72.9	70.1	67.2	65.3	64.6	63.8	65.1	67.2	70.4	71.8	72.3	72.8	73.7	75.5	Diurnal Average		
																			97	97	97	96	97	98	98	99	99	99	99	98	98	97	97	98	98	98	98	96	95	95	97	98	98	Diurnal Maximum	
DF - DAS Failure																																													





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Athabasca Valley - October 2017

Maximum Speed: 45 km/h on Oct 24 12:00	Maximum Daily Speed Average: 19.5 km/h on Oct 1	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 20 17:00	Minimum Daily Speed Average: 2.2 km/h on Oct 30	Hours of Data: 743
Maximum Diurnal Speed Average: 7.7 km/h at hour 15	Minimum Diurnal Speed Average: 1.4 km/h at hour 8	Hours of Missing Data: 1
Monthly Average Velocity: 4.2 km/h 295.7 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 6 Median = 10 Q <sub>3</sub> = 16 P <sub>90</sub> = 23 P <sub>99</sub> = 35	Percent Operational Time: 99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	NW11	NNW19	NNW17	NNW19	NNW19	NNW19	NNW19	NNW19	NNW23	NW23	NW22	NW16	NNW19	NNW23	NW18	NW19	NW21	NW20	NNW18	NNW23	NNW22	NNW29	NNW33	NW19.5	NNW33	
2-Oct	NNW33	NNW26	NNW25	NNW26	NNW26	NNW29	NNW30	N29	N28	N30	NNW29	NNW27	N23	NNW26	NNW24	NNW18	NNW19	NNW14	W7	WSW7	SW8	S2	SE3	NNW19.0	NNW33	
3-Oct	SE5	SE7	SE7	SE8	SE8	SE8	SE7	SE10	SE8	SE6	SW9	SW12	SW17	SW19	SW12	SW11	SW13	SW6	ENE1	WSW9	SSW5	SW10	SSE2	SSE3	S6.2	SW19
4-Oct	SE1	N1	NNW2	N5	NNW3	ESE2	ESE2	SSW4	SW10	SW4	E2	E5	ENE7	E6	E7	ESE7	SE10	SE11	SE10	SE10	SE9	SSE9	SE11	SE10	SE4.2	SE11
5-Oct	SE10	SE10	SE10	SE9	SE11	SE11	SE10	SE7	SE5	SSW10	SW10	SW9	SW7	SW12	SW15	SW16	SW14	SW6	W12	W13	WSW17	WSW15	SW14	SW13	SSW7.6	WSW17
6-Oct	SW12	SW10	SW12	WSW11	SW8	WSW10	SW10	SW12	SW13	SW13	WSW15	W23	W25	W24	W28	NNW22	W11	WSW9	W9	W12	SSW5	NNW2	N0	S5	WSW11.5	W28
7-Oct	SE4	SSE4	SE4	ESE5	S3	NNE2	NNW13	NNW12	NNW14	NNW15	NNW15	NNW12	NW8	NNW16	NNW17	NNW17	NNW18	NNW25	NNW20	NNW23	NNW23	NNW25	NW27	NW29	NW12.6	NW29
8-Oct	NW28	NW25	NW27	NNW23	NNW22	NNW21	NNW21	NNW17	NW24	NW22	NW27	NW26	NW26	NNW27	NNW25	NNW23	NW20	NNW15	NNW13	NNW12	NNW14	W8	WSW9	SSW6	NNW19.2	NW28
9-Oct	S6	SE5	SSE3	SSE6	SE11	SE11	SE11	SE18	SE18	SE17	SE15	SE15	SE12	SE9	E2	W18	NNW10	SW1	SE7	NNW18	W6	SW11	SW14	WSW14	S6.0	SE18
10-Oct	SW10	WSW10	WSW12	SW9	SSW5	S5	SE7	ESE5	S5	ESE5	NE4	N9	N8	NNW9	N10	N10	NNE10	NE8	NNE9	NNE9	NNE9	NNE9	N9	N12	N2.9	N12
11-Oct	N11	N8	N8	NNW10	NNW13	NNW13	NNW13	N13	NNW13	NNW17	NNW19	NNW20	NNW19	N19	N18	N18	N19	N16	N15	NNW15	N16	N13	NNW15	NNW18	NNW14.7	NNW20
12-Oct	NNW21	NNW21	N18	N15	NNW16	NNW16	NW13	NW17	NW17	NW19	NW18	NW17	NW17	NW16	NW14	NW14	NNW13	NNW10	W10	NNW9	NNW11	NW8	NW9	NW7	NW13.8	NNW21
13-Oct	NNW7	WSW5	NW7	SW8	SW9	SW10	S5	SSW6	SSW8	SSW6	SSW12	SW13	SW13	SW14	SW13	SW13	SSW12	SSW9	SSW10	SW10	SW13	SSW4	SE3	SSE4	SW8.0	SW14
14-Oct	SSW5	S5	SSE8	SSE10	SE10	SE10	SE10	SE9	SE13	SE15	SE12	S5	SW17	SW16	SW17	WSW17	WSW13	WSW10	WSW9	W14	NNW18	NNW21	W21	WSW17	SW7.1	W21
15-Oct	W14	SW2	S5	SSE4	SE4	SE8	SE10	SE9	SE11	SE11	SE14	SE15	SE15	SE15	SE13	SE9	SE10	SSE11	SSE9	SE4	SE4	SSW6	SW8	SW11	SSE7.6	SE15
16-Oct	SW8	SSW6	WSW15	NNW28	NNW9	SW3	S2	SE4	ESE3	SSW8	SSW11	SSW14	SW14	SW12	SW12	SW9	SSW5	SE4	SE9	SSW6	SSW5	S6	SSE7	SSE6	SW6.4	NNW28
17-Oct	SE6	SE6	ESE3	E2	SE4	SE4	SSE6	SSE7	SSE7	SE8	SE8	ESE3	NE3	N3	NNW9	N8	NNW5	NNW14	NNW15	NNW23	NNW23	NNW28	NNW30	NNW28	NW4.9	NNW30
18-Oct	NNW30	NNW29	NNW32	NNW33	NNW29	NNW20	NNW18	NNW18	NNW20	NNW14	NNW15	NNW15	NNW13	NW7	N3	ENE3	ESE6	ESE9	SE9	SE10	SE12	SE12	SE10	SE12	NNW9.0	NNW33
19-Oct	ESE14	ESE15	SE14	SE14	SE13	SE12	SE13	SE11	SE12	SE13	SE10	SE8	SE10	SE11	SE10	SE14	SE14	SE13	SE13	ESE8	SE8	SE8	SSE5	SE6	SE11.2	ESE15
20-Oct	SE4	E5	ESE5	ESE4	SSE3	E2	ESE6	SSE6	SE6	SE8	SE9	SE5	NW4	NNE2	SSE6	SW3	SSE0	NNW2	NNW3	NNW2	SSW3	SSW4	SSW3	ESE1	SE2.5	SE9
21-Oct	NW0	W4	NNW4	NNW6	NNW6	NNW6	NW6	W4	SW5	SW6	WSW5	NNW3	NW6	NNW6	N6	N5	NNW1	NNW1	SSW1	NNW5	NNW6	NNW9	NW8	NNW4	NW3.7	NNW9
22-Oct	N5	NNE4	NNE1	NNE4	N6	NW7	NNW4	NE3	NE3	NNW5	NNW8	NNW11	NNW12	NNW12	NNW11	NNW14	NNW12	NNW9	N6	ENE3	NW2	NW2	S3	SSE5	NNW5.1	NNW14
23-Oct	SE6	SE7	S5	WSW15	WSW16	WSW17	WSW16	SW13	WSW12	SW10	NNW16	W17	NNW14	W18	W19	W16	WSW7	SSW5	SSW8	S6	SSE9	SSE10	SE8	SE11	WSW8.2	W19
24-Oct	SE14	SE12	SE11	SE14	SE14	SE8	E3	ESE5	W26	NNW38	NNW35	NNW45	NNW38	NW37	NW37	NW27	NW22	NW18	NW9	NNE9	NNE8	NNE8	NE7	NE3	NW10.4	NW45
25-Oct	NNE3	ENE4	NNE4	NE5	NNE5	NNE5	N6	N6	N7	NNW10	NNW11	NNW16	NNW21	NNW23	NNW20	NNW21	NNW19	NNW20	NNW15	NNW11	NW8	NNW6	NW6	WSW5	NNW9.8	NNW23
26-Oct	WSW9	SW8	S4	S5	SW18	SW16	S9	SSE9	SSE10	S11	SSW11	SW12	SW15	SW15	SSW13	SW11	SW8	S4	SSW5	SW9	SSE3	SW8	SSE3	S4	SSW8.3	SW18
27-Oct	SSW5	SE3	ESE5	SE6	SE9	SE9	SE10	SE12	SE9	SE11	SE12	SE14	SE12	SE12	SE13	SE14	SE13	SE15	SE14	SE16	SE14	SE14	SE13	SE14	SE11.1	SE16
28-Oct	SE14	SE13	SE12	ESE5	ESE7	SE5	SW12	WSW25	WSW22	WSW20	W25	NW29	NW34	NW30	NW36	NW32	NW30	NW32	NW29	NW32	NW31	NW35	NNW32	NNW33	NNW17.6	NW36
29-Oct	NW32	NW31	NW30	NW34	NW33	NW34	N22	N25	N23	N22	N21	N22	NNW19	N16	NNW17	N14	N9	NNE5	NNE3	E2	SSE5	SE5	SSE5	SSE3	NNW15.5	NW34
30-Oct	SSW6	SE5	SSE4	SSE4	SE3	SE6	ESE8	SE8	SE9	SE10	SE10	SE9	SE4	E3	E6	NE2	NNW5	NNW8	NNW7	NNW6	NNW6	NNW5	W3	W1	SE2.2	SE10
31-Oct	NNW3	E1	E1	ESE3	SE7	SE5	E3	SE6	SE8	DF	E2	NNE1	N3	NNE5	NNE5	N7	N7	N8	N7	N8	N9	N7	N12	NNW19	NNE3.5	NNW19

WNW3.4	NNW2.2	NNW2.7	NNW3.3	W2.9	NNW2.5	NNW1.8	WSW1.4	W2.6	NNW3.5	NNW4.8	NNW6.6	NNW7.2	NNW7.5	NNW7.7	NW7.5	NW5.4	NW4.5	NW3.5	NNW5.2	NNW4.6	NNW4.3	NNW4.0	NNW3.5	Diurnal Average
NNW33	NNW31	NNW32	NNW34	NNW33	NNW34	NNW30	N29	N28	NNW38	NNW35	NW45	NW38	NW37	NW37	NW32	NNW30	NNW32	NNW29	NNW32	NNW31	NNW35	NNW32	NNW33	Diurnal Maximum

DF - DAS Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods

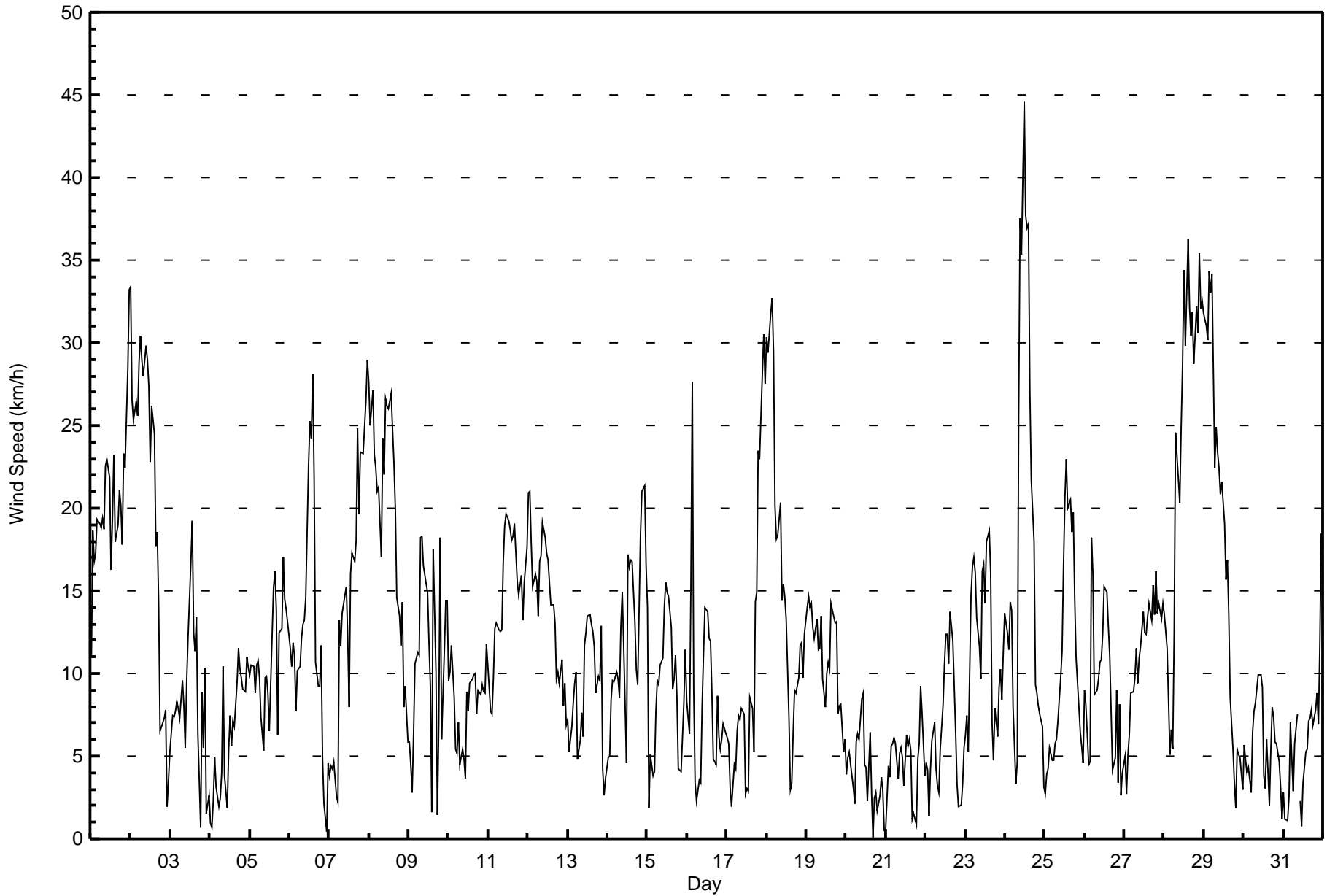


**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Speed (WS) - km/h**  
**Athabasca Valley - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 16 km/h on Oct 9 20:00 Minimum Value: 1 km/h on Oct 21 13:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 O <sub>1</sub> = 2 Median = 2 O <sub>3</sub> = 4 P <sub>90</sub> = 6 P <sub>99</sub> = 8																	Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	5	3	3	3	3	4	3	4	4	5	4	4	4	5	4	3	4	4	4	3	6	7	7	7	7
2-Oct	7	7	7	6	7	6	5	8	8	8	7	7	7	7	6	4	4	4	2	2	1	1	2	1	8
3-Oct	2	1	2	2	1	2	2	3	2	2	3	5	5	6	4	4	4	3	1	3	3	3	2	1	6
4-Oct	2	2	2	1	1	2	2	5	1	2	2	2	2	2	2	2	2	2	3	2	2	2	2	2	5
5-Oct	2	2	2	2	2	2	2	1	1	3	3	2	2	4	5	4	4	3	3	3	3	4	3	3	5
6-Oct	3	4	3	2	2	2	3	3	3	3	5	10	6	7	7	5	3	2	2	3	3	4	3	2	10
7-Oct	1	2	2	2	2	2	3	2	2	2	3	3	7	6	5	6	5	8	6	6	6	6	6	5	8
8-Oct	6	5	4	4	4	3	4	3	5	4	5	6	5	5	5	4	4	3	3	2	3	2	2	1	6
9-Oct	1	2	2	2	2	3	2	3	3	2	3	3	2	2	3	4	5	1	2	16	6	3	4	3	16
10-Oct	2	3	4	3	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	4
11-Oct	2	3	2	3	3	2	3	3	3	3	3	4	4	4	5	4	5	4	4	3	4	3	3	4	5
12-Oct	3	4	4	4	3	3	2	2	3	3	3	3	3	2	3	3	2	2	2	2	3	2	2	1	4
13-Oct	2	2	1	2	2	1	2	2	2	3	2	2	2	2	3	3	3	3	2	2	2	3	1	1	3
14-Oct	2	2	2	1	1	1	2	2	3	3	3	4	4	4	3	4	3	2	2	4	4	3	4	2	4
15-Oct	3	3	3	1	1	2	2	2	2	2	3	3	3	3	3	2	2	2	3	1	1	2	3	3	3
16-Oct	2	2	6	8	5	2	1	2	2	2	2	3	3	4	4	2	1	1	2	2	2	2	2	2	8
17-Oct	1	1	1	1	2	2	2	2	3	2	2	2	2	2	3	2	3	4	2	5	8	7	7	5	8
18-Oct	6	6	6	6	7	4	3	4	4	4	3	4	4	3	2	2	2	2	2	2	3	3	5	7	7
19-Oct	4	4	4	4	3	3	3	3	3	3	2	2	2	3	3	4	3	3	3	3	2	2	2	2	4
20-Oct	2	1	2	1	2	1	3	2	3	3	3	2	2	2	3	1	1	2	1	2	2	2	2	1	3
21-Oct	1	1	1	1	2	2	1	2	2	2	2	2	1	1	1	2	2	1	1	2	2	1	1	2	2
22-Oct	1	1	2	2	2	1	2	1	1	2	2	2	2	2	3	2	2	2	2	2	2	2	2	1	3
23-Oct	2	1	3	3	2	3	3	2	3	2	4	3	4	4	4	4	2	2	1	2	2	1	3	4	4
24-Oct	3	3	3	2	3	3	2	2	14	7	8	11	9	7	7	7	4	5	2	2	2	2	3	1	14
25-Oct	1	1	1	1	1	1	1	2	2	2	3	3	4	4	3	3	3	3	3	2	2	2	2	1	4
26-Oct	3	3	1	2	7	8	3	2	3	4	3	4	4	4	4	5	2	2	2	3	2	4	1	1	8
27-Oct	1	1	2	2	1	2	2	2	2	2	2	2	2	2	3	4	3	3	3	2	3	3	3	3	4
28-Oct	2	3	3	2	1	1	6	4	4	4	5	7	7	6	6	6	7	7	7	9	6	7	6	6	9
29-Oct	6	7	7	7	7	7	6	6	7	6	5	6	5	4	4	4	2	2	1	1	1	1	1	1	7
30-Oct	2	1	1	2	2	3	2	1	1	2	2	2	2	1	1	1	1	2	1	1	1	1	2	2	3
31-Oct	2	1	1	1	1	1	1	1	1	DF	1	1	2	2	2	2	2	2	1	2	2	2	5	4	5
Diurnal Maximum																									
7 7 7 8 7 8 6 8 14 8 8 11 9 7 7 7 7 7 8 16 8 7 7 7 7																									
DF - DAS Failure																									







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h  
Athabasca Valley - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	168	22.61	22.61
6 - 11	253	34.05	56.66
12 - 19	208	27.99	84.66
20 - 28	74	9.96	94.62
29 - 38	39	5.25	99.87
> 38	1	0.13	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Wind Speed (WS) - km/h  
Athabasca Valley - October 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	8	14	7	4	13	15	24	17	16	15	6	3	4	8	5	9	168
6 - 11	23	8	2	1	3	7	82	17	5	15	31	11	6	7	14	21	253
12 - 19	15	0	0	0	0	2	50	0	0	4	36	14	10	19	22	36	208
20 - 28	7	0	0	0	0	0	0	0	0	0	0	3	6	16	20	22	74
29 - 38	2	0	0	0	0	0	0	0	0	0	0	0	0	10	20	7	39
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
<b>Totals</b>	55	22	9	5	16	24	156	34	21	34	73	31	26	60	82	95	743

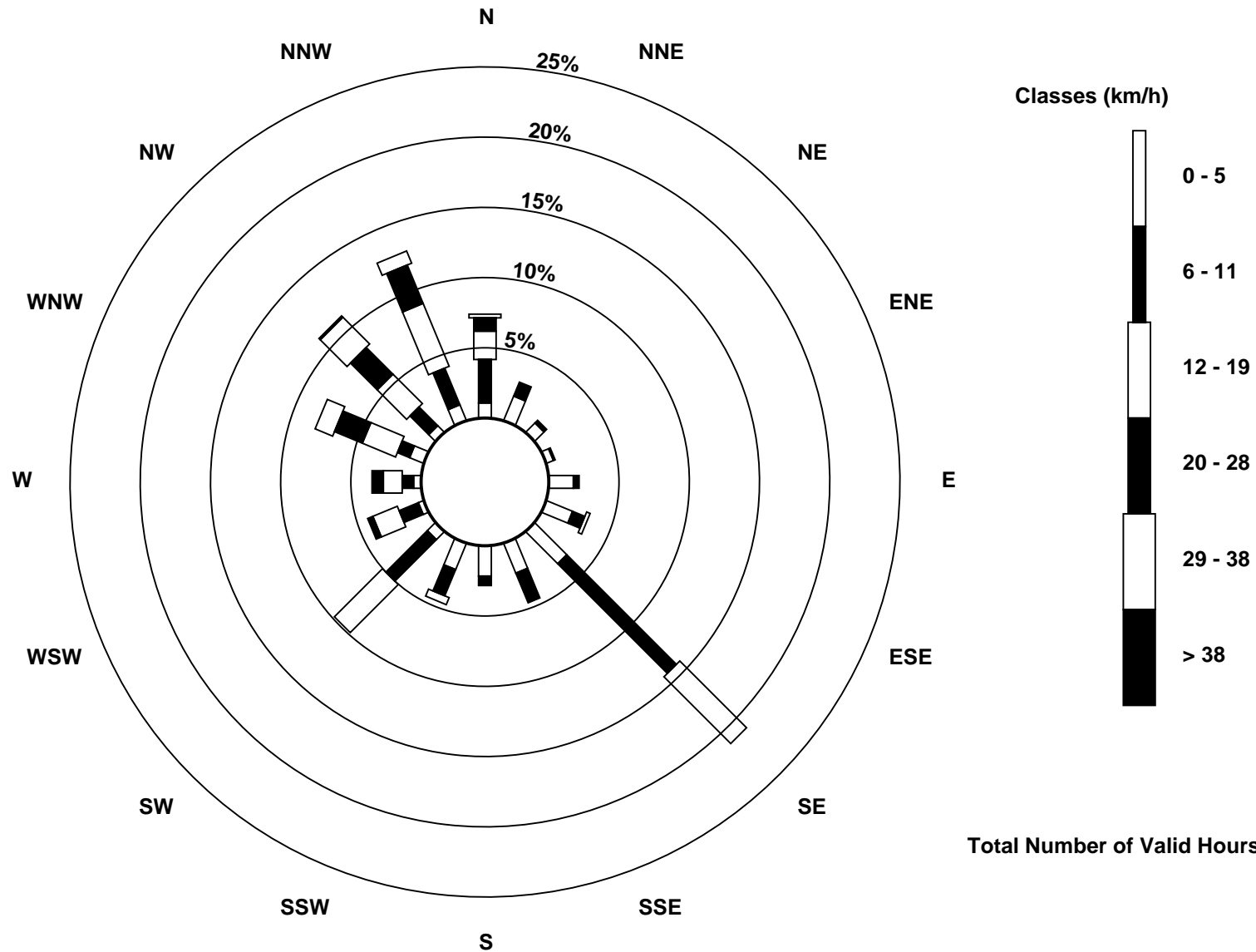
Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed (WS) - km/h  
Athabasca Valley (AMS 7)





**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Wind Direction (WD) - deg**  
**Athabasca Valley - October 2017**

Direction of Maximum Speed: 304 deg on Oct 24 12:00		Hours in Service:	744
Direction of Maximum Daily Speed Average: 318.6 deg on Oct 1		Hours of Data:	743
Direction of Minimum Speed: 159 deg on Oct 20 17:00		Hours of Missing Data:	1
Direction of Minimum Daily Speed Average: 2.2 deg on Oct 30		Percent Operational Time:	99.9
Monthly Average Direction: 294.1 deg			

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	314	286	297	309	297	301	307	310	305	303	308	310	325	339	331	322	318	316	320	330	337	347	340	338	318.6
2-Oct	339	343	345	340	340	337	335	353	357	354	348	340	350	340	341	348	337	327	282	266	244	227	170	130	340.2
3-Oct	135	136	141	140	135	125	126	130	135	127	221	217	216	217	224	225	215	234	57	251	211	226	168	165	190.6
4-Oct	132	359	296	351	336	117	104	209	222	236	84	96	77	83	86	117	132	126	137	142	142	148	137	139	130.9
5-Oct	141	141	135	133	129	137	139	140	141	206	217	224	215	233	236	232	221	219	262	278	254	246	229	219	207.9
6-Oct	222	216	226	237	236	238	232	224	229	228	241	261	262	267	280	283	271	256	269	266	211	294	1	173	251.0
7-Oct	132	152	138	117	183	20	327	333	336	332	336	341	307	301	288	329	346	328	341	333	316	320	316	314	324.7
8-Oct	317	307	306	301	304	296	306	300	323	319	310	312	311	300	288	295	307	306	298	286	286	260	241	199	302.5
9-Oct	169	143	155	162	146	140	144	140	137	140	142	140	141	131	93	280	297	219	135	285	275	220	233	238	172.0
10-Oct	233	237	244	233	198	180	142	121	181	119	49	355	350	345	360	8	21	37	12	19	13	20	6	354	355.6
11-Oct	350	355	353	347	345	343	347	358	346	339	341	341	345	353	354	354	357	1	352	346	351	356	345	337	348.7
12-Oct	336	337	356	354	336	333	314	305	314	322	318	316	308	309	313	314	310	295	280	327	289	314	326	307	320.4
13-Oct	283	250	317	229	232	221	185	201	212	206	213	216	217	221	218	208	197	212	226	225	199	142	152	218.7	
14-Oct	192	177	167	151	141	141	140	137	137	139	134	182	223	229	228	241	243	244	248	277	306	287	271	254	220.0
15-Oct	259	225	186	168	139	141	141	134	141	137	140	134	135	137	137	143	140	147	148	141	143	205	216	223	153.5
16-Oct	218	210	254	289	283	226	189	141	107	209	208	212	231	231	228	230	212	145	140	203	196	180	162	150	221.0
17-Oct	137	126	104	79	144	145	160	155	161	145	135	116	41	354	346	351	342	330	323	303	297	304	303	299	307.4
18-Oct	288	289	284	283	288	304	300	286	285	302	301	295	296	326	353	69	107	120	127	133	134	134	128	127	287.1
19-Oct	120	121	131	133	132	135	143	145	139	137	136	131	139	134	125	128	131	136	136	122	127	141	151	137	133.2
20-Oct	143	100	119	118	149	89	104	150	140	146	143	131	315	16	167	219	159	298	330	290	205	197	195	107	143.5
21-Oct	324	279	330	344	342	297	308	276	231	229	244	341	322	344	356	355	322	302	197	344	337	328	313	345	317.1
22-Oct	358	26	30	30	355	317	298	50	37	336	339	340	340	335	342	336	328	331	3	77	318	306	174	153	343.6
23-Oct	144	143	183	240	244	248	248	236	239	221	282	276	286	277	273	273	242	208	209	171	154	147	138	144	237.9
24-Oct	138	132	138	136	140	134	81	102	281	291	283	304	314	316	309	314	321	324	320	13	20	18	48	41	310.4
25-Oct	28	66	28	55	23	14	5	355	354	342	340	339	339	339	340	338	336	337	330	322	324	344	316	244	341.8
26-Oct	238	221	186	175	233	231	174	163	161	173	198	215	215	225	208	229	222	188	211	215	158	231	162	174	207.9
27-Oct	194	144	122	139	141	135	138	137	135	139	138	140	137	135	137	134	135	135	140	139	145	141	139	138	138.6
28-Oct	136	141	140	117	120	131	225	242	247	256	275	305	307	313	309	316	311	304	311	316	307	310	305	303	296.8
29-Oct	308	314	314	318	319	326	349	351	350	353	358	349	345	350	345	351	7	26	21	100	168	136	151	153	335.9
30-Oct	197	142	158	162	132	130	121	134	138	138	133	141	138	86	97	40	347	338	340	339	330	302	278	268	125.1
31-Oct	282	88	89	104	136	132	89	142	136	DF	98	28	6	29	15	8	11	354	3	354	353	356	352	342	15.5

283.0 281.6 284.5 291.2 280.4 283.5 290.8 256.8 271.3 283.6 288.5 299.7 299.2 302.1 301.2 304.9 310.4 314.1 307.1 302.6 295.5 290.7 293.7 285.9  
 Diurnal Average

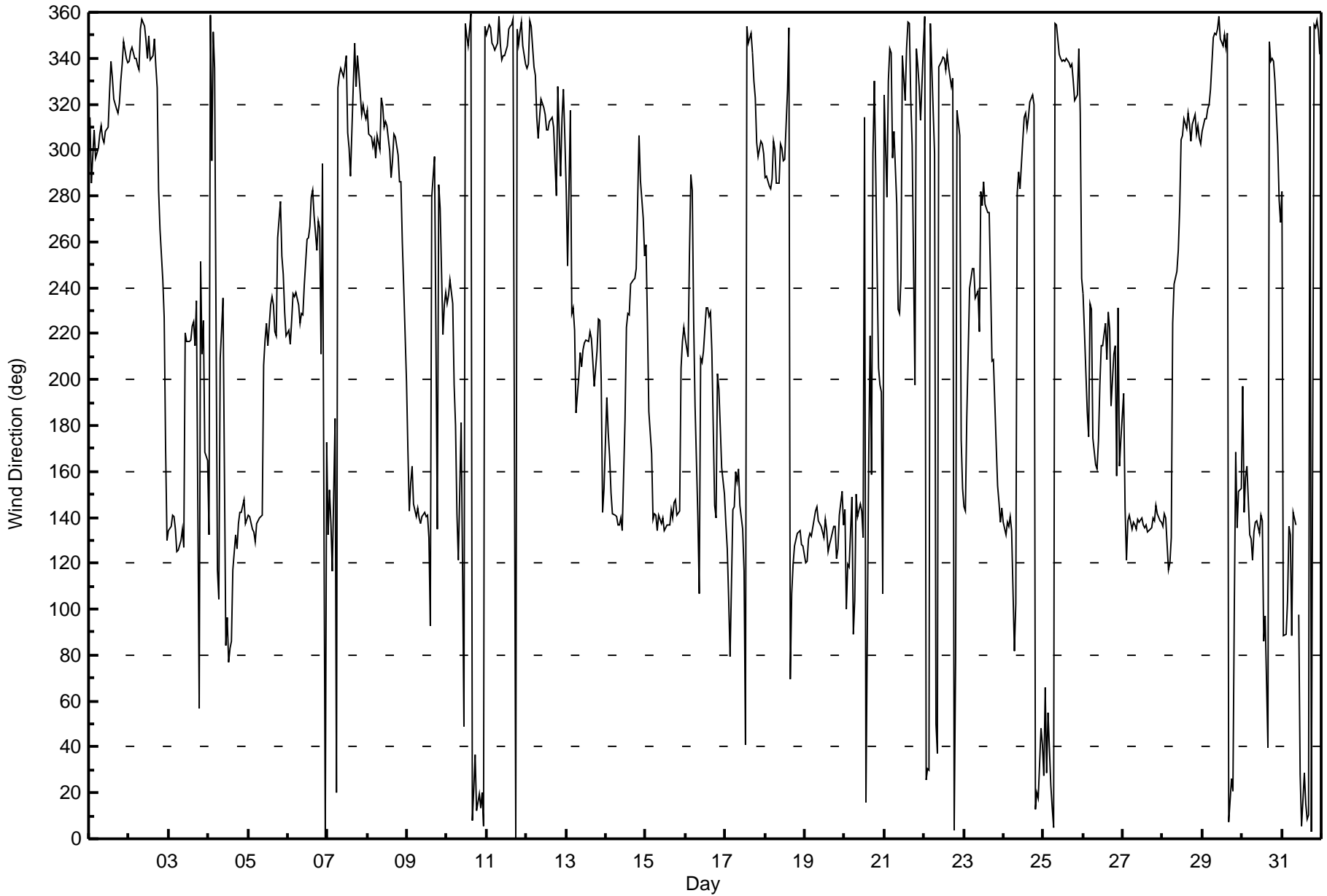
DF - DAS Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Direction (WD) - deg**  
**Athabasca Valley - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 96 deg on Oct 4 01:00 Minimum Value: 8 deg on Oct 21 13:00 Percentiles: P <sub>1</sub> = 9 P <sub>10</sub> = 11 Q <sub>1</sub> = 13 Median = 17 Q <sub>3</sub> = 26 P <sub>90</sub> = 51 P <sub>99</sub> = 89																	Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	28	13	13	17	14	14	13	13	15	11	11	10	24	13	10	10	10	10	10	12	13	19	15	11	28
2-Oct	12	17	18	15	16	12	11	20	21	21	18	15	20	16	17	18	16	15	26	24	15	10	66	47	66
3-Oct	18	12	12	14	12	18	19	16	12	30	25	23	21	17	19	21	24	37	88	14	55	15	84	57	88
4-Oct	96	90	55	25	51	71	61	66	8	29	92	45	17	40	22	26	14	12	16	17	16	17	12	13	96
5-Oct	14	14	13	13	11	9	9	11	21	21	19	18	19	17	16	15	18	33	11	14	13	12	14	23	33
6-Oct	24	33	19	13	22	12	14	18	16	13	18	20	14	15	15	13	17	10	15	25	58	87	85	47	87
7-Oct	37	44	42	37	64	70	10	12	9	10	12	15	28	20	15	24	19	15	26	10	18	13	12	11	70
8-Oct	12	10	10	12	10	11	11	14	11	11	11	13	17	14	13	15	12	14	13	14	15	26	14	19	26
9-Oct	18	35	48	24	15	15	14	11	11	10	11	11	12	13	88	12	21	74	21	75	58	20	21	11	88
10-Oct	16	16	17	26	59	46	22	29	47	31	54	20	18	19	18	17	17	23	14	12	15	18	22	18	59
11-Oct	18	19	19	17	16	13	18	18	18	11	12	13	18	19	19	18	20	18	19	17	17	18	17	12	20
12-Oct	10	11	19	20	12	12	11	10	11	12	13	13	10	12	16	12	11	16	13	16	20	15	10	20	20
13-Oct	22	34	21	27	11	9	33	20	15	36	11	11	12	11	17	17	17	24	18	14	11	71	55	30	71
14-Oct	33	42	16	11	9	9	12	16	13	11	12	63	16	14	14	15	12	10	11	14	13	14	11	8	63
15-Oct	10	96	44	53	38	15	12	12	13	13	13	12	12	11	12	11	12	10	13	31	49	29	25	15	96
16-Oct	17	26	20	14	24	76	54	48	61	16	12	13	14	18	16	15	21	21	14	36	41	29	20	16	76
17-Oct	15	23	32	85	32	43	26	21	27	17	23	72	50	63	18	18	66	9	16	10	13	12	12	13	85
18-Oct	12	13	13	11	13	12	11	13	12	19	18	22	20	38	67	56	19	15	16	16	14	18	21	19	67
19-Oct	19	19	19	18	17	17	15	16	16	15	16	22	18	17	24	15	14	13	12	27	22	23	37	23	37
20-Oct	39	24	28	30	55	68	25	32	38	23	26	54	57	74	36	63	92	59	28	60	64	30	50	90	92
21-Oct	94	25	20	24	28	20	21	44	15	20	38	77	8	27	23	32	84	47	73	35	24	9	11	47	94
22-Oct	34	29	74	22	33	20	29	35	39	27	14	13	11	14	18	10	15	21	31	53	79	63	57	21	79
23-Oct	17	14	47	10	8	10	9	8	9	14	18	17	17	15	14	13	19	41	24	18	10	12	12	9	47
24-Oct	12	14	16	13	13	26	70	56	61	12	14	18	15	12	11	11	11	12	20	22	20	13	18	27	70
25-Oct	41	13	21	19	12	13	17	20	19	16	13	10	10	10	10	9	9	9	13	12	14	27	31	38	41
26-Oct	18	25	29	49	20	30	26	22	19	24	27	20	19	18	26	22	22	58	48	36	66	42	59	24	66
27-Oct	23	49	27	18	12	15	13	12	15	11	12	10	11	13	12	14	14	13	14	11	13	12	12	11	49
28-Oct	11	11	13	30	24	36	51	9	12	13	12	15	12	13	11	11	11	11	10	13	10	9	11	11	51
29-Oct	11	12	13	11	11	11	19	19	19	19	20	19	15	19	16	20	21	15	27	52	18	26	19	63	63
30-Oct	45	35	37	65	72	25	15	10	10	12	12	15	66	52	25	49	15	15	11	11	21	19	43	76	76
31-Oct	37	57	36	44	14	19	27	16	12	DF	50	76	43	35	27	16	17	18	15	18	18	19	20	14	76
96 96 74 85 72 76 70 66 61 36 92 77 66 74 88 63 92 74 88 75 79 87 85 90																									
Diurnal Maximum																									
DF - DAS Failure																									





# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Athabasca Valley	Station number:	AMS 07
Calibration Date:	October 4, 2017	Last Cal Date:	September 7, 2017
Start time (MST):	6:45	End time (MST):	11:02
Reason:	Routine		

### Calibration Standards

Cal Gas Concentration	<u>49.2</u>	ppm	Cal Gas Exp Date	February 16, 2019
Calibrator Make/Model	Teledyne API 700		Serial Number	2445
ZAG Make/Model	Teledyne API 701		Serial Number	1864

### Analyzer Information

Analyzer make: Thermo 45C

Analyzer serial #: 630718530

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Analyzer Range	0 - 1000 ppb		PMT voltage	-619	-619
Calculated slope	0.993695	1.006674	Lamp voltage	800	800
Calculated intercept	1.129502	2.352424	Pressure	701.7	701.7
Analyzer Background	18.1	18.8	Flow	0.482	0.482
Analyzer Coefficient	1.012	1.010	Intensity	43529	43529

### SO<sub>2</sub> Calibration Data

Set Point	Total air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.8	----
as found span	4978	78.8	766.7	760.9	1.008
calibrator zero	5000	0.0	0.0	0.3	----
high point	4978	78.8	766.7	761.2	1.007
second point	4973	39.5	387.7	379.6	1.021
third point	4994	19.8	194.3	189.3	1.026
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	78.8	763.4	762.9	1.001
Average Correction Factor					1.018

Corrected As found	760.10	Previous response	770.42	*% change	1.4%
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\* = > +/-5% change initiates investigation

Notes:

Zero adjusted, No maintenance done

Calibration Performed By: Melissa Lemay





# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

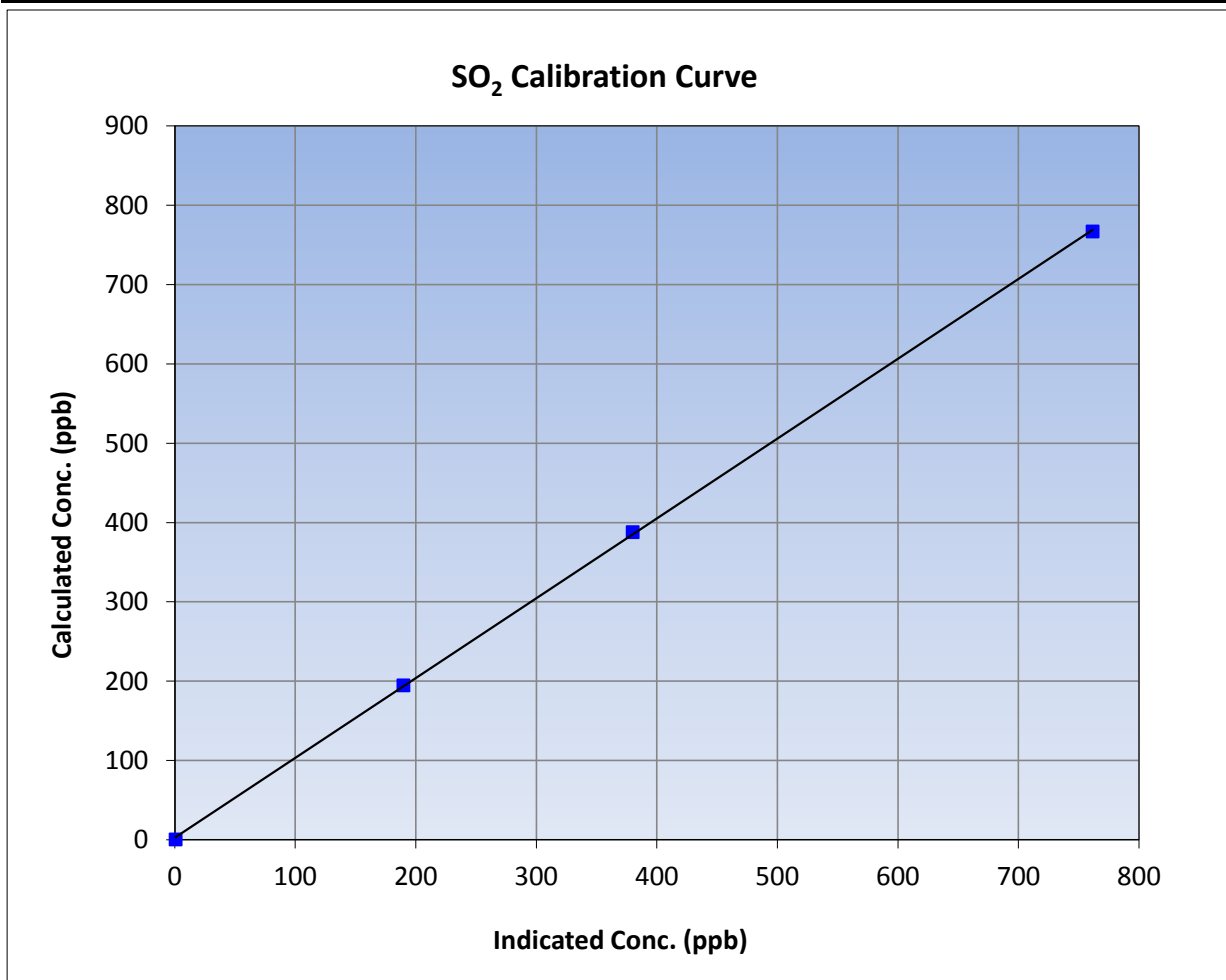
Version-03-2017

### Station Information

Calibration Date	October 4, 2017	Previous Calibration	September 7, 2017
Station Name	Athabasca Valley	Station Number	AMS 07
Start Time (MST)	6:45	End Time (MST)	12:12
Analyzer make	Thermo 45C	Analyzer serial #	630718530

### Calibration Data

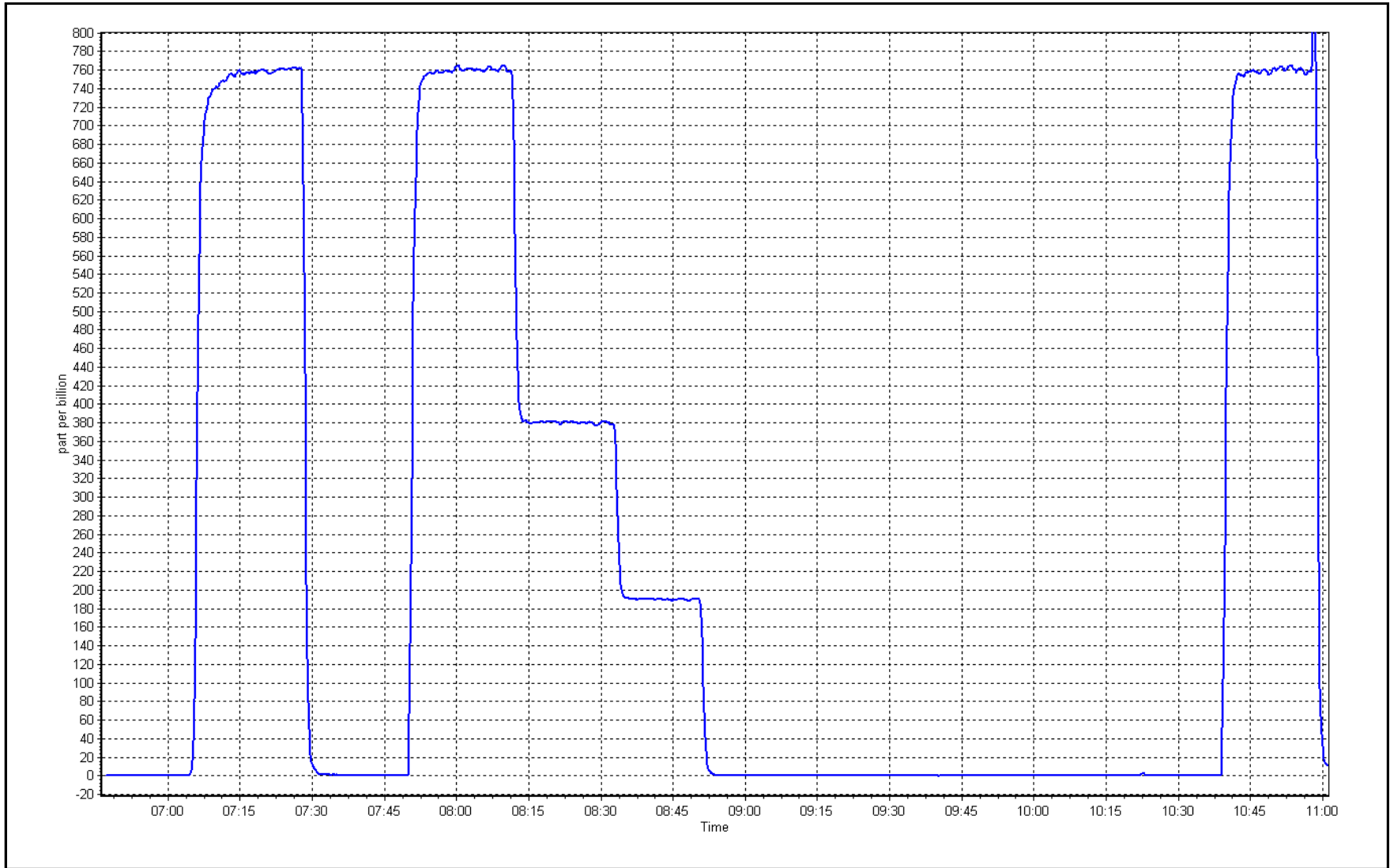
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	0.3	----	Correlation Coefficient	0.999928	<b>≥0.995</b>
766.7	761.2	1.0072	Slope	1.006674	<b>0.90 - 1.10</b>
387.7	379.6	1.0214	Intercept	2.352424	<b>+/-30</b>
194.3	189.3	1.0264			



SO2 Calibration Plot

Date: October 4, 2017

Location: Athabasca Valley







# Wood Buffalo Environmental Association

## TRS Calibration Summary

Version-03-2017

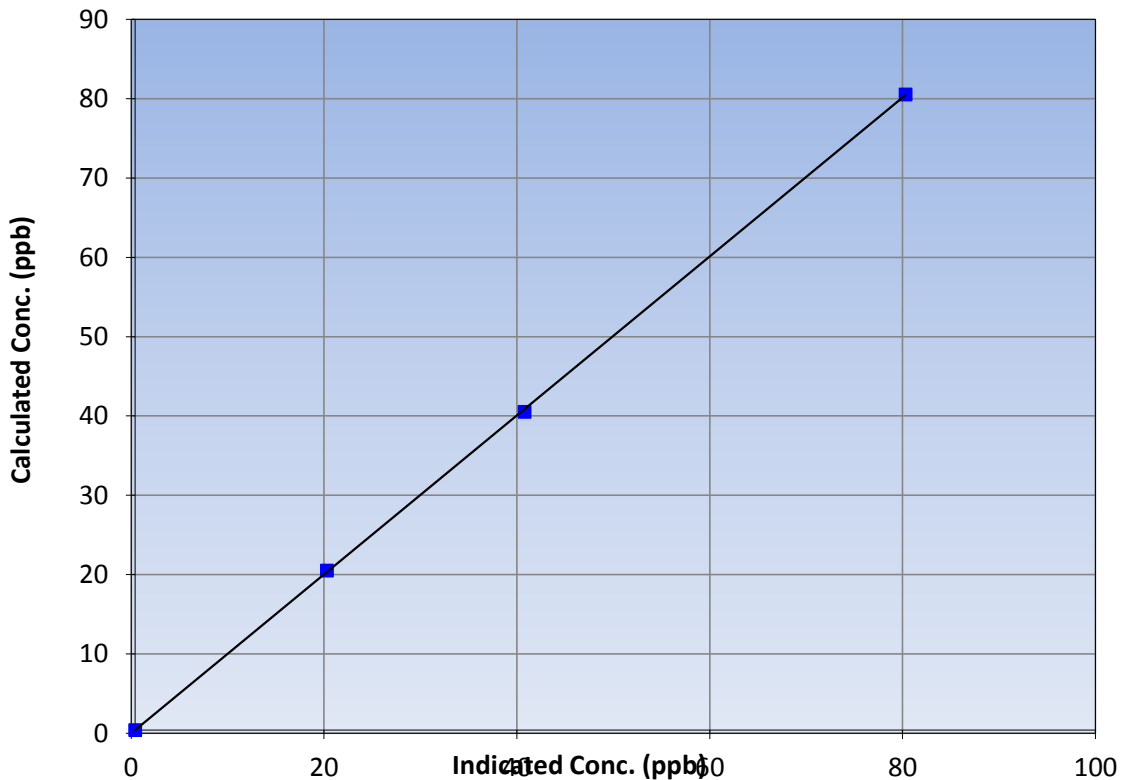
### Station Information

Calibration Date	October 23, 2017	Previous Calibration	September 18, 2017
Station Name	AMS 7	Station Number	Athabasca Valley
Start Time (MST)	7:50	End Time (MST)	11:11
Analyzer make	Thermo 43i LTE	Analyzer serial #	1507864683

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.0	----	Correlation Coefficient	0.999953	
80.2	79.9	1.0033			≥0.995
40.1	40.4	0.9933	Slope	1.002000	
20.1	19.9	1.0110			0.90 - 1.10
			Intercept	-0.016837	+/-3

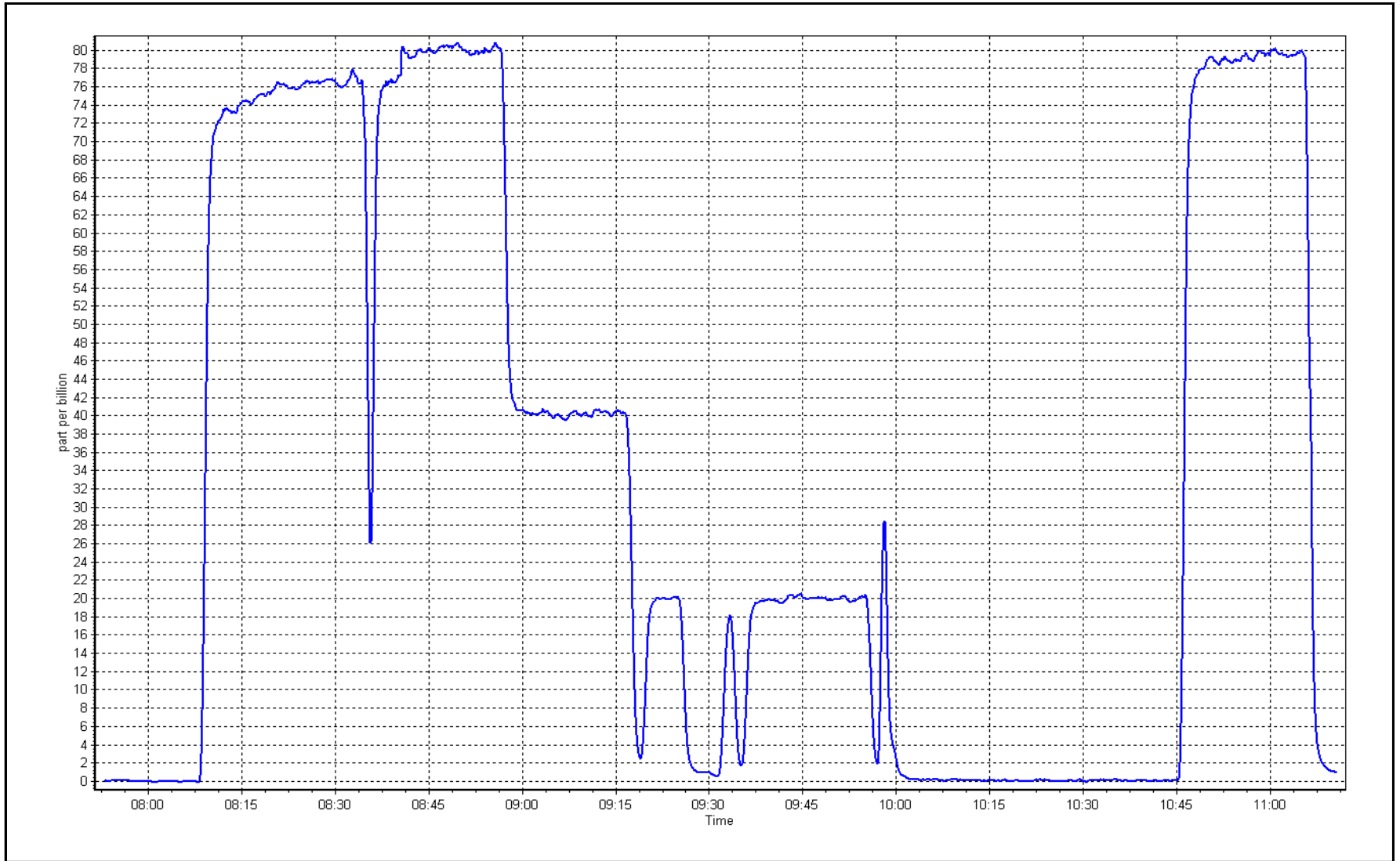
TRS Calibration Curve



TRS Calibration Plot

Date: October 23, 2017

Location: Athabasca Valley







# Wood Buffalo Environmental Association

## TRS Calibration Summary

Version-03-2017

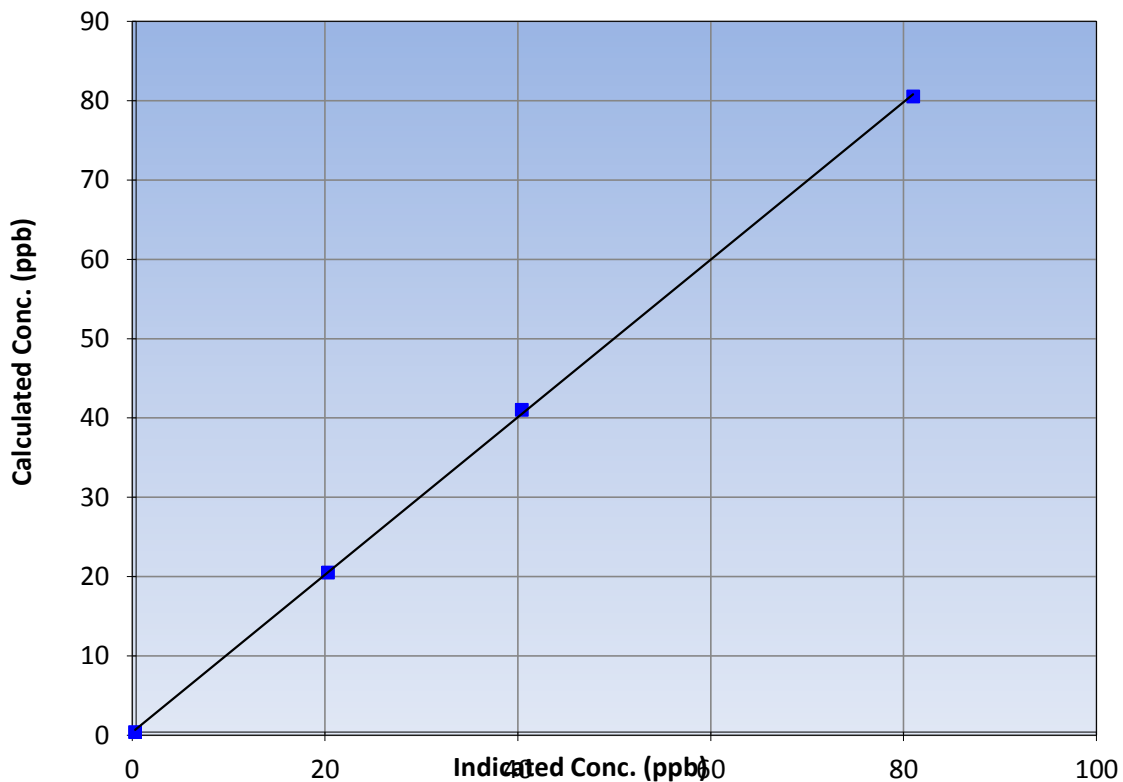
### Station Information

Calibration Date	October 31, 2017	Previous Calibration	January 0, 1900
Station Name	Athabasca Valley	Station Number	AMS 07
Start Time (MST)	10:22	End Time (MST)	13:48
Analyzer make	Thermo 43i LTE	Analyzer serial #	1410661331

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits
0.0	-0.1	----	Correlation Coefficient	≥0.995
80.2	80.6	0.9944		
40.6	40.0	1.0156	Slope	0.90 - 1.10
20.1	19.9	1.0103		
			Intercept	+/-3

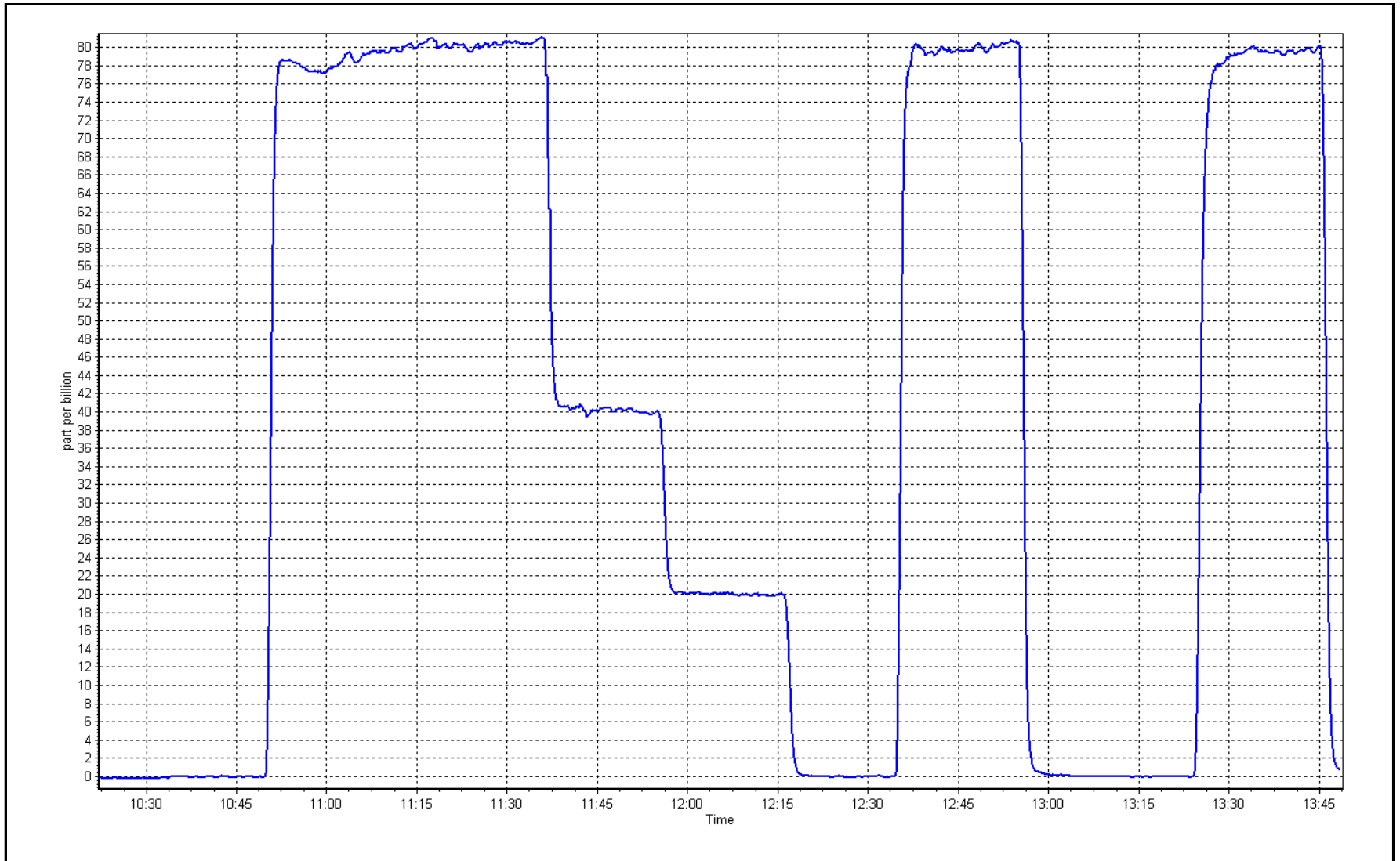
TRS Calibration Curve



TRS Calibration Plot

Date: October 31, 2017

Location: Athabasca Valley







# Wood Buffalo Environmental Association

## THC / NMHC Calibration Report

Version-03-2017

### Station Information

Station Name:	Athabasca Valley	Station number:	AMS 07
Calibration Date:	October 4, 2017	Last Cal Date:	September 7, 2017
Start time (MST):	6:45	End time (MST):	11:03
Reason:	Maintenance		

### Calibration Standards

Gas Cert Reference	LL110103	Cal Gas Expiry Date	February-16-19
CH4 Cal Gas Conc.	<u>488.0</u> ppm	CH4 Equiv Conc.	1035.3 ppm
C3H8 Cal Gas Conc.	<u>199.0</u> ppm	Station temp.	25 Deg C
Calibrator Model	Teledyne API 700	Serial Number	2445
ZAG make/model	Teledyne API 701	Serial Number	1864

### Analyzer Information

Analyzer make: Thermo 55i

Analyzer serial #: 1426262594

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
THC Range (ppm)	0 - 50 ppm		Column Temp	75.1	75.1
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.2	175.2
CH4 SP Ratio	0.000222	0.000221	Flame Temp	405.0	405.0
CH4 Retention time	13.0	13.2	Carrier Pressure	36.1	36.1
NMHC SP Ratio	4.21E-05	4.18E-05	Fuel Pressure	44.8	44.8
NMHC Peak Area	207389	208895	Air Pressure	25.9	25.9

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
THC Cal Slope	0.993929	0.991463
THC Cal Offset	0.031561	0.029475
CH4 Cal Slope	0.996003	0.993993
CH4 Cal Offset	0.036831	0.028682
NMHC Cal Slope	0.991518	0.989190
NMHC Cal Offset	-0.003005	0.000970

Notes: Nitrogen changed out, span adjusted

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association

## THC / NMHC Calibration Report

Version-02-2017

### THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	----
as found span	4973	78.8	16.40	16.60	0.988
calibrator zero	5000	0.0	0.00	0.00	----
high point	4973	78.8	16.40	16.54	0.992
second point	4973	39.5	8.22	8.22	1.000
third point	4994	19.8	4.10	4.10	1.001
as left zero	5000	0.0	0.00	0.00	----
as left span	4932	78.8	16.54	16.51	1.002
Average Correction Factor					0.998
Corrected As found	16.60	Prev response	16.47	*% change	-0.8%

### NMHC Calibration Data

Set Point	Total air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	----
as found span	4973	78.8	8.67	8.82	0.983
calibrator zero	5000	0.0	0.00	0.00	----
high point	4973	78.8	8.67	8.77	0.989
second point	4973	39.5	4.35	4.38	0.992
third point	4994	19.8	2.17	2.20	0.986
as left zero	5000	0.0	0.00	0.00	----
as left span	4932	78.8	8.74	8.75	0.999
Average Correction Factor					0.989
Corrected As found	8.82	Prev response	8.75	*% change	-0.8%

### CH4 Calibration Data

Set Point	Total air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i>
as found zero	5000	0.0	0.00	0.00	----
as found span	4973	78.8	7.73	7.79	0.993
calibrator zero	5000	0.0	0.00	0.00	----
high point	4973	78.8	7.73	7.77	0.995
second point	4973	39.5	3.88	3.84	1.009
third point	4994	19.8	1.93	1.90	1.018
as left zero	5000	0.0	0.00	0.00	----
as left span	4932	78.8	7.80	7.77	1.003
Average Correction Factor					1.008
Corrected As found	7.79	Prev response	7.73	*% change	-0.8%

\* = > +/-5% change initiates investigation



# Wood Buffalo Environmental Association

## THC Calibration Summary

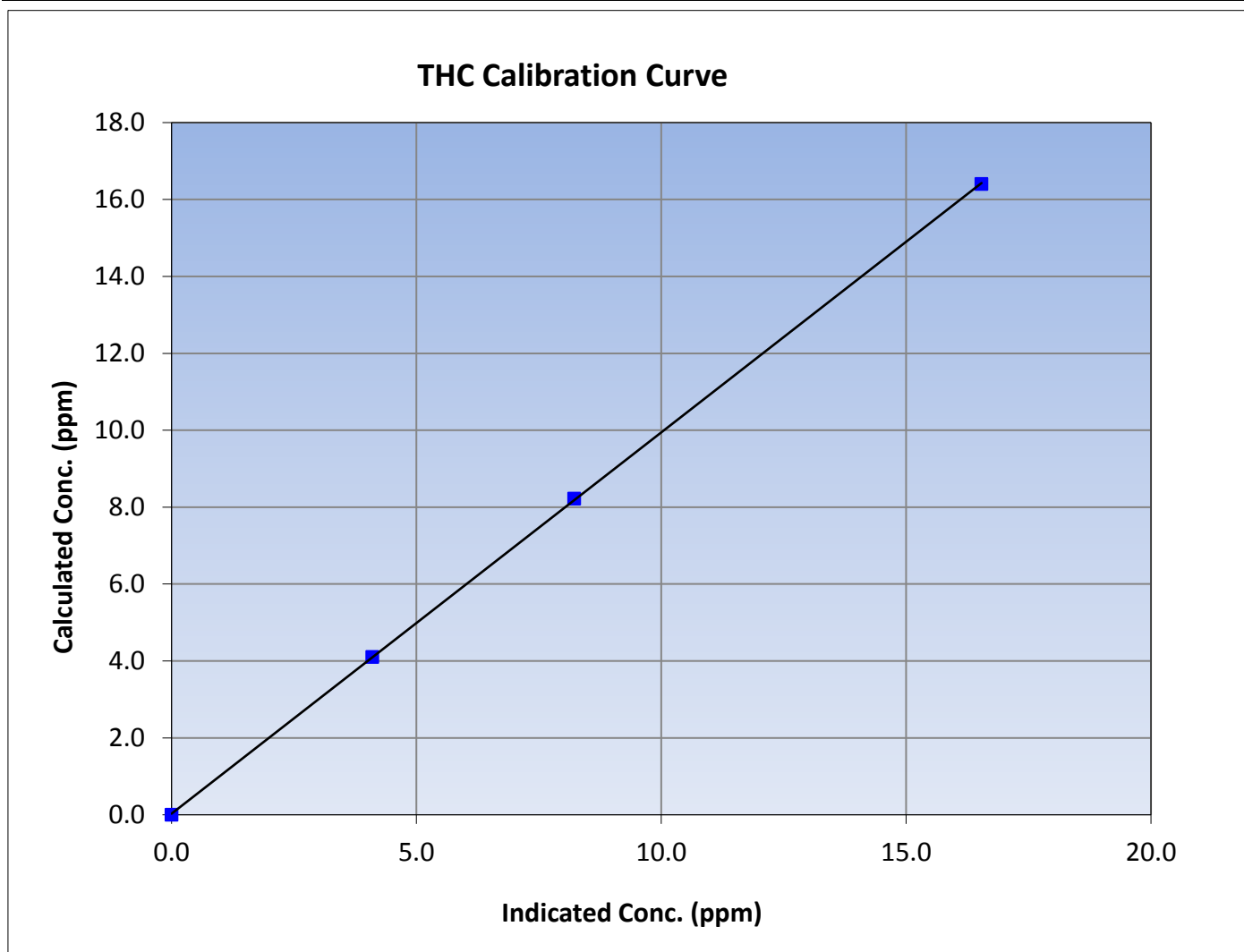
Version-02-2017

### Station Information

Calibration Date	October 4, 2017	Previous Calibration	September 7, 2017
Station Name	Athabasca Valley	Station Number	AMS 07
Start Time (MST)	6:45	End Time (MST)	12:10
Analyzer make	Thermo 55i	Analyzer serial #	1426262594

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.00	0.00	----	Correlation Coefficient	0.999977	$\geq 0.995$			
16.40	16.54	0.9918						
8.22	8.22	1.0004				Slope	0.991463	0.90 - 1.10
4.10	4.10	1.0011						
			Intercept	0.029475	$\pm 0.5$			





# Wood Buffalo Environmental Association

## CH<sub>4</sub> Calibration Summary

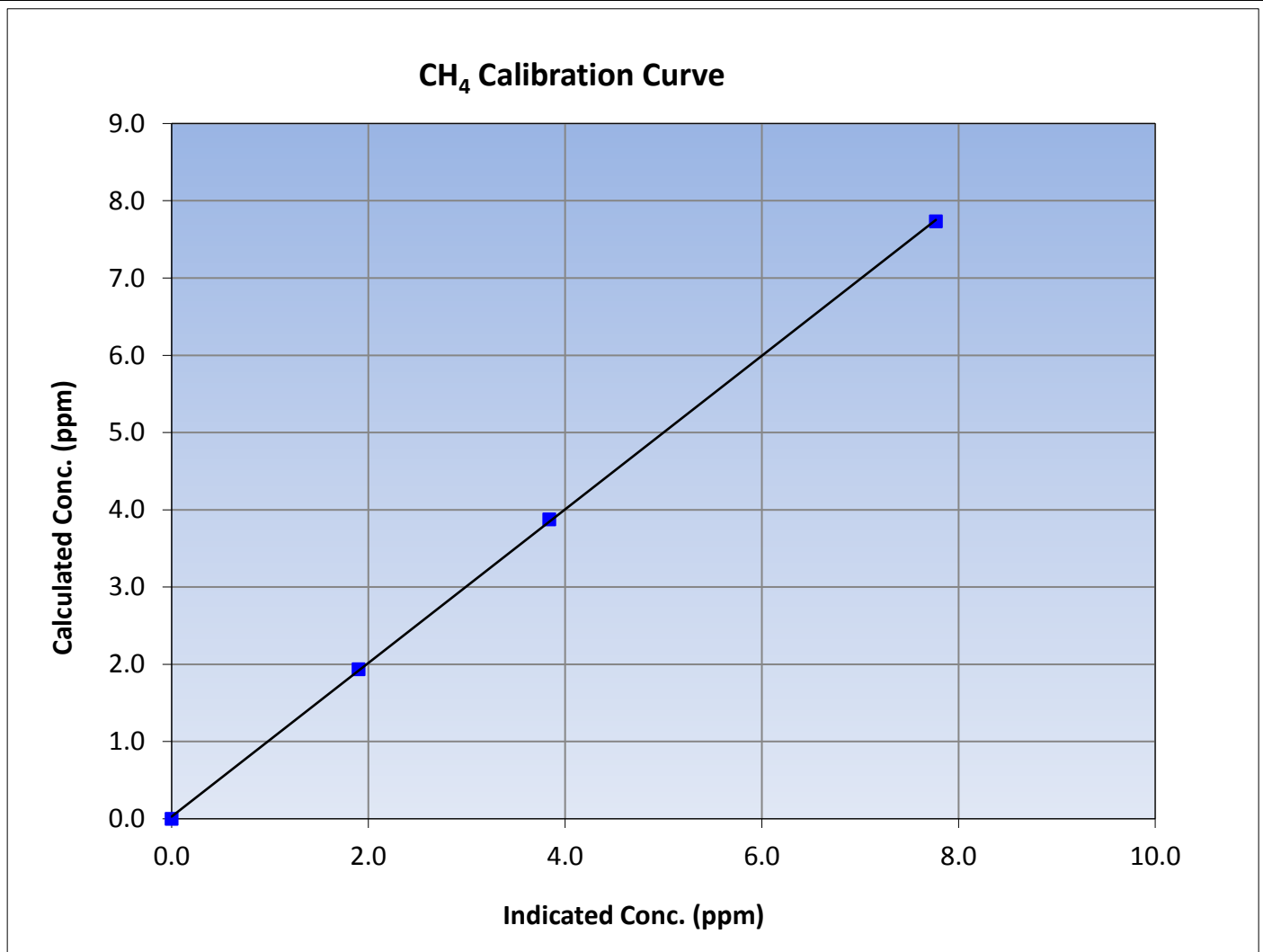
Version-02-2017

### Station Information

Calibration Date	October 4, 2017	Previous Calibration	September 7, 2017
Station Name	Athabasca Valley	Station Number	AMS 07
Start Time (MST)	6:45	End Time (MST)	12:10
Analyzer make	Thermo 55i	Analyzer serial #	1426262594

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.00	0.00	----	Correlation Coefficient	0.999925	$\geq 0.995$			
7.73	7.77	0.9952						
3.88	3.84	1.0094				Slope	0.993993	0.90 - 1.10
1.93	1.90	1.0183						
			Intercept	0.028682	$\pm 0.5$			





# Wood Buffalo Environmental Association

## NMHC Calibration Summary

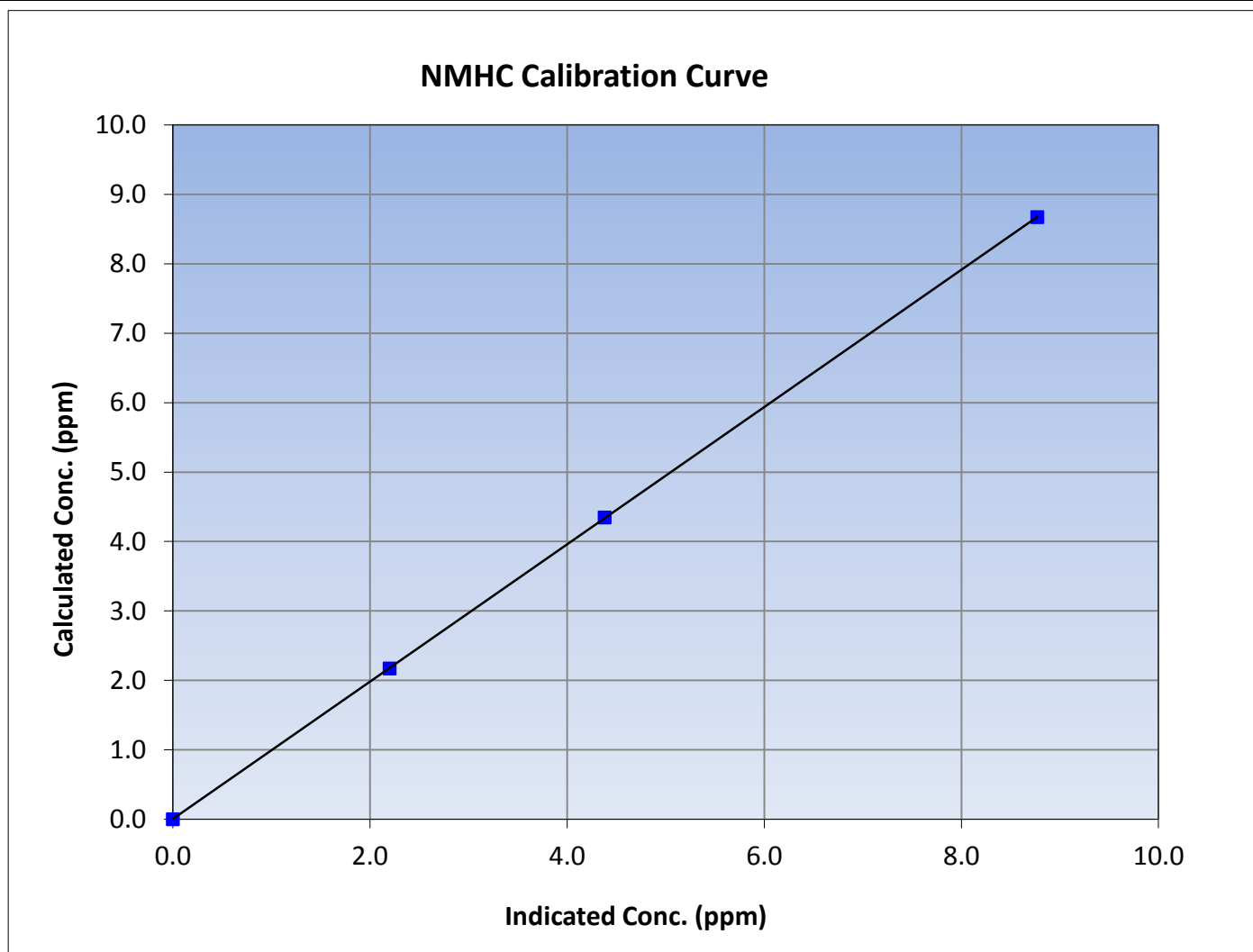
Version-02-2017

### Station Information

Calibration Date	October 4, 2017	Previous Calibration	September 7, 2017
Station Name	Athabasca Valley	Station Number	AMS 07
Start Time (MST)	6:45	End Time (MST)	12:10
Analyzer make	Thermo 55i	Analyzer serial #	1426262594

### Calibration Data

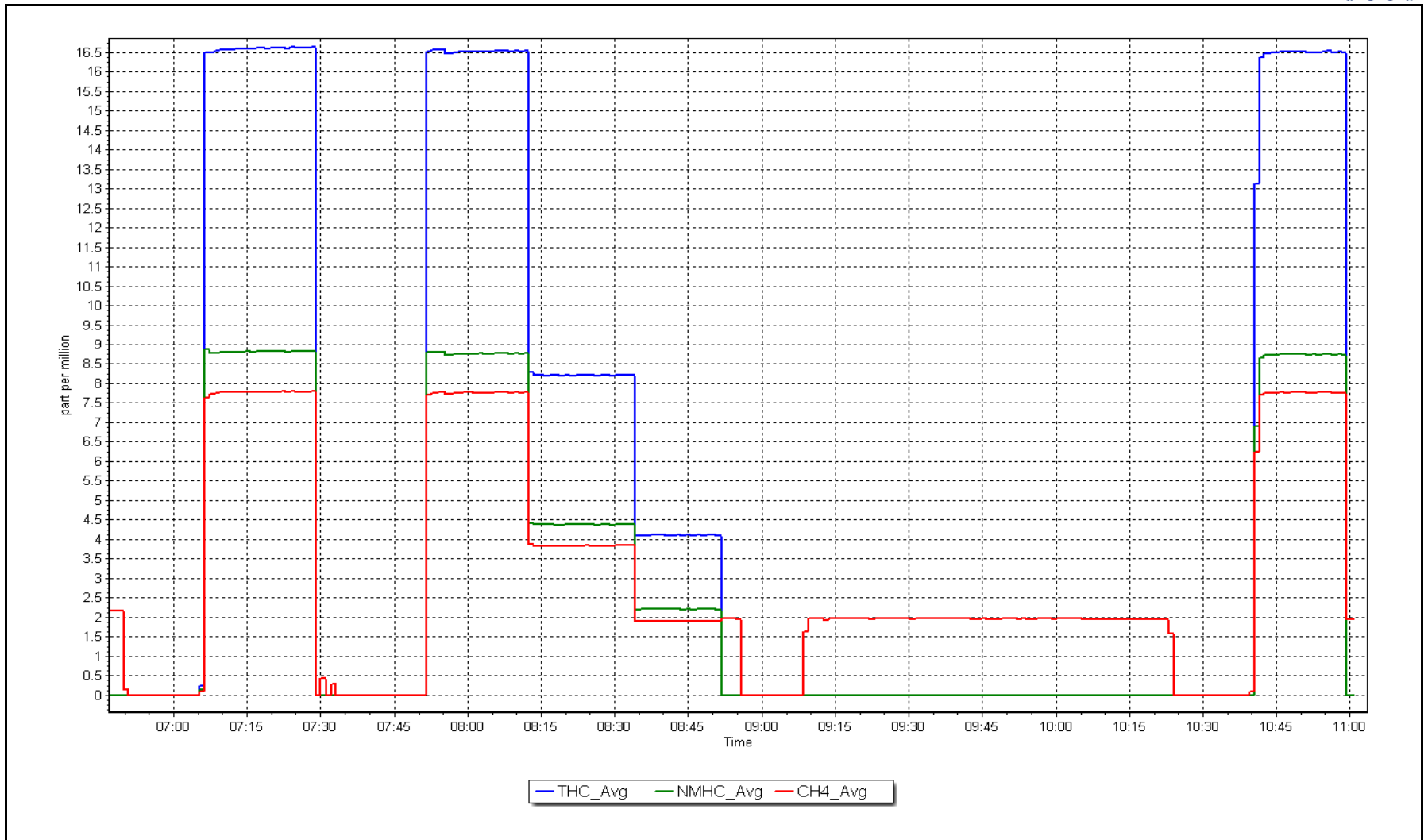
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.00	0.00	----	Correlation Coefficient	0.999994	$\geq 0.995$			
8.67	8.77	0.9888						
4.35	4.38	0.9924				Slope	0.989190	0.90 - 1.10
2.17	2.20	0.9862						
			Intercept	0.000970	$\pm 0.5$			



NMHC Calibration Plot

Date: October 4, 2017

Location: Athabasca Valley







# Wood Buffalo Environmental Association

## O<sub>3</sub> Calibration Summary

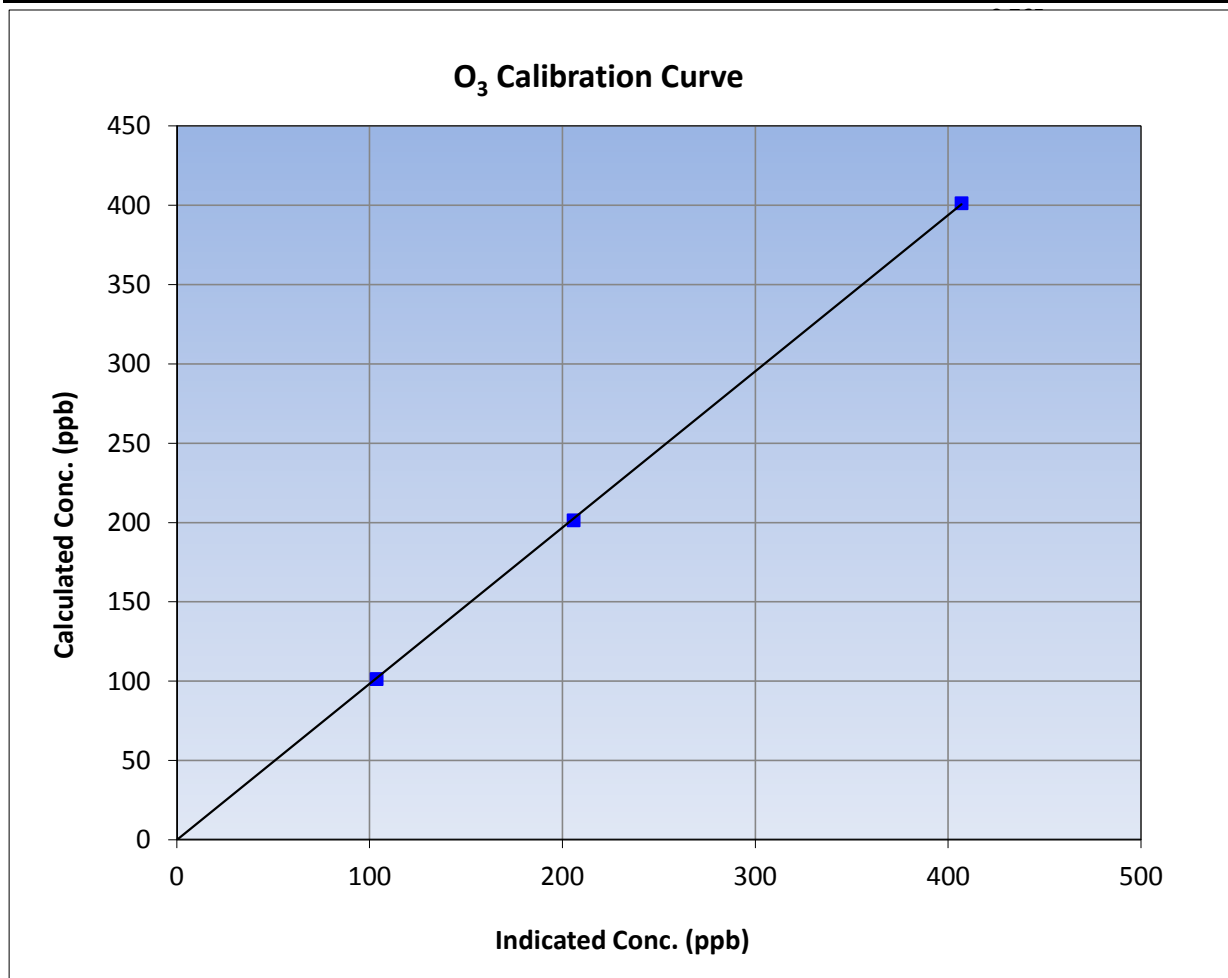
Version-03-2017

### Station Information

Calibration Date	October 23, 2017	Previous Calibration	September 18, 2017
Station Name	Athabasca Valley	Station Number	AMS 07
Start Time (MST)	11:07	End Time (MST)	13:32
Analyzer make	Thermo 49i	Analyzer serial #	1507964700

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	-0.7	----	Correlation Coefficient	0.999967	≥0.995
401.0	406.5	0.9865			
201.0	205.4	0.9786	Slope	0.985291	0.90 - 1.10
101.0	103.2	0.9787			
			Intercept	-0.223016	+/- 10

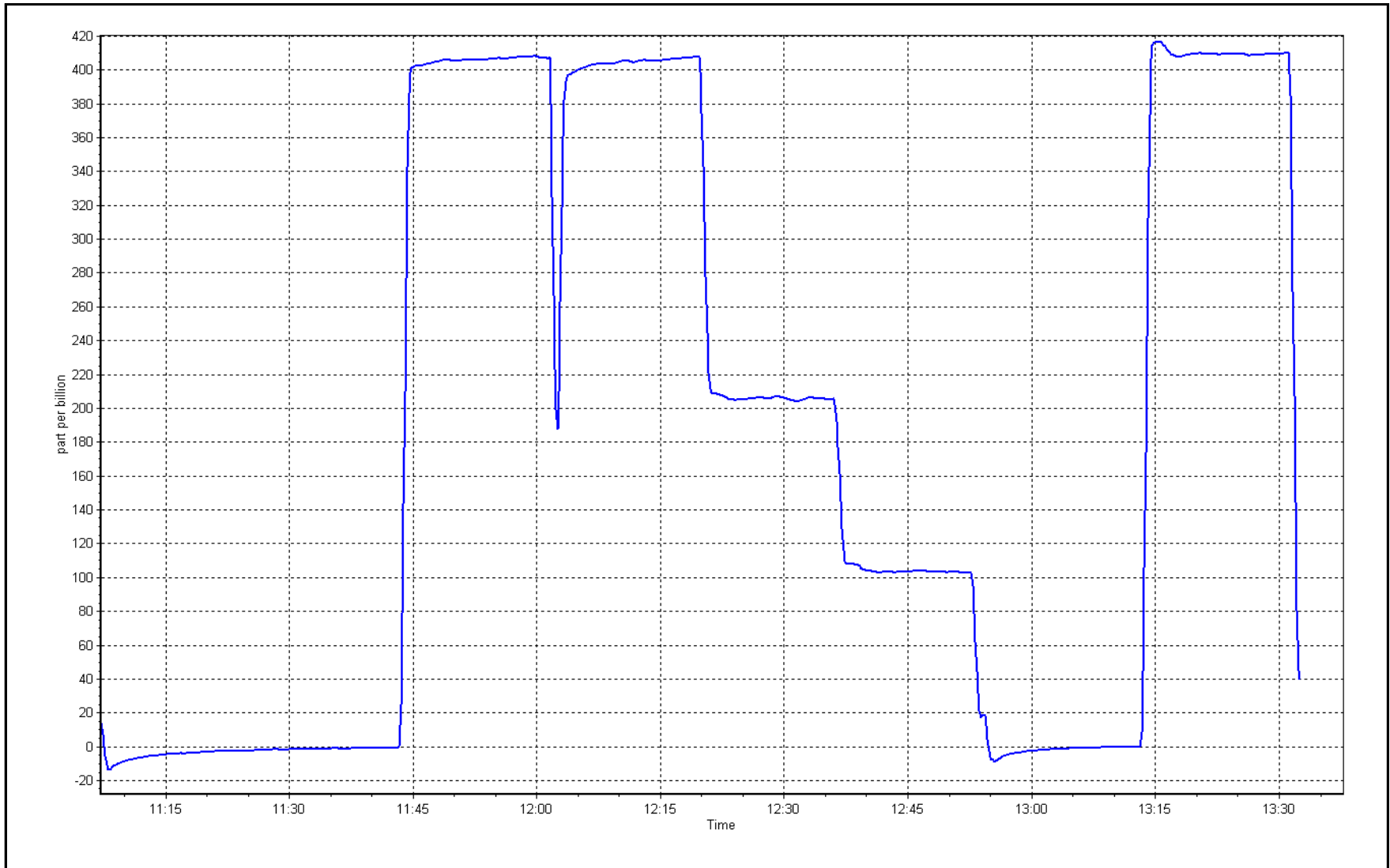




O<sub>3</sub> Calibration Plot

Date: October 23, 2017

Location: Athabasca Valley





# Wood Buffalo Environmental Association

## NO<sub>x</sub> - NO - NO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Athabasca Valley	Station number:	AMS 07
Calibration Date:	October 4, 2017	Last Cal Date:	September 7, 2017
Start time (MST):	6:45	End time (MST):	11:03
Reason:	Routine		

### Calibration Standards

NO Gas Cylinder #	LL110103	Cal Gas Expiry Date	February-16-19
NOX Cal Gas Conc.	<u>50.8</u> ppb	NO Cal Gas Conc.	<u>50.8</u> ppb
Calibrator Model	Teledyne API T700	Serial Number	2445
ZAG make/model	Teledyne API T701	Serial Number	1864

### Analyzer Information

Analyzer make: Thermo 42C			Analyzer serial #: 601114773		
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coefficient	1.526	1.564	NOX Range (ppb)	0 - 1000 ppb	
NOX coefficient	0.999	1.000	PMT Temperature	-3.6	-3.6
NO <sub>2</sub> coefficient	1.000	1.000	Reaction cell Press	177.5	177.5
NO bkgrnd	4.3	4.4	Sample Flow	0.746	0.746
NOX bkgrnd	4.5	4.6	PMT Voltage	-784	-784

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope	1.008144	1.000525
NO <sub>x</sub> Cal Offset	-1.814116	-1.752198
NO Cal Slope	1.007300	1.000215
NO Cal Offset	-1.793020	-1.592132
NO <sub>2</sub> Cal Slope	0.998209	1.004333
NO <sub>2</sub> Cal Offset	1.089320	0.487019



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

Version-03-2017

### Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero						0.2	0.0	0.3	----	----
as found span	4932	78.8	811.6	811.6	0.0	791.9	791.8	0.4	1.0249	1.0251
calibrator zero	5009	0.0	0.0	0.0	0.0	0.2	0.0	0.3	----	----
high point	4932	78.8	811.6	811.6	0.0	812.0	812.2	-0.4	0.9996	0.9993
second point	4973	39.5	403.5	403.5	0.0	406.4	406.0	0.5	0.9929	0.9938
third point	4994	19.7	200.4	200.4	0.0	203.2	203.4	-0.1	0.9862	0.9852
as left zero	5009	0.0	0.0	0.0	0.0	0.2	0.0	0.3	----	----
as left span	4973	78.8	805.0	389.4	415.6	801.5	388.2	409.8	1.0043	1.0031
<b>Average Correction Factor</b>									<b>0.9929</b>	<b>0.9928</b>

Corrected As found	NO <sub>x</sub> = 791.7 ppb	NO = 791.8 ppb		*Percent Change	NO <sub>x</sub> = 1.9%
Previous Response	NO <sub>x</sub> = 806.9 ppb	NO = 807.6 ppb		*Percent Change	NO = 2.0%
<i>* = &gt; +/-5% change initiates investigation</i>					

### GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
1st NO ref point		0.0	810.4	812.2	-1.6	1.0015	0.9993	----	----
1st NO2 (400 ppb O3)	389.4	422.8	810.4	389.4	420.9	1.0015	----	1.0045	99.6%
2nd NO2 (200 ppb O3)	592.8	219.4	810.2	592.8	217.6	1.0018	----	1.0083	99.2%
3rd NO2 (100 ppb O3)	698.7	113.5	810.4	698.7	111.7	1.0015	----	1.0161	98.4%
2nd NO ref point	----	0.0	810.0	812.2	-2.0	1.0020	0.9993	----	----
<b>Average Correction Factor</b>						<b>1.0017</b>	<b>0.9993</b>	<b>1.0096</b>	<b>99.0%</b>

Notes:

Span adjusted, No maintenance done

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

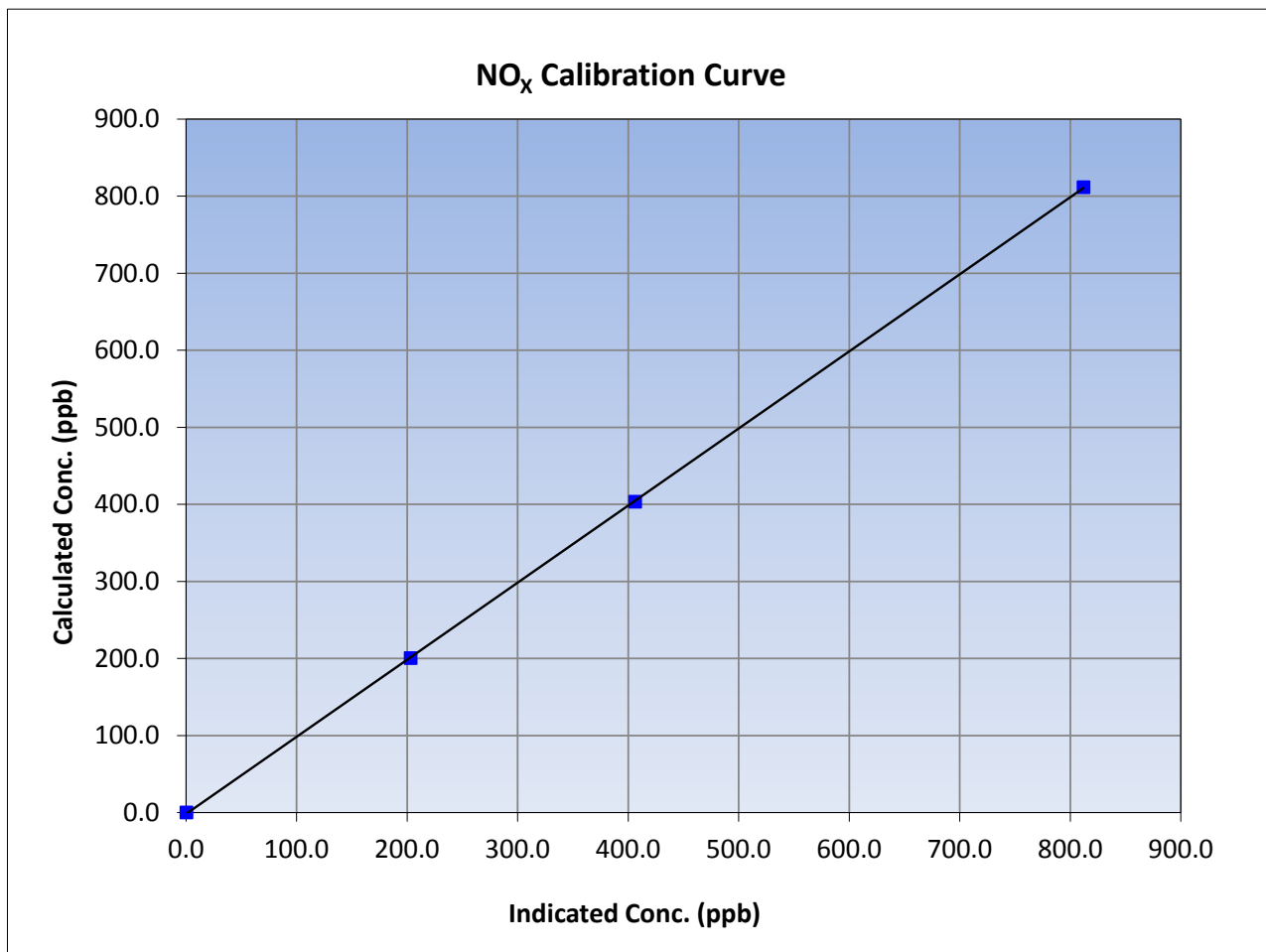
Version-03-2017

### Station Information

Calibration Date	October 4, 2017	Previous Calibration	September 7, 2017
Station Name	Athabasca Valley	Station Number	AMS 07
Start Time (MST)	6:45	End Time (MST)	11:03
Analyzer make	Thermo 42C	Analyzer serial #	601114773

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	0.2	----	Correlation Coefficient	≥0.995	
811.6	812.0	0.9996			
403.5	406.4	0.9929			
200.4	203.2	0.9862			
			Slope	1.000525	0.90 - 1.10
			Intercept	-1.752198	+/-20





# Wood Buffalo Environmental Association

## NO Calibration Summary

Version-03-2017

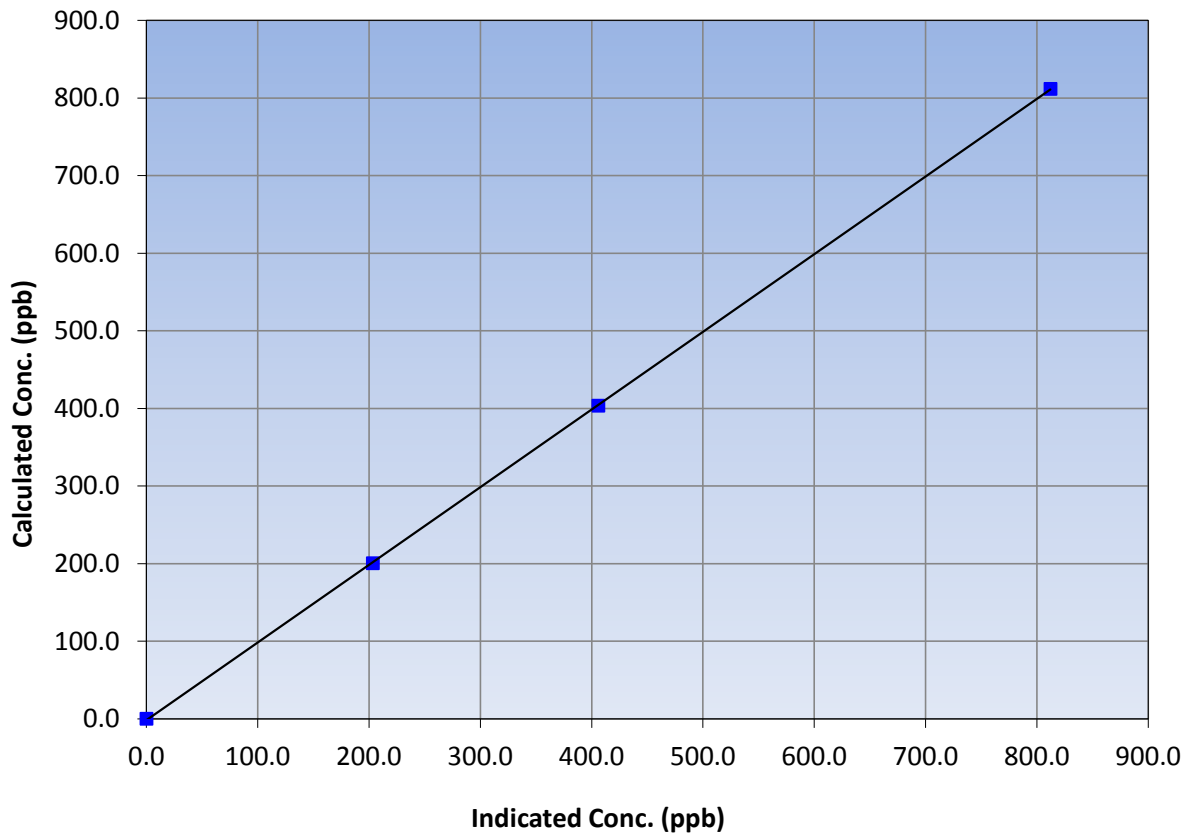
### Station Information

Calibration Date	October 4, 2017	Previous Calibration	September 7, 2017
Station Name	Athabasca Valley	Station Number	AMS 07
Start Time (MST)	6:45	End Time (MST)	11:03
Analyzer make	Thermo 42C	Analyzer serial #	601114773

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	0.0	----	Correlation Coefficient	≥0.995	
811.6	812.2	0.9993			
403.5	406.0	0.9938			
200.4	203.4	0.9852			
			Slope	1.000215	0.90 - 1.10
			Intercept	-1.592132	+/-20

NO Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

Version-03-2017

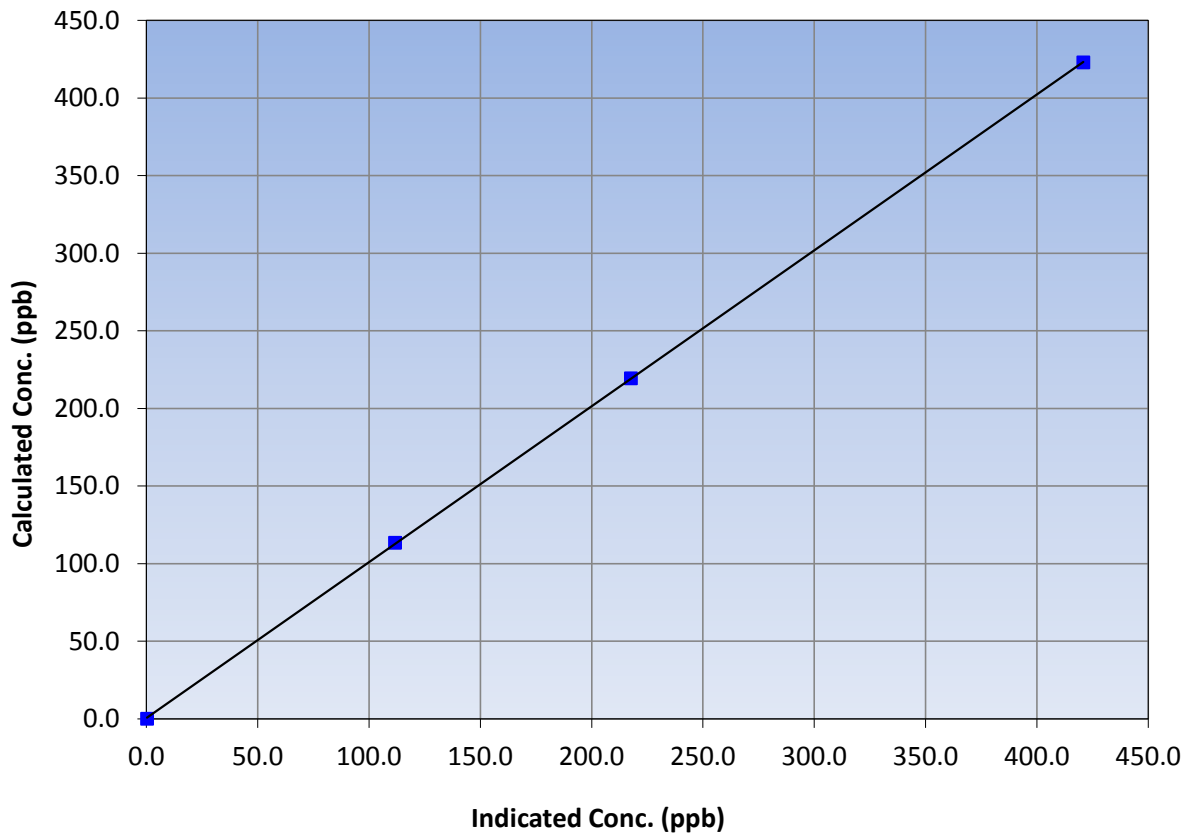
### Station Information

Calibration Date	October 4, 2017	Previous Calibration	September 7, 2017
Station Name	Athabasca Valley	Station Number	AMS 07
Start Time (MST)	6:45	End Time (MST)	11:03
Analyzer make	Thermo 42C	Analyzer serial #	601114773

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.3	----	Correlation Coefficient	≥0.995	
422.8	420.9	1.0045			
219.4	217.6	1.0083			
113.5	111.7	1.0161			
			Slope	0.999983	0.90 - 1.10
			Intercept	1.004333	+/-20

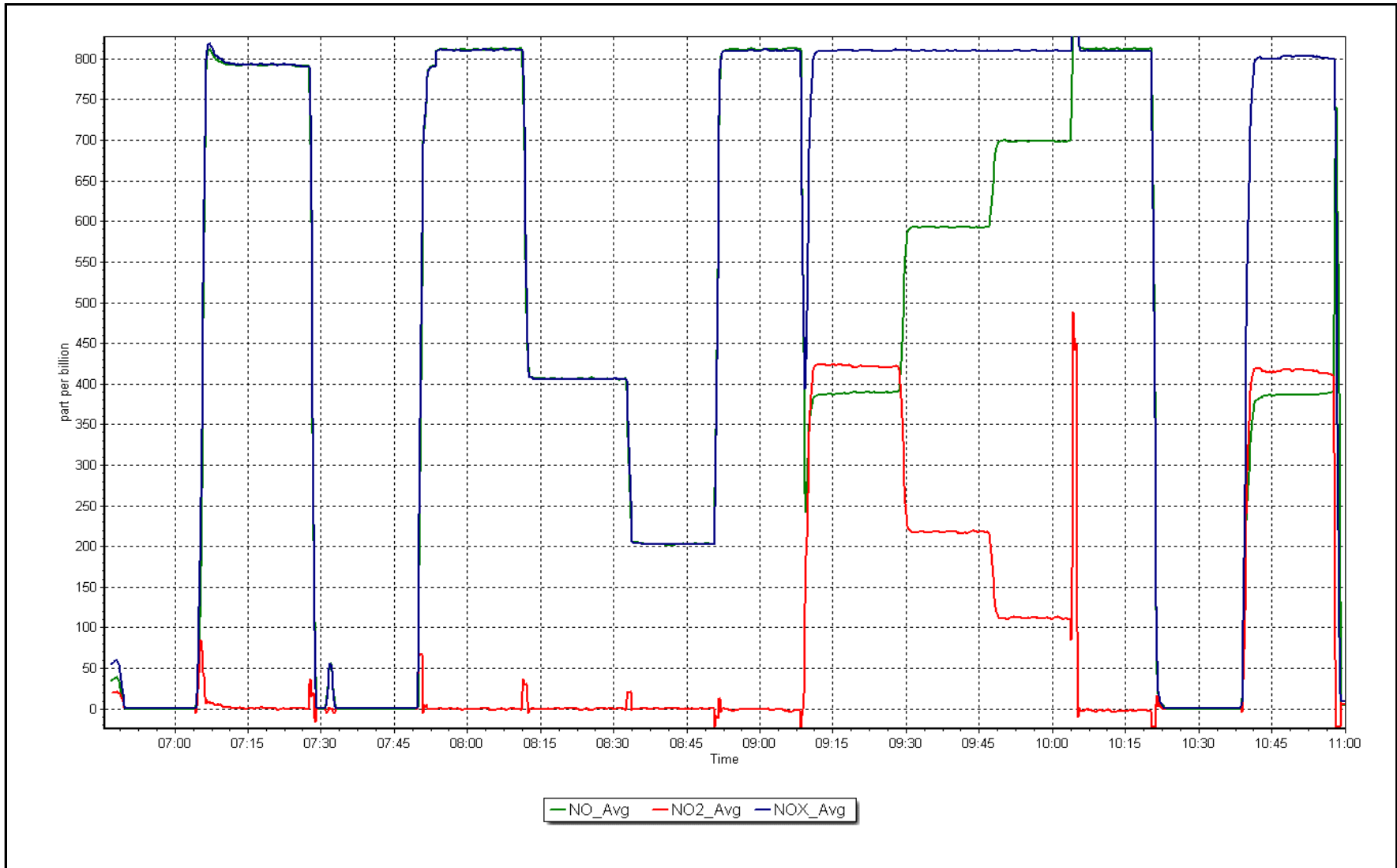
NO<sub>2</sub> Calibration Curve



NO<sub>x</sub> Calibration Plot

Date: October 4, 2017

Location: Athabasca Valley





# Wood Buffalo Environmental Association

## SHARP PM<sub>2.5</sub> CALIBRATION

Version-02-2017

### Station Information

Station Name:	Athabasca Valley	Station number:	AMS 07
Calibration Date:	October 23, 2017	Last Cal Date:	September 18, 2017
Start time (MST):	8:10	End time (MST):	10:38
Sharp Model:	Thermo 5030	S/N:	E515
Particulate Fraction:	PM2.5	C14 Source S/N:	3256
Flow Meter Make/Model:	Delta Cal	S/N:	1450
Temp/RH standard:	Delta Cal	S/N:	1450

### Monthly Calibration Test

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<b>(Limits)</b>
T1 (°C)	2	1.7	2	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	991	985	991	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	990	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	3.8	-----	0	<input checked="" type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified	<input type="checkbox"/>			
Cyclone cleaning :	PM10 Cyclone	<input checked="" type="checkbox"/>	PM2.5 Cyclone	<input checked="" type="checkbox"/>	
Date Filter Tape Installed:					

### Quarterly Calibration Test

Leak Test:	Date of check:	<u>October 23, 2017</u>	Last Cal Date:	<u>July 5, 2017</u>
	Flow w/o adaptor:	<u>16.55</u>	Flow w/ adaptor:	<u>16.15</u>

**(Limit) 0.4 LPM**

<u>Adjusted</u>	<u>Current Test</u>	<u>Previous Test</u>	<u>% Change</u>
<input type="checkbox"/>	Foil S/N: <u>2518</u>	Foil S/N: <u>2518</u>	
Foil Calibration	Foil Mass: <u>1337</u>	Foil Mass: <u>1337</u>	
	Calibration Date: <u>October 23, 2017</u>	Calibration Date: <u>July 5, 2017</u>	
<b>(Limit) +/- 5% of previous</b>	Correction Factor: <u>6885</u>	Correction Factor: <u>6893</u>	-0.12%

### Annual Calibration Test

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<b>(Limits)</b>
T2 (°C)				<input type="checkbox"/>	+/- 2 °C
T3 (°C)				<input type="checkbox"/>	+/- 2 °C
T4 (°C)				<input type="checkbox"/>	+/- 2 °C
RH (%)				<input type="checkbox"/>	+/- 10%
Date Sample Tube Cleaned:					
Date Pump Rebuilt/Replaced:					

Notes: Leak found in connection of sharp to stack, leak fixed and leak check passed, Nephelometer adjusted; cyclone head cleaned

Calibration by: Melissa Lemay







# Wood Buffalo Environmental Association

## CO Calibration Summary

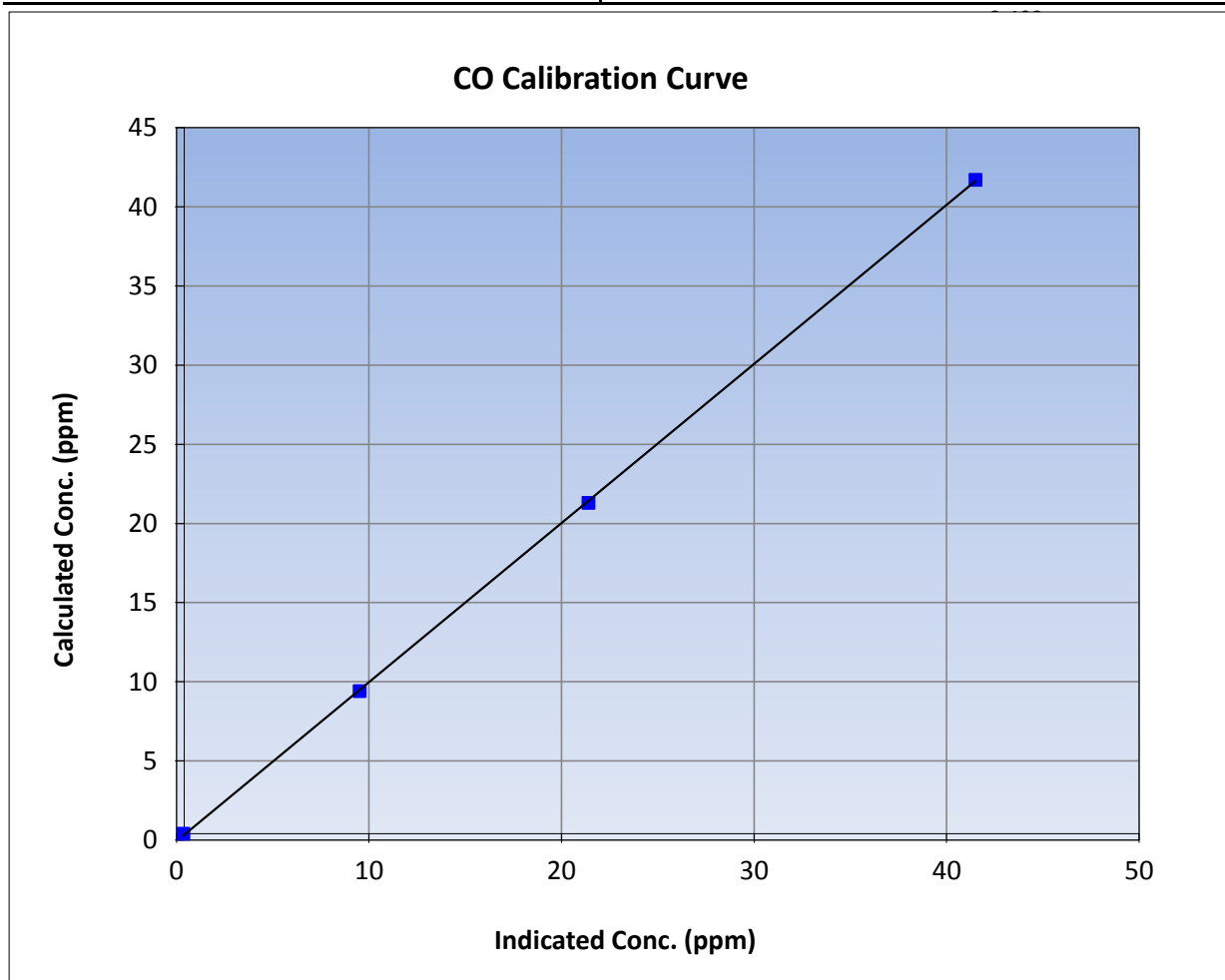
Version-03-2017

### Station Information

Calibration Date	October 2, 2017	Previous Calibration	September 1, 2017
Station Name	Athabasca Valley	Station Number	AMS 07
Start Time (MST)	7:15	End Time (MST)	11:28
Analyzer make	Thermo 48i-LTE	Analyzer serial #	1408761381

### Calibration Data

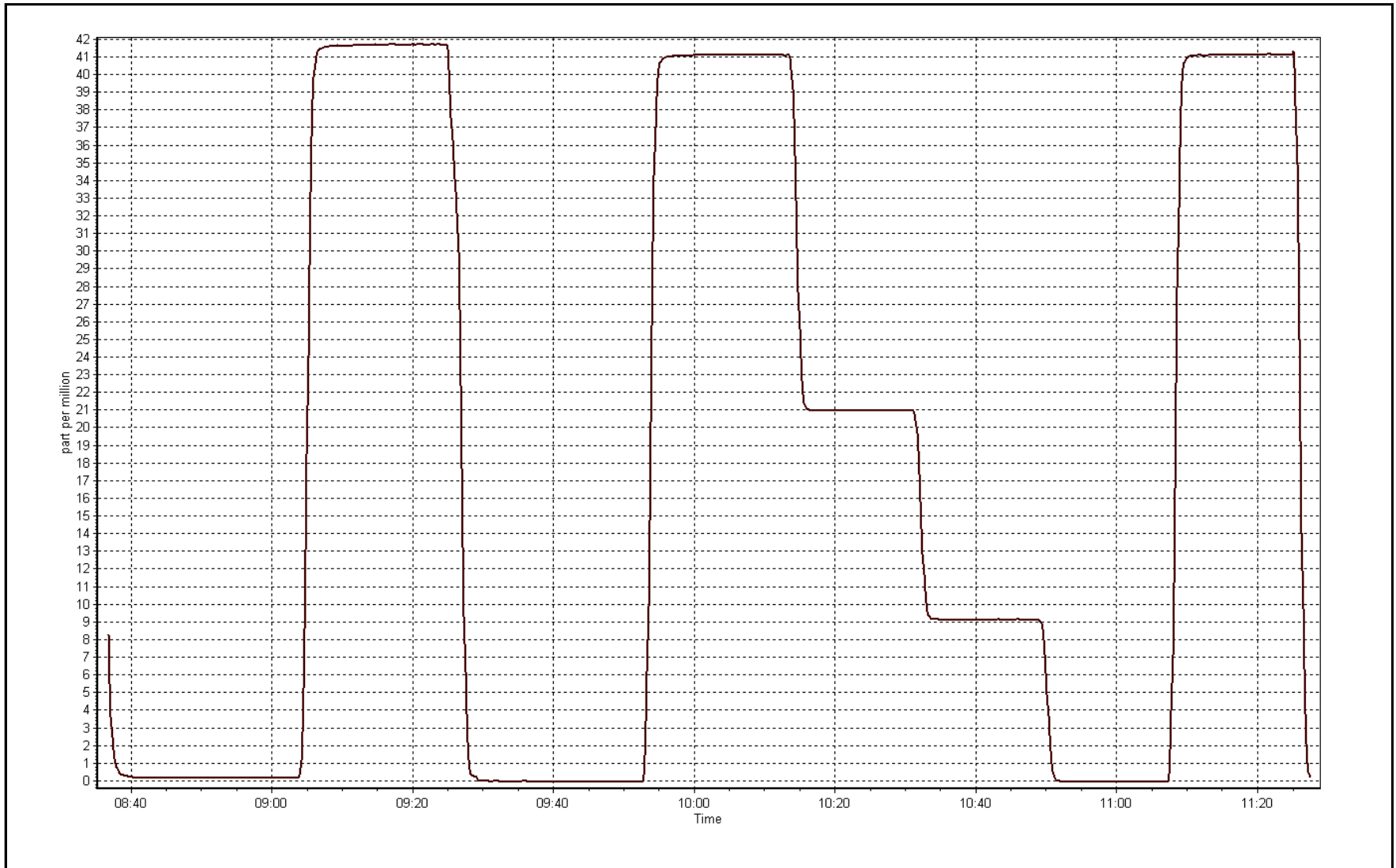
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.0	----	Correlation Coefficient	0.999958	≥0.995
41.3	41.1	1.0049			
20.9	21.0	0.9957	Slope	1.004953	0.90 - 1.10
9.0	9.1	0.9872			
			Intercept	-0.079605	+/-1.5



CO Calibration Plot

Date: October 2, 2017

Location: Athabasca Valley





## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 8  
FORT CHIPEWYAN  
OCTOBER 2017**

Operations, Data Collection,  
QA/QC, Data Validation and Reporting by:  
Wood Buffalo Environmental Association  
Fort McMurray, Alberta

November 29, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)  
OCTOBER 2017

MONTHLY SUMMARY for  
AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	700	37	44	99.06	6	0	1	0
O3(ppb) Average	701	35	43	98.92	35	0	30	-
NO2(ppb) Average	698	37	46	98.79	8	0	3	-
NO(ppb) Average	698	37	46	98.79	6	-	1	-
NOX(ppb) Average	698	37	46	98.79	14	-	4	-
PM2.5(ug/m3) Average	702	2	42	94.62	58.3	-	16.4	0
Wind Speed 10 m (km/h) Average	721	0	23	96.91	34	-	24	-
Wind Direction 10 m (deg) Average	721	0	23	96.91	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100	12.5	-	8.4	-
Relative Humidity (%) Average	744	0	0	100	99	-	98	-
Precipitation (mm) Total	557	0	187	74.87	2.3	-	6.1	-
Leaf Wetness (% of range) Average	744	0	0	100	71	-	12	-
Global Solar Radiation (W/m2) Average	744	0	0	100	507	-	137	-

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)  
OCTOBER 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile							
					Min	P10	Q1	Median	Q3	P90	Max	
SO2(ppb) Average	700	0.1	0	-	0	0	0	0	0	0	0	6
O3(ppb) Average	701	22.3	6	-	7	15	19	22	26	30	35	
NO2(ppb) Average	698	0.6	1	-	0	0	0	0	1	2	8	
NO(ppb) Average	698	0.2	0	-	0	0	0	0	0	0	6	
NOX(ppb) Average	698	0.7	1	-	0	0	0	0	1	2	14	
PM2.5(ug/m3) Average	702	2.44	4.6	-	0	0.5	0.7	1.2	2.5	5	58.3	
Wind Speed 10 m (km/h) Average	721	13.3	6	-	0	6	8	13	17	22	34	
Wind Direction 10 m (deg) Average	721	-	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	1.78	3.3	-	-6.7	-1.8	-0.5	1	3.9	6.6	12.5	
Relative Humidity (%) Average	744	83.8	12	-	36	68	77	86	93	97	99	
Precipitation (mm) Total	557	-	-	25.65	-	-	-	-	-	-	-	-
Leaf Wetness (% of range) Average	744	3.2	8	-	-1	0	0	0	2	12	71	
Global Solar Radiation (W/m2) Average	744	49.8	88	-	0	0	0	0	67	181	507	

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)  
OCTOBER 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NO2, NO, NOX, SO2	02 Oct 2017 09:00	02 Oct 2017 15:00	7	Station power failure
O3	02 Oct 2017 09:00	02 Oct 2017 14:00	6	Station power failure
O3	05 Oct 2017 08:00	05 Oct 2017 08:00	1	Station power failure
O3	12 Oct 2017 13:00	12 Oct 2017 13:00	1	Maintenance - reinitiated daily QA check
NO2, NO, NOX	05 Oct 2017 08:00	05 Oct 2017 09:00	2	Station power failure
PM2.5	01 Oct 2017 20:00	01 Oct 2017 20:00	1	Unstable operation - excessive baseline drift
PM2.5	01 Oct 2017 22:00	02 Oct 2017 09:00	12	Unstable operation - excessive baseline drift
PM2.5	02 Oct 2017 10:00	02 Oct 2017 14:00	5	Station power failure
PM2.5	02 Oct 2017 15:00	02 Oct 2017 15:00	1	Unstable operation - excessive baseline drift
PM2.5	03 Oct 2017 00:00	03 Oct 2017 18:00	19	Unstable operation - excessive baseline drift
PM2.5	11 Oct 2017 14:00	11 Oct 2017 15:00	2	Maintenance - analyzer replacement
Wind Speed, Wind Direction	10 Oct 2017 01:00	10 Oct 2017 01:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	24 Oct 2017 23:00	25 Oct 2017 09:00	11	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	26 Oct 2017 00:00	26 Oct 2017 10:00	11	Flat line in sensor output signal - Sensor frozen
Precipitation Collector	24 Oct 2017 06:00	01 Nov 2017 00:00	187	Analyzer Failure



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort Chipewyan - October 2017

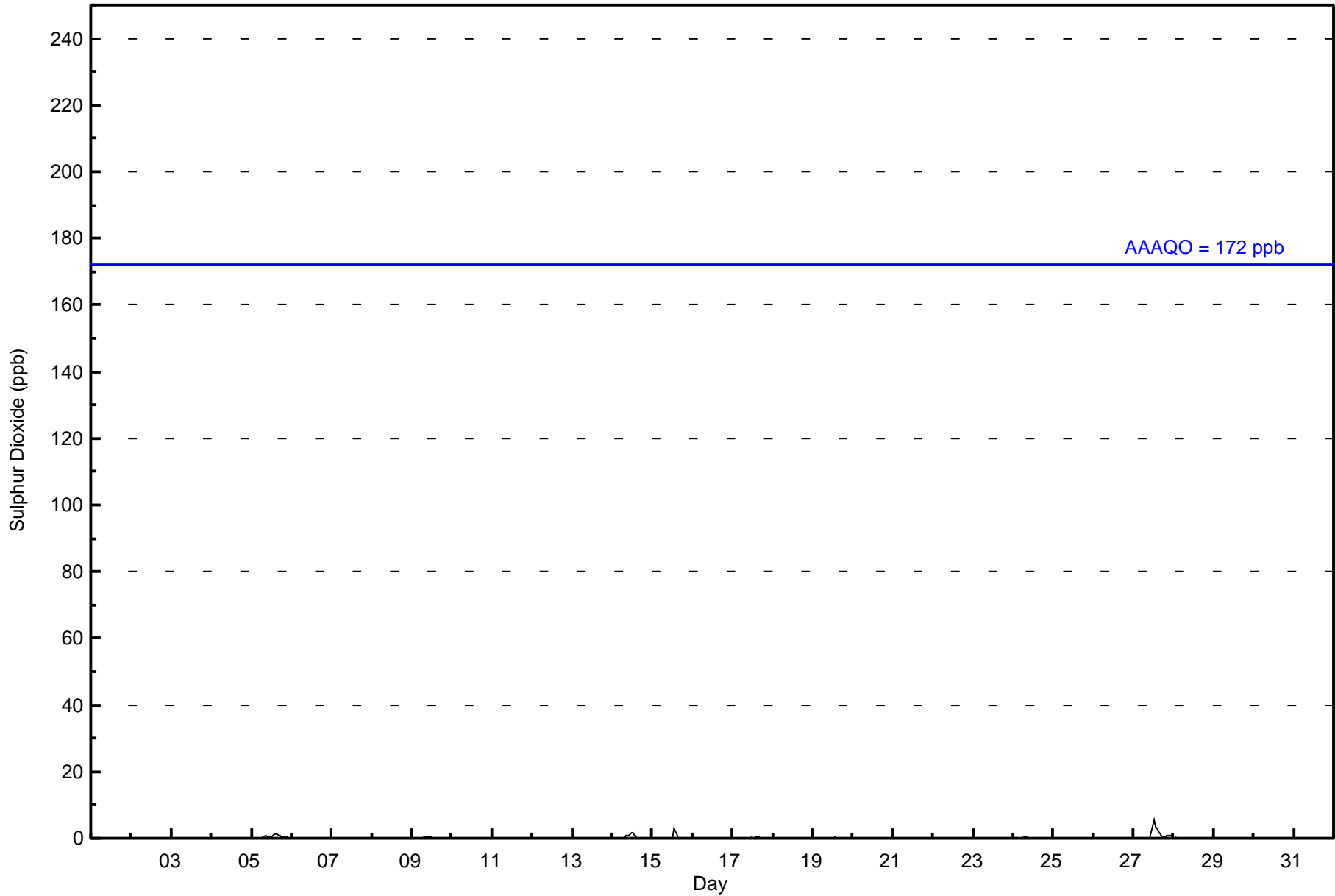
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 6 ppb on Oct 27 13:00      Maximum Daily Average: 1.1 ppb on Oct 27																	Hours in Service: 744 Hours of Data: 700 Hours of Missing Data: 44 Hours of Calibration: 37 Percent Operational Time: 99.1																																	
Minimum Value: 0 ppb on Oct 4 15:00      Minimum Daily Average: 0.0 ppb on Oct 4 Maximum Diurnal Average: 0.3 ppb at hour 14      Minimum Diurnal Average: 0.0 ppb at hour 1 Monthly Average: 0.1 ppb      Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 1																																																		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
2-Oct	0	0	0	0	Z	0	0	0	0	PF	PF	PF	PF	PF	PF	0	0	0	0	0	0	0	0	0	0	--	0																							
3-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
4-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
5-Oct	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.5	1																							
6-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
7-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
8-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
9-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
10-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
11-Oct	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	--	0																								
12-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
13-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
14-Oct	0	0	0	0	Z	0	0	0	0	1	1	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0.3	2																							
15-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0.2	3																							
16-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
17-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
18-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
19-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
20-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
21-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
22-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
23-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
24-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
25-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
26-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
27-Oct	0	0	0	0	0	Z	0	0	0	0	0	4	6	3	3	2	1	1	1	1	0	1	1	1	1	1.1	6																							
28-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
29-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
30-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
31-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
																								0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Diurnal Average
																								0	0	0	0	0	0	0	0	1	1	1	4	6	3	3	2	1	1	1	1	0	1	1	1	1	1	Diurnal Maximum
Z - zerospan      C - Calibration      PF - Power Failure Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb    24-hr 48 ppb																																																		





Wood Buffalo Environmental Association  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort Chipewyan - October 2017





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort Chipewyan - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	700	100.00	100.00
11 - 20	0	0.00	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 700

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort Chipewyan - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 10	58	12	8	29	56	49	32	27	17	29	34	30	60	65	95	79	680
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>58</b>	<b>12</b>	<b>8</b>	<b>29</b>	<b>56</b>	<b>49</b>	<b>32</b>	<b>27</b>	<b>17</b>	<b>29</b>	<b>34</b>	<b>30</b>	<b>60</b>	<b>65</b>	<b>95</b>	<b>79</b>	<b>680</b>

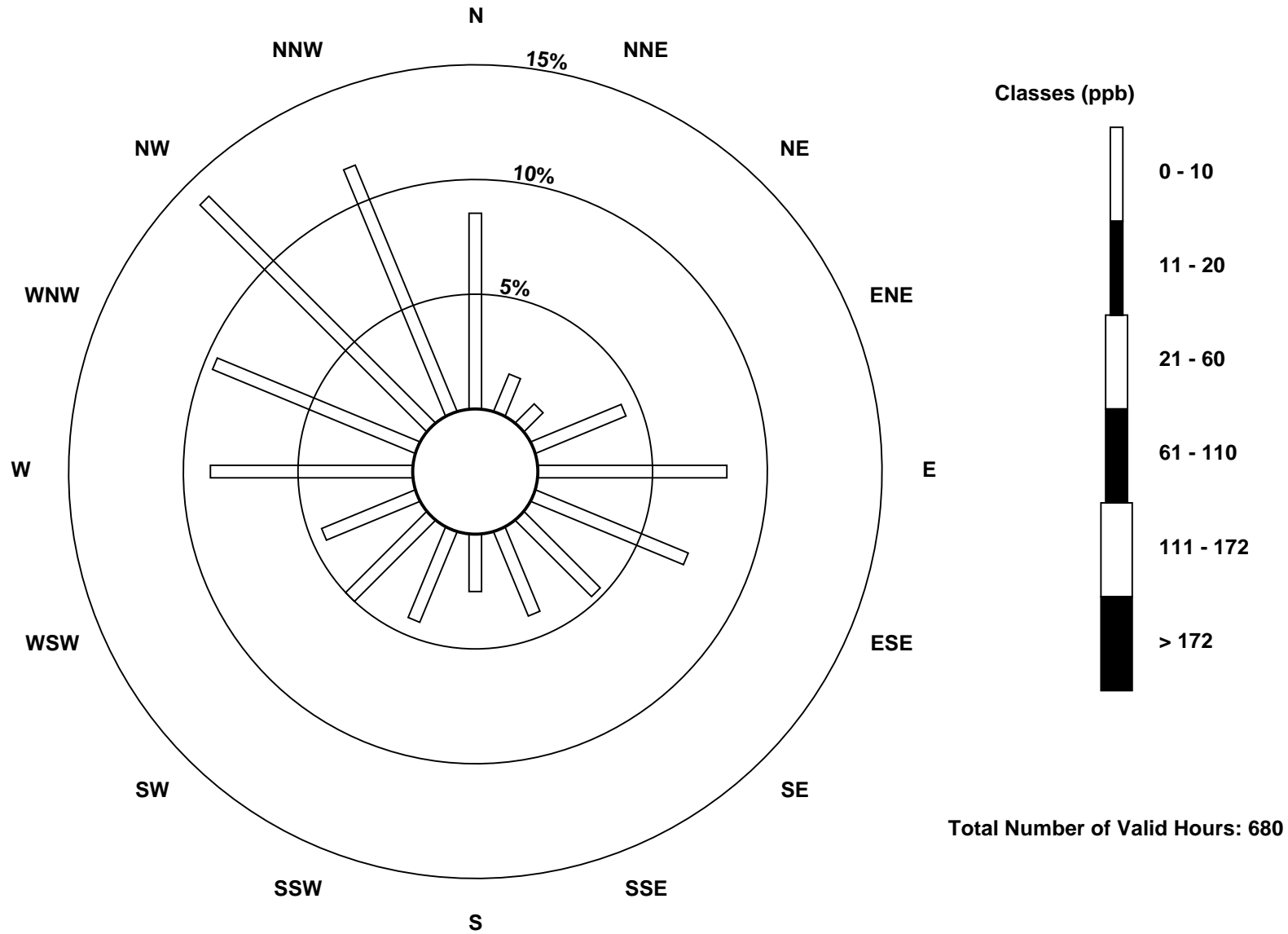
Total Number of Valid Hours: 680

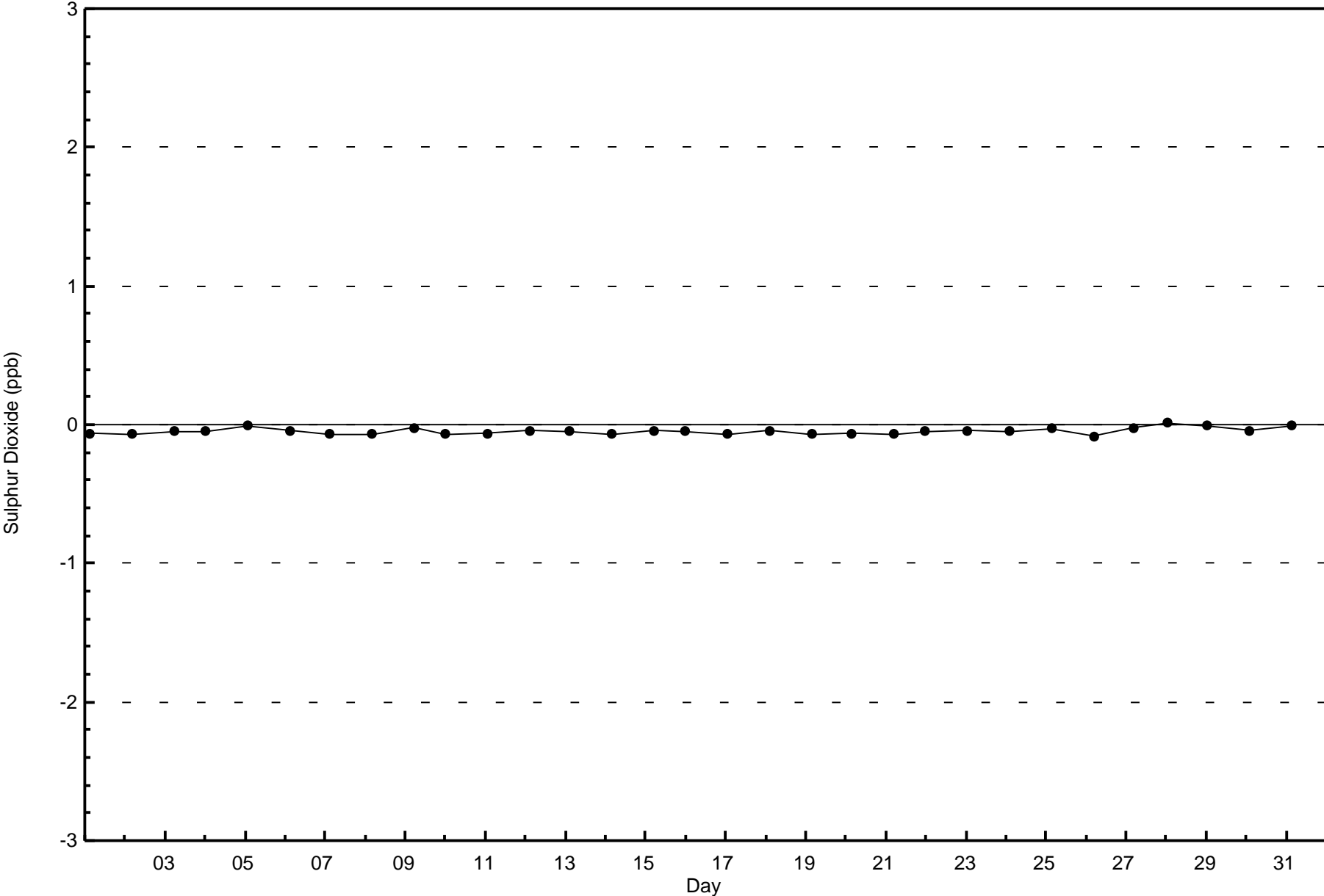
Total Number of Hours: 744

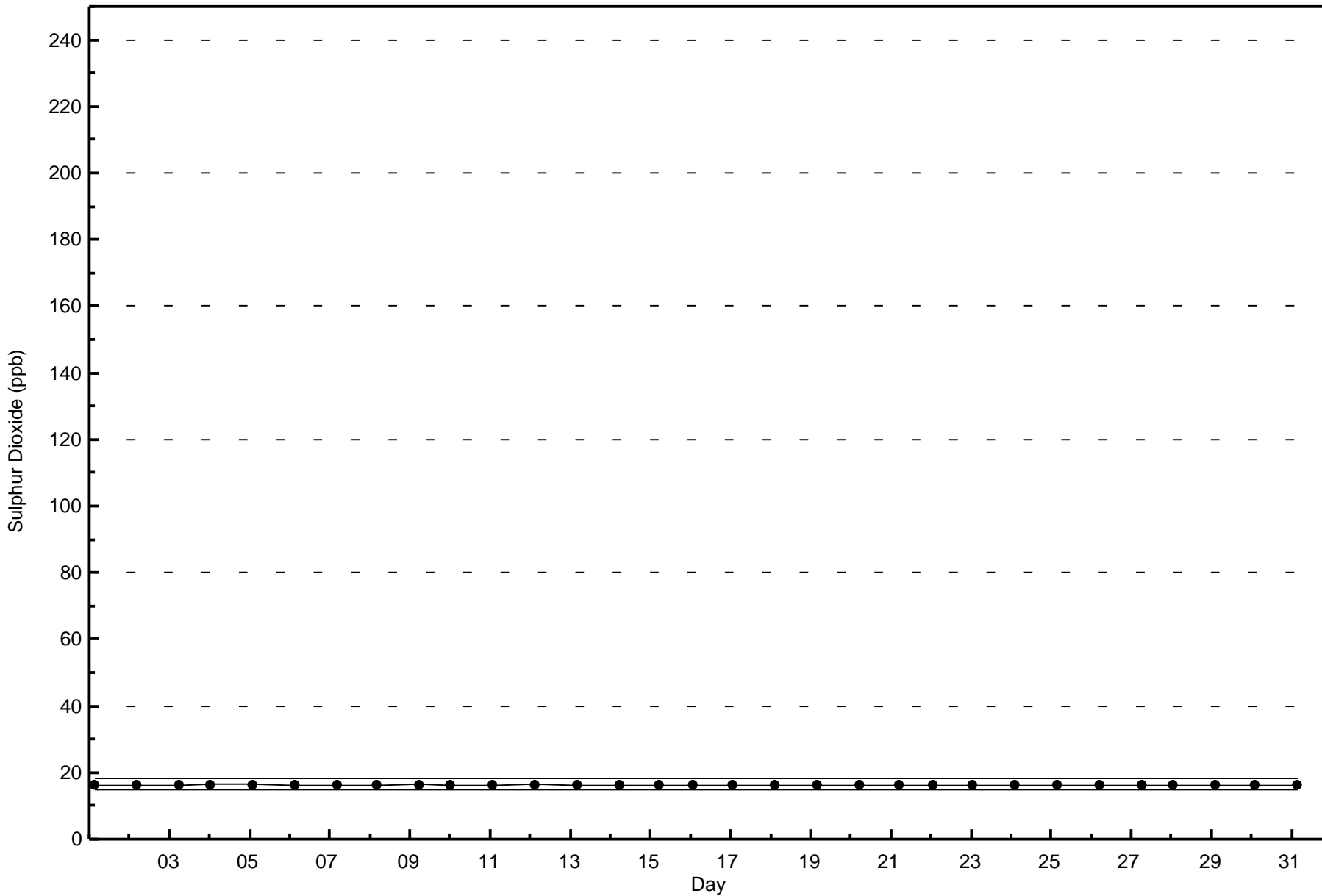


**Wood Buffalo Environmental Association  
Wind Rose Oct 2017**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort Chipewyan (AMS 8)**







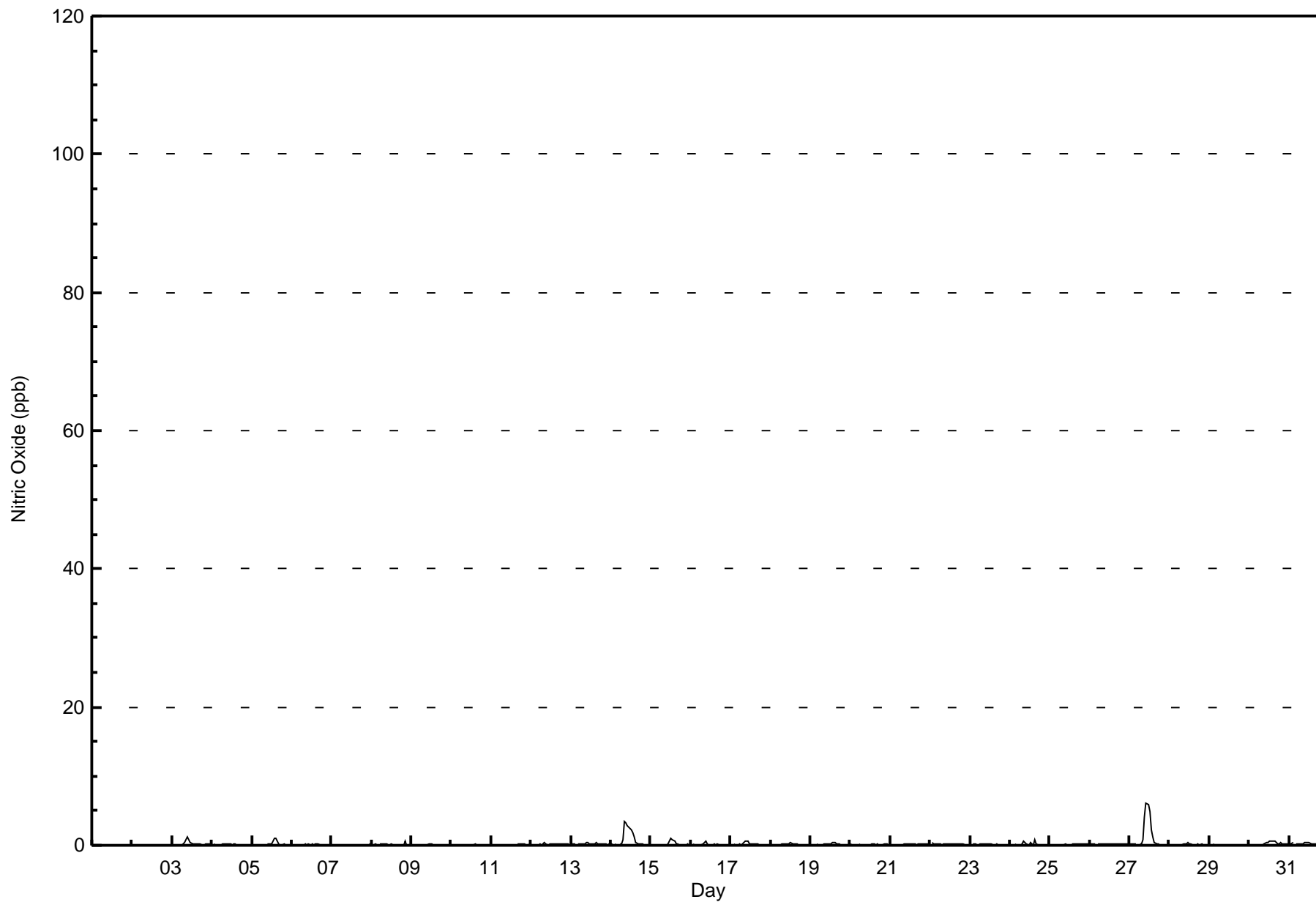


Maximum Value: 6 ppb on Oct 27 11:00																	Maximum Daily Average: 1.2 ppb on Oct 27							Hours in Service: 744																					
Minimum Value: 0 ppb on Oct 1 08:00																	Minimum Daily Average: 0.0 ppb on Oct 1							Hours of Data: 698																					
Maximum Diurnal Average: 0.5 ppb at hour 11																	Minimum Diurnal Average: 0.1 ppb at hour 5							Hours of Missing Data: 46																					
Monthly Average: 0.2 ppb																	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 3							Hours of Calibration: 37																					
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																					
1-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																		
2-Oct	0	0	0	0	Z	0	0	0	0	PF	PF	PF	PF	PF	PF	0	0	0	0	0	0	0	0	0	0	--	0																		
3-Oct	0	0	0	0	0	Z	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																		
4-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																		
5-Oct	0	Z	0	0	0	0	0	0	PF	PF	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0.2	1																		
6-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																		
7-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																		
8-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.1	1																		
9-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																		
10-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																		
11-Oct	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	--	0																			
12-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																		
13-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																		
14-Oct	0	0	0	0	Z	0	0	1	3	3	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0.9	3																		
15-Oct	0	0	0	0	0	Z	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.2	1																		
16-Oct	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																		
17-Oct	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																		
18-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																		
19-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																		
20-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																		
21-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																		
22-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																		
23-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																		
24-Oct	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.2	1																		
25-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																		
26-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																		
27-Oct	0	0	0	0	0	Z	0	0	1	4	6	6	5	2	1	0	0	0	0	0	0	0	0	0	0	1.2	6																		
28-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																		
29-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																		
30-Oct	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1																		
31-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																		
																	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.4	0.5	0.5	0.4	0.3	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Diurnal Average
																	0	0	0	0	0	0	0	0	1	3	4	6	6	5	2	1	1	0	0	0	0	0	0	1	0	0	0	0	Diurnal Maximum
Z - zerspan			C - Calibration			PF - Power Failure																																							



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitric Oxide (NO) - ppb**  
**Fort Chipewyan - October 2017**







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Fort Chipewyan - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	698	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 698

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitric Oxide (NO) - ppb  
Fort Chipewyan - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 20	58	12	8	29	54	49	32	27	17	29	34	30	60	65	95	79	678
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>58</b>	<b>12</b>	<b>8</b>	<b>29</b>	<b>54</b>	<b>49</b>	<b>32</b>	<b>27</b>	<b>17</b>	<b>29</b>	<b>34</b>	<b>30</b>	<b>60</b>	<b>65</b>	<b>95</b>	<b>79</b>	<b>678</b>

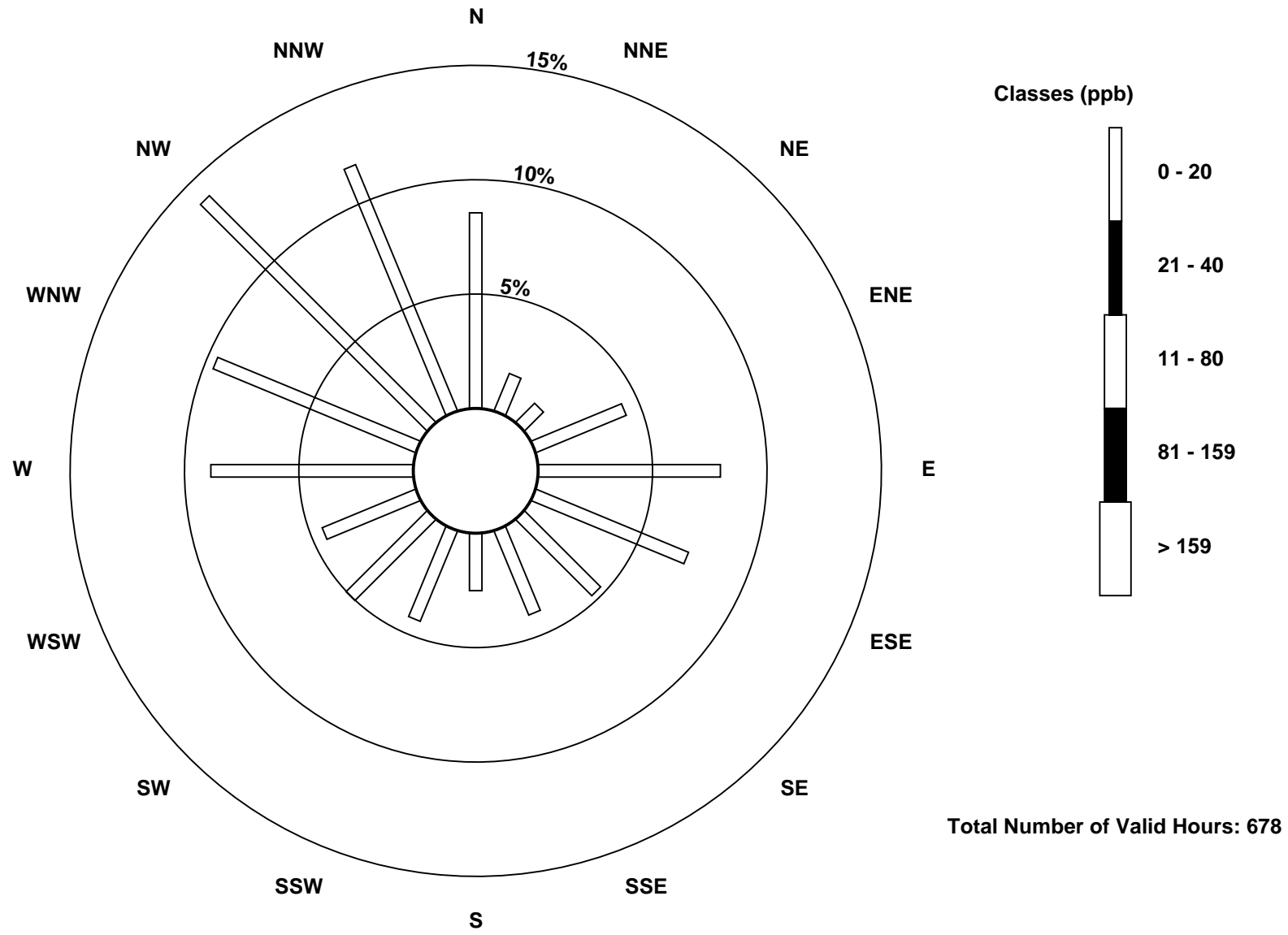
Total Number of Valid Hours: 678

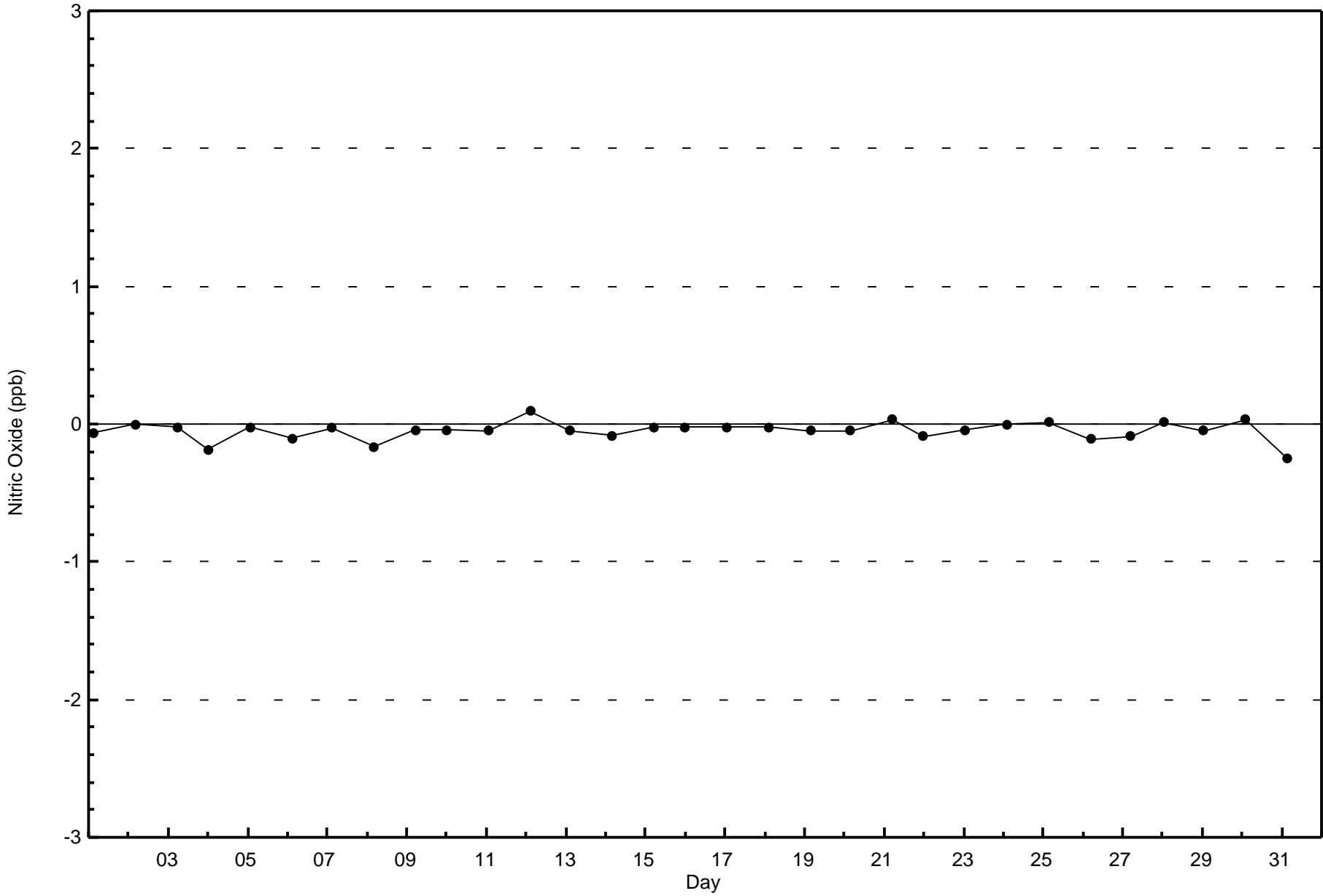
Total Number of Hours: 744

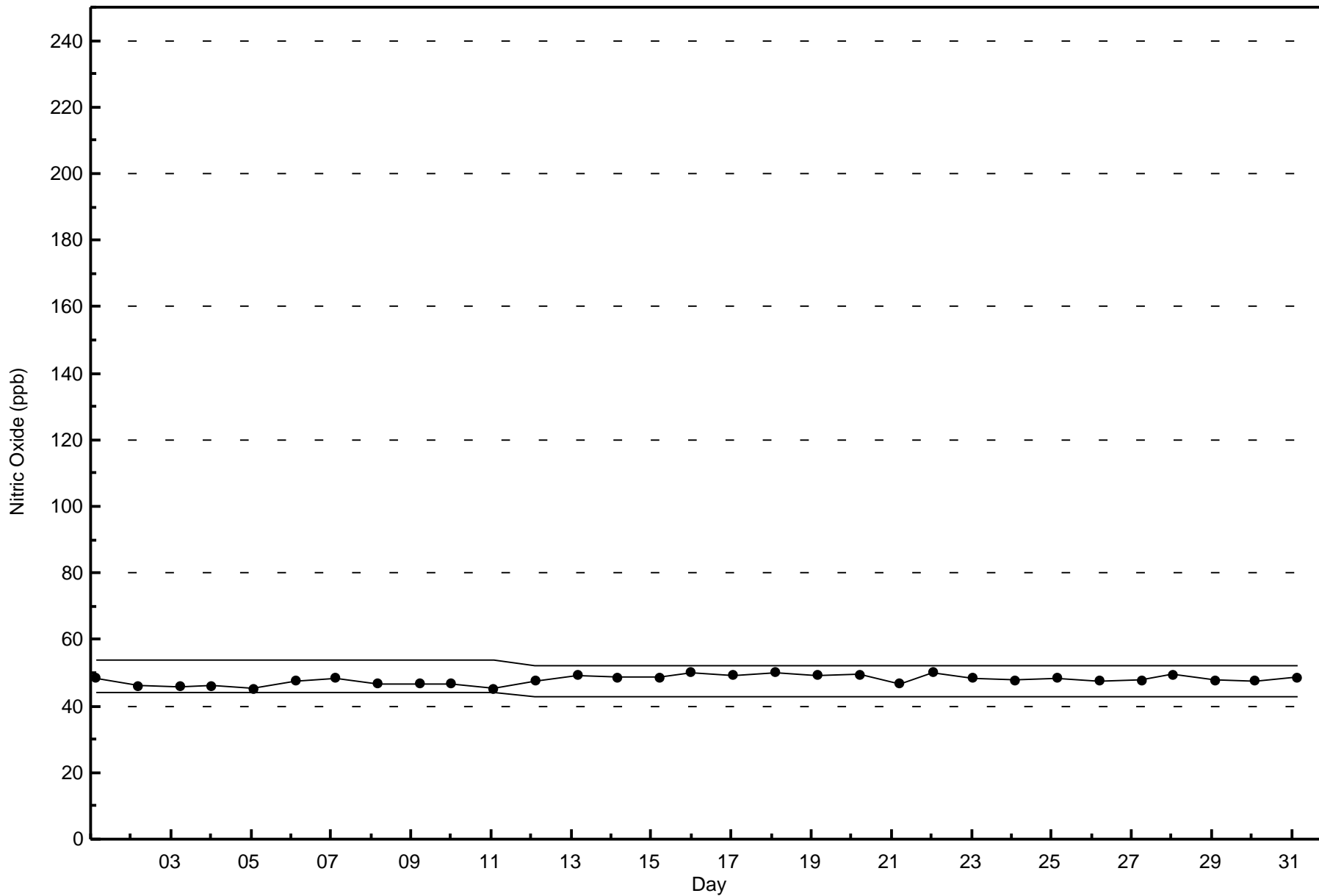


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitric Oxide (NO) - ppb  
Fort Chipewyan (AMS 8)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb

Fort Chipewyan - October 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 8 ppb on Oct 27 12:00	Maximum Daily Average: 3.2 ppb on Oct 27		Hours of Data:	698
Minimum Value: 0 ppb on Oct 1 08:00	Minimum Daily Average: 0.1 ppb on Oct 29		Hours of Missing Data:	46
Maximum Diurnal Average: 0.9 ppb at hour 9	Minimum Diurnal Average: 0.3 ppb at hour 9		Hours of Calibration:	37
Monthly Average: 0.6 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 2 P <sub>99</sub> = 5		Percent Operational Time:	98.8

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Oct	0	0	0	0	Z	0	0	0	PF	PF	PF	PF	PF	PF	PF	0	0	0	1	0	1	0	0	0	--	1
3-Oct	0	0	0	0	0	Z	1	3	4	4	2	1	1	1	1	1	1	1	1	0	1	0	0	0	0.9	4
4-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
5-Oct	0	Z	0	0	0	0	0	PF	PF	1	1	1	1	2	2	2	2	2	3	1	1	1	1	1	1.0	3
6-Oct	1	1	Z	1	0	0	0	1	1	0	0	0	1	0	1	1	1	2	1	2	0	0	0	0	0.6	2
7-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
8-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.2	1
9-Oct	0	0	0	0	0	Z	2	1	1	1	1	1	1	1	0	0	0	0	2	1	1	1	0	0	0.6	2
10-Oct	Z	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.3	1
11-Oct	0	Z	0	0	0	0	0	0	1	0	C	C	C	C	C	C	0	1	0	0	0	0	0	0	--	1
12-Oct	0	0	Z	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.2	2
13-Oct	0	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1
14-Oct	0	0	0	0	Z	1	3	5	5	3	3	2	3	3	3	3	1	1	1	1	0	0	0	0	1.6	5
15-Oct	0	0	0	0	0	Z	0	0	0	0	0	2	4	5	4	2	1	1	1	1	1	1	2	2	1.1	5
16-Oct	Z	1	2	2	1	2	1	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0.6	2
17-Oct	1	Z	1	0	1	4	5	4	4	3	3	2	1	1	1	1	1	0	2	0	0	0	0	0	1.5	5
18-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
19-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	1	0	0	0	0.2	1
20-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	1	0	0	0	0.3	1
21-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0.3	1
22-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.2	1
23-Oct	0	Z	1	1	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0.3	1
24-Oct	0	1	Z	3	3	3	3	3	4	2	1	0	1	1	0	1	0	0	0	0	0	0	0	0	1.1	4
25-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0.2	1
26-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	1	1	1	1	0.4	1
27-Oct	2	4	1	2	1	Z	0	0	2	5	5	8	8	6	5	4	3	2	2	1	2	2	4	4	3.2	8
28-Oct	Z	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
29-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
30-Oct	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	2	3	3	2	2	1	1	1	1	0.9	3
31-Oct	1	0	1	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1

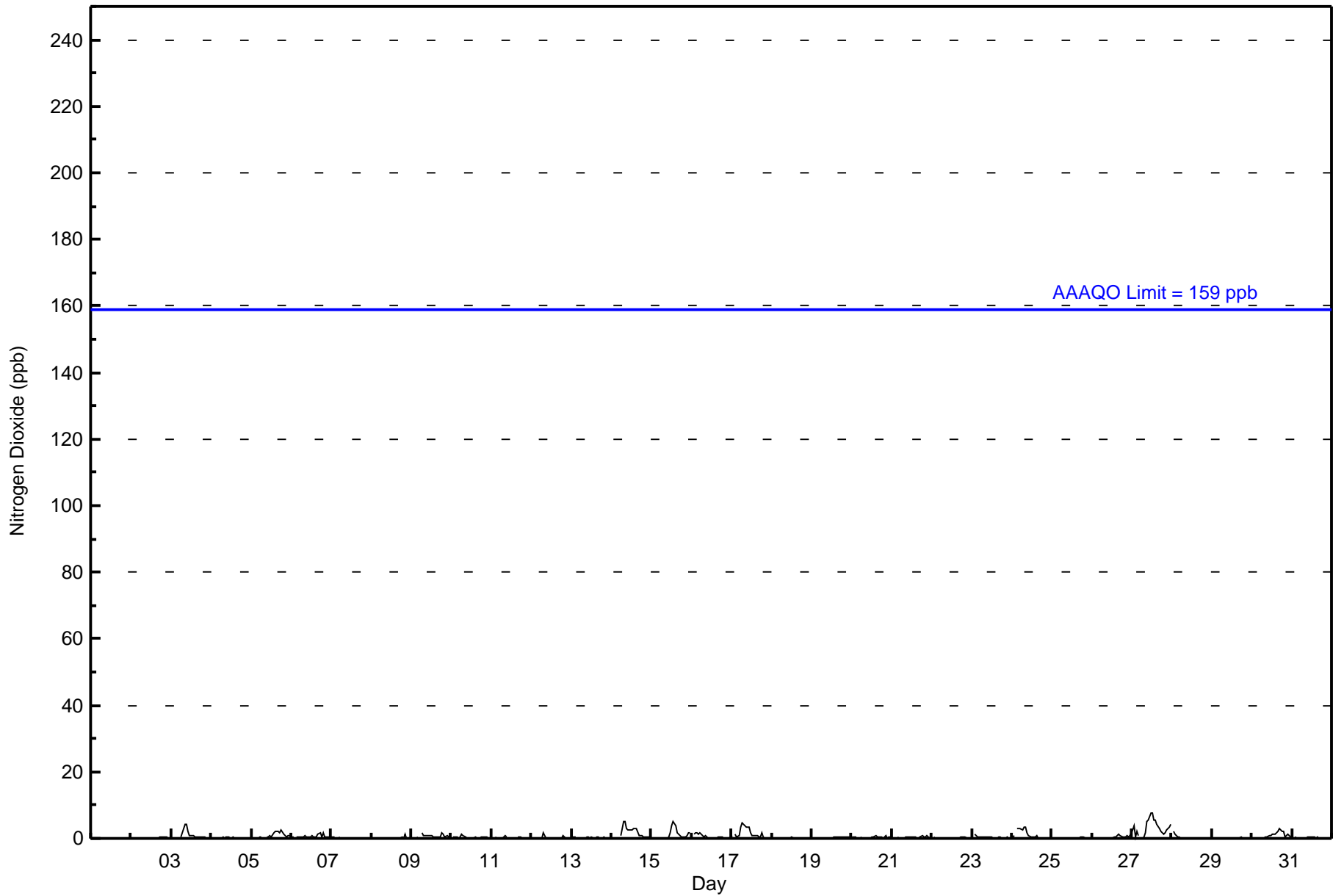
0.3	0.4	0.4	0.4	0.4	0.5	0.6	0.8	0.9	0.8	0.7	0.7	0.8	0.8	0.8	0.7	0.6	0.5	0.6	0.5	0.4	0.4	0.3	0.4	Diurnal Average	
2	4	2	3	3	4	5	5	5	5	5	5	8	8	6	5	4	3	3	3	2	2	2	4	4	Diurnal Maximum

Z - zerospan      C - Calibration      PF - Power Failure  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort Chipewyan - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort Chipewyan - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	698	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 698

Total Number of Hours: 744





**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort Chipewyan - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	58	12	8	29	54	49	32	27	17	29	34	30	60	65	95	79	678
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	58	12	8	29	54	49	32	27	17	29	34	30	60	65	95	79	678

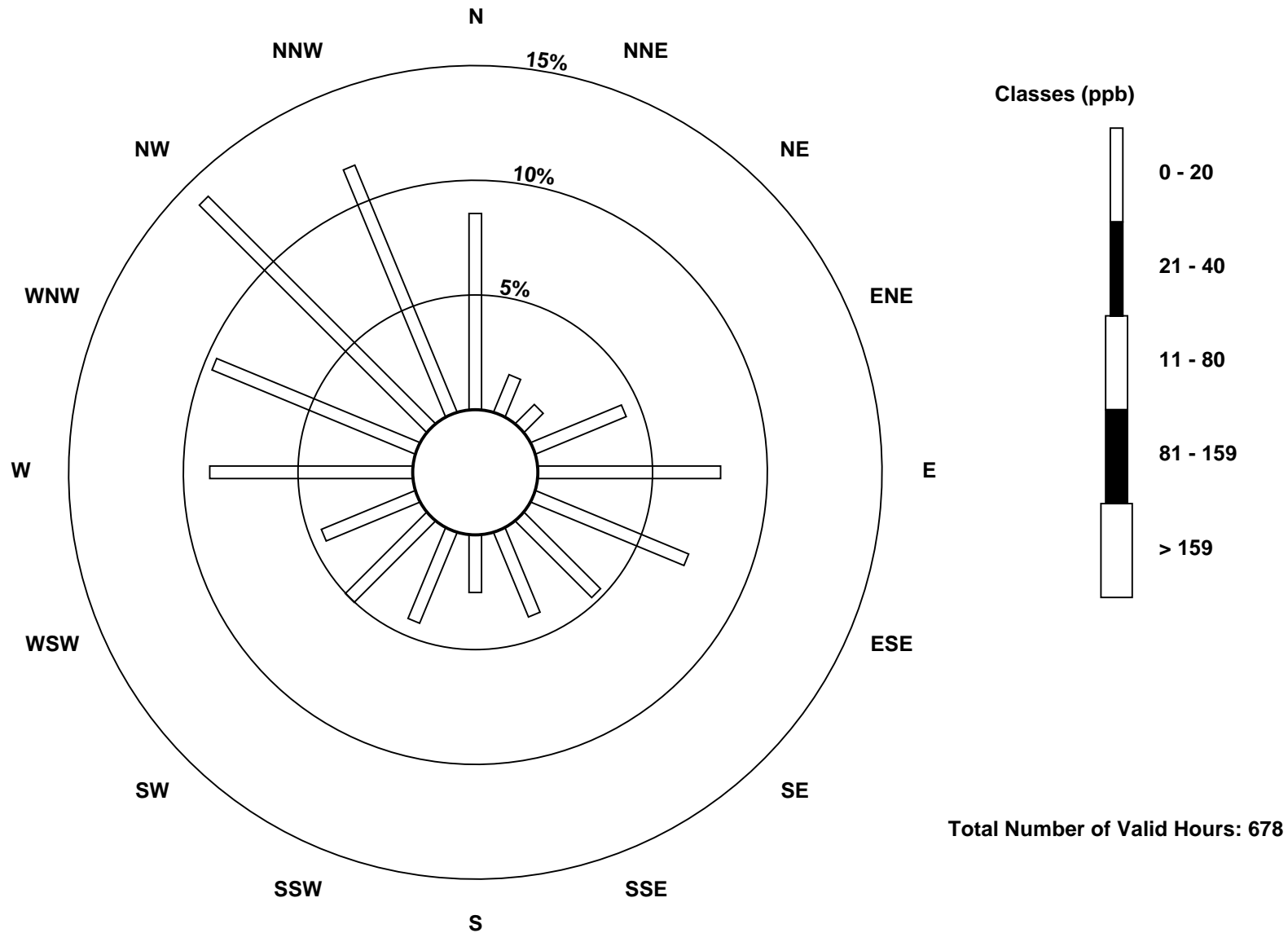
Total Number of Valid Hours: 678

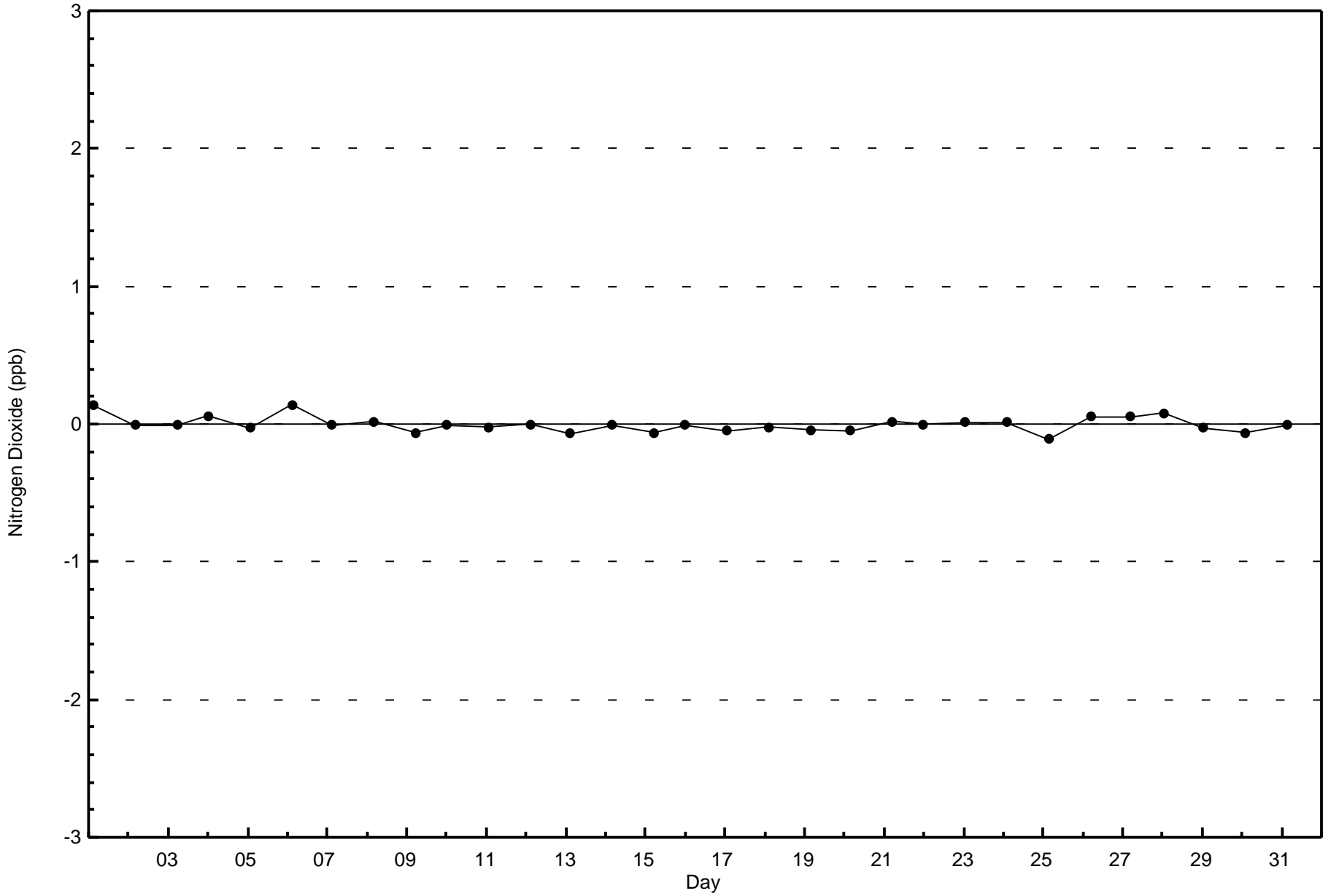
Total Number of Hours: 744

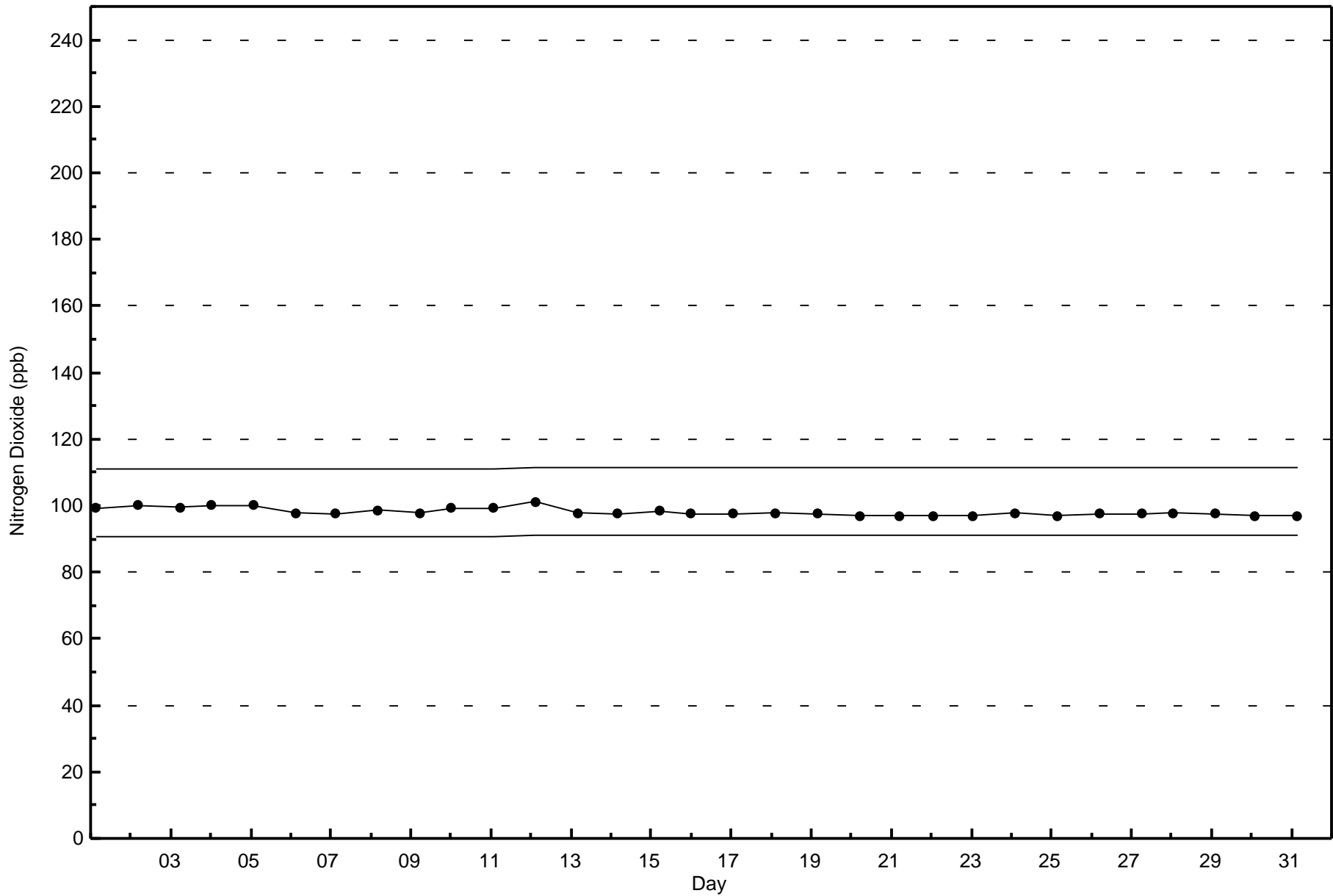


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort Chipewyan (AMS 8)









**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

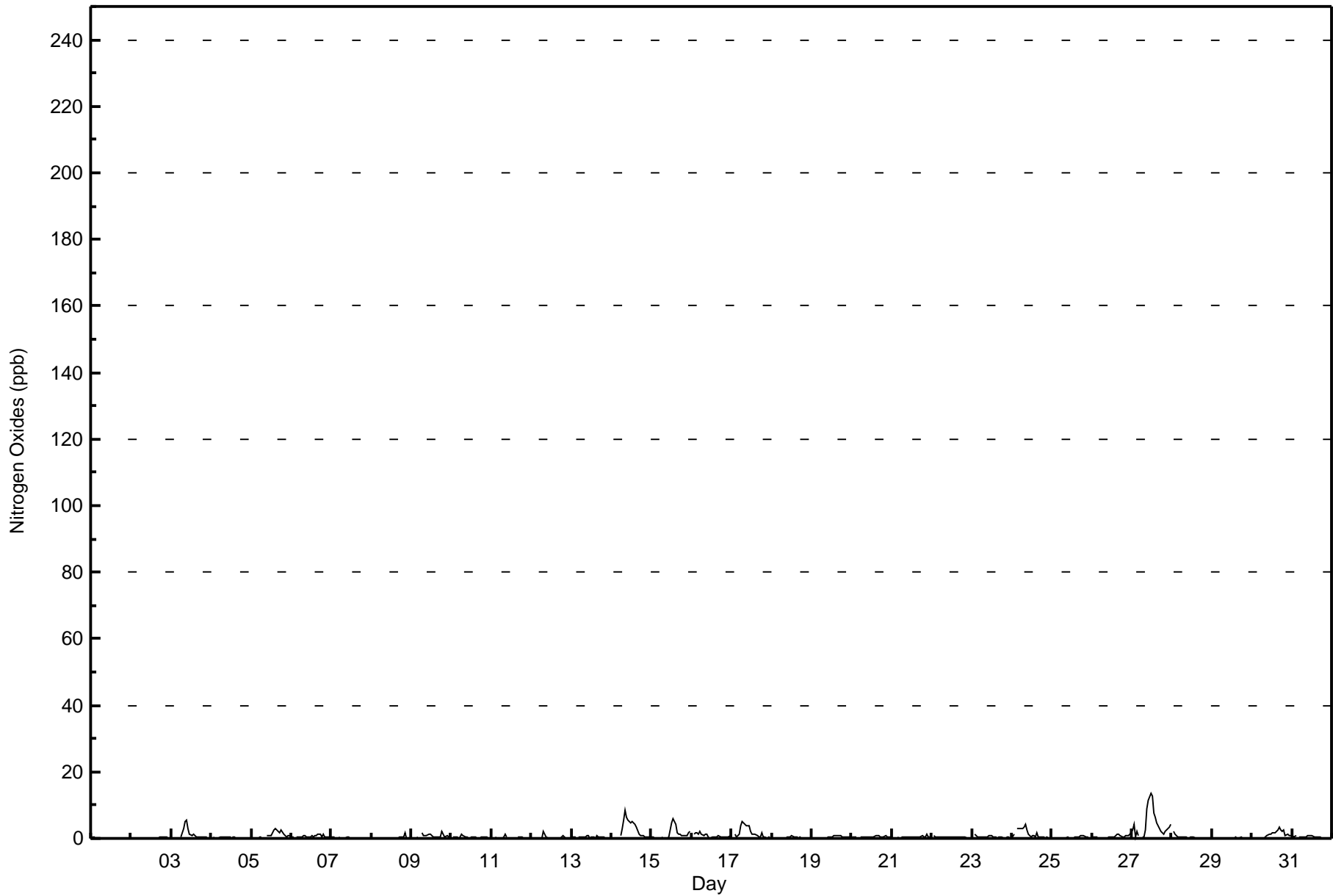
**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort Chipewyan - October 2017**

Maximum Value: 14 ppb on Oct 27 12:00																		Maximum Daily Average: 4.4 ppb on Oct 27						Hours in Service: 744																									
Minimum Value: 0 ppb on Oct 1 19:00																		Minimum Daily Average: 0.1 ppb on Oct 1						Hours of Data: 698																									
Maximum Diurnal Average: 1.3 ppb at hour 13																		Minimum Diurnal Average: 0.3 ppb at hour 1						Hours of Missing Data: 46																									
Monthly Average: 0.7 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 2 P <sub>99</sub> = 6						Hours of Calibration: 37																									
																		Percent Operational Time: 98.8																															
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
2-Oct	0	0	0	0	Z	0	0	0	0	PF	PF	PF	PF	PF	PF	0	0	0	1	0	0	0	0	0	0	--	1																						
3-Oct	0	0	0	0	0	Z	1	3	5	5	3	1	1	1	1	1	1	1	1	1	1	0	0	0	1.1	5																							
4-Oct	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
5-Oct	0	Z	0	0	0	0	0	0	PF	PF	1	1	1	1	3	3	2	2	3	1	1	1	1	1	1.2	3																							
6-Oct	1	0	Z	0	0	1	1	1	1	0	0	0	1	0	1	1	1	1	0	1	0	0	0	0	0.6	1																							
7-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
8-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0.2	2																							
9-Oct	0	0	0	0	0	Z	2	1	1	1	1	1	1	1	0	0	0	0	2	1	1	1	0	0	0.6	2																							
10-Oct	Z	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.3	1																							
11-Oct	0	Z	0	0	0	0	0	0	1	0	C	C	C	C	C	C	0	1	0	0	0	0	0	0	--	1																							
12-Oct	0	0	Z	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.3	2																							
13-Oct	0	1	0	Z	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0.4	1																							
14-Oct	0	0	0	0	Z	1	3	6	9	6	5	5	5	4	3	1	1	1	1	1	1	0	0	0	2.5	9																							
15-Oct	0	0	0	0	0	Z	0	0	0	0	1	2	5	6	4	2	1	1	1	1	1	1	2	2	1.3	6																							
16-Oct	Z	1	2	2	1	2	1	1	1	1	0	0	0	0	0	1	1	0	0	0	0	0	1	0.8	2																								
17-Oct	1	Z	1	0	1	4	5	5	4	4	4	2	1	1	1	1	1	0	2	1	0	0	0	1.7	5																								
18-Oct	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
19-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	1	0	0	0	0.4	1																							
20-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	1	1	1	0	0.5	1																							
21-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0.4	1																							
22-Oct	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.3	1																							
23-Oct	0	Z	1	1	1	0	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0.4	1																							
24-Oct	0	1	Z	3	3	3	3	3	4	2	1	0	1	1	0	2	0	0	0	0	0	0	0	0	1.3	4																							
25-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0.3	1																							
26-Oct	0	0	0	0	Z	0	0	0	0	0	1	0	0	1	1	1	1	1	0	0	1	1	1	1	0.5	1																							
27-Oct	3	4	1	2	1	Z	0	1	3	9	12	14	13	8	6	5	3	2	2	1	2	2	4	4	4.4	14																							
28-Oct	Z	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2																							
29-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
30-Oct	0	0	Z	0	0	0	0	0	1	1	1	1	2	2	2	2	3	3	2	3	1	1	1	1	1.2	3																							
31-Oct	1	0	1	Z	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0.4	1																							
																								0.3	0.5	0.4	0.5	0.4	0.5	0.7	0.9	1.2	1.2	1.2	1.2	1.3	1.1	1.0	0.9	0.7	0.6	0.7	0.6	0.5	0.4	0.4	0.5	Diurnal Average	
																								3	4	2	3	3	4	5	6	9	9	12	14	13	8	6	5	3	3	3	3	2	2	4	4	Diurnal Maximum	
Z - zerspan																								C - Calibration						PF - Power Failure																			



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort Chipewyan - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort Chipewyan - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	698	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 698

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort Chipewyan - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	58	12	8	29	54	49	32	27	17	29	34	30	60	65	95	79	678
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	58	12	8	29	54	49	32	27	17	29	34	30	60	65	95	79	678

Total Number of Valid Hours: 678

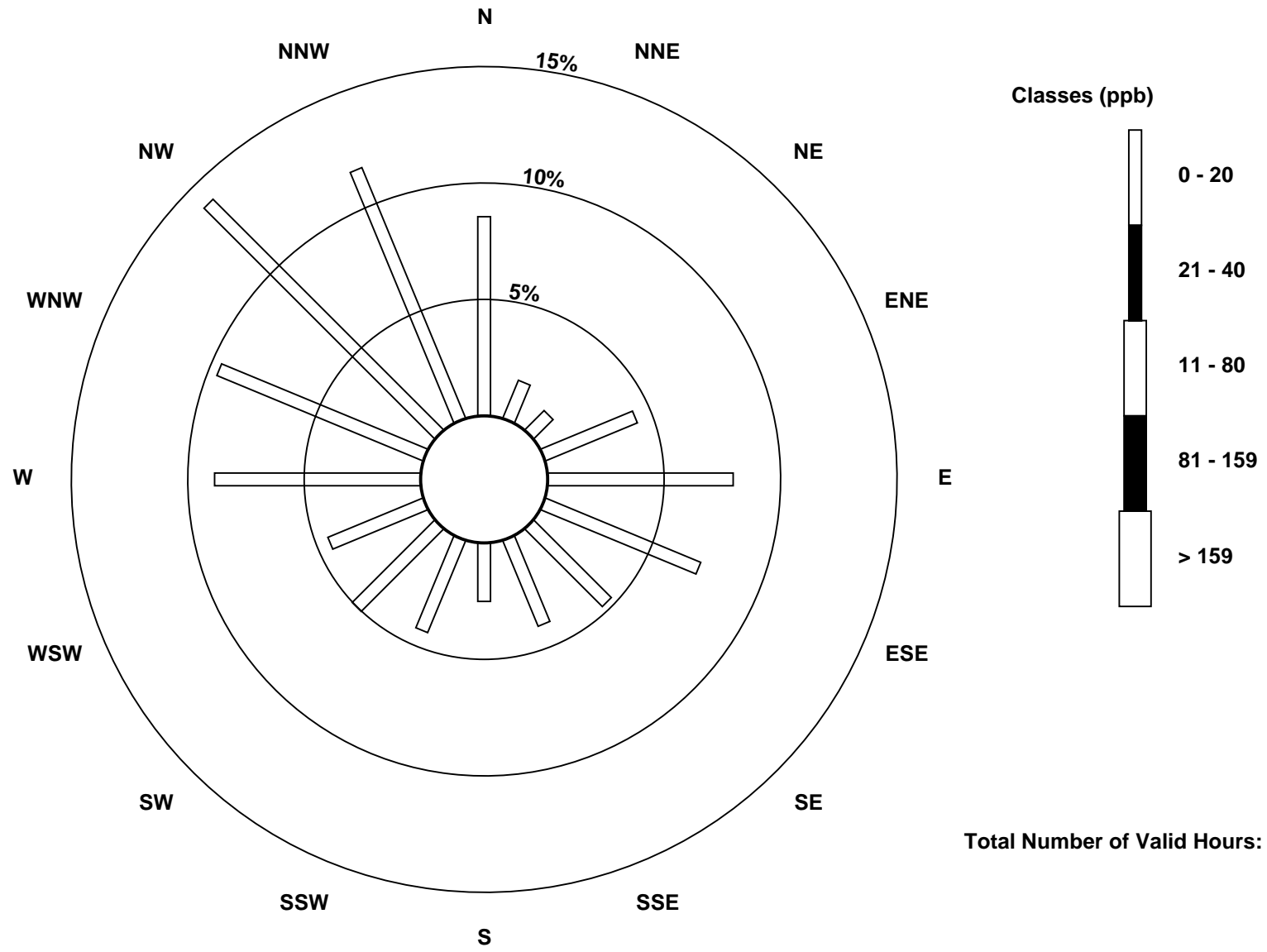
Total Number of Hours: 744

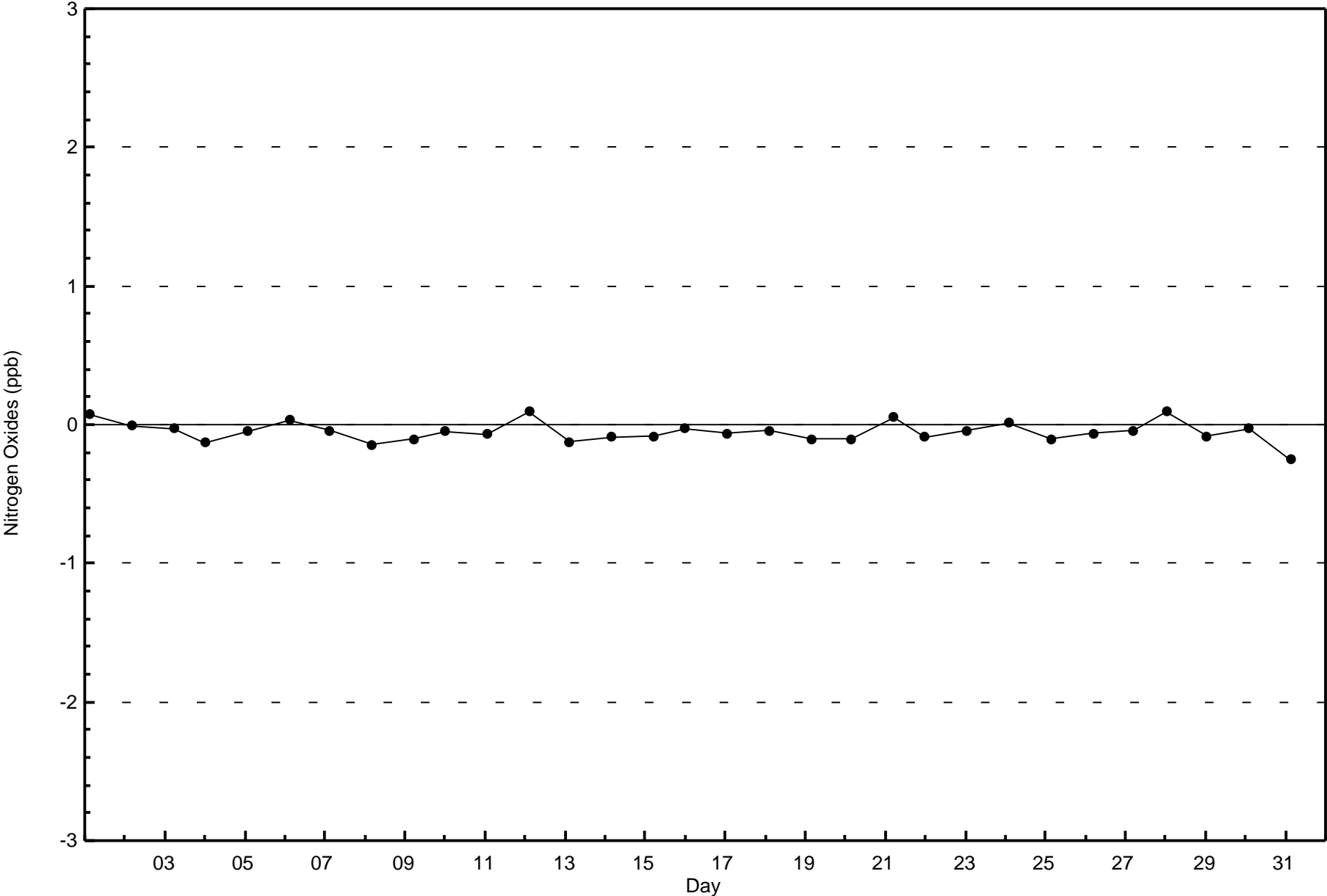


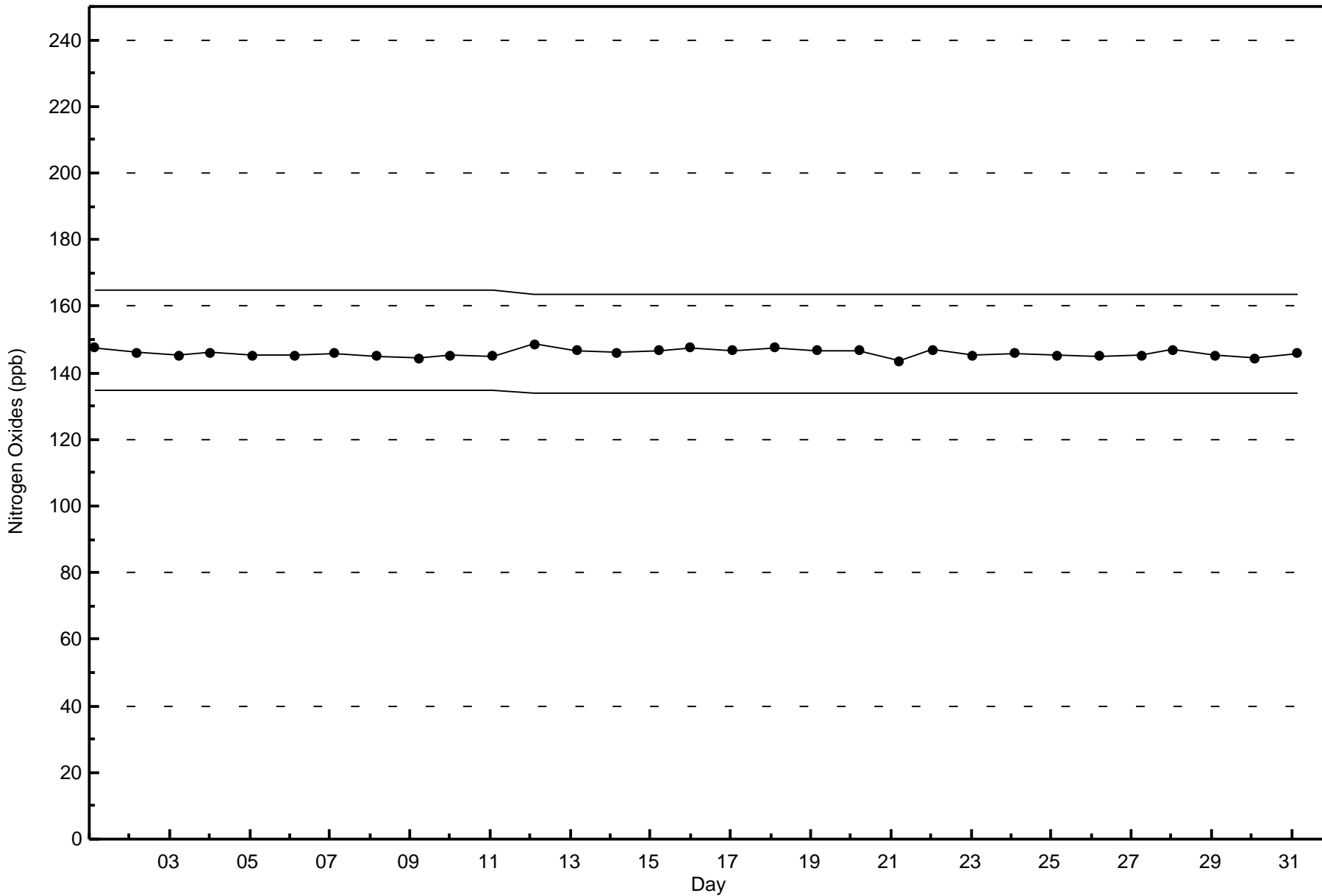


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort Chipewyan (AMS 8)









Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O<sub>3</sub>) - ppb

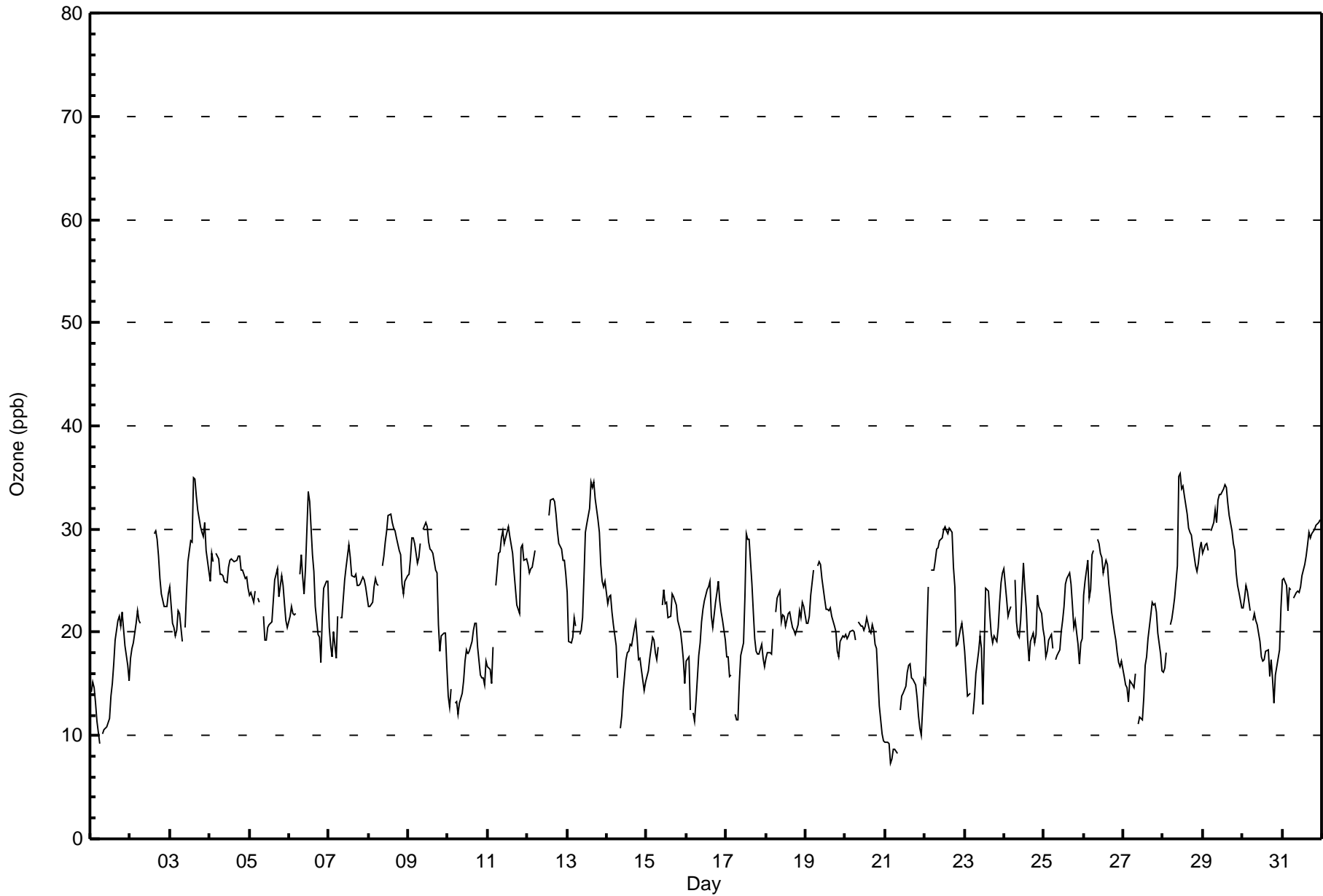
Fort Chipewyan - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0		Hours in Service: 744																									
Maximum Value: 35 ppb on Oct 28 11:00		Maximum Daily Average: 29.7 ppb on Oct 29																									
Minimum Value: 7 ppb on Oct 21 04:00		Hours of Data: 701																									
Maximum Diurnal Average: 25.4 ppb at hour 15		Hours of Missing Data: 43																									
Monthly Average: 22.3 ppb		Hours of Calibration: 35																									
Minimum Daily Average: 12.2 ppb on Oct 21		Percent Operational Time: 98.9																									
Minimum Diurnal Average: 20.1 ppb at hour 3		Percentiles: P <sub>1</sub> = 9 P <sub>10</sub> = 15 Q <sub>1</sub> = 19 Median = 22 Q <sub>3</sub> = 26 P <sub>90</sub> = 30 P <sub>99</sub> = 34																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	14	15	15	13	11	9	Z	10	11	11	11	12	14	15	17	19	21	22	21	22	20	19	17	15	15.4	22	
2-Oct	18	18	19	21	22	21	21	Z	PF	PF	PF	PF	PF	PF	30	30	29	27	25	24	23	23	22	24	--	30	
3-Oct	24	21	20	20	20	22	22	19	Z	20	24	27	29	29	35	35	33	32	30	30	29	31	28	26	26.3	35	
4-Oct	25	28	27	Z	28	27	26	26	25	25	25	26	27	27	27	27	27	27	27	26	26	25	25	24	26.3	28	
5-Oct	24	24	23	24	Z	23	23	PF	22	19	19	20	21	21	23	25	26	26	23	26	25	23	21	20	22.7	26	
6-Oct	22	22	22	22	22	Z	26	27	25	24	26	34	33	30	28	26	23	20	19	17	21	24	25	25	24.4	34	
7-Oct	20	19	18	20	18	22	Z	21	21	25	26	27	28	27	25	25	26	25	25	25	25	25	24	23	23.6	28	
8-Oct	22	23	23	24	25	25	25	Z	26	27	29	30	31	31	31	30	30	29	28	27	25	24	25	25	26.8	31	
9-Oct	26	27	29	29	29	27	27	29	Z	30	31	30	29	28	28	28	26	26	21	18	20	20	20	17	25.8	31	
10-Oct	14	13	15	Z	13	13	12	13	14	15	17	18	18	18	19	20	21	21	19	16	16	16	15	17	16.2	21	
11-Oct	17	16	15	19	Z	24	28	28	29	30	29	29	30	29	28	28	26	23	22	22	28	28	27	27	25.3	30	
12-Oct	27	26	26	26	28	Z	29	C	C	C	C	31	M	31	33	33	33	31	30	29	28	27	27	26	28.9	33	
13-Oct	24	19	19	20	21	21	Z	20	20	21	25	30	30	32	35	34	35	33	31	30	27	25	24	25	26.1	35	
14-Oct	23	23	24	22	21	19	16	Z	11	12	14	17	18	18	19	19	20	21	19	17	17	16	14	15	18.1	24	
15-Oct	16	16	18	19	19	18	17	19	Z	23	24	23	23	23	21	22	24	23	23	23	21	20	19	17	15	20.1	24
16-Oct	17	18	12	Z	12	11	13	18	19	21	22	23	24	24	25	22	21	23	24	25	23	22	21	19	20.0	25	
17-Oct	18	18	16	16	Z	12	12	12	15	18	19	23	30	29	29	25	22	19	18	18	18	19	17	17	19.0	30	
18-Oct	17	18	18	18	20	Z	22	23	24	21	22	22	21	22	22	21	20	20	20	21	22	21	23	23	20.9	24	
19-Oct	21	21	22	24	25	26	Z	26	27	27	25	23	22	22	22	22	22	21	20	18	18	19	20	19	22.2	27	
20-Oct	20	19	20	20	20	20	19	Z	21	21	21	20	21	21	20	20	21	20	19	18	13	12	10	10	18.5	21	
21-Oct	9	9	9	7	8	9	9	8	Z	12	14	14	15	16	17	17	16	15	15	14	12	11	10	15	12.2	17	
22-Oct	15	20	24	Z	26	26	27	28	28	29	29	30	30	30	30	30	30	26	24	19	19	20	21	20	25.3	30	
23-Oct	18	16	14	14	Z	12	14	16	18	20	18	13	19	24	24	22	20	19	20	19	20	23	25	26	18.9	26	
24-Oct	26	23	22	22	23	Z	25	21	20	20	21	27	24	22	19	17	19	20	19	20	24	23	22	20	21.7	27	
25-Oct	19	18	18	19	20	18	Z	17	18	18	20	21	22	25	25	26	25	23	21	21	19	17	19	19	20.4	26	
26-Oct	24	25	27	23	24	28	28	Z	29	29	28	27	26	27	27	25	23	22	20	19	18	17	17	17	23.9	29	
27-Oct	16	15	15	13	15	15	15	16	Z	11	12	12	14	17	18	19	22	23	23	23	22	20	18	16	16.8	23	
28-Oct	16	17	18	Z	21	21	22	23	26	35	35	34	34	33	31	30	30	29	28	26	26	27	28	29	27.0	35	
29-Oct	28	29	29	28	Z	30	31	32	31	33	33	33	34	34	34	33	31	30	29	28	26	25	24	22	29.7	34	
30-Oct	22	23	25	24	22	Z	21	22	21	21	19	18	17	17	18	18	16	17	15	13	16	17	18	22	19.3	25	
31-Oct	25	25	25	22	24	24	Z	23	24	24	24	24	25	27	27	28	30	29	30	30	30	31	31	31	26.7	31	
20.2 20.1 20.1 20.4 20.7 20.1 21.1 20.8 21.9 22.1 22.8 24.0 24.5 25.0 25.4 25.1 24.6 24.0 22.8 22.0 21.8 21.5 21.2 21.0																								Diurnal Average			
28 29 29 29 29 30 31 32 31 35 35 34 34 34 35 35 35 33 31 30 30 31 31 31																								Diurnal Maximum			
Z - zerspan C - Calibration M - Maintenance PF - Power Failure																											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																											



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort Chipewyan - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort Chipewyan - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	269	38.37	38.37
21 - 50	432	61.63	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 701

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort Chipewyan - October 2017**

<b>Concentration</b> <b>Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	23	5	2	8	20	21	3	11	10	10	13	12	26	43	30	21	258
21 - 50	35	8	7	21	33	30	29	15	7	20	21	20	33	21	66	56	422
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	58	13	9	29	53	51	32	26	17	30	34	32	59	64	96	77	680

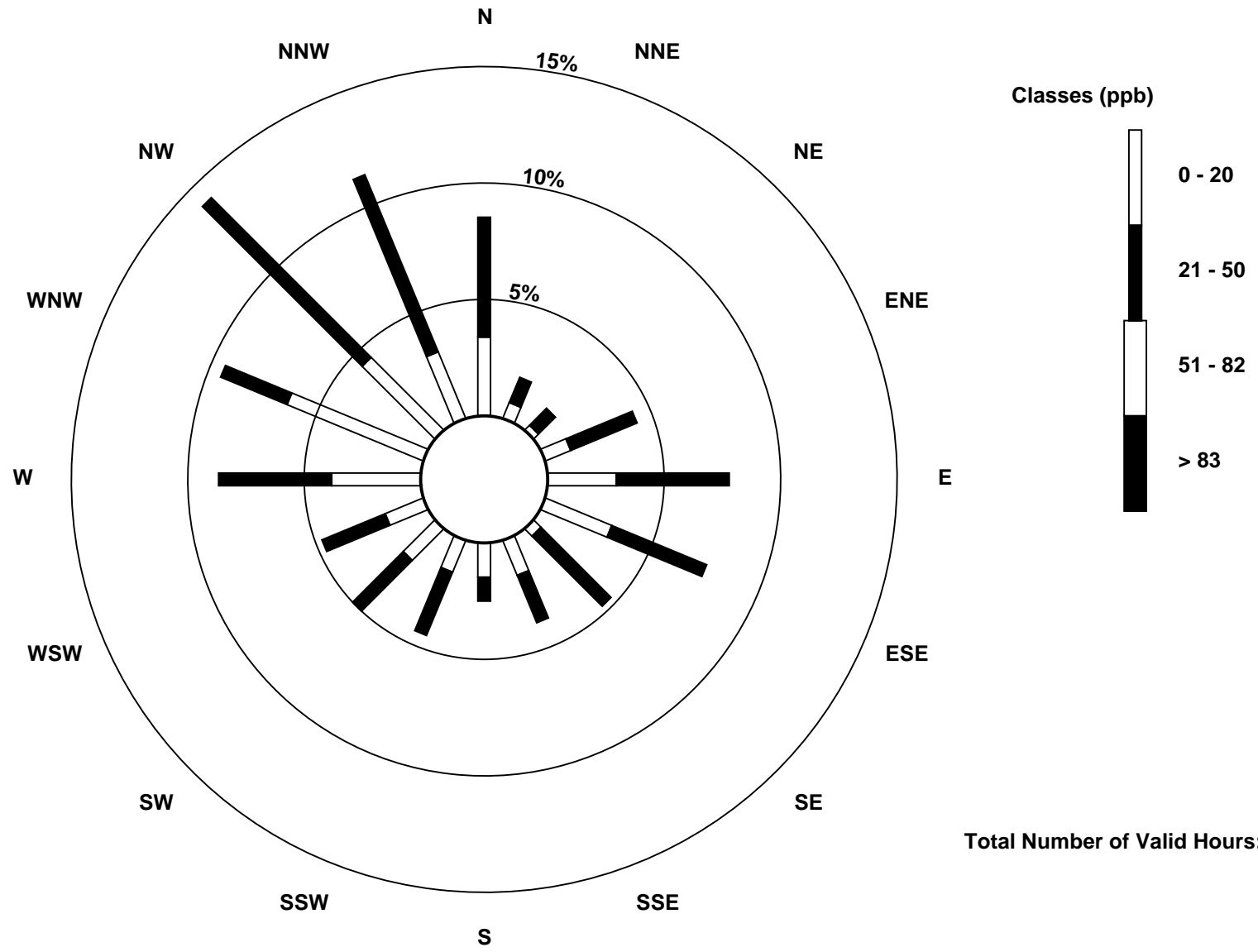
Total Number of Valid Hours: 680

Total Number of Hours: 744



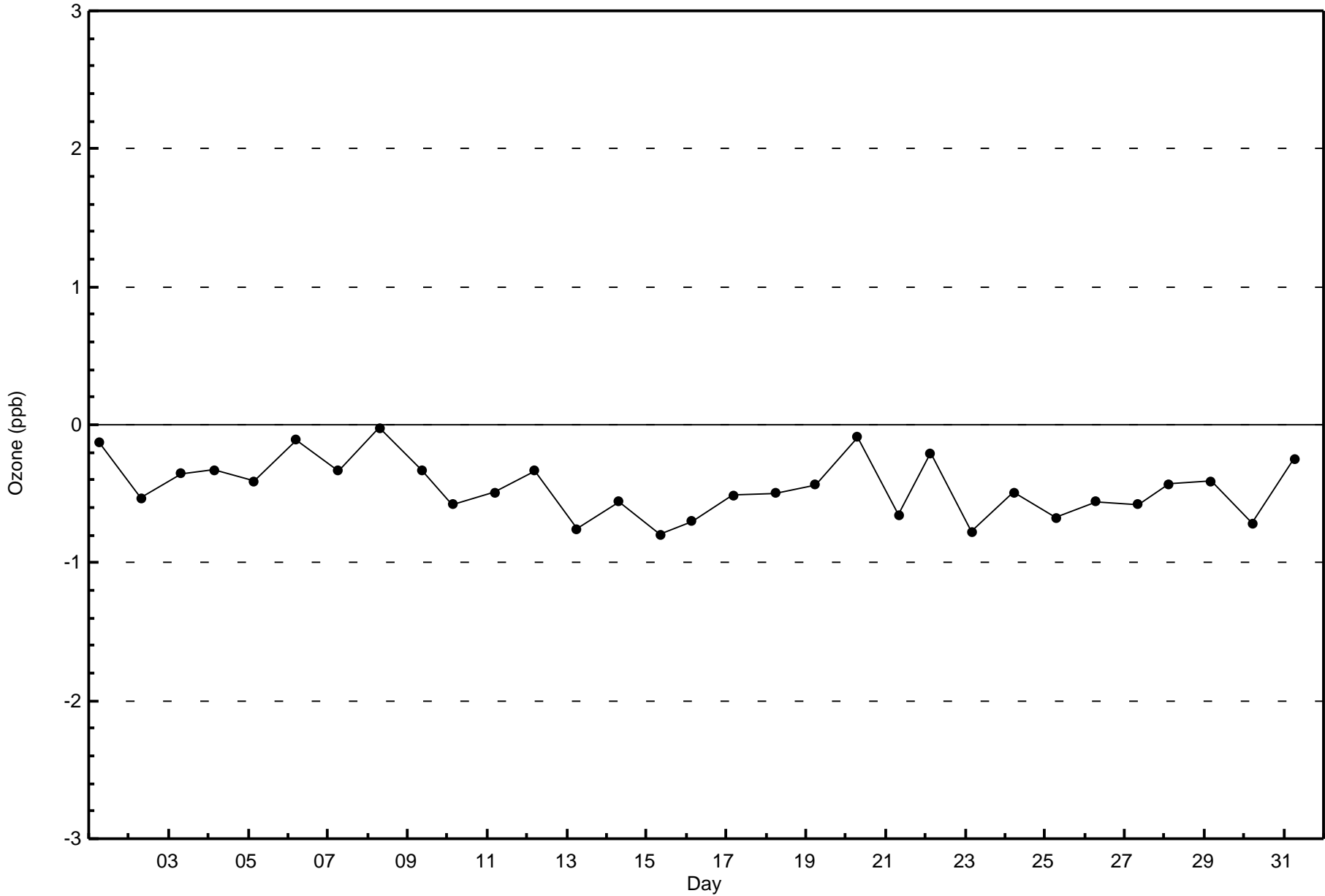
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

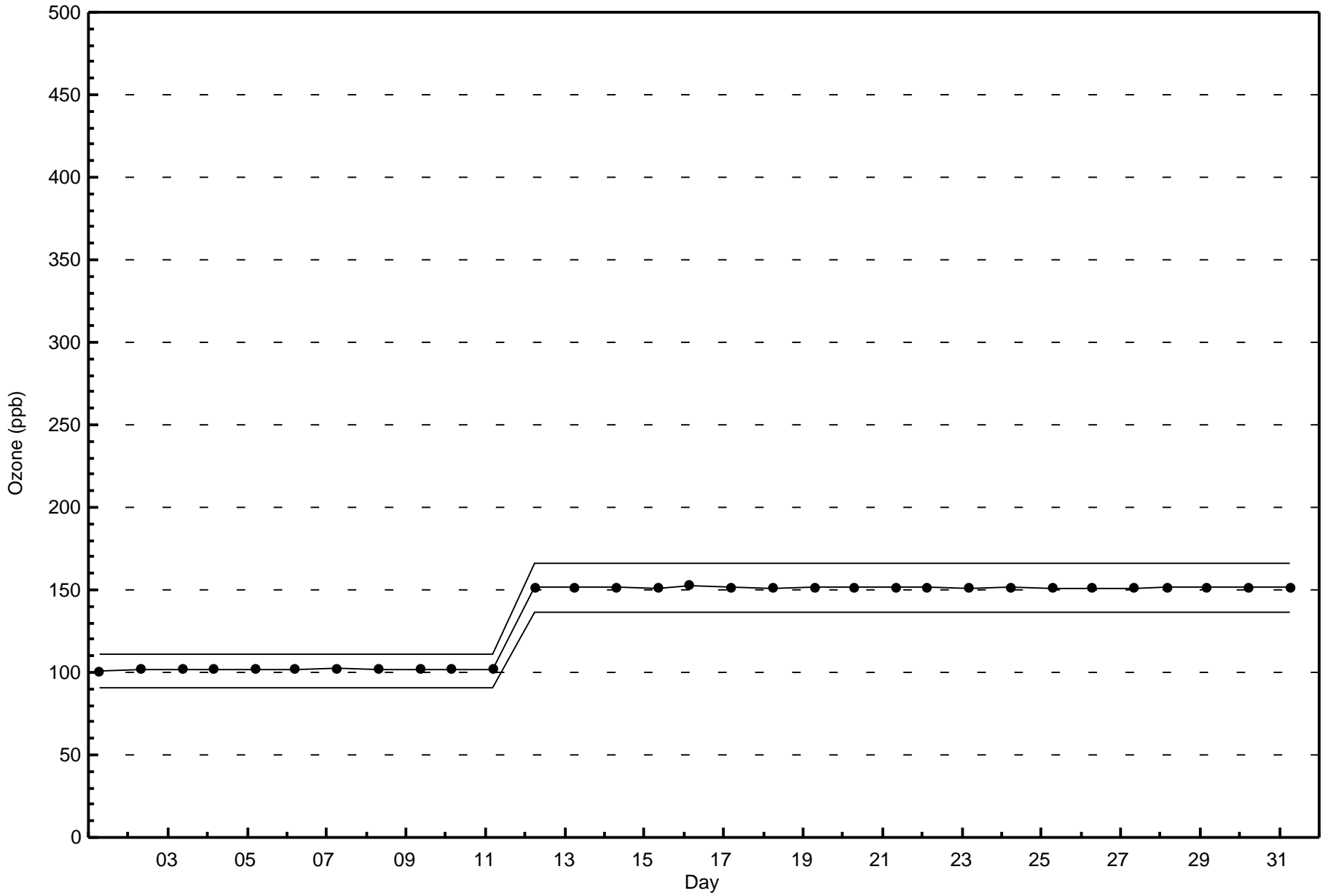
Ozone (O<sub>3</sub>) - ppb  
Fort Chipewyan (AMS 8)



Total Number of Valid Hours: 680







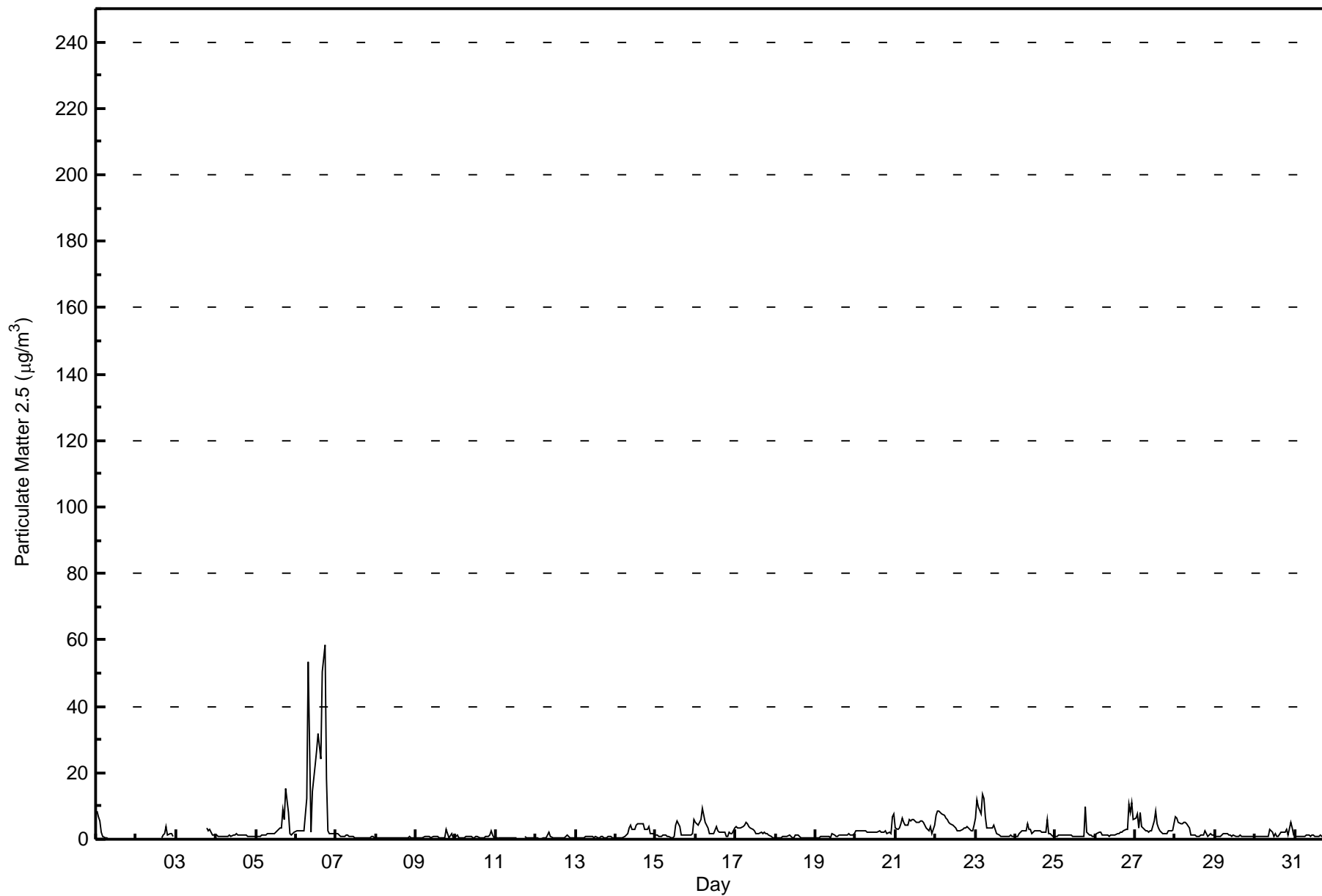


Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 58.3 µg/m <sup>3</sup> on Oct 6 18:00 Minimum Value: 0.0 µg/m <sup>3</sup> on Oct 1 19:00 Maximum Diurnal Average: 3.7 µg/m <sup>3</sup> at hour 8 Monthly Average: 2.44 µg/m <sup>3</sup>		Maximum Daily Average: 16.4 µg/m <sup>3</sup> on Oct 6 Minimum Daily Average: 0.5 µg/m <sup>3</sup> on Oct 11 Minimum Diurnal Average: 1.7 µg/m <sup>3</sup> at hour 21 Percentiles: P <sub>1</sub> = 0.0 P <sub>10</sub> = 0.5 Q <sub>1</sub> = 0.7 Median = 1.2 Q <sub>3</sub> = 2.5 P <sub>90</sub> = 5.0 P <sub>99</sub> = 25.9		Hours in Service: 744 Hours of Data: 702 Hours of Missing Data: 42 Hours of Calibration: 2 Percent Operational Time: 94.6																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	8.4	6.8	5.4	2.1	0.8	0.3	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	UO	0.0	UO	UO	UO	1.2	8.4
2-Oct	UO	UO	UO	UO	UO	UO	UO	UO	UO	PF	PF	PF	PF	PF	UO	0.3	1.2	1.7	3.8	1.1	1.6	1.5	0.7	UO	--	3.8
3-Oct	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	3.3	2.4	2.8	2.2	1.4	1.3	--	3.3
4-Oct	1.1	1.0	0.9	0.8	0.9	0.9	0.9	0.9	1.1	1.0	1.1	1.4	1.5	1.3	1.2	1.1	1.2	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.1	1.5
5-Oct	1.0	1.0	1.0	1.1	1.1	1.1	1.2	1.6	1.7	1.6	1.8	1.8	2.0	2.8	3.4	3.6	8.9	6.0	15.1	7.9	1.8	1.5	1.8	2.2	3.0	15.1
6-Oct	2.4	2.4	2.4	2.4	2.4	2.5	12.4	53.5	28.0	2.3	14.2	22.6	26.6	31.9	27.9	23.9	50.4	58.3	18.1	2.6	1.7	1.7	1.7	1.6	16.4	58.3
7-Oct	1.5	1.5	1.3	0.8	0.7	0.8	1.1	1.4	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.9	0.7	0.4	0.8	1.5
8-Oct	0.4	0.5	0.6	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.5	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.4	0.8	0.4	0.4	0.4	0.5	0.8
9-Oct	0.5	0.4	0.5	0.5	0.5	0.7	0.7	0.6	0.6	0.6	1.0	1.0	0.8	0.7	0.6	0.5	0.5	0.5	2.8	1.6	0.6	1.6	0.6	0.8	0.8	2.8
10-Oct	0.7	1.2	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.6	0.6	0.7	0.8	0.6	0.6	0.5	0.6	0.9	0.8	1.3	2.7	1.5	0.6	0.8	2.7
11-Oct	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.6	0.5	0.5	0.5	0.5	M	M	C	C	0.9	0.4	0.5	0.4	0.3	0.3	0.4	0.5	0.9
12-Oct	0.3	0.2	0.2	0.2	0.2	0.3	0.3	1.1	2.1	0.9	0.5	0.4	0.4	0.5	0.4	0.4	0.4	0.5	1.0	1.2	0.5	0.5	0.4	0.4	0.6	2.1
13-Oct	0.4	0.6	0.4	0.4	0.5	0.6	0.8	0.8	0.7	0.8	0.7	0.5	0.7	0.6	0.4	0.7	0.9	0.5	0.6	1.0	0.8	0.9	0.5	0.5	0.6	1.0
14-Oct	0.6	0.6	0.6	0.6	0.6	0.8	1.1	1.7	3.4	4.3	2.8	3.1	4.4	4.6	4.8	4.7	4.5	3.2	2.9	3.0	3.9	1.8	1.5	1.3	2.5	4.8
15-Oct	1.2	1.1	0.8	0.6	1.2	1.3	1.2	0.9	0.7	0.6	0.6	0.8	4.2	5.6	3.8	1.4	1.4	1.3	1.2	1.4	1.3	1.5	1.8	6.1	1.8	6.1
16-Oct	5.0	4.2	5.0	6.0	9.5	7.4	5.2	3.2	1.8	1.5	1.6	1.9	3.7	2.3	2.0	2.0	2.1	2.1	1.0	0.7	2.0	1.8	1.8	3.4	3.2	9.5
17-Oct	3.8	3.3	3.4	3.2	3.6	4.4	5.2	4.5	3.6	3.4	3.1	2.7	1.7	1.9	1.9	2.0	1.8	2.0	1.5	1.6	1.2	0.8	0.5	0.5	2.6	5.2
18-Oct	0.6	0.5	0.4	0.5	0.8	0.8	0.7	0.9	1.1	0.9	0.5	0.6	1.3	1.1	0.7	0.5	0.5	0.6	0.5	0.5	0.4	0.5	0.5	0.5	0.7	1.3
19-Oct	0.5	0.5	0.5	0.7	0.7	0.7	0.7	0.6	0.7	0.6	1.6	1.2	0.8	1.0	1.1	1.1	1.1	1.2	1.2	1.2	1.8	1.2	1.2	1.8	1.0	1.8
20-Oct	2.4	2.6	2.6	2.6	2.5	2.5	2.4	2.3	2.2	2.0	1.9	2.0	2.0	1.9	2.4	2.3	2.0	2.0	2.3	1.8	2.2	1.7	6.7	7.6	2.6	7.6
21-Oct	3.3	3.1	3.4	4.8	6.5	5.2	4.1	4.1	5.9	5.4	6.1	6.0	5.1	5.3	5.1	5.3	5.4	5.0	3.6	2.8	2.5	3.9	1.8	4.1	4.5	6.5
22-Oct	7.1	8.3	8.6	8.2	7.6	7.3	6.5	5.9	5.2	4.7	4.3	3.7	3.4	2.6	2.5	2.4	2.8	3.5	3.4	3.6	3.4	2.5	2.6	4.3	4.8	8.6
23-Oct	6.3	12.1	9.7	7.8	13.4	12.5	6.8	3.5	3.4	3.6	3.6	4.4	2.8	1.6	1.4	1.0	0.9	0.8	1.0	0.8	0.8	1.1	0.8	0.6	4.2	13.4
24-Oct	0.7	1.0	1.7	2.1	2.5	2.4	2.4	4.8	2.8	2.8	1.8	2.4	2.7	2.5	2.6	2.5	2.3	2.1	1.9	5.9	1.7	1.8	1.0	1.0	2.3	5.9
25-Oct	1.0	1.0	1.1	1.2	1.2	1.3	1.3	1.4	1.3	1.2	1.0	0.9	0.8	0.7	1.0	0.9	0.8	0.9	0.9	9.7	2.1	1.1	0.6	0.6	1.4	9.7
26-Oct	1.1	1.9	2.0	2.2	1.2	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.3	1.6	1.6	2.1	2.3	2.5	3.1	3.2	10.6	8.1	11.2	5.8	2.9	11.2
27-Oct	6.4	7.5	3.4	8.2	3.7	2.8	2.4	2.5	2.3	2.4	2.4	5.3	8.5	4.5	3.5	2.6	1.7	1.7	1.7	1.8	2.5	2.6	2.7	4.6	3.7	8.5
28-Oct	6.8	6.3	5.2	4.7	4.8	5.1	5.0	4.6	3.5	1.4	1.1	1.2	1.3	1.0	1.0	1.3	1.3	1.1	2.5	1.0	1.1	1.5	1.2	1.1	2.7	6.8
29-Oct	1.0	1.0	0.9	0.9	1.2	1.8	1.9	1.7	1.4	1.2	1.0	1.3	0.8	0.8	0.8	1.4	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	1.1	1.9
30-Oct	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.9	2.8	2.2	0.9	1.6	1.0	1.0	2.2	2.3	2.1	2.3	3.0	1.1	5.1	3.6	1.1	1.6	5.1
31-Oct	1.0	0.8	0.7	1.0	0.8	0.7	1.0	1.2	1.1	0.9	1.2	1.2	0.9	0.9	0.8	1.1	0.9	0.8	0.6	0.6	0.6	0.5	0.5	0.5	0.8	1.2
																								Diurnal Average		
																								Diurnal Maximum		
C - Calibration      M - Maintenance      UO - Unstable Operation      PF - Power Failure Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m <sup>3</sup>																										



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Fort Chipewyan - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Fort Chipewyan - October 2017**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	357	50.85	50.85
6 - 15	46	6.55	57.41
16 - 25	3	0.43	57.83
26 - 80	7	1.00	58.83
> 81.0	0	0.00	58.83

Total Number of Valid Hours: 702

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Fort Chipewyan - October 2017**

Concentration Ranges ( $\mu\text{g}/\text{m}^3$ )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	12	4	3	19	50	32	13	18	11	11	9	16	41	41	37	20	337
6 - 15	1	1	1	2	2	5	2	3	2	0	3	0	8	12	4	0	46
16 - 25	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	3
26 - 80	0	0	0	0	0	0	1	0	0	0	0	1	2	1	1	1	7
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	13	5	4	22	52	37	16	21	13	11	12	18	51	54	43	21	393

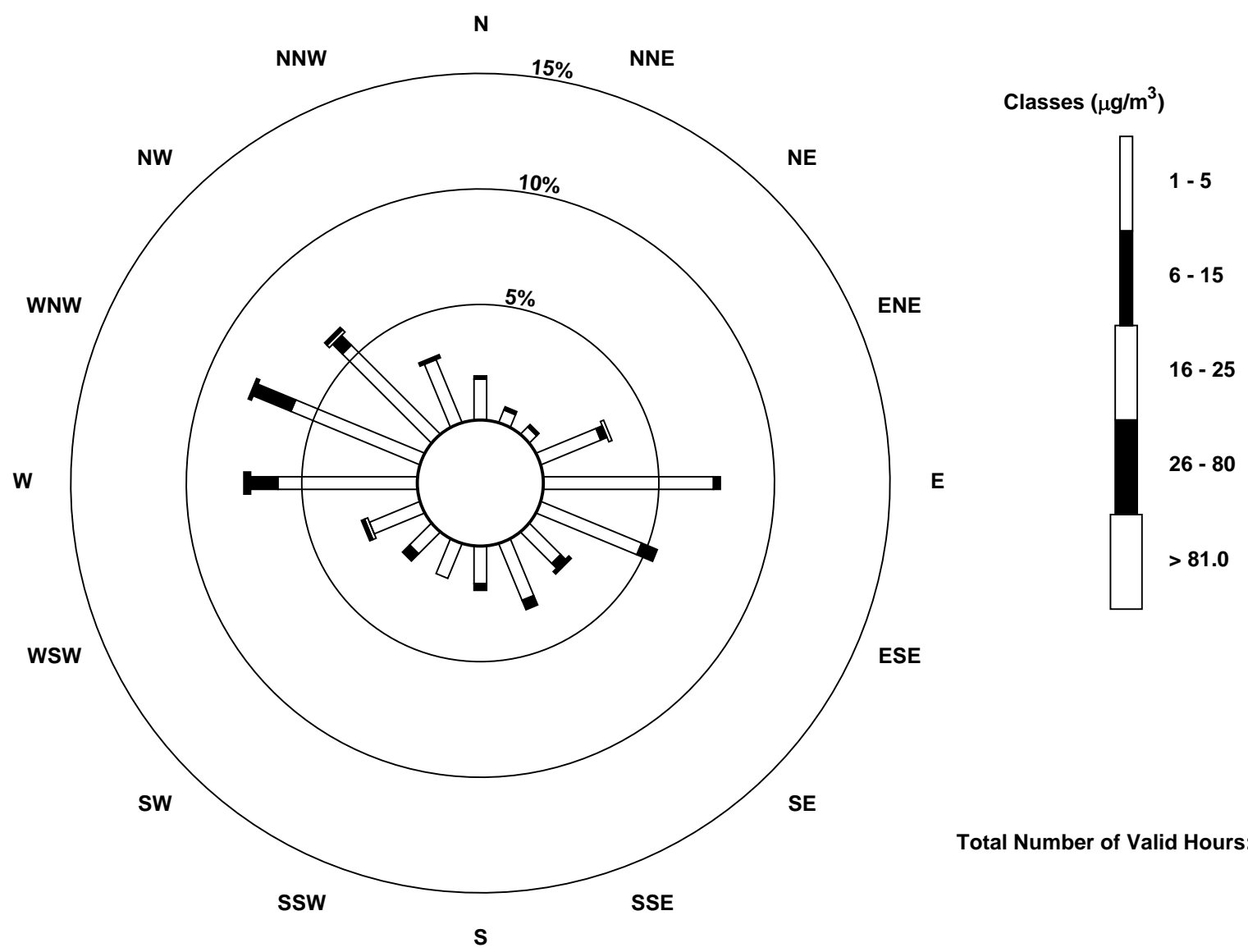
Total Number of Valid Hours: 679

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Fort Chipewyan (AMS 8)



Total Number of Valid Hours: 679



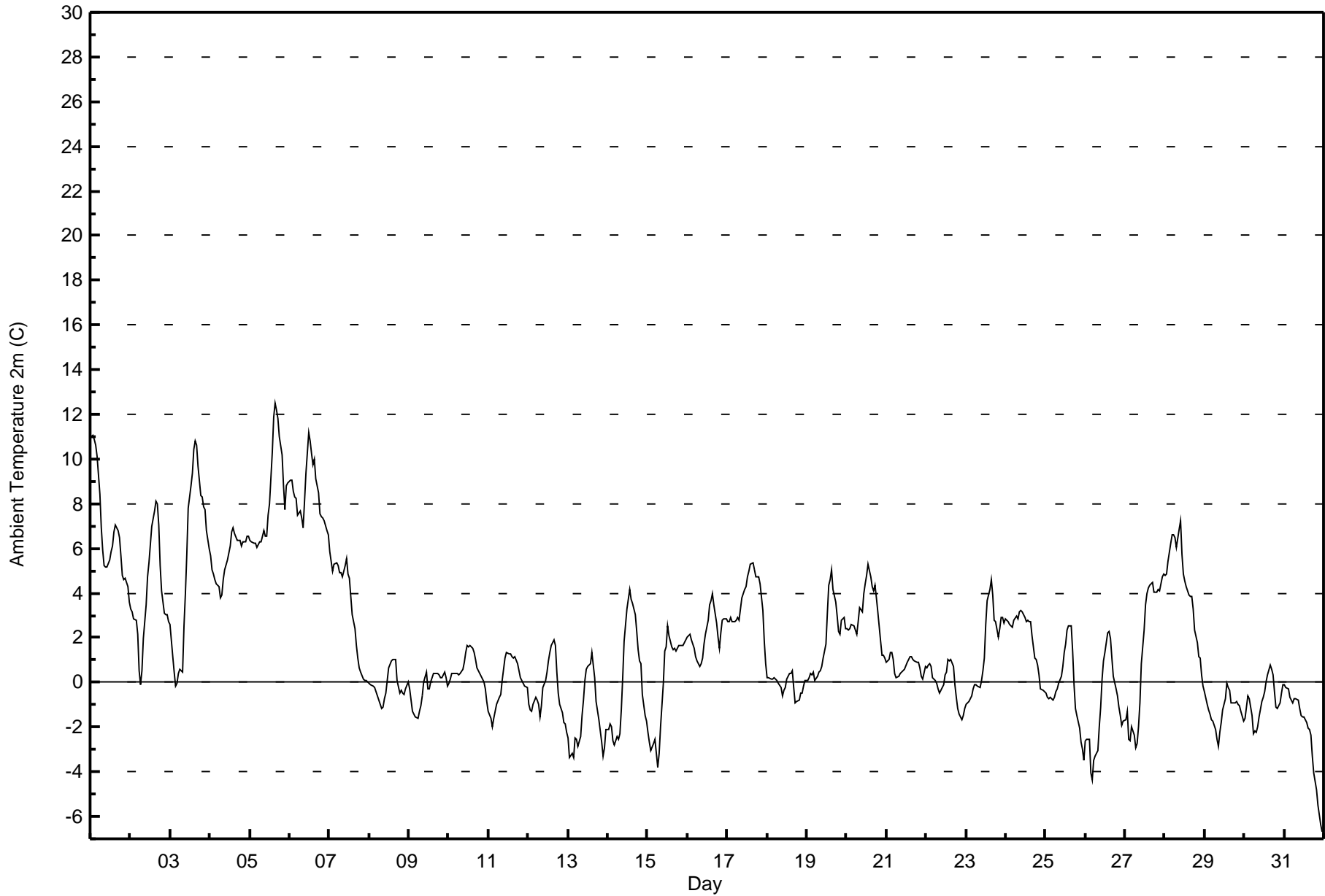
Maximum Value: 12.5 C on Oct 5 16:00																	Maximum Daily Average: 8.4 C on Oct 6										Hours in Service: 744																					
Minimum Value: -6.7 C on Nov 1 00:00																	Minimum Daily Average: -2.3 C on Oct 31										Hours of Data: 744																					
Maximum Diurnal Average: 3.5 C at hour 16																	Minimum Diurnal Average: 0.7 C at hour 8										Hours of Missing Data: 0																					
Monthly Average: 1.78 C																	Percentiles: P <sub>1</sub> = -4.0 P <sub>10</sub> = -1.8 Q <sub>1</sub> = -0.5 Median = 1.0 Q <sub>3</sub> = 3.9 P <sub>90</sub> = 6.6 P <sub>99</sub> = 11.0										Hours of Calibration: 0																					
																											Percent Operational Time: 100.0																					
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	11.0	11.1	10.9	10.6	10.1	8.4	6.9	5.9	5.2	5.2	5.1	5.5	5.8	6.1	6.8	7.1	6.8	6.5	5.7	4.8	4.6	4.6	4.3	3.6	6.8	11.1																						
2-Oct	3.3	3.2	2.9	2.8	2.1	0.5	-0.1	0.5	1.9	3.5	4.8	5.4	6.2	7.0	7.6	8.1	8.0	7.0	5.2	4.1	3.1	3.1	3.0	2.7	4.0	8.1																						
3-Oct	2.6	1.1	0.4	-0.2	-0.1	0.4	0.6	0.5	2.5	4.0	5.7	7.8	8.8	9.4	10.4	10.8	10.6	9.7	8.4	8.3	7.9	7.8	6.8	6.0	5.4	10.8																						
4-Oct	5.7	5.1	4.9	4.6	4.4	4.3	3.8	3.9	4.6	5.0	5.5	5.8	6.1	6.8	7.0	6.7	6.4	6.4	6.1	6.3	6.3	6.6	6.6	6.6	5.6	7.0																						
5-Oct	6.4	6.3	6.3	6.3	6.1	6.2	6.3	6.3	6.8	6.5	6.5	7.5	8.0	10.3	11.9	12.5	12.2	11.8	11.0	10.2	8.8	7.7	8.8	8.9	8.3	12.5																						
6-Oct	9.1	9.0	8.6	8.3	8.2	7.5	7.7	7.3	6.9	8.1	9.4	11.2	10.8	10.2	9.7	10.0	9.1	8.5	7.6	7.4	7.4	7.2	6.8	6.6	8.4	11.2																						
7-Oct	5.8	5.4	5.0	5.3	5.4	5.3	4.9	4.9	4.7	5.2	5.6	4.9	4.7	3.8	3.0	2.4	1.7	1.1	0.7	0.5	0.2	0.1	0.1	0.0	3.4	5.8																						
8-Oct	0.0	-0.1	-0.2	-0.3	-0.4	-0.6	-0.8	-1.2	-1.1	-0.7	-0.5	0.1	0.6	1.0	1.0	1.0	1.1	0.1	-0.5	-0.4	-0.5	-0.6	-0.3	0.0	-0.1	1.1																						
9-Oct	-0.3	-0.8	-1.3	-1.4	-1.6	-1.6	-1.3	-1.0	-0.6	0.0	0.5	-0.3	-0.3	0.0	0.2	0.4	0.4	0.4	0.3	0.2	0.2	0.5	0.2	-0.2	-0.3	0.5																						
10-Oct	-0.1	0.1	0.4	0.4	0.4	0.4	0.3	0.4	0.6	0.9	1.3	1.7	1.6	1.6	1.5	1.3	1.0	0.7	0.5	0.3	0.1	0.0	-0.3	-0.8	0.6	1.7																						
11-Oct	-1.3	-1.6	-2.0	-1.6	-1.3	-1.0	-0.7	-0.6	0.1	0.6	1.1	1.4	1.3	1.3	1.2	1.1	1.1	0.8	0.5	0.2	0.1	-0.1	-0.1	-0.2	0.0	1.4																						
12-Oct	-1.0	-1.2	-1.3	-1.0	-0.7	-0.8	-1.0	-1.5	-1.0	-0.2	0.1	0.5	1.0	1.3	1.6	1.9	1.7	0.5	-0.5	-1.0	-1.4	-1.8	-1.9	-2.2	-0.4	1.9																						
13-Oct	-2.5	-3.4	-3.2	-3.3	-2.5	-2.6	-2.9	-2.5	-1.5	-0.8	0.1	0.6	0.7	0.8	1.3	0.8	0.2	-0.9	-1.6	-2.2	-2.7	-3.3	-2.9	-2.1	-1.5	1.3																						
14-Oct	-2.1	-1.9	-2.0	-2.6	-2.8	-2.4	-2.6	-2.3	-1.2	0.2	1.9	3.3	3.7	4.2	3.7	3.5	3.0	2.3	1.5	1.0	0.8	-0.6	-1.5	-1.7	0.2	4.2																						
15-Oct	-2.2	-2.7	-3.0	-2.7	-2.6	-3.2	-3.8	-3.2	-2.0	0.0	1.4	1.6	2.5	2.1	1.6	1.5	1.5	1.4	1.5	1.6	1.6	1.7	1.8	1.9	-0.1	2.5																						
16-Oct	2.0	2.1	1.9	1.7	1.5	1.2	0.9	0.7	0.9	1.1	1.7	2.1	2.8	3.5	3.7	4.0	3.5	2.7	2.0	1.5	2.2	2.8	2.8	2.9	2.2	4.0																						
17-Oct	2.7	2.7	2.9	2.7	2.7	2.8	2.9	2.8	3.3	3.8	4.1	4.3	4.8	5.0	5.3	5.4	5.0	4.7	4.7	4.7	4.4	3.2	1.8	0.8	3.6	5.4																						
18-Oct	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.0	-0.3	-0.6	-0.4	-0.2	0.1	0.4	0.4	0.5	-0.2	-0.9	-0.8	-0.8	-0.5	-0.5	-0.2	0.1	-0.1	0.5																						
19-Oct	0.1	0.2	0.4	0.3	0.5	0.1	0.3	0.5	0.5	0.7	1.1	1.7	3.1	4.4	4.6	5.0	4.1	3.6	2.9	2.3	2.2	2.8	2.9	2.4	1.9	5.0																						
20-Oct	2.4	2.4	2.4	2.6	2.5	2.4	2.1	2.7	3.4	3.2	4.0	4.4	4.8	5.3	4.7	4.3	4.1	4.3	3.8	3.2	1.9	1.2	1.2	1.1	3.1	5.3																						
21-Oct	0.9	1.0	1.4	1.4	1.1	0.4	0.2	0.3	0.4	0.5	0.5	0.6	0.9	1.0	1.2	1.1	1.1	1.0	0.9	0.9	0.6	0.3	0.1	0.7	0.8	1.4																						
22-Oct	0.7	0.8	0.8	0.7	0.2	0.1	0.0	-0.3	-0.5	-0.4	-0.1	0.4	0.5	1.0	1.0	1.1	0.7	-0.1	-0.7	-1.2	-1.4	-1.7	-1.5	-1.2	0.0	1.1																						
23-Oct	-1.0	-0.9	-0.9	-0.6	-0.3	-0.1	-0.1	-0.2	-0.2	0.1	0.5	1.1	2.6	3.7	4.1	4.6	3.9	2.8	2.7	2.0	2.4	2.9	2.9	2.7	1.5	4.6																						
24-Oct	2.9	2.7	2.6	2.5	2.5	2.8	3.0	2.8	3.1	3.2	3.2	2.9	2.7	2.8	2.7	2.7	2.1	1.1	1.0	0.8	0.3	-0.3	-0.4	-0.4	2.1	3.2																						
25-Oct	-0.5	-0.6	-0.7	-0.7	-0.8	-0.6	-0.4	-0.3	-0.1	0.3	0.7	1.3	1.7	2.3	2.6	2.6	1.4	-0.1	-1.1	-1.5	-2.0	-2.6	-3.0	-3.5	-0.2	2.6																						
26-Oct	-2.6	-2.5	-2.5	-4.0	-4.3	-3.5	-3.3	-3.0	-2.0	-1.1	0.2	1.0	1.4	2.2	2.3	2.0	1.1	0.3	-0.3	-0.6	-1.1	-1.5	-1.9	-1.7	-1.1	2.3																						
27-Oct	-1.6	-1.3	-2.6	-2.6	-2.0	-2.4	-2.9	-2.7	-2.0	-0.9	0.9	2.4	3.5	4.0	4.3	4.4	4.5	4.1	4.0	4.0	4.2	4.1	4.7	4.8	1.4	4.8																						
28-Oct	4.8	4.8	5.4	6.2	6.6	6.6	6.5	6.1	6.8	7.2	5.7	4.9	4.6	4.3	3.9	3.8	3.9	3.3	2.4	1.8	1.1	1.1	0.4	-0.2	4.2	7.2																						
29-Oct	-0.4	-1.0	-1.2	-1.4	-1.7	-1.8	-2.1	-2.5	-2.9	-2.2	-1.8	-1.2	-0.7	0.0	-0.2	-0.4	-0.9	-0.9	-0.9	-0.9	-1.0	-1.0	-1.3	-1.8	-1.3	0.0																						
30-Oct	-1.6	-1.1	-0.6	-0.7	-1.5	-2.3	-2.2	-2.2	-2.0	-1.5	-0.9	-0.7	-0.4	0.0	0.3	0.8	0.6	0.3	-0.4	-1.1	-1.2	-0.9	-0.5	-0.1	-0.8	0.8																						
31-Oct	-0.1	-0.2	-0.3	-0.6	-0.8	-0.9	-0.7	-0.7	-0.8	-1.2	-1.5	-1.6	-1.5	-1.8	-2.1	-2.1	-2.3	-3.3	-4.1	-4.8	-5.5	-5.9	-6.4	-6.7	-2.3	-0.1																						
																								1.4	1.3	1.1	1.1	1.0	0.8	0.7	0.7	1.1	1.6	2.1	2.6	3.0	3.4	3.5	3.5	3.1	2.5	2.0	1.7	1.4	1.2	1.1	0.9	Diurnal Average
																								11.0	11.1	10.9	10.6	10.1	8.4	7.7	7.3	6.9	8.1	9.4	11.2	10.8	10.3	11.9	12.5	12.2	11.8	11.0	10.2	8.8	7.8	8.8	8.9	Diurnal Maximum





**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature 2m (AT 2m) - C**  
**Fort Chipewyan - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C  
Fort Chipewyan - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	247	33.20	33.20
0 - 10	479	64.38	97.58
10 - 20	18	2.42	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %**

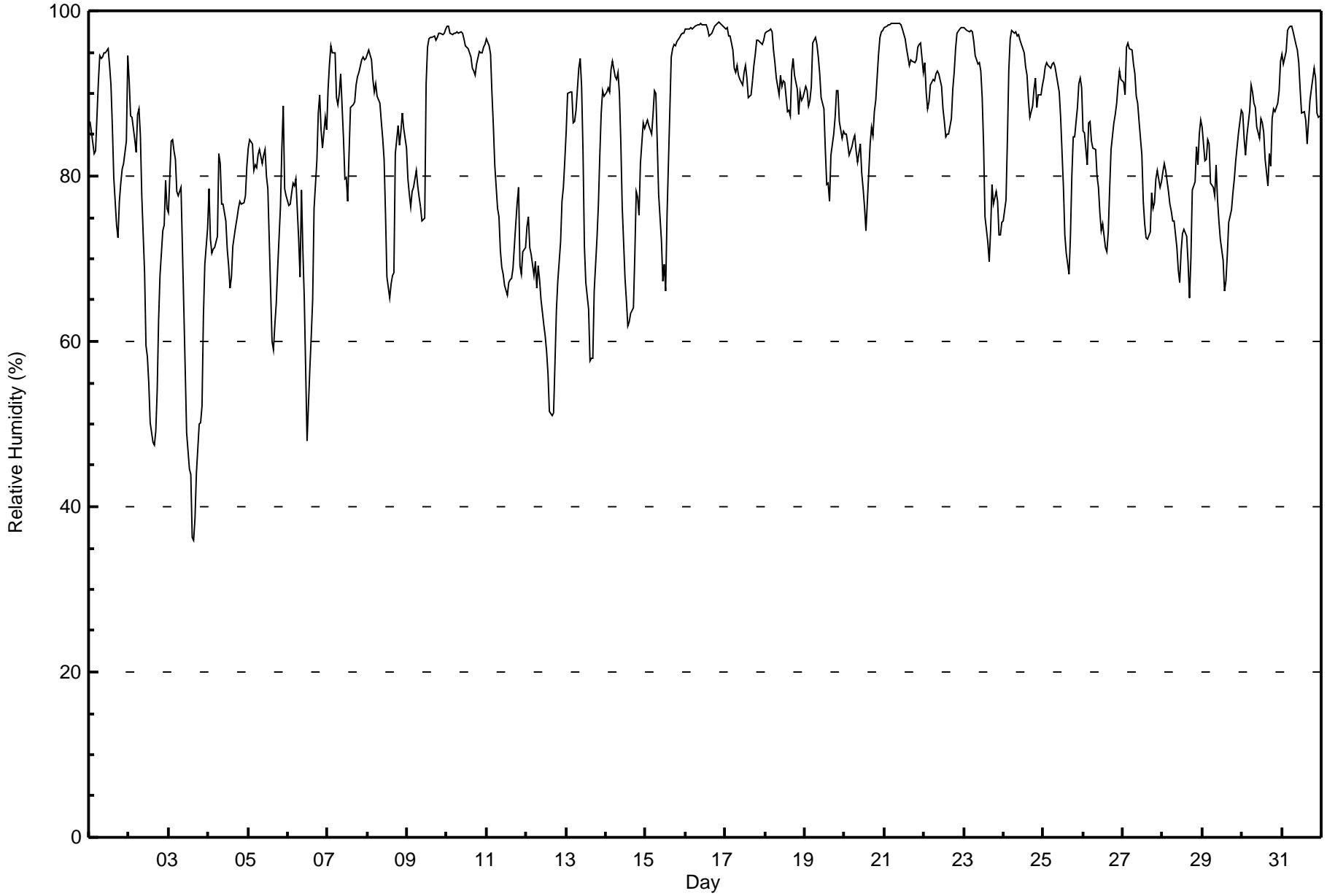
**Fort Chipewyan - October 2017**

Maximum Value: 99 % on Oct 16 21:00																		Maximum Daily Average: 98.0 % on Oct 16																		Hours in Service: 744	
Minimum Value: 36 % on Oct 3 16:00																		Minimum Daily Average: 61.9 % on Oct 3																		Hours of Data: 744	
Maximum Diurnal Average: 88.3 % at hour 1																		Minimum Diurnal Average: 75.1 % at hour 16																		Hours of Missing Data: 0	
Monthly Average: 83.8 %																		Percentiles: P <sub>1</sub> = 48 P <sub>10</sub> = 68 Q <sub>1</sub> = 77 Median = 86 Q <sub>3</sub> = 93 P <sub>90</sub> = 97 P <sub>99</sub> = 98																		Hours of Calibration: 0	
																																				Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24													
1-Oct	87	85	84	83	83	91	95	94	94	95	95	96	93	91	86	80	74	73	77	79	81	82	84	95	86.5	96											
2-Oct	91	87	87	84	83	87	88	85	78	68	60	58	55	50	48	47	49	54	63	68	73	74	79	76	70.6	91											
3-Oct	76	84	84	83	82	78	78	79	71	64	57	49	45	44	36	36	39	44	50	50	52	63	69	74	61.9	84											
4-Oct	79	72	71	71	71	73	83	82	77	77	75	71	69	67	68	72	74	75	76	77	77	77	78	81	74.6	83											
5-Oct	83	84	84	81	81	81	82	83	82	83	83	80	79	66	60	59	62	65	69	76	83	88	78	78	77.1	88											
6-Oct	77	77	78	79	79	80	72	68	78	71	65	48	52	57	61	65	76	82	88	90	86	83	87	86	74.3	90											
7-Oct	90	94	96	95	95	90	89	90	92	85	80	80	77	83	88	89	89	91	92	93	94	94	94	94	89.7	96											
8-Oct	95	95	94	92	90	91	90	89	87	85	82	75	68	65	67	68	68	83	86	84	86	88	86	83	83.1	95											
9-Oct	80	78	76	78	79	81	79	78	76	75	75	91	96	97	97	97	97	97	97	97	97	97	97	98	87.8	98											
10-Oct	98	98	97	97	97	97	97	97	97	97	97	96	96	96	94	93	93	92	94	95	95	95	96	96	95.9	98											
11-Oct	97	96	95	90	86	81	76	75	71	69	68	67	66	67	68	68	69	74	77	79	69	68	71	71	75.7	97											
12-Oct	74	75	71	70	68	70	66	69	68	65	62	61	59	56	52	51	51	57	64	67	72	77	79	82	66.1	82											
13-Oct	85	90	90	90	86	87	88	93	94	91	83	72	67	64	58	58	58	66	73	77	83	88	90	90	80.0	94											
14-Oct	90	91	90	93	94	92	92	93	90	84	76	68	65	62	62	63	64	71	78	78	75	82	86	86	80.2	94											
15-Oct	86	87	86	85	87	90	90	84	78	72	67	69	66	75	88	94	95	96	96	96	97	97	97	97	86.6	97											
16-Oct	98	98	98	98	98	98	98	98	98	98	98	98	98	98	97	97	97	98	98	99	99	99	98	98	98.0	99											
17-Oct	98	98	97	97	95	93	92	93	92	92	91	93	93	92	89	90	92	93	95	96	97	96	96	96	94.0	98											
18-Oct	97	97	98	98	98	95	94	92	90	92	91	91	91	88	88	87	93	94	92	91	87	90	89	90	92.2	98											
19-Oct	91	90	89	89	91	96	97	96	94	92	90	88	83	79	79	77	83	85	87	90	90	87	85	85	88.1	97											
20-Oct	85	85	84	83	83	84	85	83	82	84	80	78	76	73	80	84	86	85	88	89	95	97	98	98	85.2	98											
21-Oct	98	98	98	98	98	98	98	98	99	98	98	98	97	95	94	93	94	94	94	94	96	96	96	92	96.5	99											
22-Oct	94	90	88	89	91	92	92	92	93	92	91	88	87	85	85	85	87	91	93	95	97	98	98	98	91.3	98											
23-Oct	98	98	98	98	98	97	96	95	94	94	93	90	84	75	72	70	73	79	77	78	77	73	74	74	85.5	98											
24-Oct	75	77	84	93	97	98	97	97	97	96	95	95	93	92	89	87	88	91	92	88	90	90	91	91	91.3	98											
25-Oct	92	93	94	93	93	94	94	93	92	90	87	83	79	73	71	68	73	80	85	85	88	91	92	91	86.4	94											
26-Oct	85	85	81	86	87	84	83	83	80	79	76	73	74	71	71	73	78	83	86	87	89	91	93	92	82.2	93											
27-Oct	91	90	96	96	95	95	94	92	90	89	87	83	77	74	73	72	73	78	76	77	80	81	79	79	84.0	96											
28-Oct	81	82	81	78	77	76	75	75	71	69	67	71	73	74	73	70	65	70	78	79	84	81	85	87	75.8	87											
29-Oct	86	82	82	84	84	79	79	78	81	77	74	72	70	66	67	71	74	76	78	80	82	84	85	88	78.3	88											
30-Oct	88	85	82	85	88	91	90	89	88	86	85	87	87	85	82	79	83	81	87	88	88	89	90	94	86.5	94											
31-Oct	95	94	95	98	98	98	98	97	96	95	94	90	88	88	87	84	87	89	90	93	92	88	87	87	92.0	98											
88.3																		88.2																		Diurnal Average	
98																		98																		Diurnal Maximum	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Fort Chipewyan - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Relative Humidity (RH) - %  
Fort Chipewyan - October 2017**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	3	0.40	0.40
40 - 60	29	3.90	4.30
60 - 80	219	29.44	33.74
80 - 100	493	66.26	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Precipitation (PC) - mm**

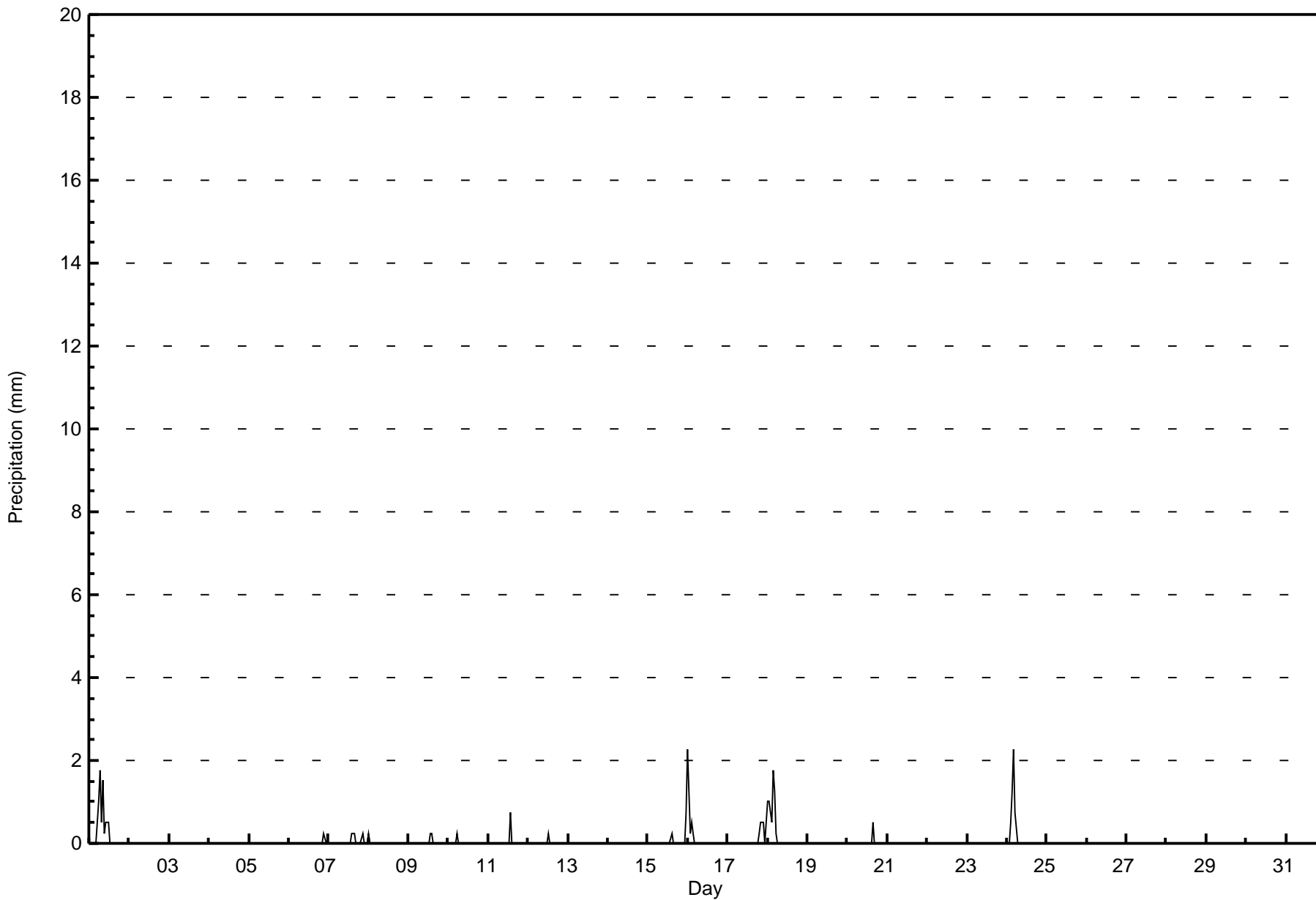
**Fort Chipewyan - October 2017**

Maximum Value: 2.3 mm on Oct 16 01:00		Maximum Daily Total: 6.1 mm on Oct 1		Hours in Service: 744																							
Minimum Value: 0.0 mm on Oct 1 01:00		Minimum Daily Total: 0.0 mm on Oct 2		Hours of Data: 744																							
Maximum Diurnal Total: 3.6 mm at hour 1		Minimum Diurnal Total: 0.0 mm at hour 17		Hours of Missing Data: 0																							
Monthly Total: 26.42 mm		Percentiles: P <sub>1</sub> = 0.0 P <sub>10</sub> = 0.0 Q <sub>1</sub> = 0.0 Median = 0.0 Q <sub>3</sub> = 0.0 P <sub>90</sub> = 0.0 P <sub>99</sub> = 1.3		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	0.0	0.0	0.0	0.0	0.0	1.0	1.8	0.5	1.5	0.3	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.1	1.8	
2-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.3	0.3
7-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.8	0.3	
8-Oct	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	
9-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.3	
10-Oct	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	
11-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.8	
12-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	
13-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
14-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
15-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	1.0	0.8	
16-Oct	2.3	0.3	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	2.3	
17-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.5	0.0	0.5	1.8	0.5	
18-Oct	1.0	1.0	0.5	1.8	1.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.8	1.8	
19-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
20-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	
21-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
22-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
23-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
24-Oct	0.0	0.0	0.5	1.3	2.3	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	2.3	
25-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
26-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
27-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
28-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
29-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
30-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
31-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		3.6	1.3	1.5	3.3	3.6	2.3	1.8	0.5	1.5	0.3	0.5	0.5	0.3	1.0	0.8	0.8	0.0	0.0	0.0	0.3	0.8	0.8	0.0	1.3	Diurnal Average	
		2.3	1.0	0.5	1.8	2.3	1.0	1.8	0.5	1.5	0.3	0.5	0.5	0.3	0.8	0.3	0.5	0.0	0.0	0.0	0.3	0.5	0.5	0.0	0.8	Diurnal Maximum	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Precipitation (PC) - mm**  
**Fort Chipewyan - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Precipitation (PC) - mm**  
**Fort Chipewyan - October 2017**

<b>Concentration Ranges (mm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	721	96.91	96.91
0.4 - 0.5	10	1.34	98.25
0.6 - 0.7	0	0.00	98.25
0.8 - 1.4	8	1.08	99.33
1.5 - 10	5	0.67	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744





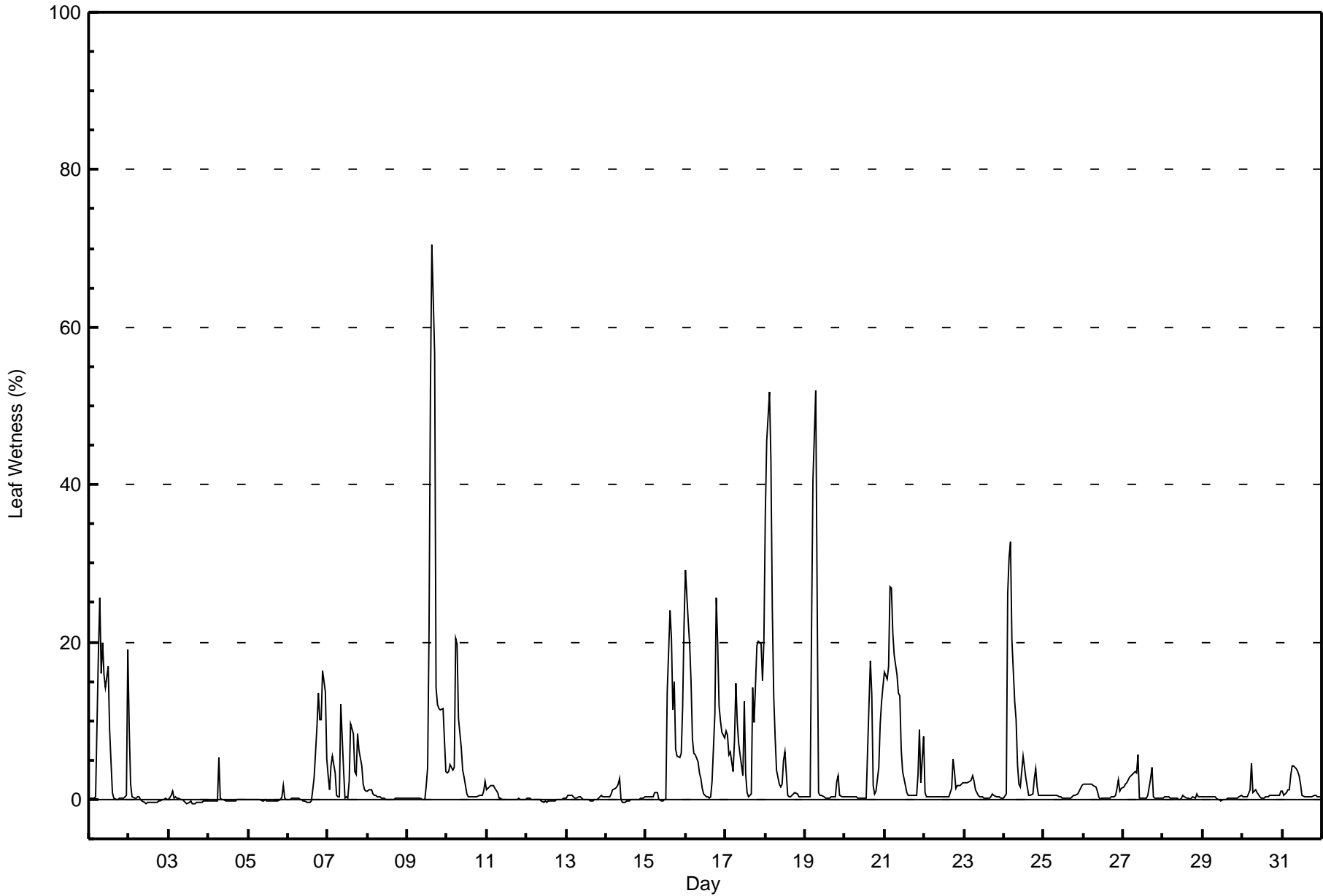
**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Leaf Wetness (SW) - %**

**Fort Chipewyan - October 2017**

Maximum Value: 71 % on Oct 9 16:00		Maximum Daily Average: 11.7 % on Oct 9		Hours in Service: 744																						
Minimum Value: -1 % on Oct 3 12:00		Minimum Daily Average: -0.1 % on Oct 3		Hours of Data: 744																						
Maximum Diurnal Average: 5.8 % at hour 7		Minimum Diurnal Average: 0.9 % at hour 13		Hours of Missing Data: 0																						
Monthly Average: 3.2 %		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 2 P <sub>90</sub> = 12 P <sub>99</sub> = 41		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	0	0	19	26	16	20	16	14	17	9	5	1	0	0	0	0	0	0	0	0	19	6.8	26
2-Oct	9	2	0	0	0	0	0	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	9
3-Oct	0	1	1	0	0	0	0	0	0	0	0	-1	0	0	-1	-1	0	0	0	0	0	0	0	0	-0.1	1
4-Oct	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	5
5-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0.0	2
6-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	9	14	10	10	16	14	5	3.4	16	
7-Oct	3	1	4	6	3	0	0	0	12	4	0	0	0	2	10	8	4	3	8	6	4	2	1	1	3.5	12
8-Oct	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
9-Oct	0	0	0	0	0	0	0	0	0	0	0	2	4	21	52	71	57	14	12	12	11	12	7	3	11.7	71
10-Oct	3	4	4	4	4	20	20	10	7	4	3	2	1	0	0	0	0	0	0	0	1	1	2	3.8	20	
11-Oct	1	2	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
12-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-0.1	0
13-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	1
14-Oct	0	0	0	1	1	1	2	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3
15-Oct	0	0	0	0	0	1	1	1	0	0	0	0	0	14	24	20	11	15	6	5	5	6	12	22	6.0	24
16-Oct	29	23	20	15	8	6	6	5	3	3	1	1	0	0	0	0	2	11	26	20	12	10	8	8	9.0	29
17-Oct	9	8	6	6	4	7	15	10	7	6	3	13	3	1	0	1	14	10	15	19	20	20	15	20	9.6	20
18-Oct	36	45	52	43	24	13	8	4	2	2	2	5	6	1	0	0	1	1	1	1	0	0	0	0	10.3	52
19-Oct	0	0	0	0	22	41	52	26	1	1	0	0	0	0	0	0	0	0	0	2	3	0	0	0	6.3	52
20-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	18	13	2	1	1	4	10	13	14	3.8	18
21-Oct	16	15	17	27	27	21	18	16	13	13	6	4	2	1	1	0	0	0	0	1	3	9	2	8	9.2	27
22-Oct	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	3	1	2	2	2	2	1.0	5
23-Oct	2	2	2	2	2	3	2	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.9	3
24-Oct	0	1	26	31	33	20	12	10	4	2	2	6	4	3	2	1	0	1	3	4	2	1	0	0	6.9	33
25-Oct	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2	0.5	2
26-Oct	2	2	2	2	2	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	1	3	1	1	1.0	3
27-Oct	2	2	2	2	3	3	3	3	3	6	0	0	0	0	0	1	3	4	0	0	0	0	0	0	1.6	6
28-Oct	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0.2	1
29-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
30-Oct	0	0	0	0	1	5	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0.7	5
31-Oct	1	1	1	1	1	3	4	4	4	3	3	2	1	0	0	0	0	0	0	0	0	0	0	0	1.4	4
		3.8	3.6	4.7	4.7	4.5	5.5	5.8	3.7	2.7	1.9	1.1	1.6	0.9	1.6	3.3	3.9	3.6	2.5	3.0	2.8	2.7	3.1	2.7	3.7	Diurnal Average
		36	45	52	43	33	41	52	26	20	16	14	17	9	21	52	71	57	15	26	20	20	20	15	22	Diurnal Maximum





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Leaf Wetness (SW) - %  
Fort Chipewyan - October 2017**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	243	39.07	39.07
0.4 - 0.5	85	13.67	52.73
0.6 - 0.7	24	3.86	56.59
0.8 - 1.4	44	7.07	63.67
1.5 - 10	141	22.67	86.33
> 10	82	13.18	99.52

Total Number of Valid Hours: 622

Total Number of Hours: 744



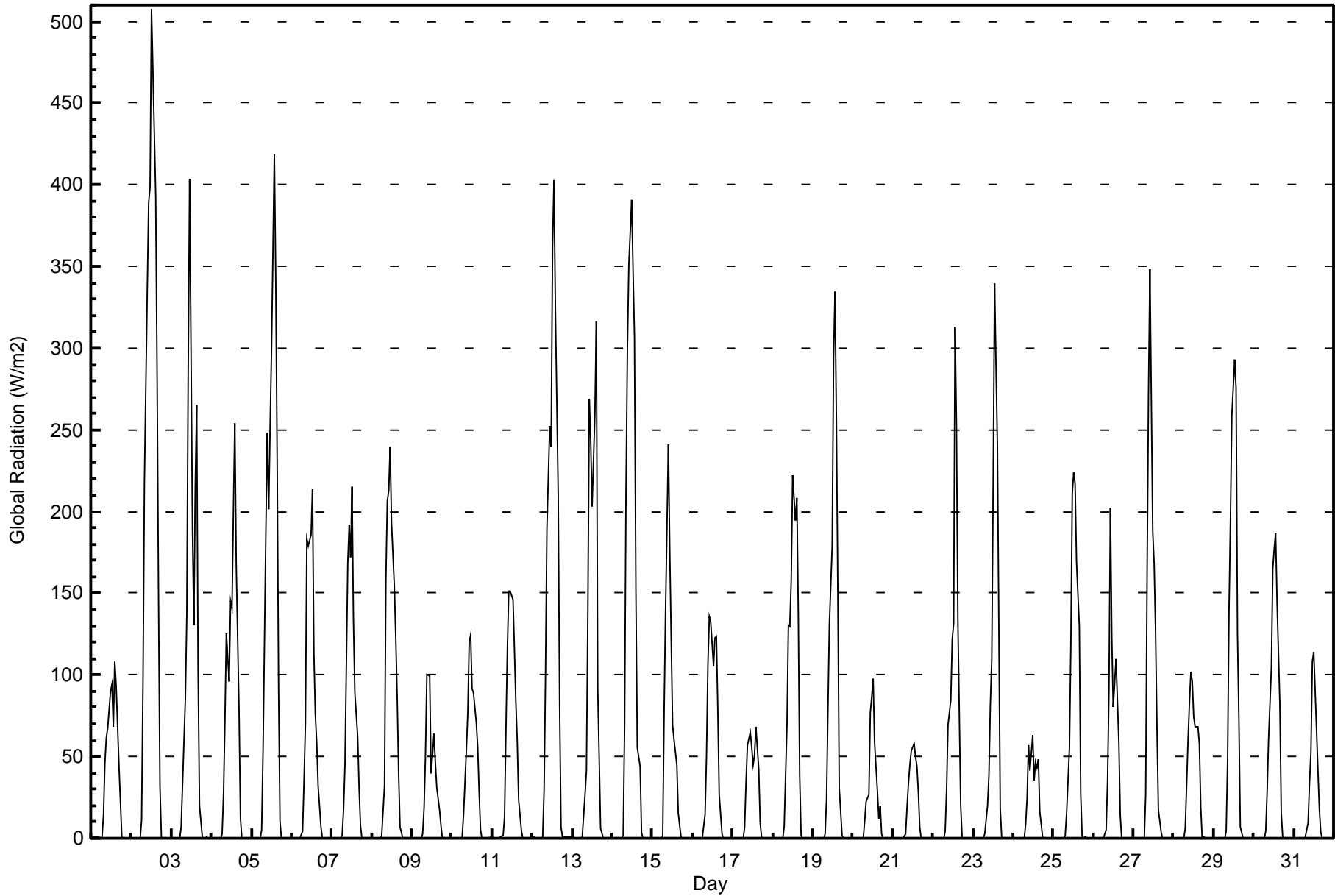
**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Global Radiation (GR) - W/m2**

**Fort Chipewyan - October 2017**

Maximum Value: 507 W/m2 on Oct 2 13:00      Maximum Daily Average: 136.6 W/m2 on Oct 2																			Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0									
Minimum Value: 0 W/m2 on Oct 2 00:00      Minimum Daily Average: 14.2 W/m2 on Oct 21 Maximum Diurnal Average: 179.1 W/m2 at hour 14      Minimum Diurnal Average: 0.1 W/m2 at hour 23 Monthly Average: 49.8 W/m2      Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 67 P <sub>90</sub> = 181 P <sub>99</sub> = 387																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Oct	0	0	1	0	0	0	1	14	46	61	67	90	94	69	108	93	44	22	1	0	0	0	0	0	29.8	108		
2-Oct	0	0	0	0	0	0	11	97	219	334	389	398	507	471	392	279	146	32	1	0	0	0	0	0	136.6	507		
3-Oct	0	0	0	0	0	0	7	60	85	137	288	404	192	131	215	266	103	20	1	0	0	0	0	0	79.5	404		
4-Oct	0	0	0	0	0	0	2	27	72	125	96	145	141	200	254	168	78	12	0	0	0	0	0	0	55.0	254		
5-Oct	0	0	0	0	0	0	5	54	188	248	202	253	299	418	341	230	92	10	0	0	0	0	0	0	97.5	418		
6-Oct	0	0	0	0	0	0	4	35	70	183	179	186	213	113	76	59	32	7	0	0	0	0	0	0	48.2	213		
7-Oct	0	0	0	0	0	0	2	17	45	169	192	172	215	134	89	62	31	7	0	0	0	0	0	0	47.3	215		
8-Oct	0	0	0	0	0	0	2	32	159	206	212	240	193	154	122	85	40	7	0	0	0	0	0	0	60.4	240		
9-Oct	0	0	0	0	0	0	3	18	50	100	100	40	51	64	47	31	18	7	0	0	0	0	0	0	22.0	100		
10-Oct	0	0	0	0	0	0	1	14	54	77	121	125	91	89	71	56	29	5	0	0	0	0	0	1	30.6	125		
11-Oct	0	0	0	0	0	1	1	13	66	116	151	151	146	115	84	59	23	4	0	0	0	0	0	0	38.9	151		
12-Oct	1	1	0	0	0	0	1	29	99	189	252	240	363	403	325	211	81	7	1	1	1	1	1	1	91.9	403		
13-Oct	0	0	0	0	0	0	1	27	41	139	269	244	203	260	316	91	50	6	0	0	0	0	0	0	68.8	316		
14-Oct	0	0	0	0	0	0	1	68	211	300	351	391	347	307	152	55	44	3	0	0	0	0	0	0	93.0	391		
15-Oct	0	0	0	0	0	0	2	78	139	241	176	122	69	61	45	16	7	1	0	0	0	0	0	0	39.9	241		
16-Oct	0	0	0	0	0	0	0	14	50	106	136	132	106	123	124	79	27	2	0	0	0	0	0	0	37.5	136		
17-Oct	0	0	0	0	0	0	0	7	34	57	65	56	45	51	69	42	10	1	0	0	0	0	0	0	18.2	69		
18-Oct	0	0	0	0	0	0	0	7	69	130	130	158	222	194	208	138	38	2	0	0	0	0	0	0	54.0	222		
19-Oct	0	0	0	0	0	0	0	2	24	79	131	179	294	335	255	150	31	2	0	0	0	0	0	0	61.8	335		
20-Oct	0	0	0	0	0	0	0	11	22	27	77	86	98	59	29	12	20	3	0	0	0	0	0	0	18.6	98		
21-Oct	0	0	0	0	0	0	0	3	19	33	45	54	57	51	44	28	7	0	0	0	0	0	0	0	14.2	57		
22-Oct	0	0	0	0	0	0	0	4	30	69	84	122	131	313	252	133	20	1	0	0	0	0	0	0	48.3	313		
23-Oct	0	0	0	0	0	0	0	2	20	39	82	110	218	340	240	131	18	1	0	0	0	0	0	0	50.0	340		
24-Oct	0	0	0	0	0	0	0	8	24	57	41	63	35	46	43	49	17	1	0	0	0	0	0	0	16.0	63		
25-Oct	0	0	0	0	0	0	0	2	15	56	118	211	224	217	169	129	27	1	0	0	0	0	0	0	48.7	224		
26-Oct	0	0	0	0	0	0	0	5	35	91	202	123	81	110	83	58	14	0	0	0	0	0	0	0	33.5	202		
27-Oct	0	0	0	0	0	0	0	26	164	272	348	188	168	126	67	17	4	0	0	0	0	0	0	0	57.5	348		
28-Oct	0	0	0	0	0	0	0	6	61	83	102	96	74	68	68	58	19	0	1	0	0	0	0	0	26.6	102		
29-Oct	0	0	0	0	0	0	0	4	47	139	194	258	293	276	126	72	7	0	0	0	0	0	0	0	59.1	293		
30-Oct	0	0	0	0	0	0	0	4	29	61	105	165	177	187	146	82	16	1	0	0	0	0	0	0	40.5	187		
31-Oct	0	0	0	0	0	0	0	1	9	34	53	108	114	66	41	17	3	0	0	0	0	0	0	0	18.6	114		
																			0.1					Diurnal Average				
																			1					Diurnal Maximum				





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Global Radiation (GR) - W/m2**  
**Fort Chipewyan - October 2017**

<b>Concentration Ranges (W/m2)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	474	63.71	63.71
21 - 100	132	17.74	81.45
101 - 300	117	15.73	97.18
301 - 600	21	2.82	100.00
601 - 900	0	0.00	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Wind Speed (WS) - km/h**  
**Fort Chipewyan - October 2017**

Maximum Speed: 34 km/h on Oct 19 00:00	Maximum Daily Speed Average: 21.7 km/h on Oct 28	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 6 17:00	Minimum Daily Speed Average: 0.5 km/h on Oct 16	Hours of Data: 721
Maximum Diurnal Speed Average: 3.6 km/h at hour 17	Minimum Diurnal Speed Average: 0.5 km/h at hour 9	Hours of Missing Data: 23
Monthly Average Velocity: 2.1 km/h 322.7 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 6 Q <sub>1</sub> = 8 Median = 13 Q <sub>3</sub> = 17 P <sub>90</sub> = 22 P <sub>99</sub> = 30	Percent Operational Time: 96.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	WNNW17	NW18	WNNW13	WNNW15	NW16	NW17	NW20	NW21	NW22	NW21	NW20	NW20	NW21	NW20	NNW18	NNW18	NNW18	NNW19	NNW20	NNW17	NNW15	NNW17	NNW16	NNW14	NW17.5	NW22	
2-Oct	NNW16	NNW18	NNW18	NNW18	NNW17	NNW16	NNW13	NNW12	NNW13	N14	N15	NNW16	NNW18	NNW15	NW16	NW16	NW14	NW9	NW8	W8	W8	WNNW10	WSW10	WSW12	NW12.6	NNW18	
3-Oct	WSW13	SW12	SW13	SW16	SW16	SSW15	SSW20	SW20	SSW25	SSW26	SSW27	SW30	SW28	WSW20	WSW23	W24	W18	W16	WNNW17	WNNW15	NW11	NNW15	NNW14	NW13	WSW14.6	SW30	
4-Oct	NW12	NNW11	NNW11	NW9	NNW9	NW7	NW7	NW8	NW8	WNNW9	NW5	WNNW7	W8	NW4	ESE6	E10	E12	E15	ESE16	ESE16	ESE15	ESE15	E15	E18	NE3.2	E18	
5-Oct	E21	E22	E23	E24	E21	E24	E20	E20	E21	E23	E21	E21	E22	E21	ENE23	ENE23	ENE17	NE11	NNE7	ESE6	SW5	SW6	W10	W11	E14.7	E24	
6-Oct	W14	W14	W13	W12	W12	W9	W10	W8	SE2	SW5	SW4	WSW12	W14	WNNW15	NW12	NW6	WSW0	NNW4	ENE2	SSE4	SSW6	WSW5	WSW4	W7	W7.0	WNNW15	
7-Oct	WNNW10	WNNW11	NW10	NW12	NW11	NNW12	NNW12	NW13	NW14	NW16	NW17	NW19	NW22	NW20	NW19	NW20	NW21	NNW20	NW18	NW19	NW18	NW16	NW16	NW16	NW15.8	NW22	
8-Oct	NNW14	NNW15	NNW15	NNW16	NNW17	NNW16	NNW16	NNW15	NNW15	NNW15	NNW15	NNW15	NNW15	NNW11	NNW9	N7	NW6	WNNW9	NW7	NNW5	W4	SW7	SSW9	SSW13	NW9.9	NNW17	
9-Oct	SW15	S15	SSE18	SSE19	SE23	SE24	SE24	SE28	SE28	SE25	SE26	SE21	SE19	ESE16	ESE15	ESE15	SE9	SE6	ENE2	NNW3	NNE4	SE2	SW4	W5	SE13.2	SE28	
10-Oct	AF	N6	N7	NNW6	N7	N6	N5	N7	N7	N6	N6	NNW7	NNW7	NNW8	NNW9	N9	NNW11	NNW9	NW5	WNNW5	NW7	NW5	WNNW6	NNW7	NNW6.4	NNW11	
11-Oct	N7	N6	N6	N6	N6	N7	N8	N7	ENE5	ENE5	NE5	NNE6	NNE8	N7	N7	N6	NNE4	N4	N5	NNE6	NNE6	N5	NNW5	N6	N5.6	NNE8	
12-Oct	NNW7	NNW8	N6	N7	N7	NNE7	NE9	NNW5	NW6	N8	N9	N10	N11	N11	N11	N11	N10	N6	N7	NNW8	N9	NNW10	N11	NNW11	N8.2	N11	
13-Oct	NNW10	NW6	WNNW9	NW10	WNNW10	W9	W11	WNNW13	WNNW13	WNNW12	NW13	NW14	NW12	NW12	W14	NW12	NW9	W9	W7	WSW8	WSW9	SW9	SW15	SSW17	WNNW9.1	SSW17	
14-Oct	SSW16	SSW15	SSW17	SSW15	SSW15	S15	S20	S21	S22	S20	S19	S19	SSW18	SSW12	SW12	WSW11	W10	W14	W12	WNNW13	WNNW13	WNNW12	WNNW14	WNNW13	SW11.5	S22	
15-Oct	WNNW13	WNNW14	WNNW13	W11	W14	WSW8	SW10	SSW8	SSW11	S14	SSE16	SE14	SSE19	SSE18	SE14	SE15	ESE15	E13	ESE11	ESE9	E10	ESE13	E11	ENE7	SSE5.9	SSE19	
16-Oct	E9	E8	WNNW10	WNNW13	WNNW16	WNNW16	W15	W14	W10	WSW8	SSW6	SSW9	W7	SW8	W4	N4	ESE7	E13	E16	E13	E13	E13	E11	E9	WNNW0.5	WNNW16	
17-Oct	E10	E8	E7	E9	E10	E6	ESE6	E11	E11	E14	ENE15	ENE19	E21	ENE21	ENE23	ENE21	NE16	NNE11	NNE8	N7	N10	N14	N16	NNW15	ENE10.5	ENE23	
18-Oct	NNW12	NW12	NW14	NW17	NW19	NW21	NW18	NW13	NW20	NW18	WNNW16	WNNW14	NW10	NW10	WNNW9	WSW8	WSW9	SW6	S11	SSE14	SE19	SE19	ESE28	ESE34	NW4.8	ESE34	
19-Oct	ESE34	ESE33	ESE27	ESE24	SE25	ESE27	ESE25	ESE27	SE25	SE24	SE19	SE16	SSE13	S16	SSE13	SSE15	SE13	ESE15	ESE15	ESE10	E11	ESE15	ESE19	ESE15	ESE19.0	ESE34	
20-Oct	ESE16	ESE15	ESE16	ESE15	ESE17	ESE18	E17	E18	E22	E22	E25	E31	E27	ENE20	ENE14	ENE17	ENE19	ENE11	NNE8	NE9	N7	NNW7	NW7	WNNW7	E13.5	E31	
21-Oct	WNNW7	WNNW10	WNNW8	W9	WNNW14	WNNW15	WNNW11	WNNW12	WNNW13	WNNW16	W15	W14	W13	W12	W13	W13	W10	WSW6	WSW6	SW5	SSE1	SE2	S2	SSE9	W8.8	WNNW16	
22-Oct	S11	SSE10	SE11	SE14	SE16	ESE15	ESE16	ESE17	SE14	ESE14	ESE10	E11	E11	E12	E11	ESE8	SE2	NW4	W4	W8	W8	W8	W8	W7	SE6.3	ESE17	
23-Oct	W6	W8	W8	W10	WNNW12	WNNW12	WNNW13	WNNW13	WNNW11	WNNW11	W12	WSW13	WSW16	WSW20	WSW16	WSW15	WSW8	SSW7	SSW7	SW9	SSW8	SSE5	SSE6	SE6	WSW8.6	WSW20	
24-Oct	S12	SSW10	SSW11	SE16	SE16	E11	E7	WNNW6	NW11	NW13	NW15	NW18	NW17	NW17	NW17	NW18	NNW16	NW10	WNNW10	NW10	NNW9	NNW8	AF	AF	NW5.8	NW18	
25-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	N14	N14	N14	N12	N13	NNW11	NNW11	NNW9	NNW8	NW9	NW8	WSW7	WSW11	WSW13	AF	AF	N14
26-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	SSW20	SW18	WSW15	W18	W18	W14	W10	W11	WNNW11	WNNW11	WNNW6	W3	WNNW6	N1	----	SSW20
27-Oct	E5	E6	SSW5	ESE5	ESE7	ESE10	SE12	SE6	SSE14	SSE13	SSE13	SSE16	S19	SSE20	SSE23	SSE20	SSE24	SSE26	S30	S30	S28	SSW20	SSW22	SSW21	SSE15.0	S30	
28-Oct	SW19	SW14	WSW14	W19	W22	W22	W21	WNNW21	WNNW24	NW28	NW32	NW27	NW26	NW28	WNNW27	WNNW28	NW30	NW28	NW30	NW29	NW23	NNW19	NNW23	NNW26	WNNW21.7	NW32	
29-Oct	NNW21	NNW19	NNW18	NNW17	N18	N16	N14	N15	NNW11	NNW15	NNW13	NNW11	NNW12	NNW8	NW10	NW9	NW11	WNNW3	SW6	SW8	SW10	SW11	SW10	SW10	NW9.2	NNW21	
30-Oct	SW9	WSW9	WSW11	WSW11	SW8	SW7	SSW6	SSW6	SSW5	SE5	SSE3	ESE8	ESE5	ESE5	E4	ENE3	NW2	WNNW3	WNNW3	NNW3	N9	NNE6	NE8	ENE12	SW1.1	ENE12	
31-Oct	ENE10	NE11	ENE11	SE11	ESE18	E19	E23	E28	E26	ENE22	ENE25	ENE24	ENE26	ENE26	NE26	ENE23	NE19	NNE16	NNE16	N13	N15	N16	N16	N16	ENE16.2	E28	

WNNW2.0	NW1.9	WNNW2.4	WNNW2.0	NW1.6	NNW1.3	NW0.7	NW0.9	NW0.5	N1.4	NNW1.2	NNW1.9	NW2.7	NW3.4	NNW3.5	NNW3.6	NNW3.6	NNW3.3	NW3.0	NW2.8	NW2.5	NW2.2	NW1.9	NW2.0	Diurnal Average
ESE34	ESE33	ESE27	E24	SE25	ESE27	ESE25	E28	SE28	NW28	NW32	E31	SW28	NW28	WNNW27	WNNW28	NNW30	NW28	S30	S30	S28	SSW20	ESE28	ESE34	Diurnal Maximum

AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

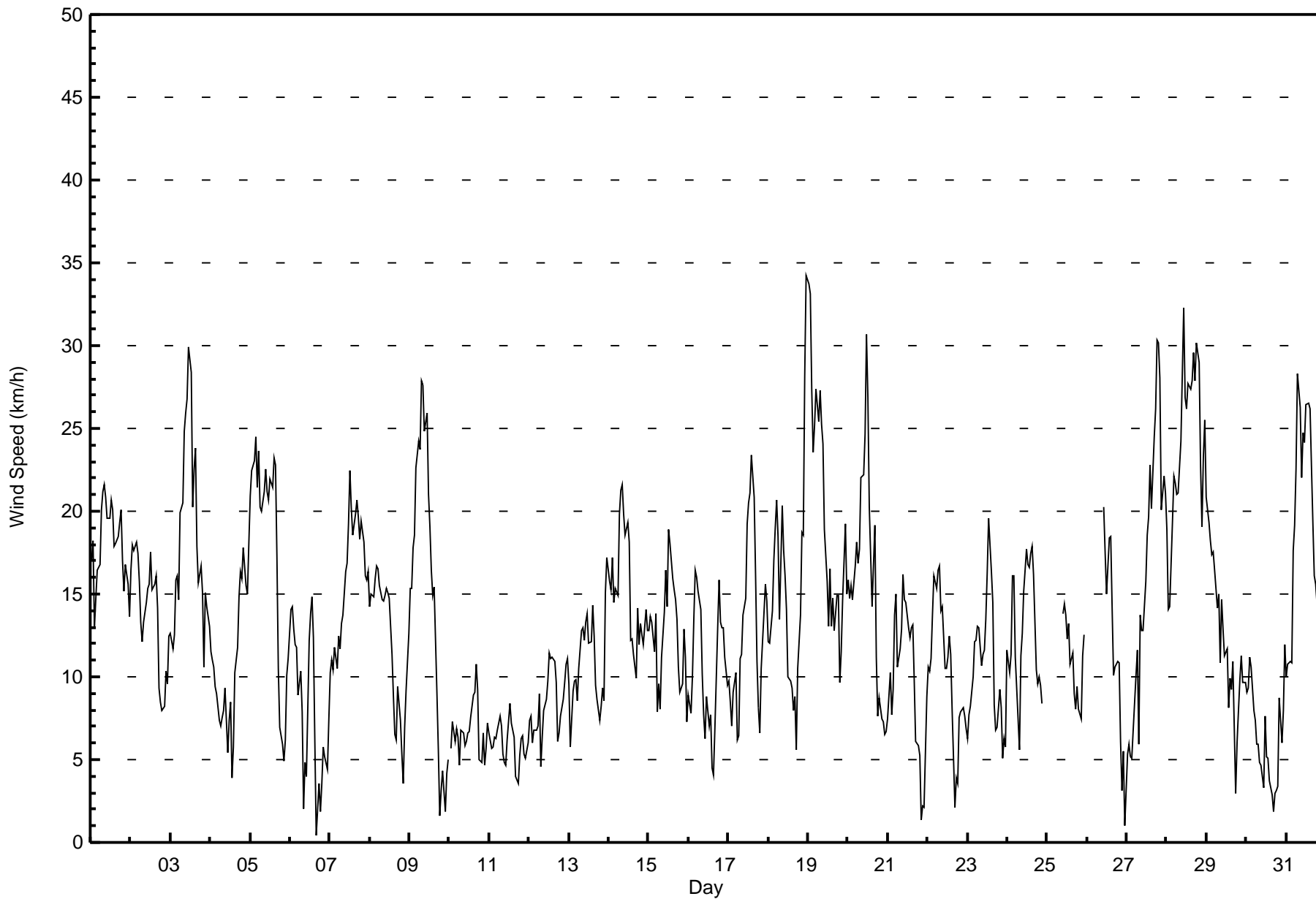
**Wind Speed (WS) - km/h**  
**Fort Chipewyan - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Oct 28 11:00	Hours in Service: 744 Hours of Data: 721 Hours of Missing Data: 23 Hours of Calibration: 0 Percent Operational Time: 96.9
Minimum Value: 1 km/h on Oct 6 20:00	
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 5 P <sub>99</sub> = 9	

Day	Hourly Period Ending At (MST)																								Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	5	5	3	4	5	5	6	6	6	6	6	6	7	7	6	6	7	7	7	6	6	6	6	5	7		
2-Oct	6	6	6	6	6	5	4	4	5	5	5	6	6	5	5	6	4	2	1	1	1	2	2	2	6		
3-Oct	2	1	3	3	4	3	4	3	4	4	4	4	5	4	6	6	4	4	4	4	3	5	6	4	6		
4-Oct	4	4	3	3	4	2	3	2	3	3	2	2	3	2	2	2	1	2	2	2	1	2	2	2	4		
5-Oct	2	3	2	2	2	2	2	2	2	2	2	2	2	3	2	4	4	3	4	2	2	2	2	3	4		
6-Oct	3	2	2	3	3	2	3	3	1	2	4	4	4	4	3	4	2	1	1	1	1	3	3	2	4		
7-Oct	2	2	2	3	3	4	4	4	4	5	5	6	7	6	6	7	6	6	5	6	5	5	5	5	7		
8-Oct	4	5	4	5	6	5	5	5	5	5	5	5	5	5	3	3	3	3	2	2	2	2	1	2	6		
9-Oct	3	3	2	2	3	3	3	3	3	3	3	3	1	2	1	1	3	1	2	1	2	1	2	2	3		
10-Oct	AF	3	2	1	2	1	1	1	1	2	2	2	2	2	3	3	3	3	1	1	2	2	2	2	3		
11-Oct	1	1	1	1	1	1	2	2	2	2	1	3	3	2	2	3	1	1	1	2	2	1	1	2	3		
12-Oct	2	2	2	2	2	2	2	2	2	3	3	4	4	4	4	4	3	1	1	2	2	2	2	2	4		
13-Oct	2	1	2	1	1	1	2	3	3	3	4	3	4	4	4	3	3	2	1	1	2	2	2	3	4		
14-Oct	2	2	2	2	2	2	2	2	3	3	3	3	4	3	2	3	2	4	3	2	3	2	2	2	4		
15-Oct	2	2	2	2	3	2	2	2	3	3	2	2	3	3	2	2	2	1	2	2	2	1	1	2	3		
16-Oct	3	5	3	3	4	3	4	3	3	2	2	2	2	2	2	2	3	1	2	2	2	2	2	2	5		
17-Oct	2	2	1	1	1	2	1	2	2	2	2	3	3	3	3	4	4	3	3	2	4	4	5	4	5		
18-Oct	3	3	4	5	6	6	5	8	6	5	4	4	3	3	3	2	3	3	2	2	2	2	4	3	8		
19-Oct	3	4	3	2	2	3	3	3	2	2	3	2	3	3	2	3	1	1	2	2	1	3	2	3	4		
20-Oct	1	2	2	2	2	3	2	2	3	3	4	3	5	4	3	3	3	4	2	2	1	1	1	1	5		
21-Oct	1	2	2	2	4	4	2	3	3	4	3	3	3	3	3	3	2	1	1	1	1	1	1	2	4		
22-Oct	1	1	1	3	3	3	2	2	2	2	3	3	2	1	2	1	1	2	2	2	2	2	2	2	3		
23-Oct	2	2	2	2	3	3	3	3	3	3	3	3	5	4	4	3	1	2	2	2	3	1	2	1	5		
24-Oct	2	2	3	2	2	2	2	3	3	3	4	5	5	5	5	5	5	4	2	3	3	2	AF	AF	5		
25-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	4	4	4	4	4	4	4	2	1	1	1	2	2	3	AF	AF	4
26-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	6	3	4	5	4	4	2	2	1	2	1	1	2	2	6		
27-Oct	1	1	2	2	2	1	2	3	2	3	2	3	3	3	3	3	5	4	4	4	4	3	3	4	5		
28-Oct	3	2	2	5	5	5	5	5	6	9	10	8	9	9	7	8	9	8	9	9	7	8	9	10	10		
29-Oct	7	7	6	6	6	6	5	5	4	5	4	4	4	4	4	3	3	2	2	1	2	2	1	2	7		
30-Oct	2	2	2	2	1	1	1	1	2	1	1	2	1	1	1	1	1	1	1	2	2	3	2	3	3		
31-Oct	2	2	2	3	2	2	2	3	4	3	4	5	4	5	5	5	5	4	5	4	4	4	4	5	5		
	7	7	6	6	6	6	6	8	6	9	10	8	9	9	7	8	9	8	9	9	7	8	9	10			
	Diurnal Maximum																										

AF - Analyzer Failure







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h  
Fort Chipewyan - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	60	8.32	8.32
6 - 11	262	36.34	44.66
12 - 19	280	38.83	83.50
20 - 28	108	14.98	98.47
29 - 38	11	1.53	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 721

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Wind Speed (WS) - km/h  
Fort Chipewyan - October 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	6	2	1	5	2	3	5	4	1	2	5	3	5	5	5	6	60
6 - 11	41	10	5	5	20	13	5	4	2	13	16	16	29	26	28	29	262
12 - 19	18	2	2	7	14	27	13	14	8	9	11	10	24	32	42	47	280
20 - 28	0	0	1	12	22	6	11	5	5	8	2	3	4	4	21	4	108
29 - 38	0	0	0	0	1	3	0	0	2	0	1	0	0	0	4	0	11
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	65	14	9	29	59	52	34	27	18	32	35	32	62	67	100	86	721

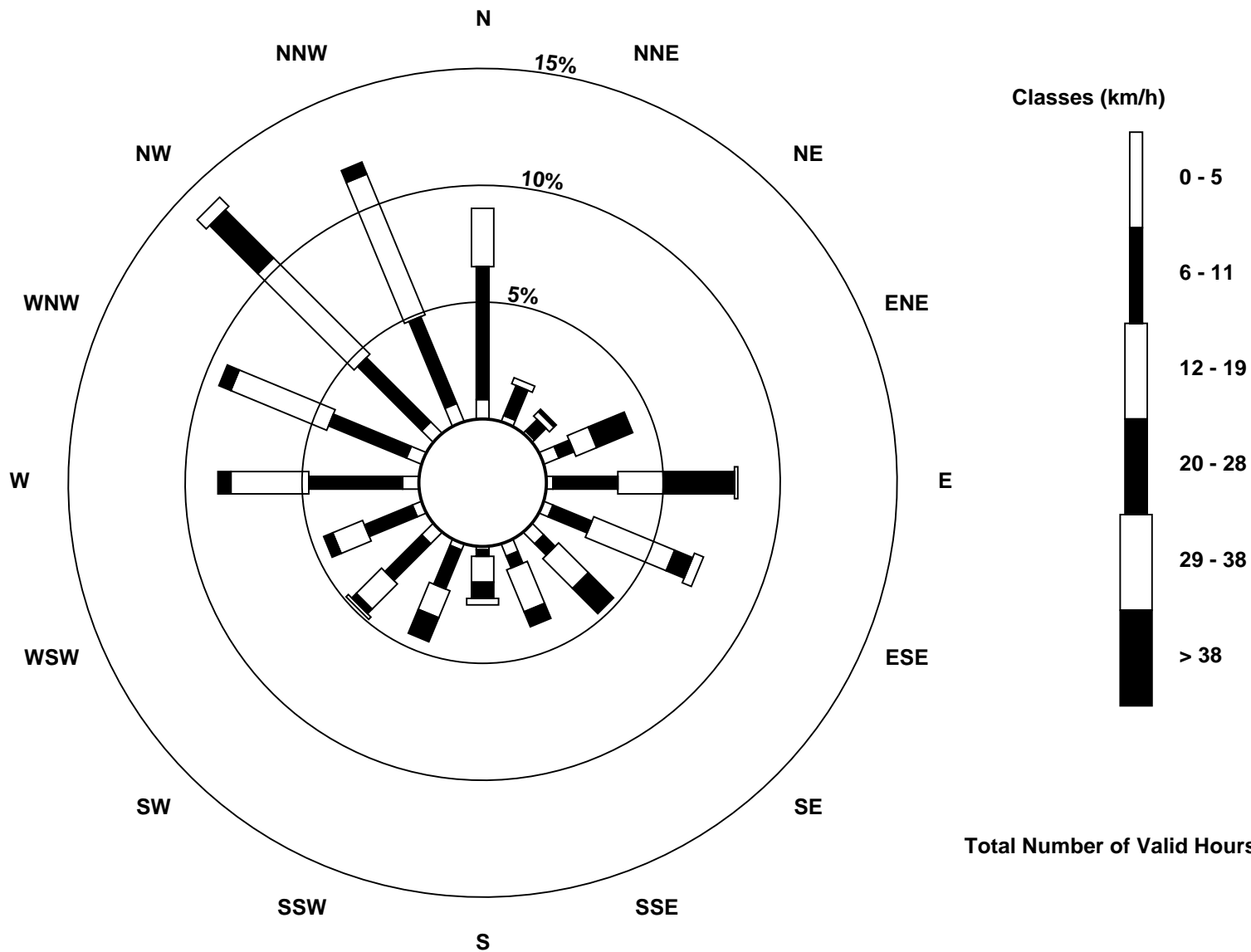
Total Number of Valid Hours: 721

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed (WS) - km/h  
Fort Chipewyan (AMS 8)





**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Wind Direction (WD) - deg**  
**Fort Chipewyan - October 2017**

Direction of Maximum Speed: 108 deg on Oct 19 00:00																					Hours in Service: 744					
Direction of Maximum Daily Speed Average: 301.7 deg on Oct 28																					Hours of Data: 721					
Direction of Minimum Speed: 254 deg on Oct 6 17:00										Direction of Minimum Daily Speed Average: 0.5 deg on Oct 16											Hours of Missing Data: 23					
Monthly Average Direction: 305.8 deg																					Percent Operational Time: 96.9					
Day	Hourly Period Ending At (MST)																								Daily Average	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	300	306	299	303	315	308	315	316	319	319	319	323	324	323	328	331	336	339	338	341	343	344	342	339	323.8	
2-Oct	342	342	344	343	331	327	328	334	341	351	354	341	331	332	321	322	312	304	304	281	280	284	256	255	325.2	
3-Oct	251	234	230	226	214	212	206	214	208	210	211	217	225	238	257	268	278	276	283	293	320	328	336	322	242.6	
4-Oct	326	339	343	325	348	325	316	316	312	296	314	296	277	304	120	100	95	100	107	115	113	122	101	92	54.6	
5-Oct	91	92	91	97	89	90	90	89	90	92	89	87	90	82	77	71	66	45	25	121	221	227	264	277	86.4	
6-Oct	267	276	279	273	278	281	264	274	142	218	217	258	267	292	308	313	254	344	76	168	207	255	249	263	271.0	
7-Oct	295	292	312	324	311	337	327	310	317	315	311	324	323	322	323	326	324	322	323	323	321	323	323	326	320.0	
8-Oct	328	330	334	333	336	332	333	339	332	326	336	330	336	343	342	359	315	303	318	340	265	231	202	199	326.0	
9-Oct	220	182	166	153	145	146	144	142	141	139	138	139	127	120	119	121	146	138	74	330	19	134	234	279	144.6	
10-Oct	AF	360	356	348	353	11	1	1	349	360	3	348	339	335	346	350	347	345	325	301	320	307	301	342	344.5	
11-Oct	359	353	352	352	352	352	352	353	73	63	40	22	26	3	7	354	16	353	10	15	14	354	339	349	6.0	
12-Oct	347	347	360	5	11	25	34	338	315	9	4	355	352	354	8	359	355	351	350	338	353	347	352	346	356.1	
13-Oct	346	315	299	309	300	273	276	285	290	302	306	307	323	306	278	304	305	269	266	251	241	234	221	206	283.9	
14-Oct	207	194	197	195	194	191	187	183	180	175	177	181	194	219	226	247	264	270	281	289	295	285	285	290	214.3	
15-Oct	290	288	290	275	270	245	226	206	193	174	166	139	160	164	148	139	122	96	103	103	101	115	100	69	161.2	
16-Oct	83	79	299	294	286	282	273	272	265	246	200	212	278	232	270	357	103	91	94	90	82	89	87	85	295.0	
17-Oct	91	92	85	89	100	88	103	90	86	84	73	73	81	71	68	63	51	30	17	359	357	358	353	345	60.2	
18-Oct	331	326	324	324	325	325	321	325	318	306	299	298	311	310	296	253	243	231	187	162	135	126	110	108	315.8	
19-Oct	104	107	115	114	125	114	112	122	124	127	136	141	161	172	153	158	132	111	113	115	95	102	113	112	121.5	
20-Oct	103	103	109	113	110	108	99	96	95	88	87	84	80	78	62	63	66	61	32	41	352	346	321	300	82.5	
21-Oct	291	295	290	278	282	285	295	292	285	282	280	280	279	277	276	274	269	254	250	229	168	130	189	158	276.4	
22-Oct	173	162	146	136	124	118	121	117	133	116	118	92	91	101	93	106	128	311	272	274	276	274	271	279	128.4	
23-Oct	272	266	271	274	284	289	295	297	303	285	261	258	254	251	241	242	240	209	203	226	213	148	157	142	256.8	
24-Oct	185	195	194	143	124	100	95	303	312	318	311	314	322	324	316	325	330	315	297	317	329	317	AF	AF	313.8	
25-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	0	9	10	8	4	346	344	335	327	308	318	238	239	237	AF	AF	--
26-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	213	226	240	263	263	260	261	279	285	289	303	274	286	355	--	
27-Oct	84	92	200	104	119	111	124	139	156	157	155	164	170	166	158	159	167	163	176	178	186	192	195	204	166.8	
28-Oct	218	234	249	267	269	271	280	285	298	313	315	306	309	311	302	302	310	314	316	320	322	330	336	333	301.7	
29-Oct	335	335	337	338	354	353	355	353	346	348	348	328	333	331	324	317	316	285	234	217	226	231	223	225	326.2	
30-Oct	236	239	258	258	235	220	206	202	193	145	166	102	111	108	100	78	304	297	287	337	359	30	50	65	215.4	
31-Oct	68	55	69	128	102	91	97	88	88	76	65	65	62	58	56	59	44	27	20	10	5	2	1	356	58.9	
303.0	313.4	298.2	297.1	308.5	338.7	321.7	322.5	306.6	351.3	334.7	326.7	325.9	325.2	329.0	338.4	339.6	334.0	318.6	307.9	318.6	318.1	308.9	324.5			
Diurnal Average																										
AF - Analyzer Failure																										
All monthly, daily, and diurnal averages have been calculated using vector methods																										



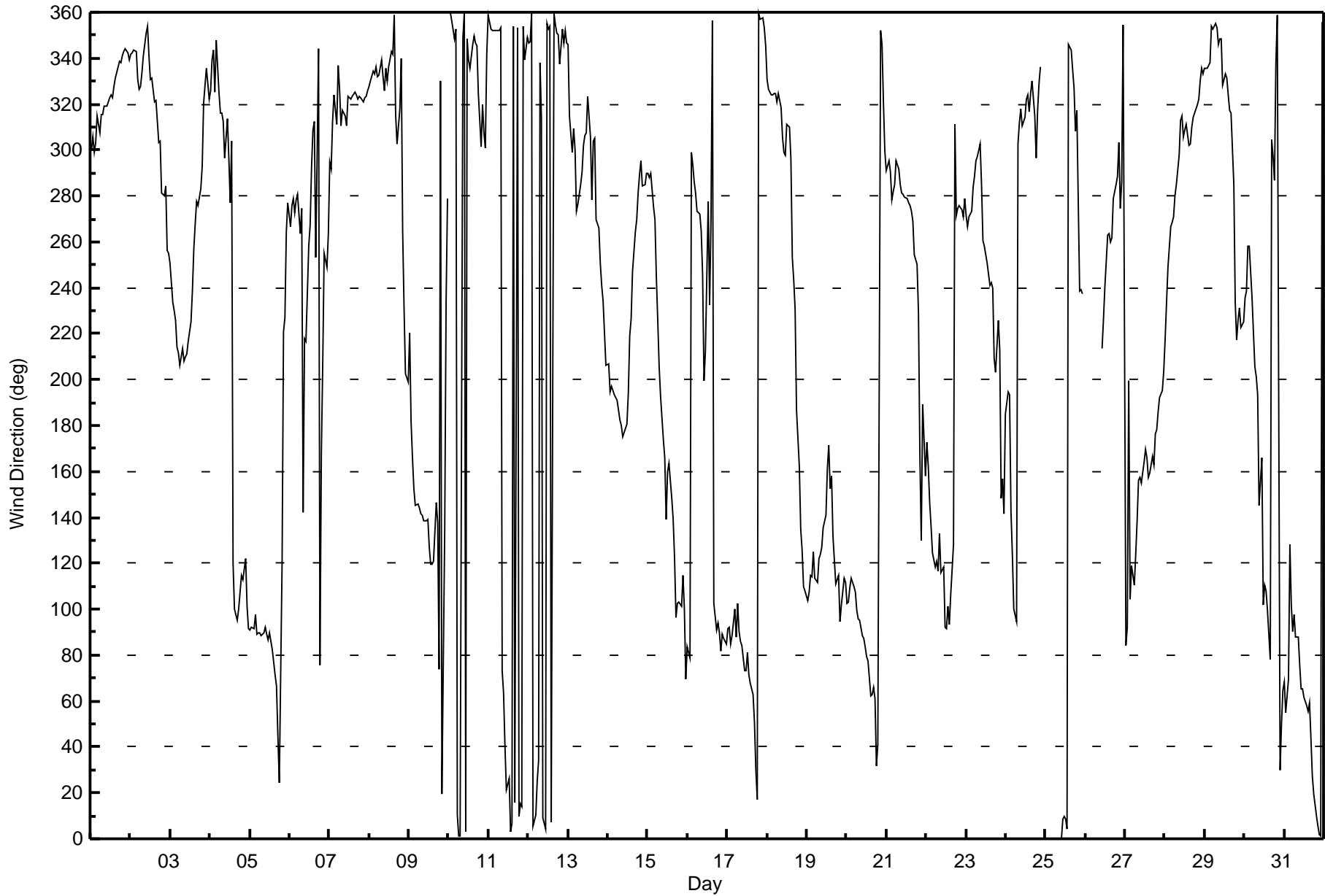
**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Direction (WD) - deg**  
**Fort Chipewyan - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 89 deg on Oct 6 17:00	Hours of Data: 721
Minimum Value: 0 deg on Oct 11 05:00	Hours of Missing Data: 23
Percentiles: P <sub>1</sub> = 5 P <sub>10</sub> = 7 Q <sub>1</sub> = 10 Median = 15 Q <sub>3</sub> = 21 P <sub>90</sub> = 27 P <sub>99</sub> = 63	Hours of Calibration: 0
	Percent Operational Time: 96.9

Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	16	17	17	17	18	18	17	17	17	18	17	19	19	21	23	24	23	23	24	24	25	24	26	24	26	
2-Oct	22	23	24	23	20	20	21	23	24	25	27	29	24	27	23	23	17	13	10	10	10	11	15	12	29	
3-Oct	13	6	10	9	10	14	11	9	8	9	8	9	10	12	16	16	14	14	13	19	18	21	25	18	25	
4-Oct	22	26	23	22	25	21	17	18	28	25	32	25	22	79	37	12	7	5	8	8	7	6	7	7	79	
5-Oct	8	6	5	6	6	5	6	6	5	5	5	6	5	7	8	10	10	17	56	29	40	13	21	17	56	
6-Oct	11	12	11	12	13	15	14	20	56	20	50	17	18	23	16	44	89	41	68	43	28	40	63	12	89	
7-Oct	10	14	16	18	19	23	20	18	19	18	19	21	19	20	19	20	19	18	18	19	18	19	20	19	23	
8-Oct	21	21	21	22	22	20	21	23	24	24	24	22	23	26	27	31	28	16	27	23	52	27	14	11	52	
9-Oct	9	15	10	8	8	8	9	7	7	8	9	7	7	7	6	7	15	13	57	42	24	64	26	24	64	
10-Oct	AF	25	19	16	18	21	11	16	16	17	19	22	23	22	22	22	21	20	21	13	14	19	23	15	25	
11-Oct	13	5	0	0	0	0	0	0	37	31	27	29	25	26	31	23	25	16	16	17	24	21	21	19	37	
12-Oct	17	15	19	18	19	16	14	28	17	31	29	29	28	32	25	25	21	15	15	15	18	15	15	12	32	
13-Oct	13	12	6	6	10	12	12	12	14	17	18	18	21	24	22	19	17	13	13	10	13	19	9	9	24	
14-Oct	9	9	8	8	7	8	7	7	8	9	9	11	15	19	18	16	14	14	13	13	14	12	12	13	19	
15-Oct	13	12	11	12	14	23	10	27	12	11	11	14	9	13	8	9	11	9	8	14	8	9	13	12	27	
16-Oct	24	64	14	15	14	14	13	15	17	21	19	23	27	17	38	27	15	5	8	9	7	7	8	7	64	
17-Oct	9	19	29	10	12	32	12	6	6	7	8	9	7	9	8	9	14	16	18	18	18	21	19	20	32	
18-Oct	19	19	19	18	19	19	17	18	16	16	16	16	20	21	21	20	23	27	10	11	7	8	6	5	27	
19-Oct	6	6	6	6	7	6	6	6	5	6	7	10	13	12	14	12	8	7	9	12	15	13	6	9	15	
20-Oct	6	8	9	8	8	7	8	6	8	6	6	6	7	8	9	10	9	17	22	13	14	13	10	13	22	
21-Oct	10	13	17	13	13	14	14	16	14	13	14	15	15	15	14	14	15	15	11	15	66	48	57	11	66	
22-Oct	8	12	14	14	13	11	11	16	15	13	21	19	18	9	8	11	80	42	42	13	15	16	16	16	80	
23-Oct	18	15	14	14	15	14	15	14	16	17	15	15	16	15	13	12	10	14	18	13	27	23	27	34	34	
24-Oct	11	10	10	15	7	12	25	34	17	16	16	16	19	19	17	20	20	24	18	19	19	19	8	AF	AF	34
25-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	19	21	20	21	22	25	23	17	12	6	10	31	8	7	AF	31
26-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	8	10	16	15	16	13	12	14	9	12	17	51	23	75	75	
27-Oct	14	34	28	21	14	9	12	45	12	13	10	11	9	9	7	9	11	9	9	9	8	7	7	10	45	
28-Oct	10	7	14	14	14	14	14	14	19	18	18	17	18	17	15	16	17	17	18	18	21	25	24	25	25	
29-Oct	24	25	23	23	23	23	22	20	21	23	23	28	26	36	23	21	22	45	15	9	11	10	9	10	45	
30-Oct	12	12	11	11	12	8	12	16	29	26	33	22	18	11	14	18	77	21	37	75	15	56	9	10	77	
31-Oct	10	12	21	11	16	9	8	6	7	9	9	9	11	11	10	11	16	16	19	21	21	18	18	18	21	
	24	64	29	23	25	32	25	45	56	31	50	29	28	79	38	44	89	45	68	75	66	64	63	75		
	Diurnal Maximum																									

AF - Analyzer Failure









# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

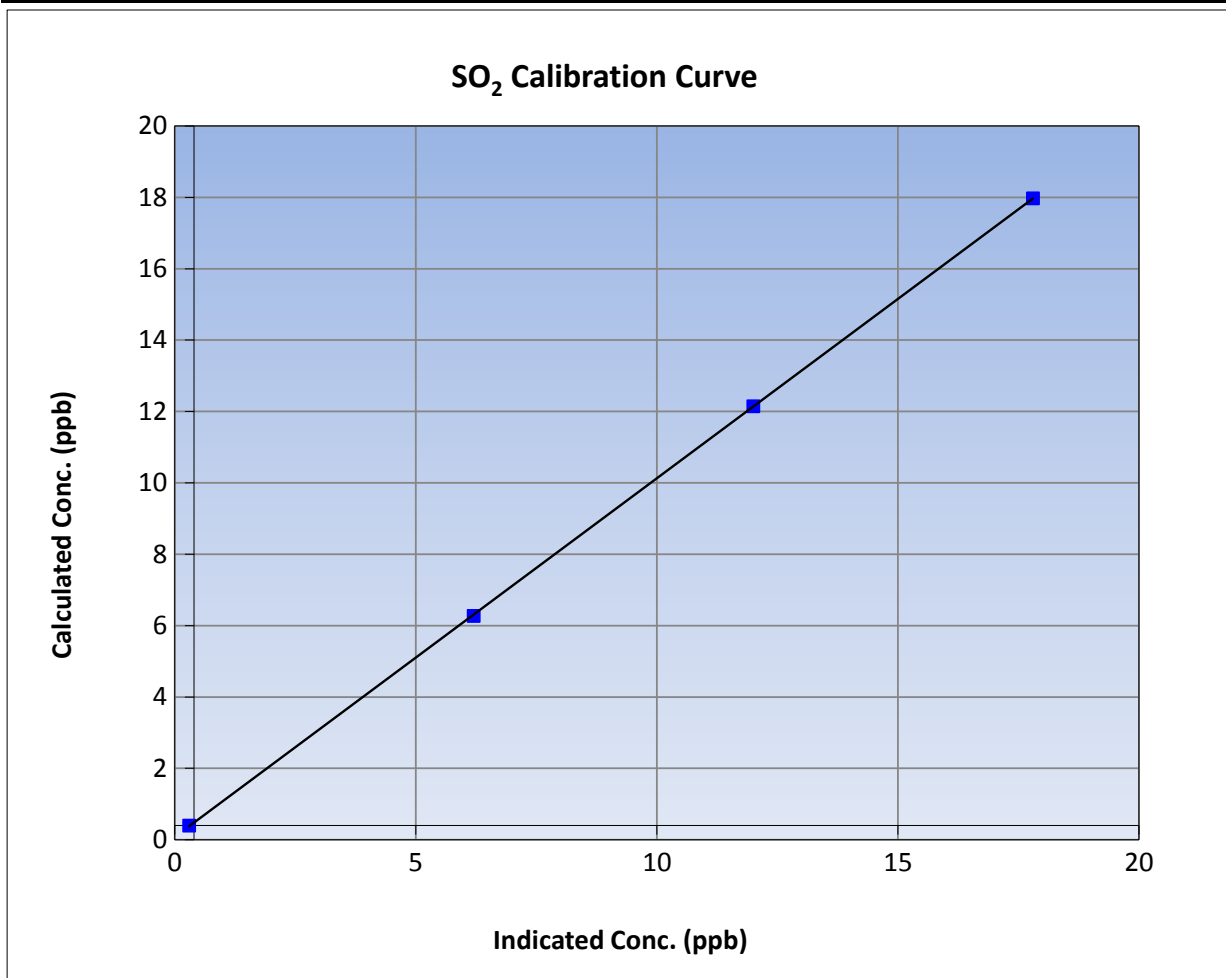
Version-03-2017

### Station Information

Calibration Date	October 11, 2017	Previous Calibration	September 6, 2017
Station Name	Fort Chipewyan	Station Number	AMS 08
Start Time (MST)	10:45	End Time (MST)	16:10
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1136451241

### Calibration Data

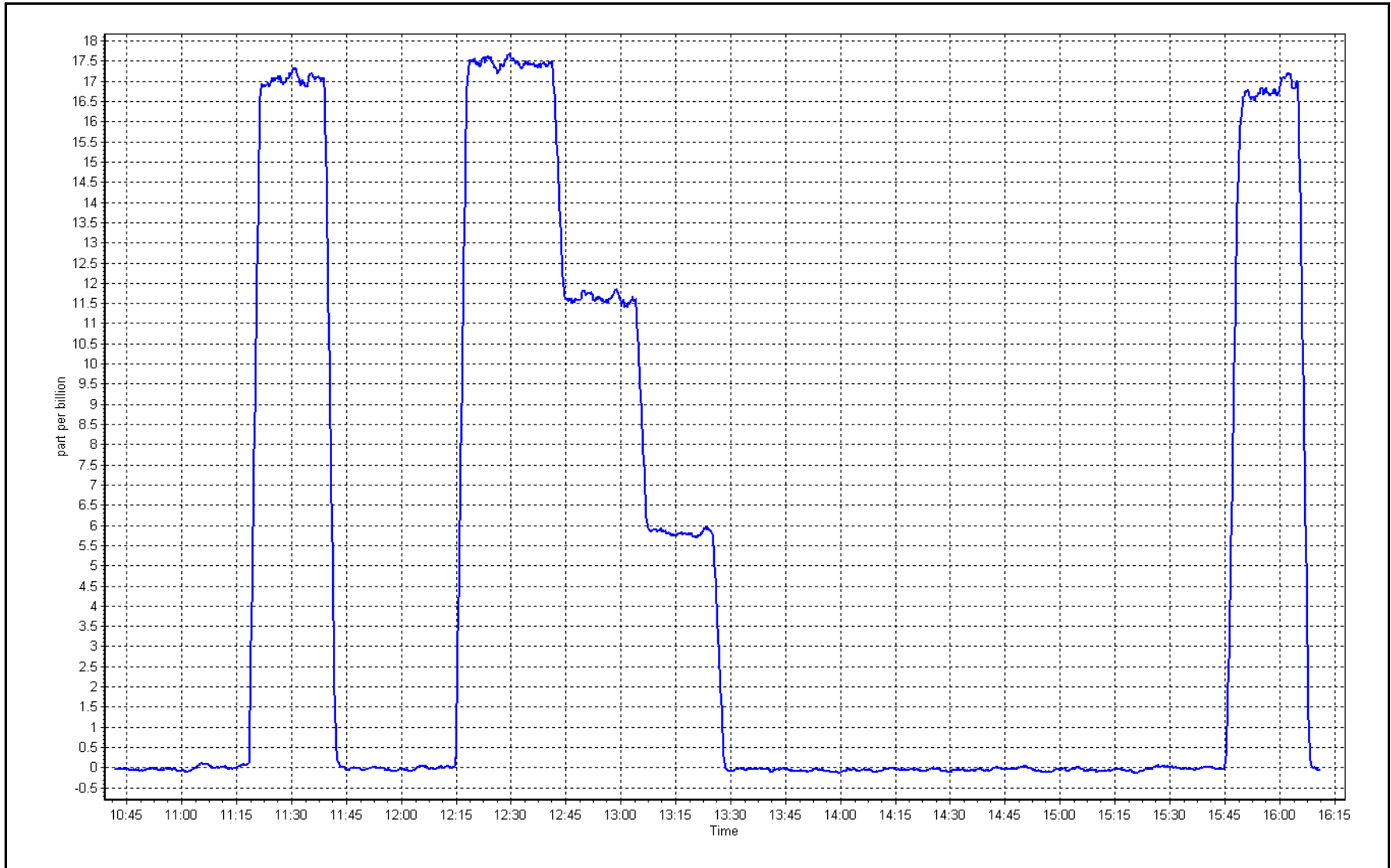
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	-0.1	----	Correlation Coefficient	0.999990	≥0.995
17.6	17.4	1.0099			
11.7	11.6	1.0127	Slope	1.005005	0.90 - 1.10
5.9	5.8	1.0128			
			Intercept	0.080369	+/-30



SO2 Calibration Plot

Date: October 11, 2017

Location: Fort Chipewyan







# Wood Buffalo Environmental Association

## O<sub>3</sub> Calibration Summary

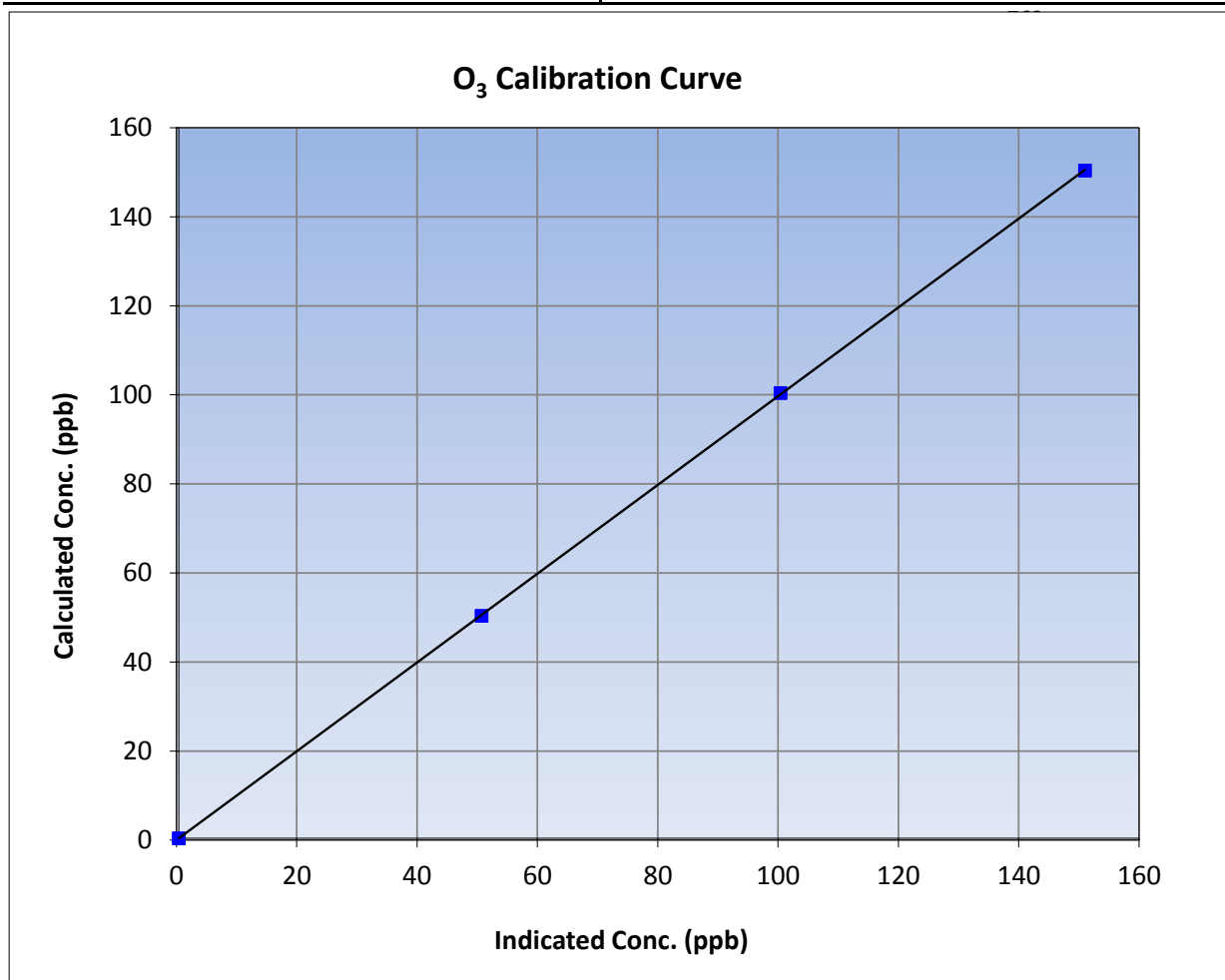
Version-03-2017

### Station Information

Calibration Date	October 12, 2017	Previous Calibration	September 7, 2017
Station Name	Fort Chipewyan	Station Number	AMS 08
Start Time (MST)	7:27	End Time (MST)	10:25
Analyzer make	API T400	Analyzer serial #	1020

### Calibration Data

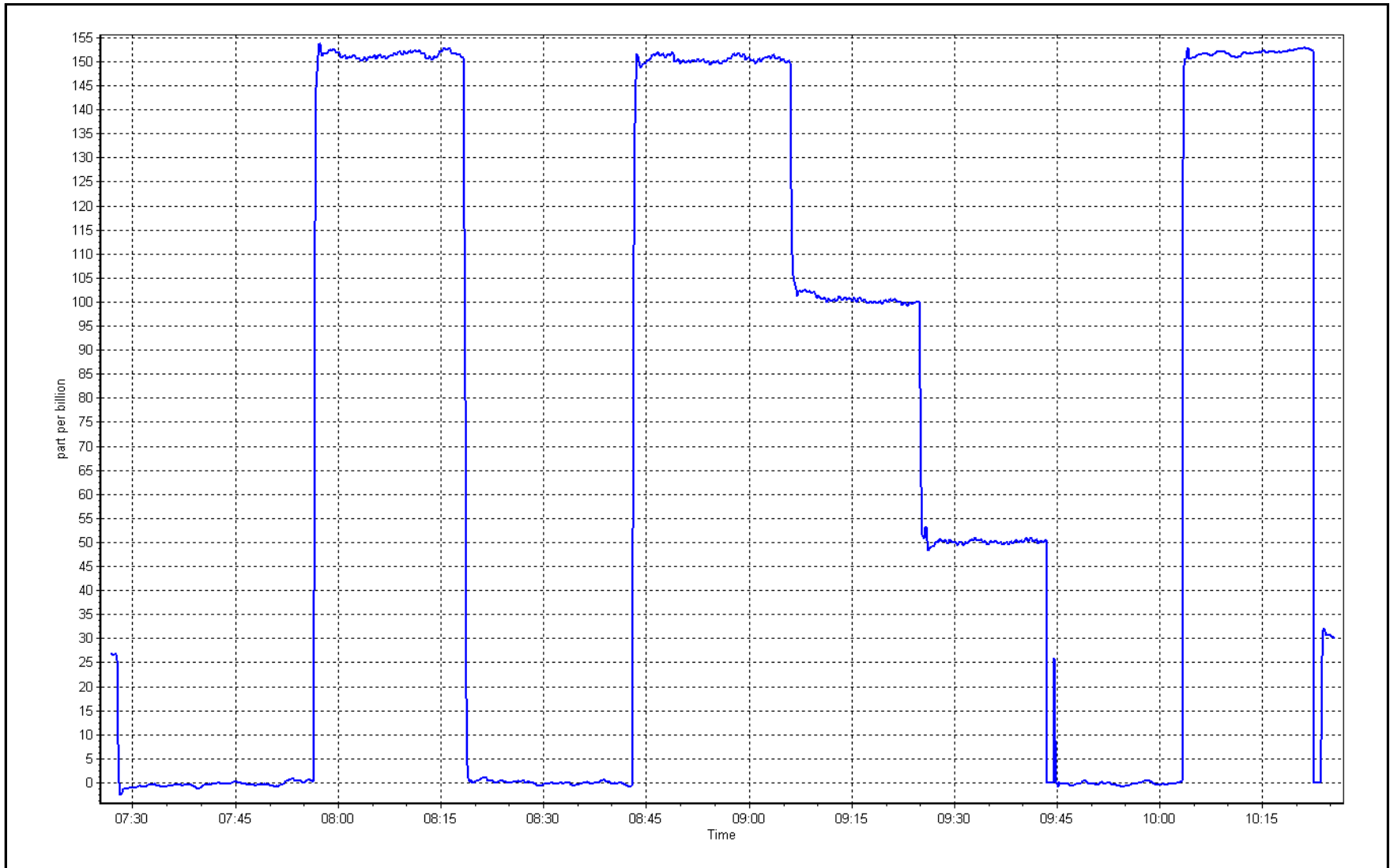
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>
0.0	0.0	----	Correlation Coefficient	≥0.995
150.0	150.6	0.9960		
100.0	100.0	1.0000	Slope	0.90 - 1.10
50.0	50.3	0.9940		
			Intercept	+/- 10



O<sub>3</sub> Calibration Plot

Date: October 12, 2017

Location: Fort Chipewyan





# Wood Buffalo Environmental Association

## NO<sub>x</sub> - NO - NO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Fort Chipewyan	Station number:	AMS 08
Calibration Date:	October 11, 2017	Last Cal Date:	September 6, 2017
Start time (MST):	10:45	End time (MST):	16:10
Reason:	Routine		

### Calibration Standards

NO Gas Cylinder #	LL79696	Cal Gas Expiry Date	February 13, 2018
NOX Cal Gas Conc.	<u>20.1</u> ppb	NO Cal Gas Conc.	<u>20.1</u> ppb
Calibrator Model	API T700	Serial Number	2656
ZAG make/model	ATI T701	Serial Number	4698

### Analyzer Information

Analyzer make: API T200u			Analyzer serial #: 11039		
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO slope	1.325	1.338	NOX Range (ppb)	0 - 1000 ppb	
NOX slope	1.344	1.356	PMT Temperature	5.1	5.1
NO <sub>2</sub> slope	1.000	1.000	Reaction cell Press	5.2	5.2
NO offset	0.1	0.1	Sample Flow	1113	1100
NOX offset	0.2	0.2	PMT Voltage	502.0	502.0

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope	1.002939	1.010582
NO <sub>x</sub> Cal Offset	0.080473	0.146185
NO Cal Slope	1.001538	1.013039
NO Cal Offset	0.110196	0.014194
NO <sub>2</sub> Cal Slope	1.008087	1.001658
NO <sub>2</sub> Cal Offset	0.260104	0.179360



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

Version-03-2017

### Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
as found span	4964	37.4	150.3	150.3	0.0	147.6	147.2	0.5	1.0183	1.0211
calibrator zero	5996	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	----	----
high point	4964	37.4	150.3	150.3	0.0	148.8	148.5	0.3	1.0101	1.0122
second point	4976	25.0	100.5	100.5	0.0	98.9	98.9	0.0	1.0160	1.0160
third point	4988	12.5	50.2	50.2	0.0	49.7	49.7	0.0	1.0110	1.0110
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
as left span	4856	37.4	153.6	46.7	106.9	148.9	46.9	102.0	1.0317	0.9957
<b>Average Correction Factor</b>									<b>1.0124</b>	<b>1.0130</b>

Corrected As found	NO <sub>x</sub> = 147.7 ppb	NO = 147.3 ppb	*Percent Change	NO <sub>x</sub> = 1.4%
Previous Response	NO <sub>x</sub> = 149.8 ppb	NO = 150.0 ppb	*Percent Change	NO = 1.8%

\* = > +/-5% change initiates investigation

### GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
1st NO ref point		0.0	147.9	147.8	0.1	1.0163	1.0170	----	----
1st NO2 (100 ppb O3)	46.7	101.1	147.4	46.7	100.7	1.0197	----	1.0040	99.6%
2nd NO2 (80 ppb O3)	67.0	80.8	147.7	67.0	80.7	1.0176	----	1.0012	99.9%
3rd NO2 (50 ppb O3)	97.9	49.9	147.3	97.9	49.4	1.0204	----	1.0101	99.0%
2nd NO ref point	----	0.0	147.3	147.6	-0.3	1.0204	1.0183	----	----
<b>Average Correction Factor</b>						<b>1.0195</b>	<b>1.0176</b>	<b>1.0051</b>	<b>99.5%</b>

**Notes:** Span with a small adjustment. Ran first GPT point long to allow stabilization.

Calibration Performed By: Ryan Power



# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

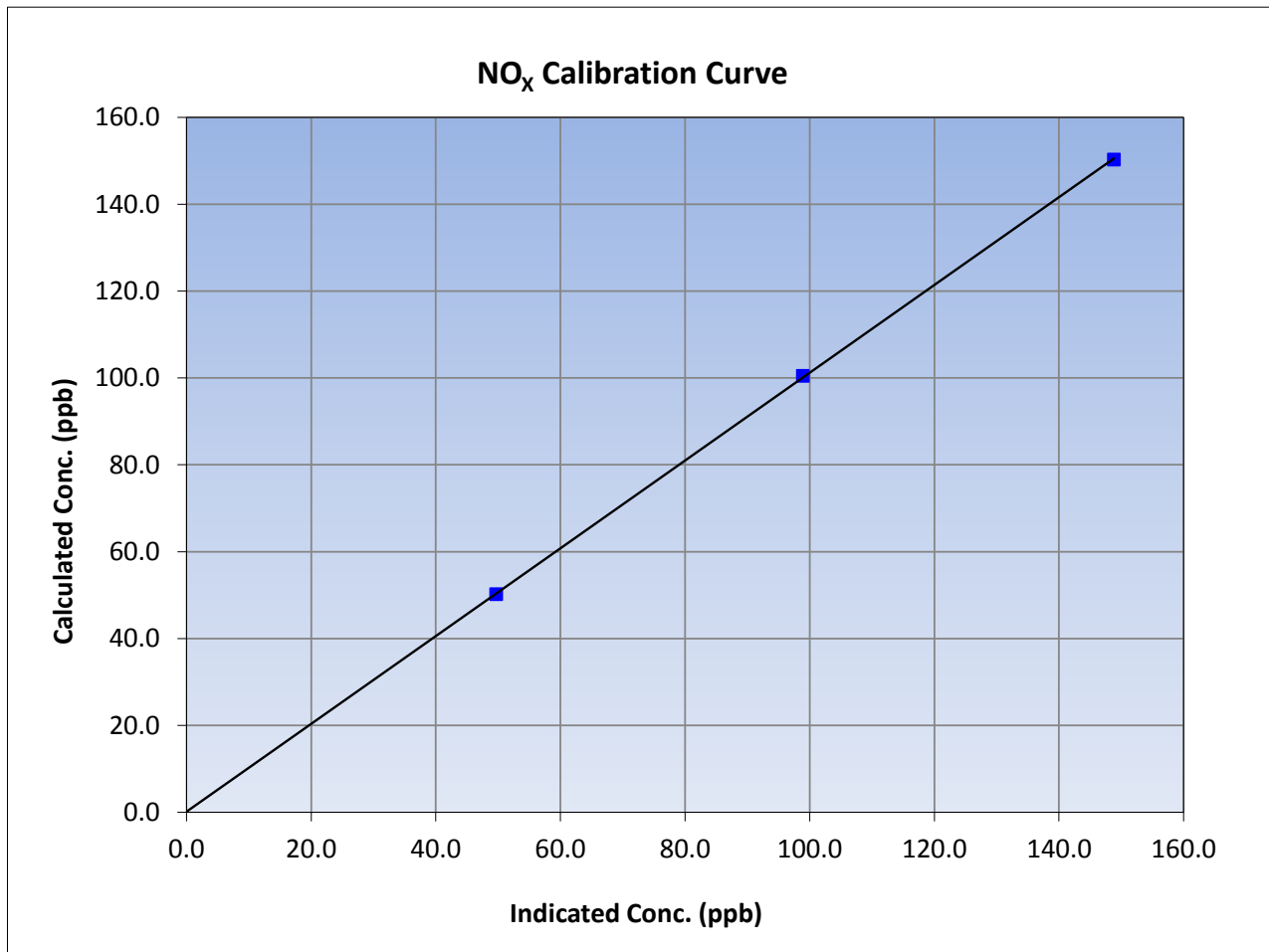
Version-03-2017

### Station Information

Calibration Date	October 11, 2017	Previous Calibration	September 6, 2017
Station Name	Fort Chipewyan	Station Number	AMS 08
Start Time (MST)	10:45	End Time (MST)	16:10
Analyzer make	API T200u	Analyzer serial #	11039

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	-0.1	----	Correlation Coefficient	≥0.995	
150.3	148.8	1.0101			
100.5	98.9	1.0160			
50.2	49.7	1.0110			
			Slope	1.010582	0.90 - 1.10
			Intercept	0.146185	+/-20







# Wood Buffalo Environmental Association

## NO Calibration Summary

Version-03-2017

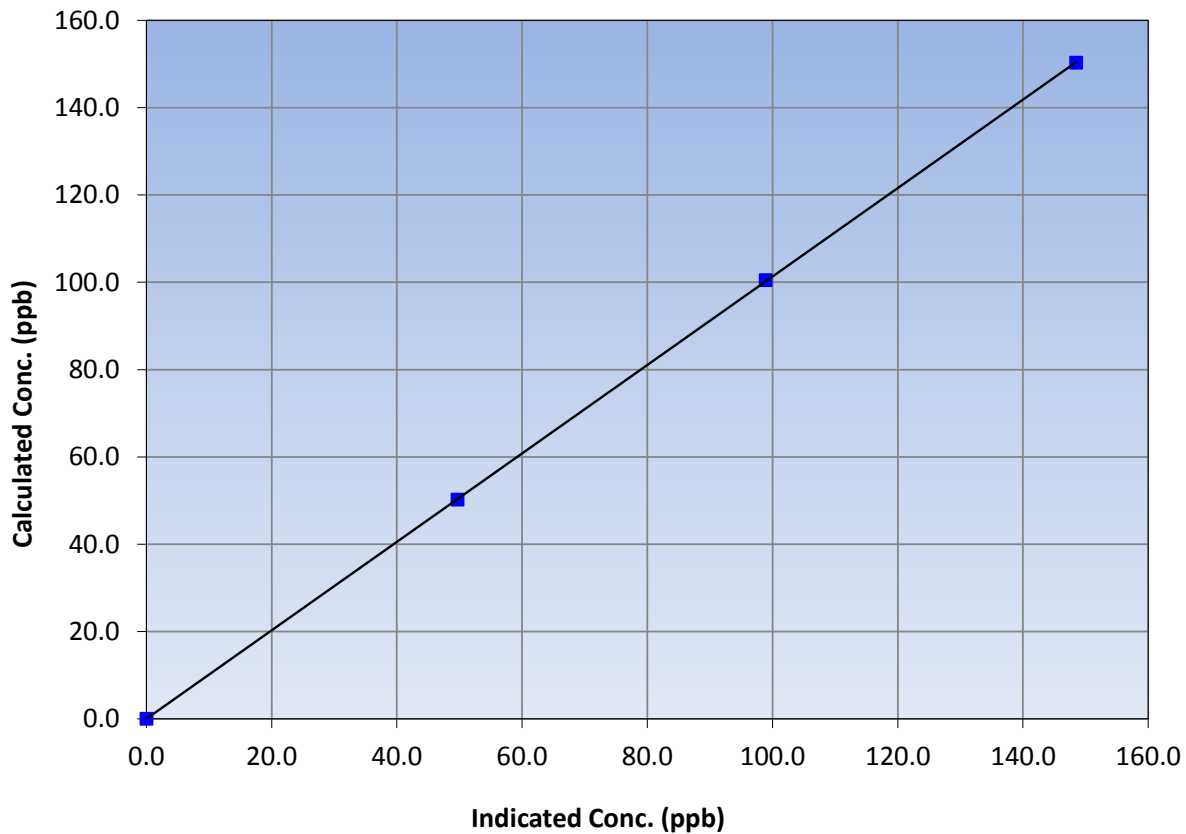
### Station Information

Calibration Date	October 11, 2017	Previous Calibration	September 6, 2017
Station Name	Fort Chipewyan	Station Number	AMS 08
Start Time (MST)	10:45	End Time (MST)	16:10
Analyzer make	API T200u	Analyzer serial #	11039

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	0.0	----	Correlation Coefficient	≥0.995	
150.3	148.5	1.0122			
100.5	98.9	1.0160			
50.2	49.7	1.0110			
			Slope	1.013039	0.90 - 1.10
			Intercept	0.014194	+/-20

NO Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

Version-03-2017

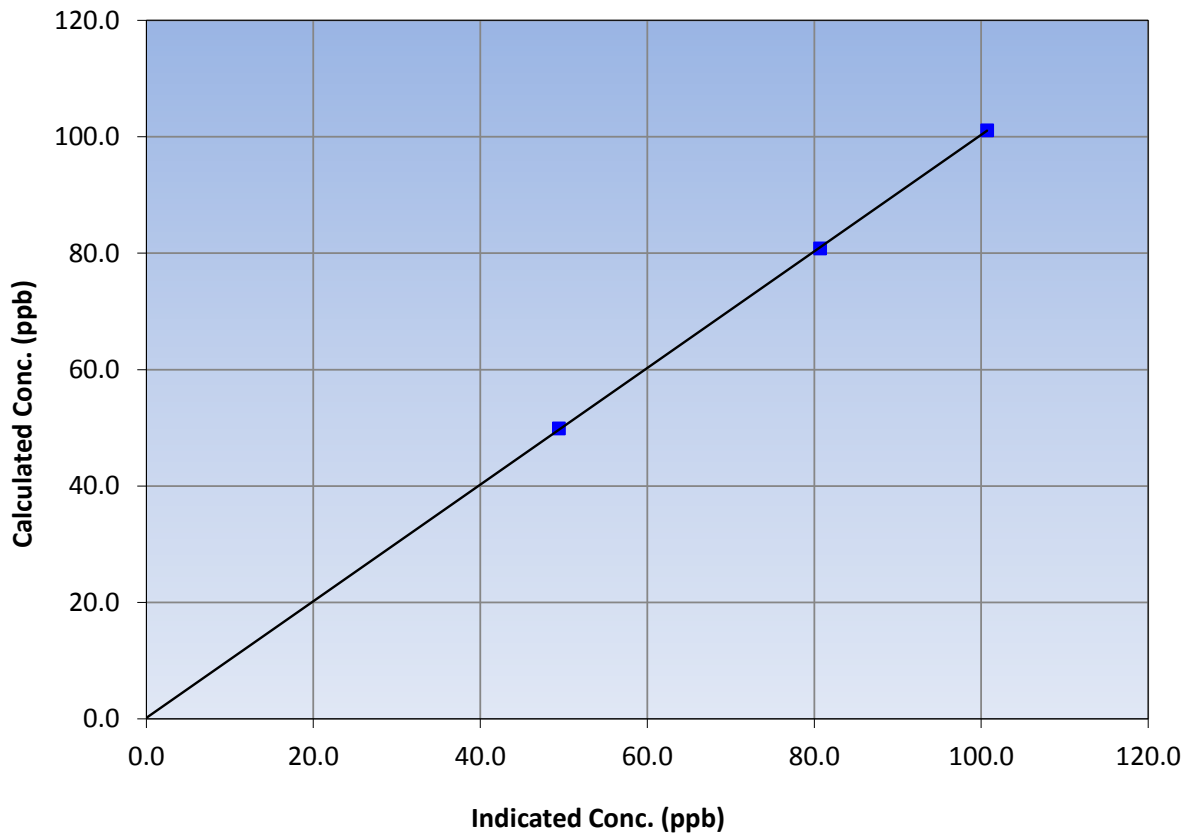
### Station Information

Calibration Date	October 11, 2017	Previous Calibration	September 6, 2017
Station Name	Fort Chipewyan	Station Number	AMS 08
Start Time (MST)	10:45	End Time (MST)	16:10
Analyzer make	API T200u	Analyzer serial #	11039

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	-0.1	----	Correlation Coefficient	≥0.995	
101.1	100.7	1.0040			
80.8	80.7	1.0012			
49.9	49.4	1.0101			
			Slope	1.001658	0.90 - 1.10
			Intercept	0.179360	+/-20

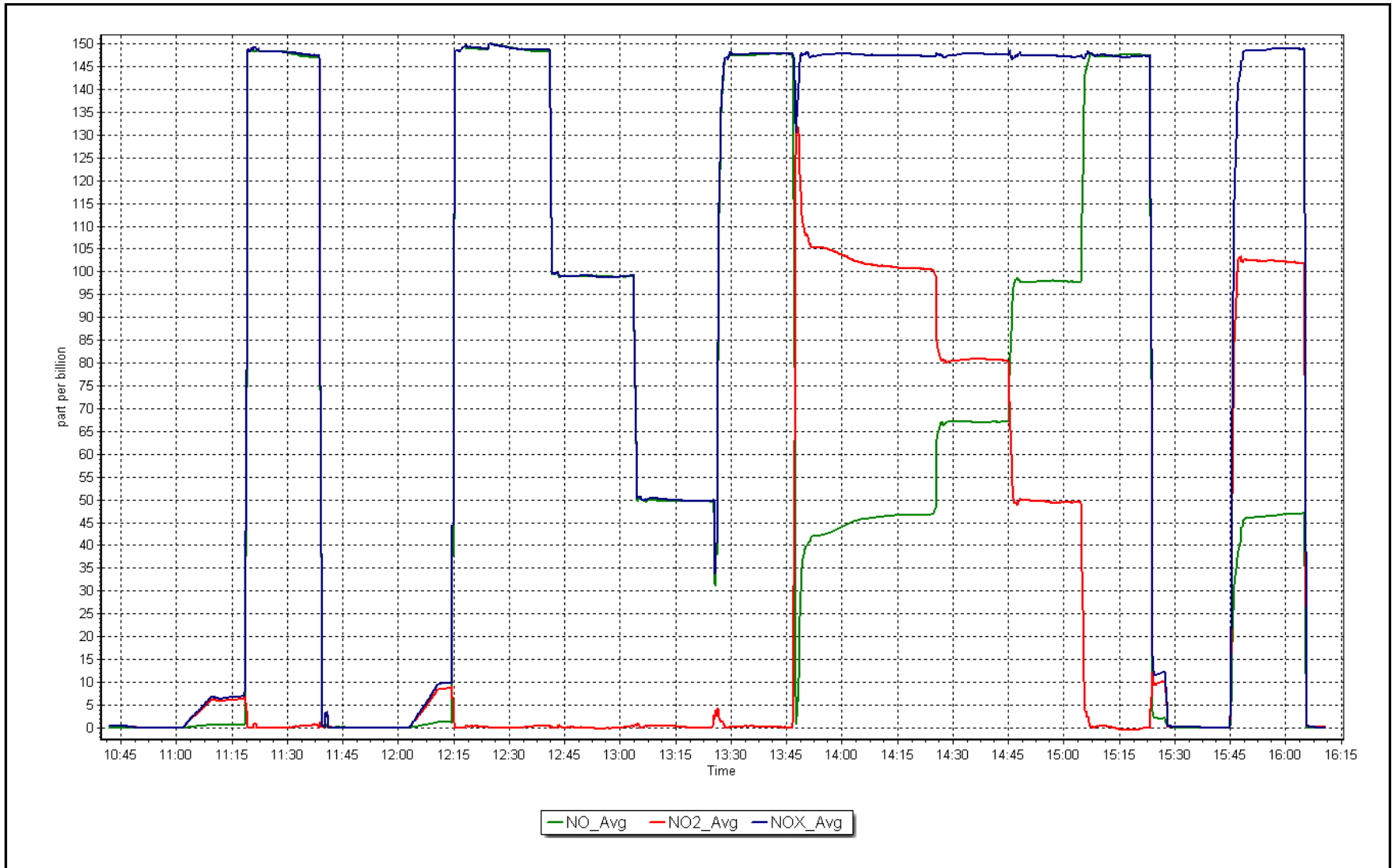
**NO<sub>2</sub> Calibration Curve**



NO<sub>x</sub> Calibration Plot

Date: October 11, 2017

Location: Fort Chipewyan





# Wood Buffalo Environmental Association

## SHARP PM<sub>2.5</sub> CALIBRATION

Version-02-2017

### Station Information

Station Name:	Fort Chipewyan	Station number:	AMS 08
Calibration Date:	October 11, 2017	Last Cal Date:	NA
Start time (MST):	15:00	End time (MST):	16:57
Sharp Model:	Thermo 5030	S/N:	E-772
Particulate Fraction:	PM2.5	C14 Source S/N:	4085
Flow Meter Make/Model:	Delta Cal	S/N:	1451
Temp/RH standard:	Delta Cal	S/N:	1451

### Monthly Calibration Test

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<b>(Limits)</b>
T1 (°C)	5	1.1	1	<input checked="" type="checkbox"/>	+/- 2 °C
P3 (hPa)	985	987.25	985	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	996	1000	<input checked="" type="checkbox"/>	+/- 50 LPH
Nephelometer zero	22.6	-----	0.1	<input type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified	<input checked="" type="checkbox"/>			
Cyclone cleaning :	PM10 Cyclone	<input checked="" type="checkbox"/>	PM2.5 Cyclone	<input checked="" type="checkbox"/>	
Date Filter Tape Installed:					

### Quarterly Calibration Test

Leak Test:	Date of check:	<u>October 10, 2017</u>	Last Cal Date:	<u>NA</u>
	Flow w/o adaptor:	<u>16.7</u>	Flow w/ adaptor:	<u>16.6</u>

**(Limit) 0.4 LPM**

Adjusted

Foil Calibration

**(Limit) +/- 5% of previous**

<u>Current Test</u>	<u>Previous Test</u>	<u>% Change</u>
Foil S/N: <u>5868</u>	Foil S/N: _____	
Foil Mass: <u>1324</u>	Foil Mass: _____	
Calibration Date: <u>October 11, 2017</u>	Calibration Date: _____	
Correction Factor: <u>6905</u>	Correction Factor: _____	---

### Annual Calibration Test (Oct 10, 2017)

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<b>(Limits)</b>
T2 (°C)	22	24	24	<input checked="" type="checkbox"/>	+/- 2 °C
T3 (°C)	23	24	24	<input checked="" type="checkbox"/>	+/- 2 °C
T4 (°C)	24	24	24	<input type="checkbox"/>	+/- 2 °C
RH (%)	25	25	25	<input type="checkbox"/>	+/- 10%
Date Sample Tube Cleaned:		June 2, 2017			
Date Pump Rebuilt/Replaced:		Not available			

Notes: Replacement SHARP install, Annual calibration carried out the previous day. C batteries changed

Calibration by: Ryan Power



## WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 9  
BARGE LANDING  
OCTOBER 2017**

Operations, Data Collection,  
QA/QC, Data Validation and Reporting by:  
Wood Buffalo Environmental Association  
Fort McMurray, Alberta

November 29, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)  
OCTOBER 2017

MONTHLY SUMMARY for  
AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
TRS(ppb) Average	707	37	37	100	2	0	1	0
THC(ppm) Average	708	36	36	100	3.3	-	2.8	-
Temperature (C) Average	744	0	0	100	23.7	-	14.6	-
Relative Humidity (%) Average	744	0	0	100	99	-	99	-
Wind Speed 10 m (km/h) Average	744	0	0	100	22	-	13	-
Wind Direction 10 m (deg) Average	744	0	0	100	-	-	-	-

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)  
 OCTOBER 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
TRS(ppb) Average	707	0.3	0	-	0	0	0	0	0	1	2
THC(ppm) Average	708	2.22	0.2	-	1.9	2	2.1	2.1	2.3	2.6	3.3
Temperature (C) Average	744	3.14	4.8	-	-6.6	-2	-0.3	2.1	5.5	9.4	23.7
Relative Humidity (%) Average	744	75.4	17	-	28	51	65	77	89	97	99
Wind Speed 10 m (km/h) Average	744	7.3	4	-	0	2	4	7	10	13	22
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)  
OCTOBER 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
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No operational issues to report





Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

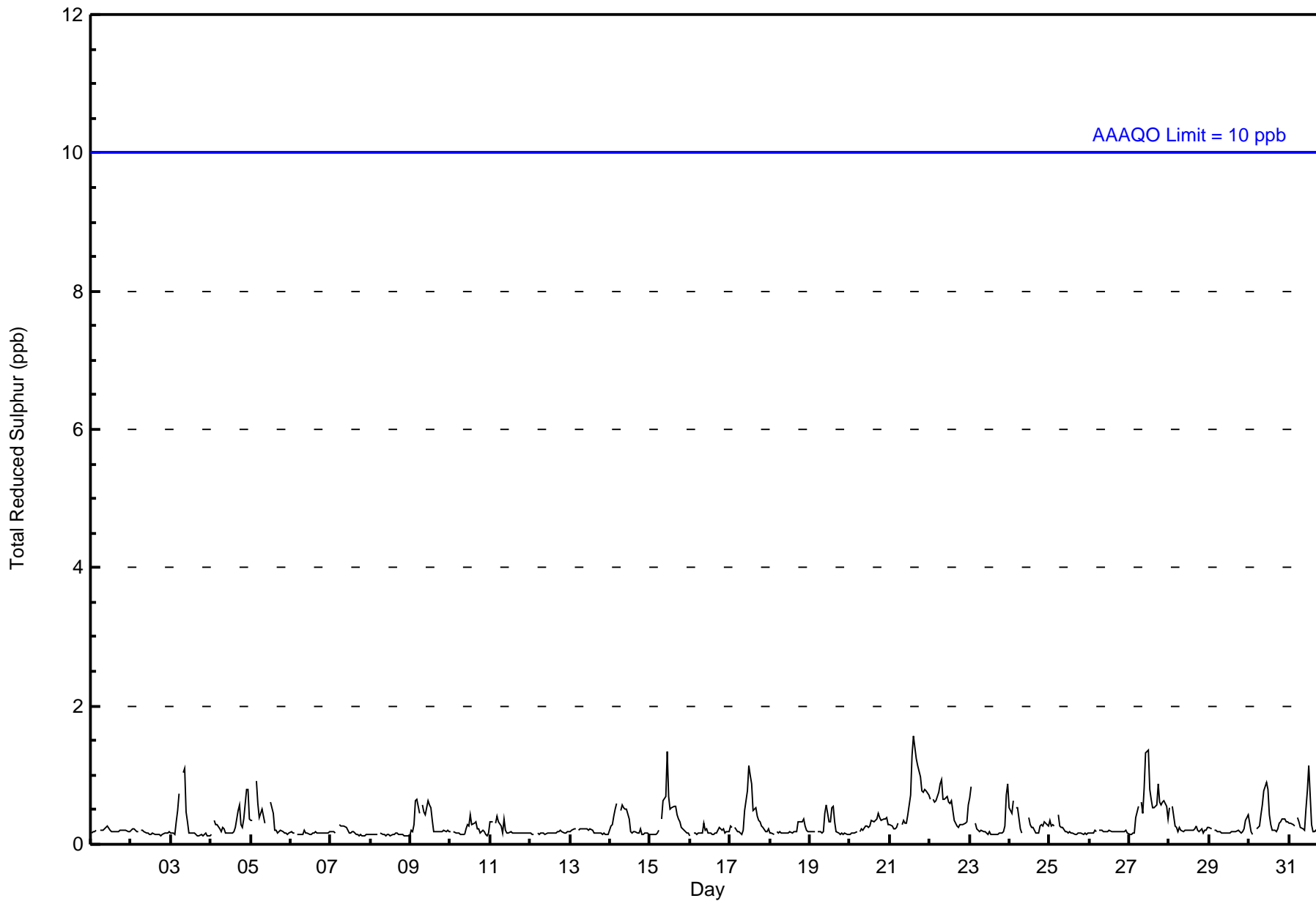
Barge Landing - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 2 ppb on Oct 21 15:00 Maximum Daily Average: 0.7 ppb on Oct 21																	Hours in Service: 744 Hours of Data: 707 Hours of Missing Data: 37 Hours of Calibration: 37 Percent Operational Time: 100.0									
Minimum Value: 0 ppb on Oct 8 22:00 Minimum Daily Average: 0.1 ppb on Oct 8 Maximum Diurnal Average: 0.4 ppb at hour 11 Minimum Diurnal Average: 0.2 ppb at hour 20 Monthly Average: 0.3 ppb Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 1																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
3-Oct	0	0	0	0	0	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
4-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0.3	1
5-Oct	0	0	Z	1	1	0	0	0	0	C	C	C	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
6-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
7-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
8-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
9-Oct	0	0	0	1	1	0	Z	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
10-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
11-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
12-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
13-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
14-Oct	0	0	0	1	1	Z	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
15-Oct	0	0	0	0	0	0	Z	0	1	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0.4	1
16-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
17-Oct	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0.4	1
18-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
19-Oct	0	0	0	0	Z	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0.3	1
20-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
21-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	1	1	2	1	1	1	1	1	1	1	1	1	0.7	2
22-Oct	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0.5	1
23-Oct	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.3	1
24-Oct	1	0	1	Z	1	1	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
25-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
26-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
27-Oct	0	0	0	0	0	1	Z	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
28-Oct	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
29-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
30-Oct	0	0	0	Z	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
31-Oct	0	0	0	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
0.3 0.2 0.3 0.3 0.3 0.3 0.2 0.3 0.3 0.3 0.4 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.2 0.2 0.2 0.3 0.3 0.3																								Diurnal Average		
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1 1 1 1 1 1 1 1 1																								Diurnal Maximum		
Z - zerospan C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Total Reduced Sulphur (TRS) - ppb**  
**Barge Landing - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Barge Landing - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	707	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb  
Barge Landing - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	92	49	23	7	5	14	28	48	78	41	44	63	53	20	45	97	707
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	92	49	23	7	5	14	28	48	78	41	44	63	53	20	45	97	707

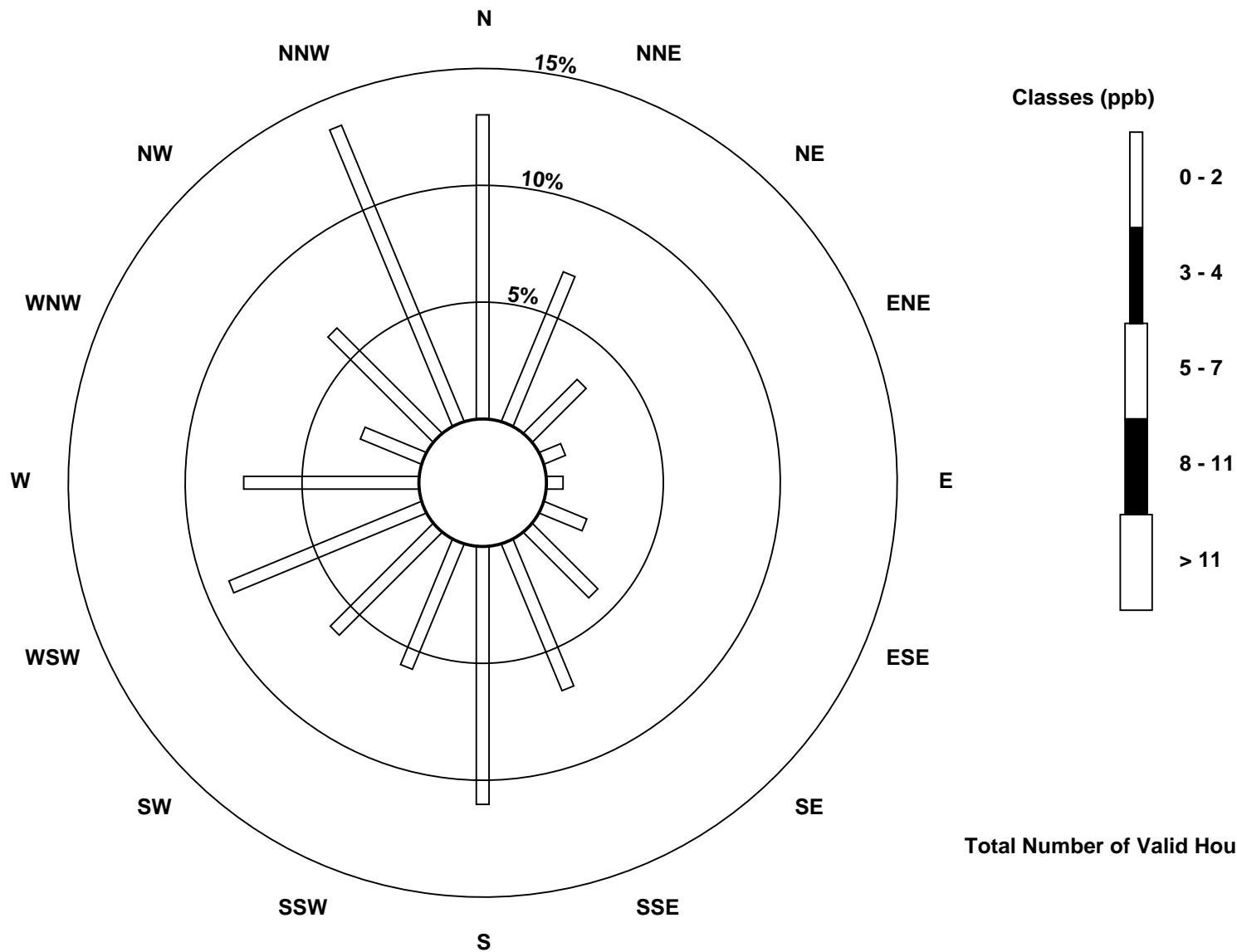
Total Number of Valid Hours: 707

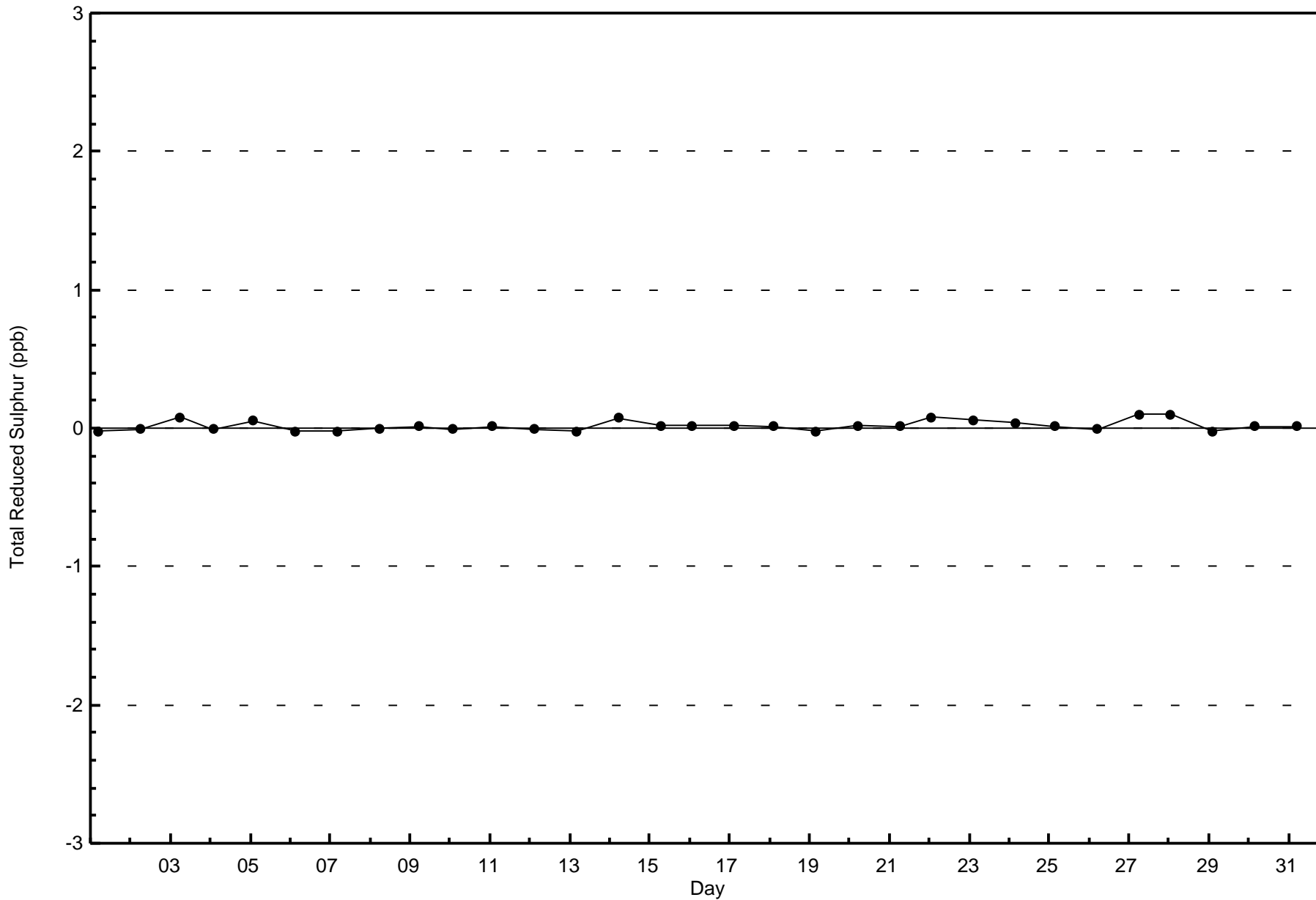
Total Number of Hours: 744

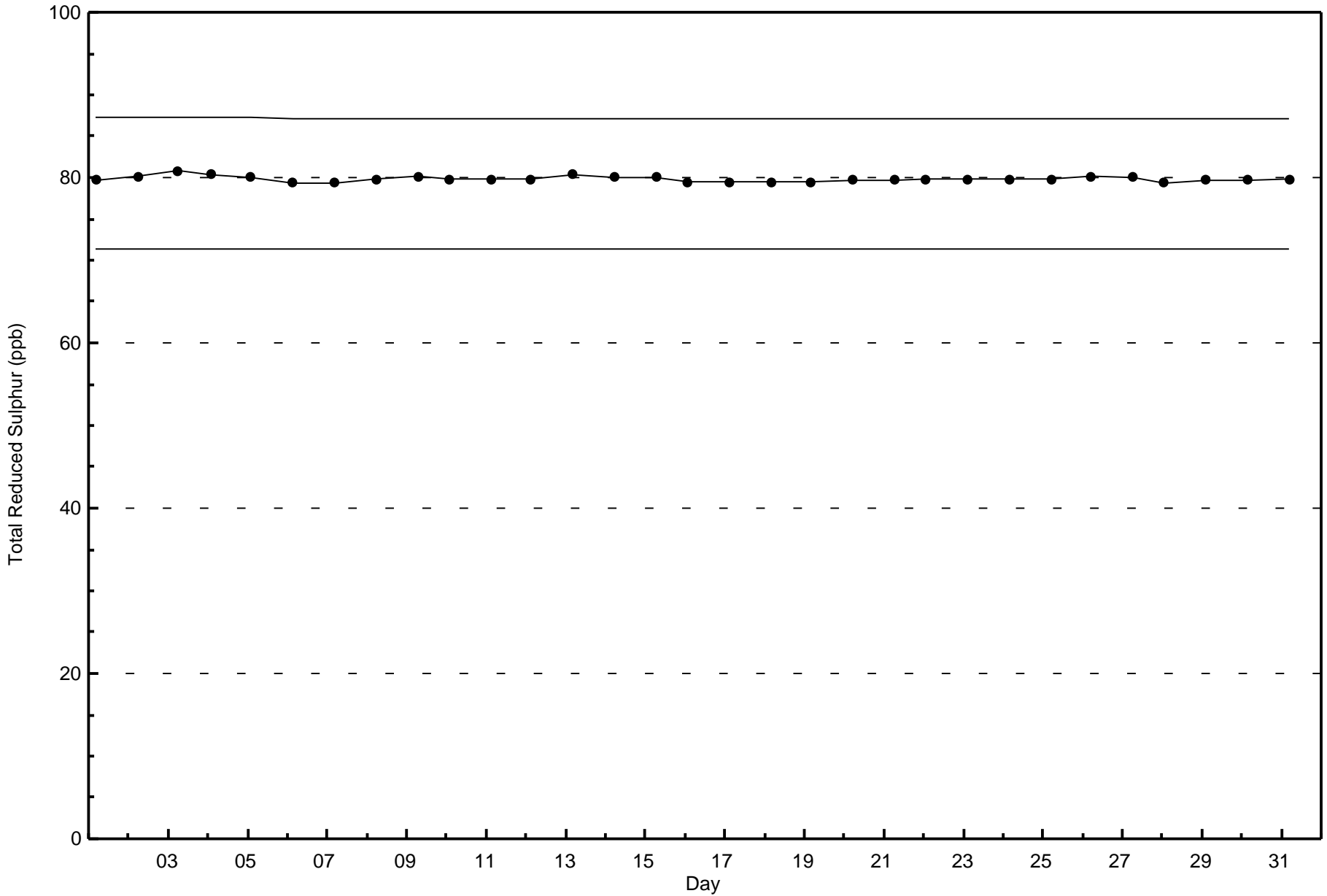


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Total Reduced Sulphur (TRS) - ppb  
Barge Landing (AMS 9)

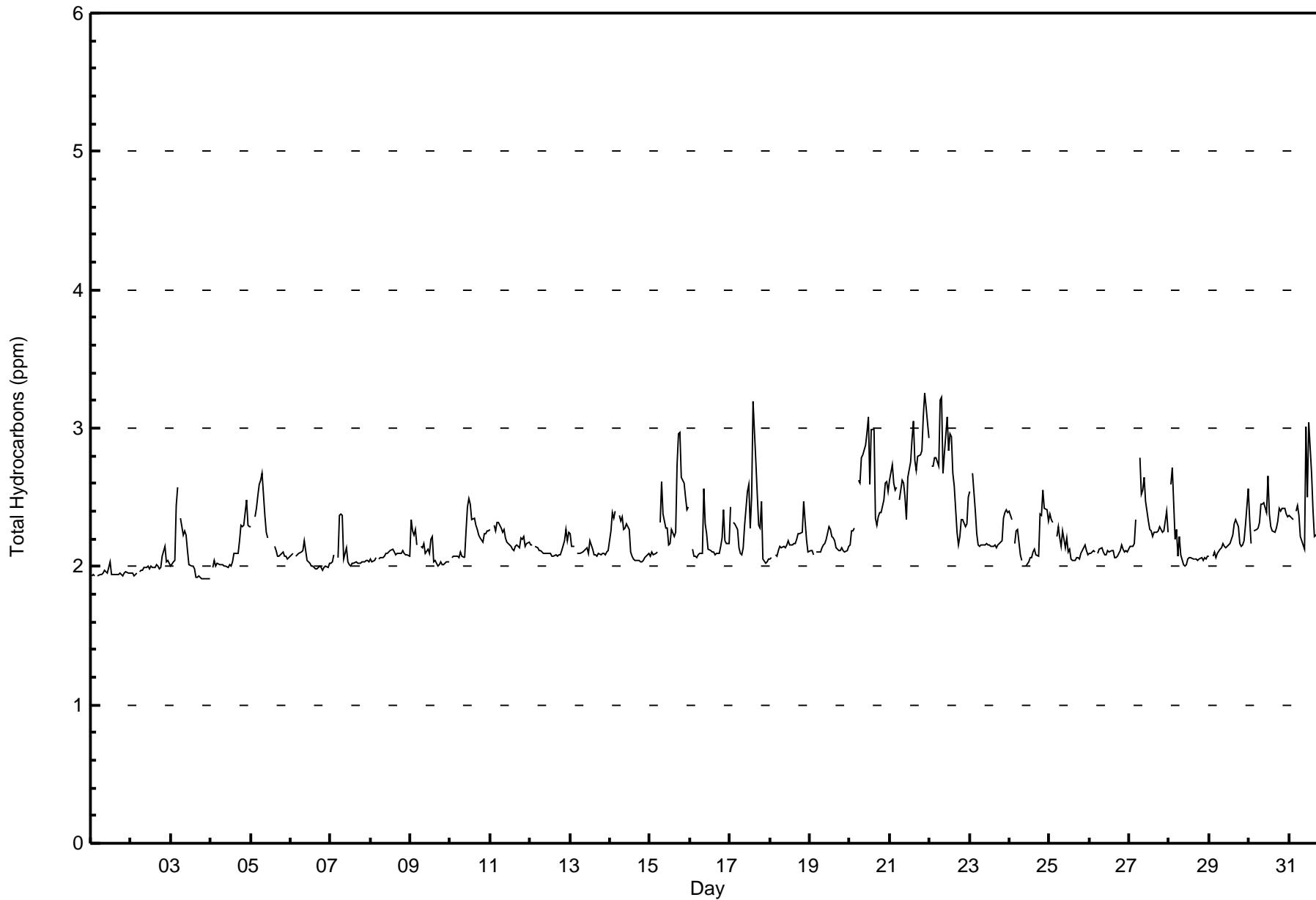














**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm  
Barge Landing - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	134	18.93	18.93
2.1 - 3.0	565	79.80	98.73
3.1 - 10.0	9	1.27	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm  
Barge Landing - October 2017**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	32	1	0	0	0	0	0	0	1	5	7	19	25	7	15	22	134
2.1 - 3.0	59	45	21	6	5	15	27	51	75	35	37	45	26	14	30	74	565
3.1 - 10.0	1	2	1	1	0	0	0	1	0	0	0	0	1	0	1	1	9
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	92	48	22	7	5	15	27	52	76	40	44	64	52	21	46	97	708

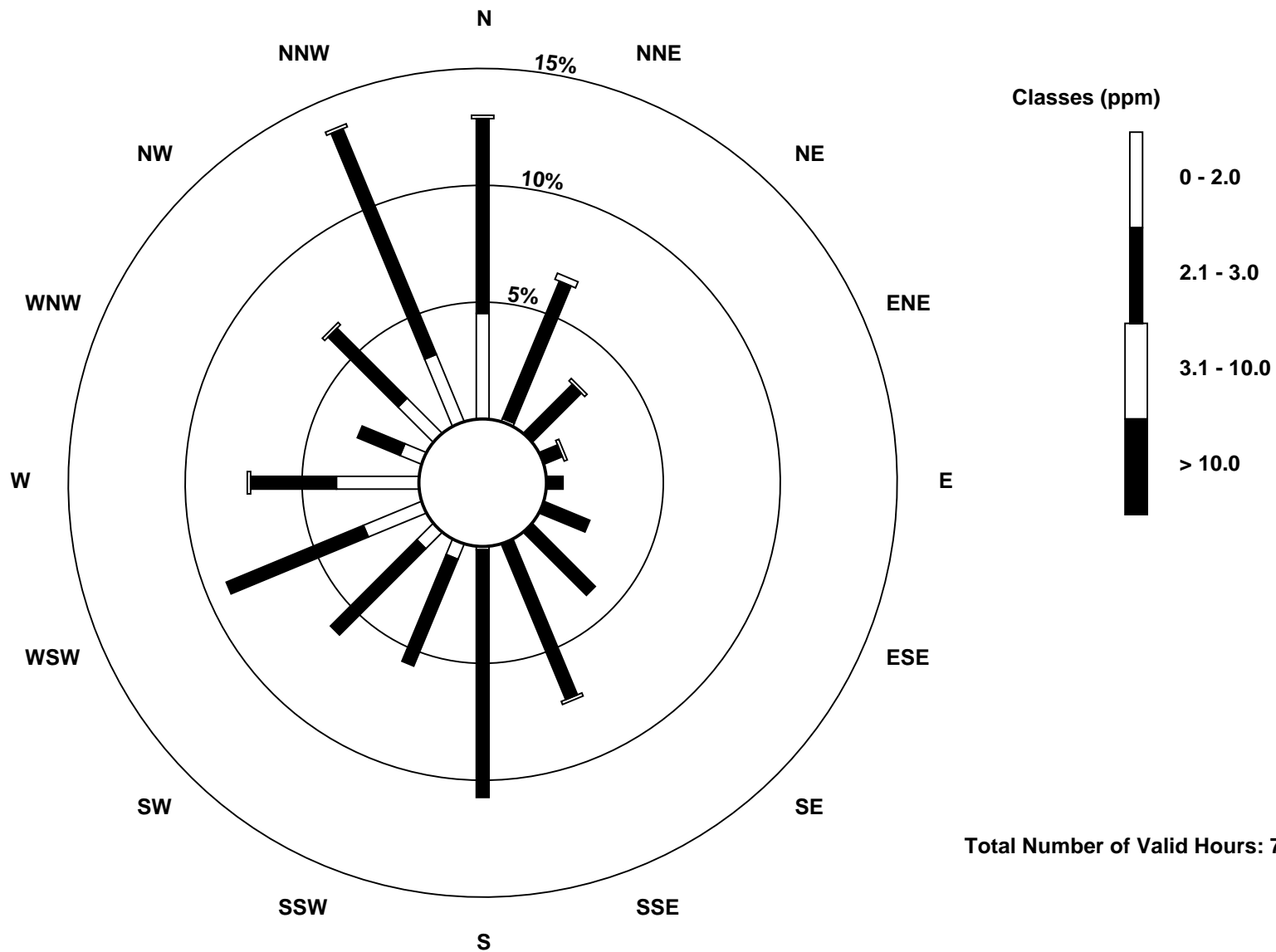
Total Number of Valid Hours: 708

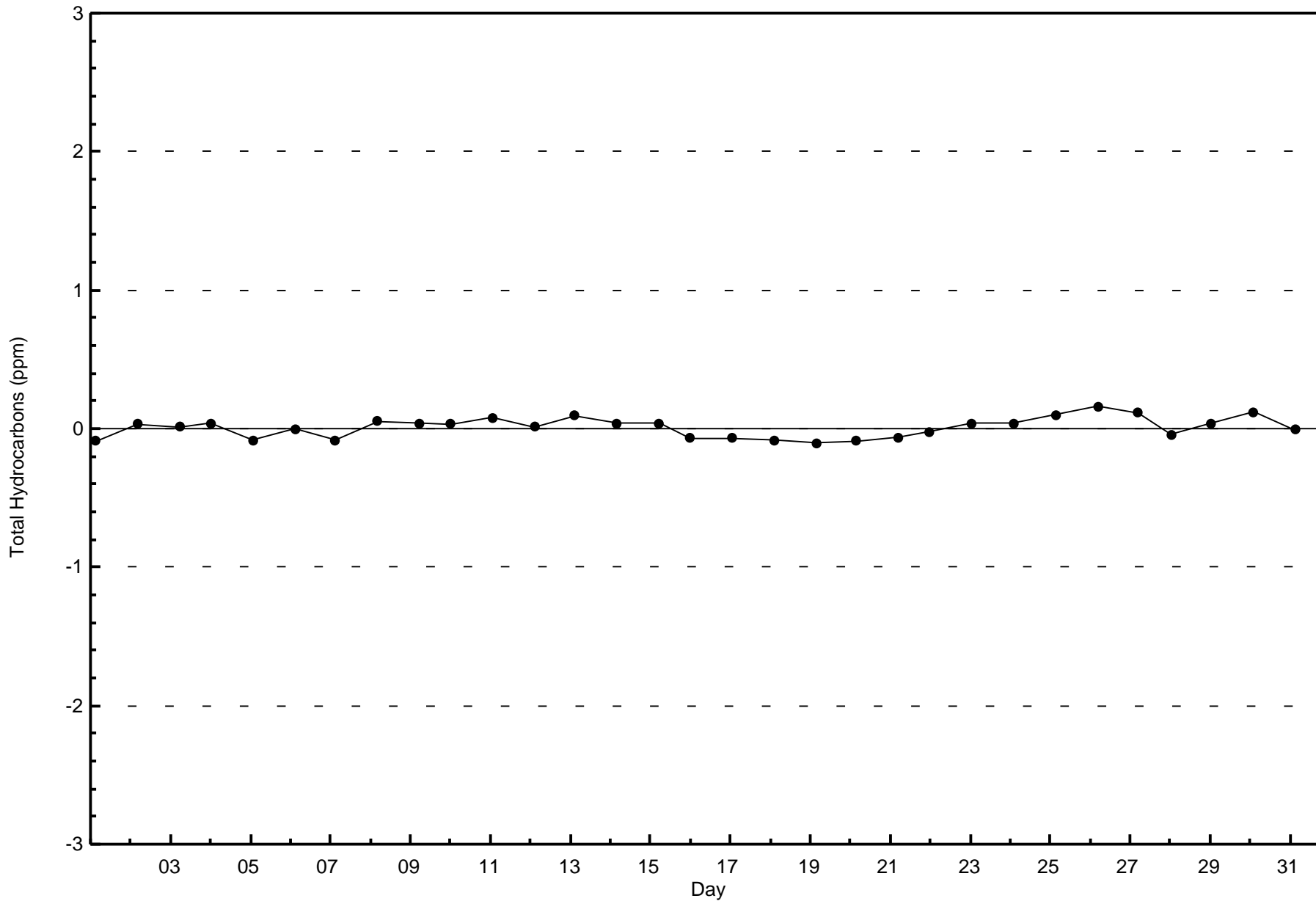
Total Number of Hours: 744

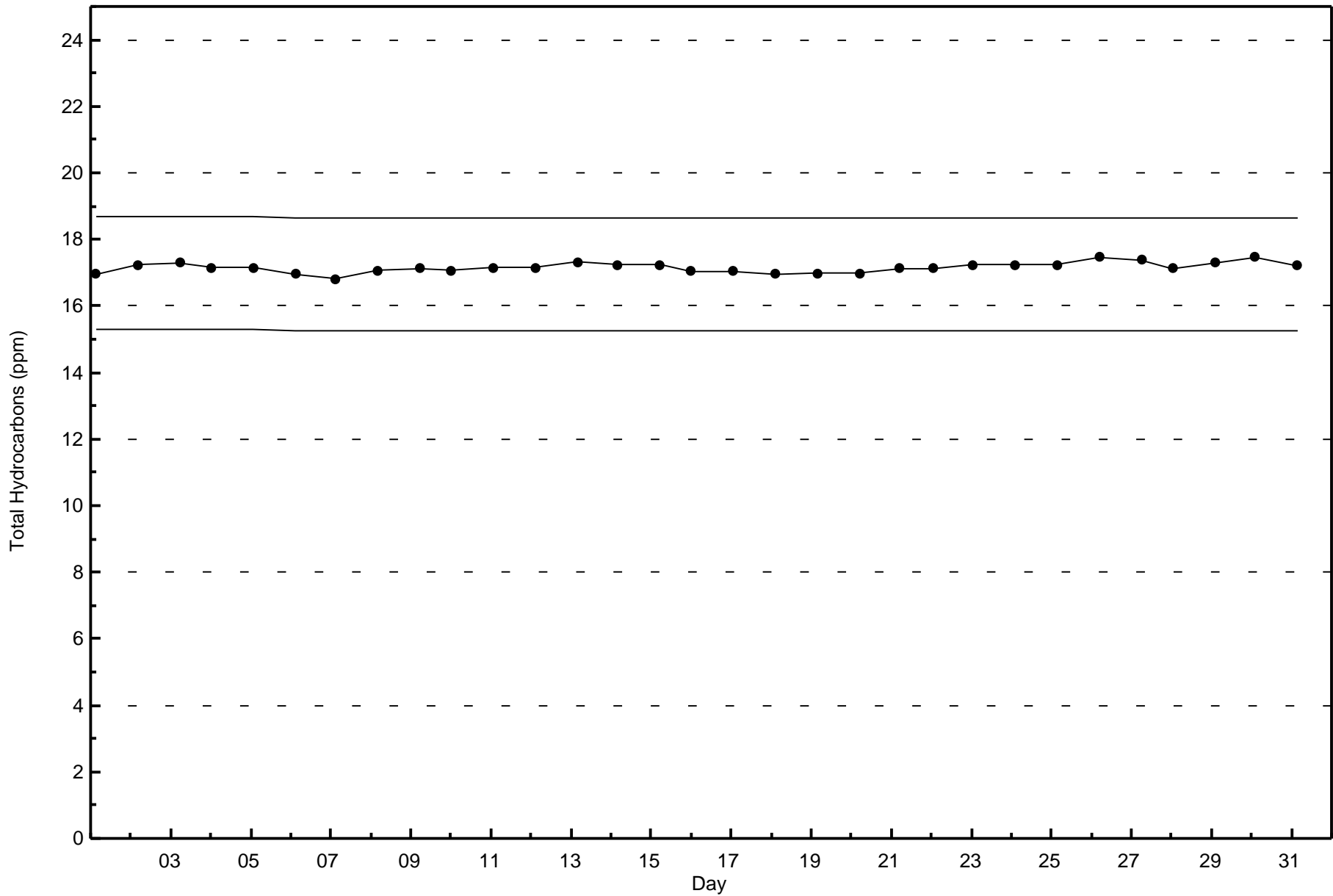


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Total Hydrocarbons (THC) - ppm  
Barge Landing (AMS 9)









**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

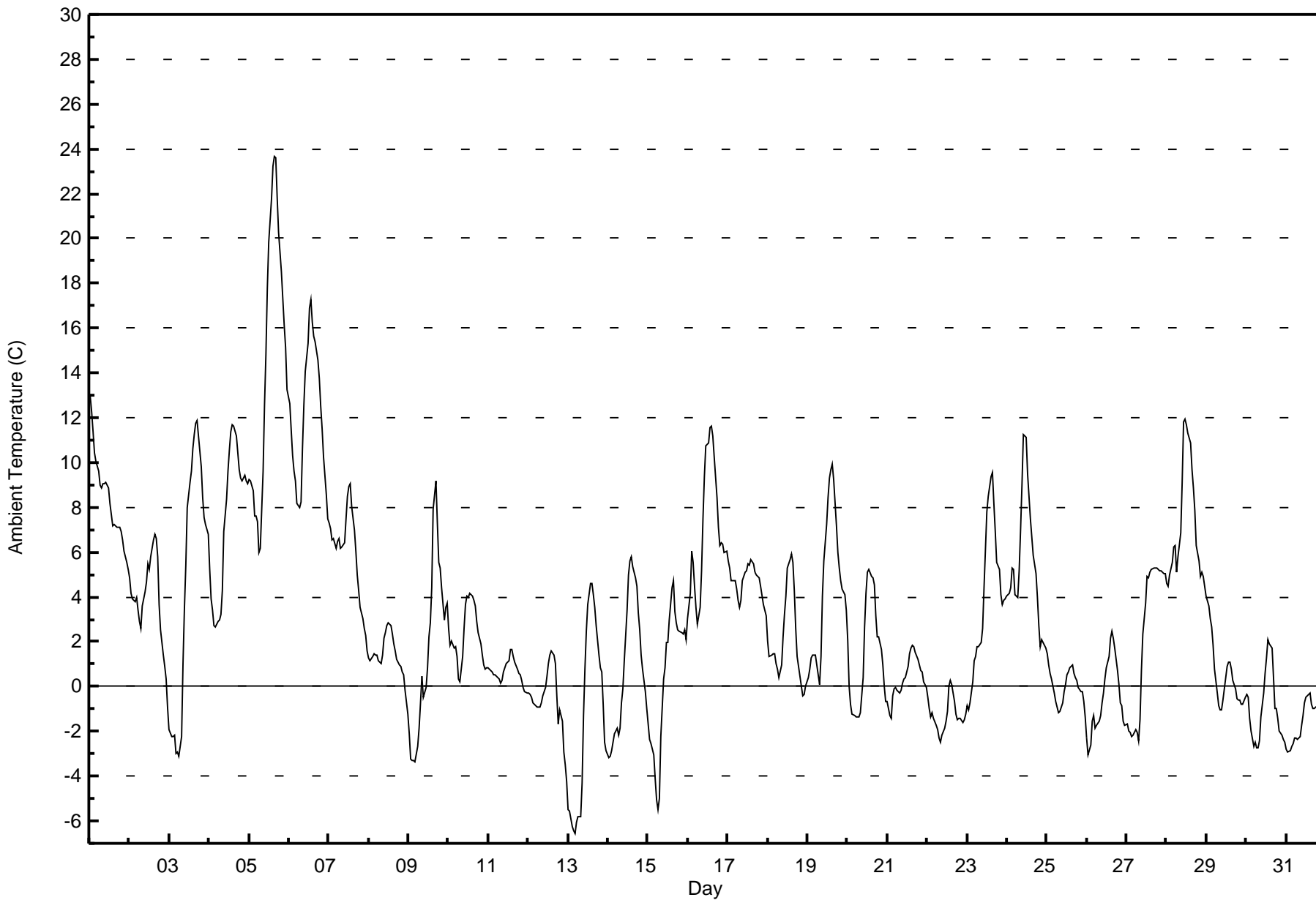
**Ambient Temperature (AT) - C**  
**Barge Landing - October 2017**

Maximum Value: 23.7 C on Oct 5 16:00		Maximum Daily Average: 14.6 C on Oct 5		Hours in Service: 744																						
Minimum Value: -6.6 C on Oct 13 05:00		Minimum Daily Average: -1.8 C on Oct 31		Hours of Data: 744																						
Maximum Diurnal Average: 6.2 C at hour 15		Minimum Diurnal Average: 0.8 C at hour 7		Hours of Missing Data: 0																						
Monthly Average: 3.14 C		Percentiles: P <sub>1</sub> = -5.5 P <sub>10</sub> = -2.0 Q <sub>1</sub> = -0.3 Median = 2.1 Q <sub>3</sub> = 5.5 P <sub>90</sub> = 9.4 P <sub>99</sub> = 19.4		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	12.9	12.3	11.4	10.4	10.0	9.6	9.0	8.8	9.1	9.1	9.1	8.9	8.2	7.7	7.2	7.2	7.1	7.1	7.1	6.9	6.6	6.0	5.5	5.2	8.4	12.9
2-Oct	4.8	4.2	3.9	3.8	4.0	3.4	2.9	2.6	3.6	4.2	4.6	5.5	5.3	5.8	6.5	6.8	6.6	5.8	3.6	2.5	1.4	0.9	0.3	-0.9	3.8	6.8
3-Oct	-1.9	-2.2	-2.2	-2.2	-3.0	-2.9	-3.1	-2.2	1.1	3.5	5.4	8.0	9.1	9.6	10.6	11.2	11.7	11.9	10.5	9.8	8.4	7.6	7.2	6.8	4.7	11.9
4-Oct	5.2	3.9	3.4	2.7	2.9	3.0	3.2	4.3	6.9	8.4	9.6	10.6	11.4	11.7	11.6	11.2	10.4	9.7	9.3	9.2	9.4	9.2	9.1	7.5	11.7	
5-Oct	9.2	9.2	8.7	7.6	7.6	7.4	6.0	6.2	9.6	12.6	14.8	17.8	19.8	21.8	23.3	23.7	23.6	21.9	20.3	18.6	17.3	16.1	15.1	13.2	14.6	23.7
6-Oct	12.6	11.5	10.3	9.6	9.2	8.2	8.0	8.2	10.6	12.5	14.1	15.3	16.9	17.3	16.3	15.6	15.4	14.6	13.8	12.5	11.5	10.2	8.6	7.5	12.1	17.3
7-Oct	7.3	7.1	6.5	6.6	6.2	6.5	6.6	6.2	6.3	6.4	7.5	8.5	8.9	9.0	8.0	7.0	6.0	5.0	4.3	3.5	3.0	2.6	2.3	1.6	6.0	9.0
8-Oct	1.3	1.2	1.3	1.5	1.4	1.4	1.2	1.0	1.4	2.2	2.4	2.8	2.8	2.7	2.4	1.9	1.6	1.2	0.9	0.9	0.7	0.5	-0.2	-1.3	1.4	2.8
9-Oct	-2.1	-3.2	-3.3	-3.3	-3.4	-2.7	-1.9	-0.8	0.5	-0.5	0.0	0.9	2.2	2.8	4.4	7.9	9.2	7.3	5.5	5.3	4.4	2.9	3.5	3.7	1.6	9.2
10-Oct	2.6	1.9	2.0	1.7	1.8	1.3	0.3	0.2	1.3	2.6	3.6	4.0	4.0	4.2	4.0	3.8	3.6	2.9	2.4	1.9	1.4	1.0	0.8	0.8	2.3	4.2
11-Oct	0.8	0.7	0.6	0.5	0.5	0.4	0.3	0.2	0.3	0.6	0.8	1.0	1.2	1.7	1.6	1.3	1.1	0.8	0.6	0.5	0.3	0.0	-0.2	-0.3	0.6	1.7
12-Oct	-0.3	-0.3	-0.5	-0.7	-0.9	-0.9	-0.9	-0.9	-0.7	-0.4	0.0	0.5	1.0	1.4	1.6	1.4	1.0	-0.4	-1.7	-1.0	-1.5	-2.9	-3.5	-4.2	-0.6	1.6
13-Oct	-5.5	-5.6	-6.3	-6.4	-6.6	-6.0	-5.8	-5.8	-4.3	-1.3	0.8	2.5	3.6	4.6	4.6	4.1	3.5	2.8	1.4	0.8	0.7	-0.8	-2.5	-2.8	-1.3	4.6
14-Oct	-3.2	-3.1	-2.8	-2.5	-2.1	-1.8	-2.2	-1.9	-0.7	-0.1	1.2	3.4	5.0	5.6	5.8	5.4	4.9	4.5	3.3	2.5	1.4	0.8	-0.2	-0.9	0.9	5.8
15-Oct	-1.7	-2.3	-2.5	-3.0	-4.1	-5.1	-5.5	-5.0	-2.2	0.4	0.8	2.0	1.9	3.0	4.4	4.7	3.4	2.9	2.6	2.5	2.4	2.3	2.5	2.1	0.3	4.7
16-Oct	3.1	4.2	6.1	5.5	4.5	3.5	2.8	3.5	5.2	7.5	9.4	10.7	10.9	11.6	11.6	11.2	10.2	8.4	7.1	6.3	6.4	6.4	6.0	6.0	7.0	11.6
17-Oct	5.6	5.3	4.8	4.7	4.7	4.4	3.9	3.5	3.8	4.7	5.1	5.2	5.5	5.4	5.7	5.5	5.1	5.0	4.9	4.8	4.5	3.6	3.4	3.2	4.7	5.7
18-Oct	2.0	1.4	1.4	1.5	1.4	1.0	0.8	0.4	1.0	2.2	3.2	4.1	5.3	5.7	5.9	5.5	4.3	2.6	1.4	0.4	0.0	-0.4	-0.3	0.0	2.1	5.9
19-Oct	0.4	0.8	1.3	1.4	1.4	1.4	0.5	0.1	1.3	4.0	5.6	7.2	8.4	9.3	9.7	9.9	9.2	7.2	6.0	5.3	4.7	4.4	4.1	3.4	4.5	9.9
20-Oct	2.1	0.0	-0.8	-1.2	-1.3	-1.3	-1.3	-1.4	-1.2	0.4	2.7	4.2	5.1	5.2	4.9	4.9	4.6	3.2	2.2	2.2	1.6	0.9	0.0	-0.6	1.5	5.2
21-Oct	-0.7	-1.3	-1.4	-0.4	-0.1	0.0	-0.1	-0.3	-0.2	0.1	0.3	0.4	0.9	1.5	1.7	1.9	1.8	1.5	1.2	0.9	0.7	0.6	0.2	-0.1	0.4	1.9
22-Oct	-0.5	-1.0	-1.4	-1.2	-1.4	-1.7	-1.9	-2.3	-2.5	-2.2	-1.9	-1.6	-1.1	0.0	0.3	0.1	-0.7	-1.2	-1.5	-1.4	-1.4	-1.6	-1.5	-1.2	-1.3	0.3
23-Oct	-0.9	-1.0	-0.7	0.2	1.2	1.3	1.8	1.8	2.0	2.6	4.4	6.1	7.8	8.5	9.3	9.5	8.1	6.9	5.5	5.2	4.1	3.7	3.9	3.9	4.0	9.5
24-Oct	4.0	4.1	4.4	5.3	5.2	4.1	4.0	5.2	7.0	9.0	11.3	11.1	9.5	8.5	7.5	6.7	5.9	5.0	4.0	2.7	1.8	2.1	1.8	1.7	5.5	11.3
25-Oct	1.5	1.0	0.6	0.3	-0.3	-0.7	-0.9	-1.2	-1.1	-0.7	-0.2	0.1	0.5	0.7	0.9	1.0	0.6	0.4	0.3	0.0	-0.2	-0.2	-0.7	-1.4	0.0	1.5
26-Oct	-2.3	-3.0	-2.6	-1.5	-1.3	-1.9	-1.7	-1.5	-1.3	-0.7	-0.3	0.4	0.8	1.3	2.1	2.5	2.1	1.7	0.7	0.1	-0.7	-0.9	-1.6	-1.7	-0.5	2.5
27-Oct	-1.7	-2.0	-2.0	-2.2	-2.1	-1.9	-2.0	-2.4	-1.5	0.7	2.4	3.7	4.9	4.8	5.1	5.2	5.3	5.3	5.3	5.2	5.2	5.2	5.1	5.0	2.1	5.3
28-Oct	4.6	4.5	5.0	5.6	6.2	6.3	5.1	5.8	6.9	9.1	11.8	11.9	11.7	11.3	10.9	9.7	8.9	7.9	6.3	5.6	4.9	5.1	4.9	4.5	7.3	11.9
29-Oct	4.0	3.6	3.0	2.6	1.9	0.8	-0.3	-0.8	-1.1	-1.0	-0.6	-0.1	0.9	1.1	1.1	0.8	0.3	-0.1	-0.5	-0.6	-0.6	-0.8	-0.8	-0.5	0.5	4.0
30-Oct	-0.4	-0.5	-1.4	-2.0	-2.7	-2.5	-2.8	-2.7	-2.4	-1.4	-0.3	0.6	1.3	2.1	1.9	1.7	0.4	-1.0	-1.0	-1.4	-2.0	-2.2	-2.3	-2.5	-1.0	2.1
31-Oct	-2.8	-2.9	-2.8	-2.7	-2.5	-2.3	-2.3	-2.3	-2.2	-1.8	-1.3	-0.7	-0.5	-0.3	-0.3	-0.8	-1.0	-1.0	-0.9	-0.9	-1.5	-2.3	-3.0	-3.4	-1.8	-0.3
	1.9	1.6	1.4	1.4	1.2	1.0	0.8	0.8	1.7	2.9	4.0	5.0	5.6	6.0	6.2	6.1	5.6	4.9	4.0	3.6	3.0	2.6	2.2	1.8	Diurnal Average	
	12.9	12.3	11.4	10.4	10.0	9.6	9.0	8.8	10.6	12.6	14.8	17.8	19.8	21.8	23.3	23.7	23.6	21.9	20.3	18.6	17.3	16.1	15.1	13.2	Diurnal Maximum	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Barge Landing - October 2017**







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C  
Barge Landing - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	211	28.36	28.36
0 - 10	472	63.44	91.80
10 - 20	55	7.39	99.19
> 20	6	0.81	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

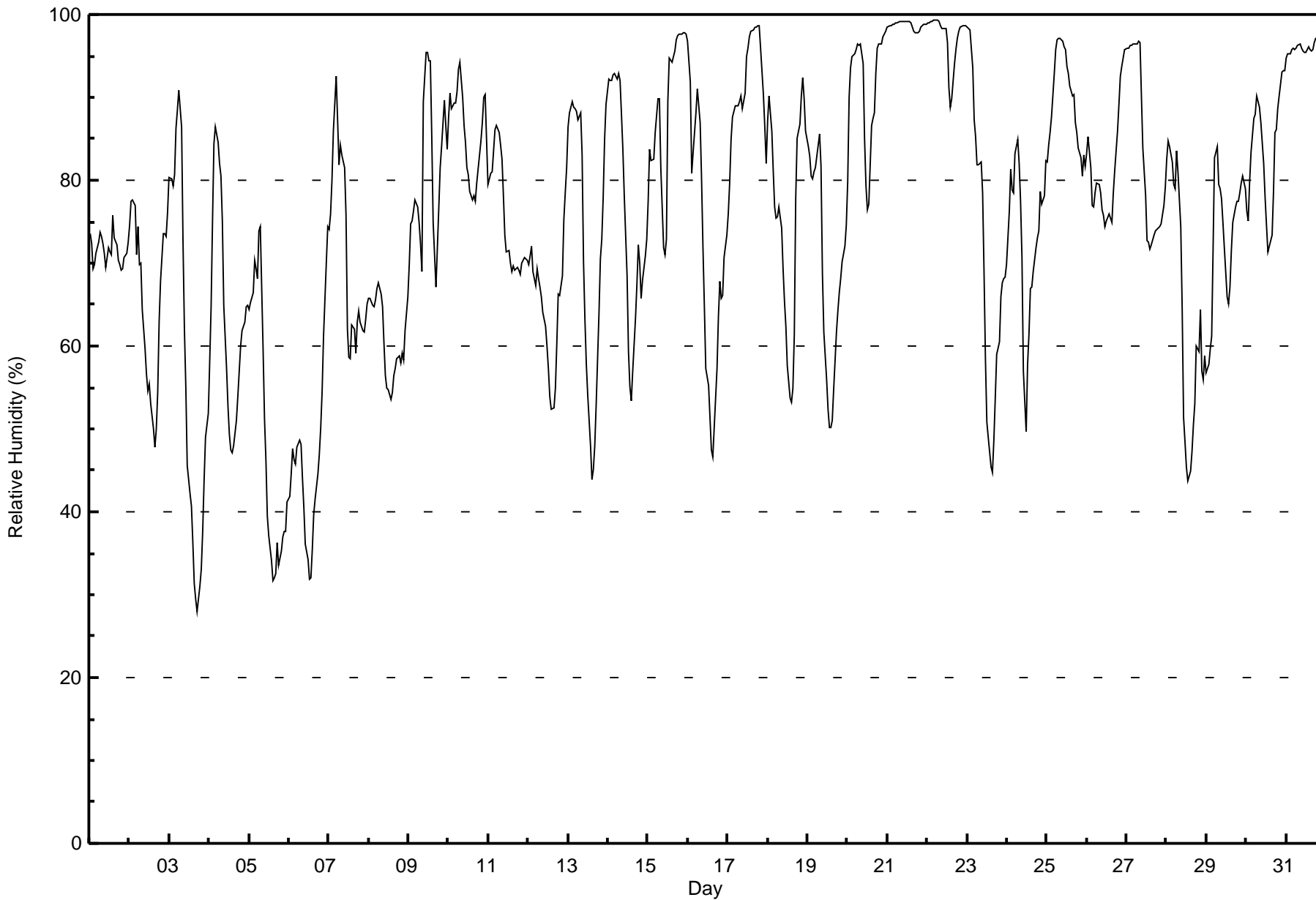


**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %  
Barge Landing - October 2017**

Maximum Value: 99 % on Oct 22 06:00      Maximum Daily Average: 98.7 % on Oct 21																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 28 % on Oct 3 18:00      Minimum Daily Average: 46.2 % on Oct 6 Maximum Diurnal Average: 84.1 % at hour 7      Minimum Diurnal Average: 65.3 % at hour 15 Monthly Average: 75.4 %      Percentiles: P <sub>1</sub> = 32 P <sub>10</sub> = 51 Q <sub>1</sub> = 65 Median = 77 Q <sub>3</sub> = 89 P <sub>90</sub> = 97 P <sub>99</sub> = 99																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	74	72	69	70	71	72	74	73	72	71	70	72	71	71	76	73	72	70	70	69	69	71	71	72	71.6	76
2-Oct	75	77	78	77	71	74	70	70	64	60	57	55	55	53	50	48	50	54	63	68	74	74	73	76	65.2	78
3-Oct	80	80	79	81	86	88	91	86	73	62	55	46	42	41	36	31	30	28	31	33	38	44	49	52	56.7	91
4-Oct	58	65	75	84	87	85	82	81	75	65	57	53	49	47	47	48	51	54	57	60	62	63	65	65	63.9	87
5-Oct	64	65	66	70	69	68	74	74	60	51	46	40	37	34	32	32	32	36	34	35	37	38	38	41	48.9	74
6-Oct	42	45	48	46	46	48	49	48	44	40	36	34	32	32	35	40	42	45	47	50	55	61	70	74	46.2	74
7-Oct	74	76	80	86	93	87	82	84	83	82	76	62	59	58	63	62	59	63	64	63	62	62	63	65	71.1	93
8-Oct	66	66	65	65	66	67	68	66	65	60	57	55	55	54	54	56	57	58	59	58	59	58	62	66	60.9	68
9-Oct	70	75	75	76	78	77	75	72	69	89	95	95	94	94	85	75	67	72	77	82	84	90	87	84	80.7	95
10-Oct	88	91	89	89	89	91	93	94	90	87	85	81	81	79	78	78	77	80	81	85	87	90	90	85	85.7	94
11-Oct	80	81	81	84	86	87	86	84	83	78	73	71	72	70	69	70	69	69	69	69	70	70	71	70	75.5	87
12-Oct	70	71	72	69	67	69	68	67	66	64	62	60	57	54	52	53	55	60	66	66	68	75	78	82	65.6	82
13-Oct	86	88	90	89	89	88	87	88	83	70	63	58	54	48	44	45	48	53	64	71	73	78	85	89	72.1	90
14-Oct	92	92	92	93	93	92	93	92	88	84	78	68	59	55	53	57	63	67	72	70	66	68	71	73	76.4	93
15-Oct	77	84	82	83	86	88	90	90	82	72	71	73	90	95	94	95	96	97	97	98	98	98	98	98	88.7	98
16-Oct	97	92	81	83	86	88	91	87	80	72	65	57	55	51	47	47	50	57	64	68	66	66	71	73	70.6	97
17-Oct	76	80	85	88	89	89	89	90	90	89	91	95	96	97	98	98	98	99	99	99	96	90	86	82	91.1	99
18-Oct	87	90	86	81	77	75	76	77	74	69	65	62	58	54	53	55	61	78	85	87	90	92	90	86	75.4	92
19-Oct	84	83	81	80	81	81	84	86	82	69	62	56	52	50	50	51	55	62	64	66	68	70	72	75	69.3	86
20-Oct	80	90	94	95	95	96	96	96	96	94	85	79	76	77	87	87	88	93	96	97	97	97	98	98	91.1	98
21-Oct	98	99	99	99	99	99	99	99	99	99	99	99	99	99	99	98	98	98	98	98	98	99	99	99	98.7	99
22-Oct	99	99	99	99	99	99	99	99	99	98	98	98	97	91	89	90	94	96	97	98	98	99	99	99	97.2	99
23-Oct	99	98	98	94	87	85	82	82	82	79	69	58	51	49	45	45	49	54	59	61	66	68	68	68	70.6	99
24-Oct	70	76	81	79	79	83	85	82	77	71	57	50	58	62	67	67	69	72	73	74	79	77	78	82	72.8	85
25-Oct	82	84	86	88	93	96	97	97	97	97	96	96	94	93	91	90	90	87	86	84	83	81	83	82	89.6	97
26-Oct	83	85	82	77	77	79	80	79	78	76	76	74	75	76	75	75	78	81	86	89	92	94	95	96	81.6	96
27-Oct	96	96	96	96	96	97	97	97	97	90	84	78	73	73	72	72	73	74	74	74	74	75	77	79	83.7	97
28-Oct	83	85	84	82	80	79	84	81	74	65	51	49	45	44	45	47	50	53	60	59	64	57	56	59	64.0	85
29-Oct	57	58	60	61	72	83	84	80	79	78	75	72	66	65	67	72	75	77	78	78	78	80	80	79	73.0	84
30-Oct	76	75	80	83	88	88	90	90	89	87	82	78	75	71	72	73	79	86	86	89	90	93	93	93	83.6	93
31-Oct	95	95	95	96	96	96	96	96	96	96	96	95	96	96	96	96	96	97	97	97	96	95	94	92	95.6	97
																								Diurnal Average		
																								Diurnal Maximum		





# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Wind Speed (WS) - km/h

## Barge Landing - October 2017

Maximum Speed: 22 km/h on Oct 24 14:00	Maximum Daily Speed Average: 10.9 km/h on Oct 2	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 22 00:00	Minimum Daily Speed Average: 0.6 km/h on Oct 21	Hours of Data: 744
Maximum Diurnal Speed Average: 3.7 km/h at hour 16	Minimum Diurnal Speed Average: 0.9 km/h at hour 7	Hours of Missing Data: 0
Monthly Average Velocity: 2.2 km/h 301.1 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 4 Median = 7 Q <sub>3</sub> = 10 P <sub>90</sub> = 13 P <sub>99</sub> = 18	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	NW7	NW8	NW9	NW10	NW9	WNW8	WNW6	NW6	NW8	NNW9	N10	N10	N13	N13	NNW12	NNW13	NNW14	N14	N13	N14	N15	N16	N16	N15	NNW10.6	N16
2-Oct	N17	N13	N14	N15	N18	N17	N17	N14	N17	N18	N18	N15	N14	N13	N10	N10	NNW9	NNW6	NW3	NNW4	WNW3	W5	W4	WSW4	N10.9	N18
3-Oct	SW3	SSW2	S6	S6	S6	S6	SSE7	S8	S8	S10	S12	SSW15	SW15	SSW15	SW12	SW11	WSW9	W9	W8	WNW8	W5	W5	SW4	W5	SW6.6	SSW15
4-Oct	NW2	NW3	N3	NNW2	W2	WSW3	W4	WNW3	W4	WSW2	NNE3	WSW2	SW3	SSW7	SSE7	SSE7	SSE5	SSE6	SE6	SSE4	S5	SSW2	SE5	S6	S2.0	SSE7
5-Oct	SE5	S5	S5	S5	S7	S6	SSW3	S3	SW7	SSW7	S8	SSW9	S9	SSW11	SSW12	SW12	WSW13	WSW10	W12	W9	W11	W12	WSW9	SSW2	SW6.8	WSW13
6-Oct	SSW4	SSW4	SW5	SW4	SW4	SW5	SW6	SW5	SSW5	SW5	WSW10	W15	W17	W19	W16	W12	W11	W9	W13	W10	W7	WSW2	WSW4	WSW2	WSW7.7	W19
7-Oct	WSW2	SSW2	SSE3	WSW1	SE1	NNE4	NNE8	NNE6	N7	N6	NNW6	NNW11	N9	N10	N12	NNW13	N14	N13	NNW13	NNW15	NNW14	NNW13	NNW14	NNW14	NNW8.0	NNW15
8-Oct	NNW13	NNW12	NNW12	NNW12	NNW12	NNW14	NNW11	NNW11	NNW10	NNW12	NNW12	NNW11	NW11	NW13	NNW11	NNW10	NNW6	NW6	WNW4	WNW5	W4	W5	SSW3	SSW5	NNW8.6	NNW14
9-Oct	SSW6	SSE6	SSE7	SSE8	SSE9	SSE9	SSE8	S8	S10	SSE9	S9	S8	SSW7	SW7	WSW6	WSW7	WSW8	SW5	W6	WSW11	WNW3	SW3	WSW10	W10	SSW5.5	WSW11
10-Oct	SW6	WSW7	WSW8	WSW2	WSW2	WSW5	W5	W4	NNW3	NNW3	NNE4	NE4	NE6	NE5	NNE7	NE6	NE7	NE8	NNE7	NNE8	NNE8	NNE10	NNE10	NNE10	N3.2	NNE10
11-Oct	NNE10	NNE10	NNE10	NNE10	NNE10	NNE11	NNE12	NNE12	NNE11	NNE12	NNE11	NNE12	NNE13	NNE14	NNE12	N11	N11	N11	N11	N10	N10	N9	N10	N9	NNE10.8	NNE14
12-Oct	NNE9	NNE9	NNE9	NNE10	N9	NNW8	NNW8	NNW9	NNW9	N10	NNW10	NNW9	NNW8	N7	N7	N6	N5	N3	WNW2	NW4	NNW6	NW4	NW3	NW3	N6.7	NNW10
13-Oct	NW3	WNW3	W4	W5	WSW1	SSE3	SSE4	S3	SW4	WSW4	SSW3	WSW5	S5	SW7	WSW10	WSW10	WSW9	WSW11	WSW8	WSW8	WSW8	NW3	SSW2	SSE4	SW4.5	WSW11
14-Oct	SE4	SE4	SE5	SE6	SSE6	SSE7	SSE8	S8	S9	S9	S9	S8	WSW9	WSW11	WSW10	WSW11	W12	W9	WNW7	NW9	NW8	NW7	W5	WSW4	SW4.2	W12
15-Oct	S3	WSW6	W4	WSW4	S2	SSE4	SSE5	SSE5	SSE6	S8	S7	S10	S8	SSE9	S8	SW1	NNW2	N2	N3	N1	NNW1	NW2	WSW1	NW2	S2.8	S10
16-Oct	SW5	WSW7	W13	W8	WSW9	SW6	SSW7	SW8	SSW7	SSW9	SW8	SW9	WSW11	WSW10	WSW10	W9	W4	S3	SSE4	SE4	SSW6	S4	S4	S4	SW5.9	W13
17-Oct	S5	SE3	SE3	SE4	ESE2	ESE3	ESE4	SE4	SE3	SSE4	SSE5	SE4	N2	N4	NNE3	NNW6	NNW7	NNW7	NNW7	WNW5	NW10	NW10	NW10	NW13	NW1.6	NW13
18-Oct	WNW13	NW10	WNW12	NW11	NW13	NW13	NW11	WNW9	NW10	NW12	NW11	NNW7	NW5	NNW4	ENE3	E4	E3	E7	ESE6	SE2	N1	NNW2	SE3	ESE5	NW4.7	NW13
19-Oct	ESE3	ESE5	ESE7	SE7	SE7	SSE8	SSE7	SSE5	SSE6	S11	S10	SSW8	S7	S8	SSE7	SE10	SE9	SE9	SSE9	SSE9	SSE7	SSE8	SSE8	SSE6	SSE7.1	S11
20-Oct	SSW1	N0	NE1	N3	NE1	N3	N3	NNW1	NNW2	NNW4	NNW4	N3	NNW2	ENE3	WNW4	NW5	W4	S2	SE4	SE3	SE4	WSW2	NW2	NNW2	NNW1.0	NW5
21-Oct	NE2	WSW0	SSE1	NNW2	NNE3	N3	WNW4	NNW3	S1	S2	SW5	S4	S4	SW3	SSE4	ESE2	N1	N3	NNW3	NNW4	NNW2	NW3	W1	NNW0	WNW0.6	SW5
22-Oct	SE3	SSE2	ENE2	ESE2	ESE1	ENE2	NE3	ENE4	ENE4	NE4	NNE4	N4	N6	N6	N6	N6	NNW7	NW6	NNW4	NNW3	W3	SSW3	SSW4	SSW4	N1.7	NNW7
23-Oct	SSE4	SSW4	SW4	W6	W7	WSW6	W8	W8	W5	W7	W7	WNW8	W9	WSW10	WSW12	WSW9	SSW6	SW5	SSW5	S5	SSE5	S7	S6	SSW5	WSW5.4	WSW12
24-Oct	S6	SSE7	SSE10	S10	S7	W2	WSW10	W10	W15	W15	WNW13	NW22	NW20	NW22	NNW13	NNW12	NNW10	N8	NNE6	NE7	NE4	NE5	NE4	NE6	NW4.9	NW22
25-Oct	NE6	NNE6	NE7	NE8	NE9	NE8	NNE8	NNE7	N9	N10	N10	N11	N11	N11	N11	N12	N11	N10	NNW7	NW2	NW3	WNW3	WSW4	WSW7	N6.7	N12
26-Oct	SW5	SW7	SW9	SW12	WSW12	SW11	SSW11	SSW12	SW13	SSW14	SW12	SW13	SW13	SW12	WSW9	WSW7	SW6	SW6	SSW5	SSW4	W3	W3	WNW1	NNW2	SW8.1	SSW14
27-Oct	ESE0	SE4	SE3	SSE4	SE4	S5	SSE6	S5	SSE7	S8	S8	S9	S10	S10	S9	S9	S10	S11	S10	S10	S11	S12	SSW10	S9	S7.5	S12
28-Oct	S9	S8	SW7	SW9	SW8	SW7	S5	WSW9	WSW9	WSW10	NW15	NW21	NNW17	NNW14	NNW17	NNW16	NW16	NNW16	NNW15	NNW18	NNW18	NNW14	NNW17	NNW17	NW9.4	NW21
29-Oct	NNW16	NNW16	NNW16	NNW16	N14	N12	N12	NNE13	NNE13	N12	N13	NNE12	NNE11	NNE10	NNE7	NNE6	NE3	ESE2	SSE3	SSW3	SSE4	SE4	S5	S5	N7.0	NNW16
30-Oct	SSW6	SSW4	S5	SSE4	SE4	SSE4	S3	SSE5	SSE5	S5	S6	S6	SW6	WSW4	NNW2	N2	NNW2	NNW3	NNW3	NNW3	NNW4	NNW4	NNW3	N2	SSW1.4	S6
31-Oct	NNW2	NNW1	N1	NNE0	ESE2	ENE1	E2	ESE3	E3	NE2	NNE4	NE5	NNE5	NNE6	NNE8	N8	N8	N7	N7	N9	N10	N10	N12	N11	NNE4.7	N12

WNW1.1	NNW1.3	WNW1.4	NNW1.5	NNW1.2	NNW1.0	NNW0.9	W1.3	W1.5	W1.9	NNW2.2	NNW3.0	NNW3.4	NNW3.3	NW3.7	NW3.6	NW2.9	NW2.5	NW2.8	NW2.9	NW2.7	NW2.1	NW2.0	Diurnal Average		
N17	NNW16	NNW16	NNW16	N18	N17	N17	N14	N17	N18	N18	NW22	NW20	NW22	NNW17	NNW16	NNW16	NNW16	NNW15	NNW18	NNW18	N16	NNW17	NNW17	Diurnal Maximum	

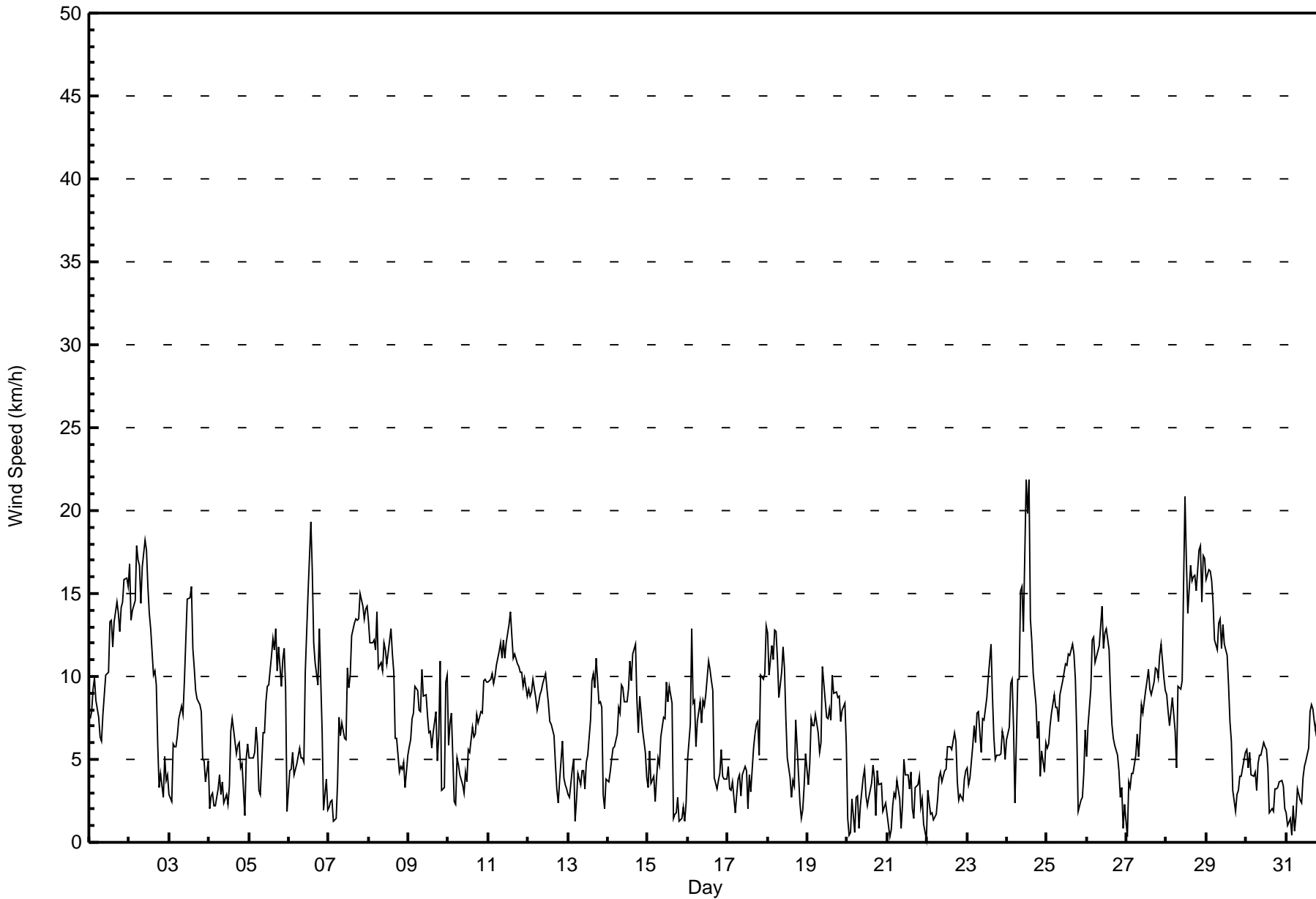
All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Speed (WS) - km/h**  
**Barge Landing - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Oct 24 12:00 Minimum Value: 1 km/h on Oct 30 21:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 3 P <sub>90</sub> = 4 P <sub>99</sub> = 7																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	3	3	3	3	3	3	3	2	3	3	4	4	5	4	4	4	5	5	4	5	5	5	5	5	5	5
2-Oct	6	4	4	5	6	6	6	4	6	6	6	5	4	4	3	4	3	2	1	1	1	1	1	1	2	6
3-Oct	2	2	2	1	1	2	2	2	3	3	4	5	5	5	4	3	4	3	3	4	2	2	3	4	5	
4-Oct	2	2	2	1	1	2	1	2	1	1	2	2	2	3	3	2	2	2	1	1	1	1	2	2	3	
5-Oct	1	2	2	1	2	1	1	1	2	2	3	3	3	4	4	4	4	3	3	3	3	3	5	2	5	
6-Oct	2	3	2	2	2	2	2	3	2	2	5	6	5	6	6	4	4	3	4	3	3	3	2	1	6	
7-Oct	2	1	1	1	1	2	2	2	2	2	2	3	3	3	4	5	4	5	5	5	5	5	5	5	5	
8-Oct	4	4	4	4	4	4	3	4	3	4	4	4	4	4	4	3	3	3	2	2	2	2	1	1	4	
9-Oct	1	1	1	2	2	3	3	3	4	3	3	3	3	3	2	3	2	1	5	4	3	2	3	3	5	
10-Oct	2	2	2	2	2	2	2	3	2	1	2	1	2	2	2	2	2	2	2	2	2	3	3	3	3	
11-Oct	3	2	3	3	3	3	3	3	3	4	3	4	4	4	4	3	4	3	3	3	3	3	3	3	4	
12-Oct	3	3	3	3	3	2	3	3	3	3	3	3	3	2	2	2	2	1	1	1	2	1	1	1	3	
13-Oct	1	1	1	1	1	2	1	1	1	1	2	2	3	3	3	3	3	3	3	3	2	2	1	1	3	
14-Oct	1	1	1	1	1	1	2	2	3	3	3	3	4	3	4	3	4	2	3	3	2	2	2	2	4	
15-Oct	1	2	3	2	1	1	1	1	2	2	3	3	3	3	3	2	2	1	1	1	1	1	1	1	3	
16-Oct	1	2	5	2	2	1	2	3	2	3	3	3	3	3	3	3	2	1	1	1	2	1	1	1	5	
17-Oct	1	1	1	2	1	2	1	1	1	1	2	1	1	1	1	2	2	2	2	2	4	4	4	5	5	
18-Oct	5	4	5	4	5	4	4	3	4	4	4	3	2	2	1	2	1	2	2	2	1	1	1	2	5	
19-Oct	2	2	2	3	2	2	2	1	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	3	
20-Oct	1	1	1	1	1	1	2	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	3	
21-Oct	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	2	
22-Oct	1	2	1	1	1	1	2	1	2	1	1	2	2	2	2	2	2	2	1	1	2	1	1	1	2	
23-Oct	1	1	2	2	2	2	2	2	3	3	3	3	3	3	3	3	2	1	1	1	1	2	2	1	3	
24-Oct	2	2	2	3	2	1	3	3	5	5	5	8	7	8	5	4	4	3	2	3	1	2	2	2	8	
25-Oct	2	2	2	3	3	2	2	2	2	3	3	3	3	3	3	4	3	3	2	1	2	2	2	2	4	
26-Oct	2	2	3	4	5	4	4	4	4	5	4	4	4	4	3	2	2	2	1	1	1	1	1	1	5	
27-Oct	1	1	1	1	1	2	1	1	2	3	2	3	3	4	3	3	3	3	3	4	4	4	4	3	4	
28-Oct	3	3	2	3	2	2	1	3	2	2	7	7	6	6	6	5	6	6	5	7	7	5	6	6	7	
29-Oct	6	6	6	6	4	4	4	5	4	4	4	4	4	3	2	2	2	1	1	1	1	1	1	1	6	
30-Oct	2	1	1	1	1	1	1	1	1	2	2	2	2	2	1	1	1	1	1	1	1	1	1	2	2	
31-Oct	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	4	3	4	
Diurnal Maximum																										





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h  
Barge Landing - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	294	39.52	39.52
6 - 11	327	43.95	83.47
12 - 19	119	15.99	99.46
20 - 28	4	0.54	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Wind Speed (WS) - km/h  
Barge Landing - October 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	21	9	13	7	4	13	24	25	28	23	18	25	22	13	17	32	294
6 - 11	42	32	11	0	1	2	6	31	52	15	20	38	21	6	21	29	327
12 - 19	31	10	0	0	0	0	0	0	2	5	9	3	12	3	6	38	119
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	94	51	24	7	5	15	30	56	82	43	47	66	55	22	48	99	744

Total Number of Valid Hours: 744

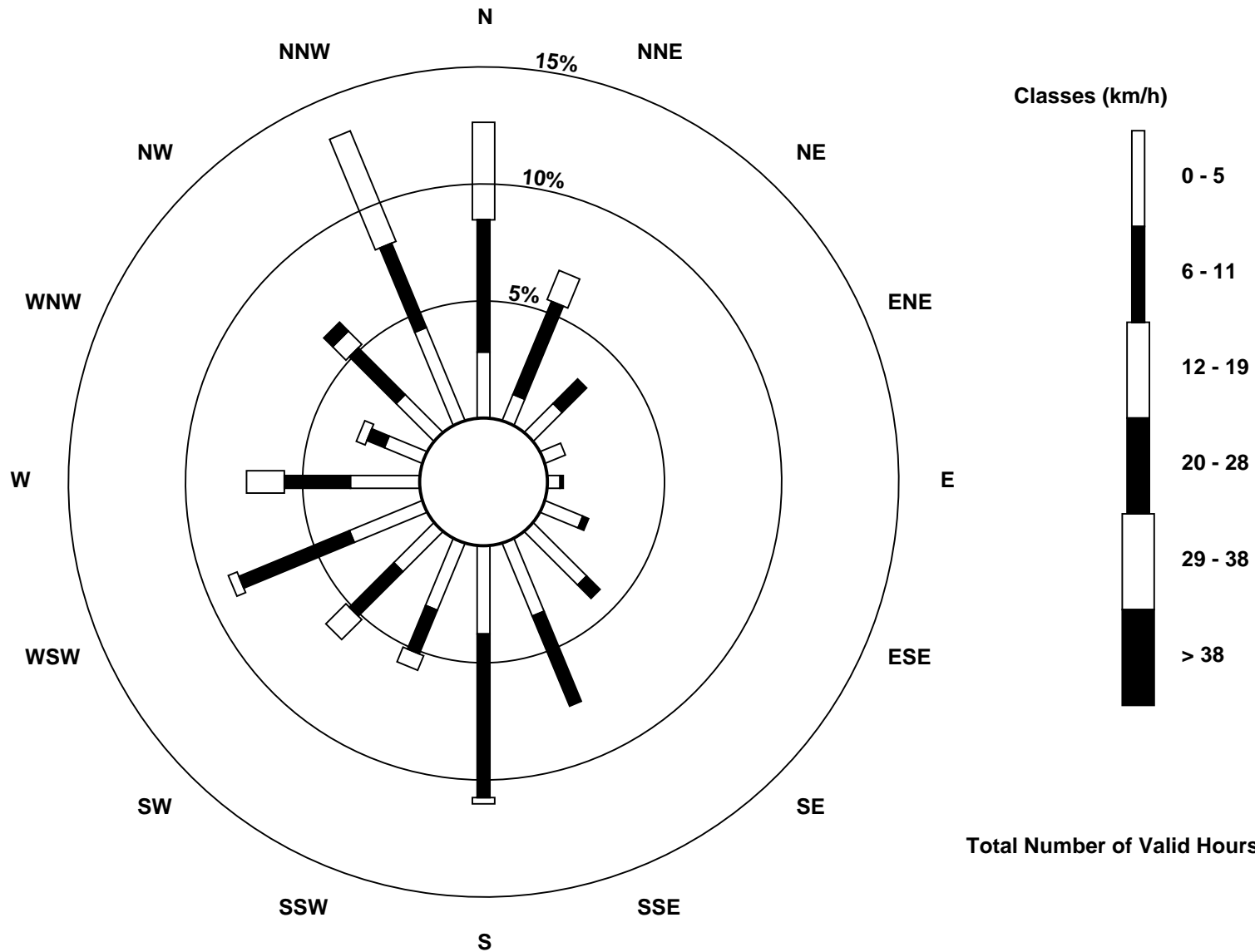
Total Number of Hours: 744





Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed (WS) - km/h  
Barge Landing (AMS 9)





**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Wind Direction (WD) - deg**  
**Barge Landing - October 2017**

Direction of Maximum Speed: 320 deg on Oct 24 14:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 353.5 deg on Oct 2	Hours of Data: 744
Direction of Minimum Speed: 297 deg on Oct 22 00:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.6 deg on Oct 21	Percent Operational Time: 100.0
Monthly Average Direction: 283.8 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	313	314	309	316	315	303	302	311	323	331	351	358	357	354	339	346	344	351	356	360	359	360	358	358	342.4
2-Oct	360	358	360	359	358	356	359	359	4	2	360	349	360	358	0	351	345	348	320	328	294	265	274	244	353.5
3-Oct	224	211	191	177	175	178	163	174	180	191	190	209	214	213	227	233	245	262	275	288	280	278	235	272	216.8
4-Oct	305	309	349	344	278	255	274	284	280	255	30	249	221	193	165	157	164	154	138	147	171	211	134	169	189.5
5-Oct	141	172	183	188	186	189	203	183	220	211	182	196	187	195	210	222	243	247	262	262	264	260	255	201	219.2
6-Oct	206	210	217	216	234	220	234	225	211	228	253	259	265	260	274	265	262	263	267	277	273	242	251	248	253.7
7-Oct	245	210	148	257	125	31	21	15	7	3	342	342	356	349	353	347	350	349	342	341	338	334	330	330	346.1
8-Oct	329	327	329	331	334	341	338	333	329	335	340	335	321	323	331	332	328	324	286	284	266	272	201	208	325.3
9-Oct	202	154	160	155	159	159	154	170	180	168	170	179	204	224	246	251	257	236	268	248	287	228	257	261	202.6
10-Oct	235	245	250	249	238	252	268	259	327	343	23	51	36	36	33	36	45	42	31	19	15	15	15	22	4.6
11-Oct	25	25	21	19	24	24	21	19	25	32	33	29	21	19	20	9	6	3	8	10	4	5	11	8	17.9
12-Oct	17	12	15	13	6	340	346	348	347	350	343	340	339	349	10	4	356	1	292	316	331	322	317	308	351.1
13-Oct	314	299	264	260	249	165	157	178	221	241	194	240	178	221	239	246	244	253	237	238	242	312	195	162	234.5
14-Oct	124	125	129	139	151	159	159	170	172	170	183	190	239	248	252	257	268	277	282	305	310	305	271	257	223.3
15-Oct	180	256	267	243	179	148	167	151	158	179	173	170	176	164	177	222	348	349	354	350	337	310	255	315	184.7
16-Oct	235	251	278	272	254	222	201	218	207	193	222	236	238	245	249	262	264	177	160	138	203	184	190	178	230.1
17-Oct	170	143	124	125	104	116	110	138	130	155	164	142	356	355	30	346	336	335	329	296	305	308	307	312	325.2
18-Oct	301	307	302	307	315	316	313	288	307	310	317	331	309	342	58	92	101	85	111	126	356	340	125	115	319.3
19-Oct	114	123	122	134	146	155	164	159	153	178	183	200	187	181	159	141	142	144	147	150	159	162	156	161	156.6
20-Oct	202	1	50	353	41	2	1	340	346	336	343	349	332	73	292	306	279	190	144	138	134	246	317	339	334.3
21-Oct	42	242	162	340	12	6	292	336	170	181	234	188	182	218	153	117	3	357	332	330	334	317	275	297	291.8
22-Oct	130	163	66	110	123	74	43	65	68	37	21	9	10	349	1	353	334	321	329	327	280	197	193	193	9.0
23-Oct	164	198	223	266	272	251	260	264	267	262	271	287	270	243	243	246	212	221	193	191	166	178	173	195	237.4
24-Oct	175	156	157	175	175	266	246	265	271	275	301	323	325	320	329	331	348	3	32	34	49	48	55	49	313.3
25-Oct	47	27	39	54	42	37	19	12	9	9	11	8	11	2	360	357	358	356	338	312	305	284	258	257	7.2
26-Oct	226	221	225	230	242	216	210	212	216	211	217	214	222	219	238	237	215	218	201	197	266	259	303	334	222.0
27-Oct	105	146	132	149	145	170	149	171	165	178	179	183	186	177	178	178	182	173	183	182	183	186	193	190	176.6
28-Oct	190	185	223	231	235	236	175	246	248	258	321	326	328	338	329	327	326	334	332	333	328	334	337	333	312.3
29-Oct	337	333	334	332	349	4	9	13	14	7	1	12	12	25	29	28	39	122	153	204	160	138	177	179	0.9
30-Oct	195	201	182	156	146	147	176	156	153	175	181	186	219	242	345	359	344	344	341	339	346	342	347	352	192.5
31-Oct	345	344	353	13	103	66	100	109	91	52	23	34	18	23	15	7	5	3	360	2	6	1	8	10	14.2

298.4 287.1 287.6 290.0 299.7 297.7 288.4 274.9 279.2 273.7 299.9 298.9 297.4 293.1 302.5 310.1 311.1 319.4 308.4 310.1 310.0 310.4 304.3 306.5  
 Diurnal Average

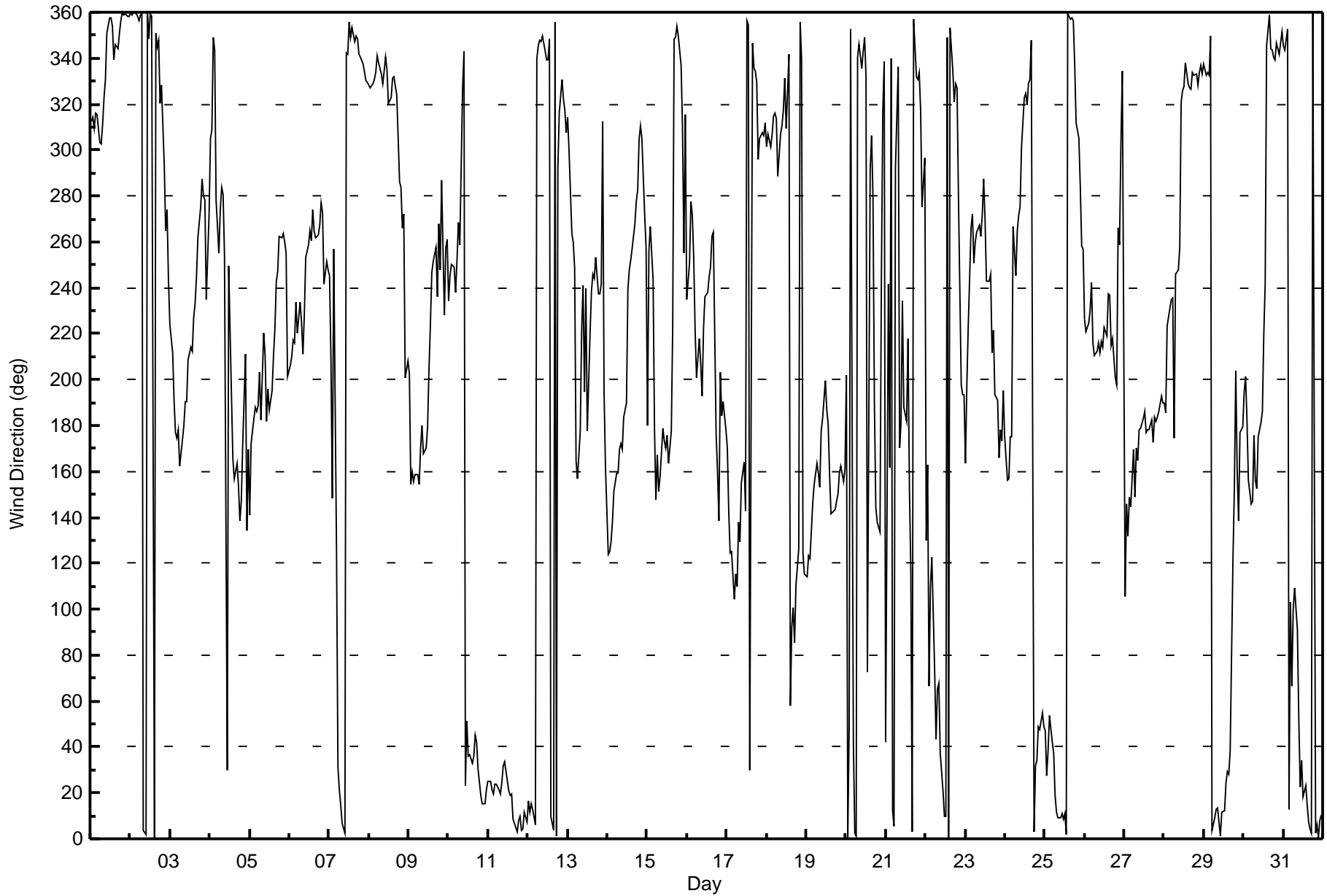
All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Direction (WD) - deg**  
**Barge Landing - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 104 deg on Oct 22 00:00 Minimum Value: 8 deg on Oct 30 17:00 Percentiles: P <sub>1</sub> = 11 P <sub>10</sub> = 17 Q <sub>1</sub> = 20 Median = 23 Q <sub>3</sub> = 29 P <sub>90</sub> = 45 P <sub>99</sub> = 89																			Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	29	26	28	24	23	26	32	29	22	21	24	28	23	23	21	22	22	23	22	23	23	22	24	23	32
2-Oct	23	23	22	21	23	22	23	22	23	23	25	22	26	27	29	26	21	22	19	16	38	12	25	29	38
3-Oct	24	70	19	27	21	19	17	23	27	26	23	26	25	25	26	23	26	24	25	41	31	27	48	70	
4-Oct	45	33	25	18	20	13	23	31	26	64	67	88	90	46	36	28	24	17	12	12	28	76	14	27	90
5-Oct	17	26	22	17	19	19	28	31	25	33	28	31	33	29	26	28	20	19	18	15	17	17	25	64	64
6-Oct	30	33	26	36	27	29	27	45	29	29	20	20	21	20	26	24	19	19	20	24	37	89	33	74	89
7-Oct	67	47	45	68	64	31	18	20	22	23	28	22	24	23	23	21	23	23	22	23	21	22	22	21	68
8-Oct	22	22	21	21	21	22	22	19	22	23	23	24	25	25	23	23	28	21	29	28	22	27	27	21	29
9-Oct	20	11	14	15	17	20	20	26	27	24	25	27	32	34	34	37	20	22	34	17	55	70	22	22	70
10-Oct	29	19	18	66	67	24	32	55	49	32	32	29	21	24	23	20	20	18	17	20	19	19	19	18	67
11-Oct	19	17	19	19	18	18	18	17	19	19	18	18	20	20	20	20	21	22	21	22	21	22	20	22	22
12-Oct	21	22	22	22	24	20	22	23	24	23	22	23	24	30	30	24	21	23	18	30	16	12	15	20	30
13-Oct	28	23	12	18	25	69	17	35	24	28	59	46	52	33	21	22	21	19	19	19	18	44	63	29	69
14-Oct	16	13	13	9	12	13	14	20	23	23	29	28	29	22	23	22	21	25	22	27	30	28	21	29	30
15-Oct	31	18	81	62	49	37	17	18	26	25	26	27	23	21	24	83	37	57	13	29	22	49	76	37	83
16-Oct	20	19	26	24	17	20	16	20	23	23	27	23	19	20	19	22	25	25	11	19	22	28	37	31	37
17-Oct	15	19	16	38	38	31	16	11	16	26	31	24	65	18	23	23	18	17	18	28	28	25	25	25	65
18-Oct	29	30	28	29	25	26	27	28	26	26	25	38	42	57	66	30	19	18	19	50	70	59	47	23	70
19-Oct	39	45	25	24	19	19	21	15	23	26	31	38	37	32	28	17	14	13	13	12	14	20	15	23	45
20-Oct	72	86	57	15	89	40	32	71	47	22	19	26	36	89	51	27	21	62	12	18	29	63	27	27	89
21-Oct	27	99	90	14	18	40	27	30	88	48	26	42	38	33	30	67	80	30	21	19	35	25	84	104	104
22-Oct	35	64	65	45	74	40	38	29	24	32	31	31	30	28	30	32	17	23	30	38	51	47	33	34	74
23-Oct	33	28	42	32	22	20	17	22	31	23	29	31	32	23	19	18	19	21	20	23	18	20	22	17	42
24-Oct	20	17	17	25	20	53	18	24	22	23	32	23	22	23	25	22	24	21	17	18	15	21	25	18	53
25-Oct	19	20	19	20	16	17	19	19	19	20	21	20	20	21	21	21	21	20	17	86	55	58	28	23	86
26-Oct	24	23	23	23	21	25	25	26	24	25	24	24	24	23	23	22	24	24	22	21	33	33	85	25	85
27-Oct	81	19	14	12	13	24	13	18	20	23	25	26	26	25	25	23	24	21	25	25	23	24	24	26	81
28-Oct	25	27	28	21	23	27	27	17	17	21	27	21	23	22	24	23	23	22	23	23	22	22	21	22	28
29-Oct	23	21	22	21	22	24	21	21	20	23	23	24	22	21	22	20	21	60	30	50	29	11	23	20	60
30-Oct	23	27	19	31	18	20	23	16	13	24	26	31	29	38	37	25	8	9	15	11	24	11	11	16	38
31-Oct	17	45	25	49	22	32	14	16	20	27	17	21	20	19	19	22	20	20	20	20	20	22	22	21	49
81 99 90 68 89 69 38 71 88 64 67 88 90 89 66 83 80 62 34 86 70 89 85 104																									
Diurnal Maximum																									







# Wood Buffalo Environmental Association

## TRS Calibration Summary

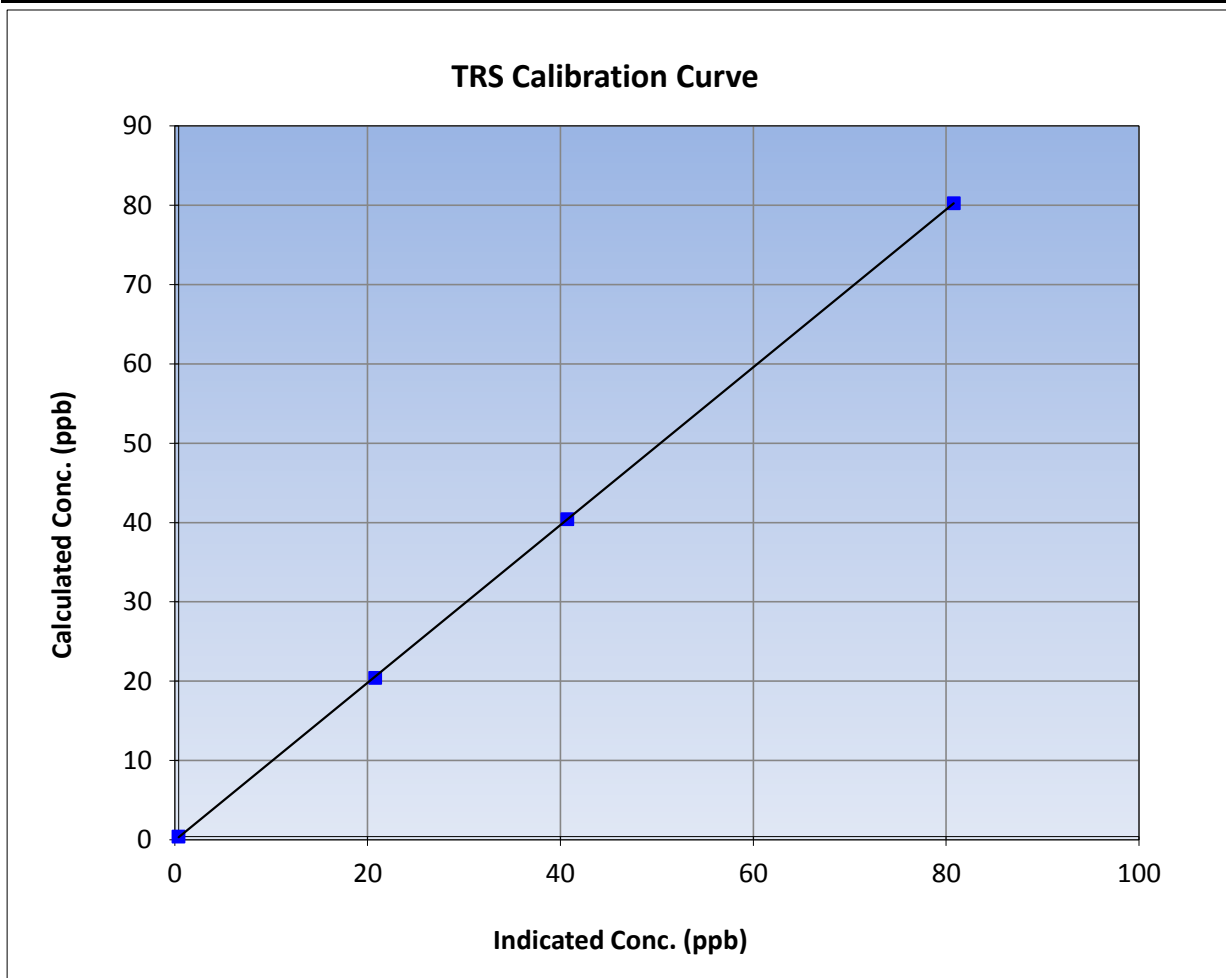
Version-03-2017

### Station Information

Calibration Date	October 5, 2017	Previous Calibration	September 6, 2017
Station Name	Barge Landing	Station Number	AMS 09
Start Time (MST)	8:56	End Time (MST)	11:49
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1331259320

### Calibration Data

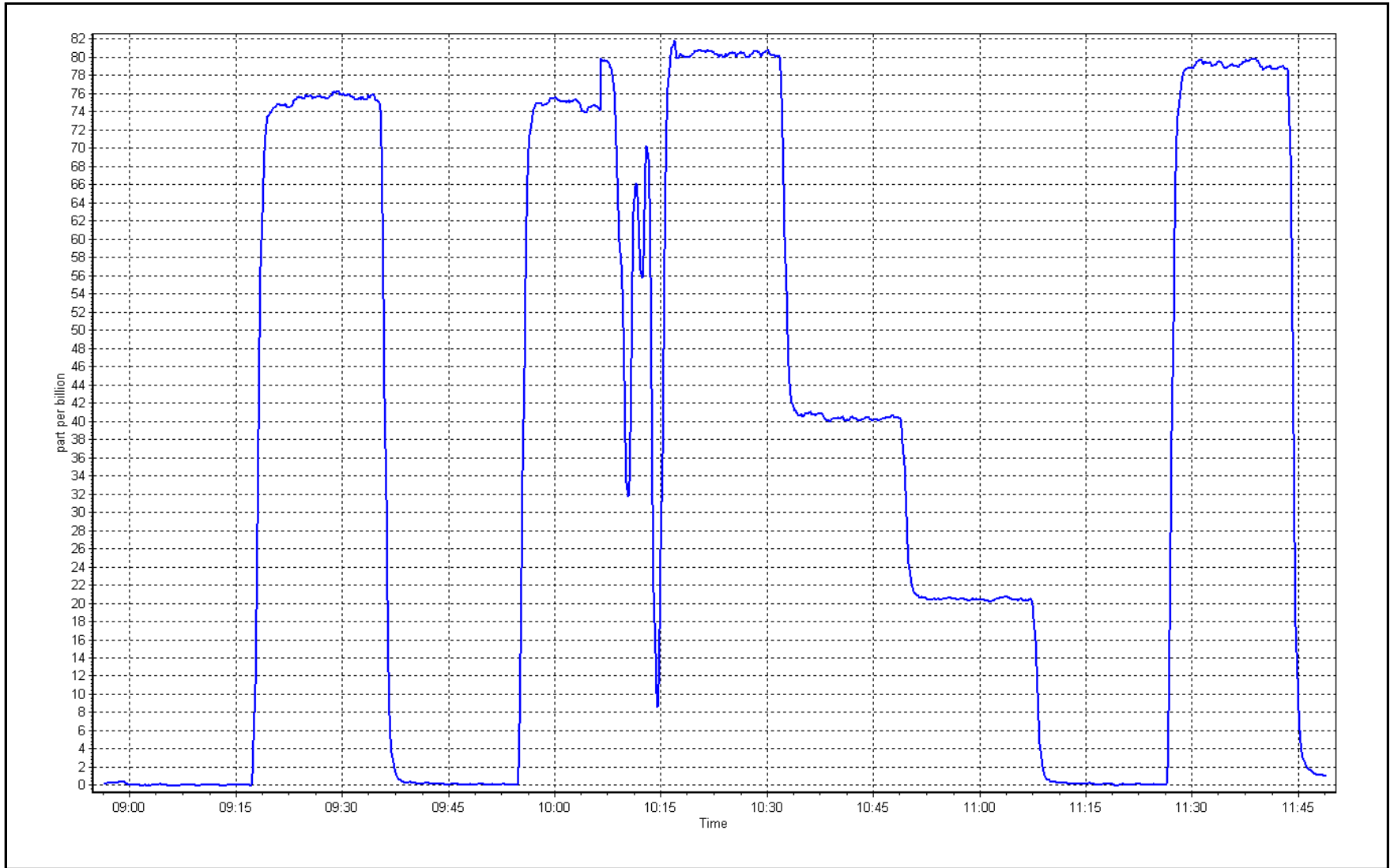
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.0	----	Correlation Coefficient	0.999988	
79.9	80.4	0.9933			≥0.995
40.0	40.3	0.9937	Slope	0.994320	
20.0	20.4	0.9816			0.90 - 1.10
			Intercept	-0.091756	+/-3



TRS Calibration Plot

Date: October 5, 2017

Location: Barge Landing





# Wood Buffalo Environmental Association

## THC Calibration Report

Version-03-2017

### Station Information

Station Name:	Barge Landing	Station number:	AMS 09
Calibration Date:	October 5, 2017	Last Cal Date:	September 7, 2017
Start time (MST):	11:43	End time (MST):	14:13
Reason:	Routine		

### Calibration Standards

Gas Cert Reference	EY0000675	Cal Gas Expiry Date	November 4, 2019
CH4 Cal Gas Conc.	<u>511.0</u> ppm	CH4 Equiv Conc.	1055.5 ppm
C3H8 Cal Gas Conc.	<u>198.0</u> ppm	Station temp.	27 Deg C
Calibrator Make/Model	API T700	Serial Number	746
ZAG Make/Model	API 701	Serial Number	4888

### Analyzer Information

Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1327059296
	<u>Start</u>	<u>Finish</u>	<u>Start</u>
Analyzer Range	0 - 25 ppm	Bias voltage supply	-299
Calculated slope	1.005143	Sample pressure	9.2
Calculated intercept	0.010071	Fuel pressure	24.1
Analyzer Background	5.71	Air pressure	34.7
Analyzer Coefficient	4.290	Flame temperature	159.3

### THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5007	0.0	0.00	-0.07	----
as found span	4942	80.2	16.86	15.88	1.061
calibrator zero	5007	0.0	0.00	0.03	----
high point	4940	80.2	16.86	16.72	1.008
second point	4980	40.1	8.43	8.40	1.004
third point	4998	20.1	4.23	4.25	0.995
as left zero	5007	0.0	0.00	0.00	----
as left span	4940	80.2	16.86	16.70	1.010
Average Correction Factor					1.002
Corrected As found	15.95	Previous response	16.76	*% change	5.1%

\* = > +/-5% change initiates investigation

Notes: MFC adjustments made, resulting in the change of the span. Adjusted the zero and the span.

Calibration Performed By: Jayme Marcoux





# Wood Buffalo Environmental Association

## THC Calibration Summary

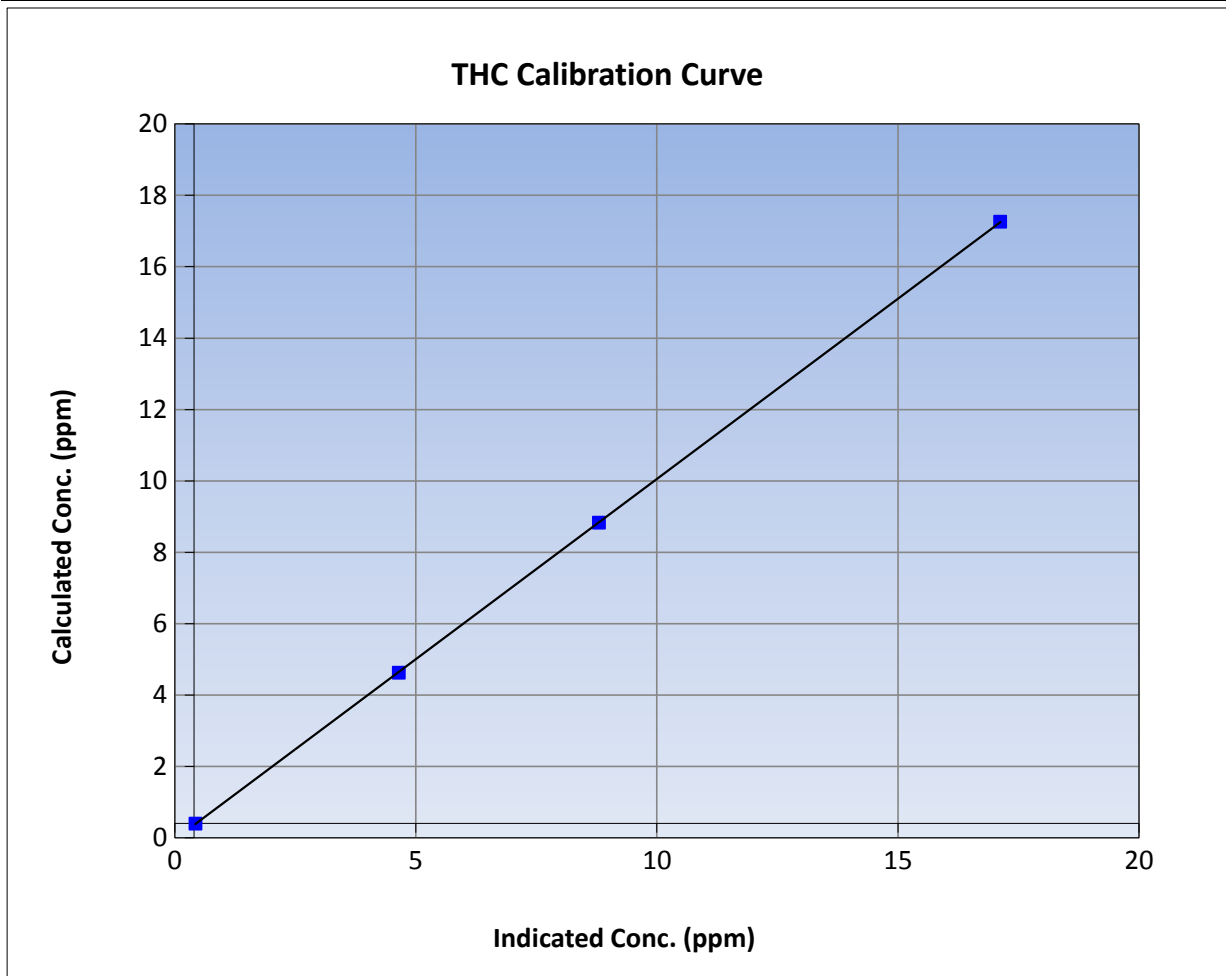
Version-03-2017

### Station Information

Calibration Date	October 5, 2017	Previous Calibration	September 7, 2017
Station Name	Barge Landing	Station Number	AMS 09
Start Time (MST)	9:05	End Time (MST)	14:13
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296

### Calibration Data

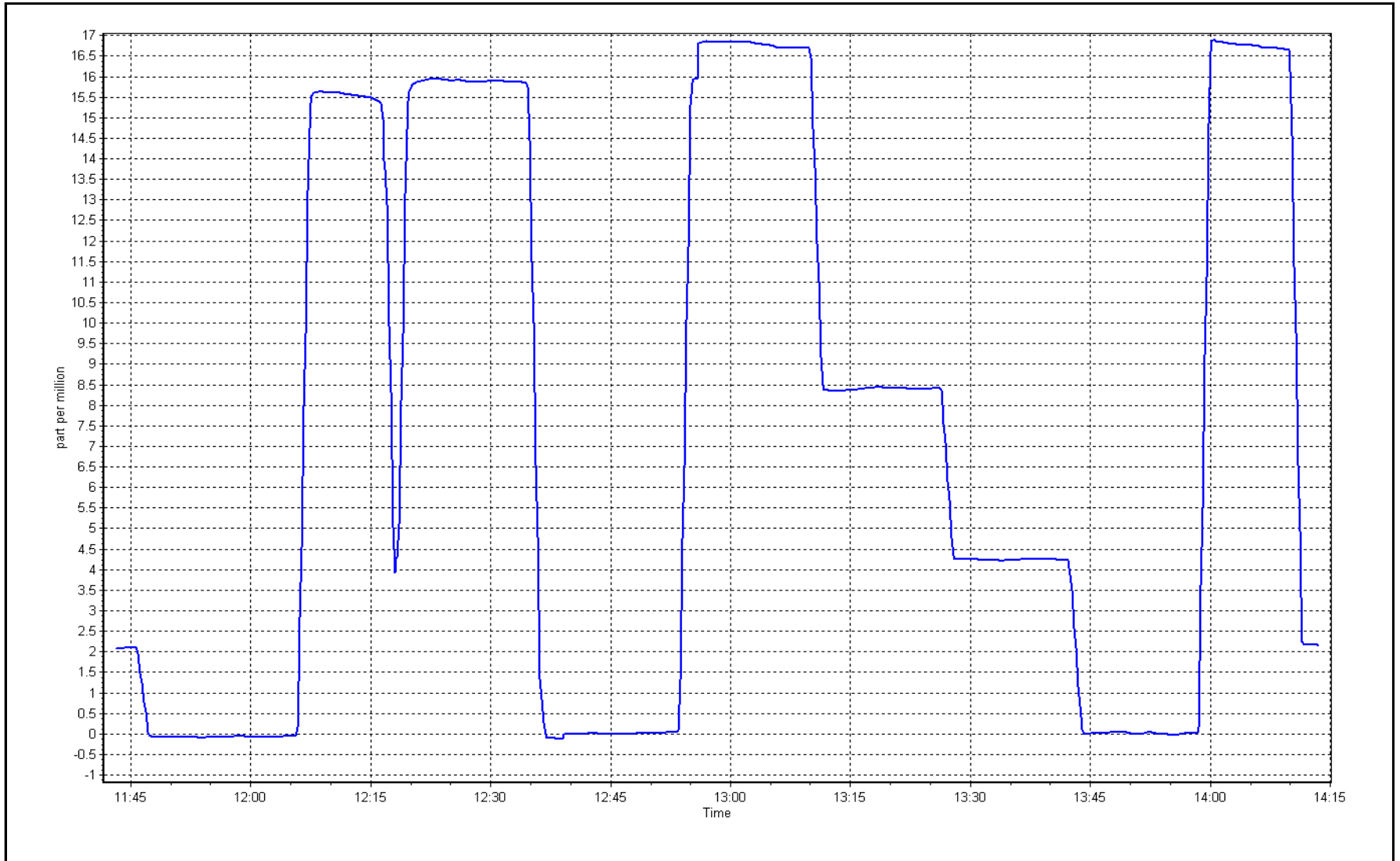
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (lc)	Correction factor (Cc/lc)	Statistical Evaluation	Limits	
0.0	0.0	----	Correlation Coefficient	0.999994	≥0.995
16.9	16.7	1.0083			
8.4	8.4	1.0037	Slope	1.010568	0.90 - 1.10
4.2	4.3	0.9948			
			Intercept	-0.048156	+/-1.5



THC Calibration Plot

Date: October 5, 2017

Location: Barge Landing





## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

### **CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT**

#### **AMS 11 LOWER CAMP OCTOBER 2017**

Operations, Data Collection,  
QA/QC, Data Validation and Reporting by:  
Wood Buffalo Environmental Association  
Fort McMurray, Alberta

November 29, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)  
OCTOBER 2017

MONTHLY SUMMARY for  
AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	707	36	37	99.87	85	0	12	0
H2S (ppb) Average	706	36	38	99.73	7	0	1	0
THC (ppm) Average	707	36	37	99.87	5.2	-	2.7	-
Temperature (C) Average	744	0	0	100	24.1	-	14.8	-
Relative Humidity (%) Average	744	0	0	100	99	-	95	-
Wind Speed 10 m (km/h) Average	739	0	5	99.33	38	-	21	-
Wind Direction 10 m (deg) Average	726	0	18	97.58	-	-	-	-

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)  
OCTOBER 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	707	3.3	8	-	0	0	0	1	2	8	85
H2S (ppb) Average	706	0.5	1	-	0	0	0	0	1	1	7
THC (ppm) Average	707	2.28	0.3	-	2	2.1	2.1	2.2	2.4	2.6	5.2
Temperature 2 m (C) Average	744	3.96	4.6	-	-4.8	-0.7	0.5	2.9	6.5	10	24.1
Relative Humidity (%) Average	744	74.1	16	-	30	53	65	75	87	94	99
Wind Speed 10 m (km/h) Average	739	11.5	7	-	0	3	6	11	16	22	38
Wind Direction 10 m (deg) Average	726	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)  
OCTOBER 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, THC	27 Oct 2017 13:00	27 Oct 2017 13:00	1	Maintenance - sample manifold cleaned
H2S	04 Oct 2017 11:00	04 Oct 2017 12:00	2	Maintenance - confirm analyzer response
Wind Speed, Wind Direction	26 Oct 2017 04:00	26 Oct 2017 04:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	29 Oct 2017 19:00	29 Oct 2017 19:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	31 Oct 2017 22:00	01 Nov 2017 00:00	3	Flat line in sensor output signal -sensor frozen
Wind Direction	21 Oct 2017 22:00	22 Oct 2017 10:00	13	Flat line in sensor output signal -sensor frozen



# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Sulphur Dioxide (SO<sub>2</sub>) - ppb

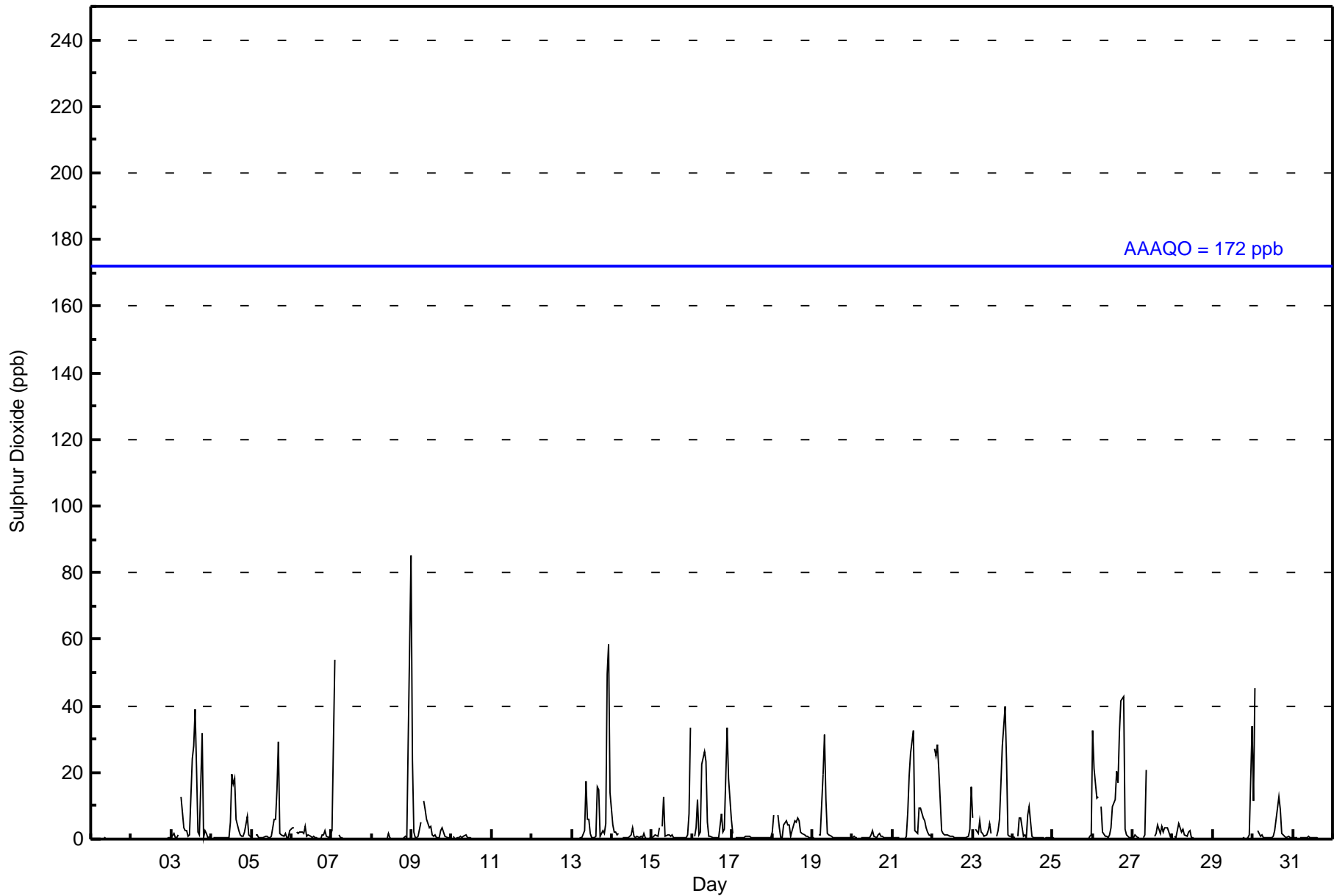
## Lower Camp - October 2017

Number of Exceedences (AAAQO):		1-hr: 0    24-hr: 0		Hours in Service: 744																																													
Maximum Value: 85 ppb on Oct 9 00:00		Maximum Daily Average: 12.1 ppb on Oct 26		Hours of Data: 707																																													
Minimum Value: 0 ppb on Oct 8 01:00		Minimum Daily Average: 0.1 ppb on Oct 11		Hours of Missing Data: 37																																													
Maximum Diurnal Average: 6.5 ppb at hour 24		Minimum Diurnal Average: 1.5 ppb at hour 6		Hours of Calibration: 36																																													
Monthly Average: 3.3 ppb		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 2 P <sub>90</sub> = 8 P <sub>99</sub> = 41		Percent Operational Time: 99.9																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
2-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
3-Oct	1	2	1	1	1	Z	13	3	3	3	1	1	24	28	39	21	2	1	32	1	2	2	0	1	7.9	39																							
4-Oct	Z	0	0	0	0	0	0	0	0	0	5	20	17	18	6	3	1	1	1	2	7	1	1	1	3.7	20																							
5-Oct	1	Z	1	1	1	0	1	1	1	1	0	0	1	6	6	15	29	2	1	1	2	1	0	3	3.2	29																							
6-Oct	3	3	Z	2	2	2	2	2	4	1	1	1	0	1	0	0	0	0	1	1	3	1	0	2	1.5	4																							
7-Oct	2	28	54	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.8	54																							
8-Oct	0	0	0	0	Z	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	30	85	5.2	85																							
9-Oct	24	2	1	1	1	5	Z	12	9	6	3	4	1	1	1	1	0	2	3	2	1	0	0	0	3.5	24																							
10-Oct	Z	1	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
11-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
12-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
13-Oct	0	0	0	Z	0	0	0	2	17	6	6	2	1	1	1	16	15	1	3	2	5	50	59	14	8.6	59																							
14-Oct	4	2	2	1	2	Z	1	0	1	0	1	1	3	1	1	1	1	1	0	2	0	0	0	1	1.1	4																							
15-Oct	1	1	1	1	3	Z	4	13	1	1	1	1	1	1	1	0	0	0	0	1	0	1	8	33	3.2	33																							
16-Oct	Z	1	3	12	1	2	22	26	23	5	1	1	0	1	1	0	1	7	2	3	18	33	18	6	8.2	33																							
17-Oct	1	Z	1	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1																							
18-Oct	2	7	Z	7	3	0	0	4	5	4	4	1	3	6	5	7	5	2	2	1	1	1	0	0	3.1	7																							
19-Oct	0	0	0	Z	1	1	20	31	12	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	3.2	31																							
20-Oct	0	1	0	0	Z	0	0	0	0	0	1	1	2	1	0	1	2	1	1	1	0	0	0	0	0.7	2																							
21-Oct	0	0	0	0	0	Z	0	0	1	8	19	26	33	3	2	2	9	9	6	5	4	2	1	1	5.8	33																							
22-Oct	Z	27	25	28	21	3	2	1	1	1	1	1	1	0	0	0	0	0	0	0	1	3	15	15	5.8	28																							
23-Oct	6	Z	3	2	6	2	2	1	1	3	5	2	Z	Z	1	3	6	17	28	40	23	1	1	1	7.2	40																							
24-Oct	1	1	Z	1	6	6	1	1	1	7	10	1	0	0	0	0	0	0	0	0	0	0	0	0	1.7	10																							
25-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	1																							
26-Oct	32	21	12	13	Z	10	2	1	1	0	1	3	10	12	20	17	32	42	43	3	1	1	1	1	12.1	43																							
27-Oct	1	1	1	1	1	Z	1	1	21	Z	Z	Z	M	1	2	4	2	4	2	3	3	3	1	2	2.8	21																							
28-Oct	Z	1	1	4	3	2	3	1	1	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	4																							
29-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	34	1.7	34																							
30-Oct	12	45	Z	2	1	1	0	0	1	0	0	0	1	3	6	13	9	2	1	1	1	1	0	0	4.4	45																							
31-Oct	0	0	0	Z	1	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1																							
																								3.6	5.6	4.1	3.2	2.1	1.5	2.5	3.4	3.4	1.8	2.1	1.8	3.6	2.7	3.4	3.5	3.8	3.0	4.2	2.2	2.3	3.5	4.1	6.5	Diurnal Average	
																								32	45	54	28	21	10	22	31	23	8	19	26	33	28	39	21	32	42	43	40	23	50	59	85	Diurnal Maximum	
Z - zerospan    C - Calibration    M - Maintenance																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb    24-hr 48 ppb																																																	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Lower Camp - October 2017**







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Lower Camp - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	645	91.23	91.23
11 - 20	26	3.68	94.91
21 - 60	35	4.95	99.86
61 - 110	1	0.14	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Lower Camp - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	63	62	24	5	3	7	29	108	32	6	3	16	48	64	71	92	633
11 - 20	0	0	0	1	0	1	1	6	1	3	5	4	0	1	0	2	25
21 - 60	0	0	0	0	0	0	0	3	5	6	11	6	0	0	0	0	31
61 - 110	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	63	62	24	6	3	8	30	117	38	15	20	26	48	65	71	94	690

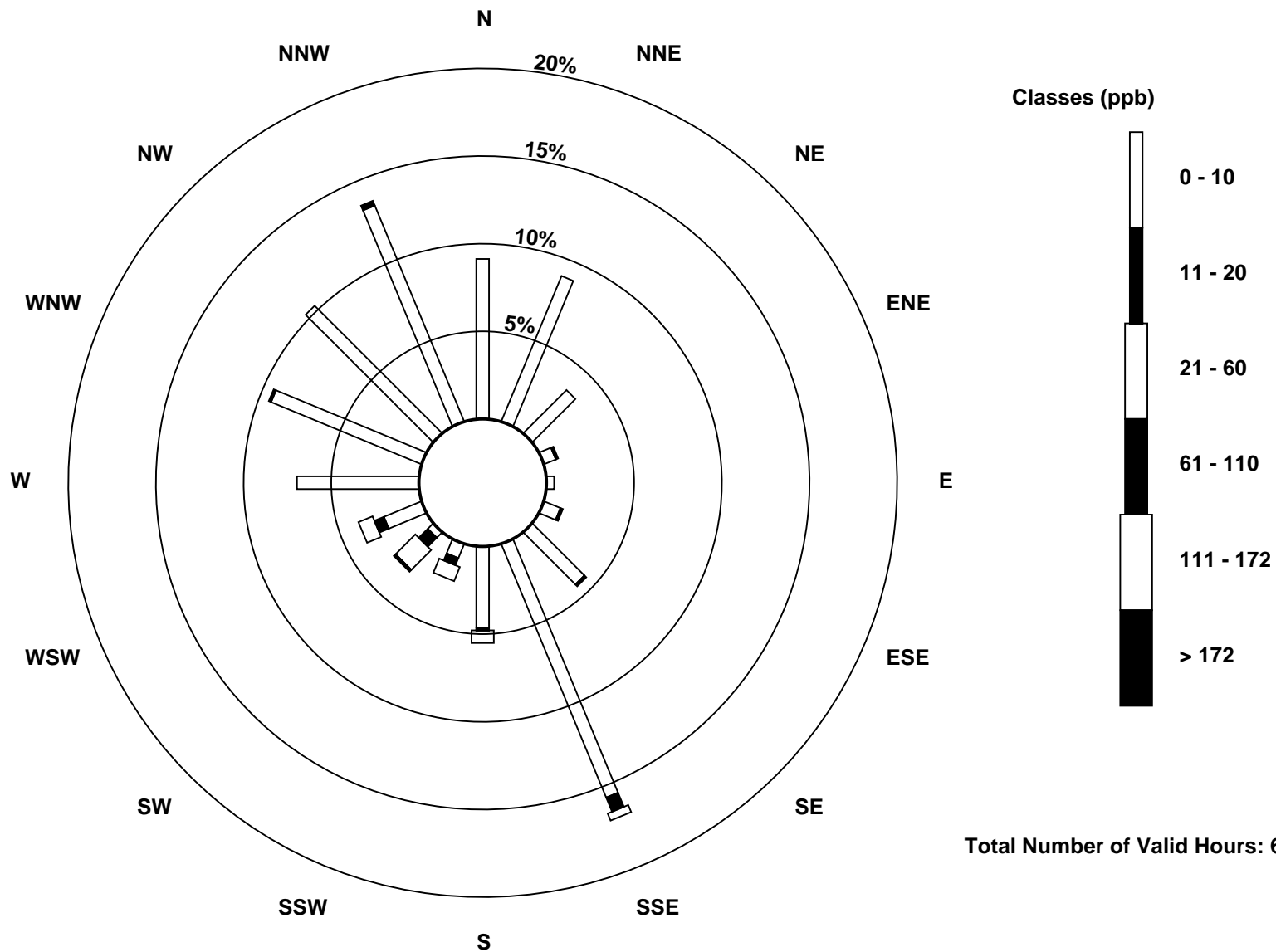
Total Number of Valid Hours: 690

Total Number of Hours: 744

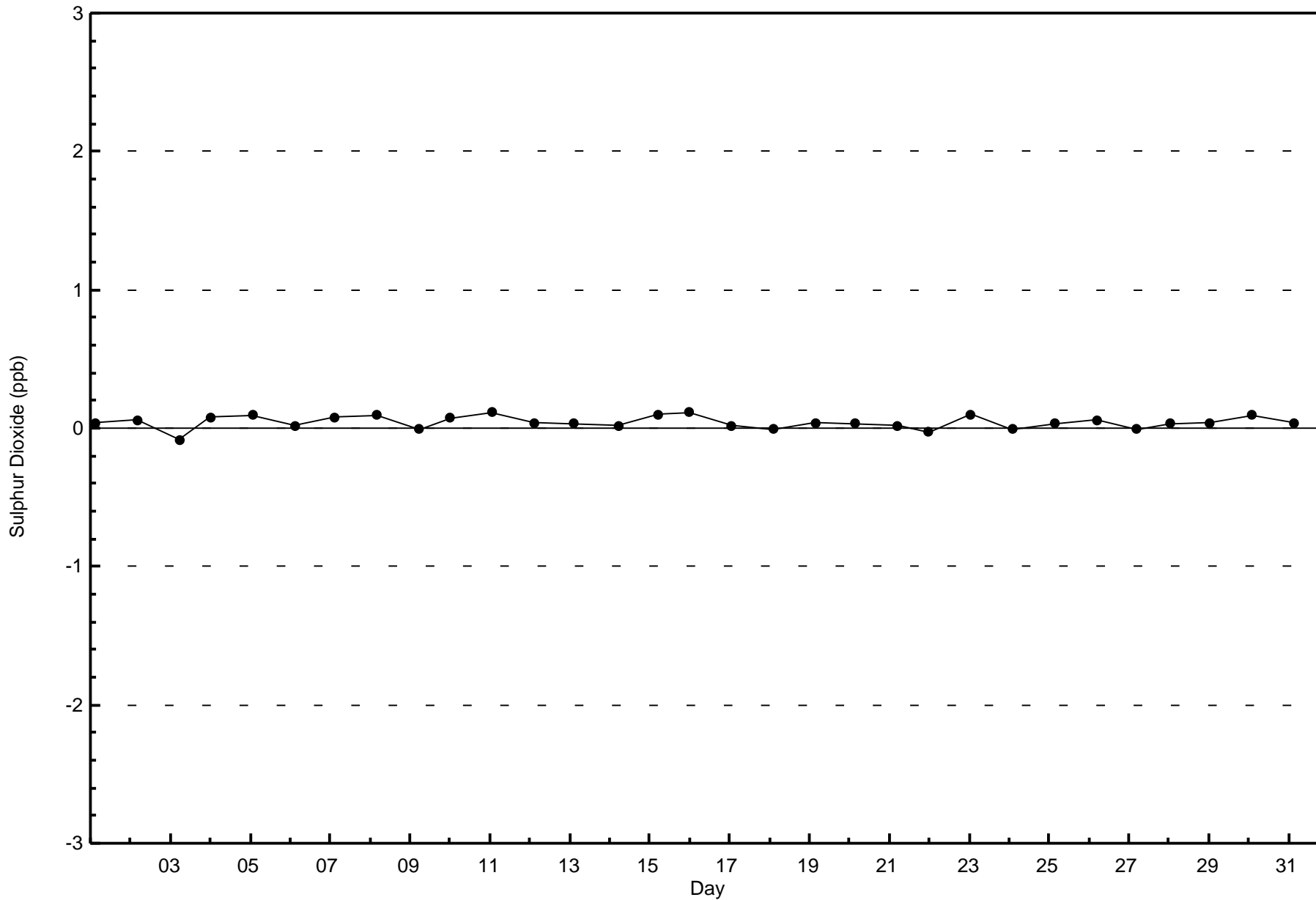


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Lower Camp (AMS 11)



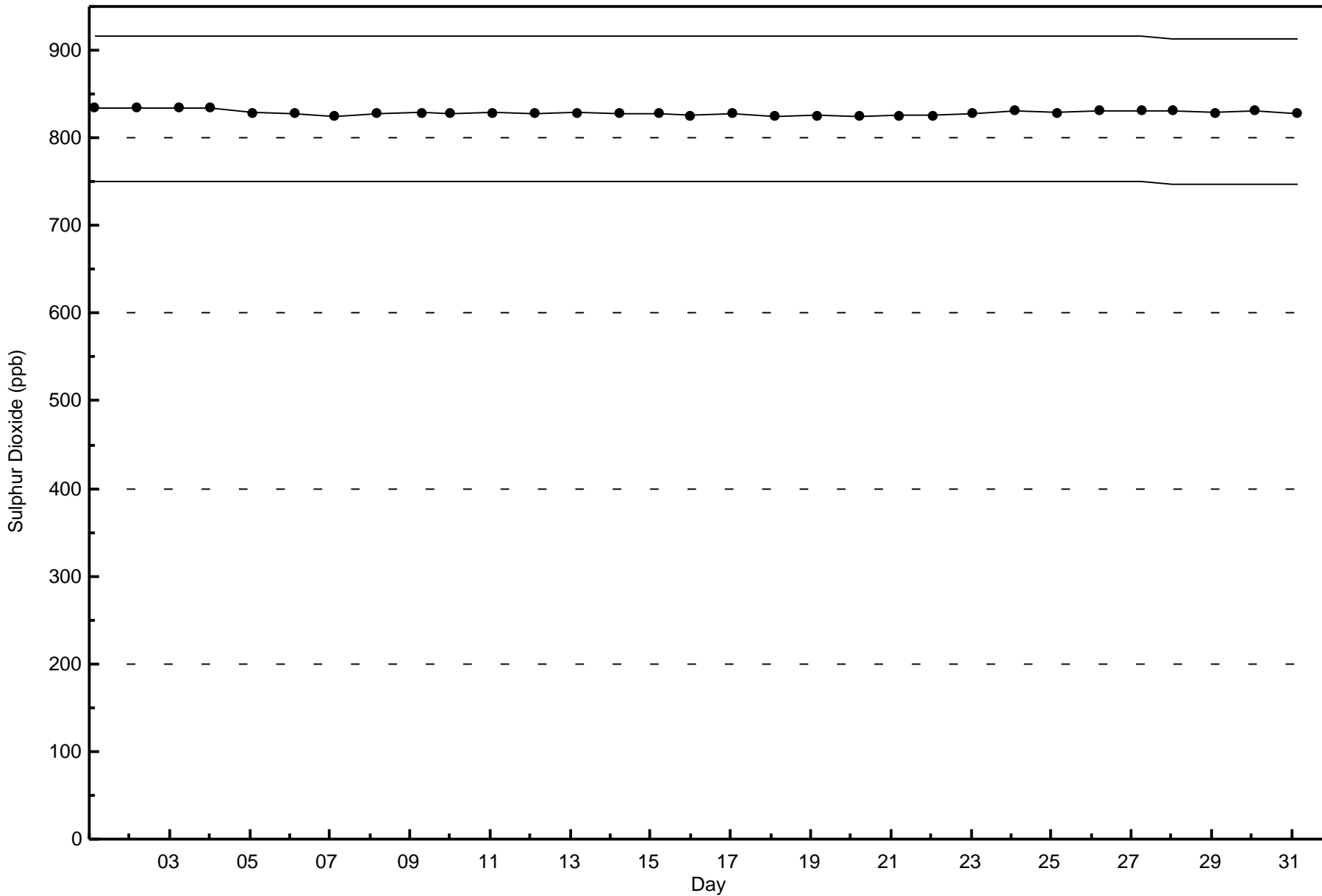
Total Number of Valid Hours: 690





Wood Buffalo Environmental Association  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Lower Camp - October 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H<sub>2</sub>S) - ppb

Lower Camp - October 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 7 ppb on Oct 13 23:00	Maximum Daily Average: 1.2 ppb on Oct 13		Hours of Data:	706
Minimum Value: 0 ppb on Oct 6 11:00	Minimum Daily Average: 0.1 ppb on Oct 10		Hours of Missing Data:	38
Maximum Diurnal Average: 0.9 ppb at hour 24	Minimum Diurnal Average: 0.3 ppb at hour 14		Hours of Calibration:	36
Monthly Average: 0.5 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 1 P <sub>99</sub> = 4		Percent Operational Time:	99.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0.2	1	
3-Oct	1	1	0	1	1	1	Z	2	0	0	0	0	2	1	3	1	1	0	3	0	0	0	0	0	0.9	3	
4-Oct	0	Z	0	0	1	1	1	1	0	0	M	M	1	0	1	0	0	0	0	0	0	0	0	0	0.4	1	
5-Oct	0	0	Z	1	0	1	1	1	0	0	0	0	0	0	1	1	3	0	0	0	0	0	0	0	0.5	3	
6-Oct	0	1	1	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
7-Oct	1	3	5	1	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	5	
8-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	7	0.6	7	
9-Oct	2	0	1	1	1	1	2	Z	1	2	1	1	0	1	1	0	0	1	1	0	0	0	0	0	0.7	2	
10-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
11-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
12-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
13-Oct	1	1	0	0	Z	1	0	1	2	1	0	0	0	0	1	1	0	1	0	1	0	1	6	7	2	1.2	7
14-Oct	1	1	1	0	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
15-Oct	0	0	0	0	0	1	Z	1	1	0	0	0	0	1	1	0	0	0	0	1	0	1	2	4	0.7	4	
16-Oct	0	Z	0	0	0	0	3	4	2	1	0	0	0	0	0	0	0	2	2	1	2	3	2	1	1.1	4	
17-Oct	0	0	Z	1	1	1	1	0	0	0	0	1	0	1	2	1	1	0	0	0	0	0	0	0	0.6	2	
18-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
19-Oct	0	0	0	0	Z	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2	
20-Oct	0	0	0	1	1	Z	0	1	0	1	1	0	0	0	0	0	1	1	1	2	1	1	2	1	0.7	2	
21-Oct	1	1	1	1	1	0	Z	0	0	0	1	3	2	1	1	1	1	1	1	1	1	1	1	0	0	0.8	3
22-Oct	1	Z	1	2	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	2	0.6	2	
23-Oct	2	2	Z	0	0	0	0	0	0	0	0	0	C	C	0	0	2	2	3	4	3	0	0	1	1.0	4	
24-Oct	1	0	0	Z	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	1	
25-Oct	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1	
26-Oct	2	1	1	1	0	Z	0	0	0	0	0	1	2	1	2	1	3	4	4	1	0	0	0	0	1.2	4	
27-Oct	0	1	0	0	0	0	Z	0	1	1	0	C	C	C	1	1	1	1	1	1	1	1	0	1	0.7	1	
28-Oct	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
29-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0.2	3	
30-Oct	3	5	3	Z	1	1	0	0	1	1	0	0	0	0	1	0	1	0	0	0	0	1	1	1	0.9	5	
31-Oct	1	0	1	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	

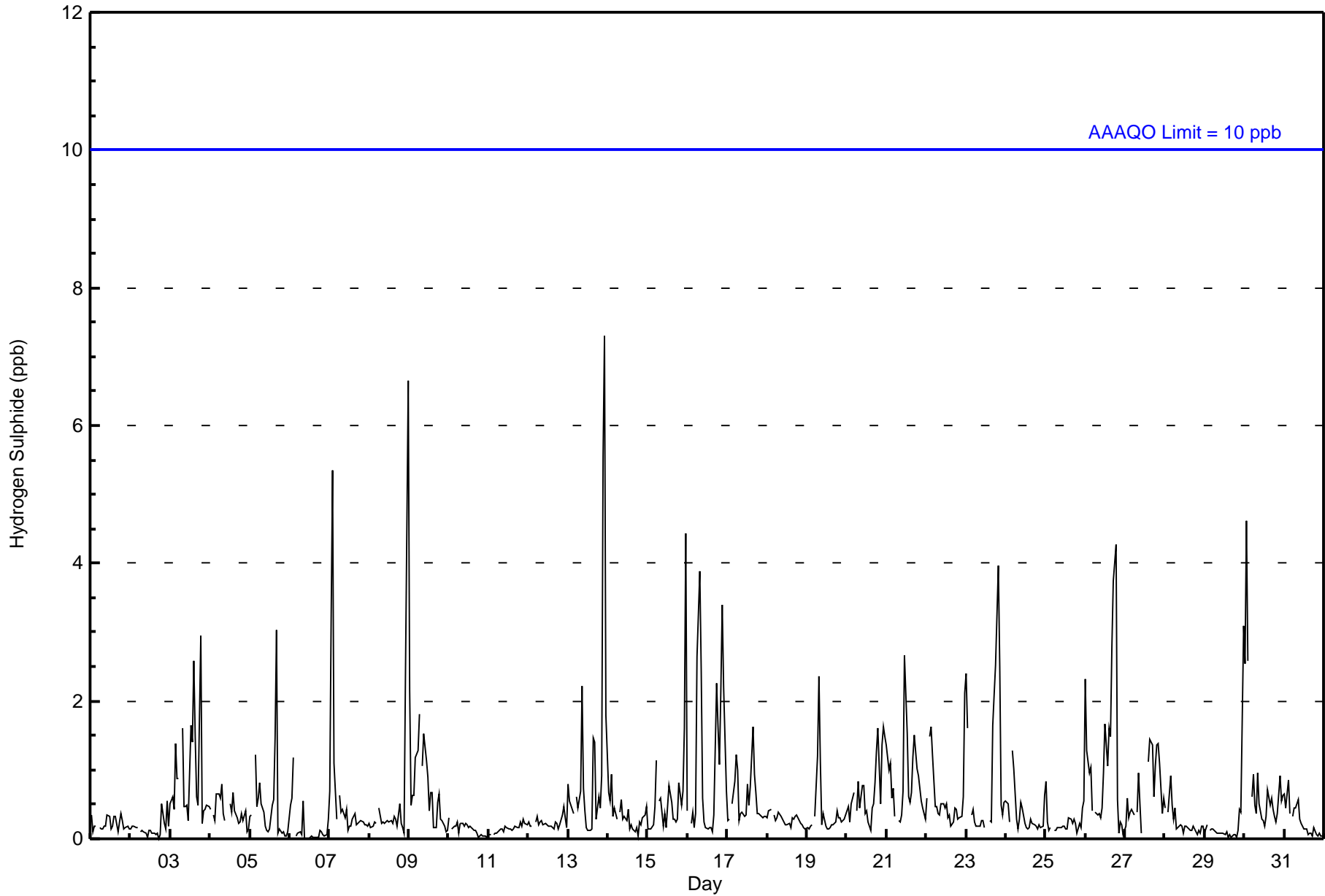
0.7	0.7	0.7	0.5	0.5	0.5	0.5	0.6	0.5	0.4	0.3	0.3	0.4	0.3	0.4	0.5	0.6	0.5	0.7	0.5	0.4	0.6	0.7	0.9	Diurnal Average
3	5	5	2	1	1	3	4	2	2	1	3	2	1	3	2	3	4	4	4	3	6	7	7	Diurnal Maximum

Z - zerospan      C - Calibration      M - Maintenance  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb      24-hr 3 ppb



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Lower Camp - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Lower Camp - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	683	96.74	96.74
3 - 4	18	2.55	99.29
5 - 7	5	0.71	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744





**Wood Buffalo Environmental Association**  
**Frequency Distribution**

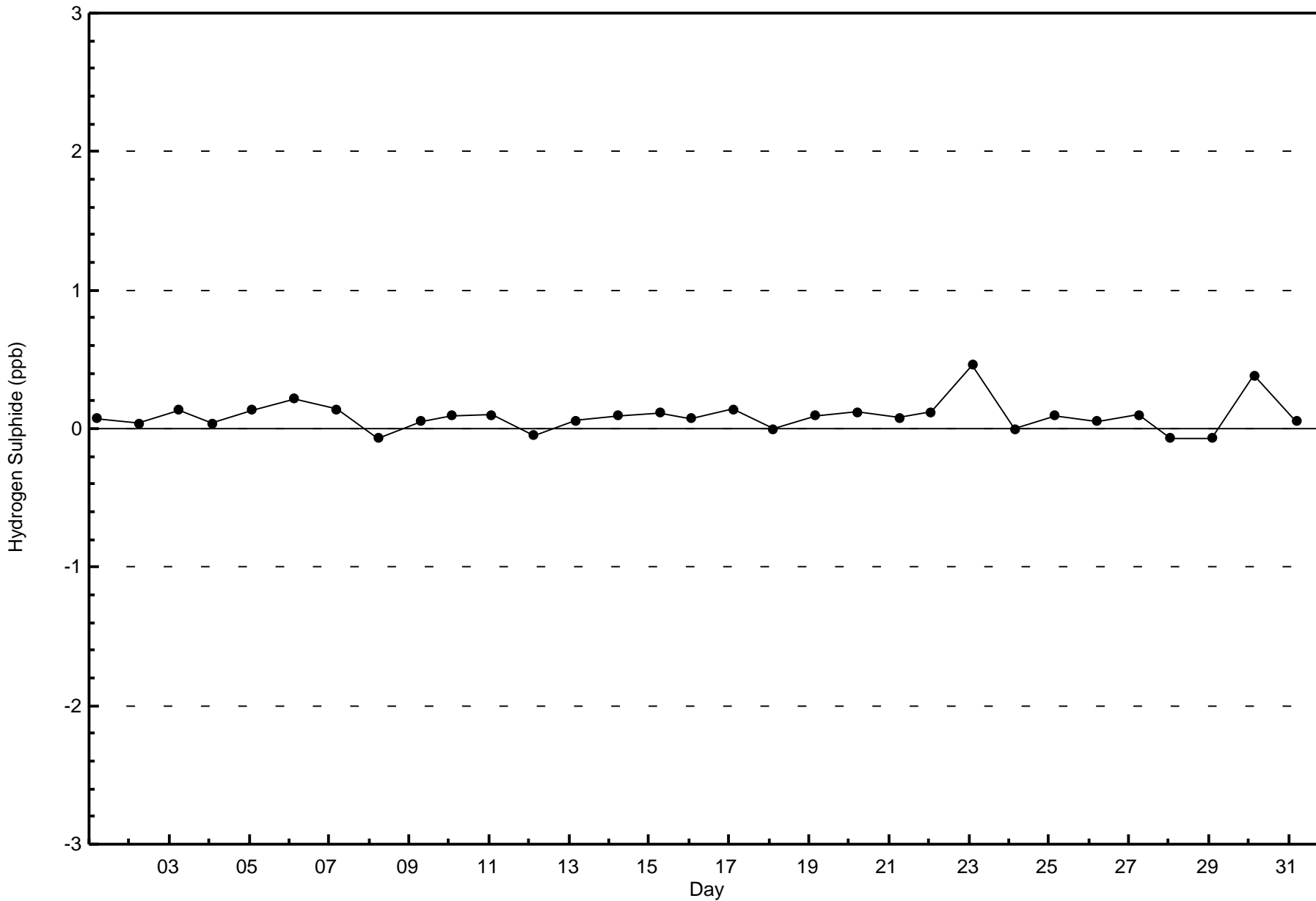
**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Lower Camp - October 2017**

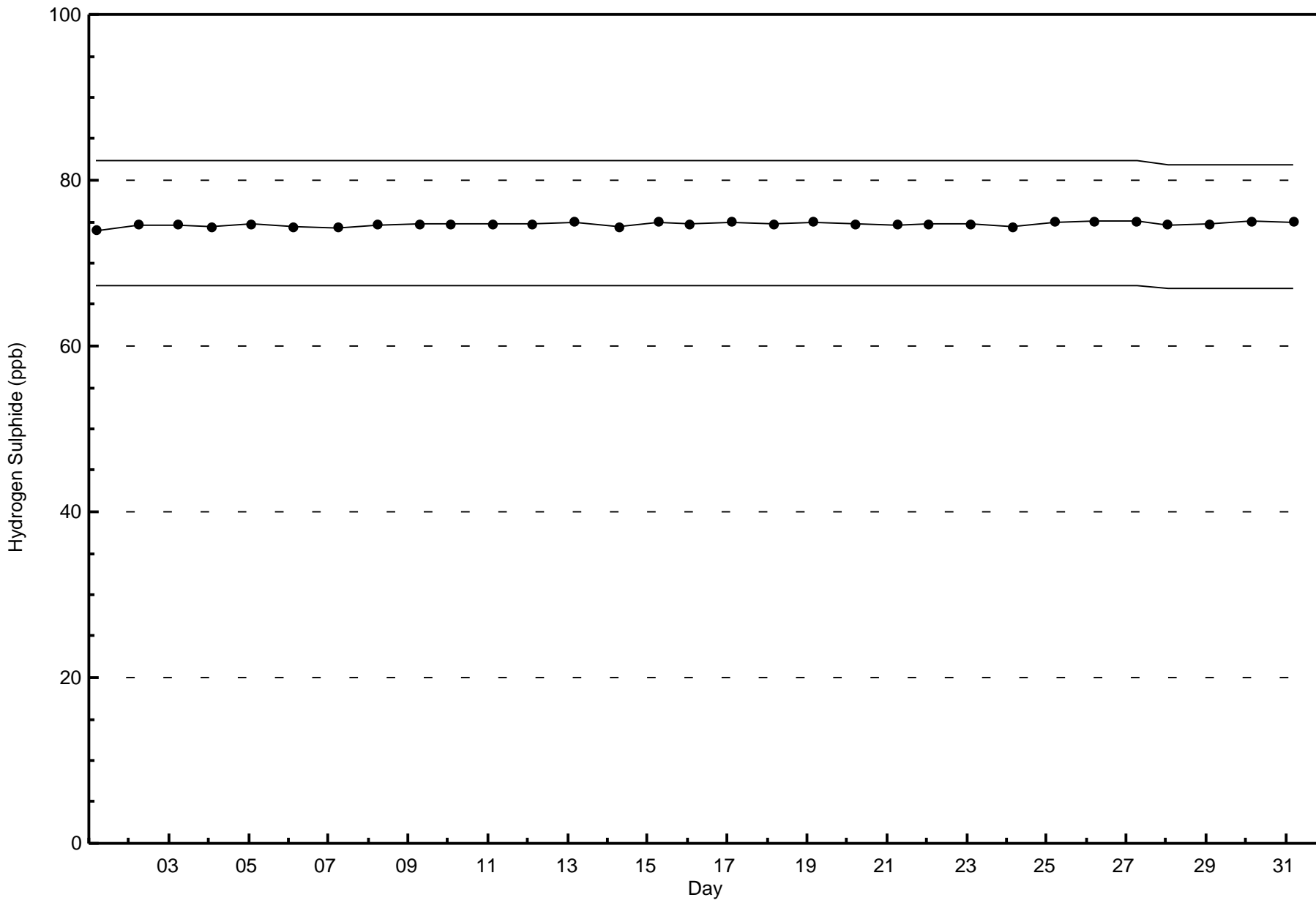
<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 2	62	64	22	6	3	8	30	120	32	11	9	23	48	65	70	93	666
3 - 4	0	0	0	0	0	0	0	1	5	4	7	1	0	0	0	0	18
5 - 7	0	0	0	0	0	0	0	0	0	0	3	2	0	0	0	0	5
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	62	64	22	6	3	8	30	121	37	15	19	26	48	65	70	93	689

Total Number of Valid Hours: 689

Total Number of Hours: 744





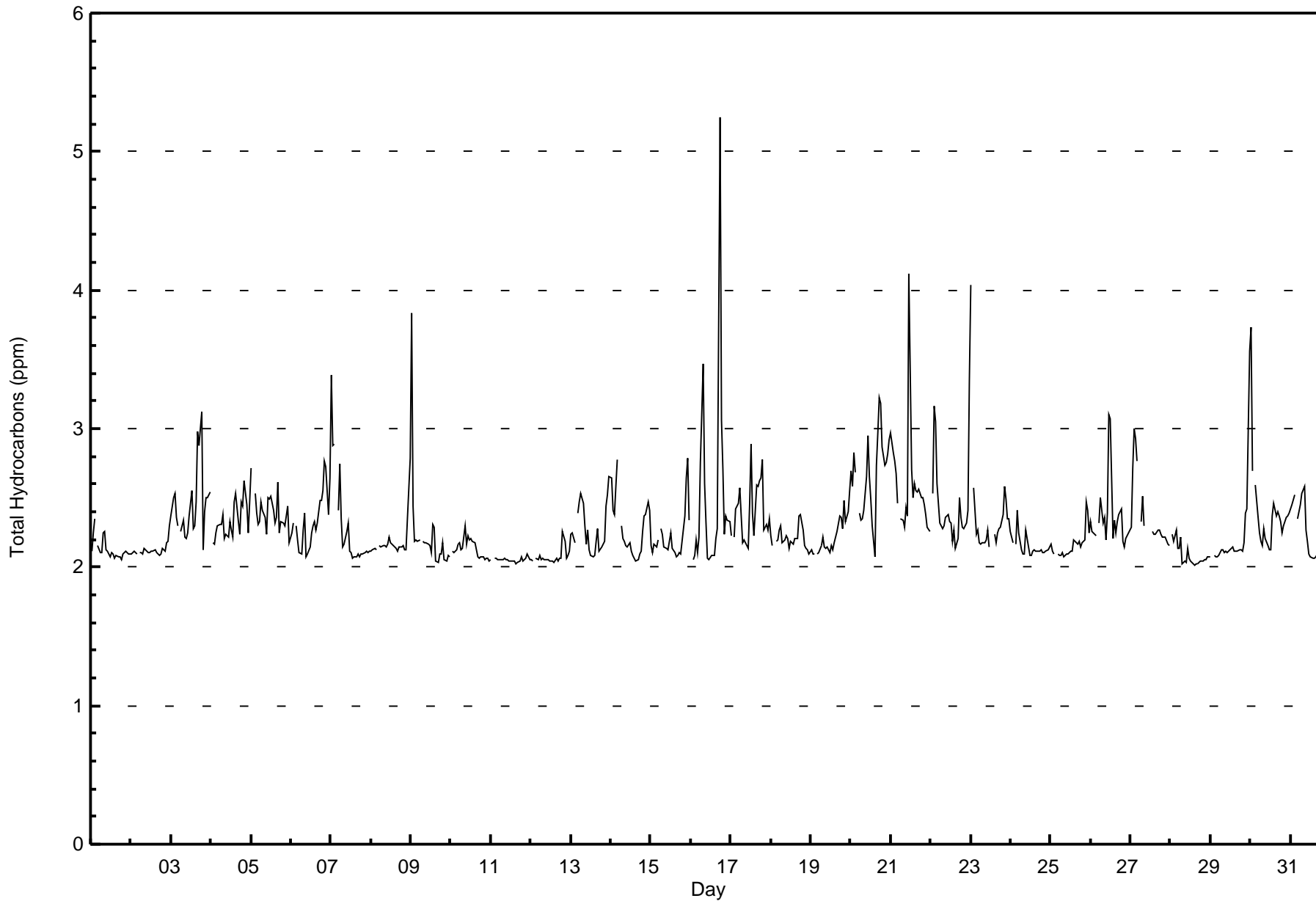






**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Lower Camp - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Lower Camp - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	36	5.09	5.09
2.1 - 3.0	655	92.64	97.74
3.1 - 10.0	16	2.26	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Lower Camp - October 2017**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	10	2	0	0	0	0	0	0	0	0	0	4	3	1	13	33
2.1 - 3.0	63	52	22	5	3	8	29	116	36	8	19	25	44	61	70	81	642
3.1 - 10.0	0	0	0	1	0	0	1	1	2	7	1	1	0	1	0	0	15
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	63	62	24	6	3	8	30	117	38	15	20	26	48	65	71	94	690

Total Number of Valid Hours: 690

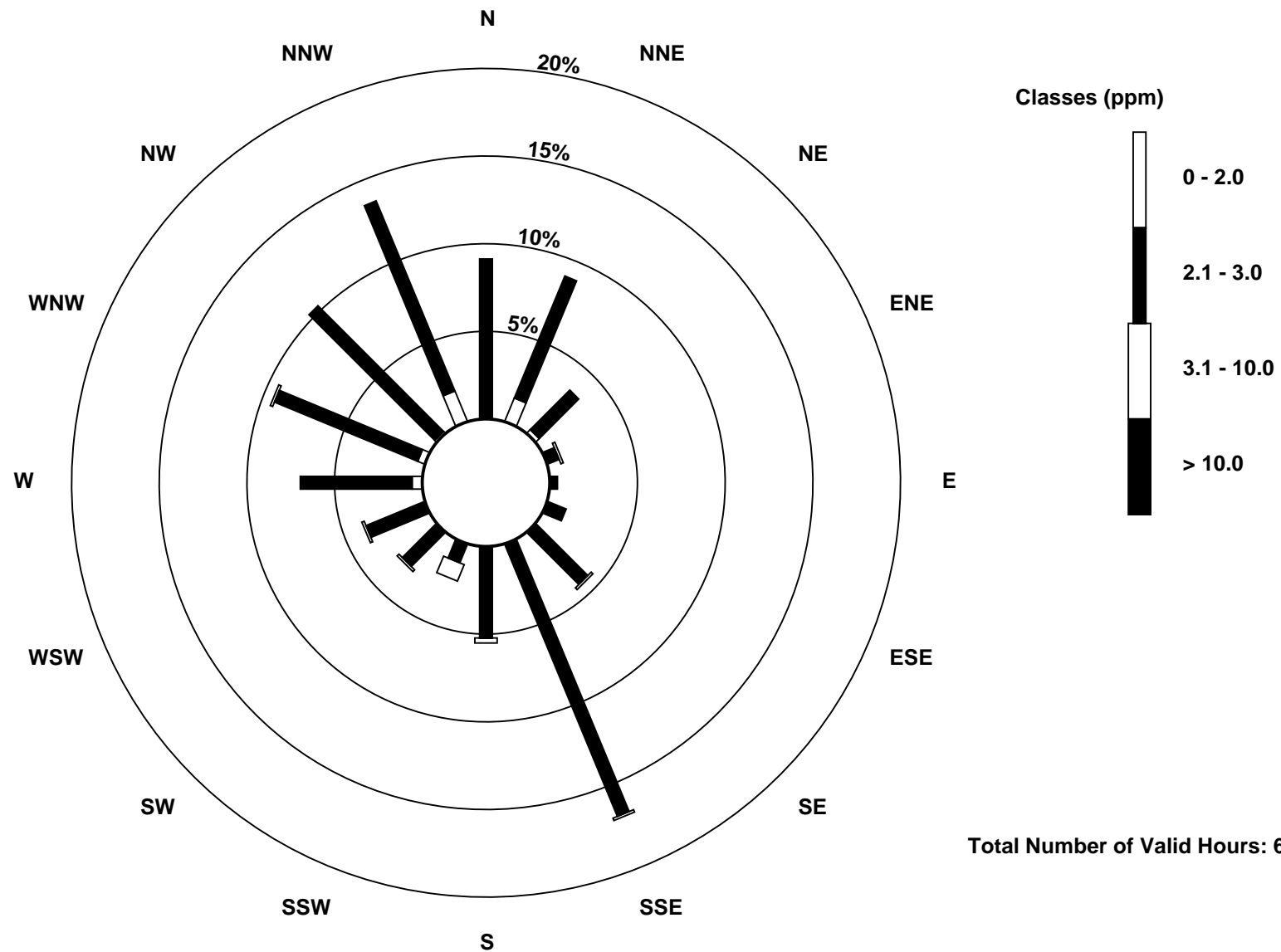
Total Number of Hours: 744





Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Total Hydrocarbons (THC) - ppm  
Lower Camp (AMS 11)

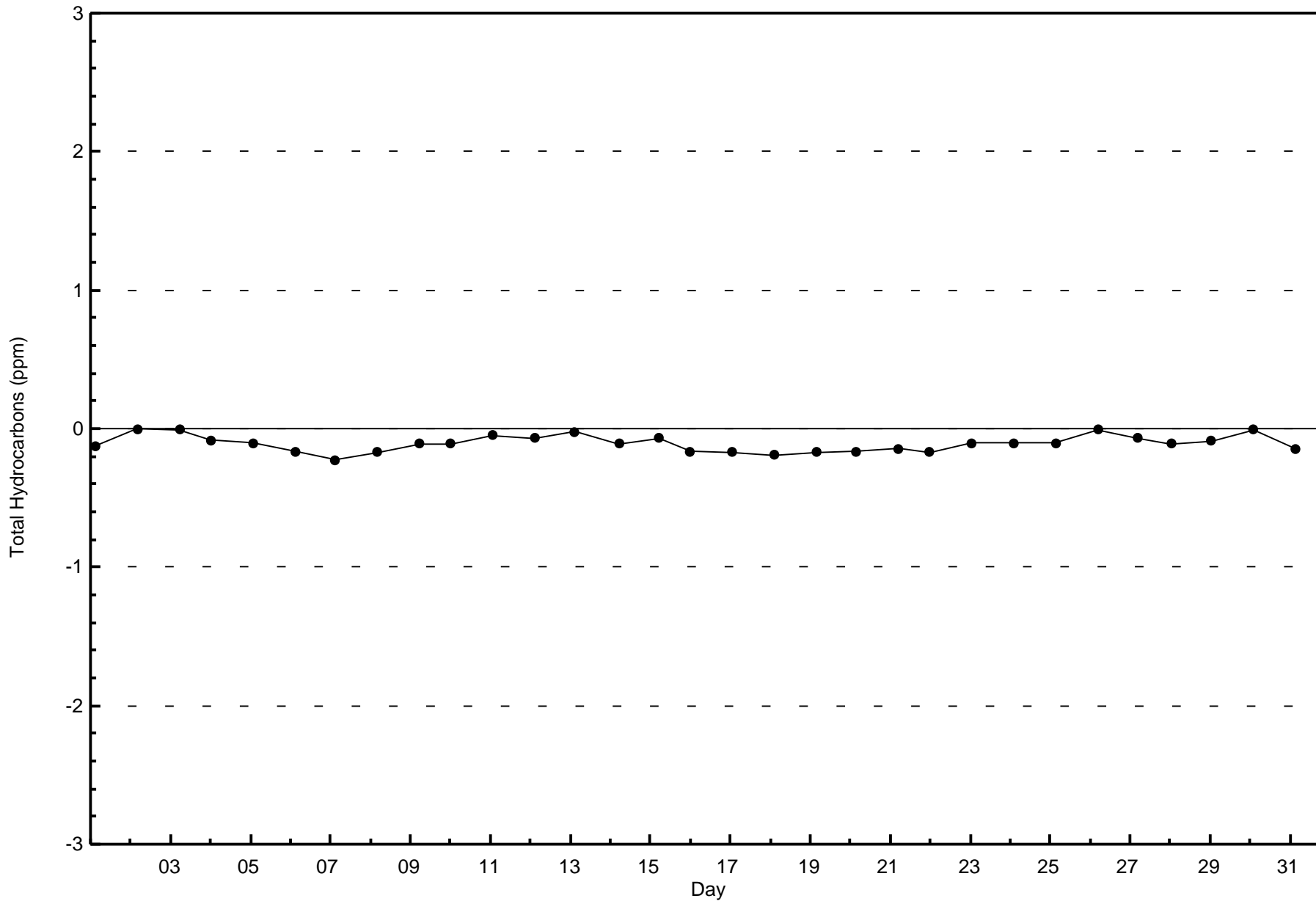


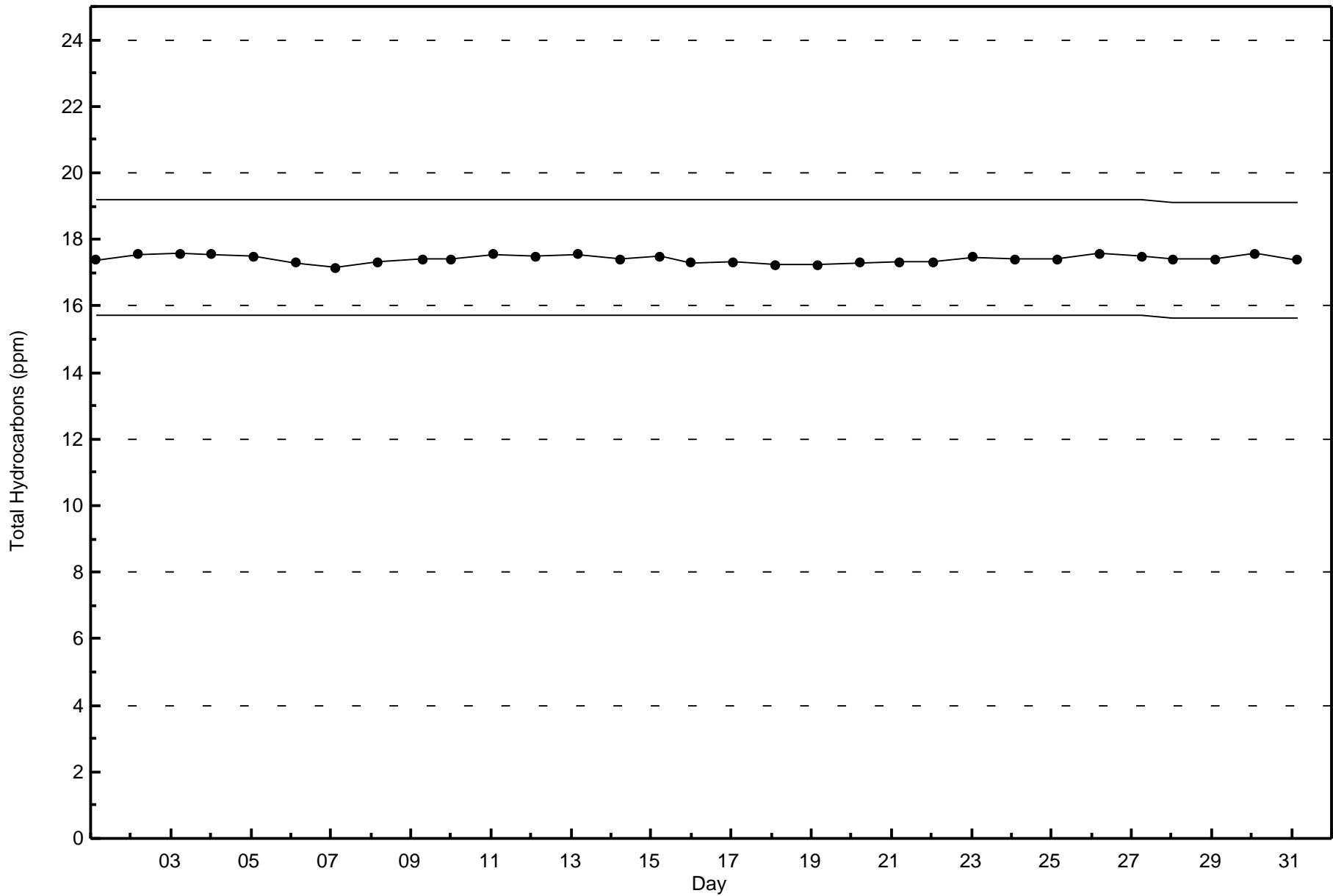
Total Number of Valid Hours: 690



Wood Buffalo Environmental Association  
Zero Responses

Total Hydrocarbons (THC) - ppm  
Lower Camp - October 2017







**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Ambient Temperature (AT) - C**

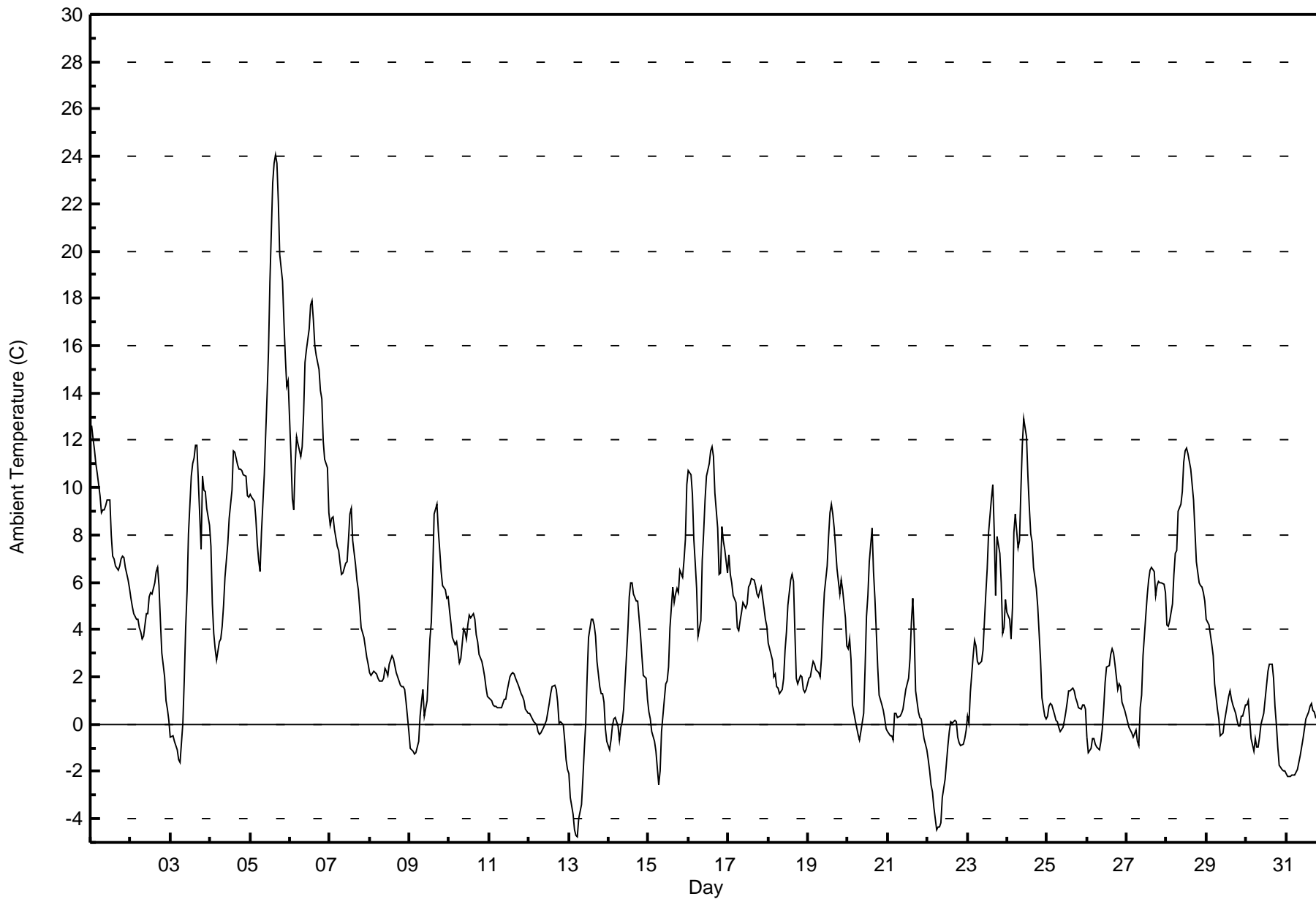
**Lower Camp - October 2017**

Maximum Value: 24.1 C on Oct 5 16:00		Maximum Daily Average: 14.8 C on Oct 5		Hours in Service: 744																							
Minimum Value: -4.8 C on Oct 13 06:00		Minimum Daily Average: -1.7 C on Oct 22		Hours of Data: 744																							
Maximum Diurnal Average: 6.7 C at hour 15		Minimum Diurnal Average: 1.9 C at hour 7		Hours of Missing Data: 0																							
Monthly Average: 3.96 C		Percentiles: P <sub>1</sub> = -4.0 P <sub>10</sub> = -0.7 Q <sub>1</sub> = 0.5 Median = 2.9 Q <sub>3</sub> = 6.5 P <sub>90</sub> = 10.0 P <sub>99</sub> = 17.6		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	12.6	12.1	11.6	11.0	10.6	9.7	9.0	9.1	9.1	9.2	9.5	9.5	8.0	7.1	7.0	6.7	6.5	6.7	7.0	7.1	7.1	6.7	6.1	5.8	8.5	12.6	
2-Oct	5.3	5.0	4.7	4.4	4.4	4.1	3.9	3.6	3.7	4.7	4.7	5.4	5.6	5.5	6.0	6.5	6.6	5.9	4.4	3.0	2.0	1.0	0.7	0.2	4.2	6.6	
3-Oct	-0.5	-0.5	-0.7	-0.9	-1.1	-1.5	-1.6	0.1	1.9	4.1	5.6	8.1	10.5	11.0	11.2	11.8	11.8	10.3	7.4	10.5	9.9	9.9	9.1	8.4	5.6	11.8	
4-Oct	7.5	5.1	3.9	3.2	2.7	3.5	3.6	4.1	5.0	6.2	7.6	8.7	9.3	9.9	11.5	11.5	11.0	10.8	10.8	10.7	10.5	10.5	9.7	9.6	7.8	11.5	
5-Oct	9.7	9.6	9.4	8.7	7.6	6.9	6.4	8.1	10.5	12.3	13.9	15.8	18.7	22.9	23.7	24.1	23.7	22.1	19.9	18.7	17.0	15.5	14.3	14.5	14.8	24.1	
6-Oct	11.4	9.5	9.0	10.9	12.2	11.9	11.3	11.7	13.1	15.3	15.8	16.7	17.7	17.9	17.1	16.0	15.6	15.0	14.1	13.7	12.0	11.2	10.8	8.9	13.3	17.9	
7-Oct	8.4	8.7	8.8	8.2	7.5	7.3	6.8	6.3	6.4	6.8	6.9	7.8	8.9	9.1	7.8	6.7	6.1	5.7	4.9	4.1	3.7	3.3	2.8	2.6	6.5	9.1	
8-Oct	2.2	2.1	2.2	2.2	2.1	2.0	1.8	1.8	1.9	2.4	2.2	2.1	2.5	2.9	2.8	2.5	2.2	2.0	1.7	1.6	1.6	1.4	0.9	-0.3	1.9	2.9	
9-Oct	-1.0	-1.1	-1.2	-1.3	-1.2	-0.7	0.3	0.9	1.5	0.4	1.0	2.3	3.6	4.3	6.4	8.9	9.3	8.2	7.3	6.5	5.9	5.7	5.3	5.4	3.2	9.3	
10-Oct	4.8	4.2	3.6	3.3	3.5	3.1	2.6	2.7	4.0	3.9	3.6	4.2	4.6	4.5	4.7	4.4	3.8	3.5	3.0	2.7	2.4	2.0	1.5	1.2	3.4	4.8	
11-Oct	1.1	1.0	0.8	0.7	0.8	0.7	0.7	0.7	0.9	1.0	1.1	1.4	2.0	2.1	2.2	2.1	1.9	1.7	1.5	1.3	1.2	1.0	0.7	0.5	1.2	2.2	
12-Oct	0.5	0.3	0.2	0.1	0.0	-0.3	-0.4	-0.4	-0.3	-0.1	0.1	0.5	0.9	1.3	1.6	1.6	1.5	0.9	0.0	0.1	0.0	-0.7	-1.5	-1.9	0.2	1.6	
13-Oct	-2.1	-3.1	-3.8	-4.4	-4.7	-4.8	-4.0	-3.4	-2.3	-1.0	0.0	2.0	3.7	4.4	4.4	4.2	3.7	2.7	1.6	1.3	1.3	1.0	-0.2	-0.7	-0.2	4.4	
14-Oct	-1.1	-0.7	-0.1	0.2	0.3	-0.1	-0.6	-0.1	0.1	0.6	1.7	4.0	5.4	6.0	6.0	5.5	5.2	5.2	4.5	3.8	2.9	2.1	2.0	1.1	2.2	6.0	
15-Oct	0.5	0.2	-0.3	-0.7	-1.1	-1.9	-2.6	-2.0	-0.3	1.1	1.7	1.8	2.4	4.1	5.8	5.1	5.5	5.7	5.5	6.5	6.2	6.9	7.8	10.1	2.8	10.1	
16-Oct	10.7	10.5	9.7	7.8	6.8	5.7	3.7	4.4	6.9	8.1	9.5	10.5	11.0	11.6	11.7	11.3	9.8	8.3	6.3	6.4	8.4	7.7	7.4	6.4	8.4	11.7	
17-Oct	7.2	6.3	6.0	5.4	5.2	4.1	4.0	4.4	4.7	5.1	4.9	5.1	5.8	5.9	6.1	6.1	5.9	5.5	5.4	5.6	5.8	4.9	4.4	4.2	5.3	7.2	
18-Oct	3.4	3.2	2.7	2.0	2.1	1.6	1.5	1.3	1.5	1.9	3.1	3.9	5.0	6.1	6.3	6.0	3.9	2.0	1.7	2.0	2.0	1.5	1.3	1.4	2.8	6.3	
19-Oct	1.9	2.0	2.4	2.6	2.6	2.3	2.2	2.0	2.8	4.4	5.6	6.7	7.9	8.9	9.3	8.9	8.3	6.6	6.1	5.5	6.1	5.7	4.5	3.3	4.9	9.3	
20-Oct	3.2	3.6	2.7	0.8	0.1	-0.2	-0.4	-0.7	-0.3	0.5	2.4	4.5	5.4	6.9	8.3	6.5	5.3	3.9	2.4	1.2	0.8	0.6	0.2	-0.2	2.4	8.3	
21-Oct	-0.3	-0.5	-0.5	-0.7	0.4	0.5	0.3	0.3	0.4	0.7	1.0	1.4	1.9	2.8	4.3	5.3	3.8	1.4	0.5	0.3	0.2	-0.2	-0.6	-1.1	0.9	5.3	
22-Oct	-1.5	-1.9	-2.6	-2.9	-3.5	-4.5	-4.3	-4.3	-4.1	-3.1	-2.3	-1.6	-0.9	-0.3	0.1	0.0	0.2	0.1	-0.6	-0.8	-0.9	-0.8	-0.6	-0.2	-1.7	0.2	
23-Oct	0.3	0.0	1.4	2.9	3.6	3.3	2.6	2.5	2.6	3.1	4.3	5.5	6.6	8.1	9.5	10.1	8.2	5.5	7.9	7.2	6.0	3.9	4.1	5.2	4.8	10.1	
24-Oct	4.7	4.4	3.6	4.9	8.1	8.9	7.5	7.7	9.9	11.8	12.9	12.2	10.5	9.2	8.0	7.7	6.6	5.8	5.0	3.8	2.7	1.1	0.4	0.2	6.6	12.9	
25-Oct	0.4	0.7	0.9	0.8	0.4	0.1	0.1	-0.1	-0.3	-0.1	0.2	0.5	1.0	1.4	1.4	1.5	1.4	1.1	0.9	0.7	0.6	0.8	0.8	0.6	0.7	1.5	
26-Oct	-0.5	-1.2	-1.0	-0.6	-0.6	-0.8	-1.0	-1.1	-0.7	-0.2	0.7	1.8	2.4	2.4	3.0	3.2	3.0	2.5	1.5	1.7	1.6	0.9	0.8	0.6	0.8	3.2	
27-Oct	0.1	-0.1	-0.3	-0.4	-0.6	-0.2	-0.7	-0.9	0.7	1.3	2.9	4.6	5.4	6.1	6.5	6.6	6.4	5.4	5.9	6.0	6.0	6.0	5.9	5.5	3.3	6.6	
28-Oct	4.2	4.1	4.4	5.1	6.3	7.2	7.4	9.0	9.3	9.8	11.0	11.6	11.7	11.4	10.8	10.1	9.5	8.2	6.9	6.0	5.9	5.8	5.6	5.2	7.8	11.7	
29-Oct	4.5	4.2	3.8	3.4	2.9	1.7	0.6	0.2	-0.5	-0.4	-0.4	0.1	0.8	1.2	1.4	1.0	0.8	0.5	0.1	-0.1	-0.1	0.3	0.3	0.8	1.1	4.5	
30-Oct	0.8	1.0	0.2	-0.6	-1.1	-0.6	-1.0	-1.0	-0.5	0.0	0.4	1.1	1.7	2.2	2.5	2.5	1.9	0.8	0.0	-1.0	-1.8	-1.9	-2.0	-2.0	0.1	2.5	
31-Oct	-2.1	-2.2	-2.2	-2.2	-2.1	-2.1	-2.1	-1.9	-1.3	-0.9	-0.6	-0.2	0.2	0.5	0.8	0.9	0.6	0.5	0.3	0.3	0.3	-0.5	-1.3	-2.0	-0.8	0.9	
		3.1	2.8	2.6	2.4	2.4	2.2	1.9	2.1	2.8	3.5	4.2	5.1	5.8	6.4	6.7	6.6	6.1	5.3	4.6	4.4	4.1	3.6	3.3	3.0	Diurnal Average	
		12.6	12.1	11.6	11.0	12.2	11.9	11.3	11.7	13.1	15.3	15.8	16.7	18.7	22.9	23.7	24.1	23.7	22.1	19.9	18.7	17.0	15.5	14.3	14.5	Diurnal Maximum	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Lower Camp - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C  
Lower Camp - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	132	17.74	17.74
0 - 10	536	72.04	89.78
10 - 20	71	9.54	99.33
> 20	5	0.67	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %**

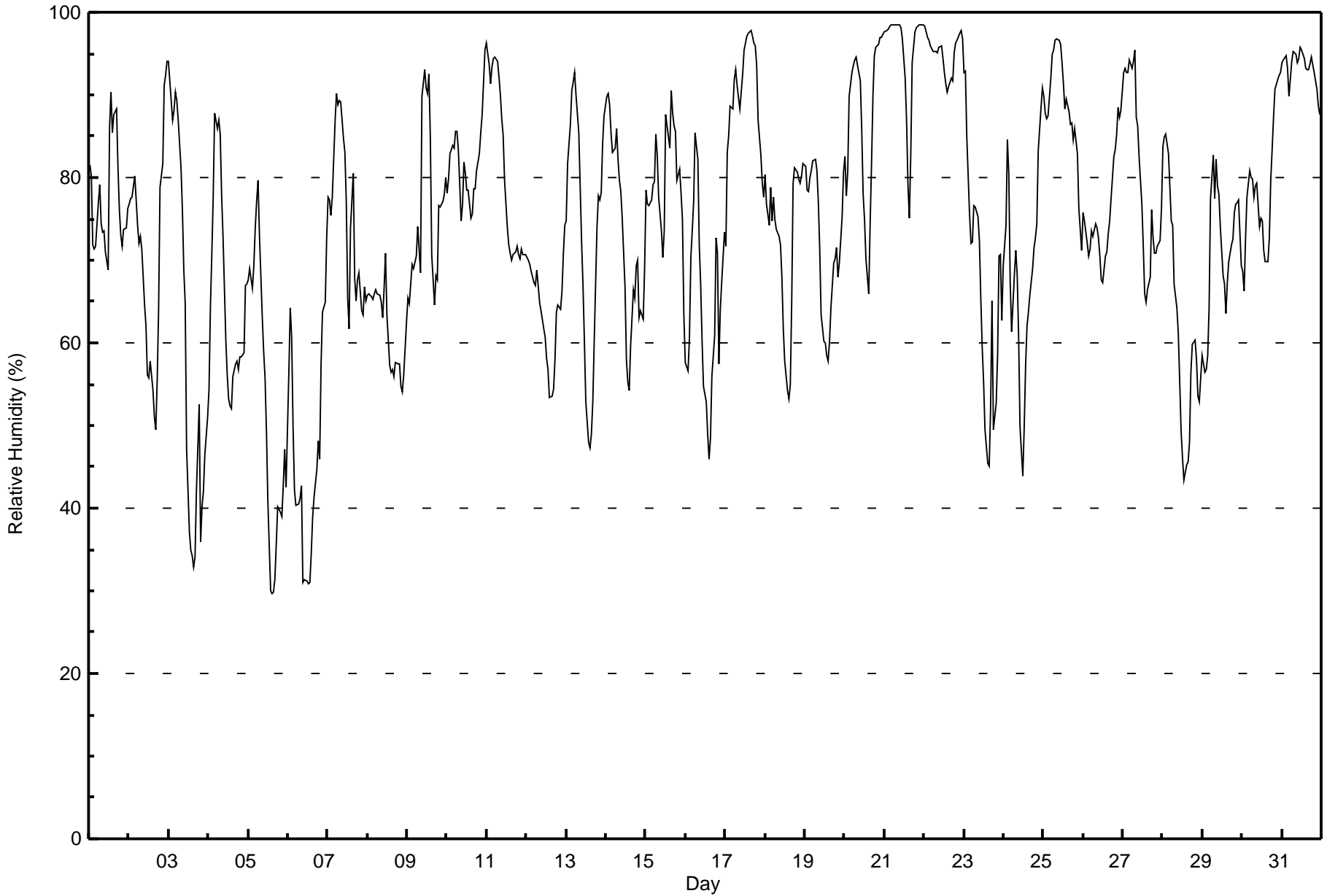
**Lower Camp - October 2017**

Maximum Value: 99 % on Oct 21 08:00														Maximum Daily Average: 95.1 % on Oct 22														Hours in Service: 744	
Minimum Value: 30 % on Oct 5 15:00														Minimum Daily Average: 46.1 % on Oct 6														Hours of Data: 744	
Maximum Diurnal Average: 82.1 % at hour 7														Minimum Diurnal Average: 64.0 % at hour 15														Hours of Missing Data: 0	
Monthly Average: 74.1 %														Percentiles: P <sub>1</sub> = 31 P <sub>10</sub> = 53 Q <sub>1</sub> = 65 Median = 75 Q <sub>3</sub> = 87 P <sub>90</sub> = 94 P <sub>99</sub> = 98														Hours of Calibration: 0	
																												Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Oct	82	80	72	71	72	77	79	74	73	74	71	69	86	90	86	88	88	81	76	73	72	74	74	76	77.4	90			
2-Oct	77	77	78	80	77	74	72	73	71	64	62	56	56	58	54	51	49	55	64	79	82	91	92	94	70.3	94			
3-Oct	94	89	87	88	90	89	87	81	76	69	65	47	37	35	34	33	34	42	53	36	40	42	46	51	60.3	94			
4-Oct	54	64	71	78	88	86	87	85	78	73	60	56	53	52	52	56	58	58	57	58	58	59	67	67	65.7	88			
5-Oct	68	69	67	69	74	77	80	73	63	59	56	49	41	30	30	30	31	36	40	40	39	43	47	43	52.2	80			
6-Oct	56	64	61	50	42	40	41	41	43	31	31	31	31	31	35	39	41	45	48	46	57	64	65	73	46.1	73			
7-Oct	78	77	75	78	87	90	89	89	89	85	83	77	65	62	74	81	68	65	68	69	64	63	67	65	75.3	90			
8-Oct	66	66	66	65	66	67	66	66	65	63	67	71	63	57	56	57	56	58	58	58	55	54	56	62	61.8	71			
9-Oct	65	65	67	70	69	70	74	71	69	90	93	91	90	93	85	71	64	68	68	77	77	77	78	80	75.9	93			
10-Oct	78	80	83	84	84	86	86	83	75	77	82	80	78	78	75	76	79	79	81	83	85	88	92	96	81.9	96			
11-Oct	96	94	91	93	94	95	94	92	90	87	85	80	74	72	71	70	71	71	72	71	70	71	71	71	81.1	96			
12-Oct	70	70	70	69	67	67	69	67	65	64	62	61	58	57	53	54	54	58	64	65	64	66	71	74	64.1	74			
13-Oct	75	82	86	90	92	93	90	85	79	72	67	60	53	48	47	49	53	60	74	78	77	78	84	87	73.3	93			
14-Oct	90	90	89	85	83	83	86	82	80	78	75	67	58	55	54	60	66	65	69	70	63	64	63	69	72.8	90			
15-Oct	78	77	77	77	79	80	85	83	78	74	70	74	88	86	84	91	88	86	86	80	81	78	75	63	79.8	91			
16-Oct	58	57	61	70	74	77	85	82	72	67	60	55	53	49	46	49	56	61	73	71	57	64	67	73	64.0	85			
17-Oct	72	83	85	89	88	92	93	91	90	88	92	95	96	97	98	98	97	96	96	94	87	83	79	78	89.9	98			
18-Oct	80	77	74	79	75	78	75	74	73	72	68	62	58	54	53	55	65	79	81	81	80	79	80	82	72.2	82			
19-Oct	81	79	78	80	81	82	82	81	77	71	63	60	60	58	58	60	64	70	70	72	68	70	75	81	71.7	82			
20-Oct	83	78	81	90	93	94	94	95	94	92	86	78	75	70	66	74	82	90	95	96	96	97	97	97	87.1	97			
21-Oct	98	98	98	98	98	99	99	99	99	98	98	97	92	87	79	75	83	94	98	98	98	98	99	99	94.9	99			
22-Oct	98	98	97	97	96	95	95	95	95	96	96	94	93	91	90	91	92	92	95	96	97	98	98	97	95.1	98			
23-Oct	93	93	85	75	72	72	77	76	75	72	65	59	55	50	45	45	52	65	49	53	59	70	71	63	66.4	93			
24-Oct	69	74	85	80	67	61	68	71	68	61	50	44	50	57	62	64	66	69	71	73	74	83	89	91	68.7	91			
25-Oct	90	88	87	87	92	95	95	97	97	97	96	94	91	88	90	88	86	87	85	86	83	76	74	71	88.3	97			
26-Oct	76	75	72	71	71	74	73	74	74	73	71	68	67	71	71	73	75	77	83	83	85	88	87	88	75.8	88			
27-Oct	93	93	93	93	94	93	94	95	87	86	83	77	72	66	65	66	68	76	73	71	71	72	72	76	80.4	95			
28-Oct	84	85	85	83	79	75	74	67	64	61	55	49	46	43	45	46	48	56	60	60	58	54	53	56	62.0	85			
29-Oct	58	56	57	58	64	77	83	78	82	79	78	74	68	67	64	67	70	72	73	76	77	77	77	69	70.9	83			
30-Oct	69	66	73	78	81	80	80	78	79	79	74	75	75	71	70	70	73	80	83	87	91	92	92	93	78.6	93			
31-Oct	94	94	95	93	90	92	94	95	95	94	94	96	95	94	93	93	93	94	95	93	92	91	89	88	93.1	96			
																												Diurnal Average	
78.1														78.6														78.8	
98														98														98	
79.7														80.0														81.0	
99														99														99	
82.1														80.5														77.9	
99														99														98	
75.7														72.9														69.2	
98														97														96	
67.0														65.2														64.0	
97														98														98	
65.2														64.0														65.1	
97														97														96	
70.5														72.7														73.2	
98														98														98	
72.8														74.3														75.7	
99														99														99	
76.5														76.5														76.5	
99														99														99	
																												Diurnal Maximum	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Lower Camp - October 2017**







Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Lower Camp - October 2017

Maximum Speed: 38 km/h on Oct 24 13:00	Maximum Daily Speed Average: 17.8 km/h on Oct 19	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 31 08:00	Minimum Daily Speed Average: 1.4 km/h on Oct 20	Hours of Data: 739
Maximum Diurnal Speed Average: 5.5 km/h at hour 15	Minimum Diurnal Speed Average: 1.5 km/h at hour 10	Hours of Missing Data: 5
Monthly Average Velocity: 3.7 km/h 320.4 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 6 Median = 11 Q <sub>3</sub> = 16 P <sub>90</sub> = 22 P <sub>99</sub> = 29	Percent Operational Time: 99.3

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	NNW13	NW16	NW19	NW18	NW17	NNW18	NW16	NW19	NW18	NW17	NNW17	N18	NNE16	N14	NNW15	NNW14	NNW14	NNW17	NNW17	N19	N22	N25	N23	N25	NNW16.8	N25
2-Oct	N26	N23	N22	N21	N22	N22	N26	NNE25	NNE23	N26	NNE26	N22	N20	NNE21	N19	N16	N14	NNW10	NW5	N4	NW3	E1	NNE3	E2	N16.3	N26
3-Oct	SSE4	SSE5	S5	SSE7	SSE11	SSE11	SSE13	SSE17	SSE15	SSE16	SSE14	S10	SW12	SW12	SW12	SSW7	S7	SSE4	WSW2	WNW17	WNW13	NNW11	N12	NNW6	S5.1	WNW17
4-Oct	NNW9	NNW4	NW6	WNW5	NW2	NNW2	NW2	NNW3	N3	NE4	N2	W6	NNW3	ENE4	SSE9	SSE11	SSE9	SSE8	SSE11	SSE12	SSE8	SSE7	SSE8	SSE10	SSE2.2	SSE12
5-Oct	SE9	SSE11	SSE10	SSE6	SSE9	SSE6	SSE8	SSE8	SSE10	SSE11	SSE12	SSE13	SSE11	WSW11	WSW17	WSW15	SW10	W11	W12	W13	WNW12	WNW14	WNW12	W14	SSW6.1	WSW17
6-Oct	SSE3	SSE3	SSE4	W8	W15	W14	W12	WNW8	SSW5	W15	W17	W22	W26	WNW23	WNW24	WNW22	WNW16	WNW13	W16	WNW13	W9	WNW10	WNW5	WNW2	W11.8	W26
7-Oct	SSW1	SW2	SW2	W6	NW8	NNW8	NNW6	N9	N8	NNE10	NNW10	NNW7	NNW10	N10	NNW15	N12	NNW19	N15	NNW21	NNW19	NNW23	NNW21	NNW25	NNW29	NNW11.5	NNW29
8-Oct	NNW25	NNW21	NNW21	NNW23	NNW22	NNW20	NNW16	NNW19	NNW22	NNW20	NW22	NW21	NW20	NW22	NW23	NNW16	NNW15	NNW12	NNW10	NW8	WNW10	W12	WSW7	SW6	NNW16.2	NNW25
9-Oct	SSW6	S8	S11	S13	S16	SSE16	SSE16	SSE13	SSE14	SSE14	SSE15	SSE16	SSE15	SE6	WSW5	WNW16	WNW16	W9	W7	WNW15	W13	WNW15	WNW15	WNW15	SSW6.8	WNW16
10-Oct	W12	WNW13	WNW17	W15	NNW4	WNW7	WNW10	W13	NW13	N11	NNE7	NNE6	NE4	NE10	NNE12	NE13	NE10	NE12	NE8	NE9	NE13	NNE12	NNE11	NNE11	N6.3	WNW17
11-Oct	NNE12	NNE14	NNE13	NNE13	NNE13	NNE14	NNE15	NNE17	NE19	NE18	NNE18	NNE20	NNE22	NE23	NE18	NNE19	NNE16	NNE17	NNE16	NNE14	NNE12	N12	N14	N12	NNE15.8	NE23
12-Oct	NNE15	NNE16	NNE14	NNE12	N11	NNW11	NW12	NNW14	NNW14	NNW15	N15	NNW15	NNW14	NNW13	NNW12	NNE10	NNW9	NW6	NW5	NNW5	NNW9	NNW9	NW5	WNW4	N10.4	NNE16
13-Oct	N6	NNW4	N3	NNW4	NNW2	SSE2	SSE4	S4	SSW2	W7	WNW7	WNW8	W8	W10	W11	WSW7	SW11	WSW14	WSW9	WSW11	WSW12	WSW11	WSW6	SE2	WSW5.3	WSW14
14-Oct	SSE4	SSE6	SSE6	S5	S7	S10	S11	S14	SSE14	SSE17	SSE16	S9	WSW11	W16	WSW14	W19	W17	WNW16	WNW14	NW16	NW20	NW18	WNW19	WNW10	WSW6.4	NW20
15-Oct	W11	W13	WNW8	NW6	NNW2	SSE6	SSE9	SSE14	SSE16	SSE19	SSE13	SSE10	SSE12	SSE17	SSE14	SSE12	SSE13	SSE11	SSE8	SSE6	SSE8	SSE5	SSE3	SW9	S7.3	SSE19
16-Oct	W15	W20	WNW27	WNW22	WNW14	WNW7	S3	SSW5	S5	S7	W11	W12	WNW15	W14	W13	WNW6	WSW1	SSW2	ENE1	SW4	WSW8	SSW3	SSW2	S4	W7.4	WNW27
17-Oct	S5	SSE6	SSE6	NNE2	NW1	ESE1	SSE4	SSE9	SSE8	SSE8	SSE10	SSE5	NNW3	N5	N4	NW5	NNW10	NNW10	NNW13	NW16	NW20	NW23	NW26	NW23	NW4.3	NW26
18-Oct	NW27	NW28	NW29	NW29	NW28	NW24	NW22	NW23	NW22	NW18	NW17	NW15	WNW9	WNW6	W6	NW2	SSE3	SE8	SSE4	ESE10	SE13	SE11	SE13	SE21	NW9.2	NW29
19-Oct	SE22	SE16	SE18	SSE22	SSE24	SSE24	SSE23	SSE16	SSE15	SSE17	SSE11	SSE13	SSE13	SSE15	SSE17	SE22	SE18	SE12	SE16	SE17	SE22	SE22	SE16	SE18	SE17.8	SSE24
20-Oct	SSE11	ESE10	NE4	NW3	WNW4	NW4	WNW4	WNW5	NW3	NW5	NNW5	N6	N9	NNE2	SSE9	NNW8	NW7	WNW2	SE2	SE1	ESE1	NW1	NNW1	NW2	NNW1.4	SSE11
21-Oct	NW1	NW4	NW3	WNW5	N5	NNE7	NE5	NE4	E3	SE4	ESE2	S5	SSE10	SSE10	SSE6	SSE2	NW6	NW6	NNE6	NNE6	NE6	AF6	AF6	AF6	ENE1.5	SSE10
22-Oct	AF5	AF7	AF7	AF3	AF6	AF5	AF4	AF6	AF7	AF4	N8	NNW8	N9	N9	N10	N7	N6	NNW7	N7	NNE5	N4	NNE3	SE3	SSW3	----	N10
23-Oct	SSE7	SSE5	WSW5	WNW14	NW18	WNW15	W16	W15	W15	WNW14	NW13	WNW14	W12	W8	WSW3	WSW4	SW13	SW10	S7	SE9	SE8	S9	S9	W7.7	NW18	
24-Oct	SSE14	SSE14	SSE12	SSE11	SSW10	WSW10	W8	W16	WNW21	WNW26	NW28	NNW37	NNW38	NNW33	NNW32	NNW20	NNW18	N11	NNE10	NE11	NNE5	ENE1	SSE1	NE1	NW9.4	NNW38
25-Oct	NNW5	ENE2	NE6	NE9	NE10	NE9	NNE11	NNE10	N10	N11	N12	N15	N15	N13	NNW12	NNW15	N15	NNW11	NNW9	NW6	NW5	NW8	WNW7	W11	N8.2	N15
26-Oct	WSW10	SW9	SW9	AF	WSW15	SW10	S9	S9	S10	S10	S8	SSW7	SW7	SW9	SW8	SW6	SW5	S2	SSW3	W9	WNW7	N2	NNW4	WNW5	SW6.1	WSW15
27-Oct	ESE1	SE4	SSE6	SSE4	SE5	SSE9	SSE10	SSE9	SSE9	SSE12	SSE15	SSE16	SSE14	S13	S12	S16	S13	SSE18	S15	S14	S13	SSE15	SSE15	SSE13	SSE11.1	SSE18
28-Oct	SSE13	SSE13	SSE11	S6	WSW5	W10	WSW7	W22	W21	W20	WNW17	NW21	NNW25	NNW25	NNW27	NNW28	NNW29	NNW29	NNW30	NW27	NNW28	NNW30	NNW27	NNW26	NW15.4	NNW30
29-Oct	NNW26	NNW32	NNW31	NNW28	N22	N21	NNE19	NNE21	NNE19	NNE17	NNE18	N19	NNE21	NNE16	NNE14	NE11	NE8	ENE5	AF	SE2	SSE4	SSE7	SSE6	SSW6	N13.1	NNW32
30-Oct	S4	SW6	SSE4	SSE6	S7	SSE7	S8	S8	SSE9	SSE10	SSW8	SSE10	SSE10	SE5	ENE2	NNW3	NNW4	NW4	WNW4	WNW5	WNW4	WNW4	WNW4	WNW2	S3.2	SSE10
31-Oct	NW3	WNW3	NW3	NNE2	NE2	NW3	WNW2	N0	SE4	ESE5	NNE4	N5	N6	NNE8	NNE9	NNE12	NNE13	NNE12	N9	NNE12	NNE13	AF	AF	AF	NNE5.1	NNE13

NW2.6	NW2.7	NW3.4	NW4.3	NW3.6	NW3.1	NW1.6	NNW2.3	NW1.7	NW1.5	NW3.2	NW4.4	NNW5.0	NW5.3	NW5.5	NNW4.9	NNW5.0	NNW4.2	NW4.2	NW4.5	NW4.3	NW4.1	NW4.0	NW2.9	Diurnal Average
NW27	NNW32	NNW31	NW29	NW28	SSE24	N26	NNE25	NNE23	N26	NW28	NNW37	NNW38	NNW33	NNW32	NNW28	NNW29	NNW29	NNW30	NW27	NNW28	NNW30	NNW27	NNW29	Diurnal Maximum

AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

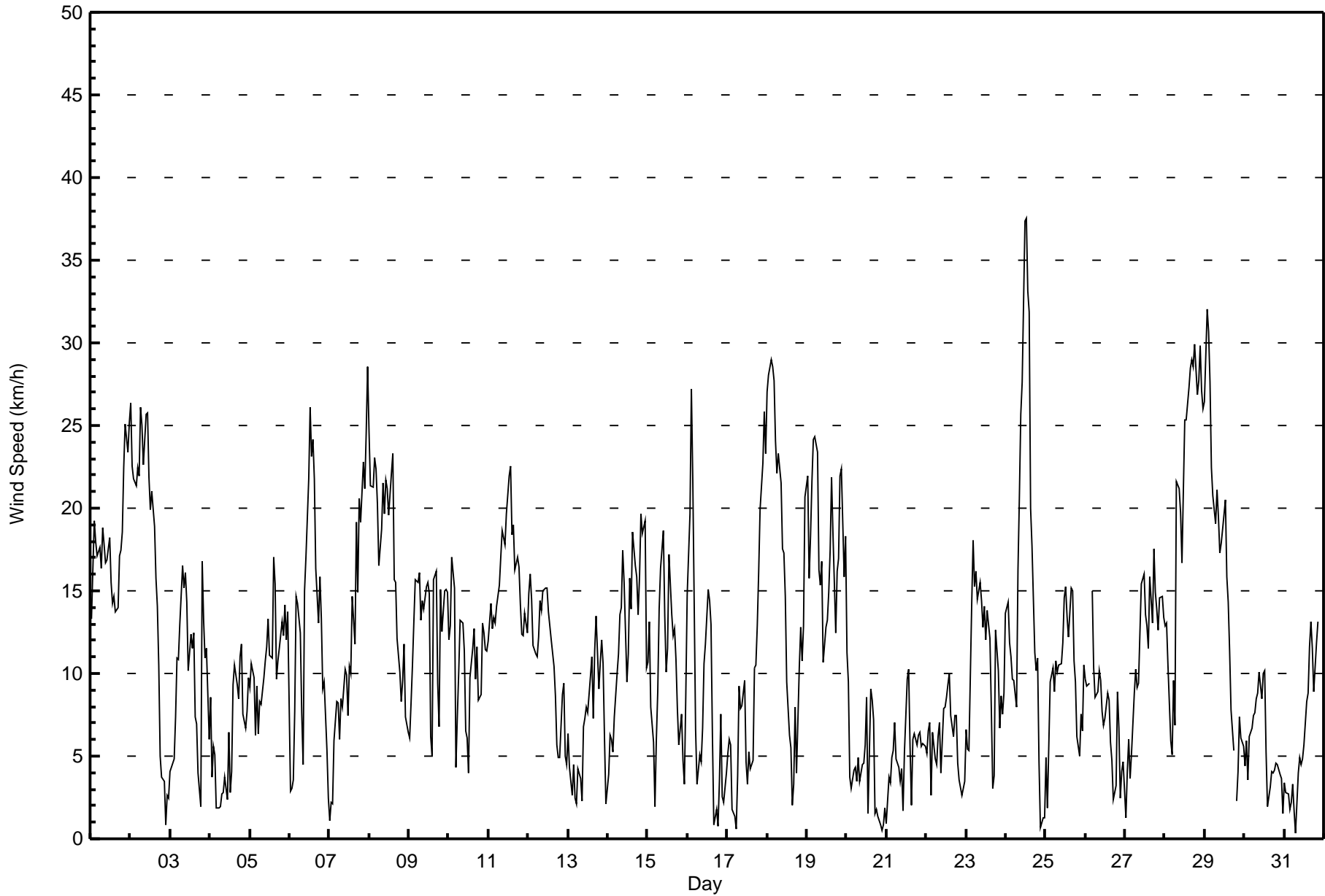
**Wind Speed (WS) - km/h**  
**Lower Camp - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Oct 24 12:00 Minimum Value: 0 km/h on Oct 31 01:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 5 P <sub>99</sub> = 7																	Hours in Service: 744 Hours of Data: 739 Hours of Missing Data: 5 Hours of Calibration: 0 Percent Operational Time: 99.3								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	4	5	4	4	4	6	4	4	4	4	4	5	3	4	3	3	3	4	4	5	7	7	7	7	7
2-Oct	7	6	6	6	6	6	8	7	6	6	6	6	5	5	5	4	4	3	2	2	1	1	1	1	8
3-Oct	1	1	2	2	3	3	3	4	4	4	3	3	5	4	5	3	2	1	3	4	3	4	3	3	5
4-Oct	3	1	2	2	1	1	1	1	2	1	2	2	1	3	2	2	2	2	2	2	2	3	2	3	3
5-Oct	3	3	3	3	2	2	3	2	2	2	2	1	2	5	3	4	4	3	2	3	3	2	2	4	5
6-Oct	2	1	2	4	3	3	3	3	2	4	4	7	6	5	6	6	3	3	7	4	4	8	3	2	8
7-Oct	2	1	2	4	2	2	2	2	2	3	2	2	3	3	4	4	5	4	5	5	5	6	5	6	6
8-Oct	5	5	4	5	5	4	5	4	4	5	5	5	5	4	5	4	3	3	2	3	3	3	4	2	5
9-Oct	1	3	3	3	4	5	5	4	5	4	4	4	4	2	4	5	4	3	3	6	4	4	3	3	6
10-Oct	2	3	4	4	2	3	4	3	4	2	3	2	2	2	2	3	3	2	2	2	2	2	3	2	4
11-Oct	2	3	3	3	3	3	3	3	4	4	4	4	5	5	5	4	4	4	4	3	3	3	3	3	5
12-Oct	4	4	4	3	3	2	2	3	3	4	4	4	3	4	3	3	2	1	1	2	2	2	1	1	4
13-Oct	1	2	2	1	1	1	1	1	1	2	2	2	2	3	3	2	4	3	2	2	3	3	3	2	4
14-Oct	1	3	2	2	2	3	3	4	3	3	4	4	3	3	3	4	4	4	3	4	5	4	3	3	5
15-Oct	2	3	3	2	3	2	2	3	5	4	4	3	3	4	3	3	2	2	2	1	2	2	2	4	5
16-Oct	3	4	8	5	3	4	2	3	2	3	3	3	3	3	3	3	1	2	2	5	3	2	2	1	8
17-Oct	1	1	2	1	1	1	3	2	2	2	3	4	1	2	1	1	3	2	3	4	5	5	5	5	5
18-Oct	6	7	7	6	5	5	4	5	5	4	3	3	3	2	3	2	1	3	2	1	3	2	3	4	7
19-Oct	5	4	4	4	4	4	6	4	4	4	4	3	2	2	3	4	3	4	3	4	2	2	5	3	6
20-Oct	4	3	2	2	2	1	1	1	1	2	3	2	2	4	3	4	2	2	1	2	1	1	2	1	4
21-Oct	1	2	1	1	2	1	2	1	1	2	1	3	2	2	2	2	2	2	2	2	2	1	1	1	3
22-Oct	2	1	1	2	2	1	2	1	2	2	2	2	2	2	2	2	2	1	2	2	1	1	2	2	2
23-Oct	3	2	4	4	4	4	3	3	3	3	4	4	3	3	4	2	2	3	3	3	3	1	2	3	4
24-Oct	4	2	2	3	4	3	3	4	6	5	7	9	9	8	6	7	5	3	3	3	4	2	1	2	9
25-Oct	1	2	2	2	2	1	2	2	2	2	2	4	4	3	3	3	4	2	2	1	2	1	2	2	4
26-Oct	3	2	4	AF	5	5	3	3	3	3	4	3	3	3	3	2	2	1	2	4	4	2	2	2	5
27-Oct	1	1	1	1	3	2	2	2	2	2	3	3	3	4	4	5	4	4	4	4	4	4	4	3	5
28-Oct	2	2	3	2	4	5	5	5	4	3	4	5	6	6	6	6	6	7	7	7	6	6	6	7	7
29-Oct	7	7	7	6	7	6	5	5	4	5	4	5	5	4	4	3	2	2	AF	2	2	2	2	2	7
30-Oct	2	2	2	2	2	2	2	2	3	4	3	3	2	2	1	1	1	1	1	1	1	1	1	1	4
31-Oct	0	1	1	1	1	1	1	1	2	2	1	1	2	1	2	2	3	2	2	3	3	AF	AF	AF	3
Diurnal Maximum																									
AF - Analyzer Failure																									



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Lower Camp - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h  
Lower Camp - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	164	22.19	22.19
6 - 11	237	32.07	54.26
12 - 19	236	31.94	86.20
20 - 28	89	12.04	98.24
29 - 38	13	1.76	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 739

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Wind Speed (WS) - km/h  
Lower Camp - October 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	10	10	6	6	3	6	9	21	10	9	4	7	0	18	23	17	159
6 - 11	20	14	12	0	0	2	6	59	20	6	12	14	18	15	10	21	229
12 - 19	18	34	6	0	0	0	10	49	9	0	4	6	28	27	18	27	236
20 - 28	16	8	1	0	0	0	5	4	0	0	0	0	6	7	20	22	89
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	11	13
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	64	66	25	6	3	8	30	133	39	15	20	27	52	67	73	98	726

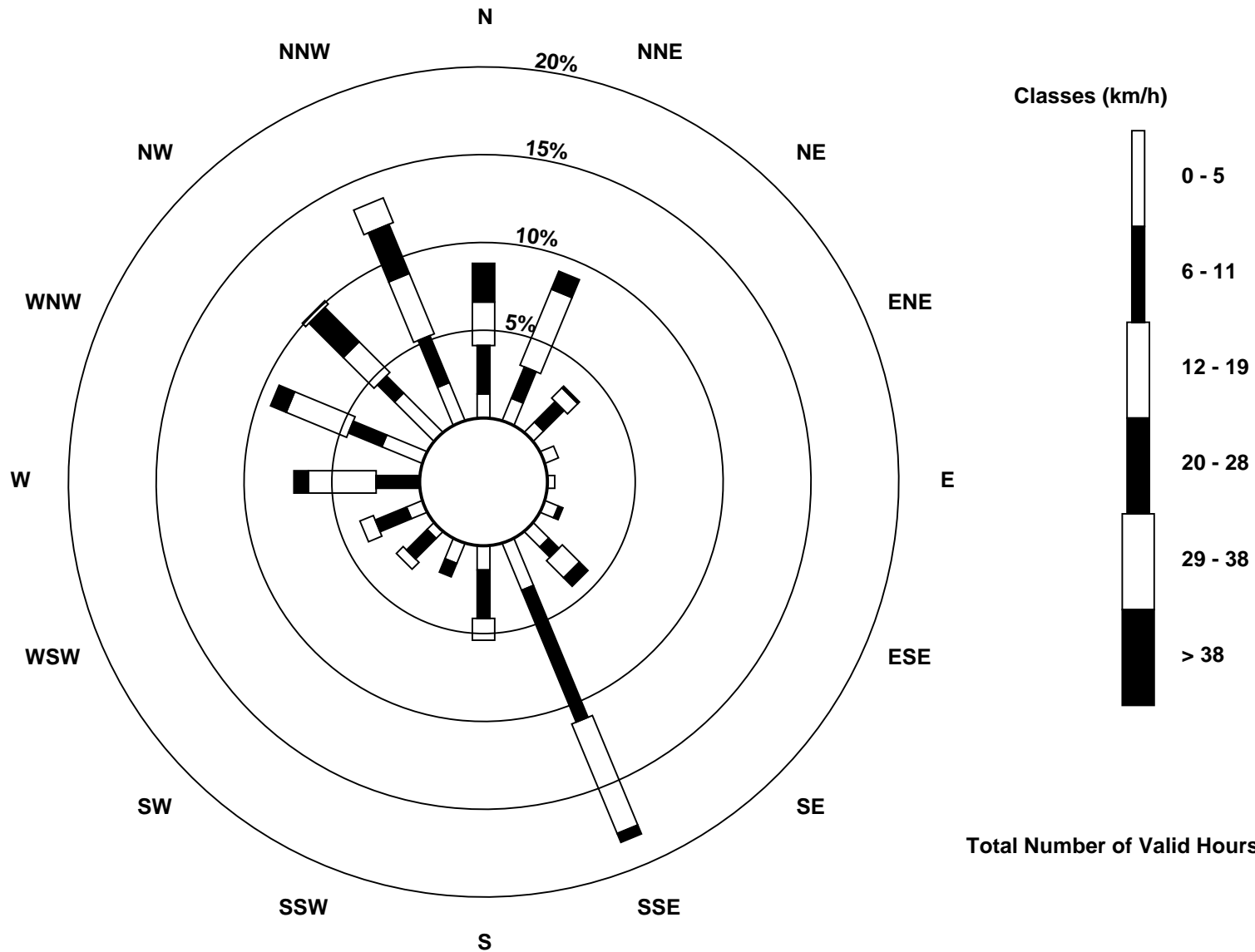
Total Number of Valid Hours: 726

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed (WS) - km/h  
Lower Camp (AMS 11)





**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Wind Direction (WD) - deg**  
**Lower Camp - October 2017**

Direction of Maximum Speed: 328 deg on Oct 24 13:00																						Hours in Service: 744			
Direction of Maximum Daily Speed Average: 145.8 deg on Oct 19																						Hours of Data: 726			
Direction of Minimum Speed: 3 deg on Oct 31 08:00											Direction of Minimum Daily Speed Average: 1.4 deg on Oct 20											Hours of Missing Data: 18			
Monthly Average Direction: 295.6 deg																						Percent Operational Time: 97.6			
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	329	318	322	323	326	332	322	316	314	322	340	356	24	359	344	336	328	338	344	356	1	9	5	8	341.9
2-Oct	2	358	2	7	6	355	8	14	12	11	15	4	357	13	7	354	357	331	320	354	310	87	24	93	4.1
3-Oct	148	168	172	168	164	161	157	154	147	155	156	183	225	225	228	211	180	155	242	289	299	348	352	348	188.4
4-Oct	348	336	308	285	326	348	304	330	358	52	11	261	333	58	148	155	157	160	163	160	166	165	155	152	161.8
5-Oct	140	151	155	155	160	159	158	149	155	155	154	153	158	250	247	237	230	269	270	274	284	283	288	277	212.2
6-Oct	150	160	165	280	278	280	275	287	194	267	272	273	278	287	285	293	286	284	280	291	281	286	300	302	279.3
7-Oct	204	232	217	260	313	347	348	1	1	13	342	329	334	9	342	0	337	357	338	341	340	340	335	336	341.1
8-Oct	334	331	332	332	333	338	348	333	331	333	318	315	321	317	324	343	341	334	347	321	286	281	255	224	326.3
9-Oct	204	184	180	169	170	168	157	159	164	165	160	162	151	144	255	285	287	268	270	293	265	283	290	283	207.7
10-Oct	279	283	282	281	331	288	292	277	311	4	16	23	34	39	32	44	51	53	47	40	35	31	30	17	353.4
11-Oct	21	22	23	27	24	20	24	31	35	35	30	31	32	35	36	25	19	16	13	15	17	11	6	10	24.4
12-Oct	13	20	24	22	9	345	326	340	345	346	351	341	346	337	347	14	339	322	315	334	345	347	321	299	350.6
13-Oct	350	334	350	334	331	153	148	174	201	259	283	287	271	263	265	237	236	253	250	254	250	239	249	136	258.5
14-Oct	162	153	153	176	182	179	175	169	168	159	162	175	248	265	258	270	281	292	294	315	320	308	300	293	247.5
15-Oct	277	274	296	312	329	165	160	153	149	150	157	147	162	166	165	154	161	158	153	149	160	161	166	236	169.4
16-Oct	261	270	291	302	295	302	182	203	190	174	272	278	288	272	278	293	253	197	59	223	237	196	202	169	271.3
17-Oct	182	168	164	26	308	122	160	152	148	156	163	153	327	2	352	326	338	331	324	315	315	318	313	314	311.4
18-Oct	315	313	313	314	316	320	318	310	311	310	311	325	302	291	281	310	149	137	157	118	132	126	138	139	312.4
19-Oct	143	130	137	150	152	151	155	160	150	155	158	153	154	152	149	145	140	130	137	139	136	138	141	144	145.8
20-Oct	150	116	47	317	303	316	299	290	310	312	345	0	7	17	161	344	325	299	134	124	108	316	328	309	344.3
21-Oct	322	311	321	300	11	33	53	51	97	138	114	179	150	147	149	149	315	320	21	31	47	AF	AF	AF	58.2
22-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	345	0	360	2	9	350	348	6	14	353	19	136	202	--
23-Oct	163	162	250	293	305	298	276	278	278	294	312	285	279	282	273	272	252	247	235	233	175	145	145	172	268.4
24-Oct	162	160	155	161	193	256	275	278	295	299	305	327	328	330	327	346	346	356	20	41	25	78	159	40	318.4
25-Oct	328	61	54	50	55	43	27	15	10	10	6	6	8	6	348	346	354	345	338	325	307	314	284	271	359.8
26-Oct	239	236	235	AF	244	227	189	183	181	178	178	198	218	226	218	235	218	191	213	265	283	7	333	302	223.1
27-Oct	112	146	156	158	145	148	152	155	157	155	152	155	159	176	174	175	174	158	171	171	170	168	167	163	162.5
28-Oct	156	160	160	171	248	259	256	272	271	272	291	325	328	334	328	329	329	329	334	324	335	336	340	343	317.5
29-Oct	332	336	338	339	354	2	13	14	15	13	13	11	14	15	26	43	52	58	AF	127	155	152	162	208	3.2
30-Oct	182	215	154	161	171	162	170	179	157	158	193	164	152	140	65	328	346	325	297	297	290	294	296	289	181.8
31-Oct	311	301	309	25	53	314	297	3	141	109	16	5	358	26	16	20	15	17	356	17	19	AF	AF	AF	13.0
314.1 307.0 314.3 318.4 316.1 315.8 311.5 299.8 311.0 316.5 324.7 325.3 326.7 326.2 315.8 328.0 327.0 329.2 321.8 320.2 322.1 325.1 321.8 310.0																									
Diurnal Average																									
AF - Analyzer Failure																									
All monthly, daily, and diurnal averages have been calculated using vector methods																									



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Direction (WD) - deg**  
**Lower Camp - October 2017**

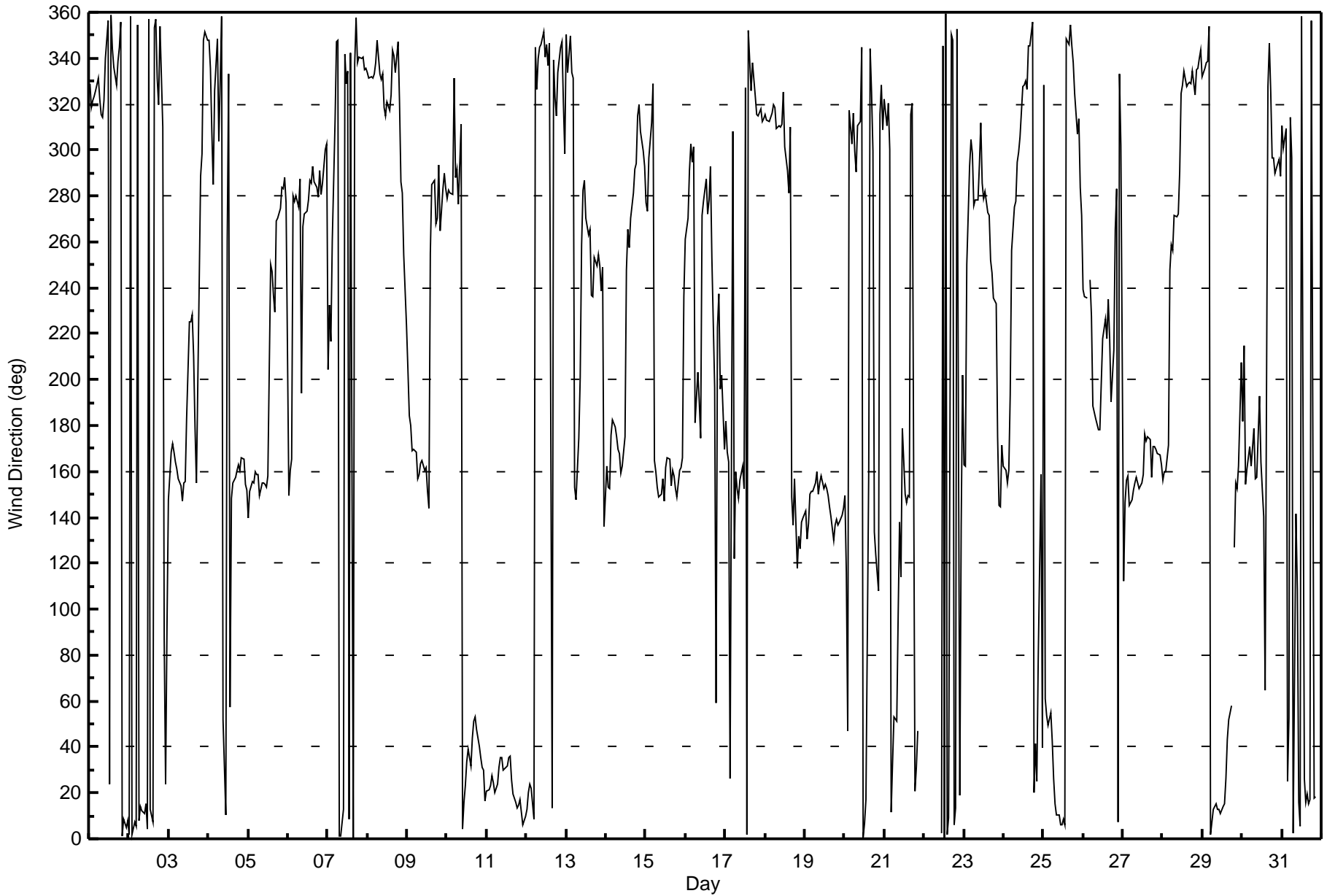
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 94 deg on Oct 20 14:00 Minimum Value: 5 deg on Oct 19 22:00 Percentiles: P <sub>1</sub> = 8 P <sub>10</sub> = 12 Q <sub>1</sub> = 14 Median = 18 Q <sub>3</sub> = 26 P <sub>90</sub> = 45 P <sub>99</sub> = 82																	Hours in Service: 744 Hours of Data: 726 Hours of Missing Data: 18 Hours of Calibration: 0 Percent Operational Time: 97.6								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	16	12	12	13	13	15	14	12	11	12	15	24	18	25	19	15	13	14	16	20	21	21	22	21	25
2-Oct	21	20	21	21	21	21	20	19	19	21	21	22	21	19	22	23	20	15	31	28	45	80	41	41	80
3-Oct	31	24	32	18	14	17	13	16	17	17	18	30	28	29	26	32	23	25	77	12	16	20	18	29	77
4-Oct	24	31	32	23	70	51	27	38	37	30	74	34	80	26	18	10	11	12	12	22	27	12	15	80	
5-Oct	26	13	14	47	12	18	22	20	14	15	9	6	35	36	19	22	29	15	13	14	13	12	14	47	
6-Oct	58	52	34	66	12	13	14	26	56	16	14	14	13	15	15	13	12	12	12	13	24	77	22	40	77
7-Oct	83	49	61	53	36	16	20	21	20	19	14	18	18	21	22	22	15	20	15	17	14	17	13	13	83
8-Oct	13	13	12	13	12	13	17	13	12	13	17	13	14	13	13	16	14	12	14	20	15	13	33	18	33
9-Oct	18	18	20	18	19	19	18	23	21	20	17	16	13	27	64	14	12	14	33	27	14	16	12	13	64
10-Oct	11	12	11	16	57	36	20	12	15	24	21	16	32	15	16	15	20	14	14	14	12	14	16	16	57
11-Oct	14	14	14	15	16	16	16	14	12	13	16	14	14	15	17	15	17	17	17	19	18	19	20	20	20
12-Oct	19	18	19	19	22	19	13	14	17	18	20	16	20	19	20	24	16	16	21	34	16	13	30	18	34
13-Oct	12	30	46	23	46	58	27	26	37	23	18	19	24	20	16	28	23	13	18	13	13	18	59	57	59
14-Oct	15	20	28	22	20	16	17	17	16	11	14	42	24	15	18	13	13	12	12	16	11	11	10	14	42
15-Oct	16	14	33	34	88	27	11	13	14	12	18	15	18	14	17	14	7	8	13	15	9	27	56	24	88
16-Oct	14	14	18	13	12	53	46	38	40	43	19	15	11	16	15	19	62	47	55	90	24	51	51	24	90
17-Oct	17	14	28	68	74	72	58	15	15	18	13	68	45	22	19	17	15	12	13	11	11	11	11	11	74
18-Oct	12	11	12	11	11	12	11	11	12	13	13	18	21	31	44	84	23	13	30	10	13	16	18	12	84
19-Oct	12	14	14	11	10	11	13	16	16	13	21	14	6	6	8	7	8	11	10	12	6	5	14	9	21
20-Oct	20	29	49	73	35	26	26	21	26	30	51	27	22	94	15	36	10	38	44	81	70	83	77	53	94
21-Oct	90	16	44	26	26	15	24	23	33	18	56	40	14	11	16	76	13	24	27	19	25	AF	AF	AF	90
22-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	21	22	23	22	29	23	24	22	18	42	31	48	37	47	48
23-Oct	27	23	70	15	12	19	12	12	11	13	21	12	15	14	15	14	64	62	18	21	30	14	32	25	70
24-Oct	12	9	9	16	34	39	29	14	12	12	14	16	14	13	12	18	17	19	21	12	65	86	62	53	86
25-Oct	19	44	17	13	11	12	12	17	17	18	19	19	18	19	16	14	18	14	15	13	26	13	32	16	44
26-Oct	17	18	20	AF	21	32	23	21	21	21	30	32	35	31	31	25	31	50	40	18	57	79	37	32	79
27-Oct	51	21	12	33	27	13	13	12	14	11	11	11	18	21	20	20	18	11	19	18	18	17	14	15	51
28-Oct	9	8	17	24	61	46	63	12	11	11	19	14	15	13	14	13	13	14	15	13	13	13	14	15	63
29-Oct	15	12	14	15	21	22	18	18	18	19	17	19	18	18	21	14	11	20	AF	42	20	15	18	31	42
30-Oct	34	38	50	15	18	13	18	20	13	26	27	26	11	42	54	27	25	30	17	9	15	18	18	51	54
31-Oct	14	21	41	60	39	20	35	78	34	30	23	18	19	12	14	12	16	14	18	16	15	AF	AF	AF	78
90 52 70 73 88 72 63 78 56 43 74 68 80 94 64 84 64 62 77 90 70 86 77 57																									
Diurnal Maximum																									
AF - Analyzer Failure																									





**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Lower Camp - October 2017**







# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

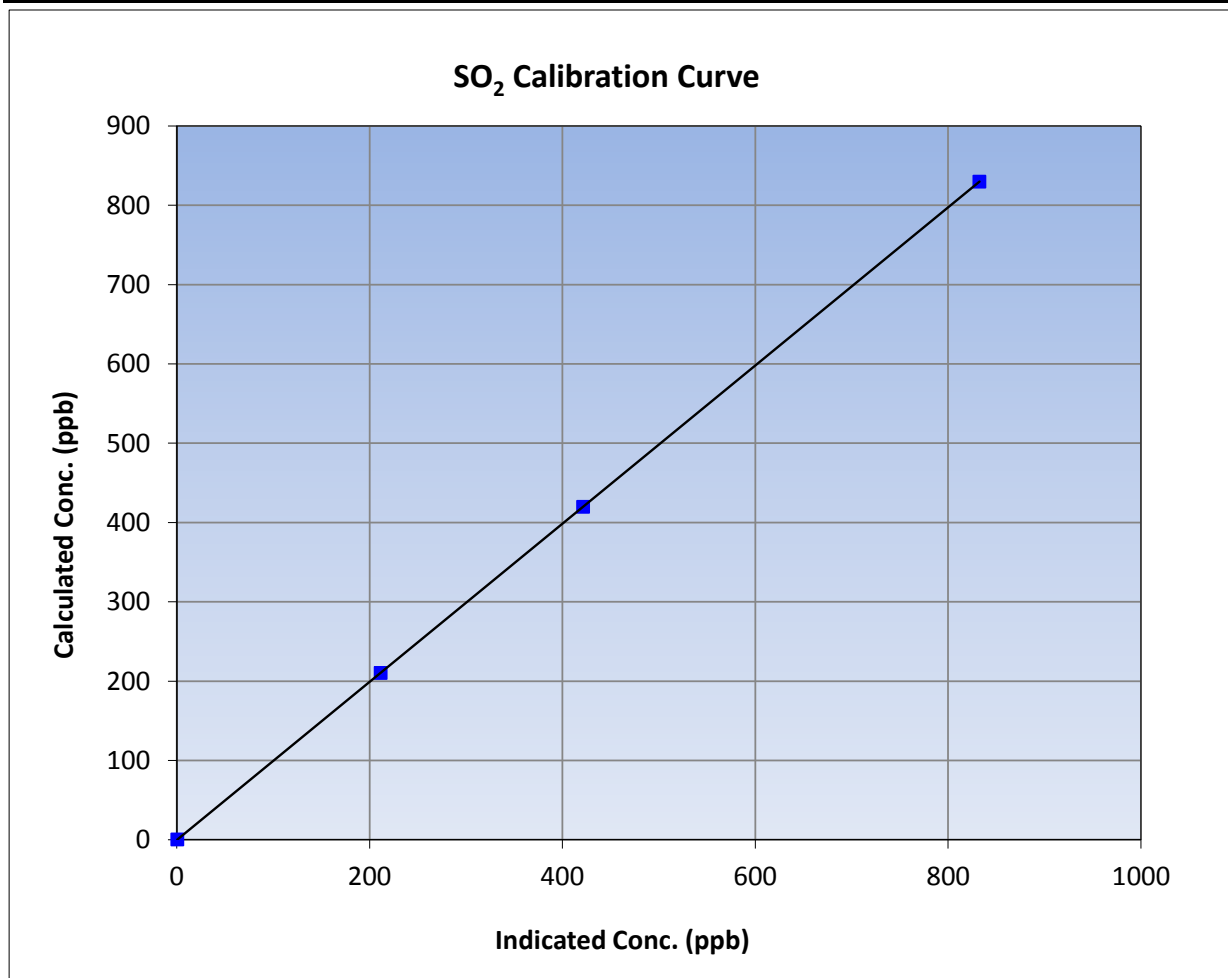
Version-03-2017

### Station Information

Calibration Date	October 27, 2017	Previous Calibration	September 25, 2017
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	9:17	End Time (MST)	11:28
Analyzer make	TEI 43i	Analyzer serial #	100841398

### Calibration Data

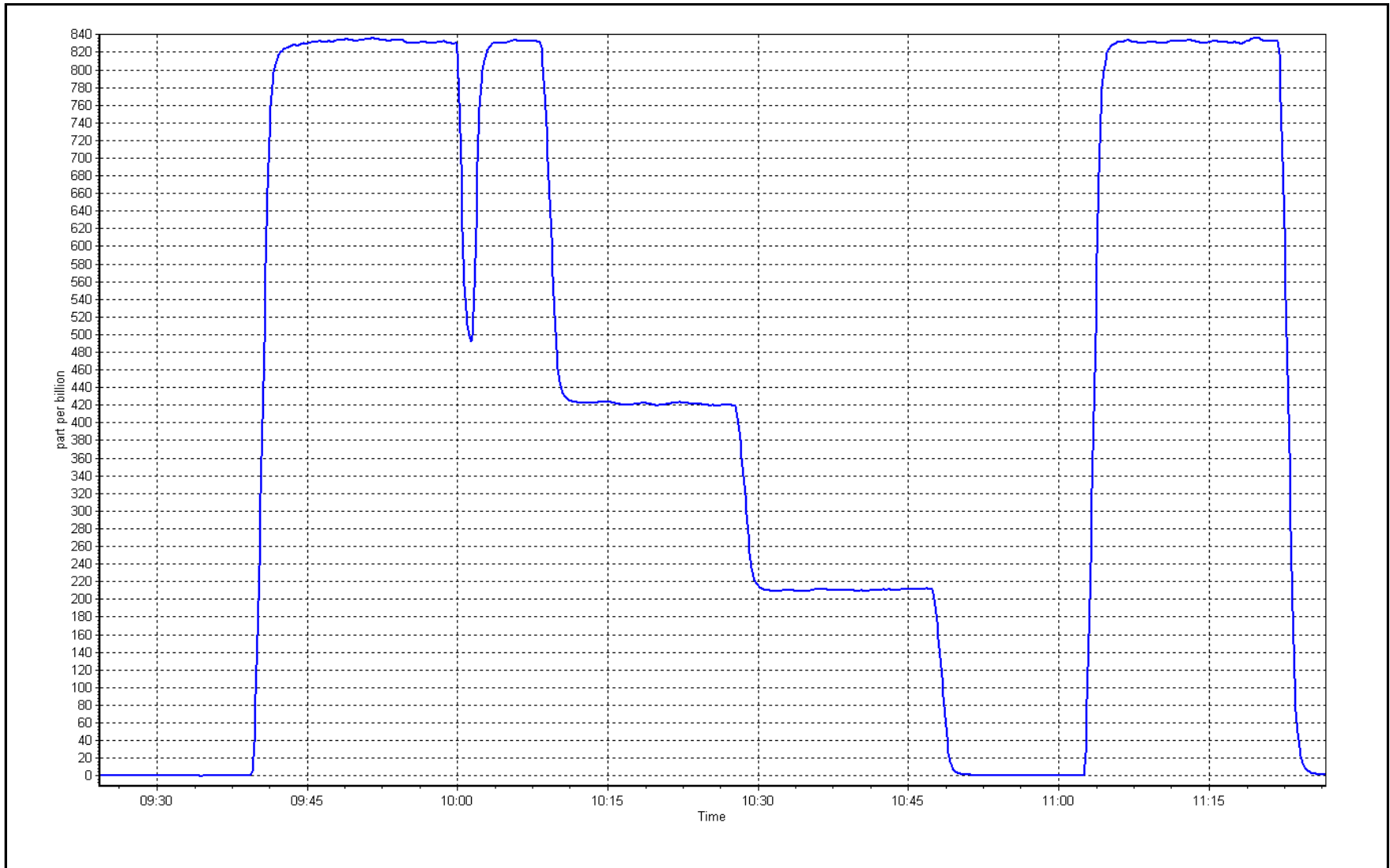
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	0.1	----	Correlation Coefficient	0.999999	≥0.995
829.7	832.2	0.9969			
419.5	421.1	0.9961	Slope	0.997243	0.90 - 1.10
209.8	211.1	0.9940			
			Intercept	-0.376232	+/-30



SO2 Calibration Plot

Date: 27-Oct

Location: Lower Camp







# Wood Buffalo Environmental Association

## H<sub>2</sub>S Calibration Summary

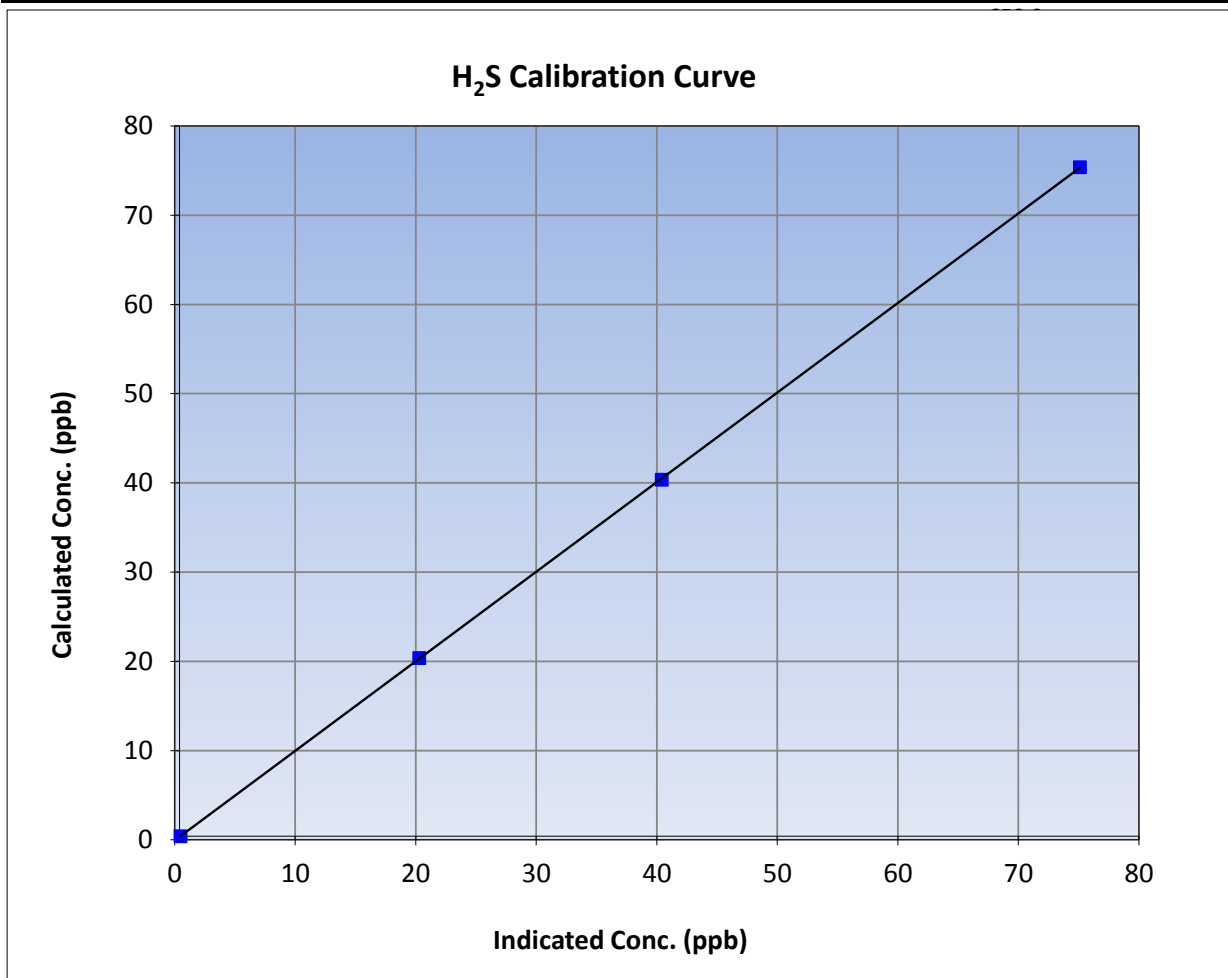
Version-03-2017

### Station Information

Calibration Date	October 27, 2017	Previous Calibration	September 26, 2017
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	9:27	End Time (MST)	13:33
Analyzer make	Thermo 450i	Analyzer serial #	1410661328

### Calibration Data

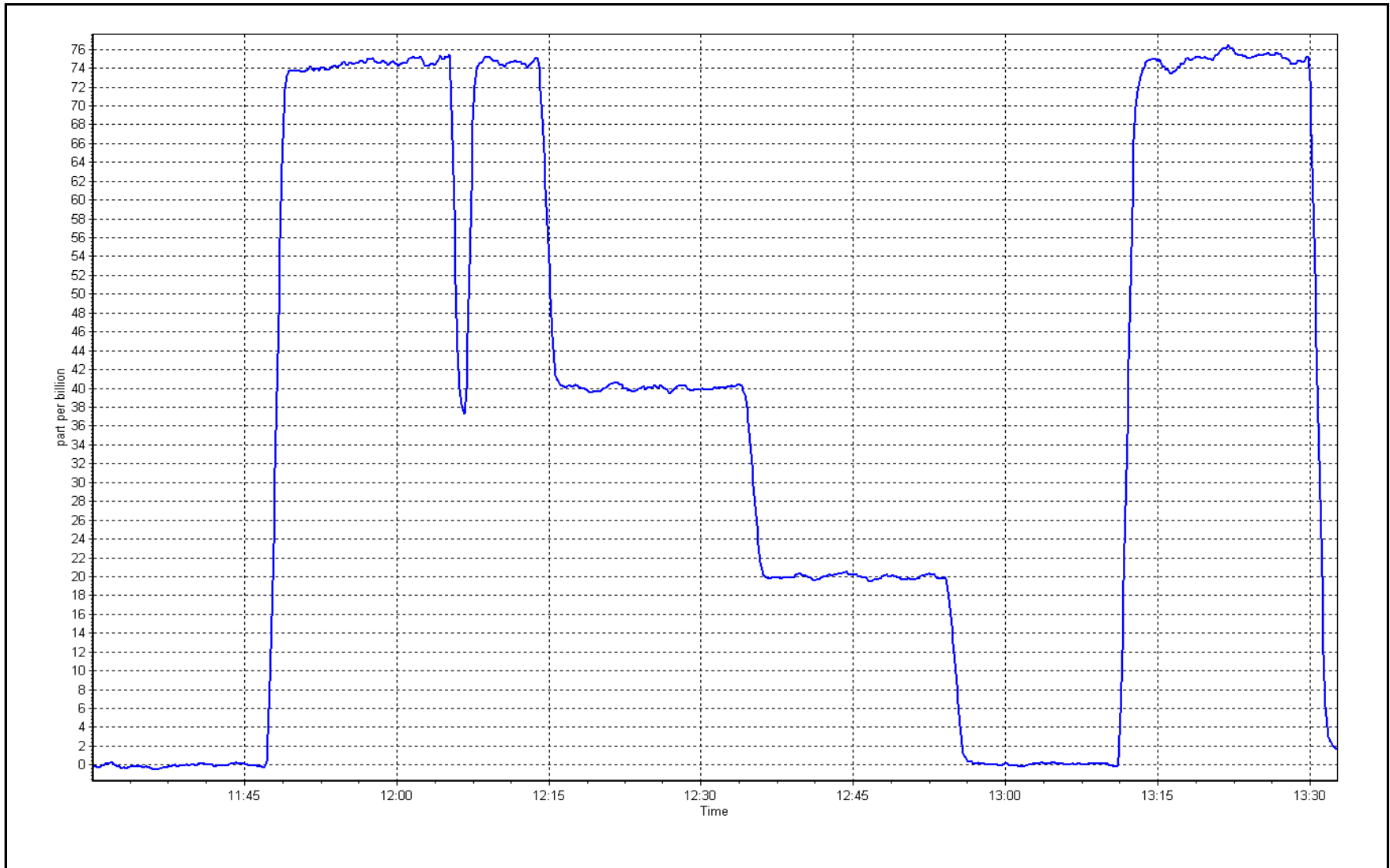
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	0.1	----	Correlation Coefficient	0.999992	
75.0	74.7	1.0037			≥0.995
40.0	40.0	0.9988	Slope	1.003999	
20.0	19.9	1.0040			0.90 - 1.10
			Intercept	-0.075616	+/-3



# H<sub>2</sub>S Calibration Plot

Date: 27-Oct

Location: Lower Camp





# Wood Buffalo Environmental Association

## THC Calibration Report

Version-03-2017

### Station Information

Station Name:	Lower Camp	Station number:	AMS 11
Calibration Date:	October 27, 2017	Last Cal Date:	September 25, 2017
Start time (MST):	9:16	End time (MST):	11:28
Reason:	Routine		

### Calibration Standards

Gas Cert Reference	LL101792	Cal Gas Expiry Date	February 16, 2019
CH4 Cal Gas Conc.	<u>493.0</u> ppm	CH4 Equiv Conc.	1043.0 ppm
C3H8 Cal Gas Conc.	<u>200.0</u> ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
ZAG Make/Model	API 701	Serial Number	3411

### Analyzer Information

Analyzer make:	51-i-LT	Analyzer serial #:	1218153353
	<u>Start</u>	<u>Finish</u>	<u>Start</u>
Analyzer Range	0 - 25 ppm	Bias voltage supply	-297.4
Calculated slope	1.005303	Sample pressure	7.8
Calculated intercept	0.024153	Fuel pressure	25.1
Analyzer Background	3.440	Air pressure	40.2
Analyzer Coefficient	4.444	Flame temperature	166.9
			<u>Finish</u>
			-297.5
			7.8
			25.1
			40.2
			167.1

### THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5002	0.0	0.00	-0.05	----
as found span	4916	83.8	17.48	17.42	1.004
calibrator zero	5002	0.0	0.00	-0.05	----
high point	4916	83.8	17.48	17.42	1.004
second point	4961	42.4	8.84	8.82	1.002
third point	4980	21.2	4.42	4.30	1.028
as left zero	5004	0.0	0.00	-0.05	----
as left span	4915	83.8	17.48	17.40	1.005
Average Correction Factor					1.011
Corrected As found	17.47	Previous response	17.37	*% change	-0.6%

\* = > +/-5% change initiates investigation

Notes: No adjustments needed.

Calibration Performed By: Aswin Sasi Kumar





# Wood Buffalo Environmental Association

## THC Calibration Summary

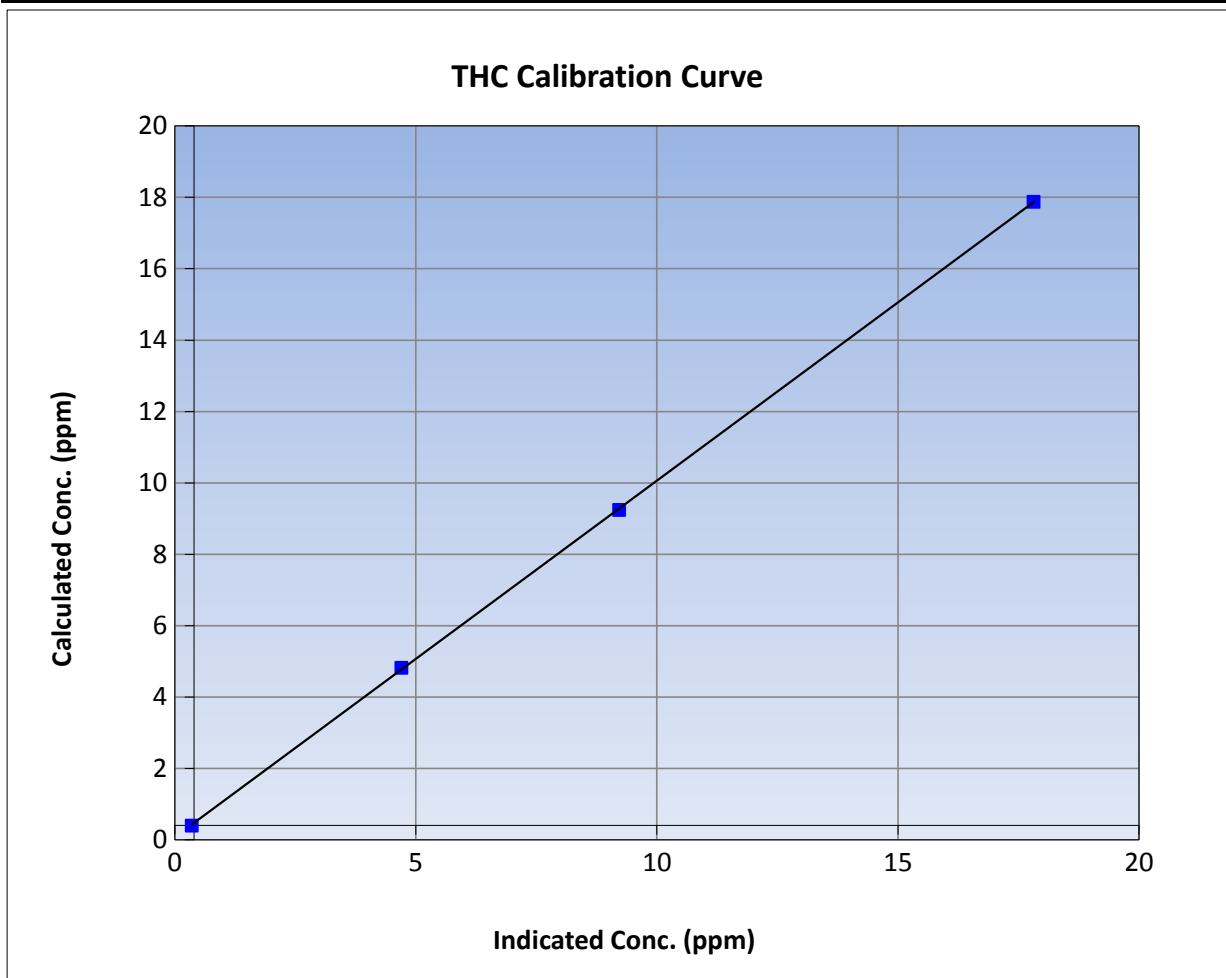
Version-03-2017

### Station Information

Calibration Date	October 27, 2017	Previous Calibration	September 25, 2017
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	10:48	End Time (MST)	11:28
Analyzer make	51-i-LT	Analyzer serial #	1218153353

### Calibration Data

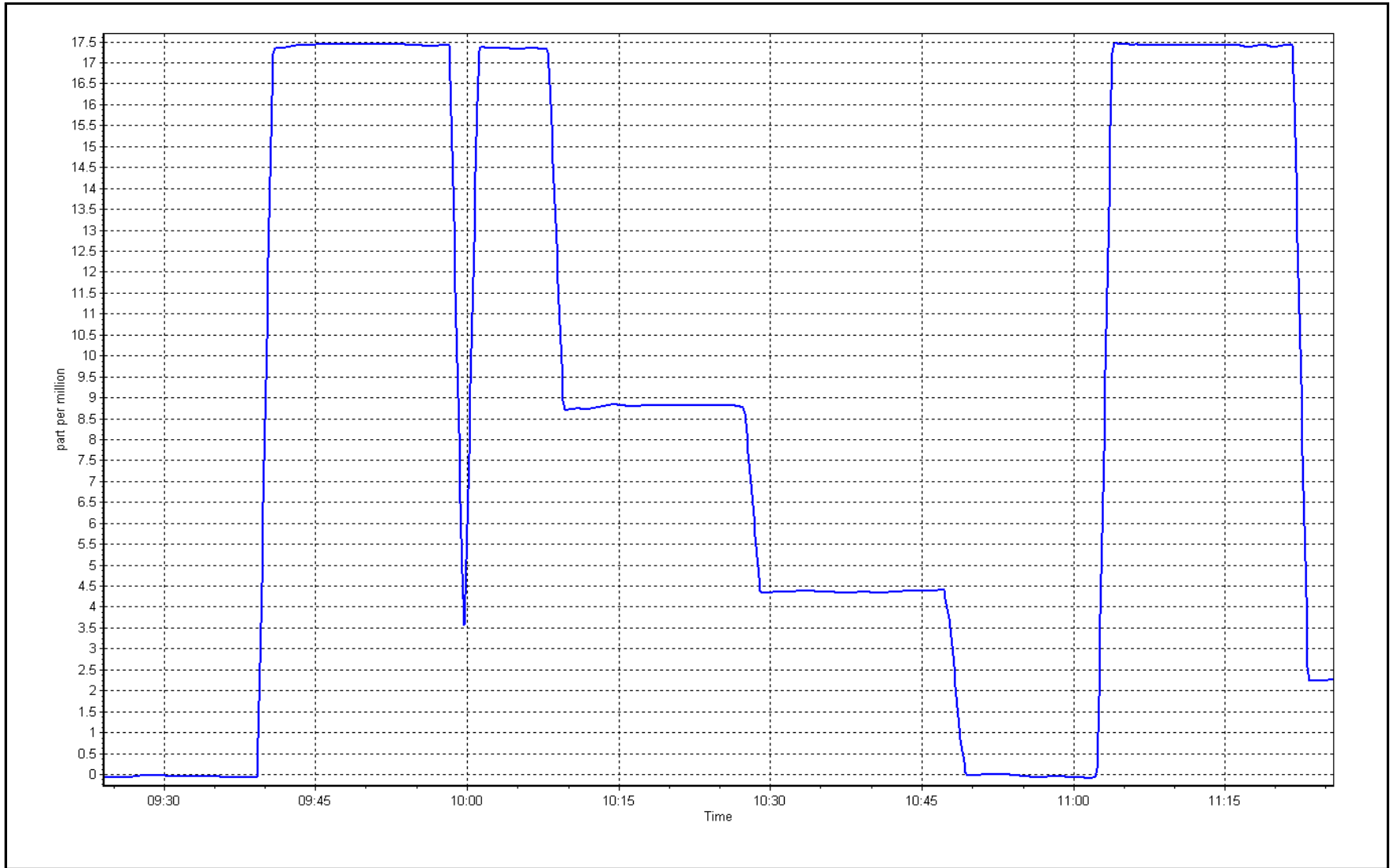
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (lc)	Correction factor (Cc/lc)	Statistical Evaluation	Limits	
0.0	-0.1	----	Correlation Coefficient	0.999969	≥0.995
17.5	17.4	1.0038			
8.8	8.8	1.0025	Slope	0.999341	0.90 - 1.10
4.4	4.3	1.0282			
			Intercept	0.069836	+/-1.5



THC Calibration Plot

Date: 27-Oct

Location: Lower Camp





## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 13**  
**FORT MCKAY SOUTH**  
**OCTOBER 2017**

Operations, Data Collection,  
QA/QC, Data Validation and Reporting by:  
Wood Buffalo Environmental Association  
Fort McMurray, Alberta

November 29, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)  
OCTOBER 2017

MONTHLY SUMMARY for  
AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	704	40	40	100	26	0	6	0
TRS(ppb) Average	707	37	37	100	2	0	1	0
THC(ppm) Average	705	39	39	100	4.7	-	2.8	-
O3(ppb) Average	708	36	36	100	41	0	33	-
NO2(ppb) Average	704	40	40	100	29	0	16	-
NO(ppb) Average	704	40	40	100	50	-	17	-
NOX(ppb) Average	704	40	40	100	71	-	33	-
PM2.5(ug/m3) Average	736	3	8	99.33	28.1	-	14.3	0
ET(C) Average	744	0	0	100	23.9	-	13.5	-
RH(%) Average	744	0	0	100	99	-	98	-
WS(km/h) Average	744	0	0	100	30	-	17	-
WD(deg) Average	744	0	0	100	-	-	-	-

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)  
OCTOBER 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	704	0.8	2	-	0	0	0	0	1	1	26
TRS(ppb) Average	707	0.2	0	-	0	0	0	0	0	0	2
THC(ppm) Average	705	2.29	0.3	-	1.9	2.1	2.1	2.2	2.4	2.6	4.7
O3(ppb) Average	708	17.1	11	-	1	2	8	18	26	31	41
NO2(ppb) Average	704	4.4	5	-	0	0	0	2	7	12	29
NO(ppb) Average	704	2.4	6	-	0	0	0	0	2	7	50
NOX(ppb) Average	704	6.9	10	-	0	0	0	3	8	19	71
PM2.5(ug/m3) Average	736	3.35	3.4	-	0	0.7	1.5	2.4	4.2	6.2	28.1
Temperature 2 m (C) Average	744	2.95	4.8	-	-6.4	-2.3	-0.6	1.9	5.4	9.3	23.9
Relative Humidity (%) Average	744	75.5	17	-	28	52	65	78	90	96	99
Wind Speed 10 m (km/h) Average	744	9.1	6	-	0	2	4	8	13	18	30
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -FORT McKAY SOUTH (AMS 13)  
OCTOBER 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
PM2.5	08 Oct 2017 13:00	08 Oct 2017 15:00	3	Unstable operation - baseline drift
PM2.5	13 Oct 2017 14:00	13 Oct 2017 15:00	2	Unstable operation - baseline drift



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb

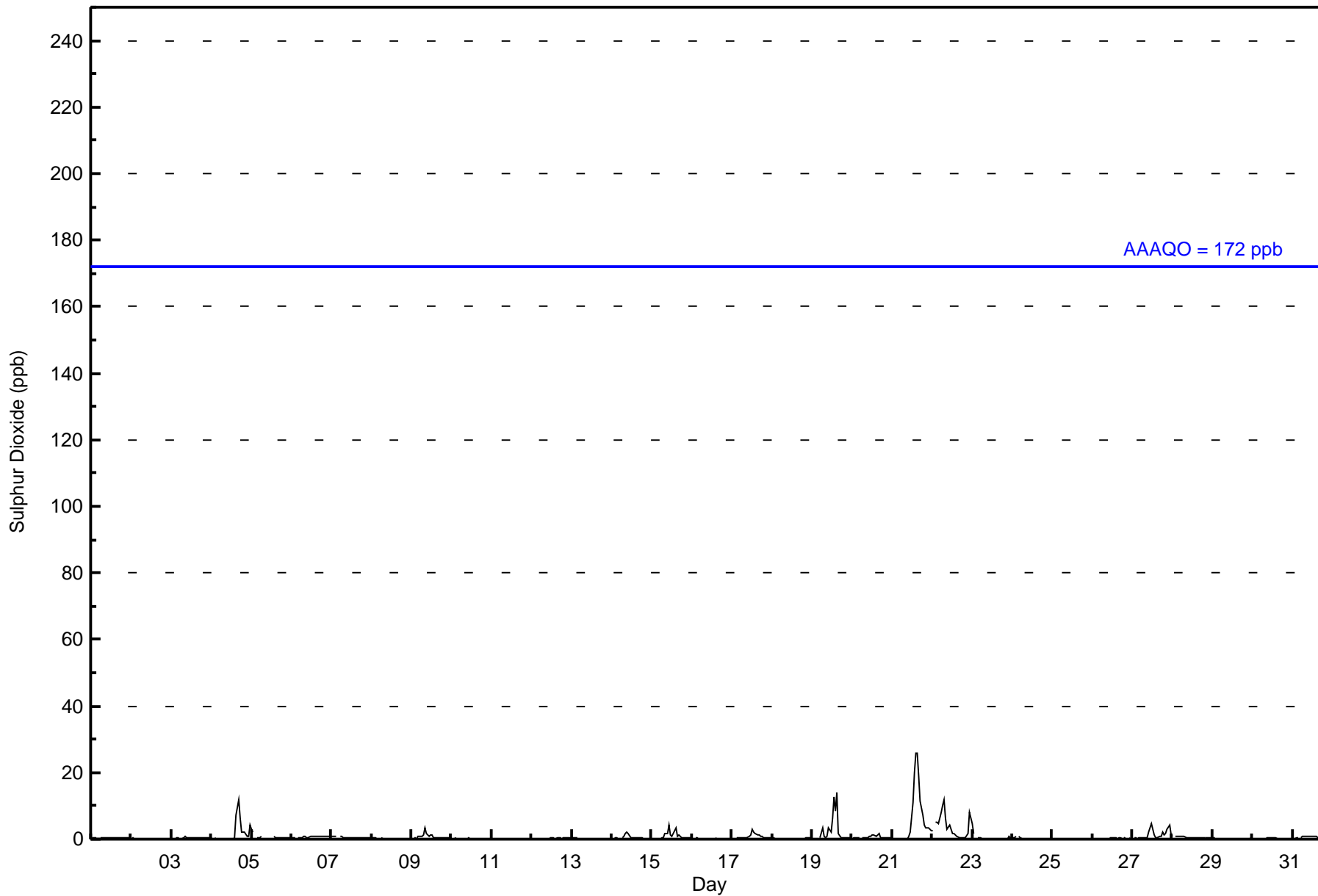
Fort McKay South - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																	Hours in Service: 744									
Maximum Value: 26 ppb on Oct 21 15:00																	Maximum Daily Average: 6.1 ppb on Oct 21							Hours of Data: 704		
Minimum Value: 0 ppb on Oct 10 22:00																	Minimum Daily Average: 0.1 ppb on Oct 25							Hours of Missing Data: 40		
Maximum Diurnal Average: 1.8 ppb at hour 16																	Minimum Diurnal Average: 0.3 ppb at hour 2							Hours of Calibration: 40		
Monthly Average: 0.8 ppb																	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 1 P <sub>99</sub> = 11							Percent Operational Time: 100.0		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Oct	Z	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
4-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	7	12	6	2	2	2	1	1	4	1.7	12
5-Oct	3	2	Z	0	0	0	1	C	C	C	C	C	C	1	0	0	0	0	0	0	0	0	0	0	--	3
6-Oct	0	0	0	Z	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
7-Oct	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0.5	1
8-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
9-Oct	Z	0	0	0	1	1	1	1	4	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.7	4
10-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
11-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
12-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
13-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
14-Oct	0	0	0	0	0	Z	0	1	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
15-Oct	Z	0	0	0	0	0	0	1	2	2	4	1	1	2	3	1	1	1	1	1	1	1	0	1	1.0	4
16-Oct	0	Z	0	0	0	0	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0.1	0
17-Oct	0	0	Z	0	0	0	0	0	0	1	1	1	3	2	2	1	1	1	1	1	0	0	0	0	0.7	3
18-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
19-Oct	0	0	0	0	Z	0	4	1	0	1	3	2	6	13	8	14	2	1	0	0	0	0	0	0	2.5	14
20-Oct	0	0	0	0	0	Z	0	0	0	1	1	1	1	1	1	1	2	1	0	0	0	1	1	0	0.6	2
21-Oct	Z	0	0	0	0	0	0	0	0	1	2	11	20	26	26	19	11	7	4	3	4	3	3	3	6.1	26
22-Oct	2	Z	5	5	5	8	10	12	6	3	4	3	2	2	1	1	1	0	1	0	0	2	8	6	3.8	12
23-Oct	5	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.4	5
24-Oct	0	0	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
25-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
26-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
27-Oct	Z	0	0	0	0	0	0	0	1	1	2	5	3	1	1	1	1	1	2	1	2	3	4	1	1.3	5
28-Oct	1	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
29-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
30-Oct	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
31-Oct	0	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.5	1
0.6 0.3 0.5 0.4 0.5 0.6 0.7 0.7 0.7 0.5 0.8 0.8 1.2 1.6 1.5 1.8 1.4 0.9 0.6 0.5 0.4 0.5 0.7 0.7																								Diurnal Average		
5 2 5 5 5 8 10 12 6 3 4 5 11 20 26 26 19 11 7 4 3 4 8 6																								Diurnal Maximum		
Z - zerospan C - Calibration																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																										



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort McKay South - October 2017**







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort McKay South - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	694	98.58	98.58
11 - 20	8	1.14	99.72
21 - 60	2	0.28	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

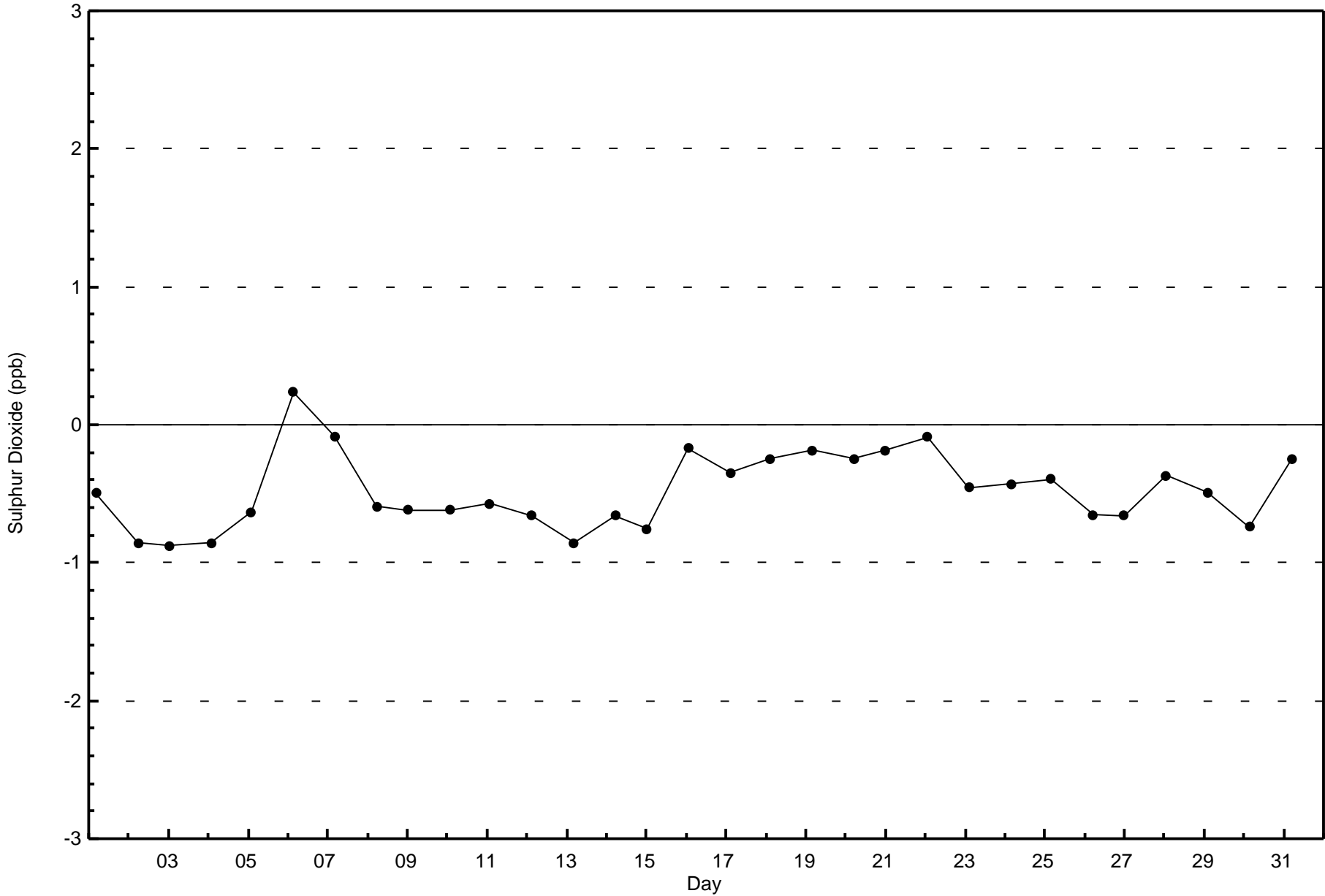
**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort McKay South - October 2017**

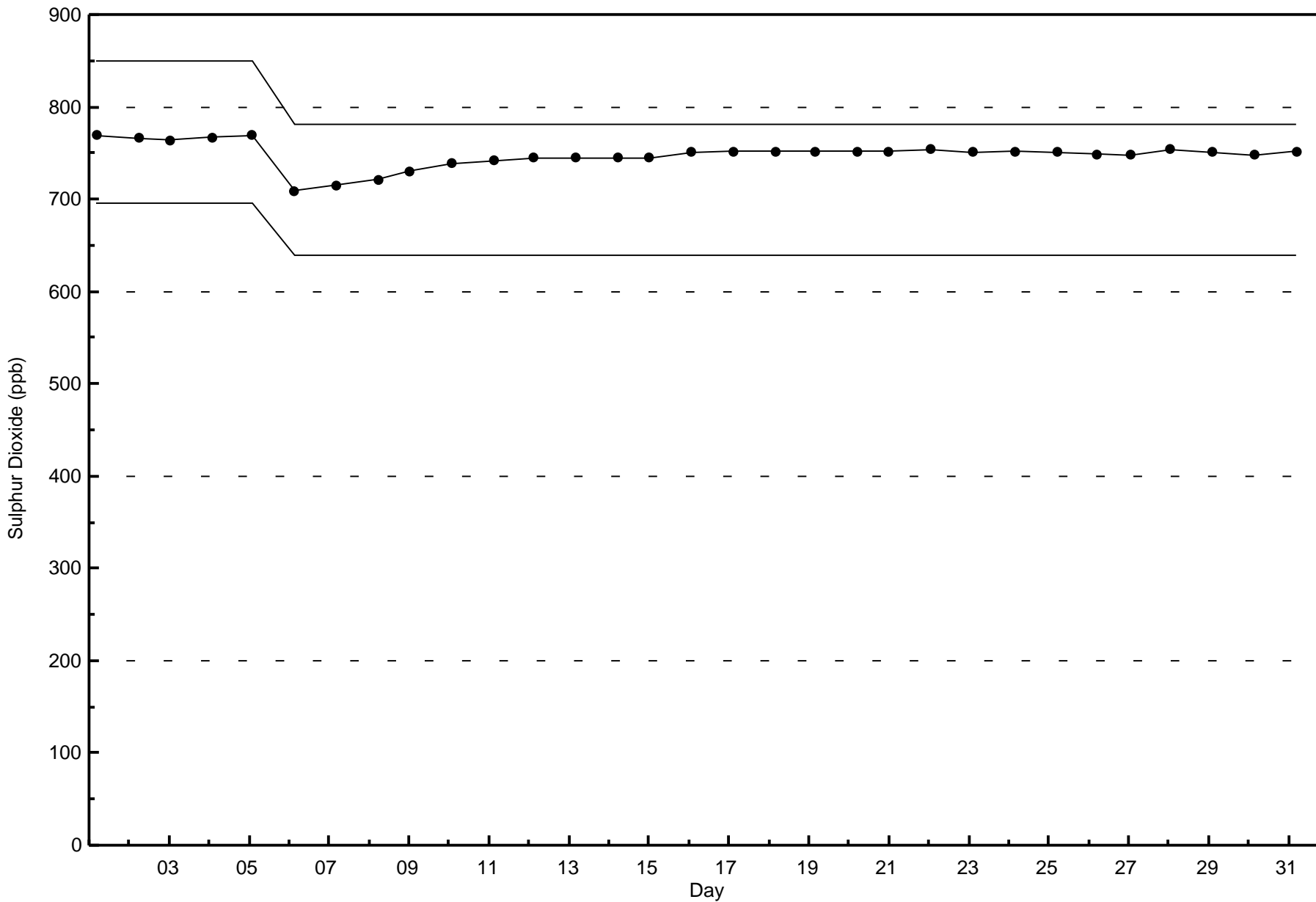
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	105	27	8	3	3	8	10	47	103	62	48	53	46	36	53	82	694
11 - 20	0	0	1	0	0	0	0	5	0	0	0	0	0	0	0	2	8
21 - 60	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	2
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	105	27	9	3	4	8	11	52	103	62	48	53	46	36	53	84	704

Total Number of Valid Hours: 704

Total Number of Hours: 744









Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

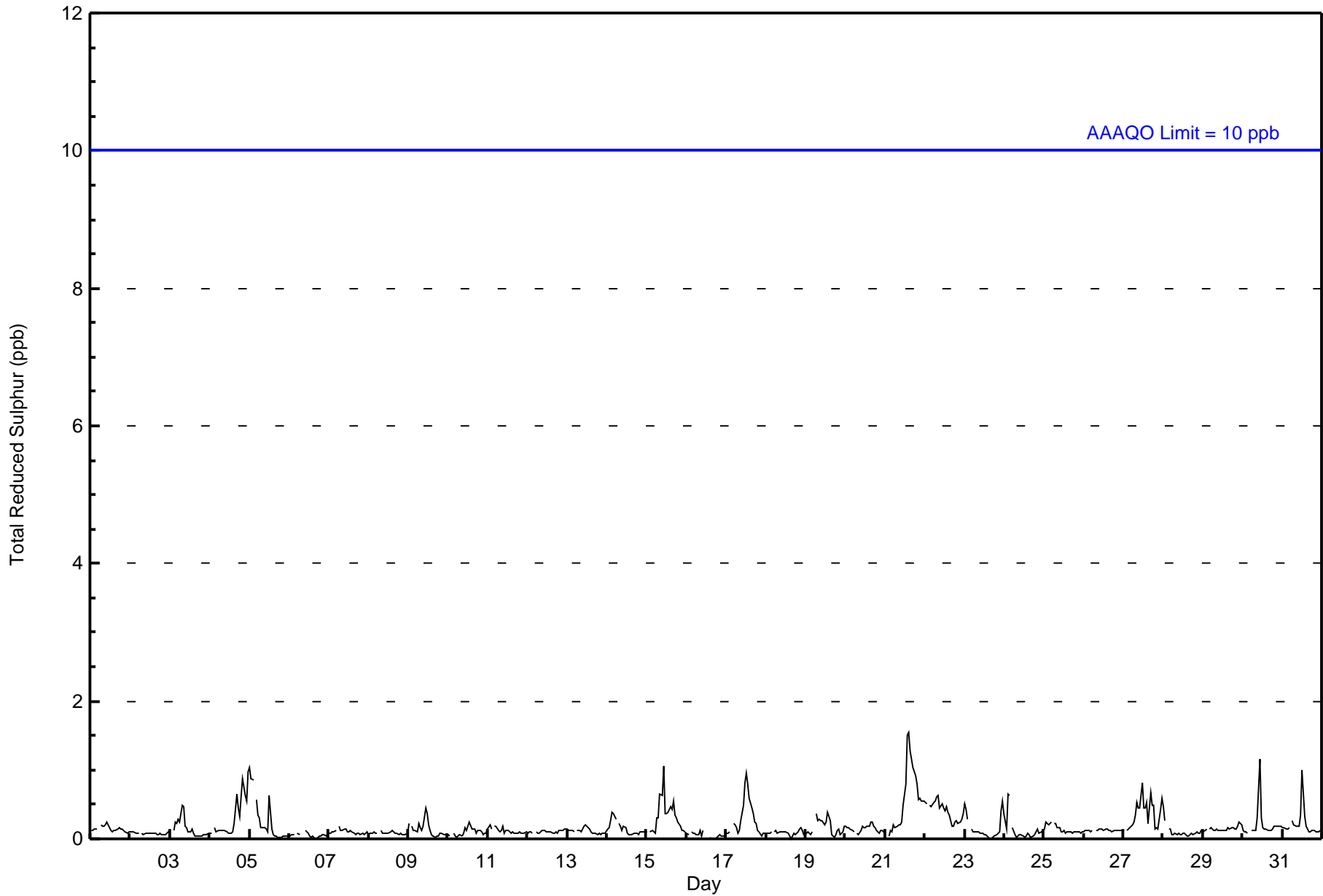
Fort McKay South - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																	
Maximum Value: 2 ppb on Oct 21 15:00										Maximum Daily Average: 0.6 ppb on Oct 21										Hours of Data: 707							
Minimum Value: 0 ppb on Oct 23 16:00										Minimum Daily Average: 0.1 ppb on Oct 16										Hours of Missing Data: 37							
Maximum Diurnal Average: 0.2 ppb at hour 11										Minimum Diurnal Average: 0.1 ppb at hour 22										Hours of Calibration: 37							
Monthly Average: 0.2 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 1										Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
4-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	1	1	0.3	1
5-Oct	1	1	1	Z	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
6-Oct	0	0	0	0	Z	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
7-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
8-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
9-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
10-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
11-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
12-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
13-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
14-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
15-Oct	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.3	1
16-Oct	0	0	Z	0	0	0	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.1	0
17-Oct	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1
18-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
19-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
20-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
21-Oct	0	Z	0	0	0	0	0	0	0	0	0	1	1	2	1	1	1	1	1	1	1	1	1	1	1	0.6	2
22-Oct	1	1	Z	0	0	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
23-Oct	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1	1	
24-Oct	0	0	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
25-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
26-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
27-Oct	0	Z	0	0	0	0	0	0	1	0	0	1	0	0	1	0	1	0	0	0	0	0	0	1	0.4	1	
28-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
29-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
30-Oct	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
31-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
0.2																								Diurnal Average			
1																								Diurnal Maximum			
Z - zerospan C - Calibration																											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																											



Wood Buffalo Environmental Association  
Hourly Averages

Total Reduced Sulphur (TRS) - ppb  
Fort McKay South - October 2017





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb  
Fort McKay South - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	707	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744





**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Fort McKay South - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	102	28	9	3	4	8	13	50	103	63	50	57	42	35	54	86	707
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	102	28	9	3	4	8	13	50	103	63	50	57	42	35	54	86	707

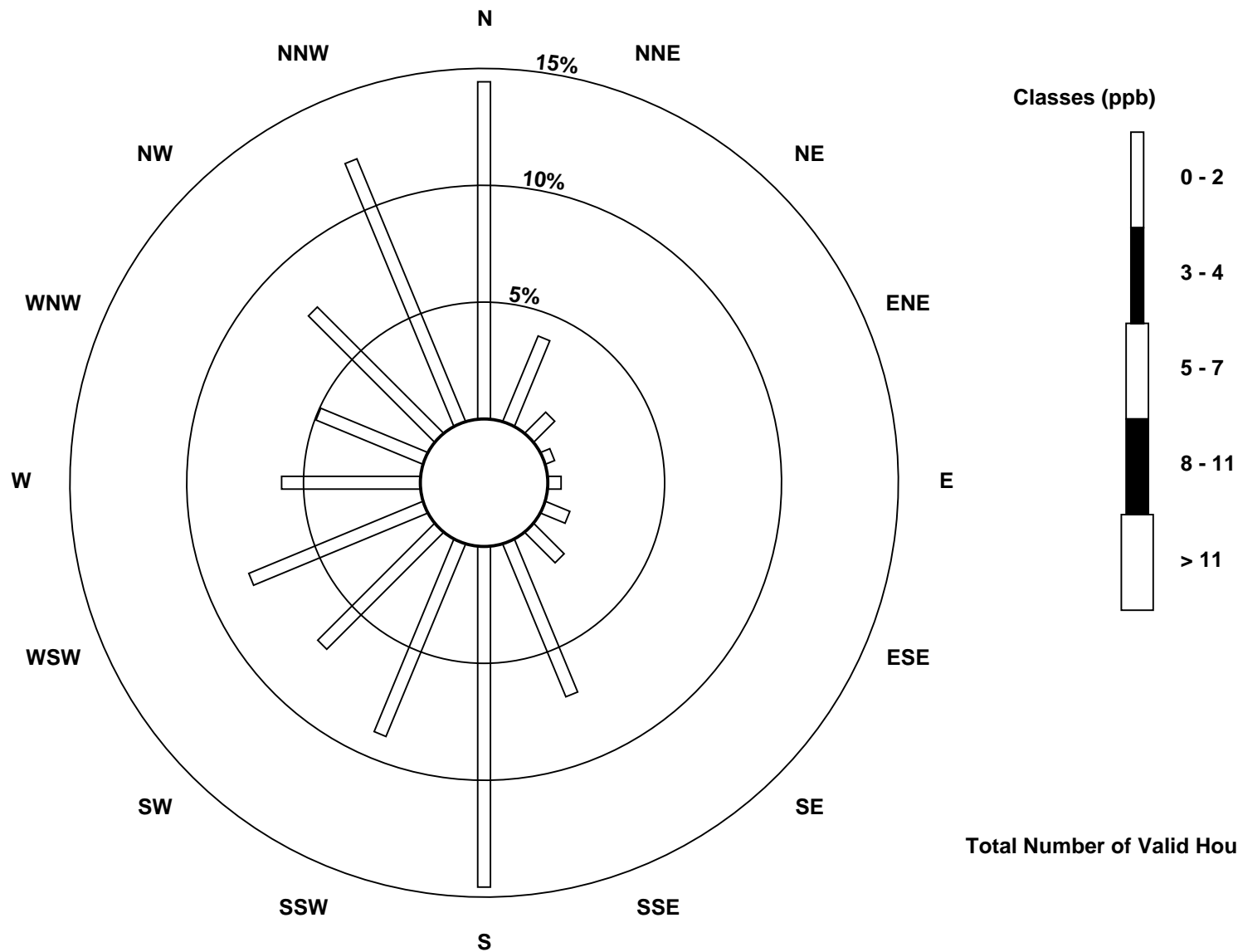
Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Total Reduced Sulphur (TRS) - ppb  
Fort McKay South (AMS 13)

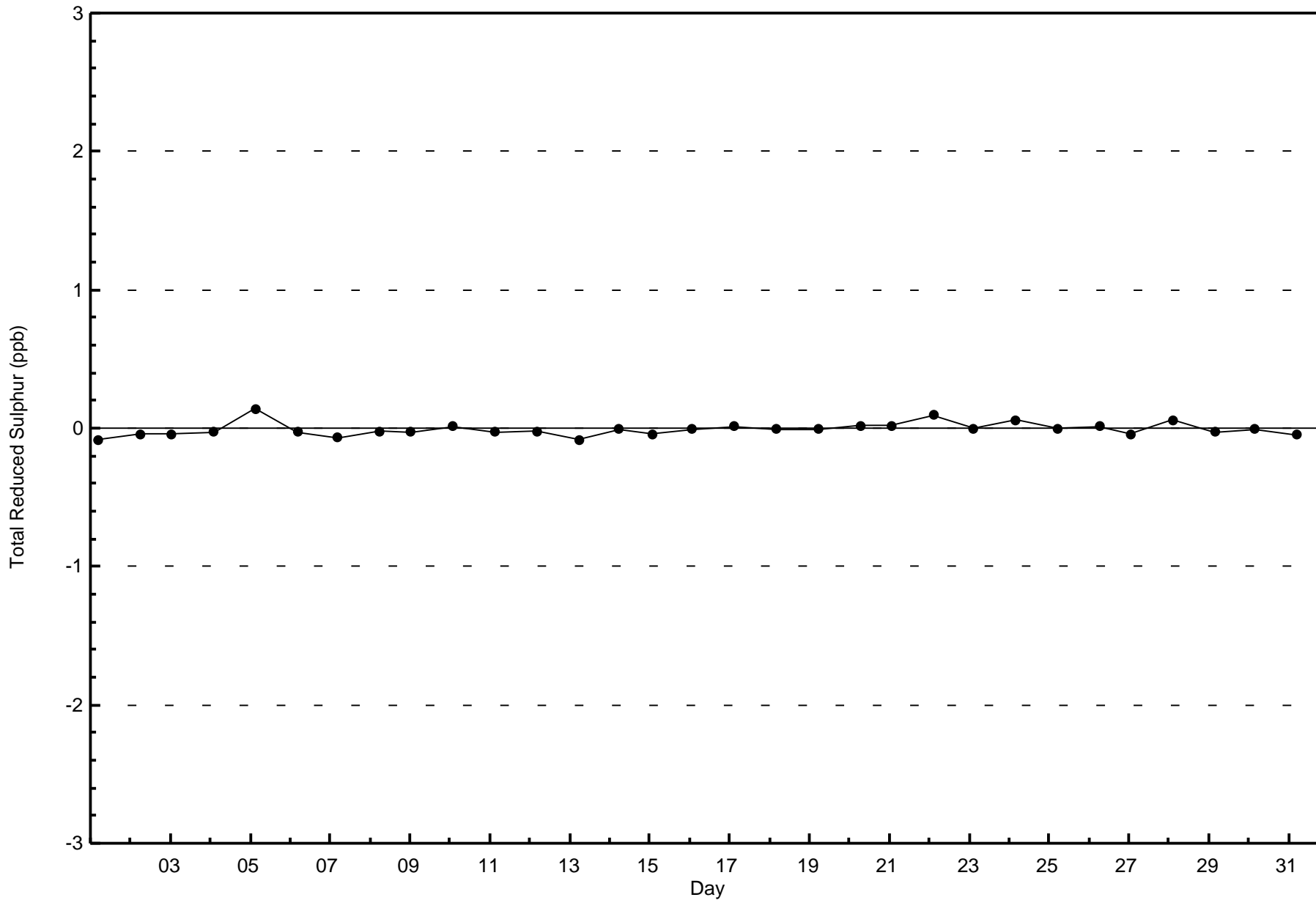


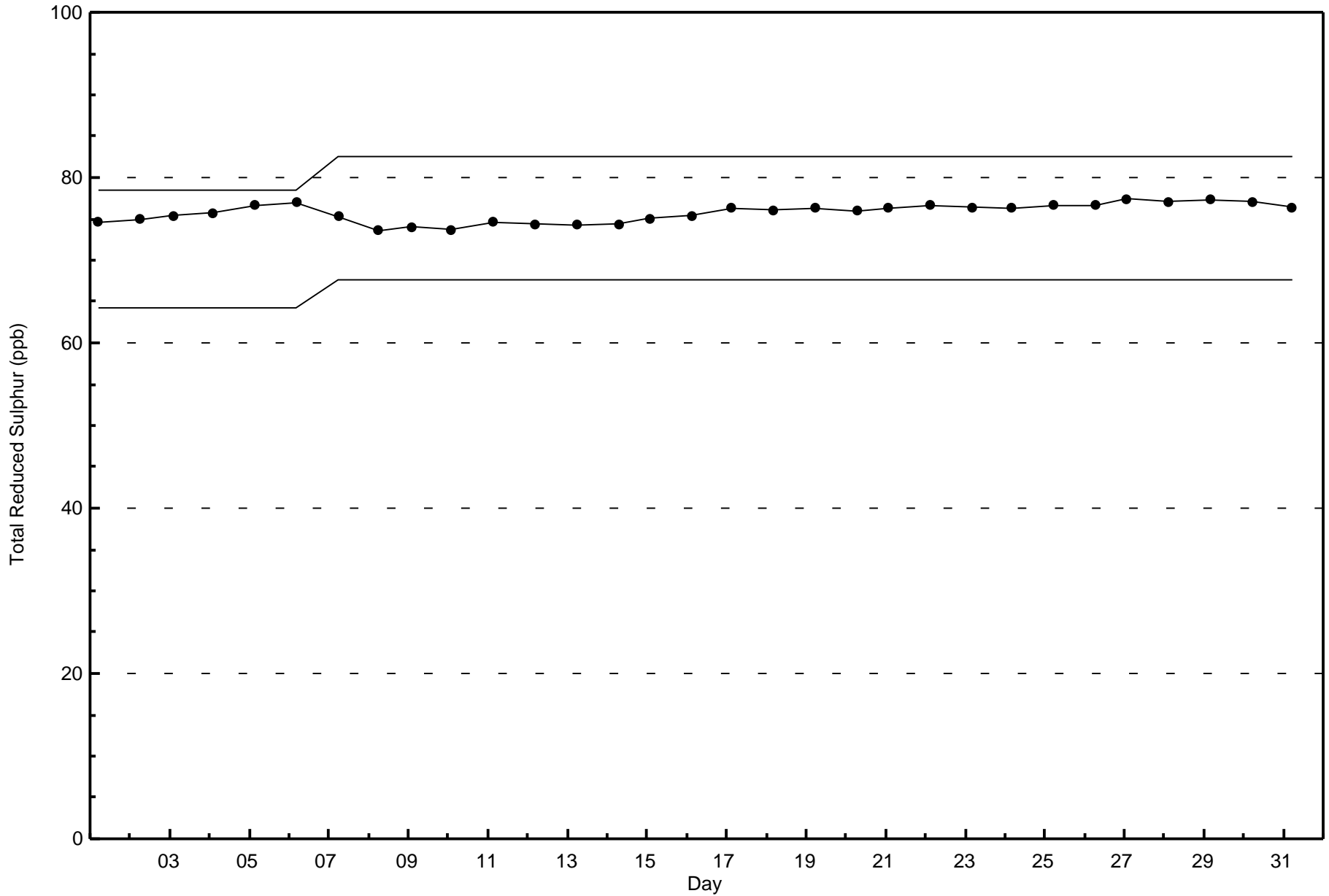
Total Number of Valid Hours: 707



Wood Buffalo Environmental Association  
Zero Responses

Total Reduced Sulphur (TRS) - ppb  
Fort McKay South - October 2017



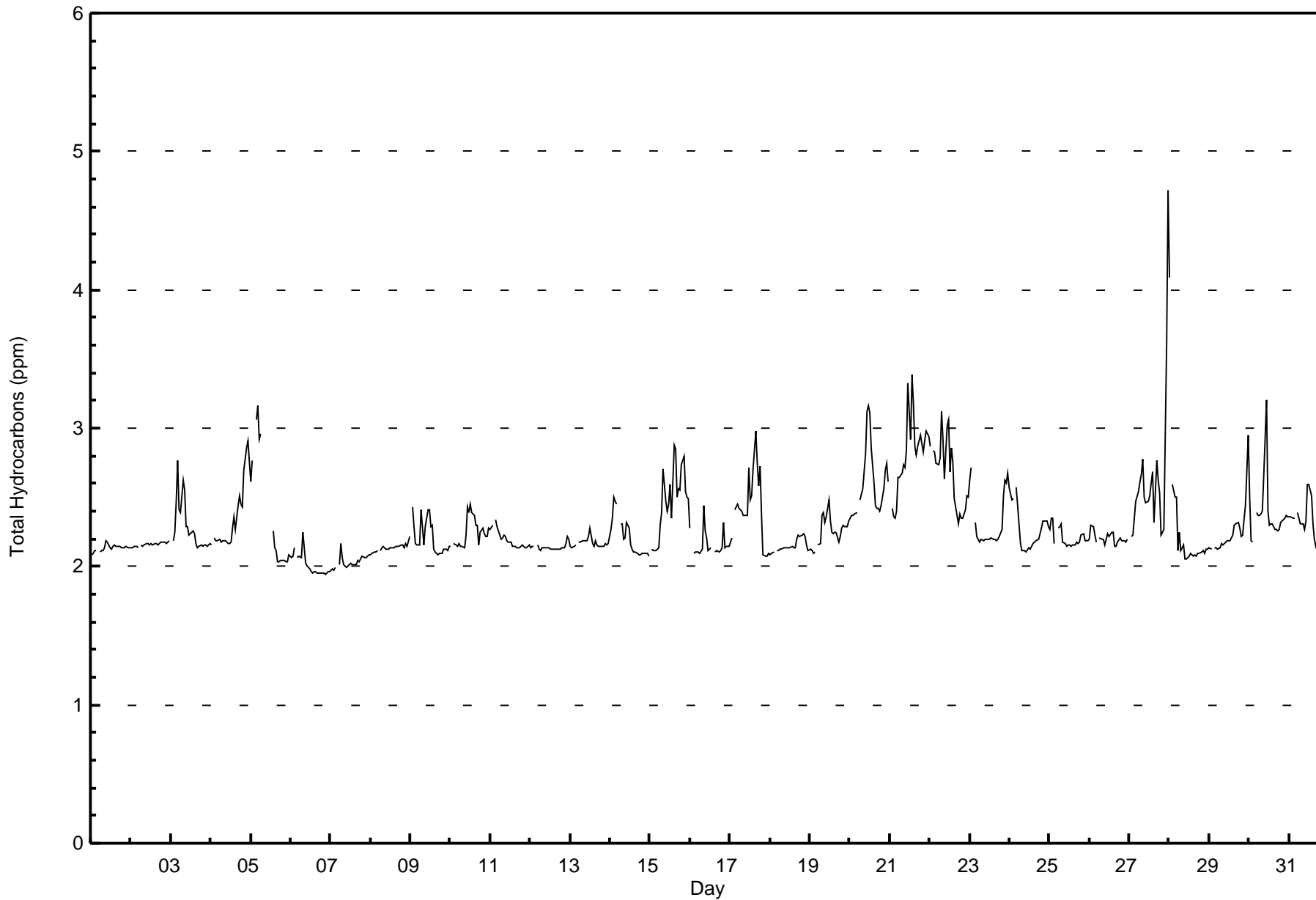






**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Fort McKay South - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Fort McKay South - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	38	5.39	5.39
2.1 - 3.0	653	92.62	98.01
3.1 - 10.0	14	1.99	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm  
Fort McKay South - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>	
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW		
0 - 2.0	2	0	0	0	0	0	0	0	0	0	2	5	16	4	0	1	8	38
2.1 - 3.0	102	24	8	3	4	8	10	50	99	59	43	37	42	36	52	76	653	
3.1 - 10.0	1	3	1	0	0	0	1	2	4	2	0	0	0	0	0	0	14	
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<b>Totals</b>	105	27	9	3	4	8	11	52	103	63	48	53	46	36	53	84	705	

Total Number of Valid Hours: 705

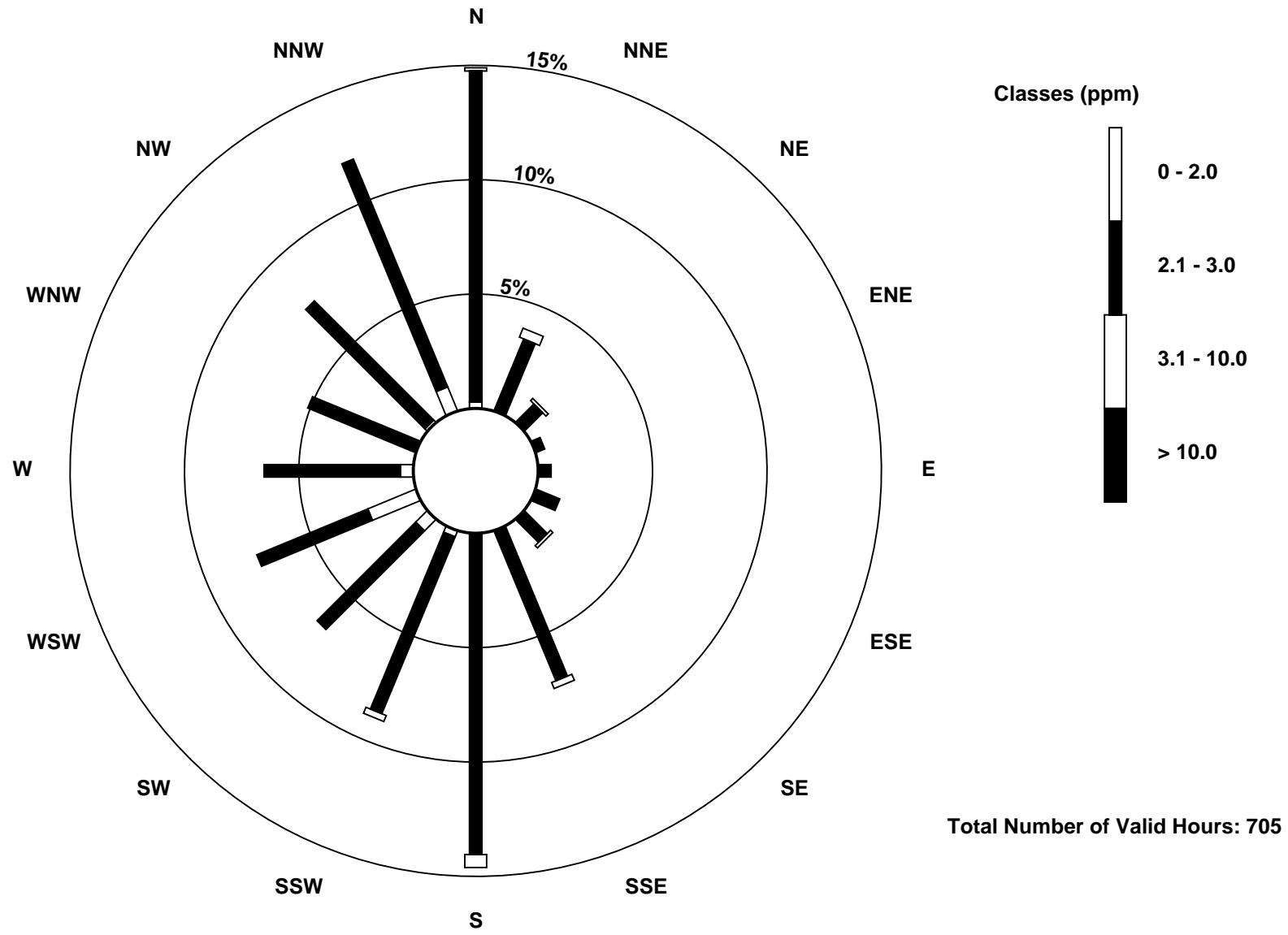
Total Number of Hours: 744

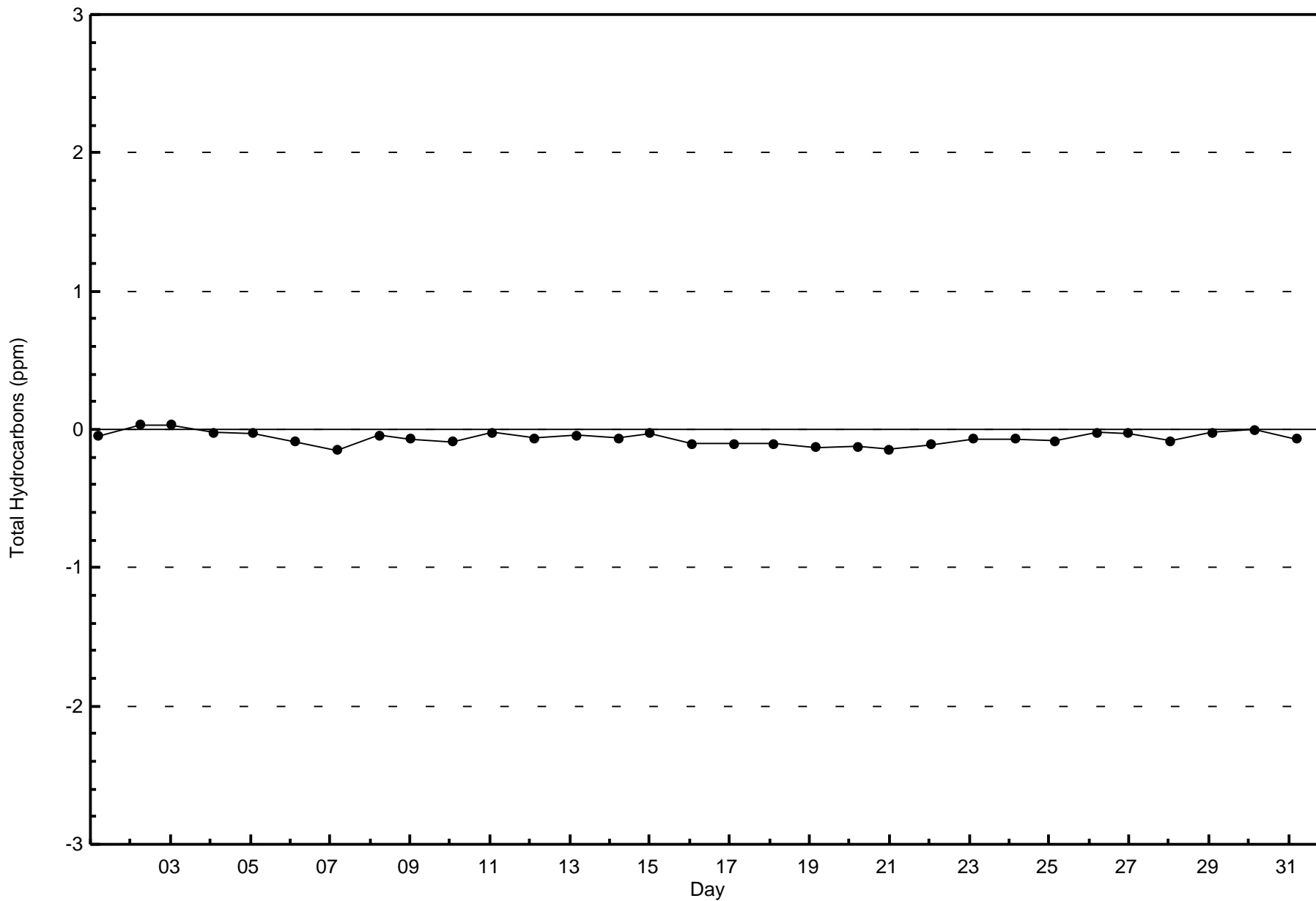


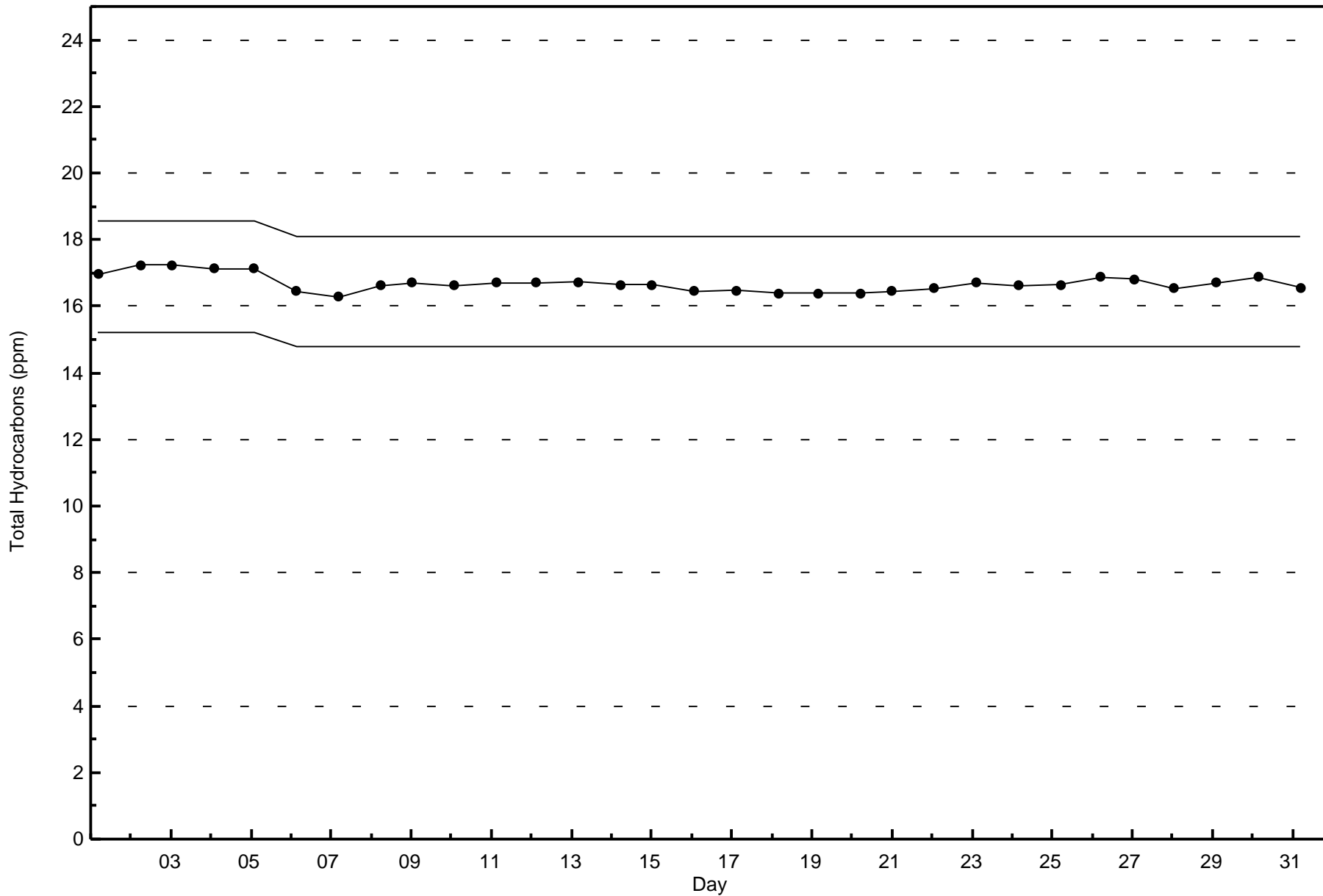


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Total Hydrocarbons (THC) - ppm  
Fort McKay South (AMS 13)









Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O<sub>3</sub>) - ppb

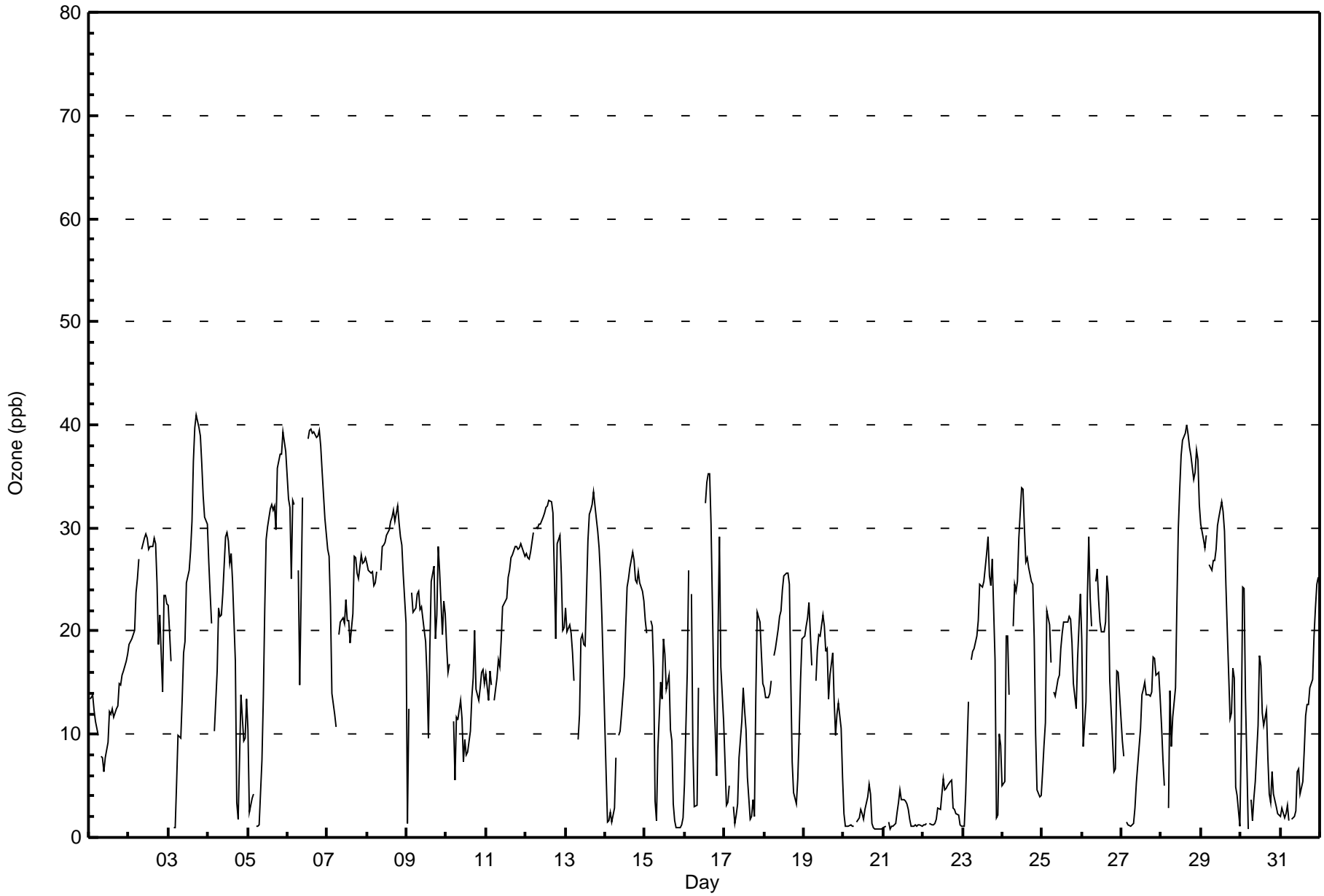
Fort McKay South - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 41 ppb on Oct 3 18:00 Maximum Daily Average: 33.3 ppb on Oct 6		Hours in Service: 744 Hours of Data: 708 Hours of Missing Data: 36 Hours of Calibration: 36 Percent Operational Time: 100.0																									
Minimum Value: 1 ppb on Oct 20 21:00 Maximum Diurnal Average: 22.1 ppb at hour 16 Monthly Average: 17.1 ppb		Minimum Daily Average: 1.8 ppb on Oct 20 Minimum Diurnal Average: 11.6 ppb at hour 6 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 8 Median = 18 Q <sub>3</sub> = 26 P <sub>90</sub> = 31 P <sub>99</sub> = 39																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	13	14	14	12	11	10	Z	8	8	6	8	9	12	12	12	12	13	13	15	15	16	16	17	18	12.3	18	
2-Oct	19	19	19	20	24	25	Z	27	Z	28	29	29	29	28	28	28	29	29	25	19	22	14	24	23	23	24.3	29
3-Oct	23	17	Z	1	1	5	10	10	13	18	19	25	26	28	31	36	40	41	40	39	36	33	31	30	24.0	41	
4-Oct	27	24	21	Z	10	16	22	21	22	24	29	30	29	27	28	25	17	3	2	8	14	9	10	13	18.6	30	
5-Oct	10	3	4	4	Z	1	1	1	8	14	22	29	30	32	32	32	32	30	36	37	37	39	38	37	22.2	39	
6-Oct	33	32	25	33	32	Z	26	15	24	33	C	C	39	39	40	39	39	39	39	39	38	36	31	29	33.3	40	
7-Oct	28	27	22	14	12	11	Z	20	21	21	21	23	21	21	19	22	27	27	26	25	27	27	27	27	22.4	28	
8-Oct	27	26	26	26	24	25	26	Z	26	28	28	29	29	30	31	31	32	31	32	31	29	28	26	21	27.8	32	
9-Oct	1	12	Z	24	22	22	24	24	22	22	20	19	16	10	18	25	26	19	22	28	26	20	23	22	20.3	28	
10-Oct	19	16	17	Z	11	6	12	11	13	12	7	9	8	8	10	14	15	20	14	13	14	16	16	15	12.9	20	
11-Oct	16	13	16	15	Z	13	15	17	17	19	22	23	23	25	26	27	27	28	28	28	28	28	28	27	22.3	28	
12-Oct	27	27	27	28	30	Z	30	30	30	30	31	31	32	32	33	33	32	26	19	28	29	26	20	20	28.3	33	
13-Oct	22	20	21	20	18	15	Z	9	12	19	20	19	19	29	31	32	32	33	31	30	28	25	21	16	22.7	33	
14-Oct	6	1	2	2	2	3	8	Z	10	10	12	16	20	24	25	26	28	27	25	25	26	25	24	23	16.0	28	
15-Oct	21	20	Z	21	21	16	4	2	9	15	13	19	18	14	16	10	9	3	2	1	1	1	1	2	10.4	21	
16-Oct	5	16	26	Z	24	9	3	3	15	C	C	C	32	34	35	35	30	14	10	6	20	29	17	11	18.8	35	
17-Oct	7	3	3	5	Z	3	1	2	3	8	11	14	12	10	6	2	2	4	2	14	22	21	18	15	8.2	22	
18-Oct	15	14	14	14	15	Z	18	18	20	21	22	24	25	26	26	25	15	7	4	3	6	10	15	19	16.4	26	
19-Oct	20	20	21	23	20	17	Z	15	18	20	20	22	20	18	18	13	16	18	13	10	12	13	11	6	16.6	23	
20-Oct	2	1	1	1	1	1	1	Z	2	2	3	2	2	3	4	5	4	1	1	1	1	1	1	1	1.8	5	
21-Oct	1	1	Z	1	1	1	1	1	2	3	5	4	4	4	3	3	2	1	1	1	1	1	1	1	1.9	5	
22-Oct	1	1	1	Z	1	1	1	1	2	3	3	4	6	5	5	5	5	6	3	3	2	2	1	1	2.8	6	
23-Oct	1	1	4	13	Z	17	18	18	20	21	25	24	24	25	27	29	25	24	27	17	2	2	10	9	16.8	29	
24-Oct	5	5	19	19	14	Z	20	25	24	25	29	34	34	30	27	27	26	25	25	19	10	5	4	4	19.8	34	
25-Oct	6	9	11	22	21	17	Z	14	14	15	16	18	20	21	21	21	21	19	15	13	17	21	24	24	17.2	24	
26-Oct	19	9	13	23	29	23	20	Z	25	26	23	21	20	20	21	25	24	15	9	6	7	16	16	14	18.5	29	
27-Oct	9	8	Z	1	1	1	1	1	3	5	7	11	14	14	15	14	14	14	14	17	17	16	16	14	9.9	17	
28-Oct	11	8	5	Z	3	14	9	12	14	23	30	34	37	38	39	40	39	38	37	35	35	38	37	32	26.4	40	
29-Oct	30	29	28	29	Z	26	26	27	27	28	30	31	33	32	30	24	20	12	12	16	15	5	4	1	22.4	33	
30-Oct	10	24	24	14	1	Z	4	2	4	5	11	18	17	12	11	12	8	4	3	6	4	3	2	2	8.7	24	
31-Oct	2	3	2	2	3	2	Z	2	2	3	6	7	4	5	8	12	13	13	14	15	20	22	24	25	9.1	25	
14.1 13.7 14.9 14.9 13.5 11.6 13.1 11.9 14.7 17.0 18.0 19.9 21.1 21.2 21.8 22.1 21.4 18.7 17.6 17.9 17.8 17.9 17.2 16.2																								Diurnal Average			
33 32 28 33 32 26 30 30 30 33 31 34 39 39 40 40 40 41 40 39 38 39 38 37																								Diurnal Maximum			
Z - zerospan C - Calibration																											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																											



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort McKay South - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort McKay South - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	419	59.18	59.18
21 - 50	289	40.82	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort McKay South - October 2017**

<b>Concentration</b> <b>Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	59	21	7	3	3	7	10	50	81	45	19	19	12	24	23	36	419
21 - 50	45	8	1	0	1	1	3	4	20	20	31	37	29	10	29	50	289
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	104	29	8	3	4	8	13	54	101	65	50	56	41	34	52	86	708

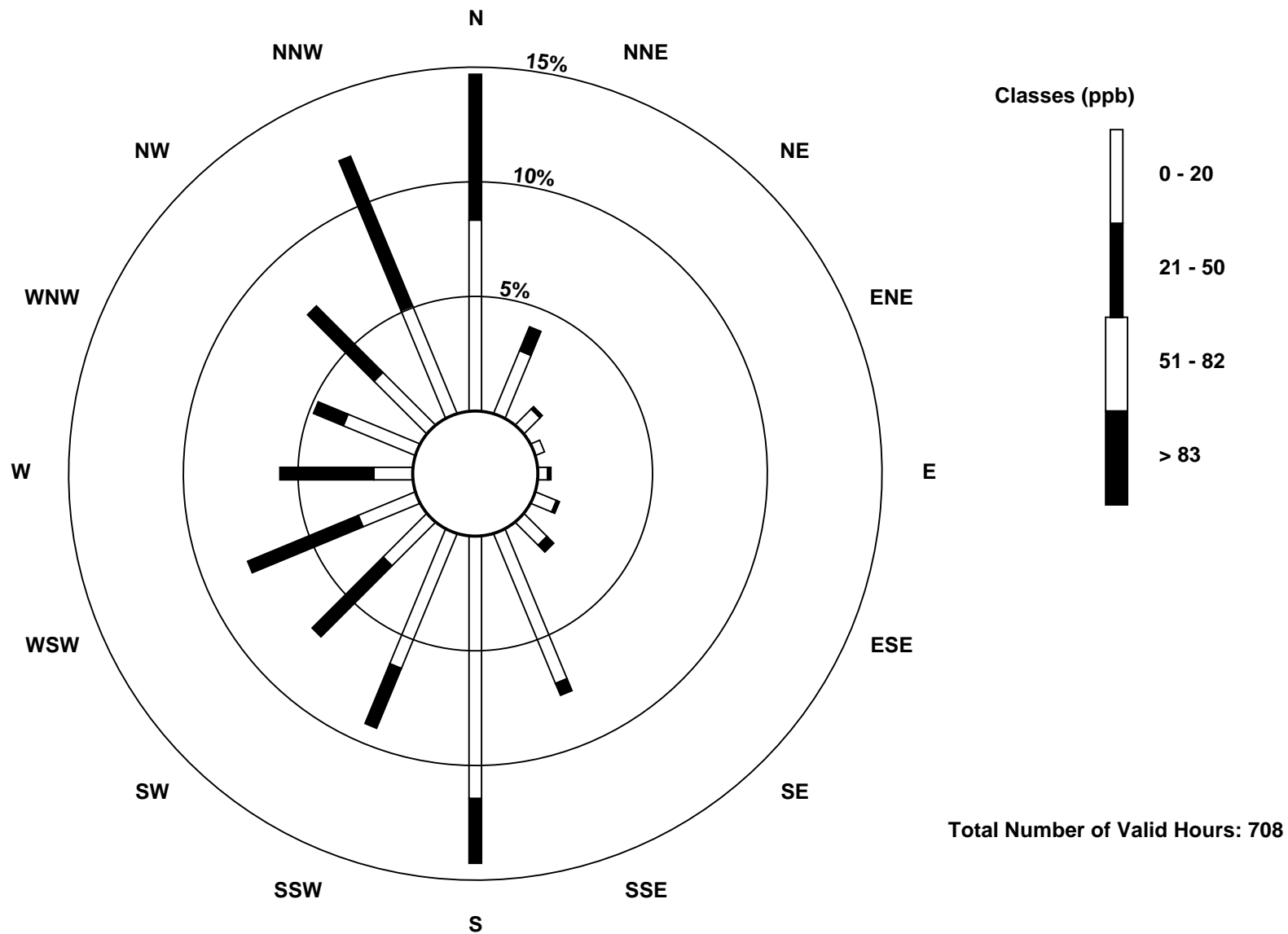
Total Number of Valid Hours: 708

Total Number of Hours: 744

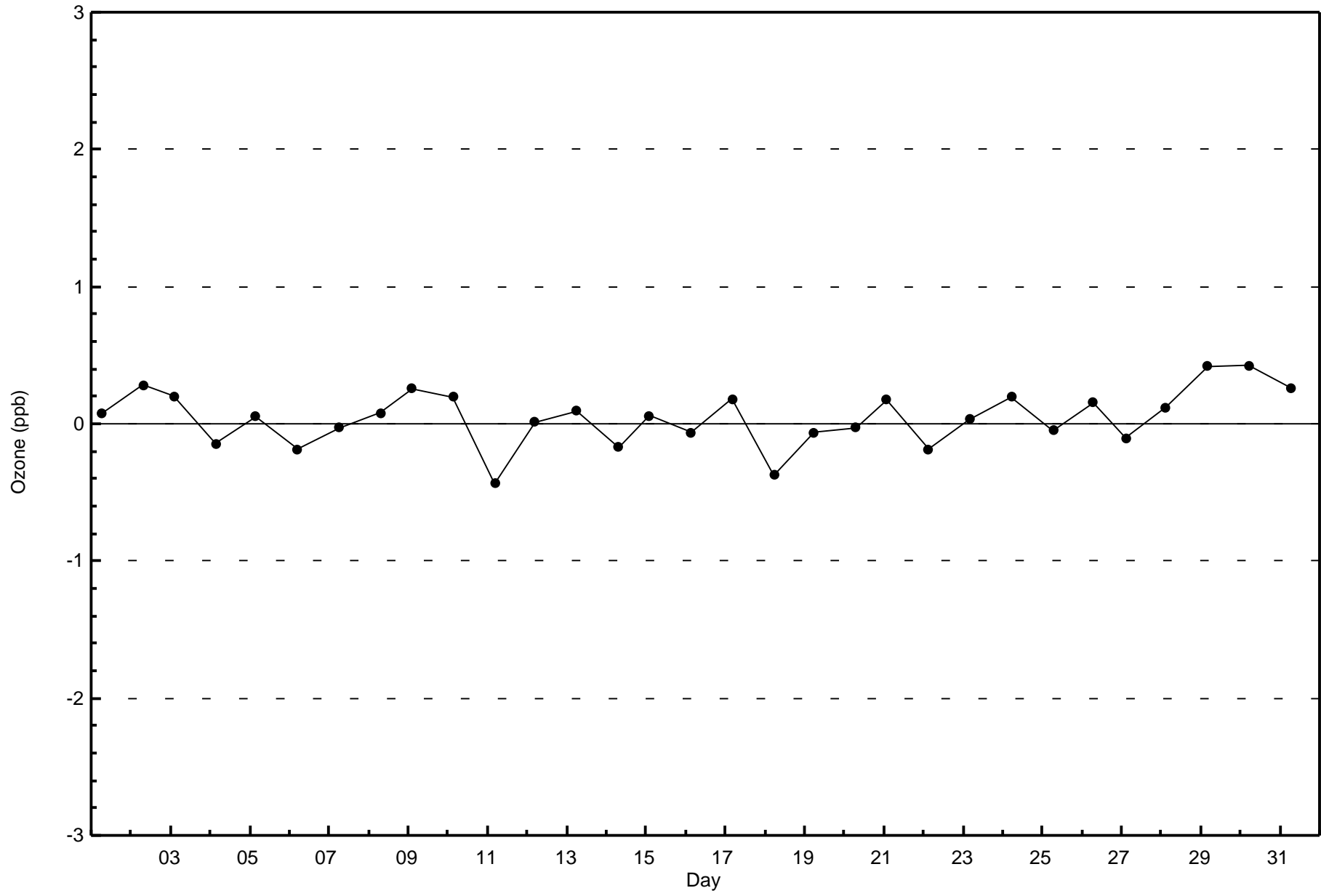


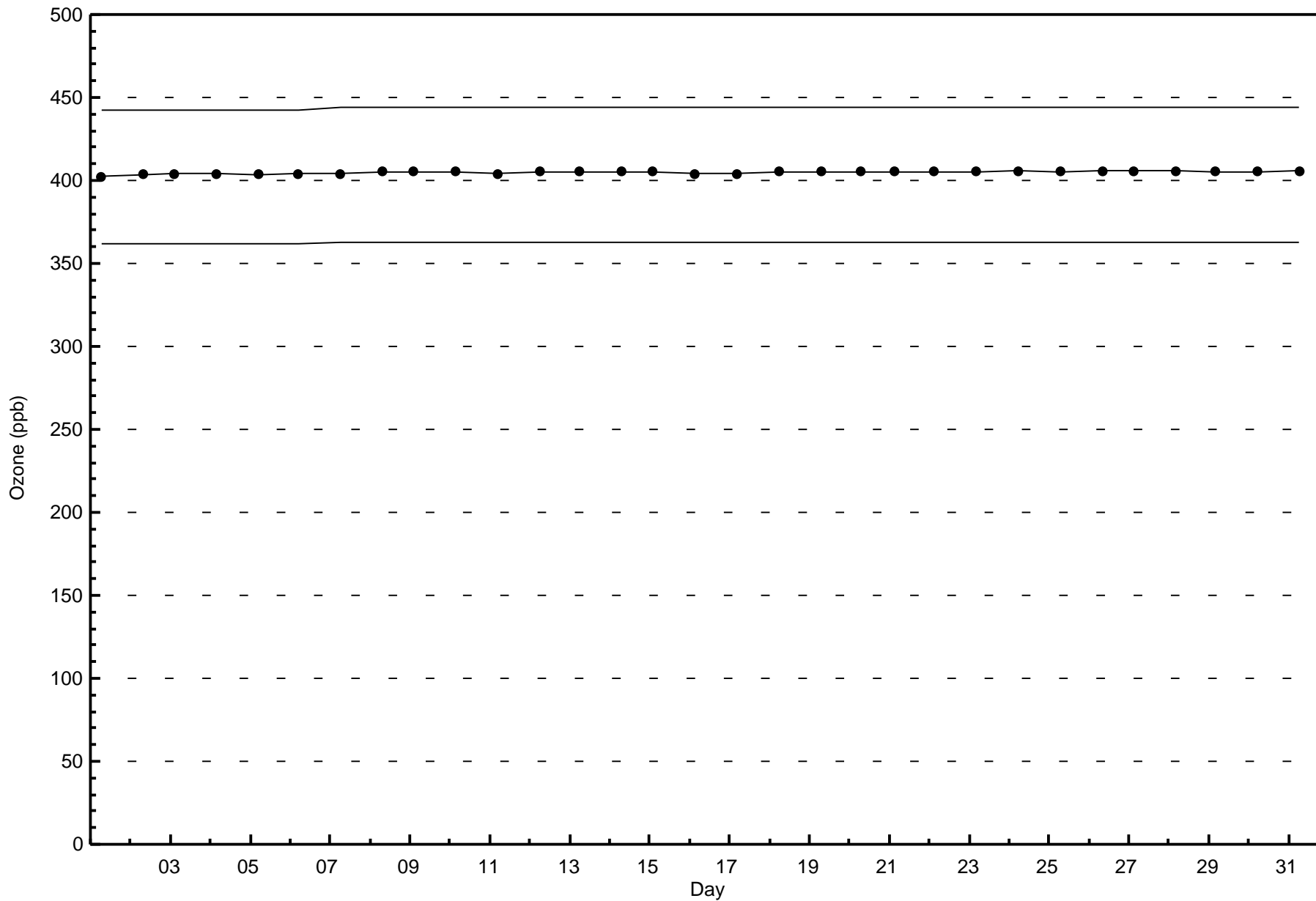
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Ozone (O<sub>3</sub>) - ppb  
Fort McKay South (AMS 13)









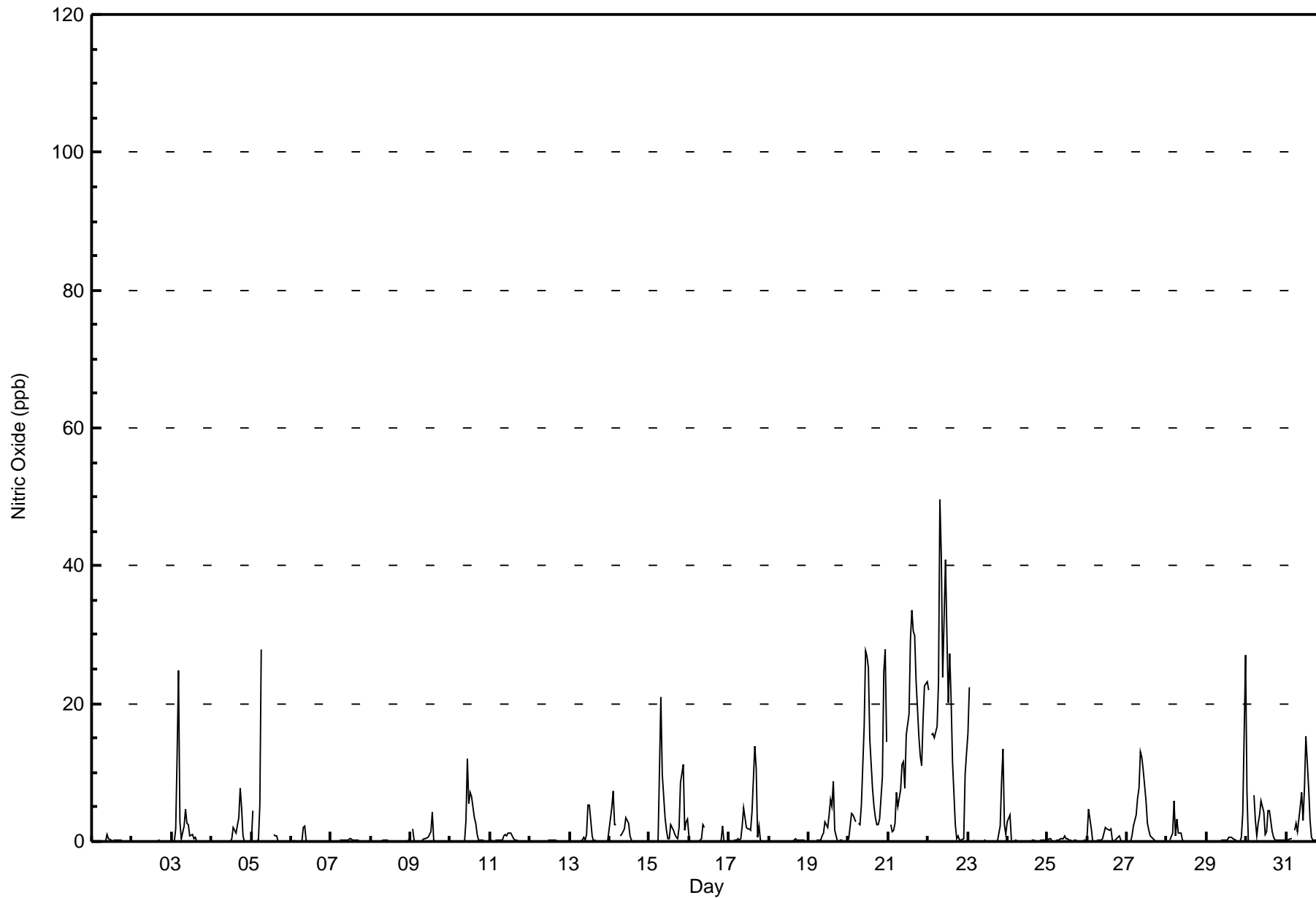


Maximum Value: 50 ppb on Oct 22 08:00		Maximum Daily Average: 17.4 ppb on Oct 22		Hours in Service: 744																																													
Minimum Value: 0 ppb on Oct 1 02:00		Minimum Daily Average: 0.0 ppb on Oct 2		Hours of Data: 704																																													
Maximum Diurnal Average: 4.3 ppb at hour 11		Minimum Diurnal Average: 1.0 ppb at hour 19		Hours of Missing Data: 40																																													
Monthly Average: 2.4 ppb		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 2 P <sub>90</sub> = 7 P <sub>99</sub> = 30		Hours of Calibration: 40																																													
				Percent Operational Time: 100.0																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																							
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
3-Oct	Z	0	2	12	25	3	0	2	5	3	2	1	1	0	1	0	0	0	0	0	0	0	0	0	2.5	25																							
4-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	2	2	1	3	8	5	1	0	0	0	0	1.0	8																							
5-Oct	0	5	Z	0	0	5	28	C	C	C	C	C	C	1	1	1	0	0	0	0	0	0	0	--	28																								
6-Oct	0	0	0	Z	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2																								
7-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																								
8-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																								
9-Oct	Z	2	0	0	0	0	0	0	0	0	1	1	1	4	0	0	0	0	0	0	0	0	0	0.5	4																								
10-Oct	0	Z	0	0	0	0	0	0	0	3	12	5	7	7	4	3	1	0	0	0	0	0	0	1.8	12																								
11-Oct	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1																								
12-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																								
13-Oct	0	0	0	0	Z	0	0	0	1	0	1	5	5	1	0	0	0	0	0	0	0	0	0	0.6	5																								
14-Oct	3	5	7	3	2	Z	1	1	2	2	4	3	1	0	0	0	0	0	0	0	0	0	0	1.4	7																								
15-Oct	Z	0	0	0	0	0	10	21	10	4	2	0	0	2	2	1	1	0	2	8	11	2	3	3.6	21																								
16-Oct	1	Z	0	0	0	0	0	1	2	2	C	C	C	0	0	0	0	0	0	0	2	0	0	0.5	2																								
17-Oct	0	0	Z	0	0	0	0	1	2	5	2	2	2	2	4	14	11	1	2	0	0	0	0	2.1	14																								
18-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																								
19-Oct	0	0	0	0	Z	0	0	0	1	1	3	2	4	6	5	9	2	0	0	0	0	0	0	1.5	9																								
20-Oct	0	2	4	4	3	Z	3	3	5	17	28	27	25	15	8	5	3	2	2	3	9	25	28	10.2	28																								
21-Oct	Z	2	1	2	3	7	5	8	11	12	8	16	19	29	34	30	30	23	15	12	11	18	22	14.8	34																								
22-Oct	22	Z	15	16	15	17	23	50	42	24	41	30	20	27	21	12	2	0	1	0	0	10	13	17.4	50																								
23-Oct	16	22	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	9	13	3	2.9	22																								
24-Oct	3	4	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	4																								
25-Oct	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																								
26-Oct	1	5	2	0	0	Z	0	0	0	0	1	2	2	2	2	0	0	0	1	1	0	0	0	0.8	5																								
27-Oct	Z	0	0	1	2	4	6	8	13	12	10	6	3	2	1	1	0	0	0	0	0	0	0	3.0	13																								
28-Oct	0	Z	0	1	6	1	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	6																								
29-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	4	27	1.5	27																							
30-Oct	7	0	0	Z	7	3	1	3	4	6	4	1	1	5	4	1	1	0	0	0	0	0	0	2.1	7																								
31-Oct	0	0	0	0	Z	2	3	1	5	7	3	8	15	8	3	1	0	0	0	0	0	0	0	2.5	15																								
																								2.1	1.9	1.3	1.5	2.6	1.7	2.7	3.4	3.6	3.4	4.3	3.8	3.8	3.7	3.0	2.6	1.8	1.2	1.0	1.0	1.4	1.9	2.3	2.7	Diurnal Average	
																								22	22	15	16	25	17	28	50	42	24	41	30	25	29	34	30	30	30	23	15	12	11	25	28	27	Diurnal Maximum
Z - zerspan C - Calibration																																																	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitric Oxide (NO) - ppb**  
**Fort McKay South - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb  
Fort McKay South - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	678	96.31	96.31
21 - 40	23	3.27	99.57
41 - 80	3	0.43	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Fort McKay South - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	101	23	6	3	3	8	10	50	101	57	48	53	45	35	53	82	678
21 - 40	3	4	1	0	1	0	1	2	2	4	1	0	1	1	0	2	23
11 - 80	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	105	27	9	3	4	8	11	52	103	61	49	53	46	36	53	84	704

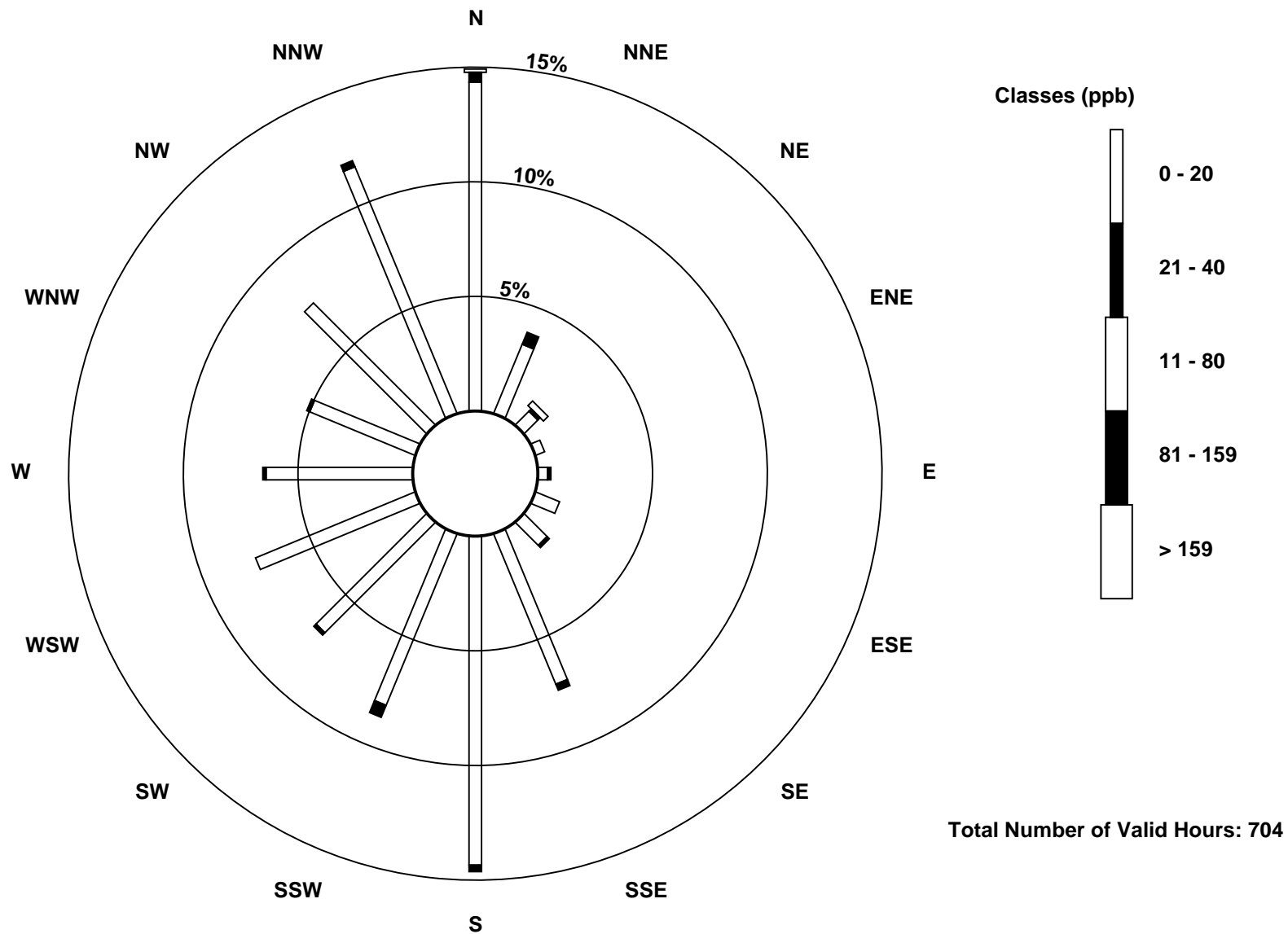
Total Number of Valid Hours: 704

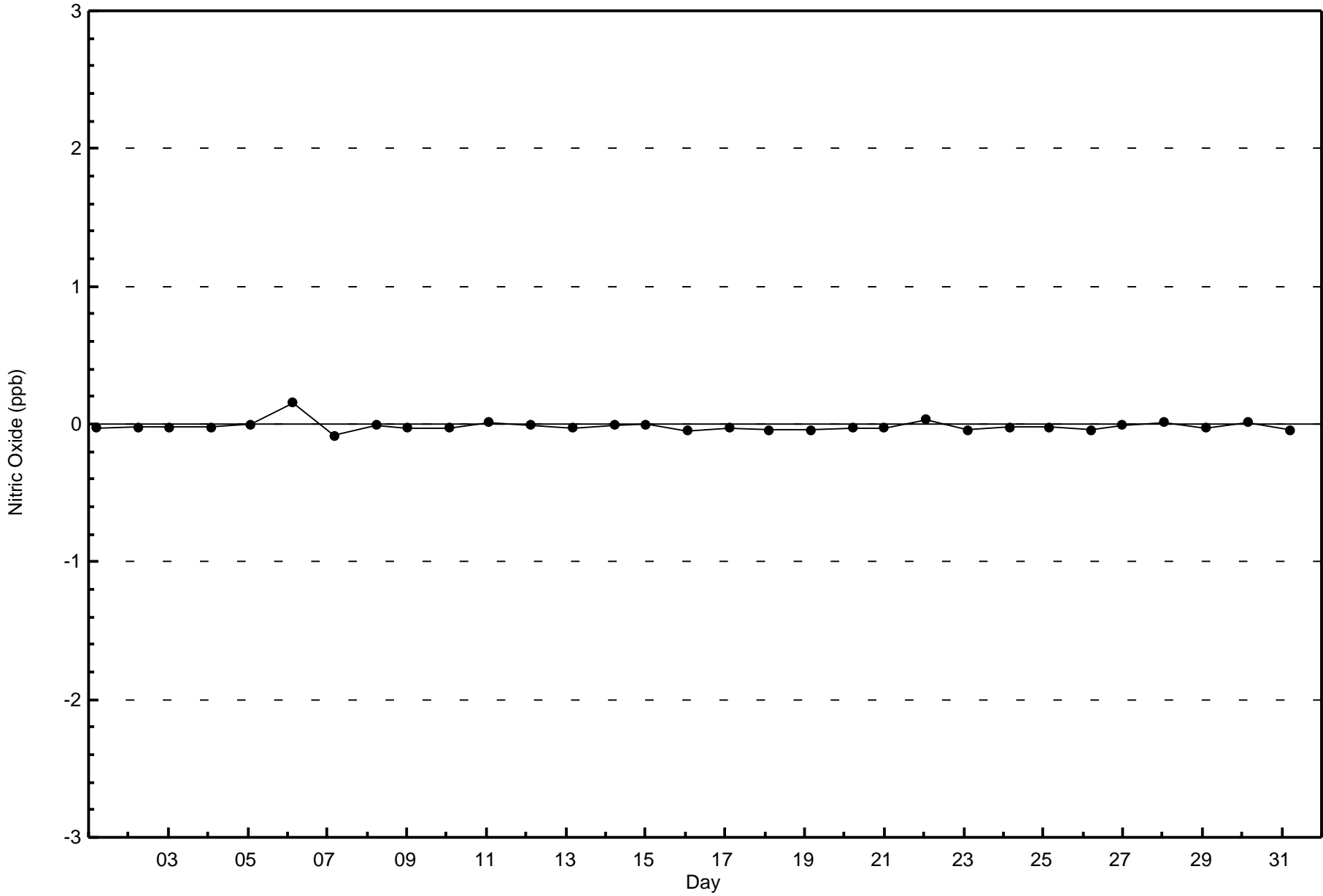
Total Number of Hours: 744



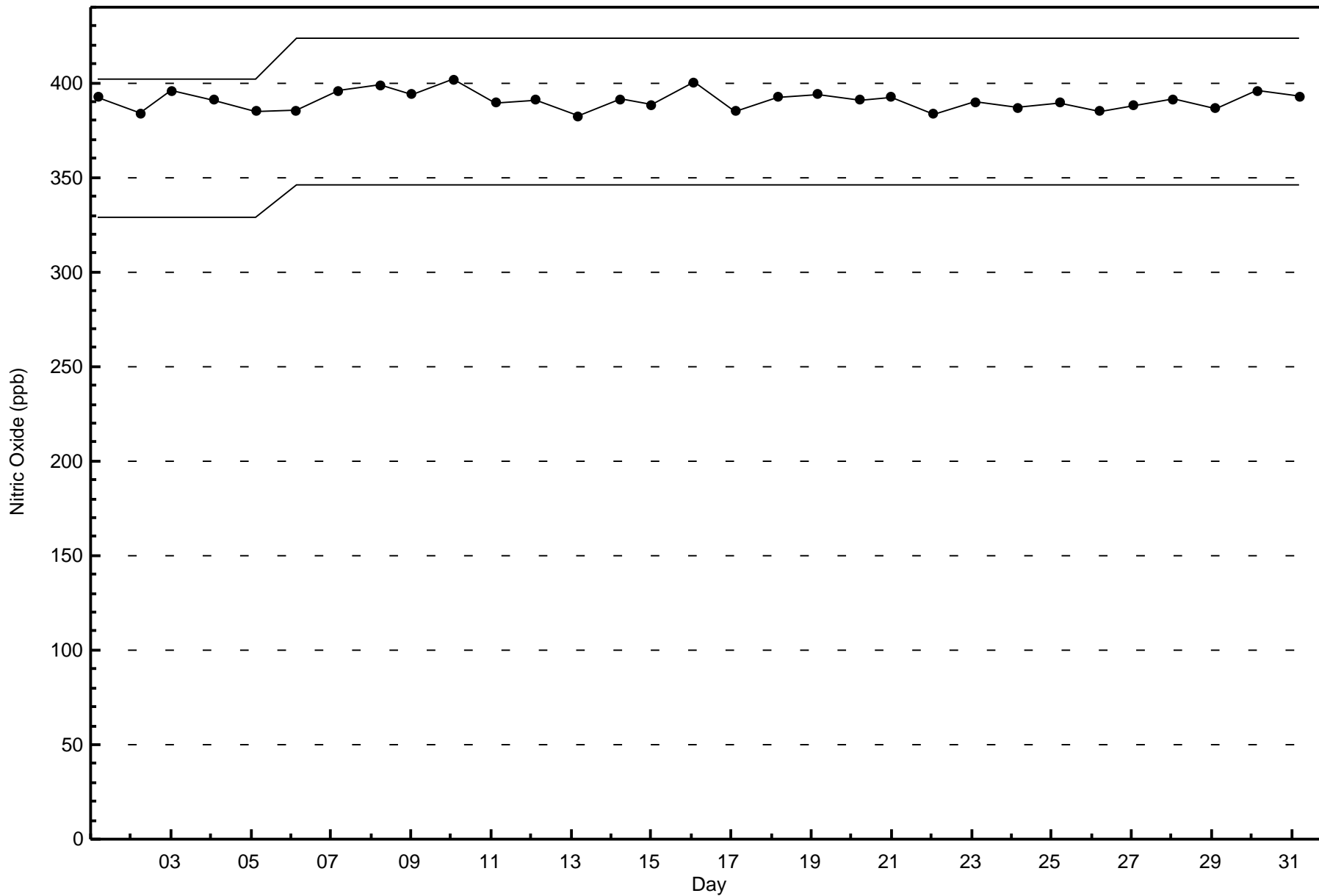
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitric Oxide (NO) - ppb  
Fort McKay South (AMS 13)











Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb

Fort McKay South - October 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 29 ppb on Oct 23 21:00	Maximum Daily Average: 15.7 ppb on Oct 22		Hours of Data:	704
Minimum Value: 0 ppb on Oct 8 21:00	Minimum Daily Average: 0.3 ppb on Oct 2		Hours of Missing Data:	40
Maximum Diurnal Average: 5.5 ppb at hour 7	Minimum Diurnal Average: 3.4 ppb at hour 23		Hours of Calibration:	40
Monthly Average: 4.4 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 O <sub>1</sub> = 0 Median = 2 O <sub>3</sub> = 7 P <sub>90</sub> = 12 P <sub>99</sub> = 21		Percent Operational Time:	100.0

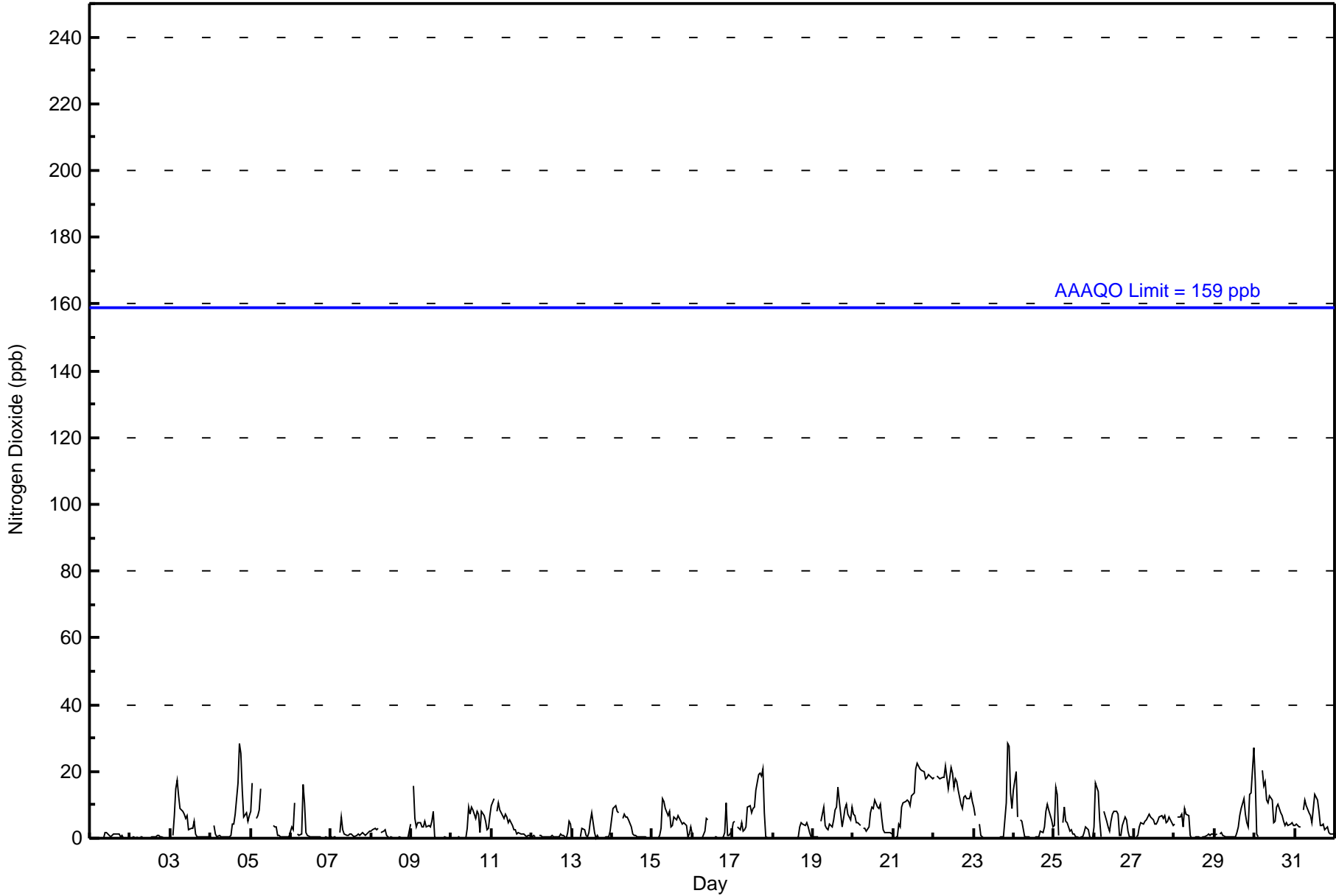
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	0	Z	0	0	0	0	2	2	1	0	1	1	1	1	1	1	1	0	0	0	0	0.6	2
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0.3	1
3-Oct	Z	1	7	15	17	13	9	8	7	6	7	3	3	3	5	1	1	0	0	1	0	0	0	0	4.7	17
4-Oct	0	Z	4	1	1	1	0	0	0	0	0	0	1	4	4	7	16	28	25	15	7	8	5	7	5.9	28
5-Oct	8	17	Z	6	7	9	15	C	C	C	C	C	C	4	3	4	1	1	1	1	1	1	1	--	17	
6-Oct	3	3	11	Z	1	1	1	16	11	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	2.3	16
7-Oct	0	0	0	0	Z	2	6	3	1	1	1	1	1	1	1	1	1	1	1	2	1	1	2	2	1.3	6
8-Oct	2	3	3	2	3	Z	2	2	3	1	1	0	0	0	0	0	0	1	0	0	0	0	0	4	1.2	4
9-Oct	Z	16	6	3	5	5	3	4	5	4	4	3	5	8	0	0	0	0	0	0	0	0	0	0	3.1	16
10-Oct	0	Z	0	0	0	0	0	0	0	3	9	7	9	8	6	8	7	2	8	7	5	3	3	7	4.1	9
11-Oct	10	12	Z	8	11	9	7	6	7	6	5	5	4	2	3	1	2	1	1	1	1	1	1	1	4.5	12
12-Oct	0	1	1	Z	1	1	1	1	0	1	0	1	1	1	1	0	1	1	1	1	0	2	5	4	1.0	5
13-Oct	1	0	0	0	Z	1	3	3	1	0	2	5	8	2	0	1	0	0	0	0	0	0	0	2	1.3	8
14-Oct	9	9	10	8	8	Z	6	7	6	7	6	4	1	1	1	1	1	1	0	0	0	0	0	0	3.7	10
15-Oct	Z	0	0	0	1	3	12	11	9	7	8	3	4	7	6	7	6	5	4	5	4	1	1	4	4.6	12
16-Oct	1	Z	0	0	0	0	0	2	6	6	C	C	C	0	0	0	0	0	0	2	11	1	1	2	1.6	11
17-Oct	5	5	Z	4	3	5	2	3	3	9	10	8	9	9	14	19	19	19	21	8	1	0	0	0	7.6	21
18-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	4	5	4	4	5	3	2	1	1.2	5
19-Oct	0	0	0	0	Z	5	9	4	3	3	4	3	6	9	9	15	11	4	6	9	10	7	6	9	5.8	15
20-Oct	7	7	5	5	4	Z	3	3	2	3	8	10	9	11	9	9	10	6	2	2	2	2	2	1	5.2	11
21-Oct	Z	0	1	4	3	9	10	11	12	11	10	13	13	21	23	22	21	20	20	18	18	19	19	18	13.7	23
22-Oct	18	Z	19	18	18	18	18	22	18	15	21	19	15	18	17	14	10	9	12	13	12	12	13	11	15.7	22
23-Oct	10	7	Z	4	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	11	29	28	14	9	5.0	29
24-Oct	14	20	6	Z	6	5	1	0	0	0	0	0	0	0	1	2	2	4	8	10	9	6	4	4	4.3	20
25-Oct	4	15	13	1	Z	5	9	5	5	2	3	1	1	1	0	0	0	0	2	3	3	0	0	0	3.2	15
26-Oct	4	17	14	6	1	Z	8	5	3	2	5	7	8	8	7	1	1	4	6	6	2	1	1	1	5.0	17
27-Oct	Z	1	1	4	5	4	5	5	7	7	6	5	4	4	5	7	7	6	7	5	5	7	5	4	4.9	7
28-Oct	4	Z	7	7	7	3	9	7	7	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	2.6	9
29-Oct	1	1	Z	1	2	1	1	0	0	0	0	0	0	2	3	7	9	12	7	5	4	13	14	27	4.8	27
30-Oct	17	1	1	Z	21	16	17	12	11	13	11	5	5	9	10	8	7	5	4	5	4	4	5	4	8.3	21
31-Oct	4	4	3	3	Z	9	12	10	8	7	5	9	13	12	8	4	4	4	3	3	2	1	1	1	5.6	13
	4.7	5.4	4.2	3.9	4.9	4.7	5.5	5.0	4.5	3.9	4.4	4.0	4.2	4.7	4.5	4.5	4.6	4.5	4.6	4.3	4.4	4.0	3.4	4.1	Diurnal Average	
	18	20	19	18	21	18	18	22	18	15	21	19	15	21	23	22	21	28	25	18	29	28	19	27	Diurnal Maximum	

Z - zerospan C - Calibration  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort McKay South - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay South - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	691	98.15	98.15
21 - 40	13	1.85	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay South - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	104	27	8	3	3	8	10	48	101	60	49	53	46	36	52	83	691
21 - 40	1	0	1	0	1	0	1	4	2	1	0	0	0	0	1	1	13
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	105	27	9	3	4	8	11	52	103	61	49	53	46	36	53	84	704

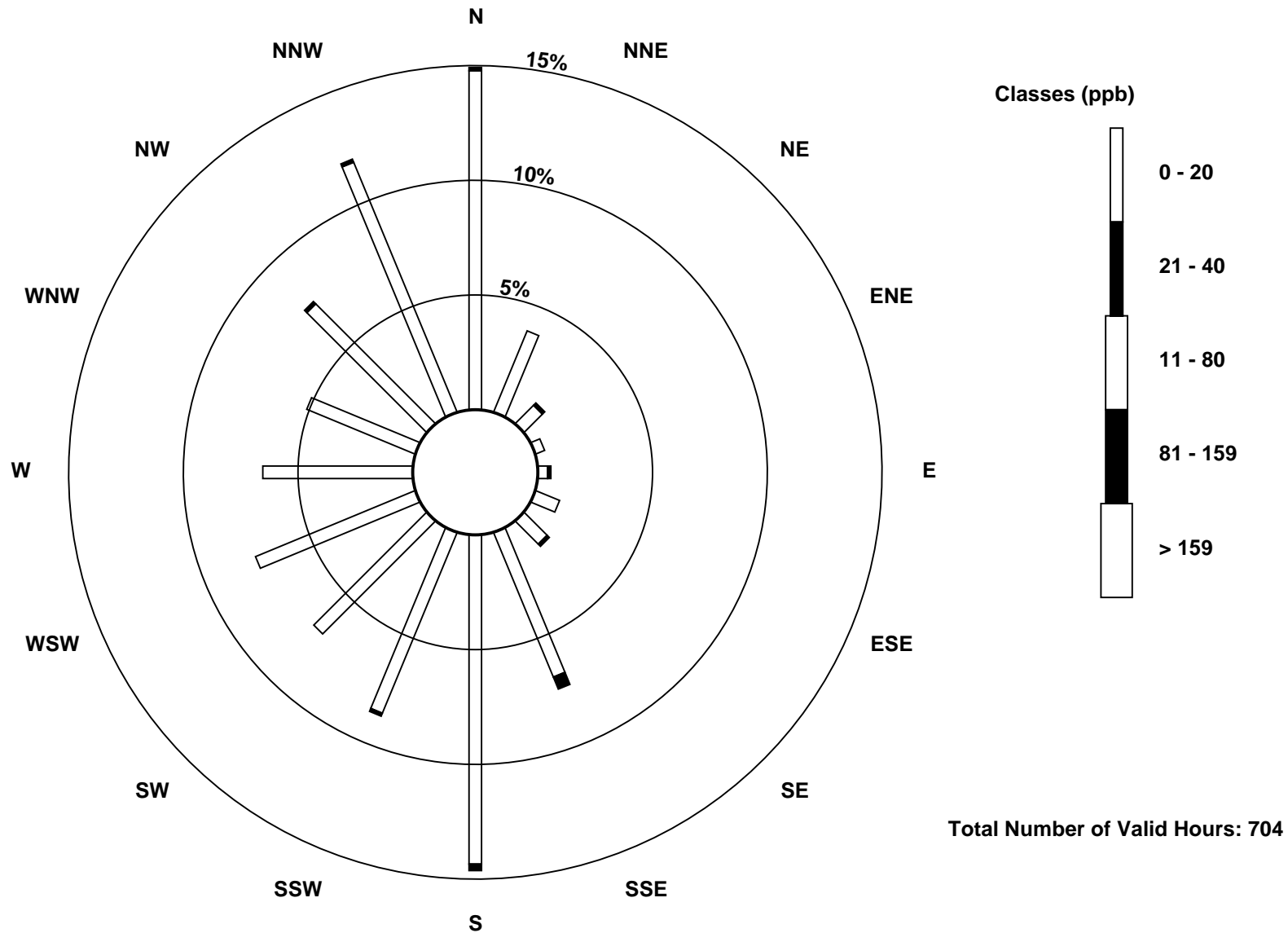
Total Number of Valid Hours: 704

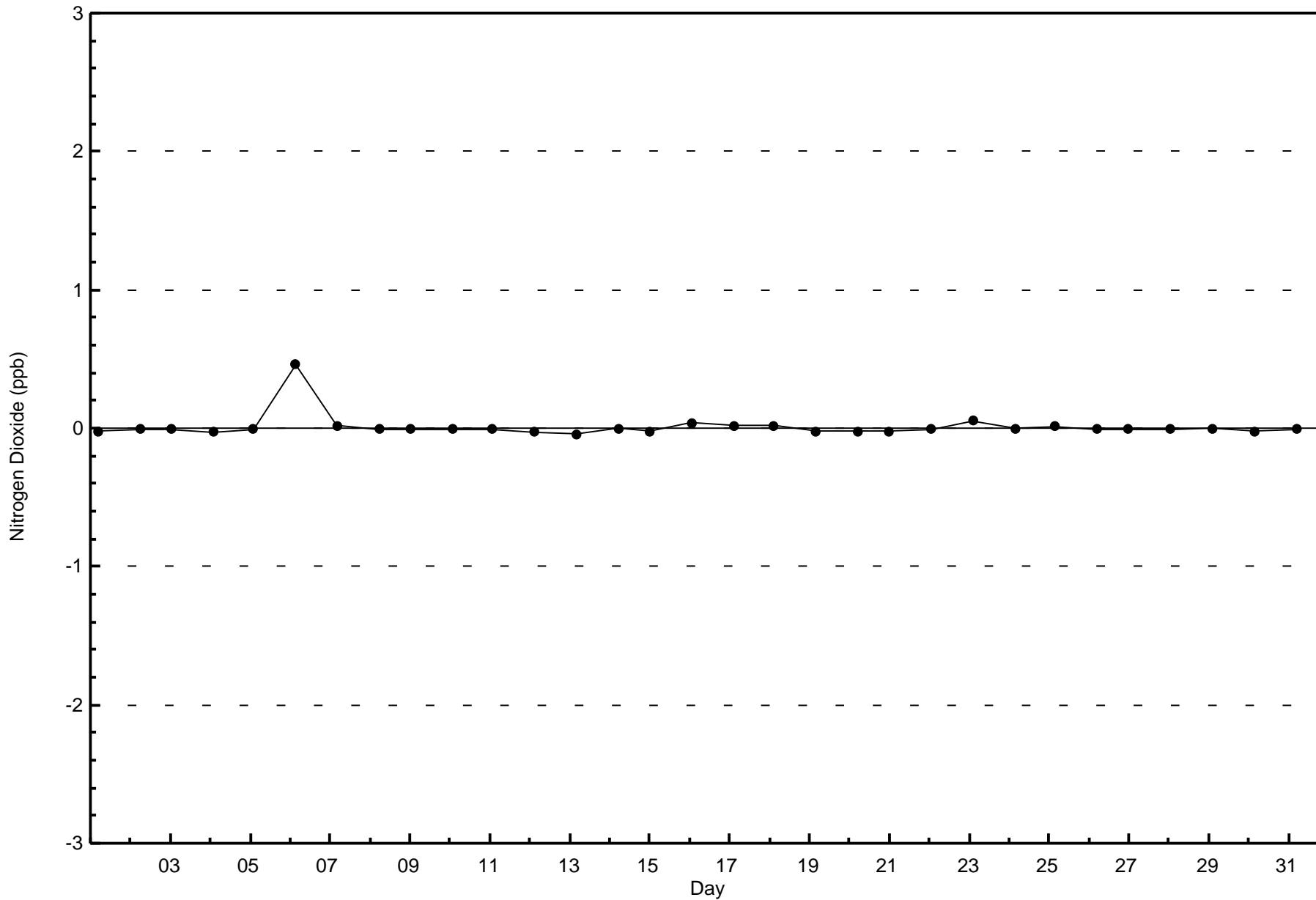
Total Number of Hours: 744

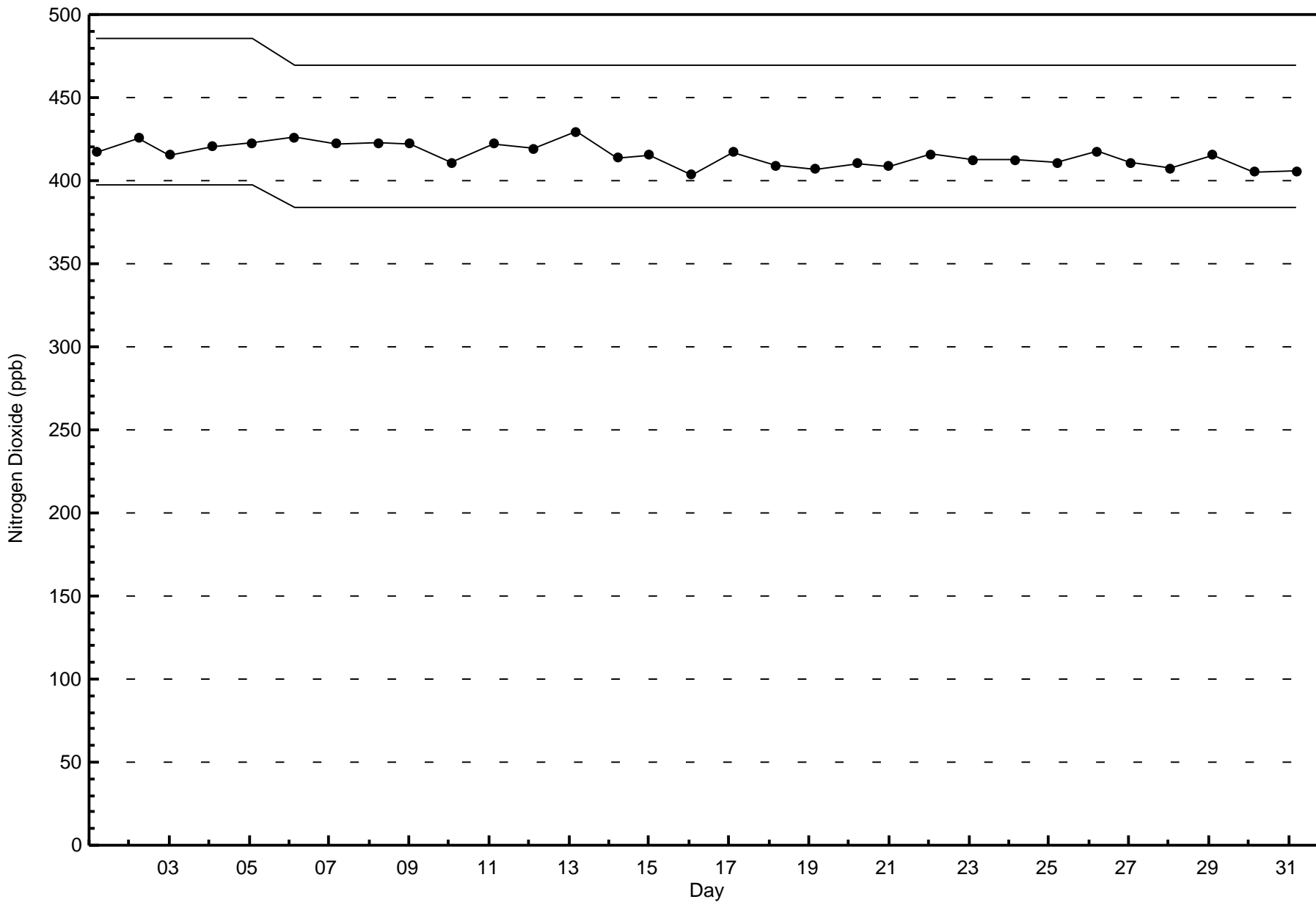


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay South (AMS 13)











Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb

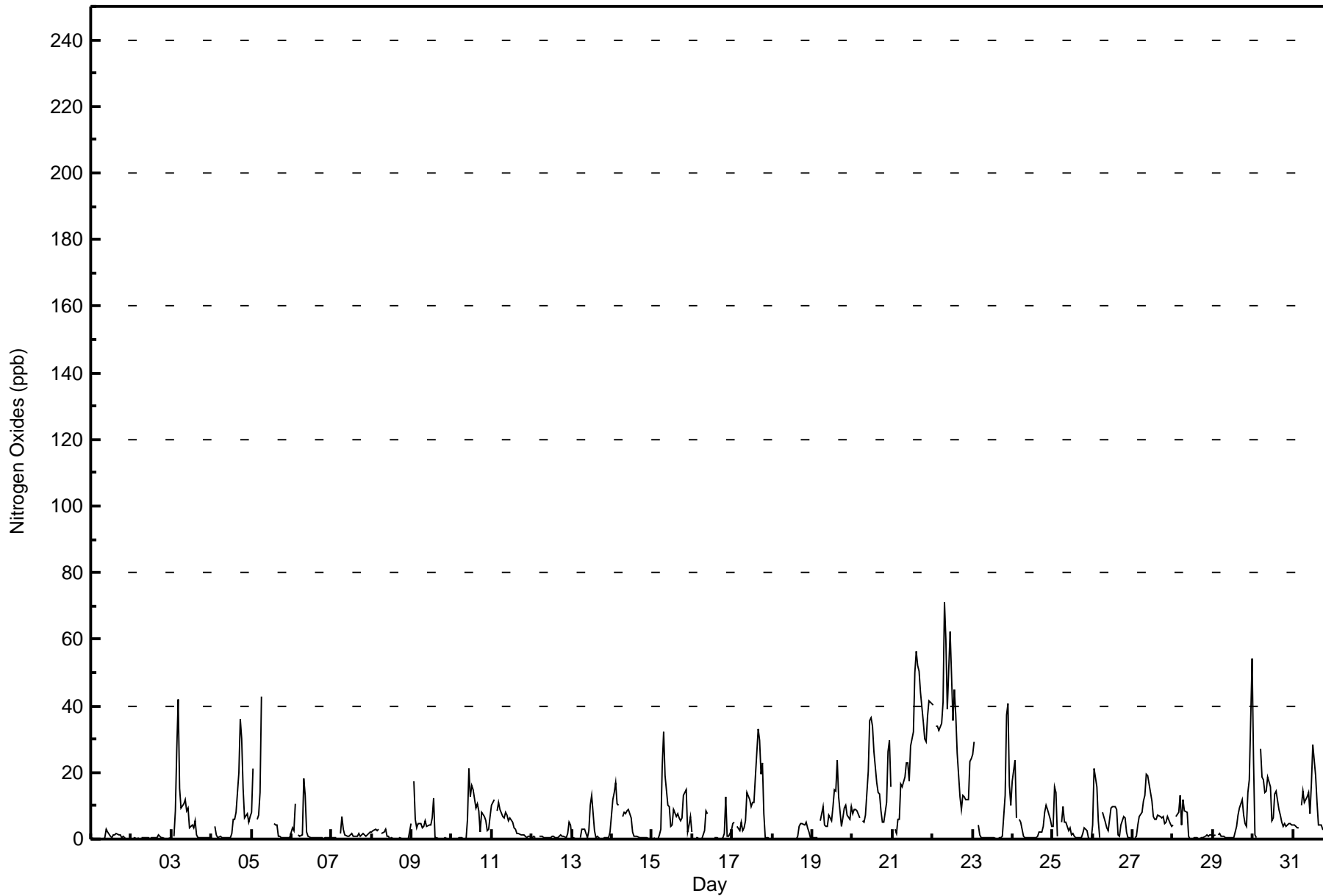
Fort McKay South - October 2017

Maximum Value: 71 ppb on Oct 22 08:00																	Maximum Daily Average: 33.1 ppb on Oct 22																	Hours in Service: 744	
Minimum Value: 0 ppb on Oct 18 09:00																	Minimum Daily Average: 0.3 ppb on Oct 2																	Hours of Data: 704	
Maximum Diurnal Average: 8.7 ppb at hour 11																	Minimum Diurnal Average: 5.2 ppb at hour 20																	Hours of Missing Data: 40	
Monthly Average: 6.9 ppb																	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 3 Q <sub>3</sub> = 8 P <sub>90</sub> = 19 P <sub>99</sub> = 50																	Hours of Calibration: 40	
																																		Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Oct	0	0	0	0	Z	0	0	0	0	3	2	1	0	1	1	2	1	1	0	1	0	0	0	0	0.7	3									
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0.3	1									
3-Oct	Z	1	8	27	42	15	9	10	12	9	9	3	4	3	6	1	1	0	0	0	0	0	0	0	7.1	42									
4-Oct	0	Z	4	1	1	1	0	0	0	0	0	0	2	6	6	8	20	36	30	15	6	8	5	7	6.9	36									
5-Oct	8	21	Z	6	7	14	43	C	C	C	C	C	C	5	4	4	1	1	1	1	0	0	1	--	43										
6-Oct	3	3	11	Z	1	1	1	18	13	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2.5	18									
7-Oct	0	0	0	0	Z	2	7	3	1	1	1	1	2	1	1	1	2	1	1	2	1	1	2	2	1.4	7									
8-Oct	2	3	3	2	3	Z	2	2	3	1	1	0	0	0	0	0	0	1	0	0	0	0	0	5	1.3	5									
9-Oct	Z	17	6	3	5	5	3	4	6	4	4	4	7	12	1	0	0	0	0	0	0	0	0	0	3.6	17									
10-Oct	0	Z	0	0	0	0	0	0	0	6	21	13	16	15	9	11	8	2	8	7	5	3	3	7	5.9	21									
11-Oct	10	12	Z	8	11	9	7	6	8	7	6	7	5	3	3	2	2	1	1	1	1	1	1	1	4.8	12									
12-Oct	0	1	1	Z	1	1	1	0	0	1	0	1	1	1	1	1	1	1	1	1	0	2	5	4	1.1	5									
13-Oct	1	0	0	0	Z	0	3	3	2	1	3	10	13	3	0	1	0	0	0	0	0	0	2	1	1.9	13									
14-Oct	12	14	17	11	10	Z	7	8	8	8	9	6	2	1	1	1	1	1	0	0	0	0	0	0	5.1	17									
15-Oct	Z	0	0	0	1	3	22	32	19	10	10	4	4	9	7	8	6	5	6	13	15	2	4	7	8.2	32									
16-Oct	2	Z	0	0	0	0	0	3	8	8	C	C	C	0	0	0	0	0	0	2	13	1	1	2	2.1	13									
17-Oct	5	5	Z	4	3	5	2	3	5	14	12	10	11	11	19	33	30	19	23	8	1	0	0	0	9.7	33									
18-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	4	5	5	4	5	3	2	1	1.3	5									
19-Oct	0	0	1	0	Z	5	10	4	4	4	7	5	10	15	14	24	13	4	6	9	10	7	6	10	7.3	24									
20-Oct	8	9	9	8	7	Z	6	5	7	20	35	36	34	26	17	14	13	8	5	5	11	26	29	16	15.4	36									
21-Oct	Z	3	2	6	6	16	16	18	23	23	17	28	32	50	56	52	50	44	35	30	29	37	41	41	28.5	56									
22-Oct	40	Z	34	34	33	35	41	71	60	39	62	49	36	45	37	26	13	9	13	13	12	12	23	24	33.1	71									
23-Oct	25	29	Z	4	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	13	37	41	16	10	7.9	41									
24-Oct	17	24	6	Z	6	5	1	0	0	0	0	0	0	0	0	1	2	2	4	8	10	9	6	4	4.7	24									
25-Oct	4	16	14	1	Z	5	10	5	5	3	4	1	2	1	1	0	0	1	2	3	3	0	0	0	3.5	16									
26-Oct	4	21	16	6	1	Z	8	5	4	3	6	9	10	10	9	1	1	4	7	6	2	1	1	1	5.8	21									
27-Oct	Z	1	1	4	7	8	11	13	19	19	17	11	7	6	6	7	7	6	7	5	5	7	5	4	7.9	19									
28-Oct	4	Z	7	8	13	4	12	9	8	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	3.2	13									
29-Oct	1	1	Z	1	2	1	1	1	0	0	0	0	0	2	4	7	9	12	7	5	4	14	18	54	6.3	54									
30-Oct	24	1	1	Z	27	19	18	14	15	19	16	6	7	14	15	9	7	5	4	5	4	4	5	4	10.5	27									
31-Oct	4	4	3	4	Z	10	14	11	13	14	8	17	28	19	11	4	4	4	3	4	2	1	1	2	8.1	28									
6.8																	7.2																	Diurnal Average	
40																	29																	Diurnal Maximum	
5.5																	5.4																		
7.5																	6.4																		
8.2																	8.4																		
8.1																	7.3																		
8.7																	7.8																		
8.0																	8.4																		
7.4																	7.1																		
6.4																	5.7																		
5.5																	5.2																		
5.8																	5.9																		
5.7																	6.8																		
5.7																	41																		
5.7																	41																		
6.8																	54																		
Z - zerospan		C - Calibration																																	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort McKay South - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort McKay South - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	643	91.34	91.34
21 - 40	44	6.25	97.59
41 - 80	17	2.41	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

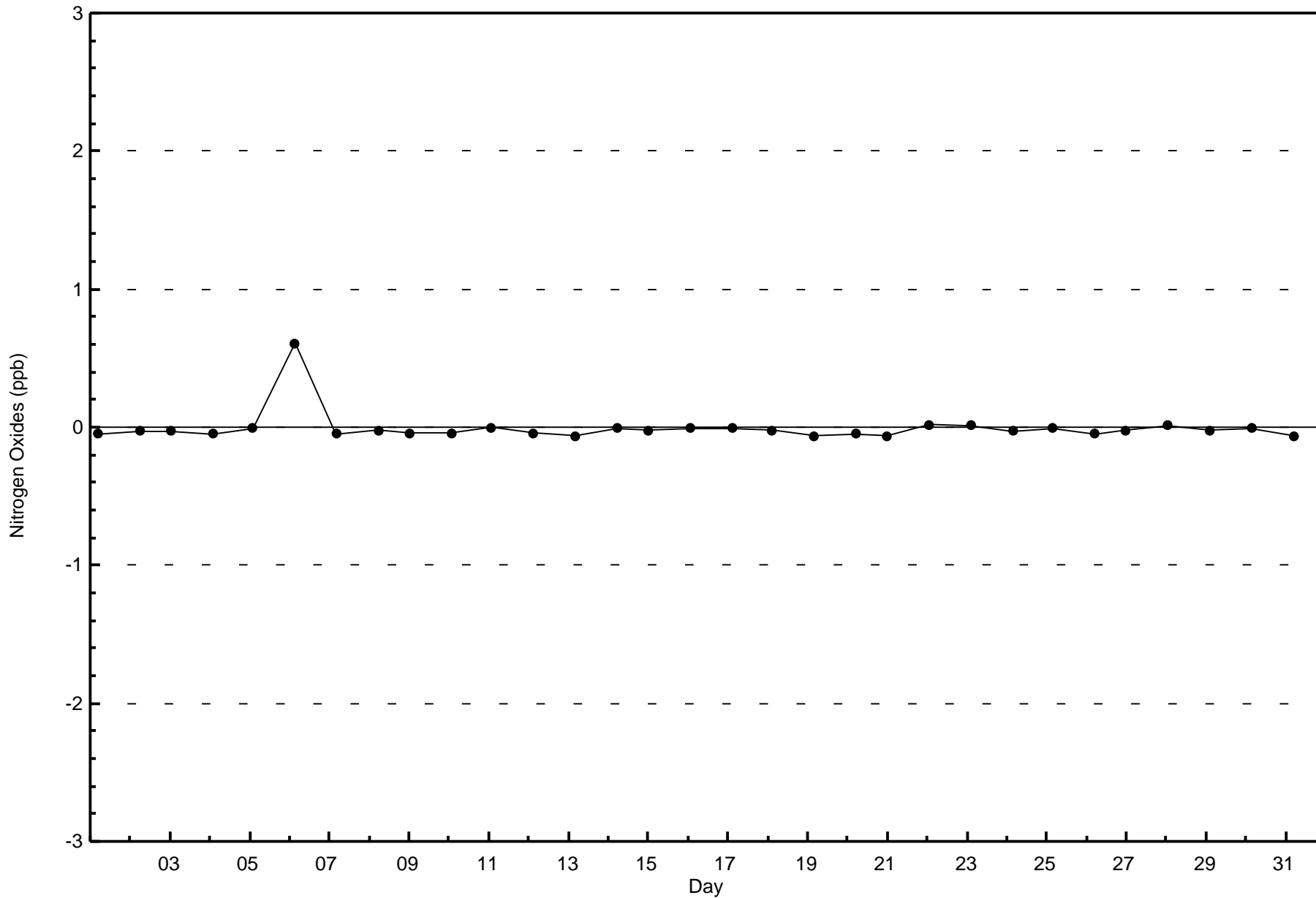
**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort McKay South - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	98	19	5	3	3	8	10	44	93	52	48	53	45	35	50	77	643
21 - 40	4	7	2	0	0	0	0	7	7	7	1	0	1	0	3	5	44
11 - 80	3	1	2	0	1	0	1	1	3	2	0	0	0	1	0	2	17
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	105	27	9	3	4	8	11	52	103	61	49	53	46	36	53	84	704

Total Number of Valid Hours: 704

Total Number of Hours: 744

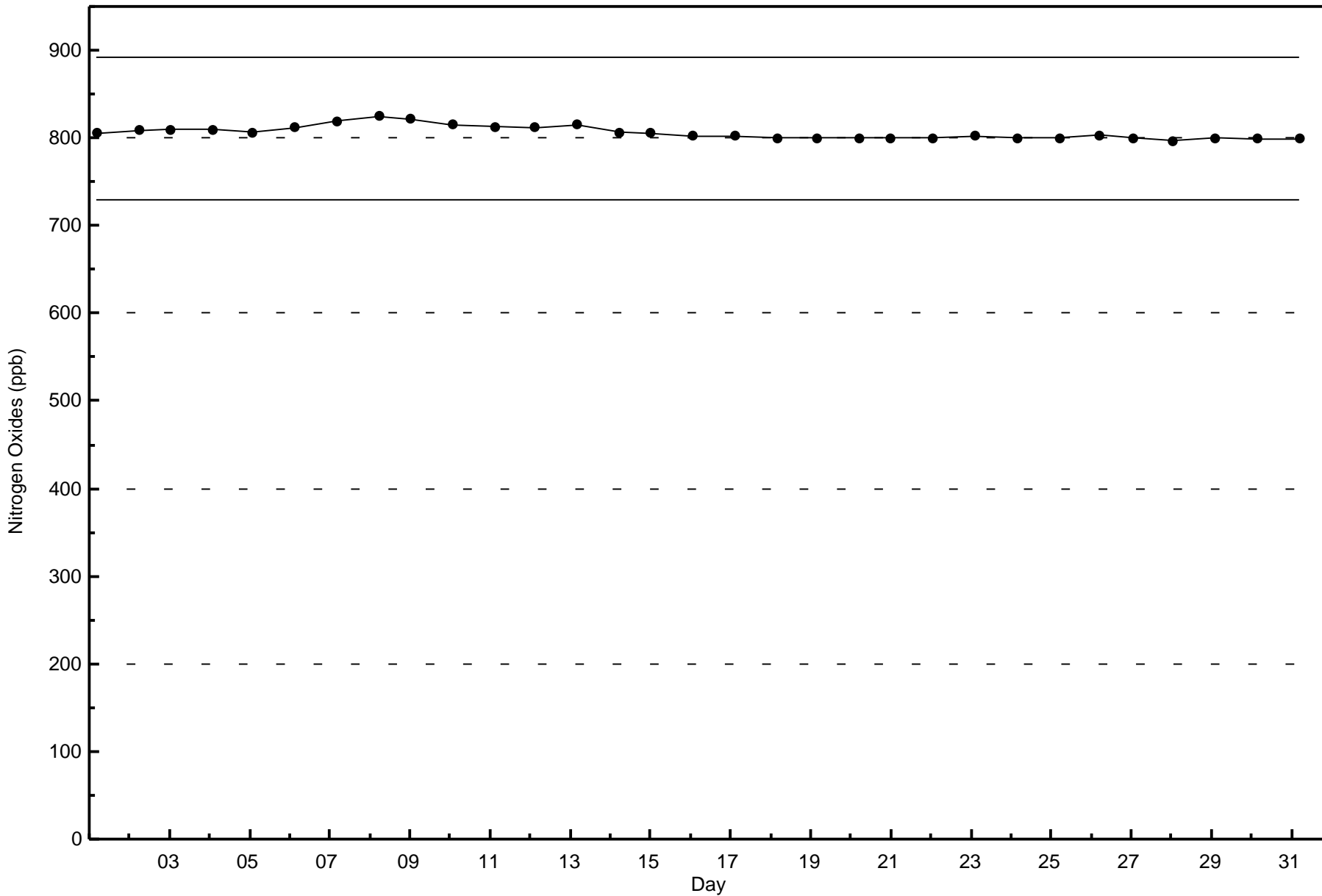






**Wood Buffalo Environmental Association**  
**Span Responses**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort McKay South - October 2017**





# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Particulate Matter 2.5 (PM<sub>2.5</sub>) - µg/m<sup>3</sup>

## Fort McKay South - October 2017

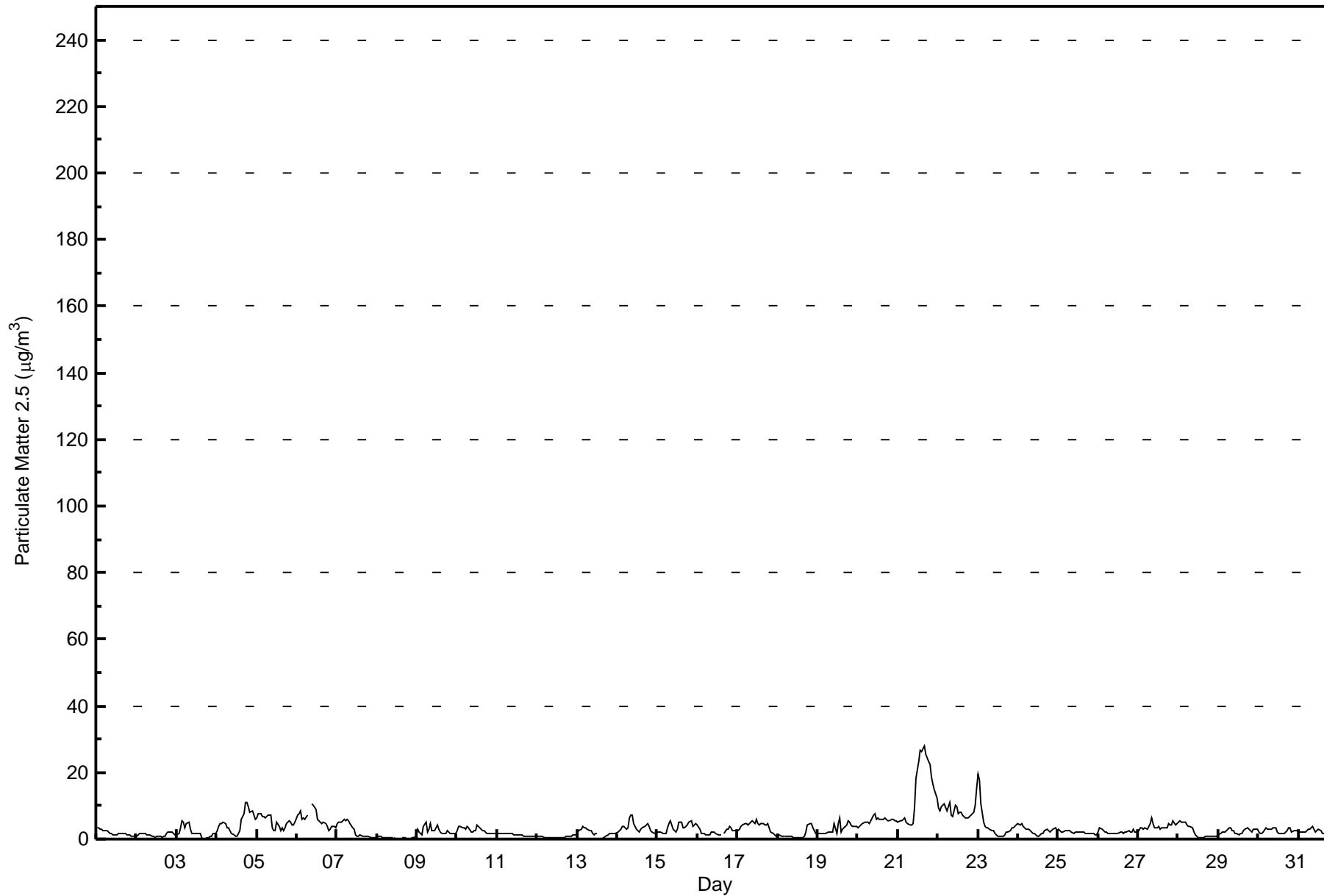
Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 28.1 µg/m <sup>3</sup> on Oct 21 17:00 Maximum Daily Average: 14.3 µg/m <sup>3</sup> on Oct 21		Hours in Service: 744 Hours of Data: 736 Hours of Missing Data: 8 Hours of Calibration: 3 Percent Operational Time: 99.3																																															
Minimum Value: 0.0 µg/m <sup>3</sup> on Oct 3 18:00 Maximum Diurnal Average: 3.7 µg/m <sup>3</sup> at hour 2 Monthly Average: 3.35 µg/m <sup>3</sup>		Minimum Daily Average: 0.4 µg/m <sup>3</sup> on Oct 8 Minimum Diurnal Average: 2.9 µg/m <sup>3</sup> at hour 12 Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.7 Q <sub>1</sub> = 1.5 Median = 2.4 Q <sub>3</sub> = 4.2 P <sub>90</sub> = 6.2 P <sub>99</sub> = 23.2																																															
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	3.3	3.3	2.8	2.9	2.7	2.6	2.5	2.1	1.8	1.6	1.4	1.4	1.5	1.6	1.5	1.7	1.6	1.5	1.3	1.2	1.1	1.0	1.0	0.9	1.8	3.3																							
2-Oct	1.0	1.2	1.6	1.6	1.5	1.5	1.3	1.3	1.2	0.8	0.7	0.6	0.6	0.6	0.7	0.6	0.8	1.0	1.6	2.3	2.1	2.2	1.6	1.5	1.3	2.3																							
3-Oct	1.5	1.8	3.2	5.4	5.1	3.6	4.5	5.0	3.1	1.5	1.5	1.6	1.9	1.8	1.6	0.2	0.1	0.0	0.4	0.6	0.7	0.9	1.5	1.7	2.1	5.4																							
4-Oct	2.4	3.7	4.9	4.7	4.9	4.7	3.4	3.4	2.4	1.8	1.1	1.0	0.8	1.6	2.4	5.9	7.7	11.1	10.9	9.8	8.1	8.6	7.3	5.8	4.9	11.1																							
5-Oct	6.5	7.7	7.8	6.9	6.8	6.5	6.6	7.1	7.2	3.4	2.4	2.6	4.9	3.6	2.4	3.3	2.7	3.2	4.5	5.3	5.1	4.2	4.2	5.2	5.0	7.8																							
6-Oct	7.2	7.6	8.4	5.9	6.4	6.1	7.0	C	C	10.6	10.1	8.8	5.9	5.5	4.9	4.8	5.1	4.8	3.8	2.6	3.2	3.9	3.7	3.6	5.9	10.6																							
7-Oct	4.5	5.3	5.0	5.2	6.0	5.7	6.0	5.4	4.6	3.5	2.9	1.2	0.9	0.9	1.2	0.8	0.8	0.8	0.8	0.7	0.4	0.5	0.5	0.5	2.7	6.0																							
8-Oct	0.6	0.7	0.6	0.6	0.5	0.6	0.5	0.5	0.6	0.4	0.2	0.3	UO	UO	UO	0.2	0.2	0.3	0.2	0.2	0.2	0.3	0.4	1.0	0.4	1.0																							
9-Oct	2.9	2.3	1.8	1.4	4.0	5.1	2.0	2.8	4.6	2.5	2.6	3.4	4.4	2.9	2.2	1.7	1.5	1.7	2.3	2.3	1.7	1.5	1.6	1.6	2.5	5.1																							
10-Oct	2.5	3.9	3.9	3.5	3.2	2.9	3.9	3.2	2.1	1.9	2.7	2.5	4.1	3.9	3.0	2.5	2.4	1.9	1.8	1.7	1.6	1.7	1.7	1.7	2.7	4.1																							
11-Oct	1.8	1.7	1.6	1.6	1.9	1.8	1.7	1.5	1.6	1.6	1.4	1.4	1.3	1.2	1.1	1.1	1.0	0.9	0.9	0.8	0.8	0.8	0.8	0.8	1.3	1.9																							
12-Oct	0.7	0.7	0.7	0.7	0.6	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.4	0.4	0.3	0.5	0.7	0.9	1.0	0.9	1.1	1.4	1.5	0.7	1.5																							
13-Oct	1.8	2.6	3.0	3.8	3.6	3.5	3.2	2.7	2.7	1.9	1.5	1.6	1.7	UO	UO	0.2	0.3	0.9	1.3	1.6	1.6	1.7	1.8	2.0	3.8																								
14-Oct	2.3	2.6	3.1	3.9	3.7	2.8	3.3	6.3	7.1	7.2	4.7	3.1	2.4	2.1	2.9	3.6	4.0	4.3	4.6	3.8	2.5	2.1	1.8	1.7	3.6	7.2																							
15-Oct	2.2	1.9	1.9	1.7	1.7	1.8	3.6	4.5	5.6	3.1	2.5	2.2	2.8	5.3	5.0	3.4	3.5	3.6	4.0	5.1	5.3	4.0	4.2	4.5	3.5	5.6																							
16-Oct	4.1	3.0	1.7	1.5	1.5	1.4	1.3	1.3	2.1	2.0	2.0	1.5	1.3	1.2	1.1	C	1.6	3.0	3.1	3.8	3.3	2.5	2.5	2.3	2.1	4.1																							
17-Oct	2.4	2.9	3.8	4.2	4.6	4.6	4.2	4.7	5.1	5.4	4.8	5.7	4.9	4.4	4.7	4.7	4.1	4.1	4.5	3.2	2.2	1.6	1.3	1.1	3.9	5.7																							
18-Oct	1.1	1.1	0.9	0.9	0.8	0.7	0.7	0.7	0.7	0.6	0.5	0.4	0.3	0.4	0.4	0.4	0.8	2.0	4.2	4.6	4.5	3.6	2.4	1.6	1.4	4.6																							
19-Oct	1.6	1.5	1.5	1.5	1.7	1.8	2.1	2.0	2.1	1.9	4.7	1.5	4.5	6.3	2.2	2.8	3.3	4.0	5.6	5.0	4.4	3.9	3.8	3.9	3.1	6.3																							
20-Oct	3.5	3.8	4.2	4.8	5.1	5.1	5.2	4.8	5.4	7.0	7.8	6.0	6.6	6.0	6.0	6.0	6.4	5.8	5.5	5.5	5.8	5.9	5.5	5.3	5.5	7.8																							
21-Oct	5.2	5.6	5.5	5.9	6.2	5.2	4.5	4.3	4.3	4.8	9.2	18.4	23.2	26.8	26.4	27.0	28.1	25.5	23.3	22.5	18.8	16.4	14.9	12.4	14.3	28.1																							
22-Oct	9.5	8.5	9.7	10.3	10.7	8.4	9.5	11.1	7.1	6.9	10.0	9.6	7.4	8.0	7.9	7.3	6.3	6.2	6.4	6.7	7.0	7.9	10.2	15.2	8.7	15.2																							
23-Oct	19.6	17.7	10.6	5.3	3.9	3.5	3.3	2.9	2.6	2.5	1.7	1.1	0.8	0.8	0.7	0.8	1.4	2.1	2.3	2.6	3.3	3.5	3.9	4.2	4.2	19.6																							
24-Oct	4.8	4.2	4.7	3.7	3.4	2.9	2.8	2.5	2.1	1.8	1.5	0.8	0.9	1.3	1.6	1.6	2.3	2.8	2.5	2.3	2.4	3.0	3.2	2.6	2.6	4.8																							
25-Oct	2.9	2.6	2.3	2.3	2.7	2.5	2.7	2.4	2.0	1.8	1.9	2.1	2.3	2.3	2.1	2.0	1.9	1.8	1.7	1.8	1.7	1.6	1.4	1.3	2.1	2.9																							
26-Oct	2.0	3.2	3.0	2.5	2.0	2.1	1.9	1.6	1.7	1.6	1.7	1.6	1.6	2.1	2.0	1.9	2.0	2.3	2.5	2.3	2.3	2.8	2.3	2.2	2.1	3.2																							
27-Oct	2.5	3.3	3.3	3.1	3.2	3.2	3.9	4.8	6.4	4.7	3.2	3.6	3.7	3.2	3.5	3.4	3.4	3.5	4.7	4.4	4.2	5.4	4.3	4.7	3.9	6.4																							
28-Oct	5.2	5.5	5.2	4.9	5.1	4.2	3.8	3.8	3.2	2.2	1.1	0.8	0.6	0.5	0.5	0.5	0.7	0.8	0.8	0.8	0.8	0.7	0.7	0.7	2.2	5.5																							
29-Oct	1.1	1.8	2.1	2.0	2.3	2.3	3.4	3.2	2.7	2.5	1.8	1.7	1.5	1.7	1.8	2.4	2.9	3.3	2.9	2.5	2.3	2.9	2.9	3.0	2.4	3.4																							
30-Oct	2.3	1.8	1.7	2.2	3.2	3.2	3.0	3.0	3.1	3.2	3.3	1.9	1.8	1.7	1.8	1.7	2.1	2.7	3.3	3.3	2.3	2.4	2.5	2.4	2.5	3.3																							
31-Oct	2.1	2.1	2.0	2.3	2.3	2.7	2.8	2.8	3.6	3.1	2.3	2.4	2.8	2.3	1.8	1.7	1.8	2.0	1.8	1.6	1.4	1.2	1.1	1.0	2.1	3.6																							
																								3.6	3.7	3.6	3.5	3.6	3.3	3.4	3.4	3.3	3.0	3.0	2.9	3.3	3.5	3.2	3.2	3.3	3.5	3.7	3.6	3.3	3.2	3.1	3.2	Diurnal Average	
																								19.6	17.7	10.6	10.3	10.7	8.4	9.5	11.1	7.2	10.6	10.1	18.4	23.2	26.8	26.4	27.0	28.1	25.5	23.3	22.5	18.8	16.4	14.9	15.2	Diurnal Maximum	
C - Calibration																								UO - Unstable Operation																									
Alberta Ambient Air Quality Objectives (AAAQO):																								24-hr		30		µg/m <sup>3</sup>																					





**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Fort McKay South - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Fort McKay South - October 2017**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	519	70.52	70.52
6 - 15	87	11.82	82.34
16 - 25	9	1.22	83.56
26 - 80	4	0.54	84.10
> 81.0	0	0.00	84.10

Total Number of Valid Hours: 736

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Fort McKay South - October 2017**

Concentration Ranges ( $\mu\text{g}/\text{m}^3$ )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	71	20	5	3	3	6	10	38	96	50	35	49	36	26	25	46	519
6 - 15	9	8	3	0	0	1	2	13	11	10	10	4	4	2	5	5	87
16 - 25	1	0	0	0	0	0	0	2	1	1	0	0	0	0	2	2	9
26 - 80	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	1	4
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	81	28	8	3	4	7	13	54	108	61	45	53	40	28	32	54	619

Total Number of Valid Hours: 736

Total Number of Hours: 744





**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

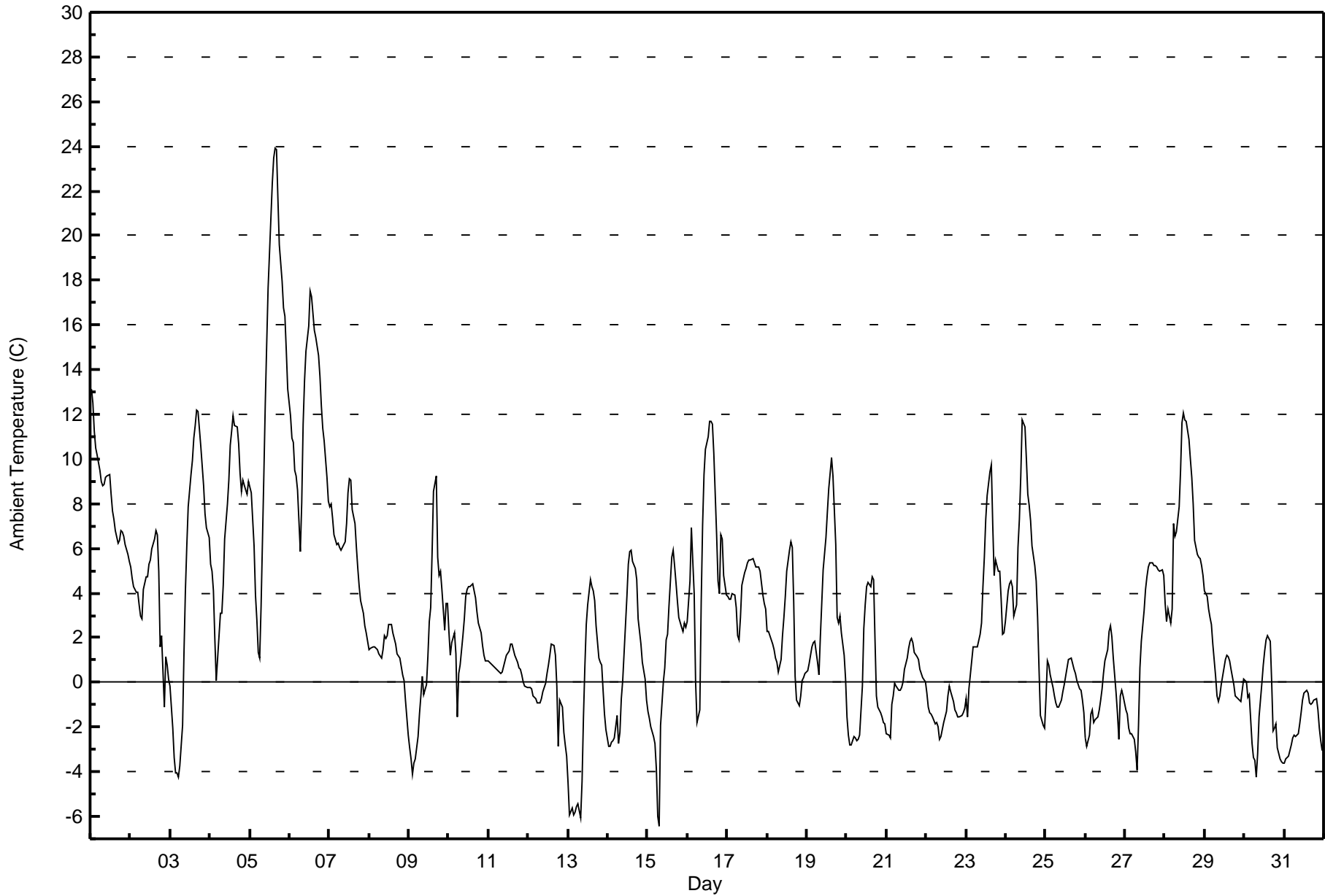
**Ambient Temperature (AT) - C**  
**Fort McKay South - October 2017**

Maximum Value: 23.9 C on Oct 5 16:00		Maximum Daily Average: 13.5 C on Oct 5		Hours in Service: 744																																												
Minimum Value: -6.4 C on Oct 15 08:00		Minimum Daily Average: -1.8 C on Oct 31		Hours of Data: 744																																												
Maximum Diurnal Average: 6.3 C at hour 15		Minimum Diurnal Average: 0.3 C at hour 7		Hours of Missing Data: 0																																												
Monthly Average: 2.95 C		Percentiles: P <sub>1</sub> = -5.6 P <sub>10</sub> = -2.3 Q <sub>1</sub> = -0.6 Median = 1.9 Q <sub>3</sub> = 5.4 P <sub>90</sub> = 9.3 P <sub>99</sub> = 18.9		Hours of Calibration: 0																																												
				Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	13.2	12.5	11.2	10.5	10.2	9.5	9.0	8.8	8.9	9.2	9.2	9.3	8.4	7.6	7.3	6.8	6.3	6.3	6.8	6.7	6.5	6.1	5.7	5.4	8.4	13.2																						
2-Oct	5.2	4.7	4.3	4.0	4.1	3.4	3.0	2.9	4.2	4.7	4.8	5.3	5.5	6.0	6.5	6.8	6.6	5.0	1.6	2.1	-1.1	1.2	0.8	0.1	3.8	6.8																						
3-Oct	-0.2	-2.1	-3.4	-4.1	-4.1	-4.2	-3.7	-2.0	1.4	4.1	6.1	7.9	9.3	9.9	10.9	11.5	12.2	12.1	10.6	9.7	8.8	7.5	6.9	6.5	4.7	12.2																						
4-Oct	5.3	5.0	4.1	2.0	0.1	2.1	3.1	3.1	4.3	6.4	8.0	9.0	10.6	11.3	11.9	11.5	11.4	10.7	9.4	8.6	9.0	8.6	8.4	9.0	7.2	11.9																						
5-Oct	8.8	8.5	6.1	3.9	2.8	1.3	1.1	3.4	9.3	12.5	15.1	17.6	19.2	22.3	23.5	23.9	23.8	21.6	19.6	18.0	16.7	16.4	14.8	13.1	13.5	23.9																						
6-Oct	11.9	10.9	10.7	9.5	9.3	8.6	5.8	8.1	11.5	13.5	14.9	16.0	17.5	17.3	16.5	15.8	15.5	14.6	13.7	12.4	11.4	10.8	9.2	8.1	12.2	17.5																						
7-Oct	7.9	8.0	7.3	6.6	6.2	6.2	6.1	5.9	6.1	6.3	7.1	8.5	9.1	9.0	7.7	7.1	6.0	5.1	4.3	3.7	3.1	2.5	2.2	1.9	6.0	9.1																						
8-Oct	1.5	1.5	1.6	1.6	1.5	1.4	1.3	1.1	1.5	2.1	2.0	2.1	2.6	2.6	2.2	2.0	1.7	1.3	1.1	0.7	0.3	0.1	-0.8	-2.3	1.3	2.6																						
9-Oct	-2.9	-3.5	-4.1	-3.6	-3.4	-2.4	-1.4	-0.6	0.3	-0.5	-0.1	1.1	2.7	3.4	5.8	8.6	9.2	5.6	4.8	5.0	4.2	2.3	3.5	3.5	1.6	9.2																						
10-Oct	2.3	1.2	1.8	2.2	1.3	-1.5	0.4	0.8	2.1	2.8	3.9	4.2	4.3	4.3	4.4	4.1	3.8	3.1	2.6	2.2	1.7	1.2	1.0	1.0	2.3	4.4																						
11-Oct	1.0	0.8	0.8	0.7	0.7	0.6	0.5	0.4	0.5	0.7	0.9	1.2	1.4	1.7	1.7	1.5	1.2	0.9	0.6	0.6	0.3	0.0	-0.2	-0.2	0.8	1.7																						
12-Oct	-0.2	-0.2	-0.3	-0.6	-0.7	-0.9	-0.9	-0.9	-0.7	-0.4	0.0	0.4	0.8	1.2	1.7	1.7	1.2	-0.1	-2.9	-0.8	-1.1	-2.2	-2.8	-3.3	-0.5	1.7																						
13-Oct	-4.5	-5.9	-5.6	-5.9	-5.8	-5.6	-5.5	-6.0	-4.4	-1.5	0.7	2.6	3.5	4.6	4.3	4.1	3.6	2.5	1.1	0.9	0.8	-0.3	-1.4	-2.1	-1.1	4.6																						
14-Oct	-2.9	-2.8	-2.6	-2.6	-2.5	-1.5	-2.7	-2.3	-0.7	0.1	1.3	3.9	5.3	5.8	5.9	5.4	5.1	4.6	2.9	2.3	1.7	0.9	0.1	-0.8	1.0	5.9																						
15-Oct	-1.3	-1.6	-2.0	-2.4	-2.8	-3.9	-6.0	-6.4	-1.9	0.0	0.7	1.9	2.2	3.4	5.6	5.9	5.2	4.5	3.7	2.9	2.4	2.3	2.6	2.5	0.7	5.9																						
16-Oct	2.7	4.5	6.9	5.4	4.0	0.0	-1.8	-1.2	3.6	7.1	9.3	10.4	11.0	11.7	11.7	11.6	10.3	6.6	4.6	3.9	6.6	6.4	4.8	3.9	6.0	11.7																						
17-Oct	3.9	3.7	3.7	4.0	3.9	3.4	2.1	1.9	2.9	4.4	4.9	5.1	5.3	5.5	5.5	5.4	5.2	5.2	5.2	5.0	3.9	3.5	3.3	4.3	5.5	5.5																						
18-Oct	2.3	2.3	1.9	1.7	1.5	1.1	0.9	0.4	1.1	2.1	2.9	3.8	5.0	5.9	6.3	6.1	3.6	0.3	-0.8	-1.0	-0.6	0.1	0.2	0.4	2.0	6.3																						
19-Oct	0.5	0.9	1.2	1.6	1.8	1.8	0.9	0.4	2.0	3.5	5.0	6.5	7.6	8.6	9.4	10.1	9.2	6.2	2.9	2.7	3.0	2.2	1.2	0.1	3.7	10.1																						
20-Oct	-1.5	-2.4	-2.8	-2.8	-2.4	-2.5	-2.6	-2.6	-2.3	-0.2	2.4	3.5	4.3	4.5	4.3	4.7	4.6	1.9	-0.6	-1.1	-1.4	-1.6	-1.8	-1.8	0.0	4.7																						
21-Oct	-2.3	-2.4	-2.5	-1.0	-0.6	0.0	-0.2	-0.3	-0.3	-0.3	0.0	0.6	1.1	1.6	1.8	2.0	1.8	1.4	1.1	1.1	0.6	0.4	0.2	0.0	0.2	2.0																						
22-Oct	-0.5	-1.1	-1.3	-1.4	-1.6	-1.8	-1.8	-2.0	-2.5	-2.4	-1.8	-1.5	-1.3	-0.6	-0.2	-0.4	-0.9	-1.2	-1.4	-1.5	-1.6	-1.5	-1.3	-1.2	-1.4	-0.2																						
23-Oct	-0.7	-1.5	-0.3	1.0	1.6	1.6	1.6	1.6	2.1	2.6	4.3	5.6	7.3	8.3	9.5	9.8	7.0	4.8	5.5	5.0	5.0	3.7	2.1	2.2	3.7	9.8																						
24-Oct	2.7	4.1	4.4	4.5	4.3	3.0	3.5	6.0	7.3	9.2	11.8	11.4	10.0	8.4	7.9	7.2	6.1	5.2	4.5	2.9	0.7	-1.5	-1.9	-2.0	5.0	11.8																						
25-Oct	-0.7	0.9	0.8	0.4	-0.2	-0.6	-0.9	-1.1	-1.1	-0.8	-0.4	-0.1	0.3	0.6	1.0	1.1	0.9	0.6	0.4	0.1	-0.3	-0.4	-0.8	-1.3	-0.1	1.1																						
26-Oct	-2.5	-2.9	-2.4	-1.4	-1.3	-1.8	-1.7	-1.6	-1.3	-0.8	-0.3	0.4	1.0	1.4	2.3	2.5	2.0	1.1	-0.4	-1.4	-2.6	-0.6	-0.4	-0.6	-0.5	2.5																						
27-Oct	-1.2	-1.4	-2.0	-2.3	-2.3	-2.5	-3.1	-3.9	-1.9	0.7	1.8	3.2	4.2	4.7	5.2	5.4	5.3	5.2	5.2	5.0	5.0	5.0	4.8	4.8	1.9	5.4																						
28-Oct	3.6	2.7	3.3	2.7	3.3	7.1	6.6	6.7	7.9	9.5	11.6	12.0	11.8	11.7	10.9	10.0	9.2	8.0	6.4	5.7	5.6	5.5	5.2	4.8	7.2	12.0																						
29-Oct	4.1	3.9	3.3	2.9	2.6	1.7	0.3	-0.6	-0.8	-0.6	-0.1	0.3	1.0	1.2	1.1	1.0	0.6	-0.1	-0.6	-0.7	-0.8	-0.8	-0.9	0.1	0.8	4.1																						
30-Oct	0.1	0.0	-0.7	-0.5	-2.8	-3.4	-3.5	-4.2	-3.2	-1.5	-0.1	0.8	1.4	1.9	2.1	1.8	0.0	-2.2	-2.1	-1.9	-2.9	-3.4	-3.5	-3.6	-1.3	2.1																						
31-Oct	-3.6	-3.4	-3.3	-3.1	-2.8	-2.5	-2.4	-2.4	-2.3	-1.9	-1.4	-0.8	-0.5	-0.4	-0.5	-0.9	-1.0	-0.9	-0.8	-0.7	-1.2	-2.1	-2.6	-3.0	-1.8	-0.4																						
																								1.7	1.4	1.3	1.1	0.8	0.6	0.3	0.4	1.7	2.9	4.0	4.9	5.5	6.0	6.3	6.3	5.7	4.5	3.5	3.2	2.7	2.4	1.9	1.6	Diurnal Average
																								13.2	12.5	11.2	10.5	10.2	9.5	9.0	8.8	11.5	13.5	15.1	17.6	19.2	22.3	23.5	23.9	23.8	21.6	19.6	18.0	16.7	16.4	14.8	13.1	Diurnal Maximum



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Fort McKay South - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C  
Fort McKay South - October 2017**

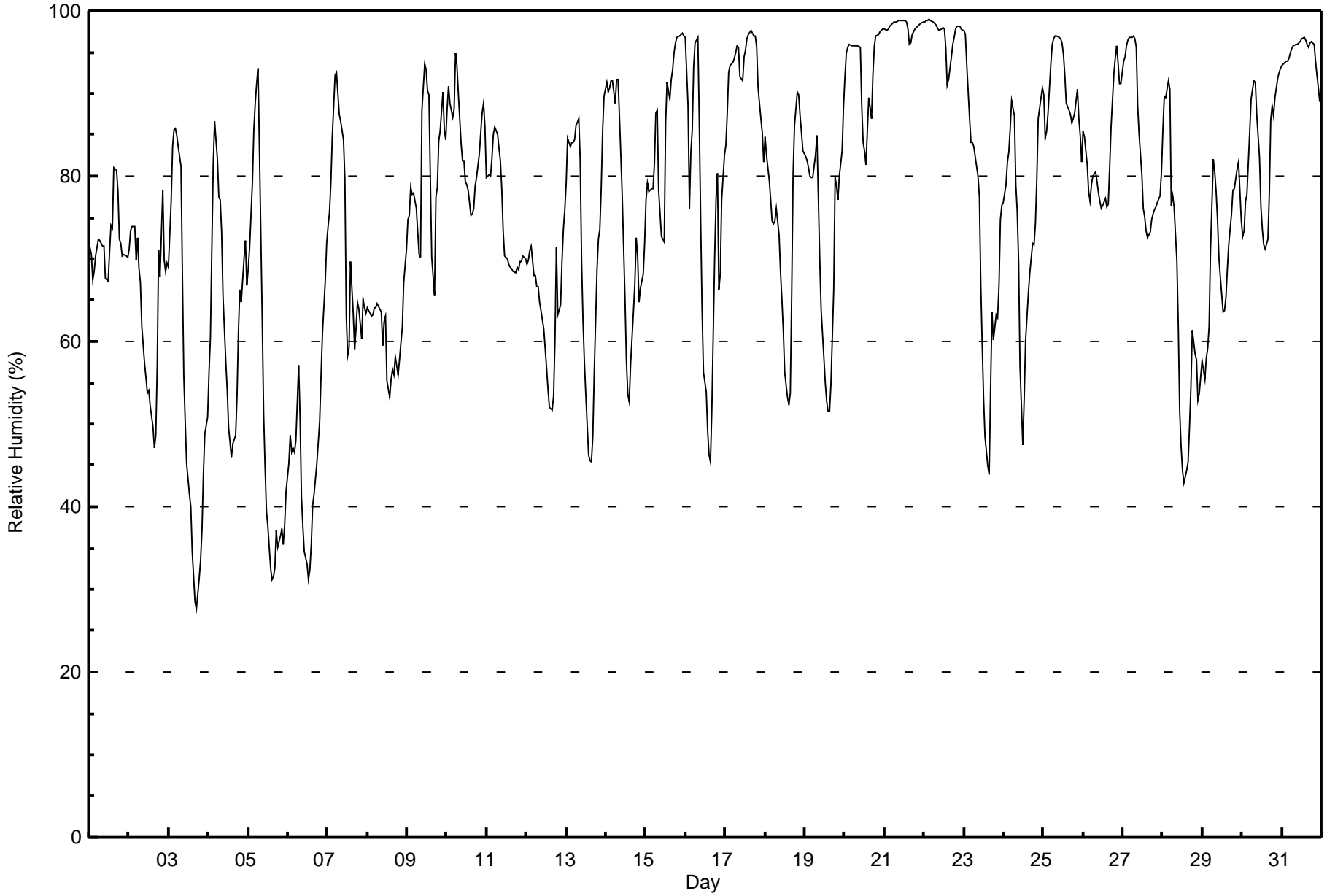
<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	225	30.24	30.24
0 - 10	457	61.42	91.67
10 - 20	57	7.66	99.33
> 20	5	0.67	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744









Maximum Speed: 30 km/h on Oct 2 11:00	Maximum Daily Speed Average: 17.2 km/h on Oct 11	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 17 09:00	Minimum Daily Speed Average: 0.7 km/h on Oct 21	Hours of Data: 744
Maximum Diurnal Speed Average: 4.0 km/h at hour 17	Minimum Diurnal Speed Average: 1.2 km/h at hour 10	Hours of Missing Data: 0
Monthly Average Velocity: 3.0 km/h 300.5 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 4 Median = 8 Q <sub>3</sub> = 13 P <sub>90</sub> = 18 P <sub>99</sub> = 24	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	NW7	WNW11	WNW14	WNW13	NW13	NW11	WNW9	WNW8	NW8	NW9	NNW14	NNW17	N19	NNW17	NNW14	NNW11	NNW13	NNW15	NNW20	NNW18	NNW22	N24	N22	N20	NNW13.7	N24
2-Oct	N22	N17	N15	NNW18	NNW25	NNW23	N21	N22	N27	N29	N30	N26	N22	N18	N16	N15	NNW14	NW6	WNW5	WNW7	WSW4	W9	W9	WSW8	NNW15.4	N30
3-Oct	WSW7	S1	S7	SSW4	S7	S9	S10	S8	S11	S14	S16	S21	S21	S18	SSW13	SSW10	SW10	WSW8	W8	W11	W10	W9	W12	W11	SSW8.9	S21
4-Oct	WNW7	NW7	NNW10	NW5	WSW3	WSW6	W7	W8	W7	WNW4	W2	SE4	S6	S10	S9	SE9	SSE10	SSE6	SSE3	S3	S6	S2	SSE4	S7	SSW2.7	SSE10
5-Oct	SSE4	S3	SSW5	SSW6	SSW4	SSW5	SSW2	SSW2	SSE4	S9	S10	S15	SSE14	S16	S16	SSW14	SW11	SW9	WSW8	SW7	WSW8	WSW9	SW8	SW7	SSW7.4	S16
6-Oct	SW7	SW8	SW8	SW6	SW8	SW7	SW5	SSW7	SSW9	SSW7	SW11	WSW15	WSW16	WSW18	W16	WSW10	WSW11	WSW9	WSW9	W6	WSW8	WSW9	W4	W6	WSW8.7	WSW18
7-Oct	WSW7	WSW6	WSW1	SSW2	NNW1	NW4	NNW6	NNW7	N8	N8	NNW7	NNW14	NNW14	NNW13	NNW13	NNW19	NNW19	NNW17	NNW17	NNW16	NNW19	NNW16	NNW19	NNW21	NNW10.6	NNW21
8-Oct	NNW17	NNW17	NNW17	NNW16	NNW16	NNW15	NNW12	NW14	NNW14	NW16	NW13	NW12	NW14	NW13	NW14	NW10	NW9	NW7	NW6	WSW4	WSW4	WSW4	SSW4	SSW6	NW10.4	NNW17
9-Oct	SSW6	S6	S9	S9	S11	SSE12	SSE13	S15	S15	SSE13	SSE11	SSE9	S7	SSW5	WSW8	WSW11	WSW6	SSW5	W8	SW10	WSW6	WSW5	WSW9	WSW10	SSW7.4	S15
10-Oct	SW6	WSW7	W10	WSW8	SW2	SW5	W6	WSW9	WNW8	NNW6	NE6	NE6	NNE9	NNE9	N12	NNE11	NNE9	NE9	NNE9	N12	N14	N14	N14	N12	N5.5	N14
11-Oct	N13	N14	N16	N14	N15	N17	N19	N20	N18	NNE19	NNE20	NNE18	N21	N22	N20	N19	N17	N18	N18	N16	N15	N17	N15	N15	N17.2	N22
12-Oct	N15	N15	N14	N15	N15	NNW11	NNW11	NNW10	NNW13	NNW13	NNW13	NNW13	NNW12	N10	N9	NNE10	N8	NNW5	W4	WNW7	NW8	NW7	WNW6	W5	NNW9.6	N15
13-Oct	W2	WSW2	W5	W5	WSW2	SSE4	S5	S4	SSW4	SW4	SE5	S6	SSW7	SSW8	SW10	SW9	SW8	SW10	SW8	SW8	SW7	SW7	SW4	SSW4	SW5.1	SW10
14-Oct	SE2	SSW1	S3	SSW3	S6	S7	S7	S8	SSE12	SSE13	SSE11	S12	SW10	SW10	SW10	SW11	WSW11	W8	W5	WNW10	WNW9	WNW9	W7	WSW10	SW5.7	SSE13
15-Oct	WSW9	WSW10	W9	WSW10	WSW10	S3	S4	SSW3	SSE6	SSE9	SSE10	SSE13	S9	SSE10	S11	SSE5	SSE4	S3	N2	N2	NW1	NNW1	S5	N4	SSW4.2	SSE13
16-Oct	WSW4	SW7	W12	W7	SW4	S5	S5	SSW6	S7	SSE11	SSW8	SW7	SSW11	SW11	SW11	WSW9	WSW3	S3	SW3	SSW2	SSW7	SSW5	SSE2	SSW3	SW5.6	W12
17-Oct	S2	SSW2	SSW1	SSE2	W1	NNW2	WSW2	SSW2	SSE0	SE3	SE6	ESE4	N3	N6	N6	NNW7	NNW8	NW8	NW9	WNW7	WNW9	NW9	WNW12	WNW15	NW3.2	WNW15
18-Oct	WNW14	WNW13	WNW14	WNW14	WNW15	WNW13	WNW9	WNW9	WNW10	WNW12	NW11	NW9	W7	NNW4	NE3	ESE4	SSE5	ESE1	ESE1	NE3	E3	E3	ESE5	ESE6	WNW5.1	WNW15
19-Oct	ENE4	ENE4	E4	SE9	SE8	SSE12	S12	S9	SSE13	SSE17	SSE13	S10	SSE11	SSE13	SE11	SSE12	SE9	SE6	SSE6	S7	S7	S6	S4	SSE2	SSE8.1	SSE17
20-Oct	WNW2	NW2	NW2	NW2	NW2	NNW3	NNW2	W2	WSW2	N2	NNE3	NNE3	NNE1	NNE2	WNW6	W6	W5	SSW3	SW3	SW3	S3	SW1	W2	NNW2	WNW1.5	W6
21-Oct	SW2	W1	NW2	N4	N2	N3	NW1	NNW3	SSW1	S3	SSW4	SSE3	SSE5	SSE4	SE5	E0	NNW5	NNW6	N3	NNW4	NW4	NW3	WNW2	SSW2	NW0.7	NNW6
22-Oct	SSE5	SE2	NNE2	NNW1	NNE2	NNE4	NE5	NE4	NE6	NE5	N7	N7	N10	N9	N9	NNW8	NW7	NW6	N4	NNW4	NW2	SSE3	S4	S5	N3.1	N10
23-Oct	S4	SSW2	WSW5	W7	W7	SW5	SSW5	WSW6	WSW5	WSW6	W8	WSW8	SW7	SW10	SW10	SW7	SSW7	SSW7	SSW8	SSW8	SSW8	S7	S6	SSW5	SW5.8	SW10
24-Oct	S6	S8	SSE9	SSE7	S5	WNW2	SW7	WSW13	W14	W12	WNW11	NW26	NW25	NW24	NW19	NNW17	NNW13	NNW9	N10	NNE8	N3	SW0	S2	NNW2	NW6.4	NW26
25-Oct	NNW3	NNE9	NNE10	NNE10	NNE11	N12	N13	N14	N15	N16	N16	N19	N17	N19	N18	NNW16	NNW16	NNW11	NW6	NW2	WSW3	W4	W6	W9	N10.2	N19
26-Oct	SW7	SSW9	SSW10	SSW12	SSW15	S14	S14	S15	S15	S18	SSW14	S15	SSW13	SSW13	SSW9	SSW6	S7	S5	S6	SSE3	SSW1	WSW9	W10	NNW2	SSW9.3	S18
27-Oct	NNE1	SSE3	SSW3	S4	SSW3	S4	S3	SSW5	S5	SSE8	SSE10	SSE12	SSE14	SSE14	S11	SSE14	S13	SSE15	S14	S14	SSE14	S13	S14	S12	S9.0	SSE15
28-Oct	S9	S9	S3	S4	S5	SW7	SW8	SW9	SW9	WSW10	NW16	NW23	NNW22	NNW21	NW21	NW21	NW20	NNW20	NW22	NW17	NW20	NNW21	NNW22	NNW23	NW11.1	NNW23
29-Oct	NNW19	NNW25	NNW23	NNW22	NNW21	N19	N17	N20	N20	N20	N22	N20	N18	NNE13	NNE10	NNE8	NNE5	ESE1	S3	SSW4	S4	S5	S4	S7	N10.7	NNW25
30-Oct	SSW7	SSW8	SW8	SSW8	SSE3	S5	S5	S4	S5	S7	S7	S9	S6	SSW4	ENE2	N4	NW2	WNW3	NW3	NW3	NW3	NNW1	WNW1	S1	SSW3.0	S9
31-Oct	WSW1	SSW1	NNW2	N2	NNW0	N2	NE2	E2	NNE2	N5	N7	N8	N9	N10	N13	N14	N15	N14	N14	N16	N20	N20	N22	N19	N8.8	N22

WNW2.9	WNW3.0	WNW3.5	WNW3.1	WNW2.7	WNW2.0	WNW1.9	W2.6	WNW1.9	WNW1.2	NW1.9	NW2.8	NW3.0	WNW3.2	NW3.7	NW3.8	NW4.0	NW3.3	NW3.7	WNW3.7	WNW3.7	WNW3.9	WNW3.7	WNW3.8	Diurnal Average
N22	NNW25	NNW23	NNW22	NNW25	NNW23	N21	N22	N27	N29	N30	NW26	NW25	NW24	NW21	NW21	NW20	NNW20	NW22	NNW18	NNW22	N24	NNW22	NNW23	Diurnal Maximum

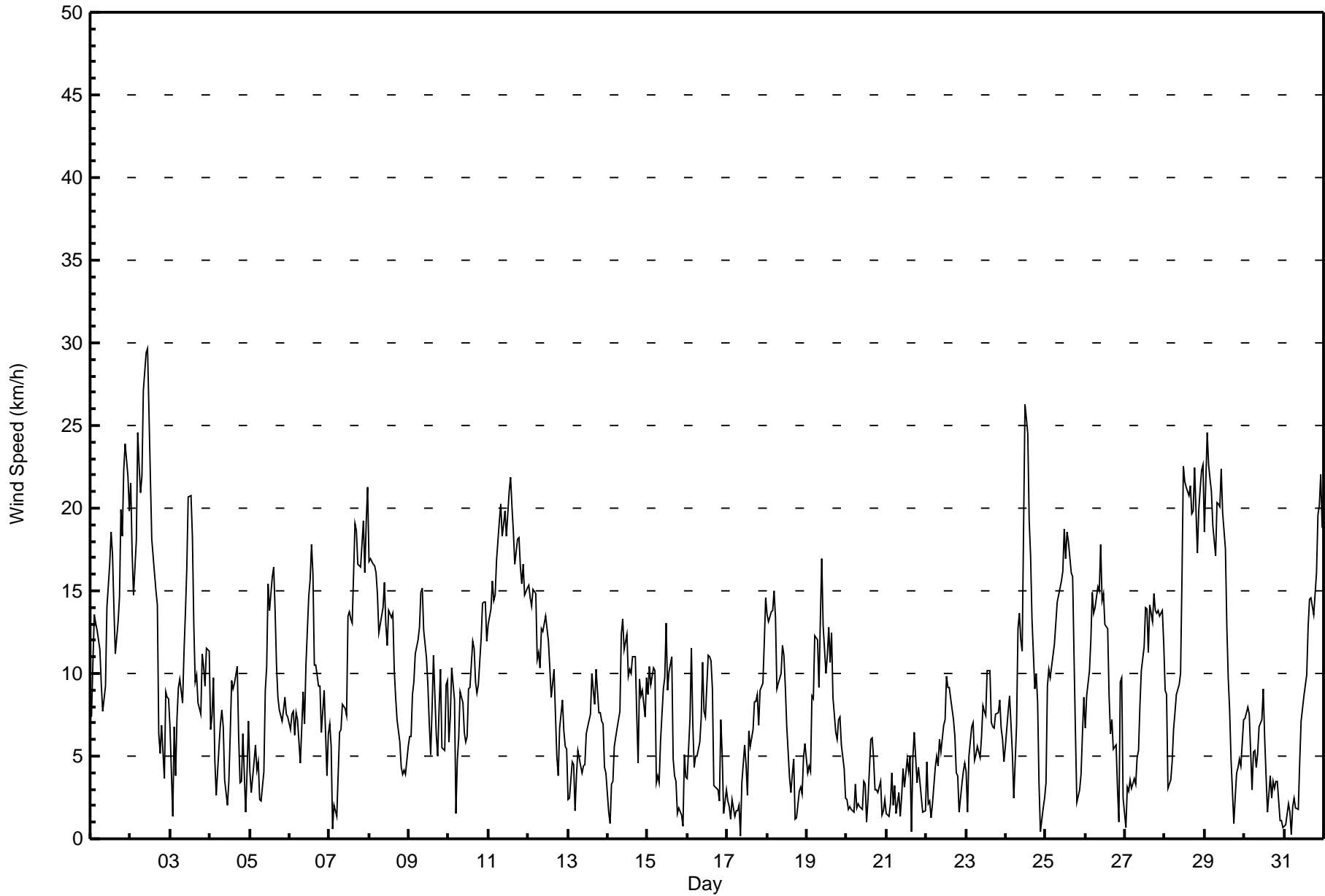
All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Speed (WS) - km/h**  
**Fort McKay South - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Oct 24 13:00 Minimum Value: 0 km/h on Oct 31 07:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 3 P <sub>90</sub> = 5 P <sub>99</sub> = 7																	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	3	4	5	5	4	4	3	3	3	3	4	5	5	6	5	3	3	4	5	4	5	5	5	5	6
2-Oct	6	5	4	6	7	6	5	6	7	7	8	7	5	5	4	5	3	3	1	2	2	2	2	2	2
3-Oct	3	2	3	1	2	1	1	2	5	4	4	4	5	5	4	3	3	4	3	4	3	2	3	3	5
4-Oct	3	2	2	1	1	2	2	2	2	2	2	2	3	3	3	2	2	2	1	2	2	1	2	1	3
5-Oct	1	1	1	1	1	1	1	1	2	2	3	4	3	3	4	4	4	2	2	2	2	2	2	2	4
6-Oct	2	2	2	2	2	2	1	2	2	2	4	6	6	7	6	4	4	3	3	2	2	3	2	2	7
7-Oct	3	2	1	2	2	2	2	1	2	2	2	4	3	4	5	5	5	5	5	5	6	4	6	6	6
8-Oct	5	5	5	5	4	4	4	4	5	6	5	4	4	4	4	3	3	2	2	1	1	1	1	1	6
9-Oct	1	1	2	1	2	2	3	3	3	2	2	2	2	2	3	4	3	2	4	3	3	3	3	3	4
10-Oct	2	2	3	3	1	2	2	3	2	2	2	2	2	2	3	3	2	2	3	3	3	3	3	3	3
11-Oct	3	3	4	3	3	4	4	4	4	5	5	5	4	5	4	4	3	4	4	4	3	3	3	4	5
12-Oct	4	3	3	3	4	3	3	3	3	3	4	4	3	3	2	3	3	1	1	2	2	2	2	1	4
13-Oct	1	1	2	2	2	1	1	1	1	1	3	2	2	3	3	3	3	3	2	2	2	2	1	2	3
14-Oct	1	1	1	1	2	2	1	1	2	2	2	3	3	4	3	4	4	3	1	4	3	3	2	2	4
15-Oct	1	2	2	2	2	2	1	1	2	1	2	3	3	2	2	2	1	1	2	1	1	1	2	1	3
16-Oct	1	4	4	3	2	1	1	2	2	3	3	2	3	3	3	3	1	1	1	2	2	1	1	1	4
17-Oct	1	1	1	2	1	1	1	1	1	2	2	1	2	1	1	2	2	2	2	2	4	3	5	5	5
18-Oct	5	5	5	5	6	4	3	3	4	4	4	3	3	2	2	2	2	1	1	1	2	2	2	2	6
19-Oct	1	2	2	3	3	3	2	3	3	3	3	3	2	3	2	2	3	2	1	2	3	2	2	1	3
20-Oct	1	1	1	1	1	2	1	1	1	1	1	1	1	3	1	2	1	1	1	1	1	1	1	1	3
21-Oct	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	2
22-Oct	1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	2	2	2	1	1	1	1	1	1	3
23-Oct	1	1	3	2	2	2	1	2	1	2	3	3	3	3	3	3	1	1	1	1	2	2	1	1	3
24-Oct	2	2	3	2	3	1	3	4	4	4	4	8	9	8	6	4	5	3	3	3	1	1	1	1	9
25-Oct	2	2	3	2	3	2	2	3	3	3	3	4	3	4	4	4	4	2	2	2	1	1	2	2	4
26-Oct	1	2	2	4	5	3	3	3	3	4	4	3	3	3	4	2	1	1	1	1	1	2	3	2	5
27-Oct	1	1	1	1	1	1	1	1	2	2	2	3	2	2	2	3	3	3	4	2	2	3	3	2	4
28-Oct	2	1	2	1	1	2	2	2	2	3	7	7	7	7	6	6	6	7	8	6	7	7	6	7	8
29-Oct	7	7	6	7	5	5	4	4	5	5	5	4	4	3	2	2	1	1	1	1	1	1	2	1	7
30-Oct	2	2	2	2	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	2
31-Oct	1	1	1	1	1	1	0	1	1	1	1	1	1	2	2	3	3	3	3	3	4	4	5	5	5
Diurnal Maximum																									





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h  
Fort McKay South - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	233	31.32	31.32
6 - 11	287	38.58	69.89
12 - 19	174	23.39	93.28
20 - 28	48	6.45	99.73
29 - 38	2	0.27	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Wind Speed (WS) - km/h  
Fort McKay South - October 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	15	11	5	3	4	7	6	20	40	35	13	17	14	7	17	19	233
6 - 11	17	13	4	0	0	1	7	16	45	26	40	37	28	19	18	16	287
12 - 19	52	4	0	0	0	0	0	19	22	7	0	4	4	11	11	40	174
20 - 28	21	1	0	0	0	0	0	0	2	0	0	0	0	0	9	15	48
29 - 38	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	107	29	9	3	4	8	13	55	109	68	53	58	46	37	55	90	744

Total Number of Valid Hours: 744

Total Number of Hours: 744





**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Wind Direction (WD) - deg**  
**Fort McKay South - October 2017**

Direction of Maximum Speed: 1 deg on Oct 2 11:00 Direction of Maximum Daily Speed Average: 4.5 deg on Oct 11	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0
Direction of Minimum Speed: 151 deg on Oct 17 09:00 Direction of Minimum Daily Speed Average: 0.7 deg on Oct 21	Percent Operational Time: 100.0
Monthly Average Direction: 274.7 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	311	295	296	303	306	304	300	290	304	322	338	346	349	336	337	333	333	336	343	341	346	349	349	349	331.3
2-Oct	351	351	349	347	347	346	349	351	359	6	1	354	3	351	350	349	340	323	289	294	247	267	264	257	346.3
3-Oct	242	176	175	192	187	176	181	179	173	184	185	187	191	190	199	204	226	246	264	261	263	266	259	263	207.9
4-Oct	292	312	342	309	249	254	268	268	272	282	269	124	178	173	173	145	153	158	160	188	170	173	160	176	208.8
5-Oct	166	171	195	194	192	192	195	211	163	177	179	176	156	185	189	197	215	214	237	227	237	247	223	231	197.1
6-Oct	221	221	227	223	223	221	219	210	212	203	226	242	242	246	264	252	250	240	250	259	253	251	264	260	238.9
7-Oct	246	240	238	194	333	312	344	334	350	353	335	331	343	333	337	341	338	335	334	331	334	328	331	329	331.8
8-Oct	329	328	327	327	330	332	329	326	329	324	315	310	323	313	315	325	326	319	316	248	254	243	212	209	319.3
9-Oct	204	188	175	175	175	166	167	173	170	160	161	165	182	212	246	247	244	213	260	224	240	241	251	256	196.6
10-Oct	229	245	260	254	220	221	265	254	289	346	48	34	15	22	11	14	21	35	20	7	1	2	5	10	350.6
11-Oct	9	8	9	6	10	11	5	7	10	13	16	16	6	10	9	359	355	355	356	356	352	353	356	354	4.5
12-Oct	353	357	357	1	1	334	330	336	342	342	343	345	340	349	355	14	5	340	278	290	307	322	297	274	342.6
13-Oct	274	246	269	272	250	168	181	184	196	233	142	181	194	212	214	227	218	222	214	221	225	227	228	213	215.3
14-Oct	130	201	177	193	177	179	172	185	167	167	166	190	229	236	227	236	257	275	260	297	288	287	273	253	220.6
15-Oct	243	252	262	254	246	188	190	197	163	148	155	167	171	154	172	162	167	184	353	358	320	333	189	3	195.6
16-Oct	241	225	266	261	229	175	187	199	171	167	203	223	212	222	224	244	253	181	236	209	205	194	152	197	214.9
17-Oct	189	200	213	162	270	336	256	213	151	138	138	123	358	0	360	327	328	322	309	287	289	307	300	299	306.7
18-Oct	301	300	293	293	301	303	299	290	299	303	310	322	279	337	55	115	158	117	113	50	99	101	115	109	303.7
19-Oct	68	74	90	124	141	151	170	176	166	161	166	171	153	153	145	153	146	142	168	176	171	182	182	162	155.4
20-Oct	301	316	317	308	310	343	348	276	254	353	22	16	23	22	287	281	267	192	214	216	190	232	273	347	294.3
21-Oct	232	265	308	4	357	359	315	327	195	181	207	150	157	148	133	90	338	333	355	337	311	317	283	206	312.5
22-Oct	150	132	12	327	30	19	34	37	55	44	10	2	10	5	356	337	309	317	3	333	314	162	179	170	7.2
23-Oct	171	203	250	263	262	229	209	244	239	245	273	248	231	225	234	217	195	198	207	205	205	182	189	200	223.7
24-Oct	189	180	149	161	183	294	225	257	264	261	288	315	321	307	316	344	336	347	5	21	352	215	188	335	304.0
25-Oct	348	14	18	27	21	10	2	0	357	356	359	355	356	353	349	340	343	341	326	316	243	263	259	260	351.7
26-Oct	221	200	195	200	210	189	184	188	188	188	192	191	194	193	199	195	191	183	182	164	192	257	263	338	197.8
27-Oct	25	165	196	185	196	179	186	196	191	164	150	159	159	161	170	168	173	168	169	170	168	169	179	179	170.0
28-Oct	174	173	184	179	188	230	228	220	230	239	306	313	327	333	321	322	323	327	321	326	324	330	329	333	311.8
29-Oct	328	330	331	327	335	355	3	3	1	2	4	4	11	16	23	28	27	123	169	199	173	180	170	189	352.7
30-Oct	204	202	219	213	151	184	186	189	187	179	173	182	184	200	59	0	307	296	306	308	318	331	303	184	204.0
31-Oct	249	213	327	349	347	1	50	93	27	4	10	10	5	6	2	1	2	4	3	0	3	6	8	3	4.4

290.3 293.2 297.3 292.5 298.1 296.8 284.9 279.6 283.1 284.5 318.8 307.1 313.6 303.3 304.9 313.9 309.8 308.4 308.3 301.8 298.9 301.3 296.7 297.2  
 Diurnal Average

All monthly, daily, and diurnal averages have been calculated using vector methods

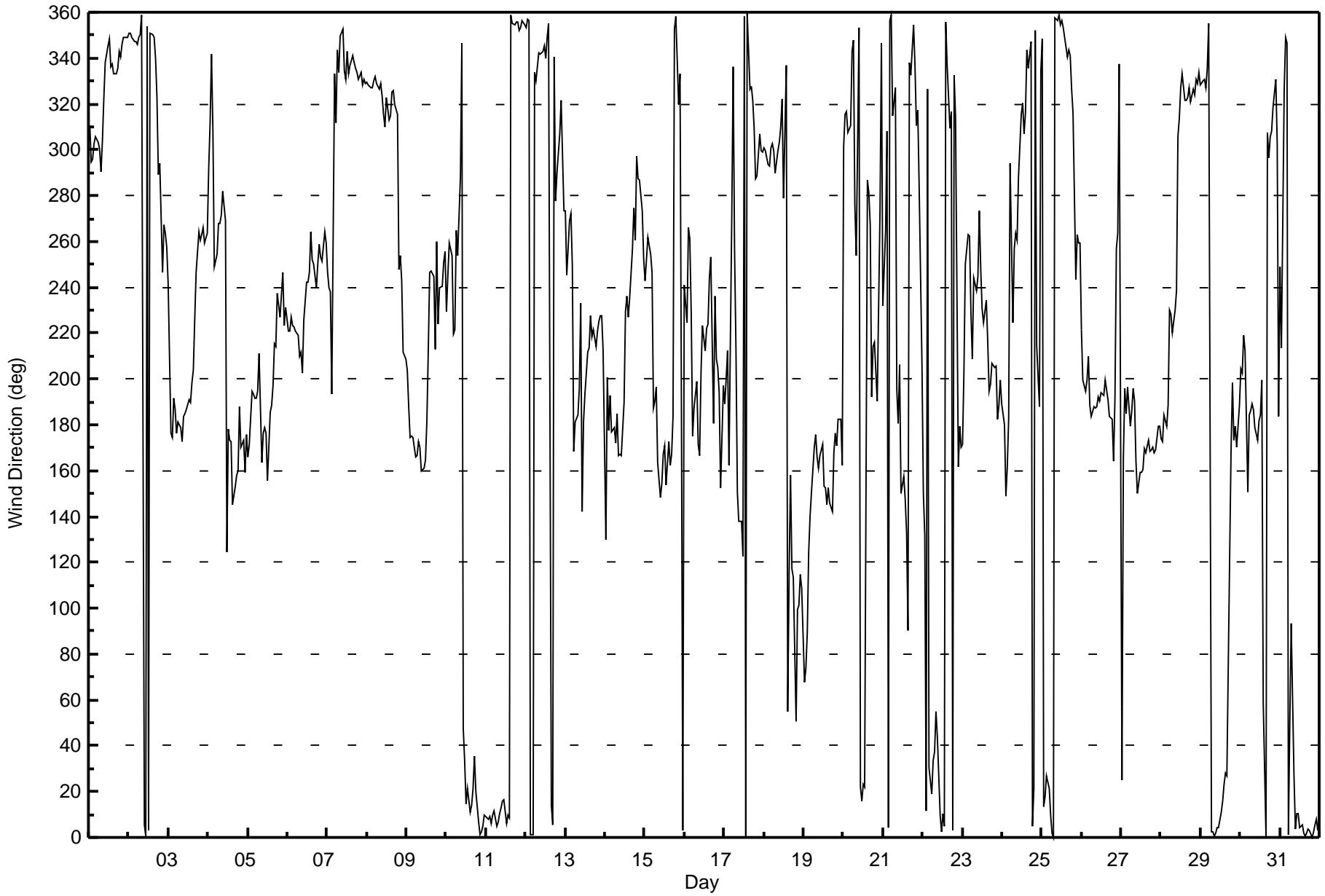




**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Direction (WD) - deg**  
**Fort McKay South - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 101 deg on Oct 4 11:00 Minimum Value: 6 deg on Oct 3 07:00 Percentiles: P <sub>1</sub> = 10 P <sub>10</sub> = 13 Q <sub>1</sub> = 16 Median = 20 Q <sub>3</sub> = 29 P <sub>90</sub> = 51 P <sub>99</sub> = 89		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	27	25	24	26	24	24	29	24	24	25	18	18	20	18	18	17	16	18	16	17	17	16	18	17	29
2-Oct	19	16	16	17	18	18	17	18	19	18	19	23	21	22	24	24	17	22	14	15	52	16	18	22	52
3-Oct	38	84	10	18	14	8	6	12	17	12	13	13	15	15	20	21	31	39	28	23	22	21	15	19	84
4-Oct	37	30	15	14	50	33	21	18	22	72	101	82	55	31	30	15	13	16	25	20	22	60	28	11	101
5-Oct	22	37	14	10	10	9	15	19	26	17	21	14	19	16	16	19	23	24	20	20	21	18	19	16	37
6-Oct	19	18	21	21	18	20	17	18	25	22	28	27	27	25	28	25	24	25	24	23	22	21	34	21	34
7-Oct	26	37	92	56	87	43	17	13	17	16	24	22	19	22	24	20	18	18	18	18	18	19	19	19	92
8-Oct	19	18	20	19	18	17	17	19	18	20	28	25	24	26	22	22	23	26	20	22	29	18	19	13	29
9-Oct	10	10	11	11	10	13	11	11	10	12	10	14	19	37	28	25	29	17	23	23	52	29	19	18	52
10-Oct	19	13	19	20	70	31	21	18	29	27	36	22	17	17	17	16	17	18	16	17	16	15	16	16	70
11-Oct	16	16	15	15	17	16	16	16	16	17	16	16	16	17	17	18	16	16	17	16	16	17	17	16	18
12-Oct	16	17	16	17	18	17	16	16	19	17	22	24	22	29	25	19	22	18	19	22	19	21	21	19	29
13-Oct	71	55	50	61	92	12	9	21	34	44	51	36	36	43	24	31	23	23	19	20	20	17	30	48	92
14-Oct	63	61	22	12	13	14	20	13	9	10	12	19	35	29	26	25	28	27	17	23	24	19	21	11	63
15-Oct	10	12	17	14	12	44	18	20	21	15	14	12	13	13	12	51	33	15	76	35	41	78	45	51	78
16-Oct	45	26	28	27	43	10	10	20	12	17	32	36	23	26	25	21	25	12	24	47	15	22	77	24	77
17-Oct	39	46	67	54	65	42	40	40	77	46	19	22	62	16	13	16	16	17	19	23	26	30	31	25	77
18-Oct	23	26	26	26	25	23	26	26	30	32	30	36	48	67	83	56	17	73	73	29	31	59	36	29	83
19-Oct	38	45	68	22	21	14	11	12	13	12	20	25	23	17	14	12	17	14	12	10	15	20	45	47	68
20-Oct	54	37	38	52	72	24	67	49	45	46	27	20	87	92	25	23	15	36	33	39	22	79	54	46	92
21-Oct	60	63	55	19	48	31	80	37	82	73	36	53	28	32	30	95	18	16	28	18	31	50	54	53	95
22-Oct	34	60	69	76	77	27	20	35	22	23	26	26	22	22	24	27	20	23	35	42	79	32	27	30	79
23-Oct	32	74	45	22	22	27	28	34	25	28	37	37	45	28	29	22	10	12	15	13	13	20	15	13	74
24-Oct	20	16	15	29	53	52	24	25	25	27	32	23	22	22	25	20	15	18	17	17	32	98	60	48	98
25-Oct	28	15	16	15	14	14	14	15	15	15	16	16	16	16	16	16	14	14	50	80	48	32	24	19	80
26-Oct	20	13	14	16	21	13	11	12	13	12	14	14	15	14	24	21	14	15	10	31	78	14	19	57	78
27-Oct	85	19	24	19	27	26	25	12	13	12	12	15	13	10	12	10	10	10	11	11	10	11	10	10	85
28-Oct	14	13	85	25	28	24	18	16	18	22	29	20	21	21	21	19	21	19	20	20	21	22	20	18	85
29-Oct	21	18	18	18	18	21	17	17	17	17	17	17	16	17	17	18	22	74	45	21	24	15	25	14	74
30-Oct	16	16	20	26	17	11	13	11	10	10	13	12	24	44	66	19	33	11	16	25	21	73	46	83	83
31-Oct	83	62	43	41	90	34	22	25	31	11	12	13	12	13	14	14	14	14	14	15	15	17	15	16	90
Diurnal Maximum																									





# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Fort McKay South	Station number:	AMS 13
Calibration Date:	October 5, 2017	Last Cal Date:	September 19, 2017
Start time (MST):	7:20	End time (MST):	8:00
Reason:	As Found		

### Calibration Standards

Cal Gas Concentration	<u>49.8</u>	ppm	Cal Gas Exp Date	September 8, 2018
Cal Gas Cylinder #	<u>LL110515</u>			
Calibrator Make/Model	API T700		Serial Number	2448
ZAG Make/Model	API 701		Serial Number	5613

### Analyzer Information

Analyzer make: API T100

Analyzer serial #: 599

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Analyzer Range	0 - 1000 ppb		HVPS voltage	524	524
Calculated slope	0.989192	0.985732	Lamp voltage	1977	1977
Calculated intercept	3.095379	0.295720	Pressure	26.2	26.2
Analyzer Background	37.6	37.6	Flow	693	693
Analyzer Coefficient	1.056	1.056	Lamp Ratio	66.8	66.8

### SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5009	0.0	0.0	-0.3	----
as found span	4935	79.0	784.6	795.7	0.986
calibrator zero	5009	0.0	0.0	-0.3	----
high point	4935	79.0	784.6	795.7	0.986
second point					
third point					
as left zero					
as left span					
Average Correction Factor					0.986
Corrected As found	796.00	Previous response	790.12	*% change	-0.7%

\* = > +/-5% change initiates investigation

Notes:

As Finds for Calibration Gas change out

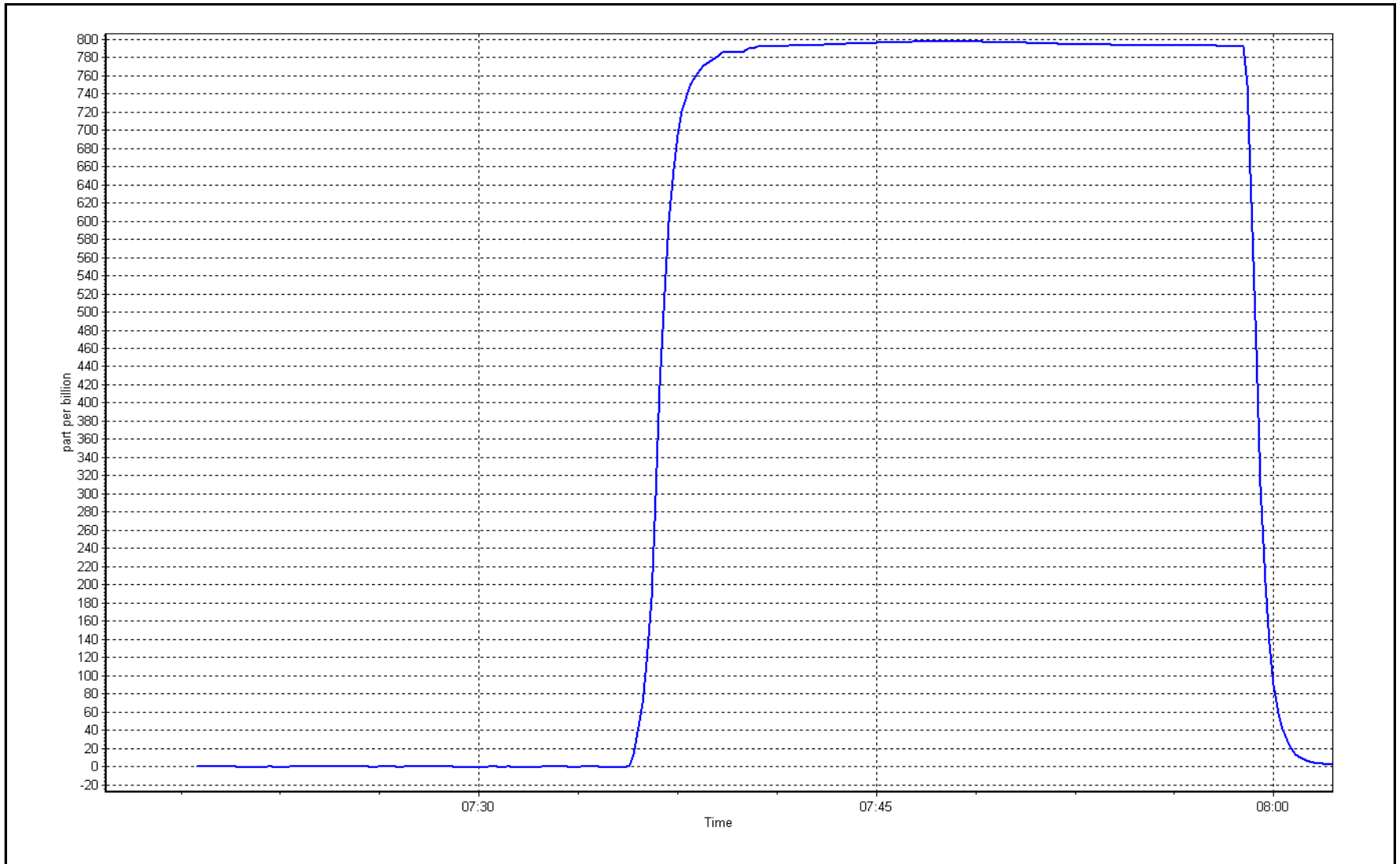
Calibration Performed By:

Melissa Lemay

SO2 Calibration Plot

Date: October 5, 2017

Location: Fort McKay South





# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Fort McKay South	Station number:	AMS 13
Calibration Date:	October 5, 2017	Last Cal Date:	September 19, 2017
Start time (MST):	7:20	End time (MST):	12:15
Reason:	Cylinder Change		

### Calibration Standards

Cal Gas Concentration	<u>49.6</u>	ppm	Cal Gas Exp Date	August 18, 2020
Cal Gas Cylinder #	<u>LL84138</u>			
Calibrator Make/Model	API T700		Serial Number	2448
ZAG Make/Model	API 701		Serial Number	5613

### Analyzer Information

Analyzer make: API T100

Analyzer serial #: 599

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Analyzer Range	0 - 1000 ppb		HVPS voltage	524	524
Calculated slope	0.985732	0.997687	Lamp voltage	1977	1977
Calculated intercept	0.295720	2.553610	Pressure	26.2	26.2
Analyzer Background	37.6	37.6	Flow	693	693
Analyzer Coefficient	1.056	1.046	Lamp Ratio	66.8	66.8

### SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5009	0.0	0.0	-0.3	----
as found span	4933	77.7	769.1	781.4	0.984
calibrator zero	5009	0.0	0.0	0.0	----
high point	4933	77.7	769.1	769.5	1.000
second point	4978	38.9	384.6	382.0	1.007
third point	4997	19.6	193.8	188.9	1.026
as left zero	5009	0.0	0.0	-0.4	----
as left span	4933	77.7	769.1	763.9	1.007
Average Correction Factor					1.011
Corrected As found	781.70	Previous response	779.98	*% change	-0.2%

\* = > +/-5% change initiates investigation

Notes:

Calibration Gas change out, span adjusted

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

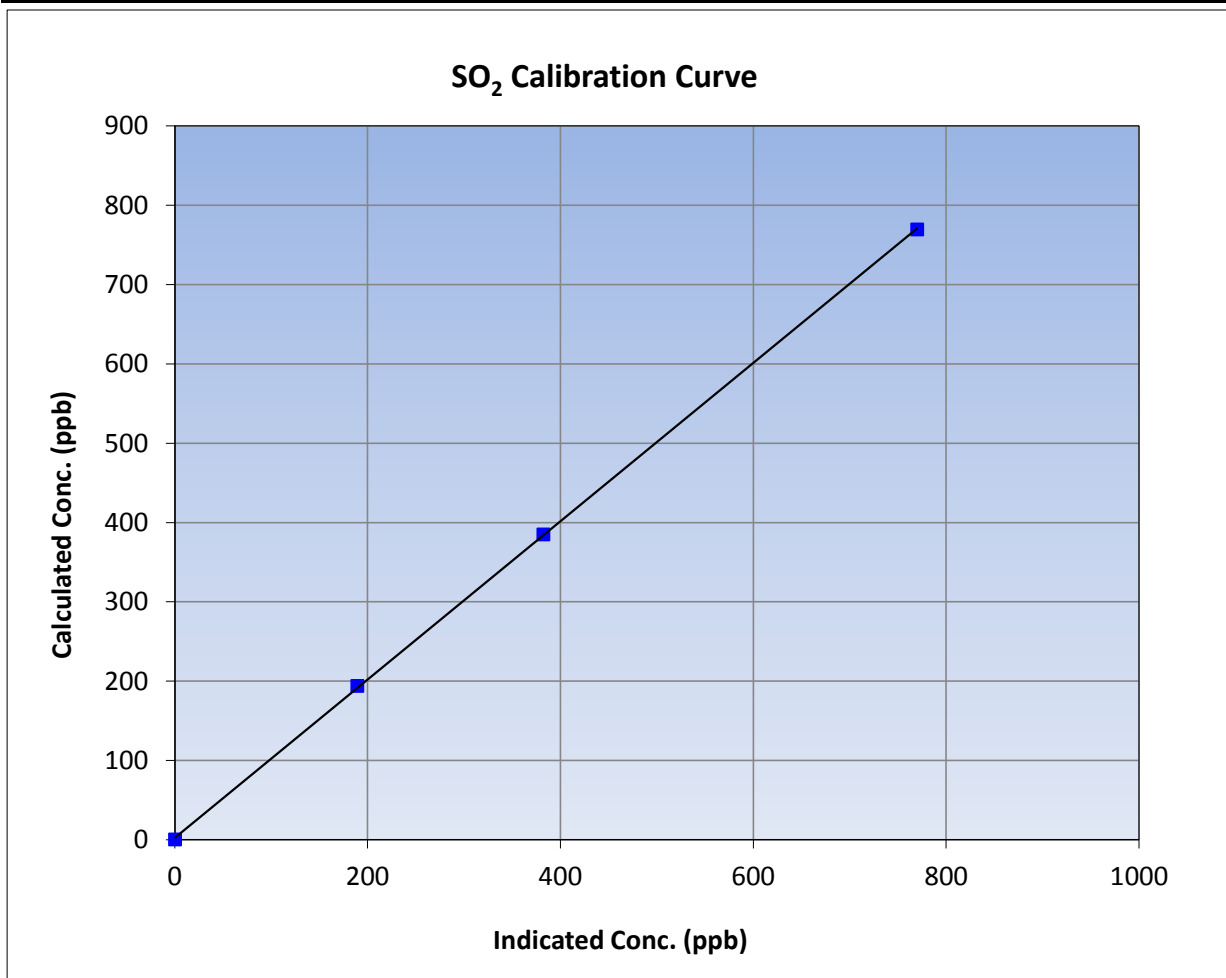
Version-03-2017

### Station Information

Calibration Date	October 5, 2017	Previous Calibration	September 19, 2017
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	7:20	End Time (MST)	12:15
Analyzer make	API T100	Analyzer serial #	599

### Calibration Data

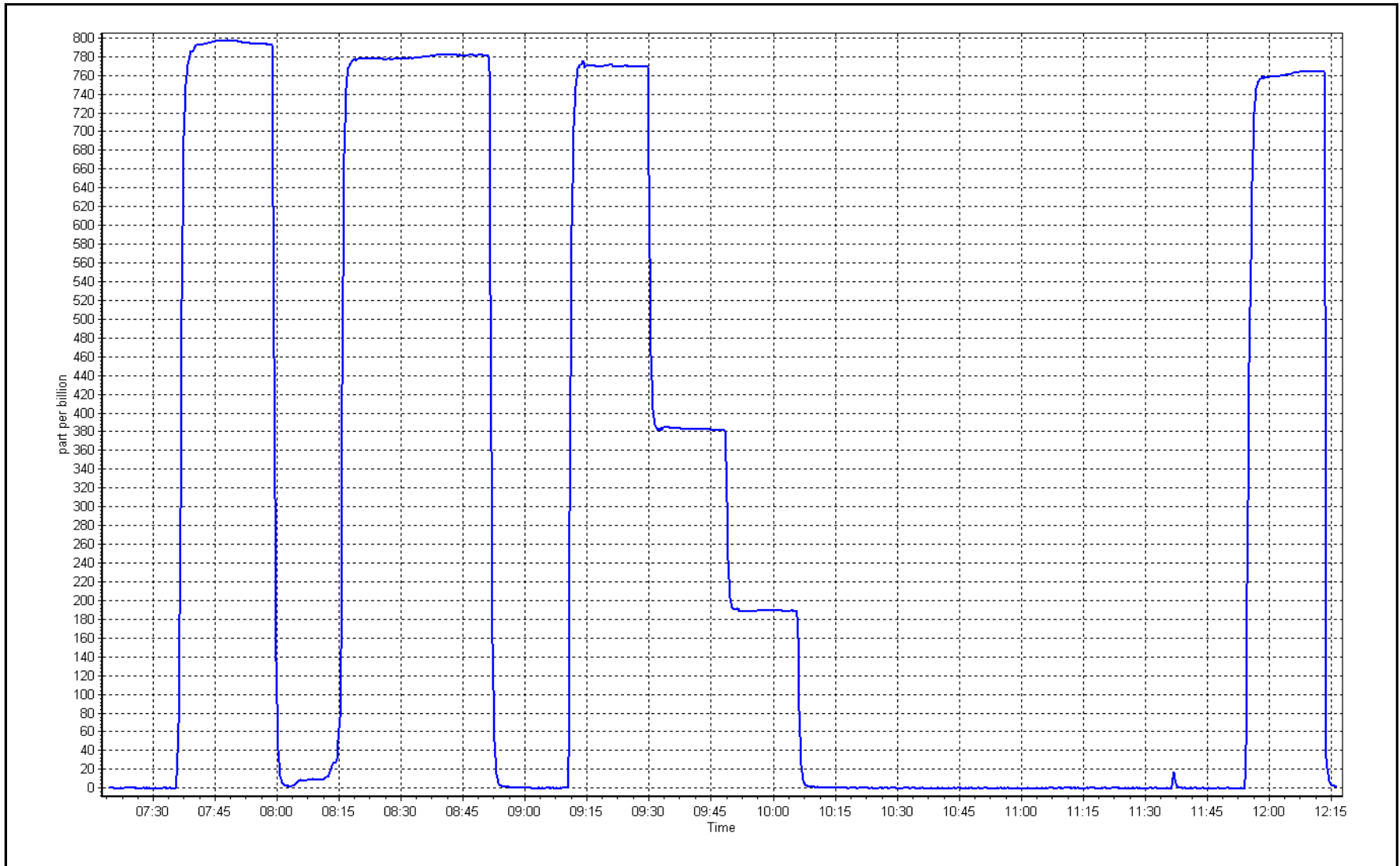
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.0	----	Correlation Coefficient	0.999949	≥0.995
769.1	769.5	0.9995			
384.6	382.0	1.0068	Slope	0.997687	0.90 - 1.10
193.8	188.9	1.0259			
			Intercept	2.553610	+/-30



SO2 Calibration Plot

Date: October 5, 2017

Location: Fort McKay South









# Wood Buffalo Environmental Association

## TRS Calibration Summary

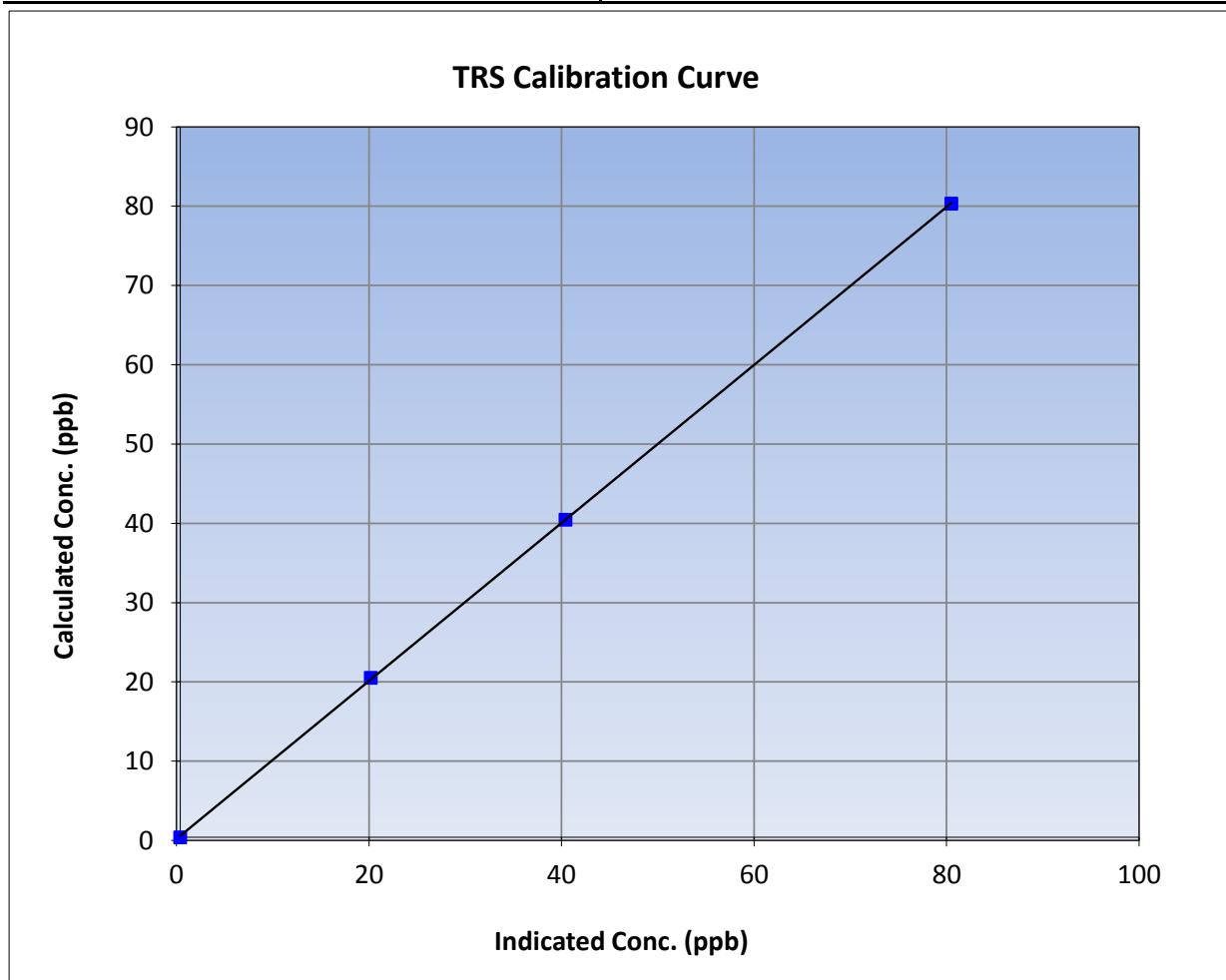
Version-03-2017

### Station Information

Calibration Date	October 6, 2017	Previous Calibration	September 22, 2017
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	7:15	End Time (MST)	10:00
Analyzer make	Thermo 43i-LTE	Analyzer serial #	1218153359

### Calibration Data

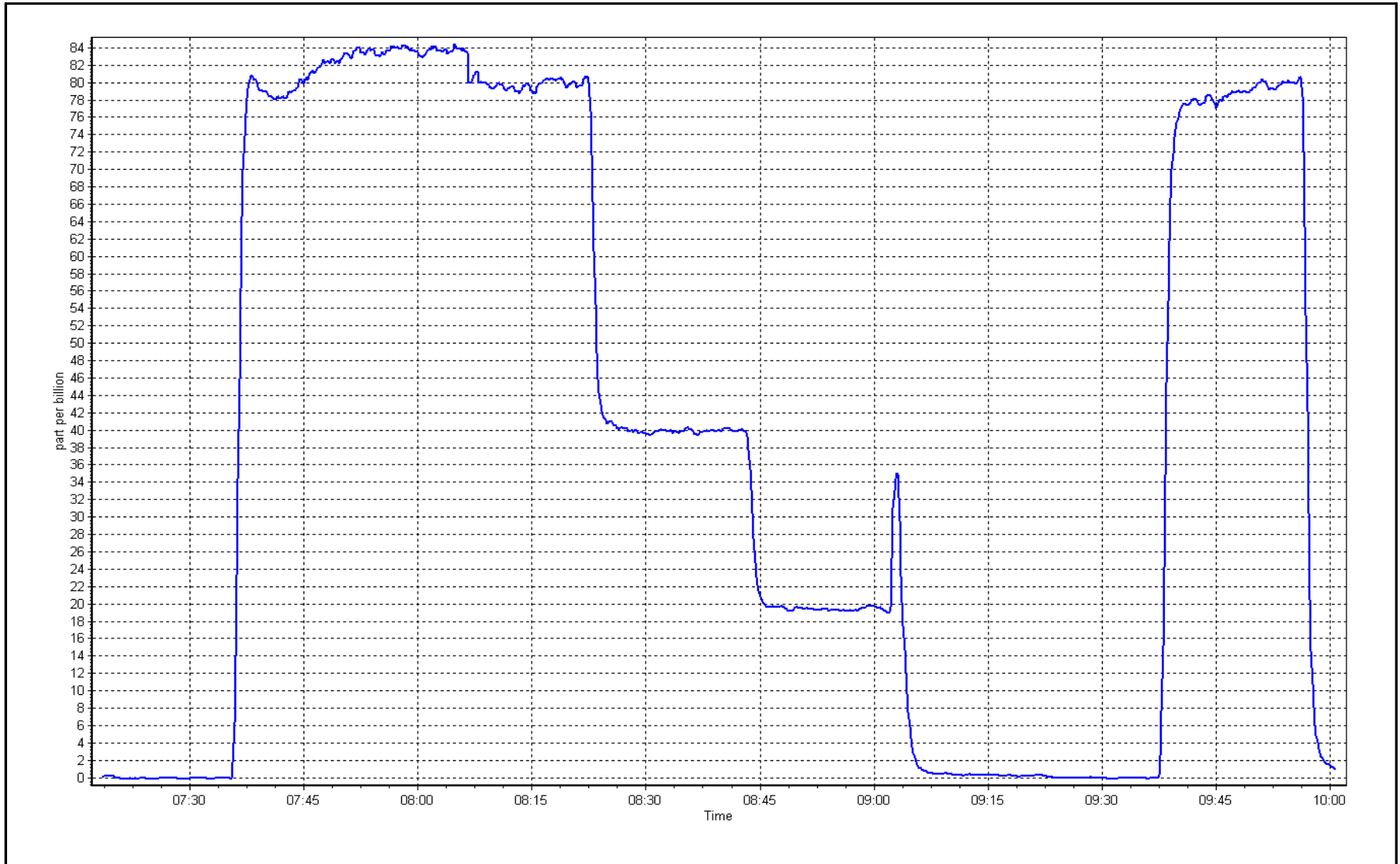
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.0	----	Correlation Coefficient	0.999975	≥0.995
79.9	80.1	0.9980			
40.1	40.0	1.0016	Slope	0.996522	0.90 - 1.10
20.1	19.8	1.0171			
			Intercept	0.180910	+/-3



TRS Calibration Plot

Date: October 6, 2017

Location: Fort McKay South





# Wood Buffalo Environmental Association

## THC Calibration Report

Version-03-2017

### Station Information

Station Name:	Fort McKay South	Station number:	AMS 13
Calibration Date:	October 5, 2017	Last Cal Date:	September 19, 2017
Start time (MST):	7:20	End time (MST):	8:00
Reason:	As Found		

### Calibration Standards

Gas Cert Reference	LL110515	Cal Gas Expiry Date	September-08-18
CH4 Cal Gas Conc.	<u>517.0</u> ppm	CH4 Equiv Conc.	1067.0 ppm
C3H8 Cal Gas Conc.	<u>200.0</u> ppm	Station temp.	22 Deg C
Calibrator Make/Model	Teledyne API 700	Serial Number	2448
ZAG Make/Model	Teledyne API 701	Serial Number	5613

### Analyzer Information

Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1505164380
	<u>Start</u>	<u>Finish</u>	<u>Start</u>
Analyzer Range	0 - 25 ppm	Bias voltage supply	-300.9
Calculated slope	0.995253	Sample pressure	9.2
Calculated intercept	0.101298	Fuel pressure	23.1
Analyzer Background	3.070	Air pressure	34.3
Analyzer Coefficient	1.500	Flame temperature	151.4
			<u>Finish</u>

### THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5009	0.0	0.00	-0.07	----
as found span	4935	79.0	16.81	16.99	0.989
calibrator zero	5009	0.0	0.00	-0.07	----
high point	4935	79.0	16.81	16.99	0.989
second point					
third point					
as left zero					
as left span					

Average Correction Factor				0.989	
Corrected As found	17.06	Previous response	16.79	*% change	-1.6%

\* = > +/-5% change initiates investigation

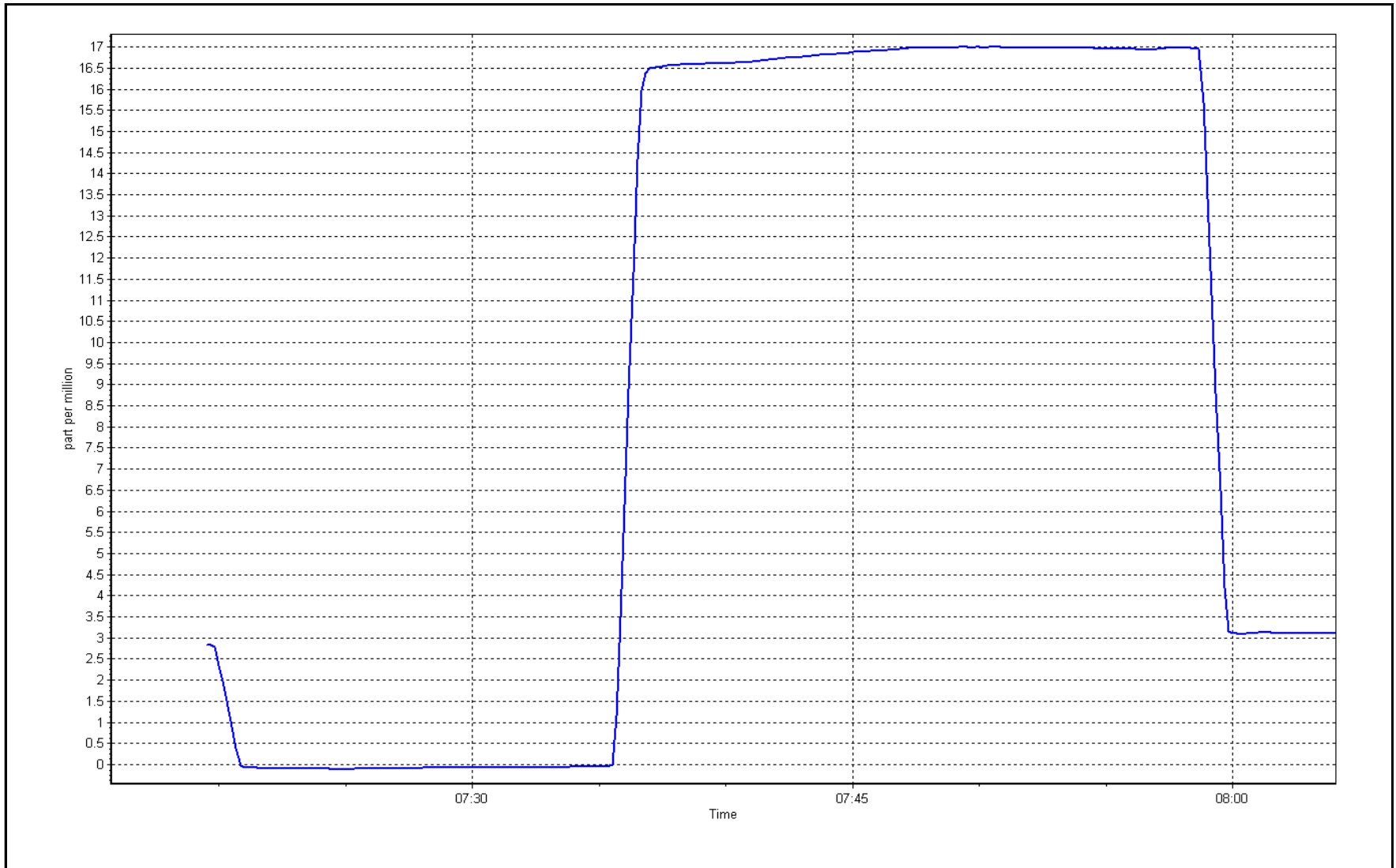
Notes: As founds for calibration gas change out

Calibration Performed By: Melissa Lemay

THC Calibration Plot

Date: October 5, 2017

Location: Fort McKay South





# Wood Buffalo Environmental Association

## THC Calibration Report

Version-03-2017

### Station Information

Station Name:	Fort McKay South	Station number:	AMS 13
Calibration Date:	October 5, 2017	Last Cal Date:	September 19, 2017
Start time (MST):	7:20	End time (MST):	12:15
Reason:	Cylinder Change		

### Calibration Standards

Gas Cert Reference	LL84138	Cal Gas Expiry Date	Tuesday, August 18, 2020
CH4 Cal Gas Conc.	<u>511.0</u> ppm	CH4 Equiv Conc.	1066.5 ppm
C3H8 Cal Gas Conc.	<u>202.0</u> ppm	Station temp.	22 Deg C
Calibrator Make/Model	Teledyne API 700	Serial Number	2448
ZAG Make/Model	Teledyne API 701	Serial Number	5613

### Analyzer Information

Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1505164380
	<u>Start</u>	<u>Finish</u>	<u>Start</u> <u>Finish</u>
Analyzer Range	0 - 25 ppm	Bias voltage supply	-300.9      -300.9
Calculated slope	0.985435	Sample pressure	9.2      9.2
Calculated intercept	0.068980	Fuel pressure	23.1      23.1
Analyzer Background	3.070	Air pressure	34.3      34.3
Analyzer Coefficient	1.500	Flame temperature	151.4      151.4

### THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5009	0.0	0.00	-0.07	----
as found span	4933	77.7	16.54	16.74	0.988
calibrator zero	5009	0.0	0.00	-0.03	----
high point	4933	77.7	16.54	16.58	0.997
second point	4978	38.9	8.27	8.20	1.008
third point	4997	19.6	4.17	4.04	1.031
as left zero	5009	0.0	0.00	-0.06	----
as left span	4933	77.7	16.54	16.56	0.999
Average Correction Factor					1.012
Corrected As found	16.81	Previous response	16.71	*% change	-0.6%

\* = > +/-5% change initiates investigation

Notes: calibration gas change out, Hydrogen changed out, zero and span adjusted

Calibration Performed By: Melissa Lemay



# Wood Buffalo Environmental Association

## THC Calibration Summary

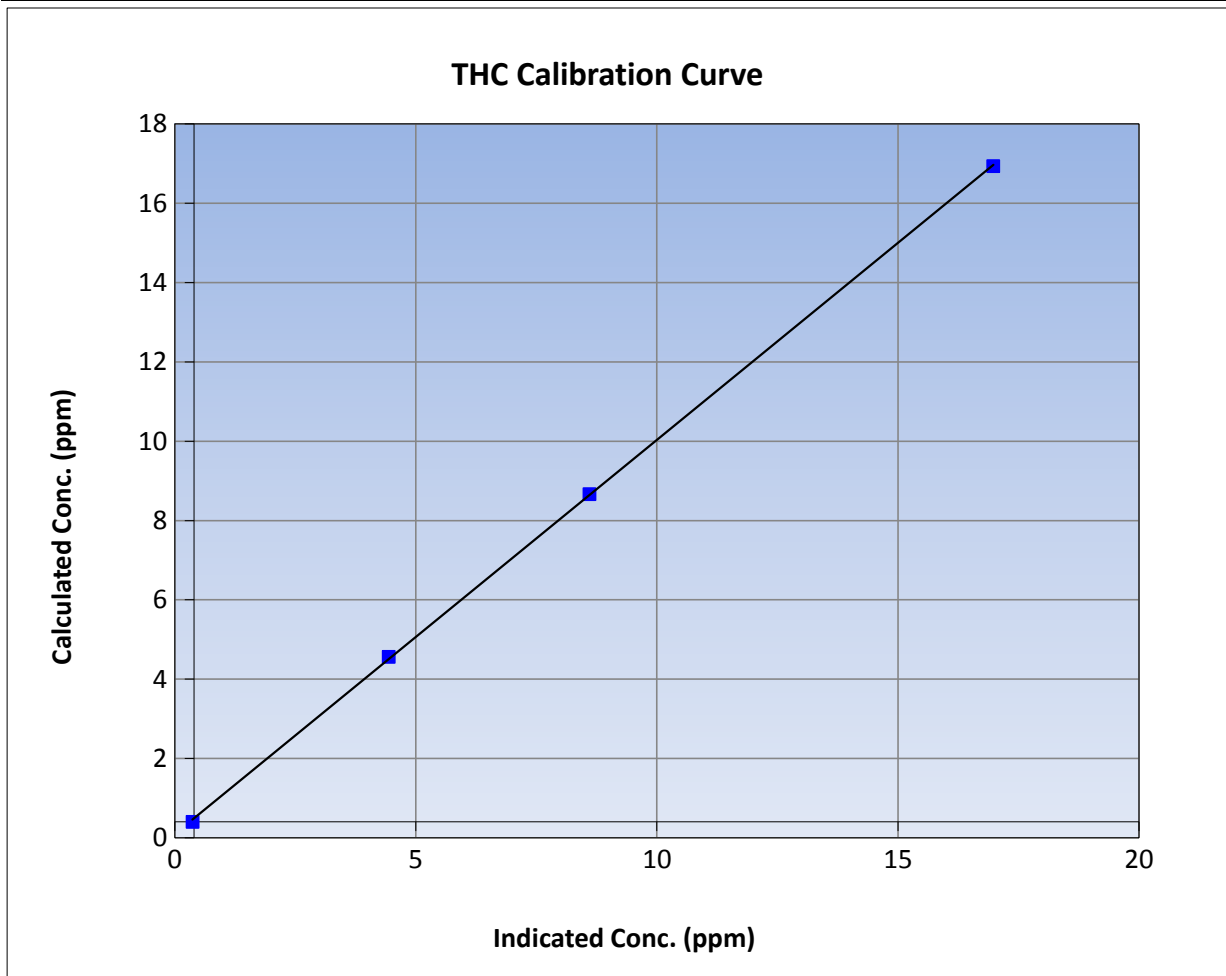
Version-03-2017

### Station Information

Calibration Date	October 5, 2017	Previous Calibration	September 19, 2017
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	7:20	End Time (MST)	12:15
Analyzer make	Thermo 51i-LT	Analyzer serial #	1505164380

### Calibration Data

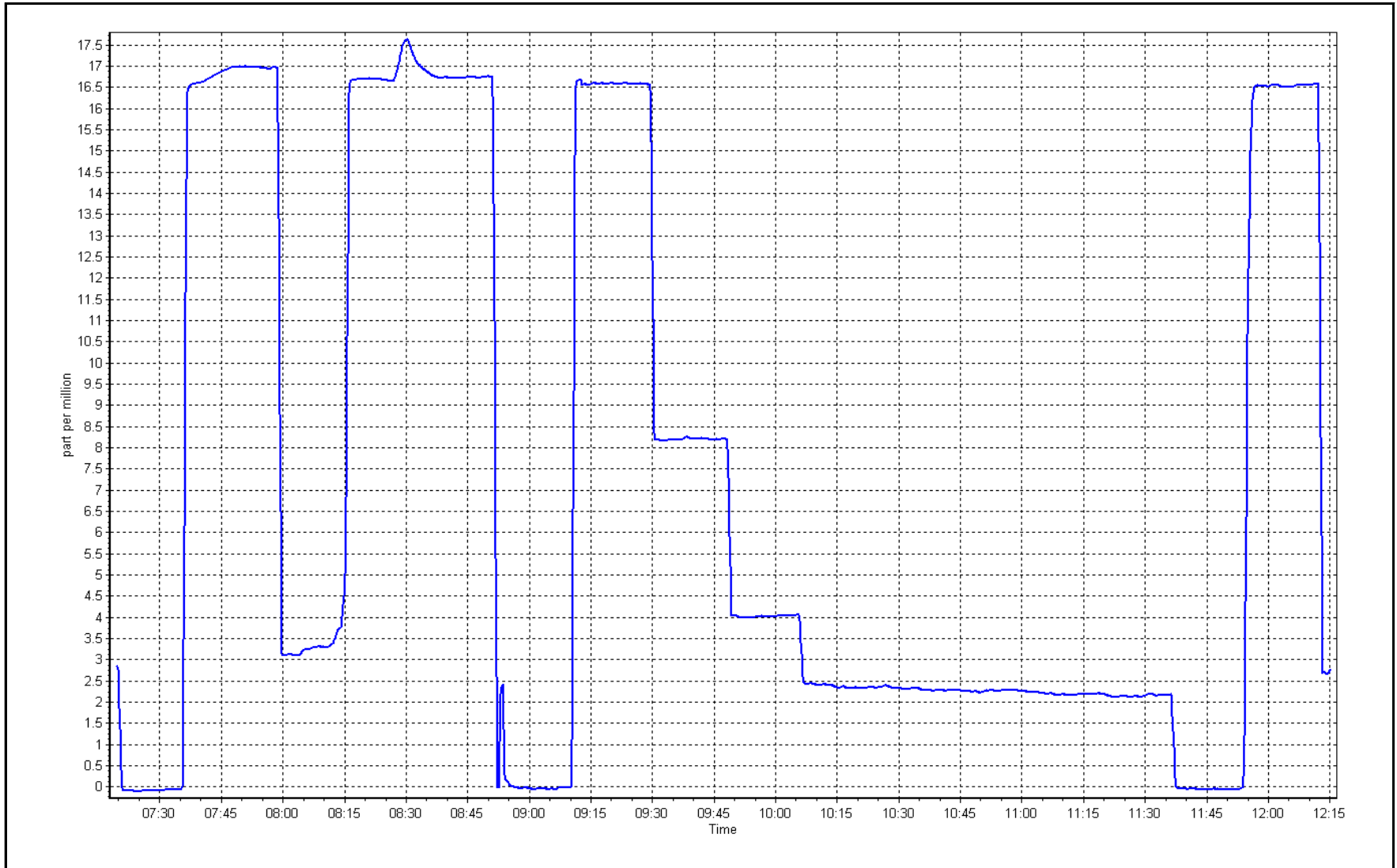
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (lc)	Correction factor (Cc/lc)	Statistical Evaluation	Limits	
0.0	0.0	----	Correlation Coefficient	0.999938	≥0.995
16.5	16.6	0.9975			
8.3	8.2	1.0085	Slope	0.993774	0.90 - 1.10
4.2	4.0	1.0314			
			Intercept	0.090883	+/-1.5



THC Calibration Plot

Date: October 5, 2017

Location: Fort McKay South









# Wood Buffalo Environmental Association

## O<sub>3</sub> Calibration Summary

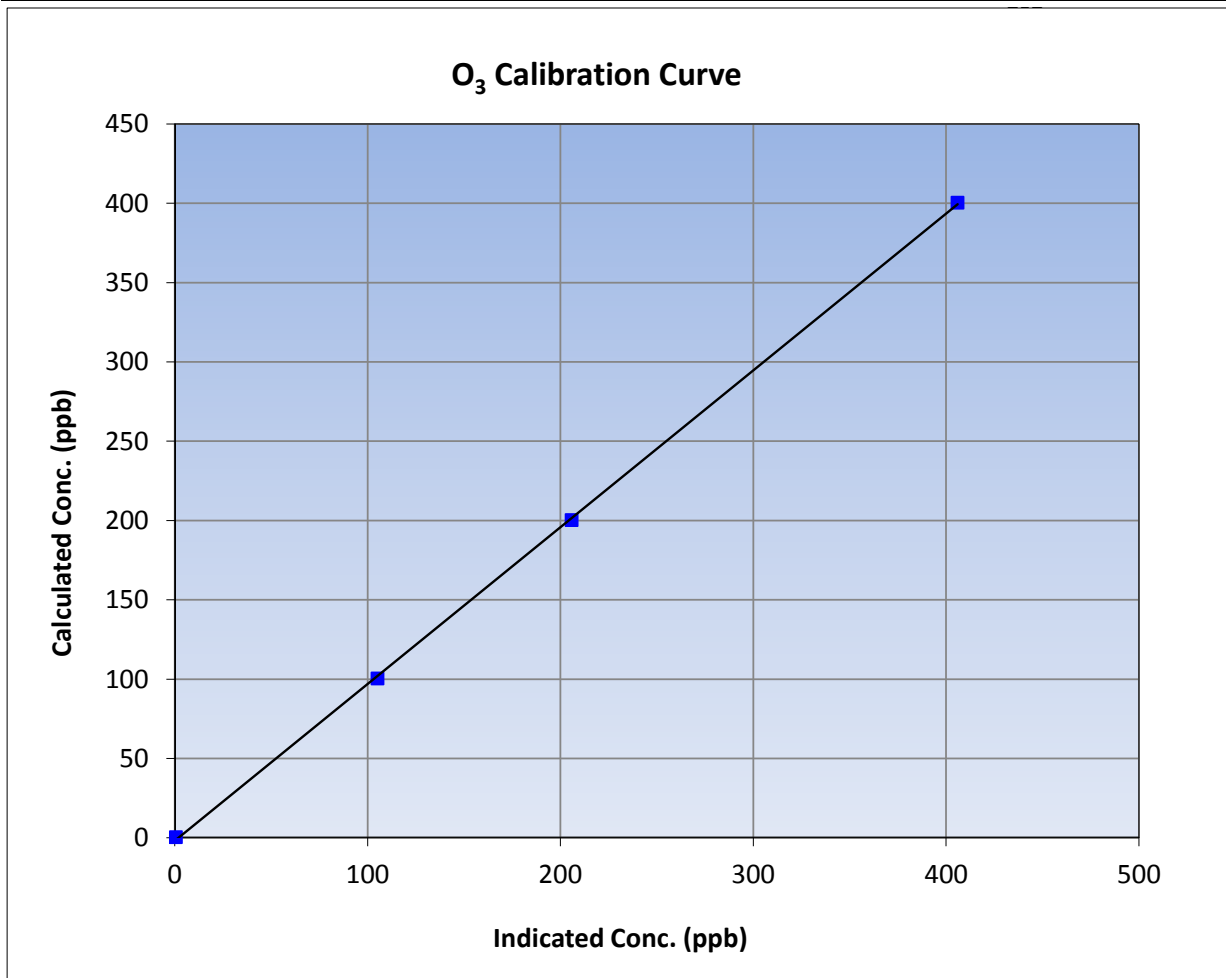
Version-03-2017

### Station Information

Calibration Date	October 6, 2017	Previous Calibration	September 22, 2017
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:55	End Time (MST)	11:47
Analyzer make	API T400	Analyzer serial #	825

### Calibration Data

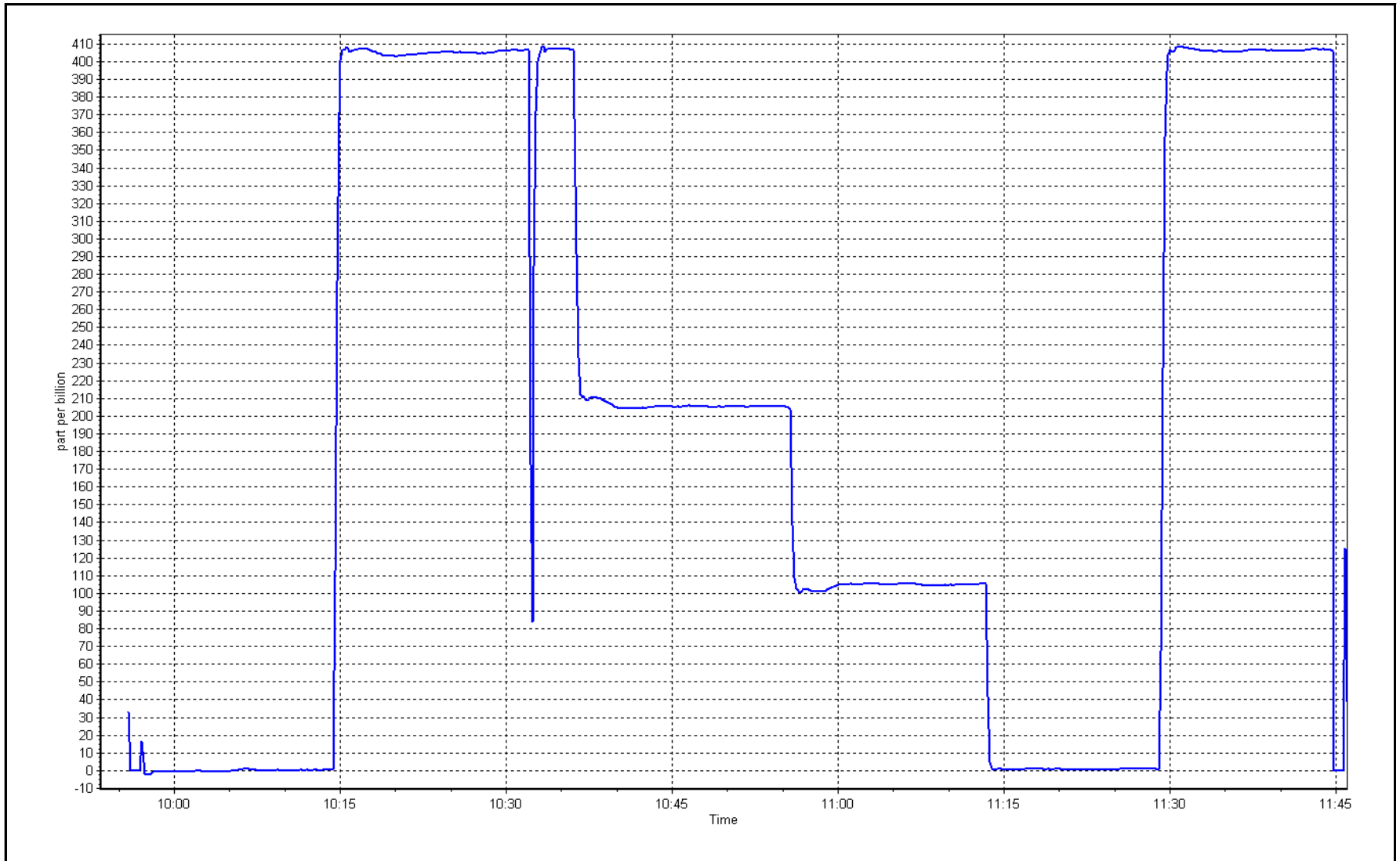
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	0.2	----	Correlation Coefficient	0.999909	≥0.995
400.0	405.6	0.9862			
200.0	205.4	0.9737	Slope	0.988610	0.90 - 1.10
100.0	104.8	0.9542			
			Intercept	-1.961246	+/- 10



O<sub>3</sub> Calibration Plot

Date: October 6, 2017

Location: Fort McKay South





# Wood Buffalo Environmental Association

## NO<sub>x</sub> - NO - NO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Fort McKay South	Station number:	AMS 13
Calibration Date:	October 5, 2017	Last Cal Date:	September 19, 2017
Start time (MST):	7:15	End time (MST):	8:00
Reason:	As Found		

### Calibration Standards

NO Gas Cylinder #	LL110515	Cal Gas Expiry Date	September 8, 2018
NOX Cal Gas Conc.	<u>50.9</u> ppb	NO Cal Gas Conc.	<u>50.7</u> ppb
Calibrator Model	API T700	Serial Number	2448
ZAG make/model	API T701	Serial Number	5613

### Analyzer Information

Analyzer make: Thermo 42i			Analyzer serial #: 1410661329		
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coefficient	1.032	1.032	NOX Range (ppb)	0 - 1000 ppb	
NOX coefficient	1.004	1.004	PMT Temperature	-3.0	-2.9
NO <sub>2</sub> coefficient	1.000	1.000	Reaction cell Press	174.3	174.9
NO bkgrnd	7.6	7.6	Sample Flow	0.907	0.892
NOX bkgrnd	7.7	7.7	PMT Voltage	-827.7	-827.7

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope	0.996852	0.992911
NO <sub>x</sub> Cal Offset	2.244680	0.000000
NO Cal Slope	0.997790	0.994923
NO Cal Offset	2.181689	0.000000
NO <sub>2</sub> Cal Slope	0.998692	
NO <sub>2</sub> Cal Offset	0.776030	



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

Version-03-2017

### Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
as found span	4935	79.0	802.0	798.8	3.2	807.7	802.9	4.8	0.9929	0.9949
calibrator zero	5009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
high point	4935	79.0	802.0	798.8	3.2	807.7	802.9	4.8	0.9929	0.9949
second point										
third point										
as left zero										
as left span										
<b>Average Correction Factor</b>									0.9929	0.9949

Corrected As found	NO <sub>x</sub> = 807.7 ppb	NO = 802.9 ppb		*Percent Change	NO <sub>x</sub> = -0.7%
Previous Response	NO <sub>x</sub> = 802.3 ppb	NO = 798.4 ppb		*Percent Change	NO = -0.6%
<i>* = &gt; +/-5% change initiates investigation</i>					

### GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
1st NO ref point									
1st NO2 (400 ppb O3)									
2nd NO2 (200 ppb O3)									
3rd NO2 (100 ppb O3)									
2nd NO ref point									
<b>Average Correction Factor</b>									

Notes:

As found for calibration gas change out

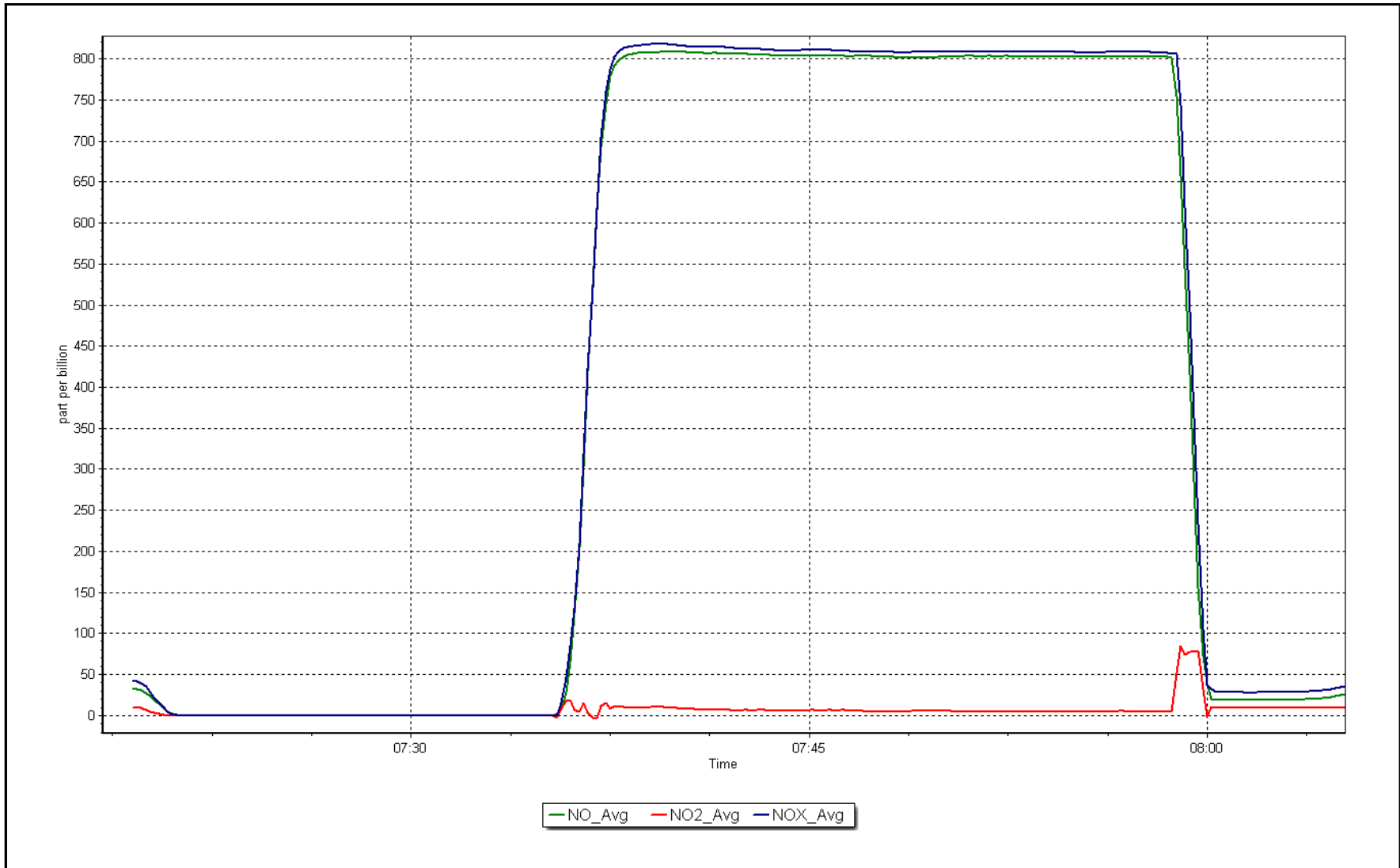
Calibration Performed By:

Melissa Lemay

NO<sub>x</sub> Calibration Plot

Date: October 5, 2017

Location: Fort McKay South





# Wood Buffalo Environmental Association

## NO<sub>x</sub> - NO - NO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Fort McKay South	Station number:	AMS 13
Calibration Date:	October 5, 2017	Last Cal Date:	September 19, 2017
Start time (MST):	7:15	End time (MST):	12:14
Reason:	Cylinder Change		

### Calibration Standards

NO Gas Cylinder #	LL84138	Cal Gas Expiry Date	August 18, 2020
NOX Cal Gas Conc.	<u>51.6</u> ppb	NO Cal Gas Conc.	<u>51.6</u> ppb
Calibrator Model	API T700	Serial Number	2448
ZAG make/model	API T701	Serial Number	5613

### Analyzer Information

Analyzer make:	Thermo 42i	Analyzer serial #:	1410661329	
	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
NO coefficient	1.032	1.030	NOX Range (ppb)	0 - 1000 ppb
NOX coefficient	1.004	1.000	PMT Temperature	-3.0 -2.9
NO <sub>2</sub> coefficient	1.000	1.000	Reaction cell Press	174.3 174.9
NO bkgrnd	7.6	7.6	Sample Flow	0.907 0.892
NOX bkgrnd	7.7	7.7	PMT Voltage	-827.7 -827.7

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope	0.992911	1.000076
NO <sub>x</sub> Cal Offset	0.000000	2.025948
NO Cal Slope	0.994923	0.999977
NO Cal Offset	0.000000	1.985447
NO <sub>2</sub> Cal Slope		0.995912
NO <sub>2</sub> Cal Offset		0.662472



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

Version-03-2017

### Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5009	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
as found span	4932	77.7	800.3	800.3	0.0	808.8	804.7	4.1	0.9895	0.9945
calibrator zero	5009	0.0	0.0	0.0	0.0	0.1	0.1	0.1	----	----
high point	4932	77.7	800.3	800.3	0.0	799.1	799.2	-0.1	1.0015	1.0014
second point	4978	38.9	400.1	400.1	0.0	397.5	397.6	-0.1	1.0065	1.0063
third point	4997	19.6	201.6	201.6	0.0	197.1	197.2	-0.2	1.0228	1.0223
as left zero	5009	0.0	0.0	0.0	0.0	0.1	0.1	0.0	----	----
as left span	4932	77.7	800.3	384.7	415.6	804.0	381.4	422.6	0.9954	1.0087
<b>Average Correction Factor</b>									<b>1.0103</b>	<b>1.0100</b>

Corrected As found	NO <sub>x</sub> = 808.8 ppb	NO = 804.7 ppb		*Percent Change	NO <sub>x</sub> = -0.3%
Previous Response	NO <sub>x</sub> = 806.0 ppb	NO = 804.4 ppb		*Percent Change	NO = 0.0%
<i>* = &gt; +/-5% change initiates investigation</i>					

### GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
1st NO ref point		0.0	793.8	794.7	-1.0	1.0082	1.0071	----	----
1st NO2 (400 ppb O3)	384.7	410.0	796.0	384.7	411.3	1.0054	----	0.9968	100.3%
2nd NO2 (200 ppb O3)	586.3	208.4	794.7	586.3	208.5	1.0071	----	0.9995	100.0%
3rd NO2 (100 ppb O3)	691.8	102.9	793.6	691.8	101.7	1.0085	----	1.0118	98.8%
2nd NO ref point	----	0.0	796.8	797.9	-1.1	1.0044	1.0030	----	----
<b>Average Correction Factor</b>						<b>1.0063</b>	<b>1.0050</b>	<b>1.0027</b>	<b>99.7%</b>

**Notes:** calibration gas change out, span adjusted; the 2nd NO ref is used due to drift during the GPT

Calibration Performed By: Melissa Lemay



# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

Version-03-2017

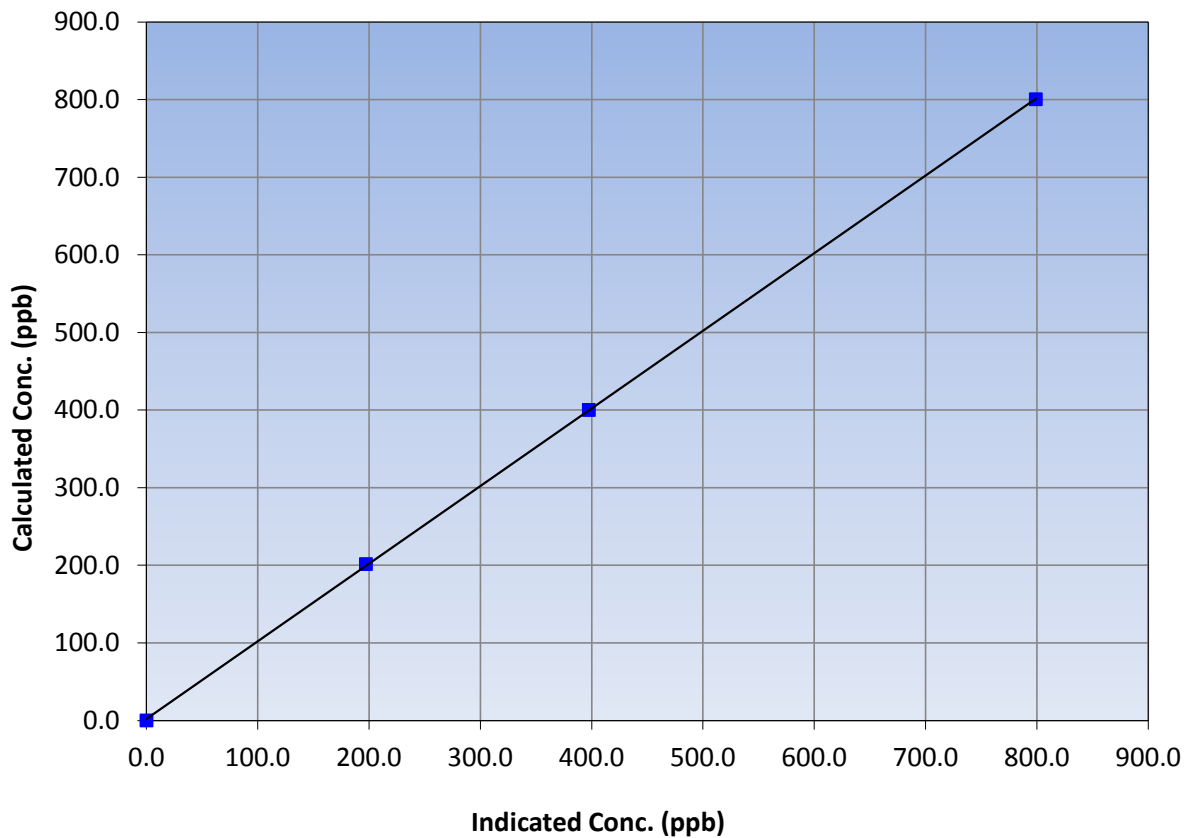
### Station Information

Calibration Date	October 5, 2017	Previous Calibration	September 19, 2017
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	7:15	End Time (MST)	12:14
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	0.1	----	Correlation Coefficient	≥0.995	
800.3	799.1	1.0015			
400.1	397.5	1.0065			
201.6	197.1	1.0228			
			Slope	1.000076	0.90 - 1.10
			Intercept	2.025948	+/-20

NO<sub>x</sub> Calibration Curve







# Wood Buffalo Environmental Association

## NO Calibration Summary

Version-03-2017

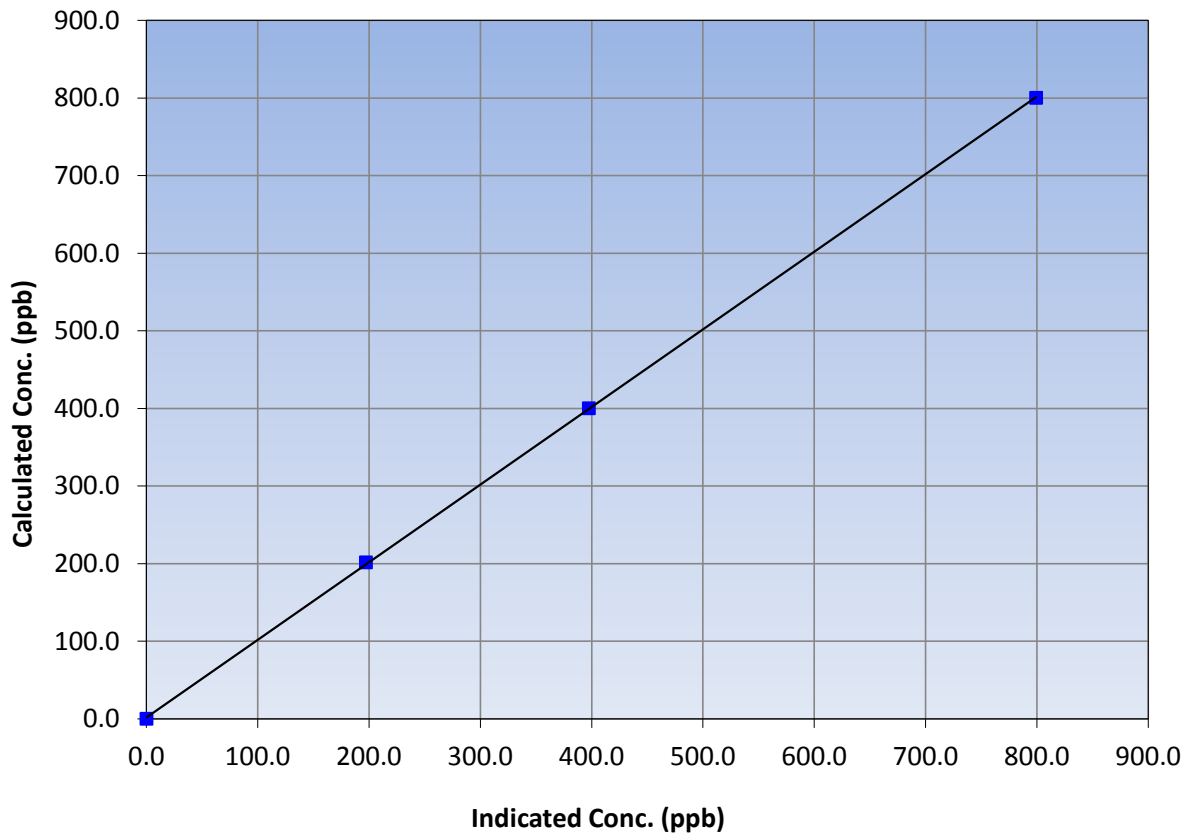
### Station Information

Calibration Date	October 5, 2017	Previous Calibration	September 19, 2017
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	7:15	End Time (MST)	12:14
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>
0.0	0.1	----	Correlation Coefficient	≥0.995
800.3	799.2	1.0014		
400.1	397.6	1.0063	Slope	0.90 - 1.10
201.6	197.2	1.0223		
			Intercept	+/-20

NO Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

Version-03-2017

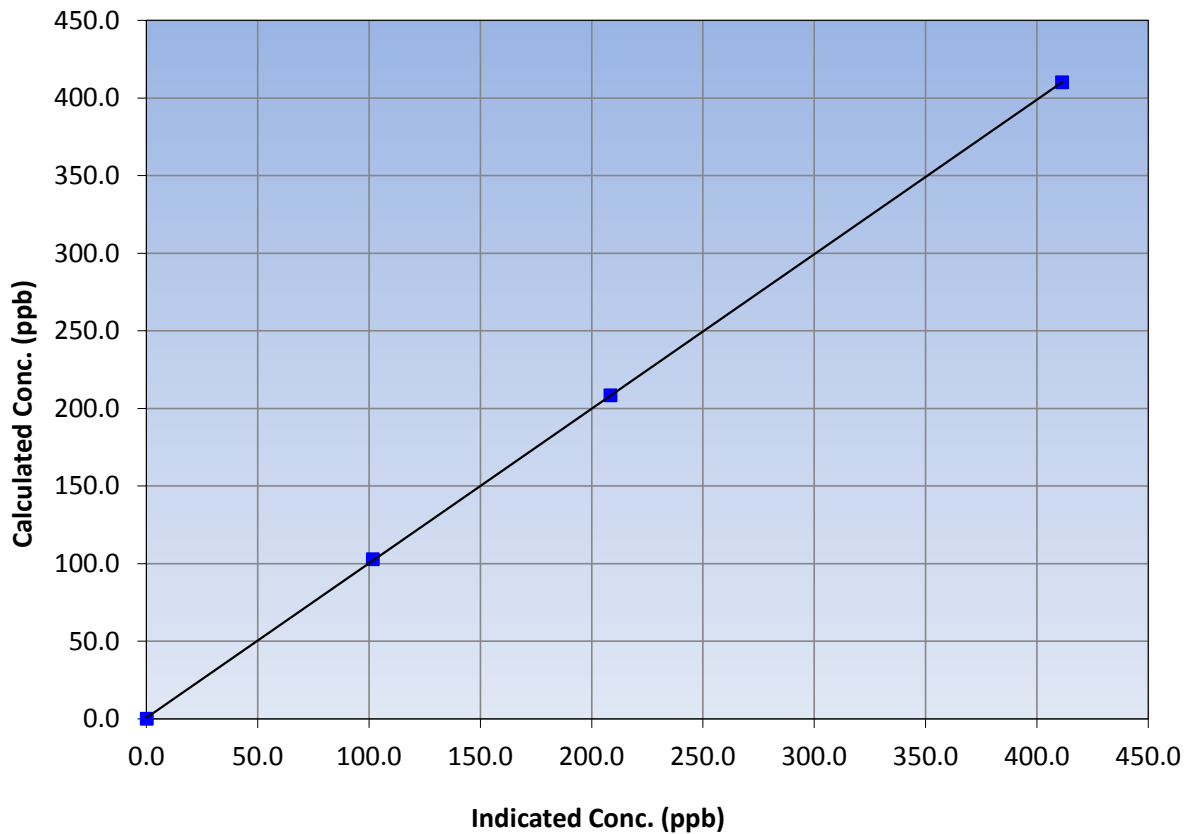
### Station Information

Calibration Date	October 5, 2017	Previous Calibration	September 19, 2017
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	7:15	End Time (MST)	12:14
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	0.1	----	Correlation Coefficient	≥0.995	
410.0	411.3	0.9968			
208.4	208.5	0.9995			
102.9	101.7	1.0118			
			Slope	0.995912	0.90 - 1.10
			Intercept	0.662472	+/-20

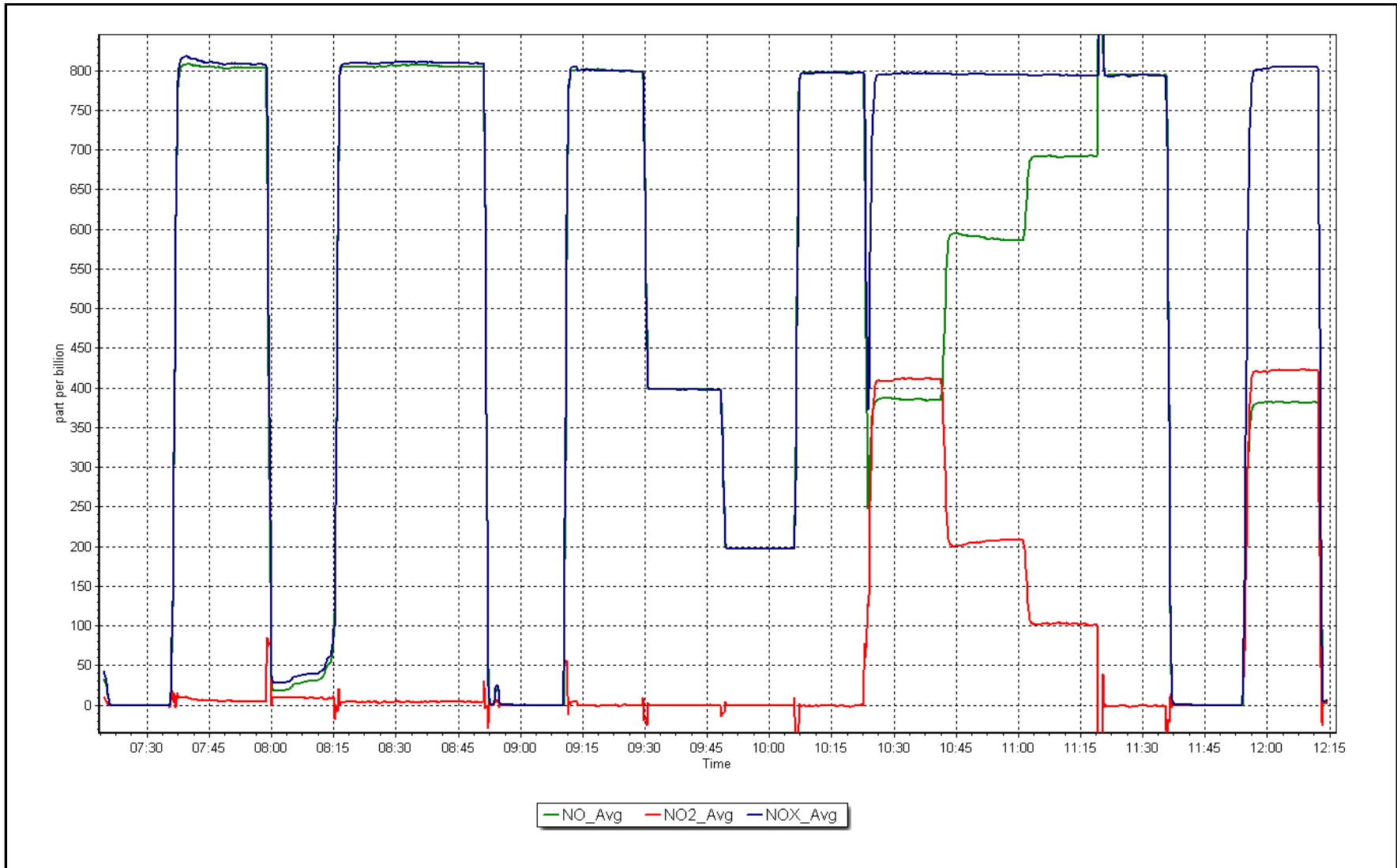
**NO<sub>2</sub> Calibration Curve**



NO<sub>x</sub> Calibration Plot

Date: October 5, 2017

Location: Fort McKay South





# Wood Buffalo Environmental Association

## SHARP PM<sub>2.5</sub> CALIBRATION

Version-02-2017

### Station Information

Station Name:	Fort McKay South	Station number:	AMS 13
Calibration Date:	October 6, 2017	Last Cal Date:	September 22, 2017
Start time (MST):	7:27	End time (MST):	8:39
Sharp Model:	5030	S/N:	E-803
Particulate Fraction:	PM2.5	C14 Source S/N:	4066
Flow Meter Make/Model:	Delta Cal	S/N:	1450
Temp/RH standard:	Delta Cal	S/N:	1450

### Monthly Calibration Test

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<b>(Limits)</b>
T1 (°C)	9	10.1	9	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	961	959	961	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	1004	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	1	-----	-0.5	<input checked="" type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified	<input checked="" type="checkbox"/>			
Cyclone cleaning :	PM10 Cyclone	<input checked="" type="checkbox"/>	PM2.5 Cyclone	<input checked="" type="checkbox"/>	
Date Filter Tape Installed:					

### Quarterly Calibration Test

Leak Test:	Date of check:	<u>October 6, 2017</u>	Last Cal Date:	<u>July 18, 2017</u>
	Flow w/o adaptor:	<u>16.74</u>	Flow w/ adaptor:	<u>16.48</u>

**(Limit) 0.4 LPM**

<u>Adjusted</u>	<u>Current Test</u>	<u>Previous Test</u>	<u>% Change</u>
<input type="checkbox"/>	Foil S/N: <u>5872</u>	Foil S/N: <u>5872</u>	
Foil Calibration	Foil Mass: <u>1337</u>	Foil Mass: <u>1337</u>	
	Calibration Date: <u>October 6, 2017</u>	Calibration Date: <u>July 18, 2017</u>	
<b>(Limit) +/- 5% of previous</b>	Correction Factor: <u>7107</u>	Correction Factor: <u>7150</u>	-0.60%

### Annual Calibration Test

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<b>(Limits)</b>
T2 (°C)				<input type="checkbox"/>	+/- 2 °C
T3 (°C)				<input type="checkbox"/>	+/- 2 °C
T4 (°C)				<input type="checkbox"/>	+/- 2 °C
RH (%)				<input type="checkbox"/>	+/- 10%
Date Sample Tube Cleaned:					
Date Pump Rebuilt/Replaced:					

Notes: Nephelometer adjusted, Cyclone head cleaned

Calibration by: Melissa Lemay



## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

### **CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT**

**AMS 14  
ANZAC  
OCTOBER 2017**

Operations, Data Collection,  
QA/QC, Data Validation and Reporting by:  
Wood Buffalo Environmental Association  
Fort McMurray, Alberta

November 29, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)  
OCTOBER 2017

MONTHLY SUMMARY for  
AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	705	38	39	99.87	4	0	1	0
TRS(ppb) Average	707	37	37	100	1	0	0	0
THC(ppm) Average	703	40	41	99.87	2.5	-	2.1	-
NMHC(ppm) Average	703	40	41	99.87	0.175	-	0.043	-
CH4(ppm) Average	703	40	41	99.87	2.4	-	2.1	-
NO2(ppb) Average	703	40	41	99.87	17	0	5	-
NO(ppb) Average	703	40	41	99.87	7	-	1	-
NOX(ppb) Average	703	40	41	99.87	22	-	6	-
O3(ppb) Average	707	36	37	99.87	44	0	39	-
PM2.5(ug/m3) Average	742	2	2	100	10.9	-	6	0
AT 2m(C) Average	744	0	0	100	23	-	15.5	-
RH(%) Average	744	0	0	100	98	-	97	-
Leaf Wetness (% of range) Average	743	0	1	99.87	97	-	25	-
WS(km/h) Average	744	0	0	100	32	-	24	-
WD(deg) Average	744	0	0	100	-	-	-	-
PC(mm) Total	720	0	0	100	0.8	-	2.5	-

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)  
OCTOBER 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	705	0.3	0	-	0	0	0	0	0	1	4
TRS(ppb) Average	707	0.2	0	-	0	0	0	0	0	0	1
THC(ppm) Average	703	1.98	0.1	-	1.9	1.9	2	2	2	2	2.5
NMHC (ppm) Average	703	0.005	0.019	-	0	0	0	0	0	0	0.175
CH4(ppm) Average	703	1.98	0	-	1.9	1.9	2	2	2	2	2.4
NO2(ppb) Average	703	1.6	2	-	0	0	1	1	2	3	17
NO(ppb) Average	703	0.3	1	-	0	0	0	0	0	1	7
NOX(ppb) Average	703	1.9	2	-	0	0	1	1	2	4	22
O3(ppb) Average	707	25.2	8	-	2	16	21	25	30	36	44
PM2.5(ug/m3) Average	742	2.83	1.4	-	0.5	1.7	2	2.4	3.1	4.6	10.9
Temperature 2 m (C) Average	744	2.95	4.9	-	-4.7	-2.3	-0.8	2.1	5.7	9.6	23
Relative Humidity (%) Average	744	76	16	-	30	51	67	79	88	95	98
Leaf Wetness (% of range) Average	743	1.1	16	-	-66	0	0	0	2	9	97
Wind Speed 20 m (km/h) Average	744	12.4	6	-	1	6	8	11	16	22	32
Wind Direction 20 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	744	-	-	10.16	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)  
OCTOBER 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NOX, O3, SO2, THC	06 Oct 2017 12:00	06 Oct 2017 12:00	1	Data logger program uploaded - data not recorded
CH4, NMHC, THC	30 Oct 2017 16:00	30 Oct 2017 17:00	2	Maintenance - replaced carrier gas cylinder
LW	01 Oct 2017 01:00	02 Oct 2017 14:00	38	DAS Collection Error
LW	14 Oct 2017 12:00	14 Oct 2017 12:00	1	Unstable Operation





# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Sulphur Dioxide (SO<sub>2</sub>) - ppb

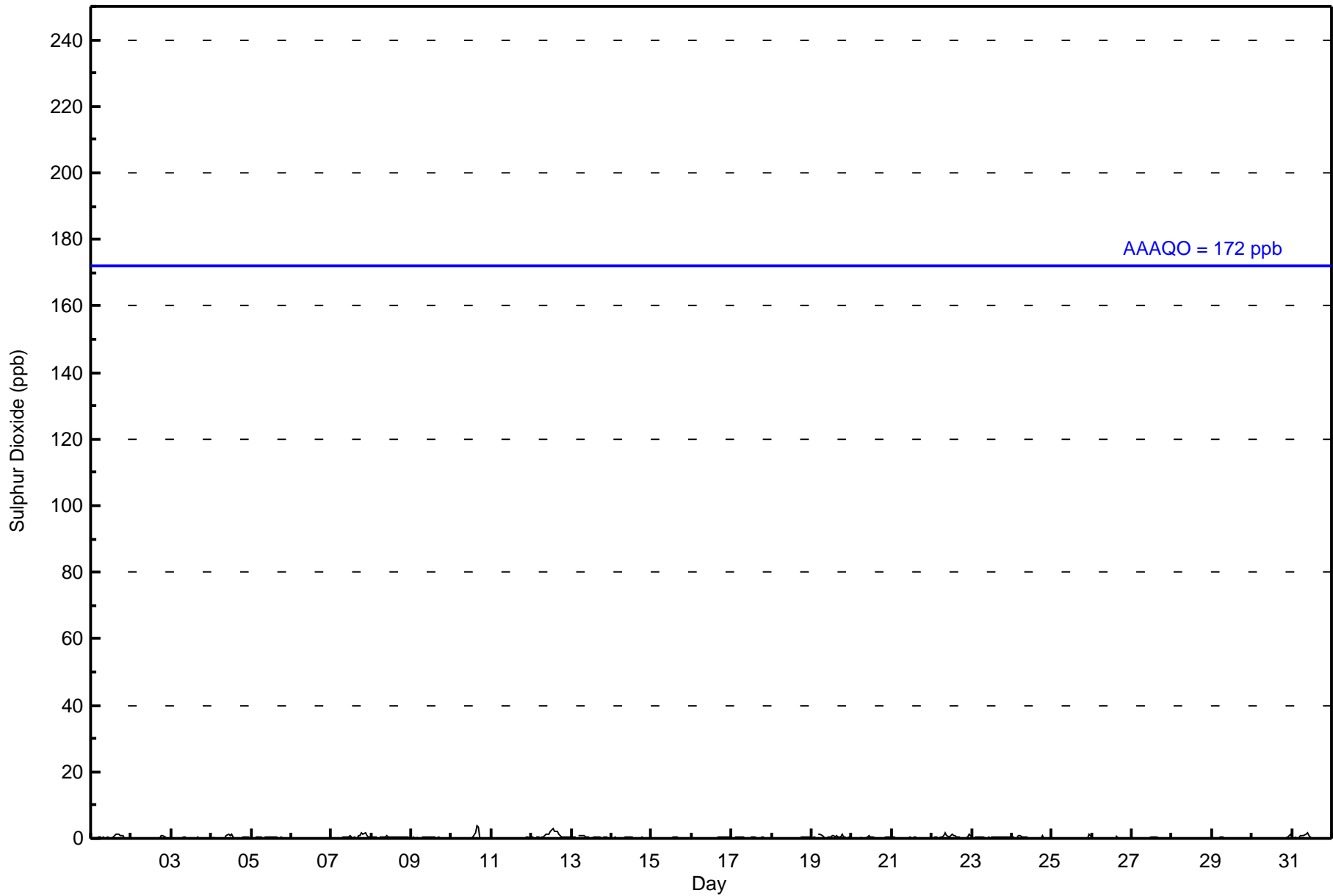
## Anzac - October 2017

Number of Exceedences (AAAQO):		1-hr: 0    24-hr: 0		Hours in Service:		744																				
Maximum Value: 4 ppb on Oct 10 16:00		Maximum Daily Average: 0.9 ppb on Oct 12		Hours of Data:		705																				
Minimum Value: 0 ppb on Oct 2 02:00		Minimum Daily Average: 0.0 ppb on Oct 28		Hours of Missing Data:		39																				
Maximum Diurnal Average: 0.4 ppb at hour 16		Minimum Diurnal Average: 0.1 ppb at hour 4		Hours of Calibration:		38																				
Monthly Average: 0.3 ppb		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 2		Percent Operational Time:		99.9																				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0.4	1
2-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.2	1
3-Oct	0	0	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
4-Oct	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1
5-Oct	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
6-Oct	0	0	Z	0	0	0	0	0	0	0	0	DF	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
7-Oct	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	1	1	2	1	2	1	0	0	0.5	2
8-Oct	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
9-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
10-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	2	4	3	0	0	0	0	0	0	0	0.5	4
11-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
12-Oct	0	0	Z	0	0	0	0	0	1	1	1	2	2	3	2	2	1	1	0	0	0	0	0	0	0.9	3
13-Oct	0	0	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
14-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
15-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
16-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
17-Oct	0	Z	0	0	0	0	0	0	0	0	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
18-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0.2	1
19-Oct	0	0	0	Z	1	1	1	0	0	0	0	0	1	1	1	1	1	0	1	1	0	0	0	0	0.5	1
20-Oct	0	0	0	0	Z	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1
21-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
22-Oct	Z	0	0	0	0	0	0	1	2	1	0	1	1	1	1	0	0	0	0	0	0	1	1	1	0.5	2
23-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
24-Oct	0	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.2	1
25-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.1	1
26-Oct	0	0	0	0	Z	0	0	0	0	C	C	C	C	C	1	0	0	0	0	0	0	0	0	0	0.1	1
27-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
28-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
29-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
30-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.1	1
31-Oct	0	0	0	Z	0	1	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
0.2   0.1   0.2   0.1   0.2   0.3   0.2   0.2   0.3   0.3   0.3   0.3   0.4   0.3   0.3   0.4   0.4   0.2   0.3   0.3   0.2   0.2   0.2   0.2																								Diurnal Average		
0   0   1   0   1   1   1   1   2   2   1   2   2   3   2   4   3   1   2   1   2   1   1   1																								Diurnal Maximum		
Z - zerospan    C - Calibration    DF - DAS Failure																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb    24-hr 48 ppb																										



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Anzac - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Anzac - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	705	100.00	100.00
11 - 20	0	0.00	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Anzac - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	45	26	12	9	8	10	49	47	33	25	59	35	63	117	106	61	705
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	45	26	12	9	8	10	49	47	33	25	59	35	63	117	106	61	705

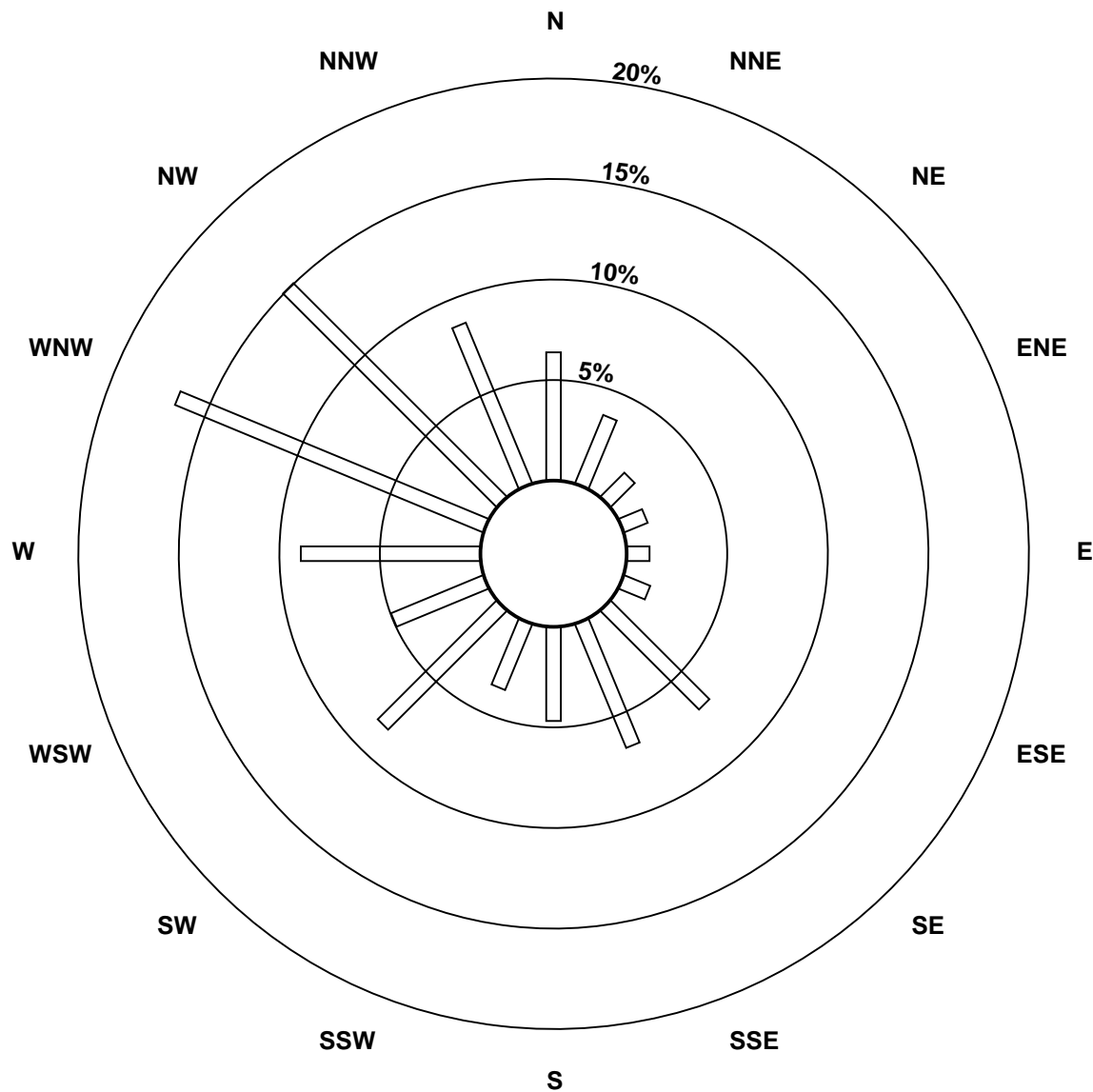
Total Number of Valid Hours: 705

Total Number of Hours: 744

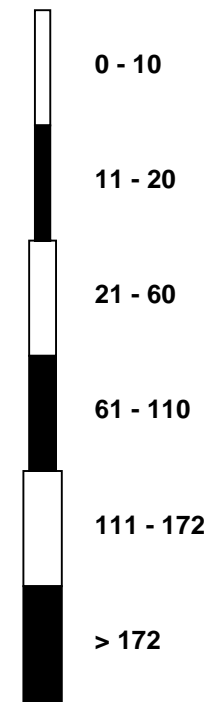


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

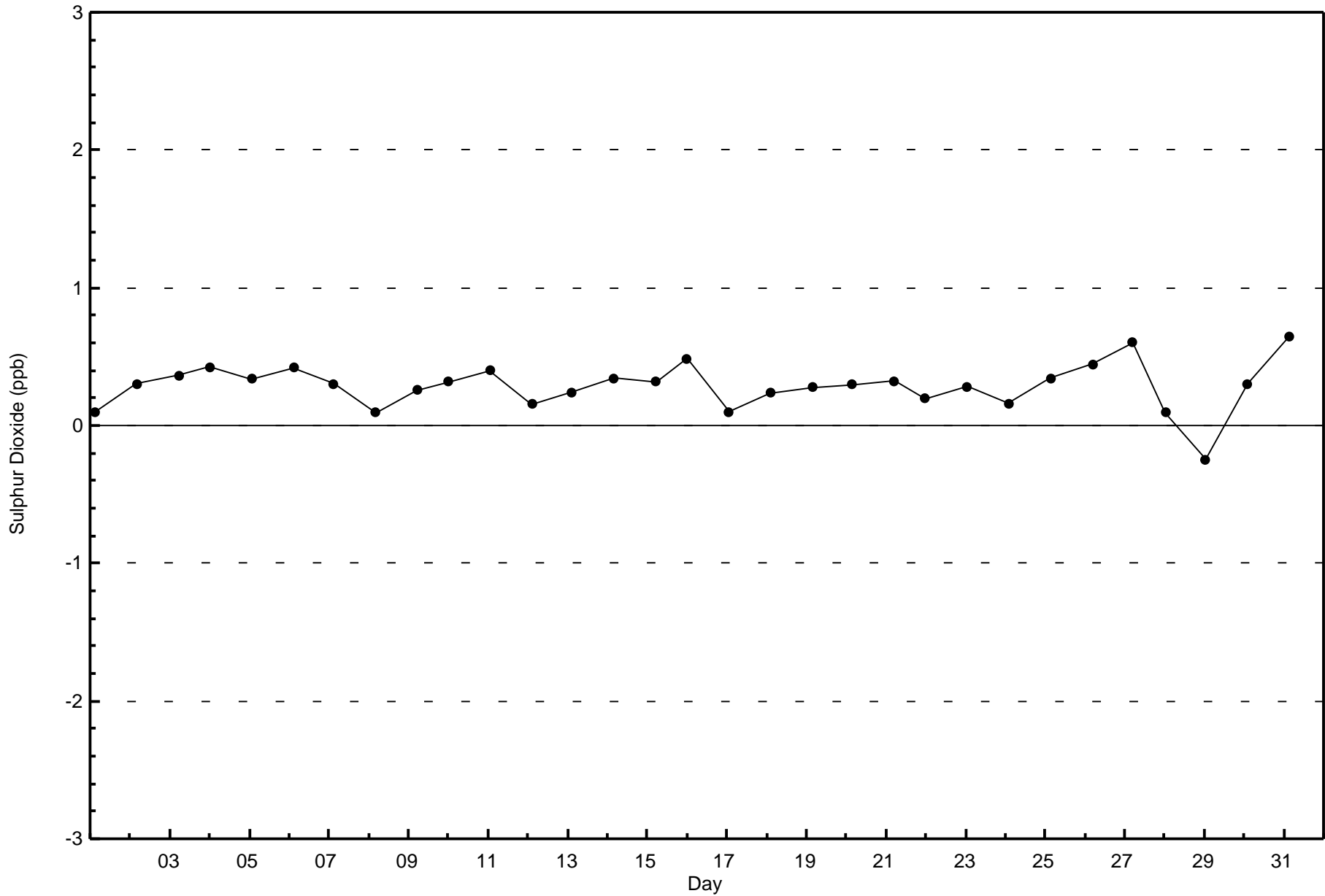
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Anzac (AMS 14)

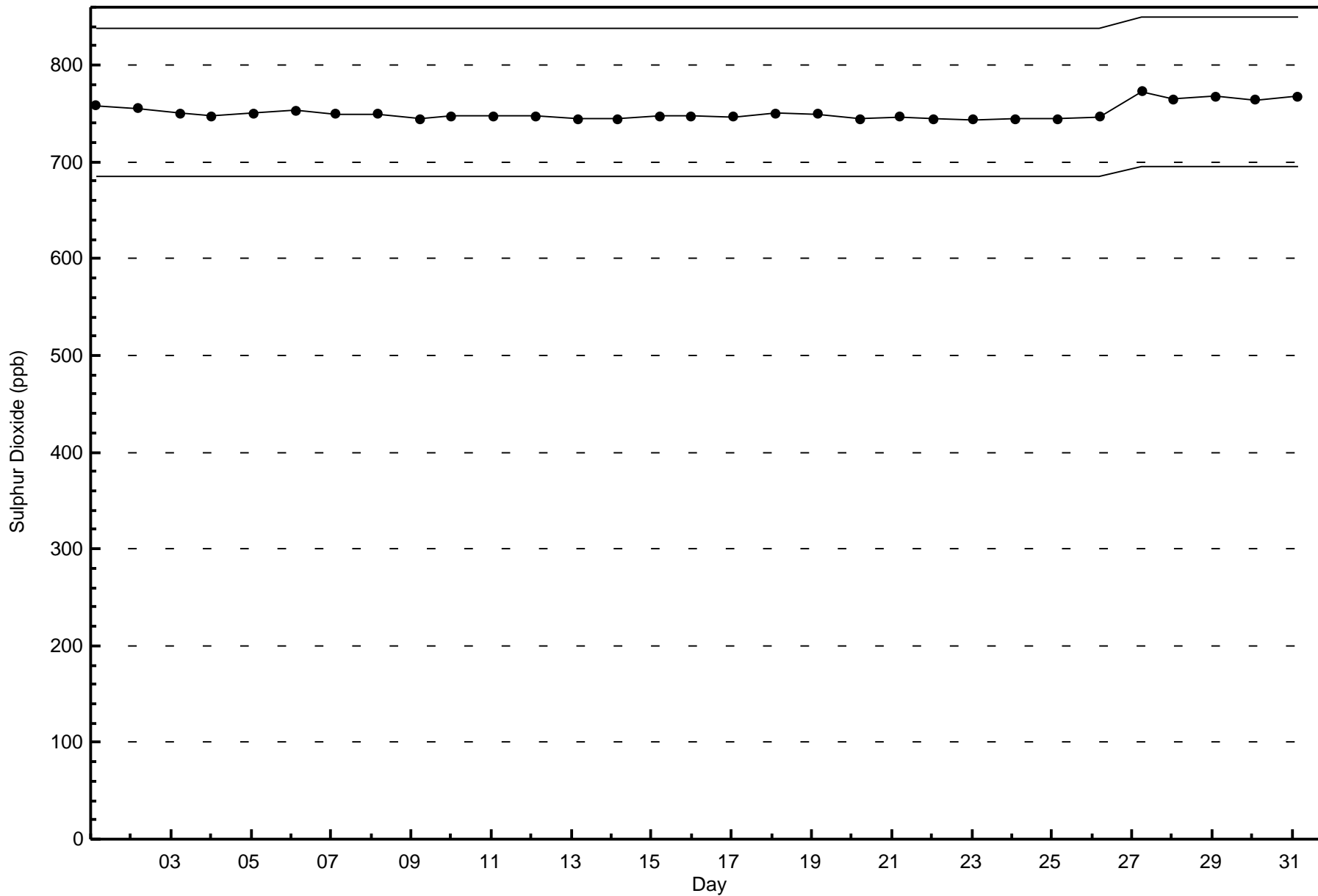


Classes (ppb)



Total Number of Valid Hours: 705







Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

Anzac - October 2017

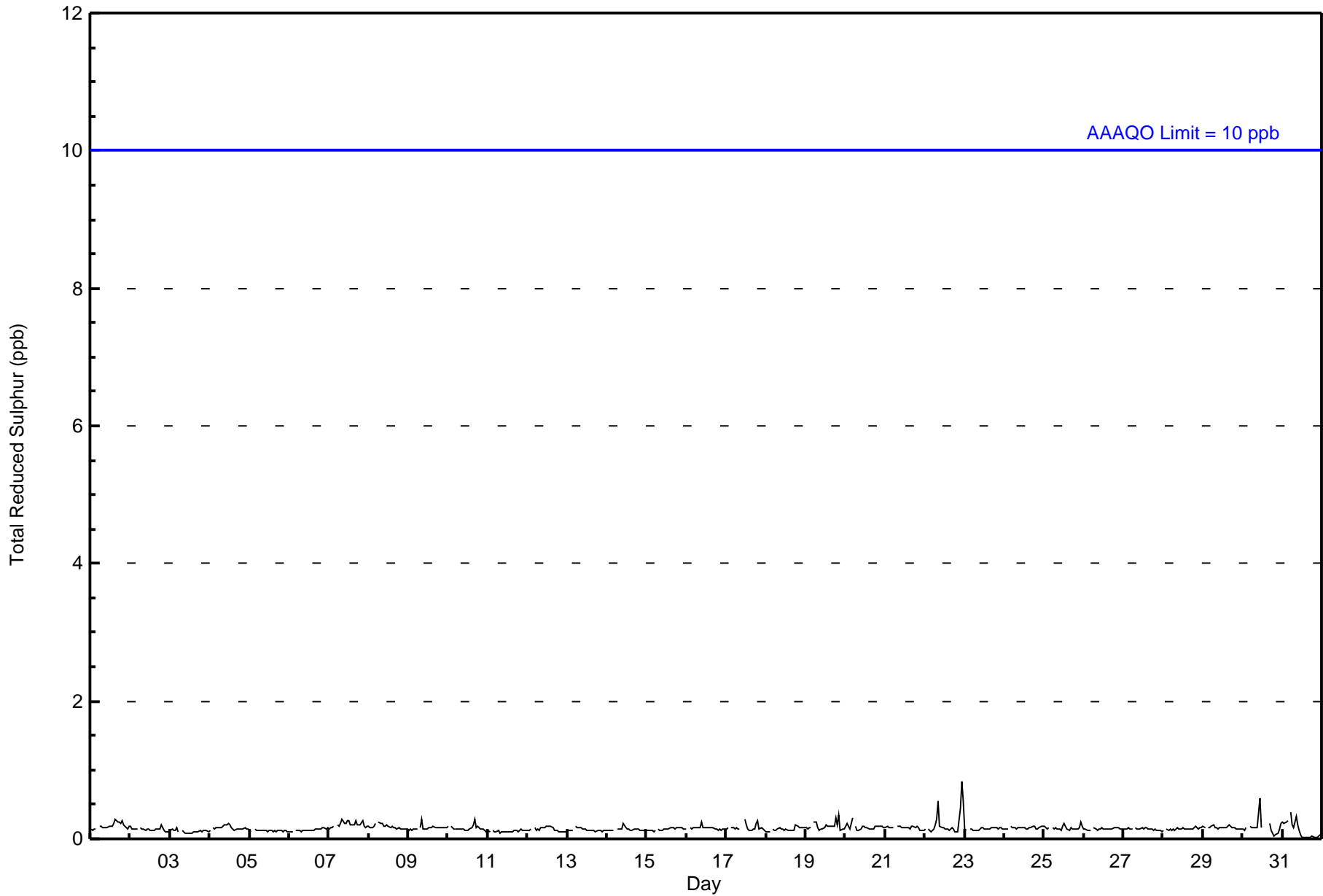
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 1 ppb on Oct 22 23:00										Maximum Daily Average: 0.2 ppb on Oct 22										Hours of Data: 707						
Minimum Value: 0 ppb on Oct 31 13:00										Minimum Daily Average: 0.1 ppb on Oct 3										Hours of Missing Data: 37						
Maximum Diurnal Average: 0.2 ppb at hour 9										Minimum Diurnal Average: 0.1 ppb at hour 2										Hours of Calibration: 37						
Monthly Average: 0.2 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 0										Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
4-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
5-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
6-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
7-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
8-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
9-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
10-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
11-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
12-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
13-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
14-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
15-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
16-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
17-Oct	0	0	Z	0	0	0	0	0	0	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
18-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
19-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
20-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
21-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
22-Oct	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1
23-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
24-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
25-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
26-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
27-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
28-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
29-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
30-Oct	0	0	0	Z	0	0	0	0	0	0	1	0	C	C	C	C	0	0	0	0	0	0	0	0	0.2	1
31-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
0.1 0.1 0.1 0.1 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.1 0.1 0.1 0.2 0.1 0.2 0.2 0.1 0.1 0.2 0.2																								Diurnal Average		
0 0 0 0 0 0 0 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1																								Diurnal Maximum		
Z - zerospan C - Calibration																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										





**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Total Reduced Sulphur (TRS) - ppb**  
**Anzac - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Anzac - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	707	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Anzac - October 2017**

<b>Concentration</b> <b>Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	45	26	12	9	7	10	47	47	30	28	64	35	63	117	106	61	707
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	45	26	12	9	7	10	47	47	30	28	64	35	63	117	106	61	707

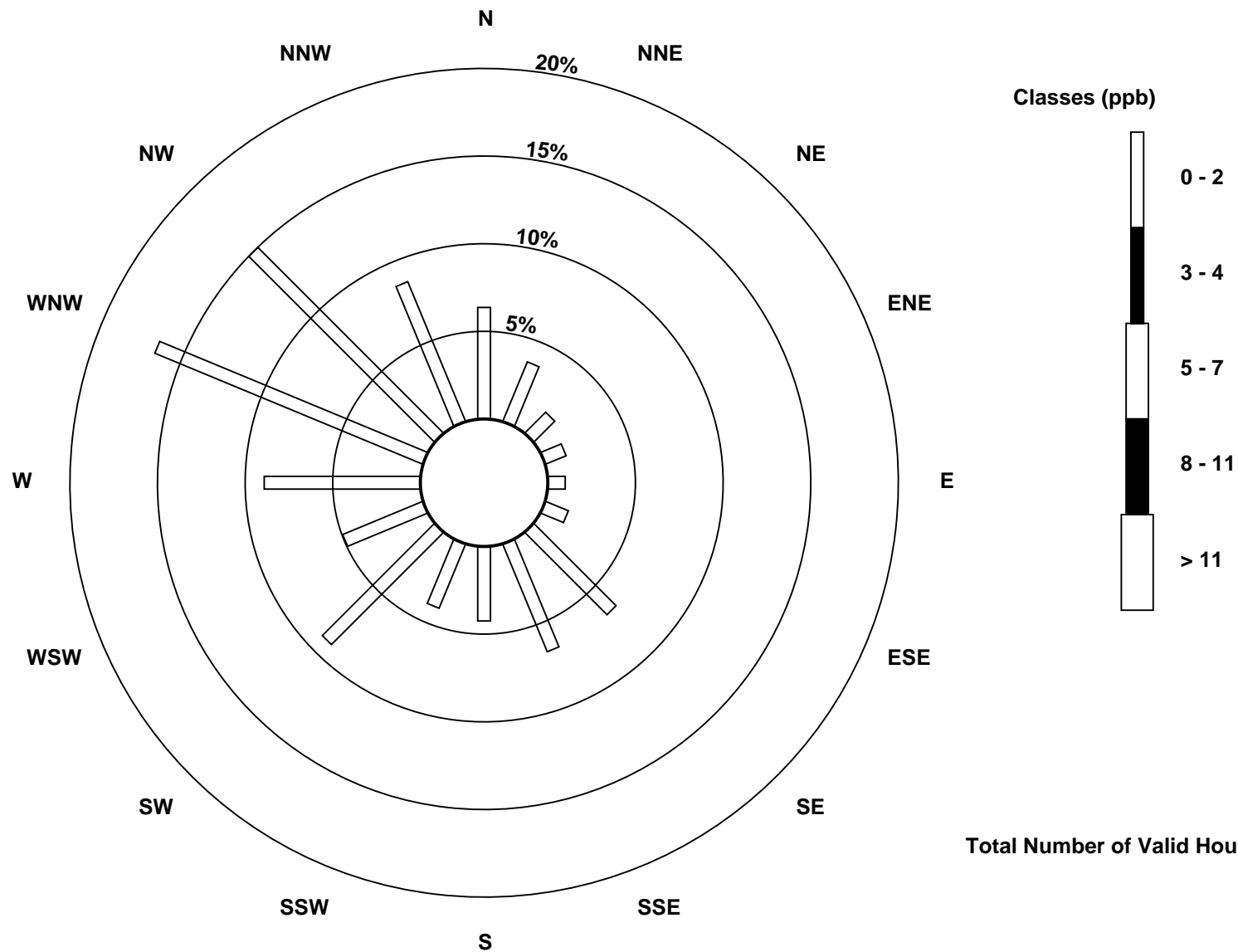
Total Number of Valid Hours: 707

Total Number of Hours: 744

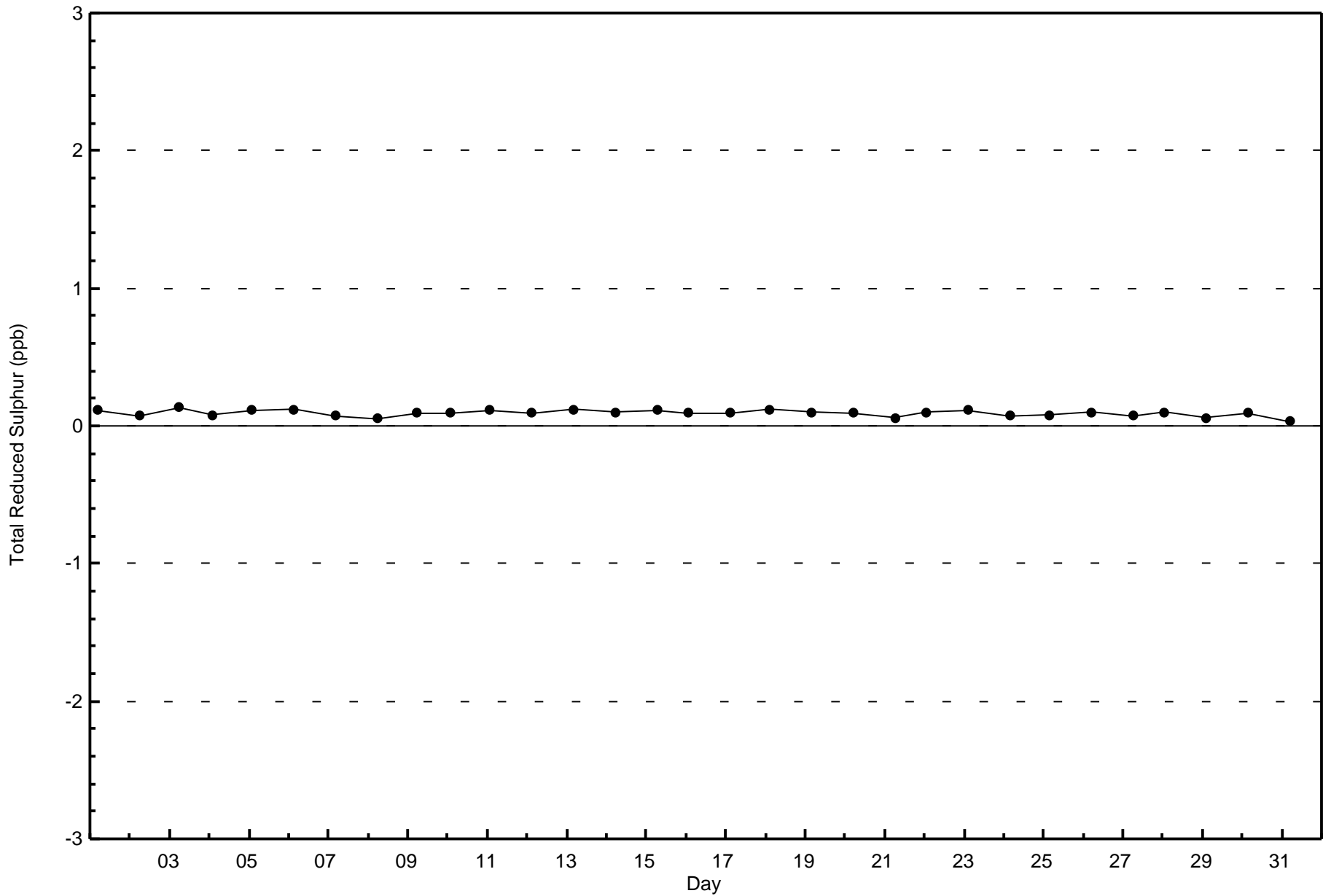


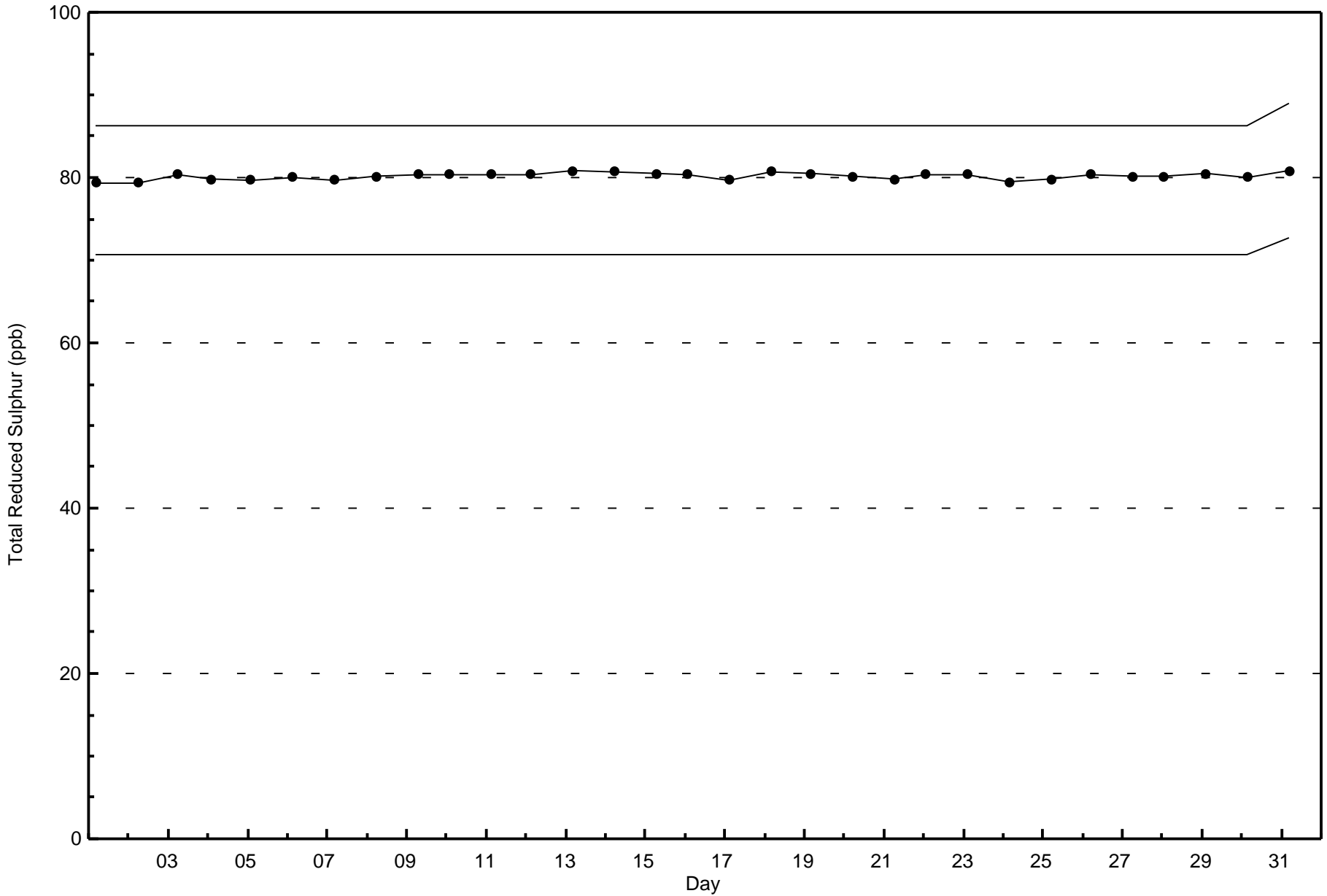
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Total Reduced Sulphur (TRS) - ppb  
Anzac (AMS 14)

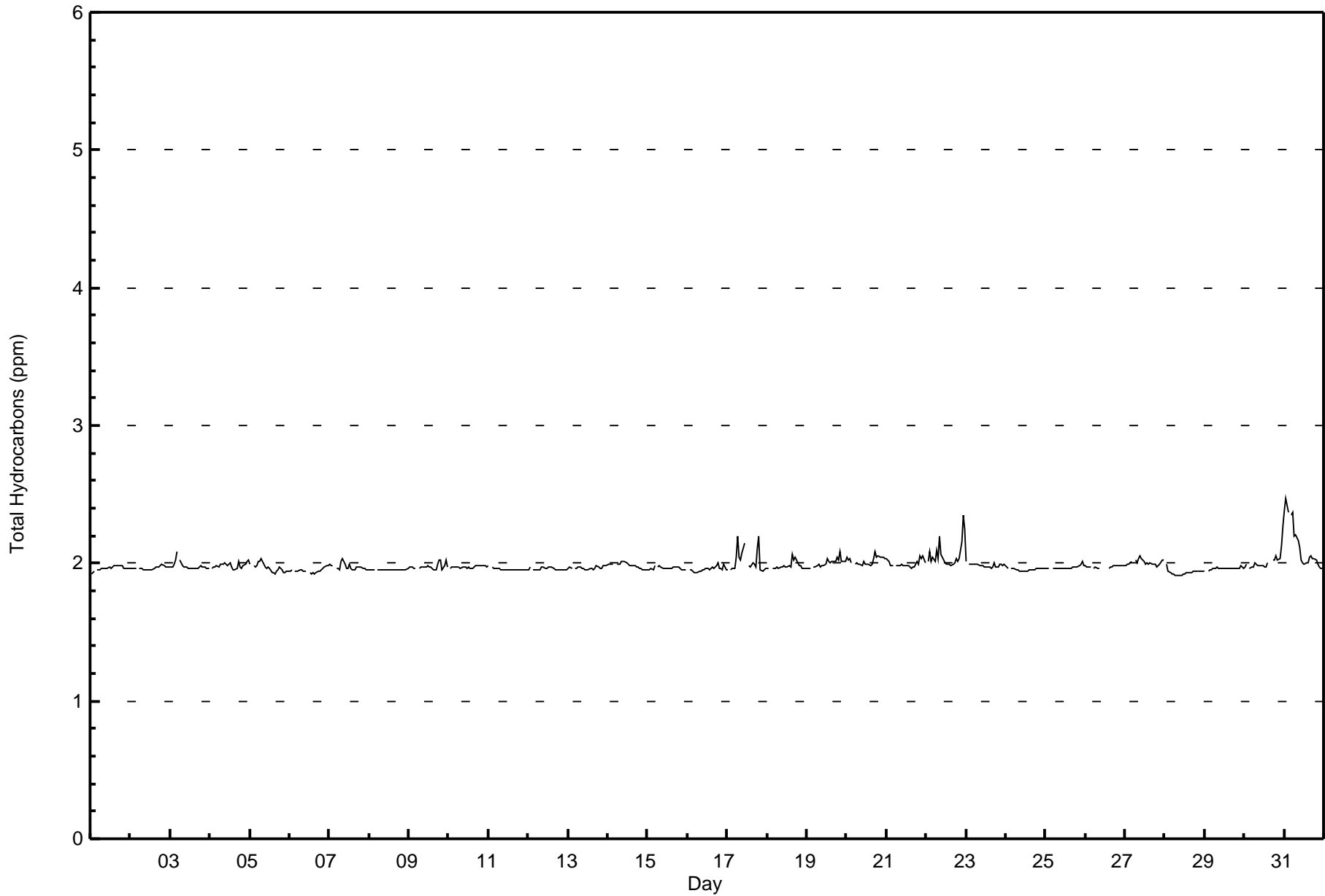


Total Number of Valid Hours: 707













**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Anzac - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	671	95.45	95.45
2.1 - 3.0	32	4.55	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Anzac - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	43	26	11	8	6	10	39	42	32	23	58	34	62	114	103	60	671
2.1 - 3.0	2	0	0	1	1	0	10	5	1	2	1	1	1	3	3	1	32
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	45	26	11	9	7	10	49	47	33	25	59	35	63	117	106	61	703

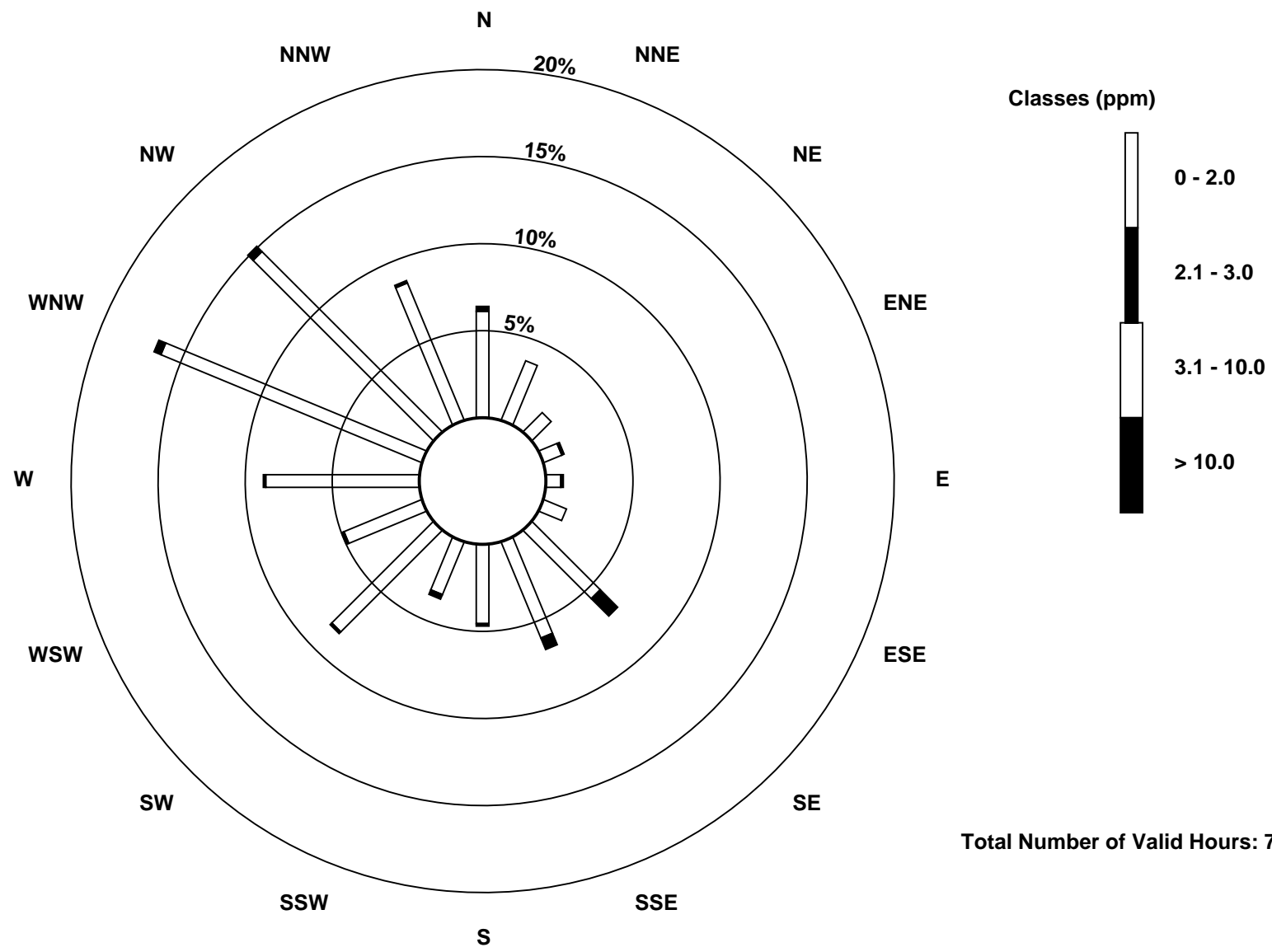
Total Number of Valid Hours: 703

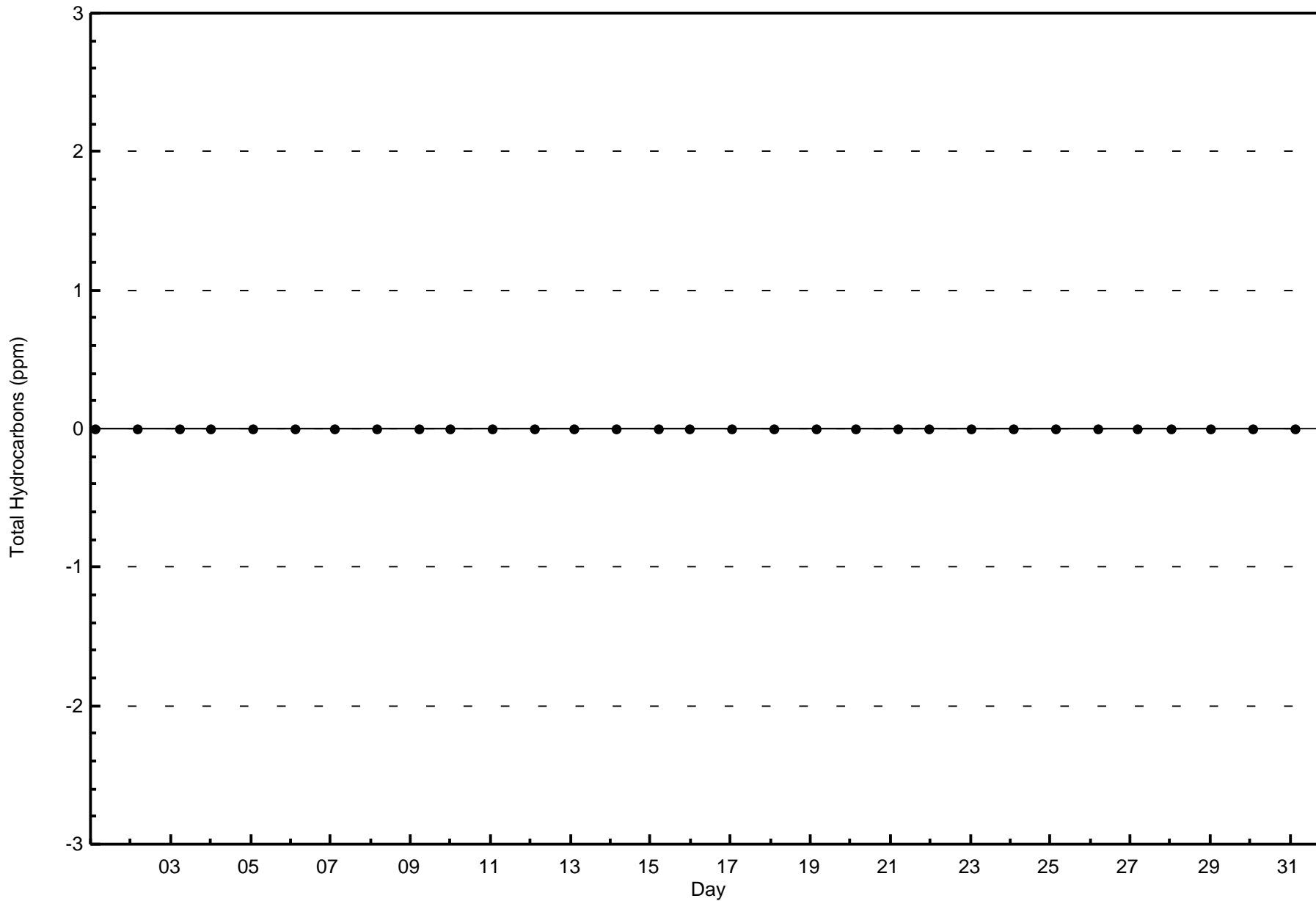
Total Number of Hours: 744

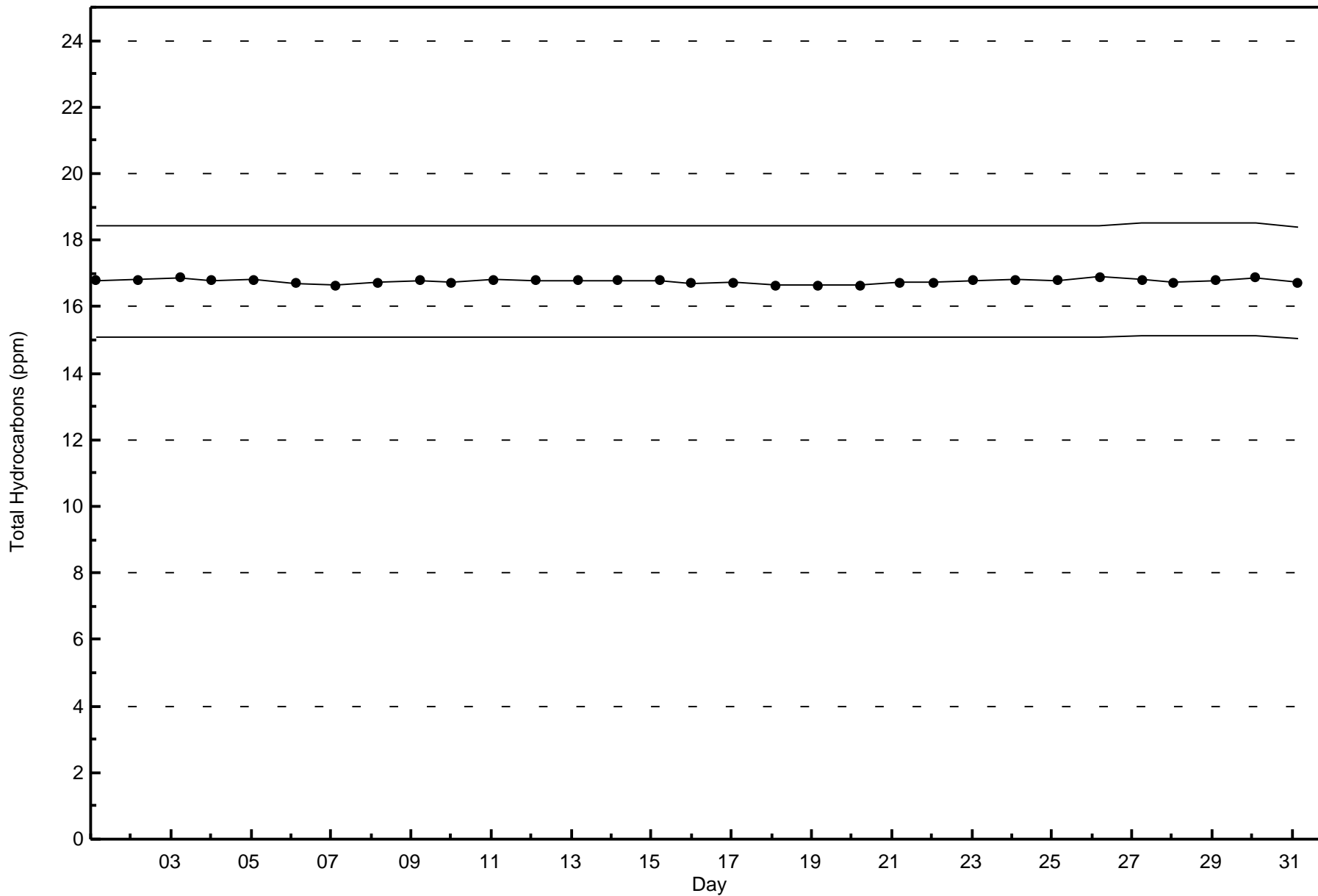


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

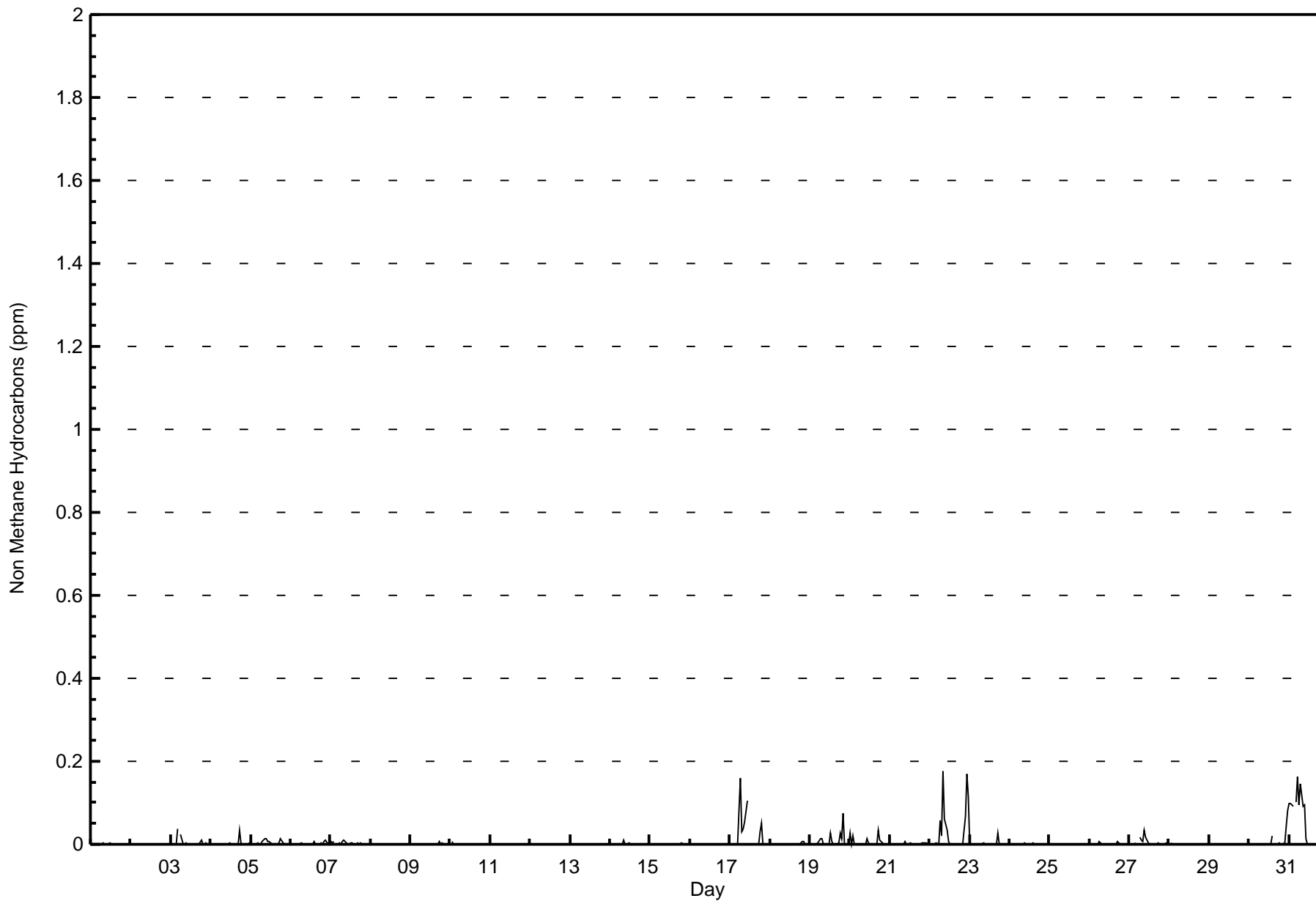
Total Hydrocarbons (THC) - ppm  
Anzac (AMS 14)













**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Anzac - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.005	631	89.76	89.76
0.006 - 0.05	51	7.25	97.01
0.06 - 0.1	17	2.42	99.43
> 0.1	4	0.57	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744





**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Anzac - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 0.005	43	26	11	9	6	8	26	36	30	24	56	31	56	107	103	59	631
0.006 - 0.05	0	0	0	0	0	2	13	7	3	1	3	3	6	8	3	2	51
0.06 - 0.1	1	0	0	0	1	0	8	3	0	0	0	1	1	2	0	0	17
> 0.1	1	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	4
<b>Totals</b>	<b>45</b>	<b>26</b>	<b>11</b>	<b>9</b>	<b>7</b>	<b>10</b>	<b>49</b>	<b>47</b>	<b>33</b>	<b>25</b>	<b>59</b>	<b>35</b>	<b>63</b>	<b>117</b>	<b>106</b>	<b>61</b>	<b>703</b>

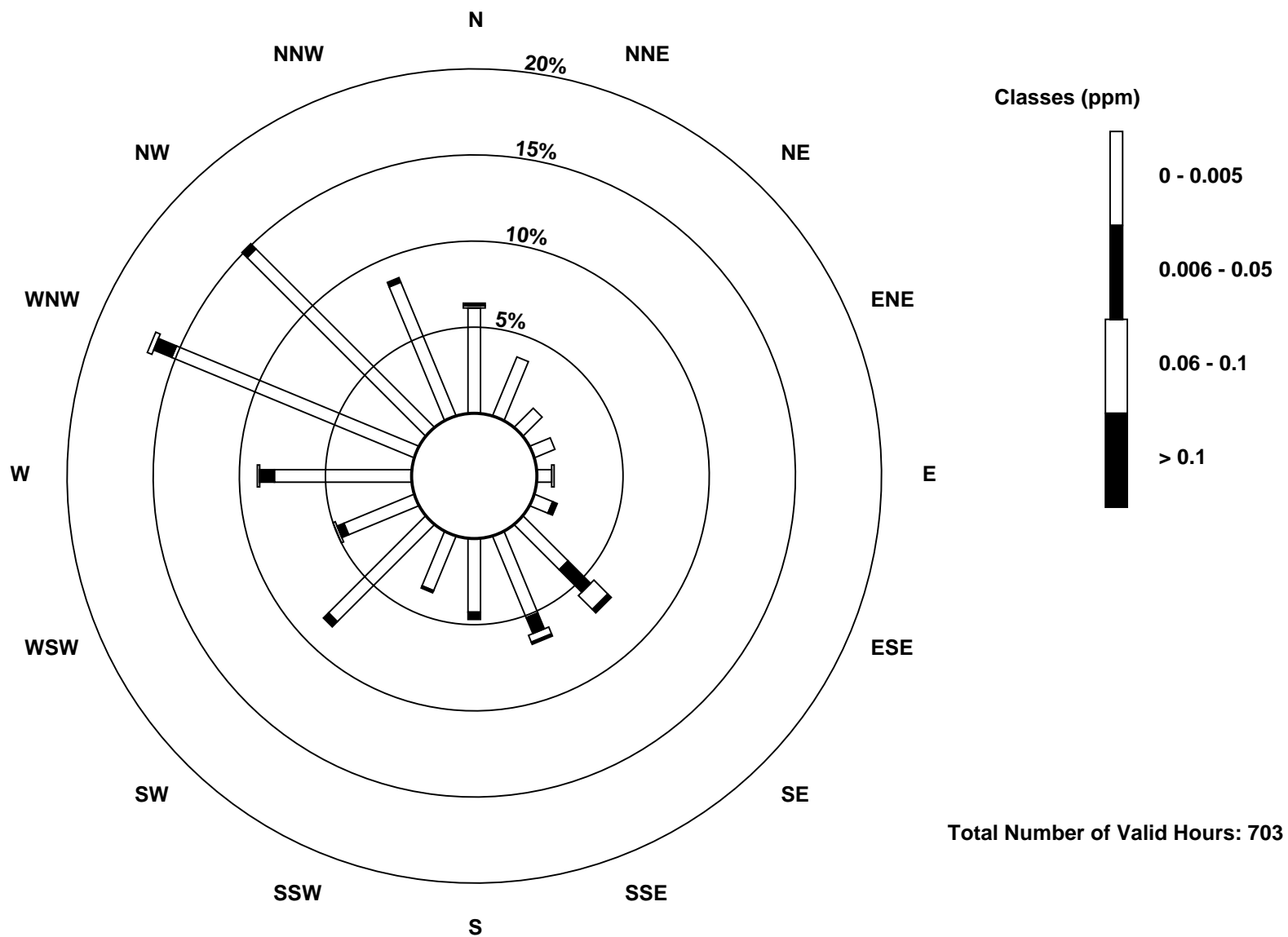
Total Number of Valid Hours: 703

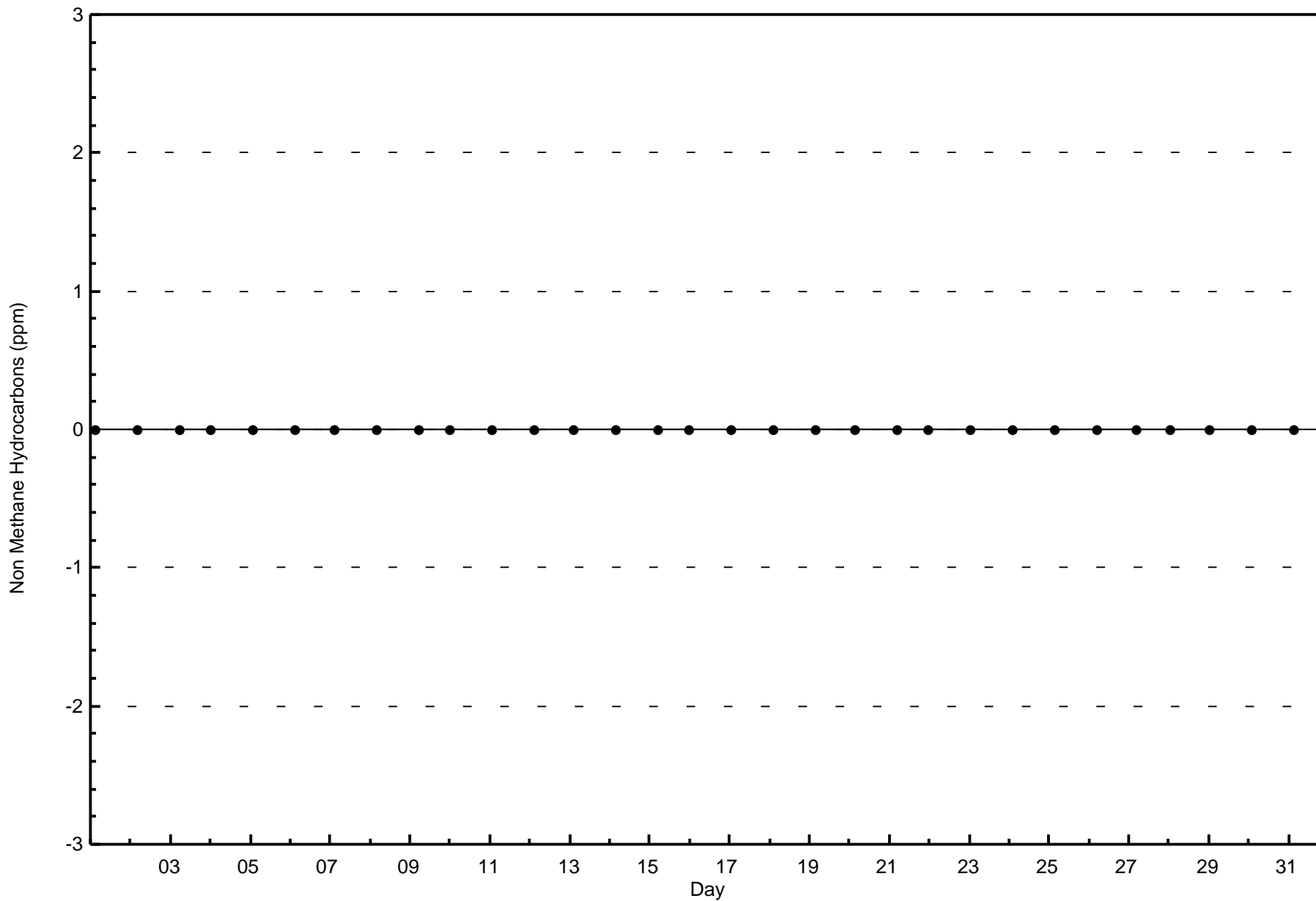
Total Number of Hours: 744

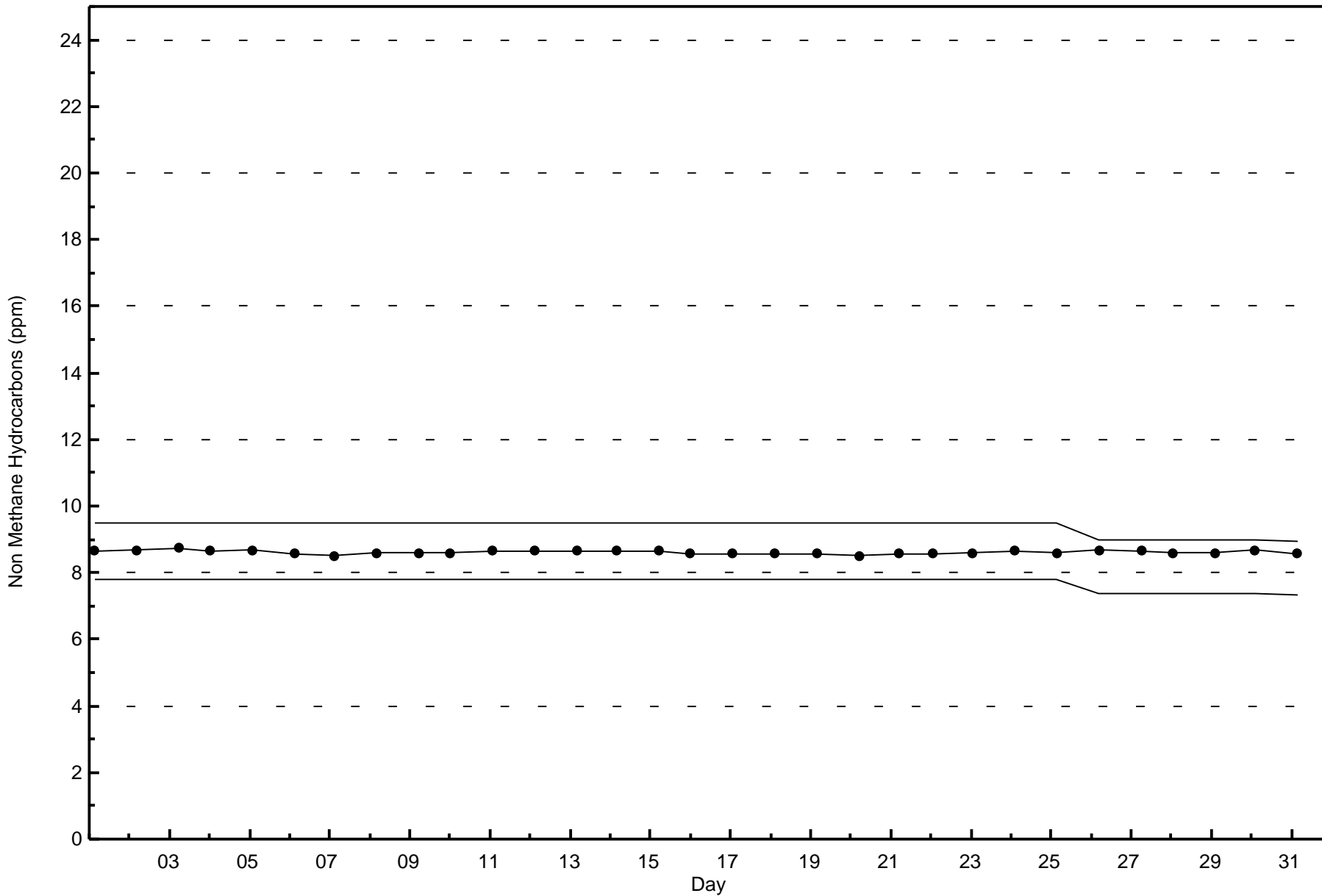


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Non Methane Hydrocarbons (NMHC) - ppm  
Anzac (AMS 14)





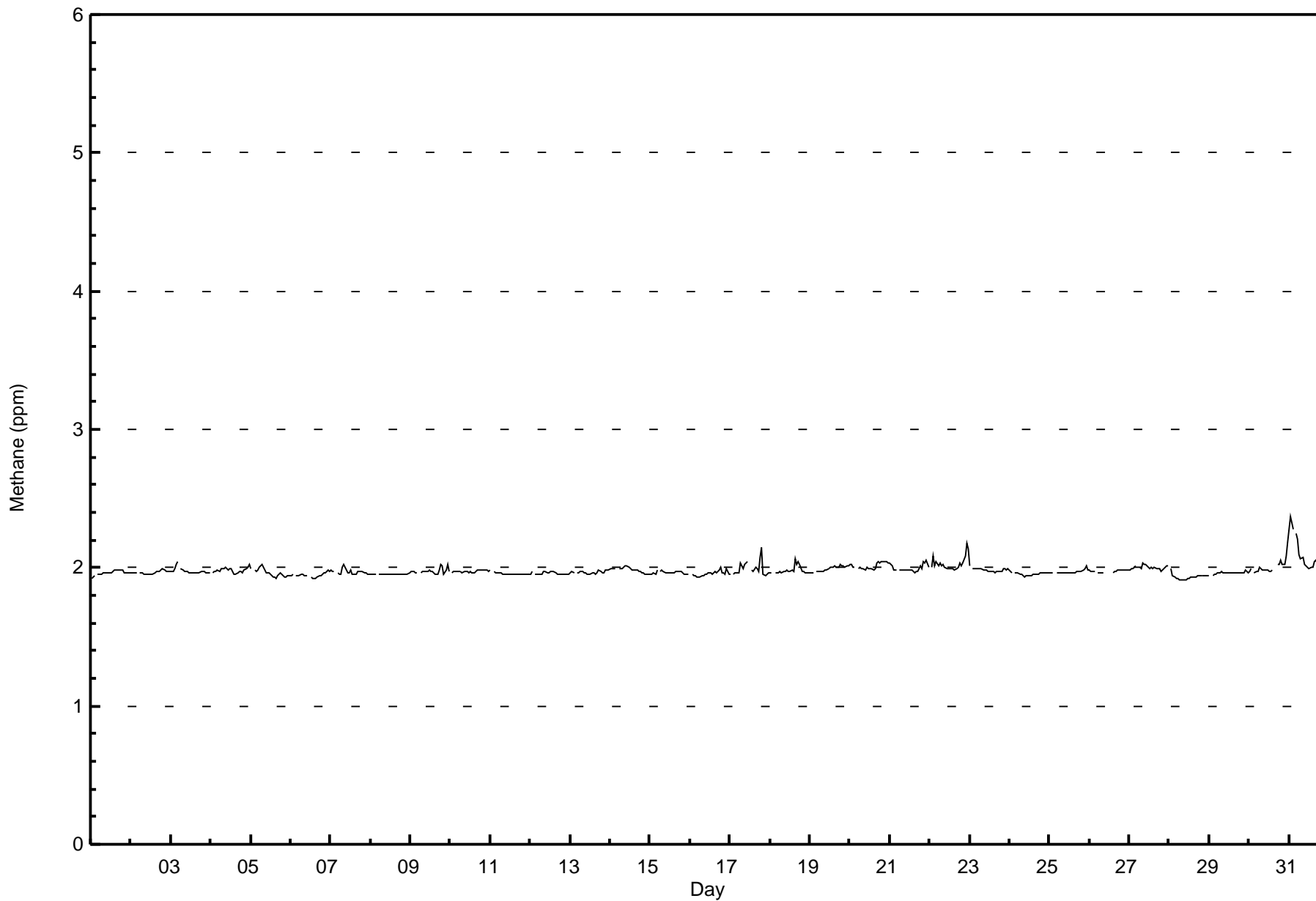






**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Methane (CH<sub>4</sub>) - ppm**  
**Anzac - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Anzac - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	683	97.16	97.16
2.1 - 3.0	20	2.84	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm  
Anzac - October 2017**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	43	26	11	8	7	10	44	45	32	24	59	34	62	115	103	60	683
2.1 - 3.0	2	0	0	1	0	0	5	2	1	1	0	1	1	2	3	1	20
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	45	26	11	9	7	10	49	47	33	25	59	35	63	117	106	61	703

Total Number of Valid Hours: 703

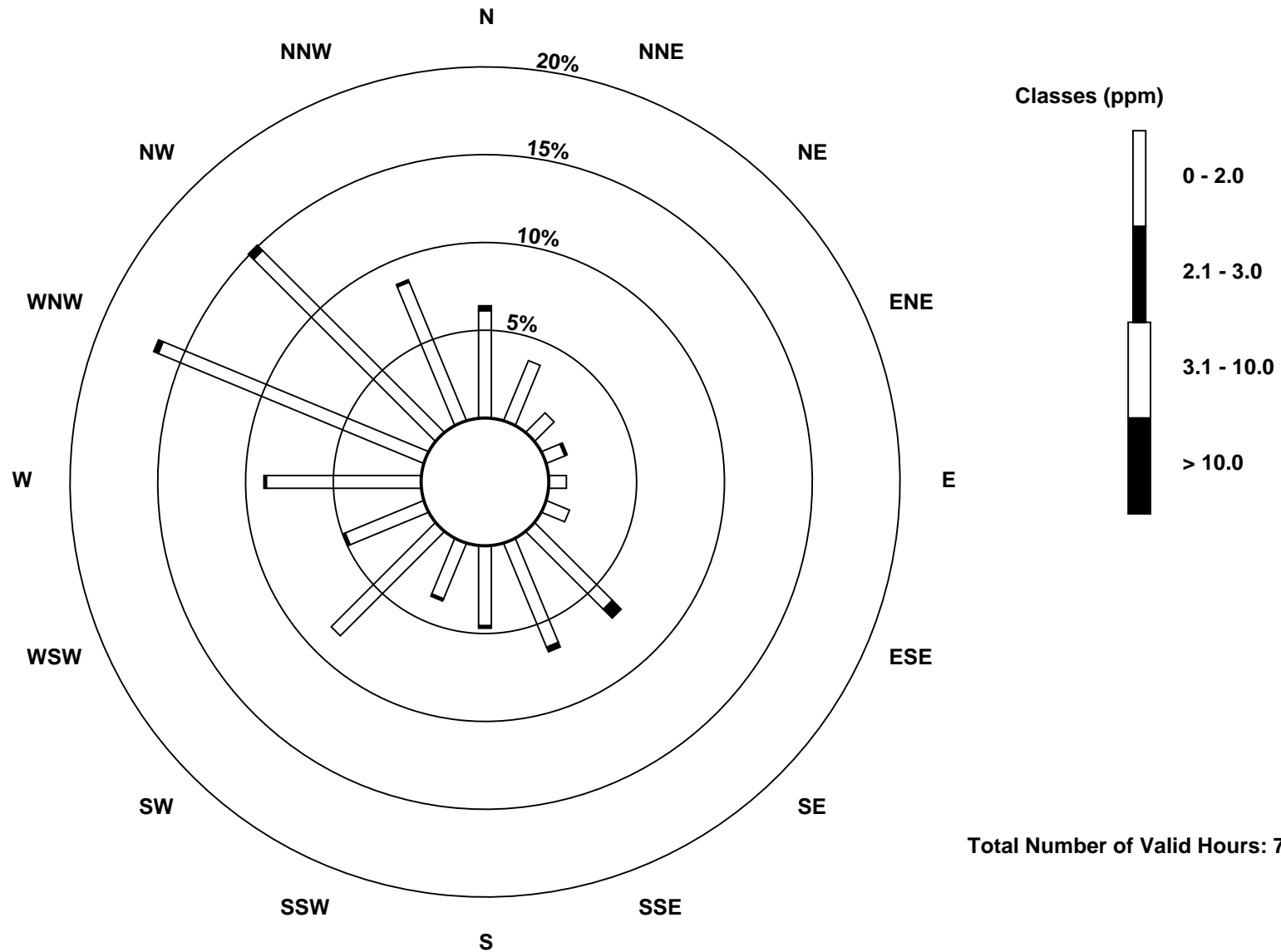
Total Number of Hours: 744

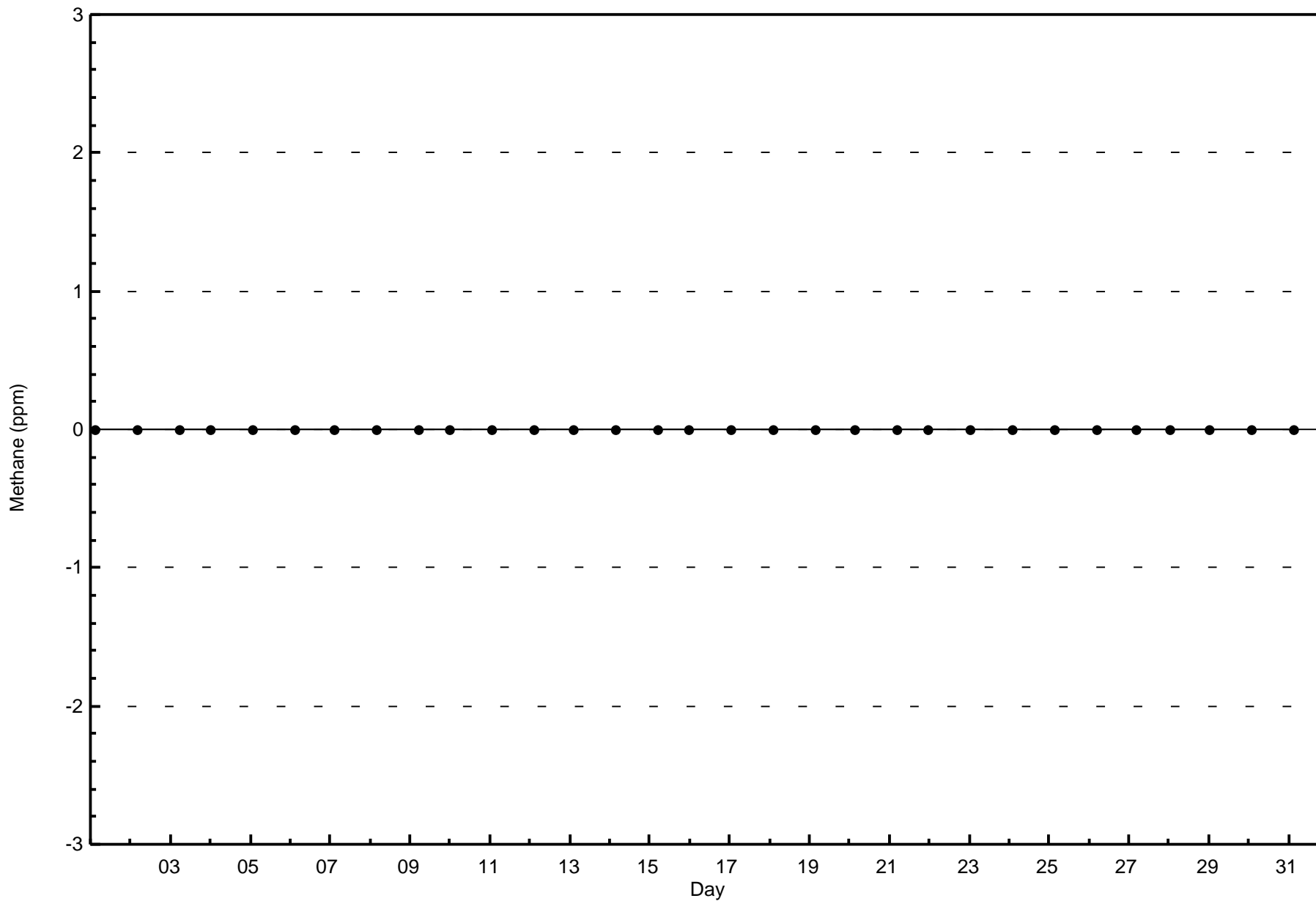




Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Methane (CH<sub>4</sub>) - ppm  
Anzac (AMS 14)

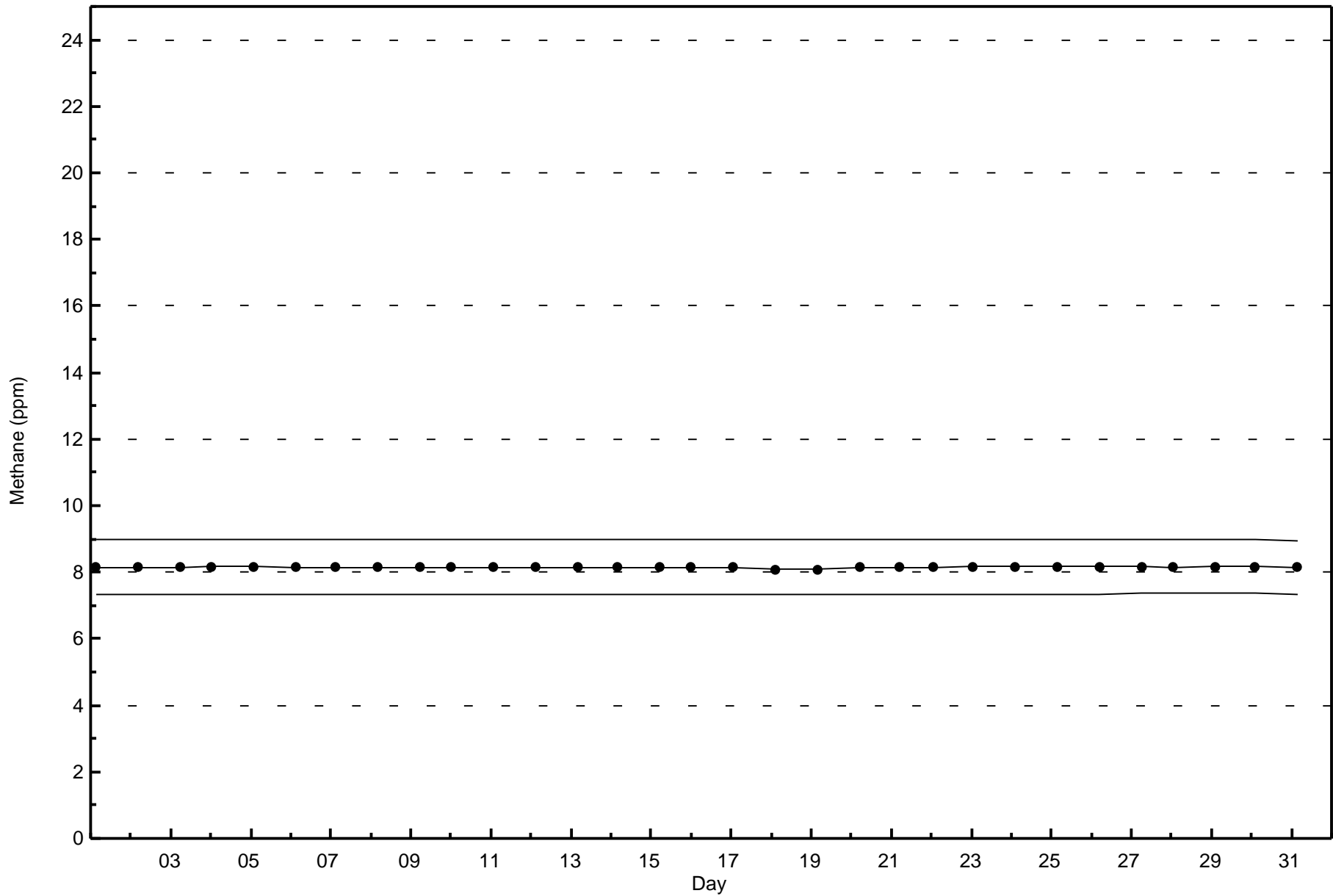






Wood Buffalo Environmental Association  
Span Responses

Methane (CH<sub>4</sub>) - ppm  
Anzac - October 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

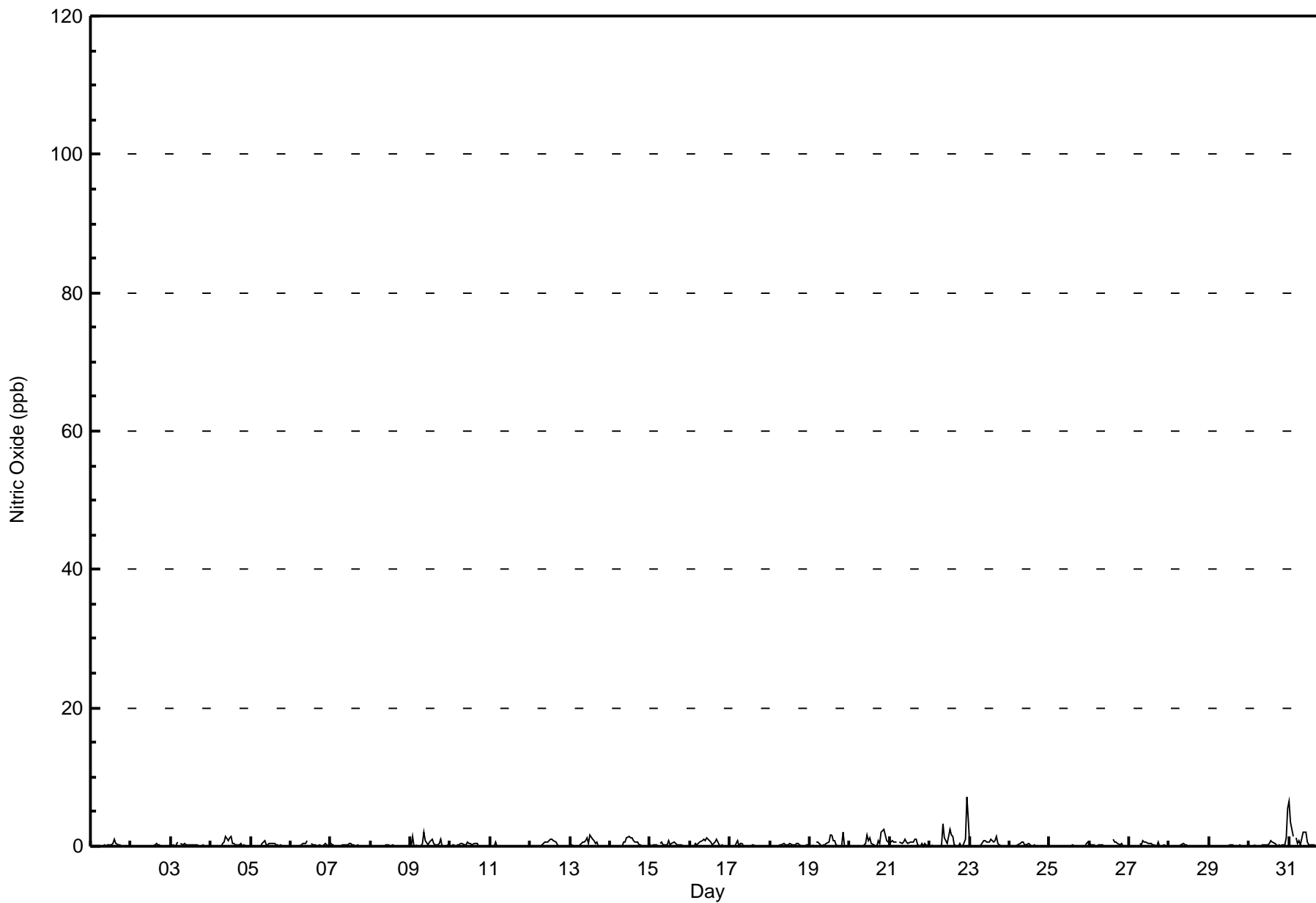
Anzac - October 2017

Maximum Value: 7 ppb on Oct 22 23:00		Maximum Daily Average: 1.1 ppb on Oct 22		Hours in Service: 744																							
Minimum Value: 0 ppb on Oct 26 22:00		Minimum Daily Average: 0.1 ppb on Oct 29		Hours of Data: 703																							
Maximum Diurnal Average: 0.6 ppb at hour 13		Minimum Diurnal Average: 0.1 ppb at hour 6		Hours of Missing Data: 41																							
Monthly Average: 0.3 ppb		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 2		Hours of Calibration: 40																							
				Percent Operational Time: 99.9																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.2	1	
2-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
3-Oct	0	0	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
4-Oct	Z	0	0	0	0	0	0	0	1	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0.4	2	
5-Oct	0	Z	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.2	1	
6-Oct	0	0	Z	0	0	0	0	0	1	0	1	DF	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1	
7-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
8-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
9-Oct	0	1	0	0	0	Z	0	0	2	1	0	1	1	1	0	0	0	0	1	0	0	0	0	0	0.4	2	
10-Oct	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
11-Oct	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1	
12-Oct	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.3	1	
13-Oct	0	0	0	Z	0	0	0	1	1	1	1	0	2	1	1	0	1	0	0	0	0	0	0	0	0.4	2	
14-Oct	0	0	0	0	Z	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.4	1	
15-Oct	0	0	0	0	0	Z	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0.2	1	
16-Oct	Z	0	0	0	0	0	1	1	1	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0.4	1	
17-Oct	0	Z	0	0	1	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
18-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
19-Oct	0	0	0	Z	1	1	0	0	0	0	0	1	2	2	1	1	0	0	0	0	2	0	0	0	0.5	2	
20-Oct	0	0	0	0	Z	0	0	0	0	0	2	1	1	0	0	0	0	1	0	2	2	2	1	1	0.6	2	
21-Oct	0	1	1	1	1	Z	1	0	1	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0.5	1	
22-Oct	Z	0	0	0	0	0	0	0	3	1	0	1	2	2	1	0	0	0	0	0	0	1	7	4	1.1	7	
23-Oct	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.4	1	
24-Oct	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1	
25-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1	1	
26-Oct	0	0	0	0	Z	0	0	0	0	C	C	C	C	C	1	1	1	0	0	0	0	0	0	0	0.3	1	
27-Oct	0	0	0	0	0	Z	0	0	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0.2	1	
28-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
29-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
30-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	6	0.5	6	
31-Oct	6	4	1	Z	1	0	1	0	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1.0	6	
		0.3	0.3	0.1	0.1	0.2	0.1	0.2	0.2	0.6	0.5	0.5	0.5	0.6	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.4	Diurnal Average
		6	4	1	1	1	1	1	1	3	2	2	1	2	2	1	1	1	1	1	1	2	2	2	7	6	Diurnal Maximum
Z - zerspan		C - Calibration			DF - DAS Failure																						



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitric Oxide (NO) - ppb**  
**Anzac - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Anzac - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	703	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitric Oxide (NO) - ppb  
Anzac - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	45	26	12	9	7	10	48	47	33	25	59	35	63	117	106	61	703
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	45	26	12	9	7	10	48	47	33	25	59	35	63	117	106	61	703

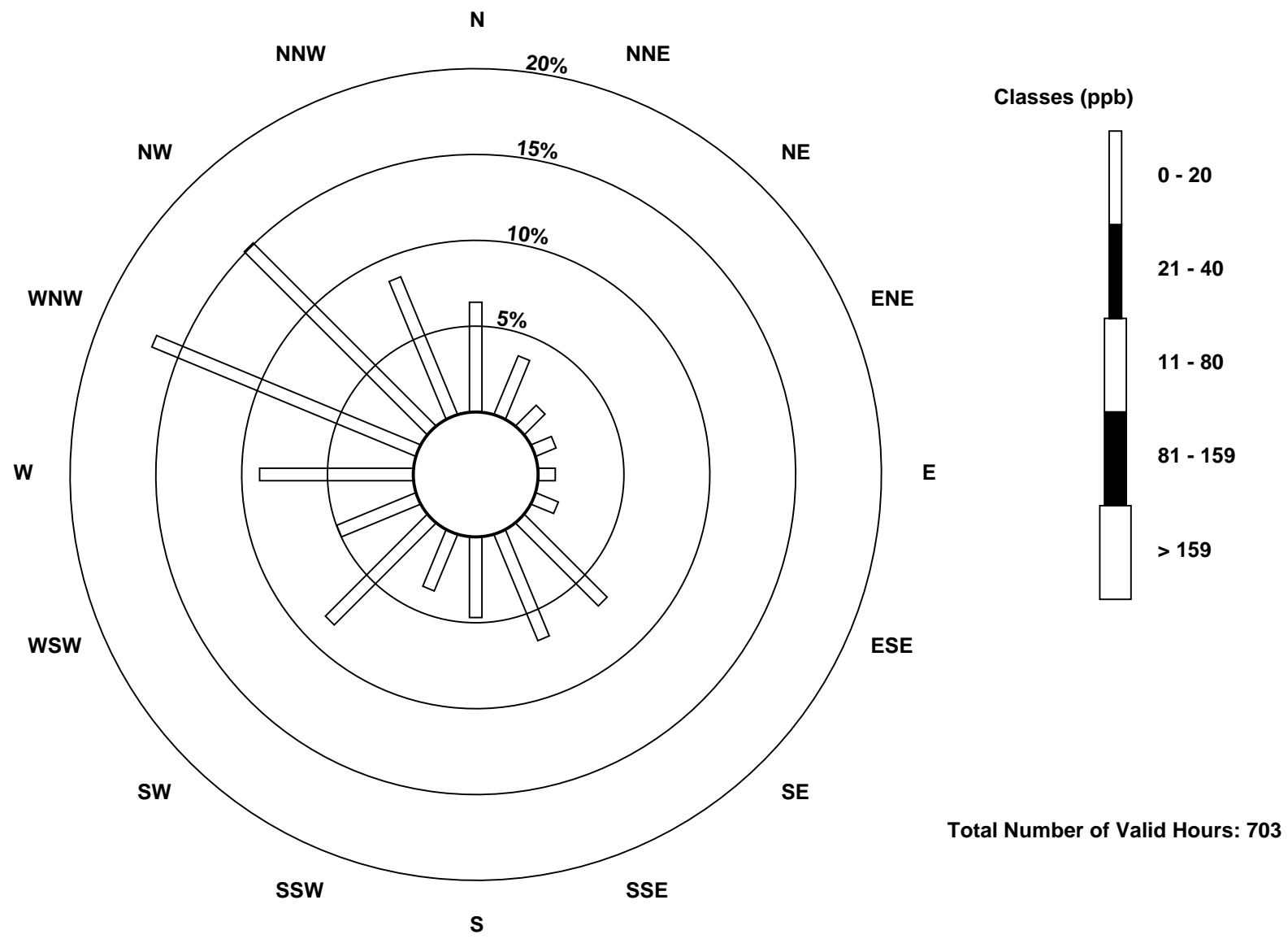
Total Number of Valid Hours: 703

Total Number of Hours: 744

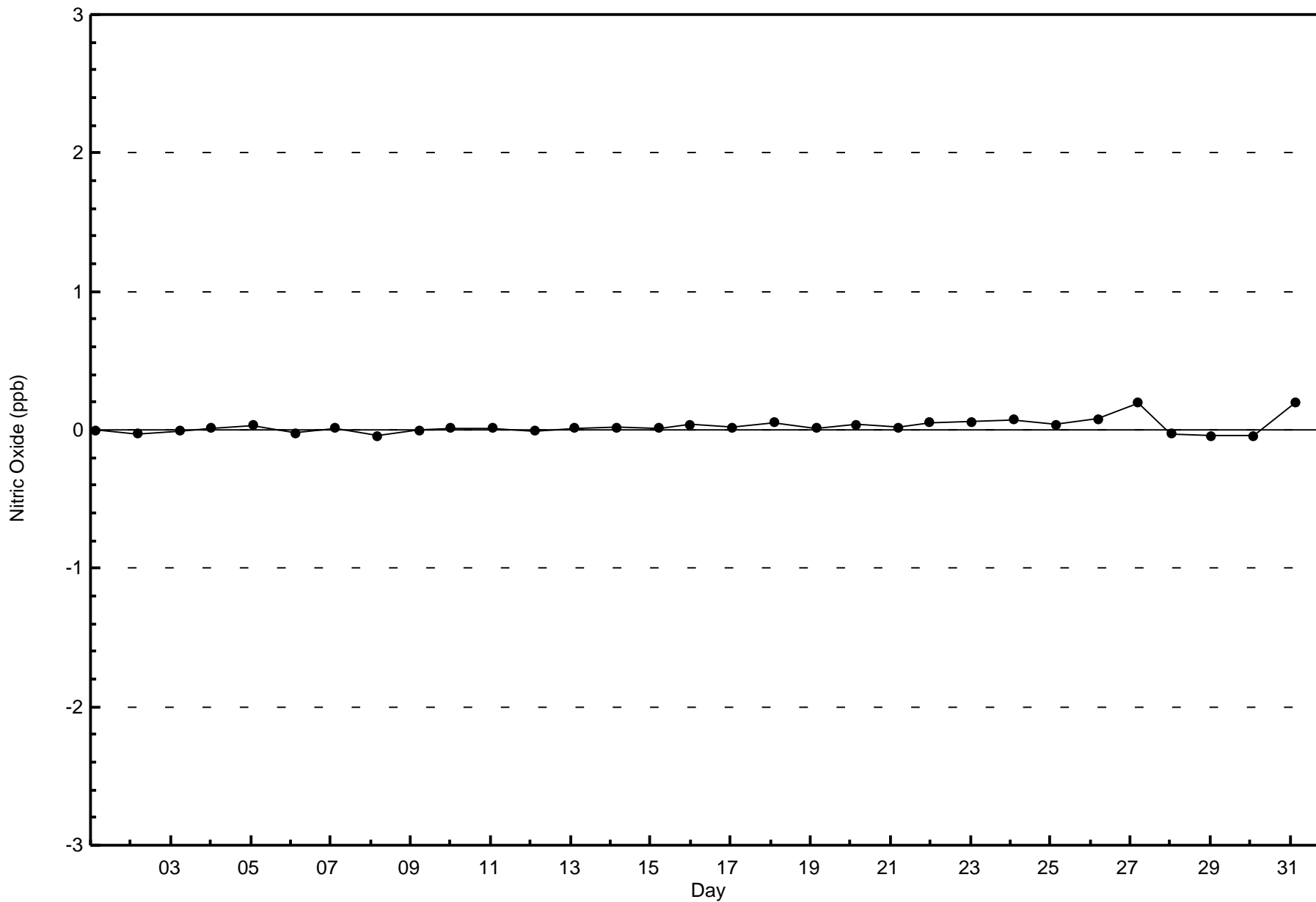


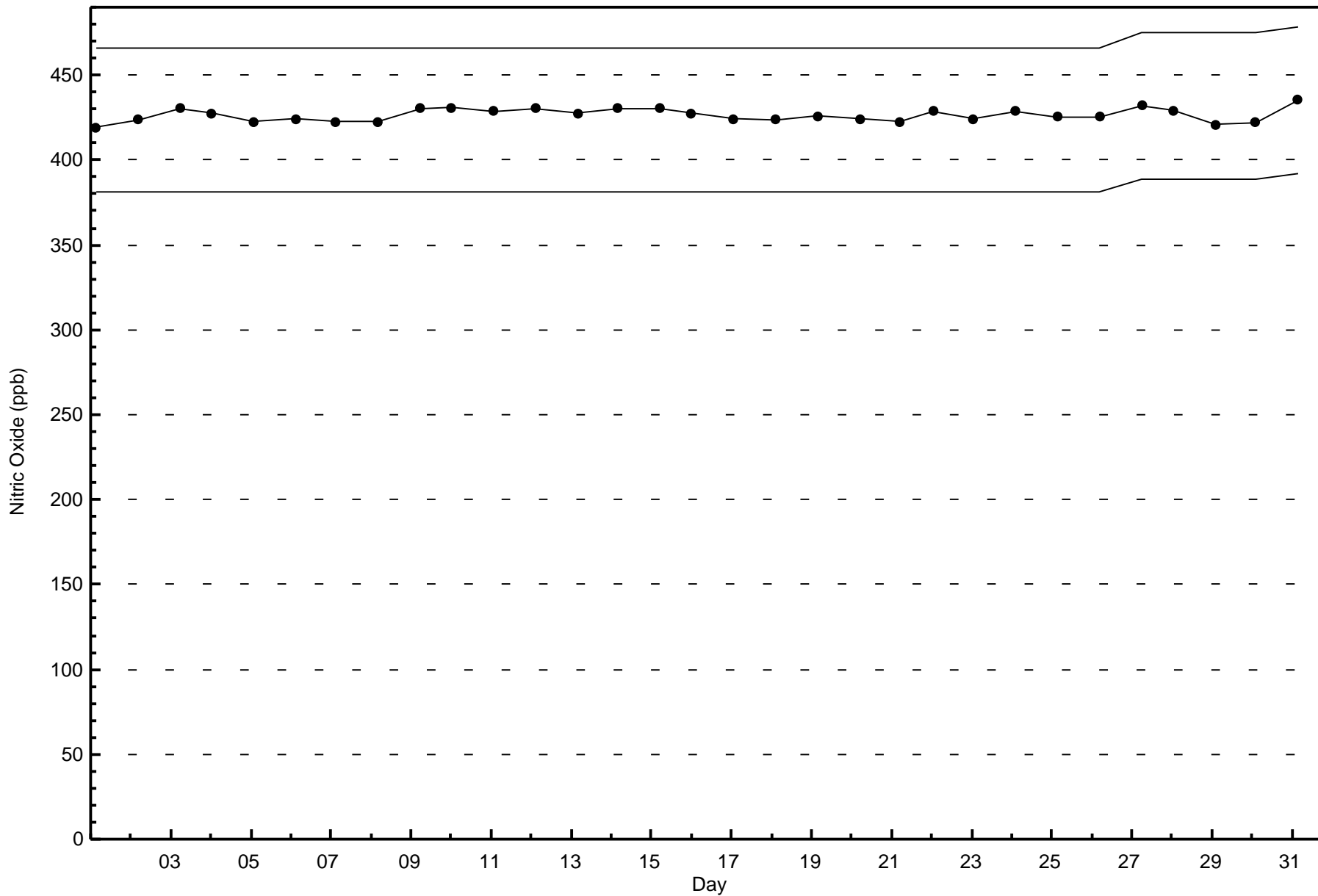
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitric Oxide (NO) - ppb  
Anzac (AMS 14)









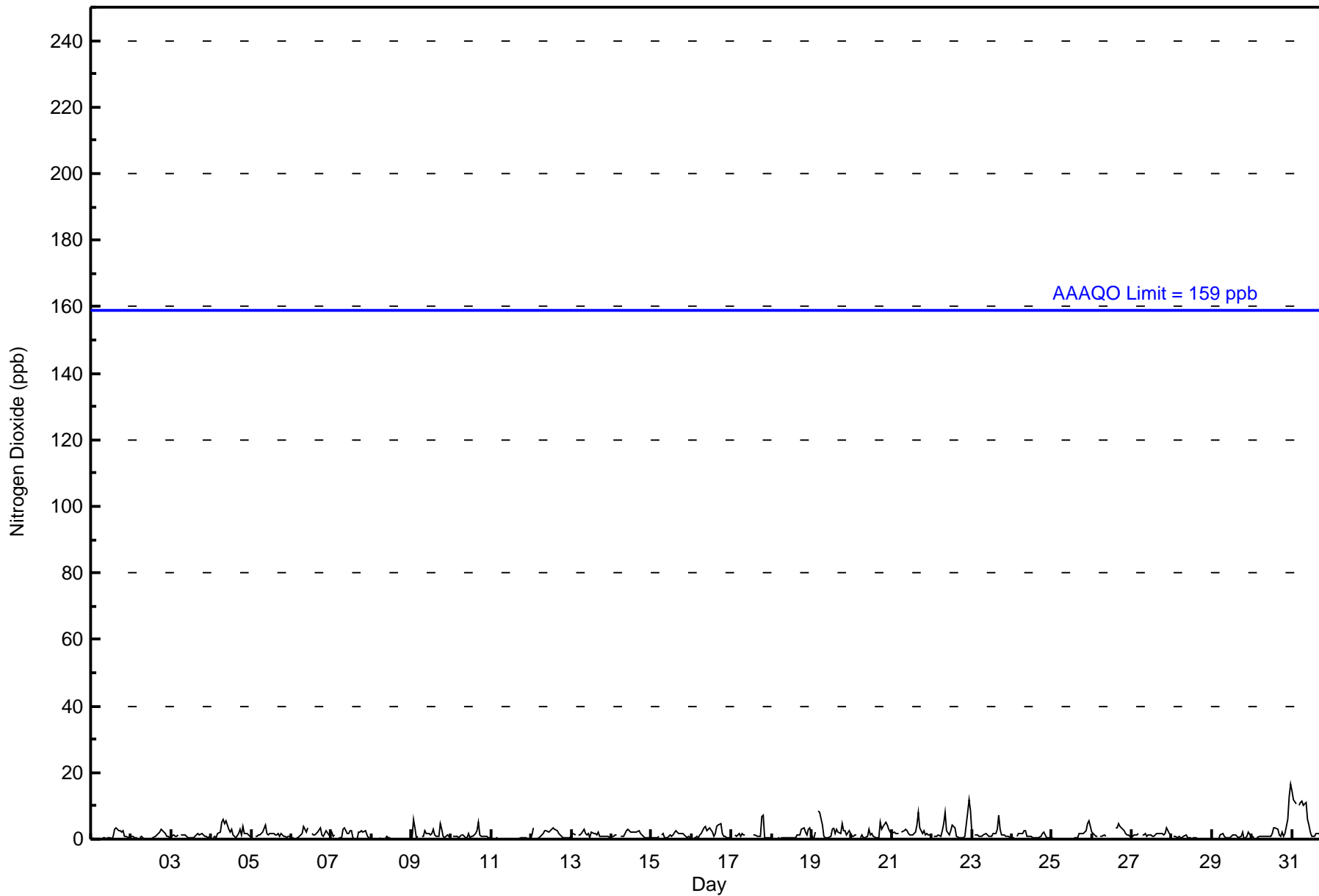


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 17 ppb on Oct 31 00:00										Maximum Daily Average: 5.0 ppb on Oct 31										Hours of Data: 703						
Minimum Value: 0 ppb on Oct 11 10:00										Minimum Daily Average: 0.2 ppb on Oct 11										Hours of Missing Data: 41						
Maximum Diurnal Average: 2.1 ppb at hour 9										Minimum Diurnal Average: 0.7 ppb at hour 4										Hours of Calibration: 40						
Monthly Average: 1.6 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 1 Q <sub>3</sub> = 2 P <sub>90</sub> = 3 P <sub>99</sub> = 11										Percent Operational Time: 99.9						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	3	3	3	3	2	3	1	1	0	1	1.0	3
2-Oct	1	1	0	1	Z	1	1	1	0	0	0	0	0	0	1	1	2	2	3	3	2	1	1	0	0.9	3
3-Oct	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	2	1	2	1	1	1	1	1	1.0	2
4-Oct	Z	1	1	1	2	2	5	6	5	6	3	2	3	1	1	1	2	3	1	4	2	2	1	1	2.3	6
5-Oct	1	Z	1	1	1	1	2	2	4	2	1	2	2	2	1	1	2	1	2	1	1	1	1	1	1.4	4
6-Oct	1	1	Z	1	1	1	2	4	3	2	3	DF	2	1	1	2	2	4	1	1	2	2	1	2	1.7	4
7-Oct	2	1	1	Z	1	1	1	3	3	2	2	3	2	1	0	0	2	2	3	2	3	1	1	0	1.5	3
8-Oct	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
9-Oct	0	6	3	1	1	Z	1	1	3	2	2	1	2	3	1	1	1	5	3	1	1	1	1	1	1.7	6
10-Oct	Z	1	1	1	1	1	1	1	1	0	2	1	1	1	2	3	5	1	1	1	1	1	1	0	1.1	5
11-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
12-Oct	1	3	Z	0	1	1	1	2	3	3	2	3	3	4	3	3	2	1	1	1	0	1	1	1	1.6	4
13-Oct	1	2	1	Z	1	1	2	3	2	1	2	1	2	2	2	1	2	1	1	1	1	1	1	1	1.4	3
14-Oct	1	1	1	1	Z	1	1	1	2	3	3	2	2	2	2	3	2	2	1	1	1	0	0	0	1.4	3
15-Oct	1	0	1	1	1	Z	1	2	1	0	1	1	1	1	3	2	2	2	2	2	2	1	1	1	1.1	3
16-Oct	Z	0	0	1	1	1	2	3	4	3	3	3	2	1	2	4	4	5	2	1	1	0	0	0	1.9	5
17-Oct	0	Z	1	1	2	1	2	1	1	C	C	C	C	1	1	1	1	1	7	7	1	0	0	0	1.6	7
18-Oct	0	0	Z	0	0	0	0	0	1	0	0	1	1	0	1	1	1	1	3	3	2	1	3	3	1.1	3
19-Oct	1	1	2	Z	9	8	4	1	0	1	1	1	3	3	2	3	2	2	5	3	3	1	2	2	2.5	9
20-Oct	1	1	1	1	Z	1	1	0	0	1	3	1	2	1	1	0	0	5	3	4	5	4	3	2	1.8	5
21-Oct	2	2	2	2	2	Z	2	2	3	3	2	1	1	2	2	4	8	3	2	3	1	2	1	1	2.3	8
22-Oct	Z	1	1	1	1	1	2	5	8	3	1	3	4	4	4	1	0	0	1	0	1	8	12	9	3.0	12
23-Oct	2	Z	1	1	1	1	1	1	2	1	1	1	1	2	2	3	7	3	1	1	1	1	1	1	1.5	7
24-Oct	1	1	Z	1	2	2	2	3	3	1	1	1	0	0	0	1	1	1	2	2	1	0	0	0	1.0	3
25-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	2	2	2	2	2	5	5	4	1.1	5
26-Oct	2	2	1	1	Z	1	1	1	1	C	C	C	C	C	3	3	5	4	3	2	2	1	1	1	1.9	5
27-Oct	1	1	1	1	2	Z	1	1	2	1	1	1	1	1	1	2	2	2	2	1	2	4	2	1	1.4	4
28-Oct	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
29-Oct	0	Z	0	0	0	1	2	1	0	1	0	0	1	1	1	1	0	1	2	0	1	1	2	1	0.8	2
30-Oct	1	1	Z	1	1	1	1	1	1	1	1	1	2	3	3	3	1	1	2	1	2	6	13	17	2.7	17
31-Oct	15	12	11	Z	10	11	11	10	11	6	4	2	1	1	2	2	2	1	1	1	1	0	0	0	5.0	15
1.3 1.5 1.3 0.7 1.5 1.5 1.7 1.9 2.1 1.5 1.4 1.2 1.4 1.3 1.5 1.6 2.1 1.9 1.9 1.7 1.3 1.6 1.8 1.7																								Diurnal Average		
15 12 11 2 10 11 11 10 11 6 4 3 4 4 4 4 4 8 5 7 7 5 8 13 17																								Diurnal Maximum		
Z - zerospan C - Calibration DF - DAS Failure																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										



Wood Buffalo Environmental Association  
Hourly Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Anzac - October 2017





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Anzac - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	703	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Anzac - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	45	26	12	9	7	10	48	47	33	25	59	35	63	117	106	61	703
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	45	26	12	9	7	10	48	47	33	25	59	35	63	117	106	61	703

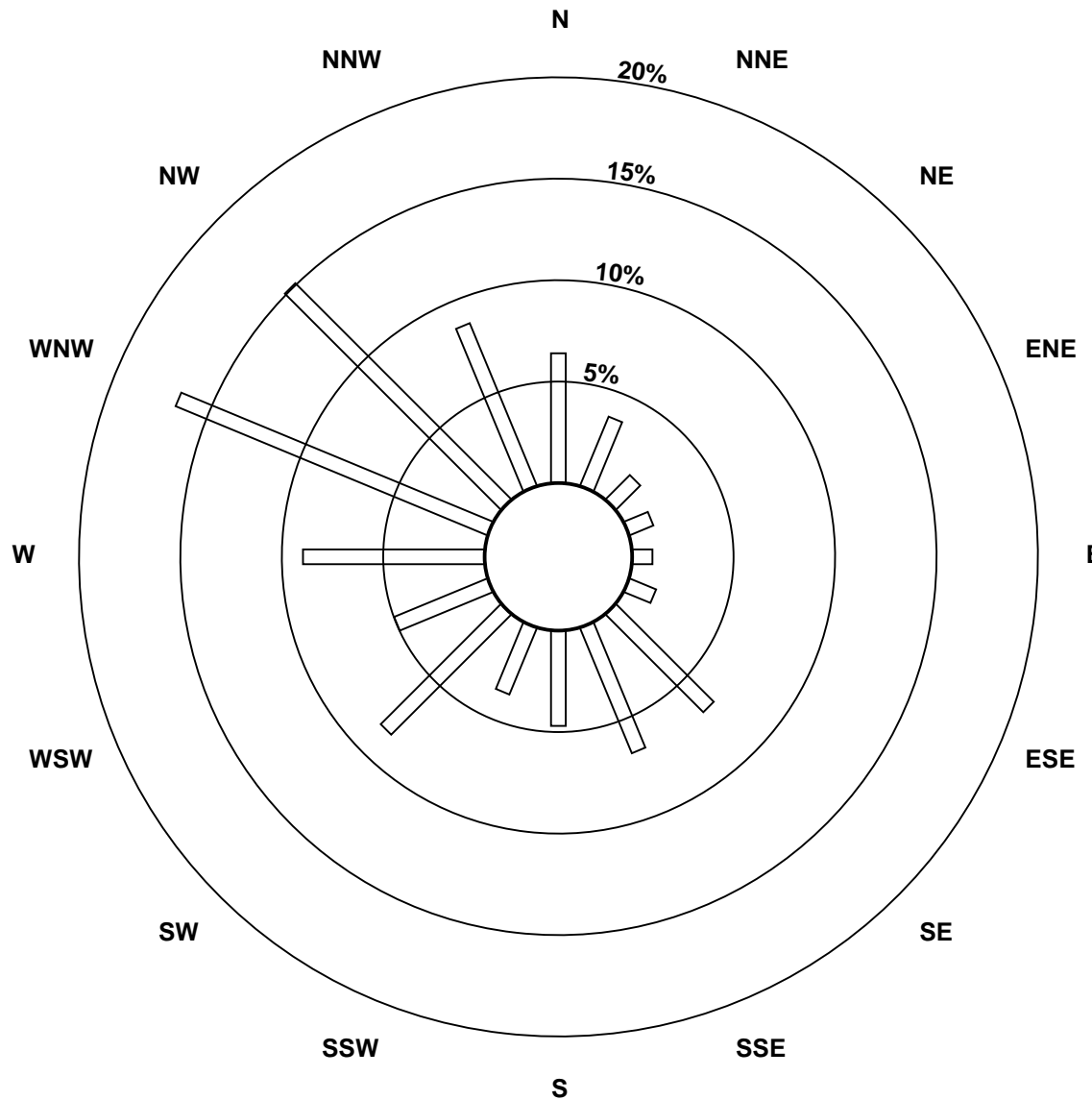
Total Number of Valid Hours: 703

Total Number of Hours: 744

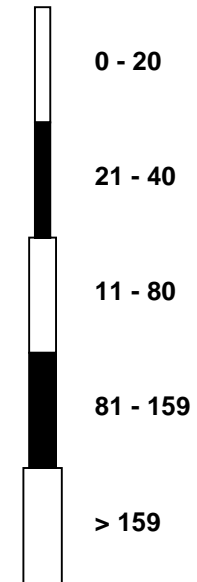


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

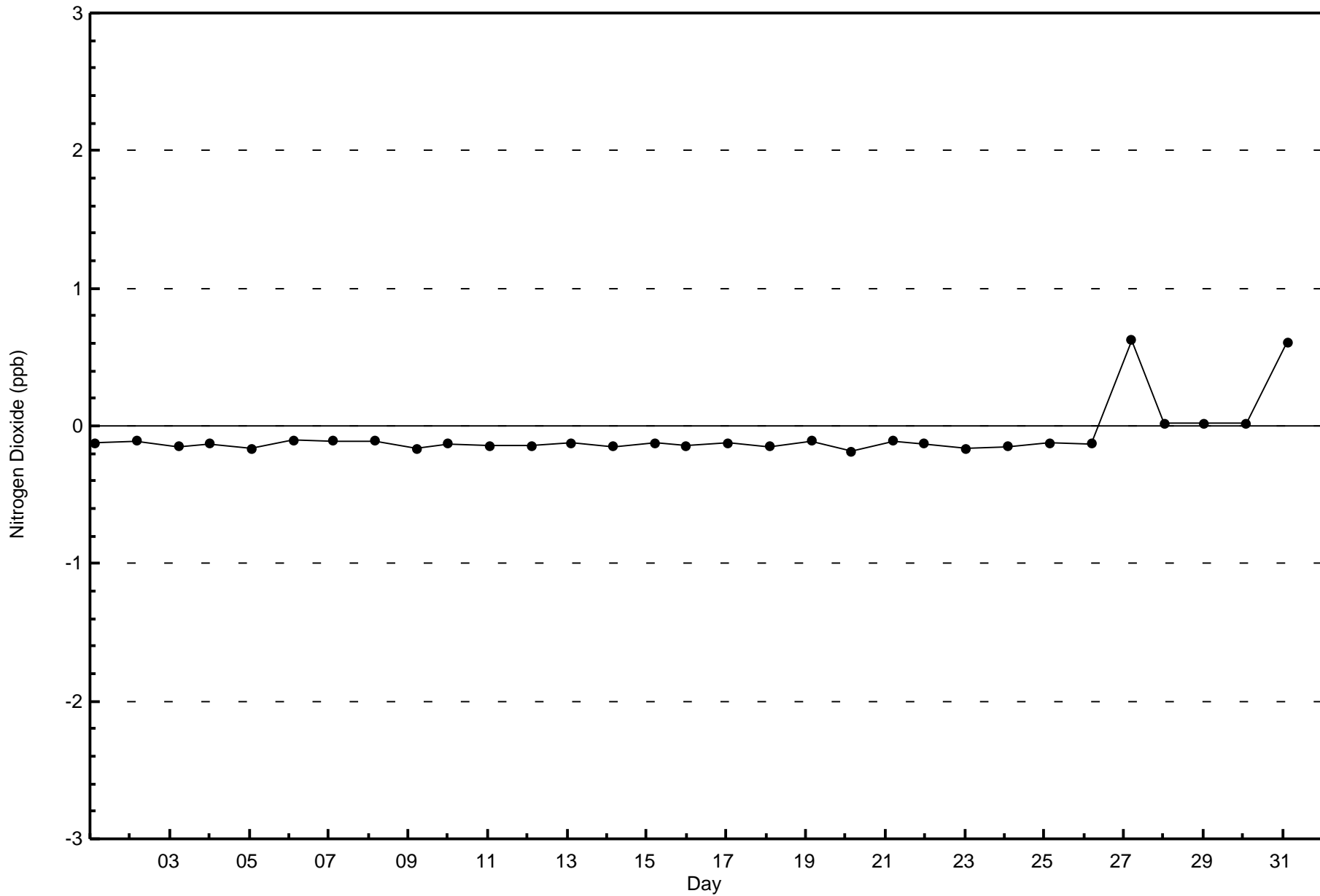
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Anzac (AMS 14)



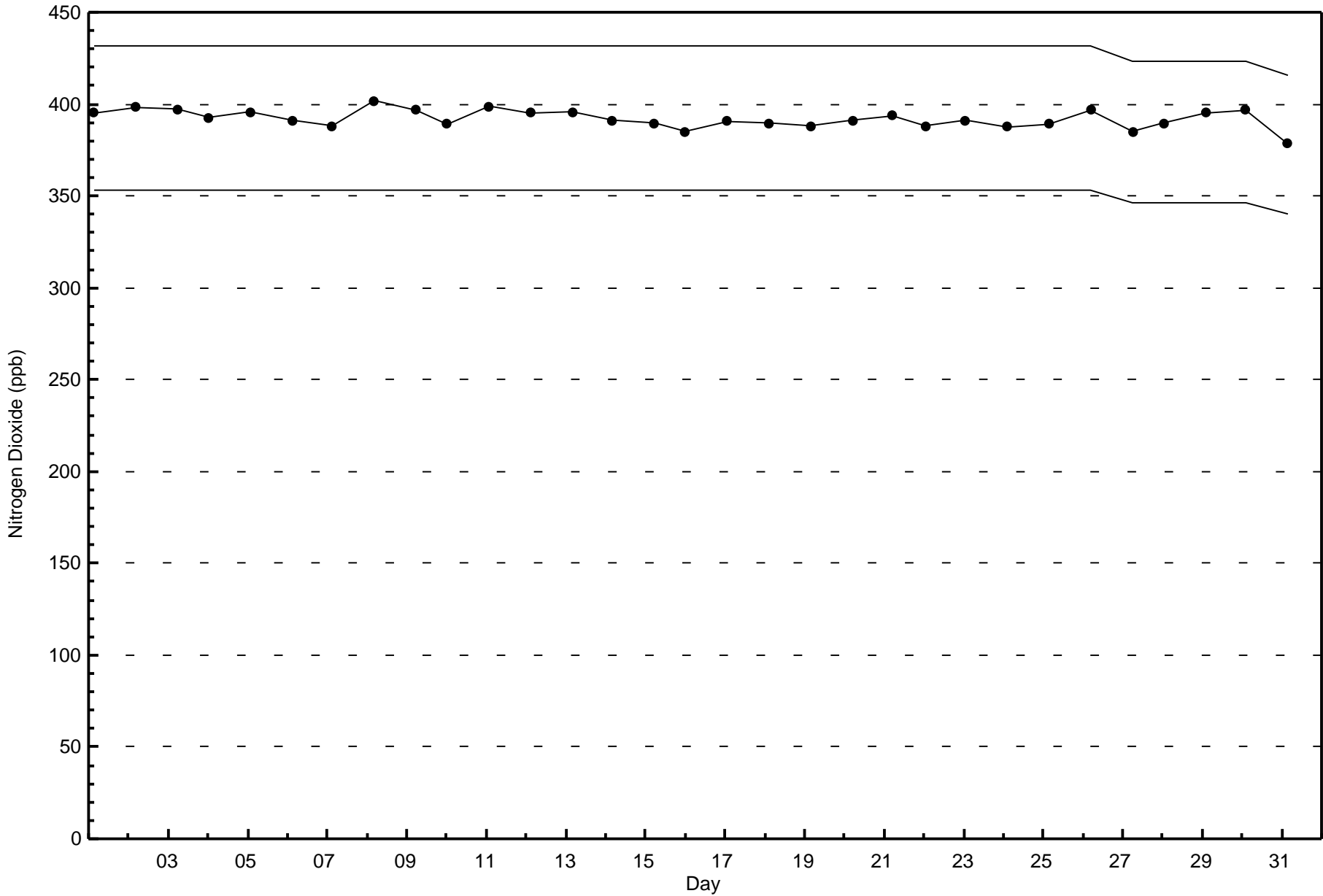
Classes (ppb)



Total Number of Valid Hours: 703









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb

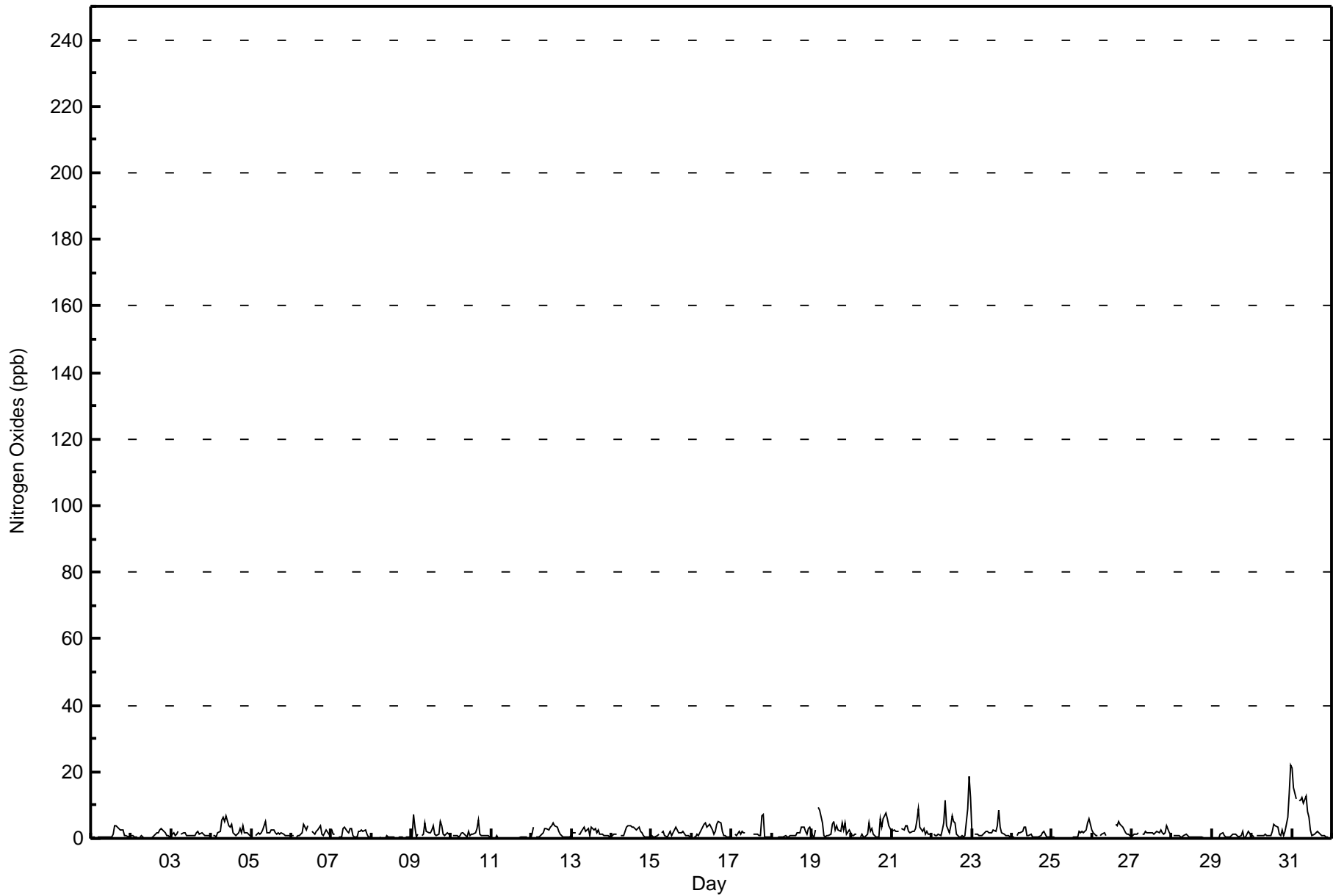
Anzac - October 2017

Maximum Value: 22 ppb on Oct 31 00:00																	Maximum Daily Average: 5.9 ppb on Oct 31																	Hours in Service: 744			
Minimum Value: 0 ppb on Oct 8 03:00																	Minimum Daily Average: 0.3 ppb on Oct 11																	Hours of Data: 703			
Maximum Diurnal Average: 2.6 ppb at hour 9																	Minimum Diurnal Average: 0.8 ppb at hour 4																	Hours of Missing Data: 41			
Monthly Average: 1.9 ppb																	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 1 Q <sub>3</sub> = 2 P <sub>90</sub> = 4 P <sub>99</sub> = 12																	Hours of Calibration: 40			
																																		Percent Operational Time: 99.9			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24													
1-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	4	4	3	3	2	3	1	1	0	1	1.2	4											
2-Oct	1	1	0	1	Z	0	1	1	0	0	0	0	0	0	1	2	2	2	3	3	2	1	1	0	1.0	3											
3-Oct	1	2	1	1	2	Z	1	2	2	1	1	1	1	1	1	2	2	1	2	1	1	1	1	1	1.2	2											
4-Oct	Z	1	1	1	1	2	5	6	5	7	4	4	4	2	1	1	2	3	2	4	2	2	1	1	2.7	7											
5-Oct	1	Z	1	1	1	1	2	2	5	2	2	2	2	2	1	2	1	2	1	2	1	1	1	1	1.6	5											
6-Oct	1	1	Z	1	1	1	2	4	4	3	4	DF	2	2	1	2	2	4	1	1	2	3	1	2	2.0	4											
7-Oct	2	1	1	Z	1	1	1	3	3	2	2	3	3	1	0	0	2	2	3	2	3	1	1	0	1.6	3											
8-Oct	0	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1											
9-Oct	0	7	3	1	1	Z	1	1	5	2	2	2	2	4	1	1	1	5	4	1	1	2	1	1	2.1	7											
10-Oct	Z	1	1	1	1	1	2	2	1	0	2	1	1	1	2	3	6	1	1	1	1	1	1	0	1.4	6											
11-Oct	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1											
12-Oct	1	4	Z	0	1	1	1	2	3	3	3	4	4	4	4	3	2	1	1	1	0	1	1	1	1.9	4											
13-Oct	1	2	2	Z	1	1	2	3	2	2	3	1	4	3	3	2	3	1	1	1	1	1	1	1	1.8	4											
14-Oct	1	1	1	1	Z	1	1	1	2	3	4	4	3	3	3	3	2	2	1	1	0	0	0	0	1.8	4											
15-Oct	1	1	1	1	1	Z	2	2	1	1	1	2	1	2	3	3	2	2	2	2	1	1	1	1	1.4	3											
16-Oct	Z	0	1	1	1	2	3	4	5	3	4	4	3	1	2	4	5	5	2	1	1	0	0	0	2.3	5											
17-Oct	0	Z	1	1	2	1	2	2	2	C	C	C	C	1	1	1	1	1	7	7	1	0	0	0	1.7	7											
18-Oct	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	2	2	3	3	2	1	3	3	1.2	3											
19-Oct	1	1	2	Z	9	9	5	1	1	1	1	1	4	5	3	4	3	2	5	3	5	1	2	2	3.0	9											
20-Oct	1	1	1	1	Z	1	1	0	0	1	4	2	3	1	1	0	0	6	3	6	8	6	4	3	2.4	8											
21-Oct	2	3	2	2	2	Z	3	3	4	4	2	2	2	2	3	5	9	4	2	3	1	2	1	1	2.8	9											
22-Oct	Z	1	1	1	1	1	2	5	11	4	2	4	7	5	5	1	0	0	1	1	1	9	19	12	4.1	19											
23-Oct	2	Z	1	1	1	1	1	1	2	2	2	2	2	3	2	4	9	3	1	1	1	1	1	1	1.9	9											
24-Oct	1	1	Z	1	2	2	2	3	3	1	1	0	0	0	0	1	1	1	2	2	1	0	0	0	1.2	3											
25-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	2	3	5	6	4	1.2	6											
26-Oct	2	2	1	1	Z	1	1	2	1	C	C	C	C	C	4	4	5	4	3	3	2	1	1	1	2.2	5											
27-Oct	1	1	1	1	2	Z	1	1	2	2	2	2	2	1	2	2	2	3	2	1	2	4	2	1	1.7	4											
28-Oct	Z	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1											
29-Oct	0	Z	0	0	0	1	2	1	0	1	0	0	1	1	1	1	0	1	2	0	1	1	2	1	0.8	2											
30-Oct	1	1	Z	1	1	1	1	1	1	1	1	1	2	4	4	3	1	1	2	1	2	6	14	22	3.2	22											
31-Oct	21	15	12	Z	11	12	12	10	13	8	6	3	1	1	2	2	2	1	1	1	1	0	0	0	5.9	21											
1.6																	1.8																	Diurnal Average			
21																	15																	Diurnal Maximum			
1.5																	0.8																				
2																	11																				
1.6																	1.6																				
1.9																	1.9																				
2.1																	2.1																				
2.6																	2.0																				
2.0																	1.9																				
1.7																	1.7																				
2.0																	1.8																				
1.8																	1.9																				
1.9																	2.0																				
2.0																	2.4																				
2.1																	2.1																				
1.9																	1.4																				
1.7																	1.7																				
2.2																	2.2																				
2.1																	2.1																				
Z - zerospan																	C - Calibration																	DF - DAS Failure			



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Anzac - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Anzac - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	701	99.72	99.72
21 - 40	2	0.28	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Anzac - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	45	26	12	9	7	10	48	47	33	25	59	35	62	116	106	61	701
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	45	26	12	9	7	10	48	47	33	25	59	35	63	117	106	61	703

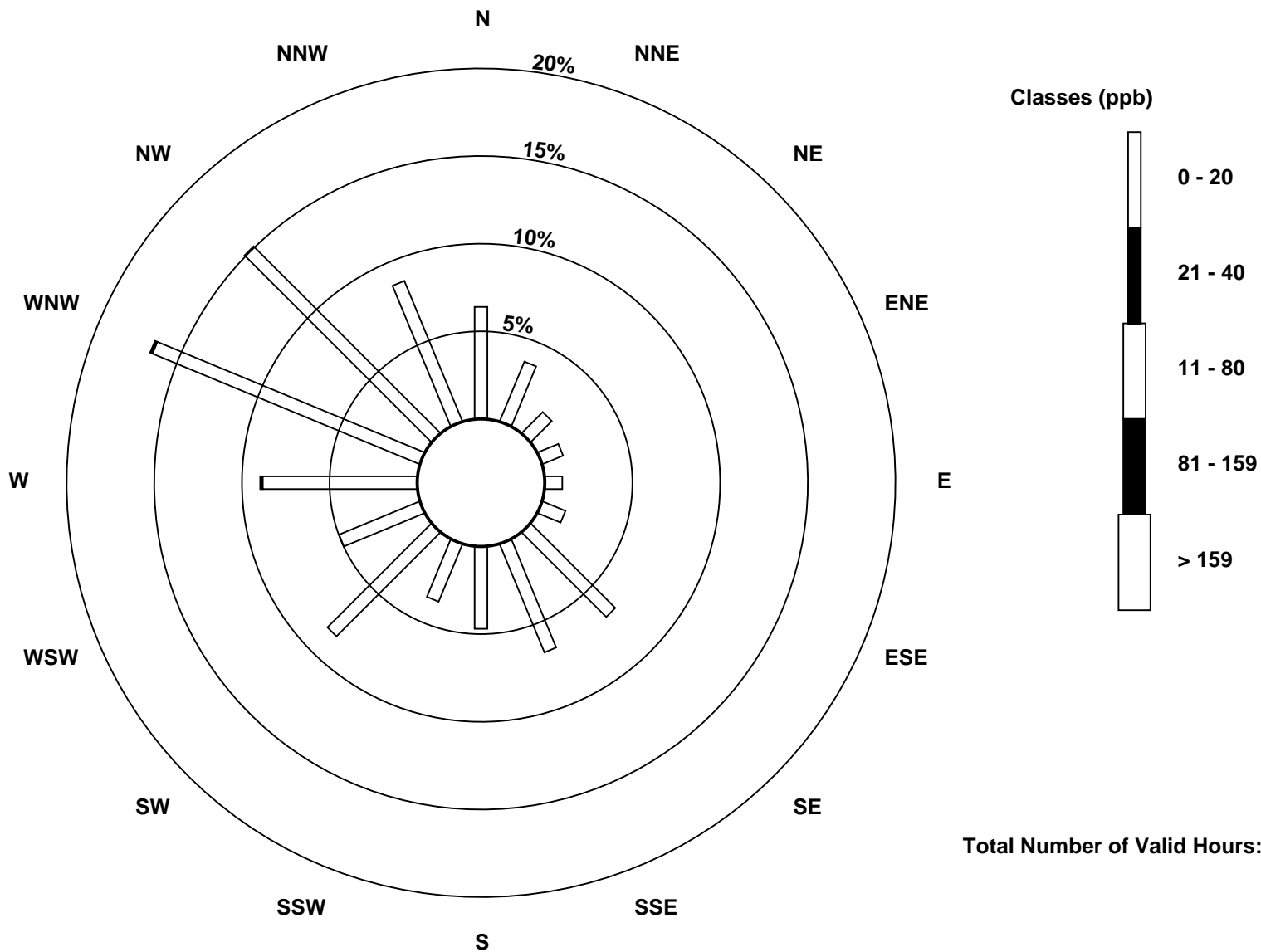
Total Number of Valid Hours: 703

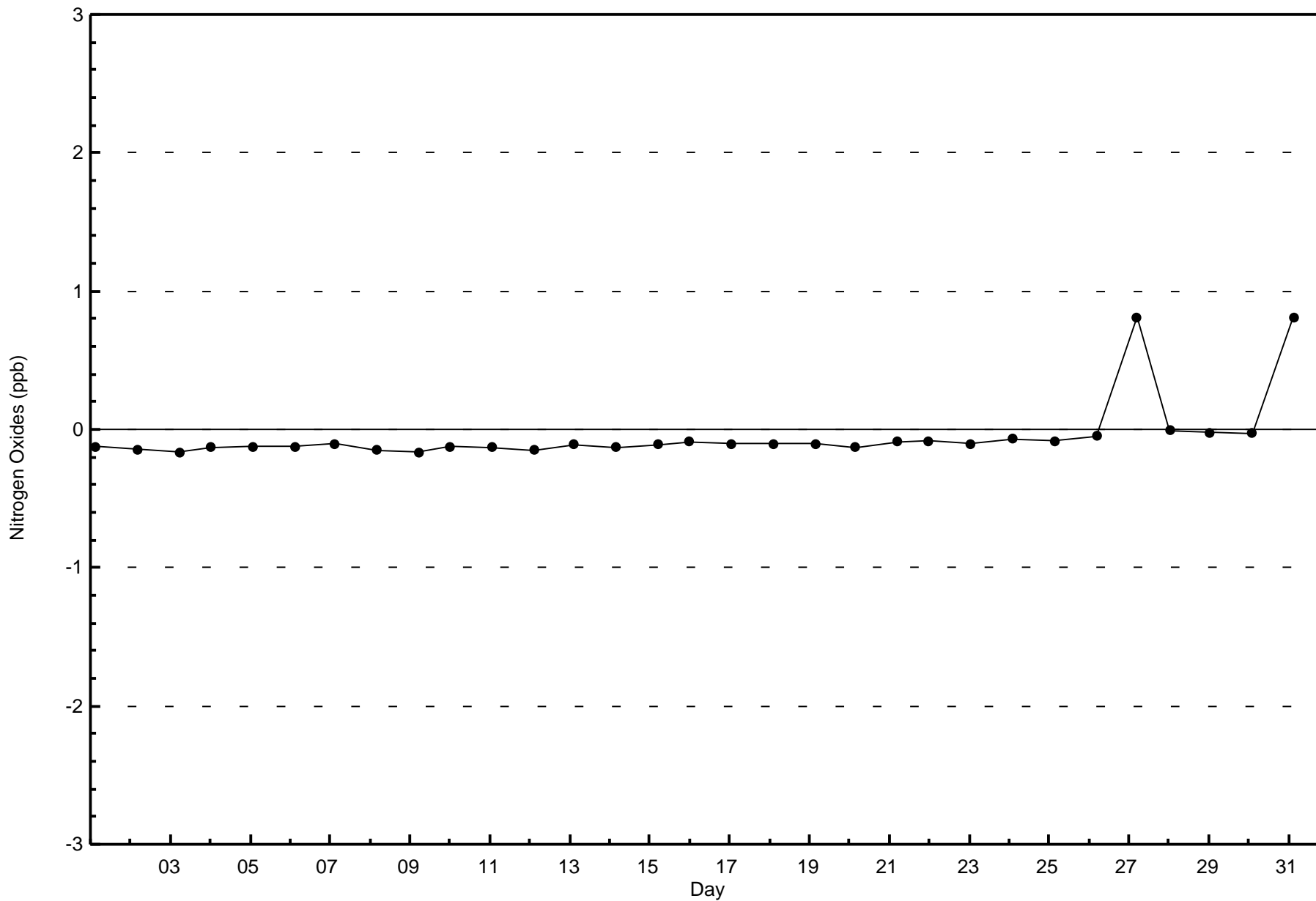
Total Number of Hours: 744

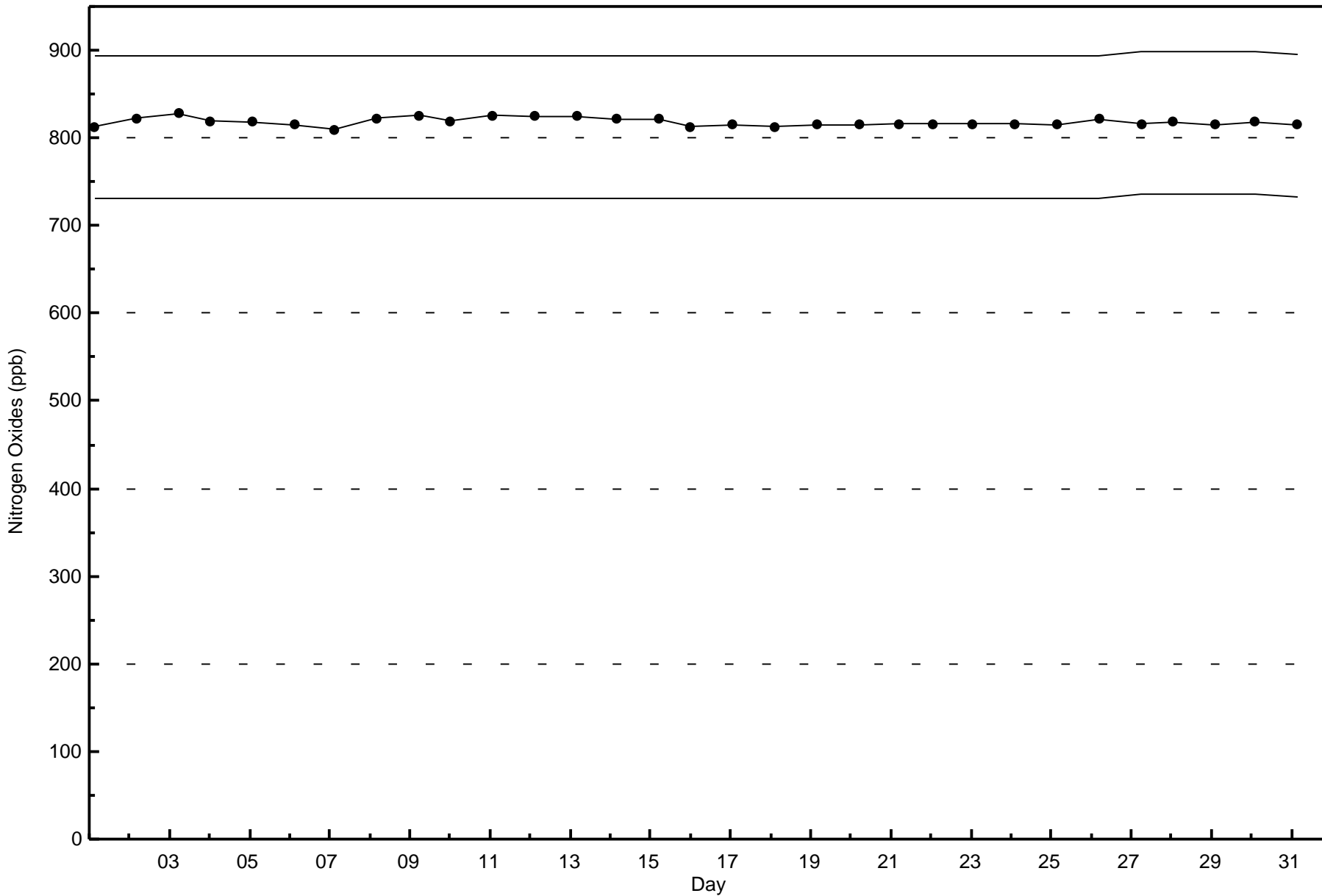


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Anzac (AMS 14)











# Wood Buffalo Environmental Association

## Summary of Hour Averages

Ozone (O<sub>3</sub>) - ppb

Anzac - October 2017

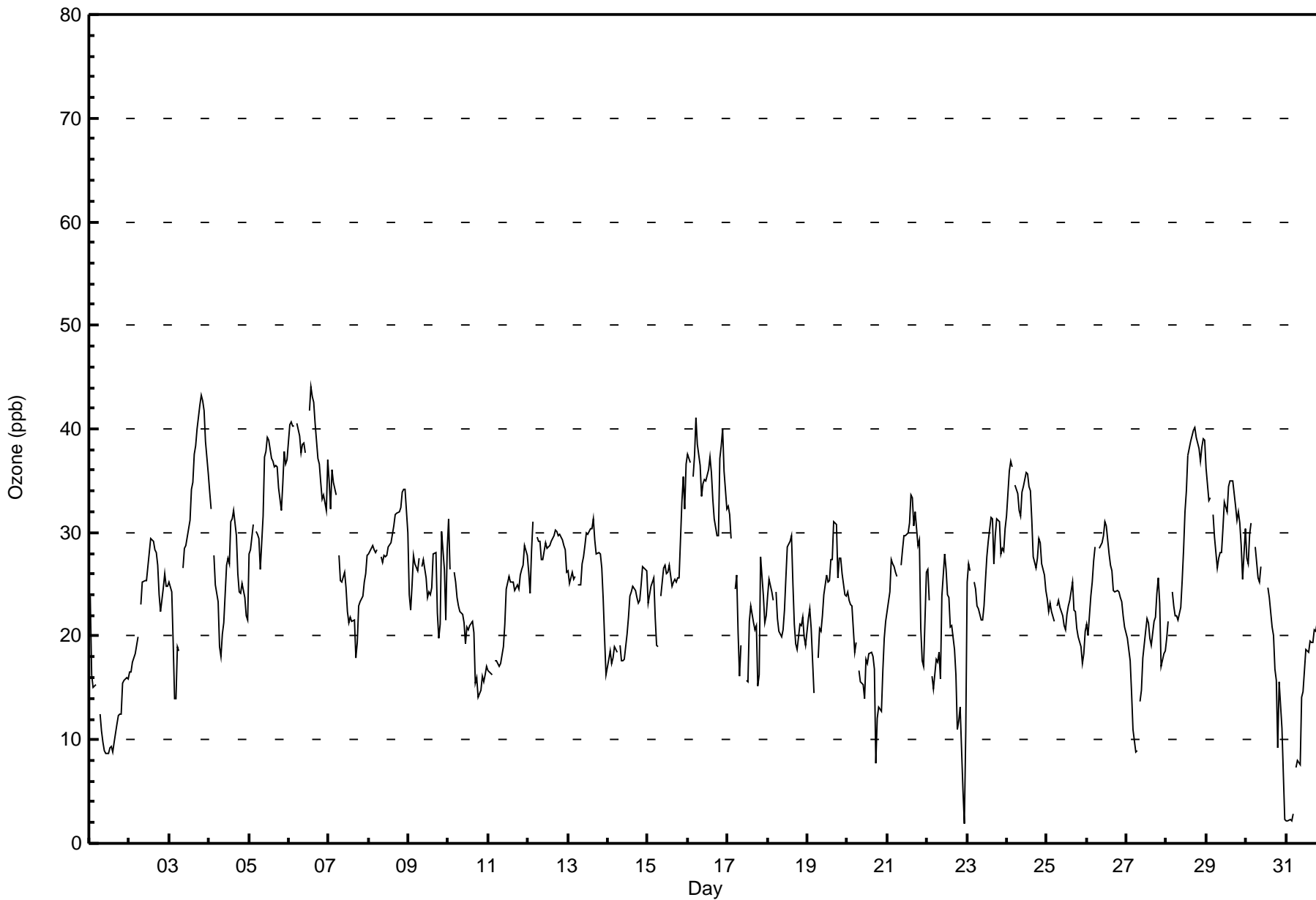
Number of Exceedences (AAAQO):		1-hr: 0    24-hr: 0		Hours in Service:		744																																											
Maximum Value: 44 ppb on Oct 6 14:00		Maximum Daily Average: 38.7 ppb on Oct 6		Hours of Data:		707																																											
Minimum Value: 2 ppb on Oct 22 23:00		Minimum Daily Average: 12.8 ppb on Oct 1		Hours of Missing Data:		37																																											
Maximum Diurnal Average: 27.6 ppb at hour 15		Minimum Diurnal Average: 22.3 ppb at hour 5		Hours of Calibration:		36																																											
Monthly Average: 25.2 ppb		Percentiles: P <sub>1</sub> = 4    P <sub>10</sub> = 16    Q <sub>1</sub> = 21    Median = 25    Q <sub>3</sub> = 30    P <sub>90</sub> = 36    P <sub>99</sub> = 41		Percent Operational Time:		99.9																																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	24	16	15	15	15	Z	12	11	10	9	9	9	9	9	10	12	12	13	12	15	16	16	16	12.8	24																								
2-Oct	17	17	17	18	19	20	Z	23	25	25	25	27	28	29	29	28	28	27	24	22	25	26	25	25	23.9	29																							
3-Oct	25	24	19	14	14	19	19	Z	27	28	29	30	31	34	35	38	38	40	42	43	43	42	39	36	30.8	43																							
4-Oct	34	32	Z	28	25	23	19	18	20	21	27	28	27	31	31	32	30	26	24	24	25	24	22	22	25.8	34																							
5-Oct	28	28	31	Z	30	30	29	26	32	37	38	39	39	37	37	36	37	36	34	32	35	38	37	37	34.1	39																							
6-Oct	40	41	40	40	Z	41	39	38	38	39	38	DF	42	44	43	43	41	37	37	35	33	34	32	37	38.7	44																							
7-Oct	35	32	36	35	34	Z	28	25	25	26	25	22	21	22	21	22	18	19	23	23	24	25	26	28	25.9	36																							
8-Oct	28	28	29	28	28	28	Z	28	27	28	28	28	29	29	30	31	32	32	32	32	34	34	34	30	29.8	34																							
9-Oct	24	23	25	28	27	26	28	Z	27	27	26	24	24	24	25	28	28	22	20	21	30	26	22	28	25.3	30																							
10-Oct	31	26	Z	26	25	24	23	22	22	21	19	21	21	21	21	20	15	16	14	15	16	16	16	17	20.4	31																							
11-Oct	17	16	16	Z	18	18	17	17	18	19	21	25	26	25	25	25	24	25	25	26	26	27	29	28	22.3	29																							
12-Oct	26	24	28	31	Z	30	29	29	27	27	29	28	29	29	29	30	30	30	30	30	29	29	28	26	28.6	31																							
13-Oct	26	25	26	25	26	Z	25	25	27	28	29	30	30	30	31	29	28	28	28	27	24	20	16	26.7	31																								
14-Oct	18	19	17	18	19	18	Z	19	18	18	18	20	22	24	24	25	24	24	23	23	25	27	26	26	21.5	27																							
15-Oct	23	24	25	26	22	19	19	Z	24	27	27	26	26	27	25	25	26	25	26	26	33	35	32	37	26.2	37																							
16-Oct	38	37	Z	35	37	41	38	36	33	35	35	35	36	37	36	33	31	30	30	37	38	40	36	32	35.6	41																							
17-Oct	33	32	29	Z	25	26	20	16	19	C	C	16	16	21	23	21	21	15	16	28	24	21	22	22.1	33																								
18-Oct	24	25	24	23	Z	24	22	21	20	21	23	26	29	29	30	25	21	19	19	21	21	22	20	19	22.9	30																							
19-Oct	22	23	21	18	14	Z	18	21	21	22	24	26	25	25	27	27	31	31	26	28	28	26	24	24	23.9	31																							
20-Oct	24	23	23	23	18	19	Z	17	16	15	14	18	17	18	18	18	17	8	12	13	13	17	20	21	17.5	24																							
21-Oct	22	24	27	27	27	26	26	Z	27	28	30	30	30	31	34	33	31	32	29	29	21	18	17	26	27.1	34																							
22-Oct	26	23	Z	16	15	18	17	18	16	24	28	26	24	24	21	21	19	16	11	12	13	5	2	11	17.7	28																							
23-Oct	25	27	26	Z	25	25	23	23	22	22	23	25	28	29	31	31	27	30	31	31	28	28	28	30	26.9	31																							
24-Oct	32	36	37	36	Z	35	34	32	32	34	34	36	36	35	34	31	28	27	28	29	29	27	26	24	31.7	37																							
25-Oct	24	22	23	22	21	Z	23	23	23	22	21	21	22	23	24	25	23	22	21	20	19	17	18	21	21.8	25																							
26-Oct	21	20	24	25	27	29	Z	28	29	29	30	31	31	28	27	26	24	24	24	24	24	23	22	21	25.7	31																							
27-Oct	20	19	18	14	11	9	9	Z	14	15	18	21	22	21	20	19	21	22	24	26	23	17	18	19	18.2	26																							
28-Oct	20	21	Z	24	23	22	22	22	23	25	28	32	34	37	39	39	40	40	39	38	37	38	39	39	31.4	40																							
29-Oct	36	33	33	Z	32	30	27	28	28	28	30	33	32	34	35	35	35	33	31	32	31	29	25	30	31.3	36																							
30-Oct	28	27	30	31	Z	29	27	26	25	27	C	C	C	25	24	21	20	17	16	9	16	11	7	2	20.8	31																							
31-Oct	2	2	2	2	3	Z	7	8	8	14	15	17	19	18	19	19	19	21	20	22	24	25	25	25	14.7	25																							
																								25.6	24.9	24.8	24.3	22.3	25.1	23.1	23.1	23.2	24.7	25.5	25.8	26.8	27.5	27.6	27.4	26.4	25.5	24.8	25.2	26.2	25.5	24.3	25.0	Diurnal Average	
																								40	41	40	40	37	41	39	38	38	39	38	39	42	44	43	43	41	40	42	43	43	42	39	39	Diurnal Maximum	

Z - zerospan      C - Calibration      DF - DAS Failure  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ozone (O<sub>3</sub>) - ppb**  
**Anzac - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Anzac - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	168	23.76	23.76
21 - 50	539	76.24	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb  
Anzac - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	10	14	7	6	7	7	19	15	9	8	9	2	2	14	19	20	168
21 - 50	34	12	5	3	1	4	29	31	20	21	54	35	59	101	88	42	539
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	44	26	12	9	8	11	48	46	29	29	63	37	61	115	107	62	707

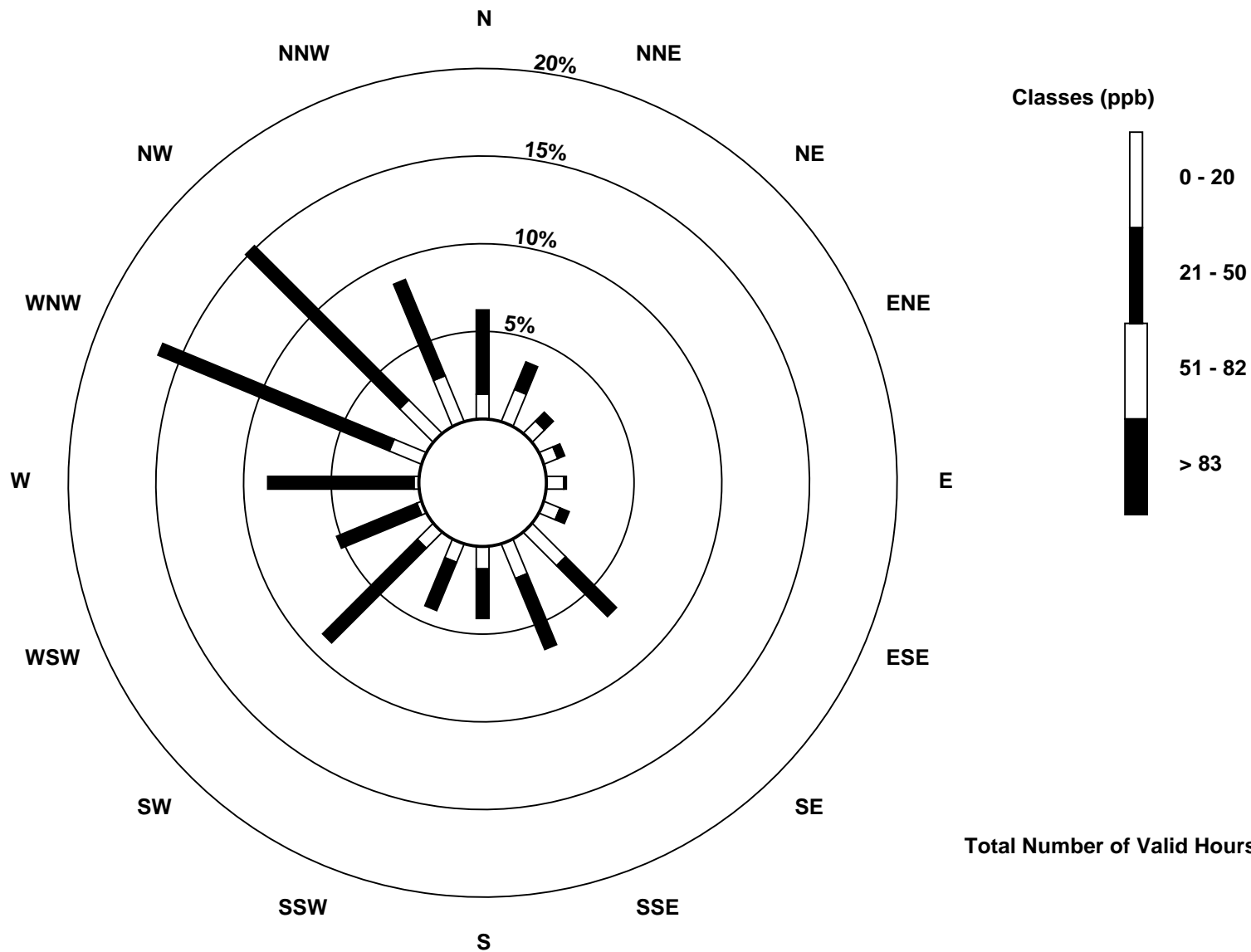
Total Number of Valid Hours: 707

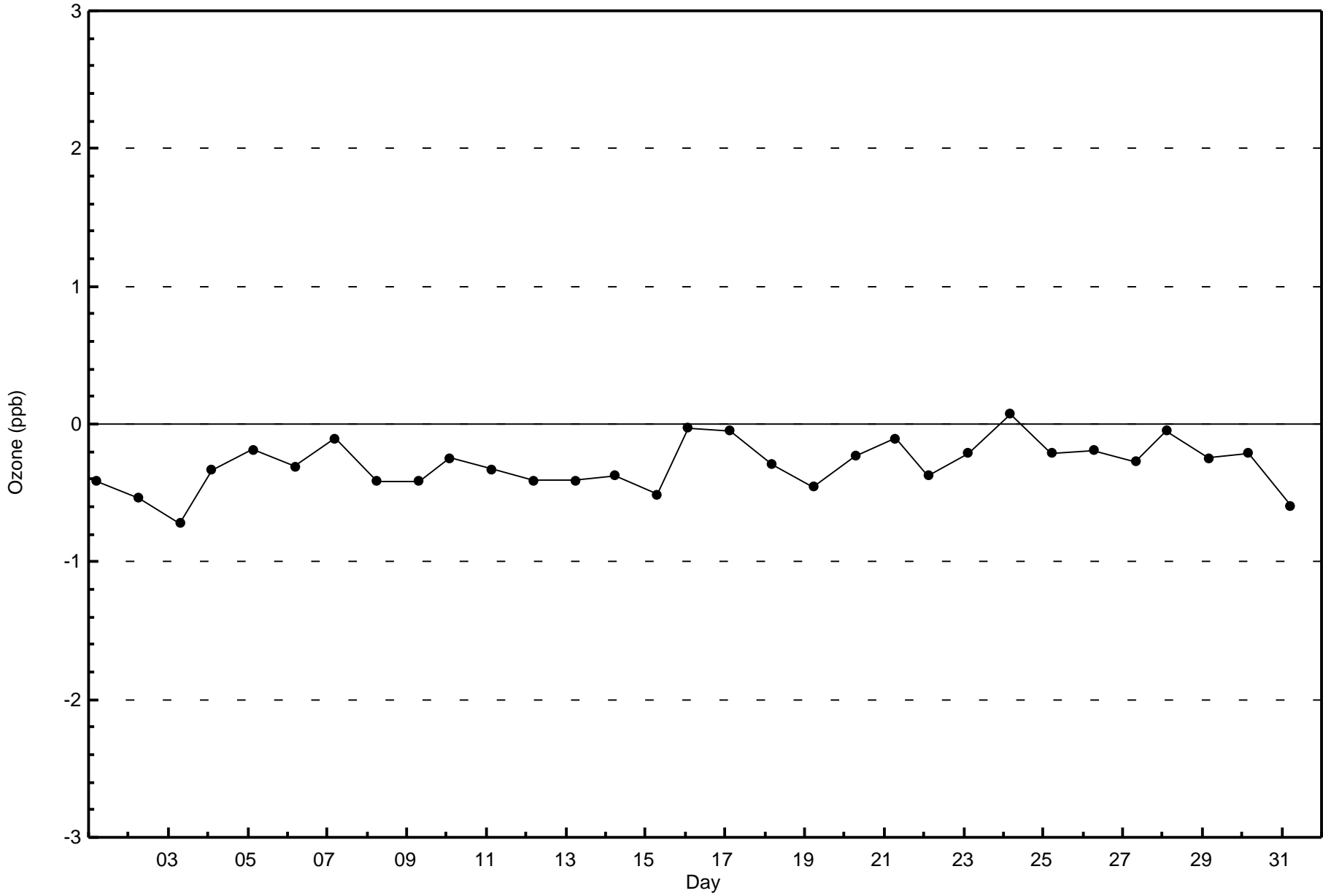
Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Ozone (O<sub>3</sub>) - ppb  
Anzac (AMS 14)

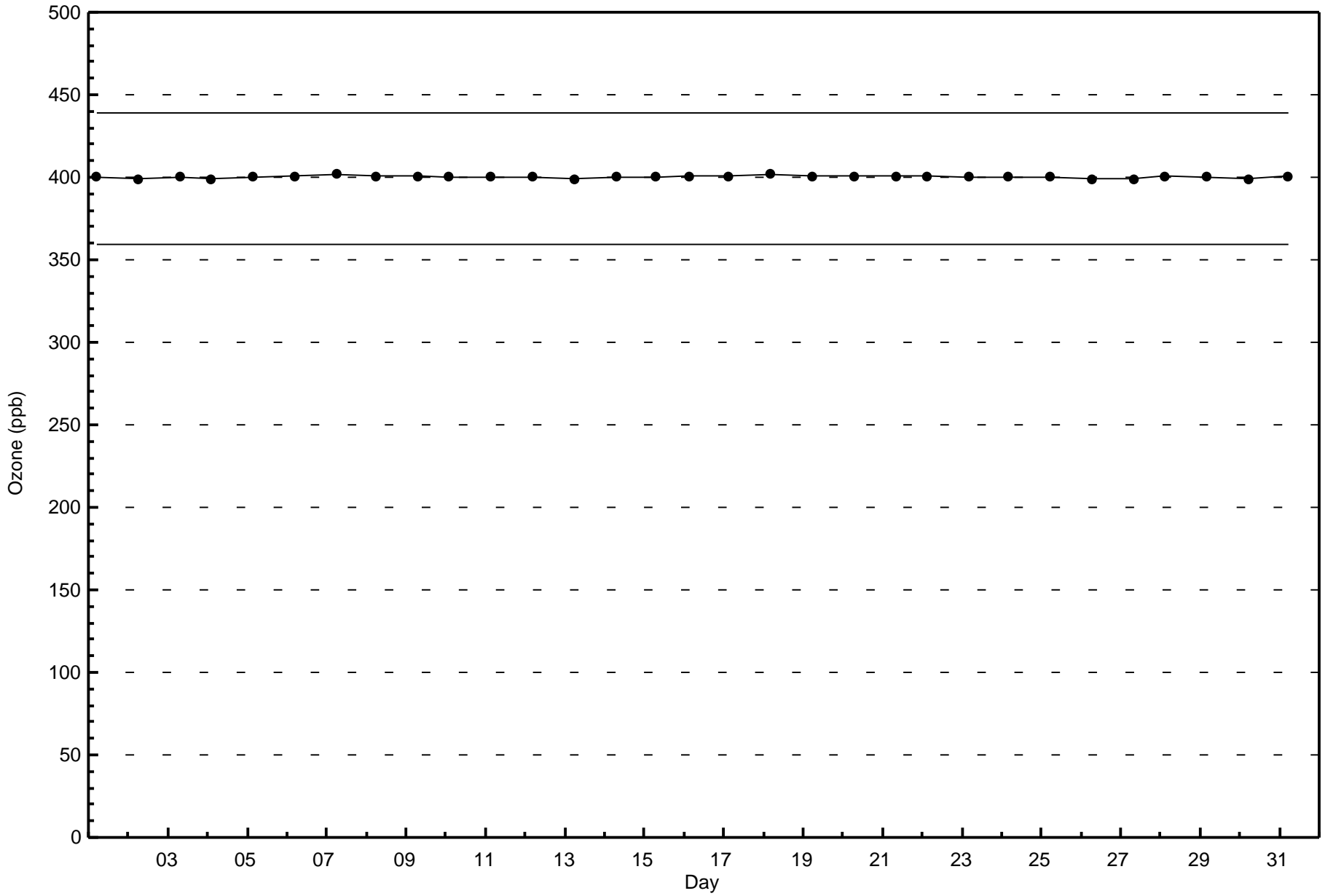






**Wood Buffalo Environmental Association**  
**Span Responses**

**Ozone (O<sub>3</sub>) - ppb**  
**Anzac - October 2017**





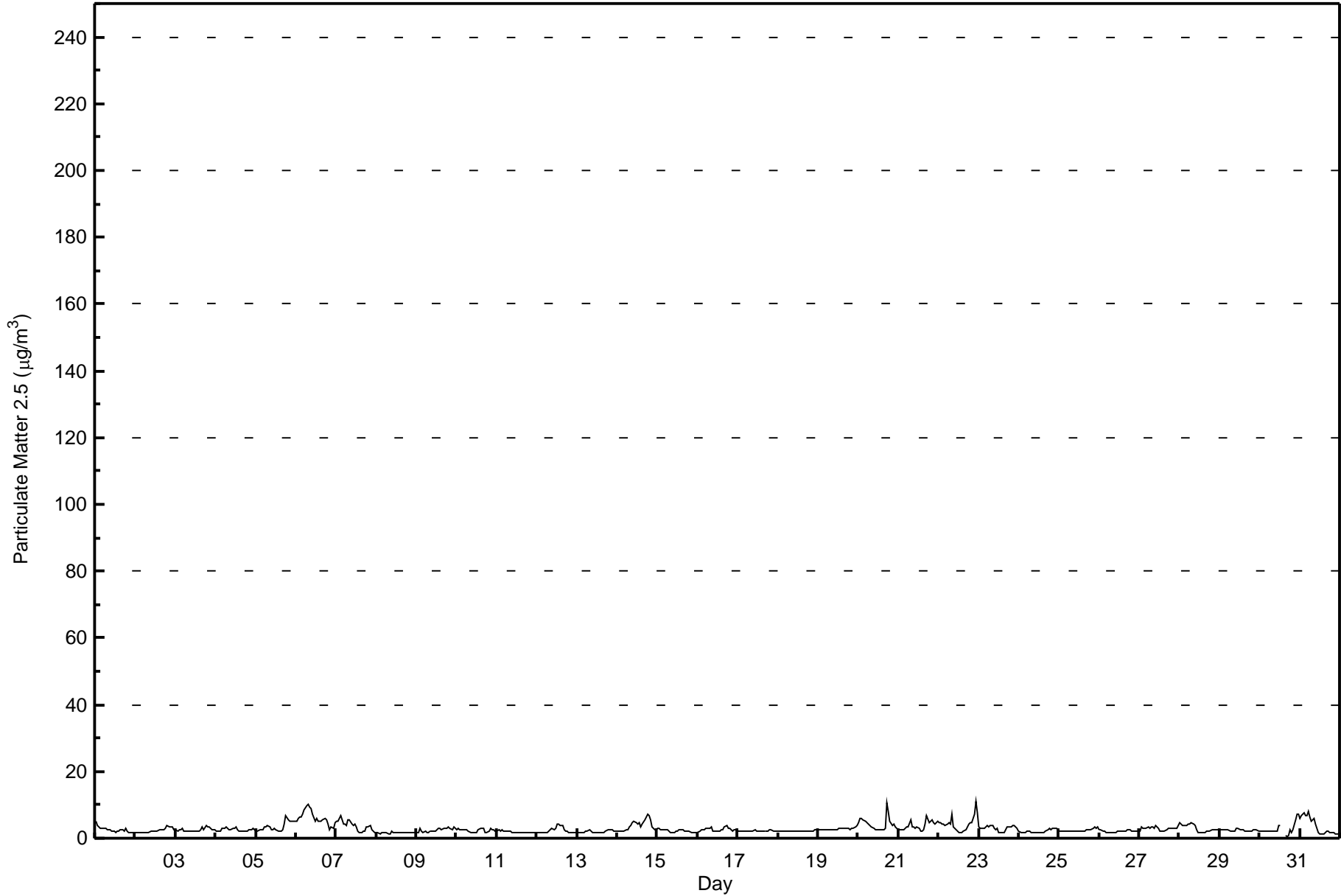
Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 10.9 µg/m <sup>3</sup> on Oct 22 23:00 Maximum Daily Average: 6.0 µg/m <sup>3</sup> on Oct 6		Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 2 Percent Operational Time: 100.0																																														
Minimum Value: 0.5 µg/m <sup>3</sup> on Oct 30 17:00 Maximum Diurnal Average: 3.2 µg/m <sup>3</sup> at hour 19 Monthly Average: 2.83 µg/m <sup>3</sup>		Minimum Daily Average: 1.6 µg/m <sup>3</sup> on Oct 8 Minimum Diurnal Average: 2.3 µg/m <sup>3</sup> at hour 15 Percentiles: P <sub>1</sub> = 1.3 P <sub>10</sub> = 1.7 Q <sub>1</sub> = 2.0 Median = 2.4 Q <sub>3</sub> = 3.1 P <sub>90</sub> = 4.6 P <sub>99</sub> = 8.3																																														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	5.3	3.7	3.4	3.1	2.9	3.2	2.9	2.7	2.7	2.4	2.2	2.1	1.8	1.9	2.1	2.6	2.5	2.2	2.8	2.2	1.7	1.6	1.5	1.6	2.5	5.3																						
2-Oct	1.6	1.6	1.7	1.8	1.8	1.8	1.8	1.9	1.9	2.0	2.0	1.9	2.0	2.1	2.4	2.6	2.5	2.6	2.9	3.7	3.2	3.2	3.2	2.5	2.3	3.7																						
3-Oct	2.5	2.2	2.5	2.5	2.8	2.1	2.0	1.9	2.0	2.0	2.2	2.0	2.0	2.1	2.2	2.5	3.2	2.6	4.0	3.2	3.3	3.0	2.6	2.6	2.5	4.0																						
4-Oct	2.3	2.1	2.1	2.3	3.0	3.1	3.3	2.9	2.4	2.6	2.8	2.8	3.3	2.4	2.1	2.0	2.1	2.0	2.2	2.2	2.7	2.7	2.8	2.5	2.5	3.3																						
5-Oct	1.9	2.0	2.4	2.5	2.7	3.5	3.6	3.9	3.2	2.7	2.7	2.8	2.6	2.3	2.1	2.0	2.7	4.1	6.7	5.5	5.1	4.9	4.9	5.2	3.4	6.7																						
6-Oct	5.2	6.1	6.2	6.2	7.3	8.5	9.6	10.4	9.2	8.7	7.3	5.2	5.8	5.1	5.2	5.0	5.6	5.8	5.4	4.2	2.4	3.2	2.9	4.5	6.0	10.4																						
7-Oct	5.0	4.9	5.9	6.7	4.4	4.0	3.7	5.3	5.4	4.4	3.8	4.1	3.6	2.0	1.8	1.7	2.2	2.1	3.4	3.4	3.7	2.6	2.2	1.8	3.7	6.7																						
8-Oct	1.5	1.5	1.5	1.5	1.5	1.6	1.5	1.5	1.5	2.0	1.7	1.6	1.5	1.6	1.6	1.7	1.7	1.7	1.7	1.7	1.8	1.6	1.7	1.7	1.6	2.0																						
9-Oct	1.7	1.8	2.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.7	3.1	3.0	2.6	2.8	3.0	3.1	3.5	2.8	2.6	3.4	3.0	2.5	3.5																						
10-Oct	2.6	2.8	2.7	2.7	2.4	2.5	2.4	2.1	1.8	1.8	1.8	1.7	1.8	2.4	2.9	3.1	3.1	1.7	1.7	2.0	2.9	2.7	2.4	1.9	2.3	3.1																						
11-Oct	2.0	2.5	2.3	2.5	2.3	2.1	2.1	2.0	2.0	1.9	1.8	1.8	1.9	1.8	1.7	1.7	1.7	1.8	1.7	1.8	1.8	1.8	1.8	1.8	1.9	2.5																						
12-Oct	1.8	1.9	1.9	1.8	1.8	1.8	1.9	2.0	2.4	3.0	2.7	3.2	4.0	4.2	4.0	3.8	2.7	1.9	1.9	1.8	1.8	1.6	1.6	1.6	2.4	4.2																						
13-Oct	1.6	1.7	1.8	1.8	1.8	2.0	2.3	2.5	2.2	1.8	1.7	1.7	1.7	1.7	1.7	1.7	2.0	2.6	2.6	2.5	2.7	2.3	2.0	2.0	2.7	7.0																						
14-Oct	2.1	2.2	2.1	2.1	2.2	2.4	2.7	3.5	4.0	4.5	5.3	4.7	4.4	4.6	3.5	4.1	5.7	6.5	7.0	7.0	5.4	3.5	2.7	2.5	4.0	7.0																						
15-Oct	2.8	2.8	2.7	2.5	2.4	2.6	2.7	2.2	1.7	1.6	1.8	2.1	2.2	2.3	2.5	2.4	2.1	2.1	1.9	1.9	1.7	1.6	1.5	1.5	2.2	2.8																						
16-Oct	1.6	2.1	2.5	2.5	2.7	2.8	3.1	3.1	3.4	2.1	2.1	2.1	2.1	2.2	2.4	2.7	3.4	3.7	3.0	2.8	2.5	2.3	2.4	2.7	2.6	3.7																						
17-Oct	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.7	2.2	2.2	2.1	2.1	2.1	2.1	2.3	2.2	2.6	2.3	2.2	2.2	2.1	2.2	2.7																						
18-Oct	2.2	2.3	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.0	2.0	2.0	2.0	2.0	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.3	2.4	2.1	2.4																						
19-Oct	2.4	2.3	2.4	2.4	2.4	2.5	2.5	2.5	2.5	2.5	2.6	2.6	2.8	3.0	2.8	2.8	2.8	2.8	2.8	2.9	2.7	2.9	2.9	3.4	2.7	3.7																						
20-Oct	4.5	6.1	6.0	5.5	5.0	4.6	4.2	3.7	3.3	2.9	2.7	2.4	2.4	2.5	2.6	2.6	2.8	10.5	8.2	5.1	3.8	4.2	3.4	2.8	4.2	10.5																						
21-Oct	2.5	2.3	2.6	2.7	3.0	3.3	3.5	5.7	3.5	3.4	2.9	3.2	2.8	2.1	2.2	2.5	4.4	6.9	4.8	5.2	5.5	4.7	4.4	4.9	3.7	6.9																						
22-Oct	4.5	4.6	4.2	4.1	4.0	4.3	4.7	4.2	7.2	3.2	2.6	2.1	1.8	1.7	1.9	2.0	2.8	3.6	4.3	4.5	4.7	7.0	10.9	7.4	4.3	10.9																						
23-Oct	3.4	2.9	2.9	3.0	3.2	3.6	3.5	3.9	3.7	3.2	2.5	2.9	1.6	1.7	1.7	1.8	2.7	3.2	3.3	3.2	3.8	3.7	3.4	2.8	3.0	3.9																						
24-Oct	2.2	1.6	1.6	1.6	1.7	2.0	1.9	1.8	1.8	1.7	1.7	1.8	1.6	1.6	1.6	1.7	2.2	2.4	2.8	2.7	2.9	3.2	2.9	2.4	2.1	3.2																						
25-Oct	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	1.9	1.9	2.0	2.3	2.6	2.4	2.4	2.4	2.8	3.2	2.9	3.2	2.3	3.2																						
26-Oct	2.7	2.4	2.0	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.1	2.2	2.2	2.2	2.4	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.7																						
27-Oct	2.2	3.2	3.0	3.1	3.1	3.2	3.0	3.2	3.3	2.8	3.7	2.8	2.2	2.2	2.1	2.1	2.5	2.8	2.9	3.1	3.1	2.9	2.9	3.7	2.9	3.7																						
28-Oct	4.8	4.1	3.7	3.6	3.7	4.1	4.4	4.7	4.2	3.9	2.7	1.8	1.6	1.7	1.8	1.8	2.0	2.1	2.2	2.4	2.4	2.5	2.6	2.3	3.0	4.8																						
29-Oct	2.5	2.7	2.6	2.5	2.4	2.6	2.1	2.0	2.1	2.3	2.8	2.9	2.7	2.5	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.5	2.4	2.7	2.2	2.4	2.9																					
30-Oct	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.2	2.2	2.2	3.7	3.8	C	C	1.0	0.5	0.7	2.6	1.7	2.6	5.4	7.2	7.0	2.7	7.2																						
31-Oct	6.0	6.6	7.5	6.9	6.7	8.2	6.5	5.1	6.1	4.0	2.8	1.9	1.2	1.1	1.2	1.7	2.0	2.2	1.8	1.7	1.6	1.4	1.3	1.3	3.6	8.2																						
																								2.8	2.9	2.9	2.9	2.9	3.0	3.0	3.1	3.1	2.8	2.6	2.5	2.5	2.3	2.3	2.4	2.6	3.0	3.2	3.0	2.9	2.9	3.1	2.9	Diurnal Average
																								6.0	6.6	7.5	6.9	7.3	8.5	9.6	10.4	9.2	8.7	7.3	5.2	5.8	5.1	5.2	5.0	5.7	10.5	8.2	7.0	5.5	7.0	10.9	7.4	Diurnal Maximum
C - Calibration																																																
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m <sup>3</sup>																																																





**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Anzac - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Anzac - October 2017**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	698	94.07	94.07
6 - 15	42	5.66	99.73
16 - 25	0	0.00	99.73
26 - 80	0	0.00	99.73
> 81.0	0	0.00	99.73

Total Number of Valid Hours: 742

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**Anzac - October 2017**

Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	43	26	11	10	9	11	43	48	34	28	67	33	50	114	108	63	698
6 - 15	2	0	0	0	0	0	8	1	0	1	1	4	16	8	1	0	42
16 - 25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	45	26	11	10	9	11	51	49	34	29	68	37	66	122	109	63	740

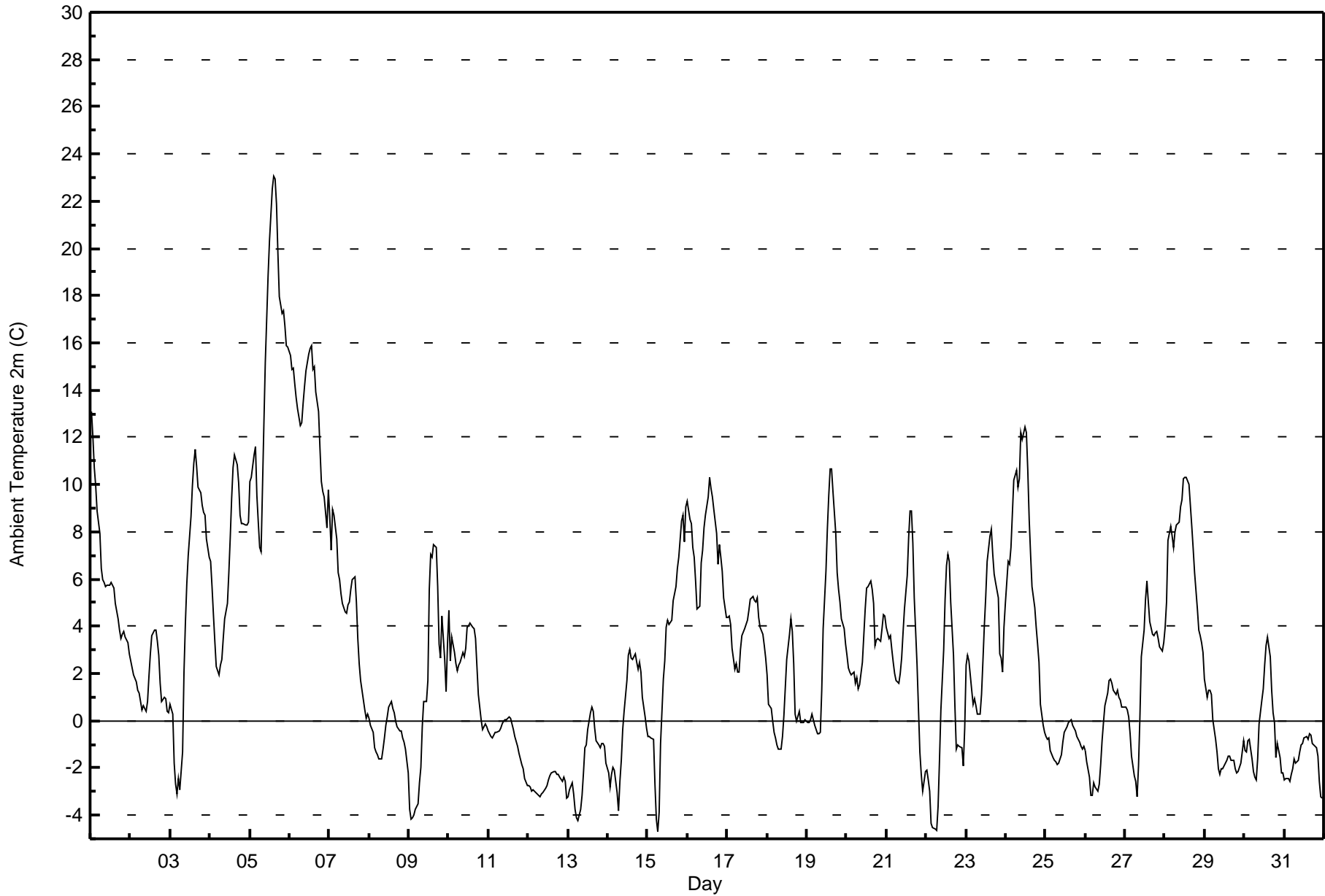
Total Number of Valid Hours: 742

Total Number of Hours: 744





Maximum Value: 23.0 C on Oct 5 15:00		Maximum Daily Average: 15.5 C on Oct 5		Hours in Service: 744																																												
Minimum Value: -4.7 C on Oct 15 07:00		Minimum Daily Average: -2.7 C on Oct 12		Hours of Data: 744																																												
Maximum Diurnal Average: 5.7 C at hour 15		Minimum Diurnal Average: 0.8 C at hour 7		Hours of Missing Data: 0																																												
Monthly Average: 2.95 C		Percentiles: P <sub>1</sub> = -4.2 P <sub>10</sub> = -2.3 Q <sub>1</sub> = -0.8 Median = 2.1 Q <sub>3</sub> = 5.7 P <sub>90</sub> = 9.6 P <sub>99</sub> = 17.9		Hours of Calibration: 0																																												
				Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	13.1	12.0	10.7	10.0	8.9	7.9	6.4	6.0	5.9	5.7	5.7	5.7	5.8	5.7	5.6	5.0	4.3	3.8	3.5	3.7	3.8	3.5	3.3	2.8	6.2	13.1																						
2-Oct	2.5	2.2	2.0	1.7	1.3	1.2	0.8	0.5	0.7	0.4	0.8	1.9	2.8	3.6	3.8	3.8	3.3	2.8	1.6	0.8	1.0	0.9	0.4	0.4	1.7	3.8																						
3-Oct	0.7	0.3	-1.8	-2.7	-3.1	-2.5	-2.9	-1.3	2.1	4.1	5.8	7.0	8.6	10.0	10.9	11.5	10.8	9.9	9.7	9.1	8.8	8.7	7.7	6.9	4.9	11.5																						
4-Oct	6.8	5.7	4.5	3.3	2.3	2.0	2.3	2.6	3.5	4.3	4.9	6.2	7.7	9.4	10.7	11.3	10.8	10.1	8.7	8.3	8.3	8.3	8.3	8.4	6.6	11.3																						
5-Oct	10.1	10.3	11.3	11.6	9.6	8.4	7.4	7.2	12.6	15.2	17.0	18.8	20.3	22.6	23.0	22.9	21.9	19.8	18.0	17.2	17.4	16.7	15.9	15.8	15.5	23.0																						
6-Oct	15.5	14.8	14.9	14.3	13.7	13.2	12.5	12.6	13.4	14.2	14.8	15.5	15.8	15.9	14.8	15.0	14.0	13.1	11.5	10.1	9.7	9.5	8.1	9.8	13.2	15.9																						
7-Oct	8.7	7.2	8.9	8.7	7.7	6.3	6.0	5.4	5.0	4.6	4.5	4.9	5.0	5.6	6.0	6.1	5.0	3.5	2.4	1.7	0.9	0.5	0.1	0.3	4.8	8.9																						
8-Oct	0.1	-0.2	-0.5	-1.1	-1.3	-1.4	-1.6	-1.6	-1.2	-0.7	-0.2	0.2	0.5	0.8	0.5	0.4	0.0	-0.2	-0.4	-0.5	-0.7	-0.9	-1.2	-2.2	-0.6	0.8																						
9-Oct	-3.8	-4.2	-4.1	-4.0	-3.8	-3.5	-2.7	-2.0	-0.3	0.8	0.8	1.7	5.5	7.0	6.9	7.4	7.3	5.7	3.3	2.6	4.5	2.6	1.2	3.2	1.4	7.4																						
10-Oct	4.7	2.6	3.5	2.9	2.4	2.1	2.3	2.5	2.9	2.7	3.0	3.9	4.0	4.1	3.9	3.9	3.5	2.3	1.1	0.0	-0.3	-0.2	-0.1	-0.3	2.4	4.7																						
11-Oct	-0.5	-0.7	-0.7	-0.6	-0.5	-0.5	-0.4	-0.3	-0.1	0.0	0.0	0.0	0.1	0.1	-0.1	-0.4	-0.7	-1.1	-1.4	-1.6	-1.8	-2.0	-2.4	-2.8	-0.8	0.1																						
12-Oct	-2.7	-2.8	-3.0	-2.9	-3.0	-3.1	-3.2	-3.2	-3.1	-3.1	-2.9	-2.7	-2.5	-2.3	-2.2	-2.1	-2.1	-2.3	-2.3	-2.4	-2.6	-2.4	-2.6	-3.3	-2.7	-2.1																						
13-Oct	-3.2	-2.9	-2.6	-3.1	-3.7	-4.1	-4.2	-3.8	-3.2	-2.2	-1.2	-1.0	-0.4	0.3	0.6	0.4	-0.3	-0.9	-1.0	-1.1	-1.0	-1.0	-1.1	-1.8	-1.8	0.6																						
14-Oct	-2.2	-2.8	-2.3	-1.9	-2.1	-3.0	-3.8	-2.6	-1.7	-0.4	0.4	1.7	2.8	3.0	2.6	2.6	2.8	2.5	2.2	2.5	2.1	1.0	0.1	-0.3	0.1	3.0																						
15-Oct	-0.6	-0.7	-0.7	-0.8	-2.7	-4.2	-4.7	-3.9	-1.0	1.7	2.6	4.0	4.3	4.1	4.3	5.1	5.4	5.7	6.4	6.9	8.4	8.7	7.6	9.0	2.7	9.0																						
16-Oct	9.3	8.5	8.4	7.3	6.9	5.9	4.7	4.8	6.7	7.2	8.2	8.7	9.4	10.3	9.8	9.5	8.9	7.9	6.6	7.5	6.9	6.3	5.2	4.4	7.5	10.3																						
17-Oct	4.4	4.4	4.0	3.1	2.2	2.4	2.1	2.0	3.0	3.6	3.9	4.1	4.2	4.7	5.2	5.3	5.1	5.0	5.2	4.4	3.9	3.6	3.2	2.6	3.8	5.3																						
18-Oct	1.9	0.7	0.5	0.0	-0.5	-0.7	-1.0	-1.2	-1.2	-0.7	0.2	1.4	2.6	3.6	4.3	3.8	2.4	0.3	0.0	0.4	-0.1	-0.1	-0.1	0.1	0.7	4.3																						
19-Oct	-0.1	-0.1	0.0	0.3	0.0	-0.2	-0.5	-0.6	-0.5	1.3	3.9	6.3	8.1	9.5	10.7	10.7	9.7	8.0	6.3	5.5	5.0	4.3	3.9	3.2	4.0	10.7																						
20-Oct	2.7	2.2	2.1	2.0	2.0	1.6	1.8	1.3	1.5	2.5	3.6	4.7	5.6	5.7	5.9	5.5	4.9	3.2	3.4	3.5	3.4	3.9	4.5	4.4	3.4	5.9																						
21-Oct	4.0	3.5	3.6	3.0	2.5	2.0	1.7	1.6	2.0	2.7	3.7	4.7	6.1	7.8	8.9	8.9	7.5	5.2	2.3	0.5	-1.3	-2.3	-3.0	-2.1	3.1	8.9																						
22-Oct	-2.1	-2.5	-3.0	-4.3	-4.5	-4.6	-4.7	-3.6	-1.6	0.5	3.0	5.1	6.5	7.0	6.8	5.0	2.8	0.7	-1.2	-1.0	-1.1	-1.2	-1.9	-0.3	0.0	7.0																						
23-Oct	2.4	2.8	2.5	1.3	0.7	0.9	0.6	0.3	0.3	1.1	2.6	4.0	5.3	6.7	7.8	8.1	7.1	6.2	5.9	5.2	2.8	2.7	2.1	4.0	3.5	8.1																						
24-Oct	5.0	6.7	6.6	7.3	8.8	10.2	10.6	9.9	10.3	12.2	11.9	12.4	12.2	10.6	8.5	7.1	5.7	4.8	4.0	3.3	2.5	0.7	-0.2	-0.5	7.1	12.4																						
25-Oct	-0.6	-0.8	-0.8	-1.2	-1.5	-1.7	-1.7	-1.9	-1.8	-1.4	-0.9	-0.5	-0.4	-0.2	-0.1	0.0	-0.2	-0.3	-0.4	-0.7	-0.9	-1.1	-1.2	-1.1	-0.9	0.0																						
26-Oct	-1.2	-1.7	-2.4	-3.1	-3.2	-2.6	-2.8	-3.0	-2.7	-1.8	-0.9	-0.1	0.7	1.1	1.7	1.8	1.6	1.3	1.1	1.3	1.0	0.9	0.6	0.5	-0.5	1.8																						
27-Oct	0.6	0.4	0.2	-0.6	-1.5	-2.3	-2.6	-3.2	-1.9	0.2	2.7	3.8	5.2	5.9	5.0	4.2	3.7	3.6	3.7	3.8	3.5	3.1	3.0	3.3	1.8	5.9																						
28-Oct	3.9	5.0	7.6	8.2	7.8	7.3	8.0	8.3	8.4	9.1	9.3	10.3	10.3	10.3	10.0	9.1	8.3	7.3	6.3	4.7	3.9	3.6	3.3	2.9	7.2	10.3																						
29-Oct	1.8	1.0	1.3	1.3	1.1	0.1	-0.8	-1.3	-2.1	-2.3	-2.1	-2.0	-1.8	-1.7	-1.5	-1.5	-1.7	-1.7	-2.1	-2.2	-2.1	-2.0	-1.8	-0.9	-1.0	1.8																						
30-Oct	-1.2	-1.3	-0.8	-0.8	-1.6	-2.2	-2.4	-2.5	-1.6	-0.2	0.9	1.3	2.4	3.2	3.6	2.7	1.3	0.3	-0.1	-1.6	-1.0	-1.5	-2.2	-2.2	-0.3	3.6																						
31-Oct	-2.5	-2.4	-2.5	-2.6	-2.2	-2.0	-1.6	-1.8	-1.7	-1.3	-1.1	-1.0	-0.7	-0.7	-0.8	-0.6	-0.6	-1.0	-1.0	-1.2	-1.5	-2.6	-3.2	-3.3	-1.7	-0.6																						
																								2.5	2.2	2.2	1.8	1.4	1.1	0.8	0.9	1.7	2.6	3.4	4.2	5.0	5.6	5.7	5.6	4.9	4.1	3.3	2.9	2.7	2.3	1.9	2.0	Diurnal Average
																								15.5	14.8	14.9	14.3	13.7	13.2	12.5	12.6	13.4	15.2	17.0	18.8	20.3	22.6	23.0	22.9	21.9	19.8	18.0	17.2	17.4	16.7	15.9	15.8	Diurnal Maximum





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C  
Anzac - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	258	34.68	34.68
0 - 10	421	56.59	91.26
10 - 20	60	8.06	99.33
> 20	5	0.67	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

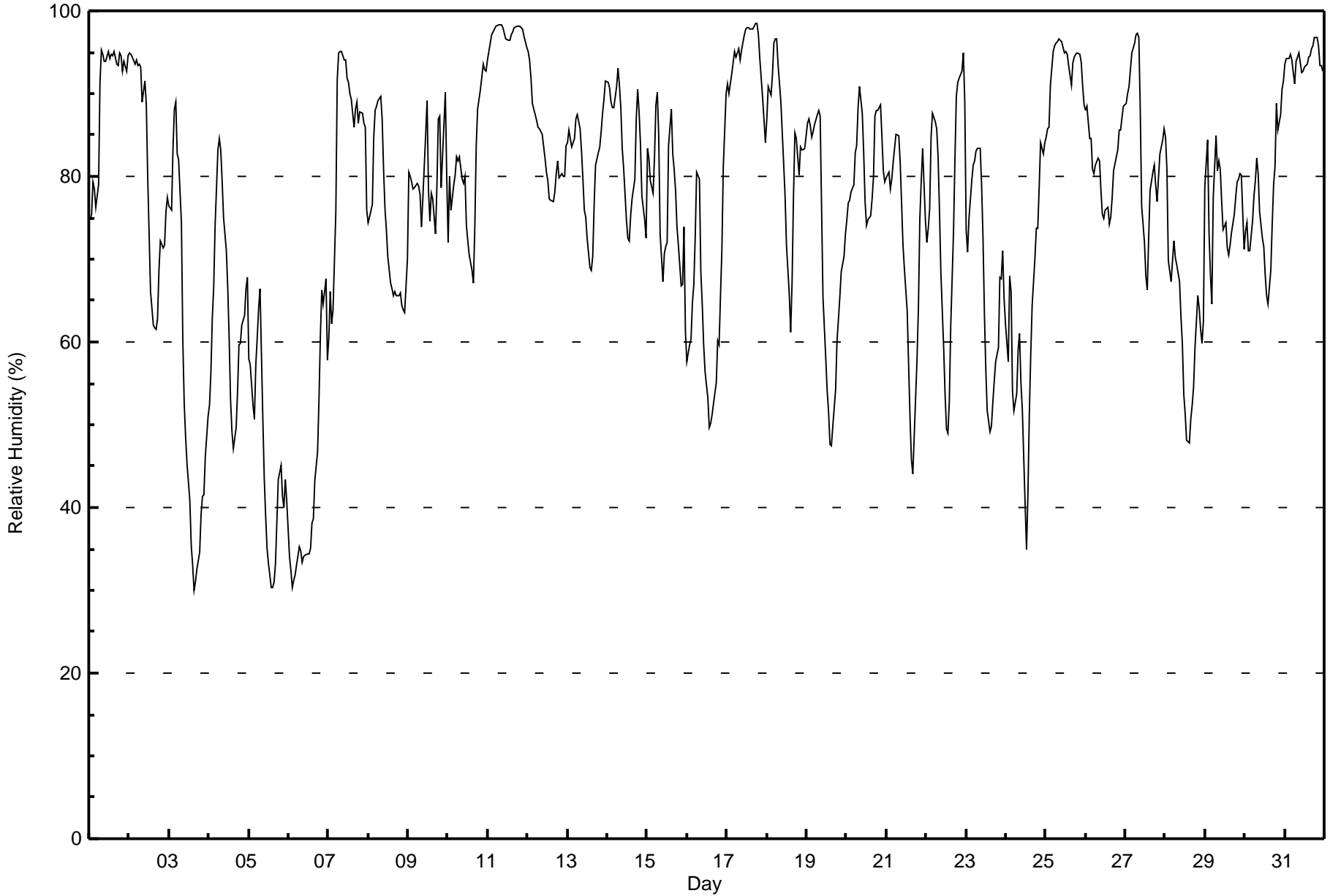
**Summary of Hour Averages**

**Relative Humidity (RH) - %**

**Anzac - October 2017**

Maximum Value: 98 % on Oct 17 19:00														Maximum Daily Average: 97.3 % on Oct 11														Hours in Service: 744											
Minimum Value: 30 % on Oct 3 16:00														Minimum Daily Average: 41.9 % on Oct 6														Hours of Data: 744											
Maximum Diurnal Average: 83.9 % at hour 7														Minimum Diurnal Average: 66.8 % at hour 15														Hours of Missing Data: 0											
Monthly Average: 76.0 %														Percentiles: P <sub>1</sub> = 32 P <sub>10</sub> = 51 Q <sub>1</sub> = 67 Median = 79 Q <sub>3</sub> = 88 P <sub>90</sub> = 95 P <sub>99</sub> = 98														Hours of Calibration: 0											
																												Percent Operational Time: 100.0											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24															
1-Oct	75	75	79	79	76	79	91	95	95	94	94	95	94	95	95	95	93	93	95	95	93	94	93	95	89.8	95													
2-Oct	95	95	94	94	94	93	93	93	89	92	89	80	73	66	62	62	62	63	69	72	71	72	76	78	80.2	95													
3-Oct	76	76	83	88	89	83	82	74	60	53	49	45	41	35	33	30	31	32	35	39	41	41	46	51	54.8	89													
4-Oct	52	56	63	67	74	83	85	83	79	75	71	67	61	53	49	47	50	54	60	60	62	63	66	68	64.5	85													
5-Oct	58	57	52	51	57	61	64	66	51	43	39	35	33	30	30	31	33	38	43	45	41	40	43	41	45.2	66													
6-Oct	34	32	30	31	32	33	35	35	33	34	34	34	34	35	38	39	43	47	53	61	66	65	68	58	41.9	68													
7-Oct	60	66	62	64	76	92	95	95	95	94	94	92	91	90	89	86	88	89	86	88	88	86	86	76	84.5	95													
8-Oct	74	75	77	85	88	89	89	90	87	81	76	74	70	67	66	66	66	66	66	66	64	64	64	70	74.1	90													
9-Oct	81	80	79	79	79	79	79	78	74	77	85	89	78	75	78	77	73	79	87	87	79	86	90	80	80.3	90													
10-Oct	72	80	76	79	80	82	82	82	80	79	80	74	72	71	69	67	74	84	88	90	92	94	93	93	80.5	94													
11-Oct	94	96	97	98	98	98	98	98	98	98	97	97	96	96	97	98	98	98	98	98	98	98	97	96	97.3	98													
12-Oct	95	94	92	89	87	87	86	86	85	85	82	81	79	77	77	77	78	80	82	80	80	80	84	84	83.5	95													
13-Oct	84	86	83	84	85	87	87	86	83	80	76	75	73	69	69	70	77	81	83	84	85	88	89	91	81.4	91													
14-Oct	91	91	89	88	88	91	93	91	88	83	81	75	73	72	75	77	80	87	90	88	84	78	75	73	83.4	93													
15-Oct	83	82	79	78	82	89	90	85	73	67	71	71	72	84	88	83	81	78	74	72	67	67	74	61	77.2	90													
16-Oct	58	60	60	65	67	73	81	80	68	65	60	57	53	50	50	51	53	55	60	60	66	71	81	90	63.8	90													
17-Oct	91	90	91	92	95	94	95	95	94	95	97	98	98	98	98	98	98	98	98	97	94	90	87	84	94.5	98													
18-Oct	87	91	90	92	96	97	97	94	89	85	82	78	72	66	61	67	78	85	85	80	84	83	83	83	83.5	97													
19-Oct	86	87	86	85	85	86	87	88	87	76	65	58	54	52	48	47	50	54	60	63	65	68	70	73	70.2	88													
20-Oct	75	77	77	78	79	83	84	88	91	88	83	77	74	75	75	77	80	87	88	88	89	85	81	79	81.5	91													
21-Oct	80	81	78	80	82	83	85	85	82	77	72	69	64	57	51	46	44	49	58	64	75	80	83	75	70.7	85													
22-Oct	72	74	76	85	88	87	86	82	76	68	59	54	50	49	53	62	73	82	90	91	92	93	95	89	76.0	95													
23-Oct	74	71	75	80	81	82	83	83	83	79	73	63	57	52	49	50	53	55	58	59	68	68	71	65	67.9	83													
24-Oct	62	58	68	66	54	52	54	59	61	55	52	40	35	42	51	59	64	70	74	74	79	84	83	84	61.6	84													
25-Oct	85	86	86	91	95	96	96	96	97	96	96	95	95	95	93	91	94	94	95	95	95	94	91	89	93.1	97													
26-Oct	88	88	85	85	81	80	81	82	82	78	75	75	76	76	74	75	77	81	82	83	86	86	87	89	81.4	89													
27-Oct	89	90	91	93	95	96	97	97	97	88	76	72	68	66	72	78	80	81	79	77	80	83	84	86	84.0	97													
28-Oct	85	81	70	67	70	72	70	69	67	63	60	54	51	48	48	51	52	55	59	66	64	62	60	63	62.7	85													
29-Oct	79	84	73	68	65	77	85	81	82	81	77	74	74	71	70	72	73	75	77	79	80	80	80	71	76.3	85													
30-Oct	73	74	71	71	75	78	80	82	80	76	73	72	68	66	65	69	74	79	81	89	86	87	90	92	77.1	92													
31-Oct	94	94	94	95	94	92	91	94	95	94	93	93	93	94	94	95	95	96	97	97	96	93	93	93	94.1	97													
														77.5	78.3	77.7	78.8	80.2	82.4	83.9	83.7	80.7	77.4	74.5	71.3	68.5	66.8	66.8	67.4	69.9	73.1	75.8	77.0	77.7	78.1	79.3	78.0	Diurnal Average	
														95	96	97	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	97	96	Diurnal Maximum	







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Relative Humidity (RH) - %  
Anzac - October 2017**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	32	4.30	4.30
40 - 60	92	12.37	16.67
60 - 80	264	35.48	52.15
80 - 100	356	47.85	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Leaf Wetness (SW) - %**

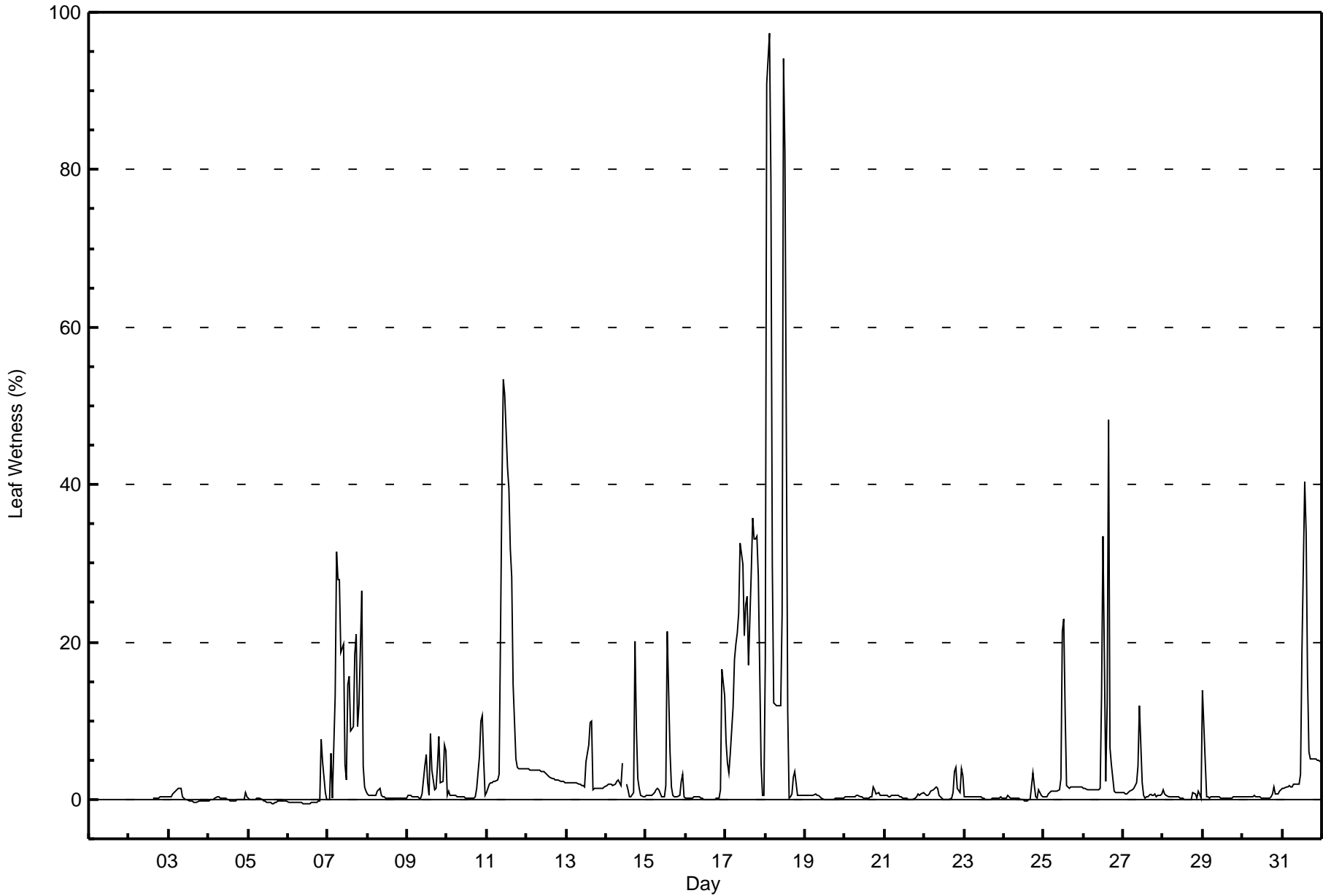
**Anzac - October 2017**

Maximum Value: 97 % on Oct 18 03:00		Maximum Daily Average: 24.8 % on Oct 18		Hours in Service: 744																							
Minimum Value: 0 % on Oct 6 14:00		Minimum Daily Average: -0.2 % on Oct 5		Hours of Data: 705																							
Maximum Diurnal Average: 8.7 % at hour 13		Minimum Diurnal Average: 1.5 % at hour 24		Hours of Missing Data: 39																							
Monthly Average: 3.8 %		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 2 P <sub>90</sub> = 10 P <sub>99</sub> = 50		Hours of Calibration: 0																							
				Percent Operational Time: 94.8																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	--	--	
2-Oct	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	0	0	0	0	0	0	0	0	0	0	0	--	0
3-Oct	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
4-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1	
5-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-0.2	0	
6-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	5	1	0	0.2	8	
7-Oct	0	0	6	0	13	32	28	28	19	20	4	2	15	16	9	9	18	21	9	12	27	4	2	1	12.3	32	
8-Oct	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
9-Oct	0	1	1	0	0	0	0	0	0	1	4	6	2	1	8	4	1	1	4	8	2	2	7	6	2.5	8	
10-Oct	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	10	11	5	1	1.6	11	
11-Oct	1	2	2	2	2	2	2	3	21	39	53	51	42	39	32	28	15	5	4	4	4	4	4	4	15.3	53	
12-Oct	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	3	2	2	2	2	2	2	2	3.1	4	
13-Oct	2	2	2	2	2	2	2	2	2	2	2	5	7	10	10	1	1	1	1	1	1	1	1	2	2.8	10	
14-Oct	2	2	2	2	2	2	2	2	2	2	5	UO	2	1	0	0	1	20	9	3	1	1	0	0	2.8	20	
15-Oct	1	0	0	0	1	1	1	1	1	0	0	0	2	21	6	2	1	0	0	0	0	2	3	0	2.0	21	
16-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	17	13	1.4	17	
17-Oct	7	5	3	6	12	18	20	21	24	32	30	21	25	26	17	29	36	33	33	34	28	4	1	1	19.3	36	
18-Oct	18	91	97	79	30	12	12	12	12	12	24	94	82	11	0	0	1	3	4	1	0	0	0	0	24.8	97	
19-Oct	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
20-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	1	1	0	0	0.5	2	
21-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.4	1	
22-Oct	1	0	1	1	1	1	1	2	1	0	0	0	0	0	0	0	0	1	4	4	1	1	4	3	1.1	4	
23-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
24-Oct	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	0	0	1	0	0	0.4	3	
25-Oct	0	0	0	1	1	1	1	1	1	1	3	21	23	11	2	1	2	2	2	2	2	2	2	2	3.4	23	
26-Oct	1	1	1	1	1	1	1	1	1	1	1	13	33	2	12	48	7	4	1	1	1	1	1	1	5.8	48	
27-Oct	1	1	1	1	1	1	1	2	2	4	12	2	0	0	0	0	1	0	1	1	0	0	0	1	1.4	12	
28-Oct	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0.4	1	
29-Oct	14	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	14	
30-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	1	1	1	0.5	2	
31-Oct	1	1	2	2	2	2	2	2	2	2	2	3	19	40	34	16	6	5	5	5	5	5	5	5	7.2	40	
		2.0	4.1	4.4	3.6	2.6	2.9	2.9	3.0	3.3	4.3	5.0	7.9	8.7	6.2	4.4	5.0	3.0	3.5	2.9	2.9	3.2	1.7	2.0	1.5	Diurnal Average	
		18	91	97	79	30	32	28	28	24	39	53	94	82	40	34	48	36	33	33	34	28	11	17	13	Diurnal Maximum	
DF - DAS Failure		UO - Unstable Operation																									



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Leaf Wetness (SW) - %**  
**Anzac - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Leaf Wetness (SW) - %  
Anzac - October 2017**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	208	33.12	33.12
0.4 - 0.5	91	14.49	47.61
0.6 - 0.7	30	4.78	52.39
0.8 - 1.4	74	11.78	64.17
1.5 - 10	149	23.73	87.90
> 10	71	11.31	99.20

Total Number of Valid Hours: 628

Total Number of Hours: 744



# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Wind Speed (WS) - km/h

## Anzac - October 2017

Maximum Speed: 32 km/h on Oct 24 13:00	Maximum Daily Speed Average: 22.4 km/h on Oct 28	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 22 20:00	Minimum Daily Speed Average: 2.4 km/h on Oct 17	Hours of Data: 744
Maximum Diurnal Speed Average: 7.1 km/h at hour 5	Minimum Diurnal Speed Average: 5.2 km/h at hour 18	Hours of Missing Data: 0
Monthly Average Velocity: 6.3 km/h 296.7 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 6 Q <sub>1</sub> = 8 Median = 11 Q <sub>3</sub> = 16 P <sub>90</sub> = 22 P <sub>99</sub> = 29	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	NW14	NW17	NW18	NW19	NW19	NNW19	NW17	NW17	NW18	NW16	NW16	NW16	NW17	NW19	NNW20	NNW21	NNW23	NNW24	NW21	NNW22	NNW25	N27	N25	NNW24	NW18.9	N27	
2-Oct	N25	N21	N23	NNW22	NNW22	NNW24	N20	N27	N25	N23	N26	N24	N24	N24	NNW24	NNW22	NNW21	NNW16	NNW9	NW8	NW10	NW10	NW9	NNW10	NNW19.0	N27	
3-Oct	WNW8	W8	W7	WSW6	SW7	SW8	SW7	SW9	SW13	SW16	SW14	SW14	SW15	SW18	SW15	WSW16	WSW14	WSW16	W14	W15	WNW14	WNW15	WNW15	WNW14	WSW10.9	SW18	
4-Oct	WNW14	WNW14	WNW11	NW9	NNW11	NNW10	NNW9	NNW7	NW7	NNW9	NNW9	NNW10	W8	W9	W8	WNW4	SW3	SSE4	SSE7	SSE8	SSE6	S6	S5	SSW6	WNW4.7	WNW14	
5-Oct	SW8	SSW7	SW10	SW9	SW9	SW10	SW6	SSW5	W9	WNW10	WNW11	WNW12	WNW10	WSW15	WSW17	SW17	SW14	SW14	WSW13	W15	W15	W11	W12	WSW10.3	WSW17		
6-Oct	W13	W10	WSW15	W16	W18	W18	W16	W16	W17	W16	W17	W22	W20	W20	WNW18	W14	WNW8	W6	W6	W4	WNW5	W6	W7	W10	W13.1	W22	
7-Oct	W6	W7	W13	W15	W15	WNW13	NNW12	NNW17	NNW18	NNW18	NNW19	NNW14	NNW14	NW13	NW12	NW14	NNW18	NNW21	NNW19	NNW17	NNW23	NW21	NW21	NW23	NW14.5	NW23	
8-Oct	NW22	NW22	NW23	NW21	NW20	NW21	NW19	NW20	NW17	NW19	NW18	NW17	NW18	NW19	NW18	NW18	NW16	NW14	NW12	NW12	NW11	WNW9	WSW8	SSW5	NW16.0	NW23	
9-Oct	S5	S8	S10	SSE11	SSE10	SE9	SE9	SSE13	S11	S9	S10	S10	WSW8	W12	WNW15	WNW12	WNW9	WSW5	SW7	SW7	NW14	SW6	SW8	W7	SSW5.3	WNW15	
10-Oct	W7	WSW7	W11	W11	WNW12	WNW10	W9	WNW10	NW11	NW11	WNW9	NW8	NW7	N12	N10	N7	N7	NE8	NE4	NEE7	NEE6	NEE6	NEE7	NW6.1	N12		
11-Oct	NE8	NNE6	NNE7	NNE9	NNE9	NNE11	NNE11	NNE11	NNE10	NNE11	NNE11	NNE13	NNE12	N12	N12	N13	N14	N15	N13	N13	N13	N14	N13	NNW12	N10.9	N15	
12-Oct	NNW13	NNW13	NNW13	N13	NNW11	NNW10	NW12	NW12	NW12	NW12	NW14	NW13	NW13	NW12	NW12	NW11	NW10	NW9	NW10	NW10	NW10	NW10	NW9	NNW7	NW11.0	NW14	
13-Oct	WNW6	WNW6	NW9	WNW9	WNW10	WNW11	WNW10	W11	WNW10	WNW9	W11	WNW13	W11	W7	W7	WSW8	SW8	SSW6	SSW7	SW8	SW7	SW6	S3	S4	W6.9	WNW13	
14-Oct	SSW7	SW6	SSW5	SSW8	SSW10	SSW9	S10	SSE9	S8	SSW8	SSW9	SW12	SW11	WSW14	WSW14	WSW12	W12	WNW11	W10	WNW14	NW14	NW17	NW15	NW13	WSW7.4	NW17	
15-Oct	WNW12	WNW10	WNW9	W9	SW7	SSW6	S8	S7	SSE7	SSE9	SSE9	S11	S12	SSW15	SSW13	SW11	SW11	SW11	SW13	SW16	SW17	SW16	SW12	WSW17	SW8.9	SW17	
16-Oct	WSW19	W19	W21	WNW22	NW19	WNW17	WNW13	WNW13	W16	W15	W12	W10	WSW10	WSW13	WSW12	WSW7	WSW7	SW6	SW7	WSW11	WSW9	SW13	S5	SSE6	W11.3	WNW22	
17-Oct	SSE9	SSE9	SSE9	SSE7	SSE8	SSE7	SSE6	SSE6	SSE8	SE5	E4	E7	SE8	SE8	SE8	N2	NNW9	NNW9	NW15	NW20	NW24	NW26	NW29	NW29	WNW2.4	NW29	
18-Oct	WNW29	WNW29	WNW29	WNW30	WNW29	WNW24	WNW24	WNW24	WNW22	WNW24	WNW21	WNW18	WNW15	WNW13	WNW10	WNW8	SSW2	SE4	SE7	SE8	SE8	SE11	SE14	SE15	SE15	WNW10.3	WNW30
19-Oct	SE18	SE19	SE18	SE18	SE16	SE13	SE11	SSE12	SSE11	SSE10	SE8	SE7	SE8	SE10	SE12	SE13	SE11	SE11	SE10	SE10	SE12	SSE13	SSE13	SSE12	SE12.1	SE19	
20-Oct	SE12	SE12	SE13	SE13	ESE10	ESE12	SE11	ESE11	ESE12	SE9	ESE3	SE7	ESE5	E6	E6	NE4	ENE2	WNW4	WNW10	WNW9	WNW9	WNW10	WNW13	WNW14	SE3.0	WNW14	
21-Oct	NW15	WNW13	WNW12	WNW13	WNW12	WNW11	WNW10	WNW10	WNW11	WNW12	WNW13	WNW13	WNW11	WNW9	W10	W10	W9	WSW7	SW4	SW4	SSW5	S5	SSE6	S8	W8.1	NW15	
22-Oct	S9	S8	S7	SSE6	SSE6	SSE6	SE8	SE9	SE6	SSE9	SSE11	SE10	ESE9	ESE10	ESE8	ESE9	E6	E4	ENE4	NE1	N5	N6	N5	WNW7	SE4.6	SSE11	
23-Oct	W13	WNW12	WNW15	WNW15	WNW17	WNW18	WNW19	WNW16	WNW16	WNW15	NW14	WNW16	WNW17	WNW15	WNW14	WNW12	WSW8	WSW9	WSW10	SW10	SSW8	SSW8	S7	S9	WNW11.1	WNW19	
24-Oct	S10	SSW14	SSW17	S19	SW21	WSW22	W24	WNW20	WNW16	WNW23	WNW24	WNW26	NW32	NW32	NW31	NW23	NNW23	NNW19	NNW14	NNW11	N10	NNE7	NNE8	NNE5	WNW13.0	NW32	
25-Oct	NE5	NE4	ENE6	ENE7	ENE9	ENE9	NE8	NNE9	NNE9	NNE10	N11	N13	N16	N15	N18	NNW17	NNW17	NNW15	NNW13	NNW13	NNW10	NNW12	NW9	WNW8	N9.5	N18	
26-Oct	WSW6	SW9	SW10	SW13	SW13	WSW15	SW11	SW11	SSW11	SW10	SW11	SW13	SW11	SW12	SW13	SW16	WSW10	WSW9	W10	W13	W11	WNW13	WNW13	WNW11	WSW10.3	SW16	
27-Oct	WNW11	WNW10	WNW6	WNW4	S1	SSE4	S5	SE6	S6	SSE7	SSE7	SSE9	SE10	SSE10	SSE13	SSE11	SSE12	SSE9	SSE12	SSE10	SSE10	SSE9	S7	SW8	S5.9	SSE13	
28-Oct	SW9	SW9	W13	W18	WNW24	WNW21	WNW25	WNW26	WNW23	WNW26	WNW25	NW26	NW27	NW27	NW26	NW23	NW24	NW25	NW26	NW31	NW28	NW32	NW27	NW28	NW22.4	NW32	
29-Oct	NW24	NW23	NW24	NW27	NW31	NNW29	NNW26	NNW28	N27	NNW23	NNW25	NNW25	NNW21	NNW22	N18	N14	N9	N7	N8	N4	WNW2	SSW5	WSW4	W5	NNW16.8	NW31	
30-Oct	SSW5	SSW6	SW7	SW8	SW9	SW9	SSW8	SSW8	SSW8	S7	S8	S8	S6	SE4	SE3	E4	NE4	NNE4	NW3	NNW6	NNW4	NW5	NW4	WNW4	SW3.1	SW9	
31-Oct	W4	WSW4	SSE2	SE2	SE4	SE5	SE6	SE6	SE7	SE7	ESE7	E8	E9	ENE11	ENE11	ENE10	ENE10	NE9	NE10	NE11	NE10	NNE8	NNE7	N9	ENE5.1	ENE11	

WNW6.2	W6.0	W6.6	WNW6.9	WNW7.1	WNW6.9	WNW5.9	WNW5.6	WNW6.0	WNW6.6	WNW6.6	WNW6.6	WNW6.7	WNW7.0	WNW7.0	WNW6.9	WNW6.4	NW5.8	NW5.2	WNW5.3	WNW6.3	NW6.6	WNW6.5	WNW5.5	WNW6.1	Diurnal Average
WNW29	WNW29	WNW29	WNW30	NW31	NNW29	NNW26	NNW28	N27	WNW26	N26	WNW26	NW32	NW32	NW31	NW23	NW24	NW25	NW26	NW31	NW28	NW32	NW29	NW29	Diurnal Maximum	

All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

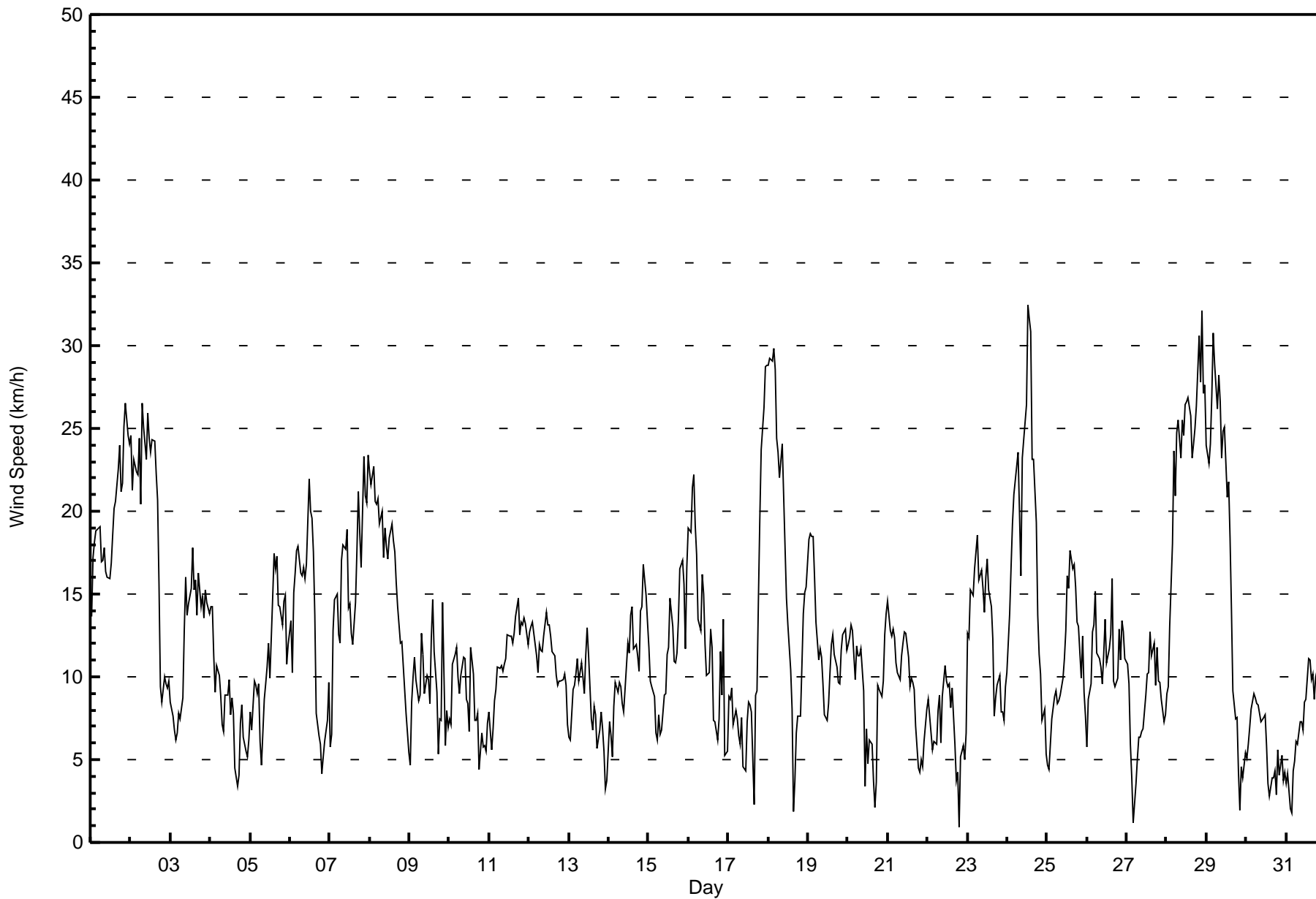
**Wind Speed (WS) - km/h**  
**Anzac - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Oct 24 13:00 Minimum Value: 1 km/h on Oct 21 20:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 5 P <sub>90</sub> = 6 P <sub>99</sub> = 9																	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	4	5	5	5	6	6	5	5	5	5	4	4	4	5	5	6	6	6	5	5	6	7	7	6	7
2-Oct	6	5	6	6	6	6	5	6	7	6	7	7	6	6	6	6	5	4	2	2	2	2	2	2	7
3-Oct	2	2	1	1	1	2	2	4	5	5	4	4	5	5	5	5	5	5	4	4	4	4	4	5	
4-Oct	4	4	3	2	2	2	2	2	2	2	2	2	3	3	3	2	1	1	2	2	2	2	2	4	
5-Oct	2	1	2	2	1	2	2	1	3	2	3	3	3	5	5	5	5	3	3	4	5	5	3	5	
6-Oct	5	4	5	5	6	6	5	5	5	5	6	7	6	6	6	4	2	2	2	1	3	2	3	7	
7-Oct	2	3	4	5	5	4	4	4	5	5	5	4	4	4	3	4	6	6	5	4	7	6	5	7	
8-Oct	6	5	6	5	6	6	5	5	4	6	5	5	6	5	5	5	5	4	3	4	3	3	3	6	
9-Oct	1	2	2	2	2	2	3	3	3	3	2	2	5	4	5	3	3	2	2	1	7	2	2	7	
10-Oct	3	4	3	3	3	3	3	3	4	3	2	3	2	3	2	2	2	2	2	3	1	1	1	4	
11-Oct	2	1	2	2	2	3	3	3	3	3	3	4	4	3	3	3	3	3	3	3	3	3	3	4	
12-Oct	3	3	3	3	3	2	3	3	3	3	4	3	4	3	3	3	2	2	2	2	2	2	3	4	
13-Oct	1	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	1	1	3	
14-Oct	2	1	2	2	2	2	2	2	3	3	3	4	3	4	5	4	3	3	4	4	4	4	4	5	
15-Oct	4	3	3	3	1	1	1	2	2	2	3	3	4	4	4	4	3	4	4	5	5	6	3	6	
16-Oct	6	6	7	7	5	5	4	4	5	5	4	3	3	4	4	2	2	2	3	4	4	5	2	7	
17-Oct	2	2	3	3	3	1	1	1	2	2	2	2	2	2	3	2	2	3	4	6	7	9	9	10	
18-Oct	9	9	9	8	8	7	7	6	7	6	6	4	4	4	2	1	1	1	1	2	3	3	4	9	
19-Oct	5	5	5	5	5	4	3	3	3	3	2	2	2	3	3	3	3	2	2	2	2	3	3	5	
20-Oct	3	3	3	3	2	3	3	3	3	3	2	2	3	2	2	1	1	1	3	2	2	3	3	4	
21-Oct	3	3	4	3	3	3	2	2	3	3	3	4	3	3	3	3	3	2	1	1	1	1	2	4	
22-Oct	1	2	1	1	1	1	2	2	2	3	3	3	2	3	2	2	2	2	1	2	1	1	1	3	
23-Oct	4	3	4	4	4	5	5	5	5	5	5	5	5	4	4	4	2	2	3	2	2	3	2	5	
24-Oct	3	4	4	5	6	8	8	6	5	8	8	9	10	10	9	6	6	6	4	4	2	2	2	10	
25-Oct	1	1	2	2	3	3	2	2	2	3	3	3	5	4	4	4	4	3	3	2	3	2	2	5	
26-Oct	1	2	2	3	4	5	3	2	3	3	4	5	4	3	4	4	4	4	4	4	3	4	4	5	
27-Oct	3	3	2	1	1	1	1	1	2	2	2	2	3	2	3	3	3	3	3	3	3	2	2	3	
28-Oct	3	2	5	5	7	6	7	7	6	7	7	8	8	8	8	7	8	7	8	9	8	9	8	9	
29-Oct	7	7	7	8	8	8	7	8	7	6	6	6	5	5	5	4	3	3	2	1	1	2	2	8	
30-Oct	1	1	3	2	2	2	1	2	1	2	2	2	2	1	1	1	1	1	1	1	2	1	1	3	
31-Oct	1	1	1	1	1	1	2	1	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	3	
Diurnal Maximum																									



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Anzac - October 2017**







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h  
Anzac - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	63	8.47	8.47
6 - 11	339	45.56	54.03
12 - 19	237	31.85	85.89
20 - 28	91	12.23	98.12
29 - 38	14	1.88	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Wind Speed (WS) - km/h  
Anzac - October 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	4	3	5	2	3	2	7	3	8	7	3	3	2	7	3	1	63
6 - 11	10	22	7	8	6	7	30	38	24	18	40	18	33	43	21	14	339
12 - 19	17	2	0	0	0	2	16	8	2	4	24	15	26	50	47	24	237
20 - 28	14	0	0	0	0	0	0	0	0	0	1	1	5	17	30	23	91
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	5	8	1	14
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	45	27	12	10	9	11	53	49	34	29	68	37	66	122	109	63	744

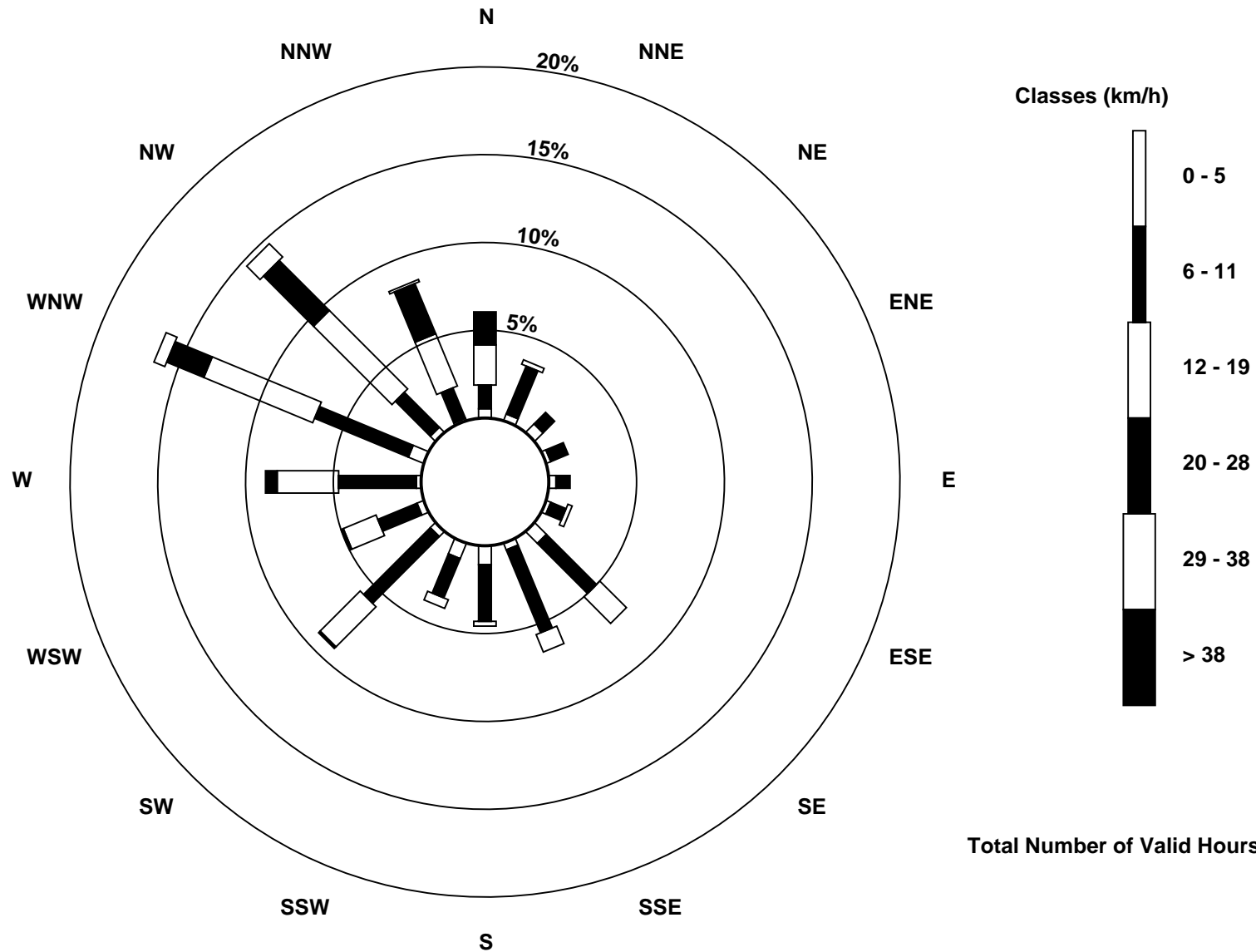
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed (WS) - km/h  
Anzac (AMS 14)





**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Wind Direction (WD) - deg**  
**Anzac - October 2017**

Direction of Maximum Speed: 315 deg on Oct 24 13:00 Direction of Maximum Daily Speed Average: 304.5 deg on Oct 28	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0
Direction of Minimum Speed: 55 deg on Oct 22 20:00 Direction of Minimum Daily Speed Average: 2.4 deg on Oct 17	Percent Operational Time: 100.0
Monthly Average Direction: 289.2 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	315	308	312	305	307	302	307	308	310	312	316	318	318	326	342	338	335	334	324	331	346	350	355	346	325.6
2-Oct	349	354	353	345	345	348	354	352	359	349	351	0	356	1	345	337	344	342	327	312	311	306	307	303	346.1
3-Oct	290	267	261	237	228	235	220	217	223	228	227	225	219	219	227	240	245	237	268	280	293	293	293	292	248.2
4-Oct	299	298	297	315	337	336	337	342	325	327	310	287	277	279	278	300	217	157	160	157	162	172	184	205	292.6
5-Oct	217	212	225	231	223	228	214	204	274	287	289	290	285	243	244	231	229	219	229	252	264	278	266	267	247.4
6-Oct	272	260	255	265	270	275	273	267	271	273	261	272	277	278	287	280	285	264	273	281	287	264	278	270	272.2
7-Oct	262	264	274	272	272	282	307	332	338	341	341	332	327	317	306	326	347	346	337	333	331	324	323	325	321.4
8-Oct	325	322	320	314	313	311	312	313	316	325	322	317	316	309	314	316	321	323	319	306	311	282	244	209	314.0
9-Oct	181	172	171	165	162	143	143	155	182	188	169	171	247	280	293	296	299	246	217	234	309	234	233	269	213.6
10-Oct	261	254	271	281	285	283	280	290	304	319	289	322	316	352	353	351	10	40	35	20	14	18	24	32	320.3
11-Oct	37	16	18	20	24	26	25	27	29	21	18	20	17	10	8	360	355	356	351	350	351	351	353	346	8.3
12-Oct	345	344	347	349	344	332	324	323	324	319	322	323	318	317	312	312	312	310	312	314	312	307	326	341	325.0
13-Oct	294	288	306	301	301	298	286	280	287	288	281	291	269	265	274	238	216	206	211	223	231	220	188	185	269.6
14-Oct	212	223	213	206	203	194	172	164	170	192	203	223	235	252	252	253	261	283	267	291	305	318	315	311	248.2
15-Oct	295	289	284	278	230	212	179	175	167	153	151	170	187	210	203	215	221	226	227	234	235	234	217	249	221.4
16-Oct	258	261	265	283	313	296	289	285	276	279	276	269	250	240	249	254	243	236	216	251	247	236	191	148	264.9
17-Oct	159	150	156	156	152	150	164	158	158	129	96	94	128	124	126	7	342	345	321	308	313	315	309	305	303.4
18-Oct	296	299	299	297	295	298	298	302	295	297	295	290	295	290	283	202	140	132	131	131	127	132	131	133	291.0
19-Oct	128	125	131	137	141	137	139	148	150	155	144	146	128	126	136	124	144	136	143	138	137	154	155	152	138.8
20-Oct	146	140	143	144	123	121	125	117	120	126	109	137	106	79	87	35	73	284	296	291	289	292	298	301	132.7
21-Oct	306	292	298	293	293	292	296	295	290	289	290	293	293	288	280	274	268	252	222	233	192	178	166	171	280.9
22-Oct	183	171	173	149	152	150	133	128	133	153	153	128	113	114	120	102	98	88	67	55	358	2	351	282	130.1
23-Oct	281	282	289	296	301	300	301	298	294	295	305	299	299	291	292	285	255	249	248	235	213	203	177	185	282.3
24-Oct	189	206	195	189	227	256	273	282	289	303	298	295	315	324	322	320	327	328	338	345	357	17	23	31	298.3
25-Oct	34	39	65	68	57	57	46	25	18	14	11	5	1	360	351	346	340	345	342	347	336	337	315	291	1.3
26-Oct	253	227	226	225	231	240	228	219	213	217	215	226	227	226	233	231	248	258	261	277	278	290	294	294	242.6
27-Oct	297	289	295	292	185	164	169	144	169	157	150	147	144	148	156	162	158	154	166	162	162	165	176	217	169.5
28-Oct	225	230	270	281	289	289	293	295	294	293	295	308	318	307	311	313	319	310	314	322	320	321	319	318	304.5
29-Oct	310	318	320	323	325	335	346	347	352	344	347	345	333	341	359	359	3	353	1	354	301	209	240	280	336.5
30-Oct	195	213	229	235	230	224	208	199	200	182	185	177	169	144	126	94	45	25	310	338	327	305	307	298	214.5
31-Oct	265	250	166	136	131	131	135	135	129	135	113	92	81	74	77	71	61	52	44	52	47	28	14	6	75.3

285.5 279.5 280.9 281.8 286.8 289.6 292.1 298.0 296.1 298.9 300.0 299.6 302.7 301.9 302.8 303.5 309.4 308.4 297.4 299.9 307.3 302.1 302.9 296.7  
 Diurnal Average

All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

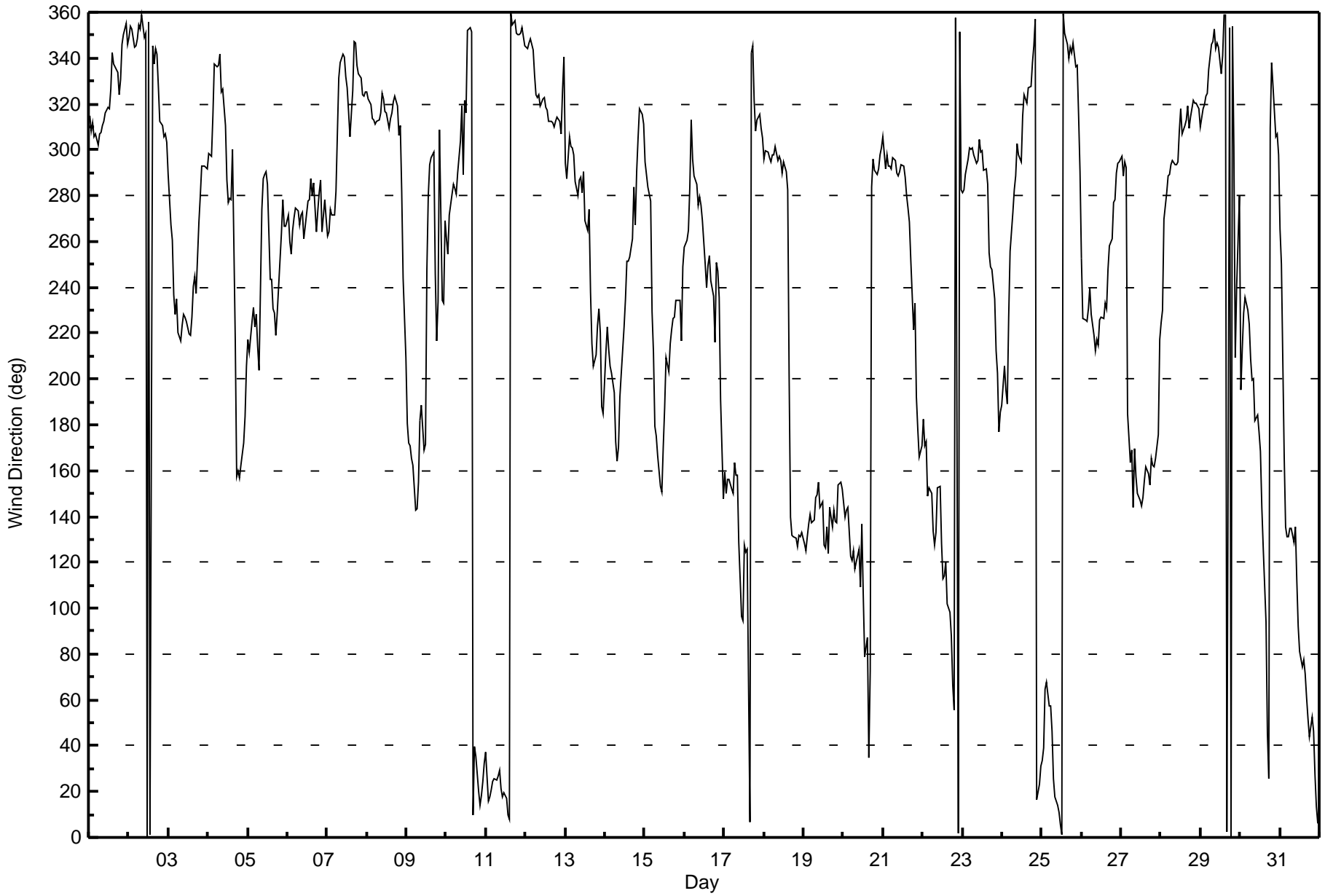
**Wind Direction (WD) - deg**  
**Anzac - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 78 deg on Oct 20 17:00 Minimum Value: 9 deg on Oct 22 06:00 Percentiles: P <sub>1</sub> = 11 P <sub>10</sub> = 14 Q <sub>1</sub> = 16 Median = 18 Q <sub>3</sub> = 22 P <sub>90</sub> = 25 P <sub>99</sub> = 63																			Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	17	17	18	18	18	20	18	17	18	18	18	16	17	17	23	21	19	19	16	19	25	26	30	26	30
2-Oct	27	29	29	24	25	26	28	28	32	28	27	32	30	31	18	17	16	14	13	12	14	14	13	14	32
3-Oct	17	15	11	27	10	14	14	22	20	18	21	20	24	19	21	20	21	22	22	20	21	19	18	18	27
4-Oct	18	16	16	19	13	13	15	15	16	17	32	25	36	28	32	50	36	21	13	13	17	25	19	18	50
5-Oct	16	12	12	13	10	12	14	25	22	21	19	19	24	23	22	21	17	15	13	22	22	23	22	23	25
6-Oct	23	24	22	24	22	22	23	23	24	22	23	22	23	22	21	23	22	22	24	22	36	21	24	22	36
7-Oct	19	17	22	22	22	20	22	15	16	15	16	17	18	19	20	21	18	17	17	15	15	16	16	15	22
8-Oct	15	15	16	17	17	18	17	16	17	16	17	19	18	18	18	18	17	17	15	19	22	25	26	20	26
9-Oct	16	12	13	13	13	17	19	15	23	23	15	24	50	25	21	20	23	35	15	23	23	27	13	31	50
10-Oct	25	35	21	19	19	21	22	22	20	19	22	41	50	18	19	19	21	15	18	12	13	14	16	15	50
11-Oct	17	17	15	16	15	16	16	15	16	16	17	16	17	17	18	16	15	16	15	15	14	14	15	14	18
12-Oct	14	15	14	16	15	15	14	14	15	15	16	15	17	16	17	16	15	15	14	14	14	14	22	14	22
13-Oct	15	24	16	15	14	17	21	19	20	26	25	19	22	35	28	20	17	19	19	17	24	18	28	18	35
14-Oct	19	16	21	17	16	17	15	16	25	24	22	20	18	20	21	25	24	23	25	21	17	15	16	16	25
15-Oct	19	21	20	22	20	14	15	17	17	17	22	20	32	18	22	38	25	17	19	20	22	25	17	21	38
16-Oct	24	23	23	22	17	18	19	20	23	22	22	24	24	22	23	24	23	21	25	22	24	17	31	22	31
17-Oct	16	18	30	24	14	15	11	14	13	21	24	22	17	16	24	71	16	22	15	18	18	18	18	18	71
18-Oct	19	18	19	18	18	18	18	18	18	18	19	19	21	26	22	66	29	14	13	17	16	18	17	18	66
19-Oct	17	16	19	17	17	20	19	16	18	19	18	20	24	26	20	16	17	19	17	14	14	14	14	14	26
20-Oct	15	15	16	16	19	16	15	16	16	22	48	31	64	19	31	30	78	22	19	14	13	17	16	16	78
21-Oct	16	17	18	17	16	16	14	14	16	16	16	17	20	23	22	24	22	16	17	19	17	16	13	11	24
22-Oct	10	18	16	14	12	9	12	15	21	19	19	27	22	22	20	20	28	48	20	71	16	12	17	19	71
23-Oct	19	19	19	18	17	19	17	18	18	20	22	20	19	21	20	21	20	19	22	16	18	19	23	18	23
24-Oct	18	20	19	22	19	24	24	21	21	19	21	22	19	17	17	14	16	15	14	15	15	15	21	21	24
25-Oct	18	17	18	14	14	15	17	15	16	16	17	17	16	16	16	16	14	15	16	13	14	14	22	20	22
26-Oct	21	14	13	12	15	18	20	16	17	24	26	21	24	19	18	16	23	25	24	23	21	20	18	18	26
27-Oct	18	19	23	18	67	16	16	16	18	16	21	20	20	18	13	15	14	16	16	15	19	18	27	17	67
28-Oct	15	15	22	20	20	20	19	18	19	19	20	18	19	19	19	17	16	18	18	17	16	17	17	16	22
29-Oct	18	16	16	16	16	16	18	16	19	17	18	16	15	17	17	15	17	23	14	19	71	23	36	39	71
30-Oct	24	16	24	16	14	11	12	14	14	15	19	14	17	31	34	38	15	13	31	11	30	14	23	19	38
31-Oct	11	22	41	47	14	19	17	17	15	19	17	17	18	15	15	16	14	18	16	15	14	16	14	15	47
Diurnal Maximum																									



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Anzac - October 2017**





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Precipitation (PC) - mm**

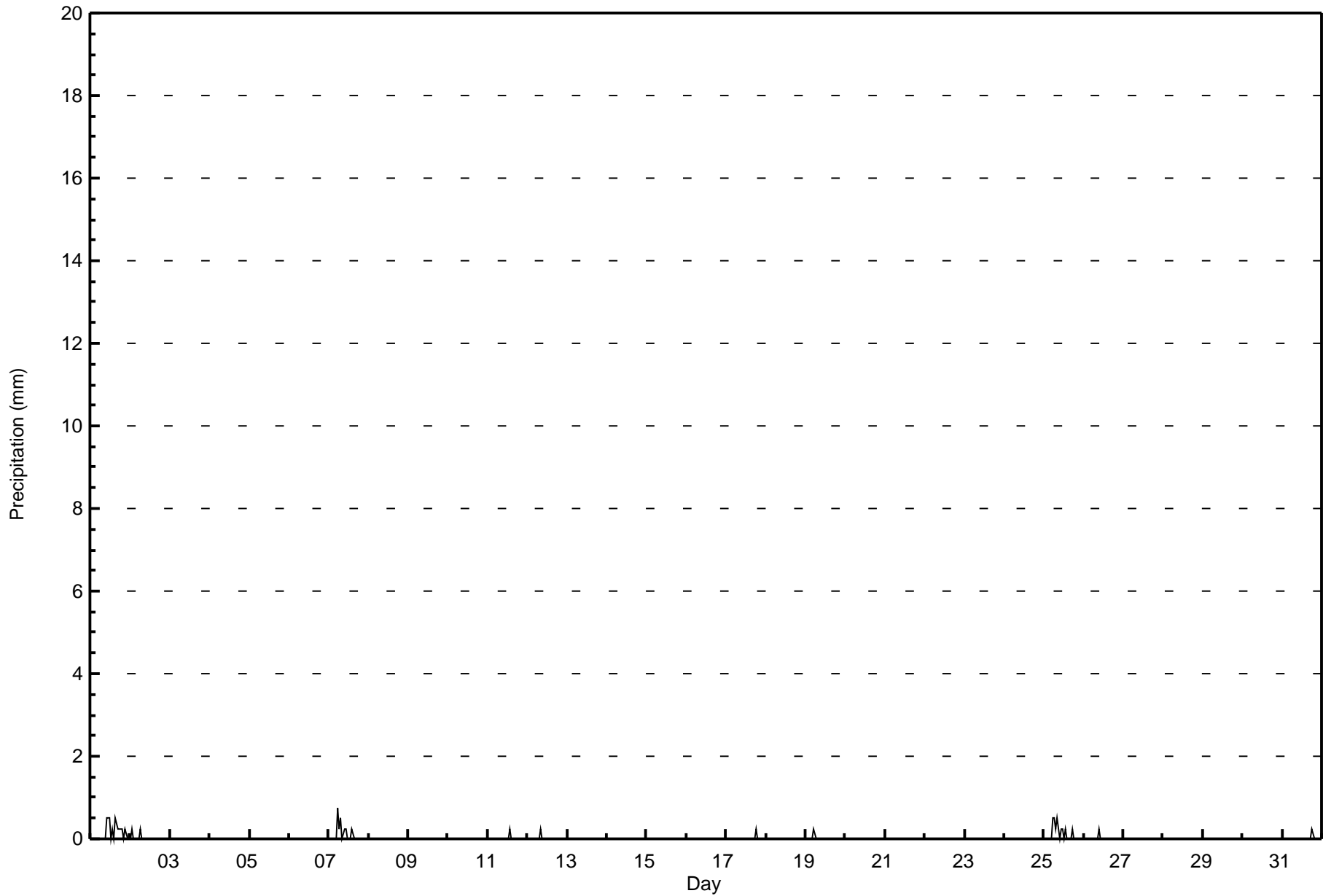
**Anzac - October 2017**

Maximum Value: 0.8 mm on Oct 7 06:00																			Maximum Daily Total: 3.0 mm on Oct 1						Hours in Service: 744		
Minimum Value: 0.0 mm on Oct 1 01:00																			Minimum Daily Total: 0.0 mm on Oct 3						Hours of Data: 744		
Maximum Diurnal Total: 1.5 mm at hour 6																			Minimum Diurnal Total: 0.0 mm at hour 1						Hours of Missing Data: 0		
Monthly Total: 10.16 mm																			Percentiles: P <sub>1</sub> = 0.0 P <sub>10</sub> = 0.0 Q <sub>1</sub> = 0.0 Median = 0.0 Q <sub>3</sub> = 0.0 P <sub>90</sub> = 0.0 P <sub>99</sub> = 0.5						Hours of Calibration: 0		
																									Percent Operational Time: 100.0		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.0	0.3	0.0	0.5	0.3	0.3	0.3	0.3	0.0	0.3	0.0	0.0	3.0	0.5	
2-Oct	0.0	0.3	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.3	
3-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-Oct	0.0	0.0	0.0	0.0	0.0	0.8	0.3	0.5	0.0	0.3	0.3	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.8	
8-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3
12-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3
13-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3
18-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19-Oct	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3
20-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25-Oct	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.3	0.5	0.0	0.3	0.3	0.0	0.3	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.5	0.5
26-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3
27-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3
																								Diurnal Average			
																								Diurnal Maximum			



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Precipitation (PC) - mm**  
**Anzac - October 2017**









# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

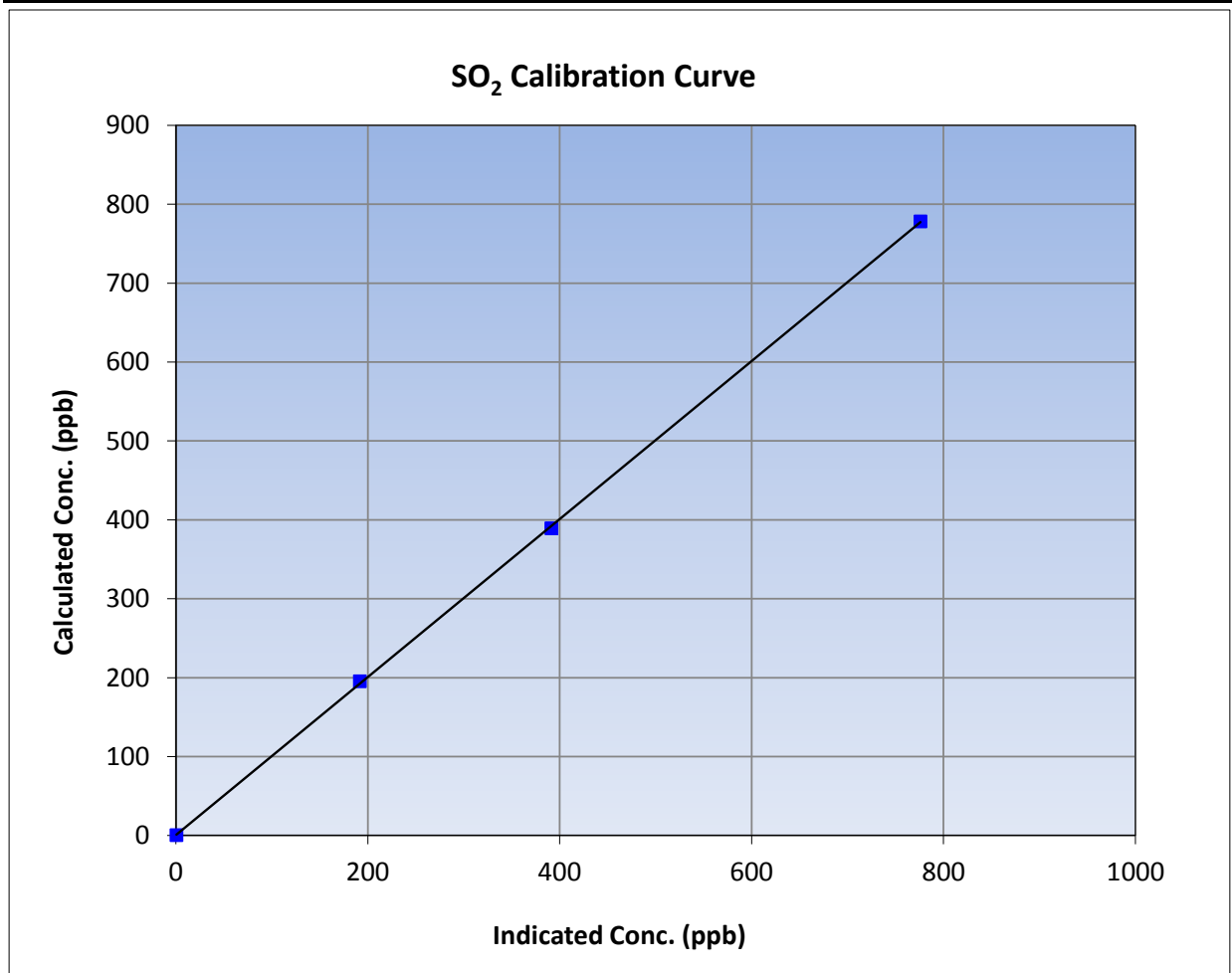
Version-03-2017

### Station Information

Calibration Date	October 26, 2017	Previous Calibration	September 7, 2017
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:15	End Time (MST)	13:51
Analyzer make	Thermo 43i	Analyzer serial #	1152430005

### Calibration Data

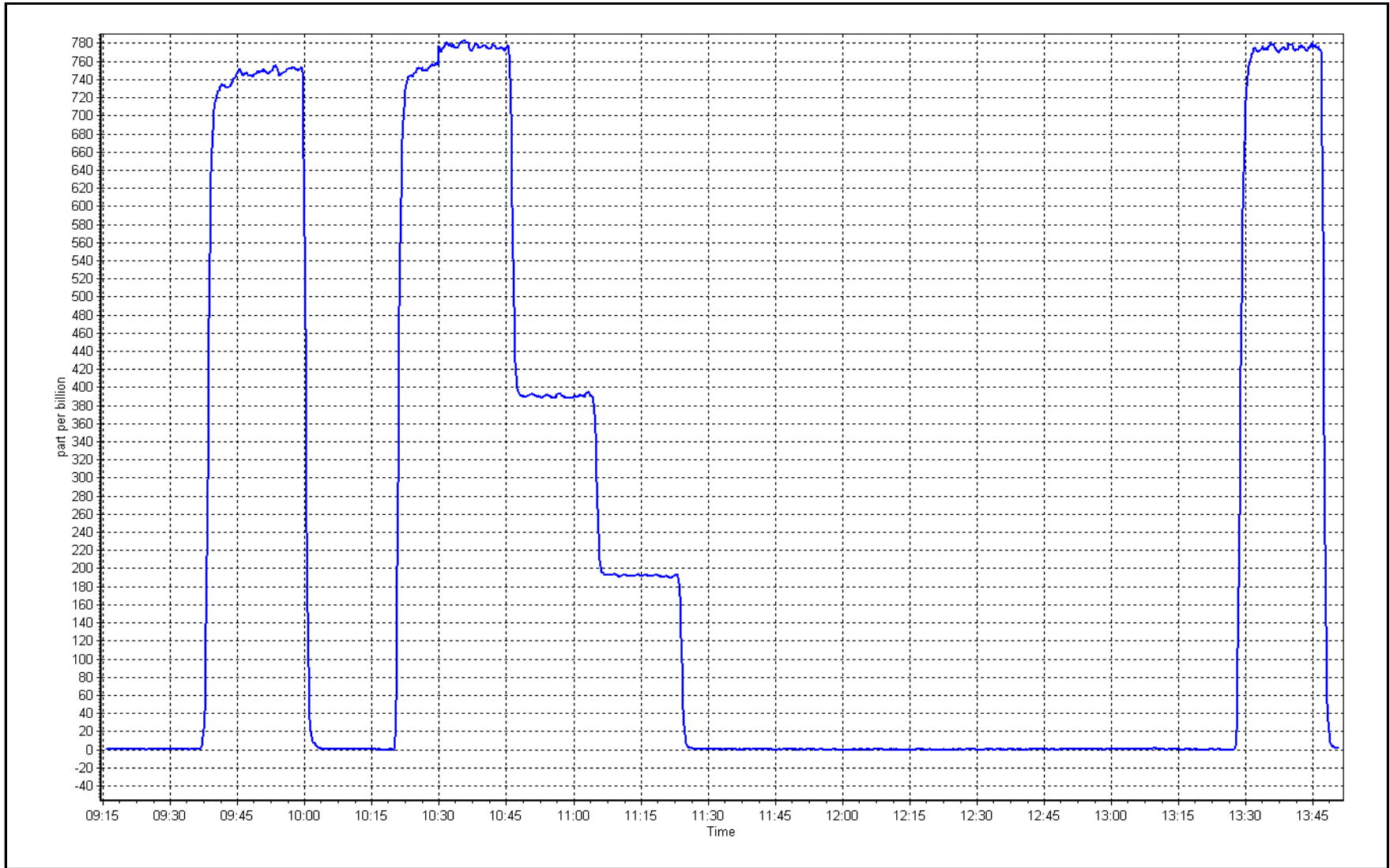
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.2	----	Correlation Coefficient	0.999949	$\geq 0.995$
777.8	775.6	1.0028	Slope	1.001232	0.90 - 1.10
388.9	390.9	0.9950	Intercept	0.451048	+/-30
195.0	191.5	1.0180			



SO2 Calibration Plot

Date: October 26, 2017

Location: Anzac







# Wood Buffalo Environmental Association

## TRS Calibration Summary

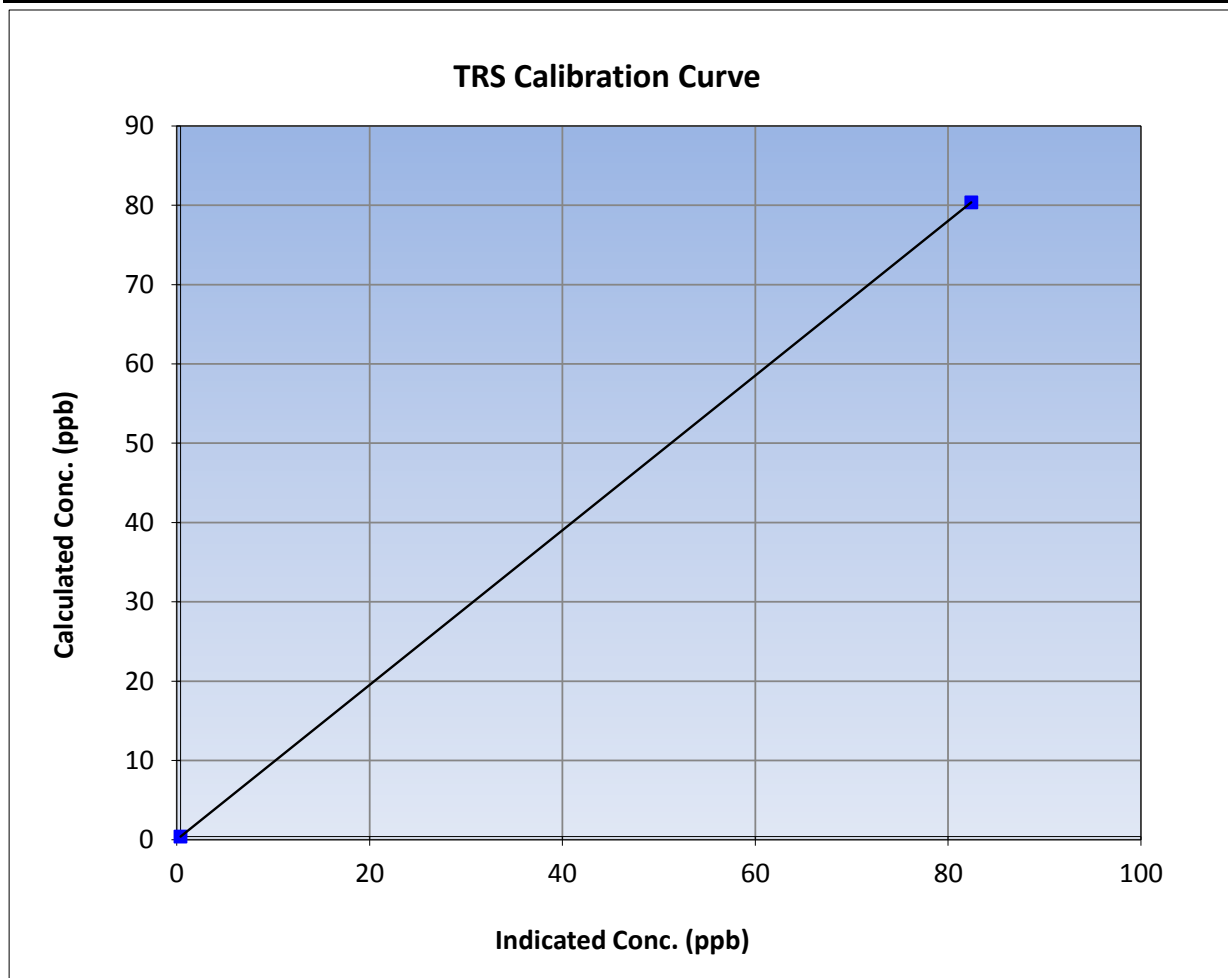
Version-03-2017

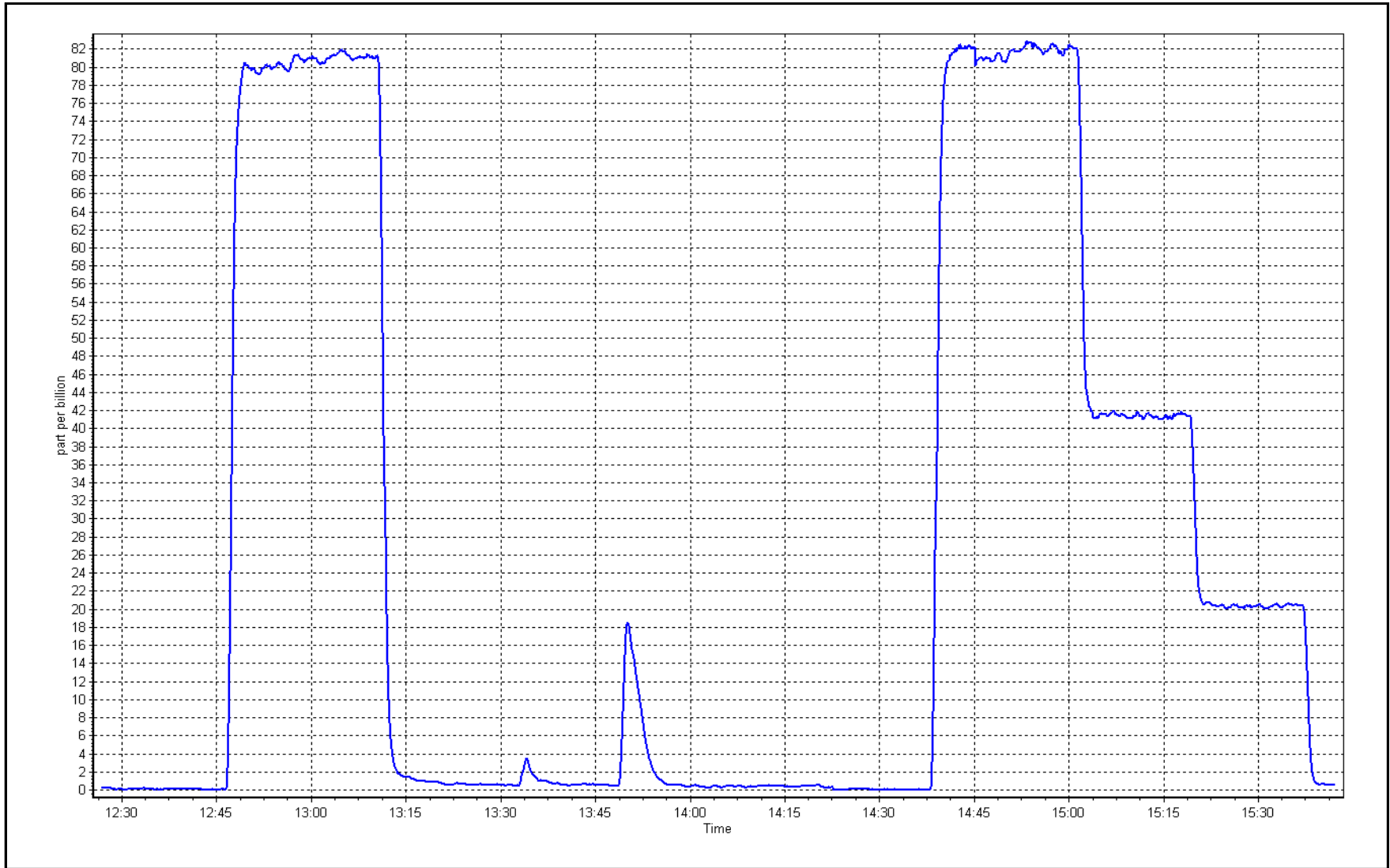
### Station Information

Calibration Date	October 30, 2017	Previous Calibration	September 5, 2017
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	12:26	End Time (MST)	15:42
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1300156232

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.0	----	Correlation Coefficient	0.999970	≥0.995
80.0	82.0	0.9753			
40.1	41.4	0.9686	Slope	0.974057	0.90 - 1.10
20.1	20.4	0.9845			
			Intercept	0.020850	+/-3







# Wood Buffalo Environmental Association

## THC / NMHC Calibration Report

Version-03-2017

### Station Information

Station Name:	Anzac	Station number:	AMS 14
Calibration Date:	October 26, 2017	Last Cal Date:	September 7, 2017
Start time (MST):	9:15	End time (MST):	14:10
Reason:	Routine		

### Calibration Standards

Gas Cert Reference	EY0000647	Cal Gas Expiry Date	November 4, 2019
CH4 Cal Gas Conc.	<u>513.0</u> ppm	CH4 Equiv Conc.	1060.3 ppm
C3H8 Cal Gas Conc.	<u>199.0</u> ppm	Station temp.	22 Deg C
Calibrator Model	Teledyne API T700	Serial Number	2659
ZAG make/model	Teledyne API 701	Serial Number	4764

### Analyzer Information

Analyzer make: Thermo 55i

Analyzer serial #: 1218153355

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
THC Range (ppm)	0 - 50 ppm		Column Temp	75.1	75.1
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.1
CH4 SP Ratio	0.000203	0.000203	Flame Temp	405.0	405.0
CH4 Retention time	11.6	11.6	Carrier Pressure	33.4	33.3
NMHC SP Ratio	3.89E-05	3.89E-05	Fuel Pressure	47.9	47.9
NMHC Peak Area	222680	222680	Air Pressure	36.6	36.6

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
THC Cal Slope	0.997384	0.994923
THC Cal Offset	0.010527	0.023903
CH4 Cal Slope	0.993365	0.990364
CH4 Cal Offset	0.030151	0.028666
NMHC Cal Slope	1.000903	0.999182
NMHC Cal Offset	-0.019510	-0.004963

Notes:

Sample inlet filter replaced after as founds.

Calibration Performed By:

Ryan Power



# Wood Buffalo Environmental Association

## THC / NMHC Calibration Report

Version-02-2017

### THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i>
as found zero	5005	0.0	0.00	0.00	----
as found span	4932	79.4	16.80	16.85	0.997
calibrator zero	5005	0.0	0.00	0.00	----
high point	4932	79.3	16.78	16.85	0.996
second point	4972	39.7	8.40	8.42	0.998
third point	4992	19.9	4.21	4.18	1.008
as left zero	5005	0.0	0.00	0.00	----
as left span	4931	79.3	16.78	16.84	0.997
Average Correction Factor					1.001
Corrected As found	16.85	Prev response	16.83	*% change	-0.1%

### NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i>
as found zero	5005	0	0.00	0.00	----
as found span	4932	79.4	8.67	8.66	1.001
calibrator zero	5005	0	0.00	0.00	----
high point	4932	79.3	8.66	8.67	0.999
second point	4972	39.7	4.34	4.36	0.994
third point	4992	19.9	2.17	2.18	0.999
as left zero	5005	0	0.00	0.00	----
as left span	4931	79.3	8.66	8.65	1.002
Average Correction Factor					0.997
Corrected As found	8.66	Prev response	8.68	*% change	0.2%

### CH4 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i>
as found zero	5005	0.0	0.00	0.00	----
as found span	4932	79.4	8.13	8.18	0.994
calibrator zero	5005	0.0	0.00	0.00	----
high point	4932	79.3	8.12	8.18	0.992
second point	4972	39.7	4.06	4.06	1.001
third point	4992	19.9	2.04	2.00	1.019
as left zero	5005	0.0	0.00	0.00	----
as left span	4931	79.3	8.12	8.19	0.991
Average Correction Factor					1.004
Corrected As found	8.18	Prev response	8.15	*% change	-0.3%

\* = > +/-5% change initiates investigation





# Wood Buffalo Environmental Association

## THC Calibration Summary

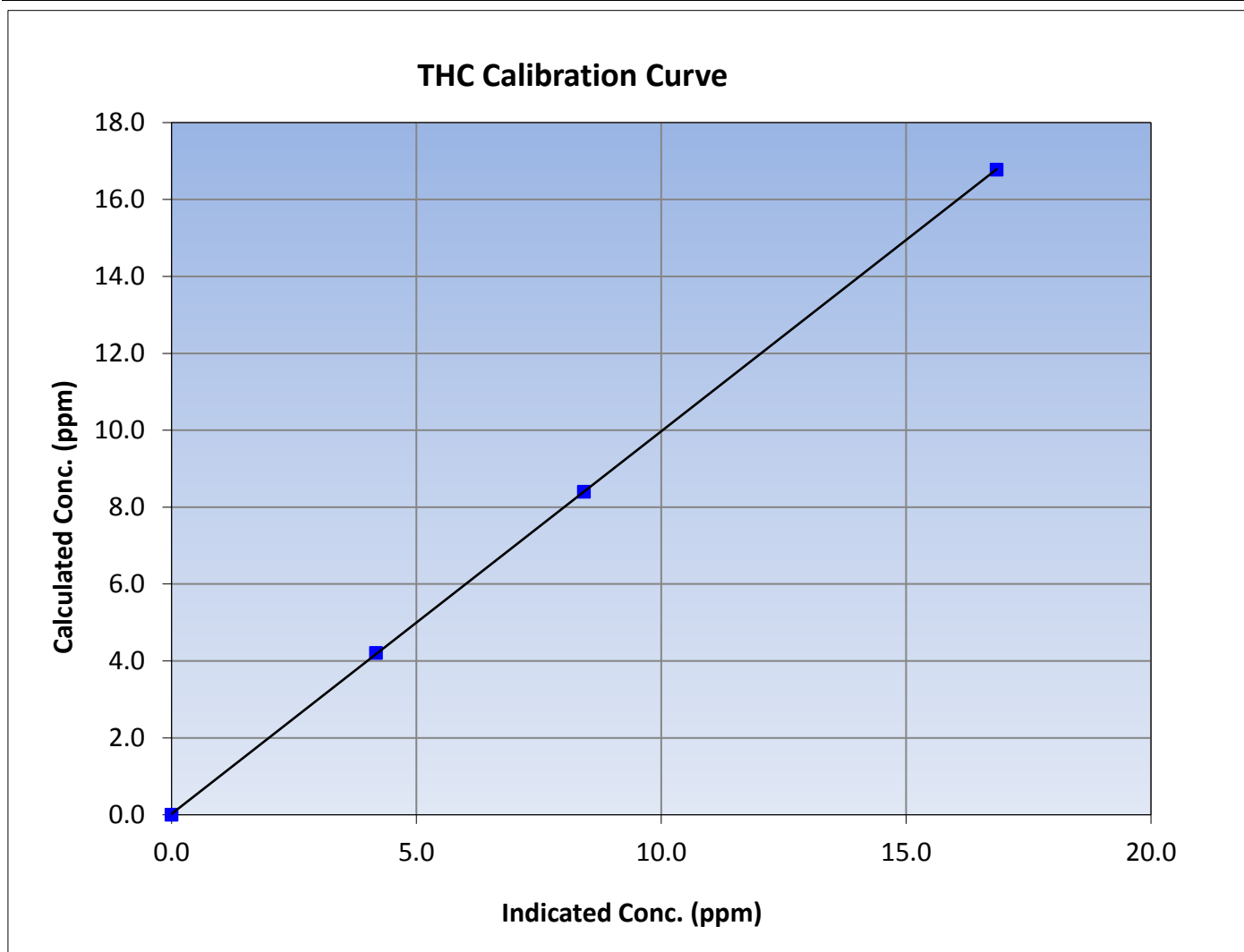
Version-02-2017

### Station Information

Calibration Date	October 26, 2017	Previous Calibration	September 7, 2017
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:15	End Time (MST)	14:10
Analyzer make	Thermo 55i	Analyzer serial #	1218153355

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.00	0.00	----	Correlation Coefficient	0.999989	$\geq 0.995$			
16.78	16.85	0.9959						
8.40	8.42	0.9977				Slope	0.994923	0.90 - 1.10
4.21	4.18	1.0083						
			Intercept	0.023903	$\pm 0.5$			





# Wood Buffalo Environmental Association

## CH<sub>4</sub> Calibration Summary

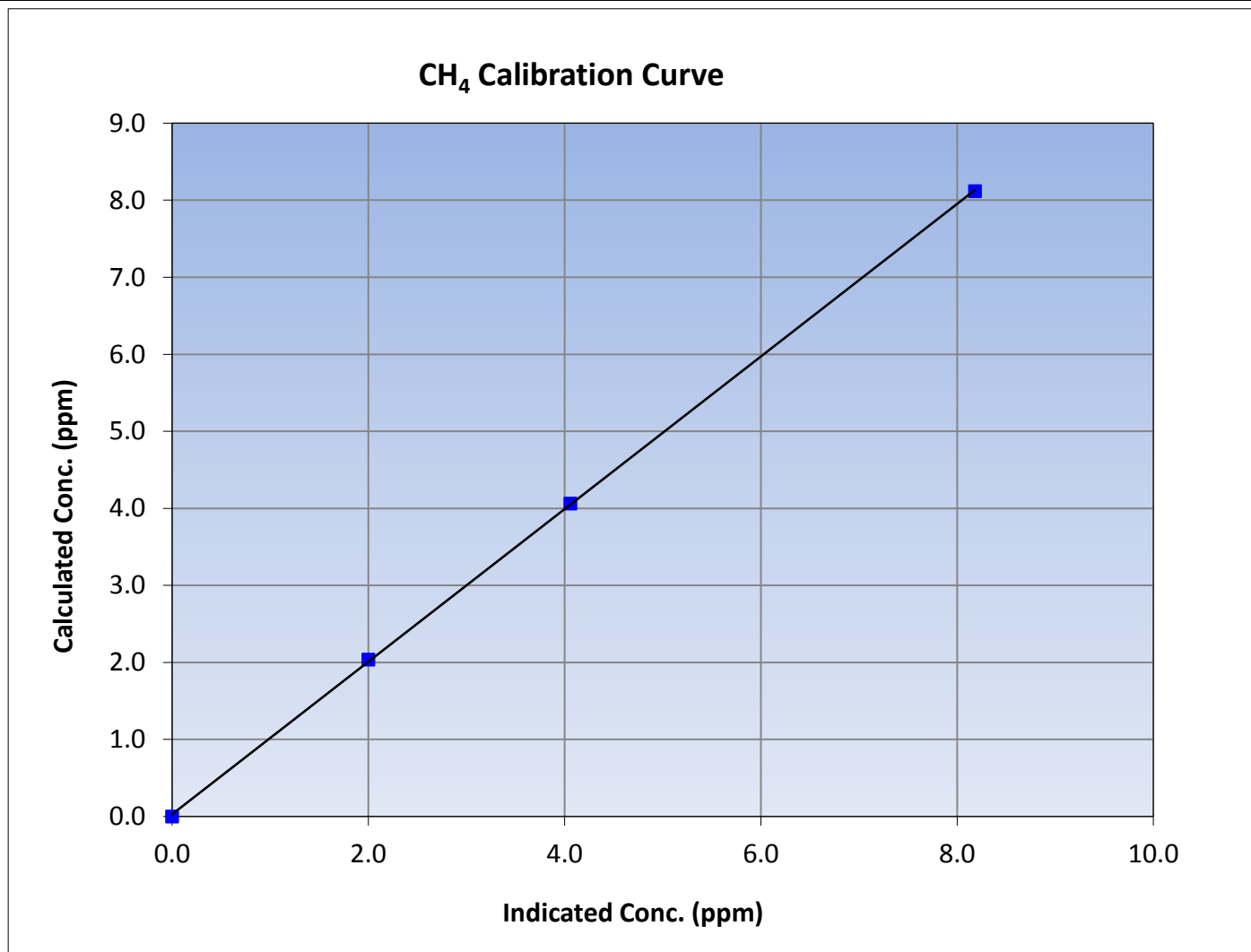
Version-02-2017

### Station Information

Calibration Date	October 26, 2017	Previous Calibration	September 7, 2017
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:15	End Time (MST)	14:10
Analyzer make	Thermo 55i	Analyzer serial #	1218153355

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.00	0.00	----	Correlation Coefficient	0.999944	$\geq 0.995$			
8.12	8.18	0.9922						
4.06	4.06	1.0009				Slope	0.990364	0.90 - 1.10
2.04	2.00	1.0190						
			Intercept	0.028666	$\pm 0.5$			





# Wood Buffalo Environmental Association

## NMHC Calibration Summary

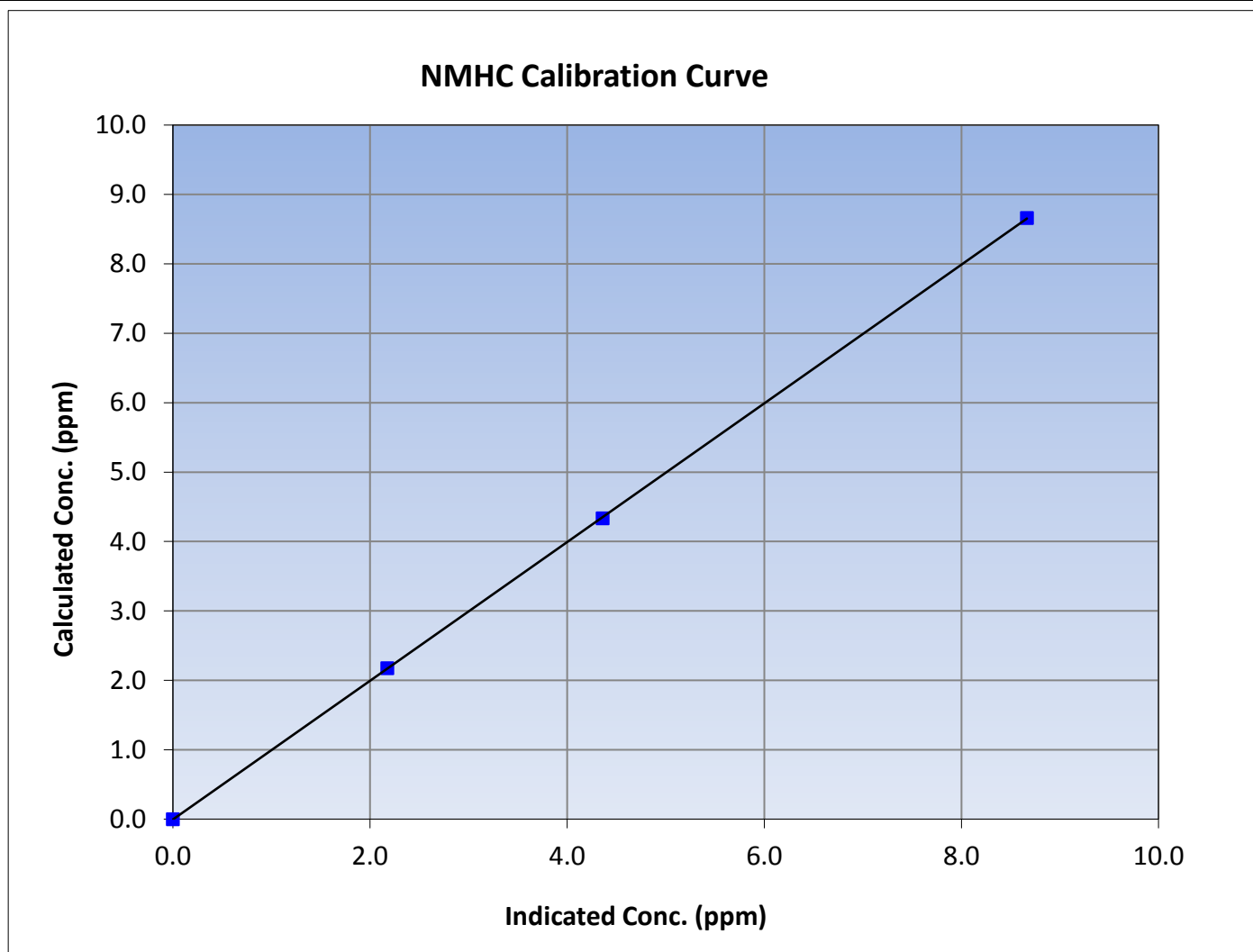
Version-02-2017

### Station Information

Calibration Date	October 26, 2017	Previous Calibration	September 7, 2017
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:15	End Time (MST)	14:10
Analyzer make	Thermo 55i	Analyzer serial #	1218153355

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00	----	Correlation Coefficient	0.999992	$\geq 0.995$
8.66	8.67	0.9994			
4.34	4.36	0.9945			
2.17	2.18	0.9986			
			Slope	0.999182	0.90 - 1.10
			Intercept	-0.004963	+/-0.5



NMHC Calibration Plot

Date: October 26, 2017

Location: Anzac







# Wood Buffalo Environmental Association

## O<sub>3</sub> Calibration Summary

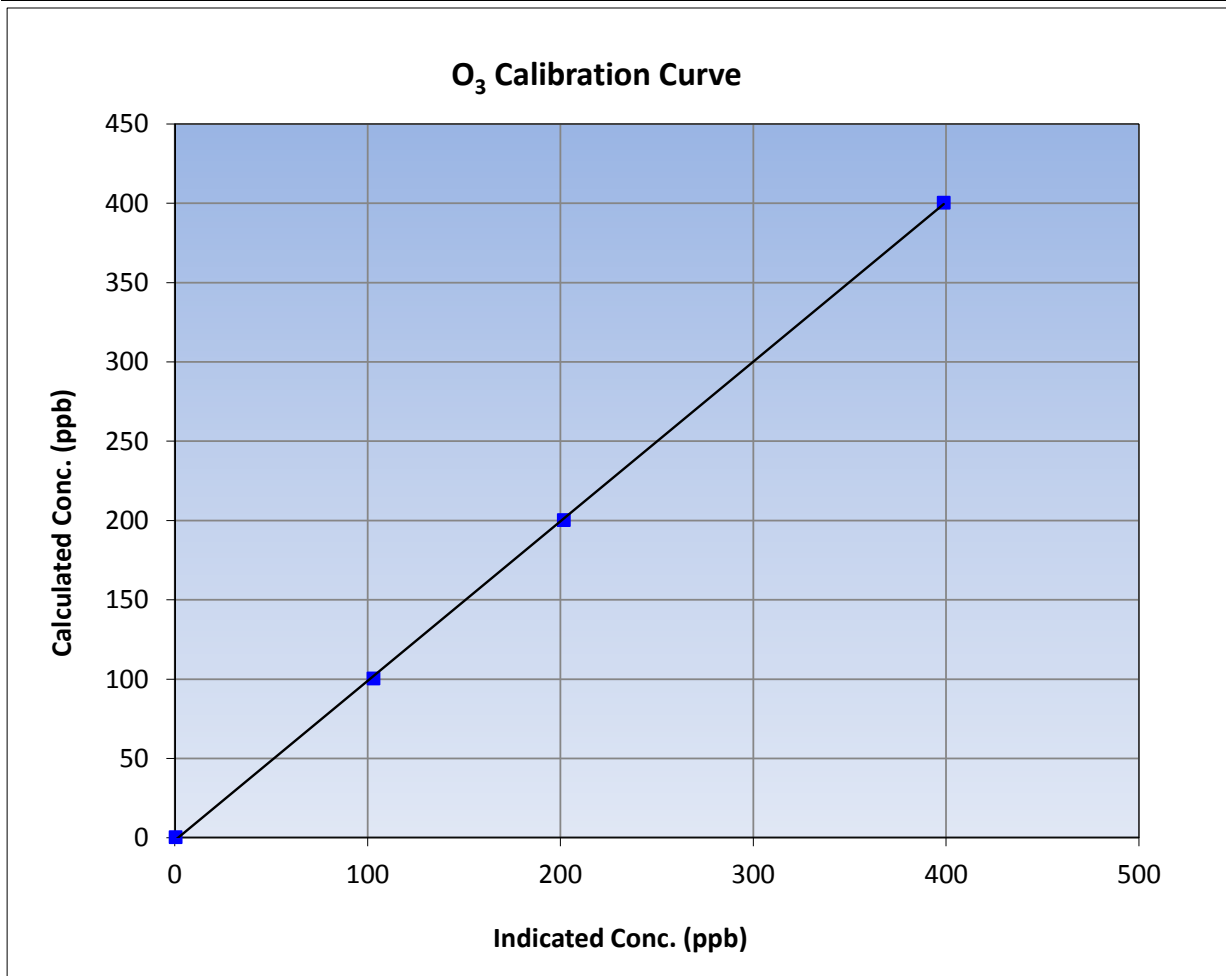
Version-03-2017

### Station Information

Calibration Date	October 30, 2017	Previous Calibration	September 7, 2017
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:52	End Time (MST)	12:30
Analyzer make	Thermo 49i	Analyzer serial #	1426262595

### Calibration Data

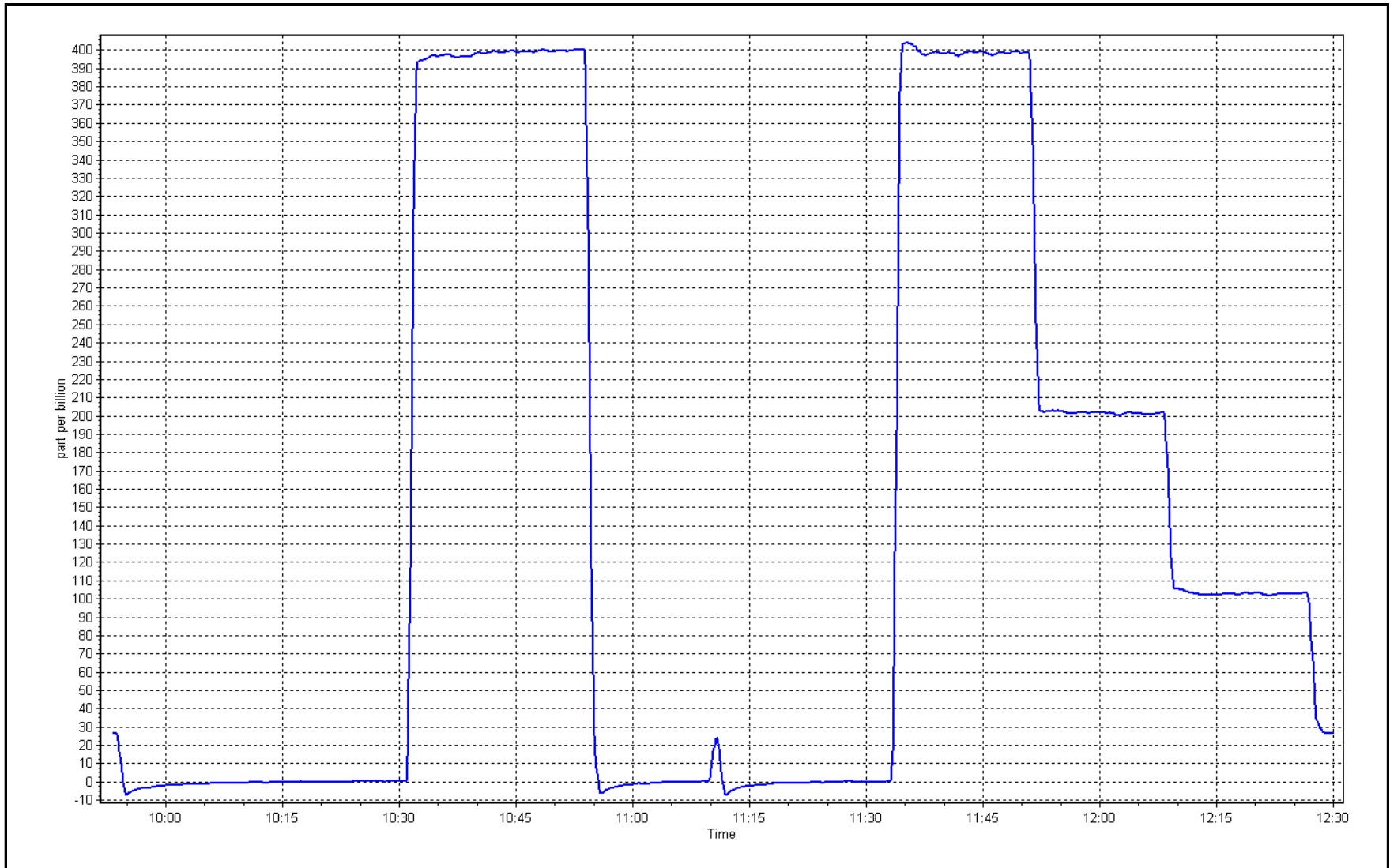
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.1	----	Correlation Coefficient	0.999922	≥0.995
400.0	398.4	1.0040	Slope	1.006189	0.90 - 1.10
200.0	201.4	0.9930	Intercept	-1.737130	+/- 10
100.0	102.7	0.9737			



O<sub>3</sub> Calibration Plot

Date: October 30, 2017

Location: Anzac





# Wood Buffalo Environmental Association

## NO<sub>x</sub> - NO - NO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Anzac	Station number:	AMS 14
Calibration Date:	October 26, 2017	Last Cal Date:	September 7, 2017
Start time (MST):	9:10	End time (MST):	13:50
Reason:	Routine		

### Calibration Standards

NO Gas Cylinder #	EY0000647	Cal Gas Expiry Date	November 4, 2019
NOX Cal Gas Conc.	<u>50.5</u> ppb	NO Cal Gas Conc.	<u>50.5</u> ppb
Calibrator Model	Teledyne API T700	Serial Number	2659
ZAG make/model	Teledyne API 701	Serial Number	4764

### Analyzer Information

Analyzer make:	Thermo 42i	Analyzer serial #:	1426262592	
	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
NO coefficient	1.140	1.134	NOX Range (ppb)	0 - 1000 ppb
NOX coefficient	1.000	1.001	PMT Temperature	-3.0 -2.7
NO <sub>2</sub> coefficient	1.000	1.000	Reaction cell Press	181.3 177.0
NO bkgrnd	4.3	4.4	Sample Flow	0.710 0.683
NOX bkgrnd	4.4	4.4	PMT Voltage	-807.7 -807.7

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope	0.998873	0.995692
NO <sub>x</sub> Cal Offset	0.511899	0.763166
NO Cal Slope	0.998214	0.995791
NO Cal Offset	0.493018	0.902745
NO <sub>2</sub> Cal Slope	0.998052	0.998065
NO <sub>2</sub> Cal Offset	0.457694	-0.194145





# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

Version-03-2017

### Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5005	0.0	0.0	0.0	0.0	-0.1	0.1	-0.2	----	----
as found span	4932	79.4	800.1	800.1	0.0	805.0	805.4	-0.5	0.9939	0.9934
calibrator zero	5005	0.0	0.0	0.0	0.0	0.1	0.0	0.1	----	----
high point	4933	79.3	799.0	799.0	0.0	801.5	801.3	0.2	0.9968	0.9971
second point	4972	39.7	400.0	400.0	0.0	402.3	402.1	0.2	0.9944	0.9949
third point	4992	19.9	200.5	200.5	0.0	198.6	198.4	0.2	1.0096	1.0106
as left zero	5005	0.0	0.0	0.0	0.0	0.1	0.0	0.1	----	----
as left span	4931	79.3	799.3	410.7	388.6	816.8	418.9	397.9	0.9786	0.9804
Average Correction Factor									1.0003	1.0009

Corrected As found      NO<sub>x</sub> = 805.1 ppb                      NO = 805.3 ppb                      \*Percent Change                      NO<sub>x</sub> = -0.6%  
 Previous Response      NO<sub>x</sub> = 800.5 ppb                      NO = 801.1 ppb                      \*Percent Change                      NO = -0.5%  
 \* = > +/-5% change initiates investigation

### GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
1st NO ref point		0.0	798.5	796.8	1.7	1.0006	1.0027	----	----
1st NO2 (400 ppb O3)	410.7	386.1	797.7	410.7	387.0	1.0016	----	0.9977	100.2%
2nd NO2 (200 ppb O3)	602.3	194.5	797.4	602.3	195.1	1.0020	----	0.9969	100.3%
3rd NO2 (100 ppb O3)	695.5	101.3	797.3	695.5	101.8	1.0021	----	0.9951	100.5%
2nd NO ref point	----	0.0	796.5	794.6	1.9	1.0031	1.0055	----	----
Average Correction Factor						1.0022	1.0041	0.9966	100.3%

Notes:                                      Sample inlet filter replaced after as founds. Small adjustments to zero and span

Calibration Performed By:                      Ryan Power



# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

Version-03-2017

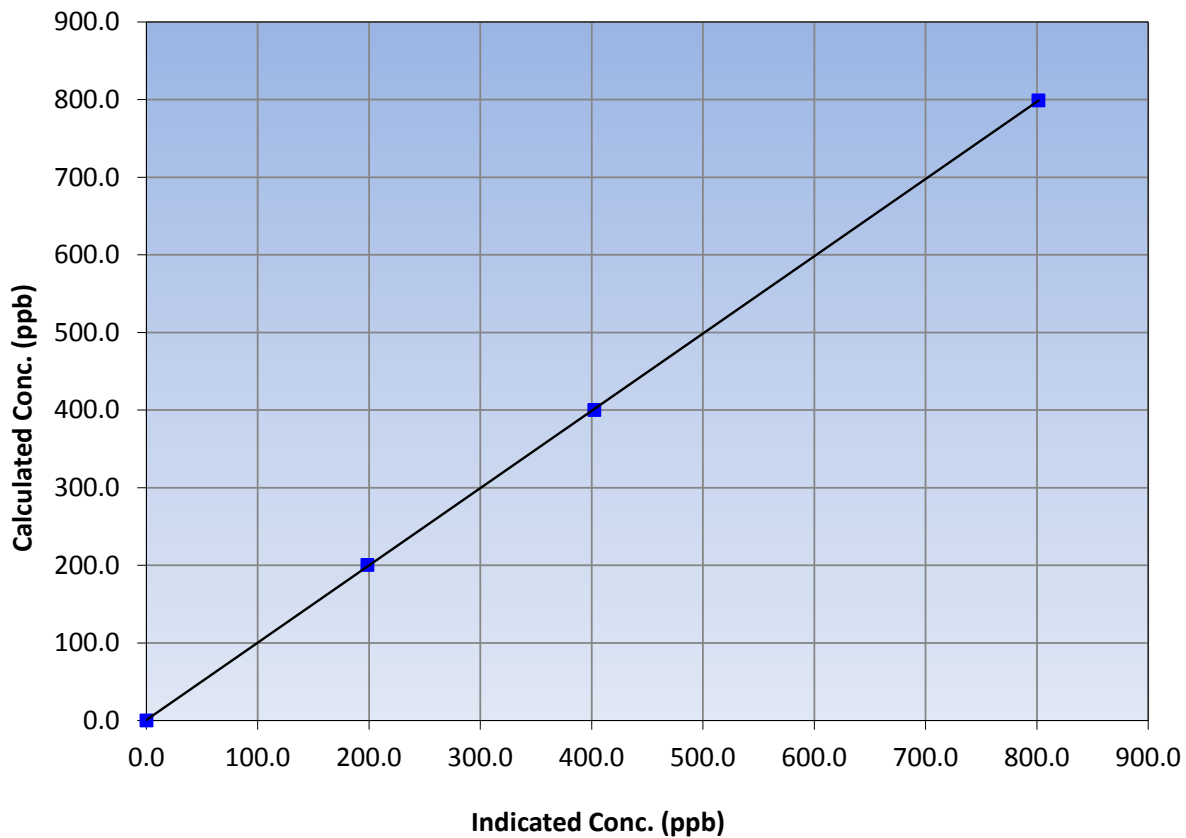
### Station Information

Calibration Date	October 26, 2017	Previous Calibration	September 7, 2017
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:10	End Time (MST)	13:50
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	0.1	----	Correlation Coefficient	≥0.995	
799.0	801.5	0.9968			
400.0	402.3	0.9944			
200.5	198.6	1.0096			
			Slope	0.995692	0.90 - 1.10
			Intercept	0.763166	+/-20

NO<sub>x</sub> Calibration Curve





# Wood Buffalo Environmental Association

## NO Calibration Summary

Version-03-2017

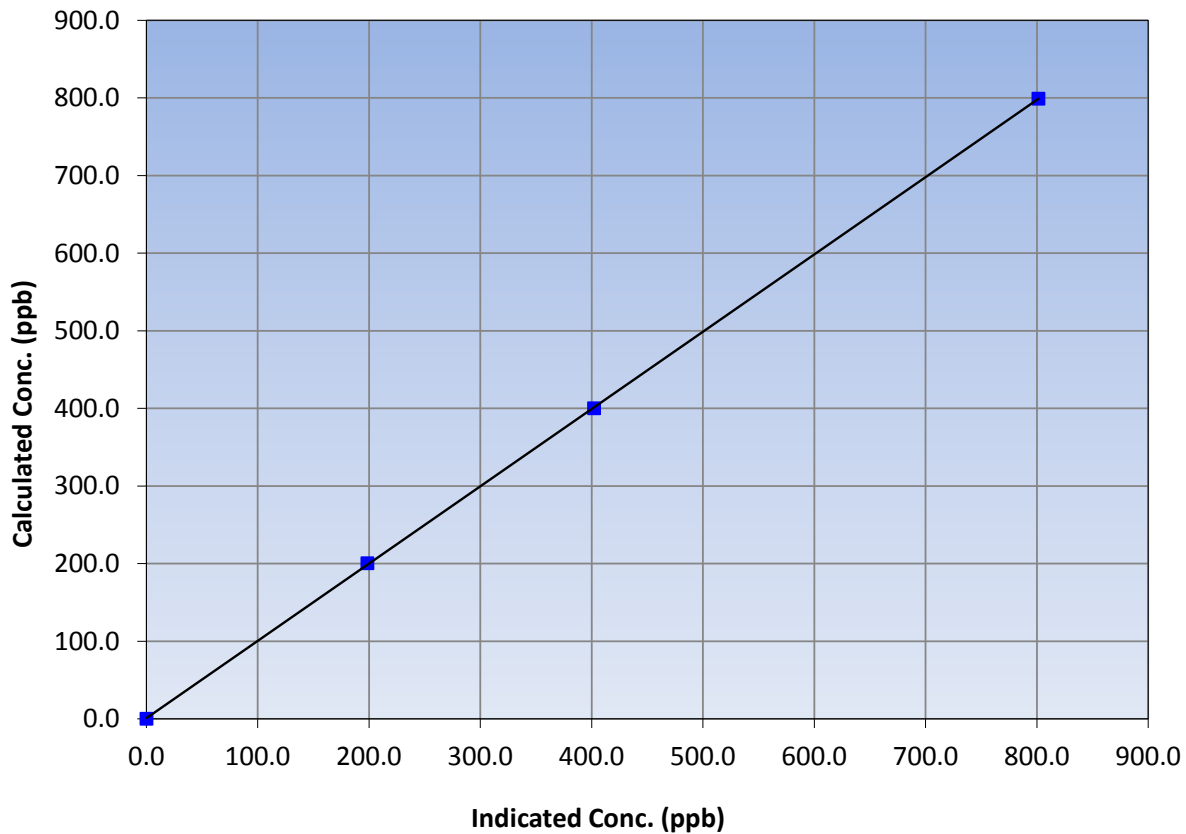
### Station Information

Calibration Date	October 26, 2017	Previous Calibration	September 7, 2017
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:10	End Time (MST)	13:50
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	0.0	----	Correlation Coefficient	≥0.995	
799.0	801.3	0.9971			
400.0	402.1	0.9949			
200.5	198.4	1.0106			
			Slope	0.995791	0.90 - 1.10
			Intercept	0.902745	+/-20

NO Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

Version-03-2017

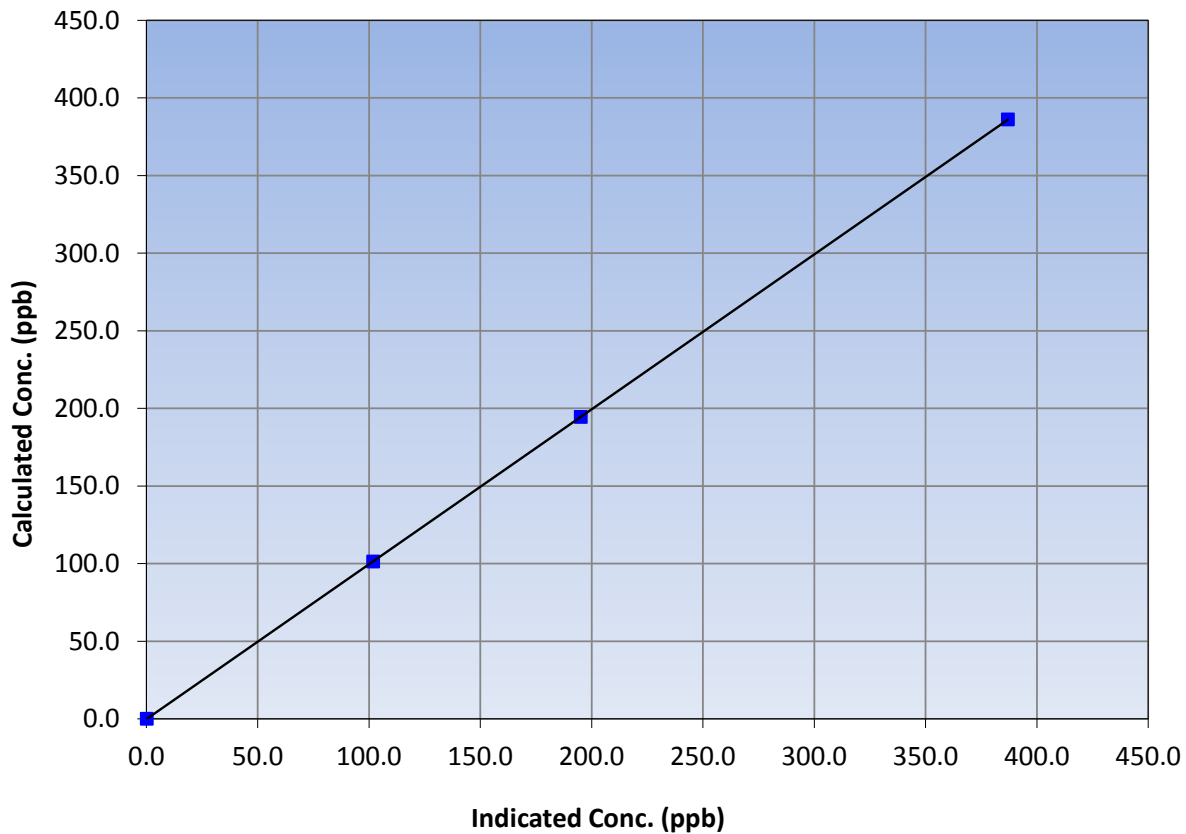
### Station Information

Calibration Date	October 26, 2017	Previous Calibration	September 7, 2017
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:10	End Time (MST)	13:50
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	0.1	----	Correlation Coefficient	≥0.995	
386.1	387.0	0.9977			
194.5	195.1	0.9969			
101.3	101.8	0.9951			
			Slope	0.998065	0.90 - 1.10
			Intercept	-0.194145	+/-20

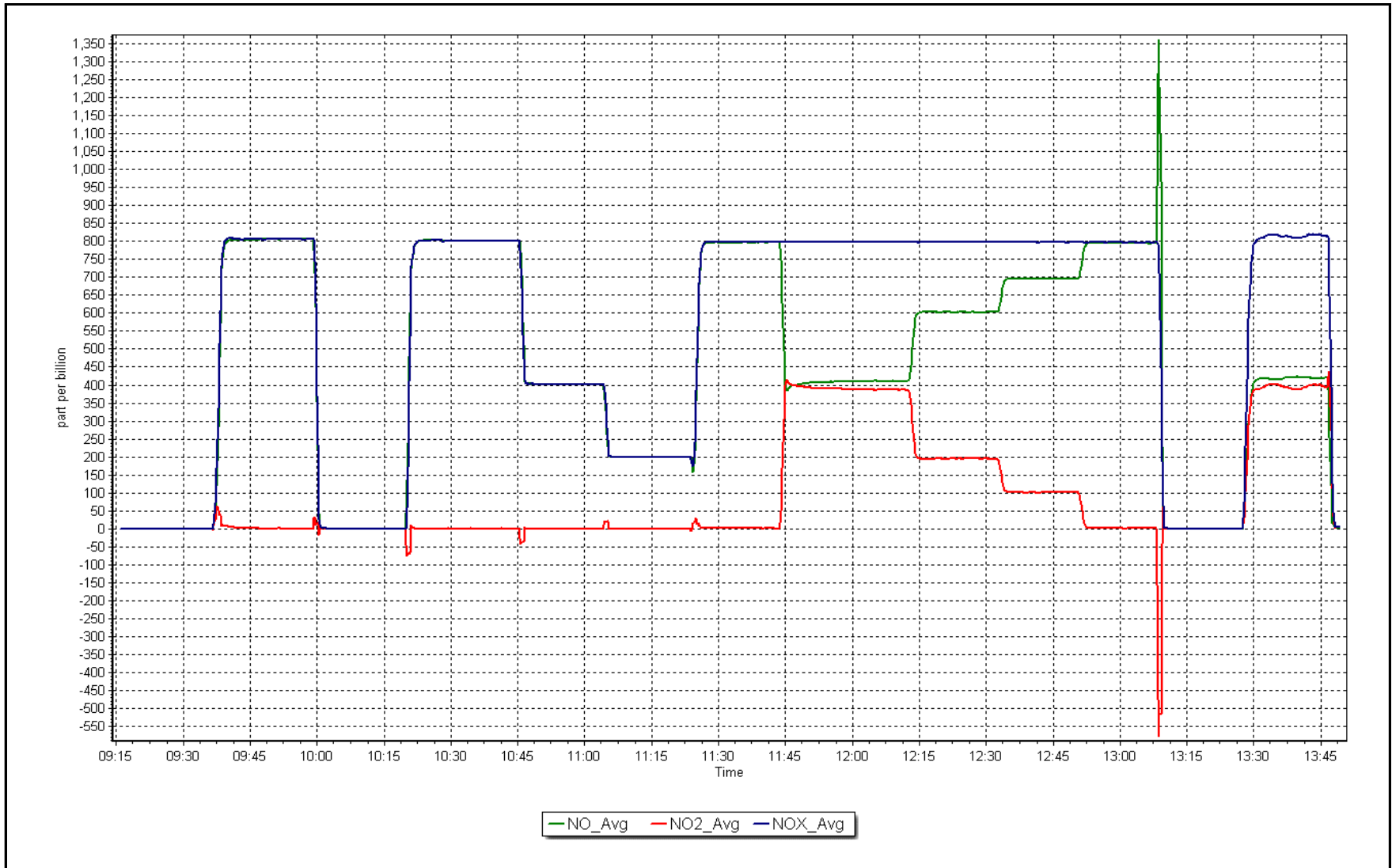
**NO<sub>2</sub> Calibration Curve**



NO<sub>x</sub> Calibration Plot

Date: October 26, 2017

Location: Anzac





# Wood Buffalo Environmental Association

## SHARP PM<sub>2.5</sub> CALIBRATION

Version-02-2017

### Station Information

Station Name:	Anzac	Station number:	AMS 14
Calibration Date:	October 30, 2017	Last Cal Date:	September 7, 2017
Start time (MST):	13:11	End time (MST):	15:00
Sharp Model:	5030	S/N:	E1093
Particulate Fraction:	PM2.5	C14 Source S/N:	4933
Flow Meter Make/Model:	Delta cal	S/N:	1019
Temp/RH standard:	NA	S/N:	NA

### Monthly Calibration Test

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<b>(Limits)</b>
T1 (°C)	3	3	3	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	956	955	956	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	999	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	3.4	-----	-0.1	<input type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified	<input type="checkbox"/>			
Cyclone cleaning :	PM10 Cyclone	<input checked="" type="checkbox"/>	PM2.5 Cyclone	<input checked="" type="checkbox"/>	
Date Filter Tape Installed:					

### Quarterly Calibration Test

Leak Test:	Date of check:	<u>September 7, 2017</u>	Last Cal Date:	<u>June 7, 2017</u>
	Flow w/o adaptor:	<u>16.75</u>	Flow w/ adaptor:	<u>16.63</u>

**(Limit) 0.4 LPM**

<u>Adjusted</u>	<u>Current Test</u>	<u>Previous Test</u>	<u>% Change</u>
<input type="checkbox"/>	Foil S/N: <u>2520</u>	Foil S/N: <u>2520</u>	
Foil Calibration	Foil Mass: <u>1278</u>	Foil Mass: <u>1278</u>	
	Calibration Date: <u>September 7, 2017</u>	Calibration Date: <u>June 7, 2017</u>	
<b>(Limit) +/- 5% of previous</b>	Correction Factor: <u>7091</u>	Correction Factor: <u>7140</u>	-0.69%

### Annual Calibration Test

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<b>(Limits)</b>
T2 (°C)				<input type="checkbox"/>	+/- 2 °C
T3 (°C)				<input type="checkbox"/>	+/- 2 °C
T4 (°C)				<input type="checkbox"/>	+/- 2 °C
RH (%)				<input type="checkbox"/>	+/- 10%
Date Sample Tube Cleaned:					
Date Pump Rebuilt/Replaced:					

Notes: Cyclone head cleaned. Reading error of Plateau Shift. Tried to zero neph but had EPROM read fail.  
Recycled power, good zero, error cleared.

Calibration by: Ryan Power



## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 15  
HORIZON  
OCTOBER 2017**

Operations, Data Collection,  
QA/QC, Data Validation and Reporting by:  
Wood Buffalo Environmental Association  
Fort McMurray, Alberta

November 29, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - HORIZON (AMS 15)  
OCTOBER 2017

MONTHLY SUMMARY for  
AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	707	37	37	100	14	0	2	0
TRS (ppb) Average	708	36	36	100	1	0	0	0
THC (ppm) Average	707	37	37	100	7.3	-	3.2	-
NO2 (ppb) Average	706	38	38	100	32	0	16	-
NO (ppb) Average	706	38	38	100	161	-	34	-
NOX (ppb) Average	706	38	38	100	181	-	46	-
PM2.5 (ug/m3) Average	742	2	2	100	26	-	8.8	0
Temperature 2 m (C) Average	744	0	0	100	23.8	-	13.6	-
Wind Speed 10 m (km/h) Average	712	0	32	95.7	44	-	22	-
Wind Direction 10 m (deg) Average	712	0	32	95.7	-	-	-	-
Precipitation (mm) Total	744	0	0	100	1.5	-	5.8	-
Relative Humidity (%) Average	744	0	0	100	100	-	99	-
Global Solar Radiation (W/m2) Average	744	0	0	100	494	-	125	-

Note : Operational time includes periods of data collection and instrument calibration



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - HORIZON (AMS 15)  
OCTOBER 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	707	0.6	1	-	0	0	0	0	1	1	14
TRS (ppb) Average	708	0.2	0	-	0	0	0	0	0	0	1
THC (ppm) Average	707	2.25	0.4	-	2	2.1	2.1	2.1	2.3	2.5	7.3
NO2 (ppb) Average	706	4.8	6	-	0	0	0	2	7	15	32
NO (ppb) Average	706	3	11	-	0	0	0	0	1	6	161
NOX (ppb) Average	706	7.8	15	-	0	0	0	2	9	22	181
PM2.5 (ug/m3) Average	742	3.25	3.4	-	0.3	0.8	1.2	1.9	4	8	26
Temperature 2 m (C) Average	744	2.51	4.9	-	-8.2	-2.6	-0.9	1.5	5	9	23.8
Wind Speed 10 m (km/h) Average	712	11.2	7	-	1	4	6	10	15	21	44
Wind Direction 10 m (deg) Average	712	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	744	-	-	9.4	-	-	-	-	-	-	-
Relative Humidity (%) Average	744	76.5	17	-	29	53	65	78	92	97	100
Global Solar Radiation (W/m2) Average	744	54.6	97	-	0	0	0	0	69	194	494

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -HORIZON (AMS 15)  
OCTOBER 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	17 Oct 2017 09:00	17 Oct 2017 09:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	20 Oct 2017 14:00	20 Oct 2017 14:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	22 Oct 2017 01:00	23 Oct 2017 03:00	27	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	31 Oct 2017 01:00	31 Oct 2017 03:00	3	Flat line in sensor output signal -sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb

Horizon - October 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 14 ppb on Oct 19 16:00	Maximum Daily Average: 1.9 ppb on Oct 22		Hours of Data:	707
Minimum Value: 0 ppb on Oct 6 02:00	Minimum Daily Average: 0.0 ppb on Oct 28		Hours of Missing Data:	37
Maximum Diurnal Average: 1.0 ppb at hour 16	Minimum Diurnal Average: 0.3 ppb at hour 6		Hours of Calibration:	37
Monthly Average: 0.6 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 1 P <sub>99</sub> = 6		Percent Operational Time:	100.0

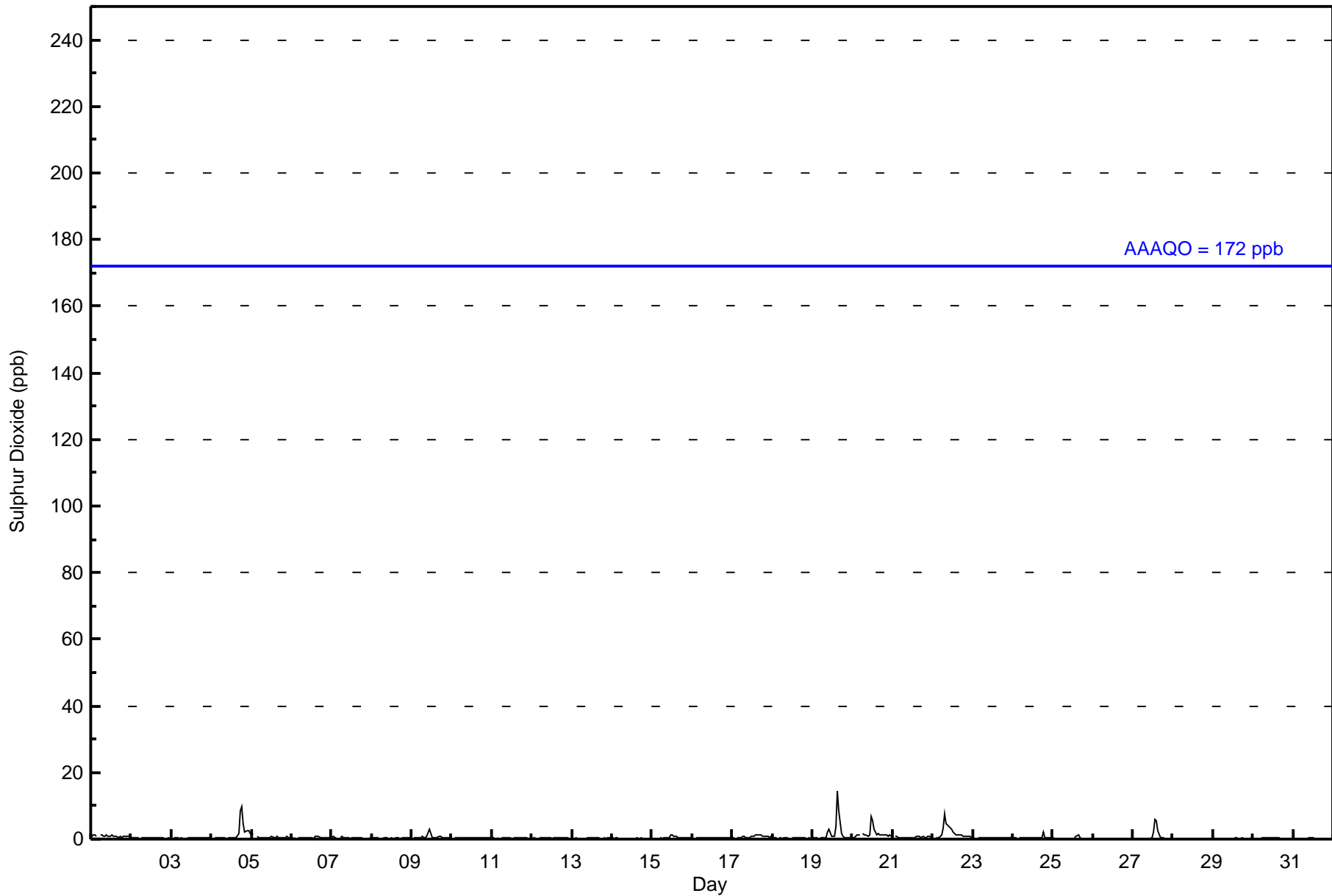
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0.9	1
2-Oct	1	1	1	1	0	Z	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.4	1
3-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.3	1
4-Oct	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	1	0	2	8	10	4	2	2	2	2	1.7	10
5-Oct	1	2	Z	1	1	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	1	1	1	1	0.6	2
6-Oct	0	0	0	Z	0	1	0	0	0	1	0	0	0	0	1	1	1	1	0	1	0	1	0	1	0.5	1
7-Oct	1	1	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
8-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
9-Oct	Z	0	0	0	0	0	1	0	0	1	3	2	1	1	0	0	1	1	1	0	0	0	0	0	0.6	3
10-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
11-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
12-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
13-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
14-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
15-Oct	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0.4	1
16-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	0.4	1
17-Oct	1	1	Z	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
18-Oct	1	1	0	Z	0	0	0	0	1	0	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
19-Oct	0	0	0	0	Z	0	0	0	1	2	3	1	1	1	4	14	9	2	1	0	0	1	1	1	1.8	14
20-Oct	1	1	1	1	1	Z	2	1	1	1	1	7	5	3	1	2	1	1	1	1	1	1	1	1	1.6	7
21-Oct	Z	1	1	1	0	0	1	1	1	1	1	0	0	1	1	1	1	1	1	0	1	1	1	1	0.6	1
22-Oct	1	Z	1	0	0	1	3	7	5	4	3	3	2	2	1	1	1	1	1	1	1	1	1	1	1.9	7
23-Oct	1	1	Z	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
24-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0.4	2
25-Oct	0	0	0	0	Z	0	0	0	0	0	C	C	C	C	0	1	1	0	0	0	0	0	0	0	0.2	1
26-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
27-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	2	6	5	2	0	0	0	0	0	0	0	0	0.8	6
28-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
29-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
30-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
31-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
0.4 0.4 0.4 0.4 0.4 0.3 0.5 0.6 0.5 0.6 0.7 0.7 0.7 0.7 0.8 1.0 0.7 0.7 0.8 0.5 0.4 0.4 0.4 0.4																								Diurnal Average		
1 2 1 1 1 1 3 7 5 4 3 7 5 6 5 14 9 8 10 4 2 2 2 2																								Diurnal Maximum		

Z - zerospan      C - Calibration  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb    24-hr 48 ppb



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Horizon - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Horizon - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	706	99.86	99.86
11 - 20	1	0.14	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Horizon - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	52	75	34	6	6	2	5	12	30	119	87	60	37	38	53	60	676
11 - 20	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	52	75	34	6	6	2	5	13	30	119	87	60	37	38	53	60	677

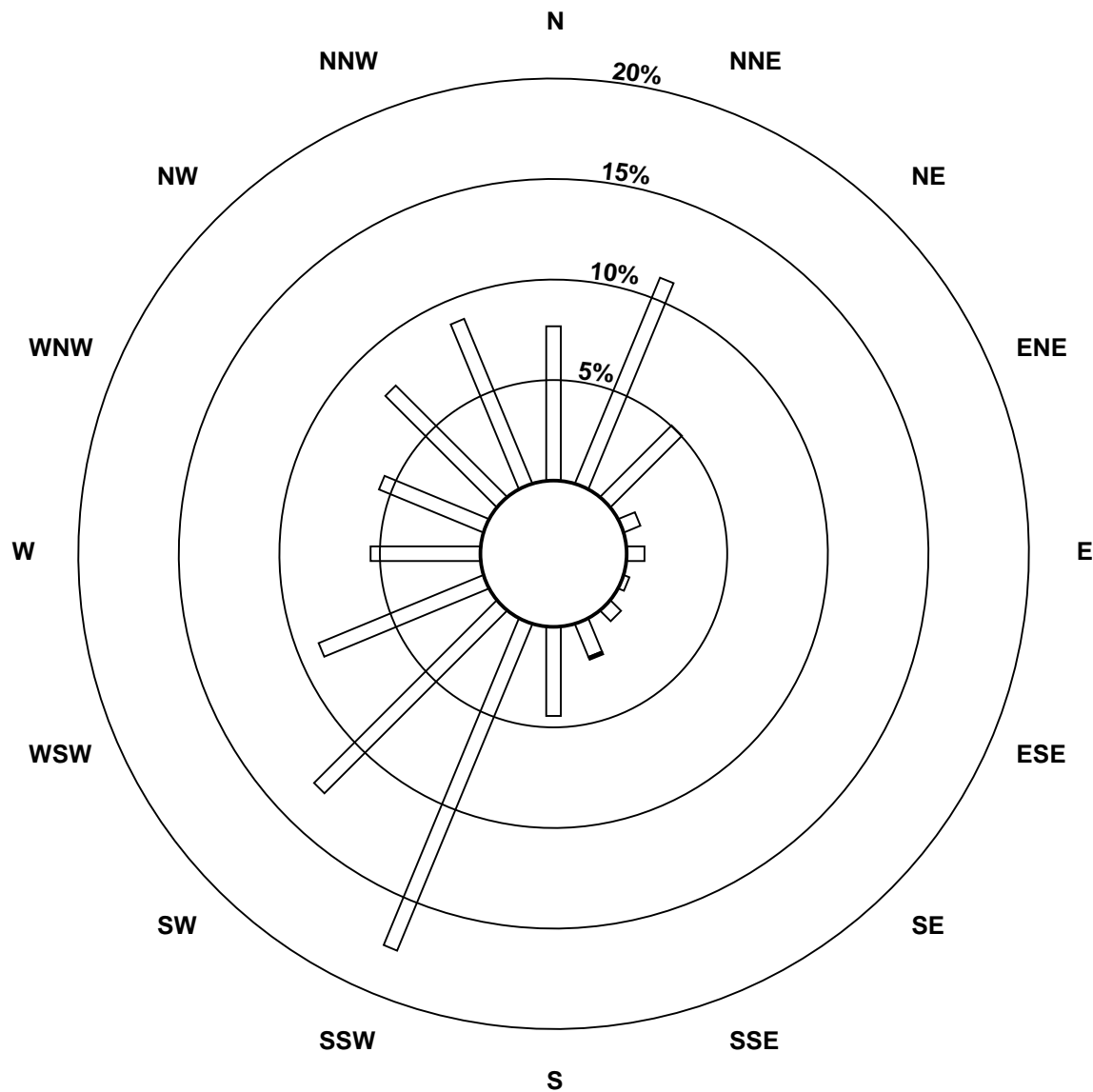
Total Number of Valid Hours: 677

Total Number of Hours: 744

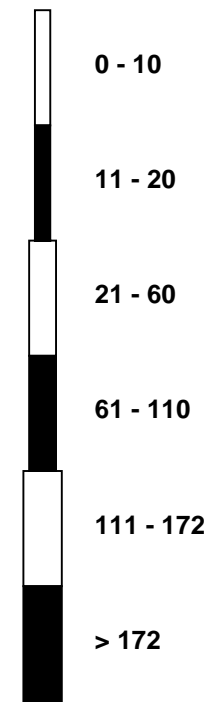


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

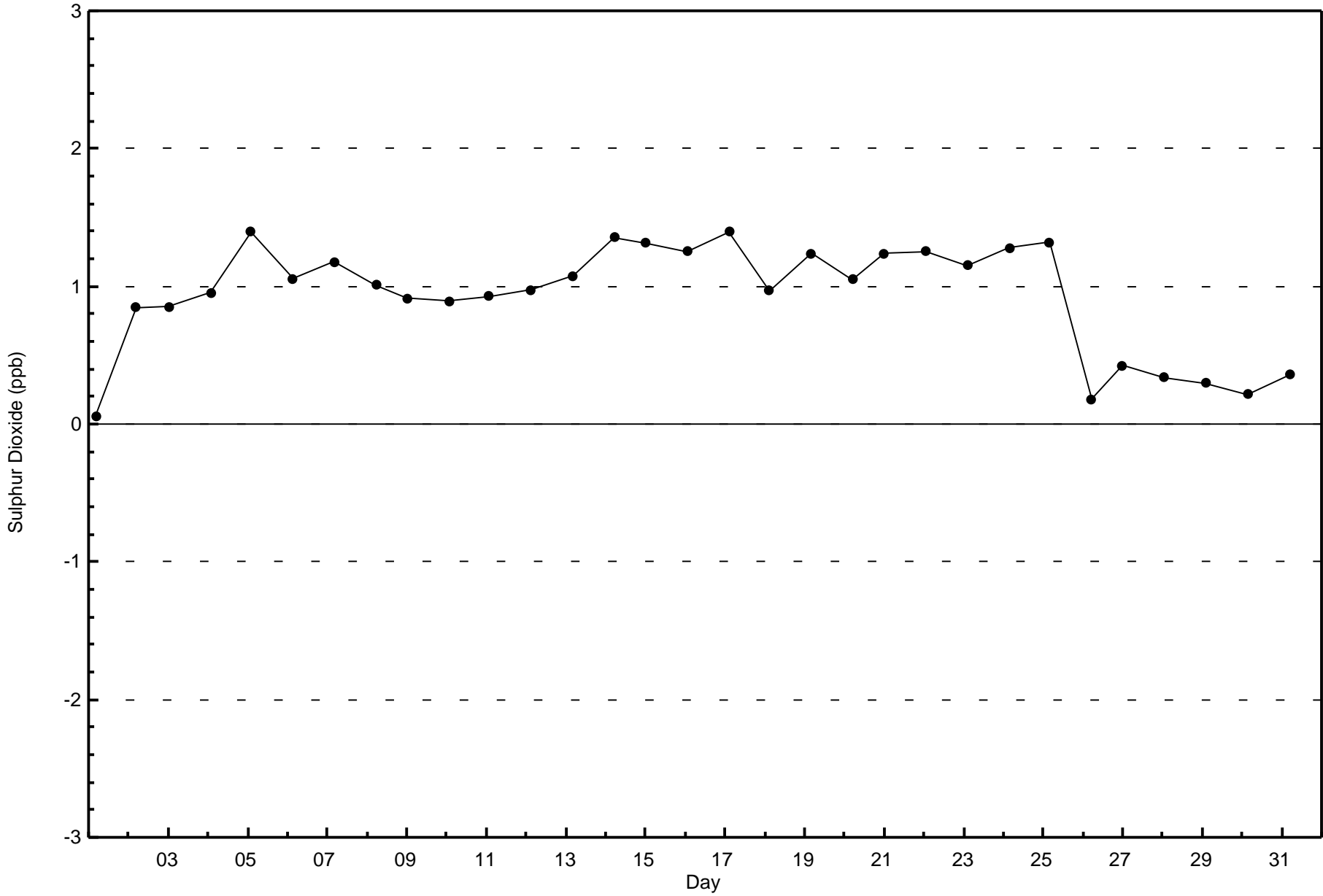
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Horizon (AMS 15)



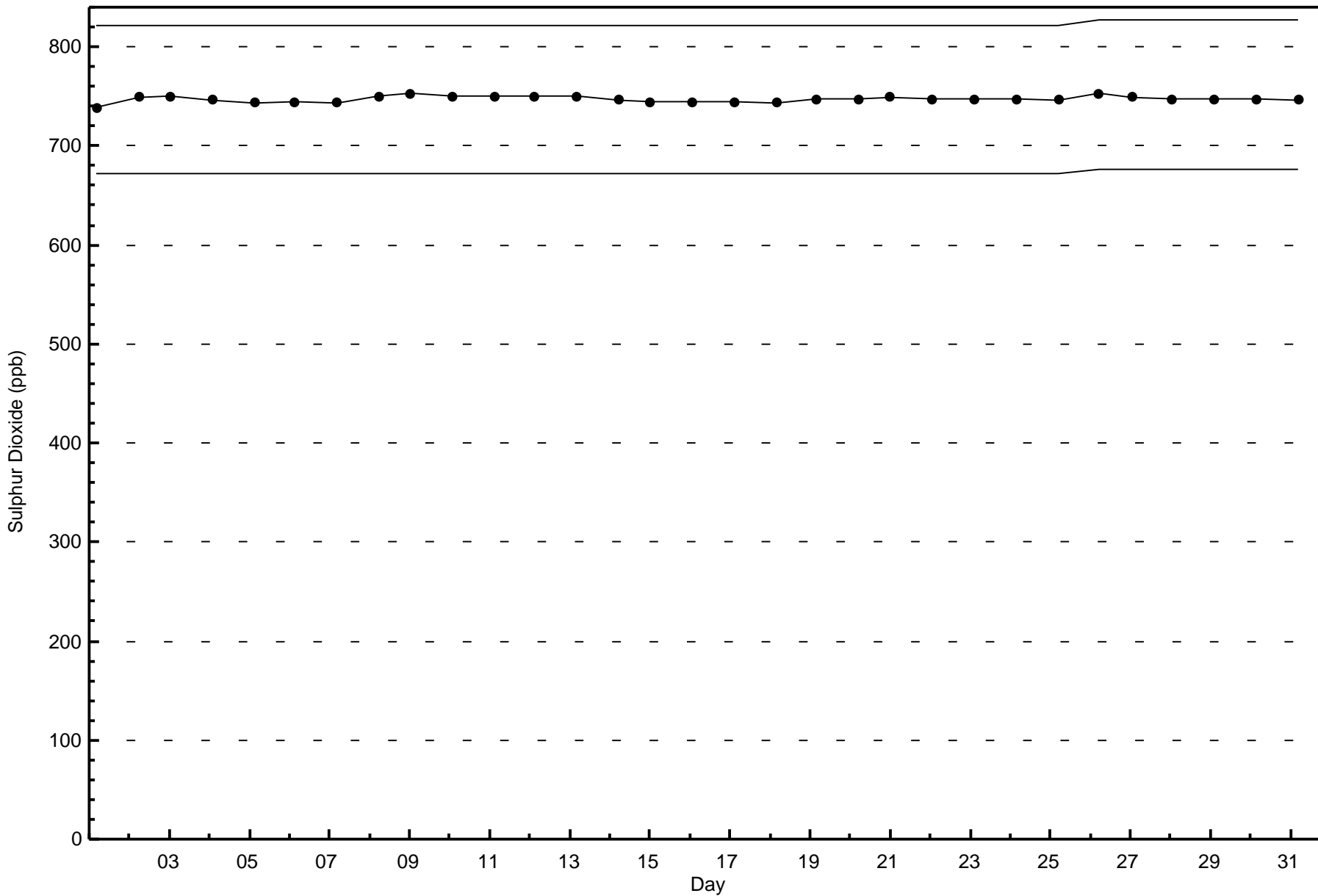
Classes (ppb)



Total Number of Valid Hours: 677









Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

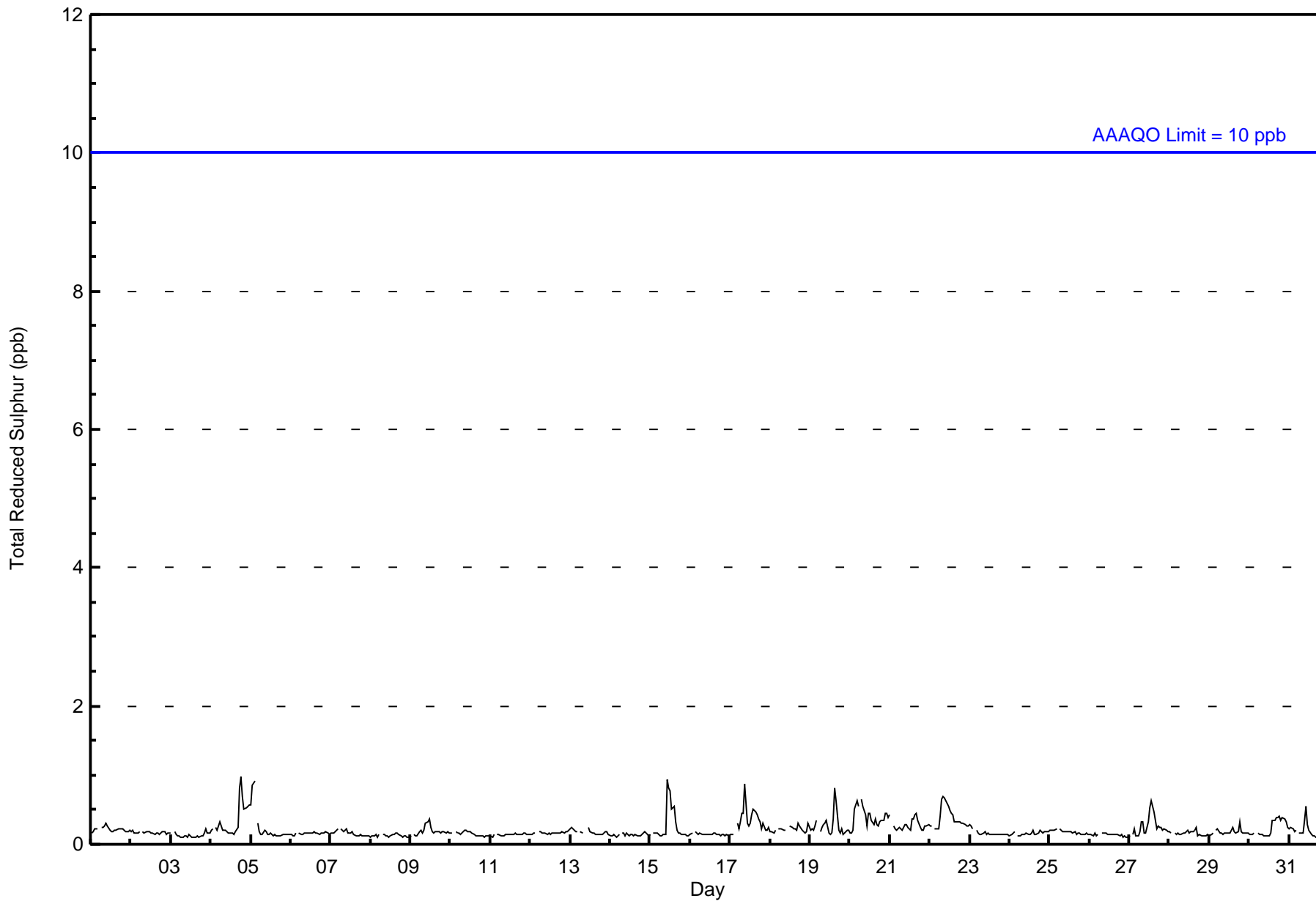
Horizon - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																							
Maximum Value: 1 ppb on Oct 4 19:00										Maximum Daily Average: 0.4 ppb on Oct 20										Hours of Data: 708																													
Minimum Value: 0 ppb on Oct 31 23:00										Minimum Daily Average: 0.1 ppb on Oct 8										Hours of Missing Data: 36																													
Maximum Diurnal Average: 0.2 ppb at hour 11										Minimum Diurnal Average: 0.2 ppb at hour 24										Hours of Calibration: 36																													
Monthly Average: 0.2 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 1										Percent Operational Time: 100.0																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
2-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
3-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
4-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0.3	1																							
5-Oct	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
6-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
7-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
8-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
9-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
10-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
11-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
12-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
13-Oct	0	0	0	0	0	Z	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
14-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
15-Oct	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1																							
16-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
17-Oct	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.3	1																							
18-Oct	0	0	0	0	Z	0	0	0	0	0	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
19-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.3	1																							
20-Oct	0	0	0	1	1	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
21-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
22-Oct	0	0	Z	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
23-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
24-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
25-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
26-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
27-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1																							
28-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
29-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
30-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
31-Oct	0	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
																								0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	Diurnal Average	
																								1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Diurnal Maximum
Z - zerospan C - Calibration																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																																																	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Total Reduced Sulphur (TRS) - ppb**  
**Horizon - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Horizon - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	708	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb  
Horizon - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	52	78	33	7	6	2	5	11	30	115	91	60	35	37	54	61	677
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	52	78	33	7	6	2	5	11	30	115	91	60	35	37	54	61	677

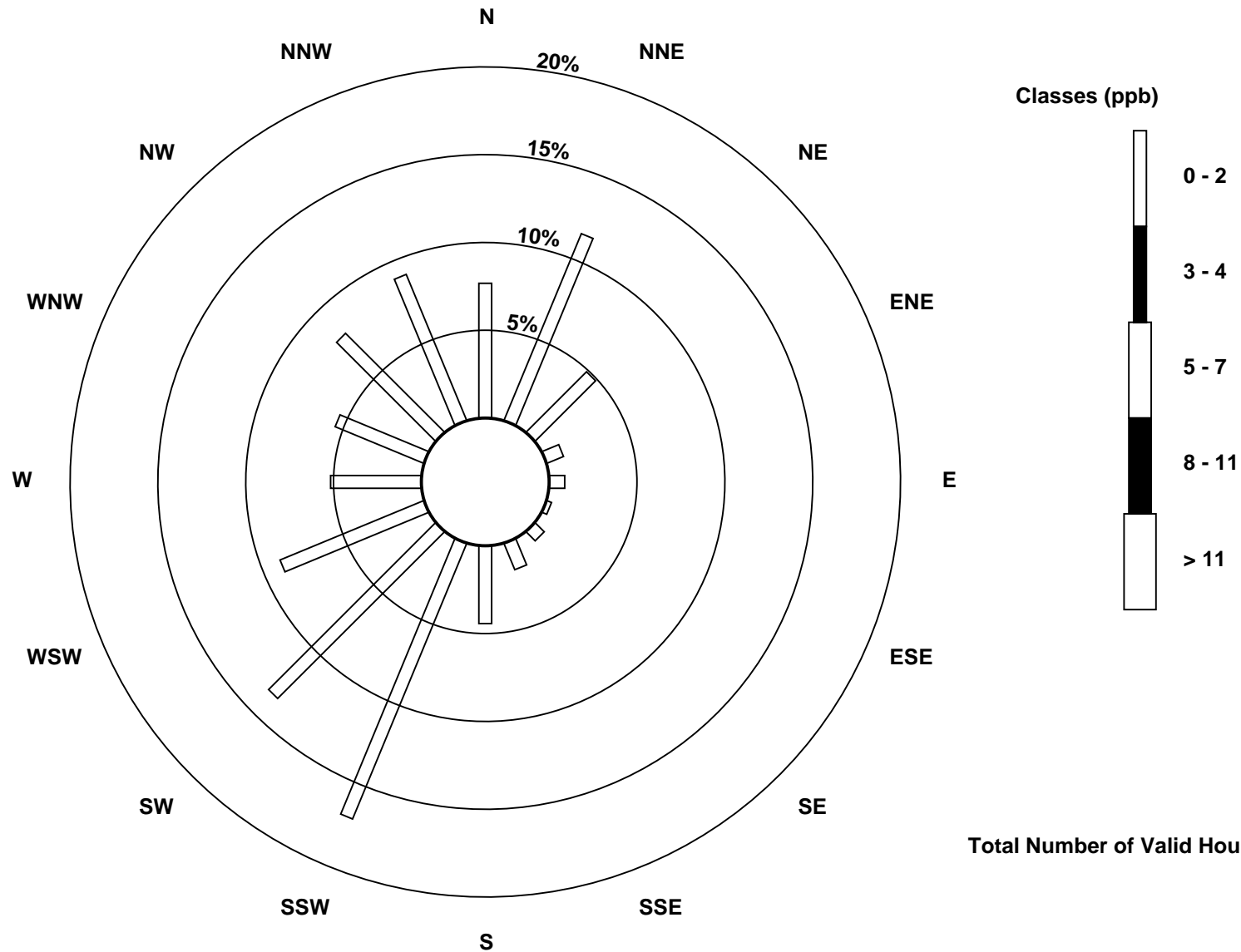
Total Number of Valid Hours: 677

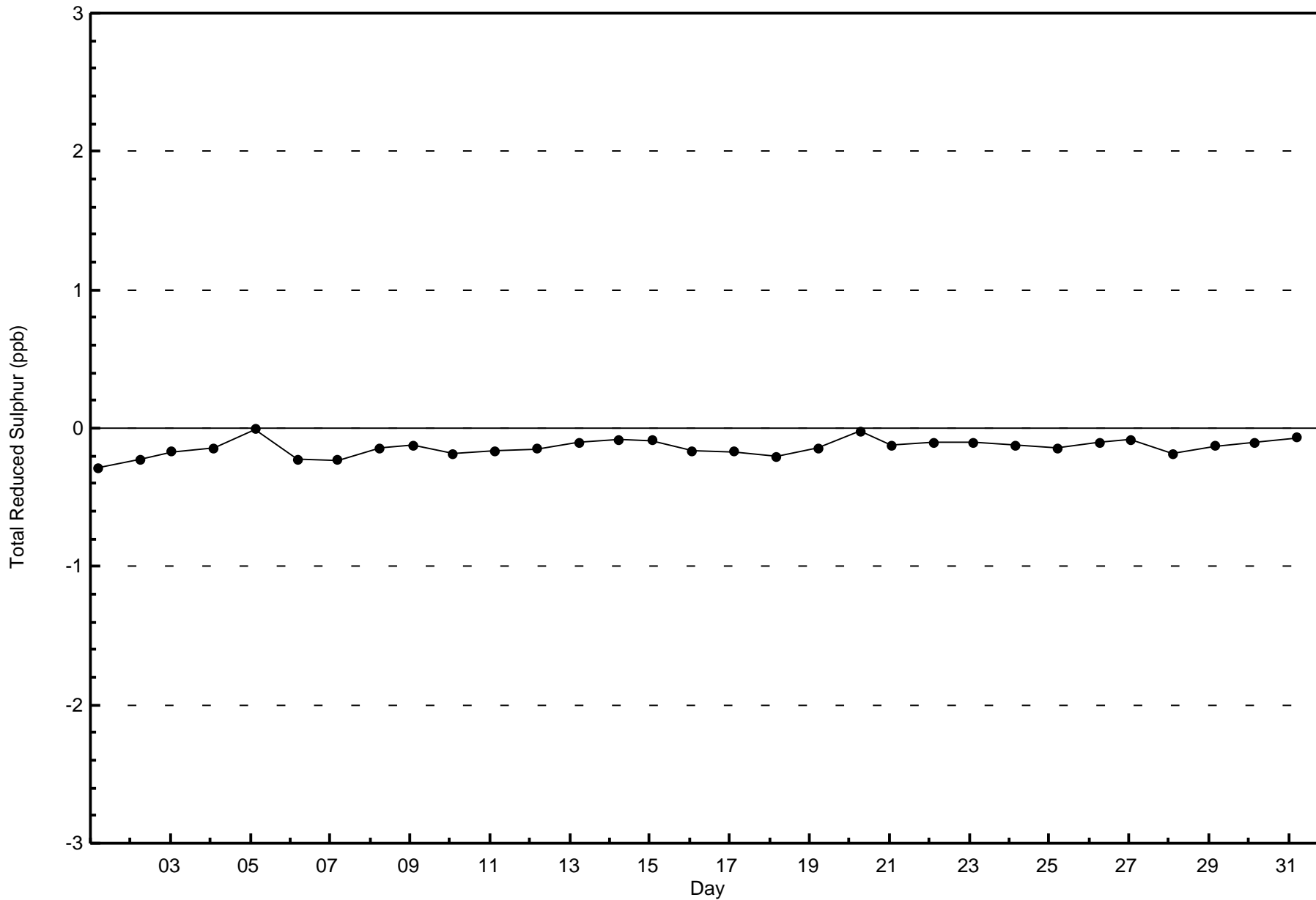
Total Number of Hours: 744

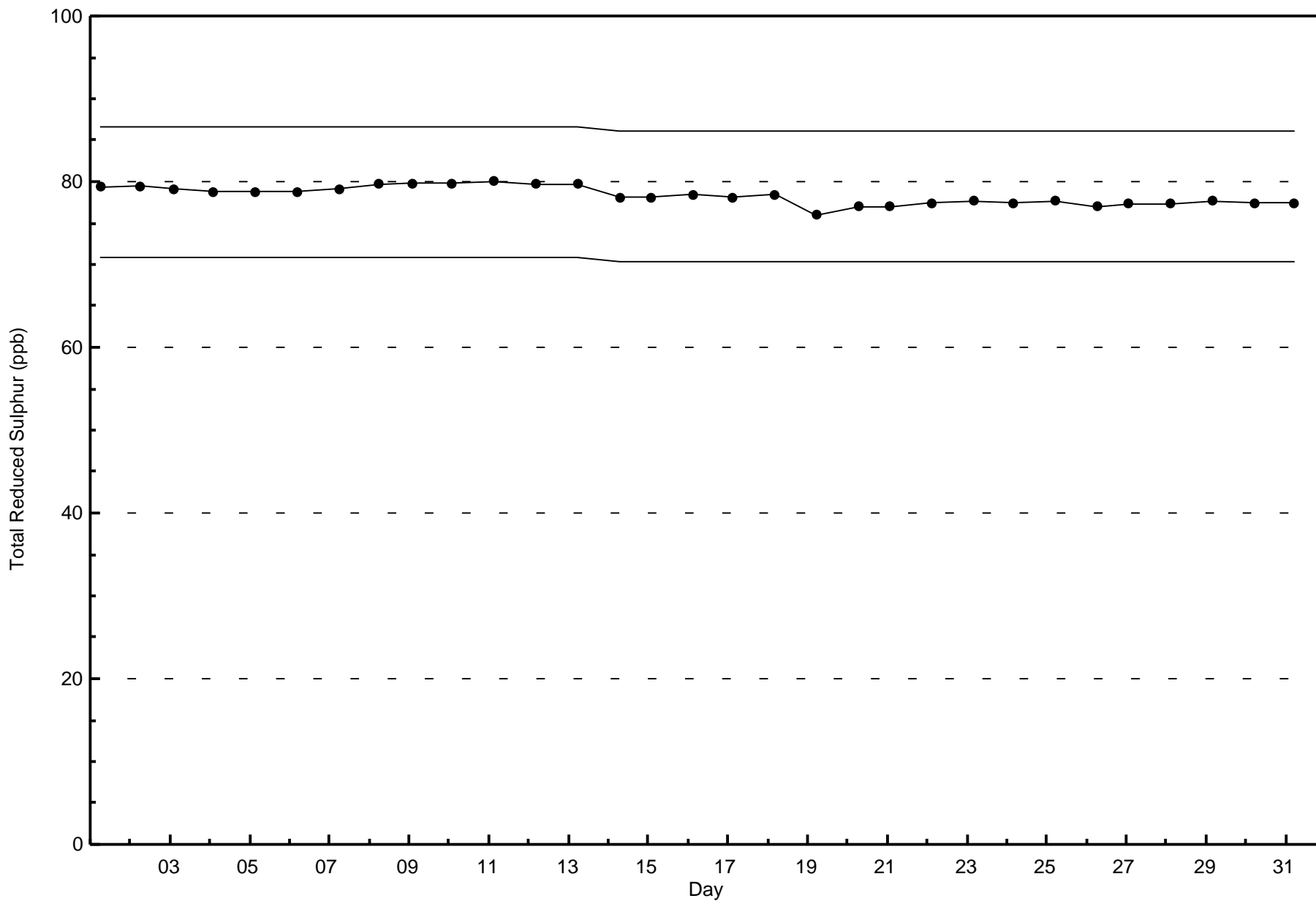


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Total Reduced Sulphur (TRS) - ppb  
Horizon (AMS 15)











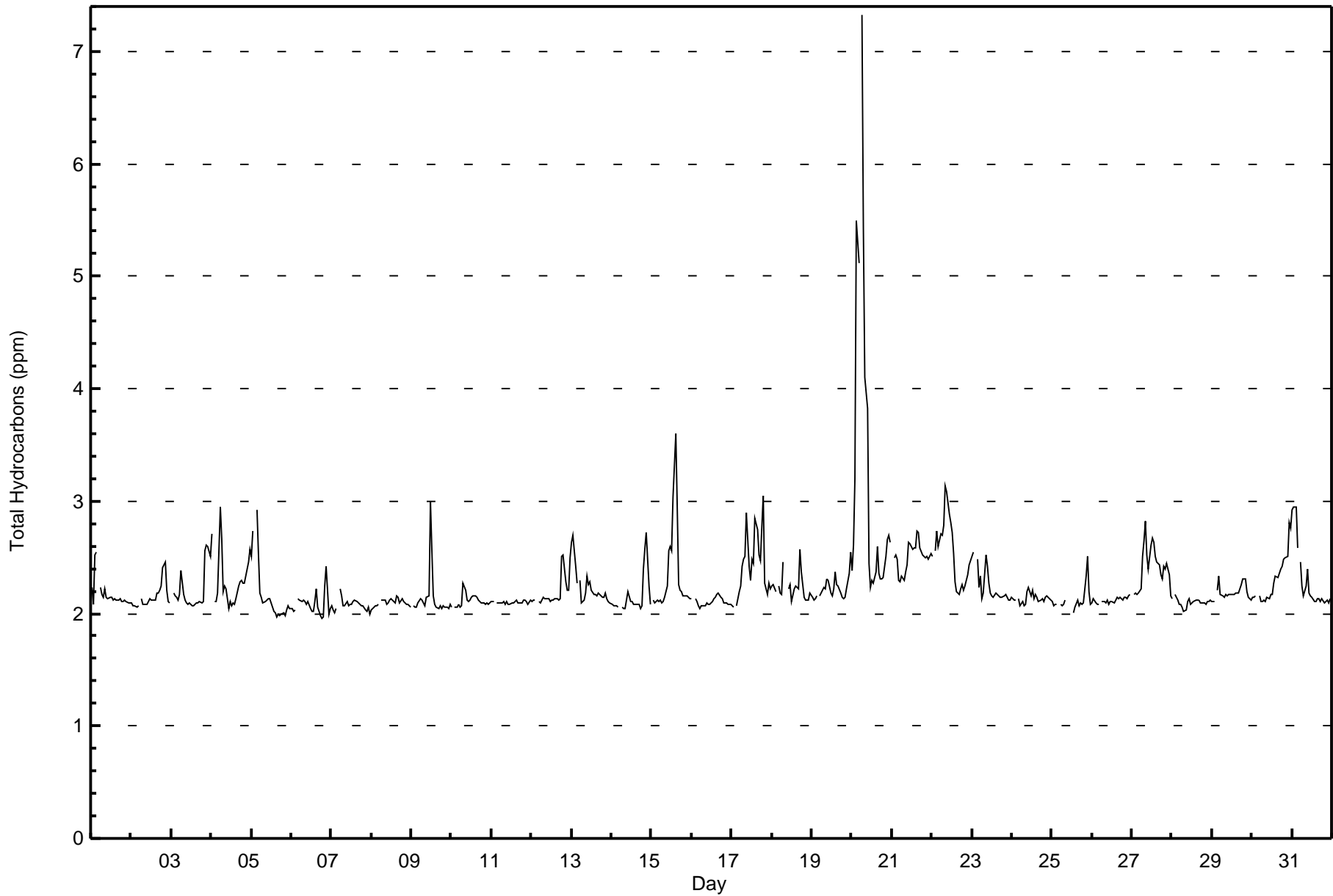
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Horizon - October 2017

Maximum Value: 7.3 ppm on Oct 20 07:00      Maximum Daily Average: 3.2 ppm on Oct 20																				Hours in Service: 744 Hours of Data: 707 Hours of Missing Data: 37 Hours of Calibration: 37 Percent Operational Time: 100.0						
Minimum Value: 2.0 ppm on Oct 6 19:00      Minimum Daily Average: 2.1 ppm on Oct 7 Maximum Diurnal Average: 2.4 ppm at hour 7      Minimum Diurnal Average: 2.2 ppm at hour 18 Monthly Average: 2.25 ppm      Percentiles: P <sub>1</sub> = 2.0 P <sub>10</sub> = 2.1 Q <sub>1</sub> = 2.1 Median = 2.1 Q <sub>3</sub> = 2.3 P <sub>90</sub> = 2.5 P <sub>99</sub> = 3.5																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	2.2	2.1	2.5	2.5	Z	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.5
2-Oct	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.4	2.5	2.2	2.1	2.1	2.1	2.5
3-Oct	Z	2.2	2.2	2.1	2.1	2.2	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.6	2.6	2.6	2.5	2.2	2.6
4-Oct	2.7	Z	2.1	2.1	2.2	2.9	2.7	2.2	2.3	2.2	2.0	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.3	2.3	2.4	2.5	2.6	2.3	2.9
5-Oct	2.5	2.7	Z	2.9	2.5	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.2	2.2	2.9
6-Oct	2.0	2.0	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.2	2.1	2.0	2.0	2.0	2.2	2.4	2.0	2.0	2.1	2.4
7-Oct	2.1	2.0	2.0	2.1	Z	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.1	2.2
8-Oct	2.0	2.0	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
9-Oct	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	3.0	2.6	2.2	2.1	2.1	2.0	2.1	2.0	2.1	2.1	2.1	2.0	2.1	2.1	3.0
10-Oct	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.3	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3
11-Oct	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
12-Oct	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.5	2.5	2.3	2.2	2.2	2.5	2.2	2.5
13-Oct	2.6	2.7	2.4	2.3	Z	2.3	2.1	2.1	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.7
14-Oct	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.0	2.0	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.1	2.4	2.6	2.7	2.2	2.1	2.7
15-Oct	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.6	2.6	2.6	3.0	3.6	2.9	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.3	3.6
16-Oct	2.1	Z	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
17-Oct	2.1	2.1	Z	2.1	2.2	2.2	2.4	2.5	2.5	2.9	2.4	2.3	2.5	2.5	2.8	2.7	2.5	2.5	2.8	3.0	2.3	2.2	2.3	2.2	2.4	3.0
18-Oct	2.2	2.3	2.2	Z	2.2	2.2	2.2	2.5	C	C	2.2	2.3	2.1	2.2	2.3	2.2	2.2	2.6	2.4	2.1	2.1	2.1	2.1	2.2	2.2	2.6
19-Oct	2.1	2.1	2.1	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.4	2.3	2.2	2.2	2.1	2.1	2.1	2.2	2.4	2.5	2.2	2.5
20-Oct	2.4	2.6	3.2	5.5	5.1	Z	7.3	5.4	4.1	3.8	2.5	2.2	2.3	2.3	2.4	2.6	2.4	2.3	2.3	2.3	2.5	2.7	2.7	2.6	3.2	7.3
21-Oct	Z	2.5	2.5	2.5	2.3	2.3	2.3	2.3	2.4	2.4	2.6	2.6	2.6	2.6	2.6	2.7	2.7	2.6	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.7
22-Oct	2.5	Z	2.6	2.7	2.6	2.7	2.7	2.8	3.1	3.1	2.9	2.8	2.7	2.5	2.3	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.4	2.5	2.5	3.1
23-Oct	2.5	2.5	Z	2.5	2.2	2.3	2.1	2.2	2.5	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.5
24-Oct	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2
25-Oct	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	C	C	C	C	2.0	2.1	2.1	2.1	2.1	2.1	2.3	2.5	2.2	2.1	2.1	2.5
26-Oct	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2
27-Oct	Z	2.2	2.2	2.2	2.2	2.2	2.5	2.7	2.8	2.5	2.4	2.6	2.7	2.6	2.5	2.5	2.4	2.3	2.3	2.4	2.4	2.4	2.4	2.2	2.4	2.8
28-Oct	2.1	Z	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
29-Oct	2.1	2.1	Z	2.2	2.3	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.1	2.1	2.3
30-Oct	2.1	2.1	2.2	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.3	2.4	2.4	2.4	2.5	2.5	2.5	2.8	2.8	2.3	2.8
31-Oct	2.9	3.0	3.0	2.6	Z	2.5	2.2	2.2	2.3	2.4	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	3.0
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan      C - Calibration																										





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Horizon - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	39	5.52	5.52
2.1 - 3.0	658	93.07	98.59
3.1 - 10.0	10	1.41	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Horizon - October 2017**

<b>Concentration</b> <b>Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>	
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW		
0 - 2.0	1	0	0	0	0	0	0	0	0	0	5	12	14	1	0	2	4	39
2.1 - 3.0	51	75	33	6	5	2	5	13	30	114	75	46	35	37	47	56	630	
3.1 - 10.0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	1	4	0	8
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	52	75	34	6	6	2	5	13	30	119	87	60	37	38	53	60	677	

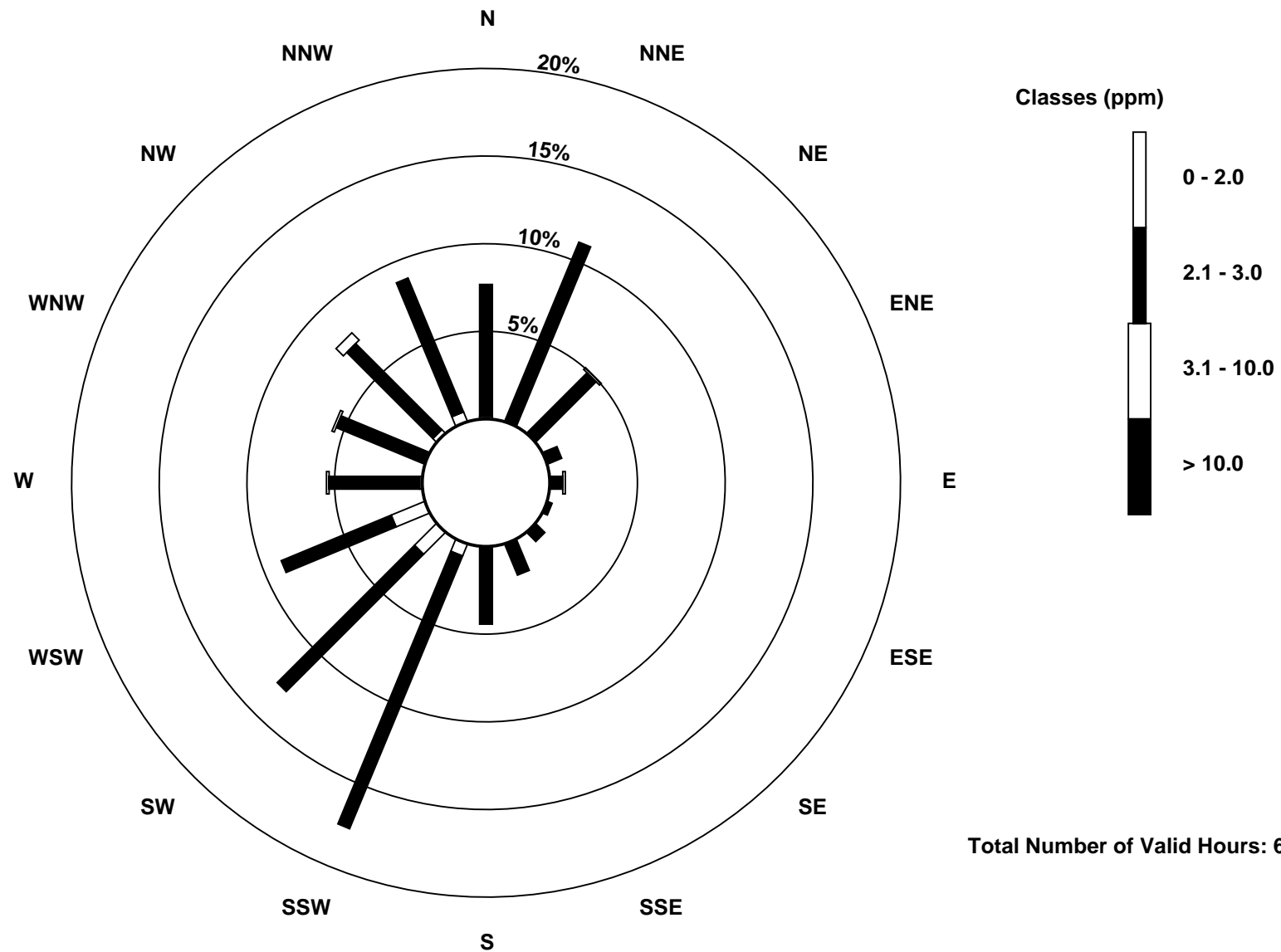
Total Number of Valid Hours: 677

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Total Hydrocarbons (THC) - ppm  
Horizon (AMS 15)



Total Number of Valid Hours: 677

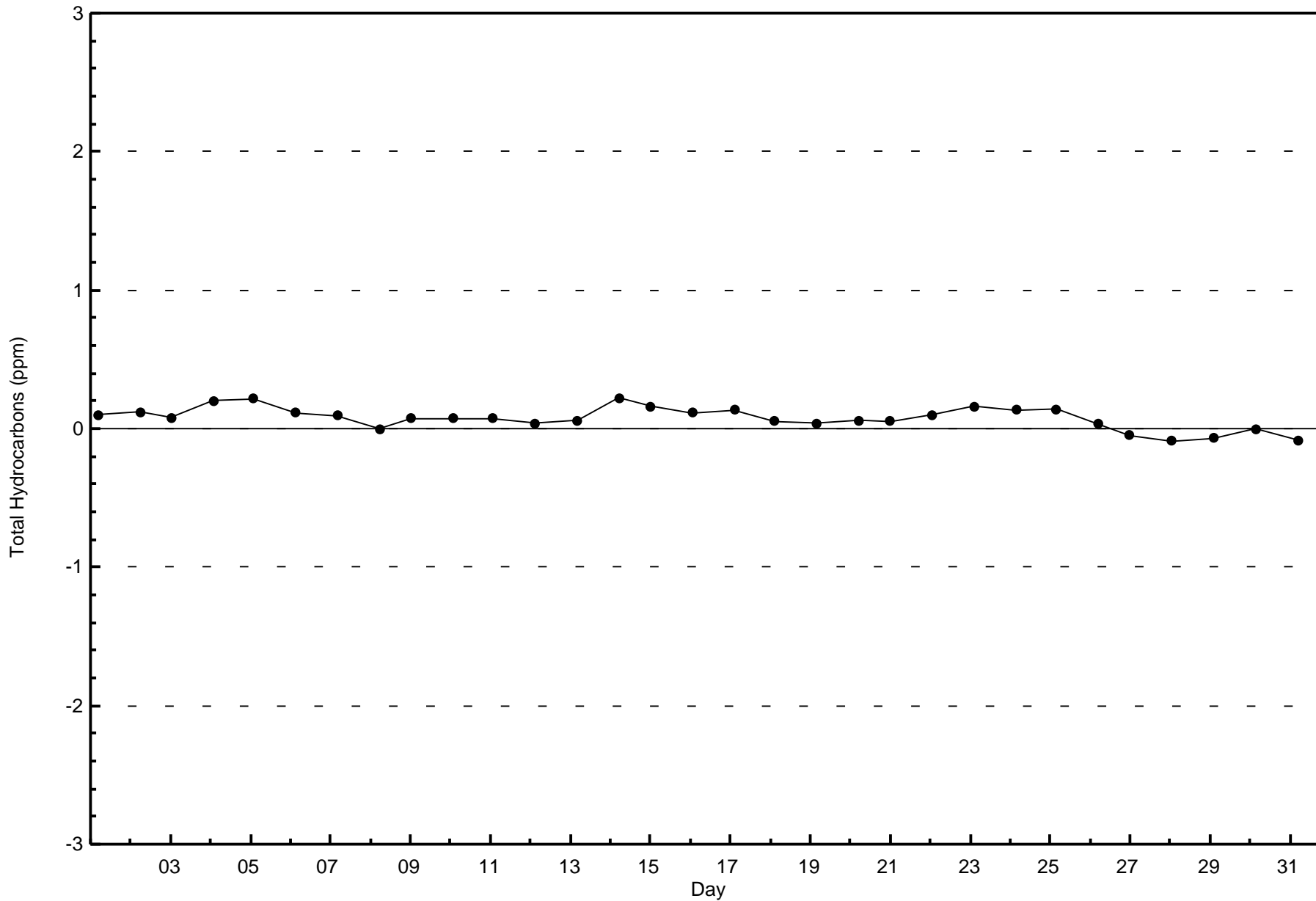


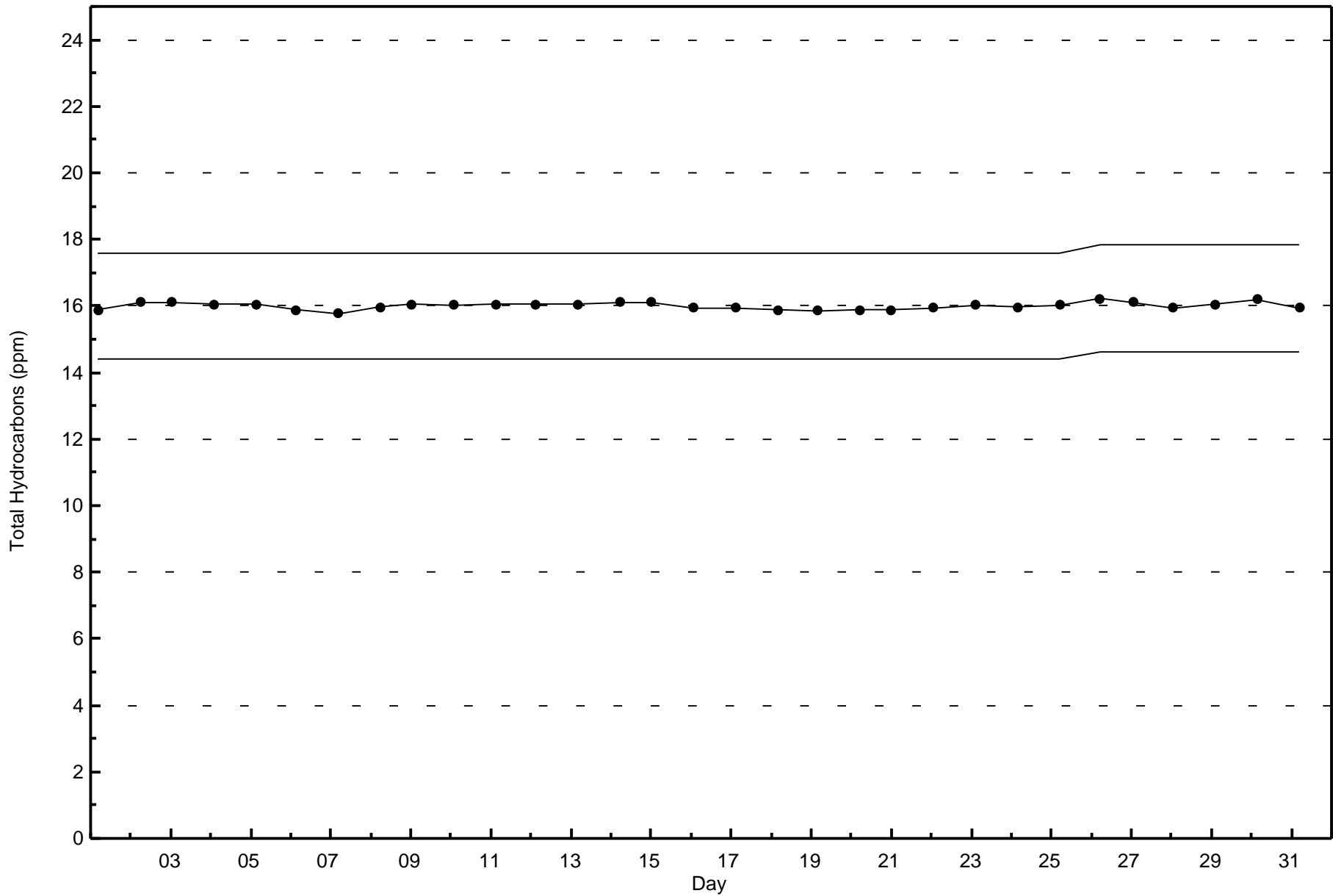
Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Horizon - October 2017







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

Horizon - October 2017

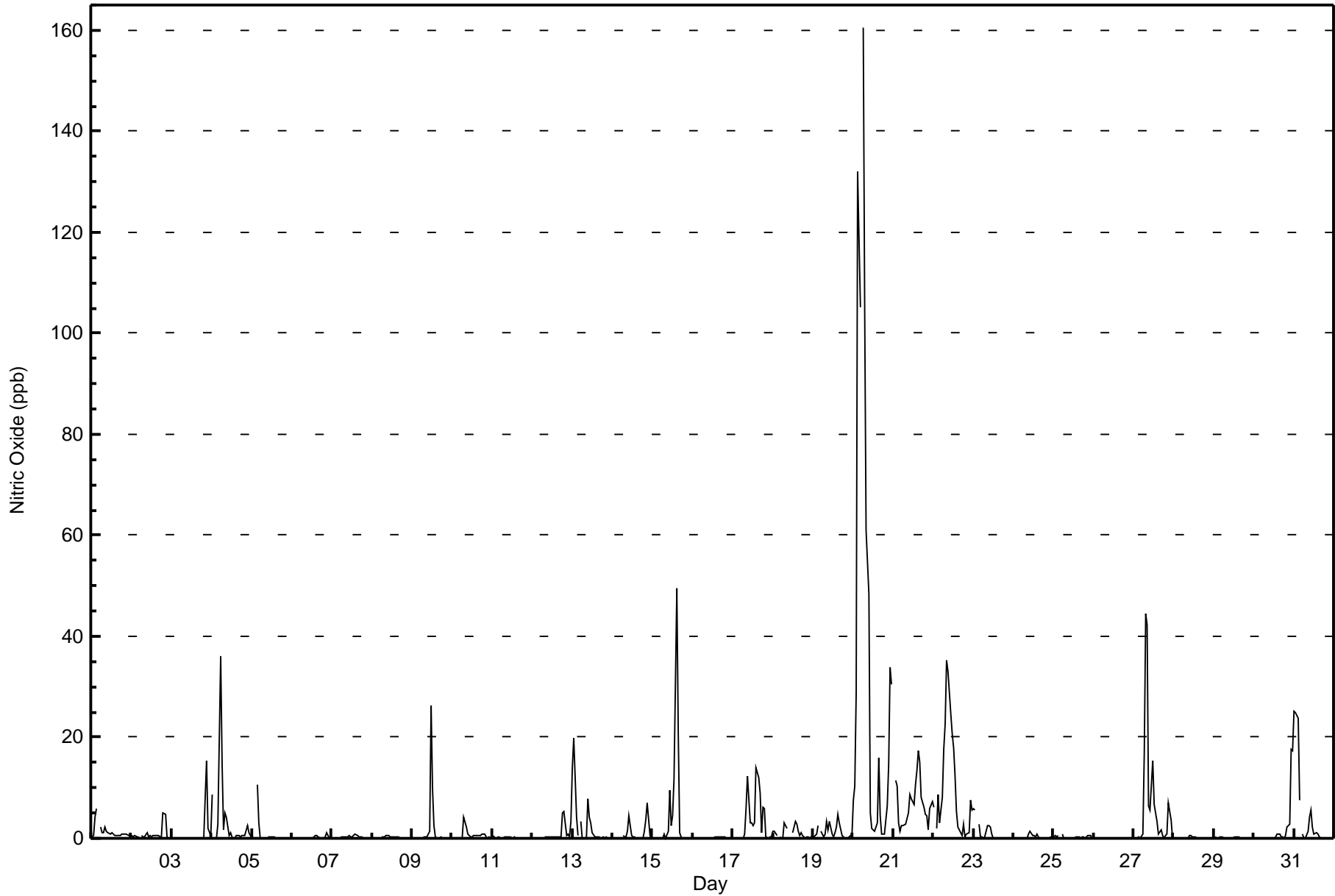
Maximum Value: 161 ppb on Oct 20 07:00																		Maximum Daily Average: 33.9 ppb on Oct 20						Hours in Service: 744		
Minimum Value: 0 ppb on Oct 3 05:00																		Minimum Daily Average: 0.0 ppb on Oct 26						Hours of Data: 706		
Maximum Diurnal Average: 7.0 ppb at hour 7																		Minimum Diurnal Average: 0.5 ppb at hour 18						Hours of Missing Data: 38		
Monthly Average: 3.0 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 6 P <sub>99</sub> = 48						Hours of Calibration: 38		
																		Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	4	6	Z	2	1	1	2	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1.3	6
2-Oct	0	0	1	0	0	Z	0	0	0	1	0	0	0	0	1	0	0	0	0	5	5	0	0	0	0.8	5
3-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	15	2	1	1.1	15
4-Oct	9	Z	0	0	3	36	15	2	5	4	1	1	0	0	0	1	1	0	1	0	1	2	1	0	3.6	36
5-Oct	0	0	Z	11	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	11
6-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0.2	1
7-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.2	1
8-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
9-Oct	Z	0	0	0	0	0	0	0	0	0	1	26	10	2	0	0	0	0	0	0	0	0	0	0	1.9	26
10-Oct	0	Z	0	0	0	0	0	4	2	1	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0.6	4
11-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
12-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	1	1	0	3	0.8	5
13-Oct	14	20	4	1	Z	3	0	0	0	8	4	3	1	0	0	0	0	0	0	0	0	0	0	0	2.6	20
14-Oct	0	0	0	0	0	Z	1	0	0	2	4	0	0	0	0	0	0	0	0	1	4	7	1	0	0.9	7
15-Oct	Z	0	0	0	0	0	0	1	0	1	10	3	5	12	50	21	1	0	0	0	0	0	0	0	4.5	50
16-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
17-Oct	0	0	Z	0	0	0	0	1	6	12	3	3	2	3	14	12	9	1	6	6	0	0	0	0	3.5	14
18-Oct	1	1	1	Z	0	0	0	3	2	C	C	C	1	3	3	1	1	1	0	0	0	0	0	0	1.0	3
19-Oct	0	1	1	2	Z	1	0	1	3	2	3	1	0	1	2	5	3	0	0	0	0	0	0	1	1.3	5
20-Oct	8	10	29	132	105	Z	161	105	61	48	5	2	2	1	3	16	4	1	1	1	7	15	34	30	33.9	161
21-Oct	Z	12	10	3	1	3	3	3	4	5	9	8	7	11	13	17	15	8	6	5	5	2	6	7	7.0	17
22-Oct	6	Z	2	9	3	8	18	23	35	33	25	21	18	12	5	2	1	1	3	0	1	1	7	6	10.4	35
23-Oct	6	6	Z	3	0	0	0	0	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1.0	6
24-Oct	0	0	0	Z	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0.2	1
25-Oct	0	1	0	1	Z	1	0	0	0	C	C	C	C	0	0	0	0	0	0	0	1	1	1	0	0.3	1
26-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
27-Oct	Z	0	0	0	0	1	17	44	42	6	6	15	7	5	3	1	2	1	0	0	1	7	4	0	7.0	44
28-Oct	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
29-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
30-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	2	3	18	1.9	18
31-Oct	25	25	24	7	Z	1	0	0	1	4	6	2	1	1	1	0	0	0	0	0	0	0	0	0	4.3	25
2.7 3.0 2.9 6.7 4.7 2.2 7.0 6.1 5.5 4.6 2.9 3.1 1.9 1.8 3.3 2.6 1.3 0.5 0.8 0.9 1.2 1.8 2.4 2.2																								Diurnal Average		
25 25 29 132 105 36 161 105 61 48 25 26 18 12 50 21 15 8 6 6 8 15 34 30																								Diurnal Maximum		
Z - zerospan C - Calibration																										





**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitric Oxide (NO) - ppb**  
**Horizon - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Horizon - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	683	96.74	96.74
21 - 40	14	1.98	98.73
41 - 80	5	0.71	99.43
81 - 159	3	0.42	99.86
> 159	1	0.14	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitric Oxide (NO) - ppb  
Horizon - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	52	75	33	6	5	2	5	13	30	117	87	60	35	34	48	59	661
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	1	6
11 - 80	0	0	1	0	0	0	0	0	0	2	0	0	1	0	1	0	5
81 - 159	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	3
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
<b>Totals</b>	52	75	34	6	6	2	5	13	30	119	87	60	37	37	53	60	676

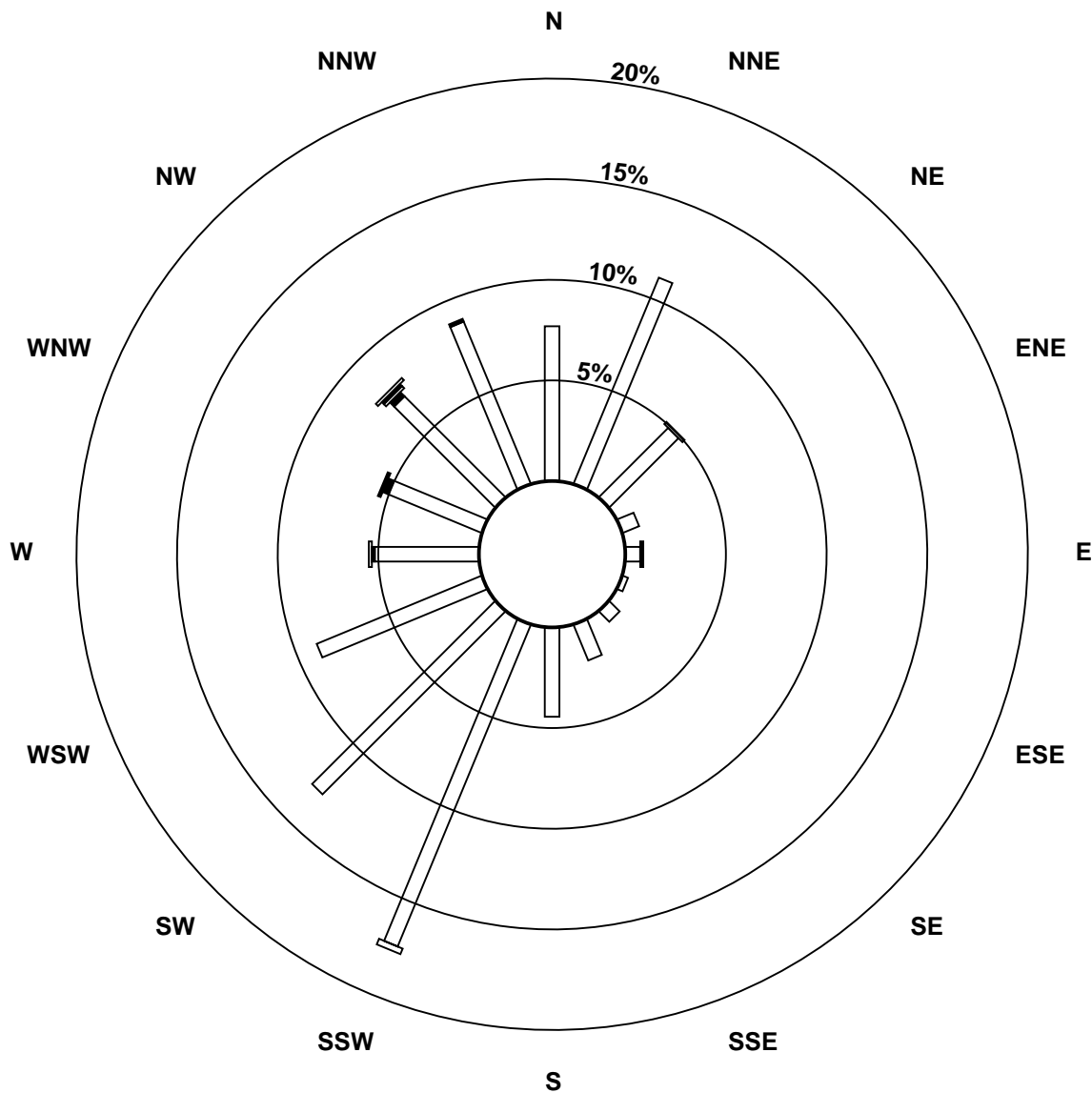
Total Number of Valid Hours: 676

Total Number of Hours: 744

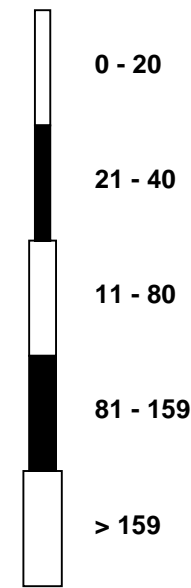


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitric Oxide (NO) - ppb  
Horizon (AMS 15)



Classes (ppb)

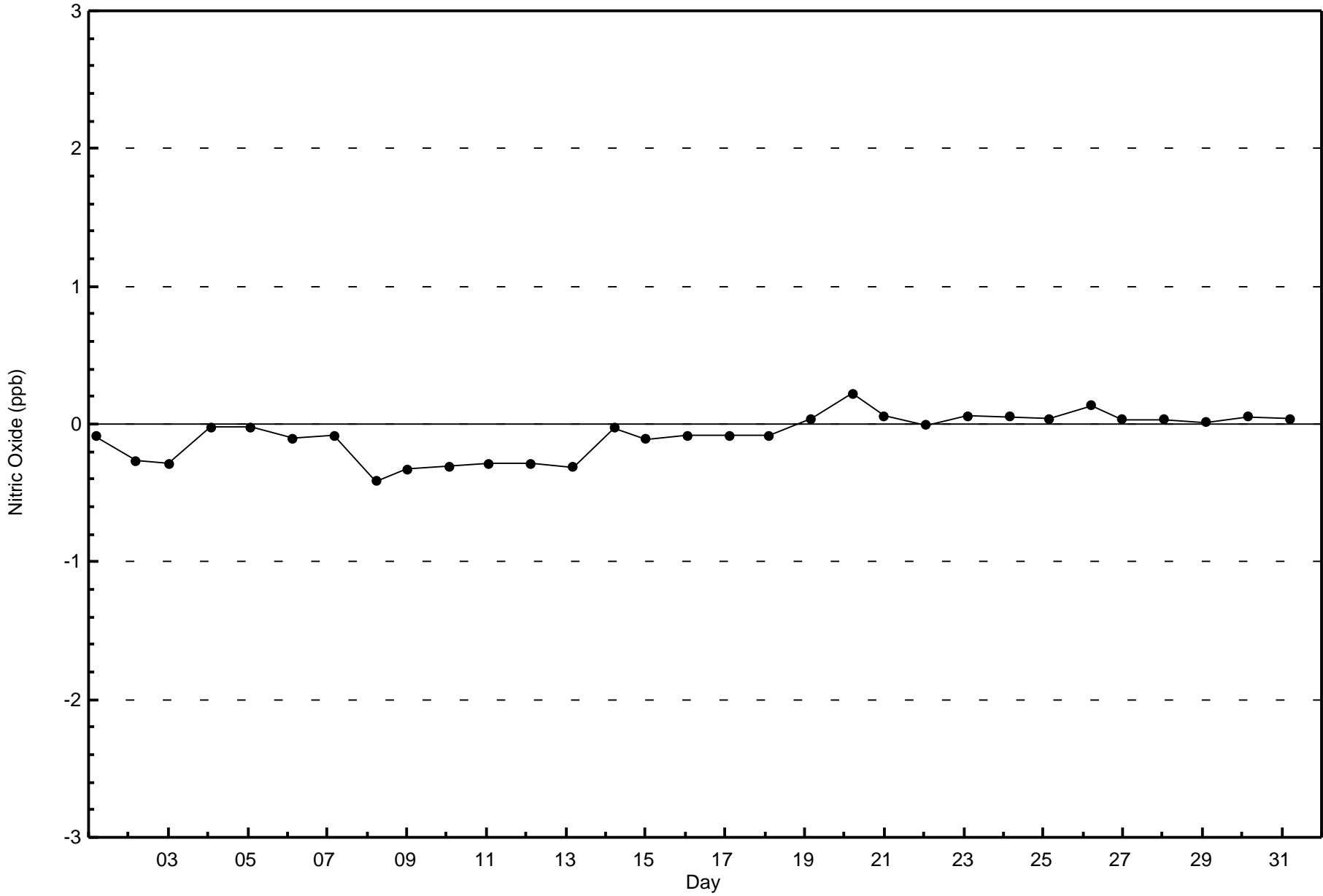


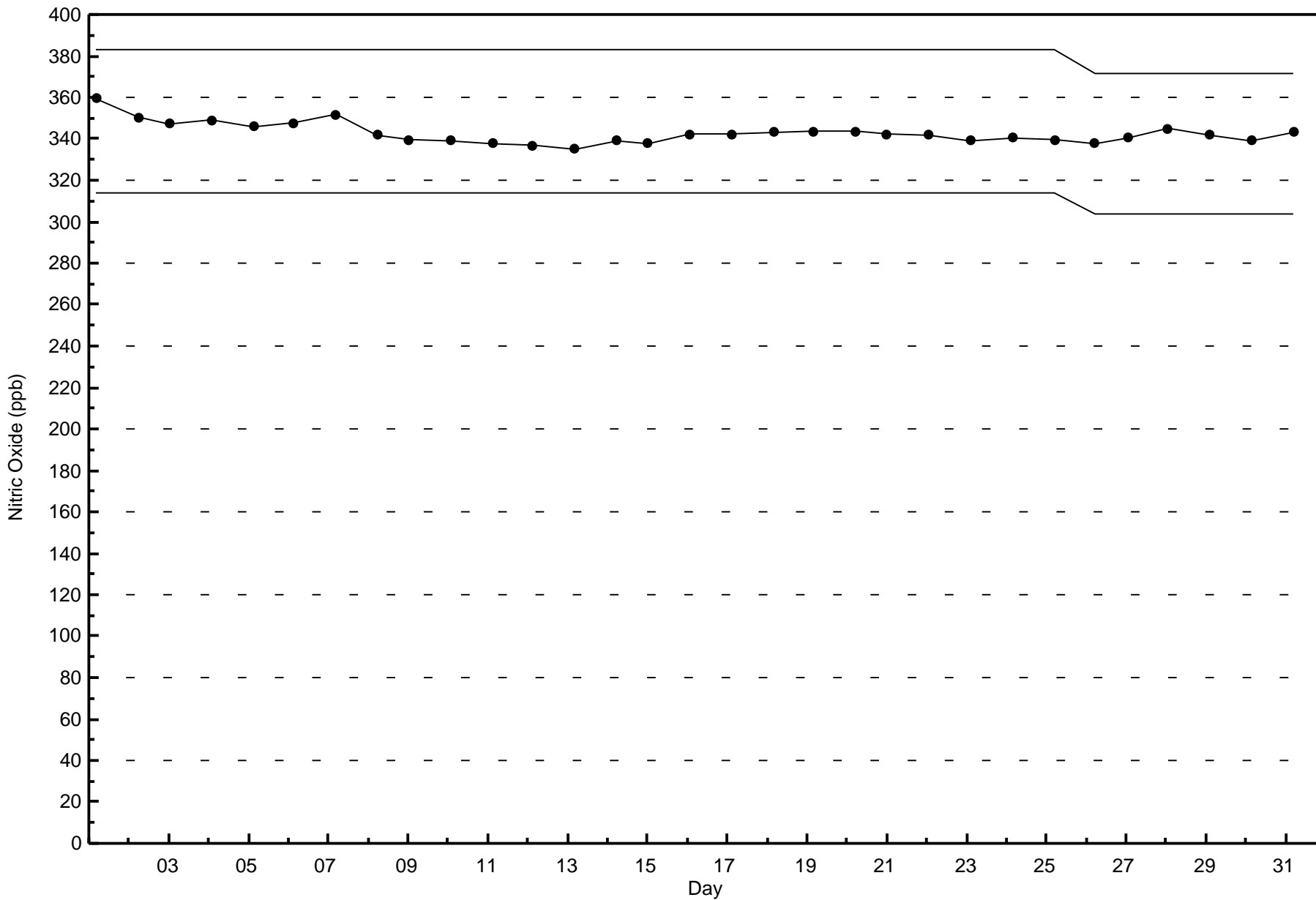
Total Number of Valid Hours: 676



Wood Buffalo Environmental Association  
Zero Responses

Nitric Oxide (NO) - ppb  
Horizon - October 2017







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb

Horizon - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 32 ppb on Oct 3 22:00	Maximum Daily Average: 15.9 ppb on Oct 22
Minimum Value: 0 ppb on Oct 3 06:00	Hours of Data: 706
Maximum Diurnal Average: 7.7 ppb at hour 22	Hours of Missing Data: 38
Monthly Average: 4.8 ppb	Hours of Calibration: 38
Minimum Daily Average: 0.3 ppb on Oct 26	Percent Operational Time: 100.0
Minimum Diurnal Average: 3.1 ppb at hour 13	
Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 2 Q <sub>3</sub> = 7 P <sub>90</sub> = 15 P <sub>99</sub> = 23	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	3	3	10	10	Z	6	3	3	3	2	2	1	2	2	2	2	2	2	4	4	5	4	4	4	3.6	10
2-Oct	4	3	6	5	4	Z	7	3	1	3	1	1	1	1	1	1	1	3	9	21	19	3	0	0	4.3	21
3-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	24	32	18	20	4.3	32
4-Oct	25	Z	1	5	12	20	16	8	12	9	2	3	1	0	0	3	5	11	22	21	21	23	24	13	11.1	25
5-Oct	11	9	Z	18	13	2	1	1	0	1	1	1	1	0	0	0	1	1	0	0	1	1	1	1	2.7	18
6-Oct	0	1	1	Z	1	0	0	0	1	1	1	1	1	0	3	5	0	0	0	0	9	17	0	2	1.8	17
7-Oct	4	1	1	1	Z	7	4	2	1	1	1	1	1	1	2	2	2	2	2	1	1	1	1	1	1.6	7
8-Oct	1	1	1	1	1	Z	2	2	2	2	1	1	1	1	2	2	4	1	2	0	0	1	1	0	1.2	4
9-Oct	Z	0	1	5	6	7	4	5	5	4	8	18	12	6	1	0	0	0	0	0	0	0	0	0	3.6	18
10-Oct	0	Z	0	0	0	0	0	5	5	2	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1.0	5
11-Oct	1	1	Z	0	1	0	0	1	1	1	1	1	0	0	0	0	0	0	1	1	1	0	0	0	0.5	1
12-Oct	0	1	1	Z	1	1	1	2	3	2	2	1	1	1	1	2	2	5	14	18	15	17	15	19	5.4	19
13-Oct	19	19	17	10	Z	12	0	0	1	10	8	5	2	0	0	0	0	0	1	1	5	2	2	2	5.0	19
14-Oct	1	1	2	1	1	Z	2	1	1	3	5	1	1	1	1	0	1	1	15	18	19	8	0	3.5	19	
15-Oct	Z	0	0	0	0	0	0	1	0	3	17	11	9	12	21	16	6	5	3	2	1	1	1	1	4.8	21
16-Oct	0	Z	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	4
17-Oct	0	0	Z	3	3	2	7	10	11	19	11	9	11	11	21	23	25	20	21	21	6	5	6	3	10.7	25
18-Oct	5	5	4	Z	2	1	2	13	6	C	C	C	2	5	5	5	6	17	11	2	1	1	1	4	4.9	17
19-Oct	4	5	4	9	Z	5	4	6	5	4	5	2	1	3	6	13	15	7	7	3	3	7	11	14	6.1	15
20-Oct	14	14	15	24	20	Z	21	13	13	13	7	7	8	7	7	14	11	9	10	9	11	11	13	9	12.2	24
21-Oct	Z	10	8	8	6	10	13	12	10	9	10	9	8	12	14	17	18	18	18	18	20	20	20	21	13.4	21
22-Oct	21	Z	17	19	18	19	22	23	24	22	19	18	17	15	10	6	8	11	16	9	12	14	14	13	15.9	24
23-Oct	12	10	Z	10	5	10	3	6	17	13	5	2	0	0	0	0	0	0	0	0	0	0	1	1	4.1	17
24-Oct	0	1	5	Z	2	1	0	0	0	5	5	2	3	3	3	2	3	4	2	1	1	1	3	1	2.1	5
25-Oct	1	2	1	2	Z	1	1	1	1	C	C	C	C	1	1	2	1	8	7	6	12	18	9	0	3.9	18
26-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	1	0.3	1
27-Oct	Z	1	0	1	1	3	13	13	11	5	4	9	8	10	10	7	14	12	14	18	18	22	13	1	8.9	22
28-Oct	1	Z	1	1	1	0	0	0	0	3	3	2	2	2	1	3	3	1	1	2	2	2	1	1	1.4	3
29-Oct	2	2	Z	3	3	3	0	0	0	0	0	0	0	0	1	1	1	6	4	9	7	2	0	0	2.0	9
30-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	1	2	4	6	10	8	9	17	15	12	4.5	17
31-Oct	10	12	9	14	Z	7	3	6	6	8	6	2	1	1	1	1	1	1	1	0	0	0	0	0	3.9	14

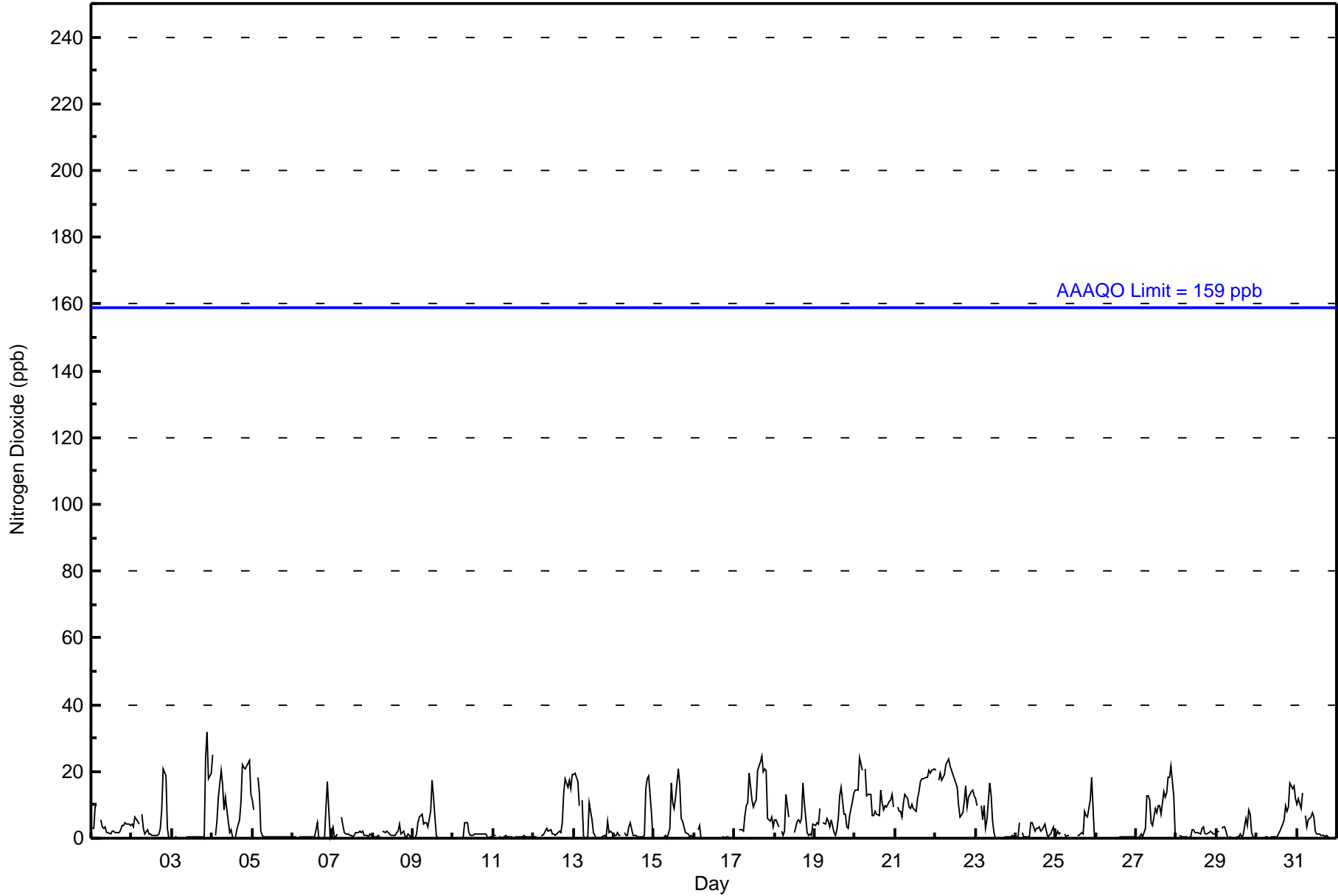
5.4	3.8	4.1	5.9	4.0	4.5	4.3	4.3	4.5	4.9	4.3	3.7	3.1	3.2	3.8	4.3	4.4	5.1	5.8	6.2	7.4	7.7	6.0	4.6	Diurnal Average
25	19	17	24	20	20	22	23	24	22	19	18	17	15	21	23	25	20	22	21	24	32	24	21	Diurnal Maximum

Z - zerospan C - Calibration  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



Wood Buffalo Environmental Association  
Hourly Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Horizon - October 2017







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Horizon - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	682	96.60	96.60
21 - 40	24	3.40	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Horizon - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	51	75	33	6	5	2	5	10	30	117	87	60	35	34	48	59	657
21 - 40	1	0	1	0	1	0	0	3	0	2	0	0	2	3	5	1	19
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	52	75	34	6	6	2	5	13	30	119	87	60	37	37	53	60	676

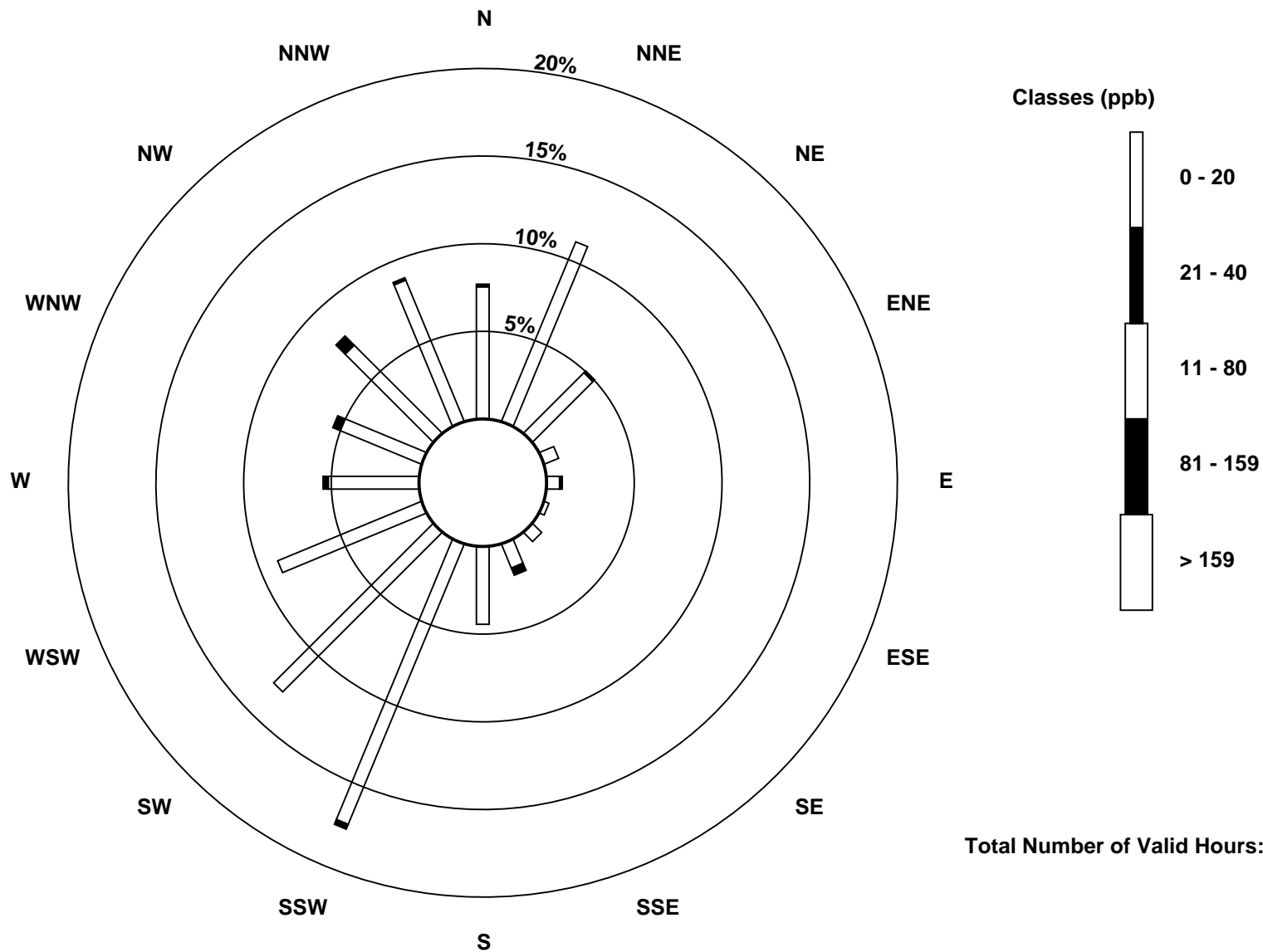
Total Number of Valid Hours: 676

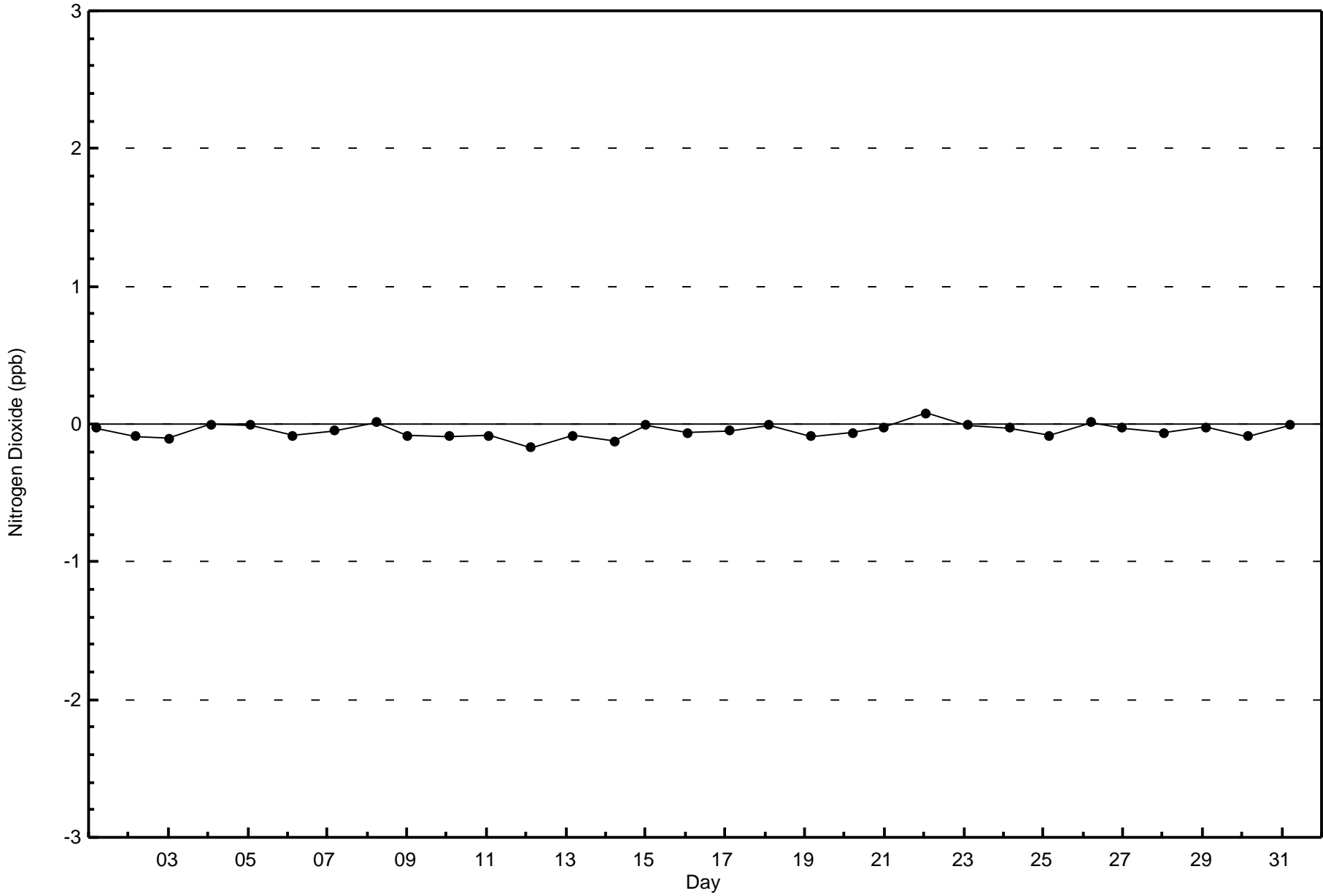
Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Horizon (AMS 15)

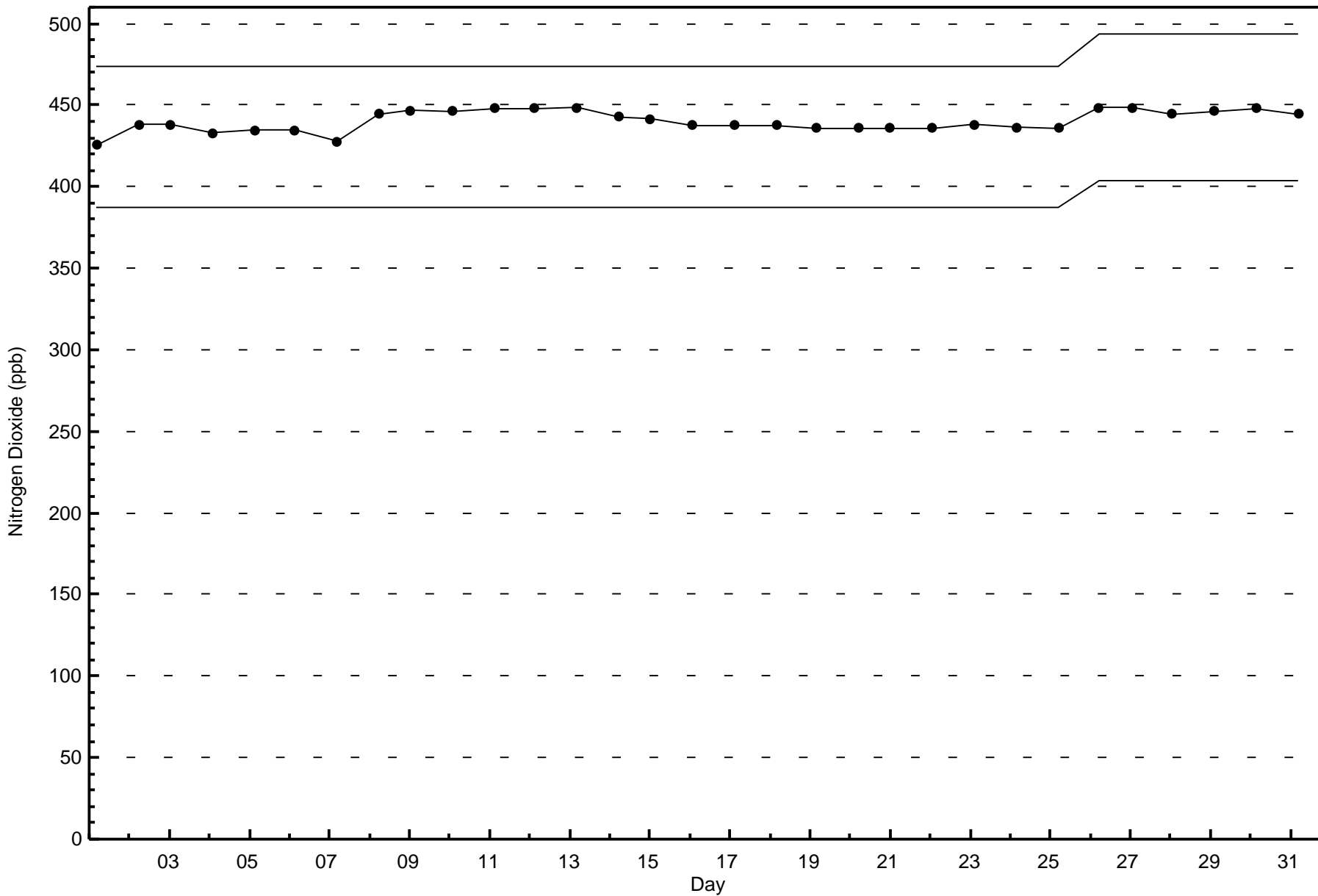






Wood Buffalo Environmental Association  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Horizon - October 2017





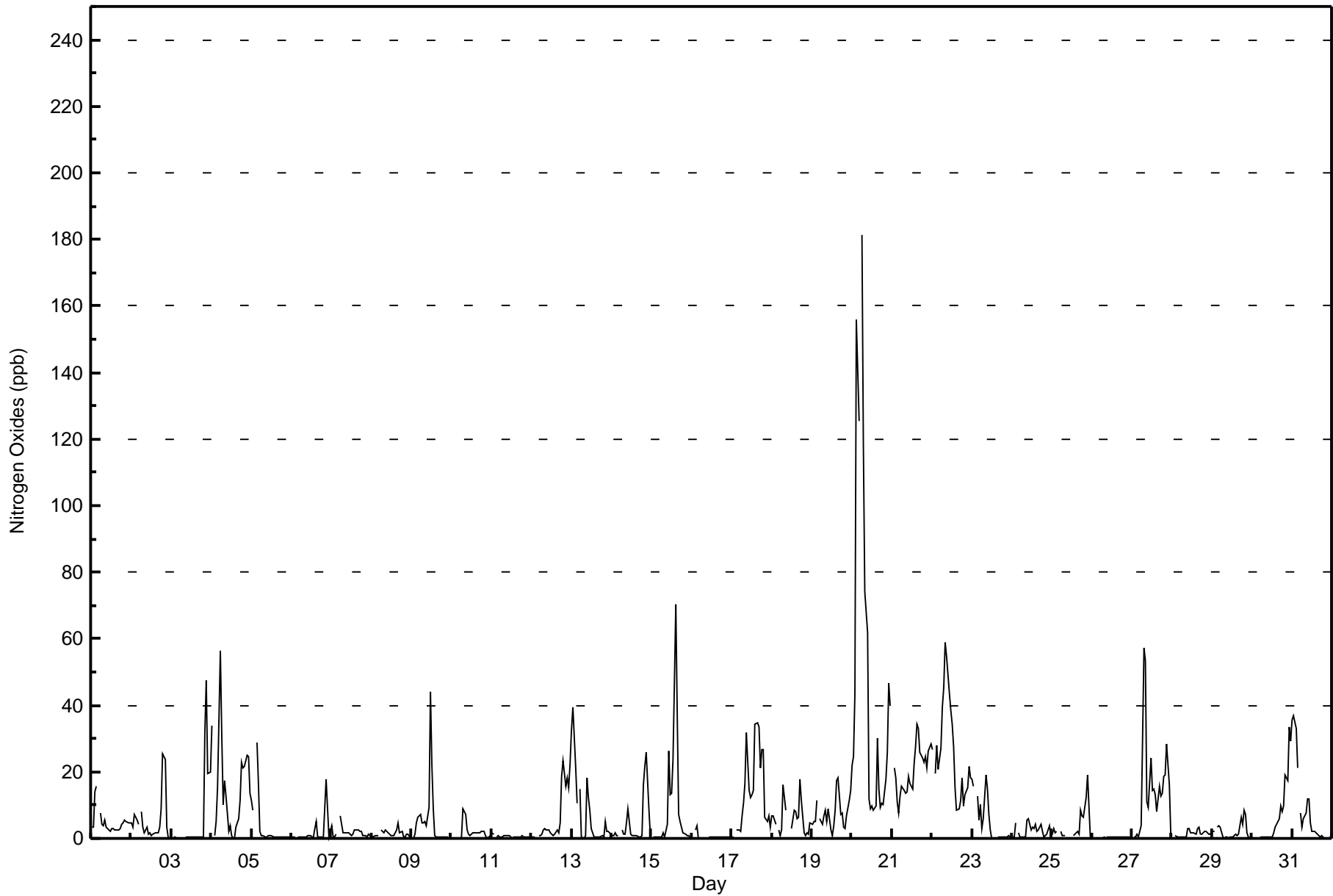
Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb

Horizon - October 2017

Maximum Value: 181 ppb on Oct 20 07:00		Maximum Daily Average: 46.2 ppb on Oct 20		Hours in Service: 744																																												
Minimum Value: 0 ppb on Oct 3 07:00		Minimum Daily Average: 0.3 ppb on Oct 26		Hours of Data: 706																																												
Maximum Diurnal Average: 12.6 ppb at hour 4		Minimum Diurnal Average: 5.0 ppb at hour 14		Hours of Missing Data: 38																																												
Monthly Average: 7.8 ppb		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 2 Q <sub>3</sub> = 9 P <sub>90</sub> = 22 P <sub>99</sub> = 57		Hours of Calibration: 38																																												
				Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	3	3	14	16	Z	8	4	4	5	3	3	2	3	3	3	2	3	3	4	5	6	5	5	4	4.8	16																						
2-Oct	5	4	7	5	4	Z	8	3	2	3	1	2	1	1	2	2	2	3	9	26	24	3	0	0	5.1	26																						
3-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	32	47	20	20	5.4	47																						
4-Oct	34	Z	1	5	15	57	31	10	17	13	2	4	1	0	0	3	6	12	23	21	21	25	25	14	14.7	57																						
5-Oct	12	9	Z	29	16	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	3.4	29																						
6-Oct	0	1	0	Z	1	1	1	1	1	1	1	1	1	3	5	0	0	0	0	0	9	18	0	2	2.0	18																						
7-Oct	4	1	0	1	Z	7	4	2	2	2	2	1	1	1	2	2	2	2	2	1	1	0	1	1	1.8	7																						
8-Oct	1	1	1	1	1	Z	2	2	3	2	2	1	1	1	2	3	5	1	2	1	0	1	1	0	1.4	5																						
9-Oct	Z	0	1	5	6	7	5	5	5	4	9	44	22	9	1	0	0	0	0	0	0	0	0	0	5.5	44																						
10-Oct	0	Z	0	0	0	0	0	9	7	2	1	1	1	2	2	2	2	2	2	2	1	0	0	0	1.6	9																						
11-Oct	2	1	Z	0	1	0	0	1	1	1	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0.6	2																						
12-Oct	0	0	0	Z	1	1	1	2	3	2	3	2	1	1	1	2	2	5	19	23	16	18	15	22	6.2	23																						
13-Oct	33	39	21	11	Z	15	0	0	1	18	12	9	3	0	0	0	0	0	1	1	5	2	2	2	7.6	39																						
14-Oct	1	1	2	1	1	Z	2	1	1	5	9	1	1	1	1	1	1	1	1	16	22	26	8	0	4.4	26																						
15-Oct	Z	0	0	0	0	0	0	2	0	4	26	13	14	24	70	37	7	5	3	2	1	1	1	1	9.3	70																						
16-Oct	0	Z	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	4																						
17-Oct	0	0	Z	3	3	2	7	10	17	32	15	12	13	14	34	35	33	21	27	27	6	5	7	4	14.2	35																						
18-Oct	7	7	4	Z	2	1	2	16	8	C	C	C	3	8	8	6	6	18	11	2	1	2	1	5	5.9	18																						
19-Oct	4	5	5	11	Z	6	4	7	8	5	9	3	1	4	8	17	18	7	7	3	3	7	11	14	7.4	18																						
20-Oct	22	25	43	156	125	Z	181	118	74	62	12	9	10	9	10	30	15	9	11	10	18	26	47	40	46.2	181																						
21-Oct	Z	21	18	11	8	13	16	15	13	14	19	16	15	23	27	34	33	26	24	23	25	21	26	28	20.4	34																						
22-Oct	27	Z	19	28	21	27	40	45	59	55	44	39	34	27	15	8	9	12	18	10	13	15	22	18	26.3	59																						
23-Oct	18	15	Z	13	5	10	3	6	19	15	7	3	0	0	0	0	0	0	0	0	0	1	0	0	5.1	19																						
24-Oct	0	0	5	Z	2	1	0	0	0	6	6	3	3	3	4	2	2	4	2	1	1	1	4	1	2.3	6																						
25-Oct	1	3	2	2	Z	2	1	1	1	C	C	C	C	1	1	2	1	8	7	6	12	19	9	0	4.3	19																						
26-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																						
27-Oct	Z	0	0	1	1	4	30	57	53	11	9	24	15	15	13	8	16	13	14	19	19	28	16	1	16.0	57																						
28-Oct	1	Z	1	1	0	0	0	0	0	3	3	2	2	2	1	3	3	1	1	2	2	2	1	1	1.5	3																						
29-Oct	2	2	Z	3	4	4	0	0	0	0	0	0	1	1	1	1	1	6	4	9	7	2	0	0	2.2	9																						
30-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	1	2	3	5	6	10	8	10	19	17	33	29	6.3	33																						
31-Oct	35	37	33	21	Z	8	3	6	8	12	12	4	2	2	2	1	1	1	1	0	0	0	0	0	8.2	37																						
																								8.1	6.8	7.0	12.6	8.7	6.7	11.3	10.5	10.0	9.5	7.2	6.8	5.0	5.0	7.0	7.0	5.7	5.6	6.6	7.1	8.6	9.5	8.4	6.8	Diurnal Average
																								35	39	43	156	125	57	181	118	74	62	44	44	34	27	70	37	33	26	27	27	32	47	47	40	Diurnal Maximum
Z - zerospan																								C - Calibration																								





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Horizon - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	624	88.39	88.39
21 - 40	64	9.07	97.45
41 - 80	14	1.98	99.43
81 - 159	3	0.42	99.86
> 159	1	0.14	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744





**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Horizon - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	49	75	26	3	3	2	5	10	27	112	87	59	26	28	42	56	610
21 - 40	3	0	7	3	2	0	0	3	3	5	0	1	10	5	7	3	52
11 - 80	0	0	1	0	0	0	0	0	0	2	0	0	1	3	2	1	10
81 - 159	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	3
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
<b>Totals</b>	52	75	34	6	6	2	5	13	30	119	87	60	37	37	53	60	676

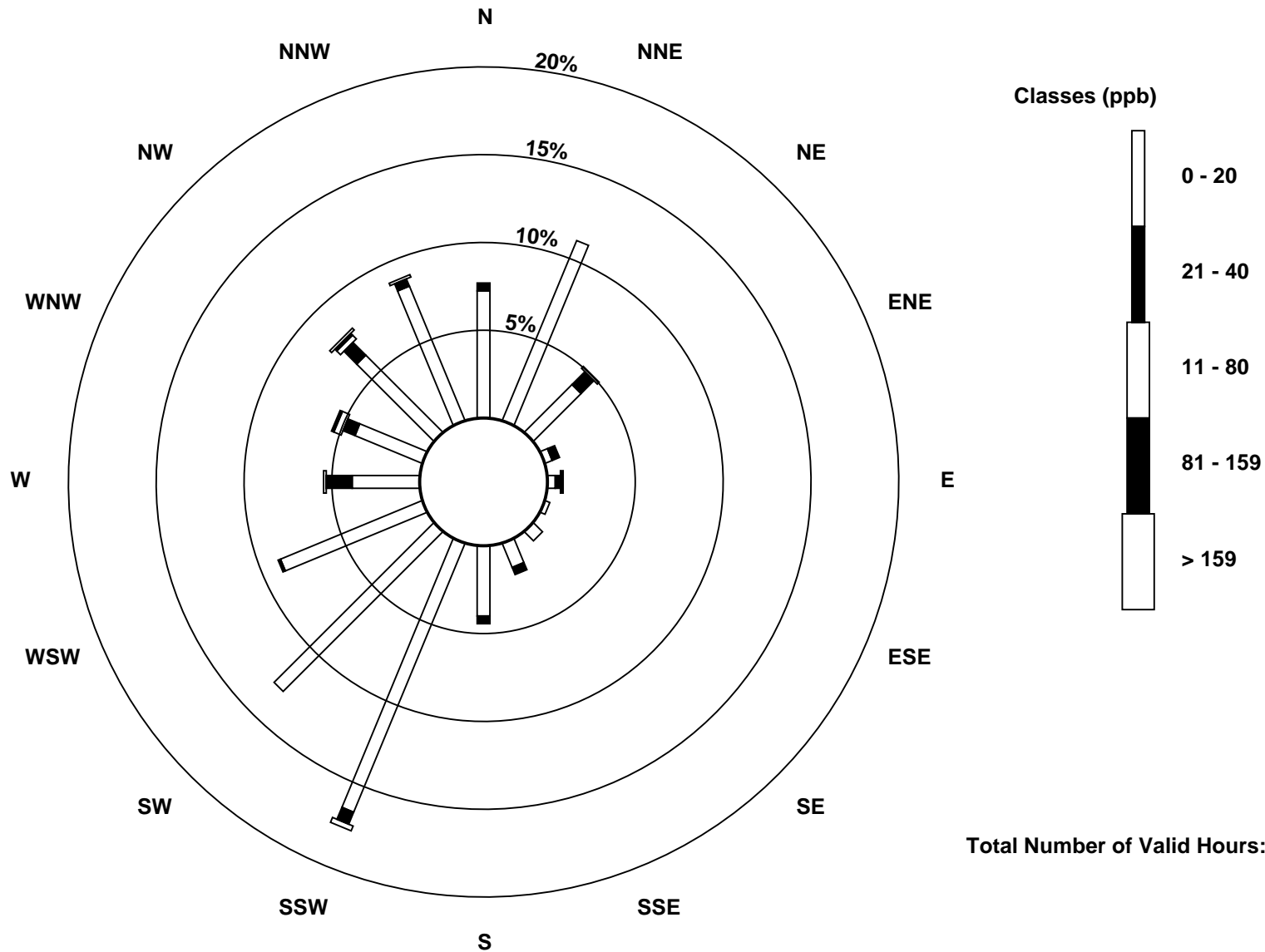
Total Number of Valid Hours: 676

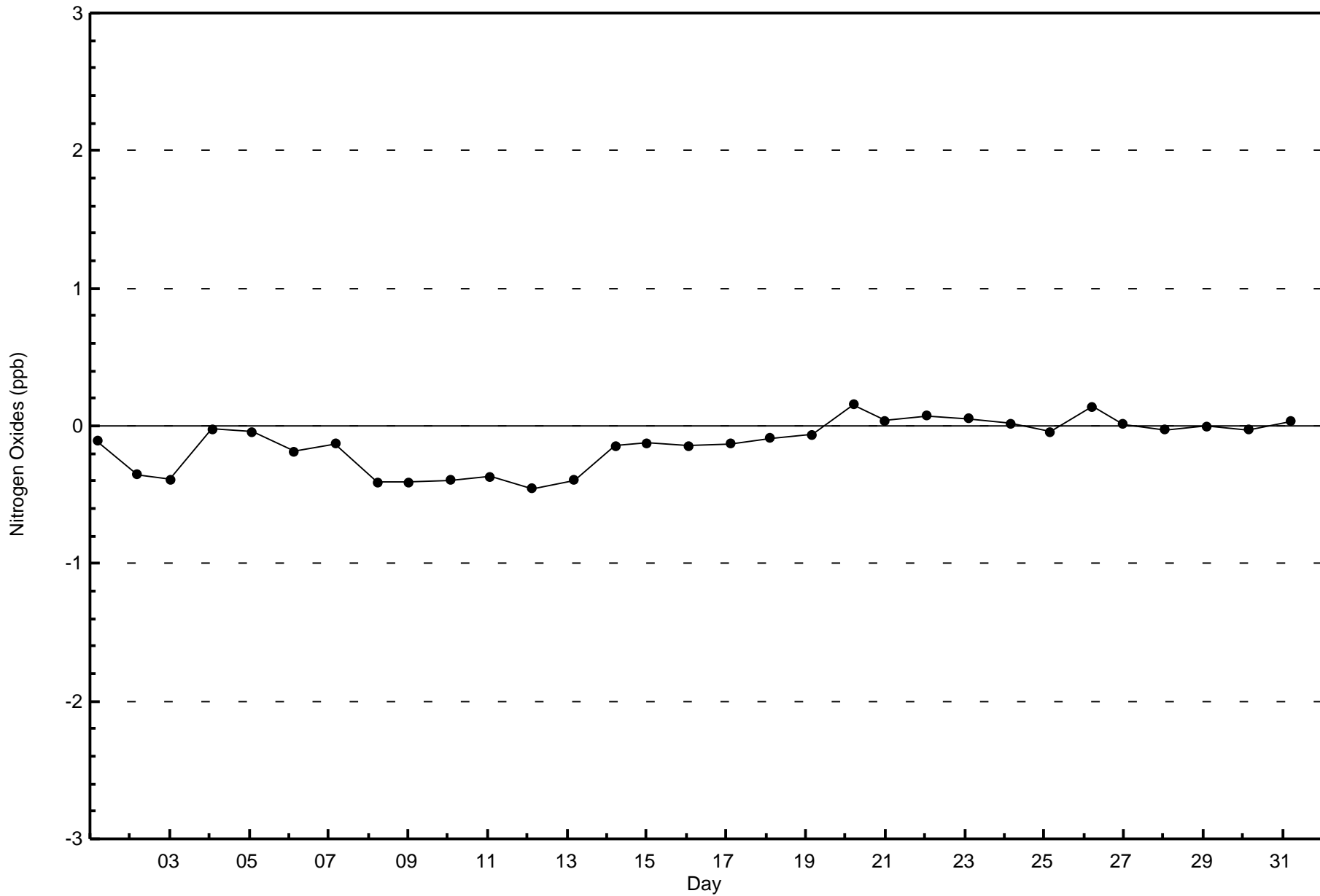
Total Number of Hours: 744

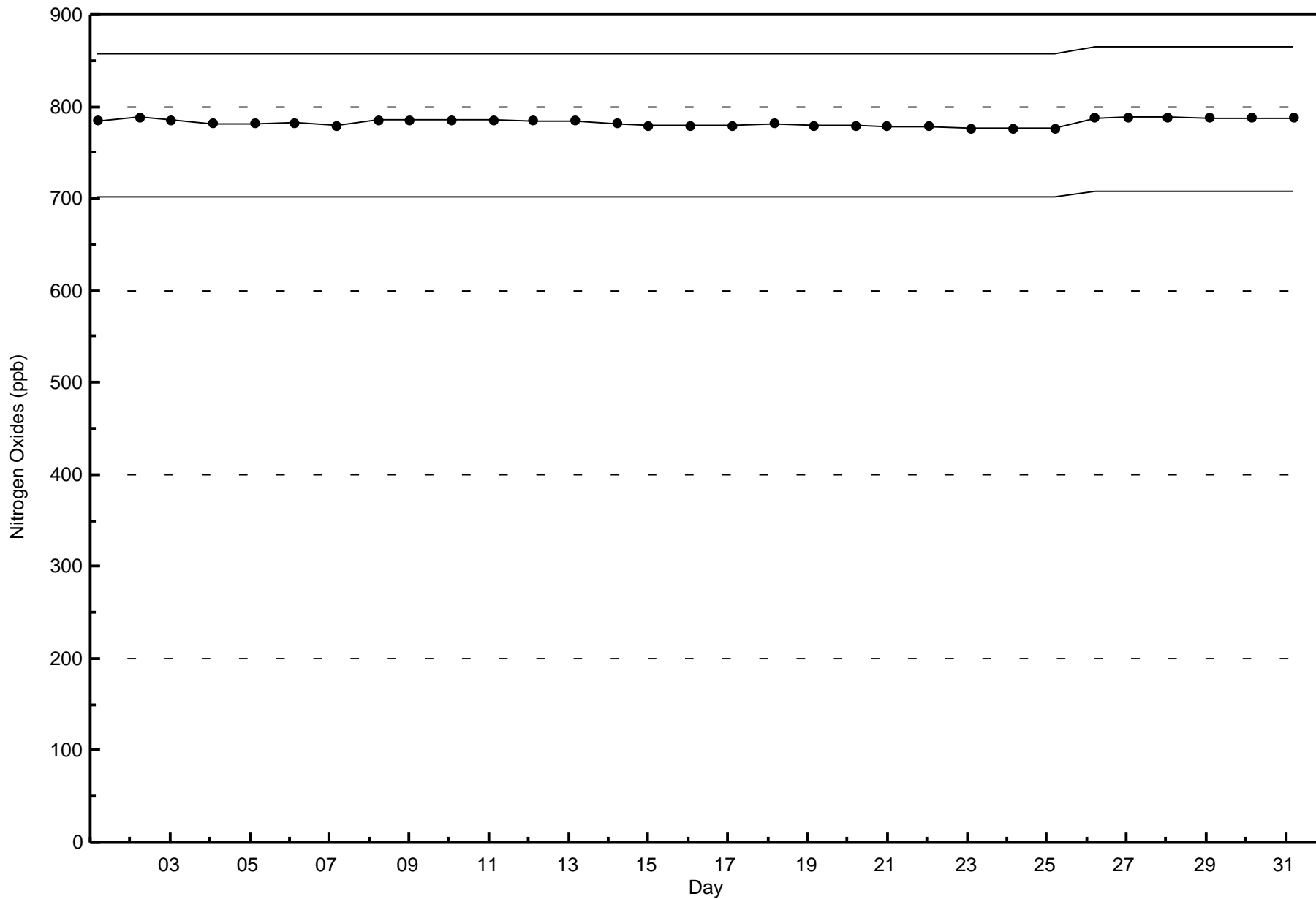


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Horizon (AMS 15)





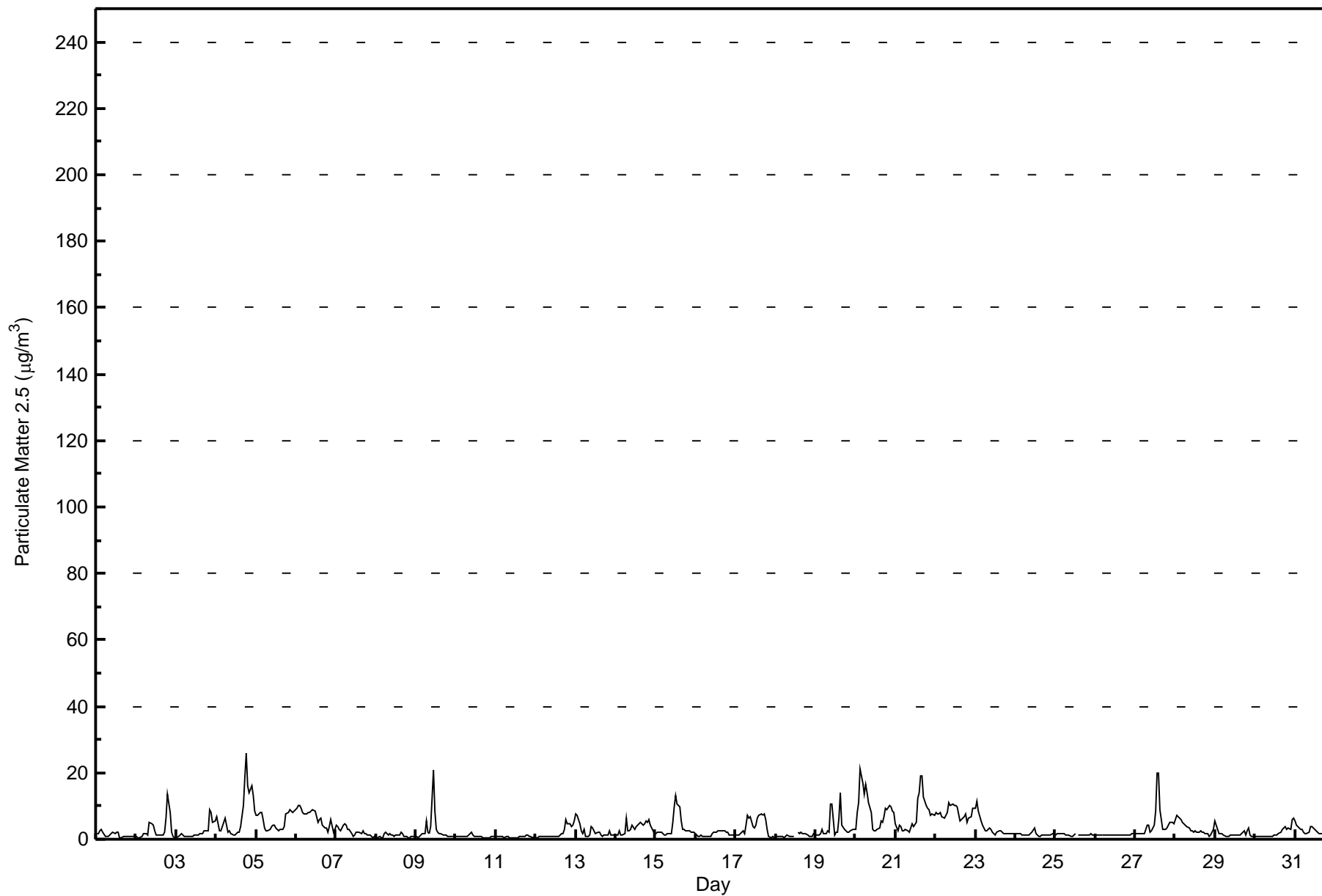




Summary of Hour Averages

Horizon - October 2017

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 26.0 µg/m <sup>3</sup> on Oct 4 19:00 Maximum Daily Average: 8.8 µg/m <sup>3</sup> on Oct 20																	Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 2 Percent Operational Time: 100.0																																
Minimum Value: 0.3 µg/m <sup>3</sup> on Oct 8 01:00 Maximum Diurnal Average: 3.9 µg/m <sup>3</sup> at hour 19 Monthly Average: 3.25 µg/m <sup>3</sup>																	Minimum Daily Average: 0.7 µg/m <sup>3</sup> on Oct 11 Minimum Diurnal Average: 2.7 µg/m <sup>3</sup> at hour 6 Percentiles: P <sub>1</sub> = 0.5 P <sub>10</sub> = 0.8 Q <sub>1</sub> = 1.2 Median = 1.9 Q <sub>3</sub> = 4.0 P <sub>90</sub> = 8.0 P <sub>99</sub> = 18.7																																
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	1.9	1.7	2.5	2.9	2.0	0.8	0.8	0.8	1.1	1.7	1.9	1.8	2.2	2.0	0.5	0.6	0.9	1.0	0.9	0.8	0.9	1.0	0.7	0.7	1.3	2.9																							
2-Oct	0.8	0.3	0.5	0.9	1.8	1.7	1.6	1.3	4.9	4.8	4.2	2.4	1.1	1.3	1.4	1.3	1.3	2.0	6.2	13.5	8.1	2.1	0.7	0.6	2.7	13.5																							
3-Oct	0.6	0.8	1.4	1.8	1.3	0.8	0.9	0.9	0.9	0.8	0.9	1.1	1.3	1.4	1.6	1.7	1.9	2.7	2.7	2.4	8.8	8.0	5.2	5.6	2.3	8.8																							
4-Oct	6.7	4.5	2.7	2.5	3.7	6.2	4.2	2.1	2.4	1.9	1.1	1.3	1.8	2.0	2.1	4.0	10.1	18.4	26.0	16.1	14.0	16.0	13.2	8.7	7.1	26.0																							
5-Oct	7.4	7.4	8.1	8.2	5.8	3.3	2.7	2.7	2.9	3.9	4.4	4.0	3.5	2.7	2.8	2.9	2.9	3.9	7.4	8.1	8.9	8.5	8.0	8.4	5.4	8.9																							
6-Oct	9.4	10.1	10.2	9.4	8.0	7.5	7.8	8.0	7.9	8.6	8.9	8.3	6.7	4.9	5.8	6.2	4.4	3.4	3.2	2.2	4.0	5.9	2.1	3.1	6.5	10.2																							
7-Oct	4.0	3.6	3.1	2.6	4.4	4.7	4.1	3.2	2.9	1.8	0.9	1.4	1.9	2.1	1.9	1.6	2.7	1.8	1.5	1.3	1.2	0.9	0.6	1.0	2.3	4.7																							
8-Oct	0.3	0.4	0.8	0.3	0.6	1.6	1.9	1.1	1.8	1.4	1.4	0.9	1.1	1.2	1.1	2.0	1.9	0.9	0.8	0.3	0.3	1.0	1.0	0.8	1.0	2.0																							
9-Oct	0.7	0.5	0.7	1.2	1.6	1.8	5.4	1.9	1.9	3.6	20.7	8.4	2.8	2.2	1.6	1.6	1.2	1.2	1.1	0.8	0.9	0.9	0.7	0.8	2.7	20.7																							
10-Oct	0.8	0.9	0.9	0.9	1.0	0.9	0.8	1.0	1.8	2.1	1.2	1.0	0.9	0.9	1.0	0.8	0.6	0.5	0.6	0.6	0.6	0.7	0.8	0.8	0.9	2.1																							
11-Oct	0.8	0.7	0.7	0.7	0.7	0.6	0.7	0.7	0.6	0.6	0.6	0.6	0.5	0.6	0.8	0.8	0.9	0.8	1.2	1.1	0.9	0.8	0.6	0.6	0.7	1.2																							
12-Oct	0.6	0.6	0.7	0.7	0.7	0.8	1.0	1.0	1.0	0.9	0.9	0.9	1.0	1.0	0.9	1.5	1.5	3.0	5.9	4.8	4.6	3.9	4.3	5.5	2.0	5.9																							
13-Oct	7.5	7.2	4.5	2.7	1.8	2.8	1.1	1.0	1.2	3.7	3.4	2.7	1.5	2.0	2.1	1.2	1.0	1.1	1.2	1.2	2.5	1.4	1.4	1.4	2.4	7.5																							
14-Oct	1.4	1.4	2.4	1.5	1.4	1.5	6.2	2.7	2.4	3.0	4.3	2.8	3.8	4.4	4.5	4.9	4.1	4.8	5.6	4.9	5.8	4.2	2.6	1.6	3.4	6.2																							
15-Oct	1.7	2.3	2.2	2.0	1.9	1.5	1.4	1.6	1.5	1.9	4.9	9.6	13.1	10.4	9.7	5.6	3.1	2.9	2.6	2.4	2.3	2.3	2.3	2.2	3.8	13.1																							
16-Oct	1.5	1.0	1.0	1.1	0.9	1.0	1.0	0.9	0.9	1.0	1.8	2.2	2.3	2.4	2.5	2.5	2.4	2.4	2.3	2.3	1.5	1.4	1.4	1.4	1.6	2.5																							
17-Oct	1.3	1.3	1.3	1.5	2.5	1.8	4.4	7.2	6.4	6.6	3.8	3.5	4.3	6.2	7.1	7.6	7.3	7.7	5.9	2.8	0.8	0.6	0.7	0.6	3.9	7.7																							
18-Oct	0.8	0.9	0.8	0.7	0.7	0.6	0.6	1.3	1.0	0.7	0.7	0.9	C	2.2	1.8	2.2	1.6	1.8	1.6	1.2	1.0	1.0	1.0	1.6	1.2	2.2																							
19-Oct	1.4	1.4	1.4	1.8	2.8	1.7	1.7	2.4	2.3	10.5	10.7	1.4	2.0	2.3	6.2	14.1	4.3	3.0	2.4	2.2	2.1	2.6	2.8	3.0	3.6	14.1																							
20-Oct	3.0	8.0	11.0	21.2	16.9	13.7	16.5	14.0	10.9	8.2	2.9	2.7	2.7	3.1	3.5	5.7	5.2	6.8	9.2	8.9	10.3	9.7	8.6	7.8	8.8	21.2																							
21-Oct	4.8	2.7	4.1	3.7	2.6	2.6	2.9	2.7	2.3	3.2	4.8	4.0	5.1	12.2	14.0	19.2	19.0	12.9	10.0	9.2	8.8	7.1	7.8	7.4	7.2	19.2																							
22-Oct	8.0	7.5	7.5	8.1	6.7	6.6	7.4	7.9	11.2	10.2	10.4	10.3	10.1	9.5	7.6	5.7	6.2	6.8	7.4	5.1	6.5	7.0	9.2	9.2	8.0	11.2																							
23-Oct	9.5	11.2	8.6	5.7	4.0	3.4	2.7	2.7	3.5	3.0	2.1	1.5	1.5	2.1	2.4	2.4	2.3	1.5	1.6	1.7	1.7	1.7	1.8	1.9	3.4	11.2																							
24-Oct	1.9	1.8	1.7	1.6	1.5	1.3	1.2	1.2	1.4	1.5	2.0	3.4	1.9	1.4	1.1	1.0	1.2	1.2	1.1	1.2	1.2	1.3	1.6	1.3	1.5	3.4																							
25-Oct	1.3	1.7	1.6	1.6	1.5	1.5	1.2	1.3	1.1	1.0	1.0	1.4	1.6	C	1.4	1.3	1.2	1.3	1.4	1.4	1.4	1.8	1.4	1.1	1.4	1.8																							
26-Oct	1.1	1.1	1.2	1.2	1.2	1.3	1.2	1.2	1.3	1.5	1.4	1.3	1.2	1.2	1.3	1.3	1.4	1.4	1.4	1.4	1.5	1.5	1.5	1.5	1.3	1.5																							
27-Oct	1.8	1.6	1.6	1.6	1.6	1.7	2.9	4.3	4.1	2.3	2.4	4.3	8.6	19.7	20.0	9.0	3.0	3.0	3.1	3.3	4.1	5.0	4.9	4.5	4.9	20.0																							
28-Oct	5.8	7.0	6.9	6.0	5.1	4.5	4.1	3.8	3.5	2.6	2.6	2.2	2.5	2.3	2.3	2.7	2.0	2.3	1.6	1.8	1.0	1.4	2.0	3.1	3.3	7.0																							
29-Oct	5.5	2.8	1.5	1.8	1.5	1.4	0.8	0.8	0.8	1.2	1.2	1.2	1.3	1.4	1.4	1.4	1.5	2.4	1.4	2.6	3.2	1.3	0.9	0.8	1.7	5.5																							
30-Oct	0.8	0.7	0.7	0.8	0.7	0.7	0.6	0.7	0.7	0.9	1.0	1.1	1.2	1.3	1.5	2.2	2.8	3.4	3.6	3.1	3.5	3.1	5.8	6.3	2.0	6.3																							
31-Oct	5.7	4.1	3.4	3.1	3.1	2.1	1.7	1.7	2.1	3.6	3.8	3.5	3.2	2.1	1.7	1.8	1.6	1.5	1.3	1.1	1.0	1.1	0.9	0.8	2.3	5.7																							
																								3.2	3.1	3.1	3.2	2.9	2.7	3.0	2.7	2.9	3.2	3.6	3.0	3.1	3.6	3.7	3.8	3.3	3.5	3.9	3.5	3.6	3.4	3.1	3.0	Diurnal Average	
																								9.5	11.2	11.0	21.2	16.9	13.7	16.5	14.0	11.2	10.5	20.7	10.3	13.1	19.7	20.0	19.2	19.0	18.4	26.0	16.1	14.0	16.0	13.2	9.2	Diurnal Maximum	
C - Calibration																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m <sup>3</sup>																																																	





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Horizon - October 2017**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	457	61.59	61.59
6 - 15	125	16.85	78.44
16 - 25	11	1.48	79.92
26 - 80	1	0.13	80.05
> 81.0	0	0.00	80.05

Total Number of Valid Hours: 742

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**Horizon - October 2017**

Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	33	42	23	4	3	2	5	7	19	85	67	48	22	14	36	43	453
6 - 15	2	2	5	3	3	0	0	3	7	15	14	8	11	9	9	6	97
16 - 25	1	0	1	0	0	0	0	2	3	1	0	0	0	1	2	0	11
26 - 80	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	36	44	29	7	6	2	5	13	29	101	81	56	33	24	47	49	562

Total Number of Valid Hours: 710

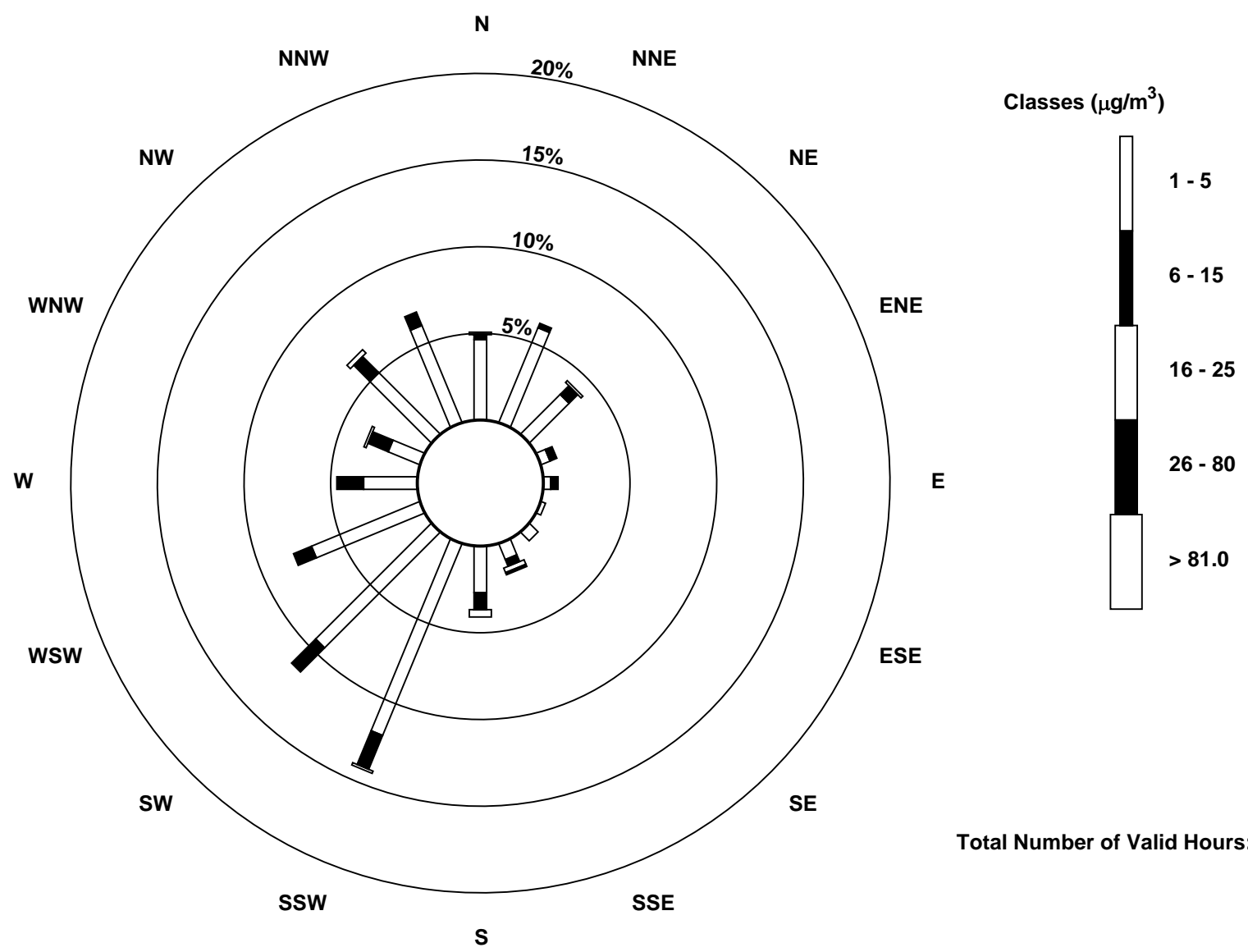
Total Number of Hours: 744





Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Horizon (AMS 15)



Total Number of Valid Hours: 710



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Ambient Temperature (AT) - C**

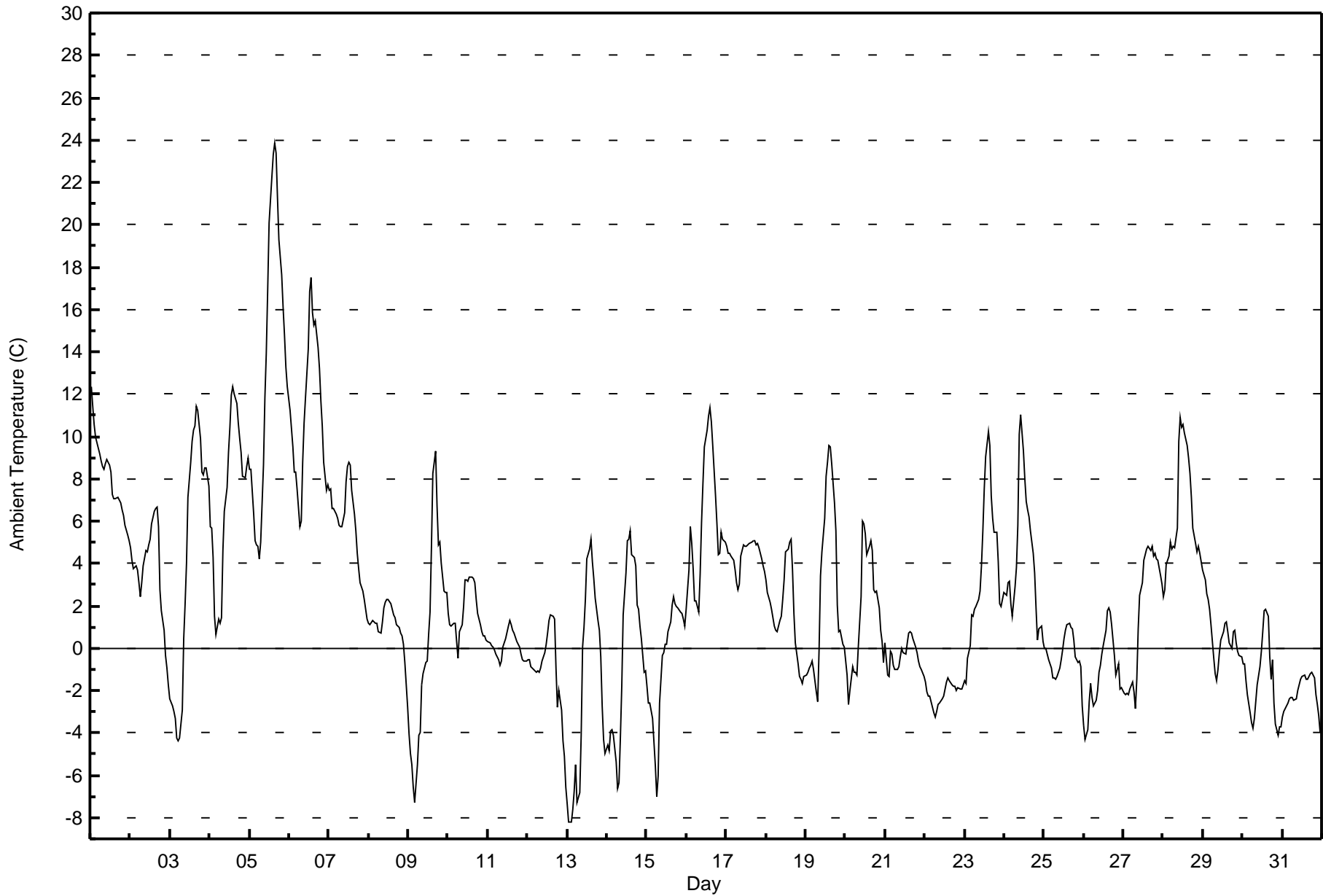
**Horizon - October 2017**

Maximum Value: 23.8 C on Oct 5 16:00		Maximum Daily Average: 13.6 C on Oct 5		Hours in Service: 744																						
Minimum Value: -8.2 C on Oct 13 03:00		Minimum Daily Average: -2.1 C on Oct 31		Hours of Data: 744																						
Maximum Diurnal Average: 5.7 C at hour 15		Minimum Diurnal Average: -0.2 C at hour 7		Hours of Missing Data: 0																						
Monthly Average: 2.51 C		Percentiles: P <sub>1</sub> = -6.9 P <sub>10</sub> = -2.6 Q <sub>1</sub> = -0.9 Median = 1.5 Q <sub>3</sub> = 5.0 P <sub>90</sub> = 9.0 P <sub>99</sub> = 18.5		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	12.4	11.4	10.5	10.0	9.7	9.2	8.8	8.6	8.4	8.7	8.9	8.7	8.3	7.3	7.1	7.1	7.1	7.0	6.8	6.5	6.3	5.8	5.4	5.1	8.1	12.4
2-Oct	4.7	4.2	3.7	3.9	3.7	3.1	2.4	3.1	3.9	4.6	4.6	4.9	5.2	5.9	6.5	6.6	6.7	5.8	2.8	1.8	0.8	-0.4	-0.9	-1.7	3.6	6.7
3-Oct	-2.4	-2.7	-3.0	-3.3	-4.2	-4.3	-4.2	-2.9	0.5	2.1	4.0	7.1	8.8	9.7	10.3	10.5	11.4	11.2	9.9	8.3	8.2	8.5	8.5	7.7	4.2	11.4
4-Oct	5.7	5.7	4.3	1.5	0.7	1.4	1.2	1.4	4.6	6.5	7.6	9.2	10.5	12.0	12.4	12.0	11.5	10.7	9.9	9.2	8.1	8.0	8.6	9.0	7.2	12.4
5-Oct	8.5	8.4	6.3	5.1	4.9	4.8	4.2	5.0	8.7	11.8	13.9	16.9	20.1	22.2	23.3	23.8	23.4	21.3	19.3	17.6	16.1	14.8	13.3	12.3	13.6	23.8
6-Oct	11.2	10.3	9.5	8.3	8.3	7.5	5.7	6.0	8.8	10.6	11.8	14.1	16.8	17.5	15.9	15.3	15.4	14.2	13.2	11.7	10.5	8.8	7.5	7.7	11.1	17.5
7-Oct	7.5	7.5	6.6	6.6	6.3	6.1	5.8	5.7	5.7	6.4	7.8	8.6	8.8	8.7	7.4	6.3	5.5	4.5	3.8	3.1	2.7	2.3	1.9	1.4	5.7	8.8
8-Oct	1.2	1.1	1.3	1.2	1.2	1.2	0.8	0.7	1.3	1.9	2.2	2.3	2.3	2.1	1.8	1.6	1.4	1.1	1.0	0.7	0.6	0.2	-0.7	-2.8	1.1	2.3
9-Oct	-4.1	-5.0	-5.5	-6.6	-7.3	-5.5	-4.1	-3.9	-1.7	-1.2	-0.7	-0.6	0.6	1.7	4.8	8.2	9.3	6.7	4.9	5.0	4.0	2.7	2.6	2.6	0.3	9.3
10-Oct	1.7	1.1	1.1	1.2	1.2	0.3	-0.4	0.8	1.1	2.0	3.2	3.2	3.1	3.3	3.4	3.3	3.1	2.3	1.6	1.1	0.8	0.6	0.6	0.4	1.7	3.4
11-Oct	0.3	0.2	0.1	0.1	-0.1	-0.3	-0.5	-0.8	-0.6	0.0	0.3	0.5	1.0	1.3	1.1	0.8	0.7	0.3	0.2	0.1	-0.3	-0.5	-0.6	-0.6	0.1	1.3
12-Oct	-0.5	-0.5	-0.8	-0.9	-1.1	-1.1	-1.1	-1.1	-0.9	-0.6	-0.2	0.2	0.7	1.3	1.6	1.5	1.4	-0.9	-2.8	-2.0	-2.9	-4.4	-5.1	-6.6	-1.1	1.6
13-Oct	-7.3	-8.2	-8.2	-7.6	-6.7	-5.5	-7.3	-6.8	-4.1	0.0	1.0	2.3	4.2	4.7	5.2	4.1	3.3	2.4	1.3	0.8	-0.4	-2.7	-4.3	-5.0	-1.9	5.2
14-Oct	-4.6	-4.8	-3.9	-3.8	-4.1	-5.4	-6.6	-6.4	-4.2	-1.8	1.6	3.6	5.1	5.1	5.5	4.4	4.3	3.9	2.0	1.9	1.1	0.4	-1.1	-1.1	-0.4	5.5
15-Oct	-1.8	-2.6	-2.6	-3.3	-4.4	-5.6	-7.0	-6.0	-2.6	-0.3	-0.2	0.2	0.8	1.3	2.0	2.5	2.1	1.9	1.9	1.9	1.7	1.6	1.4	1.1	-0.7	2.5
16-Oct	1.9	3.7	5.7	4.9	3.8	2.3	2.3	1.7	3.5	6.0	7.8	9.5	10.3	11.0	11.4	10.7	9.6	7.2	5.9	4.4	4.5	5.5	5.1	5.0	6.0	11.4
17-Oct	4.8	4.5	4.5	4.3	4.2	3.7	3.1	2.7	3.0	4.4	4.9	4.8	4.8	4.9	5.0	5.0	5.1	5.0	4.9	5.0	4.8	4.2	3.9	3.6	4.4	5.1
18-Oct	3.2	2.6	2.2	1.9	1.4	1.0	0.9	0.8	1.3	1.5	2.3	3.2	4.5	4.7	5.0	5.1	3.7	1.7	0.3	-0.7	-1.3	-1.4	-1.6	-1.3	1.7	5.1
19-Oct	-1.3	-1.1	-0.9	-0.8	-0.6	-1.0	-2.0	-2.5	0.0	3.4	4.6	6.1	8.1	8.8	9.6	9.5	8.7	6.8	5.5	2.0	0.8	0.8	0.2	0.0	2.7	9.6
20-Oct	-0.6	-1.3	-2.7	-2.0	-0.8	-1.1	-1.1	-1.3	0.1	2.5	6.0	5.9	5.4	4.4	4.8	5.1	4.6	2.7	2.7	2.7	1.9	0.9	0.3	-0.6	1.6	6.0
21-Oct	0.2	-1.3	-1.3	-0.2	-0.3	-0.8	-1.0	-1.0	-0.9	-0.4	0.0	-0.2	-0.2	0.3	0.7	0.8	0.7	0.5	0.0	-0.2	-0.6	-0.9	-1.0	-1.3	-0.4	0.8
22-Oct	-1.6	-2.1	-2.2	-2.3	-2.5	-3.0	-3.2	-3.0	-2.7	-2.6	-2.4	-2.2	-1.9	-1.6	-1.4	-1.5	-1.7	-1.8	-1.8	-2.0	-1.9	-2.0	-1.9	-1.7	-2.1	-1.4
23-Oct	-1.5	-1.6	-0.5	0.1	1.6	1.5	1.8	2.0	2.3	2.7	3.9	5.5	7.5	9.1	10.3	9.6	7.2	6.2	5.4	5.5	4.1	2.1	2.0	2.3	3.7	10.3
24-Oct	2.6	2.5	3.1	3.2	2.1	1.5	2.9	3.8	5.8	10.1	11.0	9.3	8.0	6.9	6.5	6.2	5.5	4.5	3.6	1.9	0.4	0.9	1.0	0.3	4.3	11.0
25-Oct	0.0	0.0	-0.3	-0.6	-0.9	-1.4	-1.4	-1.4	-1.3	-0.9	-0.5	-0.1	0.4	0.8	1.1	1.2	1.0	0.9	0.4	-0.4	-0.7	-0.6	-0.8	-2.7	-0.3	1.2
26-Oct	-3.7	-4.3	-3.8	-2.5	-1.7	-2.3	-2.7	-2.4	-2.0	-1.2	-0.8	-0.2	0.1	0.8	1.8	1.9	1.7	1.1	-0.3	-1.2	-1.0	-0.8	-1.9	-1.9	-1.1	1.9
27-Oct	-2.1	-2.2	-2.1	-2.2	-2.0	-1.6	-2.1	-2.8	-1.5	0.9	2.5	3.1	4.2	4.4	4.7	4.8	4.6	4.8	4.4	4.5	4.2	4.1	3.4	3.0	1.6	4.8
28-Oct	2.4	2.8	3.9	4.4	5.0	4.7	4.8	4.7	5.7	9.8	10.9	10.4	10.6	10.2	9.6	9.0	8.3	7.1	5.6	5.0	4.5	4.8	4.5	4.1	6.4	10.9
29-Oct	3.7	3.2	2.6	2.3	1.8	1.1	-0.5	-1.2	-1.5	-1.0	-0.2	0.4	0.8	1.2	1.2	0.8	0.3	0.0	0.8	0.9	0.3	-0.1	-0.3	-0.4	0.7	3.7
30-Oct	-0.7	-0.7	-1.5	-2.2	-3.1	-3.5	-3.8	-3.3	-2.5	-1.7	-0.9	-0.1	0.8	1.8	1.9	1.5	-0.4	-1.5	-0.5	-2.6	-3.6	-4.1	-3.7	-3.7	-1.6	1.9
31-Oct	-3.2	-3.0	-2.7	-2.6	-2.4	-2.3	-2.3	-2.5	-2.4	-2.0	-1.7	-1.4	-1.3	-1.3	-1.4	-1.5	-1.4	-1.2	-1.1	-1.4	-2.2	-2.6	-3.2	-4.0	-2.1	-1.1
	1.2	0.9	0.8	0.6	0.4	0.1	-0.2	-0.1	1.2	2.7	3.6	4.4	5.1	5.5	5.7	5.7	5.3	4.4	3.6	2.9	2.3	1.8	1.4	1.0	Diurnal Average	
	12.4	11.4	10.5	10.0	9.7	9.2	8.8	8.6	8.8	11.8	13.9	16.9	20.1	22.2	23.3	23.8	23.4	21.3	19.3	17.6	16.1	14.8	13.3	12.3	Diurnal Maximum	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Horizon - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C**  
**Horizon - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	252	33.87	33.87
0 - 10	439	59.01	92.88
10 - 20	47	6.32	99.19
> 20	6	0.81	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Precipitation (PC) - mm**

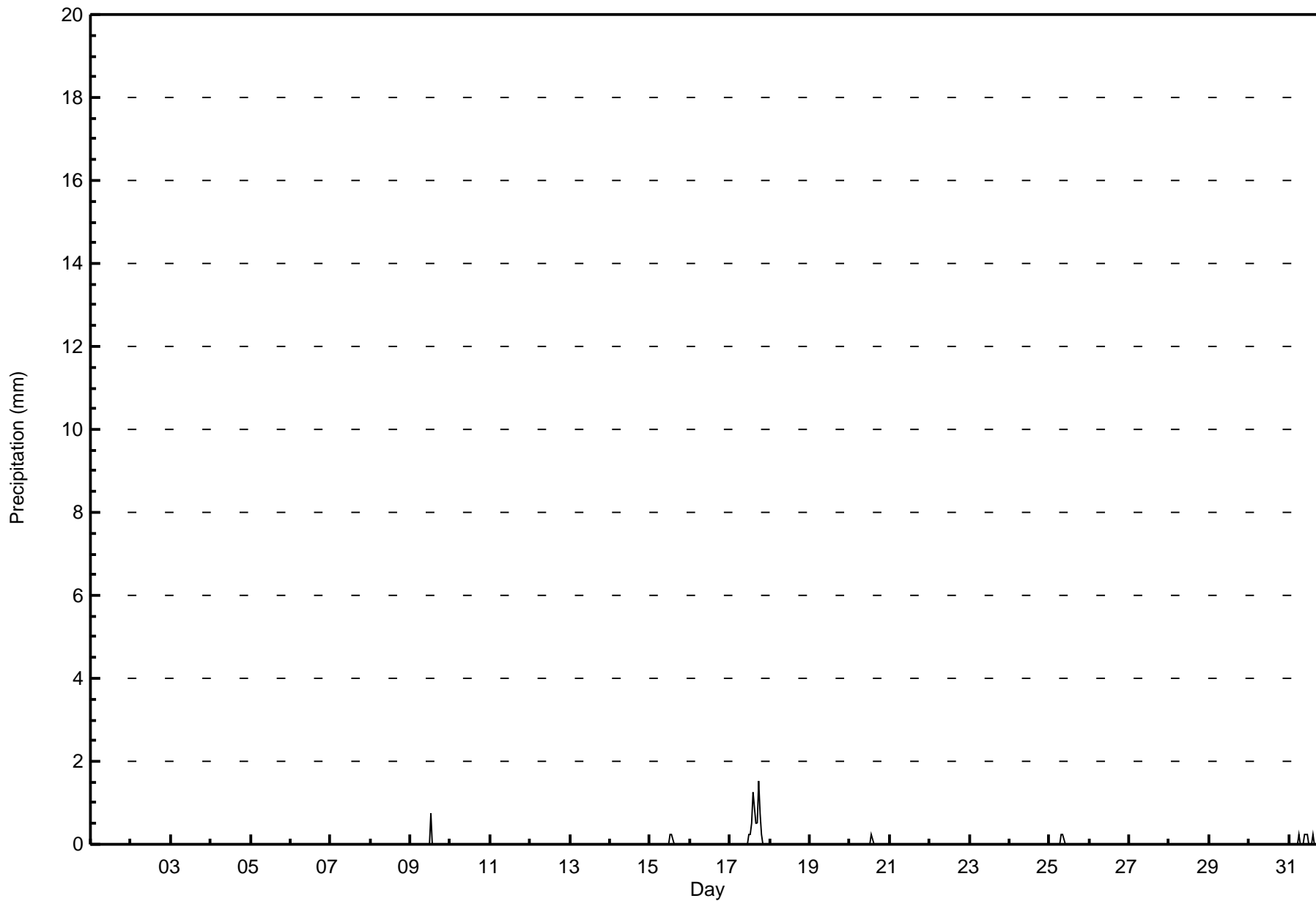
**Horizon - October 2017**

Maximum Value: 1.5 mm on Oct 17 18:00																Maximum Daily Total: 5.8 mm on Oct 17																Hours in Service: 744			
Minimum Value: 0.0 mm on Oct 1 01:00																Minimum Daily Total: 0.0 mm on Oct 1																Hours of Data: 744			
Maximum Diurnal Total: 1.5 mm at hour 18																Minimum Diurnal Total: 0.0 mm at hour 1																Hours of Missing Data: 0			
Monthly Total: 9.40 mm																Percentiles: P <sub>1</sub> = 0.0 P <sub>10</sub> = 0.0 Q <sub>1</sub> = 0.0 Median = 0.0 Q <sub>3</sub> = 0.0 P <sub>90</sub> = 0.0 P <sub>99</sub> = 0.5																Hours of Calibration: 0			
																																Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
2-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
3-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
4-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
5-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
6-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
7-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
8-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
9-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.8	
10-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
11-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
12-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
13-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
14-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
15-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.3
16-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.5	1.3	0.5	0.5	1.5	0.8	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.8	1.5
18-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
21-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.3
26-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.3	0.3	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.3
																								Diurnal Average											
																								Diurnal Maximum											



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Precipitation (PC) - mm**  
**Horizon - October 2017**





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %**

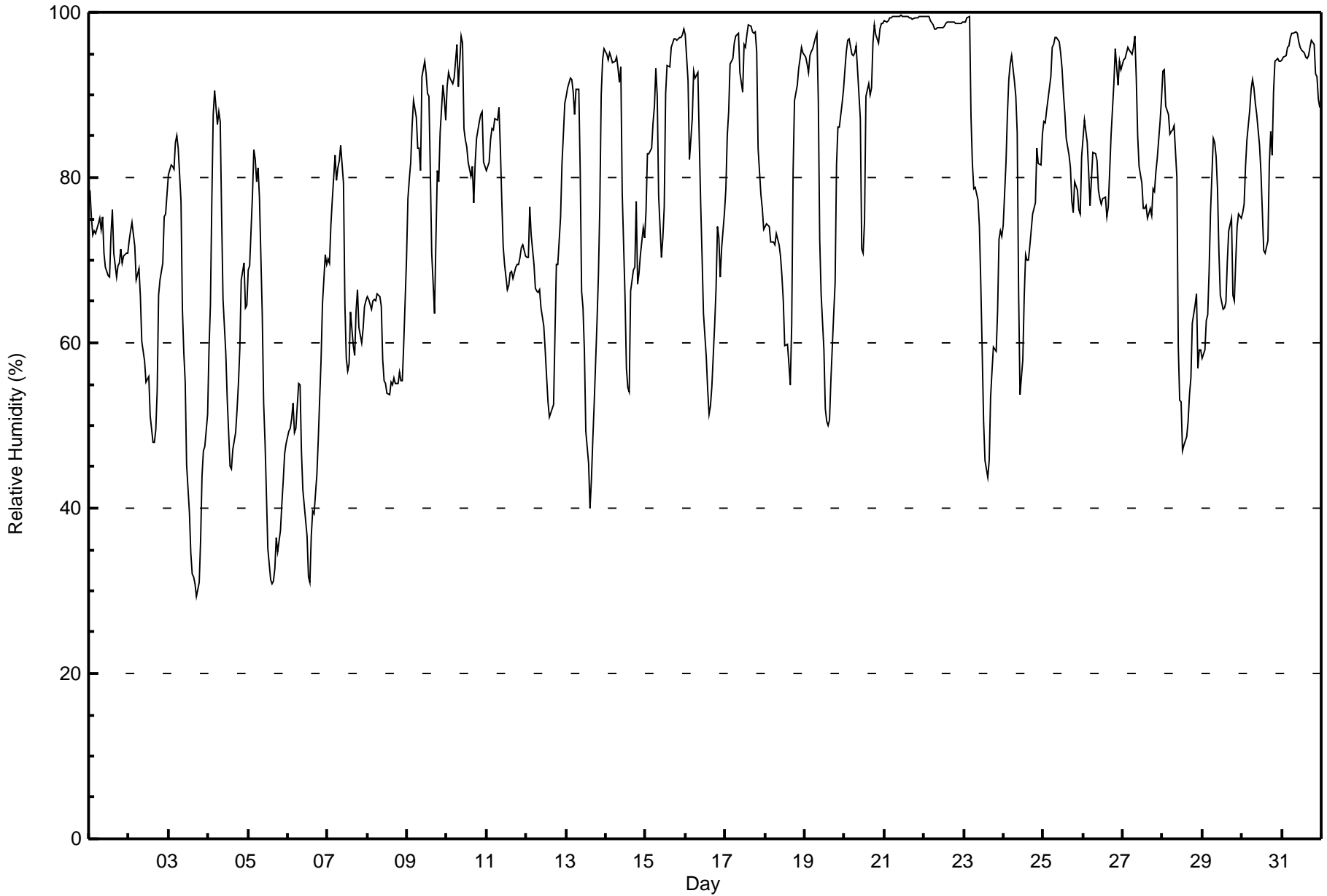
**Horizon - October 2017**

Maximum Value: 100 % on Oct 21 11:00																	Maximum Daily Average: 99.4 % on Oct 21																	Hours in Service: 744														
Minimum Value: 29 % on Oct 3 18:00																	Minimum Daily Average: 48.5 % on Oct 6																	Hours of Data: 744														
Maximum Diurnal Average: 86.0 % at hour 7																	Minimum Diurnal Average: 65.5 % at hour 15																	Hours of Missing Data: 0														
Monthly Average: 76.5 %																	Percentiles: P <sub>1</sub> = 32 P <sub>10</sub> = 53 Q <sub>1</sub> = 65 Median = 78 Q <sub>3</sub> = 92 P <sub>90</sub> = 97 P <sub>99</sub> = 100																	Hours of Calibration: 0														
																																		Percent Operational Time: 100.0														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	79	75	73	74	73	74	75	74	75	71	69	68	68	73	76	71	68	69	70	71	70	70	71	71	72.0	79																						
2-Oct	72	74	75	72	68	68	69	66	60	58	55	56	56	51	48	48	49	54	66	68	70	75	76	78	63.8	78																						
3-Oct	80	81	81	81	84	85	84	77	64	59	55	45	39	35	32	32	31	29	31	36	44	47	47	51	55.5	85																						
4-Oct	59	65	77	88	90	87	88	87	75	65	59	53	49	45	45	47	49	52	55	59	68	70	64	65	65.0	90																						
5-Oct	69	69	78	83	82	79	81	78	64	53	48	42	35	31	31	31	33	36	35	37	41	43	47	48	53.1	83																						
6-Oct	49	50	51	53	49	50	55	55	47	42	40	37	32	31	37	40	39	44	48	53	58	65	71	69	48.5	71																						
7-Oct	70	70	74	77	83	80	81	82	84	79	65	58	57	57	64	60	58	64	66	62	60	62	64	65	68.4	84																						
8-Oct	66	65	64	65	65	65	66	66	64	58	55	55	54	54	55	55	56	55	55	57	55	55	60	70	59.8	70																						
9-Oct	77	80	82	86	89	87	84	84	81	92	94	93	90	90	81	71	64	72	81	80	85	91	90	87	83.8	94																						
10-Oct	91	93	92	91	92	94	96	91	97	96	86	85	84	82	80	81	77	82	85	87	88	88	82	81	87.5	97																						
11-Oct	81	82	85	86	86	87	87	89	84	77	72	69	66	67	69	69	68	69	70	70	70	71	72	71	75.6	89																						
12-Oct	70	70	76	73	70	67	66	66	66	64	62	59	56	53	51	52	53	61	69	69	75	82	85	89	66.9	89																						
13-Oct	90	91	92	92	90	88	91	91	81	66	64	59	49	45	40	43	48	53	63	68	76	90	94	96	73.3	96																						
14-Oct	95	94	95	95	94	94	95	93	92	93	78	66	57	55	54	66	69	69	77	67	68	71	74	73	78.5	95																						
15-Oct	76	83	83	84	87	89	93	90	78	70	73	76	90	94	93	96	96	97	97	97	97	97	97	98	88.7	98																						
16-Oct	97	92	82	84	87	93	92	93	85	77	70	64	58	54	51	52	55	62	67	74	73	68	72	76	74.1	97																						
17-Oct	79	85	88	94	94	96	97	97	97	93	90	96	96	97	98	98	98	97	98	95	84	78	76	74	91.5	98																						
18-Oct	74	74	74	72	72	72	72	73	72	71	68	65	60	60	58	55	62	81	89	91	93	94	96	95	74.7	96																						
19-Oct	95	94	93	95	95	96	97	97	89	73	66	59	52	50	50	51	56	64	67	81	86	86	89	91	78.0	97																						
20-Oct	93	95	97	97	95	95	95	96	93	87	71	71	75	90	91	90	91	96	98	97	96	98	99	99	91.9	99																						
21-Oct	99	99	99	99	99	99	100	100	100	100	100	100	100	100	99	99	99	99	99	99	99	99	100	100	99.4	100																						
22-Oct	100	100	100	100	99	98	98	98	98	98	98	98	98	99	99	99	99	99	99	99	99	99	99	99	98.7	100																						
23-Oct	99	99	99	99	87	82	79	79	77	74	67	59	51	46	44	46	53	57	59	59	64	73	74	73	70.7	99																						
24-Oct	74	82	88	92	94	95	92	90	85	66	54	58	66	71	70	70	72	76	76	77	84	82	82	85	78.3	95																						
25-Oct	87	87	88	90	92	96	96	97	97	96	95	93	90	88	85	83	81	77	76	79	78	76	76	83	86.9	97																						
26-Oct	85	87	84	81	77	80	83	83	82	78	77	77	77	78	75	76	81	85	91	96	93	91	94	93	83.5	96																						
27-Oct	94	94	95	96	95	95	96	97	92	85	81	79	76	76	77	75	76	76	79	78	81	82	87	90	85.5	97																						
28-Oct	93	93	89	88	85	86	86	86	80	59	53	53	47	48	49	50	54	56	62	65	66	57	59	59	67.6	93																						
29-Oct	58	59	63	63	69	76	85	84	83	79	71	66	64	64	65	70	73	75	66	65	70	74	76	75	70.5	85																						
30-Oct	76	77	81	85	88	91	92	91	89	88	84	81	76	71	71	72	82	86	83	90	94	94	94	94	84.5	94																						
31-Oct	94	95	95	96	96	97	97	98	98	97	97	96	95	95	95	94	95	96	97	96	93	92	90	88	95.0	98																						
																								81.3	82.3	83.6	84.8	84.8	85.1	86.0	85.3	81.6	76.3	71.6	68.9	66.6	66.1	65.5	65.9	67.2	70.6	73.3	74.9	76.7	78.1	79.1	80.1	Diurnal Average
																								100	100	100	100	99	99	100	100	100	100	100	100	100	100	99	99	99	99	99	99	99	99	100	100	Diurnal Maximum



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Horizon - October 2017**







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Relative Humidity (RH) - %**  
**Horizon - October 2017**

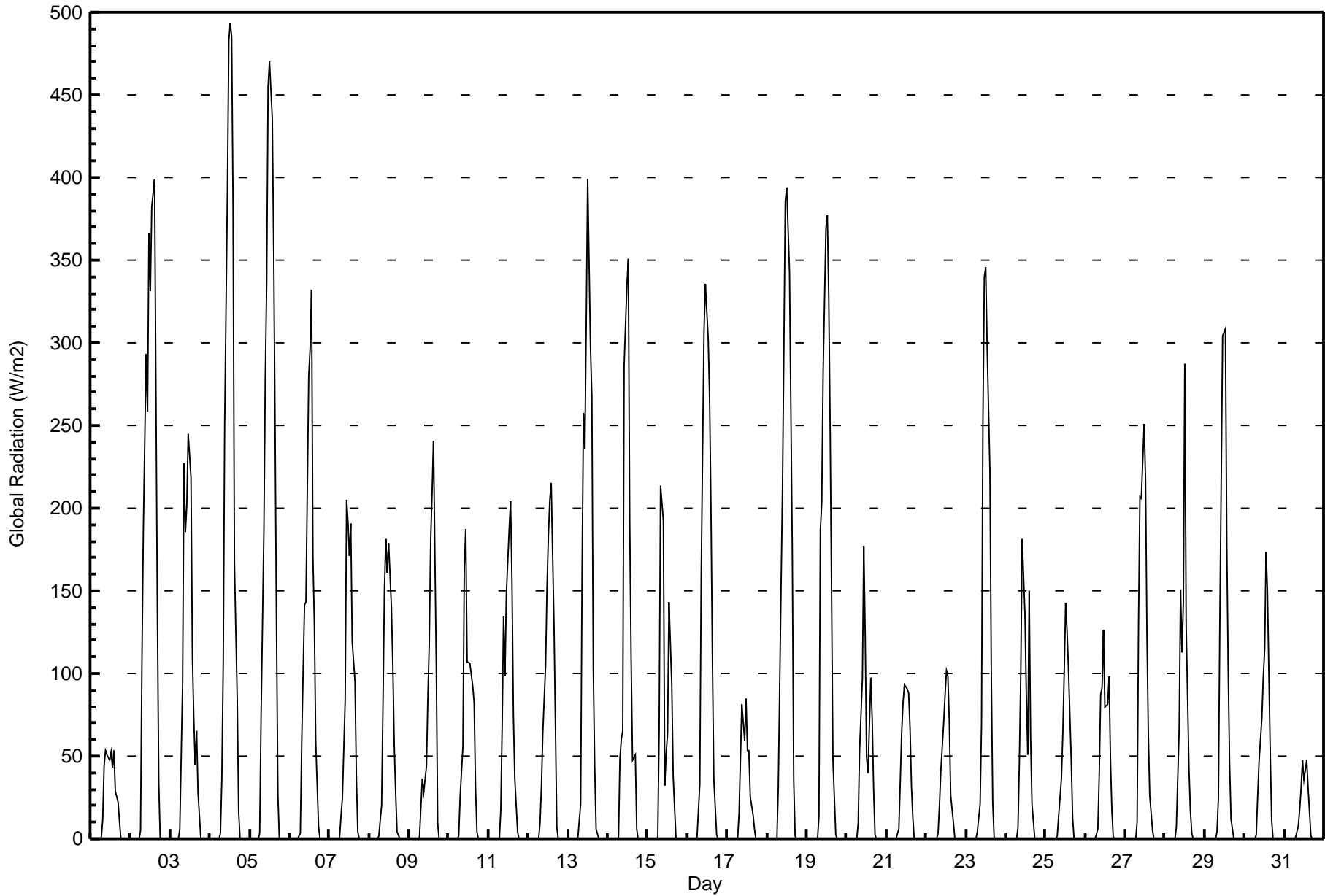
<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	23	3.09	3.09
40 - 60	123	16.53	19.62
60 - 80	247	33.20	52.82
80 - 100	351	47.18	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Value: 494 W/m2 on Oct 4 13:00																			Maximum Daily Average: 124.9 W/m2 on Oct 5						Hours in Service: 744	
Minimum Value: 0 W/m2 on Oct 1 01:00																			Minimum Daily Average: 9.8 W/m2 on Oct 31						Hours of Data: 744	
Maximum Diurnal Average: 213.2 W/m2 at hour 13																			Minimum Diurnal Average: 0.0 W/m2 at hour 5						Hours of Missing Data: 0	
Monthly Average: 54.6 W/m2																			Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 69 P <sub>90</sub> = 194 P <sub>99</sub> = 365						Hours of Calibration: 0	
																									Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	0	0	0	1	11	44	53	51	48	52	43	53	29	22	10	0	0	0	0	0	0	17.4	53
2-Oct	0	0	0	0	0	0	5	107	187	293	259	366	332	382	399	270	139	34	1	0	0	0	0	0	115.6	399
3-Oct	0	0	0	0	0	0	6	93	227	186	201	245	219	111	72	45	65	28	0	0	0	0	0	0	62.5	245
4-Oct	0	0	0	0	0	0	3	37	107	249	393	483	494	486	383	166	84	16	0	0	0	0	0	0	120.9	494
5-Oct	0	0	0	0	0	0	4	74	186	280	337	455	470	435	354	247	127	27	0	0	0	0	0	0	124.9	470
6-Oct	0	0	0	0	0	0	3	58	101	142	144	281	297	332	170	130	58	8	0	0	0	0	0	0	71.8	332
7-Oct	0	0	0	0	0	0	1	13	25	84	205	192	171	191	120	95	37	4	0	0	0	0	0	0	47.4	205
8-Oct	0	0	0	0	0	0	2	20	84	150	181	161	178	140	105	57	28	4	0	0	0	0	0	0	46.2	181
9-Oct	0	0	0	0	0	0	1	19	37	28	44	85	118	180	209	240	104	9	0	0	0	0	0	0	44.8	240
10-Oct	0	0	0	0	0	0	2	25	56	164	187	106	107	106	92	83	32	4	0	0	0	0	0	0	40.2	187
11-Oct	0	0	0	0	0	0	0	17	69	135	98	149	187	204	155	75	37	5	0	0	0	0	0	0	47.1	204
12-Oct	0	0	0	0	0	0	0	9	32	65	105	153	184	205	215	129	69	7	0	0	0	0	0	0	48.8	215
13-Oct	0	0	0	0	0	0	1	21	161	258	236	314	399	297	267	103	44	6	0	0	0	0	0	0	87.8	399
14-Oct	0	0	0	0	0	0	1	49	60	65	286	335	351	192	109	47	50	6	0	0	0	0	0	0	64.6	351
15-Oct	0	0	0	0	0	0	1	66	214	193	33	52	63	143	93	38	19	0	0	0	0	0	0	0	38.1	214
16-Oct	0	0	0	0	0	0	0	33	158	235	307	336	303	266	197	109	37	3	0	0	0	0	0	0	82.6	336
17-Oct	0	0	0	0	0	0	0	15	48	81	59	85	53	54	25	14	6	0	0	0	0	0	0	0	18.4	85
18-Oct	0	0	0	0	0	0	0	31	153	212	298	385	394	343	259	174	36	2	0	0	0	0	0	0	95.3	394
19-Oct	0	0	0	0	0	0	0	13	186	203	283	369	377	328	248	149	48	3	0	0	0	0	0	0	92.0	377
20-Oct	0	0	0	0	0	0	0	9	54	96	177	124	49	40	97	72	30	2	0	0	0	0	0	0	31.3	177
21-Oct	0	0	0	0	0	0	0	6	34	63	82	93	91	88	67	32	13	0	0	0	0	0	0	0	23.7	93
22-Oct	0	0	0	0	0	0	0	4	20	41	70	87	102	98	71	27	9	0	0	0	0	0	0	0	22.1	102
23-Oct	0	0	0	0	0	0	0	4	21	69	254	340	346	298	222	99	22	0	0	0	0	0	0	0	69.8	346
24-Oct	0	0	0	0	0	0	0	7	47	99	182	135	86	51	150	62	21	0	0	0	0	0	0	0	35.0	182
25-Oct	0	0	0	0	0	0	0	1	13	36	64	100	142	126	103	47	13	0	0	0	0	0	0	0	27.0	142
26-Oct	0	0	0	0	0	0	0	6	40	87	91	127	79	81	99	48	17	0	0	0	0	0	0	0	28.2	127
27-Oct	0	0	0	0	0	0	0	10	129	207	206	251	218	124	64	26	5	0	0	0	0	0	0	0	51.7	251
28-Oct	0	0	0	0	0	0	0	7	67	151	113	143	288	129	42	17	4	0	0	0	0	0	0	0	40.0	288
29-Oct	0	0	0	0	0	0	0	4	24	130	216	304	308	176	101	45	12	0	0	0	0	0	0	0	55.0	308
30-Oct	0	0	0	0	0	0	0	3	25	46	73	97	115	174	150	52	11	0	0	0	0	0	0	0	31.1	174
31-Oct	0	0	0	0	0	0	0	1	8	18	30	47	36	48	31	16	1	0	0	0	0	0	0	0	9.8	48
																			0.0 0.0 0.0 0.0 0.0 0.0 1.0 25.0 84.4 132.9 169.9 208.1 213.2 189.5 152.4 88.4 38.7 5.8 0.0 0.0 0.0 0.0 0.0 0.0						Diurnal Average	
																			0 0 0 0 0 0 6 107 227 293 393 483 494 486 399 270 139 34 1 0 0 0 0 0 0						Diurnal Maximum	





Maximum Speed: 44 km/h on Oct 24 12:00	Maximum Daily Speed Average: 15.8 km/h on Oct 8	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 29 18:00	Minimum Daily Speed Average: 1.0 km/h on Oct 21	Hours of Data: 712
Maximum Diurnal Speed Average: 6.6 km/h at hour 15	Minimum Diurnal Speed Average: 2.6 km/h at hour 8	Hours of Missing Data: 32
Monthly Average Velocity: 4.7 km/h 295.6 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 4 Q <sub>1</sub> = 6 Median = 10 Q <sub>3</sub> = 15 P <sub>90</sub> = 21 P <sub>99</sub> = 32	Percent Operational Time: 95.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	NW10	NW12	WNW13	WNW12	NW13	WNW11	NW13	NW10	NW15	NW16	NNW15	N15	NNW15	NNW16	NNW16	NNW22	NNW23	NNW20	N21	N22	N20	N22	N22	N23	NNW15.5	N23	
2-Oct	N22	NNW23	N19	N21	N25	N24	N17	N20	N25	N26	N25	N24	N18	N19	NNW18	NNW18	N17	NNW11	WNW9	WNW10	W8	WSW10	SW9	SW10	NNW15.3	N26	
3-Oct	SW10	SW10	SW12	SSW11	SSW12	SSW14	SSW12	SSW10	SSW16	SW15	SSW14	SW22	SW22	SW19	SW15	SW19	WSW18	WSW16	W11	SW11	W13	WNW17	W13	WNW12	SW12.6	SW22	
4-Oct	NW11	NNW10	N7	NW5	W5	WNW6	W5	SW5	WSW7	NW7	NNW4	W4	SSW4	SSW9	S10	SE8	SSE8	SSE7	SSE5	SSW3	W2	SSE4	SSE5	S6	SW2.3	NW11	
5-Oct	S3	SSW6	SW3	SSW9	SSW12	SW14	SW13	SSW8	SSW8	SSW9	SSW10	SSW12	SSW15	SSW16	SW18	SW19	SW15	SW11	WSW13	SW11	WSW10	WSW10	WSW12	WSW14	SW10.8	SW19	
6-Oct	SW14	SW13	SW15	SW13	SW13	SW13	SSW9	SSW9	SSW13	SW14	SW14	SW18	WSW19	WSW23	W22	W14	W11	WSW10	WSW11	WSW9	W9	WSW7	SW10	WSW10	WSW12.2	WSW23	
7-Oct	WSW10	WSW7	SSW5	SSW4	NE2	NE5	NNW8	NNE5	NNE6	N8	NNW16	NNW18	NNW18	NNW19	NNW24	NNW21	NNW22	NNW24	NNW23	NNW19	NNW24	NNW27	NW27	NW31	NNW14.0	NW31	
8-Oct	NW27	NNW26	NNW26	NNW23	NNW21	NNW15	NNW17	NNW19	NW19	NNW24	NNW23	NNW21	NW23	NW24	NNW20	NNW17	NW15	NW11	WNW8	W8	W8	W7	SSW4	SSW7	NW15.8	NW27	
9-Oct	SSW7	SSW8	SSW8	SSW6	SSW7	SSW6	SSW4	WSW3	SSW6	S6	S5	WNW5	WSW5	SW8	WSW12	WSW11	W11	SW7	W9	W8	WSW12	SW11	WSW15	WSW16	SW7.4	WSW16	
10-Oct	WSW13	WSW14	WSW14	SW11	SW9	SW8	WSW9	WNW6	NNE5	NNE5	NE5	NE7	NE6	NE6	NE8	NNE8	NE12	NE10	NE11	NE11	NNE11	NNE14	NNE15	NNE14	N3.5	NNE15	
11-Oct	NNE12	NNE11	NNE14	NNE15	NNE16	NNE17	NNE17	NNE17	NNE17	NNE18	NNE19	NNE18	NNE17	NNE18	NNE19	NNE17	NNE16	NNE16	NNE14	N14	N14	N14	N14	NNE13	NNE15.5	NNE19	
12-Oct	NNE13	NNE11	NNE13	NNE14	NNE12	N10	N11	N12	NNW12	N10	N12	NNW14	NNW13	NNW11	N10	N10	NNW11	NW6	W7	WNW11	NW10	WNW7	WNW6	W6	NNW9.2	NNW14	
13-Oct	WNW7	W6	W7	WSW6	WSW7	WSW5	SW6	SSW6	SW5	SSW2	SSE2	SSE5	SSW9	SSW11	SW16	WSW14	WSW14	WSW12	SW12	SW11	NNW5	NE2	SSW5	SSW6	SW6.5	SW16	
14-Oct	SSW7	SSW5	SSE5	SSW4	SW4	SSW3	SSW3	SW3	SW4	S5	SSW9	SSW9	SW13	WSW15	WSW13	WSW13	WSW12	WSW8	WSW7	WNW13	WNW14	W10	W8	WSW10	WSW6.8	WSW15	
15-Oct	WSW9	WSW10	WSW13	WSW11	SW10	SW7	SSW7	SSW9	SSW8	SSW6	S5	S4	WNW3	NW2	NW8	W4	SW5	SW5	SW6	SW6	SW7	SW7	SSW7	SSW9	SW6.2	WSW13	
16-Oct	SW7	SW11	W15	WSW10	SW9	SSW9	SSW11	SSW13	SSW13	SSW13	SSW13	SSW16	SW13	WSW11	WSW10	WSW6	SSW6	SSW7	SSW6	SSW7	SW6	SW8	SW8	SSW6	SSW7	SW9.4	SW16
17-Oct	SSW7	SSW6	SSW5	SSE5	SSW1	NNW3	NNE4	NNE2	AF	ENE1	SSE5	SE5	E3	NNE6	NE5	N9	NNW10	NNW9	NNW9	WNW8	WNW19	WNW21	WNW16	WNW26	NW4.5	WNW26	
18-Oct	WNW23	WNW23	WNW23	WNW27	WNW27	NW22	NW18	WNW16	WNW19	WNW19	WNW17	WNW11	WNW11	NW10	NW6	N2	ENE5	E8	NE7	NNE8	NNE8	NNE7	NNE6	NNE7	NW11.2	WNW27	
19-Oct	NNE8	NNE7	NNE7	N6	NNE4	NE5	NNW3	N2	S2	S8	SSW11	SSW8	SW8	S8	S8	SSE7	SE5	SE7	SSE5	SE1	SW2	SSW4	WNW1	N1	SSE1.7	SSW11	
20-Oct	NW2	NNW2	NW2	NW6	WNW3	NW6	NW4	E1	NE2	W4	WSW4	S4	S4	AF	W5	W6	SW5	SW7	SSW7	SW3	NNW4	N4	NNW4	NW2	W2.3	SW7	
21-Oct	NE4	NE1	ESE1	NNE4	NNE6	NE4	ESE1	S1	NW1	SSW4	SW7	S5	S6	SSW4	SSW2	NE1	N3	NE5	ENE3	NE3	ENE3	NE3	E2	E2	E1.0	SW7	
22-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
23-Oct	AF	AF	AF	SW4	NW16	W9	W11	W7	W7	WNW9	WNW11	W11	WSW13	WSW12	SW11	SW12	SSW10	SW10	SW10	SW11	SW9	SSW8	SSW5	SSW7	WSW8.1	NW16	
24-Oct	SSW9	S6	SSE6	SW3	W3	SW9	SW10	SW13	WSW15	W22	WNW33	NW44	NW29	NW27	NW27	NW25	NNW15	N10	N8	NE7	NE3	ENE5	NE6	NE6	WNW9.4	NW44	
25-Oct	NNE7	NE7	NE8	NE8	NNE12	NNE12	NNE12	NNE12	NNE15	NNW15	NNE16	N17	N19	N19	N19	N16	N12	N13	NW11	WNW7	WNW8	W6	WSW10	SW7	N9.3	N19	
26-Oct	SW11	SW11	SSW12	SW15	SW18	SSW14	SSW12	SSW15	SSW16	SSW19	SW19	SW20	SW18	SW15	SW11	SW10	SSW9	SSW9	SSW7	WSW6	WSW10	WSW11	WSW10	WSW8	SW12.4	SW20	
27-Oct	SW5	SSW5	SSW6	S7	S7	S8	S7	SSW8	SSW7	SSW7	SSW9	S9	S11	S10	S7	S8	SSW10	S10	SSW10	SSW10	S12	SSW11	SSW11	SSW11	SSW8.5	S12	
28-Oct	SSW12	SSW13	SSW12	SSW16	SSW15	SSW17	SSW16	SSW15	SSW10	WSW7	NW20	NW27	NW27	NW27	NW31	NW24	NW27	NNW32	NW34	NNW34	NW29	NNW30	NNW30	NNW33	NW15.2	NW34	
29-Oct	NNW35	NNW32	NNW30	NNW31	NNW26	N21	NNE13	NNE15	NNE12	NNE14	NNE19	NNE20	NNE15	NNE11	NNE10	ENE7	E4	W1	N7	NW7	SW5	SSW7	SSW8	SSW10	N10.9	NNW35	
30-Oct	SW11	SW14	SW14	SW10	SSW7	S8	SSW9	SSW10	SSW11	SSW13	SSW12	SSW11	SSW7	SSW3	NE4	NE5	N5	NNW5	N5	NW3	N3	NW5	NW4	NW2	SW4.7	SW14	
31-Oct	AF	AF	AF	NE2	ENE1	NNE3	NNE3	NE4	NE4	NNE6	NNE8	NNE10	NNE10	NE13	NNE15	NNE15	NNE14	NNE14	NNE14	NNE14	NNE17	NNE19	NNE20	NNE20	NNE17	NNE10.8	NNE20

WNW5.3	NNW5.1	NNW5.0	W4.5	NNW4.3	NNW3.2	W3.0	W2.6	W3.4	NNW3.9	NNW4.4	NNW5.0	NNW5.5	NNW6.1	NW6.6	NW5.9	NW5.5	NW4.4	NNW4.8	NW5.5	NW6.0	NNW5.5	NNW4.8	NNW5.0	Diurnal Average
NNW35	NNW32	NNW30	NNW31	WNW27	N24	NW18	N20	N25	N26	WNW33	NW44	NW29	NW27	NW31	NW25	NW27	NNW32	NW34	NNW34	NW29	NNW30	NNW30	NNW33	Diurnal Maximum

AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Speed (WS) - km/h**  
**Horizon - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Oct 29 06:00	Hours in Service: 744 Hours of Data: 712 Hours of Missing Data: 32 Hours of Calibration: 0 Percent Operational Time: 95.7
Minimum Value: 1 km/h on Oct 16 20:00	
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 O <sub>1</sub> = 2 Median = 2 O <sub>3</sub> = 4 P <sub>90</sub> = 5 P <sub>99</sub> = 7	

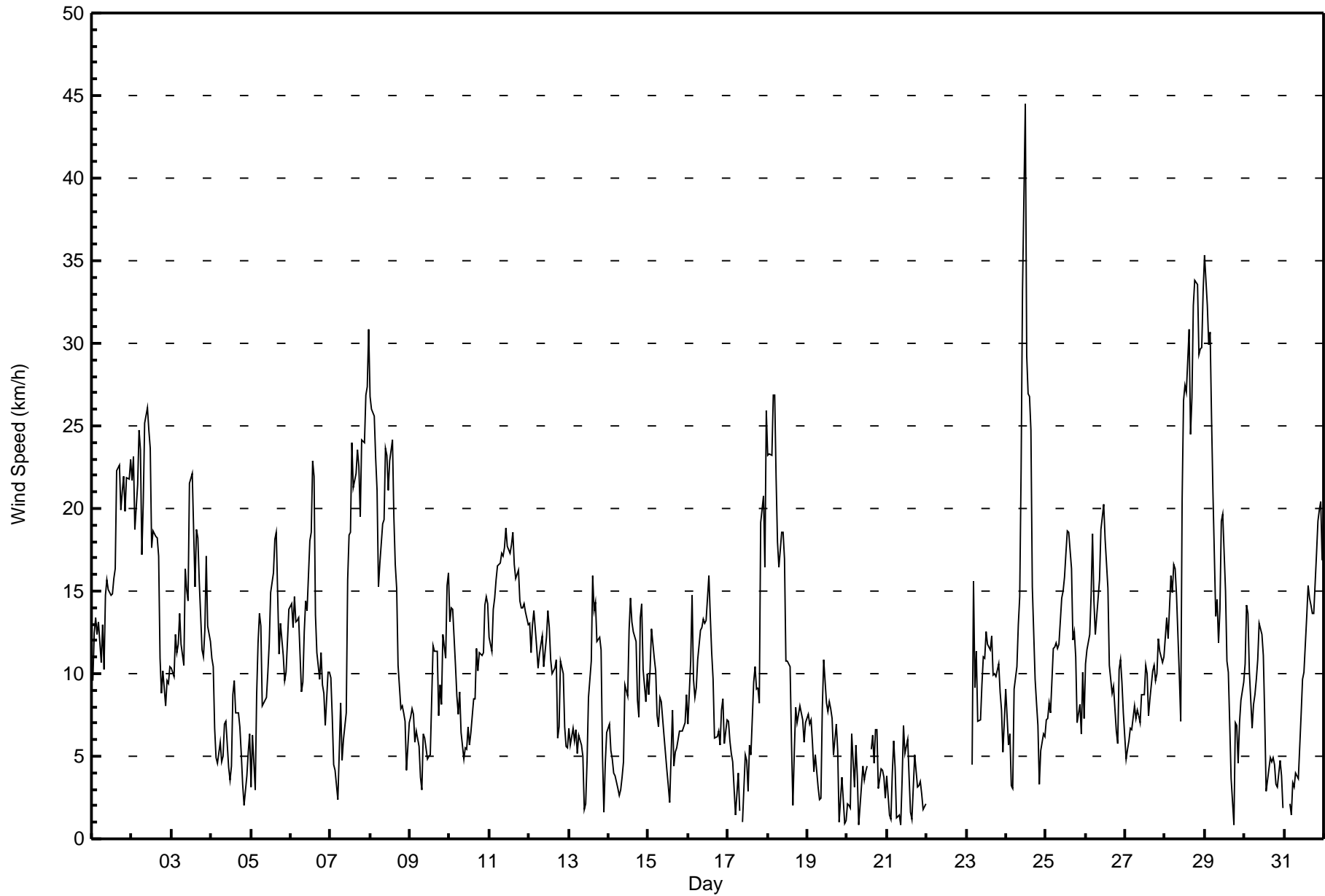
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	3	3	3	2	3	3	3	2	3	3	6	5	5	4	4	5	5	6	5	5	6	7	6	6	7
2-Oct	6	5	5	6	6	6	5	5	7	8	7	7	5	5	5	4	4	4	2	1	2	1	1	2	8
3-Oct	1	2	2	2	2	2	2	3	5	4	4	6	5	6	4	4	4	5	3	2	4	3	3	2	6
4-Oct	2	3	2	1	1	2	2	1	1	2	2	2	3	3	3	2	2	2	2	1	1	2	1	2	3
5-Oct	1	2	2	1	2	2	2	2	2	2	3	3	4	4	5	4	5	3	2	2	2	2	2	2	5
6-Oct	2	2	2	2	2	3	2	2	3	3	3	5	5	6	5	4	3	2	3	2	2	2	3	2	6
7-Oct	3	2	1	2	1	1	3	3	2	3	5	4	4	5	4	5	6	5	5	5	5	5	5	5	6
8-Oct	5	5	5	4	4	4	3	3	4	5	6	4	4	4	4	4	3	2	2	2	2	2	1	1	6
9-Oct	1	1	1	1	1	1	1	1	3	2	2	2	1	2	3	3	3	2	6	2	3	3	3	3	6
10-Oct	2	2	3	2	2	2	1	2	1	2	2	2	2	2	2	3	3	2	3	3	3	4	4	4	4
11-Oct	4	3	3	4	4	4	4	4	4	5	5	4	4	5	5	5	4	4	4	4	4	4	3	4	5
12-Oct	4	4	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	1	1	1	4
13-Oct	1	1	1	1	1	2	1	1	1	1	2	2	3	5	4	4	4	3	3	3	3	2	1	1	5
14-Oct	1	1	1	1	1	2	1	2	1	1	3	3	4	3	4	4	3	2	1	5	2	2	2	2	5
15-Oct	1	3	2	2	2	3	2	2	3	2	1	1	2	3	1	1	1	1	1	1	1	1	2	1	3
16-Oct	2	4	4	2	2	2	2	2	3	3	3	3	4	3	3	3	2	1	1	1	2	2	1	1	4
17-Oct	1	1	1	1	2	1	1	2	AF	1	1	1	1	2	1	2	2	2	1	3	5	4	4	6	6
18-Oct	5	5	5	5	5	5	4	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	1	2	5
19-Oct	2	2	2	1	2	1	1	1	3	3	3	3	3	3	3	2	2	2	2	1	2	2	1	2	3
20-Oct	2	2	2	1	2	2	1	2	2	2	1	2	1	AF	1	1	1	1	1	2	2	1	2	1	2
21-Oct	1	2	1	1	2	1	1	2	1	2	2	2	2	2	2	1	1	1	1	1	1	1	2	1	2
22-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
23-Oct	AF	AF	AF	2	4	3	3	3	2	2	4	3	3	4	3	3	2	1	2	2	2	1	1	2	4
24-Oct	2	2	1	1	2	3	3	3	3	7	8	9	7	4	5	4	5	4	2	2	2	1	2	1	9
25-Oct	2	2	2	2	3	3	3	3	3	4	4	4	5	5	5	4	3	4	2	2	2	3	2	2	5
26-Oct	2	2	2	3	6	3	3	4	4	4	5	5	5	3	4	2	2	2	1	2	2	3	2	2	6
27-Oct	2	1	1	1	1	1	1	1	1	2	2	2	3	3	2	2	2	3	2	2	3	2	2	2	3
28-Oct	3	3	3	3	3	3	3	3	3	5	5	6	5	5	7	6	7	7	7	9	6	8	6	7	9
29-Oct	7	6	6	6	6	10	3	3	3	4	5	5	4	3	3	2	1	4	3	3	1	1	2	2	10
30-Oct	2	2	2	2	1	1	2	1	2	2	3	3	2	2	1	1	1	1	1	1	1	1	1	1	3
31-Oct	AF	AF	AF	1	1	1	1	1	1	2	2	2	2	4	4	4	3	3	3	4	5	5	5	4	5
Diurnal Maximum																									
7 6 6 6 6 10 5 5 7 8 8 9 7 6 7 6 7 7 7 9 6 8 6 7																									

AF - Analyzer Failure



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Horizon - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h  
Horizon - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	144	20.22	20.22
6 - 11	285	40.03	60.25
12 - 19	200	28.09	88.34
20 - 28	67	9.41	97.75
29 - 38	15	2.11	99.86
> 38	1	0.14	100.00

Total Number of Valid Hours: 712

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Wind Speed (WS) - km/h  
Horizon - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	8	9	20	6	5	2	3	9	10	21	15	4	9	4	11	8	144
6 - 11	12	22	14	1	1	0	2	4	19	72	44	33	22	17	15	7	285
12 - 19	18	48	2	0	0	0	0	0	1	31	32	25	4	12	9	18	200
20 - 28	16	3	0	0	0	0	0	0	0	0	3	1	2	7	14	21	67
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	9	15
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
<b>Totals</b>	54	82	36	7	6	2	5	13	30	124	94	63	37	41	55	63	712

Total Number of Valid Hours: 712

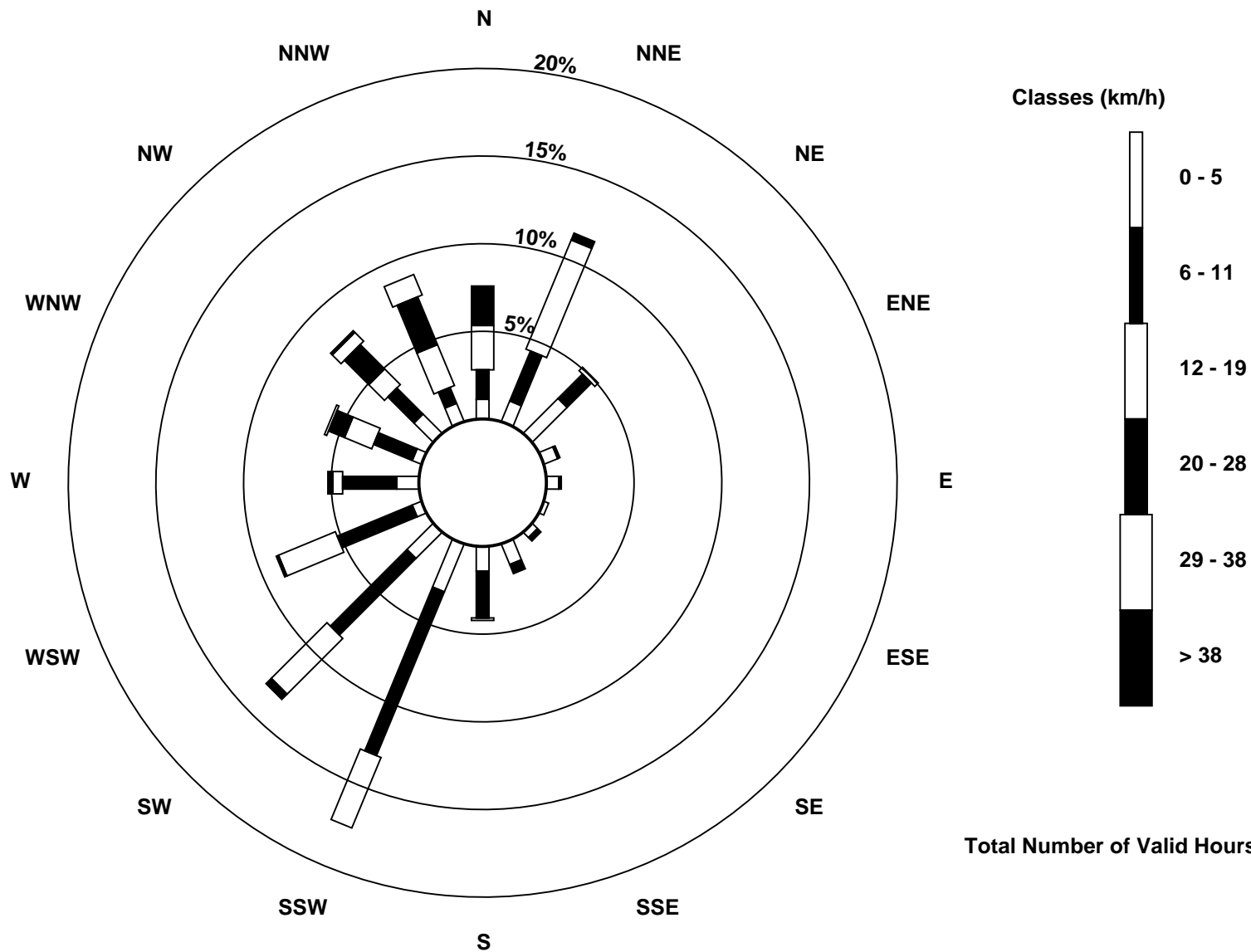
Total Number of Hours: 744





Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed (WS) - km/h  
Horizon (AMS 15)





# Wood Buffalo Environmental Association

## Summary of Hour Averages

Wind Direction (WD) - deg

Horizon - October 2017

Direction of Maximum Speed: 310 deg on Oct 24 12:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 321.7 deg on Oct 8	Hours of Data: 712
Direction of Minimum Speed: 273 deg on Oct 29 18:00	Hours of Missing Data: 32
Direction of Minimum Daily Speed Average: 1.0 deg on Oct 21	Percent Operational Time: 95.7
Monthly Average Direction: 268.1 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	320	311	293	292	308	302	314	305	308	323	347	359	344	339	342	341	343	347	350	350	357	353	353	351	336.0
2-Oct	350	348	351	355	354	351	357	4	5	356	4	2	4	351	348	341	351	341	298	300	273	241	235	220	347.2
3-Oct	216	214	219	209	202	201	197	196	210	214	199	215	215	220	234	233	245	255	271	236	276	286	278	294	229.6
4-Oct	305	336	8	306	276	282	276	218	253	311	340	264	196	195	186	141	162	161	152	202	259	164	148	187	231.9
5-Oct	180	206	227	198	199	214	218	207	211	202	192	198	210	209	218	219	230	229	242	236	251	249	240	238	219.2
6-Oct	235	232	229	223	227	225	211	200	211	225	227	235	246	256	281	279	264	240	244	249	273	241	234	256	240.7
7-Oct	239	251	203	213	37	43	345	21	26	1	333	332	335	336	343	332	343	337	337	337	335	329	326	326	333.3
8-Oct	324	329	327	327	327	336	337	332	320	330	335	331	316	316	335	335	311	315	285	265	261	270	211	200	321.7
9-Oct	202	199	204	206	213	194	210	250	198	179	181	286	242	217	238	244	259	233	261	274	243	227	242	249	231.3
10-Oct	238	238	239	229	220	230	244	284	16	28	46	50	43	48	42	33	34	35	37	37	27	22	27	28	8.7
11-Oct	32	31	27	28	31	26	25	30	31	30	31	30	16	22	12	19	19	18	12	9	6	9	11	12	21.8
12-Oct	15	16	13	23	26	8	6	0	343	358	352	340	333	341	349	351	348	326	278	301	314	299	285	274	347.9
13-Oct	283	272	259	240	242	252	225	210	220	204	162	165	193	213	232	239	242	243	235	231	330	37	198	201	232.8
14-Oct	195	194	152	203	215	199	195	223	224	188	199	210	231	243	249	258	258	253	252	298	292	281	263	250	243.0
15-Oct	241	242	245	240	233	225	206	192	196	202	187	171	285	308	306	277	228	230	228	225	234	218	208	200	227.2
16-Oct	223	227	265	245	216	193	193	202	204	196	207	207	218	226	237	237	246	212	212	228	217	232	210	196	218.4
17-Oct	204	205	209	154	199	345	31	30	AF	62	167	135	88	31	43	355	345	331	309	284	297	296	299	300	305.6
18-Oct	297	298	300	299	302	308	306	293	298	303	303	295	282	319	317	8	78	84	40	21	22	26	31	22	312.0
19-Oct	33	27	32	356	20	40	341	3	186	187	199	205	214	170	176	150	140	141	151	127	232	209	299	351	159.2
20-Oct	322	330	319	308	303	307	322	97	54	262	252	171	170	AF	268	270	233	222	206	219	329	359	328	317	274.8
21-Oct	44	42	106	20	31	52	102	187	315	192	220	187	179	199	201	48	3	35	63	49	77	52	82	101	83.1
22-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
23-Oct	AF	AF	AF	234	311	278	273	267	277	283	283	275	258	239	232	220	210	220	215	223	215	204	202	203	246.9
24-Oct	204	184	164	218	266	219	231	236	245	281	298	310	306	307	309	321	337	6	6	54	47	70	50	44	301.0
25-Oct	25	39	43	36	32	33	27	24	17	19	15	16	11	8	7	8	7	353	324	299	288	275	257	230	6.4
26-Oct	220	219	213	219	226	207	206	210	211	213	215	214	221	220	234	220	206	213	199	241	240	249	246	244	219.7
27-Oct	227	210	196	177	188	185	182	199	210	197	192	172	191	189	177	181	200	180	197	193	189	196	202	199	192.3
28-Oct	200	199	213	198	207	211	210	209	206	246	316	317	324	317	315	321	320	327	320	329	324	332	330	332	304.6
29-Oct	333	334	328	327	341	358	22	24	24	23	27	27	31	27	25	60	87	273	358	306	220	210	206	202	354.1
30-Oct	219	220	220	215	197	186	193	198	199	202	202	205	206	192	40	39	0	337	4	324	356	314	313	316	216.1
31-Oct	AF	AF	AF	49	70	17	28	49	35	29	29	28	26	34	30	22	23	21	23	22	20	21	23	22	25.0

285.7 283.6 281.4 279.8 289.3 282.7 279.4 272.4 274.7 290.0 300.6 302.1 289.2 295.9 305.4 309.8 311.8 310.8 303.1 305.7 305.5 303.7 297.0 292.1  
Diurnal Average

AF - Analyzer Failure

All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

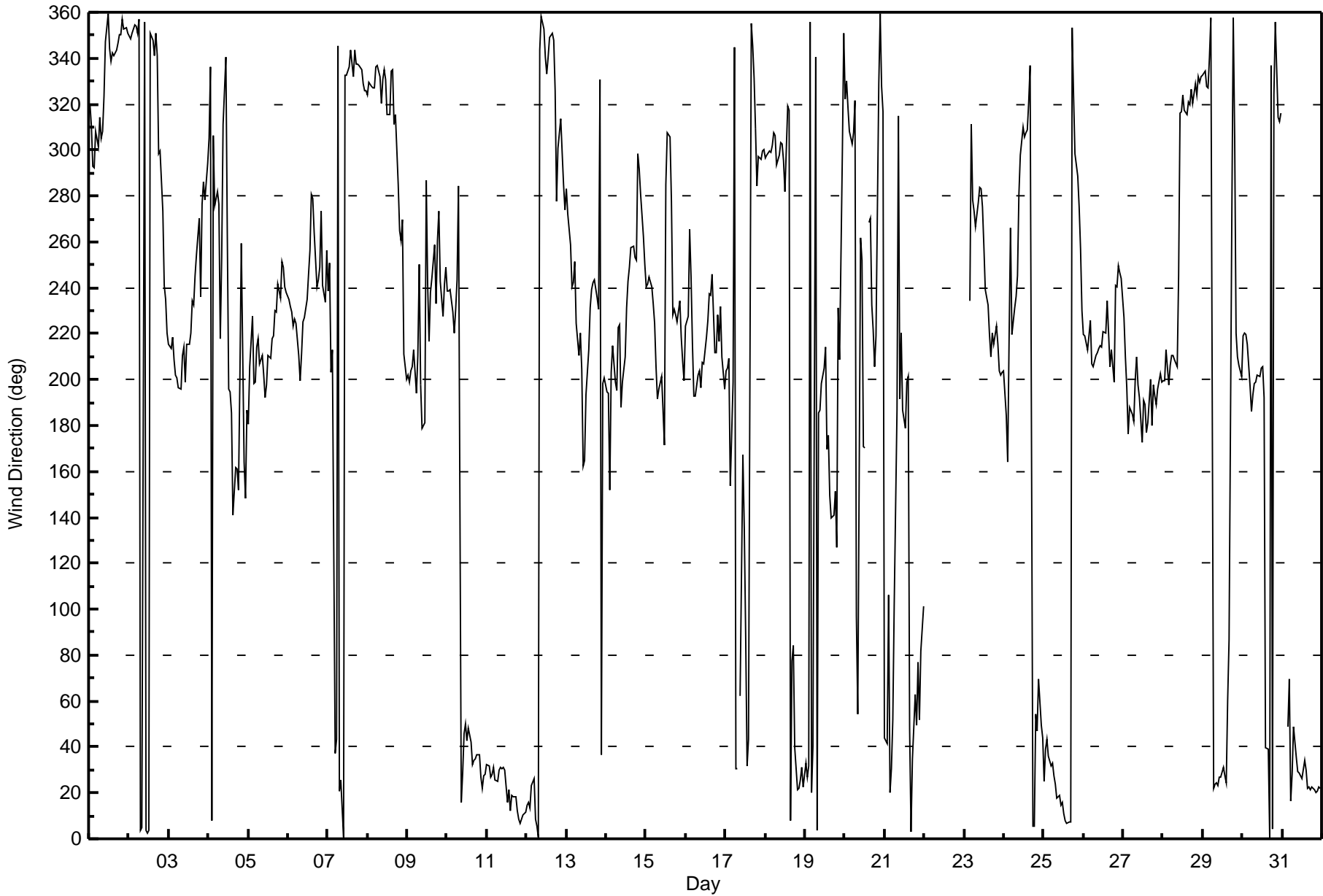
**Wind Direction (WD) - deg**  
**Horizon - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 94 deg on Oct 20 08:00 Minimum Value: 6 deg on Oct 12 22:00 Percentiles: P <sub>1</sub> = 8 P <sub>10</sub> = 11 Q <sub>1</sub> = 13 Median = 18 Q <sub>3</sub> = 22 P <sub>90</sub> = 34 P <sub>99</sub> = 76																		Hours in Service: 744 Hours of Data: 712 Hours of Missing Data: 32 Hours of Calibration: 0 Percent Operational Time: 95.7								
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	18	20	11	11	15	11	11	13	12	10	20	23	22	15	13	14	15	17	18	20	22	21	20	21	23	
2-Oct	18	18	18	21	21	20	21	23	23	22	23	23	25	21	21	17	18	25	9	8	27	11	10	12	27	
3-Oct	9	11	9	12	12	13	12	14	17	16	19	16	17	17	17	14	15	16	18	12	21	11	13	11	21	
4-Oct	13	25	19	28	36	32	31	18	13	34	54	76	71	32	31	31	23	18	18	34	46	39	20	18	76	
5-Oct	22	15	23	9	11	11	10	16	17	20	20	21	21	21	18	16	15	15	12	12	24	17	10	10	24	
6-Oct	11	12	11	12	12	12	15	14	13	15	15	18	19	18	22	20	18	15	14	14	15	22	12	15	22	
7-Oct	22	21	35	73	72	16	26	29	20	28	16	17	17	13	17	16	18	14	17	14	14	11	10	9	73	
8-Oct	9	10	9	10	10	11	11	10	10	12	17	17	12	12	15	17	12	19	29	15	16	19	31	14	31	
9-Oct	11	10	8	11	13	23	42	16	20	22	21	40	31	21	14	17	18	15	21	25	12	15	11	12	42	
10-Oct	11	11	11	14	13	14	10	41	27	27	30	23	22	22	23	19	19	18	18	19	18	19	19	18	41	
11-Oct	19	19	18	18	18	18	19	18	19	19	20	19	20	22	22	21	21	20	21	22	21	22	21	21	22	
12-Oct	21	22	22	20	19	22	20	22	20	24	23	20	20	27	26	19	20	30	12	11	6	6	12	13	30	
13-Oct	10	11	10	17	16	29	9	13	18	58	69	41	37	27	17	20	16	16	15	14	52	75	17	8	75	
14-Oct	16	14	17	26	12	52	56	44	23	14	21	28	24	19	17	16	13	19	12	12	12	15	13	56		
15-Oct	11	12	11	10	10	14	15	11	17	20	22	31	62	46	15	29	14	17	14	10	13	14	20	12	62	
16-Oct	15	17	19	19	17	19	17	13	14	17	17	19	16	18	22	20	18	11	11	13	17	13	18	16	22	
17-Oct	12	10	19	17	76	52	24	62	AF	87	18	25	30	20	22	18	13	15	8	19	11	9	13	11	87	
18-Oct	12	11	10	10	11	11	11	11	13	12	15	23	26	20	37	78	24	15	21	18	18	21	24	19	78	
19-Oct	21	28	25	27	34	14	25	65	68	22	22	23	24	36	32	22	18	16	29	86	53	54	48	57	86	
20-Oct	38	25	20	8	42	14	24	94	53	26	31	41	35	AF	26	15	20	16	13	77	40	37	34	33	94	
21-Oct	30	54	64	21	17	26	70	59	70	37	20	37	27	43	69	76	35	26	33	47	39	53	76	49	76	
22-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
23-Oct	AF	AF	AF	48	11	20	15	26	19	17	17	26	23	28	17	16	11	11	14	13	14	12	19	13	48	
24-Oct	15	24	18	45	32	22	16	14	13	17	14	11	12	9	9	13	14	26	21	27	53	14	18	15	53	
25-Oct	19	18	17	18	18	19	18	18	20	20	21	21	21	21	22	21	20	19	10	20	14	32	15	17	32	
26-Oct	11	13	14	14	16	15	15	15	16	16	15	15	15	15	21	19	16	12	19	25	10	15	12	25	25	
27-Oct	25	21	9	11	15	11	14	10	13	17	20	21	20	17	18	19	16	19	16	16	16	16	14	13	25	
28-Oct	14	15	15	14	14	12	12	12	17	40	13	12	11	10	10	13	11	12	12	12	11	13	13	12	40	
29-Oct	12	13	10	10	13	27	18	19	20	20	19	19	21	21	22	23	32	81	27	30	24	14	15	14	81	
30-Oct	14	11	10	11	9	8	11	13	13	14	15	16	21	65	33	17	14	12	19	21	24	17	20	27	65	
31-Oct	AF	AF	AF	18	28	18	17	12	17	19	17	16	18	17	18	18	18	18	18	18	19	18	19	19	28	
38 54 64 73 76 52 70 94 70 87 69 76 71 65 69 78 35 81 33 86 53 75 76 57																										
Diurnal Maximum																										
AF - Analyzer Failure																										



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Horizon - October 2017**





# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Horizon	Station number:	AMS 15
Calibration Date:	October 25, 2017	Last Cal Date:	September 19, 2017
Start time (MST):	9:00	End time (MST):	13:08
Reason:	Routine		

### Calibration Standards

Cal Gas Concentration	<u>50.9</u>	ppm	Cal Gas Exp Date	May 22, 2020
Cal Gas Cylinder #	<u>EY0000368</u>			
Calibrator Make/Model	Teledyne API T700		Serial Number	1223
ZAG Make/Model	Teledyne API 701		Serial Number	1004

### Analyzer Information

Analyzer make: Thermo 43i

Analyzer serial #: 710321322

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Analyzer Range	0 - 1000 ppb		PMT voltage	-623	-623
Calculated slope	1.002728	0.999630	Lamp voltage	870	871
Calculated intercept	-1.277851	-0.500211	Pressure	705.1	712.4
Analyzer Background	19.1	19.0	Flow	0.553	0.556
Analyzer Coefficient	0.956	0.956	Intensity	91	90

### SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5080	0.0	0.0	0.3	----
as found span	5012	75.8	758.3	757.1	1.002
calibrator zero	5080	0.0	0.0	0.3	----
high point	5012	75.8	758.3	759.3	0.999
second point	5045	37.8	378.5	378.4	1.000
third point	5070	18.8	188.0	189.4	0.993
as left zero	5080	0.0	0.0	0.3	----
as left span	5012	75.8	758.3	760.4	0.997
Average Correction Factor					0.997
Corrected As found	756.80	Previous response	757.54	*% change	0.1%

\* = > +/-5% change initiates investigation

#### Notes:

Sample inlet filter replaced after as founds. No adjustments.

Calibration Performed By:

Asad Hidayat



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

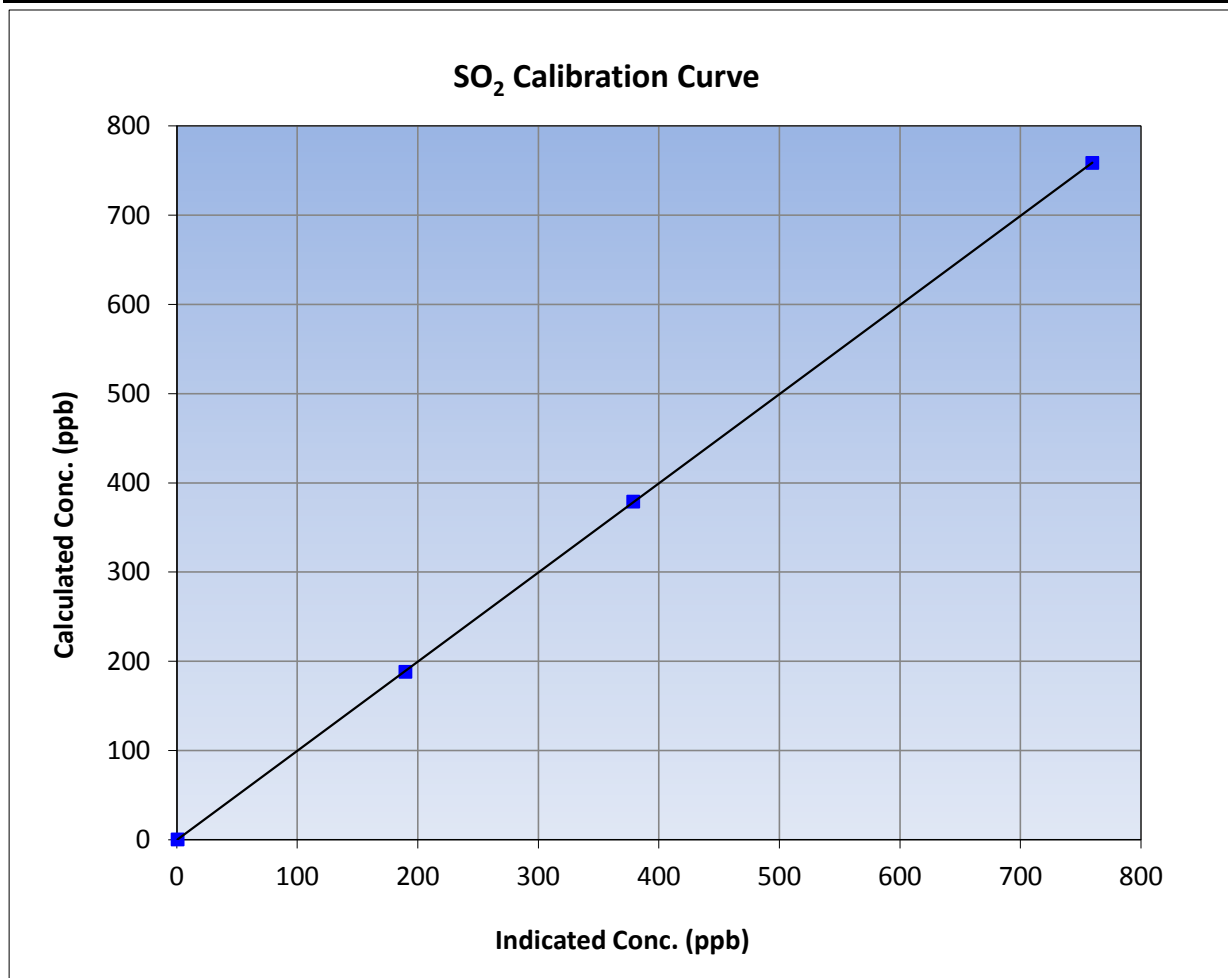
Version-03-2017

### Station Information

Calibration Date	October 25, 2017	Previous Calibration	September 19, 2017
Station Name	Horizon	Station Number	AMS 15
Start Time (MST)	9:00	End Time (MST)	13:08
Analyzer make	Thermo 43i	Analyzer serial #	710321322

### Calibration Data

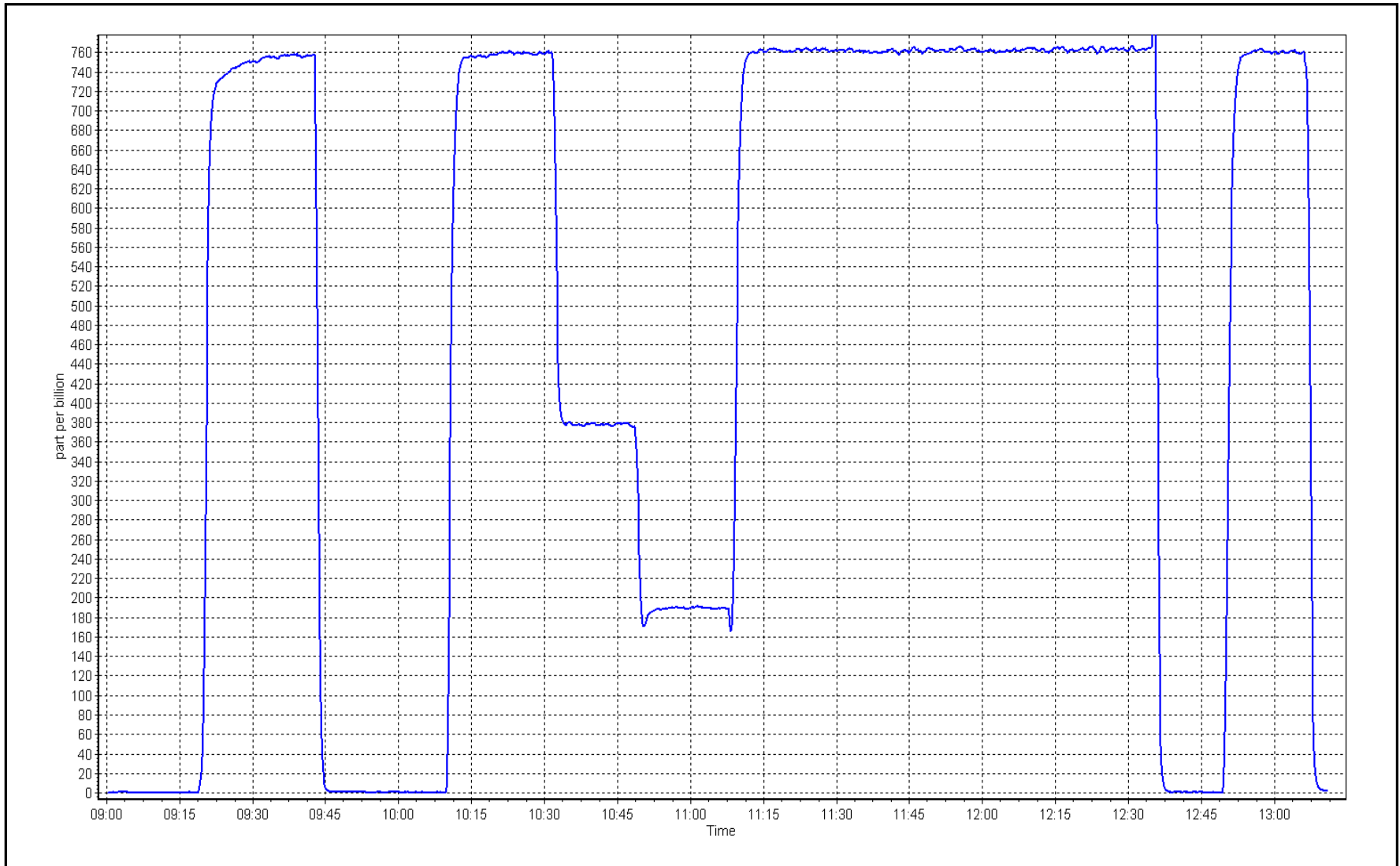
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.3	----	Correlation Coefficient	0.999996	≥0.995
758.3	759.3	0.9987	Slope	0.999630	0.90 - 1.10
378.5	378.4	1.0004	Intercept	-0.500211	+/-30
188.0	189.4	0.9928			



SO2 Calibration Plot

Date: October 25, 2017

Location: Horizon









# Wood Buffalo Environmental Association

## TRS Calibration Summary

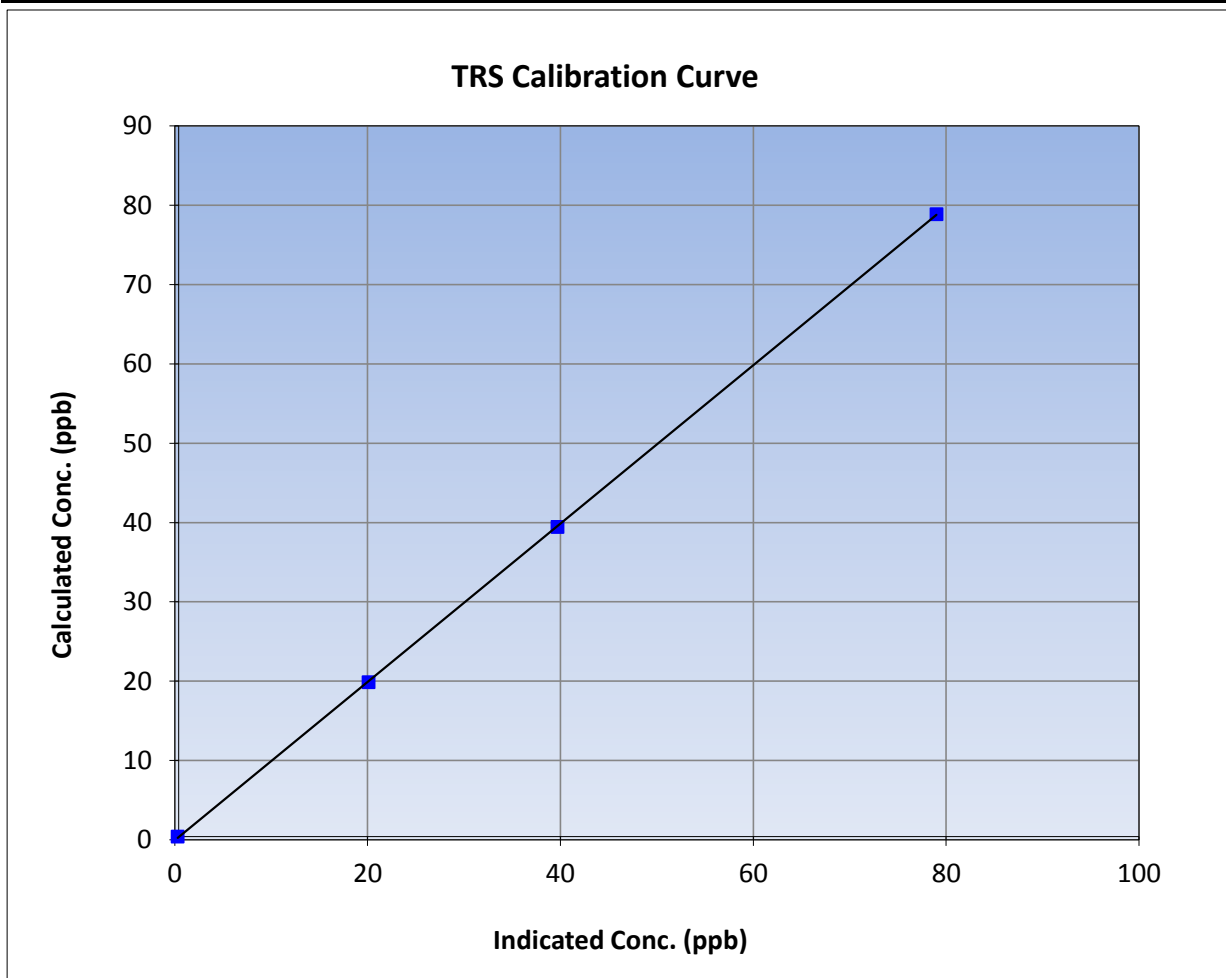
Version-03-2017

### Station Information

Calibration Date	October 13, 2017	Previous Calibration	September 18, 2017
Station Name	Horizon	Station Number	AMS 15
Start Time (MST)	9:02	End Time (MST)	10:38
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1151680032

### Calibration Data

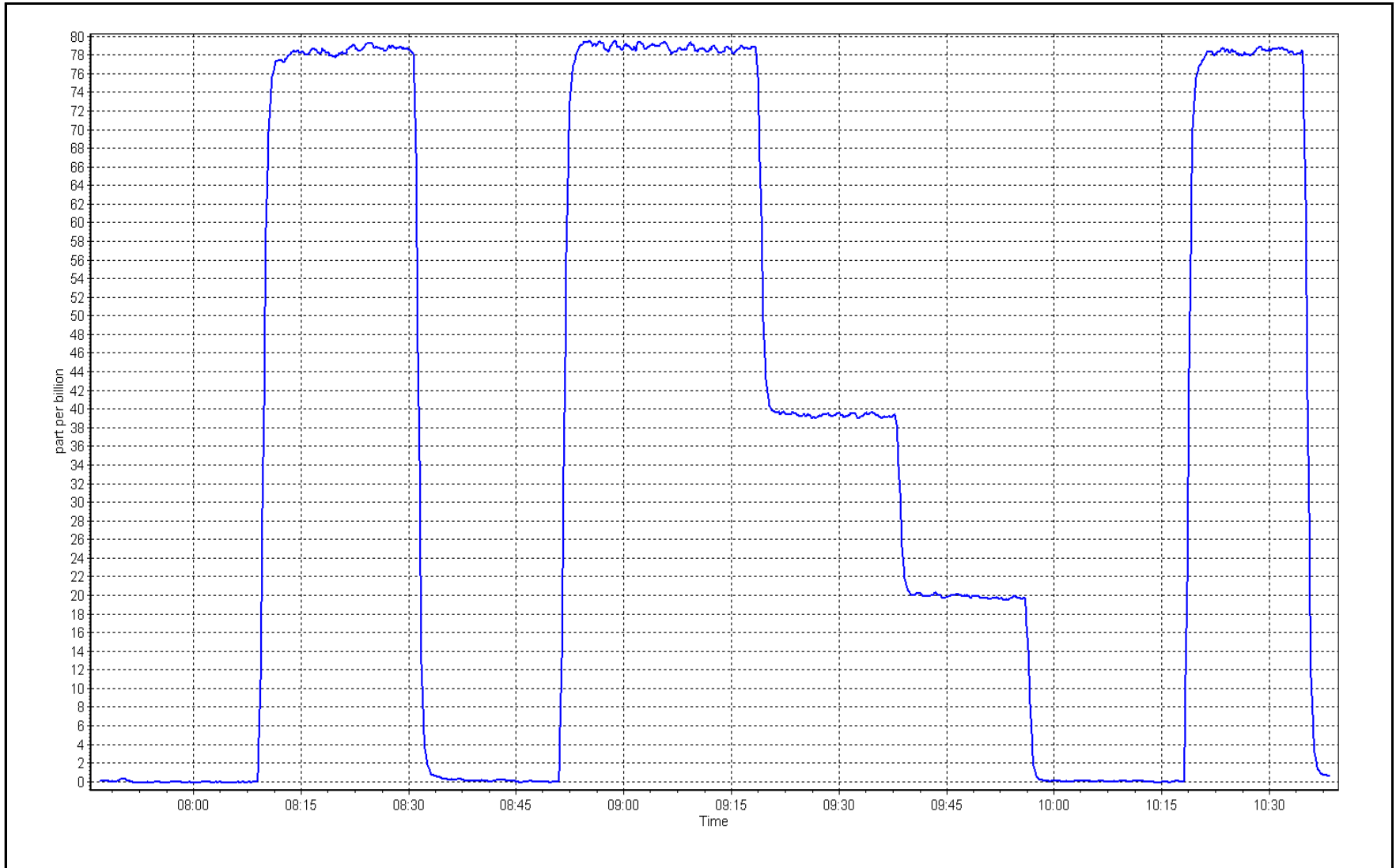
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits
0.0	-0.1	----	Correlation Coefficient	≥0.995
78.5	78.6	0.9987		
39.1	39.3	0.9938	Slope	0.90 - 1.10
19.5	19.7	0.9889		
			Intercept	+/-3



TRS Calibration Plot

Date: October 13, 2017

Location: Horizon





# Wood Buffalo Environmental Association

## THC Calibration Report

Version-03-2017

### Station Information

Station Name:	Horizon	Station number:	AMS 15
Calibration Date:	October 25, 2017	Last Cal Date:	September 19, 2017
Start time (MST):	9:00	End time (MST):	13:08
Reason:	Routine		

### Calibration Standards

Gas Cert Reference	EY0000368	Cal Gas Expiry Date	May 22, 2020
CH4 Cal Gas Conc.	<u>506.0</u> ppm	CH4 Equiv Conc.	1067.0 ppm
C3H8 Cal Gas Conc.	<u>204.0</u> ppm	Station temp.	Deg C
Calibrator Make/Model	Teledyne API T700	Serial Number	1223
ZAG Make/Model	Teledyne API 701	Serial Number	1004

### Analyzer Information

Analyzer make:	Thermo 51-LT	Analyzer serial #:	1327059295
	<u>Start</u>	<u>Finish</u>	<u>Start</u>
Analyzer Range	0 - 25 ppm	Bias voltage supply	-300
Calculated slope	1.004034	Sample pressure	8.8
Calculated intercept	-0.043725	Fuel pressure	26.3
Analyzer Background	2.14	Air pressure	38.0
Analyzer Coefficient	3.211	Flame temperature	154.7
			<u>Finish</u>
			-300
			8.7
			26.3
			38.0
			155.0

### THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5080	0.0	0.00	0.17	----
as found span	5012	75.8	15.90	15.96	0.996
calibrator zero	5080	0.0	0.00	-0.04	----
high point	5012	75.8	15.90	15.88	1.001
second point	5040	37.8	7.94	7.87	1.010
third point	5070	18.8	3.94	3.95	0.999
as left zero	5080	0.0	0.00	-0.02	----
as left span	5012	75.8	15.90	15.96	0.996
Average Correction Factor					1.003
Corrected As found	15.79	Previous response	15.88	*% change	0.5%

\* = > +/-5% change initiates investigation

Notes:

Sample inlet filter replaced after as founds. Adjusted zero only.

Calibration Performed By: Asad Hidayat



# Wood Buffalo Environmental Association

## THC Calibration Summary

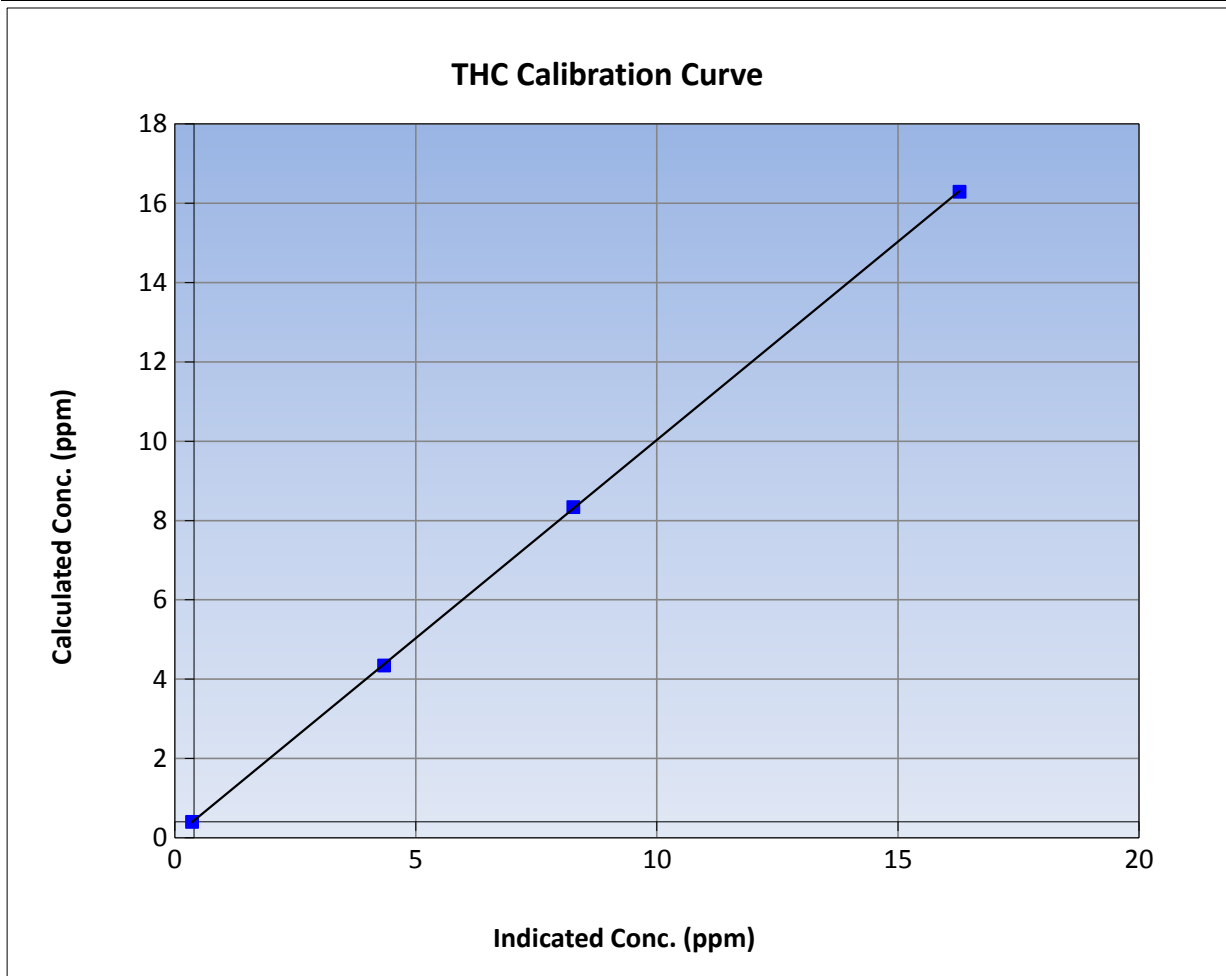
Version-03-2017

### Station Information

Calibration Date	October 25, 2017	Previous Calibration	September 19, 2017
Station Name	Horizon	Station Number	AMS 15
Start Time (MST)	8:47	End Time (MST)	13:08
Analyzer make	Thermo 51-LT	Analyzer serial #	1327059295

### Calibration Data

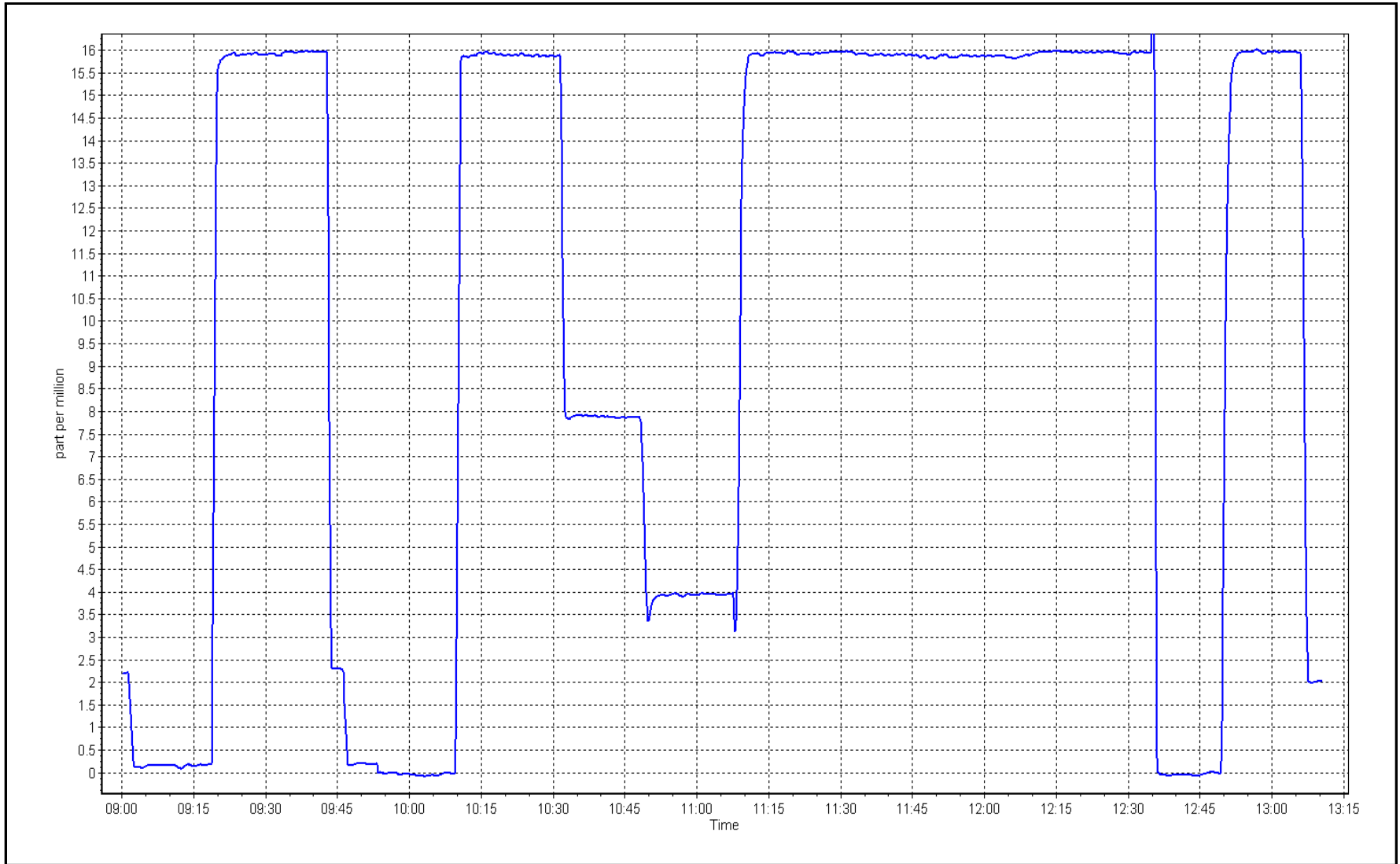
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.0	----	Correlation Coefficient	0.999976	≥0.995
15.9	15.9	1.0012			
7.9	7.9	1.0097	Slope	0.999849	0.90 - 1.10
3.9	3.9	0.9992			
			Intercept	0.034150	+/-1.5



THC Calibration Plot

Date: October 25, 2017

Location: Horizon





# Wood Buffalo Environmental Association

## NO<sub>x</sub> - NO - NO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Horizon	Station number:	AMS 15
Calibration Date:	October 25, 2017	Last Cal Date:	September 19, 2017
Start time (MST):	9:00	End time (MST):	13:08
Reason:	Routine		

### Calibration Standards

NO Gas Cylinder #	EY0000368	Cal Gas Expiry Date	May 22, 2020
NOX Cal Gas Conc.	<u>52.6</u> ppb	NO Cal Gas Conc.	<u>52.6</u> ppb
Calibrator Model	Teledyne API T700	Serial Number	1223
ZAG make/model	Teledyne API 701	Serial Number	1004

### Analyzer Information

Analyzer make:	Thermo 42i	Analyzer serial #:	710321429	
	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
NO coefficient	1.187	1.207	NOX Range (ppb)	0 - 1000 ppb
NOX coefficient	0.999	1.000	PMT Temperature	-3.0 -3.0
NO <sub>2</sub> coefficient	1.000	1.000	Reaction cell Press	181.5 180.9
NO bkgrnd	13.9	14.1	Sample Flow	0.628 0.625
NOX bkgrnd	14.1	14.3	PMT Voltage	-778.8 -779.2

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope	1.003998	0.996713
NO <sub>x</sub> Cal Offset	-0.504556	0.014885
NO Cal Slope	1.001998	0.998125
NO Cal Offset	-0.322558	-0.145890
NO <sub>2</sub> Cal Slope	0.999462	0.993766
NO <sub>2</sub> Cal Offset	0.552798	0.271007



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

Version-03-2017

### Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5080	0.0	0.0	0.0	0.0	-0.1	0.0	-0.2	----	----
as found span	5010	75.8	784.0	784.0	0.0	775.5	775.6	-0.1	1.0109	1.0108
calibrator zero	5080	0.0	0.0	0.0	0.0	-0.1	0.0	-0.2	----	----
high point	5012	75.8	783.7	783.7	0.0	786.9	785.8	0.1	0.9959	0.9973
second point	5040	37.8	391.6	391.6	0.0	390.7	390.7	0.0	1.0022	1.0022
third point	5070	18.8	194.3	194.3	0.0	196.5	196.2	0.3	0.9889	0.9904
as left zero	5080	0.0	0.0	0.0	0.0	3.4	3.3	0.3	----	----
as left span	5012	75.8	783.7	346.1	437.6	781.8	344.3	437.6	1.0024	1.0052
<b>Average Correction Factor</b>									<b>0.9957</b>	<b>0.9966</b>

Corrected As found	NO <sub>x</sub> = 775.6 ppb	NO = 775.6 ppb		*Percent Change	NO <sub>x</sub> = 0.7%
Previous Response	NO <sub>x</sub> = 781.3 ppb	NO = 782.7 ppb		*Percent Change	NO = 0.9%

\* = > +/-5% change initiates investigation

### GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
1st NO ref point		0.0	782.8	781.0	1.8	1.0011	1.0034	----	----
1st NO2 (400 ppb O3)	346.1	434.9	783.7	346.1	437.6	0.9999	----	0.9938	100.6%
2nd NO2 (200 ppb O3)	554.9	226.1	781.5	554.9	226.6	1.0028	----	0.9978	100.2%
3rd NO2 (100 ppb O3)	662.3	118.7	781.7	662.3	119.5	1.0025	----	0.9933	100.7%
2nd NO ref point	----	0.0	782.4	780.2	2.3	1.0016	1.0044	----	----
<b>Average Correction Factor</b>						<b>1.0017</b>	<b>1.0039</b>	<b>0.9950</b>	<b>100.5%</b>

Notes: Changed inlet filter after as founds. Adjusted span only.

Calibration Performed By: Asad Hidayat



# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

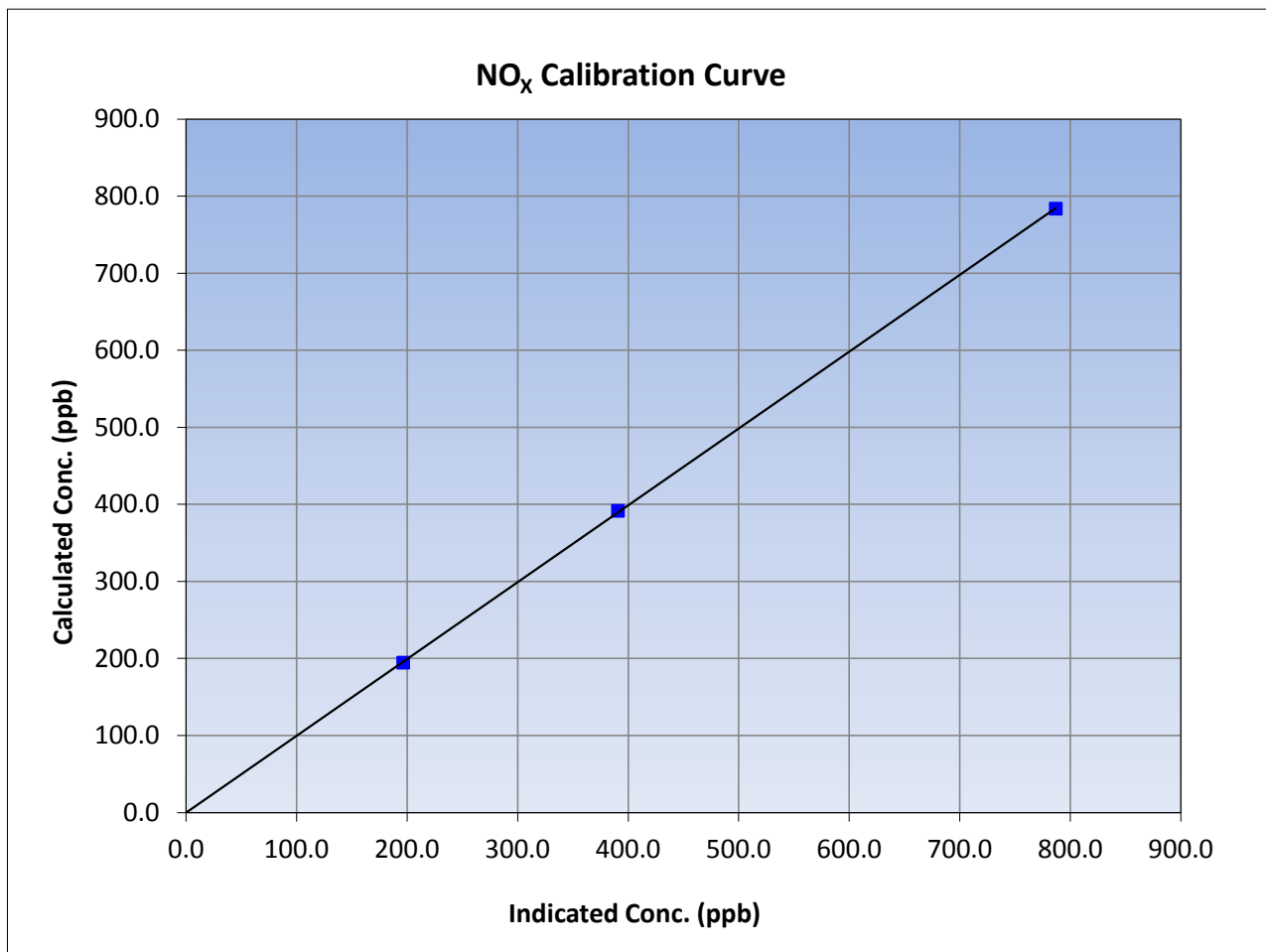
Version-03-2017

### Station Information

Calibration Date	October 25, 2017	Previous Calibration	September 19, 2017
Station Name	Horizon	Station Number	AMS 15
Start Time (MST)	9:00	End Time (MST)	13:08
Analyzer make	Thermo 42i	Analyzer serial #	710321429

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	-0.1	----	Correlation Coefficient	≥0.995	
783.7	786.9	0.9959			
391.6	390.7	1.0022			
194.3	196.5	0.9889			
			Slope	0.996713	0.90 - 1.10
			Intercept	0.014885	+/-20







# Wood Buffalo Environmental Association

## NO Calibration Summary

Version-03-2017

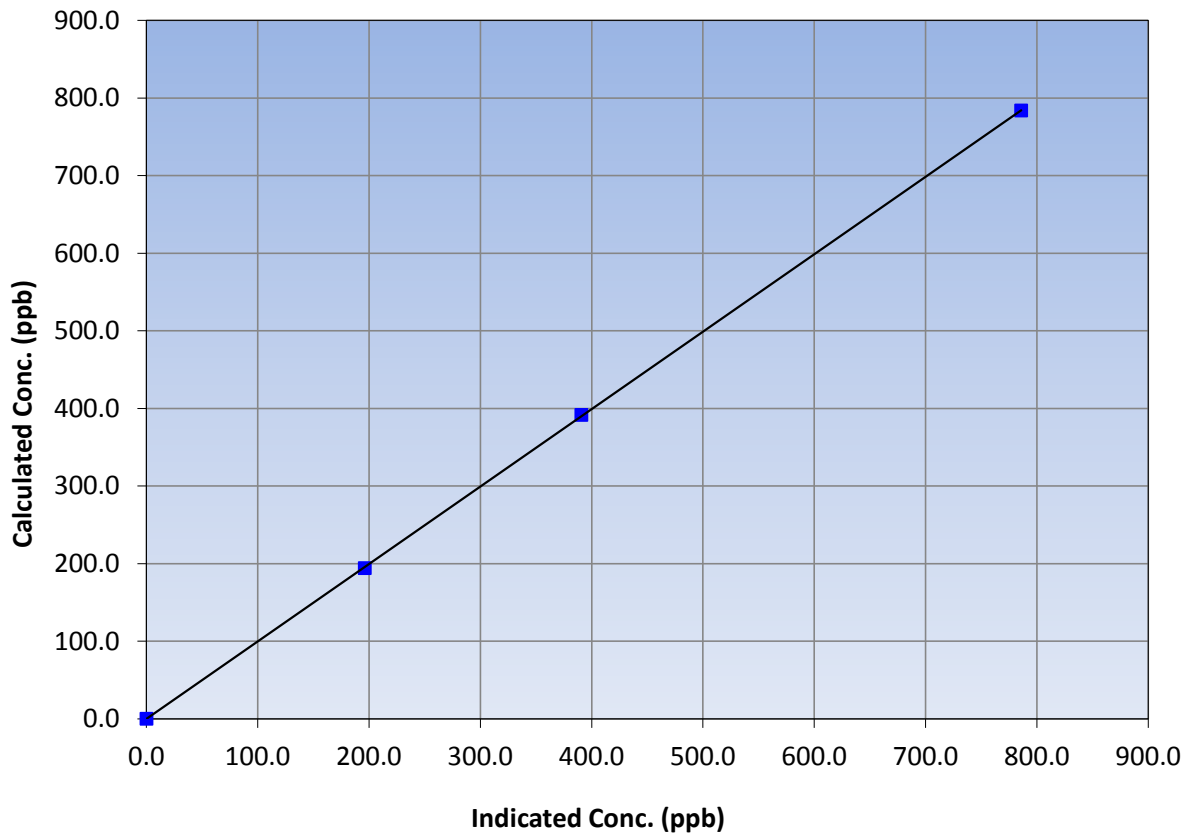
### Station Information

Calibration Date	October 25, 2017	Previous Calibration	September 19, 2017
Station Name	Horizon	Station Number	AMS 15
Start Time (MST)	9:00	End Time (MST)	13:08
Analyzer make	Thermo 42i	Analyzer serial #	710321429

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	0.0	----	Correlation Coefficient	≥0.995	
783.7	785.8	0.9973			
391.6	390.7	1.0022			
194.3	196.2	0.9904			
			Slope	0.998125	0.90 - 1.10
			Intercept	-0.145890	+/-20

NO Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

Version-03-2017

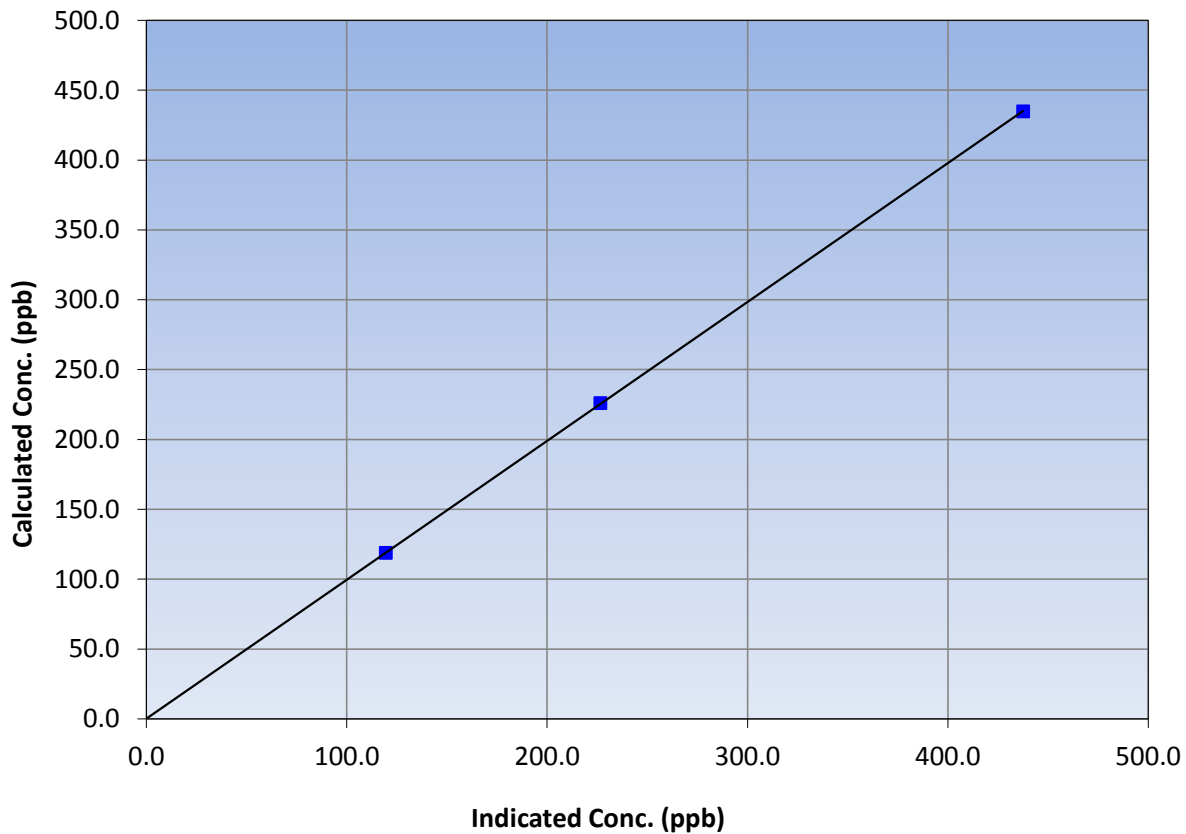
### Station Information

Calibration Date	October 25, 2017	Previous Calibration	September 19, 2017
Station Name	Horizon	Station Number	AMS 15
Start Time (MST)	9:00	End Time (MST)	13:08
Analyzer make	Thermo 42i	Analyzer serial #	710321429

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	-0.2	----	Correlation Coefficient	≥0.995	
434.9	437.6	0.9938			
226.1	226.6	0.9978			
118.7	119.5	0.9933			
			Slope	0.993766	0.90 - 1.10
			Intercept	0.271007	+/-20

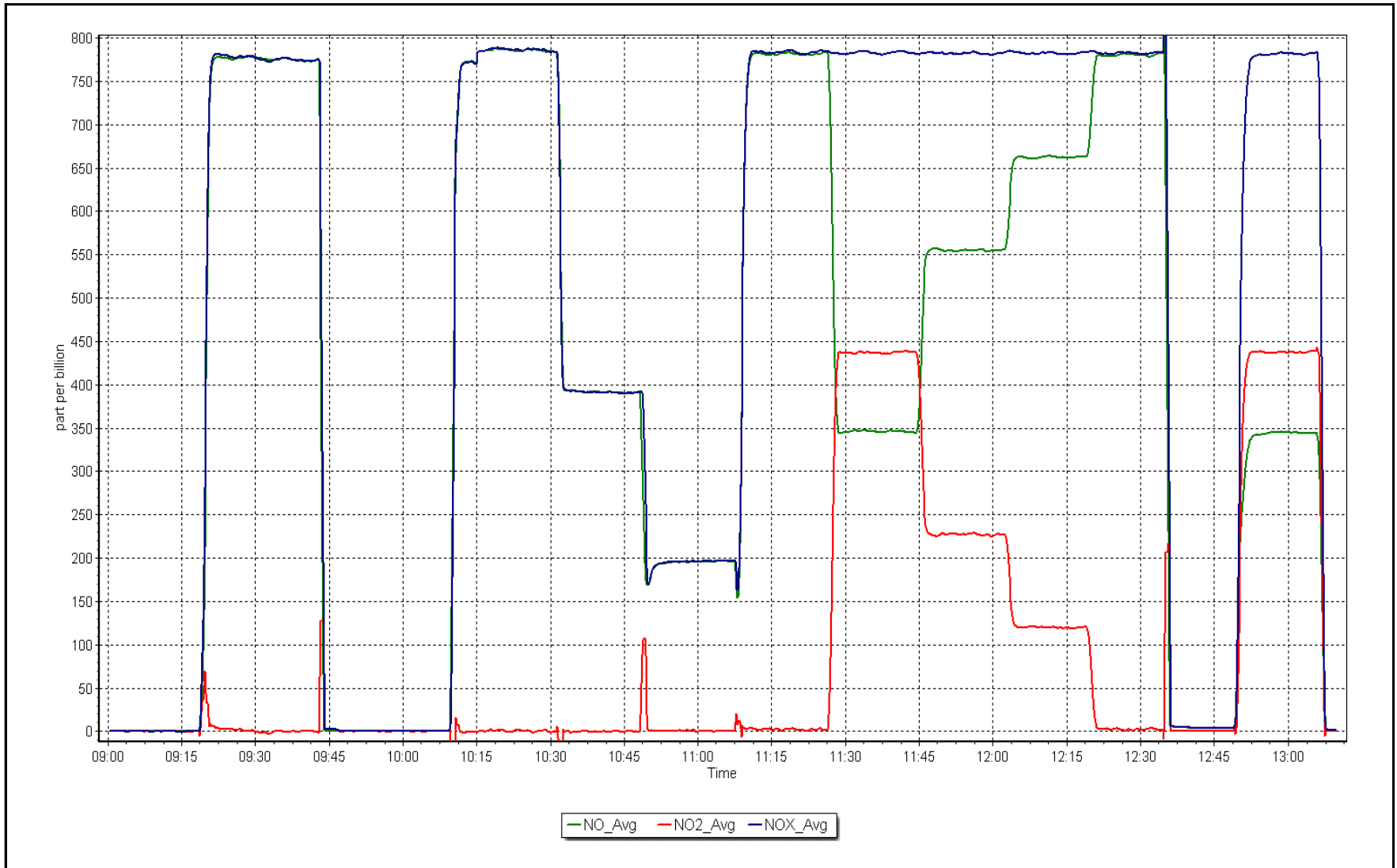
NO<sub>2</sub> Calibration Curve



# NO<sub>x</sub> Calibration Plot

Date: October 25, 2017

Location: Horizon





# Wood Buffalo Environmental Association

## SHARP PM<sub>2.5</sub> CALIBRATION

Version-02-2017

### Station Information

Station Name:	Horizon	Station number:	AMS 15
Calibration Date:	October 25, 2017	Last Cal Date:	September 18, 2017
Start time (MST):	12:50	End time (MST):	13:20
Sharp Model:	5030	S/N:	E-2020
Particulate Fraction:	PM2.5	C14 Source S/N:	7409
Flow Meter Make/Model:	Delta cal	S/N:	628
Temp/RH standard:	NA	S/N:	NA

### Monthly Calibration Test

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<b>(Limits)</b>
T1 (°C)	2.0	1.0	2.0	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	977	979	977	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000.0	994.0	1000.0	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	-0.3	-----	-0.3	<input type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified	<input type="checkbox"/>			
Cyclone cleaning :	PM10 Cyclone	<input checked="" type="checkbox"/>	PM2.5 Cyclone	<input checked="" type="checkbox"/>	
Date Filter Tape Installed:					

### Quarterly Calibration Test

Leak Test: \_\_\_\_\_ Date of check: \_\_\_\_\_ Last Cal Date: September 18, 2017  
 Flow w/o adaptor: \_\_\_\_\_ Flow w/ adaptor: \_\_\_\_\_

**(Limit) 0.4 LPM**

<u>Adjusted</u>	<u>Current Test</u>	<u>Previous Test</u>	<u>% Change</u>
<input type="checkbox"/>	Foil S/N: _____	Foil S/N: _____	
Foil Calibration	Foil Mass: _____	Foil Mass: _____	
	Calibration Date: _____	Calibration Date: <u>July 21, 2017</u>	
<b>(Limit) +/- 5% of previous</b>	Correction Factor: _____	Correction Factor: _____	---

### Annual Calibration Test

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<b>(Limits)</b>
T2 (°C)				<input type="checkbox"/>	+/- 2 °C
T3 (°C)				<input type="checkbox"/>	+/- 2 °C
T4 (°C)				<input type="checkbox"/>	+/- 2 °C
RH (%)				<input type="checkbox"/>	+/- 10%
Date Sample Tube Cleaned:					
Date Pump Rebuilt/Replaced:					

Notes: Cyclone head cleaned. No adjustments made.

Calibration by: Asad Hidayat



## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 16  
MUSKEG RIVER  
OCTOBER 2017**

Operations, Data Collection,  
QA/QC, Data Validation and Reporting by:  
Wood Buffalo Environmental Association  
Fort McMurray, Alberta

November 29, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MUSKEG RIVER (AMS 16)  
OCTOBER 2017

MONTHLY SUMMARY for  
AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	706	38	38	100	18	0	4	0
THC (ppm) Average	700	38	44	99.19	4.1	-	3.1	-
NO2 (ppb) Average	705	39	39	100	31	0	18	-
NO (ppb) Average	705	39	39	100	131	-	23	-
NOX (ppb) Average	705	39	39	100	159	-	38	-
PM2.5 (ug/m3) Average	743	1	1	100	43.3	-	12.6	0
Temperature 2 m (C) Average	744	0	0	100	22.9	-	13.3	-
Relative Humidity (%) Average	744	0	0	100	100	-	99	-
Barometric Pressure (inHg) Average	744	0	0	100	29.3	-	29.2	-
Wind Speed 10 m (km/h) Average	723	0	21	97.18	41	-	23	-
Wind Direction 10 m (deg) Average	723	0	21	97.18	-	-	-	-

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MUSKEG RIVER (AMS 16)  
OCTOBER 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	706	0.8	2	-	0	0	0	0	0	2	18
THC (ppm) Average	700	2.4	0.3	-	1.9	2.1	2.2	2.3	2.5	2.8	4.1
NO2 (ppb) Average	705	9.2	6	-	0	2	4	9	13	18	31
NO (ppb) Average	705	6.8	13	-	0	0	0	2	8	17	131
NOX (ppb) Average	705	16	17	-	0	2	4	12	22	35	159
PM2.5 (ug/m3) Average	743	4.36	4.5	-	0.2	1.2	1.9	3	5.2	8.4	43.3
Temperature 2 m (C) Average	744	2.57	4.7	-	-8.3	-2.8	-0.6	1.7	5	8.6	22.9
Relative Humidity (%) Average	744	76.9	16	-	31	53	67	79	90	96	100
Barometric Pressure (inHg) Average	744	28.75	0.3	-	28.1	28.3	28.5	28.8	29	29.1	29.3
Wind Speed 10 m (km/h) Average	723	12.6	7	-	0	4	7	12	17	22	41
Wind Direction 10 m (deg) Average	723	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -MUSKEG RIVER (AMS 16)  
OCTOBER 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC	05 Oct 2017 11:00	05 Oct 2017 16:00	6	Unstable Operation - station temperature fluctuations
Wind Speed, Wind Direction	22 Oct 2017 03:00	22 Oct 2017 14:00	12	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	22 Oct 2017 20:00	23 Oct 2017 04:00	9	Flat line in sensor output signal -sensor frozen





Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb

Muskeg River - October 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 18 ppb on Oct 22 05:00	Maximum Daily Average: 4.1 ppb on Oct 22		Hours of Data:	706
Minimum Value: 0 ppb on Oct 1 02:00	Minimum Daily Average: 0.0 ppb on Oct 1		Hours of Missing Data:	38
Maximum Diurnal Average: 1.5 ppb at hour 14	Minimum Diurnal Average: 0.3 ppb at hour 22		Hours of Calibration:	38
Monthly Average: 0.8 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 2 P <sub>99</sub> = 16		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
2-Oct	0	0	0	0	0	Z	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Oct	Z	0	0	0	0	1	3	5	4	3	2	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1.0	5
4-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	9	17	7	3	1	1	1	1	1	1.8	17
5-Oct	1	1	Z	3	2	1	1	1	1	0	0	3	5	3	0	0	0	0	0	0	0	0	0	0	0	1.1	5
6-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
7-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
8-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
9-Oct	Z	0	0	0	0	0	0	0	1	2	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0.5	2
10-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
11-Oct	0	0	Z	0	0	0	0	0	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1
12-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
13-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
14-Oct	0	0	0	0	0	Z	0	1	2	3	4	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.7	4
15-Oct	Z	0	0	0	0	0	0	0	1	4	8	8	2	1	2	1	1	1	1	1	1	1	1	1	1	1.4	8
16-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
17-Oct	0	0	Z	0	0	0	0	0	0	0	1	2	1	1	0	0	0	0	1	0	0	0	0	0	0	0.4	2
18-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
19-Oct	0	0	0	0	Z	0	0	0	0	0	4	7	6	16	17	3	1	0	0	0	0	0	0	0	0	2.5	17
20-Oct	0	0	0	0	0	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
21-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	1	13	17	16	13	8	5	7	4	3	2	3	4.0	17	
22-Oct	2	Z	8	11	18	17	9	3	2	2	2	1	0	0	0	1	0	0	0	0	0	0	2	14	4.1	18	
23-Oct	9	5	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.8	9	
24-Oct	1	1	2	Z	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
25-Oct	0	0	0	0	Z	0	0	0	0	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
26-Oct	0	0	0	0	0	Z	1	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2
27-Oct	Z	0	0	0	0	0	0	0	0	1	4	6	3	7	2	1	0	0	1	1	3	3	4	3	1.7	7	
28-Oct	2	Z	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3
29-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
30-Oct	0	0	0	Z	0	0	0	0	0	1	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0.5	2
31-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0

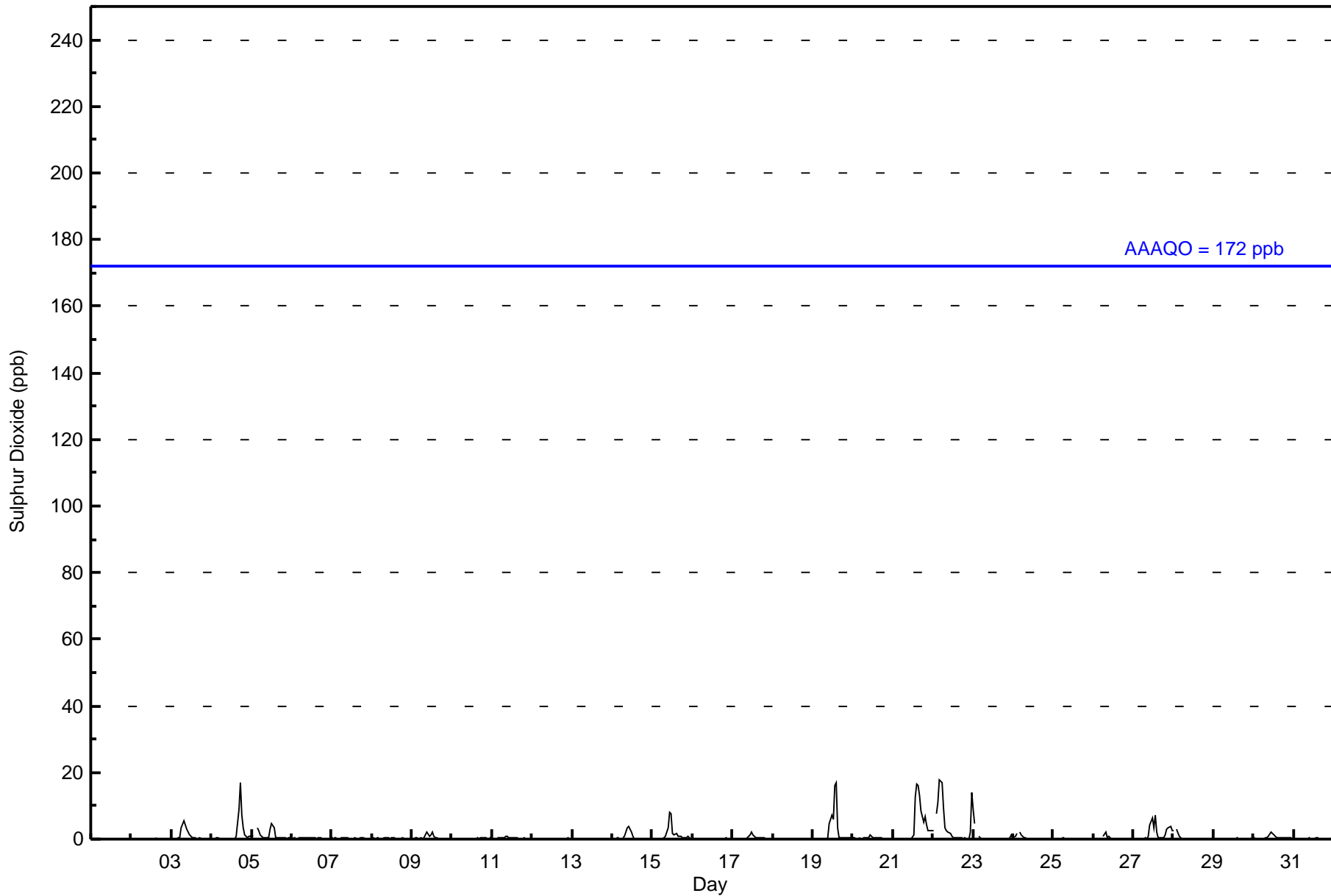
0.7	0.3	0.6	0.7	1.0	0.9	0.6	0.5	0.5	0.7	1.1	1.2	0.8	1.5	1.4	0.8	0.9	1.0	0.6	0.5	0.4	0.3	0.4	0.8	Diurnal Average
9	5	8	11	18	17	9	5	4	4	8	8	6	16	17	16	13	17	7	7	4	3	4	14	Diurnal Maximum

Z - zerospan      C - Calibration  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb      24-hr 48 ppb



Wood Buffalo Environmental Association  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Muskeg River - October 2017





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Muskeg River - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	695	98.44	98.44
11 - 20	11	1.56	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Muskeg River - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	66	48	24	14	6	12	7	33	102	80	55	56	36	37	41	62	679
11 - 20	0	0	0	0	0	0	0	1	4	1	0	0	1	0	0	0	7
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	66	48	24	14	6	12	7	34	106	81	55	56	37	37	41	62	686

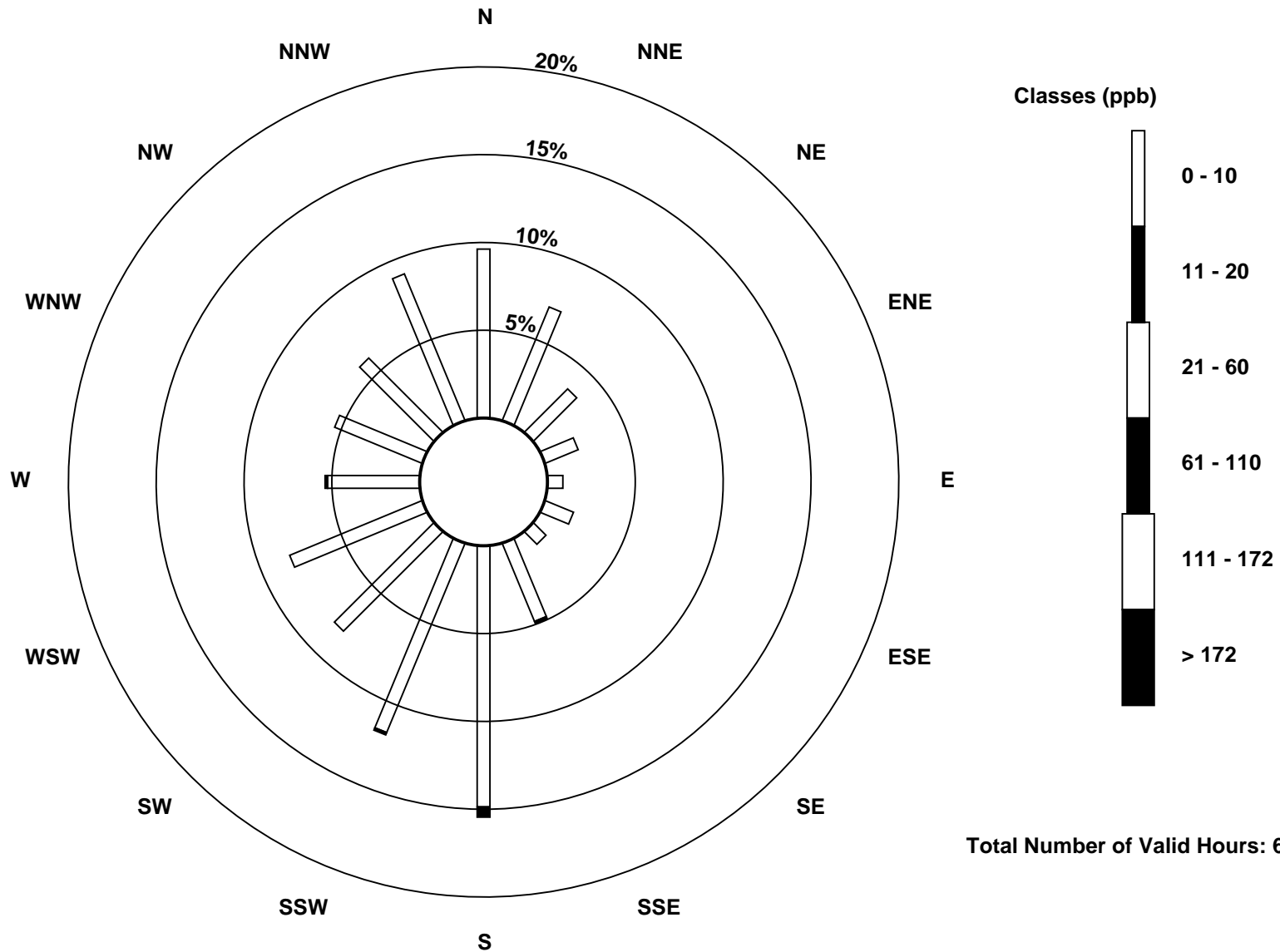
Total Number of Valid Hours: 686

Total Number of Hours: 744

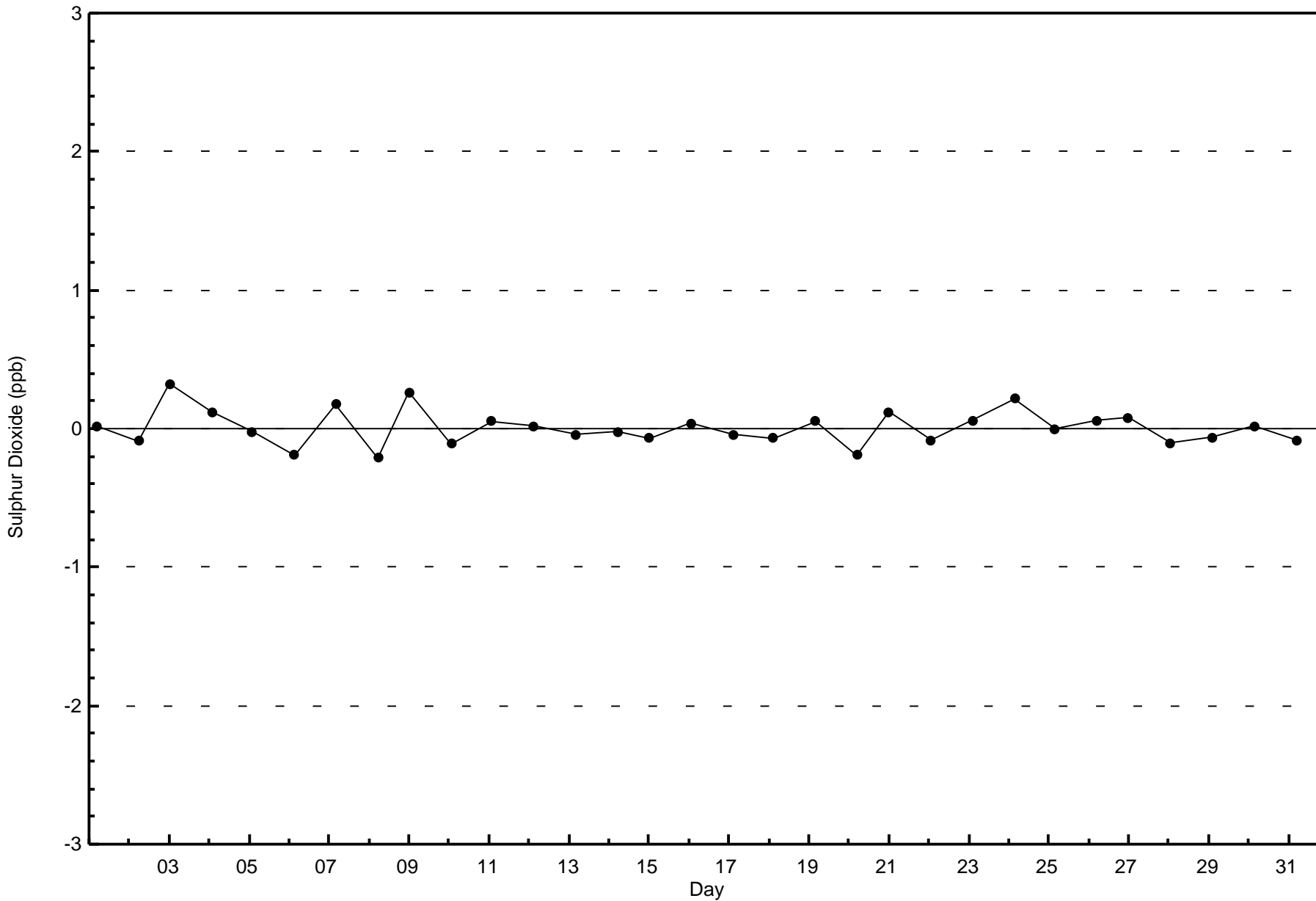


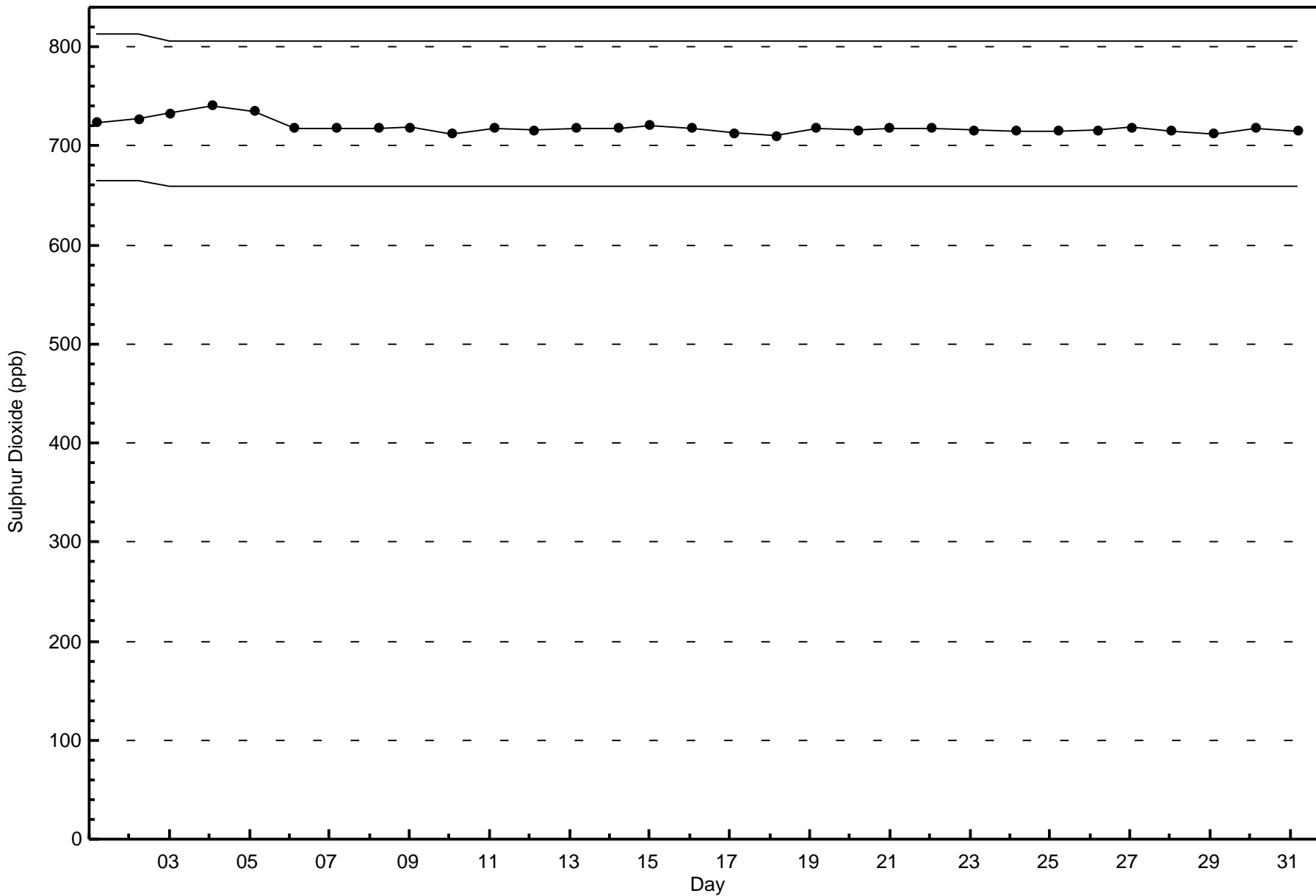
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Muskeg River (AMS 16)



Total Number of Valid Hours: 686







**Wood Buffalo Environmental Association**

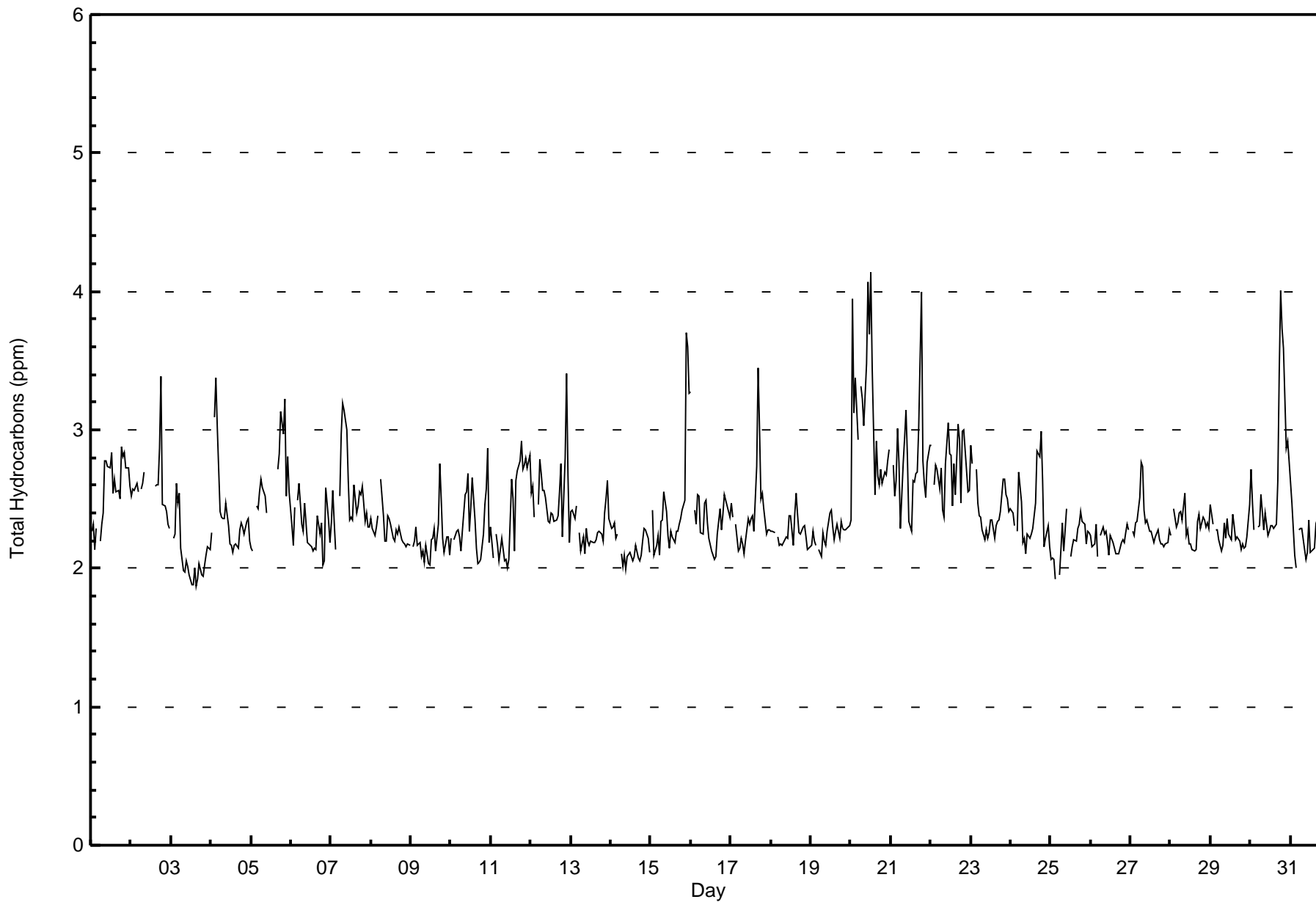
**Summary of Hour Averages**

**Total Hydrocarbons (THC) - ppm**

**Muskeg River - October 2017**

Maximum Value: 4.1 ppm on Oct 20 13:00		Maximum Daily Average: 3.1 ppm on Oct 20		Hours in Service: 744																																													
Minimum Value: 1.9 ppm on Oct 3 16:00		Minimum Daily Average: 2.1 ppm on Oct 3		Hours of Data: 700																																													
Maximum Diurnal Average: 2.6 ppm at hour 19		Minimum Diurnal Average: 2.3 ppm at hour 15		Hours of Missing Data: 44																																													
Monthly Average: 2.40 ppm		Percentiles: P <sub>1</sub> = 2.0 P <sub>10</sub> = 2.1 Q <sub>1</sub> = 2.2 Median = 2.3 Q <sub>3</sub> = 2.5 P <sub>90</sub> = 2.8 P <sub>99</sub> = 3.7		Hours of Calibration: 38																																													
				Percent Operational Time: 99.2																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	2.3	2.3	2.1	2.3	Z	2.2	2.3	2.4	2.8	2.8	2.7	2.7	2.8	2.5	2.6	2.6	2.6	2.5	2.9	2.8	2.8	2.7	2.7	2.6	2.6	2.9	2.8	2.7	2.7	2.6	2.6	2.9																	
2-Oct	2.5	2.6	2.6	2.6	2.6	Z	2.6	2.6	2.7	C	C	C	C	C	2.6	2.6	2.6	2.9	3.4	2.5	2.5	2.4	2.3	2.3	2.6	2.6	2.5	2.4	2.3	2.3	2.6	3.4																	
3-Oct	Z	2.2	2.2	2.6	2.5	2.5	2.1	2.0	2.0	2.1	2.0	2.0	1.9	1.9	2.0	1.9	1.9	2.0	1.9	1.9	2.0	2.1	2.2	2.1	2.1	1.9	2.0	2.1	2.2	2.1	2.6	2.6																	
4-Oct	2.3	Z	3.1	3.4	3.0	2.4	2.4	2.4	2.4	2.5	2.3	2.2	2.2	2.1	2.2	2.2	2.1	2.3	2.3	2.3	2.2	2.3	2.4	2.2	2.4	2.3	2.2	2.3	2.4	2.2	2.4	3.4																	
5-Oct	2.2	2.1	Z	2.5	2.4	2.6	2.6	2.6	2.5	2.4	UO	UO	UO	UO	UO	UO	2.7	2.8	3.1	3.0	3.2	2.5	2.8	2.6	--	--	--	--	--	--	3.2																		
6-Oct	2.3	2.2	2.4	Z	2.5	2.6	2.3	2.3	2.5	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.4	2.3	2.3	2.0	2.1	2.6	2.3	2.2	2.3	2.0	2.1	2.6	2.3	2.2	2.6																		
7-Oct	2.3	2.6	2.3	2.1	Z	2.5	3.0	3.2	3.1	3.0	2.6	2.3	2.4	2.4	2.6	2.4	2.5	2.5	2.5	2.6	2.3	2.4	2.3	2.3	2.5	2.6	2.3	2.4	2.3	2.3	2.5	3.2																	
8-Oct	2.4	2.3	2.2	2.3	2.4	Z	2.6	2.4	2.2	2.2	2.4	2.4	2.3	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.6																	
9-Oct	Z	2.2	2.2	2.3	2.2	2.2	2.1	2.1	2.0	2.2	2.0	2.0	2.2	2.2	2.3	2.1	2.3	2.8	2.5	2.2	2.1	2.2	2.2	2.1	2.2	2.2	2.1	2.2	2.2	2.1	2.2	2.8																	
10-Oct	2.2	Z	2.2	2.3	2.3	2.2	2.1	2.3	2.5	2.6	2.7	2.3	2.4	2.7	2.3	2.1	2.0	2.0	2.1	2.2	2.5	2.6	2.9	2.2	2.3	2.2	2.5	2.6	2.9	2.2	2.9	2.9																	
11-Oct	2.3	2.1	Z	2.3	2.2	2.1	2.2	2.1	2.1	2.1	2.0	2.1	2.6	2.5	2.1	2.6	2.7	2.8	2.9	2.7	2.7	2.8	2.7	2.8	2.4	2.7	2.7	2.8	2.7	2.8	2.9	2.9																	
12-Oct	2.5	2.6	2.4	Z	2.5	2.8	2.7	2.6	2.6	2.5	2.3	2.3	2.4	2.4	2.3	2.3	2.4	2.6	2.8	2.2	2.8	3.4	2.7	2.2	2.5	2.2	2.8	3.4	2.7	2.2	2.5	3.4																	
13-Oct	2.4	2.4	2.4	2.5	Z	2.3	2.1	2.2	2.1	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.4	2.5	2.6	2.4	2.3	2.2	2.4	2.5	2.6	2.4	2.3	2.6																	
14-Oct	2.3	2.3	2.3	2.2	2.2	Z	2.1	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.3	2.2	2.1	2.2	2.2	2.3	2.3	2.2	2.1	2.2	2.3																	
15-Oct	Z	2.4	2.1	2.2	2.2	2.1	2.3	2.3	2.6	2.4	2.2	2.1	2.3	2.2	2.2	2.3	2.3	2.3	2.4	2.4	2.5	3.7	3.6	3.3	2.5	2.4	2.5	3.7	3.6	3.3	2.5	3.7																	
16-Oct	3.3	Z	2.4	2.3	2.5	2.5	2.3	2.3	2.5	2.5	2.3	2.2	2.1	2.1	2.1	2.1	2.2	2.4	2.3	2.4	2.5	2.5	2.4	2.4	2.4	2.4	2.5	2.5	2.4	2.4	2.4	3.3																	
17-Oct	2.5	2.4	Z	2.3	2.1	2.2	2.2	2.2	2.1	2.2	2.4	2.3	2.4	2.4	2.3	2.7	3.4	3.0	2.5	2.5	2.4	2.2	2.3	2.3	2.4	2.4	2.5	2.4	2.2	2.3	2.3	2.4	3.4																
18-Oct	2.3	2.3	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.4	2.2	2.4	2.5	2.4	2.3	2.2	2.3	2.3	2.2	2.1	2.1	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.5																	
19-Oct	2.2	2.3	2.2	2.2	Z	2.1	2.1	2.3	2.2	2.2	2.3	2.4	2.4	2.3	2.2	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4																	
20-Oct	2.3	3.9	3.1	3.4	2.9	Z	3.3	3.2	3.0	3.5	4.1	3.7	4.1	3.4	2.5	2.9	2.7	2.6	2.7	2.6	2.7	2.7	2.8	2.9	3.1	2.6	2.7	2.7	2.8	2.9	3.1	4.1																	
21-Oct	Z	2.7	2.5	2.6	3.0	2.8	2.3	2.8	2.9	3.1	2.8	2.3	2.3	2.6	2.6	2.7	2.7	3.0	4.0	2.8	2.6	2.5	2.8	2.9	2.8	2.6	2.5	2.8	2.9	2.8	4.0																		
22-Oct	2.9	Z	2.6	2.7	2.7	2.6	2.7	2.4	2.4	2.8	3.1	2.8	2.8	2.5	2.8	2.5	3.0	2.9	2.5	3.0	3.0	2.7	2.6	2.6	2.7	2.6	3.0	3.0	2.7	2.6	2.6	3.1																	
23-Oct	2.9	2.8	Z	2.7	2.5	2.4	2.4	2.3	2.2	2.3	2.2	2.3	2.3	2.4	2.2	2.3	2.3	2.4	2.4	2.6	2.6	2.5	2.5	2.4	2.4	2.6	2.6	2.5	2.5	2.4	2.4	2.9																	
24-Oct	2.4	2.4	2.3	Z	2.3	2.7	2.5	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.3	2.4	2.5	2.8	2.8	3.0	2.6	2.2	2.2	2.3	2.2	2.4	2.6	2.2	2.2	2.3	2.2	2.4	3.0																
25-Oct	2.1	2.1	2.1	1.9	Z	2.0	2.1	2.3	2.1	2.4	C	C	2.1	2.2	2.2	2.2	2.3	2.3	2.4	2.3	2.3	2.2	2.3	2.3	2.2	2.3	2.3	2.2	2.3	2.3	2.2	2.4																	
26-Oct	2.2	2.2	2.2	2.3	2.1	Z	2.2	2.3	2.3	2.3	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3																
27-Oct	Z	2.3	2.2	2.3	2.3	2.5	2.8	2.7	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.8																	
28-Oct	2.2	Z	2.4	2.3	2.3	2.4	2.4	2.3	2.5	2.2	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.3	2.4	2.3	2.4	2.4	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.3	2.5																	
29-Oct	2.5	2.3	Z	2.3	2.3	2.2	2.1	2.2	2.3	2.2	2.4	2.2	2.2	2.4	2.3	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.2	2.2	2.5	2.2	2.1	2.2	2.2	2.5	2.3	2.5																	
30-Oct	2.7	2.5	2.3	Z	2.3	2.3	2.5	2.4	2.3	2.4	2.2	2.3	2.3	2.3	2.3	2.3	2.6	3.4	4.0	3.7	3.6	2.9	2.9	2.8	2.7	3.6	3.6	2.9	2.9	2.8	2.7	4.0																	
31-Oct	2.6	2.5	2.1	2.0	Z	2.3	2.3	2.3	2.1	2.1	2.1	2.4	2.1	2.1	2.2	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.4	2.3	2.3	2.3	2.4	2.3	2.4	2.3	2.3	2.6																	
																								2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.4	2.3	2.3	2.3	2.4	2.5	2.6	2.5	2.5	2.5	2.5	2.4	Diurnal Average		
																								3.3	3.9	3.1	3.4	3.0	2.8	3.3	3.2	3.1	3.5	4.1	3.7	4.1	3.4	2.8	2.9	3.4	3.4	4.0	3.7	3.6	3.7	3.6	3.3	Diurnal Maximum	
Z - zerospan																								C - Calibration				UO - Unstable Operation																					







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Muskeg River - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	25	3.57	3.57
2.1 - 3.0	645	92.14	95.71
3.1 - 10.0	30	4.29	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 700

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Muskeg River - October 2017**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	1	4	1	0	0	0	0	8	5	2	0	3	1	0	0	25
2.1 - 3.0	61	45	19	11	6	11	7	34	95	71	50	51	32	36	38	59	626
3.1 - 10.0	5	2	1	2	0	1	0	0	0	2	3	5	2	0	3	3	29
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	66	48	24	14	6	12	7	34	103	78	55	56	37	37	41	62	680

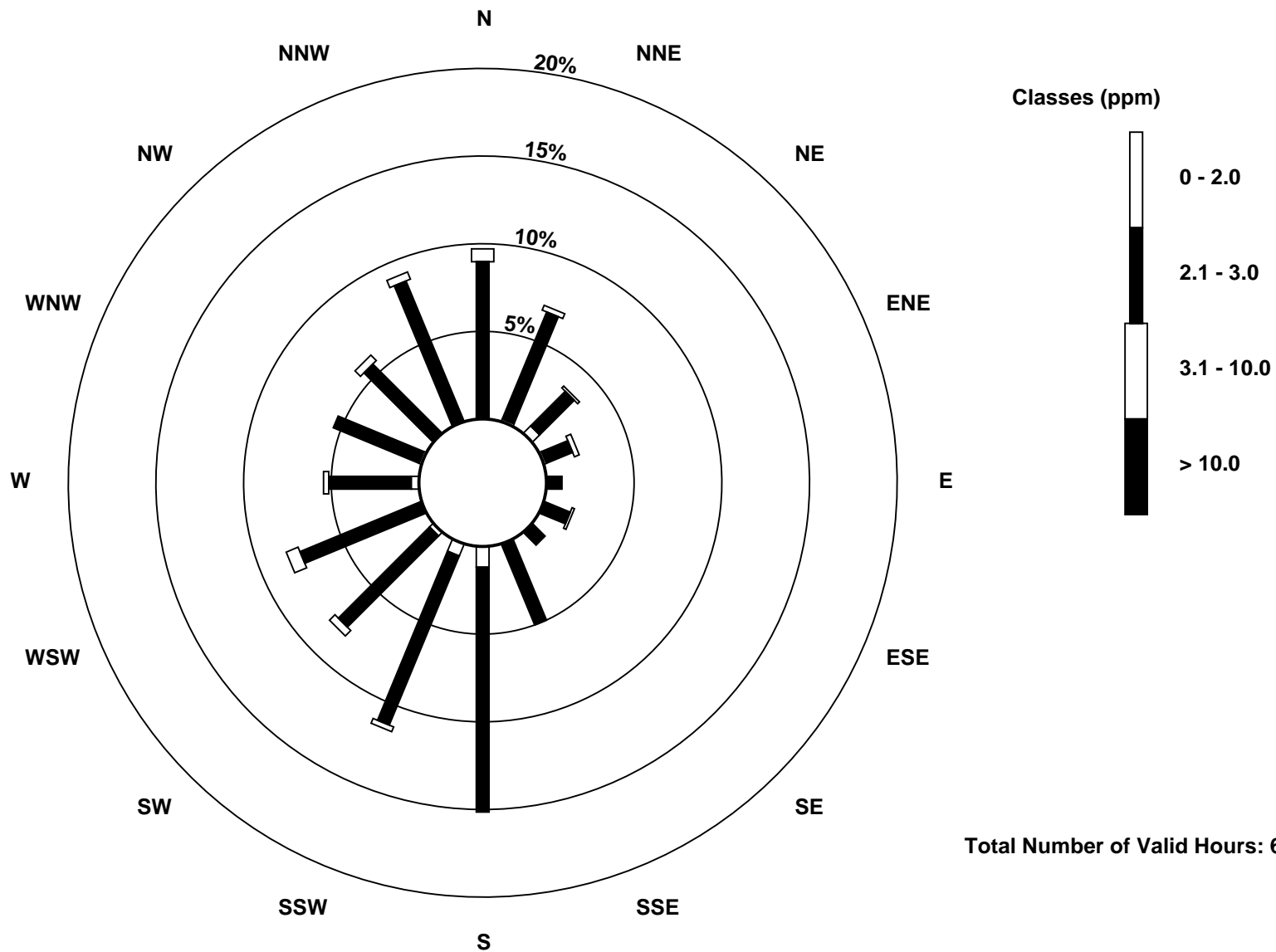
Total Number of Valid Hours: 680

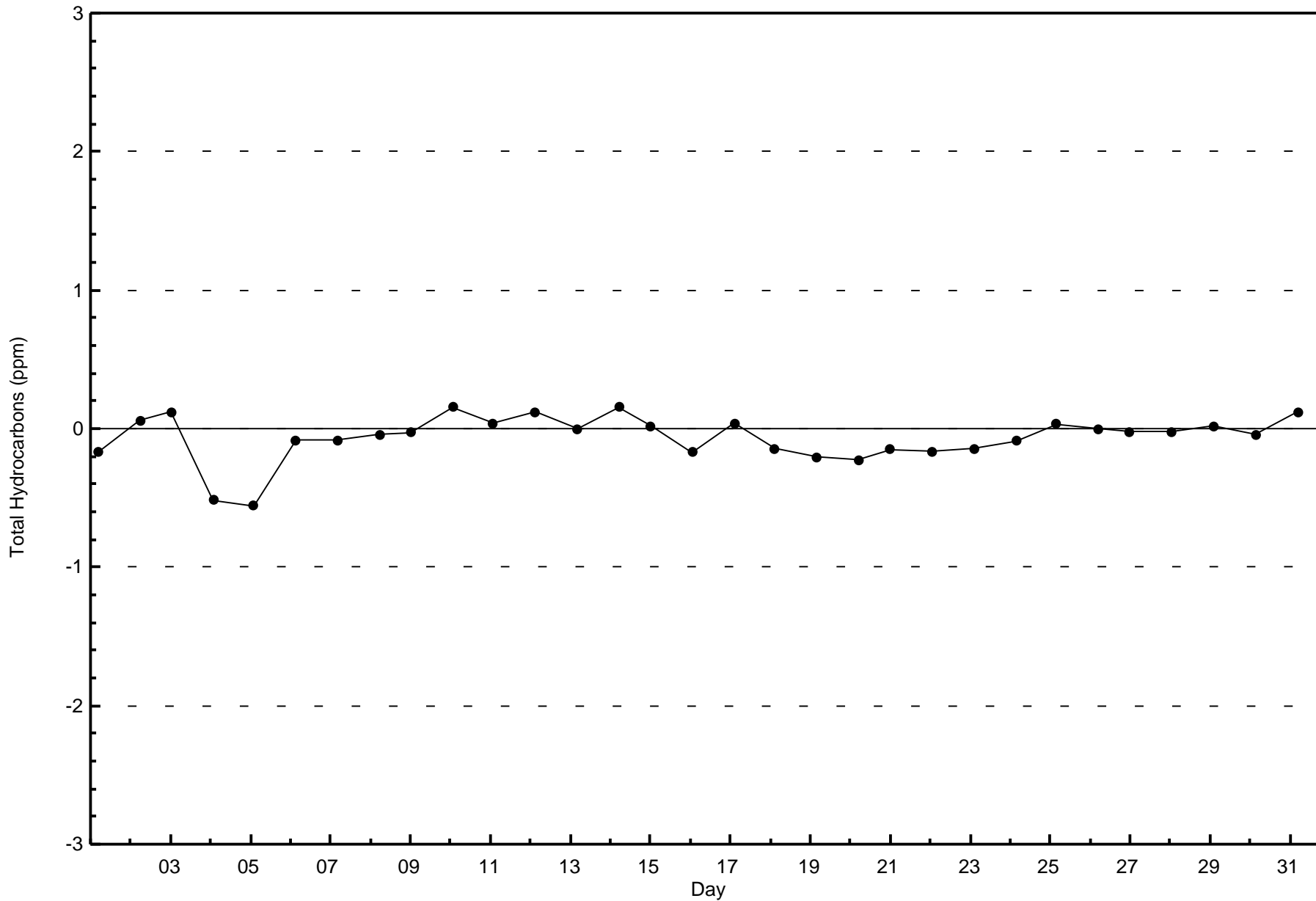
Total Number of Hours: 744

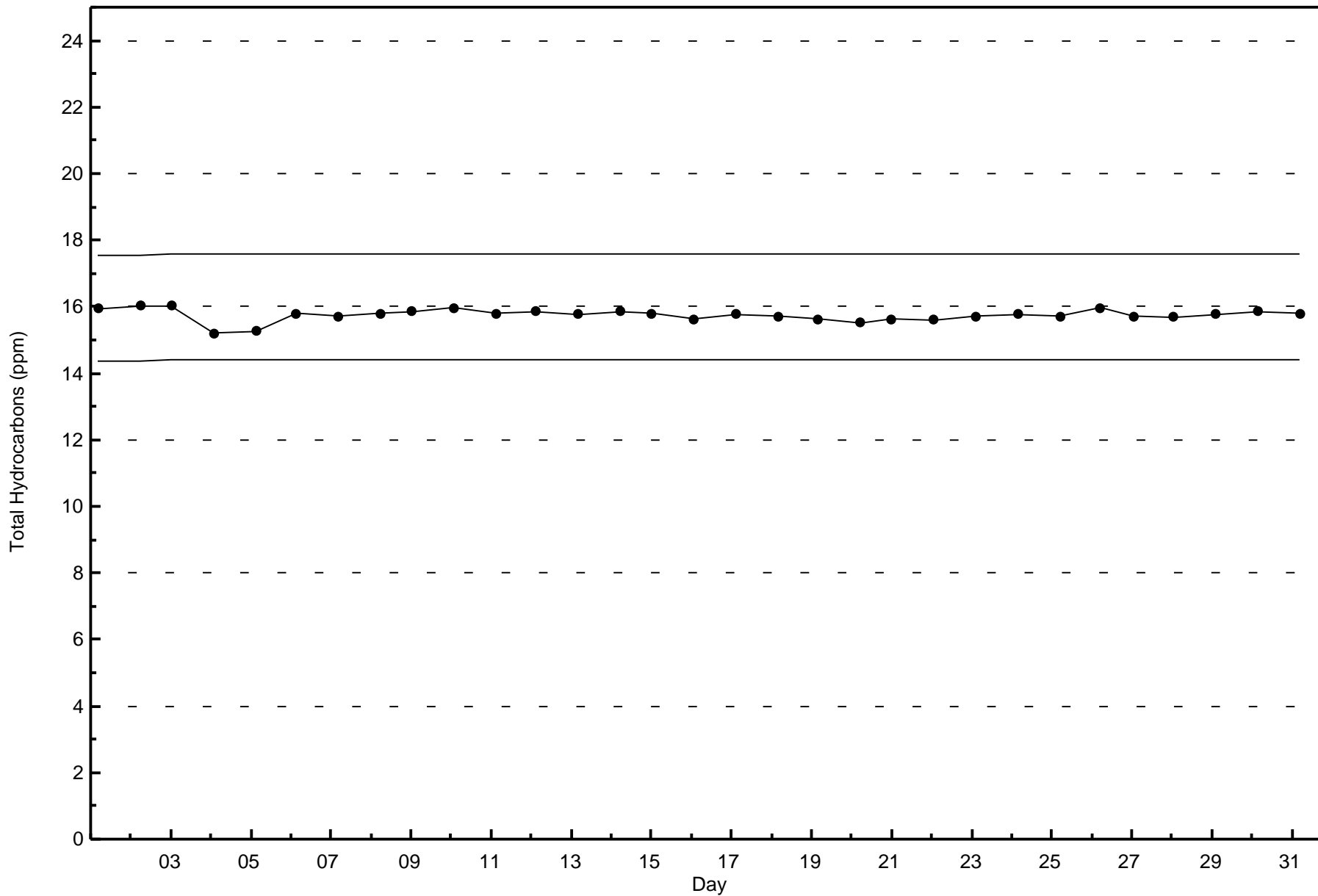


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Total Hydrocarbons (THC) - ppm  
Muskeg River (AMS 16)









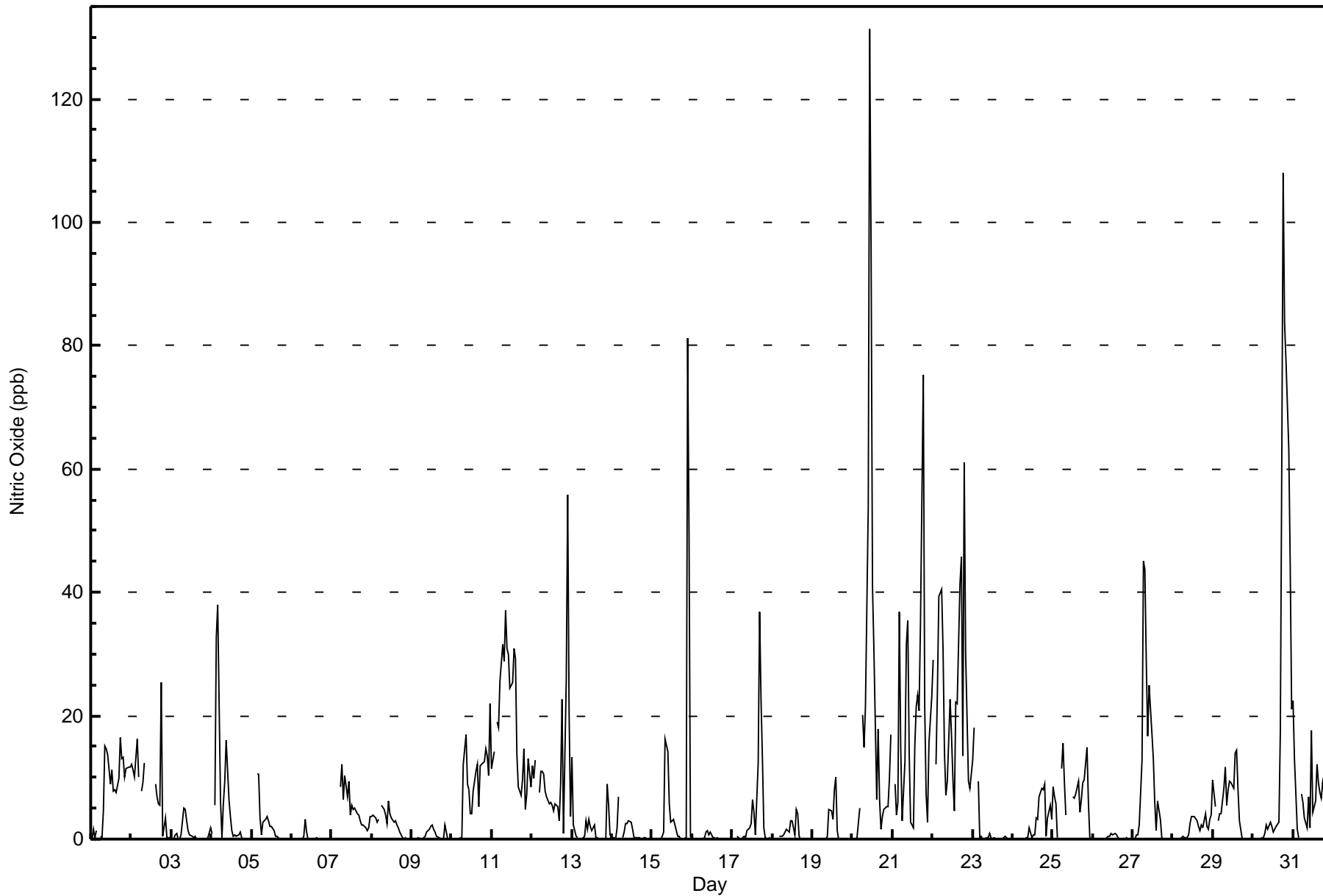
Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

Muskeg River - October 2017

Maximum Value: 131 ppb on Oct 20 11:00		Maximum Daily Average: 22.8 ppb on Oct 22		Hours in Service: 744																																													
Minimum Value: 0 ppb on Oct 3 20:00		Minimum Daily Average: 0.2 ppb on Oct 26		Hours of Data: 705																																													
Maximum Diurnal Average: 11.0 ppb at hour 11		Minimum Diurnal Average: 2.2 ppb at hour 3		Hours of Missing Data: 39																																													
Monthly Average: 6.8 ppb		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 2 Q <sub>3</sub> = 8 P <sub>90</sub> = 17 P <sub>99</sub> = 74		Hours of Calibration: 39																																													
				Percent Operational Time: 100.0																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	0	2	0	1	Z	0	0	5	15	15	14	9	11	8	8	8	10	16	13	13	10	11	12	12	8.4	16																							
2-Oct	12	11	10	16	10	Z	8	9	12	C	C	C	C	C	9	7	6	5	25	0	3	0	0	0	8.1	25																							
3-Oct	Z	0	1	1	0	0	1	5	5	3	1	1	0	0	0	0	0	0	0	0	0	0	0	2	0.9	5																							
4-Oct	1	Z	6	33	38	6	0	6	9	16	6	4	1	0	1	0	1	0	0	0	0	0	0	0	5.6	38																							
5-Oct	0	0	Z	10	11	3	1	3	3	4	3	2	2	1	1	0	0	0	0	0	0	0	0	0	2.0	11																							
6-Oct	0	0	0	Z	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	3																							
7-Oct	0	0	0	0	Z	8	12	6	10	7	9	4	5	5	5	4	4	3	2	2	2	1	2	4	4.2	12																							
8-Oct	4	4	3	3	3	Z	5	5	4	2	6	4	3	3	3	2	2	1	0	0	0	0	0	0	2.6	6																							
9-Oct	Z	0	0	0	0	0	0	0	1	1	2	2	2	2	1	0	0	0	0	0	2	0	0	0	0.6	2																							
10-Oct	0	Z	0	0	0	0	0	12	17	9	8	4	4	8	11	12	5	12	12	13	15	14	10	22	8.2	22																							
11-Oct	11	14	Z	19	18	26	32	29	37	31	30	24	25	31	29	14	8	7	10	15	5	7	13	8	19.3	37																							
12-Oct	12	10	13	Z	8	11	11	11	8	7	6	6	5	5	6	5	3	9	23	1	26	56	21	4	11.5	56																							
13-Oct	13	2	0	0	Z	0	0	0	3	2	3	2	1	2	0	0	0	0	0	0	9	6	1	1	2.0	13																							
14-Oct	0	0	0	2	7	Z	0	1	3	3	3	3	2	0	0	0	0	0	0	0	0	0	0	0	1.1	7																							
15-Oct	Z	0	0	0	0	0	0	1	16	14	6	3	3	3	1	0	0	0	0	0	0	81	49	0	7.8	81																							
16-Oct	0	Z	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
17-Oct	0	0	Z	0	0	0	0	0	0	1	2	3	6	4	1	12	37	23	13	2	0	0	0	0	4.6	37																							
18-Oct	0	0	0	Z	0	0	0	1	2	1	1	3	3	1	5	4	1	0	0	0	0	0	0	0	1.0	5																							
19-Oct	0	0	0	0	Z	0	0	0	0	0	5	5	3	8	10	1	0	0	0	0	0	0	0	0	1.4	10																							
20-Oct	0	0	0	0	5	Z	20	15	21	54	131	96	41	31	6	18	6	2	4	5	5	5	10	17	21.4	131																							
21-Oct	Z	9	4	6	37	15	3	13	32	35	14	3	2	15	21	23	21	35	75	22	7	3	16	23	18.8	75																							
22-Oct	29	Z	12	24	39	40	31	14	7	9	23	17	10	5	22	22	41	46	13	61	30	9	8	11	22.8	61																							
23-Oct	13	18	Z	9	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.9	18																							
24-Oct	0	0	0	Z	0	0	0	0	0	0	2	0	1	1	4	3	7	8	8	9	0	3	6	3	2.4	9																							
25-Oct	8	7	6	0	Z	12	16	9	4	C	C	C	7	7	7	9	4	6	9	10	15	6	0	0	7.1	16																							
26-Oct	0	0	0	0	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.2	1																							
27-Oct	Z	0	1	1	2	13	45	44	29	17	25	17	13	6	1	6	3	0	0	0	0	0	0	0	9.7	45																							
28-Oct	0	Z	0	0	0	0	0	0	0	1	3	4	4	4	3	2	1	2	2	4	2	2	3	4	1.8	4																							
29-Oct	10	5	Z	3	4	4	8	12	6	8	9	9	8	14	14	8	3	0	0	0	0	0	0	0	5.5	14																							
30-Oct	0	0	0	Z	0	0	0	1	2	2	3	2	1	2	2	3	17	60	108	84	78	63	44	21	21.5	108																							
31-Oct	22	13	2	0	Z	7	6	3	2	7	2	18	4	6	12	9	8	7	9	6	14	10	11	19	8.6	22																							
																								5.2	3.7	2.2	5.0	7.3	5.7	6.5	6.6	8.2	8.7	11.0	8.5	5.7	5.7	6.0	5.7	6.1	7.9	10.6	8.0	7.0	9.1	6.8	4.9	Diurnal Average	
																								29	18	13	33	39	40	45	44	37	54	131	96	41	31	29	23	41	60	108	84	78	81	49	23	Diurnal Maximum	
Z - zerospan		C - Calibration																																															







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Muskeg River - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	643	91.21	91.21
21 - 40	43	6.10	97.31
41 - 80	14	1.99	99.29
81 - 159	4	0.57	99.86
> 159	0	0.00	99.86

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitric Oxide (NO) - ppb  
Muskeg River - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	61	35	22	11	6	11	6	32	100	79	53	55	35	35	35	54	630
21 - 40	2	10	2	2	0	1	1	2	4	1	1	0	1	2	3	5	37
11 - 80	2	2	0	1	0	0	0	0	2	1	1	1	0	0	2	1	13
81 - 159	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	4
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	65	48	24	14	6	12	7	34	106	81	55	56	36	37	41	62	684

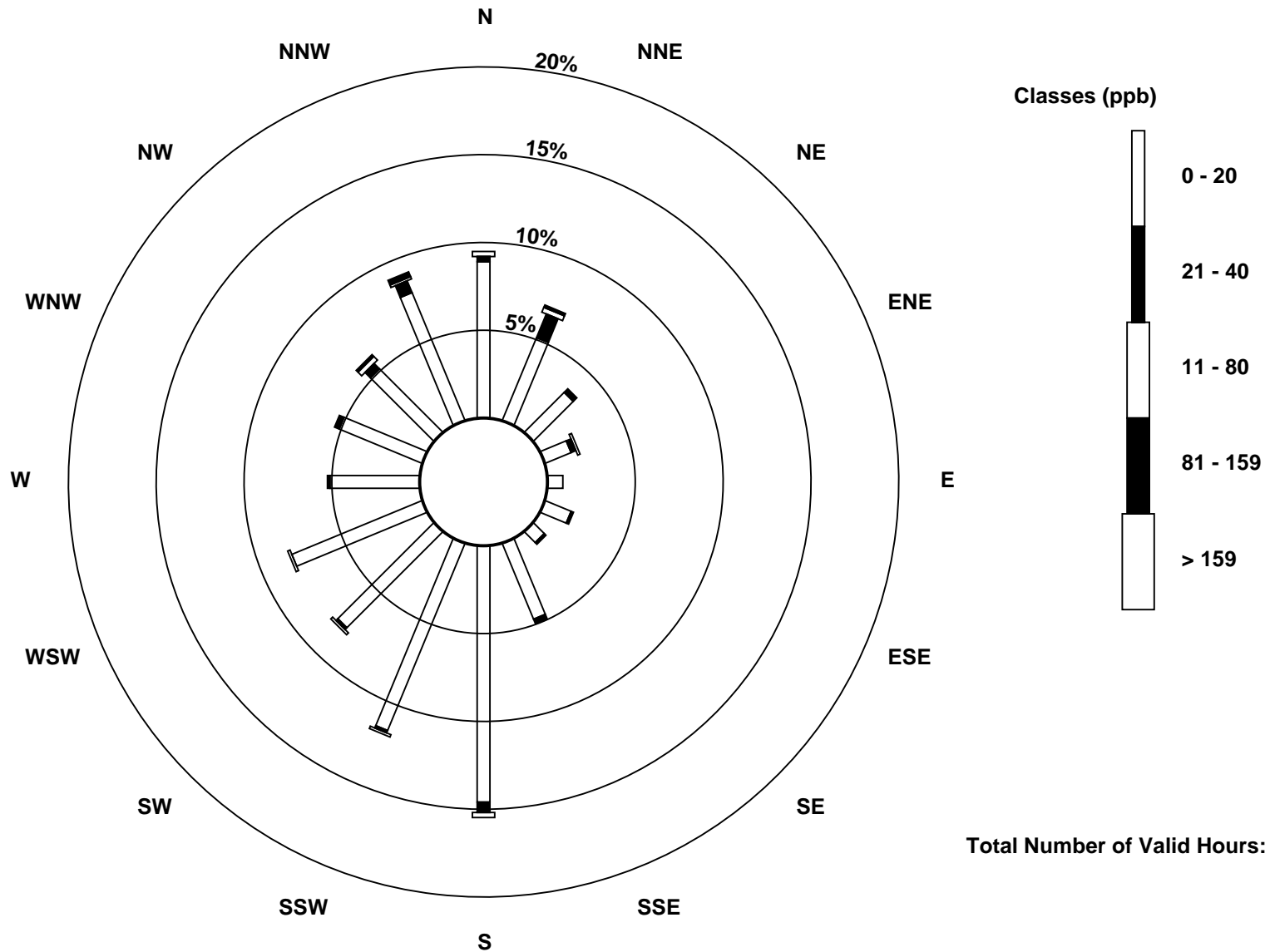
Total Number of Valid Hours: 685

Total Number of Hours: 744

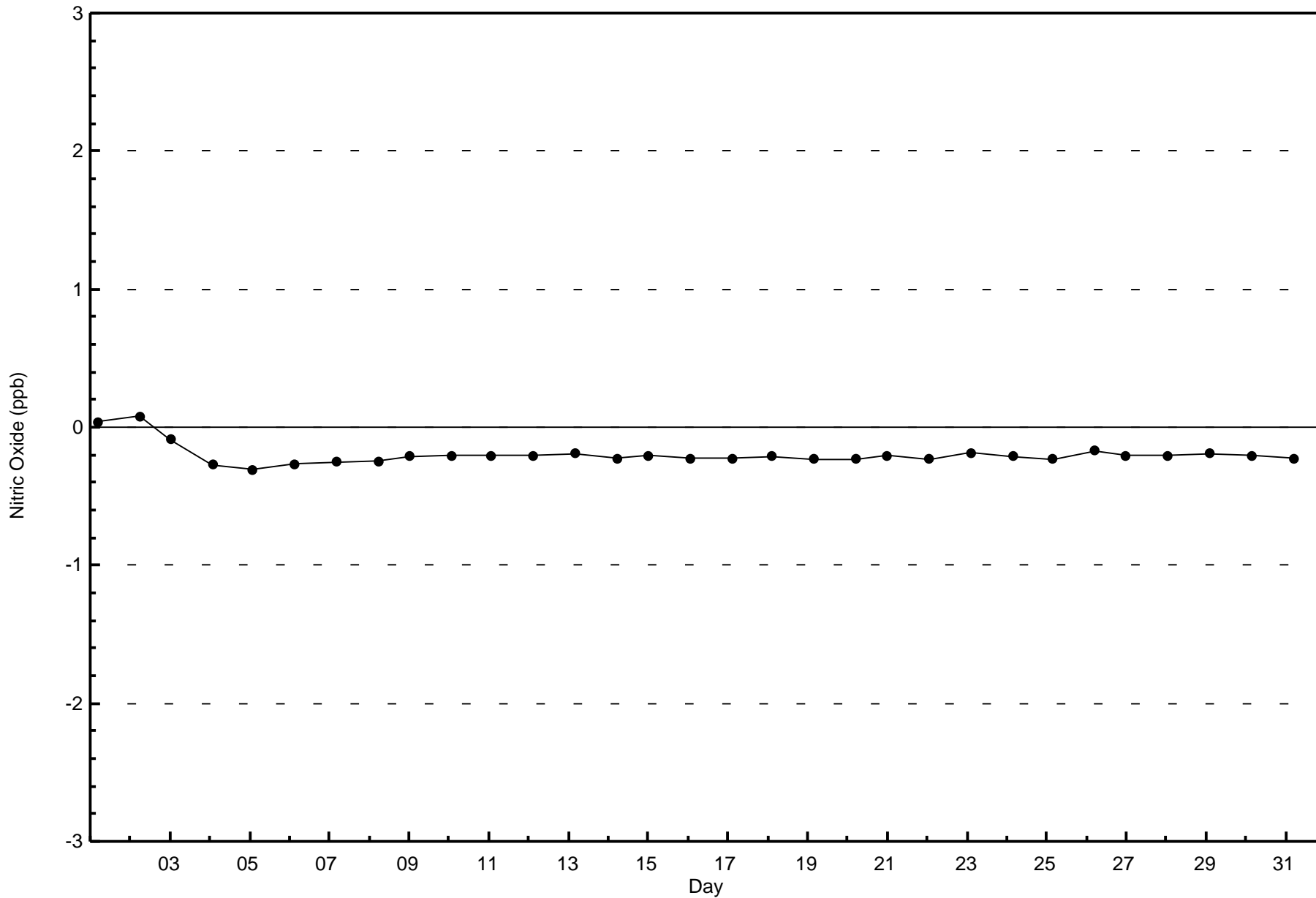


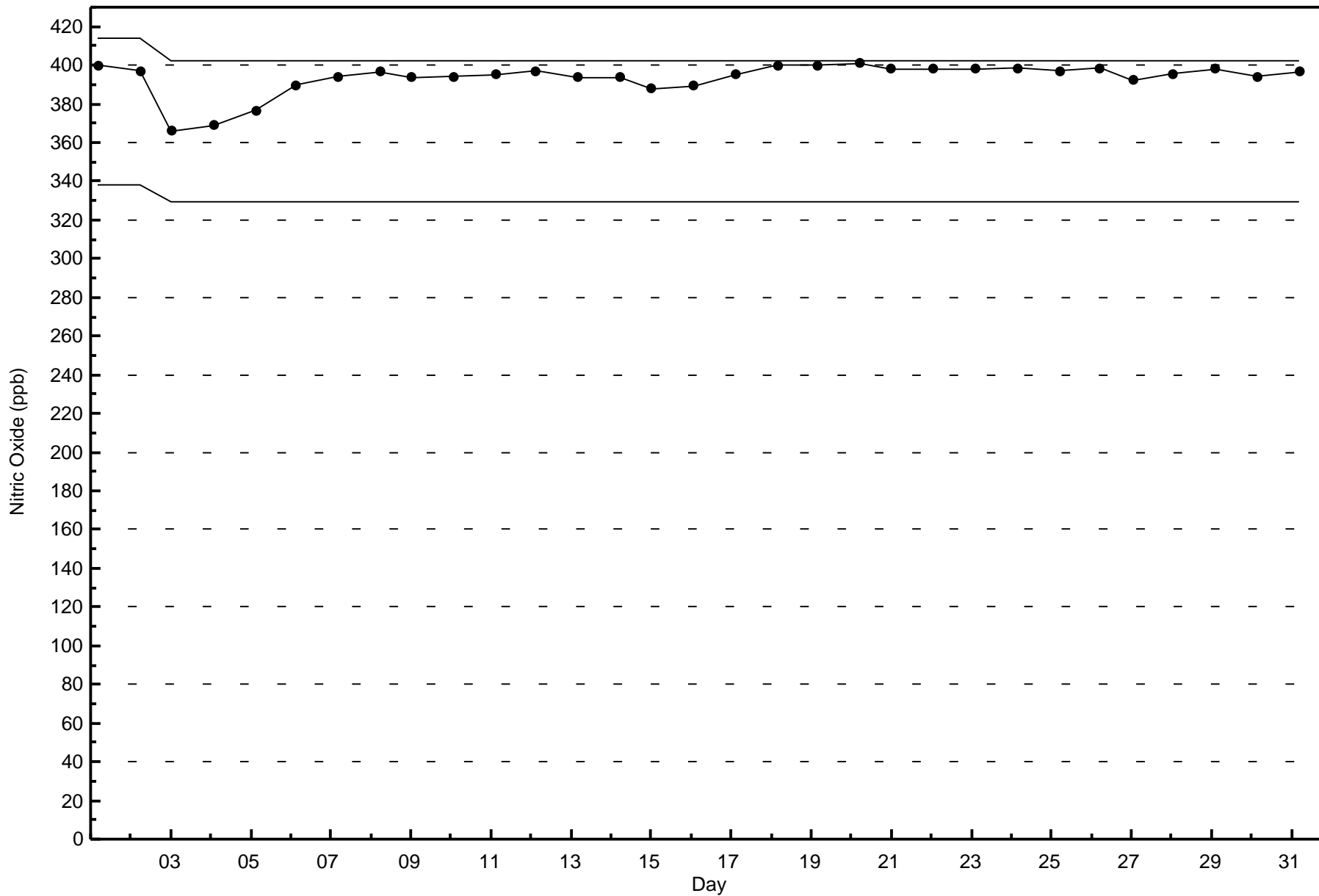
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitric Oxide (NO) - ppb  
Muskeg River (AMS 16)



Total Number of Valid Hours: 685







# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Nitrogen Dioxide (NO<sub>2</sub>) - ppb

## Muskeg River - October 2017

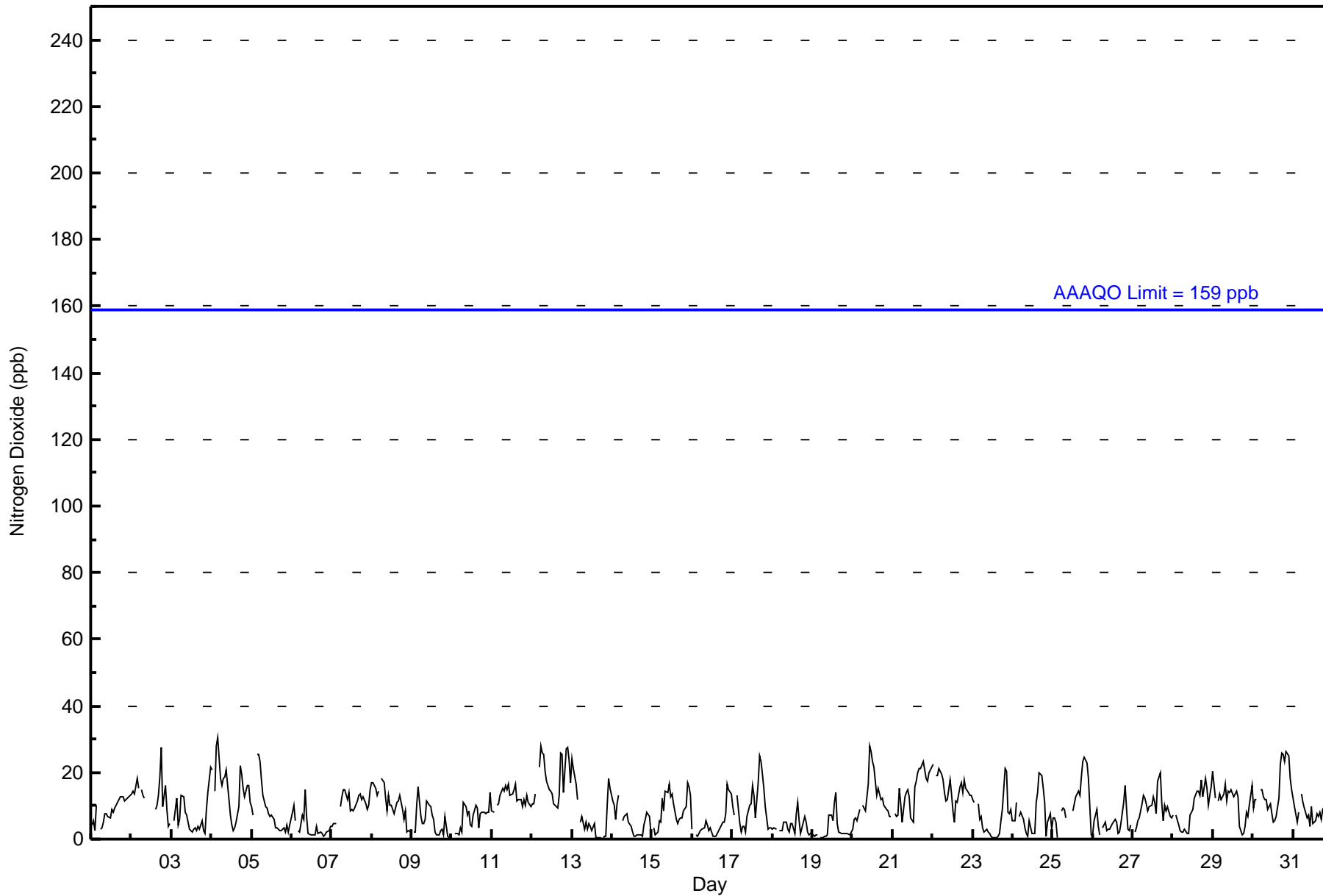
Number of Exceedences (AAAQO):		1-hr: 0    24-hr: 0		Hours in Service:		744																																										
Maximum Value: 31 ppb on Oct 4 05:00		Maximum Daily Average: 18.3 ppb on Oct 12		Hours of Data:		705																																										
Minimum Value: 0 ppb on Oct 13 19:00		Minimum Daily Average: 3.1 ppb on Oct 19		Hours of Missing Data:		39																																										
Maximum Diurnal Average: 10.8 ppb at hour 19		Minimum Diurnal Average: 7.4 ppb at hour 13		Hours of Calibration:		39																																										
Monthly Average: 9.2 ppb		Percentiles: P <sub>1</sub> = 1   P <sub>10</sub> = 2   Q <sub>1</sub> = 4   Median = 9   Q <sub>3</sub> = 13   P <sub>90</sub> = 18   P <sub>99</sub> = 27		Percent Operational Time:		100.0																																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	4	5	3	10	Z	3	3	5	8	8	7	6	9	8	9	10	12	13	13	13	11	12	13	13	8.6	13																						
2-Oct	14	14	14	18	15	Z	15	13	12	C	C	C	C	C	9	10	13	19	28	10	16	9	4	5	13.2	28																						
3-Oct	Z	5	9	12	4	6	13	13	8	7	5	3	2	3	4	2	4	3	6	2	2	9	14	22	6.8	22																						
4-Oct	21	Z	14	28	31	18	16	18	19	21	12	7	4	2	3	5	10	22	20	15	13	16	16	11	14.9	31																						
5-Oct	10	7	Z	26	25	23	18	13	10	9	8	7	4	6	3	3	3	3	3	3	2	4	2	4	8.7	26																						
6-Oct	8	10	5	Z	3	2	7	6	15	7	2	1	1	1	1	4	2	2	2	1	1	2	2	4	3.9	15																						
7-Oct	4	5	5	5	Z	10	13	15	15	12	14	9	9	9	9	11	13	14	12	13	10	9	10	15	10.4	15																						
8-Oct	17	17	15	13	15	Z	18	17	12	9	13	10	10	8	9	11	12	13	9	6	8	2	2	2	10.8	18																						
9-Oct	Z	2	2	10	16	7	5	5	6	11	10	10	7	6	2	1	1	3	3	1	7	1	0	0	5.0	16																						
10-Oct	1	Z	2	2	1	4	2	11	10	7	9	4	4	7	10	9	3	8	8	8	8	8	8	14	6.4	14																						
11-Oct	9	8	Z	10	11	13	15	14	16	15	17	13	14	15	17	12	12	12	10	12	10	13	11	10	12.5	17																						
12-Oct	11	11	14	Z	22	28	26	25	20	17	15	14	14	10	10	9	13	26	25	14	27	28	24	17	18.3	28																						
13-Oct	24	21	17	12	Z	5	7	3	5	3	5	4	3	5	1	1	1	1	1	1	1	10	18	15	6.9	24																						
14-Oct	12	10	6	11	13	Z	6	7	7	8	5	4	2	1	1	1	1	1	1	4	6	8	7	2	5.4	13																						
15-Oct	Z	3	1	2	6	5	12	9	14	14	17	13	14	11	6	5	6	7	7	8	10	17	16	13	9.3	17																						
16-Oct	3	Z	1	1	2	2	3	3	6	4	2	3	1	1	1	2	3	4	5	5	8	16	15	13	4.5	16																						
17-Oct	10	7	Z	13	5	2	4	4	2	7	10	10	16	13	6	17	25	23	20	15	10	3	3	3	10.0	25																						
18-Oct	3	4	3	Z	2	3	3	5	5	3	2	5	5	2	8	11	5	2	3	7	5	2	1	2	3.9	11																						
19-Oct	1	1	1	1	Z	1	1	1	1	1	7	7	6	11	14	5	2	2	2	2	2	2	1	2	3.1	14																						
20-Oct	3	6	7	6	9	Z	10	10	9	16	28	26	23	22	13	15	13	12	12	10	9	9	7	7	12.2	28																						
21-Oct	Z	8	7	7	15	11	5	13	14	15	13	6	5	16	17	20	21	21	24	21	18	17	20	22	14.5	24																						
22-Oct	23	Z	19	19	21	20	18	14	12	12	18	14	8	5	11	11	16	17	14	18	15	14	13	13	15.0	23																						
23-Oct	12	11	Z	11	6	7	3	2	3	2	2	1	0	0	0	1	2	5	9	21	20	8	8	9	6.3	21																						
24-Oct	6	6	11	Z	7	8	6	3	2	1	5	2	2	2	11	14	20	19	15	11	1	5	8	3	7.2	20																						
25-Oct	7	6	5	1	Z	9	9	9	7	C	C	C	8	11	13	14	13	19	23	25	23	18	10	1	11.5	25																						
26-Oct	1	5	9	4	1	Z	3	5	2	3	3	4	5	6	5	2	2	5	11	16	10	3	2	4	4.8	16																						
27-Oct	Z	2	3	6	6	10	13	12	11	8	10	10	13	11	8	17	20	10	5	10	9	10	7	6	9.5	20																						
28-Oct	7	Z	7	4	2	2	2	3	2	2	7	8	9	12	14	15	13	18	13	18	15	10	13	16	9.3	18																						
29-Oct	20	12	Z	11	14	12	14	17	11	14	14	15	13	13	14	13	4	1	2	4	8	7	10	16	11.3	20																						
30-Oct	9	12	12	Z	15	15	13	12	12	9	11	8	5	6	7	12	22	26	25	23	26	25	18	15	14.7	26																						
31-Oct	12	10	5	8	Z	14	11	10	6	7	4	10	5	6	8	7	8	6	9	8	11	10	11	16	8.7	16																						
																								9.6	8.0	7.5	9.6	10.6	9.1	9.4	9.5	9.0	8.7	9.4	8.0	7.4	7.6	7.9	8.7	9.5	10.7	10.8	10.5	10.4	9.9	9.5	9.5	Diurnal Average
																								24	21	19	28	31	28	26	25	20	21	28	26	23	22	17	20	25	26	28	25	27	28	24	22	Diurnal Maximum

Z - zerospan    C - Calibration  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



Wood Buffalo Environmental Association  
Hourly Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Muskeg River - October 2017





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Muskeg River - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	661	93.76	93.76
21 - 40	44	6.24	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744





**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Muskeg River - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	61	45	24	12	6	11	7	31	105	77	52	56	36	34	35	50	642
21 - 40	4	3	0	2	0	1	0	3	1	4	3	0	1	3	6	12	43
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	65	48	24	14	6	12	7	34	106	81	55	56	37	37	41	62	685

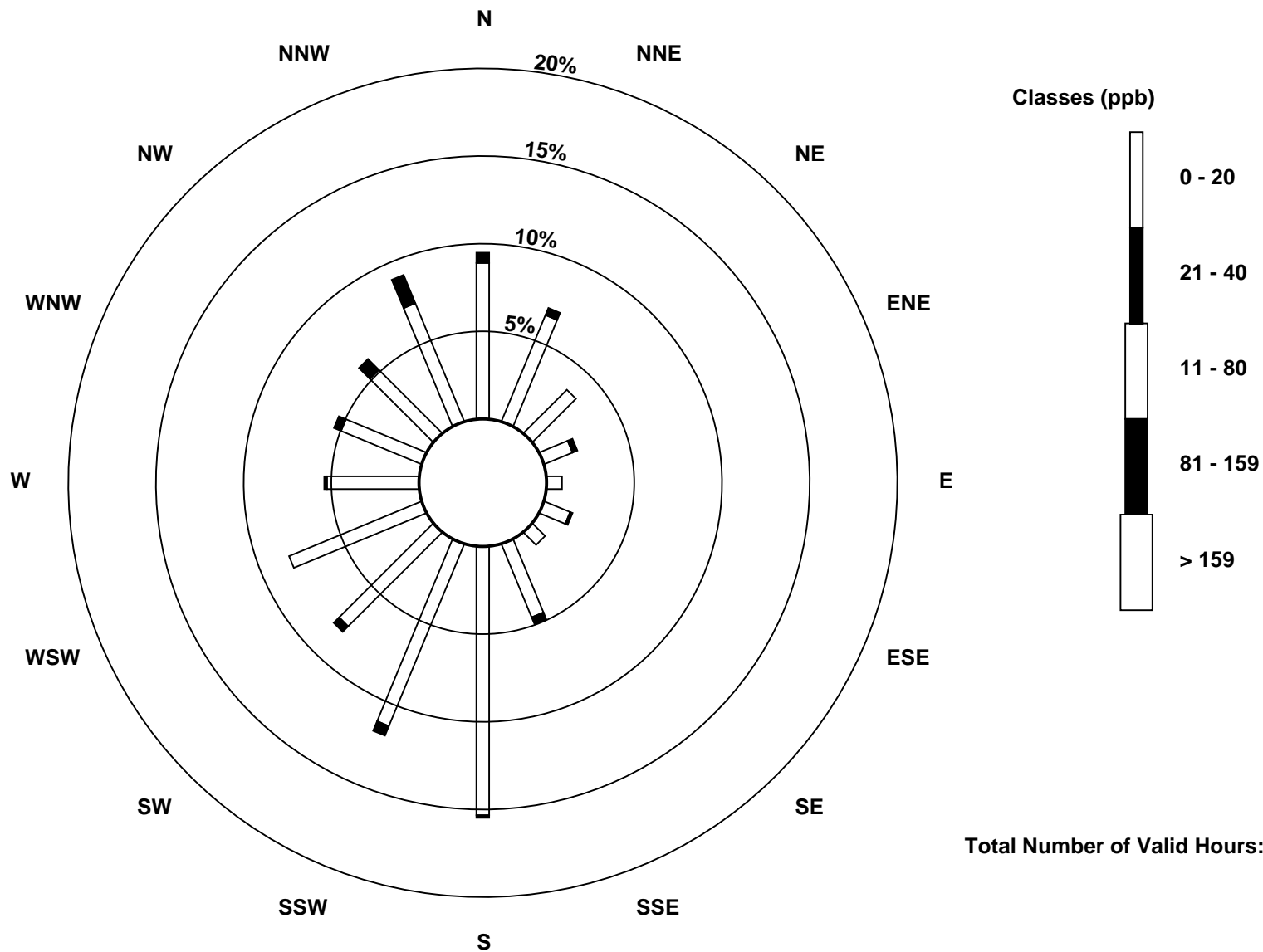
Total Number of Valid Hours: 685

Total Number of Hours: 744

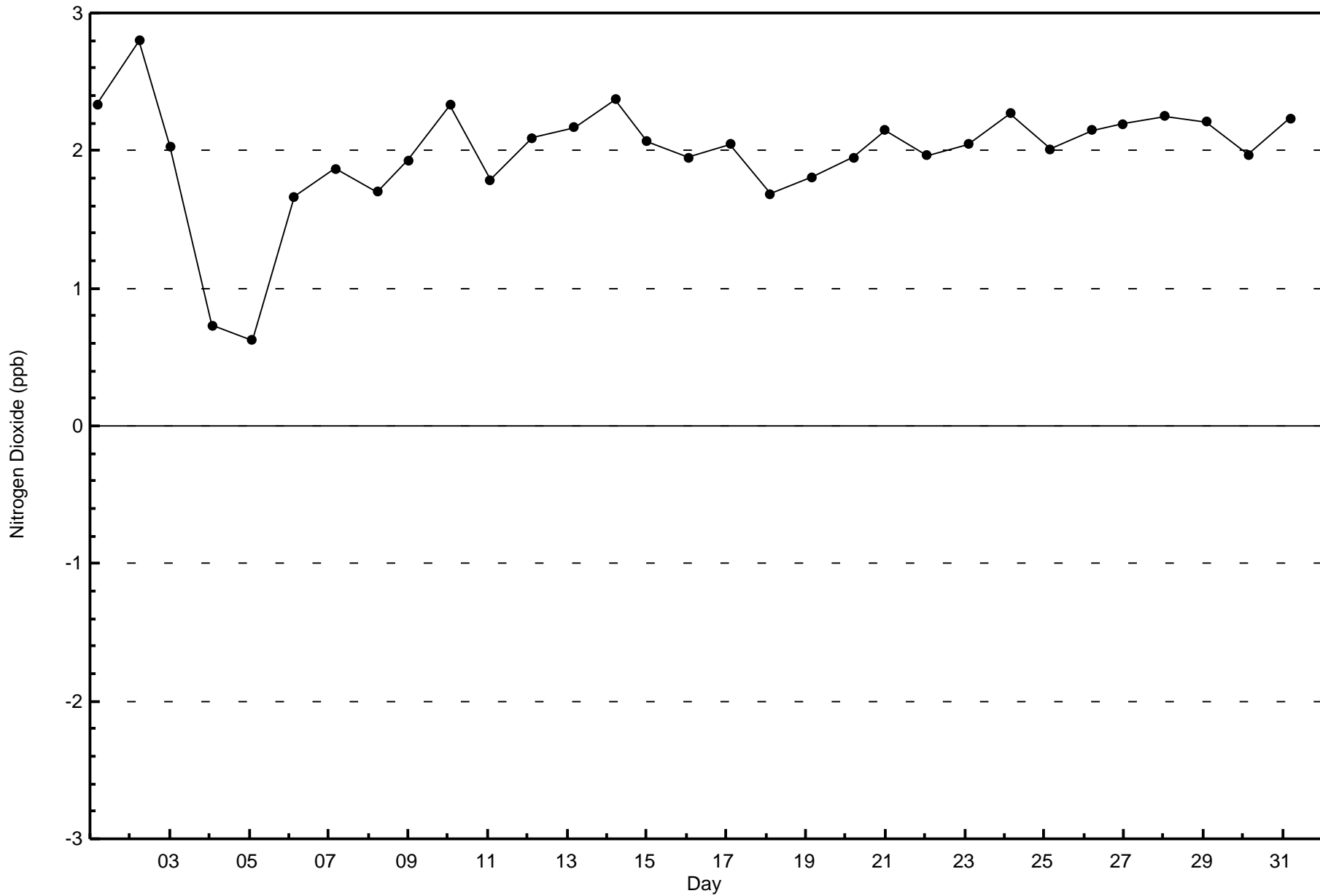


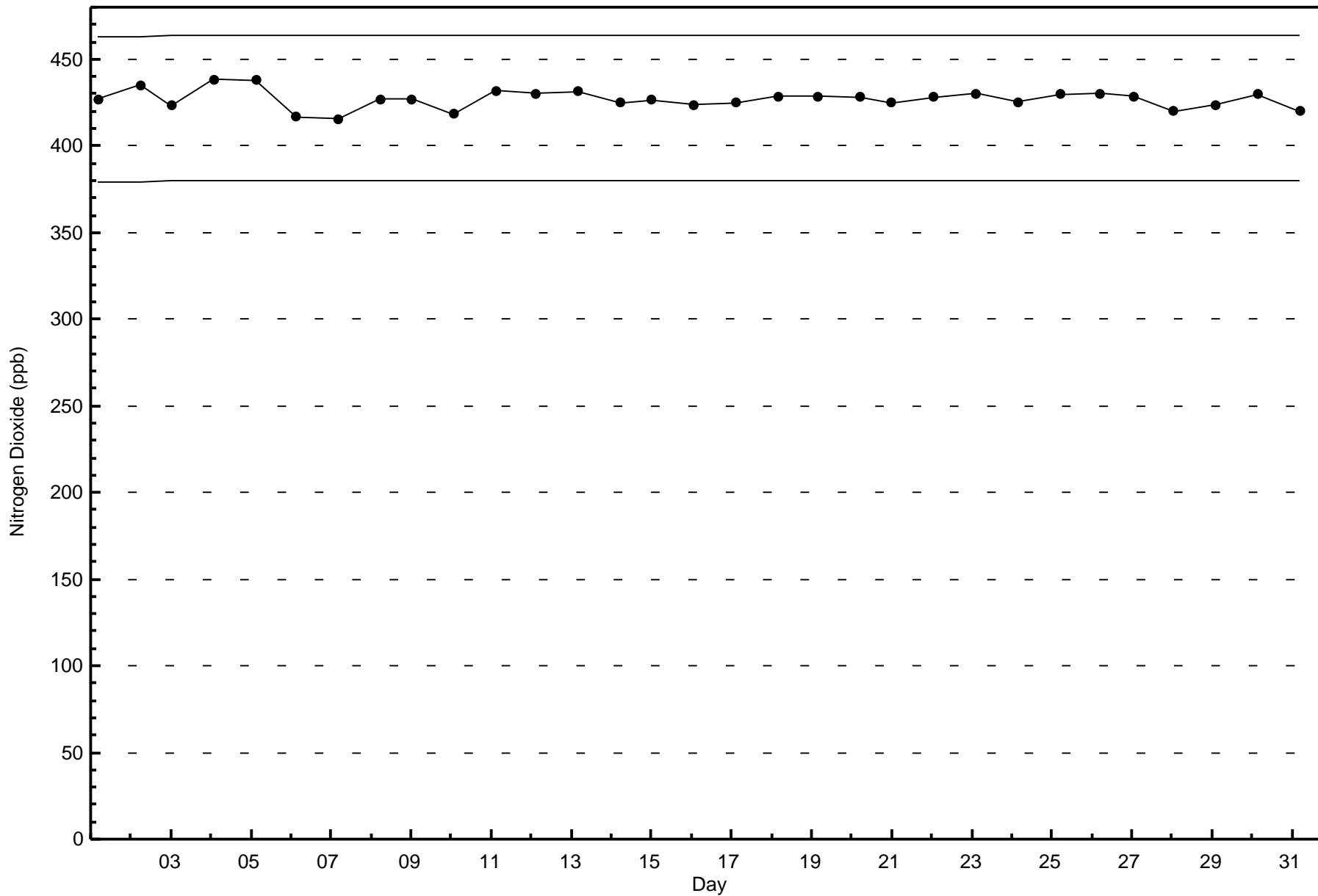
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Muskeg River (AMS 16)



Total Number of Valid Hours: 685



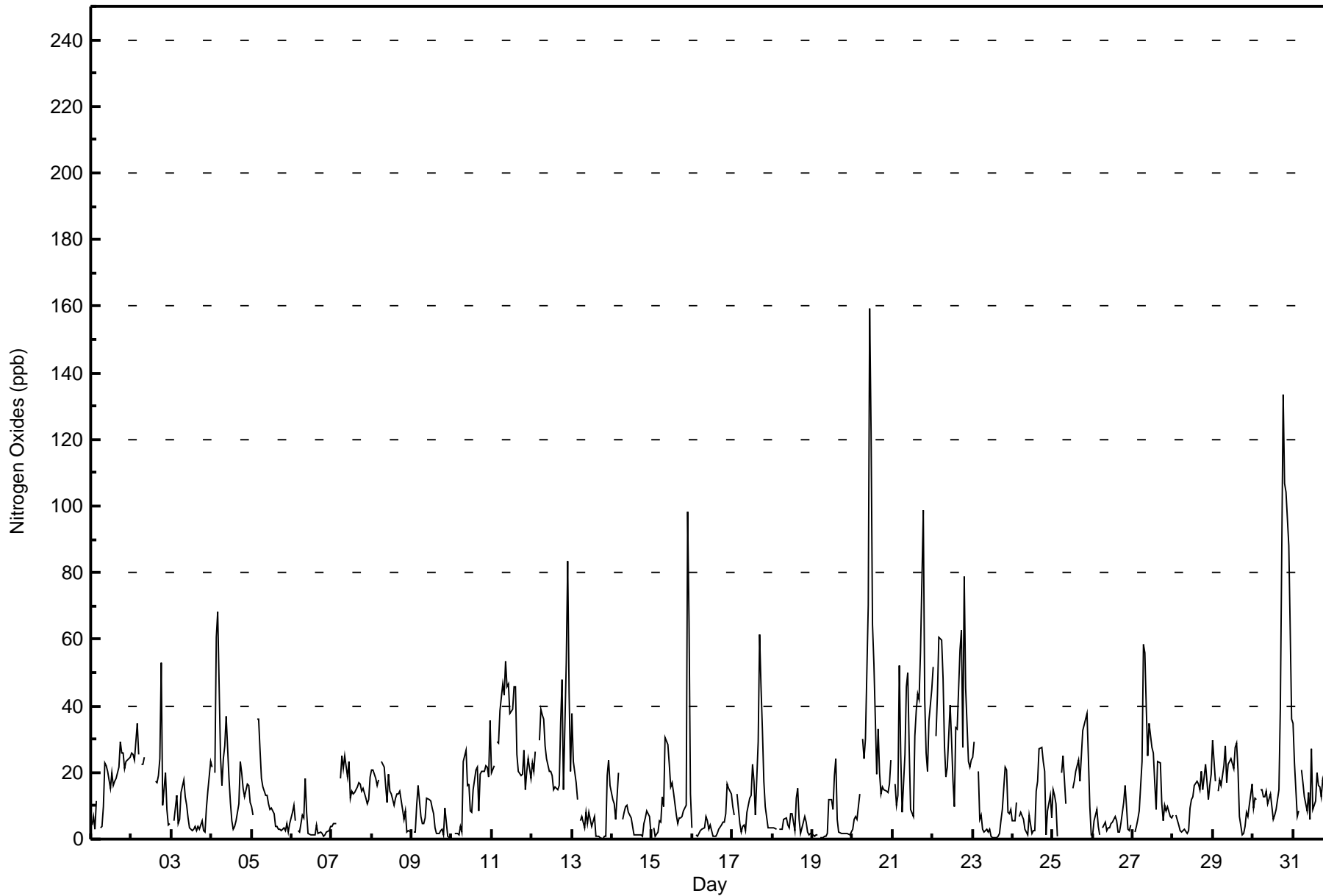




**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Muskeg River - October 2017**

Maximum Value: 159 ppb on Oct 20 11:00		Maximum Daily Average: 37.7 ppb on Oct 22		Hours in Service: 744																																													
Minimum Value: 0 ppb on Oct 13 19:00		Minimum Daily Average: 4.1 ppb on Oct 6		Hours of Data: 705																																													
Maximum Diurnal Average: 21.4 ppb at hour 19		Minimum Diurnal Average: 9.7 ppb at hour 3		Hours of Missing Data: 39																																													
Monthly Average: 16.0 ppb		Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 4 Median = 12 O <sub>3</sub> = 22 P <sub>90</sub> = 35 P <sub>99</sub> = 98		Hours of Calibration: 39																																													
				Percent Operational Time: 100.0																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	4	7	3	12	Z	3	4	10	23	22	20	15	20	16	17	18	22	29	26	26	21	23	24	25	17.0	29																							
2-Oct	26	25	24	35	25	Z	23	22	24	C	C	C	C	C	18	17	19	24	53	10	20	9	4	5	21.3	53																							
3-Oct	Z	5	9	13	5	6	14	18	13	10	6	4	3	3	4	2	4	3	6	2	2	9	14	23	7.8	23																							
4-Oct	22	Z	20	61	68	24	16	24	28	37	18	11	6	3	4	5	11	23	20	15	13	16	16	11	20.5	68																							
5-Oct	10	7	Z	36	36	27	18	16	13	13	11	9	9	7	4	4	3	3	3	3	2	5	2	5	10.7	36																							
6-Oct	8	10	5	Z	3	2	7	6	18	8	2	1	1	1	1	4	2	2	2	1	1	2	2	4	4.1	18																							
7-Oct	4	5	4	5	Z	18	25	21	25	19	24	12	14	13	14	16	17	16	14	15	12	10	12	19	14.6	25																							
8-Oct	21	21	18	16	18	Z	23	22	16	11	19	14	13	10	12	13	14	14	9	6	9	2	2	2	13.4	23																							
9-Oct	Z	2	2	10	16	7	5	5	6	12	12	12	9	7	3	1	2	3	3	1	9	1	0	0	5.6	16																							
10-Oct	1	Z	2	2	1	4	2	23	27	16	17	8	8	15	21	22	8	19	20	20	22	22	18	36	14.5	36																							
11-Oct	20	22	Z	29	29	39	47	43	53	46	47	38	39	46	46	25	20	19	19	27	15	20	24	18	31.8	53																							
12-Oct	23	20	26	Z	29	39	37	36	28	24	20	20	19	15	16	15	16	35	48	15	53	83	44	21	29.7	83																							
13-Oct	38	23	17	12	Z	5	7	3	8	5	8	6	4	7	1	1	1	1	0	1	1	19	24	16	9.0	38																							
14-Oct	12	10	6	13	20	Z	6	8	10	10	8	6	4	1	1	1	1	1	1	5	6	8	7	2	6.4	20																							
15-Oct	Z	3	1	2	6	5	13	10	30	28	22	16	17	14	7	5	6	7	7	9	10	98	65	13	17.1	98																							
16-Oct	3	Z	1	1	2	2	3	4	7	6	3	4	1	1	1	2	3	4	5	5	8	17	15	14	4.8	17																							
17-Oct	10	7	Z	14	5	2	4	4	3	8	12	13	23	18	7	29	62	46	33	17	10	3	3	3	14.5	62																							
18-Oct	3	4	3	Z	3	3	3	6	7	4	3	8	8	3	12	15	6	2	3	7	5	2	1	2	4.9	15																							
19-Oct	1	1	1	1	Z	1	1	1	1	2	12	12	9	19	24	6	2	2	1	2	2	2	1	2	4.5	24																							
20-Oct	3	6	7	6	14	Z	30	24	30	70	159	122	64	52	20	33	20	13	16	15	14	14	17	24	33.6	159																							
21-Oct	Z	16	10	13	52	25	8	25	46	50	27	9	7	31	39	44	42	56	99	42	26	20	35	45	33.4	99																							
22-Oct	52	Z	31	43	61	60	48	28	19	22	40	30	18	10	34	33	57	63	28	79	45	23	22	24	37.7	79																							
23-Oct	25	29	Z	20	6	7	3	2	3	2	3	1	0	1	0	1	2	5	9	22	21	8	8	9	8.2	29																							
24-Oct	6	5	11	Z	7	8	6	3	2	1	7	2	3	3	14	17	27	27	23	20	1	8	13	6	9.6	27																							
25-Oct	15	13	11	1	Z	20	25	18	10	C	C	C	15	17	20	24	17	25	32	34	38	24	10	1	18.6	38																							
26-Oct	1	5	9	4	1	Z	3	5	2	3	3	5	5	7	6	2	2	4	11	16	10	3	2	4	5.0	16																							
27-Oct	Z	2	4	6	9	23	58	56	39	25	35	28	26	17	9	24	23	11	5	10	9	10	7	7	19.2	58																							
28-Oct	7	Z	7	4	2	2	3	3	2	3	10	12	13	16	17	17	15	20	15	22	17	12	16	19	11.0	22																							
29-Oct	30	18	Z	14	18	16	22	28	17	22	23	24	21	28	29	21	7	1	2	4	8	7	10	17	16.8	30																							
30-Oct	9	12	12	Z	15	15	13	13	14	11	13	10	6	7	9	15	40	86	133	107	104	88	63	36	36.1	133																							
31-Oct	35	23	7	8	Z	21	17	13	8	14	6	27	9	12	20	16	16	13	18	14	25	20	22	35	17.3	35																							
																								14.8	11.7	9.7	14.6	18.0	14.8	15.9	16.1	17.2	17.4	20.4	16.5	13.1	13.3	13.9	14.4	15.6	18.6	21.4	18.4	17.3	19.0	16.3	14.4	Diurnal Average	
																								52	29	31	61	68	60	58	56	53	70	159	122	64	52	46	44	62	86	133	107	104	98	65	45	Diurnal Maximum	
Z - zerospan		C - Calibration																																															





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Muskeg River - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	518	73.48	73.48
21 - 40	138	19.57	93.05
41 - 80	39	5.53	98.58
81 - 159	10	1.42	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Muskeg River - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	29	17	18	10	3	9	6	30	88	73	52	55	31	29	28	36	514
21 - 40	33	21	6	2	3	2	1	2	15	6	1	0	4	7	7	18	128
11 - 80	1	8	0	2	0	1	0	2	3	1	1	1	1	1	5	6	33
81 - 159	2	2	0	0	0	0	0	0	0	1	1	0	1	0	1	2	10
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	65	48	24	14	6	12	7	34	106	81	55	56	37	37	41	62	685

Total Number of Valid Hours: 685

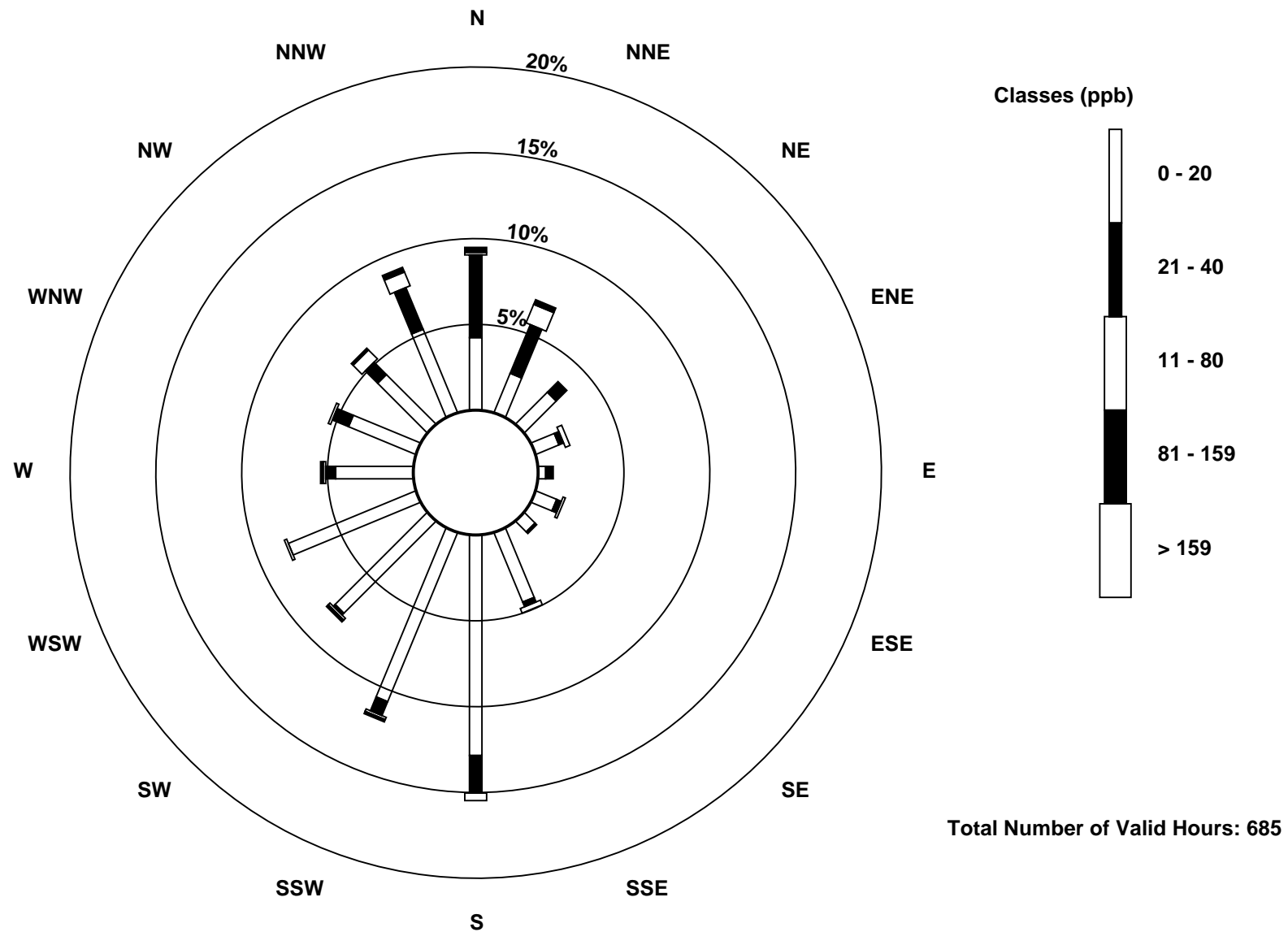
Total Number of Hours: 744

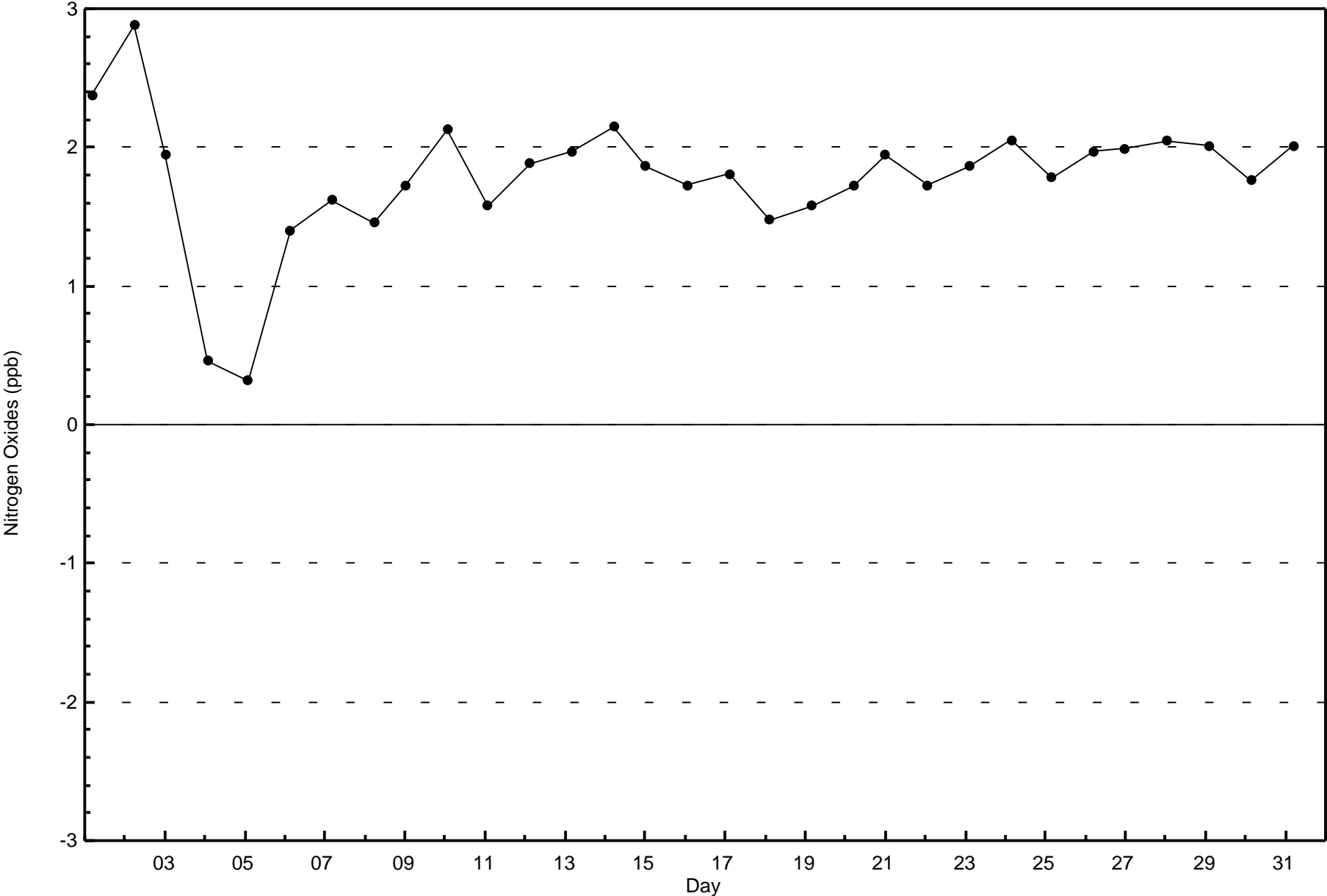


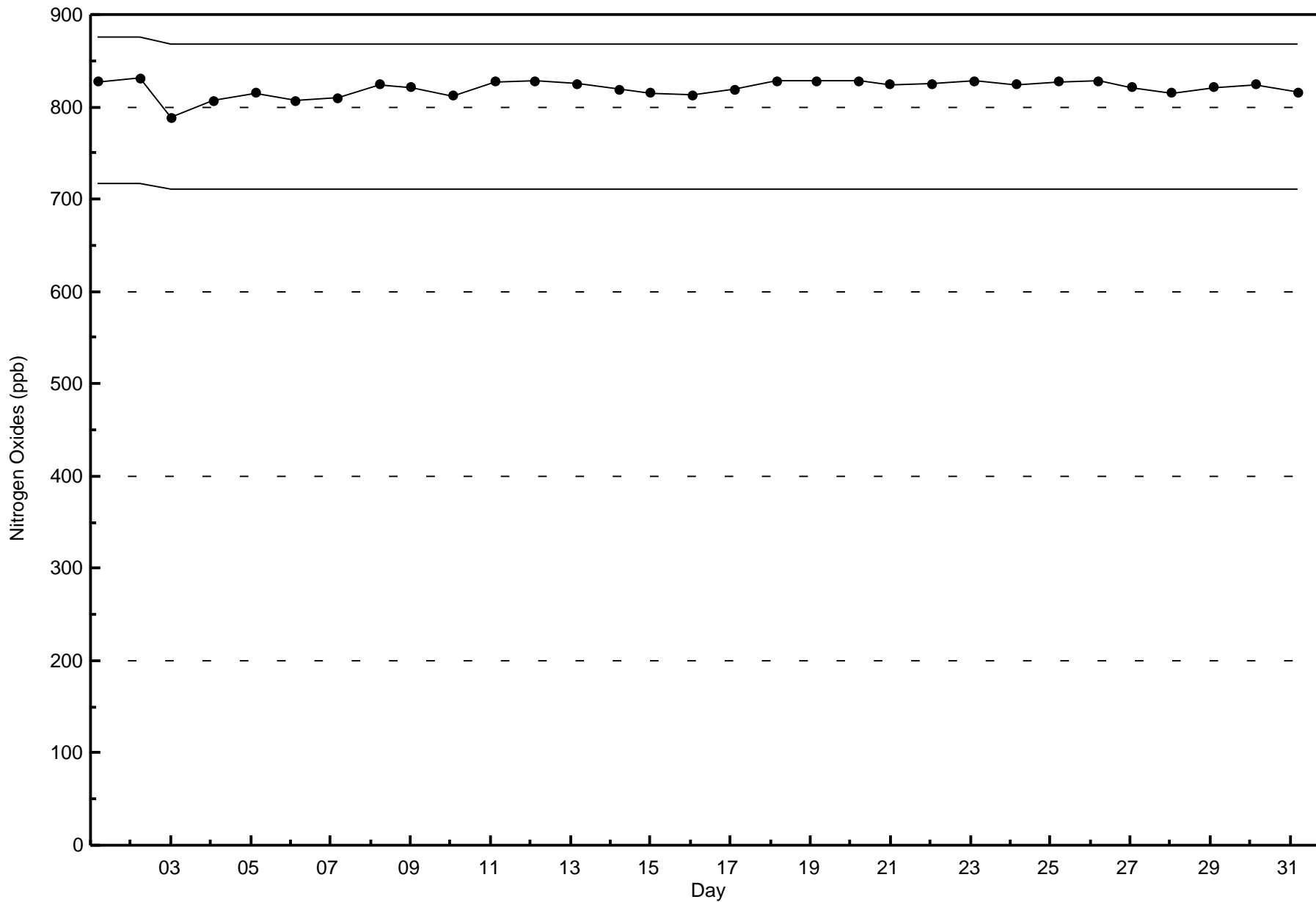


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Muskeg River (AMS 16)







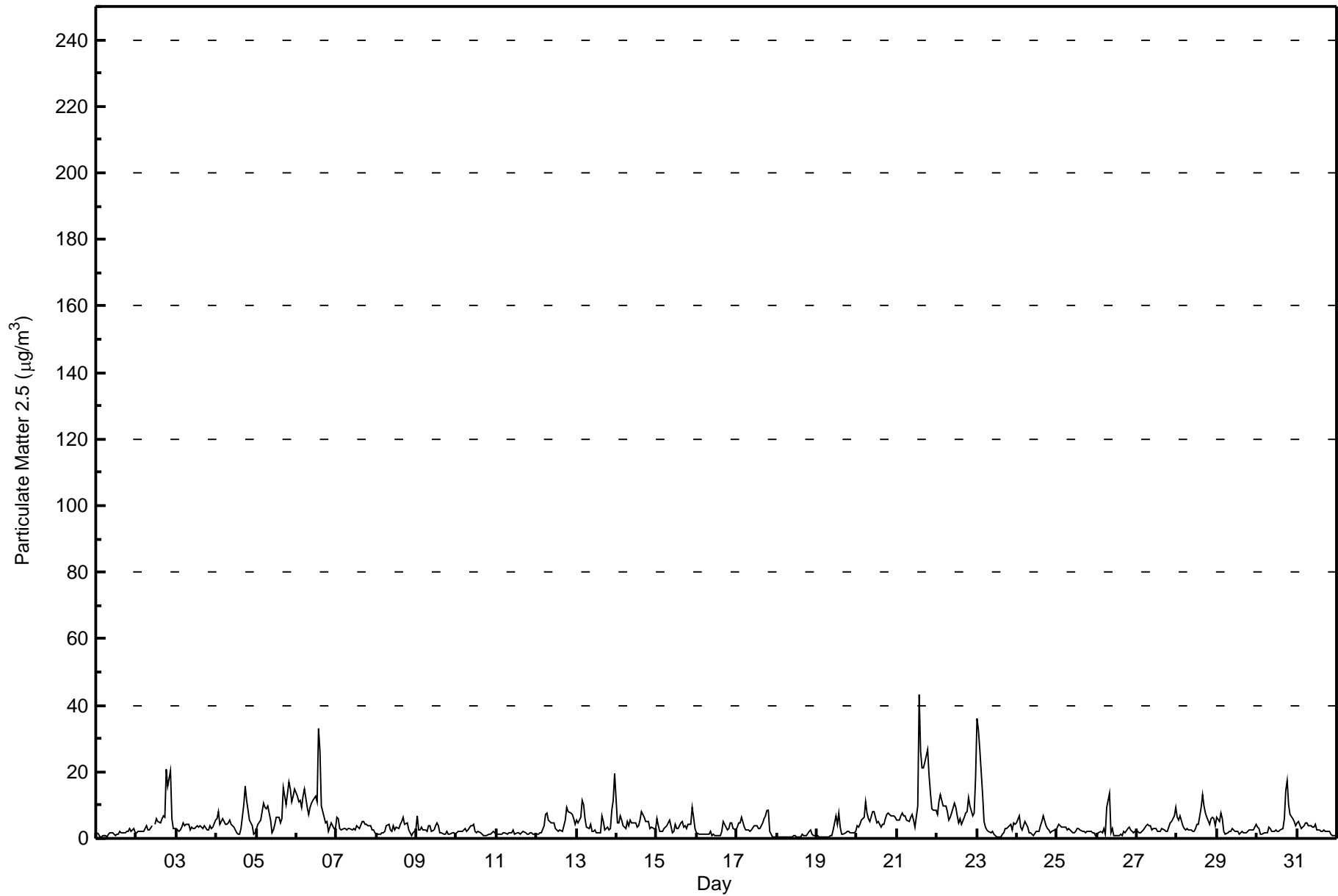


Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 43.3 µg/m <sup>3</sup> on Oct 21 14:00 Maximum Daily Average: 12.6 µg/m <sup>3</sup> on Oct 21		Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 1 Percent Operational Time: 100.0																								
Minimum Value: 0.2 µg/m <sup>3</sup> on Oct 18 04:00 Maximum Diurnal Average: 6.0 µg/m <sup>3</sup> at hour 19 Monthly Average: 4.36 µg/m <sup>3</sup>		Minimum Daily Average: 0.8 µg/m <sup>3</sup> on Oct 18 Minimum Diurnal Average: 3.2 µg/m <sup>3</sup> at hour 10 Percentiles: P <sub>1</sub> = 0.3 P <sub>10</sub> = 1.2 Q <sub>1</sub> = 1.9 Median = 3.0 Q <sub>3</sub> = 5.2 P <sub>90</sub> = 8.4 P <sub>99</sub> = 26.2																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	1.6	1.4	0.3	0.6	0.7	0.7	0.6	1.3	1.8	1.6	1.6	0.9	1.2	1.3	2.0	1.9	1.6	1.7	2.3	2.0	2.8	2.2	2.8	1.9	1.5	2.8
2-Oct	1.6	2.1	2.1	2.0	2.3	2.9	3.8	2.4	2.6	3.7	C	4.3	6.0	5.1	4.8	5.9	6.6	6.2	20.6	15.6	20.5	6.0	3.1	3.1	5.8	20.6
3-Oct	2.8	2.0	2.8	3.5	4.5	4.0	4.3	4.1	2.7	3.6	2.9	2.8	4.0	3.5	3.7	3.3	3.0	3.6	2.6	2.7	3.7	3.1	3.2	5.6	3.4	5.6
4-Oct	5.8	8.2	4.1	5.1	5.7	4.1	4.2	4.6	5.6	4.3	3.3	2.6	1.7	1.1	1.4	3.1	10.1	15.8	11.4	8.4	5.4	3.8	1.1	1.6	5.1	15.8
5-Oct	3.1	4.1	5.3	8.2	10.6	9.2	9.0	9.8	5.5	1.9	2.3	4.4	6.5	6.2	4.7	6.1	15.3	12.8	10.4	17.1	14.7	10.8	12.9	14.9	8.6	17.1
6-Oct	12.8	11.1	11.6	9.4	12.8	14.7	9.2	7.3	9.3	10.4	11.4	12.9	11.2	33.1	26.4	9.8	8.2	4.6	4.9	2.0	3.5	4.7	3.2	3.1	10.3	33.1
7-Oct	6.1	5.8	3.0	2.5	3.0	2.9	2.6	3.0	3.0	2.4	2.8	2.7	3.7	3.4	2.9	5.1	5.2	4.3	4.3	4.0	3.8	2.4	2.5	1.6	3.5	6.1
8-Oct	1.4	1.4	1.5	1.5	1.7	2.3	3.7	4.3	2.4	2.1	3.6	2.4	3.4	2.9	4.0	5.0	6.5	4.2	4.8	2.6	1.5	0.9	1.5	2.7	2.8	6.5
9-Oct	6.8	2.4	2.5	3.3	2.6	2.7	2.0	3.7	3.7	2.2	2.7	3.8	4.7	3.7	1.9	1.5	1.2	1.2	2.1	1.4	1.5	1.5	1.6	1.4	2.6	6.8
10-Oct	1.6	2.1	2.3	2.1	2.4	2.8	2.0	2.5	3.7	3.9	4.3	2.2	1.9	2.1	1.8	1.3	1.0	1.0	1.1	1.3	1.4	1.7	2.0	1.6	2.1	4.3
11-Oct	1.3	1.1	1.2	1.4	1.5	1.5	1.5	1.6	1.9	1.5	2.4	1.3	1.5	1.7	1.5	1.7	1.9	1.9	1.4	1.5	1.6	1.8	1.2	1.2	1.5	2.4
12-Oct	1.3	1.4	1.7	1.6	3.7	7.3	7.5	5.5	5.0	4.5	4.8	3.1	2.4	2.3	2.5	2.2	3.7	5.7	9.4	8.2	7.4	7.3	6.1	4.3	4.5	9.4
13-Oct	5.4	4.6	6.3	11.6	10.3	6.1	3.2	3.0	4.3	2.2	2.1	2.6	1.6	1.7	1.7	6.7	5.0	2.7	3.4	2.7	2.9	8.3	11.3	19.7	5.4	19.7
14-Oct	4.8	4.7	6.8	5.5	3.9	3.0	5.3	3.8	5.7	4.7	4.7	4.8	3.6	4.0	5.4	8.2	6.2	4.9	5.3	5.0	2.9	3.5	2.9	2.4	4.7	8.2
15-Oct	5.8	3.6	2.2	2.3	3.2	3.2	3.9	4.9	5.4	1.8	2.0	4.3	3.0	3.1	4.5	5.2	3.4	4.0	3.1	4.4	4.1	9.3	6.4	2.9	4.0	9.3
16-Oct	1.5	1.5	1.1	1.1	1.1	1.1	1.1	1.2	2.0	1.0	1.3	0.9	0.8	0.8	0.8	1.9	5.0	3.4	2.7	2.9	4.6	4.6	2.9	2.4	2.0	5.0
17-Oct	3.4	4.6	4.8	6.4	3.3	2.7	2.5	2.4	2.2	2.4	3.8	3.9	4.0	3.0	2.9	4.5	6.0	6.8	8.7	8.3	2.0	0.5	0.3	0.3	3.7	8.7
18-Oct	0.4	0.4	0.3	0.2	0.2	0.2	0.2	0.4	0.5	0.6	0.8	1.0	0.5	0.3	0.6	1.1	1.0	0.7	0.9	2.1	2.5	1.3	0.9	0.9	0.8	2.5
19-Oct	0.7	0.6	0.6	0.5	0.5	0.5	0.6	0.6	0.7	0.7	2.6	6.7	4.3	7.6	3.5	1.3	1.1	1.6	2.0	1.9	1.8	1.9	1.9	2.2	1.9	7.6
20-Oct	3.7	3.2	4.2	5.6	6.2	10.8	7.4	6.0	4.9	8.1	8.1	6.5	4.8	5.3	3.4	4.3	4.1	5.7	7.2	7.6	6.9	6.9	6.7	6.3	6.0	10.8
21-Oct	5.6	5.6	6.6	7.7	6.8	6.8	5.4	5.2	6.2	7.0	5.4	3.5	9.9	43.3	26.2	21.3	21.0	22.8	26.7	18.9	13.6	9.0	8.5	8.4	12.6	43.3
22-Oct	7.4	11.1	13.3	11.5	9.6	9.7	7.9	5.7	6.2	7.7	10.7	9.5	6.8	4.7	6.1	4.3	6.4	7.5	8.1	12.3	9.6	6.6	7.8	18.2	8.7	18.2
23-Oct	36.2	32.7	26.7	13.2	5.0	3.2	2.5	2.2	1.8	2.0	1.3	0.7	0.5	0.5	0.6	1.2	1.8	2.9	3.1	3.9	4.3	2.7	4.5	4.2	6.6	36.2
24-Oct	4.6	7.0	3.5	2.7	3.8	4.9	3.3	1.9	1.8	1.4	0.9	2.1	2.3	2.3	3.7	5.3	6.6	3.9	2.9	2.7	1.8	2.1	2.6	1.9	3.2	7.0
25-Oct	3.2	4.4	3.9	3.4	3.4	3.2	2.4	3.0	2.3	1.8	1.6	2.1	2.9	3.1	2.4	2.1	2.0	1.8	2.2	2.2	2.1	1.8	1.6	1.0	2.5	4.4
26-Oct	1.0	1.5	2.1	1.7	3.0	1.4	9.3	13.5	1.9	2.9	1.0	0.7	0.9	1.0	1.2	1.0	2.0	1.9	3.0	3.5	2.6	2.2	1.7	2.0	2.6	13.5
27-Oct	2.3	1.8	1.9	1.9	2.6	3.6	4.3	3.6	3.7	2.5	2.9	2.8	2.3	2.1	2.2	3.0	2.7	2.2	2.3	3.3	4.5	5.2	6.7	9.2	3.3	9.2
28-Oct	6.4	5.4	6.7	3.9	3.0	2.7	2.8	2.6	2.5	1.9	2.2	2.8	4.3	4.2	9.4	13.2	9.7	7.5	6.2	4.2	5.8	6.5	5.9	3.8	5.2	13.2
29-Oct	6.5	5.1	7.6	6.0	2.2	1.4	1.7	2.1	2.3	2.9	2.7	2.0	2.3	1.2	1.6	2.3	1.6	1.7	2.2	2.7	2.6	2.5	2.6	4.2	2.9	7.6
30-Oct	3.4	3.0	1.4	1.4	1.7	1.8	1.9	3.3	3.1	2.2	2.1	2.6	2.3	2.2	2.6	2.9	6.1	14.5	17.4	10.0	7.4	5.8	5.2	3.9	4.5	17.4
31-Oct	4.7	5.1	2.8	3.3	3.8	4.5	4.5	3.9	4.0	3.6	3.2	4.2	2.7	2.6	2.2	2.3	2.5	2.2	2.1	1.9	1.3	0.9	0.8	0.8	2.9	5.1
																								Diurnal Average		
4.9 4.8 4.5 4.2 4.0 4.1 3.9 3.8 3.5 3.2 3.4 3.5 3.5 5.1 4.5 4.5 5.1 5.2 6.0 5.4 4.9 4.1 3.9 4.4																								Diurnal Maximum		
36.2 32.7 26.7 13.2 12.8 14.7 9.3 13.5 9.3 10.4 11.4 12.9 11.2 43.3 26.4 21.3 21.0 22.8 26.7 18.9 20.5 10.8 12.9 19.7																										
C - Calibration																										
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m <sup>3</sup>																										



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Muskeg River - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Muskeg River - October 2017**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	516	69.45	69.45
6 - 15	151	20.32	89.77
16 - 25	12	1.62	91.39
26 - 80	8	1.08	92.46
> 81.0	0	0.00	92.46

Total Number of Valid Hours: 743

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Muskeg River - October 2017**

Concentration Ranges ( $\mu\text{g}/\text{m}^3$ )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	66	43	22	10	5	3	7	21	90	63	39	38	29	16	22	41	515
6 - 15	6	4	2	3	3	3	0	10	15	19	12	13	4	5	13	23	135
16 - 25	0	0	0	0	0	1	0	2	1	0	1	1	1	0	4	0	11
26 - 80	0	0	0	0	0	0	0	0	1	1	1	2	0	0	0	0	5
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	72	47	24	13	8	7	7	33	107	83	53	54	34	21	39	64	666

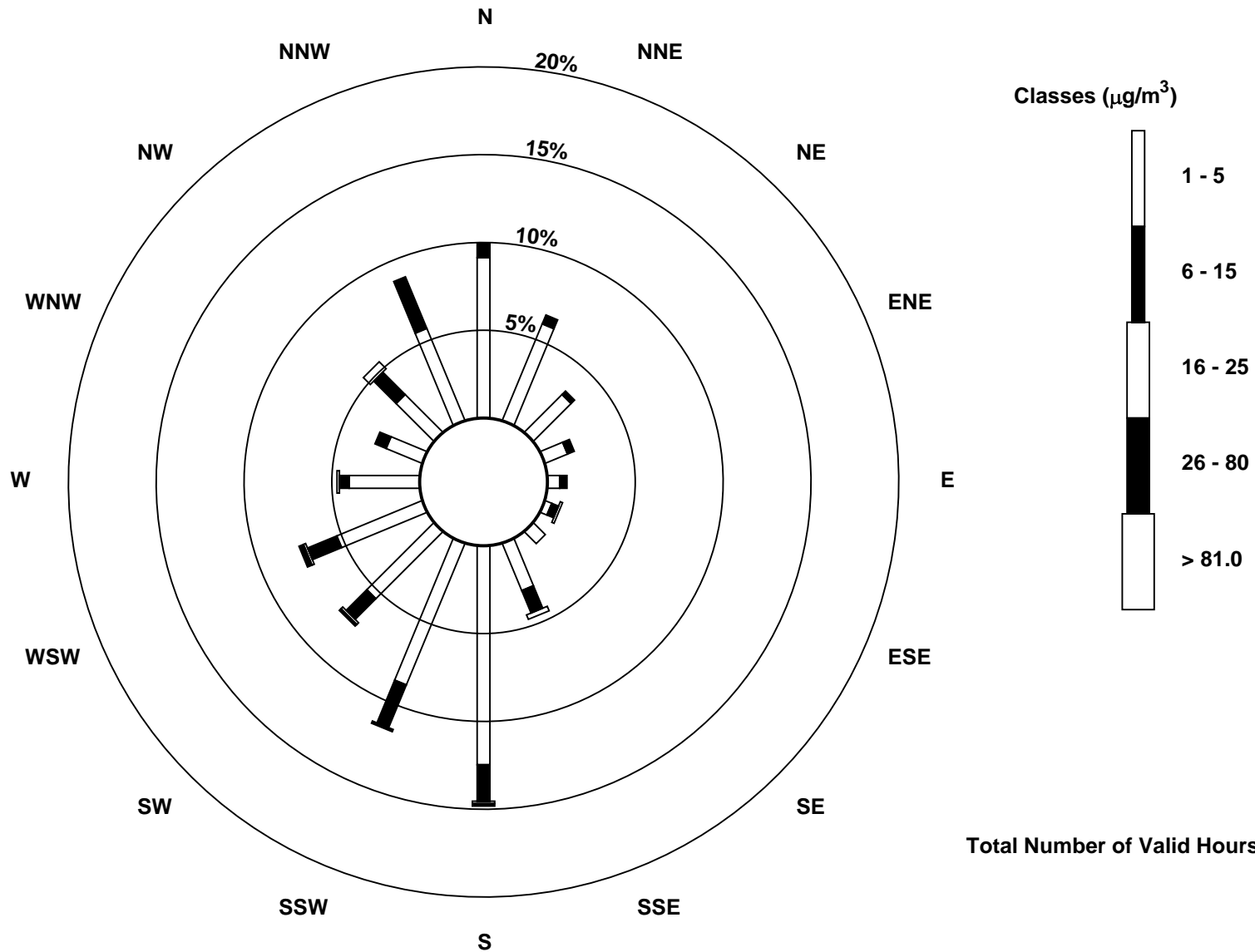
Total Number of Valid Hours: 722

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Muskeg River (AMS 16)







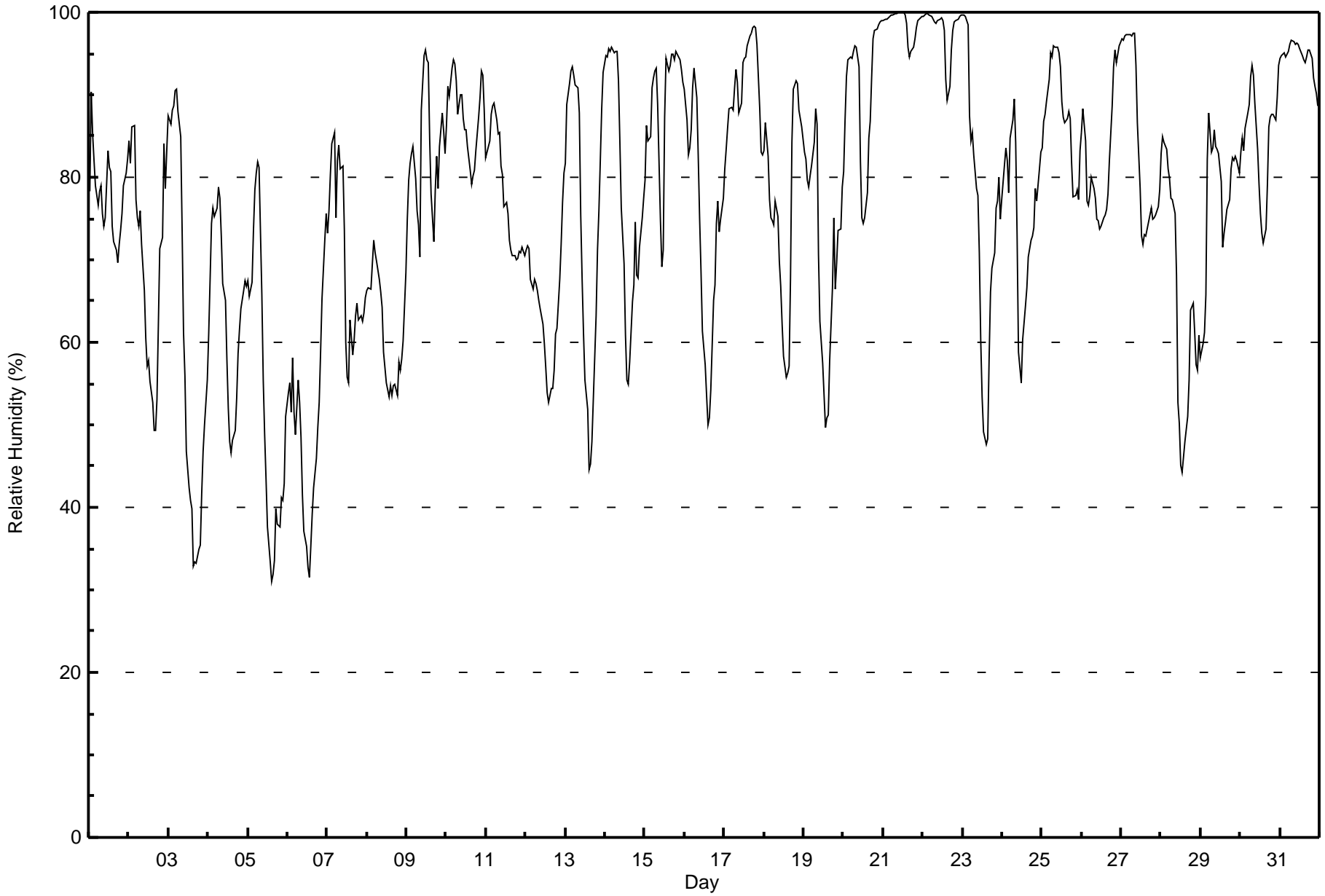
**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %**

**Muskeg River - October 2017**

Maximum Value: 100 % on Oct 21 11:00																			Maximum Daily Average: 98.6 % on Oct 21						Hours in Service: 744																								
Minimum Value: 31 % on Oct 5 15:00																			Minimum Daily Average: 49.6 % on Oct 6						Hours of Data: 744																								
Maximum Diurnal Average: 85.1 % at hour 7																			Minimum Diurnal Average: 65.6 % at hour 16						Hours of Missing Data: 0																								
Monthly Average: 76.9 %																			Percentiles: P <sub>1</sub> = 33 P <sub>10</sub> = 53 Q <sub>1</sub> = 67 Median = 79 Q <sub>3</sub> = 90 P <sub>90</sub> = 96 P <sub>99</sub> = 100						Hours of Calibration: 0																								
																									Percent Operational Time: 100.0																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	78	90	85	82	79	77	78	79	76	74	75	83	81	81	74	72	71	70	72	74	76	79	81	82	77.8	90																							
2-Oct	84	82	86	86	77	75	74	76	72	66	61	57	58	55	53	49	49	53	62	71	73	84	79	83	69.4	86																							
3-Oct	87	86	88	89	91	91	88	85	74	61	56	47	42	41	40	33	33	35	35	42	47	50	55	59.5	91																								
4-Oct	61	68	74	76	75	76	79	77	73	67	65	58	52	48	47	48	49	53	59	61	64	66	67	67	63.8	79																							
5-Oct	67	66	67	73	79	80	82	81	66	55	49	43	38	33	31	32	34	40	38	38	41	41	43	51	52.8	82																							
6-Oct	54	55	51	58	51	49	55	53	48	42	37	35	33	31	35	39	42	46	50	53	59	65	72	76	49.6	76																							
7-Oct	73	76	80	84	85	75	82	84	81	81	74	60	56	55	63	58	60	63	65	63	63	63	63	65	69.7	85																							
8-Oct	66	67	66	69	72	71	70	68	66	64	59	57	55	53	55	53	55	55	54	58	57	58	60	68	61.5	72																							
9-Oct	75	80	82	83	84	80	76	74	70	88	95	95	94	94	85	78	72	79	82	79	84	88	86	83	82.7	95																							
10-Oct	86	91	90	93	94	94	92	88	90	90	87	86	86	84	81	79	80	81	83	87	90	93	92	88	87.7	94																							
11-Oct	82	84	84	88	89	89	87	85	85	81	80	76	77	76	72	71	71	71	70	70	71	71	71	71	78.0	89																							
12-Oct	71	72	71	68	67	68	67	66	65	64	62	60	57	54	53	54	54	57	61	62	68	72	77	80	64.6	80																							
13-Oct	82	89	91	93	93	92	91	91	88	75	68	61	55	52	45	45	48	53	63	71	76	82	88	93	74.4	93																							
14-Oct	95	95	96	95	96	95	95	95	92	84	76	70	61	55	55	58	65	67	75	68	68	72	75	78	78.3	96																							
15-Oct	80	86	84	85	91	92	93	93	89	75	69	71	87	94	93	94	95	95	94	95	95	94	93	92	88.7	95																							
16-Oct	91	87	83	84	86	91	93	90	83	75	69	61	57	54	50	51	54	65	67	74	77	73	75	77	73.6	93																							
17-Oct	81	83	86	88	88	88	91	93	91	88	89	94	94	95	96	97	98	98	98	98	96	88	83	83	91.1	98																							
18-Oct	83	87	83	77	75	75	74	77	75	70	67	62	58	56	56	57	68	84	91	92	91	88	87	86	75.8	92																							
19-Oct	83	82	80	79	80	81	84	88	86	71	63	57	54	50	51	51	58	67	75	66	70	74	74	79	70.9	88																							
20-Oct	81	87	92	94	95	94	95	96	96	93	82	75	74	75	78	85	87	92	97	98	98	99	99	99	90.0	99																							
21-Oct	99	99	99	99	100	100	100	100	100	100	100	100	100	100	99	96	95	95	96	97	98	99	99	99	98.6	100																							
22-Oct	99	100	100	100	100	100	99	99	99	99	99	99	99	98	92	89	91	95	98	99	99	99	100	100	97.9	100																							
23-Oct	100	100	99	98	87	84	85	83	79	78	71	60	53	49	48	48	58	66	69	71	76	77	80	75	74.8	100																							
24-Oct	77	82	84	82	78	85	87	89	84	73	59	55	60	62	64	67	70	72	73	74	79	77	81	83	74.9	89																							
25-Oct	84	87	88	89	92	95	95	96	96	96	95	93	89	87	87	87	88	87	82	78	78	78	77	83	87.8	96																							
26-Oct	85	88	84	77	77	78	80	79	77	75	75	74	74	75	75	76	78	82	89	93	96	94	95	96	82.2	96																							
27-Oct	97	97	97	97	97	97	97	97	97	94	87	79	73	72	73	73	75	75	76	75	75	75	76	79	84.6	97																							
28-Oct	83	85	84	83	81	80	77	77	76	68	53	50	45	44	48	50	51	55	64	65	61	57	57	61	64.8	85																							
29-Oct	58	60	61	66	82	88	83	84	86	84	83	83	79	72	73	75	76	77	81	82	82	83	82	81	77.5	88																							
30-Oct	83	85	83	86	88	89	92	94	92	89	83	79	76	73	72	74	79	86	87	88	88	87	90	93	84.8	94																							
31-Oct	94	95	95	95	95	95	96	97	97	96	96	96	96	95	94	94	95	95	95	94	92	91	90	89	94.5	97																							
																								81.3	83.5	83.7	84.4	84.6	84.6	85.1	84.9	82.2	78.0	73.6	70.3	68.2	66.5	65.7	65.6	67.7	71.2	74.2	75.1	76.8	77.9	78.8	80.5	Diurnal Average	
																								100	100	100	100	100	100	100	100	100	100	100	100	100	100	99	97	98	98	98	99	99	99	100	100	Diurnal Maximum	





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Relative Humidity (RH) - %**  
**Muskeg River - October 2017**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	20	2.69	2.69
40 - 60	110	14.78	17.47
60 - 80	253	34.01	51.48
80 - 100	361	48.52	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

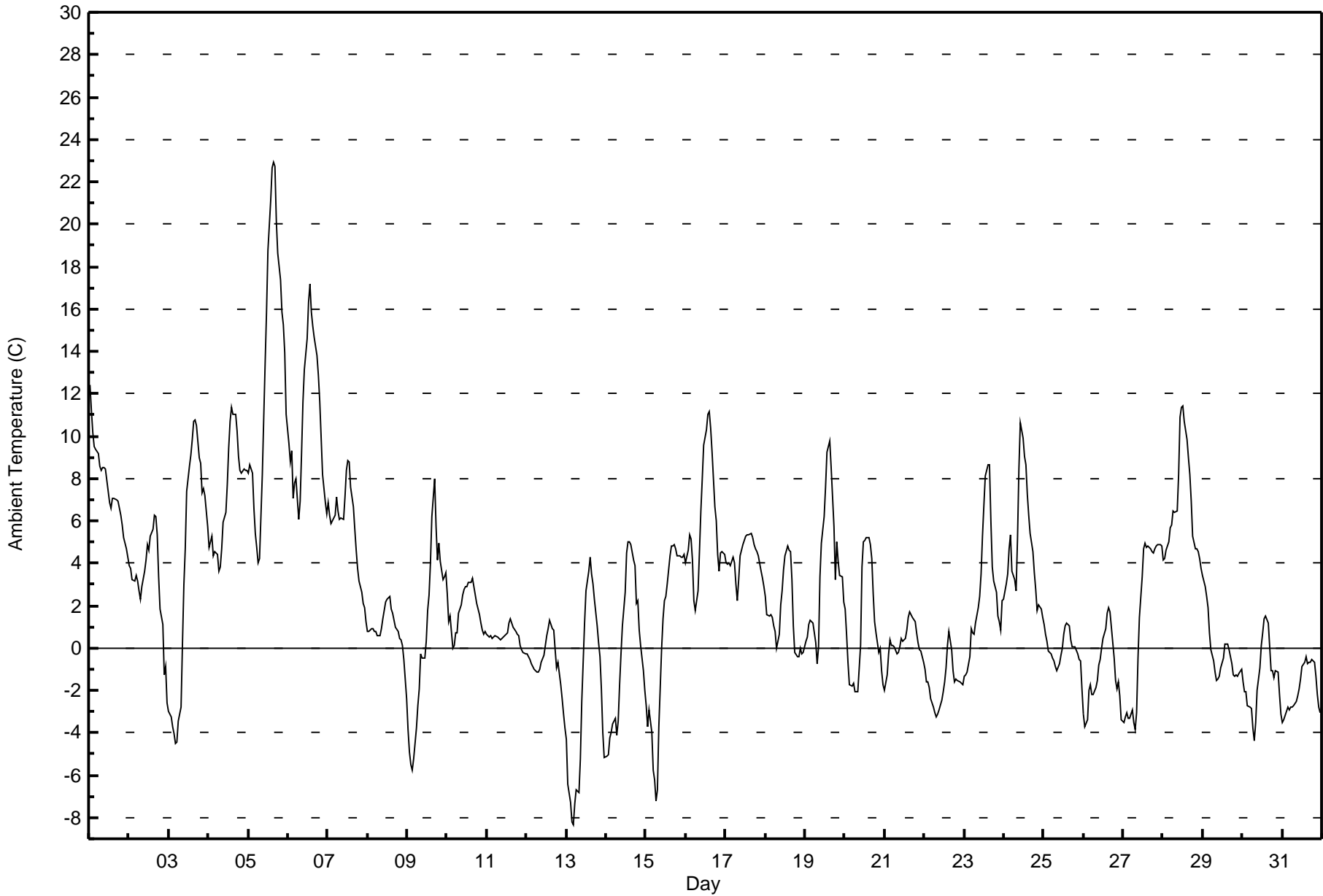
**Ambient Temperature (AT) - C**  
**Muskeg River - October 2017**

Maximum Value: 22.9 C on Oct 5 16:00		Maximum Daily Average: 13.3 C on Oct 5		Hours in Service: 744																																												
Minimum Value: -8.3 C on Oct 13 05:00		Minimum Daily Average: -2.2 C on Oct 13		Hours of Data: 744																																												
Maximum Diurnal Average: 5.7 C at hour 15		Minimum Diurnal Average: 0.2 C at hour 8		Hours of Missing Data: 0																																												
Monthly Average: 2.57 C		Percentiles: P <sub>1</sub> = -6.7 P <sub>10</sub> = -2.8 Q <sub>1</sub> = -0.6 Median = 1.7 Q <sub>3</sub> = 5.0 P <sub>90</sub> = 8.6 P <sub>99</sub> = 18.5		Hours of Calibration: 0																																												
				Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	12.4	11.3	10.2	9.5	9.4	9.2	8.6	8.4	8.5	8.5	8.5	7.4	6.9	6.6	7.0	7.0	7.0	6.9	6.6	6.3	5.8	5.2	4.7	4.3	7.8	12.4																						
2-Oct	3.9	3.7	3.2	3.1	3.4	3.1	2.7	2.3	2.9	3.6	4.2	4.9	4.6	5.3	5.6	6.2	6.2	5.4	3.4	1.9	1.1	-1.3	-0.8	-2.6	3.2	6.2																						
3-Oct	-3.0	-3.3	-3.7	-4.0	-4.5	-4.4	-3.5	-2.8	0.2	2.9	4.7	7.4	8.6	9.1	9.8	10.7	10.8	10.5	9.0	8.7	7.4	7.5	7.2	5.7	3.8	10.8																						
4-Oct	4.7	5.0	5.3	4.3	4.5	4.4	3.6	3.8	4.7	6.0	6.4	7.7	9.4	10.7	11.4	11.0	11.0	10.2	9.1	8.4	8.2	8.4	8.4	8.4	7.3	11.4																						
5-Oct	8.3	8.6	8.3	6.6	5.4	4.8	4.0	4.2	8.2	10.8	13.4	15.9	18.7	21.1	22.7	22.9	22.7	20.1	18.6	17.4	15.8	15.2	13.9	11.0	13.3	22.9																						
6-Oct	9.6	8.8	9.3	7.1	7.8	8.0	6.1	7.0	9.2	11.6	13.2	14.6	16.3	17.2	15.9	15.2	14.7	13.8	12.9	11.6	9.9	8.2	6.9	6.4	10.9	17.2																						
7-Oct	6.9	6.3	5.8	6.0	6.3	7.1	6.5	6.0	6.1	6.1	7.1	8.4	8.8	8.8	7.6	6.7	5.6	4.6	3.8	3.2	2.6	2.1	1.9	1.2	5.6	8.8																						
8-Oct	0.8	0.8	0.9	0.9	0.8	0.8	0.6	0.6	0.9	1.4	1.8	2.2	2.3	2.5	1.9	1.6	1.3	1.0	0.8	0.5	0.4	0.1	-0.5	-2.4	0.9	2.5																						
9-Oct	-3.8	-4.9	-5.5	-5.8	-5.2	-3.8	-2.7	-1.9	-0.3	-0.5	-0.5	0.3	1.8	2.5	4.1	6.2	8.0	5.7	4.1	5.0	4.1	3.2	3.4	3.6	0.7	8.0																						
10-Oct	2.6	1.2	1.5	0.0	0.1	0.7	0.7	1.6	2.1	2.5	2.8	2.9	2.9	3.1	3.1	3.3	2.9	2.5	2.1	1.6	1.2	0.9	0.7	0.8	1.8	3.3																						
11-Oct	0.7	0.5	0.6	0.5	0.5	0.6	0.5	0.4	0.4	0.5	0.5	0.6	0.7	1.2	1.4	1.2	1.0	0.8	0.7	0.6	0.1	-0.1	-0.2	-0.3	0.6	1.4																						
12-Oct	-0.3	-0.4	-0.5	-0.8	-1.0	-1.1	-1.1	-1.1	-1.0	-0.7	-0.3	0.1	0.6	0.9	1.3	0.9	0.9	-0.1	-0.9	-0.7	-1.7	-2.4	-3.1	-3.8	-0.7	1.3																						
13-Oct	-4.3	-6.4	-7.3	-8.2	-8.3	-7.3	-6.7	-6.8	-5.2	-2.5	-0.7	1.2	2.7	3.6	4.3	3.5	3.1	2.3	1.1	0.3	-0.4	-1.9	-4.0	-5.2	-2.2	4.3																						
14-Oct	-5.1	-5.1	-4.2	-4.0	-3.6	-3.3	-4.1	-3.5	-1.7	-0.3	1.0	2.6	4.5	5.0	5.0	4.9	4.2	3.9	2.1	2.2	0.8	0.1	-1.1	-2.0	-0.1	5.0																						
15-Oct	-2.8	-3.7	-2.9	-4.0	-5.7	-6.2	-7.2	-6.7	-3.7	0.0	1.4	2.2	2.4	3.0	4.4	4.8	4.8	4.9	4.7	4.3	4.3	4.3	4.3	4.4	0.5	4.9																						
16-Oct	4.0	4.6	5.4	5.2	4.2	2.2	1.8	2.7	4.5	6.5	8.0	9.6	10.3	11.0	11.2	10.4	9.2	6.7	6.0	4.4	3.6	4.5	4.5	4.4	6.0	11.2																						
17-Oct	4.0	3.9	4.0	3.9	4.3	4.0	3.0	2.3	3.2	4.4	4.9	5.1	5.3	5.3	5.4	5.4	5.2	4.9	4.7	4.5	4.3	3.6	3.3	2.9	4.2	5.4																						
18-Oct	2.4	1.6	1.5	1.6	1.4	1.0	0.8	0.0	0.6	2.1	2.7	3.7	4.3	4.8	4.6	4.5	3.2	1.1	-0.2	-0.4	-0.4	0.0	-0.3	-0.2	1.7	4.8																						
19-Oct	0.3	0.5	1.1	1.3	1.2	1.2	0.2	-0.7	0.1	3.3	5.0	6.2	7.6	9.2	9.5	9.8	8.5	5.7	3.2	5.0	4.1	3.4	3.4	2.2	3.8	9.8																						
20-Oct	1.8	0.7	-0.6	-1.7	-1.8	-1.7	-2.1	-2.1	-2.0	0.1	3.9	5.0	5.1	5.2	5.2	4.9	4.2	2.5	1.3	0.7	-0.2	0.0	-1.0	-1.7	1.1	5.2																						
21-Oct	-2.0	-1.3	-0.3	0.4	0.1	0.1	0.1	-0.3	-0.2	0.1	0.5	0.3	0.5	0.9	1.4	1.7	1.6	1.4	1.2	0.7	0.3	-0.1	-0.2	-0.6	0.3	1.7																						
22-Oct	-1.0	-1.6	-1.6	-1.8	-2.4	-2.8	-3.0	-3.3	-3.1	-2.9	-2.4	-2.0	-1.6	-0.9	0.2	0.8	-0.1	-1.1	-1.6	-1.5	-1.5	-1.6	-1.7	-1.7	-1.7	0.8																						
23-Oct	-1.3	-1.3	-1.1	-0.4	0.9	0.7	0.7	1.2	1.9	2.5	3.5	5.3	6.8	8.1	8.6	8.6	6.0	3.8	3.1	2.6	1.5	1.2	0.8	2.2	2.8	8.6																						
24-Oct	2.3	3.0	3.5	4.7	5.4	3.6	3.3	2.7	5.1	8.4	10.6	9.9	9.1	8.7	7.3	6.2	5.4	4.5	3.6	2.8	1.8	2.0	1.8	1.4	4.9	10.6																						
25-Oct	1.1	0.6	0.3	-0.1	-0.2	-0.5	-0.6	-0.9	-1.0	-0.8	-0.4	0.0	0.6	1.0	1.2	1.1	0.4	0.1	0.1	0.0	-0.3	-0.5	-0.6	-2.0	-0.1	1.2																						
26-Oct	-3.1	-3.7	-3.4	-2.0	-1.7	-2.2	-2.2	-1.8	-1.5	-0.8	-0.5	0.0	0.5	0.9	1.6	1.9	1.7	1.0	-0.5	-1.6	-1.9	-1.6	-2.3	-3.4	-1.1	1.9																						
27-Oct	-3.5	-3.2	-3.1	-3.3	-3.3	-2.9	-3.5	-3.9	-3.1	-0.5	1.5	3.4	4.7	5.0	4.8	4.8	4.7	4.6	4.5	4.7	4.8	4.9	4.9	4.8	1.3	5.0																						
28-Oct	4.1	4.2	4.6	5.0	5.7	5.8	6.4	6.4	6.5	8.2	10.9	11.4	11.4	10.7	9.9	9.0	8.2	6.9	5.3	4.7	4.7	4.6	4.2	3.8	6.8	11.4																						
29-Oct	3.4	2.9	2.4	1.9	0.7	-0.1	-0.6	-1.1	-1.5	-1.5	-1.3	-0.9	-0.5	0.2	0.2	0.2	-0.1	-0.8	-1.3	-1.3	-1.3	-1.3	-1.2	-1.0	-0.2	3.4																						
30-Oct	-1.6	-2.1	-2.0	-2.7	-2.8	-2.8	-3.8	-4.4	-3.5	-2.0	-0.9	0.1	0.7	1.4	1.5	1.2	0.1	-1.0	-1.0	-1.4	-1.1	-1.1	-2.2	-3.1	-1.4	1.5																						
31-Oct	-3.5	-3.4	-3.0	-2.8	-2.9	-2.8	-2.8	-2.7	-2.5	-2.2	-1.9	-1.4	-0.8	-0.7	-0.4	-0.7	-0.7	-0.7	-0.5	-0.6	-1.3	-2.2	-2.8	-3.1	-1.9	-0.4																						
																								1.2	0.9	0.9	0.7	0.6	0.5	0.2	0.2	1.1	2.4	3.5	4.3	5.0	5.5	5.7	5.7	5.2	4.3	3.4	3.1	2.5	2.1	1.7	1.1	Diurnal Average
																								12.4	11.3	10.2	9.5	9.4	9.2	8.6	8.4	9.2	11.6	13.4	15.9	18.7	21.1	22.7	22.9	22.7	20.1	18.6	17.4	15.8	15.2	13.9	11.0	Diurnal Maximum



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Muskeg River - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C  
Muskeg River - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	232	31.18	31.18
0 - 10	466	62.63	93.82
10 - 20	41	5.51	99.33
> 20	5	0.67	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

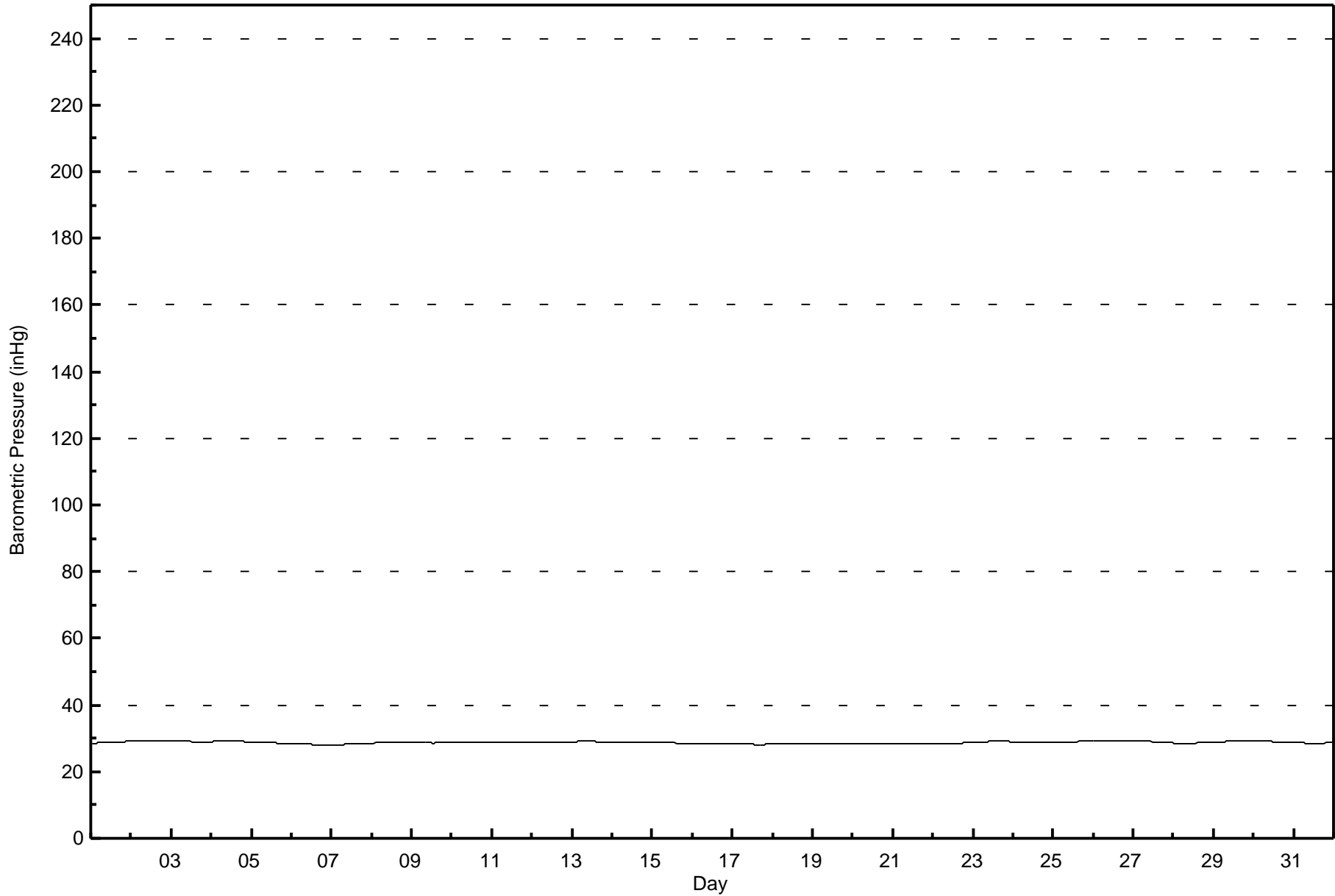


Maximum Value: 29.3 inHg on Oct 29 18:00      Maximum Daily Average: 29.2 inHg on Oct 2																						Hours in Service:	744			
Minimum Value: 28.1 inHg on Oct 7 03:00      Minimum Daily Average: 28.2 inHg on Oct 6																						Hours of Data:	744			
Maximum Diurnal Average: 28.8 inHg at hour 22      Minimum Diurnal Average: 28.7 inHg at hour 14																						Hours of Missing Data:	0			
Monthly Average: 28.75 inHg      Percentiles: P <sub>1</sub> = 28.1 P <sub>10</sub> = 28.3 Q <sub>1</sub> = 28.5 Median = 28.8 Q <sub>3</sub> = 29.0 P <sub>90</sub> = 29.1 P <sub>99</sub> = 29.3																						Hours of Calibration:	0			
																						Percent Operational Time:	100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	28.5	28.5	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.1	28.8	29.1
2-Oct	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.3
3-Oct	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.1	29.2
4-Oct	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.1	29.2
5-Oct	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.6	28.6	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.7	29.0
6-Oct	28.4	28.4	28.4	28.4	28.3	28.3	28.3	28.3	28.3	28.2	28.2	28.2	28.2	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.2	28.4
7-Oct	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.3	28.3	28.3	28.4	28.4	28.4	28.5	28.5	28.5	28.5	28.3	28.5
8-Oct	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.9
9-Oct	28.9	28.9	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.9
10-Oct	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	29.0
11-Oct	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0
12-Oct	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	29.0
13-Oct	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1
14-Oct	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.9
15-Oct	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.7	28.7	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.4	28.4	28.4	28.7	28.9
16-Oct	28.4	28.4	28.4	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.6
17-Oct	28.5	28.5	28.5	28.4	28.4	28.4	28.4	28.3	28.3	28.3	28.3	28.2	28.2	28.2	28.1	28.1	28.1	28.1	28.1	28.2	28.2	28.2	28.2	28.2	28.3	28.5
18-Oct	28.3	28.3	28.4	28.4	28.4	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.4	28.4	28.5	28.6
19-Oct	28.4	28.4	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.4
20-Oct	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.4	28.4	28.4	28.4	28.3	28.4
21-Oct	28.4	28.4	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.6
22-Oct	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7
23-Oct	28.7	28.8	28.8	28.8	28.9	28.9	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.1
24-Oct	28.9	28.9	28.8	28.7	28.7	28.6	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	29.0
25-Oct	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	29.0	29.0	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.3	29.3	29.0
26-Oct	29.3	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.3
27-Oct	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.8	28.8	28.8	28.7	28.7	28.7	28.6	28.9
28-Oct	28.6	28.6	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8
29-Oct	28.8	28.9	28.9	28.9	28.9	29.0	29.0	29.1	29.1	29.2	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.3
30-Oct	29.3	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.8	29.0	29.3
31-Oct	28.8	28.8	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.6	28.8
																								Diurnal Average		
																								Diurnal Maximum		



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Barometric Pressure (BP) - inHg**  
**Muskeg River - October 2017**







Maximum Speed: 41 km/h on Oct 24 12:00	Maximum Daily Speed Average: 22.9 km/h on Oct 11	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 30 18:00	Minimum Daily Speed Average: 1.0 km/h on Oct 20	Hours of Data: 723
Maximum Diurnal Speed Average: 5.6 km/h at hour 16	Minimum Diurnal Speed Average: 2.0 km/h at hour 7	Hours of Missing Data: 21
Monthly Average Velocity: 3.7 km/h 302.2 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 4 Q <sub>1</sub> = 7 Median = 12 Q <sub>3</sub> = 17 P <sub>90</sub> = 22 P <sub>99</sub> = 29	Percent Operational Time: 97.2

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	WNW8	NW12	NW14	WNW15	WNW13	NW14	WNW12	NW10	NNW11	NNW14	N14	NNE18	N20	NNW18	NNW18	NNW18	NNW22	N24	N27	N28	N30	N28	N28	N28	NNW16.9	N30
2-Oct	N28	N28	N26	N24	N28	N30	N29	N27	N30	N32	N30	N26	N26	N22	N21	N14	NNW15	NNW12	NW8	NW8	NW6	WSW7	WSW6	SSW7	N18.8	N32
3-Oct	SSW7	S6	S9	S7	S8	S9	S14	S12	S12	SSW12	S15	SSW19	SSW19	SSW20	SSW15	SW15	SSW8	SW9	W15	W14	WNW12	WNW14	WNW14	WNW13	SSW9.7	SSW20
4-Oct	NW8	N13	N15	N12	NNW8	WNW7	W9	W7	W5	NW7	NW3	N4	WSW4	SSW6	S8	S7	S9	SSE8	SSE6	S5	S7	SSW4	SSE8	S6	WSW1.8	N15
5-Oct	S7	S7	S7	SSW7	SSW5	SSW8	SSW9	SSW5	SSW8	SSW10	S11	S13	S14	SSW16	SSW16	SSW15	SW17	SW17	WSW20	WSW17	WSW18	W16	WSW15	S5	SSW10.6	WSW20
6-Oct	SSE8	SSE9	SW11	SSE10	SW14	SW14	SSE6	S9	S8	SW13	SW22	WSW23	WSW24	WSW29	WSW26	WNW17	WSW12	WSW13	WSW16	W15	W9	SSW4	S6	W6	WSW11.3	WSW29
7-Oct	WSW3	S4	S5	SW4	ENE8	NNE18	NNE17	N16	N18	N14	NNW10	NW15	NNW16	NNW17	NNW17	NNW18	NNW21	NNW18	NNW20	NNW20	NNW20	NNW21	NW20	NNW13.0	NNW21	
8-Oct	NW18	NW18	NW19	NNW18	NNW15	NNW18	NNW16	NNW16	NNW15	NNW16	NNW16	NNW15	NNW14	NW17	NW19	NW18	NW15	NW12	WNW10	W9	WNW9	W9	WSW6	SSW7	NW13.2	NW19
9-Oct	SSW7	S9	S11	SSE10	SSE14	SSE14	SSE13	S10	S12	S12	S13	S9	SSW10	SW12	WSW13	SW8	WSW10	WSW12	WSW13	W15	W11	WSW14	WSW17	W16	SSW9.3	WSW17
10-Oct	WSW15	WSW12	WSW13	SW6	SW6	WSW12	W13	WNW9	NNE9	NNE11	N6	NE7	NE9	NNE10	NNE13	NE16	NE18	NE18	NNE19	NNE19	NNE19	NNE20	NNE19	NNE21	N7.7	NNE21
11-Oct	NNE22	NNE22	NNE23	NNE21	NNE21	NE24	NNE24	NNE25	NNE27	NNE27	NNE25	NNE25	NNE23	NNE24	NNE25	N23	N22	N22	N23	NNE24	N23	N22	NNE22	N21	NNE22.9	NNE27
12-Oct	NNE20	NNE19	NNE19	N19	N17	NNW12	NNW14	NNW14	NNW15	N14	NNW16	NNW15	NNW14	N15	N14	N15	N12	NNW10	NW8	WNW10	NNW9	N4	NW9	NW10	N12.6	NNE20
13-Oct	WNW7	SW3	SW5	SW5	SW5	SSW5	SSW6	SSW7	SSW7	SW7	SSW6	SW5	WSW9	SSW9	SW17	WSW17	WSW16	WSW16	SW18	SW16	WSW12	NW5	SSW3	SSE6	SW7.9	SW18
14-Oct	SSE5	SSE6	S5	S6	S7	S10	S11	S12	S14	S14	S14	S13	SSW14	WSW19	WSW17	WSW17	WSW17	W13	W12	WNW17	NW12	WNW15	WNW11	W11	SW8.1	WSW19
15-Oct	WSW9	WSW6	W12	SW5	SSW6	S7	S8	S7	S9	S10	S10	S14	S12	S13	S12	SSW9	SSW7	SSW7	S5	S4	SSW4	W2	WSW6	SW10	SSW7.0	S14
16-Oct	SW13	SW15	W18	W14	WSW17	SW11	S12	SSW14	SW15	SSW13	SW15	SW16	SW19	WSW17	WSW18	WSW14	WSW8	S5	SSW4	SSE5	SSW9	SSW7	S7	S6	SW11.0	SW19
17-Oct	S6	S5	S3	SSE6	SE4	SE5	SE5	SSE7	SSE4	SSE5	S7	SSE5	E4	NE9	NE12	N9	NNW11	NNW11	NW13	WNW10	WNW16	WNW20	WNW19	WNW20	WNW2.6	WNW20
18-Oct	WNW23	WNW24	WNW26	WNW25	WNW25	WNW21	WNW18	W13	WNW18	WNW17	WNW15	NW9	WNW7	WSW3	N3	ENE6	ENE10	ENE12	ENE9	E6	ESE6	SE7	ESE7	ESE7	WNW7.8	WNW26
19-Oct	ESE8	ESE5	ESE7	SSE10	SSE12	SSE13	S11	S8	S9	S13	SSW13	SSW11	SSW10	S10	S10	SSE10	SSE10	SSE8	SSE11	S9	SSE11	SSE13	S10	S6	SSE9.3	SSW13
20-Oct	SW5	WSW5	WSW4	W4	E4	NNW4	NE2	ESE1	WNW2	NW5	NNW4	NNW4	ENE2	ENE8	NE6	WNW10	W7	SW4	S6	S4	SSE4	SW1	E2	ENE3	WNW1.0	WNW10
21-Oct	E5	ENE8	ENE7	NNE7	NW6	NE4	SSW2	W5	WNW3	SSW4	SSW6	SSW6	S7	SSW5	S4	S3	W3	SW1	SW1	ESE4	ESE5	ESE4	SSE3	SSE4	SSSE1.4	ENE8
22-Oct	SSE6	SW4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	N8	NE12	NNW6	NW9	NW7	AF	AF	AF	AF	AF	----	NE12
23-Oct	AF	AF	AF	AF	W14	W10	WSW11	W12	W10	WSW12	W13	W13	WSW13	WSW15	SW16	SW17	SW8	SSW7	S8	S8	S8	S8	S7	SSW7	WSW9.2	SW17
24-Oct	S9	S11	S12	S14	SSW11	SW11	SW13	WSW9	WSW18	W22	WNW23	NW41	NW35	NW30	NW19	NW18	NNW16	N17	N16	NNE16	ENE9	NE10	NNE14	NE14	NW8.0	NW41
25-Oct	NE16	NE17	NE18	NE18	NE20	NE18	NNE21	NNE17	N22	N22	N23	N25	N25	N24	N20	N22	N22	NNW15	NNW9	NNW7	WNW6	W5	SW3	WSW8	NNE14.4	N25
26-Oct	SW9	SSW10	SW14	SW20	SW25	SSW16	SSW14	SSW16	SSW19	SSW19	SSW16	SSW17	SW19	SW16	SW11	SW13	SW10	SSW7	SSW7	S6	SW6	SW4	WSW6	SSW3	SW12.3	SW25
27-Oct	WSW3	SSW6	S4	SSE5	SSW6	S8	S9	S8	S7	S9	S13	S14	S15	S16	S13	S14	S12	S15	S13	S15	S15	S16	S15	SSW13	S10.9	S16
28-Oct	SSW12	SSW10	SSW13	SW17	SW15	WSW19	WSW24	WSW24	WSW19	SW15	NW23	NW27	NW24	NNW19	NW23	NW25	NNW24	NNW20	NNW22	NNW20	NW23	NNW25	NNW26	NNW20	WNW13.9	NW27
29-Oct	NNW21	NNW23	NW29	NNW23	NNW18	N25	N28	N25	N22	N20	N19	N18	N20	NNE20	NNE16	NNE13	NE10	SE2	SSW5	SSW4	SSW5	SSW5	SSW7	SSW8	N12.4	NW29
30-Oct	S9	SSW7	SW10	S6	SSW9	SSW6	SSE5	SSE6	S8	S9	SSW9	SSW8	SSW8	SSW5	W2	W3	NNE2	SSW0	NW1	NNE4	NNE8	N6	NNE3	ENE3	SSW3.3	SW10
31-Oct	SE1	E3	ENE5	ENE5	E4	E2	SE2	ESE3	ESE3	ENE6	NE9	NE12	NE15	NE18	NNE19	NNE19	N17	NNE19	NNE17	N22	N23	N25	N25	NNE25	NNE11.2	N25

WNW2.7	WNW2.1	WNW3.6	WNW2.3	W3.3	WNW2.6	W2.0	W2.6	WNW2.9	WNW3.0	WNW3.7	WNW4.4	WNW4.8	NW4.9	NW5.6	NW5.3	NW4.5	NW4.7	NW4.8	NW4.5	NW4.6	NW4.1	NW3.4	Diurnal Average	
N28	N28	NW29	WNW25	N28	N30	N29	N27	N30	N32	N30	NW41	NW35	NW30	WSW26	NW25	NNW24	N24	N27	N28	N30	N28	N28	N28	Diurnal Maximum

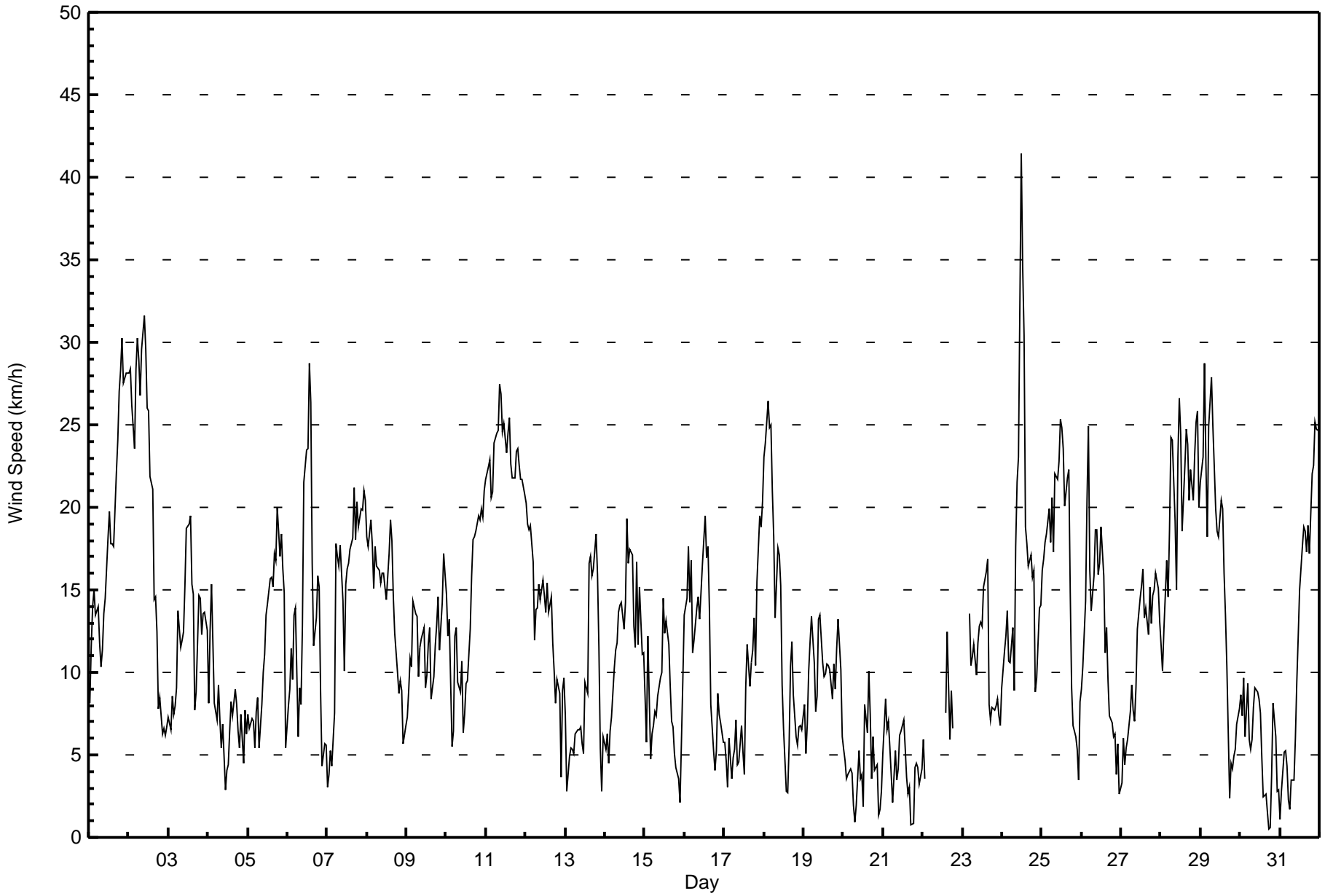
AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Speed (WS) - km/h**  
**Muskeg River - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on Oct 24 12:00 Minimum Value: 1 km/h on Oct 17 03:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 O <sub>1</sub> = 2 Median = 3 O <sub>3</sub> = 4 P <sub>90</sub> = 6 P <sub>99</sub> = 9																		Hours in Service: 744 Hours of Data: 723 Hours of Missing Data: 21 Hours of Calibration: 0 Percent Operational Time: 97.2									
Day	Hourly Period Ending At (MST)																								Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	2	3	3	3	3	3	3	3	4	5	5	4	5	6	6	6	8	6	8	8	7	7	7	8	8		
2-Oct	8	8	8	6	8	8	7	7	7	8	8	6	7	6	6	5	5	4	1	2	3	2	3	2	8		
3-Oct	1	2	2	1	2	2	4	4	4	4	5	6	6	6	5	5	3	3	3	3	2	3	2	1	6		
4-Oct	2	5	4	4	2	2	1	1	2	2	2	2	3	3	2	2	2	2	1	1	1	1	1	2	5		
5-Oct	1	1	1	1	1	2	2	1	3	3	3	3	4	5	5	4	4	3	3	2	2	2	2	2	5		
6-Oct	3	1	4	2	3	4	2	2	2	5	4	4	5	7	6	5	3	2	3	3	3	3	2	4	7		
7-Oct	3	2	2	2	5	3	4	5	5	4	4	5	6	5	5	6	7	7	7	7	7	7	7	7	7		
8-Oct	6	6	6	6	5	7	6	6	5	6	5	5	5	6	6	6	5	4	2	2	2	2	2	1	7		
9-Oct	1	1	2	1	2	2	2	2	3	3	3	2	3	4	3	2	2	1	4	4	2	2	3	3	4		
10-Oct	3	3	2	3	1	2	2	4	3	3	2	3	3	3	4	3	3	3	4	4	4	4	4	4	4		
11-Oct	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5		
12-Oct	5	4	5	5	6	4	4	4	5	4	4	5	4	5	4	4	5	4	1	2	3	2	1	2	6		
13-Oct	3	1	1	2	1	1	1	1	2	2	2	3	3	5	4	3	3	3	3	2	3	2	1	1	5		
14-Oct	1	1	1	1	1	2	2	2	2	3	3	3	4	4	4	4	4	3	1	5	4	3	4	2	5		
15-Oct	2	2	3	2	2	1	1	1	3	2	3	3	3	4	3	3	2	2	1	1	1	1	2	1	4		
16-Oct	3	3	4	3	3	3	2	3	5	4	4	4	4	4	3	3	1	1	1	1	2	1	1	1	5		
17-Oct	1	2	1	2	2	1	1	2	1	1	2	2	1	3	2	3	3	3	3	3	5	5	4	4	5		
18-Oct	5	5	5	5	6	6	4	3	4	4	4	4	3	3	2	2	3	2	3	1	2	3	2	2	6		
19-Oct	3	3	3	3	3	3	3	2	2	4	4	3	3	3	2	2	3	2	2	3	2	3	3	2	4		
20-Oct	1	1	1	2	2	3	2	2	2	2	1	1	2	7	4	2	1	2	1	1	1	1	2	1	7		
21-Oct	3	4	3	3	2	2	1	1	2	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	4		
22-Oct	1	2	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	3	3	3	2	3	AF	AF	AF	AF	AF	3		
23-Oct	AF	AF	AF	AF	3	2	2	3	3	2	3	4	3	3	4	3	2	1	1	1	1	2	2	2	4		
24-Oct	2	3	2	3	4	3	3	2	5	4	7	11	9	9	9	6	6	5	5	4	4	3	4	2	11		
25-Oct	3	2	3	3	3	3	4	4	4	4	5	5	5	6	5	6	6	5	4	3	2	1	2	4	6		
26-Oct	3	2	4	5	6	5	4	5	6	6	5	5	6	5	3	3	3	2	1	1	3	4	2	1	6		
27-Oct	1	1	1	2	1	2	2	1	1	3	3	3	4	3	3	3	3	4	3	4	3	4	4	3	4		
28-Oct	3	3	4	5	5	4	3	4	3	3	8	7	8	6	7	8	8	7	9	8	8	10	9	7	10		
29-Oct	9	8	9	8	6	7	7	6	6	5	5	5	5	5	4	3	4	2	2	1	1	1	1	2	9		
30-Oct	1	2	2	2	2	3	1	1	1	2	2	2	3	2	1	1	1	1	2	2	2	3	3	2	3		
31-Oct	1	2	1	1	2	1	1	1	1	3	1	1	2	3	4	4	4	4	4	5	5	5	6	6	6		
																		9 8 9 8 8 8 7 7 7 8 8 11 9 9 9 8 8 7 9 8 8 10 9 8									
																		Diurnal Maximum									
AF - Analyzer Failure																											





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h  
Muskeg River - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	113	15.63	15.63
6 - 11	232	32.09	47.72
12 - 19	257	35.55	83.26
20 - 28	110	15.21	98.48
29 - 38	10	1.38	99.86
> 38	1	0.14	100.00

Total Number of Valid Hours: 723

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Muskeg River - October 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	3	3	2	5	7	7	6	10	14	19	14	6	8	2	4	3	113
6 - 11	4	5	7	9	1	5	1	20	62	44	15	13	11	12	12	11	232
12 - 19	20	19	14	1	0	0	0	6	35	21	26	33	17	16	15	34	257
20 - 28	43	22	2	0	0	0	0	0	0	1	3	6	1	9	7	16	110
29 - 38	6	0	0	0	0	0	0	0	0	0	0	1	0	0	3	0	10
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
<b>Totals</b>	76	49	25	15	8	12	7	36	111	85	58	59	37	39	42	64	723

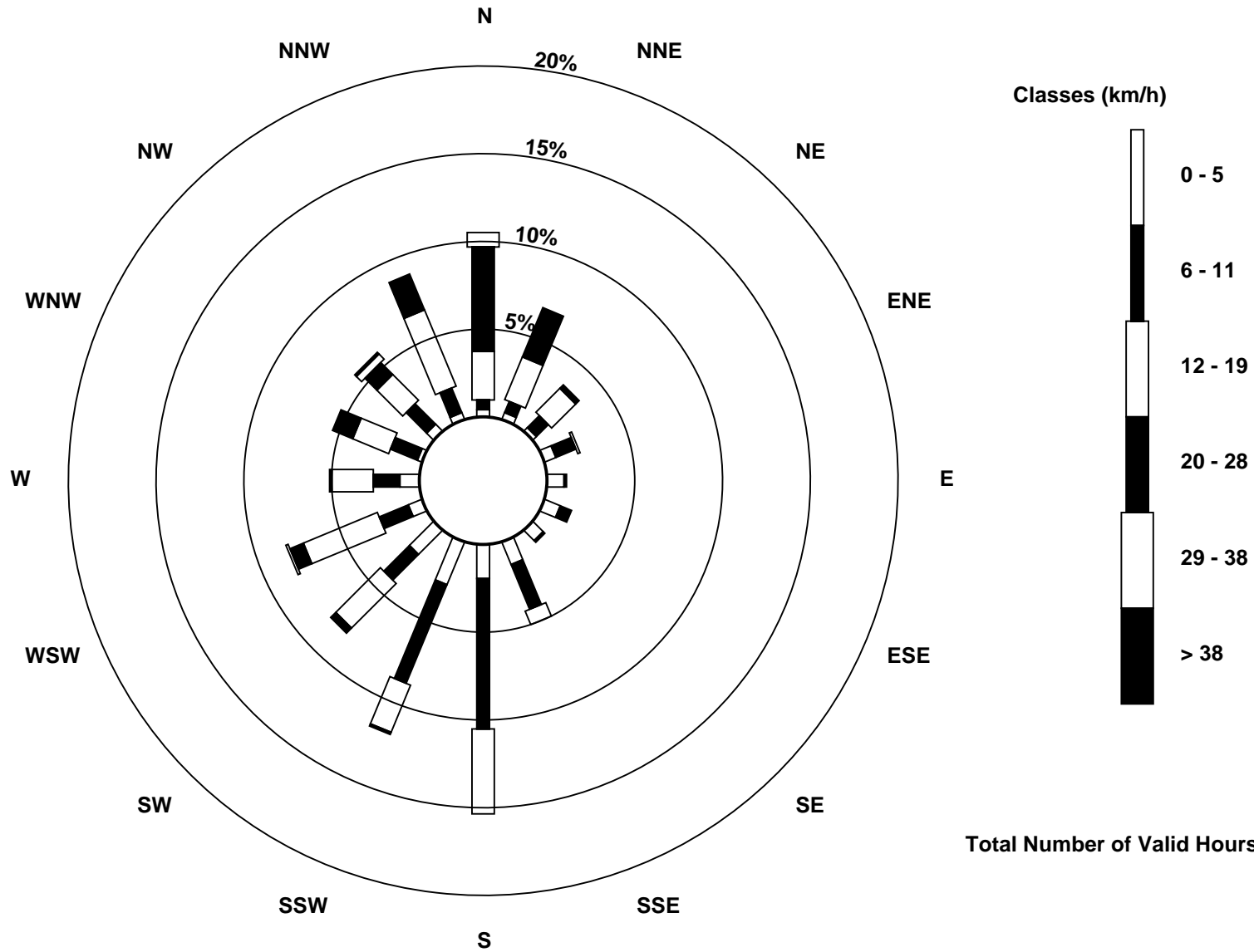
Total Number of Valid Hours: 723

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed (WS) - km/h  
Muskeg River (AMS 16)





**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Wind Direction (WD) - deg**  
**Muskeg River - October 2017**

Direction of Maximum Speed: 306 deg on Oct 24 12:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 22.0 deg on Oct 11	Hours of Data: 723
Direction of Minimum Speed: 207 deg on Oct 30 18:00	Hours of Missing Data: 21
Direction of Minimum Daily Speed Average: 1.0 deg on Oct 20	Percent Operational Time: 97.2
Monthly Average Direction: 259.1 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	282	308	310	297	300	305	295	308	331	338	356	19	4	334	339	337	348	352	356	356	3	1	2	358	343.0
2-Oct	356	357	359	1	359	0	4	7	8	7	1	5	358	356	4	350	346	346	317	314	307	245	255	212	356.3
3-Oct	199	182	188	178	189	184	188	186	189	197	191	202	206	206	209	217	204	235	260	271	283	295	295	292	218.4
4-Oct	310	358	8	352	328	298	266	275	269	310	321	357	247	194	188	170	174	160	149	169	182	208	161	178	256.6
5-Oct	173	181	187	207	196	205	209	202	208	201	183	184	187	202	207	200	231	235	249	252	248	259	250	179	216.8
6-Oct	152	165	228	163	226	230	162	179	184	219	236	241	251	253	256	286	252	253	254	263	268	198	189	269	236.9
7-Oct	240	183	191	220	65	26	19	1	2	2	341	320	339	332	333	328	343	336	337	337	331	331	331	325	341.5
8-Oct	324	325	324	331	333	346	343	332	328	327	343	336	335	317	320	324	325	324	301	276	284	265	252	204	322.7
9-Oct	200	179	176	168	168	162	166	174	177	174	173	182	200	224	239	226	238	239	248	260	270	249	253	264	210.9
10-Oct	250	243	257	217	219	253	268	300	26	25	3	52	35	17	21	36	46	35	32	29	24	22	14	29	9.9
11-Oct	27	29	29	28	30	34	29	30	33	33	30	31	20	23	28	10	7	7	8	14	5	8	14	8	22.0
12-Oct	15	13	17	8	352	339	342	345	345	351	348	342	346	355	358	4	352	340	308	297	331	352	310	311	349.7
13-Oct	300	220	223	214	219	196	193	192	207	218	212	220	242	192	229	238	253	253	236	233	243	306	211	166	230.4
14-Oct	164	154	175	178	183	176	170	173	170	178	181	188	206	244	246	253	256	274	275	300	307	290	286	272	229.1
15-Oct	255	252	264	225	195	183	176	185	178	175	181	174	175	178	188	199	206	198	184	181	195	262	242	231	198.4
16-Oct	233	232	263	266	249	218	185	211	224	207	216	229	232	237	237	249	253	169	192	158	199	200	174	172	225.9
17-Oct	183	180	174	153	139	125	140	157	165	155	180	164	80	49	54	6	343	332	322	302	286	292	298	293	301.2
18-Oct	289	286	290	295	300	303	301	280	294	295	302	324	288	256	354	66	74	74	75	95	113	138	123	113	302.7
19-Oct	117	119	122	149	159	161	176	172	170	180	194	206	195	189	175	148	150	164	162	180	168	167	172	184	168.2
20-Oct	235	237	255	281	82	331	36	118	286	313	328	330	68	59	38	292	274	232	191	185	157	216	79	73	288.2
21-Oct	81	77	68	22	326	51	192	276	284	210	205	207	178	195	178	172	271	225	227	111	118	115	162	161	153.7
22-Oct	162	220	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	8	34	345	314	309	AF	AF	AF	AF	AF	--
23-Oct	AF	AF	AF	AF	277	272	252	263	271	258	270	260	249	242	228	235	215	195	191	189	186	179	173	202	237.7
24-Oct	187	171	171	180	194	233	226	238	253	266	297	306	306	306	324	326	341	2	8	22	67	43	32	47	306.9
25-Oct	37	38	47	54	47	44	33	13	4	5	7	7	8	6	359	350	353	346	338	337	291	266	229	243	11.3
26-Oct	233	213	220	222	233	211	194	204	209	201	207	208	214	215	221	226	217	201	205	189	228	235	246	212	214.4
27-Oct	244	200	173	158	193	184	178	191	180	184	177	177	182	178	181	174	182	171	182	182	183	185	190	192	182.2
28-Oct	194	198	207	216	222	238	244	241	242	234	311	315	320	329	320	322	332	333	332	336	322	334	335	335	298.5
29-Oct	338	331	326	333	334	4	8	9	7	5	4	353	4	20	25	22	50	143	199	198	195	199	205	197	355.8
30-Oct	186	201	216	180	209	202	160	166	186	191	194	197	201	210	278	269	20	207	319	21	15	4	33	62	196.5
31-Oct	141	97	66	74	80	84	139	117	110	57	56	53	49	48	27	15	10	22	23	4	9	7	11	22	28.0

290.6 297.7 296.4 288.6 278.3 292.6 279.4 280.1 292.4 286.5 294.0 299.2 297.0 294.5 305.6 311.4 321.1 320.0 306.6 311.7 309.4 311.5 312.4 312.8  
 Diurnal Average

AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Direction (WD) - deg**  
**Muskeg River - October 2017**

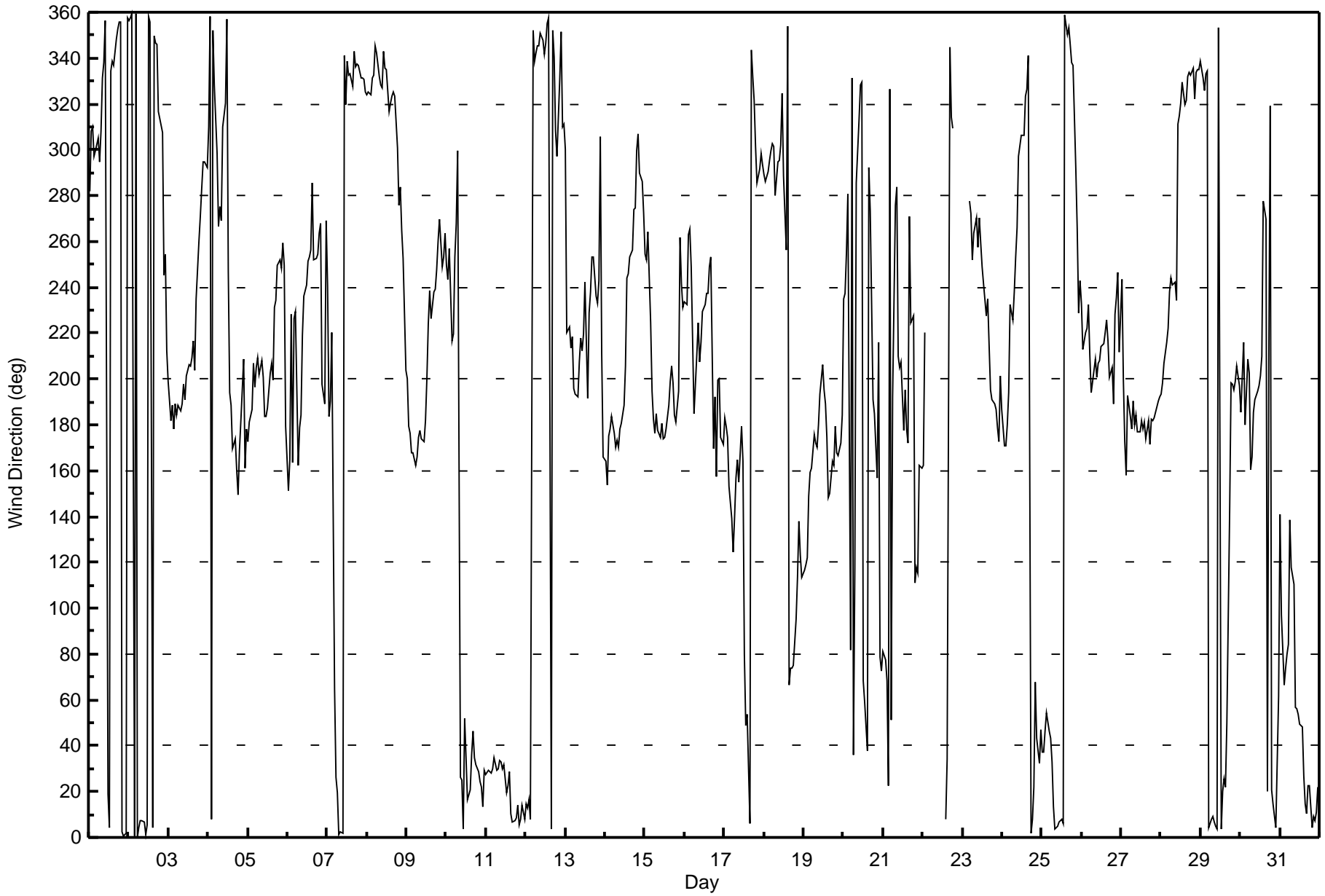
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 102 deg on Oct 30 19:00 Minimum Value: 6 deg on Oct 14 00:00 Percentiles: P <sub>1</sub> = 8 P <sub>10</sub> = 11 Q <sub>1</sub> = 13 Median = 18 Q <sub>3</sub> = 22 P <sub>90</sub> = 33 P <sub>99</sub> = 75		Hours in Service: 744 Hours of Data: 723 Hours of Missing Data: 21 Hours of Calibration: 0 Percent Operational Time: 97.2																																													
Day	Hourly Period Ending At (MST)																								Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Oct	14	12	14	13	14	14	13	22	22	22	31	23	17	22	22	22	20	18	18	19	18	18	18	19	31																						
2-Oct	20	20	19	19	18	18	18	16	15	16	18	21	18	20	18	25	23	17	13	11	35	24	32	14	35																						
3-Oct	15	23	13	15	15	14	17	20	19	23	19	22	23	21	21	19	34	33	9	12	10	11	10	8	34																						
4-Oct	13	22	19	19	20	29	8	11	26	22	62	60	81	47	30	26	15	12	13	13	37	17	30	81																							
5-Oct	11	14	14	13	22	21	12	17	21	23	21	20	22	22	21	21	14	8	9	8	10	9	9	34																							
6-Oct	20	9	21	20	13	16	44	13	18	25	12	10	11	13	12	16	12	9	10	11	11	37	36	46																							
7-Oct	69	51	26	59	39	13	17	17	18	18	27	21	23	22	23	22	21	22	22	23	21	21	21	21	69																						
8-Oct	21	20	20	23	23	19	21	21	21	23	25	26	25	21	20	19	19	22	19	18	16	13	26	15	26																						
9-Oct	15	9	9	7	8	12	12	13	14	13	14	16	21	23	14	22	21	6	14	12	17	10	9	12	23																						
10-Oct	10	12	9	36	19	10	12	32	44	23	35	41	33	24	28	13	9	12	11	12	15	16	17	11	44																						
11-Oct	11	8	10	11	11	12	11	11	12	11	10	11	16	15	13	15	14	14	16	17	14	13	16	16	17																						
12-Oct	19	19	18	18	18	21	19	19	19	21	21	23	21	19	27	19	21	21	10	13	18	58	11	9	58																						
13-Oct	48	29	20	37	19	10	11	14	17	23	33	39	18	34	16	12	10	11	8	11	13	34	36	6	48																						
14-Oct	14	15	19	9	13	10	11	12	12	14	16	19	28	13	14	11	13	13	8	15	14	12	9	9	28																						
15-Oct	15	16	11	39	14	14	14	12	20	15	15	13	14	14	18	18	20	20	13	16	26	42	30	9	42																						
16-Oct	8	9	17	13	12	24	13	18	18	20	18	16	12	13	11	12	11	24	14	14	20	18	12	16	24																						
17-Oct	18	14	22	26	44	16	13	8	10	19	16	30	27	14	13	37	17	19	16	19	14	11	13	11	44																						
18-Oct	11	10	11	11	13	14	13	12	12	14	15	31	46	90	77	22	13	10	12	11	21	30	19	31	90																						
19-Oct	20	33	36	23	13	13	14	12	12	17	21	24	24	23	20	16	14	13	10	19	13	14	15	25	36																						
20-Oct	26	12	11	32	33	42	59	70	79	42	28	29	68	52	53	14	11	46	18	28	18	59	39	27	79																						
21-Oct	19	14	31	35	26	58	55	11	34	31	23	25	18	26	32	64	24	66	83	16	20	21	29	25	83																						
22-Oct	13	30	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	40	17	44	19	22	AF	AF	AF	AF	AF	44																						
23-Oct	AF	AF	AF	AF	15	18	14	15	13	11	18	19	17	20	14	9	13	15	12	15	15	13	24	14	24																						
24-Oct	15	13	15	17	17	19	14	16	12	12	24	14	14	16	23	21	19	19	18	24	25	30	24	17	30																						
25-Oct	15	12	11	9	11	11	10	18	13	14	15	16	15	14	18	17	16	18	29	33	33	25	57	21	57																						
26-Oct	19	16	15	15	12	20	18	20	19	19	22	21	18	21	22	14	18	19	16	12	46	59	29	47	59																						
27-Oct	43	16	24	24	16	13	12	14	13	18	15	15	16	14	14	12	14	12	16	15	14	16	16	17	43																						
28-Oct	16	17	19	21	17	11	8	7	9	13	20	16	19	21	18	18	22	22	22	24	20	21	21	22	24																						
29-Oct	22	21	20	22	22	17	14	15	15	18	17	18	17	18	18	24	32	73	31	22	20	17	18	17	73																						
30-Oct	14	18	16	26	17	42	16	15	12	15	17	19	25	33	62	28	62	83	102	34	23	26	75	47	102																						
31-Oct	70	50	14	15	17	19	22	13	14	14	8	6	10	10	13	18	16	15	14	14	16	14	17	15	70																						
Diurnal Maximum																								70	51	36	59	44	58	59	70	79	42	62	60	81	90	77	64	62	83	102	34	46	59	75	47
AF - Analyzer Failure																																															





**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Muskeg River - October 2017**





# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Muskeg River	Station number:	AMS 16
Calibration Date:	October 2, 2017	Last Cal Date:	September 11, 2017
Start time (MST):	9:41	End time (MST):	13:54
Reason:	Routine		

### Calibration Standards

Cal Gas Concentration	<u>48.2</u>	ppm	Cal Gas Exp Date	November 4, 2017
Cal Gas Cylinder #	<u>EY0000638</u>			
Calibrator Make/Model	API T700		Serial Number	493
ZAG Make/Model	API 701		Serial Number	2155

### Analyzer Information

Analyzer make:	Thermo 43i	Analyzer serial #:	1118148498		
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Analyzer Range	0 - 1000 ppb		PMT voltage	-710.4	-710.4
Calculated slope	0.990332	0.998975	Lamp voltage	813	812
Calculated intercept	1.065297	1.223562	Pressure	719.8	722.2
Analyzer Background	8.9	8.7	Flow	0.445	0.447
Analyzer Coefficient	1.051	1.036	Intensity	91	91

### SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
as found zero	4998	0.0	0.0	0.1	----
as found span	4930	76.6	737.5	743.1	0.992
calibrator zero	4998	0.0	0.0	0.1	----
high point	4932	76.6	737.2	737.6	0.999
second point	4972	38.5	370.4	368.1	1.006
third point	4993	19.4	186.6	184.7	1.010
as left zero	4998	0.0	0.0	0.1	----
as left span	4930	76.6	737.5	736.0	1.002
Average Correction Factor					1.005
Corrected As found	743.00	Previous response	743.58	*% change	0.1%

\* = > +/-5% change initiates investigation

#### Notes:

Changed inlet filter after as founds. Adjusted the span

Calibration Performed By: Jayme Marcoux



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

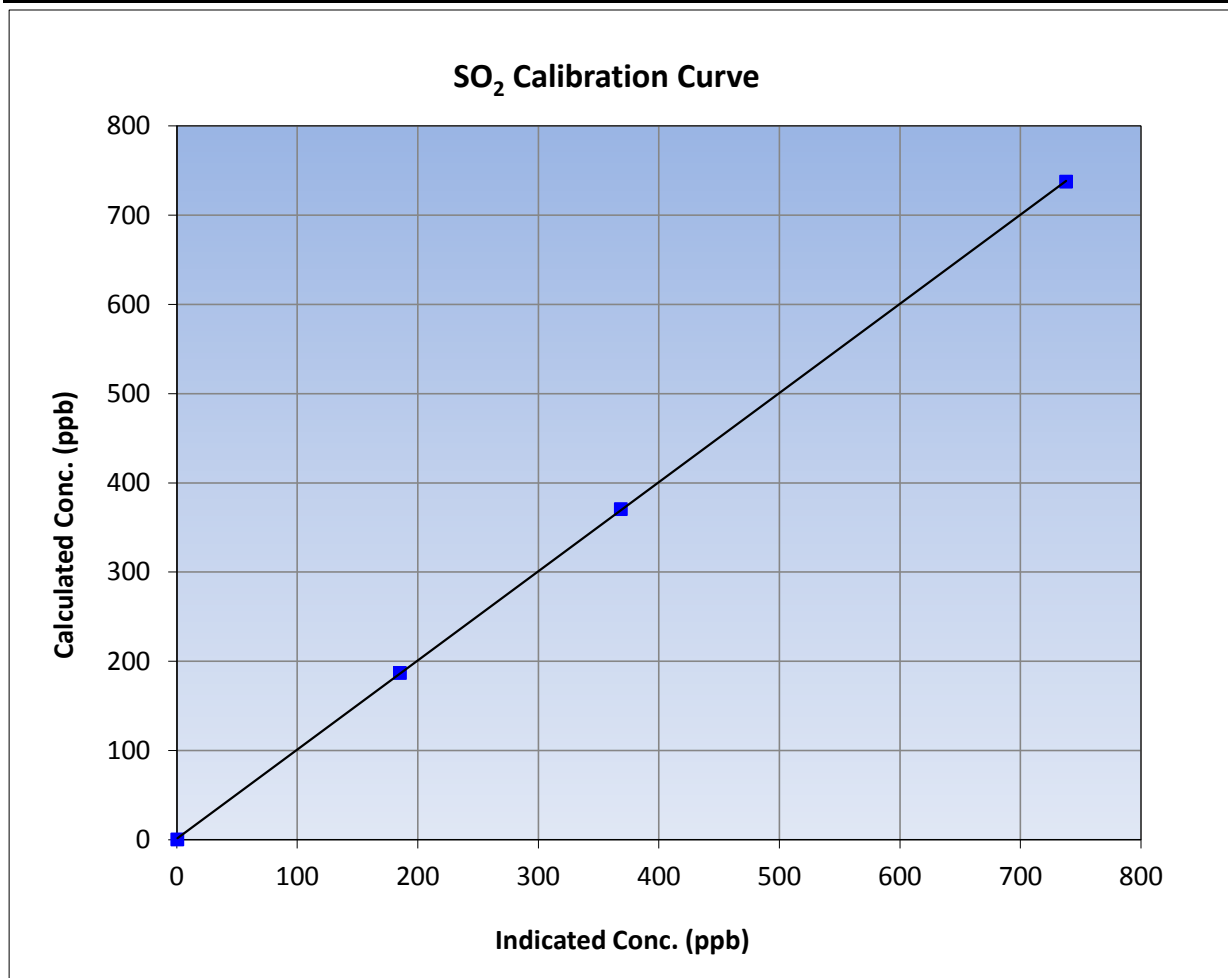
Version-03-2017

### Station Information

Calibration Date	October 2, 2017	Previous Calibration	September 11, 2017
Station Name	Muskeg River	Station Number	AMS 16
Start Time (MST)	8:39	End Time (MST)	13:54
Analyzer make	Thermo 43i	Analyzer serial #	1118148498

### Calibration Data

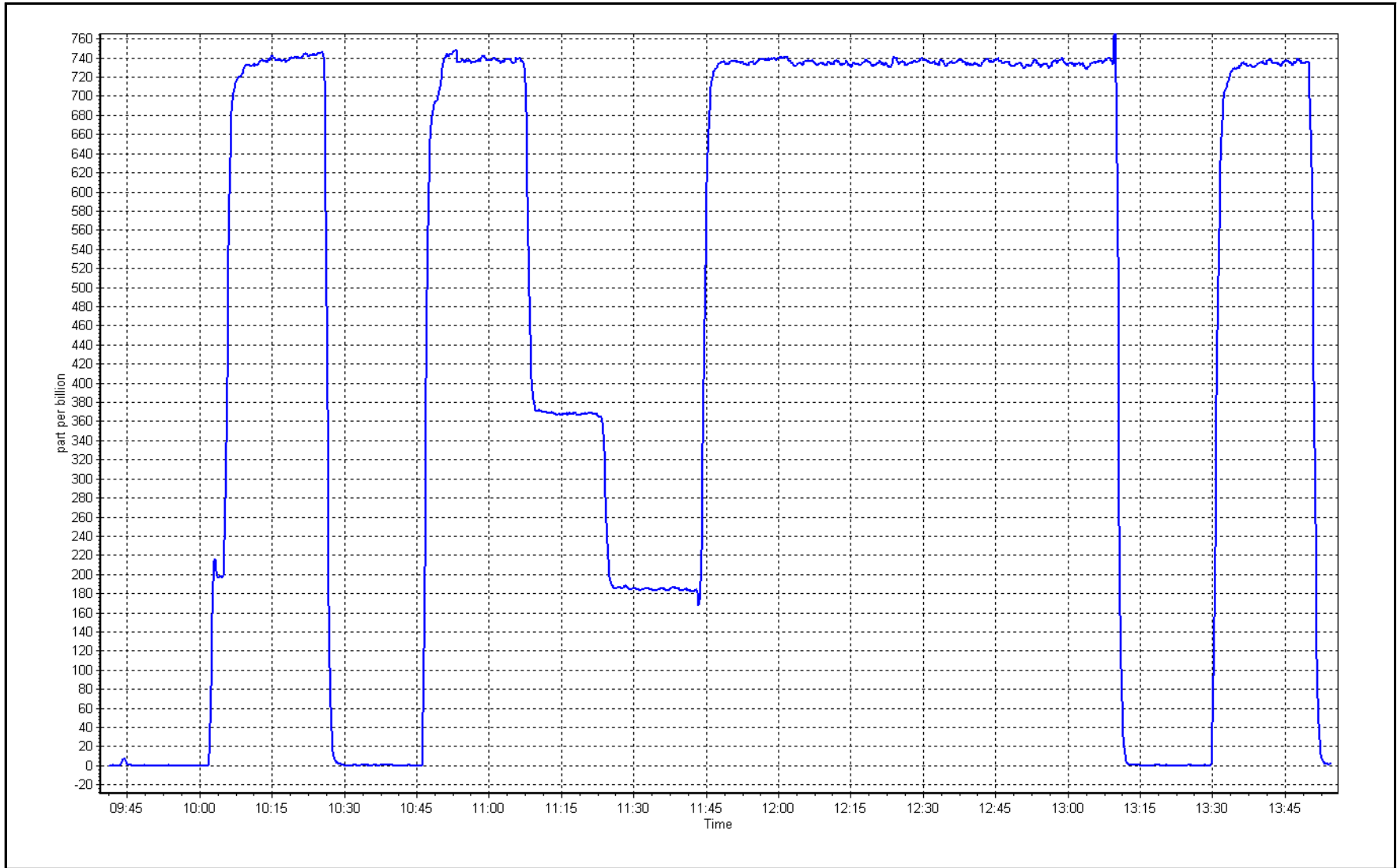
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.1	----	Correlation Coefficient	0.999982	≥0.995
737.2	737.6	0.9994			
370.4	368.1	1.0061	Slope	0.998975	0.90 - 1.10
186.6	184.7	1.0100			
			Intercept	1.223562	+/-30



SO2 Calibration Plot

Date: October 2, 2017

Location: Muskeg River





# Wood Buffalo Environmental Association

## THC Calibration Report

Version-03-2017

### Station Information

Station Name:	Muskeg River	Station number:	AMS 16
Calibration Date:	October 2, 2017	Last Cal Date:	September 1, 2017
Start time (MST):	9:41	End time (MST):	13:53
Reason:	Routine		

### Calibration Standards

Gas Cert Reference	EY0000638	Cal Gas Expiry Date	November 4, 2019
CH4 Cal Gas Conc.	<u>502.0</u> ppm	CH4 Equiv Conc.	1035.5 ppm
C3H8 Cal Gas Conc.	<u>194.0</u> ppm	Station temp.	23 Deg C
Calibrator Make/Model	API T700	Serial Number	493
ZAG Make/Model	API 701	Serial Number	2155

### Analyzer Information

Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1218153458
	<u>Start</u>	<u>Finish</u>	<u>Start</u>
Analyzer Range	0 - 25 ppm	Bias voltage supply	-287
Calculated slope	1.003692	Sample pressure	8.2
Calculated intercept	0.054763	Fuel pressure	24.2
Analyzer Background	2.52	Air pressure	34.9
Analyzer Coefficient	4.808	Flame temperature	157.4

### THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	4998	0.0	0.00	-0.08	----
as found span	4930	76.6	15.84	15.91	0.996
calibrator zero	4998	0.0	0.00	0.04	----
high point	4930	76.6	15.84	15.84	1.000
second point	4970	38.5	7.96	8.02	0.993
third point	4993	19.2	3.97	4.12	0.964
as left zero	4998	0.0	0.00	-0.02	----
as left span	4930	76.6	15.84	15.87	0.998
Average Correction Factor					0.986
Corrected As found	15.99	Previous response	15.73	*% change	-1.6%

\* = > +/-5% change initiates investigation

Notes: Changed inlet filter and Hydrogen cylinder after as founds. Adjusted the zero and the span.

Calibration Performed By: Jayme Marcoux



# Wood Buffalo Environmental Association

## THC Calibration Summary

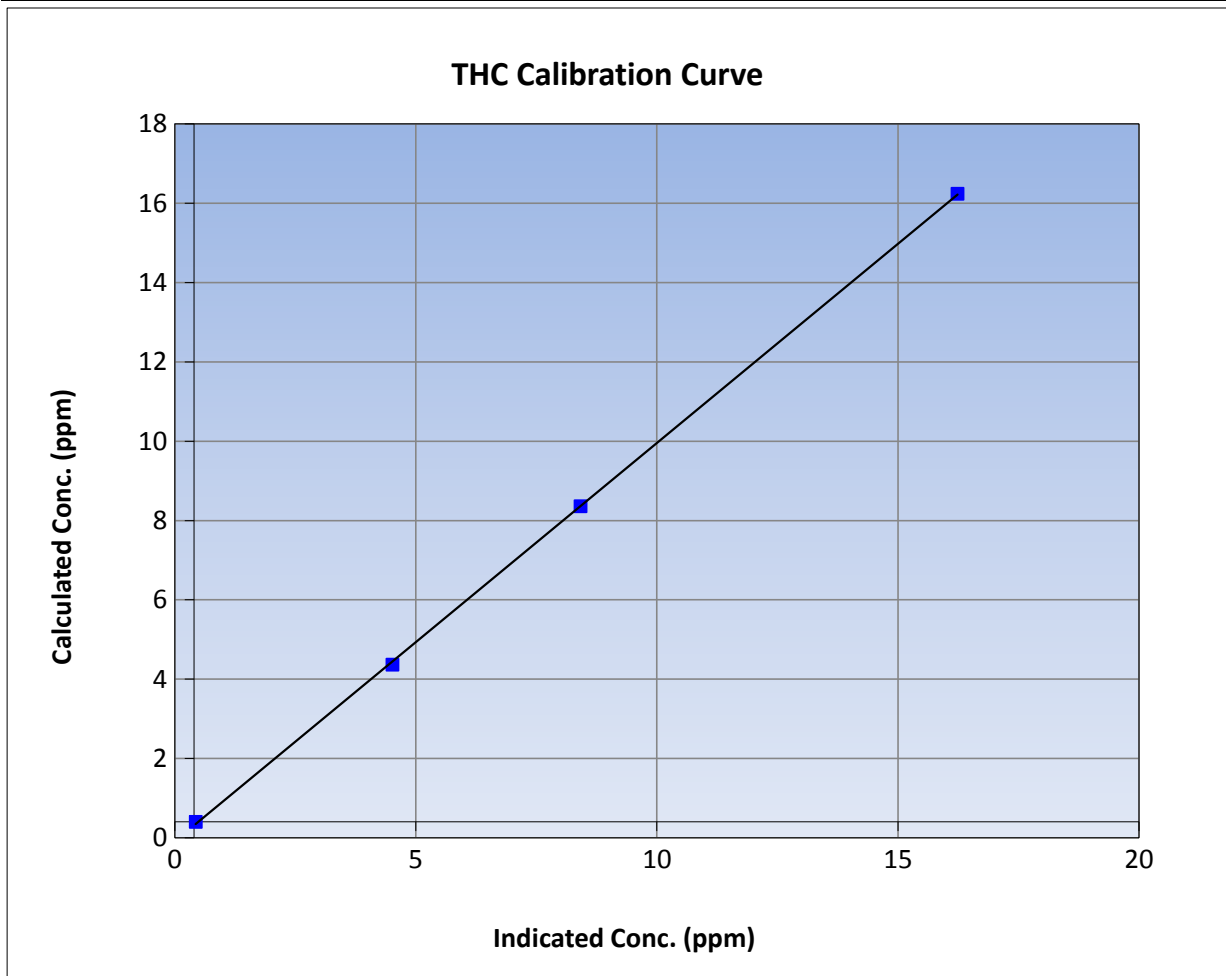
Version-03-2017

### Station Information

Calibration Date	October 2, 2017	Previous Calibration	September 1, 2017
Station Name	Muskeg River	Station Number	AMS 16
Start Time (MST)	8:37	End Time (MST)	13:53
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458

### Calibration Data

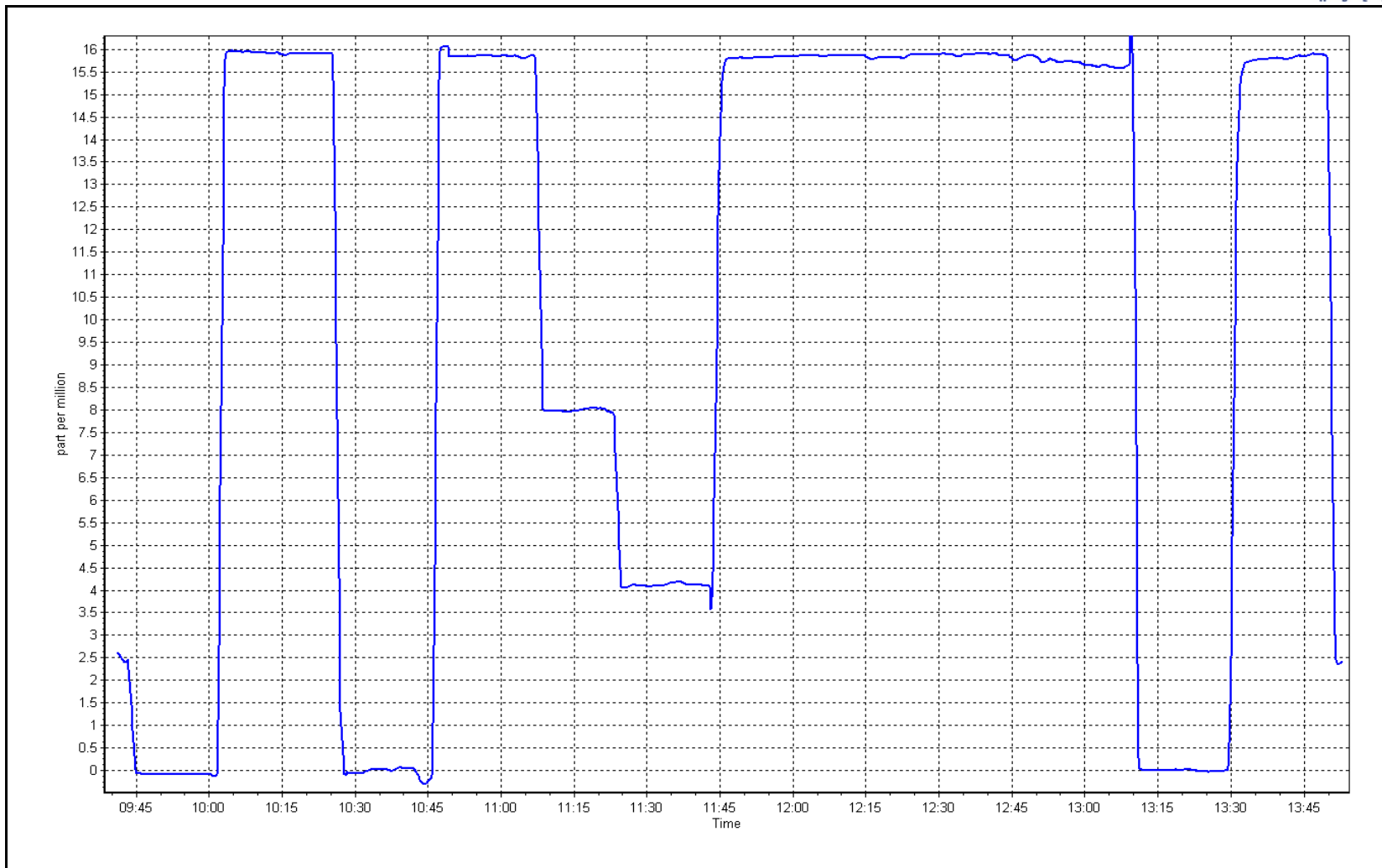
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.0	----	Correlation Coefficient	0.999932	≥0.995
15.8	15.8	1.0002			
8.0	8.0	0.9929	Slope	1.004896	0.90 - 1.10
4.0	4.1	0.9637			
			Intercept	-0.094180	+/-1.5



THC Calibration Plot

Date: October 2, 2017

Location: Muskeg River





# Wood Buffalo Environmental Association

## NO<sub>x</sub> - NO - NO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Muskeg River	Station number:	AMS 16
Calibration Date:	October 2, 2017	Last Cal Date:	September 11, 2017
Start time (MST):	9:41	End time (MST):	13:53
Reason:	Routine		

### Calibration Standards

NO Gas Cylinder #	EY0000638	Cal Gas Expiry Date	November-04-19
NOX Cal Gas Conc.	<u>52.4</u> ppb	NO Cal Gas Conc.	<u>52.4</u> ppb
Calibrator Model	API T700	Serial Number	493
ZAG make/model	API T701	Serial Number	2155

### Analyzer Information

Analyzer make: Thermo 42i			Analyzer serial #: 1426262593		
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coefficient	1.061	1.059	NOX Range (ppb)	0 - 1000 ppb	
NOX coefficient	0.997	0.997	PMT Temperature	-2.7	-2.8
NO <sub>2</sub> coefficient	1.000	1.000	Reaction cell Press	161.6	1.6
NO bkgrnd	8.9	9.1	Sample Flow	0.983	
NOX bkgrnd	9.1	9.5	PMT Voltage	-744.4	-744.8

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope	1.005243	1.003374
NO <sub>x</sub> Cal Offset	-0.006533	1.099062
NO Cal Slope	1.005144	1.002411
NO Cal Offset	0.455165	1.360492
NO <sub>2</sub> Cal Slope	0.985700	0.999788
NO <sub>2</sub> Cal Offset	-0.209170	1.289344





# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

Version-03-2017

### Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Dilution flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	4998	0.0	0.0	0.0	0.0	0.3	0.1	0.1	----	----
as found span	4930	76.6	801.7	801.7	0.0	818.9	818.4	0.4	0.9790	0.9796
calibrator zero	4998	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
high point	4930	76.6	801.7	801.7	0.0	798.5	799.1	-0.7	1.0040	1.0033
second point	4970	38.5	402.8	402.8	0.0	399.6	399.7	-0.1	1.0080	1.0077
third point	4993	19.4	202.8	202.8	0.0	200.2	199.8	0.4	1.0130	1.0151
as left zero	4998	0.0	0.0	0.0	0.0	2.2	-0.1	2.3	----	----
as left span	4930	76.6	801.7	373.9	427.8	789.7	368.3	421.5	1.0152	1.0152
<b>Average Correction Factor</b>									<b>1.0083</b>	<b>1.0087</b>

Corrected As found	NO <sub>x</sub> = 818.6 ppb	NO = 818.3 ppb	*Percent Change	NO <sub>x</sub> = -2.6%
Previous Response	NO <sub>x</sub> = 797.5 ppb	NO = 797.2 ppb	*Percent Change	NO = -2.6%

\* = > +/-5% change initiates investigation

### GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
1st NO ref point		0.0	790.7	789.6	1.0	1.0139	1.0153	----	----
1st NO2 (400 ppb O3)	373.9	415.7	789.1	373.9	415.2	1.0160	----	1.0012	99.9%
2nd NO2 (200 ppb O3)	571.7	217.9	787.6	571.7	216.0	1.0179	----	1.0088	99.1%
3rd NO2 (100 ppb O3)	675.0	114.6	787.0	675.0	112.0	1.0187	----	1.0232	97.7%
2nd NO ref point	----	0.0	787.3	786.7	0.7	1.0183	1.0191	----	----
<b>Average Correction Factor</b>						<b>1.0177</b>	<b>1.0172</b>	<b>1.0111</b>	<b>98.9%</b>

**Notes:** Changed inlet filter after asfinds. Adjusted the zero and the span.

Calibration Performed By: Jayme Marcoux



# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

Version-03-2017

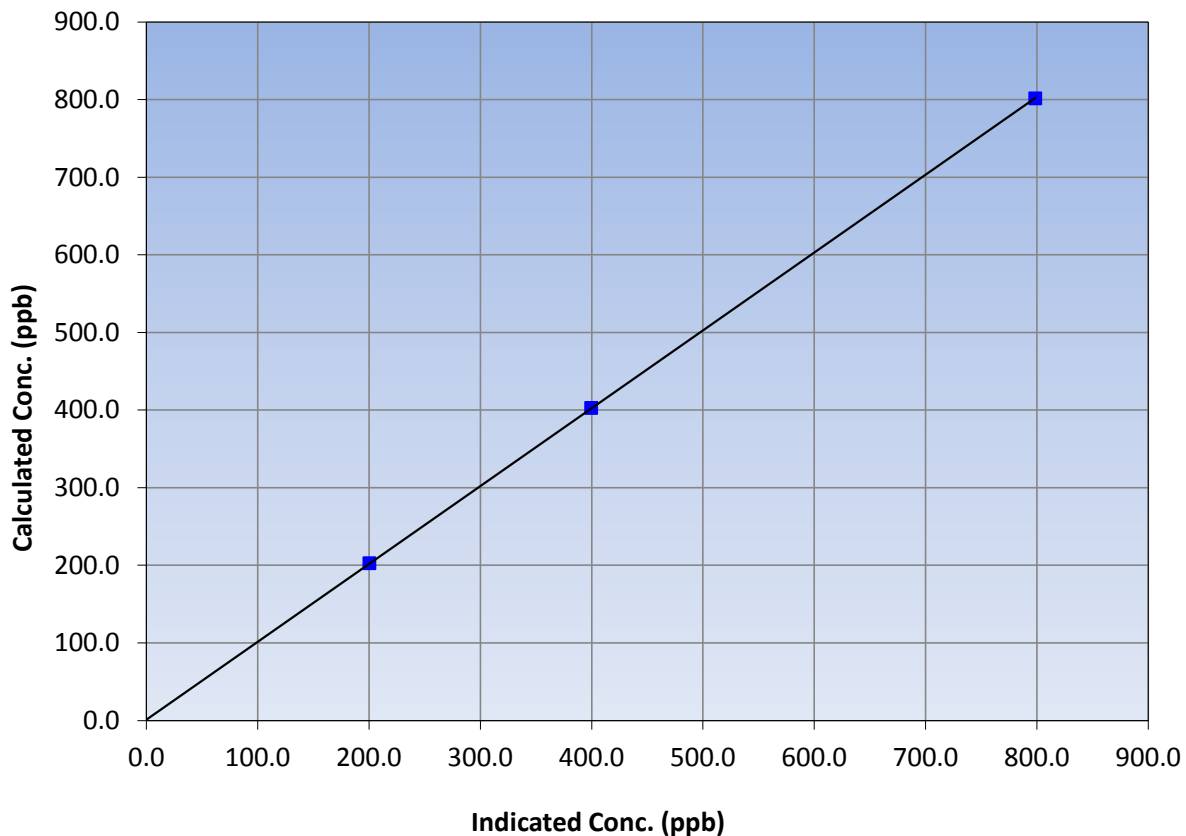
### Station Information

Calibration Date	October 2, 2017	Previous Calibration	September 11, 2017
Station Name	Muskeg River	Station Number	AMS 16
Start Time (MST)	9:41	End Time (MST)	13:53
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	-0.1	----	Correlation Coefficient	≥0.995	
801.7	798.5	1.0040			
402.8	399.6	1.0080			
202.8	200.2	1.0130			
			Slope	1.003374	0.90 - 1.10
			Intercept	1.099062	+/-20

NO<sub>x</sub> Calibration Curve





# Wood Buffalo Environmental Association

## NO Calibration Summary

Version-03-2017

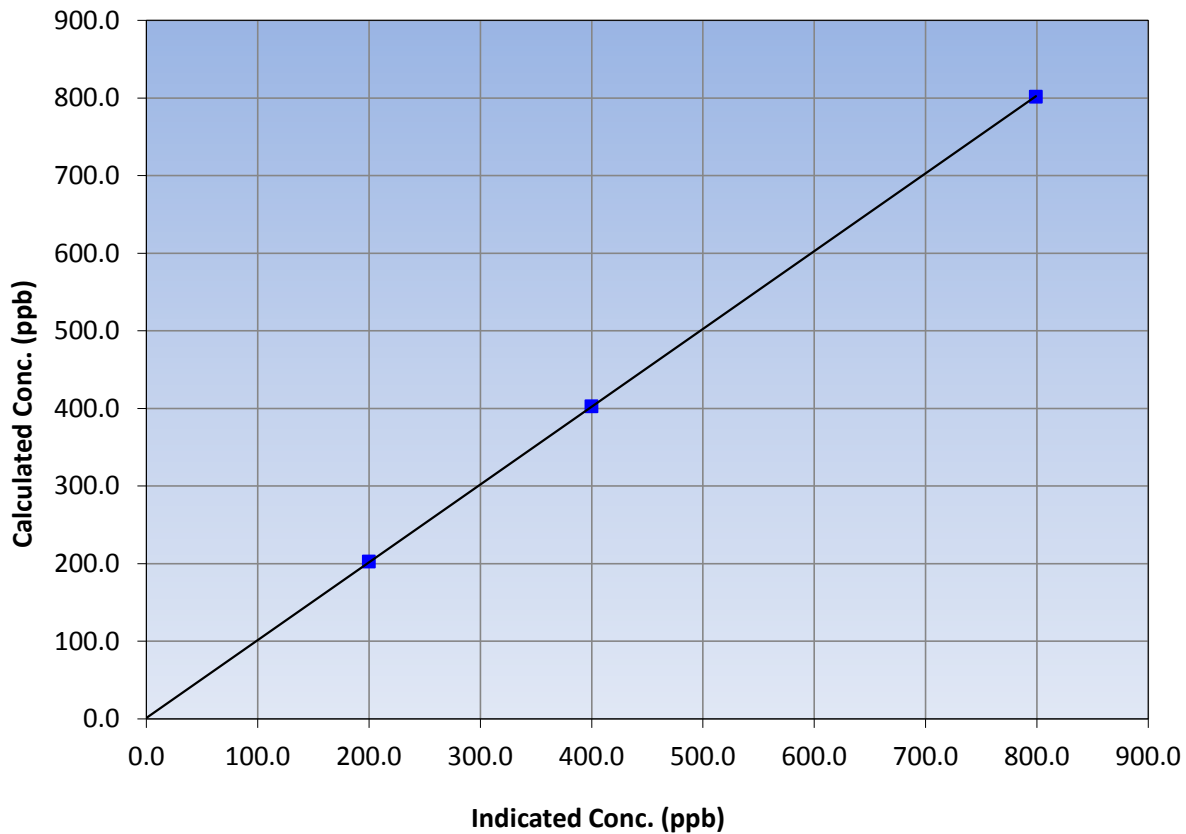
### Station Information

Calibration Date	October 2, 2017	Previous Calibration	September 11, 2017
Station Name	Muskeg River	Station Number	AMS 16
Start Time (MST)	9:41	End Time (MST)	13:53
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	-0.1	----	Correlation Coefficient	≥0.995	
801.7	799.1	1.0033			
402.8	399.7	1.0077			
202.8	199.8	1.0151			
			Slope	1.002411	0.90 - 1.10
			Intercept	1.360492	+/-20

NO Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

Version-03-2017

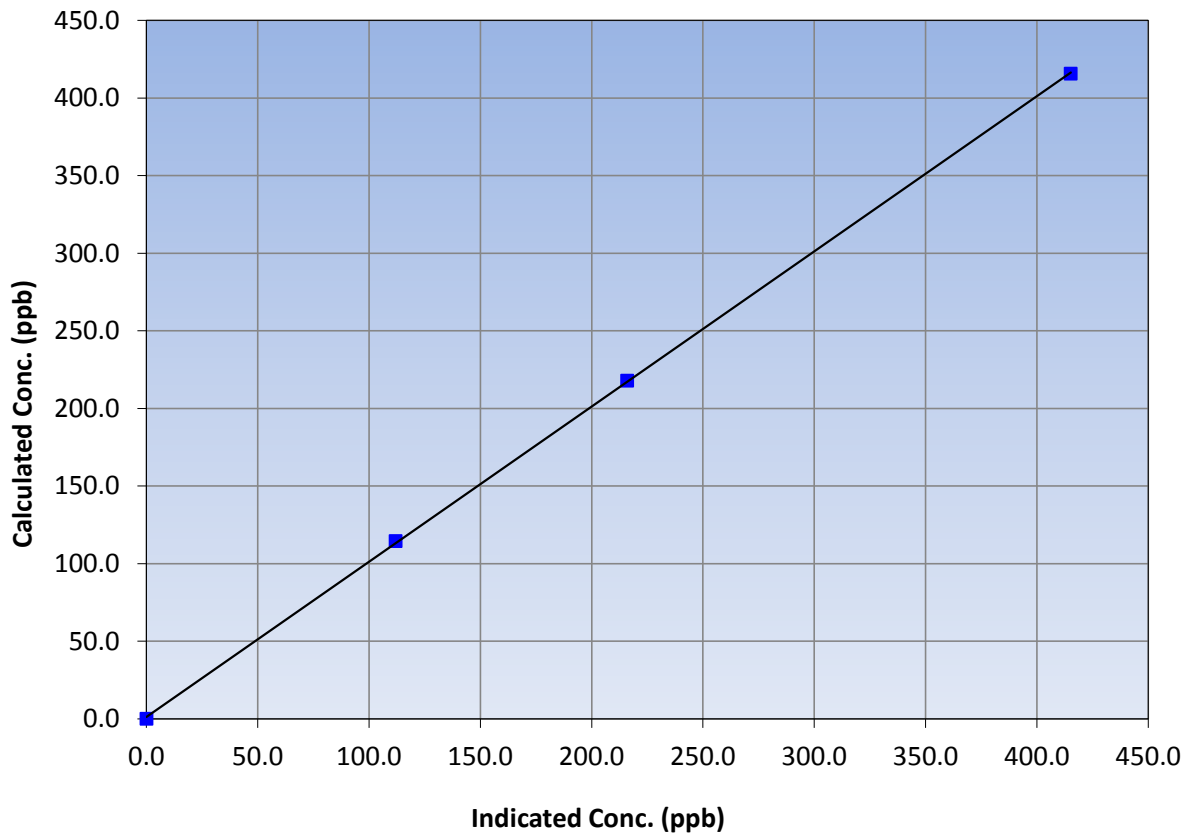
### Station Information

Calibration Date	October 2, 2017	Previous Calibration	September 11, 2017
Station Name	Muskeg River	Station Number	AMS 16
Start Time (MST)	9:41	End Time (MST)	13:53
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.0	----	Correlation Coefficient	≥0.995	
415.7	415.2	1.0012			
217.9	216.0	1.0088			
114.6	112.0	1.0232			
			Slope	0.999788	0.90 - 1.10
			Intercept	1.289344	+/-20

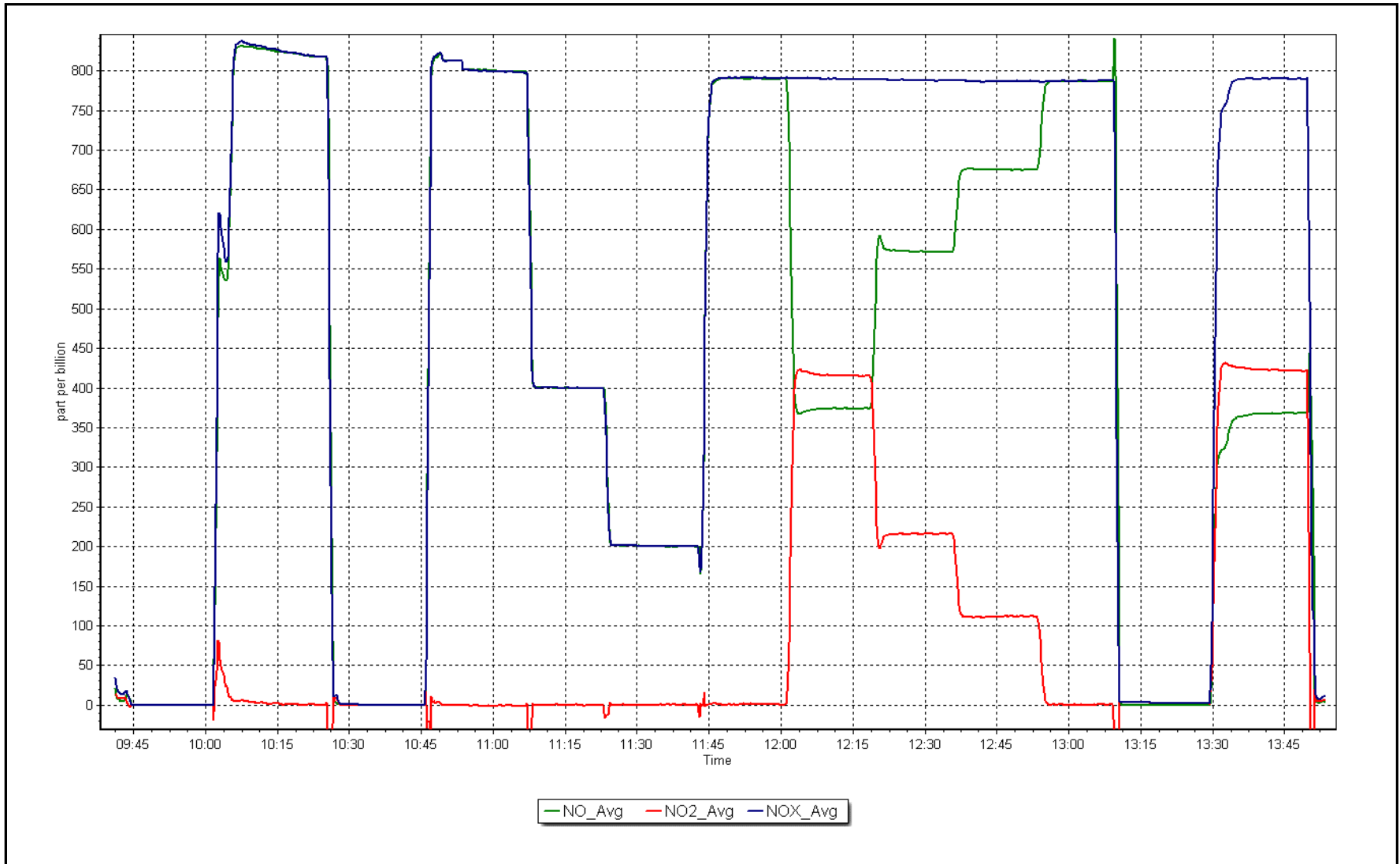
**NO<sub>2</sub> Calibration Curve**



NO<sub>x</sub> Calibration Plot

Date: October 2, 2017

Location: Muskeg River





# Wood Buffalo Environmental Association

## SHARP PM<sub>2.5</sub> CALIBRATION

Version-02-2017

### Station Information

Station Name:	Muskeg River	Station number:	AMS 16
Calibration Date:	October 2, 2017	Last Cal Date:	September 11, 2017
Start time (MST):	10:00	End time (MST):	10:58
Sharp Model:	Thermo/Sharp 5030	S/N:	E-798
Particulate Fraction:	PM2.5	C14 Source S/N:	4142
Flow Meter Make/Model:	DeltaCal	S/N:	628
Temp/RH standard:	NA	S/N:	NA

### Monthly Calibration Test

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<b>(Limits)</b>
T1 (°C)	5.5	4.2	5.5	<input checked="" type="checkbox"/>	+/- 2 °C
P3 (hPa)	990	990	990	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	1003	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	0.1		0.1	<input type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified	<input type="checkbox"/>			
Cyclone cleaning :	PM10 Cyclone	<input checked="" type="checkbox"/>	PM2.5 Cyclone	<input checked="" type="checkbox"/>	
Date Filter Tape Installed:					

### Quarterly Calibration Test

Leak Test: Date of check: \_\_\_\_\_ Last Cal Date: August 11, 2017  
 Flow w/o adaptor: 16.8 Flow w/ adaptor: 16.68

**(Limit) 0.4 LPM**

<u>Adjusted</u>	<u>Current Test</u>	<u>Previous Test</u>	<u>% Change</u>
<input type="checkbox"/>	Foil S/N: <u>8074</u>	Foil S/N: <u>8074</u>	
Foil Calibration	Foil Mass: <u>1259</u>	Foil Mass: <u>1259</u>	
	Calibration Date: <u>October 2, 2017</u>	Calibration Date: <u>July 12, 2017</u>	
<b>(Limit) +/- 5% of previous</b>	Correction Factor: <u>6960</u>	Correction Factor: <u>7151</u>	-2.67%

### Annual Calibration Test

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<b>(Limits)</b>
T2 (°C)				<input type="checkbox"/>	+/- 2 °C
T3 (°C)				<input type="checkbox"/>	+/- 2 °C
T4 (°C)				<input type="checkbox"/>	+/- 2 °C
RH (%)				<input type="checkbox"/>	+/- 10%
Date Sample Tube Cleaned:					
Date Pump Rebuilt/Replaced:					

Notes: Cleaned the cyclone head. Adjusted T1

Calibration by: Jayme Marcoux



## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 17  
WAPASU  
OCTOBER 2017**

Operations, Data Collection,  
QA/QC, Data Validation and Reporting by:  
Wood Buffalo Environmental Association  
Fort McMurray, Alberta

November 29, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)  
OCTOBER 2017

MONTHLY SUMMARY for  
AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	707	37	37	100	16	0	3	0
H2S (ppb) Average	708	36	36	100	1	0	0	0
THC (ppm) Average	707	37	37	100	3.4	-	2.4	-
O3 (ppb) Average	709	35	35	100	41	0	31	-
NO2 (ppb) Average	706	38	38	100	20	0	7	-
NO (ppb) Average	706	38	38	100	42	-	8	-
NOX (ppb) Average	706	38	38	100	58	-	11	-
PM2.5 (ug/m3) Average	743	1	1	100	27.3	-	9.4	0
Temperature 2 m (C) Average	744	0	0	100	21.1	-	13.2	-
Relative Humidity (%) Average	744	0	0	100	100	-	98	-
Precipitation (mm) Total	744	0	0	100	4.4	-	18	-
Wind Speed 10 m (km/h) Average	719	0	25	96.64	26	-	17	-
Wind Direction 10 m (deg) Average	719	0	25	96.64	-	-	-	-

Note : Operational time includes periods of data collection and instrument calibration



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)  
OCTOBER 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	707	0.7	2	-	0	0	0	0	0	2	16
H2S (ppb) Average	708	0.1	0	-	0	0	0	0	0	0	1
THC (ppm) Average	707	2.11	0.1	-	2	2	2.1	2.1	2.1	2.2	3.4
O3 (ppb) Average	709	21.4	8	-	1	11	17	22	27	31	41
NO2 (ppb) Average	706	2.8	3	-	0	0	1	2	4	7	20
NO (ppb) Average	706	0.9	3	-	0	0	0	0	1	1	42
NOX (ppb) Average	706	3.6	5	-	0	0	1	2	4	9	58
PM2.5 (ug/m3) Average	743	3.02	3.3	-	0.4	0.8	1.1	1.8	3.6	6	27.3
Temperature 2 m (C) Average	744	1.51	4.5	-	-7.3	-3.3	-1.9	0.5	4.1	7.4	21.1
Relative Humidity (%) Average	744	83.2	15	-	35	62	75	87	95	98	100
Precipitation (mm) Total	744	-	-	60.73	-	-	-	-	-	-	-
Wind Speed 10 m (km/h) Average	719	10	5	-	0	4	6	9	14	17	26
Wind Direction 10 m (deg) Average	719	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)  
OCTOBER 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	06 Oct 2017 18:00	06 Oct 2017 18:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	11 Oct 2017 03:00	12 Oct 2017 02:00	24	Flat line in sensor output signal -sensor frozen



# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Sulphur Dioxide (SO<sub>2</sub>) - ppb

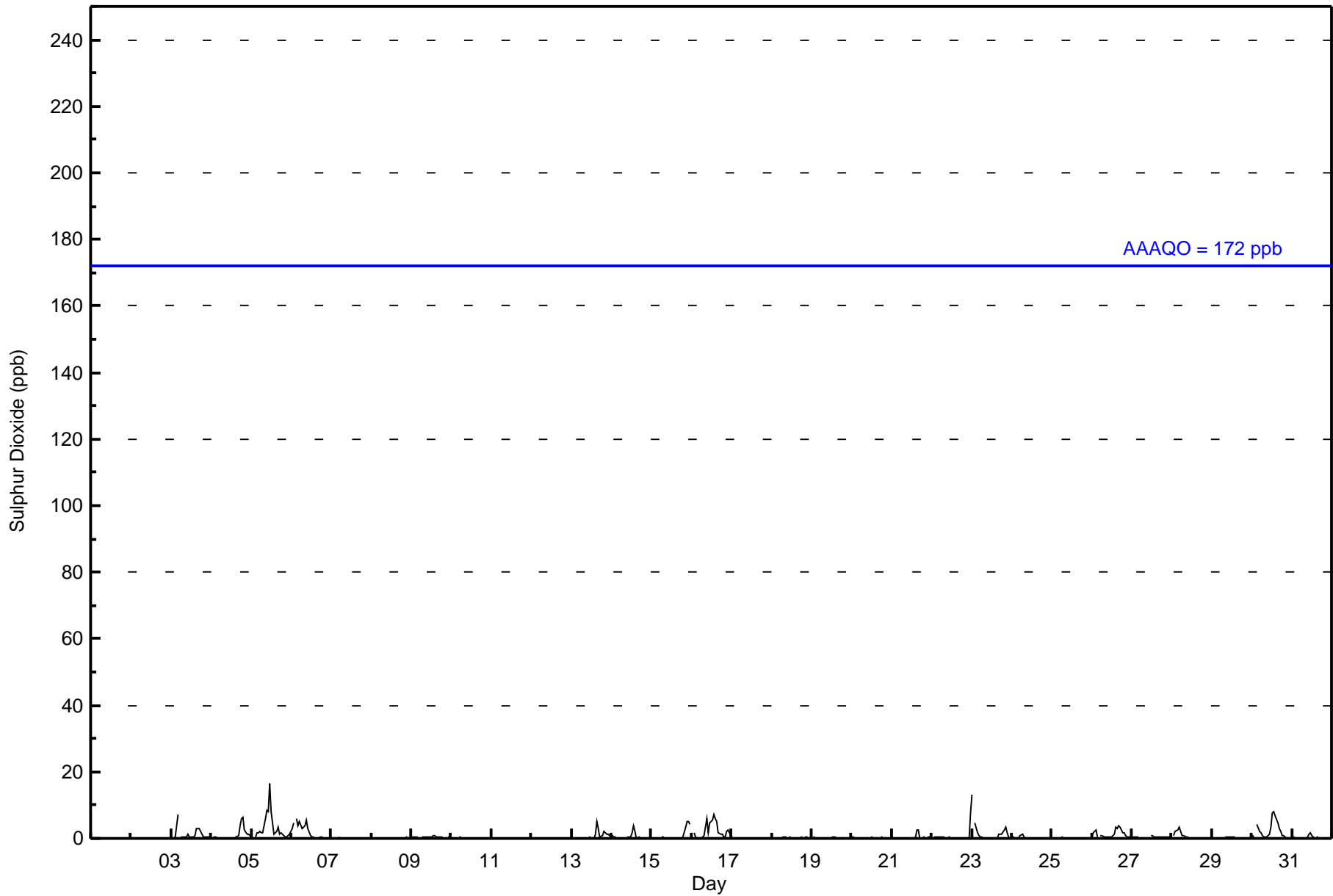
## Wapasu - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																	Hours in Service: 744									
Maximum Value: 16 ppb on Oct 5 12:00																	Maximum Daily Average: 3.1 ppb on Oct 5									
Minimum Value: 0 ppb on Oct 1 01:00																	Hours of Data: 707									
Maximum Diurnal Average: 1.1 ppb at hour 12																	Hours of Missing Data: 37									
Monthly Average: 0.7 ppb																	Hours of Calibration: 37									
Minimum Daily Average: 0.0 ppb on Oct 1																	Percent Operational Time: 100.0									
Minimum Diurnal Average: 0.4 ppb at hour 8																	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 2 P <sub>99</sub> = 8									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
2-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Oct	0	0	0	4	7	Z	1	0	0	0	1	0	0	0	1	3	3	3	1	0	0	0	0	0	1.2	7
4-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	6	6	2	1	1	1	1.1	6
5-Oct	1	Z	0	2	2	2	2	2	6	8	8	16	8	1	2	2	3	1	2	1	0	0	1	1	3.1	16
6-Oct	3	5	Z	6	4	5	3	3	4	6	3	1	0	0	0	0	0	0	0	0	0	0	0	0	1.9	6
7-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
8-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
9-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.3	1
10-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
11-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
12-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
13-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	5	3	0	1	2	2	1	1	1	0.9	5
14-Oct	1	0	0	0	Z	0	0	0	0	0	0	2	4	2	0	0	0	0	0	0	0	0	0	0	0.5	4
15-Oct	0	0	0	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	3	5	5	4	0.9	5
16-Oct	Z	2	0	0	0	0	0	1	3	6	2	5	6	7	6	5	2	1	1	1	0	2	3	1	2.3	7
17-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
18-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
19-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
20-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
21-Oct	0	0	0	0	0	Z	0	0	0	0	0	C	C	0	0	3	3	0	0	0	0	0	0	0	0.4	3
22-Oct	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0.5	7
23-Oct	13	Z	5	2	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	3	2	0	0	1.5	13
24-Oct	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
25-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
26-Oct	0	2	3	1	Z	1	1	0	0	0	0	0	0	1	3	3	4	3	2	2	1	0	0	0	1.2	4
27-Oct	0	0	0	0	0	Z	0	C	C	C	C	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1
28-Oct	Z	1	2	2	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	3
29-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
30-Oct	1	0	Z	4	2	2	1	0	0	1	1	3	8	8	7	5	3	2	1	1	0	0	0	0	2.2	8
31-Oct	0	1	0	Z	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0.3	2
0.8 0.5 0.5 0.9 0.8 0.6 0.4 0.4 0.6 0.8 0.7 1.1 1.0 0.8 0.9 0.9 0.8 0.6 0.6 0.6 0.5 0.5 0.5 0.6																								Diurnal Average		
13 5 5 6 7 5 3 3 6 8 8 16 8 8 7 5 4 4 4 6 6 3 5 5 7																								Diurnal Maximum		
Z - zerospan C - Calibration																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																										



Wood Buffalo Environmental Association  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Wapasu - October 2017





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Wapasu - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	705	99.72	99.72
11 - 20	2	0.28	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Wapasu - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	67	26	18	12	10	4	40	82	72	54	83	50	16	19	23	104	680
11 - 20	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	67	26	18	12	10	4	40	82	73	55	83	50	16	19	23	104	682

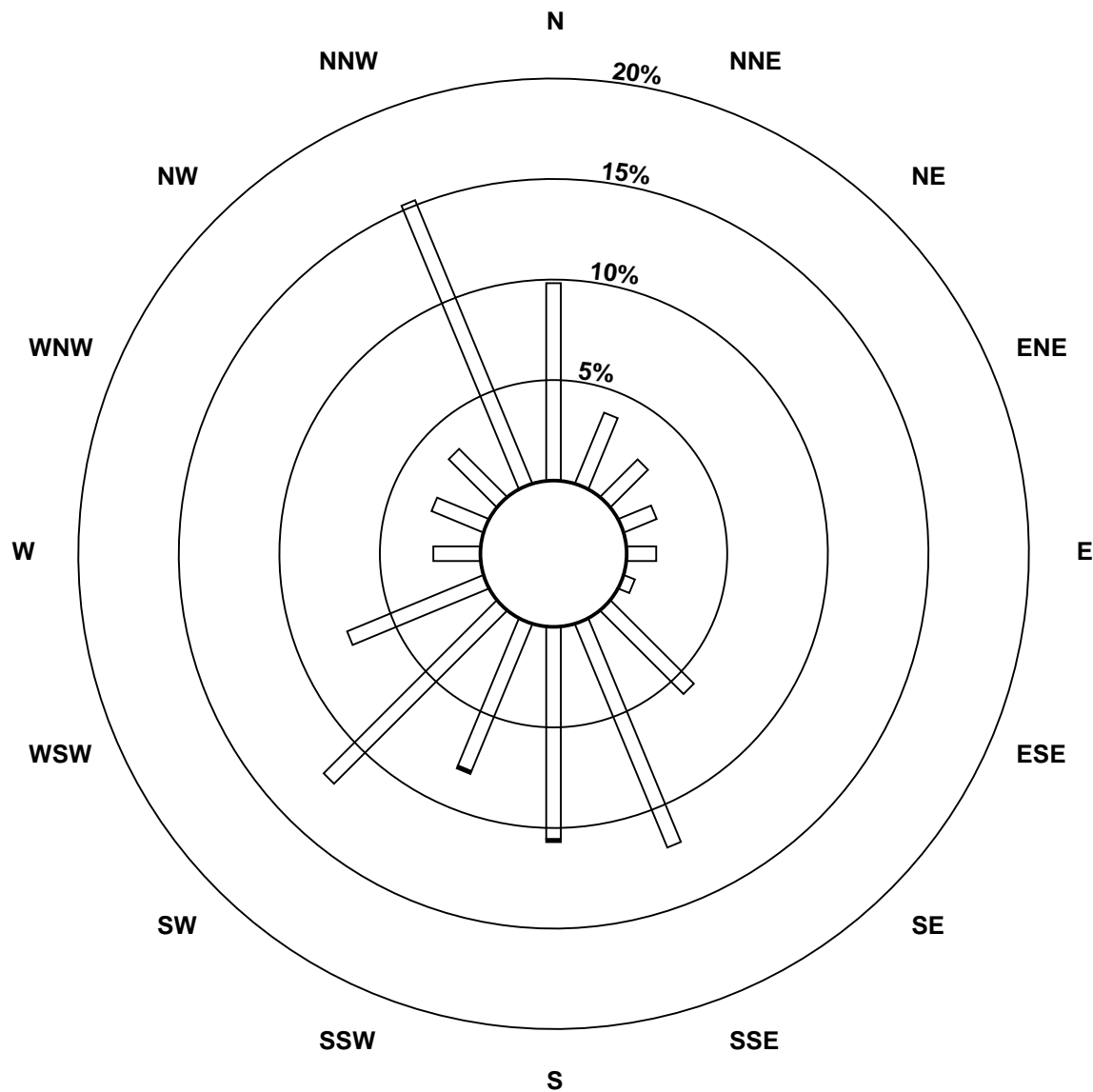
Total Number of Valid Hours: 682

Total Number of Hours: 744

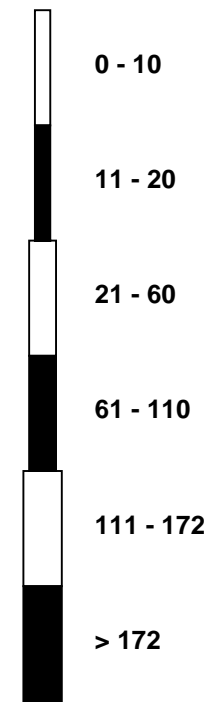


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

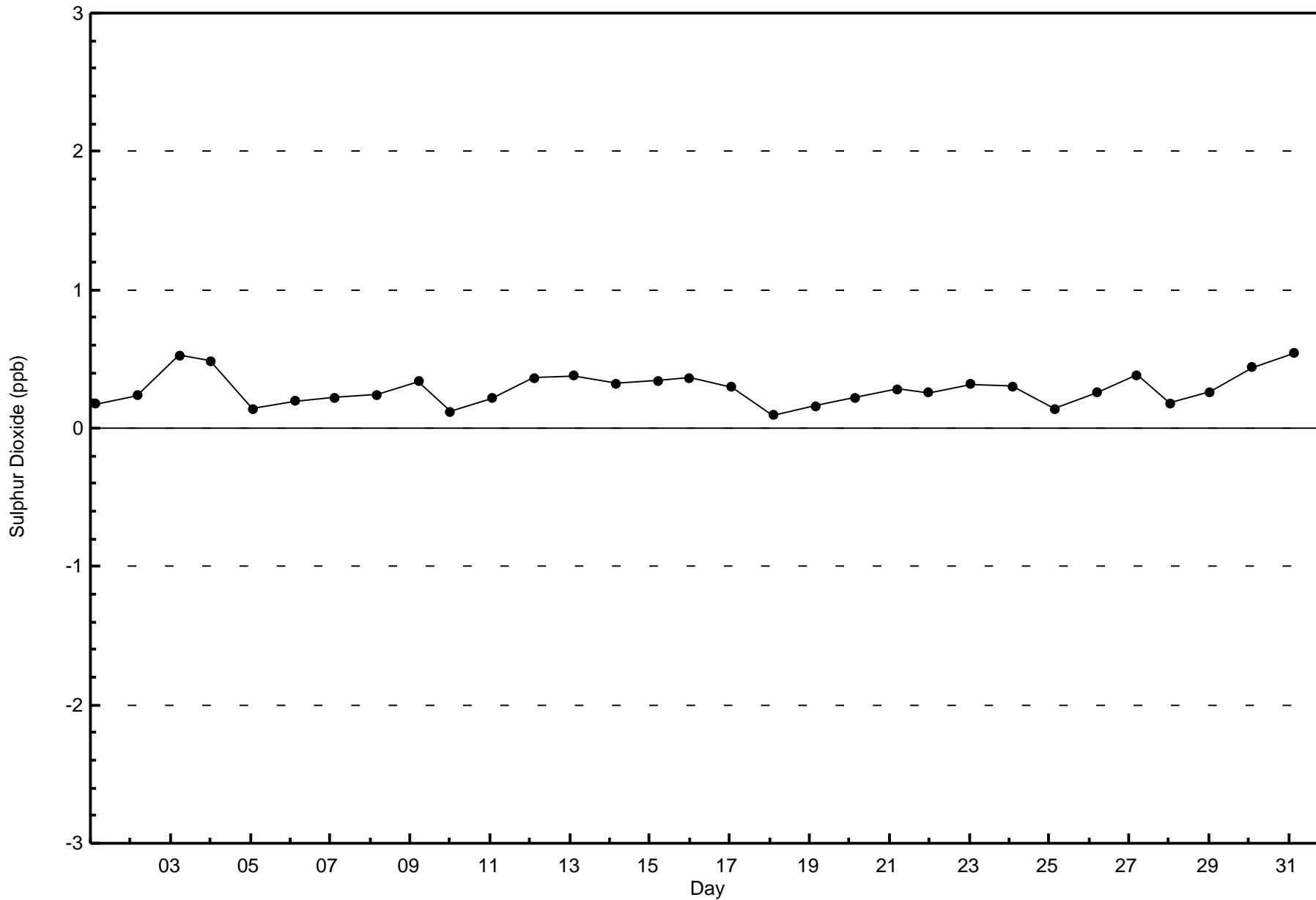
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Wapasu (AMS 17)



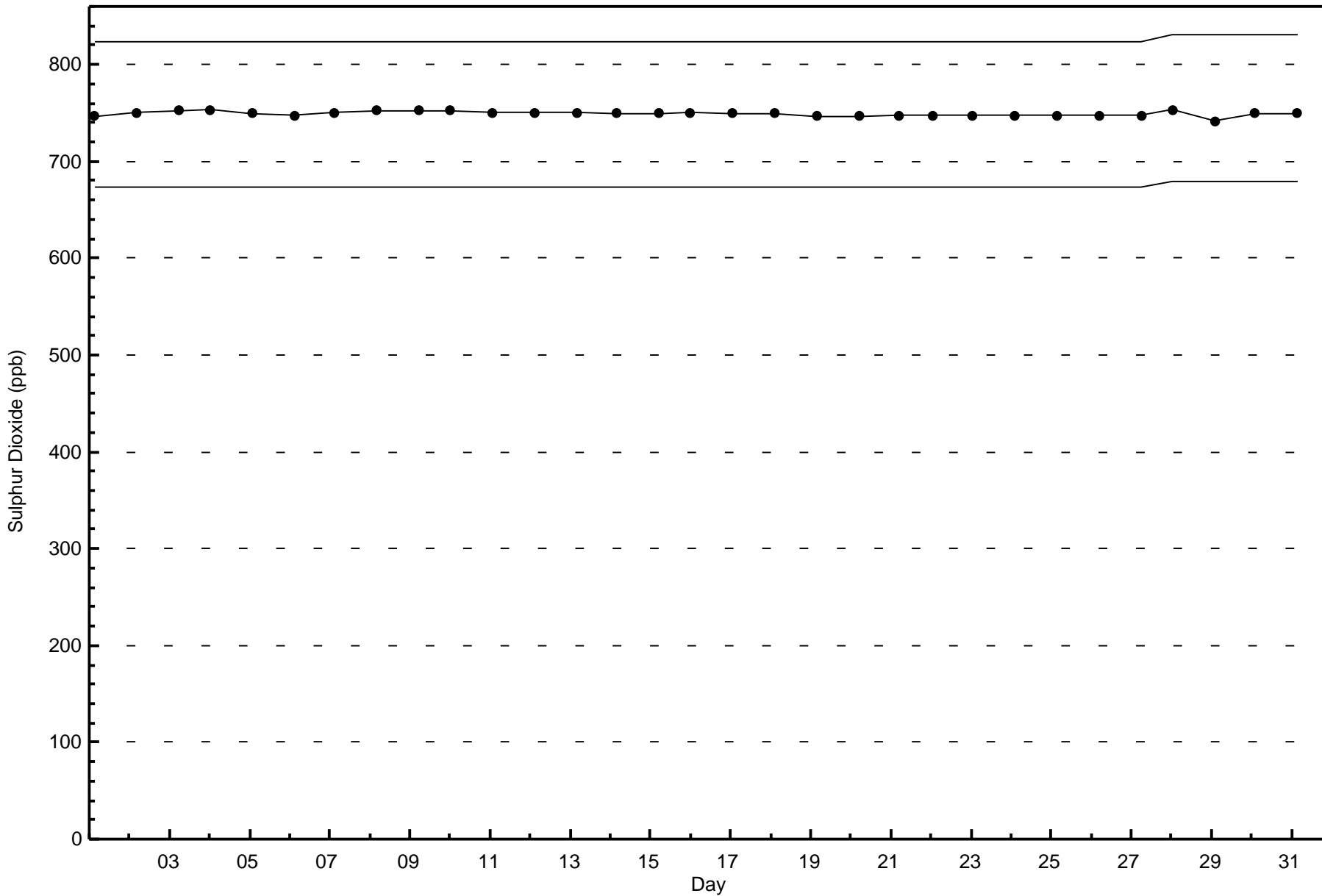
Classes (ppb)



Total Number of Valid Hours: 682





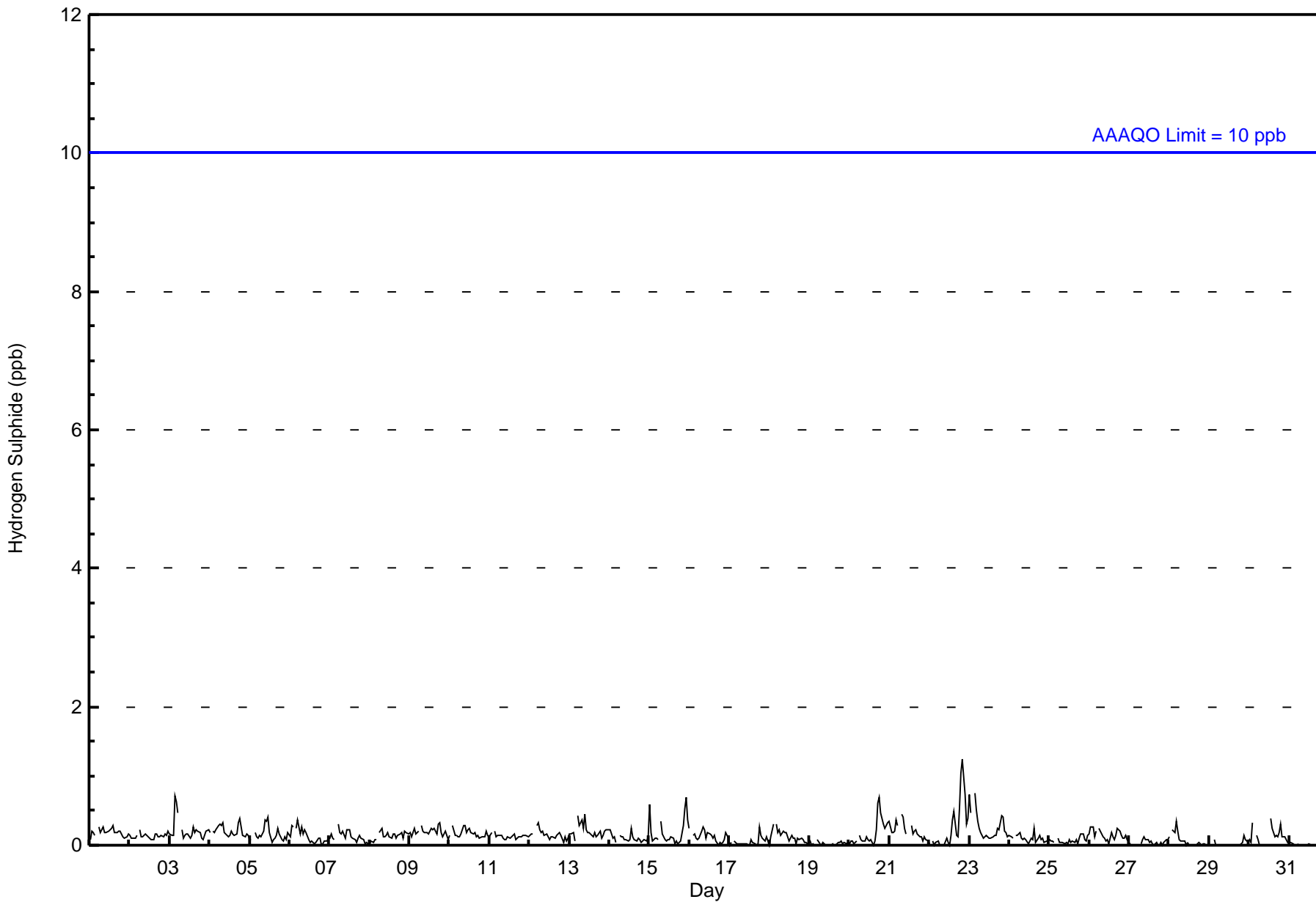




Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 1 ppb on Oct 22 21:00	Maximum Daily Average: 0.3 ppb on Oct 23		Hours of Data:	708
Minimum Value: 0 ppb on Oct 16 18:00	Minimum Daily Average: 0.0 ppb on Oct 31		Hours of Missing Data:	36
Maximum Diurnal Average: 0.2 ppb at hour 5	Minimum Diurnal Average: 0.1 ppb at hour 13		Hours of Calibration:	36
Monthly Average: 0.1 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 1		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Oct	0	0	0	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
4-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
5-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
6-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
7-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
8-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
9-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
10-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
11-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
12-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
13-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
14-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
15-Oct	1	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.2	1
16-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
17-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
18-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
19-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
20-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.2	1
21-Oct	0	0	0	0	0	0	Z	0	0	0	0	C	C	0	0	0	0	0	0	0	0	0	0	0	0.2	0
22-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0.3	1
23-Oct	1	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
24-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
25-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
26-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
27-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
28-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
29-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
30-Oct	0	0	0	Z	0	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.1	0
31-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
0.1																								0.1	0.1	
1																								0	0	

Z - zerospan      C - Calibration  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb    24-hr 3 ppb





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Wapasu - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	708	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Wapasu - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	68	26	19	12	10	4	41	83	75	54	82	50	16	19	23	102	684
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	68	26	19	12	10	4	41	83	75	54	82	50	16	19	23	102	684

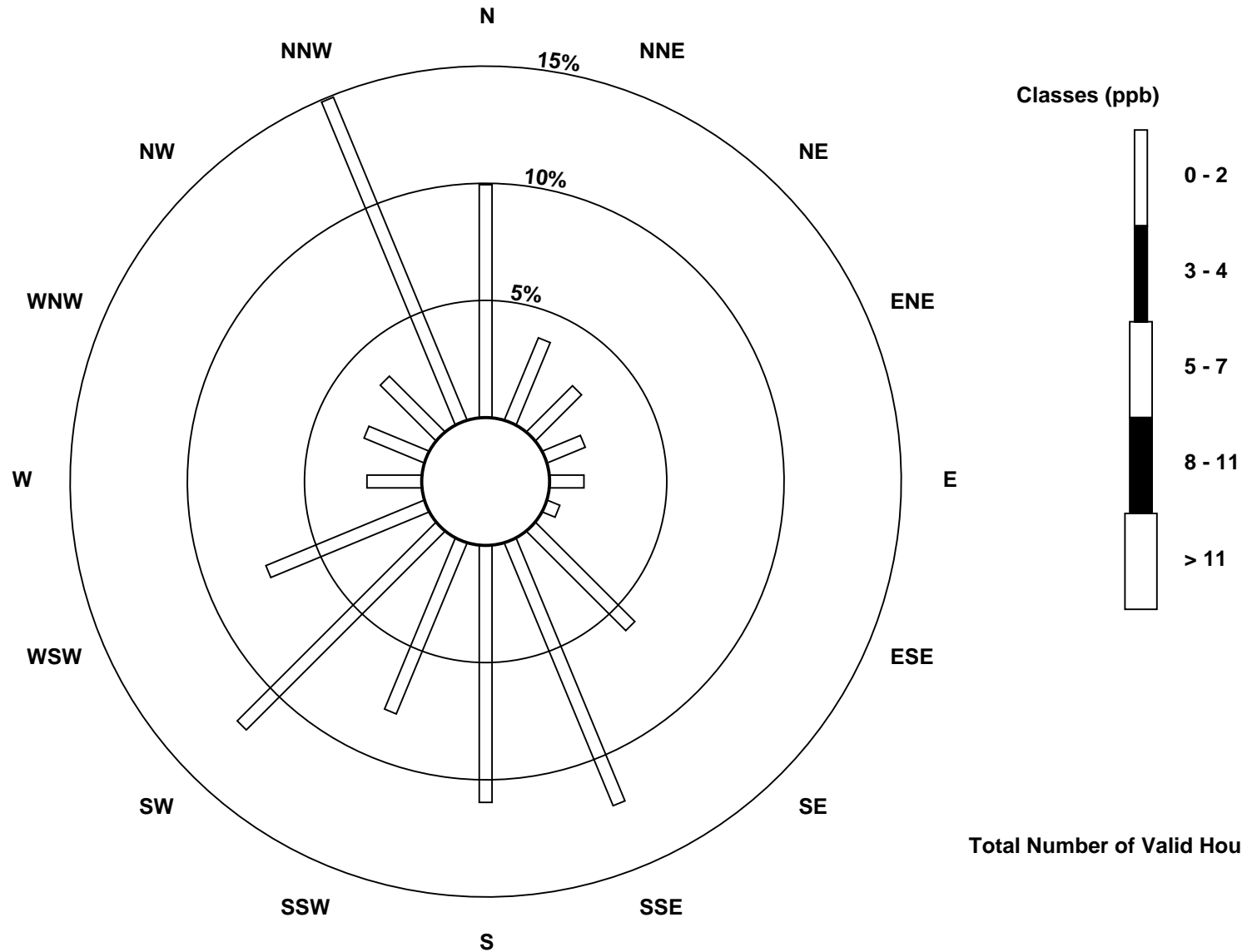
Total Number of Valid Hours: 684

Total Number of Hours: 744

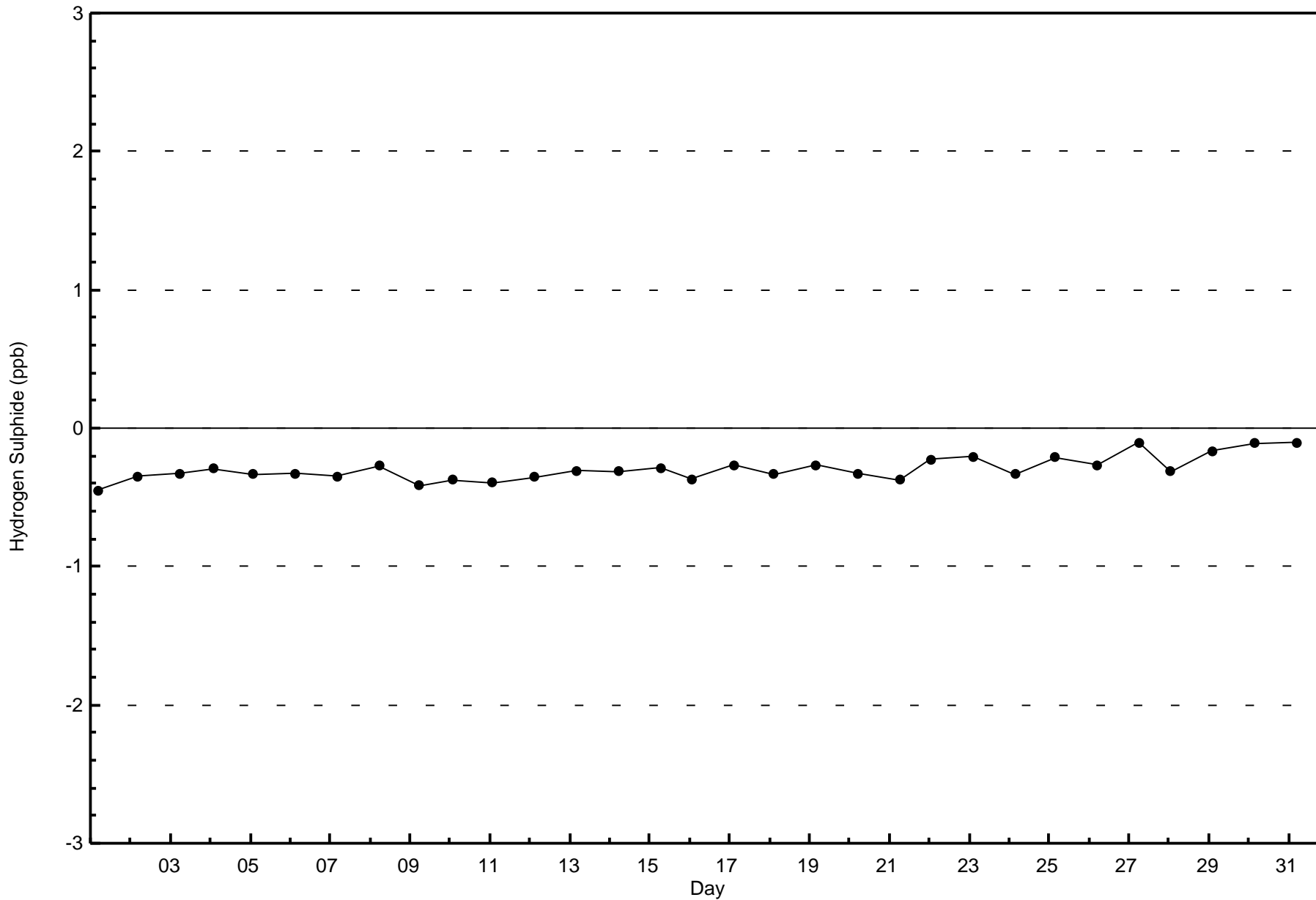


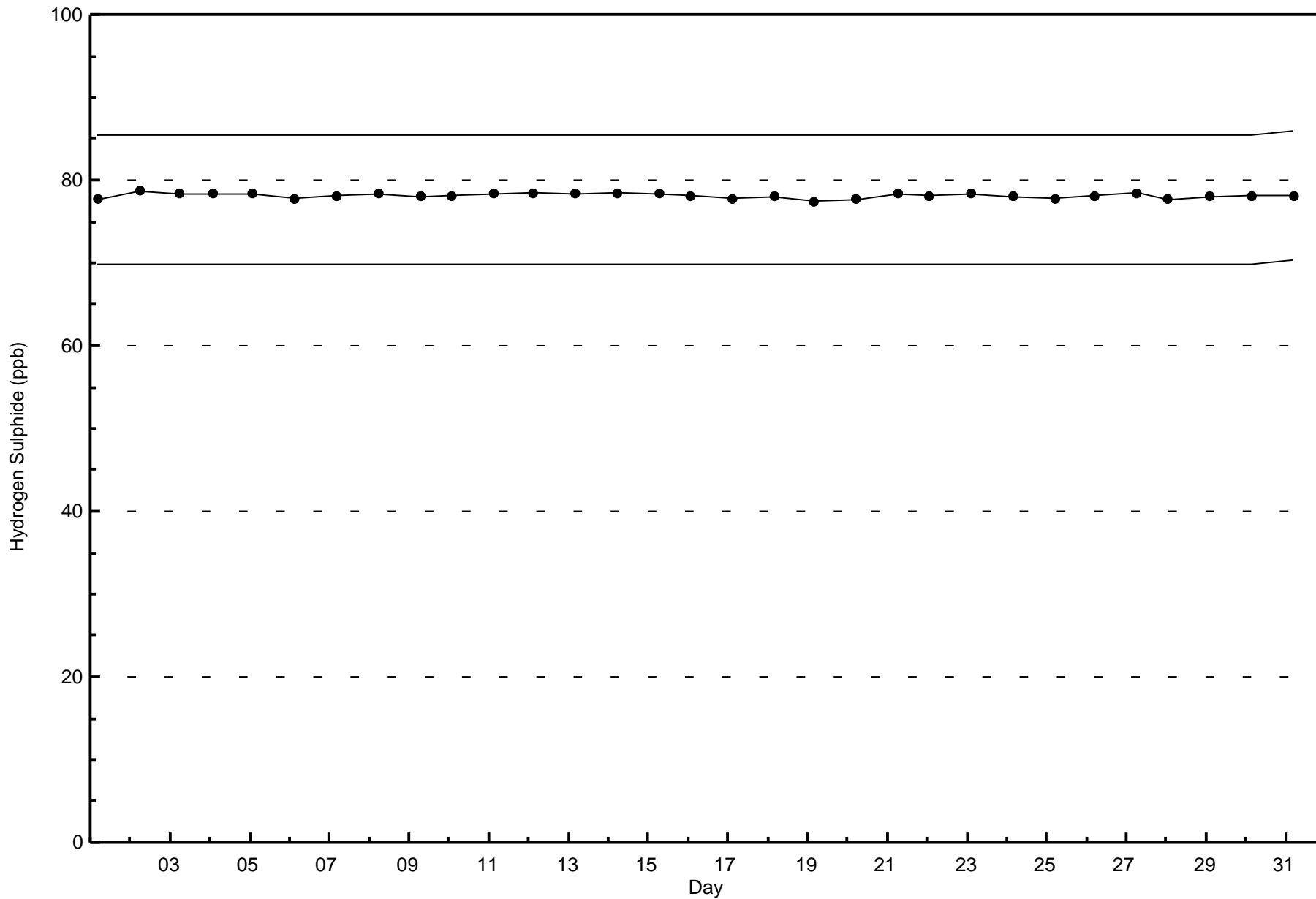
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Wapasu (AMS 17)



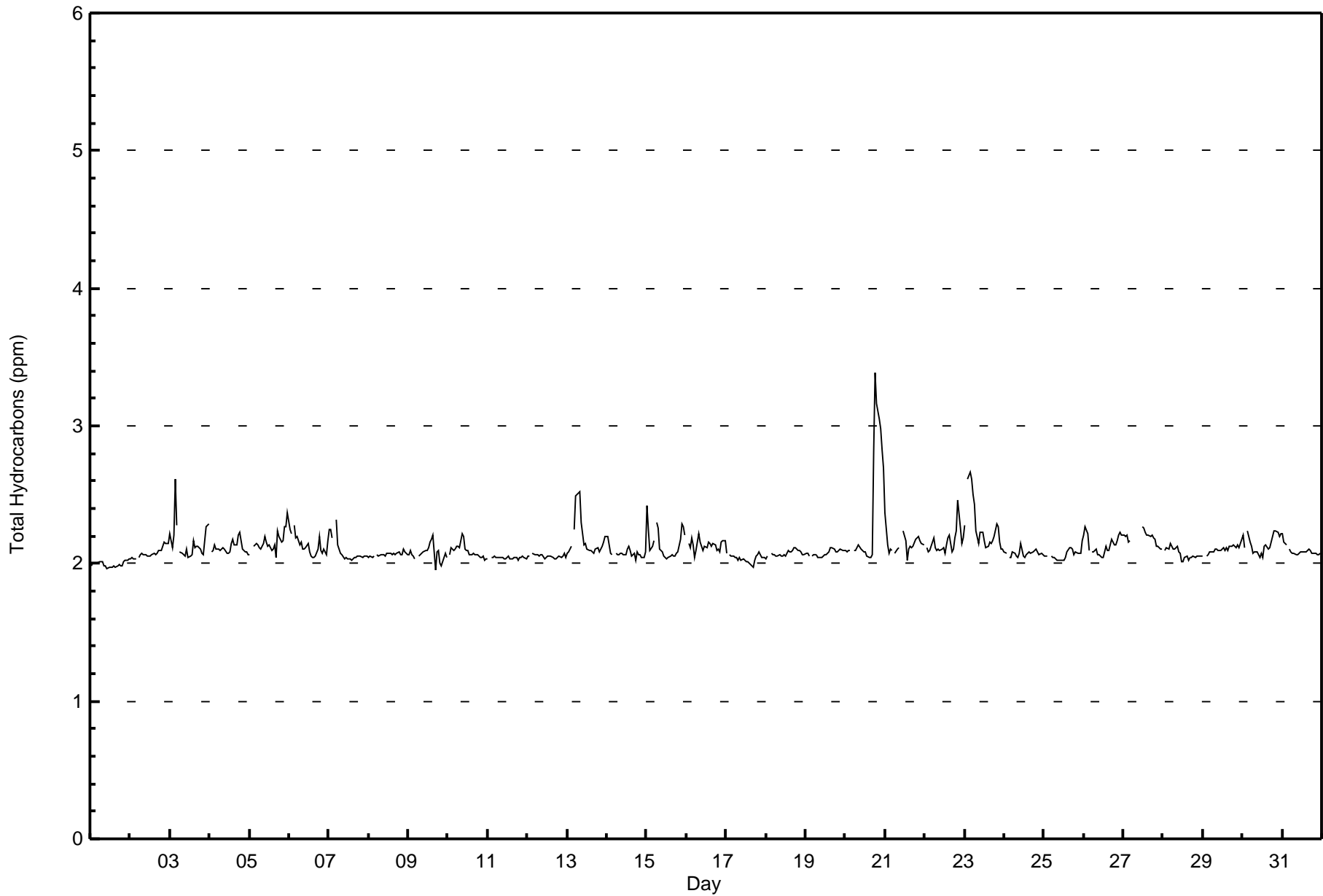
Total Number of Valid Hours: 684













**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Wapasu - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	144	20.37	20.37
2.1 - 3.0	560	79.21	99.58
3.1 - 10.0	3	0.42	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm  
Wapasu - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	14	10	6	2	2	0	3	11	8	6	3	6	2	2	11	38	124
2.1 - 3.0	52	16	12	10	7	4	35	71	65	49	80	44	15	17	12	66	555
3.1 - 10.0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	3
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	66	26	18	12	9	4	40	82	73	56	83	50	17	19	23	104	682

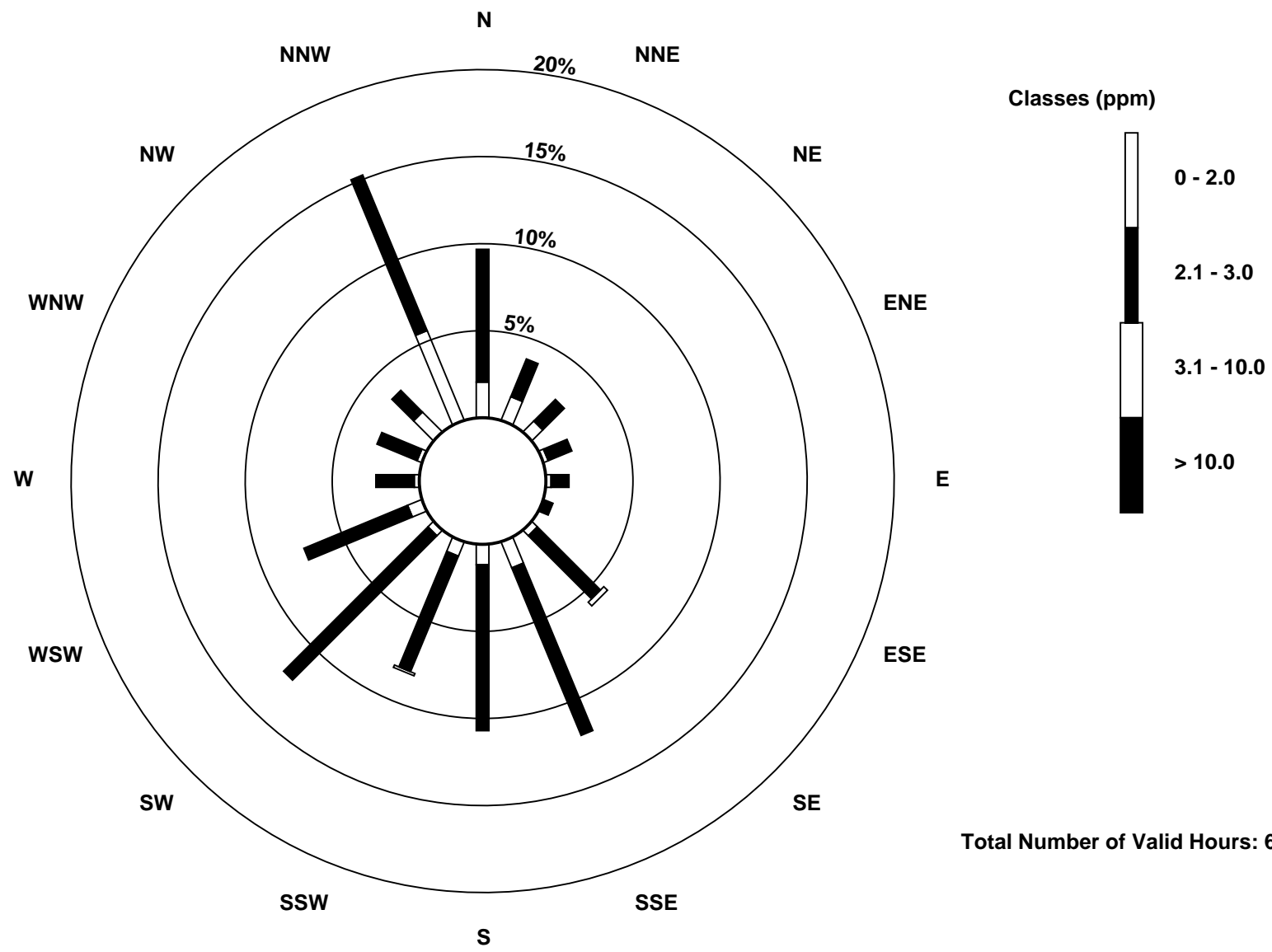
Total Number of Valid Hours: 682

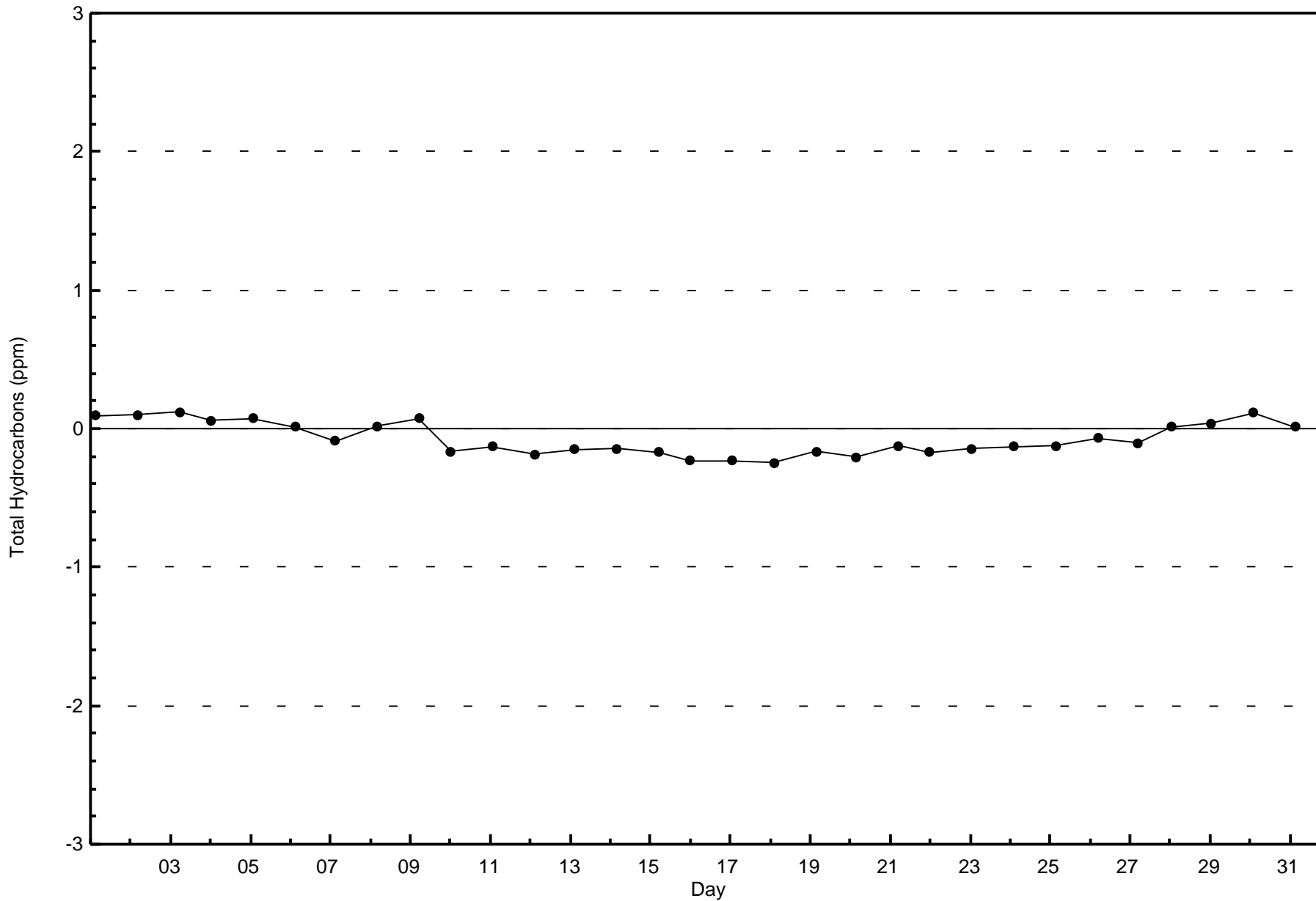
Total Number of Hours: 744

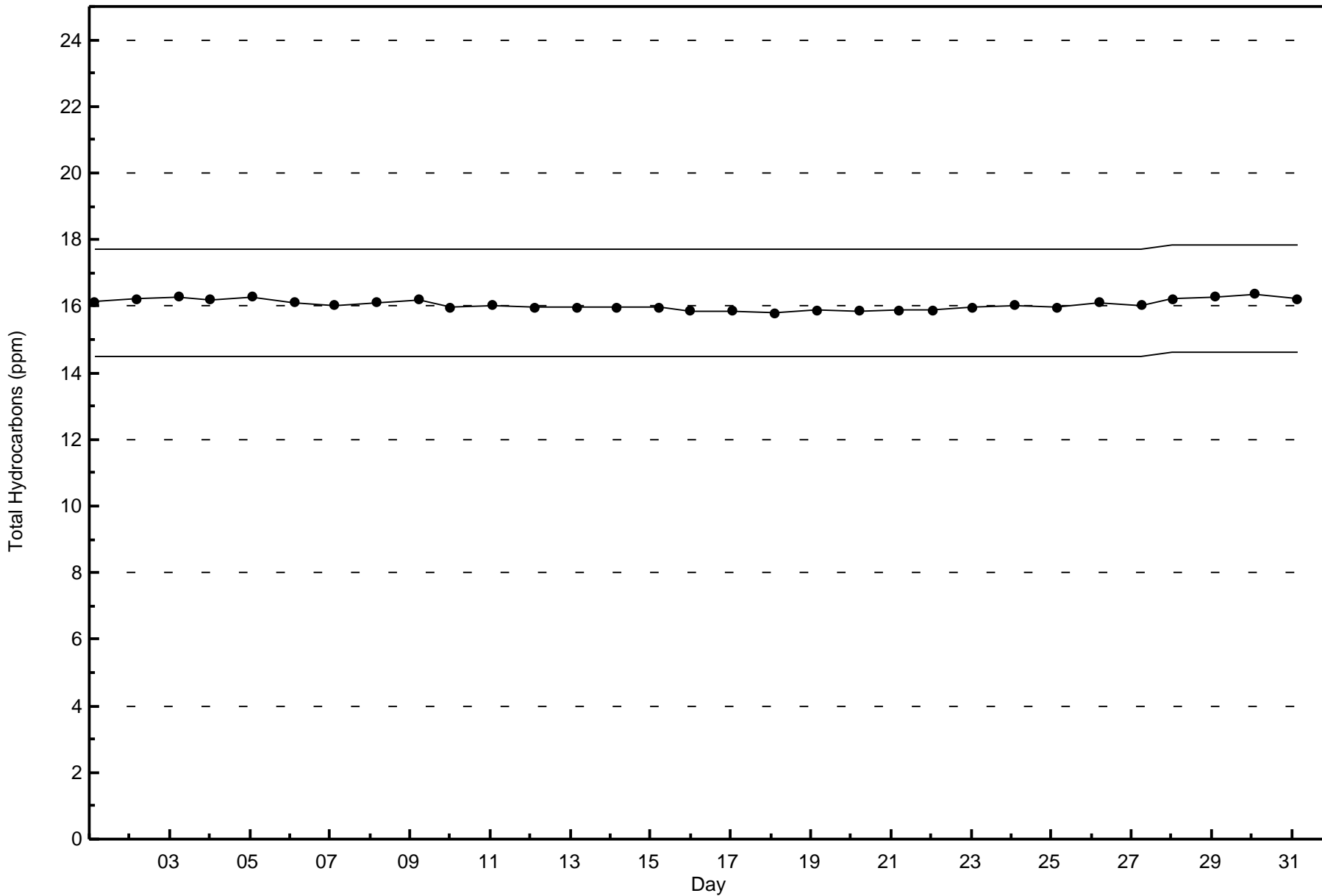


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Total Hydrocarbons (THC) - ppm  
Wapasu (AMS 17)









Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O<sub>3</sub>) - ppb

Wapasu - October 2017

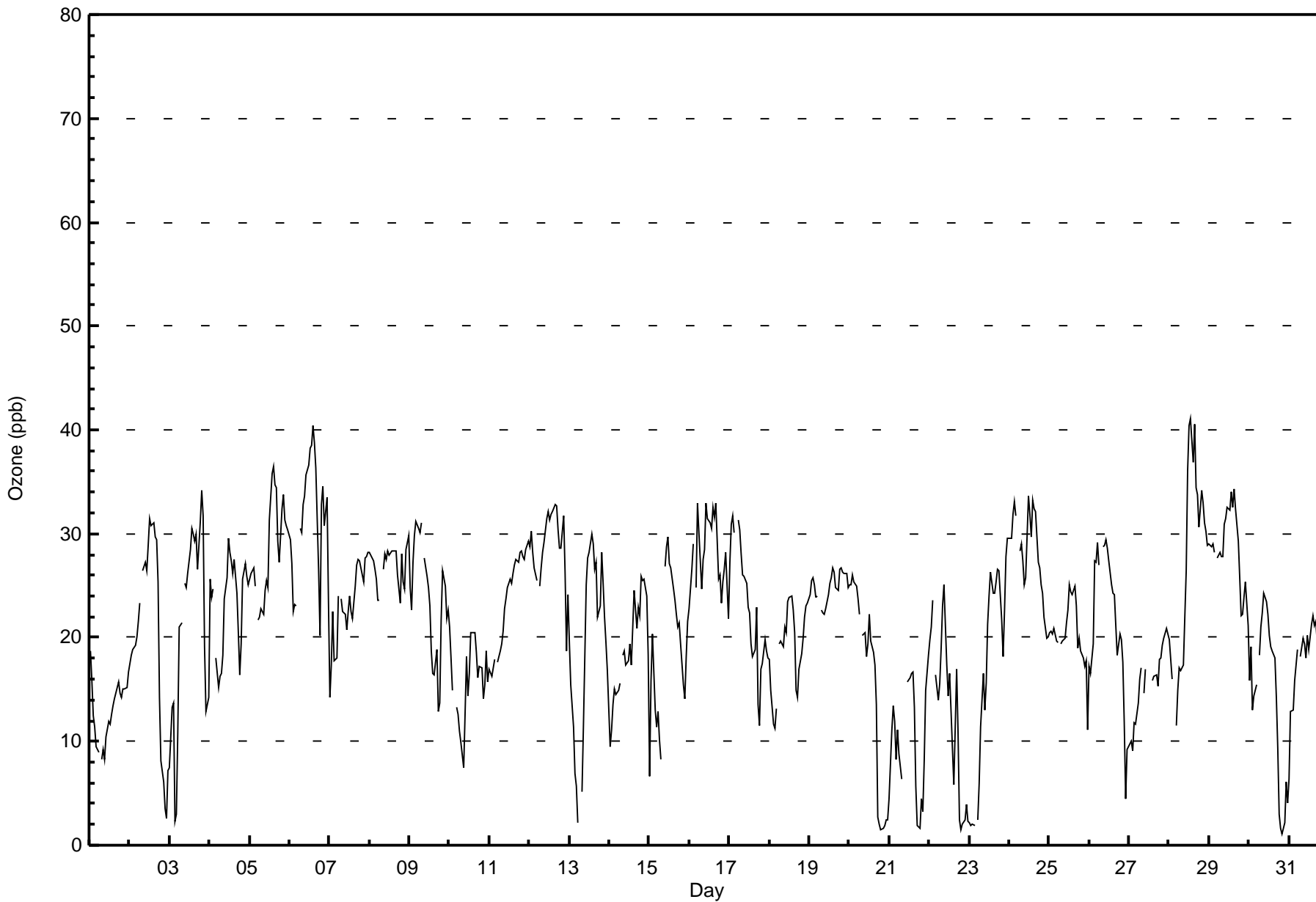
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																							
Maximum Value: 41 ppb on Oct 28 14:00										Maximum Daily Average: 31.2 ppb on Oct 6										Hours of Data: 709																													
Minimum Value: 1 ppb on Oct 30 21:00										Minimum Daily Average: 10.3 ppb on Oct 21										Hours of Missing Data: 35																													
Maximum Diurnal Average: 25.7 ppb at hour 13										Minimum Diurnal Average: 17.9 ppb at hour 5										Hours of Calibration: 35																													
Monthly Average: 21.4 ppb										Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 11 Q <sub>1</sub> = 17 Median = 22 Q <sub>3</sub> = 27 P <sub>90</sub> = 31 P <sub>99</sub> = 38										Percent Operational Time: 100.0																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	19	16	13	11	10	9	Z	8	9	8	10	12	12	13	13	14	15	16	15	14	15	15	15	17	13.0	19																							
2-Oct	17	18	19	19	20	22	Z	Z	26	27	26	29	31	31	31	30	29	25	14	8	6	3	3	7	20.3	31																							
3-Oct	7	13	14	Z	3	11	21	Z	Z	25	25	26	29	31	30	29	30	27	31	34	32	19	13	14	21.2	34																							
4-Oct	26	24	25	Z	18	15	16	17	18	24	26	30	28	27	26	28	24	20	16	19	26	27	26	25	23.1	30																							
5-Oct	26	26	27	Z	Z	22	22	23	22	24	26	25	31	36	37	35	34	29	27	32	34	31	31	30	28.5	37																							
6-Oct	29	27	22	23	23	Z	31	30	33	34	36	37	38	39	40	39	36	26	20	33	35	31	34	23	31.2	40																							
7-Oct	14	17	22	18	18	24	Z	Z	24	22	22	21	23	24	22	22	25	27	27	27	25	28	28	28	23.3	28																							
8-Oct	28	28	27	27	26	24	Z	Z	Z	27	28	28	28	28	28	28	28	26	23	28	25	25	28	30	27.0	30																							
9-Oct	25	23	27	30	31	31	30	31	Z	Z	28	26	25	23	19	17	16	19	13	14	22	26	25	22	23	23.6	31																						
10-Oct	21	18	15	Z	13	13	11	10	7	13	18	14	17	21	21	20	19	16	17	17	14	16	19	16	15.8	21																							
11-Oct	17	16	17	18	Z	18	19	19	21	23	24	25	26	25	26	27	28	27	28	28	28	28	29	29	23.7	29																							
12-Oct	29	30	28	27	25	Z	25	27	28	29	31	32	31	32	32	33	33	30	29	29	32	26	19	24	28.7	33																							
13-Oct	20	15	11	7	6	2	Z	5	11	18	25	28	28	30	29	27	27	22	23	28	25	22	20	17	19.4	30																							
14-Oct	9	11	14	15	15	15	16	Z	18	19	17	18	19	17	21	25	21	23	22	26	25	26	24	18	18.8	26																							
15-Oct	7	16	20	13	11	13	10	8	Z	Z	27	29	30	27	27	25	24	22	21	21	19	15	14	18	22	19.1	30																						
16-Oct	23	27	29	Z	25	33	30	25	27	29	33	31	31	31	33	32	33	26	26	23	25	27	28	22	28.1	33																							
17-Oct	27	31	32	30	Z	31	30	28	26	26	25	23	22	19	18	19	23	14	12	17	17	20	19	18	22.9	32																							
18-Oct	18	15	12	11	13	Z	19	20	19	21	20	23	24	24	23	21	15	14	17	18	20	22	23	23	18.9	24																							
19-Oct	24	25	26	25	24	24	Z	Z	23	22	22	23	24	25	26	27	26	25	25	27	27	26	26	25	24.9	27																							
20-Oct	25	25	26	25	25	24	22	Z	Z	20	20	18	19	22	20	19	17	14	3	2	1	2	2	2	15.5	26																							
21-Oct	4	11	13	12	8	11	9	6	Z	Z	15	C	16	16	17	17	13	6	2	2	4	3	8	15	18	10.3	18																						
22-Oct	20	21	24	Z	16	14	16	19	23	25	17	14	17	13	9	6	17	11	2	1	2	2	4	2	12.9	25																							
23-Oct	2	2	2	2	Z	2	6	11	17	13	16	21	24	26	24	24	25	27	26	22	18	23	28	30	17.0	30																							
24-Oct	30	30	32	33	32	Z	Z	28	29	27	25	26	34	32	30	33	32	32	27	27	25	24	22	20	20	28.2	34																						
25-Oct	21	21	20	21	20	20	Z	Z	19	20	20	21	23	25	24	24	25	23	19	20	19	18	17	18	11	20.3	25																						
26-Oct	17	17	19	27	27	29	27	Z	Z	29	29	29	29	27	25	24	24	21	18	20	20	18	12	4	9	21.9	29																						
27-Oct	10	10	9	12	12	14	16	17	Z	Z	15	17	C	C	C	16	16	16	15	18	18	19	20	21	20	15.5	21																						
28-Oct	20	18	16	Z	11	15	17	17	17	22	26	36	40	41	37	40	34	34	31	34	33	31	30	29	27.4	41																							
29-Oct	29	29	29	Z	Z	28	28	28	28	31	31	33	32	34	33	34	32	29	26	22	22	24	25	21	28.6	34																							
30-Oct	16	19	13	14	15	Z	Z	18	21	22	24	23	22	20	19	19	18	14	9	3	2	1	2	6	4	14.2	24																						
31-Oct	6	13	13	16	17	19	Z	Z	18	20	19	18	20	19	21	22	21	22	19	21	21	22	24	26	19.2	26																							
																								18.9	19.7	19.9	18.9	17.9	18.5	20.6	19.4	21.6	22.7	23.8	24.9	25.7	25.6	25.0	24.8	24.0	20.7	19.6	20.7	20.5	19.9	20.0	19.5	Diurnal Average	
																								30	31	32	33	32	33	31	31	33	34	36	37	40	41	40	40	36	34	31	34	35	31	34	30	Diurnal Maximum	
Z - zerospan C - Calibration																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																																																	





**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ozone (O<sub>3</sub>) - ppb**  
**Wapasu - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Wapasu - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	301	42.45	42.45
21 - 50	408	57.55	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Wapasu - October 2017**

<b>Concentration</b> <b>Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	23	16	14	8	6	4	18	47	31	24	26	16	6	11	14	32	296
21 - 50	42	10	5	4	3	0	22	38	44	30	58	33	10	8	9	73	389
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	65	26	19	12	9	4	40	85	75	54	84	49	16	19	23	105	685

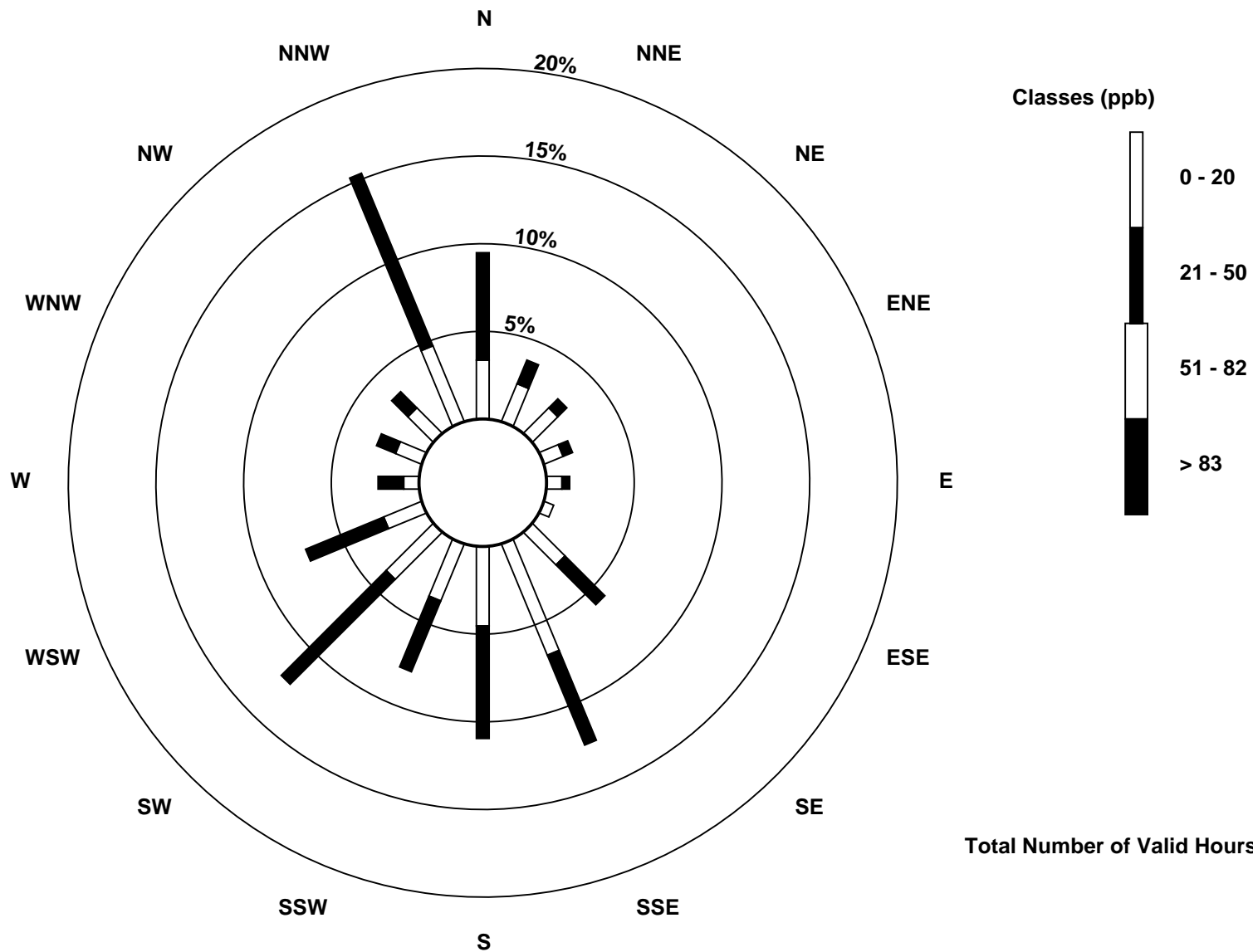
Total Number of Valid Hours: 685

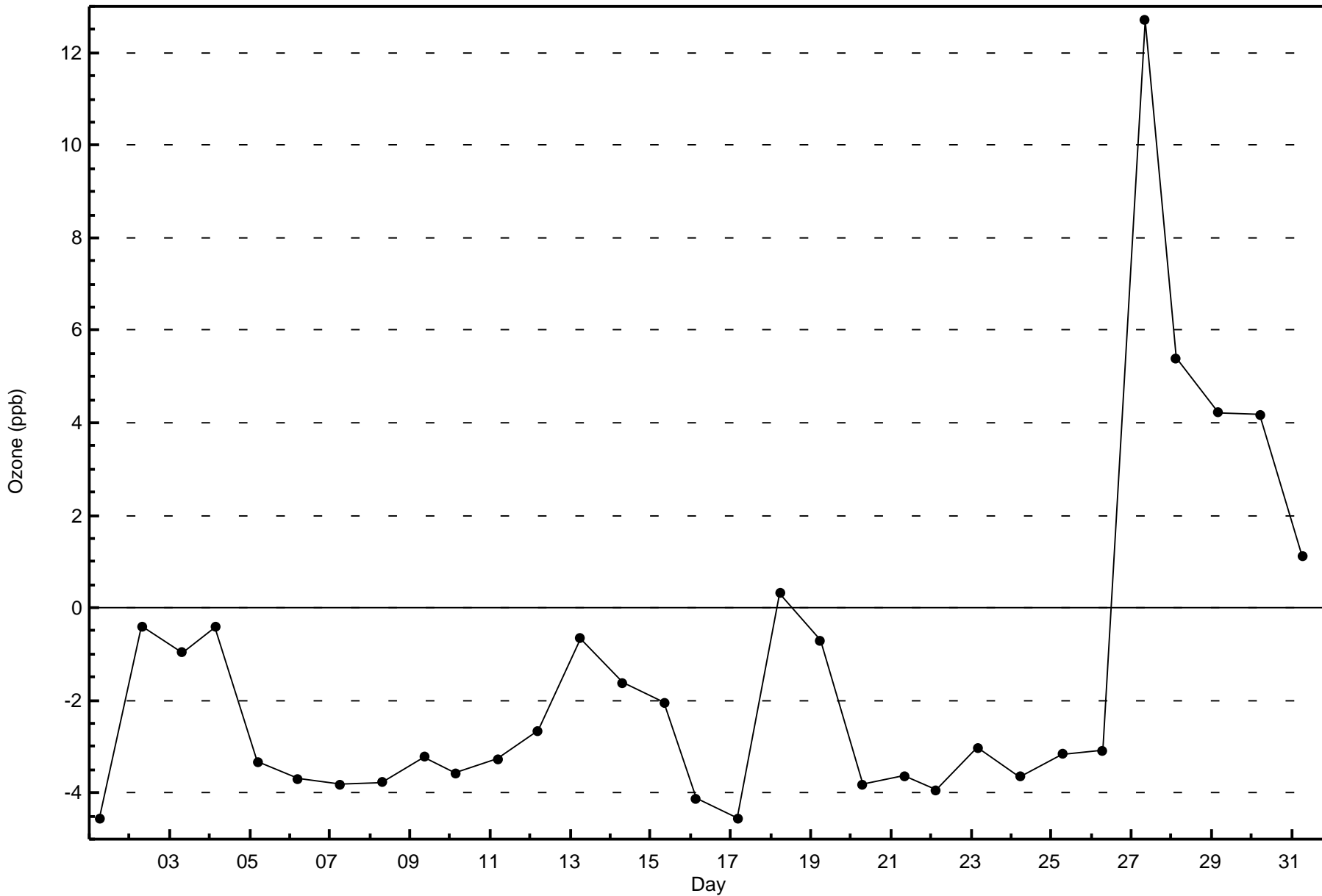
Total Number of Hours: 744

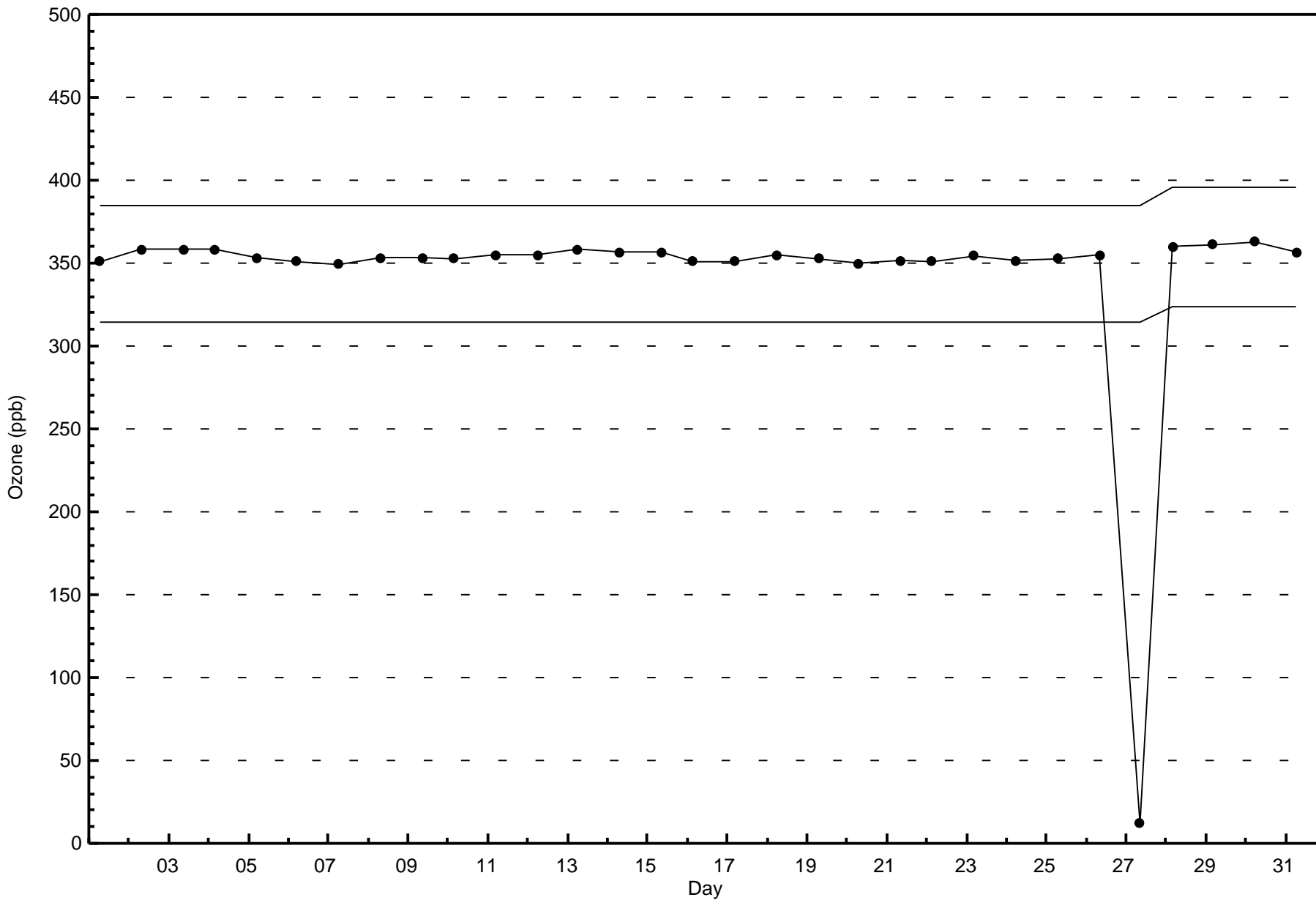


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Ozone (O<sub>3</sub>) - ppb  
Wapasu (AMS 17)









**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

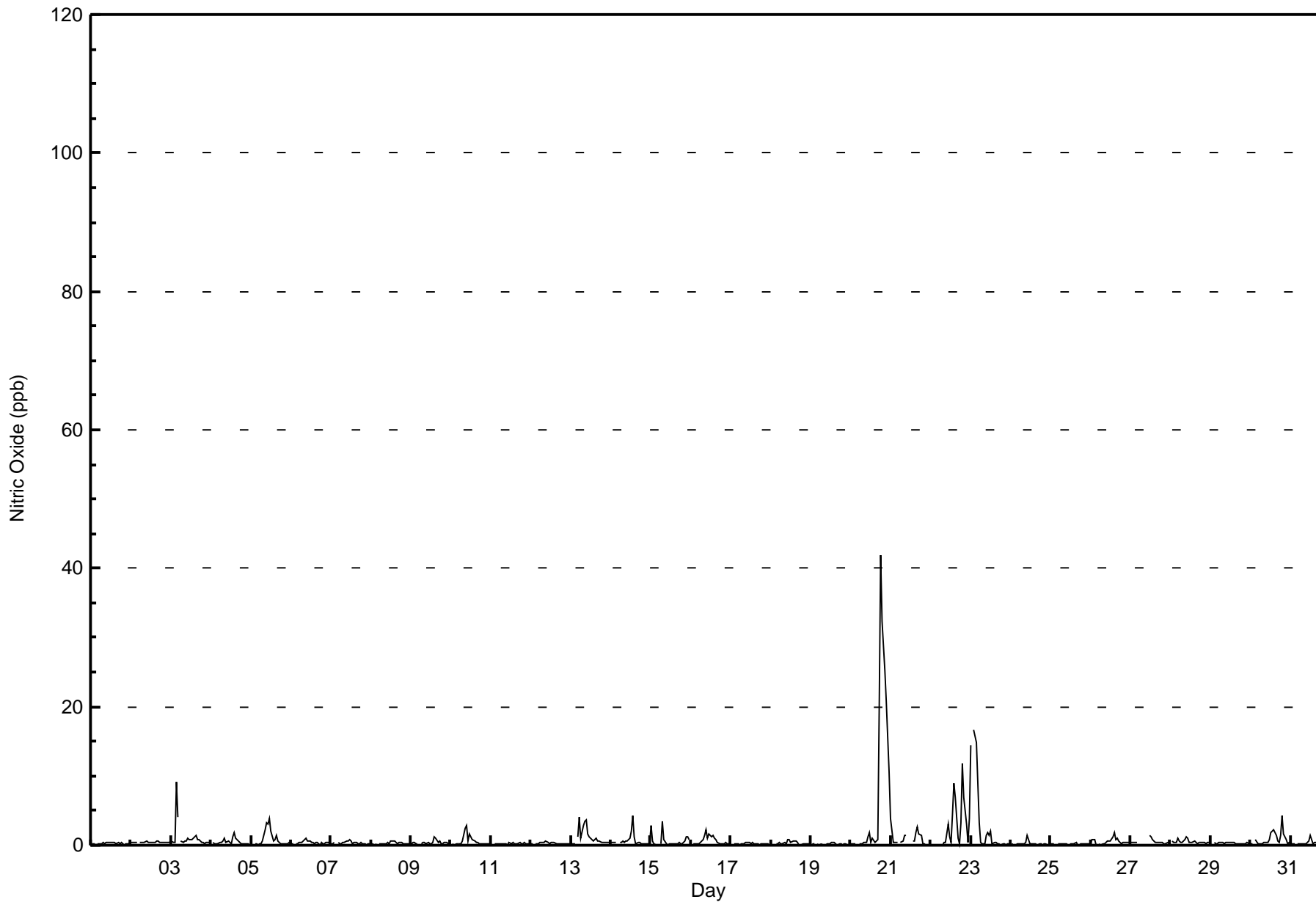
**Nitric Oxide (NO) - ppb**  
**Wapasu - October 2017**

Maximum Value: 42 ppb on Oct 20 19:00		Maximum Daily Average: 7.6 ppb on Oct 20		Hours in Service: 744																						
Minimum Value: 0 ppb on Oct 8 03:00		Minimum Daily Average: 0.2 ppb on Oct 25		Hours of Data: 706																						
Maximum Diurnal Average: 1.8 ppb at hour 20		Minimum Diurnal Average: 0.3 ppb at hour 2		Hours of Missing Data: 38																						
Monthly Average: 0.9 ppb		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 1 P <sub>99</sub> = 15		Hours of Calibration: 38																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
2-Oct	0	0	0	0	Z	0	0	0	0	1	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0.4	1
3-Oct	1	0	0	9	4	Z	1	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1.2	9	
4-Oct	Z	0	0	0	0	0	0	1	1	1	1	0	0	1	2	1	1	0	0	0	0	0	0	0.5	2	
5-Oct	0	Z	0	0	0	0	0	1	2	3	3	4	2	1	1	1	0	0	0	0	0	0	0	0.9	4	
6-Oct	0	0	Z	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
7-Oct	0	0	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1	
8-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0.3	1	
9-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0.4	1	
10-Oct	Z	0	0	0	0	0	0	1	2	3	1	2	1	1	1	0	0	0	0	0	0	0	0	0.6	3	
11-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
12-Oct	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
13-Oct	0	0	0	Z	1	4	1	3	3	4	2	1	1	1	1	1	1	1	0	0	0	0	0	1.2	4	
14-Oct	0	0	0	0	Z	0	0	1	0	1	1	1	2	4	1	0	0	0	0	0	0	0	0	0.7	4	
15-Oct	3	1	0	0	0	Z	0	3	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.6	3	
16-Oct	Z	0	0	0	0	0	0	1	2	2	1	2	1	1	1	0	0	0	0	0	0	0	0	0.7	2	
17-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
18-Oct	0	0	Z	0	0	0	0	0	0	0	1	1	0	1	1	1	0	0	0	0	0	0	0	0.3	1	
19-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
20-Oct	0	0	0	0	Z	0	0	0	0	0	1	2	0	1	0	1	1	20	42	32	25	21	16	11	7.6	42
21-Oct	4	1	0	0	0	Z	0	1	1	1	C	C	C	1	1	2	3	2	1	0	0	0	0	0.9	4	
22-Oct	Z	0	0	0	0	0	0	0	0	0	3	1	0	5	9	7	1	0	3	12	7	3	0	4	2.4	12
23-Oct	14	Z	17	15	9	3	0	0	0	1	2	2	2	0	0	0	0	0	0	0	0	0	0	2.9	17	
24-Oct	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
25-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
26-Oct	0	1	1	0	Z	0	0	0	0	0	1	1	1	1	2	1	1	1	0	0	0	0	0	0.5	2	
27-Oct	0	0	0	0	0	Z	0	C	C	C	C	1	1	1	1	0	0	0	0	0	0	0	0	0.5	1	
28-Oct	Z	1	0	0	1	1	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0.5	1	
29-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
30-Oct	0	0	Z	1	0	0	0	0	0	0	0	1	2	2	2	1	1	0	1	4	2	1	0	0.9	4	
31-Oct	0	0	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1	
		1.0	0.3	0.9	1.2	0.8	0.5	0.3	0.5	0.7	0.8	0.8	0.8	0.7	0.9	0.9	0.8	0.5	1.0	1.8	1.8	1.3	1.0	0.8	0.7	Diurnal Average
		14	1	17	15	9	4	1	3	3	4	3	4	2	5	9	7	3	20	42	32	25	21	16	11	Diurnal Maximum
Z - zerspan		C - Calibration																								



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitric Oxide (NO) - ppb**  
**Wapasu - October 2017**







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb  
Wapasu - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	702	99.43	99.43
21 - 40	3	0.42	99.86
41 - 80	1	0.14	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitric Oxide (NO) - ppb  
Wapasu - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	67	26	18	12	9	4	37	82	73	54	83	50	16	19	23	104	677
21 - 40	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3
11 - 80	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	67	26	18	12	9	4	40	82	73	55	83	50	16	19	23	104	681

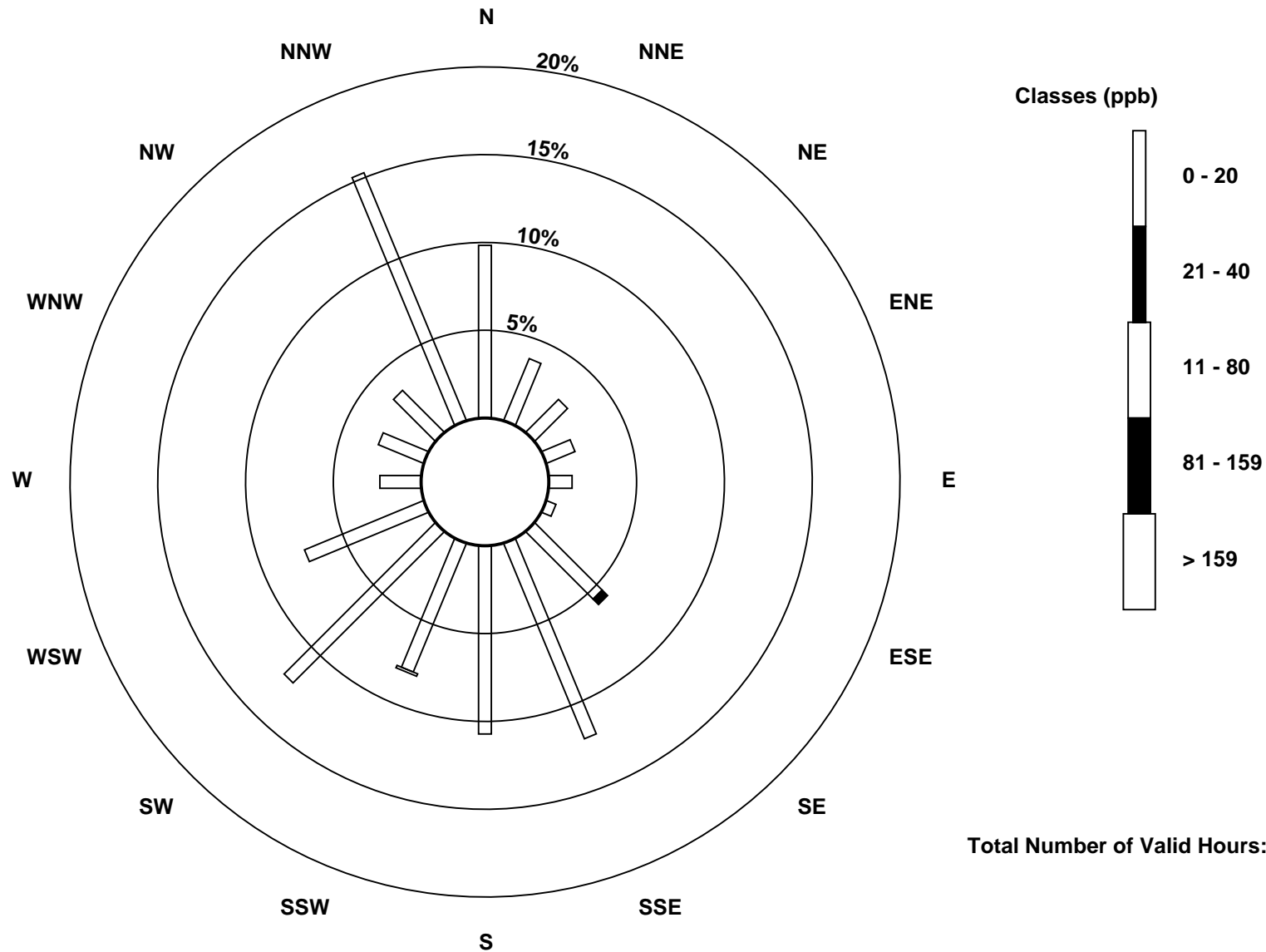
Total Number of Valid Hours: 681

Total Number of Hours: 744

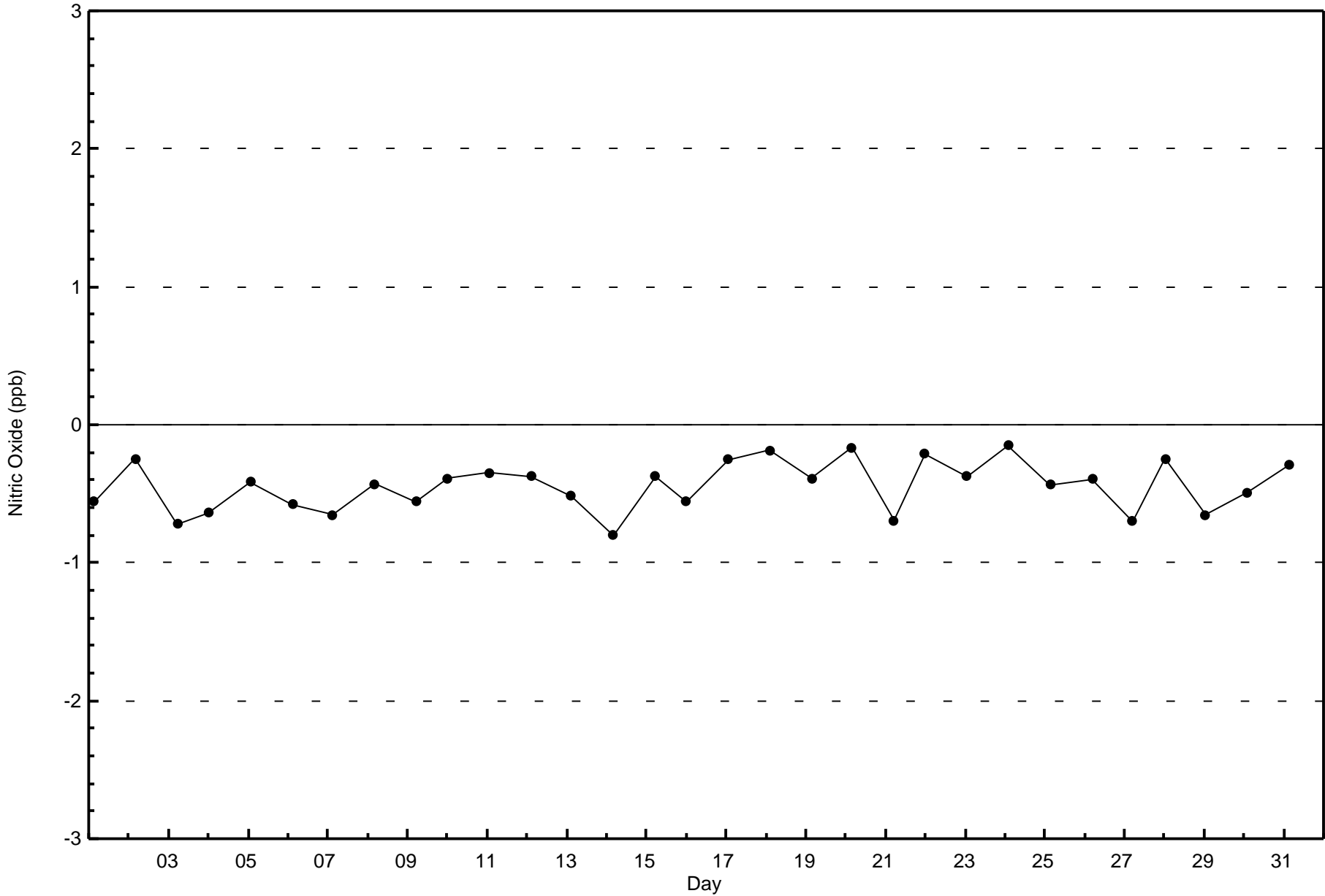


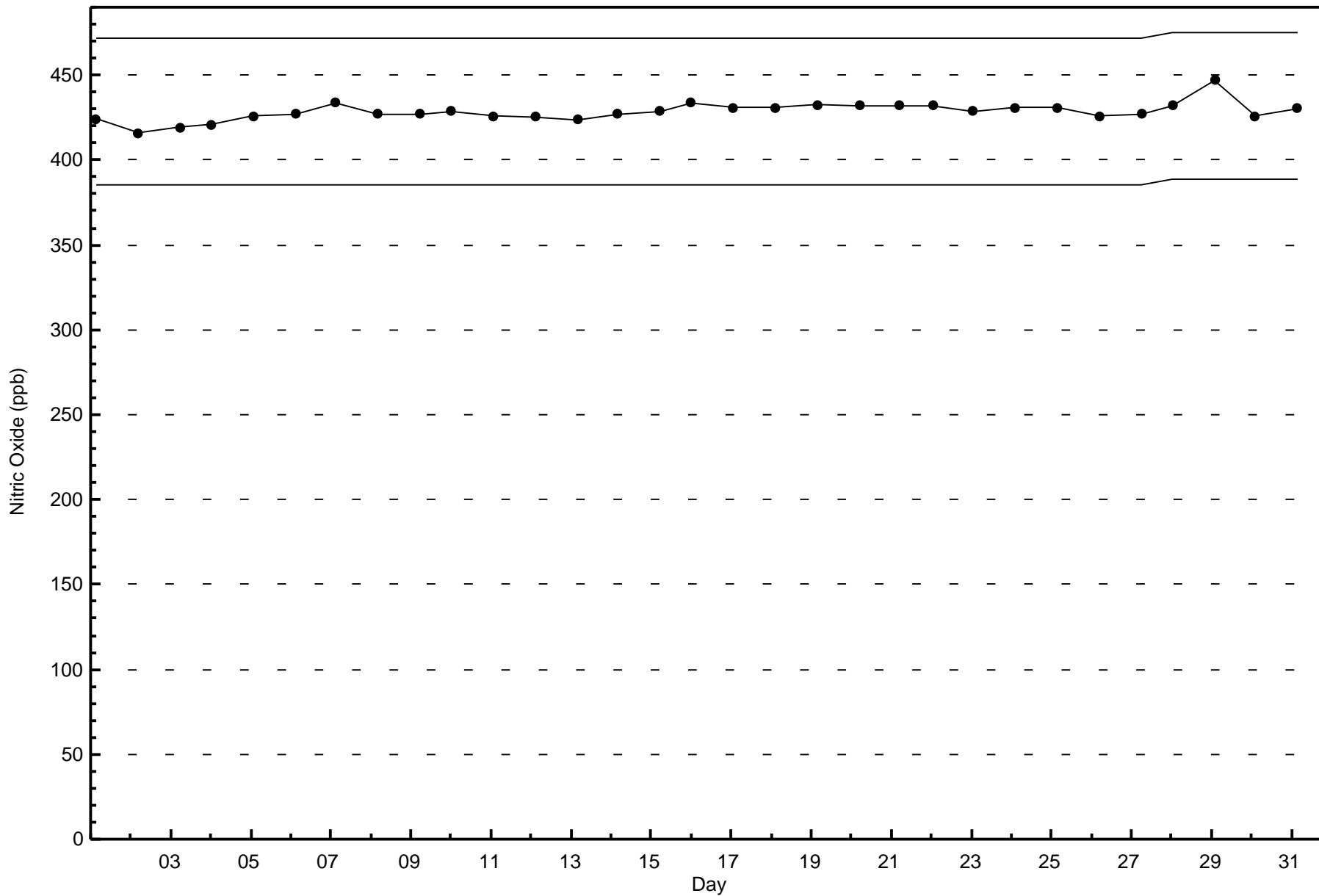
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitric Oxide (NO) - ppb  
Wapasu (AMS 17)



Total Number of Valid Hours: 681







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb

Wapasu - October 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 20 ppb on Oct 3 05:00	Maximum Daily Average: 7.3 ppb on Oct 30		Hours of Data:	706
Minimum Value: 0 ppb on Oct 1 01:00	Minimum Daily Average: 0.1 ppb on Oct 11		Hours of Missing Data:	38
Maximum Diurnal Average: 4.6 ppb at hour 5	Minimum Diurnal Average: 1.5 ppb at hour 13		Hours of Calibration:	38
Monthly Average: 2.8 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 4 P <sub>90</sub> = 7 P <sub>99</sub> = 16		Percent Operational Time:	100.0

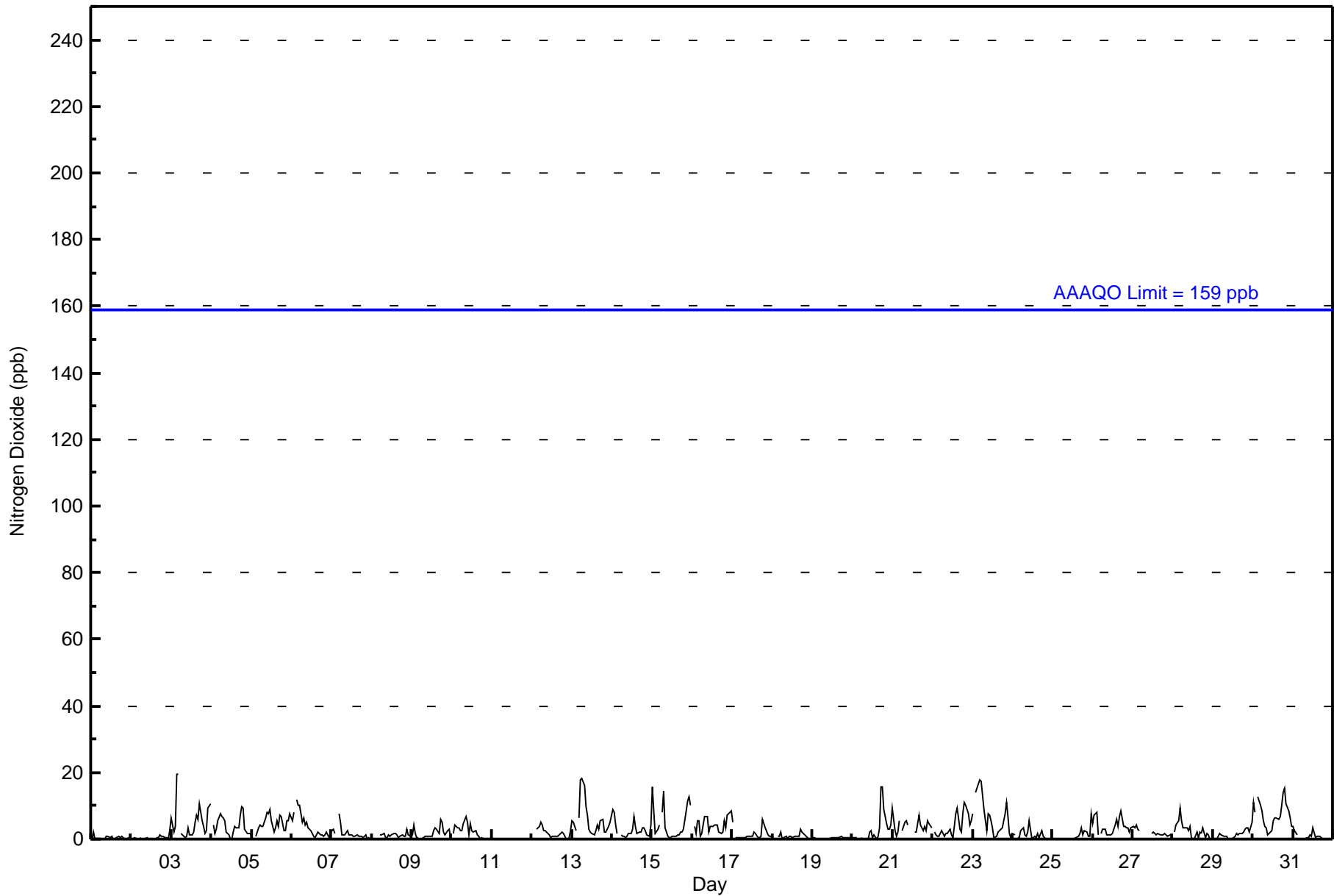
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	2	0	Z	0	0	0	0	0	1	1	1	1	0	0	1	1	0	1	1	0	0	0	0	0.4	2
2-Oct	0	0	0	0	Z	1	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1	1	0	3	0.4	3
3-Oct	6	2	4	19	20	Z	2	1	1	1	3	1	1	2	5	7	6	11	6	4	2	3	9	11	5.5	20
4-Oct	Z	4	2	3	5	8	7	6	6	2	1	0	0	2	4	4	4	7	10	9	3	2	2	2	4.0	10
5-Oct	1	Z	1	2	3	4	4	4	7	8	8	9	6	2	3	6	4	7	7	3	2	6	6	8	4.7	9
6-Oct	6	8	Z	12	10	10	5	6	4	5	4	2	2	1	1	1	2	1	1	1	1	2	1	2	3.8	12
7-Oct	3	3	2	Z	8	5	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1.6	8
8-Oct	0	0	0	0	Z	1	1	2	1	0	1	1	1	2	2	1	0	1	1	1	1	3	1	1	1.0	3
9-Oct	1	4	2	0	0	Z	1	1	1	1	1	1	1	3	3	3	2	6	5	2	1	3	3	1	1.9	6
10-Oct	Z	2	4	3	3	3	3	5	7	5	1	5	3	2	3	1	1	0	0	0	0	0	0	0	2.2	7
11-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
12-Oct	0	0	Z	3	4	5	4	3	3	2	1	1	1	1	1	1	1	2	2	2	0	0	0	3	1.7	5
13-Oct	6	5	3	Z	6	18	18	16	10	7	3	2	2	1	2	4	3	6	6	2	2	3	4	5	5.8	18
14-Oct	9	8	4	2	Z	1	1	1	1	1	2	2	3	7	4	2	2	2	4	3	3	1	1	4	2.9	9
15-Oct	16	8	2	3	4	Z	8	15	4	1	1	1	1	1	1	1	1	2	2	3	9	12	13	10	5.1	16
16-Oct	Z	4	2	6	6	1	2	7	7	7	2	4	4	4	4	4	2	2	2	5	4	7	8	8	4.4	8
17-Oct	5	Z	0	0	0	0	0	0	1	1	1	1	1	2	2	1	0	1	6	5	3	1	1	1	1.4	6
18-Oct	0	0	Z	1	1	2	0	0	1	0	1	1	1	1	1	1	1	3	2	1	1	1	0	0	0.8	3
19-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0.3	1
20-Oct	1	1	0	0	Z	0	0	0	0	0	2	3	0	1	0	1	4	16	16	9	5	3	3	4	3.0	16
21-Oct	9	3	1	2	5	Z	3	5	5	4	C	C	C	2	2	5	7	4	3	4	3	5	5	4	4.0	9
22-Oct	Z	2	1	1	1	3	2	1	2	2	3	1	1	4	8	9	3	2	8	11	10	8	4	6	3.9	11
23-Oct	8	Z	14	17	18	17	13	9	3	8	7	5	4	0	1	2	3	3	4	8	11	7	2	1	7.0	18
24-Oct	2	1	Z	0	0	3	3	1	1	2	5	0	1	1	0	2	1	2	1	1	0	0	0	0	1.2	5
25-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	2	3	1	3	2	1	1	8	0.9	8
26-Oct	5	7	8	1	Z	2	3	3	1	1	1	1	2	4	6	4	7	8	4	4	4	3	2	3	3.7	8
27-Oct	4	3	4	3	3	Z	2	C	C	C	C	2	2	2	1	2	1	1	1	2	1	1	1	1	1.9	4
28-Oct	Z	2	4	5	9	6	3	3	4	3	4	1	0	0	2	0	2	2	4	1	2	1	0	0	2.5	9
29-Oct	0	Z	0	1	2	1	1	1	1	0	0	0	1	1	2	1	2	2	2	3	3	3	2	5	1.5	5
30-Oct	11	8	Z	13	10	8	5	4	3	1	2	3	5	6	6	6	7	10	14	15	11	9	6	4	7.3	15
31-Oct	4	3	1	Z	0	0	0	0	0	1	1	1	4	0	1	1	1	1	0	0	0	0	0	0	0.8	4
	3.7	3.2	2.3	3.9	4.6	3.8	3.0	3.1	2.4	2.2	2.0	1.6	1.5	1.7	2.1	2.3	2.3	3.5	3.7	3.3	2.8	2.7	2.4	3.0	Diurnal Average	
	16	8	14	19	20	18	18	16	10	8	8	9	6	7	8	9	7	16	16	15	11	12	13	11	Diurnal Maximum	

Z - zerospan      C - Calibration  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Wapasu - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Wapasu - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	706	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744





**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Wapasu - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	67	26	18	12	9	4	40	82	73	55	83	50	16	19	23	104	681
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	67	26	18	12	9	4	40	82	73	55	83	50	16	19	23	104	681

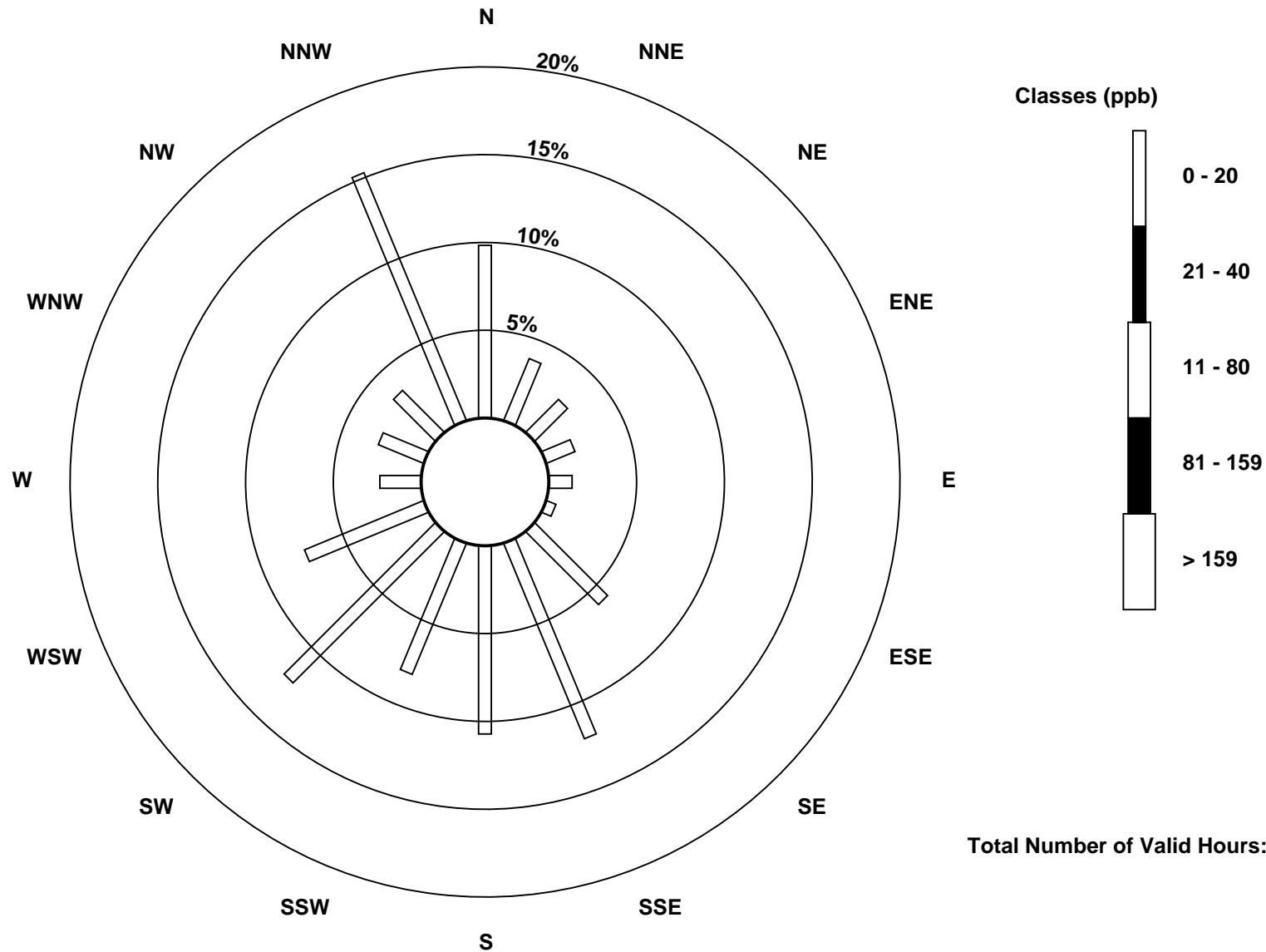
Total Number of Valid Hours: 681

Total Number of Hours: 744

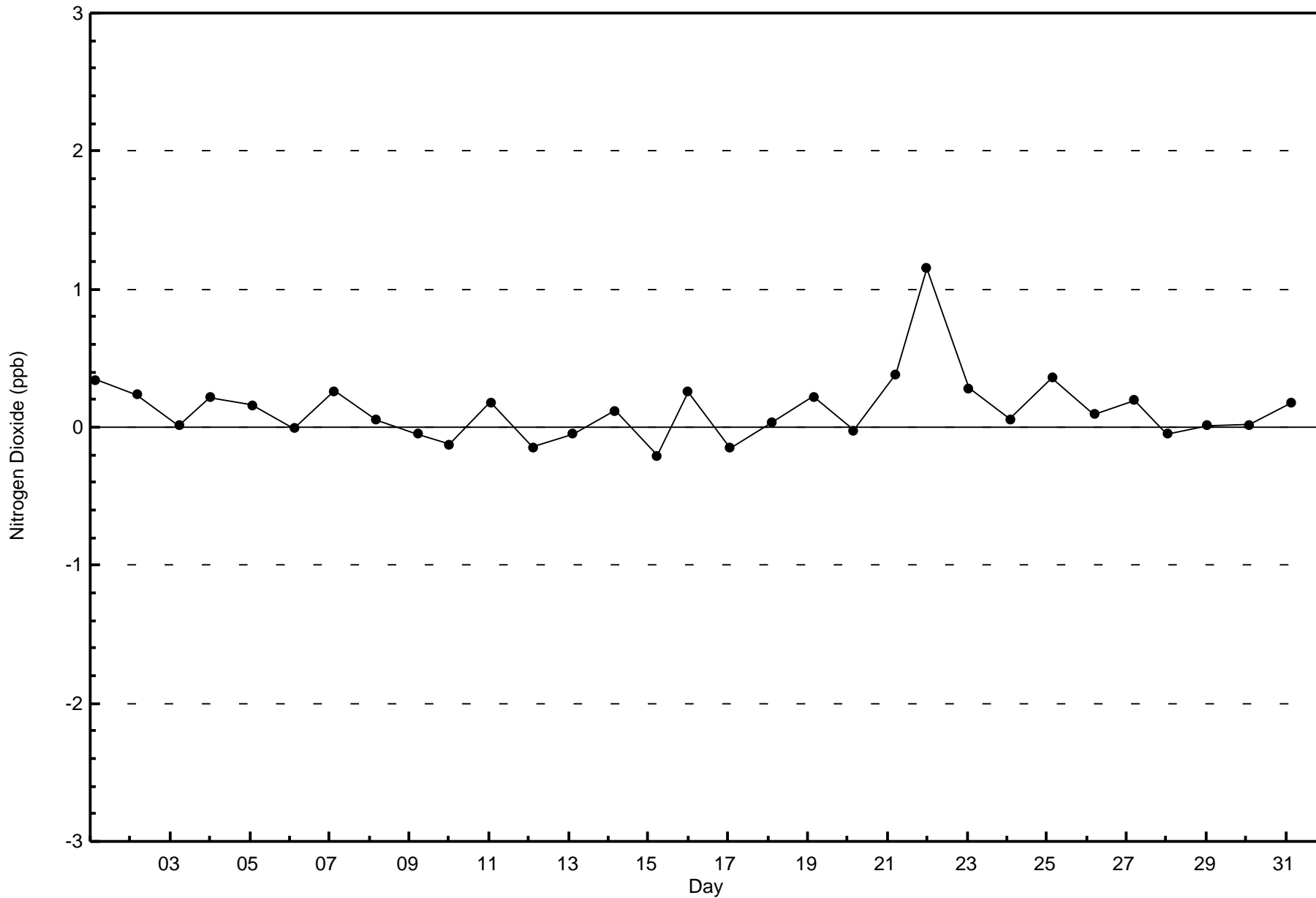


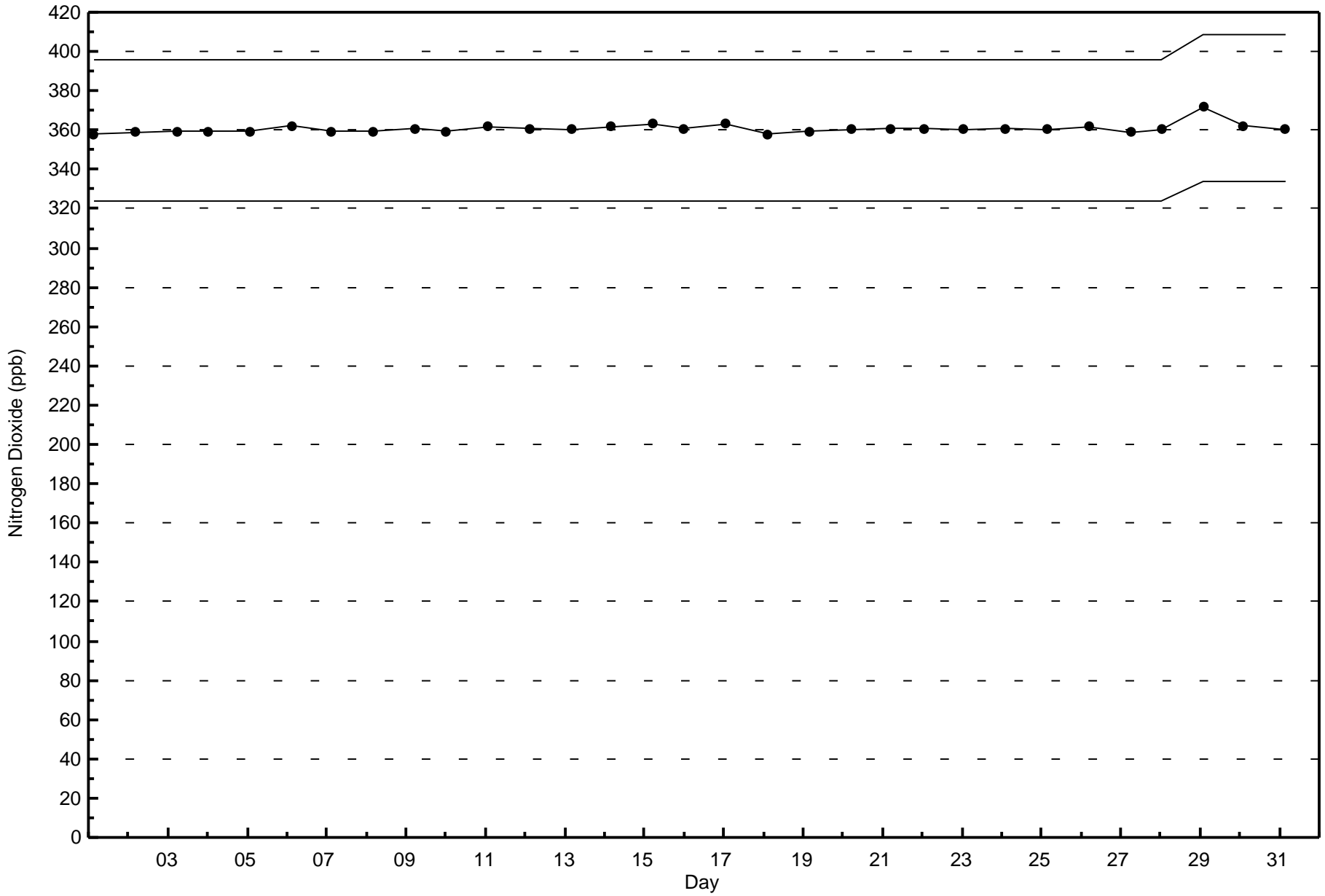
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Wapasu (AMS 17)



Total Number of Valid Hours: 681







Wood Buffalo Environmental Association

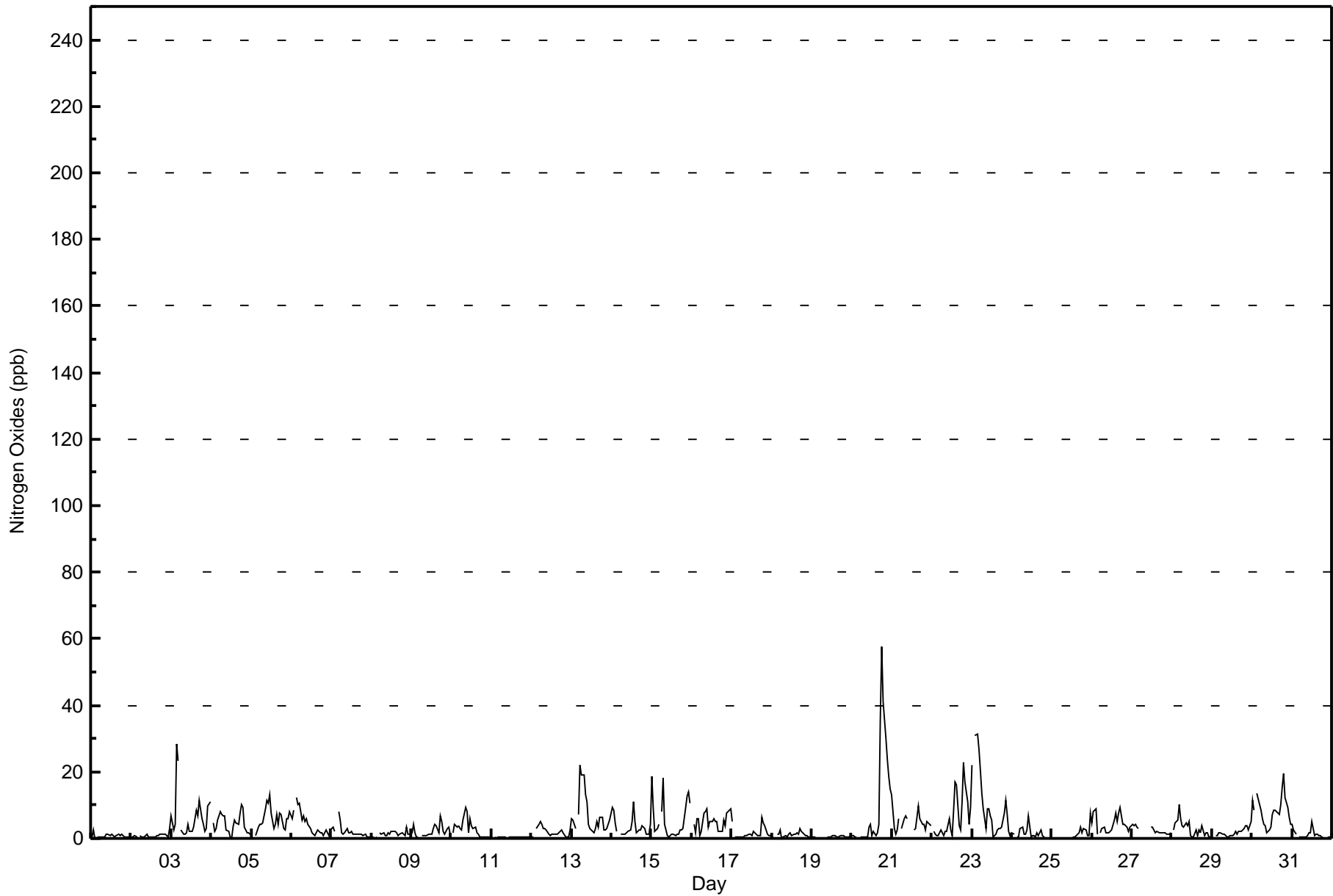
Summary of Hour Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb

Wapasu - October 2017

Maximum Value: 58 ppb on Oct 20 19:00																		Maximum Daily Average: 10.6 ppb on Oct 20																		Hours in Service: 744	
Minimum Value: 0 ppb on Oct 25 12:00																		Minimum Daily Average: 0.3 ppb on Oct 11																		Hours of Data: 706	
Maximum Diurnal Average: 5.4 ppb at hour 19																		Minimum Diurnal Average: 2.3 ppb at hour 13																		Hours of Missing Data: 38	
Monthly Average: 3.6 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 4 P <sub>90</sub> = 9 P <sub>99</sub> = 28																		Hours of Calibration: 38	
																																				Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24													
1-Oct	0	2	0	Z	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0.7	2											
2-Oct	0	0	1	1	Z	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1	1	1	3	0.9	3											
3-Oct	7	2	4	28	23	Z	2	1	1	2	4	2	2	3	6	8	7	12	6	4	2	3	10	11	6.6	28											
4-Oct	Z	5	2	3	6	8	7	7	7	3	2	1	0	3	6	5	4	8	10	9	3	2	2	1	4.5	10											
5-Oct	1	Z	1	2	3	4	4	5	9	11	11	13	8	3	4	7	4	8	7	3	3	6	6	8	5.7	13											
6-Oct	6	8	Z	12	10	11	5	7	5	6	4	3	2	1	1	2	3	2	2	1	2	2	1	2	4.3	12											
7-Oct	3	3	2	Z	8	5	2	1	2	3	2	2	2	1	1	1	1	1	1	1	1	0	0	0	2.0	8											
8-Oct	0	0	0	0	Z	2	1	2	1	1	2	1	2	2	2	2	1	1	2	1	1	3	1	1	1.3	3											
9-Oct	2	4	2	0	1	Z	1	1	1	1	1	1	1	3	4	4	2	7	5	2	1	3	3	1	2.3	7											
10-Oct	Z	2	4	3	4	3	3	5	9	8	2	6	4	3	3	2	1	0	1	0	0	0	0	0	2.8	9											
11-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0											
12-Oct	0	0	Z	3	4	5	4	3	3	3	1	1	1	1	1	1	2	2	2	2	0	0	1	3	2.0	5											
13-Oct	6	5	3	Z	7	22	19	19	13	11	4	3	3	2	3	5	3	6	6	2	3	3	4	6	6.9	22											
14-Oct	9	8	5	2	Z	1	1	1	1	2	2	3	5	11	5	2	3	3	4	3	3	1	1	4	3.5	11											
15-Oct	19	9	2	3	4	Z	8	18	4	1	1	1	1	1	1	1	1	2	2	3	9	13	14	11	5.7	19											
16-Oct	Z	4	2	6	6	1	2	7	8	9	3	5	5	6	5	5	2	2	2	5	4	8	8	9	5.0	9											
17-Oct	5	Z	1	0	1	0	1	1	1	1	1	1	1	2	2	1	1	1	6	5	4	1	1	1	1.6	6											
18-Oct	0	0	Z	1	1	2	0	1	1	0	1	2	1	1	1	2	1	3	2	1	1	1	0	0	1.1	3											
19-Oct	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0.5	1											
20-Oct	1	1	1	0	Z	0	0	0	0	0	4	4	1	2	1	2	4	36	58	41	30	24	19	15	10.6	58											
21-Oct	13	3	1	3	6	Z	3	6	7	6	C	C	C	3	3	6	10	6	4	4	3	5	5	4	4.9	13											
22-Oct	Z	2	1	1	1	3	1	1	2	2	6	3	1	8	17	16	4	2	11	23	17	11	4	9	6.4	23											
23-Oct	22	Z	31	31	27	21	13	9	3	9	9	7	5	0	1	3	3	3	4	8	11	7	2	1	10.0	31											
24-Oct	2	1	Z	0	1	3	3	1	1	2	7	0	1	1	1	2	1	3	1	1	0	0	0	0	1.4	7											
25-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	2	3	2	3	2	1	1	8	1.1	8											
26-Oct	5	8	9	1	Z	2	3	3	2	2	2	2	2	6	8	5	8	9	4	4	4	3	2	4	4.2	9											
27-Oct	4	4	4	3	3	Z	2	C	C	C	C	3	3	2	2	2	2	2	2	2	2	1	1	2	2.4	4											
28-Oct	Z	3	5	6	10	6	4	4	4	4	5	1	1	1	3	1	2	2	4	1	2	2	1	1	3.0	10											
29-Oct	0	Z	1	1	2	2	1	1	1	1	1	1	1	1	2	1	2	2	2	3	4	4	3	5	1.8	5											
30-Oct	11	8	Z	14	10	9	6	4	4	2	3	3	7	9	9	7	7	10	15	20	12	9	6	4	8.3	20											
31-Oct	4	3	1	Z	0	0	0	0	1	1	2	2	5	1	1	1	1	1	0	0	0	0	0	0	1.1	5											
4.7																		3.4																		Diurnal Average	
22																		9																		Diurnal Maximum	
3.2																		5.1																			
31																		31																			
5.3																		4.3																			
3.3																		3.3																			
3.7																		3.1																			
3.1																		3.1																			
2.8																		2.8																			
2.4																		2.4																			
2.3																		2.3																			
2.6																		3.1																			
3.1																		3.1																			
17																		16																			
10																		36																			
4.5																		5.4																			
5.4																		5.1																			
4.1																		4.1																			
3.8																		3.2																			
3.2																		3.7																			

Z - zerospan C - Calibration





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Wapasu - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	692	98.02	98.02
21 - 40	12	1.70	99.72
41 - 80	2	0.28	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Wapasu - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 20	67	26	18	12	9	4	37	81	70	54	80	48	15	19	23	104	667
21 - 40	0	0	0	0	0	0	2	1	3	0	3	2	1	0	0	0	12
11 - 80	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>67</b>	<b>26</b>	<b>18</b>	<b>12</b>	<b>9</b>	<b>4</b>	<b>40</b>	<b>82</b>	<b>73</b>	<b>55</b>	<b>83</b>	<b>50</b>	<b>16</b>	<b>19</b>	<b>23</b>	<b>104</b>	<b>681</b>

Total Number of Valid Hours: 681

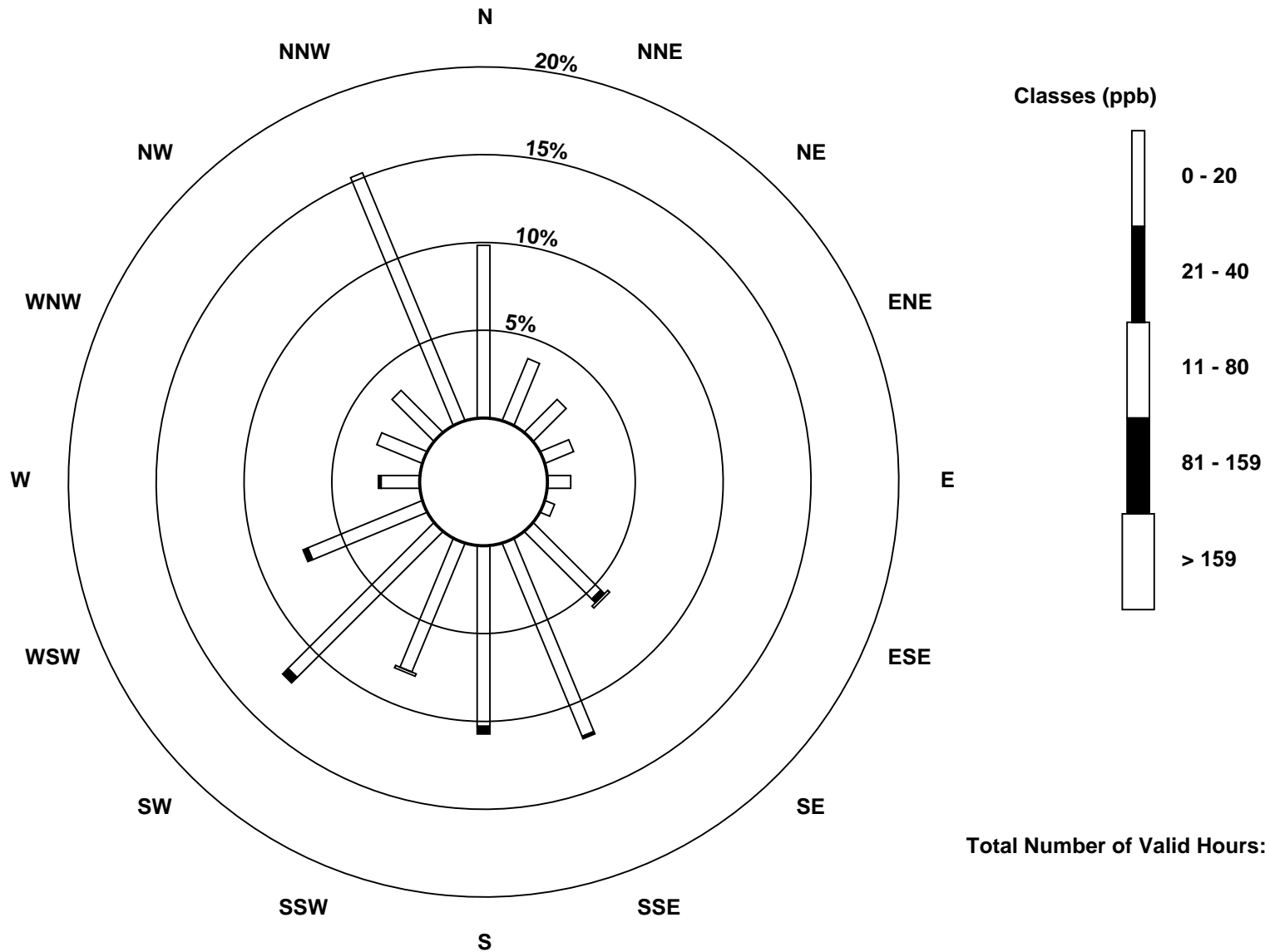
Total Number of Hours: 744

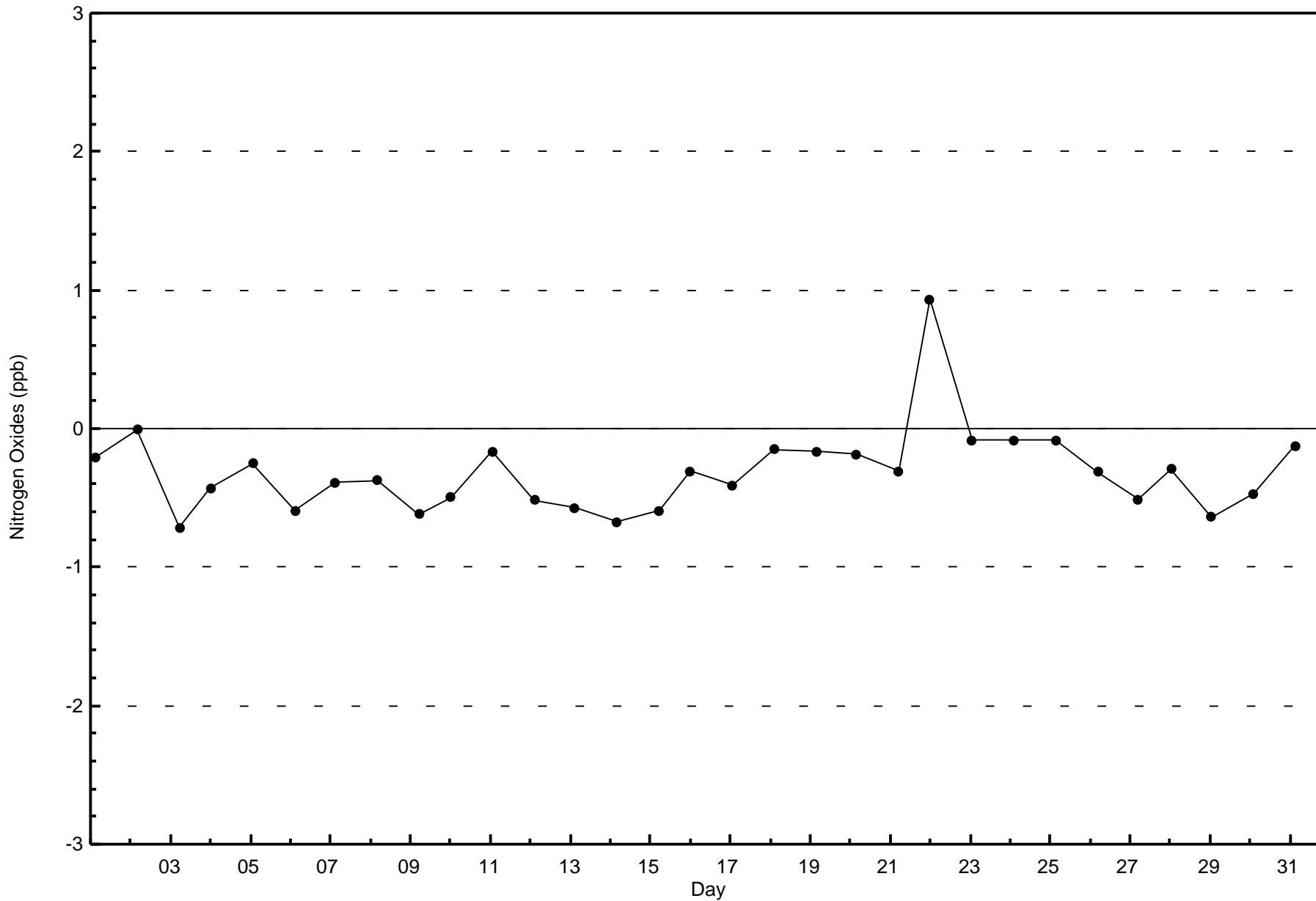




Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Wapasu (AMS 17)

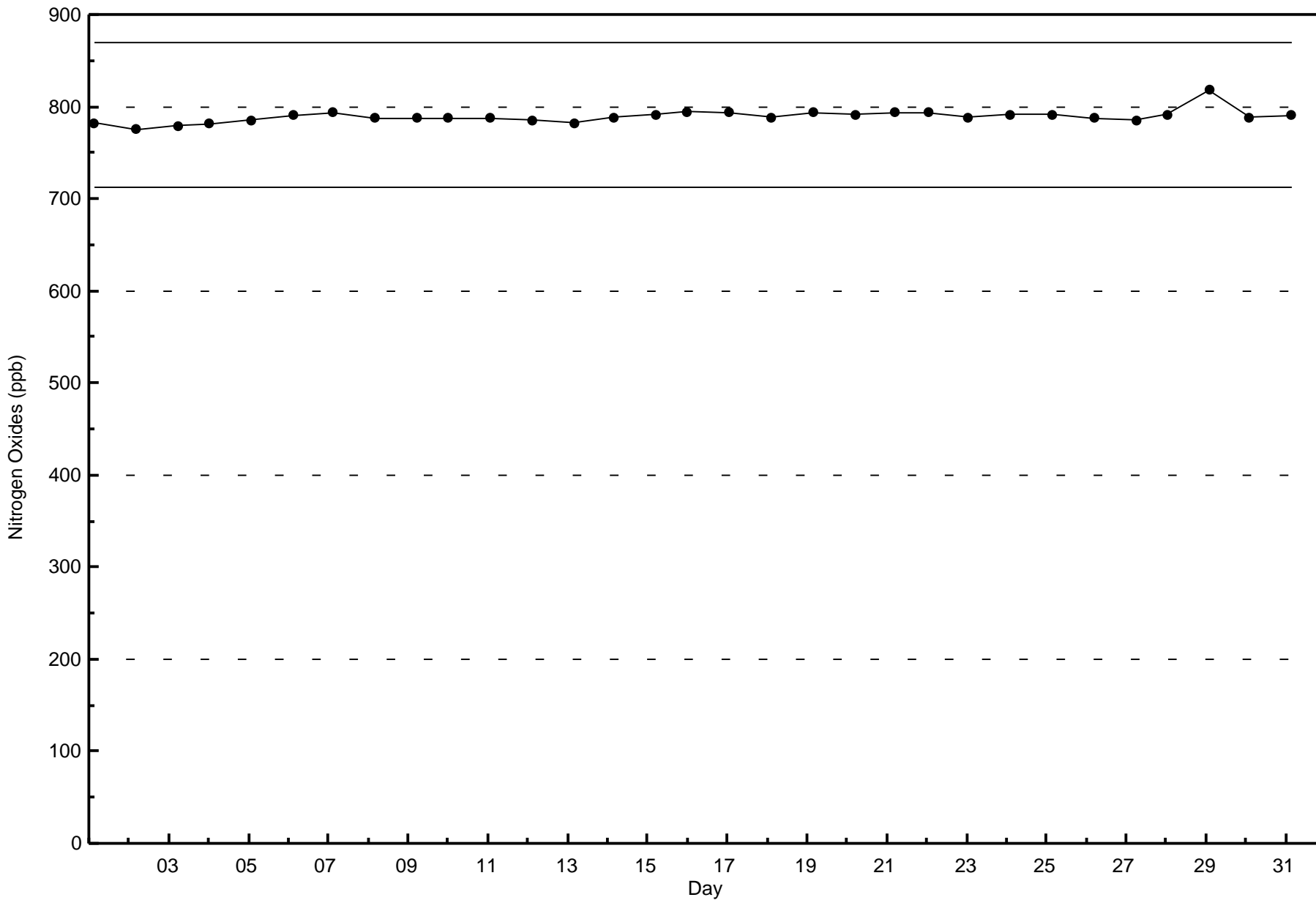






Wood Buffalo Environmental Association  
Span Responses

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Wapasu - October 2017



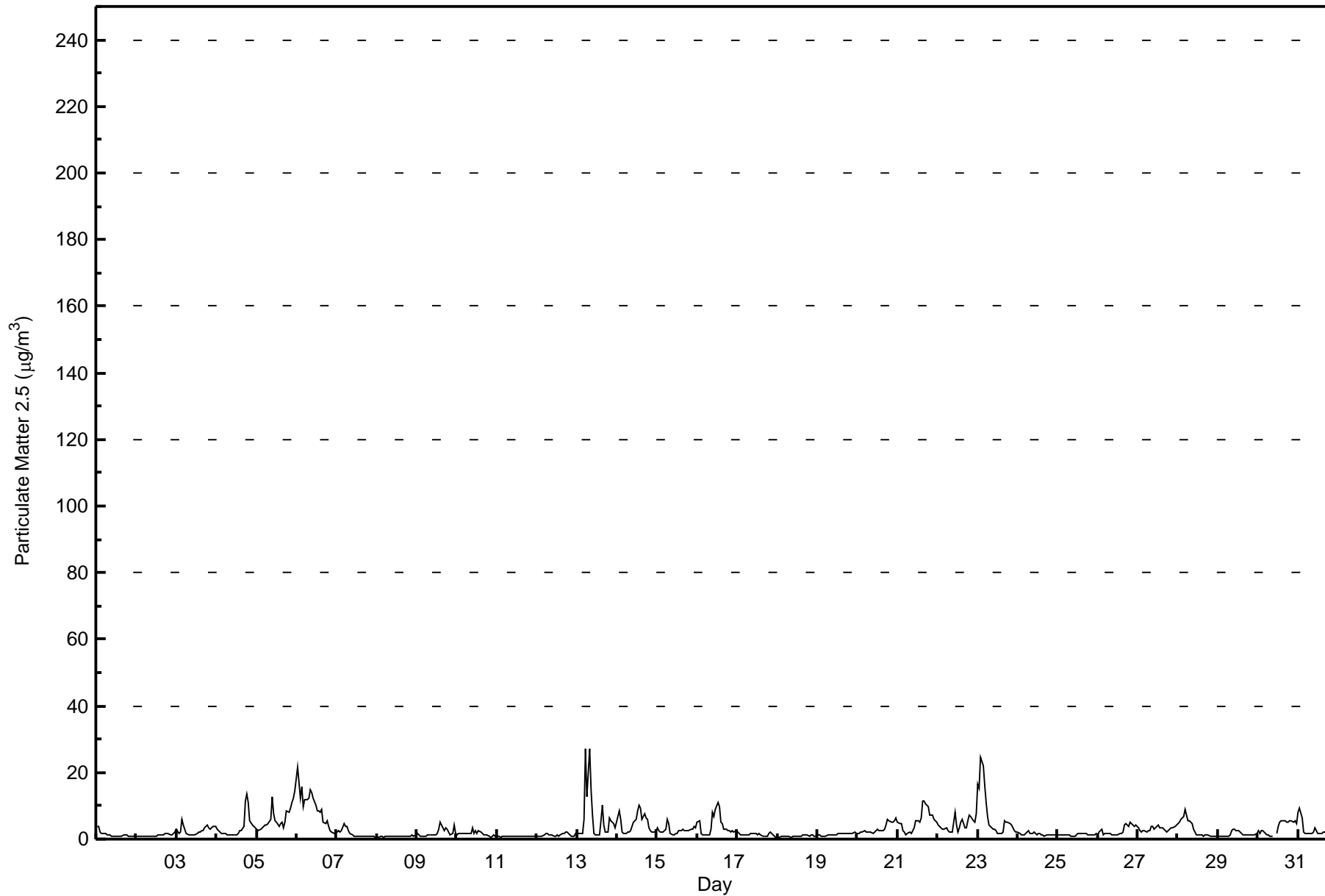


Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 27.3 µg/m <sup>3</sup> on Oct 13 08:00 Minimum Value: 0.4 µg/m <sup>3</sup> on Oct 10 21:00 Maximum Diurnal Average: 3.8 µg/m <sup>3</sup> at hour 1 Monthly Average: 3.02 µg/m <sup>3</sup>		Maximum Daily Average: 9.4 µg/m <sup>3</sup> on Oct 6 Minimum Daily Average: 0.8 µg/m <sup>3</sup> on Oct 11 Minimum Diurnal Average: 2.6 µg/m <sup>3</sup> at hour 12 Percentiles: P <sub>1</sub> = 0.6 P <sub>10</sub> = 0.8 Q <sub>1</sub> = 1.1 Median = 1.8 Q <sub>3</sub> = 3.6 P <sub>90</sub> = 6.0 P <sub>99</sub> = 16.4		Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 1 Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	3.7	3.9	2.0	1.5	1.6	1.7	1.4	1.2	1.1	1.0	1.0	1.0	1.0	0.9	0.9	1.0	1.2	1.2	1.1	1.0	1.0	0.9	0.8	0.8	1.4	3.9																						
2-Oct	0.8	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	1.0	1.1	1.1	1.3	1.3	1.7	1.8	1.6	1.3	1.4	1.6	2.0	1.2	2.0																						
3-Oct	3.1	1.8	2.1	6.0	4.3	2.9	1.7	1.4	1.2	1.2	1.4	1.4	1.5	2.1	2.3	2.5	2.4	3.5	4.3	3.5	3.2	3.2	4.0	3.8	2.7	6.0																						
4-Oct	2.9	2.7	2.2	1.8	1.9	1.8	1.5	1.5	1.5	1.4	1.3	1.1	1.1	1.9	2.5	2.5	3.9	11.3	13.7	11.0	5.5	4.1	3.9	3.5	3.6	13.7																						
5-Oct	3.0	2.7	2.8	3.3	4.0	4.2	4.4	4.5	5.9	12.5	7.6	5.6	5.2	4.0	4.5	4.9	3.6	5.3	8.6	7.9	9.4	11.1	12.2	14.3	6.3	14.3																						
6-Oct	21.7	16.9	12.3	15.5	9.9	12.0	11.7	12.5	15.0	14.2	12.1	10.1	8.4	8.4	8.1	8.8	5.2	4.8	5.3	3.7	2.4	2.1	1.9	2.0	9.4	21.7																						
7-Oct	2.3	2.5	2.2	2.4	4.5	3.9	3.7	2.5	1.8	1.4	1.0	0.9	0.8	0.7	0.8	1.0	1.0	0.8	0.8	0.8	0.8	0.6	0.7	0.6	1.6	4.5																						
8-Oct	0.6	0.6	0.6	0.7	0.6	0.7	0.8	0.8	0.8	0.8	0.7	0.7	0.8	0.7	0.8	0.8	0.7	0.7	0.8	0.9	0.9	1.1	1.0	1.1	0.8	1.1																						
9-Oct	1.5	1.4	1.0	0.8	0.9	1.0	1.1	1.2	1.1	1.3	1.3	1.3	1.5	3.1	5.0	4.1	2.7	3.3	3.0	2.0	1.3	1.7	4.3	1.5	2.0	5.0																						
10-Oct	1.3	1.6	1.9	1.7	1.7	1.6	1.7	1.7	1.9	3.3	1.8	2.4	1.8	2.4	2.1	1.7	1.3	1.1	1.2	0.8	0.4	0.8	1.3	0.7	1.6	3.3																						
11-Oct	0.9	0.8	0.6	0.8	0.7	0.7	0.9	0.9	0.9	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.8	0.9																						
12-Oct	0.8	0.7	0.9	1.1	1.3	1.5	1.5	1.4	1.1	1.1	1.1	1.0	1.2	1.0	1.3	1.5	1.8	1.9	2.1	1.5	0.8	0.8	1.0	1.7	1.3	2.1																						
13-Oct	2.2	1.9	1.5	1.5	5.8	27.3	12.6	27.3	14.9	7.2	1.6	1.4	1.3	1.4	5.7	10.1	4.4	2.0	2.2	6.3	5.5	5.0	4.8	3.4	6.6	27.3																						
14-Oct	6.9	8.5	5.8	2.3	1.6	1.8	1.9	2.3	2.7	4.0	5.0	6.0	8.6	10.3	9.4	6.1	7.7	6.5	5.8	3.5	2.7	2.0	2.0	2.3	4.8	10.3																						
15-Oct	3.4	2.6	2.1	2.3	2.5	3.0	6.0	4.7	1.9	1.5	1.3	1.5	1.9	2.4	2.7	2.8	2.7	2.7	2.6	2.4	2.9	2.9	4.0	3.3	2.7	6.0																						
16-Oct	5.2	5.6	1.8	1.3	1.3	1.1	1.3	1.5	3.1	7.8	6.9	9.1	11.1	9.9	5.0	4.8	2.8	3.0	2.5	2.5	2.2	2.7	2.1	2.5	4.1	11.1																						
17-Oct	2.1	1.5	1.4	1.4	1.4	1.4	1.4	1.5	1.6	1.6	1.6	1.6	1.4	1.5	1.4	1.0	1.0	0.8	0.9	1.7	2.2	1.4	0.8	0.6	1.4	2.2																						
18-Oct	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.7	0.8	0.8	0.9	0.9	1.0	1.1	1.1	1.1	1.1	1.0	1.1	1.1	1.0	1.0	0.9	1.1																						
19-Oct	1.1	1.2	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.3	1.5	1.6	1.7	1.7	1.6	1.7	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.4	1.9																						
20-Oct	1.9	1.9	2.0	2.1	2.3	2.0	2.3	2.2	1.9	1.9	2.1	2.4	2.8	2.4	2.4	2.4	2.8	4.4	6.0	5.5	5.0	4.9	5.5	6.6	3.2	6.6																						
21-Oct	5.2	4.6	4.6	2.5	2.2	1.4	1.6	2.1	1.7	2.5	3.3	5.4	5.6	5.2	6.2	11.3	11.6	10.7	9.7	7.3	7.0	7.4	6.1	5.1	5.4	11.6																						
22-Oct	4.3	3.8	3.3	3.0	3.0	3.2	2.7	2.1	2.0	1.9	7.9	4.4	2.3	3.4	5.1	5.9	3.3	3.2	5.4	7.4	6.7	5.7	5.0	7.7	4.3	7.9																						
23-Oct	16.6	15.4	24.4	21.8	16.0	10.8	6.7	4.2	3.2	3.1	2.9	2.7	1.9	1.5	1.9	2.2	5.4	4.9	5.0	4.7	4.1	3.2	2.4	2.1	7.0	24.4																						
24-Oct	1.9	1.7	1.5	1.4	1.5	1.7	2.5	1.9	1.7	1.7	2.0	1.5	1.6	1.5	1.1	1.1	1.1	1.4	1.2	1.4	1.4	1.4	1.4	1.4	1.5	2.5																						
25-Oct	1.4	1.2	1.3	1.2	1.4	1.4	1.4	1.2	1.0	1.0	1.0	1.2	1.6	1.8	1.8	1.7	1.5	1.7	1.3	1.3	1.2	1.1	1.1	1.5	1.4	1.8																						
26-Oct	1.4	2.2	3.2	1.4	1.5	1.5	1.5	1.5	1.4	1.4	1.3	1.3	1.4	1.6	1.7	2.1	4.4	4.5	3.7	5.1	4.6	4.2	3.9	4.4	2.6	5.1																						
27-Oct	3.6	2.4	2.2	2.4	2.4	2.2	2.3	2.6	3.9	4.0	2.9	3.7	4.2	3.4	3.2	3.4	2.5	2.3	2.4	2.8	3.6	3.5	3.9	4.3	3.1	4.3																						
28-Oct	4.6	5.3	5.8	6.6	8.8	7.4	5.5	5.4	4.5	3.0	2.3	1.2	1.1	1.1	1.3	1.0	1.2	1.3	1.3	0.9	1.0	1.0	0.9	0.9	3.1	8.8																						
29-Oct	0.9	0.9	0.9	1.0	1.1	1.0	0.9	1.4	2.4	2.9	3.0	2.6	2.5	2.1	1.6	1.2	1.1	1.1	1.1	1.2	1.3	1.4	1.4	1.7	1.5	3.0																						
30-Oct	2.5	1.6	2.5	2.6	1.6	1.4	1.1	1.0	1.0	0.9	C	1.6	3.8	5.1	5.6	5.5	5.4	4.9	5.3	5.6	5.4	5.3	5.3	4.8	3.5	5.6																						
31-Oct	7.9	9.3	6.3	2.3	1.7	1.6	1.7	1.8	1.8	2.3	3.3	2.7	1.8	1.7	1.8	2.0	2.0	1.8	2.2	2.3	2.1	1.8	1.2	1.0	2.7	9.3																						
																								3.8	3.5	3.3	3.1	2.9	3.4	2.8	3.1	2.8	2.9	2.7	2.6	2.7	2.8	2.9	3.2	2.9	3.1	3.4	3.2	2.9	2.8	2.8	2.9	Diurnal Average
																								21.7	16.9	24.4	21.8	16.0	27.3	12.6	27.3	15.0	14.2	12.1	10.1	11.1	10.3	9.4	11.3	11.6	11.3	13.7	11.0	9.4	11.1	12.2	14.3	Diurnal Maximum
C - Calibration																																																
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m <sup>3</sup>																																																



Wood Buffalo Environmental Association  
Hourly Averages

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Wapasu - October 2017





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Wapasu - October 2017**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	523	70.39	70.39
6 - 15	83	11.17	81.56
16 - 25	7	0.94	82.50
26 - 80	2	0.27	82.77
> 81.0	0	0.00	82.77

Total Number of Valid Hours: 743

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**Wapasu - October 2017**

Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	50	20	15	8	9	4	34	73	64	46	58	39	11	12	16	63	522
6 - 15	0	1	1	3	0	0	4	13	8	12	24	11	4	1	1	0	83
16 - 25	0	0	0	0	0	0	0	1	3	0	2	1	0	0	0	0	7
26 - 80	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	50	21	16	11	9	4	38	87	77	58	84	51	15	13	17	63	614

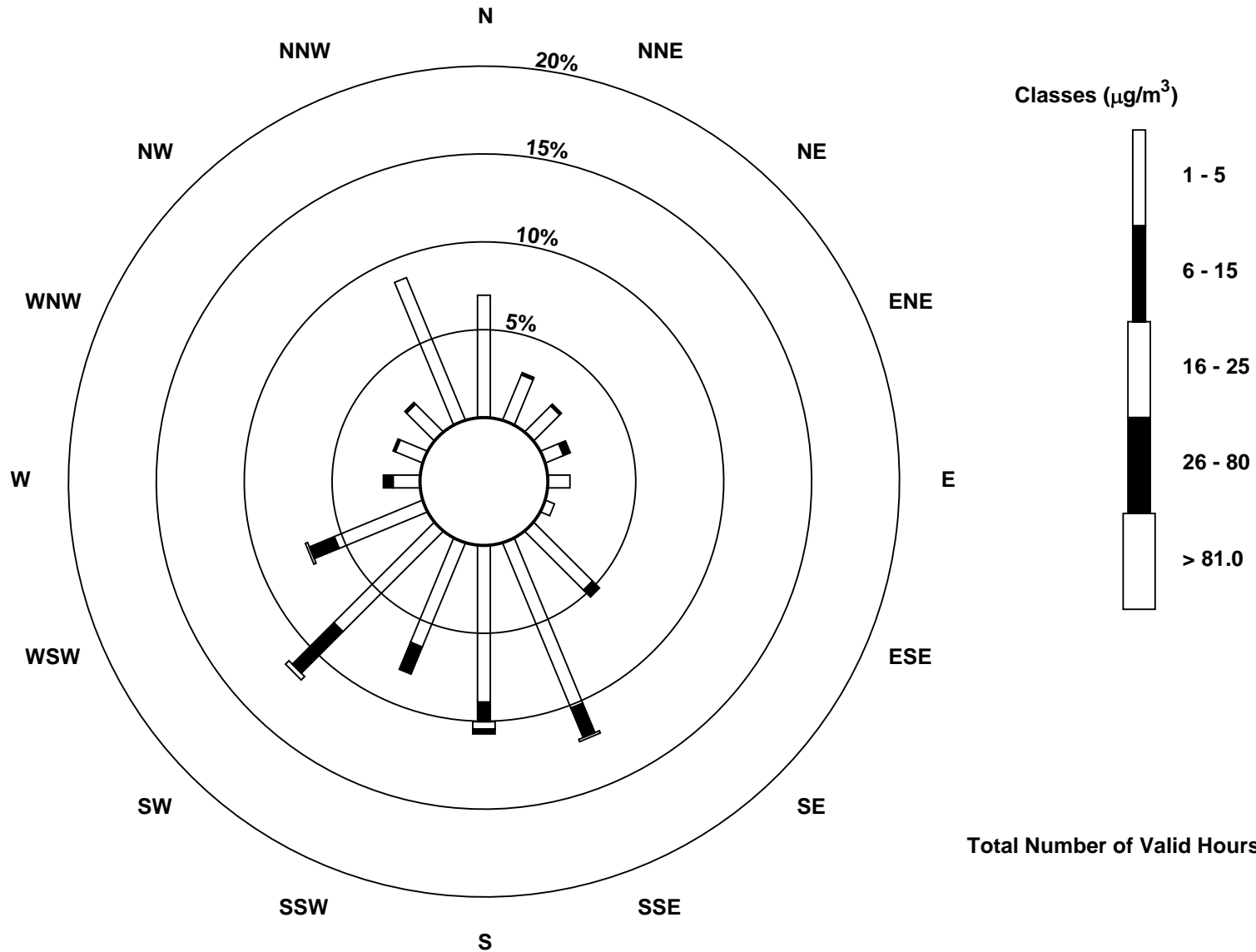
Total Number of Valid Hours: 718

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Wapasu (AMS 17)







**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Ambient Temperature (AT) - C**

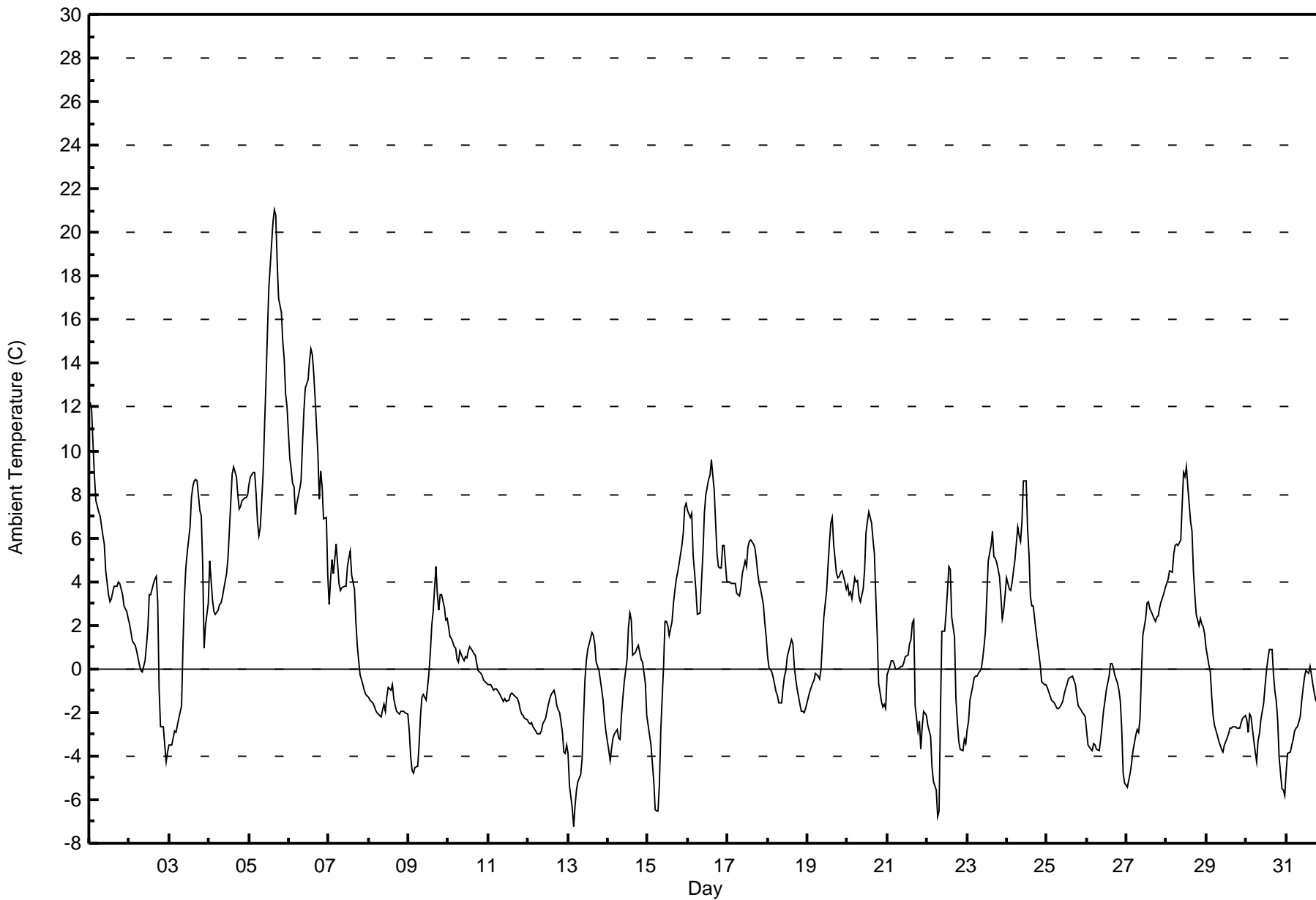
**Wapasu - October 2017**

Maximum Value: 21.1 C on Oct 5 16:00		Maximum Daily Average: 13.2 C on Oct 5		Hours in Service: 744																						
Minimum Value: -7.3 C on Oct 13 04:00		Minimum Daily Average: -2.4 C on Oct 29		Hours of Data: 744																						
Maximum Diurnal Average: 4.0 C at hour 15		Minimum Diurnal Average: -0.1 C at hour 7		Hours of Missing Data: 0																						
Monthly Average: 1.51 C		Percentiles: P <sub>1</sub> = -6.3 P <sub>10</sub> = -3.3 Q <sub>1</sub> = -1.9 Median = 0.5 Q <sub>3</sub> = 4.1 P <sub>90</sub> = 7.4 P <sub>99</sub> = 16.5		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	12.2	11.8	10.2	8.8	7.7	7.2	7.0	6.6	6.1	5.7	4.5	3.4	3.1	3.2	3.5	3.8	3.8	4.0	3.9	3.7	3.4	2.9	2.6	2.3	5.5	12.2
2-Oct	2.0	1.6	1.3	1.1	0.8	0.5	0.2	-0.1	-0.1	0.4	1.1	1.9	3.4	3.4	3.9	4.1	4.3	3.1	-0.9	-2.6	-2.7	-3.5	-4.3	-3.8	0.6	4.3
3-Oct	-3.5	-3.5	-3.2	-2.8	-2.9	-2.6	-2.3	-1.7	1.1	3.3	4.6	5.3	6.5	7.8	8.4	8.6	8.7	8.6	7.3	7.0	4.8	0.9	2.0	3.0	2.7	8.7
4-Oct	5.0	4.0	3.1	2.6	2.5	2.7	3.0	3.0	3.3	3.6	4.4	5.0	6.3	7.7	8.9	9.2	8.8	8.0	7.3	7.4	7.7	7.8	7.8	8.0	5.7	9.2
5-Oct	8.5	8.8	9.0	9.0	8.0	6.7	6.1	6.5	8.9	11.0	13.0	15.2	17.4	19.4	20.4	21.1	20.8	18.6	17.0	16.4	15.0	14.2	12.6	12.0	13.2	21.1
6-Oct	9.6	9.2	8.5	8.4	7.1	7.6	8.2	8.6	10.3	11.8	12.9	13.2	14.1	14.7	14.4	13.5	12.4	9.8	7.8	9.1	8.4	6.9	6.9	4.3	9.9	14.7
7-Oct	3.0	4.1	5.0	4.4	5.7	4.8	3.9	3.6	3.7	3.8	3.8	4.7	5.1	5.4	4.3	3.6	2.1	1.1	0.4	-0.3	-0.7	-0.9	-1.1	-1.2	2.8	5.7
8-Oct	-1.3	-1.4	-1.5	-1.7	-1.9	-2.0	-2.1	-2.2	-1.9	-1.6	-1.9	-1.3	-0.9	-1.0	-0.7	-1.4	-1.7	-2.0	-2.1	-1.9	-1.9	-2.0	-2.0	-2.1	-1.7	-0.7
9-Oct	-2.8	-4.0	-4.7	-4.8	-4.5	-4.5	-3.5	-2.1	-1.3	-1.2	-1.4	-0.8	-0.2	0.7	2.0	2.6	4.7	3.4	2.7	3.4	3.4	2.8	2.2	2.3	-0.2	4.7
10-Oct	1.9	1.5	1.4	1.0	1.0	0.5	0.3	0.8	0.5	0.4	0.5	0.5	0.8	1.0	0.8	0.7	0.6	0.3	-0.1	-0.2	-0.3	-0.5	-0.6	-0.6	0.5	1.9
11-Oct	-0.7	-0.7	-0.9	-1.0	-0.9	-0.9	-1.1	-1.3	-1.4	-1.5	-1.4	-1.5	-1.4	-1.2	-1.1	-1.1	-1.2	-1.4	-1.6	-1.9	-2.1	-2.1	-2.3	-2.3	-1.4	-0.7
12-Oct	-2.4	-2.5	-2.5	-2.6	-2.8	-3.0	-3.0	-3.0	-2.8	-2.6	-2.3	-1.9	-1.7	-1.4	-1.2	-1.0	-1.3	-1.7	-1.9	-2.0	-2.9	-3.8	-3.9	-3.5	-2.4	-1.0
13-Oct	-3.9	-5.4	-6.4	-7.3	-6.3	-5.6	-5.2	-4.9	-4.1	-2.3	-0.5	0.3	0.9	1.4	1.6	1.5	1.1	0.3	-0.1	-0.5	-1.0	-1.5	-2.3	-2.9	-2.2	1.6
14-Oct	-3.8	-4.2	-3.6	-3.2	-3.0	-2.8	-3.2	-3.2	-2.2	-1.3	-0.6	0.5	1.9	2.6	2.2	0.6	0.7	1.0	1.1	0.7	0.4	0.3	-0.7	-2.1	-0.9	2.6
15-Oct	-2.6	-3.1	-3.5	-5.1	-6.5	-6.5	-6.5	-5.3	-2.8	0.2	2.2	2.1	2.0	1.5	2.2	3.0	3.6	4.1	4.4	4.8	5.6	6.2	7.4	7.6	0.6	7.6
16-Oct	7.3	7.0	7.1	5.2	4.4	3.6	2.5	2.6	4.0	5.3	7.2	8.0	8.7	8.9	9.6	8.9	8.1	5.2	4.7	4.7	4.6	5.7	5.7	4.0	6.0	9.6
17-Oct	4.0	4.0	3.9	3.9	3.9	3.4	3.4	3.3	3.7	4.4	4.9	4.7	5.6	5.8	5.9	5.7	5.5	5.0	4.4	3.9	3.6	2.9	2.1	1.4	4.2	5.9
18-Oct	0.6	0.1	-0.1	-0.4	-0.7	-1.0	-1.2	-1.6	-1.6	-0.9	-0.3	-0.1	0.6	1.1	1.4	1.1	0.1	-0.4	-0.9	-1.6	-2.0	-2.0	-2.0	-1.8	-0.6	1.4
19-Oct	-1.3	-1.1	-0.8	-0.7	-0.5	-0.2	-0.3	-0.5	0.0	1.2	2.4	3.6	4.7	5.8	6.7	7.0	5.7	4.3	4.2	4.2	4.4	4.5	4.0	3.7	2.5	7.0
20-Oct	3.9	3.4	3.5	3.2	4.2	4.0	4.1	3.3	3.1	3.7	4.5	6.2	6.8	7.2	6.7	5.9	5.2	3.3	1.5	-0.7	-1.5	-1.8	-1.6	-1.8	3.2	7.2
21-Oct	-0.2	0.1	0.4	0.4	0.2	0.0	0.0	0.1	0.1	0.1	0.3	0.5	0.7	1.2	1.3	2.1	2.3	-1.7	-2.8	-2.4	-3.7	-2.6	-1.9	-2.1	-0.3	2.3
22-Oct	-2.6	-2.9	-3.1	-4.5	-5.2	-5.6	-6.8	-6.5	-2.0	1.7	1.7	2.6	3.6	4.7	4.6	2.3	1.5	-1.4	-2.4	-3.3	-3.7	-3.7	-3.2	-3.4	-1.6	4.7
23-Oct	-2.8	-2.4	-1.4	-0.8	-0.4	-0.3	-0.3	-0.2	0.0	0.4	1.0	1.7	3.3	4.9	5.7	6.3	5.1	5.1	4.9	4.3	3.3	2.3	2.7	3.4	1.9	6.3
24-Oct	4.2	3.7	3.6	4.0	4.5	5.0	6.5	6.1	5.9	6.7	8.6	8.6	6.5	5.3	3.3	2.9	2.9	1.7	1.2	0.7	0.2	-0.6	-0.7	-0.7	3.8	8.6
25-Oct	-0.8	-1.0	-1.3	-1.4	-1.6	-1.7	-1.8	-1.8	-1.8	-1.5	-1.2	-0.9	-0.7	-0.5	-0.4	-0.3	-0.5	-0.7	-1.2	-1.7	-1.9	-2.0	-2.1	-2.2	-1.3	-0.3
26-Oct	-2.8	-3.5	-3.7	-3.8	-3.4	-3.5	-3.7	-3.8	-3.3	-2.7	-2.0	-1.5	-1.0	-0.4	0.2	0.3	0.1	-0.2	-0.7	-1.0	-1.5	-2.8	-4.8	-5.2	-2.3	0.3
27-Oct	-5.4	-5.1	-4.8	-4.3	-3.7	-3.1	-2.8	-2.9	-2.3	-0.2	1.5	2.3	3.0	3.1	2.8	2.6	2.3	2.2	2.4	2.5	2.8	3.1	3.4	3.8	0.1	3.8
28-Oct	3.9	4.1	4.5	4.4	5.3	5.7	5.7	5.7	5.9	7.5	9.0	8.8	9.3	8.4	6.7	6.3	4.5	3.4	2.5	2.0	2.3	2.1	1.9	1.6	5.1	9.3
29-Oct	1.0	0.2	-0.1	-1.2	-2.2	-2.6	-3.0	-3.3	-3.5	-3.7	-3.8	-3.5	-3.2	-3.0	-2.7	-2.7	-2.6	-2.6	-2.7	-2.7	-2.7	-2.5	-2.3	-2.2	-2.4	1.0
30-Oct	-2.3	-2.9	-2.1	-2.2	-3.3	-3.8	-4.2	-3.3	-3.0	-2.3	-1.6	-0.8	-0.1	0.4	0.9	0.9	-0.3	-1.0	-1.5	-2.4	-4.1	-5.5	-5.5	-5.8	-2.3	0.9
31-Oct	-4.7	-3.9	-3.8	-3.5	-3.2	-2.8	-2.7	-2.6	-2.2	-1.5	-0.9	-0.4	-0.1	-0.2	0.1	-0.3	-0.7	-1.1	-1.4	-1.7	-1.7	-2.0	-3.0	-4.2	-2.0	0.1
	0.7	0.5	0.5	0.2	0.1	0.0	-0.1	0.0	0.7	1.5	2.3	2.8	3.4	3.8	4.0	3.8	3.4	2.5	1.8	1.5	1.1	0.7	0.6	0.3	Diurnal Average	
	12.2	11.8	10.2	9.0	8.0	7.6	8.2	8.6	10.3	11.8	13.0	15.2	17.4	19.4	20.4	21.1	20.8	18.6	17.0	16.4	15.0	14.2	12.6	12.0	Diurnal Maximum	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Wapasu - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C  
Wapasu - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	340	45.70	45.70
0 - 10	377	50.67	96.37
10 - 20	24	3.23	99.60
> 20	3	0.40	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %**

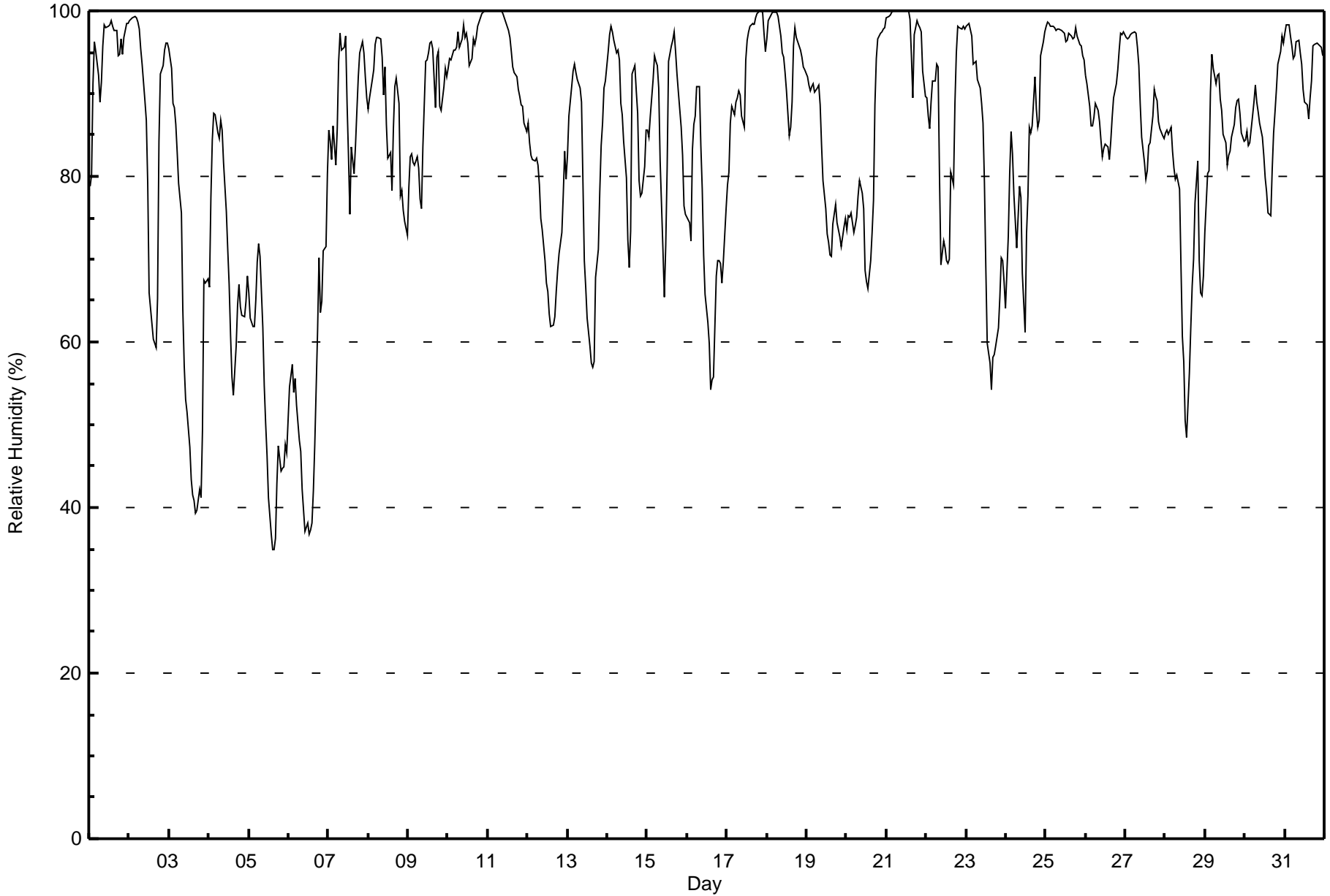
**Wapasu - October 2017**

Maximum Value: 100 % on Oct 11 00:00																			Maximum Daily Average: 98.0 % on Oct 21						Hours in Service: 744																				
Minimum Value: 35 % on Oct 5 16:00																			Minimum Daily Average: 51.9 % on Oct 5						Hours of Data: 744																				
Maximum Diurnal Average: 88.9 % at hour 5																			Minimum Diurnal Average: 74.7 % at hour 14						Hours of Missing Data: 0																				
Monthly Average: 83.2 %																			Percentiles: P <sub>1</sub> = 38 P <sub>10</sub> = 62 Q <sub>1</sub> = 75 Median = 87 Q <sub>3</sub> = 95 P <sub>90</sub> = 98 P <sub>99</sub> = 100						Hours of Calibration: 0																				
																									Percent Operational Time: 100.0																				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																					
1-Oct	79	80	91	96	95	92	89	91	96	98	98	98	98	99	98	98	98	95	95	97	95	97	98	98	94.5	99																			
2-Oct	99	99	99	99	99	99	98	95	93	89	87	79	66	64	60	60	59	65	84	92	93	95	96	96	86.2	99																			
3-Oct	95	93	89	88	86	83	79	76	64	57	53	51	47	43	41	41	39	40	42	41	49	67	67	68	62.6	95																			
4-Oct	67	77	84	88	87	85	85	87	86	82	76	71	67	61	56	54	59	64	67	64	63	63	65	68	71.9	88																			
5-Oct	66	63	62	62	65	70	72	70	62	55	50	46	41	37	35	35	36	43	47	44	45	45	48	47	51.9	72																			
6-Oct	55	56	57	54	56	52	48	47	42	40	37	38	37	37	38	42	48	61	70	64	65	71	72	80	52.8	80																			
7-Oct	86	84	82	86	81	86	94	97	95	96	97	89	83	75	84	80	84	88	92	95	96	95	92	90	88.6	97																			
8-Oct	88	90	92	93	96	97	97	97	94	90	93	86	82	83	78	86	91	92	89	78	78	76	75	73	87.2	97																			
9-Oct	79	82	83	82	81	82	81	77	76	84	94	94	95	96	96	95	88	94	95	89	88	91	93	92	87.8	96																			
10-Oct	93	94	94	95	95	96	97	96	97	98	97	97	96	93	94	97	96	97	98	99	100	100	100	100	96.6	100																			
11-Oct	100	100	100	100	100	100	100	100	100	100	99	99	98	97	95	93	93	92	90	90	89	88	86	85	95.6	100																			
12-Oct	86	84	82	82	82	82	81	79	75	74	70	67	66	63	62	62	63	66	69	71	73	78	83	80	74.2	86																			
13-Oct	83	87	91	93	94	93	92	91	89	79	70	67	63	59	57	57	58	68	71	78	84	87	91	92	78.8	94																			
14-Oct	95	97	98	97	96	95	95	94	89	87	84	80	72	69	73	92	93	90	88	79	78	78	81	86	87.1	98																			
15-Oct	86	85	87	92	95	94	93	91	82	71	66	72	81	94	96	96	97	95	92	90	86	82	76	75	86.5	97																			
16-Oct	75	74	72	83	86	87	91	91	84	78	70	66	62	60	54	55	56	68	70	70	70	67	70	76	72.3	91																			
17-Oct	79	80	86	88	87	89	90	90	90	87	86	94	96	98	98	98	98	99	100	100	100	100	97	95	92.8	100																			
18-Oct	97	99	100	100	100	100	100	99	97	95	94	93	90	85	86	89	96	98	97	96	95	94	93	93	95.2	100																			
19-Oct	92	91	90	91	91	90	91	91	89	84	80	76	73	72	71	70	74	77	74	73	73	71	74	75	80.5	92																			
20-Oct	73	75	75	76	73	74	75	78	79	78	76	69	67	66	70	73	77	89	94	97	97	97	98	98	80.2	98																			
21-Oct	99	99	100	100	100	100	100	100	100	100	100	100	100	100	99	95	90	97	99	98	98	98	93	90	98.0	100																			
22-Oct	90	87	86	89	92	92	93	93	80	69	72	71	70	69	70	80	79	89	95	98	98	98	98	98	85.7	98																			
23-Oct	98	98	99	97	94	94	94	92	91	89	86	79	69	60	58	54	58	58	59	62	65	70	70	67	77.5	99																			
24-Oct	64	73	80	85	83	78	71	75	79	77	68	61	73	78	86	85	86	92	88	86	87	95	96	97	81.0	97																			
25-Oct	98	99	99	98	98	98	98	98	98	98	97	97	96	96	97	97	97	97	98	97	96	96	95	94	97.1	99																			
26-Oct	92	91	89	86	86	87	89	88	87	84	82	83	84	84	82	84	87	89	91	93	95	97	97	97	88.6	97																			
27-Oct	97	97	97	97	97	97	97	96	93	89	85	82	80	81	84	84	87	91	90	89	87	86	85	85	89.6	97																			
28-Oct	85	86	85	86	83	81	80	80	79	69	61	58	51	49	56	62	67	70	77	82	70	66	66	68	71.4	86																			
29-Oct	73	80	81	90	95	93	91	92	92	89	88	85	84	81	83	83	85	86	88	89	89	88	85	84	86.5	95																			
30-Oct	84	85	84	84	87	89	91	89	88	86	85	83	80	78	76	75	81	85	88	90	94	95	97	96	86.3	97																			
31-Oct	97	98	98	97	96	94	95	96	96	95	94	90	89	89	87	90	92	96	96	96	96	96	96	95	94.3	98																			
																			85.5	86.7	87.5	88.8	88.9	88.7	88.6	88.3	85.8	82.8	80.5	78.1	76.0	74.7	74.9	76.3	77.8	81.7	83.7	83.5	83.6	84.7	84.9	85.1	Diurnal Average		
																			100	100	100	100	100	100	100	100	100	100	100	100	100	100	99	98	98	99	100	100	100	100	100	100	100	Diurnal Maximum	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Wapasu - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Relative Humidity (RH) - %  
Wapasu - October 2017**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	12	1.61	1.61
40 - 60	55	7.39	9.01
60 - 80	174	23.39	32.39
80 - 100	486	65.32	97.72

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Precipitation (PC) - mm**

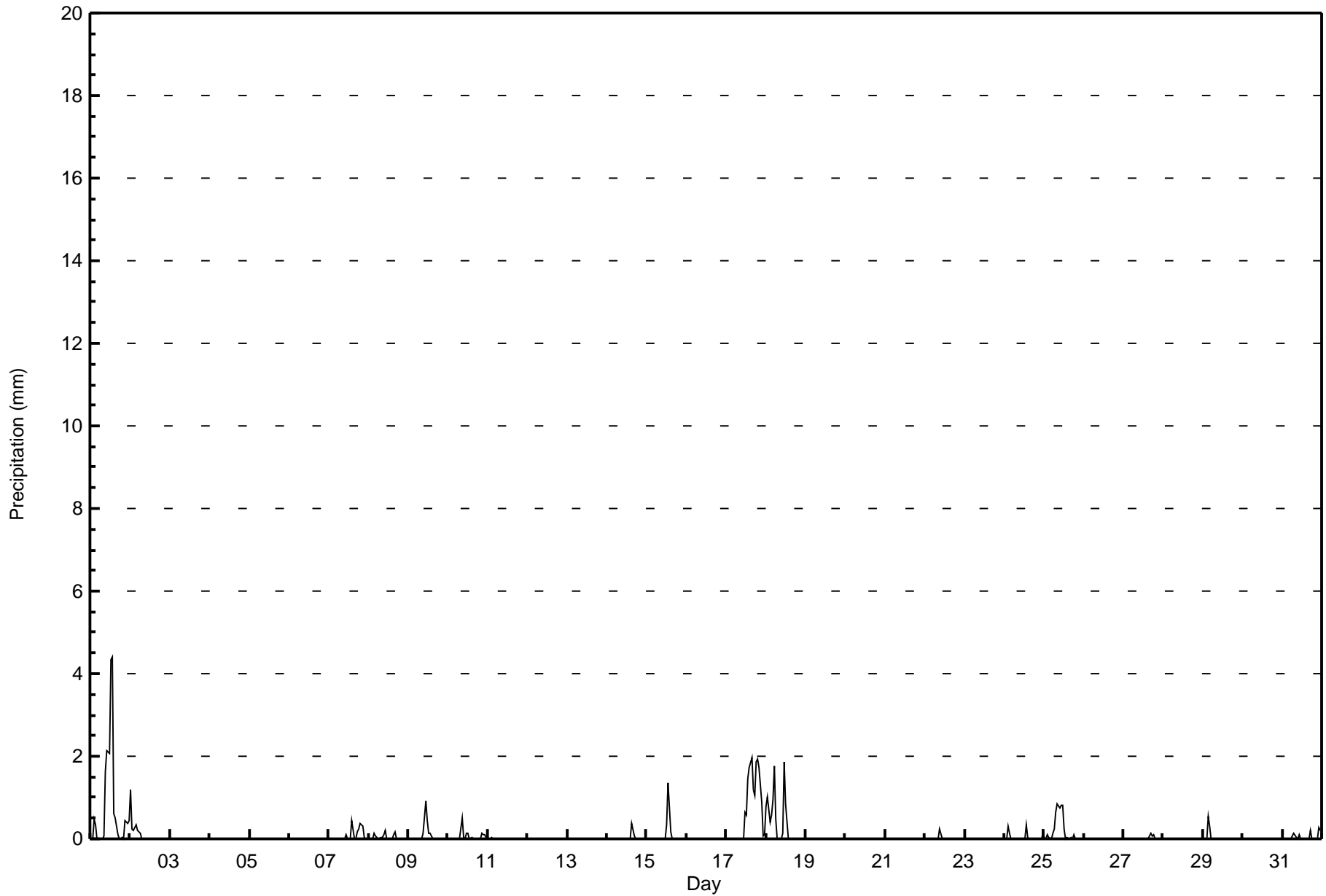
**Wapasu - October 2017**

Maximum Value: 4.4 mm on Oct 1 14:00		Maximum Daily Total: 18.0 mm on Oct 1		Hours in Service: 744																							
Minimum Value: 0.0 mm on Oct 1 01:00		Minimum Daily Total: 0.0 mm on Oct 3		Hours of Data: 744																							
Maximum Diurnal Total: 7.7 mm at hour 14		Minimum Diurnal Total: 0.8 mm at hour 23		Hours of Missing Data: 0																							
Monthly Total: 60.73 mm		Percentiles: P <sub>1</sub> = 0.0 P <sub>10</sub> = 0.0 Q <sub>1</sub> = 0.0 Median = 0.0 Q <sub>3</sub> = 0.0 P <sub>90</sub> = 0.1 P <sub>99</sub> = 1.8		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	0.0	0.0	0.5	0.3	0.0	0.0	0.0	0.0	0.1	1.6	2.1	2.1	4.3	4.4	0.6	0.5	0.1	0.0	0.0	0.1	0.0	0.4	0.4	0.5	18.0	4.4	
2-Oct	1.2	0.3	0.2	0.3	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	1.2	
3-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.4	0.0	0.0	0.2	0.2	0.4	0.3	0.1	0.0	0.0	1.7	0.4	
8-Oct	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.2	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.2	
9-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.9	0.4	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.9	
10-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	1.3	0.5	
11-Oct	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	
12-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	
15-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	1.4	
16-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.6	1.5	1.7	2.0	1.2	1.1	1.9	1.9	1.7	0.9	0.1	0.1	15.2	2.0	
18-Oct	0.8	1.0	0.4	0.6	1.0	1.8	0.5	0.0	0.0	0.0	0.1	1.9	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.8	1.9	
19-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2
23-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24-Oct	0.0	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.0	0.4	
25-Oct	0.0	0.0	0.1	0.1	0.0	0.1	0.3	0.7	0.8	0.8	0.8	0.8	0.3	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	4.8	0.8	
26-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.1	
28-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29-Oct	0.0	0.0	0.0	0.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.6	
30-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.3	0.2	1.1	0.3	
																								Diurnal Average			
																								Diurnal Maximum			



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Precipitation (PC) - mm**  
**Wapasu - October 2017**







Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Wapasu - October 2017

Maximum Speed: 26 km/h on Oct 1 21:00	Maximum Daily Speed Average: 16.2 km/h on Oct 1	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 13 03:00	Minimum Daily Speed Average: 0.5 km/h on Oct 17	Hours of Data: 719
Maximum Diurnal Speed Average: 4.0 km/h at hour 14	Minimum Diurnal Speed Average: 1.3 km/h at hour 4	Hours of Missing Data: 25
Monthly Average Velocity: 2.0 km/h 263.5 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 4 Q <sub>1</sub> = 6 Median = 9 Q <sub>3</sub> = 14 P <sub>90</sub> = 17 P <sub>99</sub> = 24	Percent Operational Time: 96.6

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	NNW6	NNW7	NW9	NW9	NW8	NW9	NNW9	NNW10	NNW16	N15	N20	N21	NNW20	NNW17	NNW19	NNW20	NNW20	NNW22	NNW21	NNW22	N26	N26	N24	N22	NNW16.2	N26	
2-Oct	N21	N23	N22	N21	N20	N19	N17	N20	N18	N20	N16	N17	N18	N19	N16	NNW17	N15	NNW9	NNW2	N4	SSE0	SE3	SE4	SSE5	N13.4	N23	
3-Oct	SSE6	SSE6	S6	SSE7	S7	S8	S10	S10	SSW13	SSW14	SSW15	SSW17	SSW20	SSW18	SW18	SW17	SW15	SW11	WSW8	WSW8	SW5	SW5	WSW4	NW5	SSW9.5	SSW20	
4-Oct	NNW11	NNW10	N10	N8	NNW7	NNW7	NNW8	NNW7	NNW9	NNW9	NNW9	W6	W5	W4	SW4	S4	SSE5	SSE7	SSE9	SSE9	SSE9	SSE9	SSE9	SSE7	NW2.0	NNW11	
5-Oct	SSE7	S9	S9	S7	S7	S7	S7	S7	SSW9	SSW10	SSW9	SSW10	SSW11	SW14	SSW14	SW14	SW16	SSW8	SSW10	SSW10	SSW10	SW7	SSW7	SSW8.8	SW16		
6-Oct	SSE7	S7	S8	S8	S7	SW10	SW11	SW13	SW14	SW15	SSW16	SSW15	SSW17	SSW13	SSW21	W13	NW6	AF	SE5	WSW7	SW6	SW6	SW8	S5	SW8.8	WSW21	
7-Oct	S4	S4	S4	SSW2	NNW7	N9	N12	N12	NNW13	NNW14	NNW15	NNW16	NNW14	NNW13	NNW12	NNW17	NNW19	NNW17	NNW18	NNW18	NNW17	NNW18	NNW20	NNW20	NNW11.9	NNW20	
8-Oct	NNW20	NNW18	NNW17	NNW20	NNW19	NNW18	NNW17	NNW18	NNW16	NNW17	NNW16	NNW16	NNW14	NNW13	N13	NNW11	NNW8	NNW3	W4	W5	WNW2	WSW4	SW5	SW5	NNW11.5	NNW20	
9-Oct	SSW5	S7	S8	SSE10	SSE14	SSE14	SSE15	SSE15	S15	SSE14	SSE14	SSE15	S9	SW9	WSW11	WSW9	WSW8	SSW6	SSW6	WSW9	WSW11	SW9	SW7	WSW9	S8.7	SSE15	
10-Oct	WSW8	SW5	WSW7	WSW6	SW7	SSW4	SW4	SW5	W4	N7	N8	NNW8	NNW10	N9	N8	N7	NNE6	NNE5	NNE6	NNE7	NNE6	NNE7	NE7	NE8	NNW3.3	NNW10	
11-Oct	NE8	NE7	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	NE8	
12-Oct	AF	AF	N11	NNW10	NNW11	NNW10	NNW11	NNW12	NNW14	NNW13	NNW15	N13	NNW14	N14	NNW13	NNW14	NNW14	NNW9	NW5	N6	NE6	E1	WNW2	NW4	NNW9.7	NNW15	
13-Oct	WNW3	WNW3	NNE0	SSE3	SSE3	S4	S4	S3	SSE4	SW7	WSW8	W6	WSW8	W8	WSW10	SW12	SW12	SSW10	SW11	SW13	SW10	SW7	SW6	SSW6	SW5.8	SW13	
14-Oct	S5	SSE6	SSE7	SSE7	S8	S8	S9	SSE11	SSE12	S12	S12	SSW11	SSW12	SW15	SW14	SW5	SW4	W6	WNW6	WNW10	WNW9	NW8	NW6	WSW4	SSW5.7	SW15	
15-Oct	WSW5	SW6	SW6	S4	SSE6	SSE6	SSE7	SSE9	S9	S10	S12	S13	SSE13	S12	S12	SSW11	SSW10	SSW11	SSW10	SSW9	SSW10	SSW11	SSW15	SSW14	SSW8.8	SW15	
16-Oct	SW14	SSW15	SSW17	W12	SSW10	WSW8	SSW7	SW7	SW12	SW14	SW12	SSW12	SSW13	SSW13	WSW9	WSW6	SE4	SSE5	SSE6	S7	SW11	SW10	S5	SW9.0	WSW17		
17-Oct	S6	SSE6	SSE6	SE6	SE7	SE8	SSE9	SSE7	S7	S7	S8	SSE7	SE6	ENE5	ENE5	E5	NNE4	NNW7	NNW12	NNW13	NW12	NW15	NW14	WNW14	SSW0.5	NW15	
18-Oct	WNW13	WNW13	NW15	NW14	NW12	NW13	NW12	NW9	WNW9	NW9	NNW9	N9	NNW5	N2	ENE4	E4	ESE4	SE7	SE10	SE10	SE12	SE14	SE14	SE18	NNW1.9	SE18	
19-Oct	SE22	SE20	SE20	SE21	SE23	SSE23	SSE20	SSE16	SSE16	SSE14	SSE12	S9	S9	S10	SSE10	SSE11	SSE12	SSE14	SSE14	SSE13	SSE15	SSE17	SE15	SE14	SSE15.0	SSE23	
20-Oct	SE14	SE13	SE14	SE14	SE14	SE14	SE17	SE17	SE17	S7	WNW2	NNE1	WSW1	WNW4	E5	SSE4	SW4	WSW5	SSW3	SE3	SE3	SE4	E2	NE4	SE6.3	SE17	
21-Oct	NE5	NE6	NNE5	N7	NNW8	NNW6	N4	NNW4	NNW5	N4	E1	W5	SSW5	SSW4	SW6	S2	ENE0	E3	SE4	SSE4	S3	SSE7	SSE6	SSE6	NE0.6	NNW8	
22-Oct	SSE7	SSE6	SSE6	SE5	SSE4	SE3	E4	ESE5	SE5	WNW1	NW5	N6	N7	NNE7	N8	NNE6	NE5	NNE3	WNW1	SW1	S3	SSW4	S5	S6	ESE1.3	N8	
23-Oct	S5	SSE5	SW7	SW6	WSW7	W5	W6	WSW7	WSW8	W8	W8	W10	SSW12	SSW11	SW14	SW12	SW11	SW11	SW8	SSW8	S7	S8	S9	S10	SW7.2	SW14	
24-Oct	SSW12	S9	S13	SSE16	S14	SSW13	SSW13	SSW12	SSW10	SSW10	SSW11	NW24	NN21	NW18	NNW19	NNW9	NNW14	N14	N11	N11	NNE8	NE4	ENE4	NE4	WNW4.9	NW24	
25-Oct	NNE6	NNE6	NE6	NE6	NE8	NE9	NE8	NNE8	NNE9	NNE10	NNE11	NNE11	NNE12	N12	N12	N12	N11	N9	NNW12	NNW9	NNW4	WSW2	WSW5	SW5	N7.1	NNE13	
26-Oct	SSW7	SW10	SW15	SW19	SW20	SW21	SSW13	SSW13	SSW15	SSW14	SSW14	SSW15	SSW14	SSW15	SW16	SW14	SW13	SW11	SW10	SW8	SW6	S3	SSE3	SSE6	SW12.0	SW21	
27-Oct	SSE6	SSE6	SSE5	SSE6	SSE5	SSE5	SSE5	SSE8	SSE10	S10	S11	S12	S11	S11	SSE12	SSE14	SSE14	SSE17	SSE16	S15	S14	S16	S15	SSW14	SSE10.5	SSE17	
28-Oct	S12	SSW11	SSW11	SSW10	SW12	SSW10	SSW12	SSW13	SSW13	SSW13	SSW10	NNW12	NNW19	NNW22	NNW21	NNW13	NNW21	N16	NNW12	NNW14	NNW15	NNW22	NNW24	NNW25	NNW24	NNW9.7	NNW25
29-Oct	NNW25	NNW24	NNW25	NNW24	N22	N22	N23	N20	N17	N17	N14	N14	N11	N14	N10	NNW13	N8	N6	NW2	WSW2	SW5	SW6	SW8	SSW5	NNW12.2	NNW25	
30-Oct	SSW7	S7	SSW9	SSW9	S6	S7	S7	S8	S8	SSE9	S8	S8	S7	SSW5	WSW1	WNW1	NNW4	NE2	NE2	ENE3	ENE2	ENE3	E4	SE4	S3.9	SSW9	
31-Oct	SE3	SE4	SE4	SE4	SSE6	SSE5	SSE5	SSE5	SSE6	SE6	ESE5	ESE7	E9	E10	ENE10	ENE9	ENE8	NE5	NE6	NE7	NNE7	NNE7	N12	N15	ENE4.2	N15	

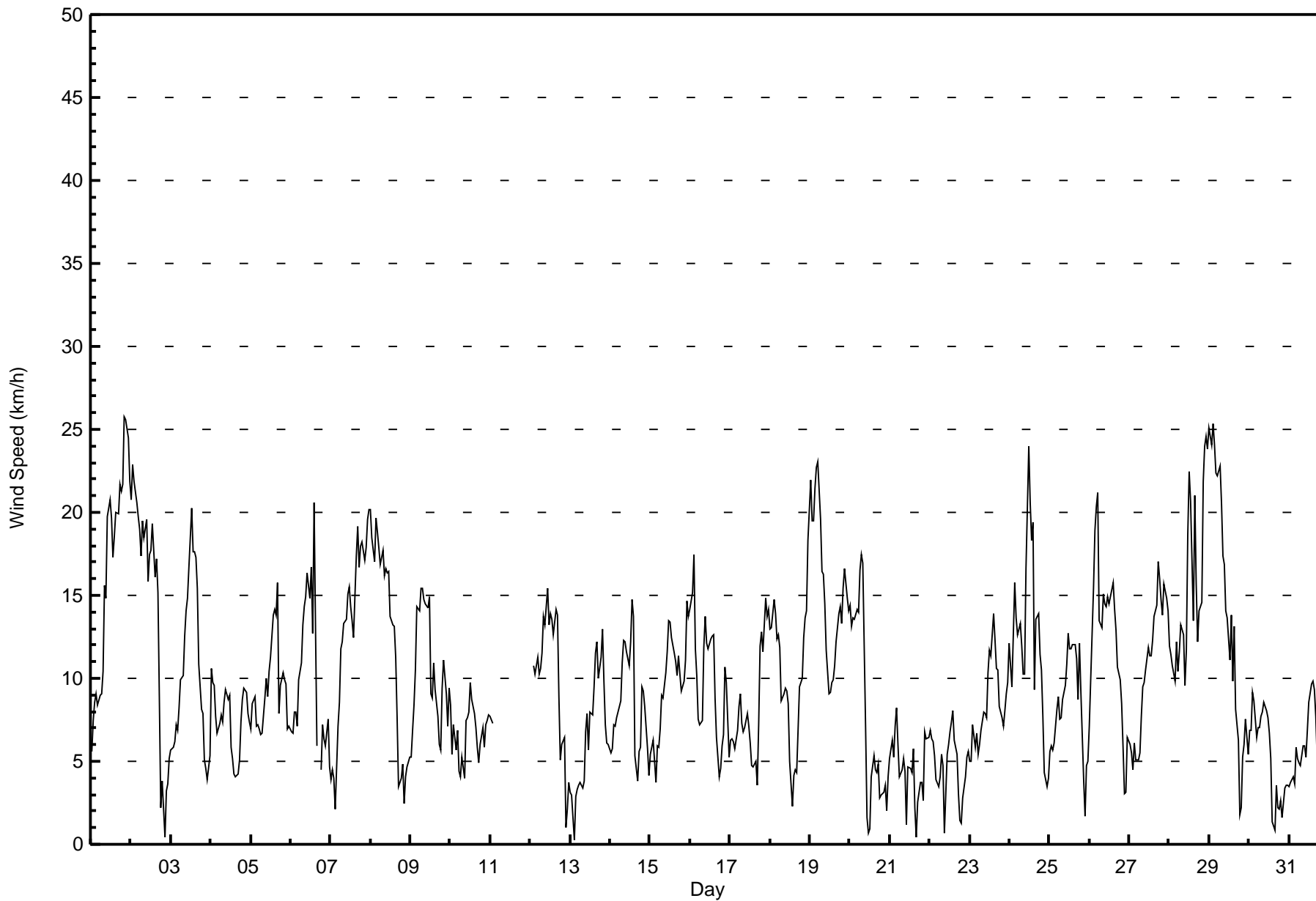
SW1.5 SW1.4 SW2.0 SW1.3 SW1.9 SW1.8 SW1.6 SW1.9 SW2.3 WSW2.5 W3.0 WNW3.3 WNW3.6 WNW4.0 WNW3.8 WNW3.6 WNW2.9 WNW1.7 W1.5 W2.1 W1.6 WSW1.7 WSW1.7 SW1.4	Diurnal Average
NNW25 NNW24 NNW25 NNW24 SE23 SSE23 N23 N20 N18 N20 N20 NW24 NNW22 NNW21 WSW21 NNW21 NNW20 NNW22 NNW21 NNW22 N26 N26 NNW25 NNW24	Diurnal Maximum

AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Wapasu - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h  
Wapasu - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	151	21.00	21.00
6 - 11	306	42.56	63.56
12 - 19	211	29.35	92.91
20 - 28	51	7.09	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 719

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Wind Speed (WS) - km/h  
Wapasu - October 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	4	7	7	9	8	3	15	20	17	9	14	10	7	9	4	8	151
6 - 11	23	16	13	3	2	1	8	44	49	30	38	27	8	5	9	30	306
12 - 19	25	3	0	0	0	0	15	25	15	18	31	13	2	5	10	49	211
20 - 28	17	0	0	0	0	0	5	2	0	1	2	1	0	0	2	21	51
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	69	26	20	12	10	4	43	91	81	58	85	51	17	19	25	108	719

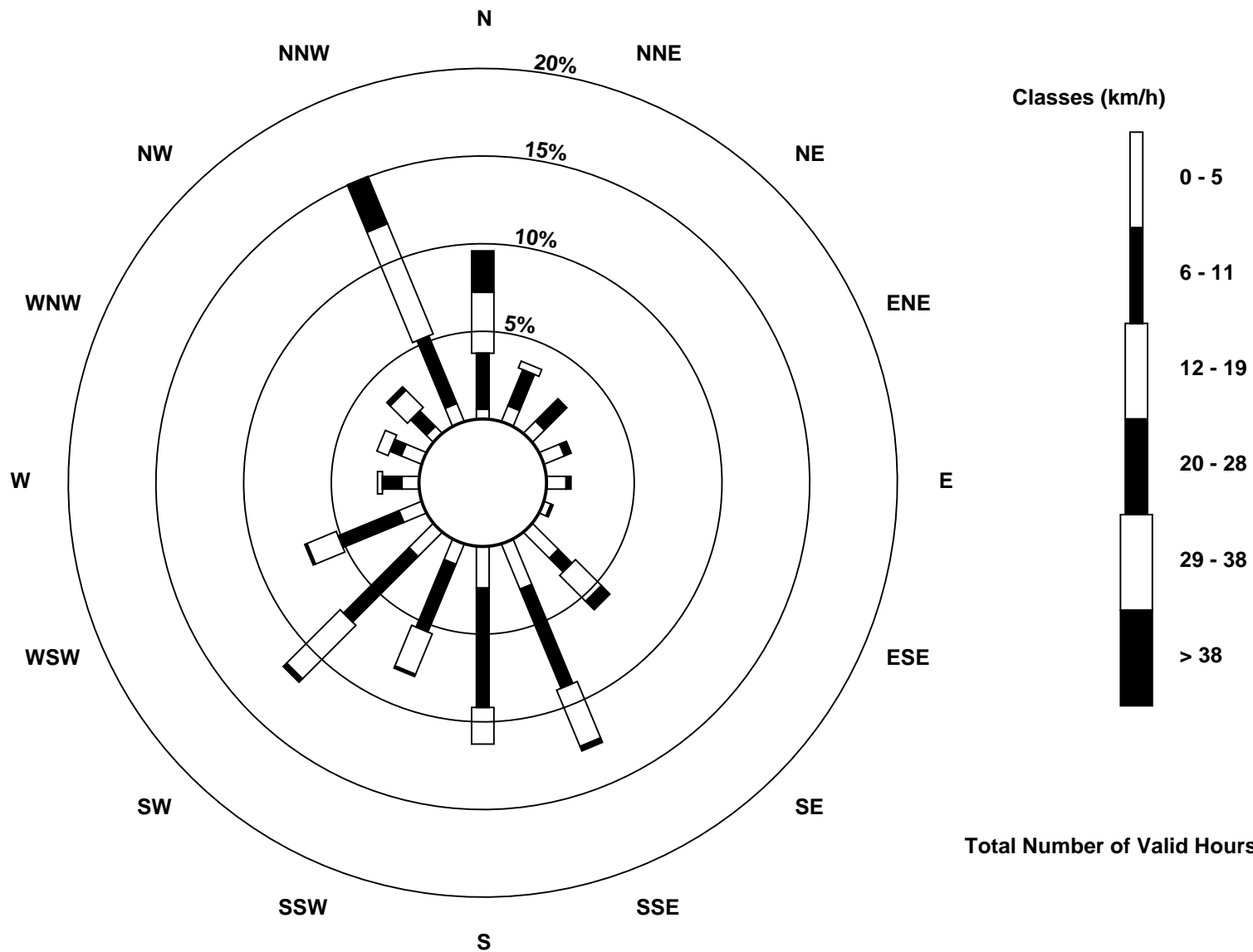
Total Number of Valid Hours: 719

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed (WS) - km/h  
Wapasu (AMS 17)





**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Speed (WS) - km/h**  
**Wapasu - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Oct 24 11:00 Minimum Value: 0 km/h on Oct 13 04:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 5 P <sub>99</sub> = 7																		Hours in Service: 744 Hours of Data: 719 Hours of Missing Data: 25 Hours of Calibration: 0 Percent Operational Time: 96.6							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	1	2	3	3	2	2	2	4	4	4	5	6	5	5	6	5	5	6	6	6	7	7	7	7	7
2-Oct	6	7	6	6	6	5	5	6	6	7	5	6	6	5	5	5	4	4	1	1	2	1	1	1	1
3-Oct	1	1	1	1	2	2	3	3	4	5	5	6	7	6	5	5	3	2	2	2	1	1	2	2	2
4-Oct	3	3	3	3	2	2	2	2	2	2	2	3	3	3	3	2	2	1	2	2	2	3	2	2	3
5-Oct	2	2	3	2	2	2	2	2	3	3	3	3	3	4	5	5	4	2	3	3	2	3	2	2	5
6-Oct	1	2	2	3	2	4	2	3	3	4	4	4	5	4	6	5	3	AF	1	2	2	1	2	1	6
7-Oct	1	1	1	1	2	2	3	4	4	4	4	4	5	4	4	5	5	5	5	6	5	5	5	5	6
8-Oct	6	5	5	5	5	5	4	5	5	5	5	5	4	4	4	3	2	1	2	1	1	1	1	2	6
9-Oct	1	2	2	3	4	4	4	4	5	5	4	4	3	3	3	2	2	2	1	2	3	2	2	3	5
10-Oct	2	1	2	1	1	2	1	1	1	3	2	2	3	2	3	2	2	2	2	2	2	2	3	3	3
11-Oct	3	3	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	3
12-Oct	AF	AF	4	3	3	2	2	3	4	4	4	4	4	4	3	4	4	3	1	2	3	1	1	1	4
13-Oct	1	1	1	0	1	1	1	1	1	2	2	2	3	3	3	5	3	3	4	4	3	1	2	2	5
14-Oct	1	1	2	2	2	2	3	3	4	4	4	4	4	4	4	3	2	2	2	4	4	3	2	1	4
15-Oct	1	1	2	1	1	1	1	2	3	3	4	5	4	4	4	4	3	3	3	3	3	4	4	4	5
16-Oct	3	3	5	5	3	2	2	3	3	4	3	3	3	3	3	3	3	2	1	1	2	3	3	1	5
17-Oct	2	2	1	1	2	2	2	2	2	2	3	2	2	2	1	2	1	2	3	3	4	5	4	5	5
18-Oct	4	4	5	4	4	4	3	3	3	2	2	3	2	1	2	1	1	2	2	3	3	4	4	5	5
19-Oct	6	5	5	6	7	6	6	5	4	4	4	3	3	3	3	3	3	3	3	3	4	4	3	3	7
20-Oct	3	3	3	3	3	3	4	5	5	5	2	2	1	2	2	2	2	1	1	1	1	1	2	1	5
21-Oct	1	2	2	2	2	1	1	1	1	2	1	2	2	2	2	2	1	1	1	2	2	1	1	1	2
22-Oct	1	1	1	1	2	2	1	1	1	1	1	2	2	2	2	2	2	1	2	1	1	1	2	2	2
23-Oct	2	2	3	2	2	2	2	2	2	2	2	3	4	4	3	3	2	2	2	2	2	2	3	3	4
24-Oct	4	3	4	5	4	4	4	3	3	3	10	8	7	6	6	2	4	4	4	4	3	2	1	1	10
25-Oct	2	2	2	2	3	3	2	3	3	3	4	4	4	3	3	4	4	3	3	3	2	1	1	2	4
26-Oct	2	3	4	5	5	5	4	4	5	5	5	5	5	5	4	4	4	3	2	2	1	1	2	1	5
27-Oct	1	1	1	1	1	1	1	2	3	3	4	3	3	4	4	4	4	5	5	5	5	5	5	4	5
28-Oct	4	4	3	3	4	3	3	3	3	3	4	6	6	6	4	6	5	3	5	4	7	8	7	7	8
29-Oct	7	7	7	7	6	6	6	6	6	6	5	5	3	5	4	4	3	2	1	2	1	1	2	2	7
30-Oct	2	2	3	3	2	2	2	2	2	3	3	3	2	2	2	1	1	1	1	1	2	1	1	1	3
31-Oct	1	1	1	1	1	1	1	1	1	2	1	2	3	3	3	3	2	2	2	2	2	2	4	4	4
Diurnal Maximum																									
AF - Analyzer Failure																									



**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Wind Direction (WD) - deg**  
**Wapasu - October 2017**

Direction of Maximum Speed: 353 deg on Oct 1 21:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 344.6 deg on Oct 1	Hours of Data: 719
Direction of Minimum Speed: 19 deg on Oct 13 03:00	Hours of Missing Data: 25
Direction of Minimum Daily Speed Average: 0.5 deg on Oct 17	Percent Operational Time: 96.6
Monthly Average Direction: 268.1 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	330	334	321	316	326	320	316	332	341	349	350	349	346	345	345	346	347	346	346	347	353	355	355	354	344.6
2-Oct	353	352	351	352	349	349	353	352	356	356	2	1	359	352	354	343	350	346	334	351	151	139	139	158	353.7
3-Oct	155	157	170	168	181	183	183	186	194	204	211	203	210	208	215	223	220	228	240	244	225	216	239	325	206.7
4-Oct	343	347	352	356	342	343	342	336	336	344	341	329	262	270	260	216	183	167	155	160	167	168	169	159	317.2
5-Oct	166	172	174	180	172	179	180	182	205	210	208	207	211	215	211	216	228	210	220	241	233	241	217	204	207.0
6-Oct	157	178	180	191	178	215	227	226	228	230	232	241	242	252	251	277	304	AF	146	244	236	220	221	176	228.1
7-Oct	180	175	182	192	334	2	355	354	348	345	339	345	345	338	340	348	345	337	339	338	340	338	340	338	341.8
8-Oct	336	335	333	338	337	338	338	340	338	340	342	341	348	347	350	337	335	329	272	276	286	248	225	214	334.4
9-Oct	204	179	171	166	161	160	162	159	169	166	162	161	189	218	239	238	237	206	211	242	249	234	231	250	190.8
10-Oct	244	231	247	242	222	202	219	232	278	2	1	342	340	358	359	359	12	19	20	12	12	23	35	36	340.3
11-Oct	37	40	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
12-Oct	AF	AF	353	348	345	340	343	343	341	343	344	351	348	354	348	337	337	331	326	2	50	87	297	305	345.1
13-Oct	293	303	19	152	167	182	180	182	161	225	248	277	248	262	254	233	231	207	224	235	230	231	218	213	229.4
14-Oct	176	164	161	168	170	176	170	162	164	169	180	193	208	225	236	228	221	260	284	298	302	306	312	257	206.1
15-Oct	247	231	228	171	158	161	156	162	178	181	173	170	166	173	187	197	198	204	201	198	206	213	226	228	192.4
16-Oct	229	238	256	279	251	244	213	214	233	227	236	229	237	235	239	240	241	139	151	159	174	224	225	181	230.6
17-Oct	176	164	151	136	141	138	148	156	175	174	178	158	127	70	74	82	19	344	340	332	311	312	306	301	201.1
18-Oct	303	298	304	305	306	304	319	305	303	315	340	10	340	5	66	89	103	131	133	132	129	125	127	132	331.9
19-Oct	131	133	124	124	141	147	152	157	155	160	167	182	170	169	165	155	149	149	148	147	150	151	146	146	147.7
20-Oct	145	144	145	137	140	136	134	129	131	171	289	25	239	298	94	160	227	257	200	143	125	143	92	44	141.3
21-Oct	53	39	16	356	337	334	11	343	339	5	90	272	202	193	228	178	65	79	131	148	170	152	154	157	33.9
22-Oct	155	157	151	146	162	141	98	115	124	284	312	360	4	15	5	15	52	31	287	220	189	201	175	174	104.9
23-Oct	174	168	224	227	241	266	260	255	254	262	264	259	255	257	233	228	228	230	221	198	189	178	170	175	228.4
24-Oct	199	180	169	167	187	208	238	243	230	250	294	317	304	321	338	339	341	351	355	6	29	42	68	46	291.7
25-Oct	17	18	39	45	47	47	37	26	24	22	17	12	14	4	359	1	2	353	341	338	338	254	237	216	10.2
26-Oct	212	215	225	230	229	229	211	202	202	201	202	203	205	212	228	228	226	221	228	225	226	190	151	152	215.4
27-Oct	152	152	155	149	152	151	151	162	166	171	177	171	172	169	161	159	166	159	164	170	180	178	190	194	168.3
28-Oct	191	204	207	196	222	226	237	237	245	257	289	324	328	330	345	332	352	348	347	332	343	340	337	334	310.2
29-Oct	335	336	336	346	349	351	349	352	357	3	11	3	3	353	356	348	0	1	318	255	227	224	226	202	346.0
30-Oct	200	191	212	209	184	169	171	174	173	168	183	183	191	212	247	291	347	36	34	71	77	76	96	146	179.8
31-Oct	144	142	139	143	147	154	161	152	147	140	118	105	90	89	70	60	64	36	36	40	23	26	4	3	77.7

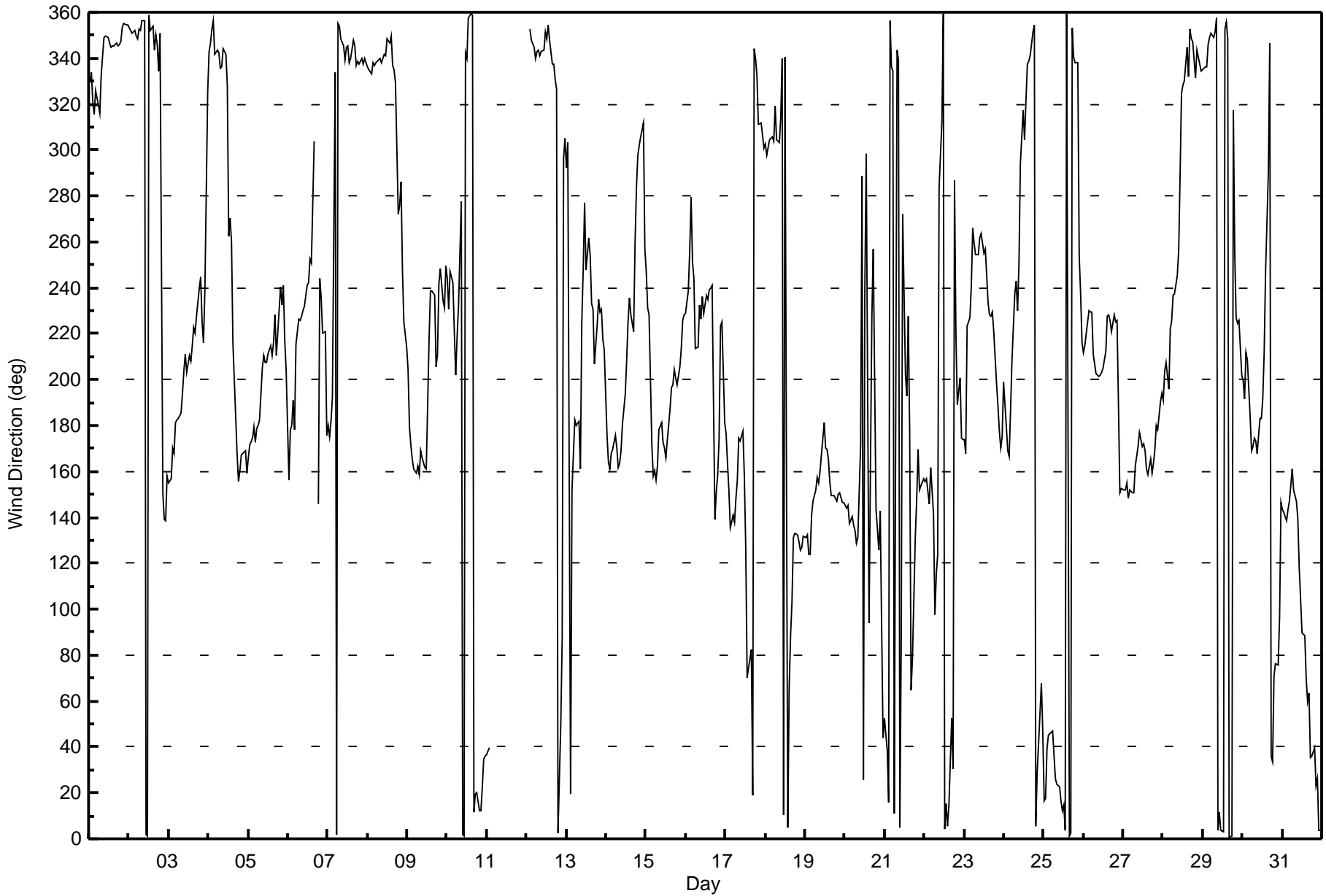
217.8 216.3 234.4 221.6 221.1 223.0 222.4 221.6 231.5 251.8 277.6 295.3 281.6 290.0 286.8 294.8 301.0 294.7 278.7 279.2 266.2 243.3 244.7 232.6  
 Diurnal Average

AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Wapasu - October 2017**







**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Direction (WD) - deg**  
**Wapasu - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 101 deg on Oct 20 12:00 Minimum Value: 7 deg on Oct 21 22:00 Percentiles: P <sub>1</sub> = 8 P <sub>10</sub> = 16 Q <sub>1</sub> = 19 Median = 23 Q <sub>3</sub> = 27 P <sub>90</sub> = 32 P <sub>99</sub> = 83		Hours in Service: 744 Hours of Data: 719 Hours of Missing Data: 25 Hours of Calibration: 0 Percent Operational Time: 96.6																							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	16	18	21	23	21	22	23	20	18	21	20	21	19	19	19	19	18	18	18	20	21	22	21	24	24
2-Oct	22	22	21	20	21	19	21	22	23	23	26	26	28	23	23	20	22	16	46	19	85	22	18	12	85
3-Oct	8	11	13	16	21	27	27	29	27	27	25	28	25	26	22	19	21	19	18	18	32	17	28	33	33
4-Oct	16	22	23	23	18	15	18	18	17	20	28	28	53	66	64	50	23	27	18	21	23	24	22	24	66
5-Oct	21	23	26	25	21	19	20	23	25	23	26	26	25	24	26	23	18	21	22	16	16	19	18	30	30
6-Oct	13	20	24	26	20	27	15	17	16	17	17	20	20	26	22	33	30	AF	12	24	20	14	16	31	33
7-Oct	33	19	22	59	28	26	20	23	20	19	17	20	18	21	22	18	20	18	17	17	19	18	17	18	59
8-Oct	18	18	19	17	18	18	19	19	18	18	19	19	23	20	22	21	18	33	28	28	51	23	27	25	51
9-Oct	28	24	22	23	21	20	23	19	25	25	22	23	35	31	18	21	23	21	21	19	20	18	22	20	35
10-Oct	17	16	19	24	16	24	18	23	33	30	25	18	21	23	25	24	28	36	32	28	28	29	30	28	36
11-Oct	27	28	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	28
12-Oct	AF	AF	18	18	16	15	15	16	18	18	18	25	21	25	23	20	18	18	21	38	24	68	40	30	68
13-Oct	38	30	85	11	16	17	19	20	20	19	30	47	28	35	32	24	17	26	20	17	17	15	21	24	85
14-Oct	19	17	20	24	22	24	24	22	23	27	28	31	29	21	21	32	52	26	32	31	28	26	30	33	52
15-Oct	21	15	17	32	12	14	16	19	29	28	27	26	25	28	30	28	28	25	27	27	26	24	20	18	32
16-Oct	17	17	24	30	22	23	22	25	17	18	21	20	19	19	20	20	27	17	14	13	26	20	18	19	30
17-Oct	21	20	16	13	17	16	17	22	27	24	28	23	25	29	29	25	37	17	17	19	26	24	25	27	37
18-Oct	27	28	26	26	25	28	22	26	27	23	20	28	46	81	47	27	18	16	17	19	19	19	20	19	81
19-Oct	19	19	20	20	21	19	19	22	19	23	24	31	28	26	23	18	16	16	17	16	17	18	17	16	31
20-Oct	18	16	16	17	18	17	18	18	19	49	82	101	101	59	51	45	40	24	39	11	20	12	41	20	101
21-Oct	21	25	34	25	16	20	31	25	26	37	84	38	43	45	36	60	53	21	23	41	53	7	9	9	84
22-Oct	8	11	10	7	43	39	14	8	14	87	29	24	25	30	25	33	25	35	72	66	43	30	30	28	87
23-Oct	29	22	22	20	27	29	24	23	22	25	26	26	24	30	17	17	14	14	23	24	25	22	25	28	30
24-Oct	28	28	26	26	29	28	21	18	18	25	33	24	27	29	20	16	18	21	23	29	30	30	26	27	33
25-Oct	32	31	28	26	24	23	29	30	31	31	29	29	29	26	24	25	25	24	16	17	41	79	17	23	79
26-Oct	24	22	18	15	16	15	25	27	28	29	28	27	28	25	16	16	18	22	15	15	17	25	57	7	57
27-Oct	8	8	11	9	11	13	13	20	24	26	29	23	24	24	22	20	23	19	23	26	29	28	29	29	29
28-Oct	29	31	27	27	18	21	17	16	21	29	29	21	21	21	20	21	24	19	19	21	19	20	19	18	31
29-Oct	19	20	19	20	20	20	20	20	23	26	29	27	28	22	25	20	26	24	64	50	17	14	15	28	64
30-Oct	27	25	24	24	26	19	23	23	26	25	28	29	27	30	86	82	30	43	21	30	37	14	15	19	86
31-Oct	20	14	10	14	15	16	18	15	17	17	23	24	23	25	25	22	22	29	24	27	32	30	25	26	32
38 31 85 59 43 39 31 30 33 87 84 101 101 81 86 82 53 43 72 66 85 79 57 33																									
Diurnal Maximum																									
AF - Analyzer Failure																									



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Wapasu	Station number:	AMS 17
Calibration Date:	October 27, 2017	Last Cal Date:	September 27, 2017
Start time (MST):	6:52	End time (MST):	10:49
Reason:	Routine		

### Calibration Standards

Cal Gas Concentration	<u>49.6</u>	ppm	Cal Gas Exp Date	2/22/2020
Cal Gas Cylinder #	<u>EY0000753</u>			
Calibrator Make/Model	API T700		Serial Number	997
ZAG Make/Model	API T701		Serial Number	4427

### Analyzer Information

Analyzer make: Thermo 43i

Analyzer serial #: 1218153459

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Analyzer Range	0 - 1000 ppb		PMT voltage	-653.8	-653.8
Calculated slope	0.994924	0.995040	Lamp voltage	980	980
Calculated intercept	-1.101458	0.153091	Pressure	694.3	694.3
Analyzer Background	9.5	9.5	Flow	0.455	0.455
Analyzer Coefficient	1.086	1.086	Intensity	90	90

### SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5097	0.0	0.0	0.2	----
as found span	5025	78.4	762.0	762.3	1.000
calibrator zero	5097	0.0	0.0	0.6	----
high point	5025	78.4	762.0	766.4	0.994
second point	5063	39.2	381.1	381.2	1.000
third point	5083	19.6	190.5	191.4	0.995
as left zero	5097	0.0	0.0	0.4	----
as left span	5025	78.4	762.0	767.9	0.992
Average Correction Factor					0.996
Corrected As found	762.10	Previous response	766.96	*% change	0.6%

\* = > +/-5% change initiates investigation

Notes:

no maintenance or adjustments done

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

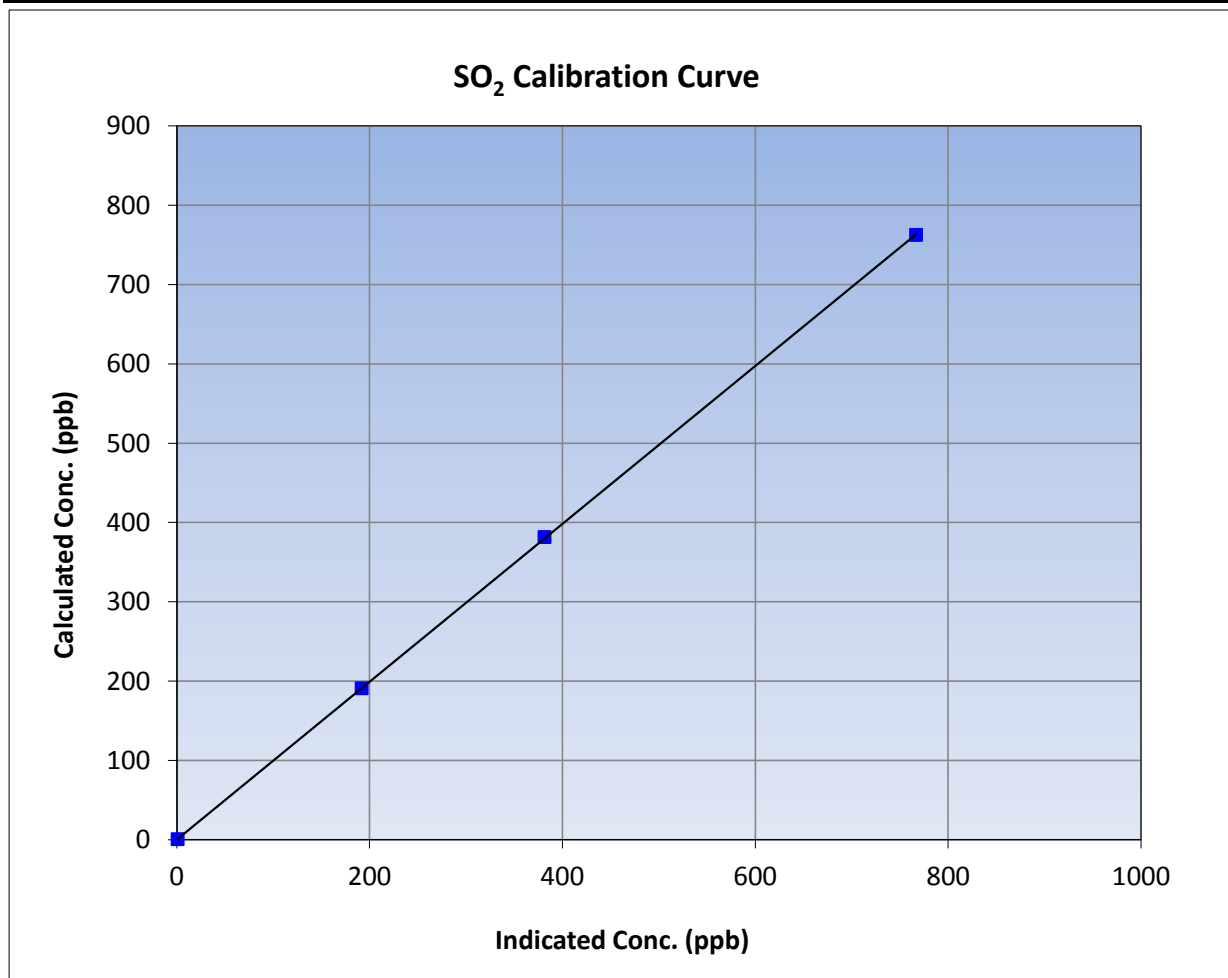
Version-03-2017

### Station Information

Calibration Date	October 27, 2017	Previous Calibration	September 27, 2017
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	7:00	End Time (MST)	10:49
Analyzer make	Routine	Analyzer serial #	1218153459

### Calibration Data

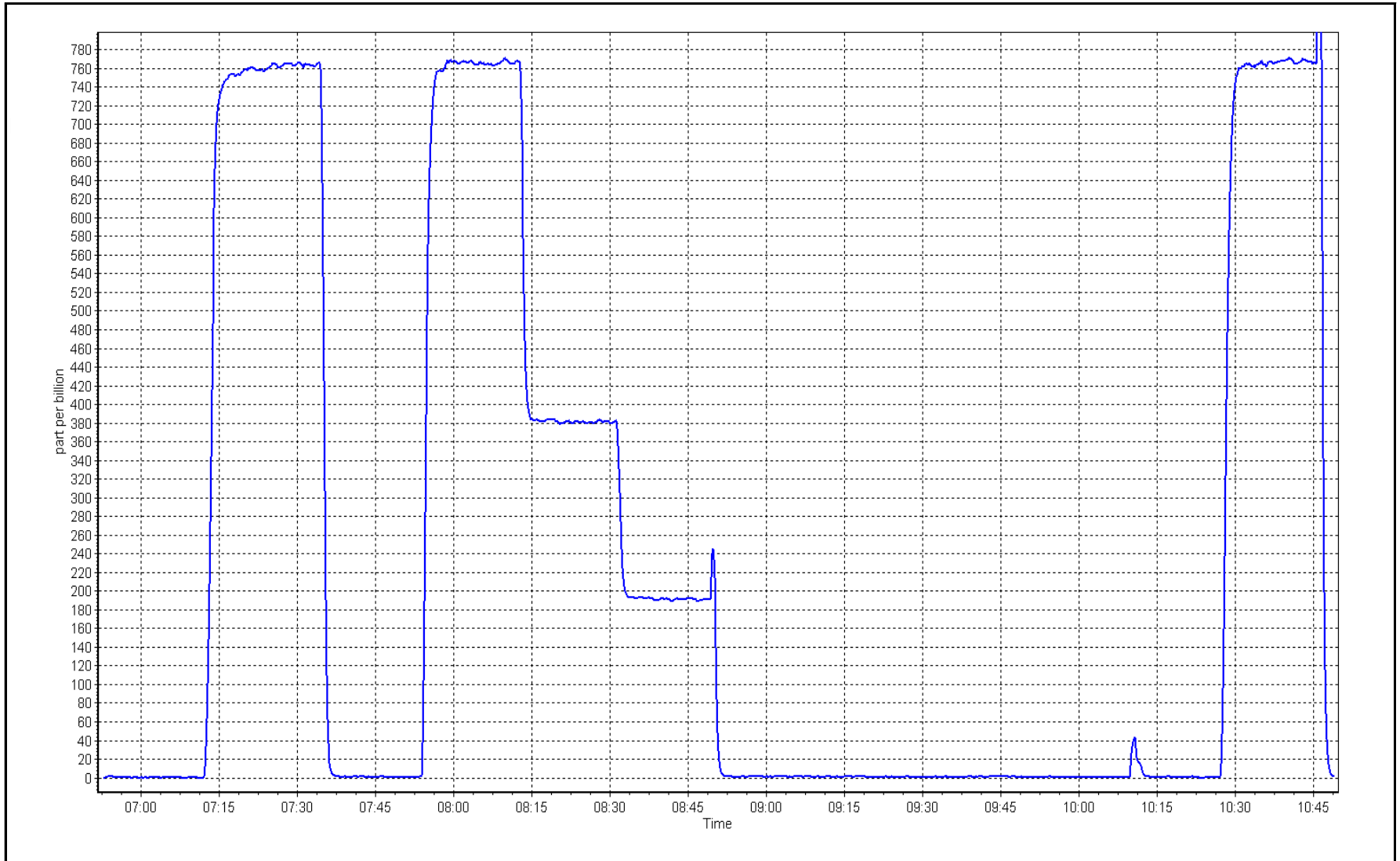
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits
0.0	0.6	----	Correlation Coefficient	≥0.995
762.0	766.4	0.9942		
381.1	381.2	0.9997	Slope	0.90 - 1.10
190.5	191.4	0.9954		
			Intercept	+/-30



SO2 Calibration Plot

Date: October 27, 2017

Location: Wapasu





# Wood Buffalo Environmental Association

## H<sub>2</sub>S Calibration Report

Version-06-2017

### Station Information

Station Name:	Wapasu	Station number:	AMS 17
Calibration Date:	October 30, 2017	Last Cal Date:	September 29, 2017
Start time (MST):	10:00	End time (MST):	12:56
Reason:	Routine		

### Calibration Standards

Cal Gas Concentration	<u>5.10</u>	ppm	Cal Gas Exp Date	September 9, 2017
Cal Gas Cylinder #	<u>CC107167</u>			
Calibrator Make/Model	API T700		Serial Number	997
ZAG Make/Model	API T701		Serial Number	4427

### Analyzer Information

Analyzer make:	Thermo 450i	Analyzer serial #:	1218153583		
	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>	
Analyzer Range	0 - 100 ppb	PMT voltage	-627.2	-627.2	
Calculated slope	0.991959	0.995381	Lamp voltage	821	821
Calculated intercept	0.280837	0.129031	Pressure	558.2	558.2
Analyzer Background	11.0	11.0	Flow	0.992	0.992
Analyzer Coefficient	0.988	0.988	Intensity	92	92

### H<sub>2</sub>S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5095	0.0	0.0	-0.1	----
as found span	5025	78.4	78.3	79.0	0.992
calibrator zero	5095	0.0	0.0	-0.3	----
high point	5025	78.4	78.3	78.4	0.999
second point	5063	39.2	39.2	39.6	0.989
third point	5093	19.7	19.7	19.6	1.003
as left zero	5095	0.0	0.0	-0.1	----
as left span	5025	78.4	78.3	79.6	0.984
SO2 Scrubber Check	5011	79.4	783.0	5.7	----
Average Correction Factor					0.997
Corrected As found	79.10	Previous response	78.70	*% change	-0.5%

\* = > +/-5% change initiates investigation

#### Notes:

No Maintenance or adjustments done; Scrubber done after as founds

Calibration Performed By: Melissa Lemay



# Wood Buffalo Environmental Association

## H<sub>2</sub>S Calibration Summary

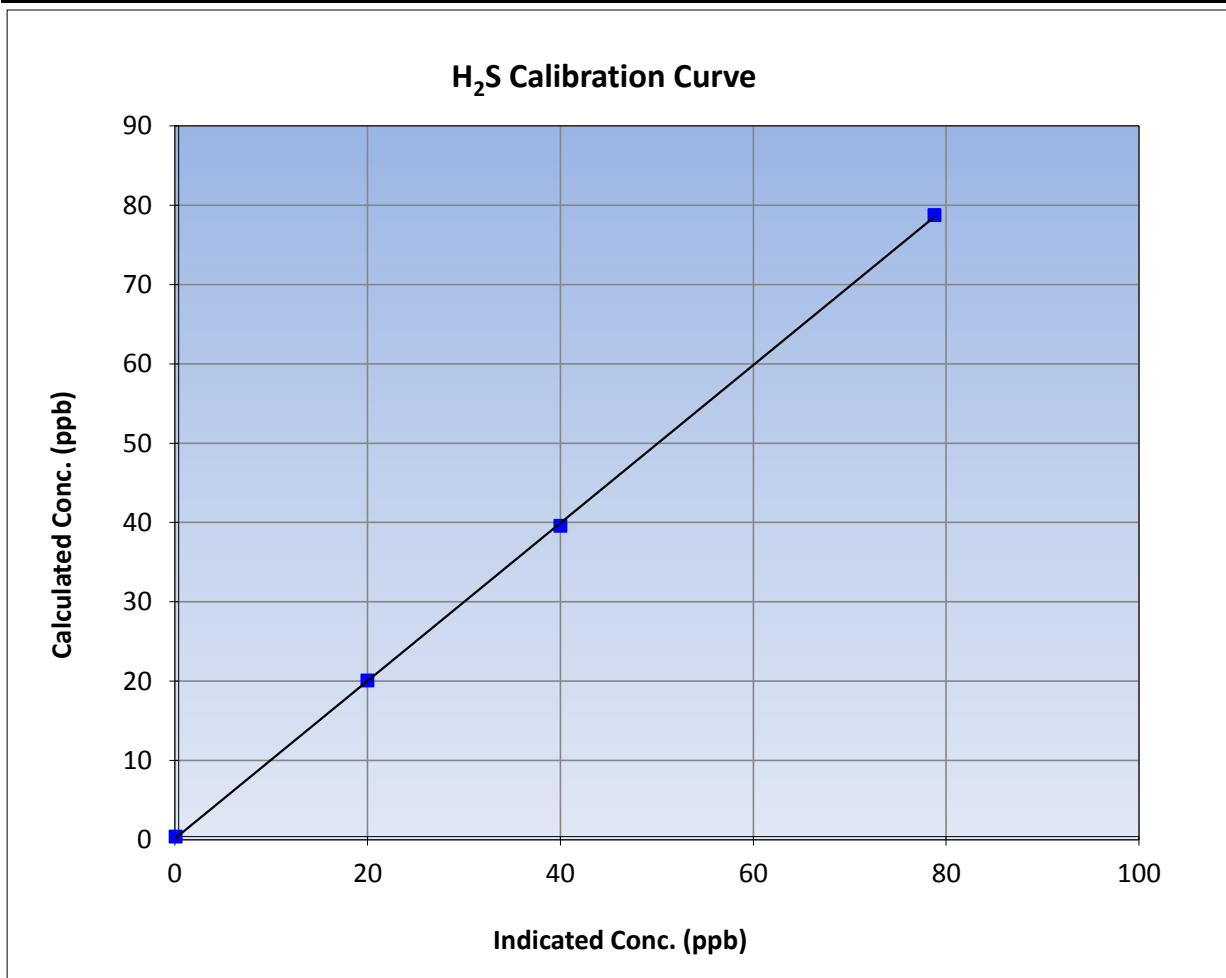
Version-03-2017

### Station Information

Calibration Date	October 30, 2017	Previous Calibration	September 29, 2017
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	10:00	End Time (MST)	12:56
Analyzer make	Thermo 450i	Analyzer serial #	1218153583

### Calibration Data

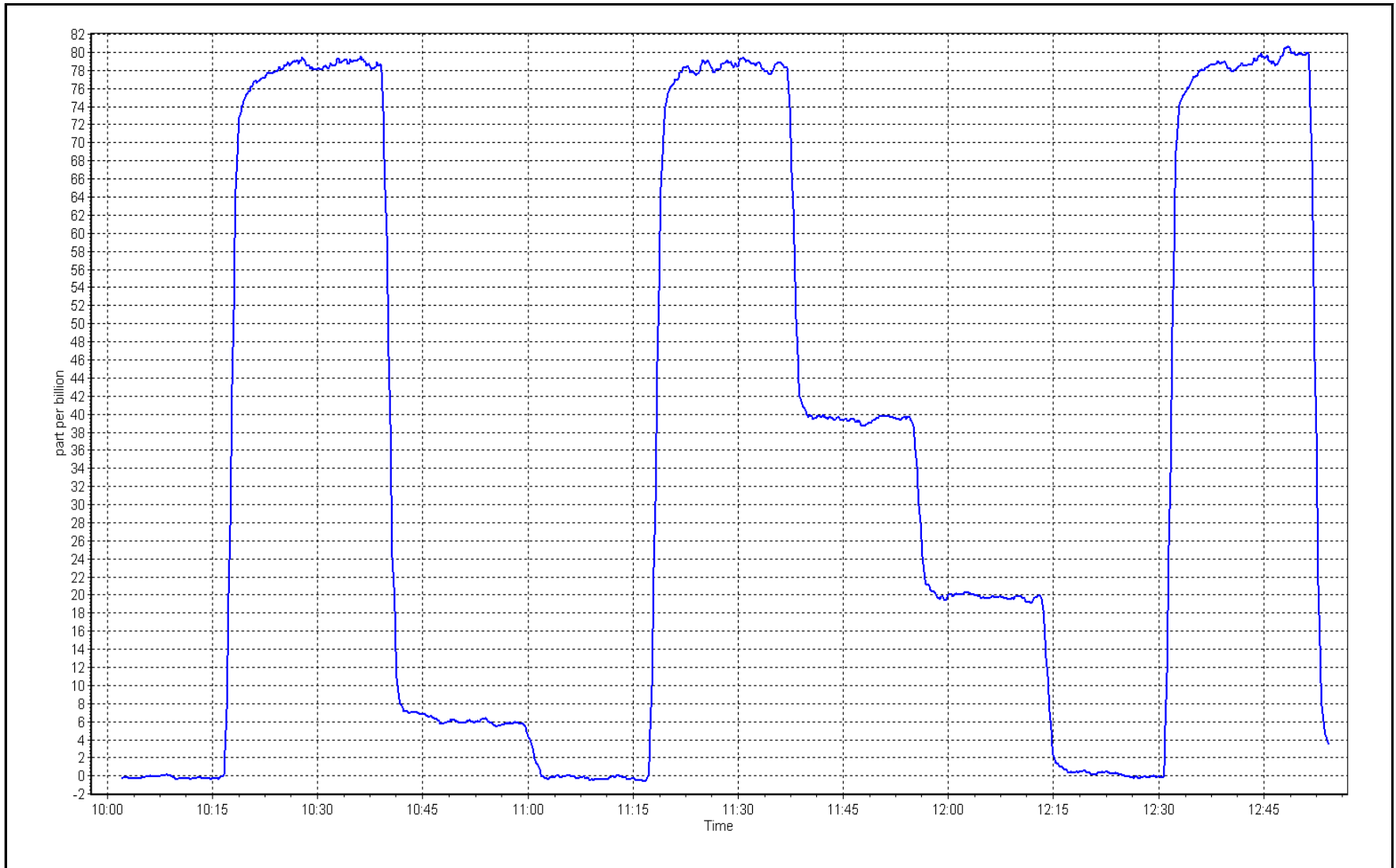
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	-0.3	----	Correlation Coefficient	0.999942	≥0.995
78.3	78.4	0.9993			
39.2	39.6	0.9895	Slope	0.995381	0.90 - 1.10
19.7	19.6	1.0026			
			Intercept	0.129031	+/-3



# H<sub>2</sub>S Calibration Plot

Date: October 30, 2017

Location: Wapasu





# Wood Buffalo Environmental Association

## THC Calibration Report

Version-03-2017

### Station Information

Station Name:	Wapasu	Station number:	AMS 17
Calibration Date:	October 27, 2017	Last Cal Date:	September 27, 2017
Start time (MST):	6:52	End time (MST):	10:47
Reason:	Routine		

### Calibration Standards

Gas Cert Reference	EY0000753	Cal Gas Expiry Date	2/22/2020
CH4 Cal Gas Conc.	<u>505.0</u> ppm	CH4 Equiv Conc.	1055.0 ppm
C3H8 Cal Gas Conc.	<u>200.0</u> ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	997
ZAG Make/Model	API T701	Serial Number	4427

### Analyzer Information

Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1218153352
	<u>Start</u>	<u>Finish</u>	<u>Start</u>
Analyzer Range	0 - 25 ppm	Bias voltage supply	-296.5
Calculated slope	1.006393	Sample pressure	8.5
Calculated intercept	-0.067425	Fuel pressure	24.8
Analyzer Background	4.323	Air pressure	40.5
Analyzer Coefficient	2.970	Flame temperature	159.6

### THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5097	0.0	0.00	-0.12	----
as found span	5025	78.4	16.21	15.96	1.015
calibrator zero	5097	0.0	0.00	0.03	----
high point	5025	78.4	16.21	16.25	0.997
second point	5063	39.2	8.11	8.18	0.991
third point	5083	19.6	4.05	4.18	0.969
as left zero	5097	0.0	0.00	0.08	----
as left span	5025	78.4	16.21	16.28	0.996
Average Correction Factor					0.986
Corrected As found	16.08	Previous response	16.17	*% change	0.6%

\* = > +/-5% change initiates investigation

Notes: hydrogen changed out, zero and span adjusted

Calibration Performed By: Melissa Lemay





# Wood Buffalo Environmental Association

## THC Calibration Summary

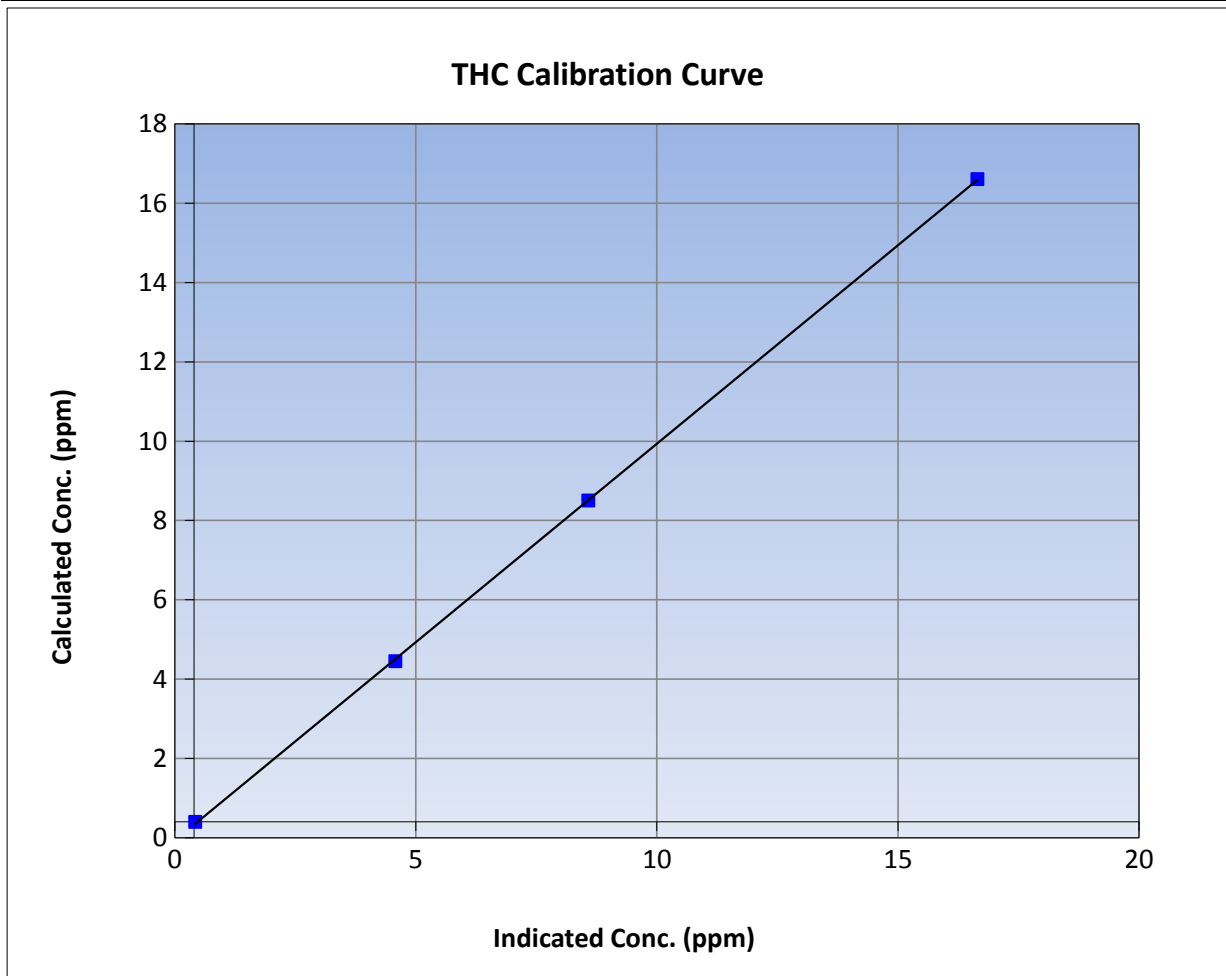
Version-03-2017

### Station Information

Calibration Date	October 27, 2017	Previous Calibration	September 27, 2017
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	6:52	End Time (MST)	10:47
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153352

### Calibration Data

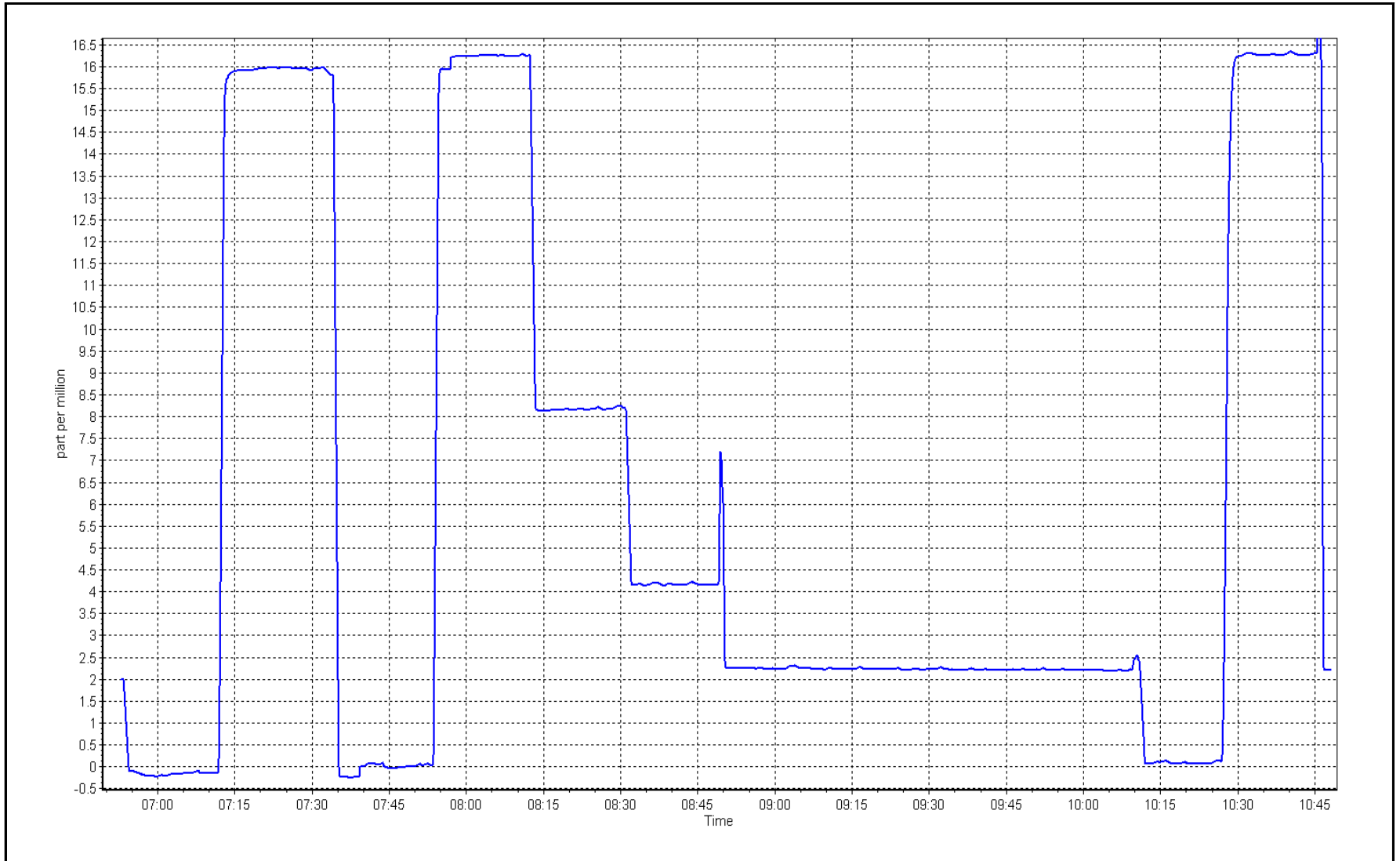
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (lc)	Correction factor (Cc/lc)	Statistical Evaluation	Limits	
0.0	0.0	----	Correlation Coefficient	0.999961	≥0.995
16.2	16.3	0.9974			
8.1	8.2	0.9909	Slope	1.000902	0.90 - 1.10
4.1	4.2	0.9695			
			Intercept	-0.075157	+/-1.5



THC Calibration Plot

Date: October 27, 2017

Location: Wapasu







# Wood Buffalo Environmental Association

## O<sub>3</sub> Calibration Summary

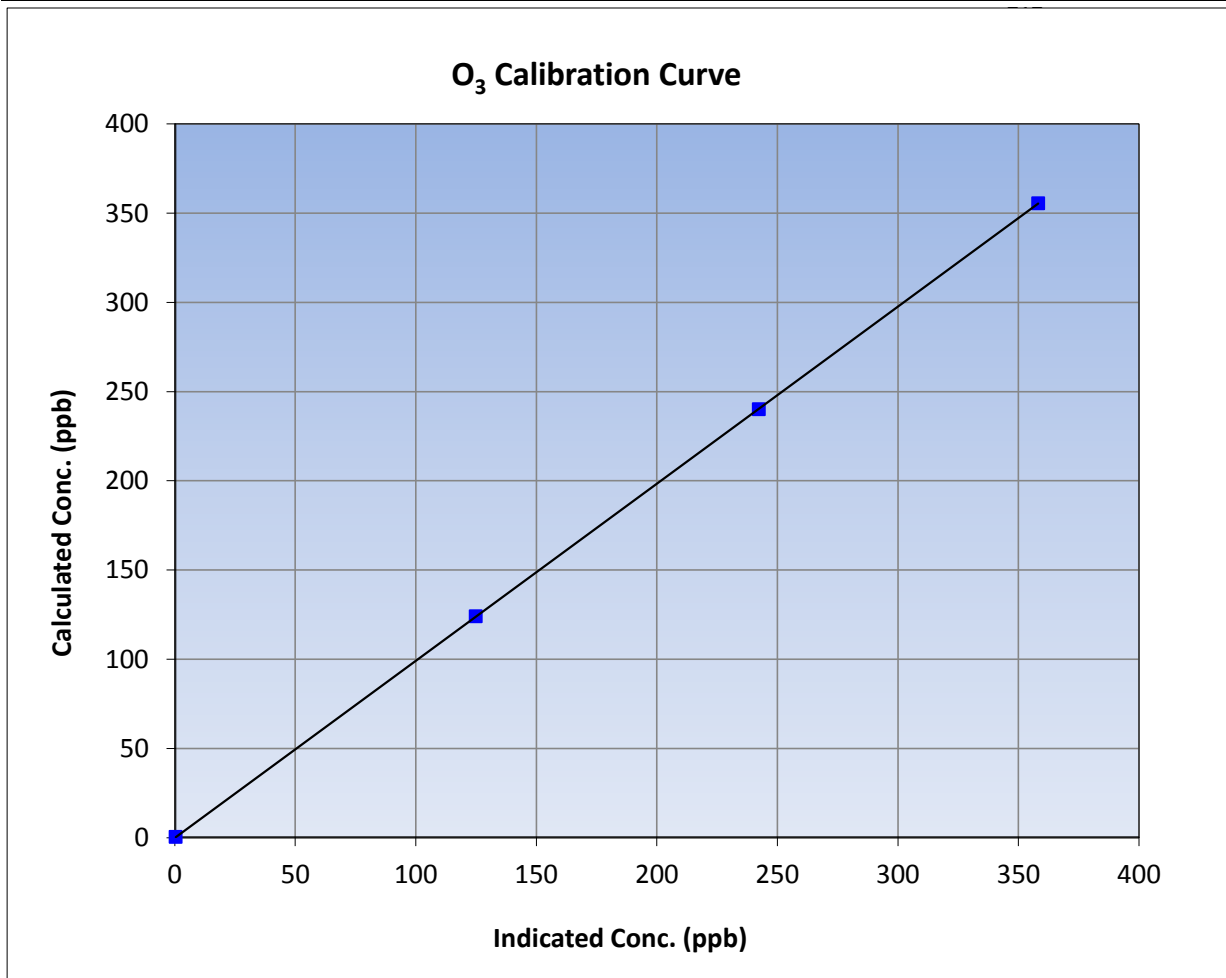
Version-03-2017

### Station Information

Calibration Date	October 27, 2017	Previous Calibration	September 29, 2017
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	8:30	End Time (MST)	13:15
Analyzer make	Teledyne T400	Analyzer serial #	824

### Calibration Data

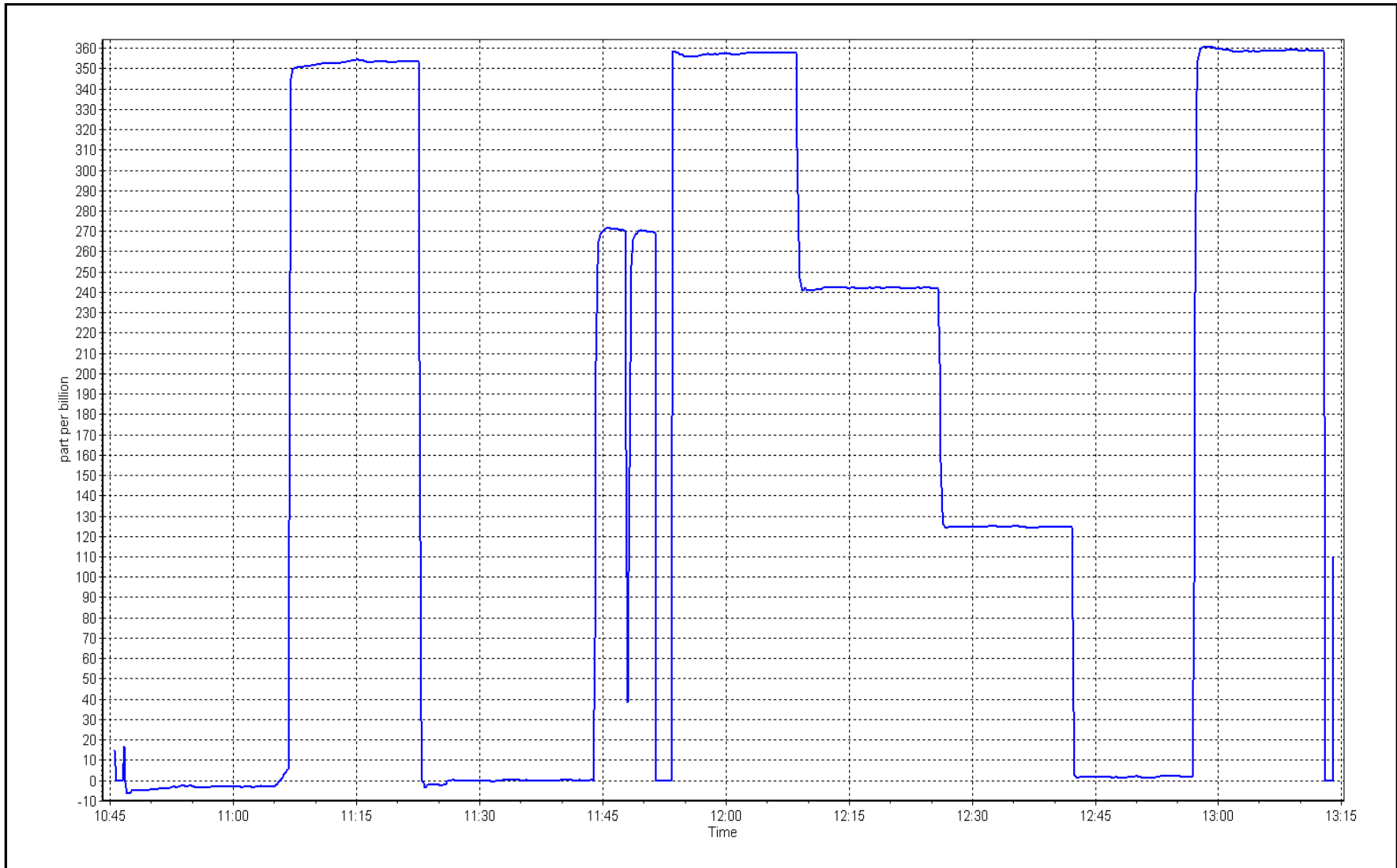
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	0.0	----	Correlation Coefficient	0.999998	<b>≥0.995</b>
355.1	357.8	0.9925	Slope	0.992015	<b>0.90 - 1.10</b>
239.7	242.0	0.9905	Intercept	-0.029188	<b>+/- 10</b>
123.6	124.5	0.9928			



O<sub>3</sub> Calibration Plot

Date: October 27, 2017

Location: Wapasu





# Wood Buffalo Environmental Association

## NO<sub>x</sub> - NO - NO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Wapasu	Station number:	AMS 17
Calibration Date:	October 27, 2017	Last Cal Date:	September 27, 2017
Start time (MST):	6:52	End time (MST):	10:47
Reason:	Routine		

### Calibration Standards

NO Gas Cylinder #	EY0000753	Cal Gas Expiry Date	2/22/2020
NOX Cal Gas Conc.	<u>51.0</u> ppb	NO Cal Gas Conc.	<u>51.0</u> ppb
Calibrator Model	API T700	Serial Number	997
ZAG make/model	API T701	Serial Number	4427

### Analyzer Information

Analyzer make: API T200		Analyzer serial #: 722	
	<u>Start</u>	<u>Finish</u>	
NO coefficient	0.924	0.924	NOX Range (ppb) 0 - 1000 ppb
NOX coefficient	0.926	0.926	PMT Temperature 7.0 7.0
NO2 coefficient	1.000	1.000	Reaction cell Press 3.2 3.2
NO bkgrnd	0.8	0.8	Sample Flow 445 445
NOX bkgrnd	1.6	1.6	HVPS Voltage 780 780

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope	1.001204	0.998815
NO <sub>x</sub> Cal Offset	2.017393	1.831770
NO Cal Slope	1.005663	0.999913
NO Cal Offset	1.580905	1.756988
NO <sub>2</sub> Cal Slope	1.019105	1.013235
NO <sub>2</sub> Cal Offset	0.433367	-0.021199



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

Version-03-2017

### Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5097	0.0	0.0	0.0	0.0	-0.5	-0.4	-0.1	----	----
as found span	5025	78.4	783.5	783.5	0.0	786.4	781.4	4.9	0.9963	1.0027
calibrator zero	5097	0.0	0.0	0.0	0.0	-0.7	-0.3	-0.4	----	----
high point	5025	78.4	783.5	783.5	0.0	783.1	782.8	0.4	1.0005	1.0009
second point	5063	39.2	391.8	391.8	0.0	390.0	388.5	1.5	1.0047	1.0086
third point	5083	19.6	195.9	195.9	0.0	193.1	193.3	-0.2	1.0145	1.0135
as left zero	5097	0.0	0.0	0.0	0.0	-0.5	-0.3	-0.2	----	----
as left span	5025	78.4	783.5	427.2	356.3	775.6	424.9	350.8	1.0102	1.0054
<b>Average Correction Factor</b>									<b>1.0066</b>	<b>1.0076</b>

Corrected As found	NO <sub>x</sub> = 786.9 ppb	NO = 781.8 ppb		*Percent Change	NO <sub>x</sub> = -0.8%
Previous Response	NO <sub>x</sub> = 780.5 ppb	NO = 777.5 ppb		*Percent Change	NO = -0.6%
<i>* = &gt; +/-5% change initiates investigation</i>					

### GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
1st NO ref point		0.0	782.8	782.3	0.5	1.0009	1.0015	----	----
1st NO2 (400 ppb O3)	427.2	355.1	777.4	427.2	350.2	1.0078	----	1.0140	98.6%
2nd NO2 (200 ppb O3)	542.6	239.7	779.3	542.6	236.7	1.0054	----	1.0127	98.7%
3rd NO2 (100 ppb O3)	658.7	123.6	781.3	658.7	122.6	1.0028	----	1.0082	99.2%
2nd NO ref point	----	0.0	780.4	780.0	0.4	1.0039	1.0045	----	----
<b>Average Correction Factor</b>						<b>1.0050</b>	<b>1.0030</b>	<b>1.0116</b>	<b>98.9%</b>

Notes: no maintenance or adjustments done,

Calibration Performed By: Melissa Lemay



# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

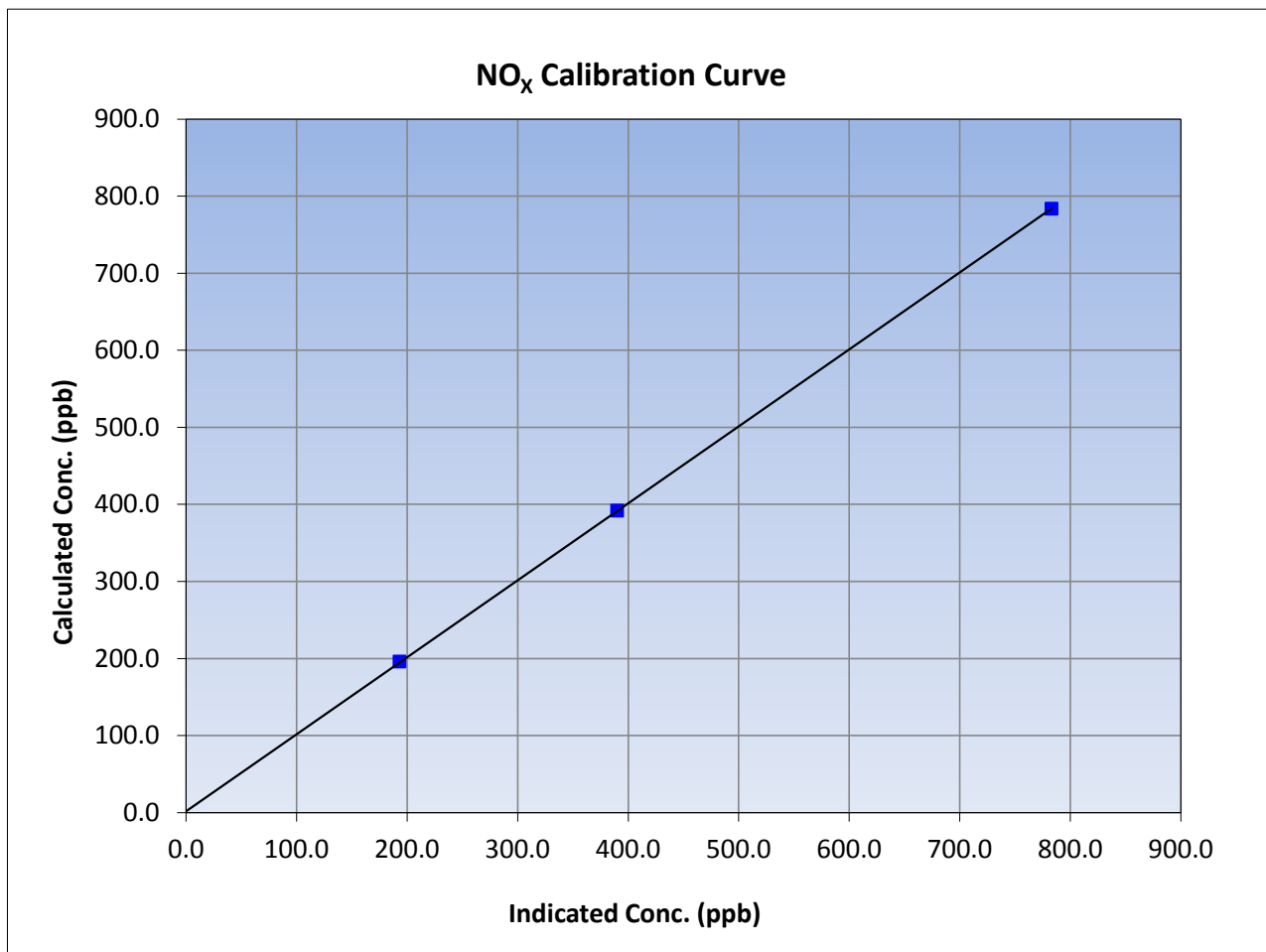
Version-03-2017

### Station Information

Calibration Date	October 27, 2017	Previous Calibration	September 27, 2017
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	6:52	End Time (MST)	10:47
Analyzer make	API T200	Analyzer serial #	722

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	-0.7	----	Correlation Coefficient	≥0.995	
783.5	783.1	1.0005			
391.8	390.0	1.0047			
195.9	193.1	1.0145			
			Slope	0.998815	0.90 - 1.10
			Intercept	1.831770	+/-20







# Wood Buffalo Environmental Association

## NO Calibration Summary

Version-03-2017

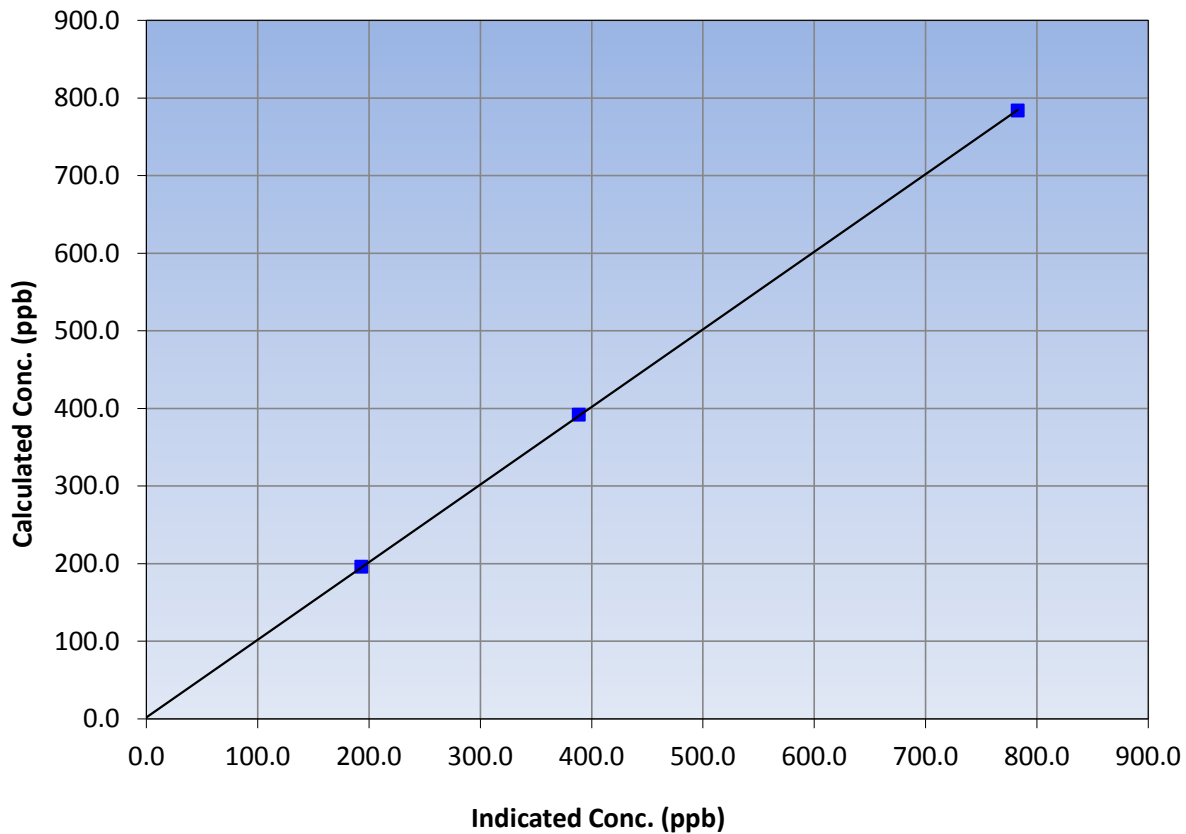
### Station Information

Calibration Date	October 27, 2017	Previous Calibration	September 27, 2017
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	6:52	End Time (MST)	10:47
Analyzer make	API T200	Analyzer serial #	722

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	-0.3	----	Correlation Coefficient	≥0.995	
783.5	782.8	1.0009			
391.8	388.5	1.0086			
195.9	193.3	1.0135			
			Slope	0.999913	0.90 - 1.10
			Intercept	1.756988	+/-20

**NO Calibration Curve**





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

Version-03-2017

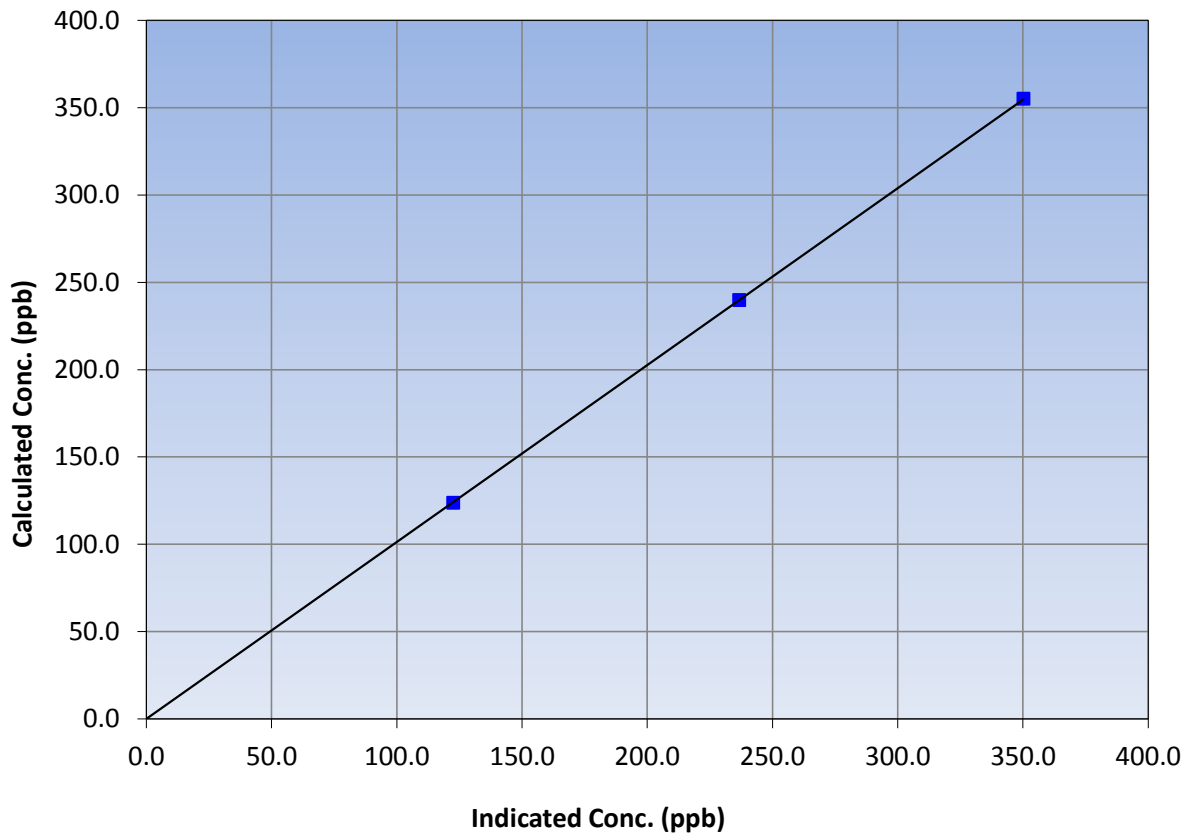
### Station Information

Calibration Date	October 27, 2017	Previous Calibration	September 27, 2017
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	6:52	End Time (MST)	10:47
Analyzer make	API T200	Analyzer serial #	722

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	-0.4	----	Correlation Coefficient	≥0.995	
355.1	350.2	1.0140			
239.7	236.7	1.0127			
123.6	122.6	1.0082			
			Slope	1.013235	0.90 - 1.10
			Intercept	-0.021199	+/-20

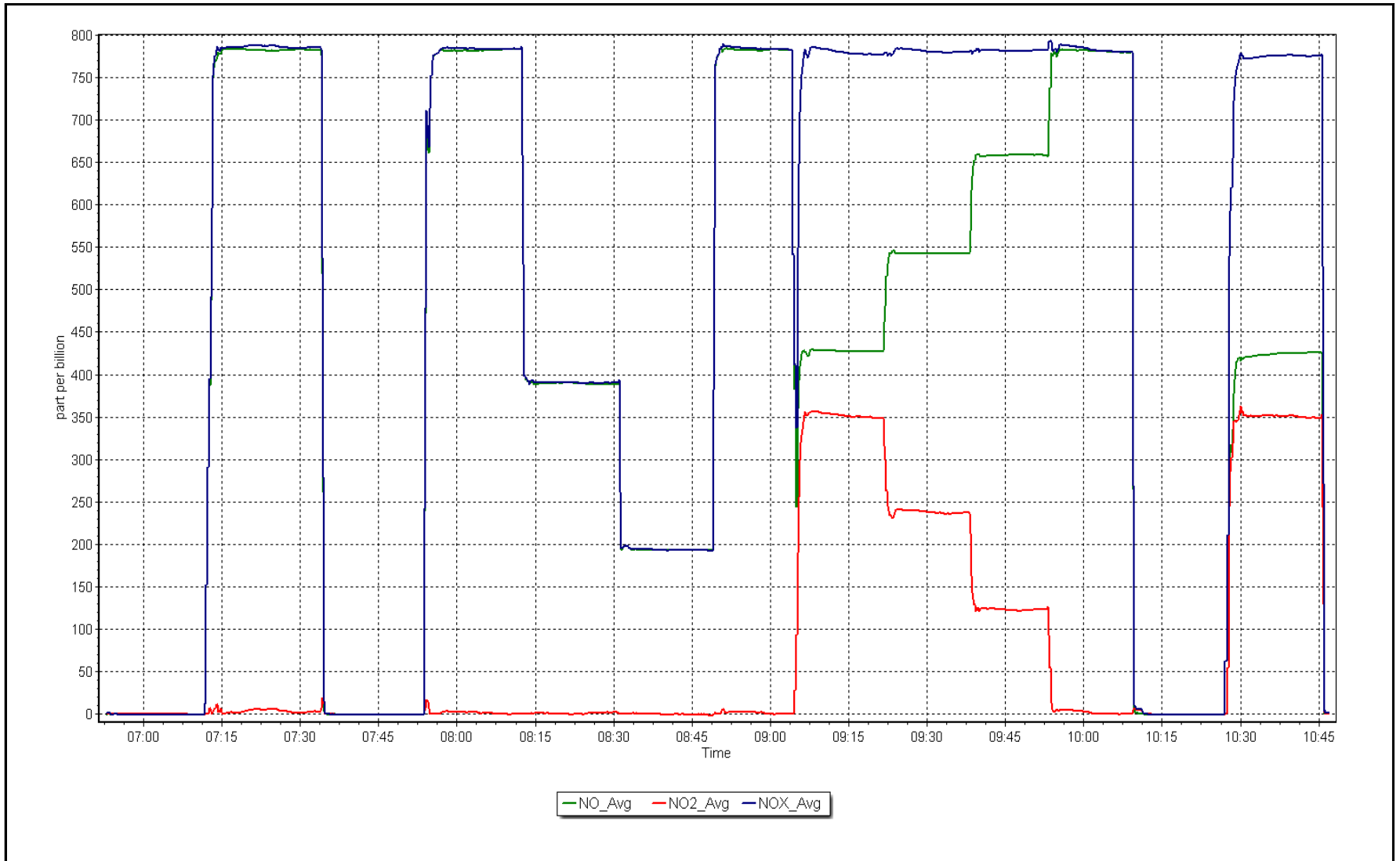
**NO<sub>2</sub> Calibration Curve**



# NO<sub>x</sub> Calibration Plot

Date: October 27, 2017

Location: Wapasu





# Wood Buffalo Environmental Association

## SHARP PM<sub>2.5</sub> CALIBRATION

Version-02-2017

### Station Information

Station Name:	Wapasu	Station number:	AMS 17
Calibration Date:	October 30, 2017	Last Cal Date:	September 29, 2017
Start time (MST):	10:14	End time (MST):	10:53
Sharp Model:	5030	S/N:	CM-2390
Particulate Fraction:	PM2.5	C14 Source S/N:	10391
Flow Meter Make/Model:	Delta Cal	S/N:	1451
Temp/RH standard:	Delta Cal	S/N:	1451

### Monthly Calibration Test

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<b>(Limits)</b>
T1 (°C)	-1	-1.8	-1	<input type="checkbox"/>	<b>+/- 2 °C</b>
P3 (hPa)	955	960	955	<input type="checkbox"/>	<b>+/- 13 hPa</b>
flow (LPH)	1000	1005	1000	<input type="checkbox"/>	<b>+/- 50 LPH</b>
Nephelometer zero	0	-----	0	<input type="checkbox"/>	<b>+/- 0.5 ug/m3</b>
Instrument Clock:	Verified	<input type="checkbox"/>			
Cyclone cleaning :	PM10 Cyclone	<input checked="" type="checkbox"/>	PM2.5 Cyclone	<input checked="" type="checkbox"/>	
Date Filter Tape Installed:					

### Quarterly Calibration Test

Leak Test:	Date of check:	<u>October 30, 2017</u>	Last Cal Date:	<u>July 12, 2017</u>
	Flow w/o adaptor:	<u>16.69</u>	Flow w/ adaptor:	<u>16.59</u>

**(Limit) 0.4 LPM**

<u>Adjusted</u>	<u>Current Test</u>	<u>Previous Test</u>	<u>% Change</u>
<input type="checkbox"/>	Foil S/N: <u>2519</u>	Foil S/N: <u>2519</u>	
Foil Calibration	Foil Mass: <u>1326</u>	Foil Mass: <u>1326</u>	
	Calibration Date: <u>October 30, 2017</u>	Calibration Date: <u>July 12, 2017</u>	
<b>(Limit) +/- 5% of previous</b>	Correction Factor: <u>7118</u>	Correction Factor: <u>7090</u>	0.39%

### Annual Calibration Test

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<b>(Limits)</b>
T2 (°C)				<input type="checkbox"/>	<b>+/- 2 °C</b>
T3 (°C)				<input type="checkbox"/>	<b>+/- 2 °C</b>
T4 (°C)				<input type="checkbox"/>	<b>+/- 2 °C</b>
RH (%)				<input type="checkbox"/>	<b>+/- 10%</b>
Date Sample Tube Cleaned:					
Date Pump Rebuilt/Replaced:					

Notes: Nephelometer 0.0ug/m3, concentration was 0.0ug/m3; cyclone head cleaned; no adjustments done

Calibration by: Melissa Lemay



## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 18**  
**STONY MOUNTAIN**  
**OCTOBER 2017**

Operations, Data Collection,  
QA/QC, Data Validation and Reporting by:  
Wood Buffalo Environmental Association  
Fort McMurray, Alberta

November 29, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STONY MOUNTAIN (AMS 18)  
OCTOBER 2017

MONTHLY SUMMARY for  
AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	674	36	70	95.43	3	0	1	0
TRS(ppb) Average	689	43	55	98.39	0	0	0	0
THC(ppm) Average	699	38	45	99.06	2.1	-	1.9	-
NMHC(ppm) Average	699	38	45	99.06	0.136	-	0.007	-
CH4(ppm) Average	699	38	45	99.06	2	-	1.9	-
O3 (ppb) Average	706	38	38	100	48	0	40	-
NO2 (ppb) Average	704	39	40	99.87	5	0	3	-
NO (ppb) Average	704	39	40	99.87	2	-	0	-
NOX (ppb) Average	704	39	40	99.87	5	-	3	-
PM2.5 (ug/m3) Average	741	3	3	100	13.1	-	6	0
Wind Speed 10 m (km/h) Average	743	0	1	99.87	24	-	16	-
Wind Direction 10 m (deg) Average	743	0	1	99.87	-	0	-	-
Temperature 2 m (C) Average	744	0	0	100	19.2	-	12.8	-
Relative Humidity (%) Average	744	0	0	100	99	-	99.0	-
Precipitation (mm) Total	741	0	3	99.6	10.3	-	28.6	-
Leaf Wetness (% of range) Average	744	0	0	100	49	-	17.0	-
Global Solar Radiation (W/m2) Average	744	0	0	100	554	-	152.0	-

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STONY MOUNTAIN (AMS 18)  
OCTOBER 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	674	0.3	0	-	0	0	0	0	0	1	3
TRS (ppb) Average	689	0.3	0	-	0	0	0	0	0	0	0
THC (ppm) Average	706	1.88	0	-	1.8	1.8	1.9	1.9	1.9	1.9	2.1
NMHC(ppm) Average	706	0.002	0.01	-	0	0	0	0	0	0	0.136
CH4(ppm) Average	706	1.88	0	-	1.8	1.8	1.9	1.9	1.9	1.9	2
O3 (ppb) Average	706	28.7	7	-	0	19	24	29	33	38	48
NO2 (ppb) Average	704	1	1	-	0	0	0	1	1	2	5
NO (ppb) Average	704	0.1	0	-	0	0	0	0	0	0	2
NOX (ppb) Average	704	1.1	1	-	0	0	0	1	1	2	5
PM2.5 (ug/m3) Average	741	2.51	1.5	-	0.6	1.2	1.5	2.1	3.1	4.4	13.1
Wind Speed 10 m (km/h) Average	743	10.1	4	-	1	5	7	10	13	16	24
Wind Direction 10 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	2.6	4.8	-	-5.9	-2.8	-1.1	1.8	5.5	8.9	19.2
Relative Humidity (%) Average	744	75.3	18	-	29	49	63	78	91	97	99
Precipitation (mm) Total	741	-	-	114.13	-	-	-	-	-	-	-
Surface Wetness (% of range) Average	744	4.1	6	-	0	1	2	2	3	8	49
Global Solar Radiation (W/m2) Average	744	66.2	121	-	0	0	0	1	69	259	554

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STONY MOUNTAIN (AMS 18)  
OCTOBER 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	04 Oct 2017 03:00	05 Oct 2017 11:00	33	Analyzer Failure - Pump Failure
SO2	21 Oct 2017 14:00	21 Oct 2017 14:00	1	Maintenance - scrubber check
TRS	20 Oct 2017 16:00	20 Oct 2017 20:00	5	Recovery - Recovery from scrubber check
TRS	21 Oct 2017 12:00	21 Oct 2017 18:00	7	Maintenance - troubleshooting to identify the cause of the failed audit
Precipitation Collector	05 Oct 2017 12:00	05 Oct 2017 14:00	3	Maintenance - Tipping bucket cleaned
Wind Speed, Wind Direction	02 Oct 2017 07:00	02 Oct 2017 07:00	1	Flat line in sensor output signal





Wood Buffalo Environmental Association

Summary of Hour Averages

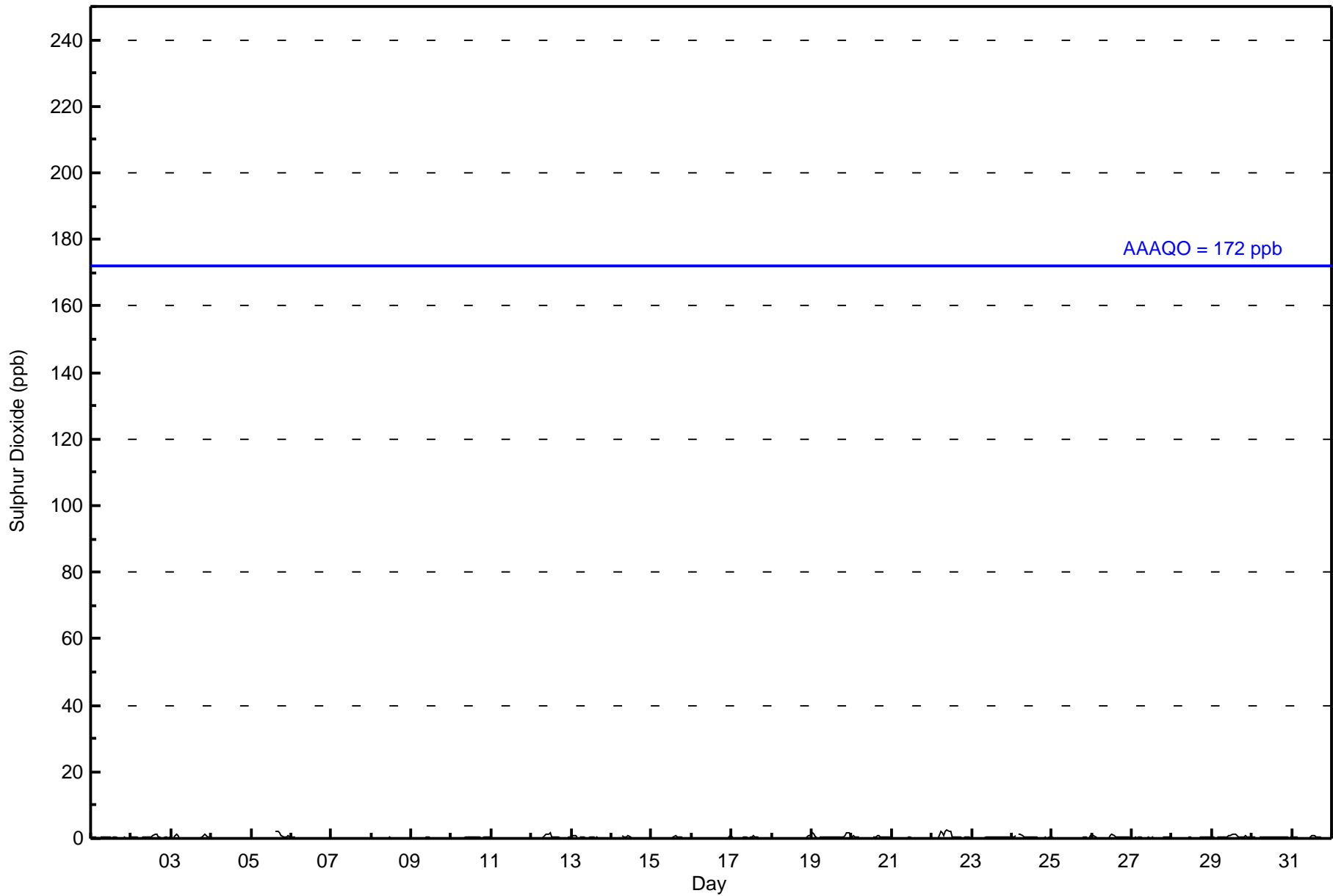
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Stony Mountain - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0												Hours in Service: 744															
Maximum Value: 3 ppb on Oct 22 10:00												Maximum Daily Average: 0.8 ppb on Oct 22															
Minimum Value: 0 ppb on Oct 13 23:00												Minimum Daily Average: 0.1 ppb on Oct 16															
Maximum Diurnal Average: 0.4 ppb at hour 12												Minimum Diurnal Average: 0.2 ppb at hour 4															
Monthly Average: 0.3 ppb												Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 2															
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0.4	1
3-Oct	Z	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.4	1	
4-Oct	0	Z	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	0	
5-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	C	C	C	2	2	2	2	1	0	0	0	1	1	--	2	
6-Oct	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1	
7-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
8-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
9-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
10-Oct	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.3	1	
11-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
12-Oct	0	0	0	Z	0	0	0	1	1	1	1	2	1	0	1	0	0	0	0	0	0	0	0	0	0.4	2	
13-Oct	1	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
14-Oct	0	0	0	0	0	Z	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
15-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.2	1	
16-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1	1	
17-Oct	1	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.2	1	
18-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	1	
19-Oct	2	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	1	0.6	2	
20-Oct	1	1	0	0	0	Z	0	0	0	0	C	C	C	1	1	1	1	0	0	0	0	0	0	0	0.4	1	
21-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0.1	0	
22-Oct	0	Z	0	0	0	2	2	1	2	3	2	2	1	0	0	1	0	0	0	0	0	0	0	0	0.8	3	
23-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
24-Oct	0	0	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
25-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1	
26-Oct	1	1	0	0	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	1	0	0	0	0	0	0.4	1	
27-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
28-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
29-Oct	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	1	1	1	0	0	0.5	1	
30-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
31-Oct	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1	
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan												C - Calibration						M - Maintenance				AF - Analyzer Failure					
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																											



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Stony Mountain - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Stony Mountain - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	674	100.00	100.00
11 - 20	0	0.00	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 674

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Stony Mountain - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	28	26	25	11	9	5	17	10	20	95	68	44	81	91	82	61	673
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	28	26	25	11	9	5	17	10	20	95	68	44	81	91	82	61	673

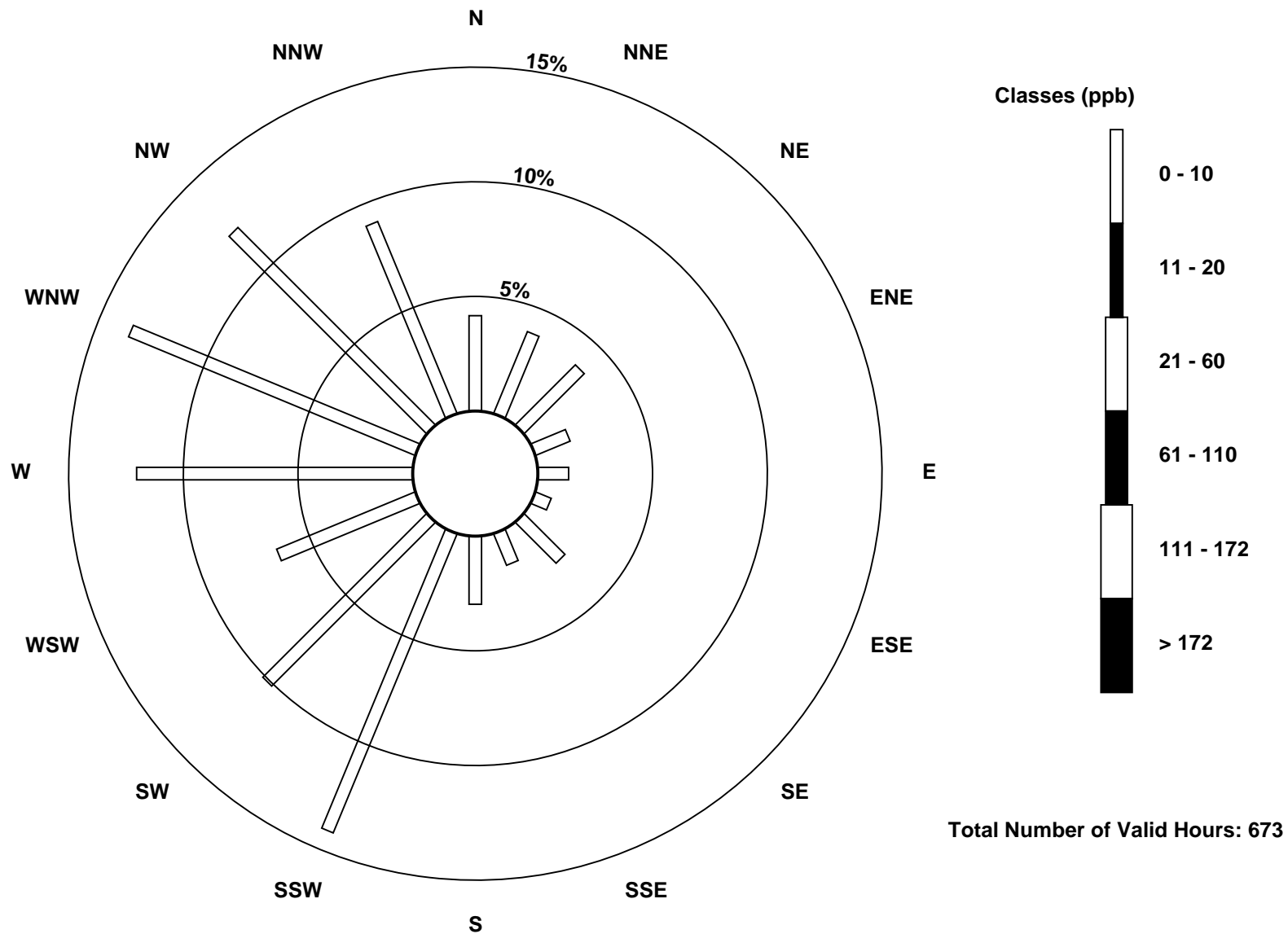
Total Number of Valid Hours: 673

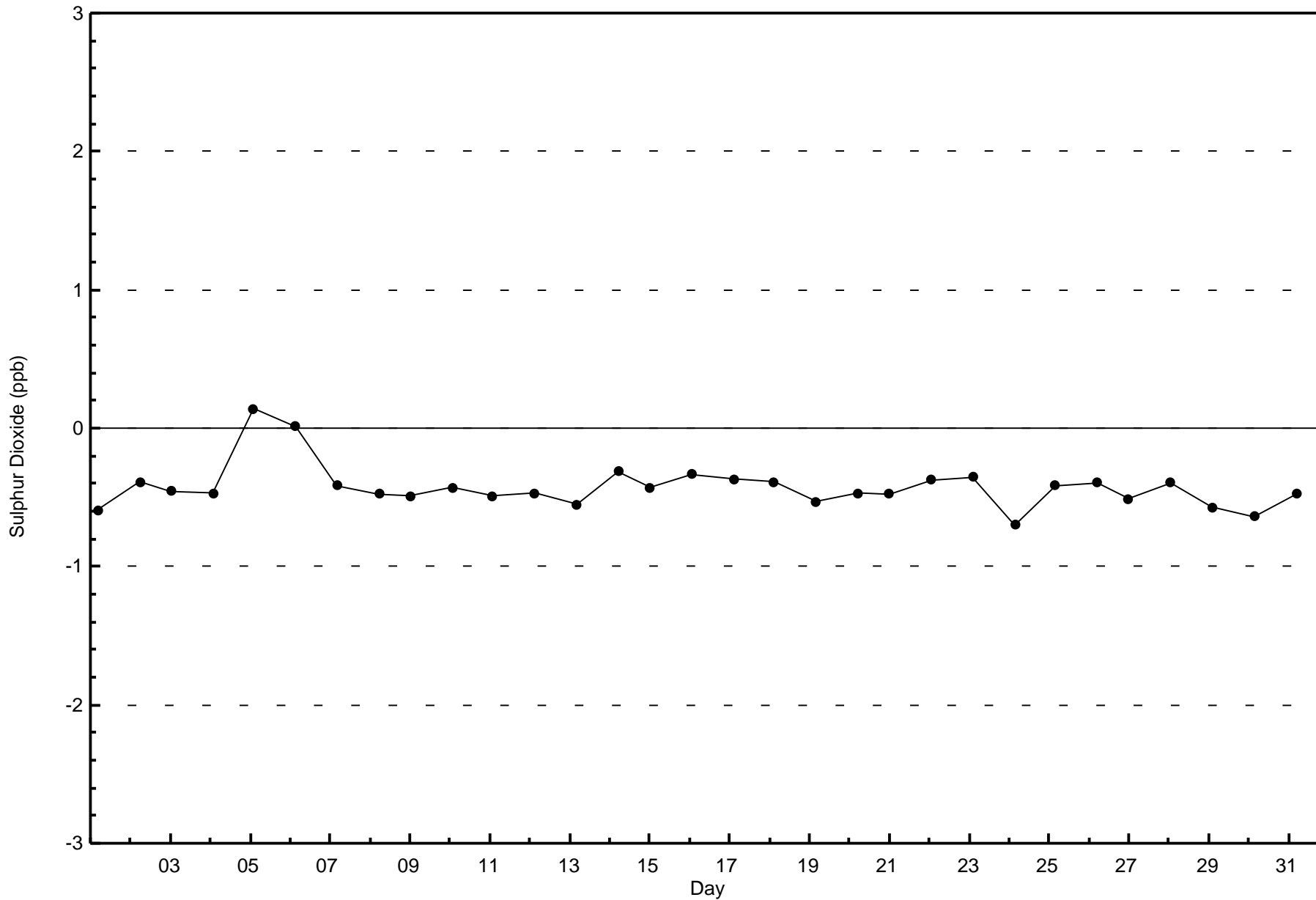
Total Number of Hours: 744

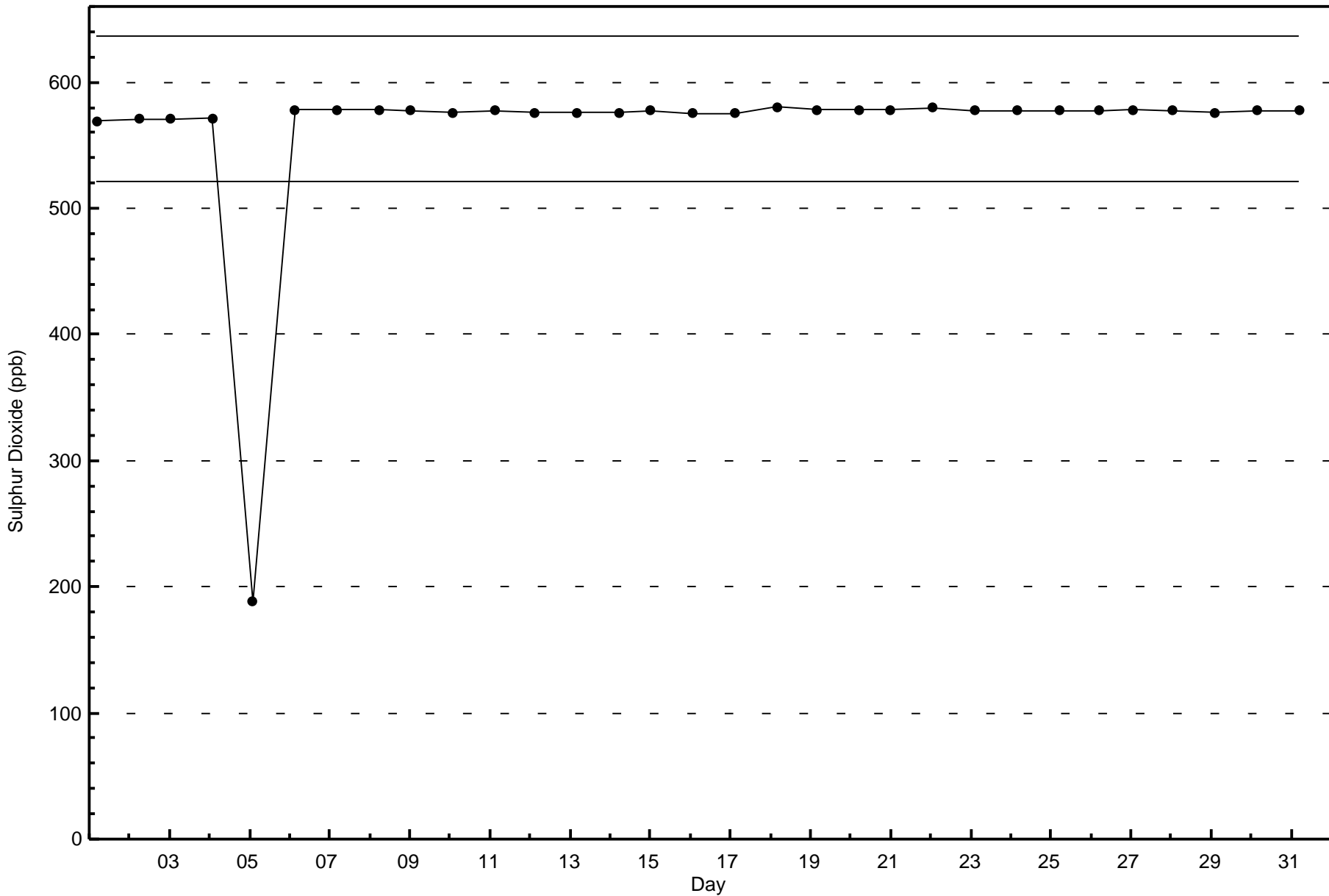


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Stony Mountain (AMS 18)









Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

Stony Mountain - October 2017

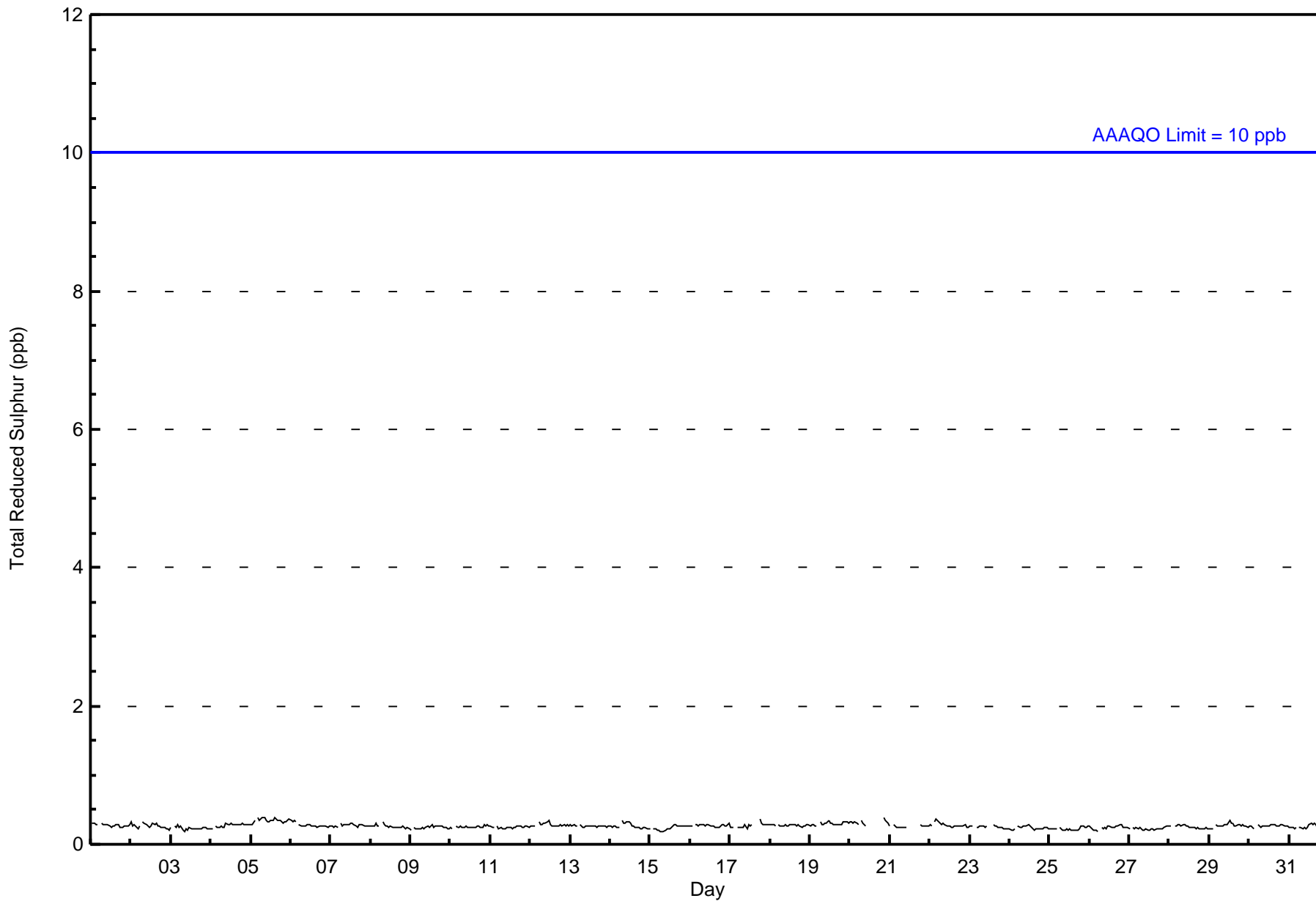
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744										Daily Average		Daily Maximum					
Maximum Value: 0 ppb on Oct 20 21:00										Maximum Daily Average: 0.3 ppb on Oct 5										Hours of Data: 689							
Minimum Value: 0 ppb on Oct 15 07:00										Minimum Daily Average: 0.2 ppb on Oct 25										Hours of Missing Data: 55							
Maximum Diurnal Average: 0.3 ppb at hour 13										Minimum Diurnal Average: 0.3 ppb at hour 17										Hours of Calibration: 43							
Monthly Average: 0.3 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 0										Percent Operational Time: 98.4							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
2-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
3-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
5-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
6-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
7-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
8-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
9-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
10-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
11-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
12-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
13-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
14-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
15-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
16-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
17-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0.3	0
18-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
19-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
20-Oct	0	0	0	0	0	0	Z	0	0	0	C	C	C	C	C	RE	RE	RE	RE	RE	0	0	0	0	0	--	0
21-Oct	0	Z	0	0	0	0	0	0	0	0	0	M	M	M	M	M	M	M	0	0	0	0	0	0	0	--	0
22-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
23-Oct	0	0	0	Z	0	0	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.2	0
24-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
25-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
26-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
27-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
28-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
29-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
30-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
31-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
0.3																								Diurnal Average			
0																								Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance RE - Recovery																											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																											





**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Total Reduced Sulphur (TRS) - ppb**  
**Stony Mountain - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Stony Mountain - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	689	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 689

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb  
Stony Mountain - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	30	24	26	11	9	5	16	12	18	100	82	44	76	85	86	65	689
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	30	24	26	11	9	5	16	12	18	100	82	44	76	85	86	65	689

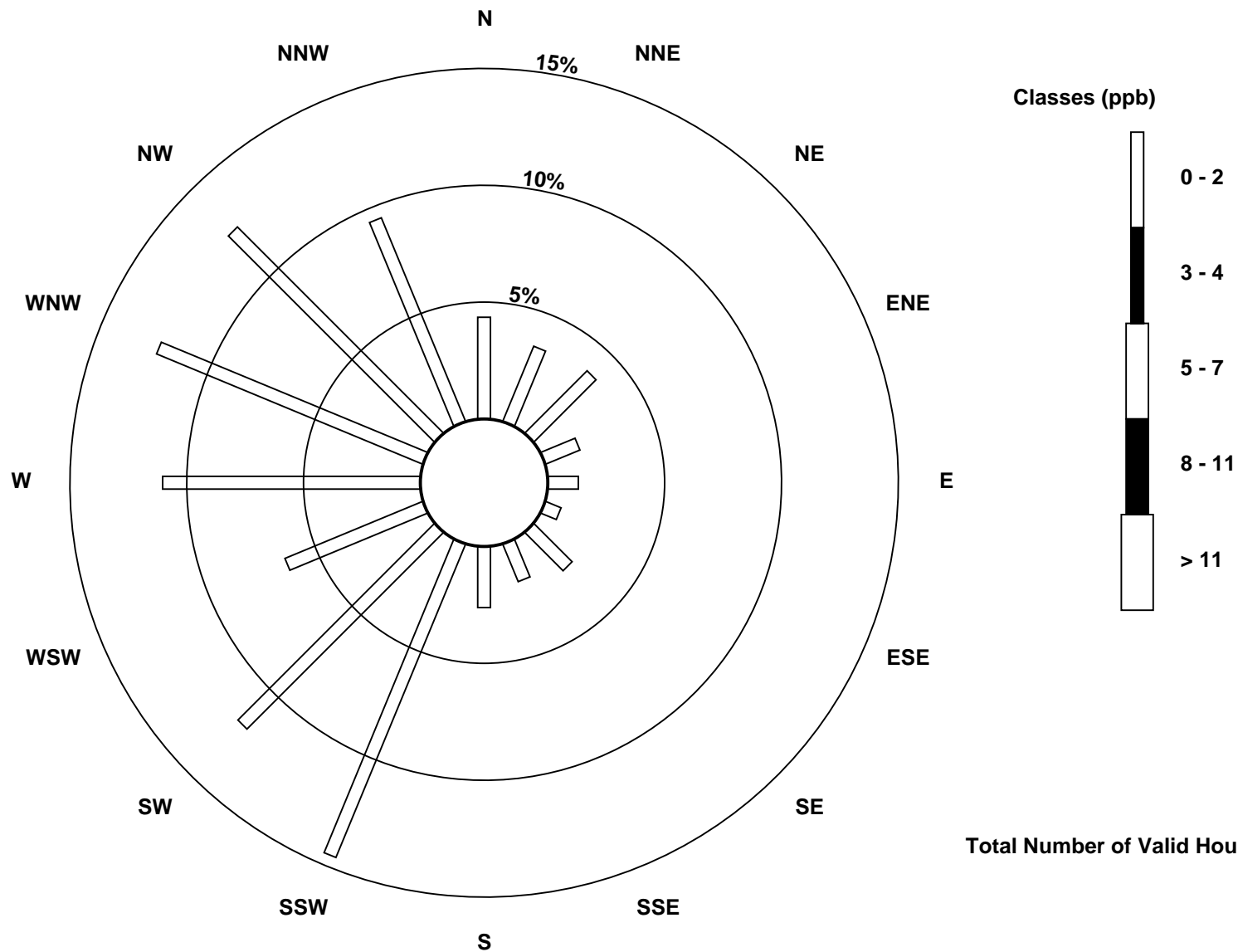
Total Number of Valid Hours: 689

Total Number of Hours: 744

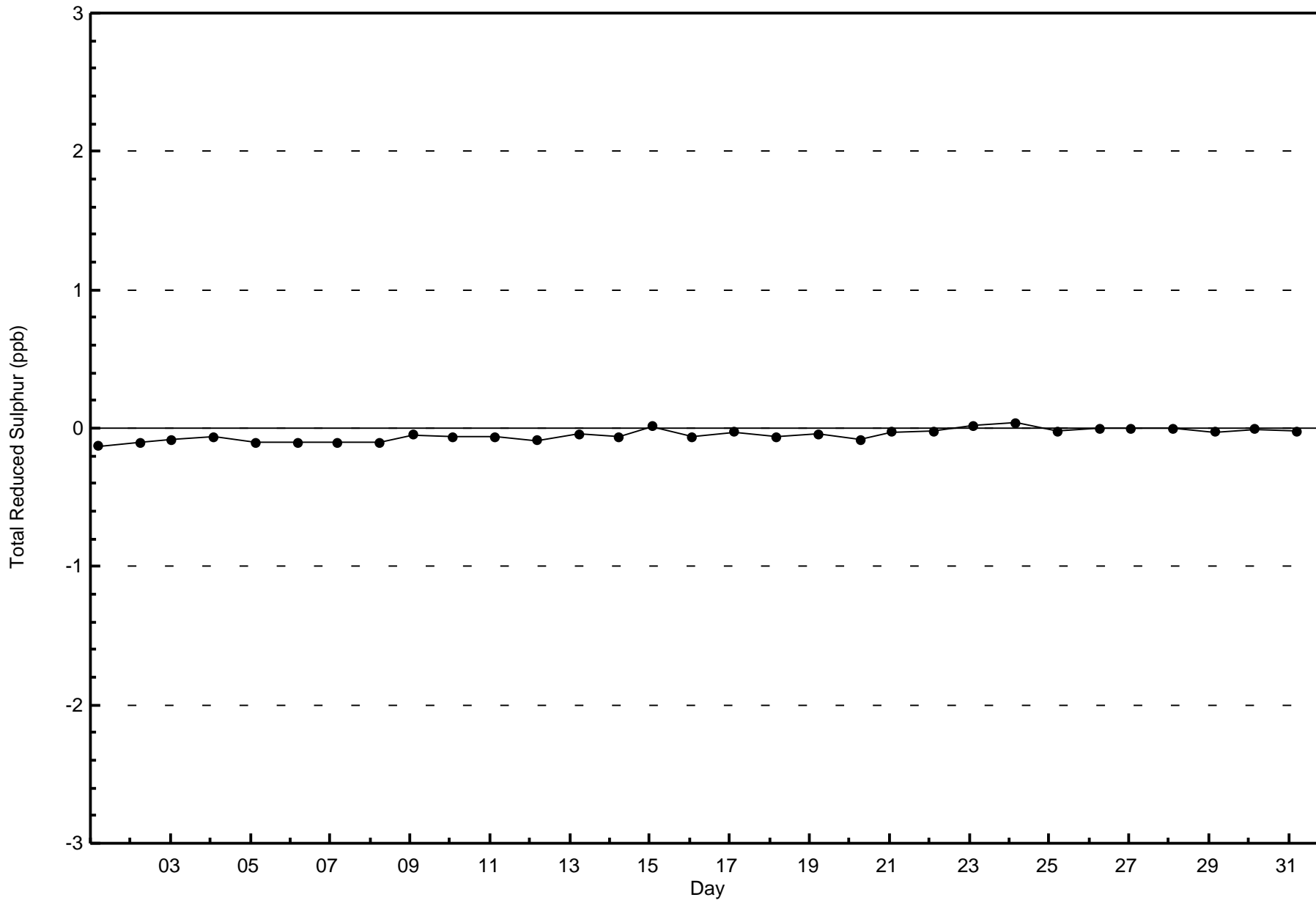


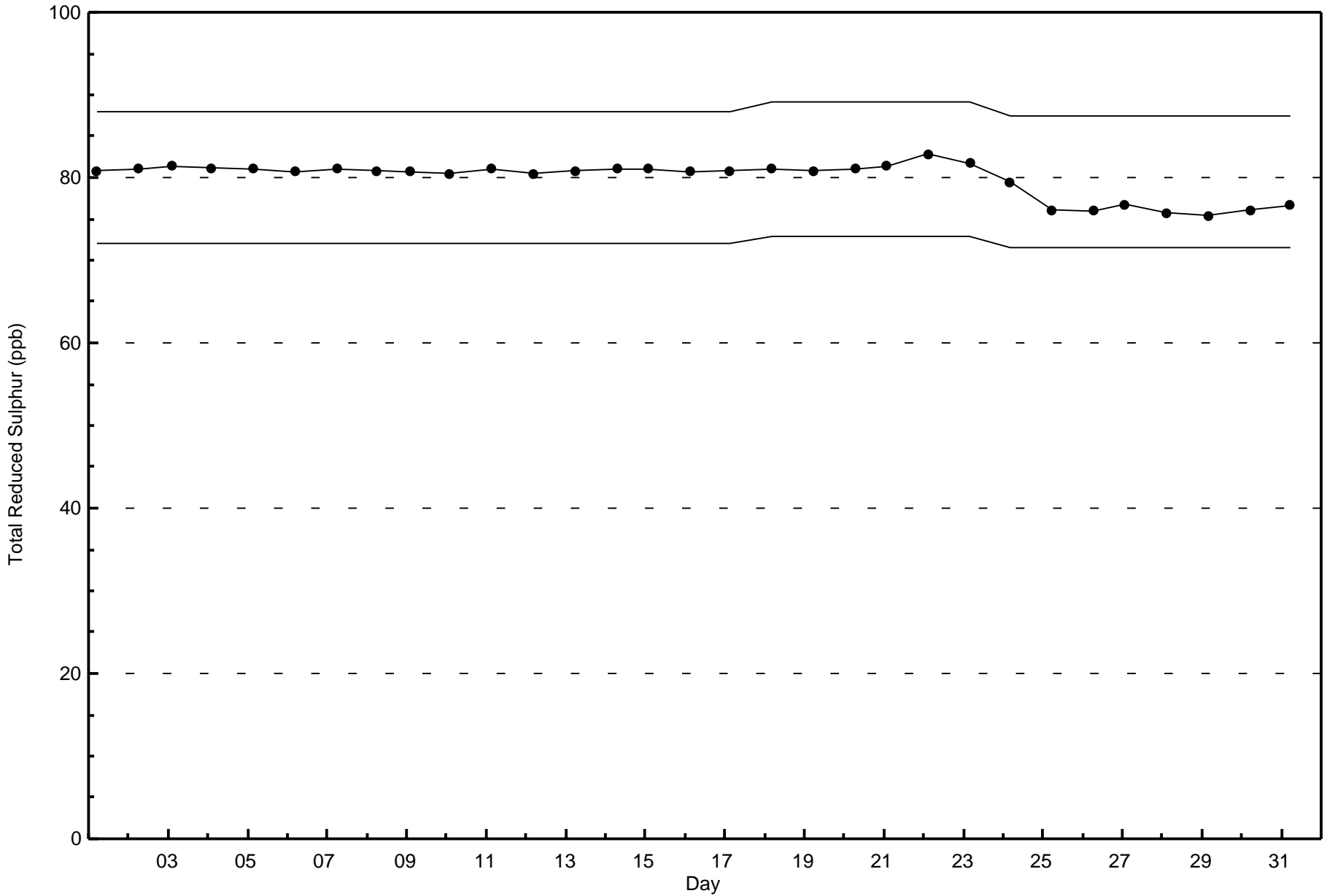
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Total Reduced Sulphur (TRS) - ppb  
Stony Mountain (AMS 18)



Total Number of Valid Hours: 689



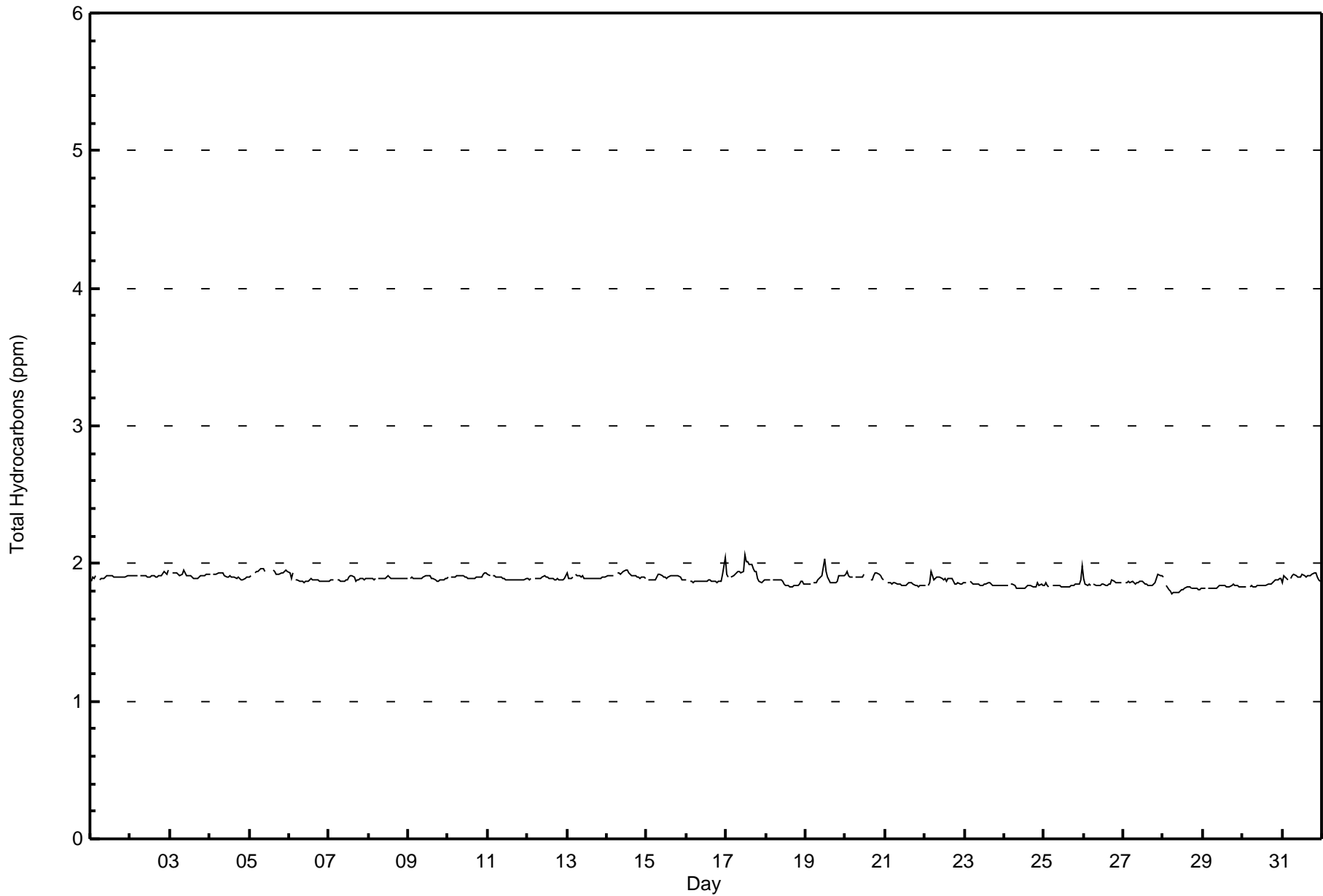






Wood Buffalo Environmental Association  
Hourly Averages

Total Hydrocarbons (THC) - ppm  
Stony Mountain - October 2017







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Stony Mountain - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	705	99.86	99.86
2.1 - 3.0	1	0.14	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Stony Mountain - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	29	26	25	11	9	5	17	10	20	98	79	45	83	93	87	67	704
2.1 - 3.0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	29	26	25	11	10	5	17	10	20	98	79	45	83	93	87	67	705

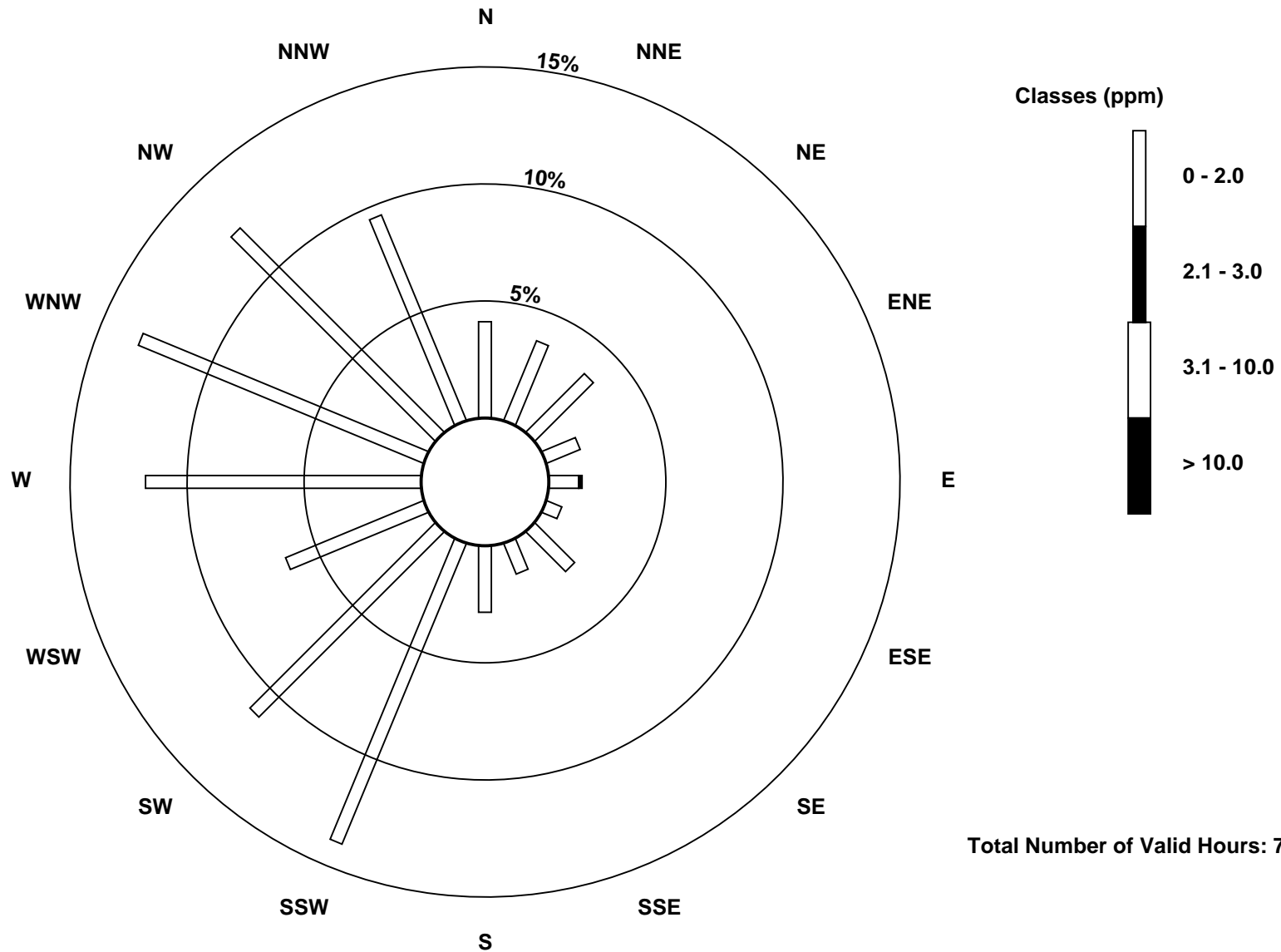
Total Number of Valid Hours: 705

Total Number of Hours: 744

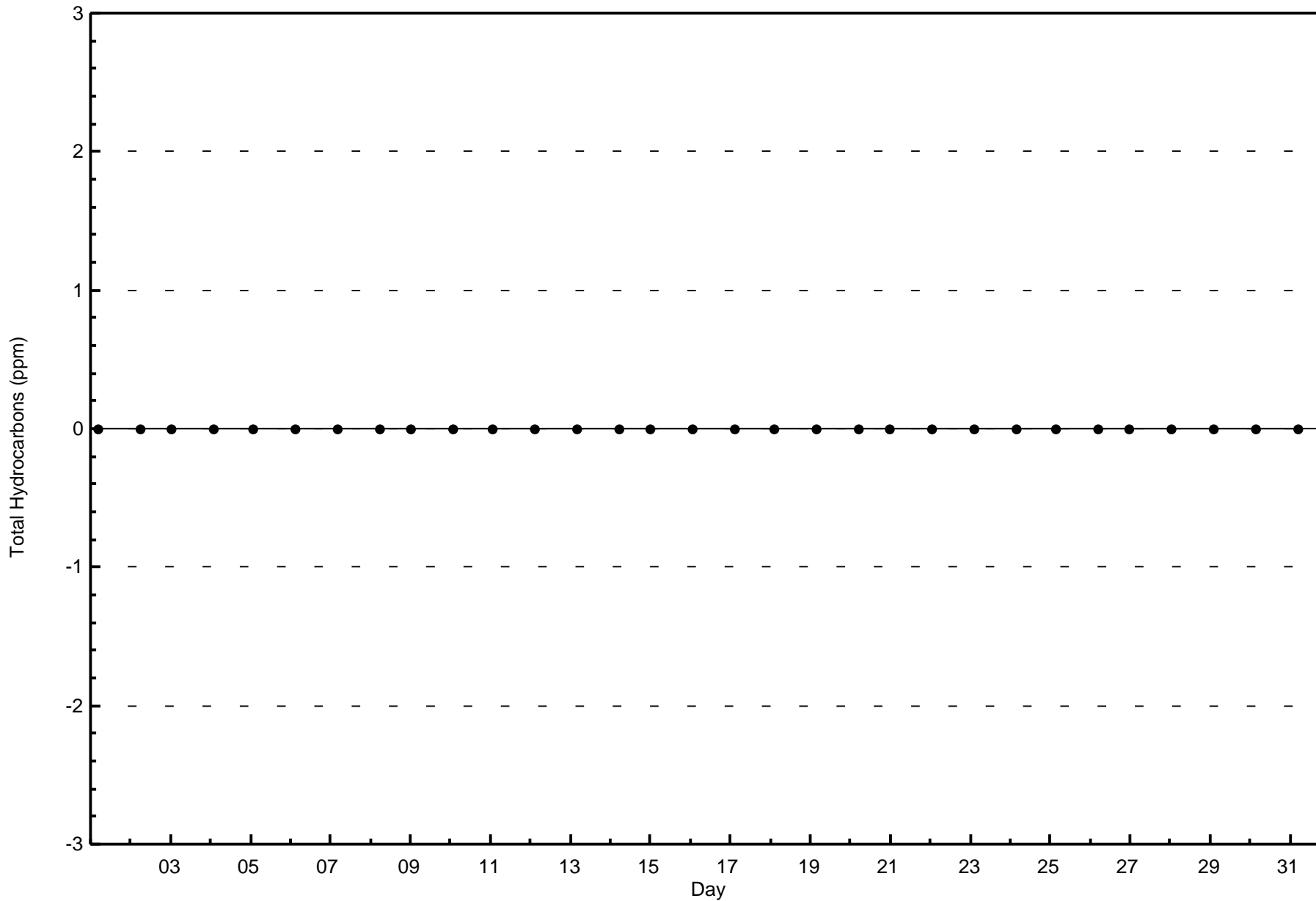


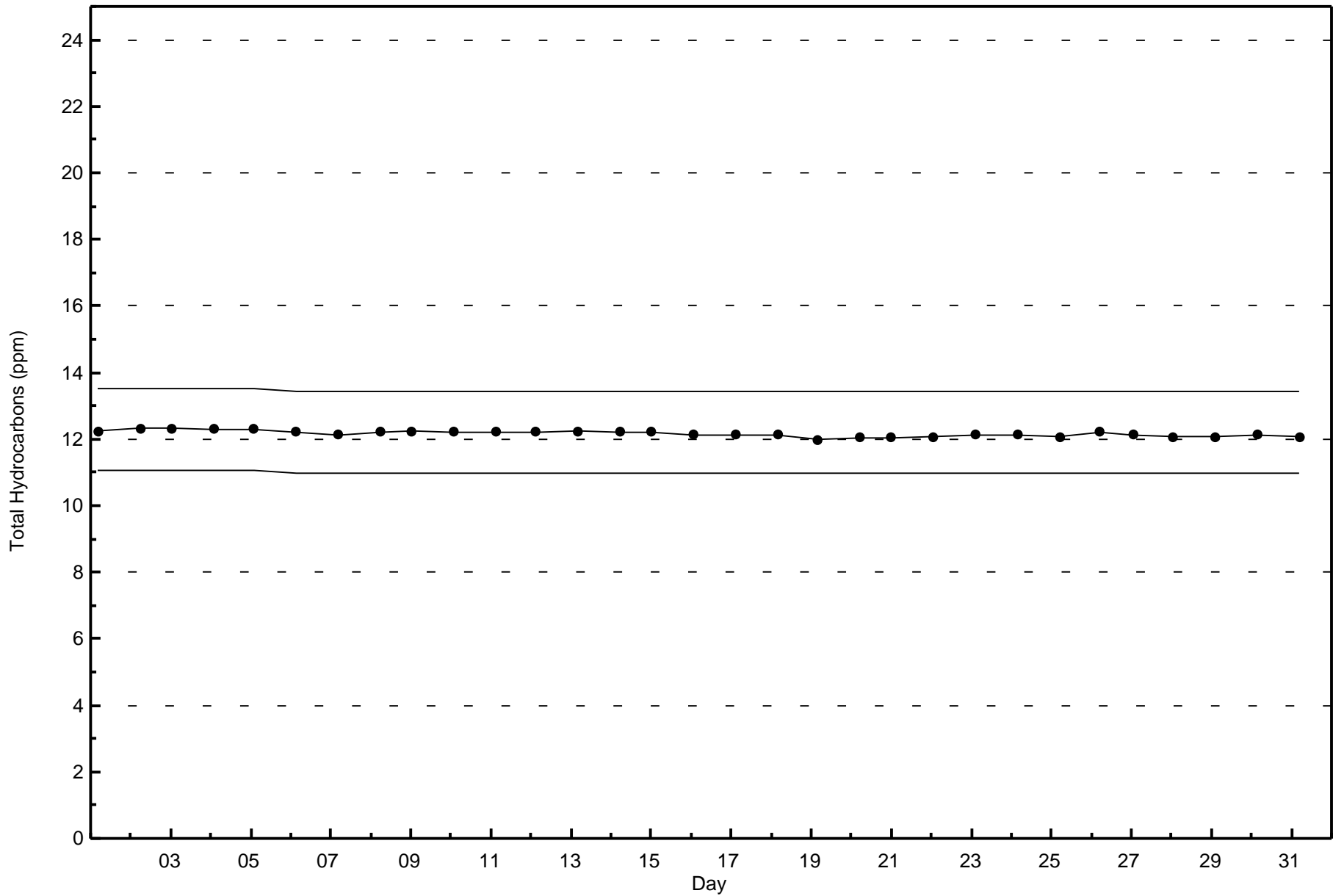
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Total Hydrocarbons (THC) - ppm  
Stony Mountain (AMS 18)



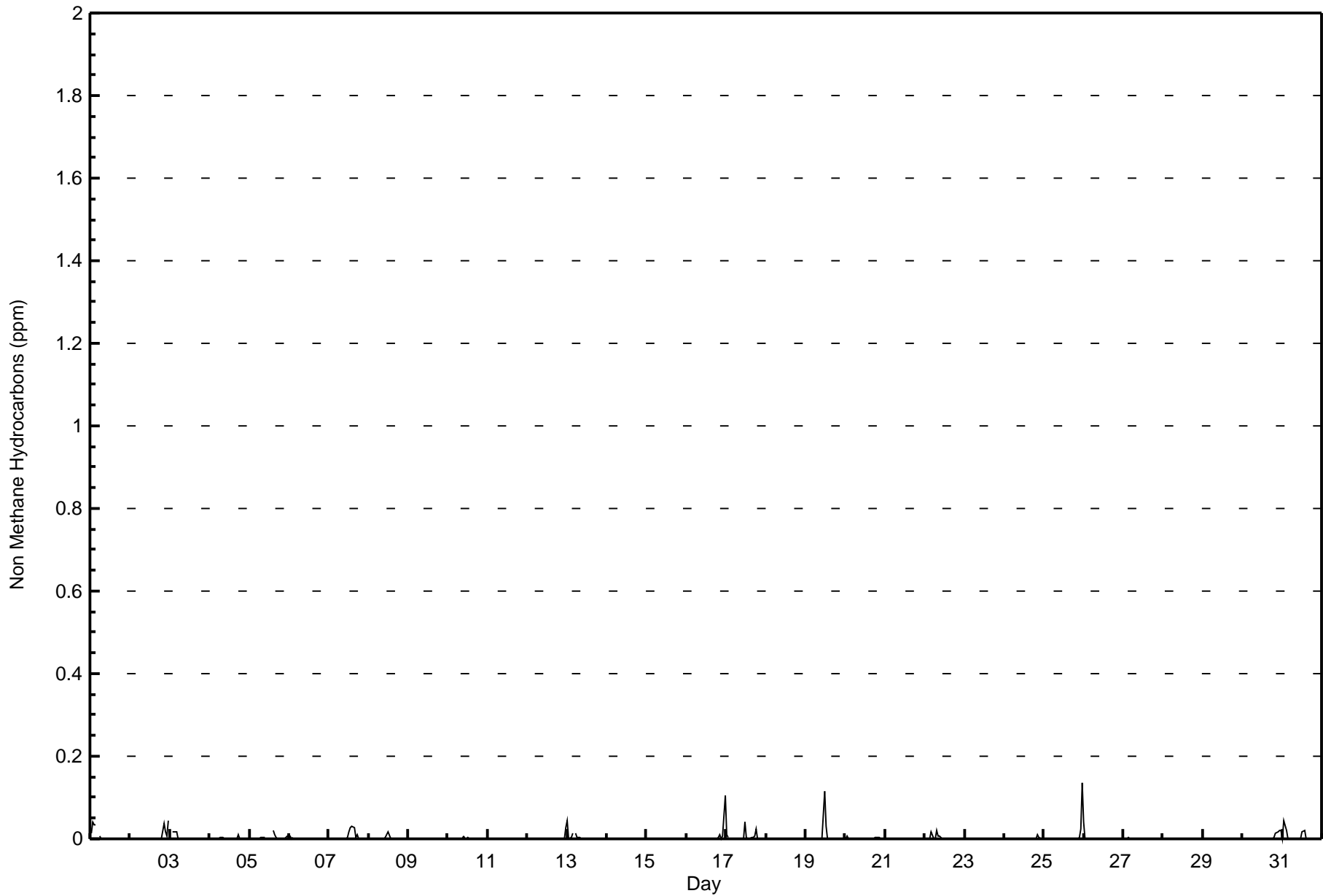
Total Number of Valid Hours: 705







Maximum Value: 0.136 ppm on Oct 26 00:00      Maximum Daily Average: 0.007 ppm on Oct 25																						Hours in Service:	744			
Minimum Value: 0.000 ppm on Oct 1 16:00      Minimum Daily Average: 0.000 ppm on Oct 11																						Hours of Data:	706			
Maximum Diurnal Average: 0.011 ppm at hour 24      Minimum Diurnal Average: 0.000 ppm at hour 11																						Hours of Missing Data:	38			
Monthly Average: 0.002 ppm      Percentiles: P <sub>1</sub> = 0.0 P <sub>10</sub> = 0.0 Q <sub>1</sub> = 0.0 Median = 0.0 Q <sub>3</sub> = 0.0 P <sub>90</sub> = 0.0 P <sub>99</sub> = 0.0																						Hours of Calibration:	38			
																						Percent Operational Time:	100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0.013	0.041	0.034	0.033	Z	0.006	0.002	0.002	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.041
2-Oct	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.036	0.017	0.008	0.043	0.005	0.043
3-Oct	Z	0.015	0.016	0.017	0.018	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.018
4-Oct	0.000	Z	0.000	0.000	0.000	0.000	0.002	0.004	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.009
5-Oct	0.000	0.000	Z	0.000	0.000	0.000	0.001	0.004	0.003	0.003	C	C	C	C	0.019	0.011	0.002	0.001	0.001	0.000	0.000	0.000	0.004	0.005	0.003	0.019
6-Oct	0.006	0.001	0.002	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006
7-Oct	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.015	0.027	0.032	0.026	0.003	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.032
8-Oct	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.002	0.010	0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.016
9-Oct	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
10-Oct	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.007	0.001	0.001	0.002	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.007
11-Oct	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
12-Oct	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.026	0.001	0.026
13-Oct	0.043	0.000	0.002	0.013	Z	0.015	0.004	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.043
14-Oct	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
15-Oct	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
16-Oct	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.011	0.000	0.006	0.105	0.006	0.105
17-Oct	0.011	0.003	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.040	0.002	0.001	0.000	0.002	0.005	0.006	0.022	0.000	0.000	0.000	0.000	0.000	0.004	0.040
18-Oct	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
19-Oct	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.114	0.032	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.114
20-Oct	0.000	0.008	0.001	0.000	0.000	Z	0.000	0.000	0.002	0.001	0.000	0.000	C	C	C	0.000	0.000	0.000	0.003	0.003	0.002	0.001	0.000	0.000	0.001	0.008
21-Oct	Z	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
22-Oct	0.000	Z	0.000	0.000	0.018	0.000	0.000	0.020	0.008	0.007	0.000	0.000	0.000	0.001	0.001	0.000	0.001	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.003	0.020
23-Oct	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24-Oct	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.002	0.000	0.000	0.001	0.011
25-Oct	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.023	0.136	0.007	0.136	
26-Oct	0.040	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.040
27-Oct	Z	0.000	0.002	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.008	0.001	0.008
28-Oct	0.008	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008
29-Oct	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.001
30-Oct	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.014	0.016	0.022	0.020	0.003	0.022
31-Oct	0.000	0.045	0.021	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.018	0.021	0.000	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.045
																						Diurnal Average				
																						Diurnal Maximum				
Z - zerospan      C - Calibration																										





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm  
Stony Mountain - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.005	649	91.93	91.93
0.006 - 0.05	54	7.65	99.58
0.06 - 0.1	3	0.42	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744





**Wood Buffalo Environmental Association  
Frequency Distribution**

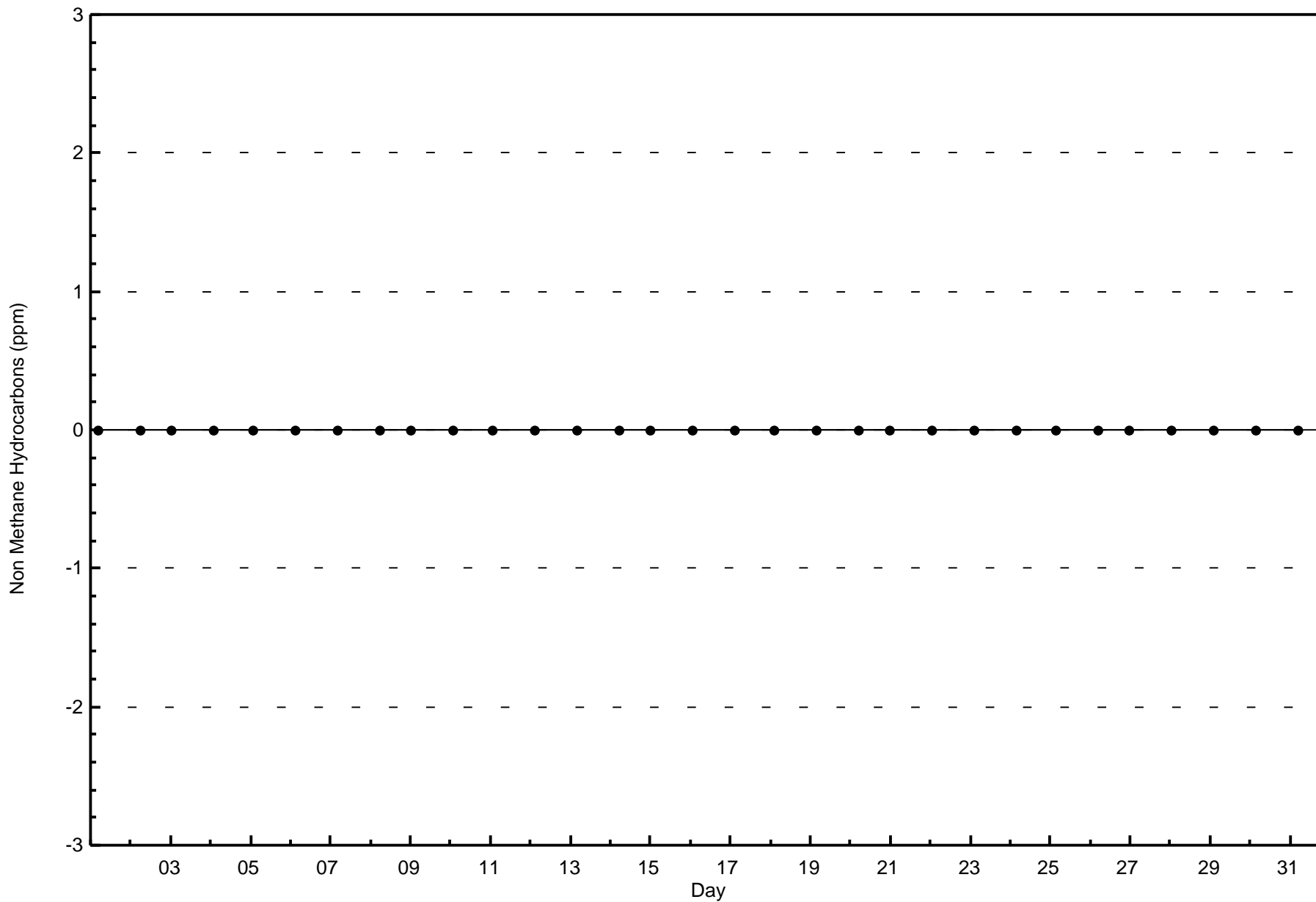
**Non Methane Hydrocarbons (NMHC) - ppm  
Stony Mountain - October 2017**

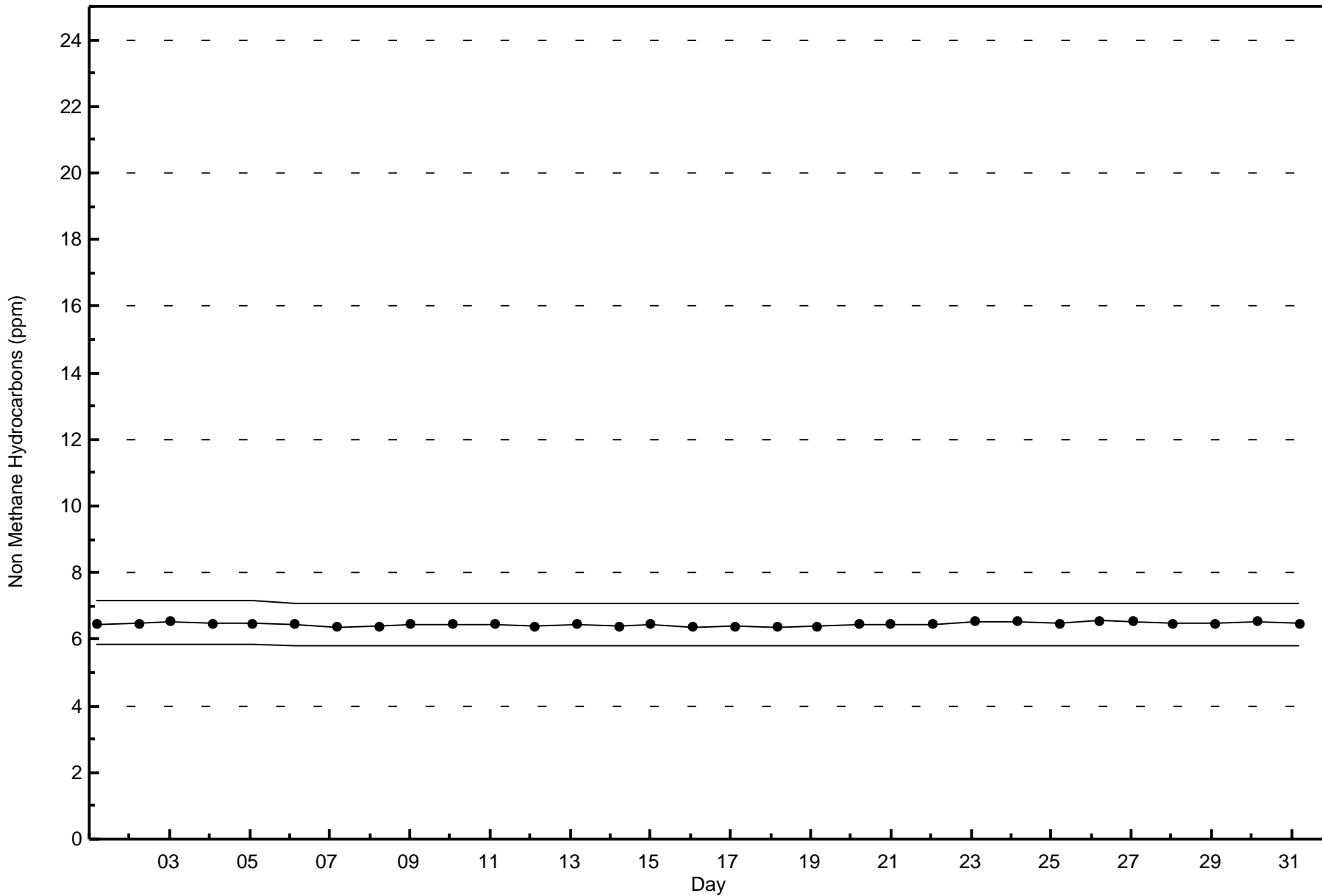
<b>Concentration Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	29	26	24	10	5	4	15	8	18	96	75	45	81	83	64	65	648
0.006 - 0.05	0	0	1	1	5	1	2	1	1	2	4	0	2	9	23	2	54
0.06 - 0.1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	3
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	29	26	25	11	10	5	17	10	20	98	79	45	83	93	87	67	705

Total Number of Valid Hours: 705

Total Number of Hours: 744





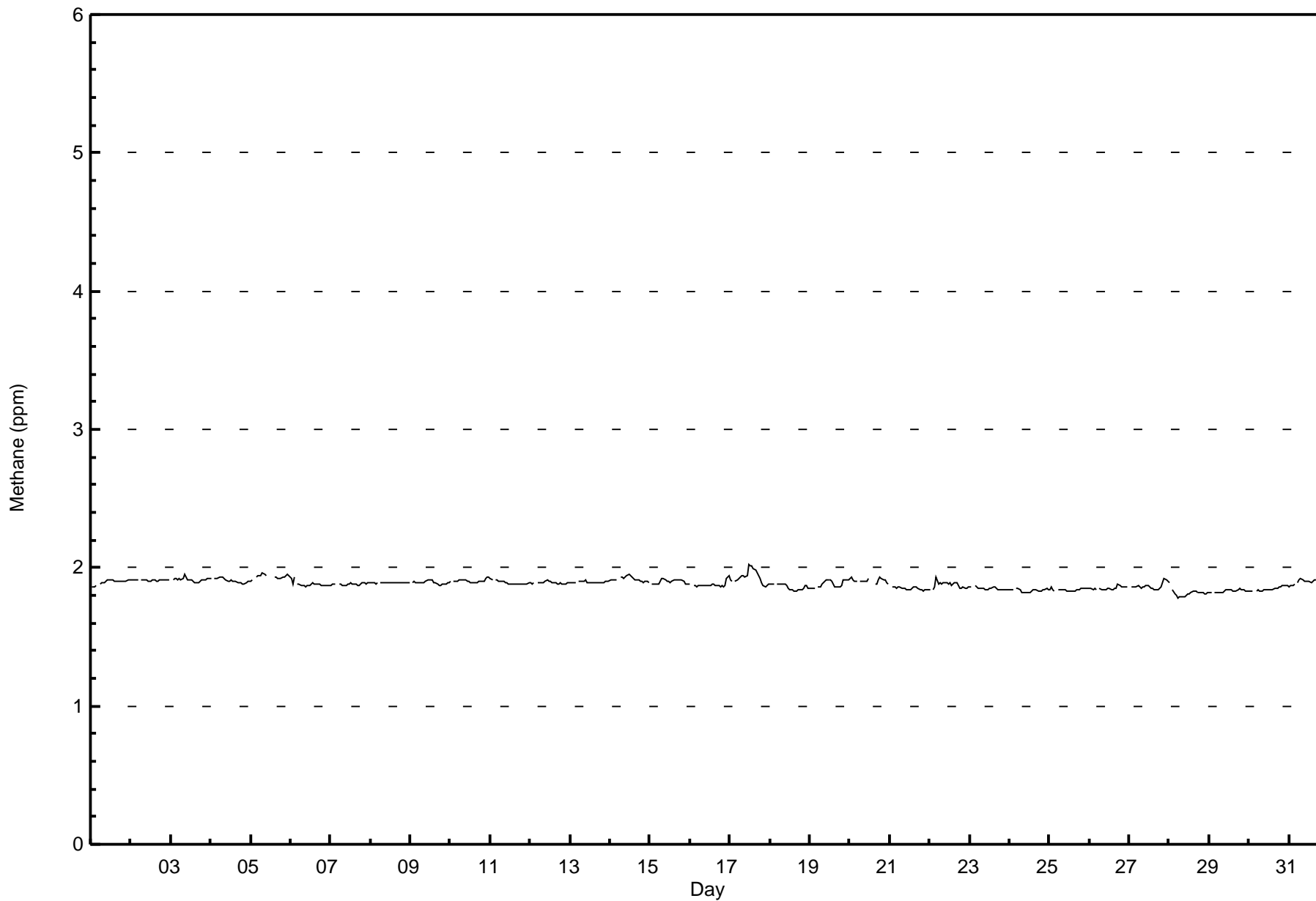






**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Methane (CH<sub>4</sub>) - ppm**  
**Stony Mountain - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Stony Mountain - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	706	100.00	100.00
2.1 - 3.0	0	0.00	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Stony Mountain - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 2.0	29	26	25	11	10	5	17	10	20	98	79	45	83	93	87	67	705
2.1 - 3.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	29	26	25	11	10	5	17	10	20	98	79	45	83	93	87	67	705

Total Number of Valid Hours: 705

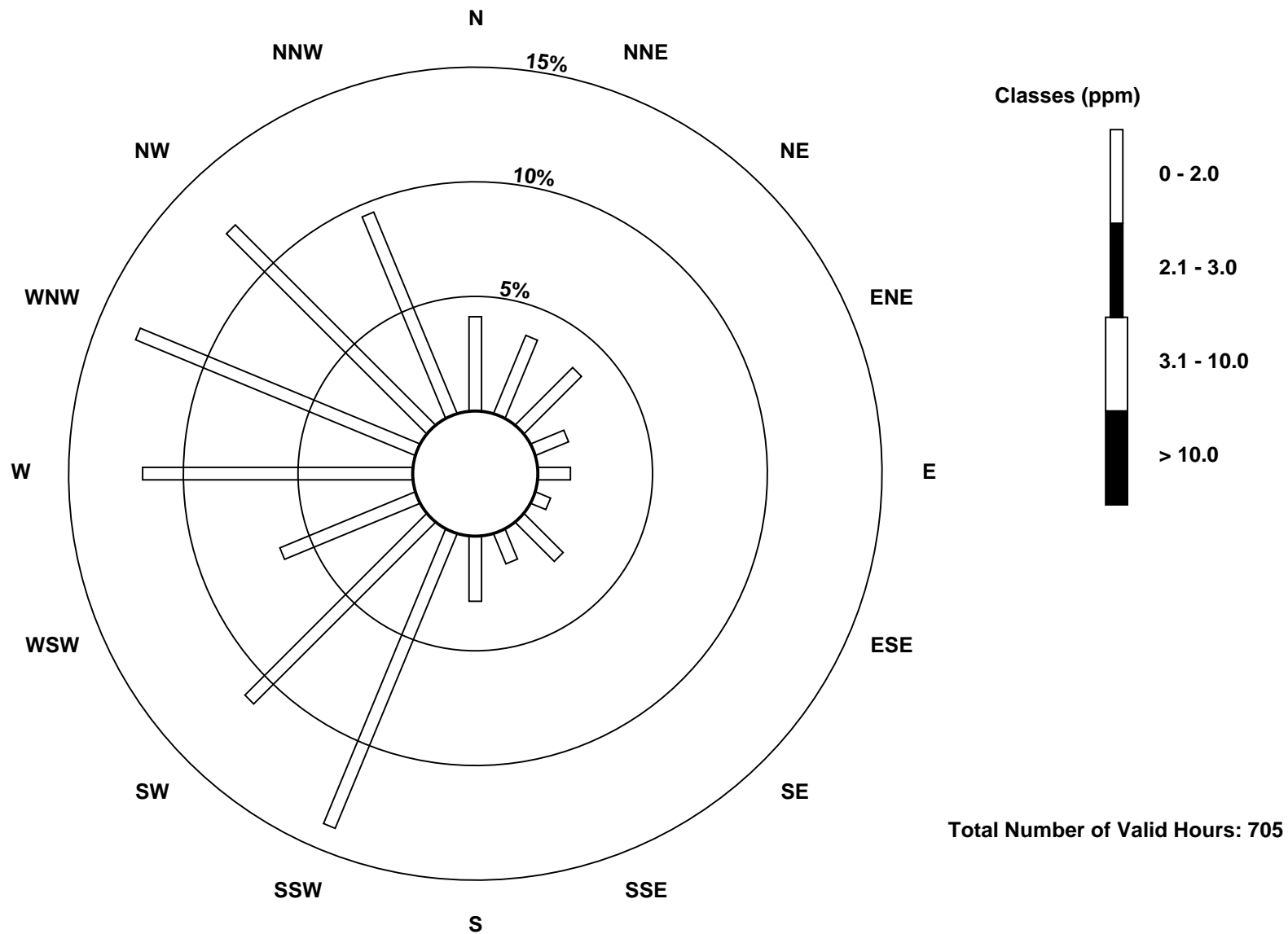
Total Number of Hours: 744

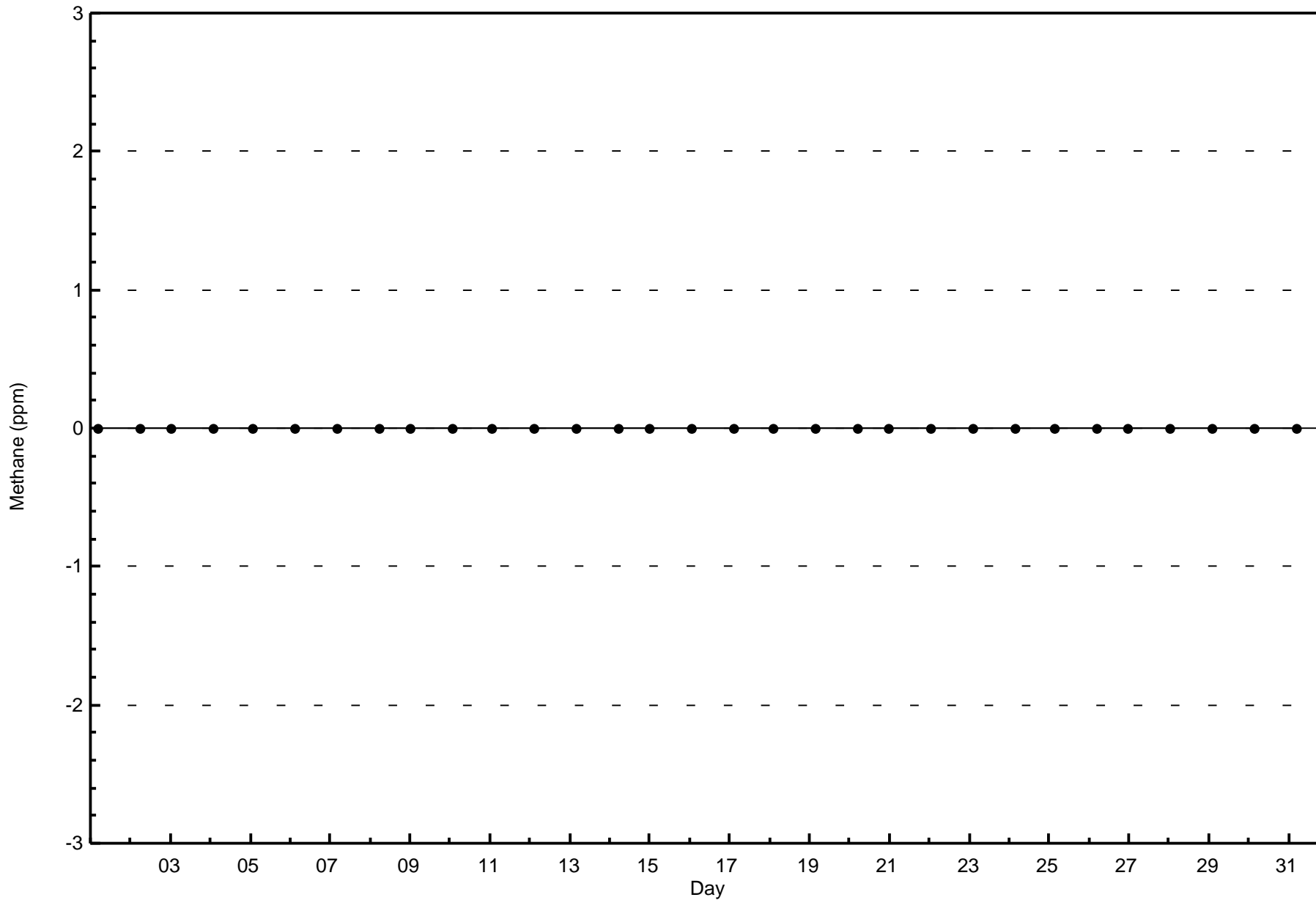


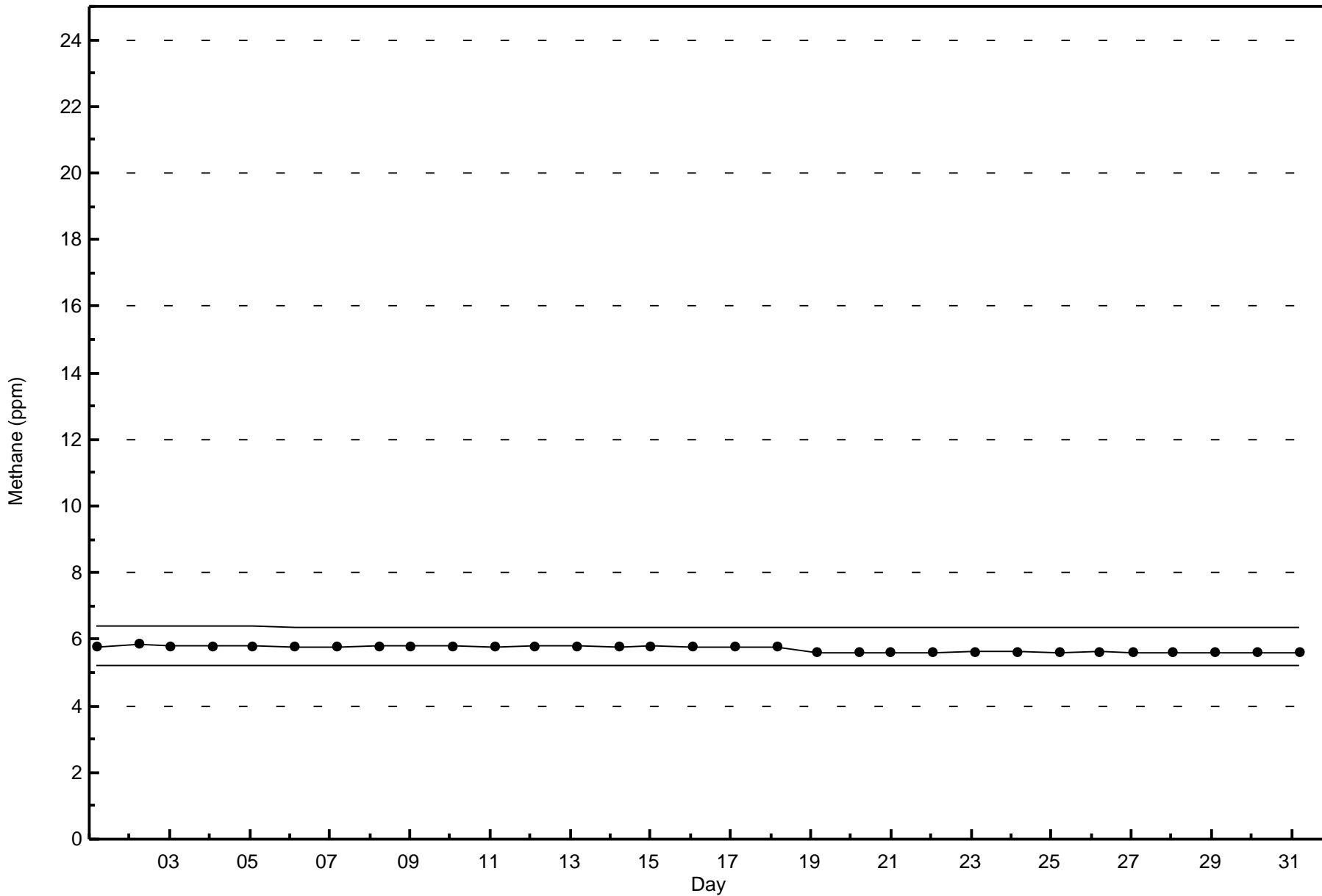


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Methane (CH<sub>4</sub>) - ppm  
Stony Mountain (AMS 18)







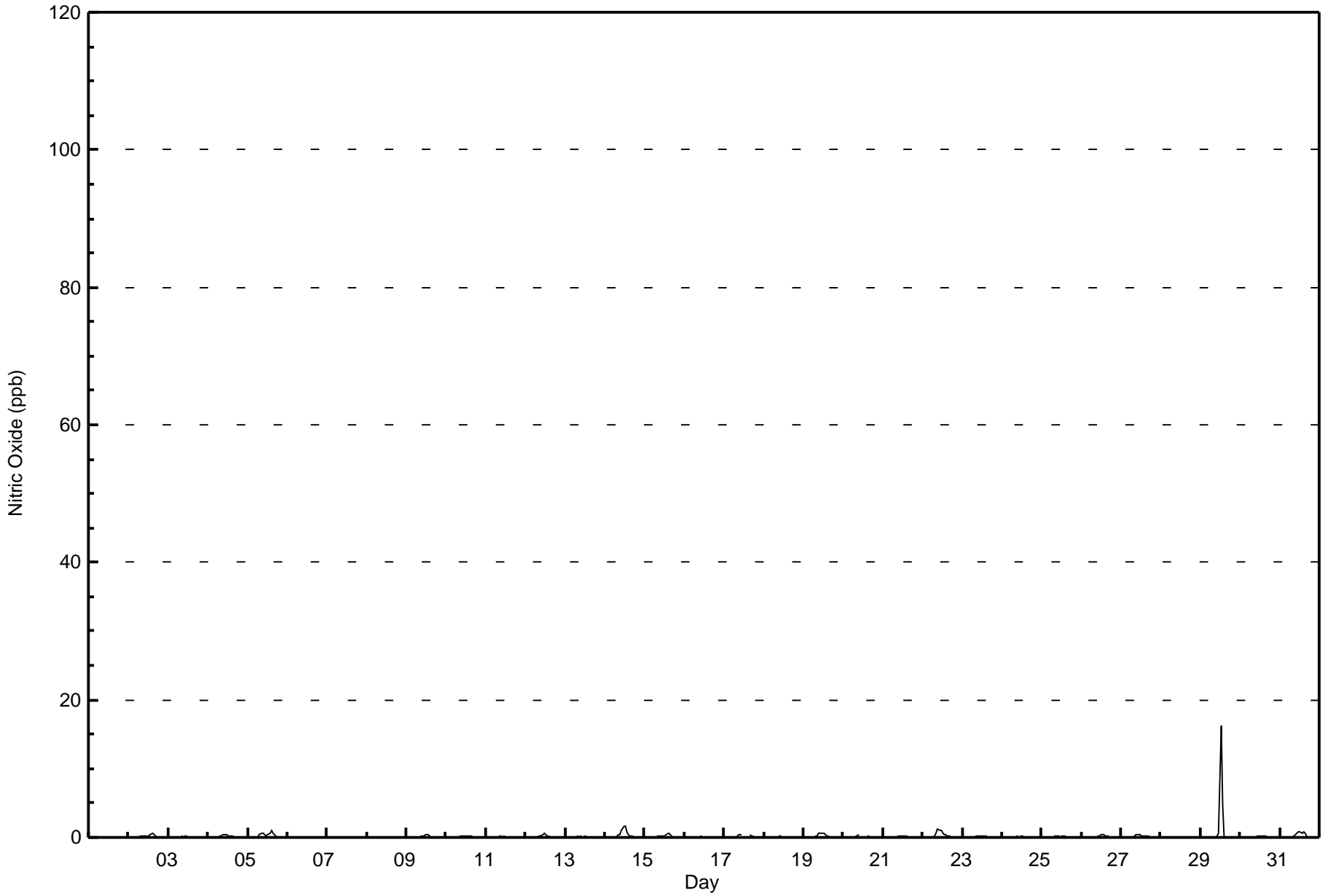


Maximum Value: 16 ppb on Oct 29 13:00																		Maximum Daily Average: 1.0 ppb on Oct 29						Hours in Service: 744			
Minimum Value: 0 ppb on Oct 1 08:00																		Minimum Daily Average: 0.0 ppb on Oct 28						Hours of Data: 705			
Maximum Diurnal Average: 0.8 ppb at hour 13																		Minimum Diurnal Average: 0.0 ppb at hour 1						Hours of Missing Data: 39			
Monthly Average: 0.1 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 1						Hours of Calibration: 39			
																		Percent Operational Time: 100.0									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.1	1
3-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
4-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
5-Oct	0	0	Z	0	0	0	0	0	1	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1
6-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
7-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
8-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
9-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
10-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
11-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
12-Oct	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
13-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
14-Oct	0	0	0	0	0	Z	0	0	0	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0.3	2
15-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.1	1
16-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
17-Oct	0	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.1	0
18-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
19-Oct	0	0	0	0	Z	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
20-Oct	0	0	0	0	0	Z	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.1	0
21-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
22-Oct	0	Z	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
23-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
24-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
25-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
26-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
27-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
28-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
29-Oct	0	0	Z	0	0	0	0	0	0	0	0	1	16	5	0	0	0	0	0	0	0	0	0	0	0	1.0	16
30-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
31-Oct	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration																											



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitric Oxide (NO) - ppb**  
**Stony Mountain - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Stony Mountain - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	705	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Stony Mountain - October 2017**

<b>Concentration</b> <b>Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	29	25	24	10	8	5	17	10	20	98	83	45	83	94	87	66	704
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	29	25	24	10	8	5	17	10	20	98	83	45	83	94	87	66	704

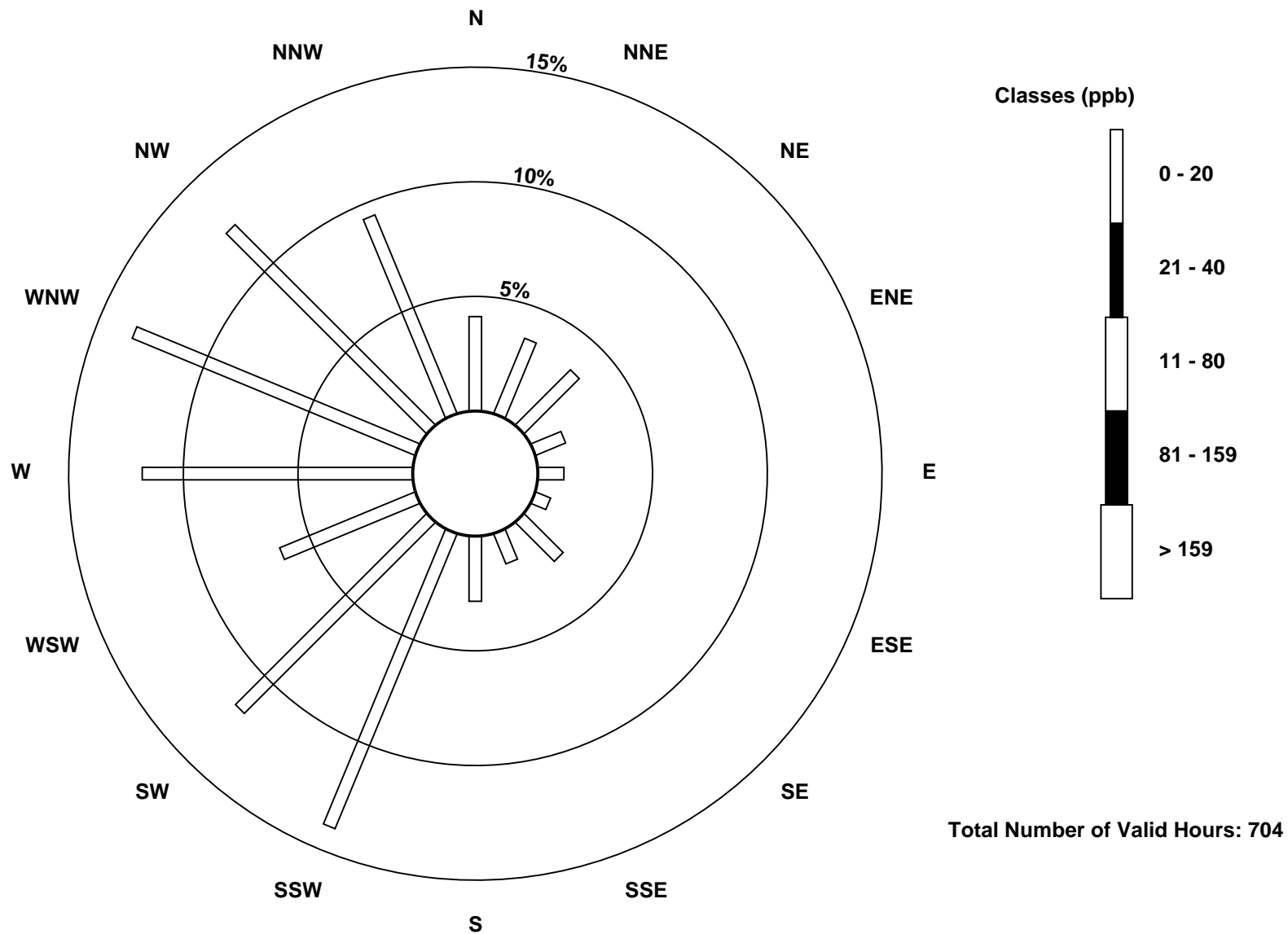
Total Number of Valid Hours: 704

Total Number of Hours: 744

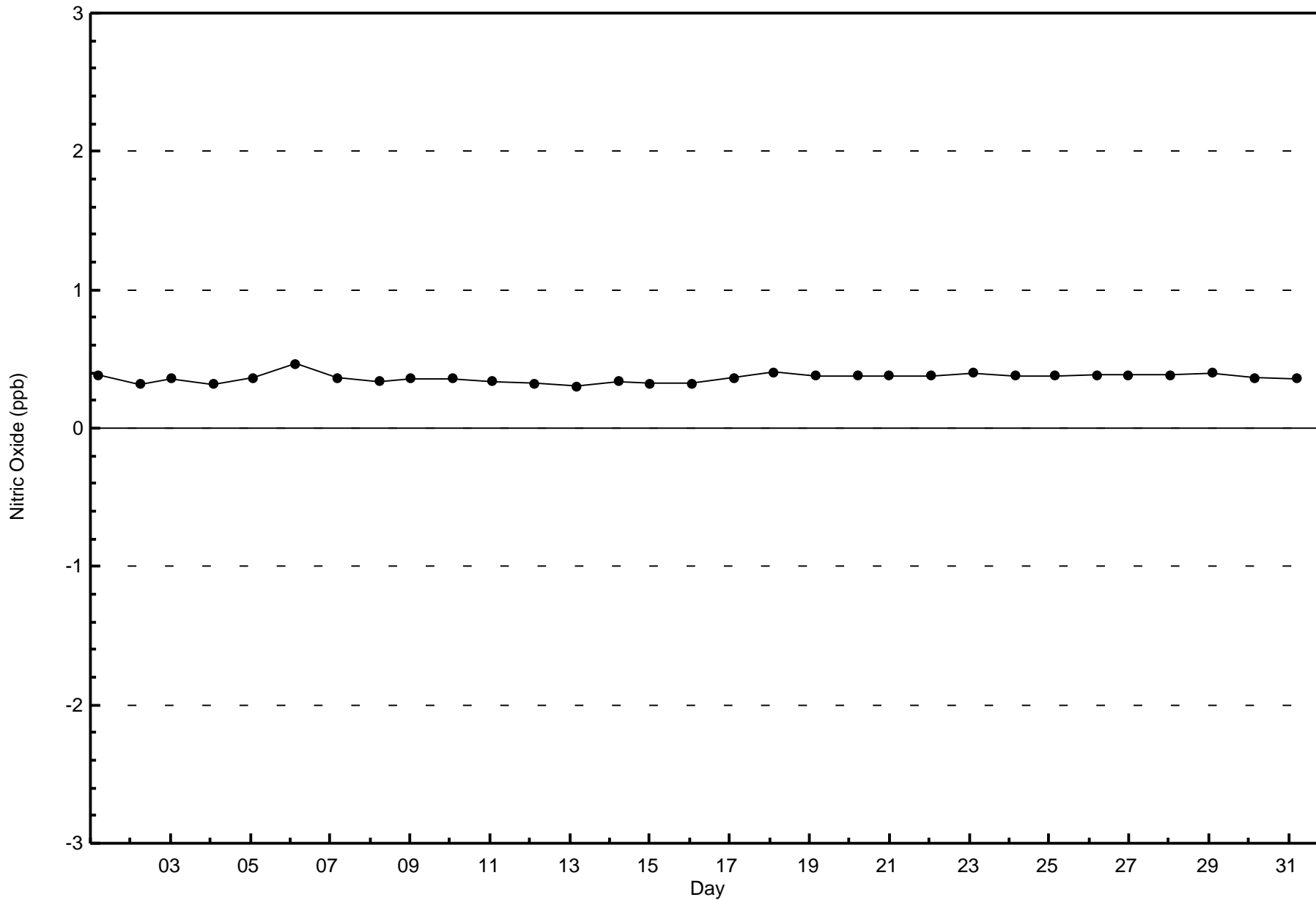


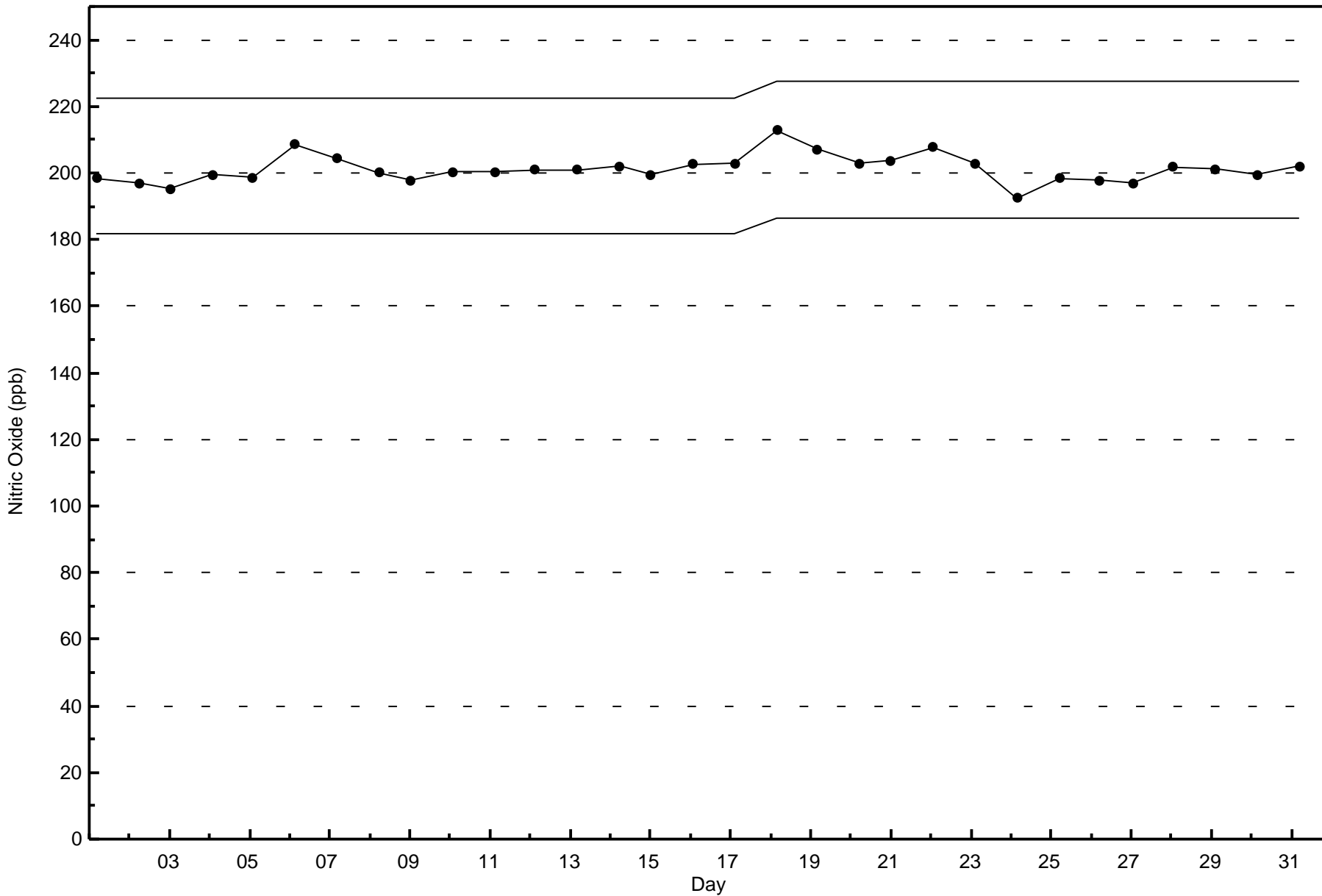
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitric Oxide (NO) - ppb  
Stony Mountain (AMS 18)











Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb

Stony Mountain - October 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 5 ppb on Oct 29 14:00	Maximum Daily Average: 2.6 ppb on Oct 5		Hours of Data:	705
Minimum Value: 0 ppb on Oct 18 03:00	Minimum Daily Average: 0.2 ppb on Oct 8		Hours of Missing Data:	39
Maximum Diurnal Average: 1.2 ppb at hour 1	Minimum Diurnal Average: 0.8 ppb at hour 3		Hours of Calibration:	39
Monthly Average: 1.0 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 1 P <sub>90</sub> = 2 P <sub>99</sub> = 4		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	1	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1	
2-Oct	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	2	1	1	1	1	0	1	0	1	0.9	2	
3-Oct	Z	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	4	2	1	1	0.9	4	
4-Oct	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	2	2	1	0.8	2	
5-Oct	1	1	Z	4	4	3	3	4	3	2	2	1	2	2	4	3	3	3	2	2	2	2	3	3	2.6	4	
6-Oct	3	2	2	Z	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0.7	3	
7-Oct	1	1	1	1	Z	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
8-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
9-Oct	Z	0	0	0	0	0	0	0	1	1	1	2	1	1	1	0	0	0	0	0	1	0	0	0	0.5	2	
10-Oct	1	Z	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	2	1	1	2	3	3	2	1.0	3
11-Oct	1	1	Z	0	0	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0.5	1	
12-Oct	1	0	1	Z	1	1	1	2	2	2	2	2	1	1	1	0	0	0	0	0	0	0	1	1	0.9	2	
13-Oct	1	1	1	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	1	
14-Oct	1	1	1	1	1	Z	3	3	3	3	4	3	3	2	2	1	1	1	1	1	1	1	1	1	1.7	4	
15-Oct	Z	1	0	0	0	0	0	1	1	1	1	1	1	1	3	2	2	2	2	2	2	2	1	1	1.1	3	
16-Oct	1	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.5	2	
17-Oct	2	1	Z	1	1	2	2	2	3	3	2	C	C	C	C	2	3	2	2	1	0	0	0	0	1.6	3	
18-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	1	2	1	0.4	3	
19-Oct	1	1	1	1	Z	1	1	2	1	2	1	1	1	1	1	1	1	1	1	1	2	3	5	5	2	1.6	5
20-Oct	3	3	2	2	1	Z	1	2	1	1	C	C	C	C	1	1	1	1	2	2	1	1	1	1	1.5	3	
21-Oct	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	0.5	1	
22-Oct	1	Z	1	2	2	3	3	2	3	4	3	3	2	1	2	2	2	2	2	1	1	1	1	1	1.8	4	
23-Oct	1	1	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	0.6	1	
24-Oct	1	1	1	Z	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.7	2	
25-Oct	2	2	1	0	Z	1	1	1	1	0	0	0	0	1	0	0	0	1	1	1	2	2	2	1	2	0.9	2
26-Oct	3	2	0	0	0	Z	0	0	0	0	0	1	2	1	1	1	2	2	3	3	3	2	2	2	1.3	3	
27-Oct	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	4	4	4	1.3	4
28-Oct	4	Z	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	4	
29-Oct	0	0	Z	0	0	0	0	0	0	1	1	1	3	5	1	1	1	1	1	1	2	2	1	0	1.0	5	
30-Oct	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	2	2	2	2	2	1	1	0.9	2	
31-Oct	1	1	1	1	Z	2	2	2	2	2	2	2	3	3	4	5	4	3	3	2	1	1	1	1	2.1	5	

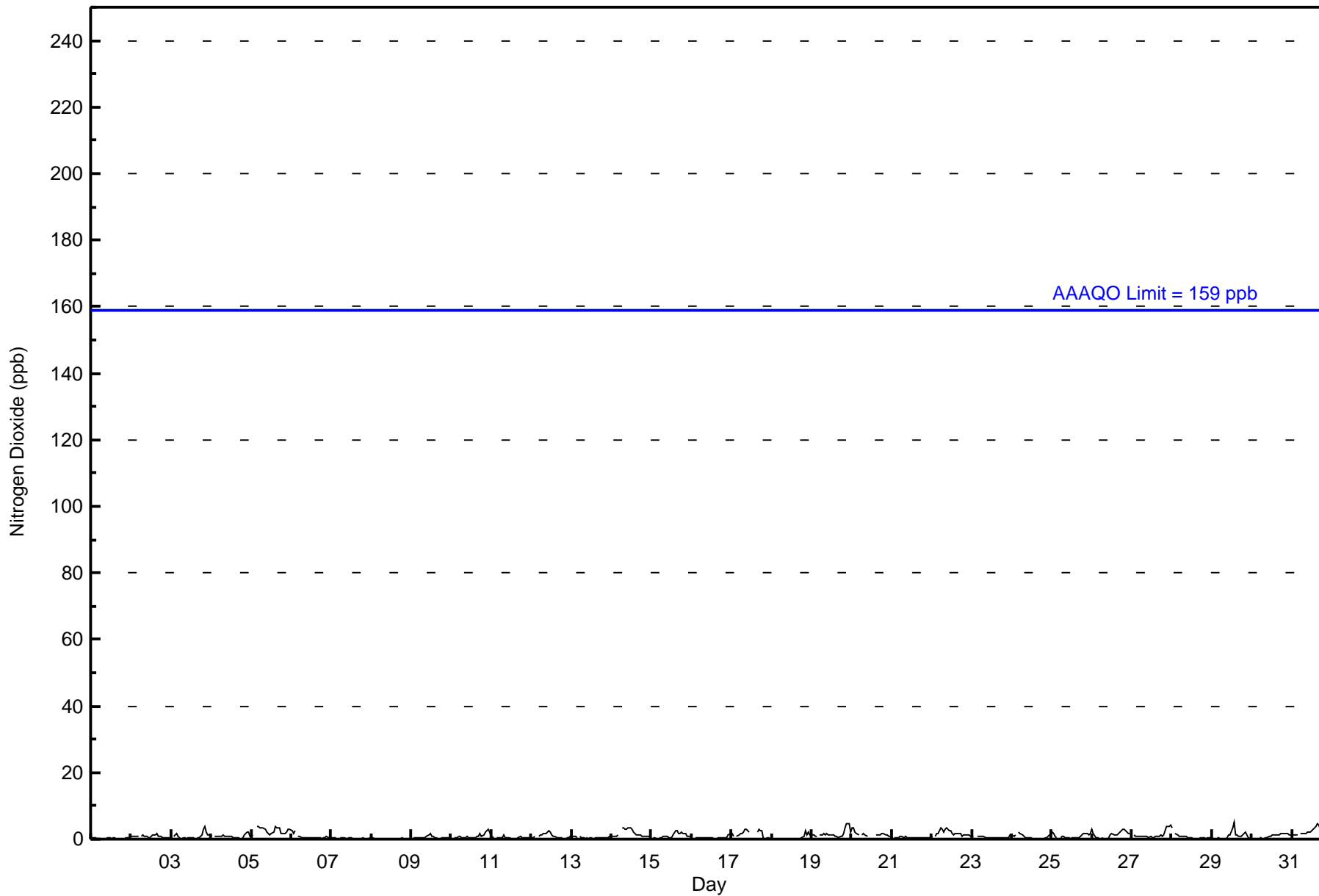
1.2	0.9	0.8	0.9	0.9	0.9	0.9	0.9	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	0.9	1.0	1.2	1.2	1.2	1.1	Diurnal Average
4	3	2	4	4	3	3	3	4	3	4	4	3	3	5	4	5	4	3	3	3	4	5	5	4	Diurnal Maximum

Z - zerospan      C - Calibration  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



Wood Buffalo Environmental Association  
Hourly Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Stony Mountain - October 2017





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Stony Mountain - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	705	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Stony Mountain - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 20	29	25	24	10	8	5	17	10	20	98	83	45	83	94	87	66	704
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	29	25	24	10	8	5	17	10	20	98	83	45	83	94	87	66	704

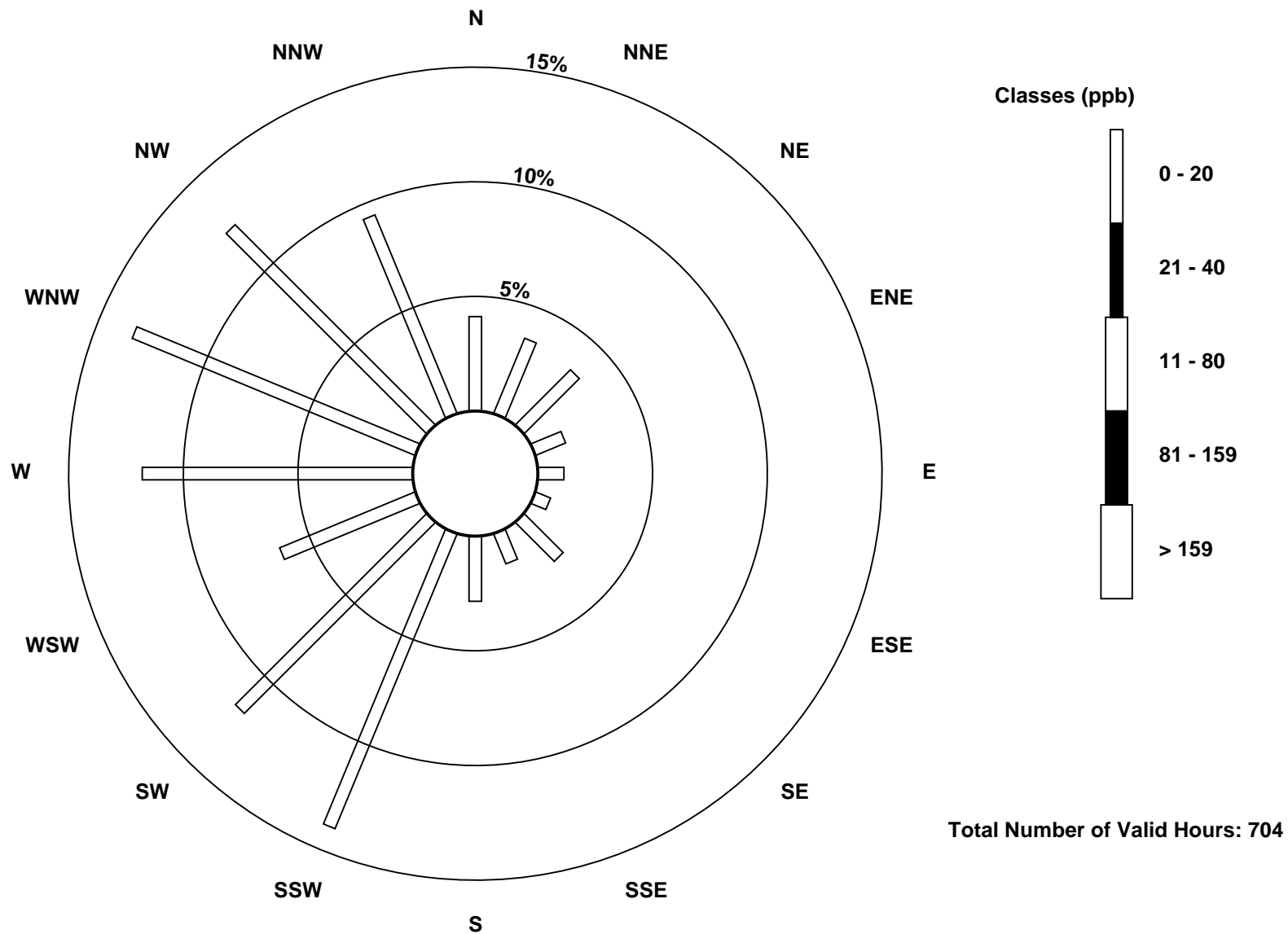
Total Number of Valid Hours: 704

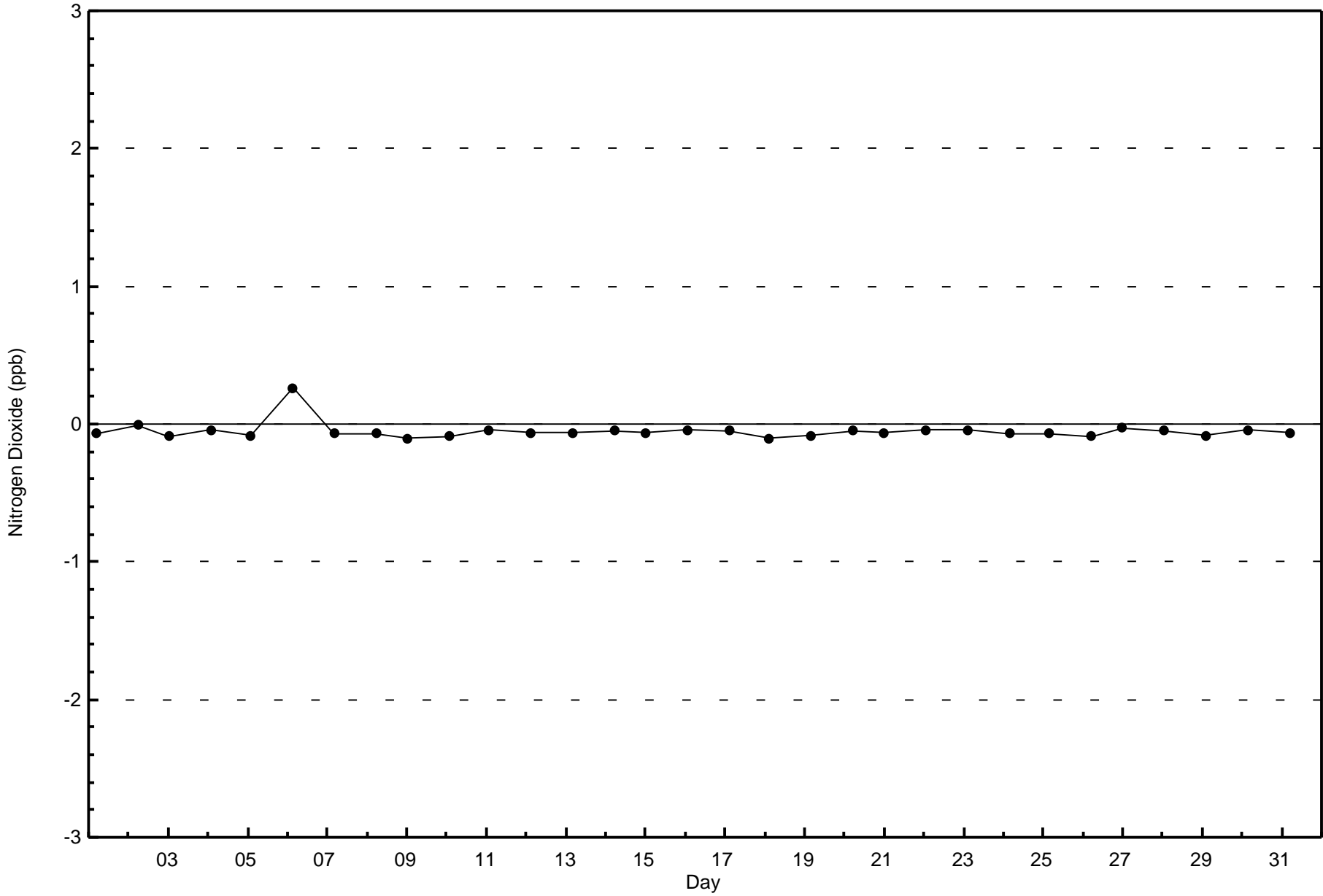
Total Number of Hours: 744



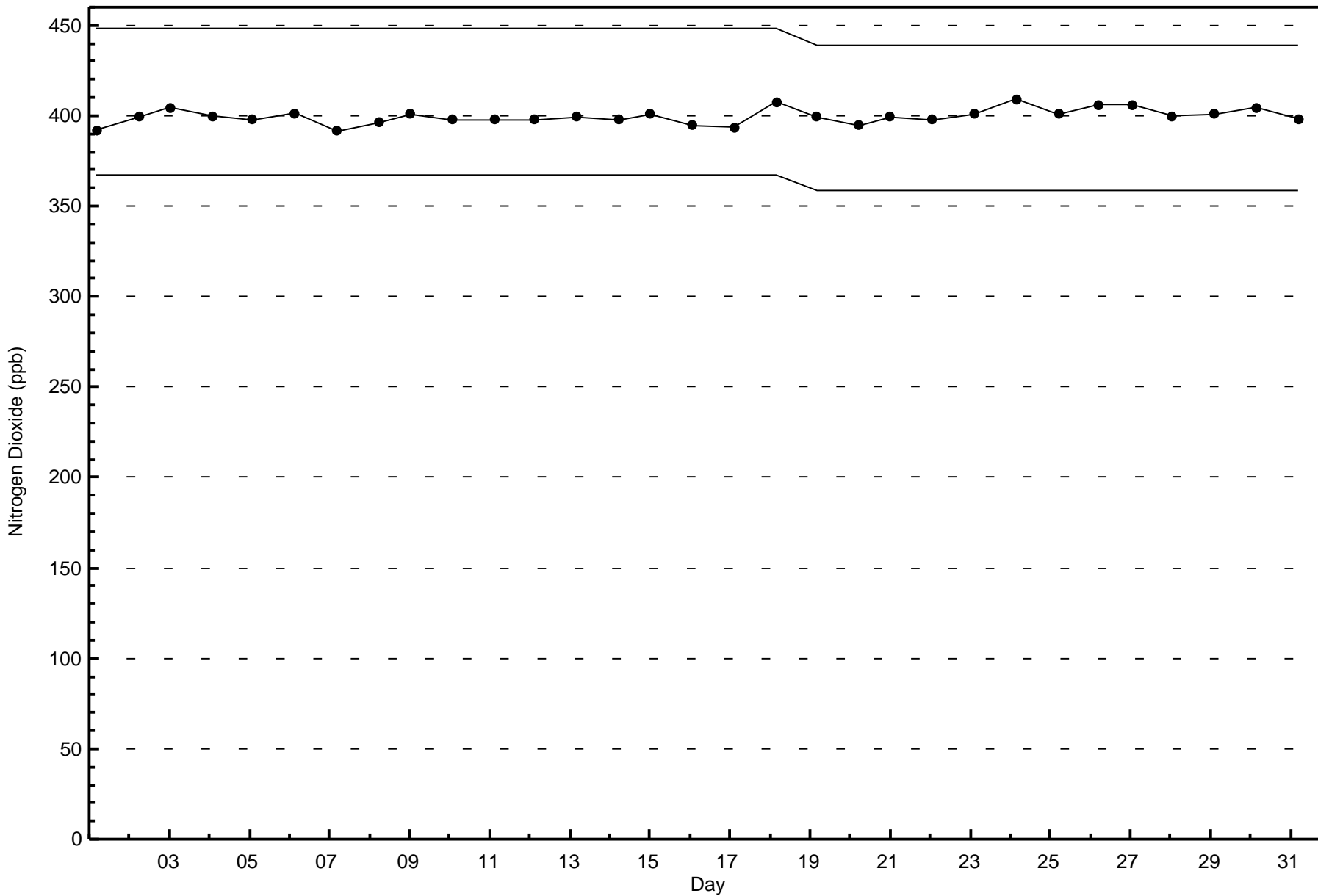
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Stony Mountain (AMS 18)











**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

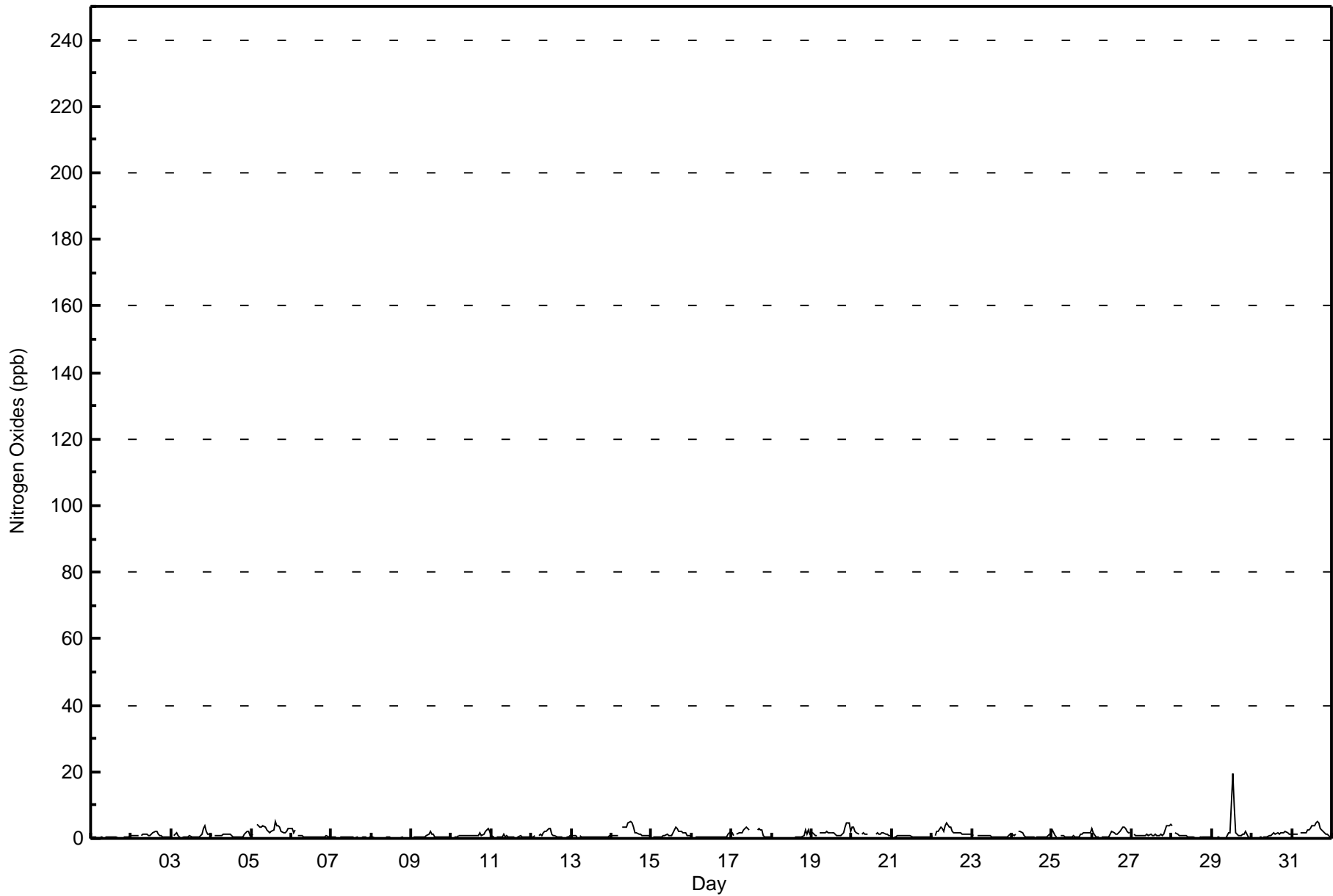
**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Stony Mountain - October 2017**

Maximum Value: 19 ppb on Oct 29 13:00		Maximum Daily Average: 2.8 ppb on Oct 5		Hours in Service: 744																						
Minimum Value: 0 ppb on Oct 8 15:00		Minimum Daily Average: 0.2 ppb on Oct 8		Hours of Data: 705																						
Maximum Diurnal Average: 1.7 ppb at hour 13		Minimum Diurnal Average: 0.8 ppb at hour 3		Hours of Missing Data: 39																						
Monthly Average: 1.1 ppb		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 1 P <sub>90</sub> = 2 P <sub>99</sub> = 5		Hours of Calibration: 39																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	1	0	1	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0.3	1
2-Oct	1	1	1	1	1	Z	1	1	1	1	1	1	2	2	2	1	1	1	0	0	0	0	0	1	1.0	2
3-Oct	Z	1	1	2	1	0	0	0	1	0	0	1	0	0	0	0	1	1	3	4	2	1	1	1.0	4	
4-Oct	1	Z	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	2	2	1	0.9	2	
5-Oct	1	1	Z	4	4	3	3	4	3	3	2	2	3	5	4	4	3	2	2	2	2	3	3	2.8	5	
6-Oct	3	2	3	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	0.8	3	
7-Oct	1	1	1	1	Z	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.4	1	
8-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
9-Oct	Z	0	0	0	0	0	0	0	1	1	1	2	1	1	1	0	0	0	0	0	0	0	0	0.6	2	
10-Oct	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	2	3	3	1.1	3	
11-Oct	1	1	Z	0	0	0	1	1	1	1	0	1	0	0	0	0	0	1	1	0	0	0	0	0.5	1	
12-Oct	1	0	1	Z	1	1	1	2	2	2	3	3	1	1	1	1	0	0	0	0	0	0	1	1.0	3	
13-Oct	1	1	1	1	Z	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.5	1	
14-Oct	1	1	1	1	1	Z	3	4	3	3	4	5	5	3	2	2	1	1	1	1	1	1	1	2.0	5	
15-Oct	Z	0	0	0	0	0	0	1	1	1	1	1	1	2	3	3	2	2	2	2	2	1	1	1.2	3	
16-Oct	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.5	2	
17-Oct	2	1	Z	1	2	2	2	2	3	3	3	C	C	C	C	3	3	3	2	1	0	0	0	1.7	3	
18-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	1	2	0.5	3	
19-Oct	2	1	1	1	Z	2	2	2	2	2	2	2	2	2	1	1	1	1	1	2	3	5	5	1.8	5	
20-Oct	3	3	2	2	1	Z	1	2	1	1	C	C	C	C	1	2	1	1	1	2	1	1	1	1.6	3	
21-Oct	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	0	0.6	1	
22-Oct	1	Z	1	2	2	3	3	2	4	5	4	3	2	2	2	2	2	2	1	1	1	1	1	2.1	5	
23-Oct	1	1	Z	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	0.7	1	
24-Oct	1	1	1	Z	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0.8	2	
25-Oct	2	2	1	1	Z	1	1	1	1	1	0	0	1	1	1	0	1	1	1	2	2	2	2	1.0	2	
26-Oct	3	2	1	0	0	Z	0	0	0	0	0	1	2	1	1	2	2	3	3	3	2	2	2	1.5	3	
27-Oct	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	4	4	1.5	4	
28-Oct	4	Z	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	4	
29-Oct	0	0	Z	0	0	0	0	0	0	1	1	2	19	10	2	1	1	1	1	1	2	1	0	2.0	19	
30-Oct	0	0	0	Z	0	0	0	0	0	1	1	1	2	1	1	1	1	2	2	2	2	2	1	1.0	2	
31-Oct	1	1	1	1	Z	2	2	2	2	2	3	3	4	4	5	5	4	3	3	2	1	1	1	2.3	5	
		1.2	0.9	0.8	0.9	0.9	1.0	1.0	1.1	1.1	1.2	1.2	1.2	1.7	1.3	1.1	1.1	1.0	1.0	1.0	1.0	1.2	1.2	1.2	1.1	Diurnal Average
		4	3	3	4	4	3	3	4	4	5	4	5	19	10	5	5	4	3	3	3	4	5	5	4	Diurnal Maximum
Z - zerospan		C - Calibration																								



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Stony Mountain - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Stony Mountain - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	705	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Stony Mountain - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	29	25	24	10	8	5	17	10	20	98	83	45	83	94	87	66	704
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	29	25	24	10	8	5	17	10	20	98	83	45	83	94	87	66	704

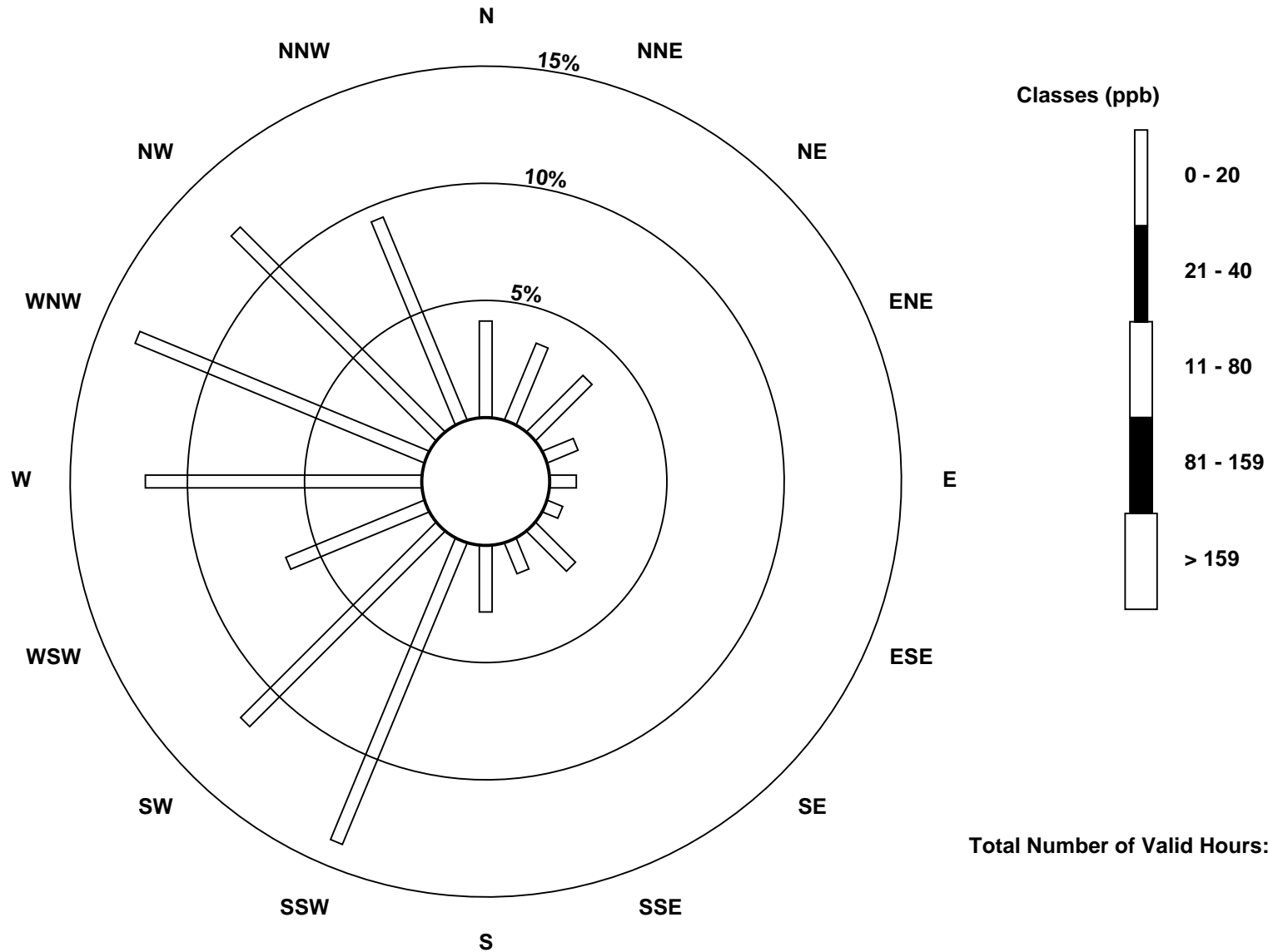
Total Number of Valid Hours: 704

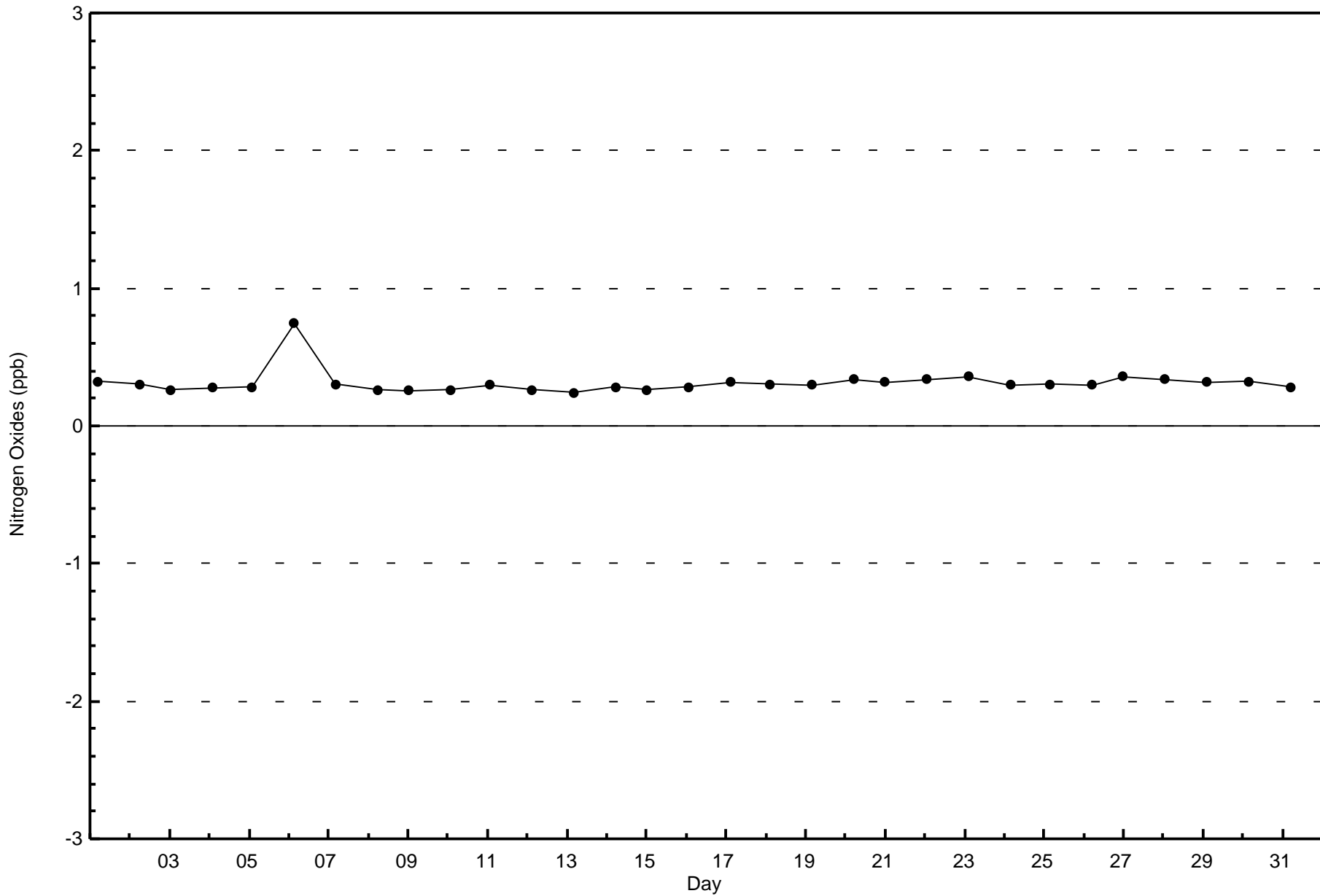
Total Number of Hours: 744

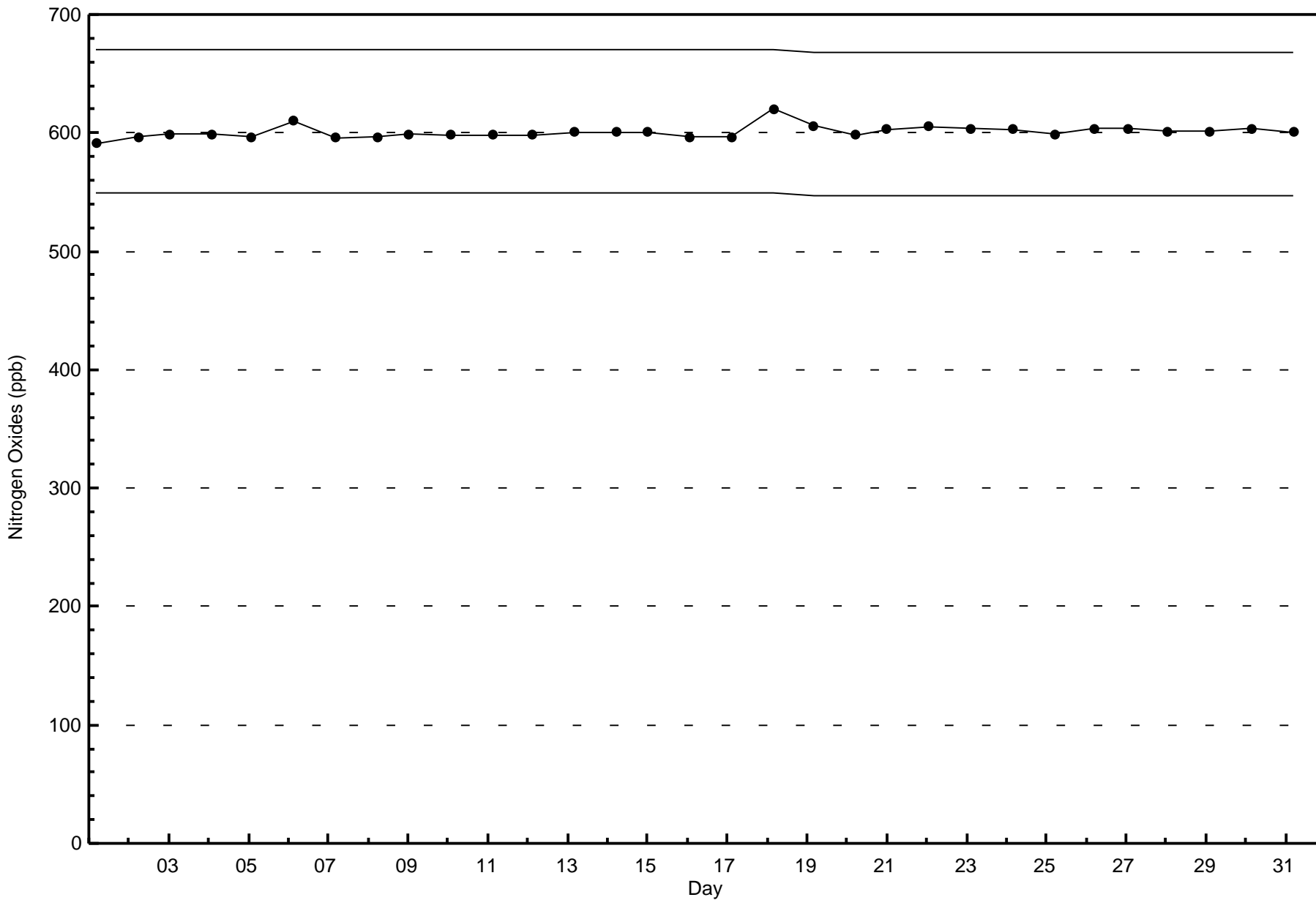


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Stony Mountain (AMS 18)











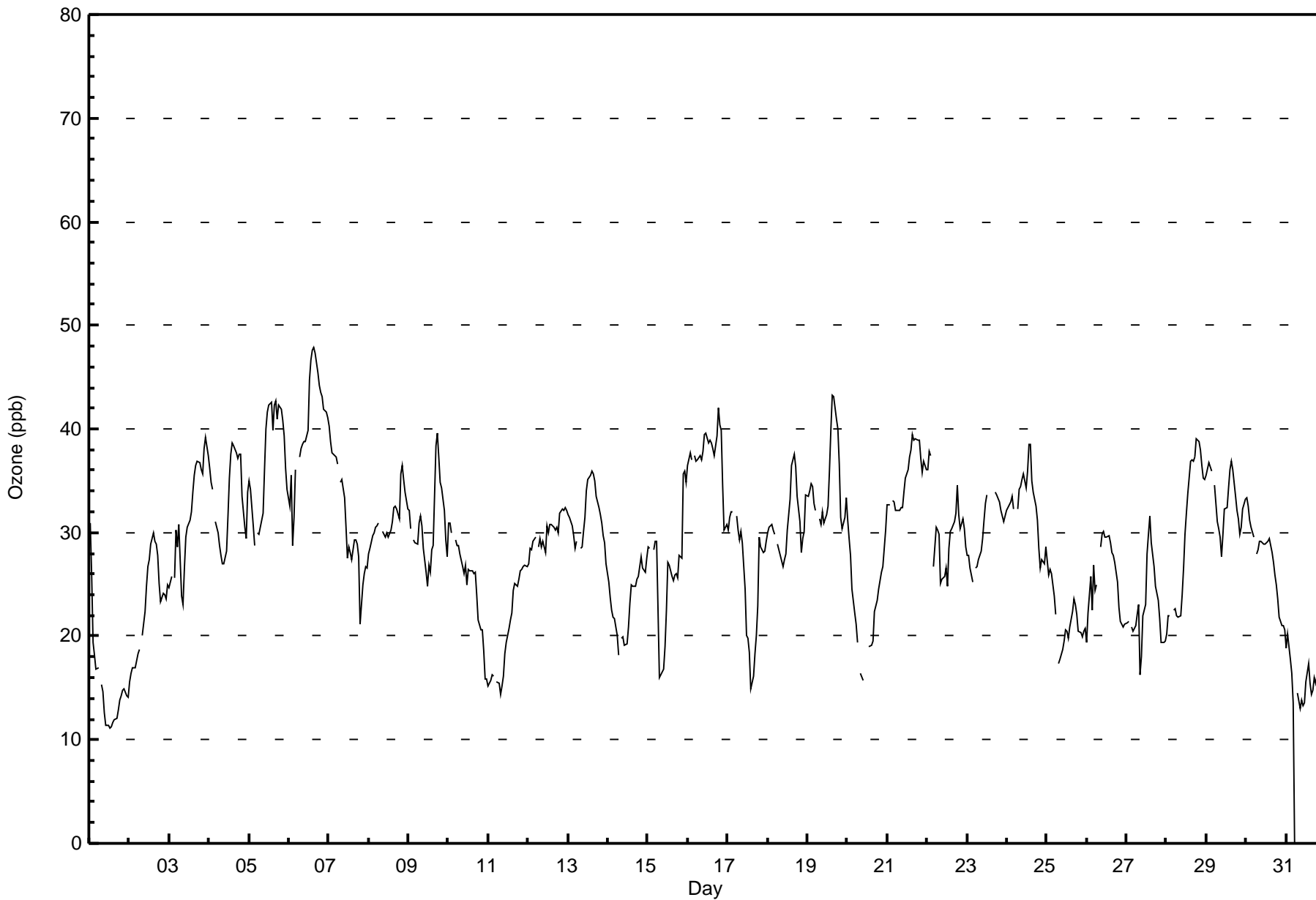
# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Ozone (O<sub>3</sub>) - ppb

## Stony Mountain - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																	
Maximum Value: 48 ppb on Oct 6 16:00										Maximum Daily Average: 40.5 ppb on Oct 6										Hours of Data: 706							
Minimum Value: 0 ppb on Oct 31 06:00										Minimum Daily Average: 15.2 ppb on Oct 1										Hours of Missing Data: 38							
Maximum Diurnal Average: 30.9 ppb at hour 17										Minimum Diurnal Average: 26.0 ppb at hour 9										Hours of Calibration: 38							
Monthly Average: 28.7 ppb										Percentiles: P <sub>1</sub> = 12 P <sub>10</sub> = 19 Q <sub>1</sub> = 24 Median = 29 O <sub>3</sub> = 33 P <sub>90</sub> = 38 P <sub>99</sub> = 44										Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	31	26	19	18	17	17	Z	15	15	13	11	11	11	11	12	12	12	13	14	14	15	15	14	14	15.2	31	
2-Oct	16	16	17	17	18	18	19	Z	20	22	25	27	27	29	30	29	29	28	25	23	24	24	24	25	23.1	30	
3-Oct	25	26	Z	26	30	29	31	24	23	27	30	30	31	32	34	36	36	37	37	36	36	38	39	37	31.7	39	
4-Oct	36	35	34	Z	31	30	29	28	27	27	28	32	35	38	39	38	38	37	38	38	33	31	29	34	33.2	39	
5-Oct	35	34	31	29	Z	30	30	30	32	36	40	42	42	43	40	42	43	41	42	42	41	39	36	34	37.1	43	
6-Oct	33	36	29	31	36	Z	37	38	39	39	39	40	45	47	48	48	47	45	44	44	43	42	42	41	40.5	48	
7-Oct	40	39	38	38	37	37	Z	35	35	33	31	28	29	28	27	29	29	29	28	21	25	26	27	27	31.1	40	
8-Oct	28	28	30	30	31	31	31	Z	30	30	30	30	30	30	31	32	33	32	31	36	36	35	34	32	31.3	36	
9-Oct	32	30	Z	29	29	29	31	32	31	28	26	25	27	26	28	29	38	40	37	35	34	32	29	28	30.7	40	
10-Oct	31	31	30	Z	29	29	29	28	27	26	27	25	26	26	26	26	26	24	22	21	21	19	16	16	25.2	31	
11-Oct	15	16	16	16	Z	16	15	14	15	16	18	19	21	22	22	24	25	25	25	26	26	27	27	27	20.7	27	
12-Oct	27	28	28	29	30	Z	29	29	29	29	28	31	30	31	31	31	30	30	30	32	32	32	32	32	30.0	32	
13-Oct	32	31	31	30	28	29	Z	28	29	30	32	34	35	35	36	36	35	34	32	32	31	30	29	27	31.5	36	
14-Oct	25	24	22	22	22	20	18	Z	20	20	19	19	21	23	25	25	26	26	26	27	28	27	26	28	23.3	28	
15-Oct	29	28	Z	28	29	29	23	16	16	17	19	22	27	27	26	25	26	26	26	28	28	36	36	35	26.1	36	
16-Oct	37	38	37	Z	37	37	37	37	37	38	39	40	39	39	39	38	37	39	42	40	40	35	30	31	37.5	42	
17-Oct	30	31	32	32	Z	32	30	29	30	29	24	20	20	18	15	16	18	20	23	30	29	28	28	29	25.9	32	
18-Oct	30	31	31	30	30	Z	29	28	27	27	27	28	30	33	36	37	38	36	33	31	28	29	30	34	31.1	38	
19-Oct	33	34	35	34	33	32	Z	31	31	32	31	32	33	36	40	43	43	41	40	37	31	30	31	33	34.7	43	
20-Oct	31	29	28	25	22	21	19	Z	16	16	C	C	C	19	19	19	22	23	23	25	26	27	28	30	23.5	31	
21-Oct	33	33	Z	33	33	32	32	32	32	32	34	35	36	37	38	39	39	39	39	39	39	37	36	37	36	35.4	39
22-Oct	36	38	37	Z	27	30	30	30	25	26	26	27	25	29	30	30	31	32	35	32	30	31	30	29	30.2	38	
23-Oct	28	28	27	25	Z	27	27	27	28	29	31	33	34	C	C	C	C	34	34	33	32	32	31	32	30.0	34	
24-Oct	32	33	33	33	32	Z	32	34	34	35	36	34	36	39	38	35	34	33	31	29	27	27	29	29	32.7	39	
25-Oct	27	26	26	26	24	22	Z	17	18	19	19	21	21	20	21	22	24	23	22	20	20	20	21	21	21.7	27	
26-Oct	19	22	26	23	27	24	25	Z	29	30	30	30	30	30	29	28	28	27	25	23	21	21	21	21	25.6	30	
27-Oct	21	21	Z	21	20	21	22	23	16	18	22	23	28	30	32	29	27	25	24	23	22	19	19	20	22.9	32	
28-Oct	20	22	22	Z	22	23	22	22	22	24	27	30	32	34	37	37	37	37	39	39	38	36	35	35	30.1	39	
29-Oct	36	37	36	36	Z	35	31	30	30	28	30	32	32	34	36	37	36	34	32	31	30	31	32	33	33.0	37	
30-Oct	33	33	31	31	30	Z	28	28	29	29	29	29	29	29	29	28	27	26	25	24	22	21	21	21	27.4	33	
31-Oct	19	20	18	16	14	0	Z	15	13	14	13	14	16	17	16	14	15	16	15	17	17	19	18	19	15.4	20	
29.0 29.2 28.6 27.2 27.6 26.1 27.4 27.1 26.0 26.4 27.4 28.0 29.2 29.7 30.3 30.6 30.9 30.7 30.3 29.8 29.2 28.8 28.4 28.6																								Diurnal Average			
40 39 38 38 37 37 37 38 39 39 40 42 45 47 48 48 47 45 44 44 43 42 42 41																								Diurnal Maximum			
Z - zerospan C - Calibration																											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																											





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Stony Mountain - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	106	15.01	15.01
21 - 50	600	84.99	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Stony Mountain - October 2017**

<b>Concentration</b> <b>Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	7	11	17	4	5	1	0	3	2	13	5	1	2	3	17	14	105
21 - 50	23	14	9	7	4	3	17	9	17	86	78	43	78	87	73	52	600
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	30	25	26	11	9	4	17	12	19	99	83	44	80	90	90	66	705

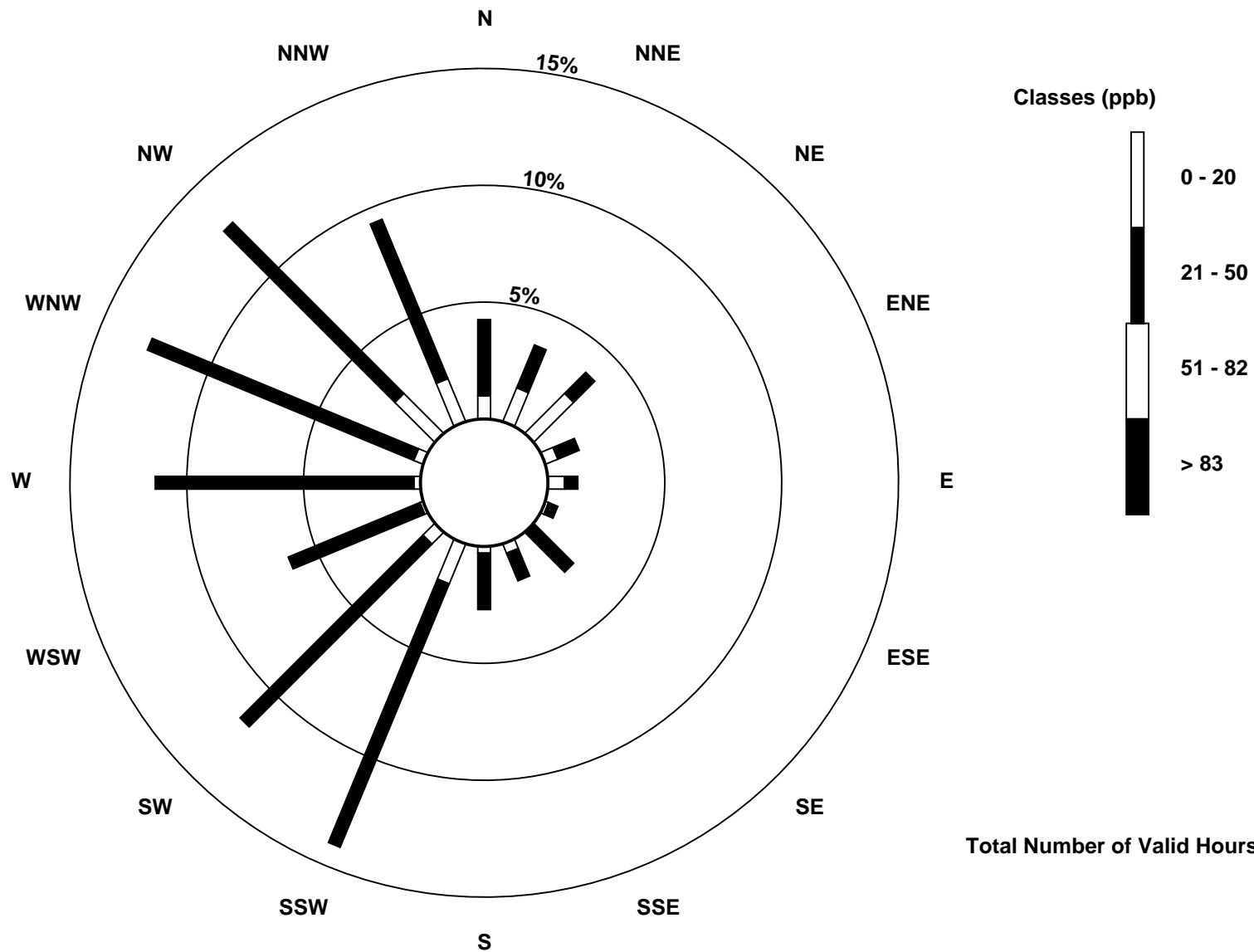
Total Number of Valid Hours: 705

Total Number of Hours: 744

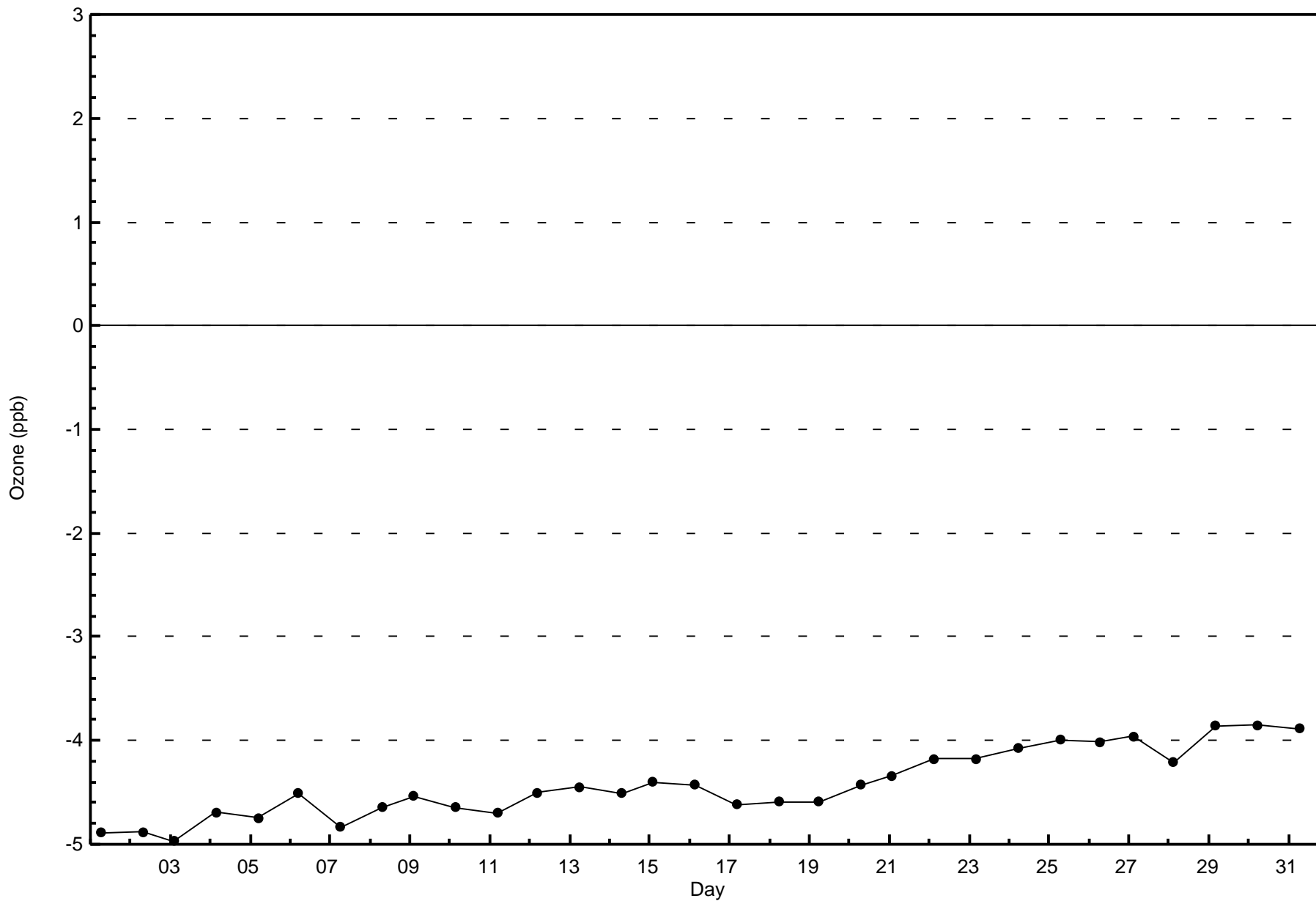


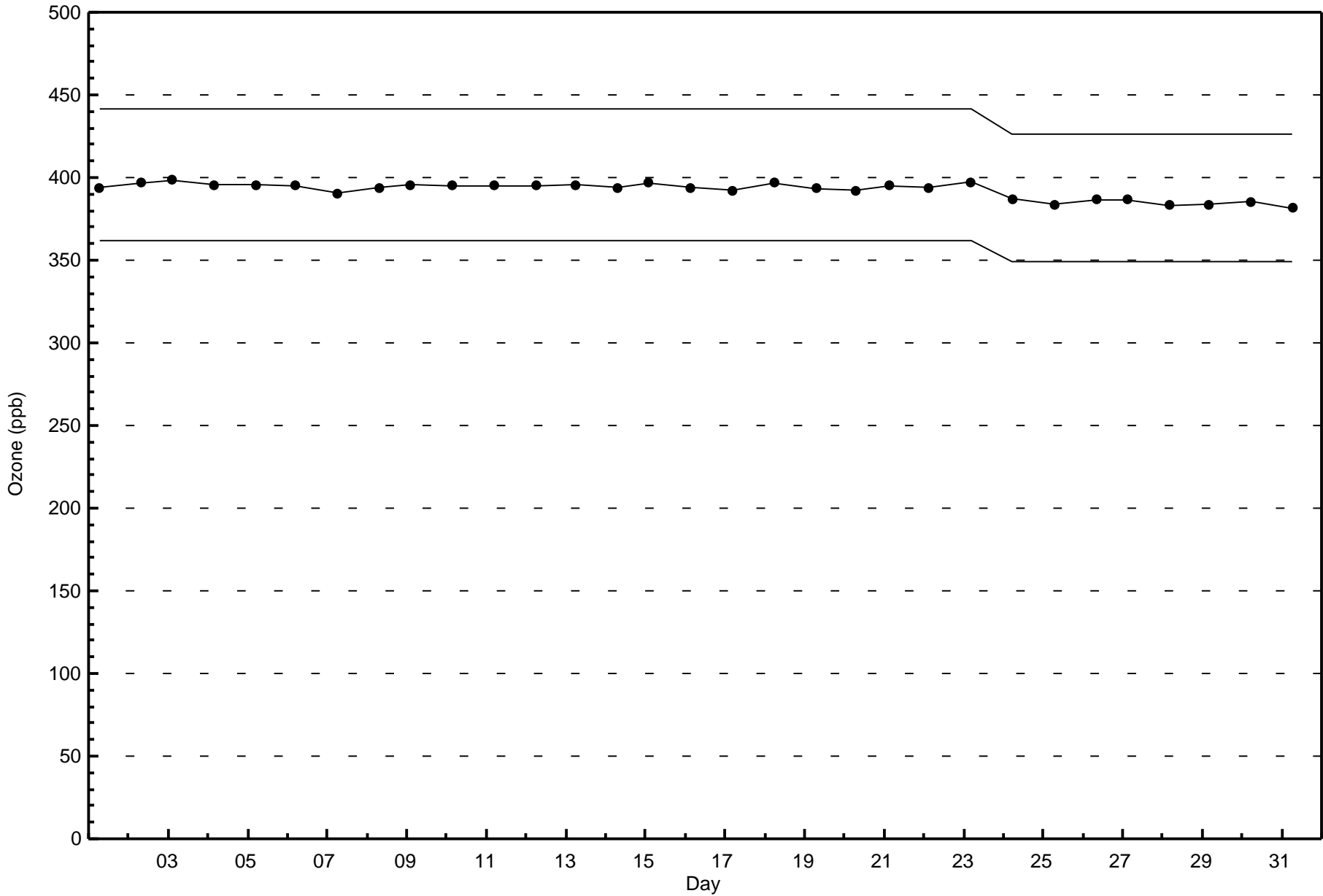
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Ozone (O<sub>3</sub>) - ppb  
Stony Mountain (AMS 18)



Total Number of Valid Hours: 705







Summary of Hour Averages

Stony Mountain - October 2017

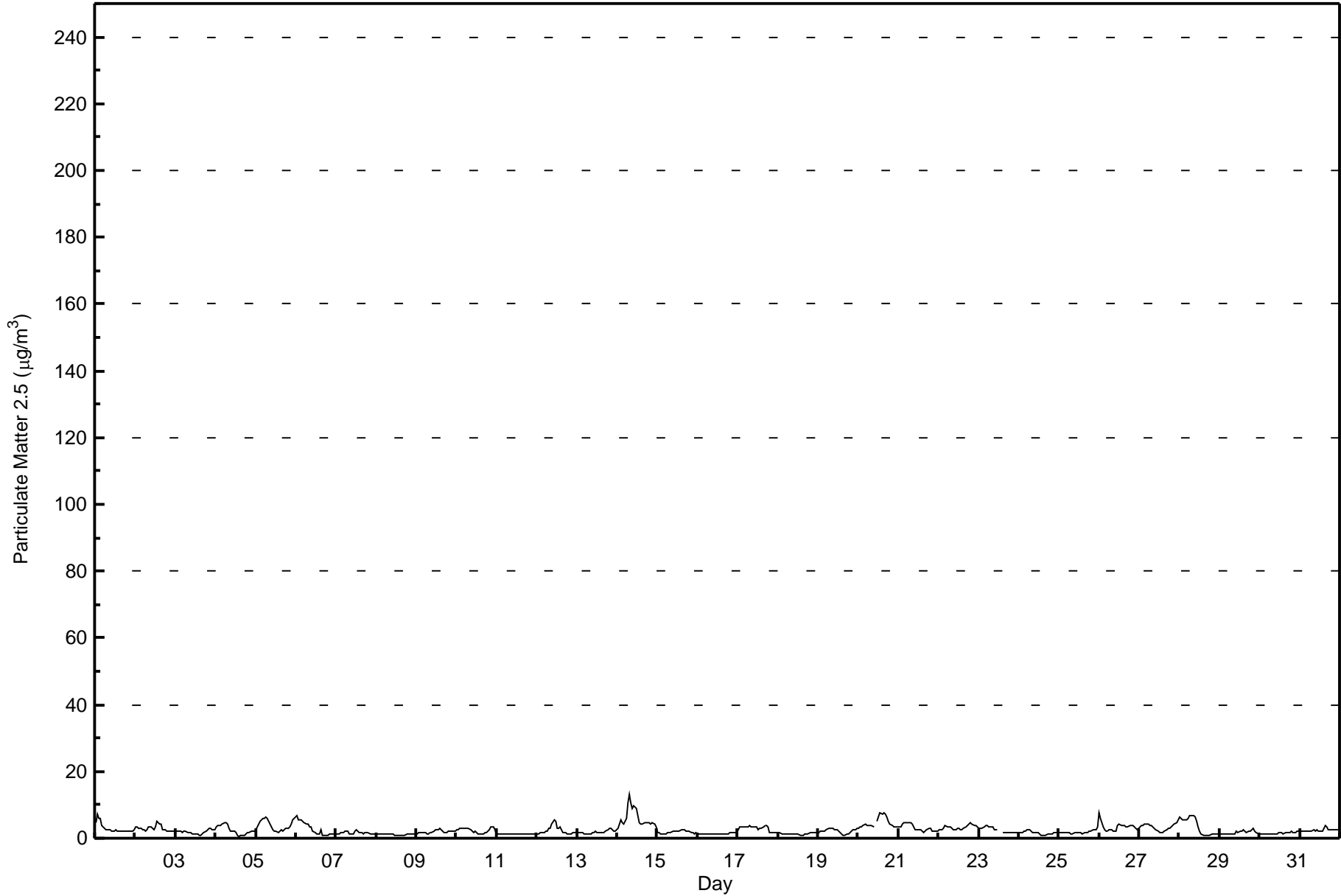
Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 13.1 µg/m <sup>3</sup> on Oct 14 08:00 Minimum Value: 0.6 µg/m <sup>3</sup> on Oct 4 15:00 Maximum Diurnal Average: 3.1 µg/m <sup>3</sup> at hour 8 Monthly Average: 2.51 µg/m <sup>3</sup>		Maximum Daily Average: 6.0 µg/m <sup>3</sup> on Oct 14 Minimum Daily Average: 1.1 µg/m <sup>3</sup> on Oct 8 Minimum Diurnal Average: 2.1 µg/m <sup>3</sup> at hour 17 Percentiles: P <sub>1</sub> = 0.9 P <sub>10</sub> = 1.2 Q <sub>1</sub> = 1.5 Median = 2.1 Q <sub>3</sub> = 3.1 P <sub>90</sub> = 4.4 P <sub>99</sub> = 6.3		Hours in Service: 744 Hours of Data: 741 Hours of Missing Data: 3 Hours of Calibration: 3 Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	4.8	7.1	6.0	5.8	3.8	2.9	2.5	2.5	2.6	2.5	2.3	2.1	2.3	2.3	2.3	2.3	2.1	2.1	2.0	2.0	2.0	1.9	2.0	2.6	3.0	7.1
2-Oct	3.2	3.3	3.0	2.8	2.3	2.5	2.3	2.5	3.2	3.3	2.8	2.6	3.2	4.9	4.3	4.4	2.6	2.6	2.6	2.2	2.0	2.0	2.0	2.0	2.9	4.9
3-Oct	2.0	2.1	2.3	2.2	1.9	1.9	2.0	1.8	1.8	1.6	1.3	1.4	1.2	1.1	1.0	1.0	1.2	1.5	2.1	2.7	3.2	2.8	2.6	2.7	1.9	3.2
4-Oct	3.3	3.7	3.8	4.0	4.4	4.5	4.7	4.3	3.1	2.3	2.1	1.9	1.6	0.9	0.6	0.7	0.7	0.9	1.1	1.6	1.8	2.1	2.2	2.3	2.4	4.7
5-Oct	2.5	3.2	5.1	5.6	6.0	5.9	6.5	6.0	4.3	3.6	2.8	2.2	1.9	1.8	2.1	2.4	2.3	2.6	2.9	3.1	3.3	4.1	5.4	5.8	3.8	6.5
6-Oct	6.6	5.4	5.4	5.7	5.3	4.6	4.3	4.2	3.6	3.4	2.3	1.7	1.4	1.3	1.2	2.5	0.9	0.9	0.9	1.0	1.1	1.1	1.1	1.1	2.8	6.6
7-Oct	1.2	1.3	1.4	1.6	1.8	2.0	2.2	1.9	1.2	1.2	1.2	1.9	2.5	1.9	1.7	1.6	1.5	1.9	1.5	1.5	1.4	1.3	1.3	1.3	1.6	2.5
8-Oct	1.3	1.3	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0	0.9	0.9	0.9	0.9	1.0	1.0	1.1	1.2	1.2	1.2	1.2	1.3	1.1	1.3
9-Oct	1.5	1.6	1.6	1.6	1.5	1.5	1.4	1.4	1.5	1.8	2.2	2.6	2.7	2.4	3.0	2.5	1.8	1.8	1.8	1.9	2.1	2.1	2.1	2.2	1.9	3.0
10-Oct	2.6	2.6	2.9	3.1	3.1	3.0	2.8	2.9	2.4	2.1	1.7	2.0	1.5	1.3	1.3	1.3	1.4	1.7	1.6	2.3	3.5	3.5	3.4	2.5	2.4	3.5
11-Oct	1.4	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.3	1.4
12-Oct	1.4	1.4	1.6	1.7	1.6	1.9	2.1	3.0	3.1	4.2	5.3	5.0	3.1	3.1	3.2	1.6	1.5	1.6	1.4	1.3	1.3	1.6	1.7	1.8	2.3	5.3
13-Oct	1.9	1.9	1.8	1.6	1.4	1.3	1.3	1.4	1.4	1.5	1.9	2.2	1.5	1.7	1.7	1.8	1.8	2.1	2.5	2.8	2.9	2.5	2.0	2.2	1.9	2.9
14-Oct	2.8	4.4	5.6	4.7	4.3	5.9	10.4	13.1	10.7	9.1	9.7	9.1	6.6	4.7	4.1	4.2	4.5	4.7	4.6	4.5	4.3	4.5	4.1	3.4	6.0	13.1
15-Oct	1.8	1.5	1.5	1.4	1.3	1.4	1.7	1.7	1.8	2.1	2.1	2.0	2.1	2.3	2.5	2.6	2.4	2.2	2.3	2.1	1.8	1.6	1.5	1.5	1.9	2.6
16-Oct	1.5	1.3	1.3	1.2	1.2	1.2	1.2	1.3	1.4	1.4	1.5	1.4	1.2	1.2	1.2	1.2	1.3	1.3	1.5	1.6	1.7	1.8	1.7	1.7	1.4	1.8
17-Oct	2.4	3.3	3.4	3.4	3.3	3.5	3.5	3.6	3.4	3.2	3.2	3.3	2.8	2.8	2.8	3.5	3.7	3.7	3.5	1.7	1.7	1.8	1.7	1.7	3.0	3.7
18-Oct	1.6	1.5	1.5	1.4	1.3	1.4	1.4	1.4	1.3	1.3	1.5	1.4	1.3	1.1	0.9	1.1	1.1	1.4	1.4	1.5	1.8	1.8	1.9	1.9	1.4	1.9
19-Oct	1.9	2.0	2.1	2.2	2.3	2.5	2.8	2.9	2.9	2.9	2.7	2.5	2.1	1.8	1.3	0.9	0.9	1.2	1.4	1.7	2.3	2.6	2.7	2.9	2.2	2.9
20-Oct	3.0	3.2	3.3	4.0	4.0	3.8	3.7	3.9	3.9	3.5	C	5.0	6.3	7.6	7.0	7.4	7.3	6.4	4.9	4.4	3.8	3.5	3.3	3.2	4.6	7.6
21-Oct	3.3	3.6	4.1	4.5	4.7	4.7	4.7	4.6	4.1	3.6	2.7	2.5	2.7	2.7	2.1	1.6	1.9	2.5	3.0	3.1	2.2	2.2	2.2	2.2	3.1	4.7
22-Oct	2.6	2.7	2.6	3.0	3.6	3.2	3.3	3.3	3.0	2.5	2.5	3.0	3.0	2.7	2.6	3.1	3.5	3.6	4.1	4.6	4.1	4.0	3.7	3.5	3.2	4.6
23-Oct	3.1	2.9	3.1	3.2	4.0	3.8	3.6	3.4	3.2	2.5	2.6	2.4	C	C	1.6	1.7	1.7	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.5	4.0
24-Oct	1.8	1.7	1.8	1.9	2.1	2.3	2.4	2.1	1.9	1.8	1.9	1.8	1.4	0.9	0.8	0.8	0.9	1.1	1.2	1.4	1.5	1.5	1.7	1.7	1.6	2.4
25-Oct	1.7	1.7	1.7	1.7	1.6	1.6	1.5	1.3	1.4	1.5	1.6	1.5	1.5	1.5	1.5	1.5	1.6	1.9	2.3	2.3	2.3	2.4	2.5	3.4	1.8	3.4
26-Oct	7.4	5.9	3.5	2.6	2.3	2.2	2.4	2.4	2.3	2.3	2.3	3.7	4.4	3.7	3.8	3.9	3.5	3.4	4.0	4.0	3.8	3.4	2.9	2.7	3.5	7.4
27-Oct	3.5	4.0	3.8	4.0	4.3	4.3	4.0	3.7	3.3	2.8	2.5	2.0	1.8	1.7	1.6	1.9	2.5	2.8	2.9	3.4	3.8	4.4	4.8	5.4	3.3	5.4
28-Oct	6.6	6.1	5.7	5.3	5.6	6.1	6.6	6.8	6.8	6.3	4.9	3.3	2.2	1.3	0.9	0.9	0.9	0.9	1.0	1.1	1.1	1.1	1.2	1.1	3.5	6.8
29-Oct	1.2	1.1	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.3	2.0	1.5	2.3	2.3	2.5	2.1	1.9	1.9	2.0	2.3	2.9	2.2	1.6	1.3	1.7	2.9
30-Oct	1.2	1.3	1.3	1.3	1.3	1.4	1.4	1.4	1.4	1.5	1.5	1.5	1.6	1.6	1.5	1.5	1.6	1.7	1.9	1.9	1.9	1.9	1.9	2.0	1.5	2.0
31-Oct	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.3	2.4	2.3	2.4	2.3	2.3	2.3	2.8	3.9	3.3	2.5	2.6	2.5	2.5	2.5	2.4	2.3	2.4	3.9
																								Diurnal Average		
																								Diurnal Maximum		
2.7 2.8 2.8 2.8 2.8 2.8 3.0 3.1 2.8 2.6 2.5 2.5 2.4 2.2 2.1 2.2 2.1 2.2 2.2 2.2 2.3 2.3 2.3 2.3 2.4 7.4 7.1 6.0 5.8 6.0 6.1 10.4 13.1 10.7 9.1 9.7 9.1 6.6 7.6 7.0 7.4 7.3 6.4 4.9 4.6 4.3 4.5 5.4 5.8																										
C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m <sup>3</sup>																										





**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Stony Mountain - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Stony Mountain - October 2017**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	676	91.23	91.23
6 - 15	37	4.99	96.22
16 - 25	0	0.00	96.22
26 - 80	0	0.00	96.22
> 81.0	0	0.00	96.22

Total Number of Valid Hours: 741

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**Stony Mountain - October 2017**

Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	30	26	27	12	9	5	17	11	19	94	75	45	78	84	78	65	675
6 - 15	0	0	0	0	0	0	0	0	0	9	11	0	4	8	4	1	37
16 - 25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	30	26	27	12	9	5	17	11	19	103	86	45	82	92	82	66	712

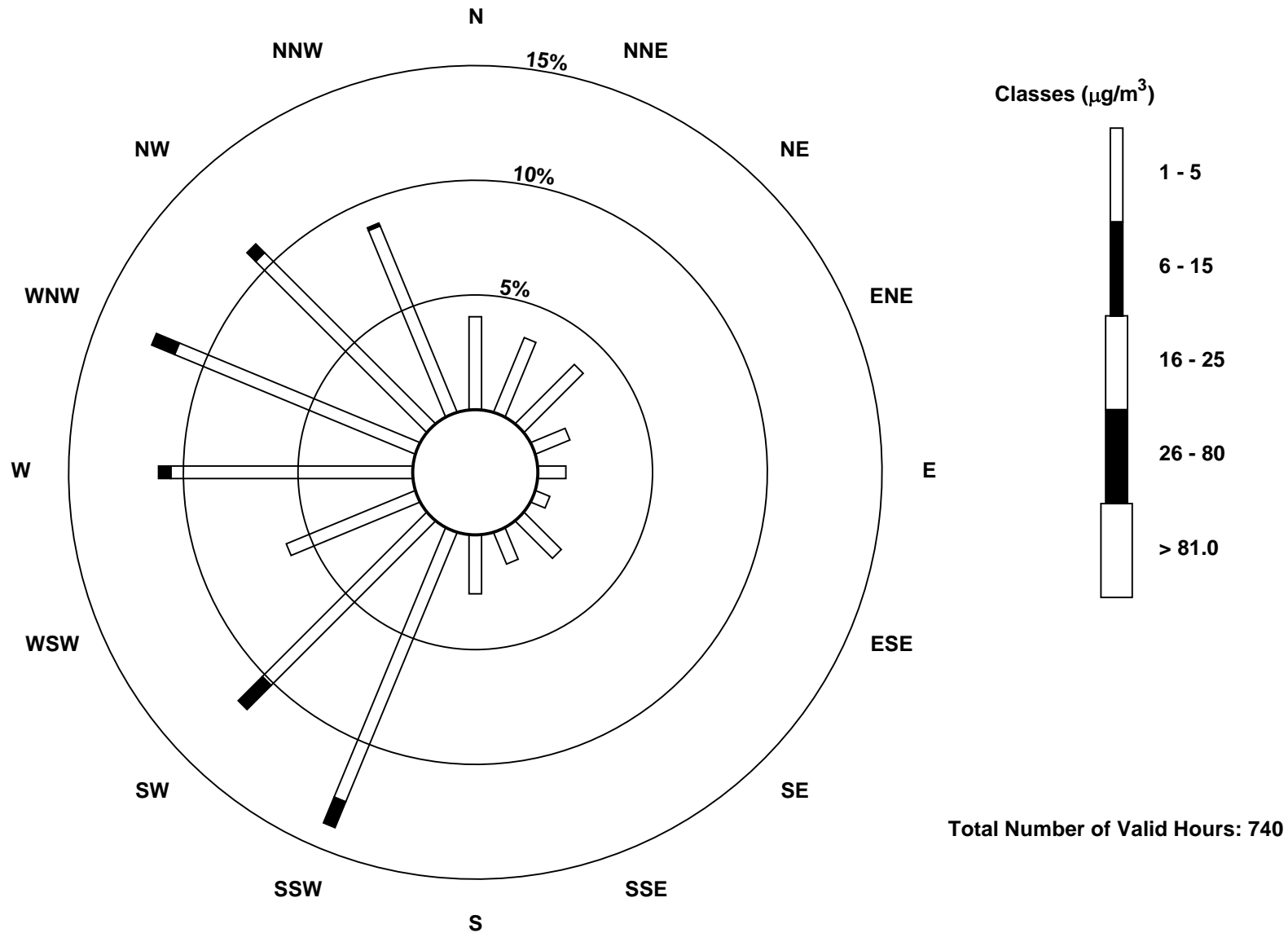
Total Number of Valid Hours: 740

Total Number of Hours: 744



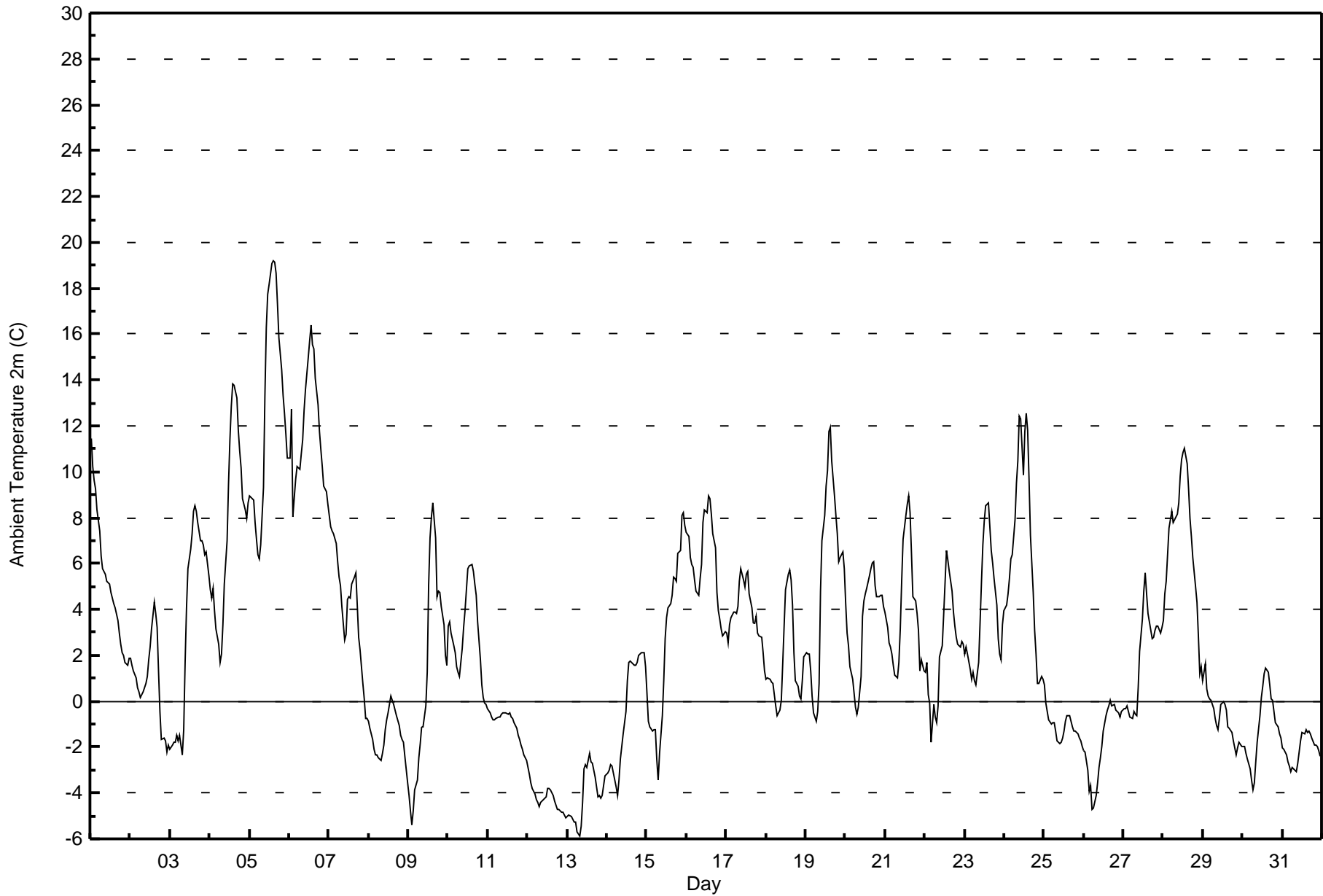
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Stony Mountain (AMS 18)





Maximum Value: 19.2 C on Oct 5 15:00      Maximum Daily Average: 12.8 C on Oct 5																				Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																												
Minimum Value: -5.9 C on Oct 13 08:00      Minimum Daily Average: -4.2 C on Oct 12 Maximum Diurnal Average: 5.5 C at hour 15      Minimum Diurnal Average: 0.6 C at hour 7 Monthly Average: 2.60 C      Percentiles: P <sub>1</sub> = -5.1 P <sub>10</sub> = -2.8 Q <sub>1</sub> = -1.1 Median = 1.8 Q <sub>3</sub> = 5.5 P <sub>90</sub> = 8.9 P <sub>99</sub> = 16.9																																																
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	11.4	10.2	9.6	9.3	8.3	7.4	6.4	5.8	5.7	5.5	5.2	5.1	4.7	4.5	4.3	4.0	3.5	3.0	2.5	2.1	2.0	1.7	1.5	1.9	5.2	11.4																						
2-Oct	1.8	1.6	1.3	1.0	0.6	0.4	0.2	0.3	0.4	0.7	1.1	1.8	2.4	3.2	4.3	3.9	3.2	1.3	-0.4	-1.7	-1.6	-1.7	-2.2	-1.9	0.8	4.3																						
3-Oct	-2.1	-1.9	-1.8	-1.8	-1.5	-1.7	-1.5	-2.3	-1.3	1.7	4.1	5.8	6.6	7.3	8.3	8.5	8.3	7.8	7.0	7.0	6.8	6.4	6.5	5.4	3.4	8.5																						
4-Oct	4.9	4.5	4.9	3.9	3.1	2.5	1.7	2.0	3.4	5.1	7.0	9.4	11.4	12.9	13.8	13.8	13.2	11.8	10.9	10.2	8.8	8.3	8.0	8.7	7.7	13.8																						
5-Oct	9.0	8.9	8.8	7.8	7.0	6.4	6.2	6.8	9.3	13.3	16.3	17.7	18.2	19.1	19.2	19.1	18.7	17.3	15.8	14.4	13.3	12.5	11.6	10.6	12.8	19.2																						
6-Oct	10.6	12.7	8.0	8.9	9.7	10.2	10.1	10.8	11.4	12.7	13.6	15.0	15.8	16.4	15.5	15.4	14.1	12.9	11.8	11.0	10.2	9.4	9.1	8.6	11.8	16.4																						
7-Oct	8.1	7.6	7.5	7.3	6.8	6.1	5.4	5.1	4.1	2.7	2.9	4.4	4.6	4.5	5.1	5.4	5.6	4.2	2.8	2.2	0.8	0.1	-0.7	-0.8	4.2	8.1																						
8-Oct	-0.9	-1.2	-1.7	-2.1	-2.3	-2.3	-2.5	-2.6	-2.3	-1.9	-1.3	-0.8	-0.5	0.2	0.0	-0.2	-0.4	-0.6	-1.1	-1.5	-1.7	-1.8	-2.4	-3.6	-1.5	0.2																						
9-Oct	-4.1	-4.8	-5.4	-4.8	-3.9	-3.4	-2.5	-1.9	-1.1	-1.1	-0.2	1.2	5.1	7.1	8.0	8.7	7.1	4.6	4.8	4.7	4.1	3.3	2.0	1.6	1.2	8.7																						
10-Oct	3.3	3.4	3.0	2.4	2.1	1.5	1.3	1.1	2.3	3.2	4.0	4.9	5.8	5.9	6.0	5.6	5.1	4.6	3.4	1.8	0.7	0.1	-0.1	-0.1	3.0	6.0																						
11-Oct	-0.3	-0.5	-0.7	-0.8	-0.8	-0.7	-0.7	-0.7	-0.6	-0.5	-0.5	-0.5	-0.6	-0.5	-0.7	-0.8	-0.9	-1.2	-1.5	-1.7	-1.9	-2.1	-2.3	-2.6	-1.0	-0.3																						
12-Oct	-2.9	-3.2	-3.5	-3.8	-4.0	-4.3	-4.4	-4.6	-4.4	-4.4	-4.2	-4.2	-3.8	-3.8	-3.9	-4.1	-4.3	-4.6	-4.7	-4.7	-4.8	-4.9	-5.0	-5.1	-4.2	-2.9																						
13-Oct	-5.0	-5.0	-5.0	-5.2	-5.2	-5.3	-5.7	-5.9	-5.4	-4.4	-2.9	-2.8	-2.9	-2.3	-2.7	-2.7	-3.0	-3.3	-4.2	-4.1	-4.2	-4.1	-3.7	-3.3	-4.1	-2.3																						
14-Oct	-3.1	-3.0	-2.8	-2.8	-3.2	-3.7	-4.1	-3.4	-2.5	-2.0	-1.4	-0.4	0.9	1.7	1.7	1.7	1.6	1.6	1.7	2.0	2.0	2.1	2.1	1.5	-0.5	2.1																						
15-Oct	0.4	-0.9	-1.1	-1.3	-1.3	-1.3	-2.5	-3.4	-2.3	-0.7	0.9	2.7	3.6	4.1	4.3	4.6	5.4	5.3	5.2	6.5	6.6	8.1	8.2	7.7	2.5	8.2																						
16-Oct	7.4	7.2	6.3	6.0	5.8	5.3	4.8	4.6	5.3	6.0	7.8	8.4	8.2	9.0	8.8	8.1	7.3	6.7	4.7	3.9	3.6	3.1	2.9	3.1	6.0	9.0																						
17-Oct	3.0	2.6	3.4	3.6	3.9	3.9	3.8	4.1	5.2	5.8	5.3	5.0	5.5	5.6	4.7	4.1	3.4	3.4	3.7	3.0	2.9	2.8	2.1	1.3	3.8	5.8																						
18-Oct	1.0	1.0	0.9	0.9	0.7	0.3	-0.2	-0.6	-0.4	0.0	1.6	3.2	4.9	5.5	5.7	5.3	4.2	2.1	0.9	0.6	0.3	0.1	0.9	2.0	1.7	5.7																						
19-Oct	2.1	2.0	2.1	1.3	0.2	-0.5	-0.8	-0.5	0.8	4.8	7.0	8.1	9.4	10.0	11.7	11.9	10.5	9.0	8.1	7.3	6.1	6.3	6.5	5.8	5.4	11.9																						
20-Oct	4.3	3.0	2.4	1.5	1.0	0.3	-0.3	-0.6	-0.3	1.1	3.7	4.4	4.7	4.9	5.5	5.8	6.0	6.1	5.0	4.5	4.6	4.6	4.6	4.1	3.4	6.1																						
21-Oct	3.9	3.2	2.6	2.4	2.1	1.6	1.1	1.0	1.7	3.1	5.3	7.1	8.1	8.6	8.9	8.2	6.4	4.6	4.4	3.8	3.1	1.3	1.8	1.4	4.0	8.9																						
22-Oct	1.3	1.7	0.3	-0.1	-1.8	-0.2	-0.7	-0.9	-0.2	2.0	2.4	3.8	5.2	6.6	6.1	5.7	4.8	3.9	3.3	2.8	2.5	2.4	2.6	2.5	2.3	6.6																						
23-Oct	2.1	2.4	2.0	1.4	1.0	1.3	0.9	0.7	1.7	3.4	5.1	6.8	7.8	8.5	8.7	7.6	6.5	6.0	5.3	4.2	2.7	2.1	1.8	3.4	3.9	8.7																						
24-Oct	3.9	4.2	4.6	5.4	6.2	6.4	7.9	9.5	10.5	12.4	12.3	9.9	11.7	12.6	11.8	9.7	7.2	4.7	3.1	2.0	0.8	0.8	1.0	1.0	6.7	12.6																						
25-Oct	0.7	-0.1	-0.5	-0.8	-1.0	-0.9	-0.9	-1.3	-1.7	-1.8	-1.8	-1.6	-1.3	-0.9	-0.6	-0.7	-0.9	-1.1	-1.3	-1.3	-1.4	-1.6	-1.7	-2.0	-1.1	0.7																						
26-Oct	-2.1	-2.2	-3.0	-3.9	-3.7	-4.7	-4.6	-4.1	-3.6	-2.9	-2.5	-2.0	-1.3	-0.6	-0.4	-0.2	0.0	-0.2	-0.1	-0.4	-0.5	-0.5	-0.7	-0.5	-1.9	0.0																						
27-Oct	-0.4	-0.3	-0.2	-0.5	-0.7	-0.7	-0.5	-0.6	-0.6	0.6	2.2	3.6	4.8	5.6	4.7	3.8	3.1	2.7	2.8	3.1	3.3	3.2	3.0	3.2	1.9	5.6																						
28-Oct	3.5	4.7	5.2	7.6	7.9	8.2	7.8	7.9	8.2	8.7	9.8	10.5	10.8	11.0	10.3	9.2	8.0	7.2	6.3	5.0	4.3	2.9	1.2	1.5	7.0	11.0																						
29-Oct	0.9	1.6	0.5	0.2	0.1	0.0	-0.3	-0.8	-1.0	-1.2	-0.7	-0.2	0.0	-0.1	-0.4	-1.1	-1.2	-1.4	-1.7	-2.0	-2.3	-2.0	-1.8	-2.0	-0.7	1.6																						
30-Oct	-2.0	-2.0	-2.3	-2.5	-2.9	-3.4	-3.9	-3.5	-2.7	-1.8	-0.6	0.2	0.6	1.2	1.5	1.2	0.7	0.1	0.0	-0.4	-0.9	-1.1	-1.4	-1.6	-1.1	1.5																						
31-Oct	-2.0	-2.1	-2.3	-2.6	-2.8	-3.1	-2.9	-3.0	-3.0	-2.7	-2.2	-1.7	-1.4	-1.4	-1.2	-1.3	-1.3	-1.4	-1.6	-1.9	-1.9	-2.0	-2.1	-2.4	-2.1	-1.2																						
																								1.9	1.8	1.4	1.2	1.0	0.8	0.6	0.6	1.2	2.2	3.2	4.0	4.8	5.4	5.5	5.2	4.6	3.8	3.1	2.7	2.2	1.9	1.7	1.6	Diurnal Average
																								11.4	12.7	9.6	9.3	9.7	10.2	10.1	10.8	11.4	13.3	16.3	17.7	18.2	19.1	19.2	19.1	18.7	17.3	15.8	14.4	13.3	12.5	11.6	10.6	Diurnal Maximum





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C  
Stony Mountain - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	272	36.56	36.56
0 - 10	415	55.78	92.34
10 - 20	57	7.66	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

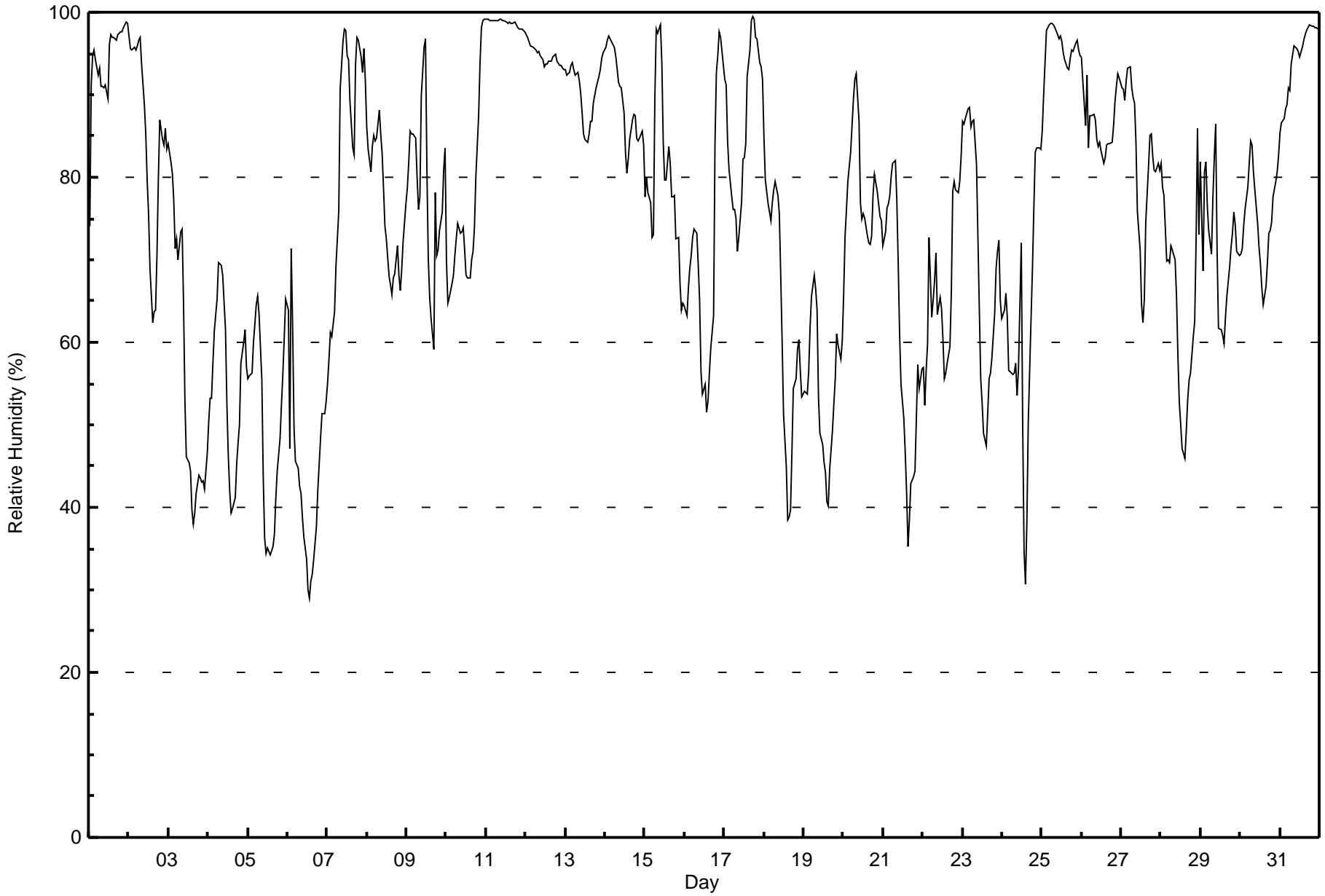
**Summary of Hour Averages**

**Relative Humidity (RH) - %**

**Stony Mountain - October 2017**

Maximum Value: 99 % on Oct 17 18:00														Maximum Daily Average: 98.7 % on Oct 11														Hours in Service: 744	
Minimum Value: 29 % on Oct 6 14:00														Minimum Daily Average: 44.2 % on Oct 6														Hours of Data: 744	
Maximum Diurnal Average: 81.0 % at hour 8														Minimum Diurnal Average: 65.2 % at hour 15														Hours of Missing Data: 0	
Monthly Average: 75.3 %														Percentiles: P <sub>1</sub> = 34 P <sub>10</sub> = 49 Q <sub>1</sub> = 63 Median = 78 Q <sub>3</sub> = 91 P <sub>90</sub> = 97 P <sub>99</sub> = 99														Hours of Calibration: 0	
																												Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Oct	74	91	95	95	94	92	93	91	91	91	91	89	96	97	97	97	97	97	98	98	98	98	99	99	94.1	99			
2-Oct	97	96	95	96	95	96	97	97	94	89	85	80	76	69	62	64	64	70	80	87	85	84	86	83	84.4	97			
3-Oct	84	82	80	77	71	73	70	73	74	65	53	46	45	44	40	38	39	42	44	44	43	43	42	47	56.6	84			
4-Oct	50	53	53	58	61	65	70	69	69	68	62	53	46	42	39	40	41	45	48	50	57	60	62	57	55.0	70			
5-Oct	56	56	56	60	62	65	66	63	55	44	36	34	35	34	35	35	37	41	44	48	52	56	61	65	49.9	66			
6-Oct	64	47	71	62	50	46	45	43	42	39	36	34	30	29	31	32	34	38	42	45	48	51	51	53	44.2	71			
7-Oct	55	58	61	61	64	69	73	76	91	96	98	98	95	94	89	84	83	94	97	97	95	93	96	92	83.6	98			
8-Oct	86	83	81	84	85	84	85	88	85	83	79	74	73	68	67	66	68	68	72	68	66	69	72	77	76.3	88			
9-Oct	79	82	86	85	85	85	80	76	78	90	96	97	81	70	66	63	59	78	71	71	73	76	81	84	78.7	97			
10-Oct	70	65	65	67	68	70	73	74	73	73	74	71	68	68	68	70	71	74	80	88	94	98	99	99	75.8	99			
11-Oct	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	98	98	98	98	98	98.7	99			
12-Oct	97	97	96	96	96	96	95	95	95	95	94	93	94	94	94	94	95	95	95	94	94	94	93	93	94.7	97			
13-Oct	93	92	93	94	94	93	92	93	92	90	88	85	85	84	85	87	87	89	91	91	92	93	94	95	90.5	95			
14-Oct	96	97	97	97	96	96	95	93	92	91	91	88	83	80	82	85	87	88	87	85	84	85	86	84	89.3	97			
15-Oct	78	80	78	77	73	73	90	98	97	98	94	84	80	80	84	82	78	78	78	72	73	67	64	65	79.9	98			
16-Oct	64	63	67	69	71	73	74	73	69	65	56	54	55	51	53	56	59	63	84	93	95	98	97	94	70.7	98			
17-Oct	92	91	84	81	78	76	76	75	71	73	77	82	82	84	92	96	99	99	99	97	97	94	93	92	86.7	99			
18-Oct	85	80	77	76	75	77	79	79	78	76	68	60	51	45	39	39	40	47	54	56	59	60	57	53	62.8	85			
19-Oct	54	54	54	56	62	66	68	67	64	53	49	48	45	44	41	40	45	49	52	56	61	60	58	60	54.4	68			
20-Oct	66	73	76	79	83	86	90	92	93	87	77	75	76	75	73	72	72	73	78	80	78	77	75	75	78.3	93			
21-Oct	72	73	76	77	78	80	82	82	77	70	61	55	51	47	42	35	38	43	44	44	51	57	54	57	60.3	82			
22-Oct	57	52	57	60	73	63	65	67	71	63	65	64	60	56	56	57	60	66	78	80	79	78	79	83	66.2	83			
23-Oct	87	86	87	88	88	86	87	87	82	73	64	56	53	49	47	51	56	56	58	64	69	71	72	65	70.1	88			
24-Oct	63	64	66	63	57	56	56	56	57	54	57	72	50	35	31	38	50	63	69	76	83	84	84	83	61.1	84			
25-Oct	86	90	94	98	98	99	99	99	98	97	97	97	96	95	94	93	93	94	95	95	96	97	96	95	95.5	99			
26-Oct	95	92	86	92	84	87	88	88	87	85	84	84	83	82	82	84	84	84	84	86	89	91	92	92	86.9	95			
27-Oct	91	91	89	92	93	93	91	90	89	84	76	71	65	62	65	75	81	85	85	82	81	81	82	81	82.3	93			
28-Oct	82	79	78	70	70	70	72	71	70	66	58	53	50	47	46	49	53	55	56	61	63	72	86	73	64.5	86			
29-Oct	82	69	81	82	77	74	71	77	82	87	71	62	61	61	60	63	66	69	71	73	76	74	71	70	72.1	87			
30-Oct	71	71	74	76	79	82	84	84	81	78	74	72	70	67	65	67	70	73	74	75	78	79	81	83	75.2	84			
31-Oct	85	87	87	88	89	91	90	94	96	96	96	95	95	96	97	97	98	98	99	98	98	98	98	98	94.3	99			
														77.7 77.2 78.7 79.2 78.9 79.4 80.3 81.0 80.4 77.9 74.4 71.8 68.6 66.1 65.2 66.0 67.7 71.4 74.4 75.9 77.6 78.6 79.3 78.8														Diurnal Average	
														99 98 98 98 99 99														Diurnal Maximum	







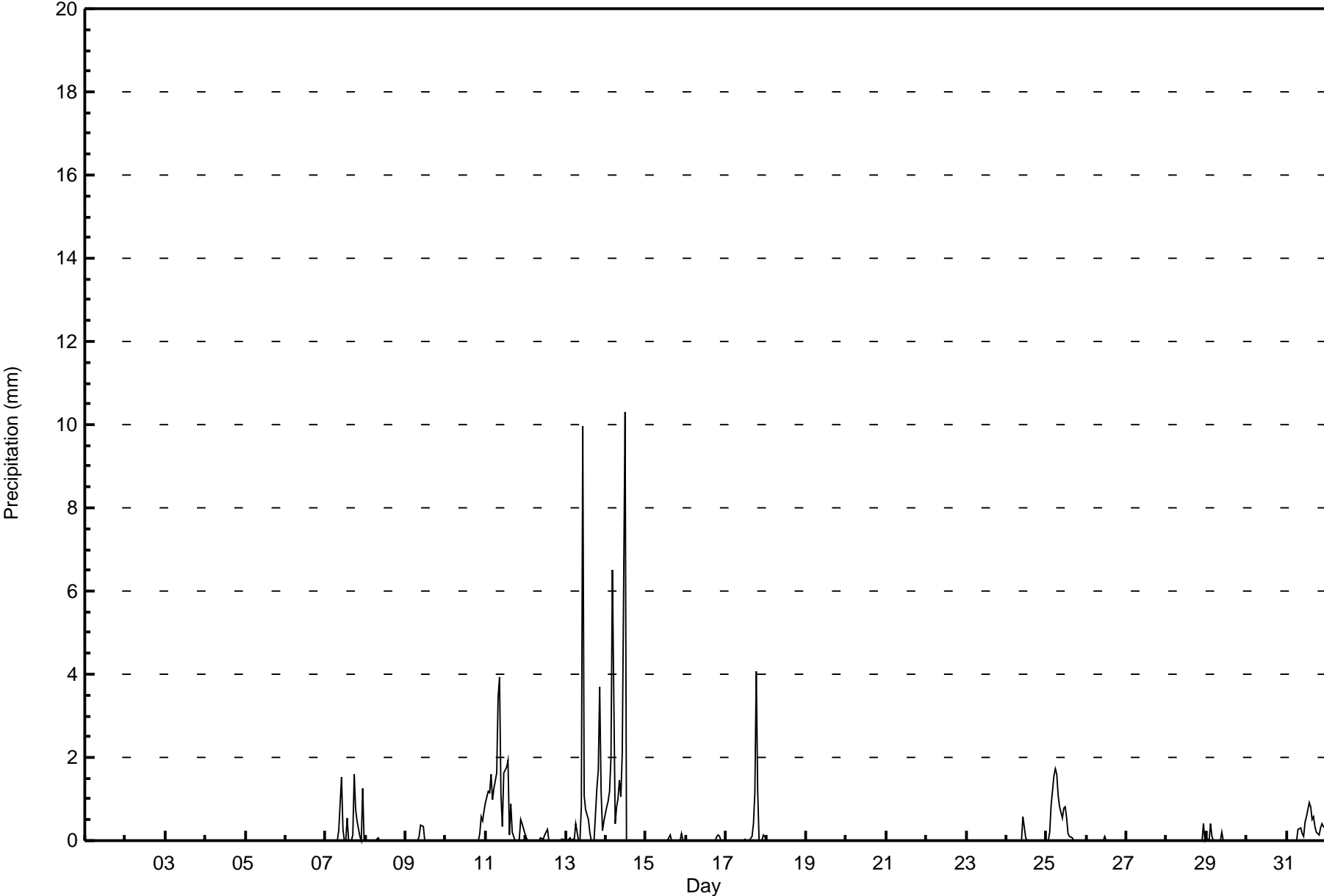
**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Precipitation (PC) - mm**

**Stony Mountain - October 2017**

Maximum Value: 10.3 mm on Oct 14 12:00      Maximum Daily Total: 28.6 mm on Oct 14																								Hours in Service: 744 Hours of Data: 741													
Minimum Value: 0.0 mm on Oct 1 01:00      Minimum Daily Total: 0.0 mm on Oct 1 Maximum Diurnal Total: 14.6 mm at hour 12      Minimum Diurnal Total: 1.3 mm at hour 17 Monthly Total: 114.13 mm      Percentiles: P <sub>1</sub> = 0.0 P <sub>10</sub> = 0.0 Q <sub>1</sub> = 0.0 Median = 0.0 Q <sub>3</sub> = 0.0 P <sub>90</sub> = 0.3 P <sub>99</sub> = 3.2																								Hours of Missing Data: 3 Hours of Calibration: 0 Percent Operational Time: 99.6													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24													
1-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
2-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	M	M	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.5	0.3	0.0	0.0	0.5	0.0	0.0	0.1	1.6	0.7	0.5	0.1	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.9	1.6
8-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
9-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.4
10-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.6	0.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.7
11-Oct	0.9	1.2	1.1	1.6	1.0	1.3	1.6	3.5	3.9	1.1	0.3	1.6	1.8	1.9	0.1	0.9	0.2	0.0	0.0	0.0	0.1	0.5	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.2	3.9	
12-Oct	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.3	
13-Oct	0.0	0.0	0.1	0.0	0.1	0.1	0.4	0.0	0.0	0.8	10.0	1.1	0.7	0.5	0.2	0.0	0.0	0.0	1.3	1.7	3.7	1.2	0.2	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.5	10.0	
14-Oct	0.8	1.0	1.2	2.0	6.5	0.4	0.8	1.0	1.5	1.0	2.1	10.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.6	10.3	
15-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2		
16-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.2		
17-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.4	1.1	4.1	1.2	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.2	4.1		
18-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
19-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
20-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
21-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
22-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
23-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
24-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.6		
25-Oct	0.0	0.0	0.2	0.9	1.6	1.7	1.6	1.1	0.8	0.5	0.8	0.8	0.5	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.9	1.7		
26-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1		
27-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
28-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4		
29-Oct	0.1	0.0	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.4			
30-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
31-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.2	0.1	0.4	0.6	0.9	0.8	0.5	0.6	0.3	0.2	0.1	0.3	0.4	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7	0.9		
1.9   2.2   3.0   4.6   9.1   3.4   4.5   5.9   6.9   5.9   14.5   14.6   3.8   4.3   1.4   1.6   1.3   3.1   6.4   3.6   4.4   2.9   3.2   1.8																								Diurnal Average													
0.9   1.2   1.2   2.0   6.5   1.7   1.6   3.5   3.9   1.5   10.0   10.3   1.8   1.9   0.8   0.9   0.6   1.6   4.1   1.7   3.7   1.2   1.3   0.7																								Diurnal Maximum													
M - Maintenance																																					





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Precipitation (PC) - mm  
Stony Mountain - October 2017**

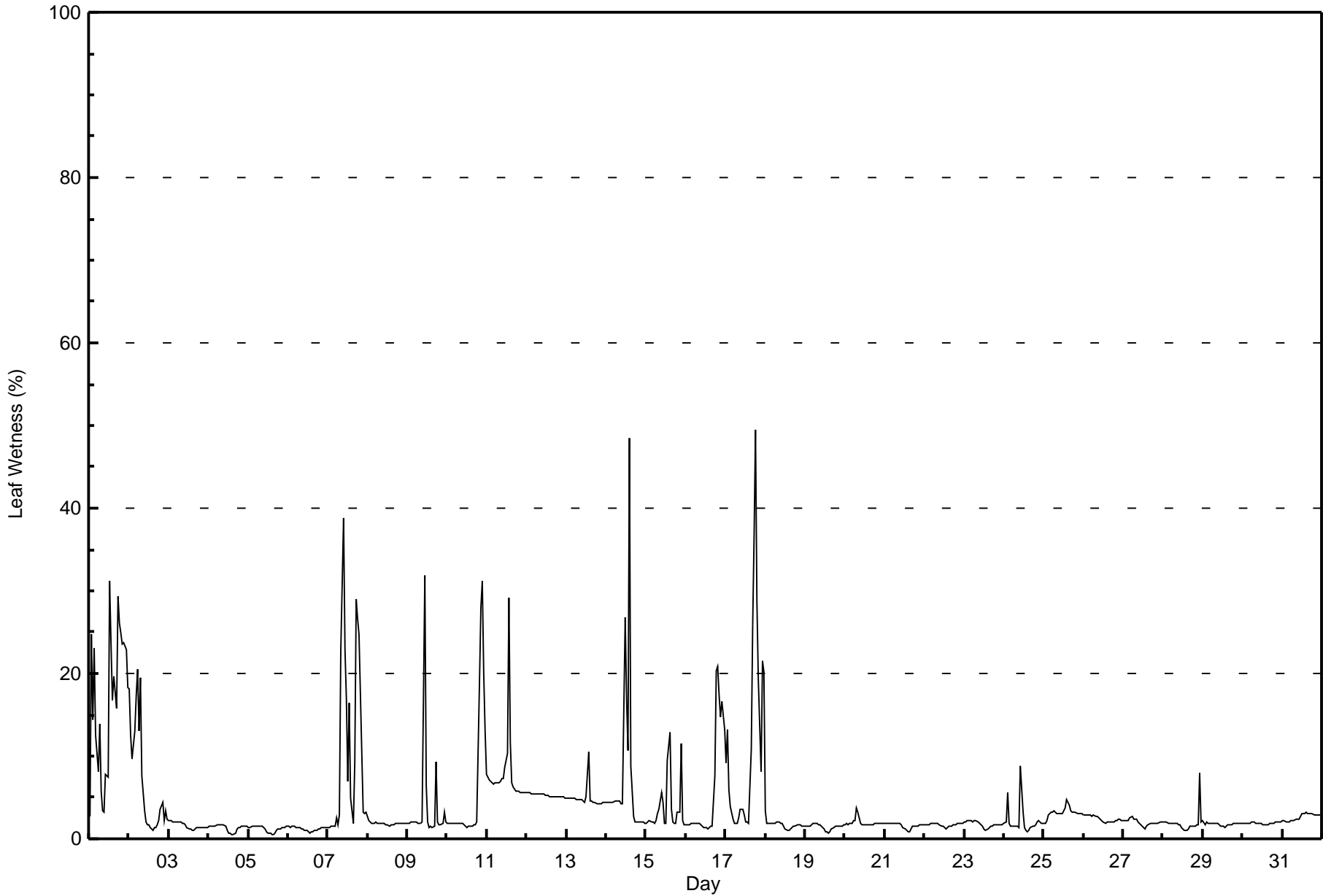
<b>Concentration Ranges (mm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	668	90.15	90.15
0.4 - 0.5	18	2.43	92.58
0.6 - 0.7	7	0.94	93.52
0.8 - 1.4	27	3.64	97.17
1.5 - 10	19	2.56	99.73
> 10	1	0.13	99.87

Total Number of Valid Hours: 741

Total Number of Hours: 744



Maximum Value: 49 % on Oct 17 19:00														Maximum Daily Average: 16.8 % on Oct 1														Hours in Service: 744	
Minimum Value: 0 % on Oct 4 16:00														Minimum Daily Average: 1.2 % on Oct 5														Hours of Data: 744	
Maximum Diurnal Average: 5.8 % at hour 19														Minimum Diurnal Average: 3.1 % at hour 16														Hours of Missing Data: 0	
Monthly Average: 4.1 %														Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 2 Q <sub>3</sub> = 3 P <sub>90</sub> = 8 P <sub>99</sub> = 31														Hours of Calibration: 0	
																												Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Oct	3	25	14	23	13	8	14	6	3	3	8	7	31	24	17	20	16	29	26	25	24	24	23	18	16.8	31			
2-Oct	18	13	10	13	17	20	13	19	8	3	2	2	2	1	1	1	1	2	2	4	4	2	3	2	6.9	20			
3-Oct	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.6	2			
4-Oct	1	1	1	2	2	2	2	2	2	2	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1.3	2			
5-Oct	1	1	1	1	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	2			
6-Oct	2	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	2			
7-Oct	1	1	2	1	1	3	2	3	23	39	23	17	7	16	5	2	9	29	27	25	10	3	3	3	10.6	39			
8-Oct	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.9	3			
9-Oct	2	2	2	2	2	2	2	2	2	2	32	7	2	1	1	1	2	9	2	2	2	2	3	2	3.6	32			
10-Oct	2	2	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2	2	19	28	31	20	13	6.0	31			
11-Oct	8	7	7	7	7	7	7	7	7	7	7	9	10	29	12	7	6	6	6	6	6	6	6	6	7.9	29			
12-Oct	6	6	6	6	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.3	6			
13-Oct	5	5	5	5	5	5	5	5	5	5	5	4	5	11	5	4	4	4	4	4	4	4	4	4	4.9	11			
14-Oct	4	4	4	4	4	5	5	5	5	4	4	27	17	11	48	9	3	2	2	2	2	2	2	2	7.4	48			
15-Oct	2	2	2	2	2	2	2	3	3	6	4	2	2	9	13	3	2	2	2	3	3	12	2	2	3.7	13			
16-Oct	2	2	2	2	2	2	2	2	2	2	2	1	1	1	2	2	8	20	21	17	15	17	13	5.8	21				
17-Oct	9	13	6	4	2	2	2	2	3	4	4	3	2	2	2	11	26	37	49	29	19	8	22	20	11.6	49			
18-Oct	3	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	2	2	2	2	2	2	2	1.7	3			
19-Oct	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	2	2	2	2	2	1.4	2			
20-Oct	2	2	2	2	2	2	2	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.9	4			
21-Oct	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	2	2	2	2	2	1.6	2			
22-Oct	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	2	2	2	2	2	2	2	2	2	1.7	2			
23-Oct	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	2	2	2	2	2	2	2	2	1.8	2			
24-Oct	2	2	6	2	2	2	2	2	1	1	9	3	1	1	1	1	1	1	2	2	2	2	2	2	2.1	9			
25-Oct	2	2	2	3	3	3	3	3	3	3	3	3	3	3	4	5	4	3	3	3	3	3	3	3	3.1	5			
26-Oct	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.4	3			
27-Oct	2	2	2	2	2	3	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	2	2	2.0	3			
28-Oct	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	2	2	2	2	2	8	2	1.9	8			
29-Oct	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2	2	2	2	2	2	1.8	2			
30-Oct	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.9	2			
31-Oct	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	2.6	3			
3.2														3.8														Diurnal Average	
18														25														Diurnal Maximum	





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Leaf Wetness (LW) - %**  
**Stony Mountain - October 2017**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	0	0.00	0.00
0.4 - 0.5	1	0.13	0.13
0.6 - 0.7	10	1.34	1.48
0.8 - 1.4	103	13.84	15.32
1.5 - 10	541	72.72	88.04
> 10	64	8.60	96.64

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

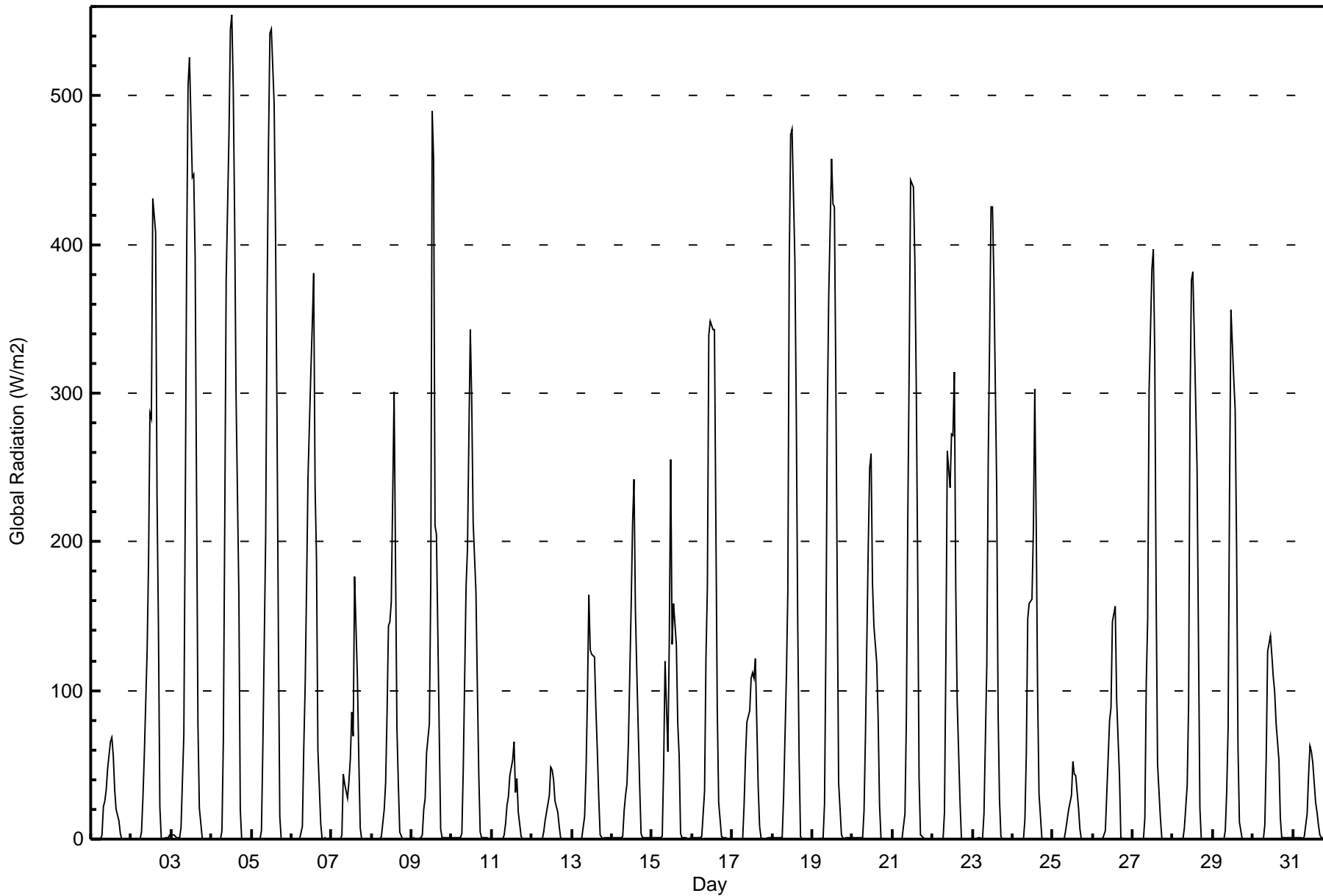
**Summary of Hour Averages**

**Global Radiation (GR) - W/m2**

**Stony Mountain - October 2017**

Maximum Value: 554 W/m2 on Oct 4 13:00      Maximum Daily Average: 151.7 W/m2 on Oct 4																			Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Minimum Value: 0 W/m2 on Oct 1 01:00      Minimum Daily Average: 10.3 W/m2 on Oct 25 Maximum Diurnal Average: 263.2 W/m2 at hour 13      Minimum Diurnal Average: 0.2 W/m2 at hour 23 Monthly Average: 66.2 W/m2      Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 69 P <sub>90</sub> = 259 P <sub>99</sub> = 504																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	0	0	0	3	22	26	34	48	65	69	56	33	20	12	4	0	0	0	0	0	0	16.3	69
2-Oct	0	0	0	0	0	0	4	28	57	127	187	287	283	431	409	231	143	22	1	0	1	1	1	2	92.2	431
3-Oct	3	3	2	1	1	1	8	71	219	392	507	526	445	447	392	235	77	21	1	0	0	0	0	0	139.6	526
4-Oct	0	0	0	0	0	0	6	66	214	376	474	545	554	506	418	299	164	20	0	0	0	0	0	0	151.7	554
5-Oct	0	0	0	0	0	0	5	63	204	365	468	542	544	495	405	287	137	15	0	0	0	0	0	0	147.1	544
6-Oct	0	0	0	0	0	0	8	62	104	171	244	314	345	380	238	189	60	11	0	0	1	0	0	0	88.7	380
7-Oct	0	0	0	0	0	0	2	43	37	28	39	54	86	69	176	108	54	7	0	0	0	0	0	0	29.3	176
8-Oct	0	0	0	0	0	0	2	20	38	84	143	146	160	301	187	75	37	5	0	0	0	0	0	0	49.9	301
9-Oct	0	1	0	0	0	1	3	20	27	58	78	173	490	457	210	205	70	7	1	1	1	1	1	1	75.2	490
10-Oct	1	1	1	1	1	1	4	46	170	195	272	343	296	213	166	103	43	5	1	1	1	1	0	0	77.6	343
11-Oct	0	0	0	0	0	0	0	3	10	23	29	42	53	66	31	41	18	2	0	0	0	0	0	0	13.3	66
12-Oct	0	0	0	0	0	0	0	5	13	18	29	49	47	40	26	18	9	1	0	0	0	0	0	0	10.6	49
13-Oct	0	0	0	0	0	0	1	15	46	96	164	127	124	122	88	60	28	3	0	1	1	1	1	1	36.6	164
14-Oct	1	1	1	1	1	1	2	19	30	37	63	158	213	242	154	112	37	4	1	1	1	1	1	1	44.9	242
15-Oct	1	1	1	1	1	1	2	48	119	59	133	255	131	158	131	78	56	4	1	1	1	0	0	1	49.2	255
16-Oct	1	1	1	1	1	1	2	33	122	170	339	348	343	343	214	88	24	2	1	1	1	0	0	0	84.7	348
17-Oct	0	0	0	0	0	0	0	23	55	79	87	108	112	108	122	35	9	1	0	0	0	1	1	1	30.8	122
18-Oct	1	1	1	1	1	1	1	29	110	166	386	473	478	389	286	147	54	2	0	0	0	0	0	0	105.2	478
19-Oct	0	0	0	0	0	0	1	24	133	286	367	457	427	425	311	171	38	3	0	0	1	1	1	0	110.3	457
20-Oct	1	1	1	1	1	1	1	19	69	197	249	260	171	143	119	81	22	1	0	0	0	0	0	0	55.7	260
21-Oct	0	0	0	0	0	0	0	17	81	216	317	443	438	390	305	185	41	3	1	0	0	0	0	0	101.6	443
22-Oct	0	0	0	0	0	0	0	18	121	261	236	272	271	314	169	93	25	1	0	0	0	0	0	0	74.3	314
23-Oct	0	0	0	1	1	0	1	17	118	254	337	425	425	378	237	86	26	2	0	0	0	0	0	0	96.1	425
24-Oct	0	0	0	0	0	0	0	13	58	148	158	161	207	303	212	99	30	1	0	0	0	0	0	0	57.9	303
25-Oct	0	0	0	0	0	0	0	1	6	20	25	29	53	44	42	21	7	0	0	0	0	0	0	0	10.3	53
26-Oct	0	0	0	0	0	0	0	6	30	55	80	88	146	157	94	68	42	1	0	0	0	0	0	0	31.9	157
27-Oct	0	0	0	0	0	0	0	14	105	148	302	383	397	327	164	50	14	1	0	0	0	0	0	0	79.3	397
28-Oct	0	0	0	0	0	0	0	8	36	91	291	376	381	340	248	133	21	0	0	0	0	0	0	0	80.3	381
29-Oct	0	0	0	0	0	0	0	6	32	75	232	356	310	288	197	62	11	0	0	0	0	0	0	0	65.4	356
30-Oct	0	0	0	0	0	0	0	10	55	127	137	124	109	99	77	53	14	1	1	1	1	1	1	1	33.7	137
31-Oct	1	1	1	1	0	1	0	2	17	42	62	59	51	24	18	10	3	1	1	1	1	1	1	1	12.4	62
																			0.3				Diurnal Average			
																			3				Diurnal Maximum			







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Global Radiation (GR) - W/m<sup>2</sup>**  
**Stony Mountain - October 2017**

<b>Concentration Ranges (W/m<sup>2</sup>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	469	63.04	63.04
21 - 100	114	15.32	78.36
101 - 300	101	13.58	91.94
301 - 600	60	8.06	100.00
601 - 900	0	0.00	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 24 km/h on Oct 18 02:00	Maximum Daily Speed Average: 15.2 km/h on Oct 5	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 16 20:00	Minimum Daily Speed Average: 2.0 km/h on Oct 22	Hours of Data: 743
Maximum Diurnal Speed Average: 6.1 km/h at hour 7	Minimum Diurnal Speed Average: 4.6 km/h at hour 21	Hours of Missing Data: 1
Monthly Average Velocity: 5.3 km/h 267.0 deg	Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 5 Q <sub>1</sub> = 7 Median = 10 Q <sub>3</sub> = 13 P <sub>90</sub> = 16 P <sub>99</sub> = 22	Percent Operational Time: 99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Oct	NW9	NW9	NW7	NW9	NW11	NW10	NW11	NW12	NW11	NW11	NW11	NW10	NW9	NW9	NW9	NW9	NW10	NNW10	NNW10	NNW9	NNW9	NNW8	NNW8	NNW8	NW9.3	NW12			
2-Oct	N11	NNW11	NNW10	N10	N10	N11	AF	NNW8	NNW11	N12	N12	N13	N12	NNW13	N11	N10	N11	NNW7	NNW4	NNW3	NW5	NW5	NW5	NW5	NNW9.0	N13			
3-Oct	NW6	NW6	WNW7	WNW6	WNW5	W6	WSW5	SSW7	SSW12	SSW14	SW15	SW15	SSW15	SSW16	SSW19	SW18	SW13	SW13	SW15	SW17	WSW14	WSW12	W12	WNW12	SW10.1	SSW19			
4-Oct	WNW10	WNW11	WNW12	WNW9	WNW9	NW7	NW7	NW5	NNW5	N6	NNW5	NNW6	NNW7	NNW6	NW6	W3	WSW4	SW4	SSW7	SSW9	SSW11	SW14	SW14	WNW4.9	SW14				
5-Oct	SW14	SW14	SW16	SW15	SW15	SW15	SW16	SW15	SW15	SW14	SW13	SW14	SW16	SW18	SW17	SSW18	SSW17	SSW16	SSW15	SSW15	SSW14	SSW15	SW15	SW14	SSW15.2	SSW18			
6-Oct	SW13	WSW12	SSW12	SW12	SW12	SW14	SW12	SW12	WSW11	SW11	SW13	WSW13	W13	W17	W14	WSW15	W13	W10	WSW7	W8	W10	W12	W15	W13	WSW11.5	W17			
7-Oct	W14	W16	W13	WSW13	W12	W12	W8	WNW11	WNW12	WNW11	WNW9	NW10	NW11	NW10	WNW12	NW10	WNW9	WNW10	WNW11	NNW9	NNW9	NW9	NNW10	NW11	WNW10.0	W16			
8-Oct	NW10	NW13	NW13	NW14	NW14	NW14	NW14	NW13	NW13	NW11	NW10	NW11	NW10	NW12	NW12	NW10	NW7	NW5	NW6	WNW9	WNW6	W7	WSW3	SW5	NNW9.7	NW14			
9-Oct	SSW6	SSW9	SSW10	SSW11	S12	S12	SSW17	SSW15	SSW16	SSW14	SSW13	SSW15	SW14	WSW13	W13	W12	W11	W12	W13	W12	WSW9	WSW8	SW5	SW9	SW10.0	SSW17			
10-Oct	WSW11	W11	WSW11	W10	W11	W11	W9	WNW7	NW5	NNW3	N3	ESE2	NNW3	NNE3	NNE3	NE6	NNE5	NNE4	NE10	NE11	NE7	NE7	NE9	NE10	NNW2.9	W11			
11-Oct	NE10	NE11	NE12	NE13	NE13	NE13	NE13	NNE12	NNE12	NNE13	NNE14	NNE12	NNE11	NNE11	NNE10	NNE11	N11	N9	N10	N9	N8	N8	N7	NNW6	NNE10.5	NNE14			
12-Oct	N5	NNW6	N6	NNW7	NNW5	NNW5	NNW5	NNW5	NNW5	NNW4	NNW4	NNW5	NNW5	NNW5	NNW4	NNW4	NW7	NW6	NW4	NW3	NNW4	NNW4	NNW4	NW4	NW4	NNW4.7	NW7		
13-Oct	NW3	WNW4	NW4	NW4	NW4	W5	WNW5	WNW6	WNW6	WNW6	W7	WNW6	WNW6	W5	WSW8	SW8	SW8	SW7	SSW9	SSW12	SW11	SW11	SW12	SSW11	WSW5.5	SW12			
14-Oct	SSW9	SSW9	SSW10	SSW10	SSW9	SSW11	SSW11	SSW12	SSW13	SSW12	SSW14	SSW14	SSW13	SW12	SW12	WSW12	SSW12	SSW13	SSW12	SSW13	SSW12	SSW13	SSW13	SSW11	W14	WNW10	NW7	SW10.1	SSW14
15-Oct	NW6	WNW5	W6	W6	W7	SW9	SSW10	SSW11	SSW14	SSW15	SSW15	SSW15	SSW15	SSW13	SSW15	SSW12	SSW13	SSW12	SSW13	SSW13	SSW13	SSW13	SSW13	SSW13	SSW15	SW10.6	SSW17		
16-Oct	WSW17	WSW17	WSW16	WSW17	WSW16	W17	W13	WSW11	WSW12	WSW10	W12	WSW11	SW13	SW14	SW11	SSW9	SSW10	SW11	WSW6	W1	NE3	SE4	SE6	SSE7	WSW9.5	WSW17			
17-Oct	SSE7	SSW6	SSW12	SSW12	SSW12	SSW10	SSW9	SSW11	SSW9	SSW2	ESE4	E7	ENE7	NE7	NNE7	NNW6	NW7	NW8	NW13	NW16	WNW17	WNW19	WNW22	WNW24	W4.9	WNW24			
18-Oct	WNW23	WNW24	WNW23	WNW23	WNW22	WNW21	WNW20	WNW19	NW14	WNW13	WNW14	WNW11	WNW10	WNW8	WNW7	W3	SW3	SE3	SSE5	SSE7	SE9	SE9	SE11	SE11	WNW8.8	WNW24			
19-Oct	SE11	SE10	SE10	SE10	SSE8	SE6	S3	SSW8	SSW11	SW8	S6	S8	S9	SSW10	S7	S8	SSE6	SSE5	SSE5	SSE7	S9	S9	S8	SE7	S7.2	SE11			
20-Oct	SE5	ENE3	NNE6	NNE6	NE7	NE6	NNE5	NNE5	NNE4	N3	E4	NNW4	NW5	NNW3	WNW2	W4	W6	WNW10	NW8	NW8	WNW9	WNW10	WNW10	WNW11	NNW3.7	WNW11			
21-Oct	WNW11	WNW10	WNW9	WNW10	WNW10	W10	W11	W11	W12	W11	WNW11	WNW11	WNW12	W11	WNW9	WNW9	W7	W5	W6	WSW6	SW8	SW7	SW6	SW8	W8.7	WNW12			
22-Oct	SSW8	SSW6	S4	ESE5	SE6	SE7	SE7	ESE7	E6	E6	E7	E5	NNE3	NNW4	NW6	W5	W8	W8	W12	W11	WNW9	W10	W11	W13	W2.0	W13			
23-Oct	W13	W12	W12	W12	W12	W14	W14	W13	W14	WNW12	WNW12	WNW13	W13	W14	WNW13	W9	W7	WSW7	WSW9	SW9	SSW10	SSW11	SSW11	SSW13	W10.2	W14			
24-Oct	SSW10	S12	S16	SSW20	SSW21	SW19	WSW21	WSW19	W18	WNW20	WNW21	WNW14	WNW16	WNW22	WNW21	NW12	NNW9	NNW6	NNW5	NNW5	NNW3	N4	NE4	ENE6	W8.5	WNW22			
25-Oct	ENE7	NE7	ENE7	ENE8	ENE7	ENE9	ENE10	NE10	NE13	NE15	NNE14	NNE12	N12	N10	N10	N9	NNW8	NNW7	NNW5	N5	NNW4	NNW3	NW5	WNW4	NNE7.0	NE15			
26-Oct	WNW4	W6	WSW6	SW7	SW8	SSW8	SSW11	SW12	SW13	SSW17	SSW20	SSW22	SSW20	SW19	SW19	SSW16	SW14	SW13	WSW11	WSW11	WSW11	W12	W10	W9	SW11.5	SSW22			
27-Oct	W10	W8	WNW7	WNW6	W7	W7	WNW7	W5	S3	SW5	SW8	SSW9	SSW9	S8	S10	S10	S10	SSW11	S13	SSW13	SSW14	SSW15	SW16	SW16	SW7.8	SW16			
28-Oct	SW14	SW13	SW14	WSW18	W19	WNW17	WNW15	WNW16	WNW16	WNW18	WNW18	WNW19	WNW19	WNW19	NW18	WNW17	WNW18	NW15	NW18	NW18	NW17	NNW11	NW11	NNW10	WNW14.5	WNW19			
29-Oct	NW13	NW21	NW14	NW15	NW16	NW17	NW15	NNW13	NW13	NNW12	NNW13	NNW13	NNW12	NNW12	N11	NNW8	NNW6	NNW5	NNE4	NNE3	NW3	NW6	WNW8	NNW10.7	WNW21				
30-Oct	WNW6	SW3	SSW8	SW10	SW10	SSW11	SSW12	SW14	SW14	SW12	SSW11	SSW10	SSW12	SSW11	SW10	SW8	SSW5	SW6	W7	WNW7	NW5	NW4	WNW5	WNW4	SW7.5	SW14			
31-Oct	WSW3	WNW2	SW2	SSW4	SSE3	S5	SSW5	S4	SSE5	SSE5	ESE5	E5	E6	E6	E7	ENE6	ENE7	ENE8	NE8	NE9	NE9	NE9	NNE9	NNE9	ENE3.3	NE9			

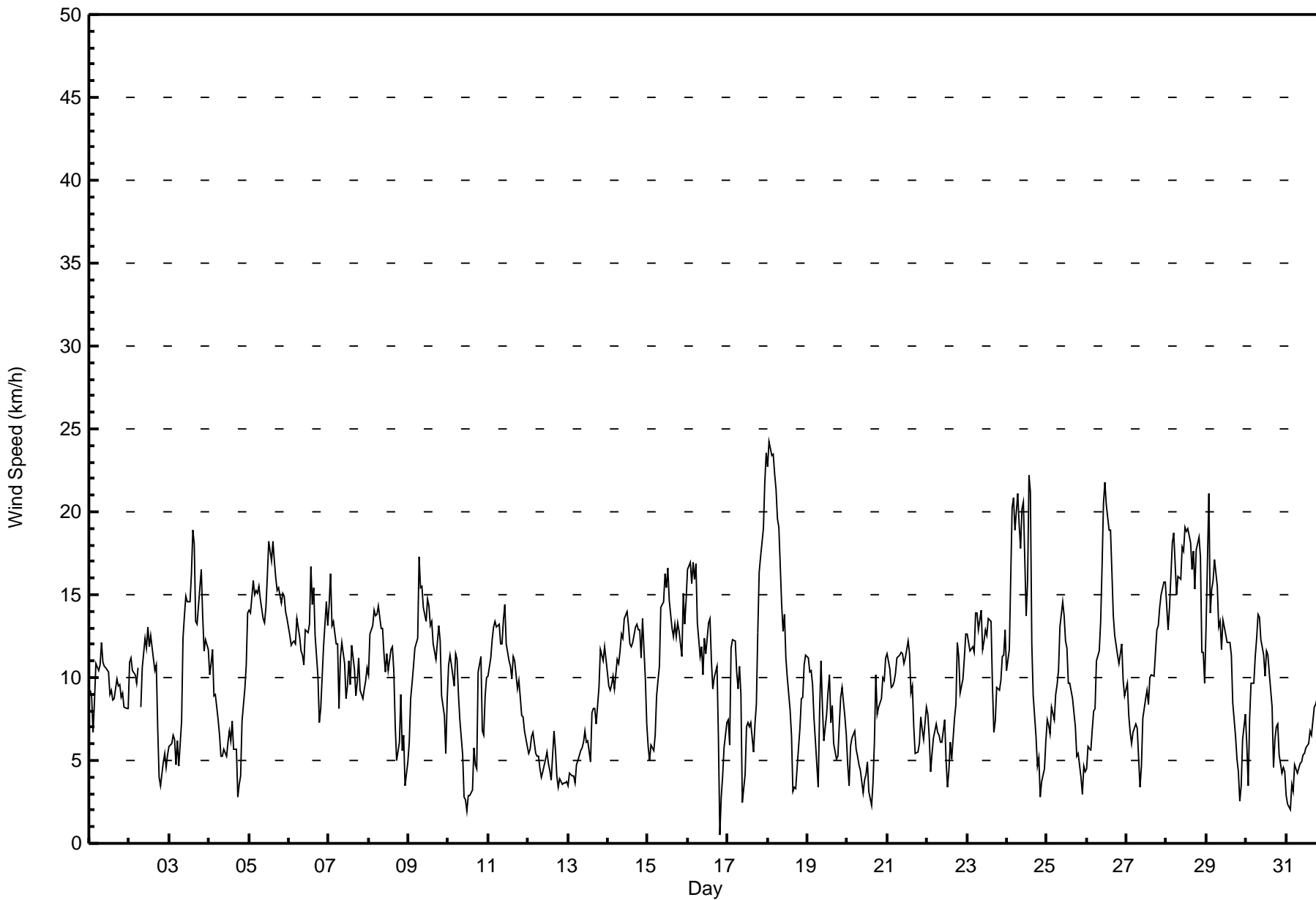
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WNW23																							WNW24	WNW23	WNW23	WNW22	WNW21	WSW21	WSW19	W18	WNW20	WNW21	SSW22	SSW20	WNW22	WNW21	SW18	WNW18	NW15	NW18	NW18	NW17	WNW19	WNW22	WNW24	Diurnal Maximum	

AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Stony Mountain - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h  
Stony Mountain - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	123	16.55	16.55
6 - 11	350	47.11	63.66
12 - 19	250	33.65	97.31
20 - 28	20	2.69	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Stony Mountain - October 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	5	10	2	1	3	4	3	6	4	5	7	4	9	10	20	30	123
6 - 11	20	9	18	11	7	1	14	6	12	44	26	19	39	46	47	31	350
12 - 19	5	7	7	0	0	0	0	0	4	50	54	22	39	27	27	8	250
20 - 28	0	0	0	0	0	0	0	0	0	5	0	1	0	14	0	0	20
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	30	26	27	12	10	5	17	12	20	104	87	46	87	97	94	69	743

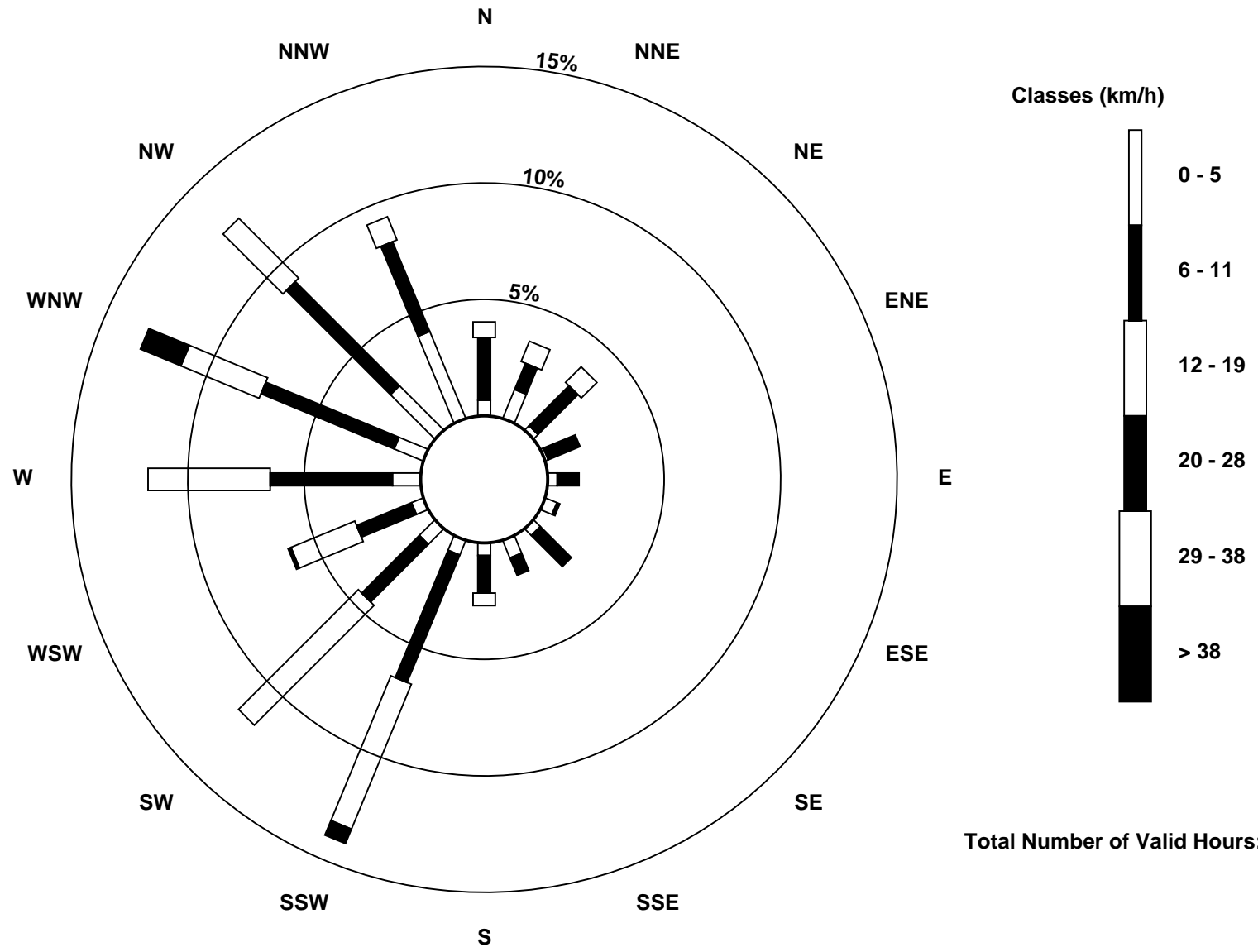
Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed (WS) - km/h  
Stony Mountain (AMS 18)





**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Speed (WS) - km/h**  
**Stony Mountain - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Oct 18 04:00 Minimum Value: 1 km/h on Oct 31 02:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 5 P <sub>99</sub> = 8																	Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	3	4	4	4	4	4	3	3	4	4
2-Oct	5	5	5	5	5	5	AF	4	5	6	5	6	5	5	5	5	4	3	2	1	1	2	1	1	6
3-Oct	1	1	2	2	2	2	1	2	4	5	5	5	5	5	6	6	5	4	5	5	5	4	4	4	6
4-Oct	3	3	4	3	3	2	2	1	2	2	2	2	3	3	3	2	2	1	1	2	2	2	3	4	4
5-Oct	4	4	4	4	4	4	4	3	4	4	5	6	5	5	6	5	5	4	4	4	4	4	4	3	6
6-Oct	3	4	3	3	3	4	4	4	3	3	4	4	5	7	5	5	5	4	2	3	3	4	4	4	7
7-Oct	5	5	5	4	4	4	3	4	4	4	3	4	4	4	4	4	4	5	4	4	4	4	4	4	5
8-Oct	4	5	5	5	5	5	5	5	5	4	4	4	4	5	5	4	3	2	3	3	2	3	1	1	5
9-Oct	2	2	2	3	3	3	5	4	4	4	4	4	4	5	5	4	4	5	5	5	3	3	2	2	5
10-Oct	4	4	4	3	3	3	3	2	2	1	1	2	2	1	1	2	2	2	3	3	2	2	2	3	4
11-Oct	3	3	4	4	4	4	4	3	4	4	4	4	3	4	4	4	4	3	4	3	3	3	2	2	4
12-Oct	2	2	2	3	2	2	2	2	2	2	3	2	2	2	2	2	2	2	1	2	2	2	1	1	3
13-Oct	1	1	1	2	1	1	1	2	2	2	2	2	3	2	3	3	3	2	3	3	3	3	3	3	3
14-Oct	2	3	3	3	2	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	3	3	4
15-Oct	2	1	2	2	2	2	3	3	4	4	4	4	5	4	4	3	3	3	3	4	3	6	4	4	6
16-Oct	5	6	5	6	5	5	4	4	4	4	4	4	5	4	4	3	3	3	3	1	1	1	2	2	6
17-Oct	2	3	3	3	3	3	2	3	3	2	2	2	2	2	2	2	2	3	6	6	6	6	7	8	8
18-Oct	8	8	9	9	8	8	7	7	5	5	5	4	4	3	3	2	1	1	2	2	2	3	4	3	9
19-Oct	4	3	4	3	3	1	1	2	3	3	2	2	2	3	3	2	2	1	2	2	3	3	2	2	4
20-Oct	3	1	2	2	2	2	1	1	1	1	1	1	2	1	1	1	2	3	2	2	2	3	3	3	3
21-Oct	3	3	3	3	3	3	3	3	4	4	3	4	4	4	3	3	3	1	1	2	2	1	1	1	4
22-Oct	1	1	1	1	1	2	2	2	2	2	2	2	1	2	2	2	3	4	4	4	3	3	4	4	4
23-Oct	4	4	4	4	4	5	5	5	4	4	4	5	4	5	4	4	2	2	3	2	2	3	3	3	5
24-Oct	3	4	5	6	6	6	7	7	6	8	8	5	6	8	8	6	4	3	2	2	1	1	1	2	8
25-Oct	2	2	2	3	2	2	2	3	4	5	4	4	4	3	4	4	3	3	2	2	2	1	2	1	5
26-Oct	1	2	2	2	2	2	4	4	4	5	6	7	6	6	6	5	5	4	4	4	4	4	3	3	7
27-Oct	3	2	2	2	2	2	2	1	2	2	2	2	3	3	3	3	3	3	3	3	4	4	4	4	4
28-Oct	4	4	4	6	6	6	5	5	6	6	6	7	7	7	7	6	6	6	7	7	7	5	5	5	7
29-Oct	6	7	6	6	6	7	6	6	6	5	6	6	5	5	5	5	4	3	2	2	1	1	2	3	7
30-Oct	2	2	2	3	3	3	3	4	4	3	3	3	3	3	3	3	2	2	2	2	1	1	2	1	4
31-Oct	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	2	3	3	3	3
8 8 9 9 8 8 7 7 6 8 8 7 7 8 8 6 6 6 7 7 7 6 7 8																								Diurnal Maximum	
AF - Analyzer Failure																									



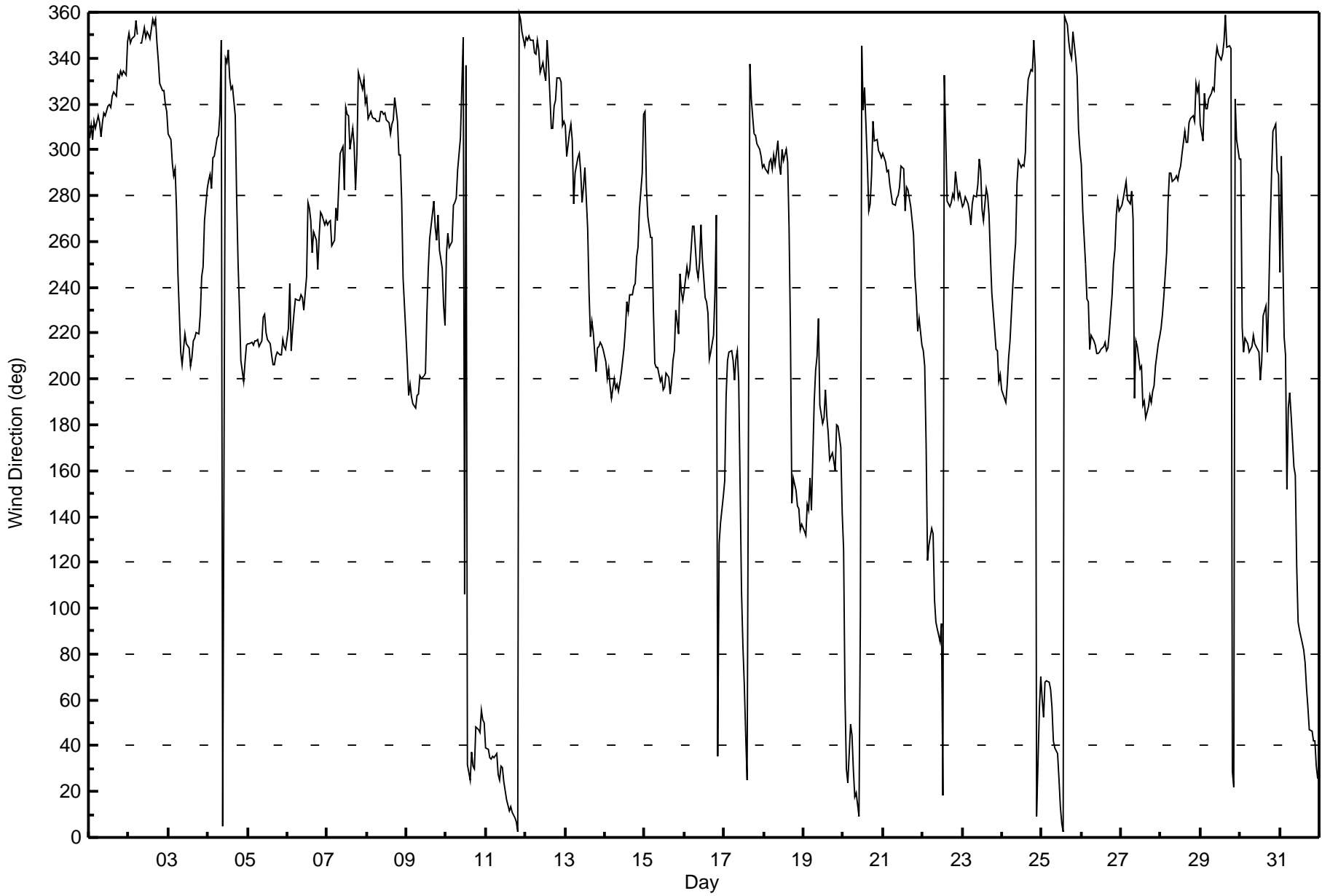


# Wood Buffalo Environmental Association

## Summary of Hour Averages

## Wind Direction (WD) - deg Stony Mountain - October 2017

Direction of Maximum Speed: 292 deg on Oct 18 02:00																						Hours in Service: 744			
Direction of Maximum Daily Speed Average: 214.9 deg on Oct 5																						Hours of Data: 743			
Direction of Minimum Speed: 272 deg on Oct 16 20:00											Direction of Minimum Daily Speed Average: 2.0 deg on Oct 22											Hours of Missing Data: 1			
Monthly Average Direction: 279.7 deg																						Percent Operational Time: 99.9			
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	305	311	305	312	309	315	312	306	312	316	315	319	320	318	324	325	324	333	331	334	333	334	333	347	319.9
2-Oct	351	347	348	349	356	350	AF	347	347	353	349	352	350	348	357	354	357	346	339	329	326	326	320	317	347.5
3-Oct	307	304	294	288	292	274	246	212	206	213	219	216	213	206	209	216	218	220	220	228	245	249	269	283	232.1
4-Oct	286	289	283	296	297	305	306	316	348	5	340	338	344	331	326	327	315	279	251	231	208	199	207	215	288.6
5-Oct	215	216	216	215	217	217	217	214	217	227	228	220	217	216	211	206	206	210	211	211	211	217	214	213	214.9
6-Oct	222	241	212	221	229	235	234	234	237	236	230	245	277	274	269	255	264	261	248	262	273	271	267	269	249.2
7-Oct	267	269	269	258	261	275	269	284	299	301	283	319	316	315	300	310	302	282	298	334	329	326	331	320	294.0
8-Oct	323	314	317	314	314	313	313	312	317	317	315	316	313	312	307	311	313	322	313	298	297	278	244	220	310.3
9-Oct	207	193	198	192	189	188	193	193	202	200	201	202	228	248	261	266	278	266	261	271	256	248	232	223	222.9
10-Oct	255	263	257	260	276	277	279	291	305	327	349	106	337	32	25	37	31	30	49	47	45	55	51	50	331.4
11-Oct	39	38	35	34	35	34	37	27	25	31	31	24	17	14	12	13	11	9	7	2	360	357	351	345	21.7
12-Oct	349	348	350	348	348	342	341	348	344	334	338	334	330	348	338	309	309	319	321	331	331	330	311	312	334.7
13-Oct	310	297	307	311	304	277	290	296	299	290	277	284	292	266	237	218	225	220	203	213	214	216	215	213	246.7
14-Oct	208	200	204	197	192	200	196	198	195	198	203	213	222	234	229	237	236	240	242	253	258	274	290	315	224.5
15-Oct	317	284	271	262	262	230	207	205	205	199	200	195	196	203	201	193	199	208	213	230	220	246	238	234	216.7
16-Oct	239	249	244	248	257	267	267	247	244	251	268	253	236	234	229	209	212	219	237	272	35	128	137	149	240.7
17-Oct	156	193	208	212	212	208	199	209	212	199	107	84	67	45	25	337	322	314	307	307	303	300	297	292	272.3
18-Oct	293	292	290	295	296	292	298	293	304	294	289	300	296	300	295	266	220	146	157	151	145	143	134	137	286.3
19-Oct	133	132	145	143	157	143	191	204	210	226	188	181	183	195	184	176	165	168	164	160	180	179	170	142	171.0
20-Oct	126	61	30	24	49	45	30	18	20	9	97	346	317	327	294	273	276	289	313	304	305	300	299	296	331.2
21-Oct	299	295	290	291	285	280	276	275	279	280	283	293	291	274	283	282	279	275	263	245	236	221	226	215	275.8
22-Oct	212	206	172	121	128	135	133	104	94	91	85	93	18	333	307	278	275	277	281	279	291	279	281	279	259.3
23-Oct	275	277	280	276	273	267	276	280	279	285	296	291	274	269	283	280	272	253	237	222	213	212	199	202	264.3
24-Oct	195	191	190	198	209	217	241	251	260	286	295	292	293	293	299	320	330	335	334	348	335	9	56	70	263.8
25-Oct	60	53	68	69	68	65	57	42	39	37	26	13	6	2	358	355	347	343	340	352	340	332	309	300	22.9
26-Oct	293	273	250	235	234	213	219	216	215	211	211	212	213	214	216	212	214	220	237	250	256	271	278	273	227.1
27-Oct	276	279	282	286	279	277	282	269	191	216	214	205	206	189	190	183	188	193	190	195	197	205	215	219	217.4
28-Oct	222	228	236	255	277	290	290	286	288	289	287	290	293	298	308	303	303	312	314	315	312	329	325	328	291.7
29-Oct	311	304	325	318	318	322	325	327	326	340	345	342	339	342	347	359	345	346	344	29	22	322	305	296	329.6
30-Oct	296	223	212	218	215	212	213	214	219	215	213	212	199	208	228	232	212	236	265	289	308	311	291	289	227.3
31-Oct	246	297	218	210	152	187	194	184	162	158	118	94	90	85	81	76	65	57	47	47	42	42	31	25	76.2
266.9 270.6 261.3 262.0 265.0 264.8 261.0 262.0 262.7 268.9 267.2 269.1 270.9 272.1 273.5 269.9 271.2 266.4 267.3 273.1 268.3 266.4 267.1 263.1																									
Diurnal Average																									
AF - Analyzer Failure																									
All monthly, daily, and diurnal averages have been calculated using vector methods																									





**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Direction (WD) - deg**  
**Stony Mountain - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 99 deg on Oct 16 20:00	Hours of Data: 743
Minimum Value: 12 deg on Oct 22 01:00	Hours of Missing Data: 1
Percentiles: P <sub>1</sub> = 15 P <sub>10</sub> = 18 Q <sub>1</sub> = 20 Median = 23 Q <sub>3</sub> = 27 P <sub>90</sub> = 33 P <sub>99</sub> = 67	Hours of Calibration: 0
	Percent Operational Time: 99.9

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	24	27	29	28	28	28	26	25	27	30	30	32	33	31	35	33	32	33	33	32	34	36	35	34	36
2-Oct	35	33	32	32	36	35	AF	28	31	34	35	32	35	37	33	34	32	34	28	19	17	20	16	12	37
3-Oct	18	15	16	17	14	17	19	19	20	22	25	26	25	25	23	24	23	23	22	22	25	25	25	21	26
4-Oct	22	23	23	23	22	21	20	19	32	39	49	45	43	48	41	41	28	32	16	30	17	19	19	20	49
5-Oct	20	20	20	20	19	18	18	18	19	23	25	26	23	25	23	22	21	21	20	19	21	20	19	19	26
6-Oct	20	28	16	19	20	23	23	23	24	25	24	29	27	29	30	28	29	27	24	23	22	21	24	24	30
7-Oct	25	23	25	26	26	23	24	24	27	24	24	26	28	26	24	26	24	26	23	32	29	29	31	28	32
8-Oct	28	25	28	25	25	23	23	25	24	26	26	25	27	27	28	25	27	34	31	24	24	27	35	18	35
9-Oct	17	17	17	18	19	18	19	20	19	20	20	19	28	29	28	25	30	34	26	24	24	23	34	18	34
10-Oct	24	24	26	25	20	20	21	20	25	49	67	88	68	68	50	21	24	16	17	17	17	16	17	18	88
11-Oct	18	20	20	19	20	20	19	20	20	20	21	22	21	22	23	23	23	23	26	26	28	28	27	31	31
12-Oct	30	29	29	30	29	35	36	32	37	36	39	36	37	33	37	26	25	27	34	32	34	32	25	29	39
13-Oct	29	25	23	23	31	22	21	22	22	21	25	32	35	43	33	26	22	22	20	19	20	19	18	18	43
14-Oct	18	19	19	19	19	18	18	19	20	20	20	21	24	26	23	23	23	23	22	25	27	24	25	27	27
15-Oct	23	19	18	19	24	19	18	18	19	19	18	20	19	21	20	19	19	18	19	25	21	26	25	21	26
16-Oct	22	25	23	25	25	24	24	25	25	28	27	29	27	25	25	22	20	21	28	99	23	19	18	20	99
17-Oct	16	28	17	17	17	18	17	18	23	76	23	17	21	29	27	22	18	23	22	22	23	24	23	23	76
18-Oct	24	24	25	24	23	24	23	23	23	24	24	27	29	32	39	53	29	18	19	18	17	21	22	22	53
19-Oct	23	20	23	19	20	15	40	19	20	25	35	28	28	25	33	26	21	18	18	19	19	21	21	21	40
20-Oct	49	38	15	21	22	30	22	29	32	45	28	38	26	55	68	24	19	24	18	19	20	19	21	19	68
21-Oct	19	20	22	21	23	21	21	20	19	22	23	27	27	27	29	27	22	15	17	20	21	13	15	13	29
22-Oct	12	14	20	17	16	19	17	17	16	22	20	31	49	45	23	22	20	23	23	23	22	22	22	21	49
23-Oct	22	21	21	21	22	22	23	22	22	26	25	28	27	28	25	22	21	23	20	18	18	18	17	19	28
24-Oct	22	20	19	19	21	21	25	27	24	25	26	24	26	24	24	28	33	32	24	24	16	20	16	16	33
25-Oct	16	16	19	17	18	16	16	19	17	19	20	23	24	26	28	27	31	33	31	30	29	29	19	24	33
26-Oct	18	19	22	20	24	20	22	22	22	21	20	19	20	22	20	21	22	21	24	23	25	22	22	24	25
27-Oct	23	20	24	21	18	17	15	27	19	29	21	22	23	26	22	21	20	18	19	18	19	19	20	19	29
28-Oct	21	21	23	27	24	23	22	21	24	22	25	24	25	26	24	23	23	26	25	26	27	33	32	33	33
29-Oct	25	23	31	27	27	27	29	31	29	31	34	33	34	34	34	30	32	30	28	31	38	33	24	27	38
30-Oct	23	38	19	19	18	18	18	19	19	20	21	20	20	21	26	25	23	22	23	19	16	18	17	19	38
31-Oct	23	23	61	21	18	23	18	24	20	21	22	20	18	18	19	18	19	18	18	18	17	19	20	22	61
	49	38	61	32	36	35	40	32	37	76	67	88	68	68	68	53	33	34	34	99	38	36	35	34	

Diurnal Maximum

AF - Analyzer Failure



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	October 5, 2017	Last Cal Date:	September 14, 2017
Start time (MST):	10:28	End time (MST):	13:33
Reason:	Maintenance		

### Calibration Standards

Cal Gas Concentration	<u>49.4</u>	ppm	Cal Gas Exp Date	February 16, 2019
Cal Gas Cylinder #	<u>LL110090</u>			
Calibrator Make/Model	API T700		Serial Number	1222
ZAG Make/Model	API 701		Serial Number	5610

### Analyzer Information

Analyzer make: Thermo 43i

Analyzer serial #: JC1501301453

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Analyzer Range	0 - 1000 ppb		PMT voltage	-602	-601
Calculated slope	0.997811	0.997232	Lamp voltage	894	894
Calculated intercept	0.628013	1.249236	Pressure	688.5	656.1
Analyzer Background	20.1	21.1	Flow	0.020	0.366
Analyzer Coefficient	0.866	0.888	Intensity	86	86

### SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5009	0.0	0.0	-0.1	----
as found span	4955	59.1	582.3	389.1	1.496
calibrator zero	4984	0.0	0.0	-0.1	----
high point	4955	59.1	582.3	583.3	0.998
second point	4988	29.6	291.4	290.1	1.005
third point	5000	14.8	145.8	144.0	1.012
as left zero	5010	0.0	0.0	-0.4	----
as left span	4833	59.0	595.8	584.2	1.020
Average Correction Factor					1.005
Corrected As found	389.20	Previous response	582.92	*% change	49.8%

\* = > +/-5% change initiates investigation

Notes:

Pump swap out after as found due to failure. Span adjusted.

Calibration Performed By:

Aswin Sasi Kumar



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

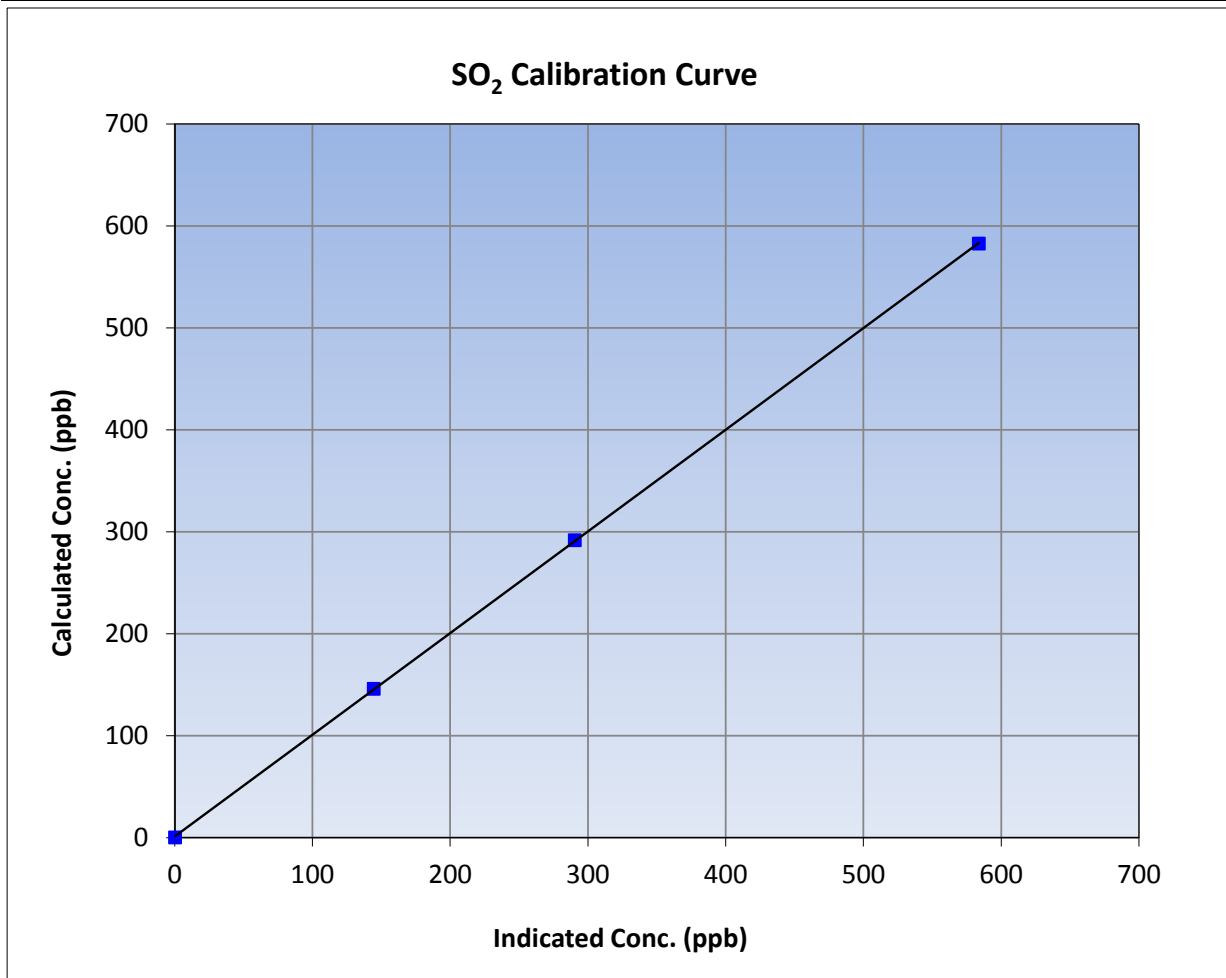
Version-03-2017

### Station Information

Calibration Date	October 5, 2017	Previous Calibration	September 14, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	10:28	End Time (MST)	13:33
Analyzer make	Thermo 43i	Analyzer serial #	JC1501301453

### Calibration Data

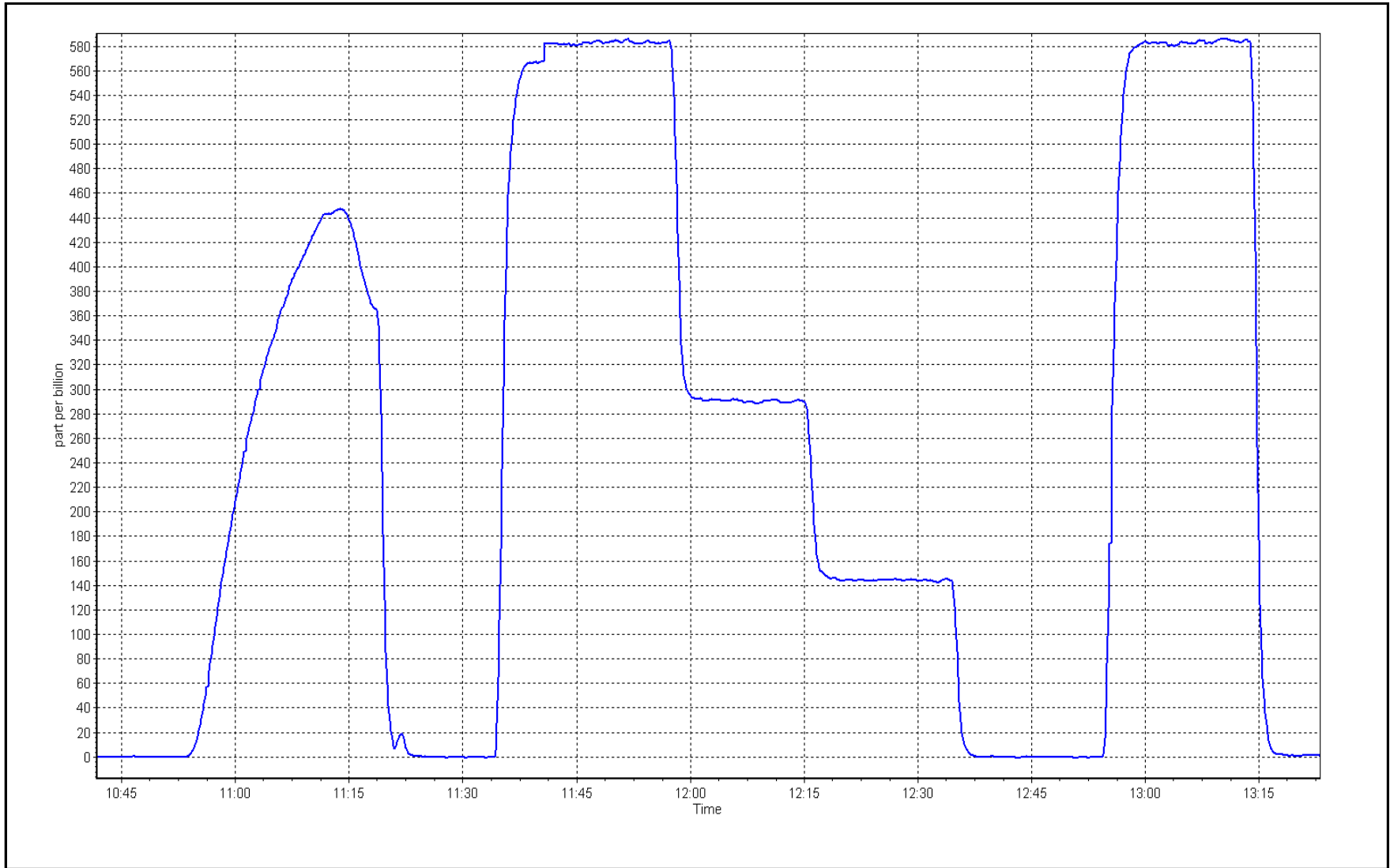
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits
0.0	-0.1	----	Correlation Coefficient	≥0.995
582.3	583.3	0.9982		
291.4	290.1	1.0046	Slope	0.90 - 1.10
145.8	144.0	1.0124		
			Intercept	+/-30



SO2 Calibration Plot

Date: 5-Oct

Location: Stony Mountain







# Wood Buffalo Environmental Association

## TRS Calibration Summary

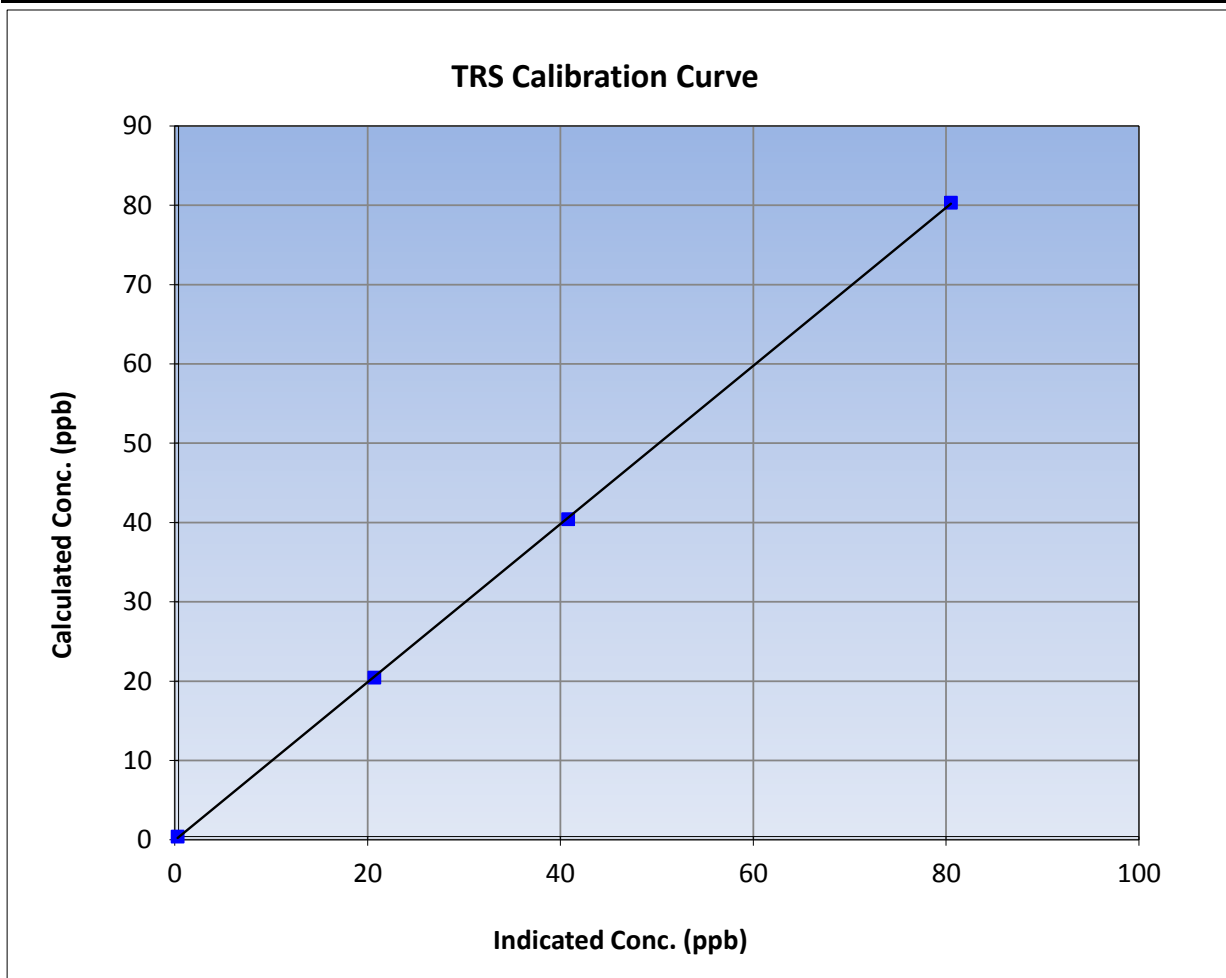
Version-03-2017

### Station Information

Calibration Date	October 17, 2017	Previous Calibration	September 27, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	14:29	End Time (MST)	17:09
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1336160090

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	-0.1	----	Correlation Coefficient	0.999973	≥0.995
79.9	80.1	0.9978			
40.0	40.4	0.9907	Slope	0.997214	0.90 - 1.10
20.1	20.3	0.9881			
			Intercept	-0.075617	+/-3

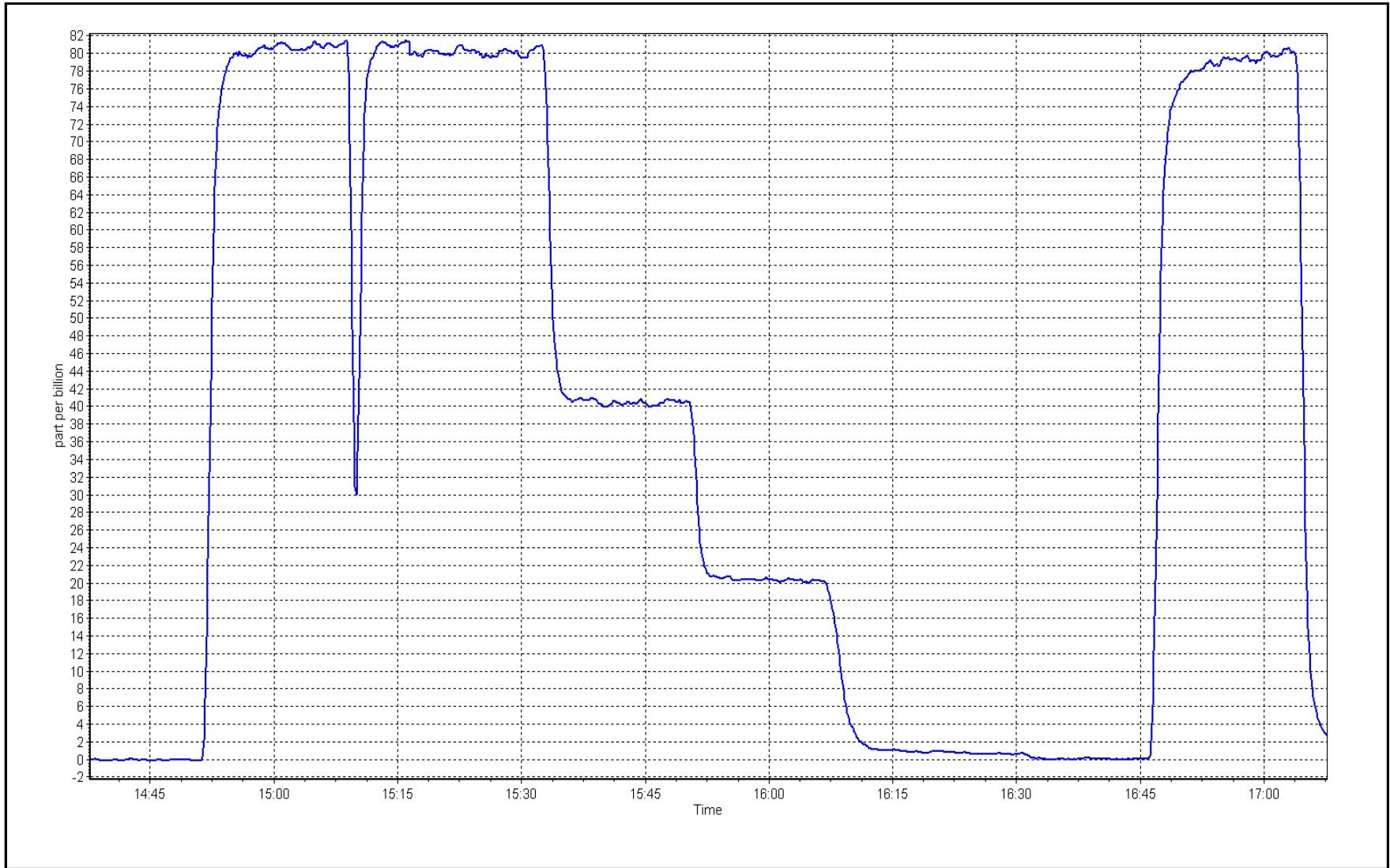




TRS Calibration Plot

Date: 17-Oct

Location: Stony Mountain







# Wood Buffalo Environmental Association

## TRS Calibration Summary

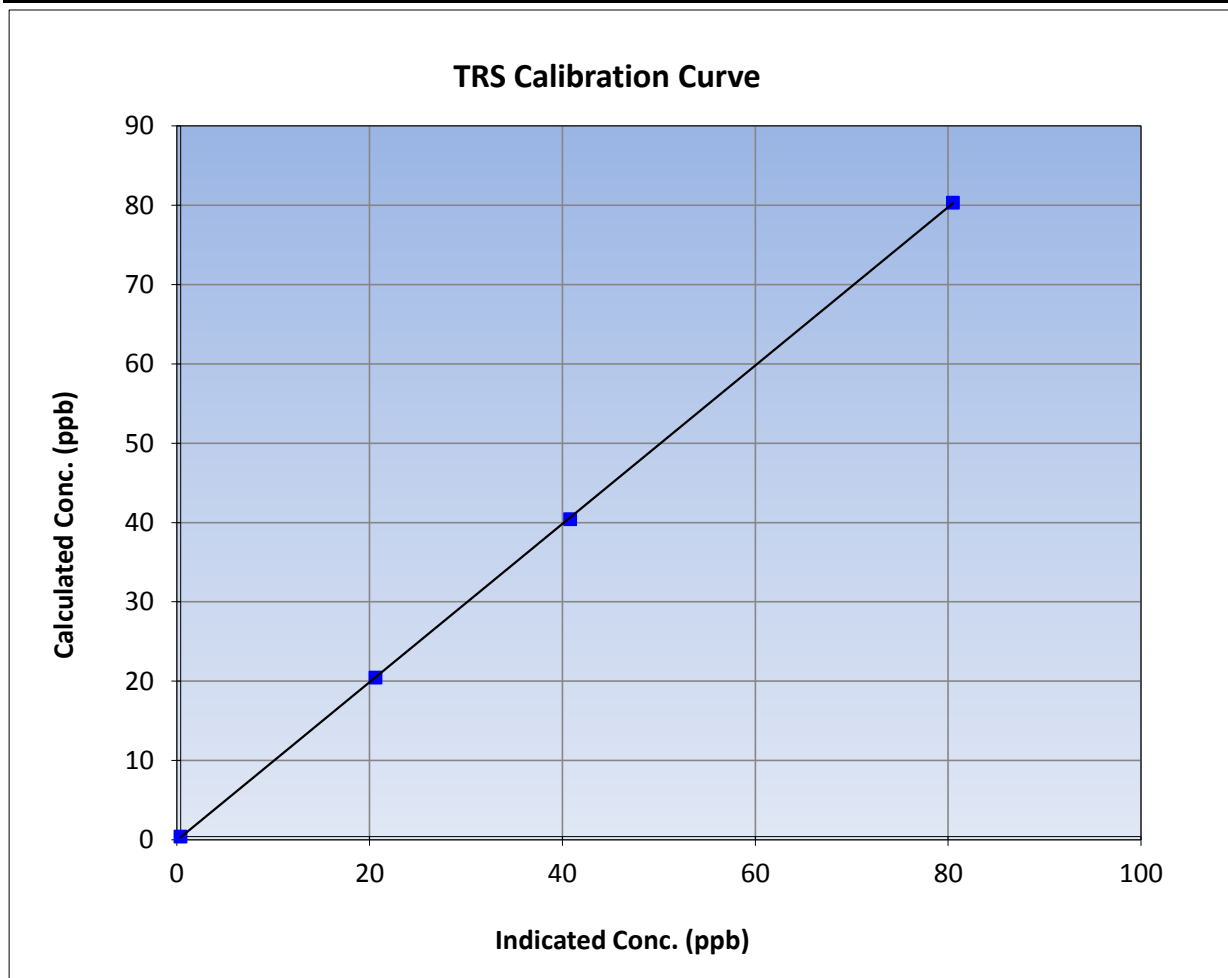
Version-03-2017

### Station Information

Calibration Date	October 23, 2017	Previous Calibration	October 17, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	10:55	End Time (MST)	13:25
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1336160090

### Calibration Data

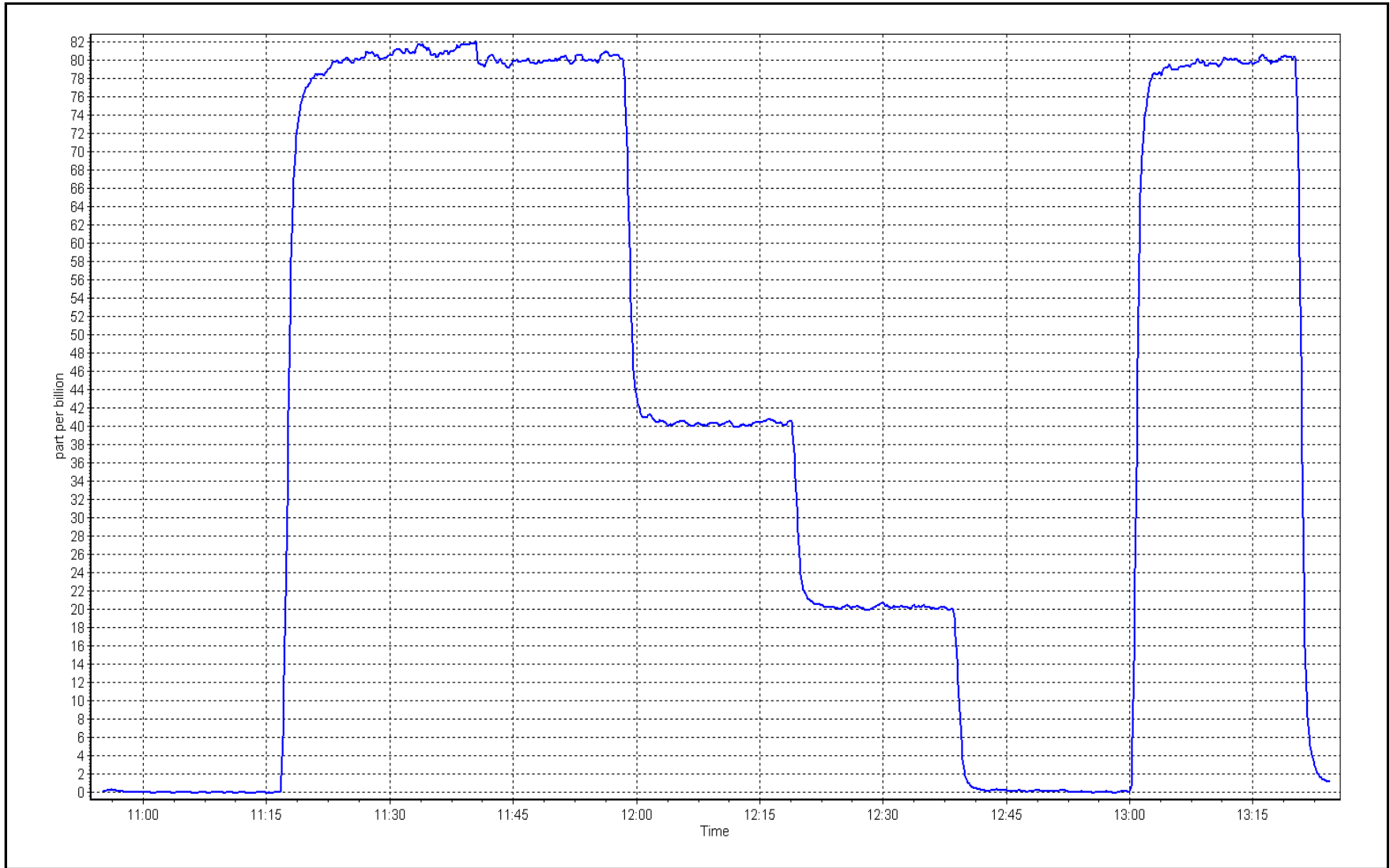
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.0	----	Correlation Coefficient	0.999982	≥0.995
80.0	80.1	0.9982			
40.0	40.4	0.9907	Slope	0.998205	0.90 - 1.10
20.1	20.2	0.9929			
			Intercept	-0.102503	+/-3



TRS Calibration Plot

Date: 23-Oct

Location: Stony Mountain





# Wood Buffalo Environmental Association

## THC / NMHC Calibration Report

Version-03-2017

### Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	October 5, 2017	Last Cal Date:	September 14, 2017
Start time (MST):	10:28	End time (MST):	13:33
Reason:	Routine		

### Calibration Standards

Gas Cert Reference	LL110090	Cal Gas Expiry Date	February 16, 2019
CH4 Cal Gas Conc.	<u>491.0</u> ppm	CH4 Equiv Conc.	1041.0 ppm
C3H8 Cal Gas Conc.	<u>200.0</u> ppm	Station temp.	23 Deg C
Calibrator Model	API 700	Serial Number	1222
ZAG make/model	Teledyne API 701	Serial Number	5610

### Analyzer Information

Analyzer make: Thermo 55i

Analyzer serial #: 1505164831

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
THC Range (ppm)	0 - 50 ppm		Column Temp	75.3	75.1
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.1	175.0
CH4 SP Ratio	0.000197	0.000197	Flame Temp	405.0	405.0
CH4 Retention time	12.0	12.0	Carrier Pressure	31.5	31.5
NMHC SP Ratio	4.49E-05	4.49E-05	Fuel Pressure	44.3	44.3
NMHC Peak Area	144367	144367	Air Pressure	34.5	34.5

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
THC Cal Slope	1.001586	0.999954
THC Cal Offset	0.013365	0.022594
CH4 Cal Slope	1.003697	0.998664
CH4 Cal Offset	0.008927	0.011097
NMHC Cal Slope	0.999707	1.000222
NMHC Cal Offset	0.004454	0.012495

Notes:

No adjustments needed.

Calibration Performed By:

Aswin Sasi Kumar



# Wood Buffalo Environmental Association

## THC / NMHC Calibration Report

Version-02-2017

### THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i>
as found zero	5009	0.0	0.00	0.00	----
as found span	4955	59.1	12.27	12.26	1.001
calibrator zero	5009	0.0	0.00	0.00	----
high point	4955	59.1	12.27	12.26	1.001
second point	4988	29.6	6.14	6.11	1.006
third point	5000	14.8	3.07	3.03	1.014
as left zero	5010	0.0	0.00	0.00	----
as left span	4833	59.0	12.55	12.31	1.020
Average Correction Factor					1.007
Corrected As found	12.26	Prev response	12.24	*% change	-0.2%

### NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i>
as found zero	5009	0	0.00	0.00	----
as found span	4955	59.1	6.48	6.48	1.001
calibrator zero	5009	0	0.00	0.00	----
high point	4955	59.1	6.48	6.48	1.001
second point	4988	29.6	3.24	3.22	1.007
third point	5000	14.8	1.62	1.60	1.014
as left zero	5010	0	0.00	0.00	----
as left span	4833	59	6.63	6.48	1.024
Average Correction Factor					1.008
Corrected As found	6.48	Prev response	6.48	*% change	0.1%

### CH4 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i>
as found zero	5009	0.0	0.00	0.00	----
as found span	4955	59.1	5.79	5.79	1.000
calibrator zero	5009	0.0	0.00	0.00	----
high point	4955	59.1	5.79	5.79	1.000
second point	4988	29.6	2.90	2.88	1.005
third point	5000	14.8	1.45	1.43	1.013
as left zero	5010	0.0	0.00	0.00	----
as left span	4833	59.0	5.92	5.83	1.016
Average Correction Factor					1.006
Corrected As found	5.79	Prev response	5.76	*% change	-0.6%

\* = > +/-5% change initiates investigation



# Wood Buffalo Environmental Association

## THC Calibration Summary

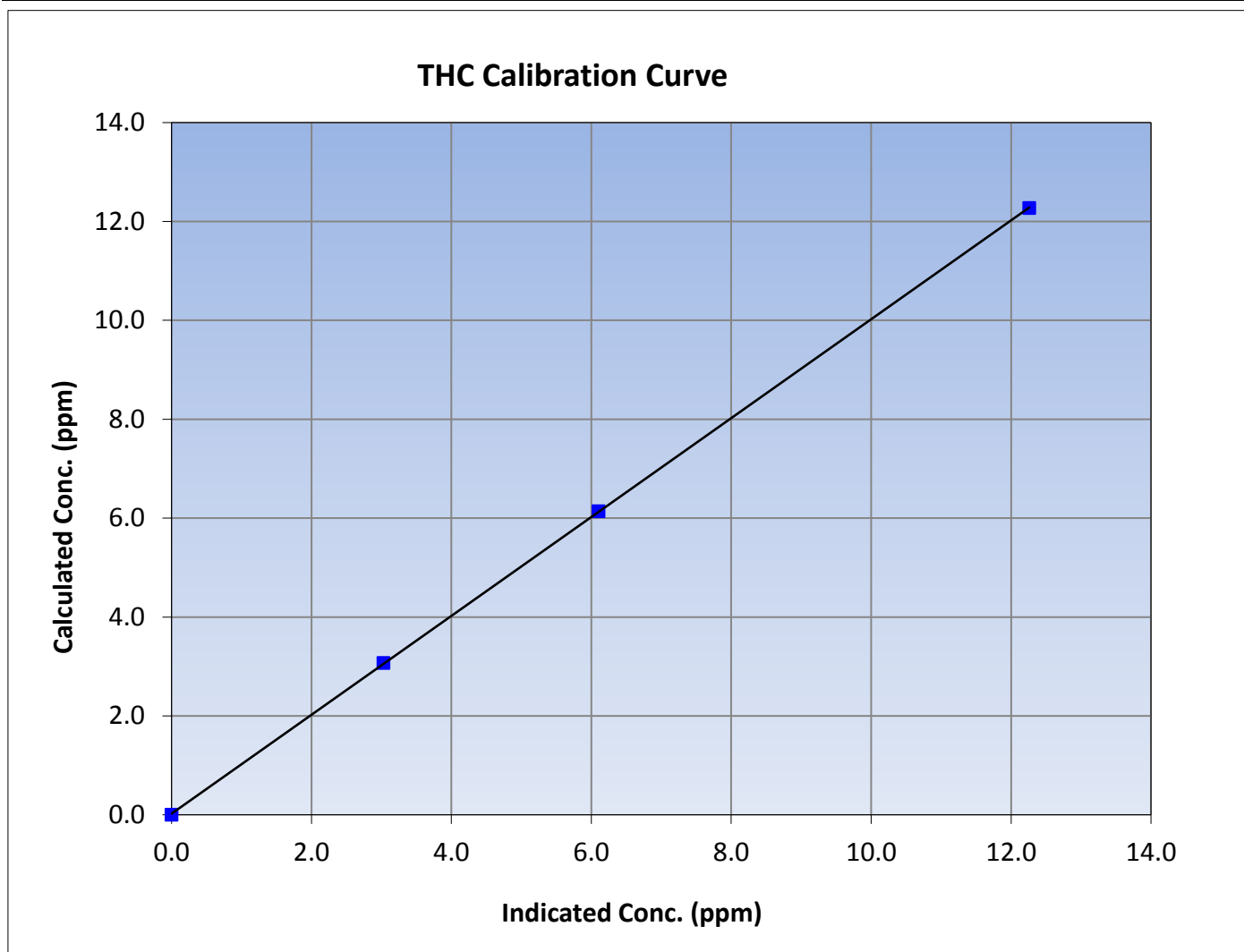
Version-02-2017

### Station Information

Calibration Date	October 5, 2017	Previous Calibration	September 14, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	10:28	End Time (MST)	13:33
Analyzer make	Thermo 55i	Analyzer serial #	1505164831

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.00	0.00	----	Correlation Coefficient	0.999984	$\geq 0.995$			
12.27	12.26	1.0008						
6.14	6.11	1.0059				Slope	0.999954	0.90 - 1.10
3.07	3.03	1.0143						
			Intercept	0.022594	$\pm 0.5$			





# Wood Buffalo Environmental Association

## CH<sub>4</sub> Calibration Summary

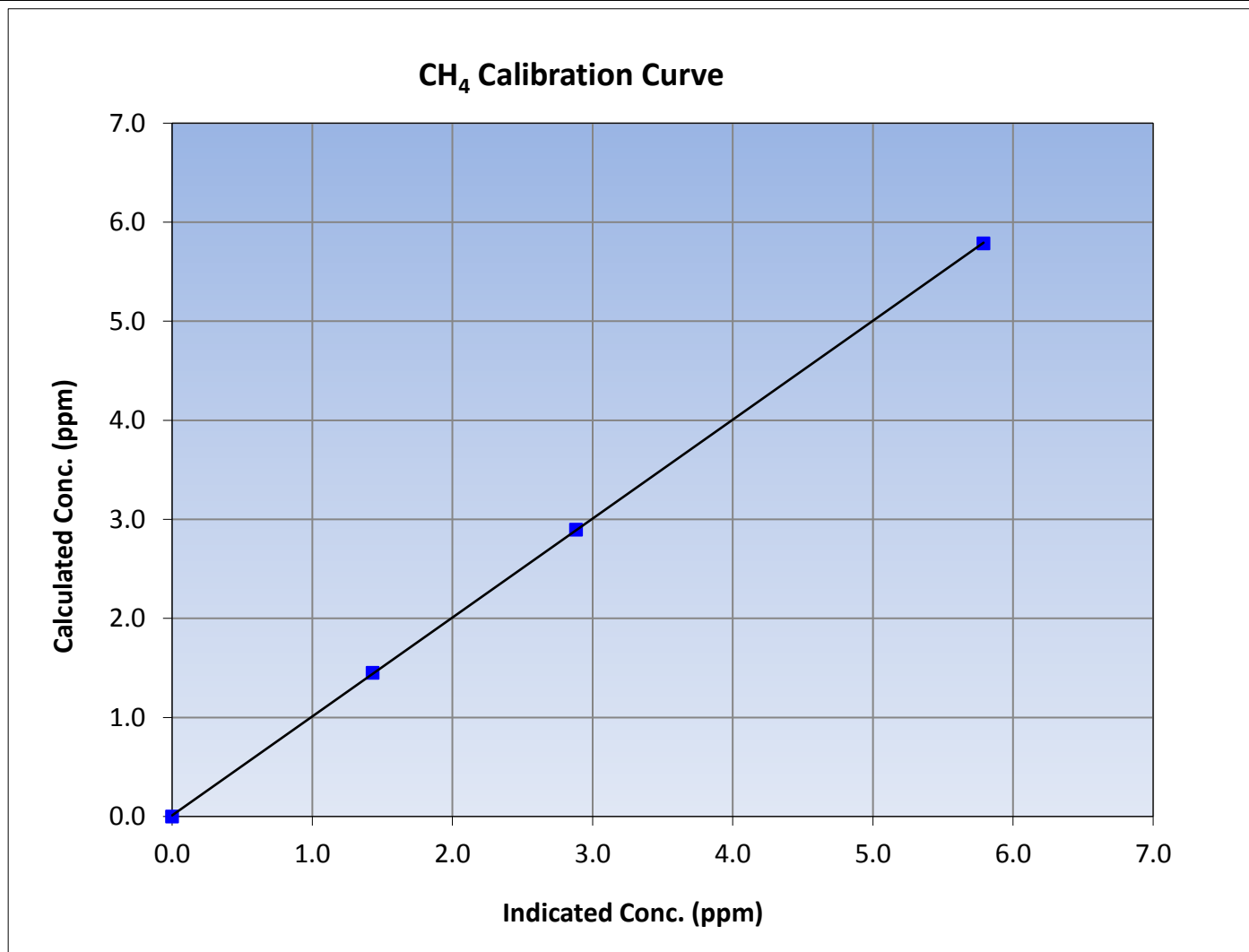
Version-02-2017

### Station Information

Calibration Date	October 5, 2017	Previous Calibration	September 14, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	10:28	End Time (MST)	13:33
Analyzer make	Thermo 55i	Analyzer serial #	1505164831

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.00	0.00	----	Correlation Coefficient	0.999983	$\geq 0.995$			
5.79	5.79	0.9995						
2.90	2.88	1.0050				Slope	0.998664	0.90 - 1.10
1.45	1.43	1.0133						
			Intercept	0.011097	$\pm 0.5$			







# Wood Buffalo Environmental Association

## NMHC Calibration Summary

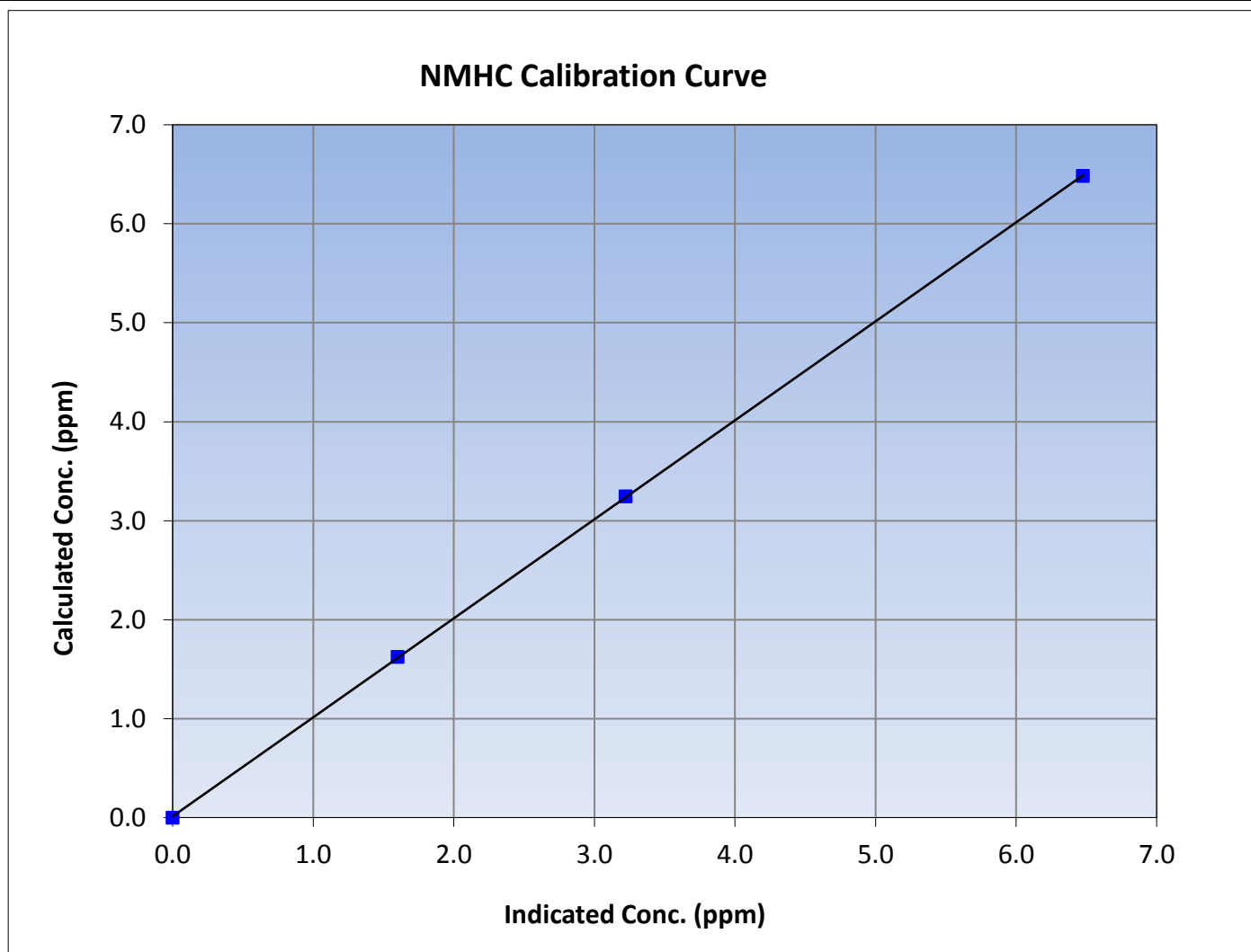
Version-02-2017

### Station Information

Calibration Date	October 5, 2017	Previous Calibration	September 14, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	10:28	End Time (MST)	13:33
Analyzer make	Thermo 55i	Analyzer serial #	1505164831

### Calibration Data

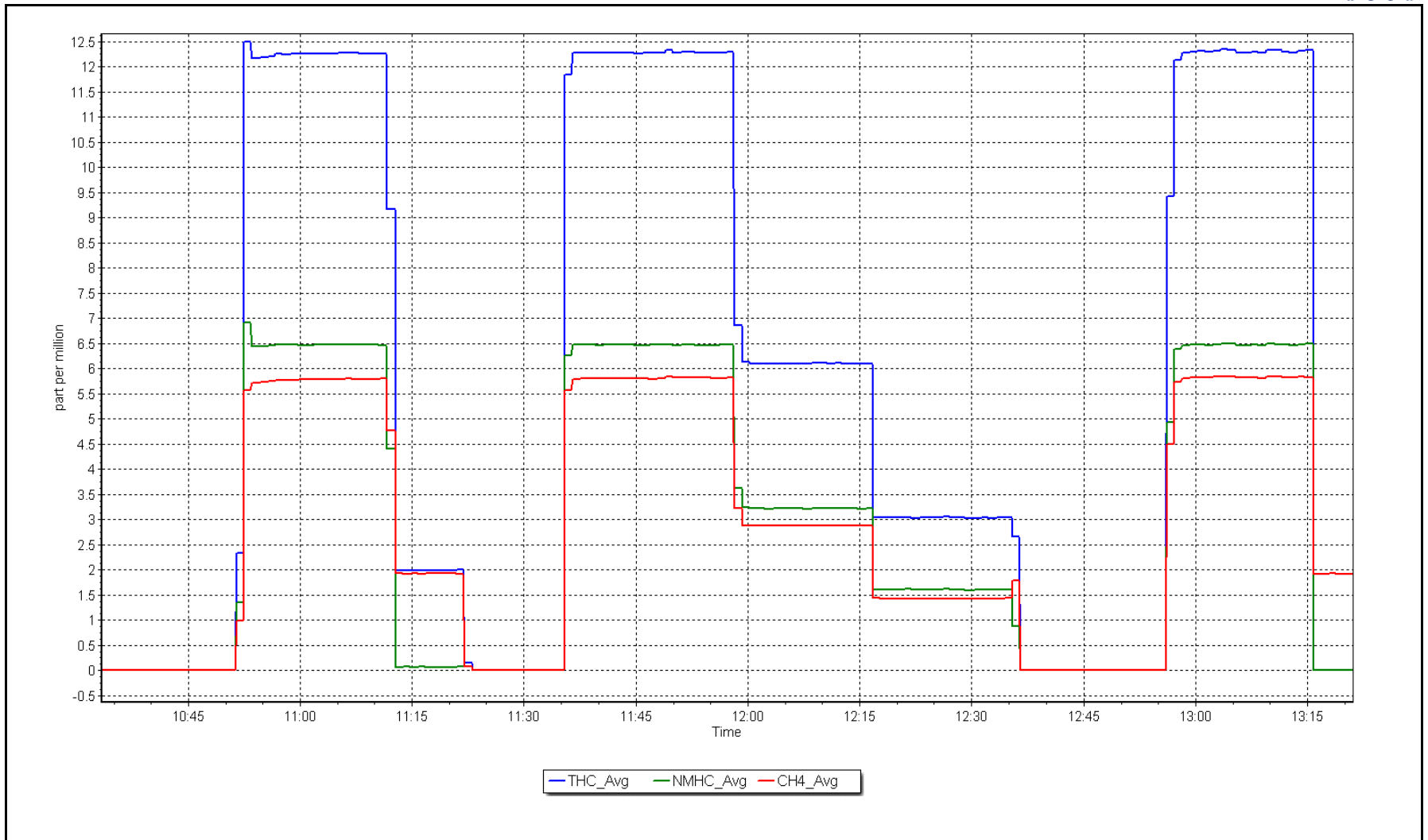
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>
0.00	0.00	----	Correlation Coefficient	0.999982	$\geq 0.995$
6.48	6.48	1.0010			
3.24	3.22	1.0070			
1.62	1.60	1.0145			
			Slope	1.000222	0.90 - 1.10
			Intercept	0.012495	+/-0.5



NMHC Calibration Plot

Date: Oct-17

Location: Stony Mountain







# Wood Buffalo Environmental Association

## O<sub>3</sub> Calibration Summary

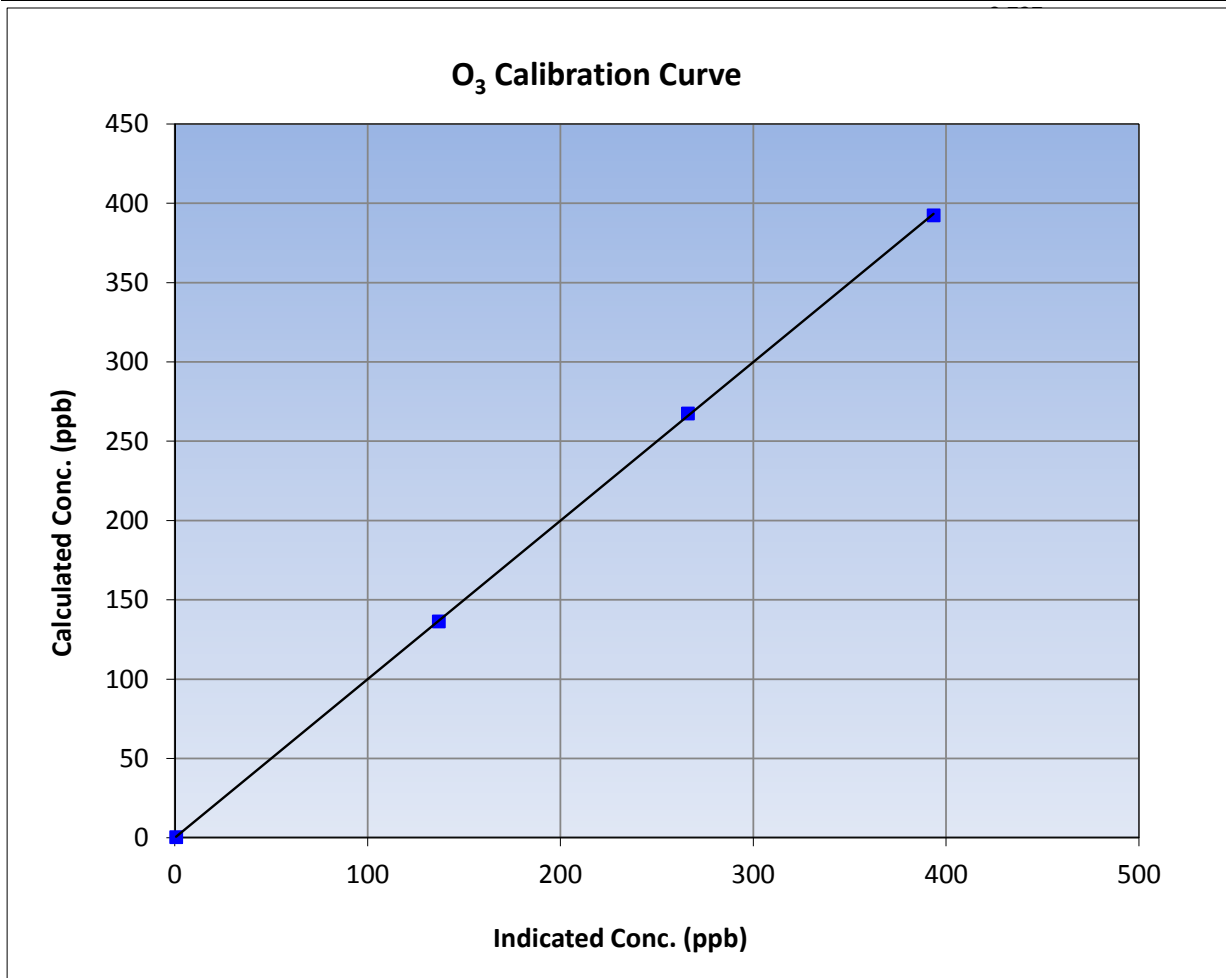
Version-03-2017

### Station Information

Calibration Date	October 23, 2017	Previous Calibration	September 27, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	13:22	End Time (MST)	16:30
Analyzer make	Thermo 49i	Analyzer serial #	1501663733

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	0.3	----	Correlation Coefficient	0.999966	<b>≥0.995</b>
392.1	393.1	0.9975	Slope	0.999735	<b>0.90 - 1.10</b>
267.1	265.8	1.0049	Intercept	-0.047248	<b>+/- 10</b>
136.1	136.5	0.9971			



O<sub>3</sub> Calibration Plot

Date: 23-Oct

Location: Stony Mountain





# Wood Buffalo Environmental Association

## NO<sub>x</sub> - NO - NO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	October 17, 2017	Last Cal Date:	September 14, 2017
Start time (MST):	10:48	End time (MST):	14:26
Reason:	Routine		

### Calibration Standards

NO Gas Cylinder #	LL110090	Cal Gas Expiry Date	February 16, 2019
NOX Cal Gas Conc.	<u>50.9</u> ppb	NO Cal Gas Conc.	<u>50.9</u> ppb
Calibrator Model	API T700	Serial Number	1222
ZAG make/model	Teledyne API T701	Serial Number	5610

### Analyzer Information

Analyzer make:	Thermo 42i	Analyzer serial #:	1336160088	
	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
NO coefficient	0.950	0.950	NOX Range (ppb)	0 - 1000 ppb
NOX coefficient	0.999	0.999	PMT Temperature	-3.0 -3.0
NO <sub>2</sub> coefficient	0.999	0.999	Reaction cell Press	191.0 189.9
NO bkgrnd	1.7	1.7	Sample Flow	0.708 0.697
NOX bkgrnd	1.8	1.8	PMT Voltage	-850.6 -850.6

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope	1.000396	1.007607
NO <sub>x</sub> Cal Offset	0.450148	0.877702
NO Cal Slope	0.999274	1.009065
NO Cal Offset	0.369681	0.675536
NO <sub>2</sub> Cal Slope	0.996899	0.998892
NO <sub>2</sub> Cal Offset	0.381812	-0.329089



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

Version-03-2017

### Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5010	0.0	0.0	0.0	0.0	0.3	0.3	-0.1	----	----
as found span	4955	59.1	599.9	599.9	0.0	595.2	594.4	0.7	1.0080	1.0093
calibrator zero	5009	0.0	0.0	0.0	0.0	0.3	0.3	-0.1	----	----
high point	4955	59.1	599.9	599.9	0.0	595.2	594.4	0.7	1.0080	1.0093
second point	4985	29.6	300.5	300.5	0.0	296.5	296.5	0.0	1.0133	1.0133
third point	5000	14.8	150.2	150.2	0.0	147.2	147.3	-0.1	1.0205	1.0198
as left zero	5010	0.0	0.0	0.0	0.0	0.5	0.5	0.0	----	----
as left span	4846	59.1	613.3	203.1	410.2	607.0	199.7	407.4	1.0103	1.0170
<b>Average Correction Factor</b>									<b>1.0139</b>	<b>1.0142</b>

Corrected As found	NO <sub>x</sub> = 594.9 ppb	NO = 594.1 ppb	*Percent Change	NO <sub>x</sub> = 0.7%
Previous Response	NO <sub>x</sub> = 599.3 ppb	NO = 600.0 ppb	*Percent Change	NO = 1.0%

\* = > +/-5% change initiates investigation

### GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
1st NO ref point		0.0	596.0	595.2	0.7	1.0066	1.0080	----	----
1st NO2 (400 ppb O3)	203.1	392.1	595.9	203.1	392.9	1.0068	----	0.9980	100.2%
2nd NO2 (200 ppb O3)	328.1	267.1	595.3	328.1	267.2	1.0078	----	0.9996	100.0%
3rd NO2 (100 ppb O3)	459.1	136.1	596.6	459.1	137.5	1.0056	----	0.9898	101.0%
2nd NO ref point	----	0.0	596.3	596.0	0.3	1.0061	1.0066	----	----
<b>Average Correction Factor</b>						<b>1.0066</b>	<b>1.0073</b>	<b>0.9958</b>	<b>100.4%</b>

Notes:

No adjustments required.

Calibration Performed By:                      Aswin Sasi Kumar



# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

Version-03-2017

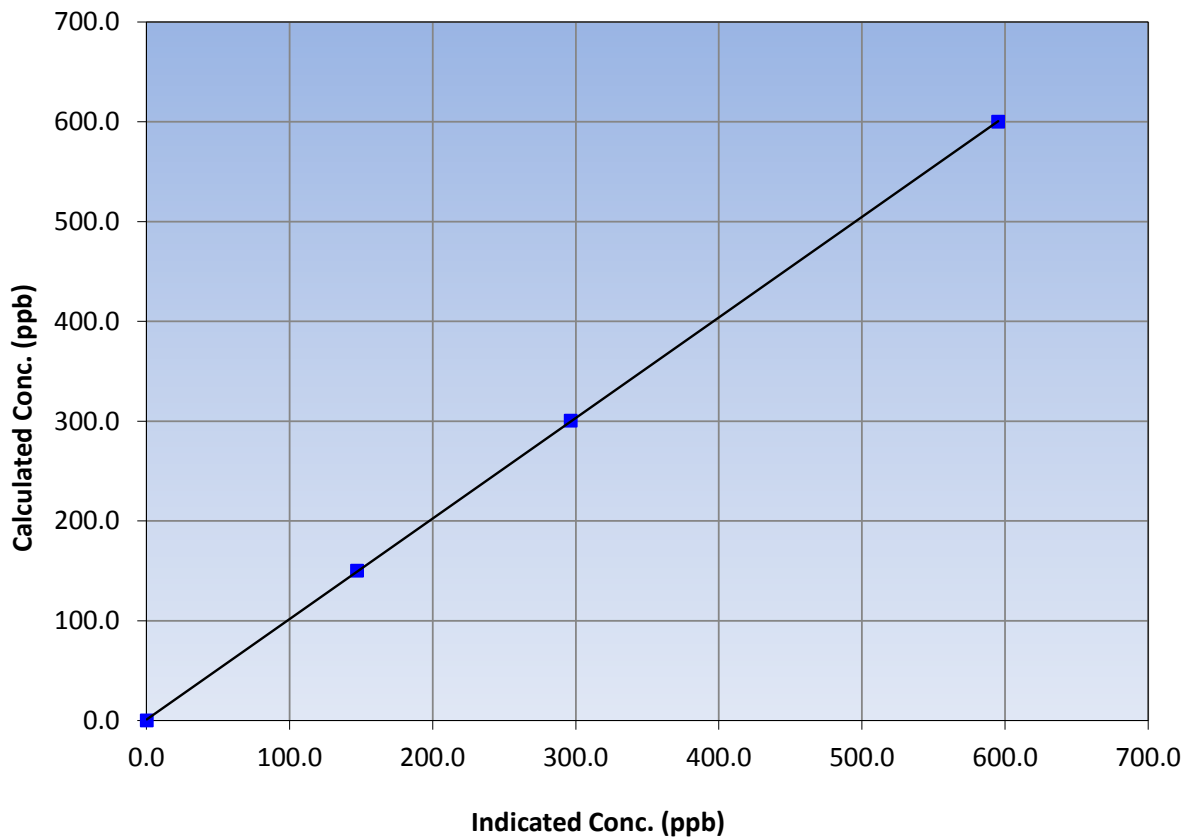
### Station Information

Calibration Date	October 17, 2017	Previous Calibration	September 14, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	10:48	End Time (MST)	14:26
Analyzer make	Thermo 42i	Analyzer serial #	1336160088

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>
0.0	0.3	----	Correlation Coefficient	≥0.995
599.9	595.2	1.0080		
300.5	296.5	1.0133	Slope	0.90 - 1.10
150.2	147.2	1.0205		
			Intercept	+/-20

NO<sub>x</sub> Calibration Curve







# Wood Buffalo Environmental Association

## NO Calibration Summary

Version-03-2017

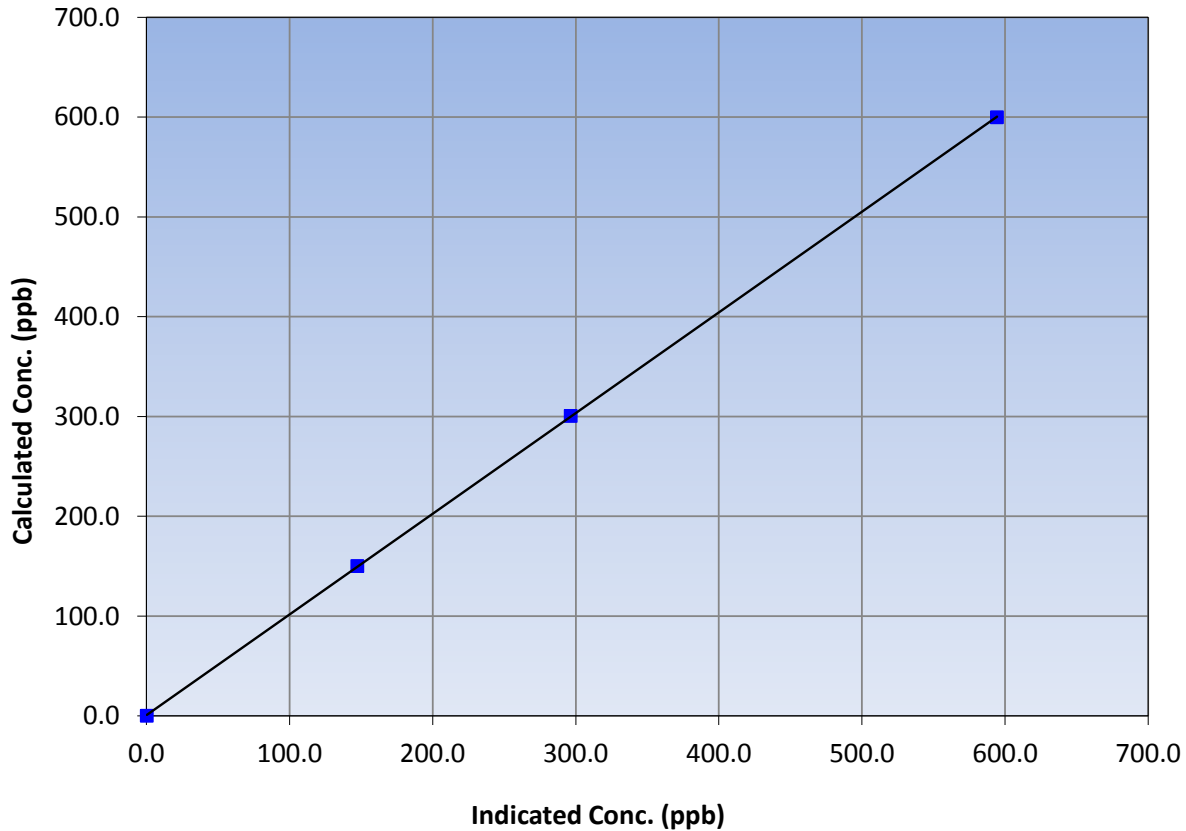
### Station Information

Calibration Date	October 17, 2017	Previous Calibration	September 14, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	10:48	End Time (MST)	14:26
Analyzer make	Thermo 42i	Analyzer serial #	1336160088

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	0.3	----	Correlation Coefficient	≥0.995	
599.9	594.4	1.0093			
300.5	296.5	1.0133			
150.2	147.3	1.0198			
			Slope	1.009065	0.90 - 1.10
			Intercept	0.675536	+/-20

NO Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

Version-03-2017

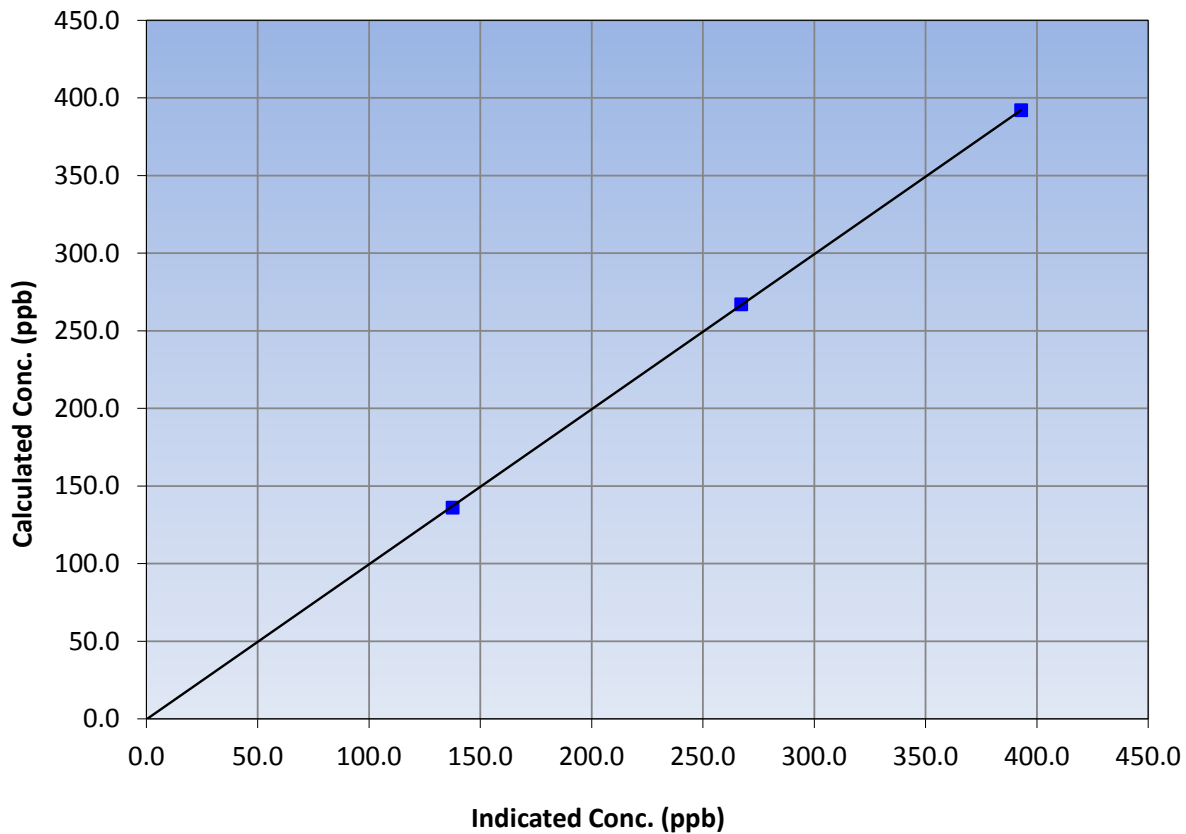
### Station Information

Calibration Date	October 17, 2017	Previous Calibration	September 14, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	10:48	End Time (MST)	14:26
Analyzer make	Thermo 42i	Analyzer serial #	1336160088

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	-0.1	----	Correlation Coefficient	≥0.995	
392.1	392.9	0.9980			
267.1	267.2	0.9996			
136.1	137.5	0.9898			
			Slope	0.998892	0.90 - 1.10
			Intercept	-0.329089	+/-20

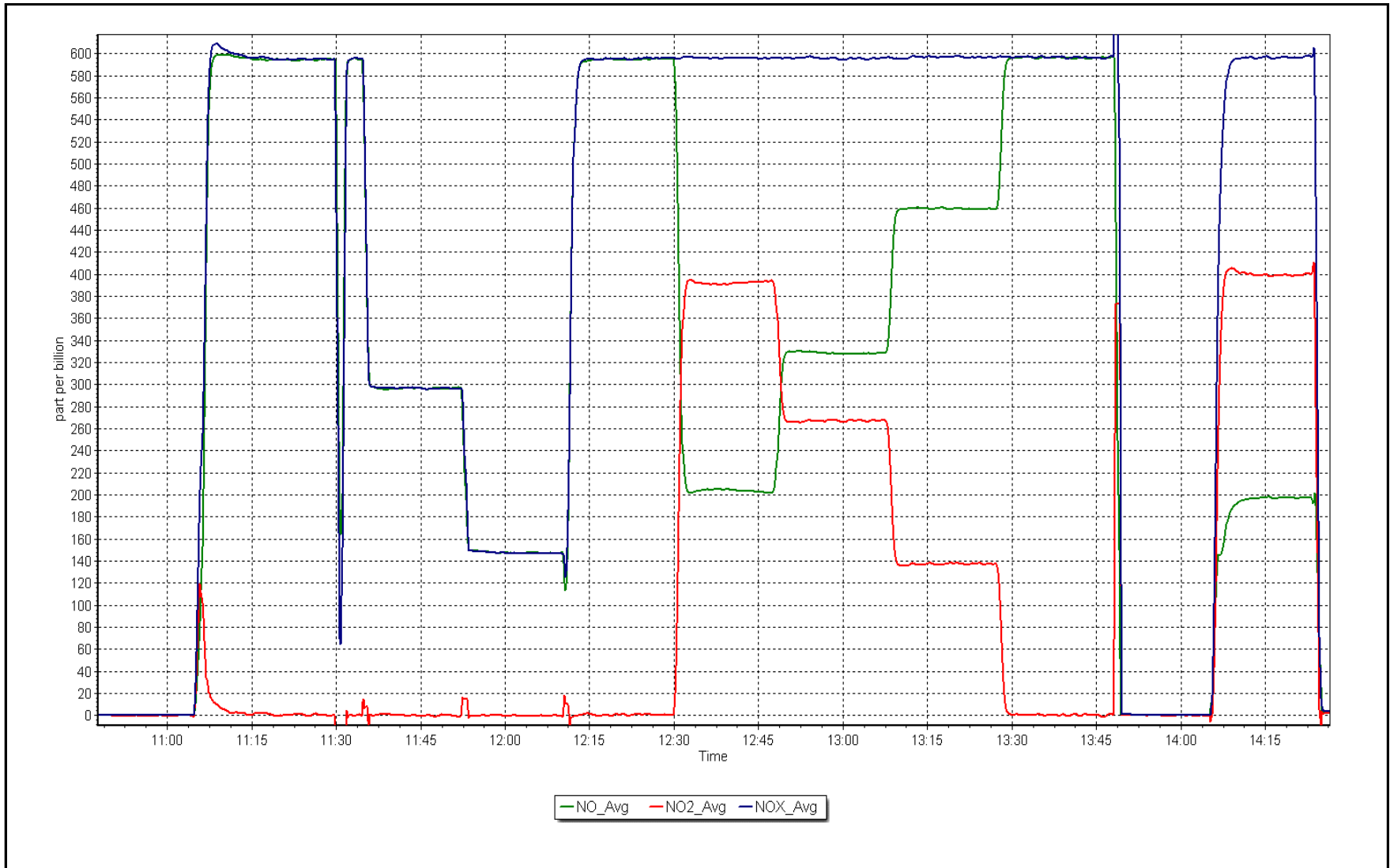
NO<sub>2</sub> Calibration Curve



NO<sub>x</sub> Calibration Plot

Date: 17-Oct

Location: Stony Mountain





# Wood Buffalo Environmental Association

## SHARP PM<sub>2.5</sub> CALIBRATION

Version-02-2017

### Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	October 23, 2017	Last Cal Date:	September 27, 2017
Start time (MST):	12:00	End time (MST):	13:30
Sharp Model:	Thermo 5030 SHARP	S/N:	E-1107
Particulate Fraction:	PM2.5	C14 Source S/N:	4965
Flow Meter Make/Model:	Delta-Cal	S/N:	628
Temp/RH standard:	Delta-Cal	S/N:	628

### Monthly Calibration Test

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<b>(Limits)</b>
T1 (°C)	7	7.6	7	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	940	940.58	940	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	999.6	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	0.1	---	0.1	<input type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified <input checked="" type="checkbox"/>				
Cyclone cleaning :	PM10 Cyclone <input checked="" type="checkbox"/>		PM2.5 Cyclone <input checked="" type="checkbox"/>		
Date Filter Tape Installed:					

### Quarterly Calibration Test

Leak Test: Date of check: \_\_\_\_\_ Last Cal Date: June 27, 2017  
 Flow w/o adaptor: \_\_\_\_\_ Flow w/ adaptor: 16.63

**(Limit) 0.4 LPM**

<u>Adjusted</u>	<u>Current Test</u>	<u>Previous Test</u>	<u>% Change</u>
<input type="checkbox"/>	Foil S/N: _____	Foil S/N: _____	
	Foil Mass: _____	Foil Mass: _____	
	Calibration Date: _____	Calibration Date: _____	
<b>(Limit) +/- 5% of previous</b>	Correction Factor: _____	Correction Factor: _____	---

### Annual Calibration Test

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<b>(Limits)</b>
T2 (°C)				<input type="checkbox"/>	+/- 2 °C
T3 (°C)				<input type="checkbox"/>	+/- 2 °C
T4 (°C)				<input type="checkbox"/>	+/- 2 °C
RH (%)				<input type="checkbox"/>	+/- 10%
Date Sample Tube Cleaned:					
Date Pump Rebuilt/Replaced:					

Notes: Cyclone head cleaned. No adjustments made.

Calibration by: Devin Russell



## WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

### CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT

#### **AMS 19 FIREBAG OCTOBER 2017**

Operations, Data Collection,  
QA/QC, Data Validation and Reporting by:  
Wood Buffalo Environmental Association  
Fort McMurray, Alberta

November 29, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)  
OCTOBER 2017

MONTHLY SUMMARY for  
AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	705	39	39	100	23	0	2	0
H2S (ppb) Average	706	38	38	100	1	0	0	0
THC (ppm) Average	704	40	40	100	3.3	-	2.4	-
NO2 (ppb) Average	704	40	40	100	23	0	7	-
NO (ppb) Average	704	40	40	100	35	-	5	-
NOX (ppb) Average	704	40	40	100	53	-	12	-
Temperature 2 m (C) Average	744	0	0	100	19.9	-	12.5	-
Relative Humidity (%) Average	744	0	0	100	100	-	98	-
Wind Speed 10 m (km/h) Average	736	0	8	98.92	39	-	24	-
Wind Direction 10 m (deg) Average	736	0	8	98.92	-	-	-	-

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)  
OCTOBER 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	705	0.7	2	-	0	0	0	0	0	2	23
H2S (ppb) Average	706	0.2	0	-	0	0	0	0	0	0	1
THC (ppm) Average	704	2.16	0.1	-	2	2.1	2.1	2.1	2.2	2.3	3.3
NO2 (ppb) Average	704	2.9	4	-	0	0	0	2	4	8	23
NO (ppb) Average	704	0.7	2	-	0	0	0	0	1	2	35
NOX (ppb) Average	704	3.6	5	-	0	0	1	2	5	9	53
Temperature 2 m (C) Average	744	0.93	4.3	-	-6.2	-3.5	-2.3	0	3.5	6.8	19.9
Relative Humidity (%) Average	744	84.5	15	-	36	63	79	89	96	98	100
Wind Speed 10 m (km/h) Average	736	15.4	7	-	1	6	10	14	20	26	39
	6	736	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)  
OCTOBER 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	21 Oct 2017 05:00	21 Oct 2017 12:00	8	Flat line in sensor output signal - Sensor frozen





Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb

Firebag - October 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 23 ppb on Oct 23 01:00	Maximum Daily Average: 2.5 ppb on Oct 30		Hours of Data:	705
Minimum Value: 0 ppb on Oct 1 06:00	Minimum Daily Average: 0.0 ppb on Oct 1		Hours of Missing Data:	39
Maximum Diurnal Average: 1.4 ppb at hour 1	Minimum Diurnal Average: 0.4 ppb at hour 23		Hours of Calibration:	39
Monthly Average: 0.7 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 2 P <sub>99</sub> = 8		Percent Operational Time:	100.0

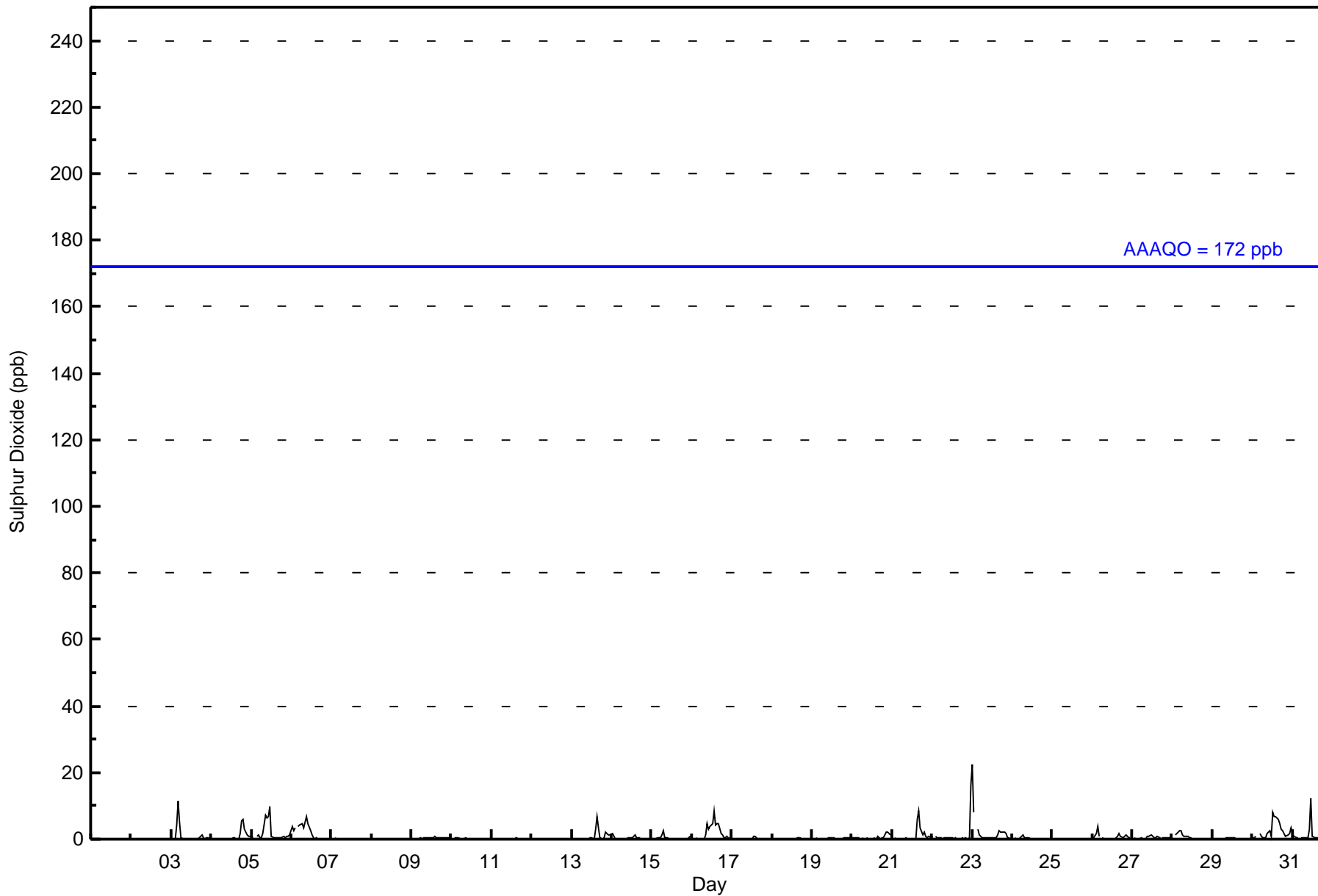
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Oct	Z	0	0	4	11	5	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1.1	11
4-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6	3	1	1	1	1	0.9	6
5-Oct	1	1	Z	1	1	0	0	2	7	6	7	10	1	0	0	0	0	0	1	1	1	1	1	1	1	1.9	10
6-Oct	4	3	3	Z	4	4	5	4	5	7	4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	2.1	7
7-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
8-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
9-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0.3	1
10-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
11-Oct	0	0	Z	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.1	0
12-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
13-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	3	7	3	0	0	0	2	2	1	1	1	1.0	7
14-Oct	2	1	0	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.4	2
15-Oct	Z	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	2	
16-Oct	1	Z	1	0	0	0	0	0	1	5	3	4	5	9	4	5	5	2	1	0	0	1	0	0	0	2.0	9
17-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.2	1
18-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
19-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
20-Oct	0	0	0	0	0	Z	0	0	0	0	C	C	C	0	0	1	0	0	0	0	2	2	2	1	0.6	2	
21-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	6	8	3	1	2	1	0	1	0	0	1.1	8	
22-Oct	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	1.0	16	
23-Oct	23	8	Z	3	1	1	0	1	0	0	0	0	0	0	0	1	2	2	2	2	2	1	0	0	2.3	23	
24-Oct	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
25-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
26-Oct	0	0	2	4	1	Z	0	0	0	0	0	0	0	0	1	2	1	1	1	1	1	1	1	0	0.7	4	
27-Oct	Z	0	0	0	0	0	0	0	0	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0.4	1
28-Oct	0	Z	1	2	3	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	3
29-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
30-Oct	0	0	1	Z	2	1	0	0	1	2	3	1	8	7	7	6	5	3	2	2	1	1	2	3	0	2.5	8
31-Oct	2	1	1	1	Z	0	0	0	0	0	3	12	1	0	1	0	0	0	0	0	0	0	0	0	0	1.1	12
	1.4	0.6	0.4	0.7	1.0	0.7	0.4	0.4	0.6	0.8	0.9	1.2	0.7	0.7	0.7	1.0	0.9	0.5	0.6	0.6	0.5	0.4	0.4	0.9		Diurnal Average	
	23	8	3	4	11	5	5	4	7	7	7	12	8	9	7	7	8	3	6	6	3	2	2	16		Diurnal Maximum	

Z - zerospan      C - Calibration  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb    24-hr 48 ppb



Wood Buffalo Environmental Association  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Firebag - October 2017





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Firebag - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	701	99.43	99.43
11 - 20	3	0.43	99.86
21 - 60	1	0.14	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

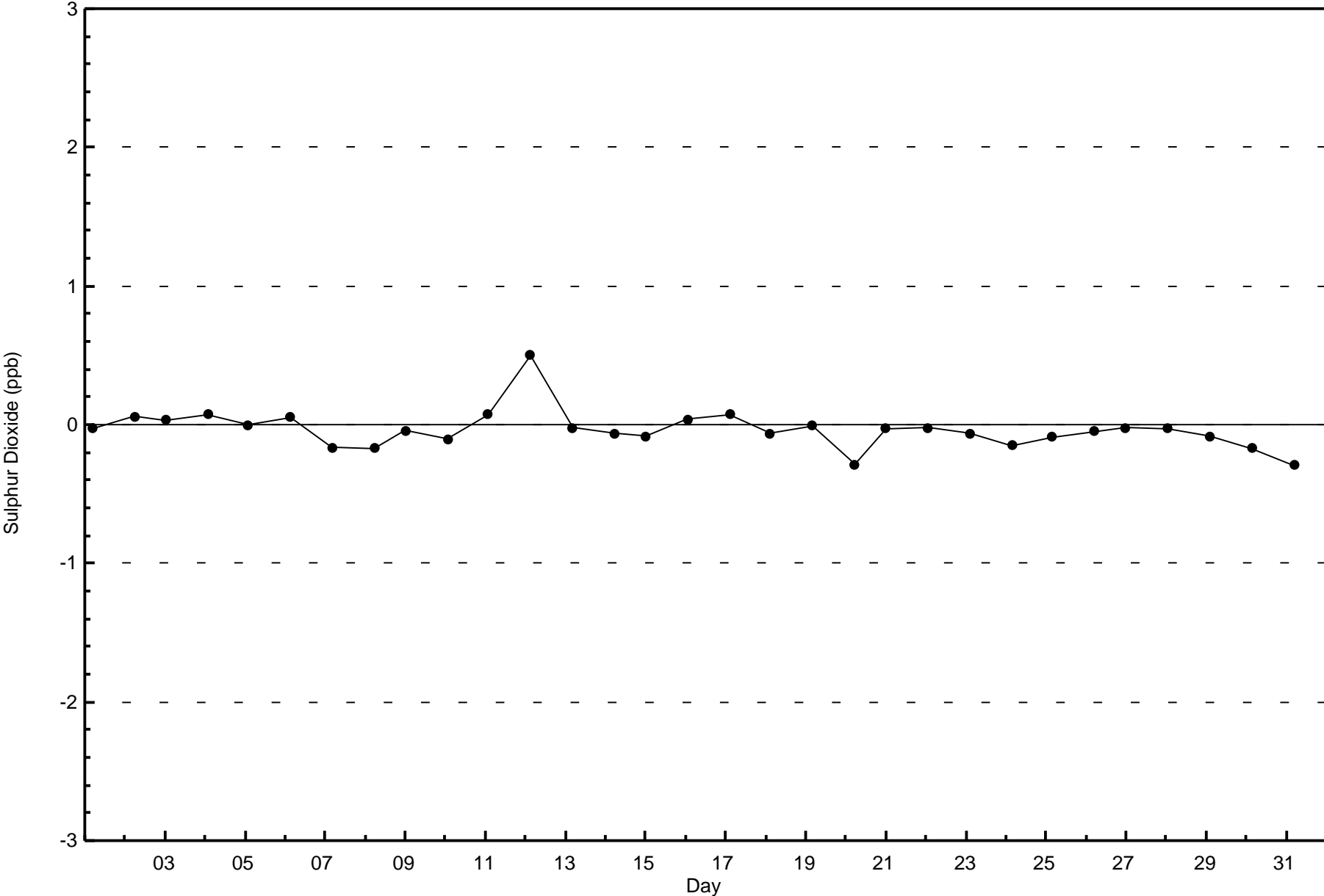
**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Firebag - October 2017**

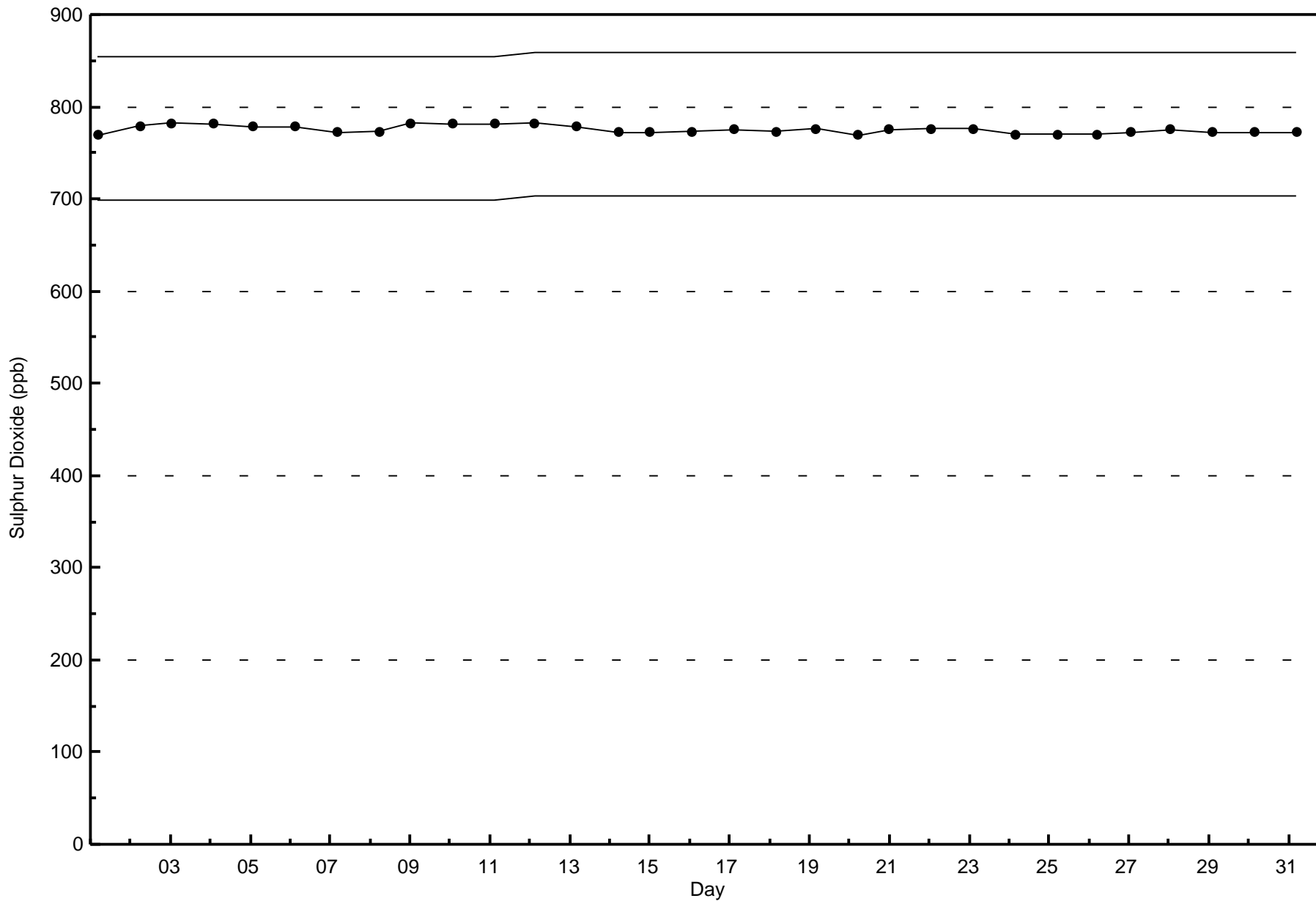
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	71	32	21	8	5	12	29	31	61	48	96	74	43	25	35	102	693
11 - 20	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	3
21 - 60	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	71	32	21	8	5	13	29	31	61	49	97	75	43	25	35	102	697

Total Number of Valid Hours: 697

Total Number of Hours: 744







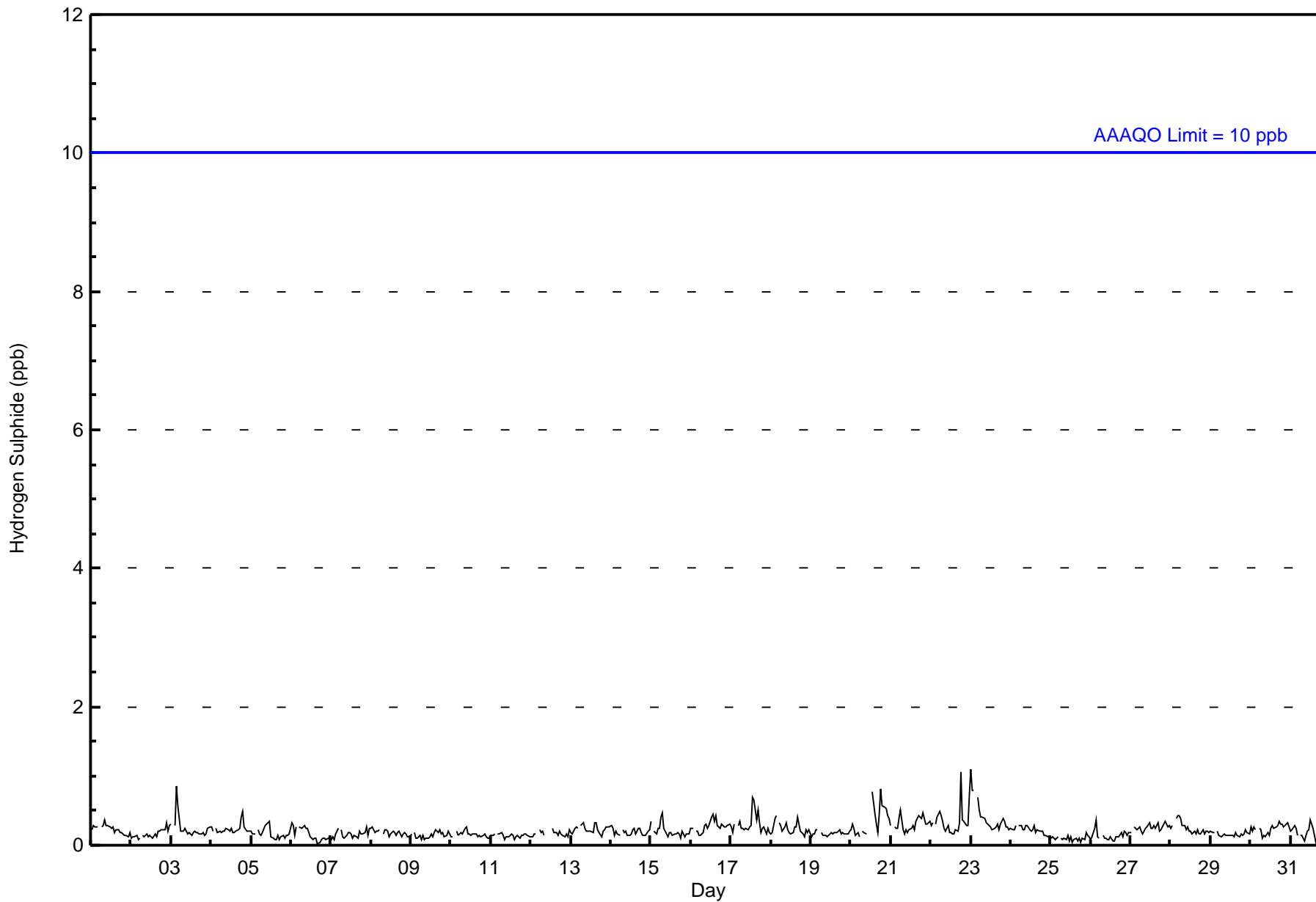






**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Firebag - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Firebag - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	706	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Firebag - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	66	37	21	8	5	13	30	29	64	48	95	76	42	25	36	103	698
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	66	37	21	8	5	13	30	29	64	48	95	76	42	25	36	103	698

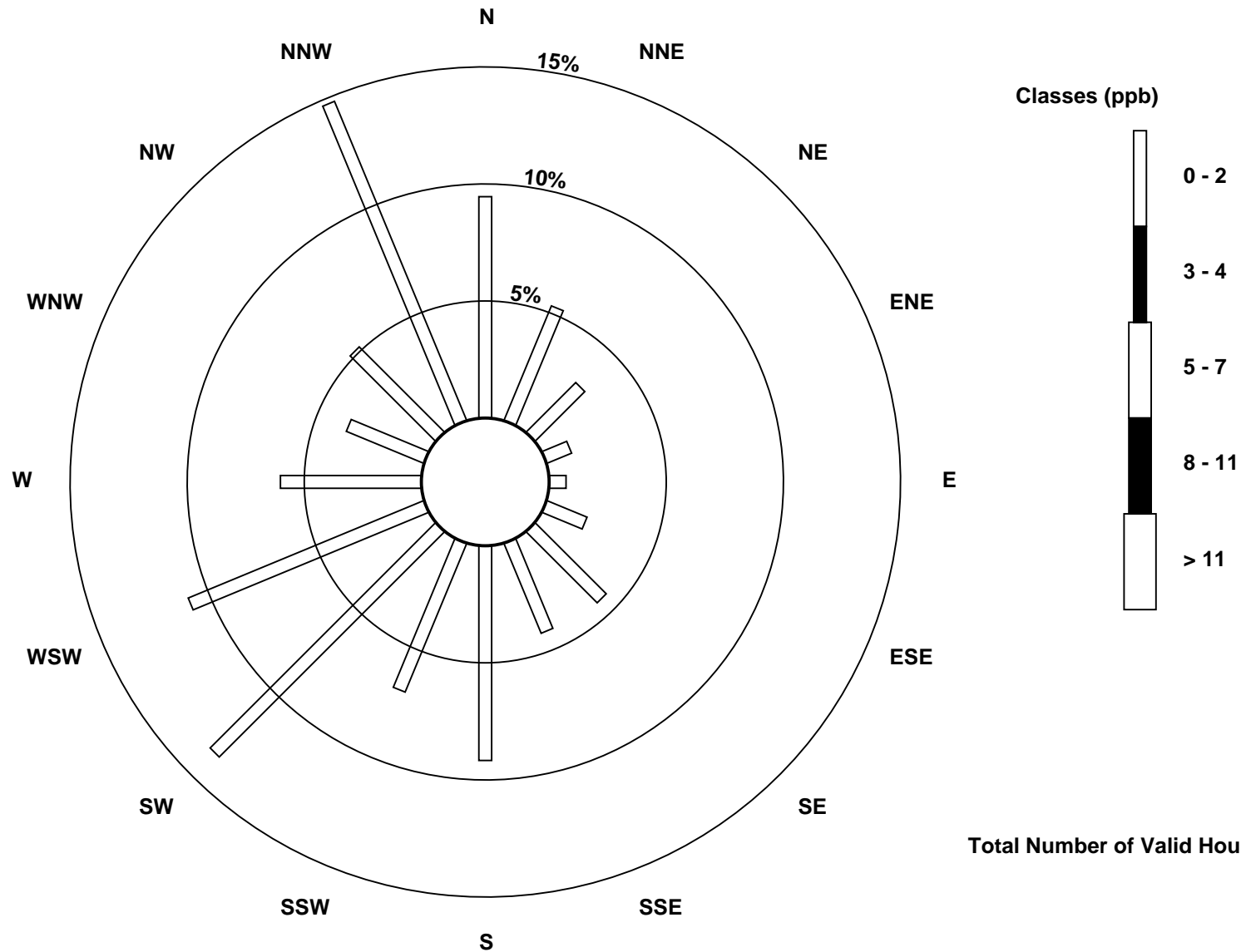
Total Number of Valid Hours: 698

Total Number of Hours: 744

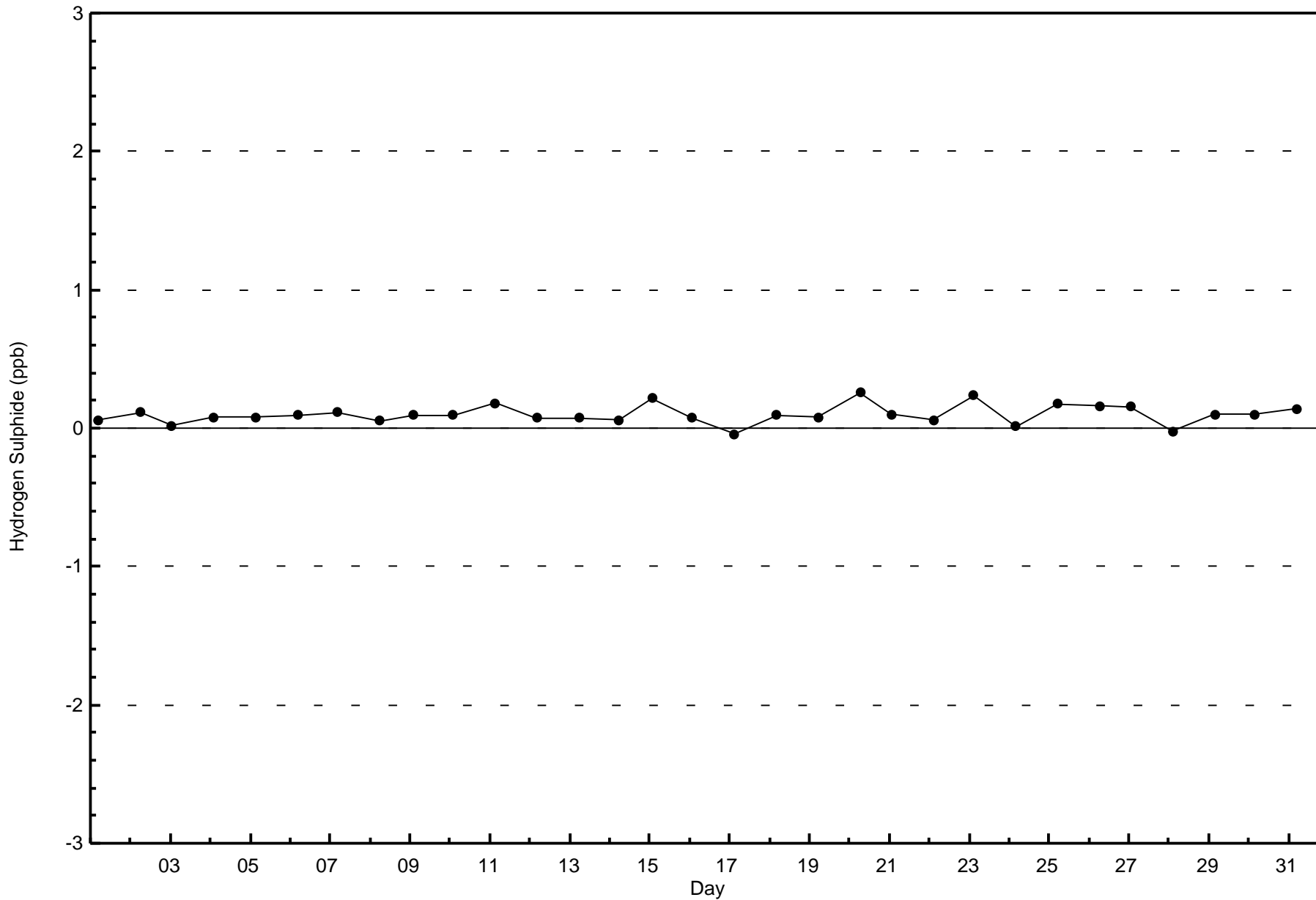


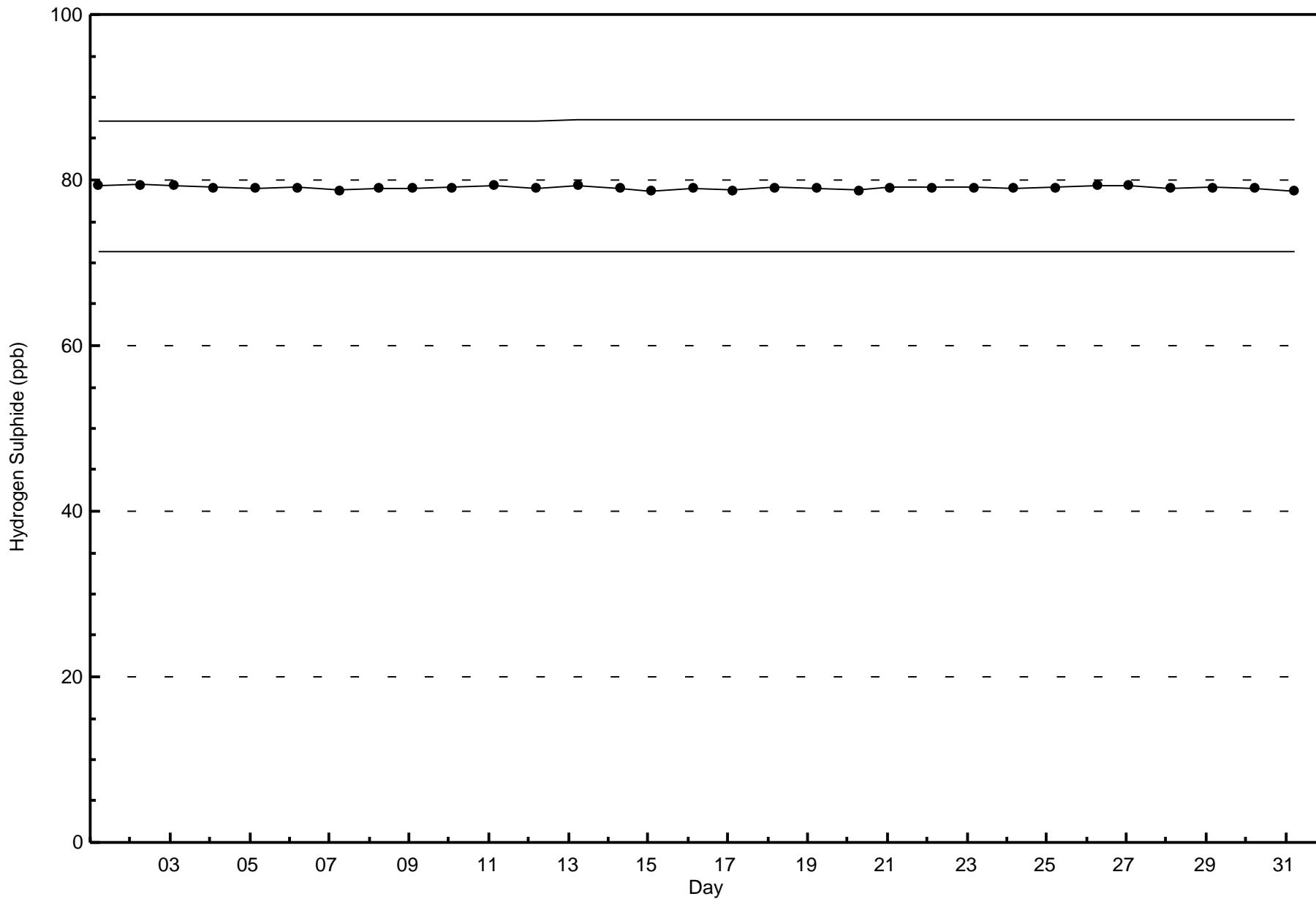
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Firebag (AMS 19)



Total Number of Valid Hours: 698



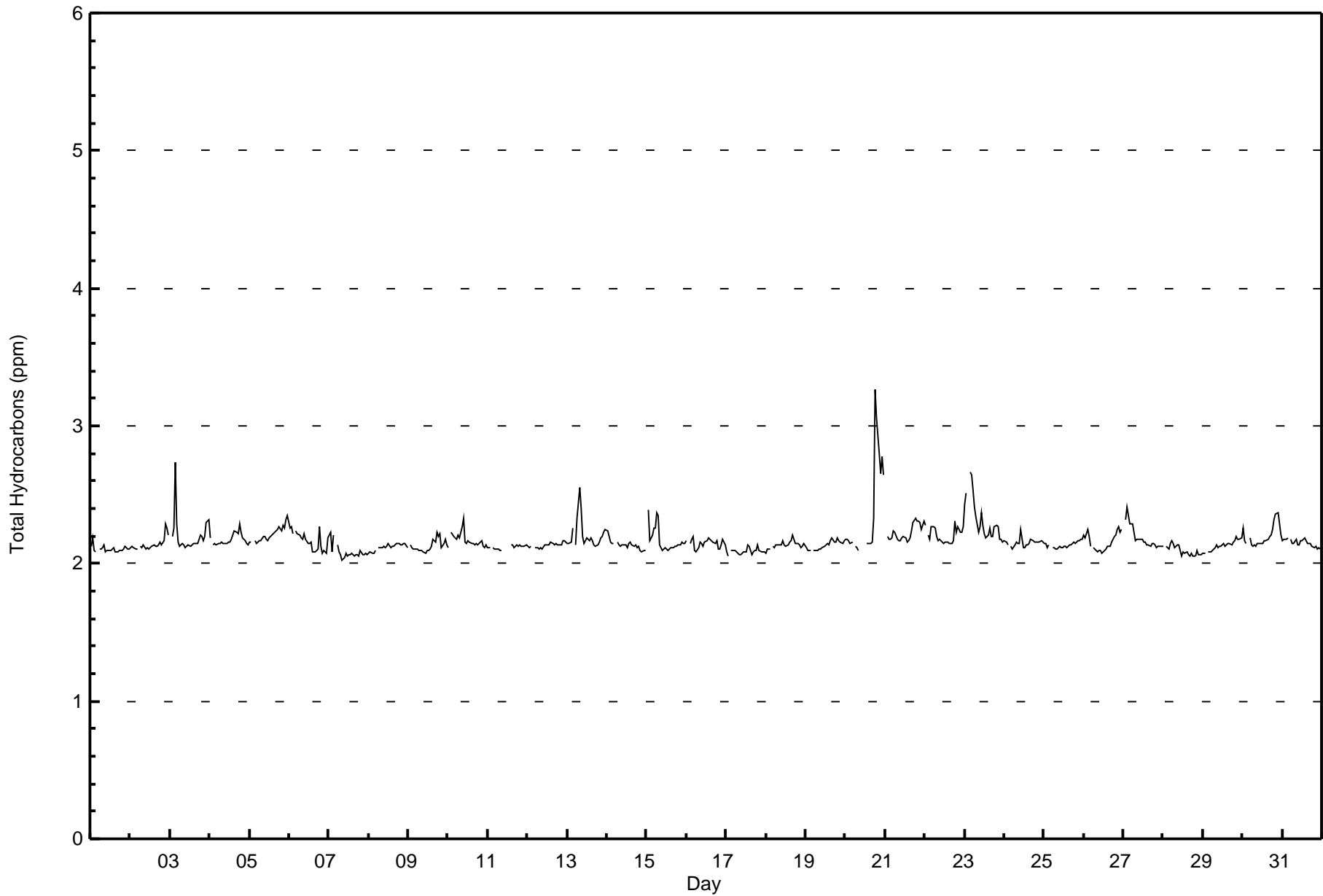






**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Firebag - October 2017**







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Firebag - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	2	0.28	0.28
2.1 - 3.0	700	99.43	99.72
3.1 - 10.0	2	0.28	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Firebag - October 2017**

<b>Concentration</b> <b>Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
2.1 - 3.0	70	32	21	8	5	13	28	31	61	49	97	75	41	25	35	101	692
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	71	32	21	8	5	13	28	31	61	49	97	75	43	25	35	102	696

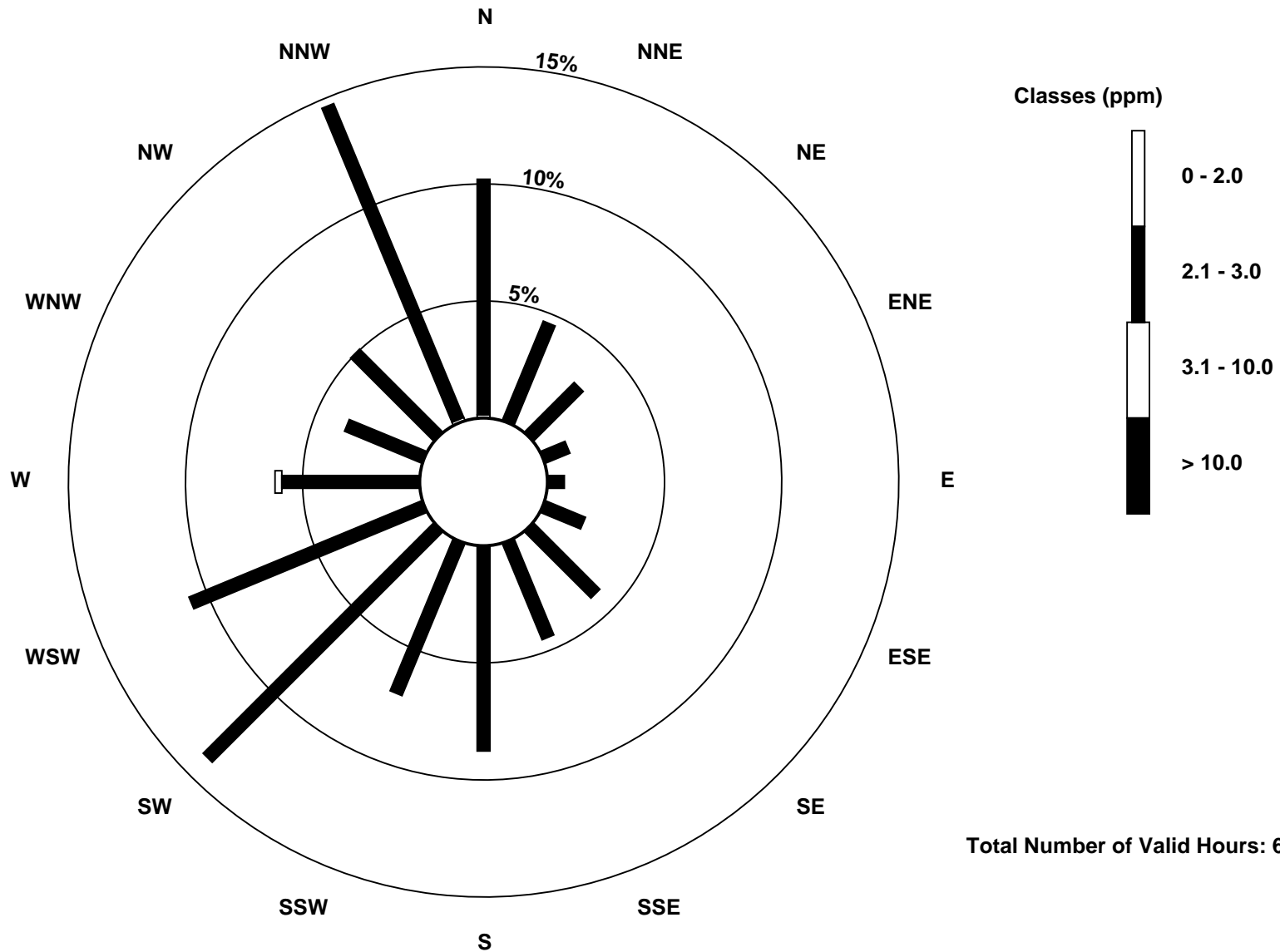
Total Number of Valid Hours: 696

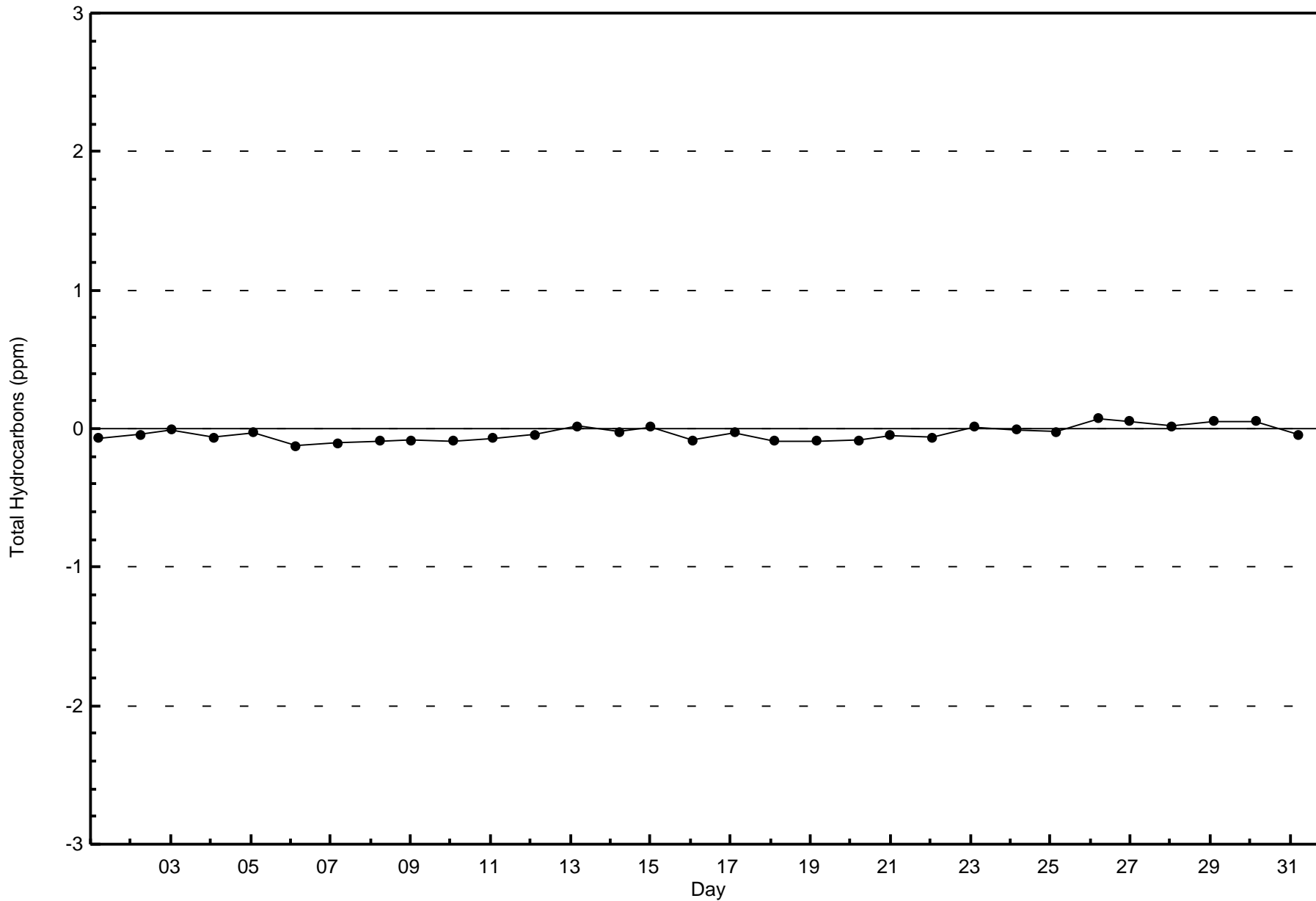
Total Number of Hours: 744

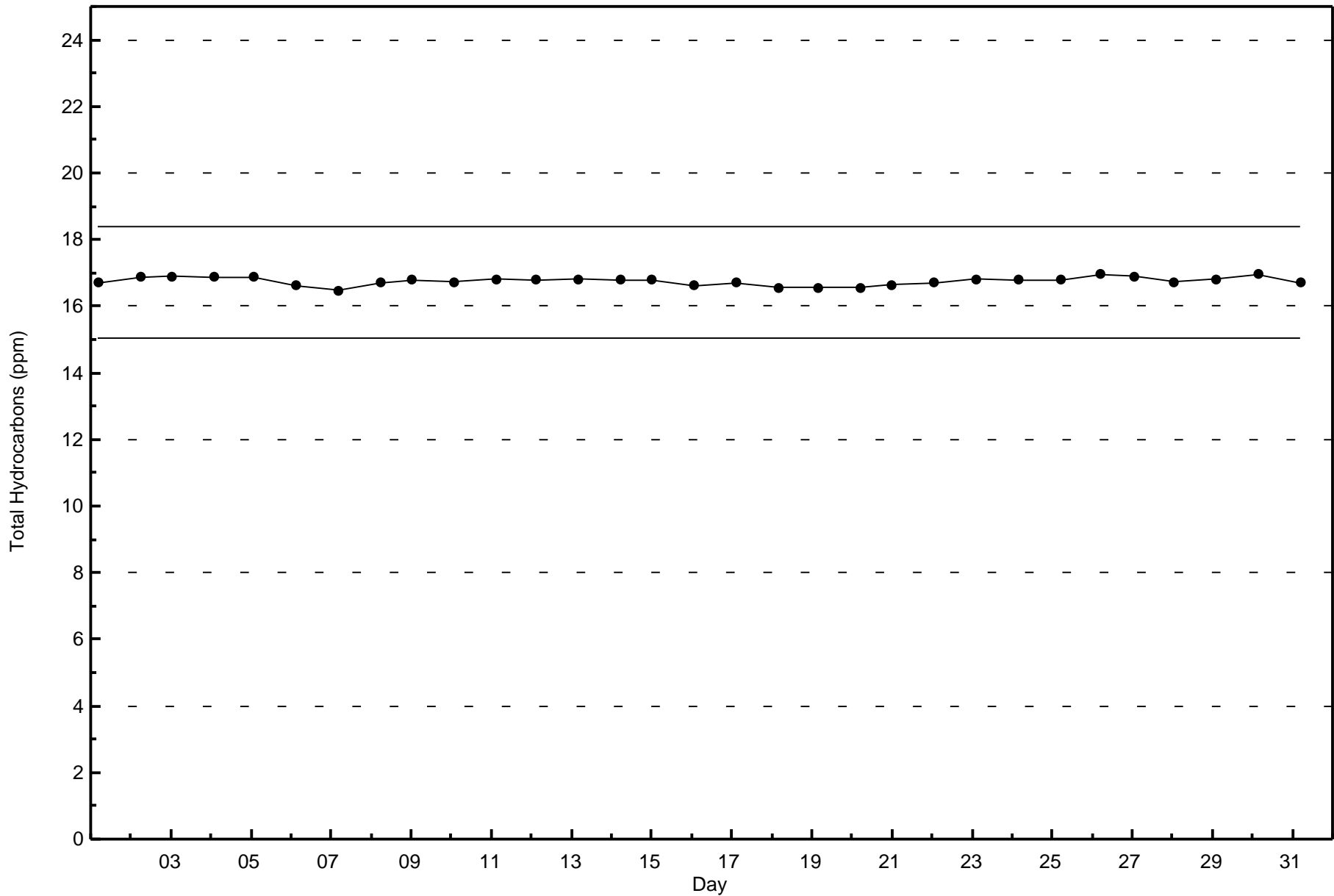


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Total Hydrocarbons (THC) - ppm  
Firebag (AMS 19)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxide (NO) - ppb

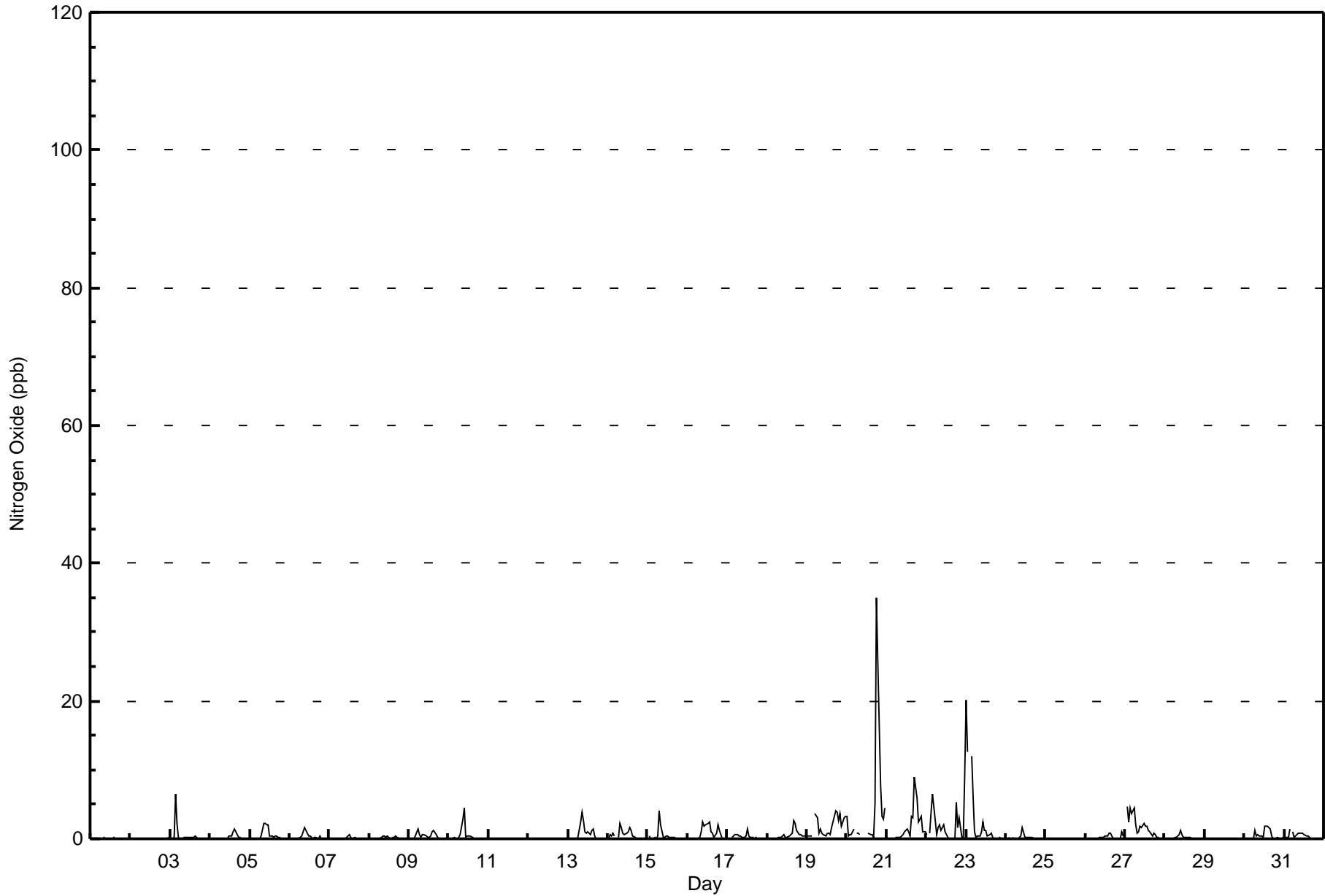
Firebag - October 2017

Maximum Value: 35 ppb on Oct 20 19:00																		Maximum Daily Average: 5.0 ppb on Oct 20																		Hours in Service: 744			
Minimum Value: 0 ppb on Oct 12 03:00																		Minimum Daily Average: 0.0 ppb on Oct 12																		Hours of Data: 704			
Maximum Diurnal Average: 1.8 ppb at hour 19																		Minimum Diurnal Average: 0.2 ppb at hour 3																		Hours of Missing Data: 40			
Monthly Average: 0.7 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 2 P <sub>99</sub> = 9																		Hours of Calibration: 40			
																																				Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24															
1-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0													
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0													
3-Oct	Z	0	0	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	6													
4-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0.2	2													
5-Oct	0	0	Z	0	0	0	0	0	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2													
6-Oct	0	0	0	Z	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2													
7-Oct	0	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1													
8-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0													
9-Oct	Z	0	0	0	0	1	1	0	1	1	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0.4	1													
10-Oct	0	Z	0	0	0	0	0	1	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	4													
11-Oct	0	0	Z	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.1	0													
12-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0													
13-Oct	0	0	0	0	Z	0	0	2	4	3	1	1	1	1	1	2	0	0	0	0	0	0	0	0	0.7	4													
14-Oct	0	1	0	1	0	Z	0	2	2	1	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0.6	2													
15-Oct	Z	0	0	0	0	0	0	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	4													
16-Oct	0	Z	0	0	0	0	0	0	1	3	2	2	2	2	1	1	0	1	2	1	1	0	0	0	0.9	3													
17-Oct	0	0	Z	0	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1													
18-Oct	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	1	1	3	2	1	1	1	1	0	0	0.5	3													
19-Oct	0	0	0	0	Z	4	3	1	1	1	1	0	1	1	1	2	2	4	4	3	4	2	3	3	1.8	4													
20-Oct	3	0	1	1	1	Z	1	1	1	C	C	C	C	1	1	1	0	5	35	26	8	3	3	4	5.0	35													
21-Oct	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	0	3	3	9	6	2	3	3	1	1	1.6	9													
22-Oct	1	Z	1	4	7	3	1	2	2	1	2	1	1	0	0	0	0	0	5	2	3	0	0	9	1.9	9													
23-Oct	20	13	Z	12	6	1	0	0	0	1	2	1	1	0	1	1	0	0	0	0	0	0	0	0	2.7	20													
24-Oct	0	0	0	Z	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2													
25-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0													
26-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0.3	1													
27-Oct	Z	5	2	5	4	5	2	1	1	2	2	2	2	2	1	1	0	1	1	0	0	0	0	0	1.6	5													
28-Oct	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1													
29-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0													
30-Oct	0	0	0	Z	0	0	1	0	1	0	0	0	2	2	2	1	0	0	0	0	0	0	0	0	0.5	2													
31-Oct	0	0	0	1	Z	1	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1													
1.0 0.8 0.2 1.2 0.9 0.6 0.4 0.6 0.8 0.9 0.7 0.6 0.6 0.5 0.5 0.6 0.4 0.8 1.8 1.2 0.7 0.4 0.3 0.7																		Diurnal Average																					
20 13 2 12 7 5 3 4 4 4 2 2 2 2 2 3 3 9 35 26 8 3 3 9																		Diurnal Maximum																					
Z - zerospan C - Calibration																																							



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Oxide (NO) - ppb**  
**Firebag - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Oxide (NO) - ppb**  
**Firebag - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	702	99.72	99.72
21 - 40	2	0.28	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744





**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Oxide (NO) - ppb  
Firebag - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	71	32	21	8	5	13	28	31	61	49	97	75	41	25	35	102	694
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	71	32	21	8	5	13	28	31	61	49	97	75	43	25	35	102	696

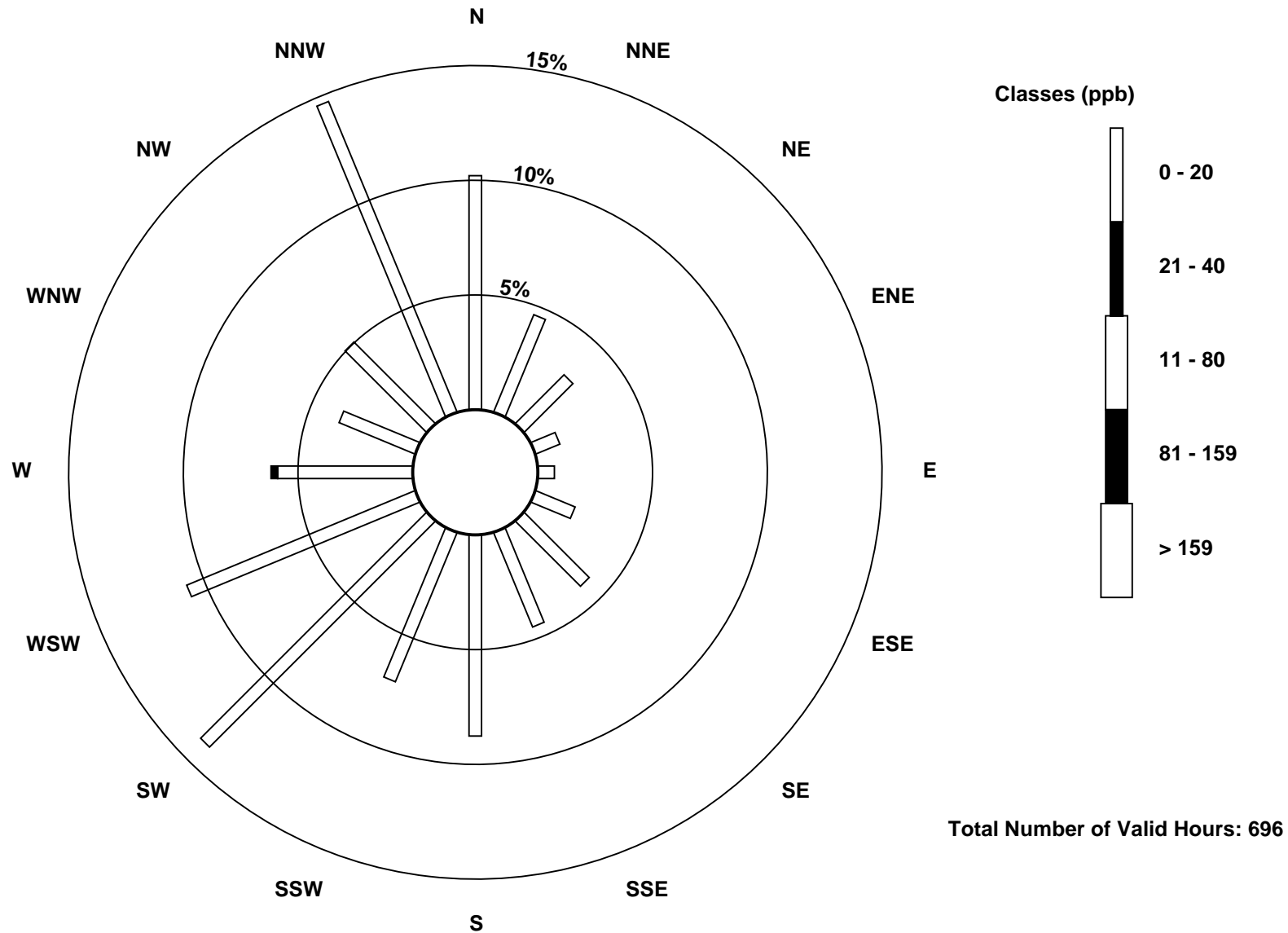
Total Number of Valid Hours: 696

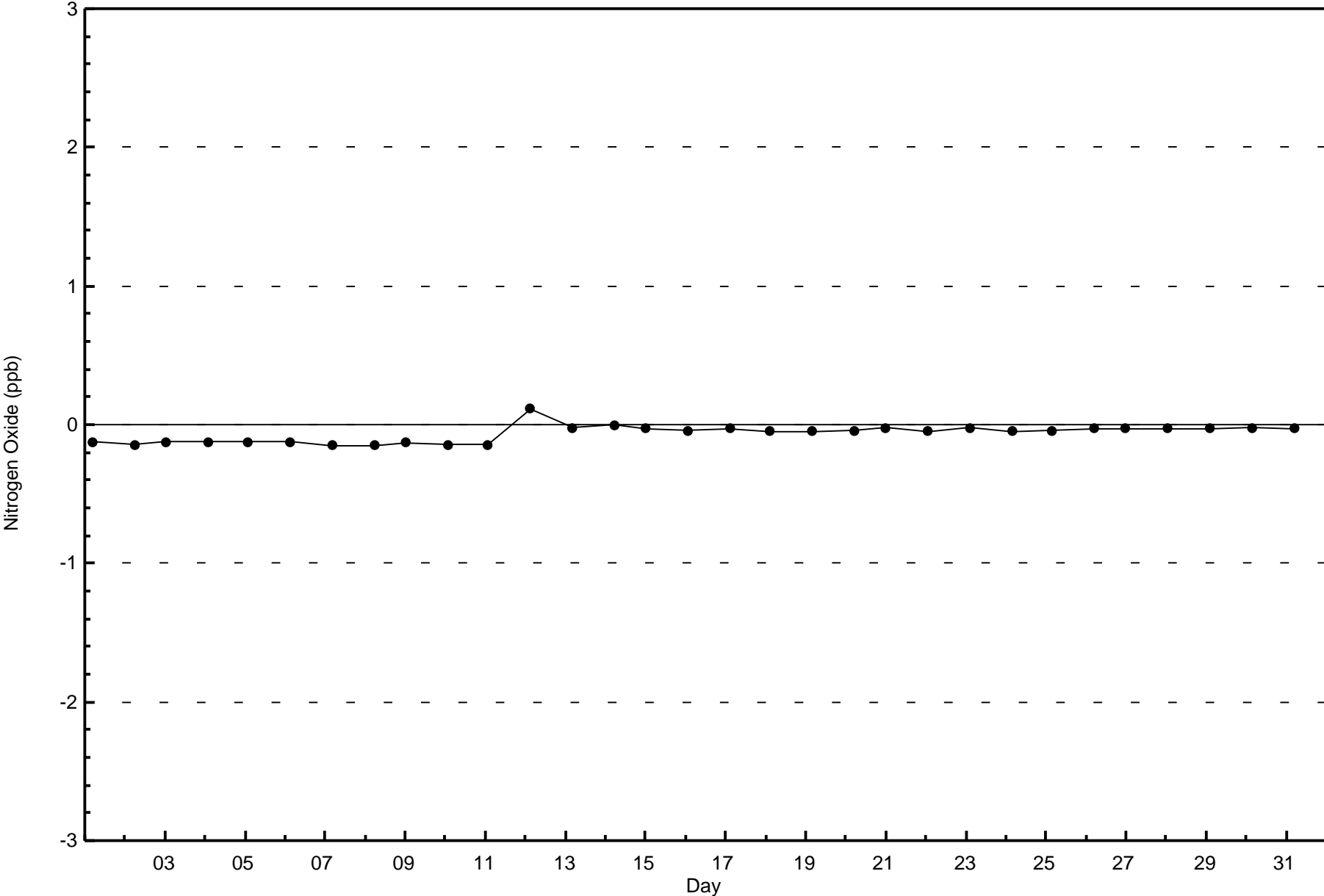
Total Number of Hours: 744

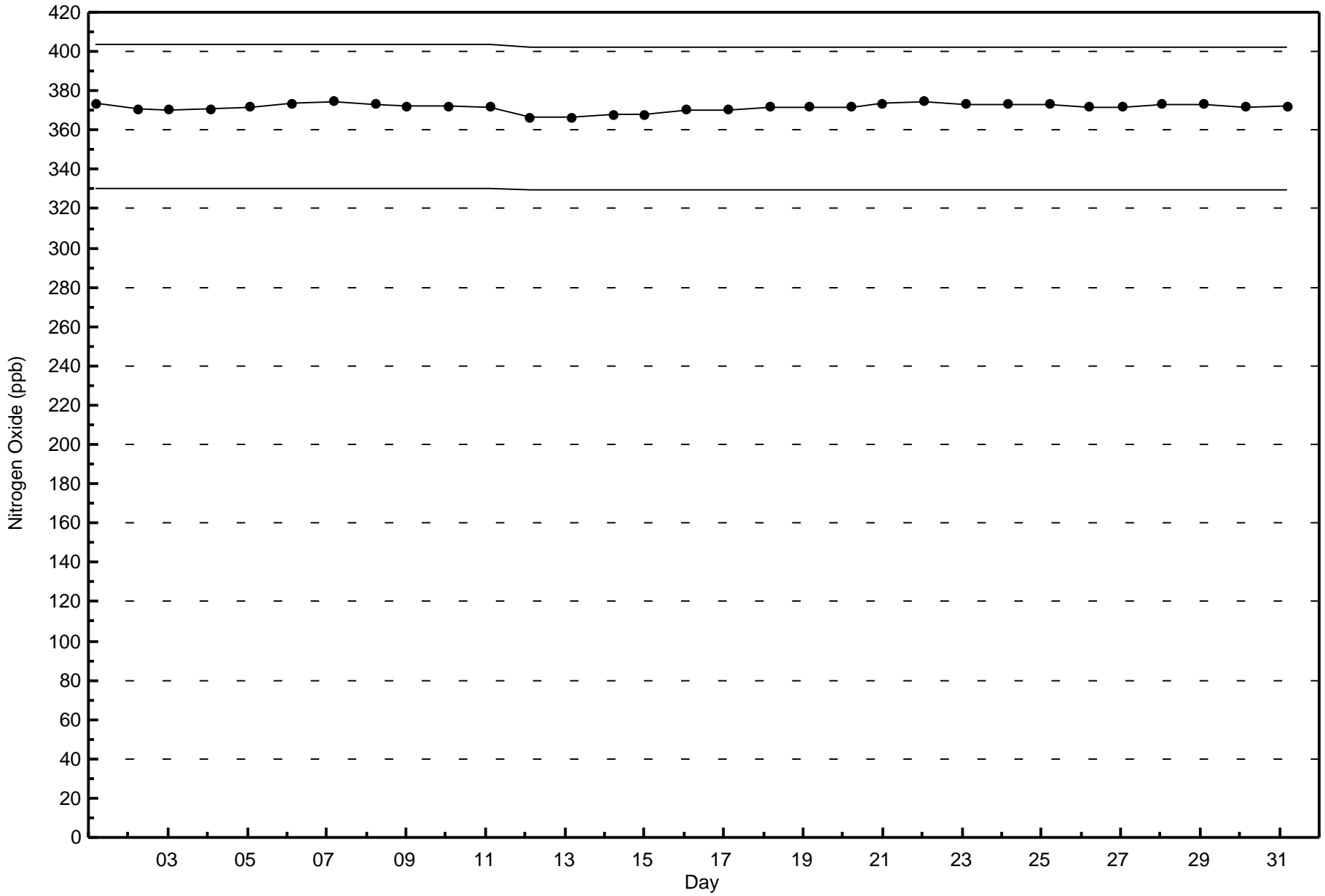


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Oxide (NO) - ppb  
Firebag (AMS 19)









Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 23 ppb on Oct 3 04:00	Maximum Daily Average: 7.4 ppb on Oct 23		Hours of Data:	704
Minimum Value: 0 ppb on Oct 1 12:00	Minimum Daily Average: 0.0 ppb on Oct 11		Hours of Missing Data:	40
Maximum Diurnal Average: 4.8 ppb at hour 5	Minimum Diurnal Average: 1.4 ppb at hour 14		Hours of Calibration:	40
Monthly Average: 2.9 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 2 Q <sub>3</sub> = 4 P <sub>90</sub> = 8 P <sub>99</sub> = 17		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	1	2	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6	1	5	0.6	6
3-Oct	Z	3	4	23	19	6	1	0	0	1	1	1	1	1	1	3	4	2	6	5	3	5	12	12	4.9	23
4-Oct	4	Z	0	0	0	0	0	0	0	0	1	1	1	1	2	4	3	5	12	9	4	2	2	2	2.3	12
5-Oct	1	2	Z	2	2	2	3	3	7	5	5	5	2	1	1	2	3	2	5	4	4	4	5	5	3.2	7
6-Oct	6	12	10	Z	9	7	6	7	6	7	6	3	2	2	1	1	1	2	7	2	1	1	1	3	4.5	12
7-Oct	4	4	1	4	Z	3	1	0	0	0	1	1	1	1	0	0	0	2	1	1	1	2	1	2	1.3	4
8-Oct	3	3	2	2	2	Z	0	1	1	1	1	1	0	0	0	1	2	3	1	1	1	1	1	1	1.2	3
9-Oct	Z	3	1	0	1	3	2	2	1	1	1	1	1	1	2	3	2	4	4	4	2	3	3	2	2.0	4
10-Oct	1	Z	3	4	5	3	3	4	6	6	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1.7	6
11-Oct	0	0	Z	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.0	0
12-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	7	0.5	7
13-Oct	2	2	5	6	Z	3	11	16	10	5	2	2	2	1	4	6	4	2	3	3	4	4	5	8	4.8	16
14-Oct	10	8	4	2	1	Z	1	3	2	2	2	1	2	3	4	2	2	2	2	2	2	1	0	1	2.5	10
15-Oct	Z	13	2	4	8	6	12	15	4	1	0	1	2	1	1	1	1	1	1	1	2	2	3	5	3.6	15
16-Oct	5	Z	2	4	5	1	1	1	4	7	4	4	6	7	4	5	4	8	9	8	5	5	9	8	5.0	9
17-Oct	3	0	Z	5	5	5	3	4	2	1	1	2	4	3	3	1	2	2	1	5	3	1	1	1	2.4	5
18-Oct	0	0	0	Z	0	0	1	1	0	1	1	0	0	0	1	2	8	7	4	2	2	1	1	1	1.4	8
19-Oct	1	1	1	1	Z	3	3	2	2	1	1	1	1	1	1	3	6	8	7	6	6	4	5	6	3.0	8
20-Oct	6	2	2	1	3	Z	1	2	1	C	C	C	C	1	1	2	1	9	19	17	17	17	14	16	7.0	19
21-Oct	Z	1	1	1	1	6	7	2	1	1	2	3	3	2	2	6	11	16	16	15	10	12	10	11	6.1	16
22-Oct	11	Z	6	8	11	6	4	5	3	2	3	2	1	1	0	0	0	0	5	5	8	4	3	10	4.3	11
23-Oct	12	13	Z	17	19	18	11	9	3	5	8	5	3	1	2	3	3	3	4	10	16	4	1	1	7.4	19
24-Oct	1	1	1	Z	1	1	3	2	1	2	6	0	0	0	1	2	1	3	0	0	0	0	0	0	1.1	6
25-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	2	4	0.5	5
26-Oct	6	4	7	7	1	Z	1	1	1	1	0	1	1	2	3	5	5	7	9	8	9	6	7	7	4.2	9
27-Oct	Z	12	12	13	11	11	10	4	4	3	2	3	3	3	3	4	2	2	2	2	1	1	1	1	4.8	13
28-Oct	1	Z	2	4	6	6	4	3	3	3	3	1	1	1	1	1	0	0	0	2	1	1	1	1	1.9	6
29-Oct	1	2	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	3	0.6	3
30-Oct	11	9	9	Z	9	5	5	3	3	2	2	1	5	5	5	6	7	8	11	11	9	8	7	6	6.3	11
31-Oct	3	3	2	4	Z	5	2	2	2	2	1	2	2	1	1	1	1	1	0	0	0	0	0	0	1.5	5

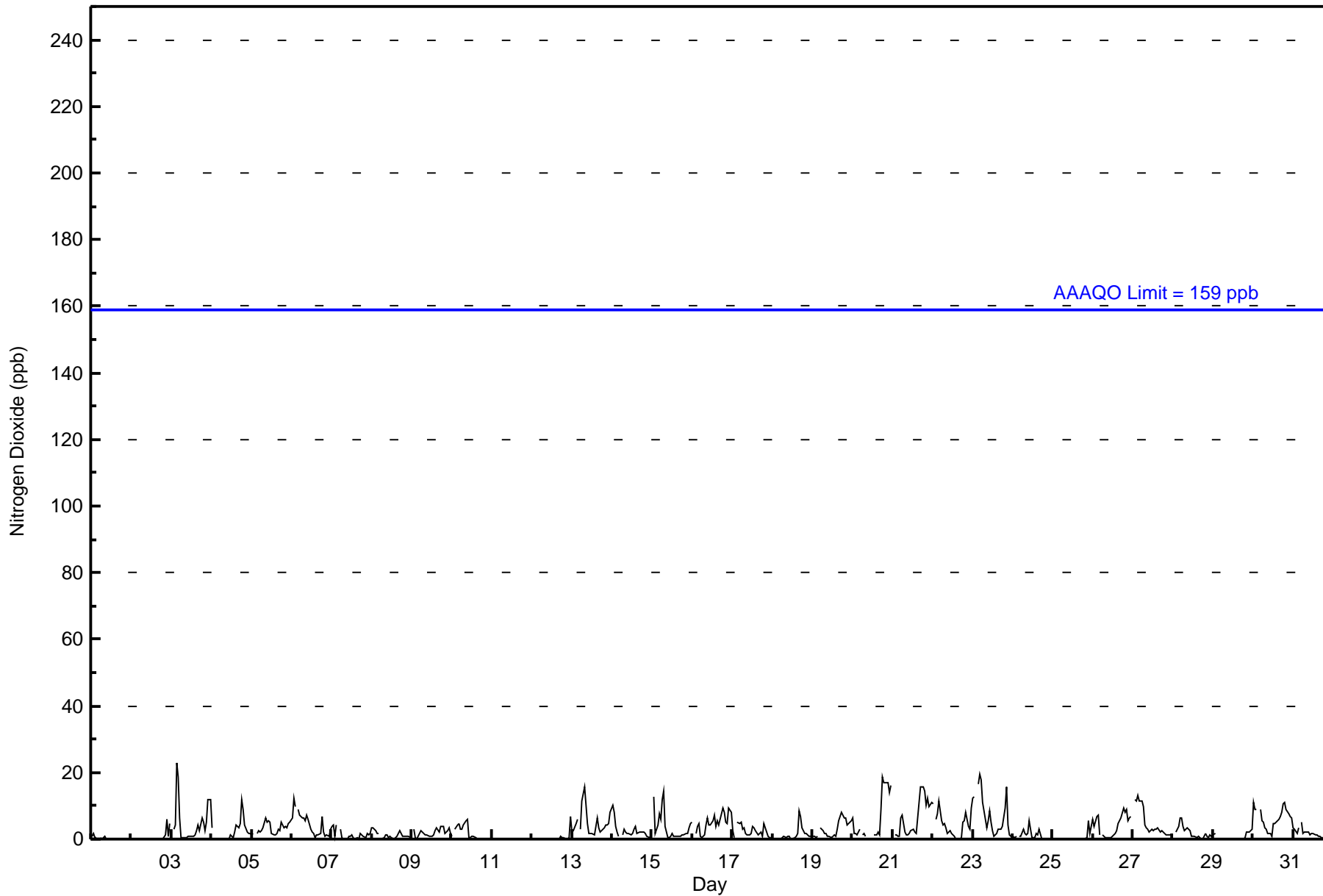
3.7	3.8	2.9	4.3	4.8	3.9	3.1	2.9	2.2	2.0	1.8	1.4	1.5	1.4	1.4	2.1	2.5	3.1	4.2	4.0	3.6	3.3	3.1	4.0	Diurnal Average
12	13	12	23	19	18	12	16	10	7	8	5	6	7	5	6	11	16	19	17	17	17	14	16	Diurnal Maximum

Z - zerospan      C - Calibration  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



Wood Buffalo Environmental Association  
Hourly Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Firebag - October 2017





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Firebag - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	703	99.86	99.86
21 - 40	1	0.14	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Firebag - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	71	32	21	8	5	13	28	31	61	48	97	75	43	25	35	102	695
21 - 40	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	71	32	21	8	5	13	28	31	61	49	97	75	43	25	35	102	696

Total Number of Valid Hours: 696

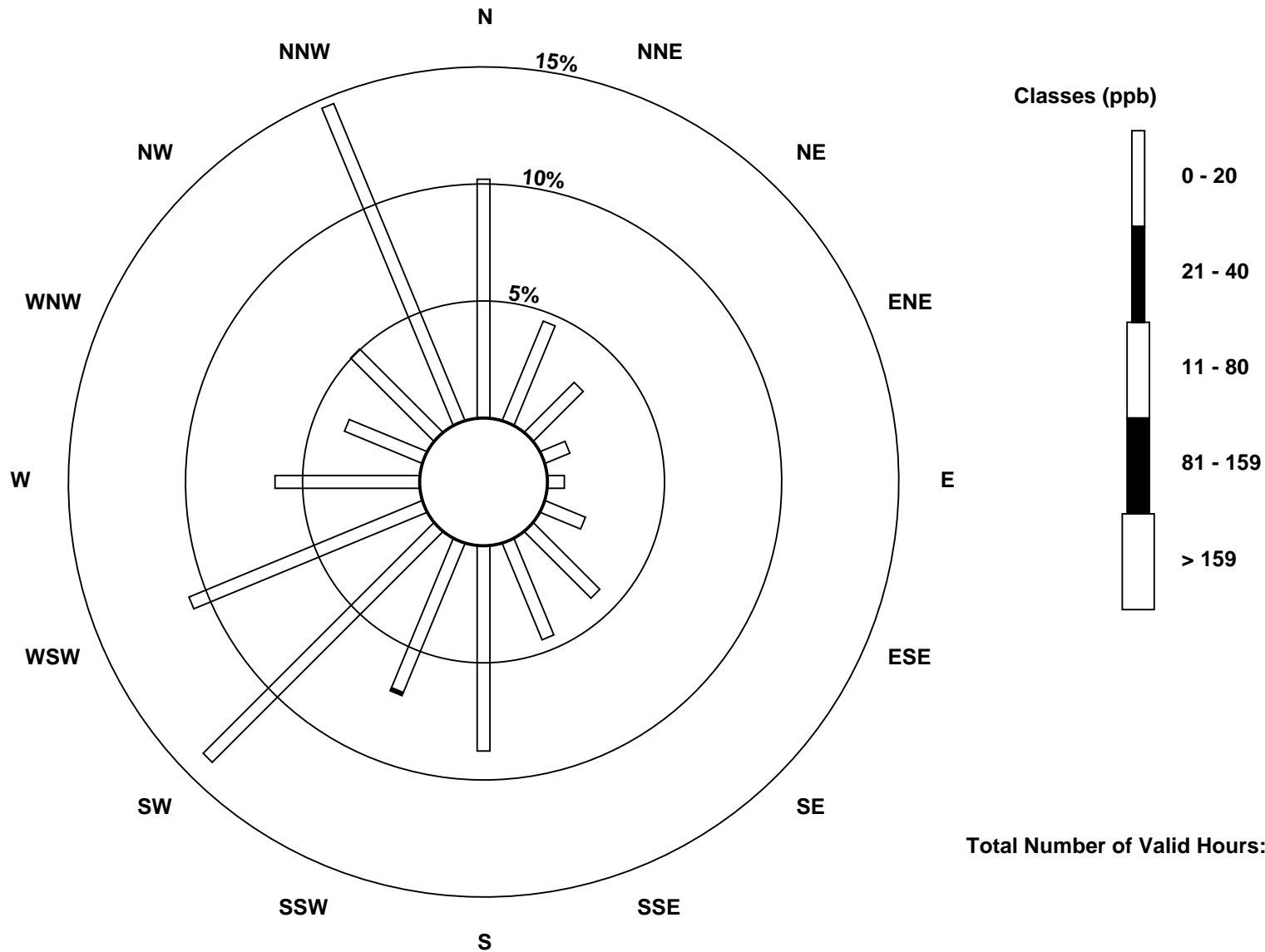
Total Number of Hours: 744

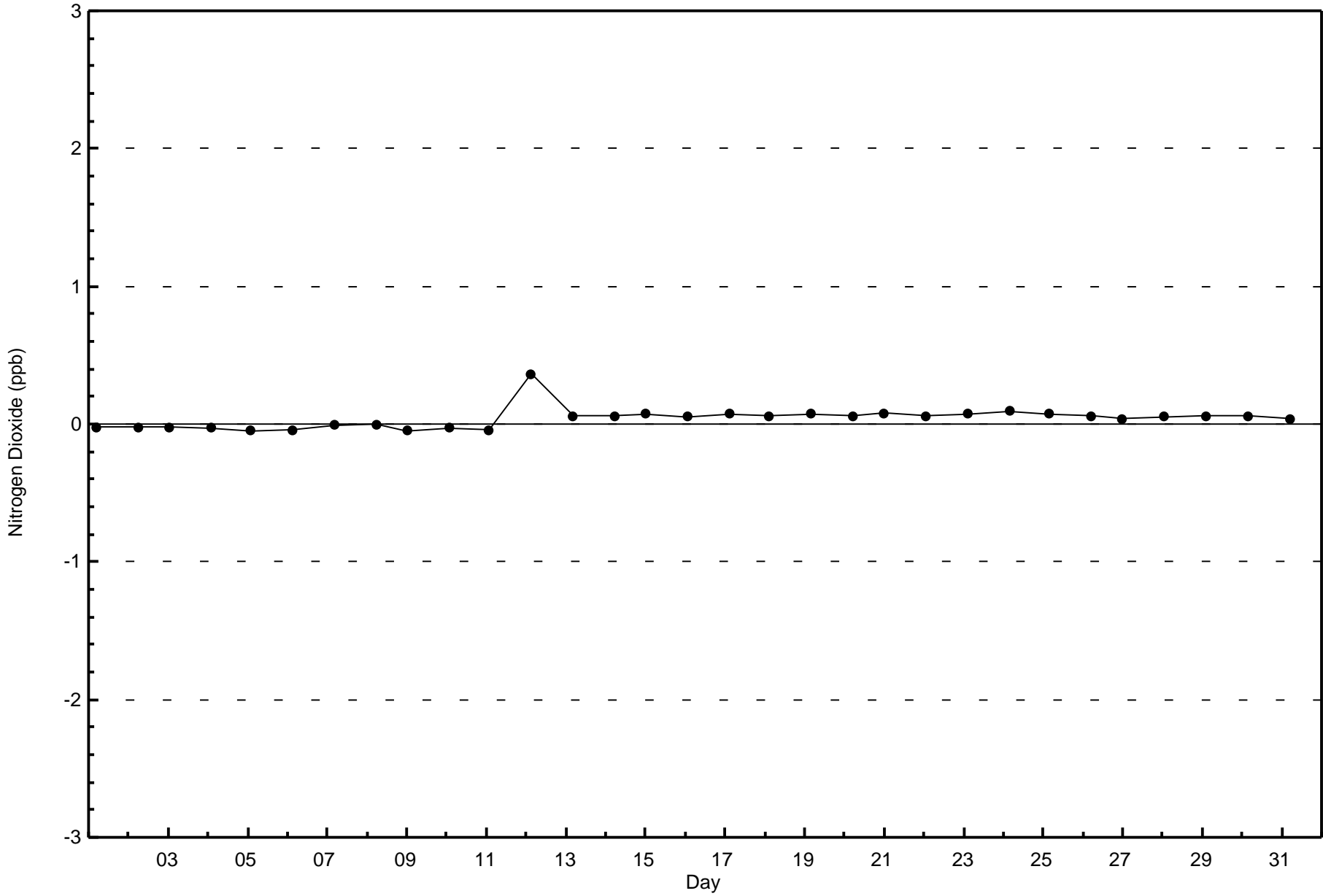


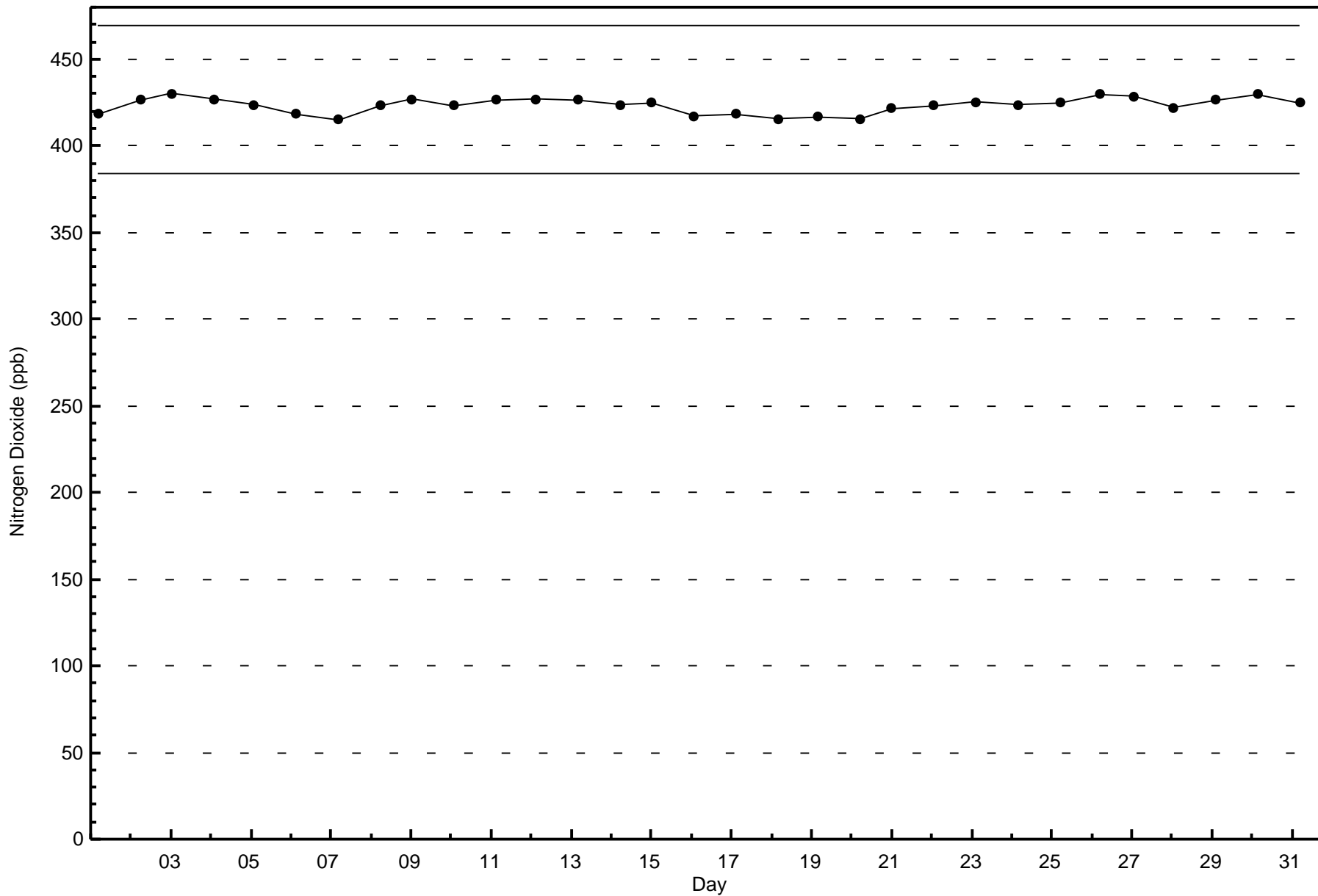


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Firebag (AMS 19)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb

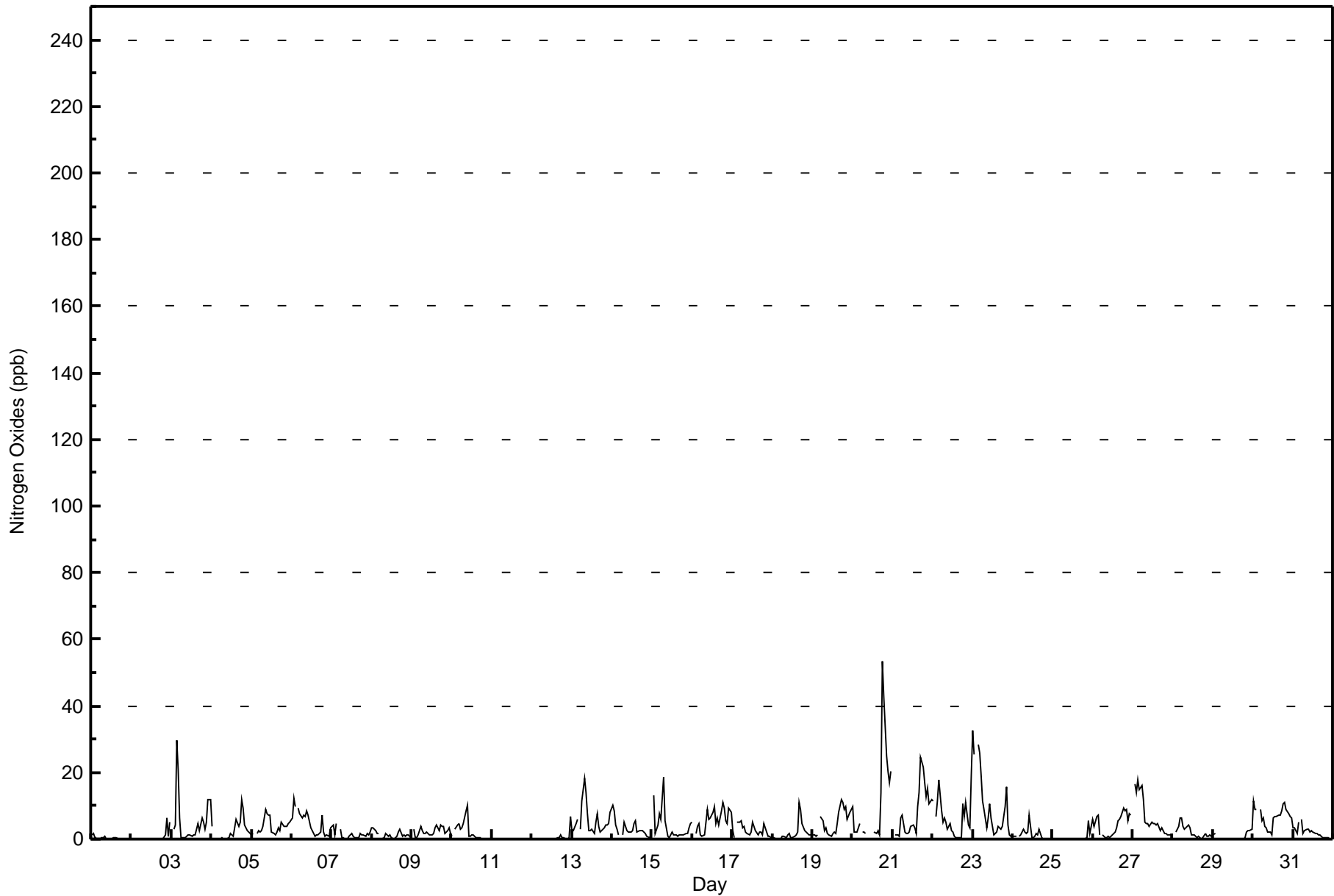
Firebag - October 2017

Maximum Value: 53 ppb on Oct 20 19:00		Maximum Daily Average: 11.9 ppb on Oct 20		Hours in Service: 744																																												
Minimum Value: 0 ppb on Oct 12 03:00		Minimum Daily Average: 0.1 ppb on Oct 11		Hours of Data: 704																																												
Maximum Diurnal Average: 6.0 ppb at hour 19		Minimum Diurnal Average: 1.9 ppb at hour 15		Hours of Missing Data: 40																																												
Monthly Average: 3.6 ppb		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 5 P <sub>90</sub> = 9 P <sub>99</sub> = 25		Hours of Calibration: 40																																												
				Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	1	2	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2																						
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6	1	5	0.6	6																						
3-Oct	Z	3	4	29	21	6	1	0	0	1	1	1	1	1	3	5	3	6	5	3	5	12	12	5.5	29																							
4-Oct	4	Z	0	0	0	0	0	0	0	0	2	1	1	3	6	4	5	12	9	4	2	2	2	2.5	12																							
5-Oct	1	2	Z	2	3	2	3	4	9	7	7	7	2	2	1	2	3	2	5	4	4	4	5	5	3.7	9																						
6-Oct	6	12	10	Z	9	7	6	7	7	9	7	3	3	2	1	1	1	2	7	2	1	1	1	3	4.8	12																						
7-Oct	4	4	1	4	Z	3	1	0	0	0	1	1	2	1	0	0	0	2	1	1	1	2	1	2	1.5	4																						
8-Oct	3	3	2	2	2	Z	0	1	2	1	1	1	1	0	1	1	2	3	1	1	1	1	1	1	1.3	3																						
9-Oct	Z	3	1	0	1	4	3	2	2	2	1	1	1	2	4	4	3	4	4	4	2	3	3	2	2.4	4																						
10-Oct	1	Z	3	4	5	3	3	5	8	10	1	1	1	1	1	0	0	0	0	0	0	0	0	0	2.1	10																						
11-Oct	0	0	Z	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.1	0																						
12-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	7	0.5	7																						
13-Oct	2	2	5	6	Z	3	12	18	14	7	3	3	3	2	5	8	4	2	3	3	4	4	5	8	5.5	18																						
14-Oct	10	8	4	3	1	Z	1	5	4	2	2	2	3	5	5	2	2	2	2	2	2	1	0	1	3.1	10																						
15-Oct	Z	13	2	4	8	6	12	19	6	1	1	1	2	1	1	1	1	1	1	1	2	2	3	5	4.1	19																						
16-Oct	5	Z	2	4	5	1	1	1	5	9	6	6	8	10	5	6	4	9	11	9	6	5	9	8	5.9	11																						
17-Oct	3	1	Z	5	5	6	4	4	2	2	1	2	5	4	3	1	2	2	1	5	3	1	1	1	2.7	6																						
18-Oct	0	0	0	Z	0	0	1	1	0	1	2	0	0	1	1	2	11	9	5	2	2	2	1	1	1.9	11																						
19-Oct	1	1	1	1	Z	7	6	3	3	2	1	1	2	2	2	5	8	12	11	9	10	6	8	9	4.8	12																						
20-Oct	10	2	2	2	5	Z	2	2	1	C	C	C	C	2	2	3	1	14	53	43	25	20	17	20	11.9	53																						
21-Oct	Z	1	1	1	1	6	7	2	2	2	2	4	4	3	2	10	14	24	22	17	13	15	11	12	7.7	24																						
22-Oct	12	Z	7	12	18	8	5	6	5	3	5	3	2	1	0	0	0	0	11	7	11	4	3	19	6.2	19																						
23-Oct	33	25	Z	28	26	19	11	9	3	6	11	6	4	1	2	4	3	3	4	10	16	4	1	1	10.0	33																						
24-Oct	1	1	1	Z	1	1	3	2	2	2	7	0	0	0	1	2	1	3	0	0	0	0	0	0	1.3	7																						
25-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	2	4	0.6	5																						
26-Oct	6	4	7	7	1	Z	1	1	1	1	0	1	1	2	3	5	6	7	9	8	9	6	8	7	4.4	9																						
27-Oct	Z	17	14	18	15	16	12	5	5	5	4	5	4	5	4	5	3	3	3	2	2	1	1	1	6.4	18																						
28-Oct	1	Z	2	4	6	6	4	3	4	4	3	1	1	1	1	1	0	0	0	2	1	1	1	1	2.2	6																						
29-Oct	1	2	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	3	0.7	3																						
30-Oct	11	9	9	Z	9	6	6	4	4	2	2	1	7	7	7	7	7	8	11	11	9	8	7	7	6.8	11																						
31-Oct	4	3	2	5	Z	6	2	3	3	3	2	2	2	2	2	1	1	1	0	0	0	0	0	0	1.9	6																						
																								4.7	4.6	3.1	5.5	5.7	4.6	3.5	3.5	3.0	2.9	2.5	2.0	2.1	1.9	1.9	2.6	2.9	3.9	6.0	5.2	4.3	3.6	3.5	4.7	Diurnal Average
																								33	25	14	29	26	19	12	19	14	10	11	7	8	10	7	10	14	24	53	43	25	20	17	20	Diurnal Maximum
Z - zerospan C - Calibration																																																



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Firebag - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Firebag - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	693	98.44	98.44
21 - 40	9	1.28	99.72
41 - 80	2	0.28	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Firebag - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	71	32	21	8	5	13	28	30	60	47	97	72	40	24	35	102	685
21 - 40	0	0	0	0	0	0	0	1	1	2	0	3	1	1	0	0	9
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	71	32	21	8	5	13	28	31	61	49	97	75	43	25	35	102	696

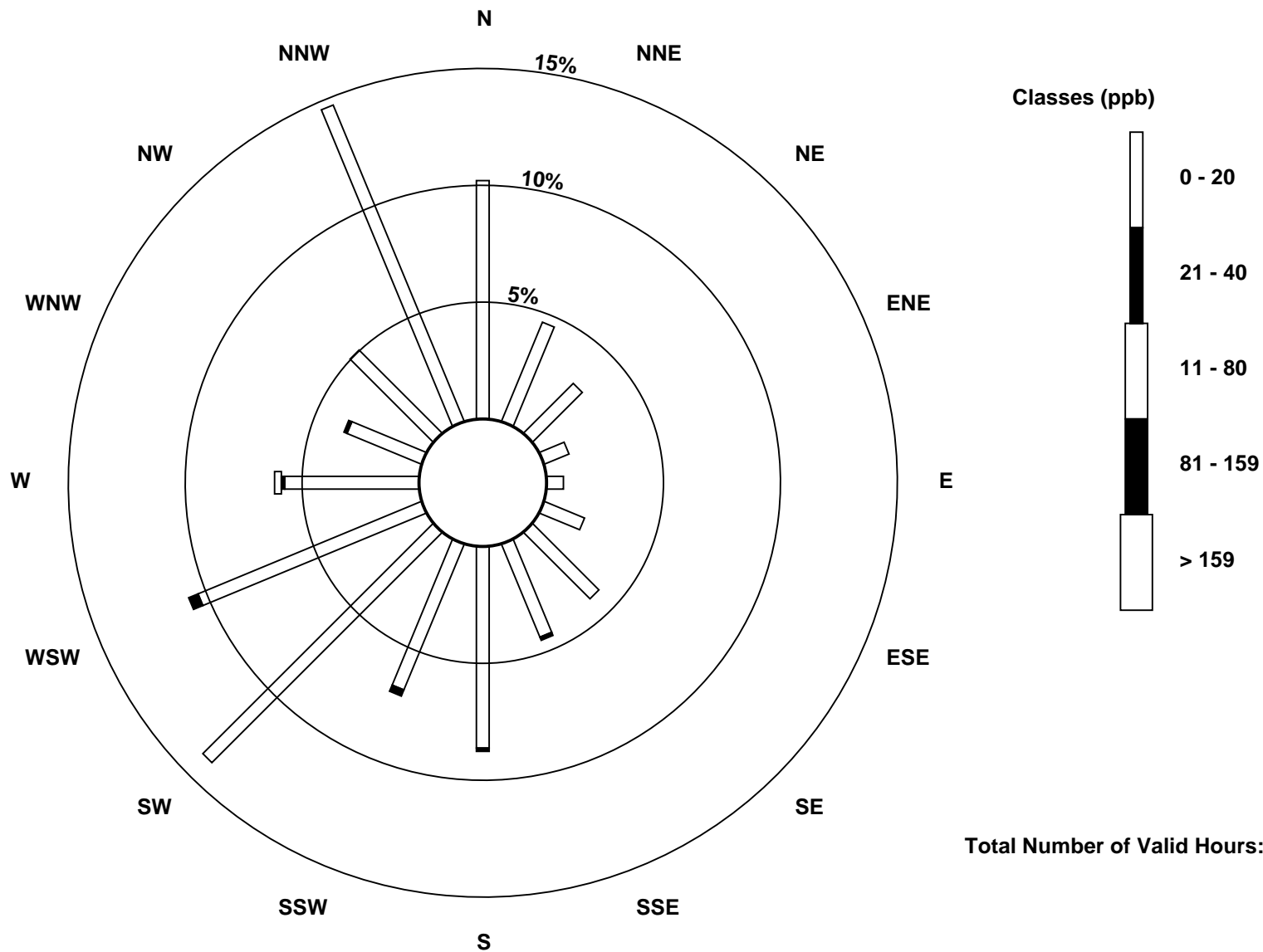
Total Number of Valid Hours: 696

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Firebag (AMS 19)

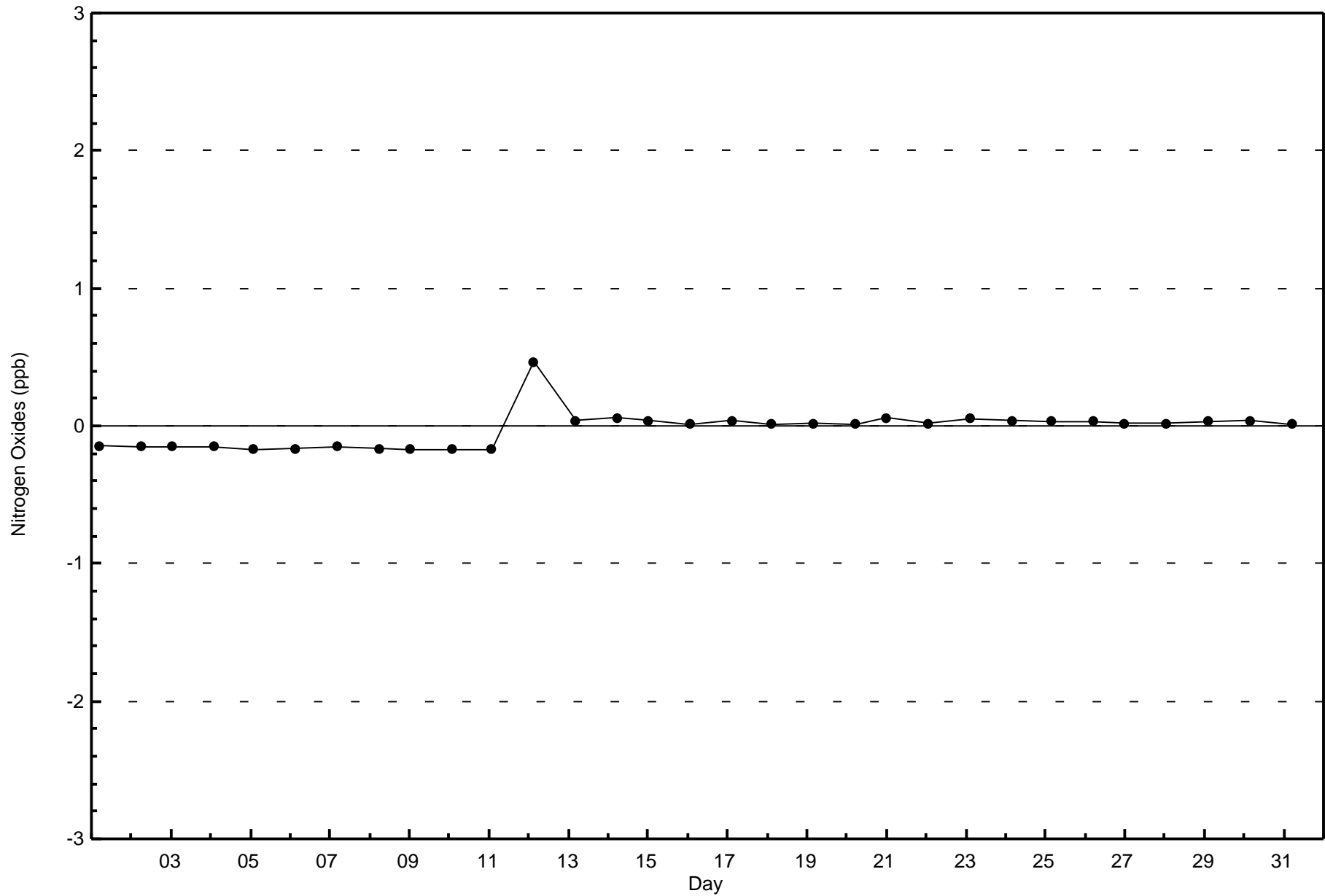


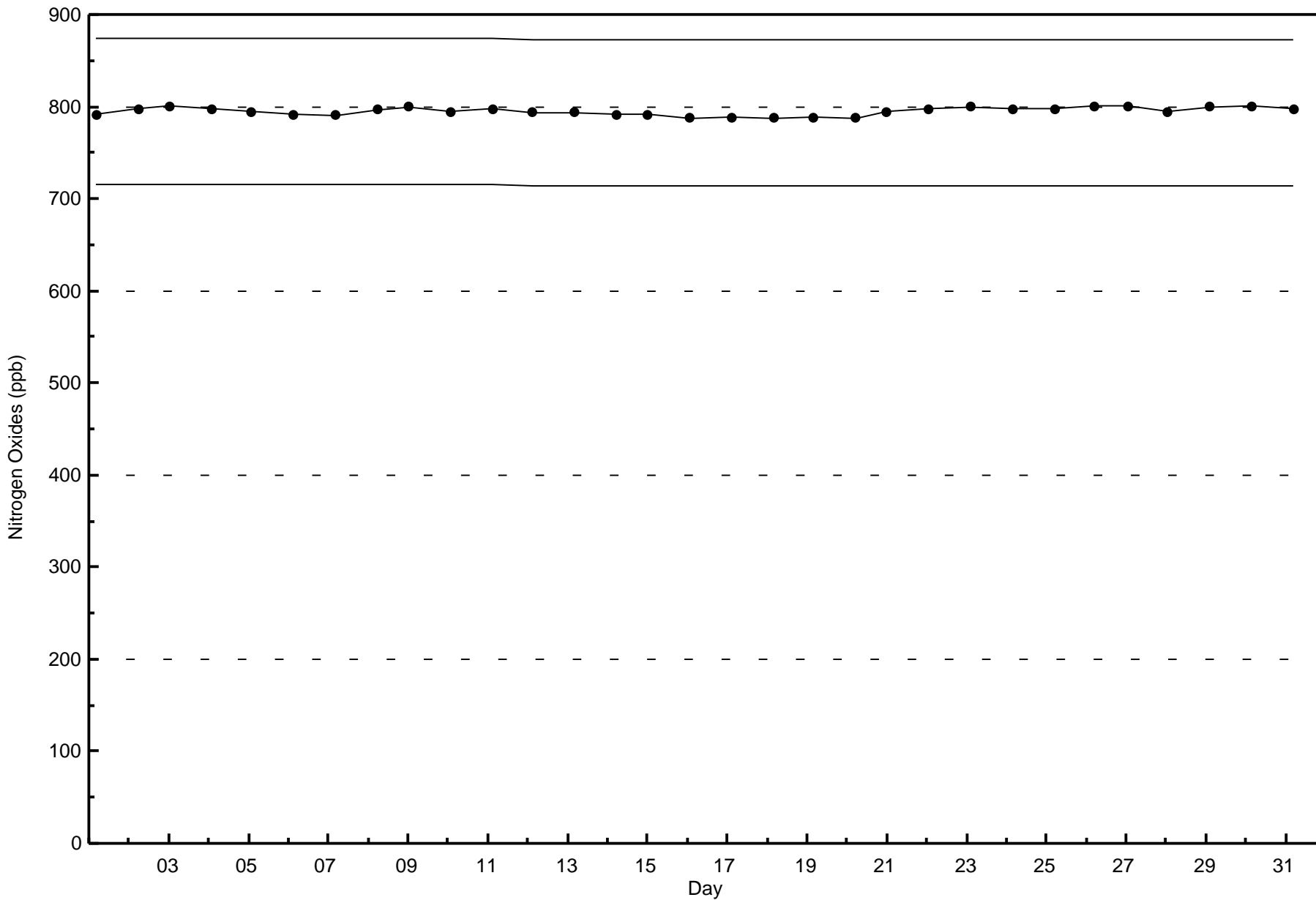




Wood Buffalo Environmental Association  
Zero Responses

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Firebag - October 2017





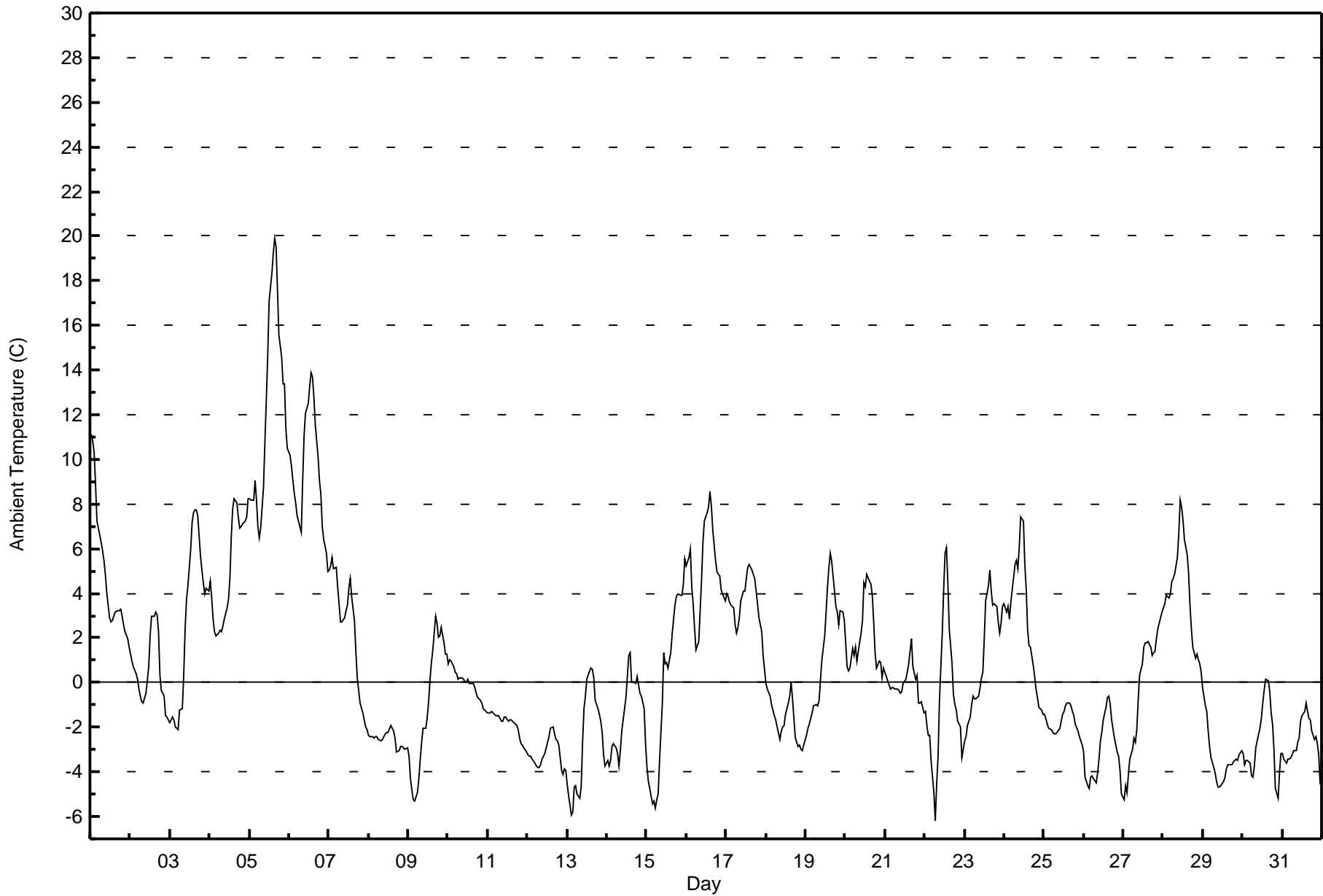


Maximum Value: 19.9 C on Oct 5 16:00		Maximum Daily Average: 12.5 C on Oct 5		Hours in Service: 744																																												
Minimum Value: -6.2 C on Oct 22 07:00		Minimum Daily Average: -3.4 C on Oct 29		Hours of Data: 744																																												
Maximum Diurnal Average: 3.0 C at hour 15		Minimum Diurnal Average: -0.5 C at hour 7		Hours of Missing Data: 0																																												
Monthly Average: 0.93 C		Percentiles: P <sub>1</sub> = -5.3 P <sub>10</sub> = -3.5 Q <sub>1</sub> = -2.3 Median = 0.0 Q <sub>3</sub> = 3.5 P <sub>90</sub> = 6.8 P <sub>99</sub> = 14.2		Hours of Calibration: 0																																												
				Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	11.1	10.8	10.3	8.8	7.2	6.6	6.3	5.9	5.5	4.9	4.0	2.9	2.7	2.8	3.0	3.2	3.2	3.2	3.3	3.0	2.6	2.3	2.0	1.6	4.9	11.1																						
2-Oct	1.3	1.0	0.7	0.4	0.1	-0.3	-0.6	-0.8	-0.9	-0.5	0.1	0.7	2.1	2.9	3.0	3.1	3.0	2.3	0.3	-0.4	-0.6	-1.5	-1.6	-1.7	0.5	3.1																						
3-Oct	-1.8	-1.6	-1.7	-2.0	-2.0	-2.1	-1.3	-1.2	0.4	2.4	3.7	4.3	6.0	7.2	7.6	7.8	7.8	7.5	5.6	5.0	4.5	4.0	4.2	4.1	2.9	7.8																						
4-Oct	4.5	3.8	2.8	2.3	2.1	2.2	2.4	2.3	2.5	2.9	3.3	3.7	4.7	6.5	7.8	8.2	8.0	7.4	6.9	7.0	7.1	7.2	7.4	8.3	5.1	8.3																						
5-Oct	8.2	8.2	8.2	9.1	8.2	7.0	6.5	6.9	8.7	10.7	12.6	14.6	17.1	18.4	19.2	19.9	19.5	17.6	15.6	14.6	13.4	13.4	11.4	10.5	12.5	19.9																						
6-Oct	10.2	9.7	9.1	8.5	8.1	7.5	7.0	6.7	9.1	11.1	12.1	12.5	13.3	13.9	13.7	12.8	11.6	10.2	9.1	8.4	7.0	6.4	5.8	5.0	9.5	13.9																						
7-Oct	5.1	5.2	5.6	5.1	5.2	4.3	3.5	2.7	2.7	2.9	3.2	3.5	4.2	4.7	3.9	2.8	1.4	0.2	-0.3	-0.9	-1.4	-1.7	-2.0	-2.1	2.4	5.6																						
8-Oct	-2.4	-2.4	-2.4	-2.5	-2.4	-2.4	-2.6	-2.6	-2.6	-2.4	-2.3	-2.2	-2.2	-1.9	-2.1	-2.2	-2.5	-3.1	-3.1	-2.9	-2.9	-2.9	-3.0	-2.9	-2.5	-1.9																						
9-Oct	-3.3	-4.3	-4.8	-5.2	-5.3	-4.9	-4.3	-3.4	-2.7	-2.1	-2.0	-1.6	-0.9	0.1	0.9	1.5	3.0	2.6	2.0	2.1	2.5	1.8	1.3	1.3	-1.1	3.0																						
10-Oct	0.8	1.0	1.0	0.7	0.5	0.4	0.1	0.2	0.2	0.2	0.0	0.0	0.2	0.0	-0.1	0.0	-0.2	-0.5	-0.7	-0.8	-0.9	-1.2	-1.2	-1.3	-0.1	1.0																						
11-Oct	-1.4	-1.3	-1.3	-1.4	-1.4	-1.5	-1.5	-1.6	-1.7	-1.8	-1.5	-1.6	-1.7	-1.7	-1.7	-1.7	-1.8	-1.9	-2.1	-2.5	-2.7	-2.8	-2.9	-3.1	-1.9	-1.3																						
12-Oct	-3.2	-3.3	-3.3	-3.4	-3.6	-3.8	-3.8	-3.8	-3.7	-3.4	-3.2	-2.9	-2.6	-2.4	-2.1	-2.0	-2.3	-2.6	-2.6	-2.8	-3.9	-4.1	-3.8	-3.9	-3.2	-2.0																						
13-Oct	-4.5	-5.1	-5.9	-5.8	-4.7	-4.6	-5.0	-5.2	-4.7	-2.7	-1.2	-0.6	0.1	0.5	0.6	0.6	0.2	-0.8	-1.2	-1.4	-1.7	-2.2	-3.2	-3.7	-2.6	0.6																						
14-Oct	-3.5	-3.7	-3.5	-2.9	-2.8	-2.9	-3.1	-3.8	-3.0	-2.2	-1.6	-0.7	0.3	1.2	1.4	0.0	0.0	-0.1	0.3	-0.1	-0.5	-0.6	-1.2	-2.7	-1.5	1.4																						
15-Oct	-3.8	-4.4	-4.8	-5.4	-5.3	-5.6	-5.2	-5.0	-3.5	-0.9	1.3	0.9	0.9	0.6	1.3	2.1	2.9	3.4	3.8	4.0	3.9	3.9	4.4	5.6	-0.2	5.6																						
16-Oct	5.3	5.6	6.0	4.3	3.5	2.4	1.5	1.8	3.2	4.6	6.3	7.2	7.6	7.9	8.5	7.9	6.8	5.5	5.0	4.9	4.8	4.2	4.0	3.7	5.1	8.5																						
17-Oct	4.0	3.8	3.6	3.5	3.3	2.6	2.2	2.5	2.9	3.6	4.1	4.1	4.7	5.2	5.3	5.1	4.9	4.7	4.1	3.5	2.9	2.3	1.2	0.6	3.5	5.3																						
18-Oct	0.0	-0.3	-0.6	-1.0	-1.3	-1.5	-1.7	-2.0	-2.5	-2.2	-2.0	-1.9	-1.4	-0.9	-0.6	0.0	-0.7	-1.6	-2.5	-2.8	-2.8	-3.0	-3.1	-2.8	-1.6	0.0																						
19-Oct	-2.4	-2.0	-1.8	-1.6	-1.3	-1.0	-1.0	-1.0	-0.8	0.1	1.1	2.1	3.2	4.3	5.2	5.8	5.4	4.1	3.4	3.1	2.6	3.2	3.2	2.8	1.5	5.8																						
20-Oct	1.8	0.7	0.5	0.7	1.5	1.2	1.6	1.0	1.4	2.2	2.8	4.5	4.3	4.9	4.6	4.4	3.9	2.7	1.3	0.6	1.0	0.9	0.2	0.7	2.1	4.9																						
21-Oct	0.5	0.1	-0.1	-0.3	-0.2	-0.2	-0.3	-0.3	-0.4	-0.5	-0.4	0.0	0.1	0.5	0.8	1.4	2.0	0.7	0.2	0.3	-0.9	-0.9	-0.8	-1.3	0.0	2.0																						
22-Oct	-1.3	-1.9	-2.3	-2.4	-3.5	-4.9	-6.2	-4.6	-3.3	-0.8	2.2	4.2	5.8	6.1	4.5	2.4	0.8	-0.5	-1.0	-1.3	-1.7	-2.0	-3.4	-3.0	-0.8	6.1																						
23-Oct	-2.6	-2.4	-1.9	-1.6	-1.0	-0.6	-0.7	-0.7	-0.6	-0.3	0.2	0.5	1.9	3.7	4.3	5.0	4.1	3.5	3.5	3.4	2.8	2.2	2.7	3.4	1.2	5.0																						
24-Oct	3.5	3.2	3.4	2.9	3.6	4.2	5.3	5.5	5.1	6.0	7.4	7.2	5.3	4.2	2.3	1.7	1.6	0.8	0.3	-0.3	-0.7	-1.1	-1.2	-1.4	2.9	7.4																						
25-Oct	-1.4	-1.6	-1.9	-2.0	-2.1	-2.2	-2.3	-2.3	-2.2	-2.0	-1.7	-1.4	-1.3	-1.0	-0.9	-0.9	-1.0	-1.3	-1.5	-1.8	-2.2	-2.4	-2.6	-2.8	-1.8	-0.9																						
26-Oct	-3.1	-4.2	-4.6	-4.8	-4.3	-4.2	-4.3	-4.5	-4.1	-3.4	-2.6	-2.2	-1.7	-1.1	-0.7	-0.6	-1.0	-1.7	-2.5	-2.8	-3.1	-3.3	-3.9	-5.0	-3.1	-0.6																						
27-Oct	-5.3	-4.6	-4.9	-4.1	-3.4	-3.0	-2.5	-2.6	-2.1	-0.8	0.3	0.8	1.6	1.8	1.8	1.8	1.6	1.2	1.4	1.4	1.9	2.4	2.9	3.2	-0.4	3.2																						
28-Oct	3.4	3.5	3.9	3.8	4.0	4.5	4.7	4.9	5.6	6.7	8.2	7.8	7.3	6.4	5.7	4.9	3.5	2.4	1.6	1.1	1.2	1.0	0.8	0.4	4.1	8.2																						
29-Oct	-0.2	-1.0	-1.3	-2.2	-2.8	-3.3	-3.8	-4.1	-4.4	-4.7	-4.7	-4.6	-4.4	-4.2	-3.9	-3.7	-3.7	-3.7	-3.5	-3.5	-3.4	-3.5	-3.2	-3.0	-3.4	-0.2																						
30-Oct	-3.2	-3.7	-3.5	-3.5	-3.6	-4.2	-4.3	-3.7	-3.0	-2.6	-2.0	-1.6	-0.9	-0.4	0.2	0.1	-0.4	-1.3	-1.9	-3.0	-4.8	-5.2	-4.0	-3.1	-2.6	0.2																						
31-Oct	-3.2	-3.4	-3.6	-3.4	-3.4	-3.3	-3.2	-3.0	-3.0	-2.7	-2.5	-1.7	-1.5	-1.3	-0.9	-1.3	-1.6	-1.6	-2.2	-2.5	-2.4	-2.7	-3.2	-4.5	-2.6	-0.9																						
																								0.4	0.2	0.0	-0.2	-0.2	-0.4	-0.5	-0.5	-0.1	0.7	1.5	1.9	2.4	2.9	3.0	2.9	2.6	1.9	1.4	1.1	0.7	0.5	0.2	0.1	Diurnal Average
																								11.1	10.8	10.3	9.1	8.2	7.5	7.0	6.9	9.1	11.1	12.6	14.6	17.1	18.4	19.2	19.9	19.5	17.6	15.6	14.6	13.4	13.4	11.4	10.5	Diurnal Maximum



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Firebag - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C  
Firebag - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	373	50.13	50.13
0 - 10	343	46.10	96.24
10 - 20	28	3.76	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %**

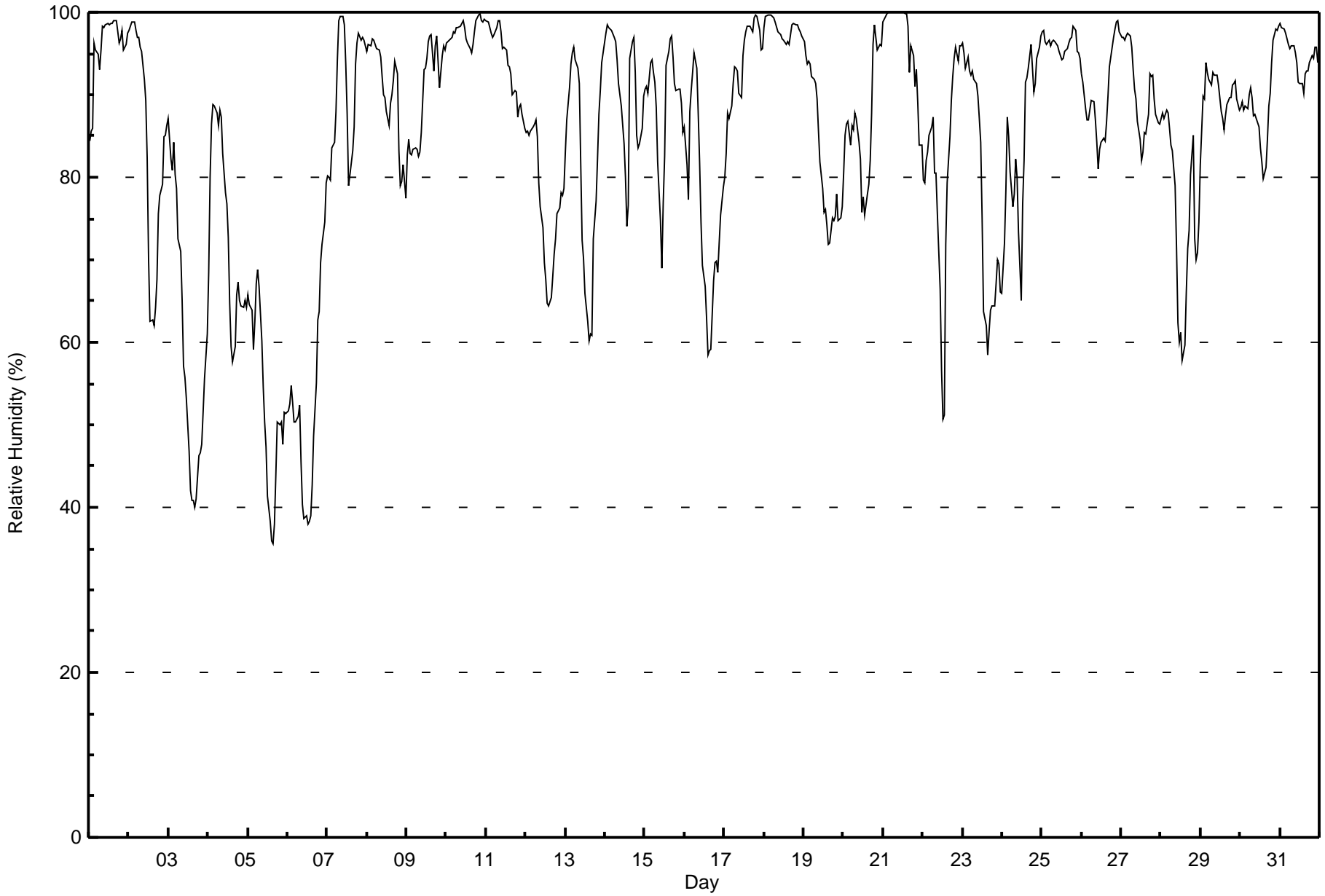
**Firebag - October 2017**

Maximum Value: 100 % on Oct 21 05:00																			Maximum Daily Average: 98.0 % on Oct 18						Hours in Service: 744																			
Minimum Value: 36 % on Oct 5 16:00																			Minimum Daily Average: 52.6 % on Oct 6						Hours of Data: 744																			
Maximum Diurnal Average: 89.6 % at hour 4																			Minimum Diurnal Average: 76.7 % at hour 14						Hours of Missing Data: 0																			
Monthly Average: 84.5 %																			Percentiles: P <sub>1</sub> = 39 P <sub>10</sub> = 63 Q <sub>1</sub> = 79 Median = 89 Q <sub>3</sub> = 96 P <sub>90</sub> = 98 P <sub>99</sub> = 100						Hours of Calibration: 0																			
																									Percent Operational Time: 100.0																			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																				
1-Oct	84	86	86	96	95	95	93	95	98	98	99	99	98	99	99	99	99	98	96	97	98	95	96	97	95.6	99																		
2-Oct	98	98	99	99	98	97	97	96	95	92	89	82	70	62	63	62	64	68	76	78	79	85	85	86	84.1	99																		
3-Oct	87	82	81	84	80	79	73	71	65	57	56	53	47	42	41	41	40	41	46	47	48	51	56	61	59.5	87																		
4-Oct	69	80	86	89	89	88	86	88	87	83	78	77	73	65	59	58	59	66	67	65	64	64	65	64	73.7	89																		
5-Oct	66	65	64	59	63	67	69	67	60	55	50	47	41	38	36	36	38	44	50	50	50	48	52	51	52.7	69																		
6-Oct	52	53	55	53	50	50	51	52	46	40	39	39	38	38	39	43	49	55	63	64	70	72	75	79	52.6	79																		
7-Oct	80	80	80	83	84	88	94	99	99	100	98	94	88	79	80	83	86	94	96	98	97	97	97	96	90.4	100																		
8-Oct	95	96	96	97	97	96	96	95	94	92	90	90	88	86	89	90	92	94	93	83	79	79	82	77	90.3	97																		
9-Oct	83	85	83	83	83	84	83	83	83	85	93	93	94	96	97	97	93	96	97	94	91	95	96	95	90.1	97																		
10-Oct	96	96	97	97	98	97	98	98	98	99	99	98	97	96	96	95	96	98	99	100	100	99	99	99	97.7	100																		
11-Oct	99	99	98	97	97	97	98	99	99	98	96	96	95	94	93	92	90	90	90	87	88	89	88	86	94.0	99																		
12-Oct	85	86	85	86	86	87	87	85	79	76	74	70	68	65	64	65	68	71	72	76	76	78	78	79	76.9	87																		
13-Oct	83	87	91	94	95	96	94	93	91	82	72	70	66	63	60	61	61	73	77	82	88	90	94	95	81.6	96																		
14-Oct	97	98	98	98	98	97	96	94	91	90	89	84	80	74	77	94	96	97	93	85	84	84	86	90	90.5	98																		
15-Oct	91	91	90	94	94	93	91	89	82	75	69	77	83	94	95	97	97	95	91	90	91	91	89	86	88.9	97																		
16-Oct	86	81	77	88	90	93	95	93	88	82	75	69	67	63	58	59	59	68	70	70	69	72	75	79	76.1	95																		
17-Oct	80	83	88	87	89	91	93	93	93	90	90	95	97	98	98	98	98	98	99	100	99	98	95	96	93.6	100																		
18-Oct	98	99	100	100	100	99	99	99	98	97	97	97	97	96	96	96	97	99	99	98	98	98	98	97	98.0	100																		
19-Oct	96	95	94	94	94	92	92	91	89	86	82	79	76	76	74	72	72	75	75	75	78	75	75	76	82.6	96																		
20-Oct	81	85	87	87	84	86	86	88	87	84	82	76	78	75	78	79	82	88	96	98	95	96	96	96	86.2	98																		
21-Oct	99	99	100	100	100	100	100	100	100	100	100	100	100	100	100	98	93	96	95	91	93	89	84	84	96.7	100																		
22-Oct	80	79	82	83	85	86	87	81	80	76	66	57	51	51	72	79	85	89	92	94	96	94	96	96	80.7	96																		
23-Oct	96	95	93	94	93	92	93	92	91	90	87	84	75	64	62	58	61	64	64	64	67	70	70	66	78.6	96																		
24-Oct	66	72	79	87	85	81	76	78	82	80	73	65	77	82	92	92	93	96	93	90	91	94	96	97	84.1	97																		
25-Oct	98	98	97	96	97	96	96	97	96	96	95	95	94	94	95	96	96	97	97	98	98	95	95	94	96.1	98																		
26-Oct	93	92	88	87	87	88	89	89	87	84	81	83	84	85	84	87	90	93	96	97	98	99	99	98	89.9	99																		
27-Oct	97	97	97	97	97	97	96	93	91	89	87	85	82	83	85	85	88	92	92	92	90	88	87	86	90.5	97																		
28-Oct	87	88	87	88	88	86	84	83	79	72	62	60	61	58	60	66	71	74	80	85	73	70	71	75	75.3	88																		
29-Oct	82	90	90	94	93	92	91	93	92	92	92	91	88	87	86	87	89	90	90	91	91	92	90	88	90.0	94																		
30-Oct	88	89	88	89	88	90	91	90	88	88	87	86	84	82	80	81	85	89	90	94	97	98	98	98	89.0	98																		
31-Oct	99	98	98	97	97	96	96	96	96	95	94	92	91	91	90	93	93	93	94	95	94	96	96	94	94.7	99																		
																			86.8	87.8	88.1	89.6	89.5	89.6	89.4	89.0	87.4	84.6	82.0	80.0	78.3	76.7	77.4	78.7	80.0	83.1	84.8	84.8	84.8	85.2	85.6	85.9	Diurnal Average	
																			99	99	100	100	100	100	100	100	100	100	100	100	100	100	100	99	99	99	99	100	100	99	99	99	Diurnal Maximum	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Firebag - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Relative Humidity (RH) - %  
Firebag - October 2017**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	10	1.34	1.34
40 - 60	50	6.72	8.06
60 - 80	144	19.35	27.42
80 - 100	531	71.37	98.79

Total Number of Valid Hours: 744

Total Number of Hours: 744





# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Wind Speed (WS) - km/h

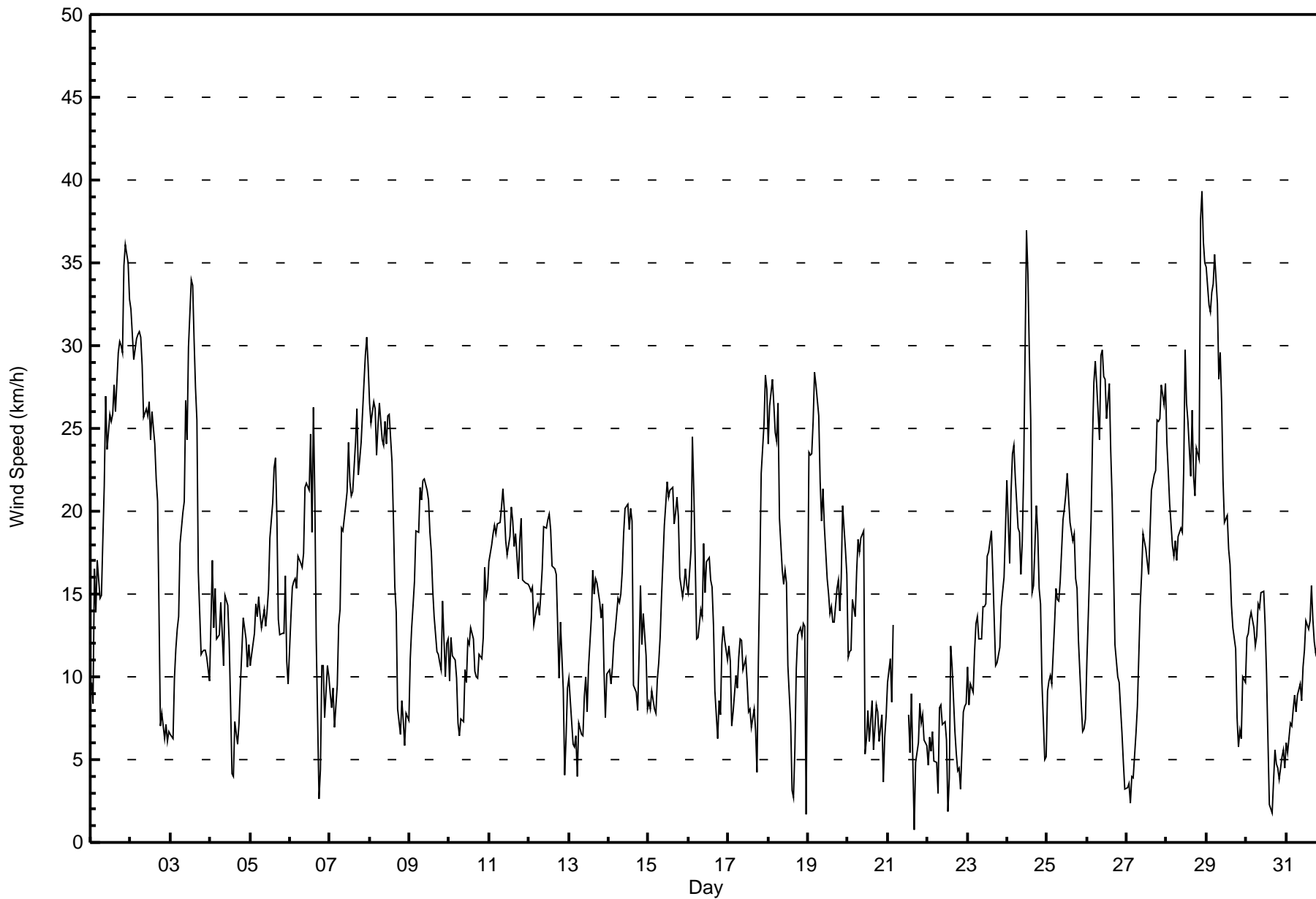
## Firebag - October 2017

Maximum Speed: 39 km/h on Oct 28 22:00	Maximum Daily Speed Average: 23.5 km/h on Oct 1	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 21 17:00	Minimum Daily Speed Average: 1.5 km/h on Oct 17	Hours of Data: 736
Maximum Diurnal Speed Average: 6.8 km/h at hour 15	Minimum Diurnal Speed Average: 3.7 km/h at hour 19	Hours of Missing Data: 8
Monthly Average Velocity: 4.8 km/h 283.6 deg	Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 6 Q <sub>1</sub> = 10 Median = 14 Q <sub>3</sub> = 20 P <sub>90</sub> = 26 P <sub>99</sub> = 35	Percent Operational Time: 98.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	NNW10	NNW8	NNW17	NW14	NW17	NW15	NW15	NNW18	NNW22	NNW27	N24	N26	NNW25	NNW26	NNW28	NNW26	NNW30	NNW30	N30	N30	N35	N36	N35	N33	NNW23.5	N36
2-Oct	N32	N31	N29	N30	N31	N31	N30	N29	N26	N26	N26	N27	N24	N26	N24	N22	NNW21	NNW14	NNW7	NNW8	NW6	NW7	WNW6	SW7	N20.8	N32
3-Oct	SW7	SW6	SSW10	SSW12	SSW13	SSW14	SSW18	SSW20	SSW21	SW27	SW24	SW30	SW34	SW34	SW30	SW27	SW25	WSW16	W11	WSW12	W12	W12	W11	NW10	SW17.1	SW34
4-Oct	NNW13	NNW17	NNW13	N15	N12	N13	N15	NNW13	NNW11	NNW15	NNW14	NNW12	NW8	WNW4	W4	SW7	SW6	SSW7	S10	S12	S14	S12	SSW11	SSW12	NW4.8	NNW17
5-Oct	S11	S11	S13	SW14	SSW14	SW15	SW14	SW13	SW14	SW13	SW14	SW15	SW18	SW21	SW23	SW23	SW20	SW13	SW13	WSW13	WSW13	W16	WSW11	SW10	SW14.2	SW23
6-Oct	SW14	SW15	SW16	SW16	SW15	SW17	WSW17	SW17	WSW17	WSW21	WSW22	WSW21	WSW25	WSW19	W26	W21	WNW12	WNW3	SSW4	WSW11	WSW11	WSW8	WSW11	WSW10	WSW14.4	W26
7-Oct	WSW9	WSW8	WSW9	WSW7	NW9	N13	N14	N19	N19	NNW20	NNW21	NNW24	NNW22	NNW21	NNW21	NNW24	NNW26	NNW22	NNW23	NNW24	NNW28	NNW29	NNW31	NNW29	NNW18.2	NNW31
8-Oct	NNW27	NNW25	NNW27	NNW26	NNW23	NNW25	NNW27	NNW24	NNW24	NNW25	NNW24	NNW26	NNW26	NNW23	NNW19	NW15	NW14	NW8	WNW7	WNW9	WNW7	WSW6	SW8	SSW7	NNW17.3	NNW27
9-Oct	SSW11	SSW13	S14	S16	S19	S19	SSE21	SSE21	S22	S22	S21	S21	S19	SW18	WSW15	WSW14	WSW12	SW11	SW11	WSW10	W15	WSW10	WSW12	W12	SSW12.9	S22
10-Oct	W10	WSW12	WSW11	W11	WSW10	WSW7	W6	WSW7	W7	NNW10	NNW10	NNW12	NNW12	NNW13	NNW12	N10	N10	N10	NNE11	NNE11	NNE12	NNE17	NNE15	NE15	NNW6.8	NNE17
11-Oct	NE17	NE18	NE19	NE19	NE19	NE19	NE19	NNE20	NNE21	NE20	NNE18	NNE17	NNE18	NNE20	NNE19	NNE18	NNE19	NNE16	NNE18	NNE20	N16	N16	N16	N16	NNE17.8	NNE21
12-Oct	N15	N15	N15	NNW13	NNW14	NNW14	NNW14	NNW15	NNW16	NNW19	N19	N20	N20	N19	NNW17	NNW17	NNW16	NNW13	NNW10	N13	NNE9	NNW4	NW6	NW9	NNW14.0	N20
13-Oct	WNW10	NW9	NW6	NW6	NNW6	W4	WSW7	WSW6	WSW6	W9	W10	W8	W11	WSW14	WSW16	WSW15	WSW16	SW16	SW15	WSW14	WSW14	WSW10	SW8	SW10	WSW9.1	WSW16
14-Oct	SW10	SSW10	S11	S12	S13	S15	S14	S15	S16	S19	S20	SSW20	SSW19	SW20	SW19	W9	SW9	W8	WNW11	WNW16	WNW12	NW14	NW11	WNW8	SW10.0	SSW20
15-Oct	W8	WSW8	WSW9	WSW8	SW8	SW10	SSW11	S12	S15	SSW19	SSW20	S22	S21	S21	S21	SSW19	SSW20	SW21	SW20	SW16	SW15	SW16	SW17	SW15	SSW14.4	S22
16-Oct	SW15	WSW18	W25	WNW21	W17	W12	WSW12	WSW14	WSW14	WSW18	WSW15	WSW17	SW17	WSW16	WSW15	WSW13	WSW9	SSW6	S9	SSW8	SSW12	SW13	SW12	SW11	WSW13.1	W25
17-Oct	SSW12	SSW11	S7	SSE8	SE10	ESE9	SE11	SSE12	S12	S10	S11	S10	SE8	E8	ENE7	ENE8	ENE7	NE4	NNW11	NNW16	NW22	NW25	NW28	WNW27	WSW1.5	NW28
18-Oct	NW24	WNW26	WNW28	NW26	NW25	NW24	NW27	NW20	NW16	NW16	NNW16	N16	NW11	NW7	N3	E3	ESE6	ESE11	SE13	ESE13	SE12	SE13	SE13	SE2	NW8.1	WNW28
19-Oct	SE24	SE23	ESE23	ESE25	SE28	SSE28	SSE26	SSE22	SSE19	S21	S19	S16	S15	S14	S14	SSE13	SSE13	SSE15	SSE16	SSE14	SSE16	SSE20	SSE18	SSE16	SSE18.2	SE28
20-Oct	SE11	SE12	SE12	SE15	SE14	ESE16	ESE18	ESE18	ESE18	SE19	SSE5	SSE6	ESE8	SSE6	SE9	SE6	SW7	W8	W8	W6	WNW8	NW4	NW6	NNW8	SE6.2	SE19
21-Oct	N10	N11	N8	NNW13	AF	AF	AF	AF	AF	AF	AF	AF	WSW8	SSW5	WSW9	SW5	NNE1	SSE5	S6	S8	SSE7	S8	S6	S6	----	NNW13
22-Oct	S5	S6	S5	SSE7	SE5	SE5	SE3	SE8	SE8	ESE7	SE7	SSE6	SE2	NE4	NNE12	NNE11	NE7	ENE5	ESE4	S4	S3	SW8	SW8	SW8	SE3.2	NNE12
23-Oct	WSW11	WSW8	WSW10	WSW9	W12	WNW13	WNW14	W12	W12	W14	WNW14	W14	W17	W18	WSW19	WSW16	WSW13	SW11	SW11	SW12	SW14	SW15	SSW16	SSW19	WSW12.1	SSW19
24-Oct	SSW22	SSW17	S21	S24	SSW24	SW22	WSW19	W19	WSW16	W18	WNW23	NW37	NW34	NW30	NNW26	NNW15	NNW16	NNW20	N19	N15	NNE14	NNE10	NNE5	NNE5	WNW9.8	NW37
25-Oct	NNE9	NNE10	NE10	ENE10	NE13	NE15	NE15	NNE15	NNE16	NNE20	NNW20	NNE21	NNE22	NNE21	N19	N18	N19	N16	N15	NNW12	NNW8	NW7	W7	WSW7	NNE12.5	NNE22
26-Oct	SW11	SW14	SW20	WSW24	WSW28	WSW29	SW28	SW24	SW29	SW30	SW28	SW28	SW26	SW28	WSW24	WSW21	SW16	SW12	SW10	SW10	WSW8	W7	SW5	SSW3	SW18.9	SW30
27-Oct	SSW3	SSW4	SSW2	S4	SSE4	SSE7	SSE8	S11	S14	SSW16	SSW19	S18	S17	S16	S19	SSE21	S22	S22	S26	S25	S26	SSW28	SSW26	SSW28	S15.7	SSW28
28-Oct	SW24	SW22	SW20	SW18	WSW17	WSW18	W17	W18	W19	W19	WNW23	NNW30	NNW27	NNW25	NNW22	NW26	NNW22	NNW21	NNW24	NNW23	NNW38	NNW39	NNW36	NNW35	NW18.0	NNW39
29-Oct	NNW35	NNW32	NNW32	N33	NNW34	NNW36	N33	N28	N30	N27	N22	N19	N20	N18	N17	N14	N13	NNW12	NNW8	NW6	W7	WSW6	WSW10	SW10	NNW18.7	NNW36
30-Oct	SW12	SW13	SW13	SW14	SW13	SW12	SSW12	SW14	SSW14	SSW15	SSW15	SSW13	SW10	SW6	WNW2	NE2	NNW4	N6	N5	NNE5	NE4	NE5	NE6	E4	SW6.0	SSW15
31-Oct	SE6	SE5	SE7	SSE7	SSE8	SSE9	S8	SSE9	SSE10	SE9	ESE11	ESE12	E13	E13	ENE13	ENE15	ENE13	NE12	NE11	NE12	NE11	NNE12	N15	N17	E6.9	N17

W4.6	W4.4	W4.6	W4.0	W3.9	W4.0	W3.9	W4.0	W4.3	W5.1	W5.4	NNW6.1	NNW6.3	NNW6.3	NNW6.8	NNW6.0	NNW5.4	NNW3.9	NNW3.7	NNW4.2	NNW4.8	NNW5.2	NNW5.3	W5.3	Diurnal Average
NNW35	NNW32	NNW32	N33	NNW34	NNW36	N33	N29	N30	SW30	SW28	NW37	NW34	SW34	SW30	SW27	NNW30	NNW30	NNW30	N30	NNW38	NNW39	NNW36	NNW35	Diurnal Maximum

AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h  
Firebag - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	45	6.11	6.11
6 - 11	202	27.45	33.56
12 - 19	291	39.54	73.10
20 - 28	156	21.20	94.29
29 - 38	41	5.57	99.86
> 38	1	0.14	100.00

Total Number of Valid Hours: 736

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Wind Speed (WS) - km/h  
Firebag - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	2	4	5	1	2	1	6	3	5	6	2	0	2	3	1	2	45
6 - 11	7	7	5	4	1	6	12	13	16	12	27	35	19	9	16	13	202
12 - 19	33	16	13	3	2	6	9	10	29	22	45	35	20	6	8	34	291
20 - 28	15	10	0	0	0	2	3	8	16	11	21	8	3	7	9	43	156
29 - 38	16	0	0	0	0	0	0	0	0	0	6	1	0	0	4	14	41
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
<b>Totals</b>	73	37	23	8	5	15	30	34	66	51	101	79	44	25	38	107	736

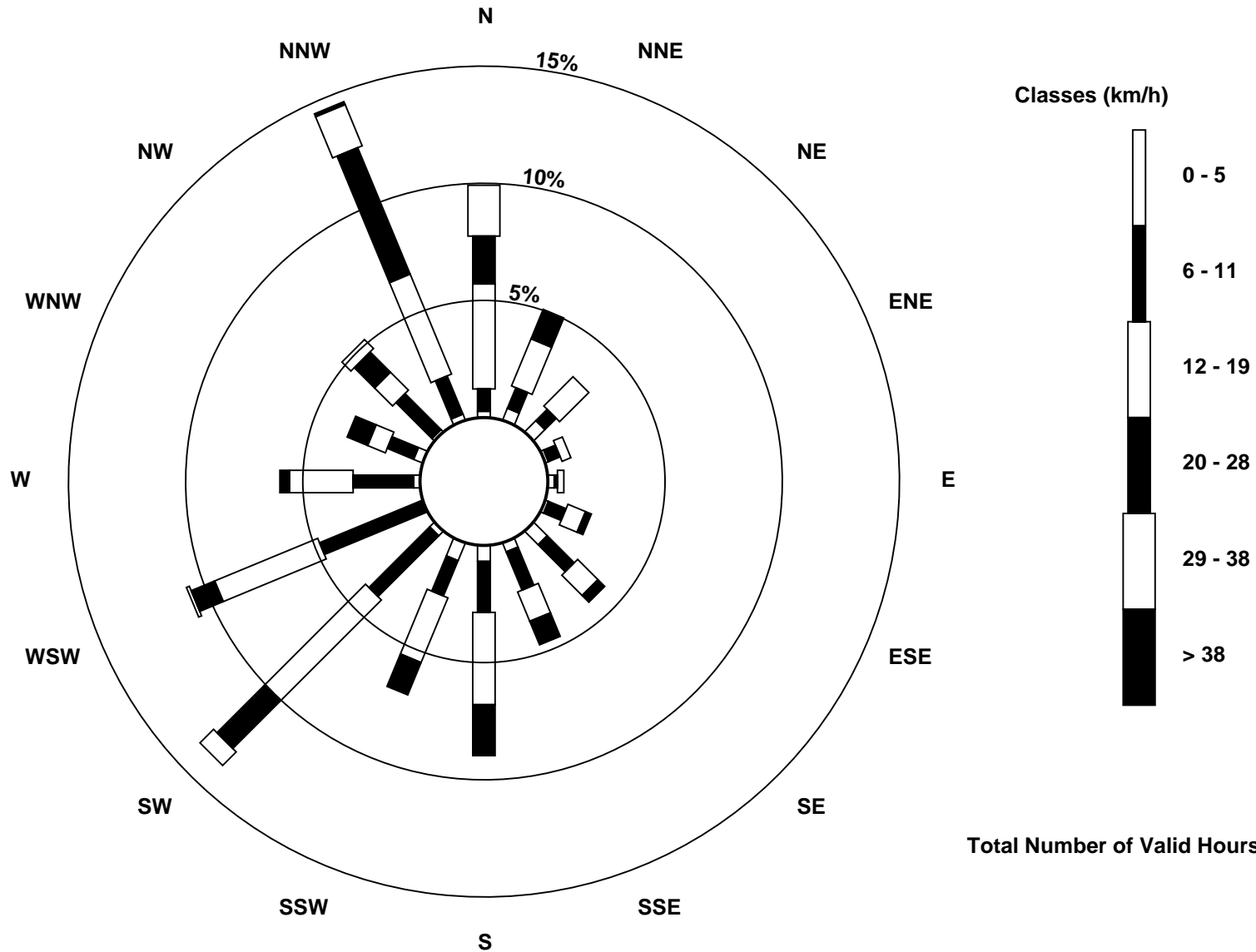
Total Number of Valid Hours: 736

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed (WS) - km/h  
Firebag (AMS 19)





**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Speed (WS) - km/h**  
**Firebag - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Oct 28 21:00	Hours in Service: 744 Hours of Data: 736 Hours of Missing Data: 8 Hours of Calibration: 0 Percent Operational Time: 98.9
Minimum Value: 1 km/h on Oct 30 20:00	
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 6 P <sub>99</sub> = 9	

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	2	2	4	3	4	3	3	4	5	7	6	5	5	6	6	5	7	7	7	7	8	9	9	8	9
2-Oct	8	6	7	6	7	7	7	7	6	6	7	6	6	6	5	5	4	4	1	1	1	1	2	1	8
3-Oct	1	1	2	2	2	2	3	3	3	5	5	6	7	5	6	5	6	4	2	1	1	1	1	2	7
4-Oct	3	4	3	3	3	3	3	2	3	3	3	3	2	3	3	2	2	2	1	1	2	2	2	2	4
5-Oct	1	2	2	2	2	2	2	2	2	2	2	3	3	4	4	4	5	2	2	2	2	3	2	2	5
6-Oct	2	2	2	2	2	3	2	2	4	4	4	5	6	5	7	6	5	1	1	2	1	1	4	1	7
7-Oct	2	2	2	2	2	3	3	4	4	4	5	5	5	5	6	5	5	5	5	5	6	6	7	6	7
8-Oct	6	6	6	6	5	6	5	6	6	6	6	5	6	5	4	3	3	2	2	2	2	1	2	2	6
9-Oct	1	2	2	2	3	3	3	3	3	3	3	3	3	4	3	2	2	1	2	3	3	2	2	2	4
10-Oct	2	2	2	2	2	2	1	1	1	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3
11-Oct	3	3	3	3	3	4	4	4	4	4	3	3	4	4	4	3	4	3	4	4	3	3	3	3	4
12-Oct	3	3	3	3	3	3	2	3	3	4	4	4	4	4	3	4	4	3	3	4	3	1	1	2	4
13-Oct	2	1	1	1	2	1	1	1	1	3	2	2	3	3	4	4	4	3	3	3	3	2	1	1	4
14-Oct	2	1	1	3	2	2	2	2	2	4	3	3	3	4	4	2	2	2	3	3	3	3	2	1	4
15-Oct	1	1	1	2	2	1	1	2	3	2	3	3	3	4	3	3	4	3	3	3	2	2	2	3	4
16-Oct	2	4	5	6	4	3	2	2	3	3	3	3	3	4	3	3	2	1	1	1	4	2	2	1	6
17-Oct	2	1	1	2	2	3	2	2	2	1	2	2	1	2	2	1	2	3	2	4	5	7	7	6	7
18-Oct	5	6	6	5	5	5	6	5	3	3	4	3	3	2	2	2	3	2	2	3	6	8	9	6	9
19-Oct	5	4	5	5	5	5	5	4	3	4	3	3	2	2	2	2	2	2	2	2	3	3	3	3	5
20-Oct	2	2	2	2	2	2	3	3	3	4	4	3	2	1	3	2	1	2	1	2	2	1	2	1	4
21-Oct	2	2	2	3	AF	AF	AF	AF	AF	AF	AF	AF	2	2	3	2	1	1	1	1	1	1	1	1	3
22-Oct	1	2	1	3	3	2	2	2	2	2	2	2	1	2	4	2	2	3	1	1	2	1	3	2	4
23-Oct	3	2	2	1	2	3	3	3	2	3	3	4	4	4	3	3	2	2	2	2	2	2	2	4	4
24-Oct	4	3	3	4	4	4	3	4	3	3	8	9	9	7	6	3	5	5	4	3	3	2	1	2	9
25-Oct	2	2	2	2	3	3	3	3	3	4	4	4	5	4	4	4	4	3	4	3	2	1	1	1	5
26-Oct	2	2	3	4	6	5	5	4	5	5	6	5	5	5	4	4	3	2	1	1	2	2	1	1	6
27-Oct	1	1	1	1	1	1	2	1	2	3	3	3	3	3	3	3	3	3	4	4	3	4	5	4	5
28-Oct	4	3	3	3	3	3	3	3	3	4	5	8	6	6	5	7	4	4	6	5	10	9	8	8	10
29-Oct	8	8	8	8	7	7	8	6	7	8	5	4	4	4	4	4	3	2	2	1	2	2	2	2	8
30-Oct	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2	1	2	2
31-Oct	2	1	1	1	1	1	1	1	1	1	2	2	3	2	3	3	3	2	2	2	2	2	4	4	4
Diurnal Maximum																									

AF - Analyzer Failure



# Wood Buffalo Environmental Association

## Summary of Hour Averages

Wind Direction (WD) - deg

Firebag - October 2017

Direction of Maximum Speed: 338 deg on Oct 28 22:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 345.1 deg on Oct 1	Hours of Data: 736
Direction of Minimum Speed: 17 deg on Oct 21 17:00	Hours of Missing Data: 8
Direction of Minimum Daily Speed Average: 1.5 deg on Oct 17	Percent Operational Time: 98.9
Monthly Average Direction: 278.8 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	333	344	345	322	324	319	310	330	337	348	349	349	343	343	343	344	346	346	349	351	355	358	358	357	345.1
2-Oct	1	354	354	355	355	353	353	354	358	355	359	356	357	352	351	353	345	346	331	333	315	311	286	230	351.4
3-Oct	228	219	213	211	212	211	210	208	211	214	225	217	223	221	228	232	231	243	261	258	260	265	266	304	227.4
4-Oct	333	341	348	354	351	350	349	342	345	344	343	330	324	292	264	233	222	194	183	186	190	189	196	207	314.3
5-Oct	190	187	190	216	213	216	219	224	228	228	223	221	228	224	217	225	228	230	226	250	246	259	244	230	224.0
6-Oct	218	216	217	224	225	236	241	232	239	240	241	248	256	256	268	280	302	284	198	251	255	248	237	239	244.5
7-Oct	244	246	246	256	317	355	1	349	353	348	340	337	335	338	336	343	342	330	332	334	338	331	332	330	334.1
8-Oct	329	327	329	329	334	341	345	343	334	333	339	329	337	339	337	326	320	315	283	282	283	250	222	211	328.7
9-Oct	205	195	188	175	173	172	167	167	173	175	173	173	191	219	251	255	253	230	230	244	264	254	243	266	201.1
10-Oct	269	253	250	261	250	250	259	255	271	336	347	338	338	343	341	356	8	8	18	17	27	25	32	40	336.8
11-Oct	40	42	41	44	48	41	39	32	33	34	28	23	23	22	16	12	12	12	12	19	10	6	4	4	25.6
12-Oct	1	357	354	348	343	346	344	338	339	345	352	354	352	351	343	344	338	334	330	8	18	334	323	315	346.8
13-Oct	302	304	315	324	328	265	242	250	246	262	260	280	262	252	245	243	245	222	222	239	246	245	231	219	252.8
14-Oct	215	193	189	184	187	191	185	172	174	179	187	199	208	223	235	262	226	259	287	298	298	307	309	284	217.6
15-Oct	267	244	247	246	215	214	202	187	189	199	193	181	171	181	187	203	212	220	219	220	215	220	226	233	207.0
16-Oct	228	250	264	287	271	260	240	243	247	241	243	244	235	252	257	244	256	194	191	194	200	233	236	219	244.1
17-Oct	213	199	180	158	138	122	131	159	181	189	182	173	124	89	62	73	76	35	336	328	324	312	307	303	250.8
18-Oct	304	298	302	305	307	305	321	314	306	316	335	350	323	320	9	96	115	121	125	122	128	127	127	134	316.3
19-Oct	131	129	122	120	130	148	155	163	163	169	179	190	181	172	172	157	150	150	153	149	152	158	155	152	151.7
20-Oct	146	137	134	129	129	119	123	122	123	139	148	149	121	149	134	137	226	267	276	271	287	307	319	344	138.5
21-Oct	10	8	358	347	AF	AF	AF	AF	AF	AF	AF	AF	244	194	242	218	17	150	172	185	155	184	189	186	--
22-Oct	180	178	177	154	140	126	125	129	125	118	144	159	141	55	28	21	53	72	113	171	185	215	224	221	137.7
23-Oct	240	243	257	257	260	288	286	276	272	277	282	276	270	274	251	245	242	230	233	220	220	215	204	204	251.0
24-Oct	207	202	186	176	197	217	250	261	255	268	297	315	307	320	330	328	333	348	354	3	12	21	27	28	289.8
25-Oct	20	31	48	61	52	49	38	27	24	23	21	15	18	12	6	5	360	356	354	348	331	309	266	237	14.5
26-Oct	219	223	236	238	237	237	231	222	220	221	222	219	219	230	238	243	234	228	227	235	247	268	219	212	229.4
27-Oct	206	208	209	189	166	167	165	181	189	194	192	185	184	174	171	168	178	169	175	178	190	192	206	210	184.8
28-Oct	216	222	233	233	239	255	262	260	268	275	301	319	336	339	336	323	345	337	338	328	341	338	334	333	307.7
29-Oct	336	333	332	349	348	348	355	359	2	360	359	7	357	356	357	350	351	348	341	309	271	248	237	221	345.9
30-Oct	221	218	224	226	223	216	204	216	213	200	203	202	216	230	295	35	342	350	356	19	49	35	54	100	217.0
31-Oct	146	136	139	154	155	163	176	164	150	132	110	111	91	90	78	63	62	54	41	49	51	24	10	4	84.8

271.5 269.9 271.5 274.7 265.2 270.4 272.0 264.7 260.9 268.3 278.7 287.7 287.3 291.4 293.5 297.4 302.7 302.4 297.5 297.9 298.3 292.4 284.6 280.9

Diurnal Average

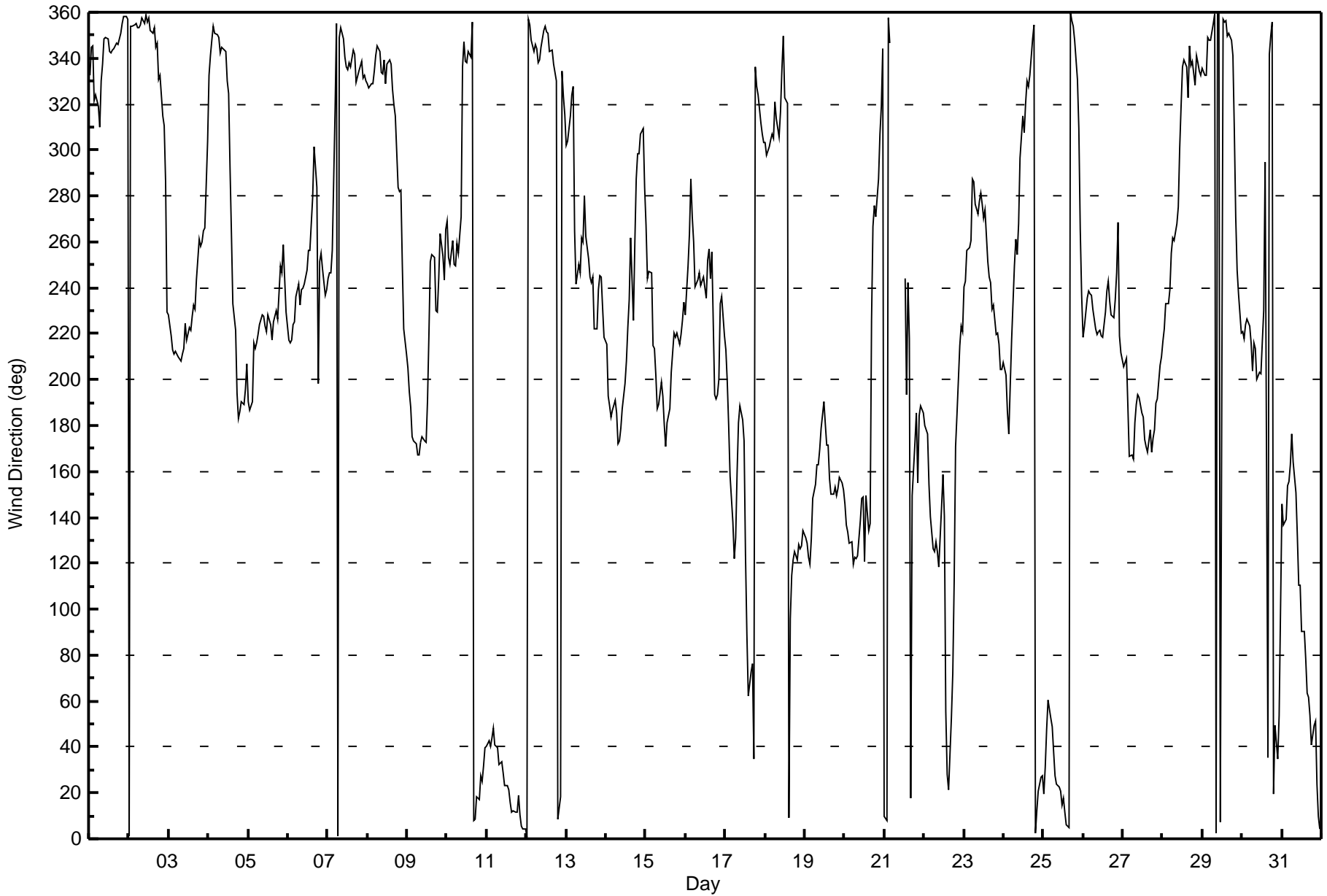
AF - Analyzer Failure

All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Firebag - October 2017**







**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Direction (WD) - deg**  
**Firebag - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 80 deg on Oct 4 15:00																	Hours in Service: 744 Hours of Data: 736 Hours of Missing Data: 8 Hours of Calibration: 0 Percent Operational Time: 98.9								
Minimum Value: 6 deg on Oct 16 20:00																									
Percentiles: P <sub>1</sub> = 7 P <sub>10</sub> = 9 Q <sub>1</sub> = 10 Median = 12 Q <sub>3</sub> = 14 P <sub>90</sub> = 18 P <sub>99</sub> = 59																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-Oct	10	14	12	12	10	12	11	13	12	12	15	13	12	12	12	12	13	14	14	14	16	19	18	16	19
2-Oct	17	16	15	14	15	15	13	16	16	16	15	15	16	15	15	15	13	13	9	9	18	8	17	14	18
3-Oct	10	9	10	8	8	9	9	10	10	11	10	10	11	10	11	10	11	16	15	8	8	7	9	23	23
4-Oct	13	13	12	13	12	12	12	12	15	13	14	16	33	68	80	23	16	19	11	8	7	8	8	17	80
5-Oct	10	11	13	9	8	7	8	8	9	12	13	12	13	13	12	11	10	9	12	10	9	10	9	7	13
6-Oct	8	8	9	8	9	11	8	8	10	11	11	12	12	14	14	14	14	51	23	12	7	10	10	7	51
7-Oct	8	12	9	22	20	17	13	11	14	15	14	12	13	15	14	12	13	12	11	13	13	11	11	11	22
8-Oct	11	11	12	11	11	12	12	12	14	12	13	12	14	11	13	18	13	13	11	11	12	26	12	21	26
9-Oct	10	6	8	9	8	8	9	9	10	9	9	9	13	16	10	10	10	9	9	19	11	10	11	11	19
10-Oct	10	10	12	11	10	12	14	11	17	21	15	12	13	12	12	11	13	12	11	12	13	12	11	12	21
11-Oct	11	10	9	10	10	10	10	10	10	10	10	11	12	11	12	12	11	12	11	10	13	12	13	14	14
12-Oct	14	13	13	11	11	11	10	10	11	14	14	14	14	14	18	14	11	12	11	23	17	15	13	13	23
13-Oct	10	9	8	9	14	31	10	9	10	13	17	35	21	16	15	15	14	10	10	12	11	8	13	9	35
14-Oct	10	13	9	13	9	9	10	9	8	10	9	12	13	13	12	19	12	16	12	11	12	12	11	11	19
15-Oct	11	7	7	11	11	10	8	9	11	7	8	10	9	10	9	13	12	9	10	9	8	8	12	11	13
16-Oct	10	11	12	13	12	12	7	10	10	11	13	13	14	14	12	11	10	22	12	6	16	9	10	12	22
17-Oct	11	7	11	11	14	11	14	11	11	8	10	14	23	13	19	20	18	60	12	11	12	13	12	11	60
18-Oct	11	11	11	11	10	11	12	14	12	13	14	14	27	26	62	46	16	11	11	11	11	11	10	13	62
19-Oct	13	12	12	12	13	11	11	11	11	10	8	9	10	9	11	11	11	10	10	11	11	10	11	11	13
20-Oct	13	12	12	12	12	10	11	11	11	14	43	33	17	22	16	53	10	23	9	9	9	11	15	12	53
21-Oct	10	12	12	10	AF	AF	AF	AF	AF	AF	AF	AF	30	32	23	27	55	12	10	21	18	9	8	7	55
22-Oct	14	10	10	23	37	31	32	12	9	13	10	18	63	76	13	10	23	11	36	27	21	19	15	15	76
23-Oct	10	13	12	10	15	12	12	11	12	12	13	15	14	15	12	11	9	9	11	8	9	8	7	9	15
24-Oct	11	9	12	10	13	18	14	11	11	13	21	14	13	19	12	11	14	15	13	13	12	12	13	12	21
25-Oct	11	15	15	12	11	10	12	10	10	10	11	12	12	13	13	13	15	13	13	17	15	16	16	15	17
26-Oct	9	8	10	9	10	10	13	10	9	10	11	10	11	10	10	10	9	9	8	8	18	11	16	12	18
27-Oct	17	12	46	20	14	10	9	9	7	7	7	9	10	9	10	9	9	9	10	9	9	7	11	9	46
28-Oct	9	9	11	11	11	11	11	12	11	13	13	14	15	13	12	13	13	11	12	13	14	13	12	12	15
29-Oct	13	12	13	13	13	13	15	16	15	16	15	14	15	14	13	14	11	11	21	12	14	12	9	10	21
30-Oct	9	8	9	9	9	9	8	9	9	6	9	9	12	19	57	61	31	14	22	18	11	17	16	21	61
31-Oct	20	19	9	14	10	13	9	10	10	18	10	11	11	12	15	11	12	10	8	10	13	11	12	13	20
																	Diurnal Maximum								
AF - Analyzer Failure																									





# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

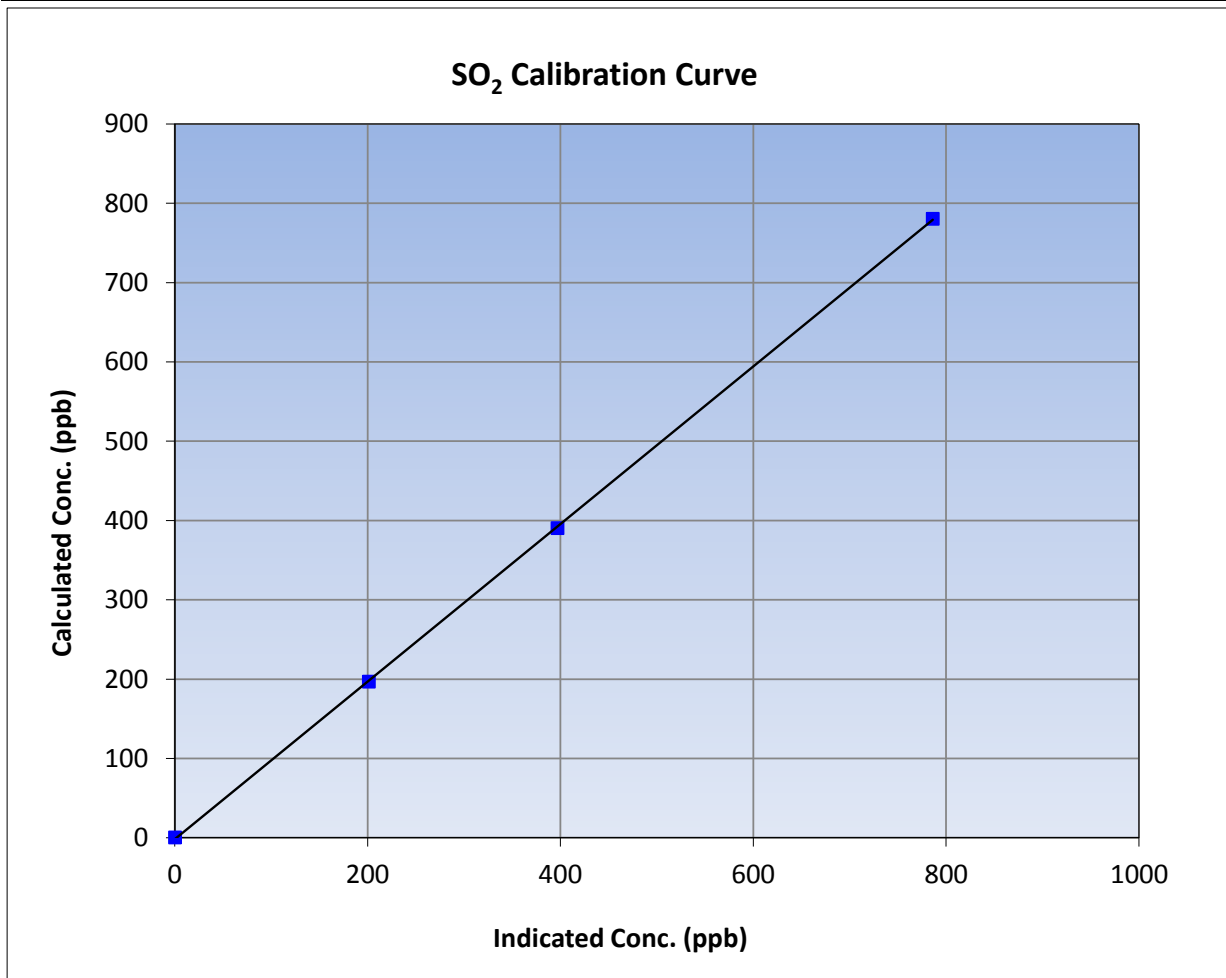
Version-03-2017

### Station Information

Calibration Date	October 11, 2017	Previous Calibration	September 26, 2017
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:00	End Time (MST)	13:24
Analyzer make	Thermo 43i	Analyzer serial #	1410661308

### Calibration Data

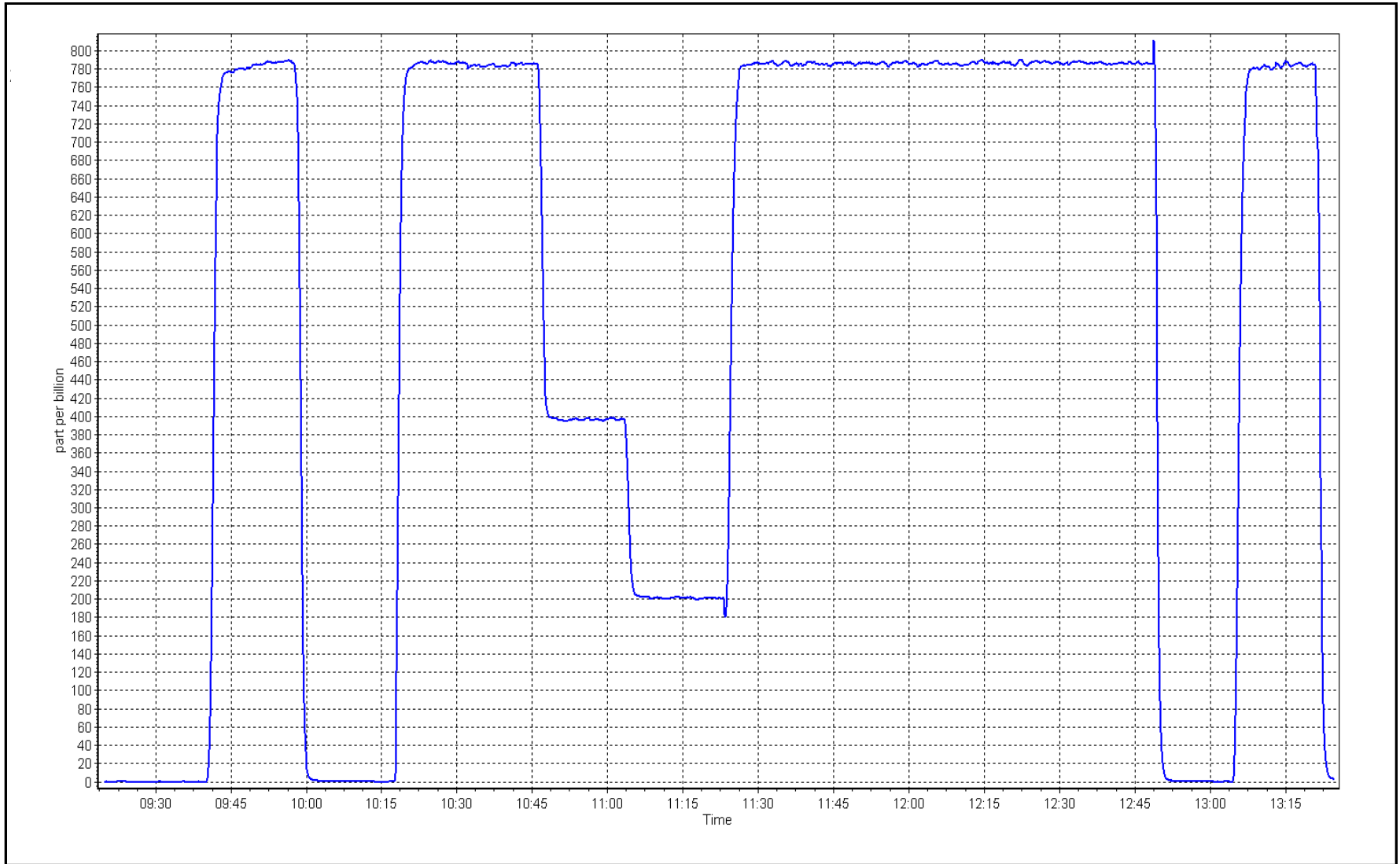
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits
0.0	0.0	----	Correlation Coefficient	≥0.995
780.2	785.8	0.9929		
390.1	396.7	0.9833	Slope	0.90 - 1.10
196.5	200.8	0.9786		
			Intercept	+/-30



SO2 Calibration Plot

Date: October 11, 2017

Location: Firebag





# Wood Buffalo Environmental Association

## H<sub>2</sub>S Calibration Report

Version-06-2017

### Station Information

Station Name:	Firebag	Station number:	AMS 19
Calibration Date:	October 12, 2017	Last Cal Date:	September 20, 2017
Start time (MST):	9:42	End time (MST):	12:36
Reason:	Routine		

### Calibration Standards

Cal Gas Concentration	<u>5.30</u>	ppm	Cal Gas Exp Date	February 13, 2018
Cal Gas Cylinder #	<u>LL77486</u>			
Calibrator Make/Model	API T700		Serial Number	996
ZAG Make/Model	API 701		Serial Number	201

### Analyzer Information

Analyzer make: Thermo 450i

Analyzer serial #: 815129098

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Analyzer Range	0 - 100 ppb		PMT voltage	-574	-574
Calculated slope	1.004726	0.999206	Lamp voltage	931	934
Calculated intercept	-0.440727	-0.221004	Pressure	531.0	544.9
Analyzer Background	14.2	14.2	Flow	0.943	0.949
Analyzer Coefficient	1.139	1.142	Intensity	85	85

### H<sub>2</sub>S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.1	----
as found span	4936	75.6	80.0	79.0	1.012
calibrator zero	5000	0.0	0.0	0.1	----
high point	4936	75.6	80.0	80.2	0.997
second point	4975	37.8	40.0	40.2	0.994
third point	4994	19.0	20.1	20.5	0.980
as left zero	5000	0.0	0.0	0.3	----
as left span	4936	75.6	80.0	79.5	1.006
SO2 Scrubber Check	4992	20.1	21.3	1.4	----
Average Correction Factor					0.990
Corrected As found	78.90	Previous response	80.02	*% change	1.4%

\* = > +/-5% change initiates investigation

#### Notes:

Changed inlet filter after as founds. Adjusted the span.

Calibration Performed By: Jayme Marcoux



# Wood Buffalo Environmental Association

## H<sub>2</sub>S Calibration Summary

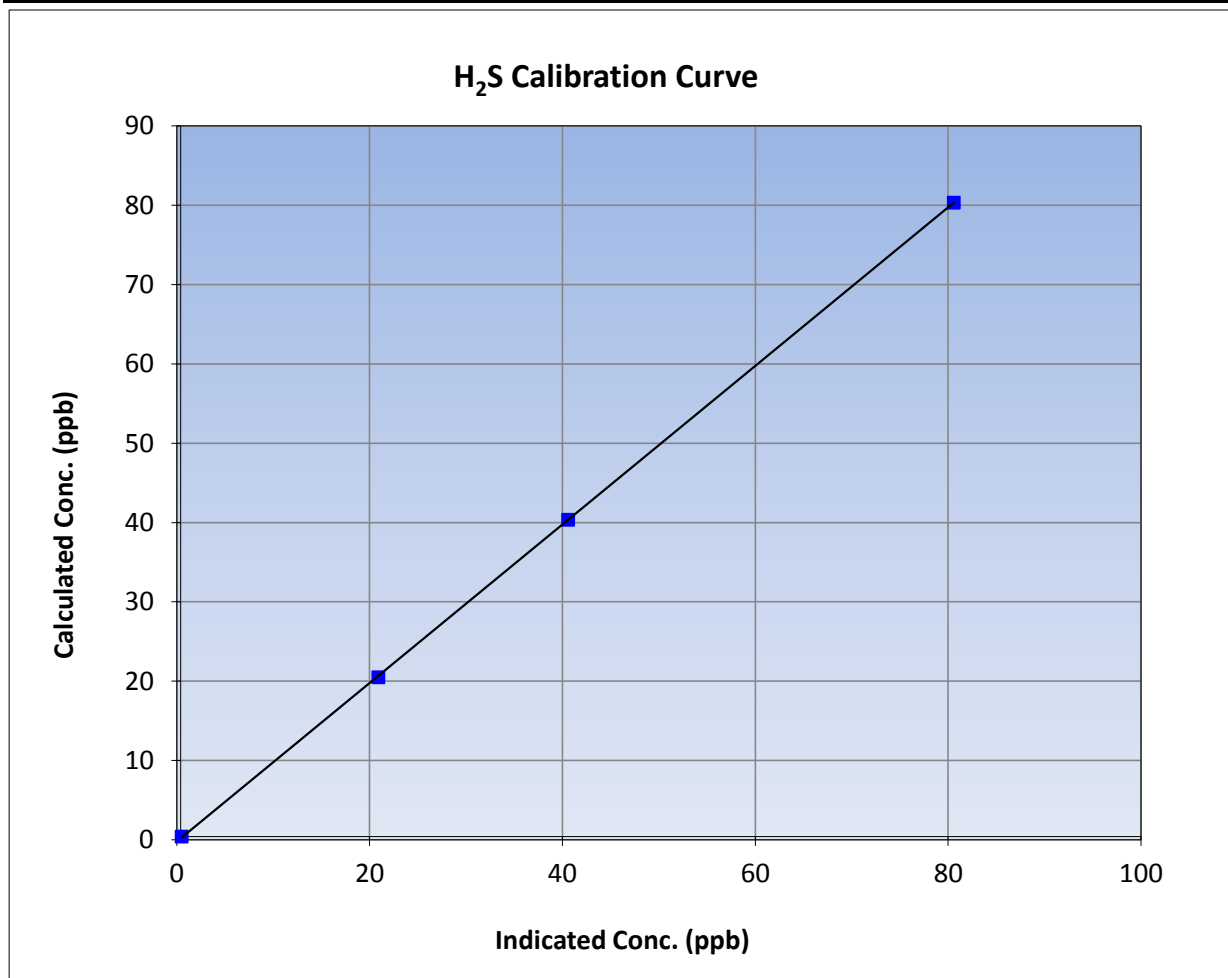
Version-03-2017

### Station Information

Calibration Date	October 12, 2017	Previous Calibration	September 20, 2017
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:42	End Time (MST)	12:36
Analyzer make	Thermo 450i	Analyzer serial #	815129098

### Calibration Data

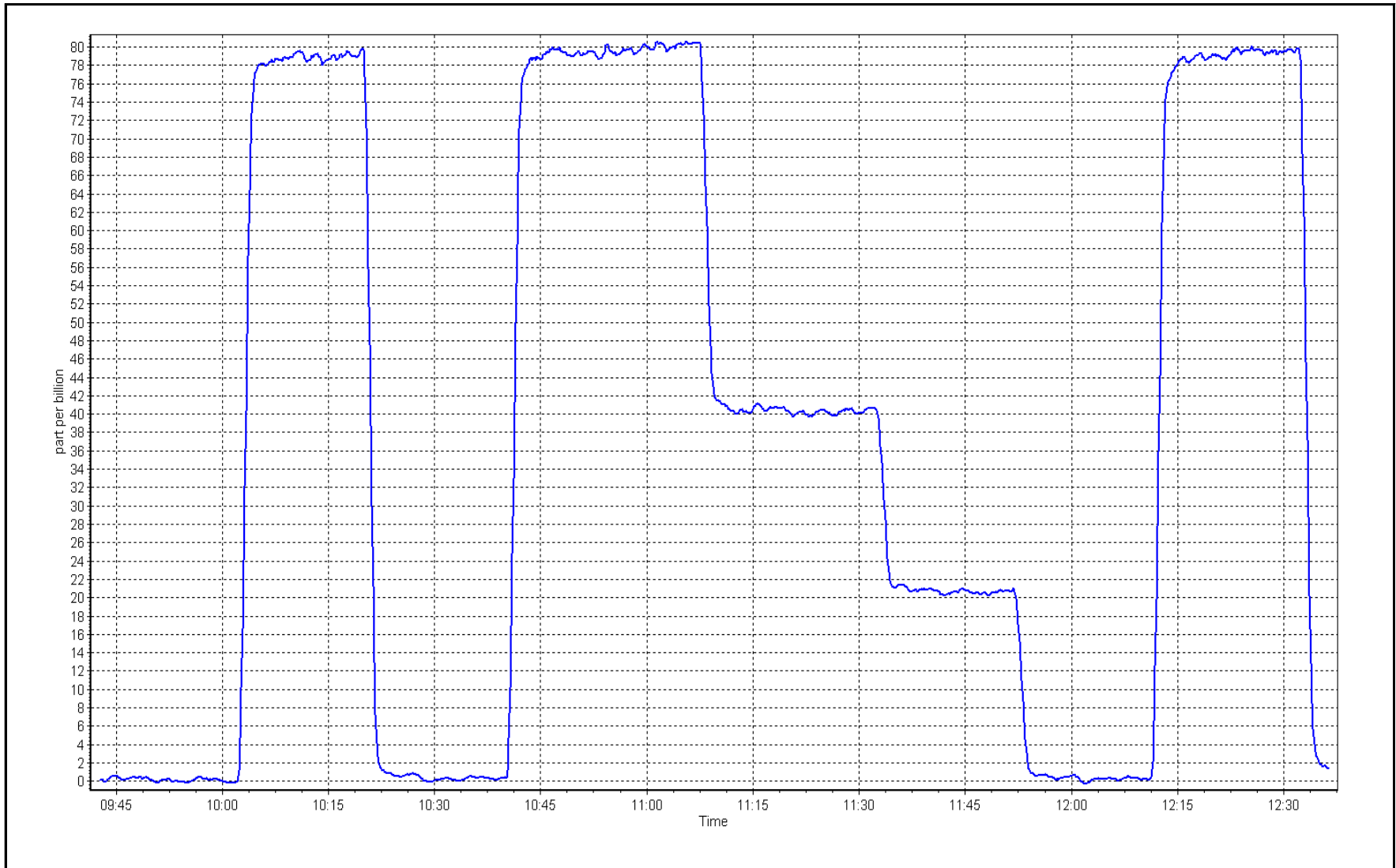
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.1	----	Correlation Coefficient	0.999987	≥0.995
80.0	80.2	0.9969			
40.0	40.2	0.9942	Slope	0.999206	0.90 - 1.10
20.1	20.5	0.9799			
			Intercept	-0.221004	+/-3



H<sub>2</sub>S Calibration Plot

Date: October 12, 2017

Location: Firebag





# Wood Buffalo Environmental Association

## THC Calibration Report

Version-03-2017

### Station Information

Station Name:	Firebag	Station number:	AMS 19
Calibration Date:	October 11, 2017	Last Cal Date:	September 26, 2017
Start time (MST):	9:19	End time (MST):	13:23
Reason:	Routine		

### Calibration Standards

Gas Cert Reference	EY0000652	Cal Gas Expiry Date	November 4, 2019
CH4 Cal Gas Conc.	<u>513.0</u> ppm	CH4 Equiv Conc.	1057.5 ppm
C3H8 Cal Gas Conc.	<u>198.0</u> ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	996
ZAG Make/Model	API 701	Serial Number	201

### Analyzer Information

Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1336160089
	<u>Start</u>	<u>Finish</u>	<u>Start</u>
Analyzer Range	0 - 25 ppm	Bias voltage supply	-305
Calculated slope	1.005277	Sample pressure	8.6
Calculated intercept	-0.083766	Fuel pressure	23.0
Analyzer Background	1.63	Air pressure	34.9
Analyzer Coefficient	3.632	Flame temperature	156.2
			<u>Finish</u>

### THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	4999	0.0	0.00	-0.06	----
as found span	4930	79.8	16.84	16.79	1.003
calibrator zero	4999	0.0	0.00	0.03	----
high point	4929	79.8	16.85	16.82	1.002
second point	4972	39.9	8.42	8.46	0.995
third point	4991	20.1	4.24	4.32	0.982
as left zero	4999	0.0	0.00	-0.04	----
as left span	4930	79.8	16.84	16.90	0.997
Average Correction Factor					0.993
Corrected As found	16.85	Previous response	16.84	*% change	0.0%

\* = > +/-5% change initiates investigation

Notes:

Changed inlet filter. Adjusted the zero.

Calibration Performed By: Jayme Marcoux





# Wood Buffalo Environmental Association

## THC Calibration Summary

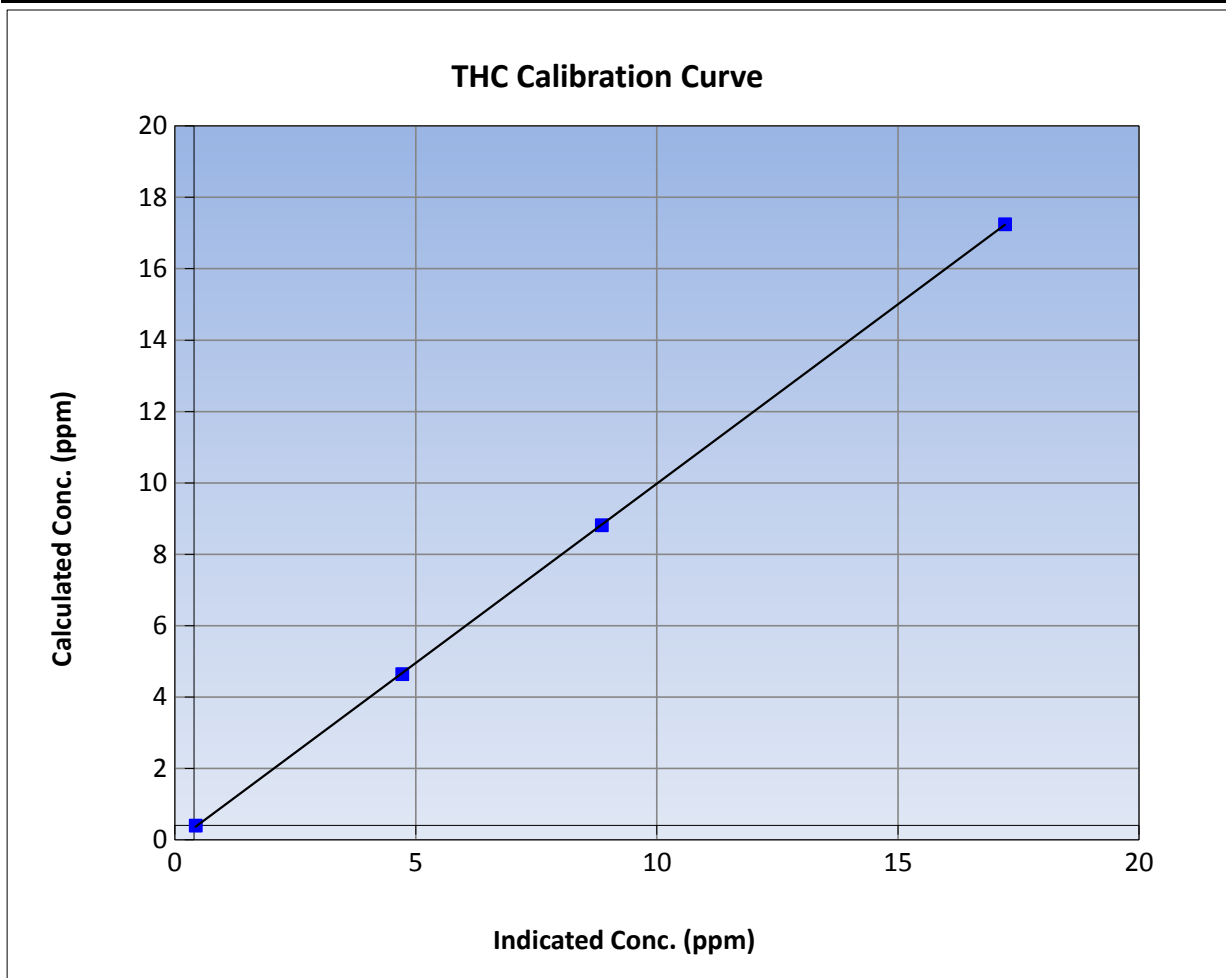
Version-03-2017

### Station Information

Calibration Date	October 11, 2017	Previous Calibration	September 26, 2017
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:19	End Time (MST)	13:23
Analyzer make	Thermo 51i-LT	Analyzer serial #	1336160089

### Calibration Data

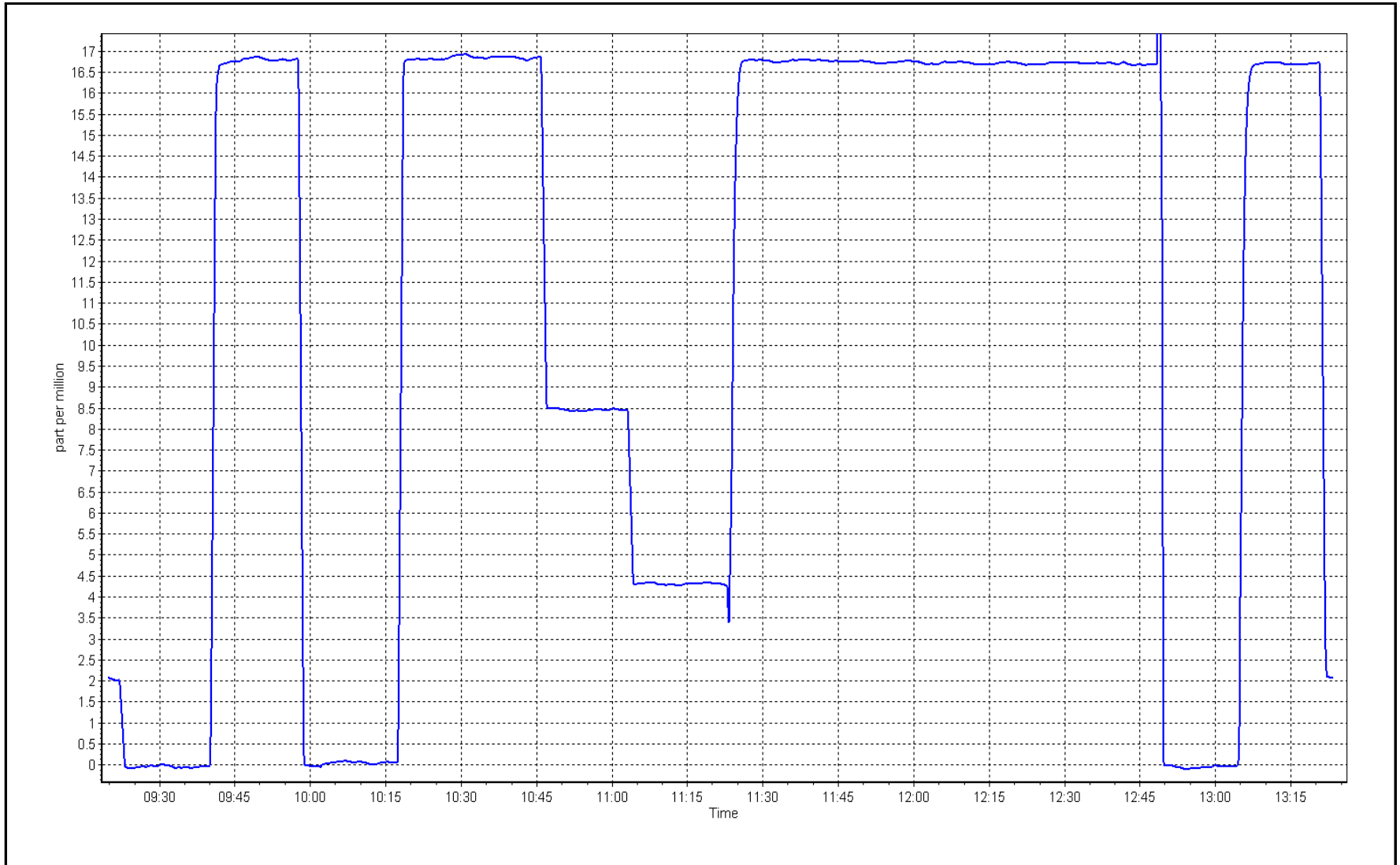
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (lc)	Correction factor (Cc/lc)	Statistical Evaluation	Limits	
0.0	0.0	----	Correlation Coefficient	0.999984	
16.8	16.8	1.0015			≥0.995
8.4	8.5	0.9952	Slope	1.004527	
4.2	4.3	0.9819			0.90 - 1.10
			Intercept	-0.065138	+/-1.5



THC Calibration Plot

Date: October 11, 2017

Location: Firebag





# Wood Buffalo Environmental Association

## NO<sub>x</sub> - NO - NO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Firebag	Station number:	AMS 19
Calibration Date:	October 11, 2017	Last Cal Date:	September 26, 2017
Start time (MST):	9:19	End time (MST):	13:24
Reason:	Routine		

### Calibration Standards

NO Gas Cylinder #	EY0000652	Cal Gas Expiry Date	November 4, 2019
NOX Cal Gas Conc.	<u>50.2</u> ppb	NO Cal Gas Conc.	<u>50.2</u> ppb
Calibrator Model	API T700	Serial Number	996
ZAG make/model	API T701H	Serial Number	201

### Analyzer Information

Analyzer make:	Thermo 42i	Analyzer serial #:	1410661309	
	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
NO coefficient	0.954	0.940	NOX Range (ppb)	0 - 1000 ppb
NOX coefficient	1.000	1.000	PMT Temperature	-2.7 -2.7
NO2 coefficient	1.000	1.000	Reaction cell Press	163.6 160.5
NO bkgrnd	4.1	4.0	Sample Flow	0.629 0.622
NOX bkgrnd	4.2	4.0	PMT Voltage	-780.7 -780.7

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope	1.000225	1.000408
NO <sub>x</sub> Cal Offset	-2.487909	-2.352210
NO Cal Slope	0.999693	0.999365
NO Cal Offset	-2.525292	-2.209723
NO <sub>2</sub> Cal Slope	0.978869	0.998982
NO <sub>2</sub> Cal Offset	2.417109	-0.333775



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

Version-03-2017

### Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	4999	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.1	----	----
as found span	4930	79.8	799.6	799.6	0.0	806.1	805.8	0.3	0.9920	0.9923
calibrator zero	4999	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	----	----
high point	4929	79.8	799.8	799.8	0.0	800.2	800.9	-0.7	0.9995	0.9986
second point	4971	39.9	399.7	399.7	0.0	404.3	404.6	-0.2	0.9887	0.9880
third point	4991	20.1	201.4	201.4	0.0	205.2	205.2	0.0	0.9813	0.9813
as left zero	4999	0.0	0.0	0.0	0.0	0.1	0.1	0.1	----	----
as left span	4929	79.8	799.8	373.9	425.9	790.1	367.1	422.9	1.0123	1.0185
<b>Average Correction Factor</b>									<b>0.9898</b>	<b>0.9893</b>

Corrected As found    NO<sub>x</sub> = 806.3 ppb  
 Previous Response    NO<sub>x</sub> = 801.9 ppb

NO = 805.9 ppb  
 NO = 802.4 ppb

\*Percent Change    NO<sub>x</sub> = -0.5%  
 \*Percent Change    NO = -0.4%  
 \* = > +/-5% change initiates investigation

### GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
1st NO ref point		0.0	799.4	798.3	1.1	1.0005	1.0019	----	----
1st NO2 (400 ppb O3)	373.9	424.4	498.9	373.9	425.0	<b>1.6031</b>	----	0.9986	100.1%
2nd NO2 (200 ppb O3)	583.7	214.6	799.0	583.7	215.3	1.0010	----	0.9967	100.3%
3rd NO2 (100 ppb O3)	688.3	110.0	799.0	688.3	110.8	1.0010	----	0.9928	100.7%
2nd NO ref point	----	0.0	798.6	797.7	0.9	1.0015	1.0026	----	----
<b>Average Correction Factor</b>						<b>1.1516</b>	<b>1.0022</b>	<b>0.9960</b>	<b>100.4%</b>

Notes:            Changed inlet filter, pump and scrubber after asfinds. New pump was not good, so reinstalled original pump. Adjusted the zero and the span.

Calibration Performed By:            Jayme Marcoux



# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

Version-03-2017

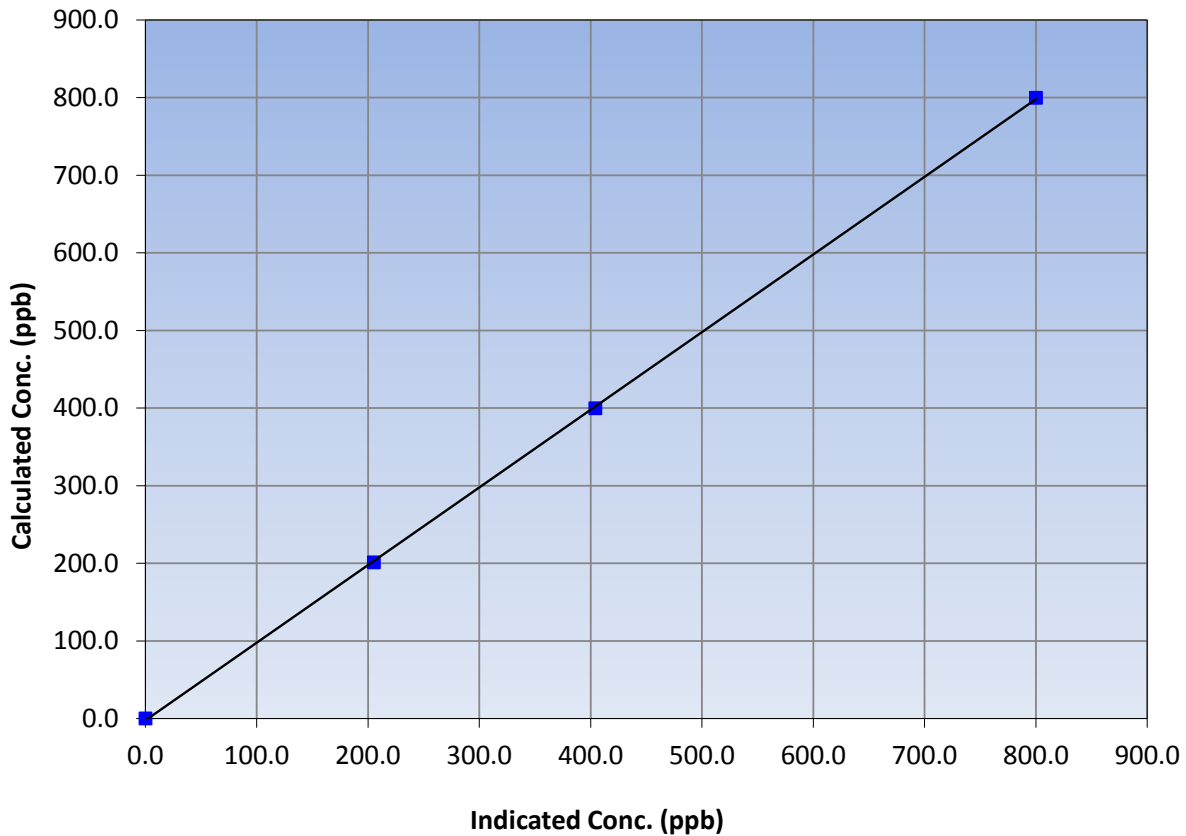
### Station Information

Calibration Date	October 11, 2017	Previous Calibration	September 26, 2017
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:19	End Time (MST)	13:24
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	0.0	----	Correlation Coefficient	≥0.995	
799.8	800.2	0.9995			
399.7	404.3	0.9887			
201.4	205.2	0.9813			
			Slope	1.000408	0.90 - 1.10
			Intercept	-2.352210	+/-20

NO<sub>x</sub> Calibration Curve





# Wood Buffalo Environmental Association

## NO Calibration Summary

Version-03-2017

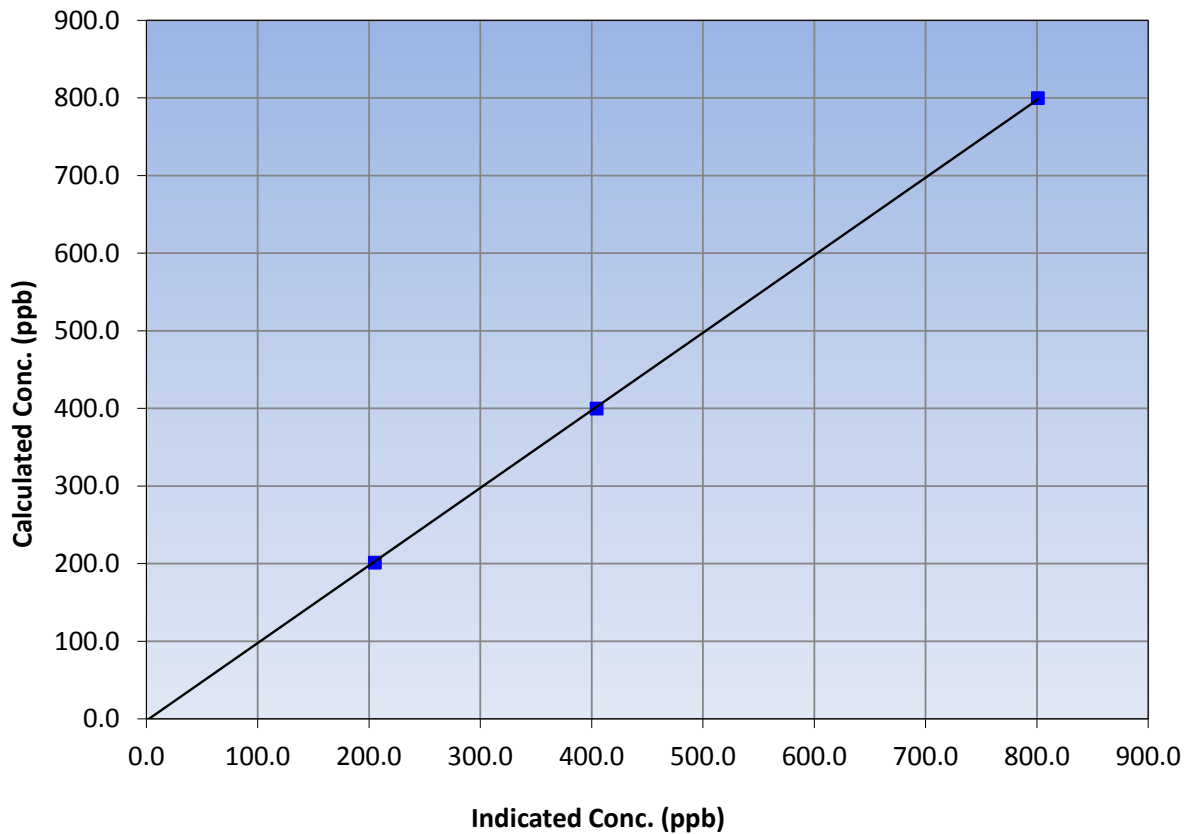
### Station Information

Calibration Date	October 11, 2017	Previous Calibration	September 26, 2017
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:19	End Time (MST)	13:24
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	-0.1	----	Correlation Coefficient	≥0.995	
799.8	800.9	0.9986			
399.7	404.6	0.9880			
201.4	205.2	0.9813			
			Slope	0.999365	0.90 - 1.10
			Intercept	-2.209723	+/-20

NO Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

Version-03-2017

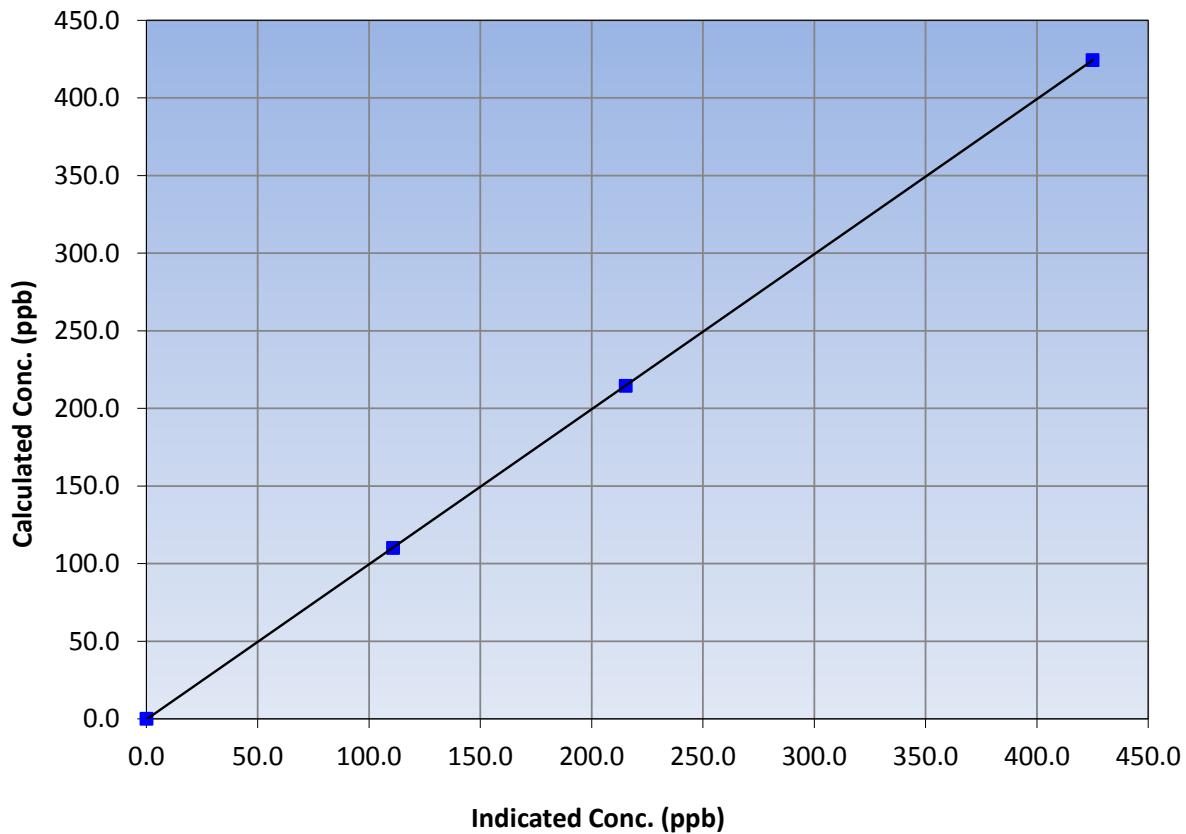
### Station Information

Calibration Date	October 11, 2017	Previous Calibration	September 26, 2017
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:19	End Time (MST)	13:24
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.0	----	Correlation Coefficient	≥0.995	
424.4	425.0	0.9986			
214.6	215.3	0.9967			
110.0	110.8	0.9928			
			Slope	0.998982	0.90 - 1.10
			Intercept	-0.333775	+/-20

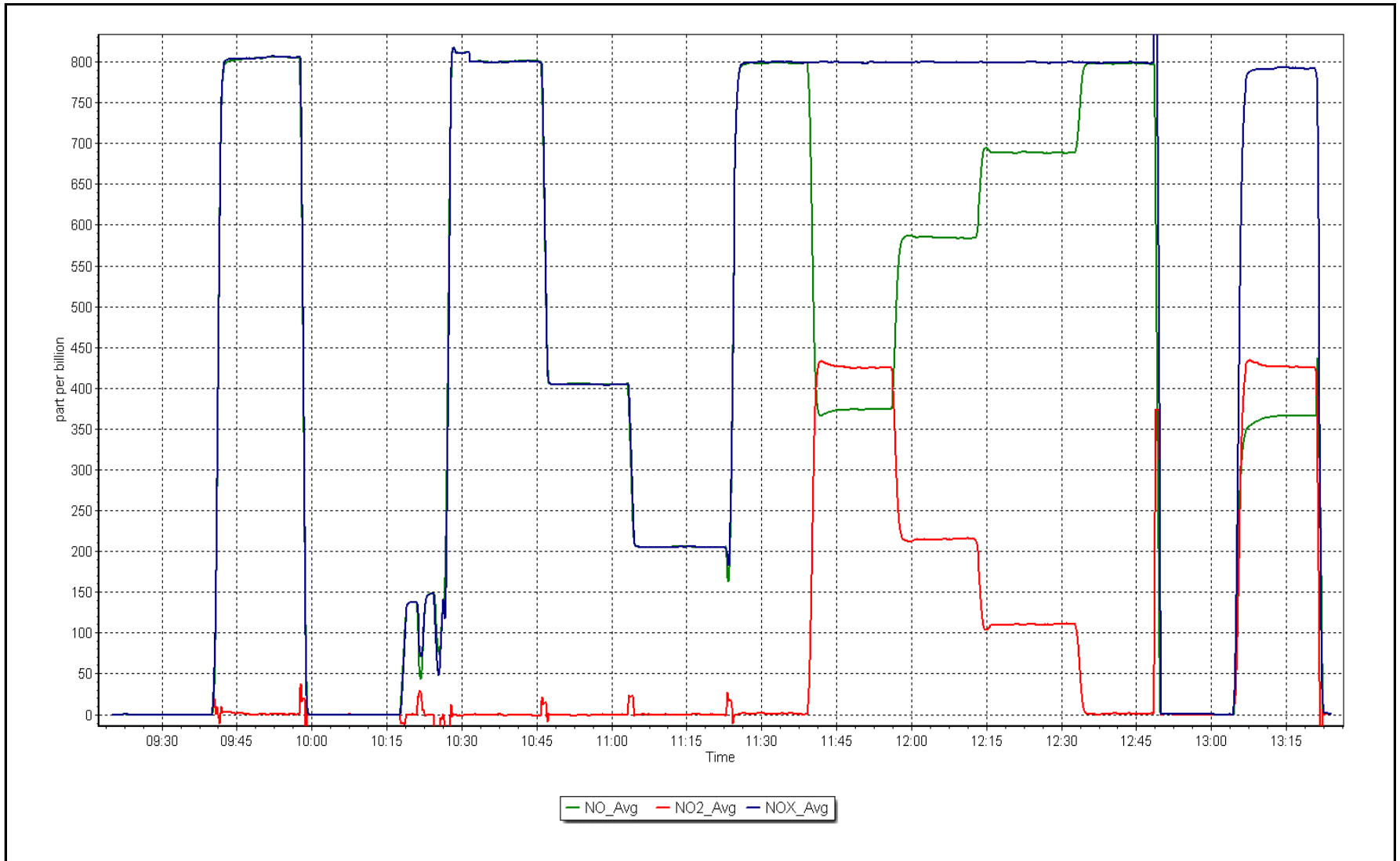
NO<sub>2</sub> Calibration Curve



NO<sub>x</sub> Calibration Plot

Date: October 11, 2017

Location: Firebag







## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

**CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT**

**AMS 20  
MACKAY RIVER  
OCTOBER 2017**

Operations, Data Collection,  
QA/QC, Data Validation and Reporting by:  
Wood Buffalo Environmental Association  
Fort McMurray, Alberta

November 29, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MACKAY RIVER (AMS 20)

OCTOBER 2017

MONTHLY SUMMARY for  
AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	706	37	38	99.87	8	0	3	0
H2S (ppb) Average	675	36	69	95.56	2	0	1	0
THC (ppm) Average	707	37	37	100	3.1	-	2.7	-
NO2 (ppb) Average	706	38	38	100	21	0	10	-
NO (ppb) Average	706	38	38	100	39	-	13	-
NOX (ppb) Average	706	38	38	100	60	-	23	-
Temperature 2 m (C) Average	744	0	0	100	22.4	-	13.3	-
Relative Humidity (%) Average	744	0	0	100	99	-	96	-
Precipitation (mm) Total	744	0	0	100	4.5	-	15.5	-
Wind Speed 10 m (km/h) Average	724	0	20	97.31	27	-	15	-
Wind Direction 10 m (deg) Average	724	0	20	97.31	-	-	-	-

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MACKAY RIVER (AMS 20)  
OCTOBER 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	706	0.5	1	-	0	0	0	0	0	1	8
H2S (ppb) Average	675	0.3	0	-	0	0	0	0	0	0	2
THC (ppm) Average	707	2.25	0.1	-	2.1	2.2	2.2	2.2	2.3	2.3	3.1
NO2 (ppb) Average	706	1.2	2	-	0	0	0	1	1	3	21
NO (ppb) Average	706	0.6	3	-	0	0	0	0	0	0	39
NOX (ppb) Average	706	1.8	6	-	0	0	0	1	1	3	60
Temperature 2 m (C) Average	744	2.06	4.9	-	-9.4	-2.9	-1.5	0.9	4.9	8.8	22.4
Relative Humidity (%) Average	744	77.9	16	-	26	51	69	82	91	96	99
Precipitation (mm) Total	744	-	-	58.61	-	-	-	-	-	-	-
Wind Speed 10 m (km/h) Average	724	8.4	4	-	0	3	5	8	11	15	27
Wind Direction 10 m (deg) Average	724	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -MACKAY RIVER (AMS 20)  
OCTOBER 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S, SO2	10 Oct 2017 14:00	10 Oct 2017 14:00	1	Station power failure
H2S	05 Oct 2017 04:00	05 Oct 2017 04:00	1	Unstable operation - excessive baseline drift
H2S	09 Oct 2017 04:00	09 Oct 2017 04:00	1	Unstable operation - excessive baseline drift
H2S	10 Oct 2017 15:00	11 Oct 2017 15:00	25	Flat line in sensor output signal
H2S	21 Oct 2017 00:00	21 Oct 2017 00:00	1	Unstable operation - excessive baseline drift
H2S	23 Oct 2017 10:00	23 Oct 2017 11:00	2	Unstable operation - excessive baseline drift
H2S	24 Oct 2017 23:00	24 Oct 2017 23:00	1	Unstable operation - excessive baseline drift
H2S	30 Oct 2017 20:00	30 Oct 2017 20:00	1	Unstable operation - excessive baseline drift
Wind Speed, Wind Direction	10 Oct 2017 08:00	10 Oct 2017 08:00	1	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	11 Oct 2017 00:00	11 Oct 2017 12:00	13	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	21 Oct 2017 04:00	21 Oct 2017 09:00	6	Flat line in sensor output signal - sensor frozen



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**

**Mackay River - October 2017**

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 8 ppb on Oct 24 15:00	Maximum Daily Average: 3.0 ppb on Oct 28		Hours of Data:	706
Minimum Value: 0 ppb on Oct 2 04:00	Minimum Daily Average: 0.0 ppb on Oct 3		Hours of Missing Data:	38
Maximum Diurnal Average: 1.1 ppb at hour 14	Minimum Diurnal Average: 0.2 ppb at hour 5		Hours of Calibration:	37
Monthly Average: 0.5 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 7		Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	1	0	0	Z	0	1	1	2	4	3	5	4	4	3	0	0	0	0	0	0	0	0	0	0	1.3	5
2-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
4-Oct	Z	0	0	0	0	0	0	0	1	2	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
5-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
6-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.1	1
7-Oct	0	0	0	Z	0	1	0	1	1	1	1	0	0	5	3	2	0	0	0	0	0	0	1	7	1.1	7
8-Oct	8	8	5	5	Z	4	3	6	5	5	4	4	1	6	3	0	0	1	0	0	0	0	0	0	2.9	8
9-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0.2	2
10-Oct	Z	0	0	0	0	0	0	0	0	3	3	0	0	PF	0	0	0	0	0	1	0	0	0	0	0.3	3
11-Oct	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.1	0
12-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	1	2	0	1	1	2	1	1	0	0.5	2
13-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
14-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1	0	0	0.5	6
15-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
16-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
17-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	0	0.3	2
18-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.1	1
19-Oct	0	0	0	Z	0	0	0	0	0	0	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
20-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1
21-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
22-Oct	Z	0	0	0	0	0	0	0	0	0	1	2	3	2	2	3	4	4	3	2	1	0	0	0	1.1	4
23-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
24-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	4	5	8	7	3	2	1	1	0	0	1	1	1.5	8
25-Oct	1	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.5	1
26-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
27-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
28-Oct	Z	0	0	0	0	0	0	0	0	0	0	1	6	6	5	4	8	7	7	2	6	7	6	2	3.0	8
29-Oct	2	Z	1	2	2	1	2	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.6	2
30-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
31-Oct	0	0	1	Z	1	1	1	0	0	0	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0.5	1

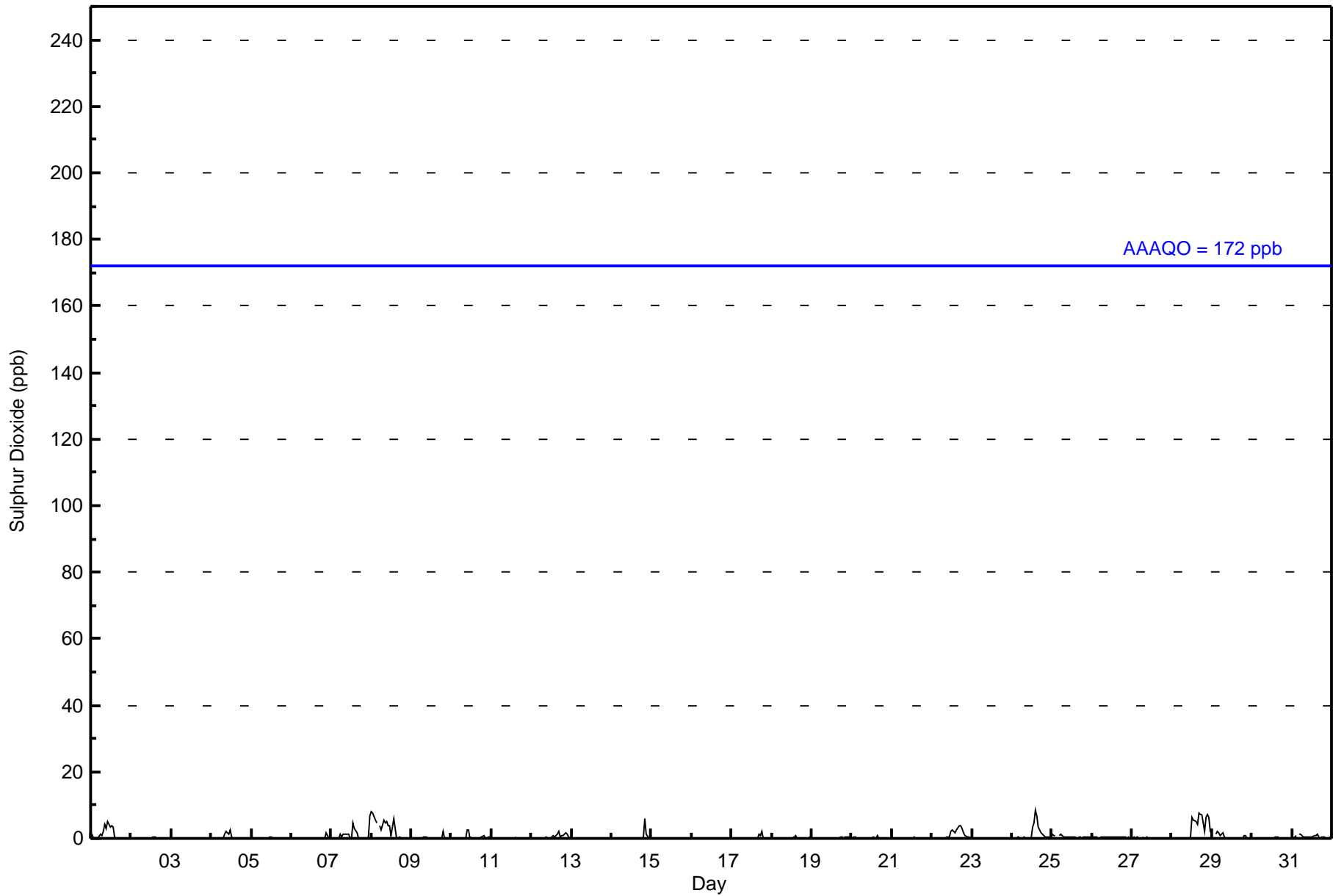
0.6	0.4	0.4	0.4	0.2	0.4	0.3	0.4	0.5	0.6	0.6	0.5	0.7	1.1	0.9	0.7	0.7	0.6	0.6	0.4	0.6	0.5	0.4	0.4	Diurnal Average
8	8	5	5	2	4	3	6	5	5	5	4	6	6	8	7	8	7	7	2	6	7	6	7	Diurnal Maximum

Z - zerospan      C - Calibration      PF - Power Failure  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb    24-hr 48 ppb



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Mackay River - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Mackay River - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	706	100.00	100.00
11 - 20	0	0.00	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Mackay River - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	27	24	12	8	6	28	18	27	65	87	58	62	60	66	94	48	690
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	27	24	12	8	6	28	18	27	65	87	58	62	60	66	94	48	690

Total Number of Valid Hours: 690

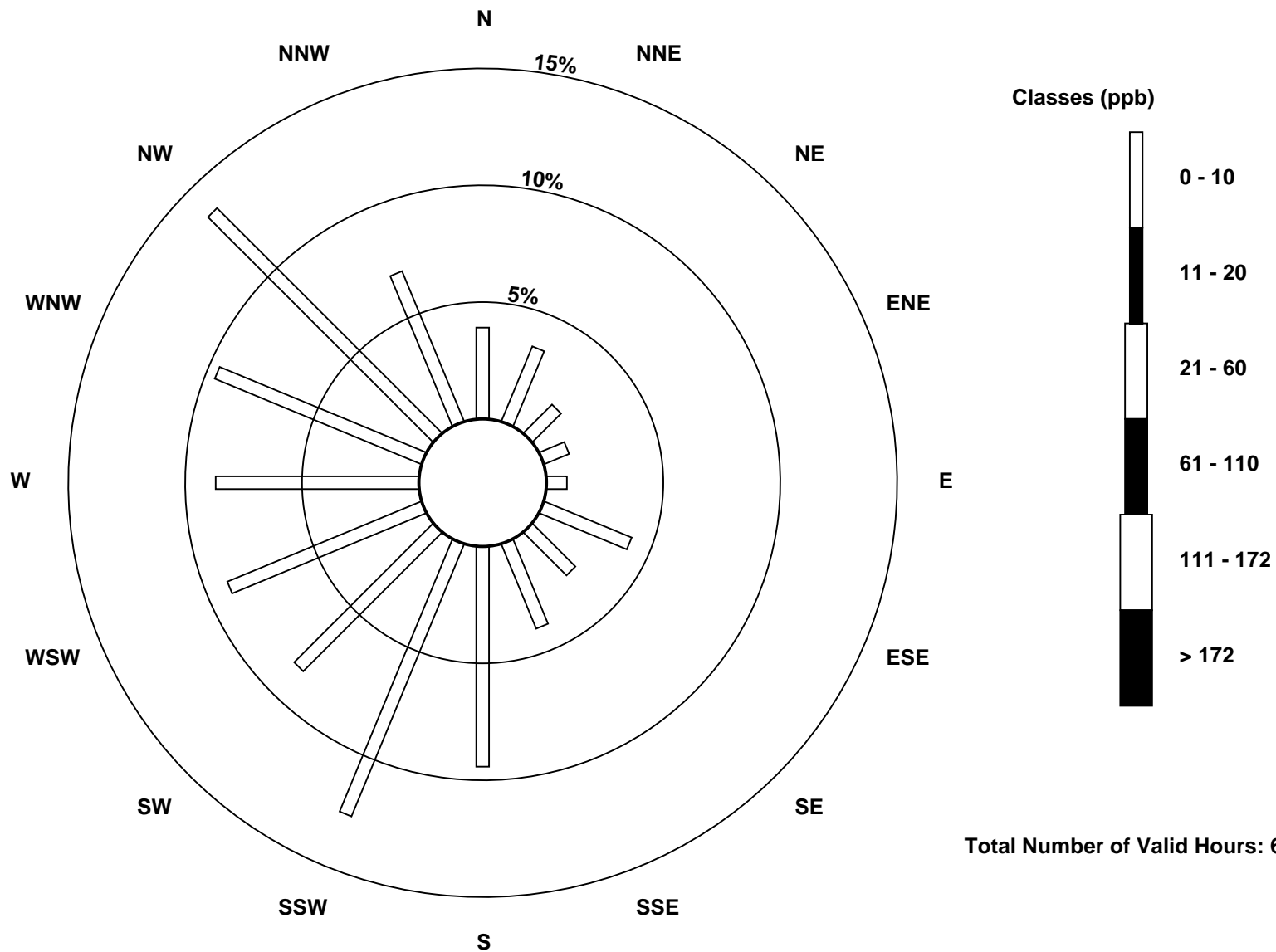
Total Number of Hours: 744



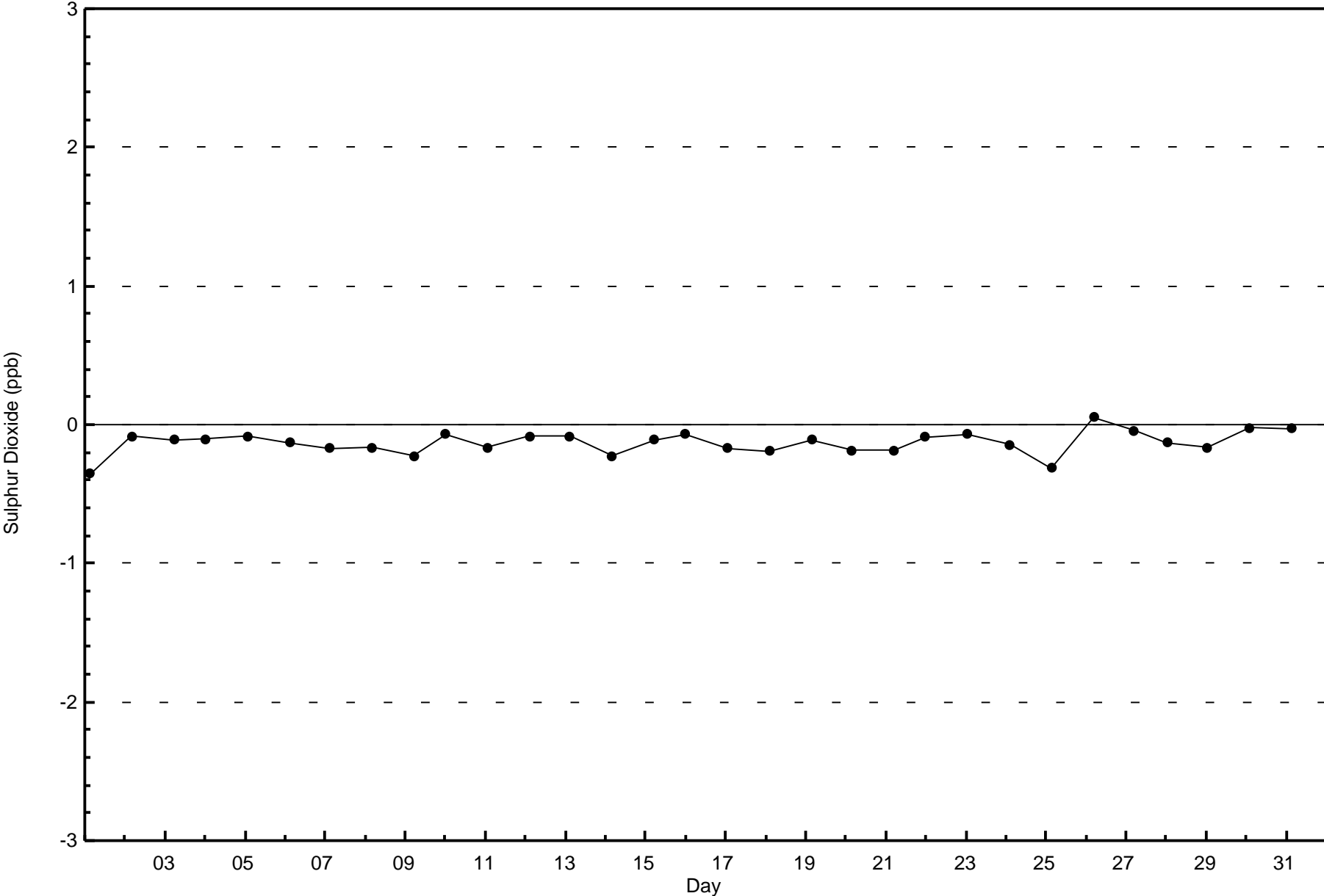


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Mackay River (AMS 20)



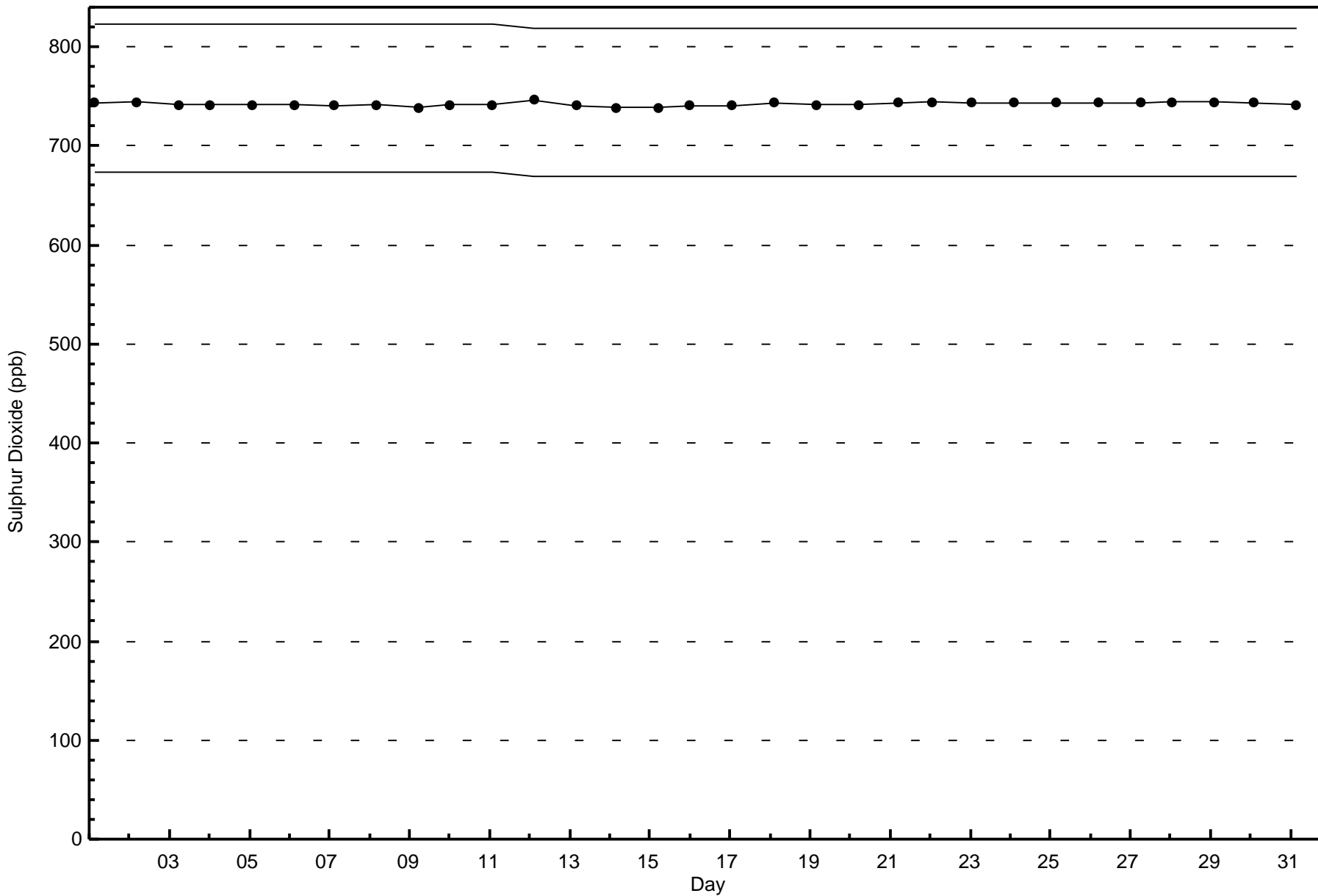
Total Number of Valid Hours: 690





**Wood Buffalo Environmental Association**  
**Span Responses**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Mackay River - October 2017**





Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H<sub>2</sub>S) - ppb

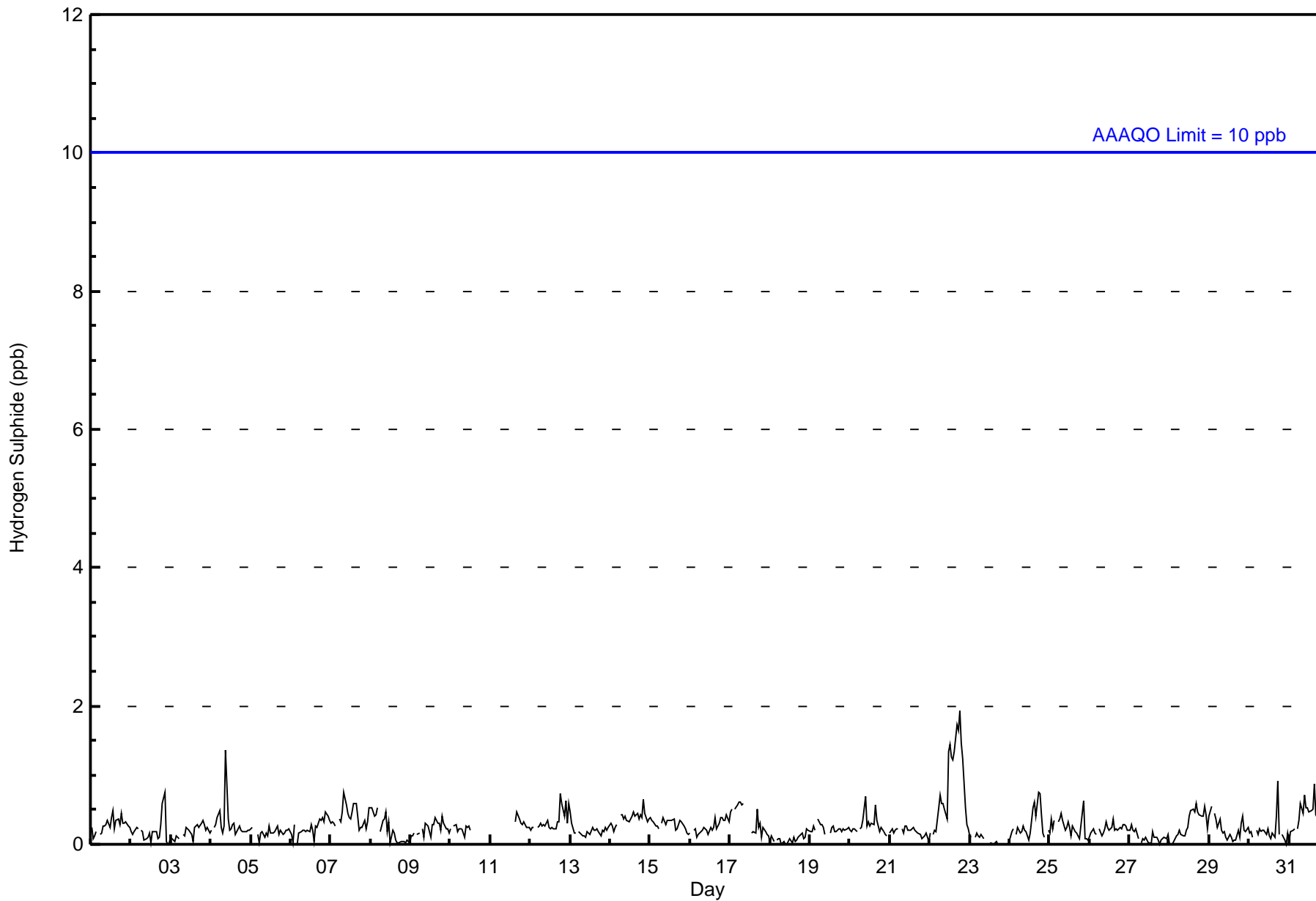
Mackay River - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744										Daily Average		Daily Maximum				
Maximum Value: 2 ppb on Oct 22 19:00										Maximum Daily Average: 0.9 ppb on Oct 22										Hours of Data: 675						
Minimum Value: 0 ppb on Oct 2 23:00										Minimum Daily Average: 0.0 ppb on Oct 23										Hours of Missing Data: 69						
Maximum Diurnal Average: 0.3 ppb at hour 18										Minimum Diurnal Average: 0.2 ppb at hour 3										Hours of Calibration: 36						
Monthly Average: 0.3 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 1										Percent Operational Time: 95.6						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.2	1
3-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-Oct	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
5-Oct	0	0	Z	UO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
6-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
7-Oct	0	0	0	0	Z	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0.4	1
8-Oct	1	1	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
9-Oct	0	0	0	UO	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
10-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	PF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	0
11-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0	0	0	0	0	0	0	0	0	--	0
12-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1	0.3	1
13-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
14-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.4	1
15-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
16-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
17-Oct	0	1	Z	1	1	1	1	1	1	C	C	C	C	0	0	0	1	0	0	0	0	0	0	0	0.4	1
18-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
19-Oct	0	0	0	0	Z	0	0	0	0	0	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
20-Oct	0	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	UO	0.3	1
21-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
22-Oct	0	Z	0	0	0	1	1	1	1	1	0	1	1	1	1	1	2	2	2	1	1	1	1	0	0.9	2
23-Oct	0	0	Z	0	0	0	0	0	0	UO	UO	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
24-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	UO	0	0.3	1
25-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.2	1
26-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
27-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
28-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0.3	1
29-Oct	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
30-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	UO	0	0	0	0	0.2	1
31-Oct	0	0	0	0	Z	0	0	1	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0.4	1
0.2 0.2 0.2 0.2 0.2 0.2 0.3 0.3 0.3 0.3 0.2 0.3 0.2 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.2 0.2 0.2																								Diurnal Average		
1 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 2 2 1 1 1 0 1																								Diurnal Maximum		
Z - zerospan C - Calibration AF - Analyzer Failure UO - Unstable Operation PF - Power Failure																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Mackay River - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Mackay River - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	675	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 675

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Mackay River - October 2017**

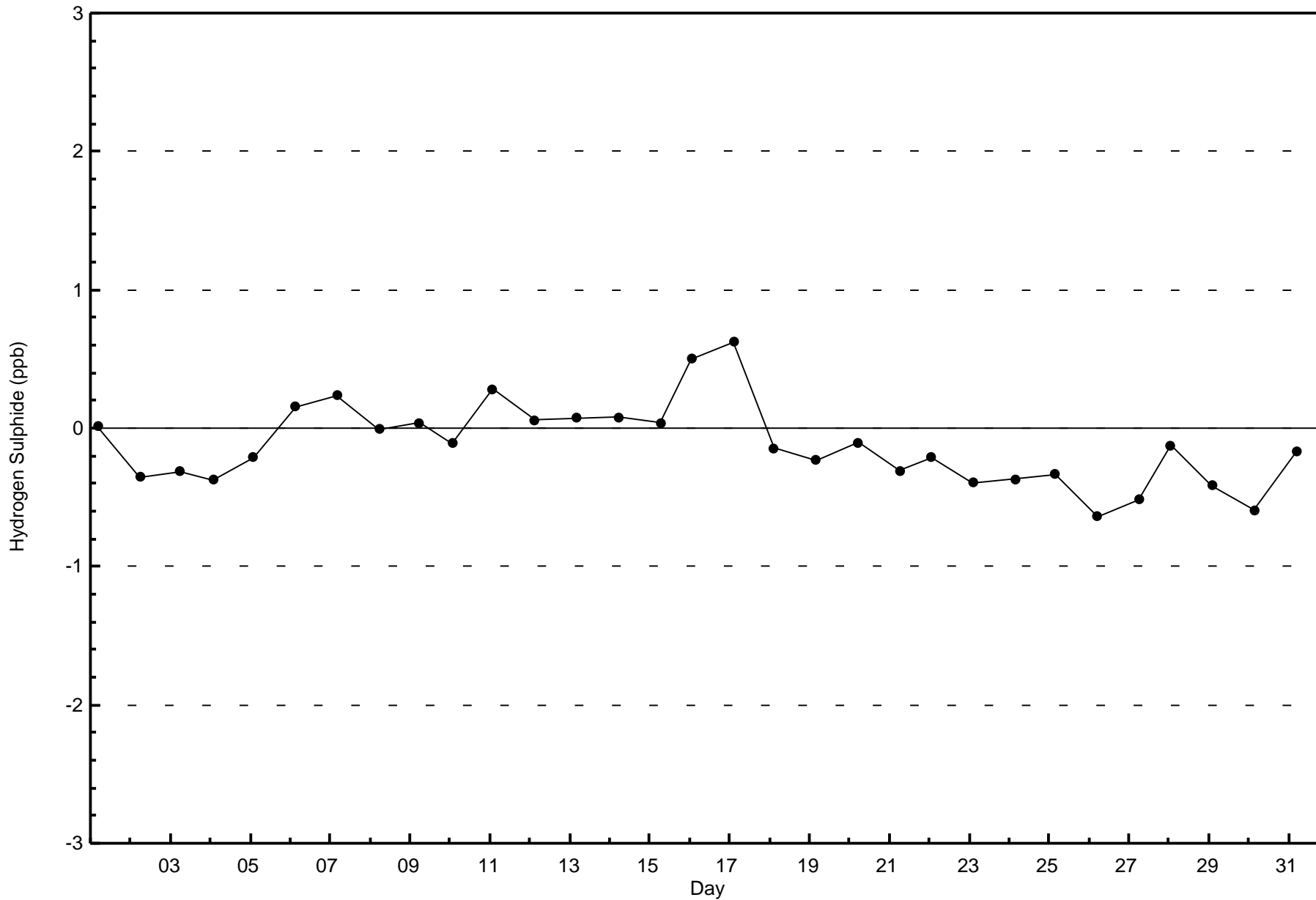
<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	26	16	10	7	4	27	19	26	65	84	60	61	58	64	96	46	669
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	26	16	10	7	4	27	19	26	65	84	60	61	58	64	96	46	669

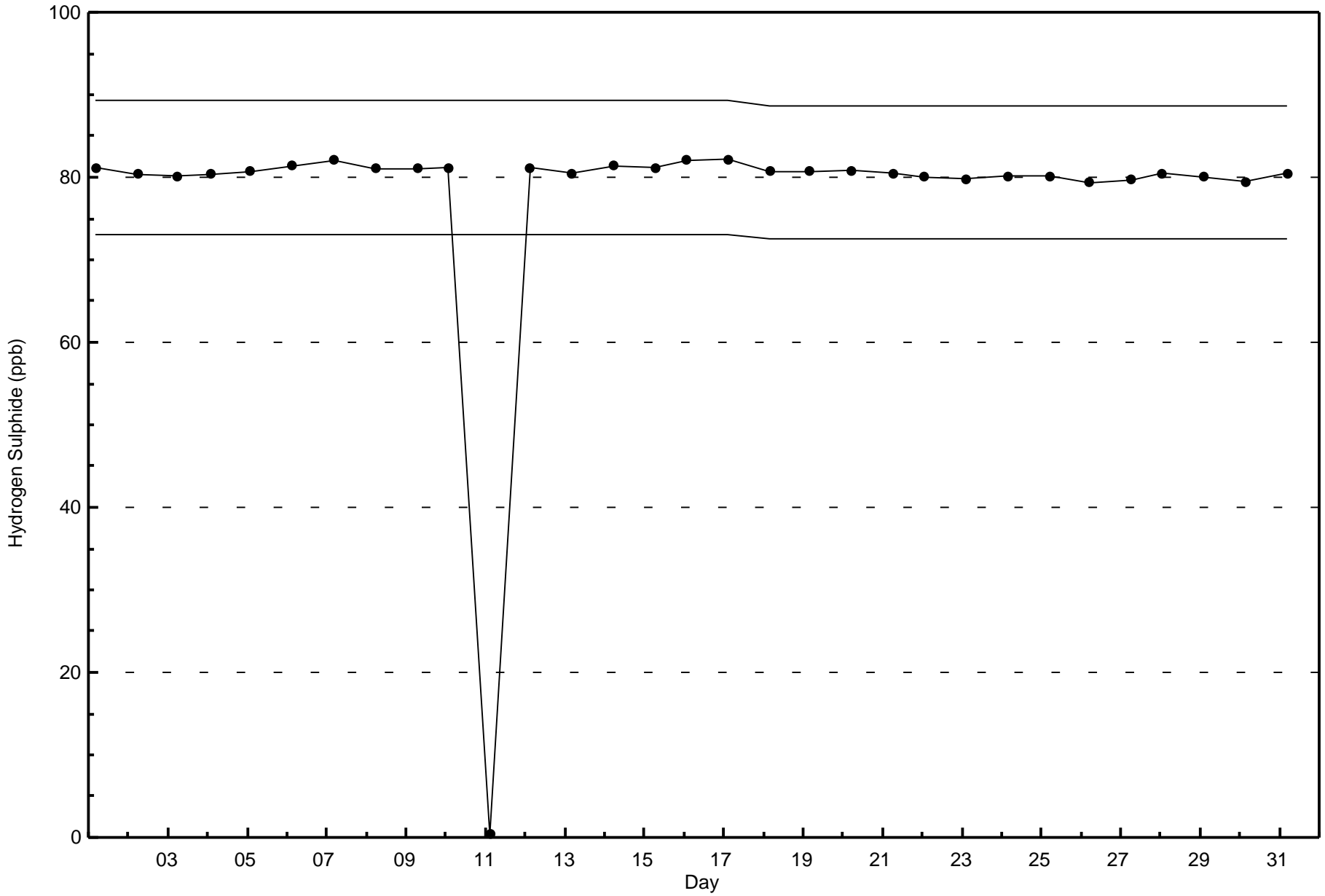
Total Number of Valid Hours: 669

Total Number of Hours: 744







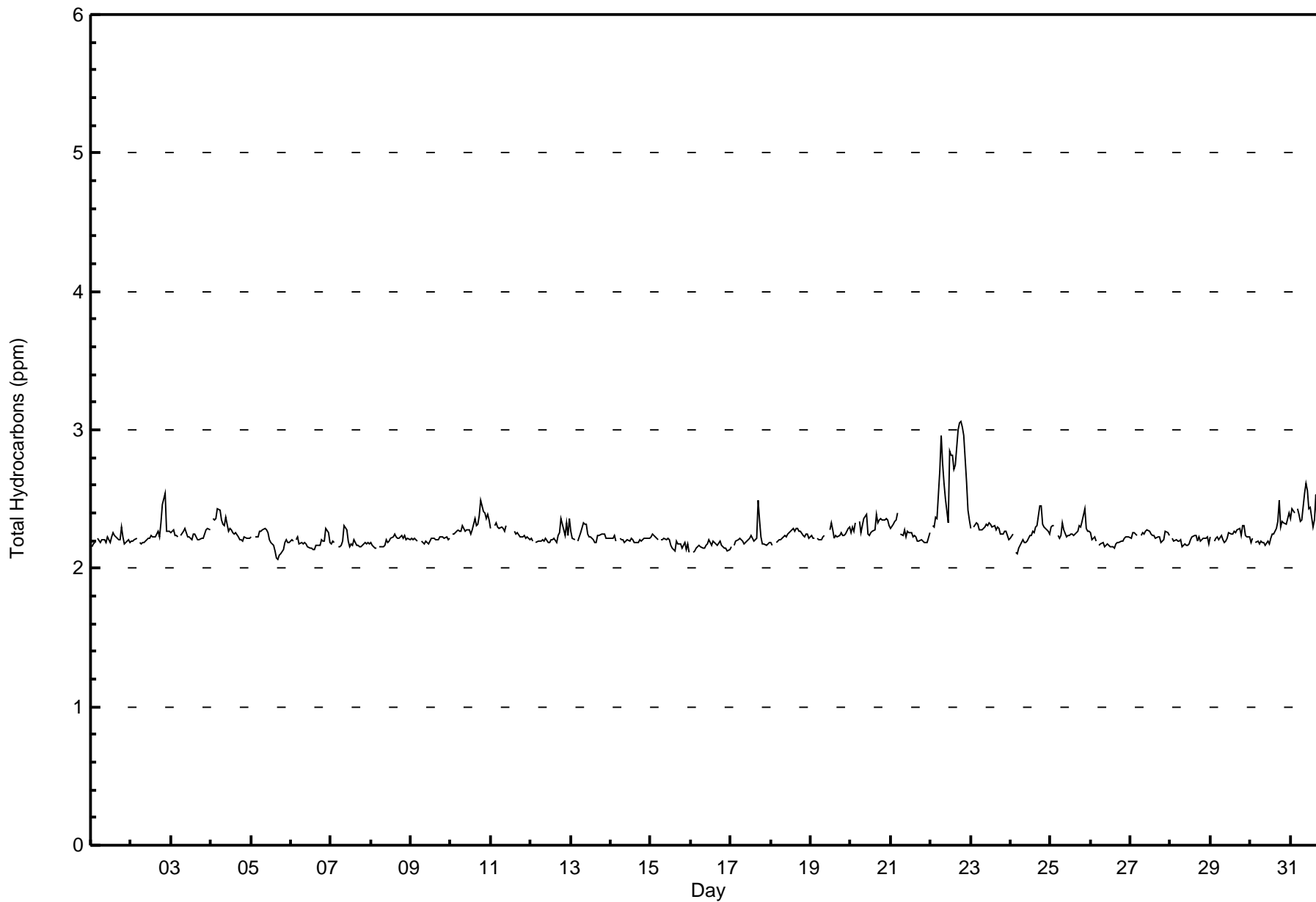






**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Mackay River - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm  
Mackay River - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	0	0.00	0.00
2.1 - 3.0	706	99.86	99.86
3.1 - 10.0	1	0.14	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm  
Mackay River - October 2017**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	27	24	12	8	6	28	18	27	64	88	58	61	60	66	95	48	690
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	27	24	12	8	6	28	18	27	64	88	58	62	60	66	95	48	691

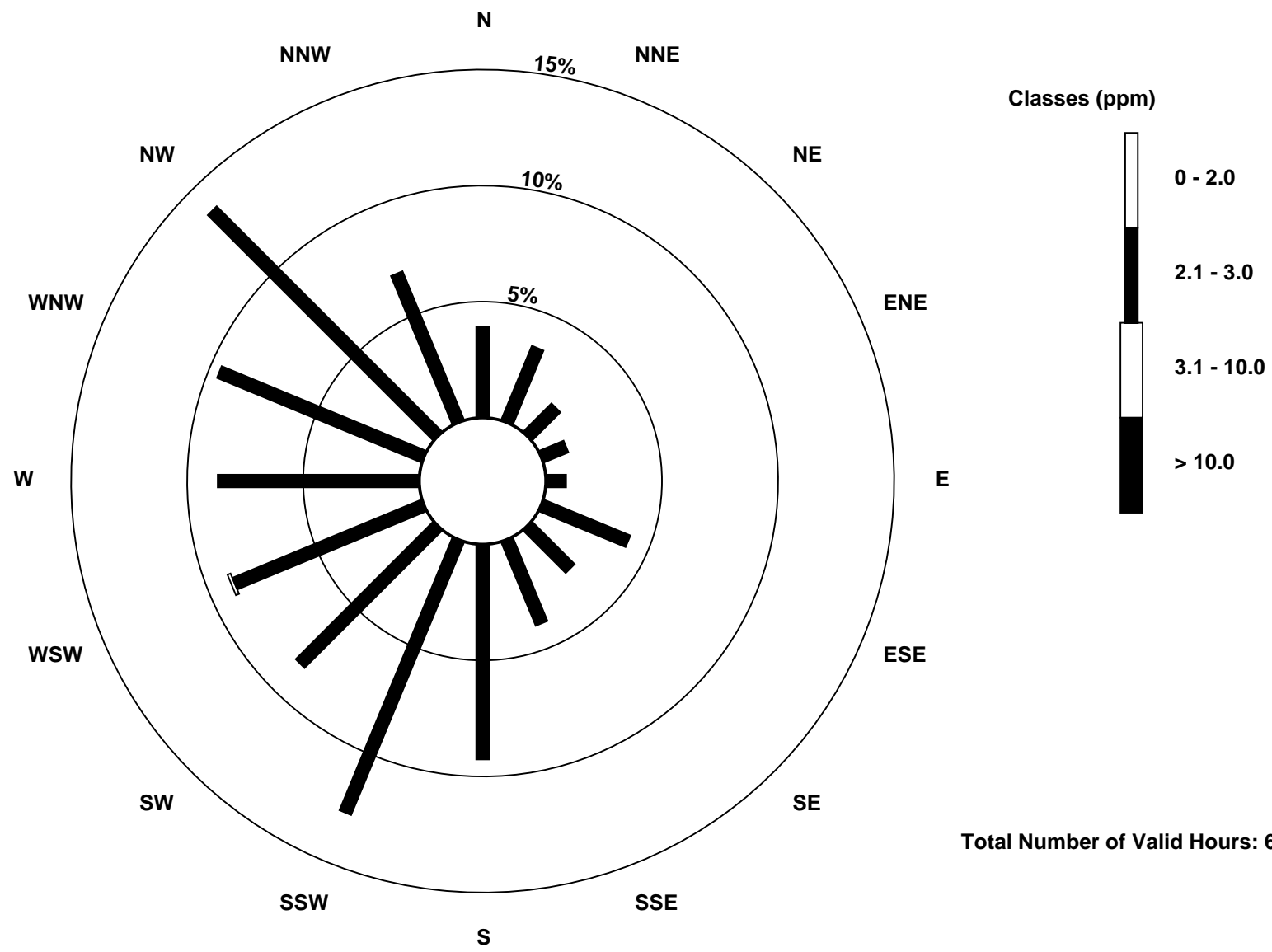
Total Number of Valid Hours: 691

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

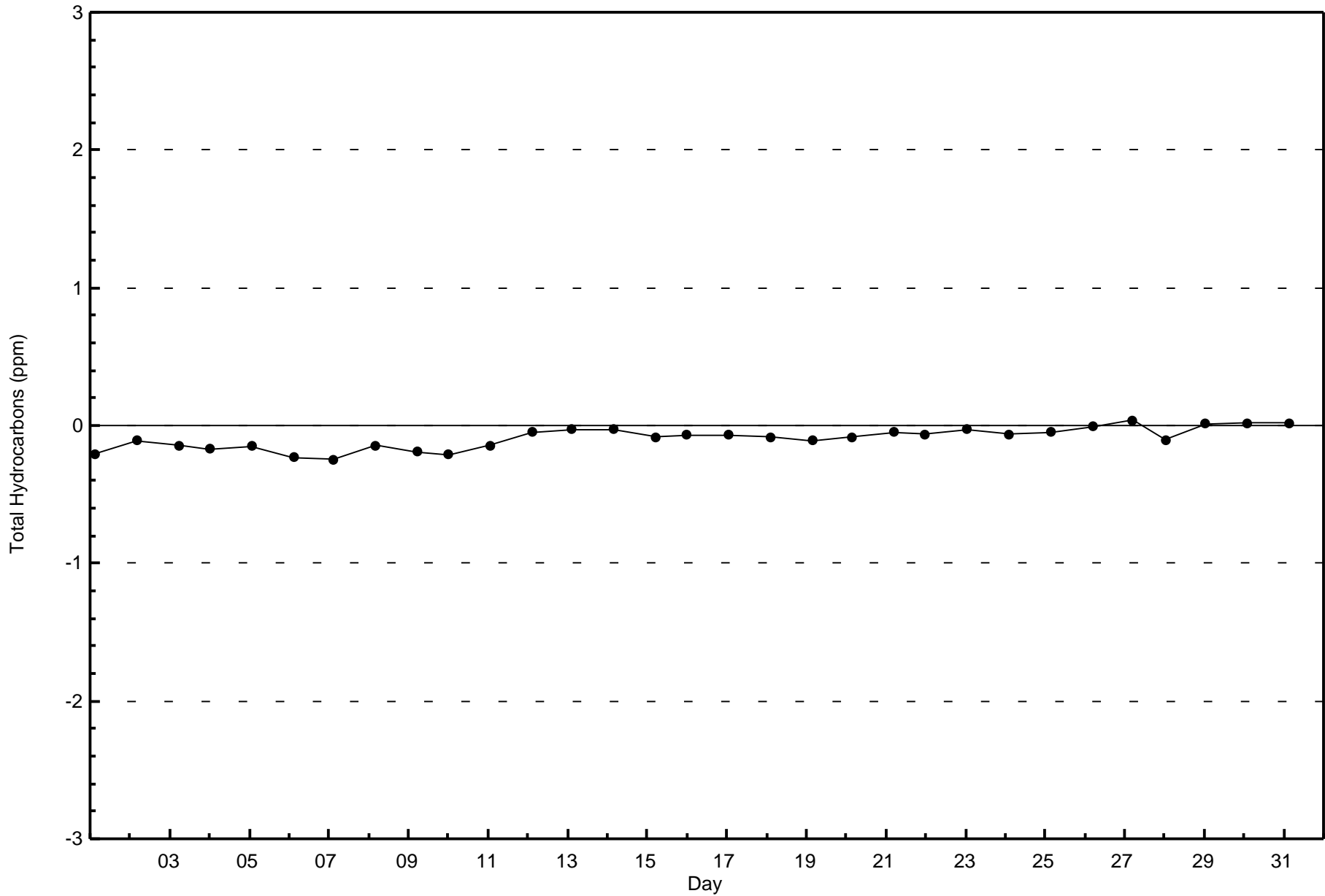
Total Hydrocarbons (THC) - ppm  
Mackay River (AMS 20)



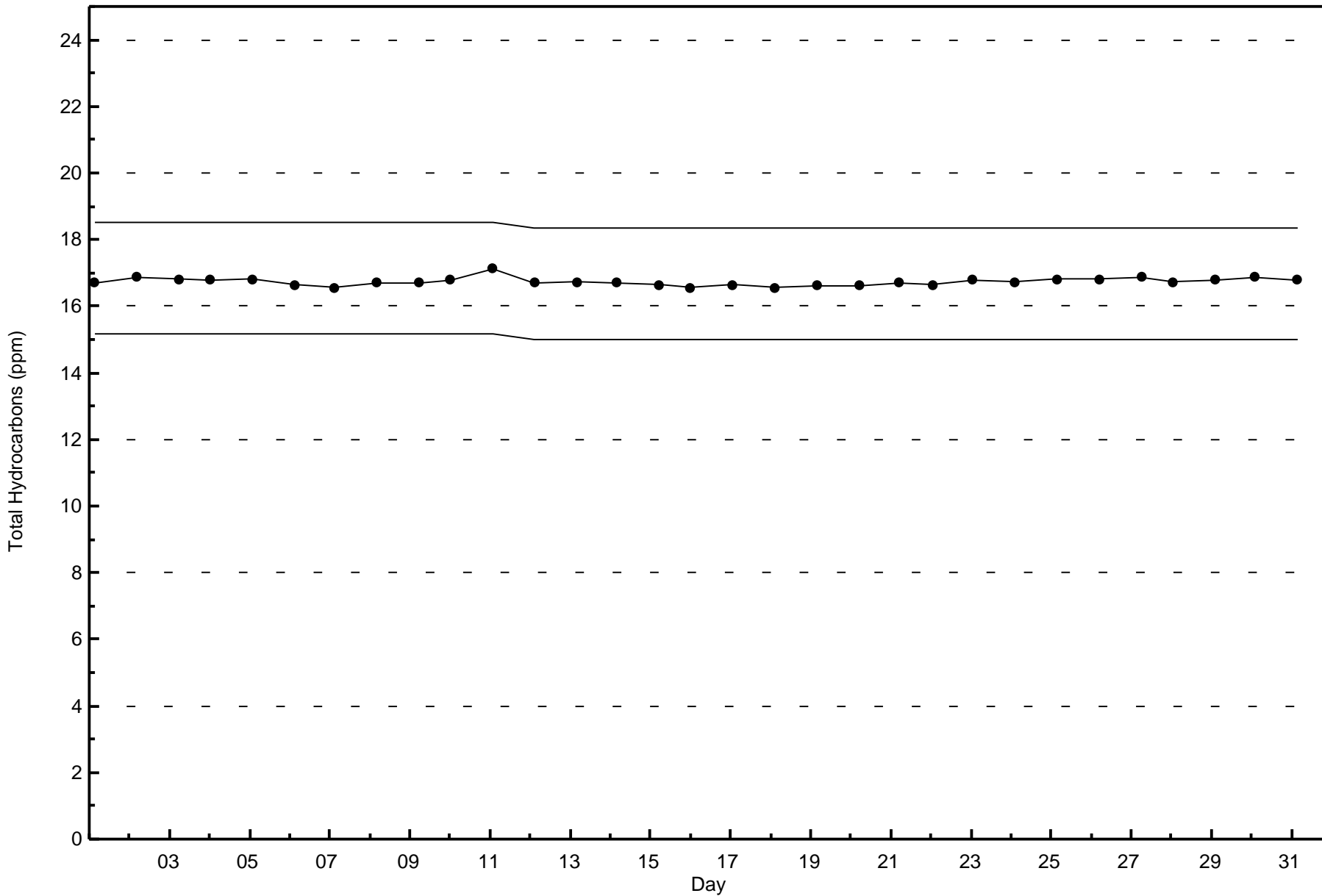


Wood Buffalo Environmental Association  
Zero Responses

Total Hydrocarbons (THC) - ppm  
Mackay River - October 2017









**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

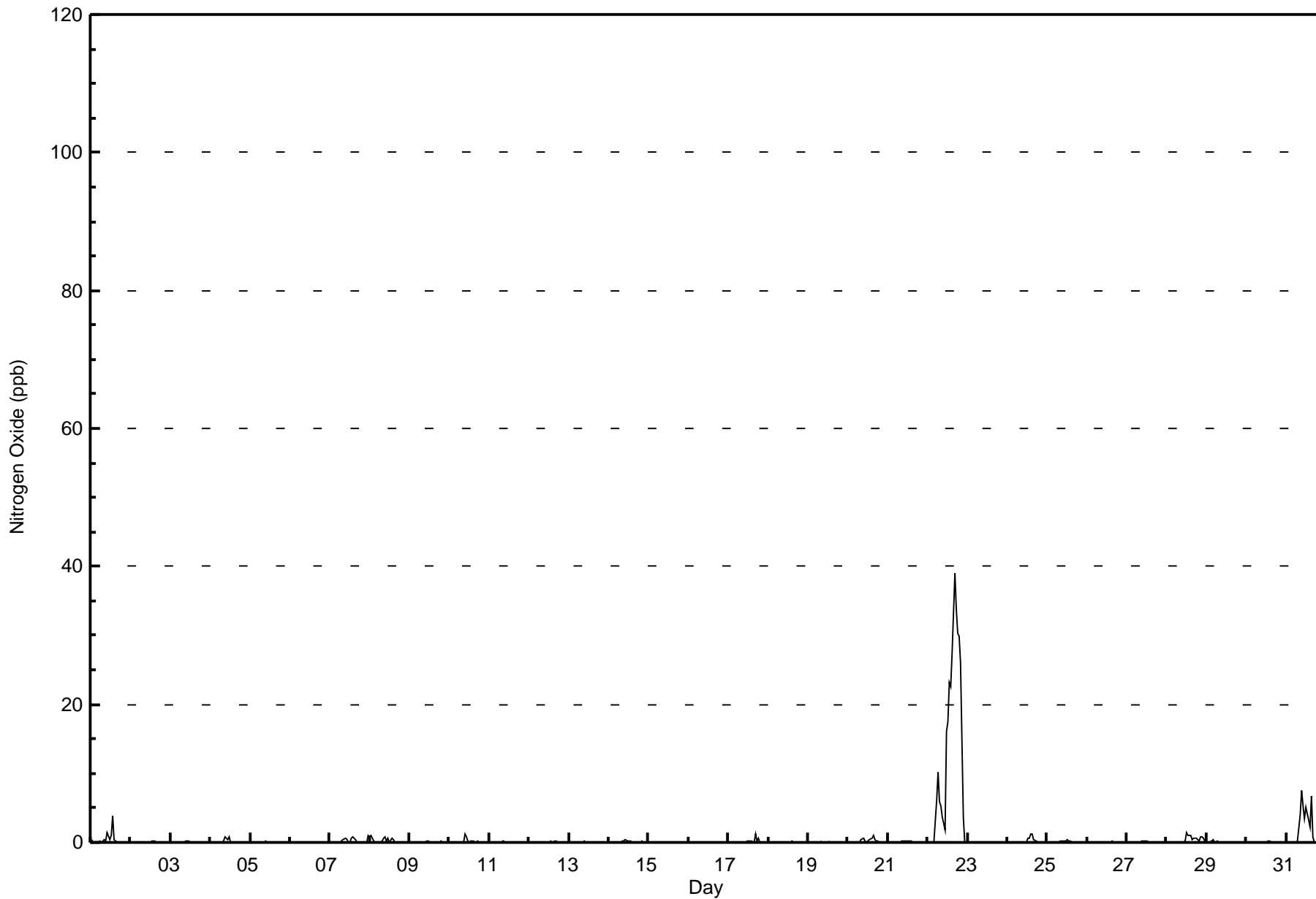
**Nitrogen Oxide (NO) - ppb**  
**Mackay River - October 2017**

Maximum Value: 39 ppb on Oct 22 17:00		Maximum Daily Average: 13.1 ppb on Oct 22		Hours in Service: 744																						
Minimum Value: 0 ppb on Oct 2 00:00		Minimum Daily Average: 0.0 ppb on Oct 18		Hours of Data: 706																						
Maximum Diurnal Average: 1.4 ppb at hour 17		Minimum Diurnal Average: 0.0 ppb at hour 3		Hours of Missing Data: 38																						
Monthly Average: 0.6 ppb		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 22		Hours of Calibration: 38																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	Z	0	0	0	0	0	0	1	0	1	4	0	0	0	0	0	0	0	0	0	0	0.4	4
2-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
3-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
4-Oct	Z	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
5-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
6-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
7-Oct	0	0	0	Z	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0.2	1
8-Oct	1	1	0	0	Z	0	0	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0.2	1
9-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
10-Oct	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
11-Oct	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.0	0
12-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
13-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
14-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
15-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
16-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
17-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0.1	1
18-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
19-Oct	0	0	0	Z	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
20-Oct	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.2	1
21-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
22-Oct	Z	0	0	0	0	6	10	6	5	4	2	16	17	23	23	27	39	34	30	30	26	4	0	0	13.1	39
23-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
24-Oct	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0.2	1
25-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
26-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
27-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
28-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	1	0	1	1	1	0	0.4	1
29-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
30-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
31-Oct	0	0	0	Z	0	0	0	0	4	7	5	3	5	3	2	7	1	0	0	0	0	0	0	0	1.7	7
		0.1	0.0	0.0	0.0	0.0	0.3	0.3	0.2	0.4	0.6	0.4	0.8	0.9	1.2	1.0	1.2	1.4	1.1	1.0	1.0	0.9	0.2	0.0	0.1	Diurnal Average
		1	1	0	0	0	6	10	6	5	7	5	16	17	23	23	27	39	34	30	30	26	4	1	1	Diurnal Maximum
Z - zerospan		C - Calibration																								



Wood Buffalo Environmental Association  
Hourly Averages

Nitrogen Oxide (NO) - ppb  
Mackay River - October 2017





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Oxide (NO) - ppb  
Mackay River - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	698	98.87	98.87
21 - 40	8	1.13	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Oxide (NO) - ppb  
Mackay River - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	26	24	12	8	6	28	18	27	64	86	57	61	60	66	95	44	682
21 - 40	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	4	8
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	27	24	12	8	6	28	18	27	64	87	58	62	60	66	95	48	690

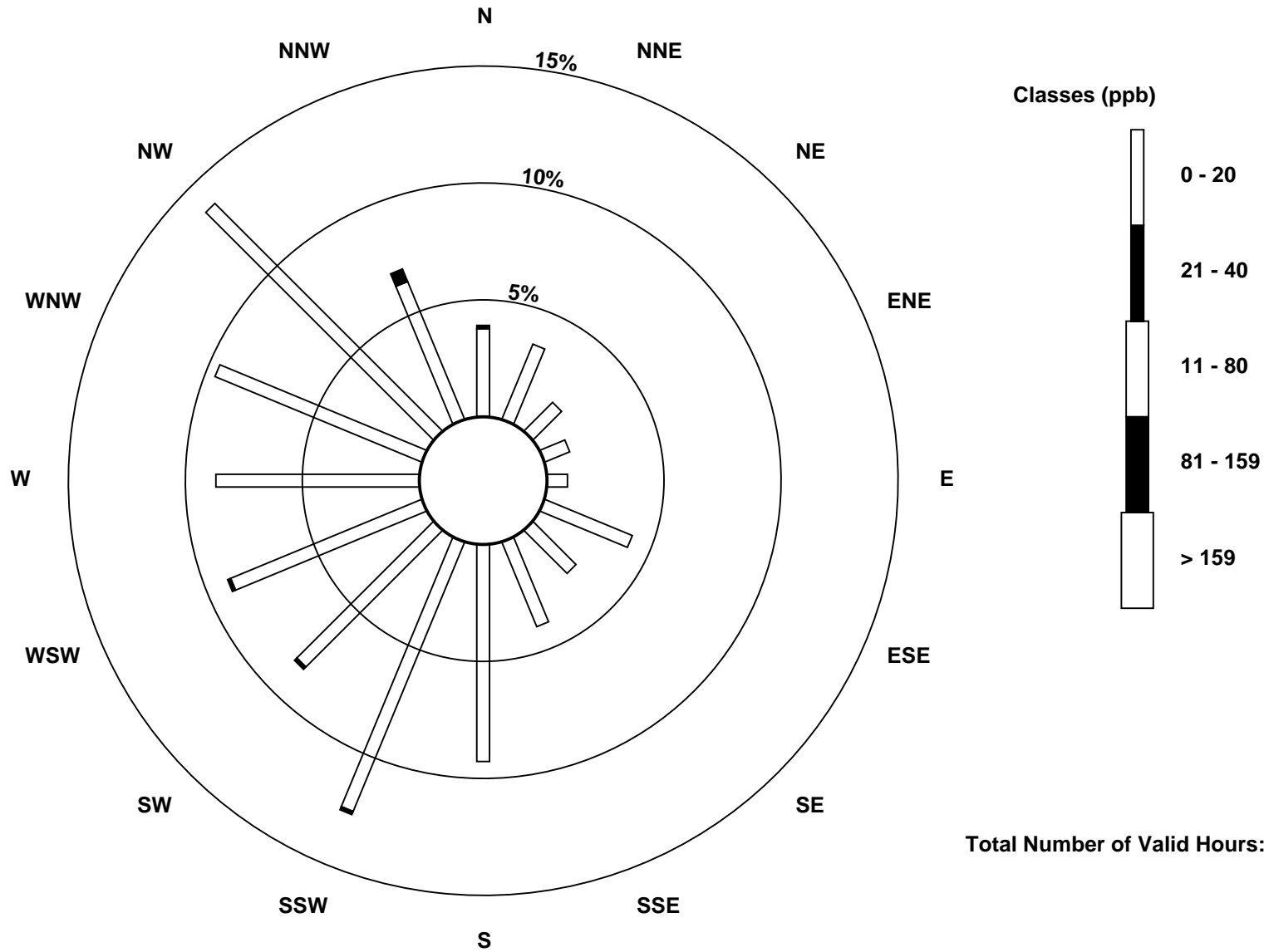
Total Number of Valid Hours: 690

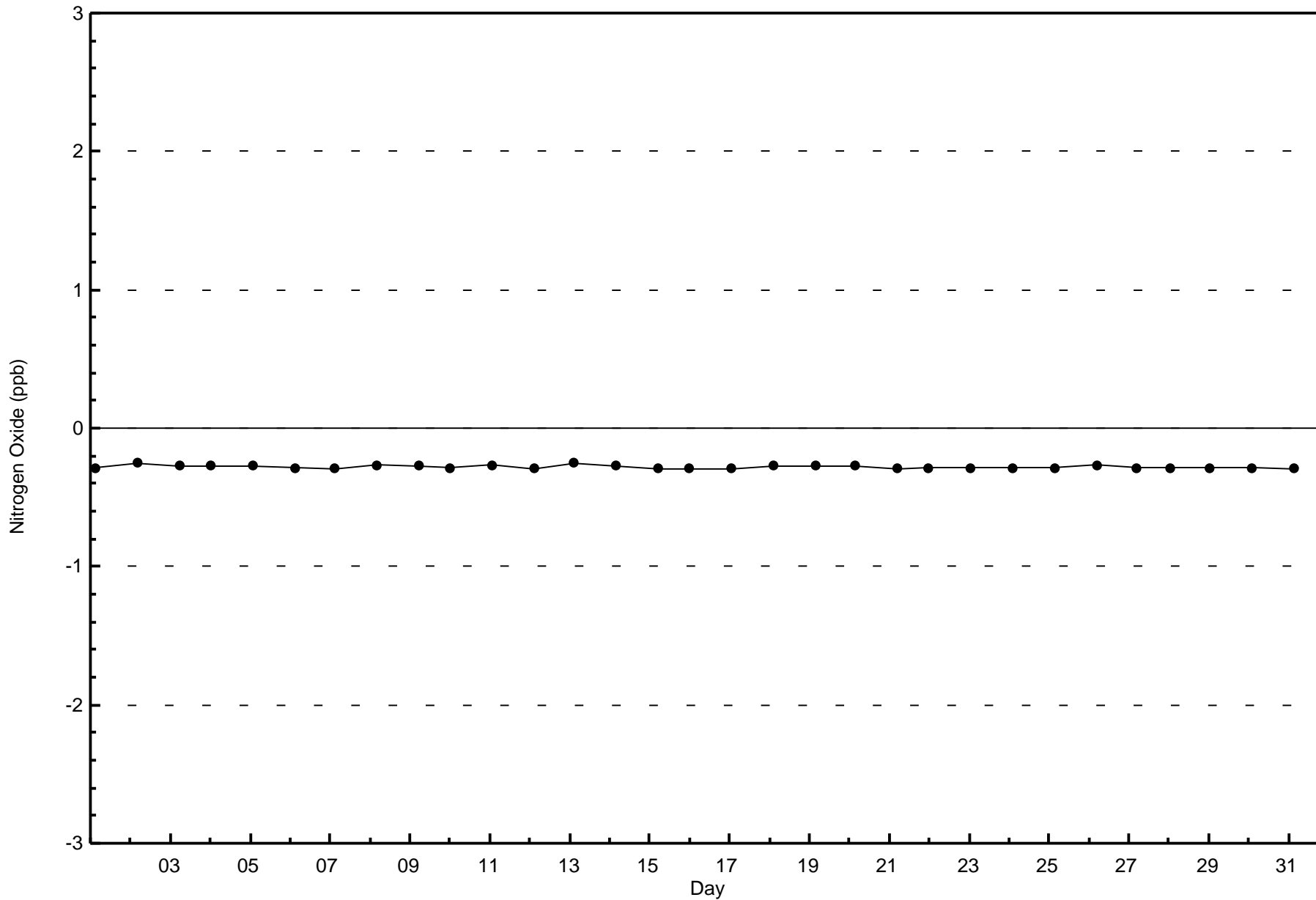
Total Number of Hours: 744

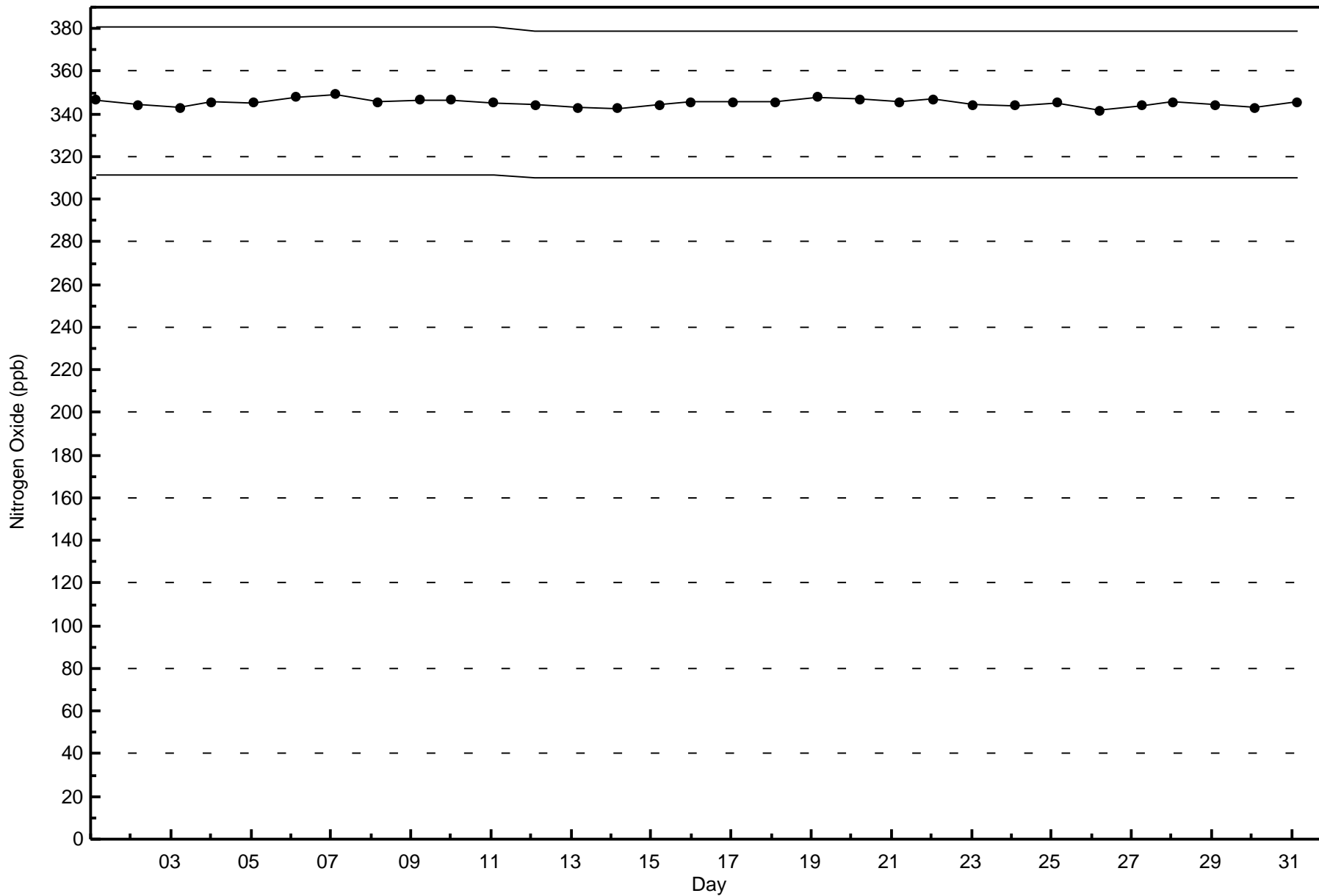


**Wood Buffalo Environmental Association**  
**Wind Rose Oct 2017**

**Nitrogen Oxide (NO) - ppb**  
**Mackay River (AMS 20)**











**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Mackay River - October 2017**

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 21 ppb on Oct 22 17:00	Maximum Daily Average: 9.7 ppb on Oct 22		Hours of Data:	706
Minimum Value: 0 ppb on Oct 1 03:00	Minimum Daily Average: 0.3 ppb on Oct 18		Hours of Missing Data:	38
Maximum Diurnal Average: 1.8 ppb at hour 17	Minimum Diurnal Average: 0.6 ppb at hour 4		Hours of Calibration:	38
Monthly Average: 1.2 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 1 P <sub>90</sub> = 3 P <sub>99</sub> = 13		Percent Operational Time:	100.0

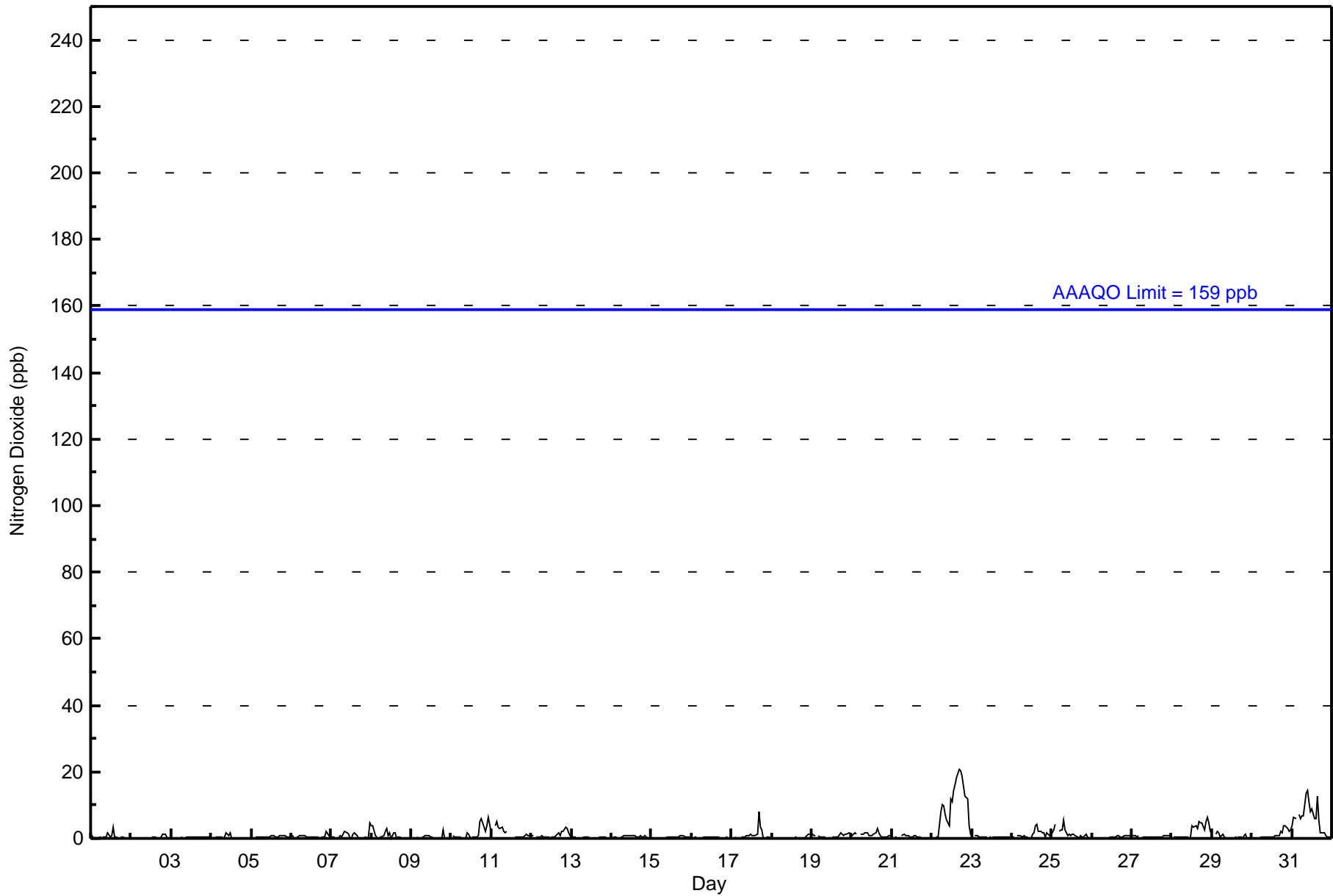
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	1	0	0	Z	0	0	0	0	1	0	2	1	1	3	1	0	0	0	1	0	0	0	0	0	0.5	3
2-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	0	0	0	0.3	1
3-Oct	0	0	0	0	0	Z	0	0	0	1	1	1	1	0	0	1	0	0	1	0	0	0	0	0	0.3	1
4-Oct	Z	0	0	0	1	1	0	0	1	2	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
5-Oct	0	Z	0	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0.6	1
6-Oct	1	1	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	2	1	0	0.6	2
7-Oct	0	0	1	Z	0	1	1	1	2	2	1	0	0	1	2	1	0	0	0	0	0	0	1	5	0.9	5
8-Oct	4	4	1	1	Z	0	0	1	2	3	1	2	0	2	2	0	0	0	0	0	0	0	0	0	1.0	4
9-Oct	0	0	0	0	0	Z	0	1	1	1	1	1	0	0	0	0	0	0	0	3	0	0	0	0	0.4	3
10-Oct	Z	1	1	1	1	1	0	0	0	2	1	0	0	0	1	0	1	5	6	3	2	4	6	4	1.7	6
11-Oct	2	Z	4	5	3	3	3	2	2	2	C	C	C	C	0	1	1	1	0	1	1	1	1	1	1.7	5
12-Oct	1	1	Z	0	0	1	1	1	1	1	0	0	0	1	0	1	2	1	2	2	3	3	2	1	1.0	3
13-Oct	1	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.3	1
14-Oct	0	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0	0	0	0.6	1
15-Oct	0	0	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	1	1	1	1	1	0	0	0	0.4	1
16-Oct	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.3	1
17-Oct	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	8	3	3	0	0	0	0	0	1.0	8
18-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.3	1
19-Oct	1	1	1	Z	1	1	1	1	1	1	C	C	C	1	1	1	1	2	1	1	1	1	2	1	0.9	2
20-Oct	1	1	2	1	Z	1	1	1	2	2	1	1	1	1	2	3	2	1	1	1	1	0	1	1	1.2	3
21-Oct	0	0	0	0	0	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1
22-Oct	Z	0	0	0	1	8	10	10	7	5	4	12	11	14	16	18	21	20	19	16	13	12	4	1	9.7	21
23-Oct	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.4	1
24-Oct	0	0	Z	1	1	1	1	1	0	0	0	0	1	2	4	4	2	2	2	2	0	2	1	1	1.2	4
25-Oct	2	3	4	Z	2	3	3	5	2	1	1	1	1	1	0	0	1	1	1	0	1	0	0	0	1.4	5
26-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0.5	1
27-Oct	1	1	1	1	1	Z	1	1	0	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	0.6	1
28-Oct	Z	1	0	1	1	1	1	0	0	0	0	1	4	3	4	3	5	5	5	2	5	7	5	2	2.4	7
29-Oct	2	Z	1	2	2	1	1	1	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0.6	2
30-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	2	2	4	4	3	2	3	1.1	4
31-Oct	4	6	6	Z	7	6	7	7	14	14	11	8	9	6	6	13	6	2	2	2	1	0	0	1	5.9	14
	0.9	0.9	1.0	0.6	0.9	1.2	1.1	1.2	1.3	1.4	1.1	1.2	1.2	1.5	1.5	1.7	1.8	1.6	1.6	1.4	1.3	1.4	1.0	0.9	Diurnal Average	
	4	6	6	5	7	8	10	10	14	14	11	12	11	14	16	18	21	20	19	16	13	12	6	5	Diurnal Maximum	

Z - zerospan      C - Calibration  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Mackay River - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Mackay River - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	705	99.86	99.86
21 - 40	1	0.14	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Mackay River - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	27	24	12	8	6	28	18	27	64	87	58	62	60	66	95	47	689
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	27	24	12	8	6	28	18	27	64	87	58	62	60	66	95	48	690

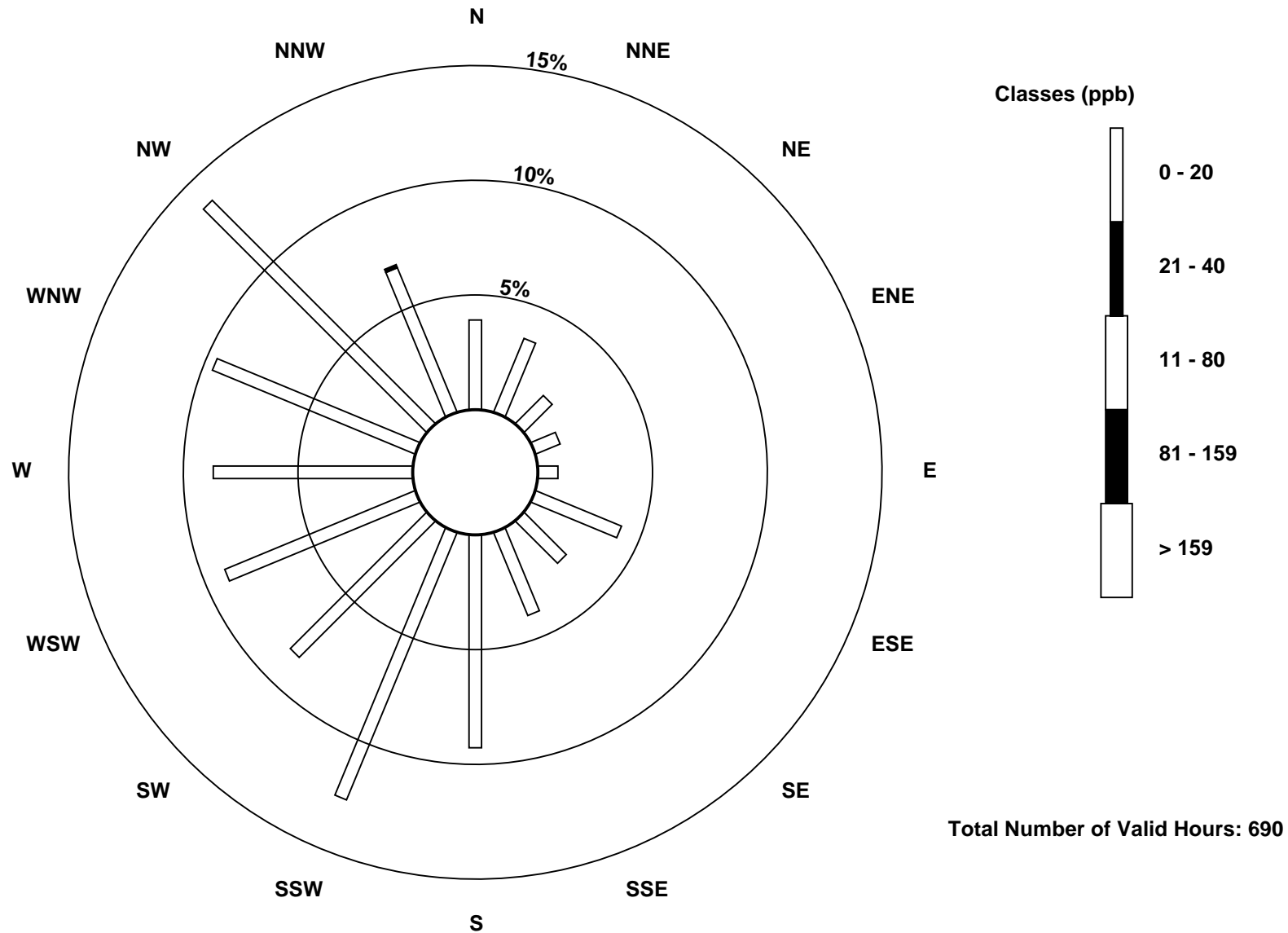
Total Number of Valid Hours: 690

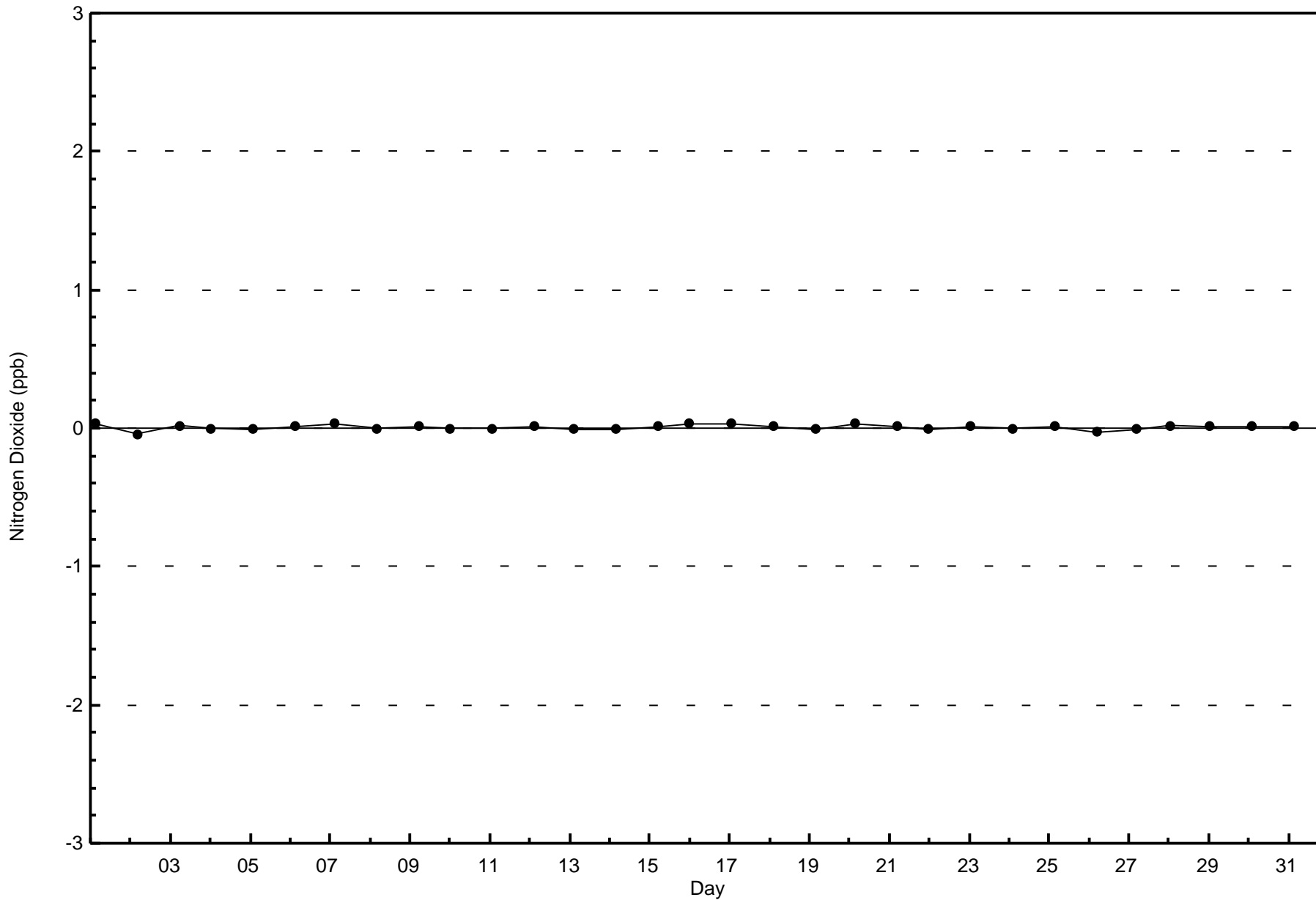
Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Mackay River (AMS 20)

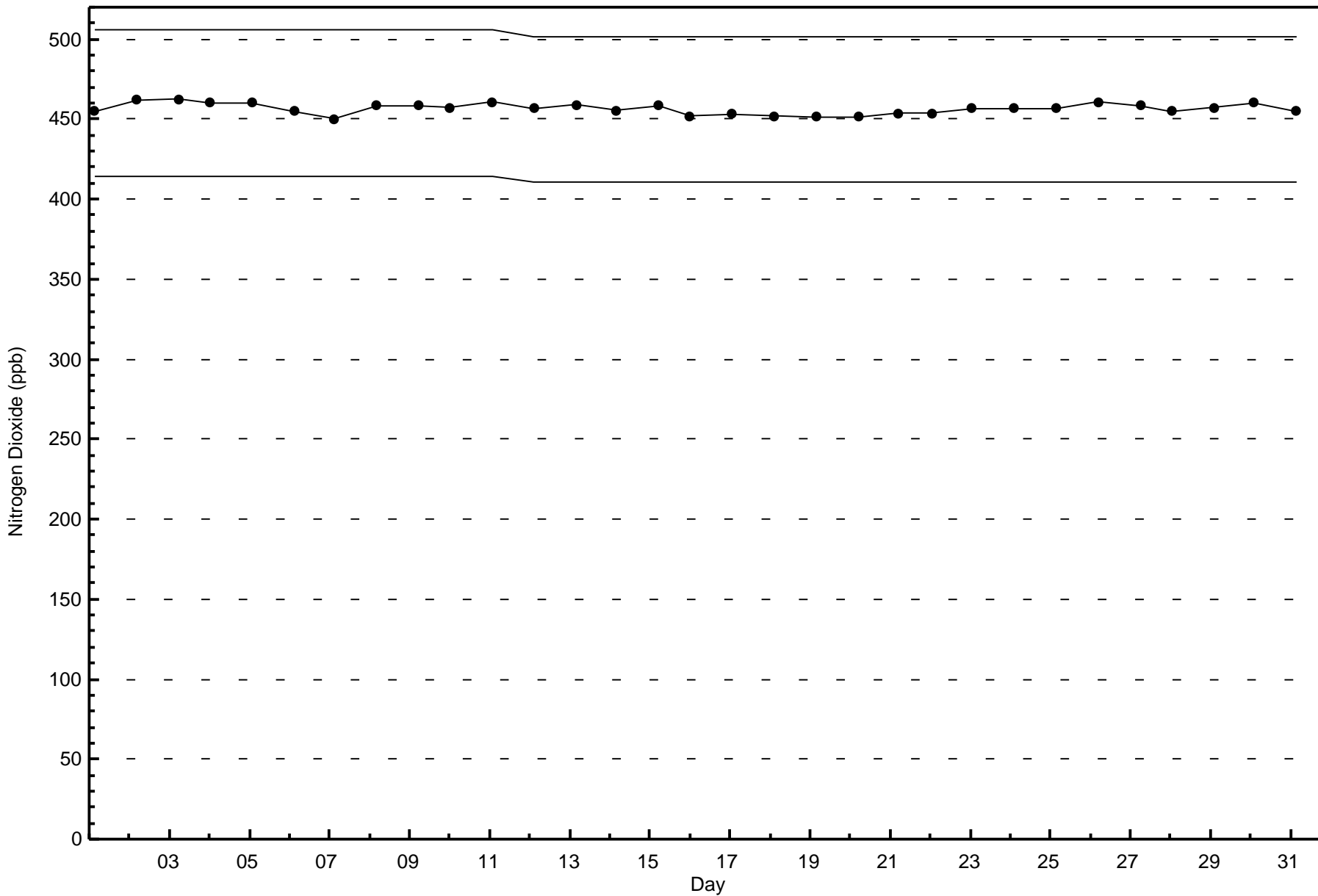






Wood Buffalo Environmental Association  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Mackay River - October 2017





**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Mackay River - October 2017**

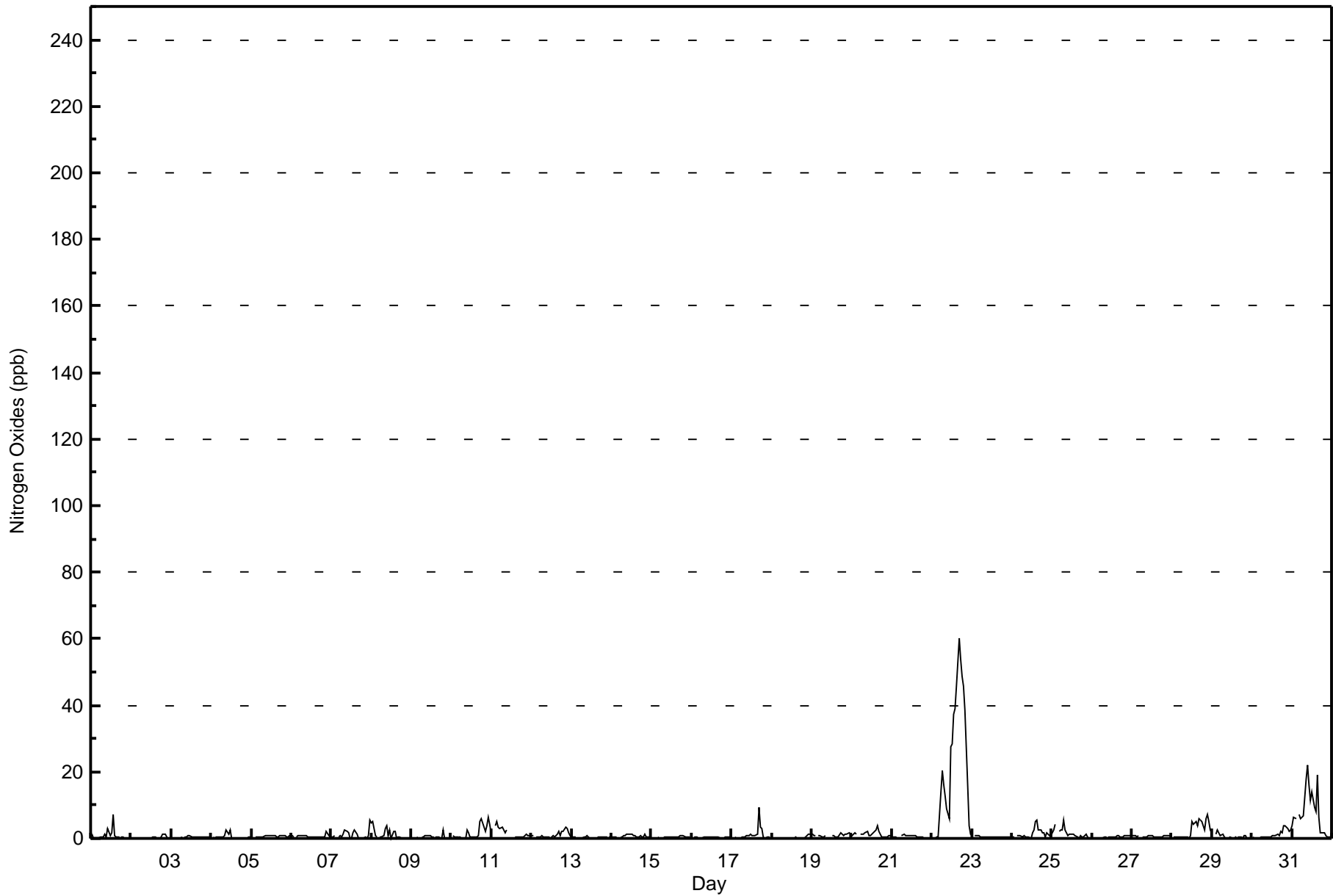
Maximum Value: 60 ppb on Oct 22 17:00		Maximum Daily Average: 22.8 ppb on Oct 22		Hours in Service: 744																																												
Minimum Value: 0 ppb on Oct 8 20:00		Minimum Daily Average: 0.3 ppb on Oct 18		Hours of Data: 706																																												
Maximum Diurnal Average: 3.2 ppb at hour 17		Minimum Diurnal Average: 0.7 ppb at hour 4		Hours of Missing Data: 38																																												
Monthly Average: 1.8 ppb		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 1 P <sub>90</sub> = 3 P <sub>99</sub> = 38		Hours of Calibration: 38																																												
				Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	1	0	0	Z	0	0	0	1	1	1	3	1	2	7	1	1	0	0	1	0	0	0	0	0	0.9	7																						
2-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	1	0	0	0	0.3	1																						
3-Oct	0	0	0	0	0	Z	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
4-Oct	Z	0	0	0	1	0	0	0	1	2	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2																						
5-Oct	0	Z	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1																						
6-Oct	1	1	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	2	1	0	0.6	2																						
7-Oct	0	0	1	Z	0	1	1	1	3	2	2	0	0	2	2	1	0	0	0	0	0	0	1	6	1.1	6																						
8-Oct	5	5	1	1	Z	0	0	1	3	4	1	2	0	2	2	0	0	0	0	0	0	0	0	0	1.2	5																						
9-Oct	0	0	0	0	0	Z	0	0	1	1	1	1	0	0	0	0	0	0	0	3	0	0	0	0	0.4	3																						
10-Oct	Z	1	1	1	0	0	0	0	0	3	2	0	0	0	1	0	1	5	6	3	2	4	6	4	1.8	6																						
11-Oct	2	Z	4	5	3	3	3	2	2	2	C	C	C	C	1	1	1	0	0	1	1	1	1	1	1.8	5																						
12-Oct	1	1	Z	0	0	1	1	0	1	1	0	0	0	1	1	1	2	1	2	2	3	3	2	1	1.1	3																						
13-Oct	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.3	1																						
14-Oct	0	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0	0	0.7	1																						
15-Oct	0	0	0	0	0	Z	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.4	1																						
16-Oct	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
17-Oct	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	9	4	3	0	0	0	0	0	1.2	9																						
18-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	0.3	1																						
19-Oct	1	1	1	Z	1	1	1	1	1	1	C	C	C	1	1	1	0	0	2	1	1	1	2	1	0.9	2																						
20-Oct	1	1	2	1	Z	1	1	1	2	2	1	1	1	2	2	4	2	1	1	1	1	0	1	1	1.4	4																						
21-Oct	0	0	0	0	0	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1																						
22-Oct	Z	0	0	0	1	14	20	16	13	9	6	28	28	37	39	46	60	54	49	46	38	15	4	1	22.8	60																						
23-Oct	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																						
24-Oct	0	0	Z	1	1	1	0	1	0	0	0	0	2	3	5	5	3	2	2	2	0	2	1	1	1.4	5																						
25-Oct	2	3	4	Z	2	2	2	5	3	1	1	1	1	1	0	0	1	1	1	0	1	0	0	0	1.5	5																						
26-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0.5	1																						
27-Oct	1	1	1	0	1	Z	1	1	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	0.7	1																						
28-Oct	Z	1	0	1	1	1	0	0	0	0	0	1	5	4	5	4	6	5	5	3	6	7	5	3	2.7	7																						
29-Oct	2	Z	1	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.6	2																						
30-Oct	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2	2	4	4	3	2	3	1.2	4																						
31-Oct	4	6	6	Z	7	6	7	7	18	22	16	12	14	9	8	19	6	2	2	2	1	0	0	0	7.6	22																						
																								0.9	0.9	1.0	0.7	0.9	1.4	1.5	1.5	1.7	1.9	1.5	2.0	2.1	2.6	2.5	2.9	3.2	2.8	2.6	2.4	2.2	1.5	1.0	0.9	Diurnal Average
																								5	6	6	5	7	14	20	16	18	22	16	28	28	37	39	46	60	54	49	46	38	15	6	6	Diurnal Maximum
Z - zerospan																								C - Calibration																								





**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Mackay River - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Mackay River - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	695	98.44	98.44
21 - 40	6	0.85	99.29
41 - 80	5	0.71	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

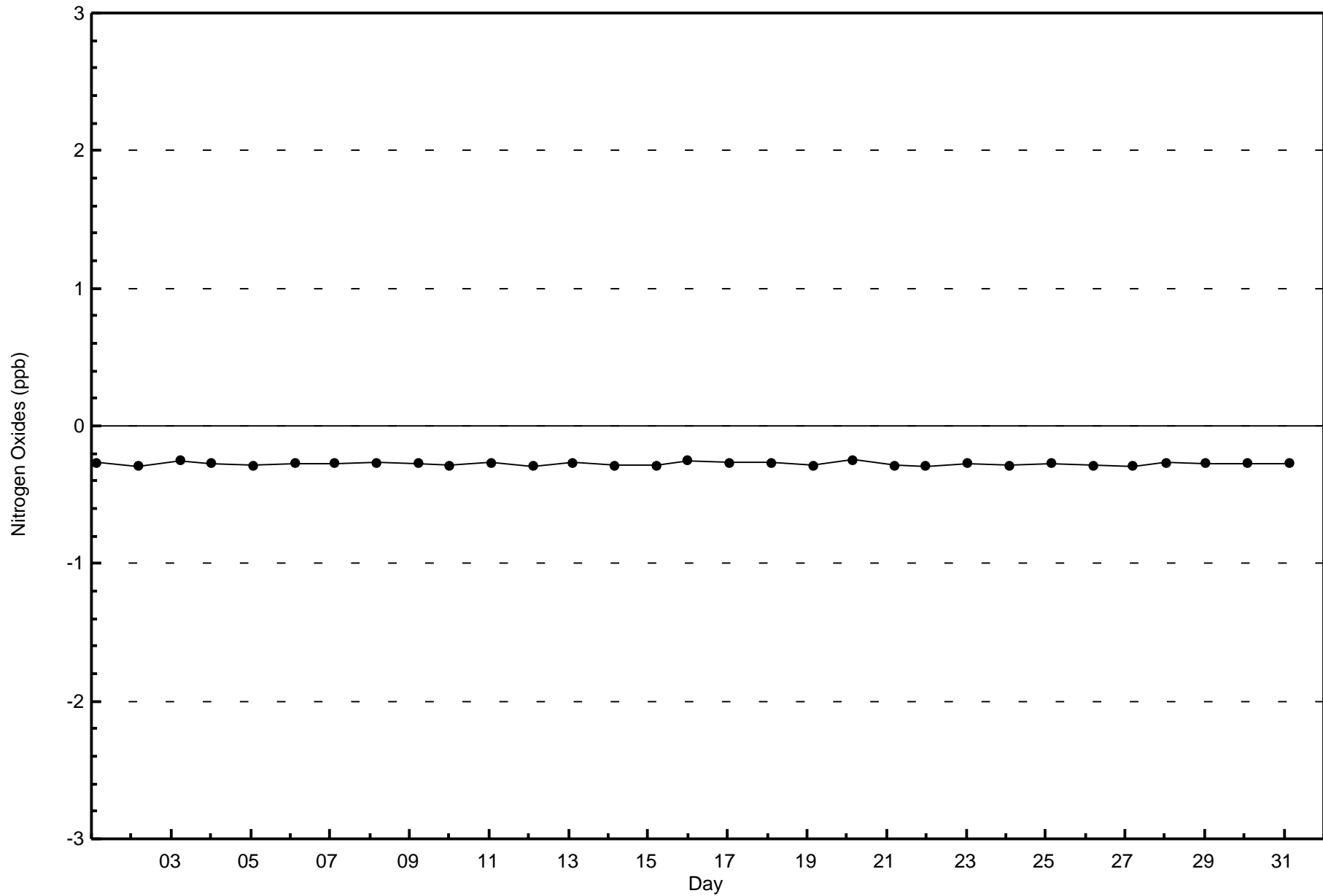
**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Mackay River - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	26	24	12	8	6	27	18	27	64	86	57	61	60	66	95	42	679
21 - 40	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	3	6
11 - 80	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	3	5
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	27	24	12	8	6	28	18	27	64	87	58	62	60	66	95	48	690

Total Number of Valid Hours: 690

Total Number of Hours: 744

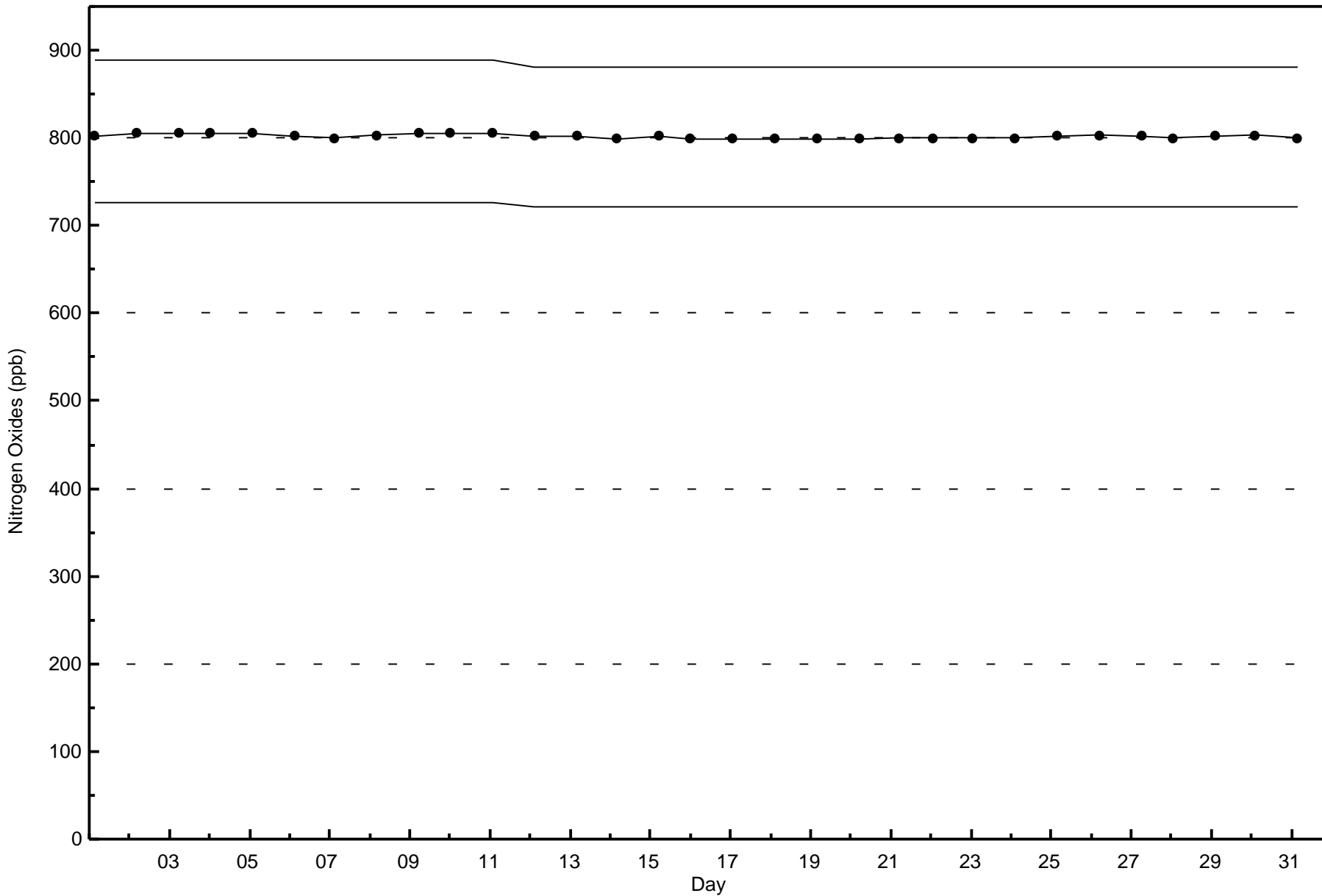






**Wood Buffalo Environmental Association**  
**Span Responses**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Mackay River - October 2017**





**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

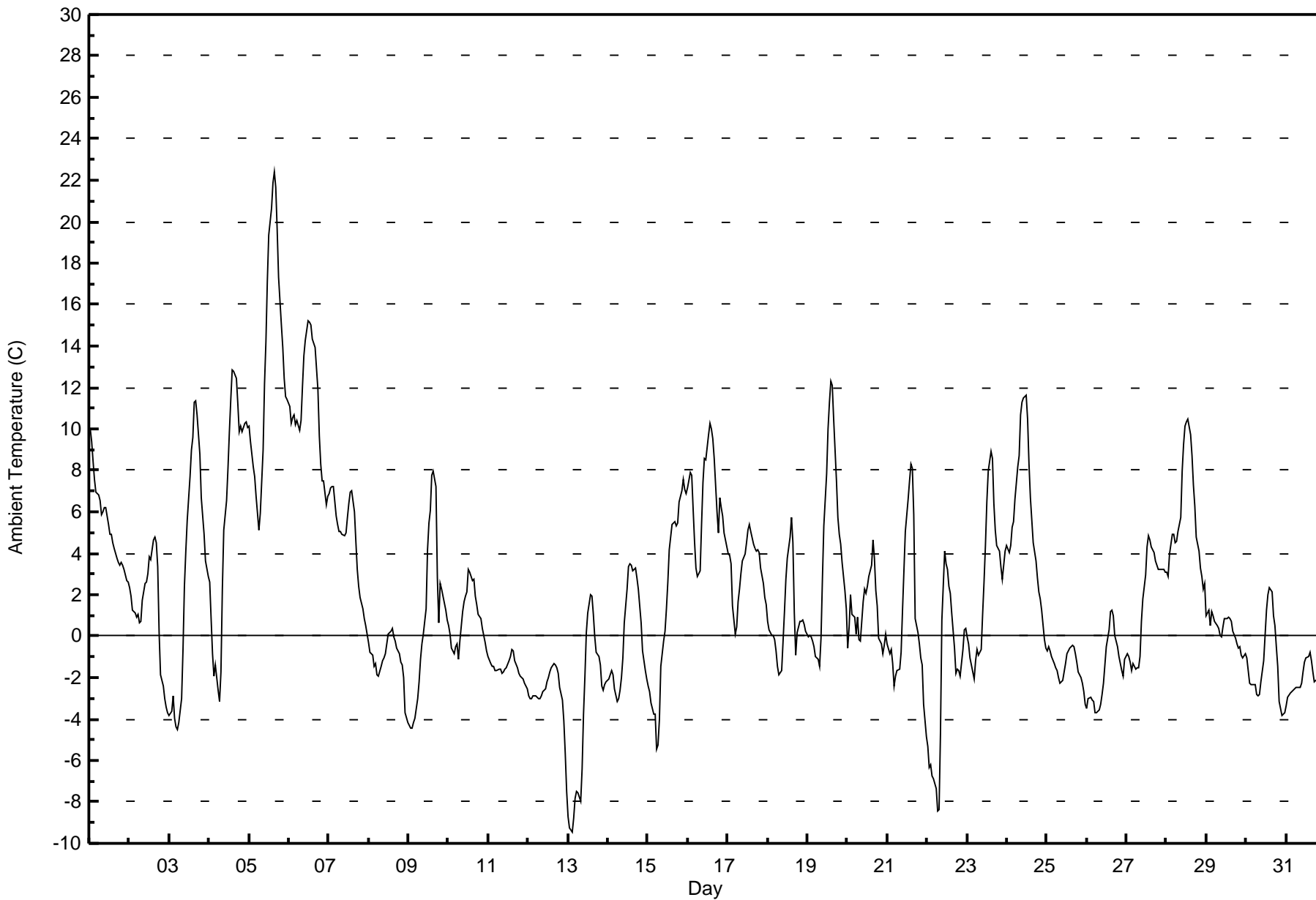
**Ambient Temperature (AT) - C**  
**Mackay River - October 2017**

Maximum Value: 22.4 C on Oct 5 16:00		Maximum Daily Average: 13.3 C on Oct 5		Hours in Service: 744																						
Minimum Value: -9.4 C on Oct 13 03:00		Minimum Daily Average: -3.6 C on Oct 13		Hours of Data: 744																						
Maximum Diurnal Average: 5.6 C at hour 15		Minimum Diurnal Average: -0.4 C at hour 7		Hours of Missing Data: 0																						
Monthly Average: 2.06 C		Percentiles: P <sub>1</sub> = -7.8 P <sub>10</sub> = -2.9 Q <sub>1</sub> = -1.5 Median = 0.9 Q <sub>3</sub> = 4.9 P <sub>90</sub> = 8.8 P <sub>99</sub> = 15.4		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	10.0	9.4	8.4	7.6	6.9	6.8	6.6	5.9	6.0	6.2	6.2	5.4	4.9	4.9	4.5	4.2	3.8	3.6	3.5	3.6	3.4	3.2	2.7	2.6	5.4	10.0
2-Oct	2.3	1.9	1.3	1.1	0.9	1.1	0.6	0.7	1.7	2.5	2.6	3.0	3.8	3.7	4.7	4.8	4.5	3.4	0.1	-1.9	-2.4	-3.0	-3.4	-3.7	1.3	4.8
3-Oct	-3.8	-3.6	-2.9	-4.0	-4.3	-4.5	-4.2	-3.0	-0.7	2.4	4.1	5.6	7.7	9.0	9.6	11.3	11.4	10.7	8.8	6.7	5.8	4.9	3.6	2.9	3.1	11.4
4-Oct	2.6	0.9	-0.9	-1.9	-1.4	-2.6	-3.2	-1.7	2.3	5.1	6.5	8.1	9.9	11.4	12.8	12.8	12.4	11.2	9.9	10.2	9.8	10.3	10.4	10.1	6.0	12.8
5-Oct	10.1	9.4	8.2	7.7	6.8	5.9	5.1	6.0	9.0	12.2	14.2	17.1	19.3	20.6	21.8	22.4	21.7	19.6	17.3	15.0	13.9	12.4	11.6	11.4	13.3	22.4
6-Oct	11.1	10.2	10.6	10.7	10.2	10.4	9.9	10.4	12.0	13.5	14.3	15.2	15.2	15.0	14.3	14.1	13.9	11.9	9.7	8.3	7.5	7.5	6.3	6.7	11.2	15.2
7-Oct	6.9	7.2	7.2	7.2	5.8	5.4	5.0	5.0	4.9	4.8	5.0	5.7	6.4	6.9	7.0	6.0	4.6	3.2	2.4	1.9	1.3	0.8	0.5	0.1	4.6	7.2
8-Oct	-0.3	-0.8	-0.9	-1.4	-1.3	-1.8	-2.0	-1.5	-1.2	-1.0	-0.8	-0.4	0.1	0.3	0.4	0.0	-0.3	-0.6	-0.9	-1.2	-1.4	-2.0	-3.7	-4.2	-1.1	0.4
9-Oct	-4.3	-4.5	-4.5	-4.2	-4.0	-3.0	-2.2	-1.1	-0.4	0.1	1.3	4.2	5.5	6.1	7.7	8.0	7.2	2.8	0.7	2.5	2.3	1.6	1.2	0.8	1.0	8.0
10-Oct	0.5	0.1	-0.6	-0.8	-0.5	-0.4	-1.1	-0.3	1.2	1.7	1.9	2.2	3.2	3.1	2.7	2.8	1.9	1.5	1.0	0.8	0.3	0.1	-0.3	-0.7	0.8	3.2
11-Oct	-1.0	-1.3	-1.5	-1.5	-1.7	-1.7	-1.6	-1.6	-1.8	-1.7	-1.6	-1.6	-1.2	-1.0	-0.7	-0.7	-1.2	-1.5	-1.8	-1.9	-2.0	-2.1	-2.3	-2.6	-1.5	-0.7
12-Oct	-2.9	-3.0	-3.0	-2.9	-2.9	-2.9	-3.0	-3.0	-2.9	-2.7	-2.5	-2.2	-2.0	-1.7	-1.5	-1.3	-1.4	-1.5	-1.8	-2.5	-3.1	-4.1	-5.7	-7.5	-2.8	-1.3
13-Oct	-8.7	-9.2	-9.4	-8.8	-7.8	-7.5	-7.6	-8.0	-6.4	-3.8	-2.0	0.1	1.1	2.0	2.0	1.0	-0.1	-0.8	-1.0	-1.4	-2.4	-2.6	-2.3	-2.2	-3.6	2.0
14-Oct	-2.1	-1.8	-1.6	-1.9	-2.6	-3.2	-3.0	-2.6	-2.0	-1.0	0.6	2.3	3.4	3.5	3.4	3.2	3.3	2.8	2.3	1.4	0.7	-0.7	-1.7	-2.1	0.0	3.5
15-Oct	-2.4	-2.7	-3.2	-3.7	-3.8	-5.5	-5.2	-4.0	-1.5	-0.2	0.2	1.3	2.6	4.1	5.4	5.5	5.5	5.3	5.5	6.5	7.0	7.6	7.1	6.9	1.6	7.6
16-Oct	7.2	7.9	7.8	6.1	4.6	3.3	2.9	3.1	5.4	7.5	8.6	8.5	9.7	10.3	10.0	9.5	8.5	6.0	5.0	6.7	6.2	5.8	5.0	4.3	6.7	10.3
17-Oct	4.0	3.9	3.5	1.5	0.1	0.4	1.7	2.3	3.0	3.6	4.0	4.5	5.1	5.4	5.1	4.4	4.3	4.1	4.2	4.1	3.3	2.5	1.8	1.5	3.3	5.4
18-Oct	0.7	0.3	0.0	0.0	-0.2	-0.7	-1.5	-1.9	-1.6	-0.2	1.2	2.7	3.8	4.8	5.7	4.5	1.1	-0.9	0.2	0.7	0.7	0.8	0.6	0.2	0.9	5.7
19-Oct	0.0	0.1	0.0	-0.2	-0.5	-1.0	-1.1	-1.5	-0.1	2.8	5.3	7.9	10.0	11.3	12.3	12.1	10.5	7.5	5.7	4.9	4.4	3.6	2.2	1.3	4.1	12.3
20-Oct	-0.6	0.5	2.0	1.0	0.9	0.1	0.9	-0.1	-0.2	1.6	2.3	2.1	2.4	2.9	3.4	4.6	3.8	2.2	1.5	-0.1	-0.4	-0.8	-0.4	0.1	1.2	4.6
21-Oct	-0.3	-0.9	-0.6	-1.4	-2.4	-1.9	-1.7	-1.6	-0.8	1.2	3.1	5.0	6.6	7.5	8.3	8.1	5.9	0.9	0.2	-0.4	-1.1	-1.4	-3.3	-4.9	1.0	8.3
22-Oct	-5.3	-6.4	-6.2	-6.7	-6.9	-7.4	-8.4	-8.3	-4.7	0.8	4.1	3.5	3.2	2.4	2.1	1.1	-0.6	-1.8	-1.6	-1.6	-1.9	-0.6	0.3	0.4	-2.1	4.1
23-Oct	0.0	-0.4	-1.1	-1.8	-2.0	-1.2	-0.6	-0.9	-0.6	1.1	2.6	4.4	6.5	8.0	8.9	8.6	6.4	5.2	4.4	4.1	3.4	2.7	3.4	4.1	2.7	8.9
24-Oct	4.3	4.0	4.4	5.3	5.5	6.6	8.1	8.7	10.7	11.3	11.5	11.6	10.5	8.3	6.7	5.6	4.5	3.6	2.8	2.2	1.8	1.3	-0.2	-0.6	5.8	11.6
25-Oct	-0.7	-0.5	-0.7	-1.0	-1.3	-1.5	-1.6	-2.0	-2.2	-2.1	-1.7	-1.3	-0.9	-0.7	-0.6	-0.5	-0.5	-0.9	-1.3	-1.8	-2.0	-2.3	-2.6	-3.3	-1.4	-0.5
26-Oct	-3.5	-3.0	-3.0	-3.1	-3.2	-3.7	-3.7	-3.5	-3.3	-2.8	-2.3	-1.4	-0.5	0.3	1.2	1.3	1.0	0.1	-0.5	-1.0	-1.3	-1.6	-1.9	-1.1	-1.7	1.3
27-Oct	-0.8	-1.0	-1.3	-1.7	-1.3	-1.6	-1.5	-1.6	-1.0	0.7	1.8	2.9	4.3	4.9	4.7	4.3	4.0	3.6	3.4	3.2	3.2	3.2	3.2	3.1	1.6	4.9
28-Oct	3.1	2.9	4.0	4.9	4.9	4.5	4.6	5.0	5.7	8.0	9.3	10.2	10.3	10.5	9.7	8.7	7.3	6.3	4.8	4.1	3.3	2.9	2.3	2.5	5.8	10.5
29-Oct	1.0	1.3	0.5	1.2	1.0	0.7	0.5	0.4	0.0	0.0	0.4	0.8	0.9	0.9	0.9	0.7	0.2	-0.1	-0.4	-0.6	-0.5	-0.9	-1.0	-0.8	0.3	1.3
30-Oct	-1.1	-1.7	-2.2	-2.4	-2.3	-2.4	-2.8	-2.9	-2.8	-2.2	-1.2	0.0	1.2	2.0	2.4	2.1	1.0	0.5	-0.5	-1.5	-3.1	-3.9	-3.8	-3.7	-1.3	2.4
31-Oct	-3.3	-2.9	-2.8	-2.7	-2.6	-2.6	-2.5	-2.5	-2.5	-2.3	-1.7	-1.2	-1.1	-1.0	-0.8	-1.2	-1.7	-2.2	-2.1	-2.1	-2.0	-2.3	-3.3	-3.8	-2.2	-0.8
	0.7	0.5	0.4	0.1	-0.2	-0.4	-0.4	-0.2	0.8	2.2	3.1	4.1	4.9	5.3	5.6	5.4	4.6	3.4	2.6	2.2	1.8	1.4	0.8	0.6	Diurnal Average	
	11.1	10.2	10.6	10.7	10.2	10.4	9.9	10.4	12.0	13.5	14.3	17.1	19.3	20.6	21.8	22.4	21.7	19.6	17.3	15.0	13.9	12.4	11.6	11.4	Diurnal Maximum	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Mackay River - October 2017**







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C  
Mackay River - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	311	41.80	41.80
0 - 10	373	50.13	91.94
10 - 20	56	7.53	99.46
> 20	4	0.54	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %**

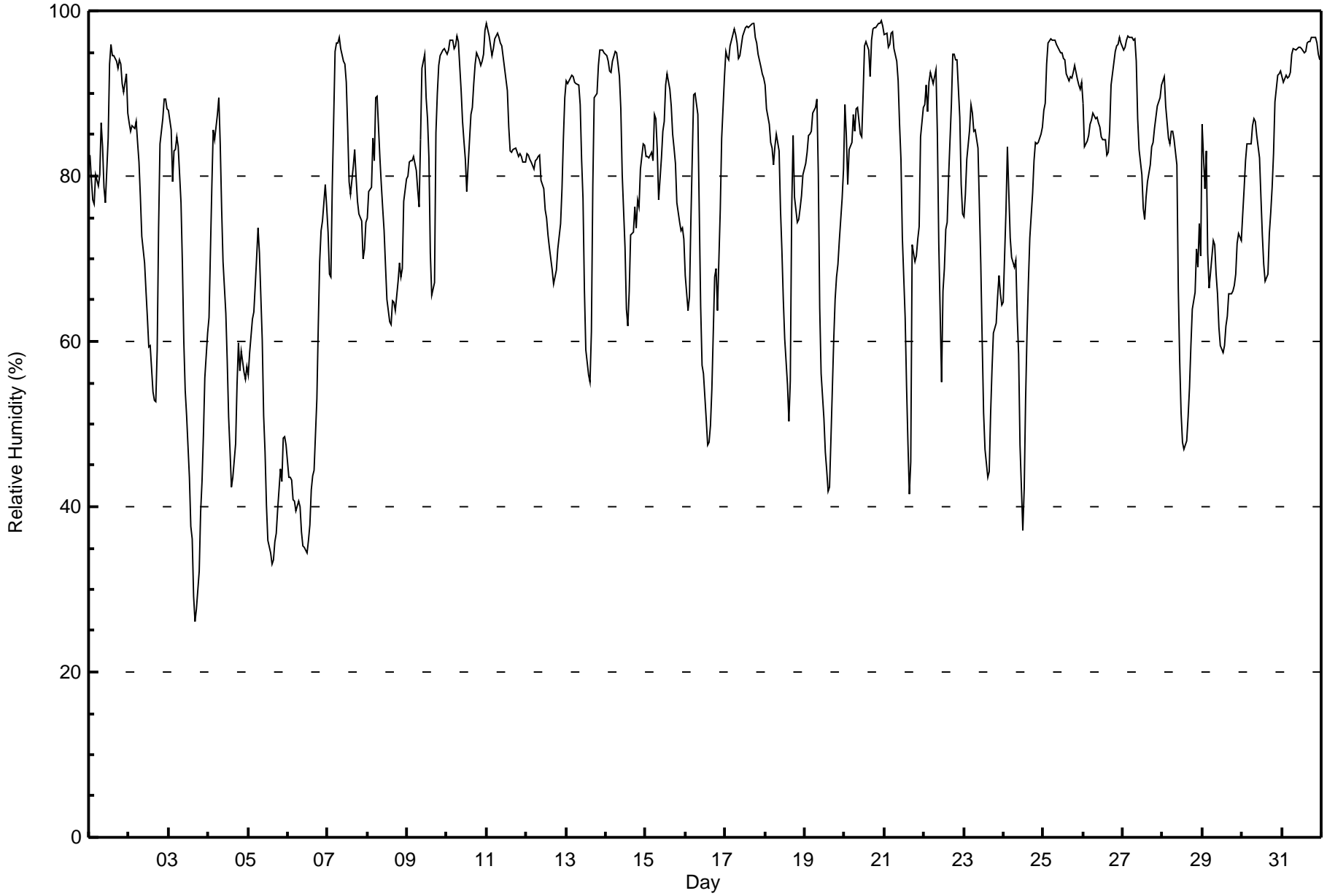
**Mackay River - October 2017**

Maximum Value: 99 % on Oct 20 23:00      Maximum Daily Average: 96.1 % on Oct 17																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 26 % on Oct 3 17:00      Minimum Daily Average: 48.6 % on Oct 6 Maximum Diurnal Average: 86.1 % at hour 7      Minimum Diurnal Average: 66.1 % at hour 15 Monthly Average: 77.9 %      Percentiles: P <sub>1</sub> = 34 P <sub>10</sub> = 51 Q <sub>1</sub> = 69 Median = 82 Q <sub>3</sub> = 91 P <sub>90</sub> = 96 P <sub>99</sub> = 98																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	83	80	77	77	80	79	80	86	83	79	77	85	94	96	94	95	94	93	94	94	91	90	92	88	86.6	96
2-Oct	86	85	86	86	87	84	82	78	73	69	66	63	59	60	54	53	53	59	74	84	87	89	89	88	74.7	89
3-Oct	88	86	79	83	83	85	84	77	69	60	54	51	44	38	36	29	26	28	32	39	43	49	56	61	57.5	88
4-Oct	63	71	79	86	84	88	89	84	76	70	63	58	51	47	42	44	48	55	60	57	59	56	55	57	64.2	89
5-Oct	56	59	63	64	67	70	74	71	60	51	47	40	36	34	33	33	36	37	40	45	43	48	48	47	50.1	74
6-Oct	44	44	43	41	41	39	41	40	37	35	35	34	36	38	42	44	44	53	62	70	73	75	79	76	48.6	79
7-Oct	73	68	68	79	95	96	96	97	95	94	94	91	86	79	78	81	83	80	77	75	75	70	71	74	82.3	97
8-Oct	75	78	79	85	82	89	90	82	79	76	73	69	65	62	62	65	65	64	67	70	68	69	77	80	73.7	90
9-Oct	80	82	82	82	82	81	78	76	84	93	95	89	87	82	71	66	67	85	90	93	95	95	95	95	84.4	95
10-Oct	95	95	96	96	95	96	97	96	90	87	84	82	78	81	88	88	91	94	95	94	93	94	95	98	91.6	98
11-Oct	98	97	96	95	95	97	97	97	96	96	94	93	90	86	83	83	83	83	83	82	83	82	82	82	89.7	98
12-Oct	83	83	82	82	81	82	82	82	83	79	78	76	75	73	71	69	67	68	69	71	74	78	85	90	77.6	90
13-Oct	91	91	92	92	92	91	91	91	89	82	77	66	59	56	55	61	79	89	90	93	95	95	95	95	83.8	95
14-Oct	95	94	93	92	94	95	95	94	92	88	80	71	64	62	66	73	73	76	74	77	76	81	84	84	82.2	95
15-Oct	82	82	82	83	82	88	87	83	77	82	85	87	91	92	91	88	85	83	82	77	74	73	74	72	82.7	92
16-Oct	68	64	65	74	82	90	90	88	76	64	57	56	51	47	48	50	54	68	69	64	70	76	85	92	68.6	92
17-Oct	95	94	94	96	97	98	97	96	94	95	97	97	98	98	98	98	99	98	97	96	95	93	92	92	96.1	99
18-Oct	91	88	86	84	83	81	84	85	83	76	71	65	60	55	50	55	76	85	77	74	75	76	78	80	75.8	91
19-Oct	82	83	85	85	85	88	88	89	80	64	56	51	47	44	42	42	48	60	65	68	69	72	77	81	68.8	89
20-Oct	89	85	79	83	84	87	85	88	88	85	85	90	96	96	95	92	96	98	98	98	98	98	99	98	91.3	99
21-Oct	97	97	96	96	97	97	95	94	91	86	82	72	63	55	48	42	45	72	70	70	72	74	85	88	78.6	97
22-Oct	89	91	88	91	93	91	92	93	85	72	55	66	69	74	74	80	89	95	95	94	94	87	79	75	83.7	95
23-Oct	75	78	82	86	89	88	85	86	83	76	69	60	51	47	44	44	51	57	61	62	65	68	66	64	68.2	89
24-Oct	65	76	83	78	73	70	69	70	63	59	47	37	42	53	61	67	73	78	82	84	84	84	85	86	69.5	86
25-Oct	88	89	94	96	97	96	96	96	96	95	95	95	94	94	92	92	92	92	93	93	92	91	90	91	93.3	97
26-Oct	89	84	84	85	86	87	88	87	87	86	86	85	84	84	83	83	86	91	94	95	96	96	97	96	88.2	97
27-Oct	95	96	96	97	97	97	96	97	94	87	83	80	76	75	77	79	81	84	84	86	87	88	90	91	88.1	97
28-Oct	92	92	89	85	84	85	85	84	81	66	58	51	48	47	48	51	54	59	64	66	71	69	74	70	69.8	92
29-Oct	86	78	83	71	66	68	72	72	68	66	62	59	59	60	62	63	66	66	66	67	68	72	73	72	68.5	86
30-Oct	75	79	82	84	84	84	86	87	87	85	82	77	73	69	67	68	73	76	79	83	89	92	92	93	81.1	93
31-Oct	92	91	92	92	92	92	95	95	95	95	96	96	95	95	95	96	96	96	97	97	97	96	95	94	94.7	97
																		82.6						Diurnal Average		
																		98						Diurnal Maximum		



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Mackay River - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Relative Humidity (RH) - %**  
**Mackay River - October 2017**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	23	3.09	3.09
40 - 60	92	12.37	15.46
60 - 80	214	28.76	44.22
80 - 100	415	55.78	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Precipitation (PC) - mm**

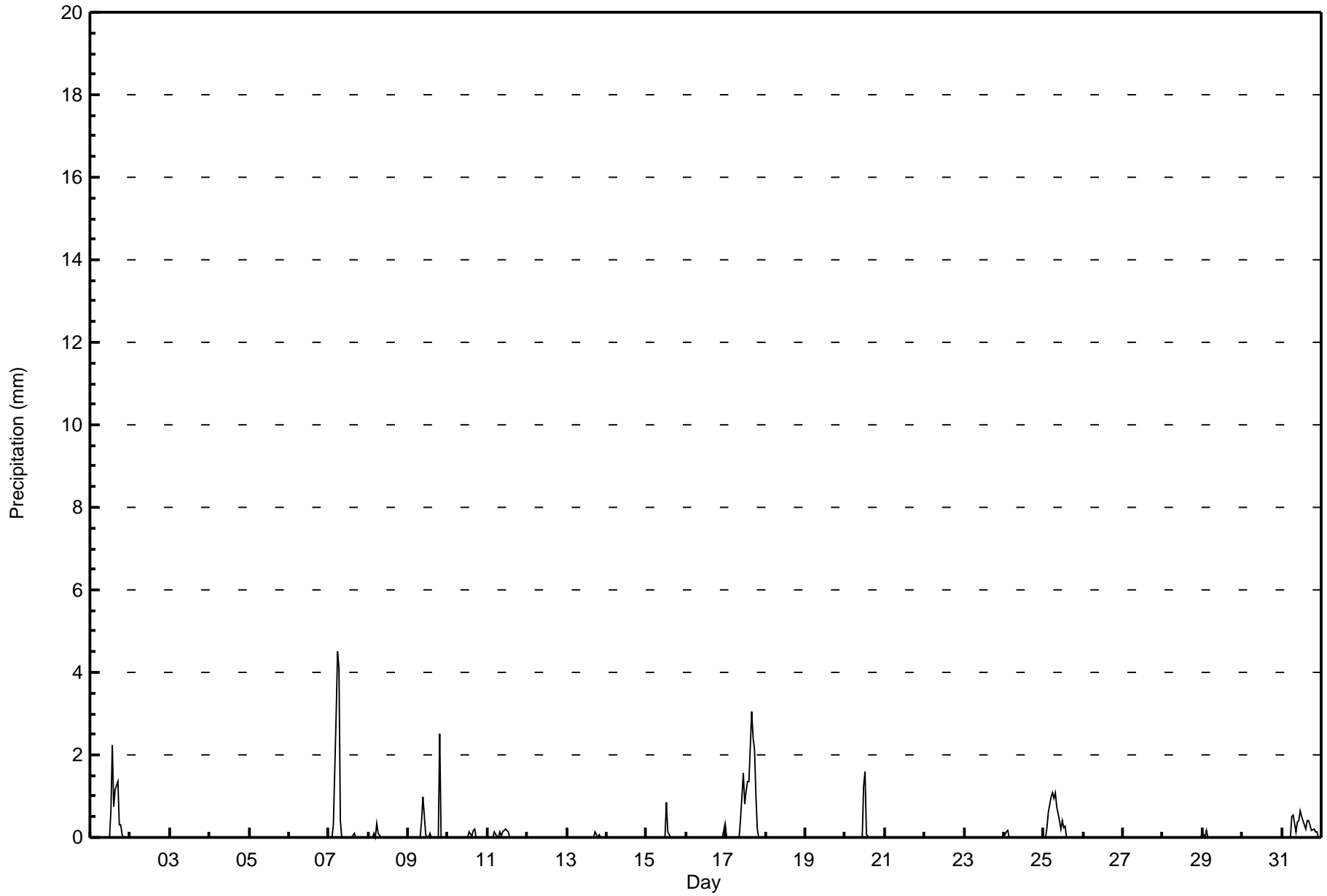
**Mackay River - October 2017**

Maximum Value: 4.5 mm on Oct 7 06:00																	Maximum Daily Total: 15.5 mm on Oct 17																	Hours in Service: 744														
Minimum Value: 0.0 mm on Oct 1 01:00																	Minimum Daily Total: 0.0 mm on Oct 2																	Hours of Data: 744														
Maximum Diurnal Total: 6.0 mm at hour 6																	Minimum Diurnal Total: 0.0 mm at hour 23																	Hours of Missing Data: 0														
Monthly Total: 58.61 mm																	Percentiles: P <sub>1</sub> = 0.0 P <sub>10</sub> = 0.0 Q <sub>1</sub> = 0.0 Median = 0.0 Q <sub>3</sub> = 0.0 P <sub>90</sub> = 0.1 P <sub>99</sub> = 2.1																	Hours of Calibration: 0														
																																		Percent Operational Time: 100.0														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	2.2	0.8	1.2	1.4	0.3	0.3	0.1	0.0	0.0	0.0	0.0	6.9	2.2																						
2-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																					
3-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																					
4-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																					
5-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																					
6-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																					
7-Oct	0.0	0.0	0.0	0.3	3.0	4.5	4.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.5	4.5																						
8-Oct	0.0	0.0	0.0	0.1	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.3																						
9-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.0	4.0	2.5																						
10-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.2																						
11-Oct	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.2																						
12-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																						
13-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.1																						
14-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																						
15-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.9																						
16-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3																						
17-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.6	0.8	1.1	1.4	1.3	3.1	2.4	2.1	1.0	0.2	0.0	0.0	0.0	0.0	15.5	3.1																						
18-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																						
19-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																						
20-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	1.6																						
21-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																						
22-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																						
23-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																						
24-Oct	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2																						
25-Oct	0.0	0.0	0.3	0.6	1.0	1.1	1.0	1.1	0.7	0.4	0.2	0.4	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.3	1.1																						
26-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																						
27-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																						
28-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																						
29-Oct	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2																						
30-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																						
31-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.6	0.1	0.4	0.4	0.6	0.5	0.3	0.2	0.4	0.4	0.3	0.2	0.2	0.1	0.1	0.0	0.0	5.4	0.6																						
																								0.2	0.1	0.6	1.0	4.1	6.0	5.7	2.2	1.3	2.3	2.4	3.4	5.1	4.6	2.3	4.9	4.4	2.9	1.5	3.1	0.1	0.1	0.0	0.3	Diurnal Average
																								0.2	0.1	0.3	0.6	3.0	4.5	4.1	1.1	0.7	1.0	1.6	1.3	1.6	2.2	1.3	3.1	2.4	2.1	1.0	2.5	0.1	0.1	0.0	0.3	Diurnal Maximum



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Precipitation (PC) - mm**  
**Mackay River - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Precipitation (PC) - mm**  
**Mackay River - October 2017**

<b>Concentration Ranges (mm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	703	94.49	94.49
0.4 - 0.5	11	1.48	95.97
0.6 - 0.7	5	0.67	96.64
0.8 - 1.4	15	2.02	98.66
1.5 - 10	10	1.34	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Wind Speed (WS) - km/h

## Mackay River - October 2017

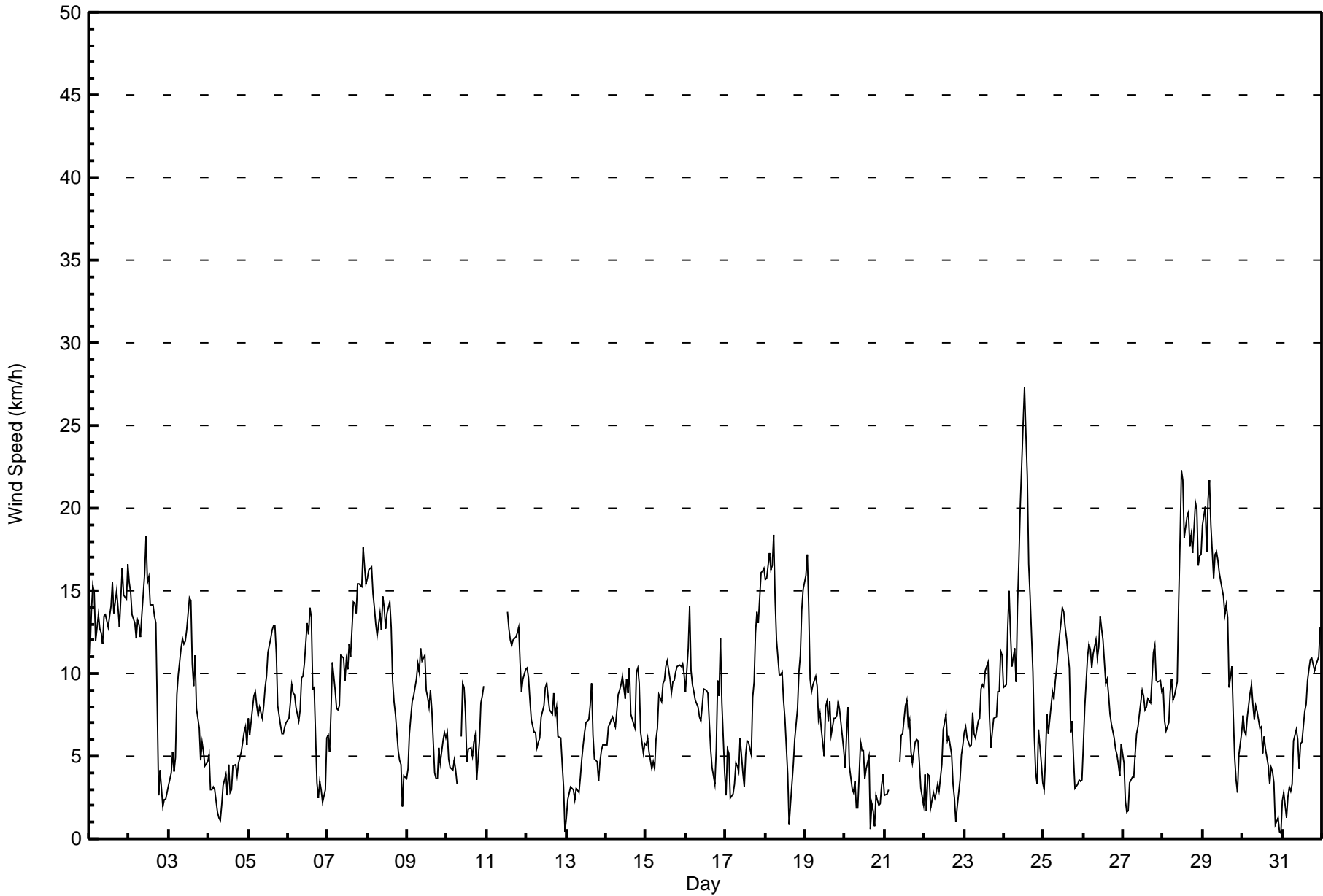
Maximum Speed: 27 km/h on Oct 24 13:00	Maximum Daily Speed Average: 13.5 km/h on Oct 1	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 31 00:00	Minimum Daily Speed Average: 0.2 km/h on Oct 20	Hours of Data: 724
Maximum Diurnal Speed Average: 5.9 km/h at hour 14	Minimum Diurnal Speed Average: 2.2 km/h at hour 22	Hours of Missing Data: 20
Monthly Average Velocity: 3.6 km/h 274.2 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 5 Median = 8 Q <sub>3</sub> = 11 P <sub>90</sub> = 15 P <sub>99</sub> = 22	Percent Operational Time: 97.3

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	WNW11	WNW14	WNW15	WNW15	WNW12	WNW14	WNW13	NW12	NW12	NW13	NW14	WNW13	NW13	NW14	NW15	NW14	NW15	NW14	NW13	NW15	NNW16	NNW15	NW14	NNW17	NW13.5	NNW17	
2-Oct	NW16	NW15	NW14	NW13	NW12	NNW13	NNW13	NNW12	N14	NNW16	NNW18	NNW16	NNW16	NNW14	NNW14	NNW13	NNW13	NNW8	NW3	NW4	WNW2	WSW2	SW2	SW3	NNW10.5	NNW18	
3-Oct	SW3	SW4	SW5	SSW4	S5	S9	S10	SSW12	SSW12	SSW12	SSW12	SSW13	SSW15	SSW14	SSW11	SW9	SW11	WSW8	W7	WSW5	W6	W5	W4	W5	SW7.6	SSW15	
4-Oct	W5	W3	W3	WNW3	NW3	SSE2	SSW1	SSW1	WSW2	NW3	W4	WNW3	WSW5	WSW3	WNW3	SSW4	SSE5	SSE4	SSE5	SSE5	S5	S6	S7	S6	SSW2.3	S7	
5-Oct	S7	S6	S8	SSW9	S9	SSW8	S7	SSW8	SSW7	SSW8	SSW9	SSW10	SSW11	SSW12	SSW13	SW13	SW13	WSW11	SW8	SW7	SW6	SSW6	SW7	SW7	SSW8.4	SW13	
6-Oct	SW7	SSW8	SW9	SW9	SW9	SW8	SW7	SW8	SW10	WSW10	WSW11	WSW13	W12	W14	WNW13	W9	W9	WSW3	NW2	SSE3	SSE3	NW2	S3	S6	WSW6.8	W14	
7-Oct	SSW6	SW5	WSW8	W11	WNW9	WNW8	WNW8	WNW8	NW11	NW11	WNW10	WNW11	WNW10	NW12	NW11	NW14	NNW14	NNW14	NNW15	NW15	NW15	NW18	NW16	NW15	NW10.4	NW18	
8-Oct	NW16	NW16	NW16	WNW15	NW14	WNW13	WNW12	NW14	NW13	NW15	WNW14	NW13	WNW14	NW14	NW13	WNW10	WNW8	WNW8	W5	WSW5	WSW5	WSW2	S4	S4	WNW10.1	WNW16	
9-Oct	S4	SSE6	SSE7	SSE8	SSE9	SSE10	SSE11	S10	S12	S11	S11	SSW9	W9	W8	W9	WNW8	WNW4	SW4	WSW4	W5	SW5	SW6	SSW6	SW6	SSW5.5	S12	
10-Oct	SW6	SW5	WSW4	WSW4	W5	W4	WSW3	AF	WNW6	NW9	NW9	NW8	WNW5	NW5	NNW5	NNE5	NNE6	NNE6	NE4	NNE6	NNE8	NNE9	NE9	AF	NNW3.2	NW9	
11-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	NNE14	NNE13	NNE12	NNE12	N12	N12	N12	N13	N11	N9	N10	N10	----	NNE14	
12-Oct	N10	N10	NNW8	NNW7	NNW6	N6	N6	NNW6	NNW6	NNW7	NNW8	NNW9	NW9	NW9	NW8	NW8	NW9	NW7	NW8	NW6	NW6	NW5	NW3	NW0	NNW6.8	N10	
13-Oct	SW1	WSW2	WSW3	WSW3	WSW3	WSW2	SW3	SW3	SW4	SW5	WSW6	WSW6	WSW7	SW7	SSW8	SSW9	SW6	SW5	WSW5	SW3	S5	S5	S6	S6	SW4.4	SSW9	
14-Oct	S6	S7	S7	S7	S7	S7	SSE8	S9	S9	SSW9	SSW10	WSW8	WSW10	WSW9	WSW10	WSW8	WNW7	WNW7	WNW10	WNW10	NW9	WNW6	W5	W6	SW5.6	WSW10	
15-Oct	W6	W6	W5	WSW4	SW5	SSE4	S6	S7	S9	SSE8	SSE9	SSE10	SSW10	SSW11	SSW10	S9	S10	S10	SSW10	SSW10	SSW11	SSW11	SSW11	SSW10	SSW7.5	SSW11	
16-Oct	SW9	WSW12	W14	W10	W9	W9	WSW8	WSW8	WSW7	WSW7	WSW8	WSW9	W9	SW9	SW7	SW5	SSW4	S3	SSW5	SW10	SW9	SSW12	SSW8	S4	WSW7.4	W14	
17-Oct	SSE3	SE5	SE5	ESE2	SE3	SSE3	SSE5	SSE4	SSE4	S6	SSE4	ENE3	NNE5	NNE6	NNE6	N5	NW9	WNW9	WNW12	WNW14	WNW13	WNW16	WNW16	WNW16	WNW2.9	WNW16	
18-Oct	WNW16	WNW16	WNW17	WNW16	WNW17	WNW18	WNW14	WNW12	WNW10	WNW10	WNW10	W8	W7	WNW4	S1	S2	ESE3	SE4	ESE6	ESE8	ESE10	ESE11	ESE14	ESE15	WNW4.3	WNW18	
19-Oct	ESE16	ESE17	ESE14	ESE10	ESE9	SE9	SE10	SE9	SSE7	S8	SW7	SSW5	S8	SSW8	SSW7	SSE8	SE6	ESE7	SE7	ESE7	SE8	SE8	SE6	SE5	SE7.5	ESE17	
20-Oct	SE4	ESE6	SE8	SE4	ESE3	E3	ESE3	N2	N2	NW6	N5	N5	NE4	W4	WNW5	NW1	SW2	SSW2	SE1	WSW3	SSW2	SSW2	WSW3	W4	ENE0.2	SE8	
21-Oct	WSW3	WSW3	W3	AF	AF	AF	AF	AF	AF	AF	W5	W6	W6	WSW8	W8	WSW7	WSW7	SW5	SSW5	SSW6	SSW6	SSW6	SSW5	S3	ESE2	WSW4.4	W8
22-Oct	SE4	SE2	ESE4	ESE4	ESE2	NNW3	NE2	NE3	NE3	NNE3	ENE4	NNW7	NNW7	NNW8	N6	NNW6	NNW5	NNW3	WSW2	SW1	SSW2	WSW4	WSW5	WSW6	N1.6	NNW8	
23-Oct	WSW6	W7	W6	W6	WSW6	W8	W6	W6	W7	W7	W9	WNW9	W9	W10	W11	W7	SW5	SSW6	SSW7	SSW7	S9	S9	S11	SSW11	WSW6.4	S11	
24-Oct	S9	S9	S13	SSW15	SSW12	SW10	W12	W9	W14	WNW17	WNW20	WNW25	NW27	NW25	NW22	NW17	NW15	NW10	NW6	NW4	N3	ENE7	E5	E3	WNW8.1	NW27	
25-Oct	ENE3	ENE5	ENE8	NE6	NE8	NE9	NE8	NNE10	NNE10	NNE12	N13	N14	N14	N13	N12	N10	NNW6	NNW7	NNW5	NNW3	NW3	W4	WSW3	SW4	N6.5	N14	
26-Oct	SW6	SW8	SW11	SW12	SW11	SSW10	SSW11	SSW12	SSW11	SSW12	SSW13	SSW13	SSW12	SSW9	SW10	SW9	SW8	SW7	SW6	SW5	WSW5	WSW4	WSW4	W6	SW8.6	SSW13	
27-Oct	W5	WSW2	WSW2	S2	S3	S4	SSE4	SSE5	S6	S7	S8	S9	S9	S8	S9	S8	S10	S11	S12	S10	SSW9	SSW10	SSW9		S6.7	S12	
28-Oct	SSW9	SSW7	SW7	W7	WSW9	W10	WSW8	WSW9	W9	WNW14	WNW18	WNW22	NW22	NW18	NW20	NW20	NW18	NW18	NW17	NW20	NW20	NW17	NW17	NW17	WNW12.9	WNW22	
29-Oct	NW19	NW20	NW17	NW20	NW22	NW19	NW16	NW17	NNW17	NNW17	NNW16	NNW16	NNW15	NNW14	NW14	NNW13	NNW9	NW10	NNW7	NW5	NW4	S3	SSW5	SSW6	NW12.3	NW22	
30-Oct	SSW7	SSW7	SSW6	SSW7	SSW9	SSW9	SSW8	SSW7	S8	S8	SSW7	SSW7	W5	WNW6	NW5	NW4	NW3	NW4	N4	N3	NW1	SE1	ENE0	SE0	SW3.4	SSW9	
31-Oct	ESE2	ESE3	ESE1	SSE3	ESE3	E3	E3	ESE6	ESE7	ESE6	E4	ENE6	NE6	NE8	NE8	NNE10	NNE10	NNE11	NNE11	NNE10	NNE11	NNE11	NNE11	NNE13	NE5.6	NNE13	

WSW3.0	WSW3.0	WSW3.5	W3.8	WSW3.7	W3.2	WSW2.8	WSW3.0	WSW3.4	W4.3	W4.9	W5.6	WNW5.9	WNW5.9	WNW5.7	WNW4.8	WNW4.3	WNW3.4	WNW3.1	WNW2.9	W2.5	W2.2	WSW2.2	WSW2.5	Diurnal Average
NW19	NW20	NW17	NW20	NW22	NW19	NW16	NW17	NNW17	WNW17	WNW20	WNW25	NW27	NW25	NW22	WNW20	NW18	NW18	NW17	NW20	NW20	NW18	NW17	NW17	Diurnal Maximum

AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h  
Mackay River - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	210	29.01	29.01
6 - 11	345	47.65	76.66
12 - 19	155	21.41	98.07
20 - 28	14	1.93	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 724

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Wind Speed (WS) - km/h  
Mackay River - October 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	7	3	5	5	6	13	11	18	16	15	23	33	20	9	19	7	210
6 - 11	10	17	8	3	0	12	9	12	51	58	37	28	38	24	20	18	345
12 - 19	10	6	0	0	0	5	0	0	3	17	3	2	5	32	48	24	155
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	0	3	11	0	14
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	27	26	13	8	6	30	20	30	70	90	63	63	63	68	98	49	724

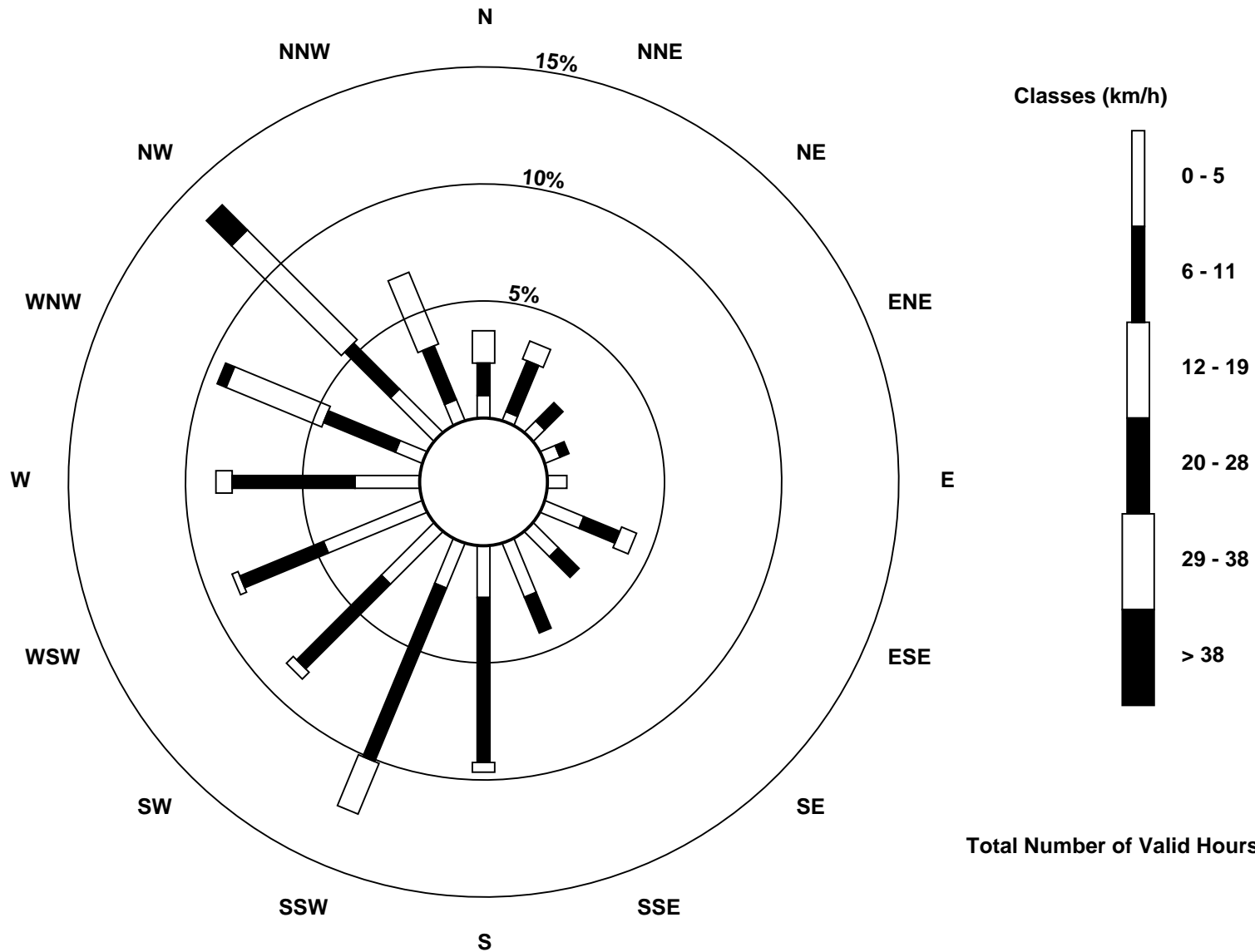
Total Number of Valid Hours: 724

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed (WS) - km/h  
Mackay River (AMS 20)





**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Speed (WS) - km/h**  
**Mackay River - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 10 km/h on Oct 24 12:00	Hours of Data: 724
Minimum Value: 1 km/h on Oct 31 00:00	Hours of Missing Data: 20
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 5 P <sub>99</sub> = 7	Hours of Calibration: 0
	Percent Operational Time: 97.3

Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	4	4	5	5	4	4	4	4	4	4	4	4	4	4	5	4	5	4	3	4	4	4	4	5	5	
2-Oct	4	4	3	4	3	4	4	4	4	5	5	5	5	4	5	4	4	3	2	2	1	1	1	1	5	
3-Oct	1	1	2	1	1	2	2	3	3	4	4	5	5	5	4	4	4	4	3	2	2	2	2	2	5	
4-Oct	2	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	1	1	1	1	1	2	2	2	2	
5-Oct	2	1	2	2	2	2	2	2	2	2	3	3	4	4	5	4	5	4	3	2	2	2	2	2	5	
6-Oct	2	2	3	3	3	3	2	3	4	4	5	6	6	6	5	5	4	2	2	2	1	4	2	1	6	
7-Oct	2	2	4	4	4	3	3	3	3	3	3	4	3	4	4	5	5	5	5	5	5	5	5	5	5	
8-Oct	6	5	5	5	5	4	4	4	4	5	5	4	4	5	5	4	3	3	2	2	2	2	1	1	6	
9-Oct	1	2	2	2	3	3	3	3	4	3	3	4	4	3	4	3	2	1	7	4	2	2	2	1	7	
10-Oct	2	1	1	2	2	1	2	AF	3	3	3	3	2	2	3	2	2	2	2	2	3	3	3	AF	3	
11-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	5	5	4	4	4	4	4	4	3	3	3	3	5	
12-Oct	4	3	3	2	2	2	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	2	1	1	4	
13-Oct	1	1	1	1	1	1	1	1	1	2	2	3	3	3	3	3	2	2	2	1	1	1	1	1	3	
14-Oct	1	2	2	2	2	2	2	3	3	3	3	4	4	4	4	3	3	3	4	3	3	2	2	2	4	
15-Oct	2	2	2	1	1	1	1	2	3	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	3	
16-Oct	3	5	6	4	4	3	3	3	3	3	4	4	4	4	3	2	1	1	3	3	3	4	3	1	6	
17-Oct	1	2	2	1	1	1	1	1	1	2	2	1	1	2	2	2	3	4	4	5	5	6	6	6	6	
18-Oct	6	6	6	6	6	7	5	4	4	4	4	3	3	2	1	1	1	1	1	2	3	3	4	5	7	
19-Oct	5	5	4	3	2	2	3	3	3	2	2	2	3	3	3	3	2	2	2	2	2	2	1	1	5	
20-Oct	1	1	2	1	2	1	2	1	1	2	2	2	2	2	2	1	1	2	1	1	1	1	1	1	2	
21-Oct	1	1	1	AF	AF	AF	AF	AF	AF	2	2	3	3	4	3	3	2	1	1	1	1	2	1	1	4	
22-Oct	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	2	2	2	2	
23-Oct	2	3	2	2	2	3	3	2	3	3	4	4	4	4	4	4	2	2	2	2	3	3	4	4	4	
24-Oct	3	3	4	5	4	4	5	4	6	7	8	10	9	8	7	6	4	3	2	1	1	3	2	1	10	
25-Oct	1	2	3	2	3	3	3	3	3	4	4	4	4	4	4	3	2	2	1	1	2	1	1	1	4	
26-Oct	2	3	4	4	4	3	3	4	3	4	4	3	4	3	3	3	3	2	2	2	2	2	1	2	4	
27-Oct	2	1	1	1	1	1	1	1	2	2	2	3	3	2	2	2	2	3	3	3	3	3	2	2	3	
28-Oct	2	2	2	3	4	4	3	3	4	6	7	7	7	6	7	7	6	6	6	6	7	6	6	5	7	
29-Oct	5	6	5	6	6	6	5	5	6	6	5	4	5	4	4	4	3	3	3	2	3	1	1	2	6	
30-Oct	2	2	2	2	3	2	2	2	2	2	2	2	2	2	1	2	1	1	1	1	1	1	1	1	3	
31-Oct	1	1	1	1	1	1	1	1	2	2	2	2	2	3	3	3	3	3	3	3	3	4	4	4	4	
	6	6	6	6	6	7	5	5	6	7	8	10	9	8	7	7	6	6	7	6	7	6	6	6	6	

Diurnal Maximum

AF - Analyzer Failure



**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

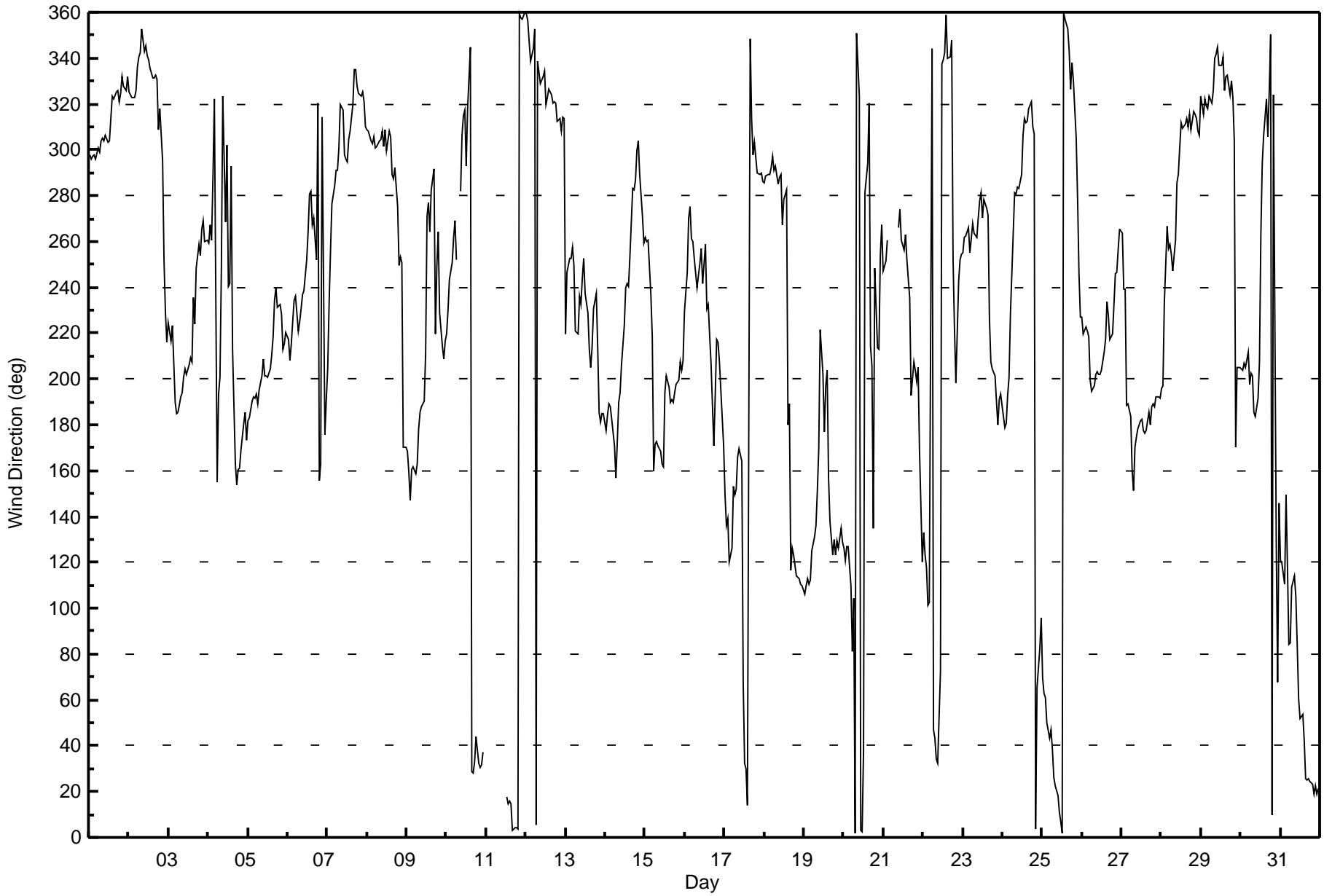
**Wind Direction (WD) - deg**  
**Mackay River - October 2017**

Direction of Maximum Speed: 306 deg on Oct 24 13:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 312.5 deg on Oct 1	Hours of Data: 724
Direction of Minimum Speed: 146 deg on Oct 31 00:00	Hours of Missing Data: 20
Direction of Minimum Daily Speed Average: 0.2 deg on Oct 20	Percent Operational Time: 97.3
Monthly Average Direction: 268.5 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	298	296	297	298	296	301	299	304	305	304	306	303	304	313	323	322	325	326	321	324	332	327	326	332	312.5
2-Oct	326	324	323	323	326	336	341	343	353	343	346	341	339	336	331	331	333	331	309	318	295	252	229	216	332.5
3-Oct	224	217	224	207	190	185	185	192	194	201	204	202	206	209	207	236	224	248	259	254	266	269	260	261	214.9
4-Oct	259	267	261	288	322	155	193	201	248	323	268	302	240	242	293	213	163	154	160	161	169	181	186	173	213.3
5-Oct	182	183	191	192	191	193	189	195	201	208	201	202	200	204	211	218	235	240	232	232	228	213	216	220	208.3
6-Oct	217	208	215	225	234	236	221	225	231	237	239	252	264	280	282	267	270	252	320	156	163	314	176	191	241.6
7-Oct	204	232	256	276	284	291	291	301	319	317	298	296	295	305	308	320	335	335	328	325	323	325	321	310	308.8
8-Oct	309	308	304	303	306	301	302	304	304	308	301	309	299	308	306	289	287	292	275	249	253	251	170	170	299.2
9-Oct	169	159	147	160	162	158	163	178	185	188	190	211	271	277	264	282	292	219	249	264	229	214	209	217	202.7
10-Oct	220	230	244	251	262	269	252	AF	282	306	315	317	293	318	345	29	28	33	44	32	30	31	37	AF	331.0
11-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	18	14	16	15	3	5	4	4	360	358	357	360	--
12-Oct	359	356	347	339	344	353	6	339	334	329	332	335	320	323	326	324	320	321	320	312	314	308	314	313	332.9
13-Oct	220	247	252	253	257	250	221	220	236	233	244	253	237	229	213	205	214	231	237	214	185	181	185	185	222.1
14-Oct	178	184	189	188	182	171	157	173	190	194	206	224	240	242	240	253	283	282	287	299	304	289	271	259	228.8
15-Oct	262	260	261	237	218	160	172	172	171	168	163	162	194	201	197	190	191	190	194	198	200	207	204	208	195.5
16-Oct	229	246	270	275	261	260	252	240	245	250	257	242	259	231	232	219	207	171	193	217	216	207	195	171	237.1
17-Oct	149	136	139	120	126	153	150	152	166	169	164	67	33	30	14	349	313	298	303	296	290	289	290	286	292.6
18-Oct	286	288	289	289	292	297	291	293	285	288	289	267	278	282	180	189	117	126	123	114	113	113	111	110	282.9
19-Oct	106	110	113	111	112	125	131	136	151	169	221	202	177	197	204	157	138	123	130	123	129	126	135	129	136.4
20-Oct	126	121	127	127	110	81	104	2	351	324	3	2	38	281	294	320	214	206	135	248	213	213	254	267	74.0
21-Oct	247	252	261	AF	AF	AF	AF	AF	AF	266	274	260	256	263	252	243	236	193	208	204	199	205	169	120	236.8
22-Oct	133	124	118	102	103	344	47	44	34	33	72	337	340	342	359	340	340	348	252	222	198	243	252	254	352.3
23-Oct	255	262	262	266	255	261	268	264	262	270	278	282	270	278	275	272	226	207	204	201	190	180	191	194	244.8
24-Oct	189	179	181	193	201	228	264	281	281	284	283	289	306	314	312	313	318	321	310	307	4	66	82	96	283.7
25-Oct	70	63	61	50	43	47	39	27	23	18	11	7	2	360	357	353	343	327	338	330	305	279	246	227	11.0
26-Oct	227	219	223	221	218	200	195	197	202	203	202	202	204	212	217	234	227	217	220	232	246	246	256	265	215.0
27-Oct	263	239	239	188	189	184	160	151	170	174	178	182	183	177	176	178	185	180	188	189	188	192	192	192	185.0
28-Oct	196	197	233	267	257	259	254	247	261	286	289	301	312	310	311	314	310	316	309	317	315	314	308	307	296.7
29-Oct	323	315	322	319	318	323	321	326	340	342	345	337	337	340	326	332	332	324	330	323	304	170	205	205	325.8
30-Oct	204	204	207	205	212	198	202	202	185	184	192	207	263	294	306	322	306	326	350	10	324	129	68	146	219.9
31-Oct	121	120	110	149	118	84	85	109	114	105	84	60	52	54	42	26	25	26	24	23	19	22	19	21	45.5

250.4 250.9 254.0 259.2 258.5 259.5 248.1 250.8 257.5 271.3 273.3 279.8 287.1 291.4 293.1 294.0 296.2 298.3 288.8 285.6 280.3 266.7 251.8 249.7  
 Diurnal Average

AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods





**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Direction (WD) - deg**  
**Mackay River - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 105 deg on Oct 18 15:00	Hours of Data: 724
Minimum Value: 11 deg on Oct 20 01:00	Hours of Missing Data: 20
Percentiles: P <sub>1</sub> = 13 P <sub>10</sub> = 19 Q <sub>1</sub> = 22 Median = 25 O <sub>3</sub> = 36 P <sub>90</sub> = 47 P <sub>99</sub> = 77	Hours of Calibration: 0
	Percent Operational Time: 97.3

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	25	26	24	24	25	24	23	23	23	23	23	23	23	21	20	20	19	19	17	19	20	20	20	21	26
2-Oct	20	18	19	18	19	21	22	21	25	25	26	26	25	25	28	24	23	19	25	18	27	41	33	30	41
3-Oct	33	27	25	23	22	15	16	19	20	22	25	26	27	28	26	37	32	45	46	42	38	49	47	44	49
4-Oct	41	40	18	27	38	40	53	66	58	78	74	80	65	85	73	47	26	22	22	23	18	17	18	19	85
5-Oct	19	18	15	15	16	16	14	18	26	26	28	27	27	28	31	30	37	40	32	32	30	22	21	23	40
6-Oct	24	22	25	27	33	42	25	31	40	40	48	48	48	41	34	47	44	42	77	33	20	87	30	15	87
7-Oct	21	38	53	41	35	33	29	28	19	19	28	27	27	26	24	26	24	21	19	20	20	21	21	21	53
8-Oct	22	22	22	24	23	24	24	25	25	22	25	24	27	24	28	33	33	30	49	48	52	70	22	22	70
9-Oct	25	26	23	24	24	26	24	23	23	20	23	30	45	42	46	37	37	22	43	55	35	19	21	20	55
10-Oct	26	27	40	38	45	42	38	AF	33	24	25	26	55	47	39	28	26	22	28	22	24	24	24	AF	55
11-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	24	23	23	24	25	25	24	24	23	24	24	25	25
12-Oct	26	25	25	24	24	32	27	22	27	29	27	26	24	28	32	31	23	21	20	21	21	22	24	72	72
13-Oct	64	31	22	31	39	57	34	35	48	33	42	50	46	42	38	25	28	30	30	33	13	13	15	15	64
14-Oct	15	19	21	20	20	26	24	25	25	21	29	36	39	42	40	45	40	36	30	22	21	27	34	43	45
15-Oct	44	44	47	42	25	15	17	23	24	27	25	27	26	23	23	23	21	24	21	21	21	24	21	23	47
16-Oct	32	46	48	42	47	46	49	41	45	53	51	39	44	44	39	32	21	12	24	28	26	25	20	28	53
17-Oct	27	19	23	24	30	28	18	20	24	25	36	33	23	26	28	33	19	24	22	27	31	30	30	30	36
18-Oct	32	32	30	32	28	26	29	27	34	35	35	48	48	71	105	58	19	13	16	18	17	18	17	19	105
19-Oct	21	19	19	19	18	20	20	21	30	26	35	49	33	36	36	27	21	15	17	15	15	13	19	16	49
20-Oct	11	14	14	24	60	29	67	76	52	22	30	42	45	49	35	92	31	75	13	20	39	35	35	36	92
21-Oct	33	35	45	AF	AF	AF	AF	AF	AF	52	45	45	42	49	47	52	37	17	14	16	18	25	33	20	52
22-Oct	14	54	36	15	72	17	29	19	13	43	41	25	28	29	29	24	20	27	43	84	61	42	41	42	84
23-Oct	45	50	50	45	46	46	48	51	50	44	46	43	47	43	43	50	29	19	18	19	17	19	21	21	51
24-Oct	21	23	24	24	21	37	45	35	40	34	37	33	24	24	22	22	20	19	23	31	38	31	35	31	45
25-Oct	30	30	28	25	25	24	28	24	23	23	26	25	25	25	24	24	22	19	26	33	24	42	38	26	42
26-Oct	32	29	30	29	29	22	20	21	24	24	24	22	26	27	30	35	29	22	22	39	43	43	40	46	46
27-Oct	53	46	66	42	28	21	19	15	18	21	21	22	24	22	23	23	22	27	22	20	22	23	19	19	66
28-Oct	21	21	36	50	50	42	46	42	47	33	31	25	22	24	23	23	22	22	22	21	21	22	24	24	50
29-Oct	23	22	21	20	22	21	21	21	24	25	26	25	24	25	21	22	23	21	21	27	55	34	22	20	55
30-Oct	21	20	21	20	22	19	22	21	17	20	23	27	46	32	30	24	19	25	18	25	76	43	42	72	76
31-Oct	48	21	35	19	22	27	29	16	18	20	36	24	26	25	23	24	23	24	22	21	24	25	25	24	48
	64	54	66	50	72	57	67	76	58	78	74	80	65	85	105	92	44	75	77	84	76	87	47	72	

Diurnal Maximum

AF - Analyzer Failure







# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

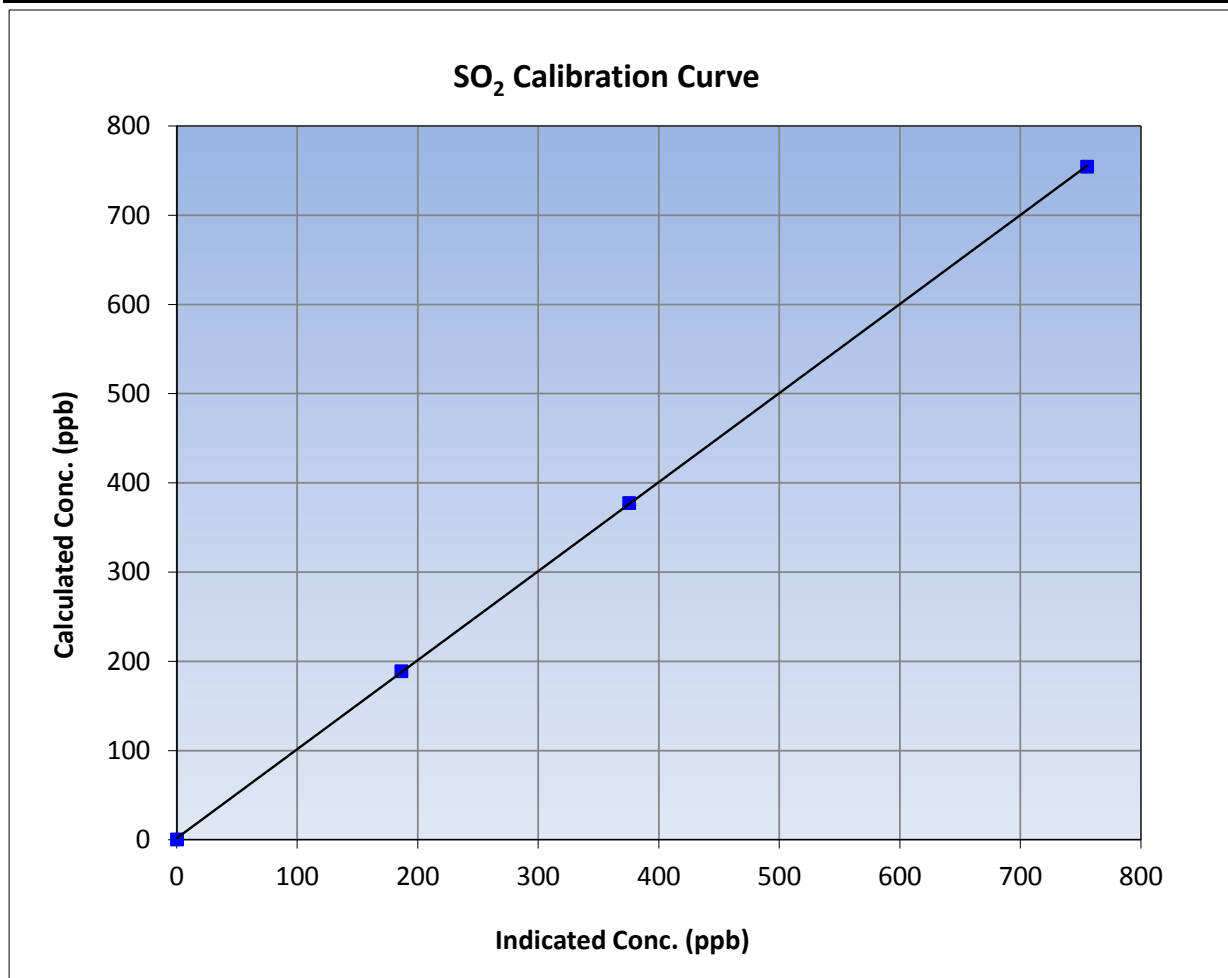
Version-03-2017

### Station Information

Calibration Date	October 11, 2017	Previous Calibration	September 22, 2017
Station Name	MacKay River	Station Number	AMS 20
Start Time (MST)	10:15	End Time (MST)	14:05
Analyzer make	Thermo 43i	Analyzer serial #	1501301450

### Calibration Data

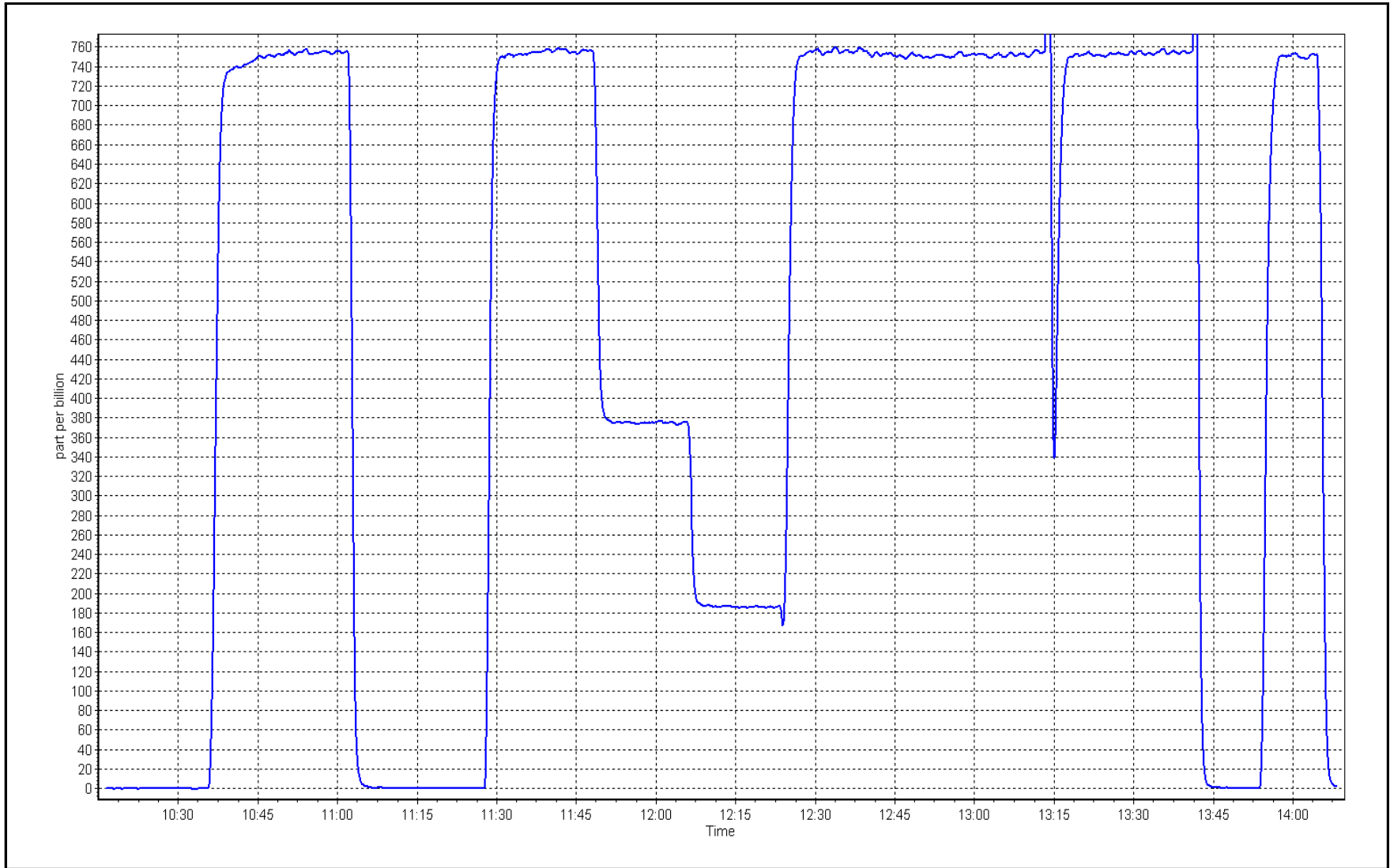
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits
0.0	-0.2	----	Correlation Coefficient	≥0.995
754.2	755.0	0.9990		
377.2	375.0	1.0057	Slope	0.90 - 1.10
188.6	186.0	1.0138		
			Intercept	+/-30



SO2 Calibration Plot

Date: October 11, 2017

Location: MacKay River





# Wood Buffalo Environmental Association

## H<sub>2</sub>S Calibration Report

Version-06-2017

### Station Information

Station Name:	MacKay River	Station number:	AMS 20
Calibration Date:	October 17, 2017	Last Cal Date:	September 18, 2017
Start time (MST):	9:35	End time (MST):	12:45
Reason:	Routine		

### Calibration Standards

Cal Gas Concentration	<u>5.35</u>	ppm	Cal Gas Exp Date	February 13, 2018
Cal Gas Cylinder #	<u>LL119508</u>			
Calibrator Make/Model	Teledyne API T700		Serial Number	1220
ZAG Make/Model	Teledyne API 701		Serial Number	4766

### Analyzer Information

Analyzer make: Teledyne API T101

Analyzer serial #: 196

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Analyzer Range	0 - 100 ppb		PMT voltage	505	505
Calculated slope	0.998729	0.997602	Lamp voltage	2286	2286
Calculated intercept	0.155489	0.294993	Pressure	17.9	17.9
Analyzer Background	30.5	32.1	Flow	0.453	0.451
Analyzer Coefficient	0.959	0.949	Intensity	56	56

### H<sub>2</sub>S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5005	0.0	0.0	0.6	----
as found span	4935	75.6	80.7	82.6	0.977
calibrator zero	5005	0.0	0.0	-0.1	----
high point	4935	75.6	80.7	80.7	1.000
second point	4975	37.9	40.4	40.2	1.006
third point	4995	19.0	20.3	19.8	1.024
as left zero	5005	0.0	0.0	-0.2	----
as left span	4935	75.6	80.7	80.6	1.001
SO2 Scrubber Check	4992	20.0	199.5	0.1	----
Average Correction Factor					1.010
Corrected As found	82.00	Previous response	80.67	*% change	-1.6%

\* = > +/-5% change initiates investigation

Notes: sample inlet filter replaced after as founds. Used an SO<sub>2</sub> cylinder (LL104186) for the Sox scrubber test after 3rd point. Adjusted both zero and span.

Calibration Performed By: Asad Hidayat



# Wood Buffalo Environmental Association

## H<sub>2</sub>S Calibration Summary

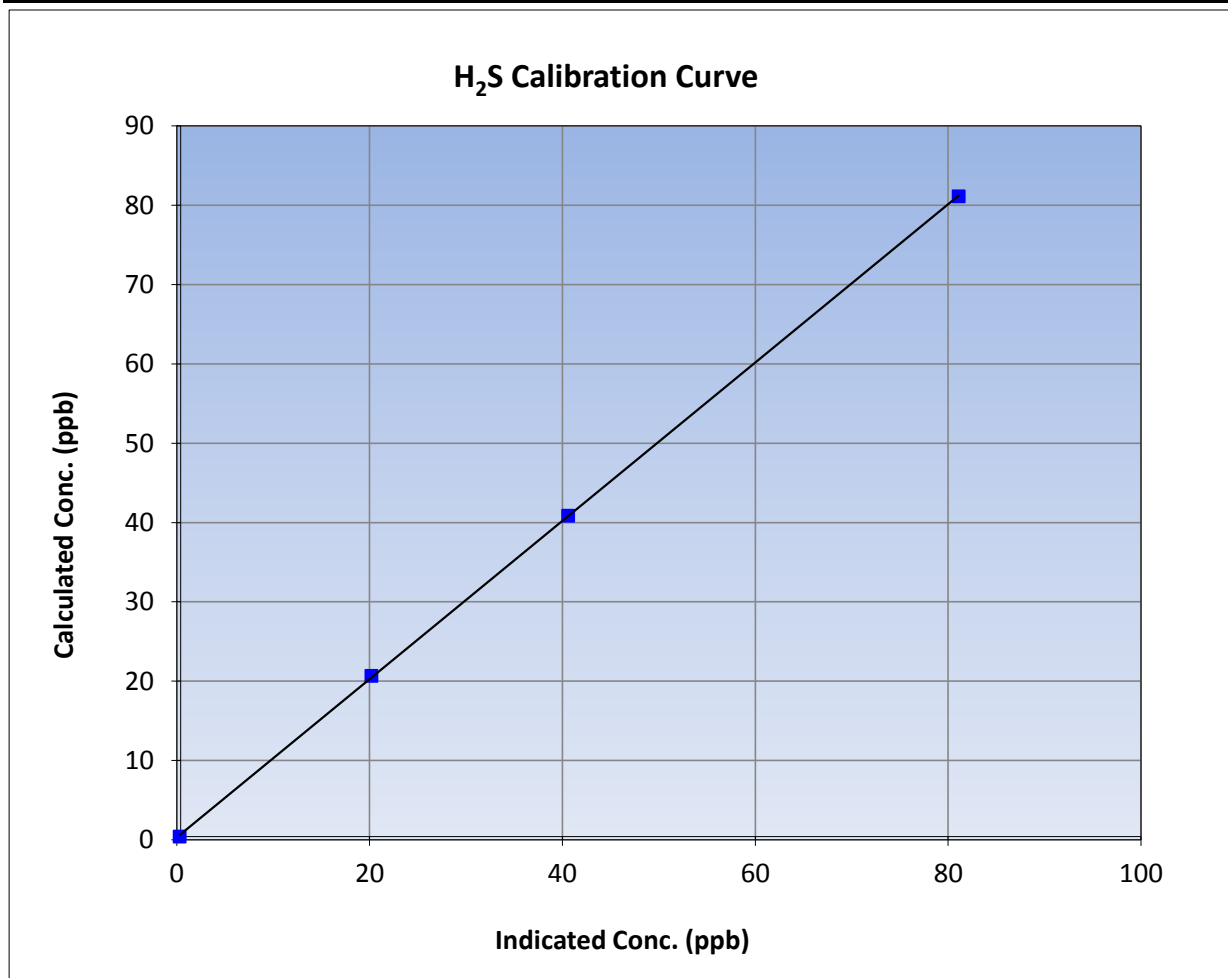
Version-03-2017

### Station Information

Calibration Date	October 17, 2017	Previous Calibration	September 18, 2017
Station Name	MacKay River	Station Number	AMS 20
Start Time (MST)	9:35	End Time (MST)	12:45
Analyzer make	Teledyne API T101	Analyzer serial #	196

### Calibration Data

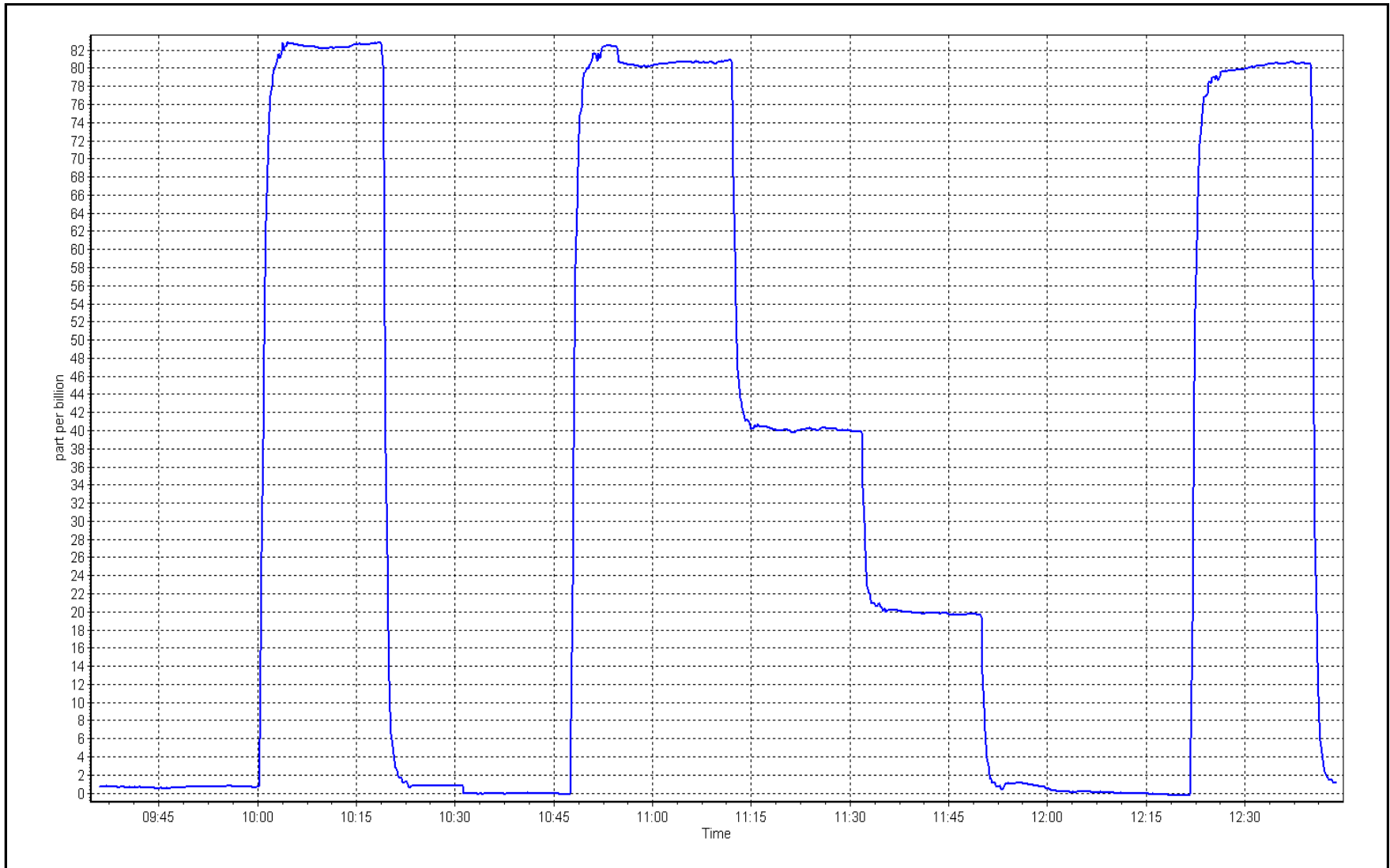
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	-0.1	----	Correlation Coefficient	0.999972	≥0.995
80.7	80.7	1.0003			
40.4	40.2	1.0062	Slope	0.997602	0.90 - 1.10
20.3	19.8	1.0239			
			Intercept	0.294993	+/-3



# H<sub>2</sub>S Calibration Plot

Date: October 17, 2017

Location: MacKay River





# Wood Buffalo Environmental Association

## THC Calibration Report

Version-03-2017

### Station Information

Station Name:	MacKay River	Station number:	AMS 20
Calibration Date:	October 11, 2017	Last Cal Date:	September 22, 2017
Start time (MST):	10:15	End time (MST):	14:05
Reason:	Routine		

### Calibration Standards

Gas Cert Reference	EY0000657	Cal Gas Expiry Date	November 4, 2019
CH4 Cal Gas Conc.	<u>513.0</u> ppm	CH4 Equiv Conc.	1060.3 ppm
C3H8 Cal Gas Conc.	<u>199.0</u> ppm	Station temp.	22 Deg C
Calibrator Make/Model	Teledyne API T700	Serial Number	1220
ZAG Make/Model	Teledyne API 701	Serial Number	4766

### Analyzer Information

Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1501663727
	<u>Start</u>	<u>Finish</u>	<u>Start</u> <u>Finish</u>
Analyzer Range	0 - 25 ppm	Bias voltage supply	-298      -298
Calculated slope	0.997027	Sample pressure	8.6      8.6
Calculated intercept	0.060370	Fuel pressure	23.9      23.9
Analyzer Background	2.580	Air pressure	34.3      34.3
Analyzer Coefficient	4.538	Flame temperature	148.0      148.0

### THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5005	0.0	0.00	-0.13	----
as found span	4930	78.7	16.66	17.13	0.973
calibrator zero	5005	0.0	0.00	-0.05	----
high point	4930	78.7	16.66	16.63	1.002
second point	4975	39.4	8.33	8.28	1.006
third point	4995	19.7	4.17	4.09	1.018
as left zero	5005	0.0	0.00	0.01	----
as left span	4930	78.7	16.66	16.63	1.002
Average Correction Factor					1.009
Corrected As found	17.26	Previous response	16.65	*% change	-3.5%

\* = > +/-5% change initiates investigation

Notes: Sample inlet filter replaced after as founds. Adjusted both zero and span.

Calibration Performed By: Asad Hidayat



# Wood Buffalo Environmental Association

## THC Calibration Summary

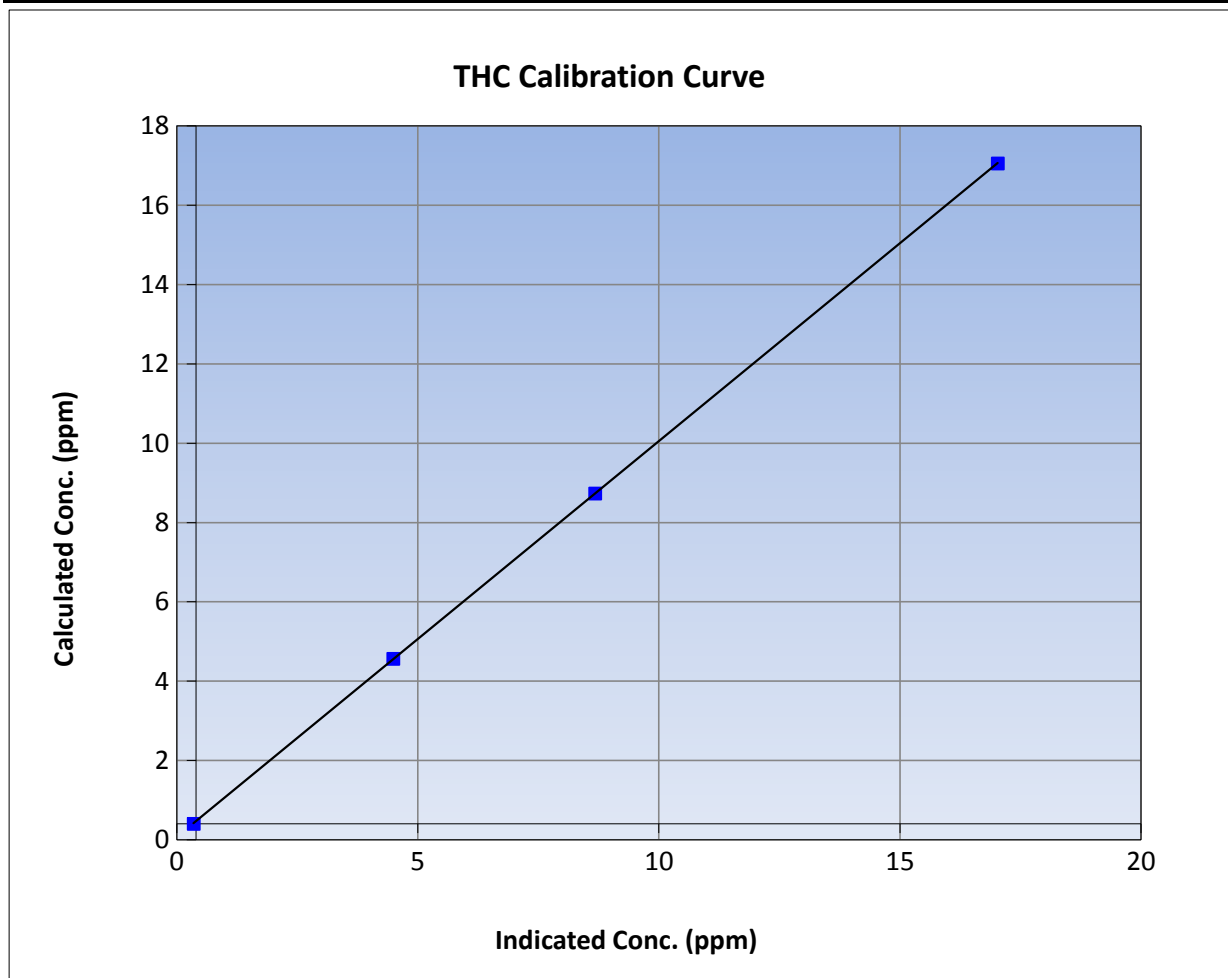
Version-03-2017

### Station Information

Calibration Date	October 11, 2017	Previous Calibration	September 22, 2017
Station Name	MacKay River	Station Number	AMS 20
Start Time (MST)	10:15	End Time (MST)	14:05
Analyzer make	Thermo 51i-LT	Analyzer serial #	1501663727

### Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (lc)	Correction factor (Cc/lc)	Statistical Evaluation	Limits	
0.0	-0.1	----	Correlation Coefficient	0.999996	≥0.995
16.7	16.6	1.0018			
8.3	8.3	1.0063	Slope	0.998219	0.90 - 1.10
4.2	4.1	1.0184			
			Intercept	0.064454	+/-1.5

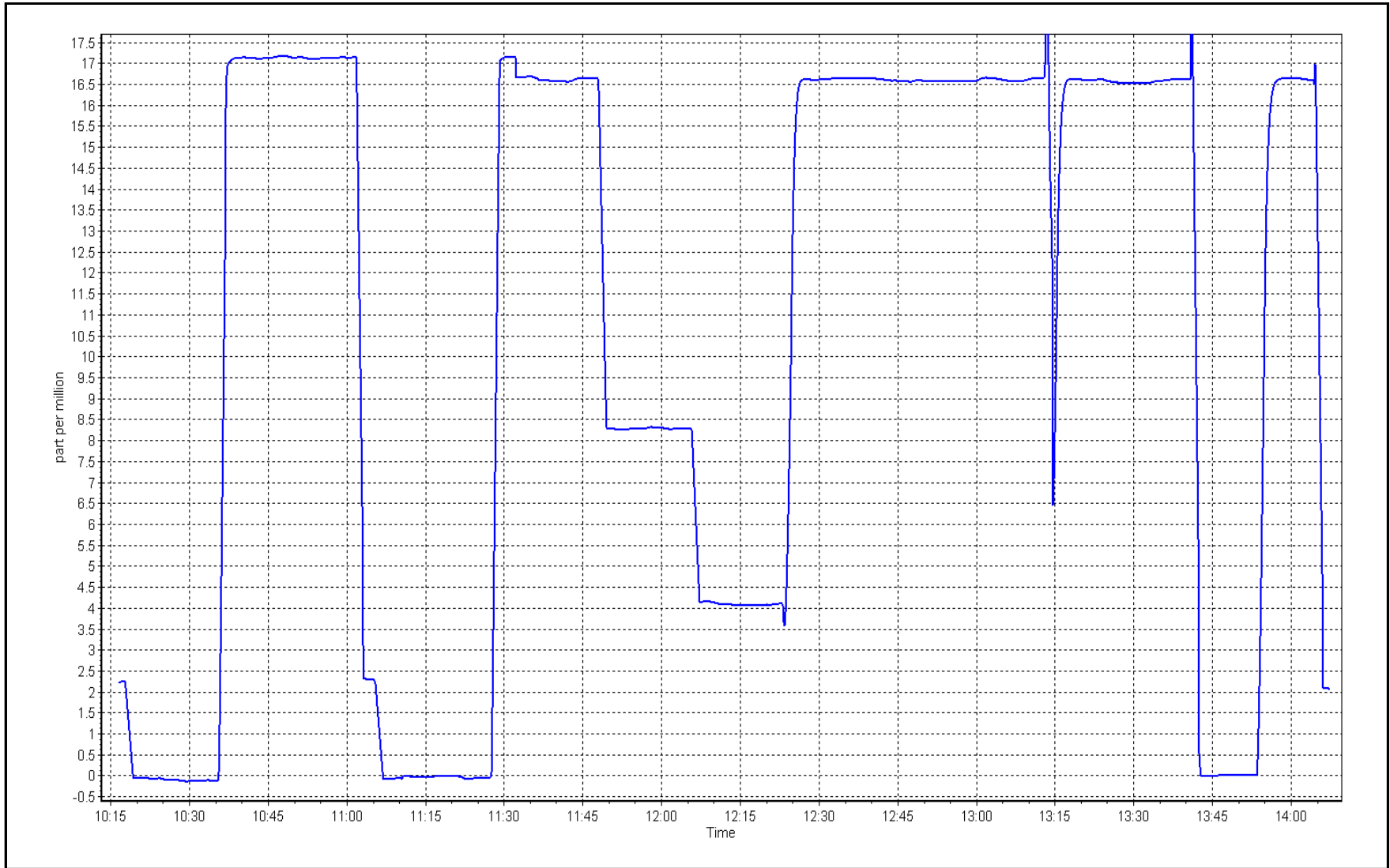




THC Calibration Plot

Date: October 11, 2017

Location: MacKay River





# Wood Buffalo Environmental Association

## NO<sub>x</sub> - NO - NO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	MacKay River	Station number:	AMS 20
Calibration Date:	October 11, 2017	Last Cal Date:	September 22, 2017
Start time (MST):	10:15	End time (MST):	14:05
Reason:	Routine		

### Calibration Standards

NO Gas Cylinder #	EY0000657	Cal Gas Expiry Date	November 4, 2019
NOX Cal Gas Conc.	<u>50.9</u> ppb	NO Cal Gas Conc.	<u>50.9</u> ppb
Calibrator Model	Teledyne API T700	Serial Number	1220
ZAG make/model	Teledyne API 701	Serial Number	4766

### Analyzer Information

Analyzer make:	Thermo 42i	Analyzer serial #:	1505164379	
	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
NO coefficient	1.078	1.070	NOX Range (ppb)	0 - 1000 ppb
NOX coefficient	0.997	0.998	PMT Temperature	-2.9 -3.0
NO2 coefficient	0.995	0.995	Reaction cell Press	167.8 167.5
NO bkgrnd	3.1	3.1	Sample Flow	0.828 0.830
NOX bkgrnd	3.2	3.1	PMT Voltage	-767.4 -767.4

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope	0.990558	0.997022
NO <sub>x</sub> Cal Offset	0.870236	1.135107
NO Cal Slope	0.988618	0.996330
NO Cal Offset	1.504421	1.676019
NO <sub>2</sub> Cal Slope	0.993230	0.995225
NO <sub>2</sub> Cal Offset	0.375588	-0.311477



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

Version-03-2017

### Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5005	0.0	0.0	0.0	0.0	-0.3	-0.3	0.0	----	----
as found span	4930	78.7	799.8	799.8	0.0	806.4	806.4	0.0	0.9918	0.9918
calibrator zero	5005	0.0	0.0	0.0	0.0	-0.3	-0.3	0.0	----	----
high point	4930	78.7	799.8	799.8	0.0	801.6	802.0	-0.4	0.9977	0.9972
second point	4975	39.4	399.9	399.9	0.0	399.1	398.2	0.8	1.0021	1.0044
third point	4995	19.7	200.0	200.0	0.0	198.9	198.2	0.7	1.0053	1.0089
as left zero	5005	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	----	----
as left span	4930	78.7	799.8	347.8	452.0	801.4	346.9	454.5	0.9980	1.0026
<b>Average Correction Factor</b>									<b>1.0017</b>	<b>1.0035</b>

Corrected As found	NO <sub>x</sub> = 806.7 ppb	NO = 806.7 ppb		*Percent Change	NO <sub>x</sub> = 0.0%
Previous Response	NO <sub>x</sub> = 806.5 ppb	NO = 807.5 ppb		*Percent Change	NO = 0.1%

\* = > +/-5% change initiates investigation

### GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
1st NO ref point		0.0	801.0	799.4	1.7	0.9985	1.0005	----	----
1st NO2 (400 ppb O3)	347.8	451.6	801.4	347.8	453.6	0.9980	----	0.9956	100.4%
2nd NO2 (200 ppb O3)	568.3	231.1	801.8	568.3	233.6	0.9975	----	0.9893	101.1%
3rd NO2 (100 ppb O3)	680.1	119.3	800.0	680.1	119.9	0.9997	----	0.9950	100.5%
2nd NO ref point	----	0.0	799.3	797.7	1.6	1.0006	1.0026	----	----
<b>Average Correction Factor</b>						<b>0.9989</b>	<b>1.0015</b>	<b>0.9933</b>	<b>100.7%</b>

Notes: Sample inlet filter replaced after as founds. Adjusted span.

Calibration Performed By: Asad Hidayat



# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

Version-03-2017

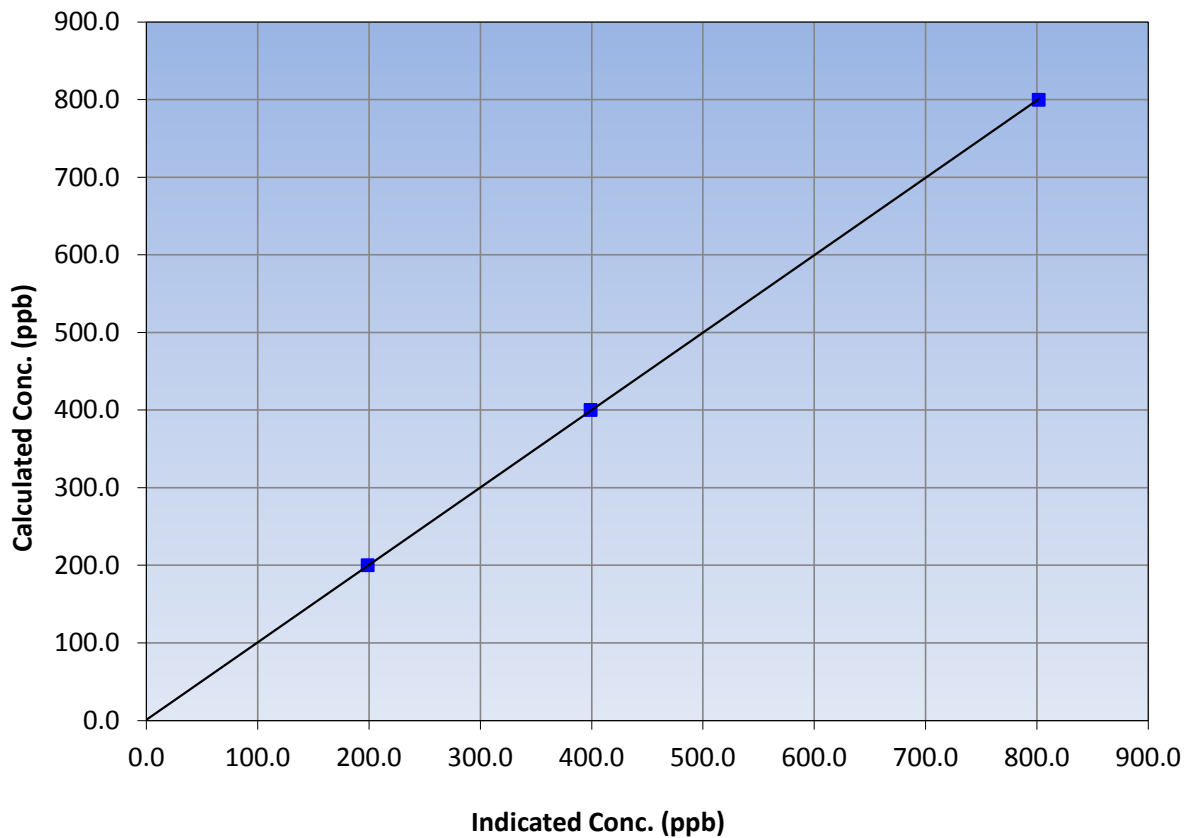
### Station Information

Calibration Date	October 11, 2017	Previous Calibration	September 22, 2017
Station Name	Mackay River	Station Number	AMS 20
Start Time (MST)	10:15	End Time (MST)	14:05
Analyzer make	Thermo 42i	Analyzer serial #	1505164379

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	-0.3	----	Correlation Coefficient	≥0.995	
799.8	801.6	0.9977			
399.9	399.1	1.0021			
200.0	198.9	1.0053			
			Slope	0.997022	0.90 - 1.10
			Intercept	1.135107	+/-20

NO<sub>x</sub> Calibration Curve





# Wood Buffalo Environmental Association

## NO Calibration Summary

Version-03-2017

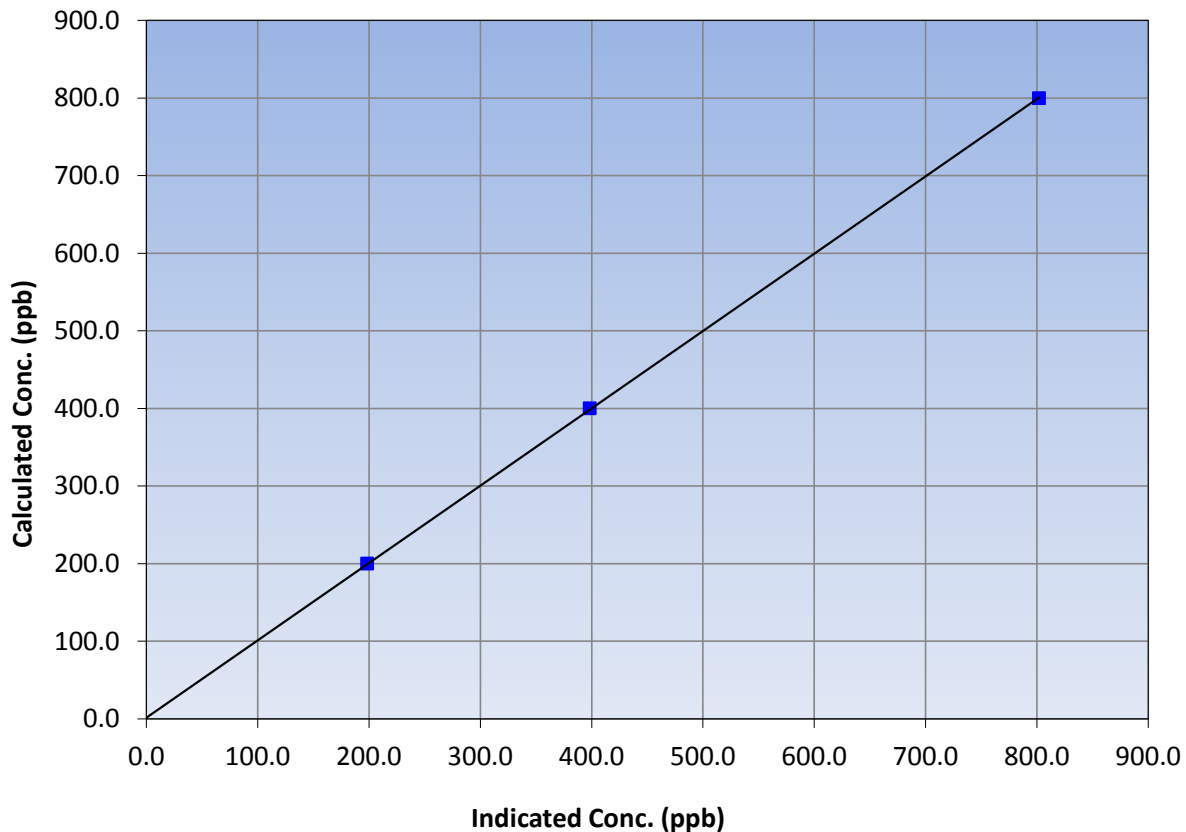
### Station Information

Calibration Date	October 11, 2017	Previous Calibration	September 22, 2017
Station Name	Mackay River	Station Number	AMS 20
Start Time (MST)	10:15	End Time (MST)	14:05
Analyzer make	Thermo 42i	Analyzer serial #	1505164379

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	-0.3	----	Correlation Coefficient	0.999983	≥0.995
799.8	802.0	0.9972			
399.9	398.2	1.0044	Slope	0.996330	0.90 - 1.10
200.0	198.2	1.0089			
			Intercept	1.676019	+/-20

NO Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

Version-03-2017

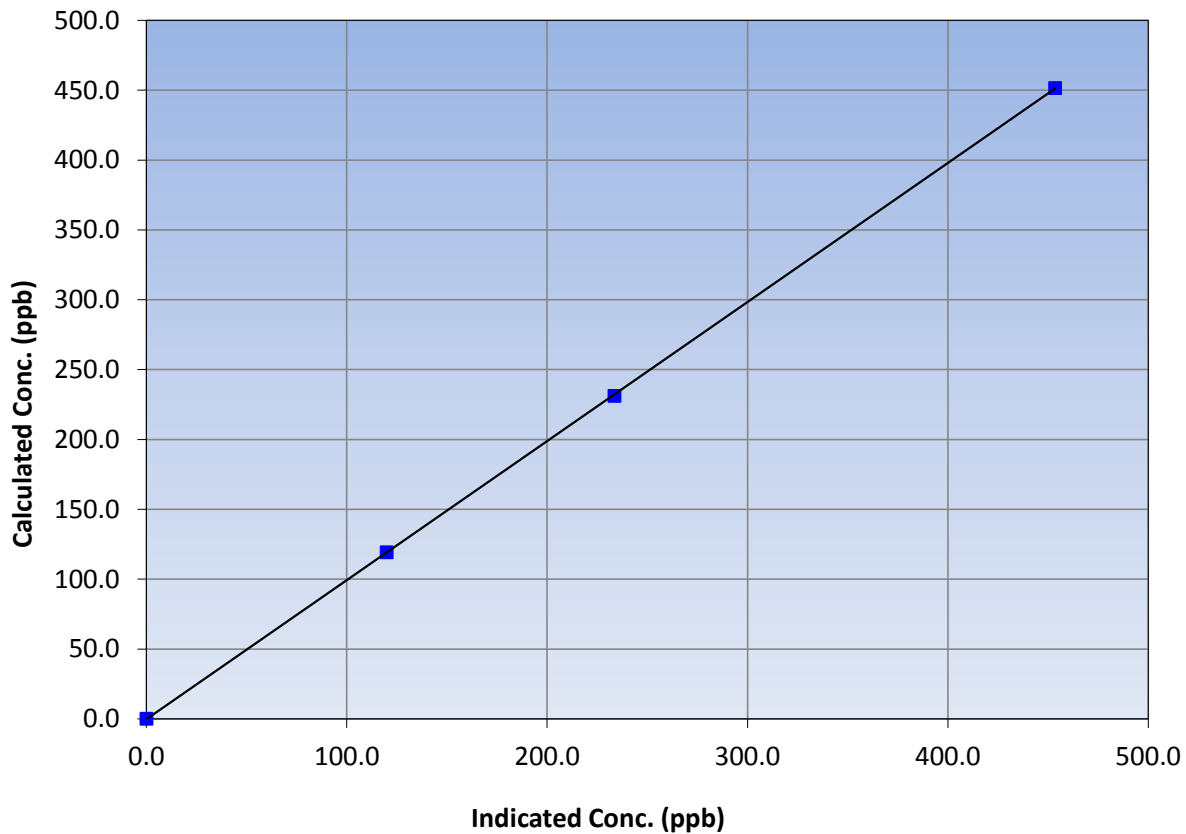
### Station Information

Calibration Date	October 11, 2017	Previous Calibration	September 22, 2017
Station Name	Mackay River	Station Number	AMS 20
Start Time (MST)	10:15	End Time (MST)	14:05
Analyzer make	Thermo 42i	Analyzer serial #	1505164379

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	0.0	----	Correlation Coefficient	≥0.995	
451.6	453.6	0.9956			
231.1	233.6	0.9893			
119.3	119.9	0.9950			
			Slope	0.995225	0.90 - 1.10
			Intercept	-0.311477	+/-20

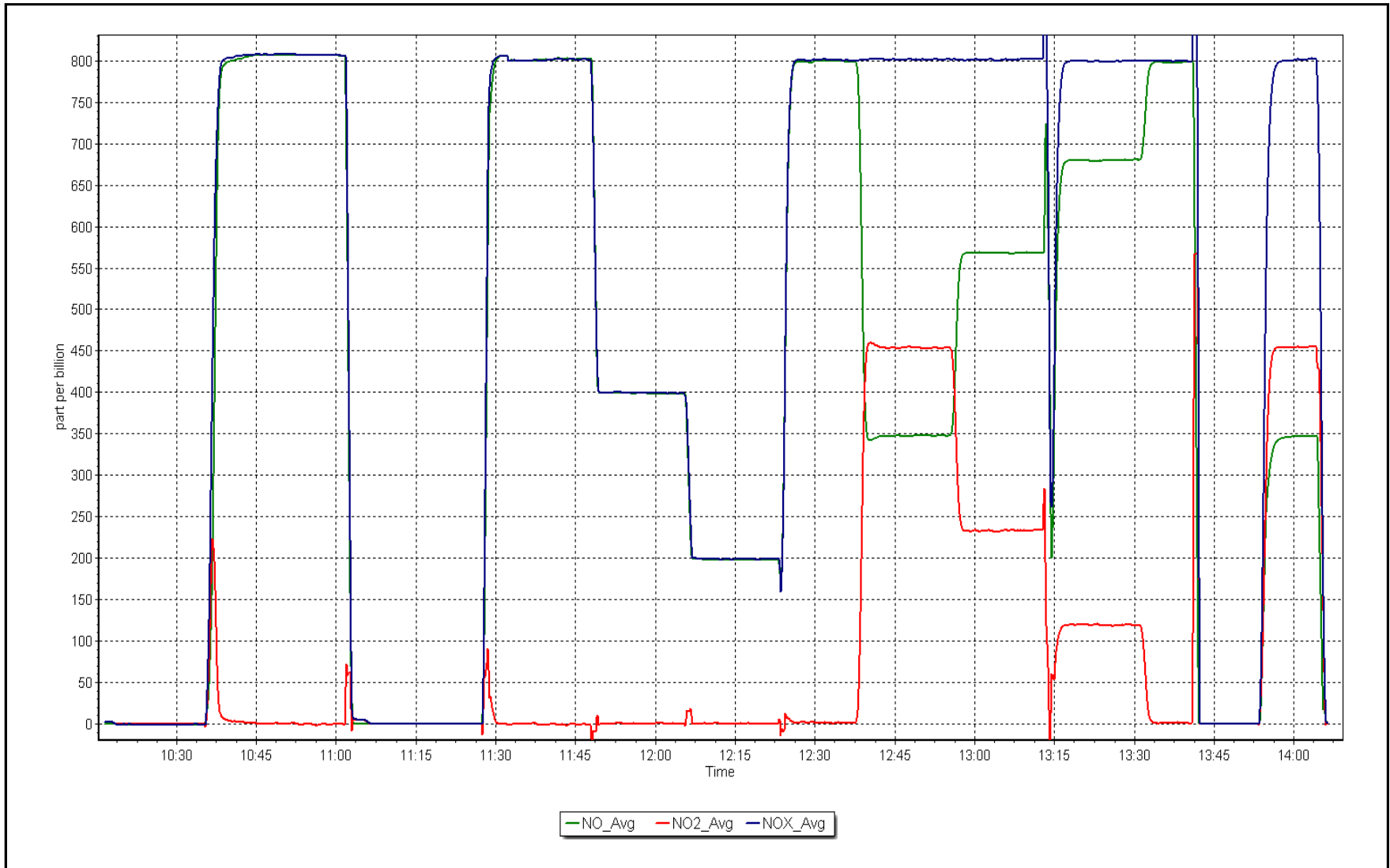
**NO<sub>2</sub> Calibration Curve**



# NO<sub>x</sub> Calibration Plot

Date: October 11, 2017

Location: MacKay River





## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 21  
CONKLIN COMMUNITY  
OCTOBER 2017**

Operations, Data Collection,  
QA/QC, Data Validation and Reporting by:  
Wood Buffalo Environmental Association  
Fort McMurray, Alberta

November 29, 2017



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN (AMS 21)  
OCTOBER 2017

MONTHLY SUMMARY for  
AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	706	37	38	99.87	2	0	1	0
TRS(ppb) Average	706	37	38	99.87	0	0	0	0
THC(ppm) Average	695	37	49	98.39	2.3	-	2.1	-
NMHC(ppm) Average	695	37	49	98.39	0.099	-	0.009	-
CH4(ppm) Average	695	37	49	98.39	2.3	-	2.1	-
O3 (ppb) Average	707	36	37	99.87	44	0	37	-
NO2 (ppb) Average	668	40	76	95.16	24	0	7	-
NO (ppb) Average	698	46	46	100	16	-	4	-
NOX (ppb) Average	668	40	76	95.16	40	-	11	-
PM2.5 (ug/m3) Average	741	3	3	100	34.9	-	7	0
Wind Speed 10 m (km/h) Average	742	0	2	99.73	27	-	16	-
Wind Direction 10 m (deg) Average	742	0	2	99.73	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100	20	-	13.2	-
Relative Humidity (%) Average	720	0	0	100	98	-	96.0	-

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN (AMS 21)  
OCTOBER 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	706	0.2	0	-	0	0	0	0	0	1	2
TRS (ppb) Average	706	0.3	0	-	0	0	0	0	0	0	0
THC (ppm) Average	695	1.95	0.1	-	1.8	1.9	1.9	1.9	2	2	2.3
NMHC(ppm) Average	695	0.001	0.006	-	0	0	0	0	0	0	0.099
CH4(ppm) Average	695	1.94	0.1	-	1.8	1.9	1.9	1.9	2	2	2.3
O3 (ppb) Average	707	25.5	9	-	3	13	19	27	32	37	44
NO2 (ppb) Average	668	2.7	3	-	0	0	1	2	4	6	24
NO (ppb) Average	698	1	2	-	0	0	0	0	1	3	16
NOX (ppb) Average	668	3.7	4	-	0	0	1	2	5	9	40
PM2.5 (ug/m3) Average	741	2.53	2.8	-	0.2	0.8	1.1	1.7	2.8	4.6	34.9
Wind Speed 10 m (km/h) Average	742	8.7	5	-	0	3	5	8	12	16	27
Wind Direction 10 m (deg) Average	742	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	2.54	5	-	-8.2	-3.2	-1.2	1.8	5.8	9.2	20
Relative Humidity (%) Average	744	76.3	17	-	29	51	65	80	91	95	99

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN (AMS 21)  
OCTOBER 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NMHC, CH4, THC	02 Oct 2017 06:00	02 Oct 2017 07:00	2	Unstable operation - excessive baseline drift
NMHC, CH4, THC	03 Oct 2017 07:00	03 Oct 2017 13:00	7	Unstable operation - excessive baseline drift
NMHC, CH4, THC, SO2, TRS, O3	18 Oct 2017 12:00	18 Oct 2017 12:00	1	Maintenance - manifold cleaning
NO2, NO, NOX	17 Oct 2017 03:00	18 Oct 2017 10:00	32	Analyzer failure - pump failure
NO2, NO, NOX	18 Oct 2017 11:00	18 Oct 2017 14:00	4	Maintenance - verify daily QA response
NMHC, CH4, THC	24 Oct 2017 10:00	24 Oct 2017 11:00	2	Maintenance - replaced fuel cylinder and relit FID
Wind Speed, Wind Direction	19 Oct 2017 18:00	19 Oct 2017 18:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	20 Oct 2017 17:00	20 Oct 2017 17:00	1	Flat line in sensor output signal



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb

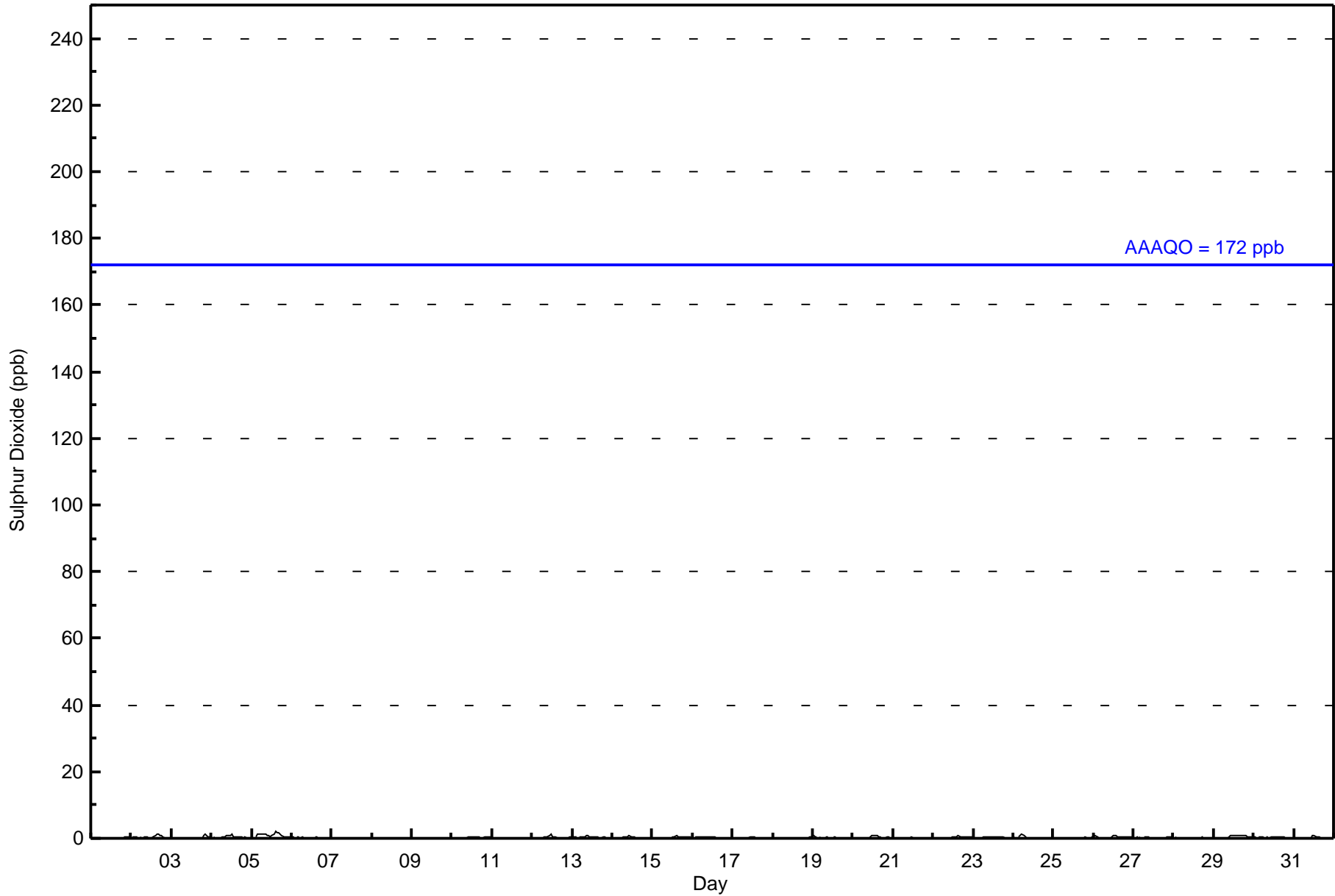
Conklin - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 2 ppb on Oct 5 15:00										Maximum Daily Average: 1.0 ppb on Oct 5										Hours of Data: 706						
Minimum Value: 0 ppb on Oct 7 21:00										Minimum Daily Average: 0.0 ppb on Oct 8										Hours of Missing Data: 38						
Maximum Diurnal Average: 0.3 ppb at hour 12										Minimum Diurnal Average: 0.2 ppb at hour 3										Hours of Calibration: 37						
Monthly Average: 0.2 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 1										Percent Operational Time: 99.9						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0.4	1
3-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0.3	1
4-Oct	Z	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1
5-Oct	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	0	0	0	0	0	1.0	2
6-Oct	1	0	Z	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.2	1
7-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
8-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
9-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
10-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
11-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
12-Oct	0	0	Z	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
13-Oct	0	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
14-Oct	0	0	0	0	Z	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
15-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.3	1
16-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
17-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
18-Oct	0	0	Z	0	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	1	0	0.1	1
19-Oct	1	0	0	Z	0	0	0	0	0	0	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
20-Oct	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0.3	1
21-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
22-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0.2	1
23-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
24-Oct	0	0	Z	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
25-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
26-Oct	0	1	0	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1
27-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
28-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
29-Oct	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.5	1
30-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
31-Oct	0	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1
0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.2 0.2 0.2 0.2 0.2 0.2																								Diurnal Average		
1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 2 2 1 1 1 1 1 1 0																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																										



Wood Buffalo Environmental Association  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Conklin - October 2017





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Conklin - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	706	100.00	100.00
11 - 20	0	0.00	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Conklin - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	57	23	15	4	2	6	9	19	44	92	87	36	38	65	103	104	704
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	57	23	15	4	2	6	9	19	44	92	87	36	38	65	103	104	704

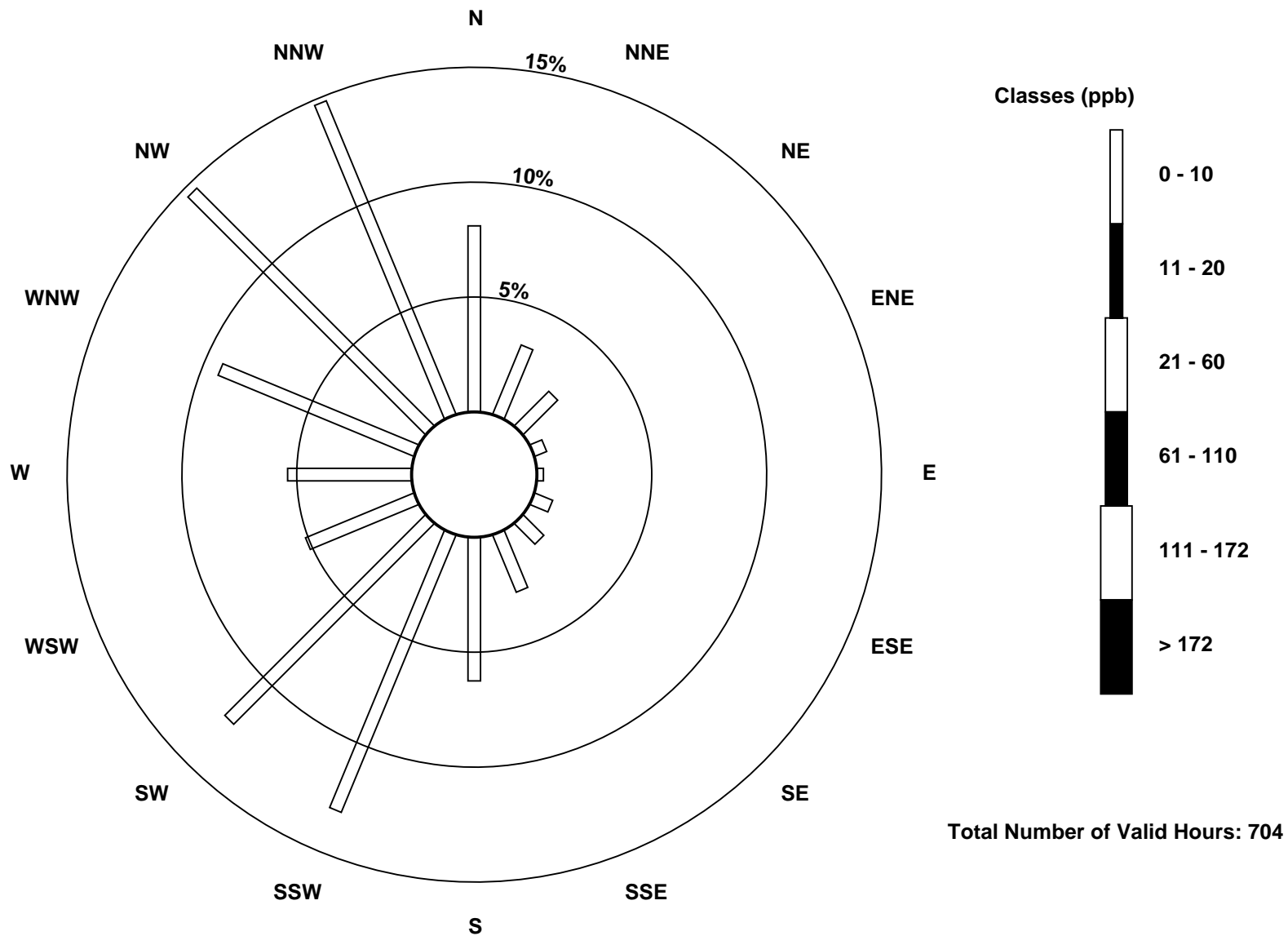
Total Number of Valid Hours: 704

Total Number of Hours: 744

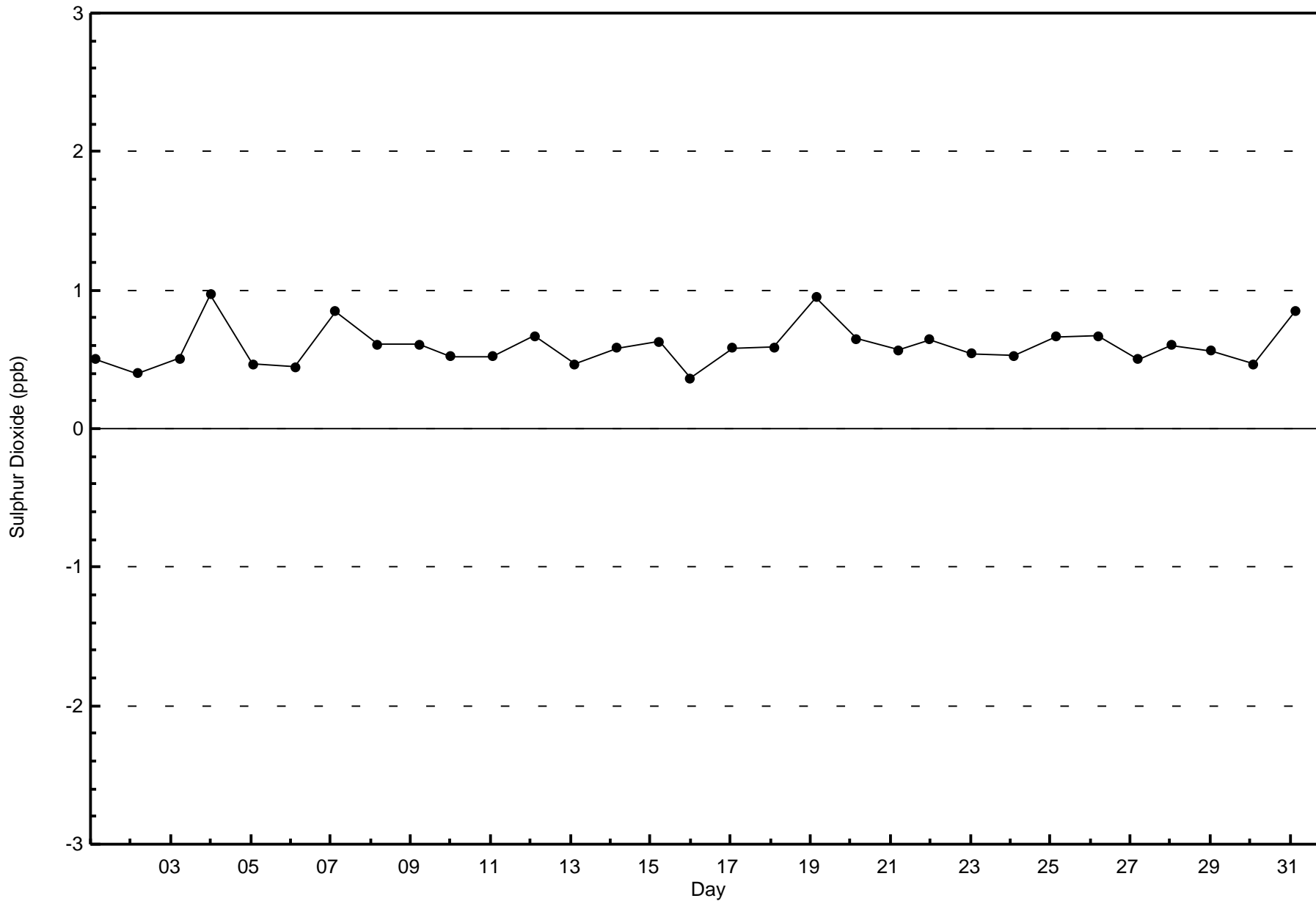


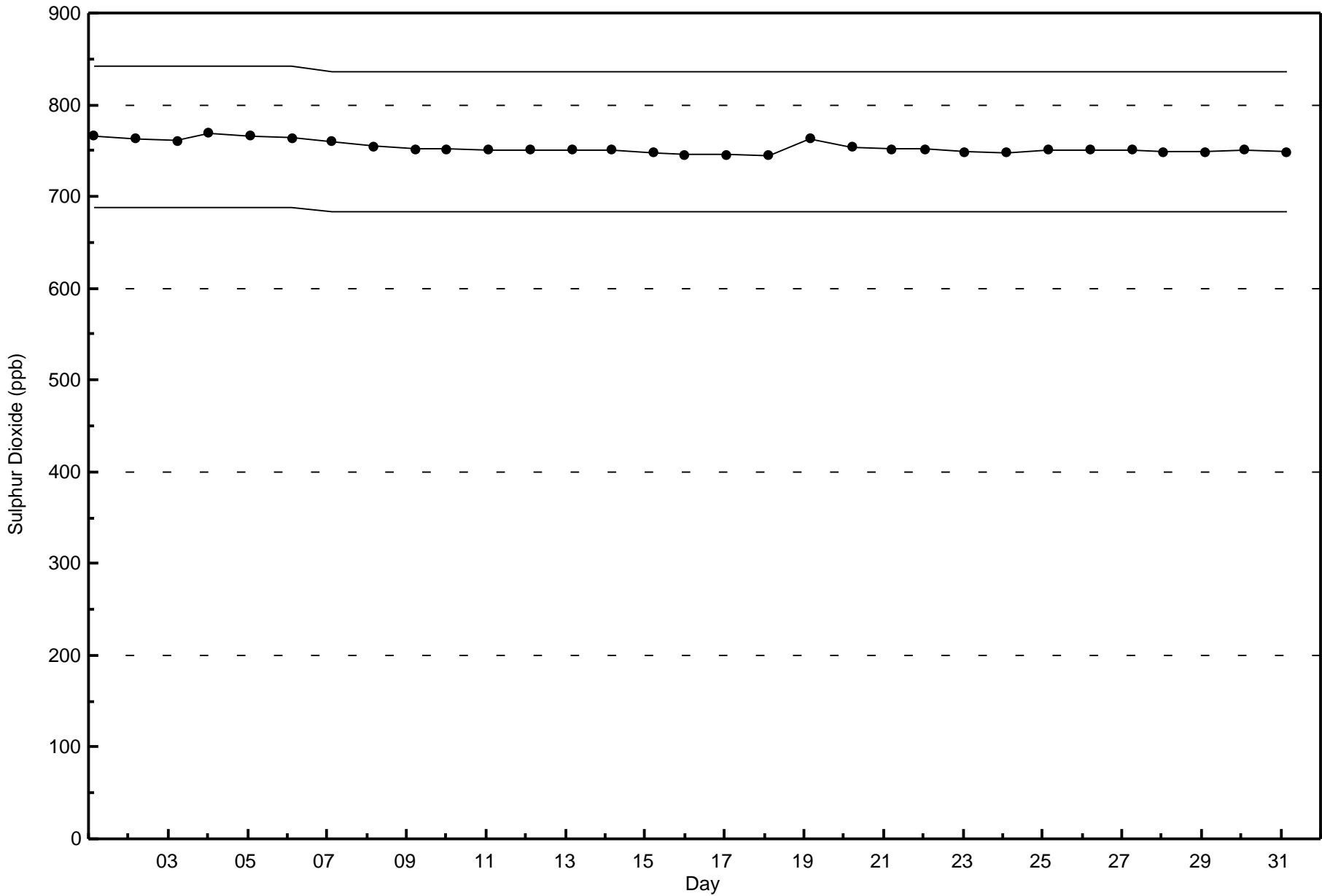
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Conklin (AMS 21)











Summary of Hour Averages

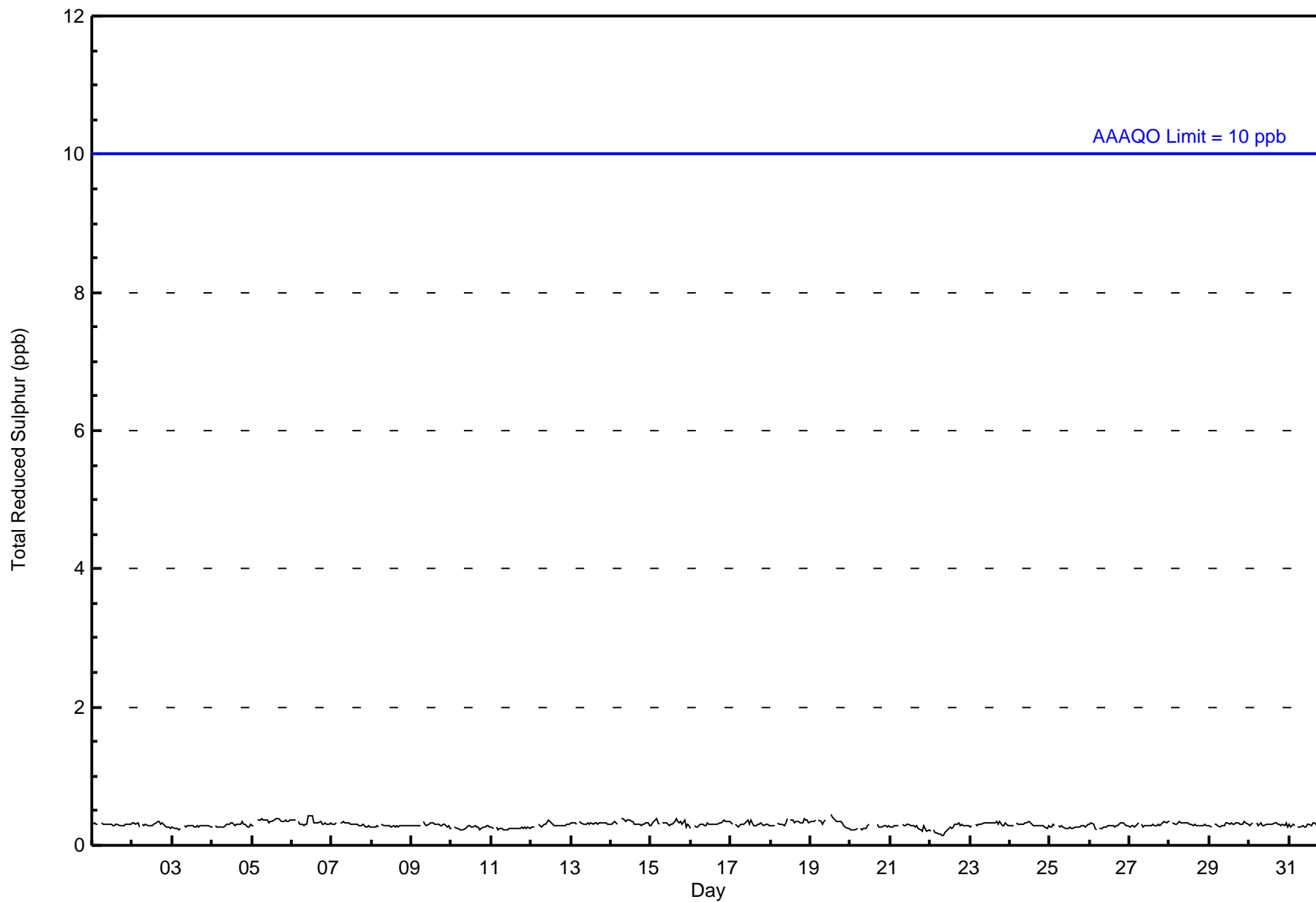
Conklin - October 2017

Number of Exceedences (AAAQO):		1-hr: 0    24-hr: 0		Hours in Service: 744																						
Maximum Value: 0 ppb on Oct 19 13:00		Maximum Daily Average: 0.4 ppb on Oct 5		Hours of Data: 706																						
Minimum Value: 0 ppb on Oct 22 08:00		Minimum Daily Average: 0.2 ppb on Oct 22		Hours of Missing Data: 38																						
Maximum Diurnal Average: 0.3 ppb at hour 13		Minimum Diurnal Average: 0.3 ppb at hour 5		Hours of Calibration: 37																						
Monthly Average: 0.3 ppb		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 0		Percent Operational Time: 99.9																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
3-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
4-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
5-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
6-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
7-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
8-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
9-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
10-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
11-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
12-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
13-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
14-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
15-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
16-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
17-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
18-Oct	0	0	0	Z	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
19-Oct	0	0	0	0	Z	0	0	0	0	0	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
20-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0.3	0
21-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
22-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
23-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
24-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
25-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
26-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
27-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
28-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
29-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
30-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
31-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
0.3																								Diurnal Average		
0																								Diurnal Maximum		
Z - zerospan    C - Calibration    M - Maintenance																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb    24-hr 3 ppb																										



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Total Reduced Sulphur (TRS) - ppb**  
**Conklin - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Conklin - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	706	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Conklin - October 2017**

<b>Concentration</b> <b>Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	57	23	15	4	2	6	8	16	43	99	87	36	40	63	105	100	704
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	57	23	15	4	2	6	8	16	43	99	87	36	40	63	105	100	704

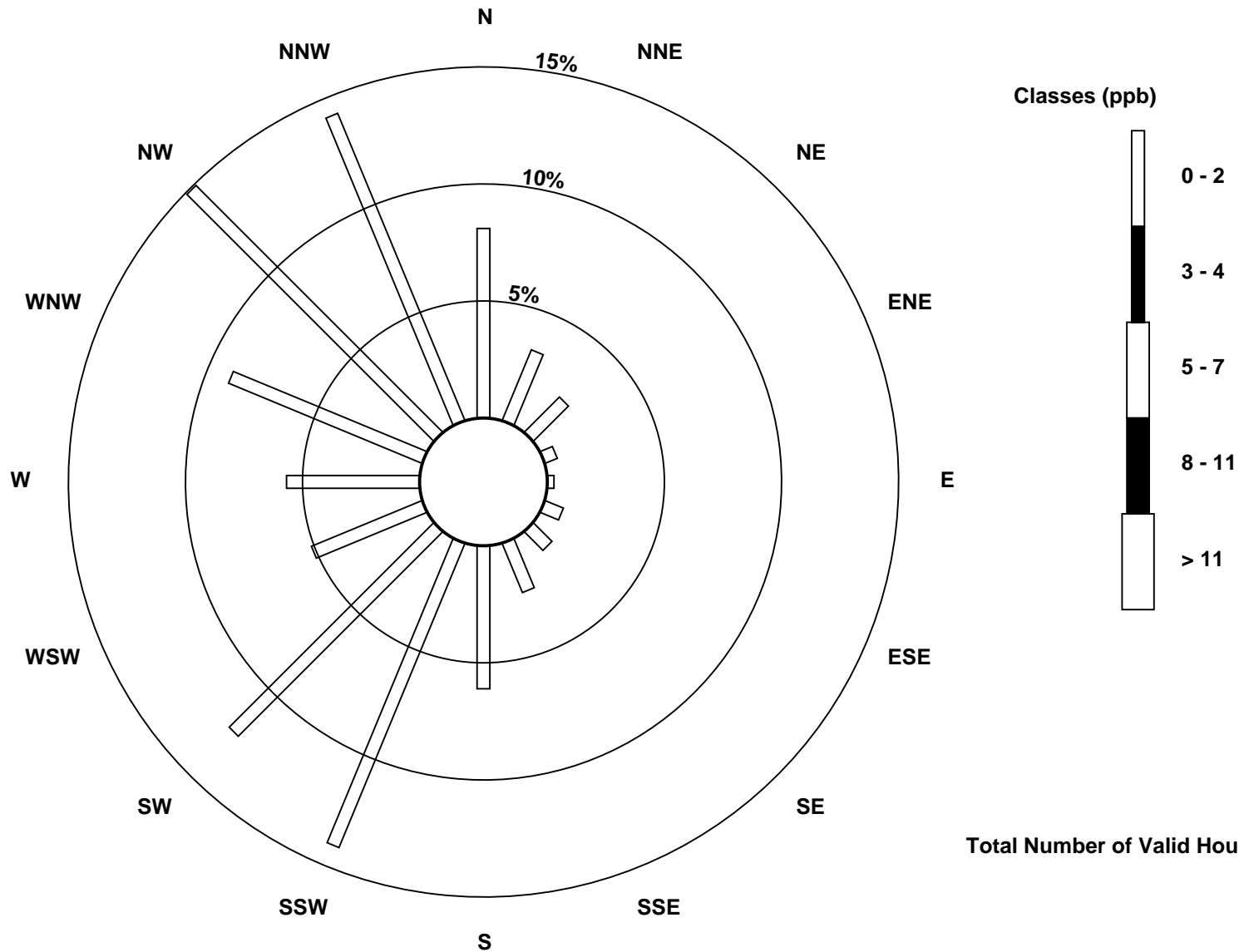
Total Number of Valid Hours: 704

Total Number of Hours: 744

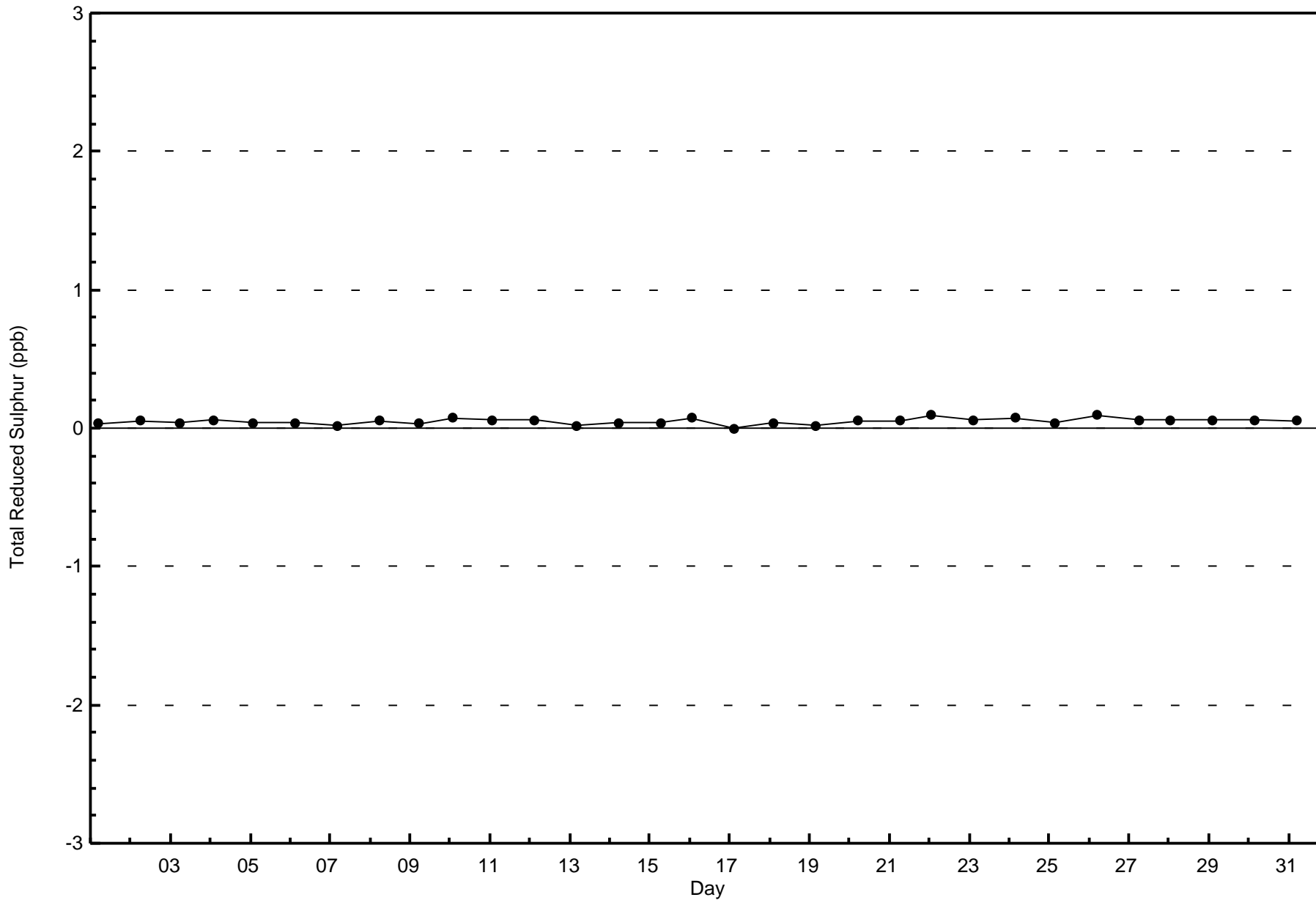


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

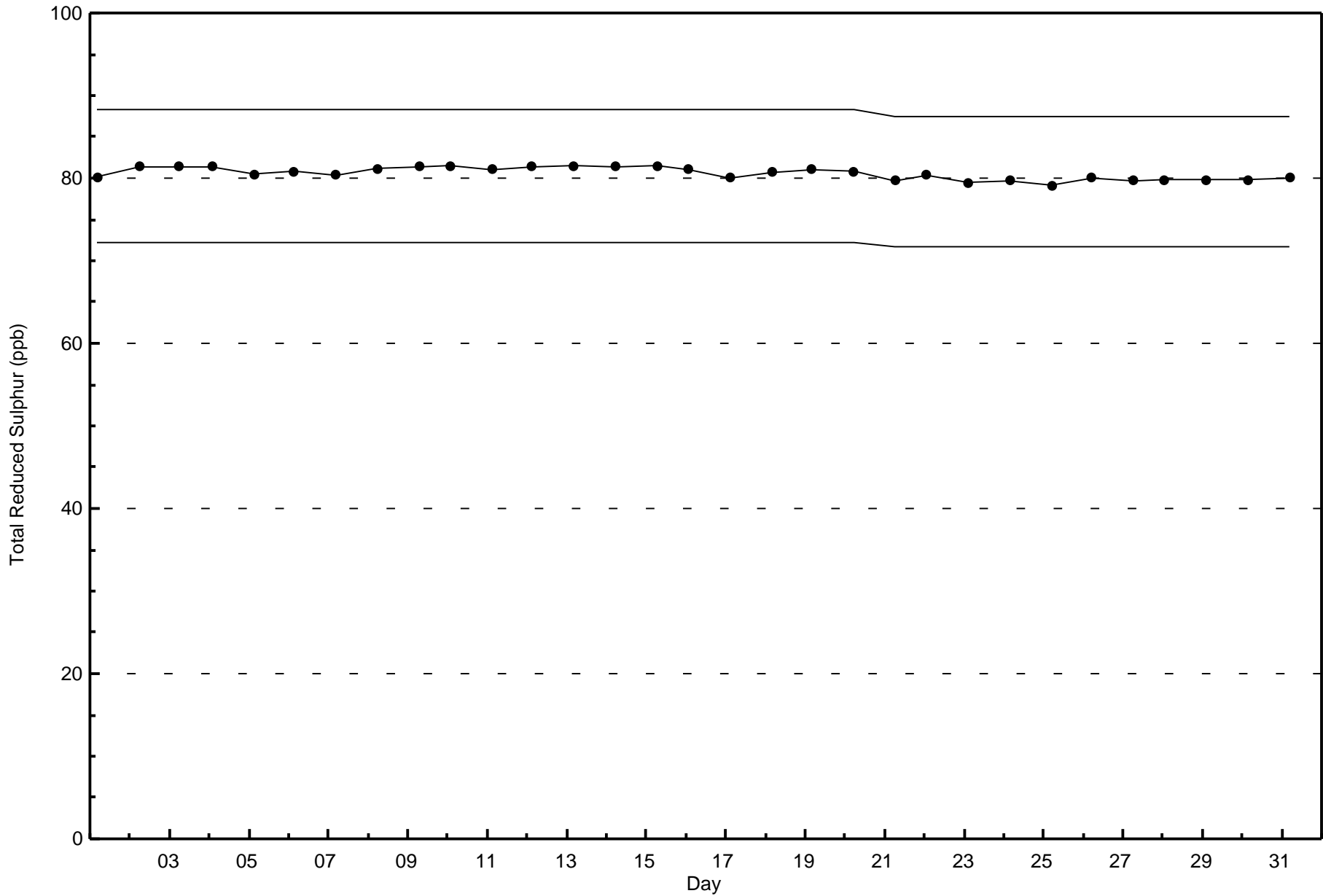
Total Reduced Sulphur (TRS) - ppb  
Conklin (AMS 21)



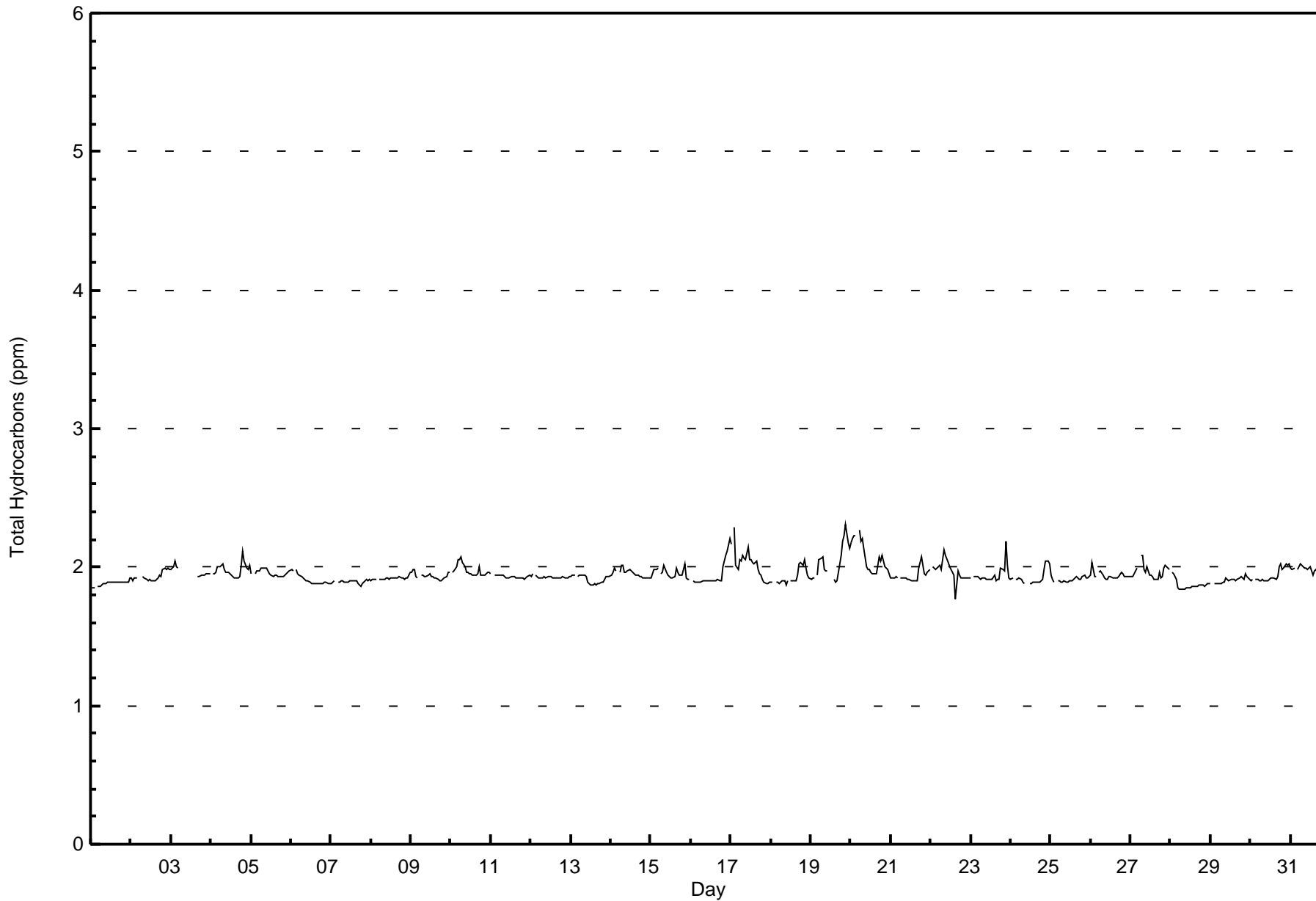
Total Number of Valid Hours: 704













**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Conklin - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	654	94.10	94.10
2.1 - 3.0	41	5.90	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 695

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Conklin - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 2.0	54	23	14	3	2	4	8	13	34	84	82	36	40	64	100	91	652
2.1 - 3.0	2	0	1	1	0	2	1	5	9	5	1	0	0	0	2	12	41
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	56	23	15	4	2	6	9	18	43	89	83	36	40	64	102	103	693

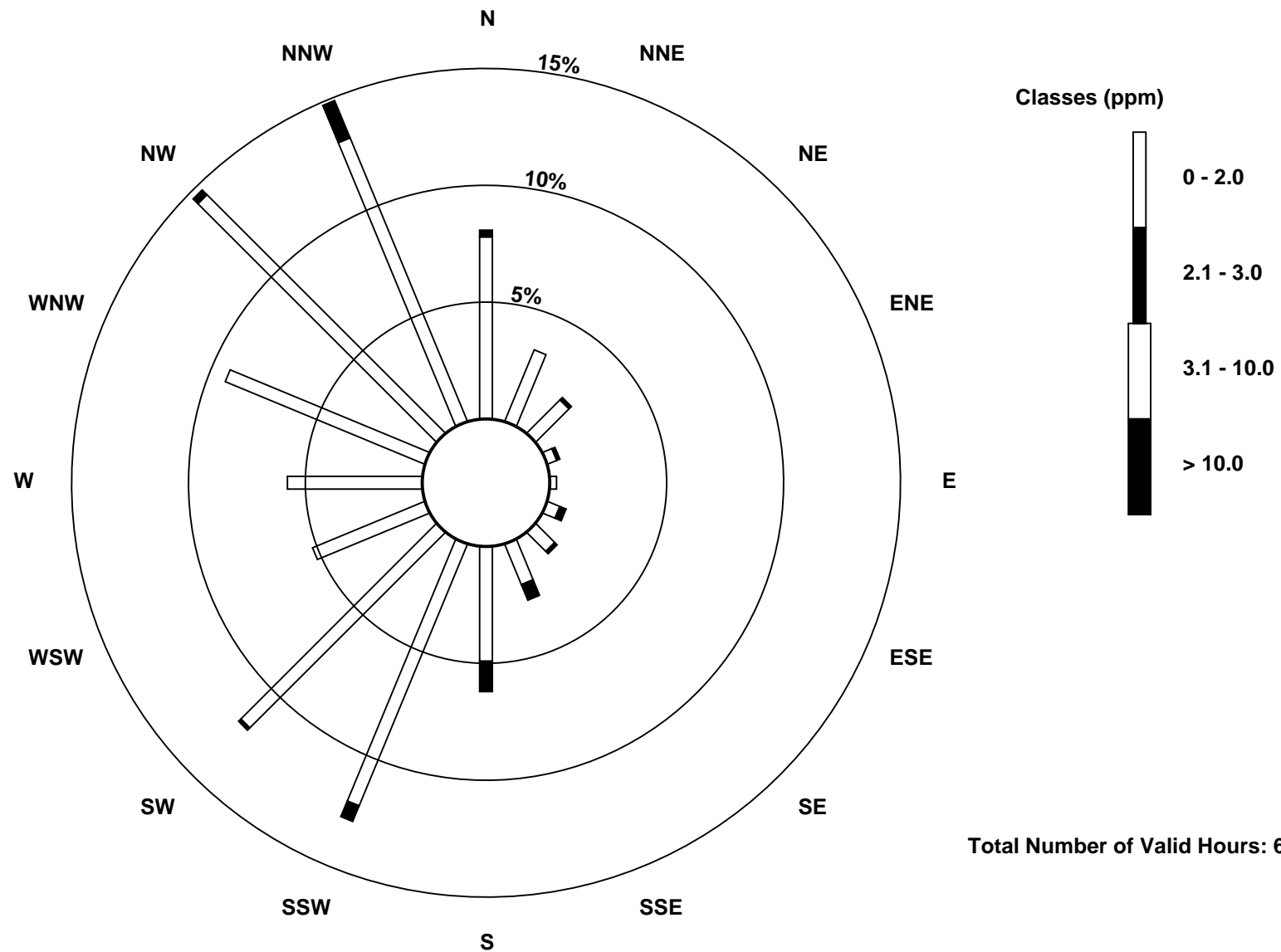
Total Number of Valid Hours: 693

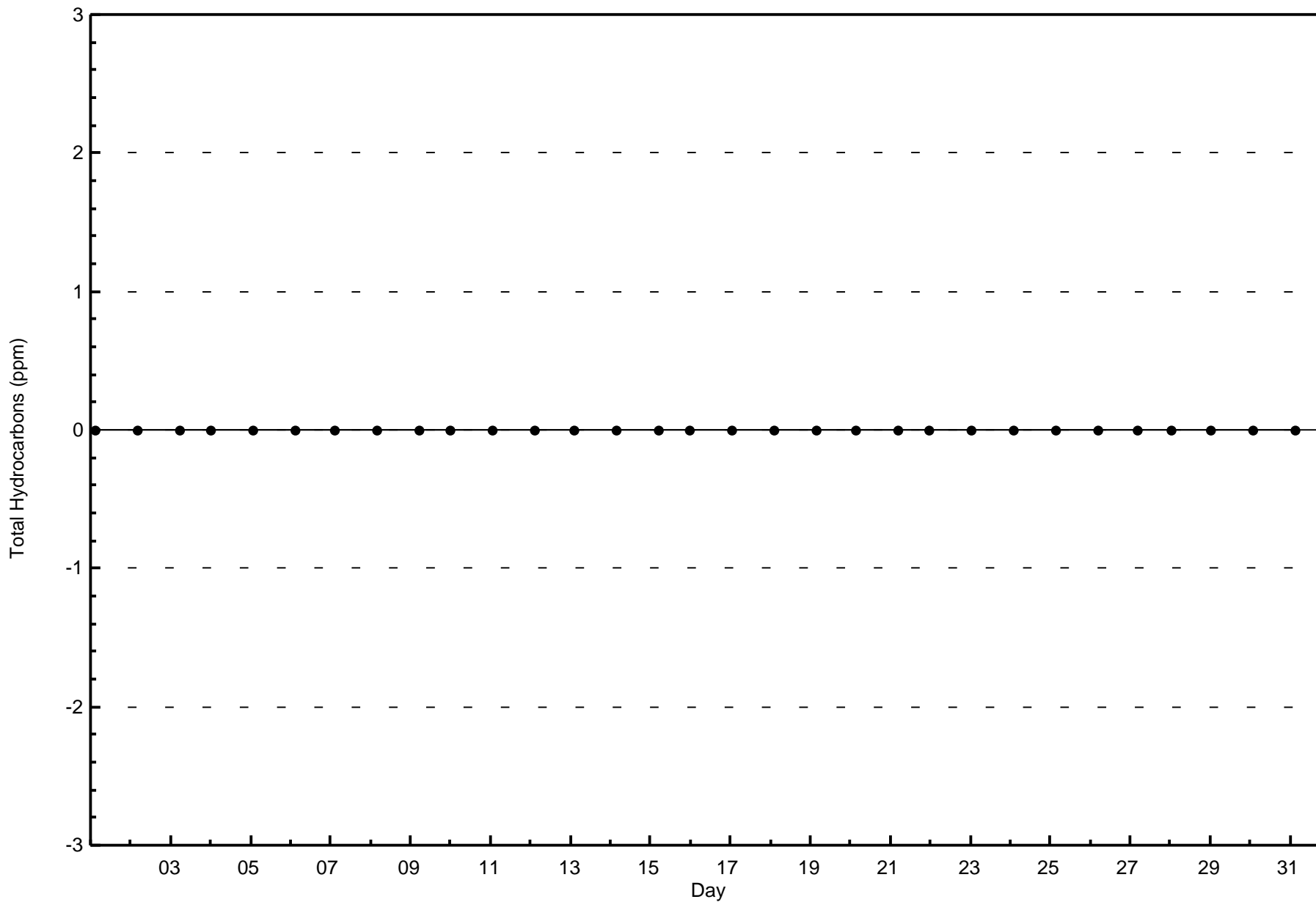
Total Number of Hours: 744

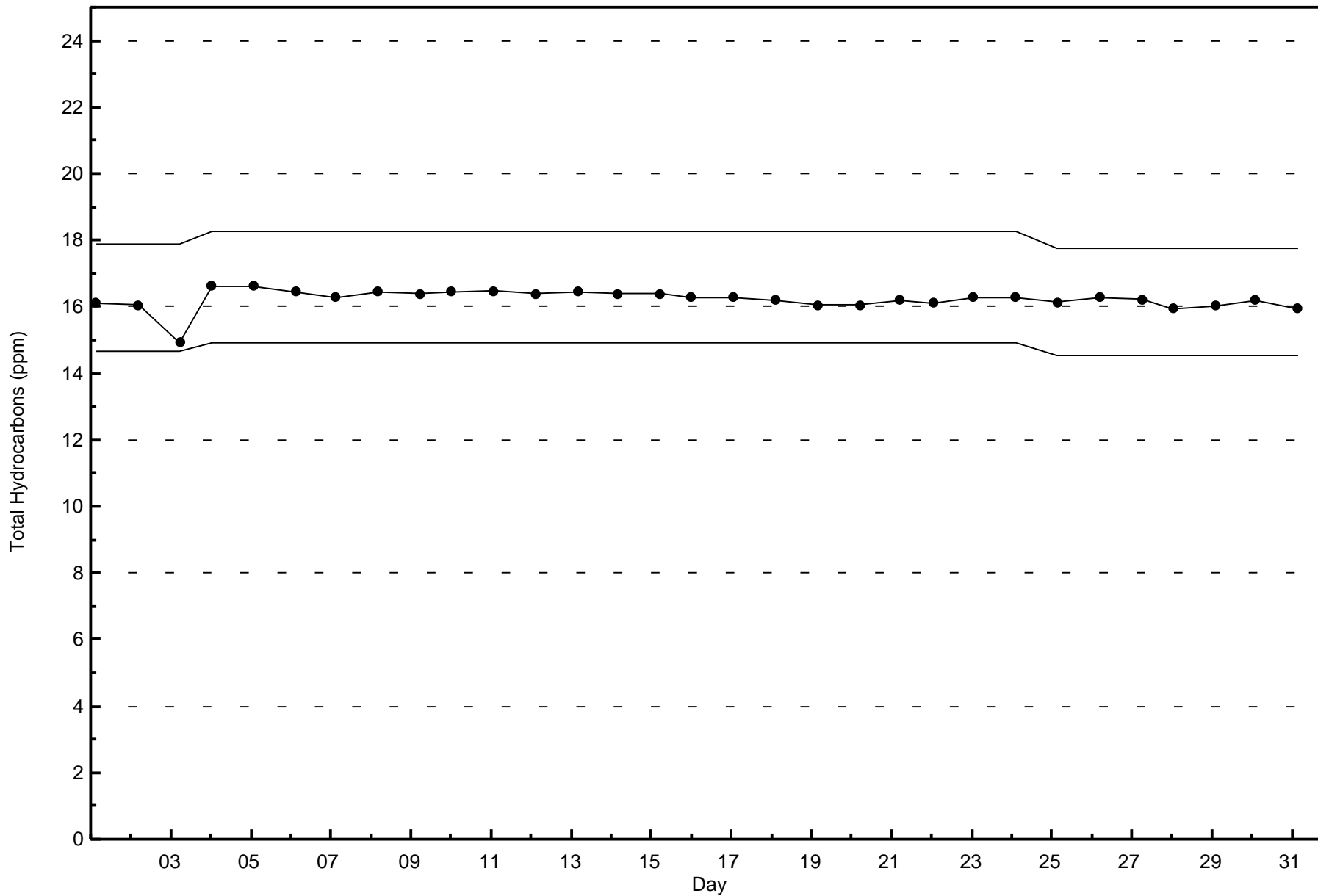


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Total Hydrocarbons (THC) - ppm  
Conklin (AMS 21)

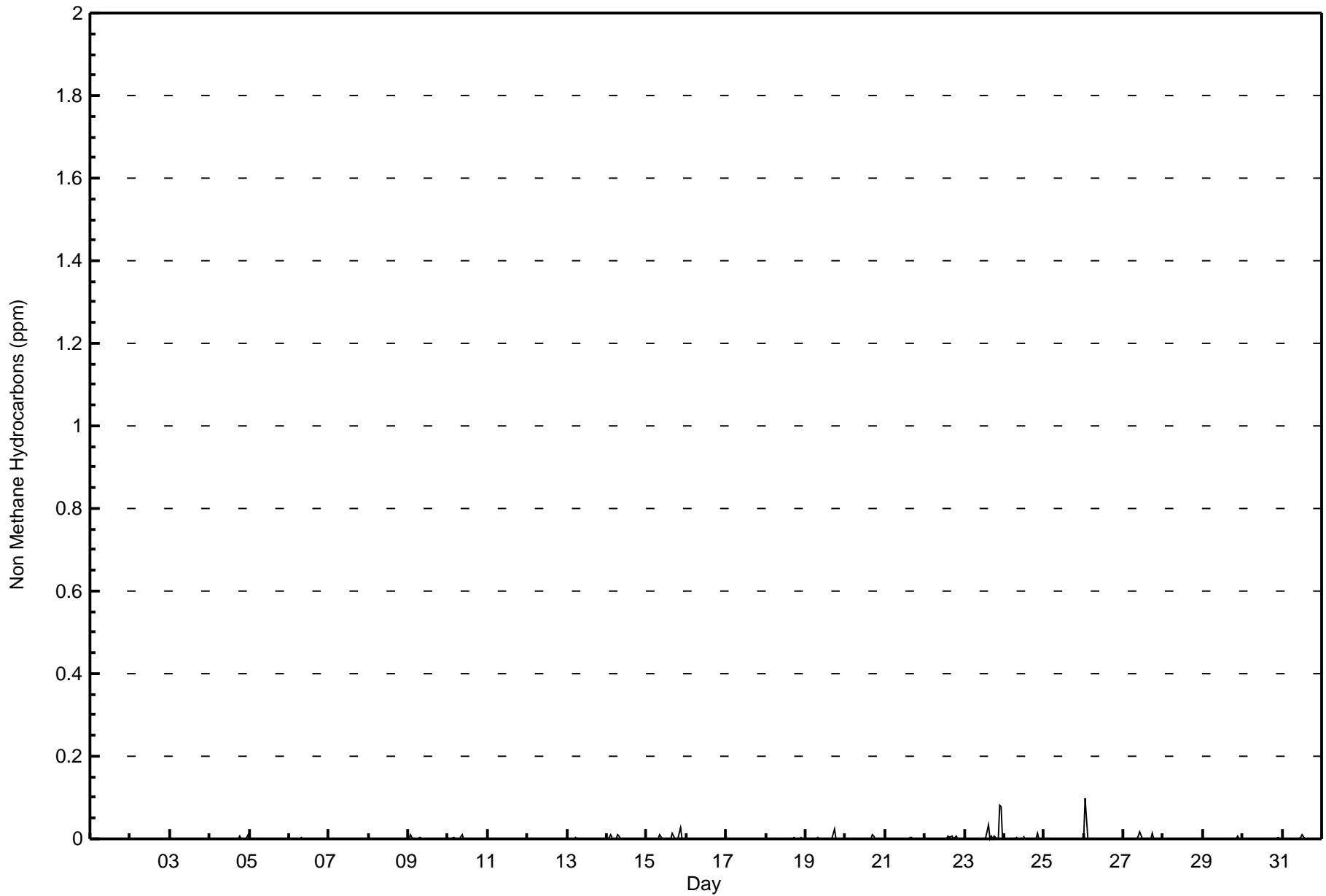














**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm  
Conklin - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.005	668	96.12	96.12
0.006 - 0.05	24	3.45	99.57
0.06 - 0.1	3	0.43	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 695

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm  
Conklin - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	55	23	15	4	2	5	9	17	39	79	81	36	38	61	101	103	668
0.006 - 0.05	1	0	0	0	0	1	0	1	4	8	2	0	1	3	1	0	22
0.06 - 0.1	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	3
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	56	23	15	4	2	6	9	18	43	89	83	36	40	64	102	103	693

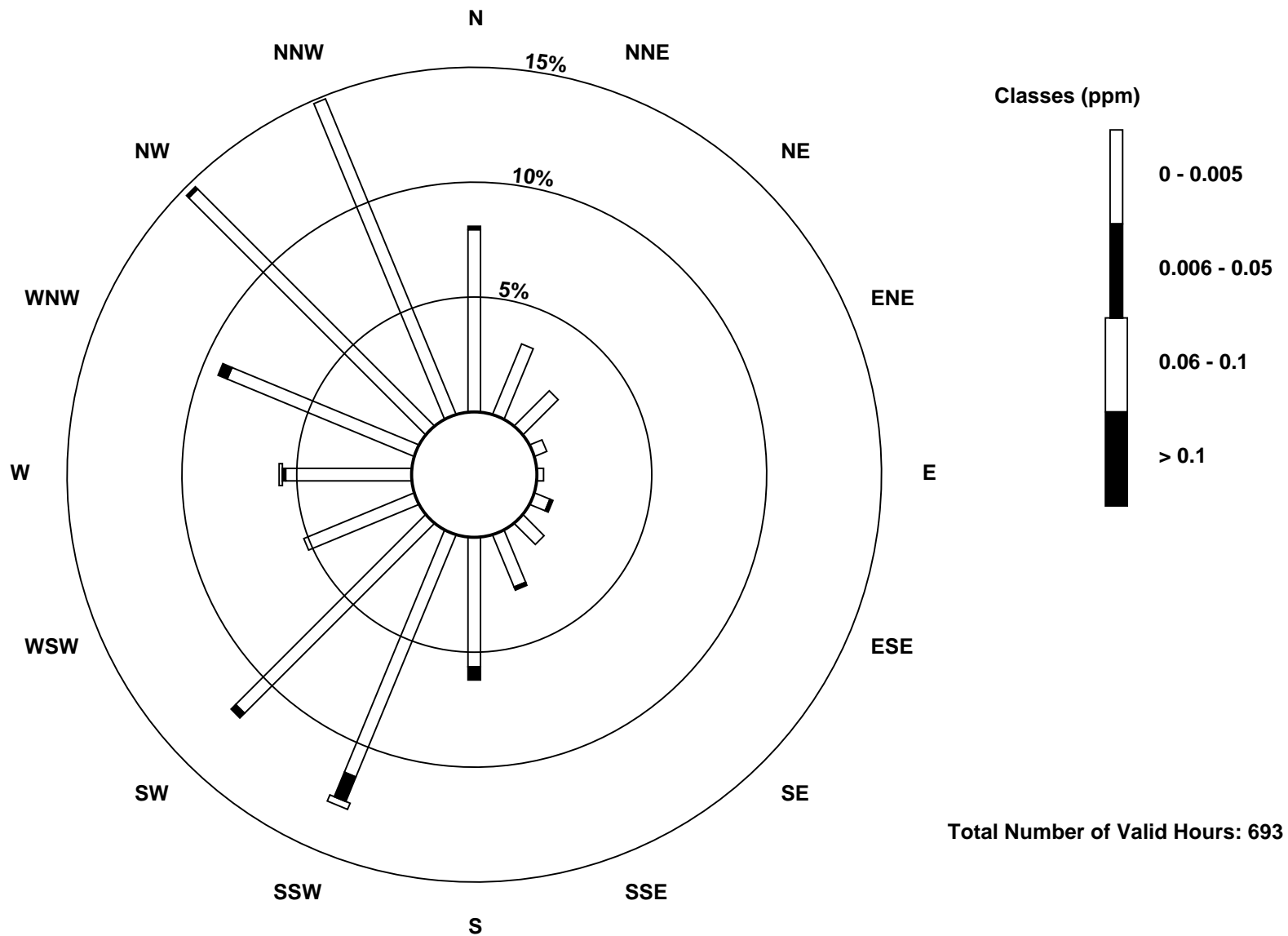
Total Number of Valid Hours: 693

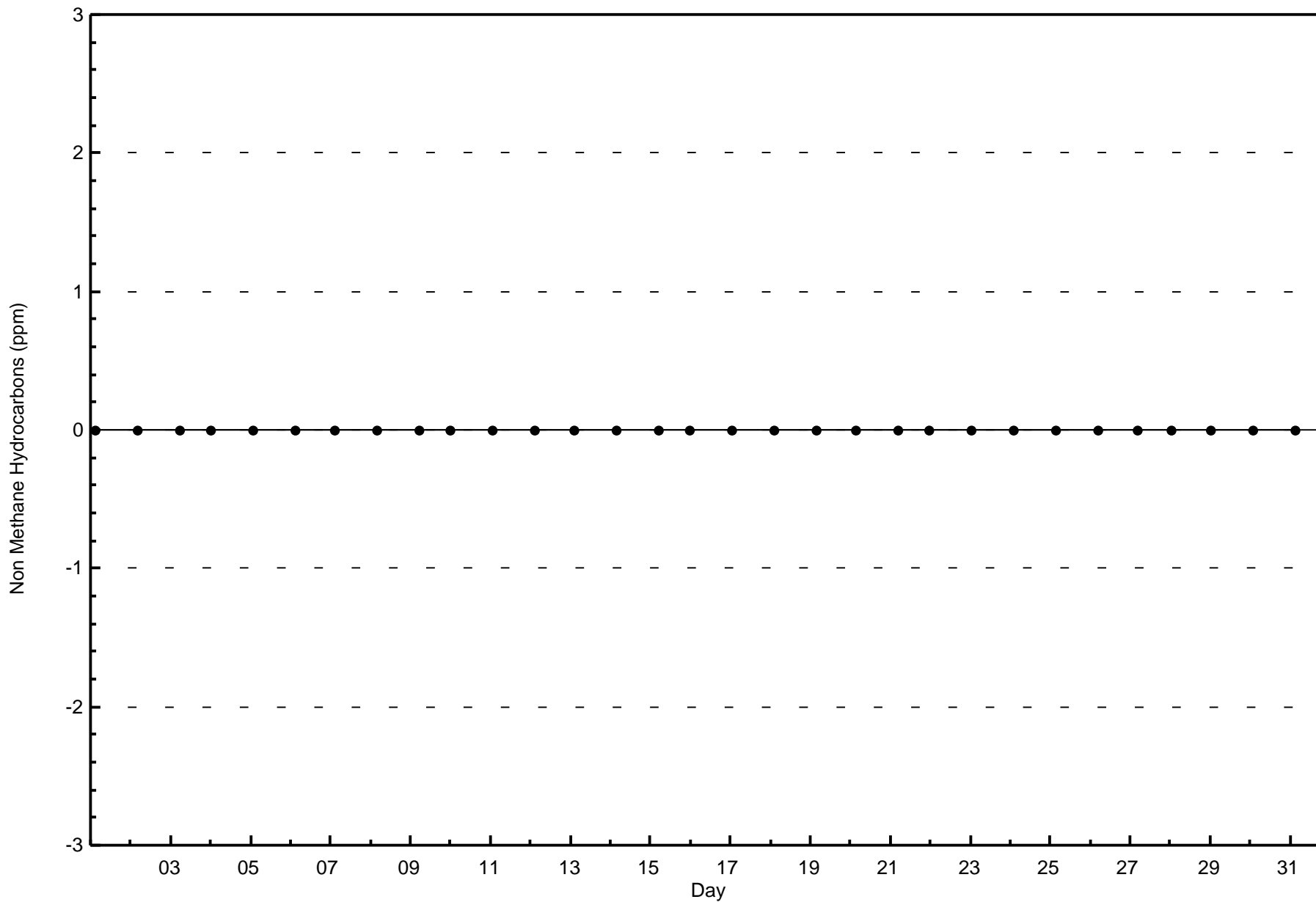
Total Number of Hours: 744

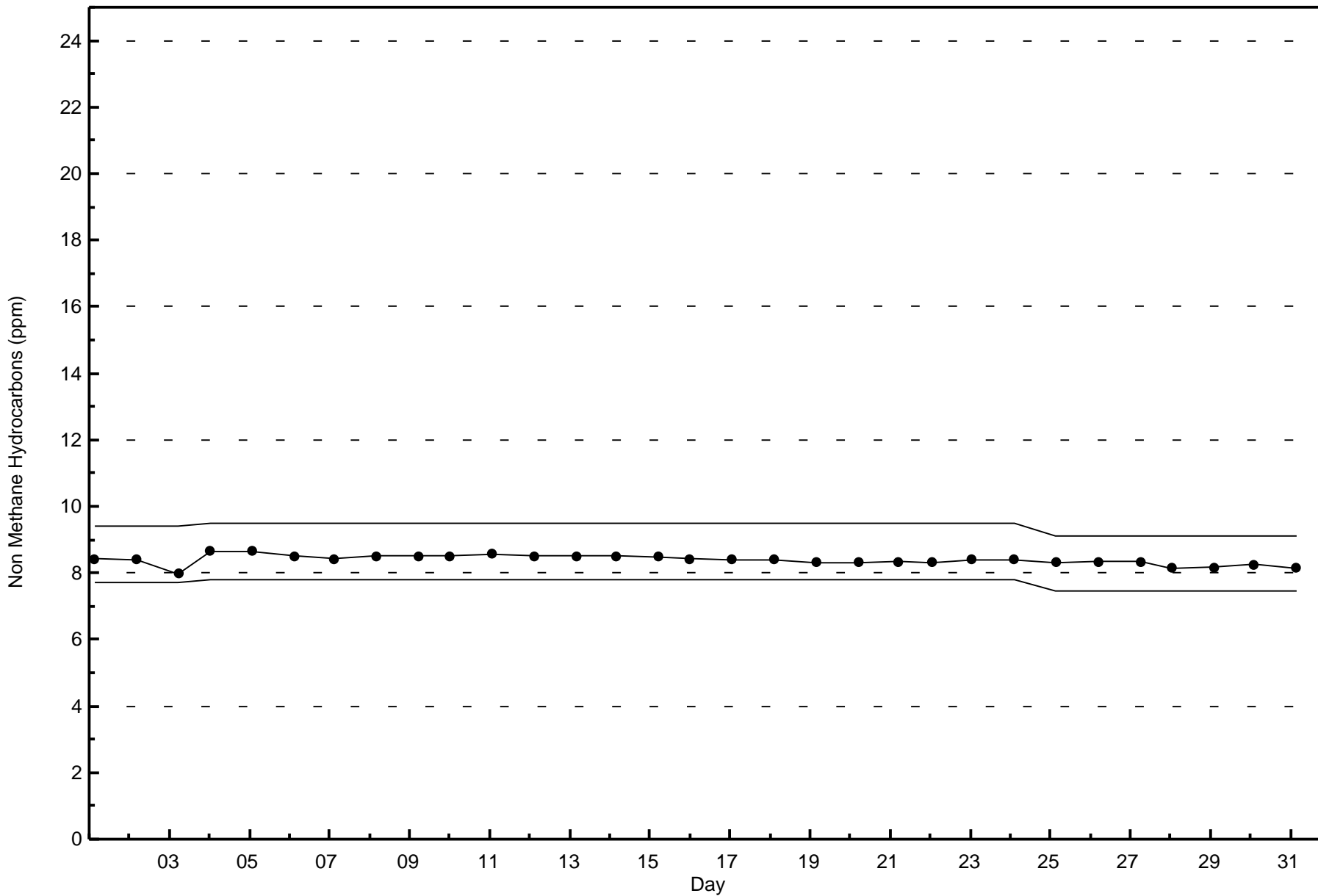


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Non Methane Hydrocarbons (NMHC) - ppm  
Conklin (AMS 21)







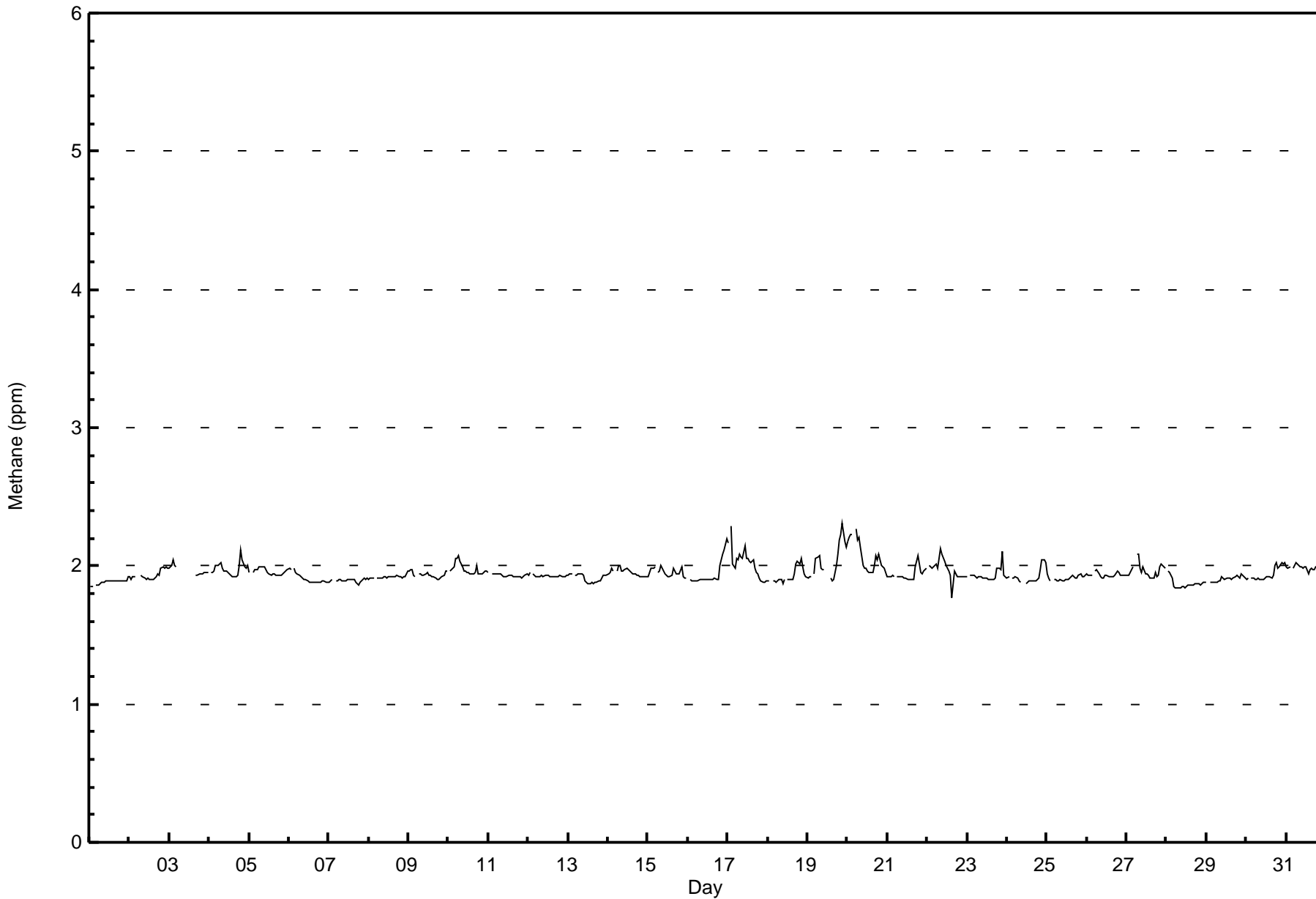






**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Methane (CH<sub>4</sub>) - ppm**  
**Conklin - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Conklin - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	654	94.10	94.10
2.1 - 3.0	41	5.90	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 695

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm  
Conklin - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	54	23	14	3	2	4	8	13	34	84	82	36	40	64	100	91	652
2.1 - 3.0	2	0	1	1	0	2	1	5	9	5	1	0	0	0	2	12	41
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	56	23	15	4	2	6	9	18	43	89	83	36	40	64	102	103	693

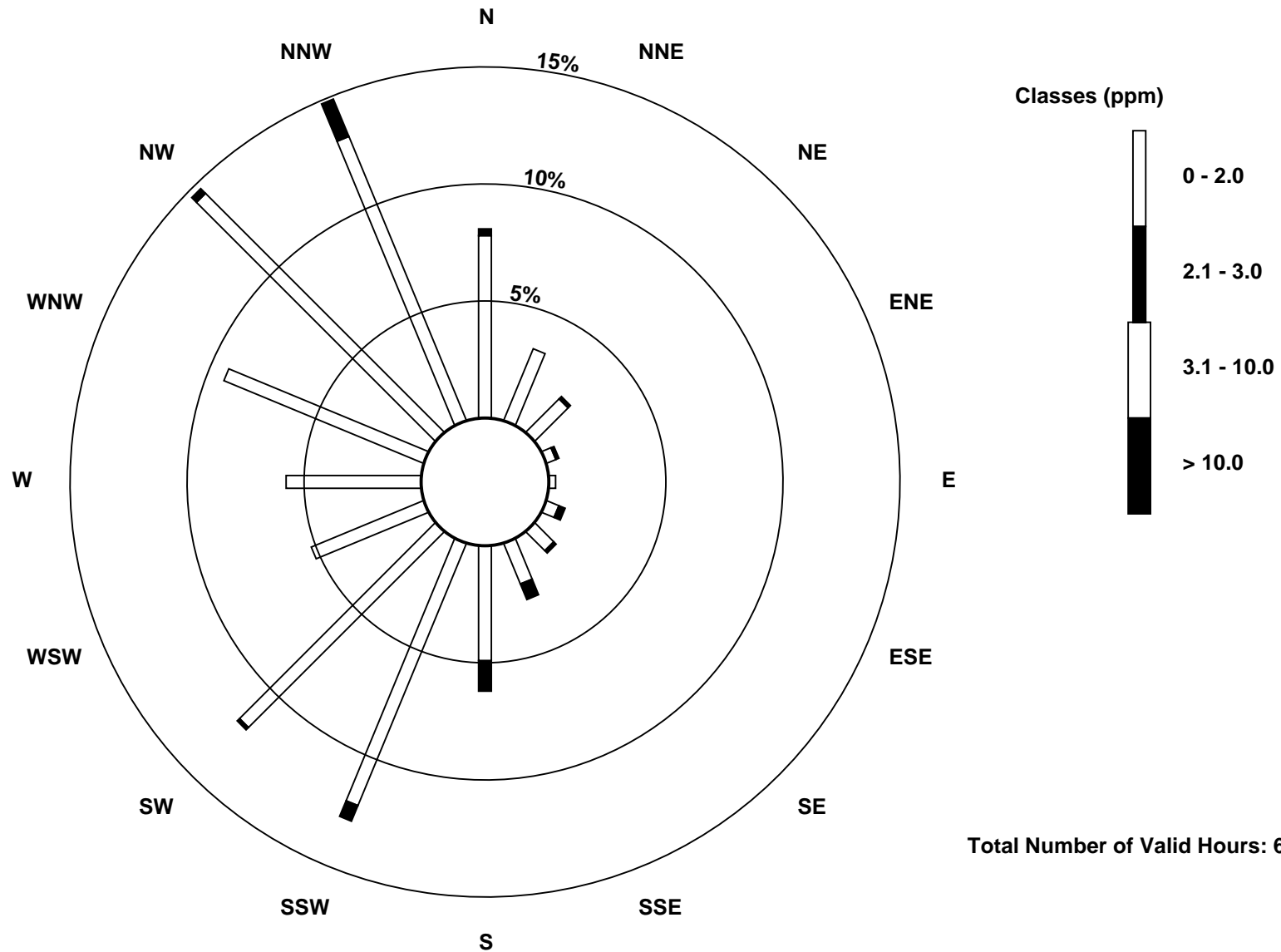
Total Number of Valid Hours: 693

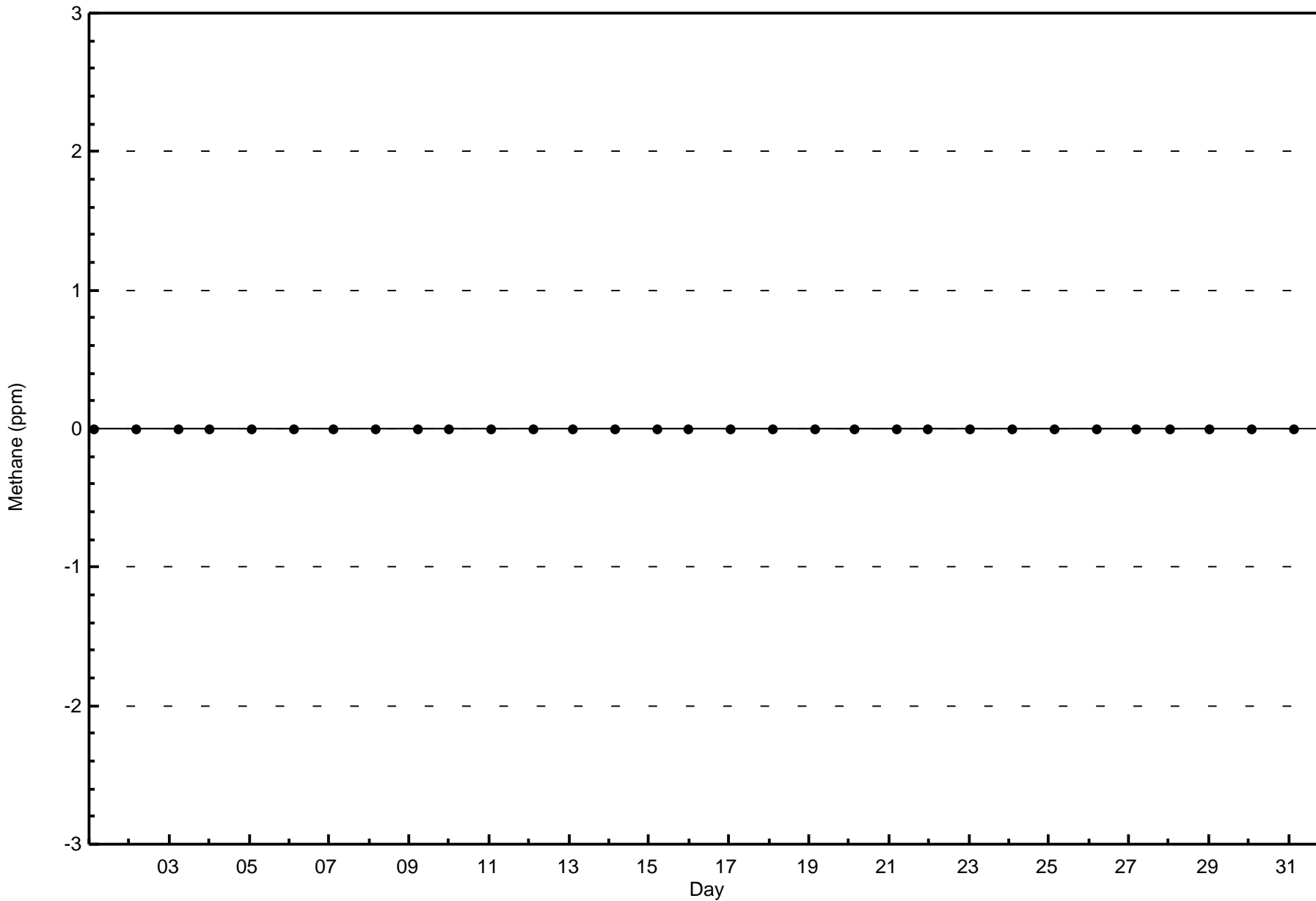
Total Number of Hours: 744

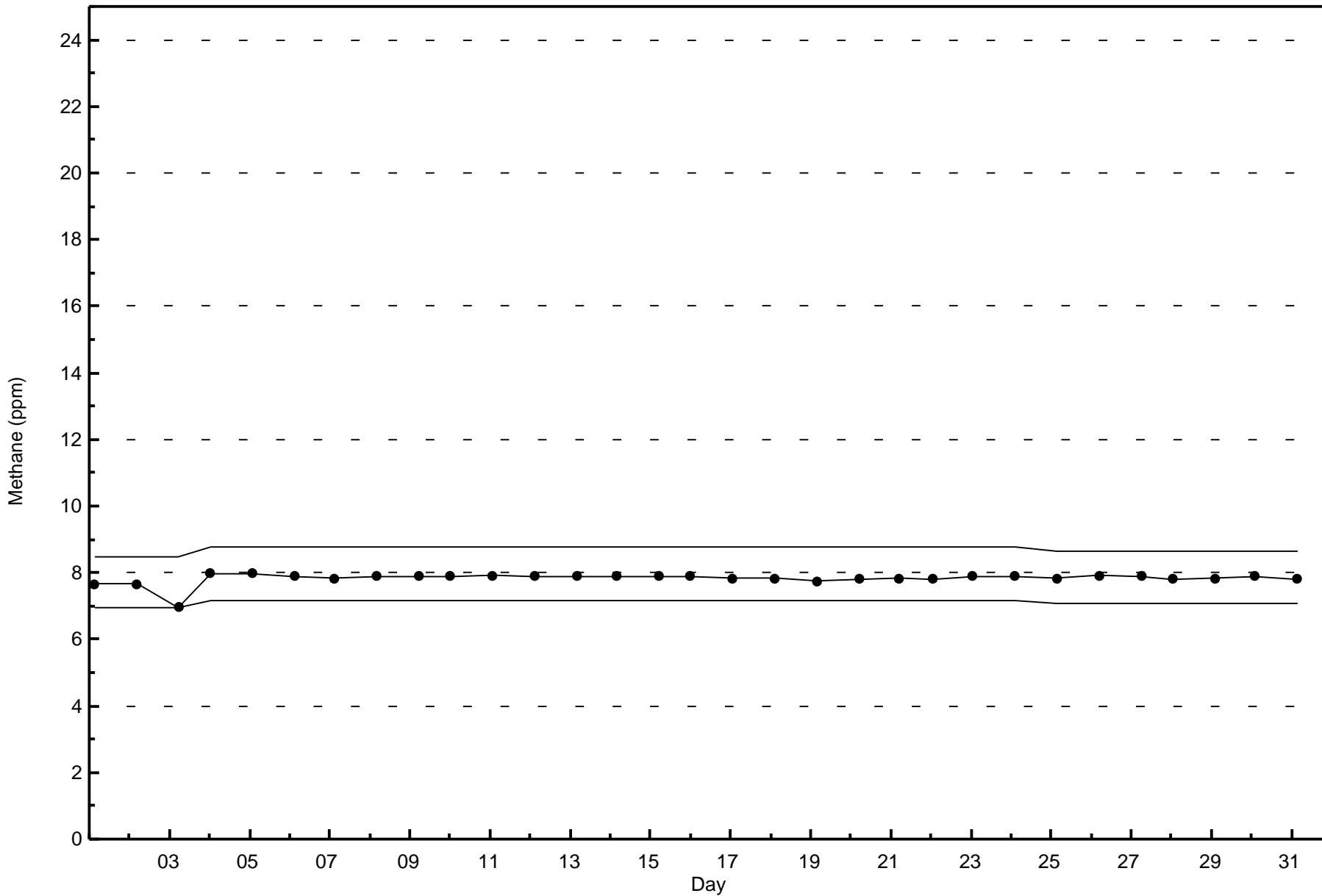


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Methane (CH<sub>4</sub>) - ppm  
Conklin (AMS 21)









**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

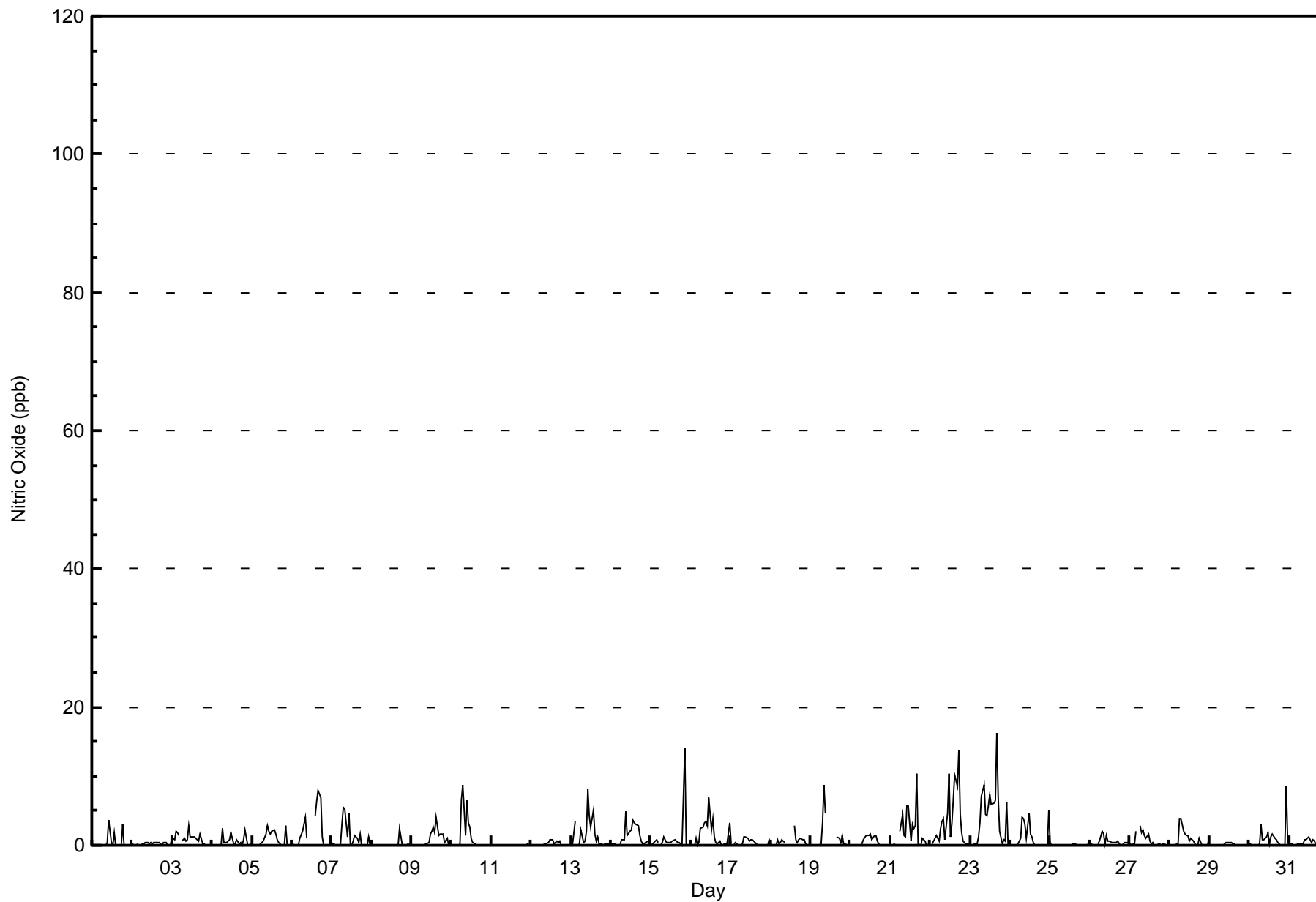
**Nitric Oxide (NO) - ppb**  
**Conklin - October 2017**

Maximum Value: 16 ppb on Oct 23 17:00																		Maximum Daily Average: 4.1 ppb on Oct 23						Hours in Service: 744																								
Minimum Value: 0 ppb on Oct 1 01:00																		Minimum Daily Average: 0.0 ppb on Oct 11						Hours of Data: 698																								
Maximum Diurnal Average: 2.1 ppb at hour 12																		Minimum Diurnal Average: 0.1 ppb at hour 2						Hours of Missing Data: 46																								
Monthly Average: 1.0 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 3 P <sub>99</sub> = 8						Hours of Calibration: 46																								
																		Percent Operational Time: 100.0																														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	0	0	0	Z	0	0	0	0	0	0	4	1	0	2	0	0	0	0	3	0	0	0	0	0	0.4	4																						
2-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
3-Oct	1	1	2	2	1	Z	1	1	1	1	3	1	1	1	1	1	1	2	0	0	0	0	0	0.9	3																							
4-Oct	Z	0	0	0	0	0	2	0	0	0	1	2	1	0	0	1	0	0	0	1	2	0	0	0.6	2																							
5-Oct	0	Z	0	0	0	0	0	1	2	3	2	2	2	2	1	0	0	0	0	0	3	0	0	0.9	3																							
6-Oct	0	0	Z	0	0	1	2	3	4	1	C	C	C	C	4	6	8	7	1	0	0	0	0	2.1	8																							
7-Oct	0	0	0	Z	0	0	3	5	5	1	5	0	0	1	1	1	0	2	0	0	0	0	1	1.2	5																							
8-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0.1	3																							
9-Oct	0	0	0	0	0	Z	0	0	0	0	0	2	2	3	2	4	1	2	2	2	0	1	0	0.9	4																							
10-Oct	Z	0	0	0	0	0	7	9	1	7	3	3	1	0	0	0	0	0	0	0	0	0	0	1.4	9																							
11-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
12-Oct	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	1	0	1	0	0	0	0	0	0.3	1																							
13-Oct	0	0	4	Z	0	0	2	0	1	2	8	4	3	5	2	1	1	0	0	0	0	0	0	1.5	8																							
14-Oct	0	0	0	0	Z	0	1	1	1	5	1	2	2	4	3	3	3	1	1	0	0	1	0	1.3	5																							
15-Oct	0	0	0	1	0	Z	0	0	1	0	0	0	0	1	1	1	0	0	0	0	14	0	0	1.0	14																							
16-Oct	Z	0	0	1	0	0	2	3	3	3	3	7	2	4	1	0	0	1	0	0	0	0	0	1.5	7																							
17-Oct	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.4	1																							
18-Oct	0	0	Z	0	1	0	0	1	0	C	C	C	C	C	3	1	0	1	1	1	1	0	0	0.6	3																							
19-Oct	0	0	0	Z	0	0	0	3	9	5	C	C	C	C	C	C	1	1	0	1	0	0	0	--	9																							
20-Oct	0	0	0	0	Z	0	0	0	1	1	1	1	2	1	1	1	1	0	0	0	0	0	0	0.5	2																							
21-Oct	0	0	0	0	0	Z	2	5	1	1	6	6	1	3	2	3	10	0	0	1	1	1	0	1.9	10																							
22-Oct	Z	0	1	1	1	1	2	3	4	1	5	10	1	3	7	10	9	14	5	2	1	0	0	3.5	14																							
23-Oct	0	Z	0	0	0	1	3	7	9	5	4	6	7	6	6	6	16	7	2	0	1	1	6	4.1	16																							
24-Oct	0	0	Z	0	0	0	1	4	4	3	1	5	2	1	0	0	0	0	0	0	0	0	0	1.2	5																							
25-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
26-Oct	1	0	0	0	Z	0	1	2	2	0	1	1	1	0	0	0	0	1	0	0	0	0	0	0.5	2																							
27-Oct	0	0	0	0	2	Z	3	2	2	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0.7	3																							
28-Oct	Z	0	0	0	0	0	4	4	2	2	1	1	1	1	1	0	0	0	1	0	0	0	0	0.8	4																							
29-Oct	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																							
30-Oct	0	0	Z	0	0	0	0	3	1	1	1	2	0	1	2	1	1	0	0	0	0	0	9	1.0	9																							
31-Oct	0	0	0	Z	0	0	0	0	0	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0.3	1																							
																								0.2	0.1	0.3	0.2	0.3	0.2	1.2	1.9	1.8	1.6	2.0	2.1	1.2	1.5	1.4	1.5	1.8	1.4	0.5	0.3	0.8	0.2	0.6	0.4	Diurnal Average
																								1	1	4	2	2	1	7	9	9	7	8	10	7	6	7	10	16	14	5	2	14	1	9	5	Diurnal Maximum
Z - zerospan C - Calibration																																																



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitric Oxide (NO) - ppb**  
**Conklin - October 2017**







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Conklin - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	698	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 698

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitric Oxide (NO) - ppb  
Conklin - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	57	23	15	4	2	6	9	19	41	91	87	36	38	61	103	104	696
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	57	23	15	4	2	6	9	19	41	91	87	36	38	61	103	104	696

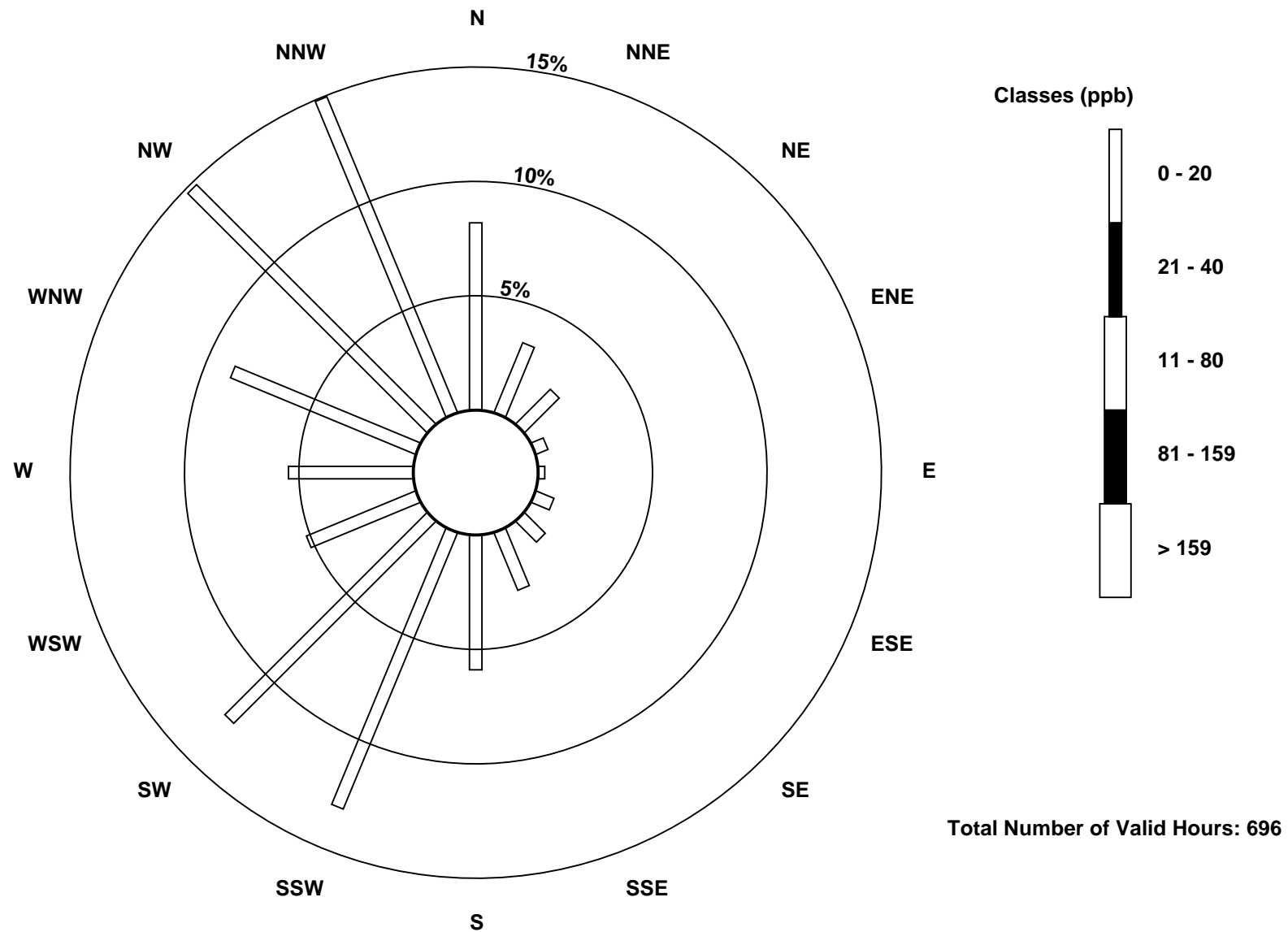
Total Number of Valid Hours: 696

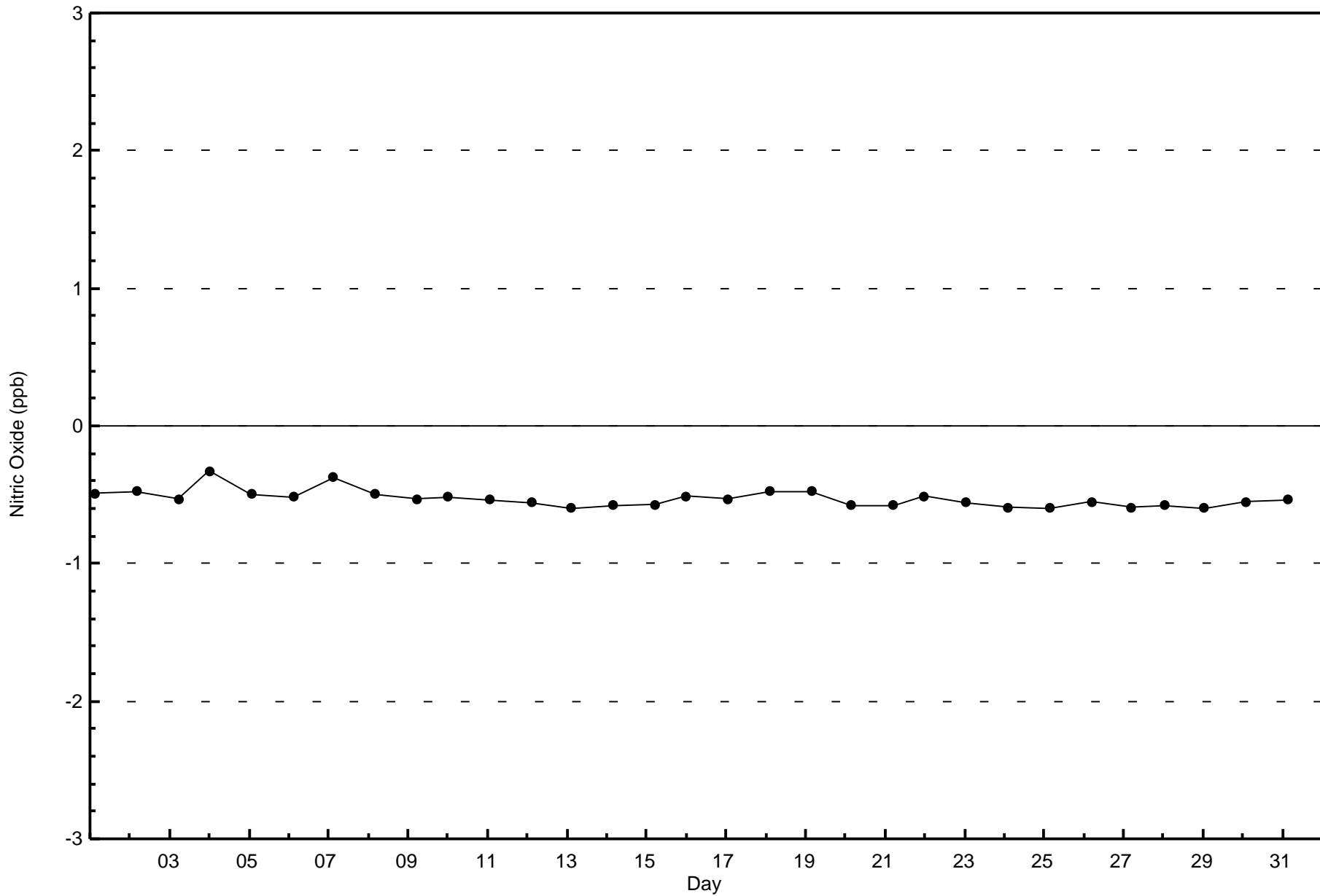
Total Number of Hours: 744

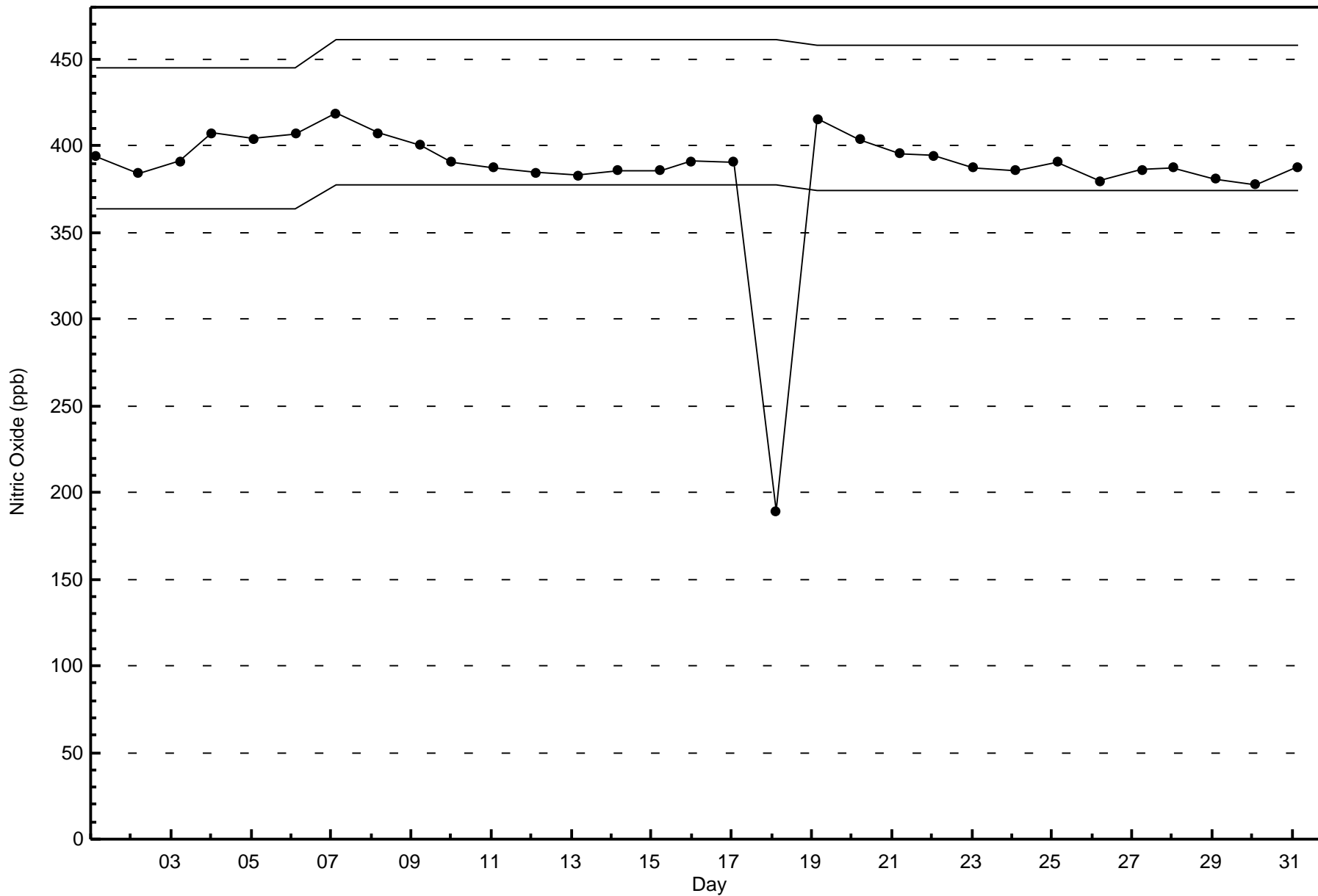


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitric Oxide (NO) - ppb  
Conklin (AMS 21)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb

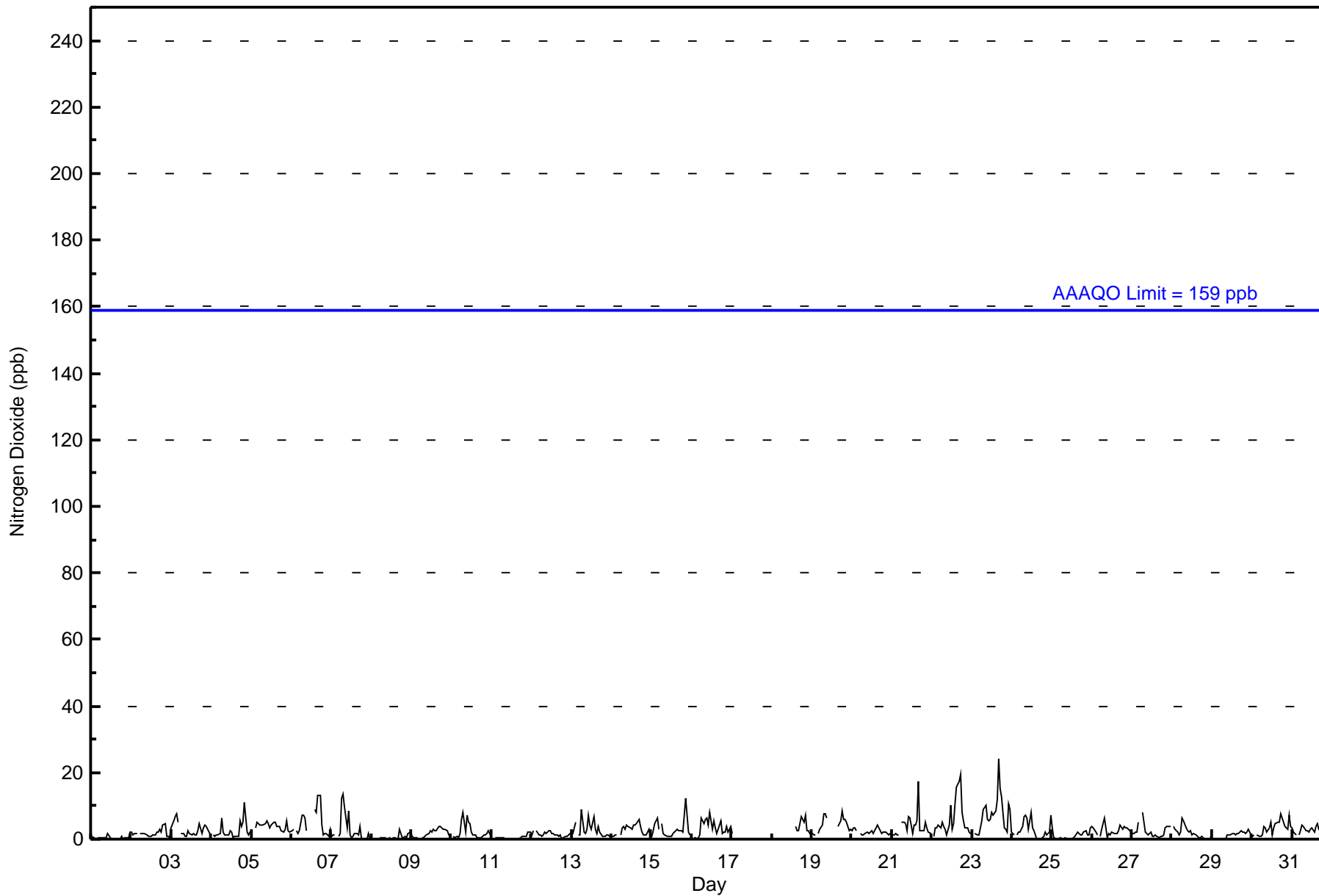
Conklin - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																							
Maximum Value: 24 ppb on Oct 23 17:00										Maximum Daily Average: 7.2 ppb on Oct 23																																							
Minimum Value: 0 ppb on Oct 1 14:00										Minimum Daily Average: 0.5 ppb on Oct 1																																							
Maximum Diurnal Average: 4.3 ppb at hour 17										Minimum Diurnal Average: 1.6 ppb at hour 6																																							
Monthly Average: 2.7 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 4 P <sub>90</sub> = 6 P <sub>99</sub> = 13																																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	1	1	0	Z	1	0	0	0	1	1	2	0	0	0	0	0	0	0	1	0	0	0	0	2	0.5	2																							
2-Oct	2	1	2	2	Z	2	2	2	2	1	1	1	1	1	1	2	2	3	2	4	5	1	1	0	1.7	5																							
3-Oct	4	5	7	8	5	Z	2	2	1	1	3	2	1	2	1	1	3	5	2	3	4	4	3	1	3.0	8																							
4-Oct	Z	1	1	1	1	2	6	2	1	1	1	3	2	1	1	1	1	6	4	5	11	2	1	2	2.5	11																							
5-Oct	2	Z	4	5	5	4	4	4	5	6	5	3	4	5	5	4	4	4	3	2	3	5	2	2	3.9	6																							
6-Oct	3	3	Z	3	2	2	7	7	6	2	C	C	C	C	9	8	13	13	4	1	2	2	1	3	4.8	13																							
7-Oct	1	1	1	Z	1	2	12	13	10	3	8	1	0	1	2	2	1	4	1	0	0	0	2	0	2.9	13																							
8-Oct	0	0	0	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	3	0	0	1	1	2	2	0.6	3																							
9-Oct	1	1	0	0	0	Z	1	0	1	1	2	3	2	3	3	3	4	4	4	3	3	3	1	1	1.8	4																							
10-Oct	Z	1	1	1	0	2	6	8	2	7	5	5	2	1	1	1	1	0	1	1	1	2	3	2	2.3	8																							
11-Oct	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2	2	0.5	2																							
12-Oct	1	2	Z	3	1	1	1	1	2	2	3	2	2	2	1	1	1	1	0	0	1	1	1	2	1.4	3																							
13-Oct	2	2	5	Z	1	1	9	2	2	3	7	4	3	7	3	2	4	2	1	1	1	1	1	1	2.8	9																							
14-Oct	1	1	1	1	Z	1	3	4	3	4	4	3	3	4	4	5	6	4	2	1	1	1	3	0	2.7	6																							
15-Oct	1	3	5	6	3	Z	5	2	1	1	1	1	1	2	3	3	3	3	3	2	12	7	2	1	3.0	12																							
16-Oct	Z	1	1	0	1	1	6	5	6	6	4	8	3	6	4	2	3	6	2	2	2	4	2	4	3.3	8																							
17-Oct	2	Z	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	2																							
18-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	M	M	4	3	2	5	7	5	7	3	2	2	--	7																							
19-Oct	2	1	1	Z	2	3	4	8	8	7	C	C	C	C	C	C	4	5	8	6	6	5	3	3	--	8																							
20-Oct	3	3	3	3	Z	2	1	1	2	2	2	2	3	2	3	4	3	3	2	2	2	2	1	2	2.2	4																							
21-Oct	1	1	2	1	1	Z	5	5	5	3	7	6	2	4	4	5	17	2	3	3	5	4	2	2	3.9	17																							
22-Oct	Z	1	3	4	4	3	5	4	3	1	4	10	3	5	11	16	17	20	8	5	3	3	2	2	6.0	20																							
23-Oct	2	Z	2	1	1	3	6	9	10	6	6	6	8	7	8	12	24	15	13	4	3	2	11	9	7.2	24																							
24-Oct	2	1	Z	1	2	2	4	7	7	6	3	8	3	3	1	0	0	0	0	1	2	1	2	7	2.8	8																							
25-Oct	3	1	0	Z	0	0	0	0	0	0	0	0	0	1	1	2	2	1	1	2	3	1	1	3	1.1	3																							
26-Oct	4	3	2	1	Z	1	3	6	4	1	2	1	2	2	2	3	4	3	4	4	4	3	3	2	2.6	6																							
27-Oct	2	2	2	2	5	Z	8	5	2	2	1	2	1	1	1	1	1	1	1	1	3	4	4	4	2.4	8																							
28-Oct	Z	4	3	2	1	2	6	6	3	3	2	2	1	2	1	1	0	0	1	0	0	0	0	0	1.8	6																							
29-Oct	2	Z	0	0	0	0	0	0	0	1	1	1	2	2	1	2	2	2	2	2	2	2	3	1	1.3	3																							
30-Oct	1	1	Z	1	1	1	1	4	4	2	4	5	1	3	5	5	5	8	6	5	4	3	7	4	3.5	8																							
31-Oct	3	2	1	Z	1	2	4	4	2	3	2	3	4	2	4	5	3	2	2	1	1	1	1	1	2.3	5																							
																								1.8	1.7	1.9	2.0	1.7	1.6	3.9	3.9	3.2	2.6	2.9	3.2	2.0	2.4	2.9	3.1	4.3	4.2	2.8	2.3	3.1	2.2	2.3	2.2	Diurnal Average	
																								4	5	7	8	5	4	12	13	10	7	8	10	8	7	11	16	24	20	13	6	12	7	11	9	Diurnal Maximum	
Z - zerospan C - Calibration M - Maintenance AF - Analyzer Failure																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																																																	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Conklin - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Conklin - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	667	99.85	99.85
21 - 40	1	0.15	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 668

Total Number of Hours: 744





**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Conklin - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	55	23	14	3	2	4	9	14	39	91	87	36	38	52	96	102	665
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	55	23	14	3	2	4	9	14	39	91	87	36	38	53	96	102	666

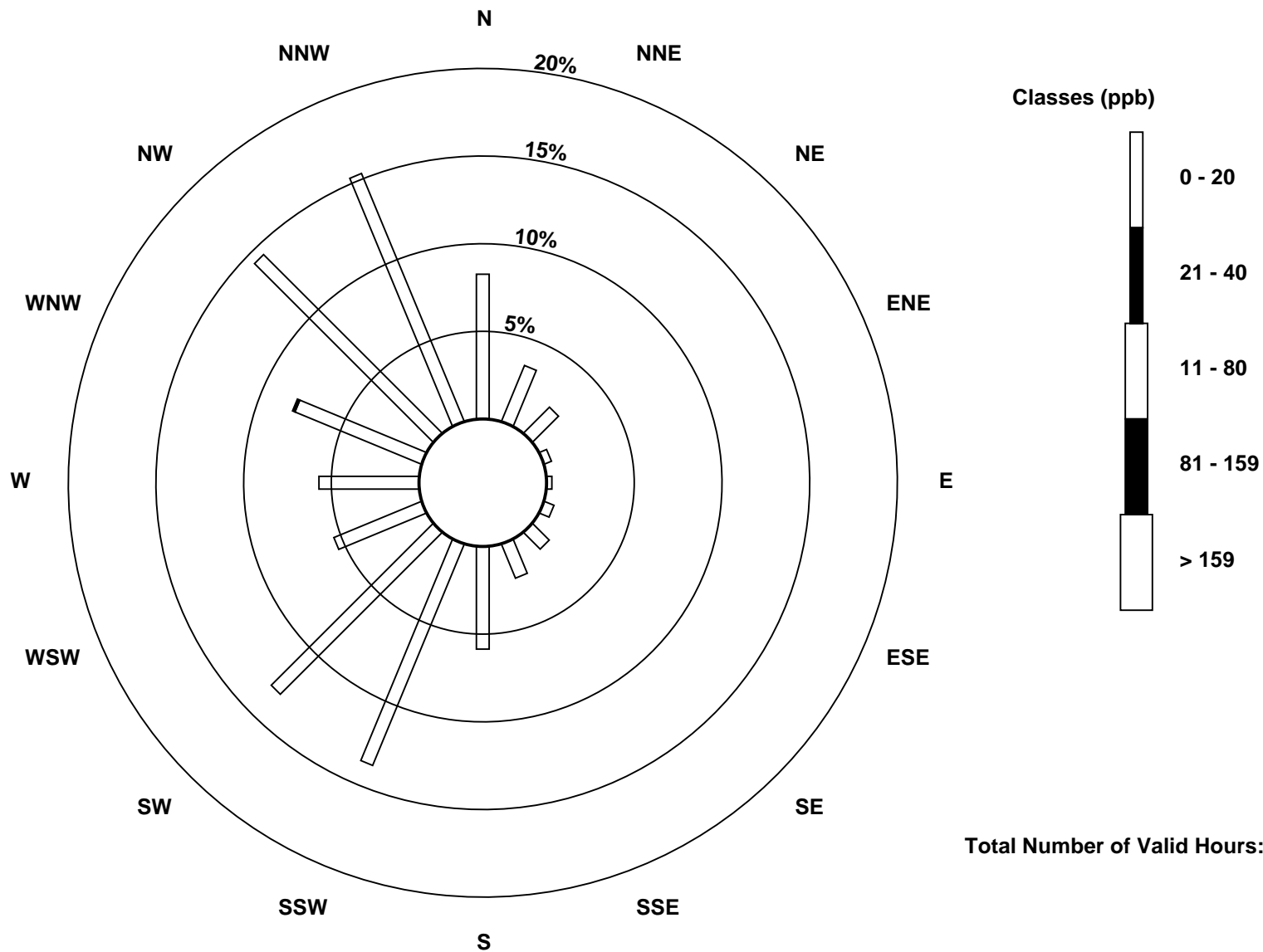
Total Number of Valid Hours: 666

Total Number of Hours: 744

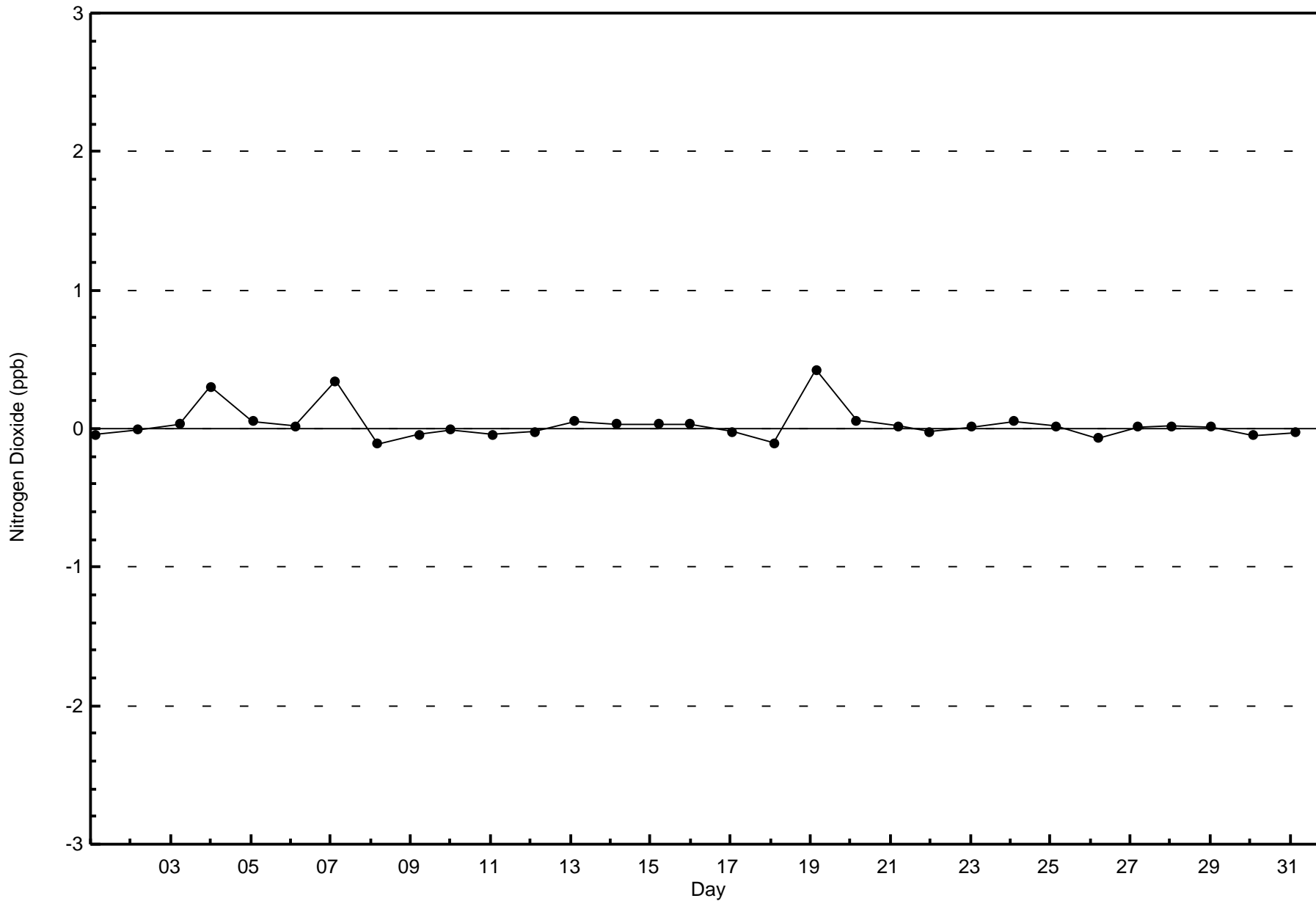


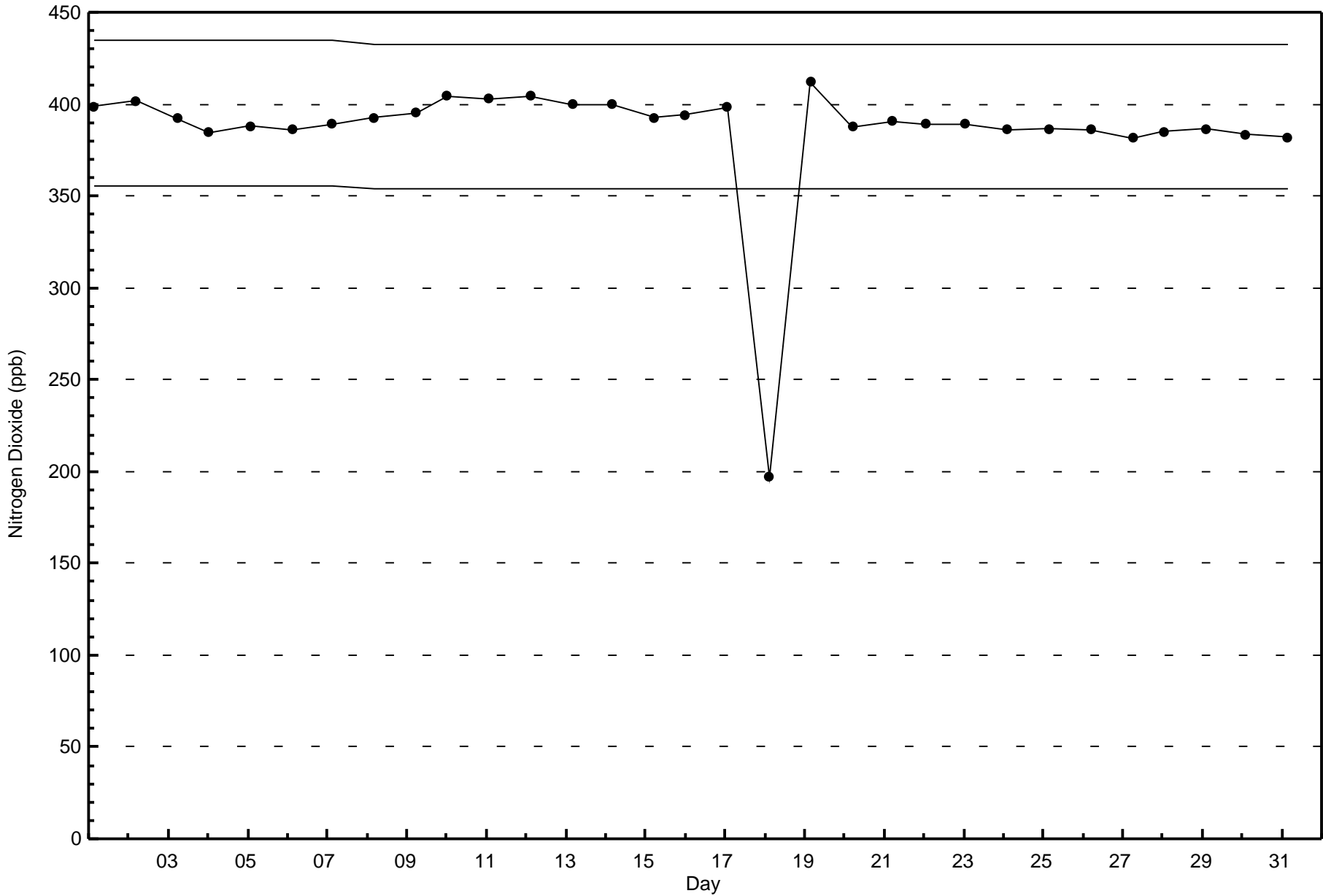
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Conklin (AMS 21)



Total Number of Valid Hours: 666



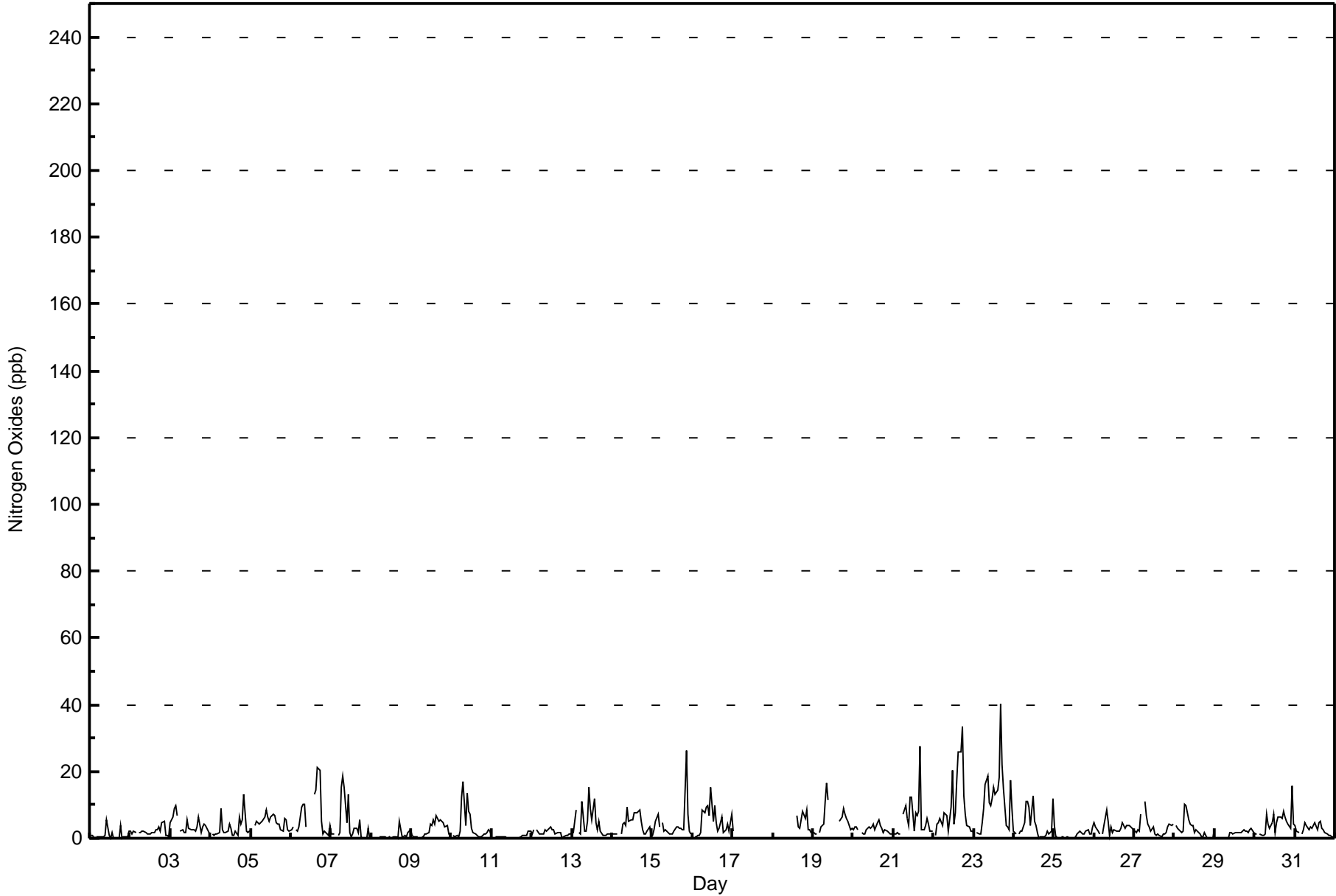




**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Conklin - October 2017**

Maximum Value: 40 ppb on Oct 23 17:00		Maximum Daily Average: 11.3 ppb on Oct 23		Hours in Service: 744																						
Minimum Value: 0 ppb on Oct 1 17:00		Minimum Daily Average: 0.5 ppb on Oct 11		Hours of Data: 668																						
Maximum Diurnal Average: 6.1 ppb at hour 17		Minimum Diurnal Average: 1.8 ppb at hour 2		Hours of Missing Data: 76																						
Monthly Average: 3.7 ppb		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 5 P <sub>90</sub> = 9 P <sub>99</sub> = 21		Hours of Calibration: 40																						
				Percent Operational Time: 95.2																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	1	1	0	Z	1	0	0	0	1	1	5	1	0	2	0	0	0	0	4	0	0	0	0	2	0.9	5
2-Oct	2	1	2	2	Z	2	2	2	2	2	1	1	1	2	2	2	2	3	2	4	5	1	1	0	2.0	5
3-Oct	5	6	9	10	7	Z	2	3	2	2	5	3	3	3	2	2	3	6	2	4	4	4	3	1	3.9	10
4-Oct	Z	1	1	1	1	2	9	2	2	2	2	4	3	1	1	2	1	6	4	6	13	2	2	2	3.0	13
5-Oct	2	Z	4	5	5	4	5	5	6	8	7	5	6	7	7	4	4	4	3	2	6	6	2	2	4.8	8
6-Oct	3	3	Z	3	2	4	9	10	10	3	C	C	C	C	13	14	21	20	5	1	2	2	1	4	6.9	21
7-Oct	1	1	1	Z	1	2	15	19	15	5	13	2	0	1	3	3	2	6	1	0	0	0	3	0	4.1	19
8-Oct	0	0	0	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	5	0	0	1	1	2	2	0.7	5
9-Oct	1	1	1	0	0	Z	1	1	1	1	2	4	4	6	4	7	5	6	5	5	3	4	1	1	2.7	7
10-Oct	Z	1	1	1	0	2	12	17	4	14	8	7	3	2	1	1	0	0	1	1	1	2	2	2	3.7	17
11-Oct	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2	2	0.5	2
12-Oct	1	2	Z	2	1	1	1	1	2	2	3	3	2	2	1	2	2	2	0	0	1	1	1	1	1.7	3
13-Oct	2	1	8	Z	2	1	11	2	2	5	15	9	6	12	5	2	5	2	1	1	1	1	1	1	4.2	15
14-Oct	1	1	1	1	Z	1	4	4	4	9	5	6	5	8	8	8	9	5	3	1	1	2	3	0	4.0	9
15-Oct	1	3	5	7	3	Z	5	2	3	2	1	1	1	2	3	3	3	3	3	2	26	7	2	1	4.0	26
16-Oct	Z	1	1	1	1	2	9	7	9	10	7	15	5	10	5	2	3	6	2	2	3	4	2	7	4.9	15
17-Oct	2	Z	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	2
18-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	M	M	7	3	3	6	8	6	8	3	2	2	--	8
19-Oct	2	1	1	Z	2	3	4	11	16	11	C	C	C	C	C	C	5	6	9	7	6	5	3	3	--	16
20-Oct	3	3	3	3	Z	2	1	1	2	4	3	4	4	2	5	6	4	3	2	2	2	2	1	1	2.7	6
21-Oct	1	1	2	1	1	Z	7	10	6	4	12	12	2	7	7	8	28	3	3	4	6	4	2	2	5.8	28
22-Oct	Z	1	4	5	6	4	8	7	7	2	9	20	4	8	17	26	26	34	13	7	4	3	2	2	9.5	34
23-Oct	2	Z	2	1	1	4	9	16	19	10	10	12	15	13	15	18	40	22	15	4	4	3	17	9	11.3	40
24-Oct	2	1	Z	1	2	2	5	11	11	9	4	13	5	4	2	0	0	0	0	1	2	1	2	12	4.0	13
25-Oct	4	1	0	Z	0	0	0	0	0	0	0	0	0	1	1	2	2	1	1	2	3	1	1	3	1.1	4
26-Oct	5	3	2	1	Z	1	4	8	5	1	3	2	3	2	2	2	3	5	3	4	4	4	3	3	3.1	8
27-Oct	2	2	3	2	7	Z	11	7	4	3	2	4	1	1	1	1	1	1	1	1	3	4	4	4	3.1	11
28-Oct	Z	4	3	2	2	2	10	10	5	4	4	4	2	3	2	1	0	0	2	0	0	0	0	0	2.6	10
29-Oct	3	Z	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	3	2	1.4	3
30-Oct	1	1	Z	1	1	1	1	7	4	3	5	7	2	5	6	6	6	8	6	5	4	3	16	4	4.5	16
31-Oct	4	2	2	Z	1	3	5	4	3	3	3	4	5	3	4	5	3	2	2	1	1	1	1	0	2.6	5
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan      C - Calibration      M - Maintenance      AF - Analyzer Failure																										





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Conklin - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	660	98.80	98.80
21 - 40	8	1.20	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 668

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Conklin - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	55	23	14	3	2	4	9	14	39	91	86	36	33	51	96	102	658
21 - 40	0	0	0	0	0	0	0	0	0	0	1	0	5	2	0	0	8
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	55	23	14	3	2	4	9	14	39	91	87	36	38	53	96	102	666

Total Number of Valid Hours: 666

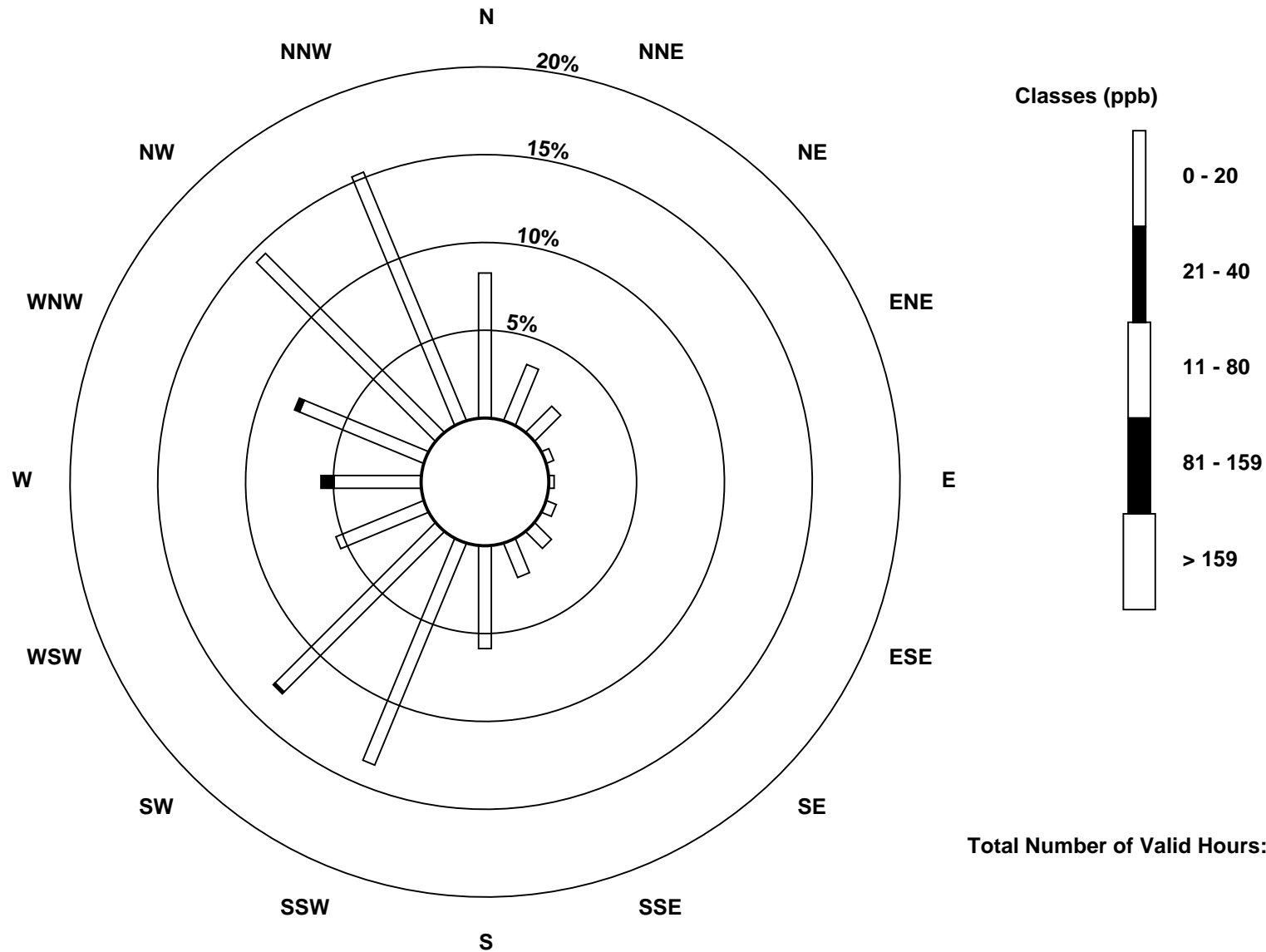
Total Number of Hours: 744

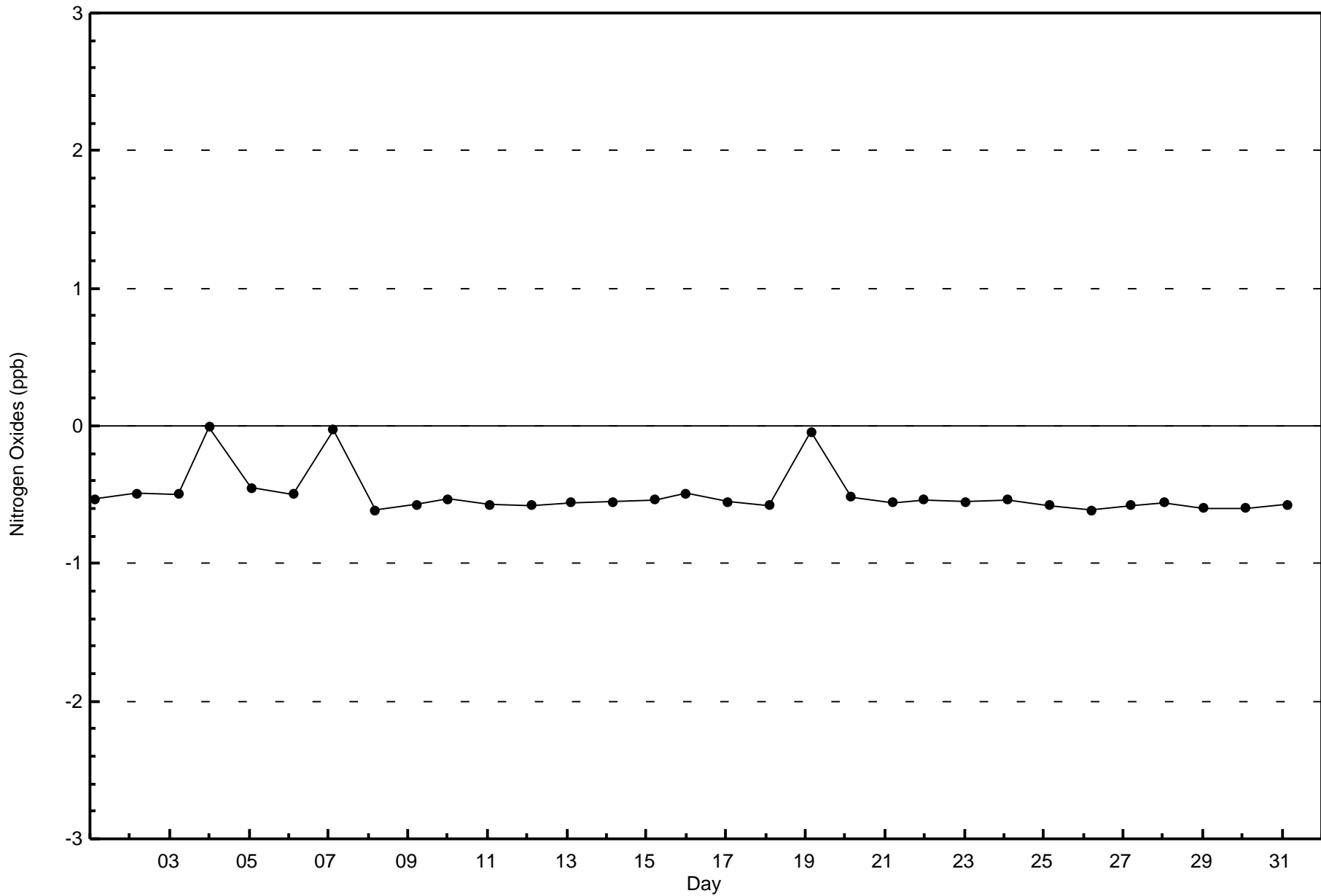


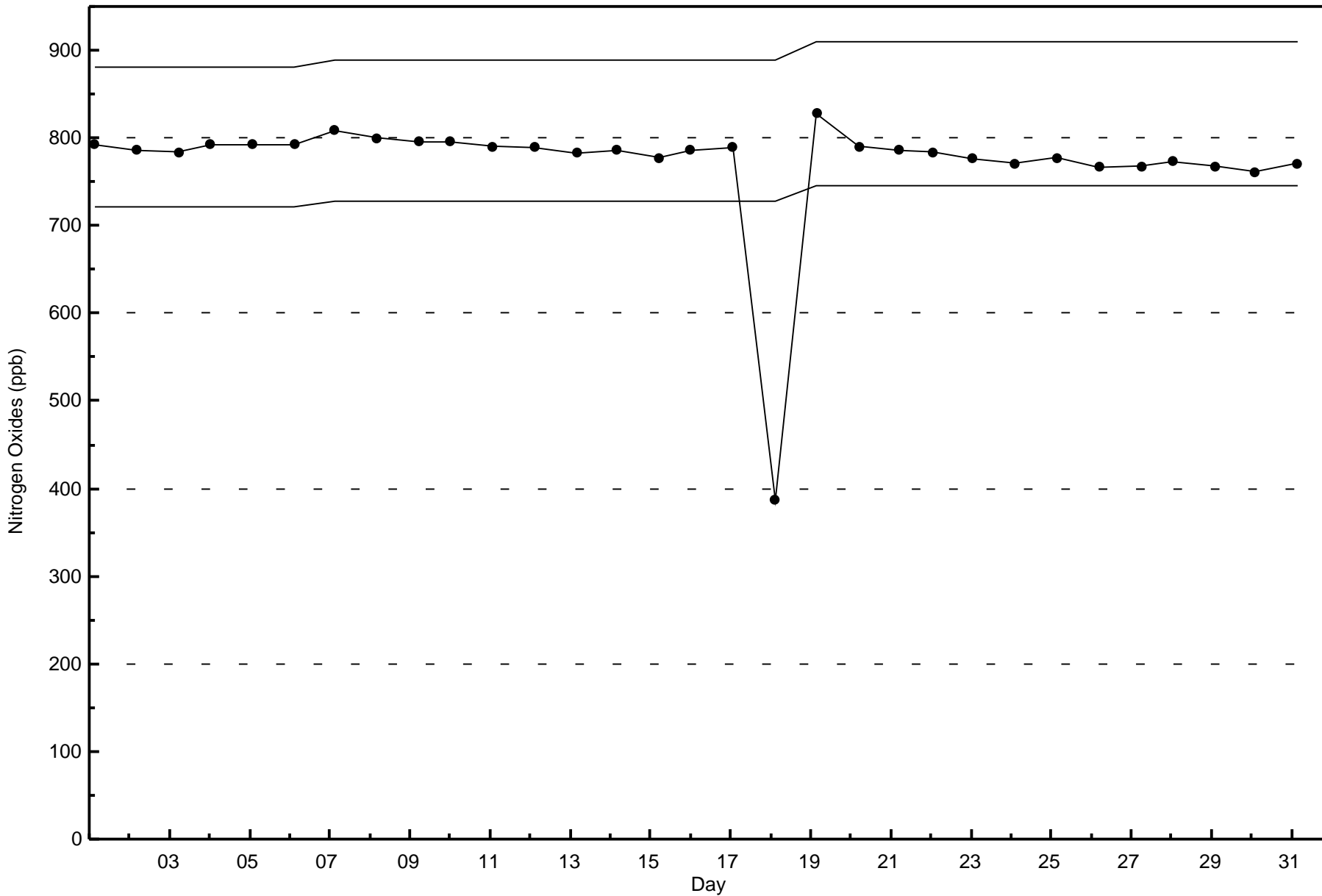


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Conklin (AMS 21)









Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O<sub>3</sub>) - ppb

Conklin - October 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 44 ppb on Oct 5 17:00	Maximum Daily Average: 36.9 ppb on Oct 6		Hours of Data:	707
Minimum Value: 3 ppb on Oct 22 08:00	Minimum Daily Average: 13.0 ppb on Oct 20		Hours of Missing Data:	37
Maximum Diurnal Average: 30.3 ppb at hour 15	Minimum Diurnal Average: 20.8 ppb at hour 8		Hours of Calibration:	36
Monthly Average: 25.5 ppb	Percentiles: P <sub>1</sub> = 5 P <sub>10</sub> = 13 Q <sub>1</sub> = 19 Median = 27 Q <sub>3</sub> = 32 P <sub>90</sub> = 37 P <sub>99</sub> = 43		Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	31	27	21	17	16	Z	16	15	14	13	11	11	11	12	12	12	13	14	14	15	15	15	15	16	15.5	31
2-Oct	16	16	17	17	18	19	Z	19	20	23	26	27	29	29	31	30	29	28	26	13	10	17	14	14	21.2	31
3-Oct	12	8	6	7	8	10	13	Z	20	26	28	30	31	32	34	35	34	33	37	35	35	35	35	37	25.3	37
4-Oct	35	34	Z	31	28	26	22	22	28	28	29	30	34	39	40	39	38	29	19	13	12	22	26	29	28.3	40
5-Oct	31	32	32	Z	30	30	29	29	31	32	36	41	42	42	40	44	44	42	43	43	41	37	39	37	36.8	44
6-Oct	34	32	30	29	Z	31	28	30	31	35	36	35	39	41	43	43	39	37	42	43	42	43	43	43	36.9	43
7-Oct	42	40	39	38	39	Z	27	25	29	32	25	27	30	29	28	30	30	25	29	24	28	28	28	28	30.4	42
8-Oct	30	31	32	32	32	32	Z	32	32	32	32	32	32	32	33	34	34	31	34	35	37	36	33	24	32.4	37
9-Oct	25	27	28	30	32	32	33	Z	33	30	28	26	28	27	29	29	36	39	37	35	30	27	25	21	30.0	39
10-Oct	23	21	Z	20	14	10	7	8	17	18	23	25	28	28	28	28	27	21	23	22	22	20	17	17	20.3	28
11-Oct	16	17	17	Z	17	17	16	16	16	17	19	20	22	23	23	25	26	26	27	28	28	28	28	28	21.7	28
12-Oct	28	29	29	29	Z	30	30	31	31	31	30	32	32	33	32	31	31	32	31	31	31	31	31	31	30.8	33
13-Oct	30	29	25	28	27	Z	22	26	27	28	27	31	34	32	35	36	34	33	33	32	32	30	29	27	29.9	36
14-Oct	26	25	23	23	22	20	Z	19	21	20	20	20	21	22	23	23	21	23	24	26	26	26	25	29	23.0	29
15-Oct	28	19	12	10	10	14	15	Z	15	17	20	24	27	27	27	26	26	26	24	24	15	24	31	32	21.5	32
16-Oct	32	36	Z	36	38	37	33	30	28	29	36	34	36	35	36	37	35	34	39	23	14	9	8	9	29.7	39
17-Oct	14	5	4	Z	12	12	15	13	13	15	17	18	18	17	13	15	17	17	21	27	28	28	27	28	17.1	28
18-Oct	29	30	30	29	Z	29	27	26	26	24	25	M	27	28	30	34	29	16	11	11	11	22	29	31	25.3	34
19-Oct	32	34	35	33	29	Z	13	9	15	25	C	C	34	37	40	43	37	21	12	8	6	5	8	8	23.1	43
20-Oct	6	5	5	6	8	6	Z	6	8	13	C	C	C	18	17	16	11	9	17	15	21	23	24	27	13.0	27
21-Oct	30	31	31	31	31	30	28	Z	27	30	29	31	36	34	35	36	24	26	17	14	18	19	18	14	26.9	36
22-Oct	13	12	Z	6	5	5	4	3	7	15	17	17	23	23	23	20	19	18	30	30	29	28	30	28	17.6	30
23-Oct	28	27	27	Z	25	25	23	21	21	26	28	29	29	31	31	28	19	22	15	21	23	24	20	22	24.5	31
24-Oct	32	33	36	36	Z	33	31	32	32	33	35	31	37	39	39	38	37	35	32	30	22	15	11	6	30.7	39
25-Oct	20	27	29	27	24	Z	22	20	18	19	21	22	22	21	22	23	25	25	23	22	22	22	19	19	22.4	29
26-Oct	18	20	20	20	20	18	Z	16	28	32	31	32	31	32	31	30	29	27	27	25	23	22	22	22	25.0	32
27-Oct	23	22	20	17	11	5	4	Z	13	16	19	24	27	31	36	33	29	24	24	24	23	22	21	20	21.3	36
28-Oct	20	20	Z	21	24	23	19	19	21	24	28	31	33	35	38	39	39	41	42	42	41	40	39	39	31.1	42
29-Oct	37	39	39	Z	39	37	34	33	32	30	33	36	37	38	39	39	38	37	35	33	32	29	28	33	35.1	39
30-Oct	34	33	32	32	Z	31	30	28	28	30	29	28	31	30	29	28	24	15	11	14	13	12	9	9	24.2	34
31-Oct	12	14	12	12	13	Z	11	11	14	13	15	17	18	21	17	16	17	18	18	19	20	22	20	21	16.0	22

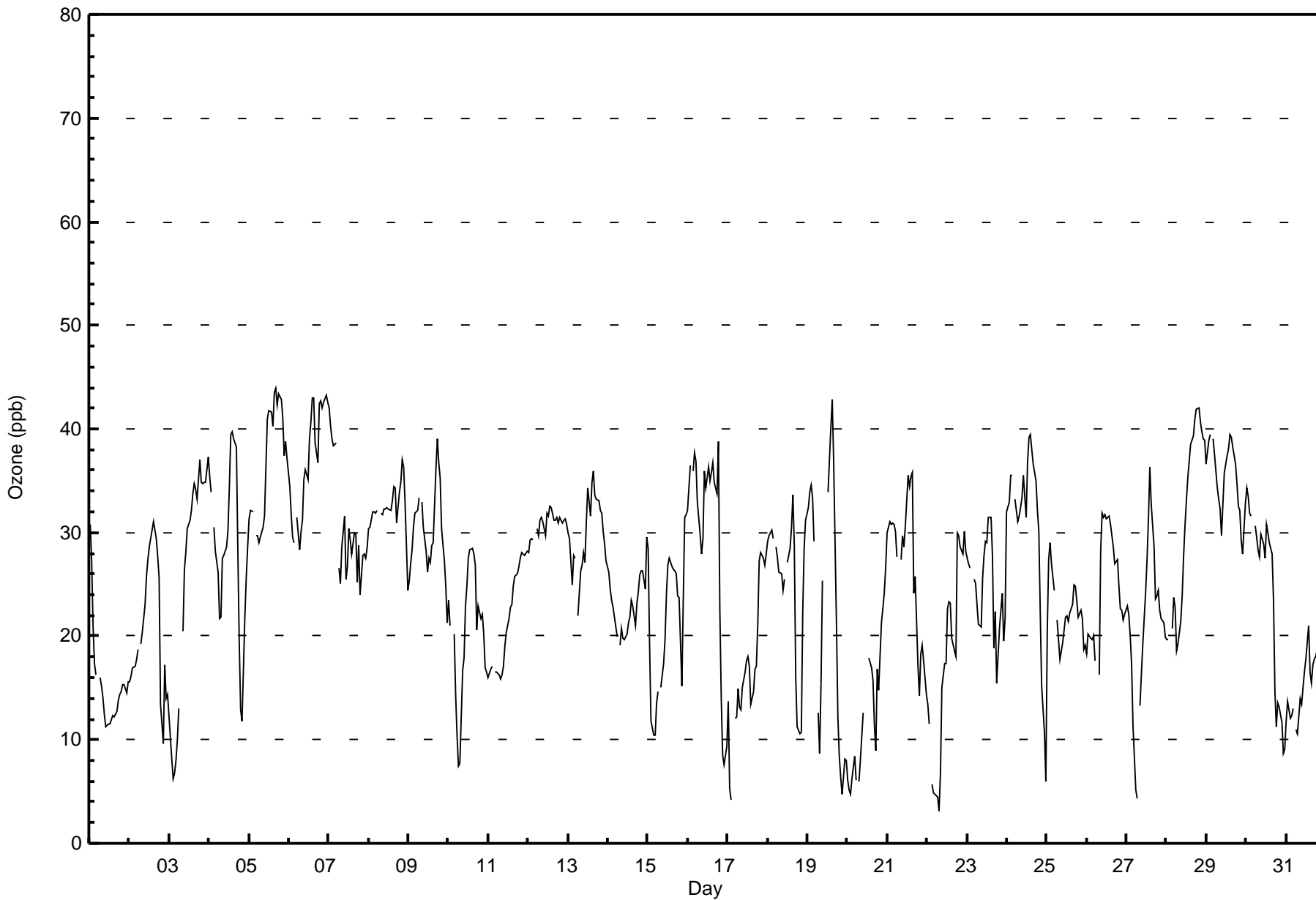
25.5	25.0	24.3	23.8	22.0	22.5	21.2	20.8	22.5	24.4	26.0	27.2	29.3	29.7	30.3	30.2	28.7	26.5	26.4	25.0	24.2	24.5	24.1	24.2	Diurnal Average	
42	40	39	38	39	37	34	33	33	35	36	41	42	42	43	44	44	42	43	43	42	43	43	43	Diurnal Maximum	

Z - zerospan      C - Calibration      M - Maintenance  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ozone (O<sub>3</sub>) - ppb**  
**Conklin - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Conklin - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	209	29.56	29.56
21 - 50	498	70.44	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb  
Conklin - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	16	14	10	2	1	4	5	16	24	37	12	1	7	7	15	37	208
21 - 50	42	9	4	3	0	2	5	4	17	60	74	34	33	57	89	64	497
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	58	23	14	5	1	6	10	20	41	97	86	35	40	64	104	101	705

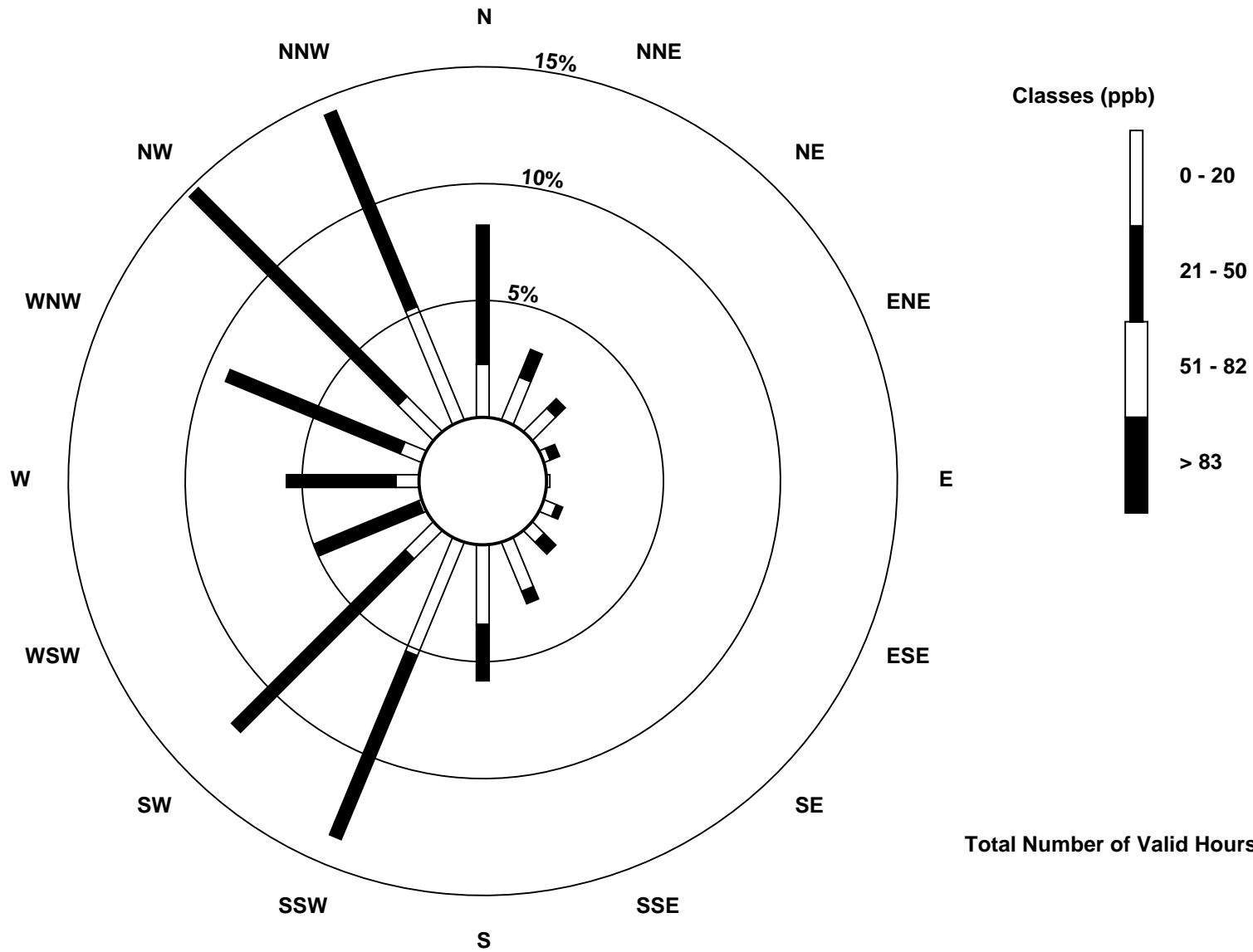
Total Number of Valid Hours: 705

Total Number of Hours: 744

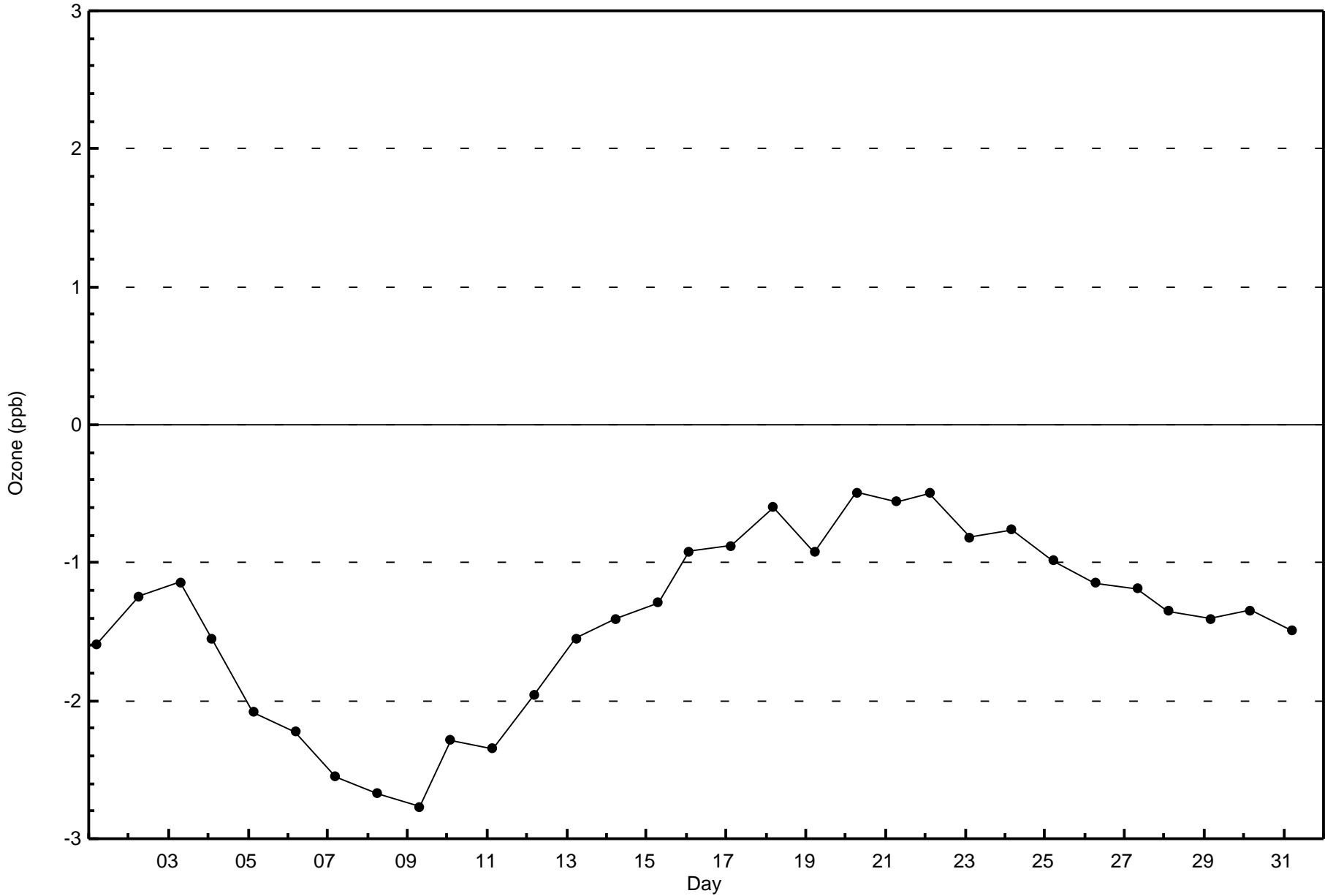


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Ozone (O<sub>3</sub>) - ppb  
Conklin (AMS 21)



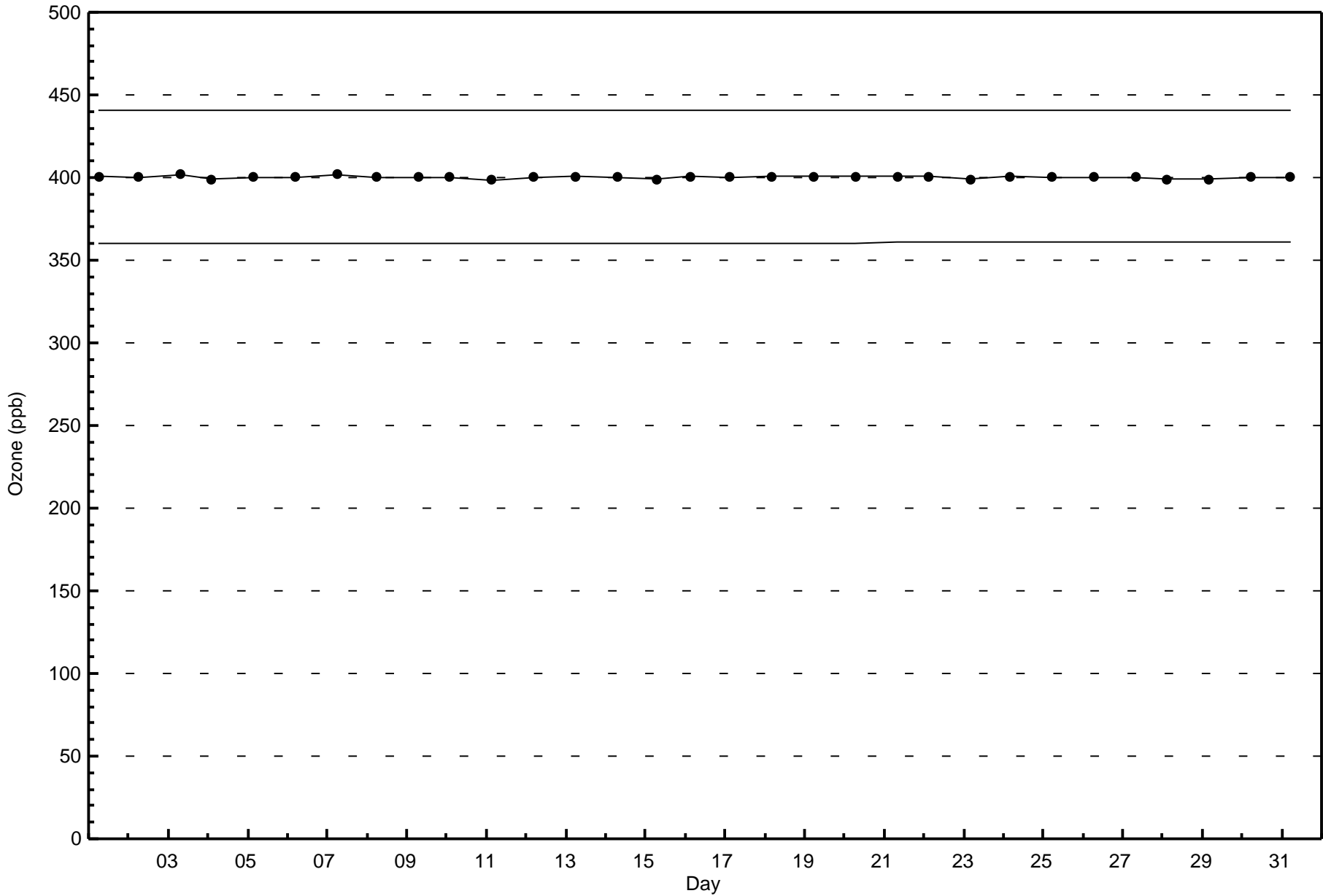






Wood Buffalo Environmental Association  
Span Responses

Ozone (O<sub>3</sub>) - ppb  
Conklin - October 2017

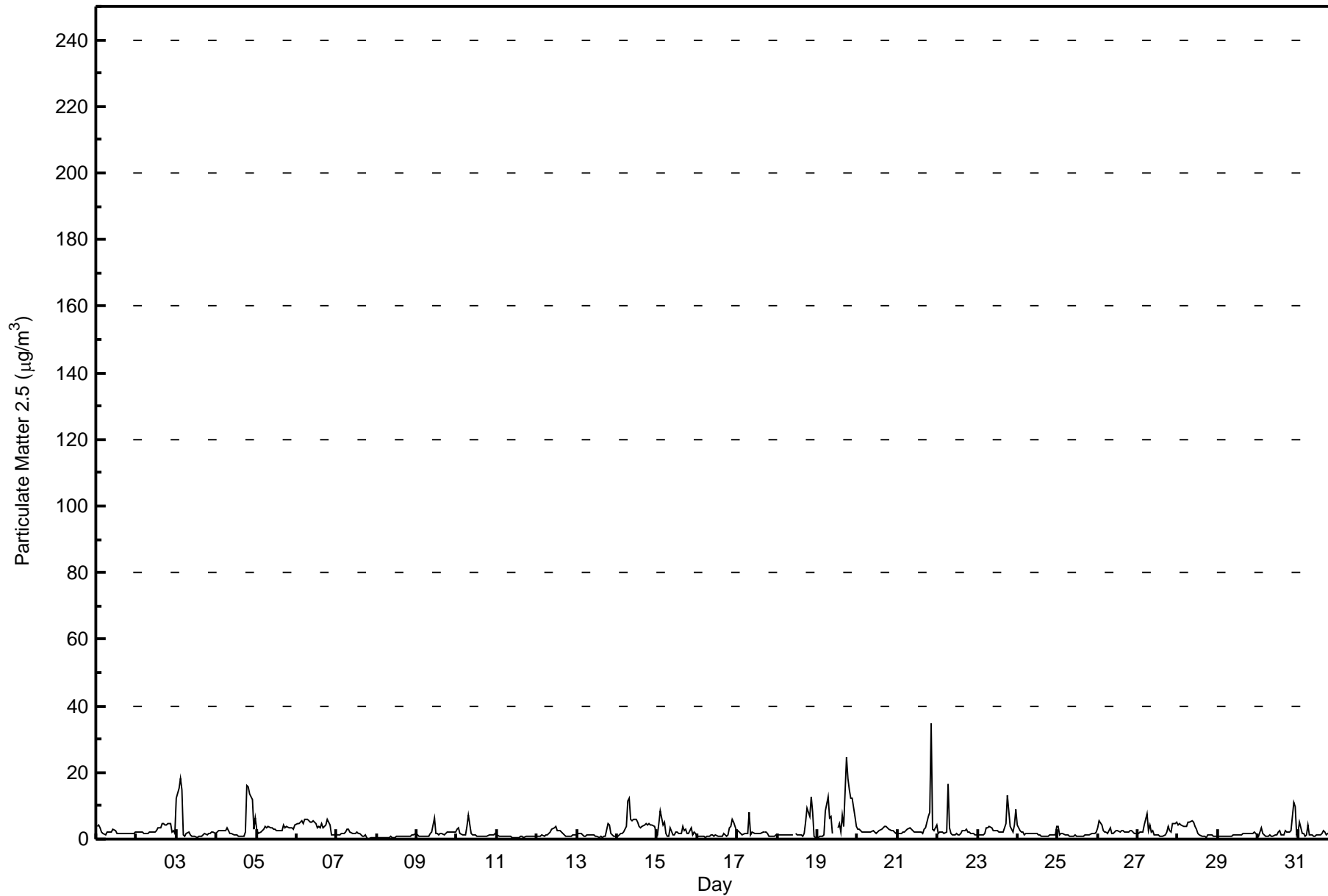




Summary of Hour Averages

Conklin - October 2017

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 34.9 µg/m <sup>3</sup> on Oct 21 21:00 Maximum Daily Average: 7.0 µg/m <sup>3</sup> on Oct 19		Hours in Service: 744 Hours of Data: 741 Hours of Missing Data: 3 Hours of Calibration: 3 Percent Operational Time: 100.0																																														
Minimum Value: 0.2 µg/m <sup>3</sup> on Oct 7 20:00 Maximum Diurnal Average: 4.2 µg/m <sup>3</sup> at hour 21 Monthly Average: 2.53 µg/m <sup>3</sup>		Minimum Daily Average: 0.7 µg/m <sup>3</sup> on Oct 8 Minimum Diurnal Average: 1.7 µg/m <sup>3</sup> at hour 15 Percentiles: P <sub>1</sub> = 0.5 P <sub>10</sub> = 0.8 Q <sub>1</sub> = 1.1 Median = 1.7 Q <sub>3</sub> = 2.8 P <sub>90</sub> = 4.6 P <sub>99</sub> = 14.9																																														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	3.7	4.2	3.3	1.9	1.5	1.3	2.0	2.0	2.2	2.2	3.0	2.5	1.7	1.8	1.8	1.8	1.7	1.8	1.8	1.7	1.7	1.7	1.7	2.0	2.1	4.2																						
2-Oct	2.0	2.2	2.1	2.0	1.8	1.8	1.8	1.8	2.2	2.2	2.1	2.3	2.7	3.3	3.3	4.6	4.6	4.2	4.3	4.7	4.6	2.3	2.5	1.8	2.8	4.7																						
3-Oct	12.5	15.2	18.1	14.7	1.1	0.8	1.9	2.2	1.2	0.9	1.0	0.8	0.6	0.8	1.0	0.8	1.2	1.6	1.2	1.7	1.7	1.9	2.0	1.7	3.6	18.1																						
4-Oct	2.0	2.3	2.4	2.3	2.5	2.7	3.2	2.5	1.7	1.5	1.3	1.2	1.1	0.8	0.9	0.9	0.9	2.1	16.1	15.5	13.6	12.1	2.8	6.4	4.1	16.1																						
5-Oct	3.1	1.6	2.0	2.5	2.8	3.8	3.5	3.7	3.4	3.3	3.2	3.0	2.5	2.5	2.5	2.4	4.4	3.2	3.9	3.3	3.3	3.3	3.2	4.1	3.1	4.4																						
6-Oct	4.6	4.6	5.0	5.3	4.7	6.0	6.0	5.3	5.2	5.0	5.4	4.8	3.5	3.9	3.3	4.8	3.5	4.1	5.9	5.1	4.4	1.4	1.3	1.6	4.4	6.0																						
7-Oct	1.2	1.3	1.4	1.6	1.8	2.0	2.8	3.1	2.0	1.5	1.7	1.7	2.2	1.6	1.5	0.8	1.0	1.2	0.5	0.2	0.2	0.3	0.5	0.5	1.4	3.1																						
8-Oct	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.9	0.8	0.8	1.0	1.2	1.2	1.5	0.7	1.5																						
9-Oct	1.1	1.0	1.0	1.0	0.9	0.8	0.8	0.8	1.8	2.3	6.5	1.6	1.6	1.2	1.5	1.5	1.2	1.6	2.2	2.1	2.0	2.1	2.2	2.1	1.7	6.5																						
10-Oct	2.9	3.3	1.7	1.5	1.4	1.3	4.0	7.0	1.7	1.2	1.1	1.1	0.9	0.9	0.9	0.9	0.8	0.8	0.8	1.1	1.3	1.4	1.5	1.6	1.7	7.0																						
11-Oct	1.1	0.9	0.9	0.9	0.9	0.9	0.8	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.6	0.7	0.7	0.8	0.8	0.8	0.9	1.0	0.8	1.1																						
12-Oct	0.9	1.0	1.0	1.2	1.0	1.1	1.1	1.8	2.0	2.8	3.4	3.7	2.6	2.7	2.5	1.6	1.2	0.9	0.8	0.9	1.0	1.2	1.3	1.4	1.6	3.7																						
13-Oct	1.5	1.6	1.5	1.2	1.1	1.0	1.4	1.1	1.1	1.1	1.1	1.0	0.7	0.6	0.7	0.5	0.7	0.8	4.6	4.4	1.8	1.1	0.9	0.9	1.3	4.6																						
14-Oct	1.0	1.3	1.8	1.8	2.2	3.9	11.6	12.3	5.8	5.7	5.9	6.0	4.9	4.0	3.5	3.9	4.1	4.7	4.4	4.5	4.2	4.0	3.8	2.3	4.5	12.3																						
15-Oct	1.4	4.6	8.5	4.1	4.9	1.7	0.9	0.8	3.6	1.2	1.3	2.2	2.0	1.7	1.9	4.0	2.6	2.8	1.7	1.7	3.6	1.4	2.3	1.6	2.6	8.5																						
16-Oct	1.0	1.0	0.9	1.0	0.8	0.5	0.8	1.0	1.2	1.2	1.0	1.2	0.9	0.9	1.0	0.9	1.8	1.0	1.2	3.2	3.8	5.8	5.1	2.4	1.6	5.8																						
17-Oct	2.3	2.1	1.7	1.4	1.5	1.9	1.6	8.2	1.4	2.1	1.7	1.6	1.7	1.6	1.8	2.0	2.0	2.3	1.7	0.9	0.9	0.9	1.1	1.9	1.9	8.2																						
18-Oct	1.2	1.1	1.2	1.1	1.2	1.2	1.2	1.3	1.2	1.5	C	1.5	1.2	1.2	1.1	1.0	1.5	5.0	9.3	6.6	12.7	8.2	0.6	0.5	2.7	12.7																						
19-Oct	0.6	0.7	0.8	0.9	1.3	8.6	12.8	6.4	6.6	1.7	C	C	3.3	4.5	1.9	7.0	3.6	24.6	18.4	14.9	12.1	12.3	6.9	3.9	7.0	24.6																						
20-Oct	3.1	3.0	2.4	2.1	2.1	2.0	2.1	2.2	2.2	2.4	2.1	1.8	2.2	2.7	2.9	3.3	3.7	3.9	3.5	3.1	2.6	2.4	2.2	1.6	2.6	3.9																						
21-Oct	1.6	1.8	1.9	2.1	2.3	2.5	3.1	3.4	3.0	2.5	2.3	1.9	1.9	2.3	2.0	1.8	3.1	3.3	6.9	8.0	34.9	3.1	2.4	4.2	4.3	34.9																						
22-Oct	1.8	2.0	1.9	2.0	1.9	2.2	16.6	3.4	1.7	1.2	1.3	1.6	1.1	1.2	1.7	2.5	2.7	2.8	2.0	2.1	1.7	1.6	1.4	1.4	2.5	16.6																						
23-Oct	1.4	1.4	1.3	1.3	1.5	3.4	3.2	3.6	3.5	2.7	2.7	2.4	2.4	2.0	2.0	2.3	3.2	4.8	13.3	3.6	2.9	2.3	4.1	8.9	3.3	13.3																						
24-Oct	4.4	2.5	2.2	2.2	1.5	1.5	1.7	1.7	1.5	1.7	1.8	1.9	1.3	1.2	1.0	0.7	0.8	0.8	0.8	1.1	1.4	1.2	1.5	3.6	1.7	4.4																						
25-Oct	3.8	1.3	1.5	1.5	1.2	1.2	1.2	1.0	1.0	1.0	1.1	1.0	1.0	1.0	1.0	1.1	1.2	1.3	1.4	1.4	1.5	1.5	1.5	2.1	1.4	3.8																						
26-Oct	3.6	5.5	4.1	2.7	2.1	1.9	1.9	3.3	1.6	1.7	1.9	2.6	2.6	2.3	2.4	2.5	2.2	2.1	2.2	2.6	2.7	2.1	1.8	1.7	2.5	5.5																						
27-Oct	1.8	2.0	2.0	2.0	4.1	7.5	2.6	4.2	2.1	2.4	1.4	1.3	1.2	0.8	0.8	1.0	1.2	2.1	3.6	2.5	2.2	4.8	4.6	5.0	2.6	7.5																						
28-Oct	4.4	4.8	4.3	4.0	3.6	4.0	4.9	5.2	5.5	5.1	3.7	3.2	1.9	1.1	0.8	0.8	0.7	0.6	1.1	1.1	1.1	1.0	1.0	0.9	2.7	5.5																						
29-Oct	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	1.1	1.3	1.1	1.2	1.3	1.3	1.7	1.8	1.8	1.7	1.8	1.7	1.9	2.2	1.3	1.3	2.2																						
30-Oct	0.9	2.2	3.6	1.6	0.9	0.9	1.0	1.2	1.0	1.0	1.1	1.3	1.9	2.5	1.3	1.3	2.5	2.0	2.1	1.9	2.7	11.1	9.9	1.2	2.4	11.1																						
31-Oct	2.3	4.9	1.8	1.6	0.9	1.1	4.1	1.4	1.1	1.0	1.0	1.4	1.4	1.5	1.9	2.5	2.2	1.4	1.5	1.3	1.3	1.4	1.5	2.0	1.8	4.9																						
																								2.4	2.7	2.7	2.3	1.8	2.3	3.3	3.0	2.3	2.0	2.2	2.0	1.8	1.8	1.7	2.0	2.1	2.9	3.9	3.4	4.2	3.2	2.4	2.3	Diurnal Average
																								12.5	15.2	18.1	14.7	4.9	8.6	16.6	12.3	6.6	5.7	6.5	6.0	4.9	4.5	3.5	7.0	4.6	24.6	18.4	15.5	34.9	12.3	9.9	8.9	Diurnal Maximum
C - Calibration																																																
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m <sup>3</sup>																																																





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Conklin - October 2017**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	550	74.22	74.22
6 - 15	41	5.53	79.76
16 - 25	5	0.67	80.43
26 - 80	1	0.13	80.57
> 81.0	0	0.00	80.57

Total Number of Valid Hours: 741

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**Conklin - October 2017**

Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	39	11	15	5	2	5	4	14	30	72	71	29	37	63	78	74	549
6 - 15	0	0	0	0	0	0	0	3	10	17	6	1	0	0	1	3	41
16 - 25	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	4
26 - 80	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	39	11	15	5	2	5	4	18	42	91	77	30	37	63	79	77	595

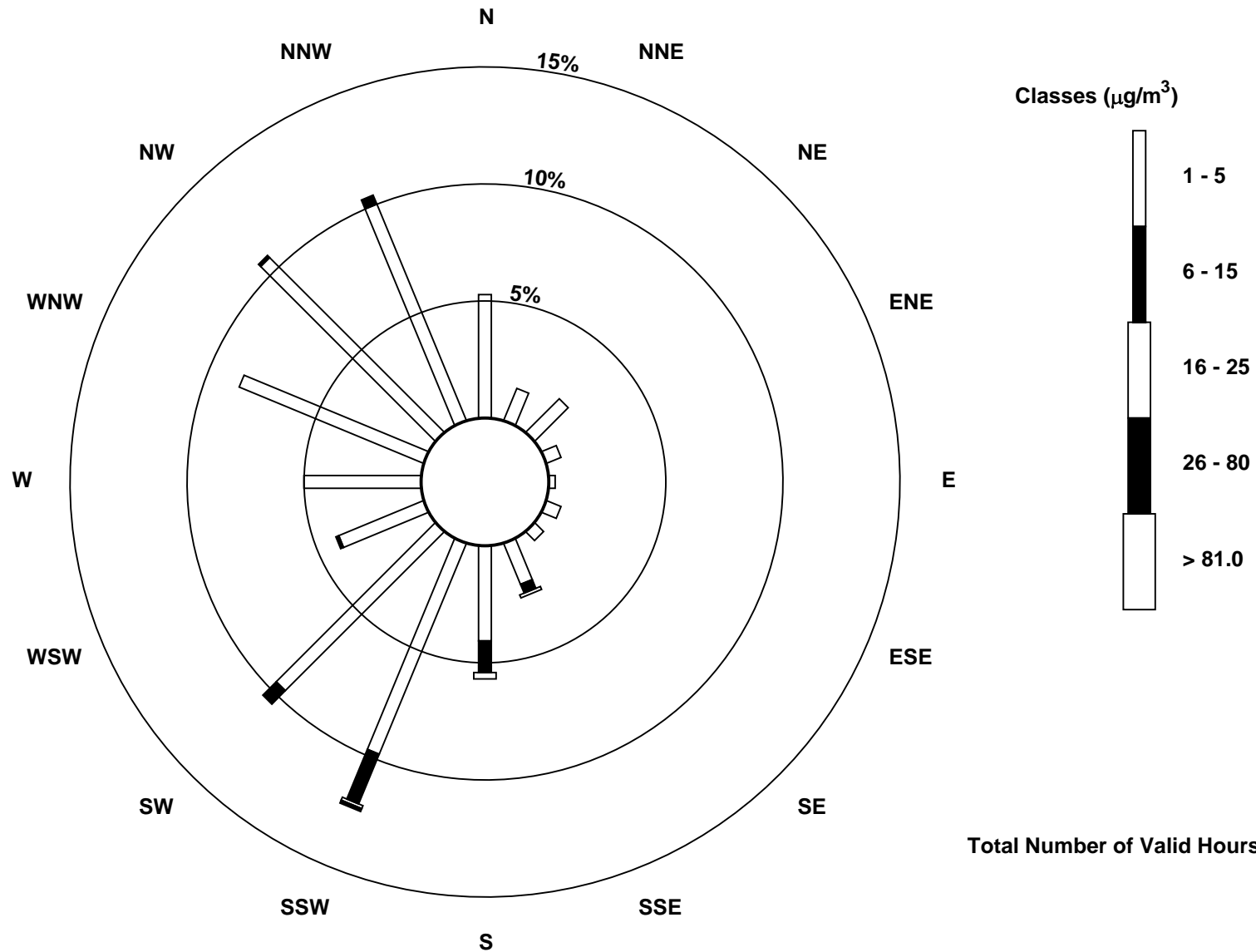
Total Number of Valid Hours: 739

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Conklin (AMS 21)





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Ambient Temperature (AT) - C**

**Conklin - October 2017**

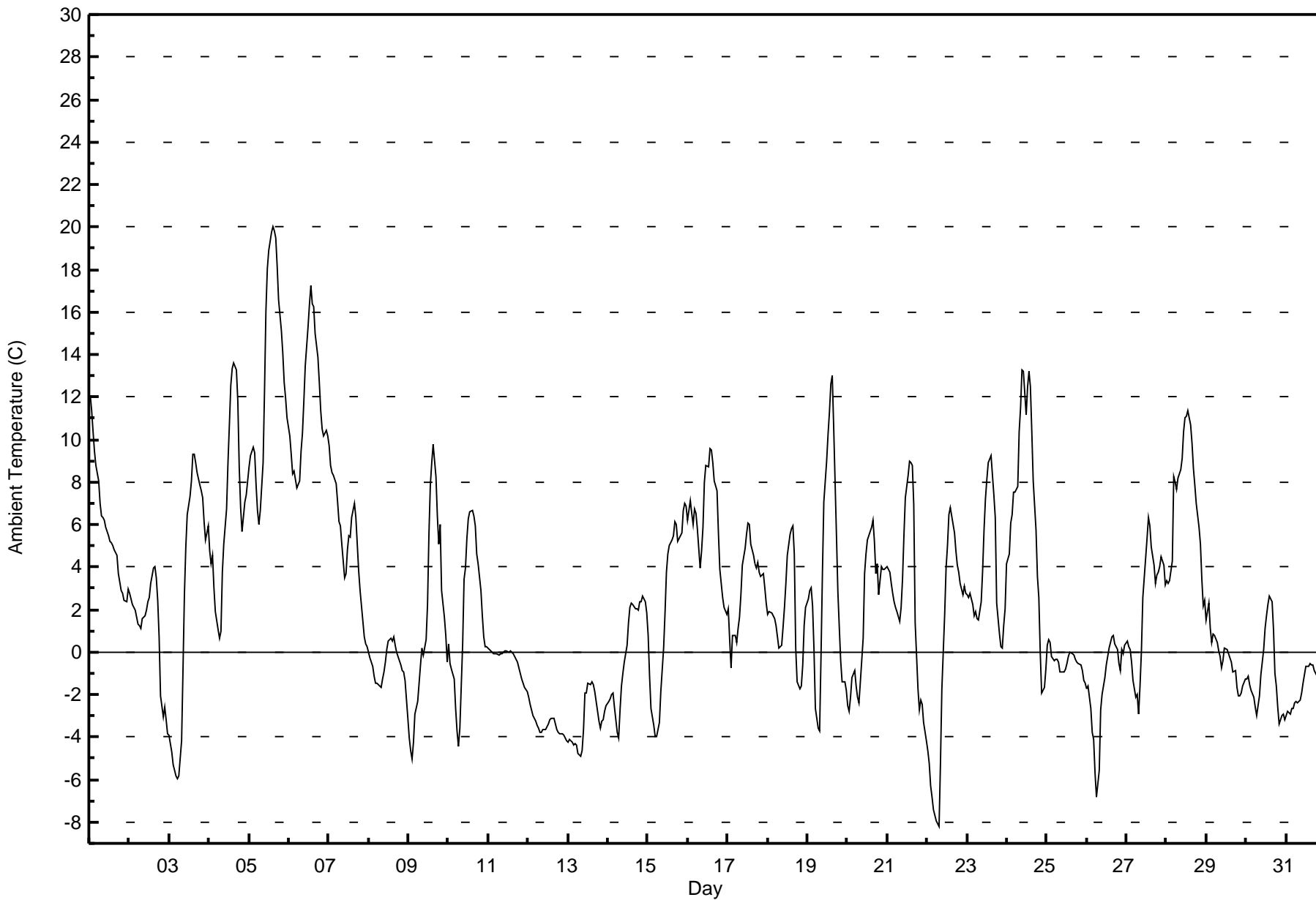
Maximum Value: 20.0 C on Oct 5 15:00		Maximum Daily Average: 13.2 C on Oct 5		Hours in Service: 744																							
Minimum Value: -8.2 C on Oct 22 08:00		Minimum Daily Average: -3.4 C on Oct 12		Hours of Data: 744																							
Maximum Diurnal Average: 6.1 C at hour 15		Minimum Diurnal Average: 0.0 C at hour 7		Hours of Missing Data: 0																							
Monthly Average: 2.54 C		Percentiles: P <sub>1</sub> = -6.0 P <sub>10</sub> = -3.2 Q <sub>1</sub> = -1.2 Median = 1.8 Q <sub>3</sub> = 5.8 P <sub>90</sub> = 9.2 P <sub>99</sub> = 17.9		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	12.1	11.4	10.4	9.4	8.8	8.0	7.0	6.4	6.3	6.2	5.9	5.5	5.2	5.1	5.0	4.8	4.6	3.7	3.3	2.9	2.8	2.4	2.3	3.0	5.9	12.1	
2-Oct	2.8	2.5	2.2	2.0	1.6	1.3	1.3	1.1	1.6	1.7	2.0	2.4	2.6	3.2	3.9	4.0	3.5	2.4	0.7	-2.0	-3.0	-2.6	-3.2	-3.9	1.2	4.0	
3-Oct	-3.9	-4.7	-5.3	-5.6	-5.8	-6.0	-5.8	-4.2	-0.8	2.7	5.0	6.5	7.3	8.0	9.3	9.3	8.9	8.4	7.9	7.6	7.3	6.1	5.3	5.9	2.6	9.3	
4-Oct	4.8	4.1	4.6	3.0	1.9	1.0	0.6	1.0	3.8	5.1	6.7	8.9	10.7	12.6	13.3	13.6	13.3	11.8	8.7	6.8	5.7	7.1	7.4	8.0	6.9	13.6	
5-Oct	8.7	9.2	9.6	9.4	7.9	6.7	6.0	6.7	8.9	12.3	16.1	18.0	18.9	19.8	20.0	19.8	19.5	18.2	16.6	15.1	14.1	12.7	12.0	11.0	13.2	20.0	
6-Oct	10.1	9.3	8.4	8.5	8.1	7.7	8.1	9.4	10.3	11.8	13.5	15.3	16.4	17.2	16.4	16.2	15.0	13.8	12.7	11.4	10.5	10.2	10.4	10.2	11.7	17.2	
7-Oct	9.7	8.8	8.4	8.3	7.9	7.1	6.1	5.9	5.1	3.5	3.7	4.8	5.5	5.4	6.3	7.0	6.3	5.1	3.8	2.9	1.4	0.7	0.4	0.3	5.2	9.7	
8-Oct	0.0	-0.3	-0.7	-1.1	-1.5	-1.5	-1.5	-1.7	-1.3	-1.0	-0.5	0.1	0.5	0.7	0.6	0.7	0.3	0.0	-0.4	-0.6	-0.9	-0.9	-1.3	-3.1	-0.6	0.7	
9-Oct	-4.0	-4.6	-5.0	-4.2	-2.9	-2.3	-1.5	-0.6	0.2	-0.2	0.6	2.2	5.5	7.9	8.9	9.8	8.3	6.4	5.1	6.0	2.9	1.7	0.8	-0.5	1.7	9.8	
10-Oct	0.4	-0.5	-0.8	-1.3	-2.7	-3.7	-4.5	-3.5	0.4	3.5	4.0	5.4	6.3	6.6	6.7	6.4	5.9	4.6	4.1	2.9	1.7	0.7	0.3	0.2	1.8	6.7	
11-Oct	0.2	0.1	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	-0.2	-0.4	-0.7	-1.0	-1.2	-1.4	-1.7	-1.9	-0.4	0.2	
12-Oct	-2.1	-2.4	-2.7	-3.0	-3.3	-3.5	-3.6	-3.8	-3.8	-3.7	-3.6	-3.5	-3.4	-3.2	-3.1	-3.1	-3.4	-3.6	-3.8	-3.8	-3.9	-3.9	-4.0	-4.2	-3.4	-2.1	
13-Oct	-4.2	-4.1	-4.3	-4.4	-4.3	-4.3	-4.8	-4.9	-4.6	-3.6	-2.0	-1.9	-1.5	-1.5	-1.4	-1.5	-1.9	-2.3	-3.3	-3.6	-3.3	-3.2	-2.8	-2.5	-3.2	-1.4	
14-Oct	-2.3	-2.2	-2.0	-2.0	-2.6	-3.7	-4.1	-2.7	-1.6	-1.0	-0.5	0.3	1.4	2.1	2.3	2.2	2.0	2.1	2.0	2.3	2.3	2.6	2.4	1.9	0.1	2.6	
15-Oct	0.8	-1.1	-2.7	-3.5	-4.0	-4.0	-3.7	-3.3	-1.9	0.2	1.8	3.7	4.6	5.0	5.3	5.5	6.1	6.0	5.2	5.3	5.6	6.7	7.0	6.9	2.1	7.0	
16-Oct	6.2	7.1	6.6	6.0	6.7	6.5	5.8	4.0	4.8	5.9	8.0	8.8	8.7	9.6	9.5	8.9	8.1	7.6	5.6	3.9	3.2	2.6	2.1	1.8	6.2	9.6	
17-Oct	2.0	0.6	-0.8	0.8	0.8	0.4	1.1	1.7	2.7	4.1	4.9	5.5	6.0	6.0	5.1	4.6	4.2	4.0	4.2	3.8	3.5	3.7	3.0	2.3	3.1	6.0	
18-Oct	1.8	1.9	1.8	1.7	1.6	1.3	0.7	0.2	0.3	1.2	2.1	3.2	4.6	5.5	5.8	5.9	4.6	0.2	-1.4	-1.7	-1.6	-0.6	1.2	2.1	1.8	5.9	
19-Oct	2.5	2.9	3.0	2.2	0.1	-2.7	-3.6	-3.7	-0.2	3.7	7.0	9.0	10.3	11.3	12.6	13.0	10.6	5.5	2.8	1.2	-0.4	-1.4	-1.4	-1.8	3.4	13.0	
20-Oct	-2.6	-2.8	-2.1	-1.2	-0.8	-1.6	-2.1	-2.4	-1.4	0.6	3.7	4.6	5.3	5.5	5.8	6.2	5.2	3.7	4.1	2.7	4.0	3.9	3.9	3.9	1.9	6.2	
21-Oct	4.0	3.8	3.2	2.8	2.4	2.1	1.9	1.4	2.1	3.5	5.5	7.2	8.3	9.0	8.9	8.8	6.9	1.4	-1.7	-2.7	-2.3	-2.5	-3.3	-4.2	2.8	9.0	
22-Oct	-4.6	-5.2	-6.3	-6.8	-7.4	-7.9	-8.0	-8.2	-5.2	-1.7	1.8	4.0	5.0	6.5	6.8	6.4	5.6	4.7	4.1	3.8	3.2	2.7	3.1	2.8	0.0	6.8	
23-Oct	2.7	2.6	2.8	2.2	1.7	1.9	1.6	1.5	2.4	3.8	5.7	7.2	8.1	8.9	9.3	8.3	7.4	6.3	2.3	0.9	0.3	0.2	1.2	2.0	3.8	9.3	
24-Oct	4.1	4.6	6.1	6.5	7.5	7.5	7.8	10.4	11.5	13.3	13.2	11.1	12.5	13.2	12.5	10.4	8.1	5.7	3.6	2.5	0.0	-1.9	-1.6	-0.8	7.0	13.3	
25-Oct	0.3	0.6	0.4	-0.2	-0.4	-0.3	-0.3	-0.5	-0.9	-0.9	-0.9	-0.8	-0.5	-0.2	0.0	-0.1	-0.2	-0.3	-0.5	-0.5	-0.6	-0.9	-1.4	-1.5	-0.4	0.6	
26-Oct	-1.7	-1.6	-2.7	-3.8	-4.1	-5.7	-6.8	-5.5	-2.7	-2.0	-1.6	-1.2	-0.6	0.2	0.4	0.7	0.8	0.4	0.1	-0.5	-0.9	0.1	-0.1	0.3	-1.6	0.8	
27-Oct	0.5	0.2	0.1	-0.5	-1.3	-2.1	-2.0	-2.9	-1.6	0.1	2.5	4.4	5.4	6.3	5.9	5.0	4.1	3.2	3.6	3.8	4.0	4.5	4.1	3.2	2.1	6.3	
28-Oct	3.4	3.3	3.3	4.3	8.3	8.0	7.7	8.2	8.6	9.1	10.3	11.0	11.1	11.3	10.7	9.8	8.6	7.8	7.0	5.9	5.1	3.5	2.2	2.4	7.1	11.3	
29-Oct	1.5	2.3	1.1	0.5	0.9	0.8	0.5	0.1	-0.2	-0.7	-0.4	0.2	0.1	-0.1	-0.2	-0.5	-0.9	-0.9	-1.7	-2.0	-2.1	-1.9	-1.6	-1.3	-0.3	2.3	
30-Oct	-1.3	-1.1	-1.5	-1.8	-2.1	-2.6	-3.0	-2.5	-2.0	-1.1	0.1	1.1	1.7	2.3	2.7	2.4	1.0	-1.0	-1.6	-2.6	-3.4	-3.0	-2.9	-3.2	-1.1	2.7	
31-Oct	-3.0	-2.8	-2.9	-2.7	-2.6	-2.4	-2.3	-2.4	-2.2	-1.9	-1.5	-1.1	-0.7	-0.7	-0.6	-0.6	-0.6	-0.9	-1.0	-1.3	-1.2	-1.4	-1.5	-1.7	-1.7	-0.6	
		1.6	1.3	1.0	0.8	0.7	0.2	0.0	0.2	1.2	2.4	3.6	4.6	5.3	5.9	6.1	5.9	5.2	4.0	3.0	2.2	1.7	1.5	1.4	1.2	Diurnal Average	
		12.1	11.4	10.4	9.4	8.8	8.0	8.1	10.4	11.5	13.3	16.1	18.0	18.9	19.8	20.0	19.8	19.5	18.2	16.6	15.1	14.1	12.7	12.0	11.0	Diurnal Maximum	





**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Conklin - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C  
Conklin - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	274	36.83	36.83
0 - 10	410	55.11	91.94
10 - 20	59	7.93	99.87
> 20	1	0.13	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %**

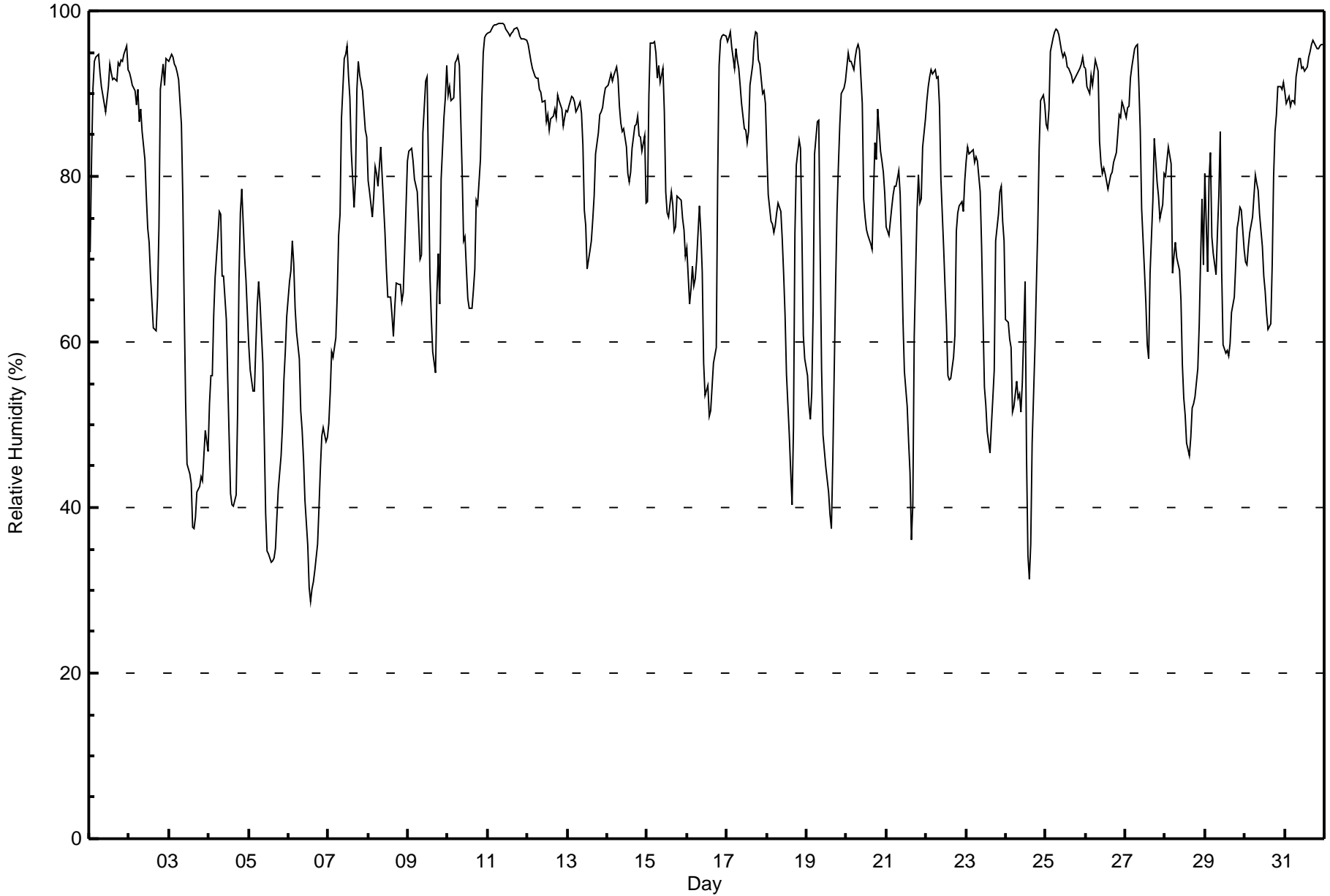
**Conklin - October 2017**

Maximum Value: 99 % on Oct 11 09:00														Maximum Daily Average: 97.6 % on Oct 11														Hours in Service: 744	
Minimum Value: 29 % on Oct 6 14:00														Minimum Daily Average: 48.0 % on Oct 6														Hours of Data: 744	
Maximum Diurnal Average: 83.3 % at hour 7														Minimum Diurnal Average: 62.9 % at hour 15														Hours of Missing Data: 0	
Monthly Average: 76.3 %														Percentiles: P <sub>1</sub> = 33 P <sub>10</sub> = 51 Q <sub>1</sub> = 65 Median = 80 Q <sub>3</sub> = 91 P <sub>90</sub> = 95 P <sub>99</sub> = 98														Hours of Calibration: 0	
																												Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Oct	71	82	91	94	94	95	92	91	90	89	88	91	93	92	92	92	92	94	93	94	94	95	96	93	91.1	96			
2-Oct	93	92	91	90	89	90	87	88	85	82	78	74	72	68	62	61	61	65	74	91	93	91	94	94	81.9	94			
3-Oct	94	95	94	93	93	93	92	86	77	64	53	45	44	43	38	37	39	42	42	44	43	46	49	47	62.2	95			
4-Oct	53	56	56	63	68	73	76	75	68	68	63	55	49	42	40	40	42	51	67	76	78	70	68	63	60.8	78			
5-Oct	59	57	54	54	60	64	67	65	58	49	39	35	34	33	33	34	35	39	42	46	50	55	59	63	49.4	67			
6-Oct	67	69	72	69	64	61	58	52	49	46	41	35	30	29	30	31	32	36	40	45	49	50	48	48	48.0	72			
7-Oct	50	54	59	58	61	66	73	75	87	94	95	96	92	90	83	76	80	91	94	92	90	88	86	85	79.7	96			
8-Oct	80	78	75	78	81	80	79	84	80	77	73	69	65	65	63	61	64	67	67	67	65	66	71	82	72.3	84			
9-Oct	83	83	83	82	80	78	74	70	71	85	92	92	81	68	63	59	56	66	71	65	80	87	89	93	77.1	93			
10-Oct	90	91	89	89	94	94	95	93	80	72	73	69	65	64	64	66	69	77	77	82	89	95	97	97	82.2	97			
11-Oct	97	97	98	98	98	98	98	98	99	98	98	98	97	97	97	97	98	98	98	97	97	97	97	96	97.6	99			
12-Oct	96	95	94	93	92	92	92	91	90	89	89	87	87	86	87	87	88	87	90	89	88	86	87	88	89.6	96			
13-Oct	88	88	90	90	89	88	88	89	88	84	76	74	69	71	72	75	78	83	85	87	88	88	90	91	83.6	91			
14-Oct	91	92	92	92	92	93	92	89	86	85	86	84	80	79	81	83	86	86	87	85	85	83	85	77	86.3	93			
15-Oct	77	90	96	96	96	95	92	93	91	93	88	78	76	75	78	77	73	74	78	78	77	75	74	70	82.9	96			
16-Oct	71	65	66	69	67	68	70	76	73	69	57	53	55	51	52	55	58	59	80	93	97	97	97	97	70.6	97			
17-Oct	96	97	97	96	93	95	94	93	91	89	86	86	84	85	91	94	96	97	97	97	94	94	90	90	92.3	97			
18-Oct	83	78	75	74	73	74	76	77	76	72	68	63	56	49	44	40	50	73	81	84	83	73	61	58	68.4	84			
19-Oct	56	52	51	54	64	83	87	87	71	57	49	45	43	42	39	37	46	67	76	81	86	90	91	92	64.3	92			
20-Oct	93	95	94	94	93	94	95	96	95	89	77	75	74	73	72	71	78	84	82	88	83	82	80	78	84.8	96			
21-Oct	74	73	75	76	78	79	79	81	78	71	63	56	52	48	44	36	40	61	76	80	77	77	84	87	68.5	87			
22-Oct	89	91	92	93	92	93	92	92	88	80	71	66	62	56	55	56	58	61	73	76	76	77	76	80	76.9	93			
23-Oct	82	84	83	83	83	82	82	82	78	71	63	55	52	49	47	50	53	57	72	75	78	79	75	72	70.3	84			
24-Oct	63	62	60	59	52	52	55	53	54	51	55	67	46	34	31	36	48	59	67	74	83	89	90	89	59.6	90			
25-Oct	86	86	88	95	97	97	98	98	97	95	94	95	94	93	93	92	91	92	92	92	93	94	94	93	93.4	98			
26-Oct	93	91	90	92	91	93	94	93	84	82	80	81	80	79	79	80	80	82	83	85	87	87	89	89	86.0	94			
27-Oct	87	88	88	92	93	95	96	96	91	86	76	69	65	60	58	68	77	85	82	79	78	75	77	80	80.9	96			
28-Oct	80	82	84	81	68	70	72	70	69	65	57	53	51	48	46	48	52	53	53	57	62	70	77	69	64.1	84			
29-Oct	80	69	80	83	73	71	68	73	78	85	69	60	59	59	58	60	64	65	69	74	75	76	76	71	70.6	85			
30-Oct	70	69	71	73	75	78	80	79	78	75	72	68	66	63	61	62	69	80	85	87	91	91	91	91	76.2	91			
31-Oct	90	89	90	88	89	89	89	92	94	94	93	93	93	93	94	95	96	97	96	95	95	96	96	96	93.1	97			
	80.1	80.3	81.2	82.0	81.7	83.0	83.3	83.1	80.5	77.6	72.9	69.9	66.7	64.0	62.9	63.2	66.1	71.8	76.5	79.1	80.8	81.1	81.7	81.2	Diurnal Average				
	97	97	98	98	98	98	98	98	99	98	98	98	97	97	97	97	98	98	98	97	97	97	97	97	Diurnal Maximum				



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Conklin - October 2017**





# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Wind Speed (WS) - km/h

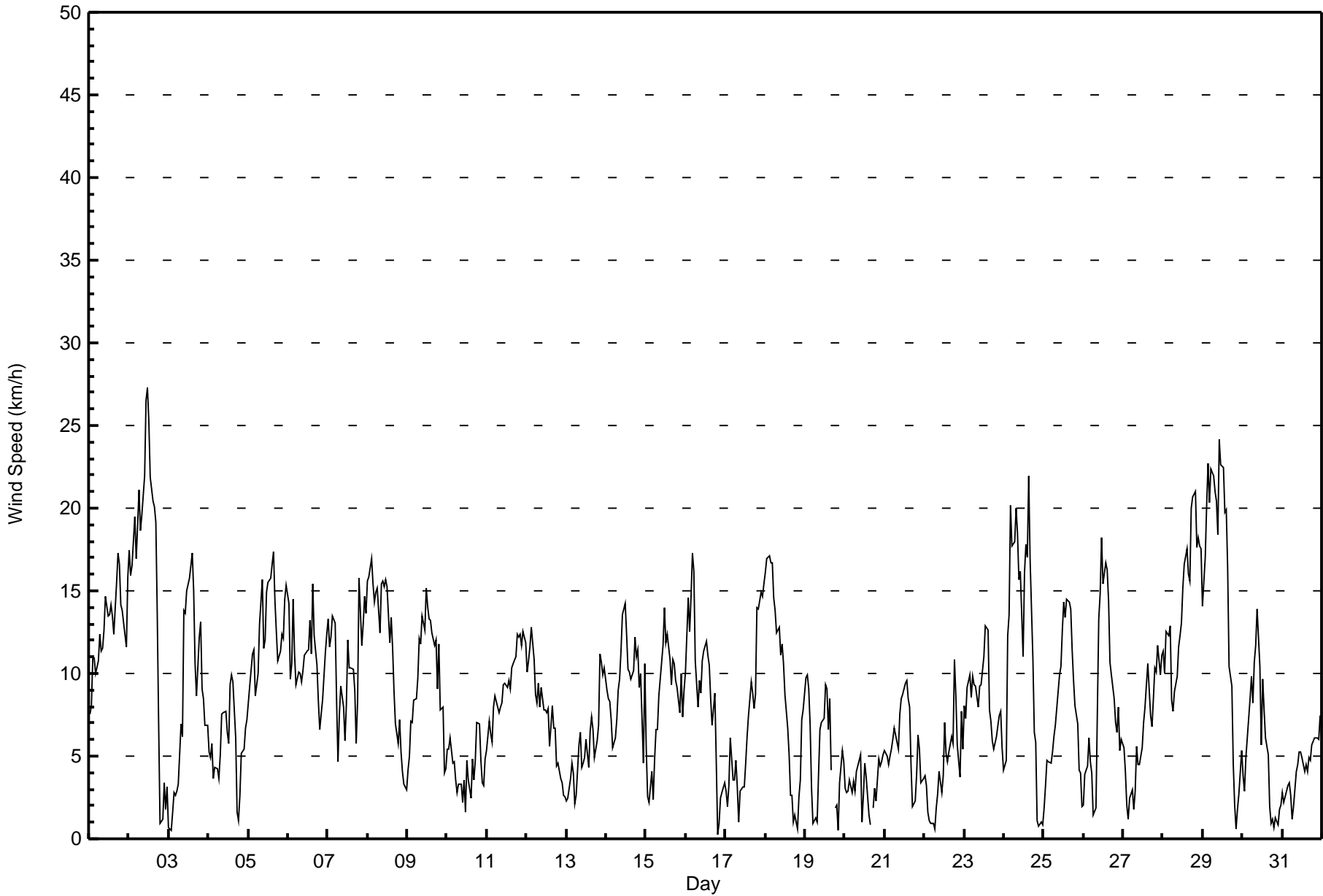
## Conklin - October 2017

Maximum Speed: 27 km/h on Oct 2 12:00	Maximum Daily Speed Average: 15.7 km/h on Oct 2	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 16 20:00	Minimum Daily Speed Average: 0.5 km/h on Oct 10	Hours of Data: 742
Maximum Diurnal Speed Average: 6.3 km/h at hour 14	Minimum Diurnal Speed Average: 3.5 km/h at hour 23	Hours of Missing Data: 2
Monthly Average Velocity: 4.5 km/h 287.9 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 5 Median = 8 Q <sub>3</sub> = 12 P <sub>90</sub> = 16 P <sub>99</sub> = 22	Percent Operational Time: 99.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	NW8	NW8	NW11	NW11	NNW10	NW11	NW12	NW11	NW11	NW13	NW15	NNW13	NNW14	NNW14	NNW13	NNW12	NNW16	NNW17	NNW17	NNW14	NNW14	NNW13	NNW12	N16	NNW12.6	NNW17	
2-Oct	N17	NNW16	N16	N20	N17	NNW19	N21	N19	N20	NNW22	N27	N27	NNW25	NNW22	NNW20	NNW20	N19	N14	NNW7	W1	WNW1	NNW3	NNW2	N3	NNW15.7	N27	
3-Oct	NNW1	SSE0	S2	SSW3	S3	SSW3	SSE3	SSW7	SSW6	SW14	WSW14	SW15	SW16	SSW17	SW17	SW15	SW11	SW9	SW12	SW13	W9	WSW8	WSW7	WNW7	SW8.2	SW17	
4-Oct	NW5	NW5	NW6	WNW4	NW4	NW4	NNW4	NNW5	NNW8	N8	NNW8	NNW6	NW6	NNW9	N10	NNW10	NNW6	NW2	S1	SSW3	SSW5	S5	S7	SSW7	NW3.5	N10	
5-Oct	SSW8	SSW9	SW11	SW11	SW9	SSW9	SSW10	SSW13	SW16	SW11	SW12	SW15	SW15	SW16	SW17	SW17	SSW14	SW13	SW11	SW11	SW12	SW12	WSW14	WSW15	SW12.5	SW17	
6-Oct	SW14	SW10	SW11	SW14	SW11	SW9	SW10	SW10	SW9	SW10	SW11	WSW11	W11	W13	W11	WSW15	W12	W10	WSW8	WSW7	W8	W8	W11	W12	WSW10.1	WSW15	
7-Oct	W13	W12	W12	W13	W13	W8	WNW5	WNW8	WNW9	NW8	W6	NW8	NNW12	NW10	NW10	NW10	NW9	WNW6	NW8	NNW16	NNW12	NNW13	NNW15	NW14	NW9.5	NNW16	
8-Oct	NW16	NW16	NW17	NW15	NW14	NW15	NW15	NW12	NW15	NW16	NW15	NW16	NW15	NW12	NW13	NW12	NNW9	NNW7	NW6	NW7	WNW5	WNW4	W3	SSW3	NW11.3	NW17	
9-Oct	SSW4	S5	S7	SSW7	S8	S9	S10	SSW12	SSW12	SSW13	SSW13	SSW15	SW14	WSW13	W13	W12	W12	W12	WSW9	W12	SW8	SW8	SSW4	S4	SW8.3	SSW15	
10-Oct	SSW5	S5	S6	S5	SSE5	S4	SSW3	S3	S3	SW2	SW4	WSW2	N5	NNW4	N2	NNE5	N4	N5	NNE7	NNE7	NE5	NE3	NE3	NNE5	ENE0.5	NNE7	
11-Oct	NNE5	NNE7	NNE6	NNE6	NNE8	NNE9	NNE8	NNE8	N8	NNE8	NNE9	NNE9	N9	N10	N9	N10	N11	N11	N12	N12	N12	N12	N13	NNW12	N9.2	N13	
12-Oct	NNW10	N11	N12	N13	NNW11	NNW9	NNW8	NNW9	NNW8	NNW9	NNW8	NNW8	NNW8	NNW8	NNW6	NNW8	NNW7	NW7	NNW4	NNW5	NW4	WNW3	NW3	NW3	NNW7.3	N13	
13-Oct	NW2	NNW2	NW4	NW5	WNW4	WNW2	NW3	NNW6	NW6	NW4	WNW5	NW5	W6	WNW4	SW7	SW7	SW7	SW5	SSW6	SSW7	SSW11	SW11	SSW10	SSW10	WSW4.0	SSW11	
14-Oct	SSW9	SSW8	SSW8	SSW7	S6	S6	SSW7	SSW9	SSW10	SSW11	SSW14	SW14	SW12	SW10	WSW10	WSW10	WSW10	WSW10	WSW11	WSW11	WSW9	W10	WNW5	NNW11	SW8.3	SW14	
15-Oct	NNW5	WSW3	SSW2	SW4	SSW2	S5	SSW7	S7	SSW9	SSW11	SSW12	SSW14	SSW12	SSW12	SSW12	SSW11	SSW9	SSW11	SSW11	SSW10	SW9	SW8	WSW10	SW7	SSW7.7	SSW14	
16-Oct	SW10	WSW15	WSW13	WSW15	WSW17	W16	W11	SW8	SW10	WSW9	W11	W11	WSW12	WSW11	WSW10	SW8	SSW7	SW9	SW5	SE0	SW1	SSW2	S3	SSW3	WSW8.5	WSW17	
17-Oct	S3	SSW2	SSE3	S6	S4	SSE4	SSE5	SSE3	SSE1	ESE3	ESE3	ENE3	NE5	N6	N7	NNW10	NNW9	NNW8	NNW9	NW14	NW14	NW15	NW15	NNW15	NW3.4	WNW15	
18-Oct	WNW16	WNW17	WNW17	WNW17	WNW17	WNW15	WNW14	WNW12	NW13	WNW11	WNW12	NW11	WNW9	WNW7	WNW5	WNW3	S3	SSW1	S1	SSW1	S3	SSE4	SE7	ESE8	WNW7.2	WNW17	
19-Oct	SE10	SE10	SSE9	SE7	SSE3	SW1	S1	SW1	S4	SW7	SSW7	SSW7	SSW9	S9	S7	S9	SSE4	AF	S2	S2	NW0	NNW3	NNW5	NNW5	S3.6	SE10	
20-Oct	NNW3	NNW3	NNW3	NNW4	NNW3	NNW3	NNW3	NNW4	NNW4	NNW5	S1	NW3	NNW5	N4	NW1	WNW1	AF	NNW2	NNW3	NW2	NW5	NNW4	NW5	NW5	NNW3.1	NW5	
21-Oct	NW5	NW5	NW5	NW5	NW5	NW6	NW7	NW6	NW5	NW8	NW9	NW9	NW9	WNW10	WNW9	WNW8	WNW5	NNW2	S2	S4	SSW6	SSW5	S3	SSE4	WNW4.3	WNW10	
22-Oct	SSE4	SE3	S2	SSW1	SSW1	NNW1	SSW1	N2	N3	N4	NNW3	WNW4	N7	NW5	NW5	W5	W6	W6	WNW11	WNW9	NW6	WNW4	WNW8	WNW5	WNW3.1	WNW11	
23-Oct	WNW8	WNW7	WNW9	WNW10	W9	W10	WNW9	WNW9	WNW8	WNW9	NW9	NW10	WNW11	WNW13	WNW13	WNW8	WNW7	W6	SW5	SSW6	SSW7	SSW7	SSW8	SSW5	W7.2	WNW13	
24-Oct	SSW4	SSW5	SSW12	SSW14	SW20	SW18	WSW18	W20	W19	NNW16	NW16	NNW11	NW16	NW18	NW17	NNW22	NNW17	NNW11	NNW6	NNW6	N1	N1	NNW1	SSE1	WNW8.1	NNW22	
25-Oct	NE2	NE3	ENE5	ENE5	ENE5	NE5	NE6	NE7	NNE8	NNE10	NNE10	NNE13	N14	N13	N14	N14	N14	N11	NNW10	N8	N7	NNW4	NW4	NW2	NNE7.3	N14	
26-Oct	WNW2	W4	SW4	SW6	SSW5	S4	E1	W2	SW8	SW13	SW15	SW18	SW15	SW17	SW16	SW14	SW11	SW10	WSW8	WSW7	WSW6	WNW8	WNW5	WNW6	SW7.7	SW18	
27-Oct	NW6	NW4	W2	NW1	SSW2	SSW3	SE2	S3	SSW6	SSW4	SSW5	SSW6	SSW7	S8	SSW9	S11	S7	S7	SSW8	SSW10	SSW10	SSW12	SSW10	SW11	SSW5.6	SSW12	
28-Oct	SW11	SW10	WSW13	WSW12	NNW13	NW8	NW8	NW9	NW10	NNW12	NNW12	NNW13	NW15	NW17	NW18	NW16	NW16	NW20	NW21	NW21	NNW18	NNW18	NNW18	NNW18	NW12.4	NW21	
29-Oct	NW14	NW17	NNW20	NNW23	NNW20	NNW22	NNW22	NNW21	NNW20	N18	N24	N23	N22	N20	N20	N16	NNE10	N9	NNE5	NE2	NNW1	SSW2	SW3	NW5	NNW14.2	N24	
30-Oct	NW4	SSW3	SSW5	SW6	SW8	SW10	SSW8	SW11	SW12	SW14	SW10	WSW6	SSW10	SW8	WSW6	W5	SSW2	WNW1	SSE1	WNW1	SSW1	SSW1	SSW2	S2	SW5.2	SW14	
31-Oct	SSW3	S2	S3	SSW3	SSE3	SSW3	SSE1	ESE2	SSE4	SE4	SE5	SE5	ESE5	ESE4	E4	ENE4	NE5	NE5	NE6	NE6	NE6	NE6	NNE6	NNE6	NNE7	E2.4	NNE7

WNW3.9	NNW3.6	W3.8	W4.4	W4.4	NNW4.1	NNW3.7	NNW4.1	NNW4.6	NNW4.8	NNW5.3	NNW5.5	NNW6.1	NNW6.3	NNW6.0	NNW5.5	NNW4.9	NNW4.7	NNW3.7	NNW3.9	W3.5	W3.7	NNW3.5	NNW3.7	Diurnal Average
N17	NW17	NNW20	NNW23	NNW20	NNW22	NNW22	NNW21	NNW20	NNW22	N27	N27	NNW25	NNW22	NNW20	NNW22	N19	NW20	NW21	NW21	NNW18	NNW18	NNW18	NNW18	Diurnal Maximum

AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h  
Conklin - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	241	32.48	32.48
6 - 11	296	39.89	72.37
12 - 19	177	23.85	96.23
20 - 28	28	3.77	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 742

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Wind Speed (WS) - km/h  
Conklin - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 5	11	4	10	5	2	5	6	19	31	38	11	2	7	22	35	33	241
6 - 11	17	19	5	0	0	1	4	1	16	49	47	21	19	27	38	32	296
12 - 19	21	1	0	0	0	0	0	0	0	16	32	14	14	18	34	27	177
20 - 28	10	0	0	0	0	0	0	0	0	0	1	0	1	0	3	13	28
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>59</b>	<b>24</b>	<b>15</b>	<b>5</b>	<b>2</b>	<b>6</b>	<b>10</b>	<b>20</b>	<b>47</b>	<b>103</b>	<b>91</b>	<b>37</b>	<b>41</b>	<b>67</b>	<b>110</b>	<b>105</b>	<b>742</b>

Total Number of Valid Hours: 742

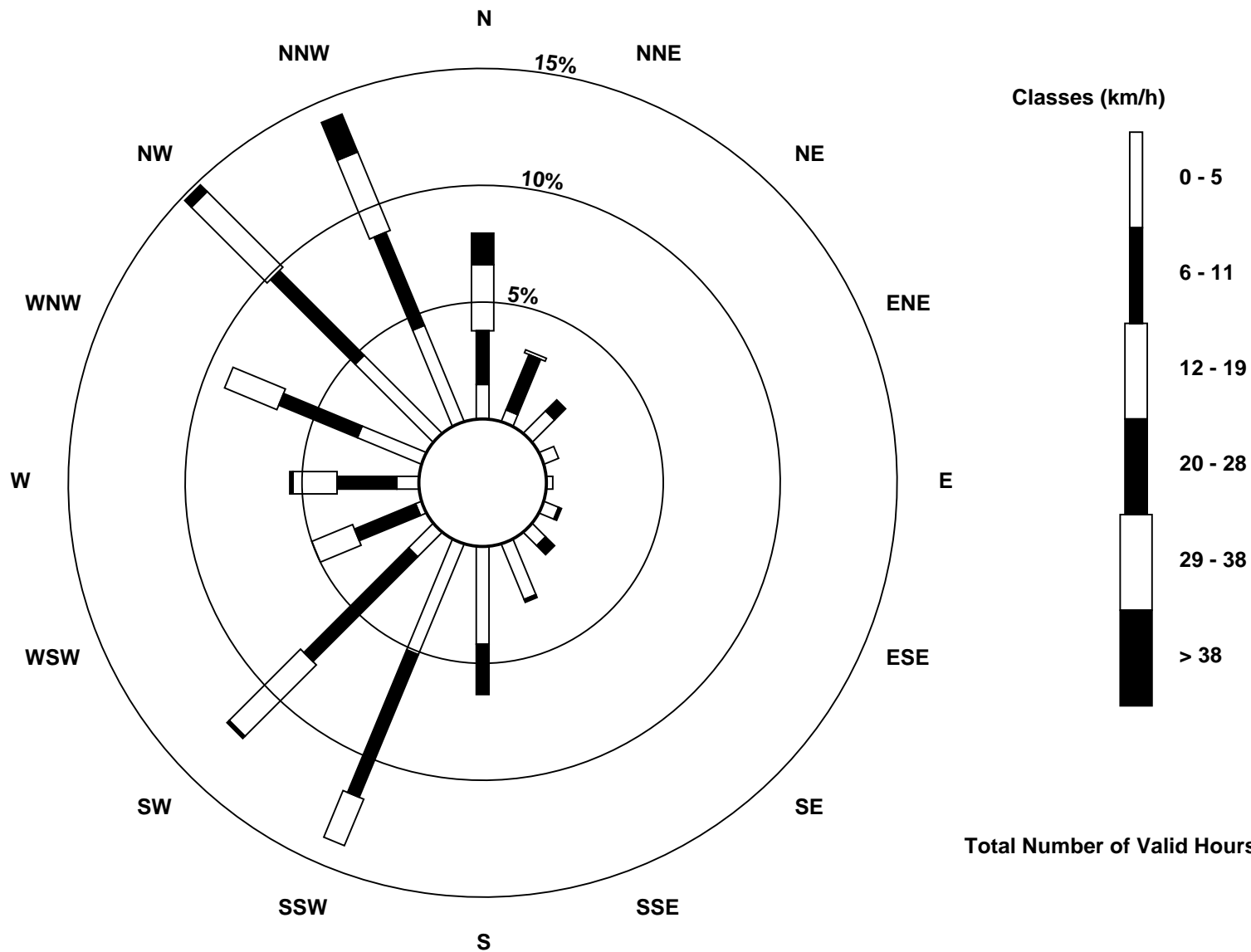
Total Number of Hours: 744





Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed (WS) - km/h  
Conklin (AMS 21)





**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Speed (WS) - km/h**  
**Conklin - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Oct 29 04:00 Minimum Value: 0 km/h on Oct 31 02:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 5 P <sub>99</sub> = 7																	Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	2	3	4	3	3	3	3	4	3	4	4	4	4	4	4	4	5	5	5	4	4	4	3	5	5
2-Oct	5	5	5	6	6	6	6	5	6	6	8	8	7	6	6	6	5	5	3	1	2	2	1	1	8
3-Oct	1	1	1	1	1	1	1	2	2	4	4	5	5	5	5	5	3	3	4	4	3	2	2	3	5
4-Oct	2	2	2	1	1	1	1	1	2	2	3	3	3	3	4	3	2	1	2	2	1	1	1	2	4
5-Oct	2	2	3	4	3	2	3	4	4	3	3	4	5	5	5	5	5	4	3	3	3	3	4	4	5
6-Oct	4	2	3	4	3	2	3	3	3	3	4	3	5	5	5	5	5	3	2	1	2	3	3	4	5
7-Oct	5	5	4	4	4	3	2	4	4	4	3	4	4	5	4	4	4	4	3	6	3	4	4	5	6
8-Oct	5	5	6	5	5	5	5	4	6	5	5	5	5	4	4	4	3	3	2	2	2	2	2	1	6
9-Oct	1	1	2	2	2	2	3	3	4	4	4	4	4	4	5	5	6	5	3	4	2	2	2	1	6
10-Oct	3	1	2	1	1	1	1	1	1	1	1	1	2	2	2	1	1	2	3	3	2	1	1	2	3
11-Oct	2	2	3	4	2	3	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4
12-Oct	2	3	3	3	3	3	2	3	3	3	2	2	2	2	2	2	2	2	1	1	1	2	1	1	3
13-Oct	1	1	1	1	1	1	1	1	2	2	1	2	2	2	2	2	2	2	2	3	3	2	2	2	3
14-Oct	2	2	2	2	1	1	2	3	3	3	4	4	4	3	3	3	3	3	3	3	3	3	2	3	4
15-Oct	4	1	1	1	2	1	1	1	3	2	3	4	3	3	3	2	3	2	2	3	2	4	2	2	4
16-Oct	3	4	4	4	5	5	4	2	2	3	4	4	4	3	3	3	2	3	3	1	1	1	1	2	5
17-Oct	2	2	1	1	2	1	1	2	1	1	2	1	2	2	2	3	2	3	4	5	5	6	6	6	6
18-Oct	7	7	7	7	6	6	5	5	5	4	4	4	3	3	2	2	1	1	1	1	1	1	3	2	7
19-Oct	3	3	3	2	3	2	1	1	2	2	2	3	3	3	2	2	3	AF	2	1	1	1	1	1	3
20-Oct	1	1	1	1	1	1	1	2	1	2	1	1	2	2	1	1	AF	2	2	2	1	1	1	2	2
21-Oct	2	2	2	2	2	2	3	2	2	3	3	3	4	4	3	3	2	1	1	1	1	1	1	1	4
22-Oct	2	1	1	1	1	1	1	1	2	1	1	1	2	2	1	2	3	3	5	4	2	2	3	2	5
23-Oct	3	3	3	4	3	3	4	4	3	4	4	4	4	5	5	3	2	1	1	1	1	1	2	2	5
24-Oct	1	2	3	4	5	5	5	6	6	7	7	7	7	7	7	5	4	2	3	1	1	1	1	1	7
25-Oct	1	1	2	2	1	2	2	2	2	3	3	4	4	4	4	4	4	3	2	2	1	1	1	1	4
26-Oct	1	2	1	1	1	1	1	2	2	4	5	6	6	5	5	4	3	3	3	2	2	3	2	2	6
27-Oct	2	1	1	1	1	1	1	1	2	2	1	2	2	2	3	2	2	2	2	2	2	3	3	3	3
28-Oct	3	3	4	3	5	3	3	4	4	5	5	5	6	7	7	7	6	7	7	8	6	7	7	6	8
29-Oct	5	6	6	8	6	7	6	6	5	6	7	6	6	6	6	5	3	3	1	1	1	1	1	3	8
30-Oct	2	1	2	1	2	2	2	3	3	3	4	1	2	3	3	2	1	1	1	1	1	1	1	1	4
31-Oct	1	0	1	1	1	1	1	2	1	1	1	1	2	1	2	1	1	1	2	2	2	2	2	2	2
Diurnal Maximum																									
AF - Analyzer Failure																									



**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Wind Direction (WD) - deg**  
**Conklin - October 2017**

Direction of Maximum Speed: 351 deg on Oct 2 12:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 348.1 deg on Oct 2	Hours of Data: 742
Direction of Minimum Speed: 134 deg on Oct 16 20:00	Hours of Missing Data: 2
Direction of Minimum Daily Speed Average: 0.5 deg on Oct 10	Percent Operational Time: 99.7
Monthly Average Direction: 287.4 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	321	317	321	323	330	325	325	324	325	324	324	327	328	329	330	331	330	335	335	336	336	333	332	351	329.8
2-Oct	349	346	349	352	351	347	352	353	351	348	350	351	346	344	344	346	349	349	341	266	302	331	334	359	348.1
3-Oct	342	155	172	198	189	192	166	200	196	218	238	222	220	213	215	220	223	236	225	225	261	237	248	292	223.5
4-Oct	305	309	312	302	321	323	327	338	341	5	341	345	324	346	349	339	330	305	169	195	205	187	183	204	321.4
5-Oct	213	213	216	220	217	212	210	212	218	230	226	228	231	226	217	216	211	215	217	214	216	220	237	238	220.4
6-Oct	232	226	223	235	234	234	227	229	227	223	219	238	277	275	277	258	270	265	251	254	270	275	268	272	248.5
7-Oct	274	281	277	261	265	278	283	288	301	314	280	325	327	321	309	308	310	303	313	333	328	328	331	324	304.1
8-Oct	326	322	323	321	321	320	319	321	325	325	325	323	325	317	326	324	334	335	317	317	302	290	268	203	321.2
9-Oct	195	187	188	195	183	175	178	194	204	202	201	207	232	250	264	266	274	267	242	270	217	219	201	180	221.3
10-Oct	209	180	178	182	156	186	194	173	190	223	235	255	351	342	359	22	6	5	31	33	50	40	39	30	61.7
11-Oct	18	21	22	22	23	23	22	13	11	17	18	14	6	6	2	4	1	1	3	1	360	356	354	346	7.3
12-Oct	346	352	349	350	345	340	331	337	339	337	337	327	332	333	333	332	329	326	328	337	321	302	304	317	336.7
13-Oct	309	329	324	323	291	288	311	327	326	310	293	305	263	286	226	220	226	215	198	204	212	216	213	208	248.9
14-Oct	210	199	203	196	184	191	198	204	205	202	210	214	222	236	238	246	243	242	240	248	246	267	297	332	226.5
15-Oct	327	242	212	216	202	174	196	186	195	195	202	205	204	208	204	199	208	208	206	226	215	237	219	224	208.8
16-Oct	226	245	240	243	256	269	270	221	233	243	264	262	243	252	239	218	213	231	234	134	224	193	174	192	242.7
17-Oct	170	192	149	177	169	155	152	149	147	121	104	61	46	6	358	338	328	320	311	313	311	308	309	295	316.1
18-Oct	302	301	298	303	303	301	302	302	315	295	296	305	303	292	283	293	183	213	180	213	171	161	138	122	296.9
19-Oct	135	138	148	142	156	230	179	215	183	228	212	193	198	189	183	170	158	AF	171	171	304	334	336	338	176.2
20-Oct	331	340	340	332	332	329	339	331	328	328	183	318	329	3	325	298	AF	341	345	314	323	327	323	318	329.7
21-Oct	315	312	304	310	315	316	311	316	319	315	309	304	313	292	297	293	294	336	182	190	200	199	170	166	296.0
22-Oct	153	144	171	200	200	329	213	356	356	5	341	298	350	325	307	280	273	278	286	293	305	301	291	298	299.4
23-Oct	294	297	287	283	275	273	291	289	295	298	306	305	299	288	289	296	284	259	224	211	206	202	205	199	277.1
24-Oct	200	203	198	207	221	227	247	260	266	295	312	290	310	308	314	339	345	347	335	345	350	349	339	152	283.2
25-Oct	53	44	73	69	58	54	54	35	29	31	24	12	5	6	3	359	354	352	347	351	351	339	323	313	11.7
26-Oct	303	274	227	226	211	174	89	261	231	216	217	214	221	224	219	219	224	233	248	241	244	283	301	301	229.9
27-Oct	310	315	274	308	213	200	142	187	205	200	203	212	201	186	204	191	183	190	194	195	206	203	207	217	204.4
28-Oct	227	229	237	244	286	307	309	306	304	299	300	301	307	313	320	321	322	325	325	325	331	342	335	335	309.6
29-Oct	318	321	336	336	332	332	337	338	339	356	351	350	355	354	358	6	13	2	25	46	330	192	227	307	344.0
30-Oct	314	206	208	216	231	217	210	219	225	228	233	247	206	223	256	269	203	293	155	294	194	193	198	169	225.2
31-Oct	196	182	183	197	155	193	157	118	153	137	127	124	115	102	80	66	50	45	38	34	35	31	19	20	83.0

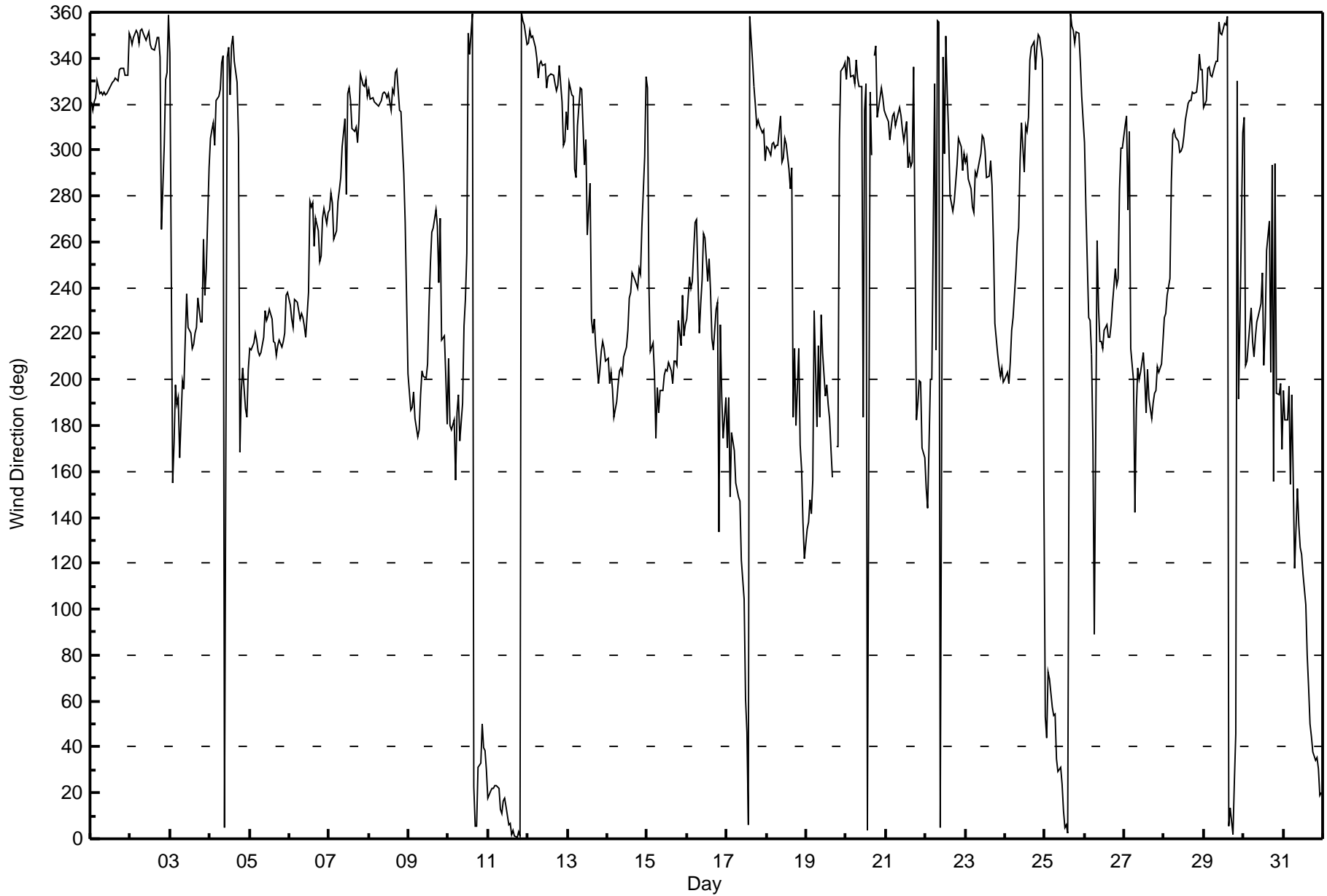
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 Diurnal Average

AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Conklin - October 2017**





**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Direction (WD) - deg**  
**Conklin - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 104 deg on Oct 26 08:00 Minimum Value: 10 deg on Oct 21 21:00 Percentiles: P <sub>1</sub> = 13 P <sub>10</sub> = 18 Q <sub>1</sub> = 19 Median = 23 O <sub>3</sub> = 30 P <sub>90</sub> = 46 P <sub>99</sub> = 79																			Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7						
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	23	29	30	26	21	21	21	24	22	23	21	21	19	20	20	20	20	20	19	20	19	20	19	20	30
2-Oct	20	19	20	22	21	20	19	19	21	20	21	22	21	21	20	21	19	19	17	59	51	42	54	16	59
3-Oct	92	85	52	21	27	28	25	19	29	21	26	25	24	22	24	26	26	27	25	22	27	21	32	32	92
4-Oct	33	25	31	21	17	18	22	17	26	29	31	53	59	31	31	27	21	36	57	74	11	11	12	21	74
5-Oct	20	19	22	23	24	21	26	23	21	24	23	24	26	25	24	22	22	21	22	19	20	21	19	18	26
6-Oct	19	21	21	19	20	20	22	24	26	21	22	27	31	31	36	24	26	21	14	16	20	25	22	26	36
7-Oct	26	31	26	22	21	26	28	29	33	26	28	23	22	23	30	29	28	30	29	19	18	18	19	19	33
8-Oct	19	21	23	22	24	23	22	22	21	21	22	23	24	26	21	23	20	21	24	24	31	37	51	30	51
9-Oct	15	16	17	18	17	19	20	19	21	18	18	17	24	24	25	26	27	32	23	26	17	18	56	32	56
10-Oct	40	25	20	27	21	16	48	26	18	56	49	85	45	55	76	26	23	17	30	30	37	38	46	32	85
11-Oct	29	27	27	25	27	27	26	25	26	26	26	27	24	22	23	23	22	22	23	21	21	19	18	17	29
12-Oct	17	18	18	18	18	19	18	18	19	20	18	20	20	24	19	19	19	16	19	22	27	32	29	34	34
13-Oct	27	58	14	16	29	39	46	20	21	37	37	29	36	37	29	22	25	25	25	25	17	17	18	16	58
14-Oct	17	19	19	20	18	16	18	18	20	18	18	19	21	22	21	18	18	18	18	19	19	24	29	20	29
15-Oct	31	30	34	14	60	24	16	17	20	18	20	18	18	19	19	18	17	18	18	22	21	22	19	22	60
16-Oct	21	19	18	17	18	21	22	28	22	21	27	26	20	21	21	20	19	23	25	79	53	34	55	52	79
17-Oct	54	42	67	16	46	23	21	46	94	45	61	68	47	36	23	18	16	27	25	26	28	31	31	34	94
18-Oct	31	33	32	32	31	32	32	32	26	32	32	34	33	34	35	48	22	75	59	79	32	28	21	22	79
19-Oct	17	17	20	37	78	71	69	71	22	28	27	31	26	28	31	18	67	AF	70	54	53	19	11	15	78
20-Oct	16	17	18	19	15	16	20	17	12	27	92	61	28	35	57	62	AF	24	16	31	20	20	22	26	92
21-Oct	25	30	31	26	26	24	28	26	32	28	29	31	29	32	32	32	27	48	14	14	10	15	20	24	48
22-Oct	14	13	51	76	73	75	93	18	22	29	46	29	16	30	29	25	21	25	26	29	28	25	27	31	93
23-Oct	30	29	25	24	22	25	28	28	31	31	31	30	30	29	30	30	21	27	14	13	13	12	14	23	31
24-Oct	32	33	18	20	19	19	18	19	19	30	30	30	30	29	28	19	19	19	15	23	54	82	62	71	82
25-Oct	61	25	30	27	29	25	29	23	23	23	22	22	20	20	20	18	18	17	17	19	16	20	19	39	61
26-Oct	32	35	26	18	29	23	65	104	29	19	20	19	22	21	19	17	20	21	18	19	21	26	32	32	104
27-Oct	29	27	67	84	54	31	19	19	22	20	19	28	22	21	19	14	14	16	17	15	16	16	18	19	84
28-Oct	24	24	20	19	28	30	29	31	31	31	32	31	29	29	25	23	22	20	21	22	22	19	22	21	32
29-Oct	25	23	19	20	19	19	18	19	21	19	20	22	21	21	22	20	22	19	23	58	70	48	41	31	70
30-Oct	30	41	22	18	21	18	19	19	19	19	23	28	19	36	34	38	55	93	54	65	66	61	31	27	93
31-Oct	28	24	20	27	17	39	50	34	15	15	17	19	24	30	33	30	24	23	22	23	22	21	22	21	50
92 85 67 84 78 75 93 104 94 56 92 85 59 55 76 62 67 93 70 79 70 82 62 71																									
Diurnal Maximum																									
AF - Analyzer Failure																									



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Conklin	Station number:	AMS 21
Calibration Date:	October 6, 2017	Last Cal Date:	September 19, 2017
Start time (MST):	9:50	End time (MST):	13:32
Reason:	Routine		

### Calibration Standards

Cal Gas Concentration	<u>49.1</u>	ppm	Cal Gas Exp Date	August 18, 2020
Cal Gas Cylinder #	<u>LL84669</u>			
Calibrator Make/Model	Teledyne API T700		Serial Number	2658
ZAG Make/Model	Teledyne API 701		Serial Number	263

### Analyzer Information

Analyzer make: Thermo 43i

Analyzer serial #: 1428701363

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Analyzer Range	0 - 1000 ppb		PMT voltage	-655	-655
Calculated slope	0.972912	0.997266	Lamp voltage	851	850
Calculated intercept	-0.486456	-0.001894	Pressure	646.0	646.4
Analyzer Background	21.4	21.3	Flow	0.475	0.476
Analyzer Coefficient	0.872	0.858	Intensity	91	92

### SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5005	0.0	0.0	0.5	----
as found span	4933	77.5	759.5	770.8	0.985
calibrator zero	5005	0.0	0.0	0.5	----
high point	4933	77.5	759.5	761.8	0.997
second point	4975	38.9	380.9	381.7	0.998
third point	4990	19.4	190.2	190.2	1.000
as left zero	5005	0.0	0.0	1.0	----
as left span	4933	77.5	759.5	767.9	0.989
Average Correction Factor					0.998
Corrected As found	770.30	Previous response	781.09	*% change	1.4%

\* = > +/-5% change initiates investigation

#### Notes:

Sample inlet filter replaced after as founds. Adjusted span.

Calibration Performed By:

Asad Hidayat



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

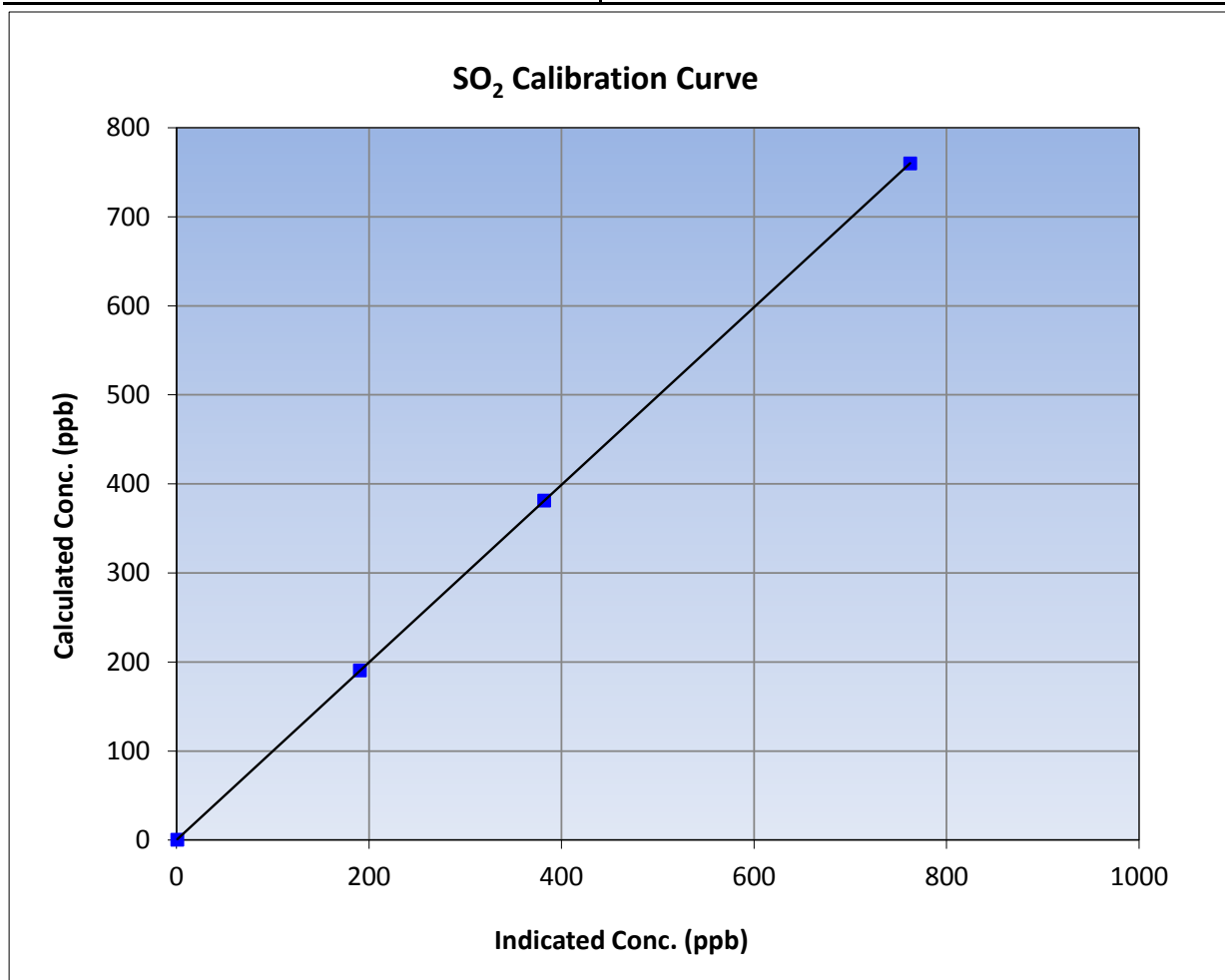
Version-03-2017

### Station Information

Calibration Date	October 6, 2017	Previous Calibration	September 19, 2017
Station Name	Conklin	Station Number	AMS 21
Start Time (MST)	9:50	End Time (MST)	13:32
Analyzer make	Thermo 43i	Analyzer serial #	1428701363

### Calibration Data

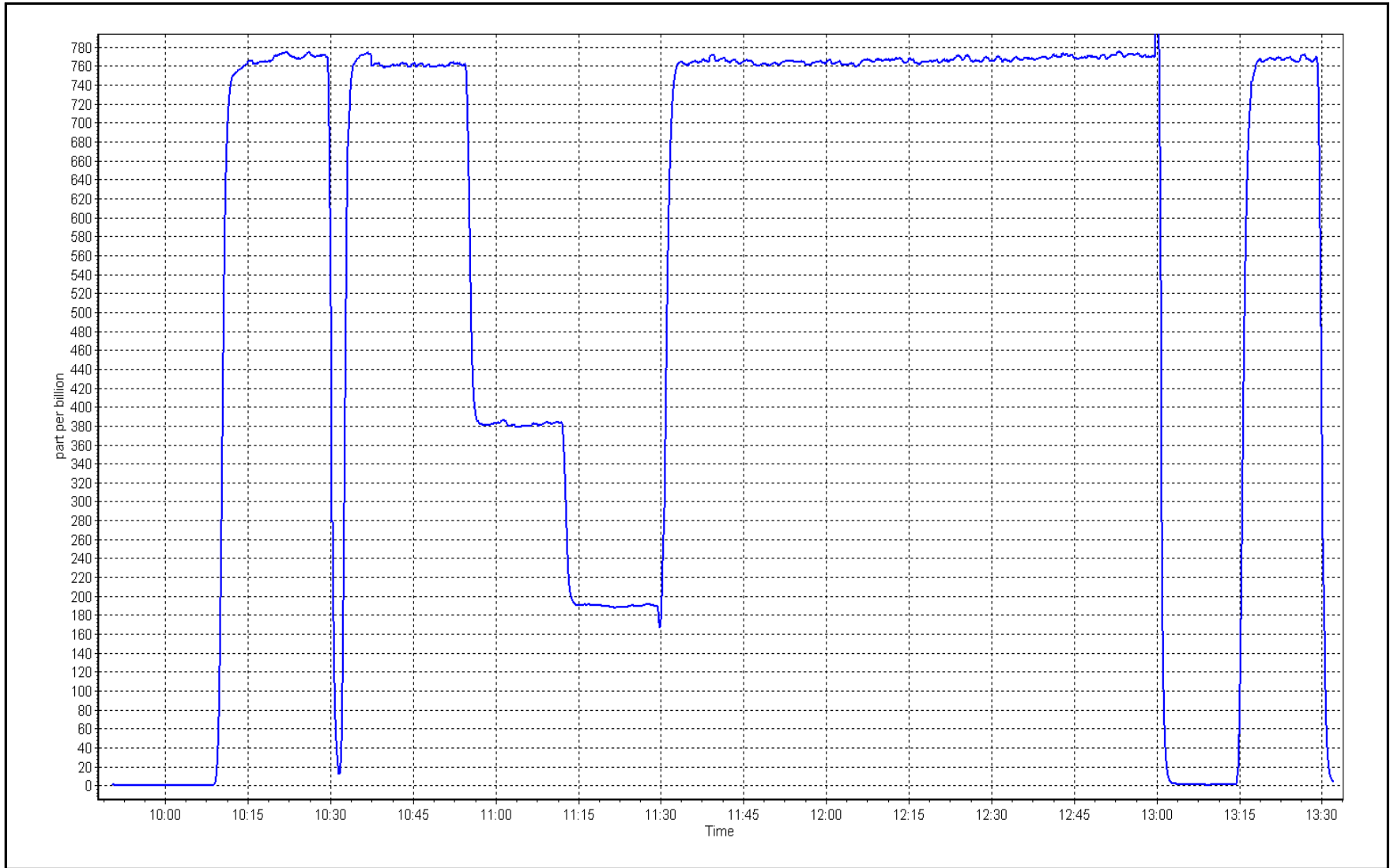
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	0.5	----	Correlation Coefficient	0.999998	<b>≥0.995</b>
759.5	761.8	0.9969	Slope	0.997266	<b>0.90 - 1.10</b>
380.9	381.7	0.9980	Intercept	-0.001894	<b>+/-30</b>
190.2	190.2	0.9997			



SO2 Calibration Plot

Date: October 6, 2017

Location: Conklin









# Wood Buffalo Environmental Association

## TRS Calibration Summary

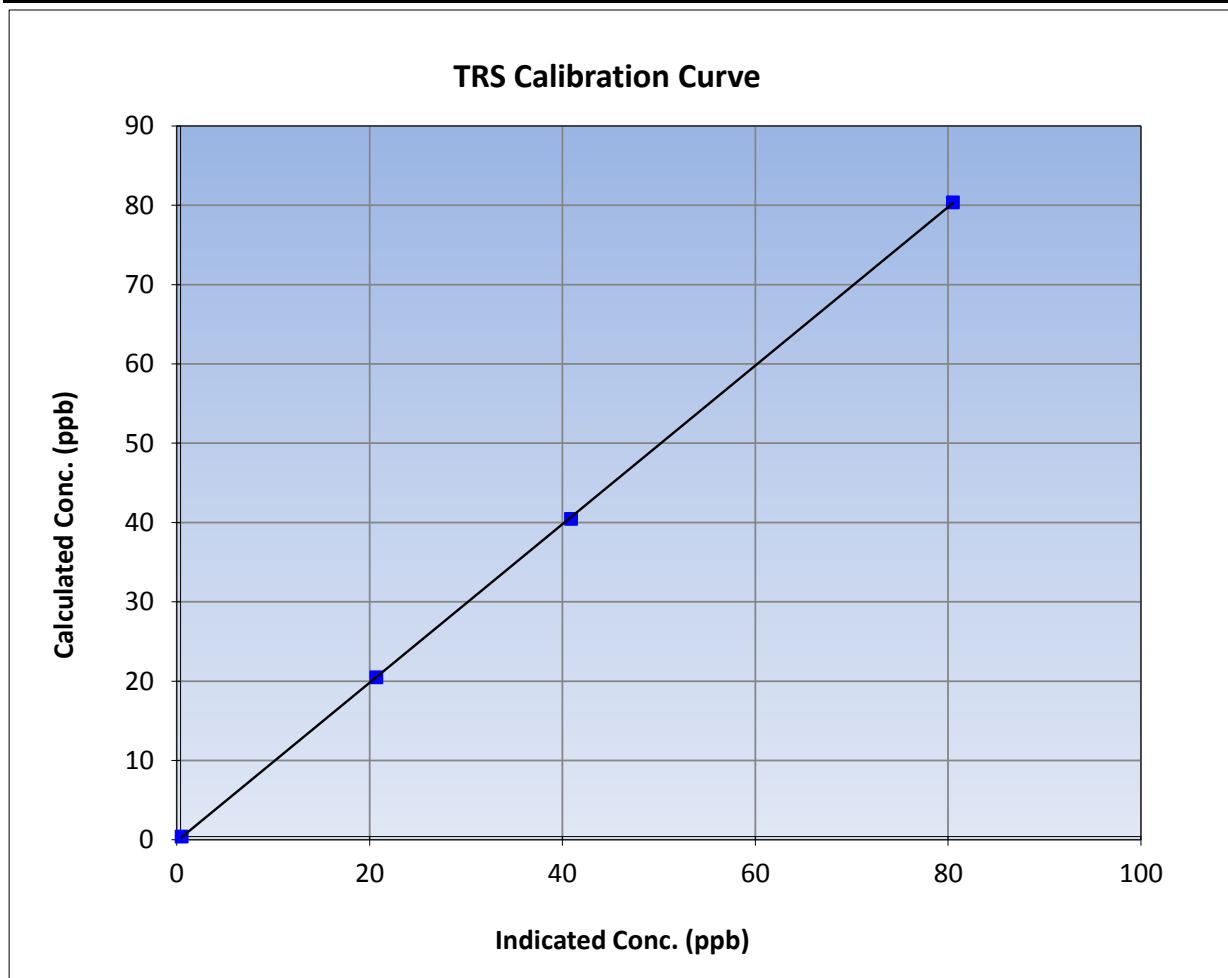
Version-03-2017

### Station Information

Calibration Date	October 20, 2017	Previous Calibration	September 8, 2017
Station Name	Conklin	Station Number	AMS 21
Start Time (MST)	12:27	End Time (MST)	15:10
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1236656116

### Calibration Data

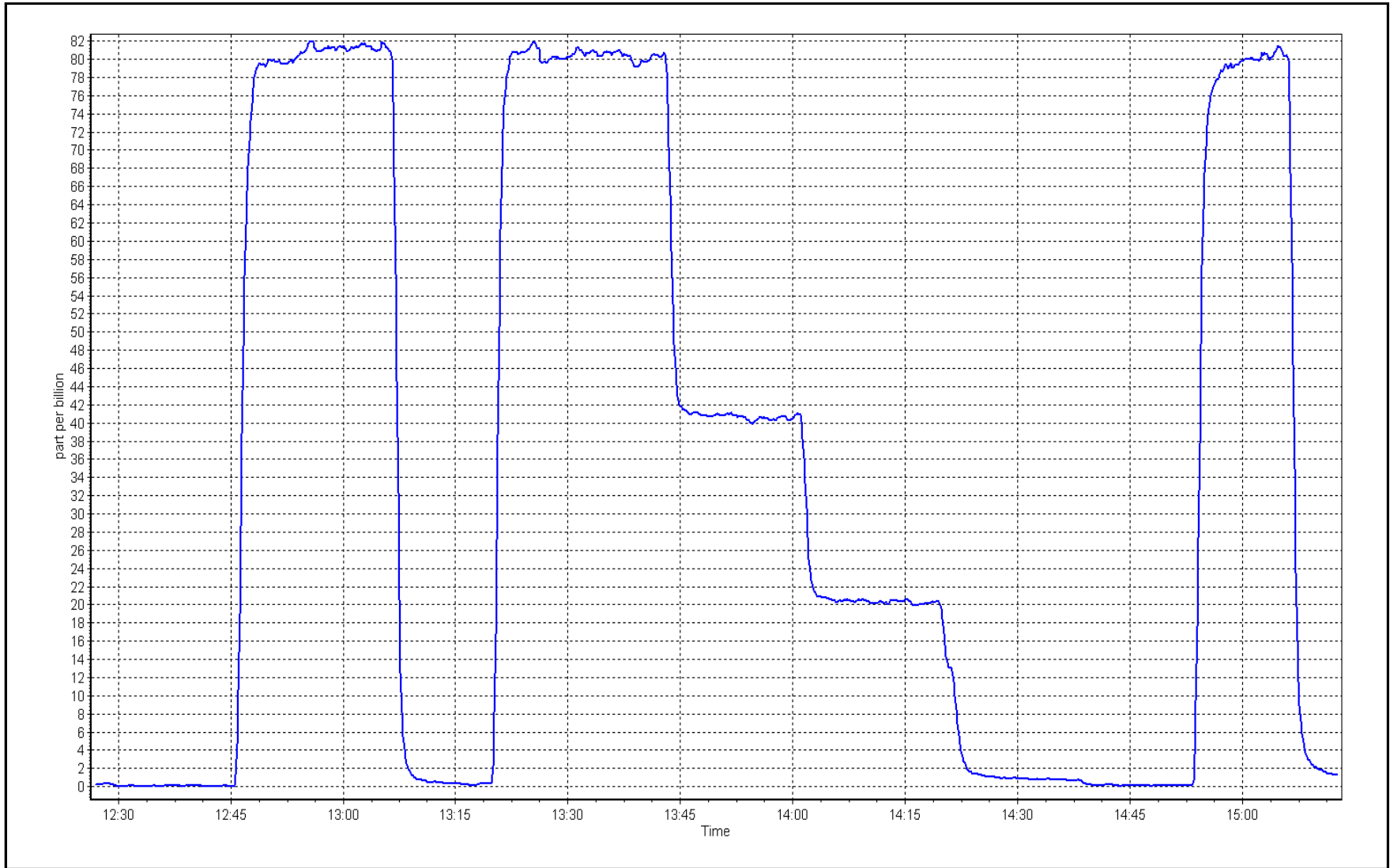
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.1	----	Correlation Coefficient	0.999982	$\geq 0.995$
80.0	80.1	0.9985	Slope	0.999599	0.90 - 1.10
40.1	40.5	0.9897	Intercept	-0.193871	+/-3
20.1	20.3	0.9906			



TRS Calibration Plot

Date: October 20, 2017

Location: Conklin





# Wood Buffalo Environmental Association

## THC / NMHC Calibration Report

Version-03-2017

### Station Information

Station Name:	Conklin	Station number:	AMS 21
Calibration Date:	October 3, 2017	Last Cal Date:	September 19, 2017
Start time (MST):	12:30	End time (MST):	15:33
Reason:	Maintenance	Faulty ZAG	

### Calibration Standards

Gas Cert Reference	LL84669	Cal Gas Expiry Date	August 18, 2020
CH4 Cal Gas Conc.	<u>513.0</u> ppm	CH4 Equiv Conc.	1068.5 ppm
C3H8 Cal Gas Conc.	<u>202.0</u> ppm	Station temp.	22 Deg C
Calibrator Model	Teledyne API T700	Serial Number	2658
ZAG make/model	Teledyne API 701	Serial Number	263

### Analyzer Information

Analyzer make: Thermo 55i

Analyzer serial #: 1152430011

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
THC Range (ppm)	0 - 50 ppm		Column Temp	75.1	75.1
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
CH4 SP Ratio	1.70E-04	1.73E-04	Flame Temp	405.0	405.0
CH4 Retention time	12.0	12.0	Carrier Pressure	37.0	37.0
NMHC SP Ratio	4.10E-05	4.12E-05	Fuel Pressure	49.7	49.7
NMHC Peak Area	213276	208362	Air Pressure	24.4	34.3

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
THC Cal Slope	1.022523	0.997602
THC Cal Offset	0.000000	0.052166
CH4 Cal Slope	1.034799	0.997761
CH4 Cal Offset	0.000000	0.033486
NMHC Cal Slope	1.011443	0.997575
NMHC Cal Offset	0.000000	0.018733

Notes: CH4 span was 10% out from last night. Daily span unstable and air pressure fluctuating. ZAG suspected. ZAG replaced after as founds. Adjusted span.

Calibration Performed By:

Asad Hidayat



# Wood Buffalo Environmental Association

## THC / NMHC Calibration Report

Version-02-2017

### THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i>
as found zero	5005	0.0	0.00	0.00	----
as found span	4933	77.5	16.53	15.01	<b>1.101</b>
calibrator zero	5005	0.0	0.00	0.00	----
high point	4933	77.5	16.53	16.55	0.999
second point	4975	38.9	8.29	8.21	1.010
third point	4992	19.5	4.16	4.08	1.020
as left zero	5005	0.0	0.00	0.00	----
as left span	4933	77.5	16.53	16.59	0.996
Average Correction Factor					1.009
Corrected As found	15.01	Prev response	16.16	*% change	7.7%

### NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i>
as found zero	5005	0	0.00	0.00	----
as found span	4933	77.5	8.59	8.04	<b>1.069</b>
calibrator zero	5005	0	0.00	0.00	----
high point	4933	77.5	8.59	8.61	0.999
second point	4975	38.9	4.31	4.29	1.005
third point	4992	19.5	2.16	2.13	1.014
as left zero	5005	0	0.00	0.00	----
as left span	4933	77.5	8.59	8.63	0.996
Average Correction Factor					1.006
Corrected As found	8.04	Prev response	8.50	*% change	5.7%

### CH4 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i>
as found zero	5005	0.0	0.00	0.00	----
as found span	4933	77.5	7.93	6.97	<b>1.138</b>
calibrator zero	5005	0.0	0.00	0.00	----
high point	4933	77.5	7.93	7.94	0.999
second point	4975	38.9	3.98	3.92	1.015
third point	4992	19.5	2.00	1.95	1.026
as left zero	5005	0.0	0.00	0.00	----
as left span	4933	77.5	7.93	7.96	0.996
Average Correction Factor					1.013
Corrected As found	6.97	Prev response	7.67	*% change	<b>10.0%</b>

\* = > +/-5% change initiates investigation



# Wood Buffalo Environmental Association

## THC Calibration Summary

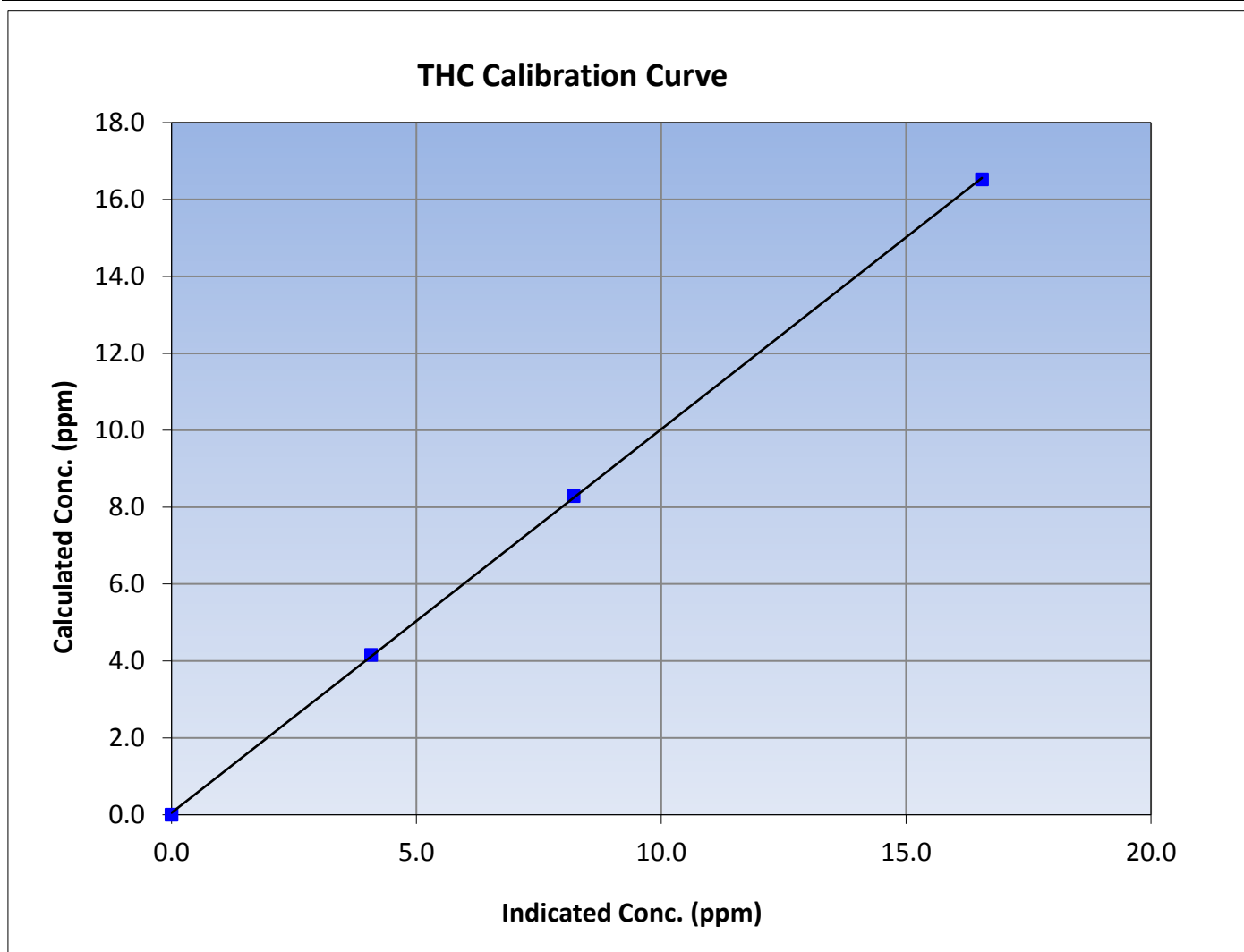
Version-02-2017

### Station Information

Calibration Date	October 3, 2017	Previous Calibration	September 19, 2017
Station Name	Conklin	Station Number	AMS 21
Start Time (MST)	12:30	End Time (MST)	15:33
Analyzer make	Thermo 55i	Analyzer serial #	1152430011

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.00	0.00	----	Correlation Coefficient	0.999951	$\geq 0.995$			
16.53	16.55	0.9988						
8.29	8.21	1.0096				Slope	0.997602	0.90 - 1.10
4.16	4.08	1.0198						
			Intercept	0.052166	$\pm 0.5$			





# Wood Buffalo Environmental Association

## CH<sub>4</sub> Calibration Summary

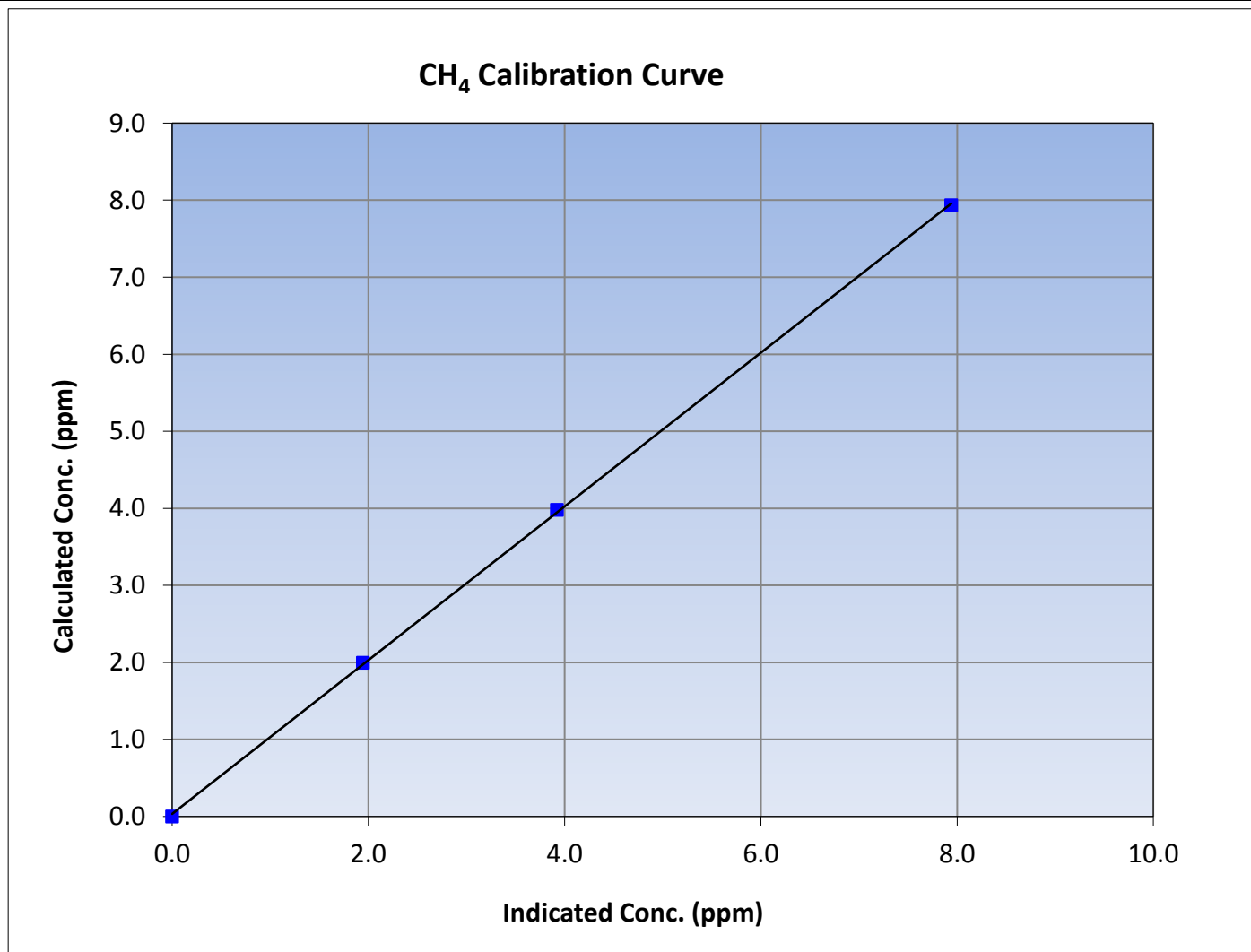
Version-02-2017

### Station Information

Calibration Date	October 3, 2017	Previous Calibration	September 19, 2017
Station Name	Conklin	Station Number	AMS 21
Start Time (MST)	12:30	End Time (MST)	15:33
Analyzer make	Thermo 55i	Analyzer serial #	1152430011

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.00	0.00	----	Correlation Coefficient	0.999907	$\geq 0.995$			
7.93	7.94	0.9992						
3.98	3.92	1.0148				Slope	0.997761	0.90 - 1.10
2.00	1.95	1.0263						
			Intercept	0.033486	$\pm 0.5$			





# Wood Buffalo Environmental Association

## NMHC Calibration Summary

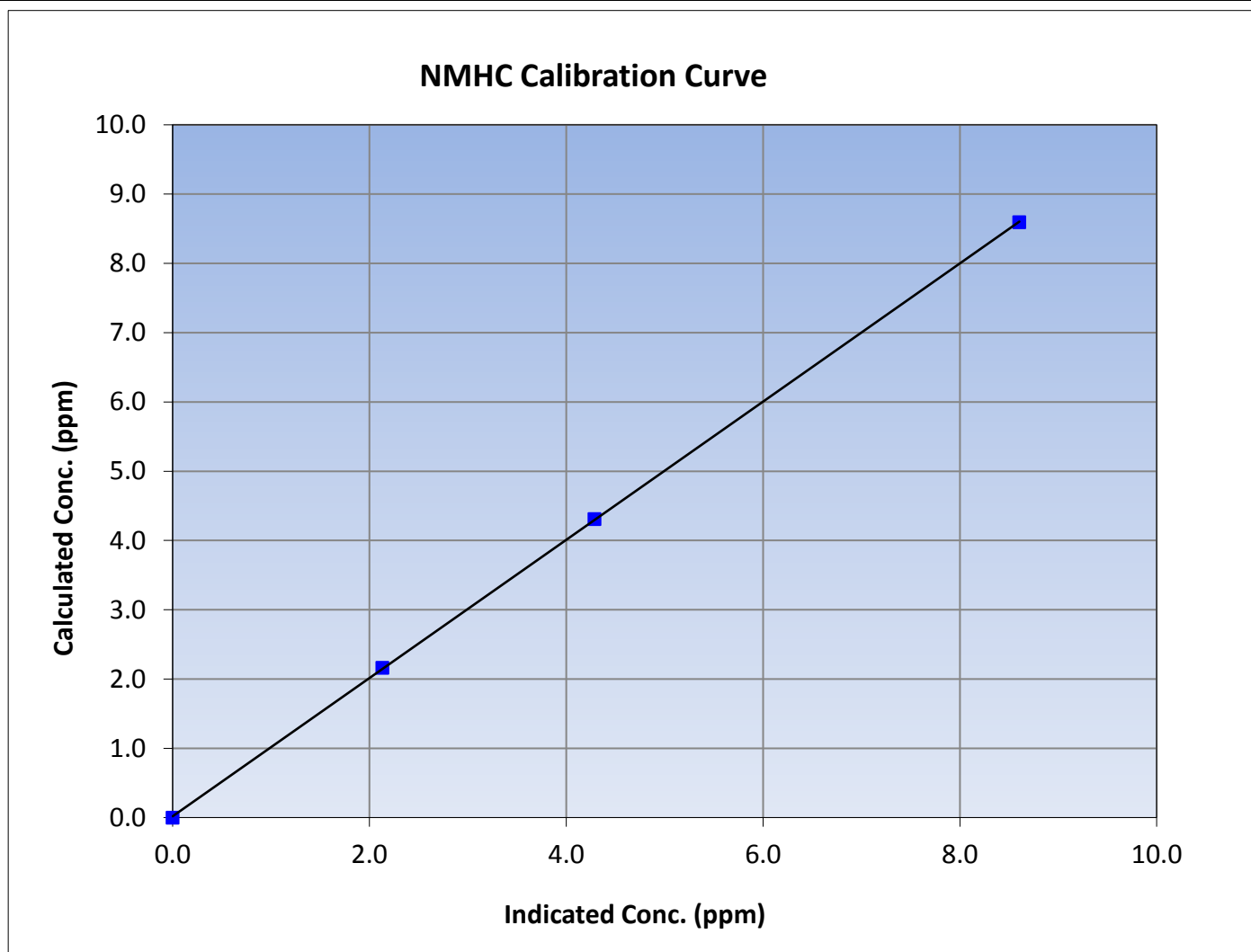
Version-02-2017

### Station Information

Calibration Date	October 3, 2017	Previous Calibration	September 19, 2017
Station Name	Conklin	Station Number	AMS 21
Start Time (MST)	12:30	End Time (MST)	15:33
Analyzer make	Thermo 55i	Analyzer serial #	1152430011

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.00	0.00	----	Correlation Coefficient	0.999978	$\geq 0.995$			
8.59	8.61	0.9985						
4.31	4.29	1.0051				Slope	0.997575	0.90 - 1.10
2.16	2.13	1.0138						
			Intercept	0.018733	$\pm 0.5$			

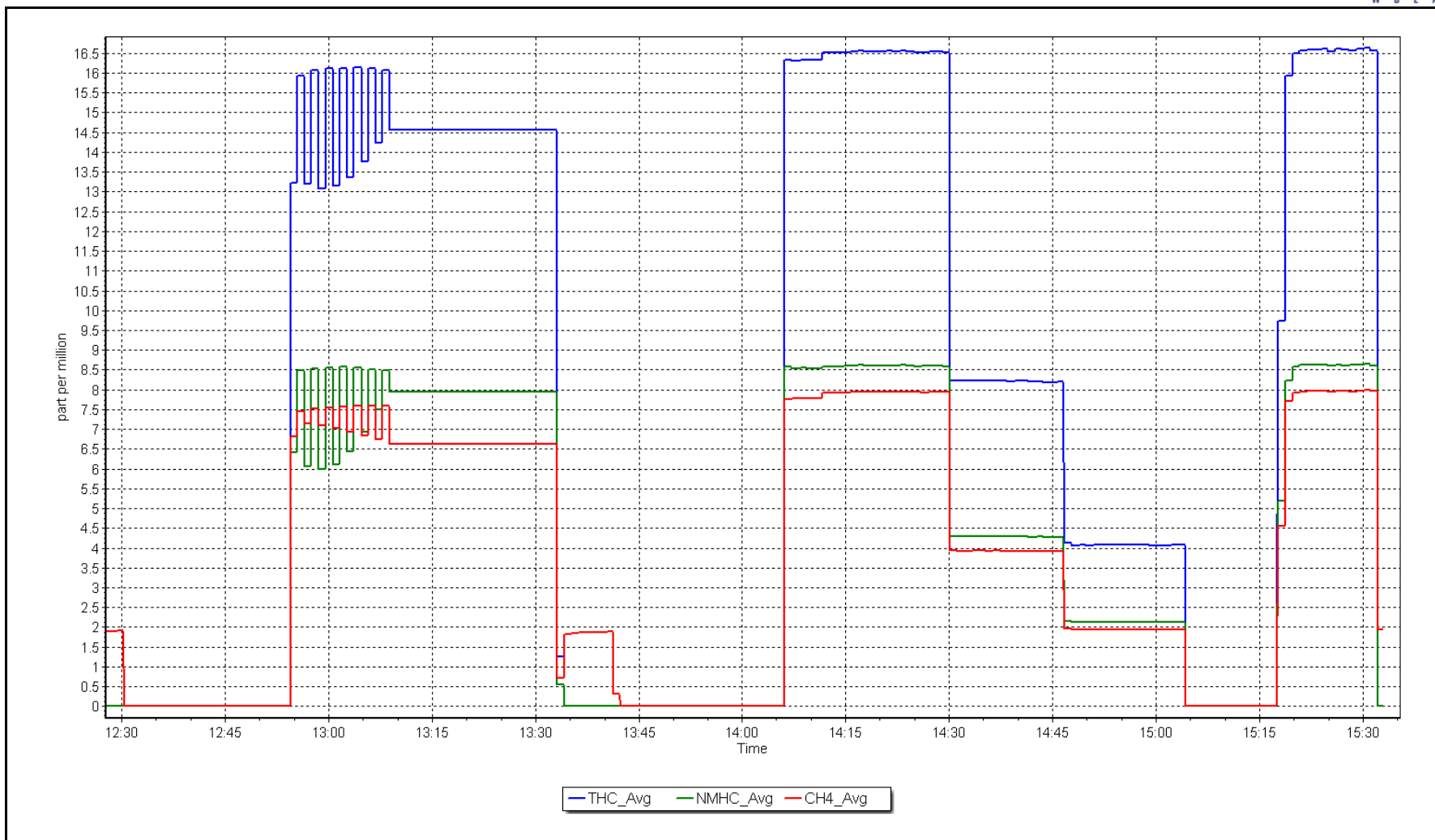




NMHC Calibration Plot

Date: October 3, 2017

Location: Conklin







# Wood Buffalo Environmental Association

## O<sub>3</sub> Calibration Summary

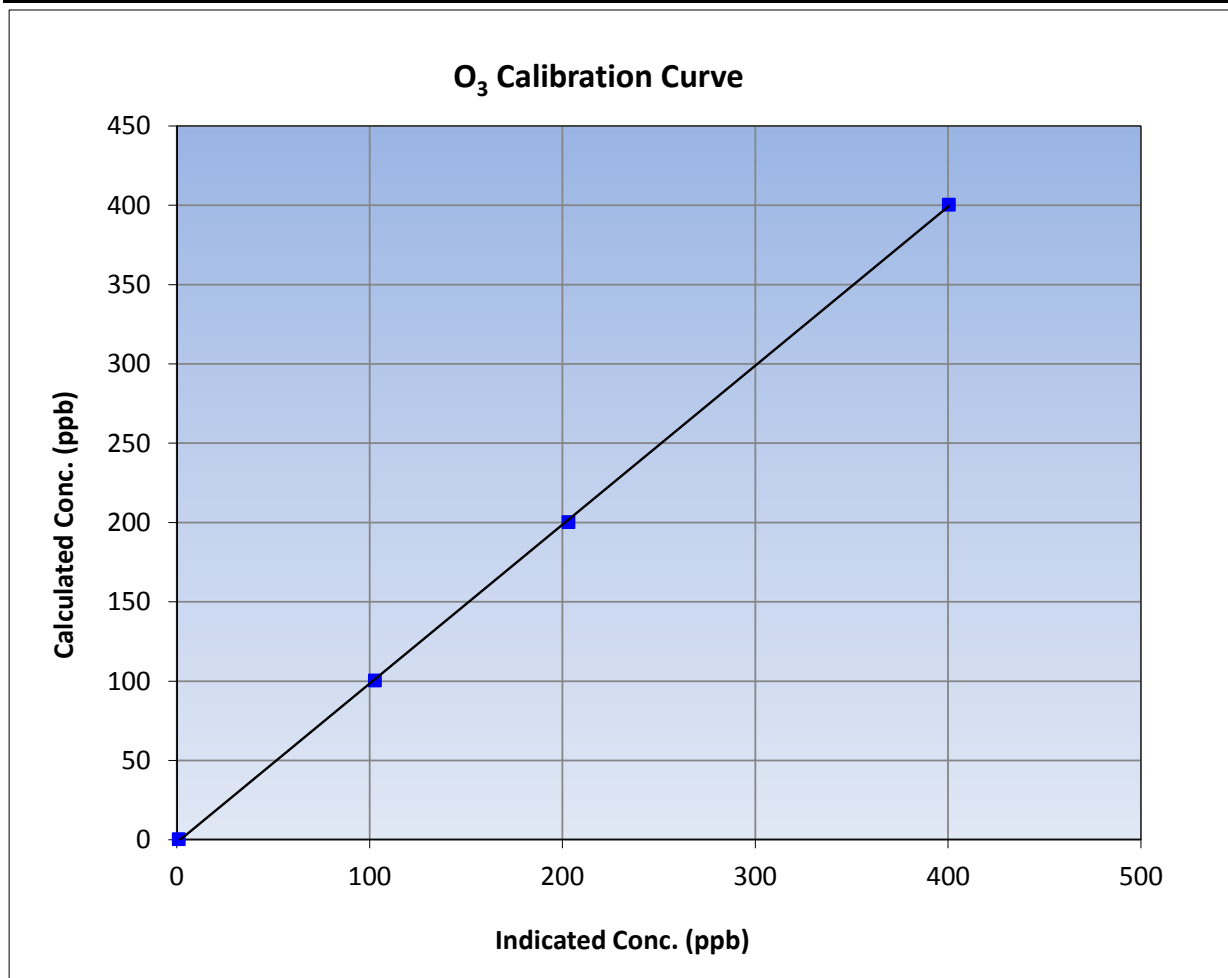
Version-03-2017

### Station Information

Calibration Date	October 20, 2017	Previous Calibration	September 8, 2017
Station Name	Conklin	Station Number	AMS 21
Start Time (MST)	10:05	End Time (MST)	12:28
Analyzer make	Thermo 49i	Analyzer serial #	1501663734

### Calibration Data

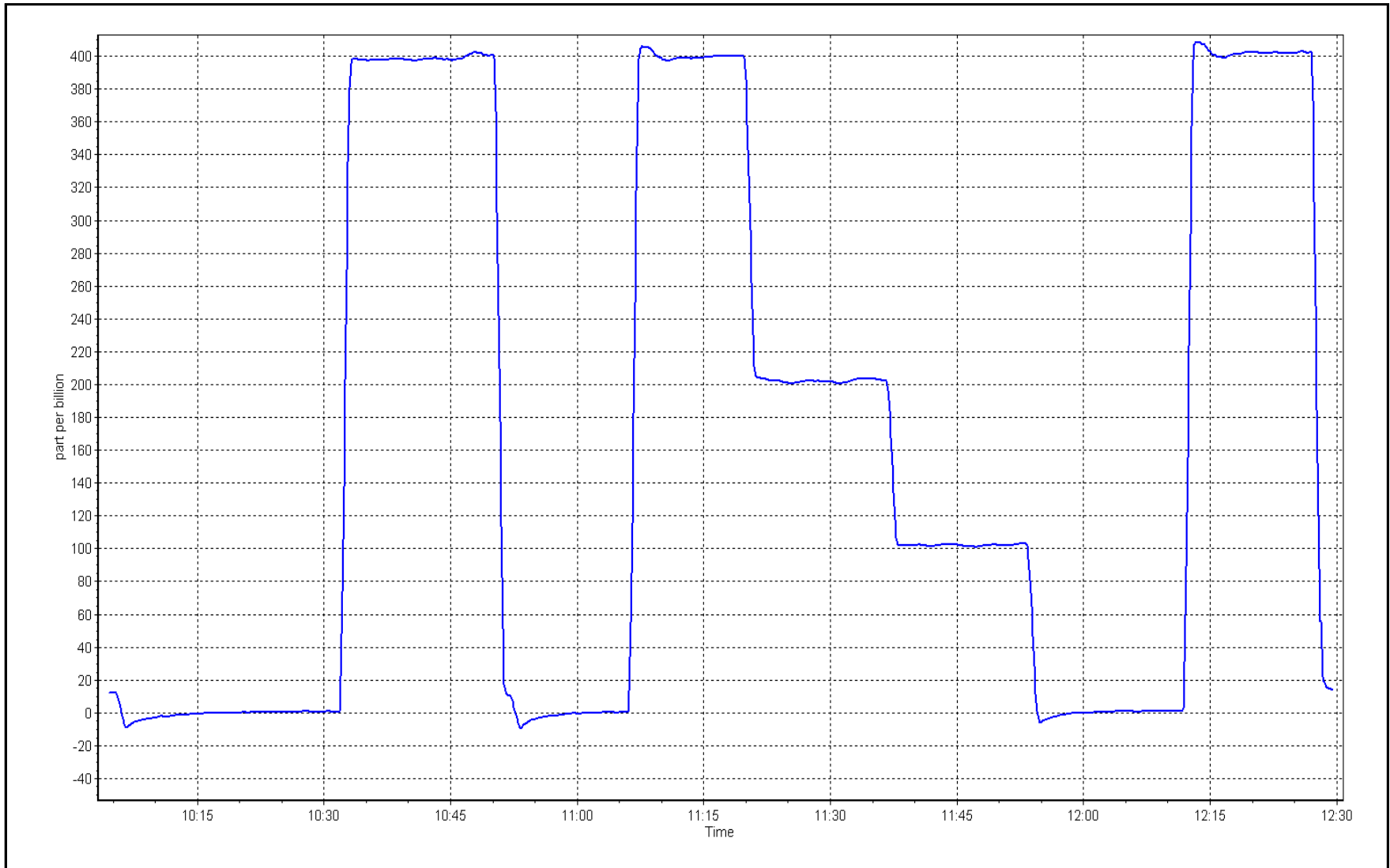
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	0.6	----	Correlation Coefficient	0.999947	≥0.995
400.0	400.0	1.0000			
200.0	202.7	0.9867	Slope	1.002353	0.90 - 1.10
100.0	102.3	0.9775			
			Intercept	-1.815046	+/- 10



O<sub>3</sub> Calibration Plot

Date: October 20, 2017

Location: Conklin





# Wood Buffalo Environmental Association

## NO<sub>x</sub> - NO - NO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Conklin	Station number:	AMS 21
Calibration Date:	October 6, 2017	Last Cal Date:	September 19, 2017
Start time (MST):	9:50	End time (MST):	13:32
Reason:	Routine		

### Calibration Standards

NO Gas Cylinder #	LL84669	Cal Gas Expiry Date	Tuesday, August 18, 2020
NOX Cal Gas Conc.	<u>51.7</u> ppb	NO Cal Gas Conc.	<u>51.7</u> ppb
Calibrator Model	Teledyne API T700	Serial Number	2658
ZAG make/model	Teledyne API T701	Serial Number	263

### Analyzer Information

Analyzer make:	Thermo 42i	Analyzer serial #:	1501663731	
	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
NO coefficient	0.948	0.950	NOX Range (ppb)	0 - 1000 ppb
NOX coefficient	0.998	0.998	PMT Temperature	-3.0 -3.0
NO <sub>2</sub> coefficient	1.000	1.000	Reaction cell Press	159.3 158.7
NO bkgrnd	9.6	9.6	Sample Flow	0.581 0.578
NOX bkgrnd	9.6	9.7	PMT Voltage	-892.4 -892.4

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope	0.986517	0.999027
NO <sub>x</sub> Cal Offset	0.493259	0.515884
NO Cal Slope	0.986274	0.997788
NO Cal Offset	0.493137	0.774942
NO <sub>2</sub> Cal Slope	NA	1.010844
NO <sub>2</sub> Cal Offset	NA	-0.026534



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

Version-03-2017

### Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5005	0.0	0.0	0.0	0.0	-0.5	-0.6	0.1	----	----
as found span	4933	77.5	799.7	799.7	0.0	797.5	797.4	0.0	1.0027	1.0028
calibrator zero	5005	0.0	0.0	0.0	0.0	-0.5	-0.5	0.0	----	----
high point	4933	77.5	799.7	799.7	0.0	799.9	800.8	-0.9	0.9997	0.9986
second point	4975	38.9	401.1	401.1	0.0	401.1	401.1	0.1	1.0000	1.0000
third point	4990	19.4	200.2	200.2	0.0	199.8	199.6	0.2	1.0021	1.0031
as left zero	5005	0.0	0.0	0.0	0.0	-0.3	-0.4	0.1	----	----
as left span	4933	77.5	799.7	403.4	396.3	806.8	405.2	401.6	0.9912	0.9956
<b>Average Correction Factor</b>									<b>1.0006</b>	<b>1.0006</b>

Corrected As found	NO <sub>x</sub> = 798.0 ppb	NO = 798.0 ppb		*Percent Change	NO <sub>x</sub> = 1.5%
Previous Response	NO <sub>x</sub> = 810.1 ppb	NO = 810.3 ppb		*Percent Change	NO = 1.5%
<i>* = &gt; +/-5% change initiates investigation</i>					

### GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
1st NO ref point		0.0	807.4	806.6	0.9	0.9904	0.9914	----	----
1st NO2 (400 ppb O3)	403.4	403.2	802.5	403.4	399.1	0.9965	----	1.0103	99.0%
2nd NO2 (200 ppb O3)	615.0	191.6	803.8	615.0	188.9	0.9949	----	1.0143	98.6%
3rd NO2 (100 ppb O3)	711.1	95.5	806.1	711.1	95.0	0.9920	----	1.0053	99.5%
2nd NO ref point	----	0.0	807.4	806.6	0.9	0.9904	0.9914	----	----
<b>Average Correction Factor</b>						<b>0.9934</b>	<b>0.9914</b>	<b>1.0099</b>	<b>99.0%</b>

**Notes:** Sample inlet filter replaced after as founds. Slightly adjusted span. Used 2nd high NO ref point for GPT reference since NO had slightly drifted.

Calibration Performed By: Asad Hidayat



# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

Version-03-2017

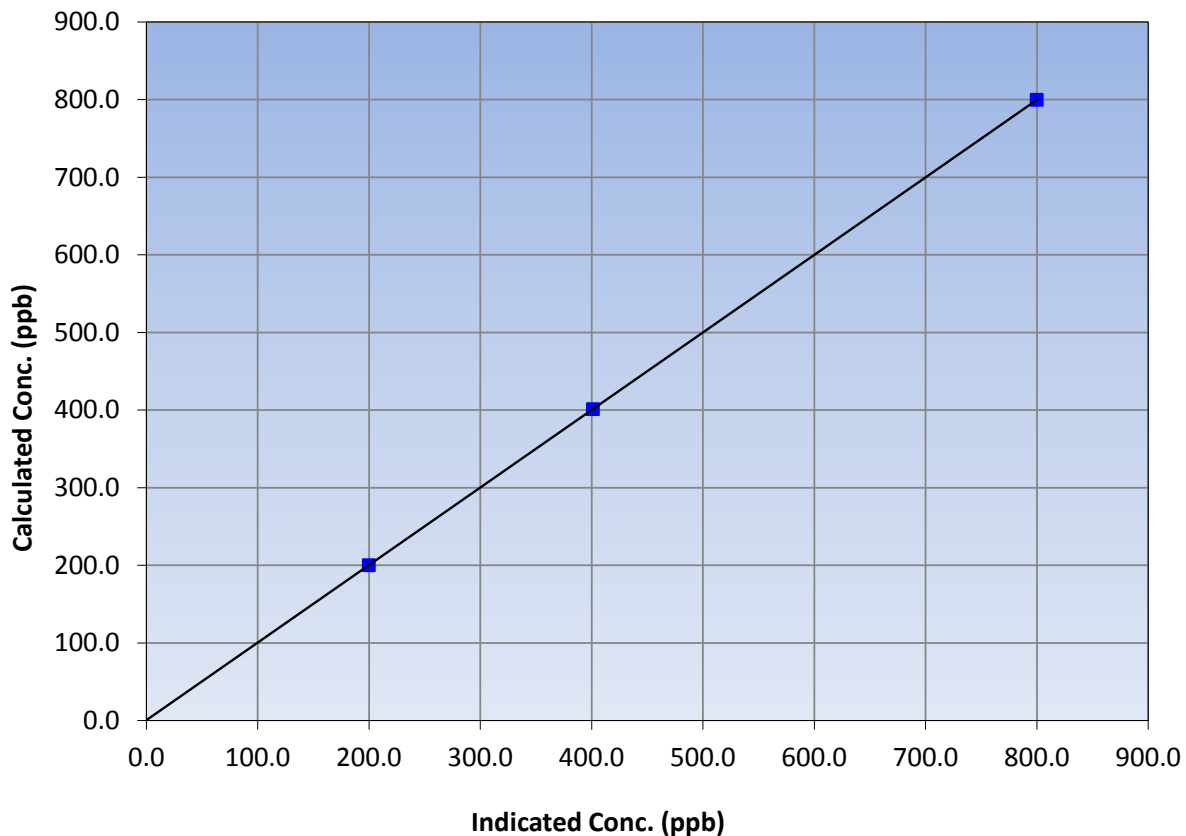
### Station Information

Calibration Date	October 6, 2017	Previous Calibration	September 19, 2017
Station Name	Conklin	Station Number	AMS 21
Start Time (MST)	9:50	End Time (MST)	13:32
Analyzer make	Thermo 42i	Analyzer serial #	1501663731

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	-0.5	----	Correlation Coefficient	≥0.995	
799.7	799.9	0.9997			
401.1	401.1	1.0000			
200.2	199.8	1.0021			
			Slope	0.999027	0.90 - 1.10
			Intercept	0.515884	+/-20

NO<sub>x</sub> Calibration Curve





# Wood Buffalo Environmental Association

## NO Calibration Summary

Version-03-2017

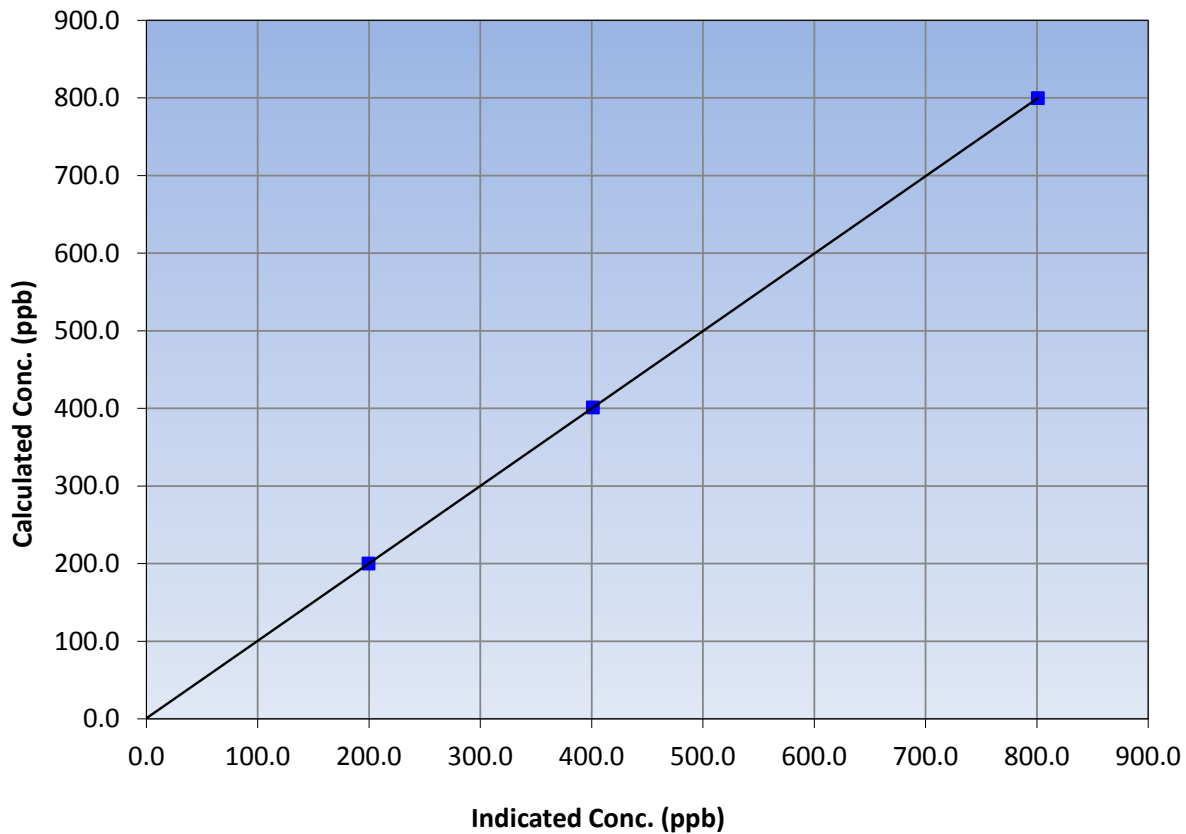
### Station Information

Calibration Date	October 6, 2017	Previous Calibration	September 19, 2017
Station Name	Conklin	Station Number	AMS 21
Start Time (MST)	9:50	End Time (MST)	13:32
Analyzer make	Thermo 42i	Analyzer serial #	1501663731

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	-0.5	----	Correlation Coefficient	0.999999	≥0.995
799.7	800.8	0.9986			
401.1	401.1	1.0000	Slope	0.997788	0.90 - 1.10
200.2	199.6	1.0031			
			Intercept	0.774942	+/-20

NO Calibration Curve







# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

Version-03-2017

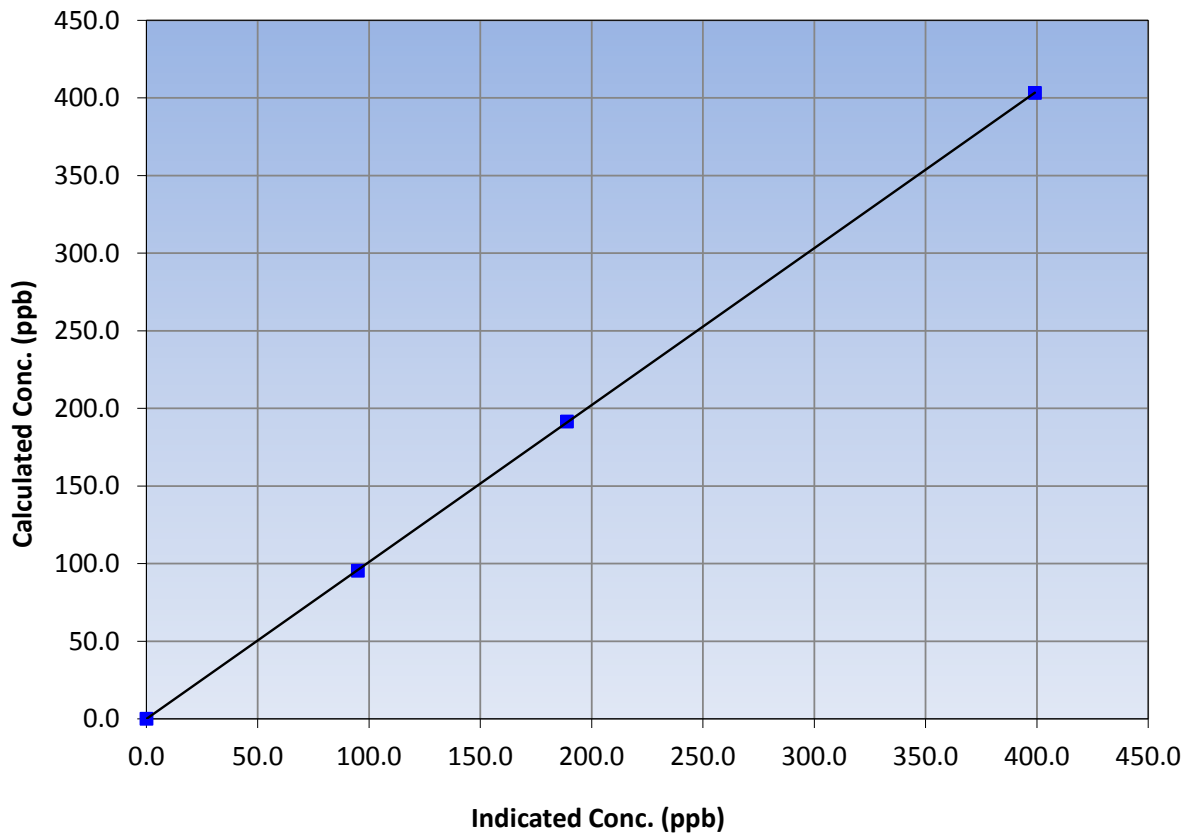
### Station Information

Calibration Date	October 6, 2017	Previous Calibration	September 19, 2017
Station Name	Conklin	Station Number	AMS 21
Start Time (MST)	9:50	End Time (MST)	13:32
Analyzer make	Thermo 42i	Analyzer serial #	1501663731

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	0.0	----	Correlation Coefficient	≥0.995	
403.2	399.1	1.0103			
191.6	188.9	1.0143			
95.5	95.0	1.0053			
			Slope	1.010844	0.90 - 1.10
			Intercept	-0.026534	+/-20

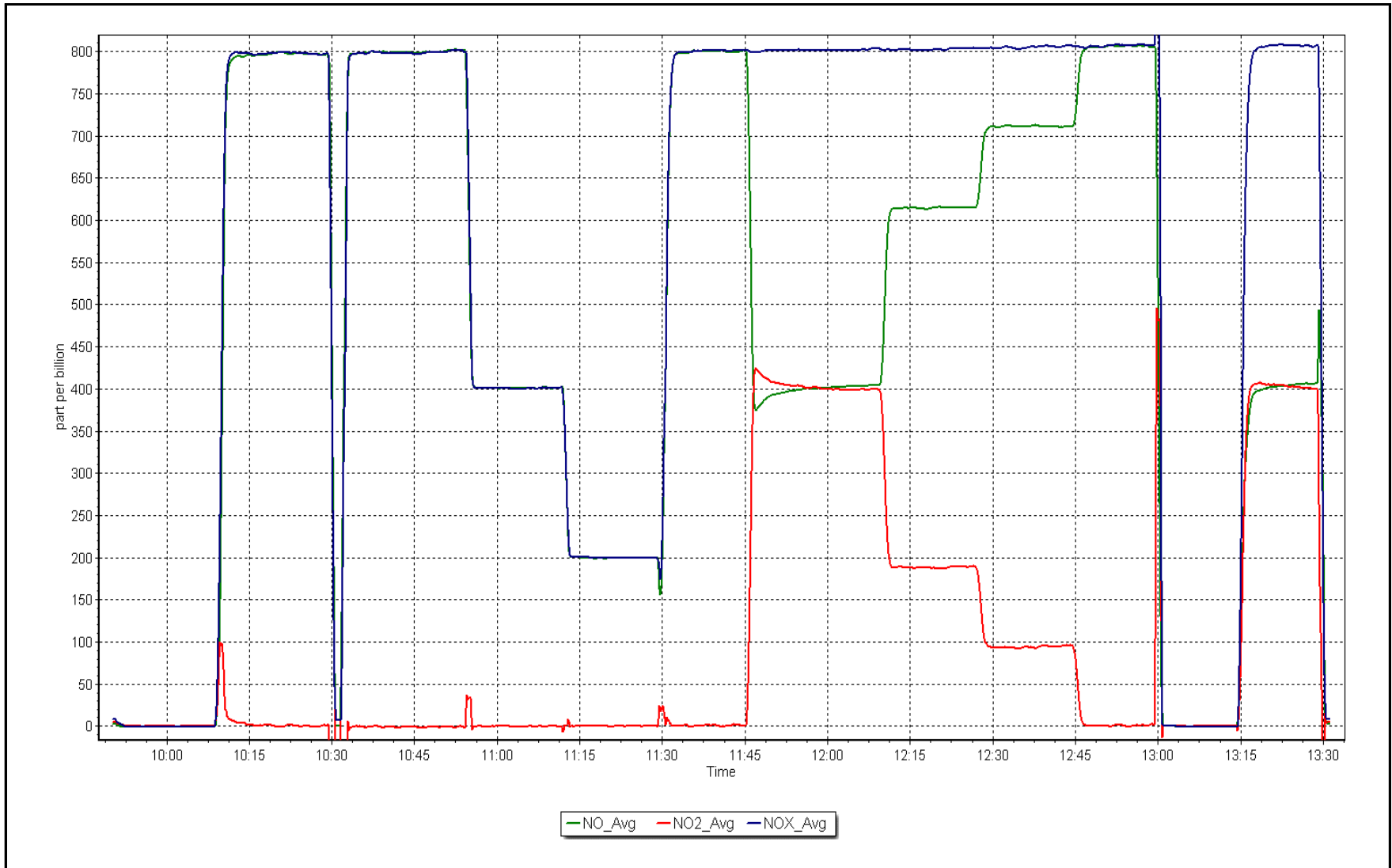
**NO<sub>2</sub> Calibration Curve**



# NO<sub>x</sub> Calibration Plot

Date: October 6, 2017

Location: Conklin





# Wood Buffalo Environmental Association

## NO<sub>x</sub> - NO - NO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Conklin	Station number:	AMS 21
Calibration Date:	October 18, 2017	Last Cal Date:	October 6, 2017
Start time (MST):	9:36	End time (MST):	14:00
Reason:	Maintenance	Pump failure	

### Calibration Standards

NO Gas Cylinder #	LL84669	Cal Gas Expiry Date	August 18, 2020
NOX Cal Gas Conc.	<u>51.7</u> ppb	NO Cal Gas Conc.	<u>51.7</u> ppb
Calibrator Model	Teledyne API T700	Serial Number	2658
ZAG make/model	Teledyne API T701	Serial Number	263

### Analyzer Information

Analyzer make:	Thermo 42i	Analyzer serial #:	1501663731	
	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
NO coefficient	0.950	0.976	NOX Range (ppb)	0 - 1000 ppb
NOX coefficient	0.998	1.000	PMT Temperature	-2.7 -3.0
NO <sub>2</sub> coefficient	1.000	1.000	Reaction cell Press	358.8 162.3
NO bkgrnd	9.6	9.9	Sample Flow	0.250 0.586
NOX bkgrnd	9.7	9.9	PMT Voltage	-892.5 -892.4

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope	0.999027	1.000742
NO <sub>x</sub> Cal Offset	0.515884	0.094377
NO Cal Slope	0.997788	1.000373
NO Cal Offset	0.774942	0.373794
NO <sub>2</sub> Cal Slope	1.010844	1.012594
NO <sub>2</sub> Cal Offset	-0.026534	-0.482285



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

Version-03-2017

### Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5005	0.0	0.0	0.0	0.0	-0.6	-0.6	0.0	----	----
as found span	4933	77.6	800.7	800.7	0.0	379.5	379.9	-0.4	2.1098	2.1076
calibrator zero	5005	0.0	0.0	0.0	0.0	-0.4	-0.4	0.0	----	----
high point	4933	77.6	800.7	800.7	0.0	799.6	799.8	-0.2	1.0014	1.0011
second point	4975	38.9	401.1	401.1	0.0	401.6	401.2	0.4	0.9988	0.9998
third point	4990	19.4	200.2	200.2	0.0	199.8	199.4	0.4	1.0021	1.0041
as left zero	5005	0.0	0.0	0.0	0.0	-0.4	-0.4	0.0	----	----
as left span	4933	77.5	799.7	393.4	406.3	815.8	400.1	415.7	0.9802	0.9833
<b>Average Correction Factor</b>									<b>1.0007</b>	<b>1.0017</b>

Corrected As found	NO <sub>x</sub> = 380.1 ppb	NO = 380.5 ppb	*Percent Change	NO <sub>x</sub> = 110.7%
Previous Response	NO <sub>x</sub> = 801.0 ppb	NO = 801.7 ppb	*Percent Change	NO = 110.7%

\* = > +/-5% change initiates investigation

### GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
1st NO ref point		0.0	815.0	813.0	1.6	0.9824	0.9849	----	----
1st NO2 (400 ppb O3)	393.4	419.6	808.2	393.4	414.8	0.9907	----	1.0116	98.9%
2nd NO2 (200 ppb O3)	598.9	214.1	810.5	598.9	211.6	0.9879	----	1.0118	98.8%
3rd NO2 (100 ppb O3)	706.6	106.4	812.9	706.6	106.4	0.9850	----	1.0000	100.0%
2nd NO ref point	----	0.0	815.0	812.9	2.1	0.9824	0.9850	----	----
<b>Average Correction Factor</b>						<b>0.9865</b>	<b>0.9849</b>	<b>1.0078</b>	<b>99.2%</b>

**Notes:** Power outage occurred at 9:53 MST. Daily span from last night was more than 10% low due to pump failing. Pump replaced after as founds. Adjusted span only. Used 2nd high NO ref point for GPT reference since NO had slightly drifted.

Calibration Performed By: Asad Hidayat



# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

Version-03-2017

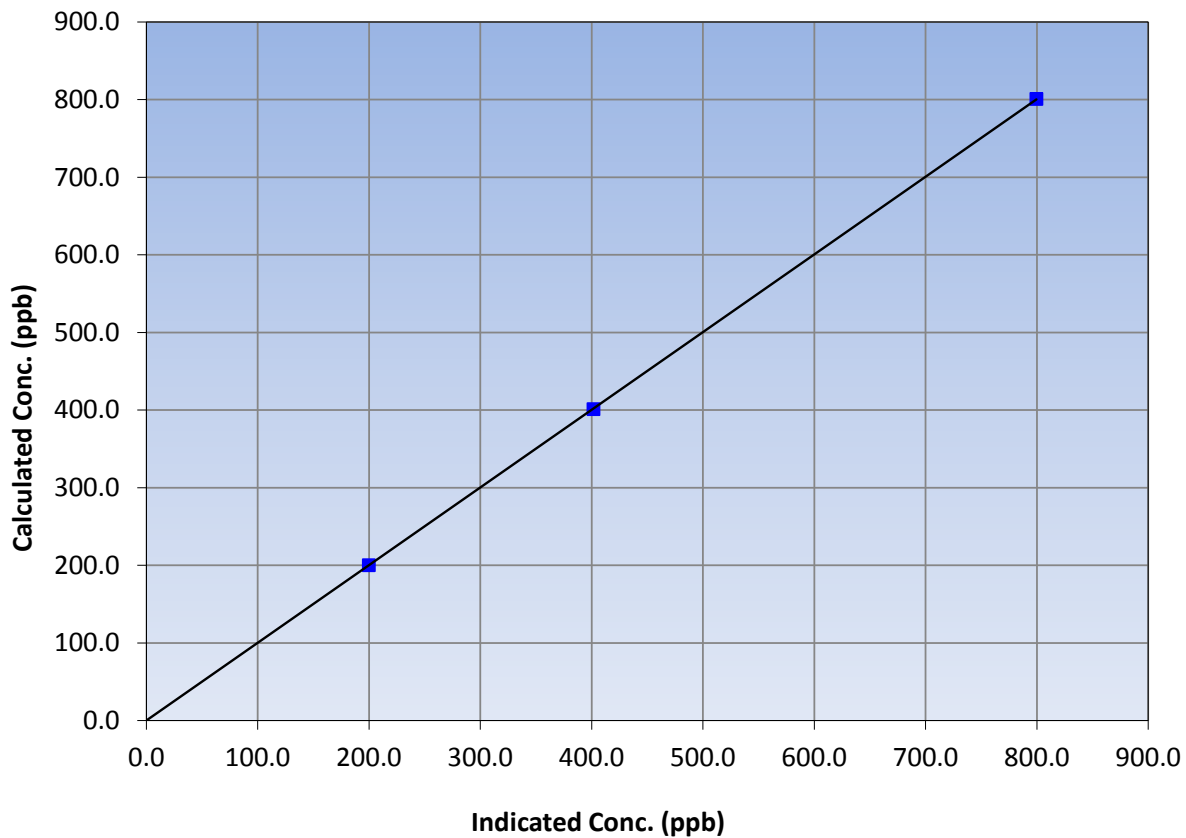
### Station Information

Calibration Date	October 18, 2017	Previous Calibration	October 6, 2017
Station Name	Conklin	Station Number	AMS 21
Start Time (MST)	9:36	End Time (MST)	14:00
Analyzer make	Thermo 42i	Analyzer serial #	1501663731

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	-0.4	----	Correlation Coefficient	≥0.995	
800.7	799.6	1.0014			
401.1	401.6	0.9988			
200.2	199.8	1.0021			
			Slope	1.000742	0.90 - 1.10
			Intercept	0.094377	+/-20

NO<sub>x</sub> Calibration Curve





# Wood Buffalo Environmental Association

## NO Calibration Summary

Version-03-2017

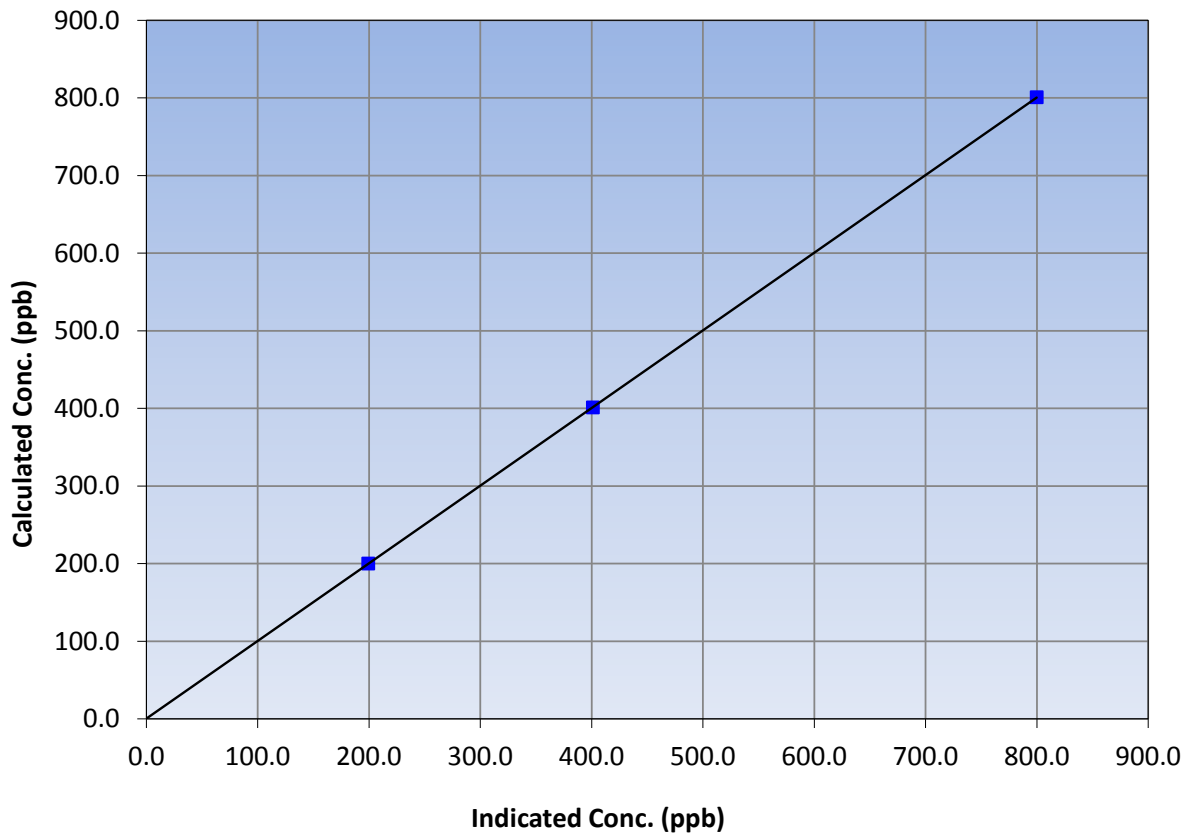
### Station Information

Calibration Date	October 18, 2017	Previous Calibration	October 6, 2017
Station Name	Conklin	Station Number	AMS 21
Start Time (MST)	9:36	End Time (MST)	14:00
Analyzer make	Thermo 42i	Analyzer serial #	1501663731

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	-0.4	----	Correlation Coefficient	≥0.995	
800.7	799.8	1.0011			
401.1	401.2	0.9998			
200.2	199.4	1.0041			
			Slope	1.000373	0.90 - 1.10
			Intercept	0.373794	+/-20

**NO Calibration Curve**





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

Version-03-2017

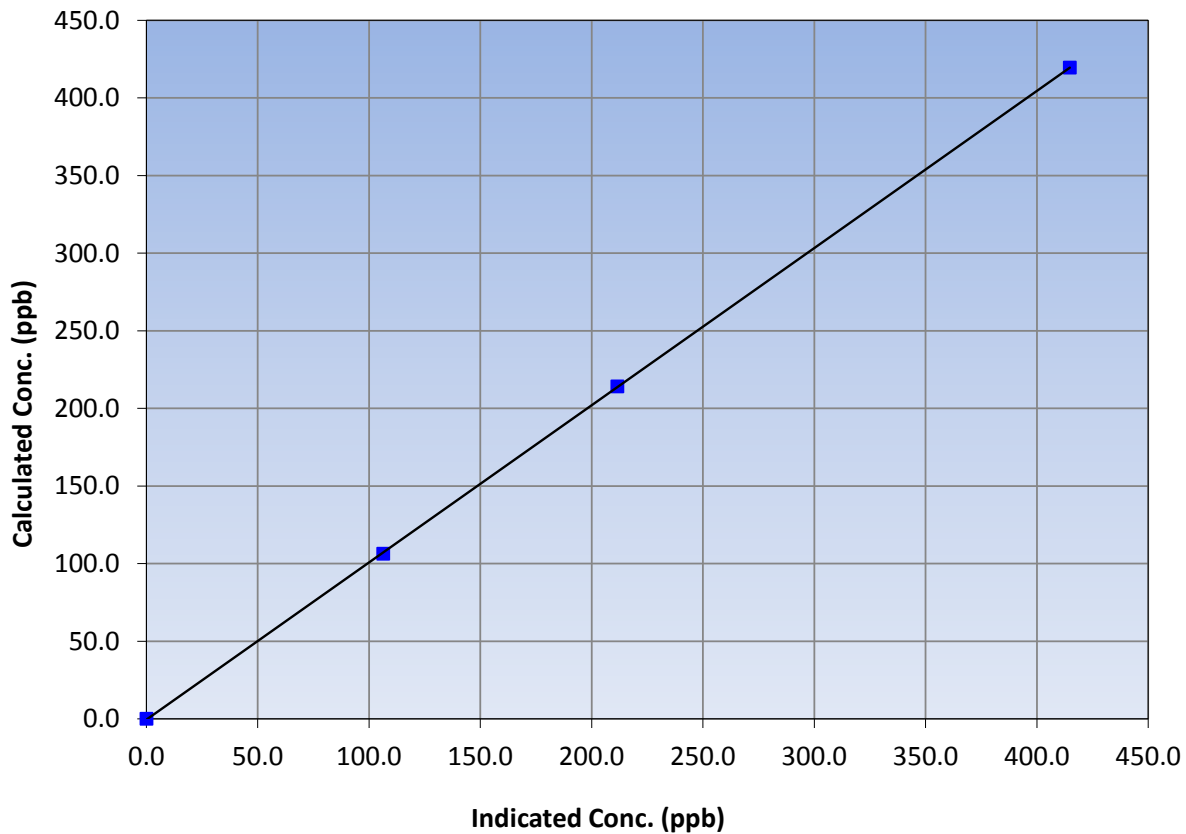
### Station Information

Calibration Date	October 18, 2017	Previous Calibration	October 6, 2017
Station Name	Conklin	Station Number	AMS 21
Start Time (MST)	9:36	End Time (MST)	14:00
Analyzer make	Thermo 42i	Analyzer serial #	1501663731

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	0.0	----	Correlation Coefficient	≥0.995	
419.6	414.8	1.0116			
214.1	211.6	1.0118			
106.4	106.4	1.0000			
			Slope	1.012594	0.90 - 1.10
			Intercept	-0.482285	+/-20

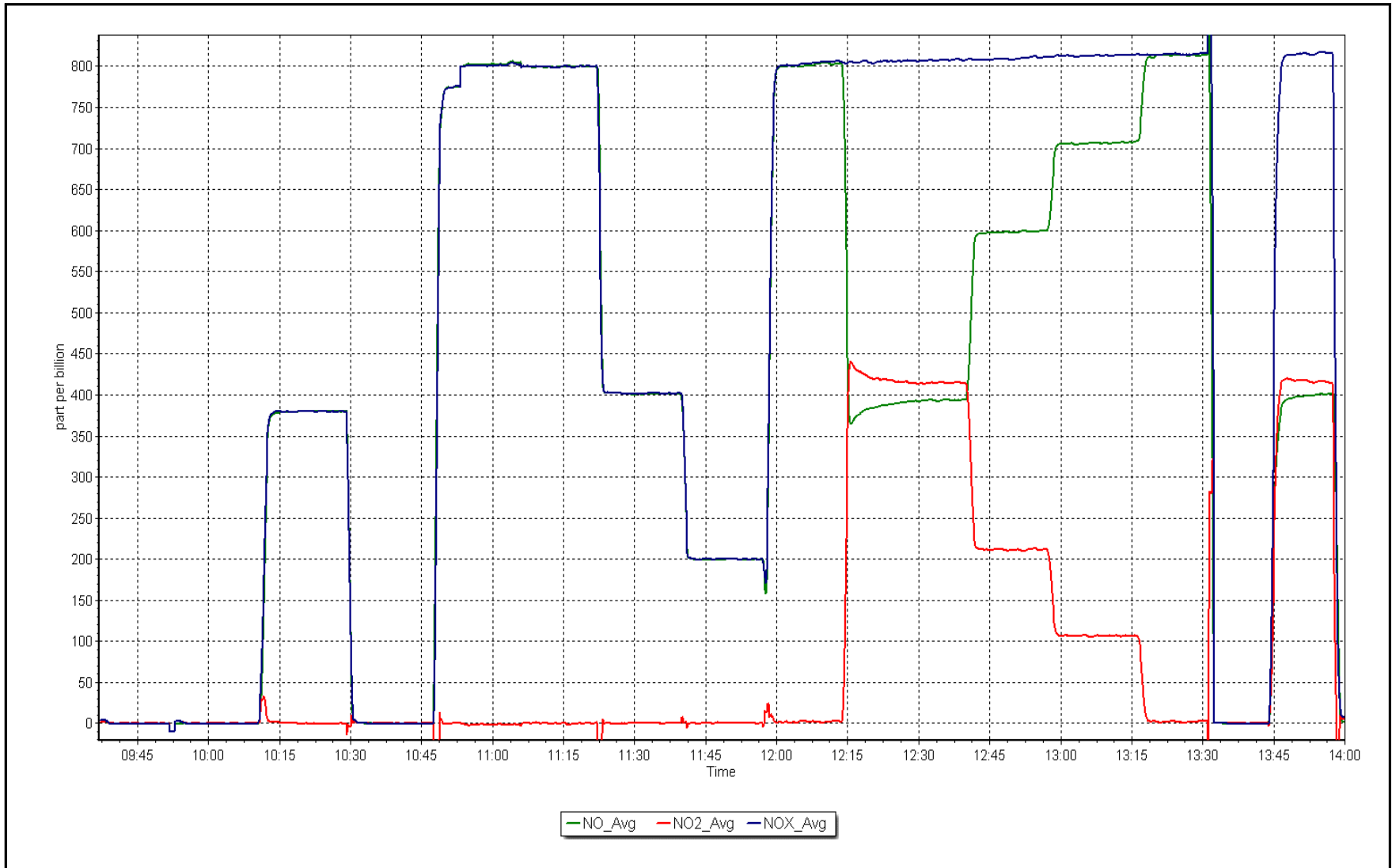
**NO<sub>2</sub> Calibration Curve**



NO<sub>x</sub> Calibration Plot

Date: October 18, 2017

Location: Conklin







# Wood Buffalo Environmental Association

## SHARP PM<sub>2.5</sub> CALIBRATION

Version-02-2017

### Station Information

Station Name:	Conklin	Station number:	AMS 21
Calibration Date:	October 18, 2017	Last Cal Date:	September 15, 2017
Start time (MST):	9:50	End time (MST):	11:12
Sharp Model:	5030	S/N:	7494
Particulate Fraction:	PM2.5	C14 Source S/N:	CM-0404
Flow Meter Make/Model:	Delta Cal	S/N:	1019
Temp/RH standard:	NA	S/N:	NA

### Monthly Calibration Test

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<b>(Limits)</b>
T1 (°C)	2	1.7	2	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	939	938	939	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	1007	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	0.3	-----	0.3	<input type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified	<input checked="" type="checkbox"/>			
Cyclone cleaning :	PM10 Cyclone	<input checked="" type="checkbox"/>	PM2.5 Cyclone	<input checked="" type="checkbox"/>	
Date Filter Tape Installed:					

### Quarterly Calibration Test

Leak Test:	Date of check:	<u>October 18, 2017</u>	Last Cal Date:	<u>July 27, 2017</u>
	Flow w/o adaptor:	<u>16.79</u>	Flow w/ adaptor:	<u>16.7</u>

**(Limit) 0.4 LPM**

<u>Adjusted</u>	<u>Current Test</u>	<u>Previous Test</u>	<u>% Change</u>
<input type="checkbox"/>	Foil S/N: <u>2598</u>	Foil S/N: <u>2598</u>	
Foil Calibration	Foil Mass: <u>1265</u>	Foil Mass: <u>1265</u>	
	Calibration Date: <u>October 18, 2017</u>	Calibration Date: <u>July 27, 2017</u>	
<b>(Limit) +/- 5% of previous</b>	Correction Factor: <u>7038</u>	Correction Factor: <u>6929</u>	1.57%

### Annual Calibration Test

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<b>(Limits)</b>
T2 (°C)				<input type="checkbox"/>	+/- 2 °C
T3 (°C)				<input type="checkbox"/>	+/- 2 °C
T4 (°C)				<input type="checkbox"/>	+/- 2 °C
RH (%)				<input type="checkbox"/>	+/- 10%
Date Sample Tube Cleaned:		July 27, 2017			
Date Pump Rebuilt/Replaced:		June 16, 2016			

Notes: Cyclone head cleaned. Completed quarterly leak and FOIL check; no issues. No adjustments made.

Calibration by: Asad Hidayat



## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

**CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT**

**AMS 22  
JANVIER  
OCTOBER 2017**

Operations, Data Collection,  
QA/QC, Data Validation and Reporting by:  
Wood Buffalo Environmental Association  
Fort McMurray, Alberta

November 29, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - JANVIER (AMS 22)  
OCTOBER 2017

MONTHLY SUMMARY for  
AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	694	37	50	98.25	2	0	1	0
TRS(ppb) Average	698	36	46	98.66	0	0	0	0
THC(ppm) Average	689	39	55	97.85	2.1	-	2	-
NMHC(ppm) Average	689	39	55	97.85	0.041	-	0.002	-
CH4(ppm) Average	689	39	55	97.85	2.1	-	2	-
O3 (ppb) Average	697	37	47	98.66	53	0	43	-
NO2 (ppb) Average	694	39	50	98.52	7	0	3	-
NO (ppb) Average	694	39	50	98.52	13	-	2	-
NOX (ppb) Average	694	39	50	98.52	18	-	4	-
PM2.5 (ug/m3) Average	673	4	71	90.99	28.2	-	5	0
Wind Speed 10 m (km/h) Average	718	0	26	96.51	25	-	13	-
Wind Direction 10 m (deg) Average	718	0	26	96.51	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100	21.5	-	13.9	-
Relative Humidity (%) Average	744	0	0	100	99	-	99.0	-

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - JANVIER (AMS 22)  
OCTOBER 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile							
					Min	P10	Q1	Median	Q3	P90	Max	
SO2 (ppb) Average	694	0.2	0	-	0	0	0	0	0	0	0	2
TRS (ppb) Average	698	0.1	0	-	0	0	0	0	0	0	0	0
THC (ppm) Average	689	1.9	0	-	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.1
NMHC(ppm) Average	689	0	0.002	-	0	0	0	0	0	0	0	0.041
CH4(ppm) Average	689	1.9	0	-	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.1
O3 (ppb) Average	697	28.8	8	-	10	17	23	29	34	39	53	
NO2 (ppb) Average	694	1.1	1	-	0	0	0	1	1	2	7	
NO (ppb) Average	694	0.6	1	-	0	0	0	0	1	1	13	
NOX (ppb) Average	694	1.7	2	-	0	1	1	1	2	3	18	
PM2.5 (ug/m3) Average	673	2.78	2.3	-	0.2	1	1.5	2.2	3.1	5.3	28.2	
Wind Speed 10 m (km/h) Average	718	7.5	4	-	0	2	4	7	10	13	25	
Wind Direction 10 m (deg) Average	718	-	-	-	-	-	-	-	-	-	-	
Temperature 2 m (C) Average	744	2.89	4.8	-	-6.2	-2.5	-0.7	1.7	5.8	9.6	21.5	
Relative Humidity (%) Average	744	75.8	17	-	27	51	64	79	90	95	99	

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - JANVIER (AMS 22)  
OCTOBER 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
PM2.5, THC, TRS, SO2, O3	18 Oct 2017 02:00	18 Oct 2017 07:00	6	Station power failure
THC, SO2, O3, NO2, NO, NOX	28 Oct 2017 21:00	28 Oct 2017 23:00	3	Station power failure
SO2, O3, NO2, NO, NOX	19 Oct 2017 12:00	19 Oct 2017 12:00	1	Maintenance - verify daily QA response
NMHC, CH4, THC	15 Oct 2017 07:00	15 Oct 2017 08:00	2	Unstable operation - excessive baseline drift
NMHC, CH4, THC	19 Oct 2017 05:00	19 Oct 2017 06:00	2	Unstable operation - excessive baseline drift
NMHC, CH4, THC	19 Oct 2017 11:00	19 Oct 2017 12:00	2	Maintenance - verify daily QA response
TRS	19 Oct 2017 12:00	19 Oct 2017 13:00	2	Maintenance - verify daily QA response
TRS	28 Oct 2017 21:00	28 Oct 2017 22:00	2	Station power failure
SO2	19 Oct 2017 16:00	19 Oct 2017 18:00	3	Maintenance - Station operator on site
NO2, NO, NOX	18 Oct 2017 02:00	18 Oct 2017 08:00	7	Station power failure
PM2.5	18 Oct 2017 19:00	19 Oct 2017 12:00	18	Analyzer Failure - flat line in sensor output signal
PM2.5	19 Oct 2017 13:00	19 Oct 2017 13:00	1	Maintenance - Flow and zero check, sample head cleaning
PM2.5	20 Oct 2017 03:00	20 Oct 2017 06:00	4	Unstable operation - excessive baseline drift
PM2.5	20 Oct 2017 10:00	20 Oct 2017 12:00	3	Unstable operation - excessive baseline drift
PM2.5	20 Oct 2017 23:00	21 Oct 2017 02:00	4	Unstable operation - excessive baseline drift
PM2.5	21 Oct 2017 04:00	21 Oct 2017 05:00	2	Unstable operation - excessive baseline drift
PM2.5	23 Oct 2017 04:00	23 Oct 2017 06:00	3	Unstable operation - excessive baseline drift
PM2.5	23 Oct 2017 11:00	23 Oct 2017 13:00	3	Unstable operation - excessive baseline drift
PM2.5	24 Oct 2017 01:00	24 Oct 2017 05:00	5	Unstable operation - excessive baseline drift
PM2.5	24 Oct 2017 09:00	24 Oct 2017 10:00	2	Unstable operation - excessive baseline drift
PM2.5	25 Oct 2017 04:00	25 Oct 2017 17:00	14	Unstable operation - excessive baseline drift
PM2.5	28 Oct 2017 21:00	28 Oct 2017 22:00	2	Station power failure
Wind Speed, Wind Direction	08 Oct 2017 04:00	08 Oct 2017 09:00	6	Flat line in sensor output signal
Wind Speed, Wind Direction	11 Oct 2017 18:00	12 Oct 2017 13:00	20	Flat line in sensor output signal



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb

Janvier - October 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 2 ppb on Oct 24 04:00	Maximum Daily Average: 0.9 ppb on Oct 5		Hours of Data:	694
Minimum Value: 0 ppb on Oct 1 01:00	Minimum Daily Average: 0.0 ppb on Oct 25		Hours of Missing Data:	50
Maximum Diurnal Average: 0.3 ppb at hour 19	Minimum Diurnal Average: 0.1 ppb at hour 3		Hours of Calibration:	37
Monthly Average: 0.2 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 1		Percent Operational Time:	98.3

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.1	1
4-Oct	Z	0	0	0	0	0	0	0	0	1	1	2	1	1	1	1	1	1	1	1	0	0	0	0	0.5	2
5-Oct	0	Z	0	0	2	1	1	1	1	1	1	1	0	0	0	1	2	2	2	1	0	1	1	1	0.9	2
6-Oct	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
7-Oct	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
8-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
9-Oct	0	0	0	0	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
10-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.1	1
11-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
12-Oct	0	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1	1	0	1	1	1	0.3	1
13-Oct	0	0	0	Z	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1
14-Oct	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
15-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
16-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
17-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
18-Oct	0	PF	PF	PF	PF	PF	PF	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	--	0
19-Oct	0	0	0	Z	0	0	0	0	0	0	0	M	0	0	0	M	M	M	0	0	0	0	0	0	0.1	0
20-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
21-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
22-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
23-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
24-Oct	0	0	Z	2	1	1	1	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
25-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
26-Oct	0	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1
27-Oct	0	0	0	0	0	Z	0	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	0	0.5	1
28-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	PF	PF	PF	0.3	0
29-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
30-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
31-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0

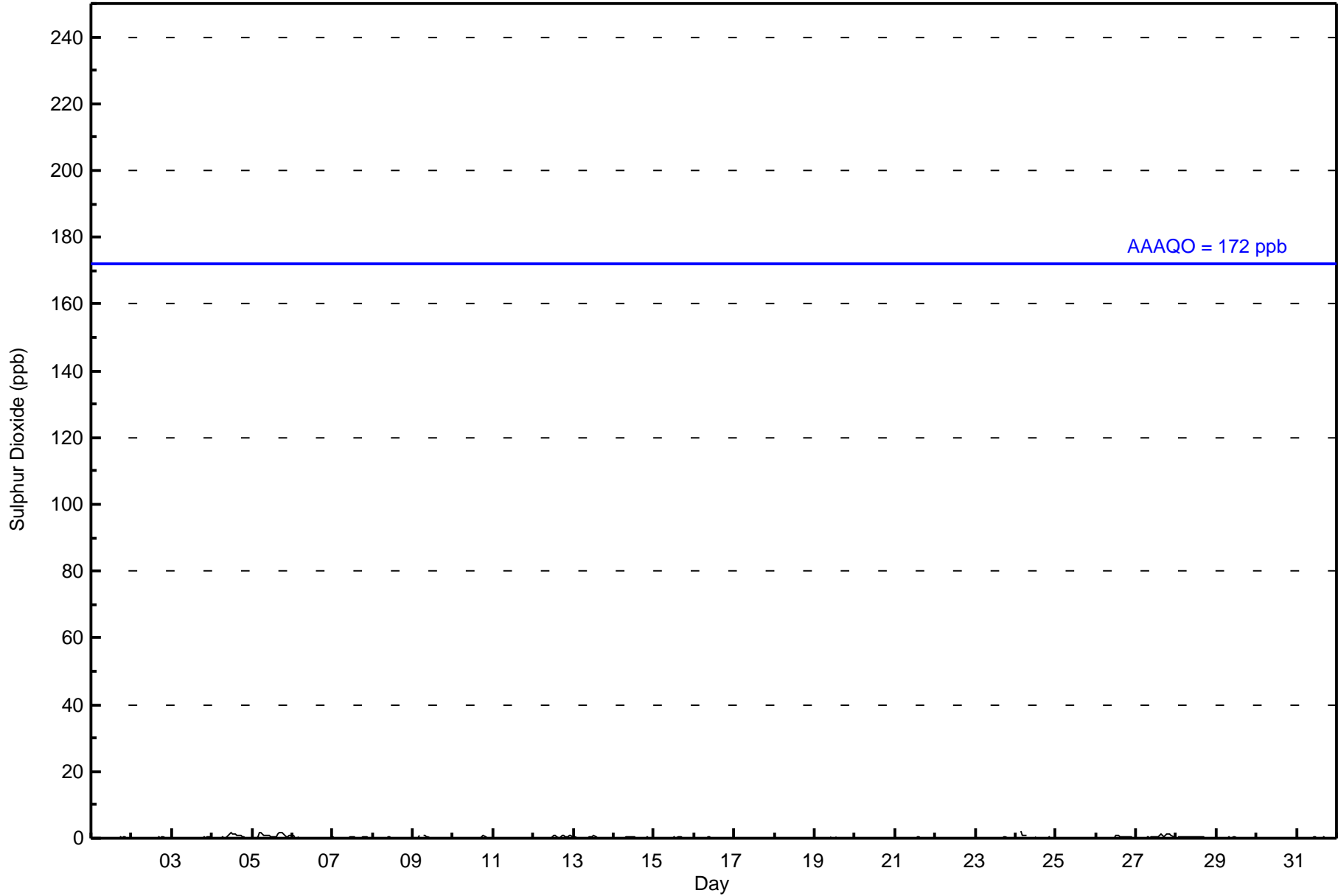
0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.1	0.1	Diurnal Average
1	1	0	2	2	1	1	1	1	1	1	1	2	1	1	1	1	1	2	2	2	1	1	1	1	Diurnal Maximum

Z - zerospan      C - Calibration      M - Maintenance      PF - Power Failure  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb    24-hr 48 ppb



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Janvier - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Janvier - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	694	100.00	100.00
11 - 20	0	0.00	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 694

Total Number of Hours: 744





**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Janvier - October 2017**

<b>Concentration</b> <b>Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	63	69	13	9	10	16	8	22	66	178	62	34	51	42	14	13	670
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	63	69	13	9	10	16	8	22	66	178	62	34	51	42	14	13	670

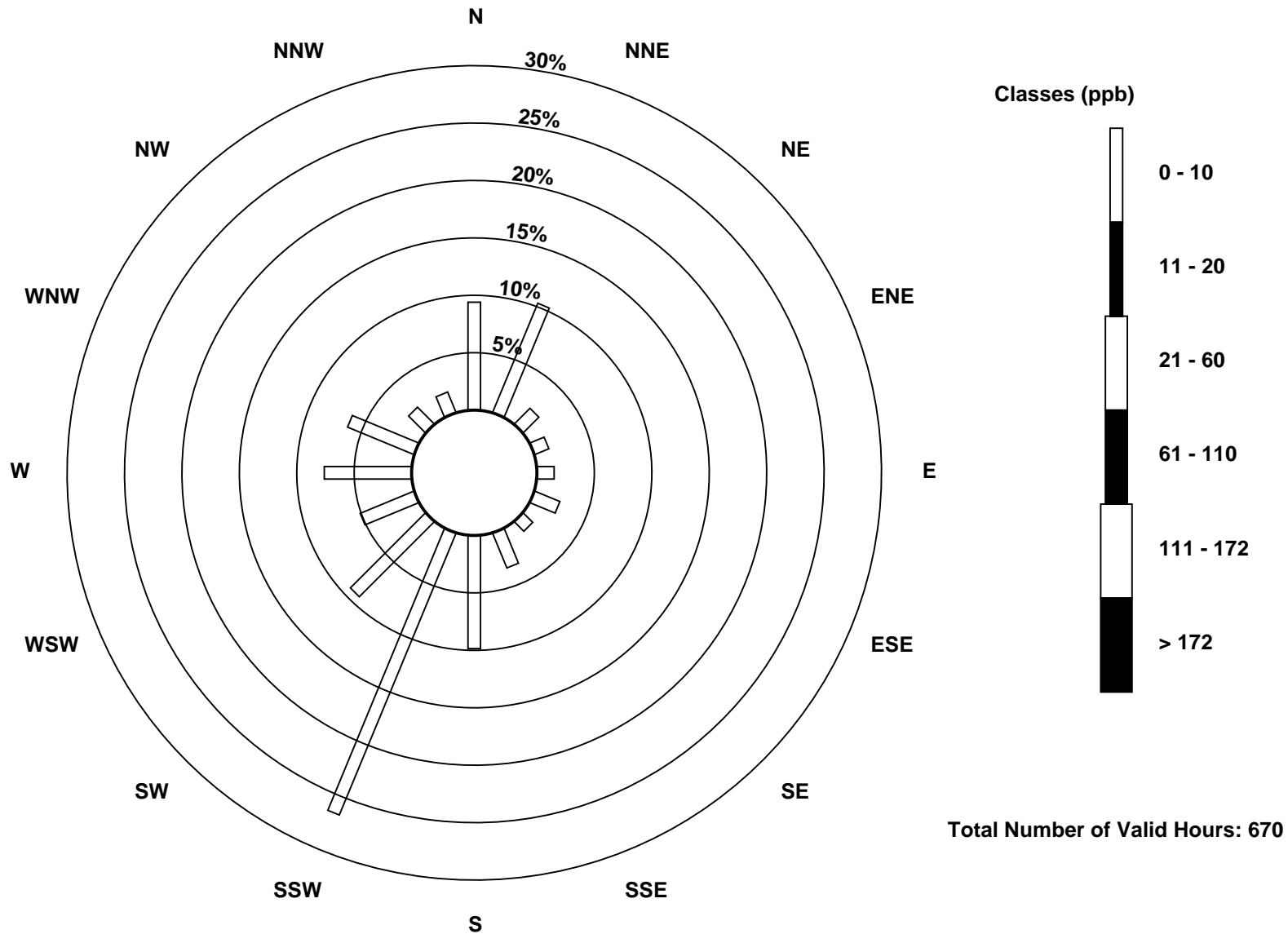
Total Number of Valid Hours: 670

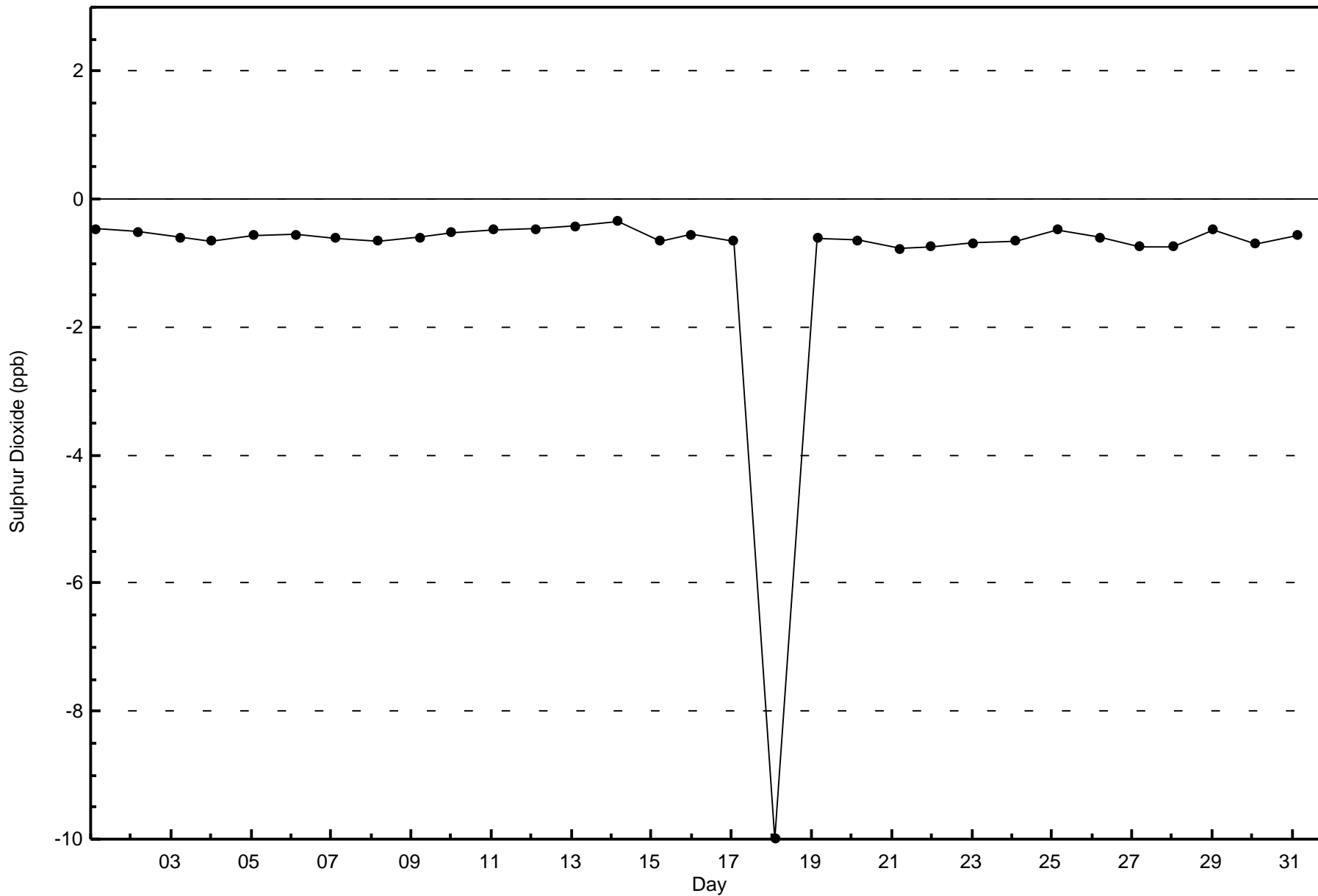
Total Number of Hours: 744

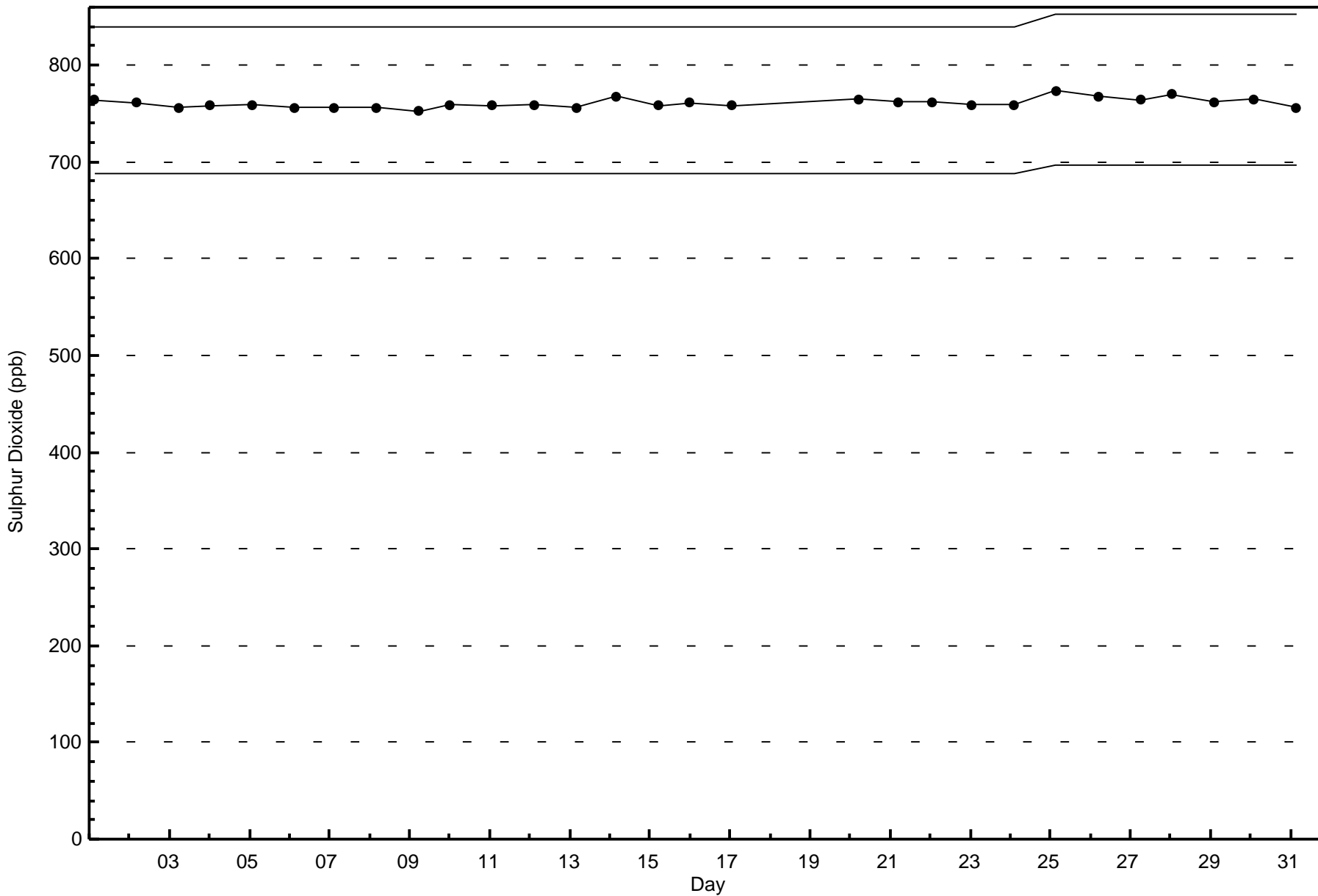


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Janvier (AMS 22)









# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Total Reduced Sulphur (TRS) - ppb

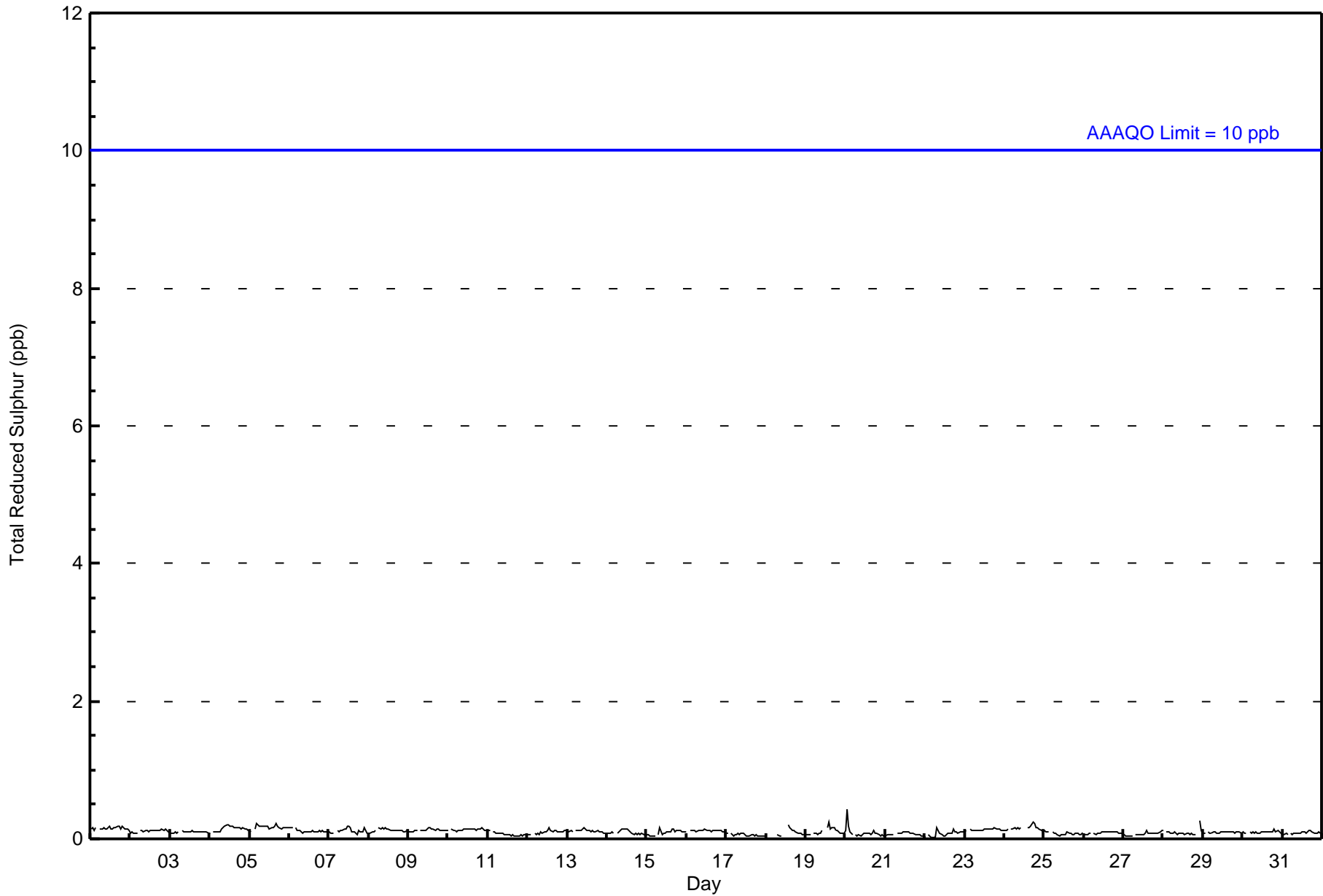
Janvier - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																	Hours in Service: 744									
Maximum Value: 0 ppb on Oct 20 02:00																	Maximum Daily Average: 0.2 ppb on Oct 5									
Minimum Value: 0 ppb on Oct 22 07:00																	Hours of Data: 698									
Maximum Diurnal Average: 0.1 ppb at hour 15																	Hours of Missing Data: 46									
Monthly Average: 0.1 ppb																	Hours of Calibration: 36									
Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 0																	Percent Operational Time: 98.7									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
4-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
5-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
6-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
7-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
8-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
9-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
10-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
11-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
12-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
13-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
14-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
15-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
16-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
17-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
18-Oct	0	PF	PF	PF	PF	PF	PF	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	--	0
19-Oct	0	0	0	0	Z	0	0	0	0	0	0	M	M	0	0	0	0	0	0	0	0	0	0	0	0.1	0
20-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
21-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
22-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
23-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
24-Oct	0	0	0	Z	0	0	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0.2	0
25-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
26-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
27-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
28-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
29-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
30-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
31-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
0.1																								Diurnal Average		
0																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance PF - Power Failure																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Total Reduced Sulphur (TRS) - ppb**  
**Janvier - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Janvier - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	698	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 698

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Janvier - October 2017**

<b>Concentration</b> <b>Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	62	70	12	10	10	16	9	23	68	175	63	36	50	43	14	13	674
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	62	70	12	10	10	16	9	23	68	175	63	36	50	43	14	13	674

Total Number of Valid Hours: 674

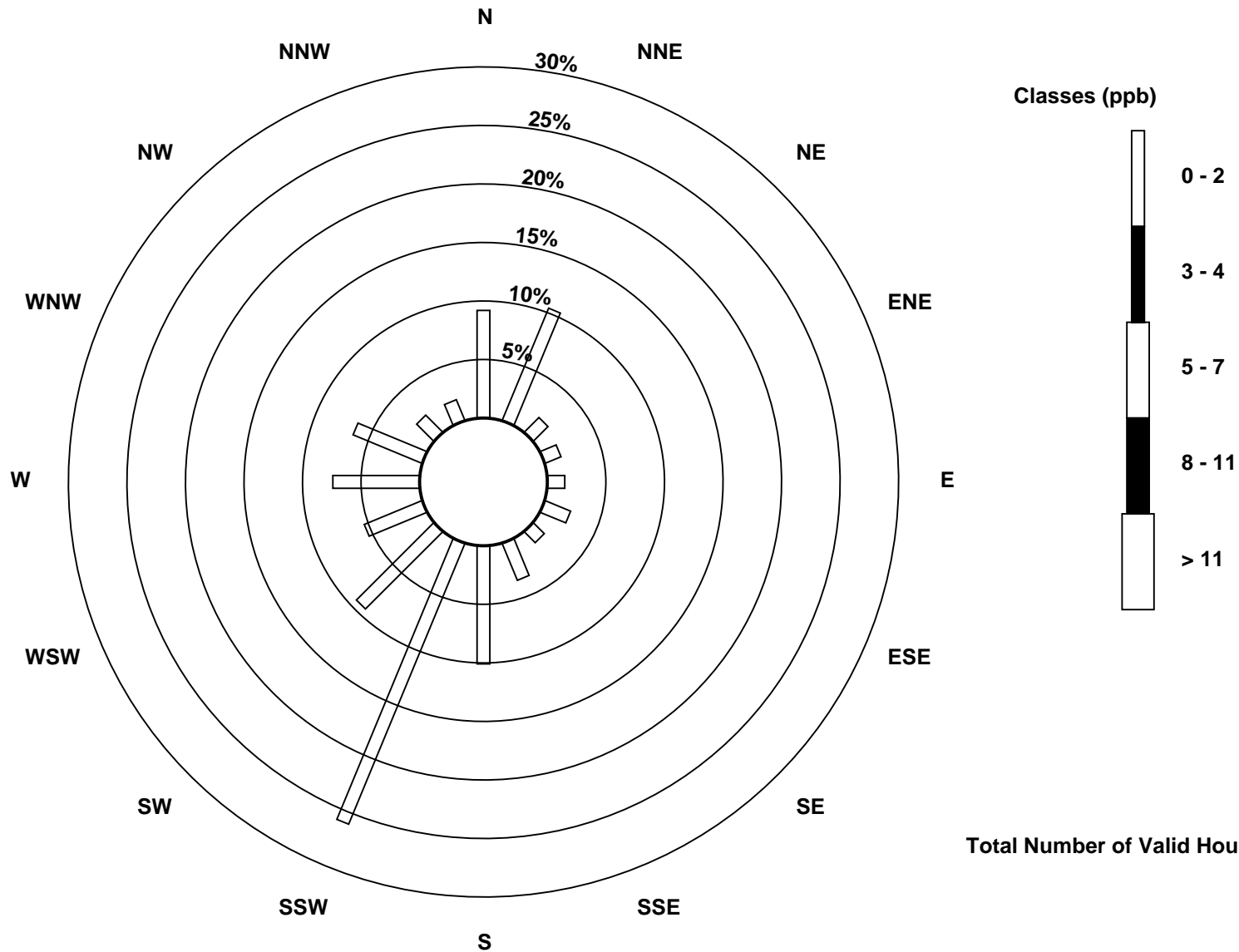
Total Number of Hours: 744



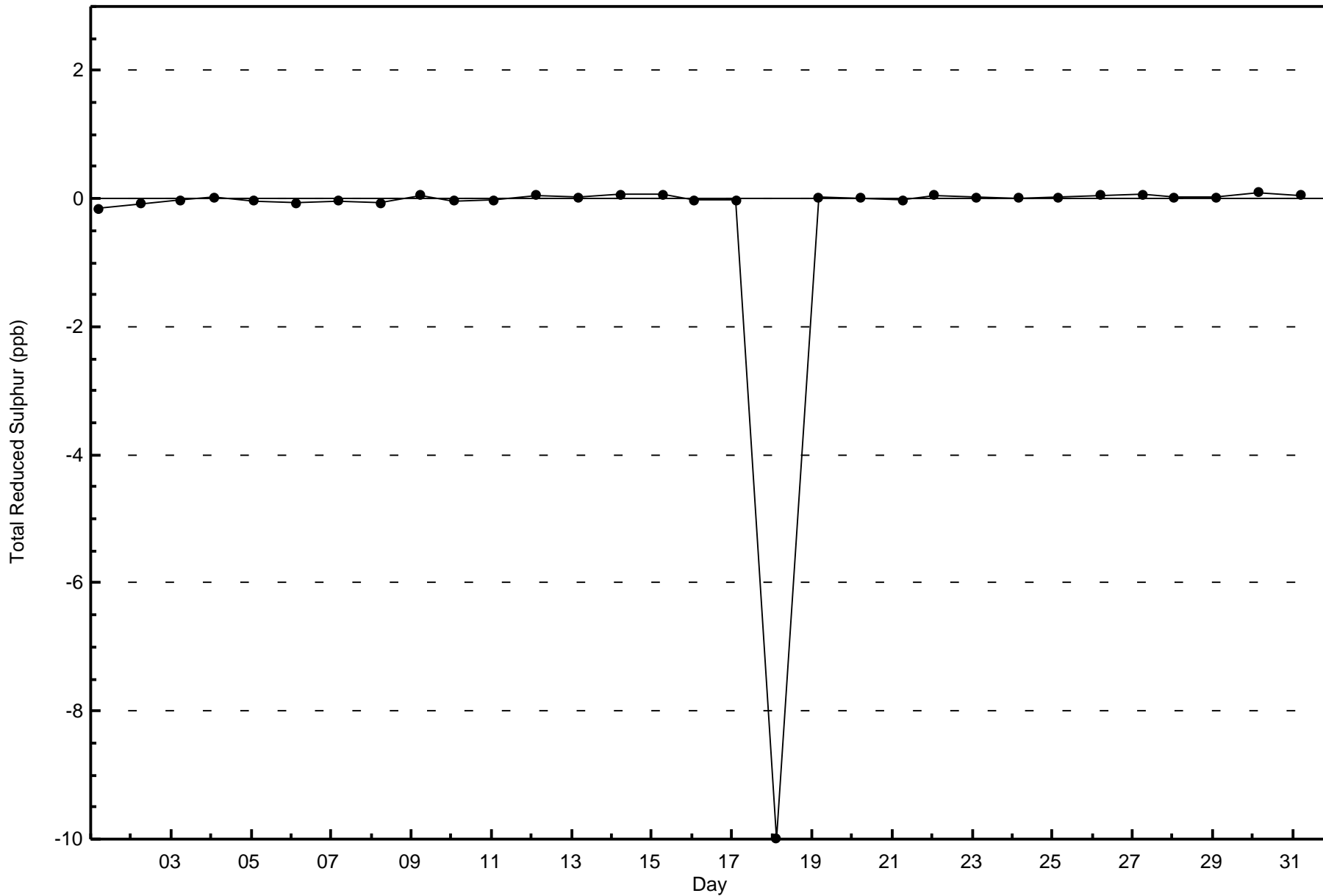


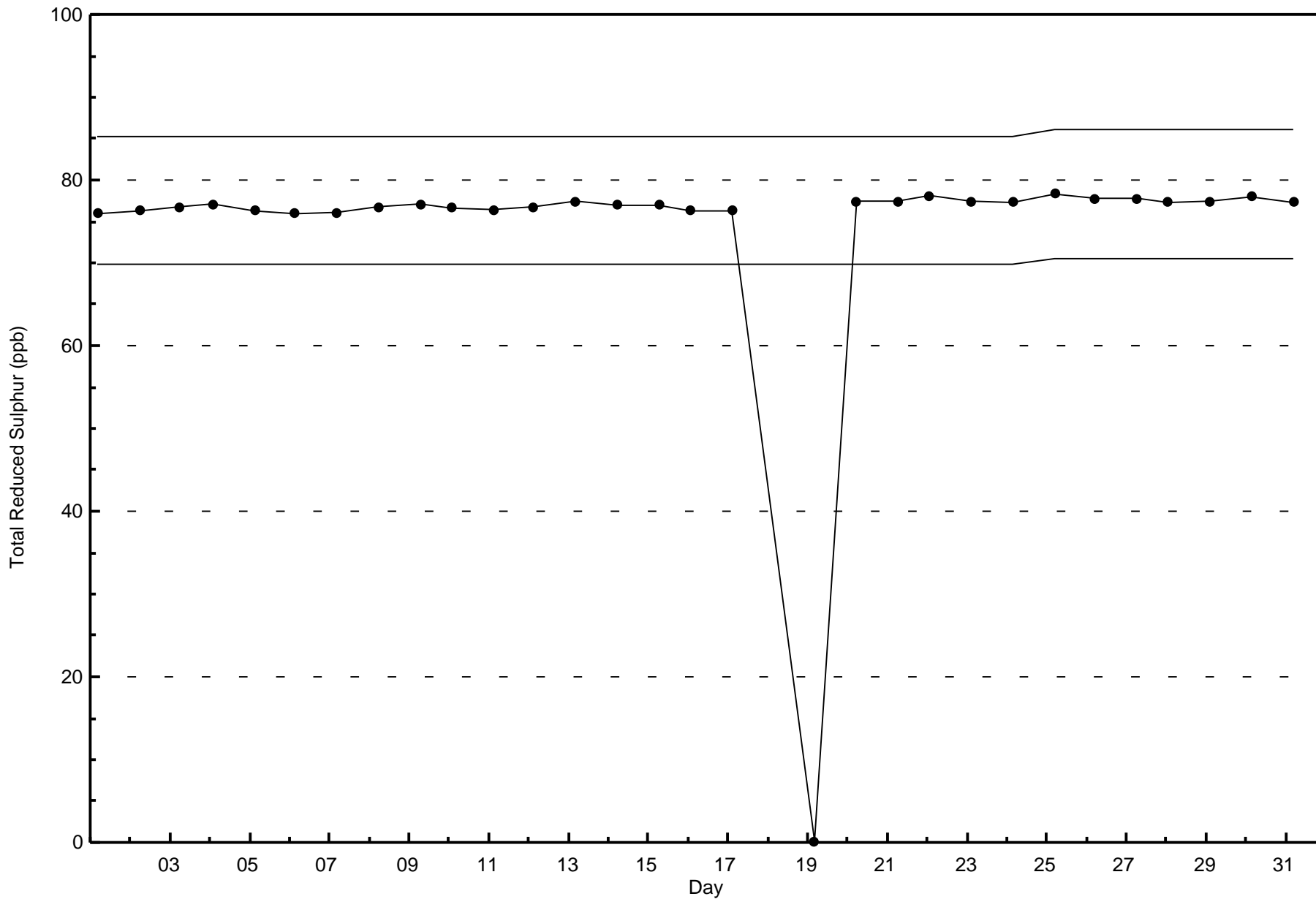
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Total Reduced Sulphur (TRS) - ppb  
Janvier (AMS 22)



Total Number of Valid Hours: 674



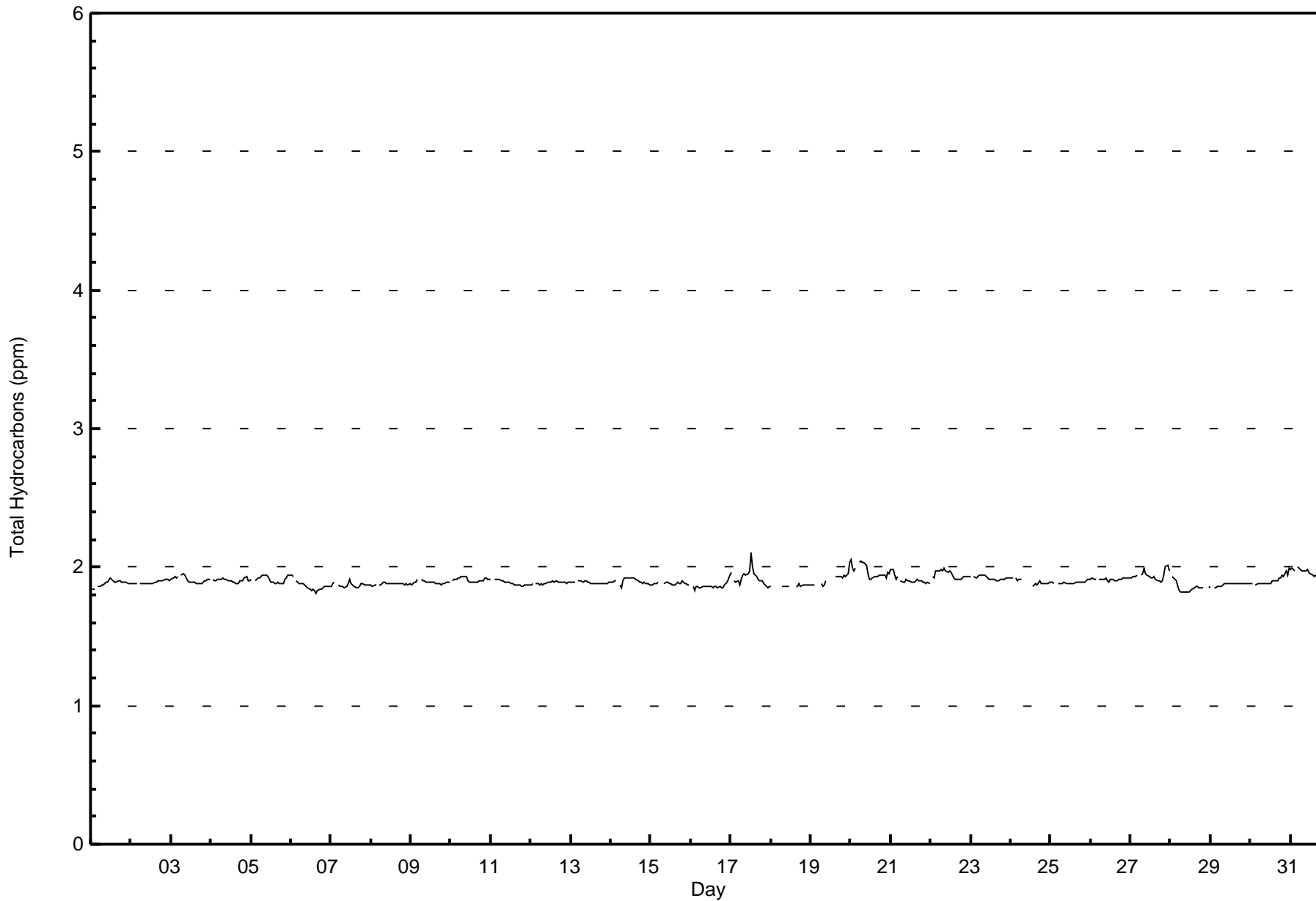






**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Janvier - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Janvier - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	687	99.71	99.71
2.1 - 3.0	2	0.29	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 689

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Janvier - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	62	68	12	8	10	17	9	23	62	177	62	34	50	42	14	13	663
2.1 - 3.0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	63	69	12	8	10	17	9	23	62	177	62	34	50	42	14	13	665

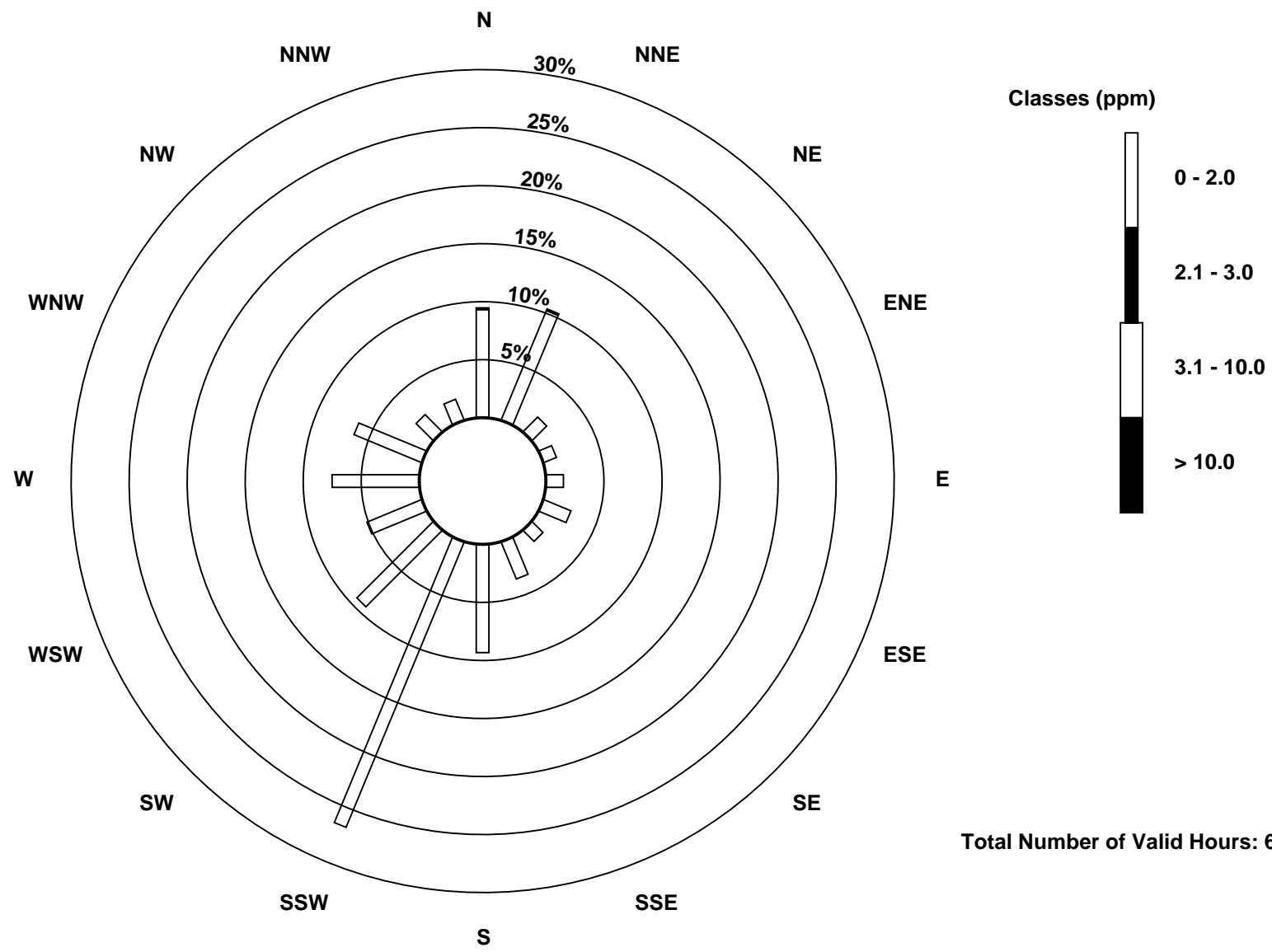
Total Number of Valid Hours: 665

Total Number of Hours: 744



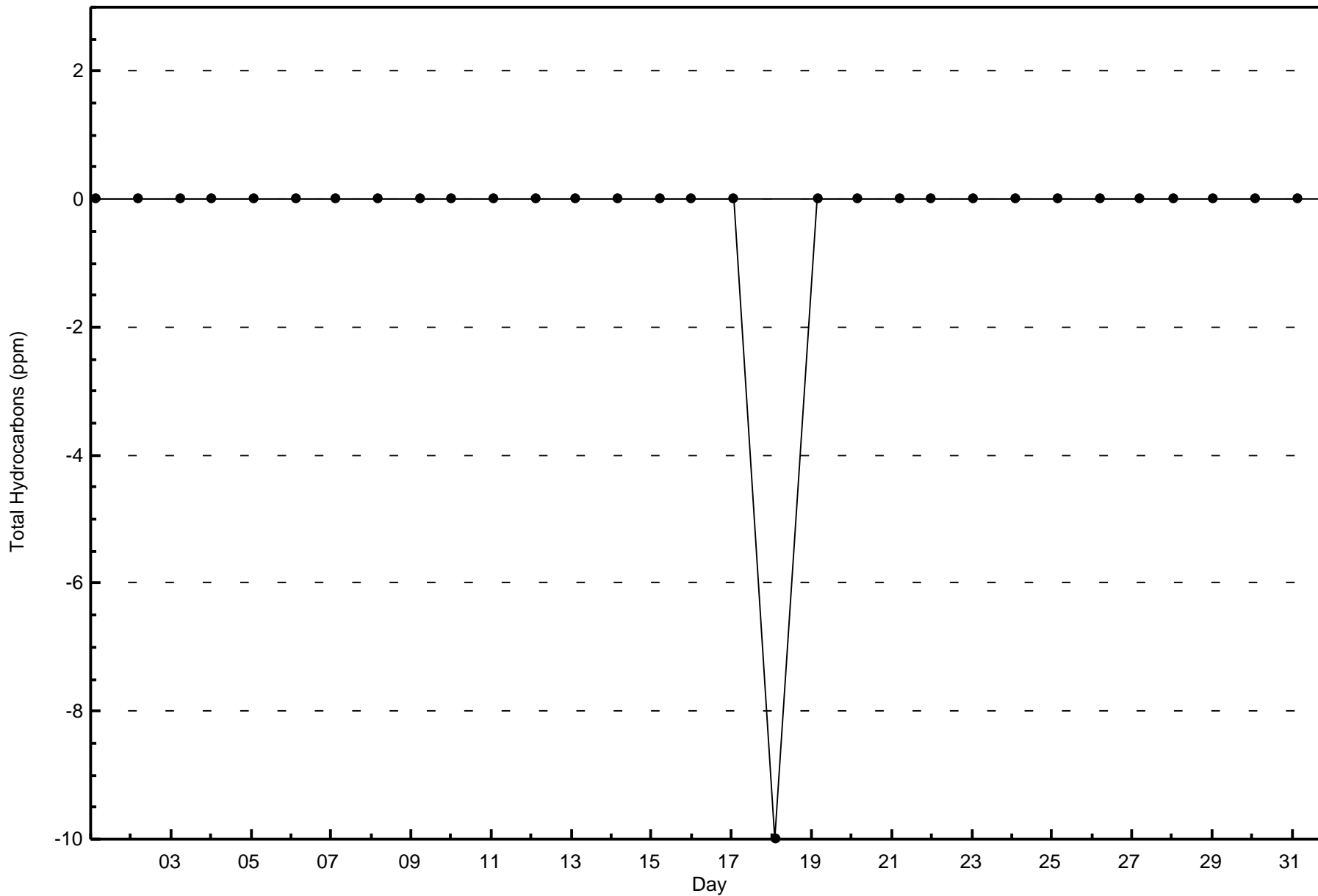
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

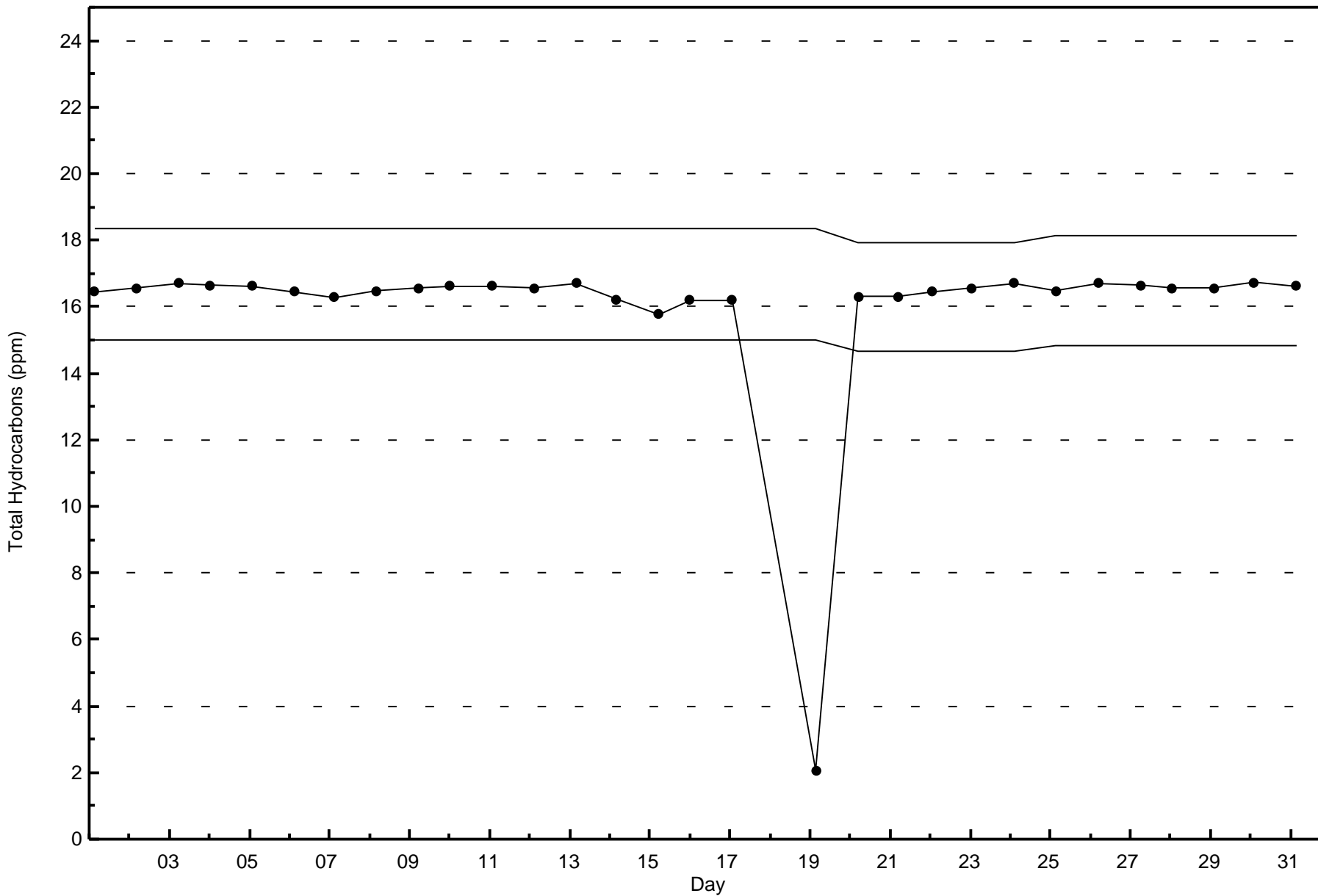
Total Hydrocarbons (THC) - ppm  
Janvier (AMS 22)



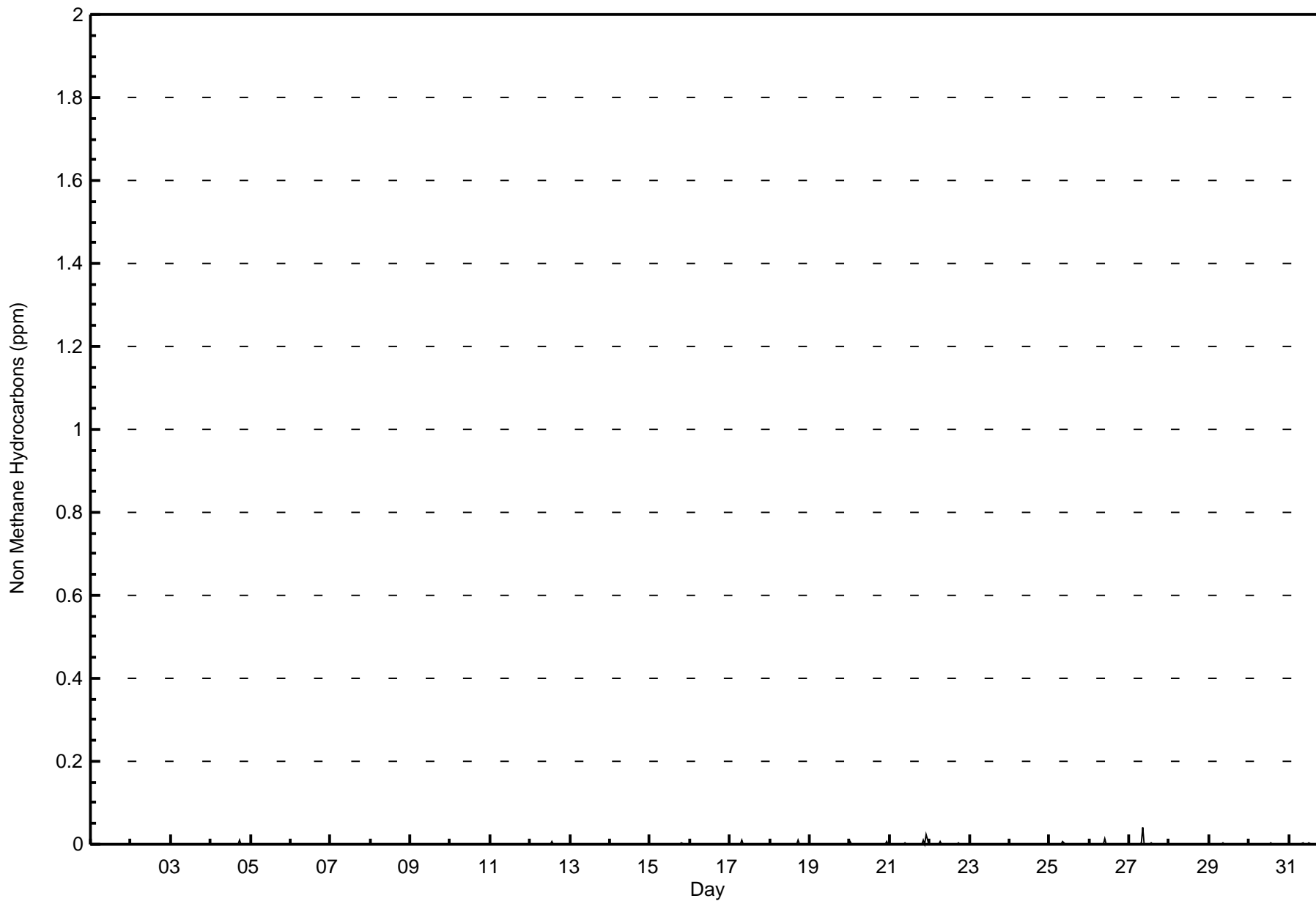
Total Number of Valid Hours: 665













**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm  
Janvier - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.005	678	98.26	98.26
0.006 - 0.05	12	1.74	100.00
0.06 - 0.1	0	0.00	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 690

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Janvier - October 2017**

<b>Concentration</b> <b>Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	63	67	12	8	9	16	8	21	60	176	62	33	51	42	13	13	654
0.006 - 0.05	0	2	0	0	1	1	1	2	2	1	0	1	0	0	1	0	12
0.06 - 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	63	69	12	8	10	17	9	23	62	177	62	34	51	42	14	13	666

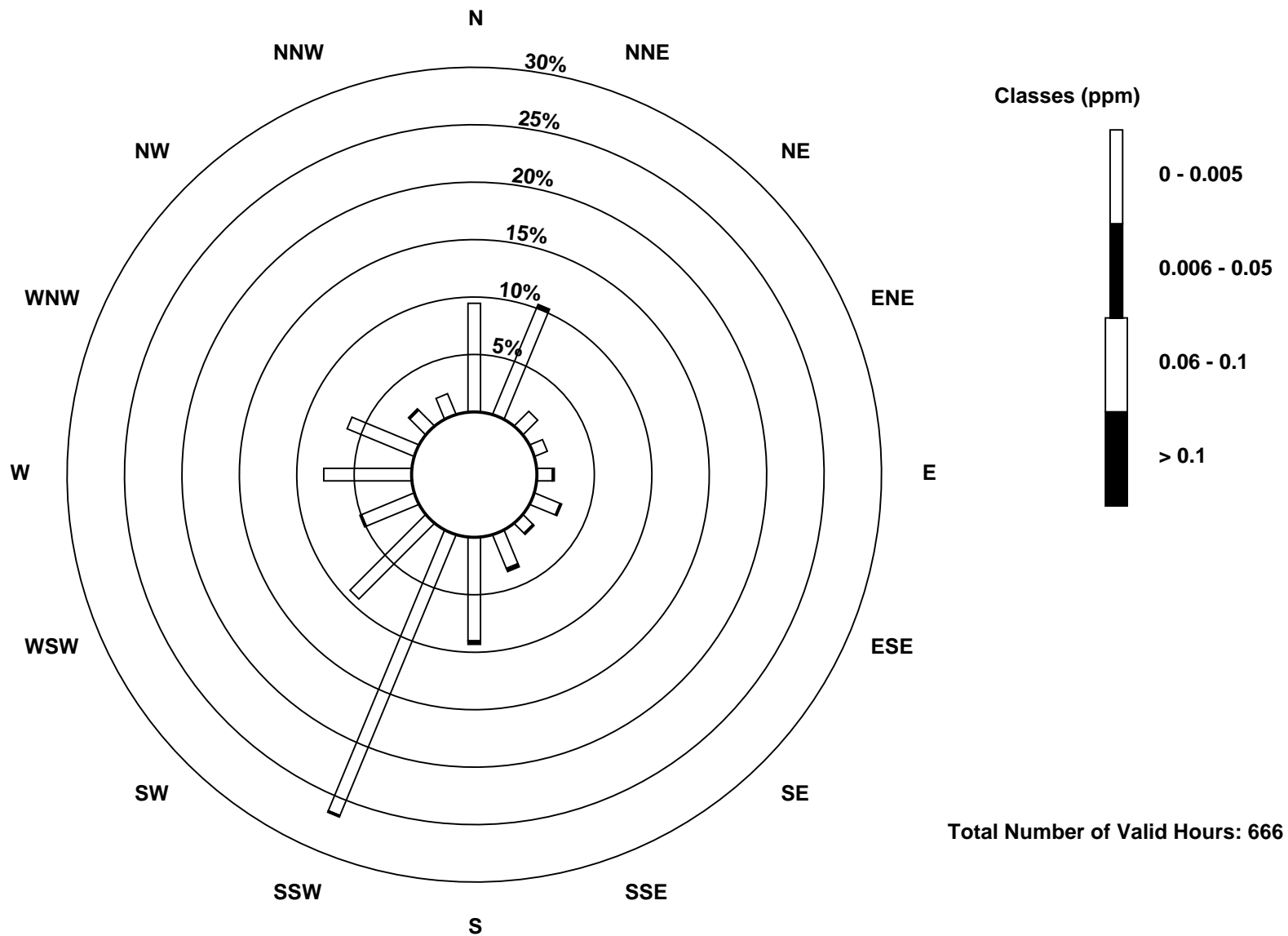
Total Number of Valid Hours: 666

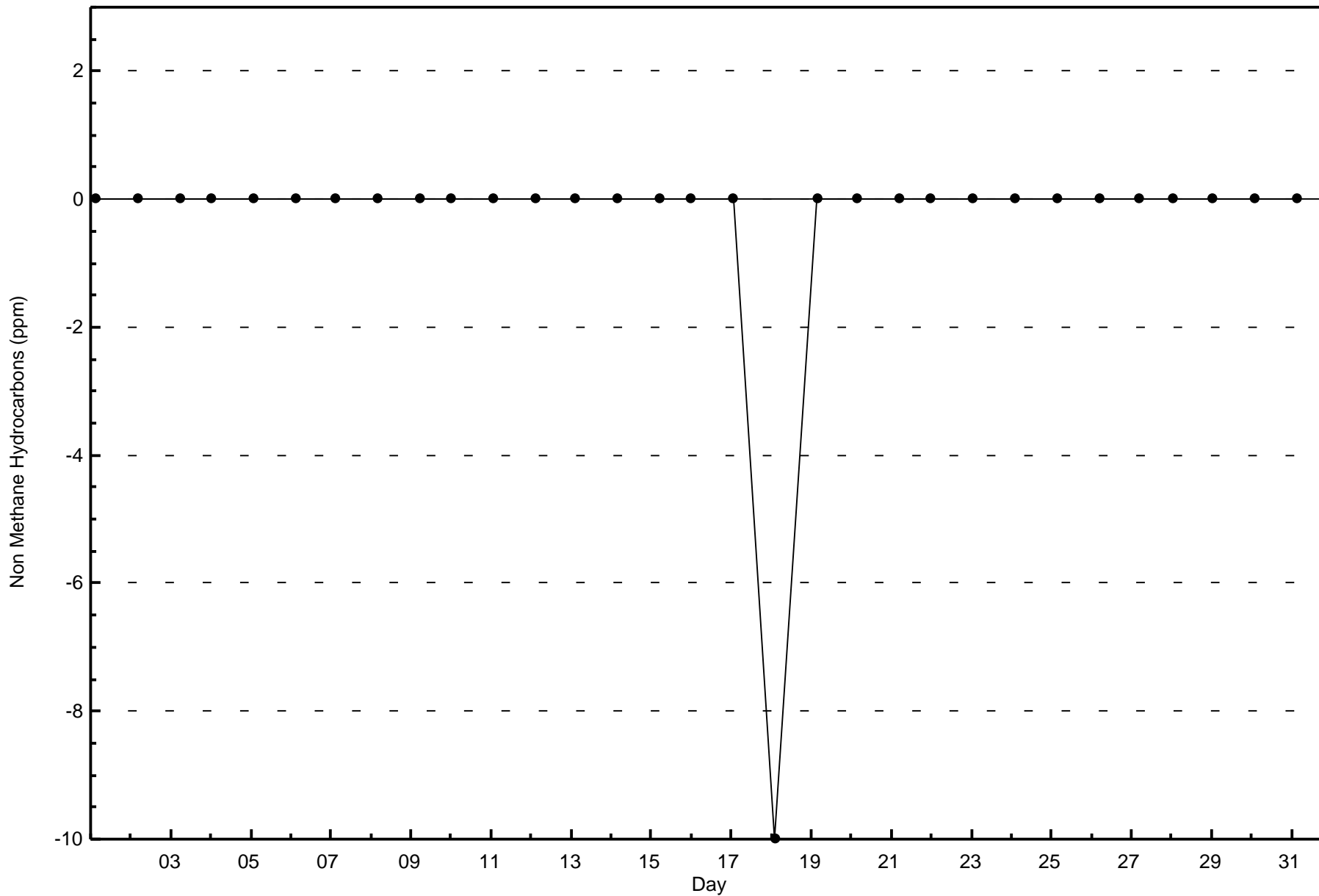
Total Number of Hours: 744



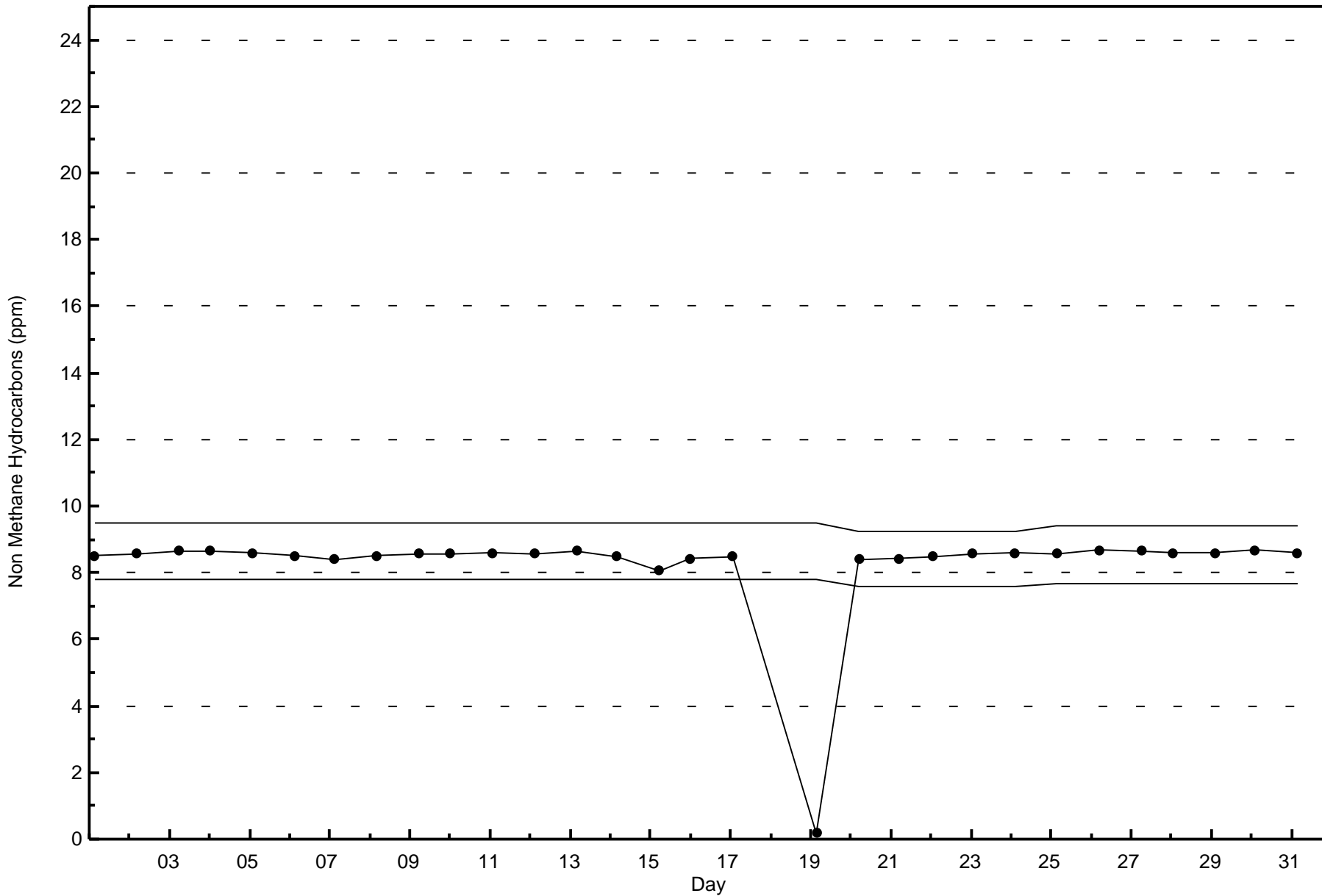
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Non Methane Hydrocarbons (NMHC) - ppm  
Janvier (AMS 22)







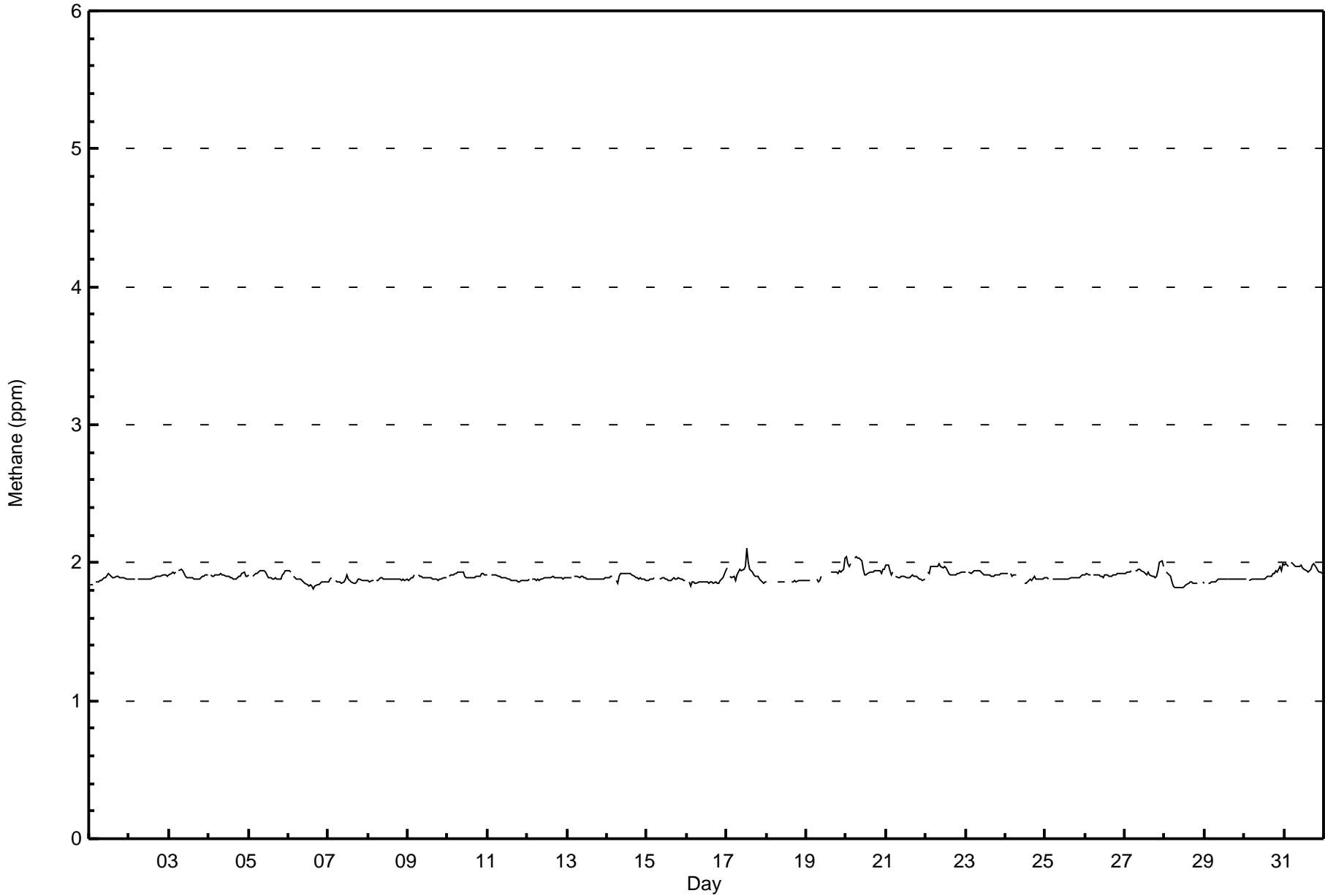






**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Methane (CH<sub>4</sub>) - ppm**  
**Janvier - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm  
Janvier - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	689	99.86	99.86
2.1 - 3.0	1	0.14	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 690

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Janvier - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 2.0	62	69	12	8	10	17	9	23	62	177	62	34	51	42	14	13	665
2.1 - 3.0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>63</b>	<b>69</b>	<b>12</b>	<b>8</b>	<b>10</b>	<b>17</b>	<b>9</b>	<b>23</b>	<b>62</b>	<b>177</b>	<b>62</b>	<b>34</b>	<b>51</b>	<b>42</b>	<b>14</b>	<b>13</b>	<b>666</b>

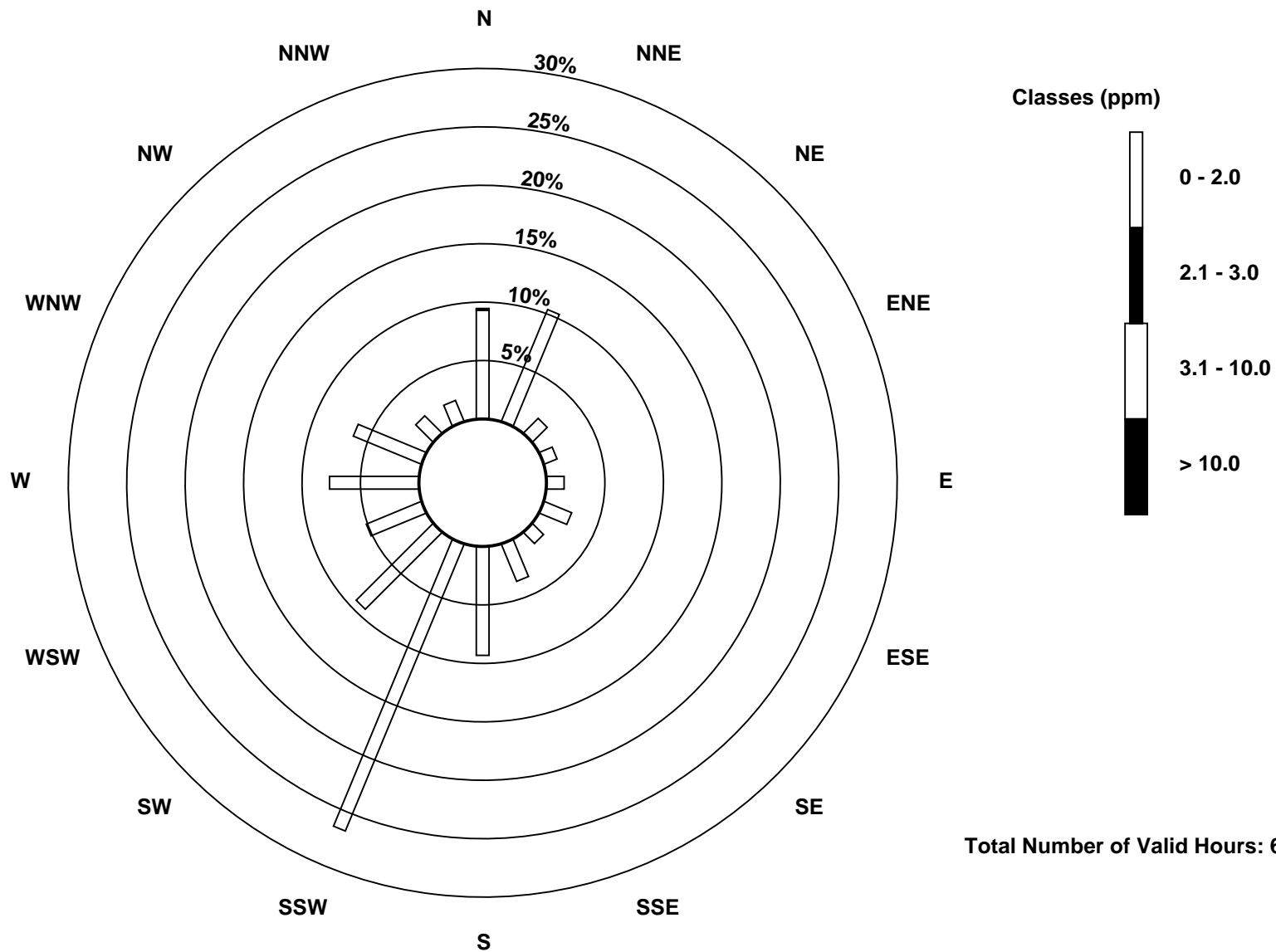
Total Number of Valid Hours: 666

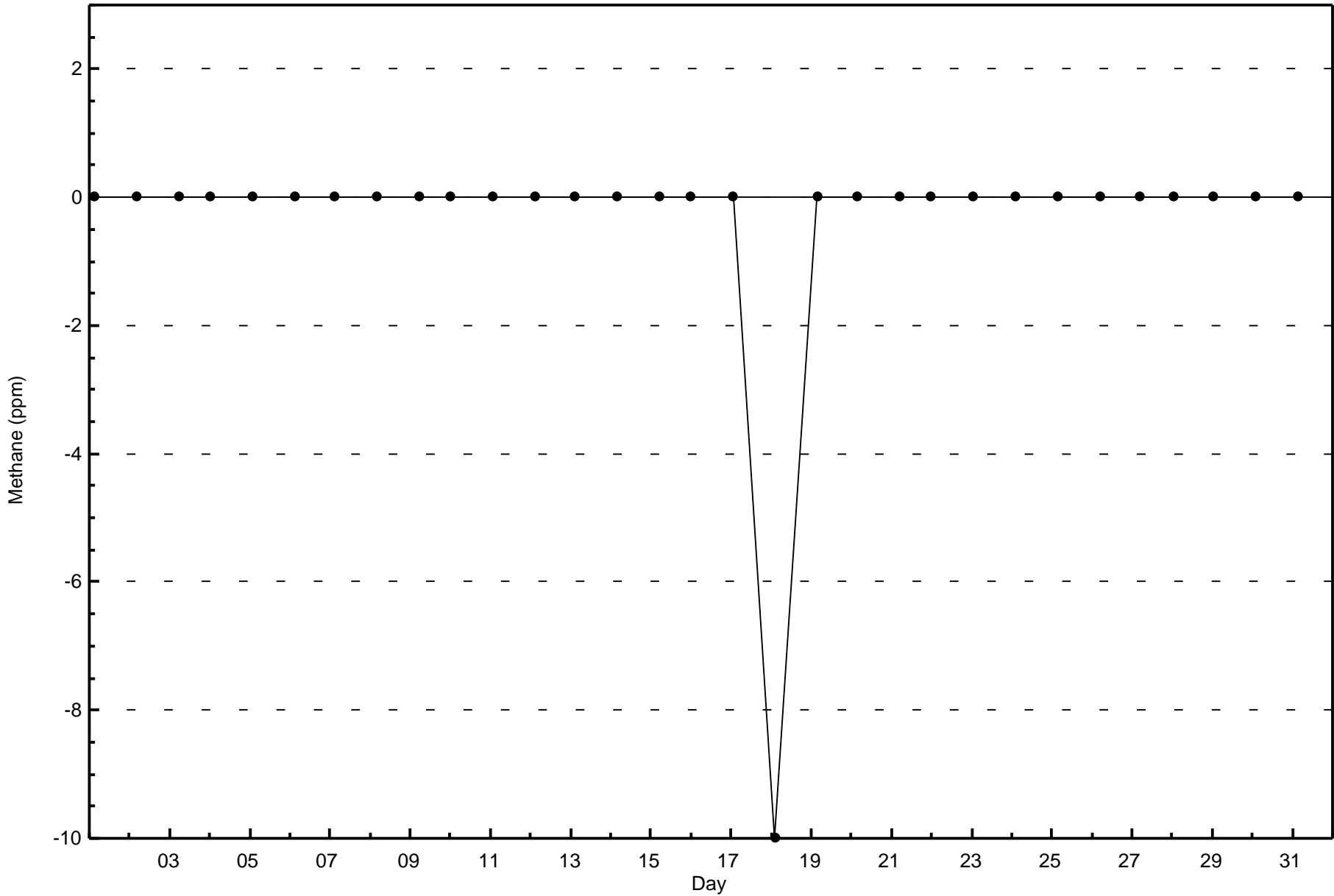
Total Number of Hours: 744

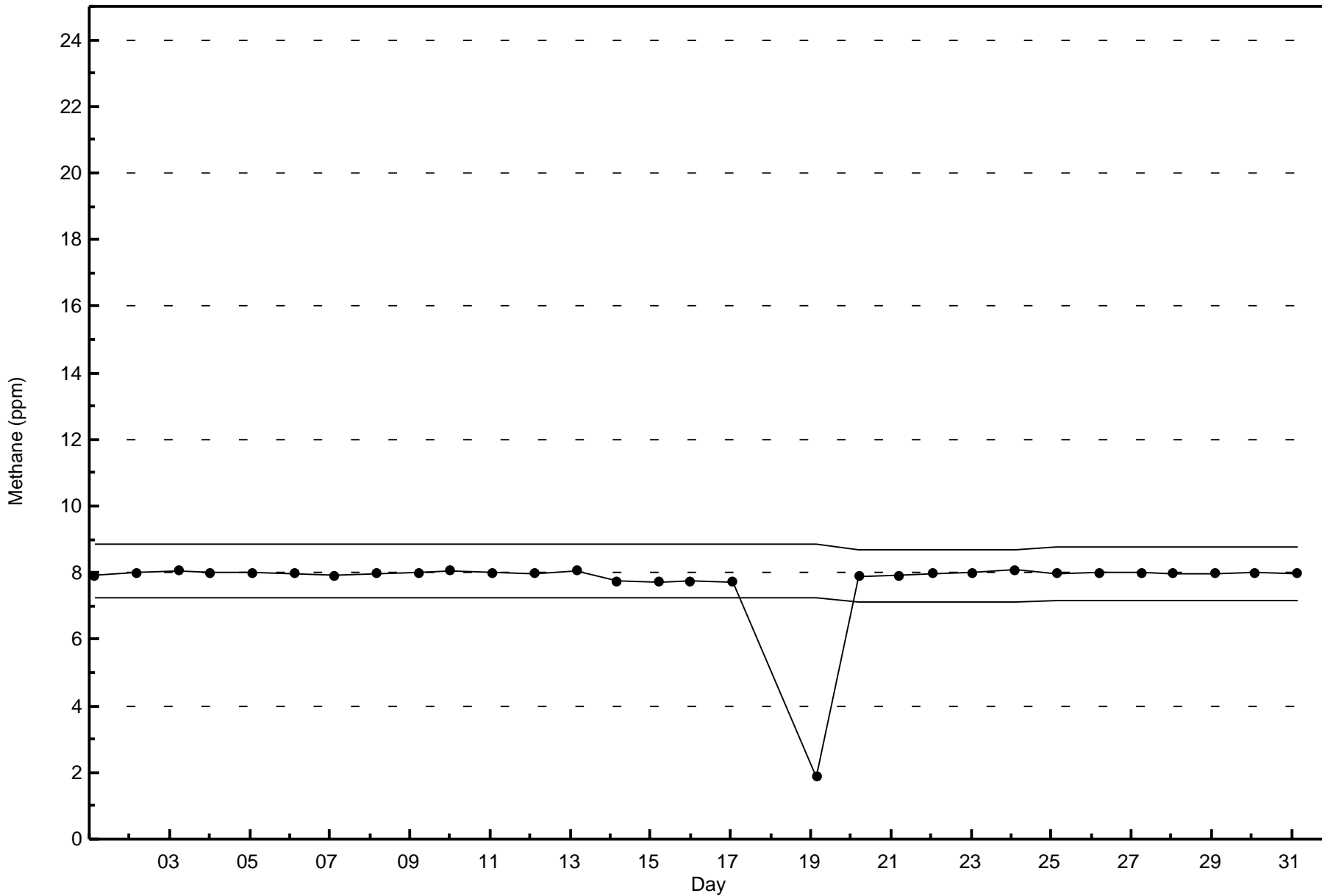


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Methane (CH<sub>4</sub>) - ppm  
Janvier (AMS 22)











# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Nitric Oxide (NO) - ppb

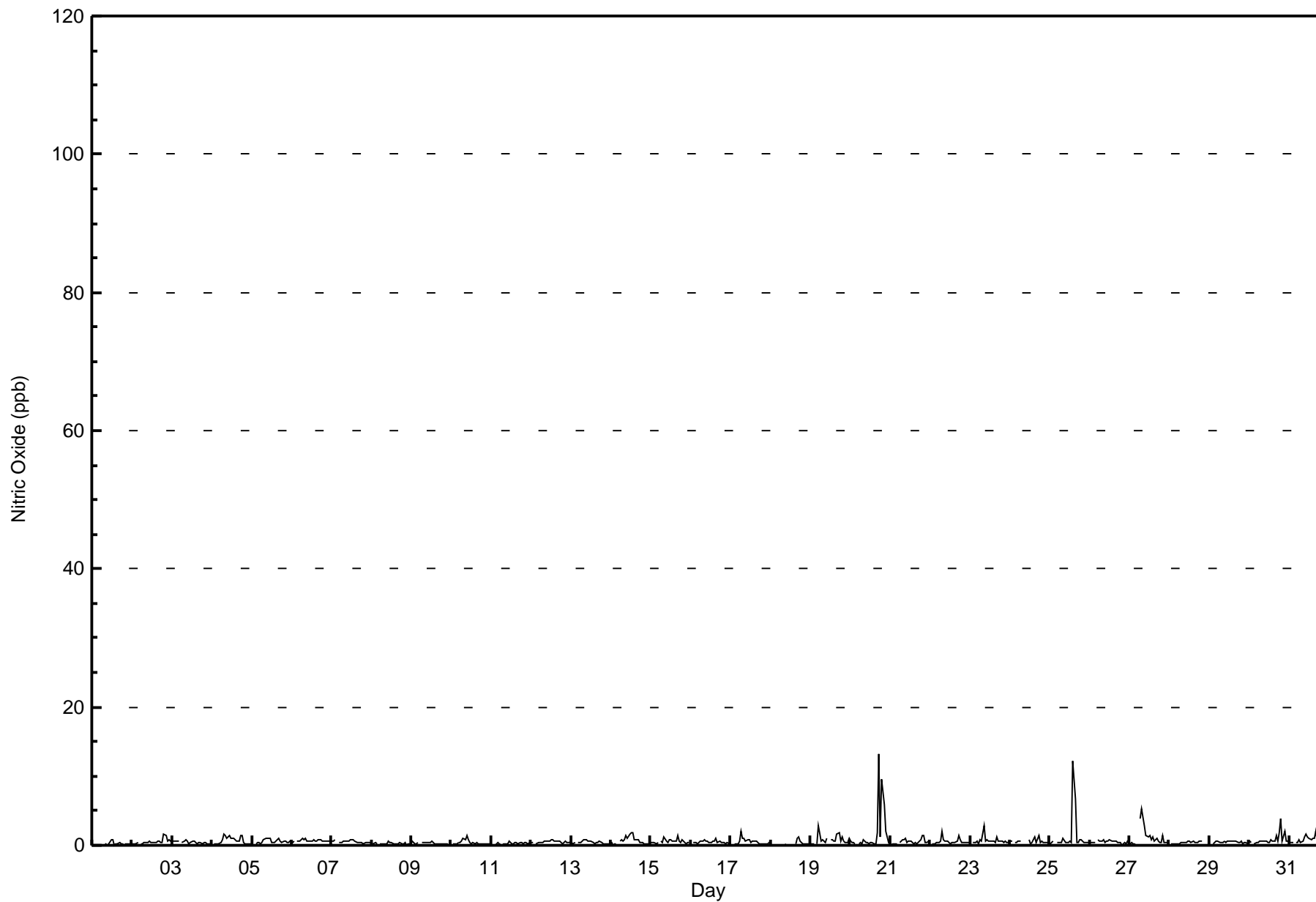
## Janvier - October 2017

Maximum Value: 13 ppb on Oct 20 18:00																		Maximum Daily Average: 1.8 ppb on Oct 20						Hours in Service: 744																									
Minimum Value: 0 ppb on Oct 1 01:00																		Minimum Daily Average: 0.2 ppb on Oct 1						Hours of Data: 694																									
Maximum Diurnal Average: 1.0 ppb at hour 18																		Minimum Diurnal Average: 0.3 ppb at hour 3						Hours of Missing Data: 50																									
Monthly Average: 0.6 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 1 P <sub>99</sub> = 4						Hours of Calibration: 39																									
																		Percent Operational Time: 98.5																															
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	0	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
2-Oct	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	1	1	0	0	2	1	1	1	1	0.5	2																							
3-Oct	1	1	1	1	1	Z	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
4-Oct	Z	0	0	0	0	0	1	2	1	1	1	1	1	1	1	1	1	2	2	0	0	0	0	0	0.7	2																							
5-Oct	0	Z	0	0	0	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	1	0.6	1																							
6-Oct	0	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1																							
7-Oct	1	1	1	Z	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.5	1																							
8-Oct	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
9-Oct	1	0	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
10-Oct	Z	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
11-Oct	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
12-Oct	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0	0	0.5	1																							
13-Oct	1	0	0	Z	0	0	0	1	1	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0.4	1																							
14-Oct	0	0	0	0	Z	1	1	1	1	1	1	2	2	2	1	1	1	0	0	0	0	0	0	0	0.7	2																							
15-Oct	0	0	0	0	0	Z	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0.6	1																							
16-Oct	Z	0	0	0	0	0	1	1	1	1	1	0	0	1	1	1	0	1	0	0	0	0	0	0	0.5	1																							
17-Oct	0	Z	0	0	0	1	2	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.5	2																							
18-Oct	0	PF	PF	PF	PF	PF	PF	PF	PF	0	0	C	C	C	C	C	0	1	1	1	0	0	0	0	--	1																							
19-Oct	0	0	0	Z	0	3	1	1	1	0	1	M	1	1	1	1	2	2	1	1	1	0	0	1	0.8	3																							
20-Oct	1	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	2	13	1	9	6	2	1	0	1.8	13																							
21-Oct	0	0	0	0	0	Z	0	1	1	1	0	1	1	0	0	0	0	0	1	1	1	0	0	1	0.5	1																							
22-Oct	Z	0	0	0	0	0	1	2	1	1	1	0	0	1	0	1	1	2	1	0	0	0	0	0	0.6	2																							
23-Oct	0	Z	0	0	1	0	1	1	3	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0.7	3																							
24-Oct	1	1	Z	0	0	1	1	1	C	C	C	C	1	0	1	1	1	0	1	0	1	0	0	0	0.6	1																							
25-Oct	0	0	1	Z	0	0	0	0	1	0	1	0	1	0	12	7	0	0	1	1	0	0	1	0	1.3	12																							
26-Oct	0	0	0	0	Z	1	1	1	1	0	1	1	1	1	1	1	1	0	0	0	0	0	0	1	0.5	1																							
27-Oct	0	0	0	0	0	Z	4	5	4	3	1	1	2	1	1	1	1	1	0	1	1	0	0	0	1.2	5																							
28-Oct	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	1	1	PF	PF	PF	0	0.4	1																							
29-Oct	0	Z	0	0	1	1	1	0	0	1	0	1	1	1	1	1	1	0	1	1	0	0	0	0	0.5	1																							
30-Oct	1	0	Z	0	0	0	1	1	1	1	1	0	0	1	1	1	2	1	2	4	1	2	1	1	0.9	4																							
31-Oct	0	0	0	Z	0	0	1	0	1	1	2	1	1	1	1	1	2	1	0	0	0	0	0	0	0.7	2																							
																								0.3	0.3	0.3	0.3	0.3	0.5	0.7	0.8	0.9	0.7	0.7	0.7	0.7	0.6	0.9	0.7	0.7	1.0	0.6	0.9	0.6	0.5	0.4	0.4	Diurnal Average	
																								1	1	1	1	1	3	4	5	4	3	2	2	2	2	12	7	2	13	2	9	6	2	1	1	Diurnal Maximum	
Z - zerspan																								C - Calibration				M - Maintenance				PF - Power Failure																	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitric Oxide (NO) - ppb**  
**Janvier - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb  
Janvier - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	694	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 694

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitric Oxide (NO) - ppb  
Janvier - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	63	69	13	9	10	17	9	23	66	178	62	34	48	42	14	13	670
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	63	69	13	9	10	17	9	23	66	178	62	34	48	42	14	13	670

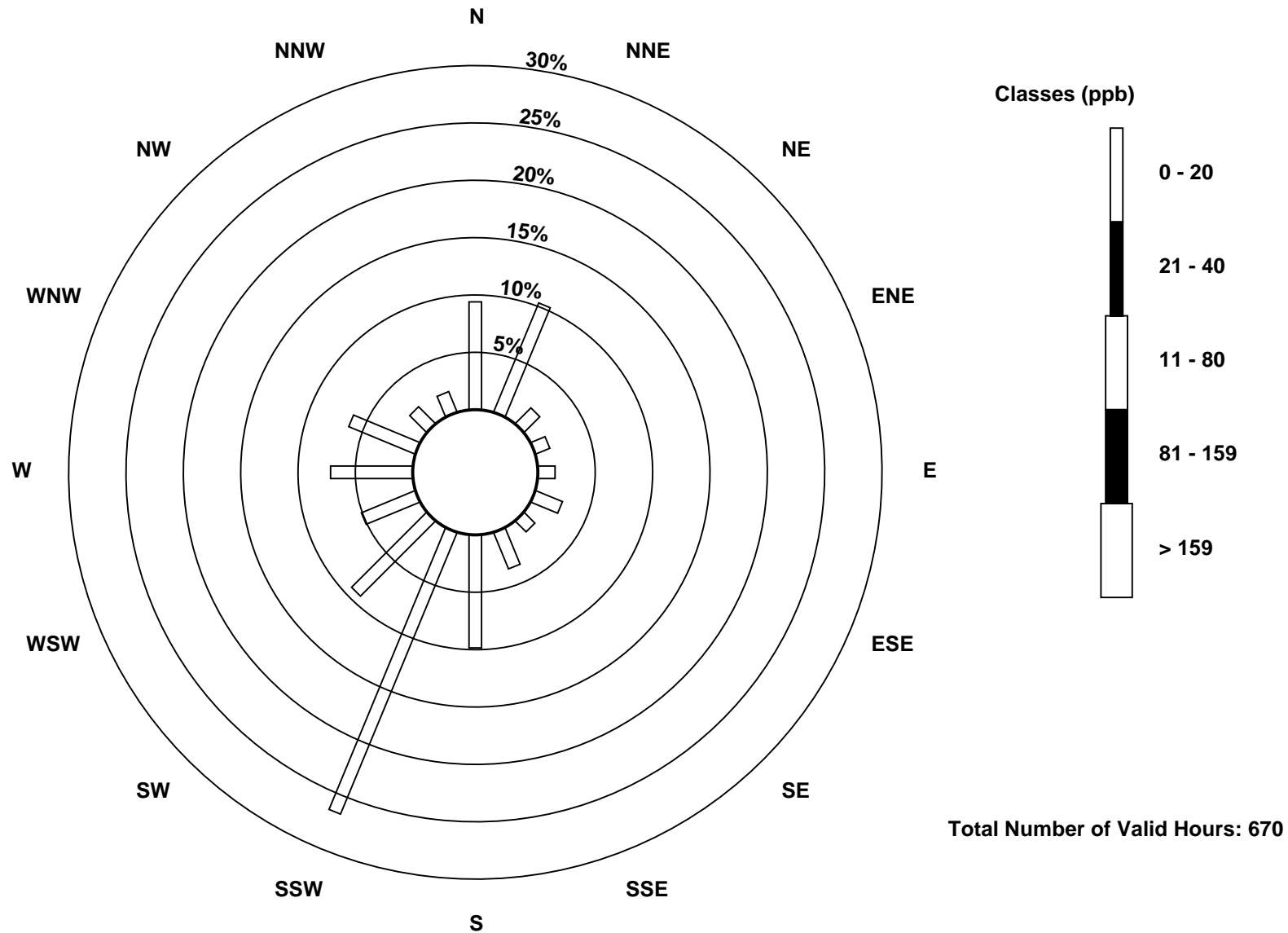
Total Number of Valid Hours: 670

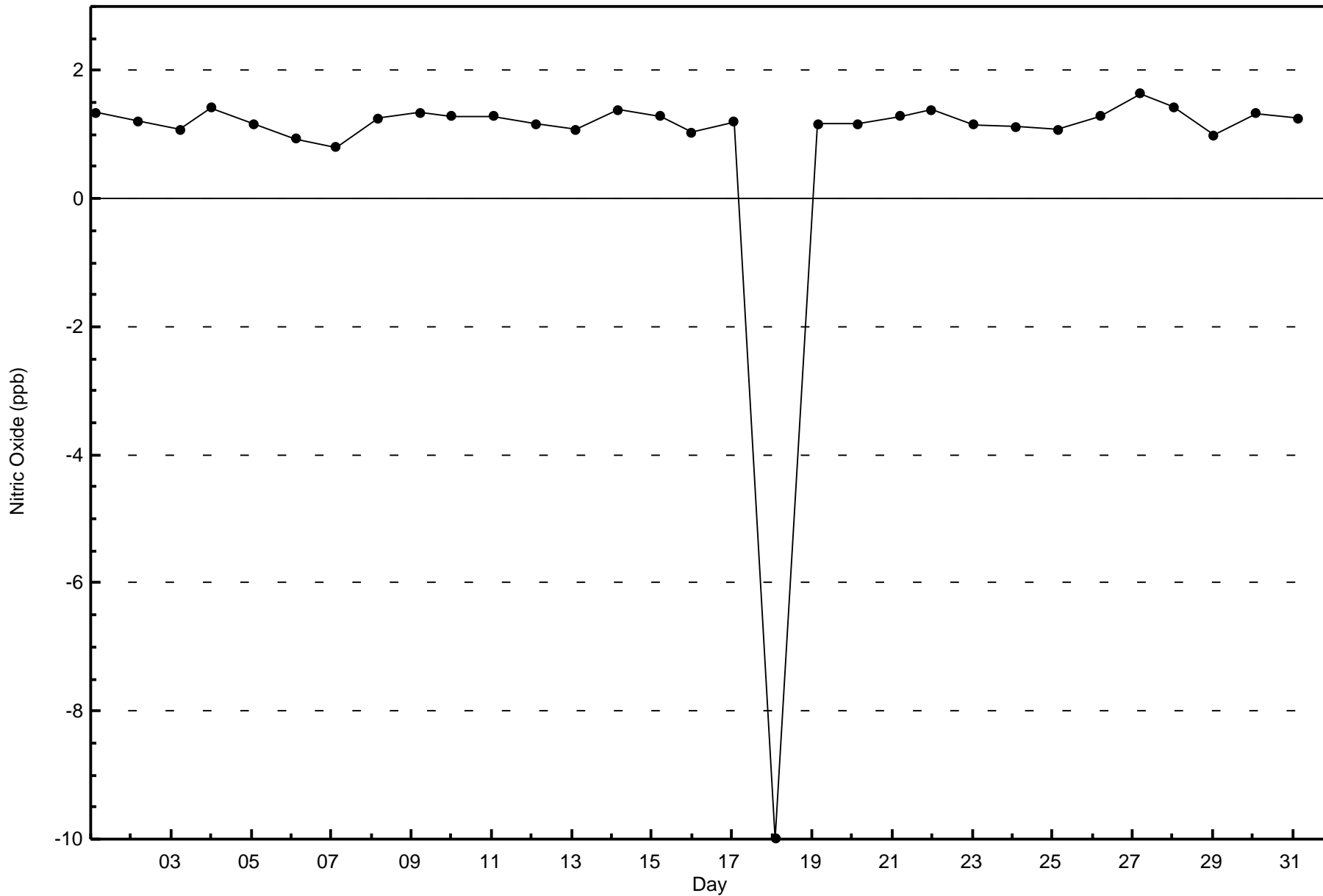
Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitric Oxide (NO) - ppb  
Janvier (AMS 22)

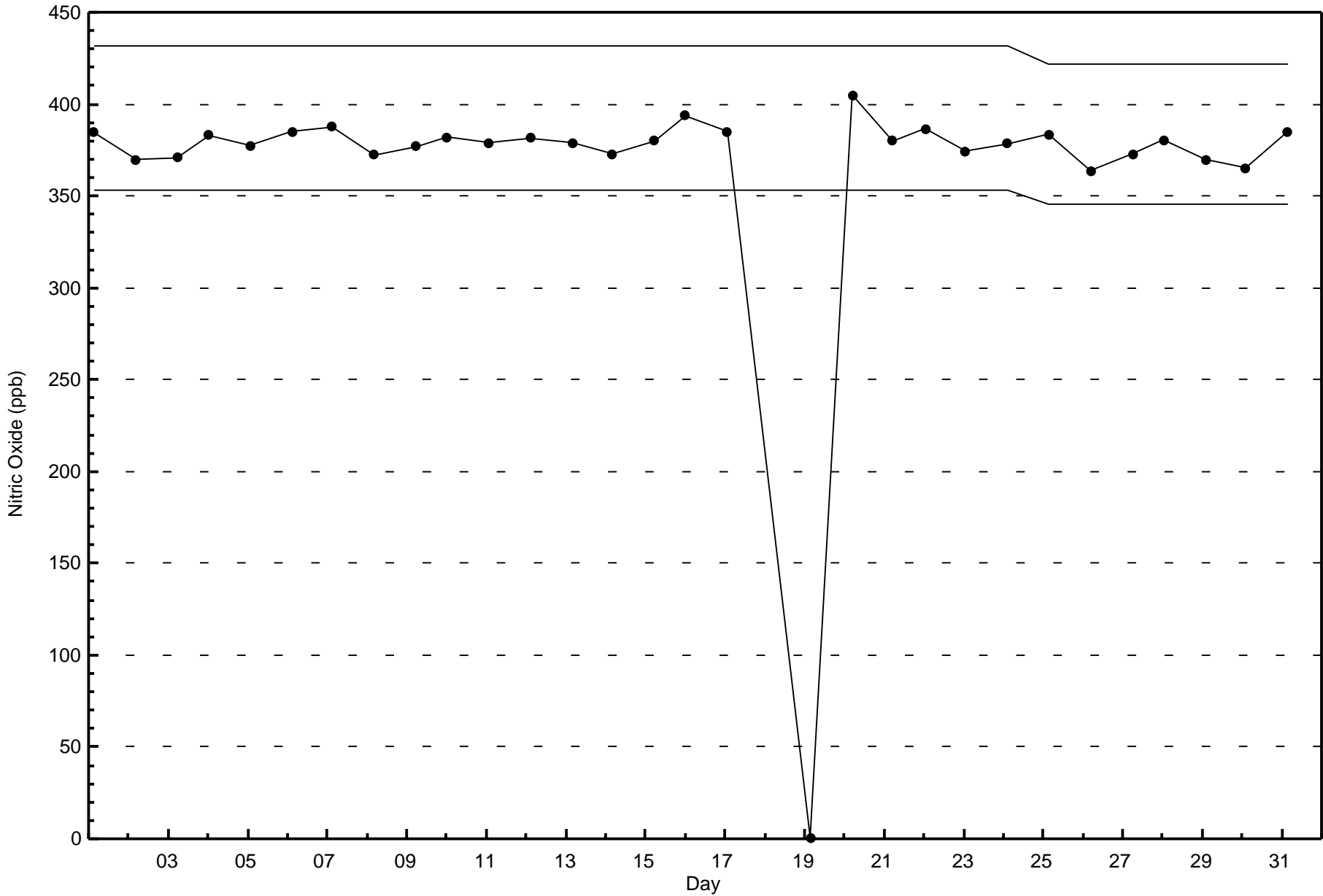






Wood Buffalo Environmental Association  
Span Responses

Nitric Oxide (NO) - ppb  
Janvier - October 2017





# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Nitrogen Dioxide (NO<sub>2</sub>) - ppb

Janvier - October 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 7 ppb on Oct 27 08:00	Maximum Daily Average: 2.7 ppb on Oct 27		Hours of Data:	694
Minimum Value: 0 ppb on Oct 6 14:00	Minimum Daily Average: 0.3 ppb on Oct 11		Hours of Missing Data:	50
Maximum Diurnal Average: 1.5 ppb at hour 8	Minimum Diurnal Average: 0.7 ppb at hour 1		Hours of Calibration:	39
Monthly Average: 1.1 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 1 P <sub>90</sub> = 2 P <sub>99</sub> = 4		Percent Operational Time:	98.5

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	1	1	0	Z	0	1	1	1	1	0	1	1	1	1	1	1	2	3	2	2	2	1	1	1	1.0	3
2-Oct	0	0	0	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	2	2	4	3	2	2	1	1.2	4
3-Oct	1	1	1	0	0	Z	1	1	1	1	0	0	1	0	0	0	0	0	1	1	1	1	1	1	0.6	1
4-Oct	Z	1	1	1	0	1	3	3	2	2	3	2	1	1	1	1	1	4	3	1	1	1	1	1	1.5	4
5-Oct	1	Z	1	2	4	4	4	4	3	3	2	2	1	1	1	2	3	4	3	2	2	2	3	3	2.4	4
6-Oct	3	3	Z	2	2	3	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	3
7-Oct	0	1	0	Z	0	0	0	1	0	2	2	4	3	1	0	0	0	0	2	2	1	1	1	0	0.9	4
8-Oct	0	0	1	0	Z	1	1	1	1	1	1	1	1	1	0	0	0	1	0	0	0	1	1	1	0.5	1
9-Oct	1	1	1	1	2	Z	3	3	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	3
10-Oct	Z	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	3	3	3	2	1	1	1.3	3
11-Oct	1	Z	1	1	0	1	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
12-Oct	0	1	Z	1	1	0	0	1	1	1	1	1	2	2	2	1	1	2	2	2	1	1	1	1	1.1	2
13-Oct	1	1	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0.5	1
14-Oct	0	1	1	1	Z	2	1	2	2	3	3	3	2	2	2	2	2	2	1	1	1	1	0	0	1.5	3
15-Oct	0	0	0	1	1	Z	2	1	1	1	1	1	2	1	2	3	3	3	2	2	2	2	2	1	1.4	3
16-Oct	Z	1	1	1	1	1	1	1	1	1	1	0	1	0	1	1	1	1	1	1	1	1	1	1	0.8	1
17-Oct	1	Z	1	1	1	1	3	3	3	2	2	2	1	2	2	2	2	1	1	1	1	1	0	0	1.4	3
18-Oct	0	PF	PF	PF	PF	PF	PF	PF	0	0	C	C	C	C	C	0	1	1	0	0	0	0	0	0	--	1
19-Oct	0	0	0	Z	0	1	1	1	0	1	1	M	1	2	1	2	3	3	2	3	2	1	1	3	1.3	3
20-Oct	1	1	1	1	Z	0	1	0	1	0	0	0	0	0	0	0	1	5	2	3	2	2	1	1	1.1	5
21-Oct	1	1	1	1	0	Z	1	1	1	1	1	1	1	0	0	0	1	1	2	2	2	0	1	1	0.9	2
22-Oct	Z	1	1	2	2	2	2	2	1	0	0	0	0	0	0	0	1	1	2	2	1	1	1	1	1.0	2
23-Oct	1	Z	1	1	1	1	1	1	2	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0.5	2
24-Oct	0	0	Z	3	1	1	2	C	C	C	C	0	0	0	0	1	0	1	0	0	1	1	1	1	0.8	3
25-Oct	1	1	0	Z	1	1	0	0	0	0	0	0	0	0	2	2	0	1	1	1	0	0	1	2	0.6	2
26-Oct	2	1	1	1	Z	1	1	1	1	0	0	0	1	2	1	1	2	2	2	2	2	2	2	1	1.2	2
27-Oct	1	1	1	1	1	Z	4	7	4	2	1	1	2	1	3	3	5	3	3	3	4	5	4	3	2.7	7
28-Oct	Z	3	3	2	1	1	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	3
29-Oct	0	Z	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0.6	1
30-Oct	1	0	Z	1	1	0	1	1	1	1	1	1	1	1	1	1	2	2	4	3	1	2	1	1	1.2	4
31-Oct	0	1	1	Z	1	1	1	1	1	2	2	1	1	1	1	2	4	3	1	1	1	0	1	0	1.2	4

0.7	0.8	0.7	0.9	0.9	1.1	1.3	1.5	1.3	1.0	0.9	0.9	0.8	0.8	0.9	1.0	1.3	1.5	1.4	1.4	1.3	1.1	1.0	0.9	Diurnal Average	
3	3	3	3	4	4	4	7	4	3	3	4	3	2	3	3	5	5	4	4	4	5	4	3	Diurnal Maximum	

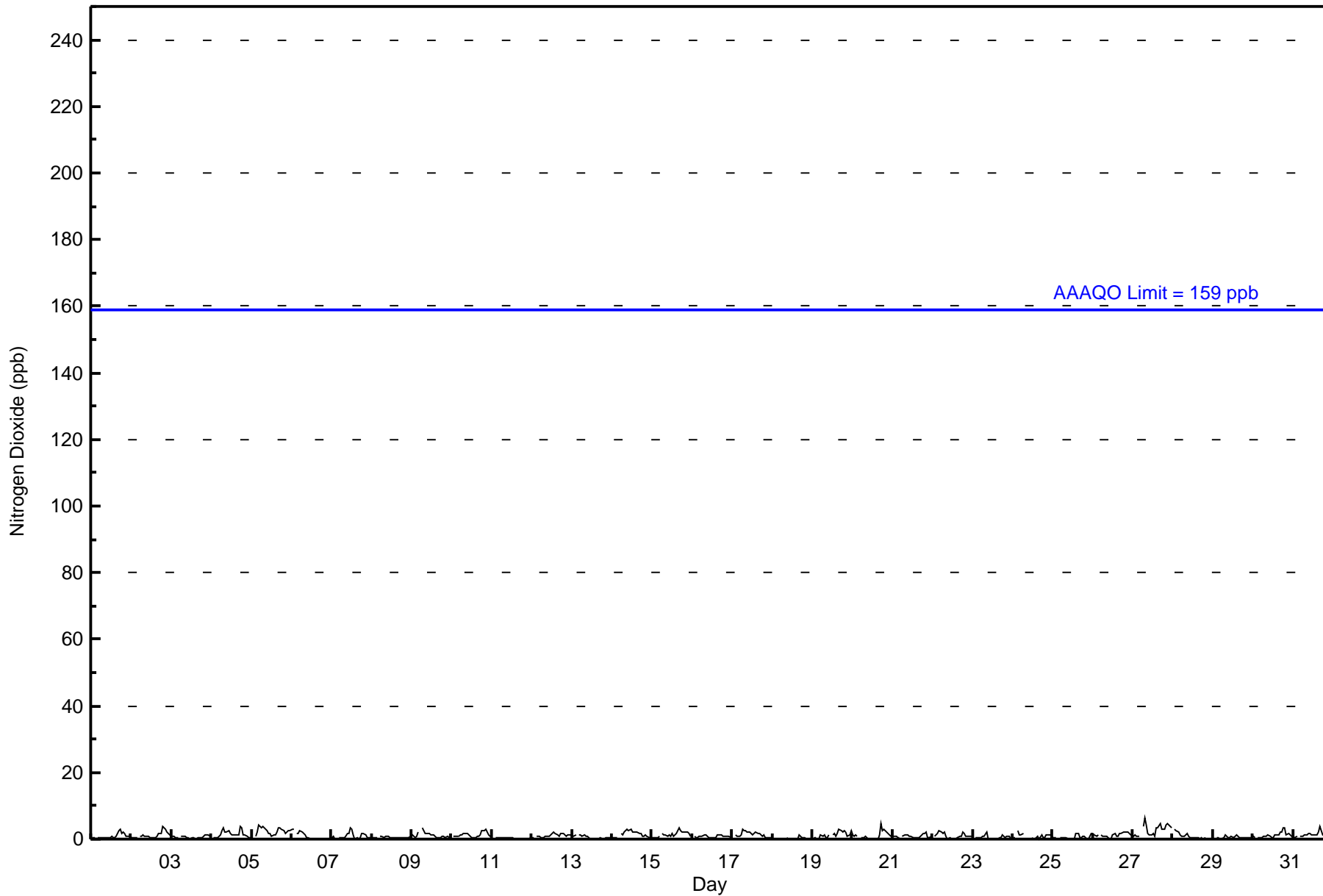
Z - zerospan      C - Calibration      M - Maintenance      PF - Power Failure  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb





Wood Buffalo Environmental Association  
Hourly Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Janvier - October 2017





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Janvier - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	694	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 694

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

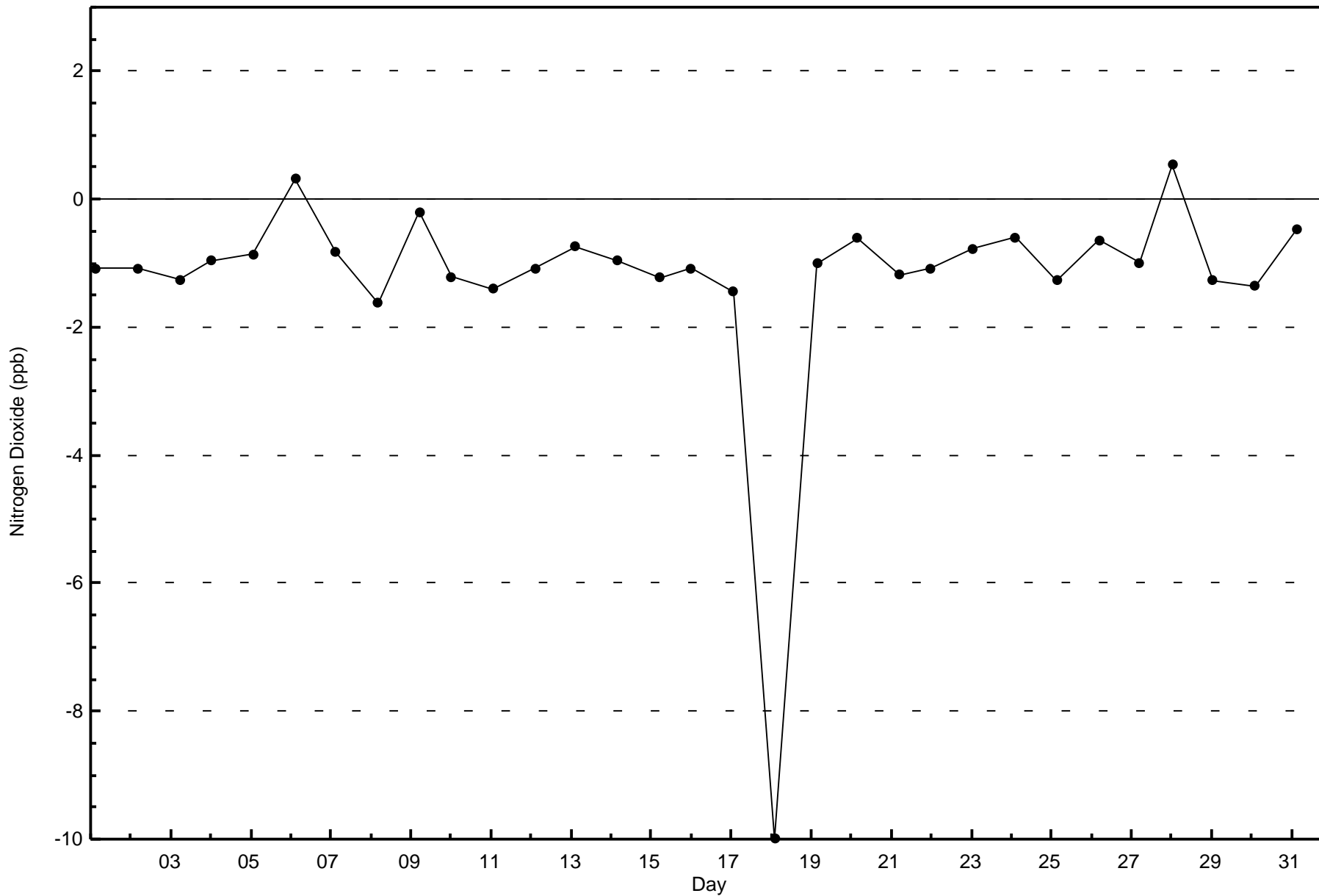
**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Janvier - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	63	69	13	9	10	17	9	23	66	178	62	34	48	42	14	13	670
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	63	69	13	9	10	17	9	23	66	178	62	34	48	42	14	13	670

Total Number of Valid Hours: 670

Total Number of Hours: 744

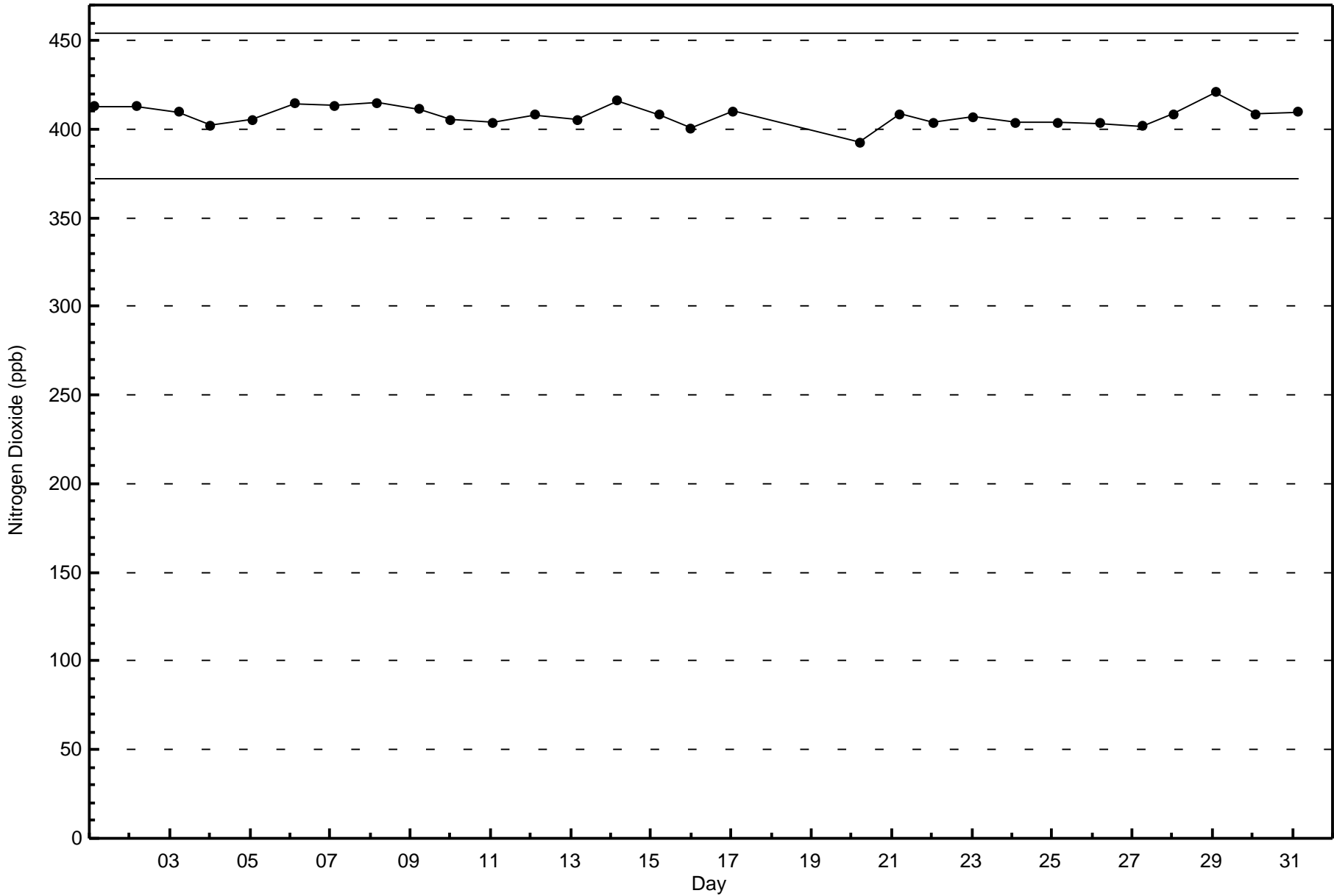






Wood Buffalo Environmental Association  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Janvier - October 2017





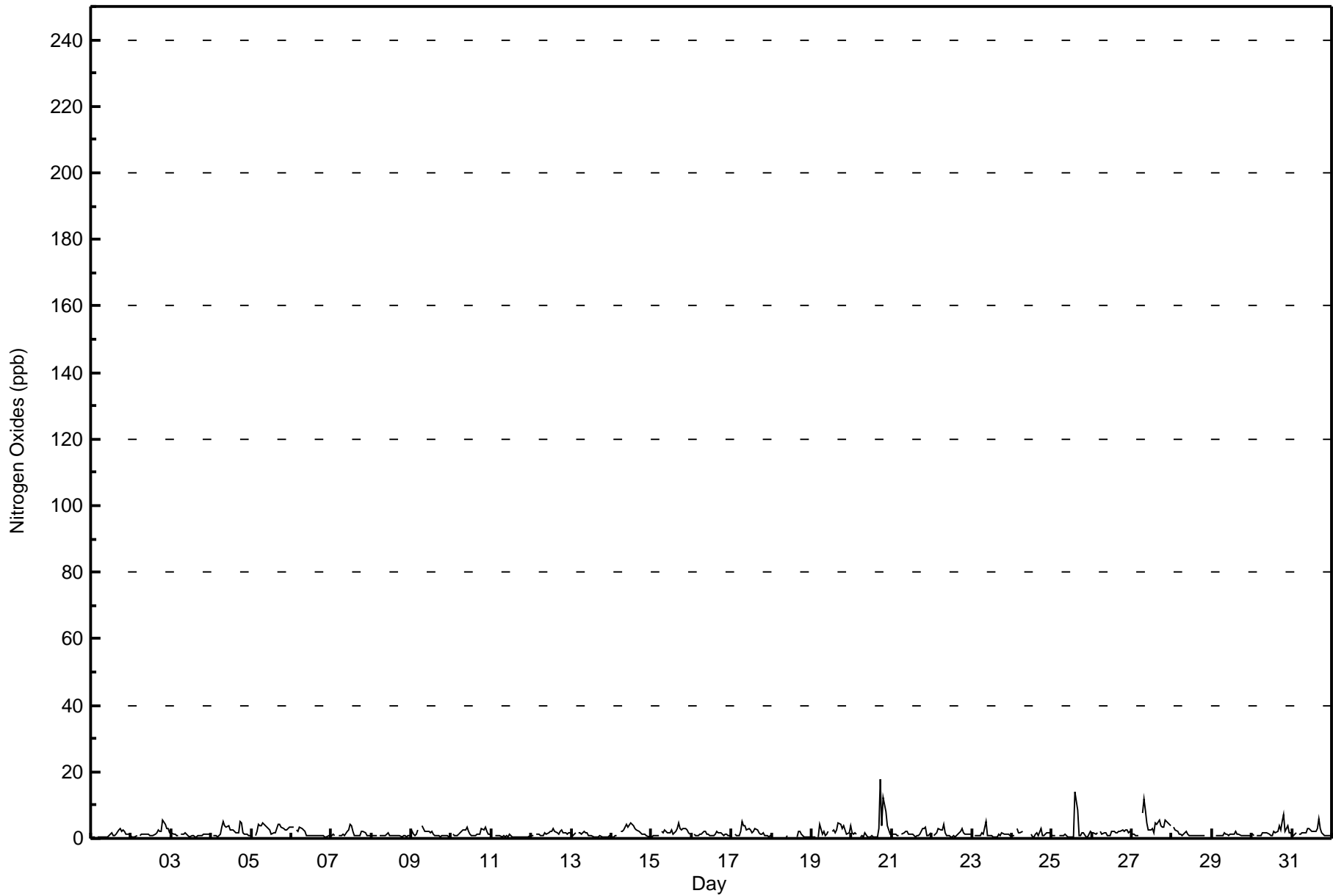
Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb

Janvier - October 2017

Maximum Value: 18 ppb on Oct 20 18:00		Maximum Daily Average: 3.9 ppb on Oct 27		Hours in Service: 744																																													
Minimum Value: 0 ppb on Oct 18 09:00		Minimum Daily Average: 0.6 ppb on Oct 11		Hours of Data: 694																																													
Maximum Diurnal Average: 2.5 ppb at hour 18		Minimum Diurnal Average: 1.0 ppb at hour 3		Hours of Missing Data: 50																																													
Monthly Average: 1.7 ppb		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 1 Median = 1 Q <sub>3</sub> = 2 P <sub>90</sub> = 3 P <sub>99</sub> = 8		Hours of Calibration: 39																																													
				Percent Operational Time: 98.5																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	1	0	0	Z	0	1	0	0	1	0	1	1	1	1	1	1	3	3	2	2	2	1	1	1	1.1	3																							
2-Oct	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	2	2	2	2	2	5	4	3	3	2	1.7	5																							
3-Oct	2	1	1	1	1	Z	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	2																							
4-Oct	Z	1	1	1	0	1	4	5	4	3	4	3	2	2	2	2	2	5	5	2	1	1	1	1	2.3	5																							
5-Oct	1	Z	1	2	4	4	4	5	4	3	3	3	1	2	2	3	4	4	3	2	3	3	3	3	2.9	5																							
6-Oct	3	3	Z	2	2	3	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.5	3																							
7-Oct	1	1	1	Z	1	1	1	1	1	2	2	4	4	2	1	1	1	1	2	2	2	1	1	1	1.5	4																							
8-Oct	1	1	1	1	Z	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	2																							
9-Oct	2	1	1	1	3	Z	4	3	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1.5	4																							
10-Oct	Z	1	1	1	1	2	2	3	2	3	2	1	1	1	1	1	1	1	3	3	3	2	1	1	1.7	3																							
11-Oct	1	Z	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.6	1																							
12-Oct	1	1	Z	1	1	1	1	1	2	1	2	2	2	3	2	2	1	2	2	2	2	1	2	2	1.6	3																							
13-Oct	1	1	2	Z	2	2	1	2	2	2	1	1	0	0	0	0	0	1	1	0	0	1	1	1	0.9	2																							
14-Oct	1	1	1	1	Z	2	2	3	3	4	4	5	4	4	3	3	2	2	1	1	1	1	1	1	2.1	5																							
15-Oct	1	1	1	1	1	Z	2	2	2	2	2	2	3	1	2	3	5	3	3	3	3	3	2	1	2.0	5																							
16-Oct	Z	1	1	1	1	1	1	2	2	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1.3	2																							
17-Oct	1	Z	1	1	1	2	5	4	4	3	3	3	2	2	3	2	2	1	1	1	1	1	1	1	2.0	5																							
18-Oct	1	PF	PF	PF	PF	PF	PF	PF	PF	0	1	C	C	C	C	C	0	2	2	1	0	0	1	1	0	--	2																						
19-Oct	0	1	1	Z	0	4	1	2	1	1	2	M	2	3	2	2	5	4	3	4	3	1	2	4	2.1	5																							
20-Oct	2	1	2	1	Z	1	1	1	2	1	0	0	1	1	0	0	3	18	4	12	8	4	3	1	2.9	18																							
21-Oct	1	1	1	1	1	Z	1	2	2	2	1	1	1	1	1	1	1	1	3	3	4	1	1	2	1.4	4																							
22-Oct	Z	1	1	2	3	3	2	4	2	1	1	1	0	1	1	1	2	2	3	2	1	1	1	1	1.6	4																							
23-Oct	1	Z	1	1	1	1	2	1	5	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1.2	5																							
24-Oct	1	1	Z	3	2	2	2	C	C	C	C	1	0	1	1	2	1	3	1	1	1	2	2	1	1.4	3																							
25-Oct	1	1	1	Z	1	1	1	1	1	1	0	1	0	14	9	1	1	2	2	0	1	1	2	1	1.8	14																							
26-Oct	2	2	1	2	Z	2	1	2	2	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	1.8	2																							
27-Oct	1	1	1	1	1	Z	8	12	8	5	2	3	3	2	4	4	5	4	3	3	6	5	4	4	3.9	12																							
28-Oct	Z	3	3	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	PF	PF	PF	0	1.2	3																						
29-Oct	0	Z	1	1	1	1	1	2	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1.0	2																							
30-Oct	1	1	Z	1	1	1	2	2	2	2	1	1	1	2	2	2	4	3	5	7	2	4	2	1	2.1	7																							
31-Oct	1	1	2	Z	1	1	2	2	2	3	3	3	2	2	2	3	6	3	2	1	1	1	1	1	1.9	6																							
																								1.1	1.2	1.0	1.2	1.3	1.6	1.9	2.3	2.1	1.7	1.6	1.5	1.5	1.4	1.8	1.8	2.0	2.5	2.0	2.3	1.9	1.5	1.4	1.3	Diurnal Average	
																								3	3	3	3	4	4	8	12	8	5	4	5	4	4	14	9	6	18	5	12	8	5	4	4	Diurnal Maximum	
Z - zerospan																								C - Calibration				M - Maintenance				PF - Power Failure																	







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Janvier - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	694	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 694

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Janvier - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	63	69	13	9	10	17	9	23	66	178	62	34	48	42	14	13	670
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	63	69	13	9	10	17	9	23	66	178	62	34	48	42	14	13	670

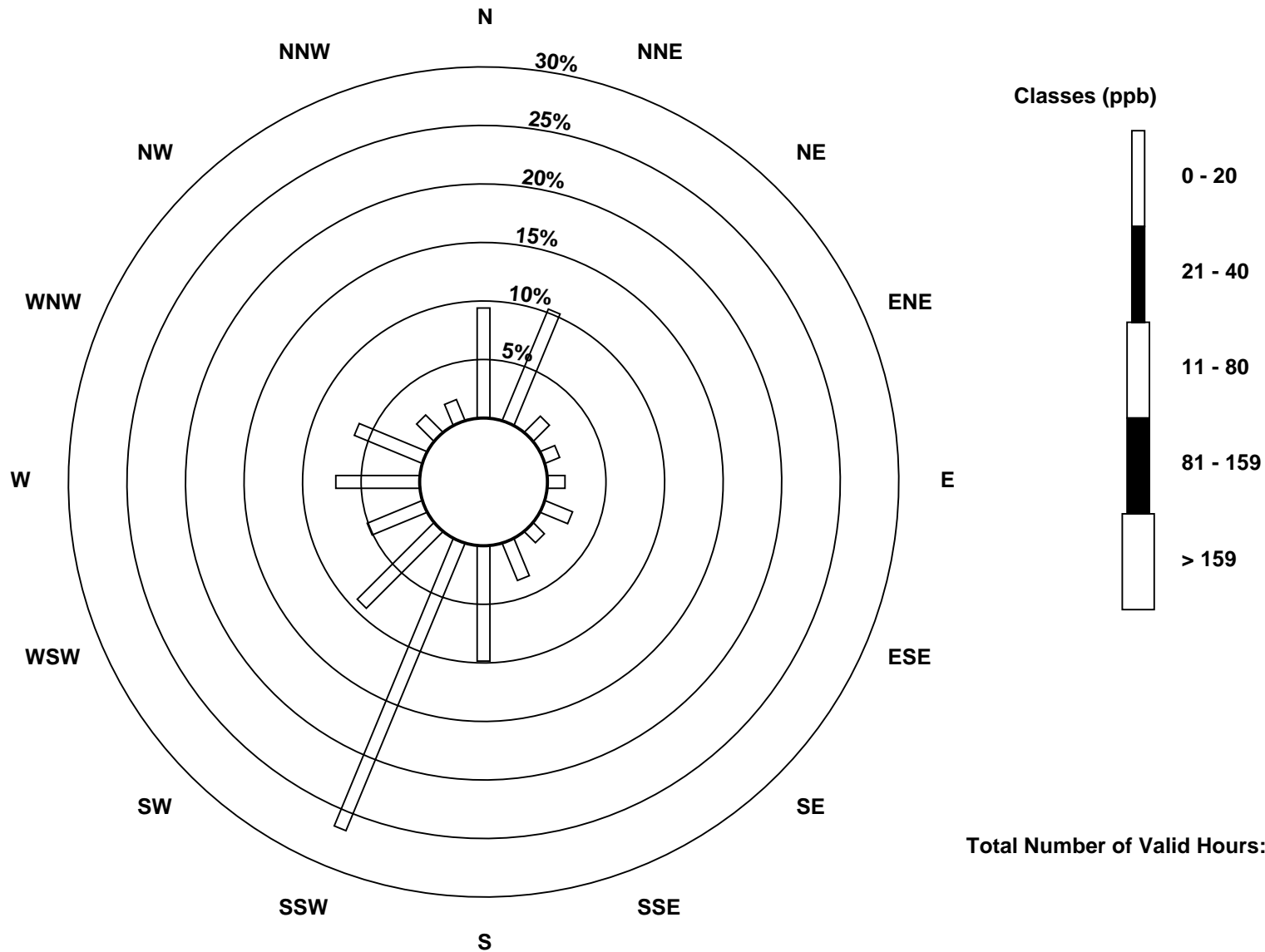
Total Number of Valid Hours: 670

Total Number of Hours: 744

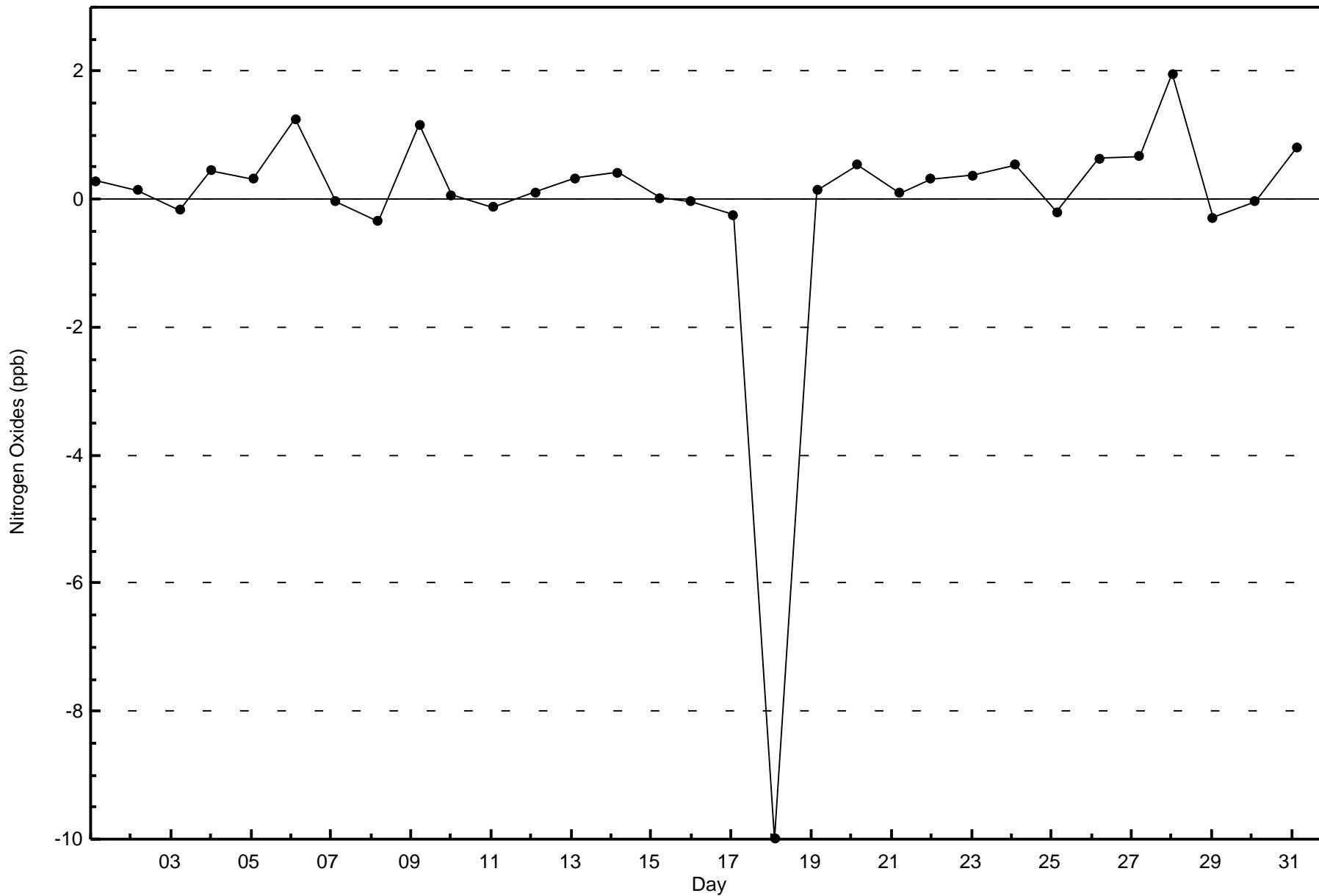


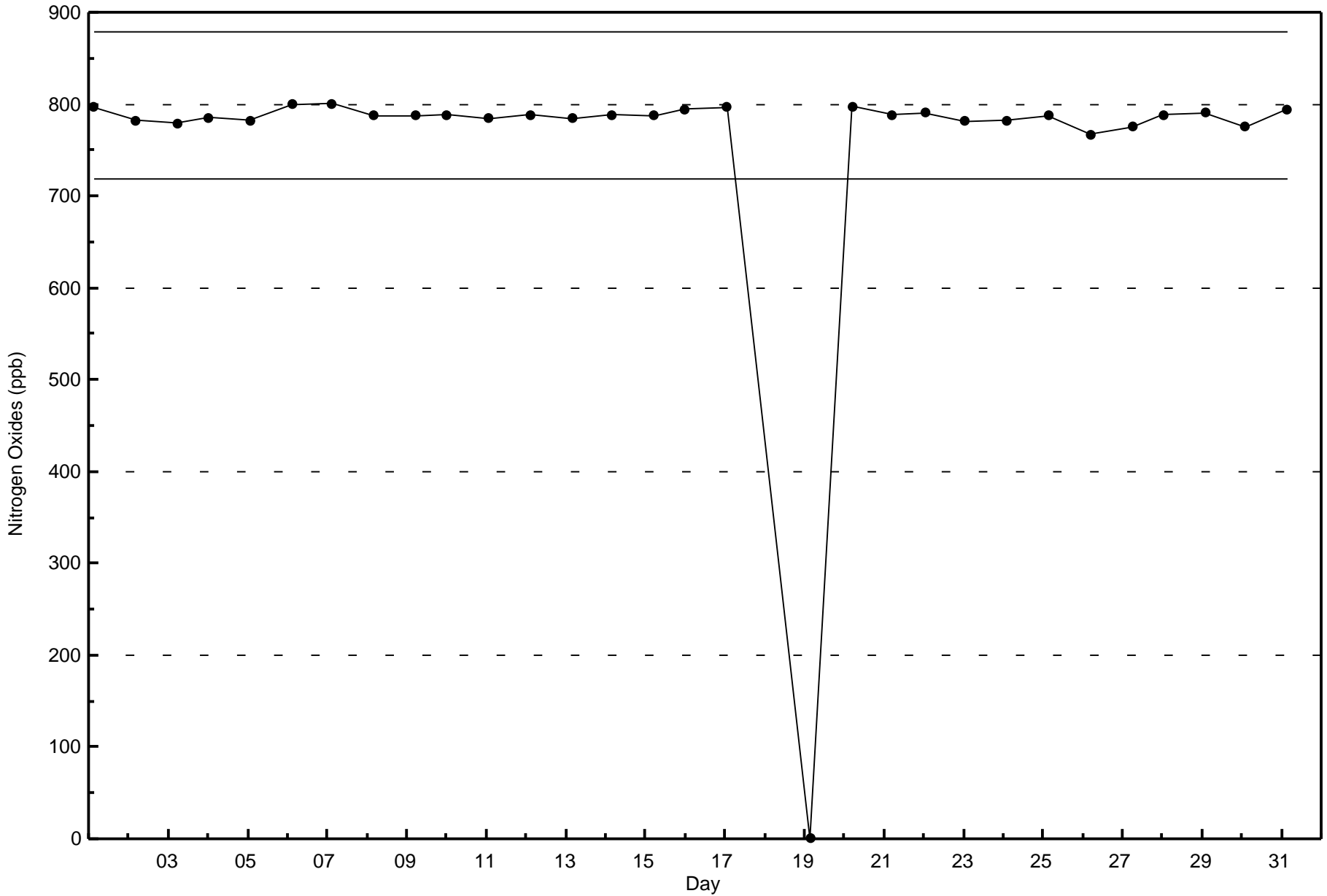
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Janvier (AMS 22)



Total Number of Valid Hours: 670







# Wood Buffalo Environmental Association

## Summary of Hour Averages

Ozone (O<sub>3</sub>) - ppb

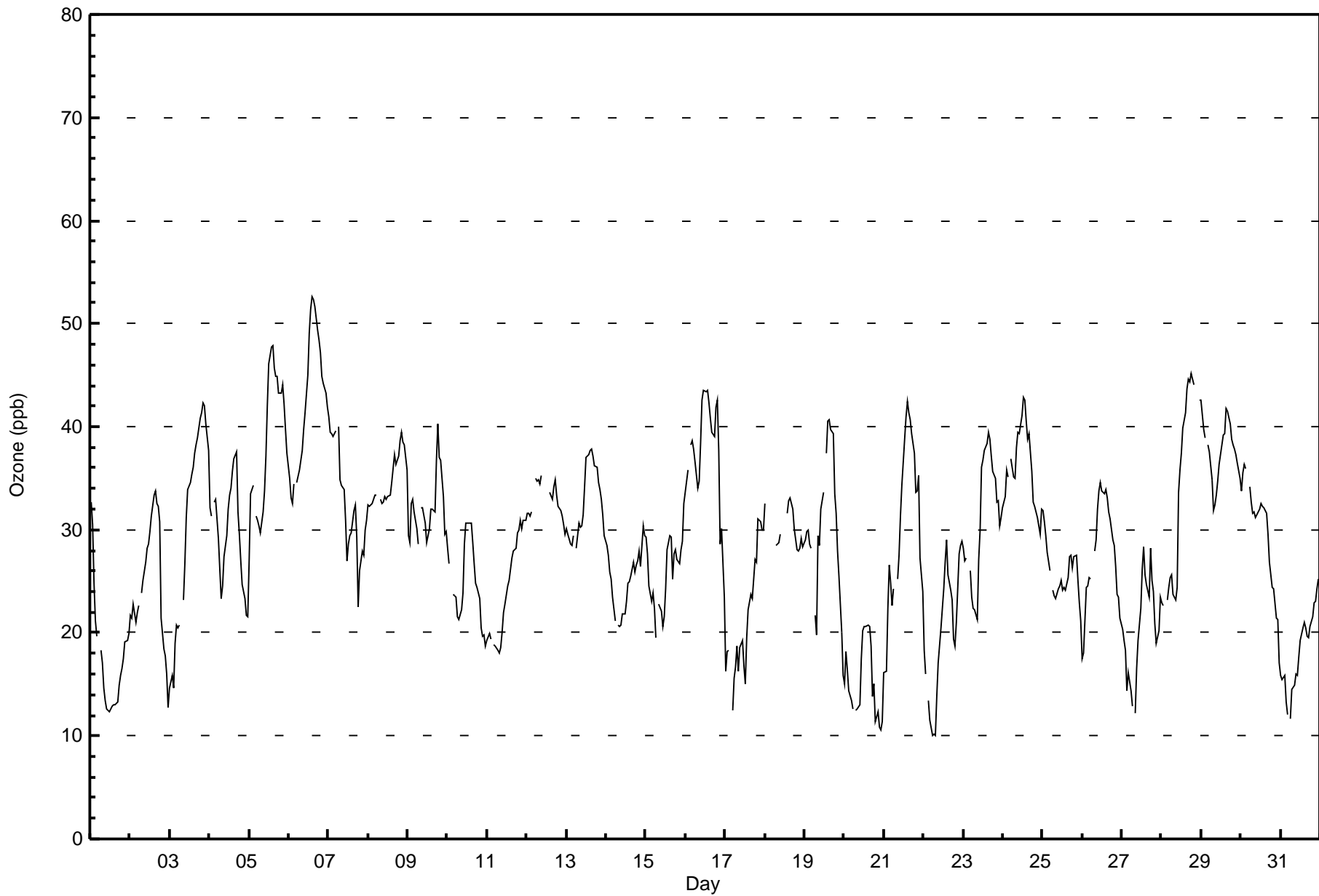
Janvier - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 53 ppb on Oct 6 15:00										Maximum Daily Average: 42.7 ppb on Oct 6										Hours of Data: 697						
Minimum Value: 10 ppb on Oct 22 08:00										Minimum Daily Average: 15.3 ppb on Oct 20										Hours of Missing Data: 47						
Maximum Diurnal Average: 33.1 ppb at hour 16										Minimum Diurnal Average: 24.9 ppb at hour 5										Hours of Calibration: 37						
Monthly Average: 28.8 ppb										Percentiles: P <sub>1</sub> = 11 P <sub>10</sub> = 17 Q <sub>1</sub> = 23 Median = 29 O <sub>3</sub> = 34 P <sub>90</sub> = 39 P <sub>99</sub> = 48										Percent Operational Time: 98.7						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	33	31	25	21	20	Z	18	17	15	13	13	12	13	13	13	13	13	15	16	17	17	19	19	20	17.6	33
2-Oct	22	21	23	21	22	23	Z	24	25	27	28	29	30	31	33	34	33	32	31	21	18	18	16	13	25.0	34
3-Oct	15	16	15	19	21	20	21	Z	23	27	31	34	35	36	37	38	39	41	41	42	42	40	38	30.7	42	
4-Oct	32	31	Z	33	33	29	26	23	24	27	29	32	33	34	36	37	37	32	30	27	25	23	22	22	29.5	37
5-Oct	27	34	34	Z	31	31	30	30	32	34	37	42	46	48	48	46	45	45	43	43	44	42	40	37	38.6	48
6-Oct	35	33	33	34	Z	35	36	37	38	40	41	45	49	51	53	52	52	49	48	47	45	44	43	42	42.7	53
7-Oct	41	39	39	39	40	Z	40	35	34	34	31	27	29	29	30	32	32	29	22	26	28	28	30	31	32.4	41
8-Oct	32	32	33	33	33	33	Z	33	33	33	33	33	33	33	35	36	37	36	37	39	39	38	38	36	34.8	39
9-Oct	29	29	33	33	32	30	29	Z	32	32	31	29	29	30	32	32	32	37	40	37	37	33	30	30	32.0	40
10-Oct	28	27	Z	24	24	23	21	21	22	24	29	31	31	31	31	29	27	25	24	23	20	20	19	24.9	31	
11-Oct	19	20	19	Z	19	19	18	18	19	20	22	23	25	25	26	27	28	28	30	30	31	30	31	31	24.2	31
12-Oct	32	32	31	32	Z	35	35	35	34	35	C	C	C	C	34	33	34	35	33	32	32	31	31	30	32.9	35
13-Oct	30	30	29	28	29	Z	28	31	30	30	31	34	37	37	38	38	37	36	36	35	34	33	31	29	32.7	38
14-Oct	29	28	26	25	23	21	Z	21	21	21	22	22	23	25	25	26	27	26	27	27	28	26	30	29	25.1	30
15-Oct	29	28	25	23	24	22	19	Z	23	22	21	22	24	28	29	29	25	28	28	27	27	28	29	32	25.8	32
16-Oct	34	36	Z	38	39	38	37	34	35	38	43	44	43	44	42	41	39	39	42	43	38	29	30	23	37.7	44
17-Oct	16	18	18	Z	12	16	17	19	16	19	19	17	15	19	22	24	23	25	27	27	31	31	30	30	21.4	31
18-Oct	33	PF	PF	PF	PF	PF	PF	29	29	30	C	C	C	32	33	33	33	32	30	28	28	28	29	28	--	33
19-Oct	29	30	30	29	28	Z	22	20	29	28	32	34	M	37	41	41	40	39	33	32	28	26	20	16	30.1	41
20-Oct	15	18	16	14	13	13	Z	12	13	13	17	20	21	21	21	21	19	14	15	11	12	11	11	11	15.3	21
21-Oct	16	16	22	27	25	23	24	Z	25	27	31	34	39	41	42	41	41	39	37	34	34	35	27	24	30.7	42
22-Oct	18	16	Z	13	11	10	10	10	14	17	21	22	24	27	29	26	24	23	19	19	21	28	28	29	20.0	29
23-Oct	28	27	27	Z	26	23	22	22	21	27	30	36	37	38	38	39	39	37	36	35	33	33	30	31	31.2	39
24-Oct	32	33	36	35	Z	37	35	35	38	39	39	41	43	43	40	39	39	36	33	32	32	31	30	32	36.1	43
25-Oct	32	31	29	28	26	Z	24	24	23	24	25	25	24	24	24	25	27	28	26	27	27	25	23	21	25.8	32
26-Oct	18	18	24	24	25	25	Z	28	29	32	34	35	34	34	34	33	32	31	29	28	26	24	23	21	27.9	35
27-Oct	20	19	18	14	16	14	13	Z	12	16	19	22	26	28	26	25	23	28	25	24	21	19	20	23	20.6	28
28-Oct	23	23	Z	23	24	25	26	24	23	24	34	36	37	40	41	44	45	44	45	44	PF	PF	PF	43	33.4	45
29-Oct	43	40	39	Z	38	38	35	32	32	33	35	36	38	39	39	42	41	40	39	38	38	37	36	35	37.6	43
30-Oct	34	36	36	36	Z	34	33	32	32	31	32	32	33	32	32	32	30	27	26	24	24	21	21	17	29.8	36
31-Oct	16	15	16	13	12	Z	12	14	15	16	16	18	19	20	21	20	20	20	21	22	23	23	24	25	18.3	25
27.1 26.8 27.1 26.4 24.9 25.7 25.2 25.3 25.5 27.0 28.5 29.8 31.1 32.3 33.0 33.1 32.7 32.1 31.3 30.3 29.4 28.6 27.8 27.4																								Diurnal Average		
43 40 39 39 40 38 40 37 38 40 43 45 49 51 53 52 52 49 48 47 45 44 43 43																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance PF - Power Failure																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																										



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ozone (O<sub>3</sub>) - ppb**  
**Janvier - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Janvier - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	121	17.36	17.36
21 - 50	572	82.07	99.43
51 - 82	4	0.57	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 697

Total Number of Hours: 744





**Wood Buffalo Environmental Association  
Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb  
Janvier - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	21	24	4	1	1	4	3	9	24	8	4	4	0	7	4	3	121
21 - 50	42	45	8	8	9	13	6	14	44	168	60	28	52	35	9	10	551
51 - 82	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	4
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	63	69	12	9	10	17	9	23	68	176	64	35	53	42	13	13	676

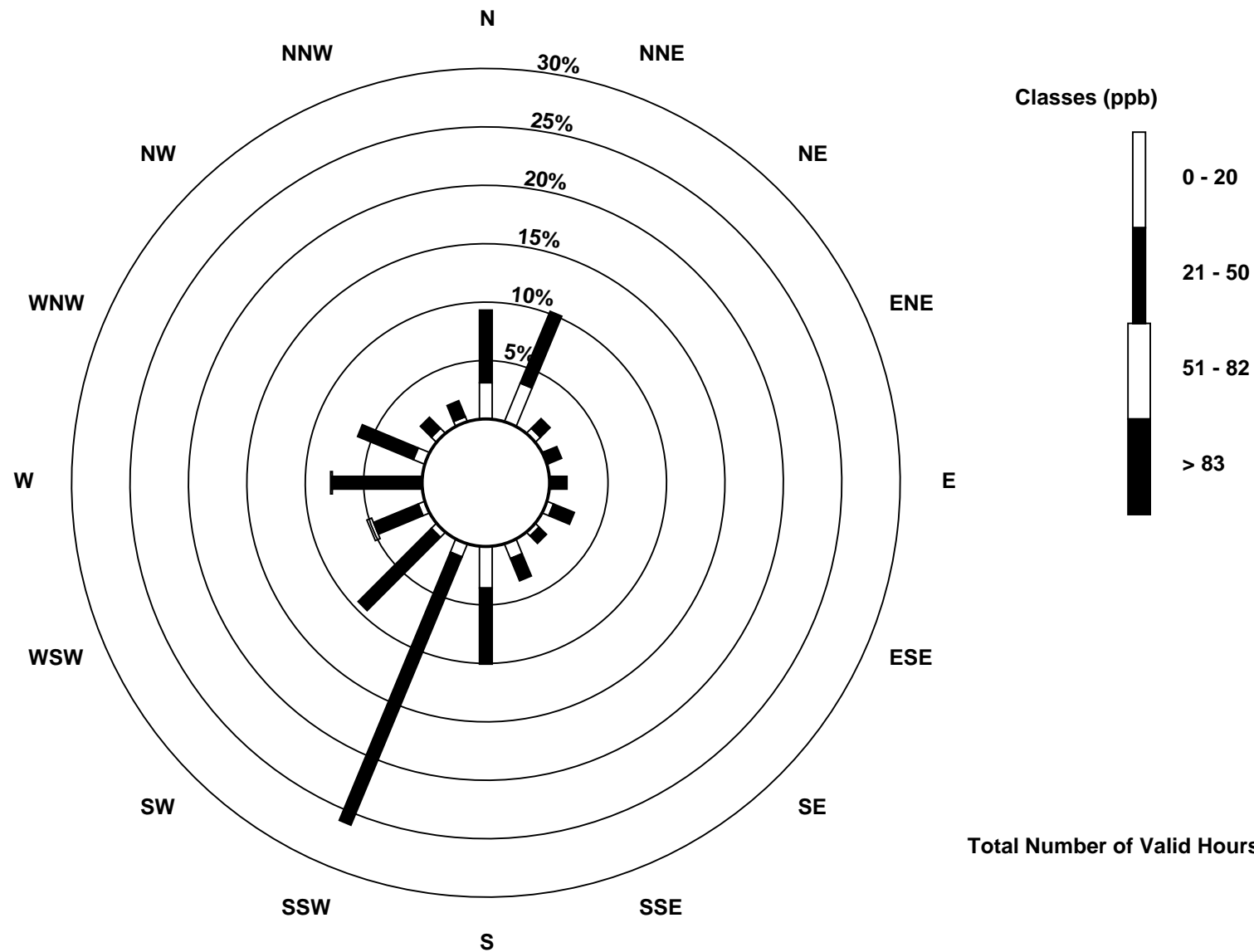
Total Number of Valid Hours: 676

Total Number of Hours: 744

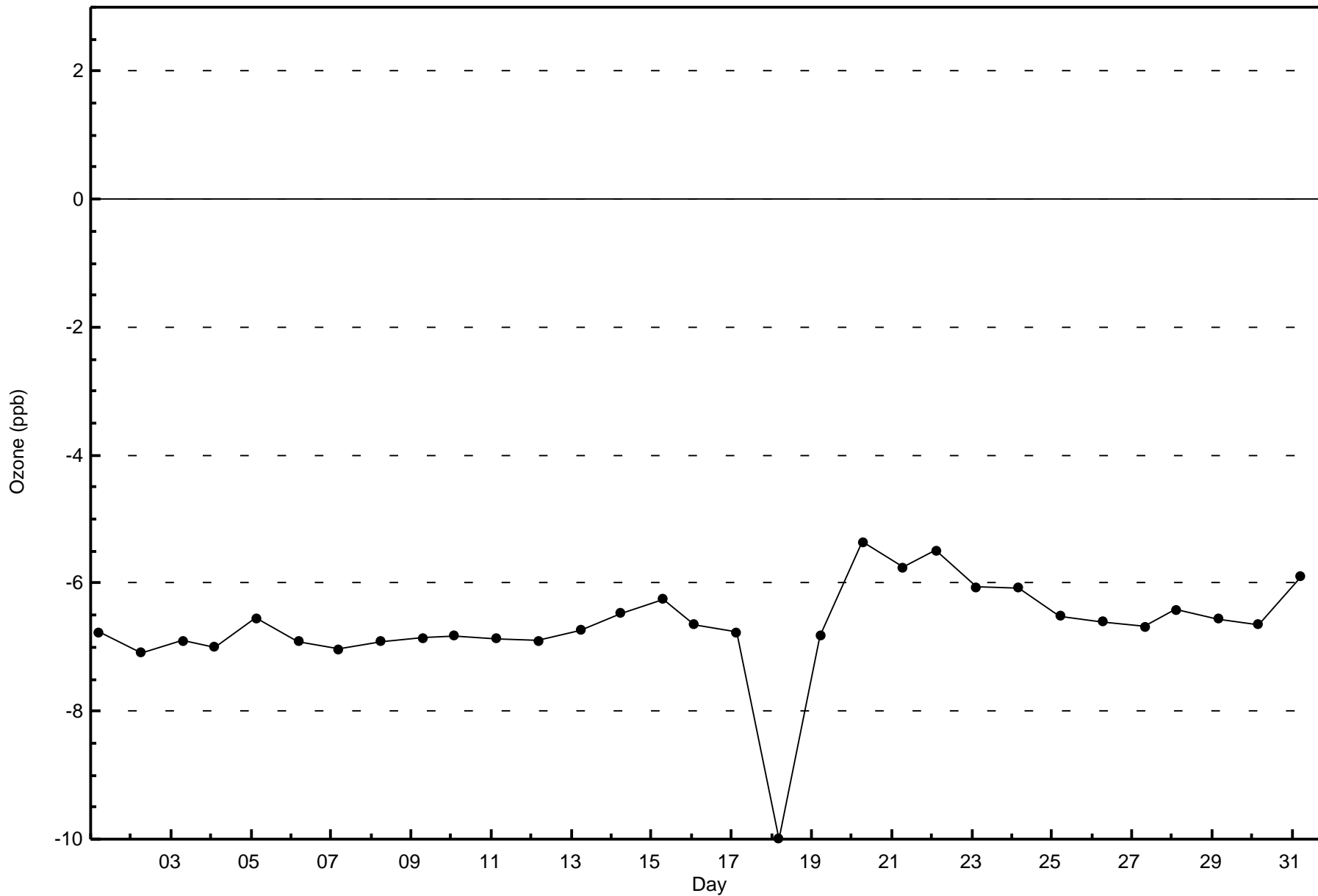


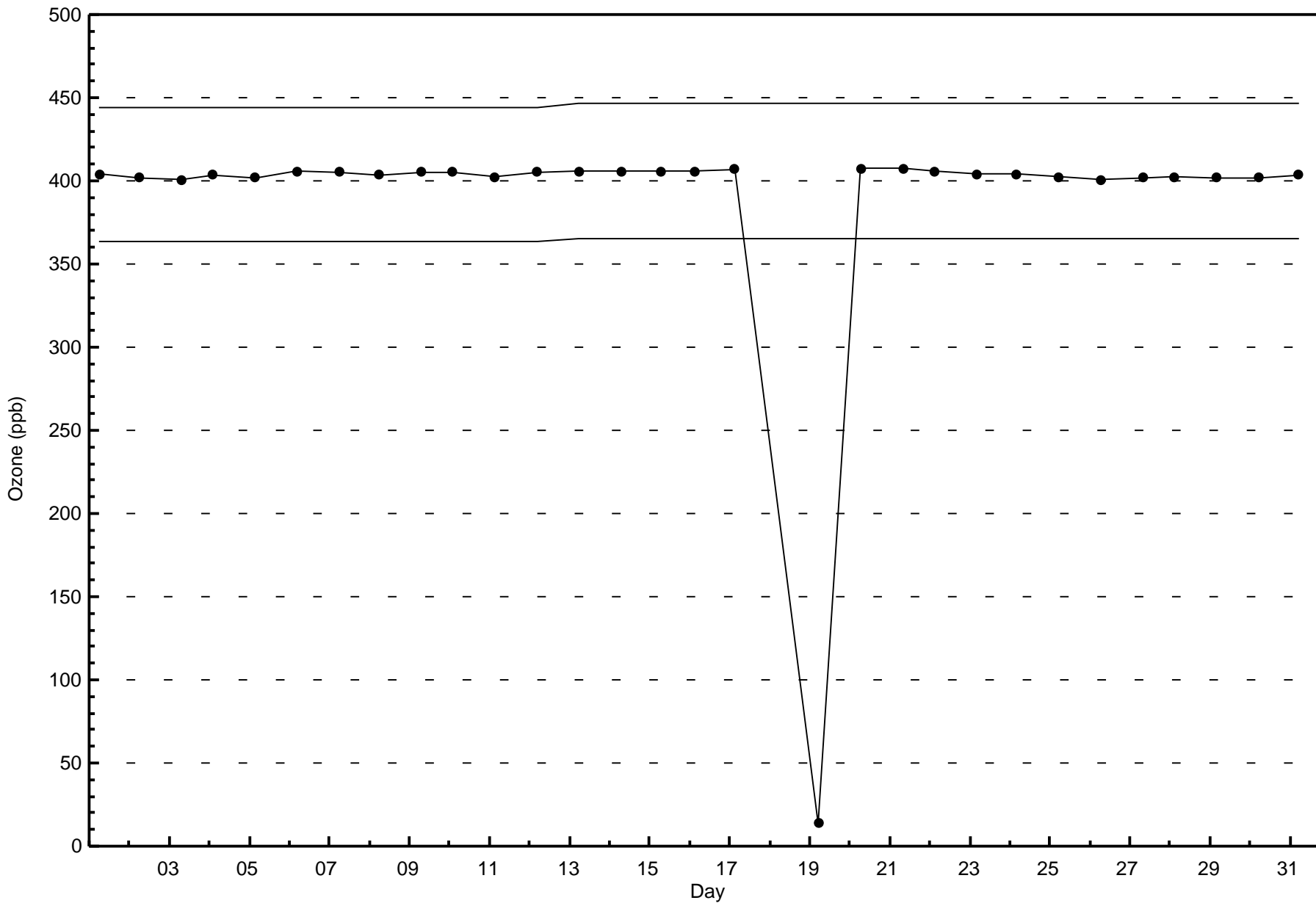
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Ozone (O<sub>3</sub>) - ppb  
Janvier (AMS 22)



Total Number of Valid Hours: 676







Summary of Hour Averages

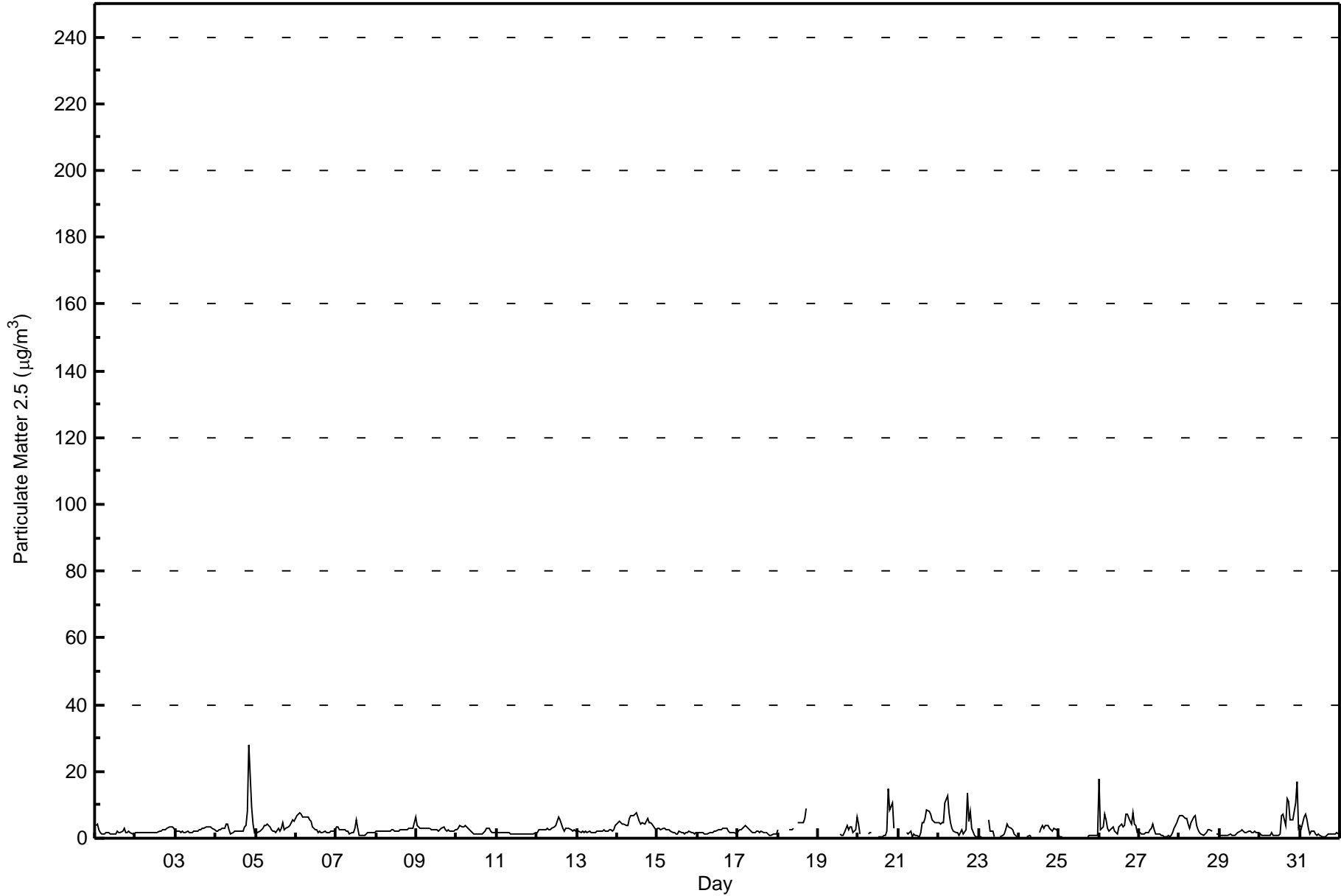
Janvier - October 2017

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 28.2 µg/m <sup>3</sup> on Oct 4 21:00 Maximum Daily Average: 5.0 µg/m <sup>3</sup> on Oct 14																	Hours in Service: 744 Hours of Data: 673 Hours of Missing Data: 71 Hours of Calibration: 4 Percent Operational Time: 91.0										
Minimum Value: 0.2 µg/m <sup>3</sup> on Oct 23 03:00 Maximum Diurnal Average: 3.9 µg/m <sup>3</sup> at hour 21 Monthly Average: 2.78 µg/m <sup>3</sup>																	Minimum Daily Average: 1.4 µg/m <sup>3</sup> on Oct 11 Minimum Diurnal Average: 2.0 µg/m <sup>3</sup> at hour 11 Percentiles: P <sub>1</sub> = 0.4 P <sub>10</sub> = 1.0 Q <sub>1</sub> = 1.5 Median = 2.2 Q <sub>3</sub> = 3.1 P <sub>90</sub> = 5.3 P <sub>99</sub> = 12.0										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	3.7	4.2	2.5	1.8	1.4	1.4	1.6	1.7	1.6	1.5	1.4	1.3	1.4	1.9	1.6	1.7	2.0	2.8	1.6	1.9	2.0	1.5	1.4	1.4	1.9	4.2	3.5
2-Oct	1.5	1.5	1.6	1.6	1.8	1.9	1.8	1.8	1.6	1.6	1.5	1.5	1.7	1.7	1.9	2.2	2.6	2.7	2.7	3.1	3.5	3.4	3.4	2.8	2.4	3.5	
3-Oct	2.2	2.1	2.1	1.8	2.0	1.8	1.8	2.0	1.9	1.7	1.8	2.0	2.1	2.3	2.4	2.6	3.1	3.1	3.3	3.4	3.5	3.2	2.9	2.4	4.2	28.2	
4-Oct	2.3	2.3	2.4	2.7	2.9	3.2	4.2	4.0	2.5	1.4	1.8	1.9	1.9	2.1	2.2	2.2	2.3	3.2	4.0	8.1	28.2	9.2	4.0	1.8	3.2	5.7	
5-Oct	2.1	1.8	1.9	2.4	3.1	3.6	4.0	4.3	3.4	2.6	2.1	2.2	1.7	2.9	2.3	3.1	4.5	2.3	3.1	3.2	3.6	4.5	5.7	5.3	4.0	7.8	
6-Oct	6.7	7.4	7.8	7.4	6.4	6.3	6.4	6.2	5.6	5.0	3.6	2.5	2.3	1.9	1.9	1.8	1.7	2.1	1.8	1.8	1.7	2.0	2.3	2.6	2.1	5.7	
7-Oct	3.4	3.2	2.7	2.6	2.6	2.6	2.1	2.0	1.4	1.7	1.9	3.0	5.7	2.8	0.9	0.9	0.8	0.8	1.3	1.9	1.7	1.5	1.6	1.7	2.6	6.3	
8-Oct	2.1	2.1	2.1	2.1	2.1	2.0	1.9	2.1	2.2	2.4	2.5	2.2	2.2	2.3	2.5	2.6	2.7	2.6	2.7	2.8	2.9	2.9	3.0	6.3	2.7	3.9	
9-Oct	3.9	3.3	2.9	3.0	3.0	2.9	2.8	2.9	2.8	2.6	2.4	2.4	2.4	2.1	2.5	2.9	3.4	2.7	2.2	2.6	2.2	2.0	2.1	2.4	2.3	4.0	
10-Oct	2.6	3.0	4.0	3.5	3.6	3.9	3.4	3.1	2.3	1.7	1.4	1.3	1.4	1.4	1.4	1.6	2.2	2.8	3.0	2.2	1.7	1.6	1.6	2.3	4.0		
11-Oct	1.6	1.8	1.7	1.6	1.7	1.7	1.6	1.5	1.4	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.3	1.4	1.5	1.5	1.4	1.8	
12-Oct	1.8	2.3	2.4	2.5	2.5	2.6	2.8	2.7	2.7	3.0	3.2	3.9	5.0	6.5	5.3	3.1	2.2	2.9	3.1	3.1	2.6	2.3	2.3	2.2	3.1	6.5	
13-Oct	2.0	2.0	1.9	1.9	1.9	2.1	1.8	2.0	1.7	1.7	1.7	1.8	2.1	2.0	2.1	2.1	2.5	2.1	2.2	2.4	2.6	2.3	2.6	3.8	2.1	3.8	
14-Oct	4.5	4.9	4.8	4.0	4.2	3.8	3.9	5.8	6.7	6.8	6.9	7.7	6.5	5.0	4.2	4.9	4.3	5.0	6.0	4.9	4.6	4.3	3.1	2.7	5.0	7.7	
15-Oct	2.8	2.9	2.8	2.9	2.8	2.4	2.4	2.4	2.3	1.5	1.6	1.5	1.5	2.1	1.7	1.8	1.5	1.6	1.6	2.2	1.6	1.5	1.4	1.5	2.0	2.9	
16-Oct	1.8	1.9	1.8	1.5	1.4	1.3	1.4	1.5	1.8	1.6	2.0	2.2	2.5	2.6	2.6	3.1	3.0	2.8	2.3	1.9	1.9	1.7	1.5	1.5	2.0	3.1	
17-Oct	2.2	2.4	2.4	3.1	3.9	3.2	2.8	2.4	2.0	1.6	1.7	2.2	2.1	1.9	2.0	1.8	1.7	1.6	1.2	1.0	1.0	1.1	1.2	1.5	2.0	3.9	
18-Oct	2.7	PF	PF	PF	PF	PF	PF	2.4	2.5	2.9	C	C	4.5	4.5	4.6	4.7	6.0	8.8	AF	AF	AF	AF	AF	AF	--	8.8	
19-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	1.2	0.8	0.8	1.7	3.9	2.7	3.4	3.6	1.6	2.5	6.5	--	6.5	
20-Oct	4.4	1.1	UO	UO	UO	UO	1.2	1.6	1.7	UO	UO	UO	0.4	0.5	0.5	0.7	0.7	2.0	14.7	8.6	10.8	2.9	UO	UO	--	14.7	
21-Oct	UO	UO	1.5	UO	UO	1.5	1.1	1.9	0.5	1.3	0.9	0.7	0.6	1.9	4.6	4.6	5.9	8.3	8.1	7.0	5.4	5.2	4.7	4.8	3.5	8.3	
22-Oct	4.6	4.1	4.6	4.5	10.4	12.5	7.5	4.6	3.2	2.3	1.7	1.6	1.0	1.6	2.7	1.1	2.8	13.7	5.0	8.1	3.1	1.0	0.6	0.4	4.3	13.7	
23-Oct	0.3	0.3	0.2	UO	UO	UO	5.7	2.1	2.1	0.4	UO	UO	UO	0.5	0.9	1.5	2.5	4.2	3.3	3.0	2.5	1.3	0.7	0.2	1.8	5.7	
24-Oct	UO	UO	UO	UO	UO	0.5	0.9	0.5	UO	UO	UO	C	C	1.5	3.1	3.7	2.9	3.6	3.8	2.9	2.6	2.3	2.9	2.6	1.7	--	3.8
25-Oct	0.6	0.5	0.3	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	0.4	0.6	0.8	0.8	0.7	0.9	0.7	--	0.9
26-Oct	17.8	2.5	3.3	7.1	5.5	3.0	1.9	3.1	3.4	2.1	1.6	1.3	3.5	4.1	3.3	3.9	7.1	7.4	5.1	4.4	7.5	4.4	3.6	1.6	4.5	17.8	
27-Oct	1.5	1.4	1.4	1.2	1.6	1.6	2.5	2.8	4.2	2.7	1.3	1.3	1.2	0.9	0.8	0.6	0.6	0.7	0.5	1.0	1.6	2.8	4.5	5.9	1.9	5.9	
28-Oct	6.6	7.0	6.6	5.9	6.1	4.0	3.0	4.5	6.3	6.7	3.7	2.5	1.8	1.3	1.0	1.3	1.5	2.4	2.6	2.1	PF	PF	1.2	1.1	3.6	7.0	
29-Oct	1.0	0.7	0.9	0.9	1.0	1.0	1.1	1.0	0.8	0.9	1.4	1.8	2.3	2.3	2.0	1.8	1.8	2.0	2.0	1.7	1.6	2.0	1.5	1.6	1.5	2.3	
30-Oct	1.4	1.0	0.7	0.7	0.9	0.8	1.0	1.6	0.8	1.0	0.8	0.9	1.1	6.6	7.3	3.6	12.1	11.2	5.3	5.5	5.7	10.6	17.1	2.8	4.2	17.1	
31-Oct	4.0	3.0	6.1	7.2	5.6	3.1	1.4	2.0	2.1	1.3	0.9	1.1	0.7	0.6	0.5	0.5	1.0	1.2	1.1	1.2	1.2	1.4	1.5	1.1	2.1	7.2	
																								Diurnal Average			
																								Diurnal Maximum			
C - Calibration      M - Maintenance      AF - Analyzer Failure      UO - Unstable Operation      PF - Power Failure Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m <sup>3</sup>																											



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Janvier - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Janvier - October 2017**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	544	80.83	80.83
6 - 15	60	8.92	89.75
16 - 25	2	0.30	90.04
26 - 80	1	0.15	90.19
> 81.0	0	0.00	90.19

Total Number of Valid Hours: 673

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**Janvier - October 2017**

Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	55	46	6	5	7	10	8	15	52	137	45	27	41	40	12	12	518
6 - 15	1	1	0	0	0	1	2	4	8	28	7	6	0	0	2	0	60
16 - 25	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	2
26 - 80	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	56	47	6	5	8	11	10	19	61	165	53	33	41	40	14	12	581

Total Number of Valid Hours: 647

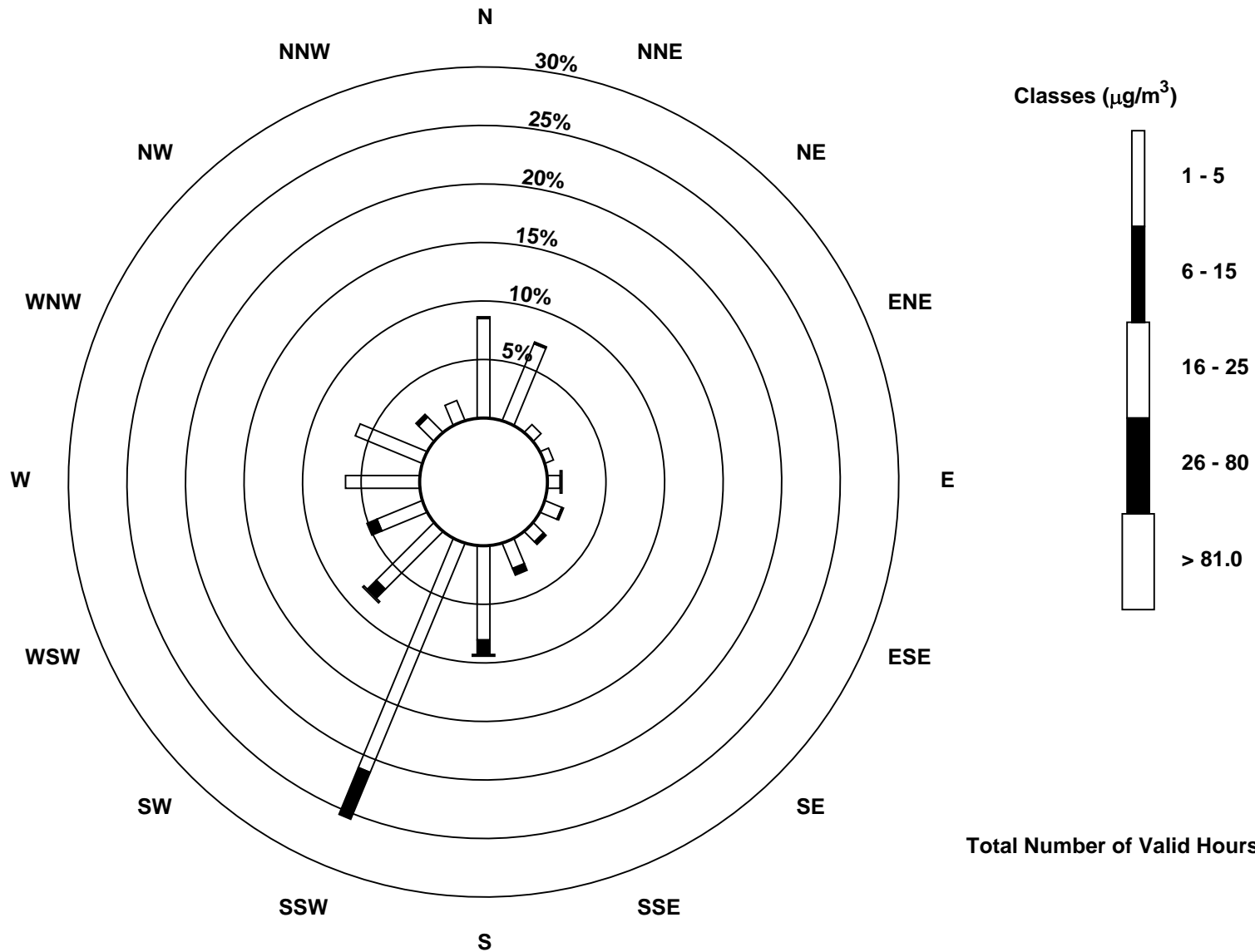
Total Number of Hours: 744





Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Janvier (AMS 22)





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Ambient Temperature (AT) - C**

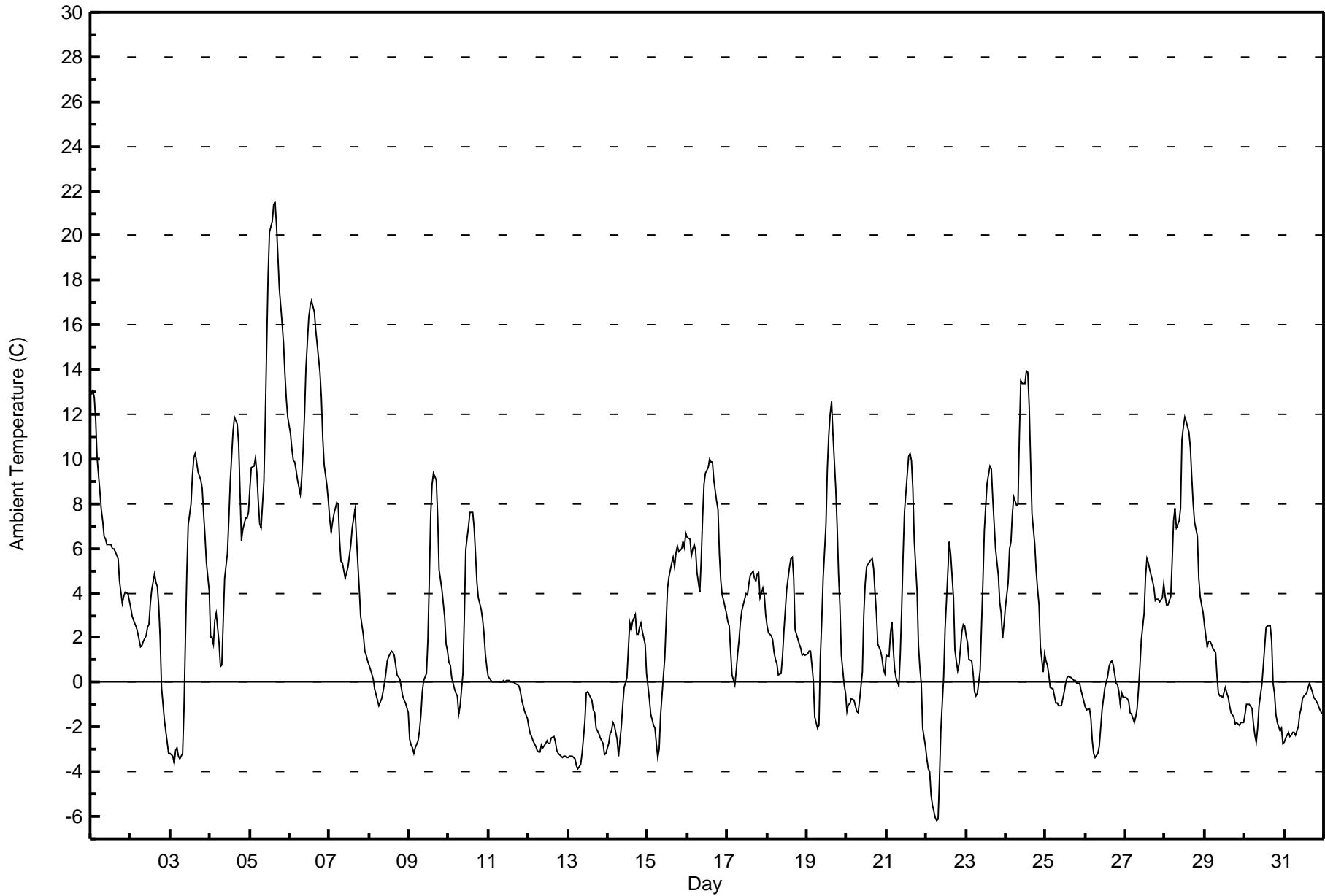
**Janvier - October 2017**

Maximum Value: 21.5 C on Oct 5 16:00		Maximum Daily Average: 13.9 C on Oct 5		Hours in Service: 744																						
Minimum Value: -6.2 C on Oct 22 07:00		Minimum Daily Average: -2.8 C on Oct 12		Hours of Data: 744																						
Maximum Diurnal Average: 6.3 C at hour 15		Minimum Diurnal Average: 0.4 C at hour 8		Hours of Missing Data: 0																						
Monthly Average: 2.89 C		Percentiles: P <sub>1</sub> = -3.9 P <sub>10</sub> = -2.5 Q <sub>1</sub> = -0.7 Median = 1.7 Q <sub>3</sub> = 5.8 P <sub>90</sub> = 9.6 P <sub>99</sub> = 17.3		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	12.9	13.0	12.7	11.7	10.1	8.5	7.8	7.2	6.5	6.4	6.2	6.2	6.2	6.0	6.0	5.9	5.5	4.6	4.0	3.5	3.8	4.1	4.0	3.6	6.9	13.0
2-Oct	3.3	3.0	2.8	2.5	2.2	1.9	1.6	1.6	1.9	2.1	2.5	2.6	3.5	4.2	4.8	4.5	4.3	3.4	2.0	-0.2	-1.7	-2.2	-2.7	-3.2	1.9	4.8
3-Oct	-3.2	-3.3	-3.6	-3.0	-2.9	-3.3	-3.4	-3.2	-1.2	1.9	4.8	7.1	8.0	9.2	10.1	10.3	9.9	9.4	9.1	8.7	7.6	6.6	5.4	4.1	3.5	10.3
4-Oct	2.0	2.0	1.7	2.8	3.1	1.8	0.7	0.8	2.8	4.7	5.8	7.3	9.0	10.1	11.2	11.8	11.6	10.7	8.5	6.4	6.9	7.4	7.4	7.6	6.0	11.8
5-Oct	8.6	9.6	9.7	10.1	9.4	8.1	7.1	6.9	9.0	11.8	15.1	18.2	20.2	20.6	21.4	21.5	20.5	19.1	17.6	16.1	15.2	13.8	12.7	11.9	13.9	21.5
6-Oct	11.1	10.5	10.0	9.8	9.5	9.1	8.4	9.2	10.4	12.0	14.1	16.3	16.8	17.1	16.8	16.6	15.8	14.5	13.9	12.7	11.0	9.7	8.8	8.1	12.2	17.1
7-Oct	7.3	6.7	7.1	7.6	8.1	8.0	6.3	5.4	5.3	4.7	4.9	5.2	5.6	6.2	6.9	7.7	6.6	5.3	4.2	3.0	2.1	1.4	1.2	1.0	5.3	8.1
8-Oct	0.8	0.6	0.2	-0.3	-0.5	-0.8	-1.0	-0.7	-0.4	0.0	0.4	0.9	1.1	1.4	1.3	1.2	0.8	0.4	0.1	-0.2	-0.6	-0.8	-0.9	-1.4	0.1	1.4
9-Oct	-2.6	-2.8	-2.9	-3.2	-2.9	-2.6	-2.2	-1.5	-0.4	0.1	0.4	1.9	4.5	7.5	8.9	9.4	9.0	7.4	5.1	4.6	4.1	2.9	1.7	1.4	2.0	9.4
10-Oct	0.9	0.8	0.2	-0.3	-0.5	-0.6	-1.4	-1.1	0.4	2.9	5.9	6.5	7.0	7.6	7.6	6.9	5.7	4.5	3.8	3.3	2.8	2.2	1.3	0.7	2.8	7.6
11-Oct	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.1	0.0	-0.1	-0.2	-0.4	-0.8	-1.0	-1.3	-1.6	-0.2	0.3
12-Oct	-2.0	-2.3	-2.5	-2.6	-2.9	-3.0	-3.1	-3.1	-2.8	-2.9	-2.7	-2.6	-2.7	-2.7	-2.5	-2.4	-2.7	-3.0	-3.2	-3.2	-3.3	-3.3	-3.3	-3.3	-2.8	-2.0
13-Oct	-3.3	-3.3	-3.3	-3.4	-3.4	-3.7	-3.9	-3.6	-3.2	-2.5	-1.7	-0.5	-0.4	-0.7	-0.8	-1.2	-1.4	-2.0	-2.3	-2.5	-2.6	-2.7	-3.2	-3.2	-2.5	-0.4
14-Oct	-2.7	-2.3	-2.2	-1.8	-1.9	-2.6	-3.3	-2.6	-2.0	-1.1	-0.2	0.2	1.5	2.7	2.4	2.7	3.0	2.2	2.1	2.5	2.6	2.3	1.7	0.4	0.2	3.0
15-Oct	-0.1	-0.7	-1.4	-1.9	-2.0	-2.7	-3.4	-3.0	-1.5	0.3	1.1	2.7	4.2	4.7	5.3	5.6	5.2	5.8	6.1	5.9	6.0	6.3	6.1	6.7	2.3	6.7
16-Oct	6.5	6.4	5.7	6.0	6.2	5.9	4.9	4.0	5.5	7.4	8.9	9.4	9.6	10.0	9.9	9.9	9.1	8.1	7.7	5.7	4.5	3.9	3.7	3.1	6.7	10.0
17-Oct	2.7	2.5	1.4	0.4	-0.1	0.5	1.3	1.9	2.7	3.2	3.7	4.0	3.9	4.4	4.8	5.0	4.7	4.5	4.8	4.9	3.8	4.2	3.9	3.1	3.2	5.0
18-Oct	2.6	2.2	2.1	1.9	1.3	1.0	0.8	0.4	0.4	1.2	2.3	3.2	4.1	5.2	5.5	5.6	4.7	2.4	2.2	1.7	1.5	1.2	1.3	1.2	2.3	5.6
19-Oct	1.3	1.4	1.4	0.8	0.1	-1.5	-2.0	-1.9	1.1	2.7	4.7	7.0	9.6	11.1	12.0	12.5	11.2	8.7	7.0	4.9	3.4	1.2	-0.1	-0.5	4.0	12.5
20-Oct	-1.3	-1.0	-1.0	-0.7	-0.8	-1.1	-1.3	-1.3	-0.8	0.5	3.0	4.4	5.2	5.3	5.5	5.5	5.1	4.1	3.1	1.7	1.4	1.1	0.6	0.4	1.6	5.5
21-Oct	1.2	1.1	2.1	2.7	1.6	0.6	0.2	-0.2	1.2	3.2	5.6	7.6	9.3	10.1	10.3	9.9	8.6	6.4	4.1	1.6	0.7	0.0	-2.0	-2.9	3.5	10.3
22-Oct	-3.5	-3.9	-4.0	-5.0	-5.5	-6.0	-6.2	-6.1	-4.3	-2.1	0.3	2.4	3.7	5.0	6.3	5.8	3.8	1.5	0.9	0.5	0.9	2.3	2.6	2.6	-0.3	6.3
23-Oct	2.1	1.8	1.1	1.0	0.4	-0.4	-0.6	-0.5	0.5	2.5	4.5	6.8	7.9	8.9	9.7	9.5	8.3	7.1	6.0	4.8	3.6	3.1	1.9	2.6	3.9	9.7
24-Oct	3.3	4.5	6.0	6.3	7.6	8.3	7.9	8.0	11.1	13.5	13.4	13.4	14.0	13.9	12.4	9.9	7.5	6.2	5.0	4.2	3.5	1.6	0.5	1.3	7.6	14.0
25-Oct	0.9	0.8	0.3	-0.2	-0.3	-0.6	-0.9	-0.9	-1.1	-1.1	-0.7	-0.4	-0.1	0.2	0.3	0.2	0.2	0.1	0.1	0.0	0.0	-0.3	-0.6	-0.8	-0.2	0.9
26-Oct	-1.1	-1.2	-1.2	-1.6	-2.6	-3.2	-3.4	-3.2	-2.9	-2.0	-1.2	-0.7	-0.2	0.3	0.7	0.9	1.0	0.8	0.0	-0.1	-0.4	-1.0	-0.5	-0.7	-1.0	1.0
27-Oct	-0.7	-0.8	-0.8	-1.3	-1.4	-1.8	-1.5	-1.2	-0.3	0.7	1.9	3.1	4.7	5.5	5.3	5.1	4.5	4.2	3.7	3.7	3.7	3.6	3.8	4.4	2.0	5.5
28-Oct	3.9	3.5	3.5	3.9	5.4	7.2	7.8	6.9	7.2	7.8	10.9	11.4	11.9	11.7	11.2	10.5	9.2	8.0	7.2	6.5	4.7	3.8	3.5	3.2	7.1	11.9
29-Oct	2.6	1.6	1.8	1.9	1.7	1.5	1.4	0.3	-0.5	-0.6	-0.6	-0.6	-0.2	-0.5	-0.7	-1.0	-1.4	-1.6	-1.9	-1.8	-1.9	-1.9	-1.8	-1.8	-0.2	2.6
30-Oct	-1.4	-1.0	-1.0	-1.0	-1.2	-1.9	-2.3	-2.7	-2.1	-1.1	-0.1	0.7	1.6	2.5	2.5	2.5	1.8	-0.1	-0.5	-1.4	-1.8	-2.2	-2.0	-2.7	-0.6	2.5
31-Oct	-2.7	-2.5	-2.2	-2.4	-2.4	-2.3	-2.2	-2.4	-2.0	-1.4	-1.1	-0.7	-0.6	-0.5	-0.3	-0.1	-0.2	-0.4	-0.7	-0.8	-1.0	-1.1	-1.3	-1.4	-1.4	-0.1
	1.6	1.5	1.4	1.3	1.1	0.8	0.5	0.4	1.3	2.4	3.6	4.6	5.5	6.0	6.3	6.2	5.5	4.6	3.9	3.1	2.6	2.1	1.7	1.4	Diurnal Average	
	12.9	13.0	12.7	11.7	10.1	9.1	8.4	9.2	11.1	13.5	15.1	18.2	20.2	20.6	21.4	21.5	20.5	19.1	17.6	16.1	15.2	13.8	12.7	11.9	Diurnal Maximum	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Janvier - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C  
Janvier - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	249	33.47	33.47
0 - 10	433	58.20	91.67
10 - 20	57	7.66	99.33
> 20	5	0.67	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %**

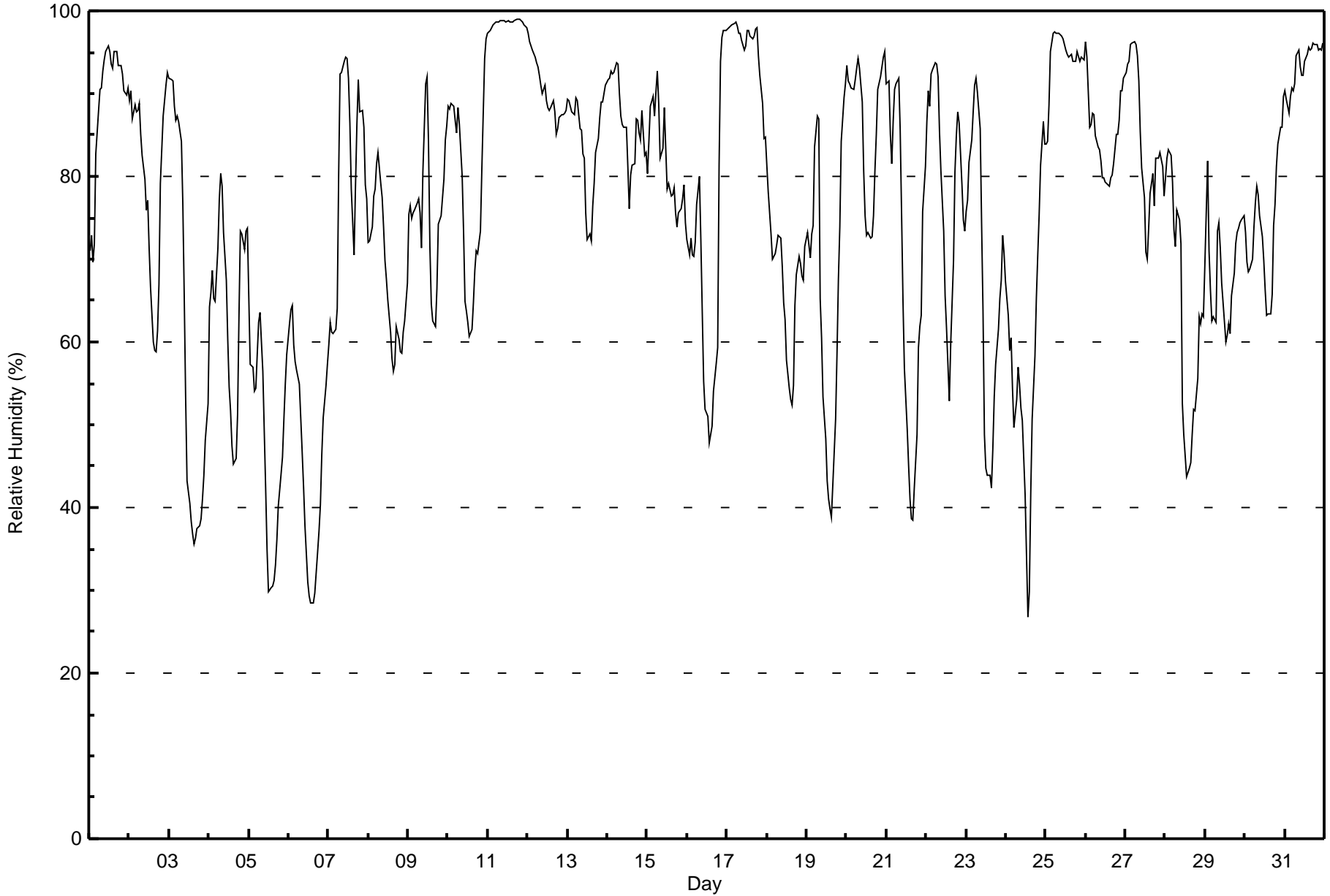
**Janvier - October 2017**

Maximum Value: 99 % on Oct 11 20:00      Maximum Daily Average: 98.6 % on Oct 11																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 27 % on Oct 24 14:00      Minimum Daily Average: 45.6 % on Oct 6 Maximum Diurnal Average: 84.0 % at hour 8      Minimum Diurnal Average: 63.5 % at hour 15 Monthly Average: 75.8 %      Percentiles: P <sub>1</sub> = 30 P <sub>10</sub> = 51 Q <sub>1</sub> = 64 Median = 79 Q <sub>3</sub> = 90 P <sub>90</sub> = 95 P <sub>99</sub> = 99																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	71	73	70	72	83	88	91	91	93	94	95	96	95	93	93	95	95	93	93	93	92	90	90	91	88.7	96
2-Oct	89	90	87	89	88	88	89	85	83	80	76	77	71	67	60	59	59	61	67	79	87	89	91	93	79.3	93
3-Oct	92	92	91	89	87	87	87	84	77	66	53	43	40	38	37	36	36	37	38	39	41	44	48	53	59.8	92
4-Oct	64	66	69	65	65	71	77	80	79	73	67	60	55	52	47	45	46	51	63	73	73	71	73	74	65.1	80
5-Oct	65	57	57	54	54	58	62	64	56	49	42	35	30	30	30	31	33	36	40	44	46	51	55	59	47.5	65
6-Oct	62	64	64	60	58	57	55	51	47	43	38	31	29	29	29	28	30	35	37	40	47	51	55	57	45.6	64
7-Oct	60	62	61	61	62	64	80	92	93	94	94	94	92	86	78	71	79	86	92	88	88	86	79	77	80.0	94
8-Oct	72	72	74	78	79	82	83	79	77	74	70	68	65	61	58	57	57	62	60	59	59	61	62	67	68.1	83
9-Oct	75	76	75	76	76	77	77	76	71	80	91	92	84	71	65	63	62	66	74	75	75	80	84	86	76.2	92
10-Oct	88	88	89	88	87	85	88	86	80	73	65	64	62	61	62	65	69	71	71	73	81	88	94	97	78.1	97
11-Oct	97	98	98	98	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	98	98	98.6	99
12-Oct	97	96	96	95	94	94	93	92	91	90	91	89	88	88	88	89	88	85	86	87	87	88	88	88	90.4	97
13-Oct	89	89	88	88	87	90	89	86	86	83	82	76	72	73	72	76	79	83	85	87	89	89	90	91	84.1	91
14-Oct	92	92	93	92	93	94	93	90	87	86	86	86	81	76	80	81	82	87	87	85	84	88	83	83	86.7	94
15-Oct	80	84	88	90	87	90	93	89	82	83	88	83	79	79	78	78	79	76	74	76	76	77	79	74	81.8	93
16-Oct	72	71	72	70	70	72	77	80	72	64	55	52	51	48	49	50	54	57	59	81	94	97	98	98	69.3	98
17-Oct	98	98	98	98	98	99	98	97	97	96	95	96	98	98	97	97	97	98	98	94	92	89	85	85	95.7	99
18-Oct	81	78	73	70	70	71	72	73	73	69	65	63	58	54	53	52	55	64	68	70	69	68	67	71	67.0	81
19-Oct	73	72	70	73	74	84	87	87	65	60	53	48	43	41	40	39	43	51	59	68	74	84	89	91	65.4	91
20-Oct	93	92	91	91	91	92	93	94	93	89	81	75	73	73	73	73	75	81	85	91	92	93	94	95	86.3	95
21-Oct	91	92	85	82	87	90	91	92	86	75	65	57	49	45	41	39	39	42	49	59	62	63	76	81	68.2	92
22-Oct	87	90	89	92	93	94	94	92	85	81	73	66	62	57	53	60	70	80	85	88	86	79	75	73	79.3	94
23-Oct	76	77	82	84	88	91	92	90	86	74	64	49	45	44	44	42	47	53	57	61	65	67	73	71	67.6	92
24-Oct	67	63	59	60	54	50	53	57	55	52	51	42	34	27	30	42	51	58	65	71	75	81	87	84	57.0	87
25-Oct	84	84	89	95	97	98	97	97	97	97	97	96	95	95	94	95	94	94	94	95	94	94	94	94	94.2	98
26-Oct	96	94	86	86	88	87	85	84	83	82	80	80	79	79	79	80	80	82	85	85	87	90	90	92	84.9	96
27-Oct	93	94	94	96	96	96	96	95	92	86	81	77	71	70	74	78	80	76	82	82	82	83	81	78	84.7	96
28-Oct	80	82	83	83	79	73	72	76	75	72	53	49	46	44	45	45	49	52	52	56	63	62	63	63	63.2	83
29-Oct	69	82	71	66	63	63	62	73	74	71	67	65	60	61	62	61	66	68	72	73	74	74	75	75	68.7	82
30-Oct	73	70	68	69	70	74	77	79	78	75	73	70	66	63	63	63	66	74	77	81	84	86	86	90	73.9	90
31-Oct	90	89	88	90	91	90	91	95	95	93	92	92	94	95	96	95	96	96	96	96	95	95	95	96	93.4	96
																		Diurnal Average		Diurnal Maximum						
81.3 81.5 80.6 80.6 80.9 82.2 83.6 84.0 80.9 77.5 73.6 69.9 66.7 64.4 63.5 64.0 66.2 69.6 72.5 75.8 77.9 79.3 80.6 81.4																		98		98						



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Janvier - October 2017**

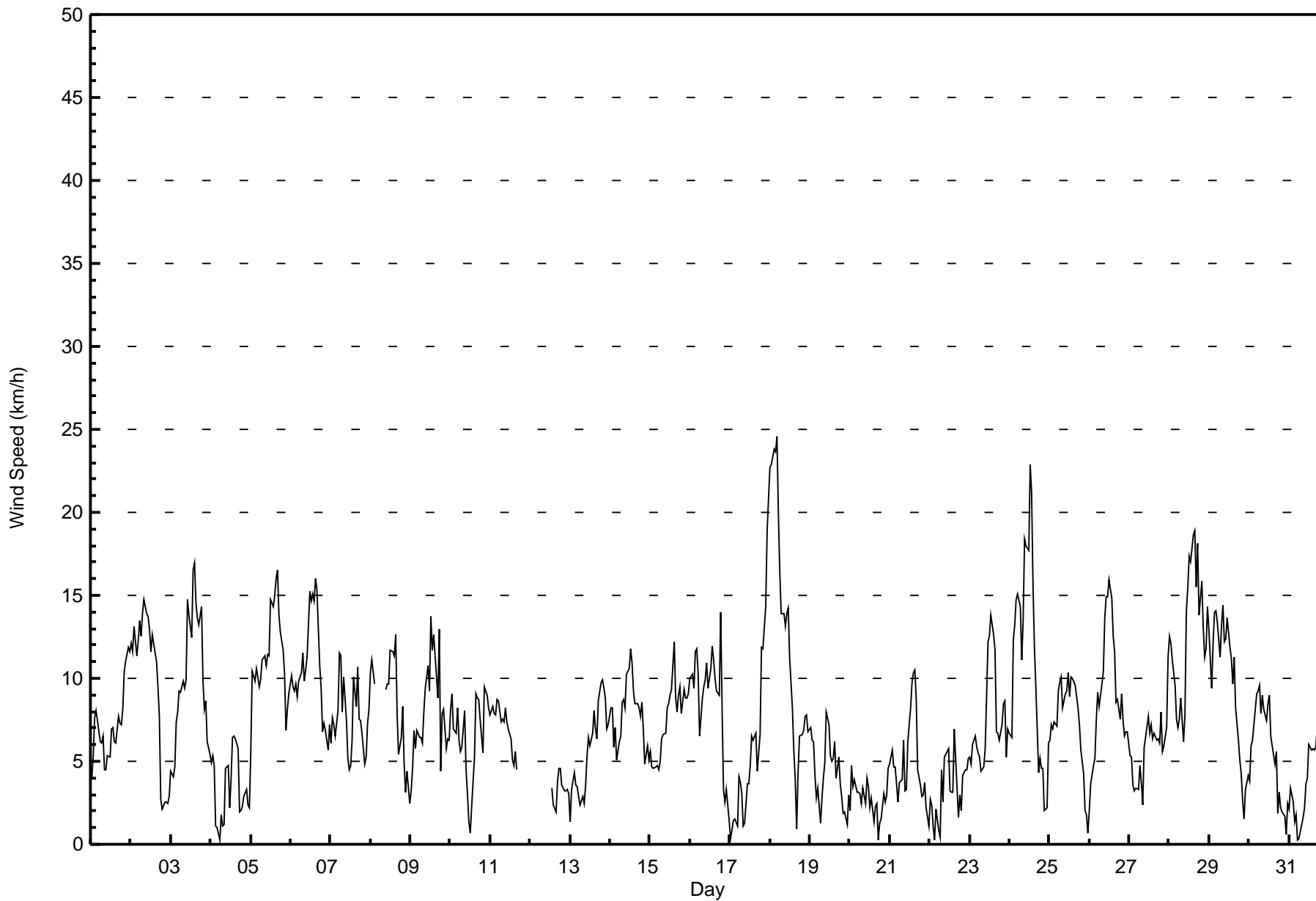






**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Janvier - October 2017**







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h  
Janvier - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	247	34.40	34.40
6 - 11	349	48.61	83.01
12 - 19	113	15.74	98.75
20 - 28	9	1.25	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 718

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Wind Speed (WS) - km/h  
Janvier - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	20	20	9	6	7	12	10	19	38	32	25	11	9	10	9	10	247
6 - 11	23	51	4	4	3	5	0	6	32	125	33	17	17	21	5	3	349
12 - 19	21	1	0	0	0	0	0	0	2	30	8	8	27	15	1	0	113
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	9
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	64	72	13	10	10	17	10	25	72	187	66	36	62	46	15	13	718

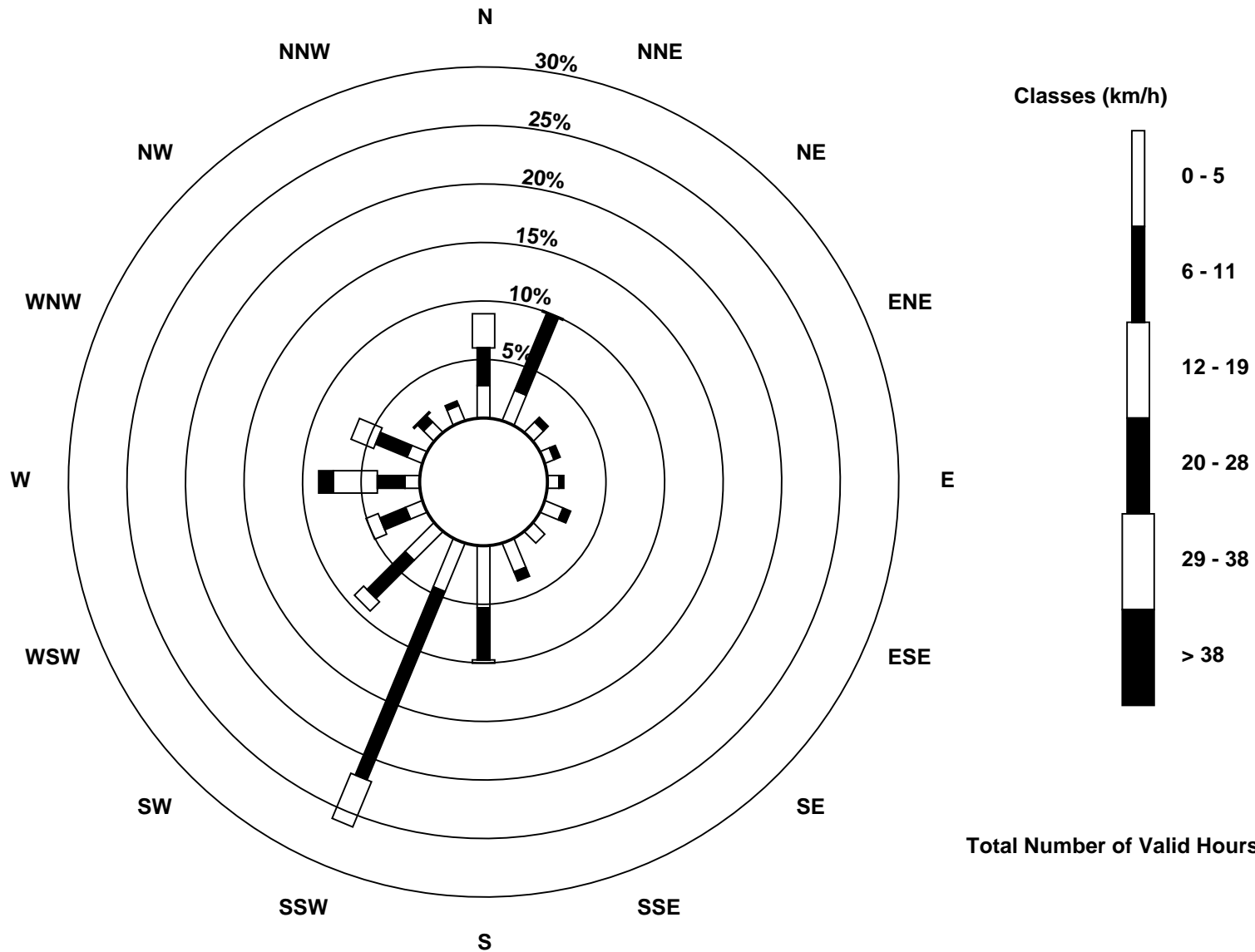
Total Number of Valid Hours: 718

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed (WS) - km/h  
Janvier (AMS 22)





**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Speed (WS) - km/h**  
**Janvier - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Oct 18 05:00 Minimum Value: 0 km/h on Oct 2 22:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 O <sub>1</sub> = 1 Median = 2 O <sub>3</sub> = 3 P <sub>90</sub> = 5 P <sub>99</sub> = 7														Hours in Service: 744 Hours of Data: 718 Hours of Missing Data: 26 Hours of Calibration: 0 Percent Operational Time: 96.5											
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	2	2	4	4	4	3	3	3	2	2	2	2	3	3	3	3	4	3	3	4	4	4	5	4	5
2-Oct	5	4	5	4	5	5	5	6	6	6	5	5	5	5	5	5	4	4	2	1	1	0	1	1	6
3-Oct	1	1	1	1	1	2	2	2	2	3	4	4	4	5	5	4	4	4	4	5	3	3	2	1	5
4-Oct	1	2	1	1	1	1	1	1	1	2	3	2	2	2	2	2	1	1	1	1	1	1	1	1	3
5-Oct	3	2	2	3	2	2	2	2	3	3	4	3	4	5	5	5	5	4	4	3	3	2	2	2	5
6-Oct	2	2	2	2	2	2	2	3	2	3	4	5	5	5	5	6	6	4	3	2	2	2	2	2	6
7-Oct	2	2	3	2	3	4	4	2	4	3	3	2	2	3	4	4	4	2	4	3	3	3	3	3	4
8-Oct	4	4	5	AF	AF	AF	AF	AF	AF	4	5	4	5	5	5	5	4	3	3	4	2	1	2	1	5
9-Oct	1	1	2	2	2	2	2	2	2	3	3	3	4	4	4	4	3	6	1	2	2	2	2	2	6
10-Oct	2	2	2	1	1	2	1	1	2	1	2	2	2	2	1	3	3	3	2	1	2	2	2	2	3
11-Oct	2	2	3	3	3	3	2	2	3	3	3	3	3	3	3	3	3	AF	AF	AF	AF	AF	AF	AF	3
12-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	1	1	2	2	1	1	1	1	1	1	2
13-Oct	1	1	1	1	1	1	1	1	1	1	1	2	2	2	3	2	2	2	2	2	2	2	2	2	3
14-Oct	2	2	1	2	1	2	1	2	2	2	2	3	4	3	3	2	2	2	2	3	2	4	4	2	4
15-Oct	1	1	1	1	1	1	2	1	1	2	2	2	2	2	3	3	2	3	2	2	3	3	2	2	3
16-Oct	3	3	3	3	4	4	2	2	3	3	3	3	4	3	3	2	2	4	3	1	1	1	1	1	4
17-Oct	1	1	1	1	1	1	2	1	1	1	1	1	2	3	2	3	2	2	3	4	4	6	7	7	7
18-Oct	8	8	9	8	9	7	6	5	4	4	4	5	4	3	2	1	2	1	2	2	2	2	3	2	9
19-Oct	2	2	2	3	1	1	1	2	1	2	2	2	2	2	2	2	1	1	3	2	2	1	1	2	3
20-Oct	1	1	1	1	2	1	2	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	2
21-Oct	1	1	1	1	1	1	1	1	2	1	1	3	3	4	3	3	3	2	1	1	1	1	1	1	4
22-Oct	1	1	1	1	1	1	1	1	2	1	2	2	1	1	1	3	1	1	1	1	1	1	1	2	3
23-Oct	1	1	1	2	1	1	1	1	1	2	3	4	4	4	5	4	2	2	2	1	1	2	2	2	5
24-Oct	2	2	3	3	4	5	4	3	4	6	7	6	8	8	7	6	5	3	2	2	2	1	2	2	8
25-Oct	2	2	2	1	1	2	2	3	2	2	3	3	3	3	4	3	3	3	3	3	2	2	1	1	4
26-Oct	1	1	1	1	2	2	2	3	3	4	4	4	5	5	4	3	2	2	2	2	2	2	2	1	5
27-Oct	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3
28-Oct	3	3	3	3	2	2	2	2	2	2	5	6	6	7	7	7	5	7	6	7	7	5	6	6	7
29-Oct	6	5	6	7	6	6	6	5	6	5	5	5	5	5	5	4	3	2	2	1	1	1	1	1	7
30-Oct	1	1	2	2	2	2	2	2	2	2	2	2	3	2	2	1	1	1	1	0	1	1	1	1	3
31-Oct	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2
8 8 9 8 9 7 6 6 6 6 7 6 8 8 7 7 6 7 6 7 7 6 7 7																								Diurnal Maximum	
AF - Analyzer Failure																									



**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

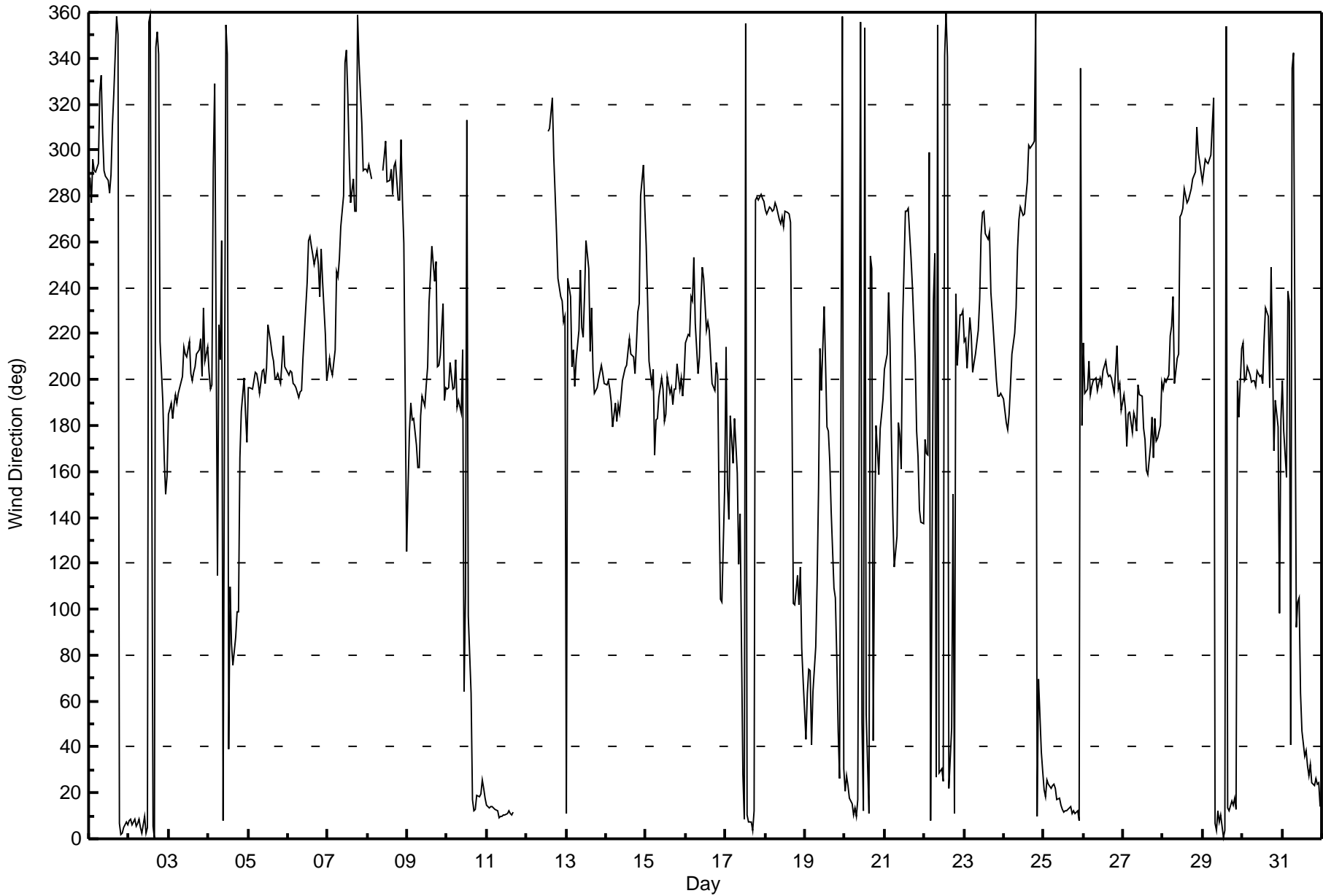
**Wind Direction (WD) - deg**  
**Janvier - October 2017**

Direction of Maximum Speed: 274 deg on Oct 18 05:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 204.4 deg on Oct 5	Hours of Data: 718
Direction of Minimum Speed: 115 deg on Oct 4 06:00	Hours of Missing Data: 26
Direction of Minimum Daily Speed Average: 0.7 deg on Oct 10	Percent Operational Time: 96.5
Monthly Average Direction: 232.8 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	288	277	296	291	290	294	325	333	307	291	289	287	281	289	311	325	358	350	7	2	3	5	7	6	326.7
2-Oct	8	9	6	9	5	7	9	5	2	9	3	5	356	358	6	0	344	351	342	217	191	165	150	158	3.7
3-Oct	185	190	183	189	194	190	194	199	201	214	211	210	216	202	199	203	205	211	213	218	202	231	208	214	205.1
4-Oct	203	196	198	292	329	115	224	209	261	8	354	342	39	110	85	76	88	99	166	186	201	186	173	124.7	
5-Oct	197	196	196	199	203	203	199	194	204	205	198	205	224	216	211	208	201	201	203	198	207	219	206	204	204.4
6-Oct	202	204	203	198	198	197	192	195	195	210	220	242	261	262	258	254	250	256	250	236	257	243	220	199	228.5
7-Oct	204	209	205	202	213	247	245	253	266	280	338	344	324	298	277	288	273	273	359	338	312	291	292	291	271.0
8-Oct	290	294	287	AF	AF	AF	AF	AF	AF	291	297	304	286	287	292	281	293	295	278	278	304	278	259	125	288.5
9-Oct	152	177	190	182	183	172	161	162	184	193	189	198	205	234	245	258	243	251	205	206	211	233	191	197	207.2
10-Oct	196	197	208	196	196	209	188	191	185	213	64	106	313	97	63	17	12	13	19	19	19	26	22	18	54.9
11-Oct	15	14	14	14	13	13	12	9	10	10	10	10	11	12	11	10	11	AF	AF	AF	AF	AF	AF	AF	--
12-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	308	309	323	297	281	263	244	236	234	225	228	--
13-Oct	11	244	236	205	213	197	209	222	248	223	219	237	260	249	212	231	204	194	196	200	203	206	203	199	214.8
14-Oct	197	200	196	190	179	190	182	189	186	192	200	205	206	213	218	211	210	202	215	229	233	280	294	275	208.1
15-Oct	258	234	208	197	204	167	182	183	192	200	196	182	185	201	194	197	189	196	196	207	196	201	193	201	197.1
16-Oct	216	220	219	236	234	253	225	202	210	233	249	244	222	225	222	210	199	195	208	202	147	104	103	153	218.8
17-Oct	214	154	139	185	164	183	172	159	119	141	28	9	355	10	8	7	4	12	278	280	278	281	279	278	296.9
18-Oct	274	272	275	275	274	274	277	275	270	268	271	266	273	273	272	269	190	102	102	115	102	118	83	69	271.3
19-Oct	44	64	74	73	41	64	84	112	153	213	195	232	207	179	177	165	143	109	105	79	47	26	358	31	124.8
20-Oct	21	28	23	18	15	10	14	10	17	356	50	12	353	54	11	254	248	43	132	180	159	179	185	192	24.8
21-Oct	204	211	238	217	175	141	118	132	181	176	161	224	273	274	274	263	253	240	209	178	167	143	138	137	221.7
22-Oct	174	168	167	299	8	235	255	27	355	29	30	25	341	360	341	22	48	150	11	237	206	228	228	230	359.7
23-Oct	216	218	205	227	219	203	207	211	221	235	263	273	273	263	261	264	238	229	219	200	193	193	194	193	233.1
24-Oct	192	181	178	185	198	211	220	231	257	270	275	272	272	279	286	302	301	303	304	360	10	70	38	29	256.5
25-Oct	21	18	25	24	22	23	24	22	17	17	15	13	12	12	12	13	14	11	12	11	12	8	336	180	16.3
26-Oct	216	194	196	208	193	197	199	201	195	198	201	198	204	208	203	201	202	201	194	204	215	196	198	187	200.4
27-Oct	193	187	171	185	186	177	185	183	178	198	193	193	179	174	161	159	171	184	166	183	173	175	180	199	181.1
28-Oct	196	200	199	202	219	223	236	198	209	211	271	272	275	283	277	278	281	283	288	290	310	299	295	290	263.8
29-Oct	286	296	295	294	296	298	323	7	4	12	7	10	1	4	354	13	12	16	14	18	13	200	184	213	339.8
30-Oct	216	199	201	206	202	199	199	199	197	204	201	202	198	217	231	227	197	249	209	169	191	179	98	183	203.2
31-Oct	199	177	157	239	233	41	335	342	92	103	105	64	47	36	39	32	27	32	24	23	26	24	24	14	36.2

234.1 227.1 227.6 228.1 230.3 229.9 224.3 216.4 226.7 242.5 250.1 256.0 259.1 260.3 258.6 266.8 254.6 247.9 235.8 235.1 235.7 236.6 238.3 233.5  
 Diurnal Average

AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods





**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Direction (WD) - deg**  
**Janvier - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 108 deg on Oct 4 06:00																	Hours in Service: 744 Hours of Data: 718 Hours of Missing Data: 26 Hours of Calibration: 0 Percent Operational Time: 96.5								
Minimum Value: 7 deg on Oct 3 04:00																									
Percentiles: P <sub>1</sub> = 9 P <sub>10</sub> = 15 Q <sub>1</sub> = 18 Median = 24 Q <sub>3</sub> = 38 P <sub>90</sub> = 58 P <sub>99</sub> = 89																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-Oct	61	39	53	49	47	52	67	69	52	48	36	46	41	42	56	62	58	58	62	55	51	43	39	38	69
2-Oct	33	32	36	37	41	42	38	35	39	39	46	46	54	51	50	48	63	63	88	42	21	23	13	18	88
3-Oct	11	13	8	7	12	11	13	16	18	22	22	26	26	23	22	21	20	20	21	25	20	29	23	17	29
4-Oct	22	24	19	92	107	108	63	65	82	62	61	90	74	43	34	30	25	42	44	39	27	36	31	27	108
5-Oct	31	15	15	16	17	17	16	14	18	22	24	27	24	25	24	24	20	17	17	15	19	20	15	15	31
6-Oct	16	17	16	15	14	14	12	15	16	21	25	24	23	23	24	27	23	21	21	21	18	21	29	16	29
7-Oct	31	18	23	25	27	23	23	20	22	33	58	65	72	50	29	49	25	30	58	68	70	66	48	44	72
8-Oct	44	42	42	AF	AF	AF	AF	AF	AF	50	58	53	49	37	46	30	51	64	34	38	55	39	36	21	64
9-Oct	21	17	14	19	14	19	21	23	16	16	15	20	22	28	22	23	23	26	33	18	20	27	12	13	33
10-Oct	13	16	18	15	10	22	9	15	10	32	72	89	101	73	38	19	22	17	14	14	13	15	14	14	101
11-Oct	16	19	18	18	20	19	18	19	21	21	23	22	22	23	22	21	23	AF	AF	AF	AF	AF	AF	AF	23
12-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	71	73	63	59	41	26	25	24	32	33	31	73
13-Oct	97	33	28	28	21	24	39	30	46	23	21	26	30	24	27	27	23	15	15	16	17	19	16	14	97
14-Oct	14	15	18	15	20	15	18	13	13	13	16	19	20	22	20	20	18	16	19	21	21	36	66	39	66
15-Oct	15	17	18	15	15	21	20	12	14	21	18	16	15	19	15	23	15	20	12	17	19	17	13	18	23
16-Oct	20	19	19	22	21	23	25	17	20	23	24	26	26	24	23	21	15	14	19	19	28	35	31	75	75
17-Oct	91	69	58	75	72	16	22	24	40	78	25	37	38	33	29	26	46	53	49	28	27	29	26	25	91
18-Oct	23	22	23	24	23	24	29	29	24	25	24	21	25	34	38	37	77	12	13	14	16	28	23	24	77
19-Oct	26	32	35	47	52	28	67	54	37	37	25	30	42	38	30	33	29	12	68	36	77	37	54	18	77
20-Oct	60	9	20	24	30	25	44	29	28	48	28	53	69	54	67	59	44	90	29	61	29	38	23	15	90
21-Oct	22	18	19	20	24	19	14	25	14	38	46	46	38	36	27	23	20	23	18	18	19	22	35	61	61
22-Oct	40	35	84	88	18	75	66	8	51	19	26	22	49	53	58	22	35	50	38	43	19	24	33	22	88
23-Oct	21	17	13	22	19	11	17	18	25	26	28	25	26	23	26	20	26	18	16	12	9	12	12	18	28
24-Oct	24	22	16	15	17	21	21	20	21	22	26	25	23	33	45	59	70	71	60	57	38	50	55	19	71
25-Oct	17	20	14	14	13	12	12	15	18	19	23	25	28	30	31	32	40	36	37	38	36	49	74	78	78
26-Oct	32	17	19	22	11	15	17	17	17	17	19	19	19	22	20	18	19	16	15	16	19	16	16	9	32
27-Oct	11	9	23	20	25	24	14	22	36	22	20	18	23	22	24	21	22	21	26	15	21	18	20	18	36
28-Oct	16	16	16	18	22	25	27	16	18	25	25	23	26	38	30	28	31	35	39	43	60	54	53	46	60
29-Oct	40	50	56	45	52	54	67	51	55	45	44	39	55	52	71	40	31	27	27	27	34	60	28	23	71
30-Oct	24	15	17	18	15	15	15	15	18	19	20	19	17	24	34	22	18	53	16	26	55	23	83	11	83
31-Oct	35	14	42	34	13	78	45	59	56	45	23	25	20	16	15	15	11	13	13	13	13	14	13	24	78
																	97 69 84 92 107 108 67 69 82 78 72 90 101 73 73 63 77 90 88 68 77 66 83 78								
Diurnal Maximum																									
AF - Analyzer Failure																									







# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

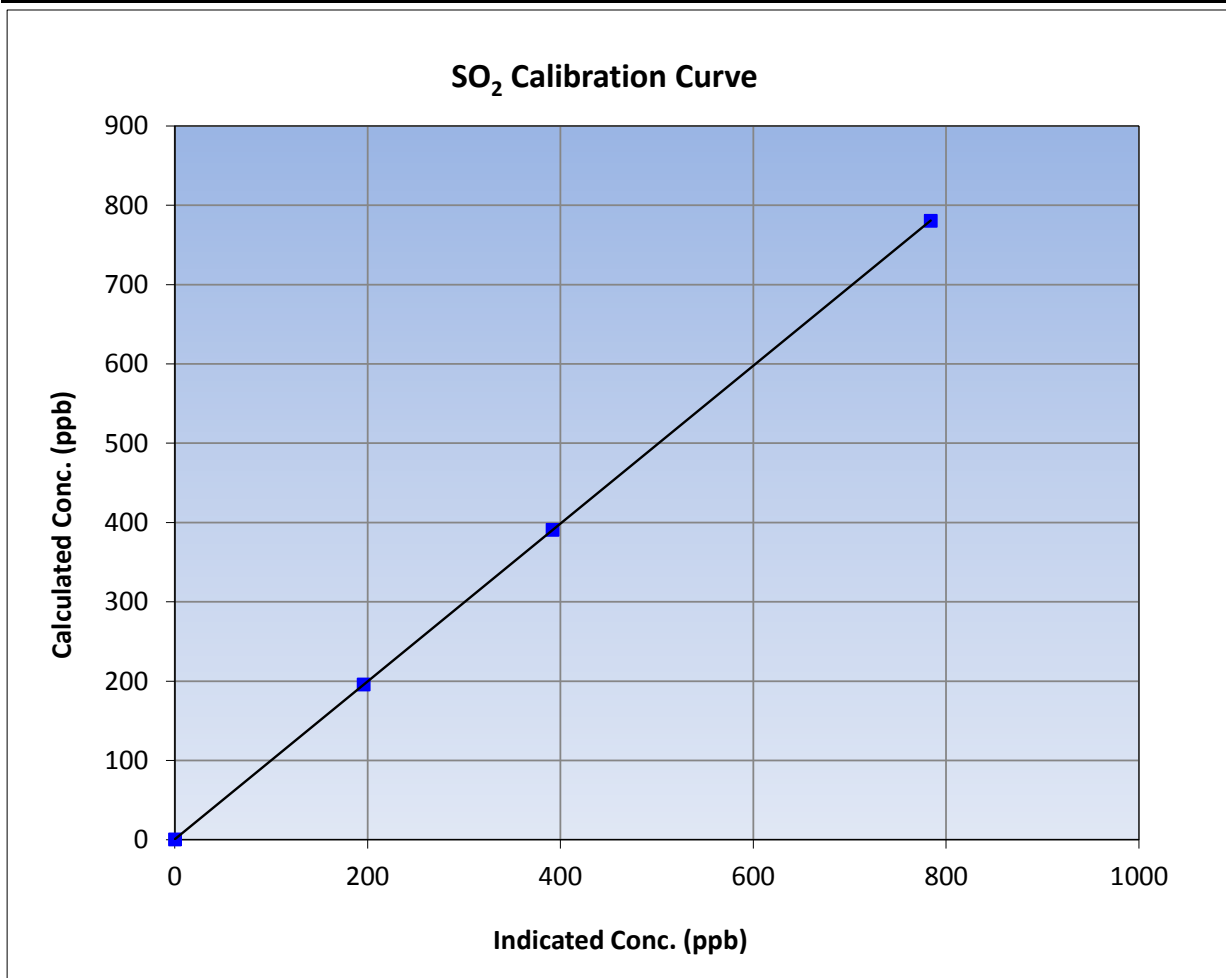
Version-03-2017

### Station Information

Calibration Date	October 24, 2017	Previous Calibration	September 28, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	7:15	End Time (MST)	10:20
Analyzer make	Thermo 43i	Analyzer serial #	1152430006

### Calibration Data

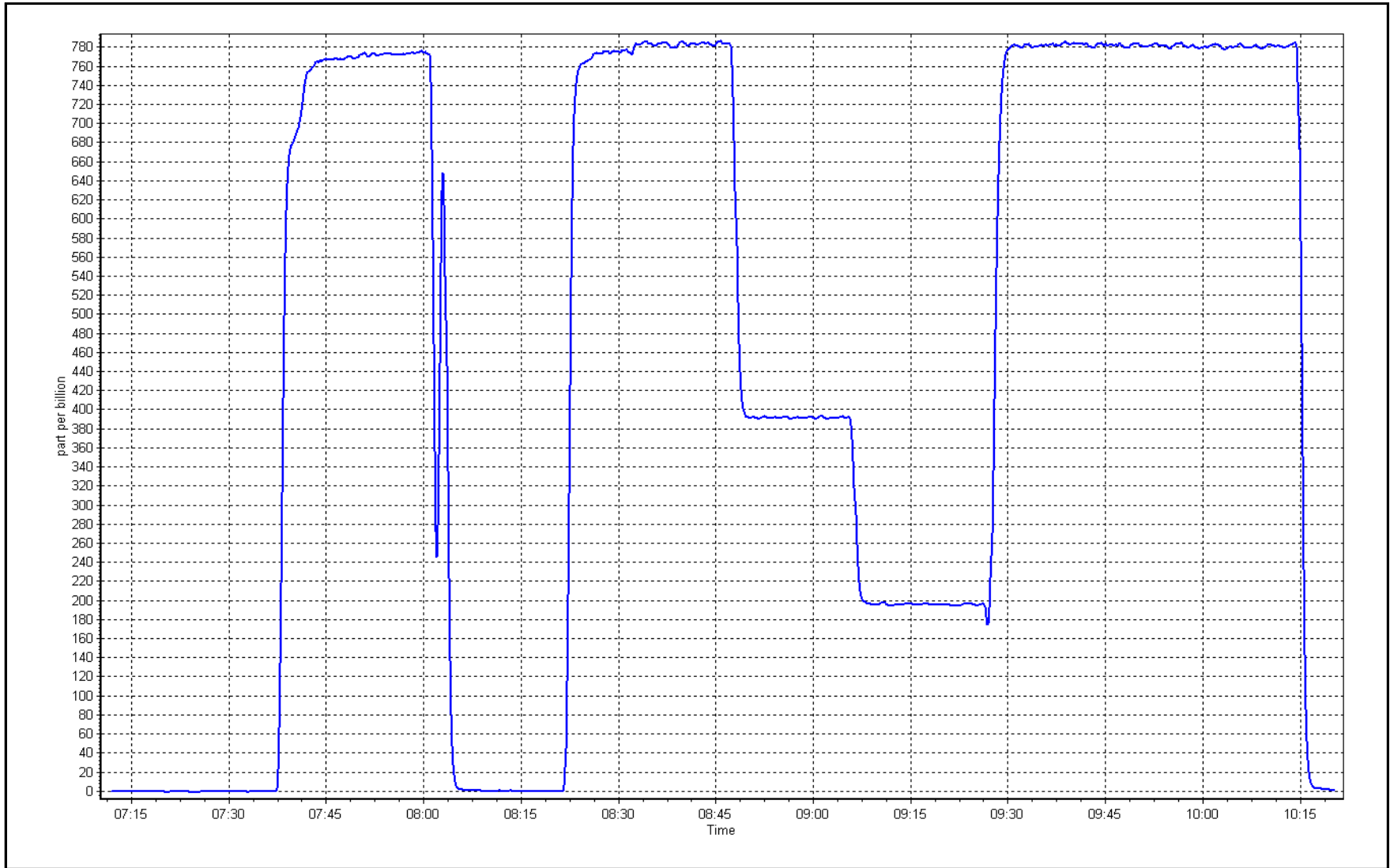
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	-0.2	----	Correlation Coefficient	0.999999	≥0.995
780.1	783.6	0.9956			
390.4	391.4	0.9975	Slope	0.995193	0.90 - 1.10
195.3	195.5	0.9991			
			Intercept	0.545800	+/-30



SO2 Calibration Plot

Date: 24-Oct

Location: Janvier







# Wood Buffalo Environmental Association

## TRS Calibration Summary

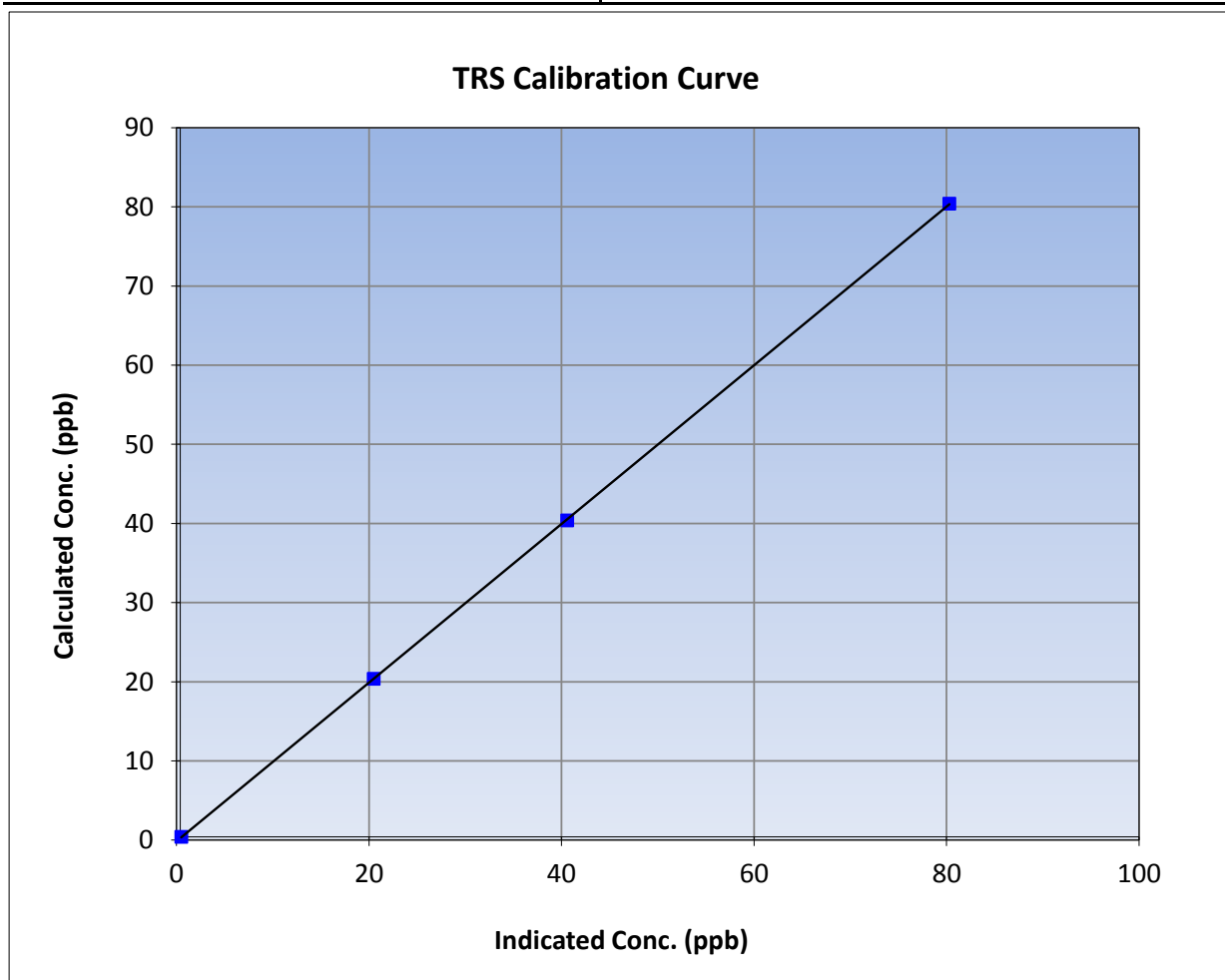
Version-03-2017

### Station Information

Calibration Date	October 24, 2017	Previous Calibration	September 29, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	11:05	End Time (MST)	13:20
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1151680031

### Calibration Data

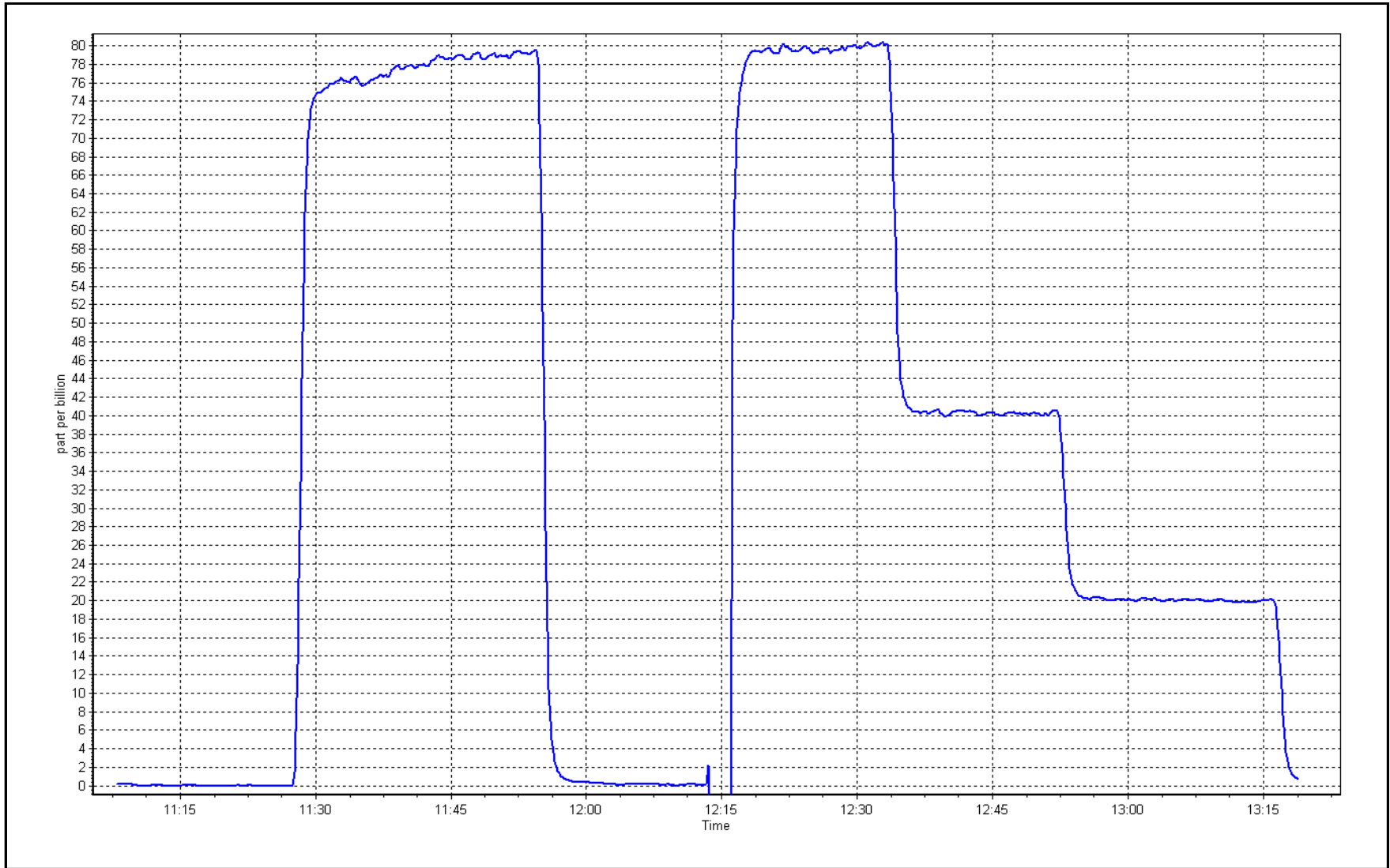
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.1	----	Correlation Coefficient	0.999991	
80.0	79.9	1.0013			≥0.995
40.0	40.2	0.9947	Slope	1.002475	
20.0	20.1	0.9950			0.90 - 1.10
			Intercept	-0.164059	+/-3



TRS Calibration Plot

Date: 24-Oct

Location: Janvier





# Wood Buffalo Environmental Association

## THC / NMHC Calibration Report

Version-03-2017

### Station Information

Station Name:	Janvier	Station number:	AMS 22
Calibration Date:	October 24, 2017	Last Cal Date:	September 5, 2017
Start time (MST):	7:15	End time (MST):	10:20
Reason:	Routine		

### Calibration Standards

Gas Cert Reference	LL107937	Cal Gas Expiry Date	September 8, 2018
CH4 Cal Gas Conc.	<u>509.0</u> ppm	CH4 Equiv Conc.	1056.3 ppm
C3H8 Cal Gas Conc.	<u>199.0</u> ppm	Station temp.	21 Deg C
Calibrator Model	Teledyne API 700	Serial Number	2447
ZAG make/model	Teledyne API 701	Serial Number	135

### Analyzer Information

Analyzer make: Thermo 55i

Analyzer serial #: 1501663728

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
THC Range (ppm)	0 - 50 ppm		Column Temp	75.0	75.0
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.2	175.1
CH4 SP Ratio	0.000188	0.000186	Flame Temp	405.0	405.0
CH4 Retention time	12.4	12.4	Carrier Pressure	36.7	36.7
NMHC SP Ratio	4.40E-05	4.39E-05	Fuel Pressure	44.9	44.9
NMHC Peak Area	195354	195744	Air Pressure	33.7	33.7

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
THC Cal Slope	0.994743	0.997150
THC Cal Offset	0.083254	0.062742
CH4 Cal Slope	0.995759	0.998250
CH4 Cal Offset	0.042951	0.042994
NMHC Cal Slope	0.993680	0.996166
NMHC Cal Offset	0.040511	0.019886

Notes:

Span adjusted. As lefts not completed.

Calibration Performed By:

Devin Russell



# Wood Buffalo Environmental Association

## THC / NMHC Calibration Report

Version-02-2017

### THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i>
as found zero	5009	0.0	0.00	0.00	----
as found span	4935	78.7	16.58	16.69	0.993
calibrator zero	5009	0.0	0.00	0.00	----
high point	4935	78.7	16.58	16.61	0.998
second point	4976	39.4	8.30	8.20	1.012
third point	4993	19.7	4.15	4.05	1.024
as left zero					
as left span					
<b>Average Correction Factor</b>					<b>1.012</b>
Corrected As found	16.69	Prev response	16.58	<b>*% change</b>	<b>-0.6%</b>

### NMHC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i>
as found zero	5009	0	0.00	0.00	----
as found span	4935	78.8	8.60	8.60	1.000
calibrator zero	5009	0	0.00	0.00	----
high point	4935	78.7	8.59	8.62	0.997
second point	4976	39.4	4.30	4.28	1.005
third point	4993	19.7	2.15	2.13	1.012
as left zero					
as left span					
<b>Average Correction Factor</b>					<b>1.005</b>
Corrected As found	8.60	Prev response	8.62	<b>*% change</b>	<b>0.2%</b>

### CH4 Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit= 0.95-1.05</i>
as found zero	5009	0.0	0.00	0.00	----
as found span	4935	78.7	7.99	8.09	0.988
calibrator zero	5009	0.0	0.00	0.00	----
high point	4935	78.7	7.99	7.99	1.000
second point	4976	39.4	4.00	3.92	1.020
third point	4993	19.7	2.00	1.93	1.038
as left zero					
as left span					
<b>Average Correction Factor</b>					<b>1.019</b>
Corrected As found	8.09	Prev response	7.98	<b>*% change</b>	<b>-1.3%</b>

\* = > +/-5% change initiates investigation



# Wood Buffalo Environmental Association

## THC Calibration Summary

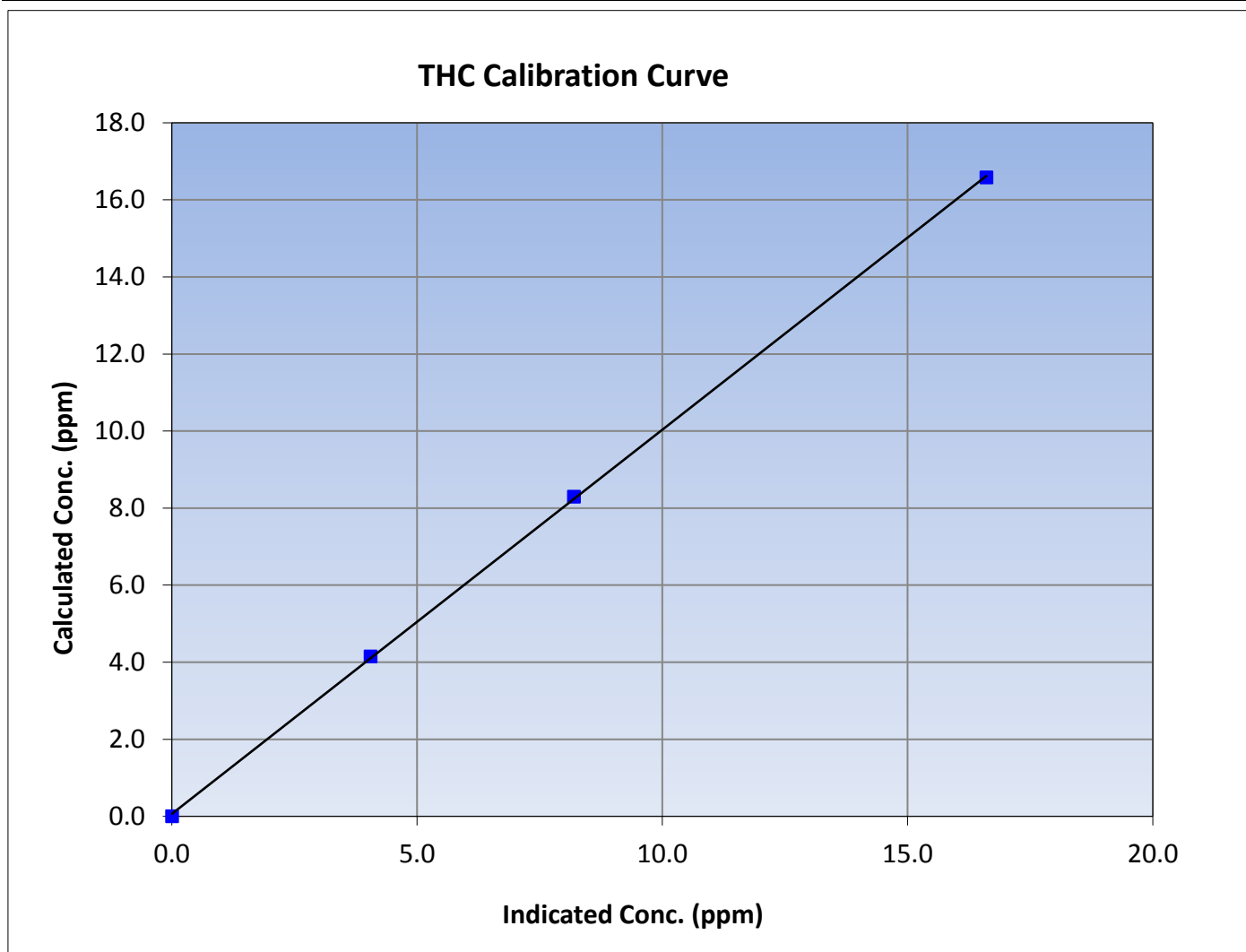
Version-02-2017

### Station Information

Calibration Date	October 24, 2017	Previous Calibration	August 10, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	7:15	End Time (MST)	10:20
Analyzer make	Thermo 55i	Analyzer serial #	1501663728

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.00	0.00	----	Correlation Coefficient	0.999922	$\geq 0.995$			
16.58	16.61	0.9985						
8.30	8.20	1.0119				Slope	0.997150	0.90 - 1.10
4.15	4.05	1.0245						
			Intercept	0.062742	$\pm 0.5$			







# Wood Buffalo Environmental Association

## CH<sub>4</sub> Calibration Summary

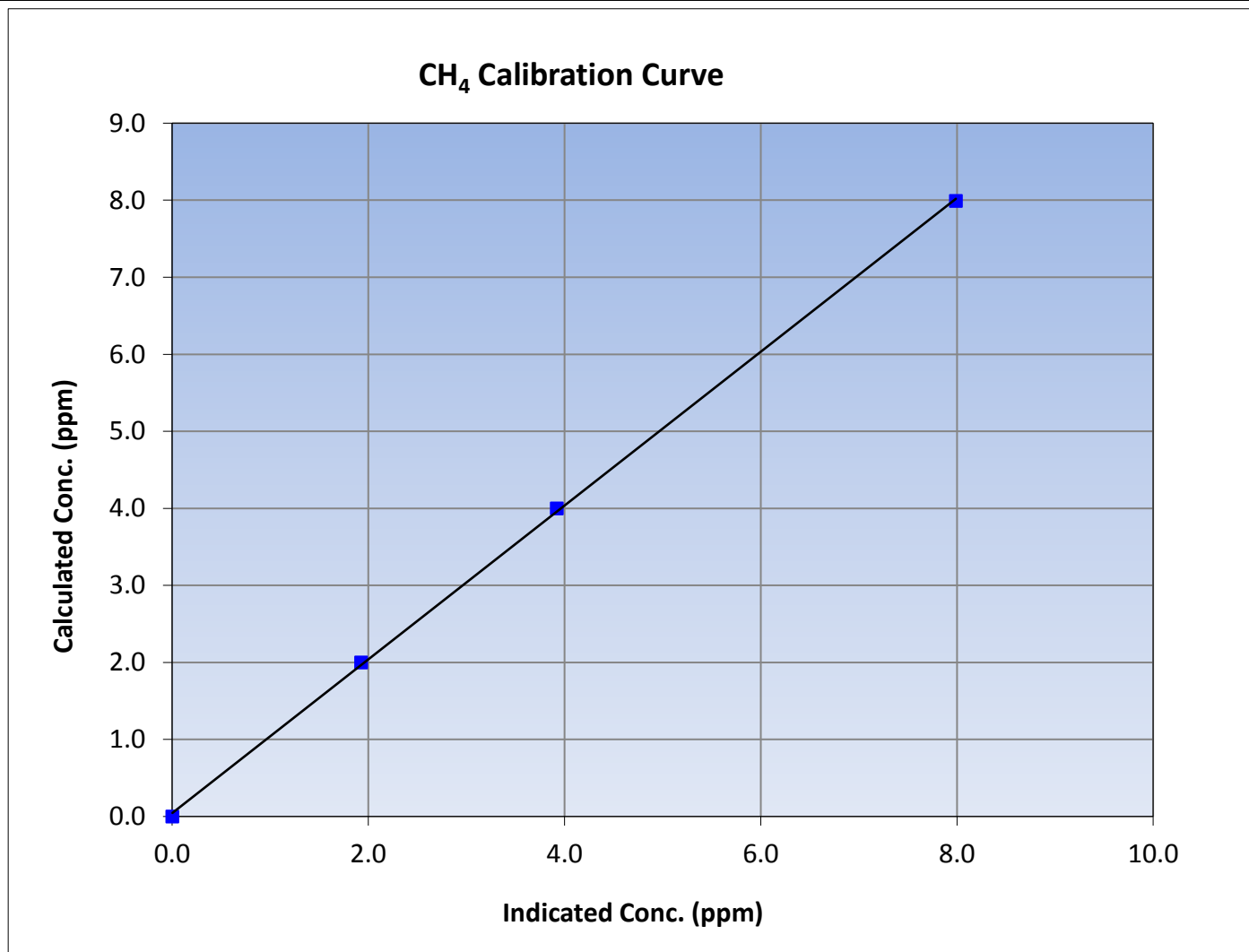
Version-02-2017

### Station Information

Calibration Date	October 24, 2017	Previous Calibration	August 10, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	7:15	End Time (MST)	10:20
Analyzer make	Thermo 55i	Analyzer serial #	1501663728

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.00	0.00	----	Correlation Coefficient	0.999837	$\geq 0.995$			
7.99	7.99	1.0001						
4.00	3.92	1.0198				Slope	0.998250	0.90 - 1.10
2.00	1.93	1.0375						
			Intercept	0.042994	$\pm 0.5$			





# Wood Buffalo Environmental Association

## NMHC Calibration Summary

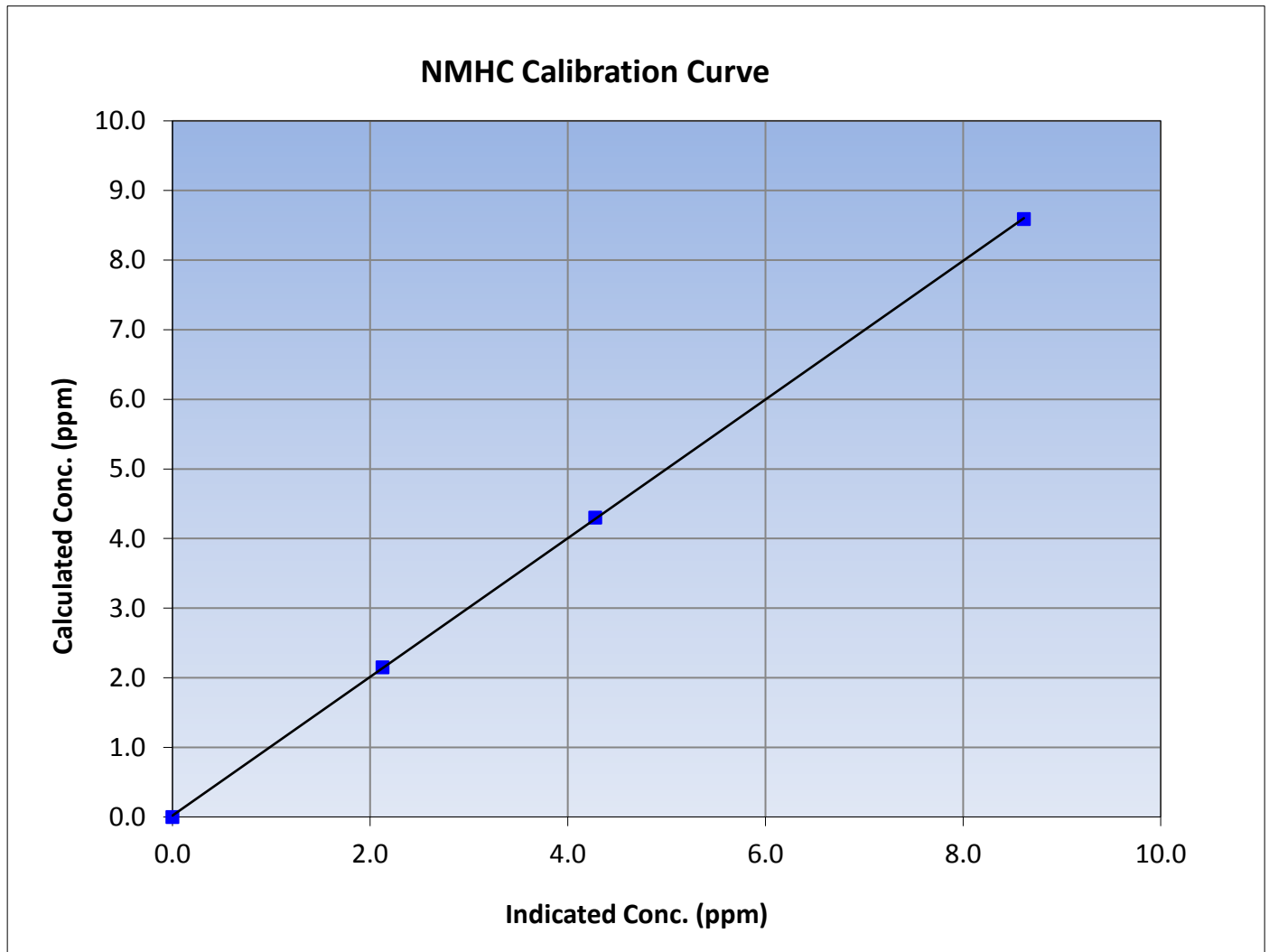
Version-02-2017

### Station Information

Calibration Date	October 24, 2017	Previous Calibration	August 10, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	7:15	End Time (MST)	10:20
Analyzer make	Thermo 55i	Analyzer serial #	1501663728

### Calibration Data

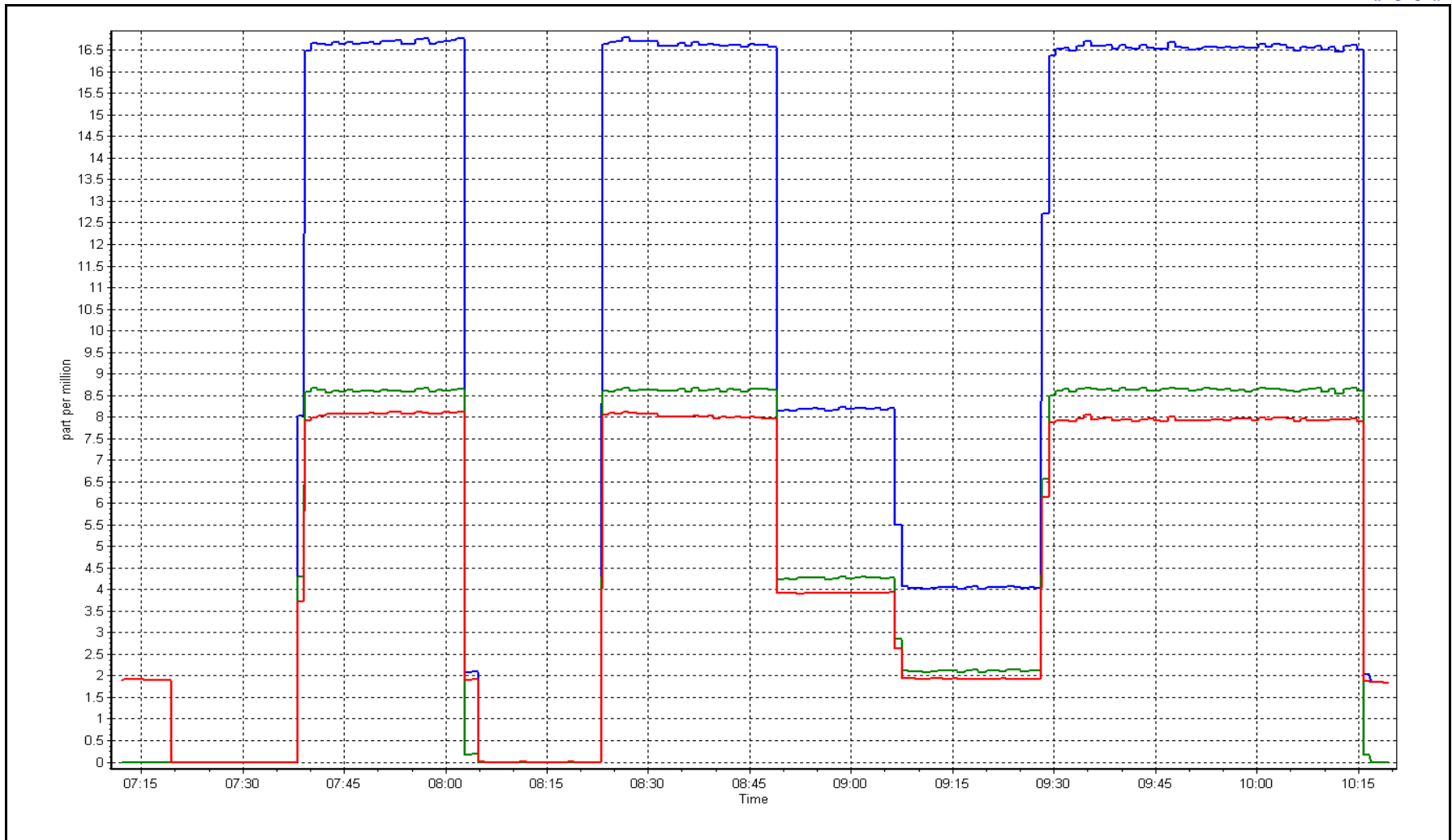
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation		<u>Limits</u>			
0.00	0.00	----	Correlation Coefficient	0.999973	$\geq 0.995$			
8.59	8.62	0.9970						
4.30	4.28	1.0052				Slope	0.996166	0.90 - 1.10
2.15	2.13	1.0121						
			Intercept	0.019886	$\pm 0.5$			



NMHC Calibration Plot

Date: October 24, 2017

Location: Janvier







# Wood Buffalo Environmental Association

## O<sub>3</sub> Calibration Summary

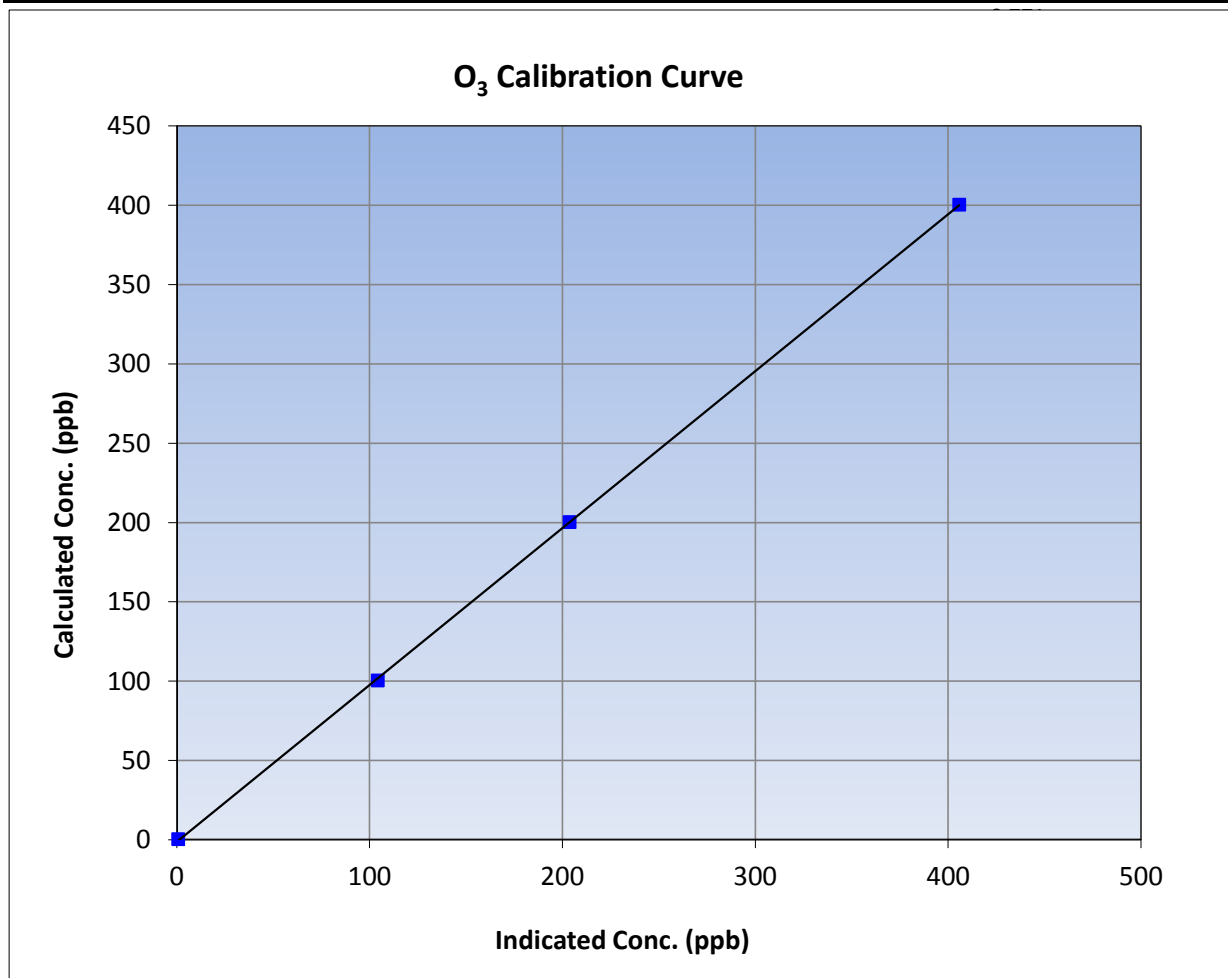
Version-03-2017

### Station Information

Calibration Date	October 12, 2017	Previous Calibration	September 15, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	10:34	End Time (MST)	13:49
Analyzer make	Thermo 49i	Analyzer serial #	1227254861

### Calibration Data

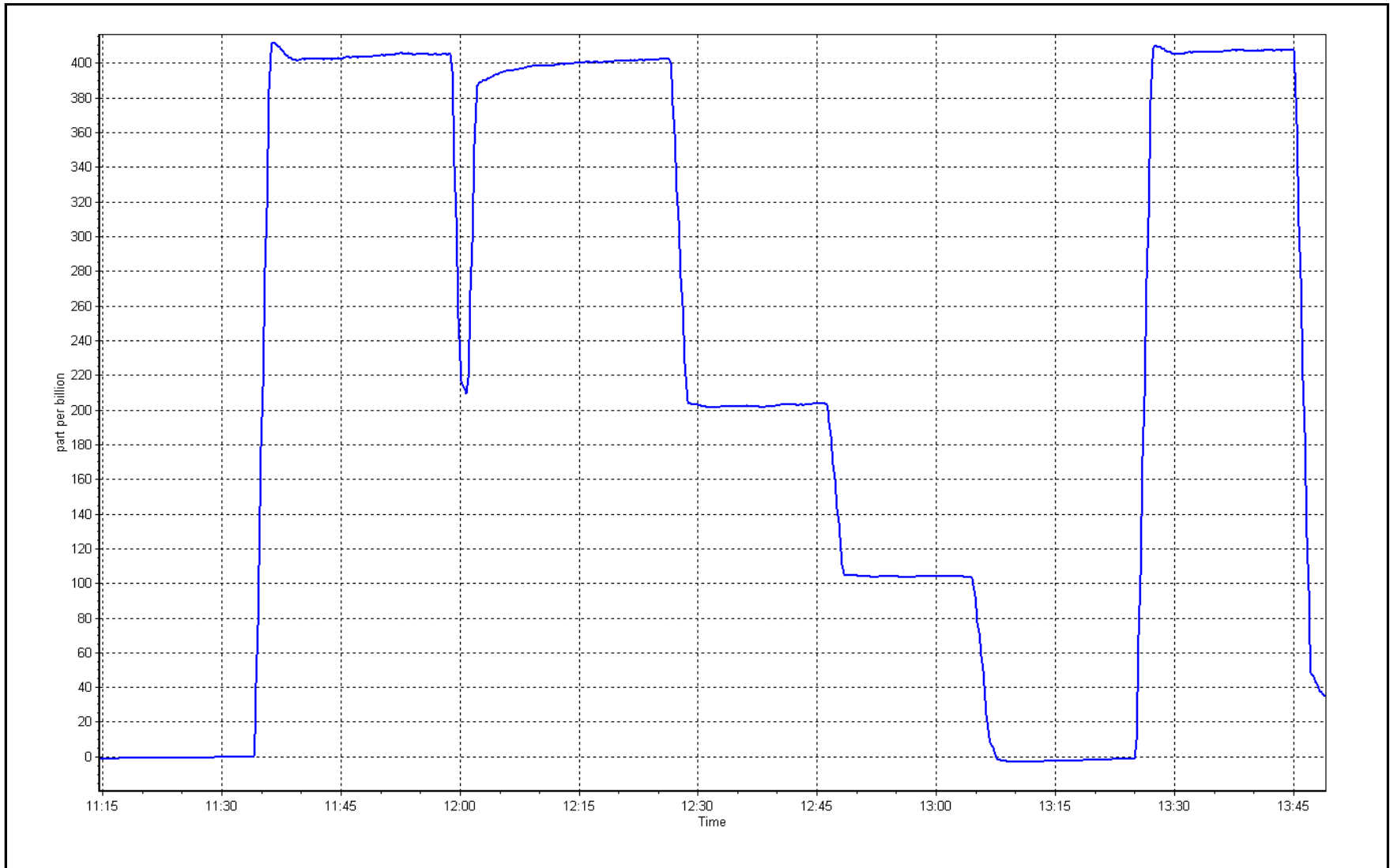
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	0.4	----	Correlation Coefficient	0.999964	<b>≥0.995</b>
400.0	405.4	0.9867	Slope	0.989392	<b>0.90 - 1.10</b>
200.0	203.3	0.9838	Intercept	-1.359137	<b>+/- 10</b>
100.0	103.9	0.9625			



O<sub>3</sub> Calibration Plot

Date: 12-Oct

Location: Janvier





# Wood Buffalo Environmental Association

## NO<sub>x</sub> - NO - NO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Janvier	Station number:	AMS 22
Calibration Date:	October 24, 2017	Last Cal Date:	September 28, 2017
Start time (MST):	7:15	End time (MST):	11:10
Reason:	Routine		

### Calibration Standards

NO Gas Cylinder #	LL107937	Cal Gas Expiry Date	Saturday, September 08, 2018
NOX Cal Gas Conc.	<u>50.9</u> ppb	NO Cal Gas Conc.	<u>50.9</u> ppb
Calibrator Model	API T700	Serial Number	2447
ZAG make/model	Teledyne API T701	Serial Number	135

### Analyzer Information

Analyzer make: API T200		Analyzer serial #: 722	
	<u>Start</u>	<u>Finish</u>	
NO coefficient	0.948	0.948	NOX Range (ppb)
NOX coefficient	0.938	0.938	0 - 1000 ppb
NO2 coefficient	1.000	1.000	PMT Temperature
NO bkgrnd	-3.8	-3.8	6.8
NOX bkgrnd	-0.3	-0.3	6.8
			Reaction cell Press
			3.3
			Sample Flow
			462
			PMT Voltage
			798
			798

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope	0.999876	0.997664
NO <sub>x</sub> Cal Offset	0.711965	0.411734
NO Cal Slope	1.000814	0.996005
NO Cal Offset	0.059561	0.718672
NO <sub>2</sub> Cal Slope	1.009223	1.005941
NO <sub>2</sub> Cal Offset	0.844914	1.779113



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

Version-03-2017

### Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5009	0.0	0.0	0.0	0.0	0.4	1.5	-1.1	----	----
as found span	4935	78.7	799.0	799.0	0.0	796.7	795.5	1.2	1.0029	1.0044
calibrator zero	5009	0.0	0.0	0.0	0.0	-0.2	1.2	-1.4	----	----
high point	4935	78.7	799.0	799.0	0.0	800.4	802.2	-1.7	0.9982	0.9960
second point	4976	39.4	399.9	399.9	0.0	400.7	400.4	0.3	0.9979	0.9987
third point	4993	19.7	200.0	200.0	0.0	199.6	197.8	1.8	1.0022	1.0113
as left zero										
as left span										
<b>Average Correction Factor</b>									0.9994	1.0020

Corrected As found	NO <sub>x</sub> = 796.3 ppb	NO = 794.0 ppb	*Percent Change	NO <sub>x</sub> = 0.3%
Previous Response	NO <sub>x</sub> = 798.4 ppb	NO = 798.3 ppb	*Percent Change	NO = 0.5%

\* = > +/-5% change initiates investigation

### GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
1st NO ref point		0.0	800.5	801.6	-1.0	0.9981	0.9967	----	----
1st NO2 (400 ppb O3)	394.4	407.2	797.8	394.4	403.5	1.0015	----	1.0092	99.1%
2nd NO2 (200 ppb O3)	585.4	216.2	797.6	585.4	212.2	1.0017	----	1.0189	98.1%
3rd NO2 (100 ppb O3)	692.6	109.0	799.3	692.6	106.7	0.9996	----	1.0216	97.9%
2nd NO ref point	----	0.0	796.5	800.2	-3.6	1.0031	0.9985	----	----
<b>Average Correction Factor</b>						1.0015	0.9976	1.0165	98.4%

Notes: No adjustments made. As lefts not completed.

Calibration Performed By: Devin Russell





# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

Version-03-2017

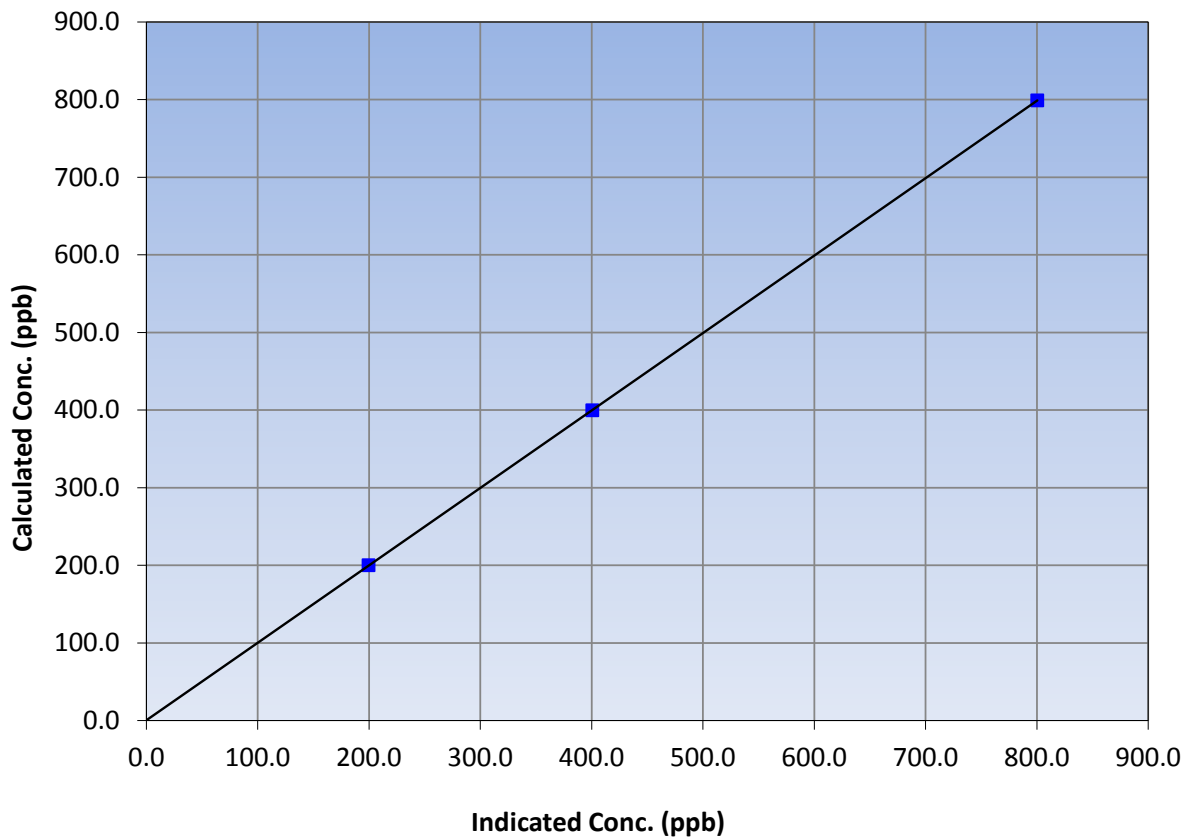
### Station Information

Calibration Date	October 24, 2017	Previous Calibration	September 28, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	7:15	End Time (MST)	11:10
Analyzer make	API T200	Analyzer serial #	722

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	-0.2	----	Correlation Coefficient	≥0.995	
799.0	800.4	0.9982			
399.9	400.7	0.9979			
200.0	199.6	1.0022			
			Slope	0.997664	0.90 - 1.10
			Intercept	0.411734	+/-20

NO<sub>x</sub> Calibration Curve





# Wood Buffalo Environmental Association

## NO Calibration Summary

Version-03-2017

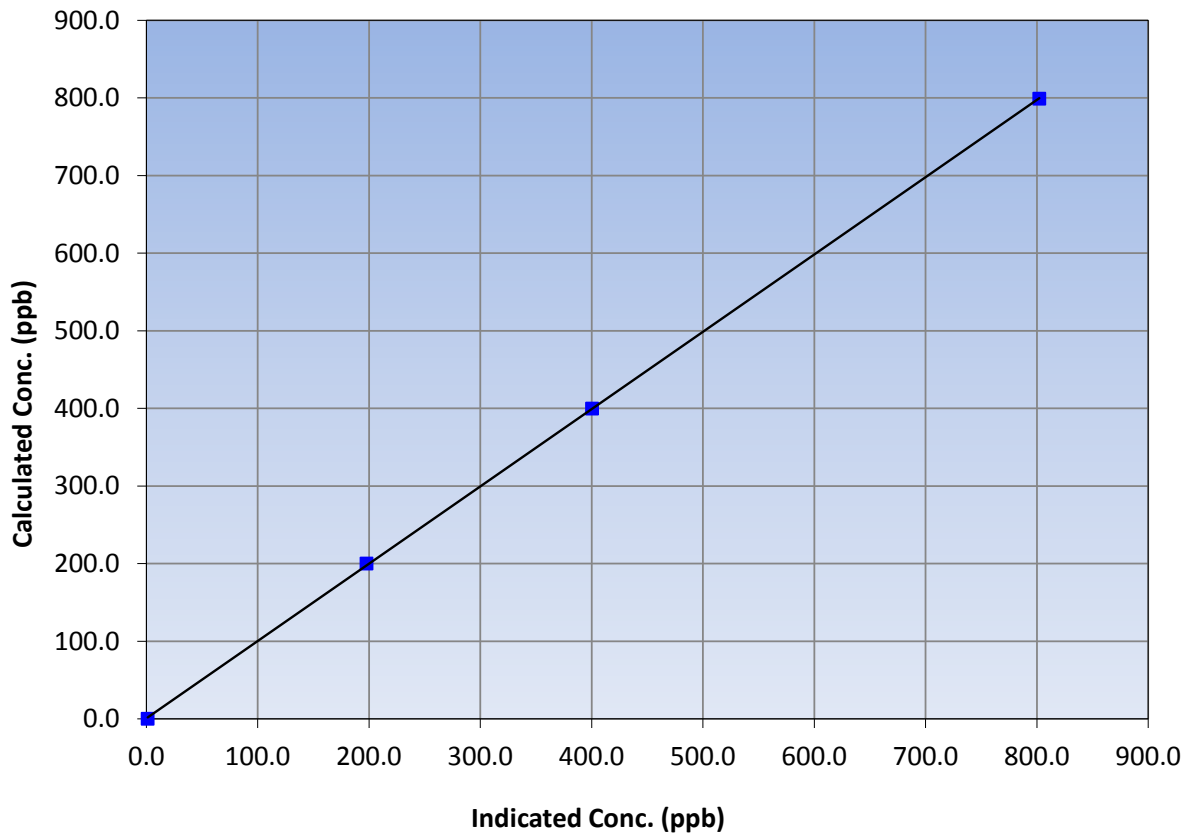
### Station Information

Calibration Date	October 24, 2017	Previous Calibration	September 28, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	7:15	End Time (MST)	11:10
Analyzer make	API T200	Analyzer serial #	722

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	1.2	----	Correlation Coefficient	≥0.995	
799.0	802.2	0.9960			
399.9	400.4	0.9987			
200.0	197.8	1.0113			
			Slope	0.996005	0.90 - 1.10
			Intercept	0.718672	+/-20

NO Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

Version-03-2017

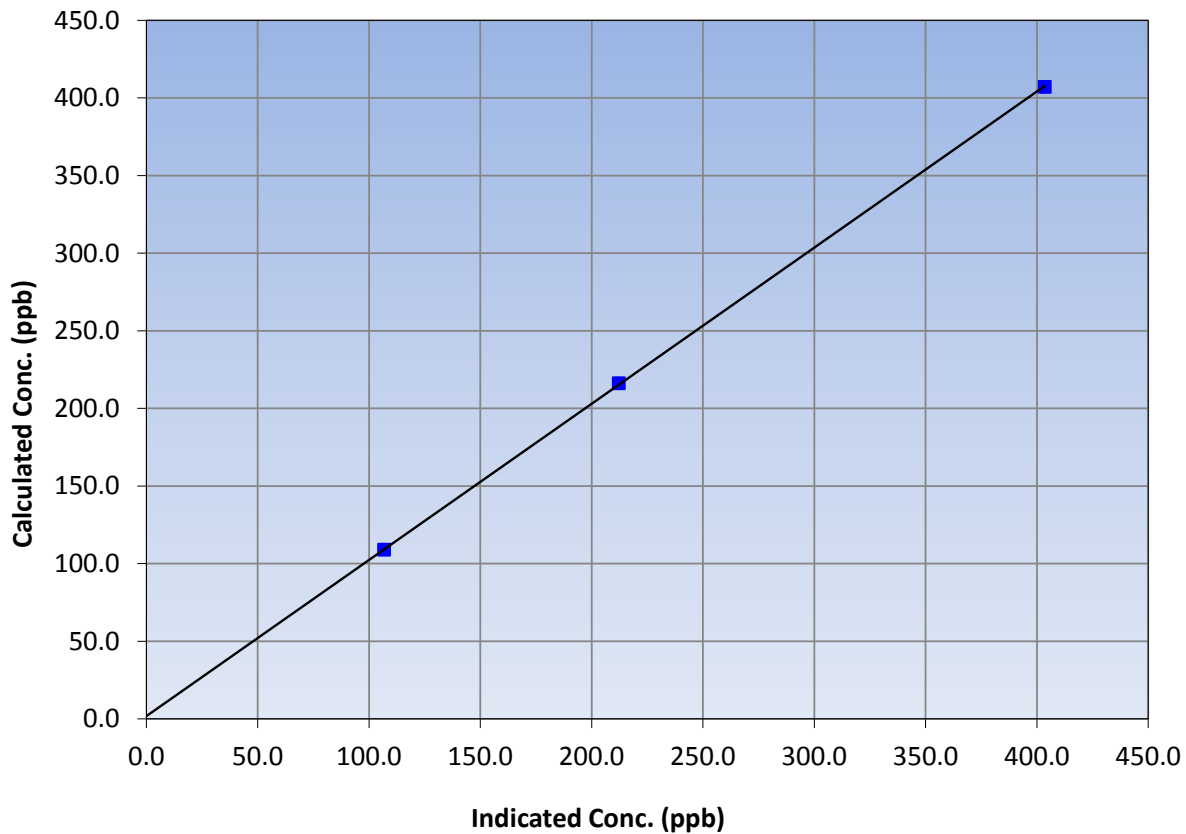
### Station Information

Calibration Date	October 24, 2017	Previous Calibration	September 28, 2017
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	7:15	End Time (MST)	11:10
Analyzer make	API T200	Analyzer serial #	722

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	-1.4	----	Correlation Coefficient	≥0.995	
407.2	403.5	1.0092			
216.2	212.2	1.0189			
109.0	106.7	1.0216			
			Slope	1.005941	0.90 - 1.10
			Intercept	1.779113	+/-20

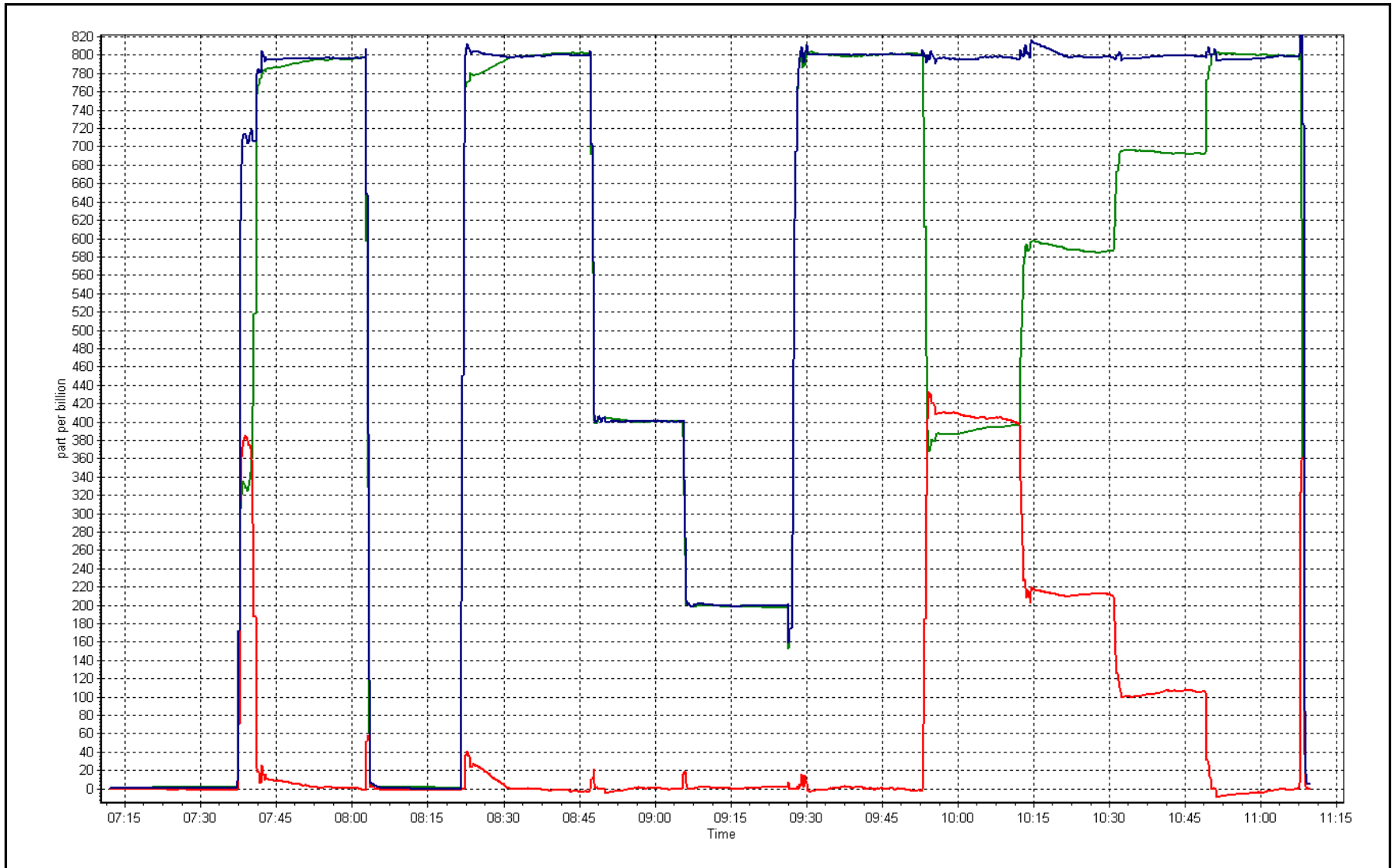
**NO<sub>2</sub> Calibration Curve**



NO<sub>x</sub> Calibration Plot

Date: 24-Oct

Location: Janvier





# Wood Buffalo Environmental Association

## SHARP PM<sub>2.5</sub> CALIBRATION

Version-08-2016

### Station Information

Station Name:	Janvier	Station number:	AMS 22
Calibration Date:	October 24, 2017	Last Cal Date:	September 28, 2017
Start time (MST):	9:30	End time (MST):	10:30
Sharp Model:	Thermo 5030 SHARP	S/N:	E-1333
Particulate Fraction:	PM2.5	C14 Source S/N:	5341
Flow Standard Model:	Delta-Cal	S/N:	628
Temp/RH standard:	Delta-Cal	S/N:	628

### Monthly Calibration Test

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<u>Tolerance</u>
T1 (°C)	13	14	13	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	952	951.25	952	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	1024	1000	<input checked="" type="checkbox"/>	+/- 50 LPH
Nephelometer zero	-0.5	---	-0.5	<input type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified <input checked="" type="checkbox"/>				
Cyclone cleaning :	PM10 Cyclone <input checked="" type="checkbox"/>		PM2.5 Cyclone <input checked="" type="checkbox"/>		
Filter Tape Installed:	<input type="checkbox"/>				

### Quarterly Calibration Test

Leak Test:	Date of check: _____	Last Cal Date:	<u>August 16, 2017</u>	<u>Tolerance</u>
	Flow w/o adaptor: _____	Flow w/ adaptor: _____		0.4 LPM

### Annual Calibration Test

Foil Calibration	Foil Mass: _____	S/N: _____
	Date of check: _____	Last Cal Date: _____
	New Correction Factor: _____	7036 _____

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<u>Tolerance</u>
T2 (°C)				<input type="checkbox"/>	+/- 2 °C
T3 (°C)				<input type="checkbox"/>	+/- 2 °C
T4 (°C)				<input type="checkbox"/>	+/- 2 °C
RH (%)				<input type="checkbox"/>	+/- 10%

Notes: Cyclone head cleaned. Flow adjusted.

Calibration by: Devin Russell



## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

**CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT**

**AMS 23  
FORT HILLS  
OCTOBER 2017**

Operations, Data Collection,  
QA/QC, Data Validation and Reporting by:  
Wood Buffalo Environmental Association  
Fort McMurray, Alberta

November 29, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT HILLS (AMS 23)  
OCTOBER 2017

MONTHLY SUMMARY for  
AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	703	41	41	100	12	0	3	0
TRS(ppb) Average	701	40	43	99.6	1	0	1	0
THC(ppm) Average	701	41	43	99.73	4	-	2	-
NO2 (ppb) Average	703	41	41	100	32	0	14	-
NO (ppb) Average	703	41	41	100	112	-	18	-
NOX (ppb) Average	703	41	41	100	144	-	29	-
PM2.5 (ug/m3) Average	715	1	29	96.24	64	-	10	0
Temperature 2 m (C) Average	744	0	0	100	23	-	14	-
Relative Humidity (%) Average	744	0	0	100	99	-	99	-
Wind Speed 10 m (km/h) Average	718	0	26	96.51	34	-	23	-
Wind Direction 10 m (deg) Average	718	0	26	96.51	-	-	-	-

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT HILLS (AMS 23)  
OCTOBER 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	703	0.5	1	-	0	0	0	0	0	1	12
TRS (ppb) Average	701	0.2	0	-	0	0	0	0	0	0	1
THC (ppm) Average	701	2.1	0	-	2	2	2	2	2	2	4
NO2 (ppb) Average	703	5.5	6	-	0	0	1	3	8	15	32
NO (ppb) Average	703	3.5	10	-	0	0	0	0	2	10	112
NOX (ppb) Average	703	9	15	-	0	1	1	3	10	24	144
PM2.5 (ug/m3) Average	715	4.2	5	-	0	1	1	2	6	9	64
Temperature 2 m (C) Average	744	3.5	4	-	0	0	0	2	5	9	23
Relative Humidity (%) Average	744	75.2	16	-	31	53	65	76	88	95	99
Wind Speed 10 m (km/h) Average	718	12.5	7	-	0	4	7	11	17	23	34
Wind Direction 10 m (deg) Average	718	-	-	-	-	-	-	-	-	-	-



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT HILLS (AMS 23)  
OCTOBER 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS	04 Oct 2017 11:00	04 Oct 2017 11:00	1	Maintenance - manifold cleaning
TRS	10 Oct 2017 12:00	10 Oct 2017 13:00	2	Maintenance - WBEA internal audit
THC	10 Oct 2017 13:00	10 Oct 2017 14:00	2	Maintenance - WBEA internal audit
PM2.5	01 Oct 2017 11:00	01 Oct 2017 11:00	1	Unstable operation - excessive baseline drift
PM2.5	01 Oct 2017 13:00	01 Oct 2017 21:00	9	Unstable operation - excessive baseline drift
PM2.5	02 Oct 2017 00:00	02 Oct 2017 09:00	10	Unstable operation - excessive baseline drift
PM2.5	02 Oct 2017 11:00	02 Oct 2017 12:00	2	Unstable operation - excessive baseline drift
PM2.5	03 Oct 2017 01:00	03 Oct 2017 02:00	2	Unstable operation - excessive baseline drift
PM2.5	03 Oct 2017 09:00	03 Oct 2017 12:00	4	Unstable operation - excessive baseline drift
Wind Speed, Wind Direction	22 Oct 2017 02:00	23 Oct 2017 03:00	26	Flat line in sensor output signal - Sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb

Fort Hills - October 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 12 ppb on Oct 27 13:00	Maximum Daily Average: 2.6 ppb on Oct 27		Hours of Data:	703
Minimum Value: 0 ppb on Oct 2 21:00	Minimum Daily Average: 0.1 ppb on Oct 18		Hours of Missing Data:	41
Maximum Diurnal Average: 0.8 ppb at hour 19	Minimum Diurnal Average: 0.2 ppb at hour 2		Hours of Calibration:	41
Monthly Average: 0.5 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 6		Percent Operational Time:	100.0

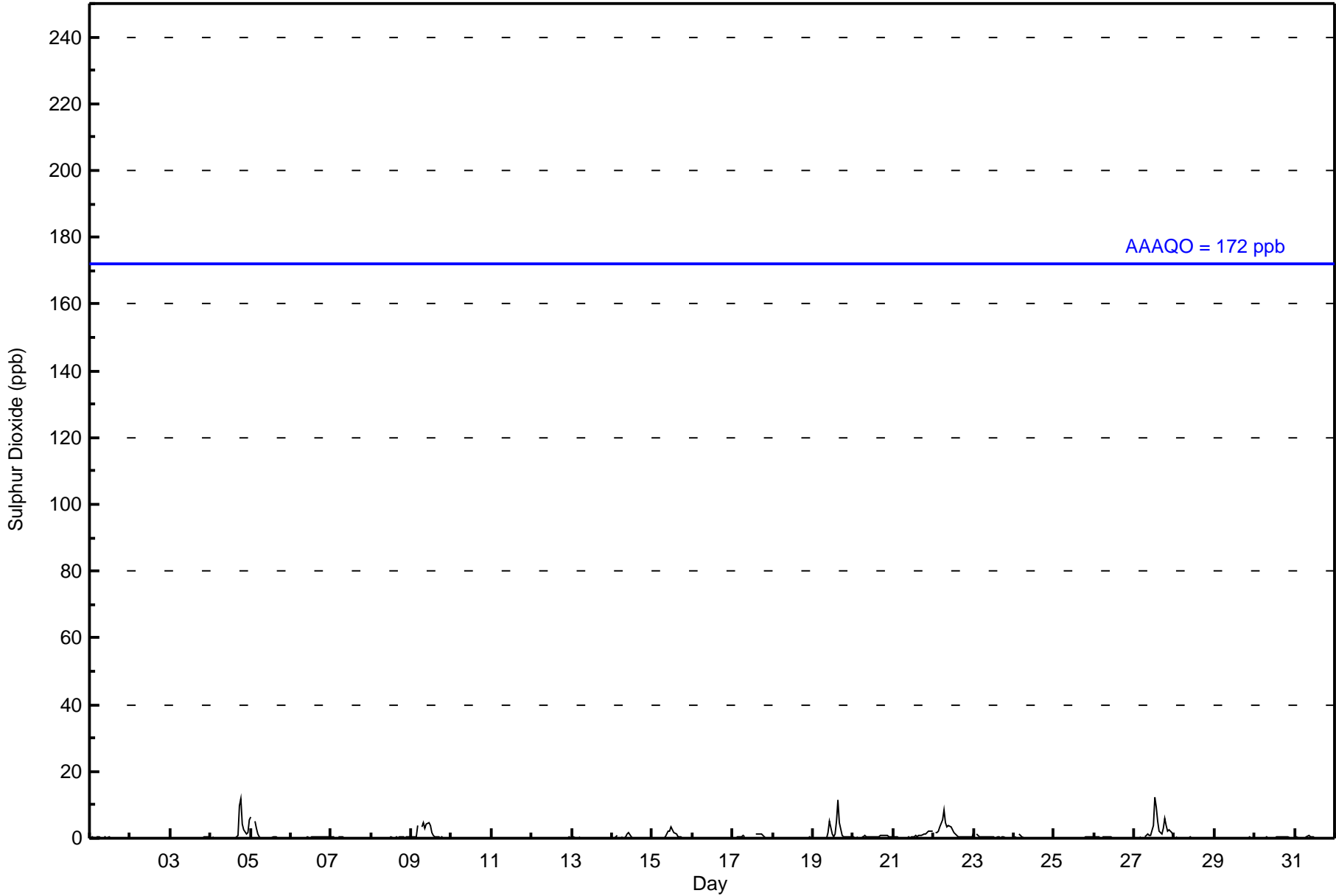
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
2-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
3-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
4-Oct	Z	0	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	2.1	12	
5-Oct	7	Z	5	3	1	0	0	0	0	0	0	0	0	0	0	0	0	1	10	12	4	2	1	2	6	0.8	7
6-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
7-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
8-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
9-Oct	0	0	0	1	4	Z	3	5	3	4	5	4	2	1	0	0	0	0	0	0	0	0	0	0	1.5	5	
10-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
11-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
12-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
13-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
14-Oct	0	0	0	1	Z	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2	
15-Oct	0	0	0	0	0	Z	0	0	0	2	2	3	2	1	1	1	0	0	0	0	0	0	0	0	0.7	3	
16-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
17-Oct	0	Z	0	0	1	1	1	0	C	C	C	C	C	C	1	1	1	1	1	1	0	0	0	0	--	1	
18-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
19-Oct	0	0	0	Z	0	0	0	0	0	2	5	1	0	1	5	11	5	1	0	0	0	0	0	0	1.5	11	
20-Oct	0	0	0	0	Z	0	1	1	0	0	1	1	0	0	0	0	1	1	1	1	1	1	0	0	0.5	1	
21-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	2	2	2	2	0.7	2	
22-Oct	Z	2	1	2	4	5	8	5	4	4	3	2	2	1	1	1	1	1	1	0	0	0	0	0	2.1	8	
23-Oct	2	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2	
24-Oct	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
25-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
26-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
27-Oct	0	0	0	0	0	Z	1	1	1	1	1	4	12	9	5	2	1	3	6	4	2	3	2	1	2.6	12	
28-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
29-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
30-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
31-Oct	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
	0.5	0.2	0.5	0.4	0.5	0.4	0.6	0.5	0.4	0.6	0.7	0.6	0.8	0.6	0.6	0.7	0.5	0.7	0.8	0.5	0.4	0.3	0.3	0.4	Diurnal Average		
	7	2	5	3	4	5	8	5	4	4	5	4	12	9	5	11	5	10	12	4	2	3	2	6	Diurnal Maximum		

Z - zerospan      C - Calibration  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb    24-hr 48 ppb



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort Hills - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort Hills - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	700	99.57	99.57
11 - 20	3	0.43	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort Hills - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	59	94	16	4	7	6	5	33	77	66	84	45	21	47	40	71	675
11 - 20	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	3
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	59	94	16	4	7	6	5	35	77	67	84	45	21	47	40	71	678

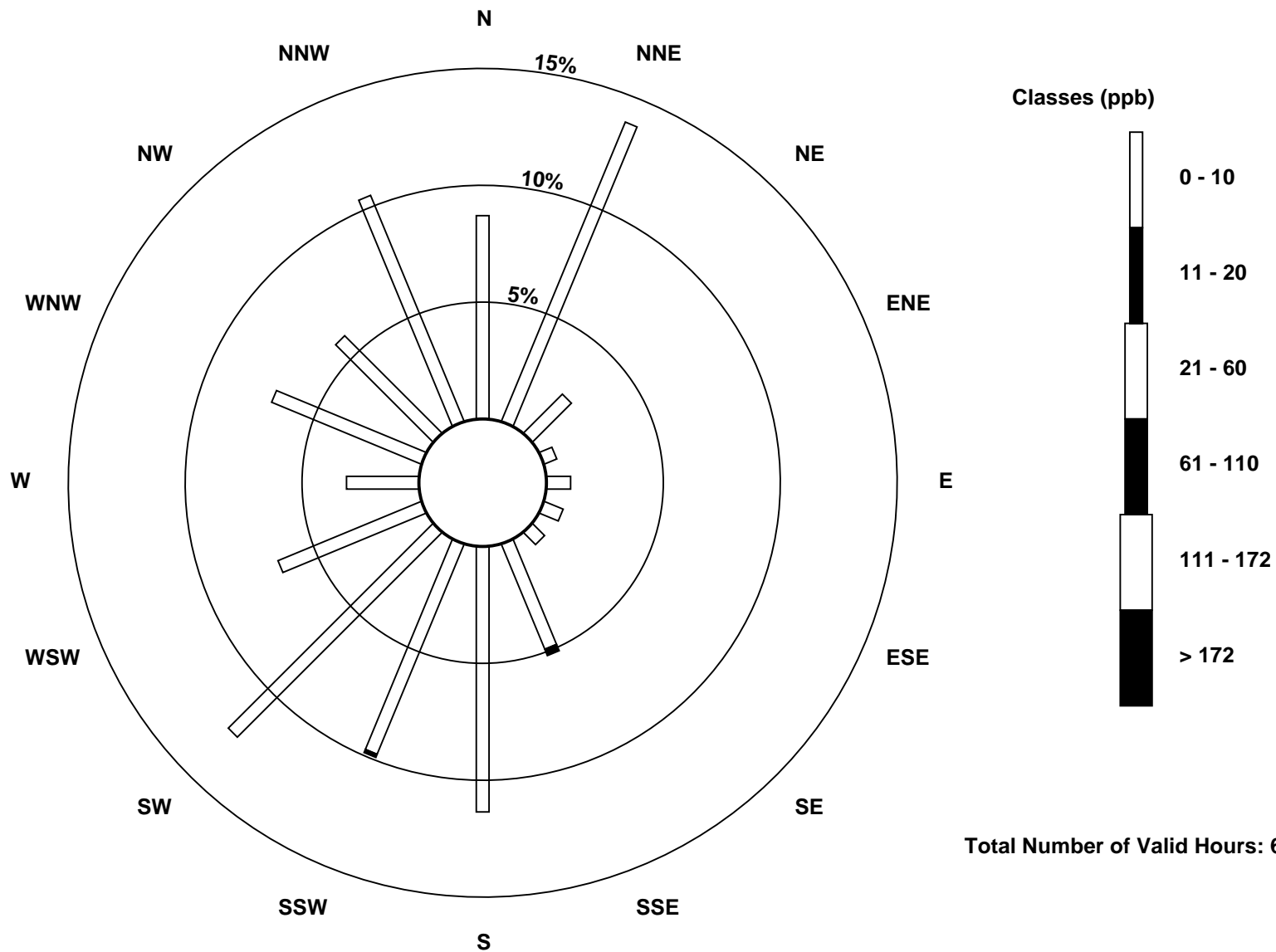
Total Number of Valid Hours: 678

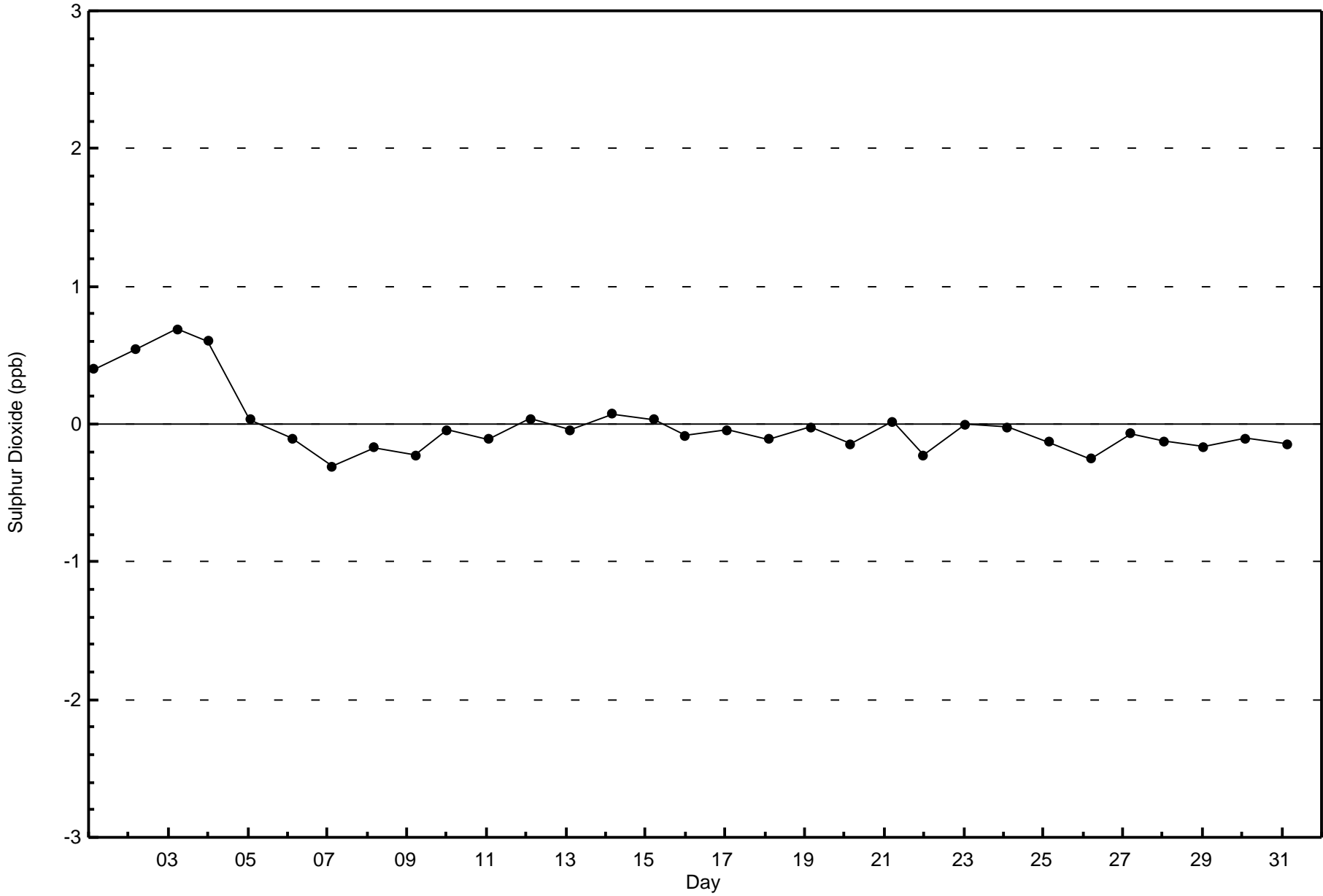
Total Number of Hours: 744

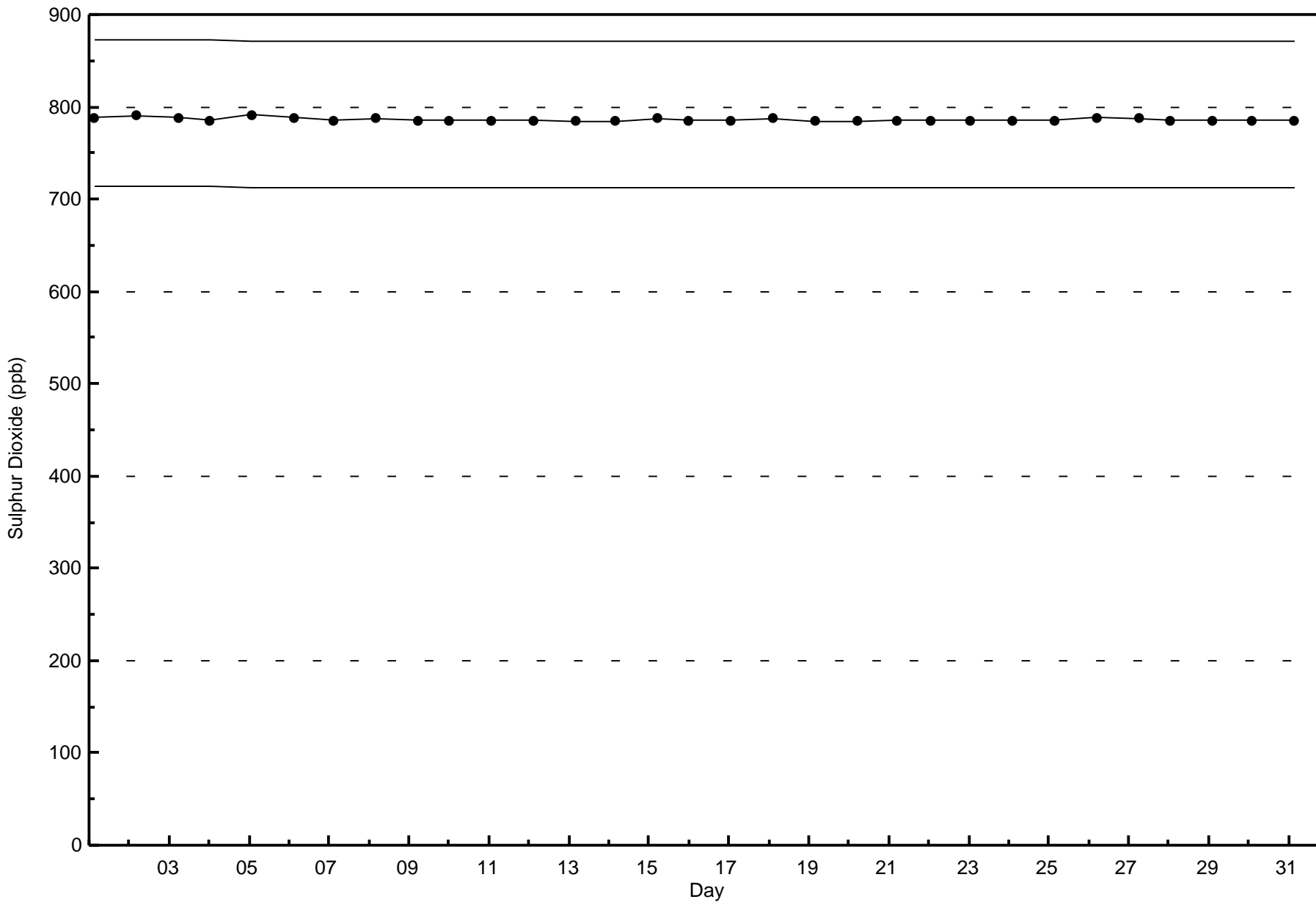


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort Hills (AMS 23)











Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

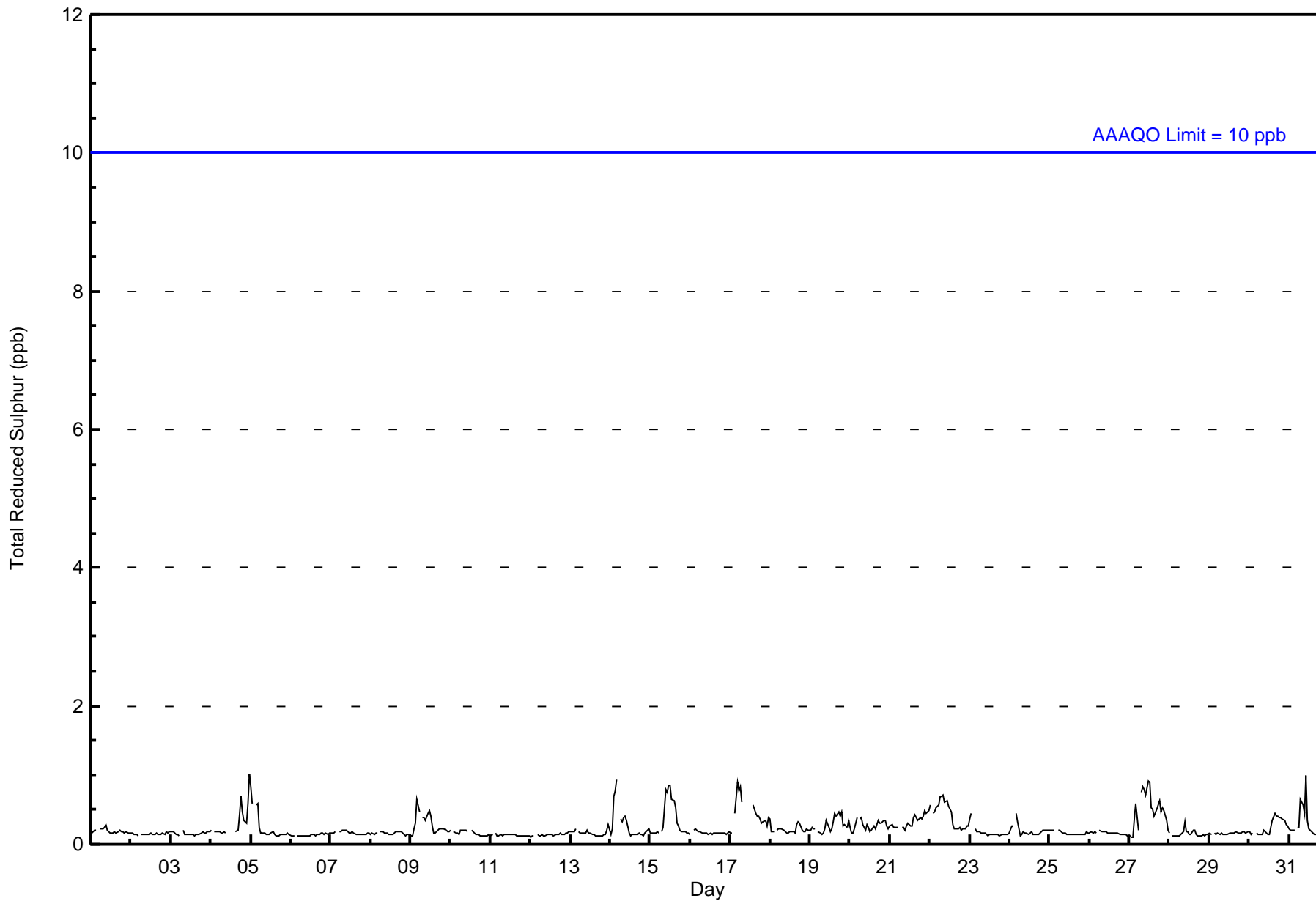
Fort Hills - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 1 ppb on Oct 5 00:00      Maximum Daily Average: 0.5 ppb on Oct 27																	Hours in Service: 744 Hours of Data: 701									
Minimum Value: 0 ppb on Oct 27 02:00      Minimum Daily Average: 0.1 ppb on Oct 11 Maximum Diurnal Average: 0.3 ppb at hour 5      Minimum Diurnal Average: 0.2 ppb at hour 2 Monthly Average: 0.2 ppb      Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 1																	Hours of Missing Data: 43 Hours of Calibration: 40 Percent Operational Time: 99.6									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
3-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-Oct	0	Z	0	0	0	0	0	0	0	0	M	0	C	C	C	0	0	0	1	0	0	0	1	1	0.3	1
5-Oct	1	1	Z	1	1	0	0	0	0	0	0	0	C	C	0	0	0	0	0	0	0	0	0	0	0.2	1
6-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
7-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
8-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
9-Oct	0	0	0	0	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
10-Oct	0	Z	0	0	0	0	0	0	0	0	0	M	M	0	0	0	0	0	0	0	0	0	0	0	0.2	0
11-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
12-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
13-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
14-Oct	0	0	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
15-Oct	0	0	0	0	0	0	Z	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.4	1
16-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
17-Oct	0	0	Z	0	1	1	1	1	C	C	C	C	C	C	1	0	0	0	0	0	0	0	0	0	--	1
18-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
19-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
20-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
21-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
22-Oct	1	Z	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1
23-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
24-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
25-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
26-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
27-Oct	0	0	0	0	1	0	Z	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1	0	0	0.5	1
28-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
29-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
30-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
31-Oct	0	0	0	0	Z	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
0.2 0.2 0.2 0.3 0.3 0.2 0.2 0.3 0.2 0.3 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2																								Diurnal Average		
1 0 1 0 1 1																								Diurnal Maximum		
Z - zerospan      C - Calibration      M - Maintenance Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb      24-hr 3 ppb																										



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Total Reduced Sulphur (TRS) - ppb**  
**Fort Hills - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Fort Hills - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	701	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 701

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Fort Hills - October 2017**

<b>Concentration</b> <b>Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	60	91	17	5	7	5	4	36	78	63	86	46	21	49	39	70	677
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	60	91	17	5	7	5	4	36	78	63	86	46	21	49	39	70	677

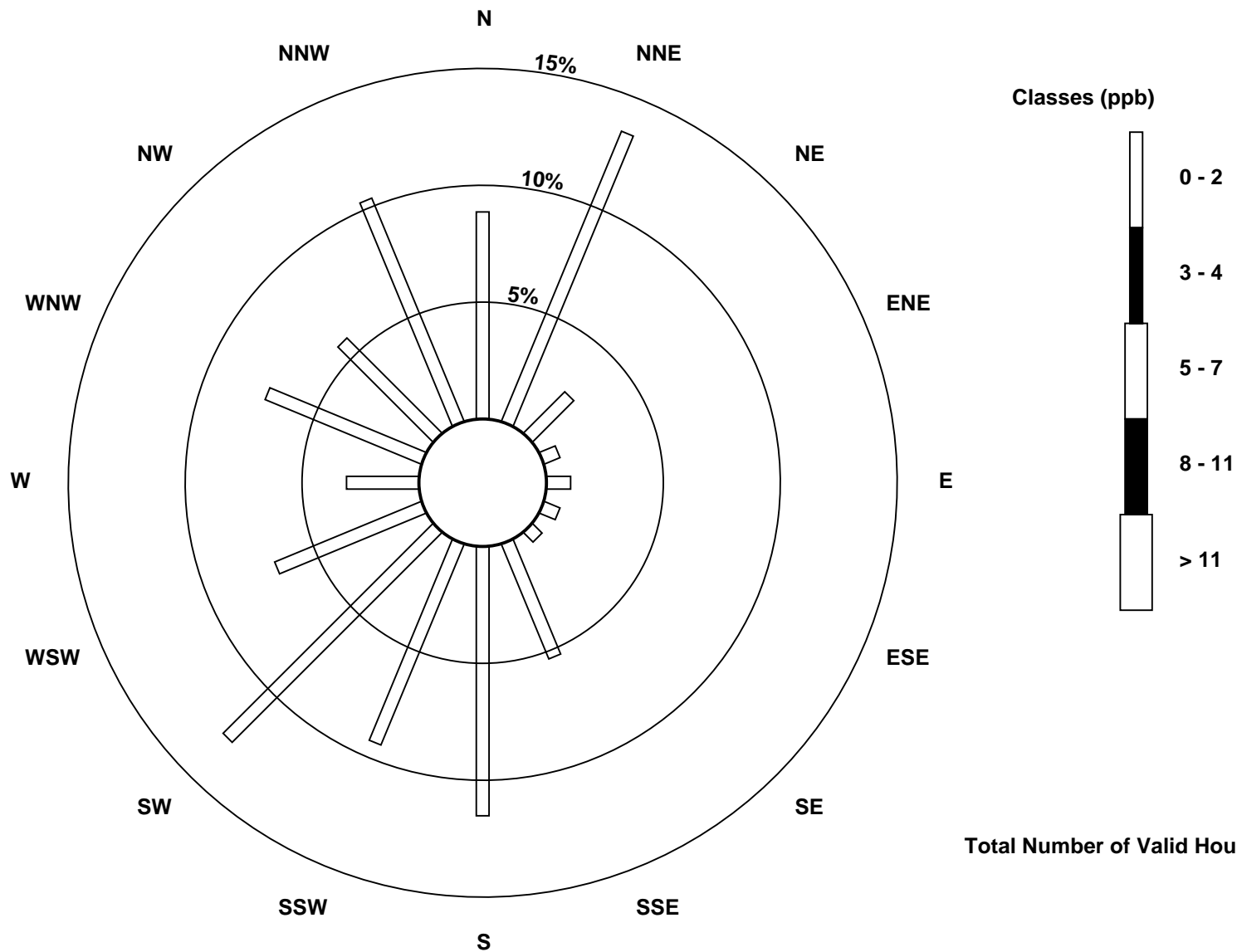
Total Number of Valid Hours: 677

Total Number of Hours: 744

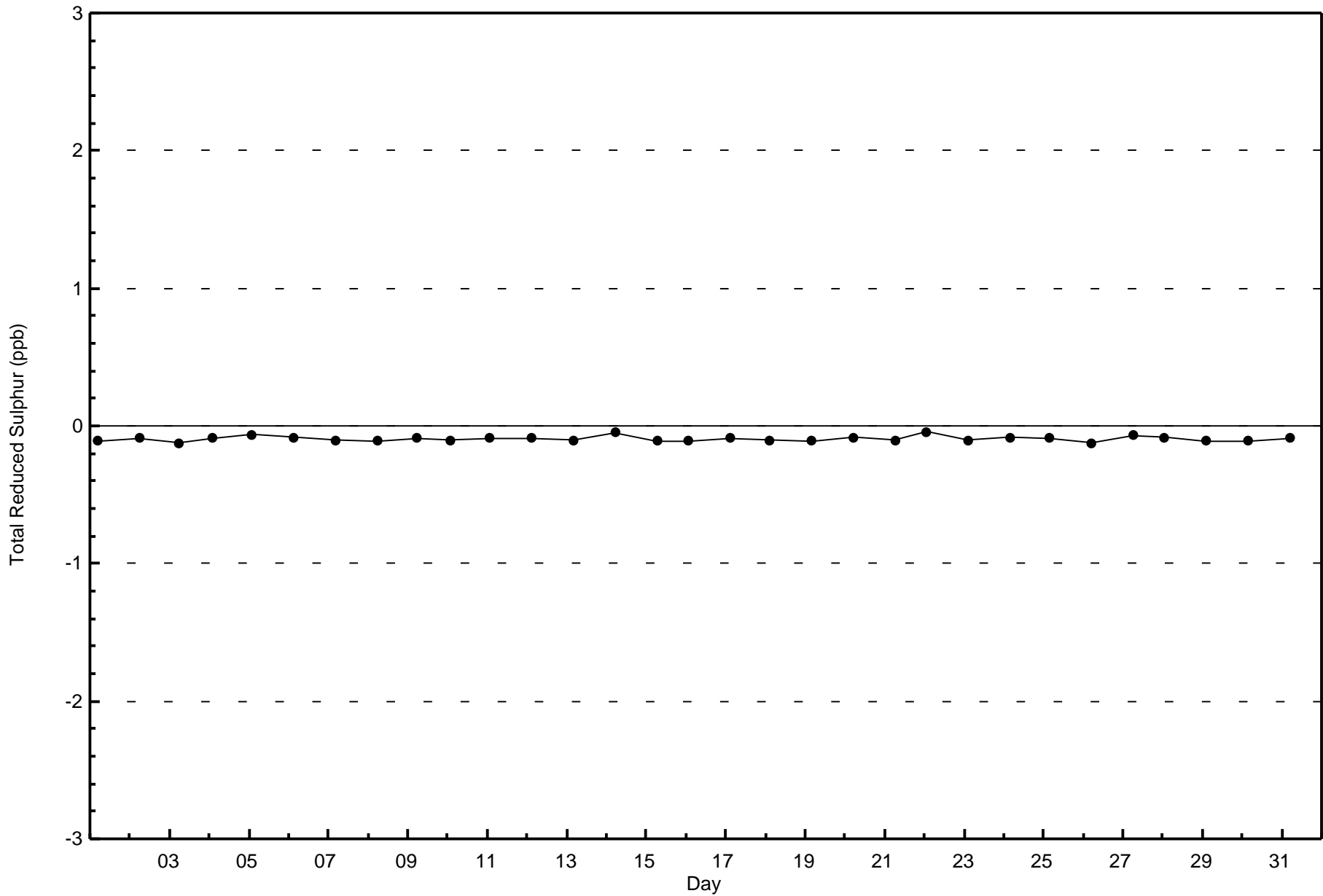


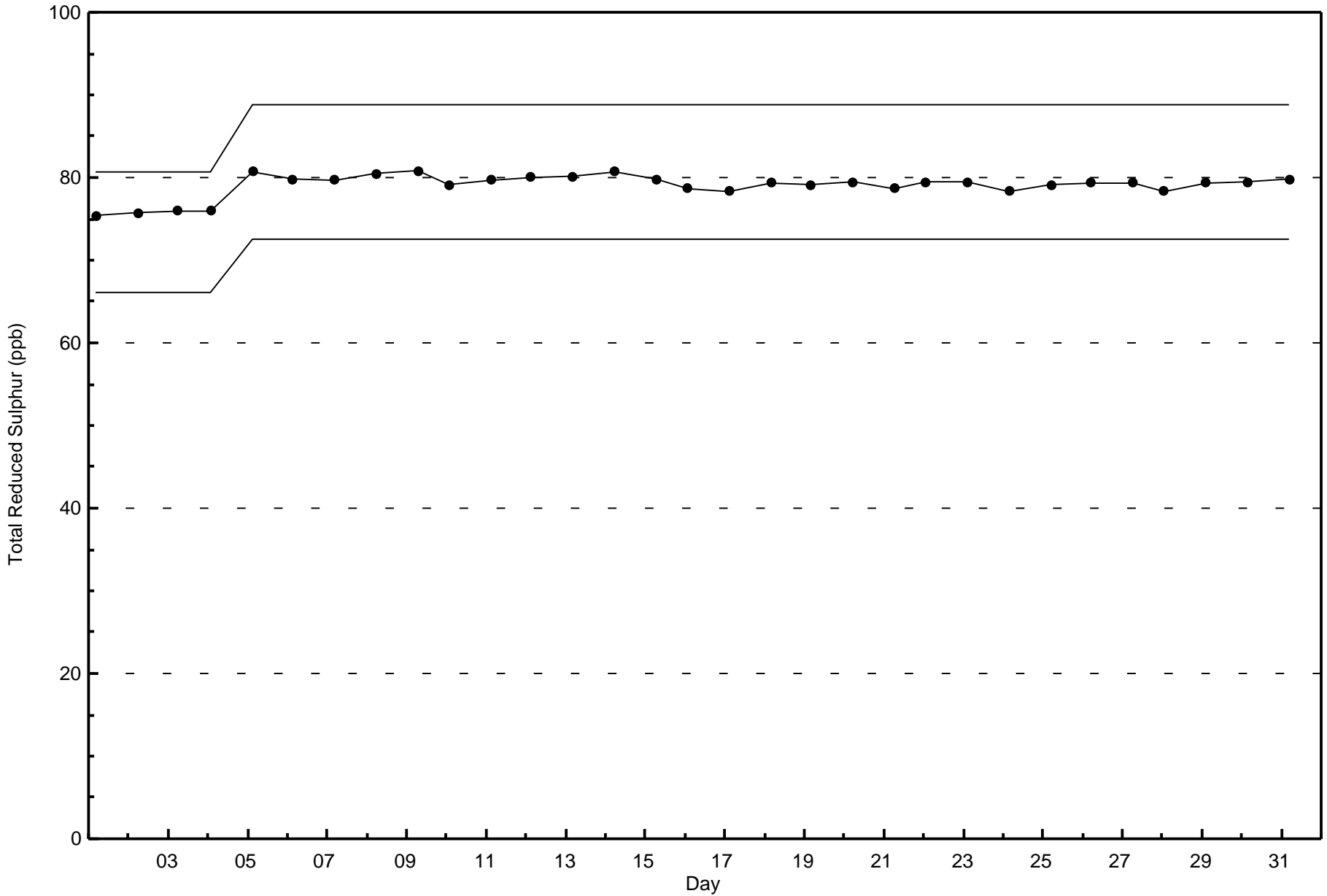
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Total Reduced Sulphur (TRS) - ppb  
Fort Hills (AMS 23)



Total Number of Valid Hours: 677







Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Fort Hills - October 2017

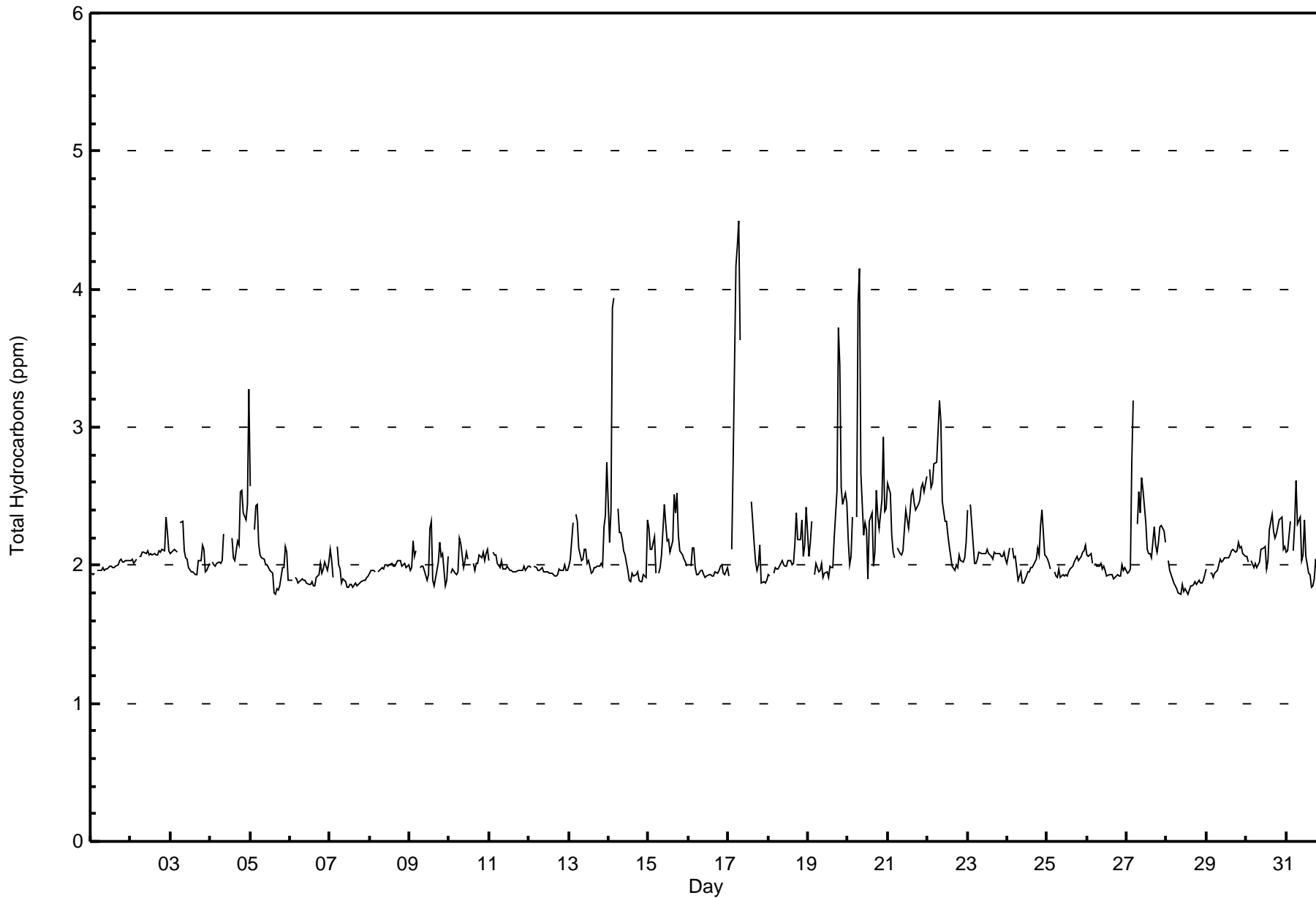
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 4 ppm on Oct 17 07:00										Maximum Daily Average: 2.5 ppm on Oct 20										Hours of Data: 701						
Minimum Value: 2 ppm on Oct 28 14:00										Minimum Daily Average: 1.9 ppm on Oct 28										Hours of Missing Data: 43						
Maximum Diurnal Average: 2.2 ppm at hour 4										Minimum Diurnal Average: 2.0 ppm at hour 13										Hours of Calibration: 41						
Monthly Average: 2.1 ppm										Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 2 Q <sub>1</sub> = 2 Median = 2 O <sub>3</sub> = 2 P <sub>90</sub> = 2 P <sub>99</sub> = 4										Percent Operational Time: 99.7						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	2	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2
2-Oct	2	2	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.1	2
3-Oct	2	2	2	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.1	2
4-Oct	Z	2	2	2	2	2	2	2	2	C	C	C	C	2	2	2	2	2	2	3	3	2	2	3	2.2	3
5-Oct	3	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	3
6-Oct	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.9	2
7-Oct	2	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.9	2
8-Oct	2	2	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2
9-Oct	2	2	2	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2
10-Oct	Z	2	2	2	2	2	2	2	2	2	2	2	M	M	2	2	2	2	2	2	2	2	2	2	2.0	2
11-Oct	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2
12-Oct	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2
13-Oct	2	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2.1	3
14-Oct	2	2	4	4	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.2	4
15-Oct	2	2	2	2	2	Z	2	2	2	2	2	2	2	2	2	3	2	3	2	2	2	2	2	2	2.2	3
16-Oct	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2
17-Oct	2	Z	2	3	4	4	4	4	C	C	C	C	C	C	2	2	2	2	2	2	2	2	2	2	--	4
18-Oct	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.1	2
19-Oct	2	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	3	4	3	3	2	3	2	2.3	4
20-Oct	2	2	2	2	Z	2	4	4	3	2	2	2	2	2	2	2	2	3	2	2	2	3	2	2	2.5	4
21-Oct	3	3	2	2	2	Z	2	2	2	2	2	2	2	3	3	2	2	2	2	3	3	3	3	3	2.4	3
22-Oct	Z	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.4	3
23-Oct	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.1	2
24-Oct	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2
25-Oct	2	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2
26-Oct	2	2	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2
27-Oct	2	2	2	3	3	Z	2	3	2	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2.3	3
28-Oct	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.9	2
29-Oct	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2
30-Oct	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.1	2
31-Oct	2	2	2	Z	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.1	3
2.1										2.1										Diurnal Average						
3										3										Diurnal Maximum						
Z - zerospan			C - Calibration			M - Maintenance																				





**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Fort Hills - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Fort Hills - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	409	58.35	58.35
2.1 - 3.0	279	39.80	98.15
3.1 - 10.0	13	1.85	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 701

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm  
Fort Hills - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	41	59	5	0	0	1	0	13	33	32	61	26	12	32	32	56	403
2.1 - 3.0	18	30	11	4	7	4	3	17	44	35	23	19	9	15	8	14	261
3.1 - 10.0	0	3	0	0	0	1	2	5	0	0	0	0	0	0	0	1	12
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	59	92	16	4	7	6	5	35	77	67	84	45	21	47	40	71	676

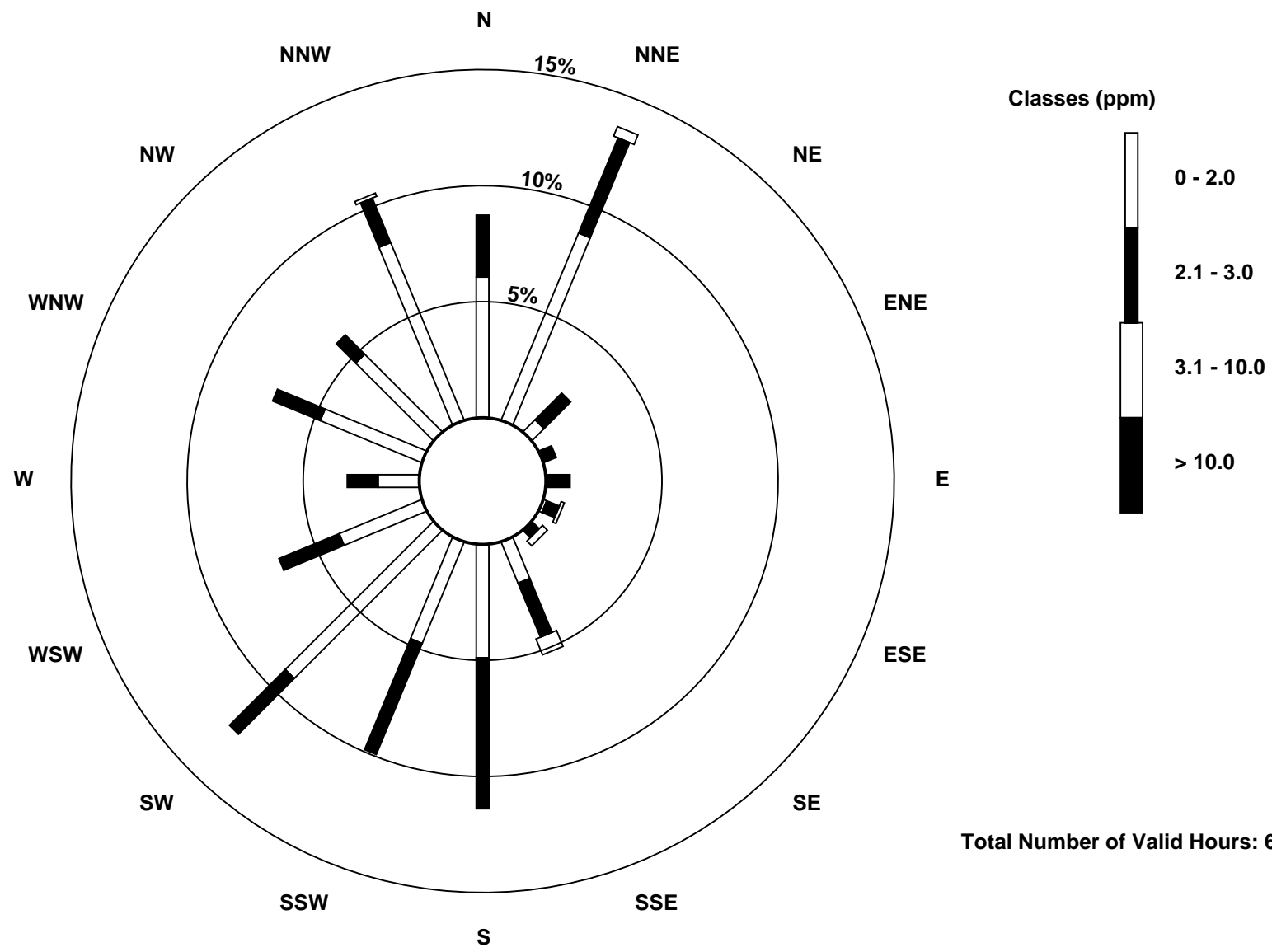
Total Number of Valid Hours: 676

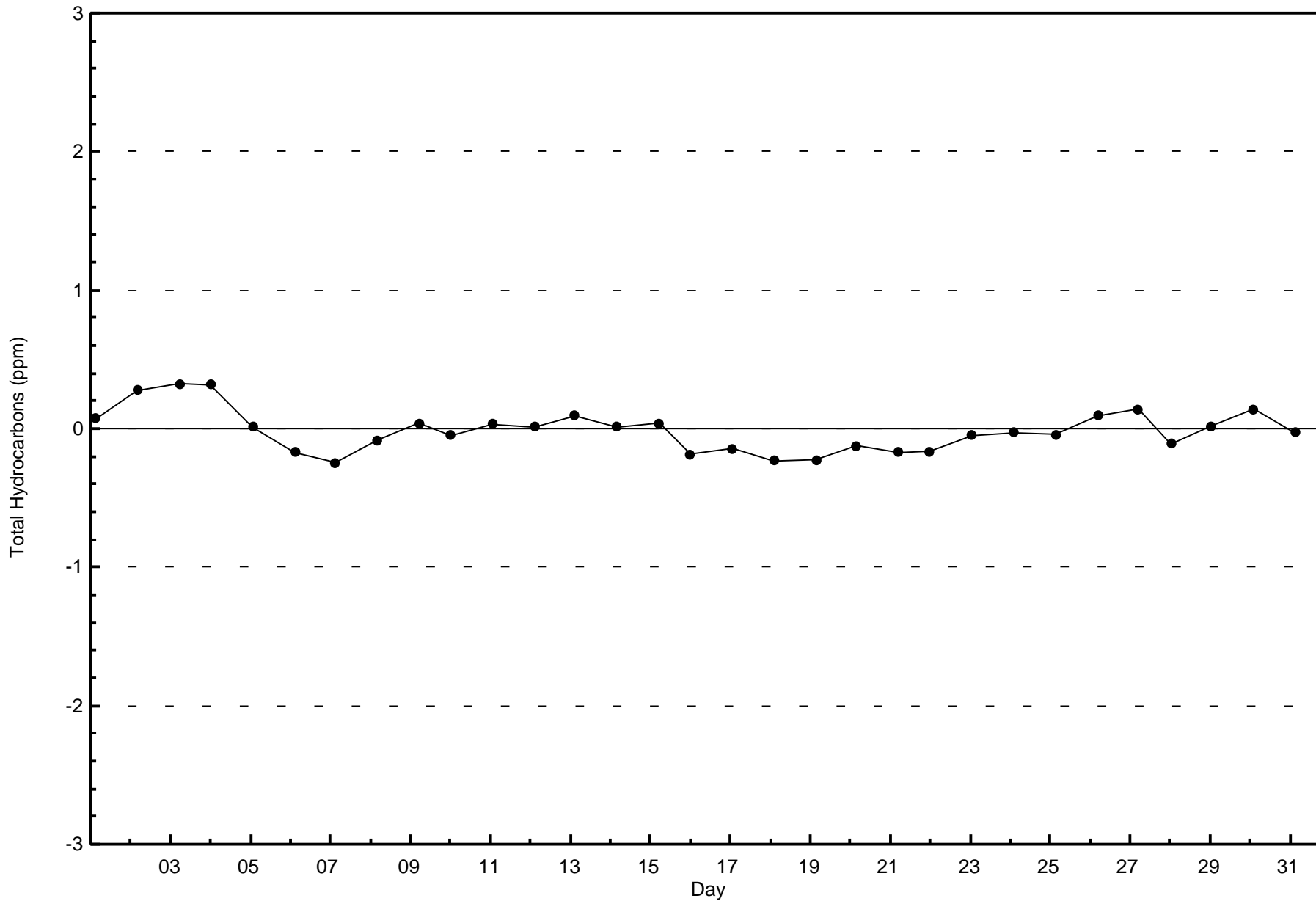
Total Number of Hours: 744

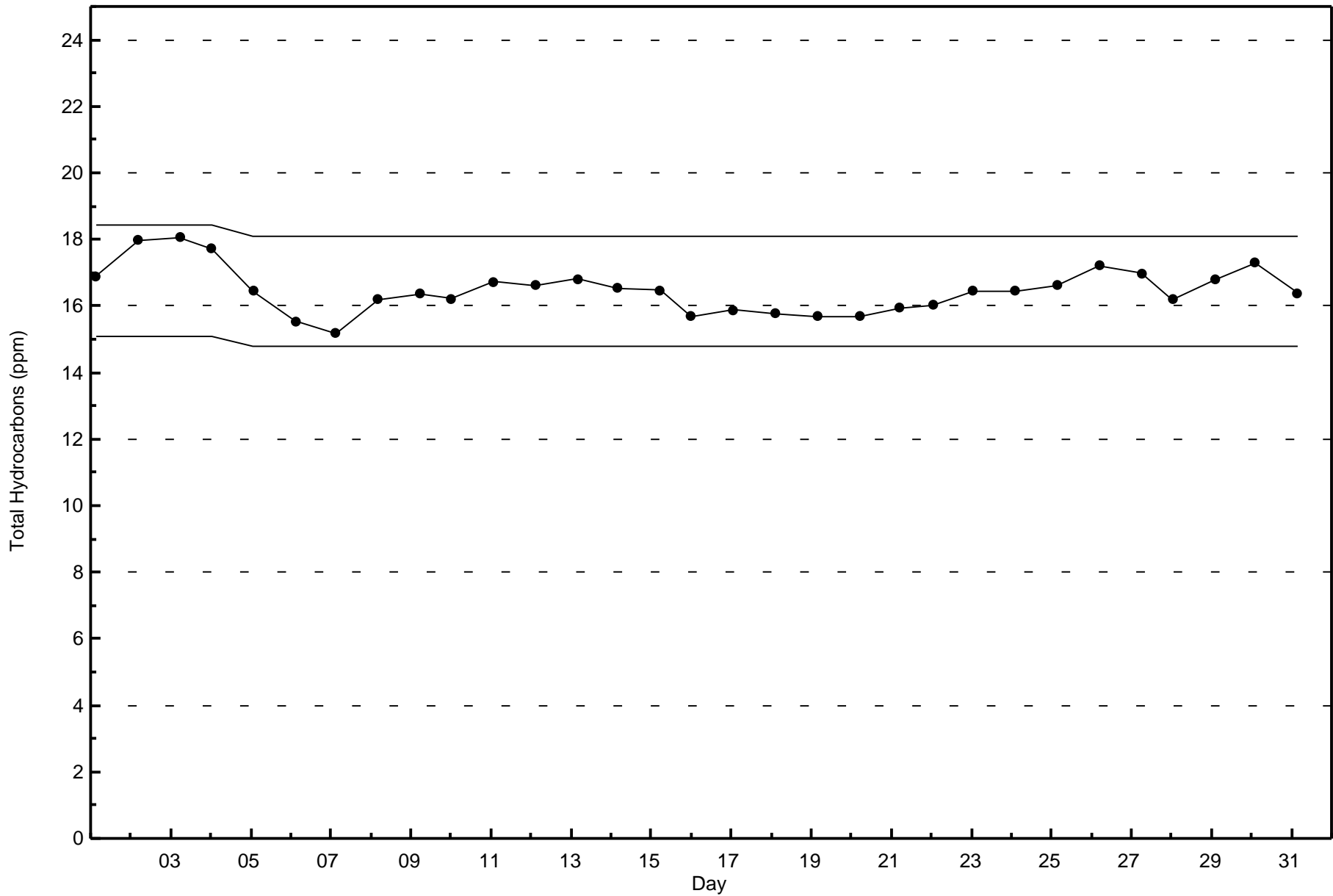


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Total Hydrocarbons (THC) - ppm  
Fort Hills (AMS 23)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

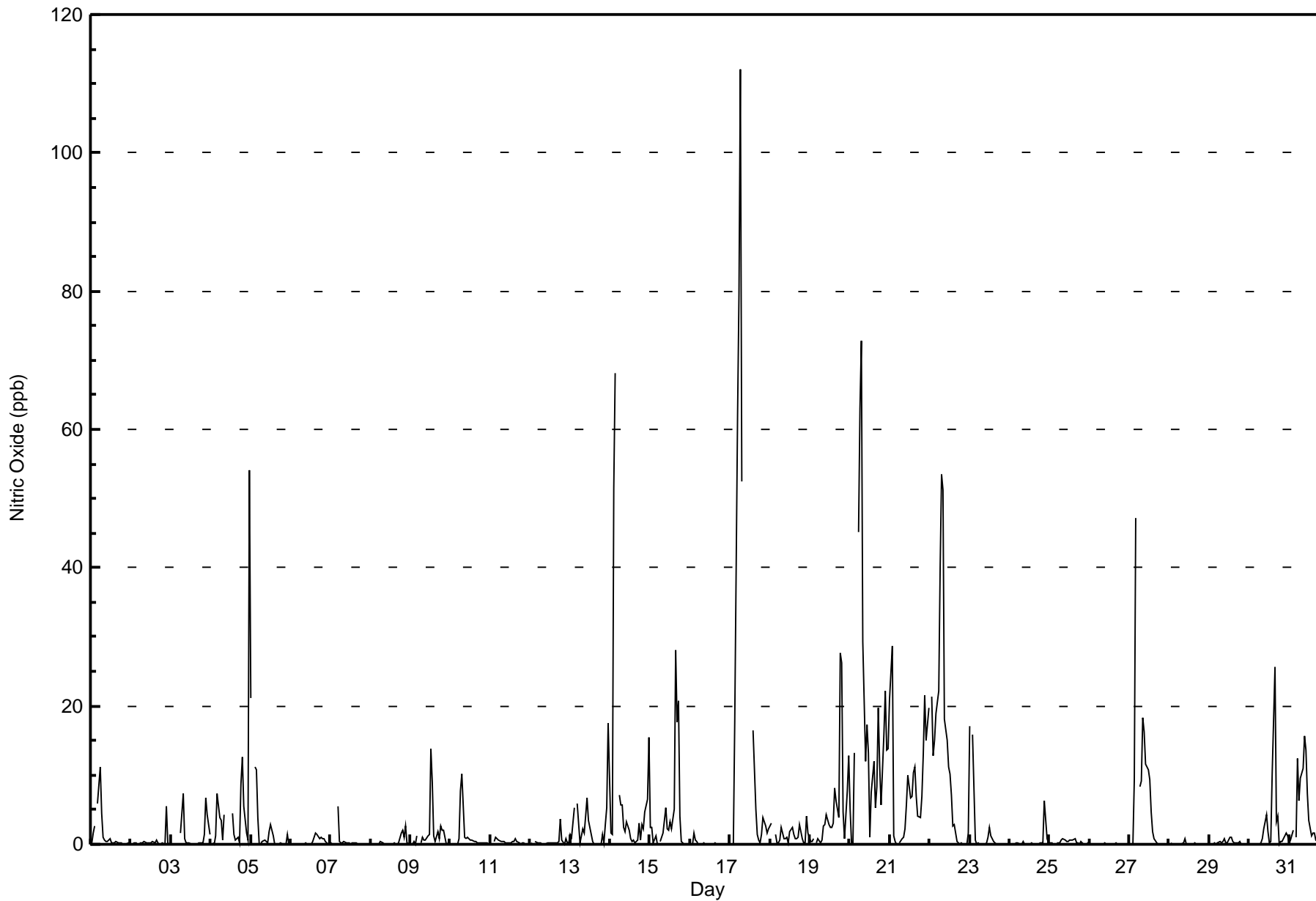
Fort Hills - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 112 ppb on Oct 17 07:00 Maximum Daily Average: 17.7 ppb on Oct 20																		Hours in Service: 744 Hours of Data: 703								
Minimum Value: 0 ppb on Oct 3 01:00 Minimum Daily Average: 0.0 ppb on Oct 26 Maximum Diurnal Average: 8.3 ppb at hour 7 Minimum Diurnal Average: 1.7 ppb at hour 21 Monthly Average: 3.5 ppb Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 2 P <sub>90</sub> = 10 P <sub>99</sub> = 50																		Hours of Missing Data: 41 Hours of Calibration: 41 Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	2	3	Z	6	11	5	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1.4	11
2-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	5	0	0	0.4	5
3-Oct	0	0	0	0	0	Z	2	7	1	0	0	0	0	0	0	0	0	0	0	0	1	7	4	2	1.1	7
4-Oct	Z	0	0	1	7	4	4	1	4	C	C	C	C	4	1	1	1	0	9	13	6	2	1	54	5.9	54
5-Oct	21	Z	11	11	4	0	0	0	1	0	0	2	3	1	0	0	0	0	0	0	0	1	0	0	2.5	21
6-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	2	1	1	1	1	1	0	0	0	0.4	2
7-Oct	0	0	0	Z	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	6
8-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	3	0	0	0.4	3
9-Oct	0	0	0	0	1	Z	0	1	1	1	1	1	14	9	1	0	2	1	3	2	2	0	0	1	1.8	14
10-Oct	Z	0	0	0	0	1	8	10	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1.1	10
11-Oct	0	Z	0	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.3	1
12-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	0	1	0	0	0.4	4
13-Oct	1	1	5	Z	6	3	0	2	2	4	7	3	2	0	0	0	0	0	0	1	0	3	5	18	2.8	18
14-Oct	2	1	52	68	Z	7	6	6	2	2	3	2	1	0	1	0	1	3	1	3	2	5	7	15	8.2	68
15-Oct	2	3	0	1	0	Z	0	1	2	5	2	2	3	2	5	28	18	21	4	0	0	0	0	0	4.4	28
16-Oct	Z	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2
17-Oct	0	Z	0	18	62	79	112	53	C	C	C	C	C	C	16	5	1	1	0	1	4	3	2	2	--	112
18-Oct	3	3	Z	1	0	0	1	2	1	1	1	0	2	2	1	1	1	1	3	1	0	0	4	2	1.4	4
19-Oct	0	0	1	Z	0	1	0	1	3	3	4	3	2	3	3	8	6	4	28	26	5	1	8	13	5.3	28
20-Oct	5	0	0	13	Z	45	63	73	29	12	17	13	1	7	12	5	8	20	11	6	16	22	14	14	17.7	73
21-Oct	21	29	1	0	0	Z	0	1	1	2	6	10	7	7	10	11	7	4	4	7	13	22	15	20	8.6	29
22-Oct	Z	21	13	15	19	22	40	53	51	18	15	11	10	7	3	3	0	0	0	0	0	0	0	2	13.3	53
23-Oct	17	Z	16	1	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	1.7	17
24-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1	0	0.4	6
25-Oct	0	0	0	Z	0	0	0	1	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0.3	1
26-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
27-Oct	0	0	0	9	47	Z	8	9	18	16	12	11	9	5	2	1	0	0	0	0	0	0	0	0	6.4	47
28-Oct	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
29-Oct	0	Z	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1
30-Oct	0	0	Z	0	0	0	0	0	1	2	4	2	0	0	10	26	3	4	0	0	0	1	2	1	2.5	26
31-Oct	0	1	2	Z	1	12	6	10	11	16	14	7	3	1	2	2	1	0	0	0	0	0	0	0	3.9	16
2.9 2.4 4.1 5.7 6.2 7.3 8.3 7.5 4.4 3.0 3.1 2.5 2.2 1.9 2.3 3.1 1.7 2.0 2.3 2.1 1.7 2.6 2.1 4.6 21 29 52 68 62 79 112 73 51 18 17 13 14 9 16 28 18 21 28 26 16 22 15 54																								Diurnal Average Diurnal Maximum		
Z - zerospan C - Calibration																										



Wood Buffalo Environmental Association  
Hourly Averages

Nitric Oxide (NO) - ppb  
Fort Hills - October 2017







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb  
Fort Hills - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	676	96.16	96.16
21 - 40	14	1.99	98.15
41 - 80	12	1.71	99.86
81 - 159	1	0.14	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitric Oxide (NO) - ppb  
Fort Hills - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	58	91	15	2	7	5	3	30	76	66	84	45	20	47	39	68	656
21 - 40	1	0	1	2	0	1	1	0	1	1	0	0	1	0	1	1	11
11 - 80	0	2	0	0	0	0	1	5	0	0	0	0	0	0	0	2	10
81 - 159	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	59	94	16	4	7	6	5	35	77	67	84	45	21	47	40	71	678

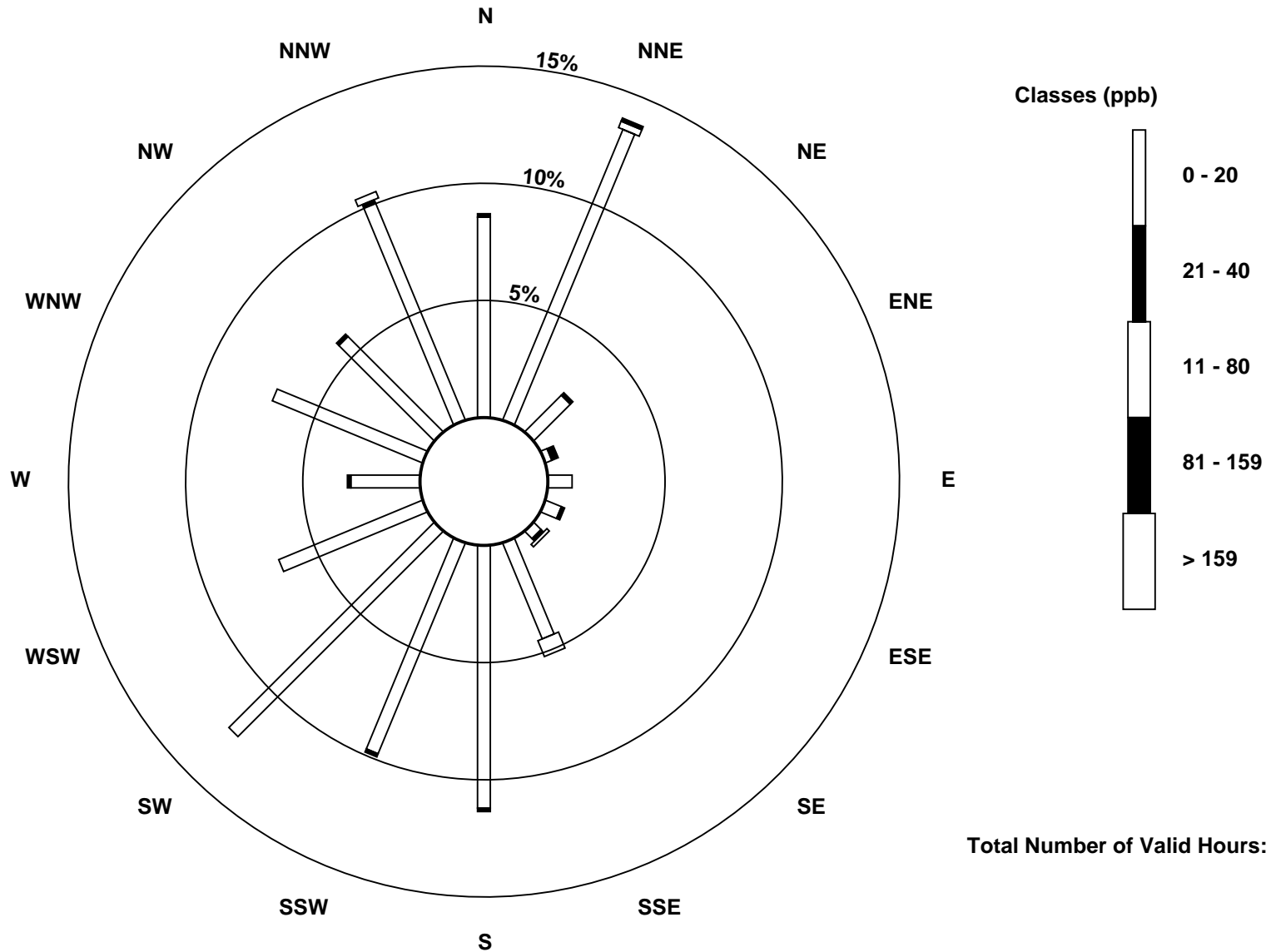
Total Number of Valid Hours: 678

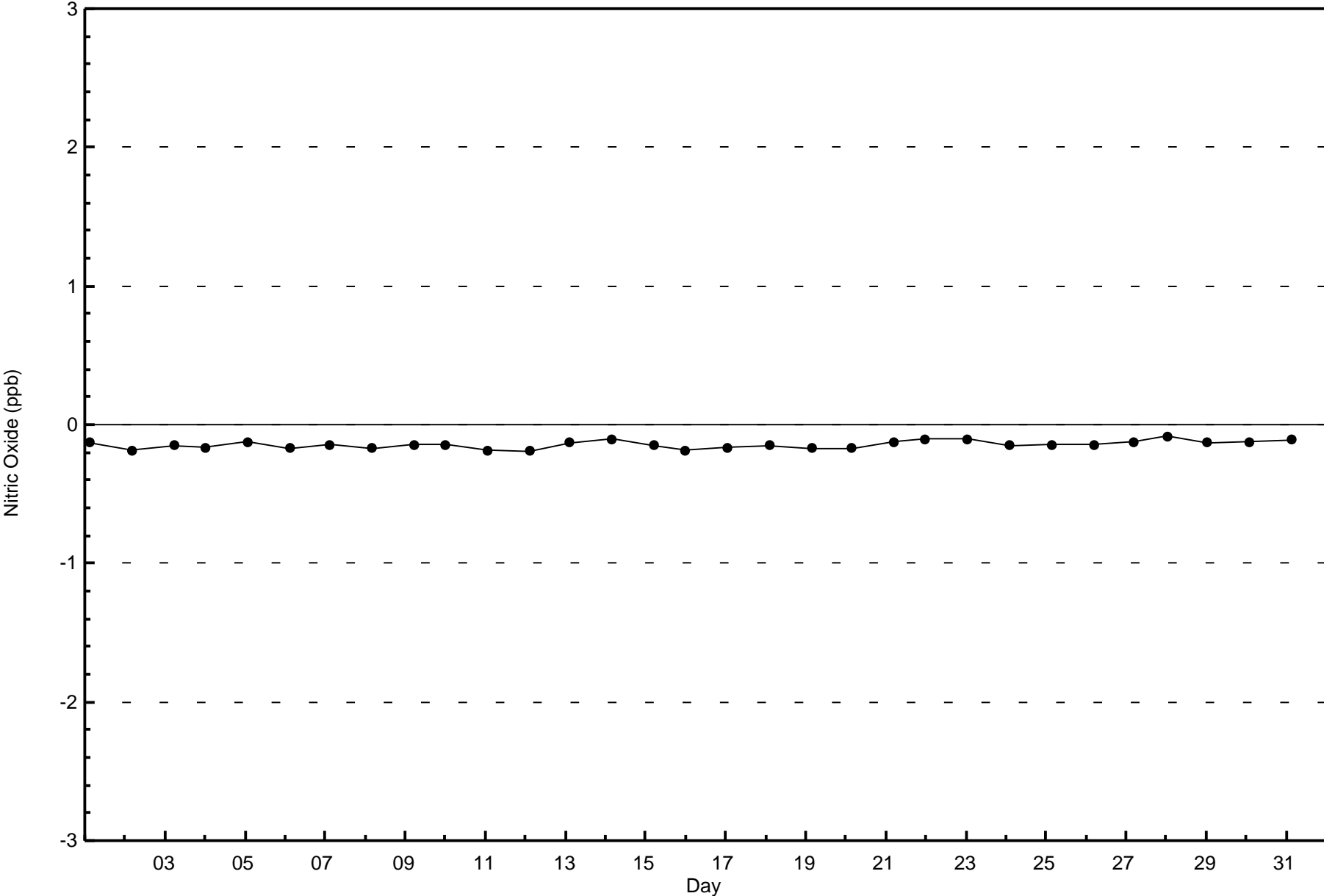
Total Number of Hours: 744

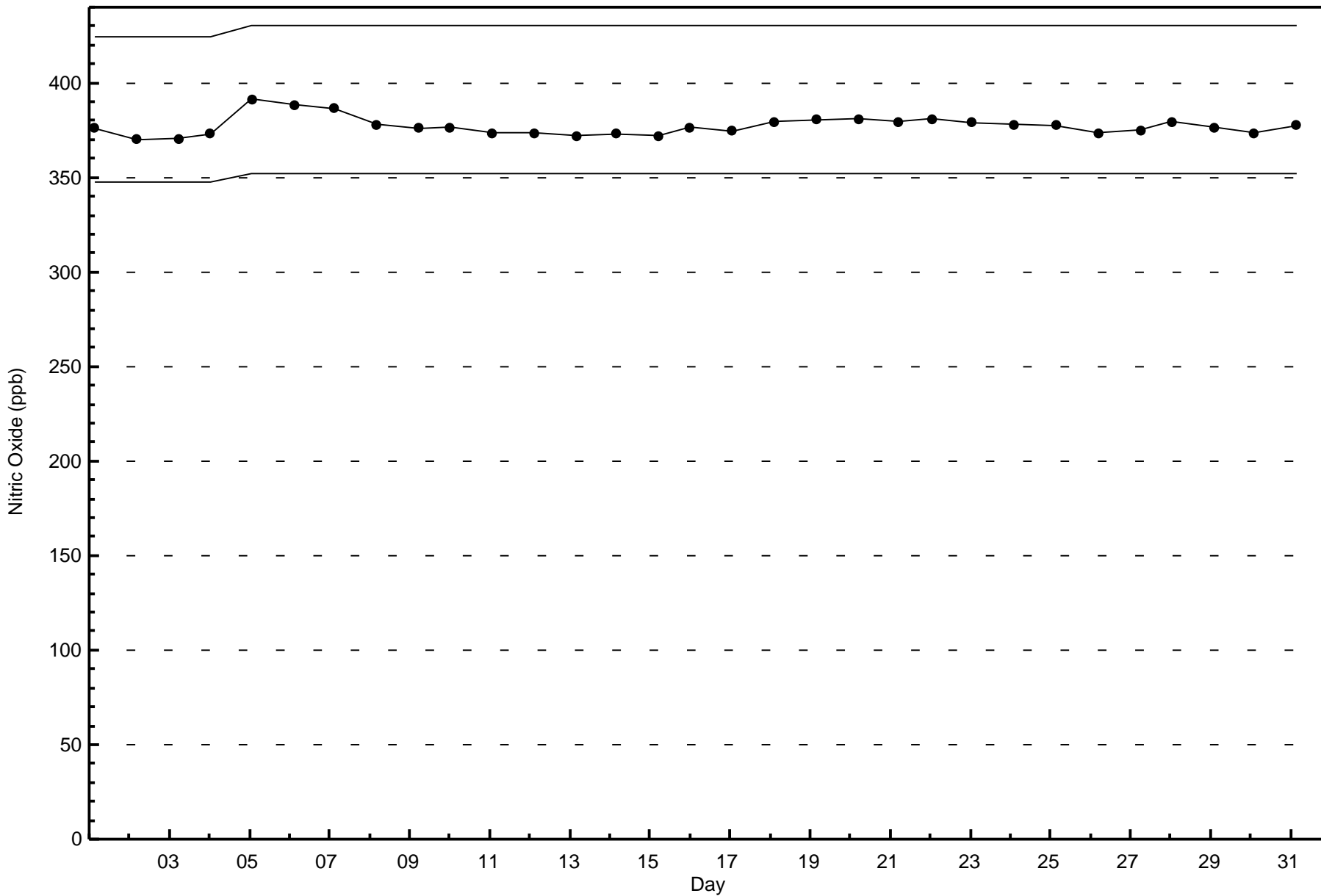


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitric Oxide (NO) - ppb  
Fort Hills (AMS 23)









# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Nitrogen Dioxide (NO<sub>2</sub>) - ppb

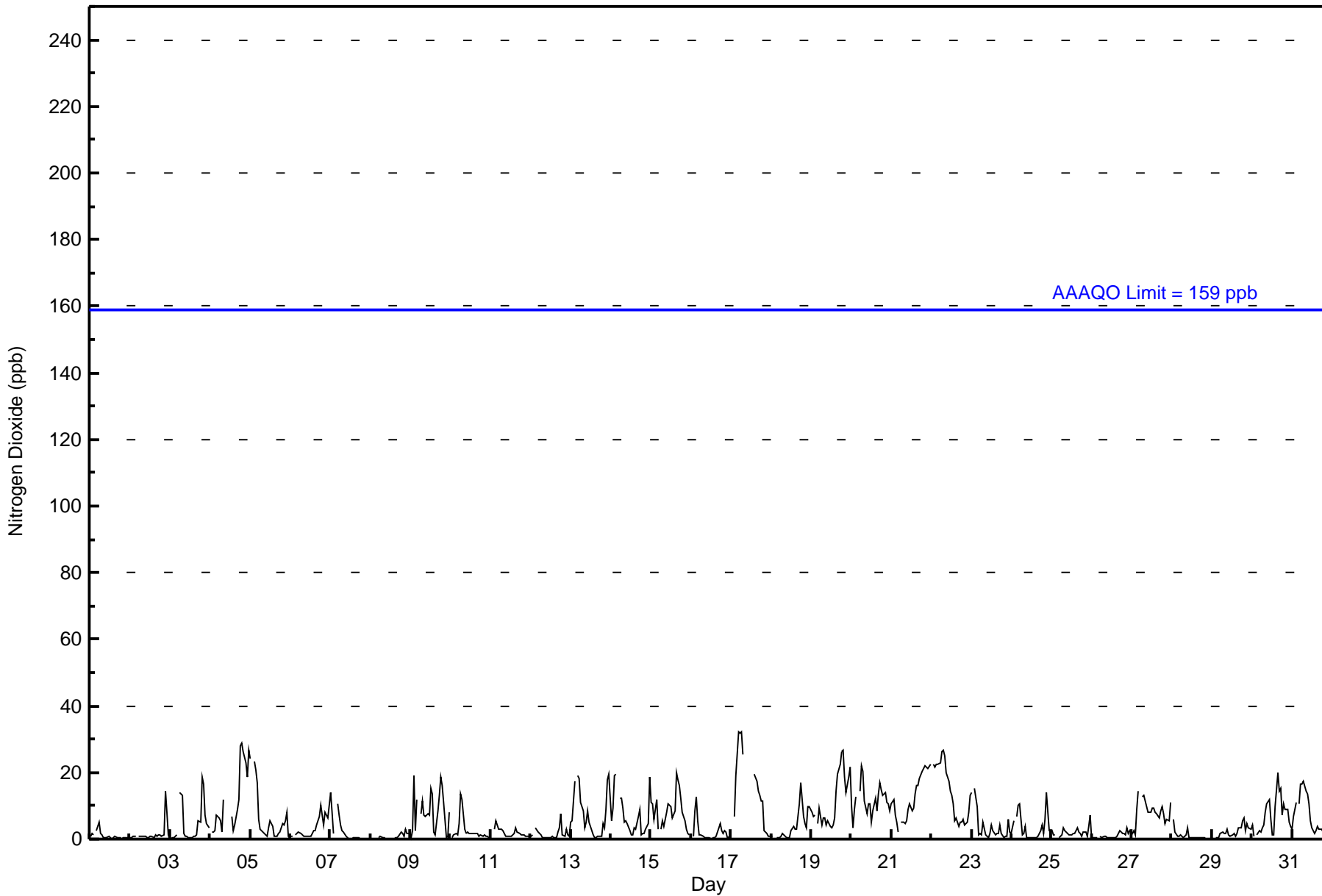
## Fort Hills - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 32 ppb on Oct 17 07:00										Maximum Daily Average: 14.2 ppb on Oct 22										Hours of Data: 703						
Minimum Value: 0 ppb on Oct 7 20:00										Minimum Daily Average: 0.7 ppb on Oct 8										Hours of Missing Data: 41						
Maximum Diurnal Average: 7.3 ppb at hour 5										Minimum Diurnal Average: 3.2 ppb at hour 14										Hours of Calibration: 41						
Monthly Average: 5.5 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 3 Q <sub>3</sub> = 8 P <sub>90</sub> = 15 P <sub>99</sub> = 27										Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	1	2	1	Z	3	5	2	1	1	0	0	1	0	0	0	1	1	1	0	0	0	0	0	0	0.9	5
2-Oct	0	0	1	1	Z	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	14	8	1	1.7	14
3-Oct	0	0	1	1	1	Z	14	13	2	1	1	1	1	1	1	1	1	6	5	19	17	7	5	4	4.3	19
4-Oct	Z	2	2	3	7	6	5	2	12	C	C	C	C	7	2	4	9	12	28	29	26	23	19	27	11.9	29
5-Oct	24	Z	23	21	17	6	3	3	2	1	1	4	6	4	1	1	1	2	2	5	4	5	8	1	6.2	24
6-Oct	1	1	Z	1	2	2	2	1	1	1	1	1	1	2	3	2	4	7	10	7	4	8	6	10	3.3	10
7-Oct	14	8	2	Z	11	7	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.4	14
8-Oct	0	0	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	1	1	2	2	1	3	2	2	0.7	3
9-Oct	1	2	19	3	12	Z	8	11	7	7	8	7	15	13	2	1	9	13	19	16	11	1	1	8	8.5	19
10-Oct	Z	1	1	2	1	5	14	12	3	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2.5	14
11-Oct	1	Z	3	5	4	3	3	2	2	1	1	1	1	2	4	2	2	1	1	1	1	1	1	1	1.8	5
12-Oct	1	1	Z	4	2	2	1	0	0	0	1	1	1	1	1	2	4	8	1	1	3	1	1	1	1.6	8
13-Oct	5	6	18	Z	19	18	11	8	4	5	8	5	4	1	0	0	1	1	5	4	9	18	19	19	7.4	19
14-Oct	6	10	19	19	Z	12	12	9	5	6	5	3	1	1	3	3	7	9	1	2	2	3	5	19	6.9	19
15-Oct	11	11	6	12	3	Z	3	5	4	8	11	10	10	7	8	20	18	16	12	8	5	3	2	1	8.4	20
16-Oct	Z	1	9	13	6	1	1	1	1	0	0	0	0	0	0	1	2	5	2	2	3	2	1	1	2.2	13
17-Oct	1	Z	7	19	32	32	32	25	C	C	C	C	C	C	20	17	14	13	12	11	3	2	1	1	--	32
18-Oct	1	1	Z	1	0	1	1	2	1	1	1	0	2	4	3	3	7	11	17	7	5	3	10	10	3.8	17
19-Oct	8	7	7	Z	5	9	4	6	7	4	6	4	4	4	6	14	20	23	26	27	19	14	19	22	11.4	27
20-Oct	10	3	9	13	Z	15	22	20	12	8	11	11	5	8	12	8	14	17	15	13	14	11	11	8	11.7	22
21-Oct	11	12	7	5	2	Z	5	5	5	6	9	11	9	10	14	16	16	18	20	21	22	22	21	22	12.5	22
22-Oct	Z	22	22	23	22	23	26	27	25	20	17	14	13	10	6	6	4	5	5	6	4	5	8	13	14.2	27
23-Oct	14	Z	15	10	1	2	1	5	1	1	1	2	4	3	1	2	2	4	2	1	1	1	6	2	3.5	15
24-Oct	2	6	Z	7	10	10	1	2	4	1	0	0	0	1	0	0	1	2	4	2	6	14	2	2	3.4	14
25-Oct	2	1	1	Z	1	1	1	4	3	2	1	1	1	2	2	3	2	2	1	2	2	1	4	7	2.0	7
26-Oct	0	0	0	0	Z	1	1	1	1	1	0	0	1	1	1	1	2	3	2	2	1	3	2	3	1.1	3
27-Oct	2	2	1	9	15	Z	13	13	11	10	8	8	9	9	8	8	6	9	10	8	5	6	6	11	8.1	15
28-Oct	Z	6	2	1	1	1	1	1	1	3	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.9	6
29-Oct	0	Z	0	1	1	2	2	2	2	3	1	1	1	2	1	2	3	3	6	6	3	5	3	3	2.2	6
30-Oct	4	1	Z	1	2	2	3	4	8	10	12	6	1	1	10	20	14	15	7	11	9	9	5	4	7.0	20
31-Oct	3	7	11	Z	11	17	16	17	15	14	11	6	3	2	3	4	3	3	3	1	1	1	1	1	6.6	17
4.7 4.3 7.2 6.9 7.3 7.0 6.9 6.7 4.7 4.0 4.0 3.4 3.3 3.2 3.6 4.8 5.4 6.7 7.2 7.0 5.7 5.8 5.6 6.6																								Diurnal Average		
24 22 23 23 32 32 32 27 25 20 17 14 15 13 20 20 20 23 28 29 26 23 21 27																								Diurnal Maximum		
Z - zerospan C - Calibration																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort Hills - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort Hills - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	673	95.73	95.73
21 - 40	30	4.27	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744





**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort Hills - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	58	91	16	4	7	5	3	30	74	65	83	45	21	46	38	70	656
21 - 40	1	3	0	0	0	1	2	5	3	2	1	0	0	1	2	1	22
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	59	94	16	4	7	6	5	35	77	67	84	45	21	47	40	71	678

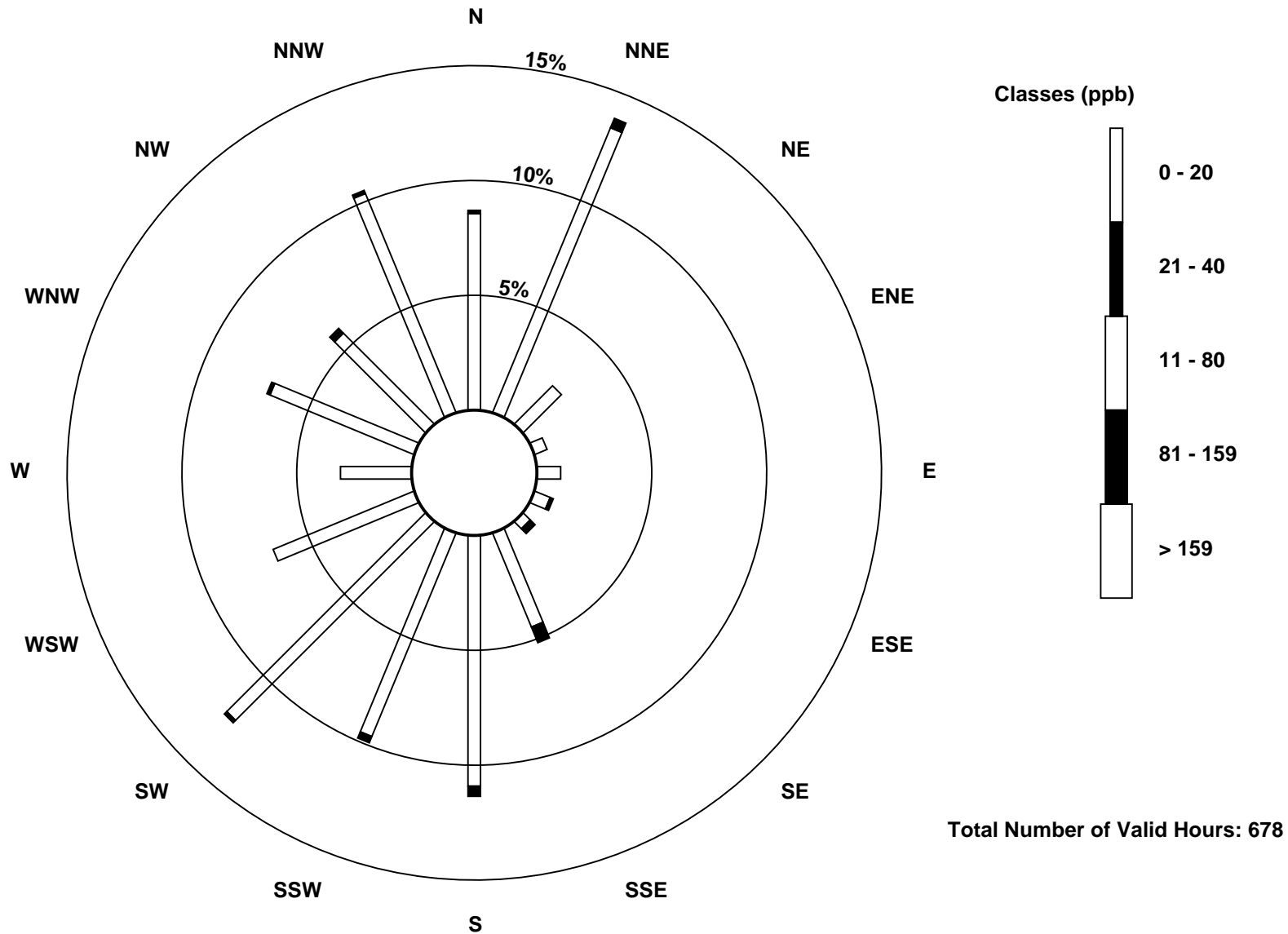
Total Number of Valid Hours: 678

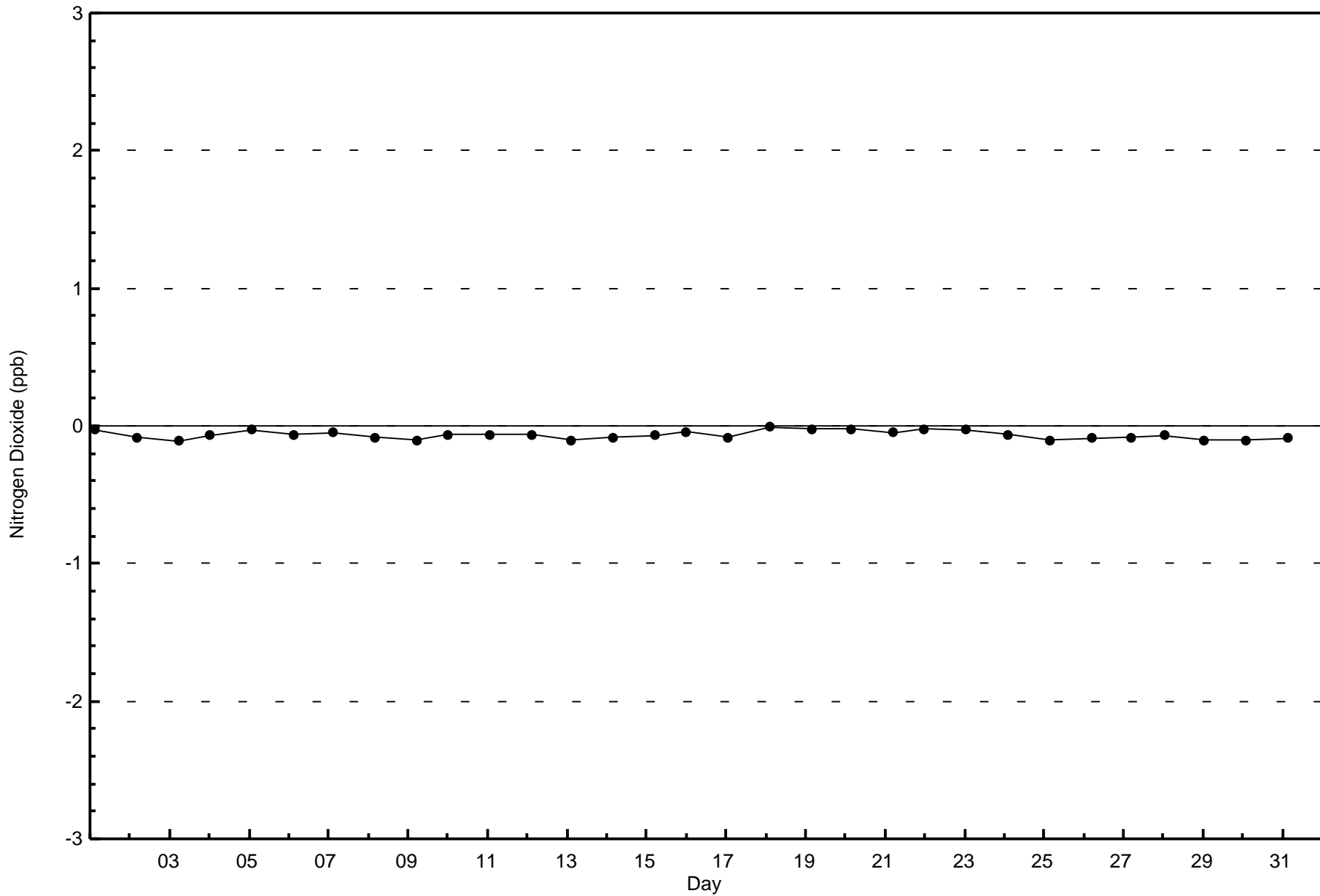
Total Number of Hours: 744

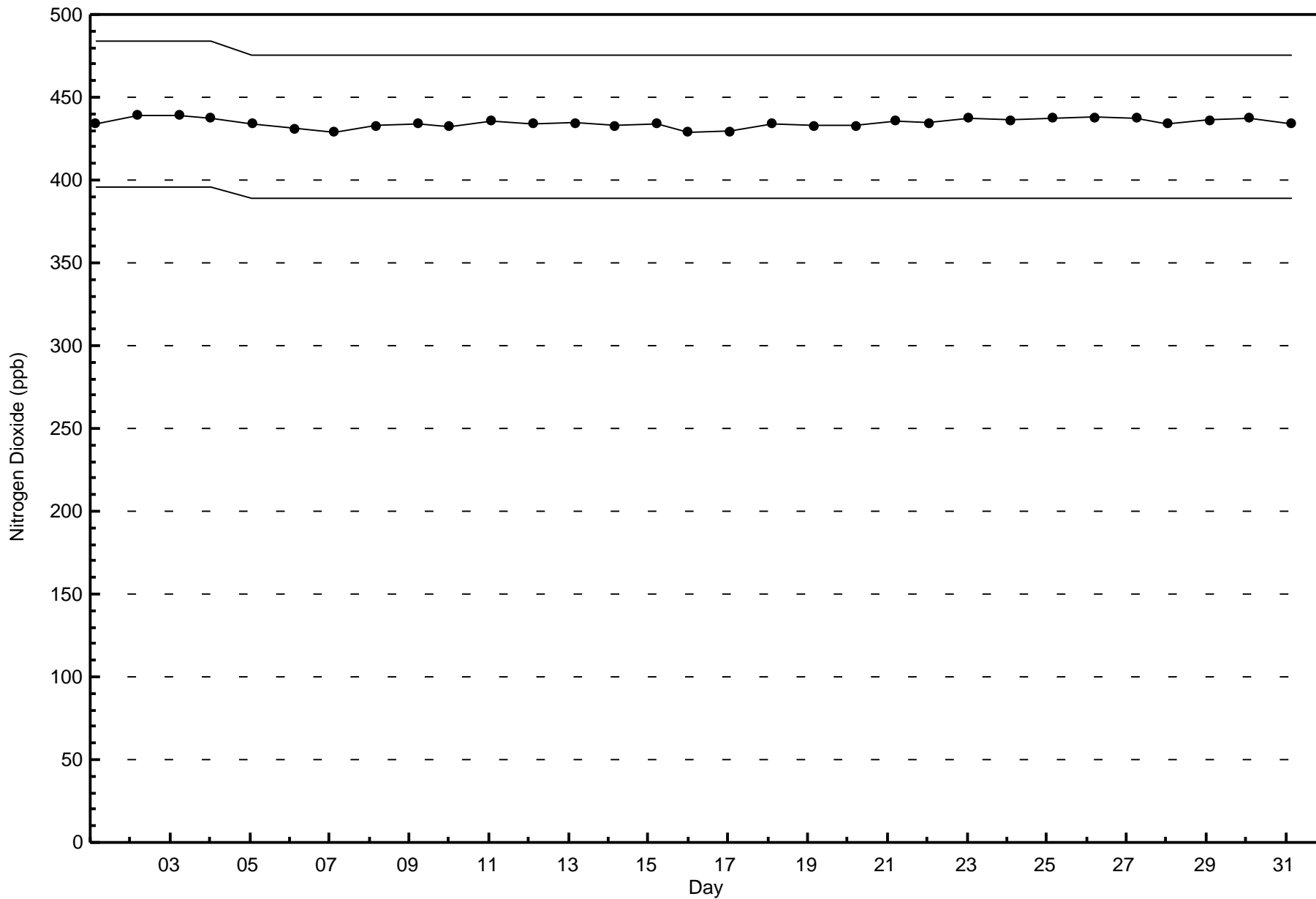


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort Hills (AMS 23)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb

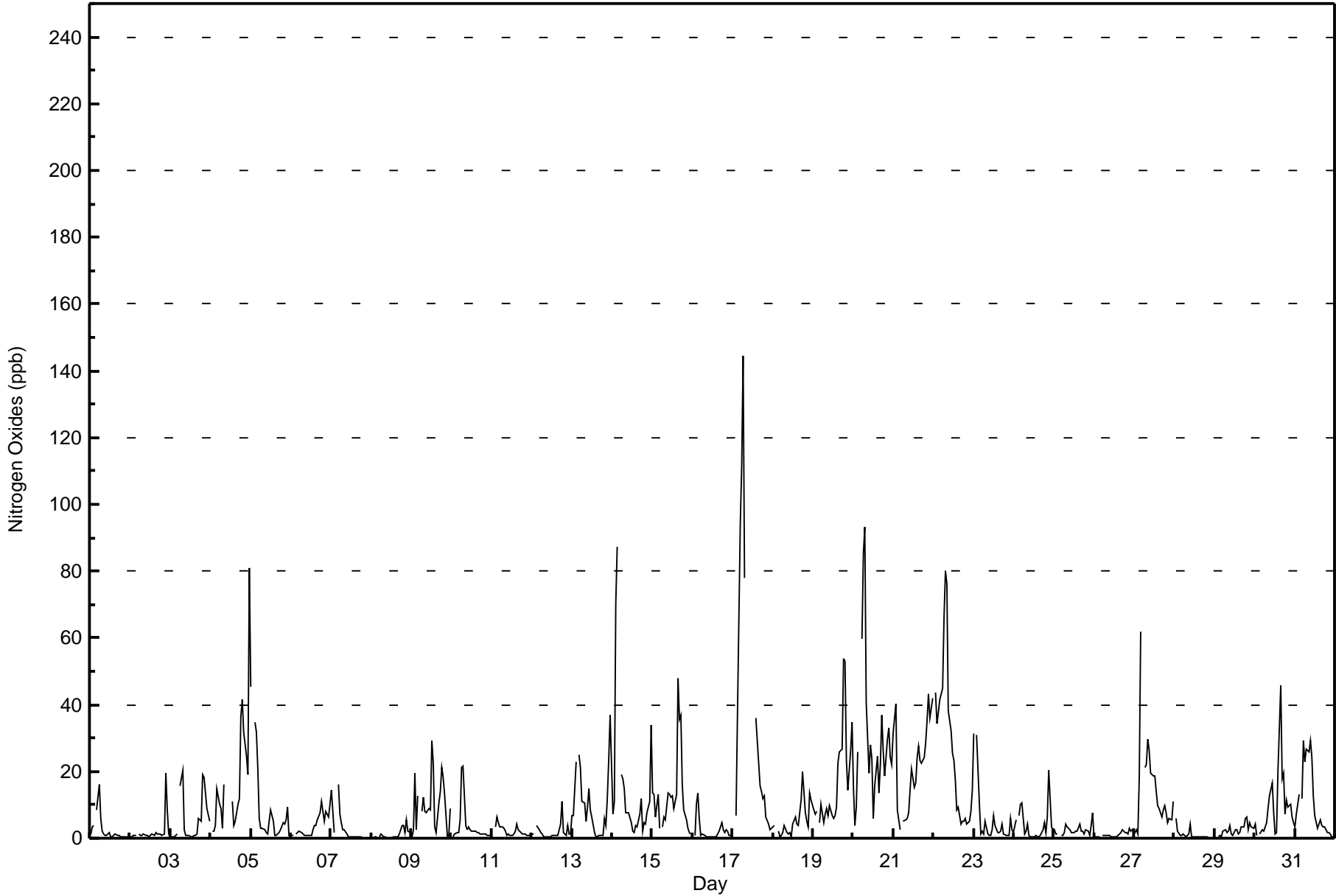
Fort Hills - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 144 ppb on Oct 17 07:00 Maximum Daily Average: 29.4 ppb on Oct 20																		Hours in Service: 744 Hours of Data: 703 Hours of Missing Data: 41 Hours of Calibration: 41 Percent Operational Time: 100.0									
Minimum Value: 0 ppb on Oct 7 22:00 Minimum Daily Average: 1.0 ppb on Oct 28 Maximum Diurnal Average: 15.2 ppb at hour 7 Minimum Diurnal Average: 5.1 ppb at hour 14 Monthly Average: 9.0 ppb Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 1 Median = 3 Q <sub>3</sub> = 10 P <sub>90</sub> = 24 P <sub>99</sub> = 79																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	1	3	4	Z	8	16	6	2	1	1	1	2	0	0	1	1	1	1	1	0	1	0	1	0	2.3	16	
2-Oct	1	1	1	1	Z	1	1	1	1	1	1	0	1	1	1	2	1	1	1	1	1	20	8	1	2.2	20	
3-Oct	0	0	1	1	1	Z	15	20	3	1	1	1	1	1	1	1	1	6	5	19	18	14	9	5	5.4	20	
4-Oct	Z	2	2	4	15	10	9	3	16	C	C	C	C	C	11	4	5	10	12	37	41	32	25	19	81	17.8	81
5-Oct	45	Z	35	32	21	6	3	3	2	1	1	5	9	5	1	1	1	2	2	5	4	5	9	1	8.7	45	
6-Oct	1	1	Z	1	2	2	2	1	1	1	1	1	1	2	4	4	6	8	11	8	5	8	6	10	3.8	11	
7-Oct	14	8	2	Z	16	7	5	3	2	1	1	0	0	0	1	1	1	0	0	0	0	0	0	0	2.7	16	
8-Oct	0	0	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	1	1	4	4	2	6	2	2	1.1	6	
9-Oct	1	2	20	3	13	Z	8	12	8	8	9	9	29	22	3	2	10	14	21	18	13	0	1	9	10.3	29	
10-Oct	Z	0	1	2	2	6	21	22	4	2	3	3	2	2	2	2	2	1	1	1	1	1	1	1	3.7	22	
11-Oct	1	Z	3	6	5	4	3	3	2	1	1	1	1	1	2	4	2	2	1	1	1	1	1	1	2.2	6	
12-Oct	1	1	Z	4	2	2	1	0	0	0	1	1	1	1	1	1	3	4	11	2	1	4	1	1	1.9	11	
13-Oct	7	7	23	Z	25	21	11	11	5	9	15	8	6	2	0	0	1	1	1	6	4	12	23	37	10.2	37	
14-Oct	7	11	71	87	Z	19	18	15	7	7	8	4	2	2	4	3	7	12	2	4	4	7	11	34	15.1	87	
15-Oct	14	13	6	13	3	Z	3	6	6	13	13	12	13	2	9	13	48	35	37	16	9	6	3	2	1	12.8	48
16-Oct	Z	1	10	13	6	1	1	1	1	0	0	0	0	0	0	1	2	5	2	2	3	2	1	1	2.4	13	
17-Oct	1	Z	7	37	94	111	144	78	C	C	C	C	C	C	36	22	16	14	12	13	6	4	3	3	--	144	
18-Oct	4	4	Z	2	1	1	2	4	2	1	2	1	4	6	4	4	8	12	20	8	5	4	14	11	5.2	20	
19-Oct	9	7	8	Z	5	10	5	7	9	7	10	7	6	7	9	23	26	27	54	53	23	15	26	35	16.8	54	
20-Oct	15	4	9	26	Z	60	85	93	41	19	28	24	6	16	24	14	22	37	26	19	30	33	24	22	29.4	93	
21-Oct	32	40	8	5	2	Z	5	6	6	8	14	21	15	17	24	27	23	22	24	28	35	43	36	42	21.1	43	
22-Oct	Z	44	34	38	41	45	66	80	76	38	32	25	23	17	8	9	4	5	5	6	4	5	8	14	27.5	80	
23-Oct	31	Z	31	10	1	2	1	5	1	1	1	3	7	4	2	2	2	4	1	1	1	1	6	2	5.2	31	
24-Oct	2	6	Z	7	10	11	1	2	4	1	0	0	1	1	1	0	1	3	5	2	6	20	3	2	3.9	20	
25-Oct	3	1	1	Z	1	1	1	4	3	3	2	2	2	2	2	4	2	2	1	3	2	1	4	7	2.4	7	
26-Oct	0	0	0	0	Z	1	1	1	1	1	0	0	0	1	1	1	2	3	2	2	1	3	2	2	1.1	3	
27-Oct	2	2	1	18	62	Z	21	22	30	26	20	19	19	14	10	9	7	8	10	8	5	6	6	11	14.5	62	
28-Oct	Z	6	2	1	1	1	1	1	1	4	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1.0	6	
29-Oct	0	Z	0	1	0	2	2	2	2	4	1	1	2	3	1	2	3	3	6	7	3	5	3	3	2.5	7	
30-Oct	4	1	Z	1	2	2	3	4	9	13	16	8	1	2	20	46	18	19	7	11	9	10	7	5	9.6	46	
31-Oct	3	7	13	Z	12	29	23	27	26	29	24	13	7	3	4	6	4	3	3	2	2	1	0	1	10.5	29	
7.6 6.7 11.3 12.5 13.5 14.3 15.2 14.2 9.1 7.0 7.1 5.9 5.5 5.1 5.9 7.9 7.1 8.7 9.5 9.1 7.4 8.4 7.7 11.2																								Diurnal Average			
45 44 71 87 94 111 144 93 76 38 32 25 29 22 36 48 35 37 54 53 35 43 36 81																								Diurnal Maximum			
Z - zerospan		C - Calibration																									



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort Hills - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort Hills - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	609	86.63	86.63
21 - 40	68	9.67	96.30
41 - 80	19	2.70	99.00
81 - 159	6	0.85	99.86
> 159	0	0.00	99.86

Total Number of Valid Hours: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort Hills - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	51	89	13	1	6	4	2	22	66	61	82	38	18	45	35	65	598
21 - 40	7	2	2	3	1	1	1	8	9	6	1	7	2	2	4	4	60
11 - 80	1	0	1	0	0	1	2	2	2	0	1	0	1	0	1	1	13
81 - 159	0	3	0	0	0	0	0	2	0	0	0	0	0	0	0	1	6
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	59	94	16	4	7	6	5	34	77	67	84	45	21	47	40	71	677

Total Number of Valid Hours: 678

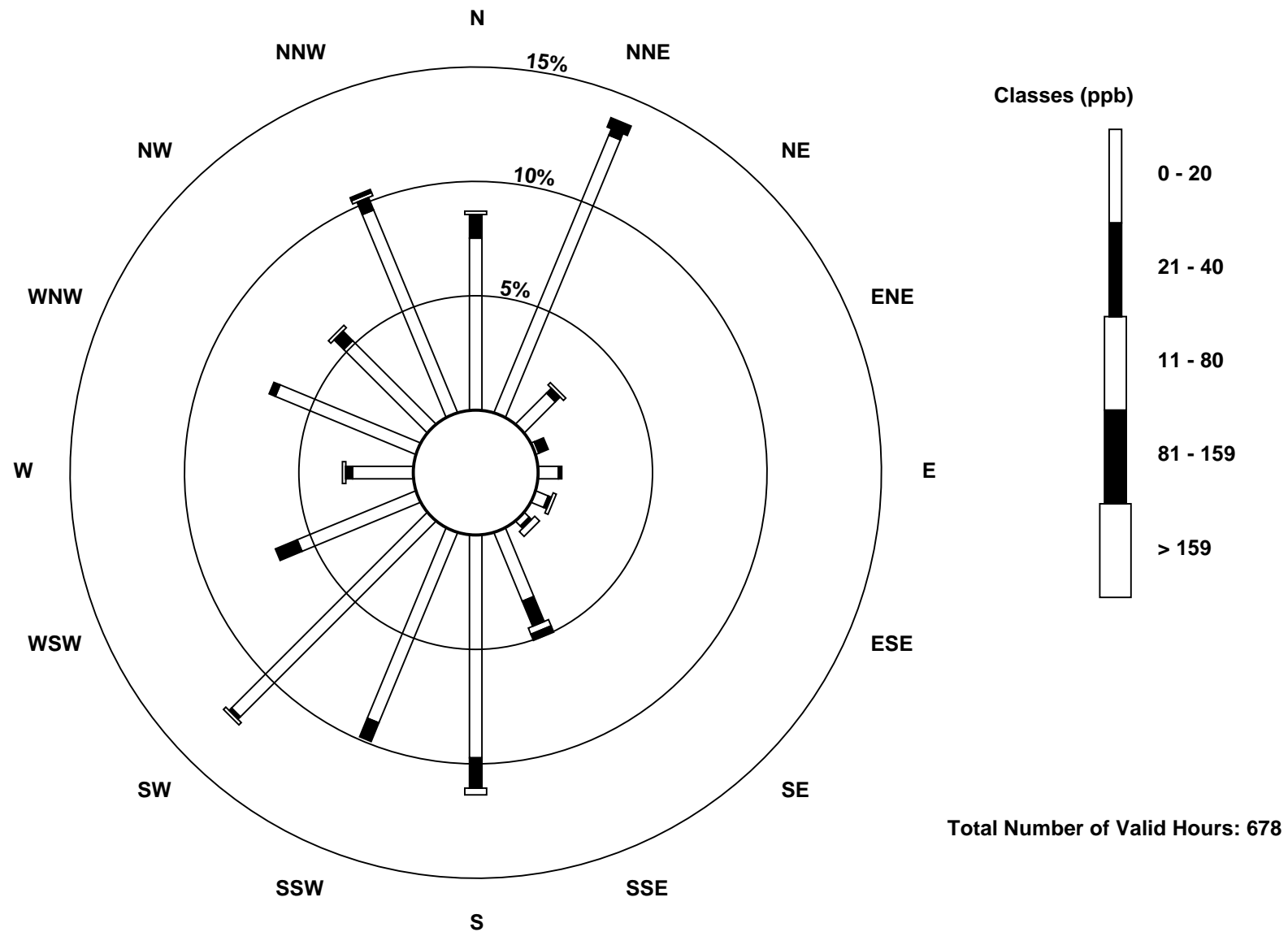
Total Number of Hours: 744





Wood Buffalo Environmental Association  
Wind Rose Oct 2017

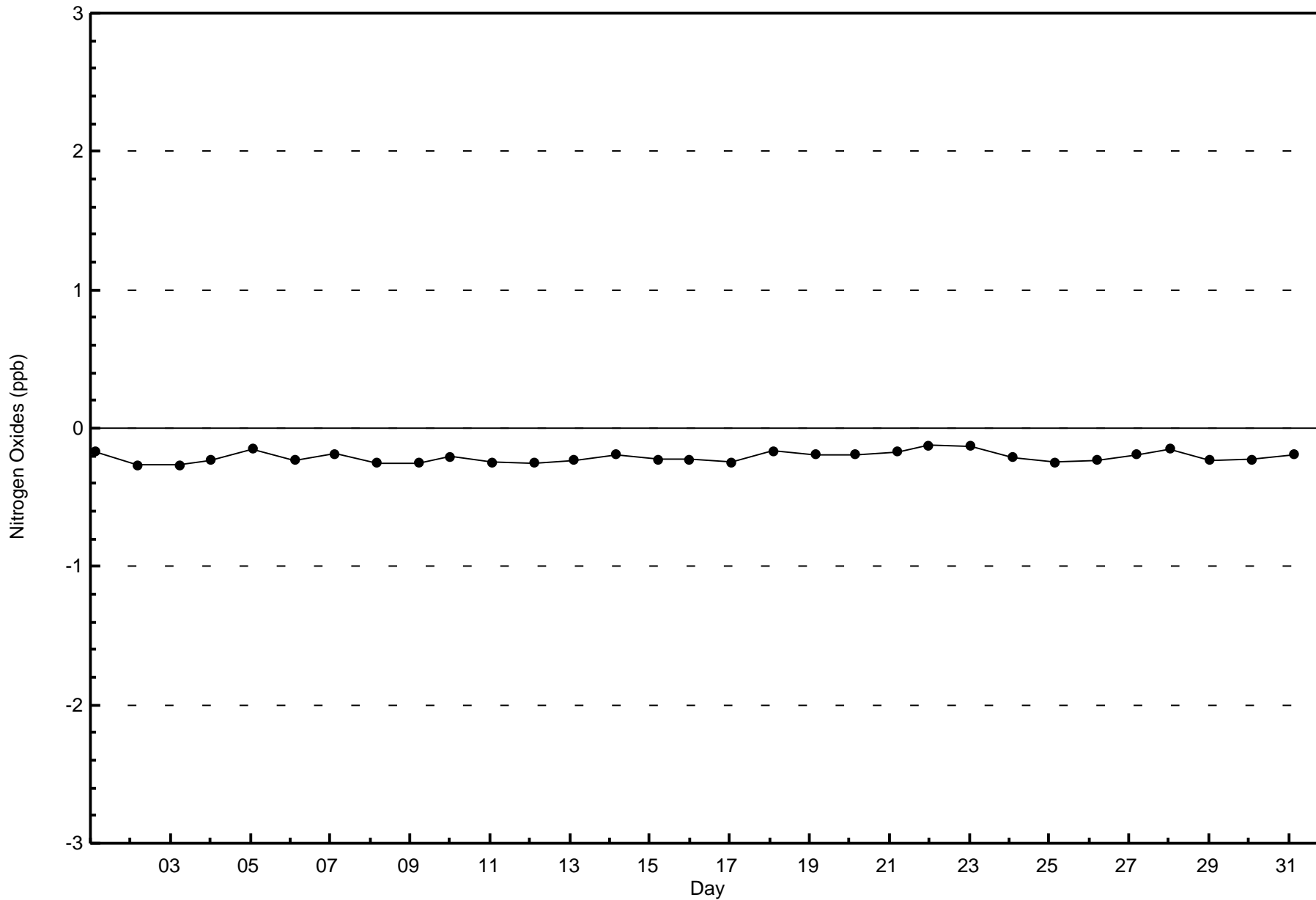
Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort Hills (AMS 23)

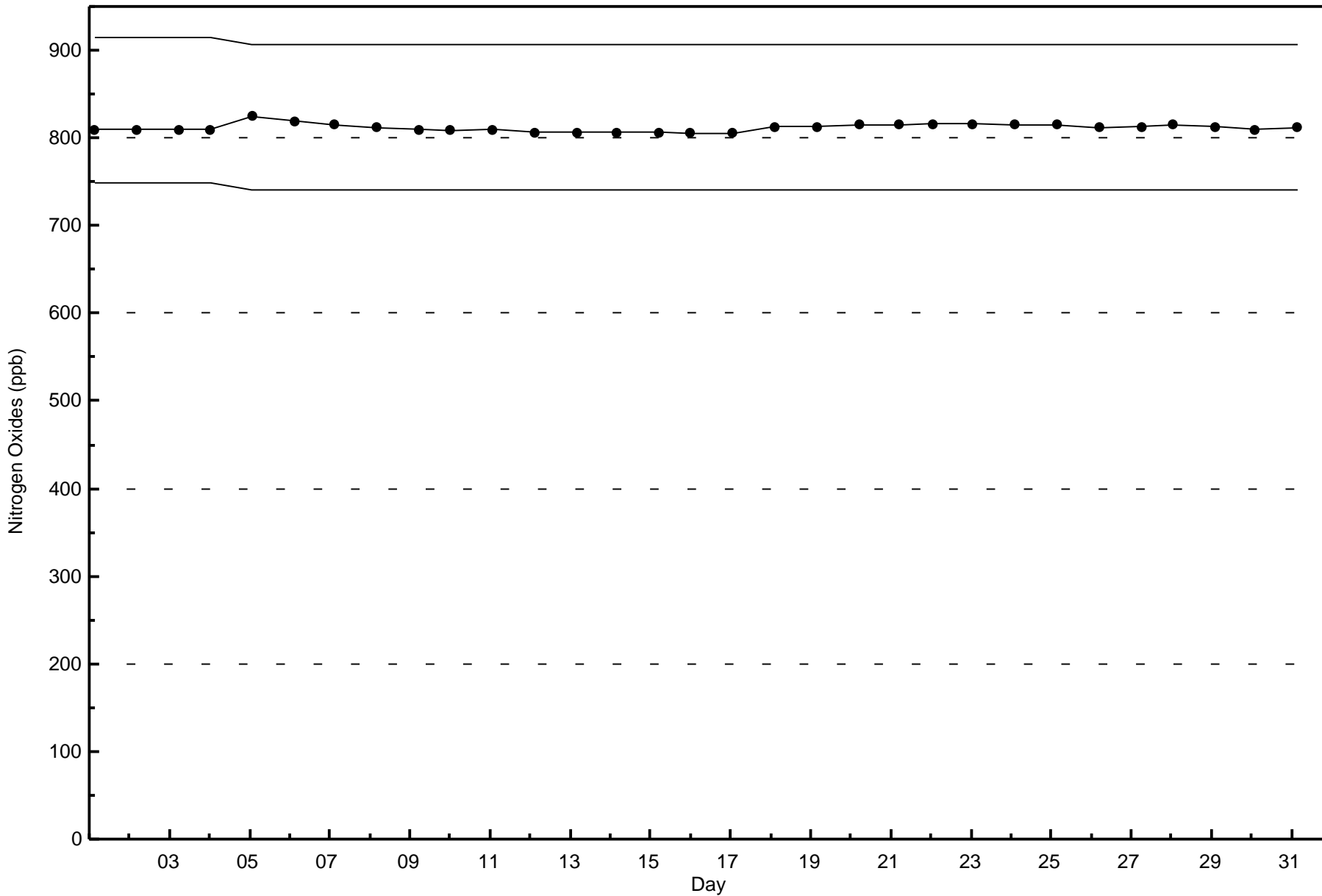




**Wood Buffalo Environmental Association**  
**Zero Responses**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort Hills - October 2017**





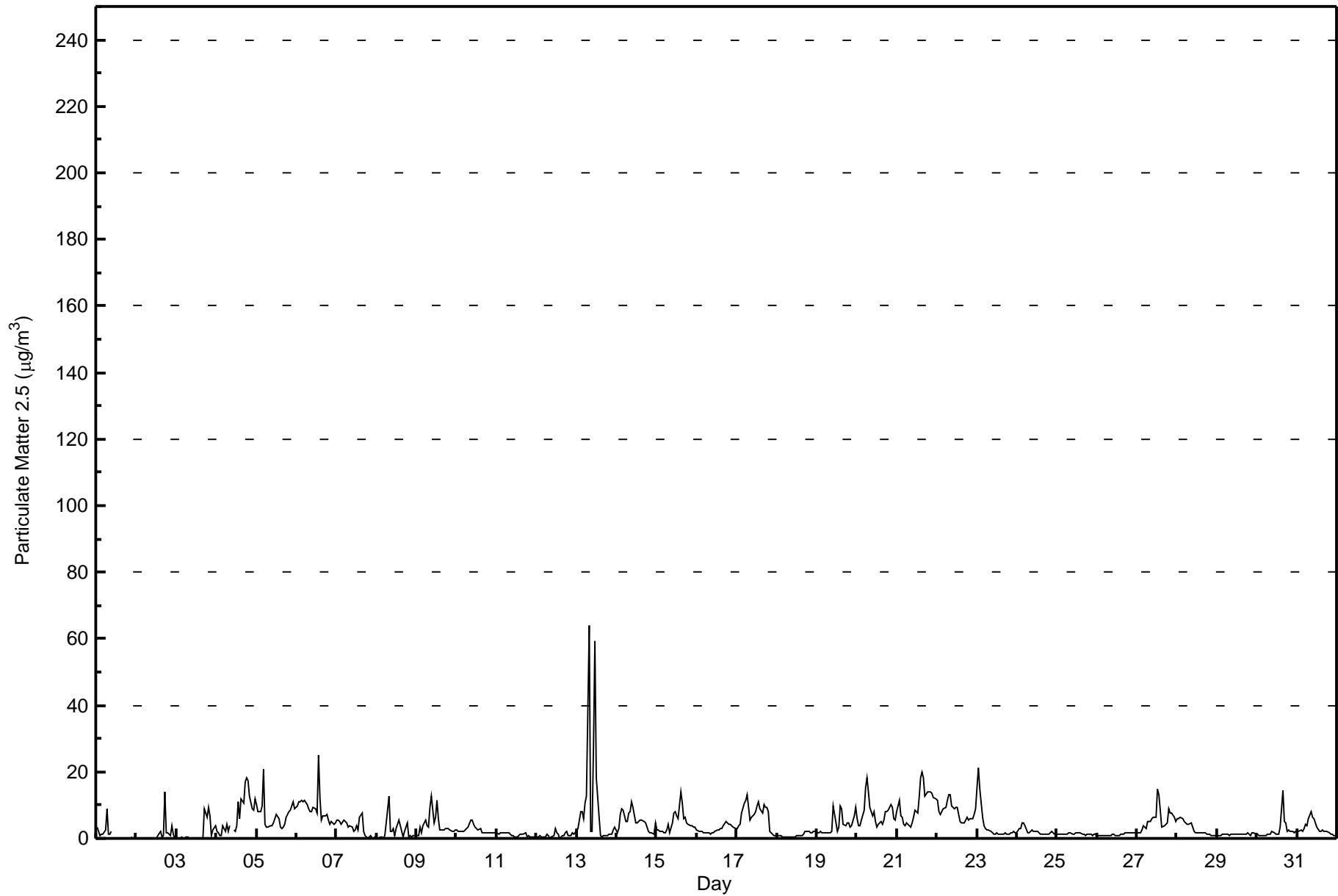


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 64 µg/m <sup>3</sup> on Oct 13 08:00	Maximum Daily Average: 10.2 µg/m <sup>3</sup> on Oct 13
Minimum Value: 0 µg/m <sup>3</sup> on Oct 3 00:00	Hours of Data: 715
Maximum Diurnal Average: 6.2 µg/m <sup>3</sup> at hour 8	Hours of Missing Data: 29
Monthly Average: 4.2 µg/m <sup>3</sup>	Hours of Calibration: 1
Minimum Daily Average: 1.0 µg/m <sup>3</sup> on Oct 12	Percent Operational Time: 96.2
Minimum Diurnal Average: 3.2 µg/m <sup>3</sup> at hour 23	
Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 6 P <sub>90</sub> = 9 P <sub>99</sub> = 19	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	3	2	1	1	1	2	9	1	1	2	UO	4	UO	UO	UO	UO	UO	UO	UO	UO	UO	0	0	UO	--	9
2-Oct	UO	UO	UO	UO	UO	UO	UO	UO	UO	1	UO	UO	0	1	2	1	1	14	2	2	1	4	1	0	--	14
3-Oct	UO	UO	0	0	0	0	0	0	UO	UO	UO	0	0	0	0	0	9	7	9	7	1	2	4	2.2	9	
4-Oct	2	2	1	1	4	2	4	2	4	C	2	4	11	6	12	11	17	18	18	13	9	8	12	7.2	18	
5-Oct	10	8	8	10	21	4	3	3	4	4	4	6	7	6	3	3	4	6	8	9	10	11	9	6.9	21	
6-Oct	10	11	11	11	11	11	10	9	8	8	9	9	8	25	12	6	7	7	7	5	4	5	4	5	8.9	25
7-Oct	5	6	5	4	6	5	5	3	4	3	2	3	4	3	6	8	2	1	0	0	1	0	0	3.2	8	
8-Oct	0	0	0	0	0	1	5	13	2	2	3	1	3	6	4	2	0	2	5	0	1	0	1	1	2.2	13
9-Oct	1	1	4	2	4	6	4	4	9	13	5	7	11	6	2	2	3	3	3	3	3	2	2	2	4.2	13
10-Oct	2	2	2	2	2	3	3	3	5	5	4	3	3	3	3	2	1	2	2	2	2	2	2	2	2.6	5
11-Oct	2	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	2	1	1	1	1	0	0	1.1	2
12-Oct	0	0	1	1	0	0	1	1	0	0	1	3	1	1	0	1	1	2	2	1	1	2	1	2	1.0	3
13-Oct	3	3	8	8	6	11	13	64	2	2	27	59	18	6	1	1	1	1	1	1	1	1	3	3	10.2	64
14-Oct	2	3	7	9	8	5	5	8	8	11	9	5	5	6	6	5	5	4	2	2	2	1	5	5.2	11	
15-Oct	3	3	2	2	2	2	3	4	2	5	8	8	7	6	14	10	6	6	5	4	4	4	3	3	4.8	14
16-Oct	3	2	2	2	2	2	2	2	1	2	2	2	3	3	3	3	4	5	4	4	4	4	3	3	2.7	5
17-Oct	3	4	4	8	11	11	13	9	6	6	7	8	10	11	9	8	10	9	9	8	2	1	1	1	7.1	13
18-Oct	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	2	2	2	2	2	2	2	1.1	2
19-Oct	2	2	2	2	2	2	2	2	2	2	10	5	2	4	10	9	4	4	5	5	4	4	7	9	4.0	10
20-Oct	6	4	4	6	8	15	18	14	9	7	8	5	3	4	5	4	6	8	8	9	10	9	6	6	7.6	18
21-Oct	8	11	7	6	4	4	5	4	3	5	7	8	8	12	18	20	18	13	14	14	14	14	12	12	10.0	20
22-Oct	11	8	7	8	9	9	11	13	13	10	9	9	9	7	5	5	5	5	6	6	6	6	7	9	8.1	13
23-Oct	15	21	15	6	4	3	2	3	2	2	1	1	1	1	1	1	1	2	1	1	2	2	2	2	3.9	21
24-Oct	2	3	3	4	5	4	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2	1	1	2.1	5
25-Oct	1	1	1	1	1	1	1	2	2	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1.3	2
26-Oct	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	1.2	2
27-Oct	2	2	2	2	4	3	5	5	5	6	6	7	15	13	9	4	4	4	5	9	8	7	6	5	5.7	15
28-Oct	6	6	6	6	5	5	4	4	5	3	2	2	2	2	2	2	2	2	1	1	1	1	1	1	3.0	6
29-Oct	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	2	1	1.2	2
30-Oct	1	1	1	1	1	1	1	1	1	2	2	1	1	1	4	14	5	5	2	3	2	2	2	2	2.4	14
31-Oct	2	2	2	2	3	4	4	6	8	6	6	5	3	2	2	2	2	2	2	2	1	1	1	1	3.0	8

3.7	3.8	3.7	3.7	4.3	4.0	4.6	6.2	3.9	4.0	5.1	5.9	4.5	4.9	4.5	4.4	3.6	4.6	4.3	4.1	3.6	3.3	3.2	3.5	Diurnal Average
15	21	15	11	21	15	18	64	13	13	27	59	18	25	18	20	18	17	18	18	14	14	12	12	Diurnal Maximum

C - Calibration      UO - Unstable Operation  
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m<sup>3</sup>





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Fort Hills - October 2017**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	414	57.90	57.90
6 - 15	175	24.48	82.38
16 - 25	11	1.54	83.92
26 - 80	3	0.42	84.34
> 81.0	0	0.00	84.34

Total Number of Valid Hours: 715

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**Fort Hills - October 2017**

Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	25	68	15	0	6	4	1	20	53	38	51	27	13	33	20	36	410
6 - 15	7	4	4	5	1	1	5	14	23	23	21	14	6	8	7	11	154
16 - 25	0	1	0	0	0	0	0	1	4	0	0	2	0	1	0	1	10
26 - 80	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	32	73	19	5	7	5	6	38	80	61	72	43	19	42	27	48	577

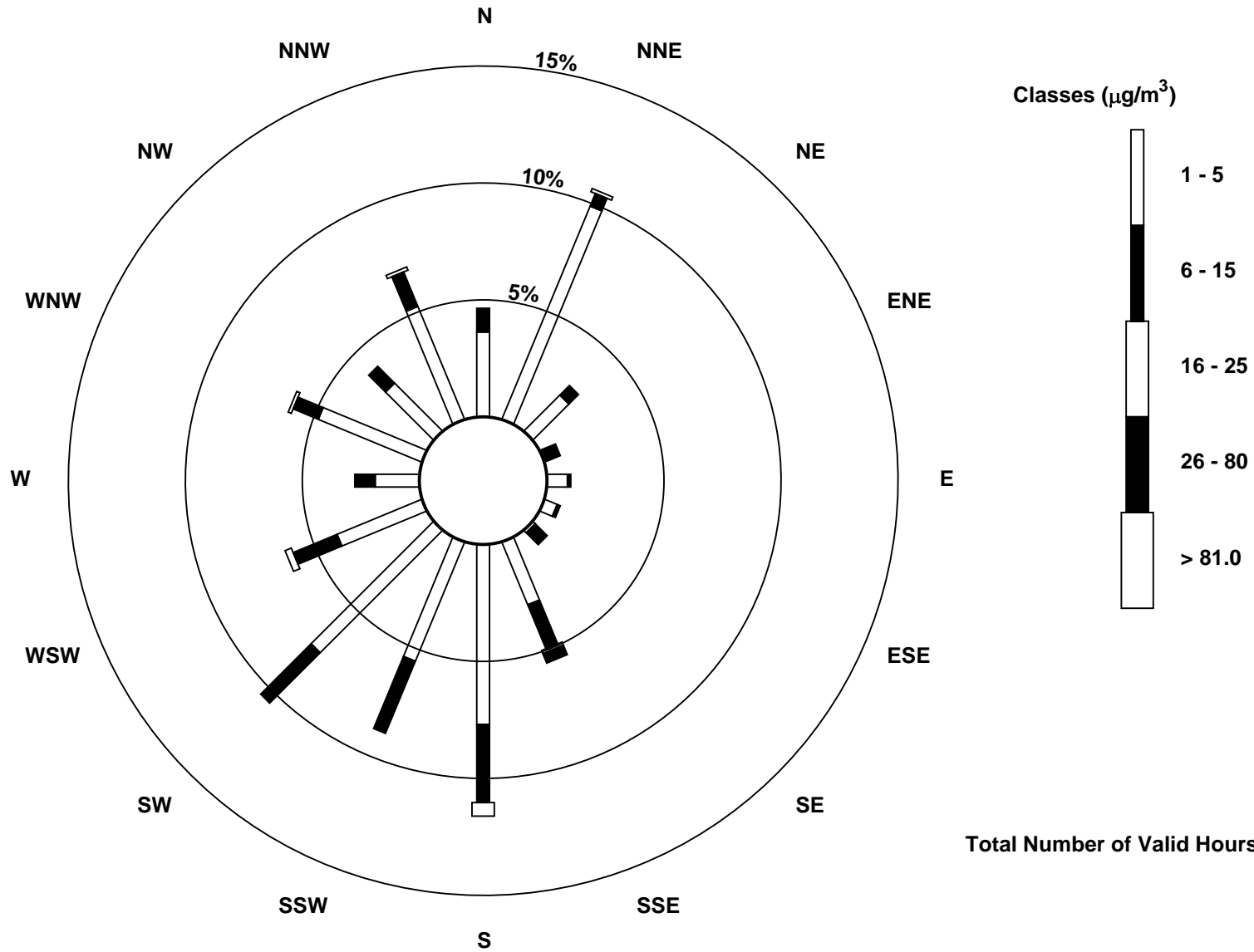
Total Number of Valid Hours: 689

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>  
Fort Hills (AMS 23)



Total Number of Valid Hours: 689





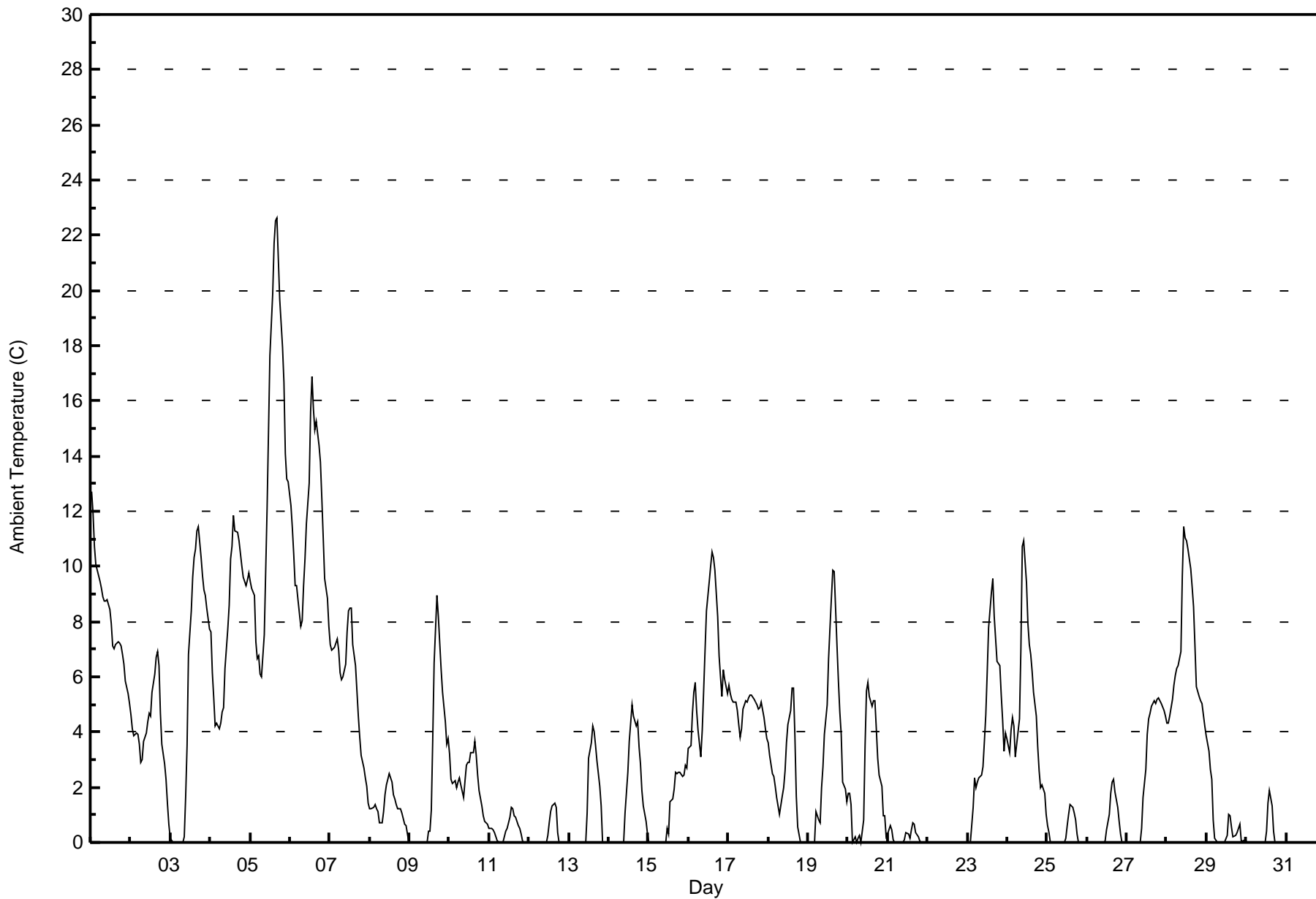
Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

Fort Hills - October 2017

Maximum Value: 23 C on Oct 5 17:00																	Maximum Daily Average: 13.5 C on Oct 5																	Hours in Service: 744			
Minimum Value: 0 C on Oct 3 02:00																	Minimum Daily Average: 0.0 C on Oct 22																	Hours of Data: 744			
Maximum Diurnal Average: 5.7 C at hour 16																	Minimum Diurnal Average: 2.0 C at hour 8																	Hours of Missing Data: 0			
Monthly Average: 3.5 C																	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 2 O <sub>3</sub> = 5 P <sub>90</sub> = 9 P <sub>99</sub> = 16																	Hours of Calibration: 0			
																																		Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24													
1-Oct	13	12	11	10	10	9	9	9	9	9	9	8	8	7	7	7	7	7	7	7	6	6	5	5	8.3	13											
2-Oct	5	4	4	4	4	4	3	3	4	4	4	5	5	5	6	7	7	6	5	4	3	2	1	1	4.1	7											
3-Oct	0	0	0	0	0	0	0	0	0	2	4	7	8	10	10	11	11	11	10	10	9	9	8	8	5.3	11											
4-Oct	8	6	5	4	4	4	4	5	5	6	8	9	10	11	12	11	11	11	10	10	10	9	9	10	8.1	12											
5-Oct	9	9	9	7	7	7	6	6	8	10	12	15	18	20	22	23	23	21	20	18	17	14	13	13	13.5	23											
6-Oct	12	11	10	9	9	9	8	8	9	10	12	13	16	17	16	15	15	14	14	12	11	10	9	8	11.6	17											
7-Oct	7	7	7	7	7	7	6	6	6	6	8	8	8	8	7	6	5	5	4	3	3	2	2	1	5.8	8											
8-Oct	1	1	1	1	1	1	1	1	1	2	2	2	3	2	2	2	1	1	1	1	1	1	1	0	1.3	3											
9-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	7	9	8	7	6	5	4	4	4	2.5	9											
10-Oct	3	2	2	2	2	2	2	2	2	2	3	3	3	3	3	4	3	2	2	1	1	1	1	1	2.2	4											
11-Oct	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0.4	1											
12-Oct	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0.3	1											
13-Oct	0	0	0	0	0	0	0	0	0	0	0	1	3	4	4	4	4	3	2	1	0	0	0	0	1.1	4											
14-Oct	0	0	0	0	0	0	0	0	0	0	1	3	4	4	5	5	4	4	3	3	2	1	1	0	1.7	5											
15-Oct	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	2	3	2	3	3	2	2	3	3	1.1	3											
16-Oct	3	3	5	5	6	5	4	3	4	6	7	8	9	10	11	10	10	8	7	6	5	6	6	5	6.4	11											
17-Oct	6	5	5	5	5	5	4	4	4	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4.9	6											
18-Oct	4	3	3	2	2	2	1	1	2	2	3	4	4	5	6	6	4	2	1	0	0	0	0	0	2.2	6											
19-Oct	0	0	0	0	0	1	1	1	2	3	4	5	7	8	9	10	10	7	6	5	4	2	2	1	3.6	10											
20-Oct	2	2	1	0	0	0	0	0	0	1	4	5	6	5	5	5	5	4	3	2	2	1	1	0	2.3	6											
21-Oct	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.2	1											
22-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0											
23-Oct	0	0	0	1	2	2	2	2	2	3	4	5	6	8	9	10	8	7	7	6	5	4	3	4	4.2	10											
24-Oct	4	3	4	5	4	3	4	4	7	11	11	9	8	7	7	6	5	5	3	3	2	2	1	1	5.0	11											
25-Oct	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0.3	1											
26-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	2	2	1	1	0	0	0	0	0.5	2											
27-Oct	0	0	0	0	0	0	0	0	0	0	2	3	4	4	5	5	5	5	5	5	5	5	5	5	2.6	5											
28-Oct	4	4	5	5	6	6	6	6	7	10	11	11	11	11	10	9	9	7	6	5	5	5	4	4	7.0	11											
29-Oct	4	3	3	2	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	1	0	0	0	0.8	4											
30-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0.2	2											
31-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0											
2.8																	2.6																	Diurnal Average			
13																	12																	Diurnal Maximum			





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C  
Fort Hills - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	689	92.61	92.61
10 - 20	51	6.85	99.46
> 20	4	0.54	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %**

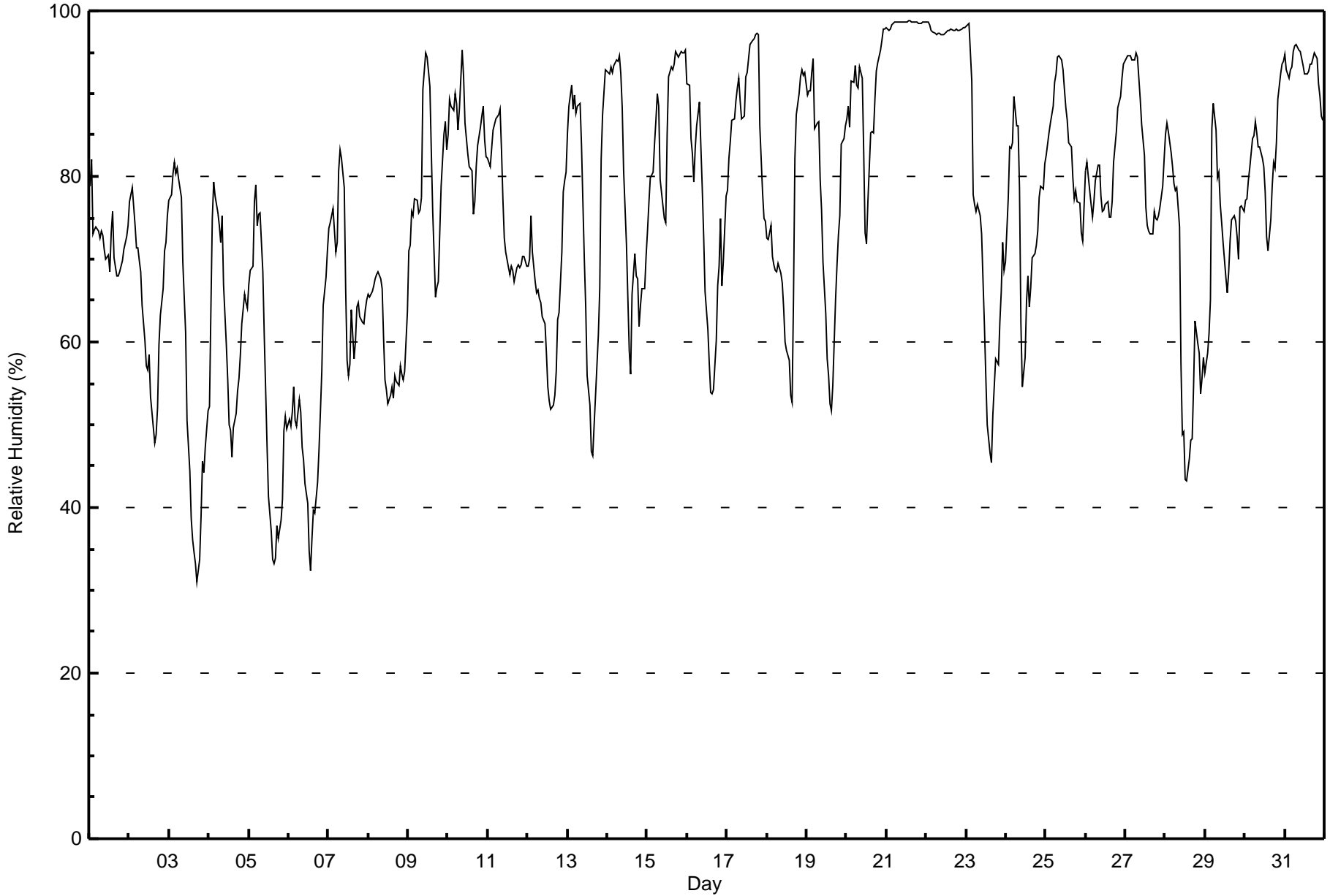
**Fort Hills - October 2017**

Maximum Value: 99 % on Oct 21 15:00														Maximum Daily Average: 98.5 % on Oct 21														Hours in Service: 744	
Minimum Value: 31 % on Oct 3 18:00														Minimum Daily Average: 48.8 % on Oct 6														Hours of Data: 744	
Maximum Diurnal Average: 82.4 % at hour 8														Minimum Diurnal Average: 65.6 % at hour 16														Hours of Missing Data: 0	
Monthly Average: 75.2 %														Percentiles: P <sub>1</sub> = 35 P <sub>10</sub> = 53 Q <sub>1</sub> = 65 Median = 76 Q <sub>3</sub> = 88 P <sub>90</sub> = 95 P <sub>99</sub> = 99														Hours of Calibration: 0	
																												Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Oct	79	82	73	74	74	73	73	73	73	71	70	70	68	73	76	70	68	68	69	69	70	71	73	74	72.3	82			
2-Oct	77	78	79	74	71	71	70	68	64	60	57	57	58	53	50	48	49	52	60	63	66	71	72	75	64.3	79			
3-Oct	77	78	80	82	80	81	80	77	70	65	61	51	44	39	36	35	33	31	34	39	46	44	47	52	56.7	82			
4-Oct	52	64	75	79	78	76	74	72	75	67	60	55	50	49	46	50	51	54	56	58	62	66	65	64	62.4	79			
5-Oct	67	69	69	77	79	74	75	76	69	61	54	47	41	37	34	33	34	38	36	38	41	49	51	49	54.1	79			
6-Oct	51	50	52	55	51	50	53	52	47	46	43	41	35	32	36	40	39	43	47	52	57	64	68	71	48.8	71			
7-Oct	74	74	75	76	71	72	81	83	82	79	66	58	56	57	64	58	60	64	65	63	62	62	64	65	68.0	83			
8-Oct	66	65	66	67	68	68	68	68	66	60	55	54	53	54	55	53	56	55	55	57	56	55	56	64	60.1	68			
9-Oct	71	72	76	75	77	77	76	76	78	91	95	94	93	91	83	76	65	67	67	73	79	85	87	83	79.4	95			
10-Oct	85	89	88	88	90	89	86	88	95	92	86	85	83	81	81	75	77	81	84	86	87	89	84	82	85.5	95			
11-Oct	82	81	83	86	86	87	88	88	83	77	73	71	69	68	69	69	67	69	69	69	69	70	70	69	75.6	88			
12-Oct	69	70	75	71	67	66	66	65	65	63	62	59	55	53	52	52	54	56	63	64	71	78	79	80	64.8	80			
13-Oct	85	88	91	88	90	88	89	89	84	77	70	64	56	52	47	46	50	54	61	66	82	87	90	93	74.5	93			
14-Oct	93	92	93	92	93	94	94	95	92	88	81	72	65	59	56	66	71	68	68	62	64	66	66	70	77.6	95			
15-Oct	73	77	80	81	84	87	90	88	80	76	75	74	85	92	93	93	94	95	95	94	95	95	95	95	86.9	95			
16-Oct	91	91	85	83	79	83	86	89	84	79	73	66	61	57	54	54	54	60	67	69	75	67	70	78	73.1	91			
17-Oct	78	82	84	87	87	89	91	92	89	87	87	92	93	94	96	96	97	97	97	97	86	78	75	75	88.6	97			
18-Oct	73	72	74	70	69	69	68	70	68	67	64	60	59	58	54	53	65	82	88	90	92	93	92	93	72.6	93			
19-Oct	90	90	90	93	94	86	86	87	80	76	70	63	58	56	53	52	55	65	69	73	75	84	85	86	75.6	94			
20-Oct	87	88	86	91	91	93	91	91	93	92	83	73	72	77	85	85	85	89	93	94	95	97	98	98	88.7	98			
21-Oct	98	98	98	98	98	99	99	99	99	99	99	99	99	99	99	99	99	99	99	98	98	99	99	99	98.5	99			
22-Oct	99	99	98	98	97	97	97	97	97	97	97	97	97	98	98	98	98	98	98	98	98	98	98	98	97.7	99			
23-Oct	98	98	98	91	78	77	76	77	75	73	67	62	56	50	47	45	51	55	58	57	62	66	72	69	69.1	98			
24-Oct	70	78	84	83	84	90	86	86	78	62	55	58	65	68	64	67	70	71	72	73	78	79	78	81	74.1	90			
25-Oct	83	84	85	86	89	91	92	94	95	94	93	91	88	87	84	84	80	77	78	77	77	73	72	76	84.6	95			
26-Oct	81	82	78	77	75	77	79	81	81	78	76	76	77	77	75	75	77	82	85	88	89	90	92	94	80.9	94			
27-Oct	94	95	95	95	94	94	95	94	92	89	86	83	76	74	73	73	73	76	75	75	75	76	79	82	83.9	95			
28-Oct	85	86	85	83	81	79	78	79	74	57	49	49	43	43	46	48	48	55	63	60	59	54	56	58	63.3	86			
29-Oct	56	59	61	65	86	89	86	80	80	77	74	72	68	66	68	72	75	75	75	73	70	76	76	76	73.1	89			
30-Oct	77	77	79	81	85	85	87	85	84	84	82	81	78	73	71	75	79	82	81	84	89	92	94	94	82.4	94			
31-Oct	95	93	92	93	93	95	96	96	95	95	94	93	92	92	93	93	93	94	95	94	91	90	87	87	93.0	96			
														79.2 80.7 81.6 81.9 82.0 82.1 82.4 82.4 80.3 76.7 72.8 69.9 67.5 66.4 65.7 65.6 66.7 69.4 71.5 72.7 74.8 76.3 77.1 78.4														Diurnal Average	
														99 99 98 98 98 99 99 99 99 99 99 99 99 99 99 99 99 99 99 99 98 98 99 99														Diurnal Maximum	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Fort Hills - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Relative Humidity (RH) - %**  
**Fort Hills - October 2017**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	19	2.55	2.55
40 - 60	120	16.13	18.68
60 - 80	300	40.32	59.01
80 - 100	305	40.99	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Wind Speed (WS) - km/h**  
**Fort Hills - October 2017**

Maximum Speed: 34 km/h on Oct 24 12:00	Maximum Daily Speed Average: 19.0 km/h on Oct 11	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 19 22:00	Minimum Daily Speed Average: 0.7 km/h on Oct 20	Hours of Data: 718
Maximum Diurnal Speed Average: 6.3 km/h at hour 15	Minimum Diurnal Speed Average: 1.6 km/h at hour 6	Hours of Missing Data: 26
Monthly Average Velocity: 3.6 km/h 305.5 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 4 Q <sub>1</sub> = 7 Median = 11 Q <sub>3</sub> = 17 P <sub>90</sub> = 23 P <sub>99</sub> = 30	Percent Operational Time: 96.5

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	NNW5	WNW6	WNW12	WNW12	WNW10	WNW8	NW9	NNW7	NNW11	NNW17	NNW19	N20	N23	NNW21	NNW20	NNW25	NNW24	N22	N24	N26	N25	N29	N29	N28	NNW16.9	N29
2-Oct	N26	N25	N23	N28	N29	N28	N27	N28	NNE30	NNE32	NNE32	N27	NNE25	NNE24	N19	N18	N16	NNW9	NW8	NW8	WNW4	WSW7	SW6	SW8	N18.4	NNE32
3-Oct	SW9	SSW8	S9	SSE10	S13	S15	SSW16	SSW16	SSW18	SSW18	SSW18	SW27	SW30	SW23	SW19	SW23	WSW19	WSW13	W10	W10	WSW7	WNW10	WNW9	NW8	SW12.9	SW30
4-Oct	NNW12	NNE13	N13	NW6	WNW6	NW6	WNW6	WNW4	S4	WNW1	WSW2	SW4	SSW5	SE9	S9	SSE14	S13	S10	SSE10	S5	SSW4	SSE6	SSE9	SSE8	S2.2	SSE14
5-Oct	S6	S5	SSW6	S8	S10	S9	S7	S9	SSW10	S9	S12	S14	S15	SSW14	SW19	SW21	SW20	SW12	WSW13	WSW10	WSW9	SW8	SW7	SW11	SSW10.0	SW21
6-Oct	SW13	SW13	SW13	SW12	SW14	SW15	SW12	SSW15	SW19	SW19	SW14	SW17	WSW21	WSW26	W24	WNW12	WNW11	W4	WSW11	W8	WNW3	WSW7	WSW11	SW5	WSW12.1	WSW26
7-Oct	SSE2	SSE4	S4	S2	NE8	NNE11	N14	N11	NNE13	N11	NNW12	NNW18	NNW19	NNW18	NNW21	NNW20	NNW23	N24	NNW23	NNW24	NNW25	NNW25	NNW22	NNW22	NNW14.2	NNW25
8-Oct	NNW19	NNW19	NNW18	NNW20	NNW16	NNW19	NNW16	NNW15	NNW13	NNW21	NNW23	NNW21	NNW18	NW19	NW21	NW17	NW15	NW9	WNW6	WNW8	NW8	WNW9	SW8	SSW9	NNW13.9	NNW23
9-Oct	SSW10	S12	S12	S13	S12	S14	S12	S7	SW6	S14	S14	SSW10	WSW8	SW9	SW13	SW9	W11	WSW9	W14	W11	WSW14	SW12	SW13	WSW12	SW9.8	WSW14
10-Oct	WSW12	SW13	WSW10	SW9	SW9	WSW10	WSW10	N8	NNE6	NNE7	NNE7	NNE9	NNE5	NNE8	N7	NNE12	NNE14	NNE12	NNE15	NNE18	NNE20	NNE20	NNE17	NNE14	N6.1	NNE20
11-Oct	NNE13	NNE12	NNE15	NNE17	NNE18	NNE20	NNE18	NNE18	NNE22	NNE24	NNE24	NNE21	NNE24	NNE23	NNE23	NNE22	NNE21	NNE20	NNE18	NNE19	NNE17	NNE18	NNE15	NNE17	NNE19.0	NNE24
12-Oct	NNE15	NNE16	NNE16	NNE16	N16	N15	N15	NNW15	N15	N16	N16	N16	N14	NNE15	N13	N11	NNE12	NNW6	WNW6	NW10	NNW8	NNW6	NW5	WNW4	N11.7	N16
13-Oct	WNW3	W1	WSW4	WSW2	SSW4	SE5	SSE6	SSE6	SSW7	S5	SSE6	SSE8	S8	SSW10	SW14	WSW20	WSW17	WSW18	WSW14	W8	N9	E4	S4	SSE7	SW5.3	WSW20
14-Oct	S9	SSE7	SSE8	SSE6	SSW6	SSW6	S5	S3	SSW7	S11	S15	SSW13	SW11	WSW16	WSW11	WSW17	W13	WNW11	NW11	WNW15	WNW14	WNW14	WNW10	WSW8	WSW6.9	WSW17
15-Oct	SW8	SW8	WSW11	SW5	SW7	SSE7	S10	SSE11	SSW12	S10	S10	SSW7	WNW3	SSW5	WNW7	W6	WSW7	SSW4	S6	SSE7	S6	SSE7	S7	S10	SSW6.1	SSW12
16-Oct	SSW8	SSW8	WNW6	WSW8	SW10	S15	SW15	SSW14	SW20	SW19	SW17	SW15	SW18	SW17	WSW16	WSW12	SW9	S6	S5	S3	S4	SW10	S5	S8	SW10.3	SW20
17-Oct	S8	S6	SSE2	SSE7	SSE5	NNE3	NNE4	SE3	SSE4	S6	S9	SSE11	SE2	NNE7	NE6	N10	N11	NNW7	NW9	WNW5	WNW13	NW16	NW20	NW18	NW2.2	NW20
18-Oct	WNW19	WNW19	WNW20	NW21	NW19	NW19	NW14	WNW14	NW16	NW16	NW13	N9	W7	SW7	W1	ESE5	E7	E8	NE7	NNE11	NNE10	NNE9	NE7	NNE7	NW8.4	NW21
19-Oct	NNE8	NNE8	NNE8	N5	NNW5	SSE7	S4	SSE7	S6	SSW9	SSW15	SW11	S9	SSE14	S12	SSE11	SSE6	SSE6	SE5	ESE3	S3	SW0	N3	NNW1	S3.5	SSW15
20-Oct	SW3	SW3	S3	N2	ENE2	NNW4	NNE5	NNW3	N2	WNW3	SSW1	WSW3	S6	E3	NW6	WNW7	W5	S4	SSE5	SE4	E2	NNW3	N4	NW2	WNW0.7	WNW7
21-Oct	ENE2	ENE5	ENE4	NNW5	NNW5	NE4	WSW2	W5	WNW3	SW5	WSW8	SSW9	SSW9	SW6	WSW3	WNW2	NNW6	NNW6	NW4	N4	NW2	NW5	WNW3	SW4	W1.9	SSW9
22-Oct	SW6	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	SW6
23-Oct	AF	AF	AF	WNW11	WNW14	W10	WNW9	W8	WNW8	WNW10	W15	W14	WSW13	WSW14	WSW14	WSW13	SW12	SW10	SW10	SW15	SSW10	SSW10	S6	SSW10	WSW9.4	W15
24-Oct	SSW10	SSE8	SSE13	S11	SW6	SSW11	SSW13	S11	W15	WNW25	NW30	NW34	NW25	NW27	NNW22	NNW23	N19	N14	NNE9	NE11	NNE4	NE4	NE9	NE7	NW7.1	NW34
25-Oct	NE13	NE12	NE14	NE13	NE17	NNE16	NNE17	NNE16	NNE17	NNE19	NNE21	NNE23	NNE23	N23	N22	N21	N18	N14	NNW10	NW10	WNW8	WNW6	WSW7	SW11	N13.0	NNE23
26-Oct	SW12	SW16	SW20	SW21	SW26	SSW22	SSW22	SSW19	SSW20	SSW22	SW25	SW26	SW25	SW19	SW13	SW13	SW12	SSW10	SSW8	SW9	WSW10	WSW5	SSW3	S3	SW15.6	SW26
27-Oct	SSE5	SSE5	SSE7	SSE8	SSE8	S9	S11	S11	S12	S11	S13	S14	SSW16	SSW15	S15	S15	SSW14	S18	S17	S18	S20	SSW19	SSW16	SSW15	S12.6	S20
28-Oct	SSW18	SSW18	SSW16	SW21	SW21	SW20	SW20	SW16	WSW10	WNW15	NW25	NW27	NNW27	NNW23	NW27	NNW26	NNW27	N24	NNW27	NNW25	NNW26	NNW30	NNW31	NNW25	NW13.6	NNW31
29-Oct	NNW30	NNW26	NNW30	NNW26	N22	NNE22	NNE24	NNE26	NNE26	NNE30	N28	N25	NNE25	NNE17	NNE12	NE9	NE6	E1	SW3	SSW4	S4	SSW10	SSW10	SSW11	N13.5	NNW30
30-Oct	SSW10	SSW11	SW12	SW9	SSW10	S12	SSW13	S11	SSW14	S12	SSW15	SSW14	SSW8	S2	ESE4	NE3	NNW4	NNW6	NNW5	N5	N3	NNW4	WNW3	NW3	SSW5.3	SSW15
31-Oct	NNW2	ESE1	E3	NE5	ESE3	N4	NNE4	E3	ENE3	NE7	NNE8	NNE10	NNE13	NNE15	NNE20	NNE19	NNE18	NNE19	NNE18	NNE22	NNE25	NNE27	NNE26	NNE26	NNE12.0	NNE27

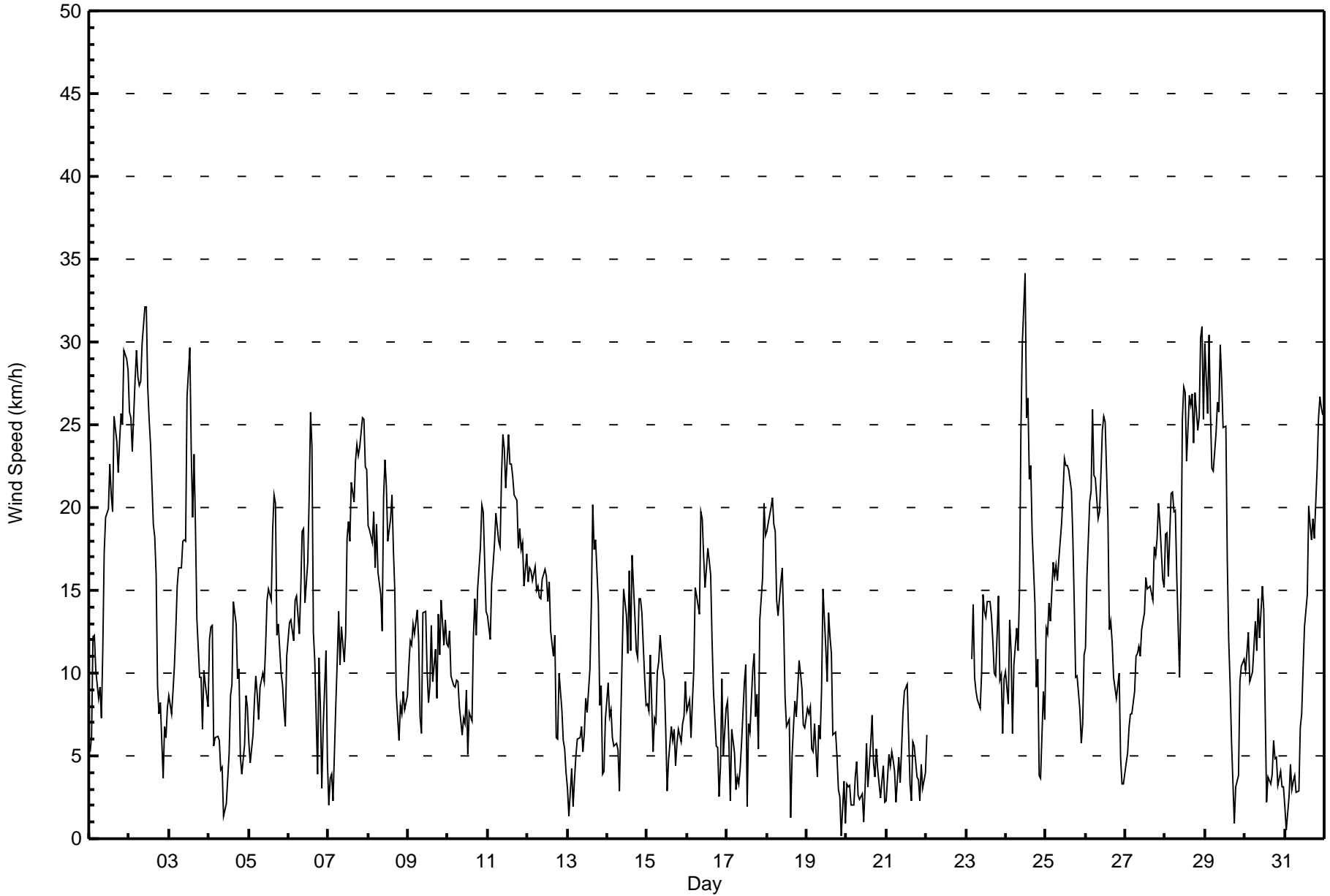
WNW2.7	WNW2.1	WNW2.5	WNW3.0	WNW2.9	W1.6	W2.1	W1.7	W2.3	WNW3.4	WNW4.1	WNW4.6	WNW4.7	WNW4.8	NW6.3	NW5.8	NW5.9	NNW4.0	NW4.2	NW5.1	NNW4.9	NW4.8	NW4.1	NW2.8	Diurnal Average
NNW30	NNW26	NNW30	N28	N29	N28	N27	N28	NNE30	NNE32	NNE32	NW34	SW30	NW27	NW27	NNW26	NNW27	N24	NNW27	N26	NNW26	NNW30	NNW31	N28	Diurnal Maximum

AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Fort Hills - October 2017**







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h  
Fort Hills - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	128	17.83	17.83
6 - 11	243	33.84	51.67
12 - 19	217	30.22	81.89
20 - 28	116	16.16	98.05
29 - 38	14	1.95	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 718

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Wind Speed (WS) - km/h  
Fort Hills - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 5	9	6	4	5	5	6	5	8	19	9	9	7	5	13	6	12	128
6 - 11	9	17	10	0	2	0	1	28	38	32	28	21	10	23	13	11	243
12 - 19	18	41	5	0	0	0	0	3	27	26	35	17	5	12	11	17	217
20 - 28	22	29	0	0	0	0	0	0	1	4	16	3	1	2	8	30	116
29 - 38	3	4	0	0	0	0	0	0	0	0	1	0	0	0	2	4	14
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>61</b>	<b>97</b>	<b>19</b>	<b>5</b>	<b>7</b>	<b>6</b>	<b>6</b>	<b>39</b>	<b>85</b>	<b>71</b>	<b>89</b>	<b>48</b>	<b>21</b>	<b>50</b>	<b>40</b>	<b>74</b>	<b>718</b>

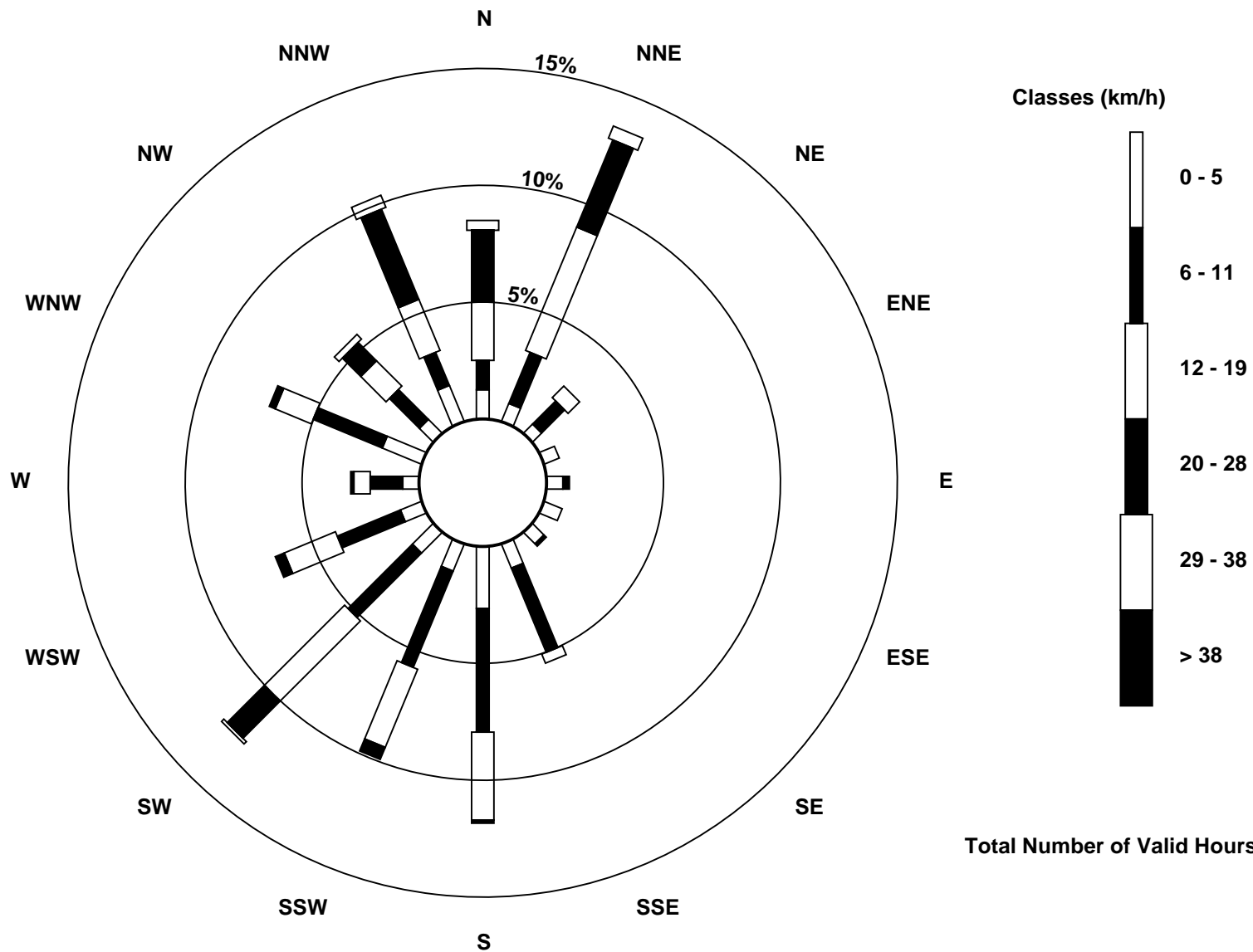
Total Number of Valid Hours: 718

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed (WS) - km/h  
Fort Hills (AMS 23)





**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Speed (WS) - km/h**  
**Fort Hills - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Oct 24 11:00 Minimum Value: 1 km/h on Oct 30 19:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 O <sub>1</sub> = 2 Median = 2 O <sub>3</sub> = 3 P <sub>90</sub> = 5 P <sub>99</sub> = 7																		Hours in Service: 744 Hours of Data: 718 Hours of Missing Data: 26 Hours of Calibration: 0 Percent Operational Time: 96.5									
Day	Hourly Period Ending At (MST)																								Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	2	4	3	2	2	2	2	2	3	5	4	5	4	4	5	6	5	5	6	6	6	8	7	7	8		
2-Oct	6	6	5	6	6	7	6	6	6	7	7	6	5	5	4	3	3	3	1	1	2	2	1	2	7		
3-Oct	1	2	1	1	1	2	2	2	3	3	4	5	5	6	3	4	4	3	2	2	2	2	2	3	6		
4-Oct	3	5	3	2	1	2	2	2	2	1	2	3	3	3	4	2	2	2	1	2	1	1	2	2	5		
5-Oct	2	1	1	1	1	1	2	1	1	2	2	2	3	3	4	4	4	2	3	2	2	2	3	2	4		
6-Oct	1	2	2	2	2	2	2	3	3	2	2	4	5	6	5	4	3	3	4	5	2	4	2	3	6		
7-Oct	2	1	2	3	3	3	3	3	3	2	5	4	4	4	5	5	5	5	5	5	5	5	5	6	6		
8-Oct	4	4	4	4	3	4	3	3	3	4	5	5	4	4	4	4	3	3	1	2	2	3	2	2	5		
9-Oct	1	1	1	1	2	2	3	1	1	2	2	1	1	3	2	2	2	4	6	4	3	2	3	3	6		
10-Oct	2	2	2	2	1	1	1	2	3	2	1	2	2	3	2	3	3	3	3	4	3	3	3	2	4		
11-Oct	3	3	2	3	3	4	4	4	4	5	4	4	4	4	5	4	4	4	3	3	3	3	3	4	5		
12-Oct	3	4	3	3	3	3	3	3	3	4	3	3	3	4	3	3	2	2	1	2	2	1	1	1	4		
13-Oct	2	1	1	1	1	2	2	2	2	1	2	1	3	4	5	4	3	3	3	3	2	1	1	1	5		
14-Oct	1	1	1	1	1	1	2	2	1	2	3	3	3	4	4	4	3	3	4	3	3	2	3	1	4		
15-Oct	1	1	2	2	2	1	1	2	3	2	1	2	2	3	2	1	1	1	1	1	1	1	2	1	3		
16-Oct	2	2	3	4	2	2	2	2	3	2	3	3	3	3	3	2	1	1	2	1	2	2	1	2	4		
17-Oct	1	2	2	1	1	2	1	1	1	1	2	2	2	2	1	2	2	1	2	2	3	4	5	4	5		
18-Oct	4	4	4	6	5	4	3	3	4	3	3	2	4	3	2	2	2	2	2	2	2	2	3	2	6		
19-Oct	2	3	3	2	1	3	3	1	2	3	3	3	2	2	3	1	2	1	3	2	1	1	1	1	3		
20-Oct	1	1	1	2	2	2	2	2	1	2	2	1	1	3	2	1	1	1	1	2	2	1	2	2	3		
21-Oct	1	2	1	1	2	2	2	1	2	2	2	1	2	3	2	2	1	2	1	2	1	1	1	2	3		
22-Oct	2	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2		
23-Oct	AF	AF	AF	4	3	4	2	2	2	3	3	3	3	3	3	3	1	1	1	2	2	2	2	1	4		
24-Oct	2	2	2	2	2	2	2	2	7	6	9	8	6	6	5	5	4	3	4	4	2	2	2	2	9		
25-Oct	3	2	3	2	4	3	3	3	3	3	4	4	4	4	4	5	3	3	1	1	1	1	2	2	5		
26-Oct	2	3	2	3	6	4	3	2	3	4	4	4	3	4	2	2	2	1	1	1	2	4	1	1	6		
27-Oct	1	1	1	1	1	1	2	2	1	2	2	2	3	2	2	2	2	3	2	2	3	2	2	3	3		
28-Oct	3	2	3	4	2	3	3	4	3	4	6	6	6	6	7	7	7	6	7	6	7	8	8	6	8		
29-Oct	8	6	7	5	5	5	5	5	4	6	5	5	5	3	3	2	2	1	1	1	2	1	1	1	8		
30-Oct	1	1	1	2	2	1	2	1	2	2	2	2	2	2	1	1	1	1	1	1	1	2	2	2	2		
31-Oct	1	1	1	1	1	1	1	1	1	1	1	2	2	2	4	3	3	3	3	4	4	4	5	5	5		
																		Diurnal Maximum									
AF - Analyzer Failure																											



# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Wind Direction (WD) - deg

## Fort Hills - October 2017

Direction of Maximum Speed: 319 deg on Oct 24 12:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 20.8 deg on Oct 11	Hours of Data: 718
Direction of Minimum Speed: 233 deg on Oct 19 22:00	Hours of Missing Data: 26
Direction of Minimum Daily Speed Average: 0.7 deg on Oct 20	Percent Operational Time: 96.5
Monthly Average Direction: 265.7 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	336	297	298	295	296	290	308	337	346	346	343	6	351	343	342	348	348	350	1	1	4	6	7	4	347.9
2-Oct	6	6	11	2	6	8	7	8	14	14	12	1	12	14	360	3	1	348	314	320	296	237	234	220	3.6
3-Oct	218	197	176	167	186	189	202	200	192	213	203	215	215	223	230	234	245	251	266	264	246	294	284	309	220.6
4-Oct	335	12	6	309	293	308	299	302	191	284	240	232	197	140	172	155	169	176	156	186	203	159	158	167	188.5
5-Oct	183	190	197	170	172	184	177	172	193	190	174	179	181	192	225	226	233	223	250	240	238	223	223	229	206.0
6-Oct	228	234	222	216	233	232	216	212	217	222	222	230	245	258	278	295	290	266	256	265	293	252	241	235	241.1
7-Oct	150	152	169	185	53	25	9	4	20	4	342	344	340	334	346	333	346	349	348	344	344	342	337	334	348.1
8-Oct	334	335	334	338	338	345	341	337	328	340	347	341	337	326	321	325	326	319	301	301	308	287	235	199	329.5
9-Oct	202	187	180	177	182	190	182	188	217	182	185	206	250	224	233	215	261	256	263	260	242	230	234	251	215.5
10-Oct	242	233	240	233	233	240	250	355	31	12	17	26	29	26	5	29	25	33	27	28	23	19	22	23	6.0
11-Oct	23	29	21	21	23	22	18	18	25	32	32	28	24	21	19	19	18	12	16	14	12	16	13	16	20.8
12-Oct	17	16	20	21	11	7	358	348	351	351	354	357	4	17	3	352	14	342	289	312	341	332	319	298	358.7
13-Oct	294	272	255	250	205	142	161	159	194	179	158	159	169	193	230	238	245	243	241	276	4	85	181	158	215.4
14-Oct	183	159	149	164	193	193	170	186	198	184	189	212	231	254	258	255	262	288	307	301	301	299	294	256	241.3
15-Oct	225	233	251	229	217	162	171	168	194	181	187	202	289	202	282	277	241	199	177	165	171	164	169	172	199.3
16-Oct	193	203	285	258	214	191	214	200	218	219	217	215	224	230	245	247	234	181	180	181	190	226	188	171	216.9
17-Oct	177	170	153	154	154	23	31	124	148	170	174	166	130	23	45	2	355	337	322	283	297	305	305	304	307.3
18-Oct	302	300	300	307	319	324	315	300	308	312	314	354	271	216	264	115	86	93	44	14	22	16	42	18	324.1
19-Oct	33	20	19	358	345	147	176	168	180	197	204	218	191	166	177	161	150	148	140	119	179	233	357	337	169.9
20-Oct	232	215	169	357	59	346	25	342	354	283	203	257	172	80	311	292	271	183	162	126	100	340	11	322	292.3
21-Oct	74	70	75	348	347	49	247	262	284	233	243	210	199	224	252	292	330	340	316	352	322	313	297	231	279.6
22-Oct	219	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
23-Oct	AF	AF	AF	287	301	280	282	277	301	298	281	265	245	249	241	238	216	224	214	223	211	193	187	213	250.0
24-Oct	197	168	166	185	214	196	211	188	260	290	308	319	308	308	340	339	352	10	31	35	30	45	37	38	311.2
25-Oct	36	39	41	37	34	31	29	18	14	16	14	14	12	10	8	6	1	357	338	320	302	282	251	217	11.2
26-Oct	216	222	221	220	231	210	207	207	207	206	218	219	223	221	231	220	214	204	213	229	247	244	209	184	217.7
27-Oct	162	161	154	159	164	178	173	184	171	176	175	170	192	193	187	177	194	174	189	185	190	194	204	196	182.7
28-Oct	200	196	210	221	217	214	218	224	245	283	323	322	329	331	322	327	344	351	344	342	334	346	342	345	309.5
29-Oct	346	340	335	342	349	13	15	17	16	14	10	11	25	23	28	43	52	97	215	207	177	200	208	193	4.0
30-Oct	208	213	216	220	194	184	192	190	194	188	202	208	209	170	108	40	344	336	340	356	350	348	299	315	207.9
31-Oct	341	118	96	49	110	10	30	101	72	43	30	19	16	25	23	18	17	18	19	17	18	20	25	25	23.4

283.9 283.6 291.1 287.3 286.0 276.8 272.5 271.3 277.7 297.8 299.7 300.1 297.3 300.3 307.5 311.2 319.9 326.5 316.9 324.8 327.0 324.4 319.2 305.7

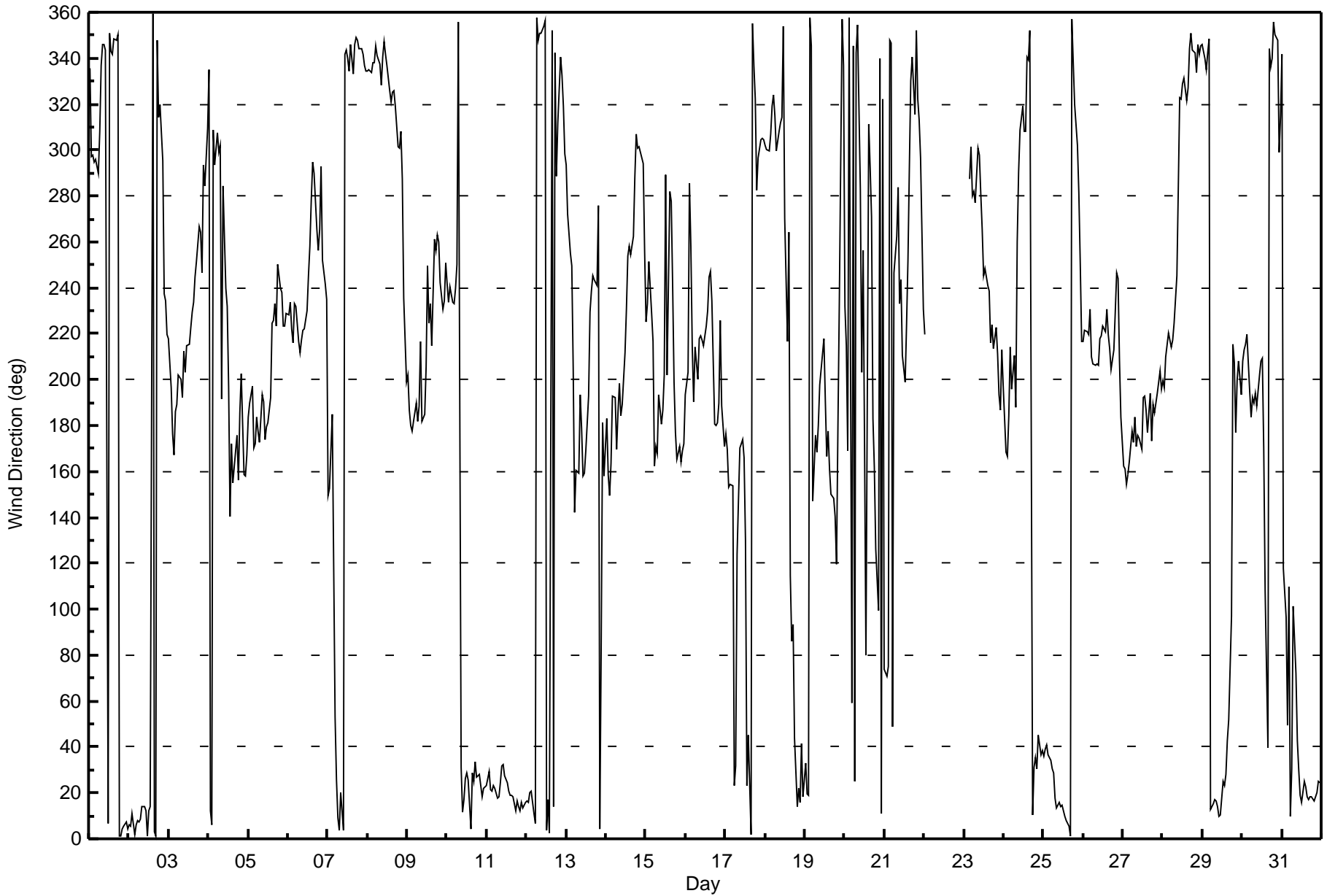
Diurnal Average

AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Fort Hills - October 2017**





**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Direction (WD) - deg**  
**Fort Hills - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 89 deg on Oct 30 14:00	Hours of Data: 718
Minimum Value: 5 deg on Oct 23 17:00	Hours of Missing Data: 26
Percentiles: P <sub>1</sub> = 6 P <sub>10</sub> = 9 Q <sub>1</sub> = 11 Median = 14 Q <sub>3</sub> = 19 P <sub>90</sub> = 38 P <sub>99</sub> = 81	Hours of Calibration: 0
	Percent Operational Time: 96.5

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	39	45	12	13	13	12	14	23	12	13	15	19	16	12	13	16	15	17	16	17	16	16	16	17	45
2-Oct	16	15	14	17	16	16	16	16	14	13	16	17	15	14	19	19	17	16	8	11	40	24	16	12	40
3-Oct	15	19	19	11	9	8	10	9	13	9	10	9	9	11	10	9	10	13	14	15	21	10	11	26	26
4-Oct	12	25	14	32	13	13	20	48	22	85	82	69	46	35	33	10	11	9	8	37	26	21	12	18	85
5-Oct	15	24	9	9	12	17	19	11	10	12	11	16	17	15	15	12	10	11	12	9	8	11	30	10	30
6-Oct	7	7	9	10	7	6	8	6	6	6	9	15	11	12	16	15	17	40	20	33	22	36	10	34	40
7-Oct	65	36	43	80	20	15	14	14	16	19	24	17	20	19	14	14	14	16	15	13	14	14	14	12	80
8-Oct	12	13	13	13	15	14	13	13	13	18	15	16	17	16	14	13	15	17	16	12	14	18	19	13	19
9-Oct	10	7	9	9	15	13	12	20	18	11	10	13	11	18	10	19	13	18	12	16	11	12	11	14	20
10-Oct	13	9	12	12	15	8	13	38	20	21	14	18	26	20	20	14	12	10	11	11	9	9	10	11	38
11-Oct	12	12	10	10	10	11	11	12	10	10	10	12	11	13	13	11	12	12	11	11	13	13	14	13	14
12-Oct	12	14	12	13	13	16	16	14	15	15	17	18	20	15	22	21	13	23	9	11	16	21	12	21	23
13-Oct	16	56	12	59	38	18	17	18	14	19	16	12	25	28	34	10	12	10	9	20	17	43	42	12	59
14-Oct	16	10	12	18	19	26	41	62	11	8	14	17	29	13	14	13	11	15	13	12	11	9	11	18	62
15-Oct	9	12	9	35	17	20	9	15	14	12	20	28	50	50	14	15	17	22	18	12	16	12	14	10	50
16-Oct	20	28	50	52	23	12	8	11	6	7	9	10	10	12	11	11	10	33	13	22	22	9	26	15	52
17-Oct	9	13	45	8	12	43	19	50	12	16	7	8	70	9	18	19	14	11	11	24	12	14	12	12	70
18-Oct	12	11	11	13	14	13	14	11	12	15	17	30	60	33	84	41	18	21	31	12	11	15	17	24	84
19-Oct	21	15	30	43	25	58	83	13	29	18	14	15	21	12	14	12	21	11	74	43	49	81	20	75	83
20-Oct	29	27	15	75	45	46	19	52	44	56	73	48	27	78	50	12	15	30	16	54	58	29	56	78	78
21-Oct	52	32	32	25	29	23	72	26	43	24	24	17	21	32	37	52	24	17	25	52	79	21	54	47	79
22-Oct	27	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	27
23-Oct	AF	AF	AF	16	11	14	15	18	15	14	14	15	17	21	30	21	5	8	6	7	18	9	29	10	30
24-Oct	11	22	10	14	12	15	17	13	39	13	16	14	13	14	17	14	14	16	16	15	30	50	22	14	50
25-Oct	12	10	11	10	9	9	9	10	11	10	11	10	12	13	13	16	15	14	9	8	18	14	18	9	18
26-Oct	8	8	8	9	10	10	8	8	8	10	9	8	8	10	12	10	10	10	11	11	10	55	45	34	55
27-Oct	17	12	14	10	10	13	13	15	10	11	10	13	11	9	8	7	10	8	8	8	7	10	9	9	17
28-Oct	8	8	10	9	9	8	11	14	19	14	17	14	14	14	14	13	17	17	16	17	16	17	14	15	19
29-Oct	16	14	13	15	14	14	12	12	11	12	15	18	11	16	14	20	11	89	51	42	46	12	8	11	89
30-Oct	9	8	7	10	8	8	7	8	8	15	10	10	17	89	38	24	13	6	21	13	11	37	24	32	89
31-Oct	41	86	27	15	25	31	14	26	34	13	11	7	9	9	9	10	10	9	9	9	9	8	9	10	86
Diurnal Maximum																									
65 86 50 80 45 58 83 62 44 85 82 69 70 89 84 52 24 89 74 54 79 81 56 78																									

AF - Analyzer Failure







# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

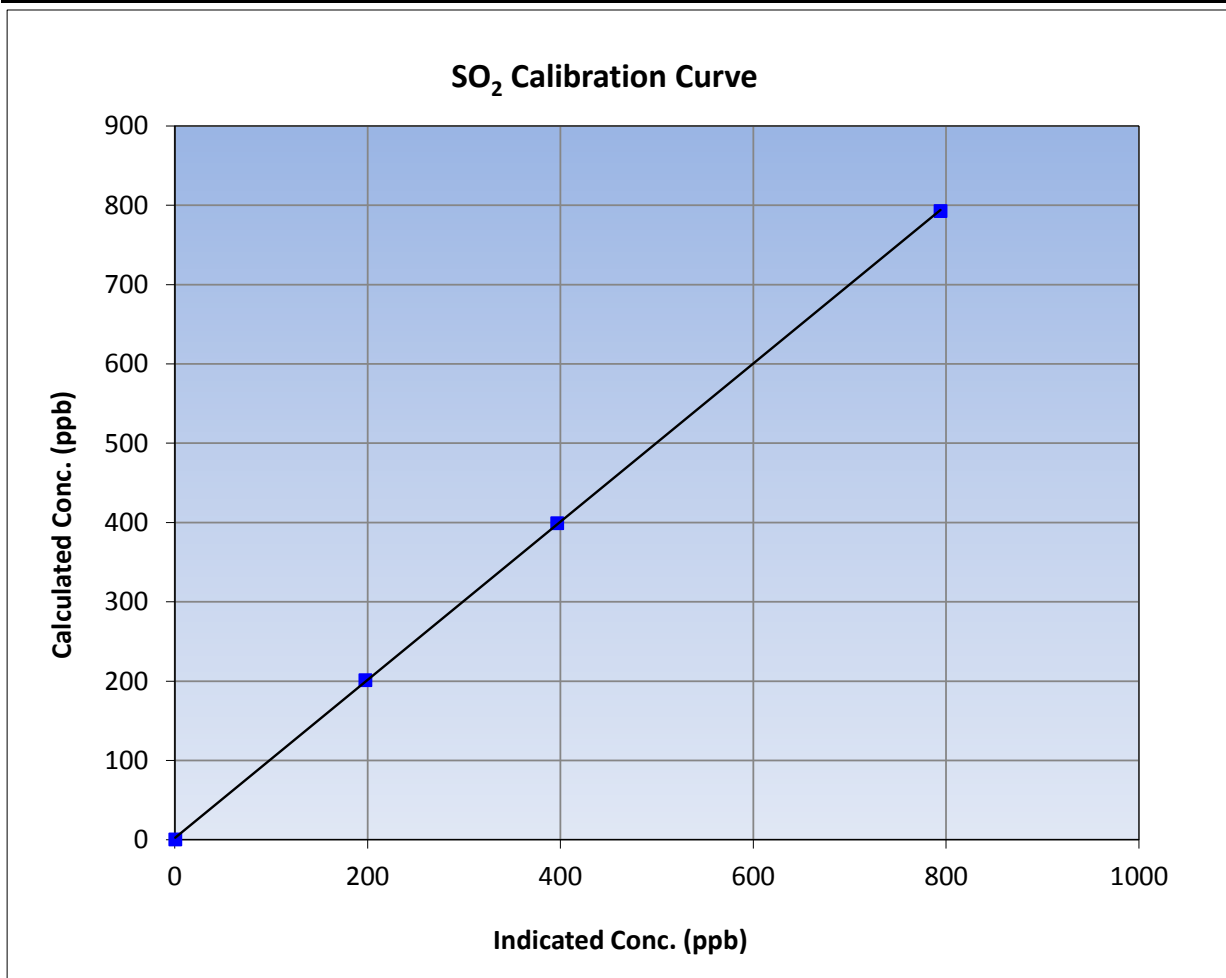
Version-03-2017

### Station Information

Calibration Date	October 4, 2017	Previous Calibration	September 12, 2017
Station Name	Fort Hills	Station Number	AMS 23
Start Time (MST)	10:22	End Time (MST)	12:29
Analyzer make	Thermo 43i	Analyzer serial #	1160290012

### Calibration Data

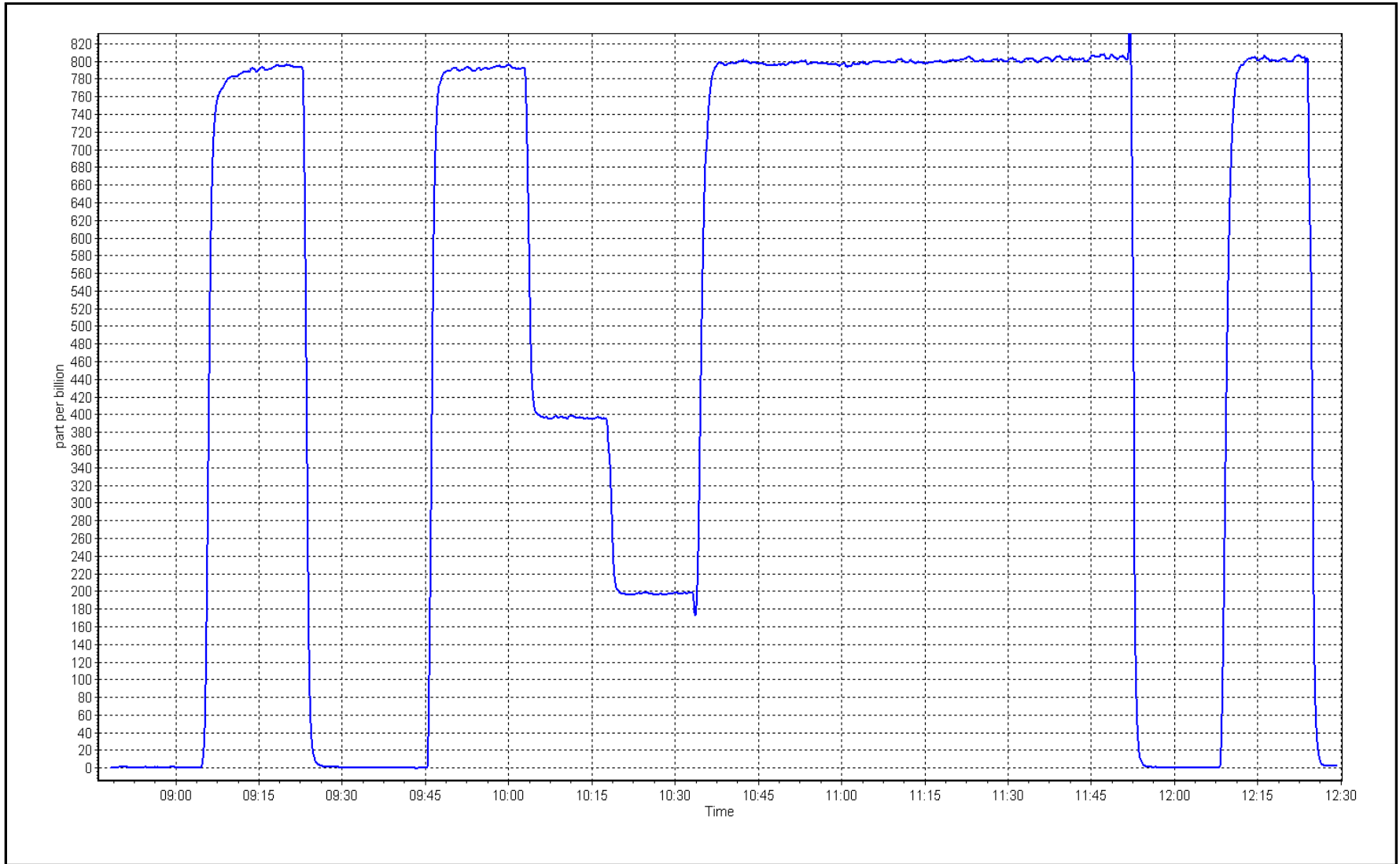
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits
0.0	0.1	----	Correlation Coefficient	≥0.995
792.6	793.8	0.9984		
398.8	396.4	1.0061	Slope	0.90 - 1.10
200.9	197.4	1.0175		
			Intercept	+/-30



SO2 Calibration Plot

Date: October 4, 2017

Location: Fort Hills





# Wood Buffalo Environmental Association

## TRS Calibration Report

Version-03-2017

### Station Information

Station Name:	Fort Hills	Station number:	AMS 23
Calibration Date:	October 4, 2017	Last Cal Date:	September 1, 2017
Start time (MST):	12:23	End time (MST):	14:28
Reason:	Routine		

### Calibration Standards

Cal Gas Concentration	<u>5.11</u>	ppm	Cal Gas Exp Date	December 7, 2019
Cal Gas Cylinder #	<u>DR0000390</u>			
Calibrator Make/Model	API T700		Serial Number	451
ZAG Make/Model	API 701		Serial Number	4522

### Analyzer Information

Analyzer make:	Thermo 43iTLE	Analyzer serial #:	1150840012	
	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
Analyzer Range	0 - 100 ppb		PMT voltage	-688
Calculated slope	0.998634	0.990699	Lamp voltage	934
Calculated intercept	0.188059	0.267915	Pressure	690.8
Analyzer Background	1.39	1.44	Flow	0.489
Analyzer Coefficient	1.068	1.111	Intensity	90

### TRS Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5006	0.0	0.0	-0.1	----
as found span	4941	78.6	80.0	76.4	1.047
calibrator zero	5012	0.0	0.0	0.1	----
high point	4939	78.7	80.1	80.8	0.992
second point	4976	39.5	40.2	40.2	1.001
third point	4997	19.9	20.3	19.8	1.024
as left zero	5012	0.0	0.0	0.0	----
as left span	4939	78.6	80.0	82.2	0.974
SO2 Scrubber Check	4997	20.4	203.3	0.1	----
Average Correction Factor					1.006

Corrected As found	76.50	Previous response	79.94	% change	4.5%
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\* = > +/-5% change initiates investigation

Notes:

Changed inlet filter after asfound. Adjusted the span.

Calibration Performed By: Jayme Marcoux



# Wood Buffalo Environmental Association

## TRS Calibration Summary

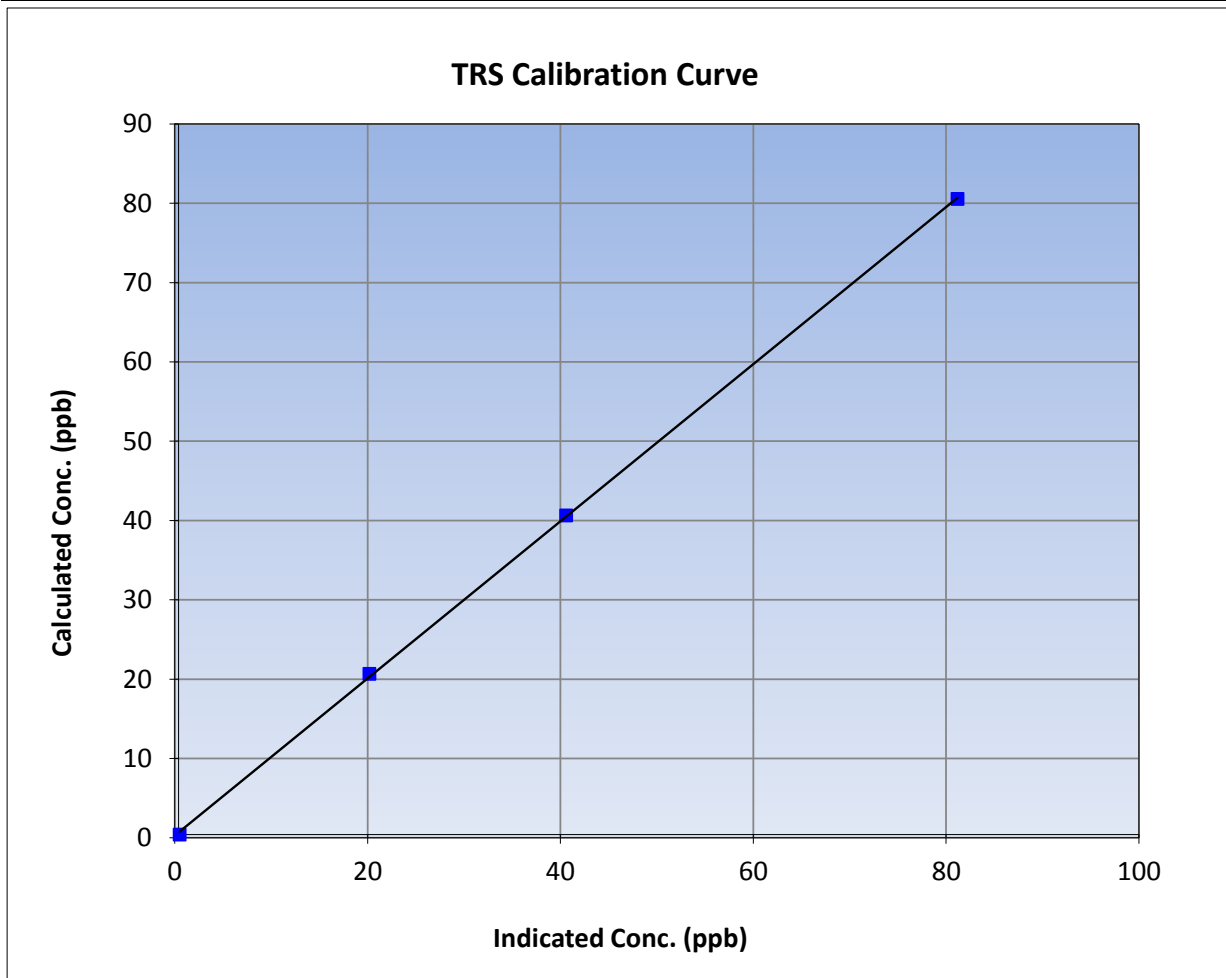
Version-03-2017

### Station Information

Calibration Date	October 4, 2017	Previous Calibration	September 1, 2017
Station Name	Fort Hills	Station Number	AMS 23
Start Time (MST)	8:25	End Time (MST)	14:28
Analyzer make	Thermo 43iTLE	Analyzer serial #	1150840012

### Calibration Data

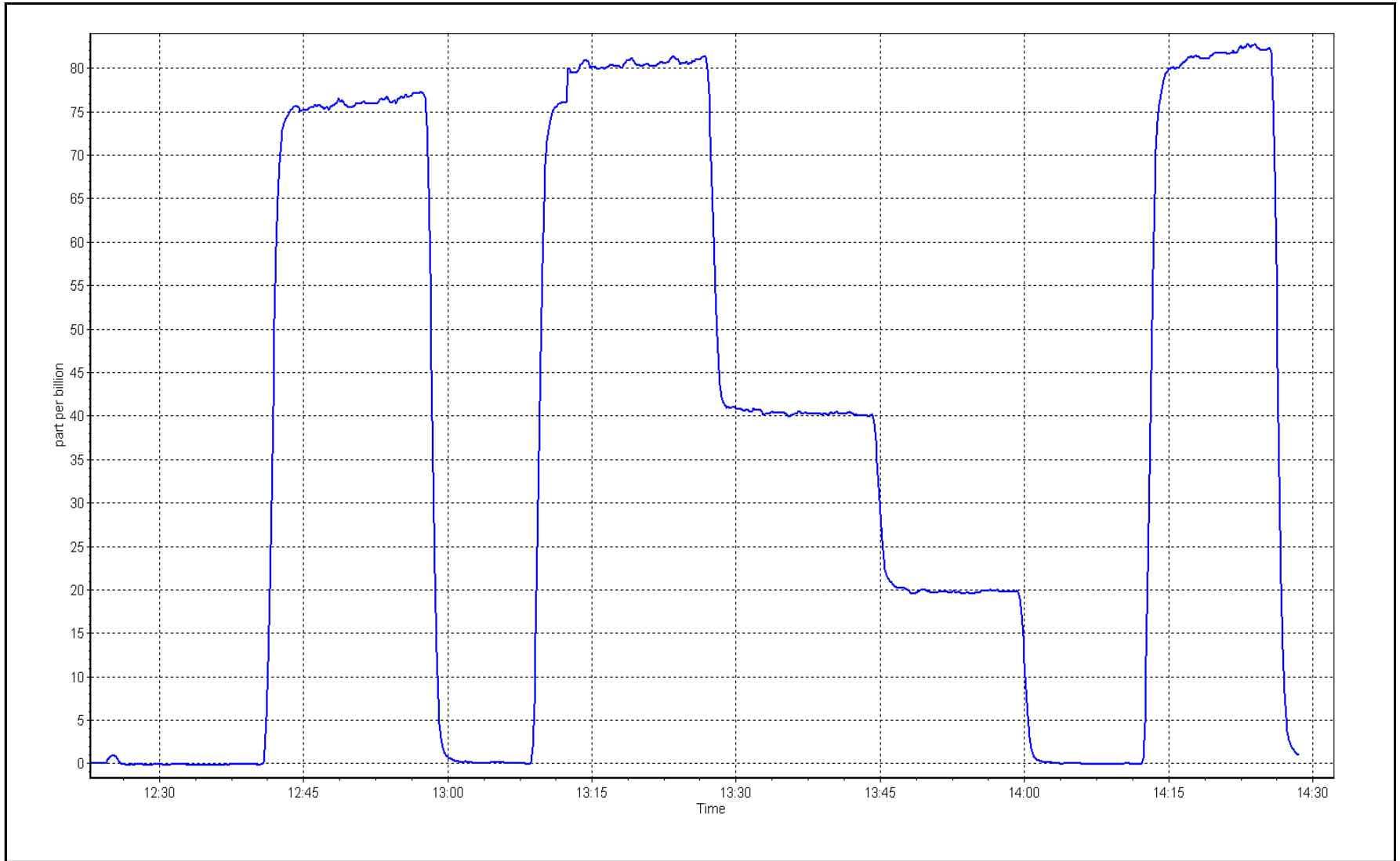
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.1	----	Correlation Coefficient	0.999905	≥0.995
80.1	80.8	0.9919			
40.2	40.2	1.0011	Slope	0.990699	0.90 - 1.10
20.3	19.8	1.0237			
			Intercept	0.267915	+/-3



TRS Calibration Plot

Date: October 4, 2017

Location: Fort Hills





# Wood Buffalo Environmental Association

## THC Calibration Report

Version-03-2017

### Station Information

Station Name:	Fort Hills	Station number:	AMS 23
Calibration Date:	October 4, 2017	Last Cal Date:	September 1, 2017
Start time (MST):	8:48	End time (MST):	12:28
Reason:	Routine		

### Calibration Standards

Gas Cert Reference	EY0000688	Cal Gas Expiry Date	November 4, 2019
CH4 Cal Gas Conc.	<u>514.0</u> ppm	CH4 Equiv Conc.	1061.3 ppm
C3H8 Cal Gas Conc.	<u>199.0</u> ppm	Station temp.	24 Deg C
Calibrator Make/Model	Teledyne API T700	Serial Number	451
ZAG Make/Model	Teledyne API 701	Serial Number	4522

### Analyzer Information

Analyzer make:	Thermo 51i-LT	Analyzer serial #:	1218153580
	<u>Start</u>	<u>Finish</u>	<u>Start</u>
Analyzer Range	0 - 25 ppm	Bias voltage supply	-299
Calculated slope	0.998699	Sample pressure	8.2
Calculated intercept	0.035837	Fuel pressure	24.2
Analyzer Background	2.40	Air pressure	37.8
Analyzer Coefficient	5.120	Flame temperature	160.1
			<u>Finish</u>

### THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5007	0.0	0.00	0.26	----
as found span	4936	80.5	17.03	17.95	0.949
calibrator zero	5011	0.0	0.00	0.01	----
high point	4937	80.5	17.03	17.07	0.998
second point	4977	40.5	8.57	8.55	1.002
third point	4997	20.4	4.31	4.26	1.013
as left zero	5009	0.0	0.00	0.06	----
as left span	4937	80.5	17.03	17.04	0.999
Average Correction Factor					1.004
Corrected As found	17.69	Previous response	17.02	*% change	-3.8%

\* = > +/-5% change initiates investigation

Notes: Changed inlet filter after asfound. Adjusted the zero and the span.

Calibration Performed By: Jayme Marcoux



# Wood Buffalo Environmental Association

## THC Calibration Summary

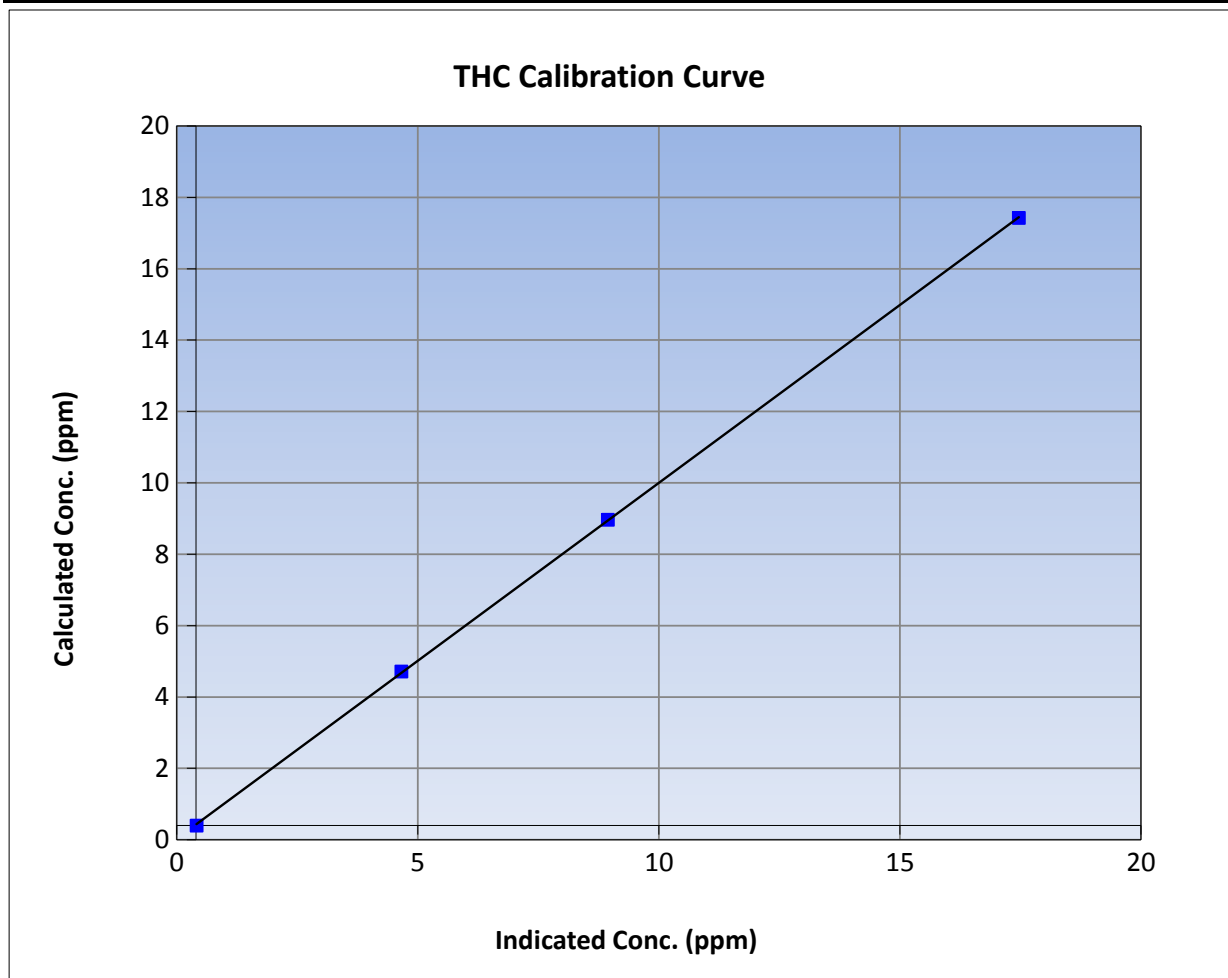
Version-03-2017

### Station Information

Calibration Date	October 4, 2017	Previous Calibration	September 1, 2017
Station Name	Fort Hills	Station Number	AMS 23
Start Time (MST)	8:48	End Time (MST)	12:28
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153580

### Calibration Data

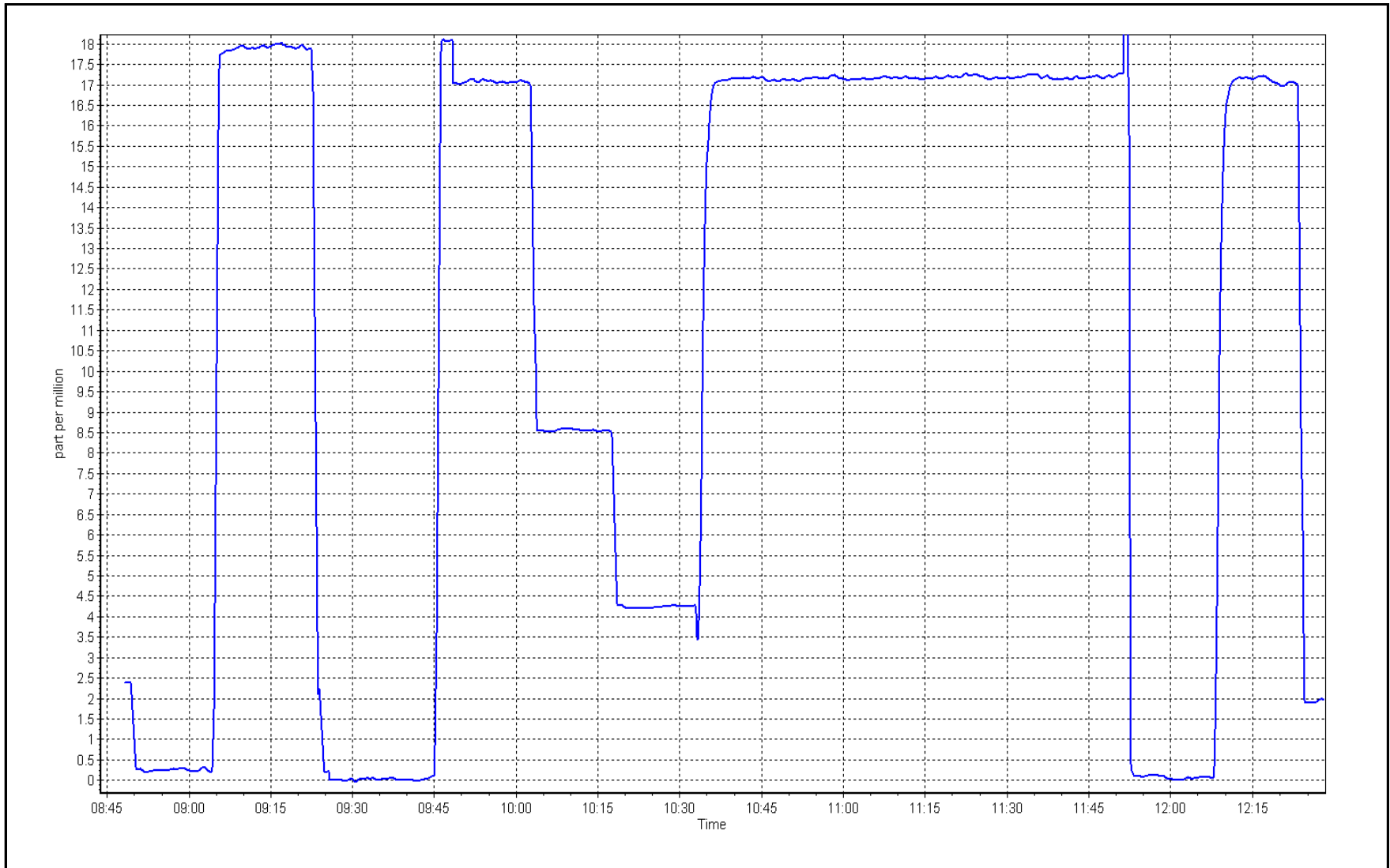
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (lc)	Correction factor (Cc/lc)	Statistical Evaluation	Limits	
0.00	0.01	----	Correlation Coefficient	0.999977	
17.03	17.07	0.9976			≥0.995
8.57	8.55	1.0025	Slope	0.997026	
4.31	4.26	1.0126			0.90 - 1.10
			Intercept	0.028112	+/-1.5



THC Calibration Plot

Date: October 4, 2017

Location: Fort Hills







# Wood Buffalo Environmental Association

## NO<sub>x</sub> - NO - NO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Fort Hills	Station number:	AMS 23
Calibration Date:	October 4, 2017	Last Cal Date:	September 12, 2017
Start time (MST):	8:48	End time (MST):	12:28
Reason:	Routine		

### Calibration Standards

NO Gas Cylinder #	EY0000688	Cal Gas Expiry Date	November 4, 2019
NOX Cal Gas Conc.	<u>49.9</u> ppb	NO Cal Gas Conc.	<u>49.9</u> ppb
Calibrator Model	Teledyne API T700	Serial Number	451
ZAG make/model	Teledyne API 701	Serial Number	4522

### Analyzer Information

Analyzer make: Thermo 42i			Analyzer serial #: 115243007		
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coefficient	1.052	1.049	NOX Range (ppb)	0 - 1000 ppb	
NOX coefficient	1.000	1.000	PMT Temperature	-2.9	-2.7
NO <sub>2</sub> coefficient	1.000	1.000	Reaction cell Press	166.3	165.0
NO bkgrnd	1.7	1.6	Sample Flow	0.781	0.765
NOX bkgrnd	1.8	1.8	PMT Voltage	-802.9	-802.5

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope	0.995838	0.995263
NO <sub>x</sub> Cal Offset	0.185520	0.664386
NO Cal Slope	0.996492	0.995625
NO Cal Offset	0.225913	0.684519
NO <sub>2</sub> Cal Slope	1.008574	1.004716
NO <sub>2</sub> Cal Offset	-2.099705	-2.131393



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

Version-03-2017

### Dilution Calibration Data

Set Point	Total flow rate (sccm)	Total flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5008	0.0	0.0	0.0	0.0	-0.2	-0.2	0.0	----	----
as found span	4937	80.5	813.6	813.6	0.0	816.3	815.3	1.0	0.9967	0.9980
calibrator zero	5008	0.0	0.0	0.0	0.0	-0.2	-0.2	0.0	----	----
high point	4937	80.5	813.6	813.6	0.0	816.6	816.3	0.3	0.9964	0.9967
second point	4976	40.5	406.1	406.1	0.0	408.6	408.4	0.2	0.9940	0.9945
third point	4997	20.4	203.7	203.7	0.0	202.6	202.5	0.2	1.0055	1.0060
as left zero	5008	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	----	----
as left span	4936	80.4	812.8	390.7	422.1	828.4	393.8	434.5	0.9812	0.9921
<b>Average Correction Factor</b>									<b>0.9986</b>	<b>0.9991</b>

Corrected As found	NO <sub>x</sub> = 816.5 ppb	NO = 815.5 ppb		*Percent Change	NO <sub>x</sub> = 0.0%
Previous Response	NO <sub>x</sub> = 816.9 ppb	NO = 816.3 ppb		*Percent Change	NO = 0.1%

\* = > +/-5% change initiates investigation

### GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
1st NO ref point		0.0	831.8	828.3	3.6	0.9782	0.9823	----	----
1st NO2 (400 ppb O3)	390.7	437.6	827.2	390.7	436.5	0.9836	----	1.0025	99.7%
2nd NO2 (200 ppb O3)	611.9	216.4	830.7	611.9	218.8	0.9795	----	0.9890	101.1%
3rd NO2 (100 ppb O3)	718.4	109.9	831.8	718.4	113.5	0.9782	----	0.9683	103.3%
2nd NO ref point	----	0.0	831.8	828.3	3.6	0.9782	0.9823	----	----
<b>Average Correction Factor</b>						<b>0.9799</b>	<b>0.9823</b>	<b>0.9866</b>	<b>101.4%</b>

**Notes:** Changed inlet filter after asfinds. Adjusted the span. Used second NO ref point due to drift

Calibration Performed By: Jayme Marcoux



# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

Version-03-2017

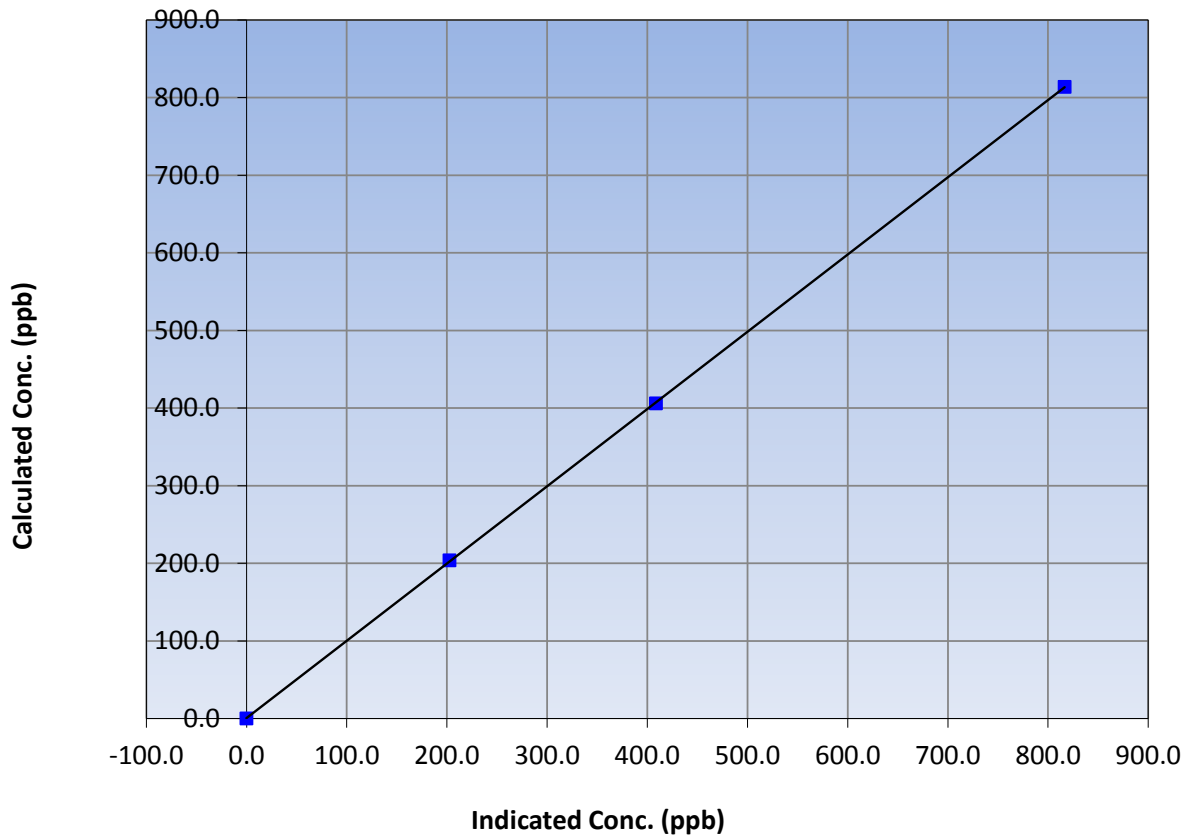
### Station Information

Calibration Date	October 4, 2017	Previous Calibration	September 12, 2017
Station Name	Fort Hills	Station Number	AMS 23
Start Time (MST)	8:48	End Time (MST)	12:28
Analyzer make	Thermo 42i	Analyzer serial #	115243007

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	-0.2	----	Correlation Coefficient	≥0.995	
813.6	816.6	0.9964			
406.1	408.6	0.9940			
203.7	202.6	1.0055			
			Slope	0.995263	0.90 - 1.10
			Intercept	0.664386	+/-20

NO<sub>x</sub> Calibration Curve





# Wood Buffalo Environmental Association

## NO Calibration Summary

Version-03-2017

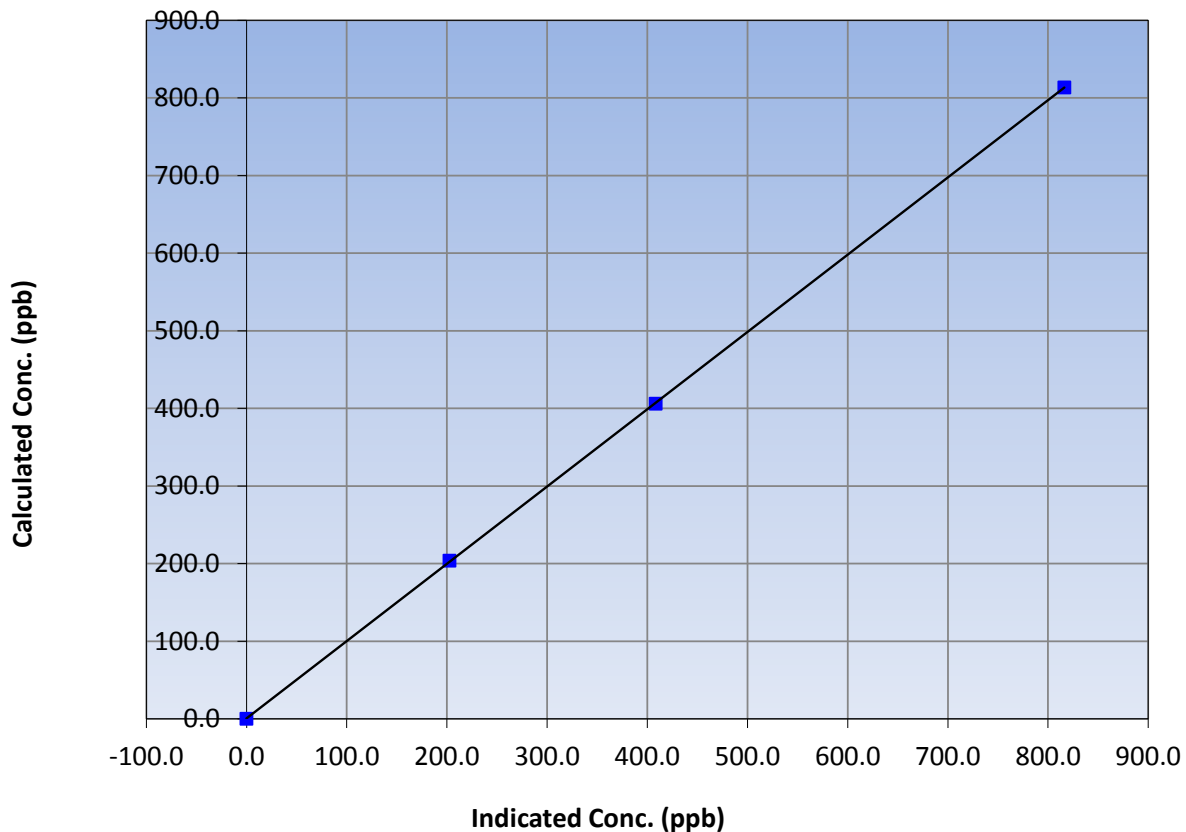
### Station Information

Calibration Date	October 4, 2017	Previous Calibration	September 12, 2017
Station Name	Fort Hills	Station Number	AMS 23
Start Time (MST)	8:48	End Time (MST)	12:28
Analyzer make	Thermo 42i	Analyzer serial #	115243007

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	-0.2	----	Correlation Coefficient	≥0.995	
813.6	816.3	0.9967			
406.1	408.4	0.9945			
203.7	202.5	1.0060			
			Slope	0.995625	0.90 - 1.10
			Intercept	0.684519	+/-20

NO Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

Version-03-2017

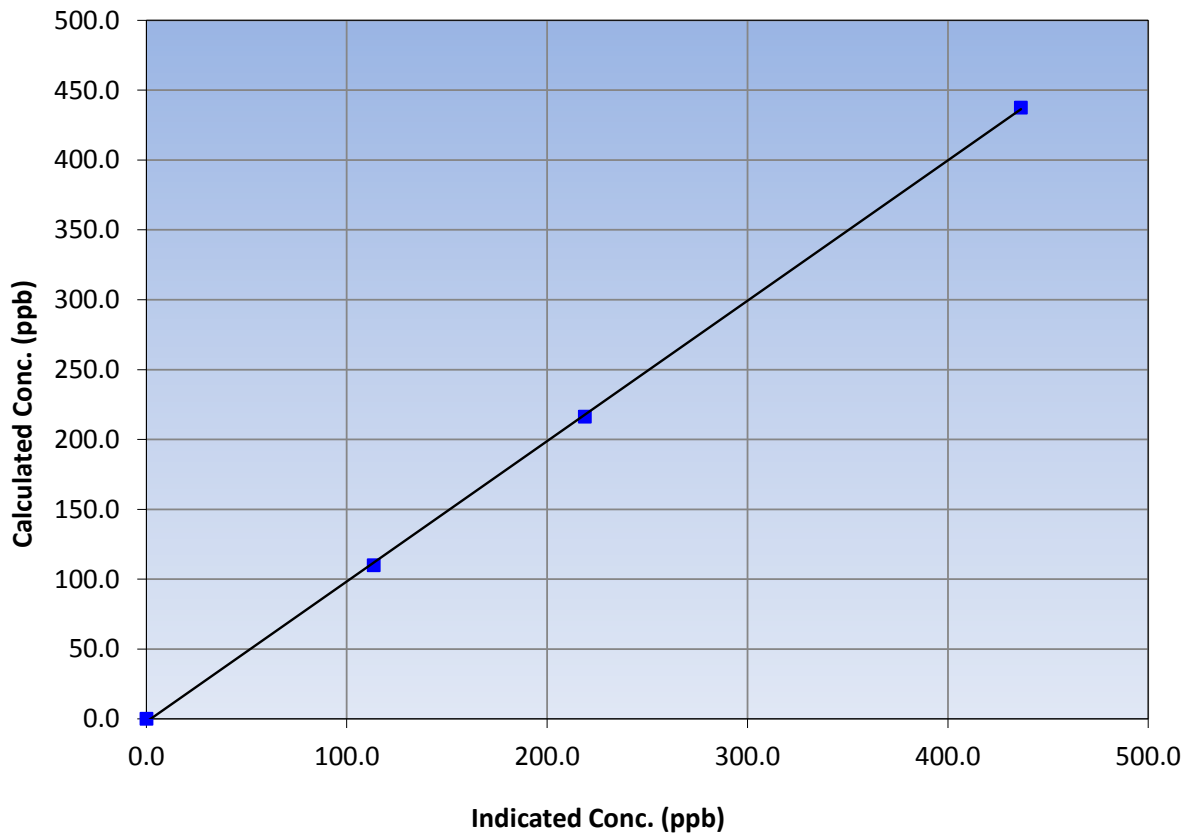
### Station Information

Calibration Date	October 4, 2017	Previous Calibration	September 12, 2017
Station Name	Fort Hills	Station Number	AMS 23
Start Time (MST)	8:48	End Time (MST)	12:28
Analyzer make	Thermo 42i	Analyzer serial #	115243007

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	0.0	----	Correlation Coefficient	≥0.995	
437.6	436.5	1.0025			
216.4	218.8	0.9890			
109.9	113.5	0.9683			
			Slope	1.004716	0.90 - 1.10
			Intercept	-2.131393	+/-20

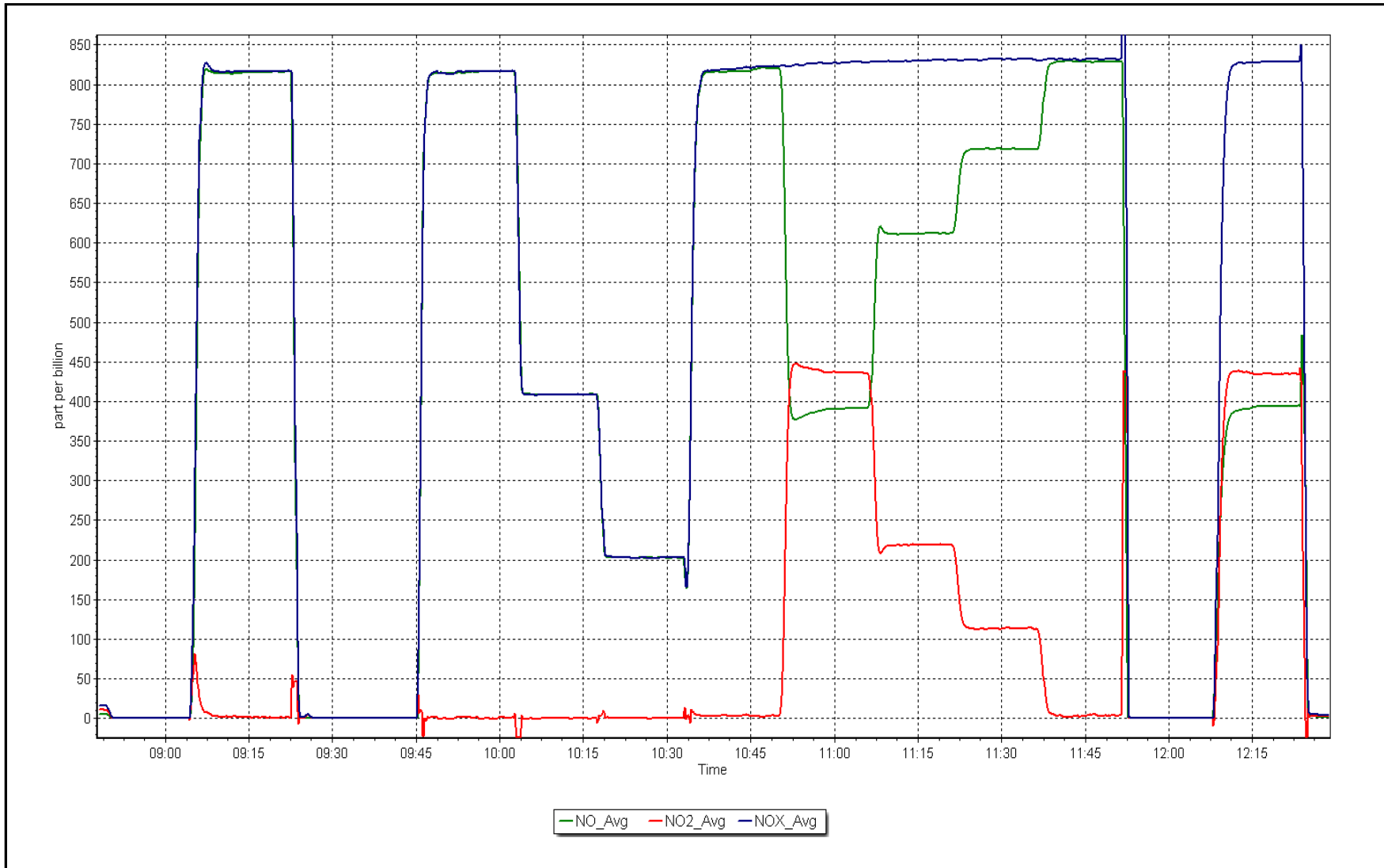
**NO<sub>2</sub> Calibration Curve**



NO<sub>x</sub> Calibration Plot

Date: October 4, 2017

Location: Fort Hills





# Wood Buffalo Environmental Association

## SHARP PM<sub>2.5</sub> CALIBRATION

Version-02-2017

### Station Information

Station Name:	Fort Hills	Station number:	AMS 23
Calibration Date:	October 4, 2017	Last Cal Date:	September 12, 2017
Start time (MST):	9:02	End time (MST):	10:07
Sharp Model:	5030	S/N:	E-802
Particulate Fraction:	PM2.5	C14 Source S/N:	4153
Flow Meter Make/Model:	DeltaCAL	S/N:	628
Temp/RH standard:		S/N:	

### Monthly Calibration Test

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<b>(Limits)</b>
T1 (°C)	6.7	6.7	6.7	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	988	987	988	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	1000	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	-0.7	-----	0.2	<input checked="" type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified	<input type="checkbox"/>			
Cyclone cleaning :	PM10 Cyclone	<input checked="" type="checkbox"/>	PM2.5 Cyclone	<input checked="" type="checkbox"/>	
Date Filter Tape Installed:					

### Quarterly Calibration Test

Leak Test:	Date of check:	<u>October 4, 2017</u>	Last Cal Date:	<u>July 10, 2017</u>
	Flow w/o adaptor:	<u>16.67</u>	Flow w/ adaptor:	<u>16.55</u>

**(Limit) 0.4 LPM**

<u>Adjusted</u>	<u>Current Test</u>	<u>Previous Test</u>	<u>% Change</u>
<input type="checkbox"/>	Foil S/N: <u>5864</u>	Foil S/N: <u>2198</u>	
Foil Calibration	Foil Mass: <u>1264</u>	Foil Mass: <u>1463</u>	
	Calibration Date: <u>October 4, 2017</u>	Calibration Date: <u>May 5, 2017</u>	
<b>(Limit) +/- 5% of previous</b>	Correction Factor: <u>7006</u>	Correction Factor: <u>6969</u>	0.53%

### Annual Calibration Test

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<b>(Limits)</b>
T2 (°C)				<input type="checkbox"/>	+/- 2 °C
T3 (°C)				<input type="checkbox"/>	+/- 2 °C
T4 (°C)				<input type="checkbox"/>	+/- 2 °C
RH (%)				<input type="checkbox"/>	+/- 10%
Date Sample Tube Cleaned:					
Date Pump Rebuilt/Replaced:					

Notes: Cleaned cyclone head. Adjusted nephelometer.

Calibration by: Jayme Marcoux



## WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 24  
SURMONT  
OCTOBER 2017**

Operations, Data Collection,  
QA/QC, Data Validation and Reporting by:  
Wood Buffalo Environmental Association  
Fort McMurray, Alberta

November 29, 2017



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SURMONT (AMS 24)  
OCTOBER 2017

MONTHLY SUMMARY for  
AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	703	41	41	100	11	0	3	0
H2S (ppb) Average	705	39	39	100	1	0	0	0
THC(ppm) Average	687	39	57	97.58	3	-	2	-
NO2 (ppb) Average	702	42	42	100	16	0	6	-
NO (ppb) Average	702	42	42	100	43	-	12	-
NOX (ppb) Average	702	42	42	100	59	-	18	-
Temperature 2 m (C) Average	744	0	0	100	21	-	14	-
Relative Humidity (%) Average	744	0	0	100	99	-	97	-
Wind Speed 10 m (km/h) Average	744	0	0	100	45	-	33	-
Wind Direction 10 m (deg) Average	744	0	0	100	-	-	-	-

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SURMONT (AMS 24)  
OCTOBER 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	703	0.6	1	-	0	0	0	0	0	1	11
H2S (ppb) Average	705	0.2	0	-	0	0	0	0	0	0	1
THC (ppm) Average	687	2	0	-	2	2	2	2	2	2	3
NO2 (ppb) Average	702	1.5	2	-	0	0	0	1	2	3	16
NO (ppb) Average	702	1.8	5	-	0	0	0	0	1	4	43
NOX (ppb) Average	702	3.3	7	-	0	0	1	1	2	7	59
Temperature 2 m (C) Average	744	3.2	4	-	0	0	0	2	5	9	21
Relative Humidity (%) Average	744	74.7	16	-	31	51	65	78	87	94	99
Wind Speed 10 m (km/h) Average	744	16.6	9	-	1	6	10	15	23	29	45
Wind Direction 10 m (deg) Average	744	0	0	-	0						0

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SURMONT (AMS 24)  
OCTOBER 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC	06 Oct 2017 12:00	06 Oct 2017 17:00	6	Unstable operation - excessive baseline drift
THC	24 Oct 2017 07:00	24 Oct 2017 10:00	4	Unstable operation - excessive baseline drift
THC	24 Oct 2017 12:00	24 Oct 2017 14:00	3	Unstable operation - excessive baseline drift
THC	30 Oct 2017 06:00	30 Oct 2017 10:00	5	Unstable operation - excessive baseline drift



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb

Surmont - October 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 11 ppb on Oct 29 09:00	Maximum Daily Average: 3.4 ppb on Oct 2		Hours of Data:	703
Minimum Value: 0 ppb on Oct 19 22:00	Minimum Daily Average: 0.1 ppb on Oct 27		Hours of Missing Data:	41
Maximum Diurnal Average: 1.0 ppb at hour 9	Minimum Diurnal Average: 0.3 ppb at hour 3		Hours of Calibration:	41
Monthly Average: 0.6 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 6		Percent Operational Time:	100.0

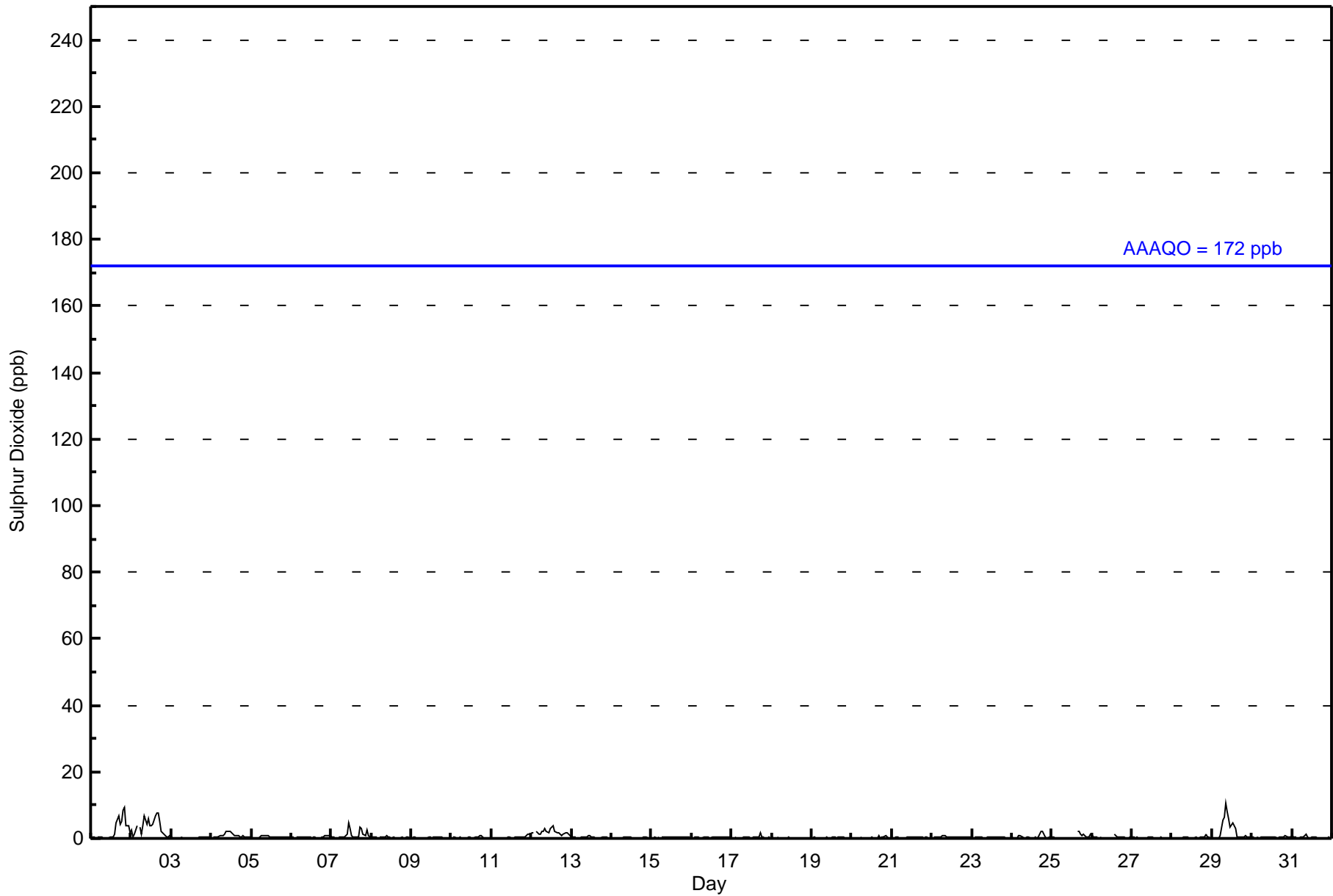
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	5	7	4	5	9	9	4	4	2	2.3	9
2-Oct	3	1	1	4	Z	3	1	4	7	4	6	4	4	4	7	8	8	5	2	2	1	0	0	1	3.4	8
3-Oct	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
4-Oct	Z	0	0	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	0	0	0	0.9	2
5-Oct	0	Z	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
6-Oct	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.4	1
7-Oct	0	0	1	Z	0	0	0	0	1	1	5	3	1	0	0	0	0	3	3	1	1	3	1	0	1.2	5
8-Oct	0	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
9-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
10-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0.3	1
11-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0.3	1
12-Oct	2	2	Z	2	1	1	2	2	3	2	2	3	4	4	2	2	2	1	1	1	2	2	1	1	1.9	4
13-Oct	1	0	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
14-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
15-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1
16-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
17-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0.3	2
18-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
19-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
20-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0.2	1
21-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.3	1
22-Oct	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	1	0	0	0	1	1	1	0	0	1	0.5	1
23-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
24-Oct	0	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	2	2	1	0	0	0	0	0.5	2
25-Oct	0	0	0	Z	0	0	0	0	0	C	C	C	C	C	C	2	2	1	1	1	1	1	1	1	--	2
26-Oct	1	1	0	0	Z	0	0	0	0	C	C	C	C	1	1	0	0	0	0	0	0	0	0	0	0.4	1
27-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
28-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.3	1
29-Oct	0	Z	0	0	0	1	5	7	11	8	6	3	5	4	3	1	1	1	0	0	1	0	0	0	2.5	11
30-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0.3	1
31-Oct	1	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
0.4 0.3 0.3 0.5 0.3 0.5 0.5 0.7 1.0 0.9 1.0 0.8 0.7 0.7 0.7 0.8 0.9 0.9 0.7 0.8 0.7 0.5 0.5 0.4																								Diurnal Average		
3 2 1 4 1 3 5 7 11 8 6 4 5 4 7 8 8 5 5 9 9 4 4 2																								Diurnal Maximum		

Z - zerospan      C - Calibration  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb    24-hr 48 ppb



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Surmont - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Surmont - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	702	99.86	99.86
11 - 20	1	0.14	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Surmont - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	36	48	29	9	8	4	8	27	29	36	51	50	103	81	88	95	702
11 - 20	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	37	48	29	9	8	4	8	27	29	36	51	50	103	81	88	95	703

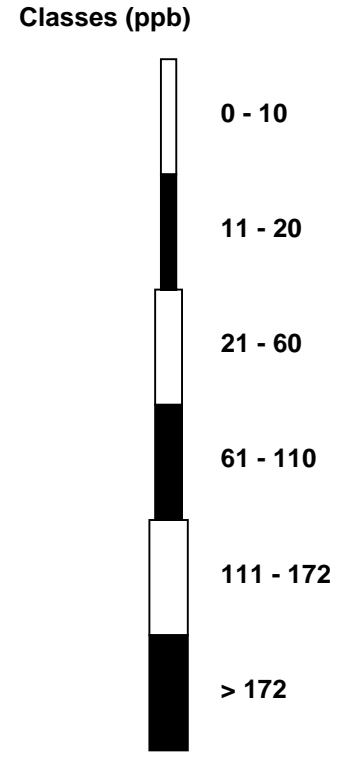
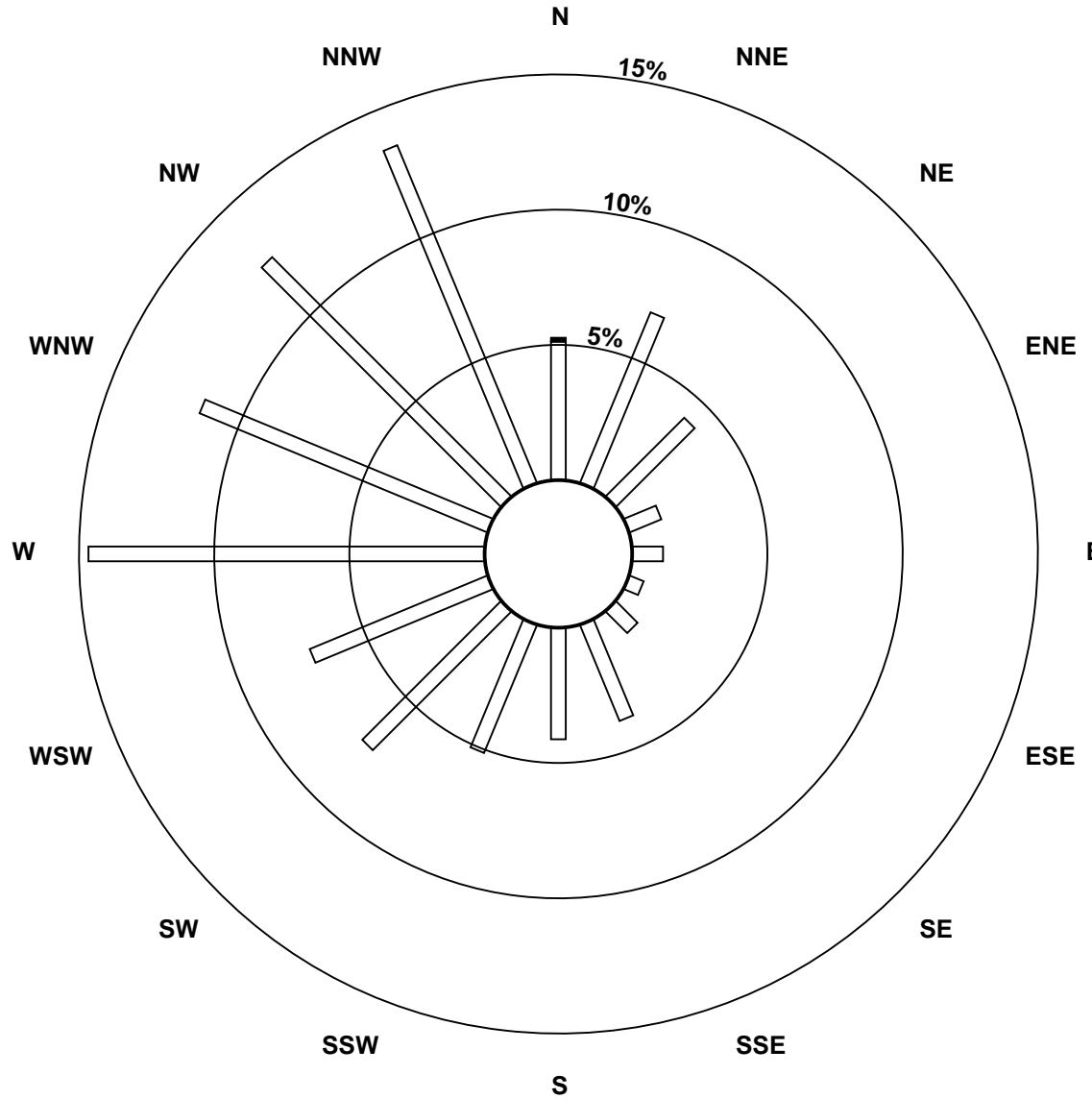
Total Number of Valid Hours: 703

Total Number of Hours: 744



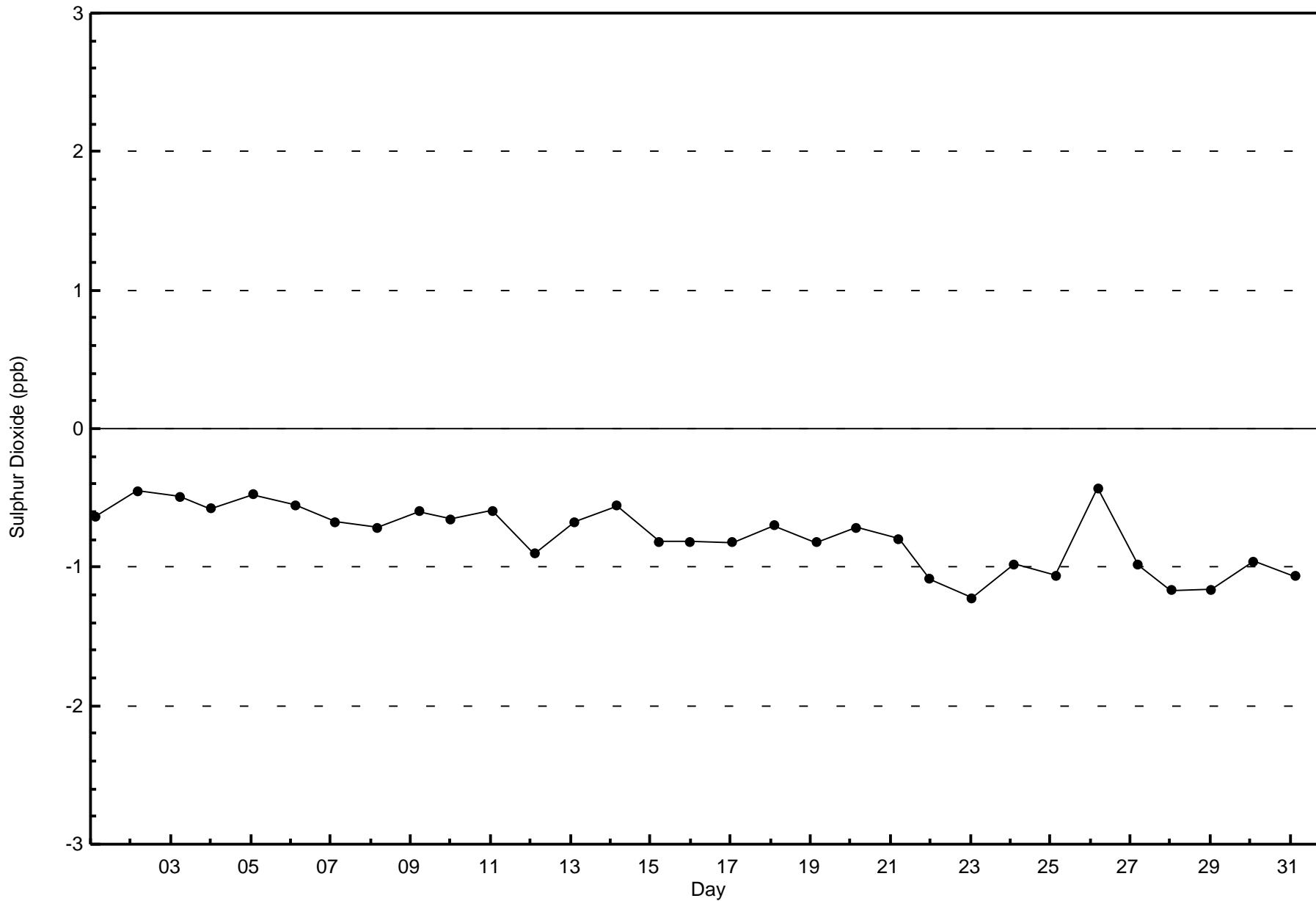
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

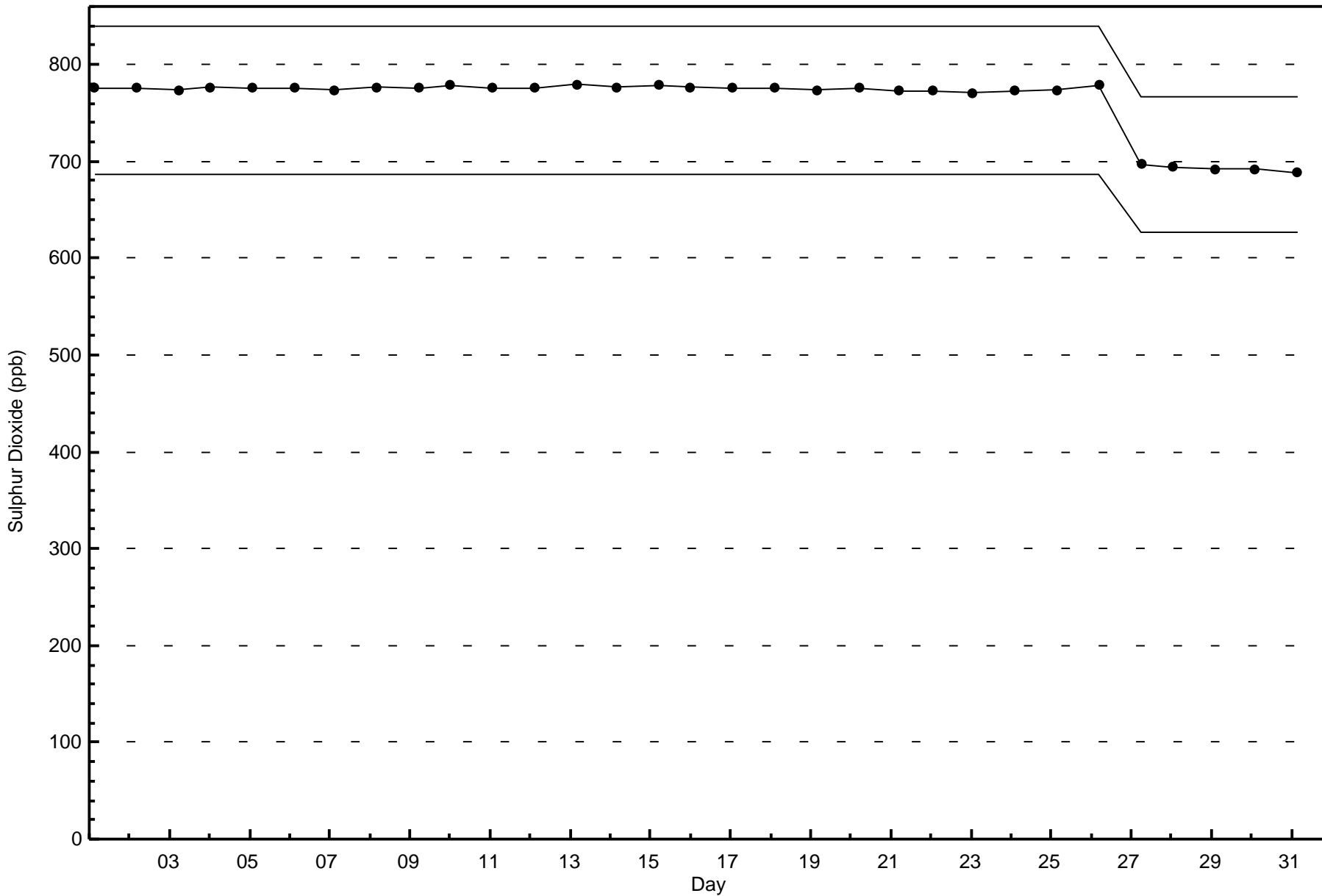
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Surmont (AMS 24)



Total Number of Valid Hours: 703









Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 1 ppb on Oct 20 23:00	Maximum Daily Average: 0.4 ppb on Oct 17		Hours of Data:	705
Minimum Value: 0 ppb on Oct 3 09:00	Minimum Daily Average: 0.1 ppb on Oct 3		Hours of Missing Data:	39
Maximum Diurnal Average: 0.3 ppb at hour 24	Minimum Diurnal Average: 0.2 ppb at hour 3		Hours of Calibration:	39
Monthly Average: 0.2 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 1		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
3-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
4-Oct	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
5-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
6-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
7-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
8-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
9-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
10-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
11-Oct	0	0	Z	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.2	0	
12-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0.3	1	
13-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
14-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.3	1	
15-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
16-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
17-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0.4	1	
18-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
19-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
20-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.3	1
21-Oct	1	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
22-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1	
23-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
24-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
25-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
26-Oct	0	0	0	0	0	Z	0	0	0	C	C	C	C	1	0	0	0	0	0	0	0	0	0	0	0.2	1	
27-Oct	0	0	0	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
28-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
29-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
30-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
31-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	

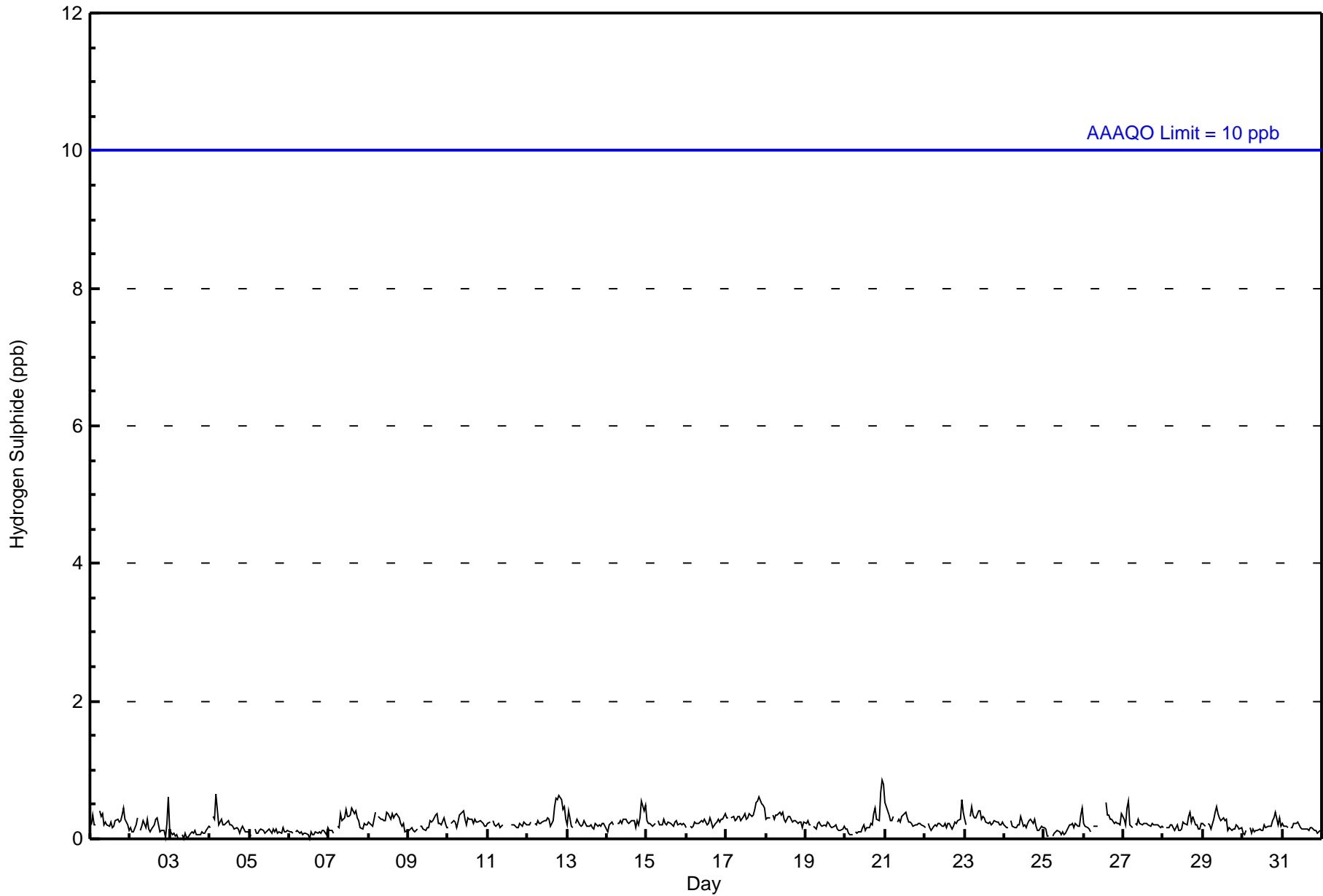
0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	Diurnal Average
1	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1	1	1	1	1	Diurnal Maximum

Z - zerospan      C - Calibration  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb    24-hr 3 ppb



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Surmont - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Surmont - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	705	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Surmont - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	38	49	30	8	8	4	8	26	29	36	52	49	104	81	87	96	705
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	38	49	30	8	8	4	8	26	29	36	52	49	104	81	87	96	705

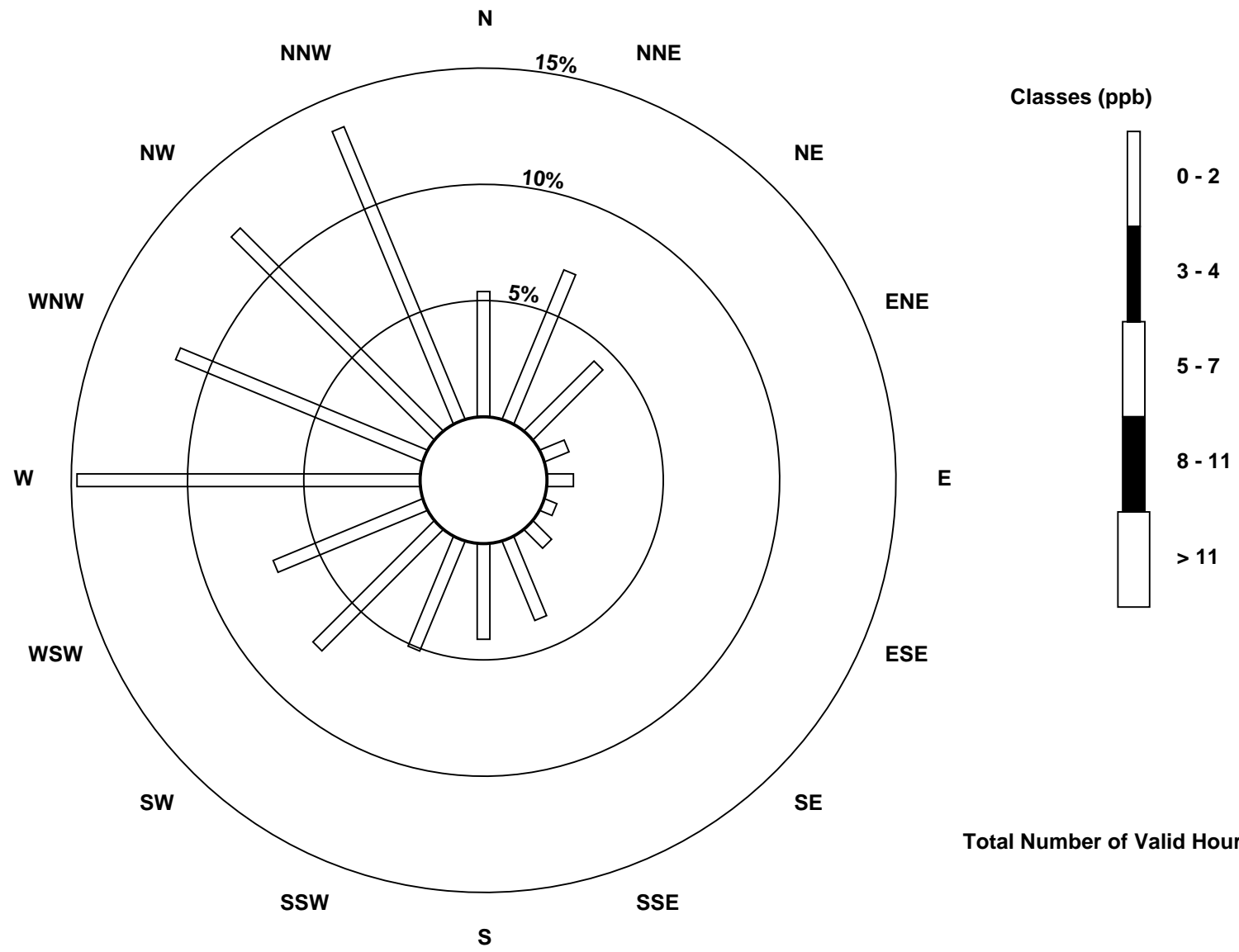
Total Number of Valid Hours: 705

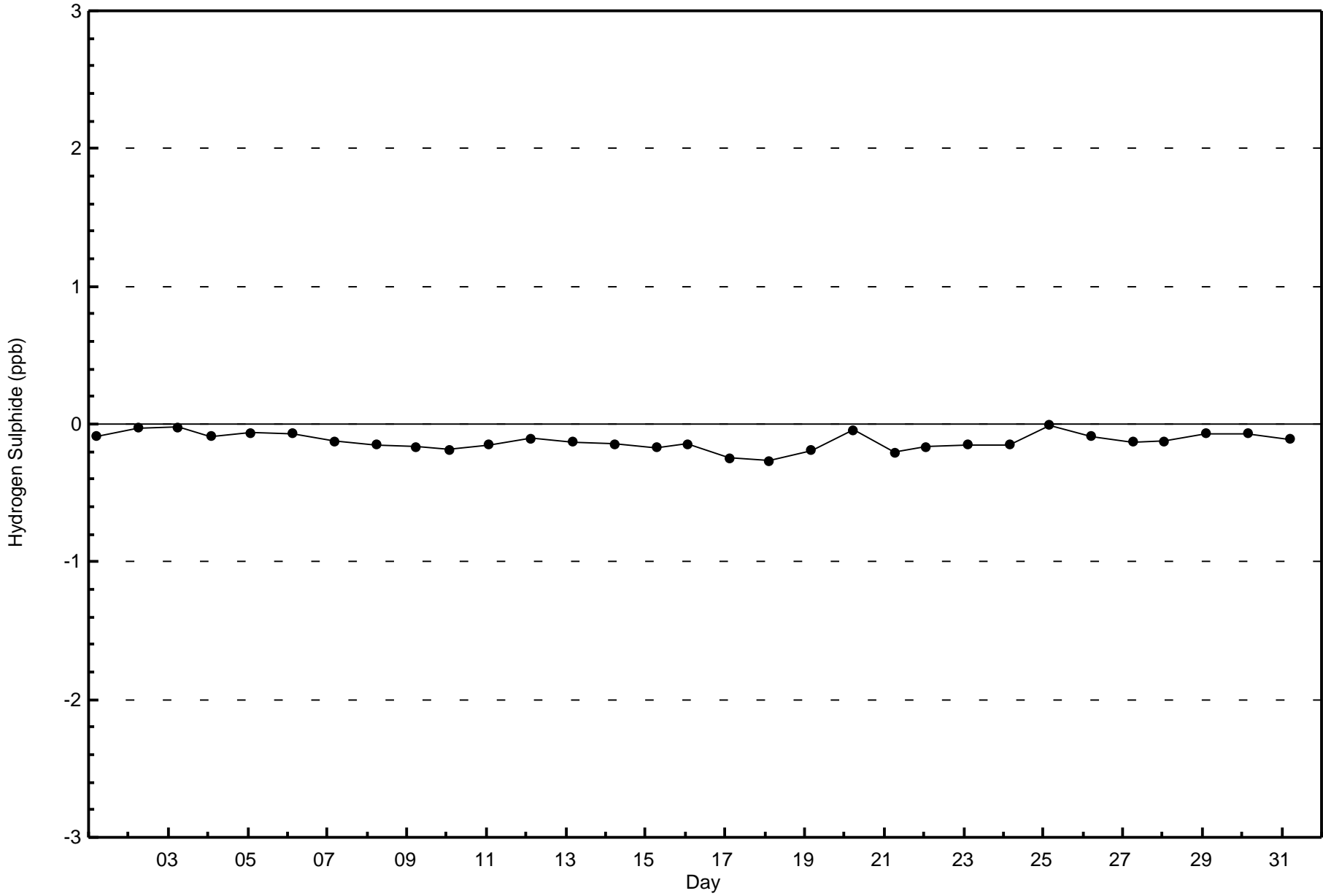
Total Number of Hours: 744



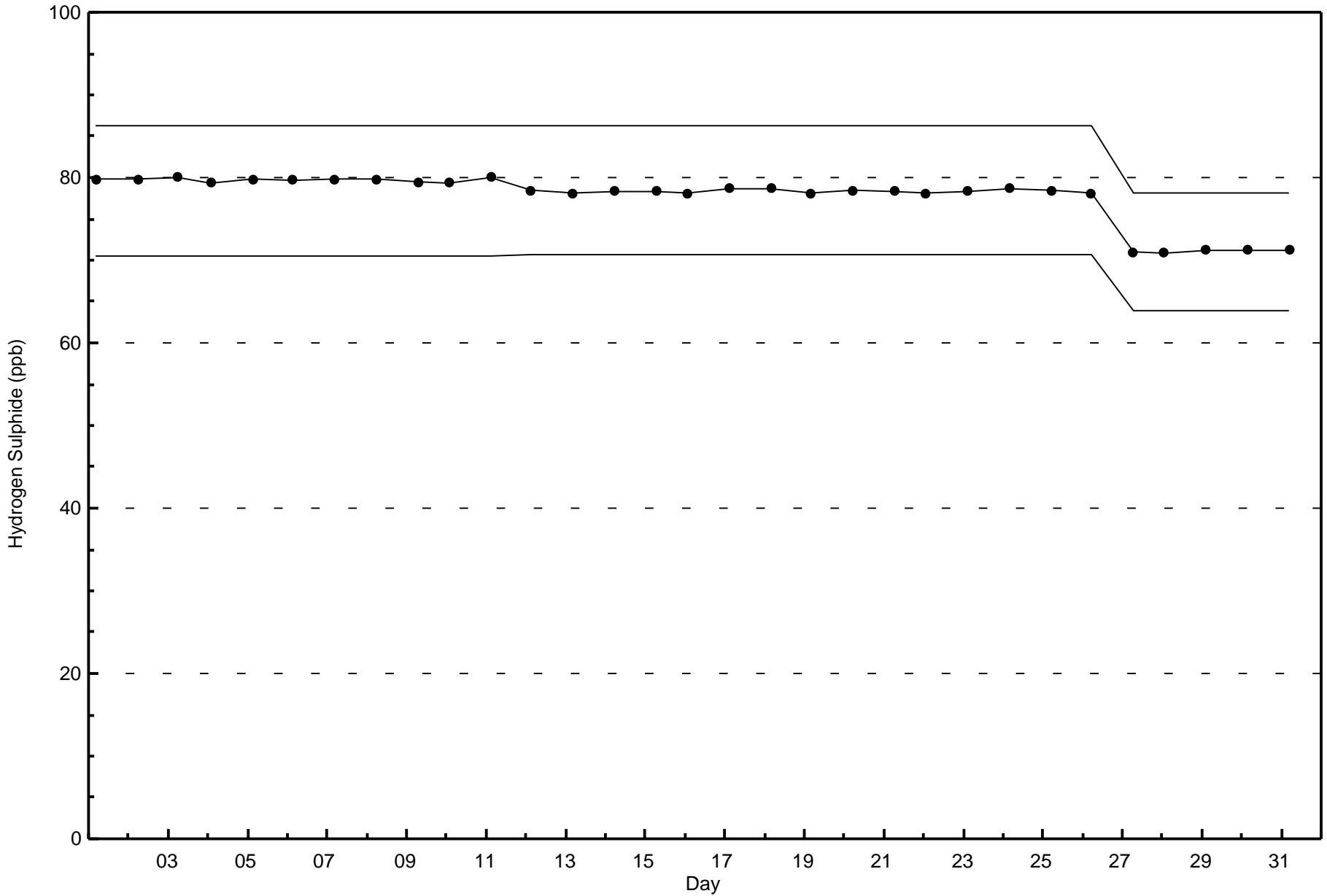
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Surmont (AMS 24)











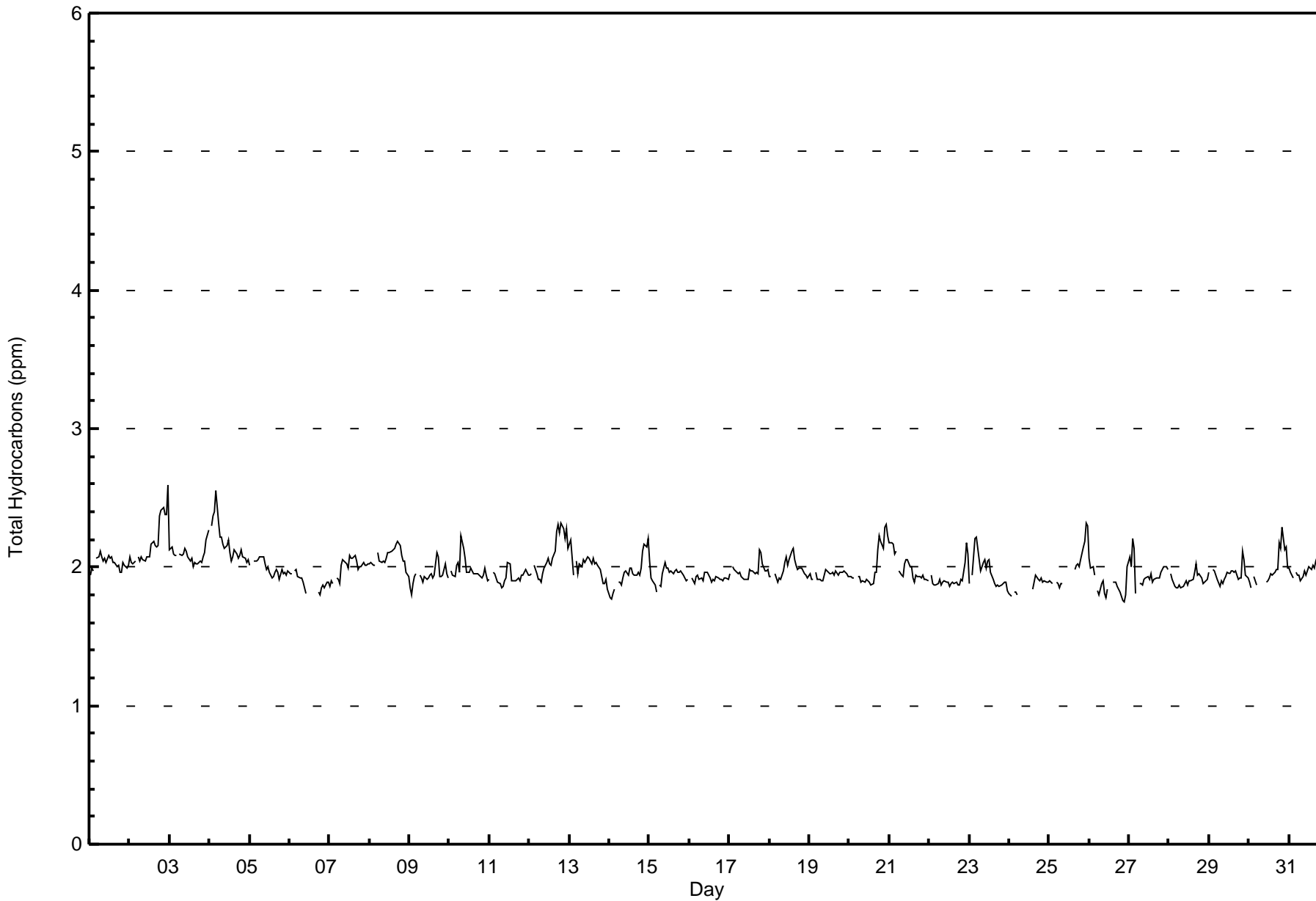
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Surmont - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0											Hours in Service: 744																
Maximum Value: 3 ppm on Oct 3 00:00											Maximum Daily Average: 2.2 ppm on Oct 2											Hours of Data: 687					
Minimum Value: 2 ppm on Oct 26 22:00											Minimum Daily Average: 1.9 ppm on Oct 26											Hours of Missing Data: 57					
Maximum Diurnal Average: 2.0 ppm at hour 23											Minimum Diurnal Average: 2.0 ppm at hour 7											Hours of Calibration: 39					
Monthly Average: 2.0 ppm											Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 2 Q <sub>1</sub> = 2 Median = 2 Q <sub>3</sub> = 2 P <sub>90</sub> = 2 P <sub>99</sub> = 2											Percent Operational Time: 97.6					
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	2	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2
2-Oct	2	2	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.2	3
3-Oct	2	2	2	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.1	2
4-Oct	Z	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.2	3
5-Oct	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2
6-Oct	2	2	Z	2	2	2	2	2	2	2	UO	UO	UO	UO	UO	UO	2	2	2	2	2	2	2	2	2	--	2
7-Oct	2	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2
8-Oct	2	2	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.1	2
9-Oct	2	2	2	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.9	2
10-Oct	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2
11-Oct	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.9	2
12-Oct	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.1	2
13-Oct	2	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2
14-Oct	2	2	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2
15-Oct	2	2	2	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.9	2
16-Oct	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.9	2
17-Oct	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2
18-Oct	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2
19-Oct	2	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.9	2
20-Oct	2	2	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2
21-Oct	2	2	2	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2
22-Oct	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.9	2
23-Oct	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2
24-Oct	2	2	Z	2	2	2	UO	UO	UO	UO	UO	UO	UO	UO	2	2	2	2	2	2	2	2	2	2	2	--	2
25-Oct	2	2	2	Z	2	2	2	2	2	C	C	C	C	C	C	2	2	2	2	2	2	2	2	2	2	--	2
26-Oct	2	2	2	2	Z	2	2	2	2	2	2	2	C	C	2	2	2	2	2	2	2	2	2	2	2	1.9	2
27-Oct	2	2	2	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2
28-Oct	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.9	2
29-Oct	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2
30-Oct	2	2	Z	2	2	UO	UO	UO	UO	UO	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2
31-Oct	2	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	2
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerspan C - Calibration UO - Unstable Operation																											





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Surmont - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	533	77.58	77.58
2.1 - 3.0	154	22.42	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 687

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Surmont - October 2017**

<b>Concentration</b> <b>Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	23	42	28	8	7	3	7	27	28	33	50	43	89	61	29	55	533
2.1 - 3.0	14	6	1	1	1	1	1	0	1	3	3	6	8	13	55	40	154
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	37	48	29	9	8	4	8	27	29	36	53	49	97	74	84	95	687

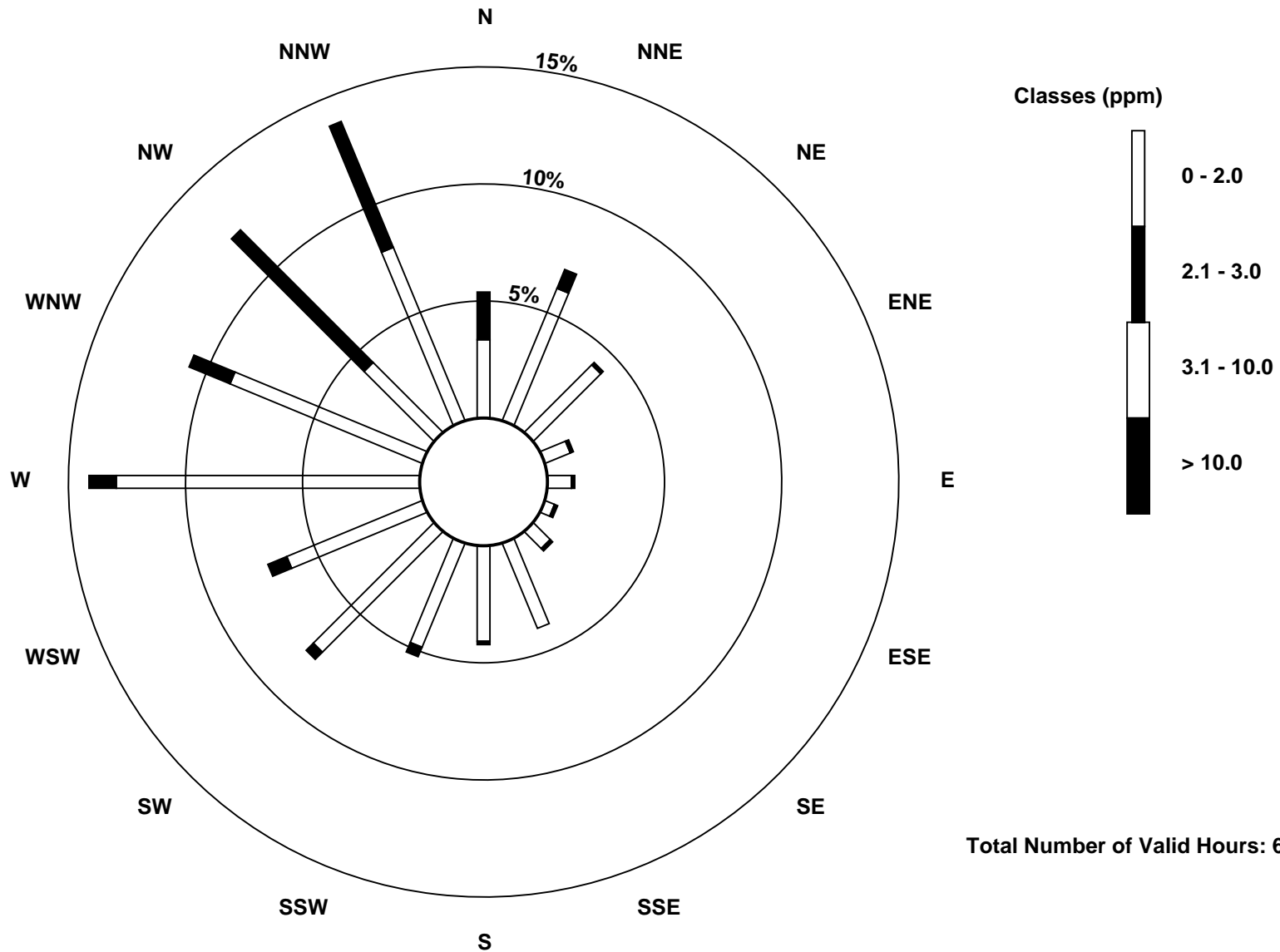
Total Number of Valid Hours: 687

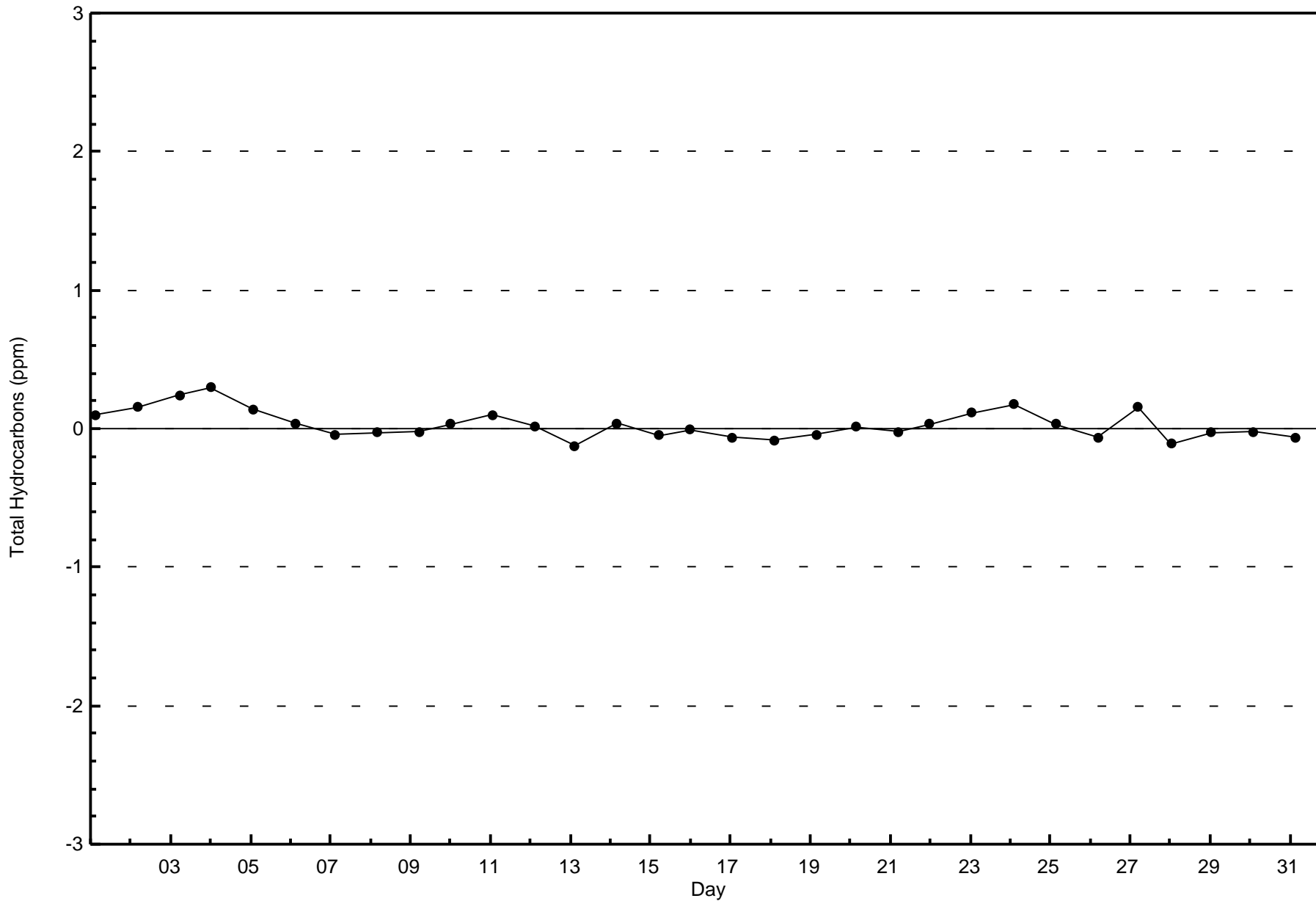
Total Number of Hours: 744

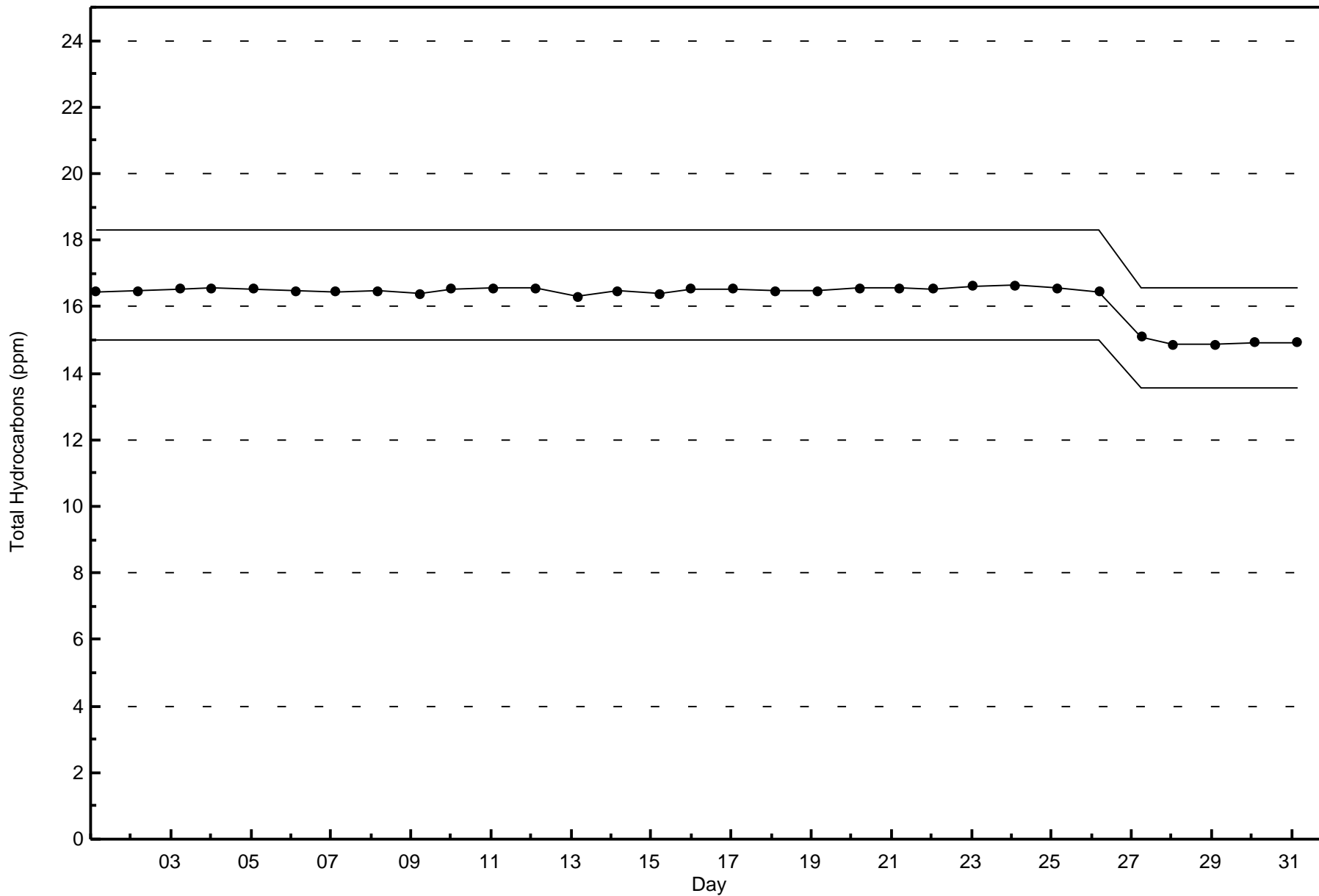


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Total Hydrocarbons (THC) - ppm  
Surmont (AMS 24)











Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxide (NO) - ppb

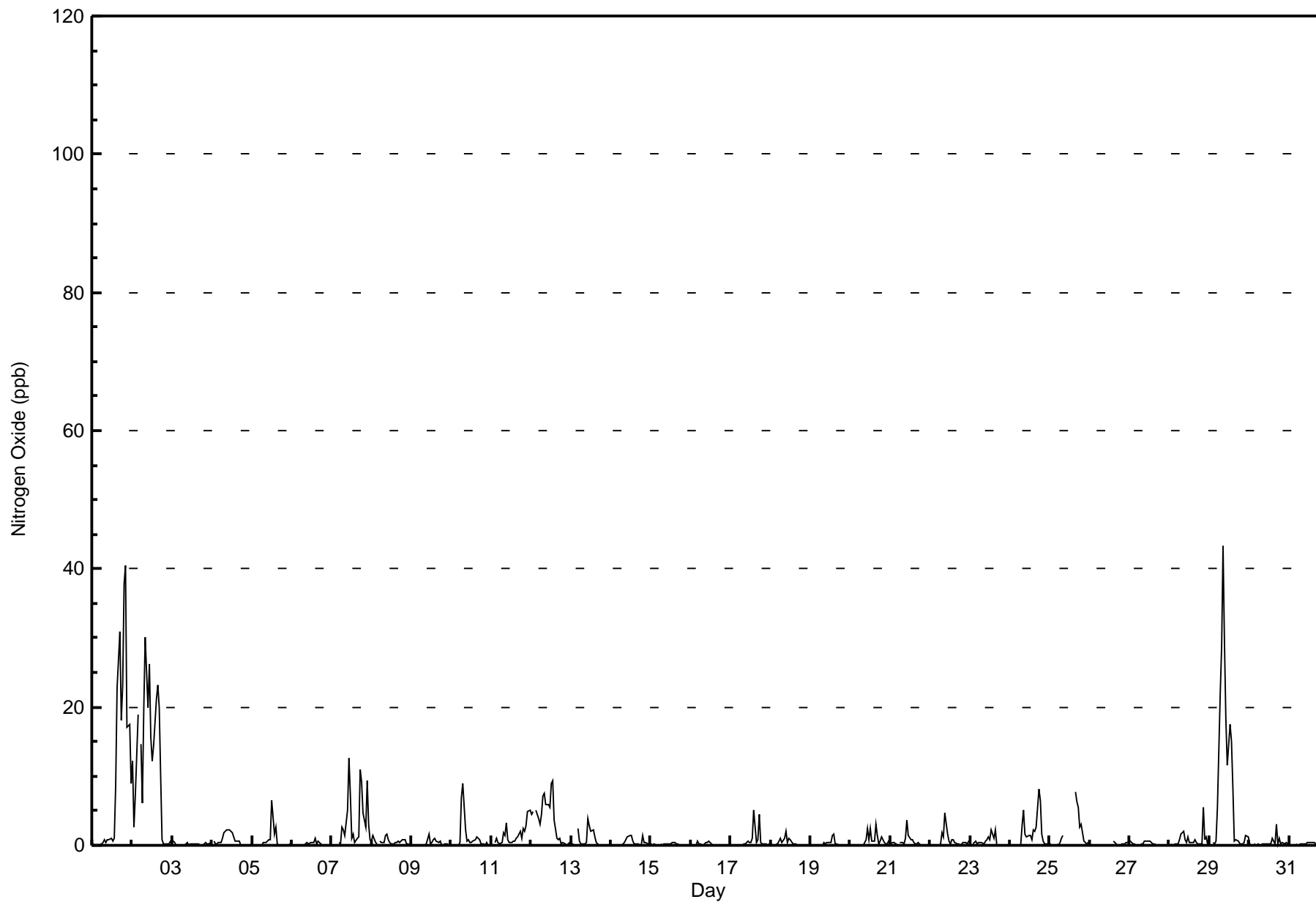
Surmont - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 43 ppb on Oct 29 09:00										Maximum Daily Average: 12.0 ppb on Oct 2										Hours of Data: 702						
Minimum Value: 0 ppb on Oct 6 23:00										Minimum Daily Average: 0.1 ppb on Oct 15										Hours of Missing Data: 42						
Maximum Diurnal Average: 3.4 ppb at hour 9										Minimum Diurnal Average: 0.4 ppb at hour 5										Hours of Calibration: 42						
Monthly Average: 1.8 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 4 P <sub>99</sub> = 28										Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	Z	0	0	0	1	0	1	1	1	1	8	23	31	18	23	38	41	17	18	9	10.1	41	
2-Oct	12	3	7	19	Z	15	6	20	30	20	26	16	12	14	21	23	20	10	1	0	0	0	1	12.0	30	
3-Oct	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
4-Oct	Z	1	0	0	0	0	1	2	2	2	2	2	1	1	1	1	0	0	0	0	0	0	0	0.8	2	
5-Oct	0	Z	0	0	0	0	0	0	0	1	1	1	7	2	3	0	0	0	0	0	0	0	0	0.7	7	
6-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0.2	1	
7-Oct	0	0	0	Z	0	0	3	2	1	5	13	7	1	2	0	1	1	11	9	5	3	9	3	3.4	13	
8-Oct	1	1	0	0	Z	1	0	0	1	2	1	0	0	0	0	1	0	1	1	1	0	0	0	0.6	2	
9-Oct	0	0	0	0	0	Z	0	0	0	0	2	0	0	1	1	1	0	1	0	0	0	0	0	0.3	2	
10-Oct	Z	0	0	0	0	0	7	9	2	1	1	0	0	1	1	1	1	1	0	0	0	0	0	1.1	9	
11-Oct	0	Z	1	1	0	0	0	2	1	3	1	0	0	1	1	1	1	2	1	2	2	3	5	1.5	5	
12-Oct	4	5	Z	5	4	3	5	7	7	6	6	5	9	9	4	1	1	1	0	0	0	0	0	3.6	9	
13-Oct	0	0	0	Z	2	1	0	0	0	0	4	3	2	2	1	0	0	0	0	0	0	0	0	0.8	4	
14-Oct	0	0	0	0	Z	0	0	0	0	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0.4	1	
15-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
16-Oct	Z	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
17-Oct	0	Z	0	0	0	0	0	0	0	0	1	0	0	1	5	0	1	4	0	0	0	0	0	0.7	5	
18-Oct	0	0	Z	0	0	1	1	0	1	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0.4	2	
19-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0.3	2	
20-Oct	0	0	0	0	Z	0	0	0	0	1	2	1	3	1	1	3	1	0	1	1	0	0	1	0.7	3	
21-Oct	0	0	0	0	0	Z	0	0	0	1	4	1	1	1	0	0	0	0	0	0	0	0	0	0.5	4	
22-Oct	Z	0	0	0	0	0	0	2	1	5	2	1	0	1	1	0	0	0	0	0	0	0	1	0.6	5	
23-Oct	1	Z	0	1	0	0	0	0	0	1	1	1	1	2	1	2	0	0	0	0	0	0	0	0.5	2	
24-Oct	0	0	Z	0	0	0	0	3	5	2	1	1	1	1	2	2	3	8	6	2	1	0	0	1.7	8	
25-Oct	0	0	0	Z	0	0	0	1	1	C	C	C	C	C	C	8	6	6	3	3	1	0	0	--	8	
26-Oct	0	0	0	0	Z	0	0	0	0	C	C	C	C	C	1	0	0	0	0	0	0	0	0	0.2	1	
27-Oct	1	0	0	0	0	Z	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.2	1	
28-Oct	Z	0	0	0	0	0	1	2	2	1	0	1	0	0	0	1	0	0	0	0	6	1	1	0.8	6	
29-Oct	0	Z	0	0	1	6	22	29	43	30	18	12	18	15	8	1	1	1	0	0	0	1	1	9.0	43	
30-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0	1	0	0	0	0	0.4	3	
31-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
0.8 0.5 0.4 1.1 0.4 1.1 1.6 2.6 3.4 3.0 3.1 2.1 2.2 2.1 2.2 2.3 2.4 2.1 1.5 1.8 1.8 1.1 1.0 0.7																								Diurnal Average		
12 5 7 19 4 15 22 29 43 30 26 16 18 15 21 23 31 18 23 38 41 17 18 9																								Diurnal Maximum		
Z - zerospan C - Calibration																										



Wood Buffalo Environmental Association  
Hourly Averages

Nitrogen Oxide (NO) - ppb  
Surmont - October 2017





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Oxide (NO) - ppb  
Surmont - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	689	98.15	98.15
21 - 40	11	1.57	99.72
41 - 80	2	0.28	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 702

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Oxide (NO) - ppb  
Surmont - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	25	48	29	9	8	4	8	27	29	36	50	50	103	81	88	94	689
21 - 40	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	11
11 - 80	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	37	48	29	9	8	4	8	27	29	36	50	50	103	81	88	95	702

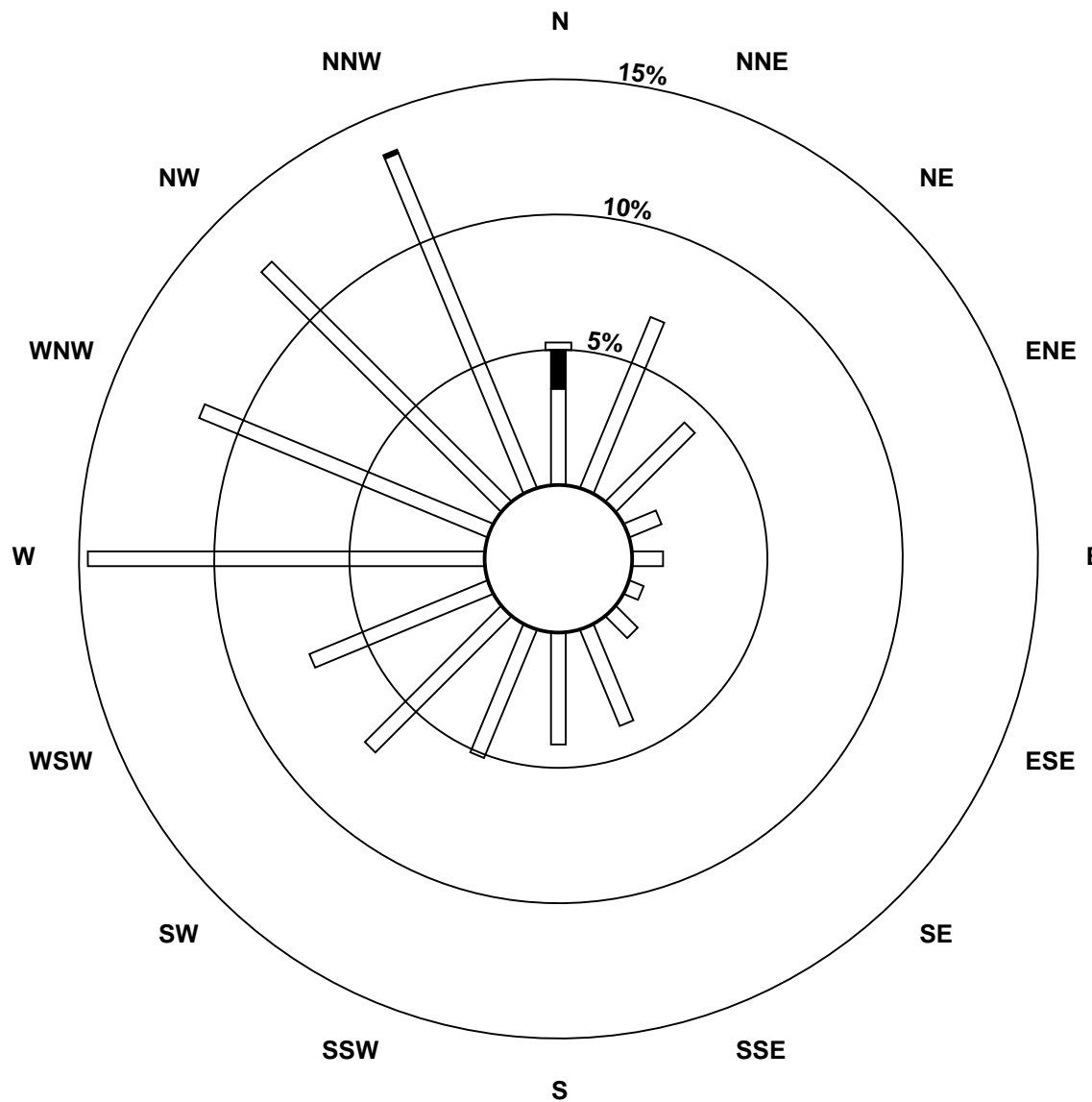
Total Number of Valid Hours: 702

Total Number of Hours: 744

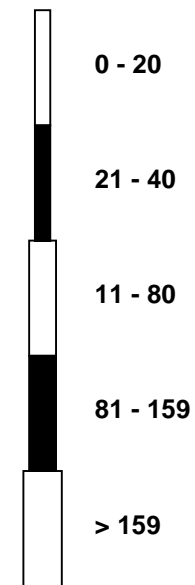


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

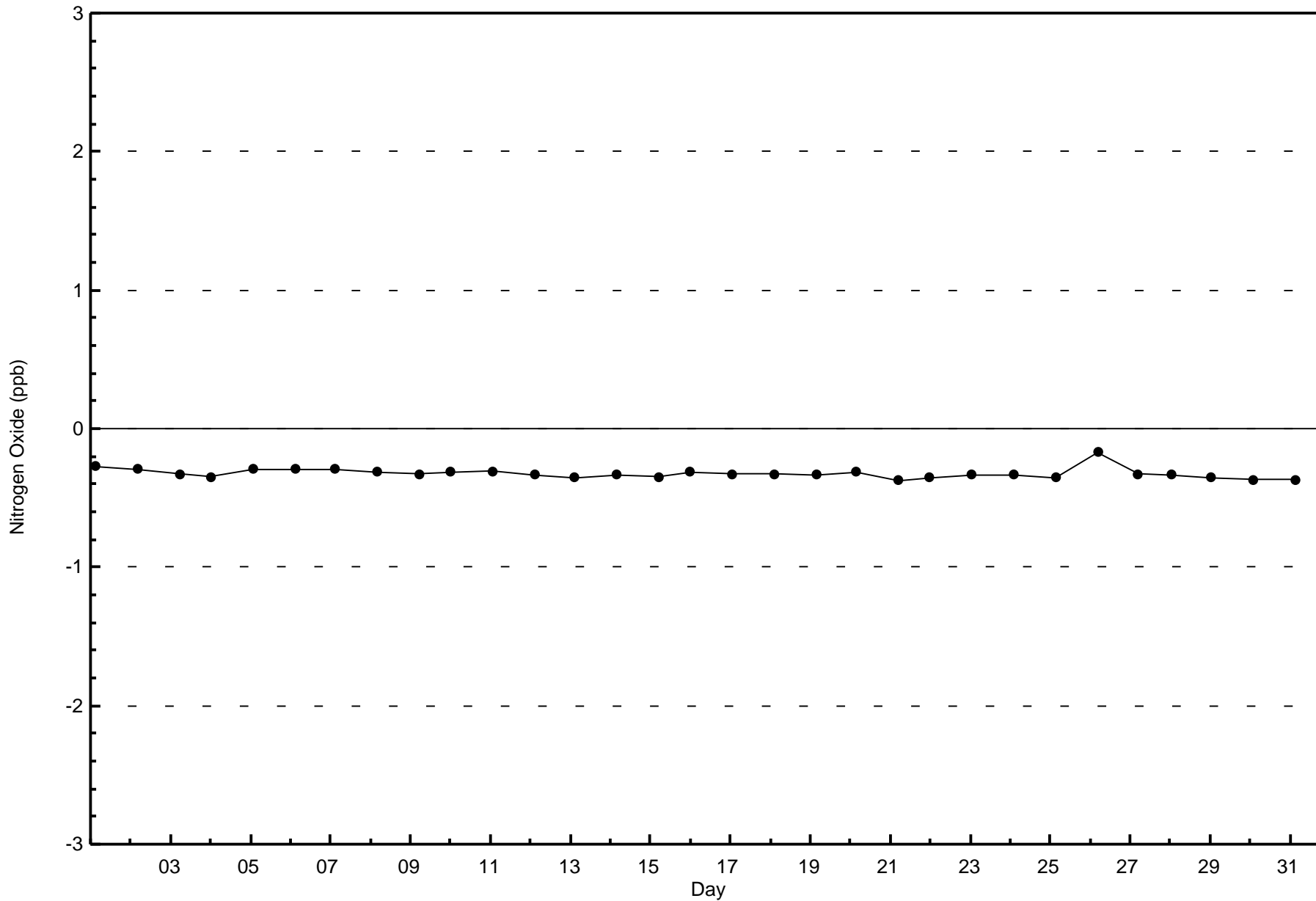
Nitrogen Oxide (NO) - ppb  
Surmont (AMS 24)

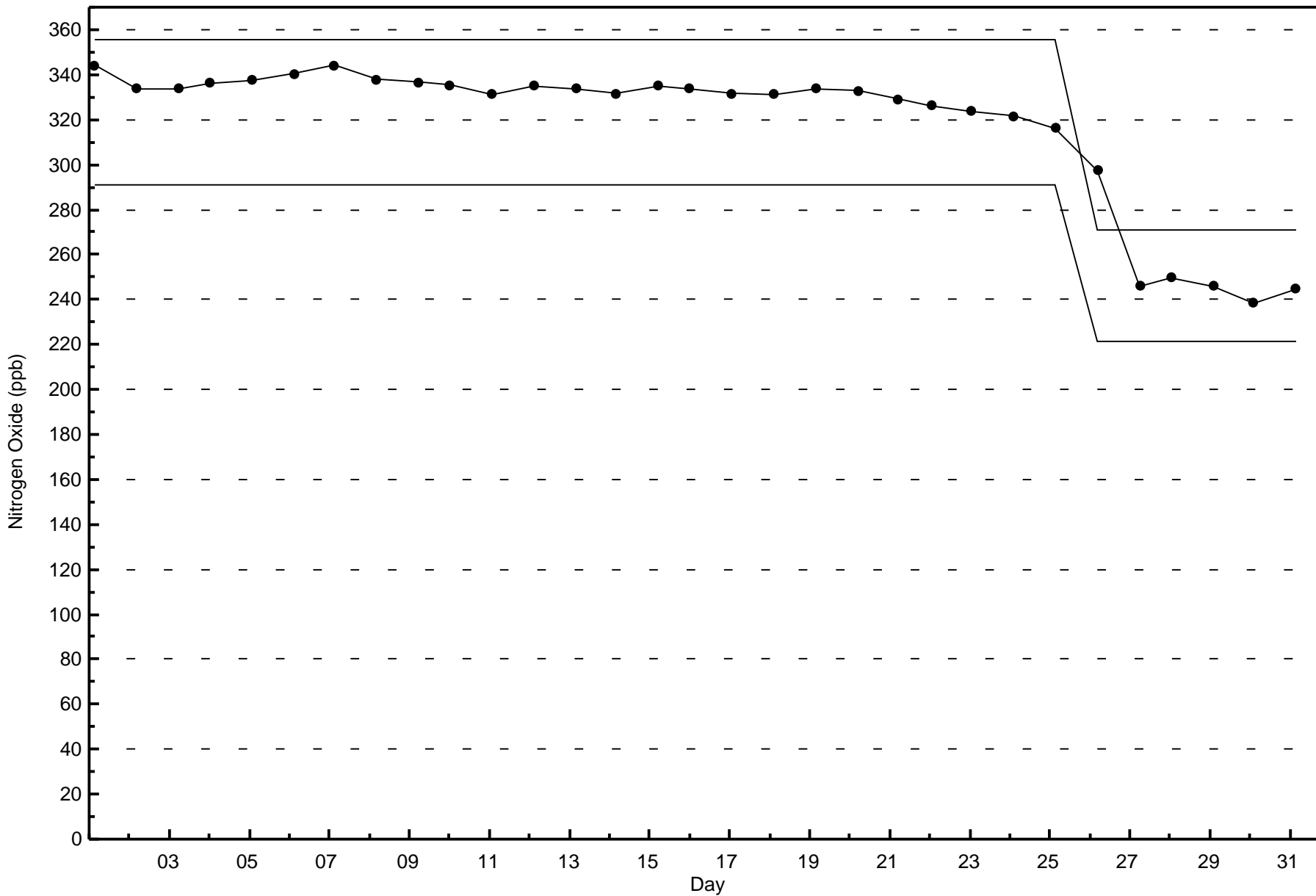


Classes (ppb)



Total Number of Valid Hours: 702







# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Nitrogen Dioxide (NO<sub>2</sub>) - ppb

## Surmont - October 2017

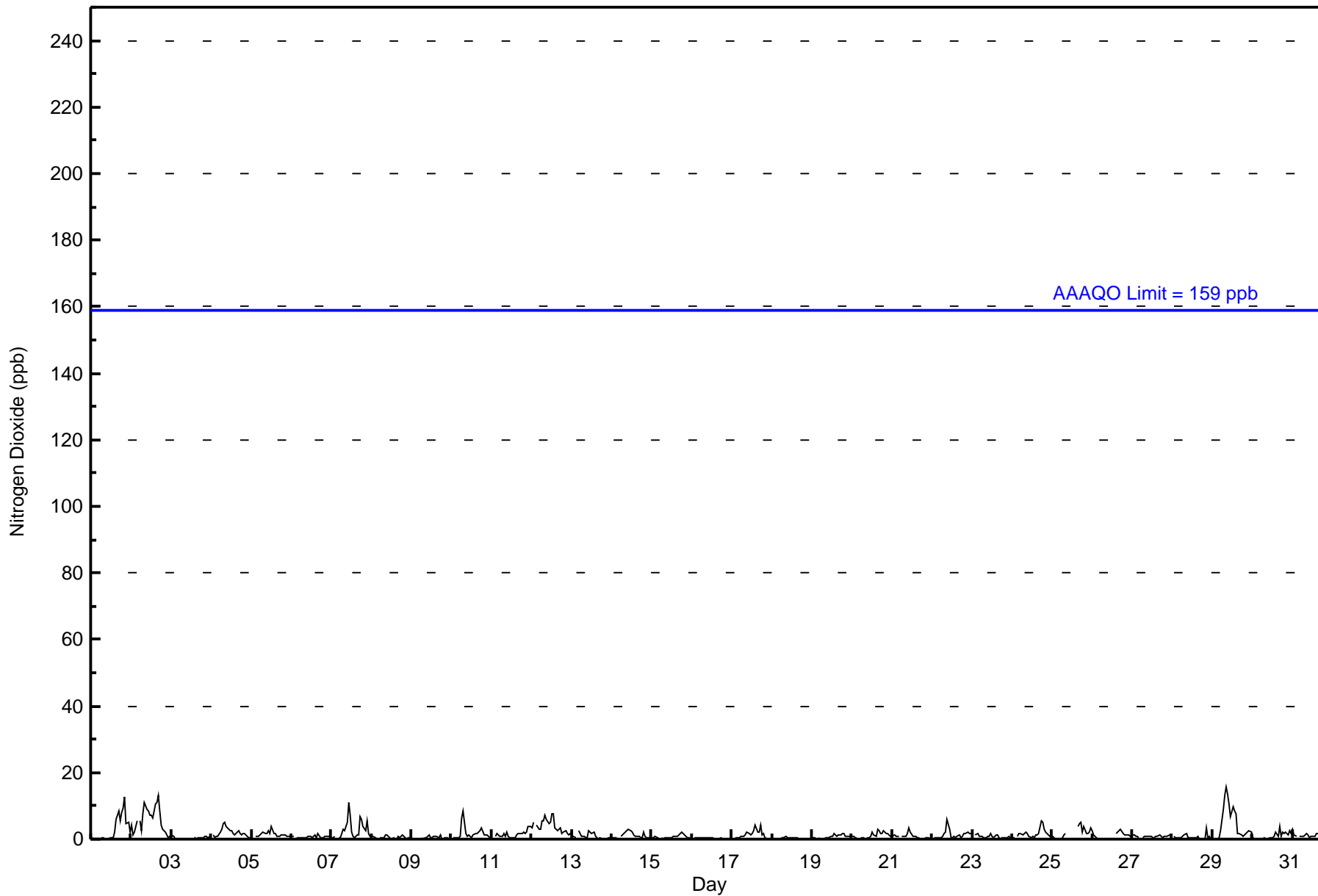
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 16 ppb on Oct 29 09:00										Maximum Daily Average: 5.8 ppb on Oct 2										Hours of Data: 702						
Minimum Value: 0 ppb on Oct 1 06:00										Minimum Daily Average: 0.2 ppb on Oct 18										Hours of Missing Data: 42						
Maximum Diurnal Average: 2.2 ppb at hour 10										Minimum Diurnal Average: 0.6 ppb at hour 3										Hours of Calibration: 42						
Monthly Average: 1.5 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 2 P <sub>90</sub> = 3 P <sub>99</sub> = 11										Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	1	2	6	8	5	8	9	13	5	5	2	2.9	13	
2-Oct	4	1	2	6	Z	5	3	8	11	9	8	7	7	6	10	11	13	9	4	3	2	1	1	1	5.8	13
3-Oct	1	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.4	1	
4-Oct	Z	1	1	1	1	2	3	5	4	3	3	3	2	1	2	3	2	1	2	2	1	0	0	2.0	5	
5-Oct	0	Z	1	1	1	1	2	2	2	2	3	2	4	2	2	1	1	1	1	1	1	1	1	1.4	4	
6-Oct	1	1	Z	1	1	0	1	1	1	1	1	1	1	1	1	2	0	0	0	1	1	1	1	0.6	2	
7-Oct	1	1	1	Z	1	0	2	3	3	5	11	7	2	1	0	1	1	7	6	4	3	5	2	1	2.9	11
8-Oct	1	1	0	0	Z	1	1	0	1	1	1	0	0	0	0	0	1	1	1	1	1	0	0	0	0.6	1
9-Oct	0	0	0	0	0	Z	0	0	0	1	1	1	0	1	1	1	1	1	0	0	0	0	0	1	0.4	1
10-Oct	Z	0	0	0	0	1	6	8	2	1	1	1	1	1	2	2	2	3	3	1	1	1	1	1	1.7	8
11-Oct	0	Z	1	2	1	1	1	2	1	2	1	1	0	1	1	1	2	2	2	2	2	2	4	4	1.4	4
12-Oct	3	5	Z	4	3	3	5	6	7	6	5	5	8	8	4	3	3	4	2	2	3	2	1	2	3.9	8
13-Oct	1	1	0	Z	2	2	1	1	0	1	3	2	2	2	1	0	0	0	0	0	0	0	0	0	0.9	3
14-Oct	1	0	0	0	Z	1	1	2	2	3	3	2	2	1	1	1	1	1	1	2	1	0	0	0	1.1	3
15-Oct	0	0	1	0	0	Z	0	0	0	1	1	1	1	1	1	1	1	2	2	2	1	1	0	1	0.7	2
16-Oct	Z	0	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
17-Oct	0	Z	0	0	1	1	1	1	1	2	2	1	2	2	4	2	2	4	1	2	0	0	0	0	1.4	4
18-Oct	0	0	Z	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1
19-Oct	0	0	0	Z	0	0	0	0	0	0	1	1	1	2	1	1	1	1	2	2	1	1	1	1	0.7	2
20-Oct	1	1	1	1	Z	0	0	0	0	0	0	1	2	1	1	3	3	2	2	2	2	2	1	1	1.2	3
21-Oct	1	1	1	1	1	Z	1	1	1	2	3	2	1	1	1	1	1	0	0	0	0	0	0	0	0.9	3
22-Oct	Z	0	0	0	0	0	1	2	2	6	3	1	0	1	1	1	1	0	1	2	2	2	2	2	1.3	6
23-Oct	2	Z	1	2	1	1	1	0	1	1	1	2	1	1	1	1	0	0	0	0	0	1	1	1	0.8	2
24-Oct	1	0	Z	1	2	2	1	2	2	2	1	1	1	1	1	1	2	5	5	3	2	2	1	1	1.7	5
25-Oct	1	1	0	Z	0	0	0	1	2	C	C	C	C	C	C	4	5	5	2	4	2	2	2	3	--	5
26-Oct	3	1	0	0	Z	0	0	0	0	C	C	C	C	C	2	2	3	3	2	1	1	1	1	1	1.2	3
27-Oct	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1
28-Oct	Z	1	1	1	0	1	1	1	2	1	0	1	0	0	0	1	0	0	0	0	4	0	1	0	0.7	4
29-Oct	0	Z	0	0	0	2	9	13	16	14	10	7	10	8	8	2	2	1	1	1	2	2	3	2	4.9	16
30-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	2	1	4	1	2	2	2	1	2	2	0.9	4
31-Oct	3	1	1	Z	1	1	1	1	2	1	1	1	1	1	2	2	2	1	1	1	1	0	0	1	1.1	3
1.0 0.8 0.6 0.8 0.7 1.0 1.4 2.0 2.1 2.2 2.2 1.7 1.7 1.6 1.7 1.7 2.1 2.0 1.7 1.6 1.6 1.2 1.1 1.0																								Diurnal Average		
4 5 2 6 3 5 9 13 16 14 11 7 10 8 10 11 13 9 8 9 13 5 5 4																								Diurnal Maximum		
Z - zerospan C - Calibration																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										





Wood Buffalo Environmental Association  
Hourly Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Surmont - October 2017





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Surmont - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	702	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 702

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Surmont - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	37	48	29	9	8	4	8	27	29	36	50	50	103	81	88	95	702
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	37	48	29	9	8	4	8	27	29	36	50	50	103	81	88	95	702

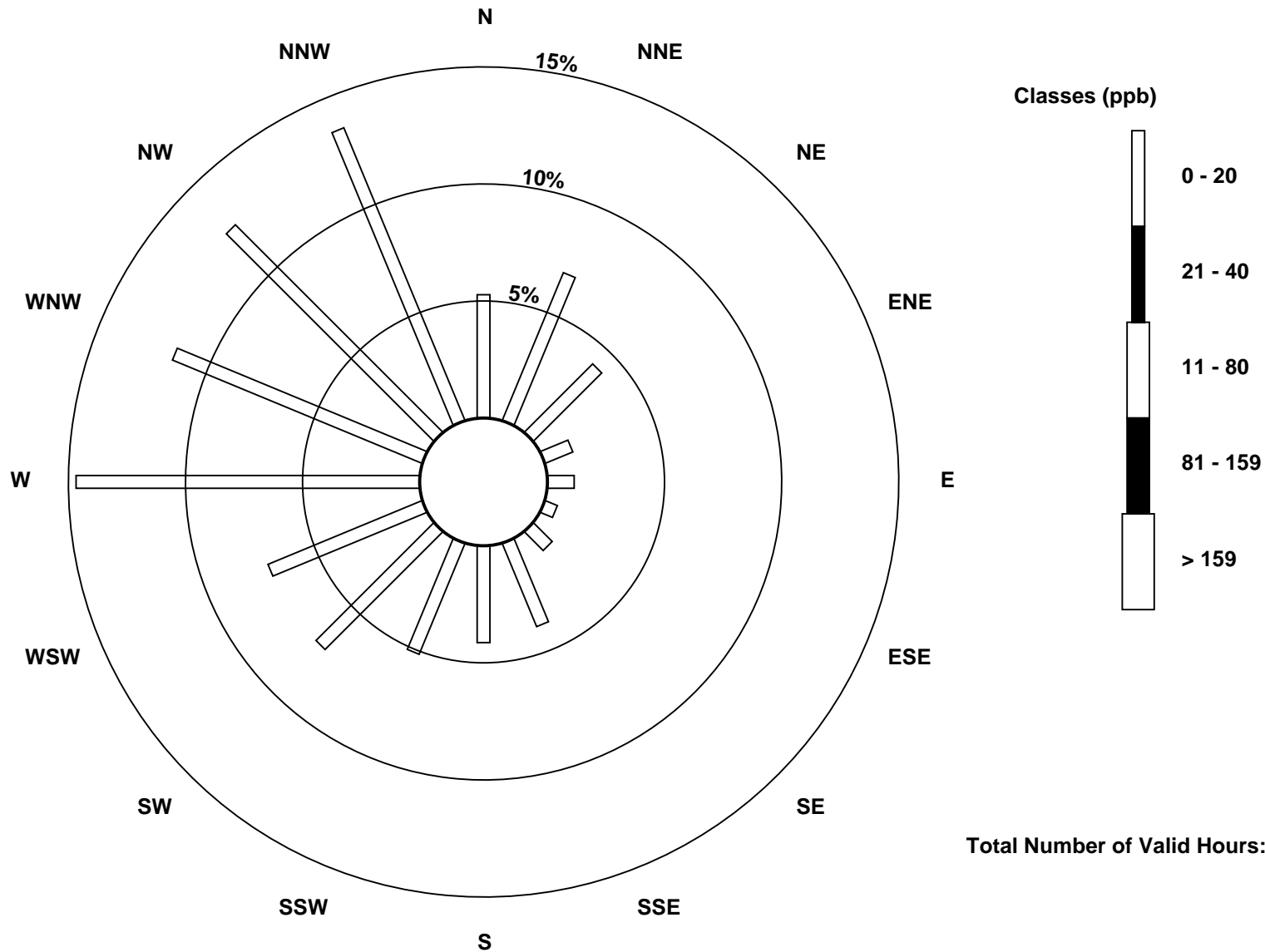
Total Number of Valid Hours: 702

Total Number of Hours: 744

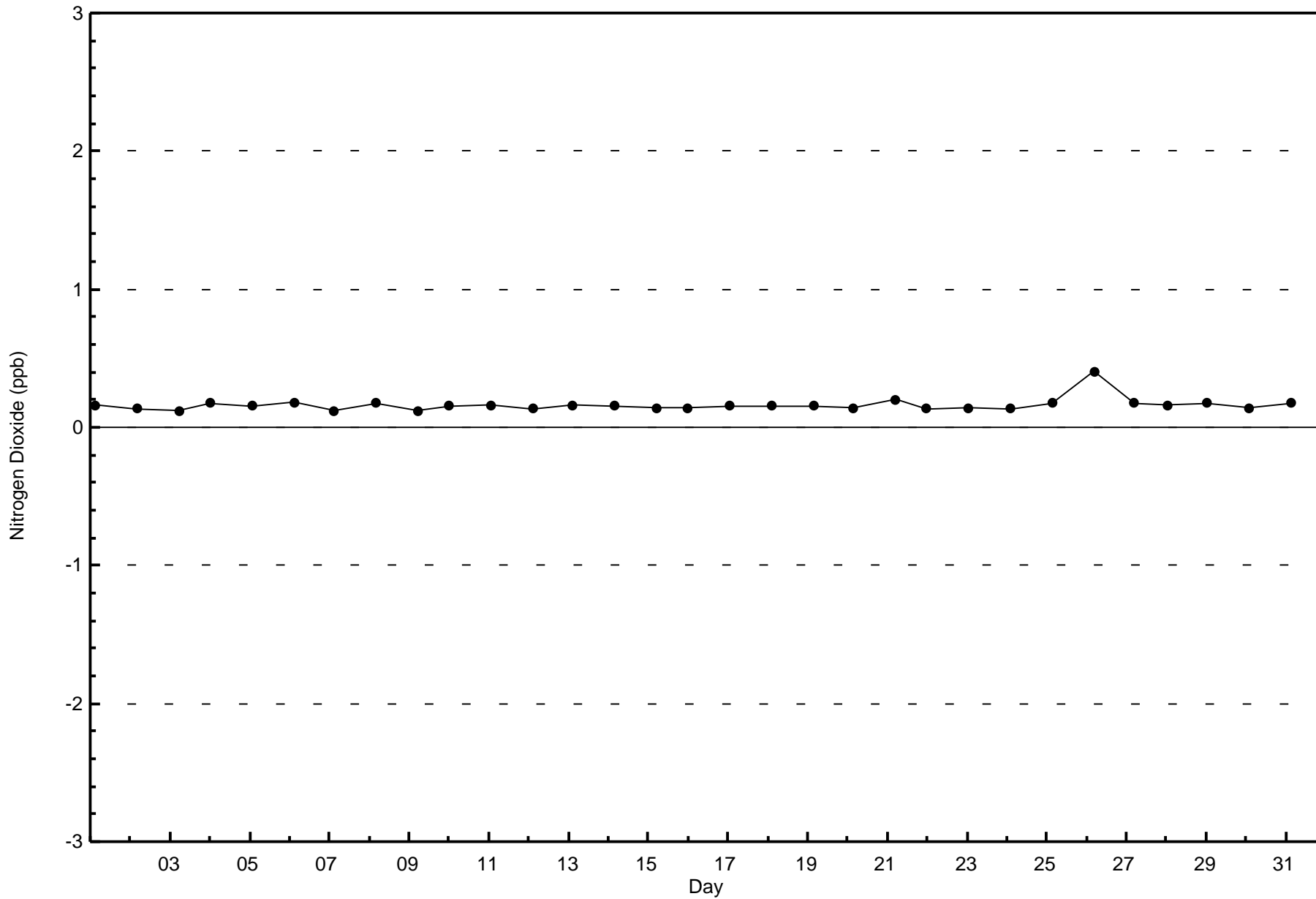


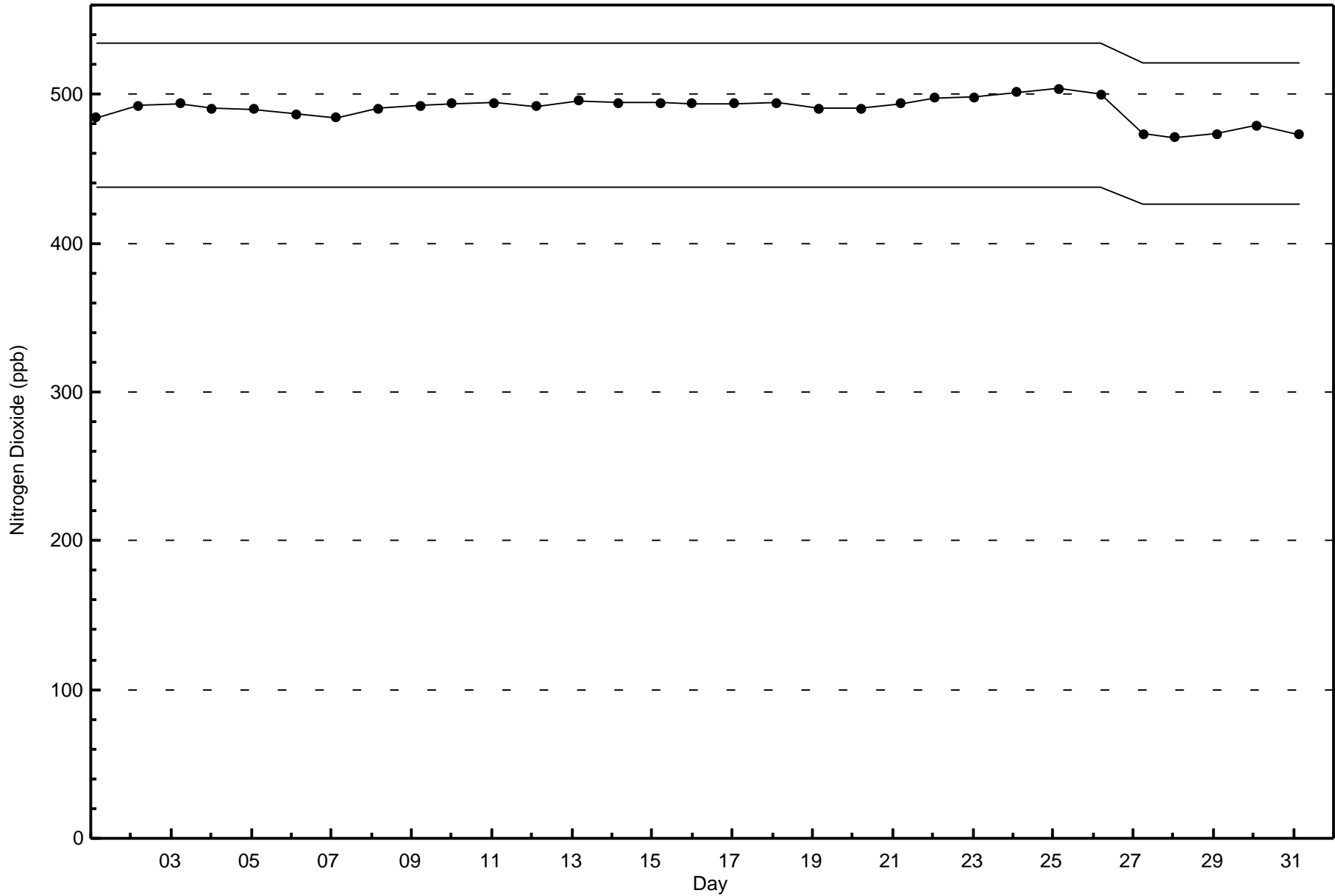
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Surmont (AMS 24)



Total Number of Valid Hours: 702







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb

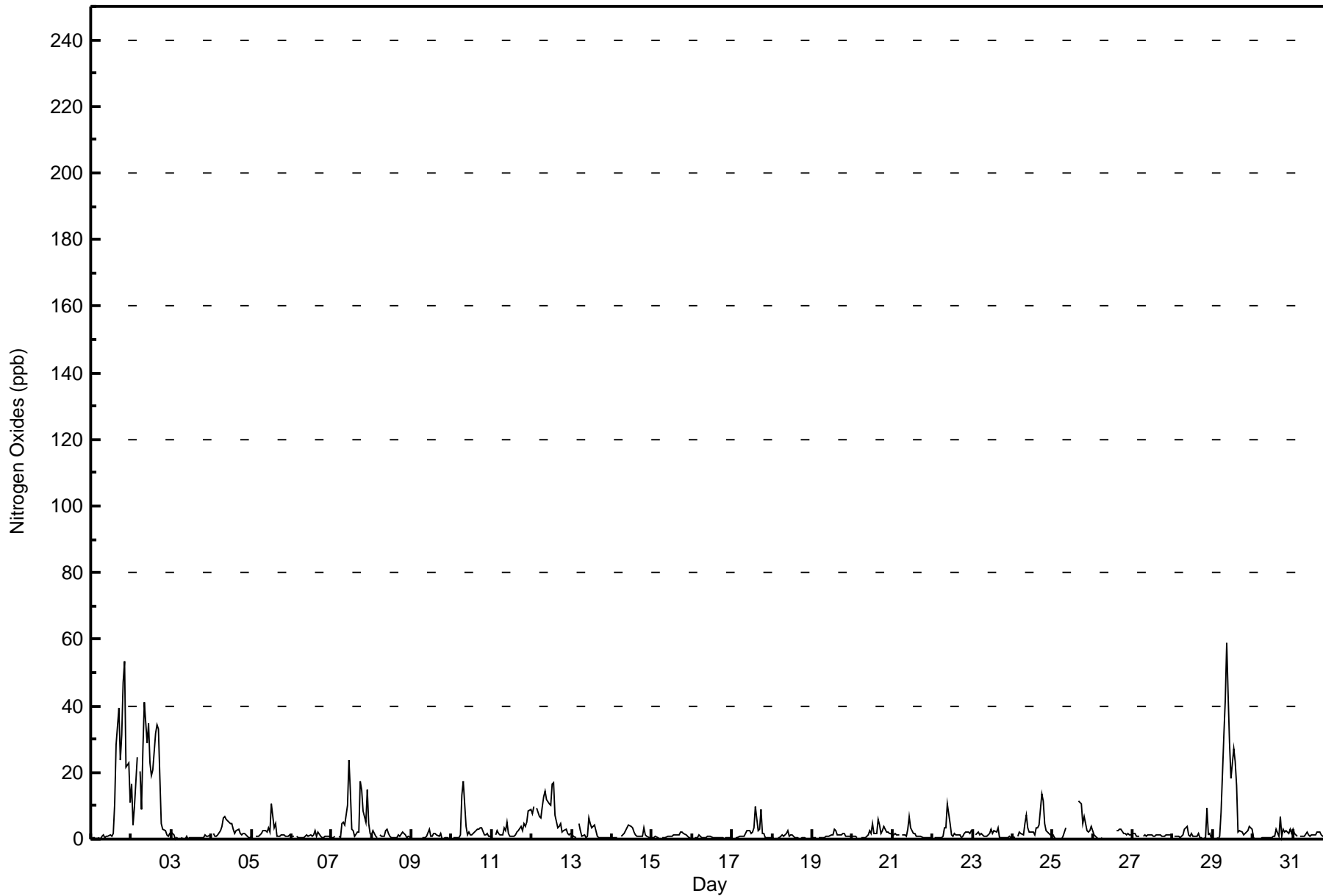
Surmont - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 59 ppb on Oct 29 09:00										Maximum Daily Average: 17.8 ppb on Oct 2										Hours of Data: 702						
Minimum Value: 0 ppb on Oct 9 01:00										Minimum Daily Average: 0.5 ppb on Oct 16										Hours of Missing Data: 42						
Maximum Diurnal Average: 5.5 ppb at hour 9										Minimum Diurnal Average: 1.0 ppb at hour 3										Hours of Calibration: 42						
Monthly Average: 3.3 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 1 Q <sub>3</sub> = 2 P <sub>90</sub> = 7 P <sub>99</sub> = 39										Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	Z	0	0	1	1	0	1	1	1	1	2	11	28	39	24	31	47	53	22	23	11	13.0	53
2-Oct	17	4	10	25	Z	20	9	27	41	29	35	23	19	21	32	35	33	19	5	3	2	1	1	2	17.8	41
3-Oct	2	1	0	0	0	Z	0	0	0	1	0	0	0	0	1	0	1	0	0	1	1	1	1	1	0.6	2
4-Oct	Z	2	1	1	1	2	4	6	7	6	5	5	3	2	2	3	2	1	2	2	1	0	0	0	2.8	7
5-Oct	1	Z	1	1	1	1	2	2	2	2	3	2	10	3	5	1	1	1	1	1	1	1	1	1	2.0	10
6-Oct	1	1	Z	1	0	0	1	1	1	1	1	1	1	1	2	1	2	1	0	0	1	1	1	1	0.9	2
7-Oct	0	1	1	Z	1	1	5	5	4	10	24	14	3	2	1	2	2	18	15	9	5	15	5	2	6.2	24
8-Oct	1	2	1	0	Z	1	1	1	3	3	2	1	0	1	0	1	1	1	2	2	1	0	1	0	1.2	3
9-Oct	0	0	0	0	0	Z	0	0	0	1	3	1	1	2	2	1	1	2	0	0	0	1	0	1	0.7	3
10-Oct	Z	1	1	0	0	1	13	17	4	1	2	1	1	2	2	3	3	3	3	1	1	2	1	1	2.9	17
11-Oct	1	Z	1	3	2	1	1	3	2	5	2	1	1	1	1	2	3	4	3	5	4	5	9	9	2.9	9
12-Oct	8	10	Z	9	7	6	10	13	15	12	11	10	17	17	7	4	4	4	2	2	3	2	1	2	7.6	17
13-Oct	2	1	1	Z	5	3	1	1	1	1	7	5	3	4	2	1	0	1	0	0	0	0	0	0	1.7	7
14-Oct	1	0	0	0	Z	1	1	2	2	3	4	4	3	2	1	1	1	1	1	3	1	1	0	0	1.6	4
15-Oct	1	0	1	0	0	Z	0	0	0	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1	0.9	2
16-Oct	Z	0	0	0	1	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
17-Oct	0	Z	0	1	1	1	1	1	2	2	2	2	2	3	10	2	3	9	2	2	0	0	0	0	2.0	10
18-Oct	0	0	Z	0	0	1	1	1	2	3	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0.6	3
19-Oct	0	0	0	Z	0	0	0	0	1	1	1	1	1	3	3	1	1	1	2	2	1	1	1	1	1.0	3
20-Oct	1	1	1	1	Z	0	0	0	0	1	3	2	5	2	2	6	4	2	2	4	2	2	2	2	1.9	6
21-Oct	1	2	1	1	1	Z	1	1	1	3	7	4	2	2	1	1	1	1	0	0	0	0	0	0	1.4	7
22-Oct	Z	0	0	0	0	0	1	4	3	10	5	1	1	2	1	1	1	0	1	2	2	2	2	3	1.9	10
23-Oct	2	Z	1	2	1	1	1	1	1	1	2	3	2	3	2	4	0	0	0	0	0	1	1	1	1.3	4
24-Oct	1	0	Z	1	2	2	1	5	7	3	2	2	2	1	3	3	4	13	12	4	3	2	1	1	3.4	13
25-Oct	1	1	0	Z	0	0	1	2	3	C	C	C	C	C	C	12	11	10	5	7	2	2	2	4	--	12
26-Oct	3	1	0	0	Z	0	0	0	0	C	C	C	C	C	2	2	3	3	2	2	1	2	1	1	1.4	3
27-Oct	2	2	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	2
28-Oct	Z	1	1	1	1	1	1	3	4	1	1	2	1	1	1	2	0	1	0	0	9	1	2	0	1.5	9
29-Oct	0	Z	1	0	1	8	31	42	59	43	29	18	27	23	16	2	3	2	1	2	2	3	4	3	13.9	59
30-Oct	1	0	Z	0	0	0	0	0	0	0	0	0	1	1	3	1	7	1	3	2	2	2	3	2	1.3	7
31-Oct	3	2	1	Z	1	1	1	1	2	1	1	1	1	1	2	2	2	1	1	1	1	1	0	1	1.3	3
1.9 1.3 1.0 2.0 1.1 2.1 3.0 4.6 5.5 5.2 5.3 3.8 3.9 3.6 3.9 4.0 4.5 4.1 3.2 3.4 3.4 2.3 2.1 1.7																								Diurnal Average		
17 10 10 25 7 20 31 42 59 43 35 23 27 23 32 35 39 24 31 47 53 22 23 11																								Diurnal Maximum		
Z - zerospan C - Calibration																										



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Surmont - October 2017**







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Surmont - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	676	96.30	96.30
21 - 40	20	2.85	99.15
41 - 80	6	0.85	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 702

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Surmont - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	19	43	29	9	8	4	8	27	29	36	50	50	103	81	88	92	676
21 - 40	12	5	0	0	0	0	0	0	0	0	0	0	0	0	0	3	20
11 - 80	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	37	48	29	9	8	4	8	27	29	36	50	50	103	81	88	95	702

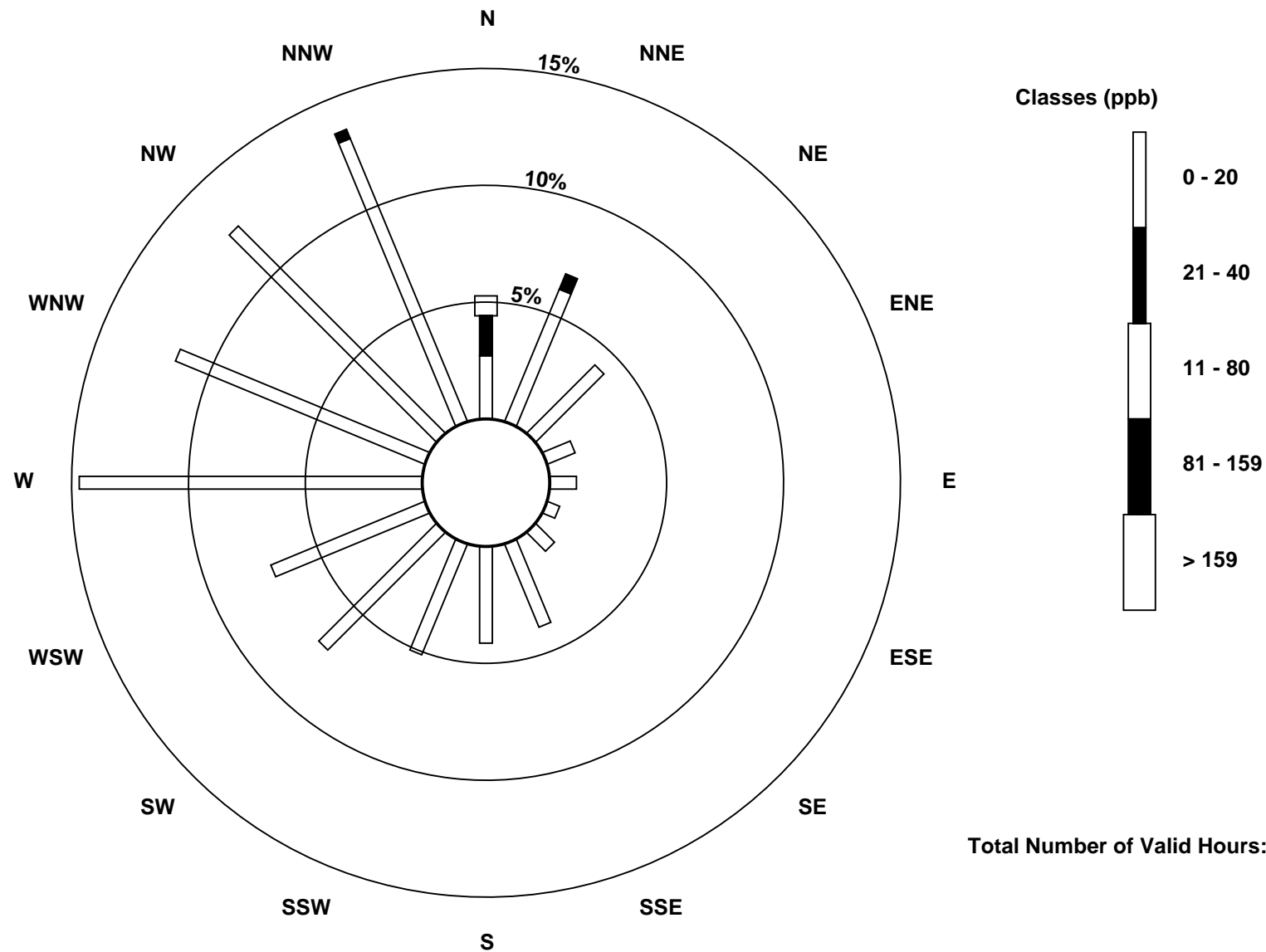
Total Number of Valid Hours: 702

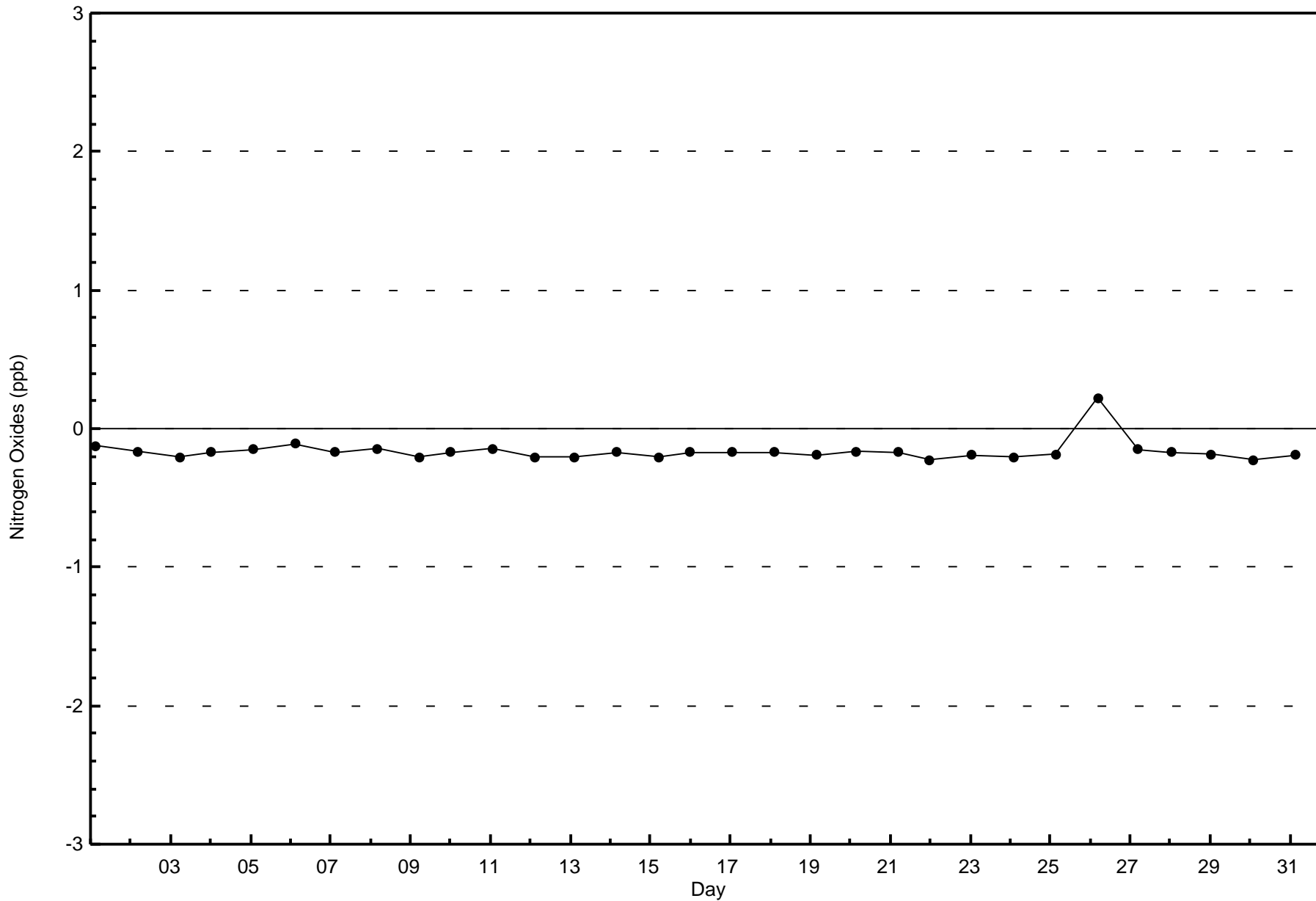
Total Number of Hours: 744

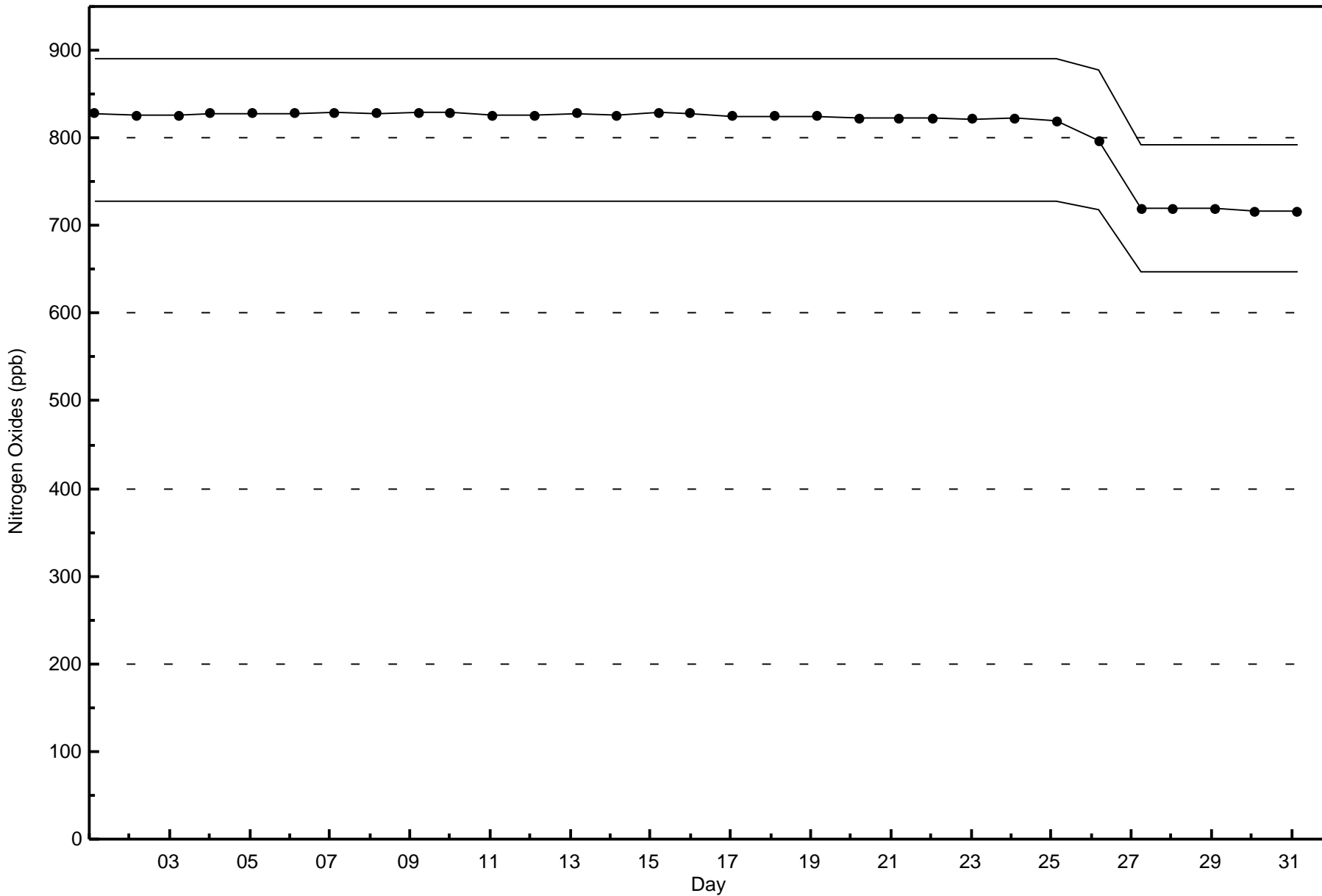


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Surmont (AMS 24)









**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Ambient Temperature (AT) - C**

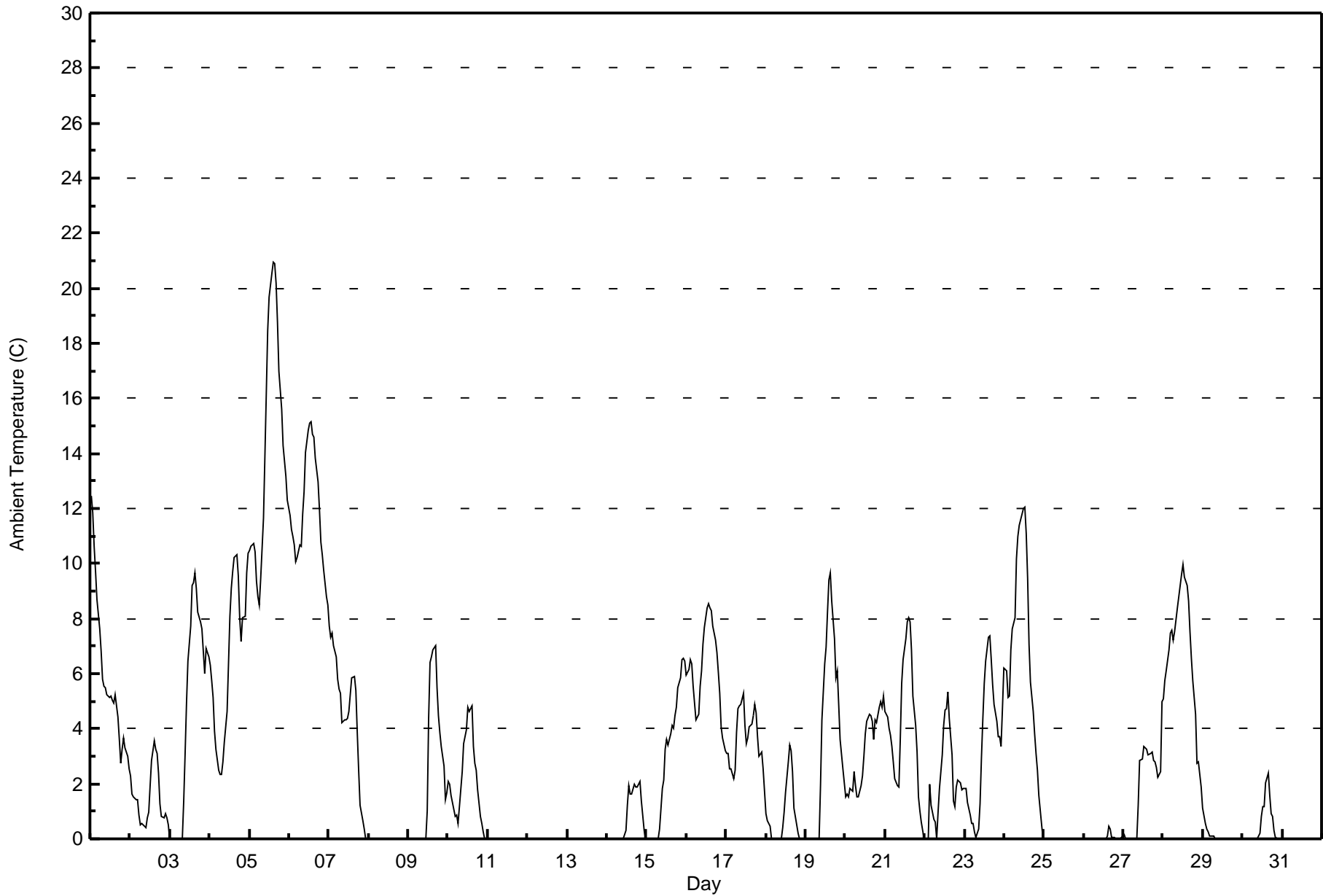
**Surmont - October 2017**

Maximum Value: 21 C on Oct 5 15:00																	Maximum Daily Average: 14.4 C on Oct 5																	Hours in Service: 744			
Minimum Value: 0 C on Oct 3 01:00																	Minimum Daily Average: 0.0 C on Oct 8																	Hours of Data: 744			
Maximum Diurnal Average: 5.2 C at hour 15																	Minimum Diurnal Average: 2.0 C at hour 7																	Hours of Missing Data: 0			
Monthly Average: 3.2 C																	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 2 O <sub>3</sub> = 5 P <sub>90</sub> = 9 P <sub>99</sub> = 18																	Hours of Calibration: 0			
																																		Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24													
1-Oct	12	12	11	10	9	8	7	6	6	5	5	5	5	5	5	5	4	4	3	3	4	3	3	3	5.9	12											
2-Oct	2	2	2	1	1	1	1	1	1	0	1	1	2	3	4	3	3	2	1	1	1	1	1	1	1.5	4											
3-Oct	0	0	0	0	0	0	0	0	1	3	5	6	8	9	9	10	9	8	8	8	7	6	7	7	4.6	10											
4-Oct	6	6	5	4	3	2	2	2	3	4	5	6	8	9	10	10	10	10	8	7	8	8	10	10	6.5	10											
5-Oct	10	11	11	10	9	9	8	9	12	14	16	18	20	21	21	21	20	19	17	16	14	14	13	12	14.4	21											
6-Oct	12	11	11	11	10	10	11	11	12	13	14	15	15	15	15	15	14	13	12	11	10	10	9	9	11.9	15											
7-Oct	8	7	7	7	7	6	5	5	4	4	4	4	5	5	6	6	5	4	2	1	1	0	0	0	4.4	8											
8-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0											
9-Oct	0	0	0	0	0	0	0	0	0	0	0	1	4	6	7	7	7	5	4	4	3	3	1	2	2.3	7											
10-Oct	2	2	2	1	1	1	1	1	2	3	4	4	5	5	5	3	3	2	2	1	1	0	0	0	2.1	5											
11-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0											
12-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0											
13-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0											
14-Oct	0	0	0	0	0	0	0	0	0	0	0	1	2	2	2	2	2	2	2	2	2	1	0	0	0.8	2											
15-Oct	0	0	0	0	0	0	0	0	0	2	2	3	4	3	4	4	4	4	5	6	6	6	7	6	2.8	7											
16-Oct	6	6	7	6	6	5	4	5	6	6	7	8	8	9	8	8	8	7	7	6	5	4	4	3	6.2	9											
17-Oct	3	3	3	3	2	2	4	5	5	5	5	4	3	4	4	4	4	5	5	4	3	3	3	2	3.6	5											
18-Oct	1	1	0	0	0	0	0	0	0	0	0	1	2	3	3	3	2	1	1	0	0	0	0	0	0.8	3											
19-Oct	0	0	0	0	0	0	0	0	0	2	4	6	7	8	9	10	9	7	6	6	5	4	3	2	3.7	10											
20-Oct	2	2	2	2	2	2	2	2	2	2	2	3	4	4	5	4	4	4	4	4	5	5	5	5	3.2	5											
21-Oct	5	4	4	4	3	3	2	2	2	4	6	6	7	8	8	8	7	5	4	3	2	1	1	0	4.1	8											
22-Oct	0	0	0	2	1	1	1	0	1	2	3	4	5	5	5	4	3	1	1	2	2	2	2	2	2.0	5											
23-Oct	2	2	1	1	1	1	0	0	1	3	4	6	6	7	7	7	6	5	4	4	4	3	5	5	3.3	7											
24-Oct	6	6	5	5	7	8	8	10	11	11	12	12	12	11	9	7	6	5	4	3	3	2	0	0	6.8	12											
25-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0											
26-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0											
27-Oct	0	0	0	0	0	0	0	0	1	3	3	3	3	3	3	3	3	3	3	3	3	2	2	5	1.8	5											
28-Oct	5	6	6	7	7	8	7	8	8	9	9	10	10	10	9	9	8	7	6	5	3	3	2	2	6.7	10											
29-Oct	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1											
30-Oct	0	0	0	0	0	0	0	0	0	0	1	1	1	2	2	2	2	1	1	0	0	0	0	0	0.5	2											
31-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0											
2.7																	2.6																	Diurnal Average			
12																	12																	Diurnal Maximum			



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Surmont - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C  
Surmont - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	0	0.00	0.00
0 - 10	690	92.74	92.74
10 - 20	50	6.72	99.46
> 20	4	0.54	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %**

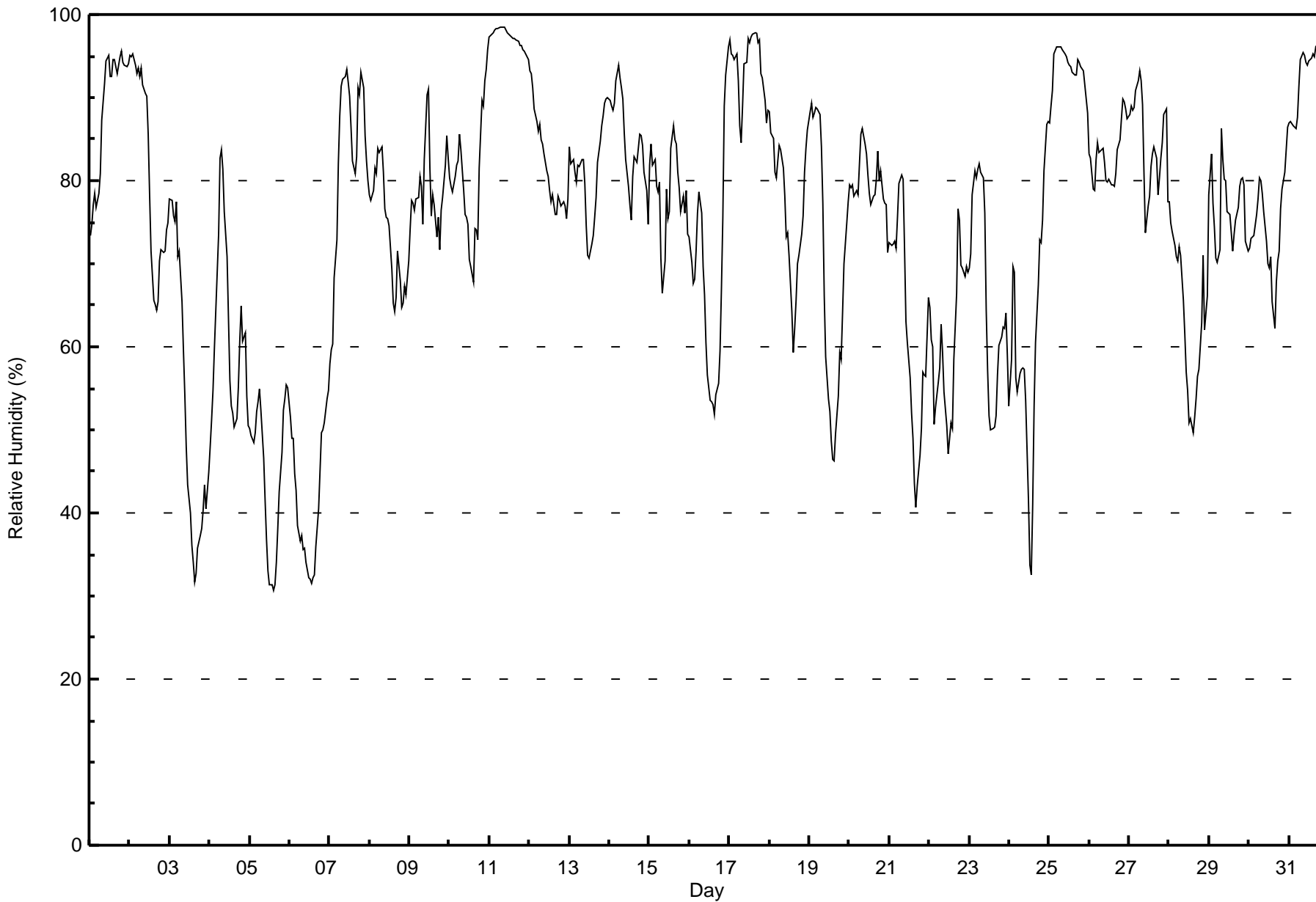
**Surmont - October 2017**

Maximum Value: 99 % on Oct 11 08:00																		Maximum Daily Average: 97.2 % on Oct 11																		Hours in Service: 744							
Minimum Value: 31 % on Oct 5 15:00																		Minimum Daily Average: 41.5 % on Oct 6																		Hours of Data: 744							
Maximum Diurnal Average: 80.2 % at hour 8																		Minimum Diurnal Average: 67.1 % at hour 15																		Hours of Missing Data: 0							
Monthly Average: 74.7 %																		Percentiles: P <sub>1</sub> = 32 P <sub>10</sub> = 51 Q <sub>1</sub> = 65 Median = 78 Q <sub>3</sub> = 87 P <sub>90</sub> = 94 P <sub>99</sub> = 98																		Hours of Calibration: 0							
																																				Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																			
1-Oct	73	75	77	78	77	78	81	87	90	92	94	95	93	93	95	95	93	94	95	96	94	94	94	94	88.6	96																	
2-Oct	95	95	95	94	93	93	93	94	91	91	90	86	78	72	66	65	64	65	70	72	71	72	74	75	81.4	95																	
3-Oct	78	78	76	75	78	71	72	65	60	54	48	43	40	36	34	32	33	36	37	38	40	43	41	45	52.2	78																	
4-Oct	48	51	55	60	64	73	83	84	81	76	71	63	56	53	52	50	51	55	61	65	61	62	54	51	61.7	84																	
5-Oct	50	49	48	50	52	53	55	52	47	42	37	33	31	31	31	31	34	38	43	47	52	54	55	55	44.7	55																	
6-Oct	52	49	49	45	43	39	37	37	36	36	34	32	32	32	32	33	36	40	45	50	50	51	54	55	41.5	55																	
7-Oct	58	60	60	68	73	82	88	91	92	93	93	92	90	86	82	81	83	91	90	93	91	86	82	80	82.8	93																	
8-Oct	78	78	79	82	81	84	83	84	81	77	76	75	75	69	65	64	66	71	68	65	65	67	66	70	73.7	84																	
9-Oct	74	78	77	76	78	78	80	79	75	83	90	91	82	76	78	77	73	76	72	77	78	82	85	83	79.1	91																	
10-Oct	80	79	79	80	82	82	86	84	79	76	76	75	71	70	68	74	74	73	82	90	89	92	93	96	80.3	96																	
11-Oct	97	98	98	98	98	98	98	99	99	98	98	98	97	97	97	97	97	97	96	96	96	96	95	94	97.2	99																	
12-Oct	93	93	91	89	87	86	87	85	84	83	81	80	79	78	78	76	76	78	78	77	77	77	75	78	82.0	93																	
13-Oct	84	82	83	81	80	82	82	83	83	80	75	71	71	72	73	76	78	82	85	87	88	89	90	90	81.0	90																	
14-Oct	90	89	88	89	92	94	92	91	90	86	83	79	77	75	81	83	82	84	86	85	84	81	79	75	84.8	94																	
15-Oct	82	84	82	83	79	79	80	71	66	70	79	75	76	84	87	85	84	81	79	76	78	76	79	74	78.7	87																	
16-Oct	73	70	68	68	71	76	79	76	70	66	61	57	54	53	53	52	54	56	59	67	76	89	93	96	68.2	96																	
17-Oct	97	95	95	95	95	92	87	85	89	94	94	97	97	97	98	98	98	97	97	93	92	90	87	89	93.6	98																	
18-Oct	88	86	85	81	80	82	84	84	81	78	73	74	71	64	59	62	66	70	71	73	76	81	84	86	76.7	88																	
19-Oct	88	89	88	88	89	89	88	84	77	66	59	54	52	49	46	46	50	54	59	59	64	70	75	77	69.2	89																	
20-Oct	79	79	79	78	79	78	82	86	86	84	83	81	78	77	78	78	80	84	80	81	78	77	77	71	79.8	86																	
21-Oct	72	72	72	73	72	76	80	81	80	72	63	60	56	52	49	43	41	43	47	50	57	57	56	66	62.1	81																	
22-Oct	65	61	60	51	53	56	57	63	59	55	50	47	49	51	50	59	67	77	75	70	69	68	70	69	60.4	77																	
23-Oct	70	71	78	81	80	81	82	81	80	76	64	57	52	50	50	50	52	57	60	61	62	62	64	59	65.9	82																	
24-Oct	53	58	70	69	56	55	57	57	57	54	42	34	32	41	53	60	68	73	73	75	81	87	87	87	60.4	87																	
25-Oct	87	89	91	95	96	96	96	96	96	95	95	94	94	94	93	93	93	95	94	94	93	92	90	88	93.2	96																	
26-Oct	83	83	79	79	83	85	83	84	84	82	80	80	80	79	79	79	81	84	85	87	90	89	89	88	83.1	90																	
27-Oct	88	89	89	89	91	92	93	92	89	81	74	77	78	82	83	84	83	78	80	83	85	88	89	77	84.7	93																	
28-Oct	77	75	74	72	71	70	72	71	66	62	57	55	51	51	50	51	54	56	57	63	71	62	64	66	63.3	77																	
29-Oct	78	83	77	74	71	70	72	86	82	80	80	76	76	74	72	74	75	77	79	80	80	79	73	72	76.7	86																	
30-Oct	72	73	73	73	76	78	80	80	78	76	73	70	69	71	65	62	68	70	72	77	79	81	84	86	74.5	86																	
31-Oct	87	87	87	87	86	88	91	95	95	95	94	94	94	95	95	95	96	96	96	96	96	96	96	95	93.0	96																	
																		77.2	77.4	77.5	77.5	77.6	78.6	80.0	80.2	78.2	76.0	73.5	71.1	68.8	67.6	67.1	67.7	69.0	71.7	73.3	74.8	76.1	76.9	77.2	77.0	Diurnal Average	
																		97	98	98	98	98	98	98	99	99	98	98	98	98	97	97	98	98	98	97	97	96	96	96	96	Diurnal Maximum	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Surmont - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Relative Humidity (RH) - %**  
**Surmont - October 2017**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	30	4.03	4.03
40 - 60	121	16.26	20.30
60 - 80	273	36.69	56.99
80 - 100	320	43.01	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

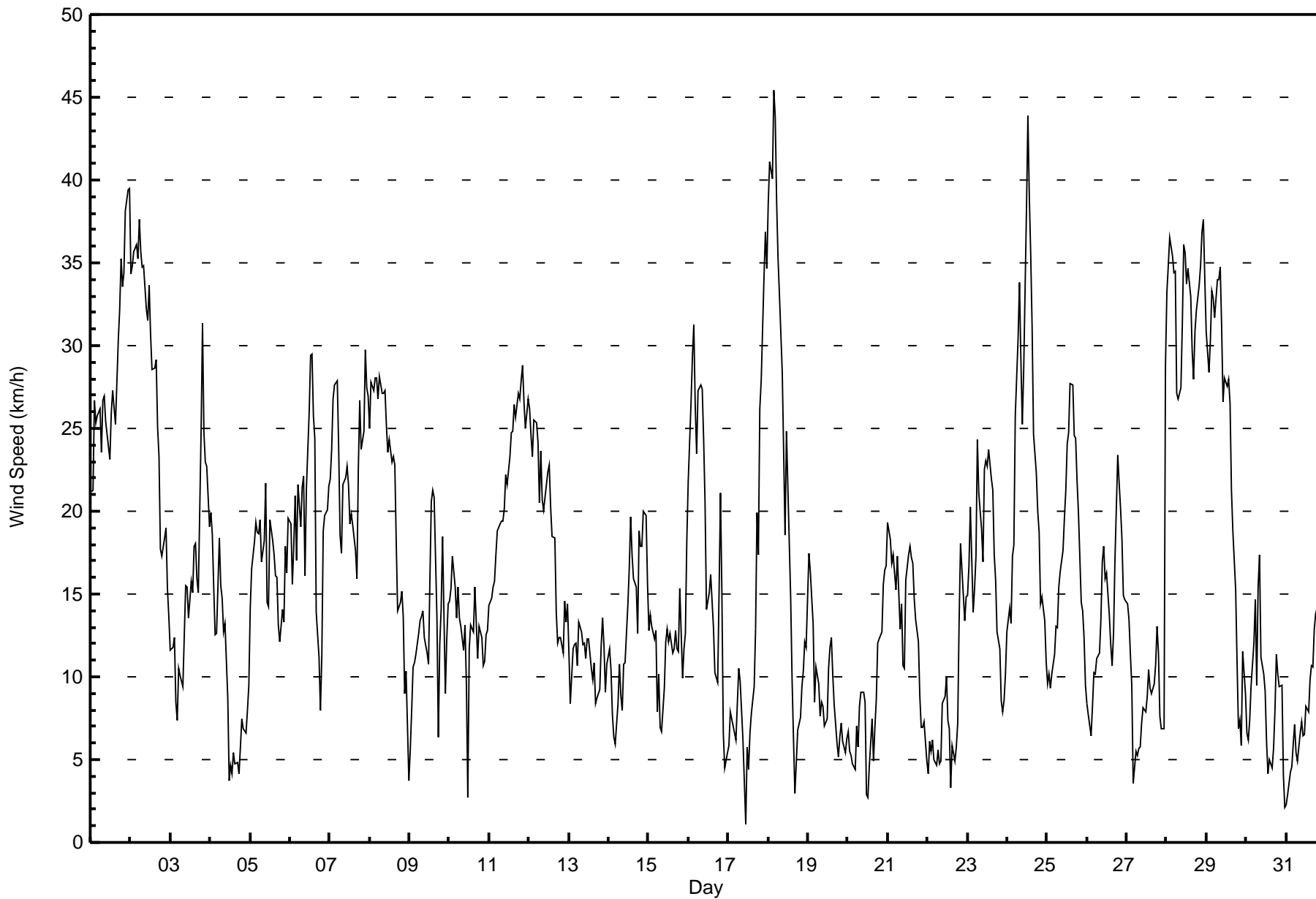


**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Wind Speed (WS) - km/h**  
**Surmont - October 2017**

Maximum Speed: 45 km/h on Oct 18 04:00		Maximum Daily Speed Average: 30.9 km/h on Oct 28		Hours in Service: 744																																													
Minimum Speed Value: 1 km/h on Oct 17 11:00		Minimum Daily Speed Average: 1.6 km/h on Oct 20		Hours of Data: 744																																													
Maximum Diurnal Speed Average: 11.4 km/h at hour 6		Minimum Diurnal Speed Average: 7.6 km/h at hour 18		Hours of Missing Data: 0																																													
Monthly Average Velocity: 10.1 km/h 313.0 deg		Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 6 Q <sub>1</sub> = 10 Median = 15 Q <sub>3</sub> = 23 P <sub>90</sub> = 29 P <sub>99</sub> = 39		Percent Operational Time: 100.0																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	NNW21	NNW21	NNW27	NNW25	NW26	NW26	NW24	NNW27	NNW27	NNW25	NNW25	NNW23	NNW26	NNW27	NNW26	N25	N30	NNW32	N35	N34	N34	NNE38	NNE39	NNE39	NNW27.4	NNE39																							
2-Oct	NNE34	NNE35	NNE36	NNE36	N35	NNE38	NNE36	NNE35	N35	N32	N32	NNE34	N31	N29	N29	N29	N25	N23	NNW18	NNW17	NNW18	NNW19	NNW15	NW14	N27.5	NNE38																							
3-Oct	WNW12	WNW12	WNW12	W8	W7	WSW11	WSW10	SW9	SW12	WSW16	WSW15	WSW14	SW16	WSW15	SW18	WSW18	WSW16	WSW15	W25	W31	WNW25	WNW23	NW23	NW19	W14.3	W31																							
4-Oct	NW20	NW19	NW15	NW13	NW13	NNW18	NNW15	N15	N13	N13	N9	NNE4	NE5	E4	ESE5	E5	SE5	S4	SSW6	SSW7	SSW7	SW7	SW8	WSW9	NW5.3	NW20																							
5-Oct	W14	W17	W18	W19	W19	W19	W19	W19	W17	W18	W22	W14	W14	W20	W18	WSW17	WSW16	WSW16	SW13	WSW12	W14	W13	W18	W16	W20	W16.6	W22																						
6-Oct	W19	W16	W18	W21	W17	W22	W19	W21	WNW22	W16	W21	W26	WNW29	WNW29	WNW26	WNW24	WNW14	WNW11	W8	W11	W19	W20	W20	W22	W19.5	WNW29																							
7-Oct	W22	W24	WNW27	WNW28	WNW28	WNW24	WNW19	NW17	NNW22	N22	N23	N22	NNW19	NNW20	NW19	NW18	NNW16	N23	NNW27	NNW24	NNW25	NNW30	NNW28	NNW27	NW20.2	NNW30																							
8-Oct	NNW25	NNW28	NNW27	NNW28	NNW28	NNW27	NNW28	NNW27	NNW27	NNW27	NNW27	NNW25	NNW24	NNW24	NW23	NNW23	NNW23	NNW18	NW14	NW15	NW15	NW14	WNW9	WNW10	SW4	NNW20.8	NNW28																						
9-Oct	SW6	SW8	SW11	SW11	SSW11	SSW13	SSW13	SSW14	SW14	SW12	SW11	SW11	W16	W21	WNW21	WNW21	WNW14	WNW6	W12	W14	WNW18	W9	WSW12	W14	WSW10.7	WNW21																							
10-Oct	W15	W15	WNW17	W15	WNW14	NW15	WNW14	NW13	NW12	NNW13	NNW9	N3	NNW12	NNW13	N13	NE15	NE13	NE11	NE13	NE12	NE11	NE11	NE13	NE13	NNW8.0	WNW17																							
11-Oct	NE14	NE15	NE15	NE16	NE17	NE19	NE19	NE19	NE19	NNE20	NNE22	NNE22	NNE23	NNE25	NNE25	NNE26	NNE26	NNE27	NNE27	NNE28	NNE29	NNE27	NNE25	NNE27	NNE21.9	NNE29																							
12-Oct	NNE26	NNE25	NNE23	NNE25	NNE25	NNE24	N20	NNW24	NNW21	NNW20	NNW22	NNW22	NNW23	NNW20	NNW18	NNW18	NNW14	NW12	NW12	NW12	NW11	NNW15	NW13	N14	N18.0	NNE26																							
13-Oct	NNW12	NW8	WNW12	WNW12	WNW12	WNW11	WNW13	WNW13	WNW12	WNW12	WNW11	WNW12	WNW12	W11	W10	WSW11	SW8	SW9	SW9	WSW12	W14	W12	W9	W11	W10.1	W14																							
14-Oct	W12	W10	WSW8	WSW6	SW6	SW8	SW11	SW9	SSW8	SW11	SW11	WSW14	W16	W20	W17	W16	W15	W13	W19	WNW18	NW18	NNW20	NNW20	NW16	W10.9	NNW20																							
15-Oct	WNW13	WNW14	WNW13	W12	W13	W8	WSW10	SW7	SW7	SW9	SW12	SW13	SSW12	SW13	SSW11	SSW12	SSW13	SW12	SW12	W15	WSW10	WSW12	WSW13	W18	WSW10.3	W18																							
16-Oct	W22	W27	W29	WNW31	WNW26	WNW23	WNW27	W28	WNW27	WNW24	WNW20	W14	W15	W16	W15	WSW13	WSW10	WSW10	W15	W21	W15	W7	WSW4	SSW5	W17.9	WNW31																							
17-Oct	SW6	SSW8	SSW7	SSW7	SSW6	WSW8	WSW11	WSW10	WSW8	WSW6	WSW1	SE6	ENE4	ENE7	ENE8	NE9	NNE13	N20	NNW17	NW26	NNW28	NNW34	NW37	NW35	NW7.6	NW37																							
18-Oct	NW39	NW41	NW40	NW45	NW44	NW39	NW35	NW33	NW28	NW24	NW19	WNW25	NW21	NW15	NW10	W6	SW3	SSE5	SSE7	SSE8	SSE9	SSE10	SSE12	SSE12	NW16.9	NW45																							
19-Oct	SE17	SSE16	SSE15	SSE13	SSE8	SSE11	S10	S8	SSW8	SSW8	SSW7	S7	S11	S12	SSE12	S10	S8	S6	S5	SSE6	S7	S6	SSW5	SSW6	S8.9	SE17																							
20-Oct	SSW7	SSW6	SSW5	SSW5	SSW4	SSE7	SSE6	SE8	SE9	SSE9	SSE8	SE3	E3	ESE5	ENE7	N5	N7	WNW9	NW12	NW12	NW13	NW16	NW16	NW17	WNW1.6	NW17																							
21-Oct	NW19	NW18	NW17	NW17	NW16	WNW15	WNW17	WNW13	WNW14	WNW11	NW11	NW16	NW17	NW18	WNW17	WNW17	W15	W13	W12	W9	W7	W7	WSW7	SSW5	WNW12.9	NW19																							
22-Oct	SW4	SSW6	SW5	SSE6	S5	S5	S6	S5	SSE5	SSE8	S9	SSE10	SSE7	SE7	S3	SE6	S5	SW6	W7	WNW13	WNW18	NW15	NNW13	NW15	SW3.2	WNW18																							
23-Oct	WNW15	WNW17	WNW20	NW14	NW15	NW17	NW24	NNW21	NNW19	NW17	NW23	NW23	NW23	WNW24	WNW22	WNW21	W17	W16	W13	W12	WSW9	WSW8	SW9	SW10	WNW15.2	NW24																							
24-Oct	SW13	SW14	SSW13	SW17	WSW18	W26	W30	WNW34	WNW29	NNW25	NNW29	NNW38	NW44	NW39	NNW35	NNW31	NNW25	NNW22	NNW20	NNE19	NNE14	NNE15	NNE13	NNE11	NW17.4	NW44																							
25-Oct	NE10	NE10	NE9	NE10	ENE11	W23	NE13	NE15	NNE16	NNE18	NNE20	NNE21	NNE24	NNE25	NNE28	NNE28	NNE25	NNE24	NNE22	NNE20	N14	NNW14	NNW12	NW9	NNE16.0	NNE28																							
26-Oct	W8	W8	WSW6	WSW8	SW10	SW10	SW11	SW11	SW13	SW17	SW18	SW16	SW16	SW14	SW12	WSW11	WSW13	W17	W23	WNW22	WNW20	WNW18	WNW15	NW15	WSW12.3	W23																							
27-Oct	NW14	NW13	NW11	NW9	SW4	W6	W5	SW6	SW6	SW7	SSW8	S8	SSE9	S10	S9	S9	S10	SSW11	SSW13	SSW11	S8	S7	S7	W29	SW6.0	W29																							
28-Oct	W33	W35	W37	WNW35	WNW34	WNW34	WNW27	WNW27	WNW27	NW31	NW36	NW36	NNW34	NW35	NW33	NW30	NW28	NNW31	NNW32	NNW34	NNW35	NNW37	NNW38	NNW34	NW30.9	NNW38																							
29-Oct	NNW31	NNW28	NNW30	NNW33	NNW33	NNW32	N34	N34	N35	N31	N27	N28	N28	NNW28	NNE27	NNE21	NNE19	NE15	NE11	N7	NNW7	WNW6	NW12	WNW9	N21.9	N35																							
30-Oct	W7	SW6	WSW7	WSW9	WSW12	W15	WSW9	W15	W17	W11	WSW10	SW9	S6	SSE4	W5	WSW4	WNW6	WNW8	NW11	NNW10	NNW9	NNW10	NW4	SSW2	W6.7	W17																							
31-Oct	E2	WSW3	SW4	SW5	SSW6	SSW7	SSW5	S5	SSE7	SSE7	SSE6	ESE7	ESE8	E8	E10	E11	E11	ENE13	ENE14	ENE15	ENE13	NE14	NE14	NNE16	E5.2	NNE16																							
NW10.7																								NW10.7	WNW11	WNW11	NW11.4	NW11.1	NW11.4	NW11.1	NW10.6	NW10.4	NW9.8	NW9.5	NW9.4	NW10.8	NW10.7	NW9.7	NW9.1	NW8.0	NW7.6	NW9.0	NW10.3	NW10.3	NW10.4	NW10.1	NW10.2	Diurnal Average	
NW39																								NW41	NW40	NW45	NW44	NW39	NNE36	NNE35	N35	N32	NW36	NW38	NW44	NW39	NNW35	NNW31	N30	NNW32	NNW35	NNW34	NNW35	NNE38	NNE39	NNE39	Diurnal Maximum		

All monthly, daily, and diurnal averages have been calculated using vector methods





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h  
Surmont - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	46	6.18	6.18
6 - 11	195	26.21	32.39
12 - 19	263	35.35	67.74
20 - 28	159	21.37	89.11
29 - 38	71	9.54	98.66
> 38	10	1.34	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Wind Speed (WS) - km/h  
Surmont - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 5	2	1	1	1	4	2	2	3	8	8	7	4	2	0	1	0	46
6 - 11	3	1	9	4	4	2	5	19	20	23	33	25	22	12	8	5	195
12 - 19	6	9	21	4	0	0	1	6	1	9	19	23	57	37	46	24	263
20 - 28	12	32	0	0	0	0	0	0	0	0	0	0	22	27	16	50	159
29 - 38	15	10	0	0	0	0	0	0	0	0	0	0	7	9	11	19	71
> 38	0	2	0	0	0	0	0	0	0	0	0	0	0	0	8	0	10
<b>Totals</b>	<b>38</b>	<b>55</b>	<b>31</b>	<b>9</b>	<b>8</b>	<b>4</b>	<b>8</b>	<b>28</b>	<b>29</b>	<b>40</b>	<b>59</b>	<b>52</b>	<b>110</b>	<b>85</b>	<b>90</b>	<b>98</b>	<b>744</b>

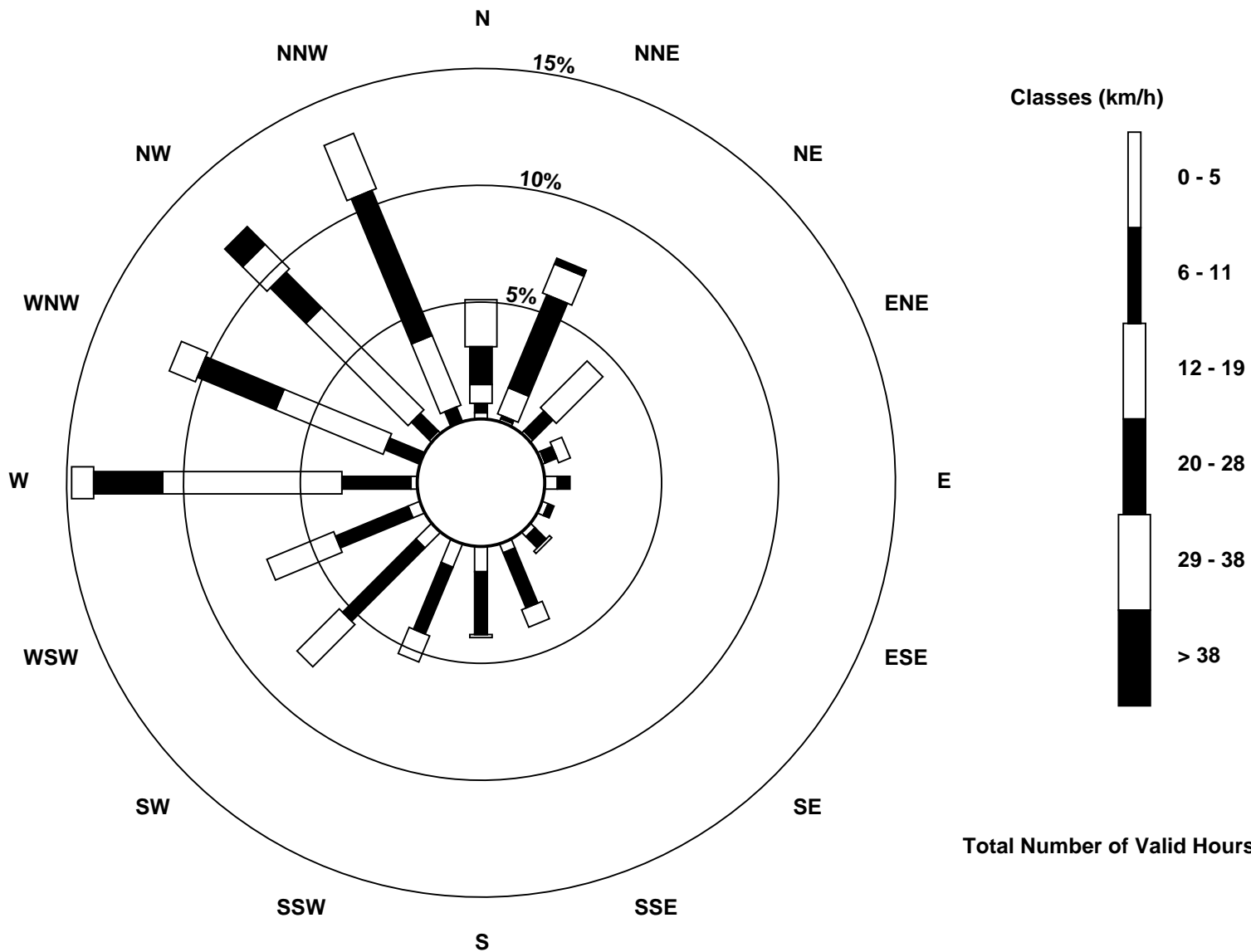
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed (WS) - km/h  
Surmont (AMS 24)







**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Speed (WS) - km/h**  
**Surmont - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Oct 18 04:00 Minimum Value: 1 km/h on Oct 31 03:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 5 P <sub>90</sub> = 7 P <sub>99</sub> = 9																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	4	5	5	5	6	6	6	6	5	5	5	4	5	5	5	6	7	7	7	8	8	8	8	9	9
2-Oct	7	7	7	8	8	7	7	7	9	8	8	8	8	7	7	7	6	6	3	3	3	3	3	3	9
3-Oct	1	1	1	2	2	2	2	2	4	4	5	5	6	4	5	5	4	5	6	5	4	3	4	4	6
4-Oct	3	3	3	2	3	3	3	3	4	3	4	3	2	2	3	2	1	2	1	2	2	1	2	3	4
5-Oct	3	3	3	3	3	3	3	3	4	4	4	3	5	5	5	5	5	4	3	4	3	3	3	5	
6-Oct	3	4	4	4	3	4	5	4	4	4	7	6	6	7	7	7	5	3	2	2	4	3	3	7	
7-Oct	3	3	5	5	4	4	3	5	5	6	6	5	3	4	5	3	4	5	6	5	6	7	5	7	
8-Oct	6	6	6	6	6	5	6	5	5	6	5	5	5	5	5	5	4	3	3	3	4	3	4	6	
9-Oct	1	2	2	2	3	3	3	3	3	3	3	3	5	5	5	4	6	2	3	4	3	2	2	6	
10-Oct	3	3	2	2	3	2	2	2	2	3	3	2	3	3	4	3	2	2	3	3	2	2	2	4	
11-Oct	2	3	3	3	3	3	3	3	4	4	4	4	5	4	4	5	5	5	5	5	5	5	5	5	5
12-Oct	5	5	5	5	5	5	5	4	5	4	5	4	4	5	4	3	3	2	2	3	2	3	3	5	
13-Oct	3	4	1	1	1	1	2	1	1	2	2	2	3	3	3	3	2	2	3	3	3	2	2	4	
14-Oct	2	2	2	1	1	2	2	2	2	3	3	4	4	5	3	3	3	3	4	3	4	5	5	5	
15-Oct	2	2	2	2	2	2	2	2	1	2	3	3	4	4	3	3	3	3	3	4	3	4	4	5	
16-Oct	5	5	5	5	5	4	4	4	5	4	4	3	4	4	3	4	3	2	5	5	5	2	1	5	
17-Oct	1	2	2	2	1	2	2	1	1	1	2	2	2	1	2	2	5	6	4	7	7	8	9	9	
18-Oct	8	9	8	10	9	9	8	7	7	6	4	5	6	4	3	2	1	1	1	2	2	2	3	10	
19-Oct	3	3	3	4	2	3	2	2	2	2	2	2	3	3	3	2	2	1	1	2	2	1	1	4	
20-Oct	1	1	1	1	1	2	2	2	2	2	3	2	2	1	2	2	2	2	2	2	2	3	3	3	
21-Oct	4	3	3	3	3	3	3	2	2	2	3	4	4	4	4	3	3	2	4	2	4	2	1	4	
22-Oct	1	2	1	1	1	1	1	1	1	3	3	2	2	2	2	1	1	1	1	3	3	3	3	3	
23-Oct	3	3	3	3	3	4	5	6	5	5	5	5	5	5	4	5	3	2	3	3	3	2	3	6	
24-Oct	4	4	4	5	5	7	5	6	6	5	8	10	10	9	8	7	6	5	5	4	3	4	2	10	
25-Oct	2	2	2	2	2	2	3	3	3	3	4	4	4	5	5	5	5	6	5	4	4	3	2	6	
26-Oct	2	2	2	2	3	3	3	4	4	5	5	5	5	4	4	3	3	5	5	4	3	3	3	5	
27-Oct	3	2	2	4	1	2	2	2	2	2	2	2	2	3	2	2	2	3	3	3	2	2	7	7	
28-Oct	6	5	6	5	6	5	5	4	5	6	8	8	8	8	8	7	7	7	7	8	8	8	7	8	
29-Oct	7	7	7	8	7	7	8	8	10	8	7	7	6	6	6	4	4	3	2	2	2	1	3	10	
30-Oct	1	1	1	2	3	4	3	4	4	3	2	2	1	1	1	2	2	2	2	3	3	2	1	4	
31-Oct	1	2	1	1	1	1	1	1	2	1	1	1	2	2	2	2	2	3	3	3	3	3	3	3	
Diurnal Maximum																									



**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Wind Direction (WD) - deg**  
**Surmont - October 2017**

Direction of Maximum Speed: 311 deg on Oct 18 04:00		Hours in Service: 744
Direction of Maximum Daily Speed Average: 312.0 deg on Oct 28		Hours of Data: 744
Direction of Minimum Speed: 252 deg on Oct 17 11:00	Direction of Minimum Daily Speed Average: 1.6 deg on Oct 20	Hours of Missing Data: 0
Monthly Average Direction: 289.4 deg		Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	336	334	336	337	320	324	320	331	337	339	338	339	337	339	343	352	349	347	349	352	6	14	13	16	346.0
2-Oct	16	18	16	14	10	14	17	13	10	11	10	13	11	6	1	351	354	4	334	333	334	336	328	323	4.6
3-Oct	290	296	284	269	269	258	247	224	229	249	240	240	236	238	232	243	251	247	268	278	284	290	309	313	264.6
4-Oct	307	311	315	310	319	336	343	359	352	360	6	29	39	84	115	89	125	187	195	211	207	224	228	249	322.2
5-Oct	265	266	269	272	269	271	273	272	271	275	265	263	264	259	252	251	253	236	243	260	265	273	269	270	264.6
6-Oct	269	264	270	274	270	279	274	276	282	274	272	279	289	292	286	284	290	289	261	265	278	279	276	278	278.4
7-Oct	277	278	282	288	287	282	290	325	338	3	352	350	336	336	320	315	328	353	348	342	343	347	343	339	323.9
8-Oct	335	338	335	332	331	330	331	336	338	340	336	329	330	325	327	329	333	324	309	306	307	293	286	223	328.6
9-Oct	216	218	223	217	213	208	204	206	215	214	215	214	262	279	293	292	298	293	277	270	292	278	255	265	251.4
10-Oct	269	272	282	280	297	304	302	308	310	330	339	356	338	339	355	37	38	44	44	45	53	46	45	48	341.8
11-Oct	43	37	37	38	36	37	39	38	39	33	33	29	24	22	21	20	20	18	19	19	19	19	18	19	26.6
12-Oct	20	17	14	18	20	18	358	344	348	344	342	341	344	344	338	335	328	321	321	324	321	330	325	4	351.7
13-Oct	346	304	288	298	301	298	289	287	285	287	286	282	280	259	247	236	229	227	256	263	261	259	262	276.8	
14-Oct	263	261	245	237	215	221	225	220	211	218	233	244	259	269	270	270	273	270	281	300	315	327	335	326	271.4
15-Oct	296	288	289	281	278	260	251	232	215	216	227	216	212	217	212	207	212	221	233	263	255	248	257	267	245.6
16-Oct	272	278	280	288	293	300	291	280	287	288	290	277	266	259	261	254	254	247	260	267	264	262	240	209	276.6
17-Oct	215	205	212	202	202	238	246	249	240	254	252	131	74	68	58	54	20	10	332	325	333	332	322	317	320.0
18-Oct	308	310	306	311	309	312	317	318	320	313	309	299	308	307	310	273	220	164	152	161	158	162	150	148	306.2
19-Oct	141	147	152	155	160	160	174	185	197	210	196	182	173	171	165	182	181	172	180	161	175	182	202	197	170.3
20-Oct	207	200	197	194	193	159	152	141	138	154	154	129	101	103	63	355	353	301	312	307	306	320	321	323	287.6
21-Oct	320	315	313	310	312	302	296	293	285	298	307	317	314	306	292	287	280	273	271	269	276	263	247	199	296.6
22-Oct	229	207	216	160	185	182	173	188	151	166	176	153	151	125	184	126	188	217	264	288	296	311	327	311	225.9
23-Oct	294	299	299	311	321	317	318	338	329	325	310	322	315	303	289	289	276	272	269	267	250	242	219	233	300.0
24-Oct	229	217	204	218	243	267	275	289	298	310	320	313	311	326	334	330	338	348	347	20	19	31	29	28	313.4
25-Oct	45	50	56	53	59	56	52	42	33	25	26	23	20	21	19	18	18	20	23	22	355	339	333	313	23.5
26-Oct	279	266	242	245	231	234	231	226	228	226	228	224	233	235	222	239	247	264	279	283	287	288	298	313	254.5
27-Oct	311	305	311	304	225	274	263	231	214	227	206	175	164	171	170	184	186	204	197	200	179	171	187	272	225.7
28-Oct	275	275	277	285	300	302	295	295	302	304	310	310	328	322	318	322	324	327	327	334	342	336	336	335	312.0
29-Oct	333	337	336	334	336	341	352	5	360	2	5	9	354	348	12	25	26	35	45	7	330	293	306	299	353.0
30-Oct	265	231	247	254	257	268	250	263	269	260	244	227	181	168	269	254	285	286	321	348	346	347	325	201	269.7
31-Oct	84	244	227	220	199	199	200	191	160	161	148	113	103	92	95	89	81	74	68	66	69	52	41	28	89.8

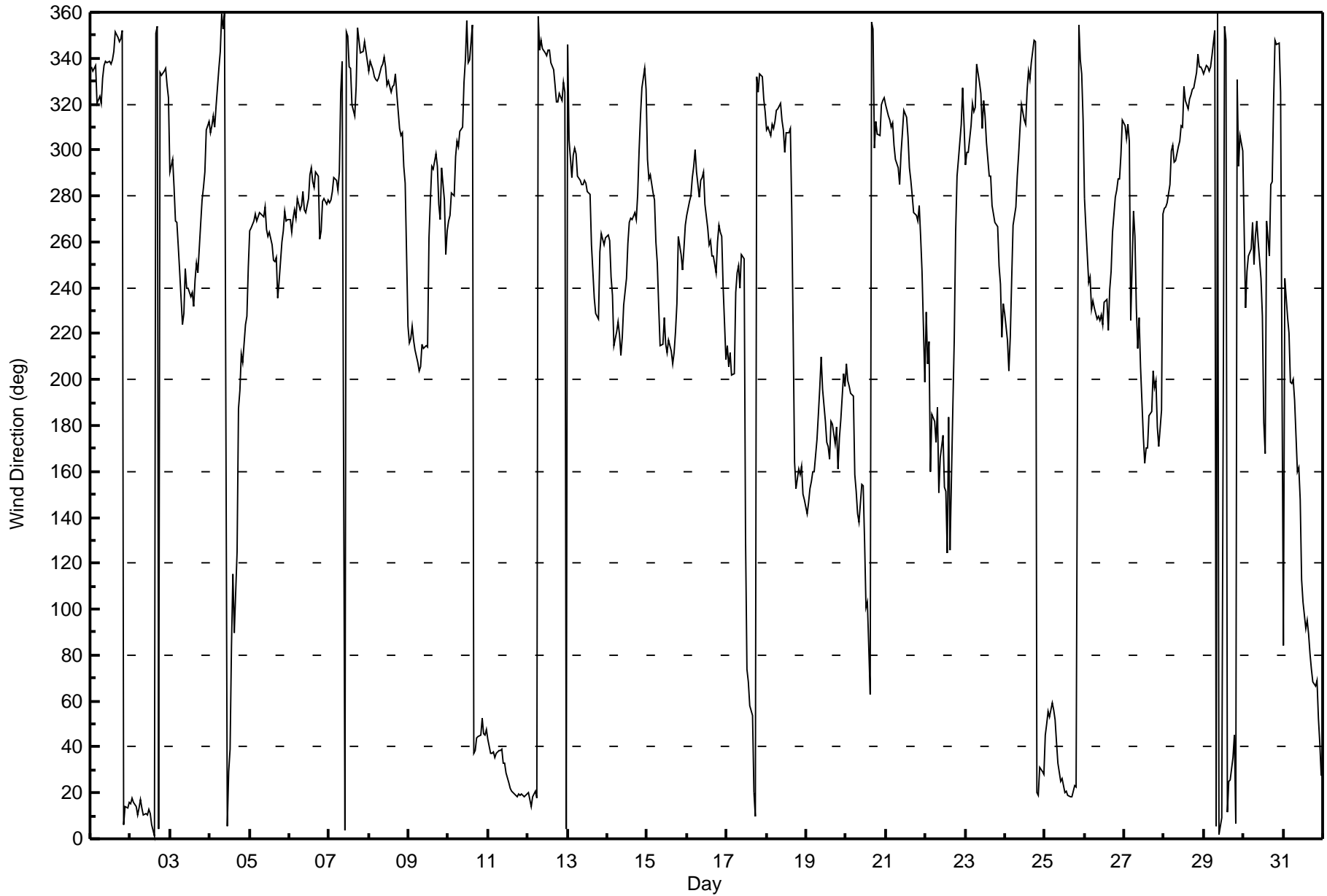
306.1 302.5 301.4 303.5 305.3 306.7 304.8 310.5 312.4 313.5 313.6 314.9 316.4 317.0 318.2 318.7 321.5 323.3 314.5 314.7 319.2 323.8 322.5 317.1  
 Diurnal Average

All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Surmont - October 2017**





**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Direction (WD) - deg**  
**Surmont - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 89 deg on Oct 17 11:00 Minimum Value: 6 deg on Oct 3 03:00 Percentiles: P <sub>1</sub> = 7 P <sub>10</sub> = 10 Q <sub>1</sub> = 12 Median = 14 Q <sub>3</sub> = 18 P <sub>90</sub> = 22 P <sub>99</sub> = 47																	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	10	13	11	13	14	13	13	13	11	12	12	12	11	12	13	17	15	13	13	17	19	16	16	16	19
2-Oct	16	16	16	17	18	17	15	17	18	18	20	18	20	20	21	18	18	22	13	9	9	9	12	12	22
3-Oct	7	8	6	15	14	11	13	19	23	21	23	26	24	24	21	21	20	22	17	10	9	8	11	10	26
4-Oct	10	10	11	10	12	16	19	21	18	24	29	49	61	65	44	32	37	20	12	9	13	10	14	21	65
5-Oct	14	15	13	12	12	11	10	13	14	12	19	23	18	20	23	23	20	19	21	17	15	11	12	11	23
6-Oct	11	14	14	11	12	11	13	12	11	18	18	13	12	14	13	15	10	12	13	12	10	10	10	10	18
7-Oct	9	10	10	10	9	10	13	18	12	24	18	18	11	13	15	13	19	20	15	12	12	15	13	13	24
8-Oct	13	13	12	13	12	13	13	12	14	14	14	14	14	16	13	13	13	14	13	14	16	28	16	23	28
9-Oct	14	13	13	16	17	18	16	15	14	15	15	17	26	16	14	12	17	31	10	12	17	32	13	12	32
10-Oct	12	11	9	9	13	9	8	10	13	15	28	83	18	13	26	12	12	11	12	12	11	12	11	11	83
11-Oct	10	10	10	10	10	10	11	10	10	11	11	12	12	13	13	14	14	14	12	13	12	13	15	14	15
12-Oct	14	16	18	15	14	16	20	12	16	14	13	12	11	14	12	11	13	13	13	13	15	11	13	31	31
13-Oct	18	30	7	7	7	8	6	7	7	7	12	12	19	24	24	22	19	18	20	19	14	15	16	14	30
14-Oct	15	16	20	20	22	15	16	14	19	16	21	20	19	17	14	14	12	13	11	10	12	14	13	13	22
15-Oct	15	8	9	9	8	16	11	25	13	14	17	17	18	17	18	18	18	19	19	16	20	24	18	14	25
16-Oct	12	11	10	10	9	10	8	10	9	11	14	19	19	18	17	17	16	18	19	16	16	16	30	22	30
17-Oct	20	18	18	13	13	14	12	13	13	13	89	19	23	17	18	18	13	20	15	13	12	13	13	13	89
18-Oct	12	11	11	11	11	12	12	14	14	14	13	13	14	18	20	19	30	14	14	14	15	16	16	19	30
19-Oct	13	14	16	17	17	16	17	24	18	17	18	18	18	21	18	18	16	14	15	17	18	19	21	18	24
20-Oct	11	12	16	24	25	20	17	15	15	20	21	47	42	26	14	39	19	14	11	9	11	11	10	11	47
21-Oct	12	10	9	9	10	13	8	9	8	15	16	14	18	14	17	13	12	10	14	17	50	16	15	19	50
22-Oct	19	22	16	14	16	13	16	23	19	18	20	21	26	16	53	10	20	18	24	8	9	14	14	14	53
23-Oct	11	10	9	10	11	11	12	12	15	16	13	14	13	13	15	11	10	11	13	12	20	20	15	22	22
24-Oct	22	20	19	19	20	17	11	11	12	13	14	13	12	15	15	14	14	18	19	19	23	16	14	14	23
25-Oct	12	13	11	11	11	11	12	10	11	12	12	13	13	14	13	14	16	14	14	15	26	18	11	17	26
26-Oct	14	19	23	21	21	23	22	21	21	19	21	21	24	23	28	26	22	19	11	10	8	8	11	12	28
27-Oct	10	10	12	36	40	17	16	28	23	18	17	15	17	16	16	18	15	16	18	18	21	20	34	14	40
28-Oct	10	10	9	10	10	9	8	9	10	12	11	12	14	15	13	14	12	14	14	13	16	14	14	13	16
29-Oct	12	13	13	14	14	14	19	20	20	21	20	19	19	16	19	13	13	13	14	29	20	33	16	15	33
30-Oct	22	15	16	15	16	16	25	16	13	18	17	17	22	24	34	18	40	11	16	19	22	17	61	43	61
31-Oct	28	26	16	18	18	16	14	15	15	16	16	15	13	16	14	16	13	14	13	13	13	13	13	13	28
Diurnal Maximum																									





# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

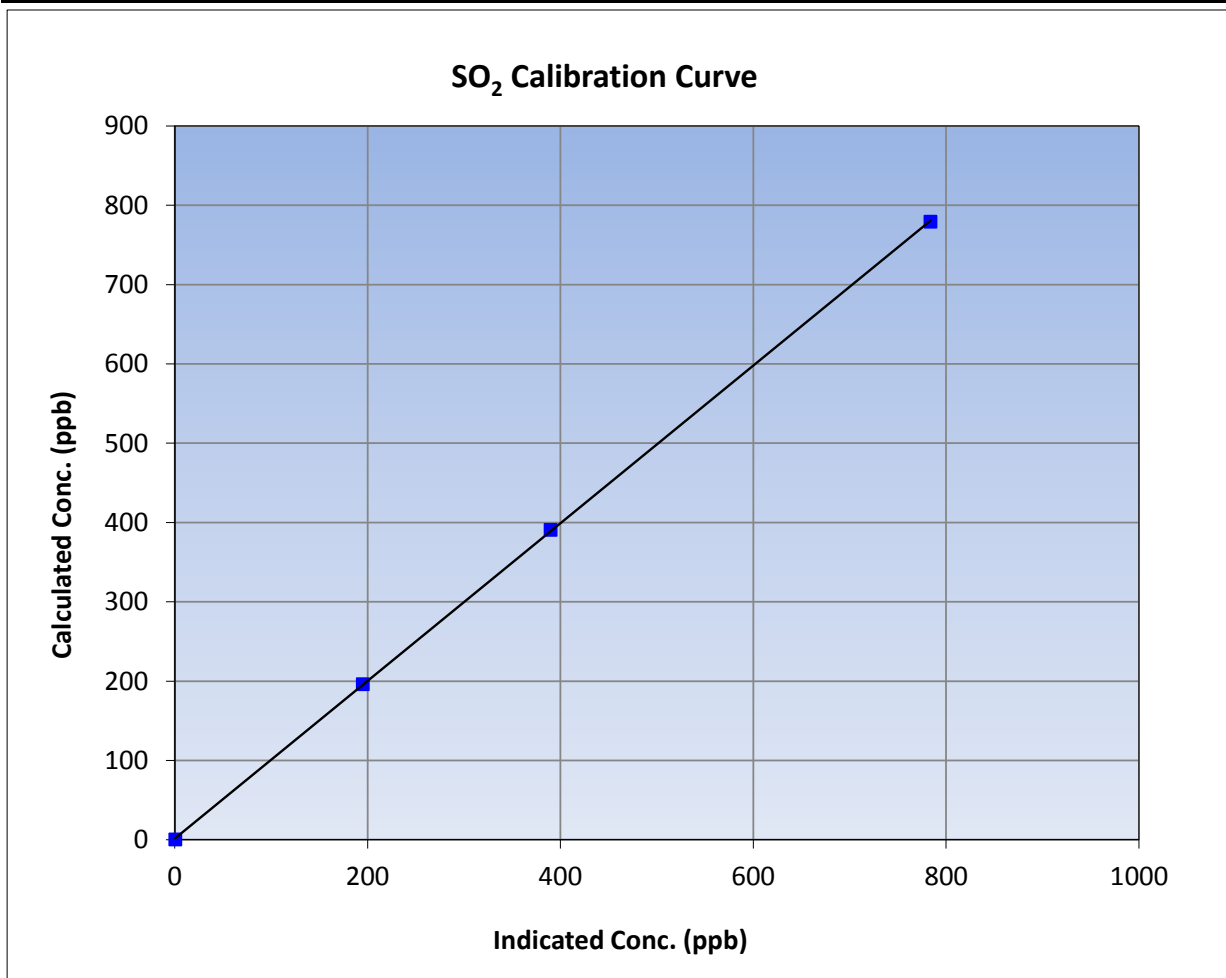
Version-03-2017

### Station Information

Calibration Date	October 25, 2017	Previous Calibration	September 7, 2017
Station Name	Surmont	Station Number	AMS 24
Start Time (MST)	9:15	End Time (MST)	15:13
Analyzer make	Thermo 43i	Analyzer serial #	1170050150

### Calibration Data

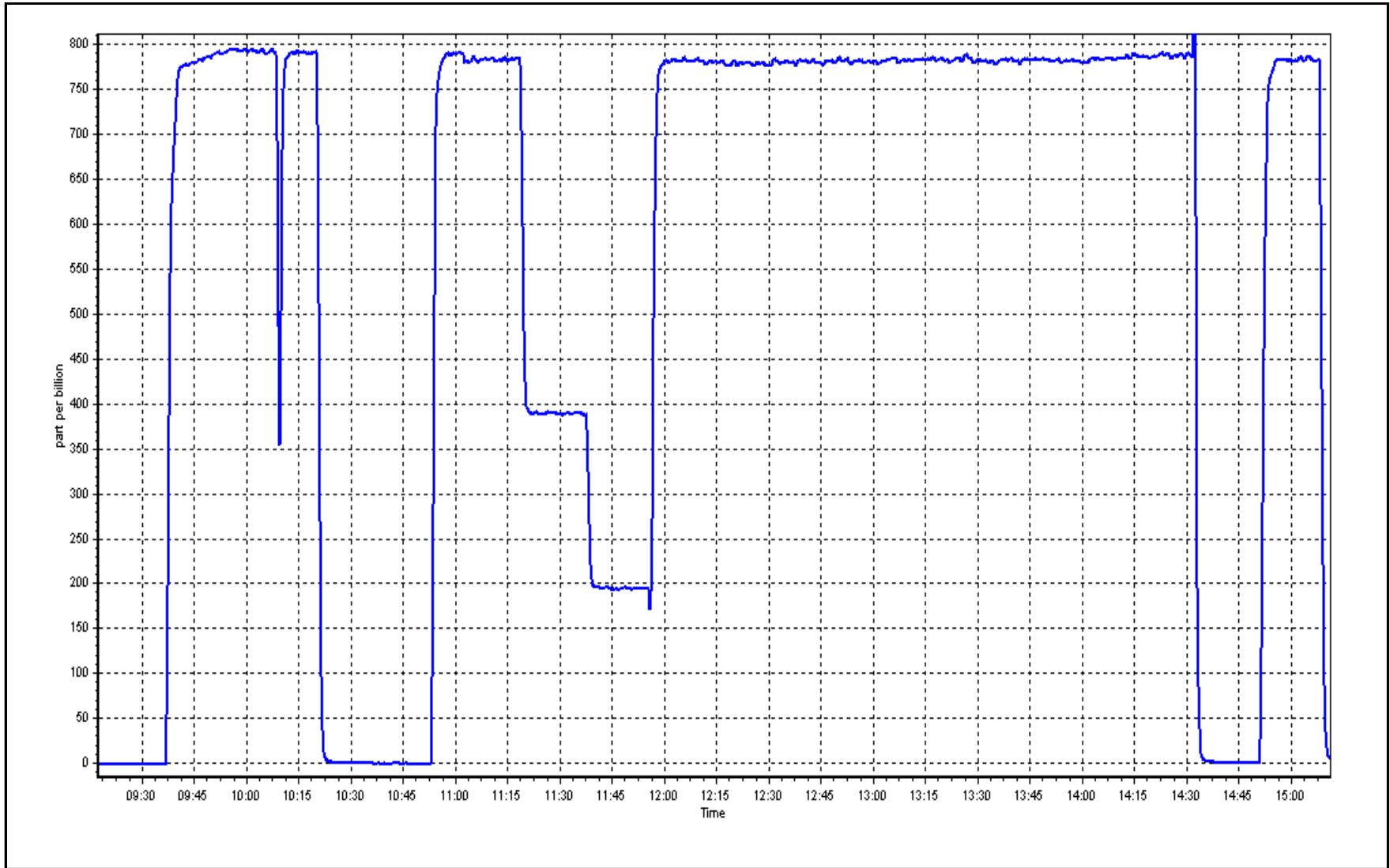
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.1	----	Correlation Coefficient	0.999977	≥0.995
779.1	783.4	0.9945	Slope	0.994053	0.90 - 1.10
390.3	389.4	1.0023	Intercept	1.446473	+/-30
195.8	194.6	1.0059			



SO2 Calibration Plot

Date: October 25, 2017

Location: Surmont





# Wood Buffalo Environmental Association

## H<sub>2</sub>S Calibration Report

Version-06-2017

### Station Information

Station Name:	Surmont	Station number:	AMS 24
Calibration Date:	October 11, 2017	Last Cal Date:	August 31, 2017
Start time (MST):	10:39	End time (MST):	13:04
Reason:	Routine		

### Calibration Standards

Cal Gas Concentration	<u>5.09</u>	ppm	Cal Gas Exp Date	February 28, 2020
Cal Gas Cylinder #	<u>LL65044</u>			
Calibrator Make/Model	API T700		Serial Number	3254
ZAG Make/Model	API T701H		Serial Number	268

### Analyzer Information

Analyzer make: Thermo 450i		Analyzer serial #: 1170050142		
	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>
Analyzer Range	0 - 100 ppb		PMT voltage	-628
Calculated slope	1.006974	1.014834	Lamp voltage	826
Calculated intercept	0.014777	-0.004646	Pressure	567.4
Analyzer Background	10.2	10.2	Flow	1.070
Analyzer Coefficient	0.933	0.916	Intensity	90

### H<sub>2</sub>S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	-0.2	----
as found span	4933	78.7	79.9	80.8	0.989
calibrator zero	5000	0.0	0.0	0.1	----
high point	4933	78.7	79.9	78.9	1.013
second point	4975	39.4	40.0	39.1	1.023
third point	4993	19.8	20.1	19.9	1.010
as left zero	5008	0.0	0.0	0.0	----
as left span	4934	78.7	79.9	76.7	1.042

SO<sub>2</sub> Scrubber Check

			Average Correction Factor	1.015
Corrected As found	81.00	Previous response	79.36	*% change -2.0%

*\* = > +/-5% change initiates investigation*

Notes:

Span adjusted.

Calibration Performed By: Aswin Sasi Kumar





# Wood Buffalo Environmental Association

## H<sub>2</sub>S Calibration Summary

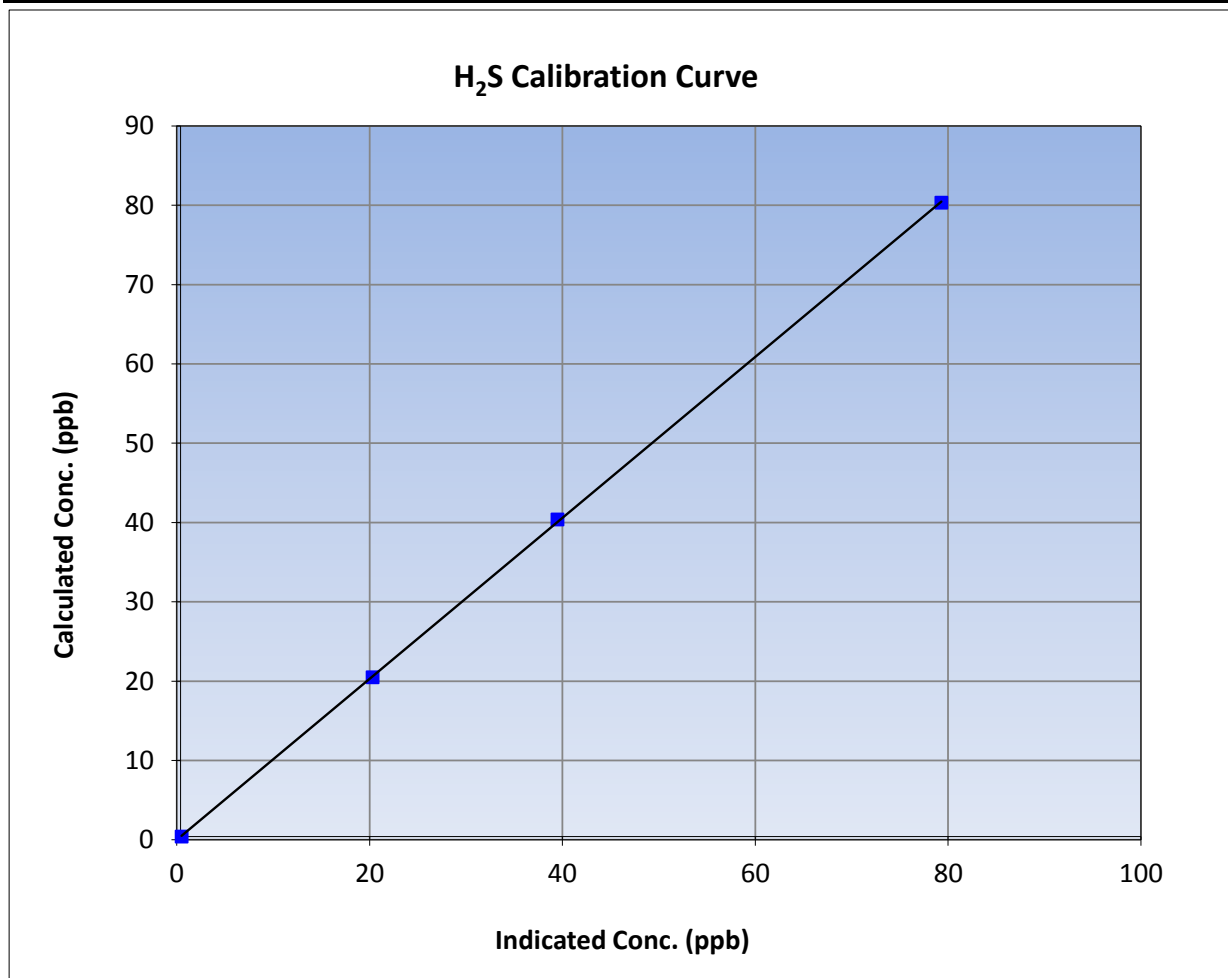
Version-03-2017

### Station Information

Calibration Date	October 11, 2017	Previous Calibration	August 31, 2017
Station Name	Surmont	Station Number	AMS 24
Start Time (MST)	10:39	End Time (MST)	13:04
Analyzer make	Thermo 450i	Analyzer serial #	1170050142

### Calibration Data

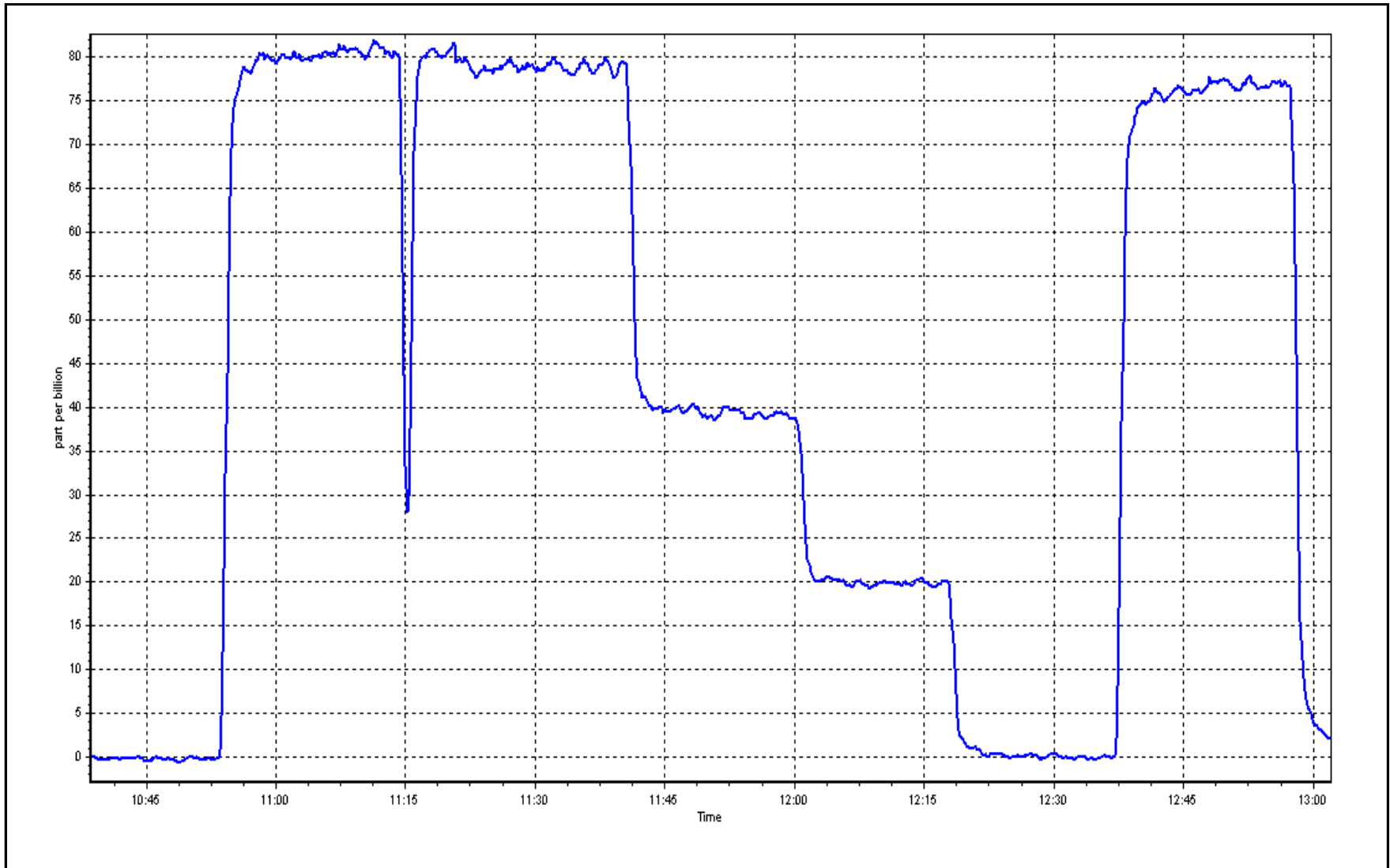
Calculated concentration (ppb) (Cc)	LL65044	Correction factor (Cc/lc)	Statistical Evaluation	Limits	
0.0	0.1	----	Correlation Coefficient	0.999961	
79.9	78.9	1.0130			≥0.995
40.0	39.1	1.0229	Slope	1.014834	
20.1	19.9	1.0103			0.90 - 1.10
			Intercept	-0.004646	+/-3



# H<sub>2</sub>S Calibration Plot

Date: October 11, 2017

Location: Surmont





# Wood Buffalo Environmental Association

## THC Calibration Report

Version-03-2017

### Station Information

Station Name:	Surmont	Station number:	AMS 24
Calibration Date:	October 25, 2017	Last Cal Date:	September 27, 2017
Start time (MST):	9:15	End time (MST):	15:13
Reason:	Routine		

### Calibration Standards

Gas Cert Reference	EY0000833	Cal Gas Expiry Date	February-22-20
CH4 Cal Gas Conc.	<u>506.0</u> ppm	CH4 Equiv Conc.	1056.0 ppm
C3H8 Cal Gas Conc.	<u>200.0</u> ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	1845
ZAG Make/Model	API T701H	Serial Number	268

### Analyzer Information

Analyzer make:	Thermo 51i-LT	Analyzer serial #:	913935796
	<u>Start</u>	<u>Finish</u>	<u>Start</u>
Analyzer Range	0 - 25 ppm	Bias voltage supply	-294
Calculated slope	1.008902	Sample pressure	9.6
Calculated intercept	0.010650	Fuel pressure	18.8
Analyzer Background	2.840	Air pressure	35.7
Analyzer Coefficient	5.232	Flame temperature	156.7

### THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.00	-0.02	----
as found span	4933	78.4	16.52	16.50	1.001
calibrator zero	4900	0.0	0.00	0.02	----
high point	4933	78.4	16.52	16.54	0.999
second point	4975	39.2	8.26	8.22	1.005
third point	4995	19.7	4.15	4.18	0.992
as left zero	5000	0.0	0.00	0.04	----
as left span	3842	62.7	16.96	16.38	1.035
Average Correction Factor					0.999
Corrected As found	16.52	Previous response	16.36	*% change	-0.9%

\* = > +/-5% change initiates investigation

Notes:

Adjusted both zero and span.

Calibration Performed By: Aswin Sasi Kumar



# Wood Buffalo Environmental Association

## THC Calibration Summary

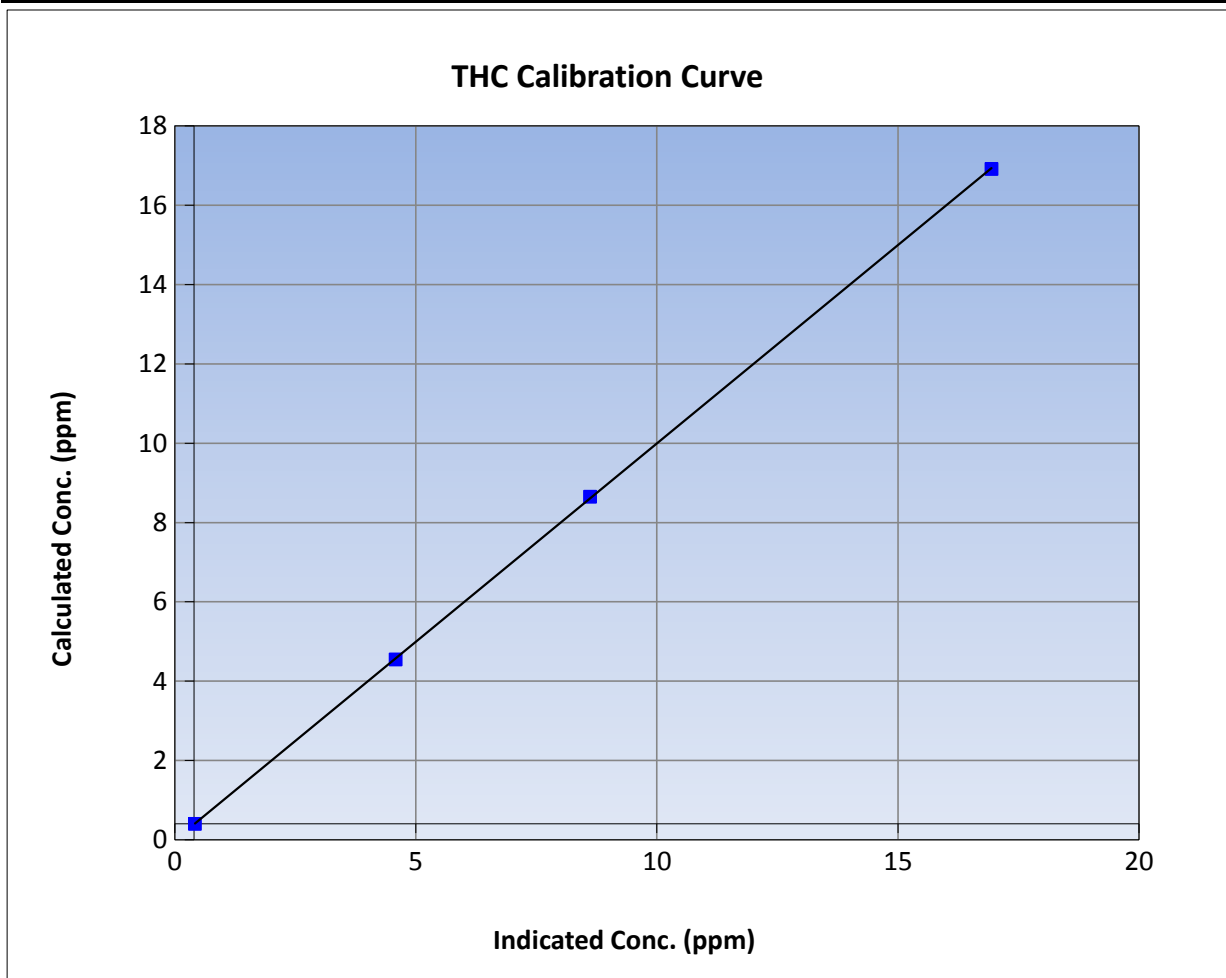
Version-03-2017

### Station Information

Calibration Date	October 25, 2017	Previous Calibration	September 27, 2017
Station Name	Surmont	Station Number	AMS 24
Start Time (MST)	9:15	End Time (MST)	15:13
Analyzer make	Thermo 51i-LT	Analyzer serial #	913935796

### Calibration Data

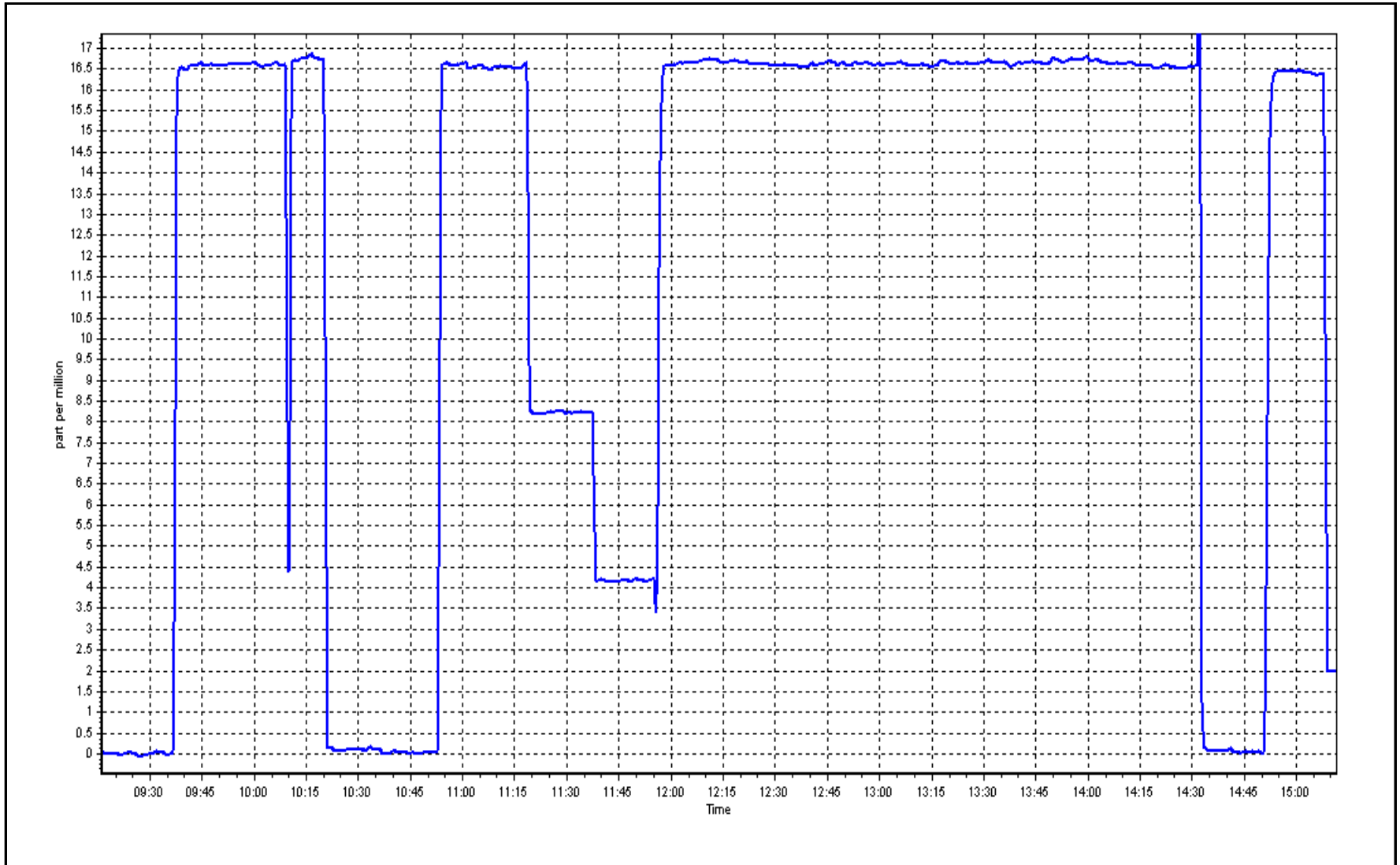
Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (lc)	Correction factor (Cc/lc)	Statistical Evaluation	Limits	
0.0	0.0	----	Correlation Coefficient	0.999979	≥0.995
16.5	16.5	0.9988			
8.3	8.2	1.0049	Slope	1.000660	0.90 - 1.10
4.1	4.2	0.9925			
			Intercept	-0.012417	+/-1.5



THC Calibration Plot

Date: October 25, 2017

Location: Surmont





# Wood Buffalo Environmental Association

## NO<sub>x</sub> - NO - NO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Surmont	Station number:	AMS 24
Calibration Date:	October 25, 2017	Last Cal Date:	September 7, 2017
Start time (MST):	9:15	End time (MST):	15:13
Reason:	Routine		

### Calibration Standards

NO Gas Cylinder #	EY0000833	Cal Gas Expiry Date	February-22-20
NOX Cal Gas Conc.	<u>51.1</u> ppb	NO Cal Gas Conc.	<u>51.1</u> ppb
Calibrator Model	API T700	Serial Number	1845
ZAG make/model	API T701H	Serial Number	268

### Analyzer Information

Analyzer make: Thermo 42i			Analyzer serial #: 1170050148		
	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coefficient	1.101	1.062	NOX Range (ppb)	0 - 1000 ppb	
NOX coefficient	0.995	0.996	PMT Temperature	-3.1	-3.0
NO2 coefficient	1.000	1.000	Reaction cell Press	159.0	159.6
NO bkgrnd	1.5	1.4	Sample Flow	0.876	0.876
NOX bkgrnd	1.4	1.3	PMT Voltage	-794.8	-794.8

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope	0.994560	0.997991
NO <sub>x</sub> Cal Offset	0.448694	0.359280
NO Cal Slope	0.992485	0.995341
NO Cal Offset	1.156187	1.295408
NO <sub>2</sub> Cal Slope	0.998914	1.000194
NO <sub>2</sub> Cal Offset	-0.808524	-0.153021



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

Version-03-2017

### Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	4900	0.0	0.0	0.0	0.0	-0.2	-0.4	0.1	----	----
as found span	4934	78.4	799.3	799.3	0.0	828.7	830.0	-1.2	0.9645	0.9630
calibrator zero	4900	0.0	0.0	0.0	0.0	-0.2	-0.3	0.1	----	----
high point	4934	78.4	799.3	799.3	0.0	800.8	802.5	-1.7	0.9981	0.9960
second point	4976	39.3	400.4	400.4	0.0	400.2	399.6	0.6	1.0006	1.0021
third point	4992	19.7	200.9	200.9	0.0	201.1	200.1	0.9	0.9988	1.0038
as left zero	5000	0.0	0.0	0.0	0.0	0.0	-0.2	0.2	----	----
as left span	3841	62.7	820.8	277.6	543.2	798.6	265.9	532.7	1.0277	1.0440
Average Correction Factor									0.9992	1.0006

Corrected As found NO<sub>x</sub> = 828.9 ppb  
 Previous Response NO<sub>x</sub> = 803.2 ppb

NO = 830.4 ppb  
 NO = 804.2 ppb

\*Percent Change NO<sub>x</sub> = -3%  
 \*Percent Change NO = -3%  
 \* = > +/-5% change initiates investigation

### GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
1st NO ref point		0.0	798.1	797.1	1.0	1.0015	1.0027	----	----
1st NO2 (400 ppb O3)	277.6	519.5	797.3	277.6	519.6	1.0025	----	0.9998	100.0%
2nd NO2 (200 ppb O3)	536.4	260.7	797.0	536.4	260.6	1.0028	----	1.0004	100.0%
3rd NO2 (100 ppb O3)	640.5	156.6	797.4	640.5	156.9	1.0023	----	0.9981	100.2%
2nd NO ref point	----	0.0	798.7	798.0	0.7	1.0007	1.0016	----	----
Average Correction Factor						1.0021	1.0022	0.9994	100.1%

Notes:

Span adjusted.

Calibration Performed By:

Aswin Sasi Kumar



# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

Version-03-2017

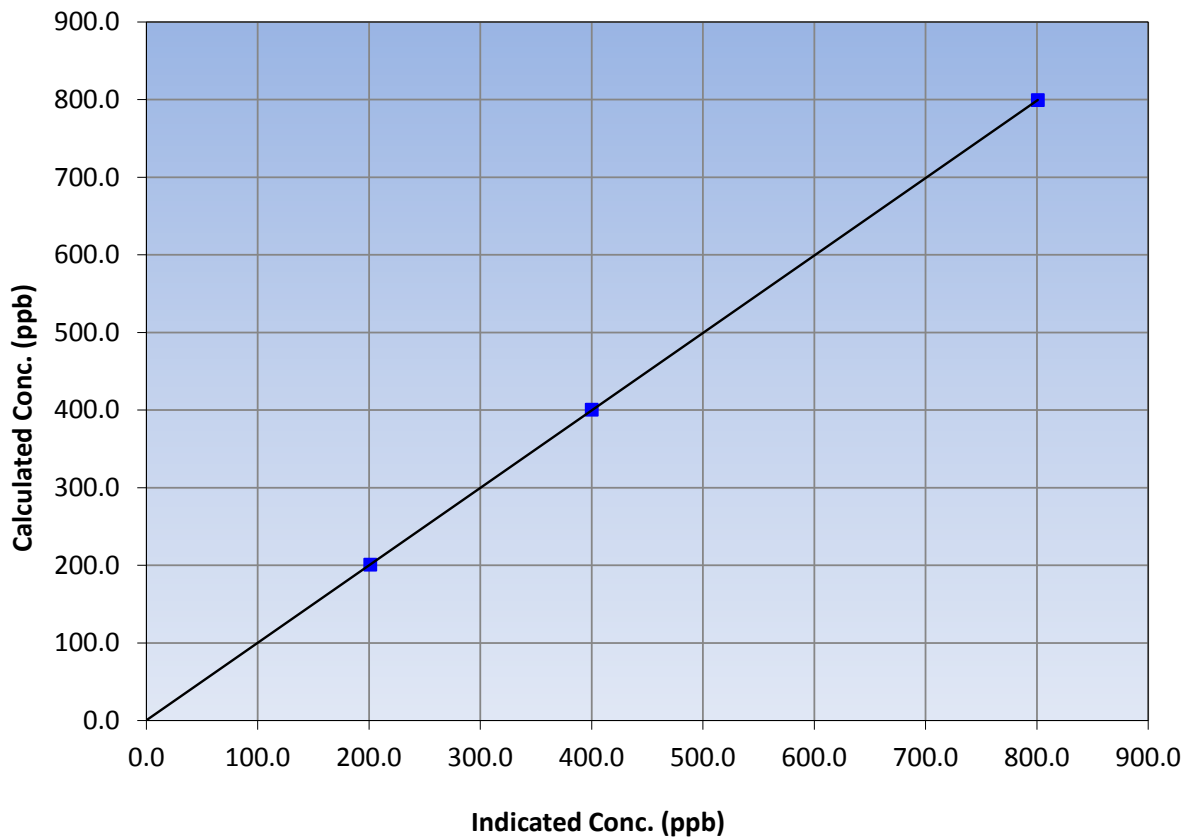
### Station Information

Calibration Date	October 25, 2017	Previous Calibration	September 7, 2017
Station Name	Surmont	Station Number	AMS 24
Start Time (MST)	9:15	End Time (MST)	15:13
Analyzer make	Thermo 42i	Analyzer serial #	1170050148

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	-0.2	----	Correlation Coefficient	≥0.995	
799.3	800.8	0.9981			
400.4	400.2	1.0006			
200.9	201.1	0.9988			
			Slope	0.997991	0.90 - 1.10
			Intercept	0.359280	+/-20

NO<sub>x</sub> Calibration Curve







# Wood Buffalo Environmental Association

## NO Calibration Summary

Version-03-2017

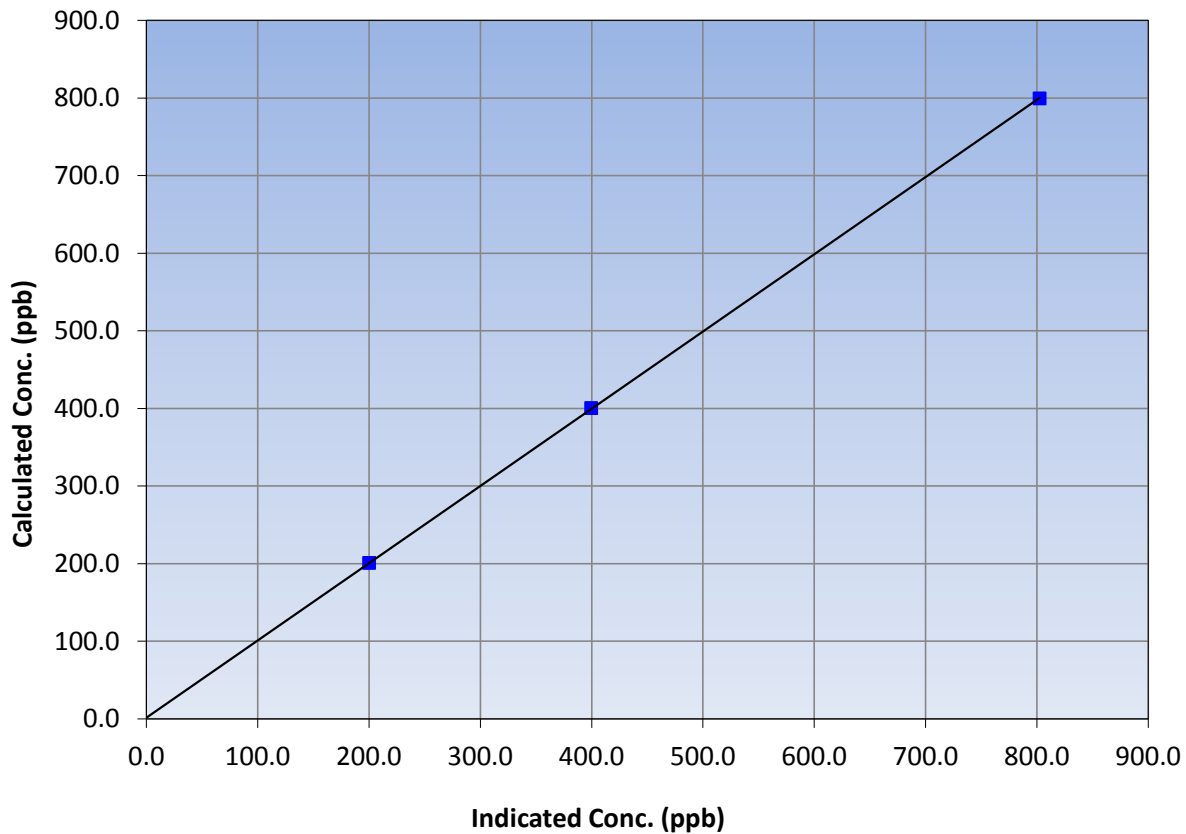
### Station Information

Calibration Date	October 25, 2017	Previous Calibration	September 7, 2017
Station Name	Surmont	Station Number	AMS 24
Start Time (MST)	9:15	End Time (MST)	15:13
Analyzer make	Thermo 42i	Analyzer serial #	1170050148

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	-0.3	----	Correlation Coefficient	≥0.995	
799.3	802.5	0.9960			
400.4	399.6	1.0021			
200.9	200.1	1.0038			
			Slope	0.995341	0.90 - 1.10
			Intercept	1.295408	+/-20

NO Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

Version-03-2017

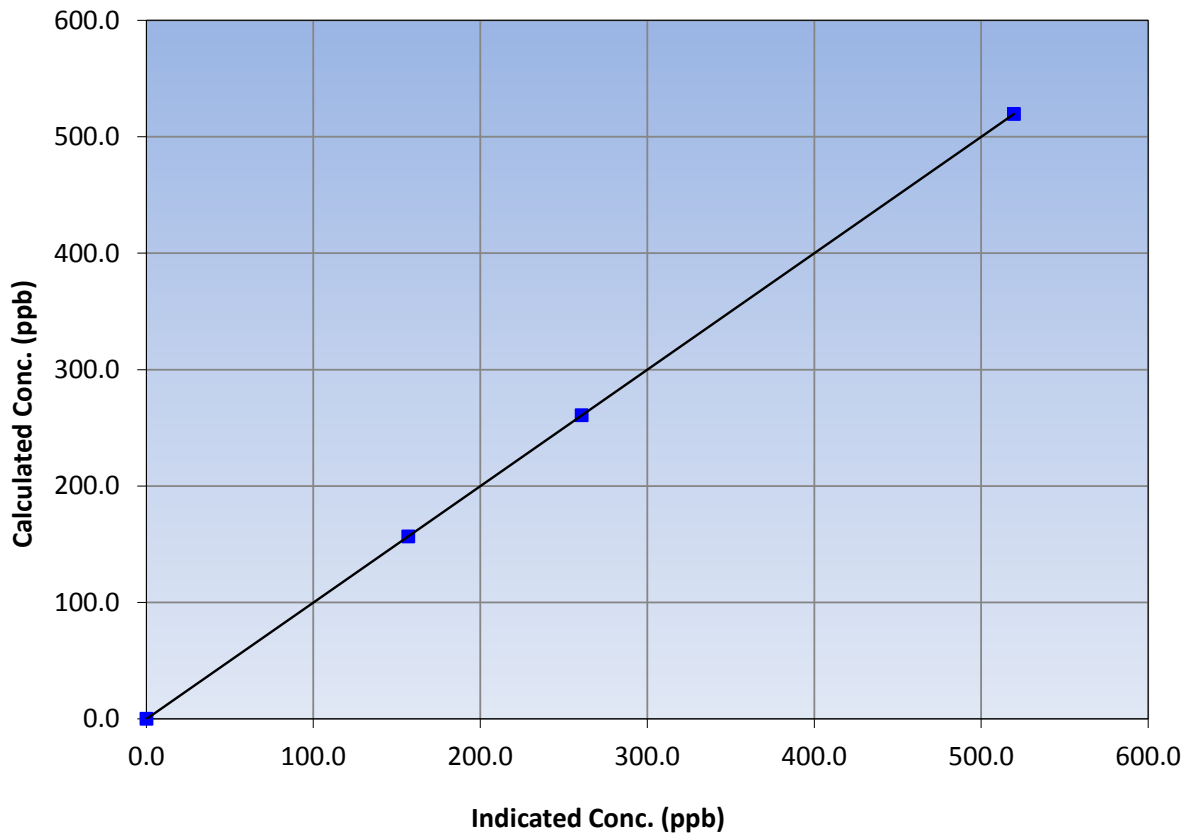
### Station Information

Calibration Date	October 25, 2017	Previous Calibration	September 7, 2017
Station Name	Surmont	Station Number	AMS 24
Start Time (MST)	9:15	End Time (MST)	15:13
Analyzer make	Thermo 42i	Analyzer serial #	1170050148

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.1	----	Correlation Coefficient	≥0.995	
519.5	519.6	0.9998			
260.7	260.6	1.0004			
156.6	156.9	0.9981			
			Slope	1.000194	0.90 - 1.10
			Intercept	-0.153021	+/-20

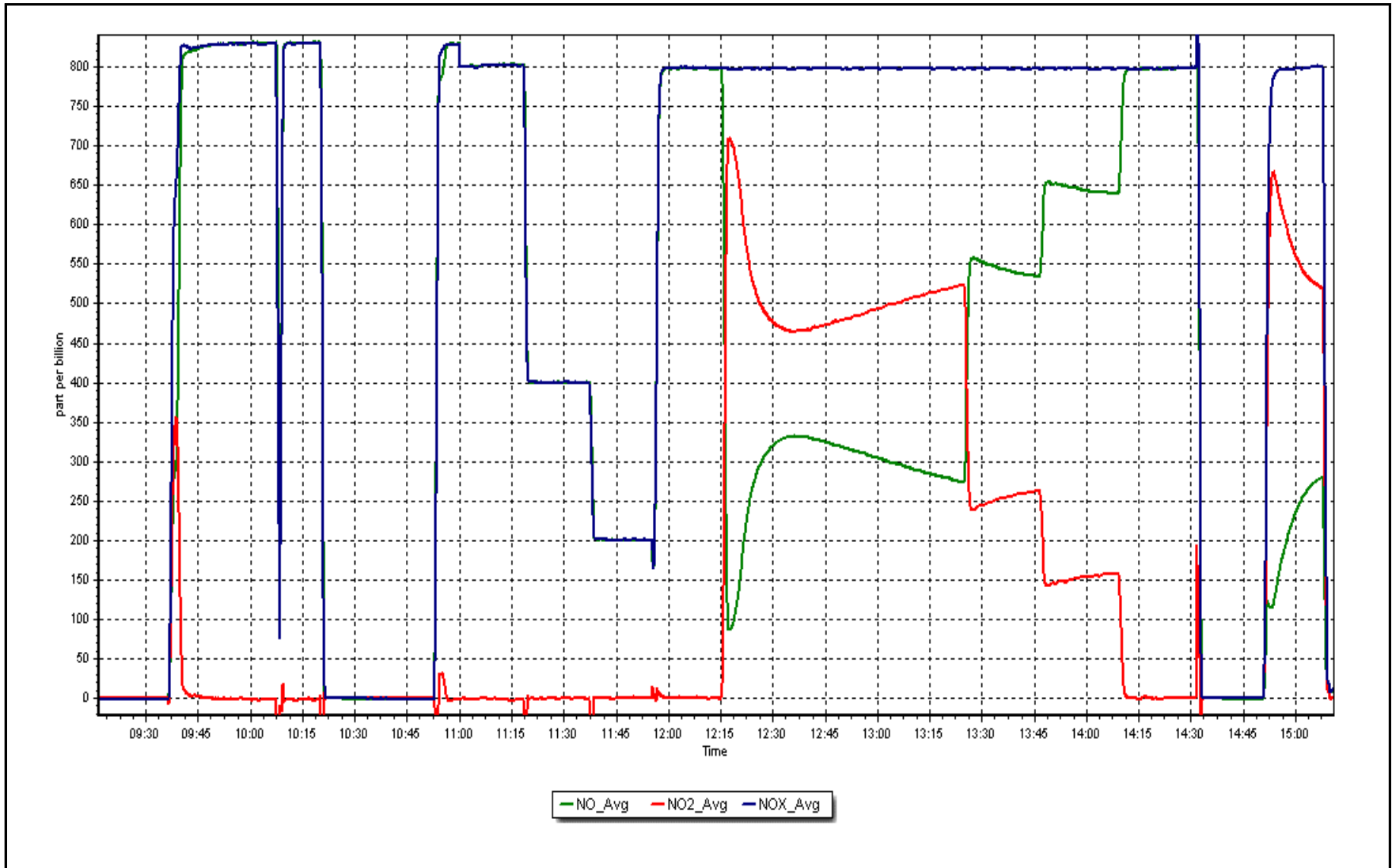
NO<sub>2</sub> Calibration Curve



NO<sub>x</sub> Calibration Plot

Date: October 25, 2017

Location: Surmont





## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 25**  
**WASKŌW OHCI PIMÂTISIWIN**  
**OCTOBER 2017**

Operations, Data Collection,  
QA/QC, Data Validation and Reporting by:  
Wood Buffalo Environmental Association  
Fort McMurray, Alberta

November 29, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WASKOW OHCI PIMATISIWIN (AMS 25)  
OCTOBER 2017

MONTHLY SUMMARY for  
AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	710	34	34	100	15	0	3	0
H2S(ppb) Average	708	36	36	100	1	0	1	0
Temperature 2 m (C) Average	744	0	0	100	27	-	15	-
Relative Humidity (%) Average	744	0	0	100	0	-	0	-
Wind Speed 10 m (km/h) Average	744	0	0	100	23.8	-	14.1	-
Wind Direction 10 m (deg) Average	744	0	0	100	-	-	-	-

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WASKOW OHCI PIMATISIWIN (AMS 25)  
 OCTOBER 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	710	0.8	1	-	0	0	0	0	1	1	15
H2S (ppb) Average	708	0.3	0	-	0	0	0	0	0	1	1
Wind Speed 10 m (km/h) Average	744	6.8	5	-	0	2	3	6	9	14	27
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	3.2	4.7	-	-5.9	-1.7	-0.3	2.1	5.6	9.2	23.8
Relative Humidity (%) Average	744	74.3	17	-	0	50	63	76	88	95	99

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WASKOW OHCI PIMATISIWIN (AMS 25)  
OCTOBER 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
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No operational issues to report



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb

Waskow ohci Pimatisiwin - October 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 15 ppb on Oct 21 16:00	Maximum Daily Average: 3.5 ppb on Oct 21		Hours of Data:	710
Minimum Value: 0 ppb on Oct 10 18:00	Minimum Daily Average: 0.2 ppb on Oct 11		Hours of Missing Data:	34
Maximum Diurnal Average: 1.4 ppb at hour 15	Minimum Diurnal Average: 0.4 ppb at hour 2		Hours of Calibration:	34
Monthly Average: 0.8 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 1 P <sub>99</sub> = 9		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.5	1
2-Oct	0	0	1	0	Z	1	1	1	0	0	0	0	0	0	1	1	1	1	0	0	1	0	0	0	0.5	1
3-Oct	1	0	0	0	0	Z	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
4-Oct	Z	0	0	1	0	0	1	1	1	0	1	0	0	0	1	3	9	7	3	2	2	1	1	3	1.7	9
5-Oct	2	Z	3	1	1	1	1	1	1	1	1	1	3	3	1	1	0	0	0	0	0	0	0	0	0.9	3
6-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
7-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
8-Oct	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
9-Oct	0	0	0	0	0	Z	1	1	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.6	2
10-Oct	Z	0	1	0	0	1	0	0	Z	1	1	0	0	C	C	C	0	0	0	0	0	0	0	0	0.3	1
11-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
12-Oct	0	0	Z	0	0	1	1	0	0	1	1	1	1	1	0	0	0	0	0	0	1	0	0	1	0.5	1
13-Oct	1	1	1	Z	1	1	0	0	0	1	1	0	1	1	0	0	1	0	1	1	1	1	1	1	0.6	1
14-Oct	1	1	0	1	Z	0	1	1	1	2	2	2	1	1	1	0	1	0	0	0	1	0	1	1	0.7	2
15-Oct	0	0	0	1	0	Z	1	1	2	2	3	3	1	1	1	1	1	1	1	1	1	1	0	1	1.0	3
16-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
17-Oct	0	Z	0	0	0	0	0	0	0	0	0	1	2	1	1	1	1	1	1	1	0	0	0	0	0.6	2
18-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.3	1
19-Oct	0	0	0	Z	0	0	0	1	1	3	3	2	4	9	13	8	2	1	1	1	1	1	1	1	2.3	13
20-Oct	1	0	0	0	Z	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.5	1
21-Oct	0	0	0	0	0	Z	0	0	0	0	0	1	3	10	12	15	13	8	4	3	3	3	2	2	3.5	15
22-Oct	Z	1	2	3	3	6	9	8	4	4	3	2	2	2	1	1	1	1	1	1	0	1	3	4	2.6	9
23-Oct	4	Z	1	1	0	1	1	1	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0.8	4
24-Oct	1	1	Z	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	0	0	0	1	1	0.7	1
25-Oct	1	1	1	Z	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.6	1
26-Oct	0	0	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0.4	1
27-Oct	0	0	0	0	0	Z	0	1	1	0	1	6	3	1	1	1	1	2	2	1	1	1	2	1	1.2	6
28-Oct	Z	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
29-Oct	0	Z	0	0	0	1	0	0	0	0	0	0	0	1	1	1	0	0	0	1	1	1	1	1	0.5	1
30-Oct	0	0	Z	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0.5	1
31-Oct	0	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
	0.6	0.4	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.8	0.8	1.0	1.2	1.4	1.3	1.2	0.9	0.7	0.5	0.5	0.5	0.6	0.7	Diurnal Average	
	4	1	3	3	3	6	9	8	4	4	3	6	4	10	13	15	13	8	4	3	3	3	3	4	Diurnal Maximum	

Z - zerospan C - Calibration

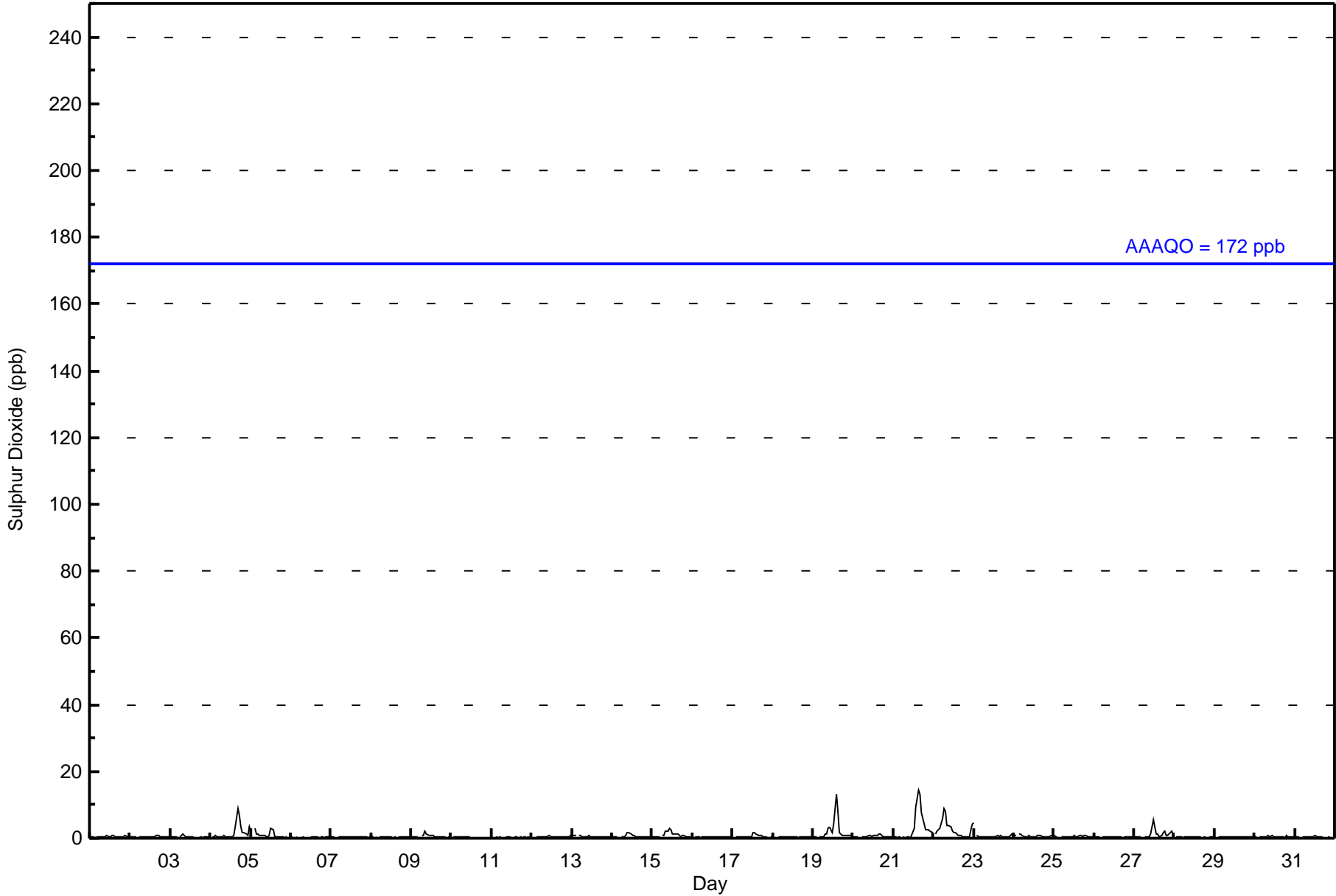
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb





**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Waskow ohci Pimatisiwin - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Waskow ohci Pimatisiwin - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	706	99.44	99.44
11 - 20	4	0.56	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Waskow ohci Pimatisiwin - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	71	24	7	11	5	6	30	101	63	27	40	33	63	63	85	77	706
11 - 20	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2	4
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	71	24	7	11	5	6	32	101	63	27	40	33	63	63	85	79	710

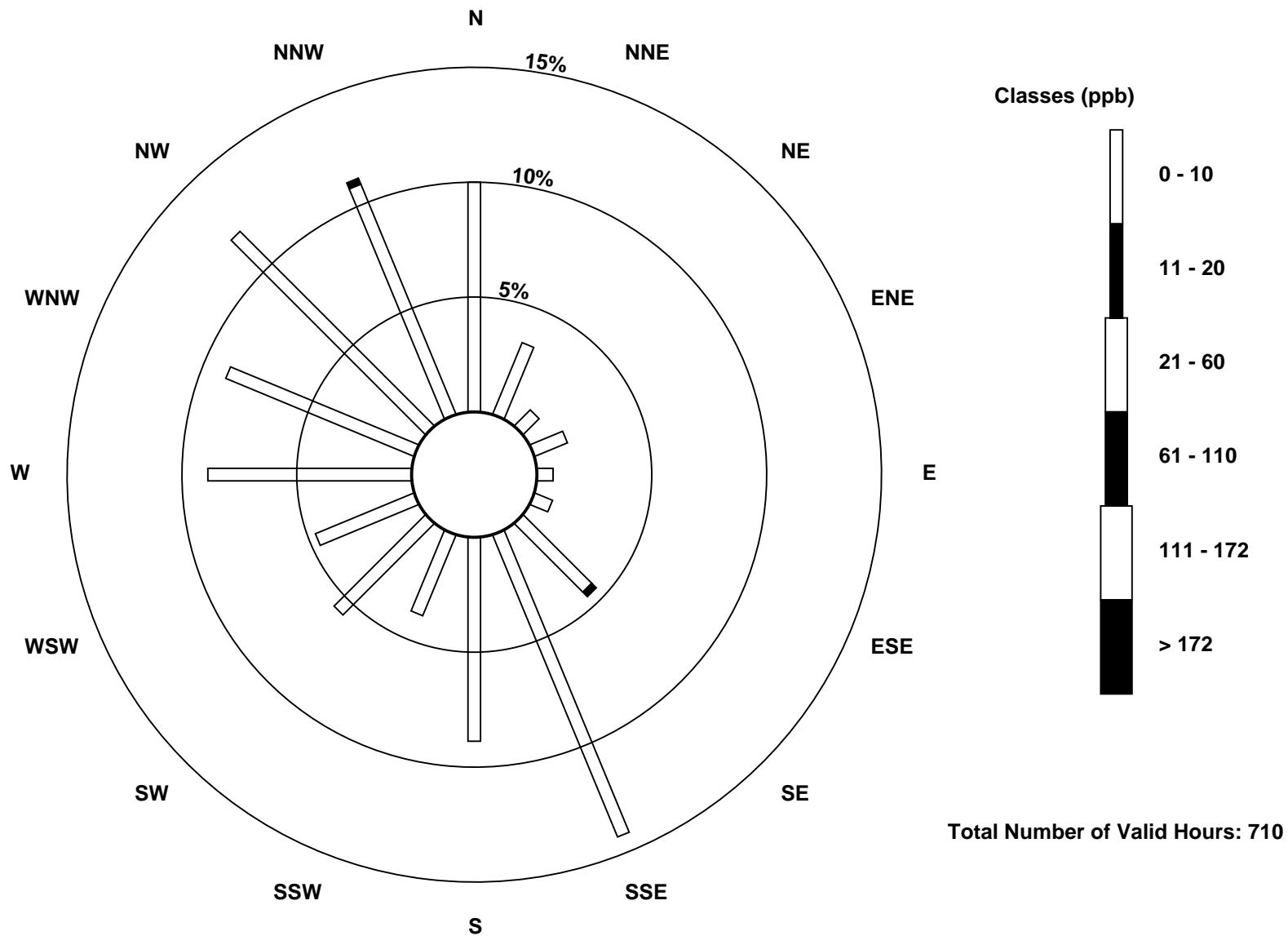
Total Number of Valid Hours: 710

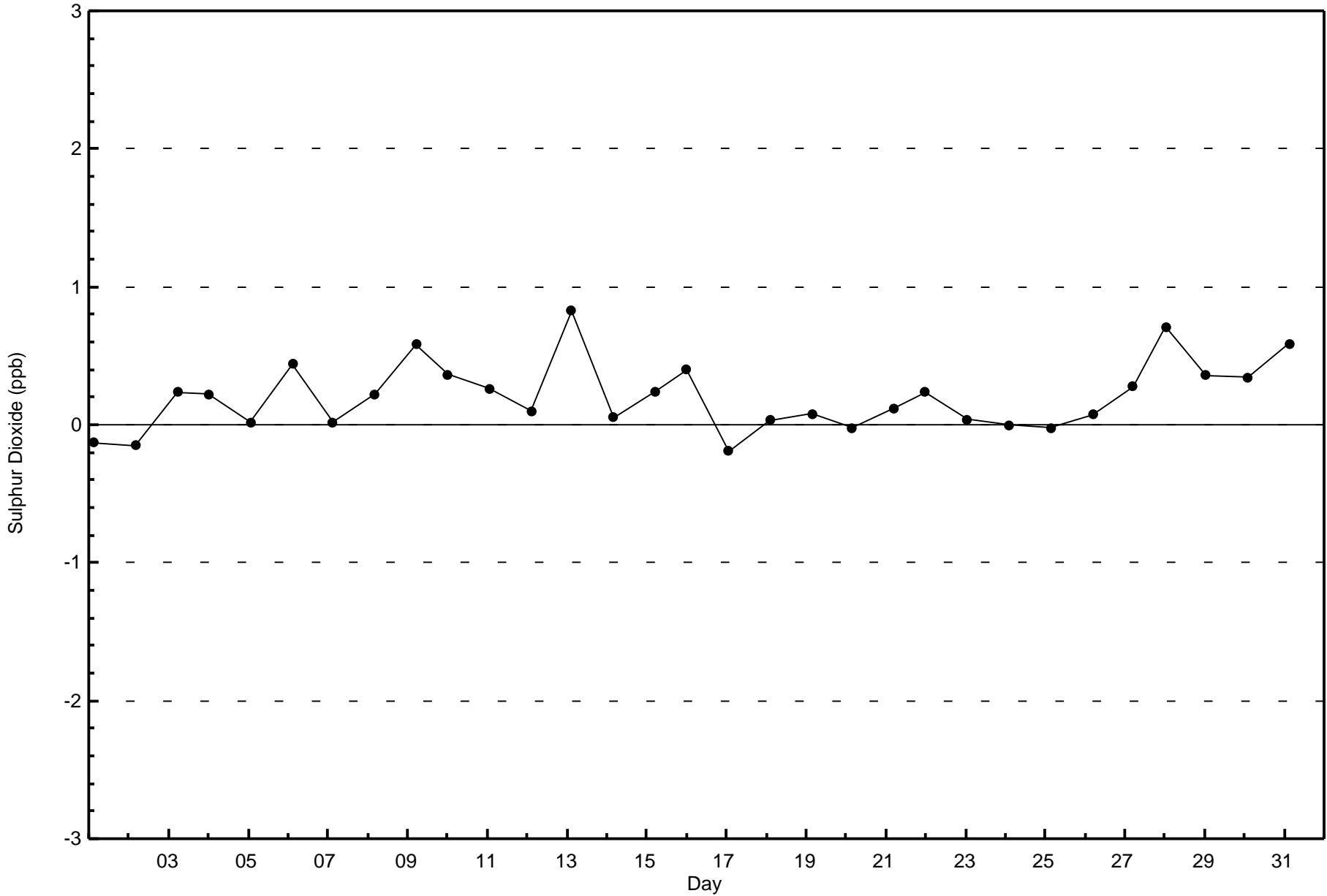
Total Number of Hours: 744

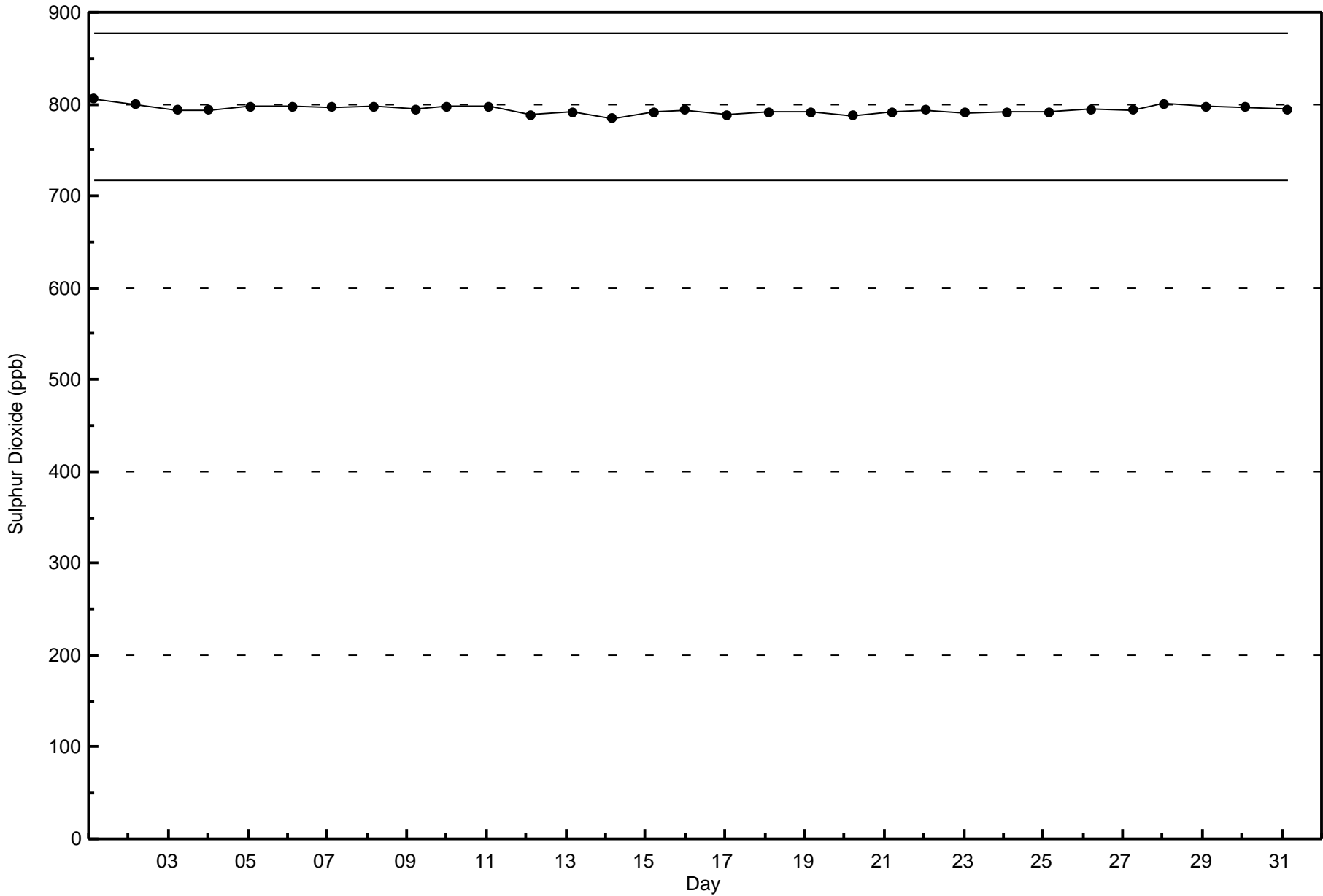


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Waskow ohci Pimatisiwin (AMS 25)









Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 1 ppb on Oct 21 16:00	Maximum Daily Average: 0.6 ppb on Oct 21		Hours of Data:	708
Minimum Value: 0 ppb on Oct 2 04:00	Minimum Daily Average: 0.1 ppb on Oct 7		Hours of Missing Data:	36
Maximum Diurnal Average: 0.3 ppb at hour 8	Minimum Diurnal Average: 0.2 ppb at hour 20		Hours of Calibration:	36
Monthly Average: 0.3 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 1		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Oct	0	0	0	0	0	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
4-Oct	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	1	0.4	1
5-Oct	1	1	Z	1	1	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0.4	1
6-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
7-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
8-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
9-Oct	0	0	0	0	0	0	Z	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
10-Oct	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	1	0	0	0	0	0	0	0	0	0	0.3	1
11-Oct	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
12-Oct	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
13-Oct	0	0	0	0	Z	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1
14-Oct	0	0	0	1	1	Z	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
15-Oct	0	0	0	0	0	0	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
16-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
17-Oct	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1
18-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
19-Oct	0	0	0	0	Z	0	0	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0.3	1
20-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
21-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
22-Oct	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.5	1
23-Oct	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1	1
24-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
25-Oct	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
26-Oct	0	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
27-Oct	0	0	0	0	0	0	Z	1	1	1	1	1	1	1	0	0	1	1	1	0	0	0	0	0	0.5	1
28-Oct	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
29-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
30-Oct	0	0	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
31-Oct	0	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1

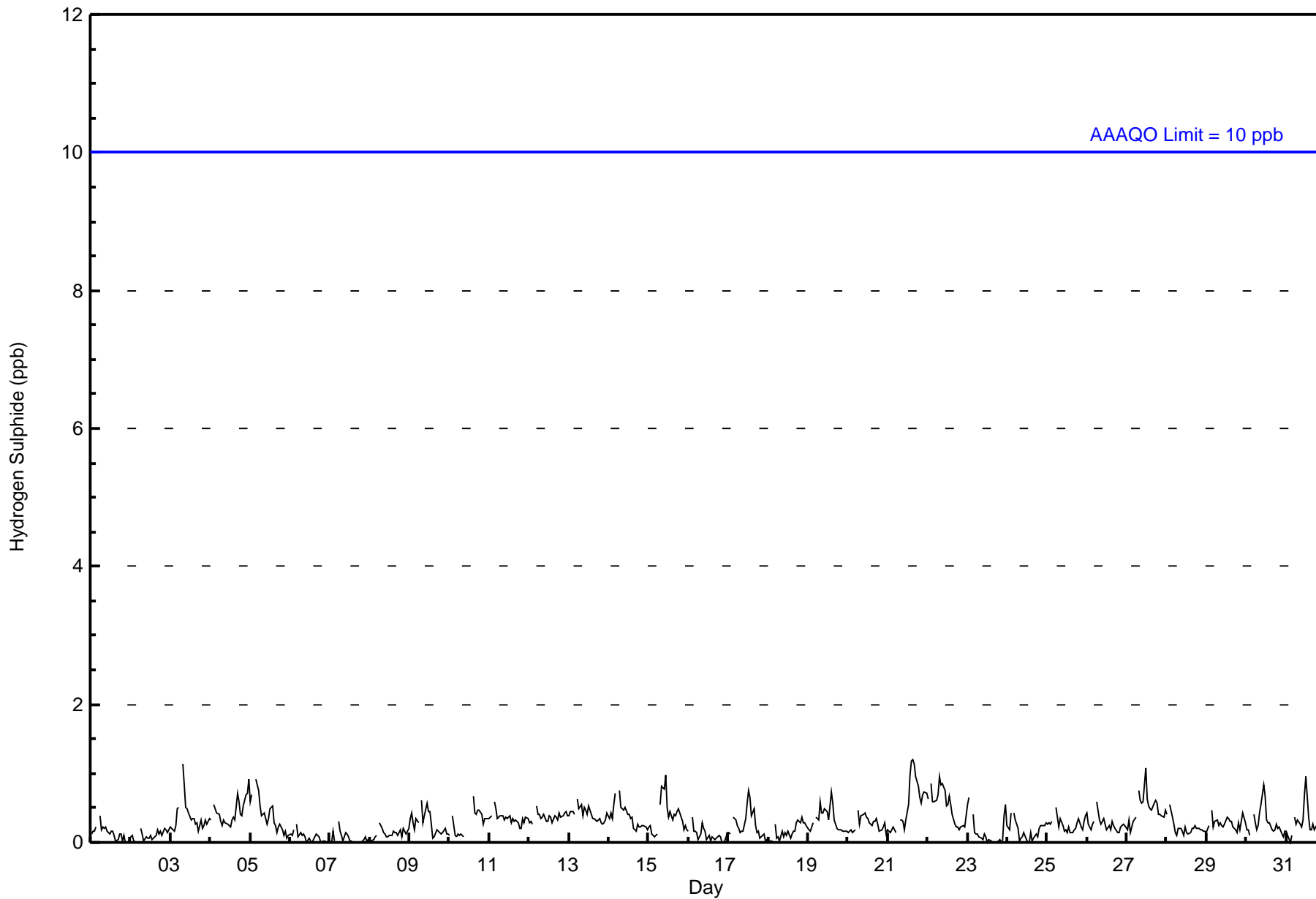
0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	Diurnal Average
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Diurnal Maximum

Z - zerospan      C - Calibration  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb    24-hr 3 ppb



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Waskow ohci Pimatisiwin - October 2017**







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Waskow ohci Pimatisiwin - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	708	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Waskow ohci Pimatisiwin - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	71	24	7	10	6	5	32	101	63	29	40	34	60	64	83	79	708
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	71	24	7	10	6	5	32	101	63	29	40	34	60	64	83	79	708

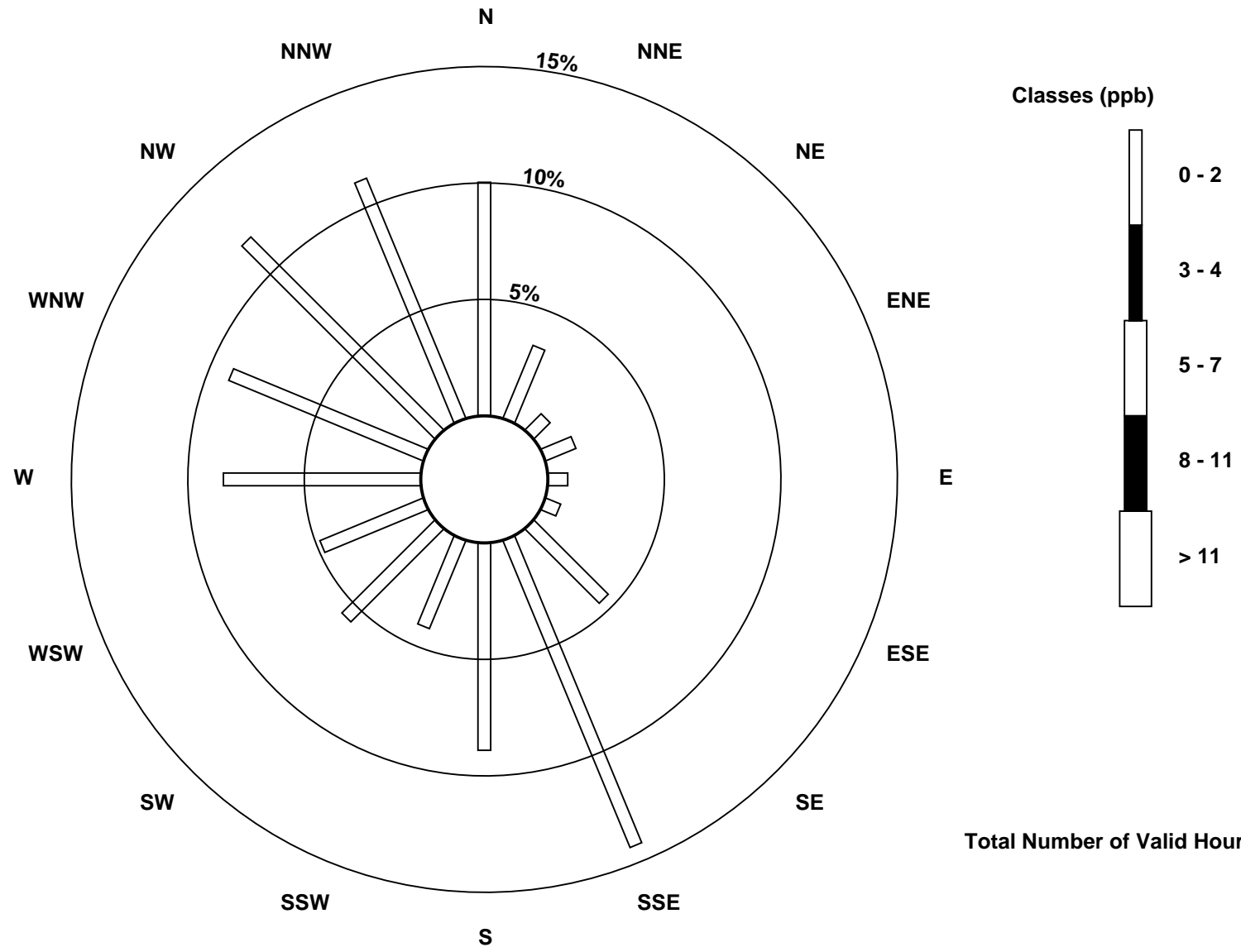
Total Number of Valid Hours: 708

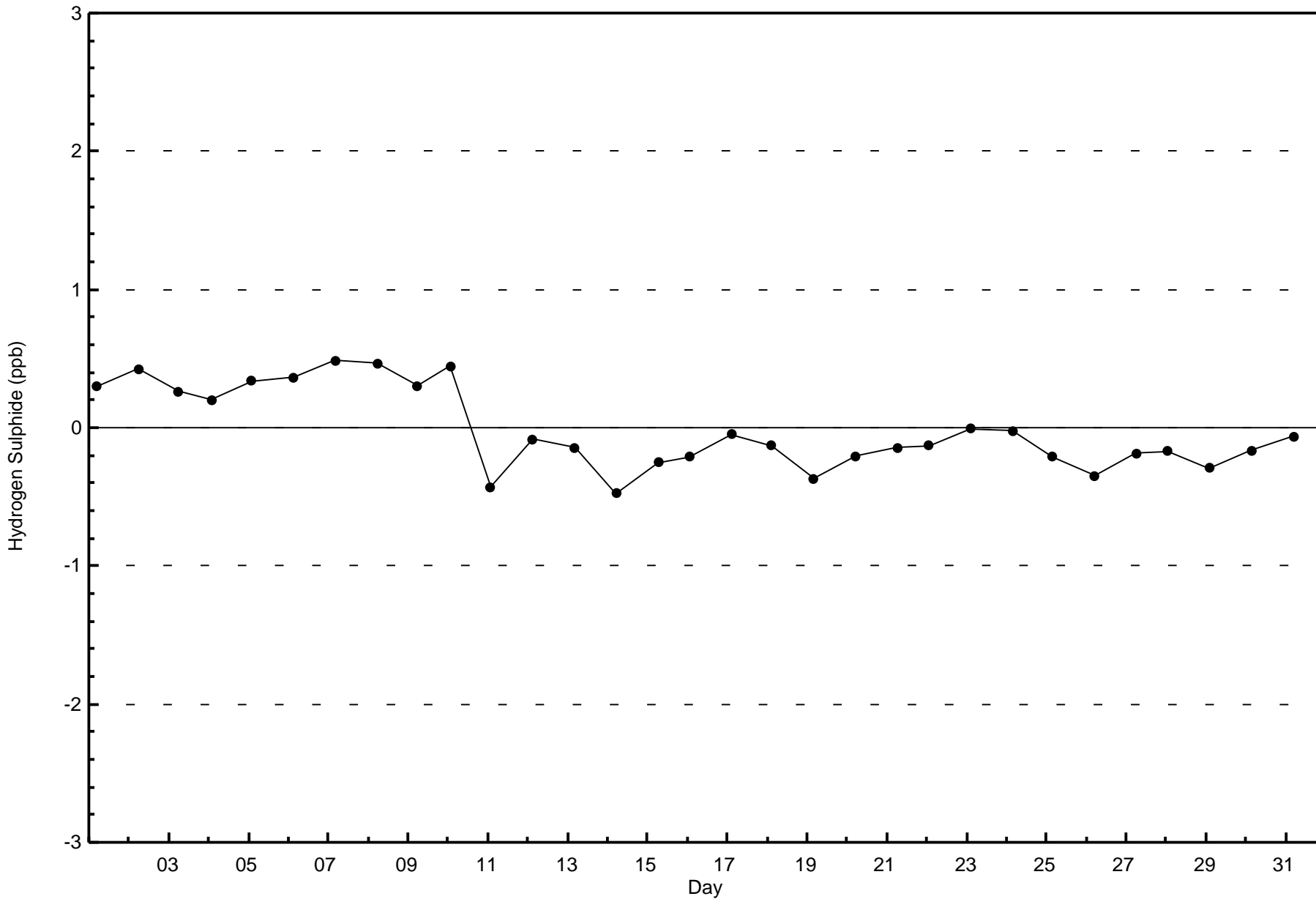
Total Number of Hours: 744

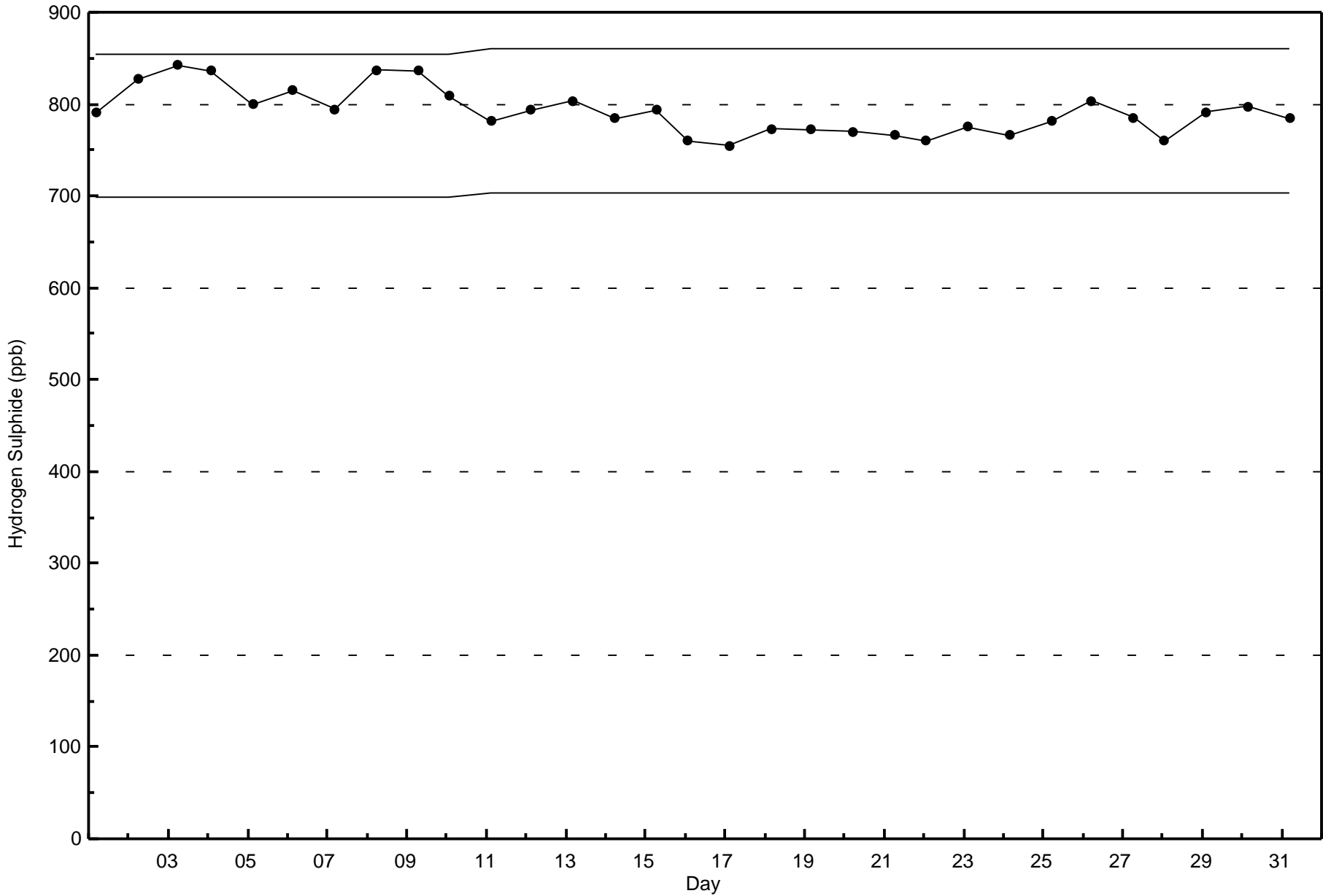


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Waskow ohci Pimatisiwin (AMS 25)







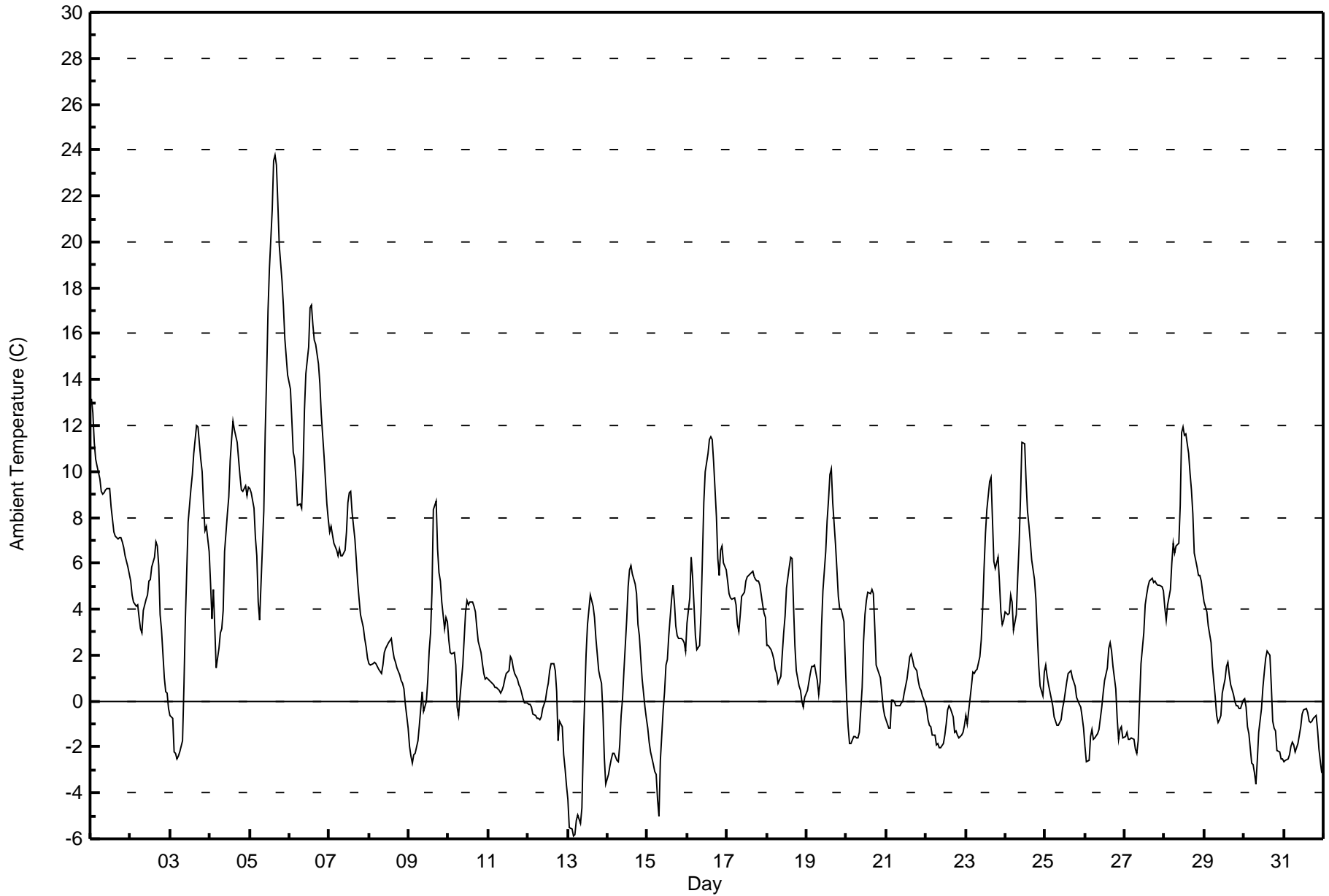


Maximum Value: 23.8 C on Oct 5 16:00		Maximum Daily Average: 14.1 C on Oct 5		Hours in Service: 744																						
Minimum Value: -5.9 C on Oct 13 04:00		Minimum Daily Average: -1.6 C on Oct 31		Hours of Data: 744																						
Maximum Diurnal Average: 6.3 C at hour 16		Minimum Diurnal Average: 0.8 C at hour 7		Hours of Missing Data: 0																						
Monthly Average: 3.17 C		Percentiles: P <sub>1</sub> = -5.0 P <sub>10</sub> = -1.7 Q <sub>1</sub> = -0.3 Median = 2.1 Q <sub>3</sub> = 5.6 P <sub>90</sub> = 9.2 P <sub>99</sub> = 17.8		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	13.2	12.6	11.3	10.5	10.2	9.7	9.1	9.0	9.1	9.2	9.3	9.2	8.5	7.9	7.3	7.2	7.1	7.1	7.1	7.0	6.7	6.3	5.9	5.5	8.6	13.2
2-Oct	5.2	4.6	4.3	4.1	4.2	3.6	3.2	3.0	3.9	4.5	4.6	5.3	5.3	5.8	6.3	6.9	6.7	5.9	3.8	3.1	1.0	0.4	0.4	-0.3	4.0	6.9
3-Oct	-0.6	-0.8	-2.2	-2.3	-2.5	-2.4	-2.2	-1.7	0.7	3.5	5.6	7.8	9.3	9.8	10.8	11.4	12.0	12.0	10.6	10.0	8.5	7.4	7.6	6.5	4.9	12.0
4-Oct	5.1	3.6	4.9	3.2	1.5	2.3	3.0	3.1	3.9	6.5	8.1	8.9	10.5	11.4	12.2	11.8	11.3	10.6	9.8	9.2	9.1	9.4	9.0	9.3	7.4	12.2
5-Oct	9.2	9.1	8.4	7.1	6.3	4.3	3.5	5.1	8.3	11.7	14.1	17.0	18.8	21.4	23.6	23.8	23.4	21.7	19.9	18.3	17.2	15.8	15.0	14.2	14.1	23.8
6-Oct	13.6	12.2	10.9	10.6	9.6	8.5	8.6	8.4	10.0	12.7	14.2	15.4	17.1	17.2	16.4	15.7	15.5	14.7	13.8	12.5	11.6	10.6	8.6	7.9	12.4	17.2
7-Oct	7.4	7.6	7.2	6.9	6.5	6.3	6.6	6.4	6.3	6.5	7.4	8.6	9.1	9.2	8.2	7.1	6.2	5.2	4.4	3.7	3.2	2.7	2.4	1.9	6.1	9.2
8-Oct	1.6	1.6	1.7	1.7	1.6	1.5	1.4	1.2	1.5	2.1	2.3	2.4	2.5	2.7	2.2	1.8	1.7	1.4	1.1	0.9	0.8	0.5	-0.1	-1.2	1.5	2.7
9-Oct	-2.0	-2.4	-2.7	-2.3	-2.3	-1.7	-1.0	-0.3	0.4	-0.4	0.0	0.9	2.2	3.0	4.8	8.3	8.7	6.6	5.6	5.2	4.3	3.2	3.7	3.5	1.9	8.7
10-Oct	2.7	2.1	2.1	2.1	1.6	-0.3	-0.6	0.2	1.6	2.7	3.9	4.4	4.2	4.3	4.3	4.1	3.9	3.2	2.6	2.1	1.6	1.2	1.0	1.0	2.3	4.4
11-Oct	1.0	0.8	0.8	0.7	0.6	0.6	0.5	0.4	0.4	0.6	0.9	1.2	1.3	1.9	1.8	1.4	1.2	0.9	0.7	0.6	0.4	0.1	-0.1	-0.1	0.8	1.9
12-Oct	-0.2	-0.1	-0.2	-0.6	-0.7	-0.7	-0.8	-0.8	-0.7	-0.3	0.0	0.5	0.8	1.3	1.6	1.6	1.3	0.4	-1.7	-0.9	-1.1	-2.3	-2.9	-3.7	-0.4	1.6
13-Oct	-4.3	-5.5	-5.6	-5.9	-5.8	-5.2	-5.0	-5.3	-4.6	-1.9	0.1	2.1	3.3	4.6	4.4	4.1	3.6	2.7	1.3	1.0	0.8	-0.5	-2.5	-3.6	-1.1	4.6
14-Oct	-3.2	-2.8	-2.5	-2.3	-2.3	-2.6	-2.7	-1.9	-0.6	0.1	1.3	3.6	5.0	5.7	5.9	5.5	5.1	4.7	3.4	2.9	1.9	1.0	-0.3	-0.8	1.0	5.9
15-Oct	-1.2	-1.8	-2.2	-2.8	-3.1	-3.2	-4.3	-5.0	-2.6	-0.4	0.4	1.6	1.8	2.9	4.4	5.0	4.3	3.3	2.8	2.7	2.7	2.6	2.5	2.2	0.5	5.0
16-Oct	3.4	4.5	6.3	5.4	4.2	2.8	2.2	2.4	3.8	6.2	8.7	10.0	10.8	11.4	11.5	11.4	10.4	8.0	6.2	5.5	6.5	6.8	6.0	5.7	6.7	11.5
17-Oct	5.2	4.7	4.5	4.5	4.5	4.2	3.3	3.1	3.8	4.5	4.7	5.2	5.4	5.4	5.5	5.6	5.4	5.3	5.3	5.2	5.0	4.2	3.8	3.7	4.7	5.6
18-Oct	2.4	2.4	2.2	2.1	1.8	1.4	1.2	0.8	1.1	2.1	3.0	3.7	4.9	5.8	6.3	6.2	4.2	2.4	1.3	0.6	0.5	0.0	-0.3	0.2	2.3	6.3
19-Oct	0.5	0.8	1.2	1.5	1.5	1.6	0.9	0.3	0.8	3.2	4.8	6.5	7.8	8.7	9.8	10.1	8.6	6.8	5.7	4.6	4.0	4.0	3.4	1.6	4.1	10.1
20-Oct	0.0	-1.1	-1.8	-1.8	-1.5	-1.6	-1.6	-1.6	-1.4	0.6	2.6	3.8	4.4	4.7	4.7	4.9	4.7	3.2	1.6	1.4	1.0	0.4	-0.2	-0.6	1.0	4.9
21-Oct	-0.8	-1.2	-1.2	0.1	0.0	0.0	-0.2	-0.2	-0.2	-0.1	0.0	0.3	0.9	1.4	1.9	2.0	1.8	1.5	1.3	0.9	0.6	0.5	0.3	-0.1	0.4	2.0
22-Oct	-0.3	-0.8	-1.1	-1.1	-1.5	-1.5	-1.9	-1.9	-2.0	-2.0	-1.8	-1.5	-1.0	-0.4	-0.2	-0.3	-0.7	-1.4	-1.3	-1.5	-1.6	-1.5	-1.3	-1.1	-1.2	-0.2
23-Oct	-0.7	-1.0	-0.5	0.7	1.2	1.2	1.3	1.4	2.0	2.6	4.0	5.8	7.3	8.3	9.5	9.7	7.9	6.1	5.8	6.3	5.2	3.9	3.3	3.5	4.0	9.7
24-Oct	3.9	3.7	3.8	4.6	4.3	3.1	3.8	5.4	6.8	8.8	11.3	11.2	9.6	8.3	7.7	7.0	6.1	5.3	4.4	2.9	1.6	0.7	0.2	1.3	5.2	11.3
25-Oct	1.6	1.1	0.7	0.4	-0.2	-0.7	-0.9	-1.1	-1.1	-0.8	-0.3	0.0	0.4	0.8	1.2	1.3	1.0	0.9	0.6	0.1	-0.1	-0.3	-0.7	-1.2	0.1	1.6
26-Oct	-2.0	-2.6	-2.6	-1.6	-1.2	-1.7	-1.6	-1.5	-1.2	-0.7	-0.3	0.4	0.9	1.4	2.3	2.5	2.2	1.5	0.5	-0.8	-1.7	-1.3	-1.1	-1.6	-0.5	2.5
27-Oct	-1.5	-1.4	-1.6	-1.6	-1.6	-1.7	-2.1	-2.3	-1.7	0.0	1.6	3.0	4.2	4.6	5.0	5.2	5.3	5.2	5.2	5.1	5.0	5.0	5.0	4.8	2.0	5.3
28-Oct	4.1	3.5	4.2	4.8	6.0	6.8	6.4	6.7	6.9	8.5	11.7	11.9	11.6	11.6	10.8	9.9	9.2	8.1	6.5	5.8	5.5	5.5	5.2	4.7	7.3	11.9
29-Oct	4.3	3.9	3.3	2.9	2.5	1.5	0.1	-0.6	-0.9	-0.8	-0.7	0.3	0.9	1.5	1.7	1.1	0.7	0.3	0.0	-0.2	-0.2	-0.3	-0.3	0.0	0.9	4.3
30-Oct	0.1	-0.3	-1.1	-1.5	-2.7	-2.8	-3.1	-3.6	-2.6	-1.4	-0.3	0.6	1.3	1.9	2.2	2.0	0.6	-0.9	-1.2	-1.3	-2.2	-2.2	-2.5	-2.5	-1.0	2.2
31-Oct	-2.6	-2.6	-2.5	-2.3	-2.0	-1.8	-1.9	-2.2	-1.8	-1.5	-1.1	-0.6	-0.4	-0.3	-0.5	-0.9	-1.0	-0.9	-0.7	-0.7	-1.2	-2.1	-2.6	-3.1	-1.6	-0.3
	2.1	1.8	1.6	1.5	1.3	1.0	0.8	0.9	1.6	2.8	3.9	4.8	5.4	6.0	6.2	6.3	5.8	4.9	4.1	3.6	3.1	2.6	2.2	1.9	Diurnal Average	
	13.6	12.6	11.3	10.6	10.2	9.7	9.1	9.0	10.0	12.7	14.2	17.0	18.8	21.4	23.6	23.8	23.4	21.7	19.9	18.3	17.2	15.8	15.0	14.2	Diurnal Maximum	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Waskow ohci Pimatisiwin - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C  
Waskow ohci Pimatisiwin - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	211	28.36	28.36
0 - 10	470	63.17	91.53
10 - 20	58	7.80	99.33
> 20	5	0.67	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %**

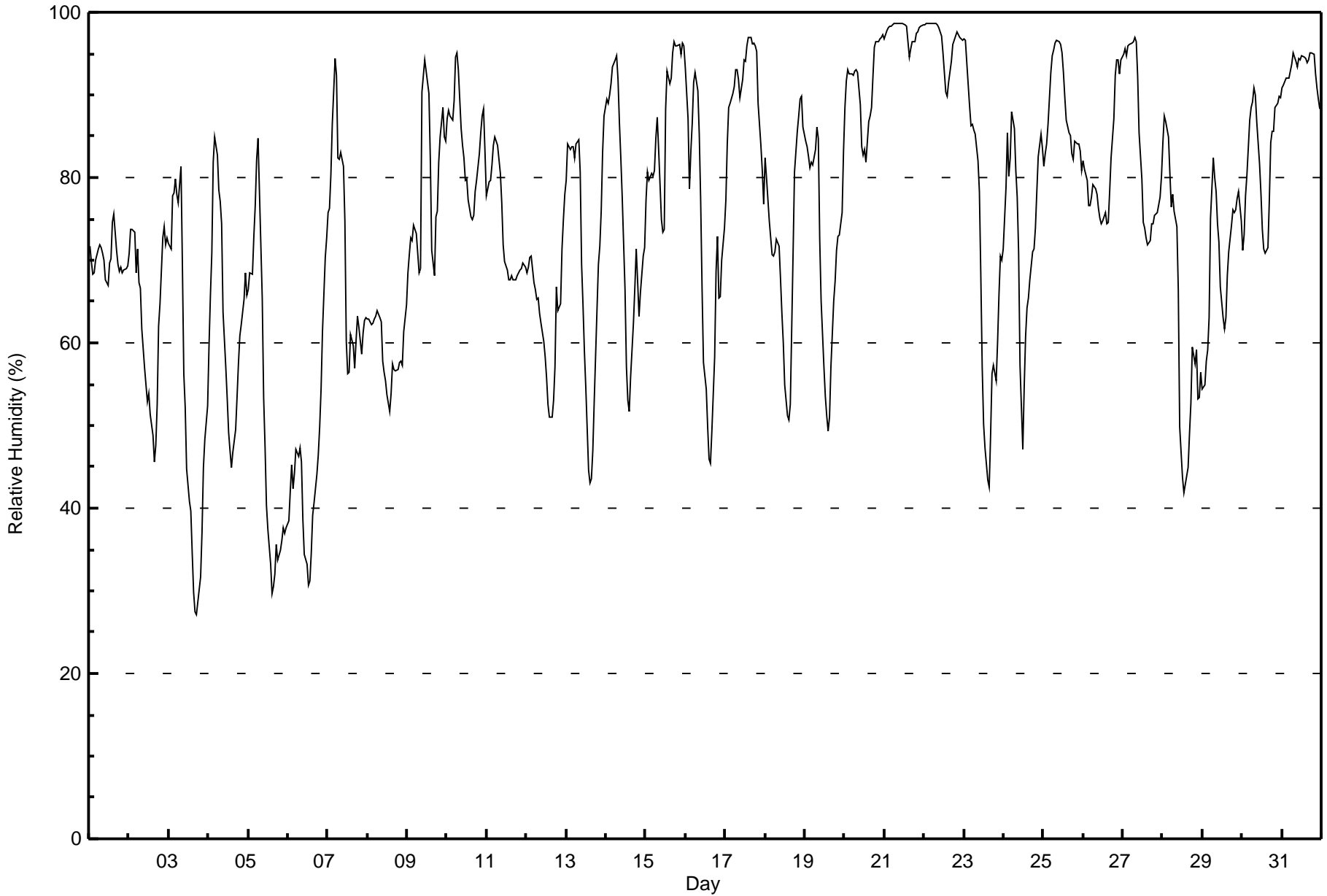
**Waskow ohci Pimatisiwin - October 2017**

Maximum Value: 99 % on Oct 22 06:00																		Maximum Daily Average: 97.7 % on Oct 21																		Hours in Service: 744														
Minimum Value: 27 % on Oct 3 18:00																		Minimum Daily Average: 45.0 % on Oct 6																		Hours of Data: 744														
Maximum Diurnal Average: 82.8 % at hour 7																		Minimum Diurnal Average: 63.7 % at hour 15																		Hours of Missing Data: 0														
Monthly Average: 74.3 %																		Percentiles: P <sub>1</sub> = 31 P <sub>10</sub> = 50 Q <sub>1</sub> = 63 Median = 76 Q <sub>3</sub> = 88 P <sub>90</sub> = 95 P <sub>99</sub> = 99																		Hours of Calibration: 0														
																																				Percent Operational Time: 100.0														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-Oct	72	70	68	69	70	71	72	72	71	70	68	67	70	70	75	76	71	69	69	69	68	69	69	69	70.1	76																								
2-Oct	71	74	74	73	69	71	67	67	62	57	55	53	54	51	49	46	48	53	62	65	73	74	72	73	62.9	74																								
3-Oct	72	71	78	78	80	78	77	81	69	56	52	45	41	40	35	30	27	27	30	32	37	45	48	52	53.4	81																								
4-Oct	60	66	71	82	85	83	78	77	74	64	57	53	49	47	45	47	50	53	57	61	62	65	68	66	63.3	85																								
5-Oct	66	68	68	73	77	82	85	78	66	53	47	40	37	33	30	30	32	36	34	35	36	38	37	38	50.8	85																								
6-Oct	38	42	45	42	44	47	46	47	46	39	34	33	31	31	35	39	41	44	46	50	54	61	70	73	45.0	73																								
7-Oct	76	76	80	87	94	92	82	82	83	81	75	60	56	56	61	60	57	60	63	62	59	61	63	63	70.5	94																								
8-Oct	63	63	62	62	63	63	64	63	62	58	57	55	54	52	54	57	57	57	57	58	58	57	61	65	59.2	65																								
9-Oct	69	71	73	72	74	73	71	69	69	90	94	93	92	90	82	71	68	75	76	82	85	88	85	84	79.0	94																								
10-Oct	87	88	87	87	89	95	95	93	86	84	82	80	80	77	75	75	75	78	80	83	86	88	88	83	84.2	95																								
11-Oct	78	80	80	82	84	85	84	82	80	77	72	70	69	68	68	68	68	68	68	68	69	69	70	69	73.9	85																								
12-Oct	69	69	70	71	67	66	65	65	64	62	60	58	56	53	51	51	53	57	67	64	65	71	75	78	63.6	78																								
13-Oct	80	84	83	84	84	82	84	85	81	70	65	59	55	45	43	44	47	53	64	69	72	76	83	87	69.9	87																								
14-Oct	89	89	90	91	93	94	95	92	87	82	78	66	57	53	52	56	62	67	71	68	63	66	70	72	75.2	95																								
15-Oct	77	81	80	81	80	81	85	87	83	75	73	74	88	93	91	92	95	96	96	96	96	95	96	96	87.0	96																								
16-Oct	93	87	79	83	87	92	93	91	85	77	67	58	54	50	46	45	49	58	69	73	66	66	70	74	71.3	93																								
17-Oct	77	84	88	89	90	91	93	93	92	90	92	94	94	96	97	97	96	96	96	95	89	84	81	77	90.5	97																								
18-Oct	82	80	75	73	71	71	71	73	72	68	64	60	55	51	51	53	62	71	81	86	87	90	90	86	71.6	90																								
19-Oct	84	84	82	81	82	82	83	86	85	73	65	57	54	51	49	51	57	65	67	71	73	73	76	83	71.5	86																								
20-Oct	88	92	93	93	92	92	93	93	93	89	84	83	83	82	87	87	88	92	96	96	96	97	97	97	91.0	97																								
21-Oct	97	98	98	98	98	99	99	99	99	99	99	99	99	98	96	94	96	96	96	97	98	98	98	98	97.7	99																								
22-Oct	99	99	99	99	99	99	99	99	99	98	98	97	95	93	90	90	92	94	96	97	97	98	97	97	96.4	99																								
23-Oct	97	97	94	89	86	87	86	85	82	78	68	57	50	47	43	43	49	56	57	55	60	66	71	70	69.7	97																								
24-Oct	71	79	85	80	82	88	86	81	78	71	57	47	55	61	64	66	68	71	71	74	78	83	85	84	73.5	88																								
25-Oct	81	83	84	86	93	95	95	96	97	96	96	95	93	90	87	85	85	83	82	84	84	84	83	81	88.3	97																								
26-Oct	82	81	80	77	77	78	79	79	78	76	75	74	75	76	74	75	78	82	87	92	94	94	92	94	81.3	94																								
27-Oct	95	96	95	96	96	96	96	97	96	92	85	80	75	74	73	72	72	74	74	75	76	76	78	80	84.2	97																								
28-Oct	84	87	87	85	81	76	78	76	74	66	50	47	44	42	44	45	49	53	59	58	59	53	53	56	62.8	87																								
29-Oct	54	55	58	59	63	75	82	80	78	74	72	67	63	62	63	68	71	74	76	76	76	77	78	75	69.9	82																								
30-Oct	71	73	78	80	87	88	89	91	90	87	82	78	74	71	71	72	77	84	86	86	88	89	90	90	82.2	91																								
31-Oct	91	91	92	92	92	93	94	95	94	93	94	94	95	95	94	94	94	95	95	95	92	91	89	88	93.1	95																								
																								77.9	79.2	79.9	80.4	81.6	82.7	82.8	82.4	79.8	75.7	71.5	67.5	65.8	64.3	63.7	63.8	65.7	69.1	72.0	73.3	74.1	75.5	76.9	77.4	Diurnal Average		
																								99	99	99	99	99	99	99	99	99	99	99	99	99	98	97	97	97	96	96	97	97	98	98	98	98	Diurnal Maximum	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Waskow ohci Pimatisiwin - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Relative Humidity (RH) - %**  
**Waskow ohci Pimatisiwin - October 2017**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	28	3.76	3.76
40 - 60	125	16.80	20.56
60 - 80	278	37.37	57.93
80 - 100	313	42.07	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

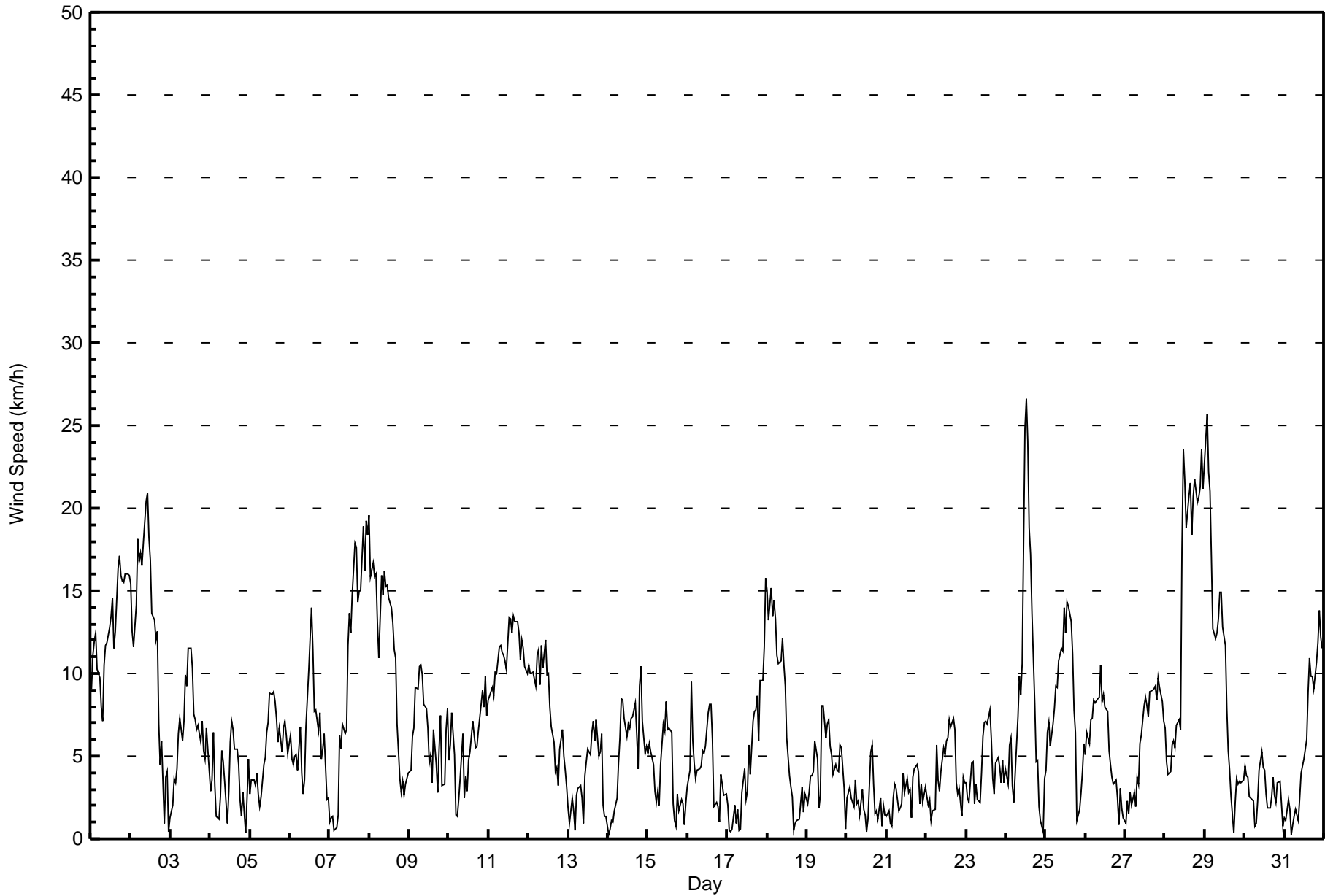


Maximum Speed: 27 km/h on Oct 24 13:00	Maximum Daily Speed Average: 12.2 km/h on Oct 1	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 14 01:00	Minimum Daily Speed Average: 1.1 km/h on Oct 21	Hours of Data: 744
Maximum Diurnal Speed Average: 4.3 km/h at hour 17	Minimum Diurnal Speed Average: 1.5 km/h at hour 10	Hours of Missing Data: 0
Monthly Average Velocity: 2.9 km/h 306.7 deg	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 2 Q <sub>1</sub> = 3 Median = 6 Q <sub>3</sub> = 9 P <sub>90</sub> = 14 P <sub>99</sub> = 22	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	WNW9	WNW11	WNW12	WNW12	WNW10	WNW10	WNW8	WNW7	NW11	NW12	NNW12	NNW13	NNW13	NNW15	NW12	NNW13	NNW16	NNW17	NNW16	NNW16	NNW15	NNW16	NNW16	NNW16	NW12.2	NNW17	
2-Oct	NNW15	NNW13	NNW12	NNW14	NNW18	NNW17	NNW17	NNW17	N18	N20	N21	NNW18	N17	NNW14	NNW13	NNW12	NNW13	NW7	WNW5	WNW6	SSW1	W4	W4	NNW0	NNW11.7	N21	
3-Oct	SE1	SSE2	SSE4	S3	S4	S6	SSE7	SSE6	S7	SSE10	SSE9	S12	S12	S10	SSW8	SSW7	SW7	WSW7	W6	W7	W5	W5	W7	W4	SSW4.7	S12	
4-Oct	WNW3	NW4	NNW6	WNW3	WSW1	SW1	WNW3	W5	W5	W3	ENE1	S3	SE6	SE7	SE5	SSE5	SSE5	ESE2	SSE1	SSE3	W0	SE2	SSE5	S1.2	SE7		
5-Oct	SE3	S4	S4	S3	S4	SSW3	SW2	SSE3	S4	SSE5	SE6	SSE7	SE9	SSE9	S9	SSW8	SW7	SW6	WSW7	WSW5	WSW7	W7	WSW6	WSW5	SSW4.2	S9	
6-Oct	SW6	SW5	SW4	SW5	SSW5	SW4	SW7	S4	SSE3	SSW4	WSW7	WSW10	WSW12	WSW14	W11	WSW8	WSW8	WSW7	WSW8	W5	W5	W6	WNW2	W2	WSW5.8	WSW14	
7-Oct	SSW1	SSE1	SSE1	S1	WNW1	NNW1	N6	NNW5	N7	NNW6	NW7	NW12	NNW14	NW12	NNW15	NW18	NW18	NNW14	NNW15	NNW15	NW19	NW16	NW19	NW18	NW9.6	NW19	
8-Oct	NW20	NW16	NW17	NW16	NW16	NW13	NW11	NW16	NW15	NW16	NW15	NW15	NW15	NW14	NW13	NW11	NW11	NW7	W4	W3	W3	WSW3	SSW3	SW4	NW10.9	NW20	
9-Oct	SW4	SSE4	SSE6	SSE7	SSE9	SSE9	SSE10	SSE11	SSE10	SSE8	SSE8	SSE7	S5	SSW5	WSW3	WSW7	SW4	S3	W5	SW7	W3	WSW3	W7	W8	S4.7	SSE11	
10-Oct	WSW5	W6	W8	W5	SSW1	S1	W2	W4	WNW6	NW2	NNE4	ENE3	NNE5	NNE5	NNE7	NNE6	NNE6	NE6	NNE7	N8	N9	N8	N10	NNE7	N3.6	N10	
11-Oct	N8	N9	N9	NNE9	N10	NNE10	N12	N12	NNE11	N11	NNE11	NNE10	N13	NNE13	N12	N13	N13	NNW13	N12	NNW11	NNW12	NNW12	N10	N10	N11.0	N13	
12-Oct	NNW10	N10	N10	N10	N9	NW11	NW11	NW9	NNW12	NNW10	NNW12	NNW10	NNW10	NNW8	N7	N6	N4	NNW4	W3	WNW5	NW7	NW5	NW4	W3	NNW7.5	NNW12	
13-Oct	NW2	W1	WNW2	W2	W0	SSE3	S3	S3	S2	W1	SE4	SE5	SE5	SSW5	SW6	SW7	SW6	SW7	SW5	SW5	SW6	WNW2	SSW1	SE1	SSW2.6	SW7	
14-Oct	S0	SW1	S1	SE1	S2	SSE2	SSE5	SSE6	SSE8	SSE7	SSE6	SW7	WSW7	SW7	WSW7	W8	W6	WNW4	WNW9	WNW10	WNW7	W5	W6	SW3.2	WNW10		
15-Oct	WSW5	W6	W5	W4	SW3	SSE2	S3	S2	SSE5	SSE7	SSE7	SSE8	SSE7	SSE7	SSE6	SSE2	NNE1	NE1	NNW3	NNW2	WNW2	W2	N1	NNW2	S1.9	SSE8	
16-Oct	SW3	SW4	W10	W6	WSW5	S4	S4	S4	SSE4	SSE5	SSW5	SW6	SW8	SW8	SW8	WSW6	WSW2	S2	SW2	SSW1	SSW4	S3	SSE3	S3	SSW3.7	W10	
17-Oct	SSE2	SSE0	W0	SSE1	WNW2	NNW1	NNW2	WSW0	ESE1	SE3	SSE4	ESE2	NNW3	N6	N4	NW7	NW8	NW8	NW9	WNW6	WNW10	WNW10	WNW12	WNW16	NW3.5	WNW16	
18-Oct	WNW15	WNW13	WNW15	WNW13	WNW14	WNW13	WNW11	WNW11	WNW11	WNW11	WNW12	WNW11	NW9	WNW6	WNW4	NE3	ENE3	ENE1	NNE1	ENE1	N1	N2	NNW3	ENE2	E3	WNW6.5	WNW15
19-Oct	ENE2	E3	ESE4	E4	ESE4	SE6	SSE5	SSE2	ESE3	SE8	SSE8	SSE6	SE7	SE7	SE6	SE5	SE4	SE4	SE4	SE4	SSE6	SE6	SSE3	NNE1	SE4.3	SE8	
20-Oct	WNW2	WNW3	WNW3	WNW2	WNW2	NW4	NW2	W2	WNW1	NW3	N2	NE1	NW0	NE1	WNW5	WNW6	W3	S2	S2	S1	S2	WSW1	NW2	NW1	WNW1.6	WNW6	
21-Oct	NW1	WSW2	NW1	NW1	N2	NNW3	W3	WNW2	NW2	SSE2	S4	SSE3	SSE4	SE3	SE3	NNW1	NNW4	NNW4	NNW4	NNW4	NW2	NW3	WNW2	WNW3	NW1.1	NNW4	
22-Oct	SW3	SSE2	N2	SE1	ENE2	NNW2	NNW6	N4	ENE3	N4	NNW6	N5	N6	NNW6	NNW7	NNW7	NW7	NW7	NNW3	NNW3	WNW3	S1	S4	SSE3	NNW2.5	NW7	
23-Oct	SSE3	S2	SW2	W5	W5	SSW2	SSE3	WSW2	SW2	WSW4	W6	W7	W7	SW7	SW8	SSW6	SSE4	SSE3	SSW5	SSW5	S4	SSE3	SSE5	S3	SW3.3	SW8	
24-Oct	SSE4	SSE3	SSE6	SSE6	SSE3	W2	SW6	W7	W10	W9	WNW11	WNW25	NW27	WNW24	NW19	NW17	NW14	NNW8	N5	NNE5	N2	NW1	S0	N4	WNW6.3	NW27	
25-Oct	N4	N6	NNE7	NNE6	NNE7	N8	N9	N9	NNW11	NNW12	N11	NNW14	N12	NNW14	NNW14	NNW13	NNW11	NNW8	NW6	NW1	WSW2	W3	W4	W6	NNW7.5	NNW14	
26-Oct	SW5	SSW6	S6	S7	SSW7	S8	S8	S9	S9	S10	S8	S9	S8	S8	SSW5	SSW4	SSE4	SSE3	S4	SSE2	W1	W3	NW2	NE1	S5.2	S10	
27-Oct	SE1	SSE2	S2	SSE3	S2	SSE3	SSE2	SSE4	SSE3	SSE6	SE6	SSE8	SSE9	SSE8	SSE7	SSE9	SSE9	SSE9	SSE9	SSE8	SSE10	SSE9	SSE8	SSE7	SSE6.0	SSE10	
28-Oct	SSE7	S5	S4	S4	SW6	WSW6	WSW5	SW7	SW7	WSW7	WNW18	NW24	NW22	NW19	NW21	NW22	NW18	NW21	NW22	NW20	NW21	NW21	NW24	NW21	NW12.0	NW24	
29-Oct	NW23	NW26	NW22	NW21	NNW17	N13	N12	N12	N13	N15	N15	N13	N12	NNE8	NE5	NNE4	NNE3	E0	SSE2	S4	SSE3	SSE4	S3	SSE4	NNW8.2	NW26	
30-Oct	SSW4	S4	SSW4	S3	S2	SSE2	SSW1	SSE1	SE2	SSE4	SSE5	S4	S4	S3	E2	N2	NW3	NW4	WNW3	NNW2	WNW3	WNW3	NW2	W1	SSW1.3	SSE5	
31-Oct	WNW1	WNW1	NW2	NW2	NNW0	NNW1	ENE1	E2	ENE1	NNE2	NNE4	NNE4	N5	NNE6	N9	N11	N10	N10	N9	N11	N12	N14	N12	N12	N5.6	N14	

WNW2.9	WNW2.7	WNW3.0	WNW2.6	WNW2.3	NW1.8	WNW1.8	WNW2.0	NW1.8	NW1.5	NW2.2	NW2.9	NW3.3	NW3.0	NW3.5	NW4.2	NW4.3	NW3.5	NW3.4	NW3.3	WNW3.6	NW3.6	NW3.3	NW3.1	Diurnal Average
NW23	NW26	NW22	NW21	NNW18	NNW17	NNW17	N18	N20	N21	WNW25	NW27	WNW24	NW21	NW22	NW18	NW21	NW22	NW20	NW21	NW21	NW24	NW21	Diurnal Maximum	

All monthly, daily, and diurnal averages have been calculated using vector methods





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h  
Waskow ohci Pimatisiwin - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	367	49.33	49.33
6 - 11	247	33.20	82.53
12 - 19	109	14.65	97.18
20 - 28	21	2.82	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Waskow ohci Pimatisiwin - October 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	17	12	6	11	6	6	20	60	51	23	20	16	41	32	24	22	367
6 - 11	32	15	1	0	0	0	12	47	15	6	23	16	23	21	19	17	247
12 - 19	22	1	0	0	0	0	0	0	2	0	0	2	0	12	28	42	109
20 - 28	2	0	0	0	0	0	0	0	0	0	0	0	0	2	17	0	21
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	73	28	7	11	6	6	32	107	68	29	43	34	64	67	88	81	744

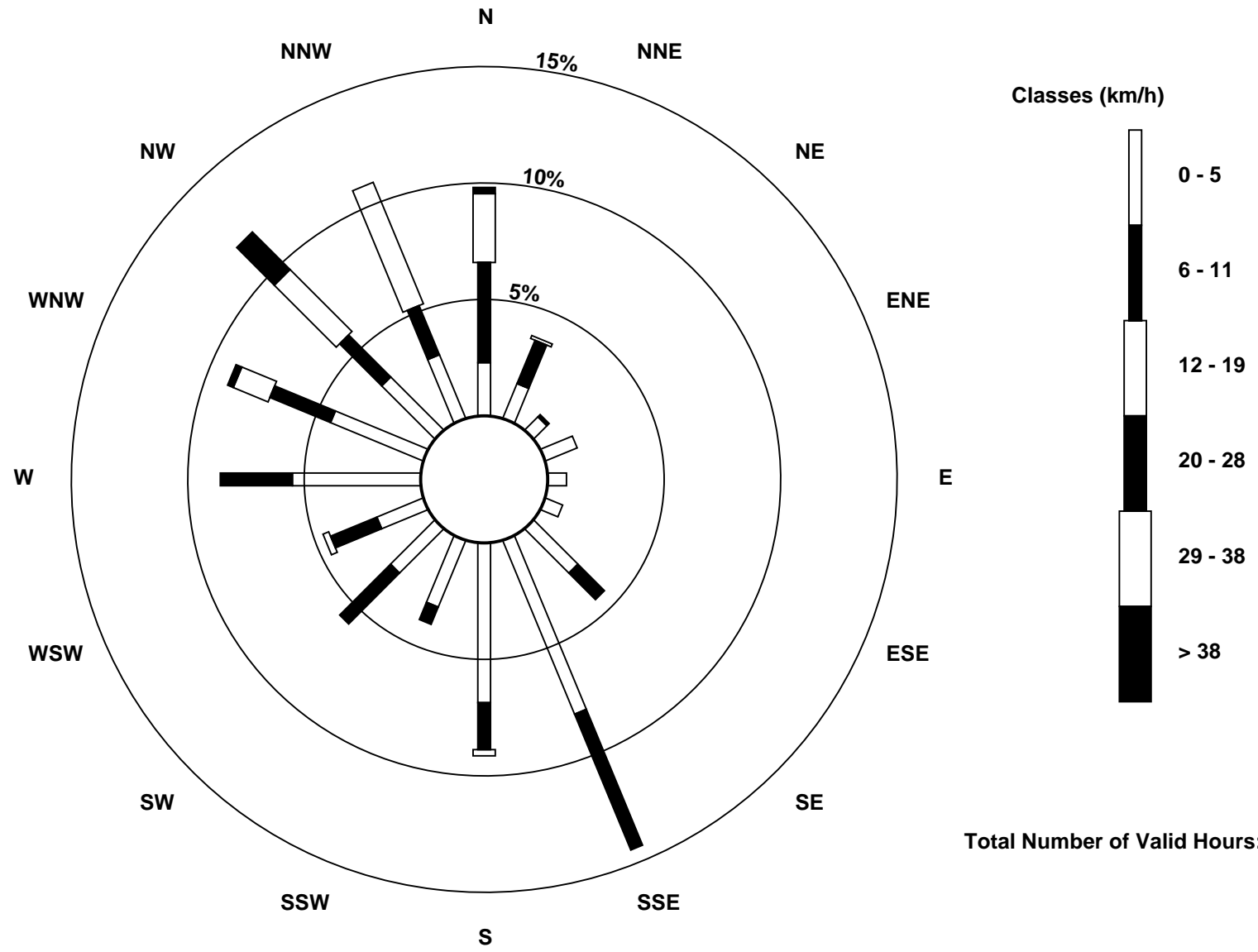
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed (WS) - km/h  
Waskow ohci Pimatisiwin (AMS 25)



Total Number of Valid Hours: 744





**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Speed (WS) - km/h**

**Waskow ohci Pimatisiwin - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Oct 24 12:00 Minimum Value: 0 km/h on Oct 31 08:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 3 P <sub>90</sub> = 4 P <sub>99</sub> = 7														Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0												
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	4	4	4	4	3	3	3	3	4	4	3	4	4	4	3	4	5	5	4	4	4	5	5	5	5	5
2-Oct	5	4	4	6	6	5	6	6	7	7	7	6	5	4	4	4	4	2	1	2	1	1	2	1	1	7
3-Oct	1	1	1	1	2	2	2	2	3	4	4	4	4	4	3	3	3	3	2	3	2	2	2	2	2	4
4-Oct	2	1	2	1	1	1	2	2	2	1	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2
5-Oct	1	2	1	1	1	1	1	1	1	2	2	3	3	3	3	4	3	2	3	2	3	3	3	3	2	4
6-Oct	3	2	3	2	2	2	3	2	1	2	4	5	5	6	5	3	4	3	3	2	2	3	1	1	1	6
7-Oct	1	1	1	2	1	1	2	1	2	2	2	4	4	4	4	5	5	4	4	5	5	5	5	5	5	5
8-Oct	6	5	4	4	4	4	3	4	4	5	4	4	4	5	4	4	3	3	2	1	2	1	1	2	2	6
9-Oct	1	1	2	2	3	3	4	3	4	3	3	2	2	3	2	3	2	1	4	3	2	2	2	3	3	4
10-Oct	2	2	3	3	1	1	1	2	2	2	1	1	2	2	3	2	2	2	3	3	3	3	3	3	3	3
11-Oct	3	3	3	3	4	3	4	4	4	4	4	4	5	5	5	4	4	4	4	3	3	3	3	3	3	5
12-Oct	4	3	4	4	3	3	3	2	3	3	4	3	3	3	3	2	1	1	1	2	2	1	1	1	1	4
13-Oct	1	1	1	1	1	1	1	1	1	1	1	2	2	3	3	3	3	3	2	2	2	2	1	1	1	3
14-Oct	1	1	1	1	1	1	2	2	3	3	2	3	3	3	3	3	3	3	1	3	3	2	2	1	1	3
15-Oct	2	2	1	2	2	1	1	1	2	2	2	2	3	3	2	1	1	1	1	1	1	1	1	1	1	3
16-Oct	1	2	4	3	2	1	1	1	1	2	2	2	3	3	3	3	1	0	1	2	2	1	1	1	1	4
17-Oct	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	2	2	3	2	4	3	5	5	5	5
18-Oct	5	5	5	4	5	4	4	4	4	4	3	3	3	2	2	1	1	1	1	1	1	1	1	1	1	5
19-Oct	1	1	2	2	2	3	2	1	3	3	3	2	2	3	2	2	2	2	1	1	2	2	2	1	1	3
20-Oct	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	2
21-Oct	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
22-Oct	1	1	1	1	1	2	2	2	1	2	2	2	2	2	2	2	1	2	1	1	1	1	1	1	1	2
23-Oct	1	1	1	1	2	2	1	1	1	2	3	3	3	3	3	3	1	1	2	2	1	1	2	1	1	3
24-Oct	2	1	3	3	1	1	3	3	4	3	7	9	8	8	6	5	5	3	2	2	1	1	1	1	1	9
25-Oct	2	2	2	2	3	2	3	3	3	3	3	4	3	4	4	4	3	2	2	1	1	1	2	2	2	4
26-Oct	2	2	2	3	4	3	3	3	3	4	3	3	3	3	2	2	1	1	1	1	1	2	1	1	1	4
27-Oct	1	1	1	1	1	1	1	1	1	2	2	3	3	3	2	3	3	3	3	3	3	3	3	3	2	3
28-Oct	2	2	1	1	3	3	2	2	3	2	8	7	6	5	6	6	6	7	7	7	6	6	7	6	6	8
29-Oct	7	7	6	6	6	4	4	4	5	5	5	5	4	3	2	2	1	1	1	1	1	1	1	1	1	7
30-Oct	2	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
31-Oct	1	1	1	1	1	1	0	0	1	1	1	2	1	2	3	3	3	3	3	3	4	4	4	4	4	4
														Diurnal Maximum												



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg**

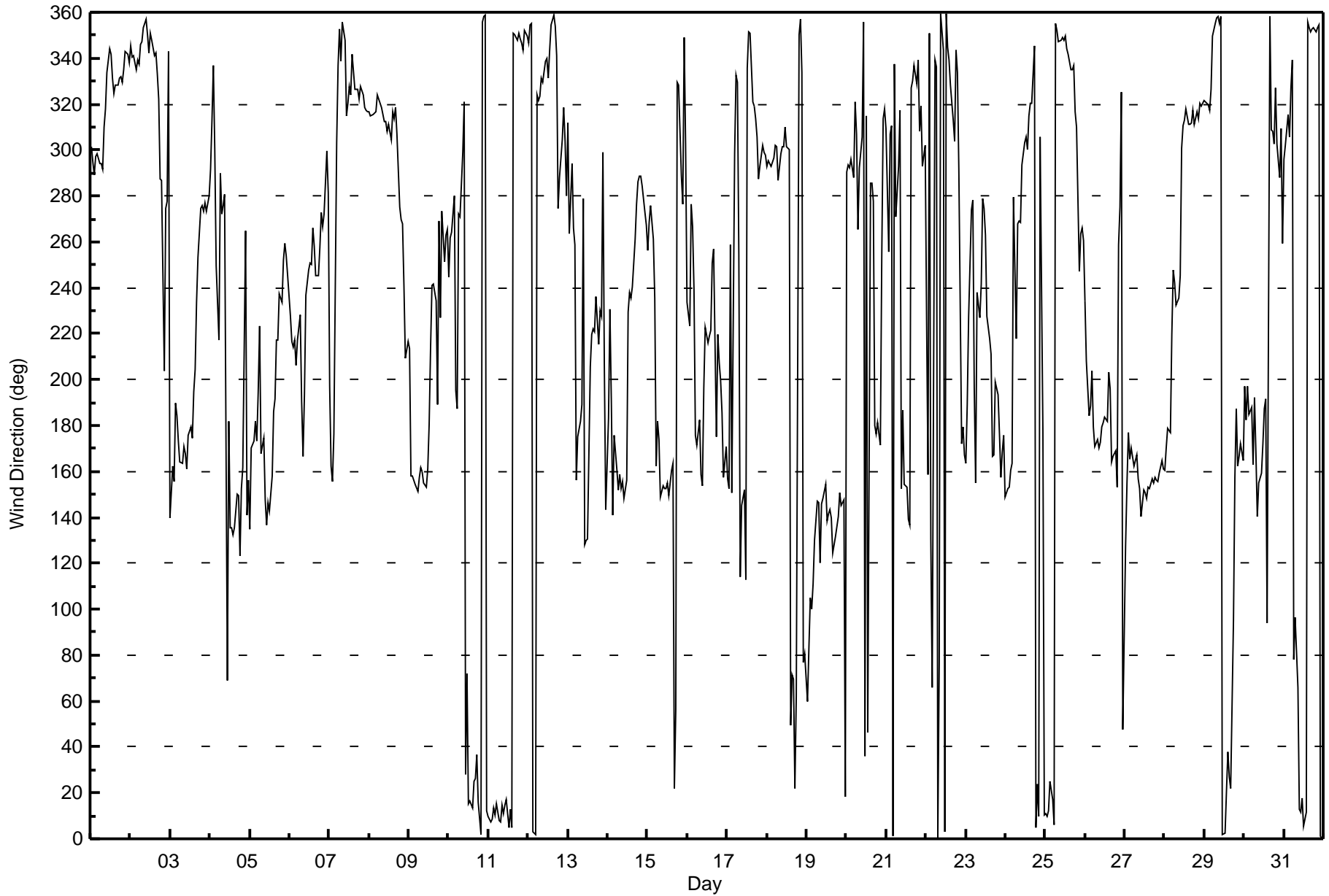
**Waskow ohci Pimatisiwin - October 2017**

Direction of Maximum Speed: 306 deg on Oct 24 13:00 Direction of Maximum Daily Speed Average: 323.1 deg on Oct 1																							Hours in Service:	744	
Direction of Minimum Speed: 183 deg on Oct 14 01:00 Direction of Minimum Daily Speed Average: 1.1 deg on Oct 21																							Hours of Data:	744	
Monthly Average Direction: 288.9 deg																							Hours of Missing Data:	0	
																							Percent Operational Time:	100.0	
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	302	294	289	297	298	294	294	292	310	318	334	344	342	331	325	328	328	331	332	330	335	343	342	338	323.1
2-Oct	345	340	341	335	339	338	346	347	353	357	350	342	351	348	341	342	333	322	287	287	204	275	278	343	340.8
3-Oct	140	162	155	190	184	174	164	163	171	168	161	176	179	174	194	204	234	254	275	276	273	277	274	280	198.4
4-Oct	292	313	337	301	249	217	290	272	276	281	69	182	135	136	132	136	150	149	123	152	162	265	141	156	176.4
5-Oct	135	170	173	182	173	195	223	168	174	148	137	147	143	158	186	192	217	217	237	234	252	259	254	245	193.0
6-Oct	228	217	214	217	206	217	228	190	167	193	237	248	251	250	266	258	245	245	257	273	267	272	300	281	243.1
7-Oct	197	162	155	176	303	337	353	339	355	348	315	320	328	324	342	326	326	326	322	328	324	319	317	316	326.2
8-Oct	317	315	316	316	316	324	322	318	315	313	313	308	311	304	317	313	319	307	275	270	268	241	209	217	311.2
9-Oct	214	158	158	156	154	152	157	162	160	155	153	161	181	213	241	242	234	189	269	227	273	251	263	266	187.7
10-Oct	245	261	264	280	195	187	272	271	299	321	28	72	15	17	14	25	26	37	16	2	356	358	359	12	349.1
11-Oct	10	7	8	13	10	15	8	8	15	11	15	17	5	13	5	351	350	348	351	348	346	344	352	350	1.9
12-Oct	347	355	355	3	2	324	322	324	332	329	339	340	332	343	355	359	354	341	274	288	304	318	304	280	335.6
13-Oct	312	263	294	266	259	156	175	182	189	279	128	130	130	206	219	222	221	236	215	230	227	299	208	144	209.1
14-Oct	183	230	191	141	176	160	152	159	153	156	148	156	230	238	236	241	261	276	286	288	289	284	273	268	229.7
15-Oct	256	268	276	261	236	162	182	174	149	154	153	152	155	149	160	163	22	56	329	329	289	277	349	303	190.3
16-Oct	234	223	276	267	239	176	171	182	159	154	196	223	216	219	221	251	257	175	220	207	199	185	157	171	213.7
17-Oct	157	153	259	151	298	333	330	254	114	145	152	113	336	352	351	321	319	313	305	287	293	302	299	298	306.5
18-Oct	293	295	293	295	297	302	301	286	298	301	301	310	301	300	50	71	69	22	62	350	357	334	77	81	302.8
19-Oct	60	83	105	100	111	130	147	147	120	146	148	154	139	141	144	140	125	132	136	140	150	145	148	18	135.2
20-Oct	290	293	292	296	288	321	307	266	292	306	356	36	315	46	286	286	278	180	176	181	171	253	313	318	290.3
21-Oct	309	256	307	310	1	337	271	293	318	152	187	154	153	139	137	327	330	337	329	340	308	319	293	302	307.2
22-Oct	226	159	351	130	66	339	336	1	77	359	344	3	359	345	339	328	313	304	343	334	292	172	179	167	337.2
23-Oct	164	189	227	274	278	197	155	238	227	242	279	274	263	228	218	211	166	167	199	193	177	158	168	176	217.9
24-Oct	149	153	153	161	164	279	218	268	269	268	293	303	306	300	315	321	320	345	5	24	10	305	177	11	302.0
25-Oct	11	10	12	25	17	6	355	352	347	348	349	348	350	344	341	335	335	337	317	310	247	263	266	261	344.9
26-Oct	234	208	184	189	204	179	171	174	170	173	180	181	184	182	203	196	164	166	169	153	259	275	325	48	185.2
27-Oct	128	155	177	165	171	162	165	167	157	153	140	152	151	148	153	153	157	155	157	156	156	159	165	161	155.9
28-Oct	160	170	179	177	220	248	242	232	235	245	301	311	313	318	311	311	312	317	311	317	314	320	319	320	304.6
29-Oct	322	320	320	317	327	350	355	358	358	355	358	2	2	21	38	27	22	95	158	187	162	167	172	165	342.0
30-Oct	197	182	197	185	188	163	192	168	140	155	159	172	187	191	94	358	309	308	303	327	303	288	310	259	204.3
31-Oct	296	302	316	306	327	339	78	97	66	13	12	17	5	12	356	353	352	353	354	352	353	354	1	0	357.1
300.2 298.7 300.8 297.0 301.6 306.9 302.7 295.1 310.8 310.6 321.4 312.9 312.1 305.6 311.1 309.7 311.7 313.2 305.6 304.6 301.5 307.3 307.2 307.9 Diurnal Average																									
All monthly, daily, and diurnal averages have been calculated using vector methods																									



Wood Buffalo Environmental Association  
Hourly Averages

Wind Direction (WD) - deg  
Waskow ohci Pimatisiwin - October 2017





**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Direction (WD) - deg**  
**Waskow ohci Pimatisiwin - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 113 deg on Oct 3 00:00																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Minimum Value: 9 deg on Oct 30 22:00																									
Percentiles: P <sub>1</sub> = 15 P <sub>10</sub> = 19 Q <sub>1</sub> = 23 Median = 31 Q <sub>3</sub> = 42 P <sub>90</sub> = 64 P <sub>99</sub> = 98																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-Oct	24	24	25	24	25	27	28	25	20	19	23	21	23	20	18	18	18	20	19	19	20	23	21	21	28
2-Oct	23	22	21	20	21	22	22	23	25	25	26	28	25	28	27	25	22	19	16	15	70	30	39	113	113
3-Oct	99	68	19	30	29	25	22	30	25	28	30	35	33	35	38	41	53	47	35	33	34	37	25	52	99
4-Oct	66	42	19	28	70	85	68	29	38	64	102	73	41	32	34	32	28	27	25	50	33	93	39	26	102
5-Oct	32	43	22	28	17	27	45	38	33	43	35	33	30	36	37	42	42	34	34	35	40	34	37	43	45
6-Oct	45	46	55	54	44	53	36	42	48	57	50	47	44	42	44	43	47	38	44	37	40	40	50	79	79
7-Oct	90	78	64	96	86	98	26	19	22	23	31	20	21	21	23	22	18	19	17	19	17	18	17	16	98
8-Oct	17	16	16	16	16	17	17	15	17	18	23	20	21	23	19	19	17	22	31	37	40	43	26	30	43
9-Oct	29	26	22	26	25	29	25	22	26	26	28	29	38	48	84	52	44	39	36	35	48	50	39	34	84
10-Oct	43	35	35	50	71	75	44	76	28	80	48	38	35	36	35	33	30	28	30	23	21	26	24	31	80
11-Oct	29	26	27	29	26	26	25	25	30	26	30	31	29	29	28	22	20	21	23	20	19	20	24	23	31
12-Oct	21	25	25	28	27	17	16	17	18	23	23	25	25	34	31	30	31	21	12	26	20	19	14	21	34
13-Oct	53	89	77	87	101	17	22	22	38	95	45	33	30	59	48	43	39	37	35	39	27	63	58	56	101
14-Oct	95	91	71	60	29	35	23	24	26	25	29	39	49	53	44	48	40	36	29	21	20	18	18	22	95
15-Oct	31	24	19	53	86	62	23	36	30	28	26	28	28	26	66	68	72	17	31	23	54	95	29	95	
16-Oct	38	45	39	32	31	16	19	31	27	32	44	45	37	39	41	47	57	15	38	60	37	41	29	21	60
17-Oct	33	68	89	95	41	86	27	86	67	40	29	38	51	19	21	14	18	17	17	23	24	24	27	23	95
18-Oct	22	24	23	23	24	21	23	23	26	23	28	30	47	64	49	44	97	91	57	33	37	27	61	43	97
19-Oct	53	49	46	35	33	31	35	78	63	28	30	39	32	34	33	31	32	25	25	24	24	29	60	85	85
20-Oct	46	28	16	31	62	16	55	81	67	36	43	44	105	98	31	29	26	59	42	68	37	98	46	45	105
21-Oct	33	54	80	56	32	33	33	53	69	60	37	52	42	55	51	90	30	28	21	27	60	37	56	31	90
22-Oct	53	55	49	82	59	93	23	46	30	42	31	33	32	30	33	27	17	20	35	49	42	87	40	34	93
23-Oct	41	35	62	27	27	94	34	57	48	40	40	44	46	43	38	37	20	27	33	30	32	33	28	32	94
24-Oct	36	36	28	31	38	45	41	44	38	37	41	23	20	21	24	20	18	18	31	34	49	91	86	37	91
25-Oct	29	23	24	28	29	26	20	19	18	18	18	19	21	19	20	18	18	16	26	95	70	49	36	36	95
26-Oct	30	34	35	38	41	35	30	33	31	33	36	34	33	33	38	40	38	29	21	22	85	63	70	41	85
27-Oct	77	29	44	23	33	32	43	30	33	31	28	26	26	30	26	27	24	26	27	25	25	25	25	28	77
28-Oct	28	36	49	29	42	37	30	27	28	37	23	19	21	20	18	19	18	16	19	18	19	18	18	17	49
29-Oct	18	18	16	16	18	26	23	22	24	22	25	27	27	34	37	37	37	91	49	28	29	24	23	36	91
30-Oct	35	31	29	44	29	39	81	50	35	24	26	34	38	69	62	59	31	15	23	41	21	9	28	88	88
31-Oct	55	42	17	26	85	73	16	15	35	25	23	28	24	27	22	20	19	20	20	20	21	20	24	25	85
																		99 91 89 96 101 98 81 86 69 95 102 73 105 98 84 90 97 91 57 95 85 98 95 113							
Diurnal Maximum																									



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Waskow Ohci Pimatisiwin	Station number:	AMS 25
Calibration Date:	October 10, 2017	Last Cal Date:	September 8, 2017
Start time (MST):	12:13	End time (MST):	14:48
Reason:	Routine		

### Calibration Standards

Cal Gas Concentration	<u>50.2</u>	ppm	Cal Gas Exp Date	April 19, 2021
Cal Gas Cylinder #	<u>EY0000817</u>			
Calibrator Make/Model	API T700		Serial Number	747
ZAG Make/Model	API 701		Serial Number	261

### Analyzer Information

Analyzer make:	Thermo 43i	Analyzer serial #:	1160290014
	<u>Start</u>	<u>Finish</u>	
Analyzer Range	0 - 1000 ppb	PMT voltage	-609
Calculated slope	0.992126	Lamp voltage	856
Calculated intercept	0.901447	Pressure	728.0
Analyzer Background	15.2	Flow	0.455
Analyzer Coefficient	0.704	Intensity	90
			<u>Finish</u>
			-610
			853
			731.7
			0.457
			89

### SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	4999	0.0	0.0	0.3	----
as found span	4931	79.8	799.5	803.0	0.996
calibrator zero	4999	0.0	0.0	0.3	----
high point	4931	79.8	799.5	797.0	1.003
second point	4972	39.8	398.7	399.5	0.998
third point	4992	20.0	200.3	199.0	1.007
as left zero	4999	0.0	0.0	0.3	----
as left span	4931	79.8	799.5	789.3	1.013
Average Correction Factor					1.003
Corrected As found	802.70	Previous response	804.91	*% change	0.3%

\* = > +/-5% change initiates investigation

#### Notes:

Changed inlet filter after as founds. Adjusted the span.

Calibration Performed By: Jayme Marcoux



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

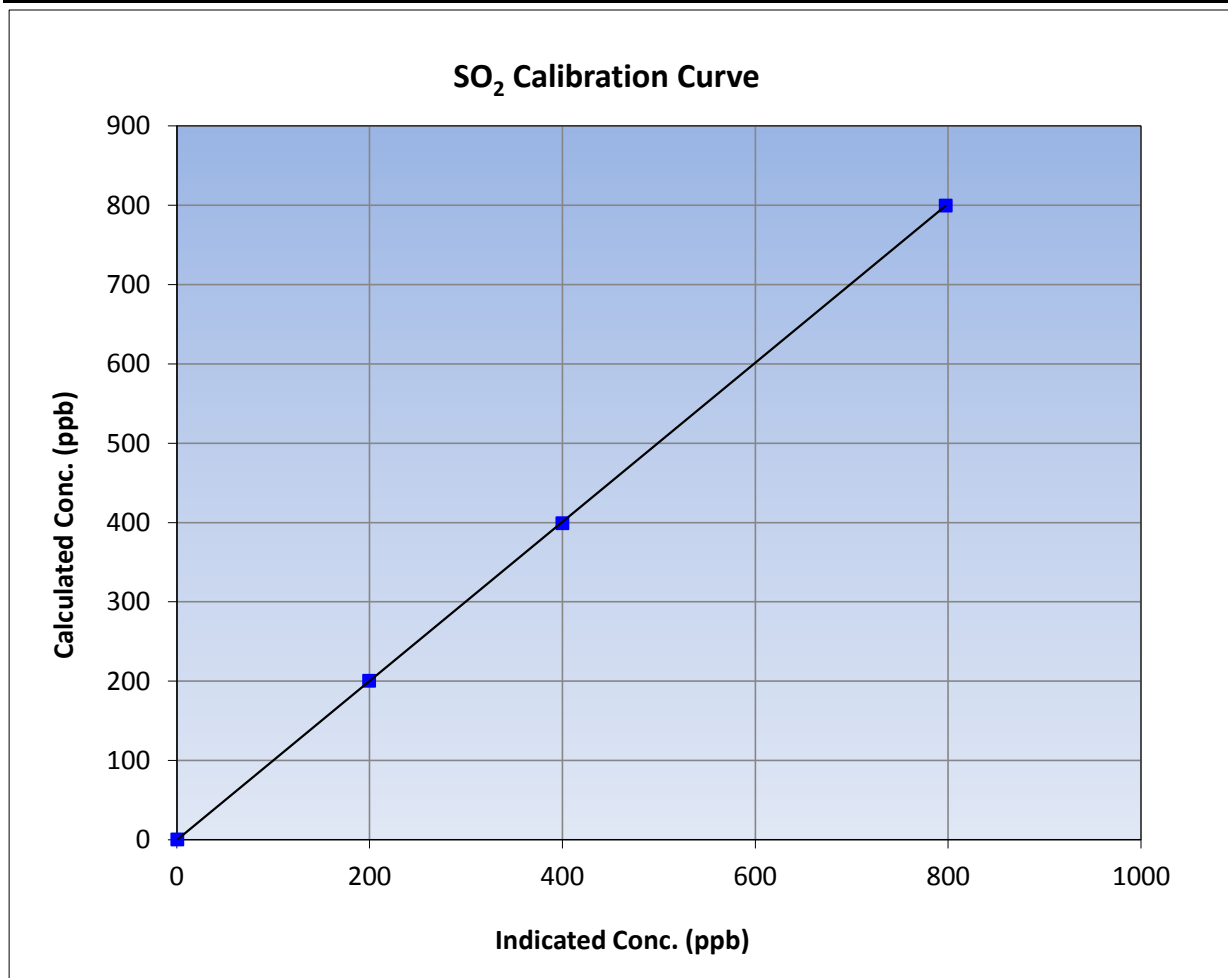
Version-03-2017

### Station Information

Calibration Date	October 10, 2017	Previous Calibration	September 8, 2017
Station Name	Waskow Ohci Pimatisiwin	Station Number	AMS 25
Start Time (MST)	12:13	End Time (MST)	14:48
Analyzer make	Thermo 43i	Analyzer serial #	1160290014

### Calibration Data

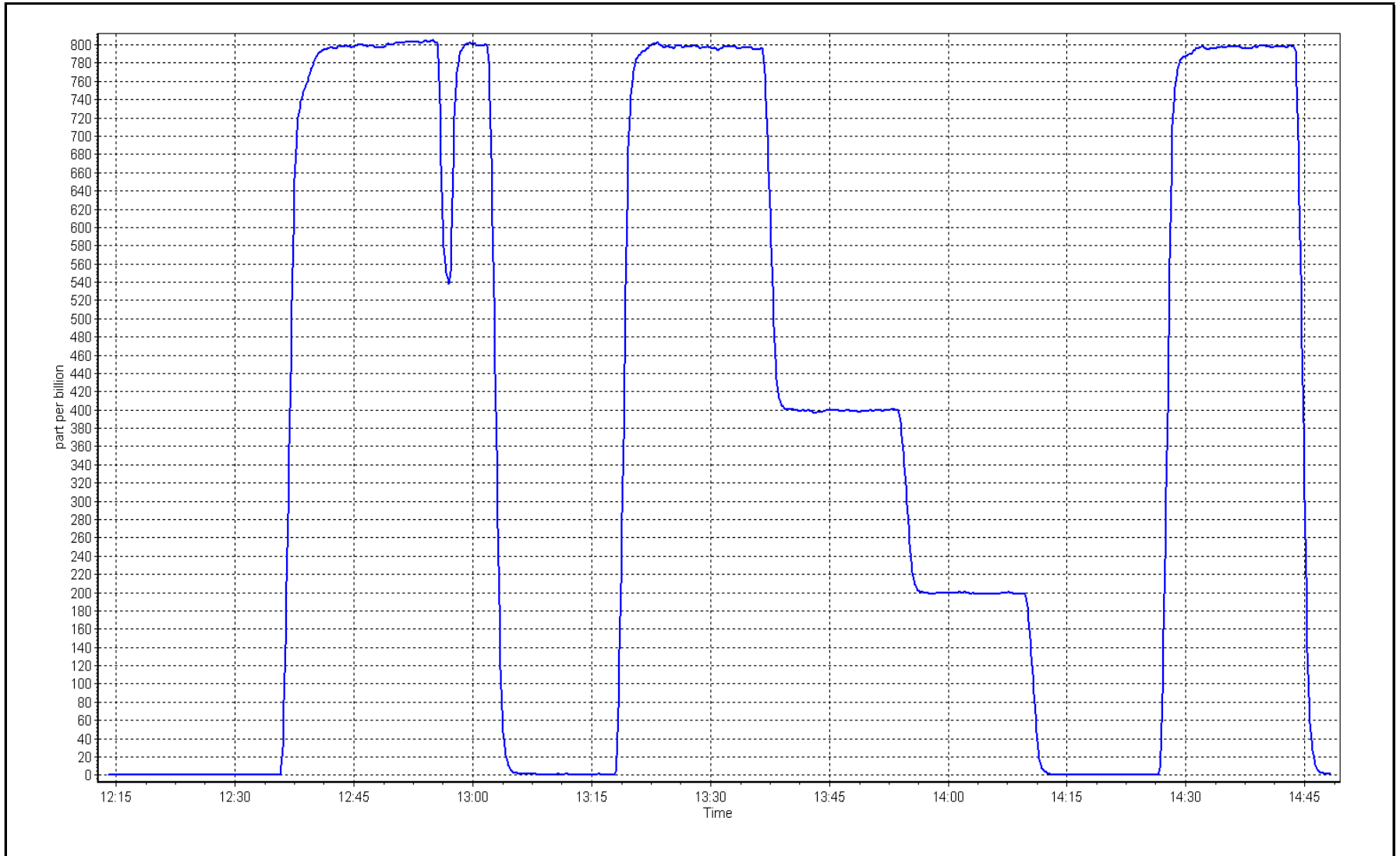
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits
0.0	0.3	----	Correlation Coefficient	≥0.995
799.5	797.0	1.0031		
398.7	399.5	0.9979	Slope	0.90 - 1.10
200.3	199.0	1.0066		
			Intercept	+/-30



SO2 Calibration Plot

Date: October 10, 2017

Location: Waskow Ohci Pimatisiwin









# Wood Buffalo Environmental Association

## H<sub>2</sub>S Calibration Summary

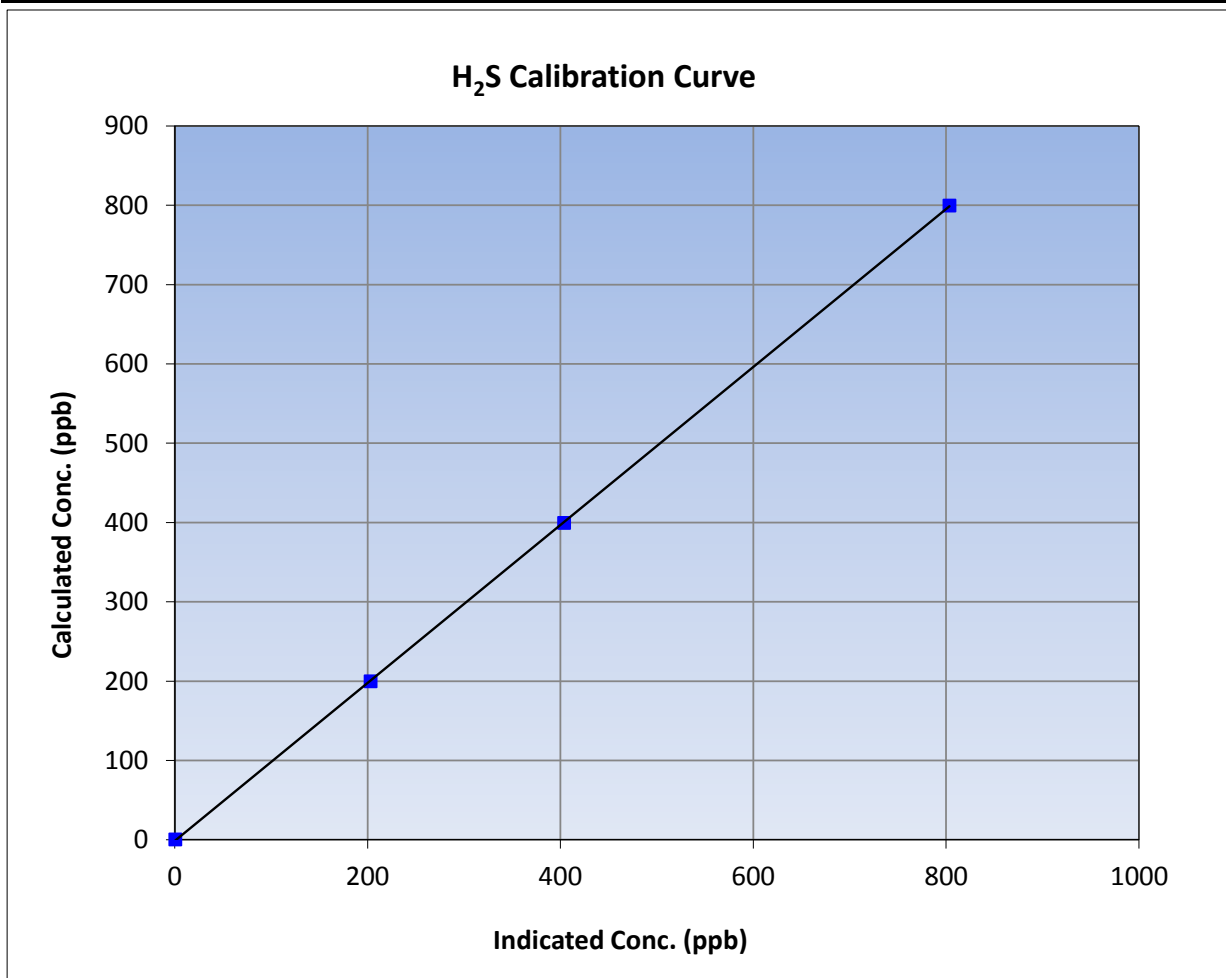
Version-03-2017

### Station Information

Calibration Date	October 10, 2017	Previous Calibration	September 8, 2017
Station Name	Waskow Ohci Pimatisiwin	Station Number	AMS 25
Start Time (MST)	8:59	End Time (MST)	12:27
Analyzer make	Thermo 450i	Analyzer serial #	822436967

### Calibration Data

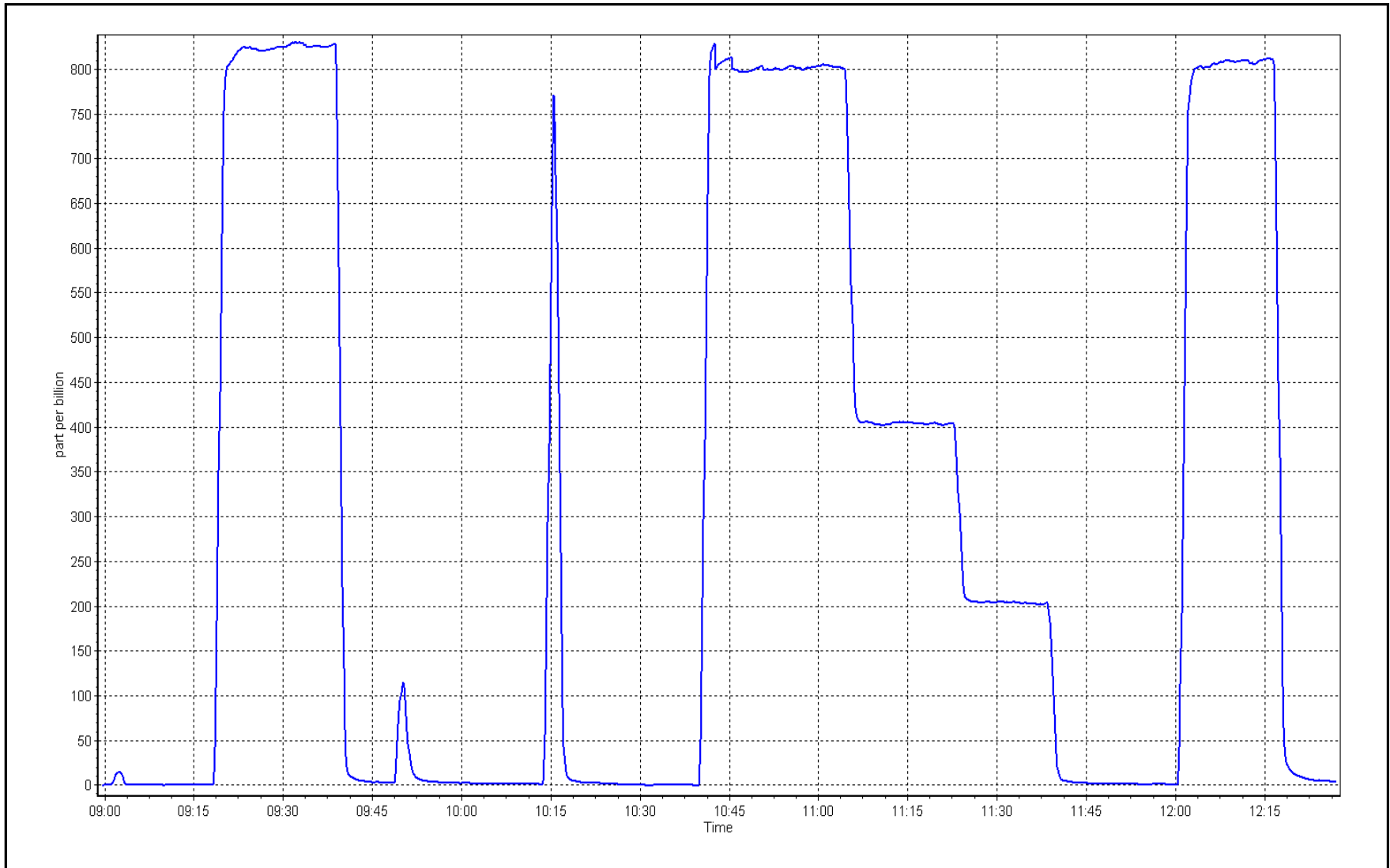
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>
0.0	0.2	----	Correlation Coefficient	≥0.995
799.3	803.1	0.9952		
399.1	403.5	0.9891	Slope	0.90 - 1.10
199.5	202.8	0.9838		
			Intercept	+/-10



# H<sub>2</sub>S Calibration Plot

Date: October 10, 2017

Location: Waskow Ohci Pimatisiwin





## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 500  
CHRISTINA LAKE  
OCTOBER 2017**

Operations, Data Collection,  
QA/QC, Data Validation and Reporting by:  
Wood Buffalo Environmental Association  
Fort McMurray, Alberta

November 29, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CHRISTINA LAKE (AMS 500)  
OCTOBER 2017

MONTHLY SUMMARY for  
AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	706	37	38	99.87	57	0	17	0
H2S (ppb) Average	708	36	36	100	2	0	0	0
NO2 (ppb) Average	705	38	39	99.87	23	0	8	-
NO (ppb) Average	705	38	39	99.87	23	-	7	-
NOX (ppb) Average	705	38	39	99.87	45	-	15	-
Temperature 2 m (C) Average	744	0	0	100	20.7	-	14.2	-
Relative Humidity (%) Average	744	0	0	100	99	-	98	-
Wind Speed 10 m (km/h) Average	702	1	42	94.49	36	-	23	-
Wind Direction 10 m (deg) Average	702	1	42	94.49	-	-	-	-

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CHRISTINA LAKE (AMS 500)  
OCTOBER 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	706	2.3	6	-	0	0	0	0	1	5	57
H2S (ppb) Average	708	0.2	0	-	0	0	0	0	0	0	2
NO2 (ppb) Average	705	3.9	3	-	0	1	2	3	5	7	23
NO (ppb) Average	705	1.8	3	-	0	0	0	1	2	4	23
NOX (ppb) Average	705	5.6	5	-	0	2	2	4	7	11	45
Temperature 2 m (C) Average	744	3.2	4.8	-	-5.6	-2.4	-0.5	2.5	6.1	9.6	20.7
Relative Humidity (%) Average	744	73.6	16	-	30	50	63	77	87	93	99
Wind Speed 10 m (km/h) Average	702	12.7	7	-	1	5	8	11	16	24	36
Wind Direction 10 m (deg) Average	702	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CHRISTINA LAKE (AMS 500)  
OCTOBER 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, NO2, NO, NOX	13 Oct 2017 12:00	13 Oct 2017 12:00	1	Maintenance - sample manifold cleaned
Wind Speed, Wind Direction	11 Oct 2017 18:00	13 Oct 2017 10:00	41	Flat line in sensor output signal



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb

Christina Lake - October 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 57 ppb on Oct 28 14:00	Maximum Daily Average: 16.8 ppb on Oct 28		Hours of Data:	706
Minimum Value: 0 ppb on Oct 16 02:00	Minimum Daily Average: 0.1 ppb on Oct 16		Hours of Missing Data:	38
Maximum Diurnal Average: 3.7 ppb at hour 14	Minimum Diurnal Average: 1.1 ppb at hour 8		Hours of Calibration:	37
Monthly Average: 2.3 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 5 P <sub>99</sub> = 37		Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	11	8	11	12	5	Z	2	5	5	5	2	1	2	2	1	1	1	2	1	1	1	1	1	0	3.4	12
2-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	4	2	0.8	4
3-Oct	1	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	1	2	2	1	0	0.6	2
4-Oct	0	0	Z	0	0	9	7	1	1	1	1	2	3	3	4	2	1	0	0	0	0	0	0	0	1.6	9
5-Oct	0	0	2	Z	4	3	2	1	2	1	0	2	3	1	1	1	2	2	2	2	1	1	1	1	1.5	4
6-Oct	2	1	1	1	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
7-Oct	0	0	0	0	0	Z	0	0	0	11	1	2	2	2	5	6	2	1	4	4	1	1	1	1	1.9	11
8-Oct	Z	4	5	6	12	12	7	4	3	3	3	4	3	7	9	6	1	1	1	1	3	2	0	0	4.1	12
9-Oct	0	Z	0	0	1	1	2	0	0	1	1	1	1	0	0	0	0	5	0	0	0	0	0	0	0.7	5
10-Oct	0	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
11-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
12-Oct	0	0	0	0	Z	0	0	0	0	0	1	2	2	1	1	0	0	0	0	1	1	4	4	2	1.0	4
13-Oct	3	5	1	1	3	Z	1	5	7	2	1	M	0	0	0	0	0	0	0	0	0	0	0	0	1.4	7
14-Oct	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	2	2	2	0.5	2
15-Oct	1	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	1	0	0	0	0.3	1
16-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
17-Oct	0	0	0	Z	1	1	1	1	0	0	0	0	1	0	0	0	0	2	21	51	49	39	43	7	9.5	51
18-Oct	7	3	2	9	Z	14	4	5	19	9	1	18	21	15	6	0	0	0	0	0	0	0	0	0	5.8	21
19-Oct	0	0	0	0	0	Z	0	1	1	1	2	2	1	1	1	1	0	0	0	0	1	1	1	0	0.7	2
20-Oct	Z	0	0	0	0	0	0	0	0	0	0	1	3	2	1	1	1	1	1	1	21	18	23	8	3.7	23
21-Oct	15	Z	11	21	1	1	0	0	0	1	7	1	9	7	3	1	0	0	0	0	0	0	0	0	3.4	21
22-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	C	C	1	0	0	0	0	0	0	0	0	0	0.2	1
23-Oct	0	0	0	Z	0	0	0	0	0	1	10	28	8	1	1	0	0	0	0	0	1	1	1	0	2.3	28
24-Oct	1	2	1	1	Z	2	1	0	0	0	34	1	C	C	C	C	2	0	0	0	0	0	0	0	2.5	34
25-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1
26-Oct	Z	1	1	0	0	0	1	1	0	1	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0.6	2
27-Oct	0	Z	0	1	0	0	0	0	0	0	0	1	1	1	0	1	0	0	1	0	0	0	0	0	0.4	1
28-Oct	1	1	Z	0	0	0	26	2	15	23	14	18	19	57	40	38	32	34	31	14	8	4	4	6	16.8	57
29-Oct	22	34	3	Z	2	3	2	4	3	1	1	1	0	2	1	1	1	1	0	0	0	0	0	0	3.6	34
30-Oct	2	1	0	0	Z	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	2	1	0	0.6	2
31-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0

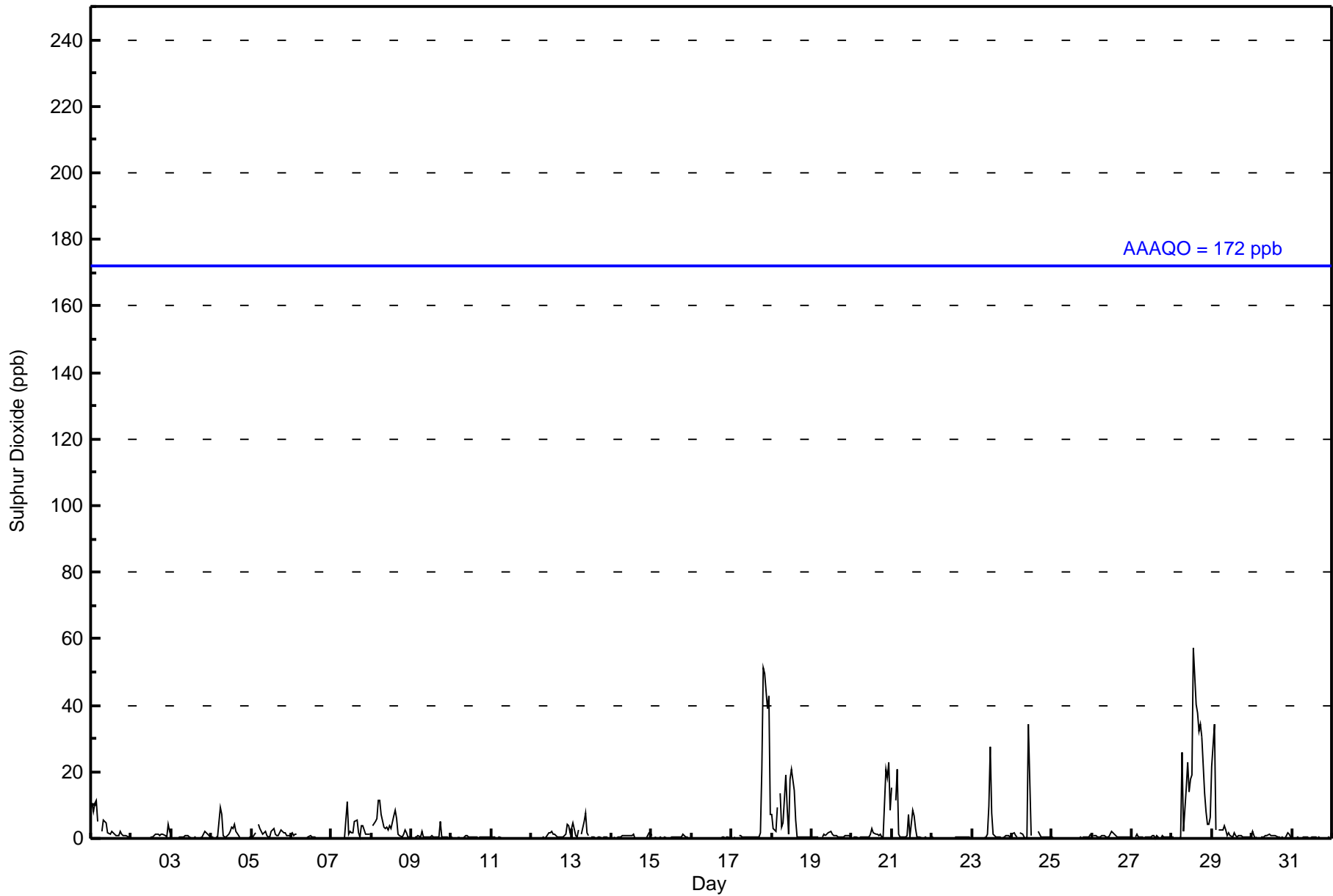
2.6	2.4	1.5	2.1	1.2	1.9	1.9	1.1	2.1	2.1	2.8	2.9	2.9	3.7	2.7	2.1	1.6	1.7	2.2	2.6	3.1	2.6	2.9	1.2	Diurnal Average	
22	34	11	21	12	14	26	5	19	23	34	28	21	57	40	38	32	34	31	51	49	39	43	8	Diurnal Maximum	

Z - zerospan      C - Calibration      M - Maintenance  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb    24-hr 48 ppb



Wood Buffalo Environmental Association  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Christina Lake - October 2017







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Christina Lake - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	667	94.48	94.48
11 - 20	18	2.55	97.03
21 - 60	21	2.97	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Christina Lake - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	17	32	21	12	11	14	22	23	72	85	85	79	34	19	66	35	627
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	7	8	3	0	18
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	5	16	0	0	21
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	17	32	21	12	11	14	22	23	72	85	85	79	46	43	69	35	666

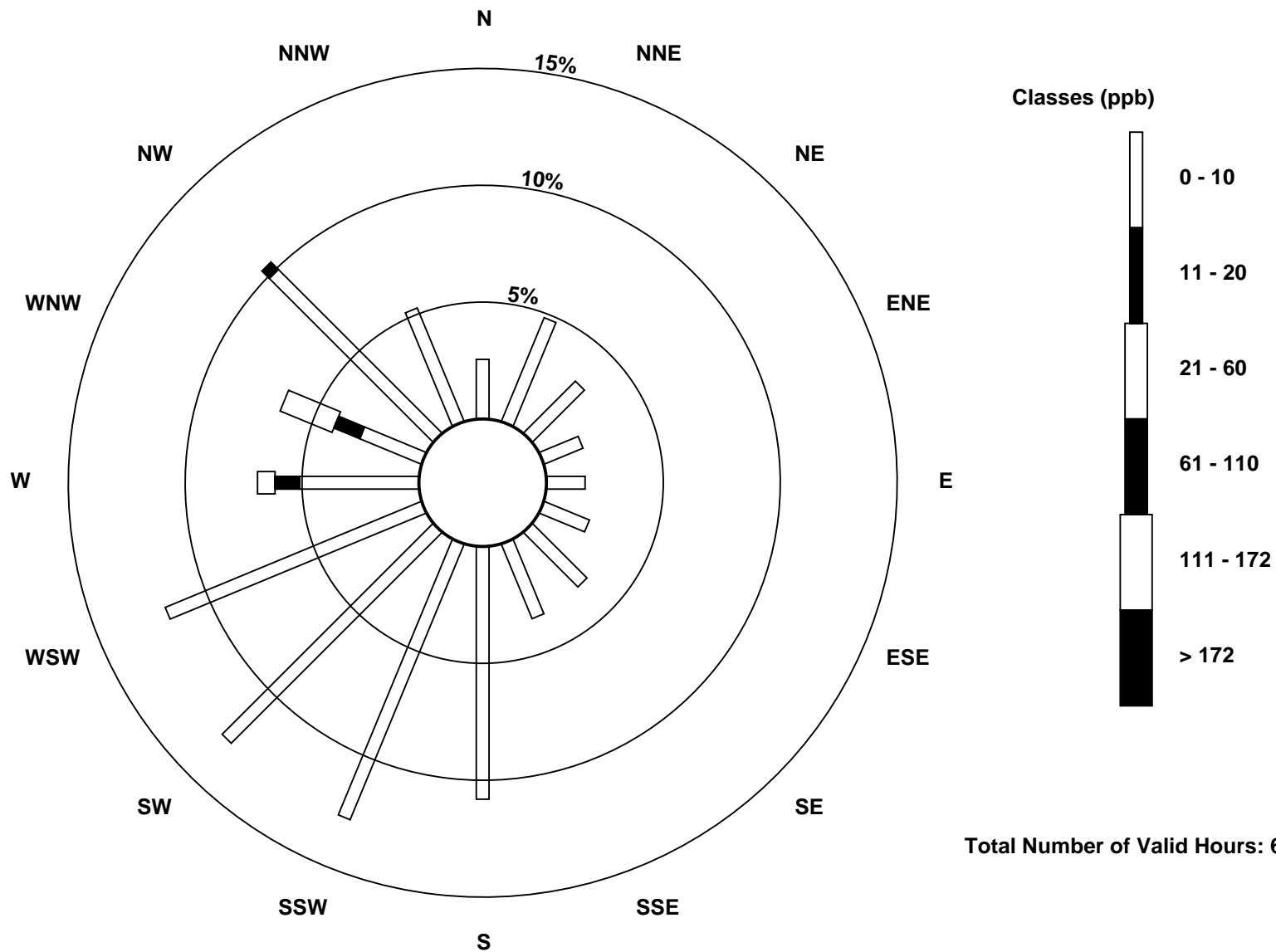
Total Number of Valid Hours: 666

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Christina Lake (AMS 500)

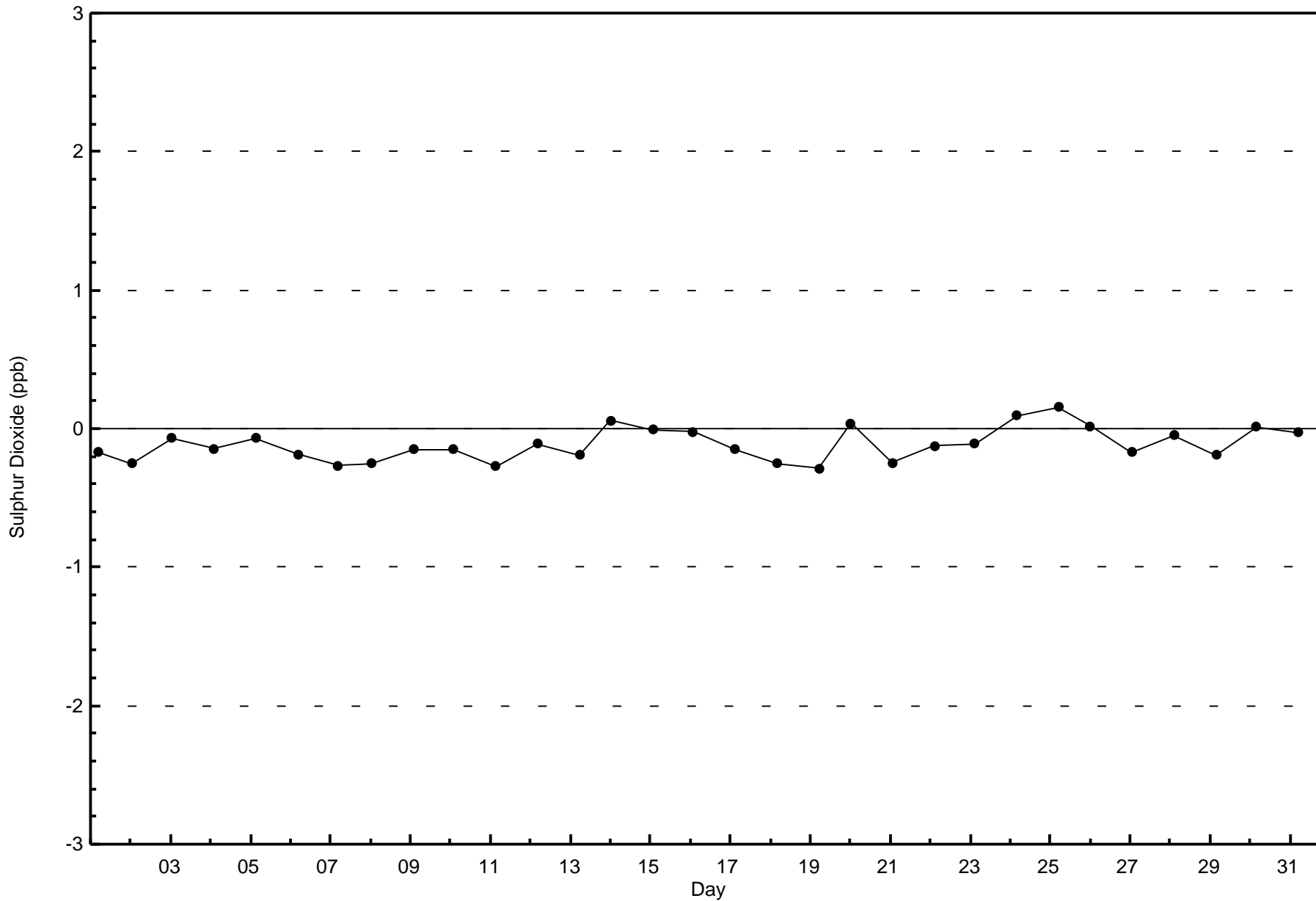


Total Number of Valid Hours: 666



Wood Buffalo Environmental Association  
Zero Responses

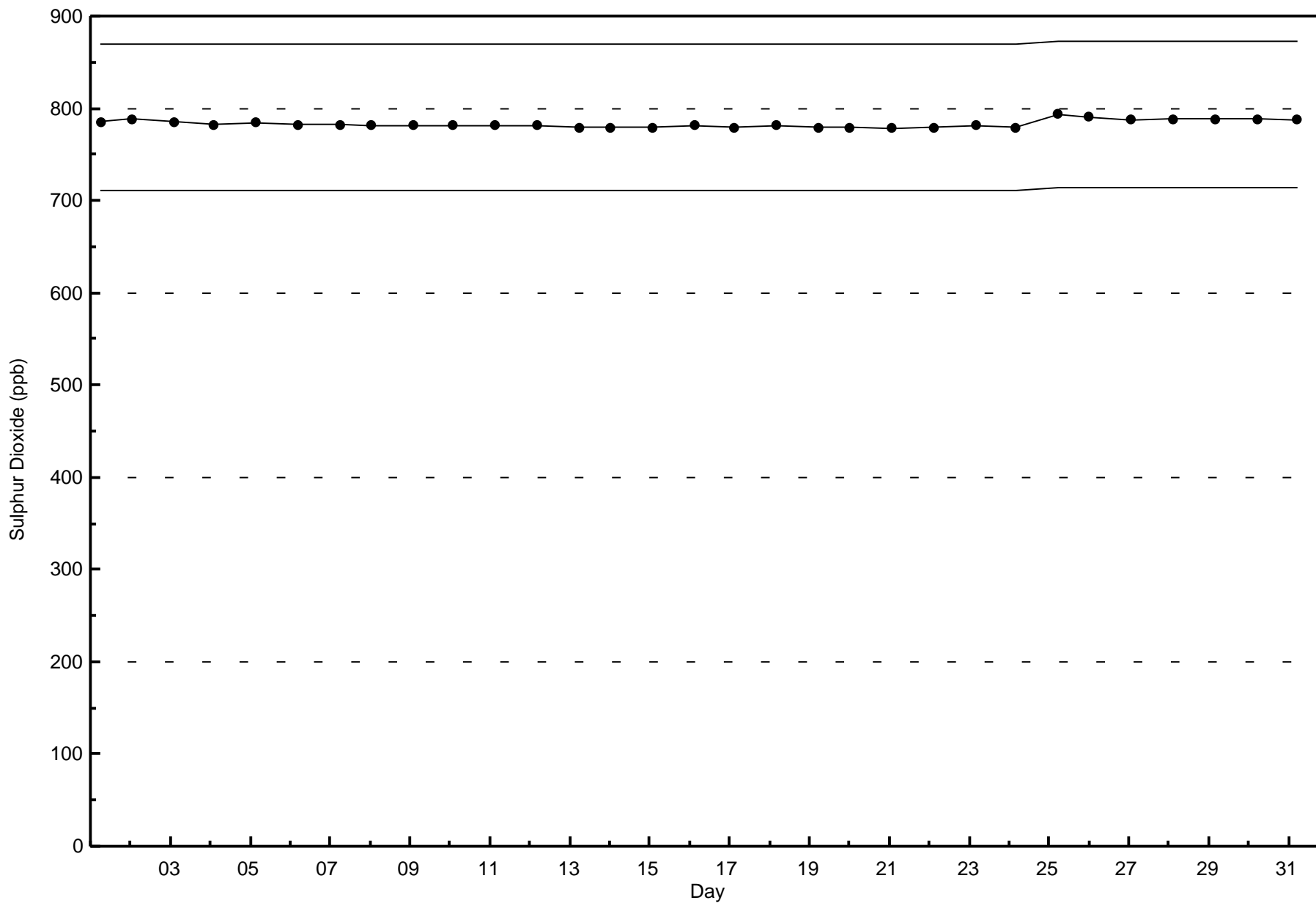
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Christina Lake - October 2017





Wood Buffalo Environmental Association  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Christina Lake - October 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H<sub>2</sub>S) - ppb

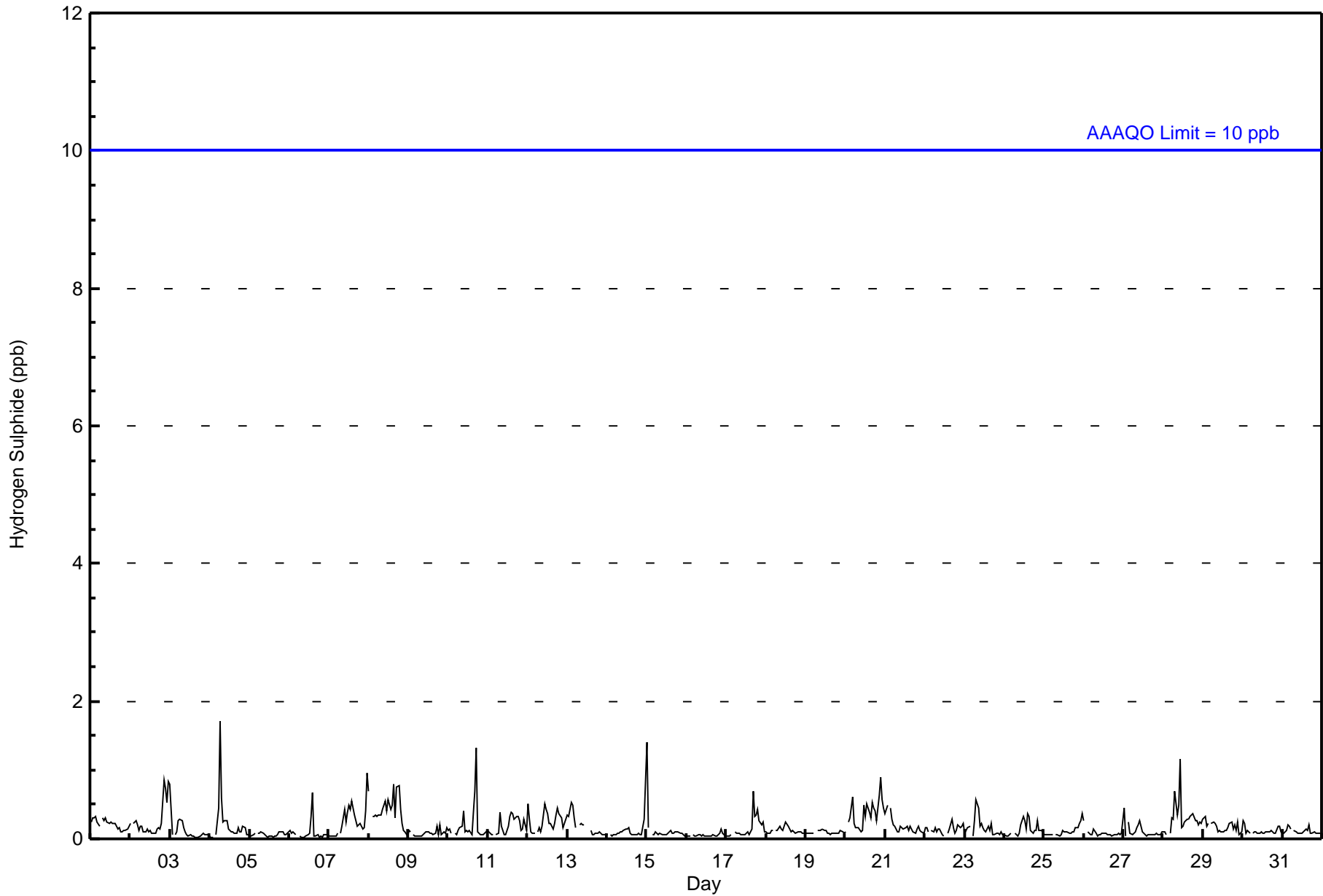
Christina Lake - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 2 ppb on Oct 4 07:00 Maximum Daily Average: 0.4 ppb on Oct 8																	Hours in Service: 744 Hours of Data: 708									
Minimum Value: 0 ppb on Oct 6 19:00 Minimum Daily Average: 0.1 ppb on Oct 16 Maximum Diurnal Average: 0.2 ppb at hour 1 Minimum Diurnal Average: 0.1 ppb at hour 3 Monthly Average: 0.2 ppb Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 1																	Hours of Missing Data: 36 Hours of Calibration: 36 Percent Operational Time: 100.0									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.3	1
3-Oct	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
4-Oct	0	0	0	Z	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2
5-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
6-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.1	1
7-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.3	1
8-Oct	1	Z	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	1	1	0	0	0	0	0	0.4	1
9-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
10-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.2	1
11-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
12-Oct	1	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
13-Oct	0	0	1	0	0	0	Z	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0.2	1
14-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1	1
15-Oct	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
16-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
17-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.2	1
18-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
19-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
20-Oct	0	Z	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	1	1	0	0.4	1
21-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
22-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	C	C	0	0	0	0	0	0	0	0	0	0	0.1	0
23-Oct	0	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
24-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
25-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
26-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
27-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
28-Oct	0	0	0	Z	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
29-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
30-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
31-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
0.2 0.1 0.1 0.2 0.1 0.1 0.2																								Diurnal Average		
1 0 1 0 1 0 2 1 0 0 1 0 1 1 1 1 1 1 1 1 0 1 1 1 1 1																								Diurnal Maximum		
Z - zerospan C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Christina Lake - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Christina Lake - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	708	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744





**Wood Buffalo Environmental Association  
Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Christina Lake - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 2	17	32	21	12	12	14	22	21	72	87	81	79	48	47	69	35	669
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	17	32	21	12	12	14	22	21	72	87	81	79	48	47	69	35	669

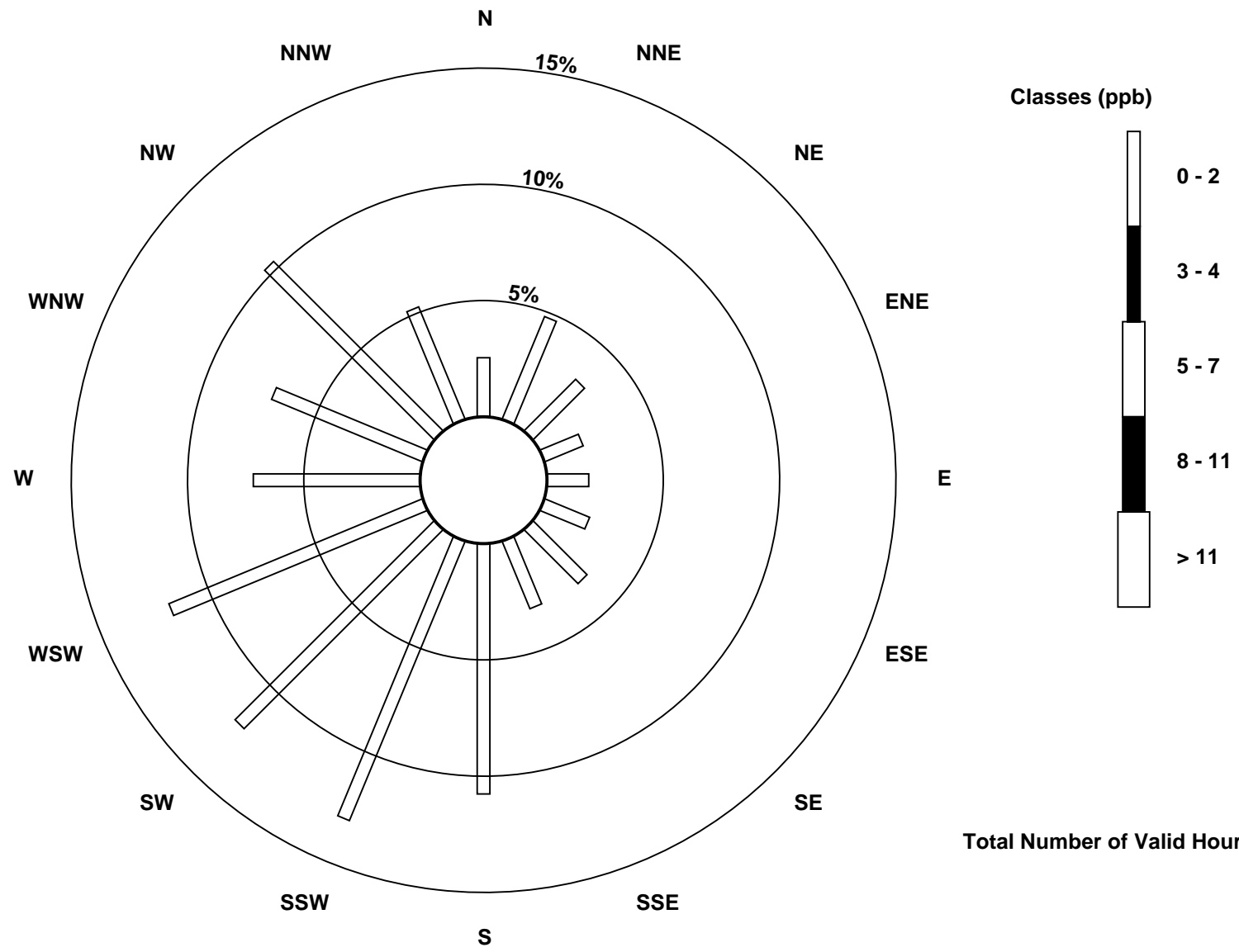
Total Number of Valid Hours: 669

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

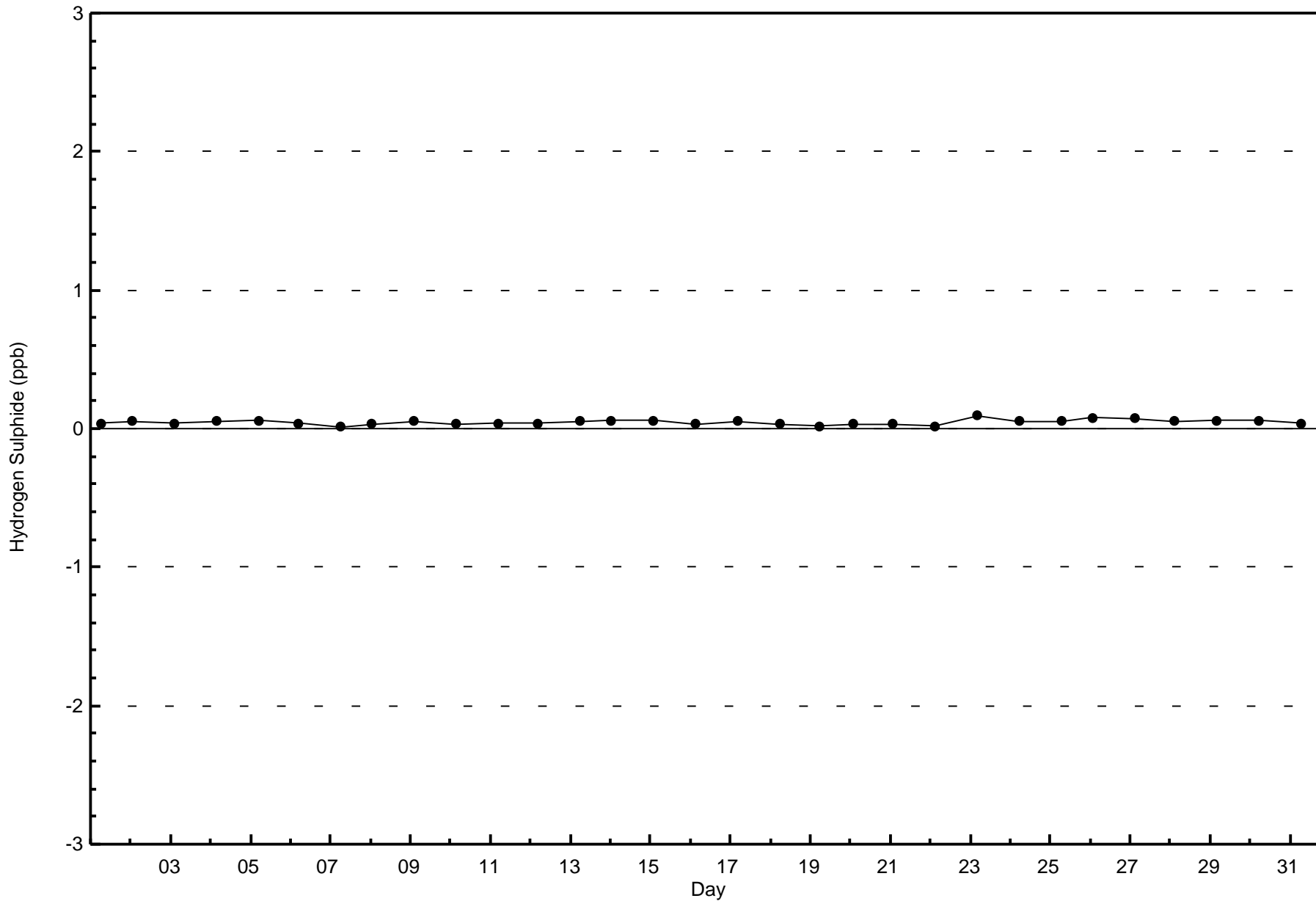
Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Christina Lake (AMS 500)

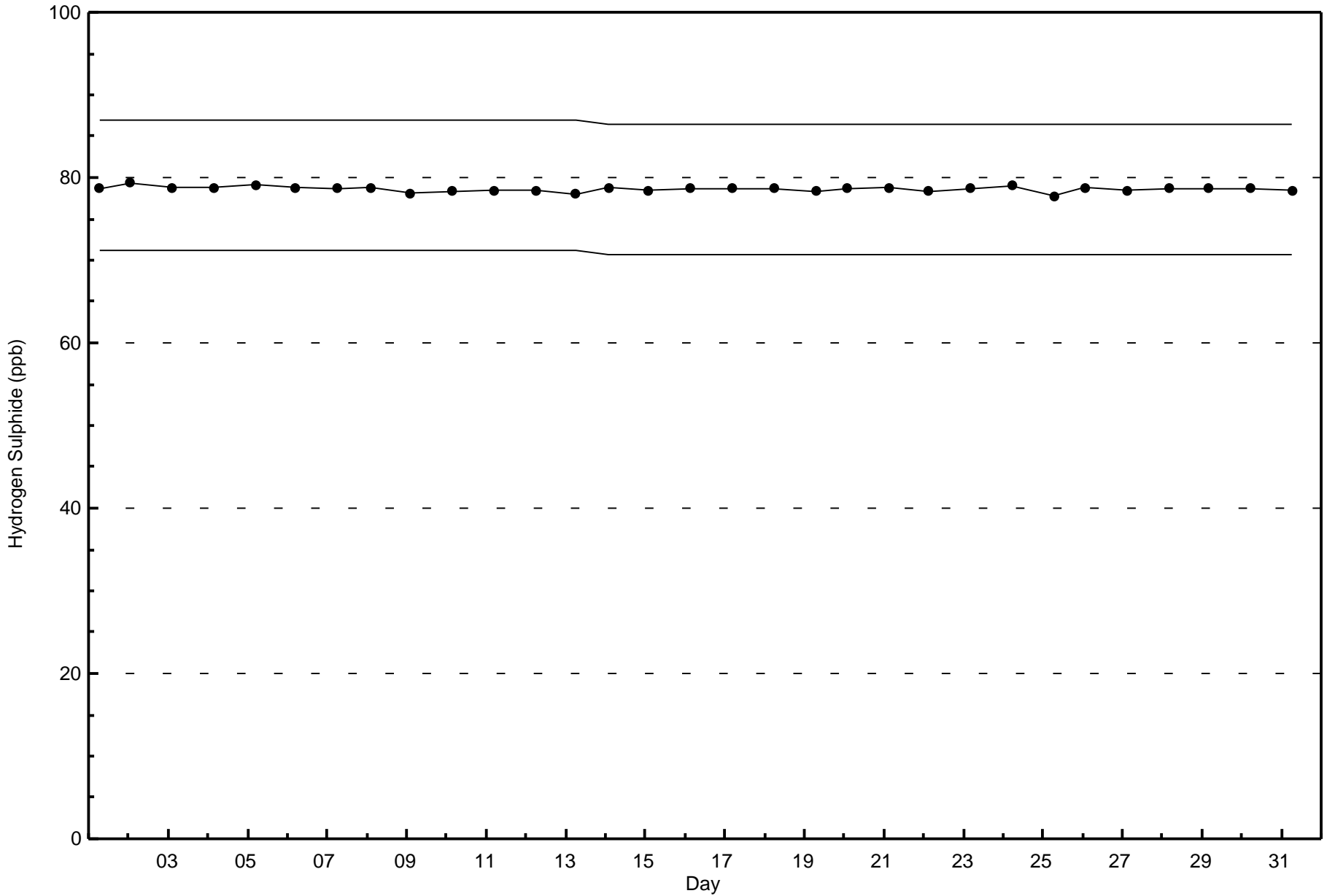




Wood Buffalo Environmental Association  
Zero Responses

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Christina Lake - October 2017







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxide (NO) - ppb

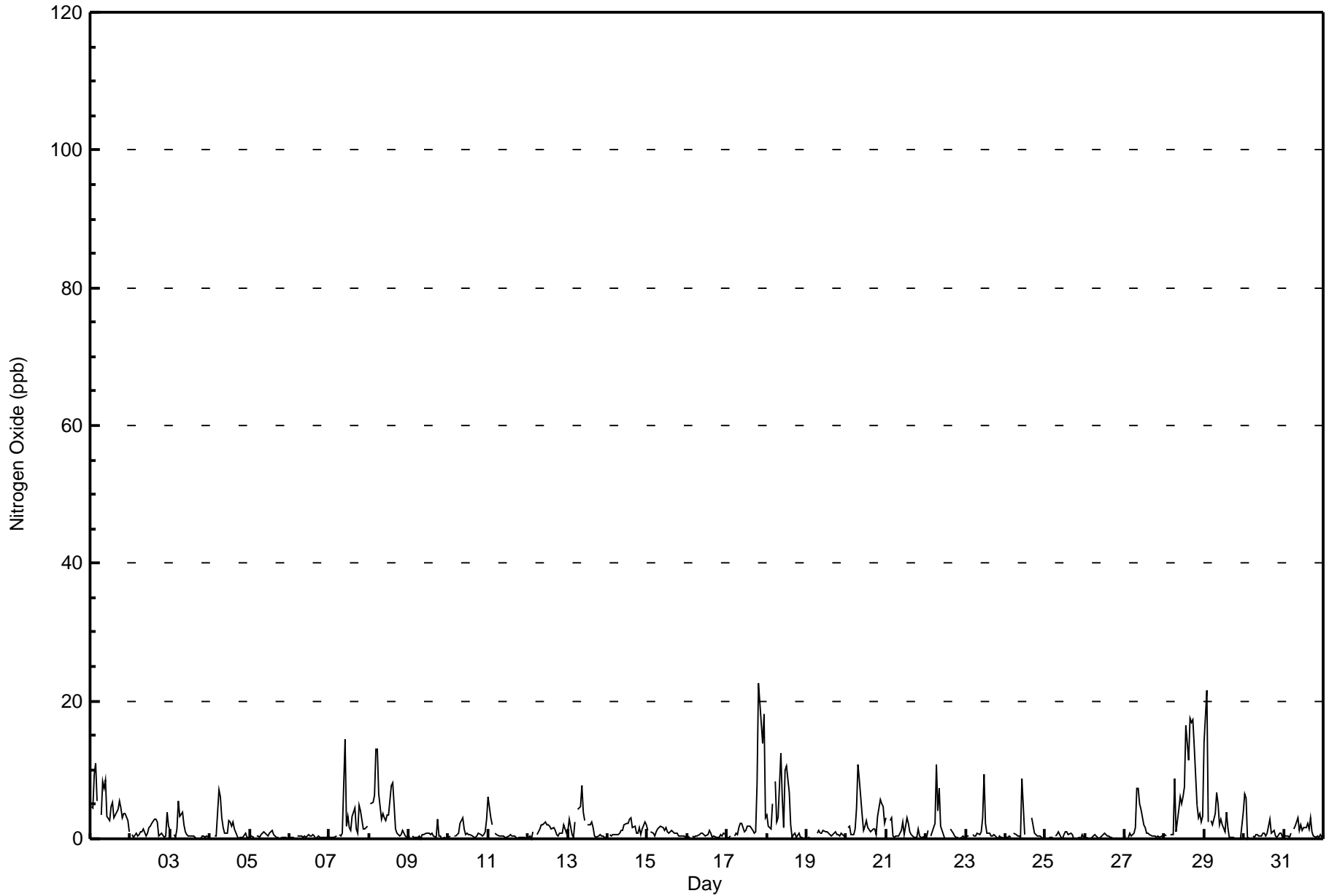
Christina Lake - October 2017

Maximum Value: 23 ppb on Oct 17 20:00		Maximum Daily Average: 6.6 ppb on Oct 28		Hours in Service: 744																											
Minimum Value: 0 ppb on Oct 3 17:00		Minimum Daily Average: 0.2 ppb on Oct 26		Hours of Data: 705																											
Maximum Diurnal Average: 2.9 ppb at hour 9		Minimum Diurnal Average: 0.9 ppb at hour 24		Hours of Missing Data: 39																											
Monthly Average: 1.8 ppb		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 2 P <sub>90</sub> = 4 P <sub>99</sub> = 17		Hours of Calibration: 38																											
				Percent Operational Time: 99.9																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24							
1-Oct	5	4	9	11	5	Z	3	8	7	9	3	3	5	5	3	3	4	6	4	3	4	4	3	1	4.9	11					
2-Oct	Z	1	0	1	0	1	1	1	1	0	1	2	2	2	3	3	2	0	1	1	0	0	4	2	1.3	4					
3-Oct	1	Z	1	0	1	5	3	4	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	5					
4-Oct	0	0	Z	0	0	7	6	3	2	1	1	3	3	2	2	1	0	0	0	0	0	1	0	0	1.5	7					
5-Oct	0	0	0	Z	0	0	0	1	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1					
6-Oct	0	0	0	0	Z	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0.3	1					
7-Oct	0	0	0	0	0	Z	1	0	1	15	2	3	2	1	3	5	2	1	5	4	1	1	2	2	2.2	15					
8-Oct	Z	5	5	6	13	13	7	3	4	3	3	3	4	8	8	5	1	1	0	1	1	1	0	0	4.1	13					
9-Oct	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	3	0	0	0	0	0	0	0.5	3					
10-Oct	0	0	Z	0	0	1	1	2	3	1	1	1	1	1	0	0	0	0	1	1	0	1	1	3	0.8	3					
11-Oct	6	3	2	Z	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0.8	6					
12-Oct	0	0	0	1	Z	1	1	1	2	2	3	2	2	2	1	2	1	1	0	1	1	2	1	1	1.3	3					
13-Oct	1	3	1	0	2	Z	4	5	8	4	3	M	2	2	3	2	0	0	1	0	0	0	0	0	1.9	8					
14-Oct	Z	1	0	1	1	1	1	1	1	1	2	2	2	3	3	2	2	1	1	2	1	1	2	2	1.4	3					
15-Oct	1	Z	1	1	0	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	0	0	0	0	0.9	2					
16-Oct	0	0	Z	0	0	0	0	1	1	1	1	0	1	1	1	0	0	0	0	0	1	0	1	1	0.5	1					
17-Oct	0	0	0	Z	0	1	1	2	2	2	1	1	2	2	2	1	1	1	8	23	20	14	18	3	4.5	23					
18-Oct	3	2	2	5	Z	8	2	3	12	6	2	10	11	7	2	0	1	1	0	1	0	0	0	0	3.4	12					
19-Oct	0	0	0	0	0	Z	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1	0	0	0.6	1					
20-Oct	Z	2	2	1	1	1	4	11	8	3	1	2	3	2	1	1	2	1	1	3	6	5	5	2	2.9	11					
21-Oct	3	Z	3	3	0	0	0	0	1	1	2	1	3	2	1	1	0	0	0	1	0	0	0	0	1.1	3					
22-Oct	0	1	Z	0	1	2	11	4	7	2	1	0	C	C	C	1	1	0	0	0	0	0	0	0	1.7	11					
23-Oct	0	0	0	Z	1	0	0	1	1	1	3	9	2	1	1	0	0	1	0	0	0	0	0	0	1.0	9					
24-Oct	0	0	0	0	Z	1	1	0	0	0	9	1	C	C	C	C	3	1	1	0	0	0	0	0	1.0	9					
25-Oct	0	0	0	0	0	Z	0	1	1	0	0	1	1	1	1	1	1	0	0	0	0	0	1	0	0.4	1					
26-Oct	Z	0	0	0	0	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1					
27-Oct	0	Z	0	1	0	1	2	7	7	5	4	2	2	1	1	1	0	0	0	0	0	0	0	0	1.6	7					
28-Oct	1	0	Z	1	1	1	9	1	4	6	5	6	8	16	11	18	17	17	13	5	3	4	3	3	6.6	18					
29-Oct	14	22	3	Z	3	2	4	7	5	2	3	2	1	4	2	0	0	0	0	0	0	0	0	4	3.3	22					
30-Oct	7	6	0	0	Z	0	0	1	1	0	0	1	1	0	1	3	1	1	1	0	0	1	1	0	1.2	7					
31-Oct	1	0	0	0	1	Z	1	2	3	1	2	1	2	2	2	1	3	1	0	0	0	0	1	0	1.1	3					
		1.7	2.0	1.2	1.3	1.3	2.0	2.2	2.4	2.9	2.3	1.8	2.0	2.1	2.4	2.0	1.8	1.5	1.3	1.3	1.6	1.4	1.3	1.4	0.9	Diurnal Average					
		14	22	9	11	13	13	11	11	12	15	9	10	11	16	11	18	17	17	13	23	20	14	18	4	Diurnal Maximum					
Z - zerospan		C - Calibration			M - Maintenance																										



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Oxide (NO) - ppb**  
**Christina Lake - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Oxide (NO) - ppb**  
**Christina Lake - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	703	99.72	99.72
21 - 40	2	0.28	100.00
11 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Nitrogen Oxide (NO) - ppb**  
**Christina Lake - October 2017**

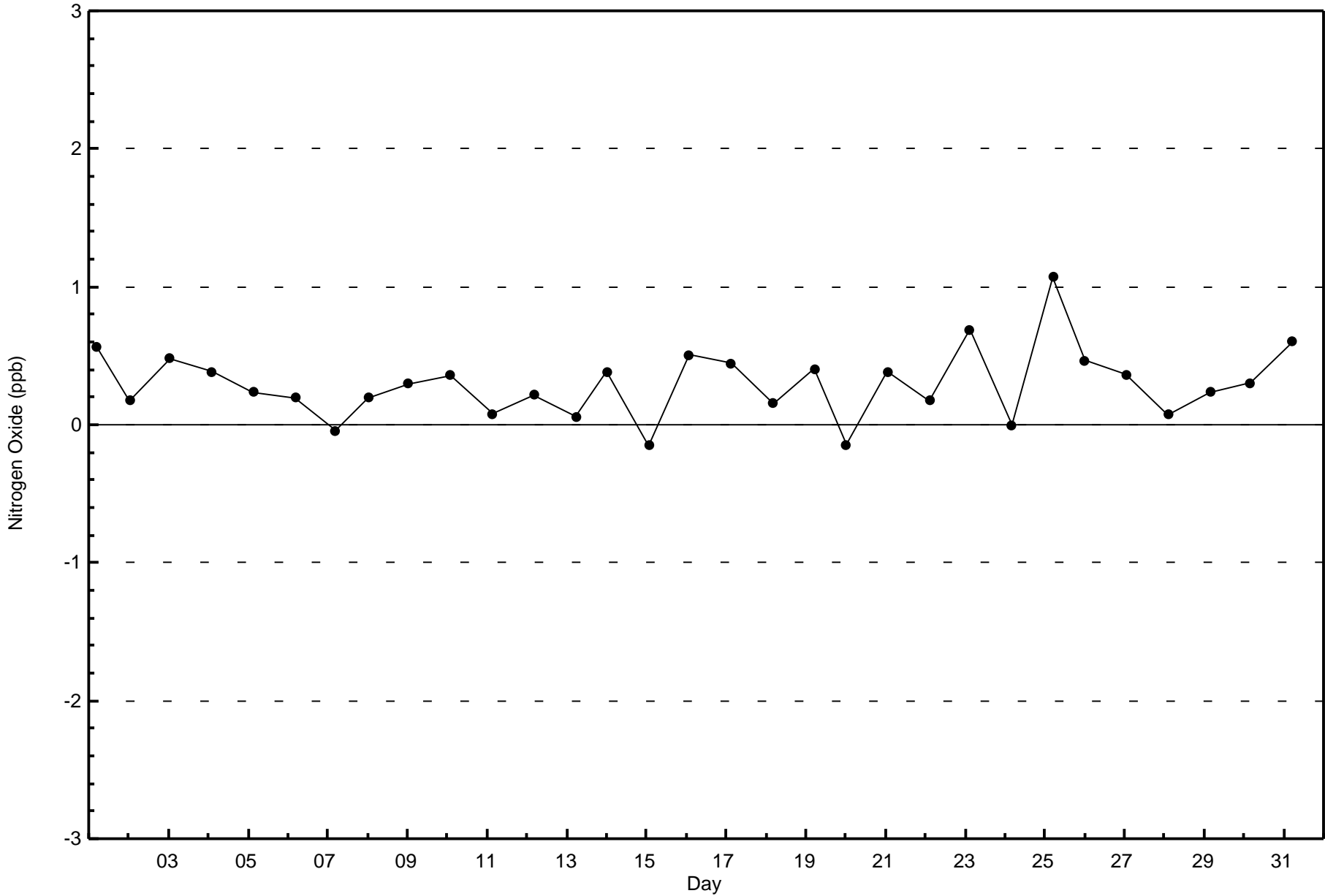
<b>Concentration</b> <b>Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	17	32	21	12	11	14	22	23	72	84	85	79	46	41	69	35	663
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	17	32	21	12	11	14	22	23	72	84	85	79	46	43	69	35	665

Total Number of Valid Hours: 665

Total Number of Hours: 744



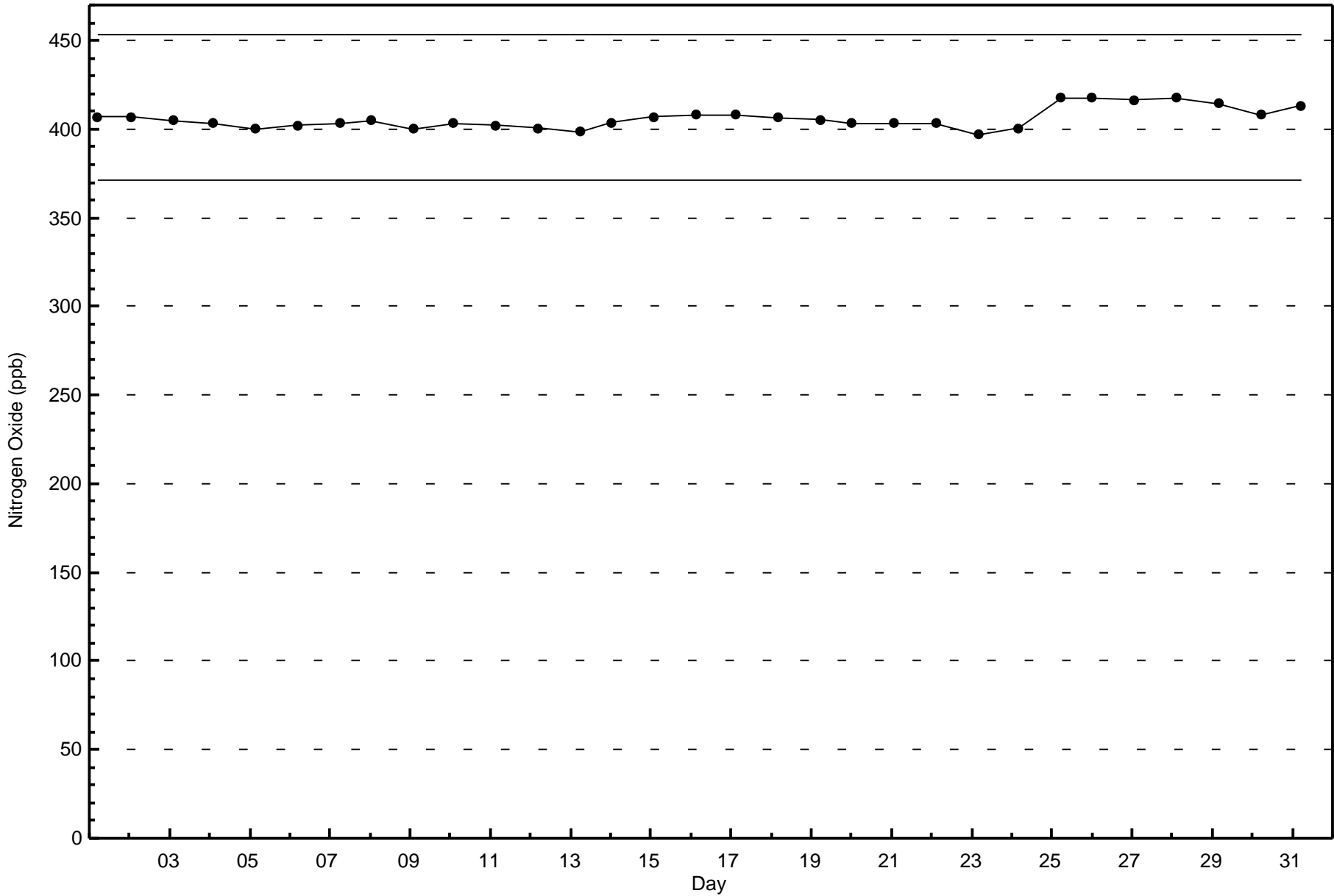






Wood Buffalo Environmental Association  
Span Responses

Nitrogen Oxide (NO) - ppb  
Christina Lake - October 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb

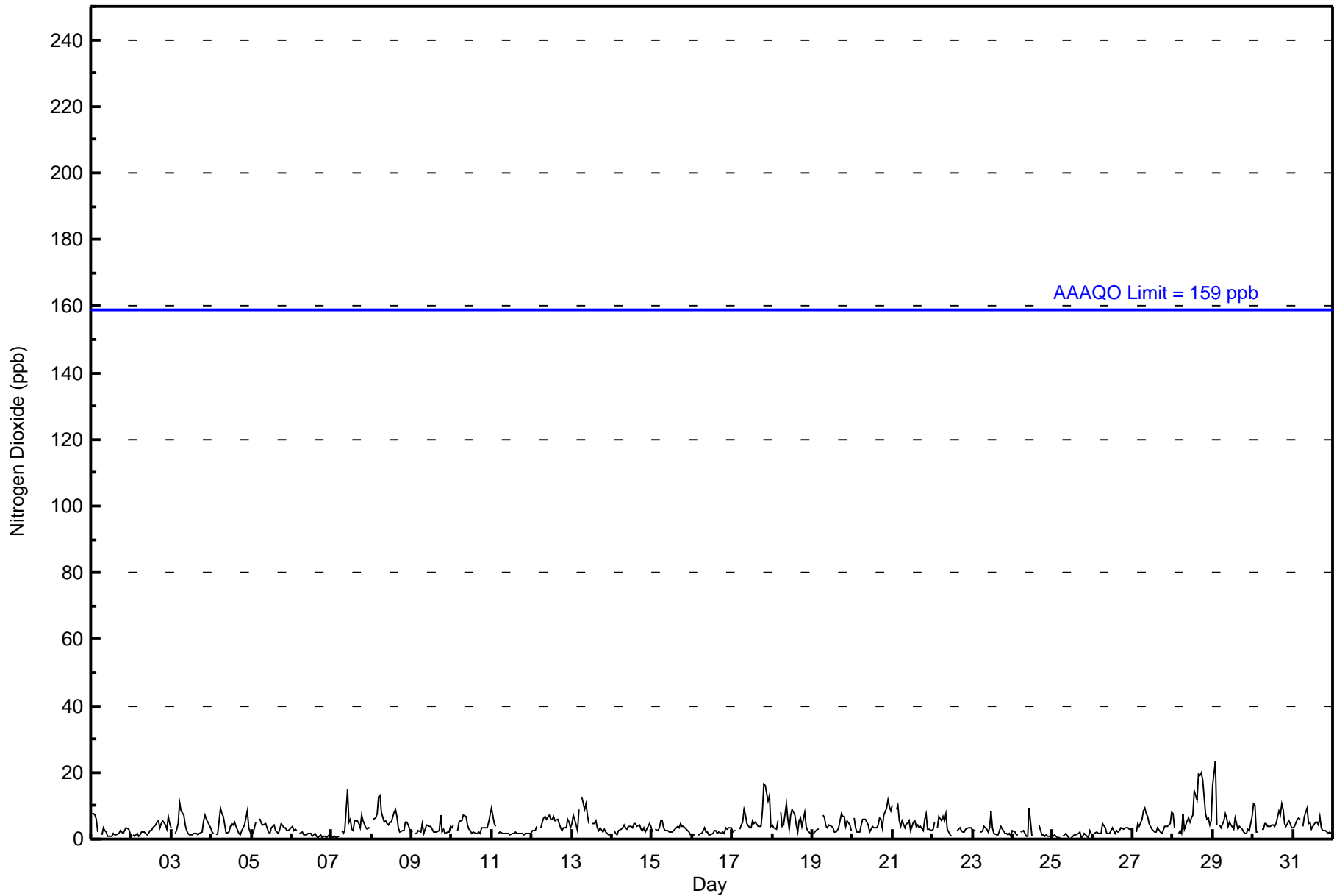
Christina Lake - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 23 ppb on Oct 29 02:00										Maximum Daily Average: 8.3 ppb on Oct 28										Hours of Data: 705						
Minimum Value: 0 ppb on Oct 25 11:00										Minimum Daily Average: 1.0 ppb on Oct 25										Hours of Missing Data: 39						
Maximum Diurnal Average: 4.8 ppb at hour 7										Minimum Diurnal Average: 3.1 ppb at hour 4										Hours of Calibration: 38						
Monthly Average: 3.9 ppb										Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 O <sub>1</sub> = 2 Median = 3 O <sub>3</sub> = 5 P <sub>90</sub> = 7 P <sub>99</sub> = 16										Percent Operational Time: 99.9						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	8	8	7	6	2	Z	1	3	3	2	1	1	1	2	1	1	2	3	2	2	3	3	3	2	2.9	8
2-Oct	Z	1	1	2	1	1	2	2	2	1	2	3	3	4	4	5	5	3	5	6	4	3	7	5	3.1	7
3-Oct	3	Z	2	3	5	11	8	7	4	3	2	1	1	2	2	2	1	2	2	5	7	6	5	3	3.8	11
4-Oct	2	2	Z	1	2	9	8	7	4	2	2	4	5	4	5	4	2	1	2	3	4	8	3	2	3.8	9
5-Oct	1	2	5	Z	6	6	5	4	5	3	2	2	3	4	3	2	2	3	5	4	3	3	3	3	3.3	6
6-Oct	4	3	3	3	Z	2	2	1	1	1	2	2	1	1	2	1	0	1	1	1	1	1	1	1	1.5	4
7-Oct	1	1	1	1	1	Z	2	2	3	15	5	6	3	3	5	5	5	4	7	6	3	3	3	4	3.8	15
8-Oct	Z	6	6	8	13	13	8	5	6	5	4	5	5	8	9	7	3	2	2	3	5	5	4	2	5.8	13
9-Oct	3	Z	2	2	3	2	5	2	3	4	4	4	3	2	2	2	3	7	2	3	2	2	2	4	2.9	7
10-Oct	3	4	Z	3	5	6	5	7	7	4	3	3	2	2	2	2	2	2	3	3	3	3	5	7	3.8	7
11-Oct	10	5	4	Z	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	1	2	2	2	2	2.2	10
12-Oct	3	3	2	4	Z	3	5	6	7	6	7	6	6	7	6	6	5	3	3	3	4	6	5	4	4.8	7
13-Oct	5	7	4	3	9	Z	13	9	11	7	5	M	5	5	6	4	2	4	2	3	2	2	1	1	4.9	13
14-Oct	Z	2	2	1	2	3	3	4	4	3	4	4	3	5	5	4	4	3	3	3	2	3	5	4	3.3	5
15-Oct	2	Z	3	3	4	5	6	4	3	3	2	2	2	3	3	4	3	5	4	4	3	3	2	1	3.1	6
16-Oct	1	1	Z	1	1	2	2	3	2	2	1	1	2	2	3	2	2	2	2	2	3	3	3	4	2.1	4
17-Oct	2	3	3	Z	3	4	5	9	7	5	3	4	6	5	5	4	4	4	9	17	16	12	13	4	6.3	17
18-Oct	4	3	3	5	Z	8	4	4	11	6	3	7	9	7	4	2	5	6	4	8	4	2	2	2	5.0	11
19-Oct	2	2	3	3	3	Z	7	7	4	4	4	4	3	2	2	3	3	8	7	7	4	6	4	3	4.0	8
20-Oct	Z	6	3	2	2	4	6	6	6	4	2	3	4	4	4	4	6	6	4	7	10	12	10	9	5.4	12
21-Oct	10	Z	9	10	6	4	5	4	5	5	5	3	5	5	4	4	4	4	3	6	8	3	3	3	5.0	10
22-Oct	3	5	Z	3	7	6	7	5	8	3	1	1	C	C	C	3	3	3	2	2	3	3	3	3	3.7	8
23-Oct	3	3	3	Z	3	2	3	4	3	2	4	8	3	2	1	1	3	4	3	2	2	1	2	1	2.6	8
24-Oct	2	2	1	1	Z	2	3	2	1	1	10	1	C	C	C	C	4	1	1	1	1	1	1	1	2.0	10
25-Oct	1	1	1	0	0	Z	1	1	2	0	0	1	1	1	1	2	2	1	1	2	1	1	3	2	1.0	3
26-Oct	Z	2	2	2	2	2	5	4	2	2	2	3	3	2	2	2	2	3	3	3	3	3	3	3	2.6	5
27-Oct	4	Z	2	5	4	6	9	9	8	7	5	3	3	2	2	4	2	2	3	4	4	4	5	8	4.4	9
28-Oct	8	4	Z	2	3	2	8	3	5	7	5	6	7	15	12	20	19	20	18	8	6	6	4	5	8.3	20
29-Oct	16	23	4	Z	4	4	5	8	7	4	5	4	3	6	5	3	4	3	2	2	2	3	3	7	5.5	23
30-Oct	11	10	2	2	Z	3	3	5	5	4	4	4	4	4	5	9	7	11	9	5	4	5	5	4	5.3	11
31-Oct	3	4	6	6	6	Z	4	7	9	5	5	3	4	5	5	4	7	3	3	2	2	2	2	2	4.3	9
4.4 4.3 3.2 3.1 3.7 4.4 4.8 4.6 4.7 3.9 3.4 3.3 3.5 4.0 3.8 3.8 3.9 4.0 3.7 4.1 3.9 3.8 3.8 3.3																								Diurnal Average		
16 23 9 10 13 13 13 9 11 15 10 8 9 15 12 20 19 20 18 17 16 12 13 9																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Christina Lake - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Christina Lake - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	704	99.86	99.86
21 - 40	1	0.14	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Christina Lake - October 2017**

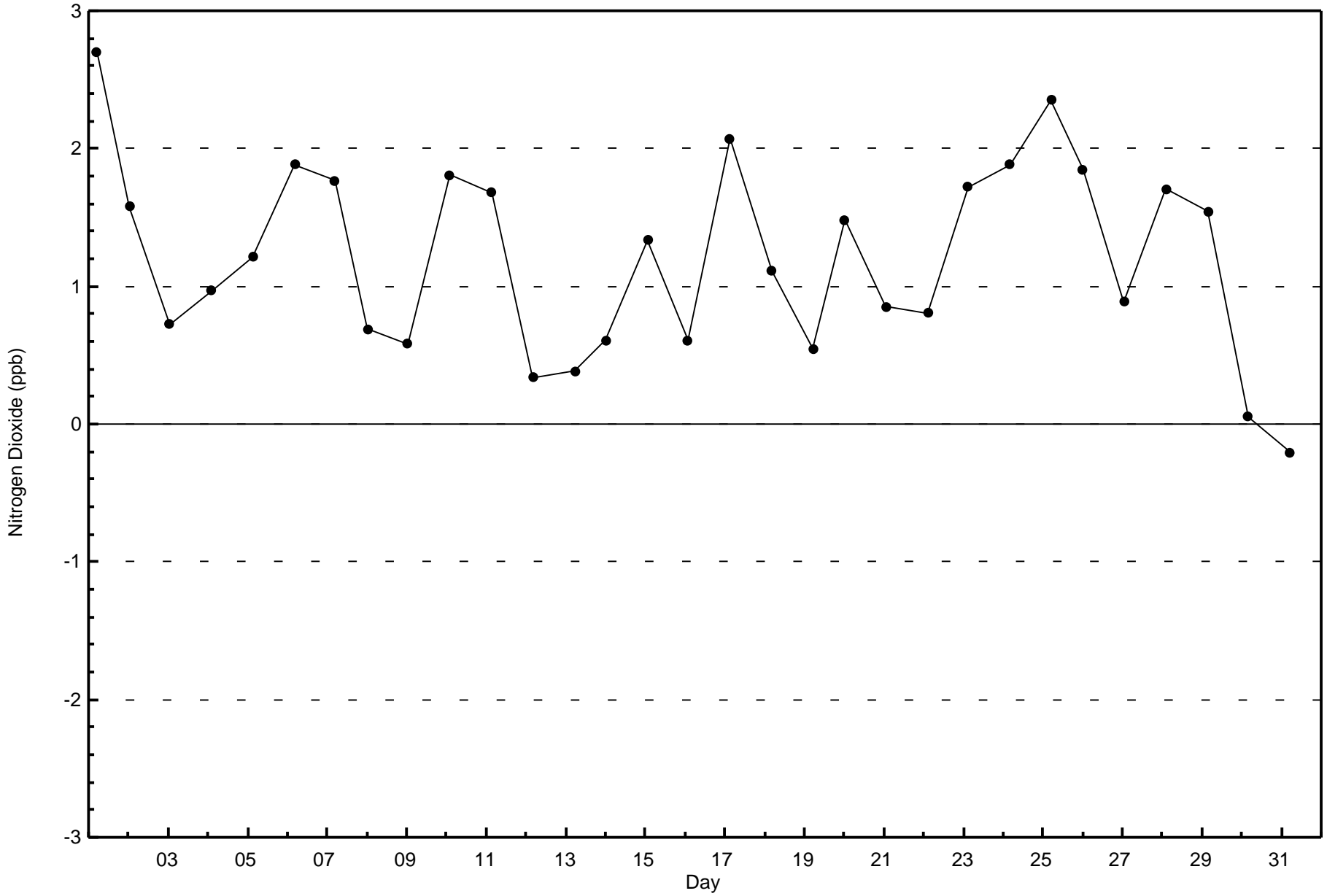
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	17	32	21	12	11	14	22	23	72	84	85	79	46	42	69	35	664
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	17	32	21	12	11	14	22	23	72	84	85	79	46	43	69	35	665

Total Number of Valid Hours: 665

Total Number of Hours: 744



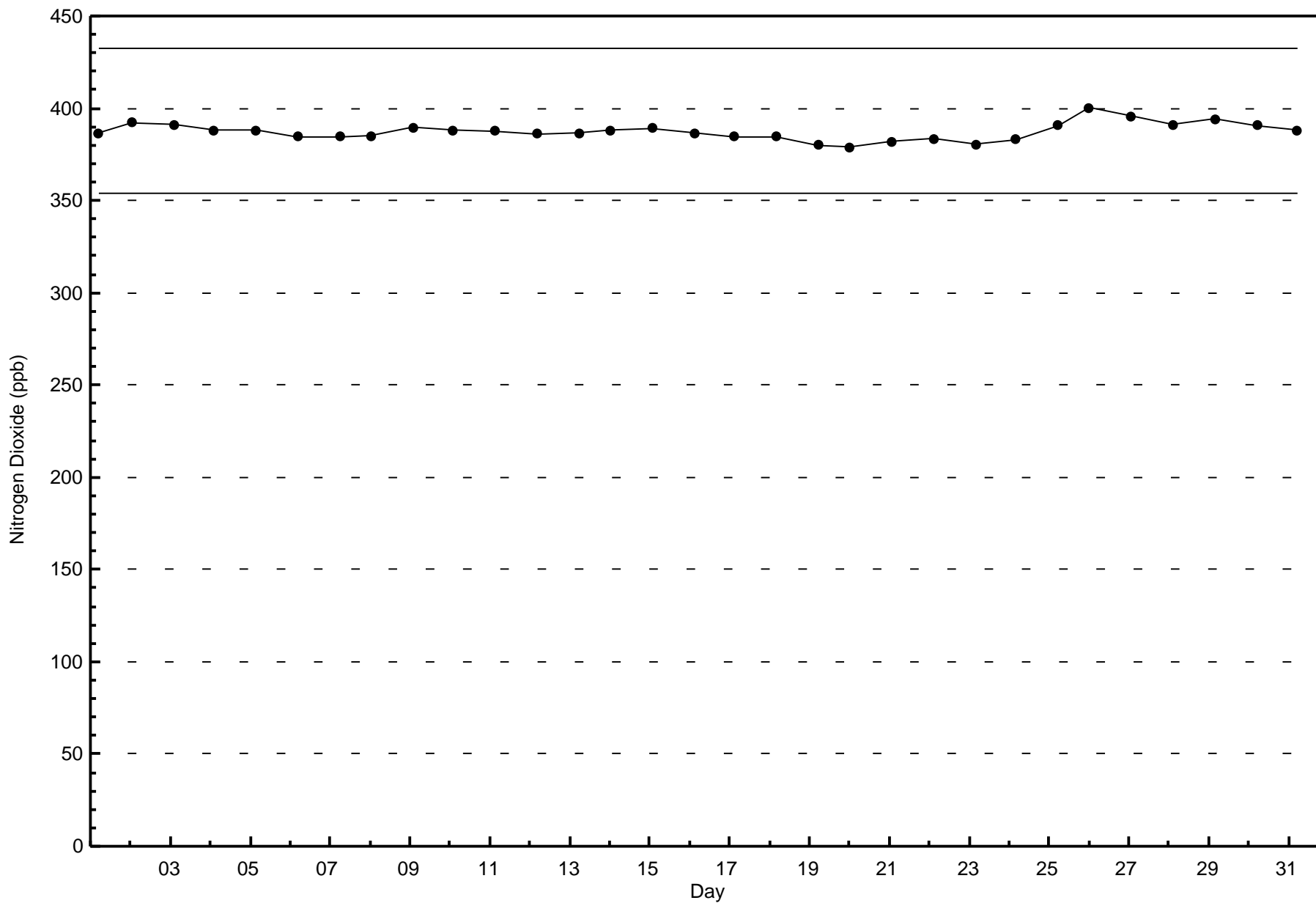






Wood Buffalo Environmental Association  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Christina Lake - October 2017





**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

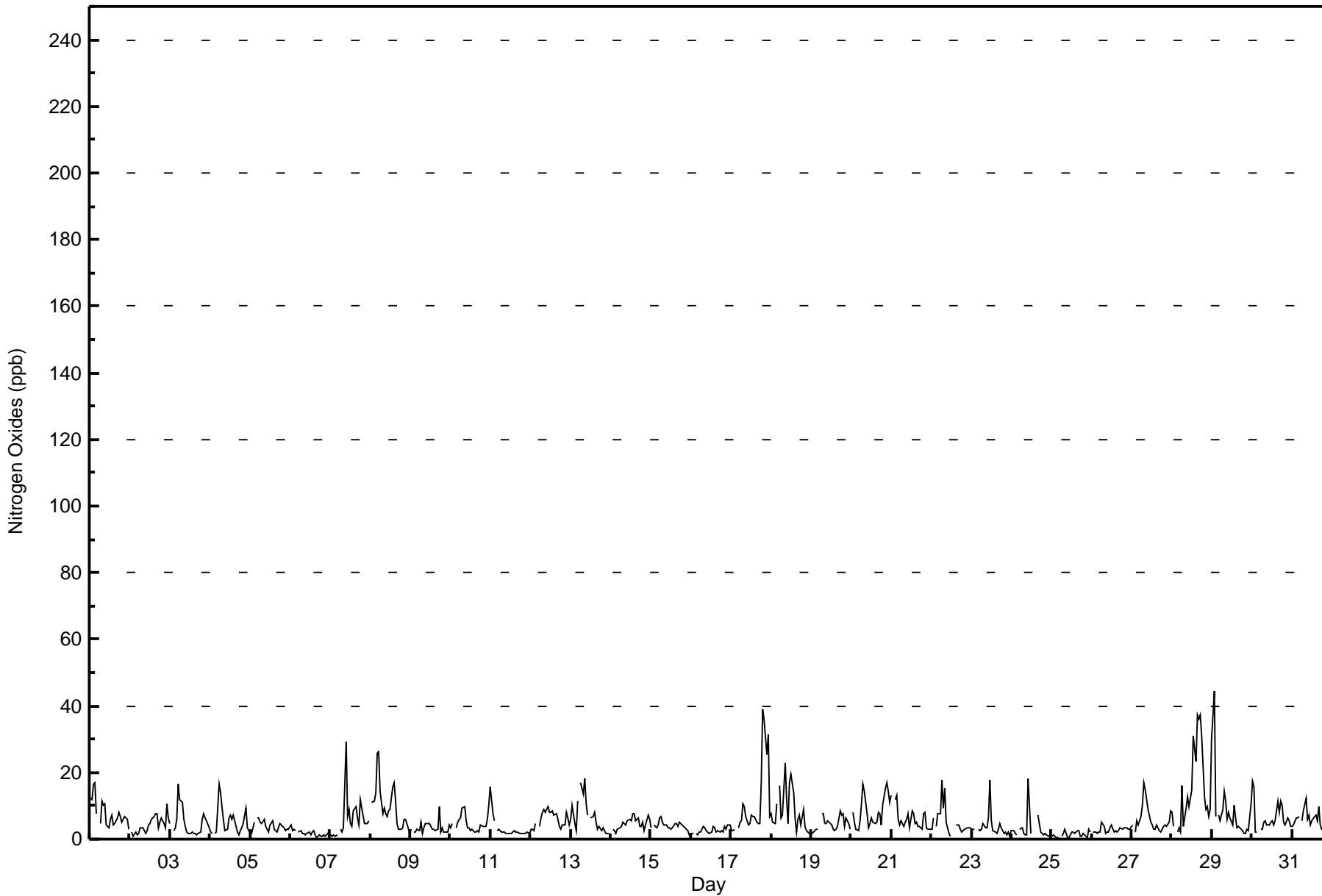
**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Christina Lake - October 2017**

Maximum Value: 45 ppb on Oct 29 02:00		Maximum Daily Average: 14.9 ppb on Oct 28		Hours in Service: 744																																													
Minimum Value: 0 ppb on Oct 25 11:00		Minimum Daily Average: 1.4 ppb on Oct 25		Hours of Data: 705																																													
Maximum Diurnal Average: 7.6 ppb at hour 9		Minimum Diurnal Average: 4.2 ppb at hour 9		Hours of Missing Data: 39																																													
Monthly Average: 5.6 ppb		Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 O <sub>1</sub> = 2 Median = 4 O <sub>3</sub> = 7 P <sub>90</sub> = 11 P <sub>99</sub> = 29		Hours of Calibration: 38																																													
				Percent Operational Time: 99.9																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	12	12	16	17	8	Z	5	11	10	11	4	3	6	7	4	5	6	8	7	5	6	7	6	3	7.8	17																							
2-Oct	Z	2	1	2	1	2	3	3	4	2	2	4	4	6	7	8	8	4	5	6	4	3	11	7	4.3	11																							
3-Oct	4	Z	2	3	6	16	12	11	6	4	2	2	2	2	2	1	2	2	6	7	6	5	3	3	4.8	16																							
4-Oct	2	2	Z	2	2	16	14	10	6	3	3	6	7	6	7	5	2	1	3	3	4	9	3	3	5.2	16																							
5-Oct	2	2	5	Z	6	6	5	5	6	4	3	2	4	6	3	2	2	3	5	4	3	3	3	3	3.8	6																							
6-Oct	4	3	3	3	Z	2	3	2	2	1	2	2	1	2	3	1	1	1	1	1	1	1	2	1	1.8	4																							
7-Oct	1	1	1	1	1	Z	3	2	4	29	7	9	5	4	9	10	6	4	12	9	5	5	5	5	6.0	29																							
8-Oct	Z	11	11	14	26	26	15	8	9	8	7	9	9	16	17	11	5	3	3	3	6	6	5	2	9.9	26																							
9-Oct	3	Z	2	2	3	2	5	2	3	5	4	5	4	3	3	2	3	10	2	3	2	2	2	4	3.3	10																							
10-Oct	3	5	Z	3	5	6	6	9	10	6	3	4	2	3	2	2	2	2	4	4	4	4	6	10	4.6	10																							
11-Oct	16	8	6	Z	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3.0	16																							
12-Oct	3	3	2	5	Z	4	6	8	9	8	10	8	8	9	7	8	6	4	3	4	4	8	6	4	6.0	10																							
13-Oct	6	10	5	3	11	Z	17	13	18	11	7	M	6	7	8	5	3	4	2	3	3	2	2	2	6.8	18																							
14-Oct	Z	3	2	2	3	3	4	5	5	4	6	6	6	7	8	5	6	4	4	5	3	4	7	6	4.7	8																							
15-Oct	4	Z	4	3	4	6	7	5	4	4	3	3	3	4	4	5	4	5	5	4	3	3	2	1	4.0	7																							
16-Oct	2	2	Z	2	1	2	2	4	3	3	2	2	2	4	3	2	3	2	2	2	4	3	4	4	2.6	4																							
17-Oct	2	3	3	Z	3	5	6	11	10	7	4	5	7	7	7	5	5	5	17	39	36	25	31	7	10.8	39																							
18-Oct	8	5	5	11	Z	16	6	7	23	12	5	17	20	14	6	2	6	7	4	9	4	3	2	2	8.4	23																							
19-Oct	2	2	3	3	3	Z	8	8	5	4	5	5	4	3	3	3	4	9	7	7	4	6	5	3	4.6	9																							
20-Oct	Z	8	5	3	3	5	11	17	15	8	3	5	6	5	5	5	8	8	4	10	15	17	15	11	8.3	17																							
21-Oct	13	Z	12	13	6	4	6	4	5	6	8	3	8	8	5	5	4	4	3	7	8	3	3	3	6.1	13																							
22-Oct	3	6	Z	4	8	8	18	9	15	5	2	1	C	C	C	4	4	3	2	3	3	4	4	3	5.4	18																							
23-Oct	3	3	3	Z	3	3	3	4	3	3	7	18	6	3	2	2	3	5	4	2	2	1	2	1	3.7	18																							
24-Oct	3	3	2	1	Z	3	3	2	1	1	18	2	C	C	C	C	7	2	2	1	2	1	1	1	3.0	18																							
25-Oct	1	1	1	1	0	Z	1	2	3	1	0	1	2	2	2	2	3	3	1	1	2	1	1	3	2	1.4	3																						
26-Oct	Z	2	2	2	2	2	5	4	2	2	2	3	4	2	3	2	3	3	3	3	3	3	3	3	2.8	5																							
27-Oct	4	Z	2	6	4	7	10	17	15	12	9	5	4	3	3	4	3	2	3	4	4	4	5	8	6.0	17																							
28-Oct	8	4	Z	2	3	2	16	4	9	13	10	12	15	31	23	37	36	37	31	13	9	10	7	9	14.9	37																							
29-Oct	30	45	7	Z	7	6	9	14	12	6	8	6	4	10	6	3	4	3	2	2	2	3	3	11	8.8	45																							
30-Oct	17	16	2	2	Z	3	3	5	5	4	4	5	5	4	6	12	8	12	10	5	4	6	5	4	6.5	17																							
31-Oct	4	4	6	6	7	Z	5	9	12	6	7	4	5	7	7	6	10	4	3	3	2	2	3	2	5.4	12																							
																								6.1	6.3	4.4	4.4	5.0	6.4	7.0	7.0	7.6	6.2	5.2	5.3	5.6	6.4	5.8	5.6	5.4	5.3	5.1	5.7	5.2	5.1	5.2	4.2	Diurnal Average	
																								30	45	16	17	26	26	18	17	23	29	18	18	20	31	23	37	36	37	31	39	36	25	31	11	Diurnal Maximum	
Z - zerospan		C - Calibration				M - Maintenance																																											



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Christina Lake - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Christina Lake - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	689	97.73	97.73
21 - 40	15	2.13	99.86
41 - 80	1	0.14	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Christina Lake - October 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	17	32	21	12	11	14	22	23	72	84	85	79	45	29	68	35	649
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	1	13	1	0	15
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	17	32	21	12	11	14	22	23	72	84	85	79	46	43	69	35	665

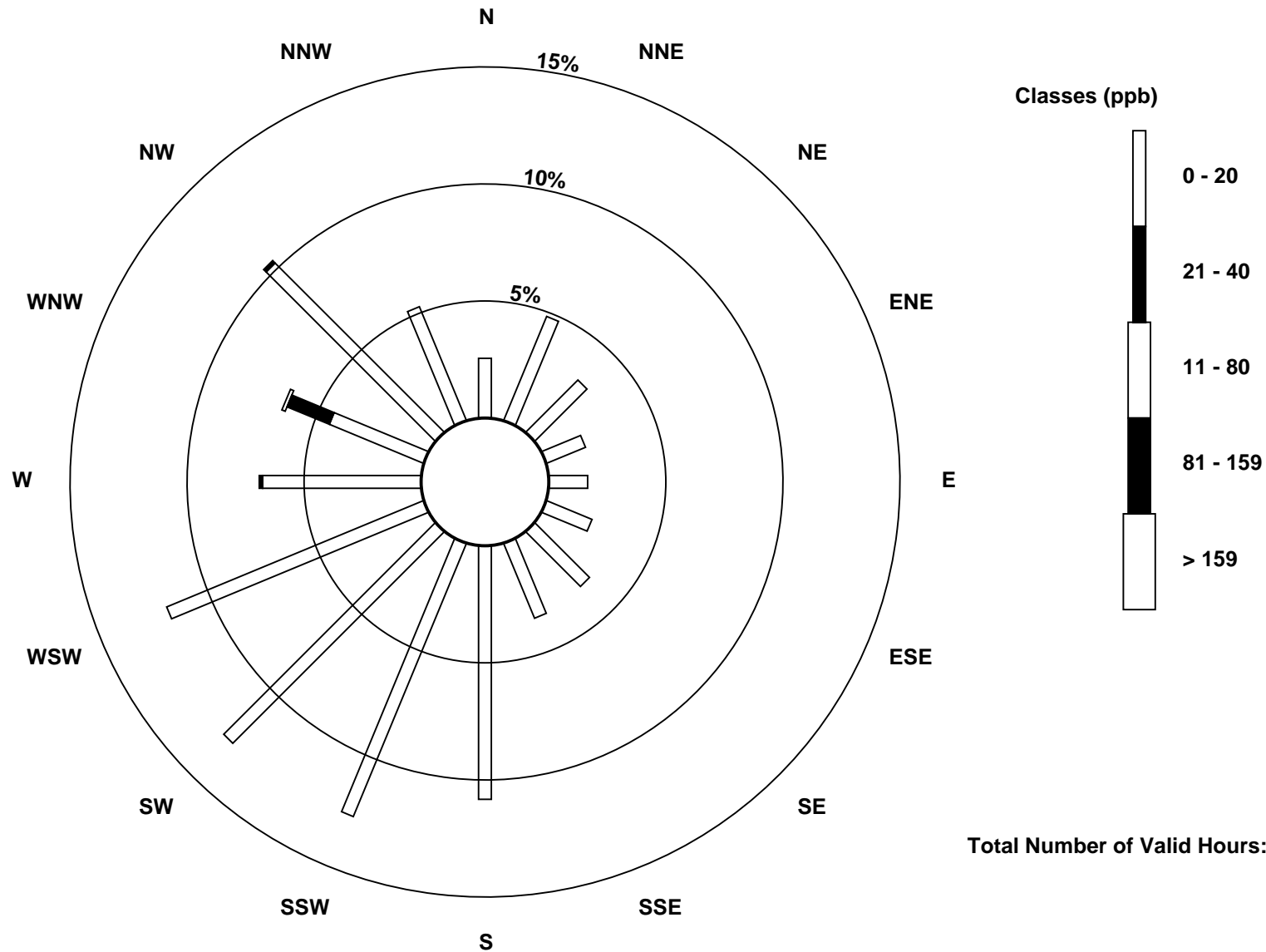
Total Number of Valid Hours: 665

Total Number of Hours: 744

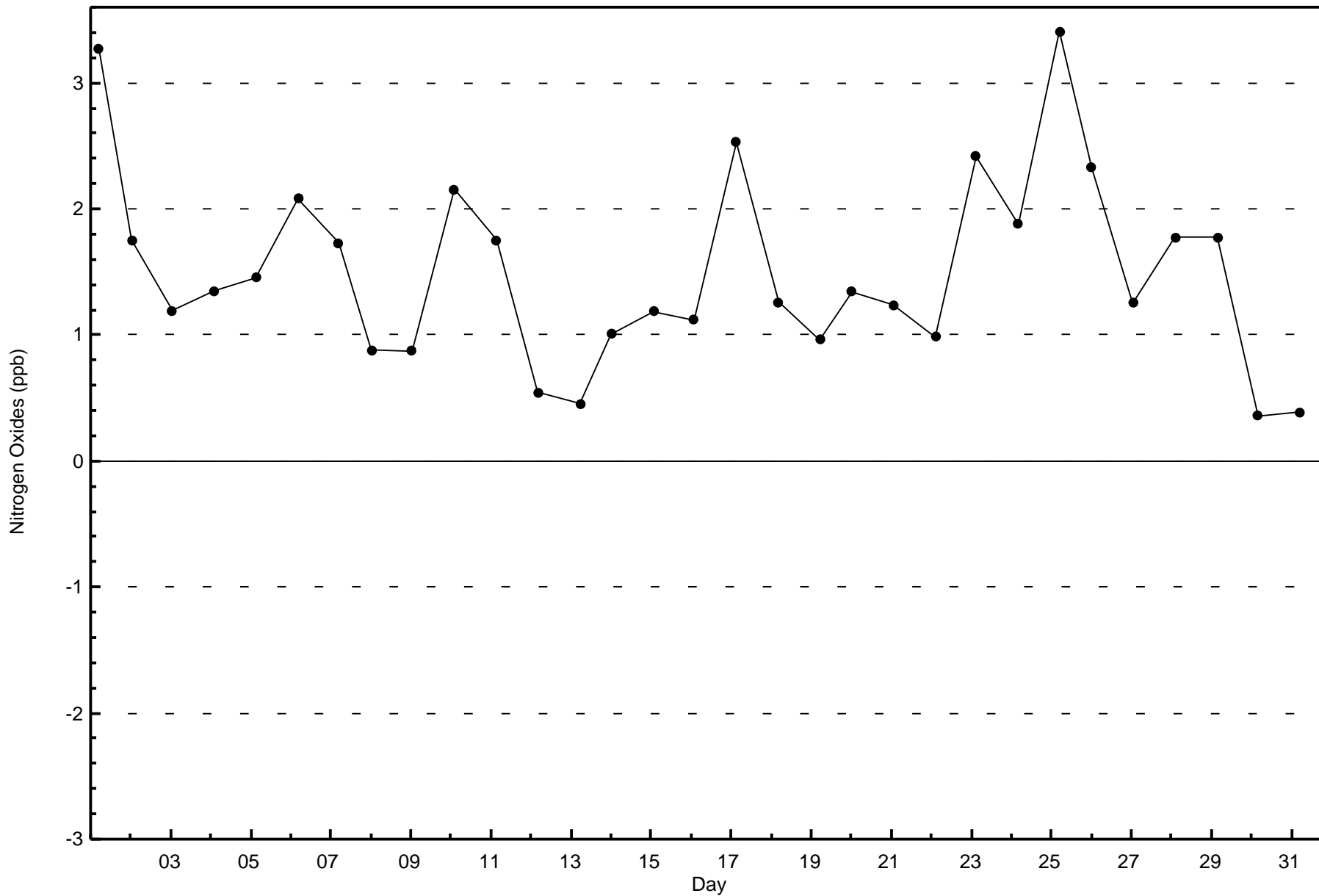


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Christina Lake (AMS 500)



Total Number of Valid Hours: 665

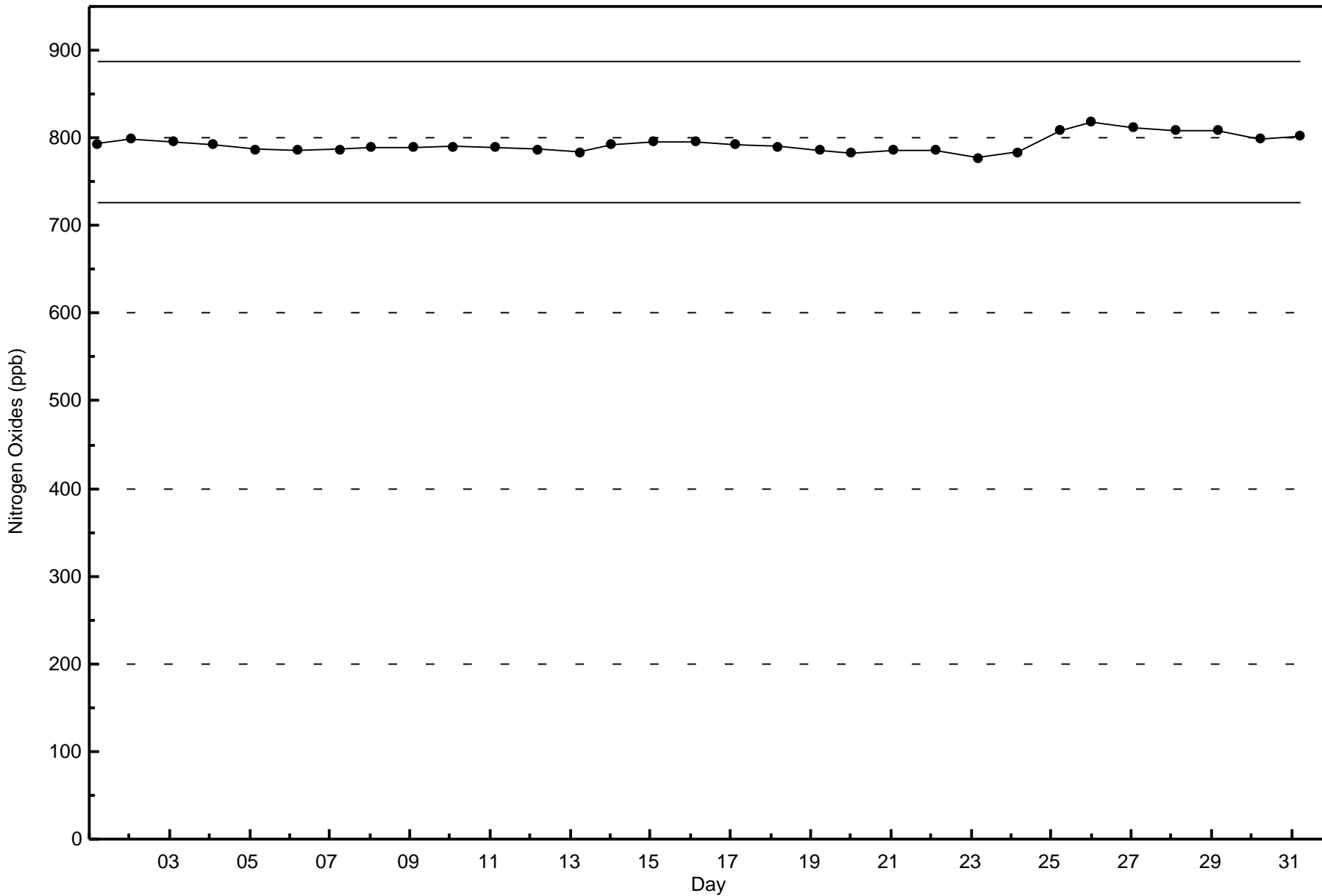






**Wood Buffalo Environmental Association**  
**Span Responses**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Christina Lake - October 2017**





**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

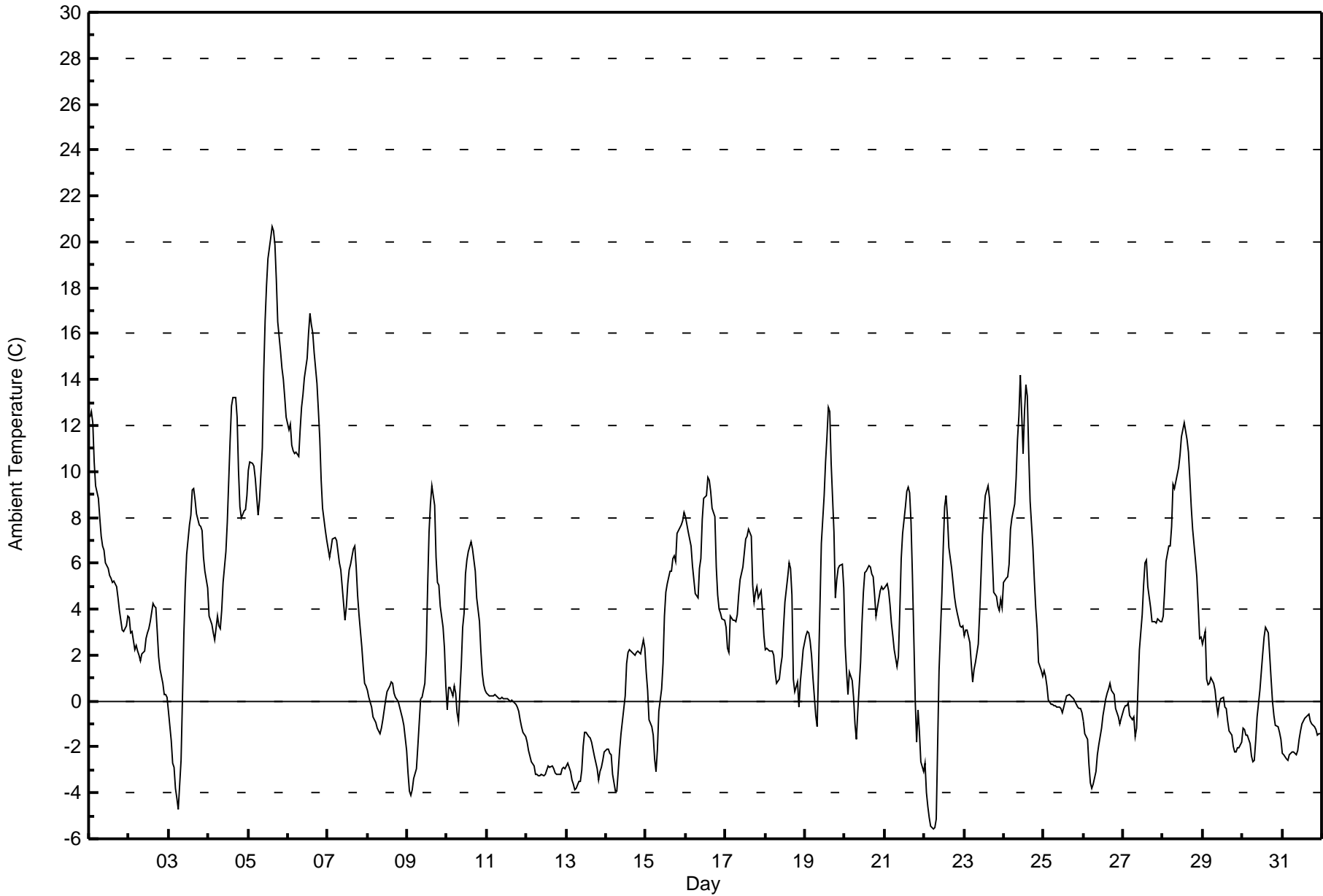
**Ambient Temperature (AT) - C**  
**Christina Lake - October 2017**

Maximum Value: 20.7 C on Oct 5 15:00      Maximum Daily Average: 14.2 C on Oct 5		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Minimum Value: -5.6 C on Oct 22 06:00 Maximum Diurnal Average: 6.3 C at hour 15 Monthly Average: 3.20 C		Minimum Daily Average: -2.9 C on Oct 12 Minimum Diurnal Average: 1.0 C at hour 7 Percentiles: P <sub>1</sub> = -4.2 P <sub>10</sub> = -2.4 Q <sub>1</sub> = -0.5 Median = 2.5 Q <sub>3</sub> = 6.1 P <sub>90</sub> = 9.6 P <sub>99</sub> = 17.8																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	12.4	12.6	12.1	10.4	9.4	8.9	8.0	7.2	6.7	6.6	6.0	5.8	5.4	5.4	5.2	5.2	5.0	4.5	4.0	3.5	3.1	3.0	3.3	3.7	6.6	12.6
2-Oct	3.6	3.0	3.0	2.3	2.4	2.2	2.0	1.8	2.0	2.2	2.8	2.9	3.1	3.5	4.2	4.2	4.1	3.0	2.0	1.4	0.8	0.3	0.3	0.1	2.4	4.2
3-Oct	-0.5	-1.7	-2.7	-2.9	-3.8	-4.2	-4.7	-2.6	0.1	2.9	5.0	6.4	7.6	8.1	9.2	9.3	8.8	8.1	7.7	7.6	7.4	6.3	5.7	4.9	3.4	9.3
4-Oct	3.7	3.5	3.3	3.0	2.6	3.7	3.3	3.1	4.0	5.2	6.5	7.8	9.6	11.4	12.8	13.2	13.2	12.4	10.1	8.5	8.0	8.3	8.4	9.0	7.3	13.2
5-Oct	10.1	10.4	10.4	10.3	9.7	8.9	8.1	8.8	11.1	14.3	16.6	18.1	19.2	20.2	20.7	20.5	19.9	18.4	16.5	15.2	14.5	14.0	13.2	12.4	14.2	20.7
6-Oct	11.8	12.1	11.1	10.9	10.8	10.9	10.7	11.8	12.8	13.4	14.0	14.9	16.0	16.9	16.4	16.1	15.2	13.8	12.7	11.5	9.6	8.4	7.4	7.0	12.3	16.9
7-Oct	6.6	6.2	6.6	7.1	7.1	7.0	6.5	6.0	5.7	4.2	3.5	4.1	5.1	5.7	6.0	6.6	6.8	5.8	4.6	3.7	2.3	1.5	0.7	0.7	5.0	7.1
8-Oct	0.5	0.2	-0.3	-0.7	-0.8	-0.9	-1.2	-1.4	-1.2	-0.8	-0.4	0.0	0.4	0.7	0.8	0.8	0.3	0.1	0.0	-0.3	-0.5	-0.8	-1.0	-2.2	-0.4	0.8
9-Oct	-3.2	-3.9	-4.1	-3.9	-3.4	-3.0	-2.0	-0.9	0.1	0.2	0.8	2.2	5.0	7.4	8.6	9.4	8.5	6.3	5.2	5.0	4.1	3.2	2.3	0.6	1.9	9.4
10-Oct	-0.4	0.6	0.6	0.3	0.7	0.4	-0.5	-0.9	1.6	3.2	3.8	5.5	6.1	6.5	6.9	6.6	6.1	5.7	4.5	3.4	2.2	1.2	0.7	0.5	2.7	6.9
11-Oct	0.4	0.2	0.2	0.2	0.2	0.3	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.0	0.1	0.0	-0.2	-0.3	-0.5	-0.8	-1.1	-1.3	-1.6	-0.1	0.4
12-Oct	-1.8	-2.2	-2.4	-2.6	-2.9	-3.2	-3.2	-3.2	-3.3	-3.2	-3.3	-3.2	-3.0	-2.8	-2.9	-2.8	-3.0	-3.1	-3.2	-3.2	-3.2	-3.0	-2.9	-3.0	-2.9	-1.8
13-Oct	-2.9	-2.7	-3.1	-3.5	-3.6	-3.8	-3.8	-3.5	-3.5	-3.0	-2.0	-1.3	-1.3	-1.5	-1.6	-1.8	-2.1	-2.4	-2.9	-3.5	-3.1	-2.9	-2.6	-2.2	-2.7	-1.3
14-Oct	-2.1	-2.1	-2.3	-2.4	-3.2	-3.9	-3.9	-3.1	-2.2	-1.4	-0.9	0.2	1.6	2.1	2.2	2.2	2.1	2.0	2.1	2.2	2.1	2.1	2.6	2.3	-0.1	2.6
15-Oct	1.3	0.5	-0.8	-1.1	-1.5	-2.5	-3.1	-2.1	-0.4	0.5	1.7	3.7	4.7	5.1	5.7	5.6	6.2	6.3	6.1	7.3	7.5	7.7	7.8	8.2	3.1	8.2
16-Oct	8.0	7.4	7.1	6.7	5.9	5.3	4.7	4.5	5.8	6.2	7.9	8.8	8.9	9.7	9.6	9.1	8.4	8.0	5.9	4.6	4.0	3.8	3.6	3.5	6.6	9.7
17-Oct	3.2	2.3	2.1	3.7	3.5	3.5	3.5	3.8	4.6	5.3	5.8	6.5	7.0	7.2	7.5	7.2	5.0	4.3	4.7	5.0	4.5	4.8	3.9	2.8	4.7	7.5
18-Oct	2.2	2.3	2.2	2.2	2.2	2.0	1.3	0.8	1.0	1.5	1.9	3.2	4.3	5.4	6.0	5.8	4.6	1.0	0.4	0.8	-0.3	0.8	1.5	2.2	2.3	6.0
19-Oct	2.9	3.0	3.0	2.6	2.0	1.0	-0.6	-1.1	1.4	4.1	6.9	9.0	10.4	11.5	12.8	12.6	10.4	7.4	4.5	5.3	5.8	5.9	5.9	4.9	5.5	12.8
20-Oct	2.4	1.3	0.3	1.3	0.9	0.1	-1.0	-1.6	-0.5	1.7	3.4	4.7	5.6	5.6	5.9	5.8	5.5	5.4	4.6	3.7	4.4	4.8	5.0	4.8	3.1	5.9
21-Oct	4.9	5.1	4.8	4.2	3.4	2.9	2.3	1.5	1.9	4.0	6.2	7.3	8.5	9.1	9.3	9.0	7.8	5.5	0.1	-1.8	-0.4	-1.4	-2.6	-3.0	3.7	9.3
22-Oct	-2.7	-4.0	-4.6	-5.1	-5.5	-5.6	-5.5	-5.1	-1.9	1.3	4.6	6.7	8.4	9.0	8.0	6.7	5.8	5.2	4.6	4.1	3.8	3.3	3.2	3.3	1.6	9.0
23-Oct	2.8	3.1	3.1	2.5	1.6	0.8	1.4	1.7	2.5	3.9	5.5	7.3	8.1	8.9	9.4	8.8	7.6	6.3	4.7	4.6	4.1	4.0	4.4	4.1	4.6	9.4
24-Oct	5.2	5.4	5.4	5.9	7.5	8.0	8.6	9.7	11.4	12.4	14.2	10.8	12.6	13.8	13.3	10.8	8.7	6.7	5.3	4.1	3.1	1.7	1.3	1.1	7.8	14.2
25-Oct	1.3	1.1	0.6	0.1	-0.1	-0.2	-0.2	-0.2	-0.3	-0.3	-0.3	-0.5	-0.3	0.0	0.2	0.3	0.2	0.2	0.1	0.0	-0.3	-0.3	-0.4	-0.5	0.0	1.3
26-Oct	-0.8	-1.4	-1.7	-2.8	-3.5	-3.8	-3.6	-3.1	-2.4	-1.9	-1.5	-1.2	-0.6	0.1	0.3	0.5	0.8	0.5	0.3	-0.3	-0.5	-0.7	-1.0	-0.8	-1.2	0.8
27-Oct	-0.3	-0.2	-0.2	-0.1	-0.6	-0.8	-0.7	-1.6	-1.2	0.6	2.2	3.8	5.0	6.0	6.2	5.0	4.1	3.4	3.4	3.5	3.4	3.6	3.5	3.4	2.1	6.2
28-Oct	3.7	4.8	6.1	6.8	6.7	7.6	9.4	9.2	9.9	10.2	10.7	11.5	11.8	12.1	11.4	10.9	9.7	8.4	7.5	6.1	5.4	4.1	2.7	2.8	7.9	12.1
29-Oct	2.5	3.0	1.0	0.7	0.8	1.0	0.8	0.5	-0.1	-0.6	-0.1	0.1	0.1	-0.3	-0.4	-0.9	-1.3	-1.5	-2.0	-2.2	-2.2	-2.0	-2.0	-1.8	-0.3	3.0
30-Oct	-1.2	-1.3	-1.5	-1.5	-1.8	-2.4	-2.7	-2.6	-1.8	-0.7	0.5	1.3	2.1	2.8	3.2	3.0	2.0	1.0	0.0	-0.7	-1.1	-1.1	-1.4	-1.7	-0.3	3.2
31-Oct	-2.3	-2.3	-2.5	-2.6	-2.4	-2.3	-2.2	-2.2	-2.3	-2.1	-1.7	-1.3	-1.0	-0.7	-0.7	-0.6	-0.6	-0.9	-1.0	-1.1	-1.2	-1.5	-1.4	-1.4	-1.6	-0.6
	2.3	2.1	1.8	1.7	1.4	1.2	1.0	1.1	2.0	2.9	3.9	4.7	5.5	6.1	6.3	6.1	5.5	4.6	3.6	3.1	2.8	2.5	2.3	2.1	Diurnal Average	
	12.4	12.6	12.1	10.9	10.8	10.9	10.7	11.8	12.8	14.3	16.6	18.1	19.2	20.2	20.7	20.5	19.9	18.4	16.5	15.2	14.5	14.0	13.2	12.4	Diurnal Maximum	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Christina Lake - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C  
Christina Lake - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	223	29.97	29.97
0 - 10	451	60.62	90.59
10 - 20	67	9.01	99.60
> 20	3	0.40	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %**

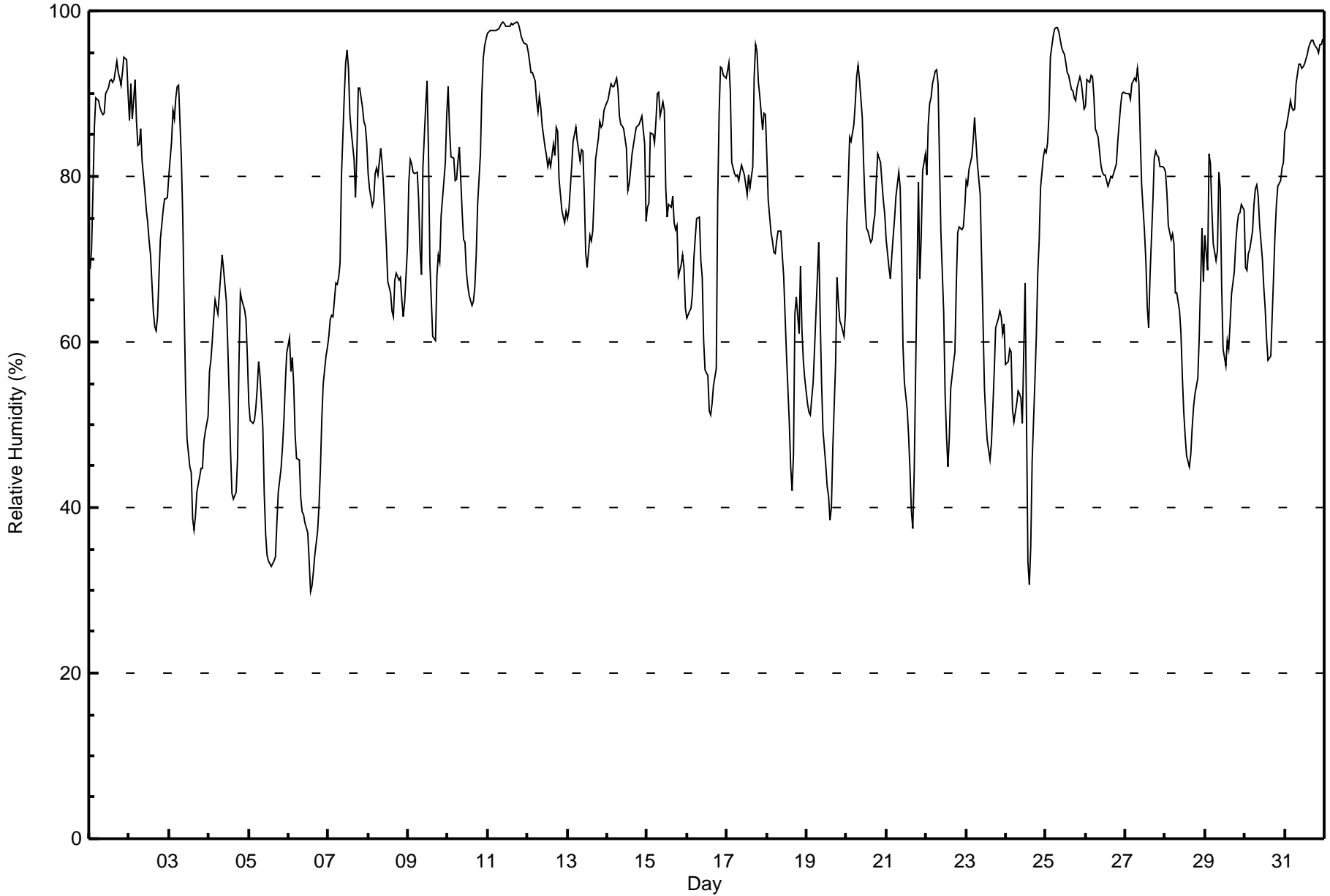
**Christina Lake - October 2017**

Maximum Value: 99 % on Oct 11 18:00      Maximum Daily Average: 97.8 % on Oct 11																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 30 % on Oct 6 14:00      Minimum Daily Average: 44.6 % on Oct 6 Maximum Diurnal Average: 79.4 % at hour 7      Minimum Diurnal Average: 62.3 % at hour 15 Monthly Average: 73.6 %      Percentiles: P <sub>1</sub> = 33 P <sub>10</sub> = 50 Q <sub>1</sub> = 63 Median = 77 Q <sub>3</sub> = 87 P <sub>90</sub> = 93 P <sub>99</sub> = 98																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	69	71	78	86	90	89	88	88	87	88	90	91	92	92	91	92	94	93	92	91	93	94	94	90	88.4	94
2-Oct	87	91	87	92	87	84	84	86	82	78	76	74	72	71	64	62	61	63	68	72	76	77	77	77	77.0	92
3-Oct	80	84	88	87	89	91	91	82	75	64	54	48	45	44	39	37	39	42	44	45	45	48	49	51	60.9	91
4-Oct	56	58	60	63	65	63	66	68	71	69	65	60	54	47	42	41	42	46	57	66	65	64	63	58	58.7	71
5-Oct	53	51	50	51	52	54	58	56	50	42	37	34	34	33	33	34	34	38	42	45	47	51	55	59	45.4	59
6-Oct	61	56	58	55	49	46	46	41	39	39	38	37	33	30	30	32	34	37	40	45	51	55	58	59	44.6	61
7-Oct	61	63	63	63	67	67	68	70	80	90	94	95	93	88	85	82	77	83	91	91	88	87	86	84	79.8	95
8-Oct	80	79	76	77	80	81	80	83	82	79	75	72	67	66	64	63	67	68	68	68	65	63	65	71	72.5	83
9-Oct	79	82	82	81	80	81	77	71	68	81	89	91	83	70	65	61	60	68	71	70	75	79	82	87	76.3	91
10-Oct	91	86	82	82	79	80	82	84	76	72	72	68	67	66	64	65	67	70	77	83	90	94	96	97	78.7	97
11-Oct	97	98	98	98	98	98	98	98	98	99	98	98	98	98	98	98	98	99	98	98	97	96	96	96	97.8	99
12-Oct	95	94	93	93	92	89	88	90	88	86	84	83	81	82	81	84	83	86	86	80	76	75	74	76	84.8	95
13-Oct	75	76	81	84	85	86	84	82	83	83	78	71	69	73	72	73	78	82	85	87	86	86	88	89	80.6	89
14-Oct	89	90	91	91	91	92	91	87	86	86	86	83	78	79	81	83	85	86	86	86	87	87	84	75	85.8	92
15-Oct	76	77	85	85	84	87	90	90	87	89	88	79	75	77	76	78	74	74	74	68	69	70	69	64	78.6	90
16-Oct	63	64	64	66	70	73	75	75	70	68	60	57	56	52	51	53	55	57	77	88	93	93	92	92	69.2	93
17-Oct	93	94	90	82	80	80	80	79	80	81	80	79	78	80	79	81	92	96	95	91	90	86	88	87	85.1	96
18-Oct	83	77	73	72	71	71	72	73	73	71	68	63	58	50	45	42	46	63	65	61	69	61	58	56	64.3	83
19-Oct	52	52	51	53	55	59	68	72	63	55	49	45	43	41	38	40	47	57	68	65	62	62	61	64	55.1	72
20-Oct	74	79	85	84	86	89	92	93	92	87	81	77	74	73	72	72	74	75	80	83	82	79	77	75	80.7	93
21-Oct	72	69	68	70	73	75	78	81	79	70	59	55	52	49	44	40	37	44	68	79	68	73	81	83	65.3	83
22-Oct	80	86	89	89	91	93	93	91	82	73	64	54	49	45	48	54	57	59	67	73	74	73	74	76	72.3	93
23-Oct	80	79	81	82	84	87	84	82	78	70	62	55	51	48	46	48	52	56	62	63	64	63	61	62	66.6	87
24-Oct	57	58	59	59	52	50	53	54	54	53	50	67	50	33	31	35	46	56	61	68	72	79	82	83	56.8	83
25-Oct	83	84	87	94	97	98	98	98	97	96	95	95	94	93	92	91	90	89	89	91	92	91	90	88	92.2	98
26-Oct	89	92	91	92	92	90	86	85	83	81	81	80	80	79	79	80	80	80	81	84	86	89	90	90	85.0	92
27-Oct	90	90	90	89	91	92	91	93	91	85	79	73	70	64	62	68	77	82	83	83	82	81	81	81	82.1	93
28-Oct	81	78	74	72	73	72	66	66	64	61	56	52	49	46	45	46	50	52	54	56	61	67	74	67	61.7	81
29-Oct	73	69	83	81	76	72	70	71	81	79	67	59	57	60	59	62	66	68	72	74	75	76	77	76	70.9	83
30-Oct	69	69	71	71	73	77	78	79	78	74	70	67	64	60	58	58	63	68	73	77	79	79	81	82	71.6	82
31-Oct	85	86	88	89	88	88	88	91	94	94	93	93	93	95	96	96	97	96	96	95	95	96	96	97	92.7	97
76.5   76.8   78.0   78.5   78.8   79.1   79.4   79.3   77.8   75.5   72.2   69.5   66.4   63.9   62.3   62.9   65.3   68.9   73.2   74.9   75.9   76.7   77.4   77.2																		Diurnal Average								
97   98   98   98   98   98   98   98   98   98   99   98   98   98   98   98   98   99   98   98   97   96   96   97																		Diurnal Maximum								



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Christina Lake - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Relative Humidity (RH) - %**  
**Christina Lake - October 2017**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	28	3.76	3.76
40 - 60	127	17.07	20.83
60 - 80	274	36.83	57.66
80 - 100	315	42.34	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



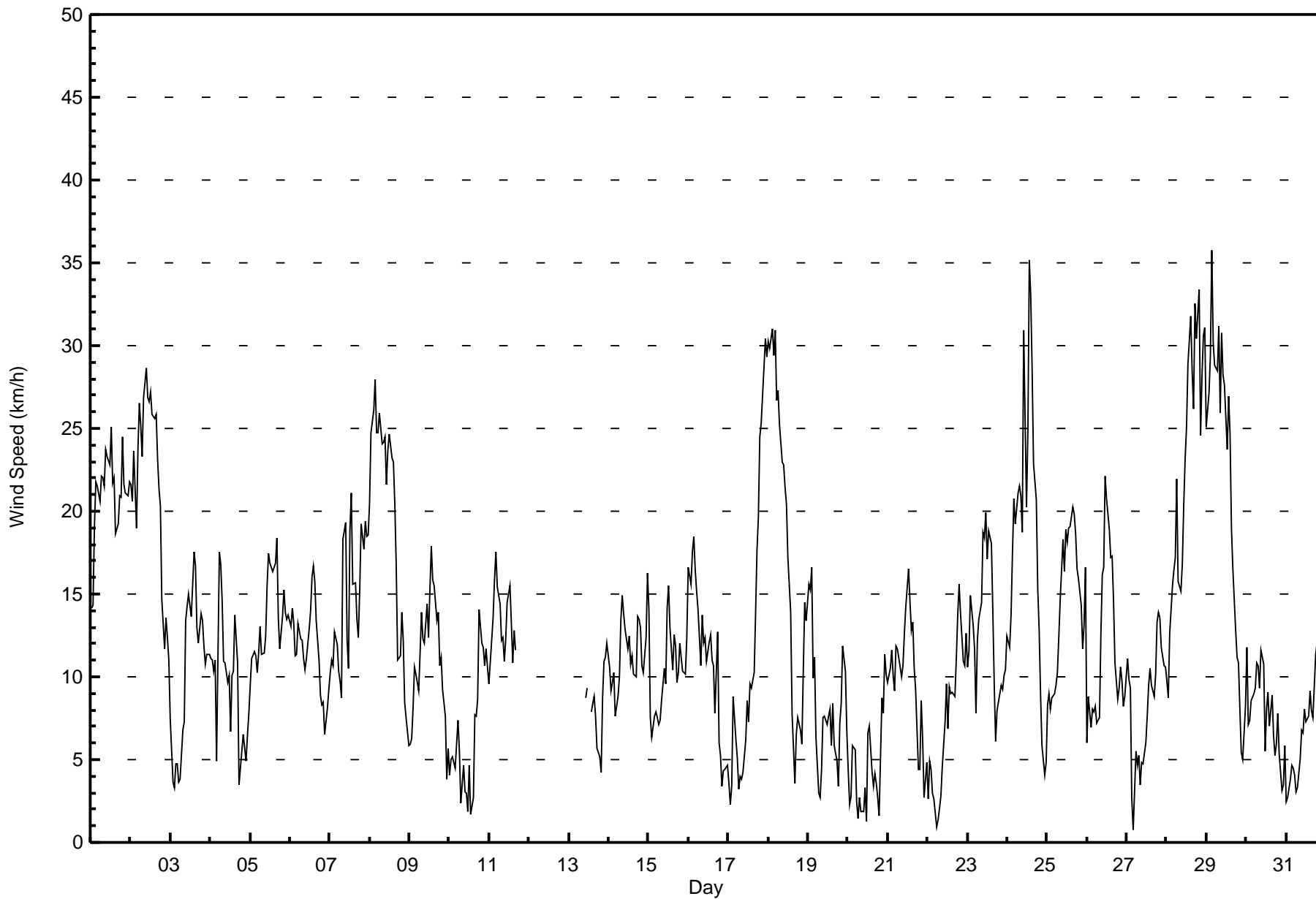
Maximum Speed: 36 km/h on Oct 29 04:00	Maximum Daily Speed Average: 21.4 km/h on Oct 2	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 27 05:00	Minimum Daily Speed Average: 2.2 km/h on Oct 20	Hours of Data: 702
Maximum Diurnal Speed Average: 9.3 km/h at hour 14	Minimum Diurnal Speed Average: 5.0 km/h at hour 22	Hours of Missing Data: 42
Monthly Average Velocity: 6.4 km/h 268.5 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 5 Q <sub>1</sub> = 8 Median = 11 Q <sub>3</sub> = 16 P <sub>90</sub> = 24 P <sub>99</sub> = 31	Percent Operational Time: 94.5

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	NW14	NNW14	NW19	NNW22	NW21	NW21	NW22	NW22	NW22	NW24	NW23	NW23	NW25	NW22	NW22	NW19	NW19	NW21	NW21	NW25	NW22	NW21	NNW21	NNW22	NW20.7	NW25	
2-Oct	NNW22	NNW21	NNW24	N19	NNW24	NNW27	NNW25	NNW23	NNW27	NNW29	N27	NNW27	NNW27	NNW26	NNW26	NW26	NNW23	NNW21	NW20	NW15	NW12	WNW14	NW12	NW11	NNW21.4	NNW29	
3-Oct	WNW7	SSW4	SSE3	SSW5	SSE5	SSW4	SSE4	SSW7	S7	SSW13	SW14	SSW15	SW14	SSW16	SSW18	SW17	SW13	SW12	SSW14	SW13	WSW12	WSW11	WSW11	WSW11	SW9.5	SSW18	
4-Oct	WSW11	WSW11	WSW10	SW11	WSW5	NW18	NW17	NW15	NNW11	NNE11	NNE10	NNW10	NNW7	NW10	NW10	NW14	NW11	W3	S4	S6	SSW7	S5	S6	S8	WNW5.5	NW18	
5-Oct	SSW9	SSW11	SSW12	SW11	SW10	SW11	SSW13	SSW11	SSW11	SSW11	SSW12	SW16	SW17	SW17	SW16	SSW17	SSW17	SSW18	SSW14	SSW12	SSW14	SSW15	SW14	SW13	SW14	SW13.4	SSW18
6-Oct	SW13	SW14	SW13	SSW11	SSW11	SW13	SW12	SW12	SW11	SW10	SW11	SW13	WSW14	W16	W17	WSW16	WSW13	WSW11	SW9	WSW8	WSW8	WSW7	WSW8	WSW9	SW11.4	W17	
7-Oct	WSW10	WSW11	WSW11	WSW13	WSW12	WSW10	WSW10	WSW9	W18	WNW19	W12	WNW11	WNW19	NW21	NW16	WNW16	W13	W12	WNW15	NW19	NW18	NW19	NW19	WNW13.1	NW21		
8-Oct	NW20	NW25	NW26	NNW28	NW25	NW25	NW26	NW24	NW24	NW24	NW22	NW24	NW25	NW23	NW23	NW20	NW17	NW11	NW11	NW14	WNW12	W8	WSW8	SSW6	NW18.9	WNW28	
9-Oct	S6	S6	S8	S11	S10	S9	S11	S14	S12	SSW12	SSW14	SSW12	SSW15	WSW18	WSW16	WSW15	WSW13	W14	SW11	WSW11	SW9	SSW8	SSW4	S6	SSW9.6	WSW18	
10-Oct	SSE4	SSW5	SW5	SW4	SW6	SW7	S6	S2	WSW5	W3	SSE3	ENE2	NNE5	E2	NE3	NNE8	N8	N9	NNE14	NE12	NE12	NE11	NE12	NE11	NE2.4	NNE14	
11-Oct	NNE10	NNE12	NNE14	NNE16	NNE18	NNE15	NNE14	N12	NNE12	NNE11	NNE12	NNE14	NNE15	N13	N11	N13	N12	AF	AF	AF	AF	AF	AF	AF	----	NNE18	
12-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
13-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	SSW12	
14-Oct	SSW11	SSW9	S10	S10	S8	S9	S10	S13	S15	S14	S13	SSW12	SW12	SW11	SSW11	SW10	SW10	SW14	SW13	SW13	SW11	SW10	W12	NW16	SSW9.8	NW16	
15-Oct	NW14	W8	SW6	SW8	SW8	SW8	S7	S7	S9	S11	S10	S14	S16	SSW13	SSW10	S13	S12	SSW10	SSW10	SSW12	SSW10	SSW10	SSW10	SSW12	SSW9.0	S16	
16-Oct	SW17	WSW16	WSW18	SW18	SW16	WSW15	WSW14	SW11	WSW14	WSW12	WSW12	SW11	SW12	SW13	SW11	SSW11	SSW8	SW13	SSW6	E5	ESE3	SE4	ESE4	SE5	SW9.8	SW18	
17-Oct	ESE4	SE2	SSE3	S9	S6	S5	S3	ESE4	E4	ENE4	ENE6	ENE9	NE7	NE10	NE9	NNW10	NW14	WNW18	WNW20	WNW24	WNW25	WNW29	WNW30	W29	WNW6.2	WNW30	
18-Oct	W30	W30	W31	W29	W31	W27	W27	W25	WNW23	W23	W21	W20	WNW17	WNW14	W8	SW6	SSW4	SSE7	SSE8	SE7	ESE6	ESE10	ESE14	ESE13	W12.8	W31	
19-Oct	SE16	SE15	SE17	SE10	SE11	SE6	SE3	S3	SSE4	SSE8	SSW8	SW7	SSW8	S8	S6	SSE8	ESE6	SE5	E3	SE7	SE8	SSE12	SSE10	ESE7	SSE7.4	SE17	
20-Oct	ENE4	ENE2	NE3	NNE6	NNE6	ENE2	S1	SE3	NE2	ENE2	E3	NNE1	NW7	NW7	NNW4	WSW3	WSW4	W4	N3	SW2	WNW9	WNW8	WNW11	W10	NW2.2	WNW11	
21-Oct	WNW10	WNW11	W12	WNW10	WSW9	WSW12	WSW12	WSW11	WSW10	WSW11	W13	W14	W17	W15	W13	W13	WSW11	SW9	SSW4	S4	S9	S6	SE3	S5	WSW8.5	W17	
22-Oct	SE3	E5	E4	SE3	S3	SE1	ESE1	E2	ENE3	NNE5	E7	ESE10	SE7	SSE9	SSW9	SW9	SW9	WSW11	WSW14	WSW16	WSW14	WSW11	WSW11	WSW13	SW3.6	WSW16	
23-Oct	SW11	WSW12	WSW15	WSW13	WSW12	SW8	WSW12	WSW13	WSW14	W19	W18	W20	W17	W19	WSW18	WSW14	SW10	SSW6	SSW8	SSW9	SSW9	SSW9	SSW10	S10	WSW11.6	W20	
24-Oct	S12	SSE12	S14	S17	SSW21	SSW19	SW21	SW22	WSW21	WSW19	W31	WSW20	W25	W35	WNW33	WNW29	NW23	NW21	NW15	NNW13	NNW9	NE6	NE4	E5	W12.0	W35	
25-Oct	NE8	NE9	ENE8	NE9	NE9	NE9	NE10	NE12	NNE15	NNE18	NNE16	N19	N18	NNW19	NNW19	NNW20	NNW20	NNW19	NNW17	NNW16	N14	N12	NW13	WNW17	N12.2	NNW20	
26-Oct	WNW6	SW9	SSW7	SW8	SSW8	SSW8	S7	SSW8	SSW13	SSW16	SSW17	SSW22	SSW21	SSW19	SSW17	SSW17	SSW15	SW11	SW9	SW9	WSW11	WSW10	SW8	SW9	SSW11.3	SSW22	
27-Oct	WSW11	SW10	SW9	W3	SSE1	SSW6	S5	S5	SE3	SSW5	SSE5	SSE6	SSE8	SSE9	S11	S9	S9	S10	S13	S14	S14	S12	S11	S11	S7.6	S14	
28-Oct	SSW10	SSW9	SW13	WSW15	WSW16	WSW17	W22	W16	W15	W17	W20	W23	W25	W29	WNW32	WNW29	WNW26	WNW33	WNW30	WNW33	WNW25	NW28	WNW31	WNW31	W20.8	WNW33	
29-Oct	WNW25	WNW27	WNW29	WNW36	WNW30	WNW29	WNW28	NW31	NW26	NW31	NNW28	NW28	NNW24	NW27	NNW25	N19	N17	N13	NNE11	N11	NNE8	N5	SSE5	SW8	NW19.1	WNW36	
30-Oct	WSW12	SW7	S7	SSW9	SSW9	SSW9	SSW11	S11	SSW9	SSW12	SSW11	SSW5	S8	S9	SSW7	SW9	SSW6	SSW5	SW6	SW8	WSW5	WSW3	S3	SW6	SSW7.4	WSW12	
31-Oct	S2	S3	SE4	SSE5	S5	SE4	SSE3	ESE3	SE5	SE7	ESE7	E8	E7	ENE8	ENE9	ENE8	NE8	NE9	NE11	NNE13	NNE13	NNE12	NNE11	NNE13	ENE5.1	NNE13	

W5.6	WSW5.9	WSW5.8	WSW6.6	WSW6.2	W6.4	W6.8	W6.2	W6.3	W6.7	W6.7	W6.9	W7.7	W9.3	W8.6	W8.0	W6.8	W6.7	W5.4	W5.6	W5.3	W5.0	W5.2	W5.7	Diurnal Average
W30	W30	W31	WNW36	W31	WNW29	WNW28	NW31	NNW27	NW31	W31	NNW28	NNW27	W35	WNW33	WNW29	WNW26	WNW33	WNW30	WNW33	WNW25	WNW29	WNW31	WNW31	Diurnal Maximum

C - Calibration      AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h  
Christina Lake - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	99	14.10	14.10
6 - 11	262	37.32	51.42
12 - 19	222	31.62	83.05
20 - 28	92	13.11	96.15
29 - 38	27	3.85	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 702

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Wind Speed (WS) - km/h  
Christina Lake - October 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	2	3	4	7	9	6	14	12	16	12	3	6	4	0	0	1	99
6 - 11	4	11	14	6	3	6	8	9	42	46	50	37	4	9	8	5	262
12 - 19	11	19	4	0	0	2	3	3	16	29	35	38	21	11	24	6	222
20 - 28	0	0	0	0	0	0	0	0	0	3	1	3	12	13	37	23	92
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	9	15	2	1	27
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	17	33	22	13	12	14	25	24	74	90	89	84	50	48	71	36	702

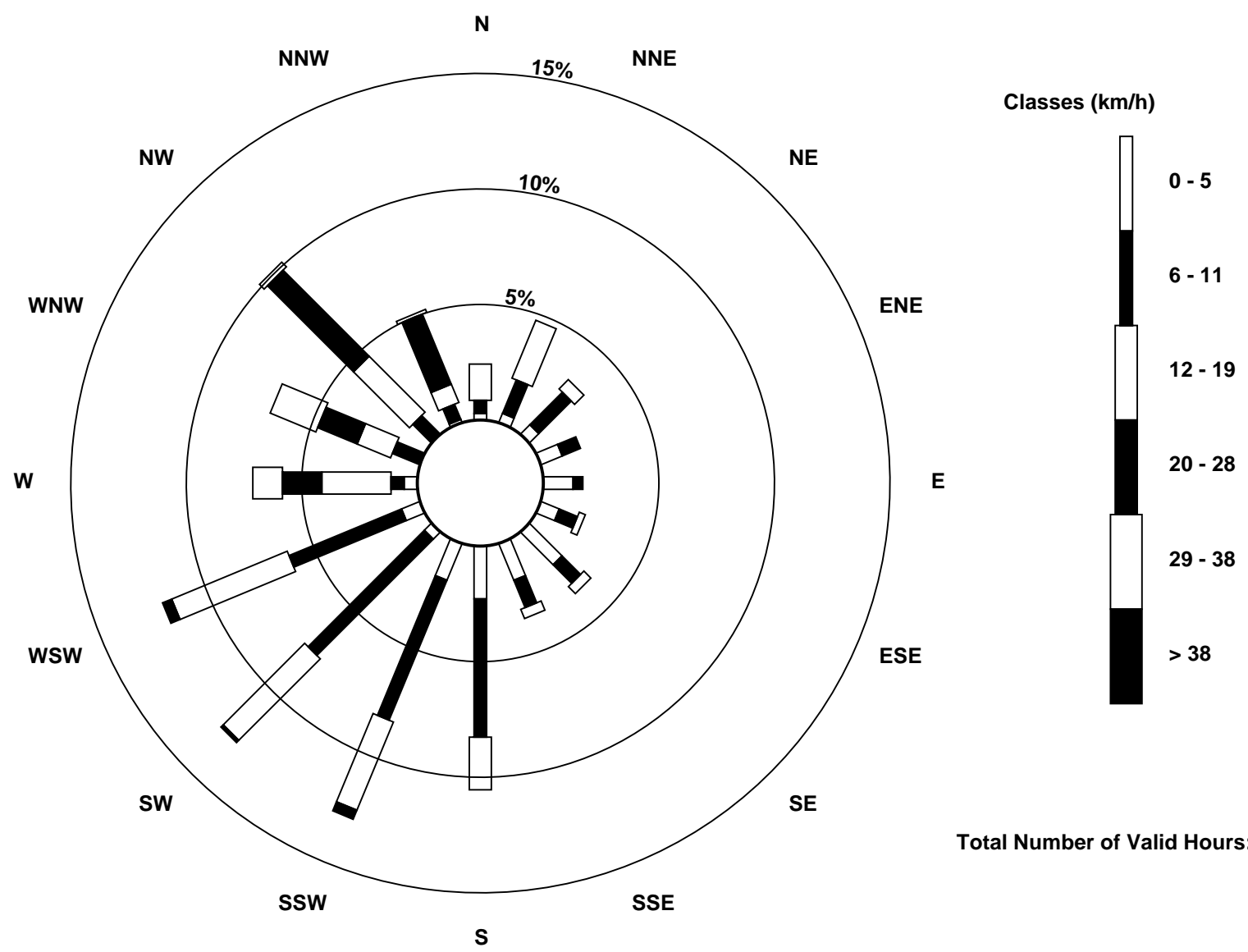
Total Number of Valid Hours: 702

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed (WS) - km/h  
Christina Lake (AMS 500)





**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Speed (WS) - km/h**  
**Christina Lake - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 10 km/h on Oct 24 14:00	Hours of Data: 702
Minimum Value: 1 km/h on Oct 3 05:00	Hours of Missing Data: 42
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 6 P <sub>99</sub> = 8	Hours of Calibration: 1
	Percent Operational Time: 94.5

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	4	5	4	5	4	4	5	5	4	5	5	5	5	4	4	4	4	5	5	5	5	4	4	5	5
2-Oct	6	5	6	4	6	6	6	6	7	6	7	6	6	5	5	6	5	5	4	4	2	2	3	2	7
3-Oct	3	1	2	3	1	2	1	1	3	4	4	4	4	5	5	6	4	3	4	4	4	3	3	3	6
4-Oct	2	2	2	2	4	5	4	4	3	3	3	4	4	3	4	4	3	2	2	2	1	2	2	2	5
5-Oct	3	3	3	4	3	3	3	3	3	4	5	5	5	5	5	6	5	4	3	3	4	4	3	4	6
6-Oct	3	4	3	3	3	3	3	4	4	3	4	4	4	5	6	6	5	4	3	2	2	1	2	2	6
7-Oct	3	3	3	4	4	4	4	3	5	5	3	4	4	4	4	4	5	3	5	5	5	4	3	4	5
8-Oct	5	6	5	6	5	5	5	4	5	5	5	5	5	5	5	5	5	3	3	4	4	3	2	1	6
9-Oct	1	1	2	2	2	2	3	3	4	4	4	3	5	6	5	5	6	8	4	3	2	2	1	1	8
10-Oct	2	1	1	1	1	1	1	2	3	2	2	2	2	2	2	2	1	2	3	3	3	2	2	3	3
11-Oct	2	3	2	3	3	3	2	2	2	2	3	3	4	3	3	3	4	AF	AF	AF	AF	AF	AF	AF	4
12-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
13-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	3	2	C	2	2	3	3	3	2	2	3	4	3	3	4
14-Oct	3	2	2	2	2	2	3	3	3	3	3	3	4	3	4	3	3	4	4	4	3	3	4	4	4
15-Oct	3	3	2	1	1	1	1	2	2	3	2	4	4	4	3	3	3	2	2	3	3	3	2	4	4
16-Oct	5	4	5	5	5	4	4	3	4	4	4	4	4	4	3	2	4	3	2	1	2	1	3	5	
17-Oct	1	2	1	2	2	1	3	2	1	2	2	2	2	3	2	3	3	4	5	6	7	7	8	7	8
18-Oct	8	8	9	8	9	8	8	7	6	6	6	5	4	4	4	2	2	1	1	1	1	3	3	3	9
19-Oct	4	3	4	3	3	2	1	2	2	2	2	2	2	3	2	2	2	1	1	2	2	2	1	1	4
20-Oct	2	2	2	1	1	1	2	1	2	1	2	2	3	2	2	2	2	2	2	1	5	3	3	3	5
21-Oct	4	3	3	2	3	2	2	2	2	3	4	4	5	4	4	4	3	1	2	2	1	1	2	1	5
22-Oct	1	1	1	1	2	1	1	1	1	1	3	3	3	2	2	2	2	3	5	4	4	2	2	3	5
23-Oct	2	3	4	3	3	2	3	3	4	5	5	4	5	5	5	4	3	1	1	2	2	3	2	2	5
24-Oct	3	3	3	5	6	5	6	6	6	6	9	7	9	10	8	8	5	5	3	3	4	1	2	1	10
25-Oct	2	2	1	2	2	2	2	2	3	3	3	4	4	4	4	4	4	3	3	3	3	3	3	2	4
26-Oct	3	2	1	2	2	2	1	2	4	4	5	6	6	5	5	4	4	4	3	3	3	3	2	2	6
27-Oct	2	2	3	2	2	3	1	2	1	2	1	1	2	2	2	2	2	2	3	3	3	3	2	2	3
28-Oct	2	3	3	4	5	4	5	5	5	5	6	7	7	7	7	7	7	7	7	9	6	7	7	7	9
29-Oct	7	7	7	8	6	6	6	6	5	6	7	6	6	6	6	4	3	3	2	2	1	3	1	2	8
30-Oct	4	2	1	2	2	2	3	2	2	3	3	2	2	3	2	3	2	1	1	2	5	3	2	2	5
31-Oct	2	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	2	2	2	2	2	2	2	2	2
Diurnal Maximum																									
8 8 9 8 9 8 8 7 7 6 9 7 9 10 8 8 7 8 7 9 7 7 8 7																									

C - Calibration      AF - Analyzer Failure



**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Wind Direction (WD) - deg**  
**Christina Lake - October 2017**

Direction of Maximum Speed: 299 deg on Oct 29 04:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 334.1 deg on Oct 2	Hours of Data: 702
Direction of Minimum Speed: 160 deg on Oct 27 05:00	Hours of Missing Data: 42
Direction of Minimum Daily Speed Average: 2.2 deg on Oct 20	Percent Operational Time: 94.5
Monthly Average Direction: 253.5 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	305	297	304	303	307	308	306	308	309	306	306	306	306	306	305	313	322	314	326	326	326	326	327	335	312.6
2-Oct	346	334	344	352	341	332	336	343	342	346	349	340	343	328	327	326	334	330	321	317	305	303	305	308	334.1
3-Oct	298	211	161	211	167	208	165	198	191	204	217	206	218	208	205	217	214	218	213	218	246	250	252	245	217.4
4-Oct	237	239	237	234	256	305	304	315	345	13	16	330	332	311	319	316	313	281	173	179	194	181	179	187	290.8
5-Oct	198	209	209	215	222	216	205	204	211	227	233	230	221	229	212	216	208	207	208	199	203	216	215	214	214.2
6-Oct	218	218	215	212	211	220	225	230	230	232	224	222	249	261	262	242	243	246	236	237	242	244	247	247	234.1
7-Oct	247	244	248	242	241	248	253	245	269	290	259	285	303	306	307	300	272	260	287	319	313	304	304	309	283.5
8-Oct	315	304	306	303	304	304	305	307	306	307	307	307	310	308	304	307	323	318	314	308	292	261	241	199	304.7
9-Oct	190	184	179	183	180	171	174	182	190	193	196	196	212	244	244	252	255	265	236	250	223	213	205	177	212.4
10-Oct	166	202	217	222	229	224	190	182	249	263	166	68	33	88	41	18	10	10	31	48	50	49	48	40	41.0
11-Oct	33	28	29	27	25	27	22	11	17	19	22	23	15	9	6	7	2	AF	AF	AF	AF	AF	AF	AF	--
12-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
13-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
14-Oct	202	195	188	183	180	184	186	184	183	182	187	206	216	227	230	225	231	229	229	235	229	236	271	306	213.7
15-Oct	304	269	219	227	221	185	181	183	184	190	180	185	186	196	194	185	191	194	193	216	219	219	217	225	204.4
16-Oct	229	237	237	236	236	238	240	229	237	246	245	229	233	236	230	213	204	221	211	91	113	132	123	134	228.0
17-Oct	109	136	148	190	181	175	177	118	86	66	71	59	54	34	37	341	305	298	299	290	287	285	286	276	297.2
18-Oct	278	277	276	278	281	280	275	275	283	277	272	279	291	288	269	215	194	160	152	135	111	121	122	121	270.9
19-Oct	129	131	139	128	138	129	132	174	163	164	199	217	197	176	177	152	123	140	90	133	143	155	154	119	148.1
20-Oct	65	78	34	19	16	63	172	135	54	60	99	33	316	323	344	238	250	270	11	225	297	288	298	270	320.0
21-Oct	293	288	274	291	253	248	246	239	240	251	273	263	272	273	265	260	250	223	193	174	186	172	139	179	253.4
22-Oct	129	91	87	134	174	136	107	93	57	21	85	107	129	162	199	229	236	244	250	257	251	237	241	246	216.4
23-Oct	236	239	251	250	245	235	248	253	253	262	268	276	263	259	257	253	235	201	206	208	202	203	193	182	244.0
24-Oct	176	168	173	182	201	206	224	236	246	252	280	255	269	275	283	303	318	318	318	332	336	42	37	91	262.7
25-Oct	55	53	63	54	55	50	48	37	27	20	12	1	350	348	347	340	336	334	337	336	351	354	314	298	359.9
26-Oct	284	228	209	216	211	197	188	192	208	201	201	201	204	203	203	207	213	219	227	232	239	242	225	229	212.1
27-Oct	239	222	223	266	160	192	190	191	139	195	162	160	161	168	174	176	174	174	169	173	182	188	189	188	184.9
28-Oct	192	201	216	239	248	258	276	261	269	270	267	272	271	281	294	284	288	293	296	298	301	304	300	299	280.1
29-Oct	290	290	303	299	301	301	303	306	310	324	327	326	343	321	334	352	355	4	14	10	22	6	147	216	318.3
30-Oct	255	230	189	201	197	194	198	190	198	197	198	198	179	187	204	225	212	206	217	226	238	244	185	216	206.2
31-Oct	175	171	140	165	173	140	156	118	130	131	117	86	88	68	64	63	54	47	34	31	33	29	21	15	64.6

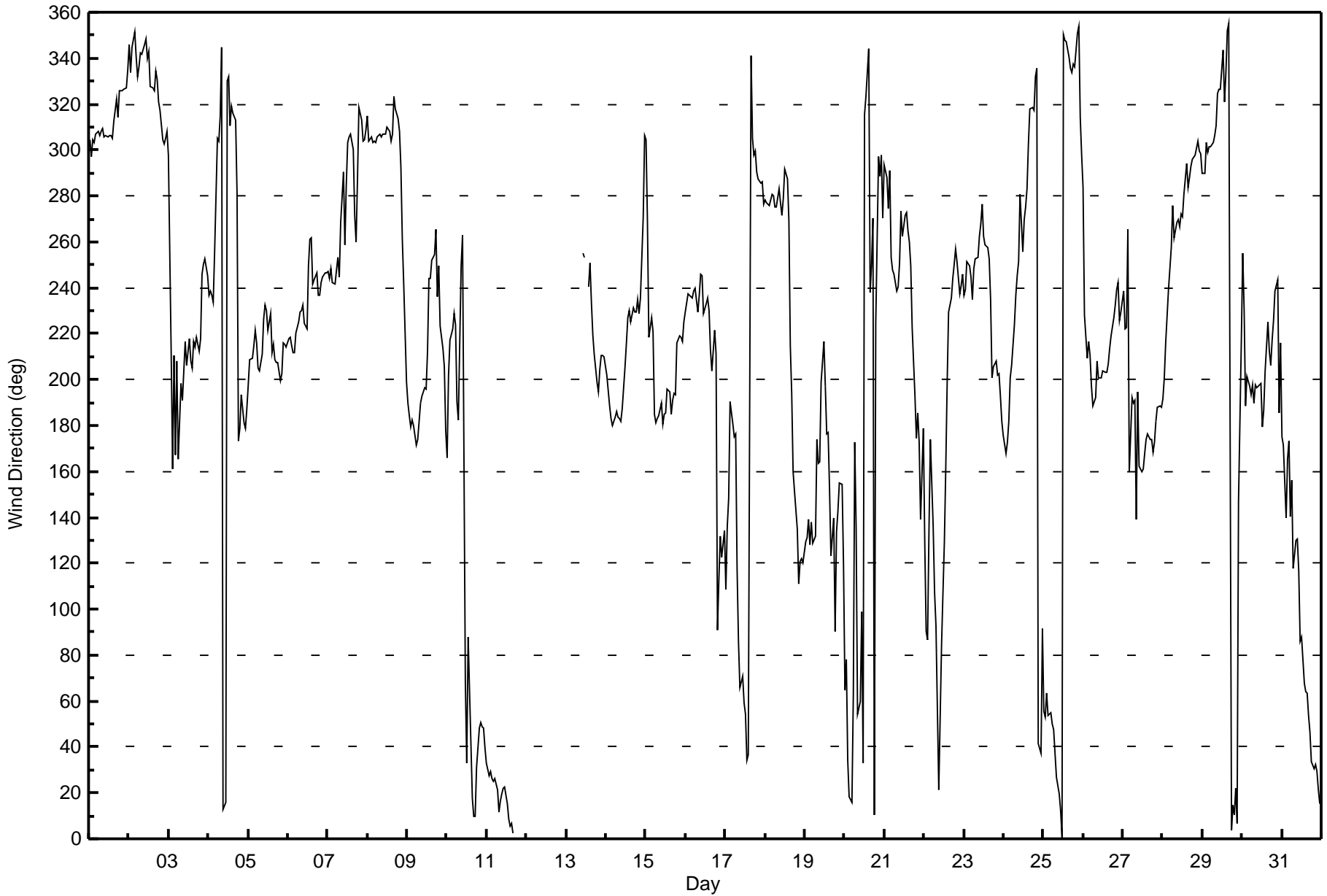
261.6 253.4 252.5 256.3 257.3 260.7 263.2 262.2 268.8 273.8 270.7 271.3 276.7 275.9 277.8 276.4 279.2 273.1 276.4 278.4 270.5 265.9 264.5 261.3  
 Diurnal Average

C - Calibration      AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Christina Lake - October 2017**





**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Direction (WD) - deg**  
**Christina Lake - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 108 deg on Oct 27 05:00 Minimum Value: 5 deg on Oct 21 21:00 Percentiles: P <sub>1</sub> = 8 P <sub>10</sub> = 11 Q <sub>1</sub> = 14 Median = 17 Q <sub>3</sub> = 21 P <sub>90</sub> = 31 P <sub>99</sub> = 84																								Hours in Service: 744 Hours of Data: 702 Hours of Missing Data: 42 Hours of Calibration: 1 Percent Operational Time: 94.5	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	19	21	18	13	11	12	12	11	11	11	11	11	11	10	15	14	14	13	11	13	11	13	18	21	
2-Oct	20	18	19	18	19	15	17	19	18	19	21	20	21	15	17	13	20	17	10	13	12	10	12	10	21
3-Oct	56	35	42	47	11	39	17	17	20	21	25	21	24	21	22	22	20	18	22	23	24	18	16	56	
4-Oct	13	14	14	12	51	12	10	14	26	20	26	33	70	29	41	19	21	61	20	25	9	23	15	15	70
5-Oct	18	19	20	23	22	20	16	18	19	22	21	24	23	23	20	21	18	18	17	16	18	17	17	24	
6-Oct	18	18	17	15	17	17	20	22	22	22	22	24	22	21	23	23	21	21	19	18	14	13	17	17	24
7-Oct	17	18	19	20	22	21	20	20	18	16	19	30	11	12	15	24	21	19	21	18	15	11	12	14	30
8-Oct	15	11	12	12	12	12	12	11	12	12	14	13	15	15	14	13	14	18	18	14	31	32	19	13	32
9-Oct	13	13	14	14	14	13	14	16	18	17	17	18	22	23	21	20	21	34	21	20	17	15	50	21	50
10-Oct	29	24	16	24	15	15	14	58	42	47	45	88	46	81	61	19	16	11	13	14	13	12	12	13	88
11-Oct	10	12	11	11	11	12	11	13	13	11	11	12	14	15	17	16	17	AF	AF	AF	AF	AF	AF	AF	17
12-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
13-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	25
14-Oct	17	19	14	14	15	14	15	14	13	15	14	19	20	23	21	20	22	20	21	20	20	21	26	12	26
15-Oct	12	42	54	12	13	8	14	15	15	18	15	15	14	18	19	15	16	16	15	19	19	17	17	18	54
16-Oct	19	19	19	19	18	18	18	19	21	20	21	24	23	23	22	18	18	18	30	36	35	25	11	26	36
17-Oct	15	68	33	17	17	13	38	40	31	17	17	12	19	20	15	29	13	17	16	15	15	14	15	15	68
18-Oct	16	15	15	15	15	17	15	16	16	16	17	18	20	22	32	29	44	12	11	19	17	12	15	12	44
19-Oct	13	14	13	16	15	19	27	66	24	16	27	28	27	23	36	15	13	10	17	23	11	8	8	31	66
20-Oct	21	41	38	21	10	39	85	27	59	87	57	87	42	25	56	54	32	83	57	67	54	18	13	25	87
21-Oct	20	18	20	17	22	16	15	13	15	21	19	19	20	22	22	18	16	16	26	16	5	8	25	7	26
22-Oct	29	12	13	22	51	91	47	32	25	20	29	29	34	18	18	20	14	15	17	17	17	13	16	15	91
23-Oct	15	16	15	15	15	17	16	16	17	17	19	17	20	18	17	16	17	12	14	13	15	16	16	14	20
24-Oct	13	13	13	15	18	17	19	18	17	20	17	16	19	16	16	13	15	10	11	19	22	20	21	23	23
25-Oct	11	11	10	10	9	10	10	11	11	11	14	17	15	16	16	15	16	16	17	17	15	14	19	8	19
26-Oct	66	15	16	16	16	15	17	21	18	17	18	17	17	17	17	17	17	20	19	17	18	16	15	16	66
27-Oct	13	12	30	77	108	53	28	19	37	29	26	22	22	18	13	14	13	13	12	13	14	14	14	13	108
28-Oct	14	22	20	19	16	15	15	17	19	19	20	17	17	16	14	14	16	13	12	12	12	13	11	12	22
29-Oct	15	14	14	11	11	11	13	13	16	14	16	15	18	16	19	17	16	16	12	12	13	55	28	40	55
30-Oct	24	38	13	15	15	14	14	14	18	17	17	23	16	19	22	20	22	17	17	12	53	87	46	24	87
31-Oct	46	57	13	11	15	16	20	18	14	11	16	13	13	11	9	9	10	11	10	10	9	9	10	11	57
Diurnal Maximum																									
C - Calibration AF - Analyzer Failure																									





# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Christina Lake	Station number:	AMS 500
Calibration Date:	October 24, 2017	Last Cal Date:	September 20, 2017
Start time (MST):	11:57	End time (MST):	15:55
Reason:	Routine		

### Calibration Standards

Cal Gas Concentration	<u>50</u>	ppm	Cal Gas Exp Date	September 8, 2018
Cal Gas Cylinder #	<u>LL107928</u>			
Calibrator Make/Model	Teledyne API T700		Serial Number	1221
ZAG Make/Model	Teledyne API 701		Serial Number	4604

### Analyzer Information

Analyzer make:	Thermo 43i	Analyzer serial #:	1118148497		
	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>	
Analyzer Range	0 - 1000 ppb	PMT voltage	-698	-698	
Calculated slope	1.001392	0.993569	Lamp voltage	838	837
Calculated intercept	0.848962	0.824878	Pressure	677.9	681.7
Analyzer Background	13.3	13.3	Flow	0.591	0.592
Analyzer Coefficient	1.024	1.035	Intensity	90	90

### SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	-0.1	----
as found span	4920	79.4	794.1	785.3	1.011
calibrator zero	5000	0.0	0.0	-0.1	----
high point	4920	79.4	794.1	798.5	0.994
second point	4960	39.7	397.0	399.2	0.995
third point	4980	19.9	199.0	198.2	1.004
as left zero	6000	0.0	0.0	0.2	----
as left span	4927	79.4	793.0	797.7	0.994
<b>Average Correction Factor</b>					<b>0.998</b>
Corrected As found	785.40	Previous response	792.14	<b>*% change</b>	0.9%

*\* = > +/-5% change initiates investigation*

#### Notes:

Sample inlet filter replaced after as founds. Adjusted span.

Calibration Performed By:

Asad Hidayat



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

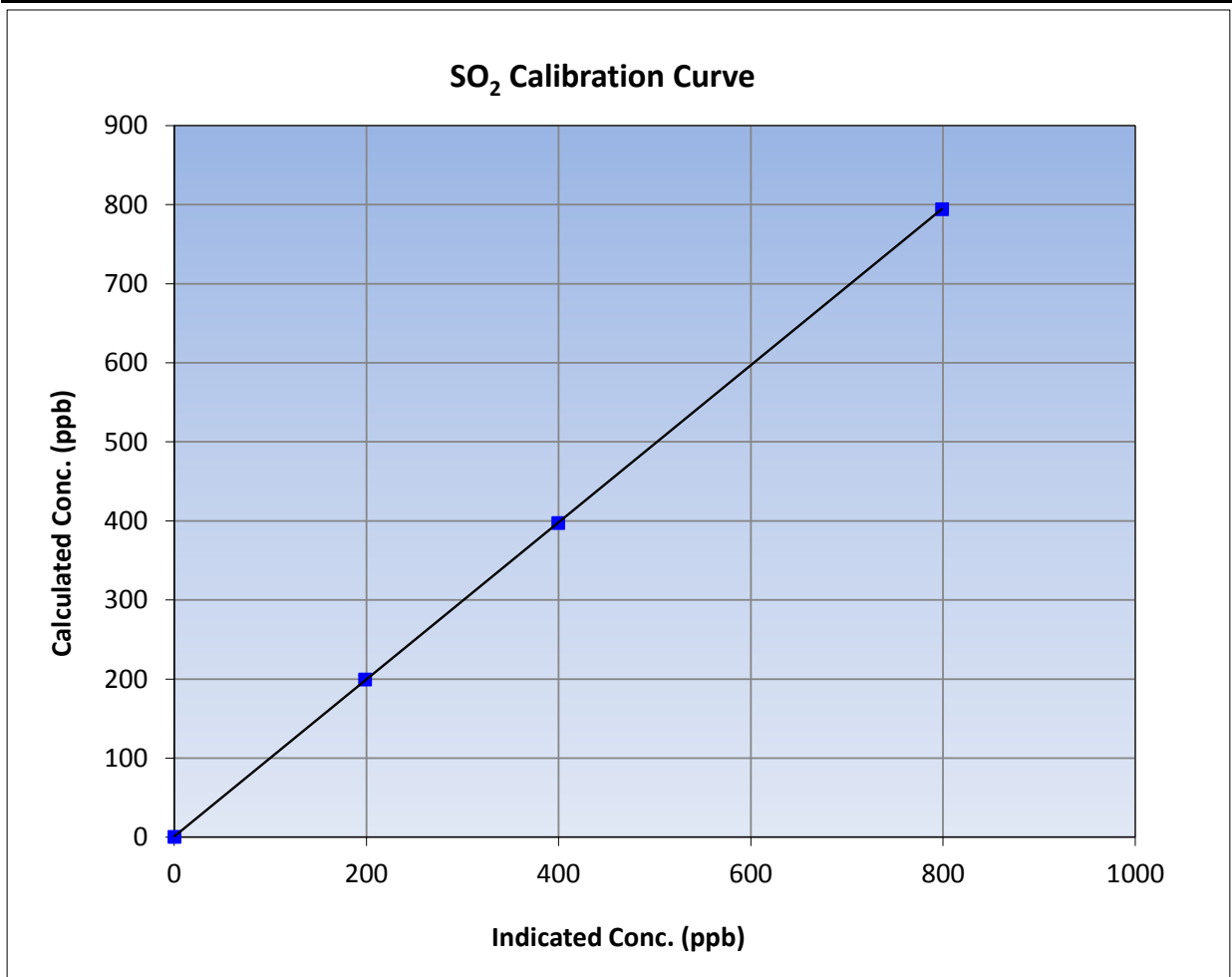
Version-03-2017

### Station Information

Calibration Date	October 24, 2017	Previous Calibration	September 20, 2017
Station Name	Christina Lake	Station Number	AMS 500
Start Time (MST)	11:57	End Time (MST)	15:55
Analyzer make	Thermo 43i	Analyzer serial #	1118148497

### Calibration Data

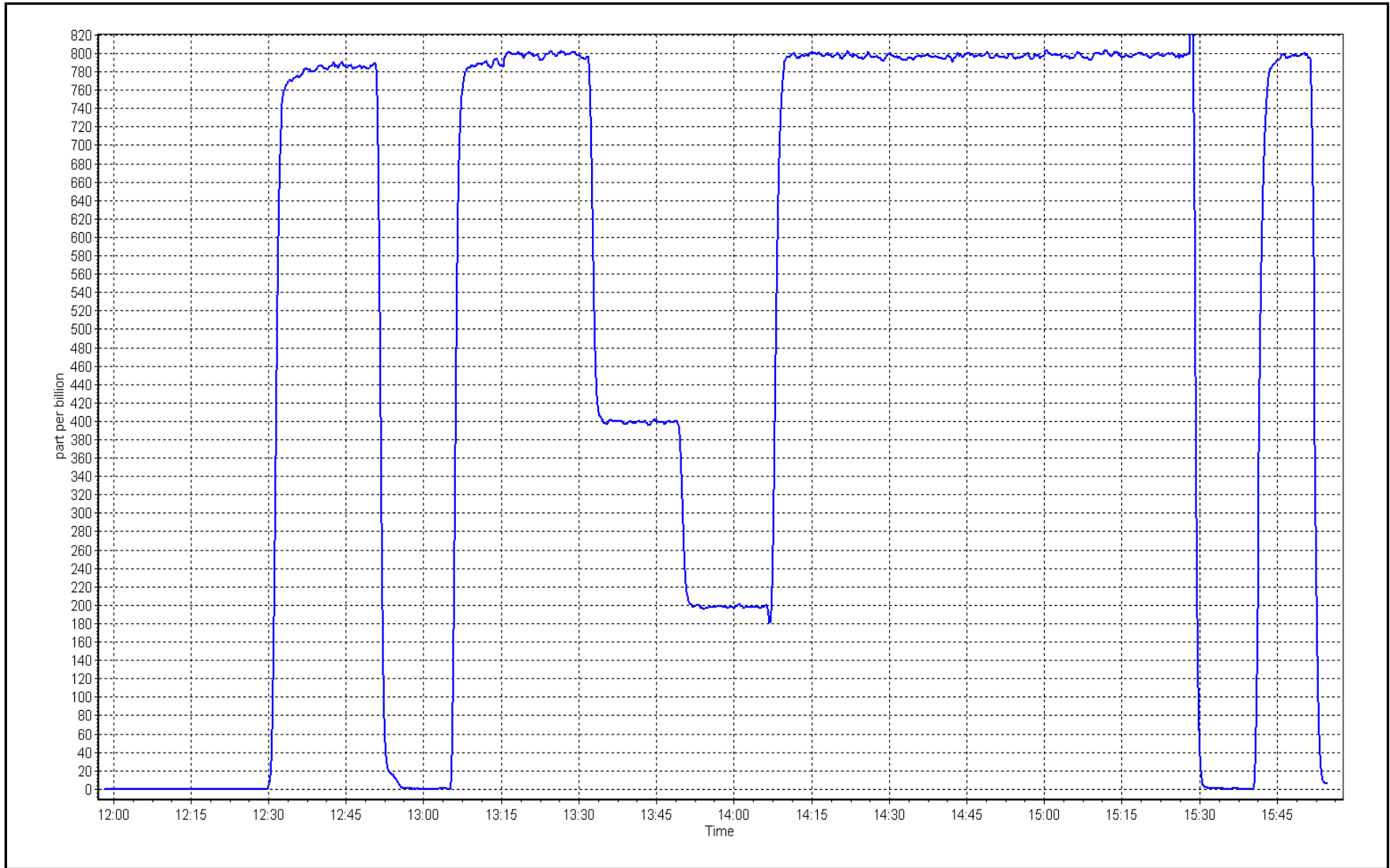
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits
0.0	-0.1	----	Correlation Coefficient	≥0.995
794.1	798.5	0.9945		
397.0	399.2	0.9945	Slope	0.90 - 1.10
199.0	198.2	1.0041		
			Intercept	+/-30



SO2 Calibration Plot

Date: October 24, 2017

Location: Christina Lake







# Wood Buffalo Environmental Association

## H<sub>2</sub>S Calibration Summary

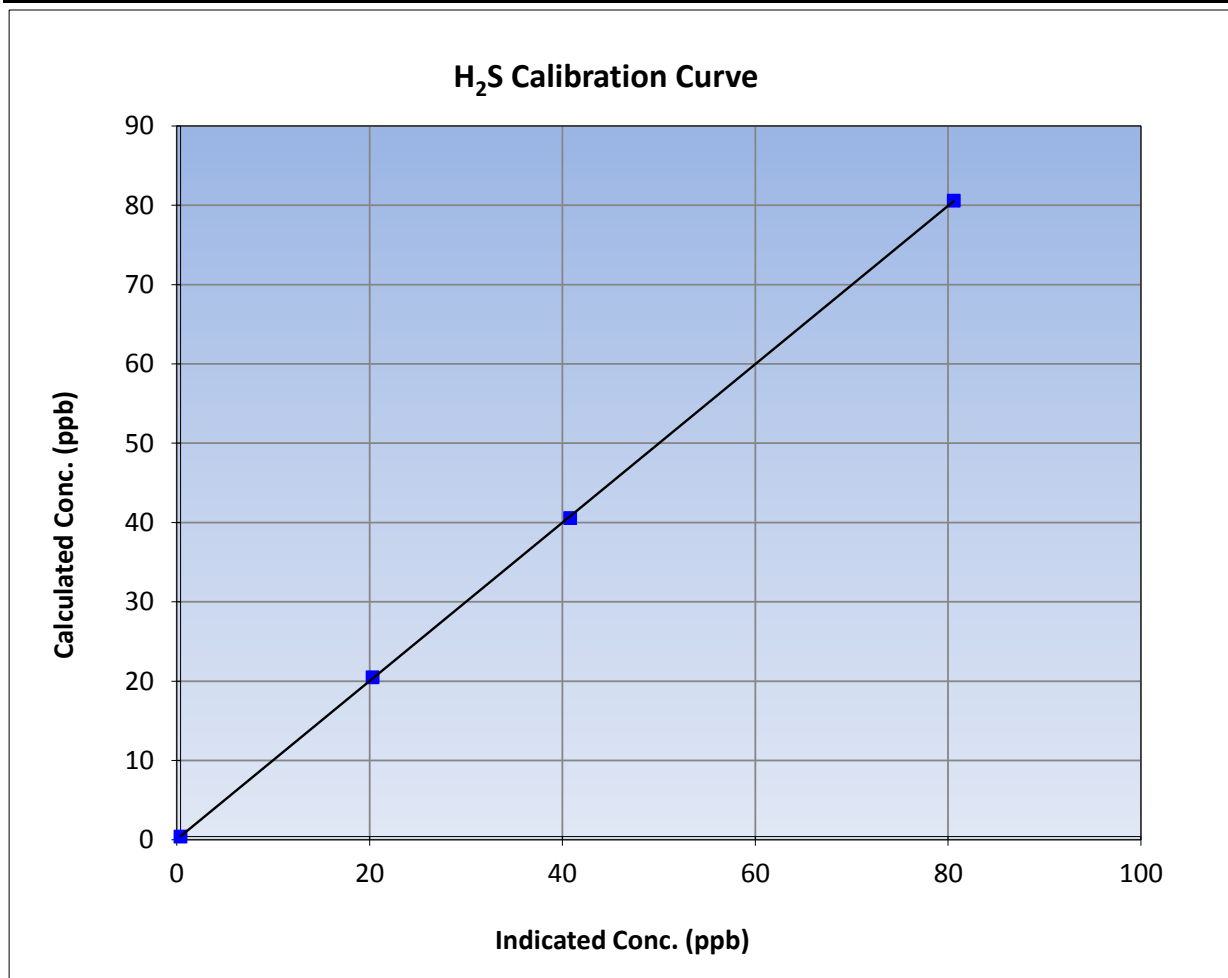
Version-03-2017

### Station Information

Calibration Date	October 13, 2017	Previous Calibration	September 20, 2017
Station Name	Christina Lake	Station Number	AMS 500
Start Time (MST)	10:55	End Time (MST)	13:15
Analyzer make	Thermo 43i- TLE	Analyzer serial #	1008841400

### Calibration Data

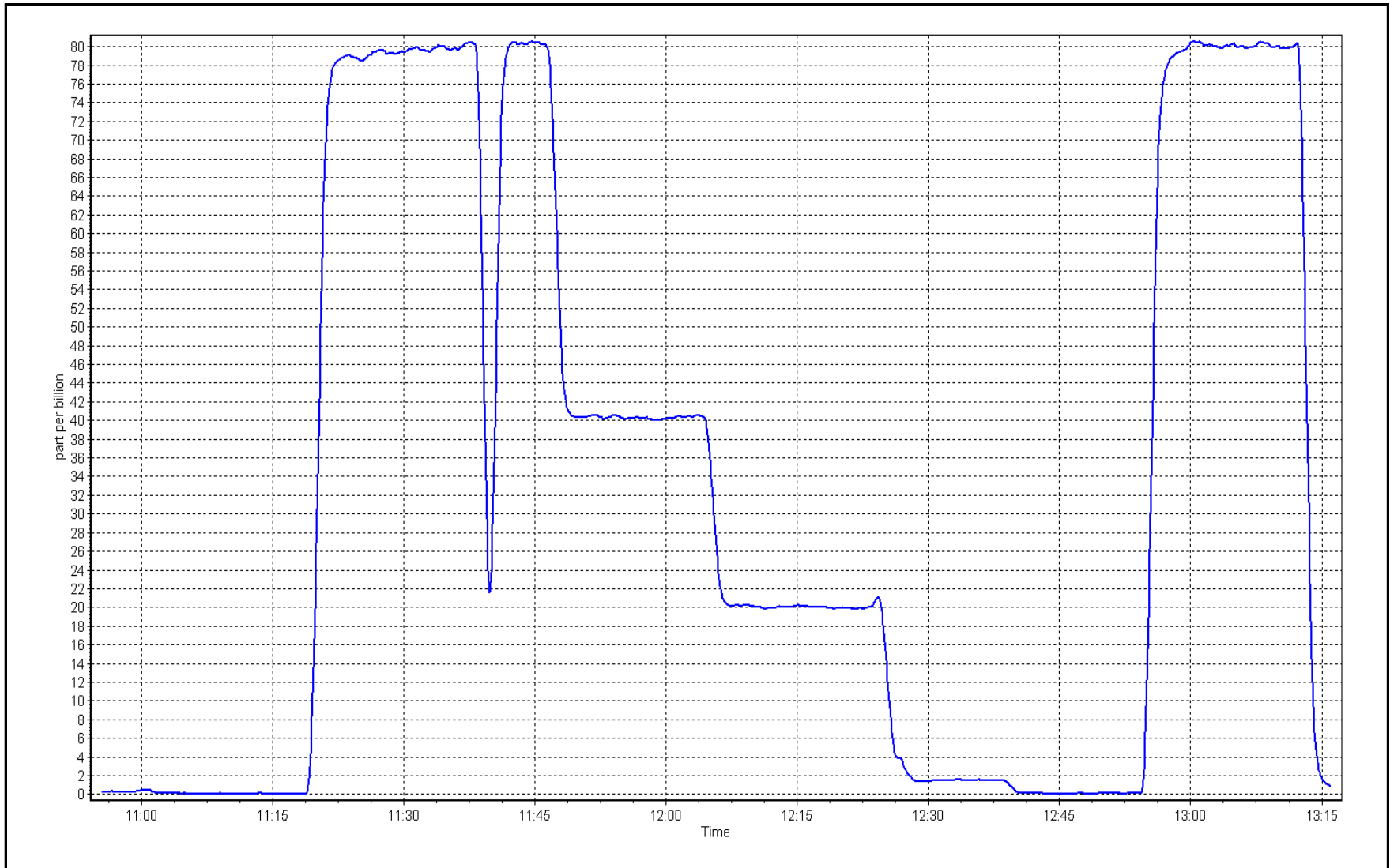
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.0	----	Correlation Coefficient	0.999978	≥0.995
80.2	80.2	0.9999			
40.2	40.4	0.9949	Slope	0.998776	0.90 - 1.10
20.1	19.9	1.0098			
			Intercept	0.038614	+/-3



# H<sub>2</sub>S Calibration Plot

Date: October 13, 2017

Location: Christina Lake





# Wood Buffalo Environmental Association

## NO<sub>x</sub> - NO - NO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Christina Lake	Station number:	AMS 500
Calibration Date:	October 24, 2017	Last Cal Date:	September 20, 2017
Start time (MST):	11:57	End time (MST):	15:55
Reason:	Routine		

### Calibration Standards

NO Gas Cylinder #	LL107928	Cal Gas Expiry Date	September 8, 2018
NOX Cal Gas Conc.	<u>50.8</u> ppb	NO Cal Gas Conc.	<u>50.5</u> ppb
Calibrator Model	Teledyne API T700	Serial Number	1221
ZAG make/model	Teledyne API 701	Serial Number	4604

### Analyzer Information

Analyzer make: Teledyne API T200

Analyzer serial #: 723

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
NO coefficient	1.322	1.366	NOX Range (ppb)	0 - 1000	ppb
NOX coefficient	1.314	1.361	Moly Temperature	316.0	315.5
NO <sub>2</sub> coefficient	1.000	1.000	Reaction cell Press	4.1	4.2
NO bkgrnd	-0.4	-0.4	Sample Flow	0.490	0.497
NOX bkgrnd	0.9	0.9	PMT Voltage	827.0	827.0

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope	1.000153	0.997908
NO <sub>x</sub> Cal Offset	1.337325	1.418502
NO Cal Slope	1.000168	0.997380
NO Cal Offset	0.972210	1.015403
NO <sub>2</sub> Cal Slope	1.008807	1.016363
NO <sub>2</sub> Cal Offset	-0.272177	0.642990



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

Version-03-2017

### Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.0	0.0	0.3	0.3	0.0	----	----
as found span	4920	79.4	806.8	802.0	4.8	777.8	773.4	4.4	1.0373	1.0370
calibrator zero	5000	0.0	0.0	0.0	0.0	0.3	0.3	0.0	----	----
high point	4920	79.4	806.8	802.0	4.8	807.7	803.5	4.2	0.9989	0.9982
second point	4960	39.7	403.4	401.0	2.4	402.6	401.2	1.3	1.0019	0.9995
third point	4981	19.9	202.1	201.0	1.2	199.0	198.6	0.4	1.0158	1.0119
as left zero	5000	0.0	0.0	0.0	0.0	-0.2	0.5	-0.8	----	----
as left span	4920	79.4	806.8	414.8	392.0	798.2	412.6	385.6	1.0108	1.0053
<b>Average Correction Factor</b>									<b>1.0055</b>	<b>1.0032</b>

Corrected As found	NO <sub>x</sub> = 777.5 ppb	NO = 773.1 ppb		*Percent Change	NO <sub>x</sub> = 3.6%
Previous Response	NO <sub>x</sub> = 805.3 ppb	NO = 800.9 ppb		*Percent Change	NO = 3.6%

\* = > +/-5% change initiates investigation

### GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
1st NO ref point		4.8	805.0	802.7	2.3	1.0022	0.9992	----	----
1st NO2 (400 ppb O3)	414.8	392.7	801.0	414.8	386.2	1.0072	----	1.0167	98.4%
2nd NO2 (200 ppb O3)	607.5	200.0	802.7	607.5	195.3	1.0051	----	1.0239	97.7%
3rd NO2 (100 ppb O3)	706.7	100.8	805.0	706.7	98.2	1.0022	----	1.0261	97.5%
2nd NO ref point	----	4.8	807.7	801.5	6.2	0.9989	1.0007	----	----
<b>Average Correction Factor</b>						<b>1.0034</b>	<b>0.9999</b>	<b>1.0222</b>	<b>97.8%</b>

**Notes:** Sample inlet filter replaced after as founds. Adjusted span.

Calibration Performed By: Asad Hidayat





# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

Version-03-2017

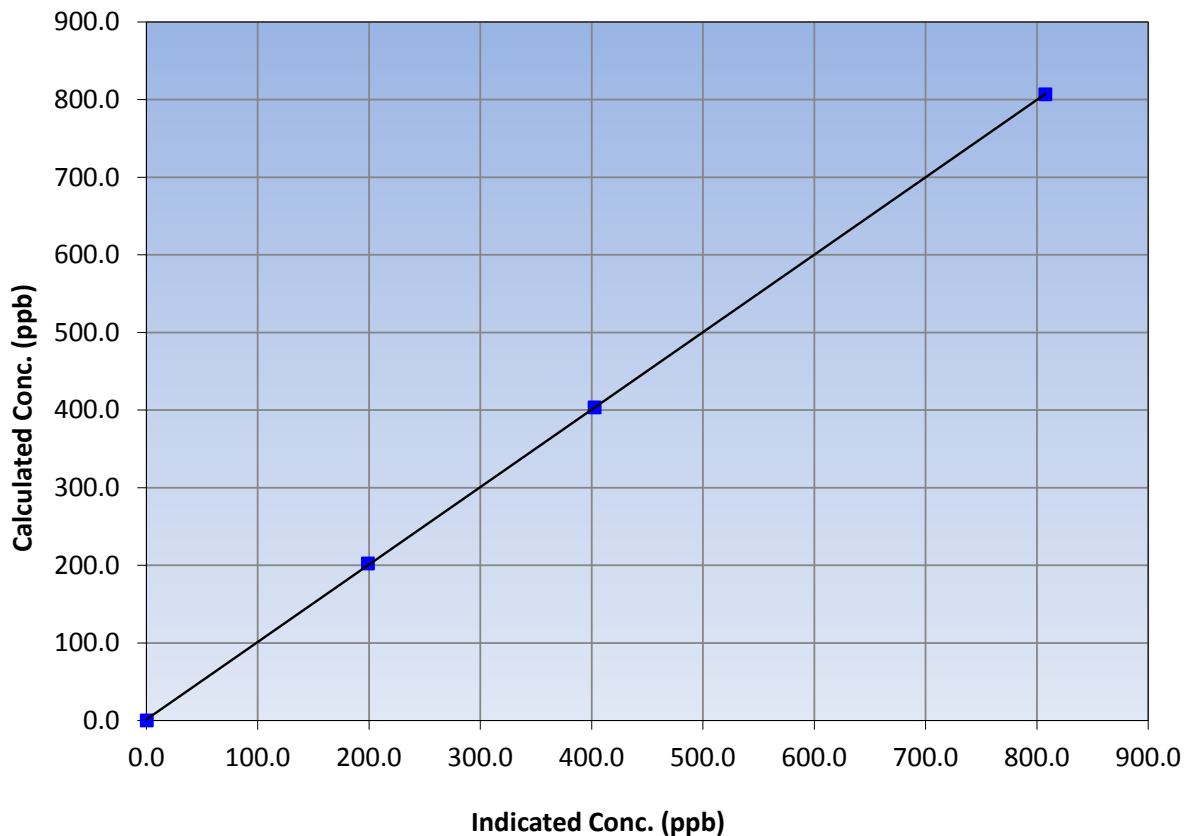
### Station Information

Calibration Date	October 24, 2017	Previous Calibration	September 20, 2017
Station Name	Christina Lake	Station Number	AMS 500
Start Time (MST)	11:57	End Time (MST)	15:55
Analyzer make	Teledyne API T200	Analyzer serial #	723

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>
0.0	0.3	----	Correlation Coefficient	≥0.995
806.8	807.7	0.9989		
403.4	402.6	1.0019	Slope	0.90 - 1.10
202.1	199.0	1.0158		
			Intercept	+/-20

NO<sub>x</sub> Calibration Curve





# Wood Buffalo Environmental Association

## NO Calibration Summary

Version-03-2017

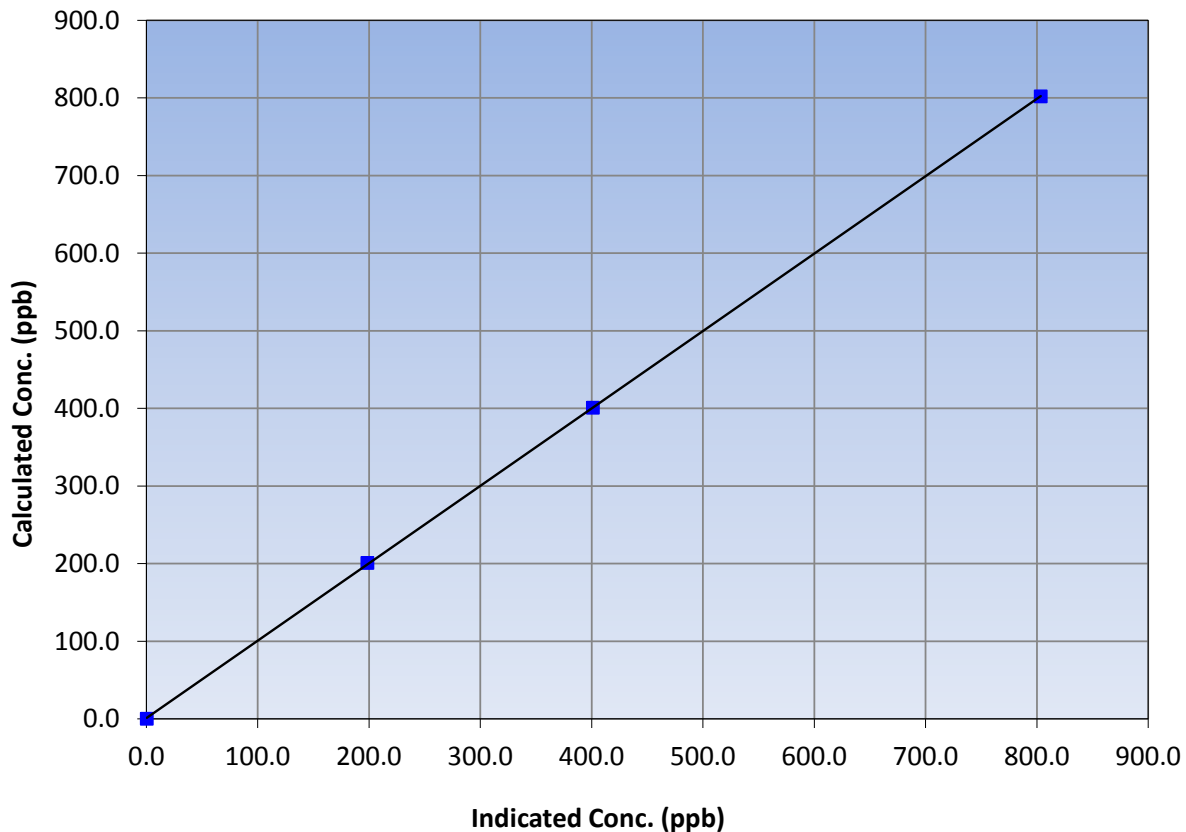
### Station Information

Calibration Date	October 24, 2017	Previous Calibration	September 20, 2017
Station Name	Christina Lake	Station Number	AMS 500
Start Time (MST)	11:57	End Time (MST)	15:55
Analyzer make	Teledyne API T200	Analyzer serial #	723

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	0.3	----	Correlation Coefficient	≥0.995	
802.0	803.5	0.9982			
401.0	401.2	0.9995			
201.0	198.6	1.0119			
			Slope	0.997380	0.90 - 1.10
			Intercept	1.015403	+/-20

NO Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

Version-03-2017

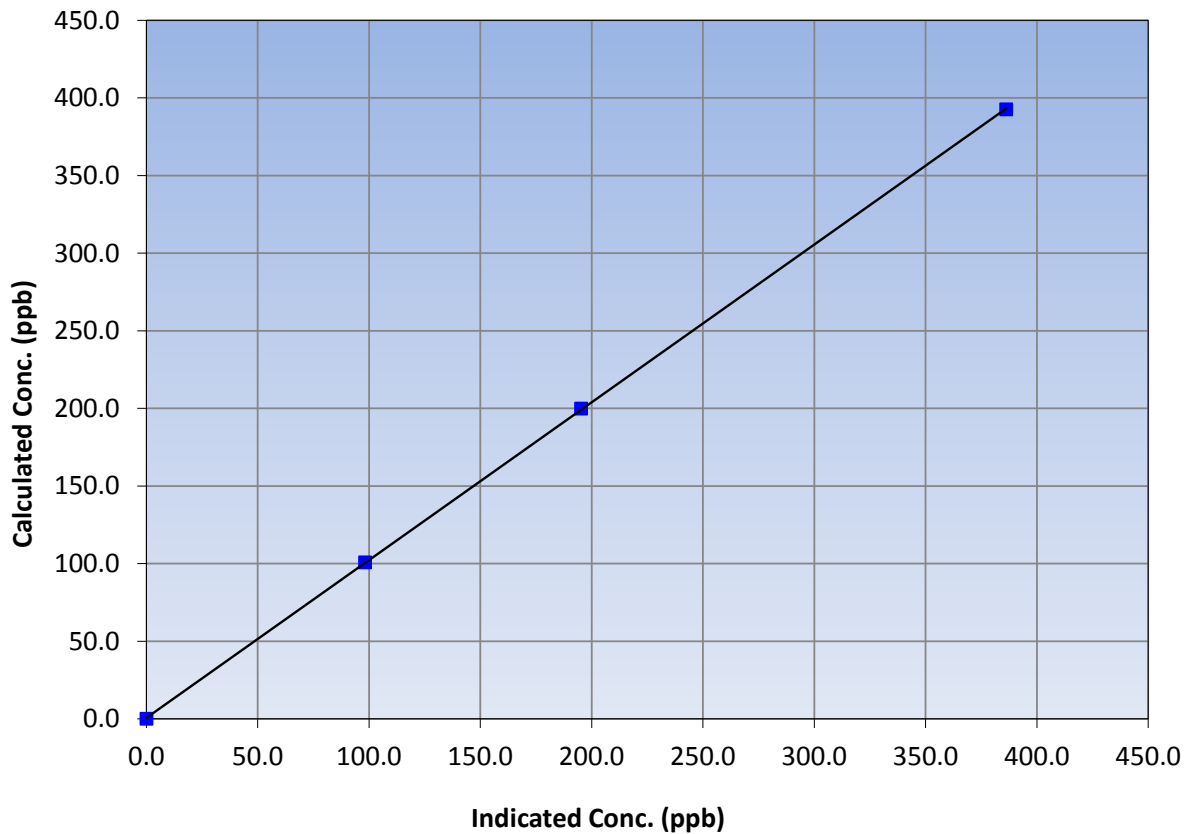
### Station Information

Calibration Date	October 24, 2017	Previous Calibration	September 20, 2017
Station Name	Christina Lake	Station Number	AMS 500
Start Time (MST)	11:57	End Time (MST)	15:55
Analyzer make	Teledyne API T200	Analyzer serial #	723

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	0.0	----	Correlation Coefficient	≥0.995	
392.7	386.2	1.0167			
200.0	195.3	1.0239			
100.8	98.2	1.0261			
			Slope	0.999983	0.90 - 1.10
			Intercept	1.016363	+/-20

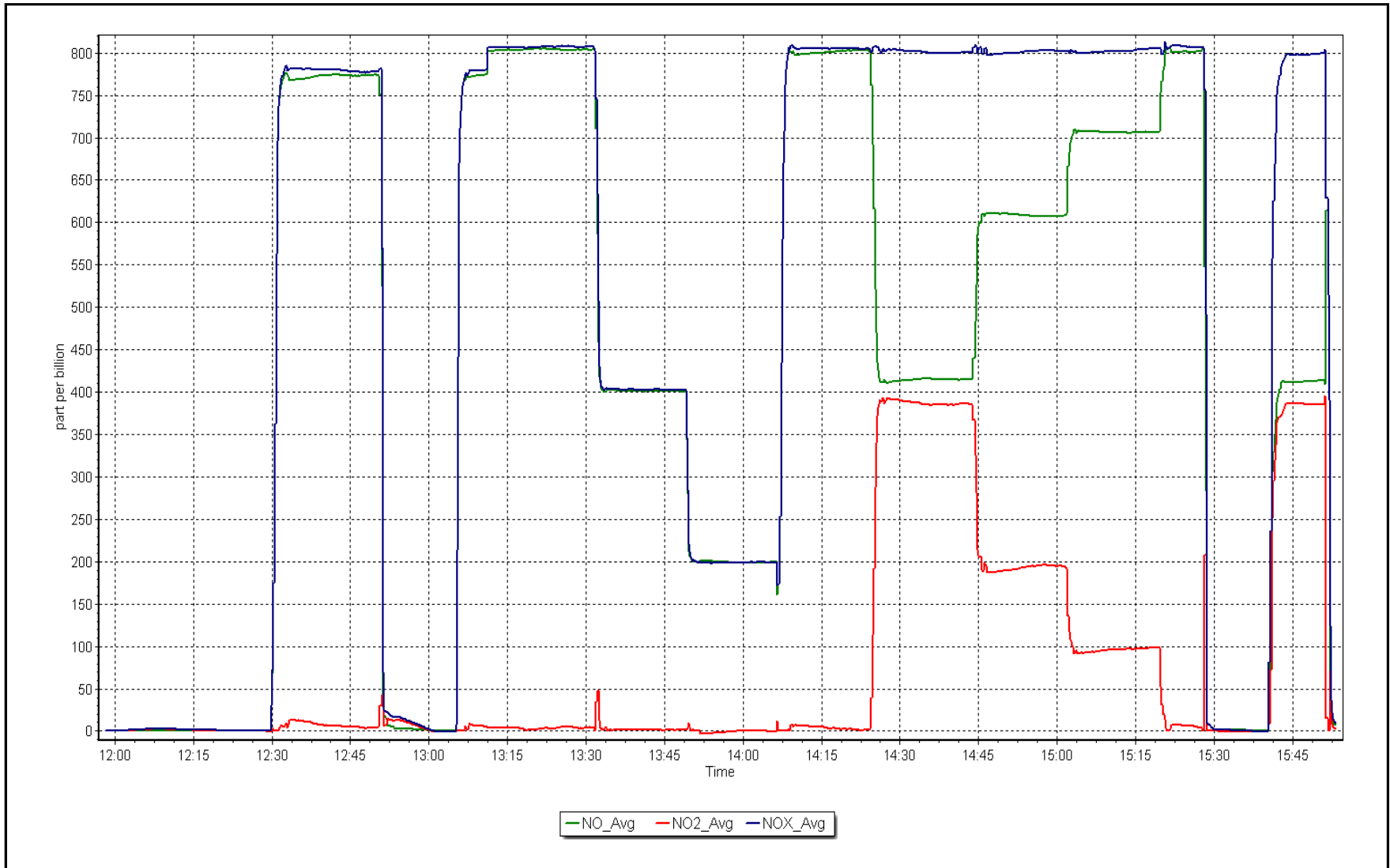
**NO<sub>2</sub> Calibration Curve**



# NO<sub>x</sub> Calibration Plot

Date: October 24, 2017

Location: Christina Lake





## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

### **CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT**

#### **AMS 501 LEISMER OCTOBER 2017**

Operations, Data Collection,  
QA/QC, Data Validation and Reporting by:  
Wood Buffalo Environmental Association  
Fort McMurray, Alberta

November 29, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LEISMER (AMS 501)  
OCTOBER 2017

MONTHLY SUMMARY for  
AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	706	37	38	99.87	32	0	8	0
H2S (ppb) Average	688	39	56	97.72	1	0	0	0
NO2 (ppb) Average	705	39	39	100	13	0	4	-
NO (ppb) Average	705	39	39	100	18	-	5	-
NOX (ppb) Average	705	39	39	100	28	-	9	-
Temperature 2 m (C) Average	744	0	0	100	20.8	-	12.2	-
Relative Humidity (%) Average	744	0	0	100	99	-	98	-
Wind Speed 10 m (km/h) Average	744	0	0	100	44	-	26	-
Wind Direction 10 m (deg) Average	744	0	0	100	-	-	-	-

Note : Operational time includes periods of data collection and instrument calibration

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LEISMER (AMS 501) OCTOBER 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING  
MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	706	1.6	4	-	0	0	0	0	1	4	32
H2S (ppb) Average	688	0.2	0	-	0	0	0	0	0	0	1
NO2 (ppb) Average	705	1.6	2	-	0	0	1	1	2	3	13
NO (ppb) Average	705	1	2	-	0	0	0	0	1	2	18
NOX (ppb) Average	705	2.6	4	-	0	0	1	1	3	5	28
Temperature 2 m (C) Average	744	2.2	4.7	-	-7.3	-3.1	-1.3	1.6	5	8.6	20.8
Relative Humidity (%) Average	744	77	16	-	31	53	67	81	91	95	99
Wind Speed 10 m (km/h) Average	744	12.7	9	-	0	4	6	10	17	27	44
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LEISMER (AMS 501)  
OCTOBER 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, H2S	24 Oct 2017 13:00	24 Oct 2017 13:00	1	Maintenance - cleaned glass manifold
H2S	10 Oct 2017 04:00	10 Oct 2017 06:00	3	Unstable operation - excessive baseline drift
H2S	16 Oct 2017 03:00	16 Oct 2017 09:00	7	Unstable operation - excessive baseline drift
H2S	16 Oct 2017 13:00	16 Oct 2017 16:00	4	Maintenance - reinitiated daily QA check
H2S	31 Oct 2017 11:00	31 Oct 2017 12:00	2	Unstable operation - excessive baseline drift





Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb

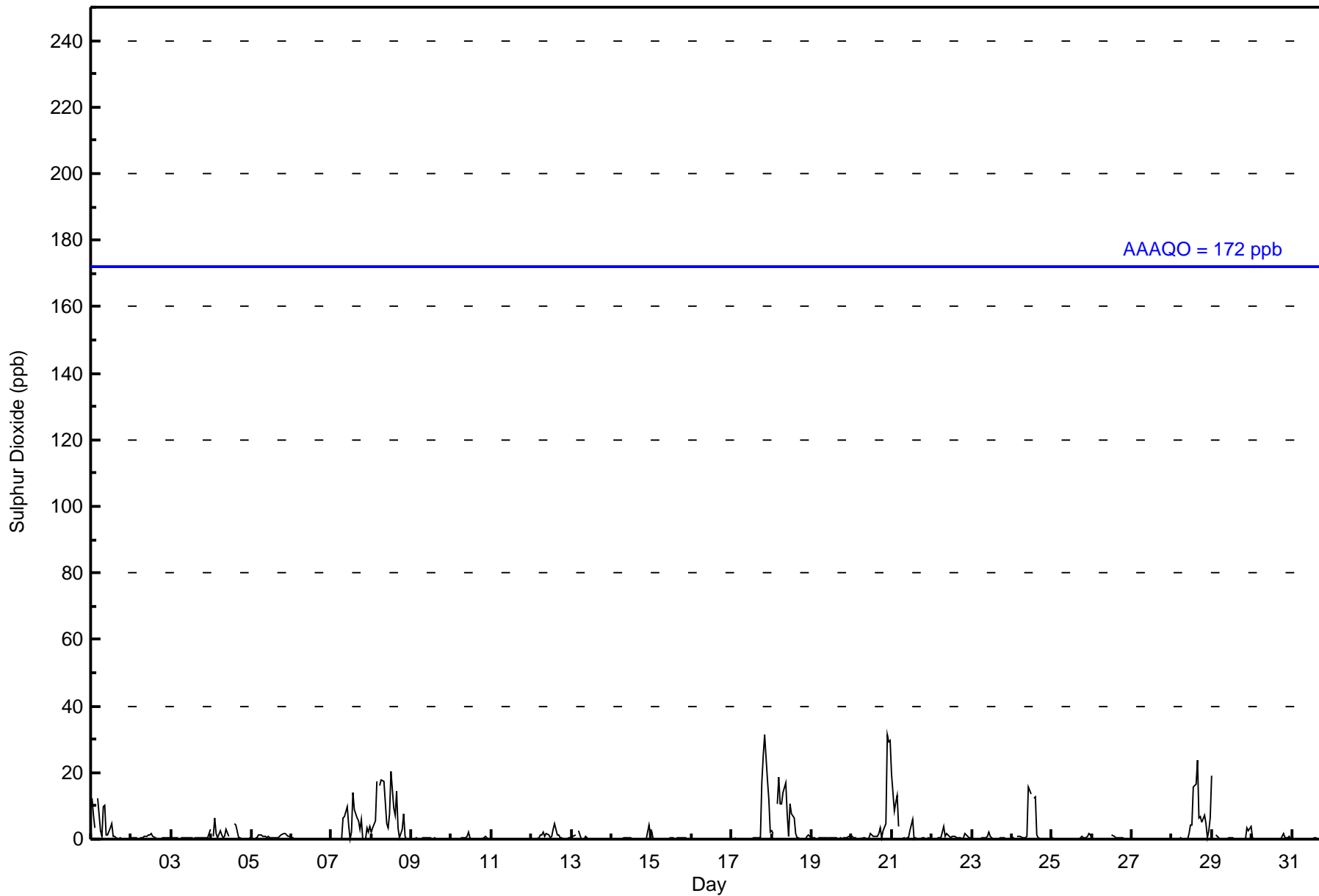
Leismer - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 32 ppb on Oct 20 22:00										Maximum Daily Average: 7.5 ppb on Oct 8										Hours of Data: 706						
Minimum Value: 0 ppb on Oct 6 06:00										Minimum Daily Average: 0.0 ppb on Oct 27										Hours of Missing Data: 38						
Maximum Diurnal Average: 2.4 ppb at hour 1										Minimum Diurnal Average: 0.6 ppb at hour 18										Hours of Calibration: 37						
Monthly Average: 1.6 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 4 P <sub>99</sub> = 19										Percent Operational Time: 99.9						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	12	7	4	Z	12	2	1	10	10	1	1	3	4	1	1	0	0	0	0	0	0	0	0	0	3.2	12
2-Oct	0	0	0	0	Z	0	0	1	1	1	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0.5	2
3-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3
4-Oct	Z	1	6	2	1	3	1	0	1	3	1	C	C	C	5	4	1	0	0	0	0	0	0	0	1.5	6
5-Oct	0	Z	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	1	2	2	1	1	1	0.8	2
6-Oct	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	1
7-Oct	0	0	0	Z	0	0	0	6	7	10	4	0	2	14	9	6	6	3	6	0	0	3	2	4	3.6	14
8-Oct	2	3	5	17	Z	16	18	17	11	5	3	8	21	9	7	14	3	0	3	8	1	0	0	0	7.5	21
9-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
10-Oct	Z	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0.3	2
11-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
12-Oct	0	0	Z	0	0	1	1	2	1	2	1	0	1	3	4	1	1	0	0	0	0	0	1	0	0.9	4
13-Oct	0	1	1	Z	3	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3
14-Oct	0	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	0.4	4
15-Oct	2	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2
16-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
17-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	17	25	31	18	12	2	4.7	31
18-Oct	3	2	Z	11	19	11	10	14	17	8	1	11	8	6	2	0	0	0	0	0	0	1	1	1	5.4	19
19-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1
20-Oct	1	1	1	0	Z	0	0	0	0	0	0	2	1	1	1	1	2	3	1	3	5	32	29	30	4.9	32
21-Oct	19	9	11	13	4	Z	0	0	0	0	0	3	6	0	1	0	0	0	0	0	0	0	0	0	3.0	19
22-Oct	Z	0	0	0	1	1	2	4	1	2	1	1	1	1	1	0	0	0	0	0	2	1	0	0	0.8	4
23-Oct	0	Z	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
24-Oct	0	0	Z	1	1	1	1	0	0	1	16	14	M	12	13	1	0	0	0	0	0	0	0	0	2.8	16
25-Oct	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	2	1	0.3	2
26-Oct	0	0	0	0	Z	0	0	0	0	C	C	C	1	1	1	0	0	0	0	0	0	0	0	0	0.2	1
27-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
28-Oct	Z	0	0	0	0	0	0	0	0	0	2	4	4	16	17	24	6	7	5	7	5	0	3	6	4.6	24
29-Oct	19	Z	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	3	2	4	1.5	19
30-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	1	0	0.3	2
31-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2.4 1.0 1.2 1.9 1.7 1.5 1.2 1.9 1.7 1.2 1.3 1.7 1.9 2.3 2.0 1.8 0.7 0.6 1.2 1.6 1.6 2.0 1.9 1.8																								Diurnal Average		
19 9 11 17 19 16 18 17 17 10 16 14 21 16 17 24 6 7 17 25 31 32 29 30																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																										



Wood Buffalo Environmental Association  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Leismer - October 2017





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Leismer - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	671	95.04	95.04
11 - 20	28	3.97	99.01
21 - 60	7	0.99	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Leismer - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	<b>Totals</b>
0 - 10	42	17	14	14	29	17	26	8	36	88	43	23	82	76	67	89	671
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	5	22	1	28
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	7
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	42	17	14	14	29	17	26	8	36	88	43	23	82	81	96	90	706

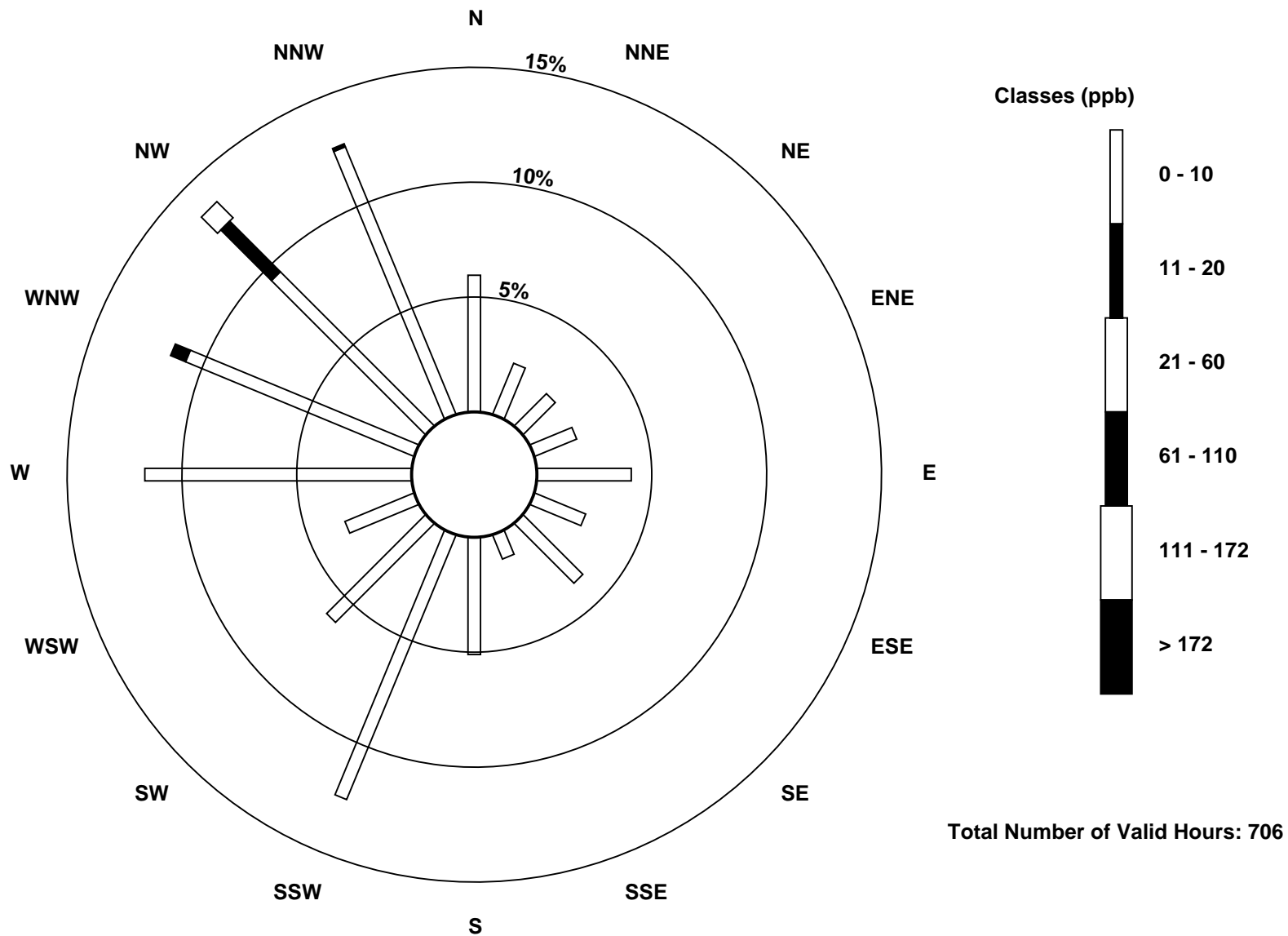
Total Number of Valid Hours: 706

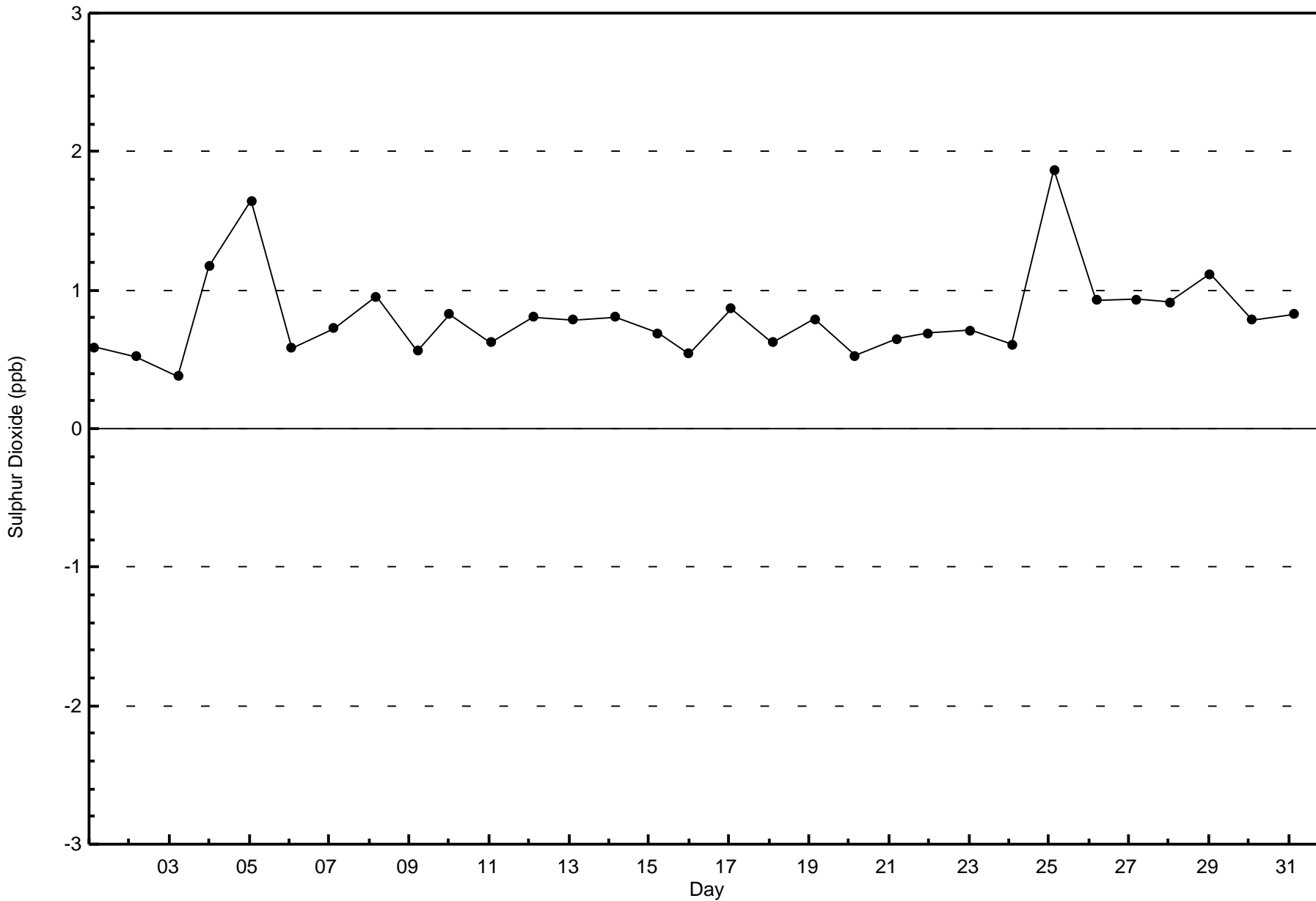
Total Number of Hours: 744

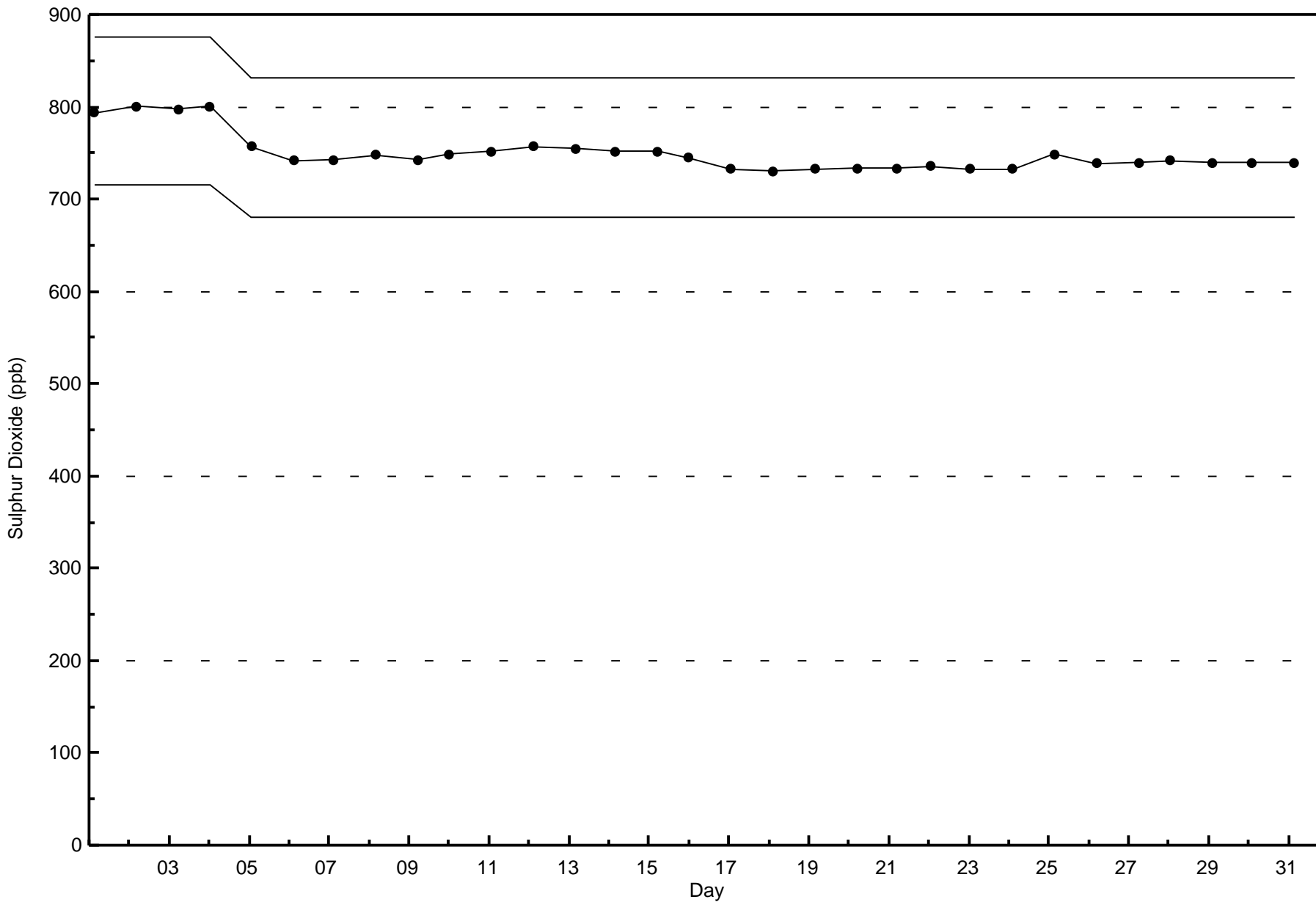


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Leismer (AMS 501)









# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Hydrogen Sulphide (H<sub>2</sub>S) - ppb

## Leismer - October 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 1 ppb on Oct 12 09:00	Maximum Daily Average: 0.4 ppb on Oct 17		Hours of Data:	688
Minimum Value: 0 ppb on Oct 3 15:00	Minimum Daily Average: 0.1 ppb on Oct 29		Hours of Missing Data:	56
Maximum Diurnal Average: 0.3 ppb at hour 16	Minimum Diurnal Average: 0.2 ppb at hour 6		Hours of Calibration:	39
Monthly Average: 0.2 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 1		Percent Operational Time:	97.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
4-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
5-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.2	1
6-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
7-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0.3	1
8-Oct	0	0	0	1	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
9-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
10-Oct	0	Z	0	UO	UO	UO	0	0	0	1	1	1	C	C	C	C	C	0	0	0	0	0	0	0	--	1
11-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
12-Oct	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.2	1
13-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
14-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1
15-Oct	0	0	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
16-Oct	0	Z	UO	UO	UO	UO	UO	UO	UO	0	0	0	M	M	M	M	1	1	1	0	0	0	0	0	--	1
17-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0.4	1
18-Oct	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
19-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
20-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.3	1
21-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
22-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
23-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
24-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0.2	0
25-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
26-Oct	0	0	0	0	0	Z	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
27-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
28-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.3	1
29-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
30-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
31-Oct	0	0	0	0	Z	0	0	0	0	0	UO	UO	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0

0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	Diurnal Average
1	0	0	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Diurnal Maximum

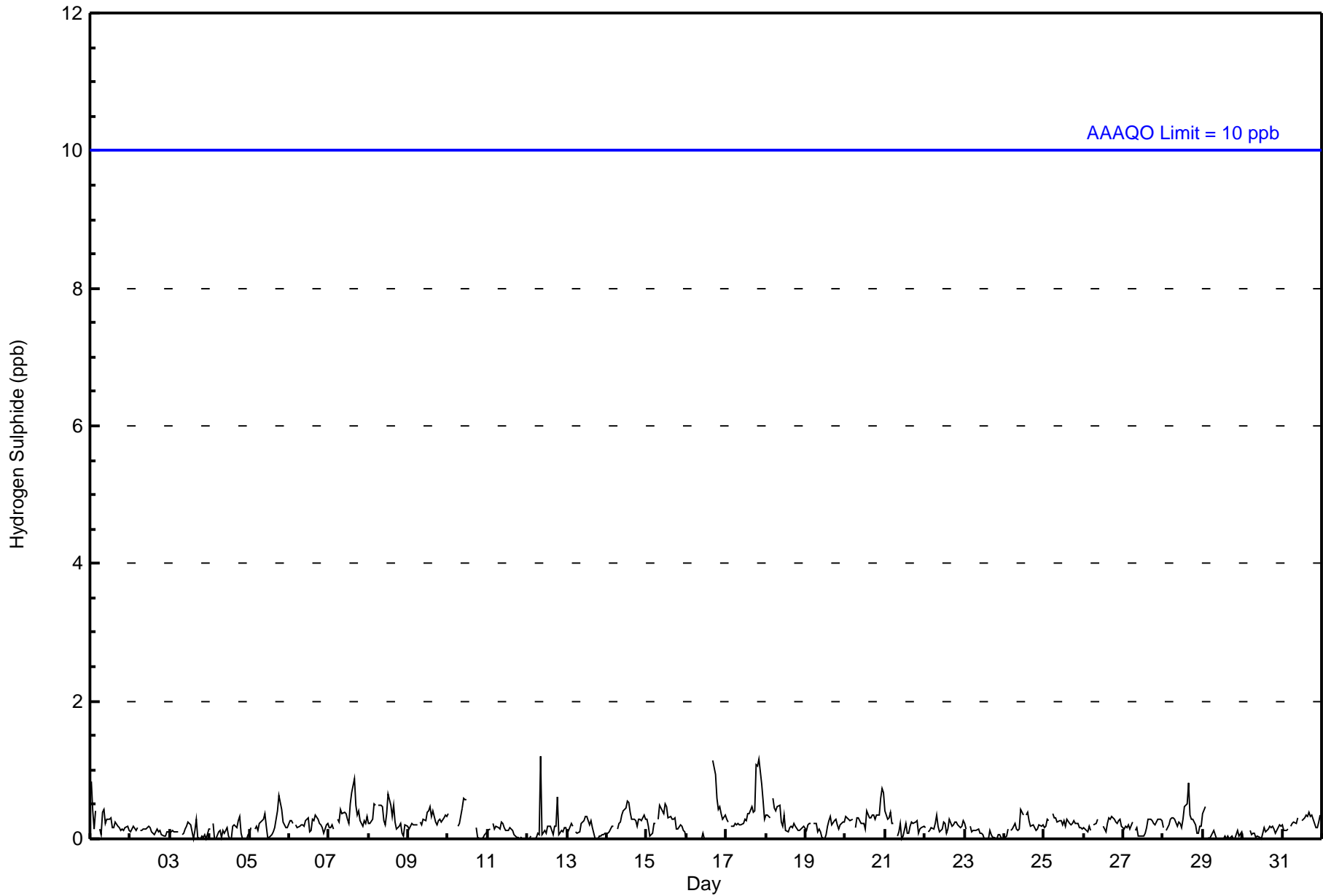
Z - zerospan                      C - Calibration                      M - Maintenance                      UO - Unstable Operation  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb      24-hr 3 ppb





**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Leismer - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Leismer - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	688	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 688

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Leismer - October 2017**

<b>Concentration</b> <b>Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	41	16	14	15	26	18	24	8	38	85	44	22	70	81	95	91	688
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	41	16	14	15	26	18	24	8	38	85	44	22	70	81	95	91	688

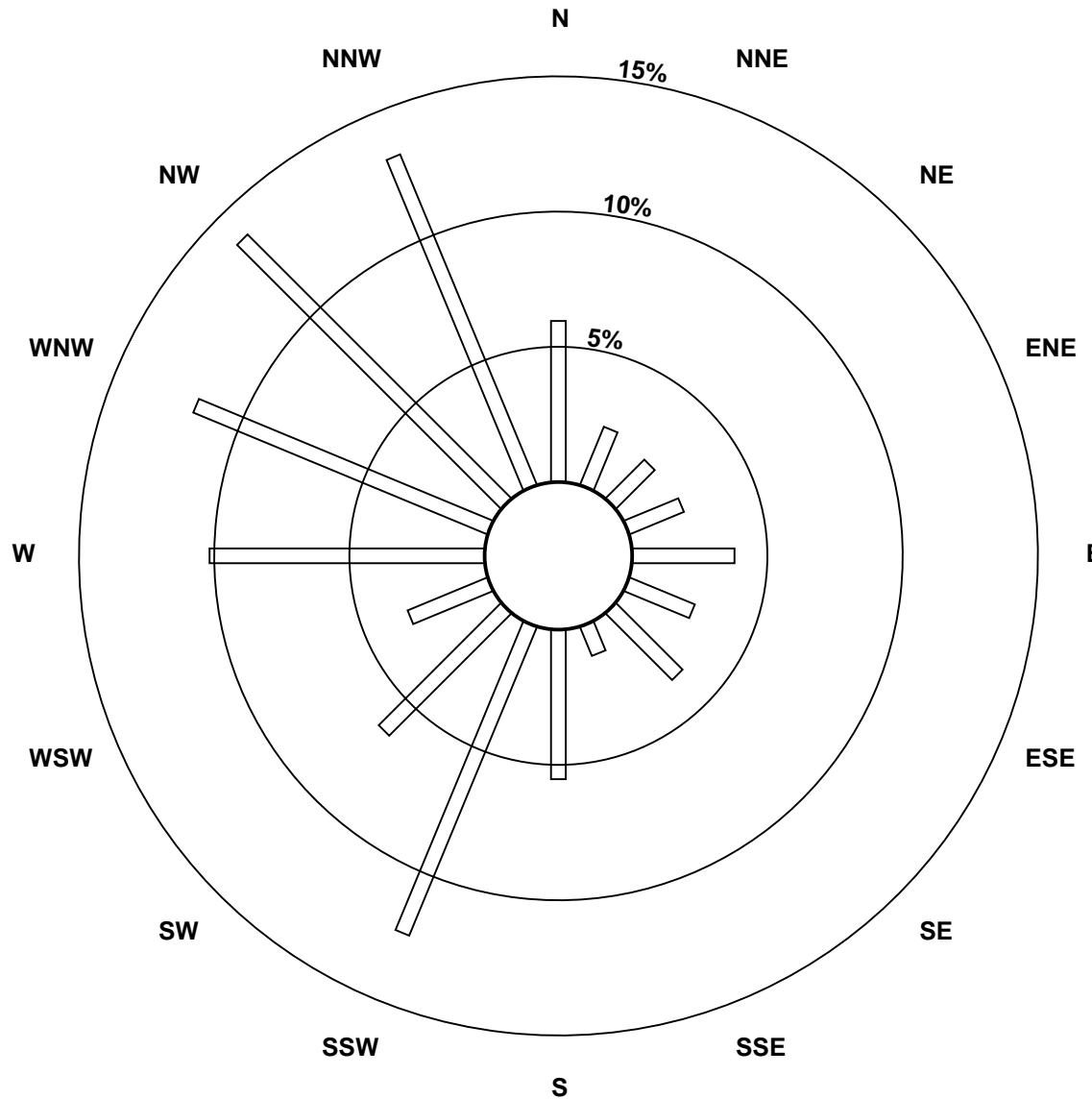
Total Number of Valid Hours: 688

Total Number of Hours: 744

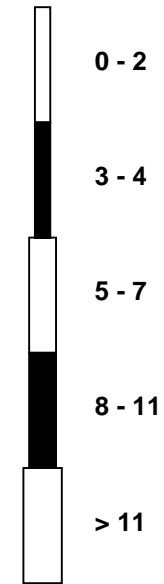


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

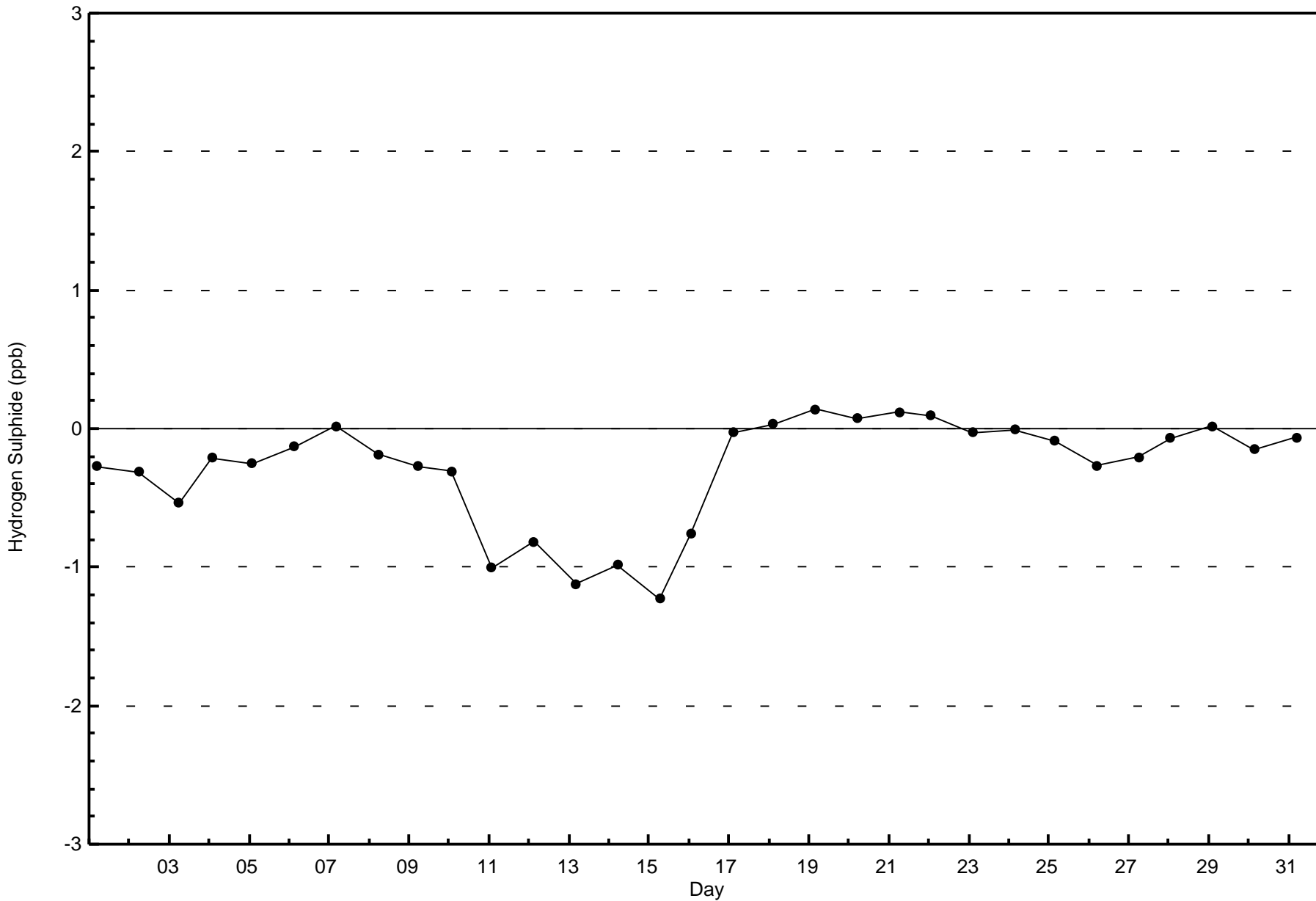
Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Leismer (AMS 501)

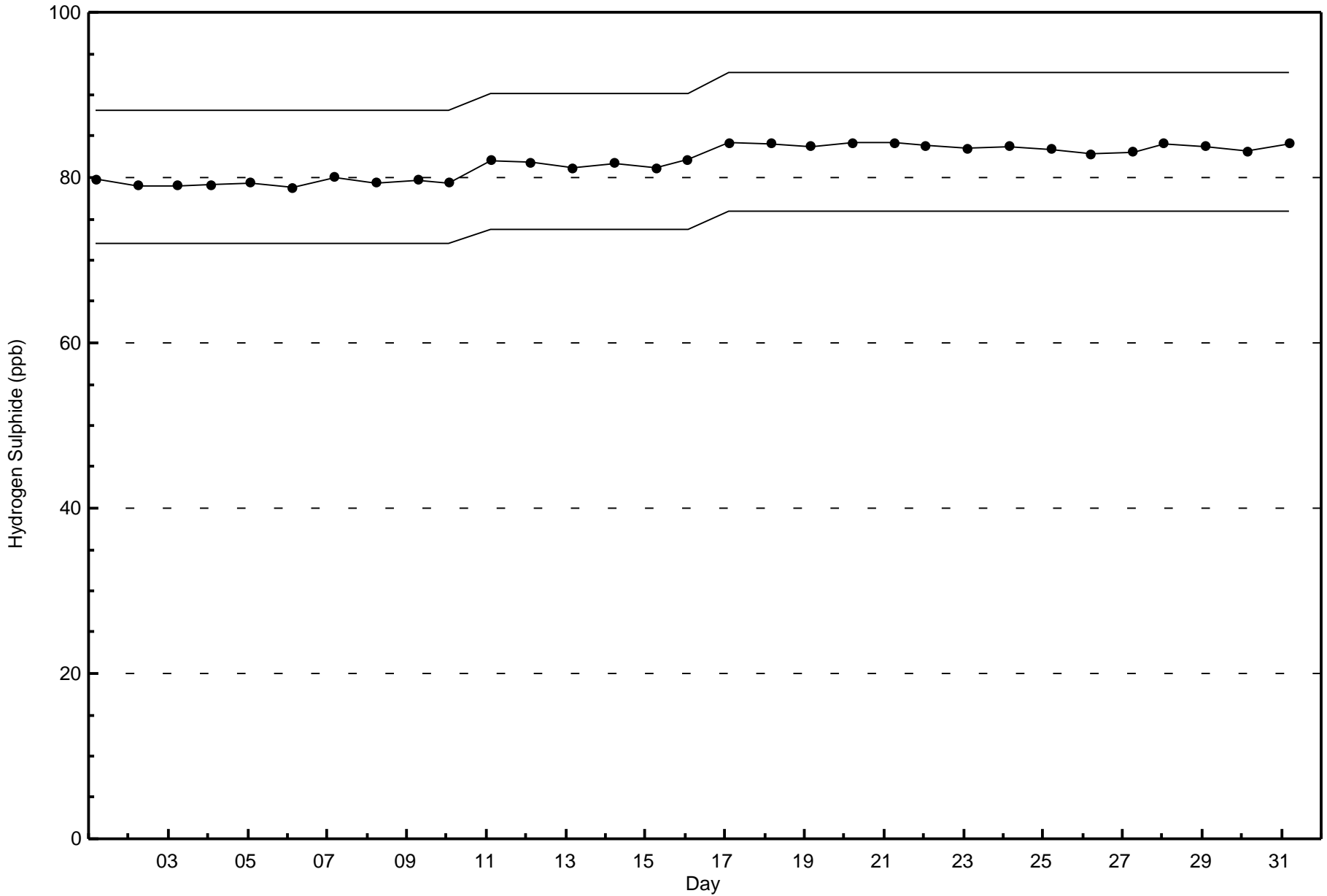


Classes (ppb)



Total Number of Valid Hours: 688







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxide (NO) - ppb

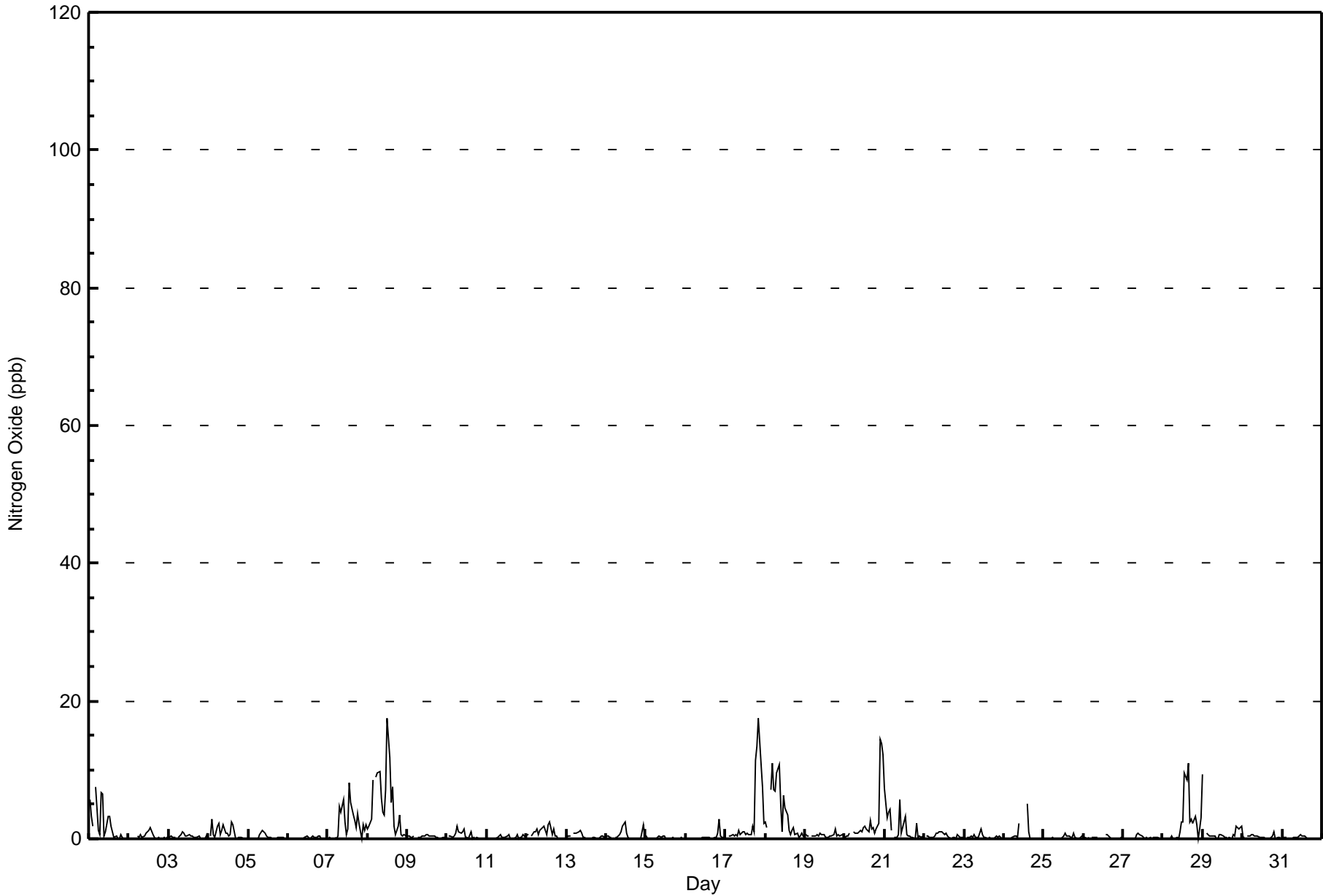
Leismer - October 2017

Maximum Value: 18 ppb on Oct 8 13:00																		Maximum Daily Average: 5.0 ppb on Oct 8																		Hours in Service: 744			
Minimum Value: 0 ppb on Oct 1 19:00																		Minimum Daily Average: 0.1 ppb on Oct 15																		Hours of Data: 705			
Maximum Diurnal Average: 1.6 ppb at hour 14																		Minimum Diurnal Average: 0.4 ppb at hour 18																		Hours of Missing Data: 39			
Monthly Average: 1.0 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 2 P <sub>99</sub> = 11																		Hours of Calibration: 39			
																																				Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24															
1-Oct	6	3	2	Z	8	1	1	7	7	0	1	3	3	2	1	0	0	0	0	1	0	0	0	0	2.0	8													
2-Oct	0	0	0	0	Z	0	0	1	0	0	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0.4	2													
3-Oct	0	0	0	0	0	Z	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1														
4-Oct	Z	0	3	1	0	2	2	1	1	2	1	1	0	1	2	2	0	0	0	0	0	0	0	0.9	3														
5-Oct	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1														
6-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0														
7-Oct	0	0	0	Z	0	0	0	5	4	6	2	1	1	8	5	3	3	2	4	2	0	2	1	2.3	8														
8-Oct	1	2	3	9	Z	9	10	10	6	4	3	7	18	12	5	8	2	1	2	3	1	0	1	5.0	18														
9-Oct	0	0	0	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1														
10-Oct	Z	0	0	0	1	1	2	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0.4	2														
11-Oct	0	Z	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0.2	1														
12-Oct	1	1	Z	0	1	1	1	1	1	1	2	1	1	2	2	1	1	0	0	0	0	0	0	0.9	2														
13-Oct	0	0	0	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1														
14-Oct	0	0	0	0	Z	0	0	0	1	1	2	2	1	0	0	0	0	0	0	0	0	0	2	0.5	2														
15-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0														
16-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0.3	3														
17-Oct	0	Z	0	0	1	0	1	0	1	1	1	1	1	1	1	1	2	1	11	13	17	11	8	3.3	17														
18-Oct	2	2	Z	7	11	7	7	10	11	5	1	6	4	3	1	1	1	2	1	1	0	0	1	3.7	11														
19-Oct	1	0	0	Z	0	0	0	1	1	1	1	1	0	0	0	0	0	1	1	0	1	0	1	0.5	1														
20-Oct	0	0	0	1	Z	1	1	1	1	1	1	2	2	1	1	3	1	2	1	1	2	14	14	2.8	14														
21-Oct	7	3	4	4	1	Z	0	0	1	6	1	2	3	1	0	0	0	0	0	2	0	0	0	1.6	7														
22-Oct	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	1	0	0	0.5	1														
23-Oct	0	Z	0	0	0	0	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1														
24-Oct	0	0	Z	0	0	0	0	0	0	2	Z	C	C	C	C	5	1	0	0	0	0	0	0	0.5	5														
25-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0.2	1														
26-Oct	0	0	0	0	Z	0	0	0	0	C	C	C	C	1	1	0	0	0	0	0	0	0	0	0.2	1														
27-Oct	0	0	0	0	0	Z	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1														
28-Oct	Z	0	0	0	0	0	0	0	0	0	1	2	3	10	8	11	2	3	2	3	2	0	1	2.3	11														
29-Oct	9	Z	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	2	2	1	1.0	9														
30-Oct	0	0	Z	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.3	1														
31-Oct	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.1	1														
																								Diurnal Average															
																								Diurnal Maximum															
1.2 0.6 0.6 1.0 1.0 1.0 1.0 1.4 1.3 1.3 0.9 1.3 1.5 1.6 1.2 1.1 0.5 0.4 0.9 1.0 1.0 1.1 1.0 0.9																																							
9 3 4 9 11 9 10 10 11 6 3 7 18 12 8 11 3 3 11 13 17 14 14 12																																							
Z - zerospan C - Calibration																																							



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Oxide (NO) - ppb**  
**Leismer - October 2017**







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Oxide (NO) - ppb  
Leismer - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	705	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Oxide (NO) - ppb  
Leismer - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	42	17	14	14	29	17	26	8	36	88	42	23	82	81	93	93	705
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	42	17	14	14	29	17	26	8	36	88	42	23	82	81	93	93	705

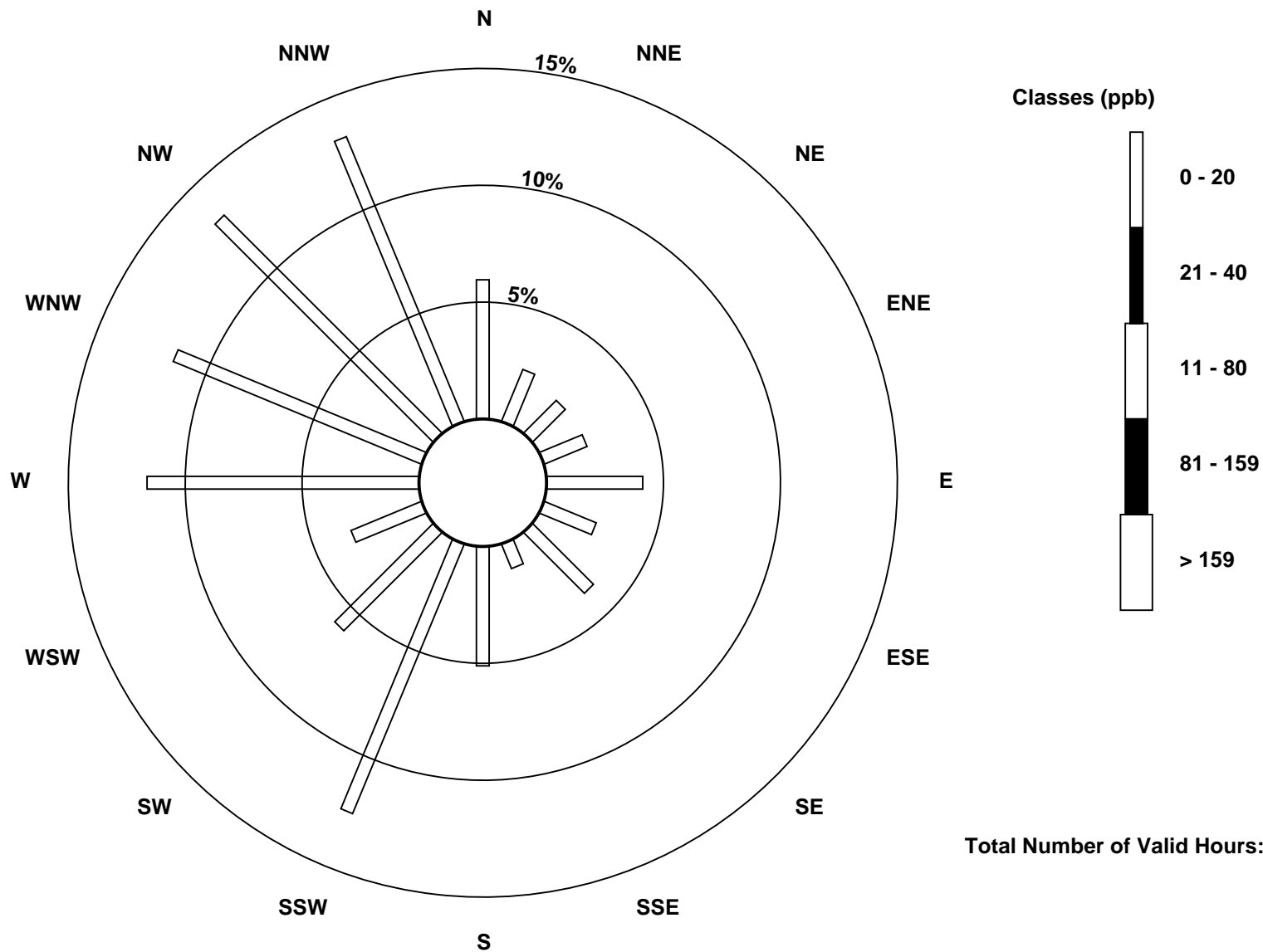
Total Number of Valid Hours: 705

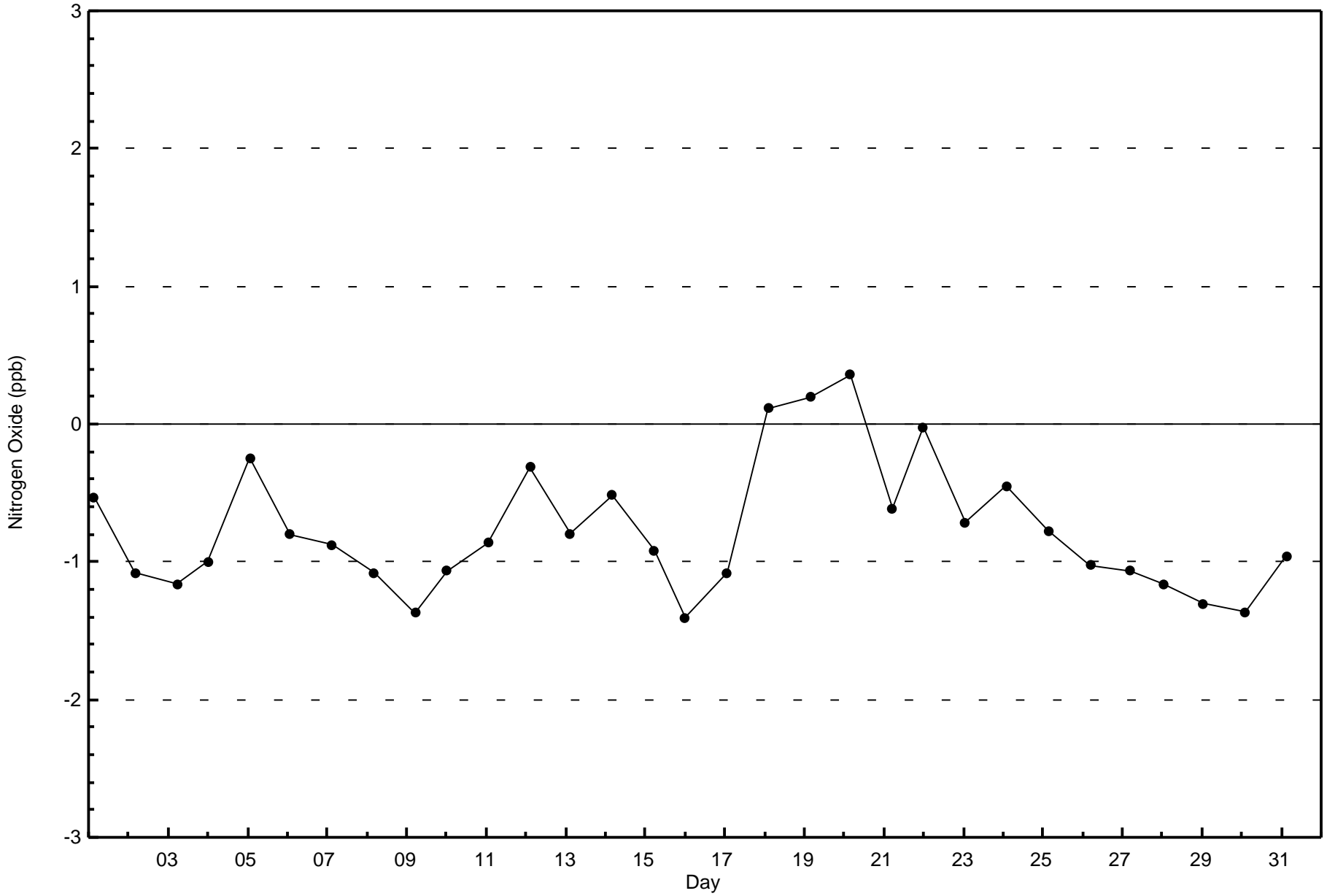
Total Number of Hours: 744

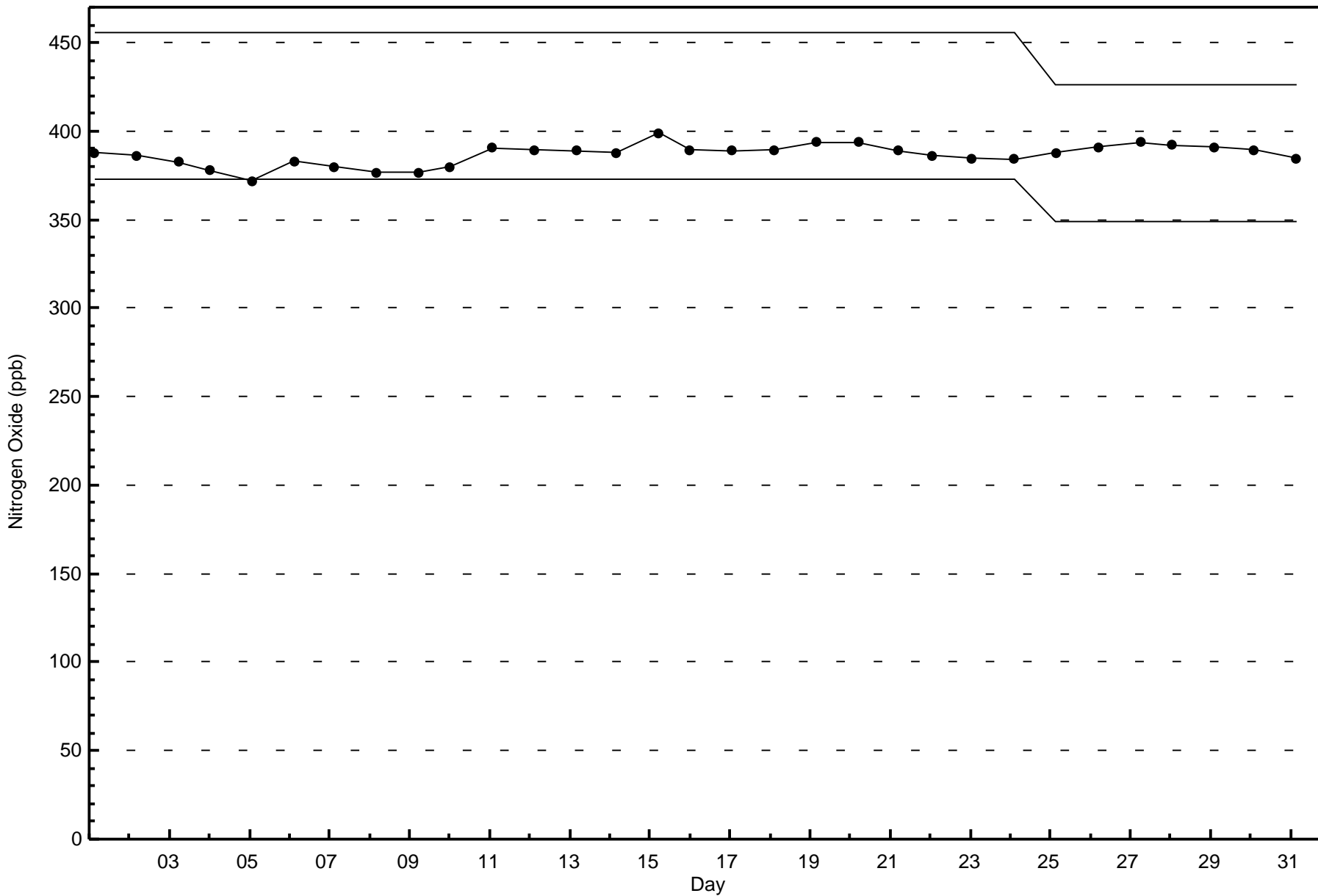


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Oxide (NO) - ppb  
Leismer (AMS 501)









# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Nitrogen Dioxide (NO<sub>2</sub>) - ppb

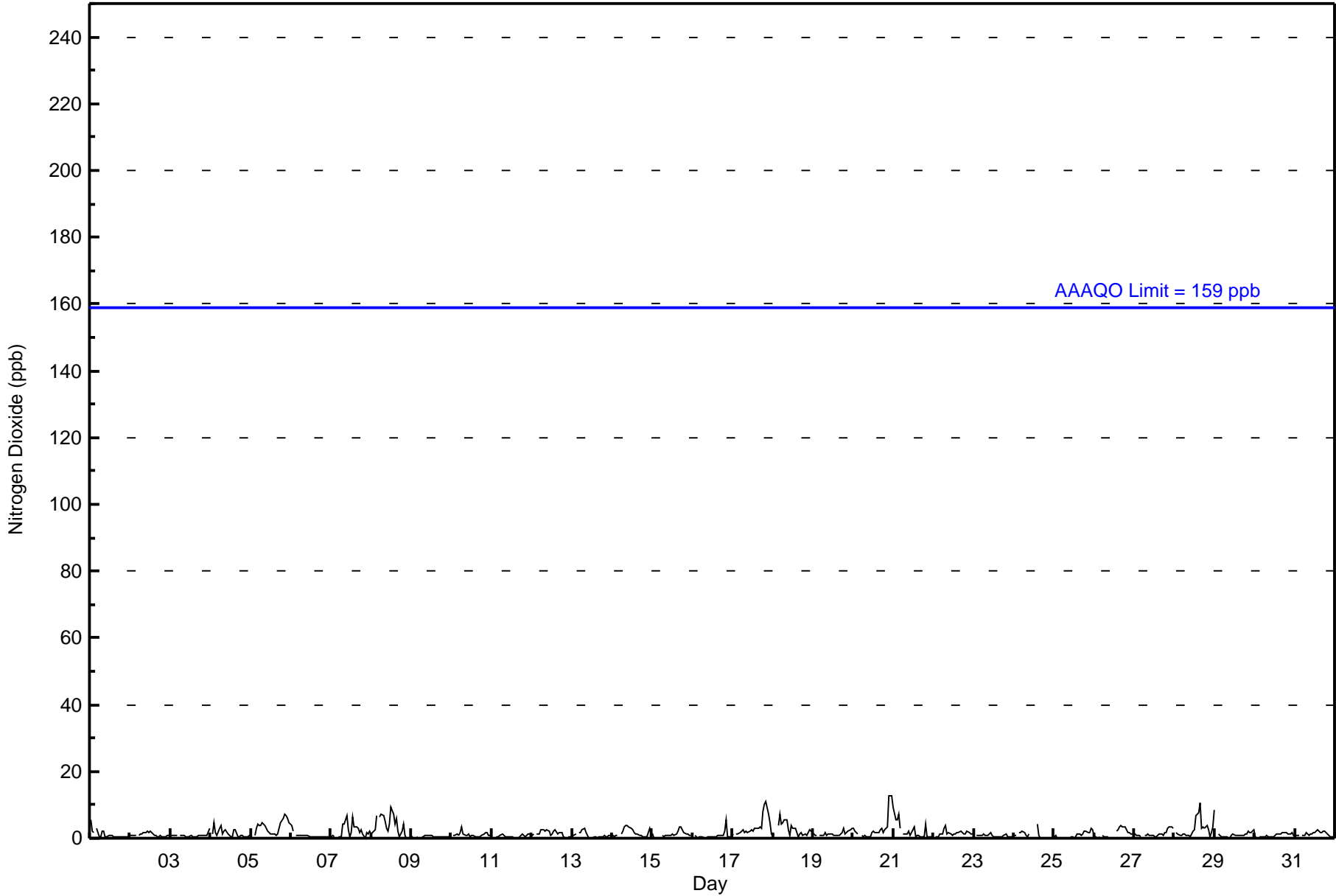
## Leismer - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																	
Maximum Value: 13 ppb on Oct 20 23:00										Maximum Daily Average: 3.7 ppb on Oct 8										Hours of Data: 705							
Minimum Value: 0 ppb on Oct 11 17:00										Minimum Daily Average: 0.5 ppb on Oct 9										Hours of Missing Data: 39							
Maximum Diurnal Average: 1.9 ppb at hour 20										Minimum Diurnal Average: 1.1 ppb at hour 2										Hours of Calibration: 39							
Monthly Average: 1.6 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 1 Q <sub>3</sub> = 2 P <sub>90</sub> = 3 P <sub>99</sub> = 9										Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	5	2	2	Z	3	1	0	2	2	0	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1.1	5	
2-Oct	1	1	1	1	Z	1	1	1	2	2	2	2	2	2	1	1	1	0	1	1	1	1	1	1	1.1	2	
3-Oct	1	1	1	1	1	Z	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	3	0.8	3	
4-Oct	Z	1	5	2	1	3	4	1	2	3	1	1	1	1	3	3	1	0	1	1	0	0	1	1	1.5	5	
5-Oct	1	Z	1	3	4	4	4	5	4	3	2	1	1	1	1	1	1	3	5	6	7	7	6	5	3.3	7	
6-Oct	4	2	Z	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	0.8	4	
7-Oct	1	1	1	Z	1	1	1	4	4	7	2	1	2	6	3	4	3	2	2	1	0	2	1	2	2.2	7	
8-Oct	1	2	2	7	Z	7	7	7	5	3	2	4	9	7	4	6	2	0	2	4	1	0	0	0	3.7	9	
9-Oct	0	0	0	0	0	Z	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0.5	1	
10-Oct	Z	1	1	1	1	2	4	1	1	1	1	0	1	1	1	0	1	0	1	1	2	2	1	1	1.0	4	
11-Oct	1	Z	0	0	0	1	1	1	0	0	0	0	1	0	0	0	0	1	1	1	1	1	1	1	0.6	1	
12-Oct	1	1	Z	1	1	2	3	3	2	3	2	1	1	2	3	1	2	2	2	1	0	0	1	1	1.4	3	
13-Oct	1	1	1	Z	2	2	2	3	2	1	0	0	0	0	0	1	1	0	1	1	1	1	1	1	0.9	3	
14-Oct	1	1	1	1	Z	1	2	3	4	4	3	2	2	1	1	1	1	1	1	0	1	0	3	1	1.7	4	
15-Oct	1	0	0	0	0	Z	1	1	1	1	1	1	1	1	1	2	3	3	3	2	1	1	1	1	1.2	3	
16-Oct	Z	1	0	0	0	0	0	0	0	1	1	1	0	0	0	1	1	1	1	2	5	0	0	1	0.7	5	
17-Oct	1	Z	1	1	2	2	3	2	2	2	2	3	2	3	3	3	4	3	8	10	11	7	5	1	3.5	11	
18-Oct	1	1	Z	4	7	4	5	5	5	3	1	4	3	3	2	0	1	2	1	1	1	2	3	2	2.6	7	
19-Oct	1	1	1	Z	1	1	1	2	1	1	1	1	1	1	1	1	1	2	3	1	2	2	3	3	1.4	3	
20-Oct	3	2	2	1	Z	1	1	1	1	1	1	2	2	2	2	2	3	3	2	2	3	13	13	13	3.1	13	
21-Oct	9	5	6	7	3	Z	1	1	1	2	1	2	3	1	1	1	0	0	1	4	0	1	1	1	2.3	9	
22-Oct	Z	1	0	1	1	1	3	4	1	2	1	1	1	1	2	2	2	2	1	1	2	2	1	1	1.5	4	
23-Oct	1	Z	1	1	1	1	1	1	1	1	2	1	1	1	0	1	0	0	1	1	1	0	1	1	0.8	2	
24-Oct	1	1	Z	2	2	2	2	1	0	1	C	C	C	C	4	1	0	0	0	0	0	0	0	0	0.8	4	
25-Oct	1	1	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	2	2	2	2	3	2	0.9	3	
26-Oct	1	0	0	0	Z	1	0	1	1	C	C	C	C	2	3	3	4	4	3	3	2	2	1	1	1.6	4	
27-Oct	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	2	2	3	3	3	3	1.4	3	
28-Oct	Z	2	1	1	1	1	1	1	1	1	2	3	7	8	11	3	4	3	4	2	1	2	3	3	2.7	11	
29-Oct	9	Z	1	1	1	0	1	0	0	0	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1.3	9	
30-Oct	0	0	Z	1	1	0	1	1	1	0	1	1	1	1	1	1	2	2	2	2	1	1	2	1	1.0	2	
31-Oct	1	1	1	Z	1	1	1	2	1	1	1	2	2	3	2	2	2	2	2	2	1	1	0	1	1	1.3	3
1.8 1.1 1.2 1.5 1.3 1.5 1.7 1.8 1.6 1.5 1.2 1.3 1.5 1.7 1.7 1.7 1.3 1.3 1.7 1.9 1.7 1.8 1.8 1.8																								Diurnal Average			
9 5 6 7 7 7 7 7 7 5 7 4 4 9 7 8 11 4 4 8 10 11 13 13 13																								Diurnal Maximum			
Z - zerospan C - Calibration																											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																											



Wood Buffalo Environmental Association  
Hourly Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Leismer - October 2017





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Leismer - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	705	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744





**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Leismer - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	42	17	14	14	29	17	26	8	36	88	42	23	82	81	93	93	705
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	42	17	14	14	29	17	26	8	36	88	42	23	82	81	93	93	705

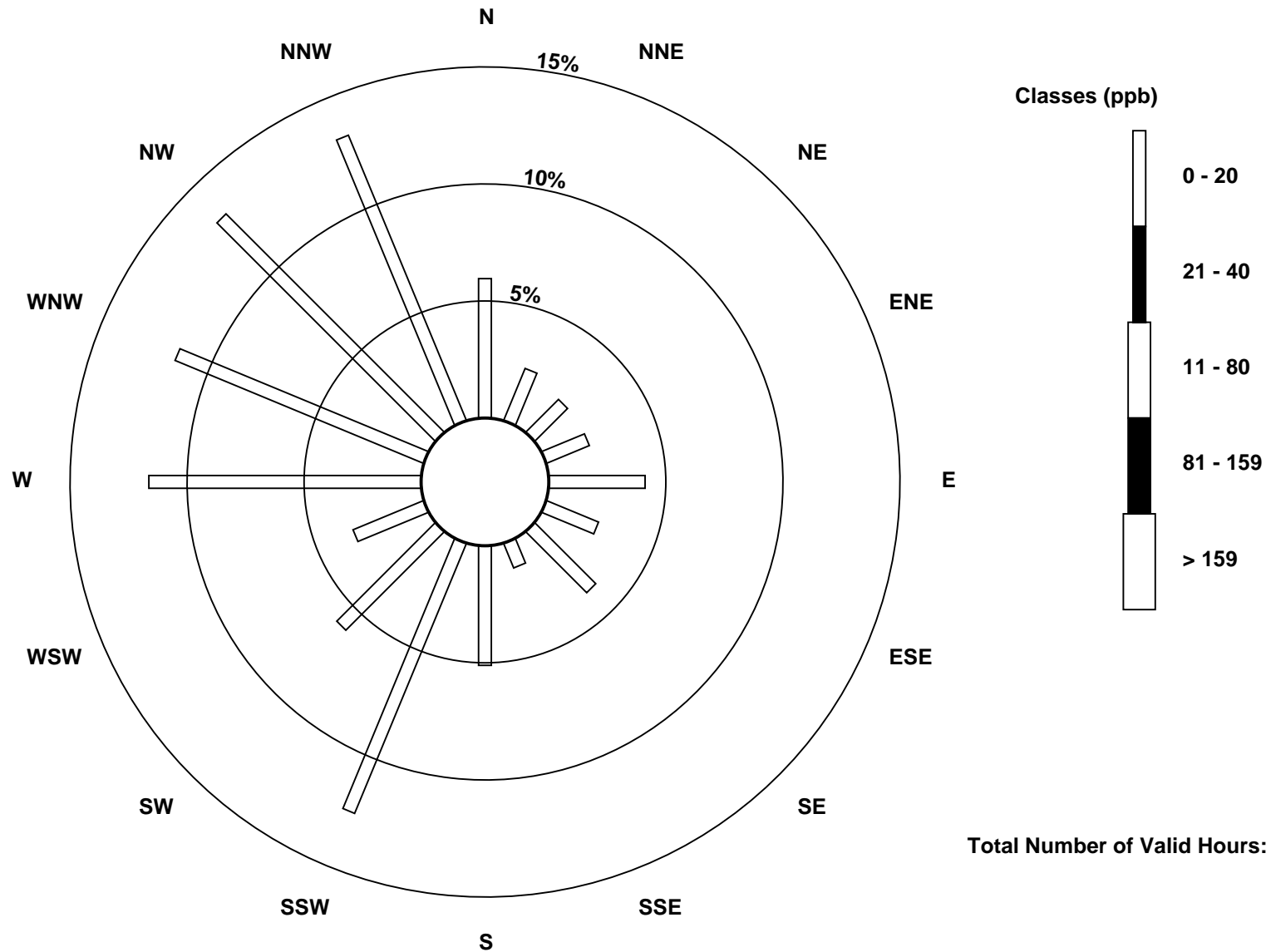
Total Number of Valid Hours: 705

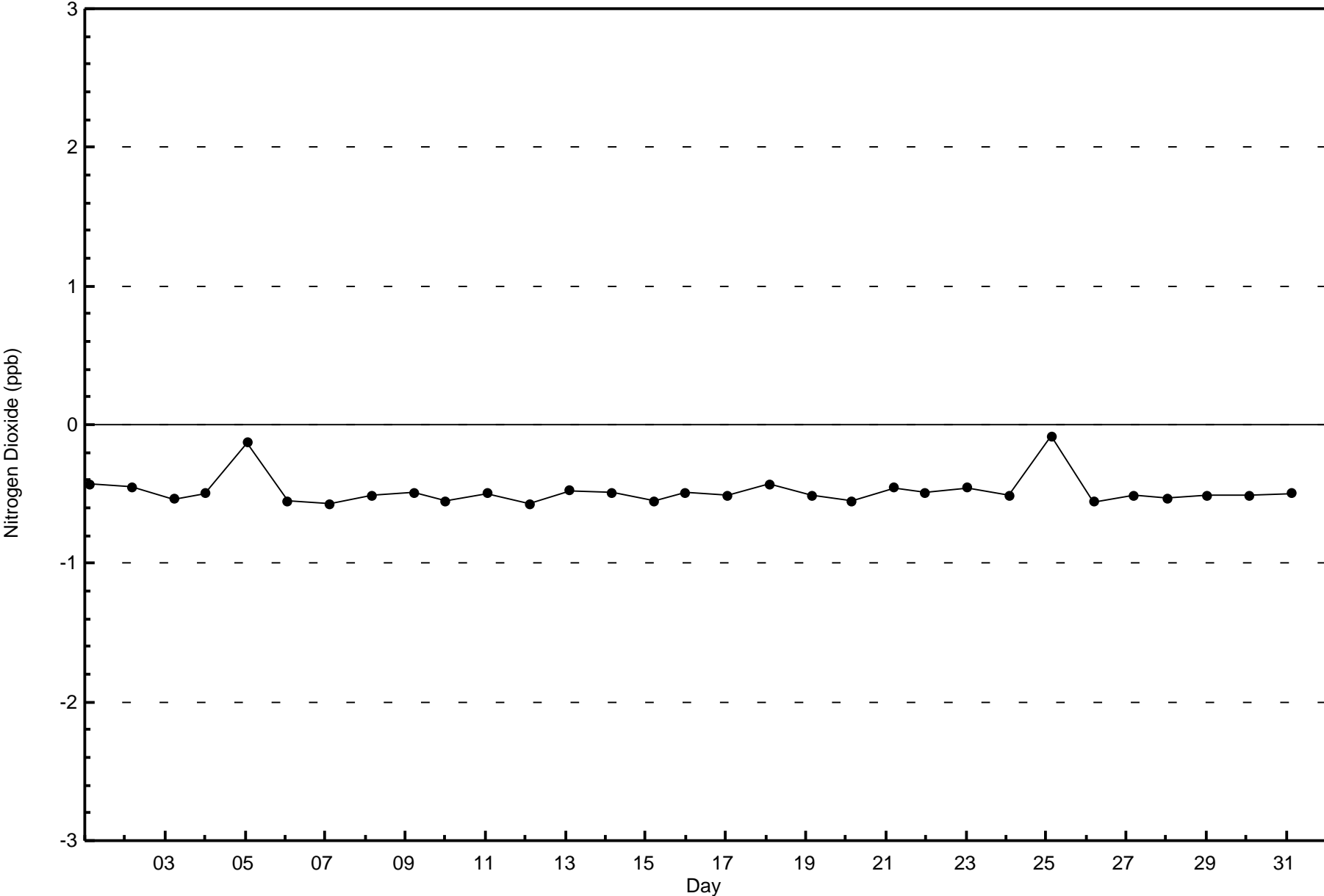
Total Number of Hours: 744

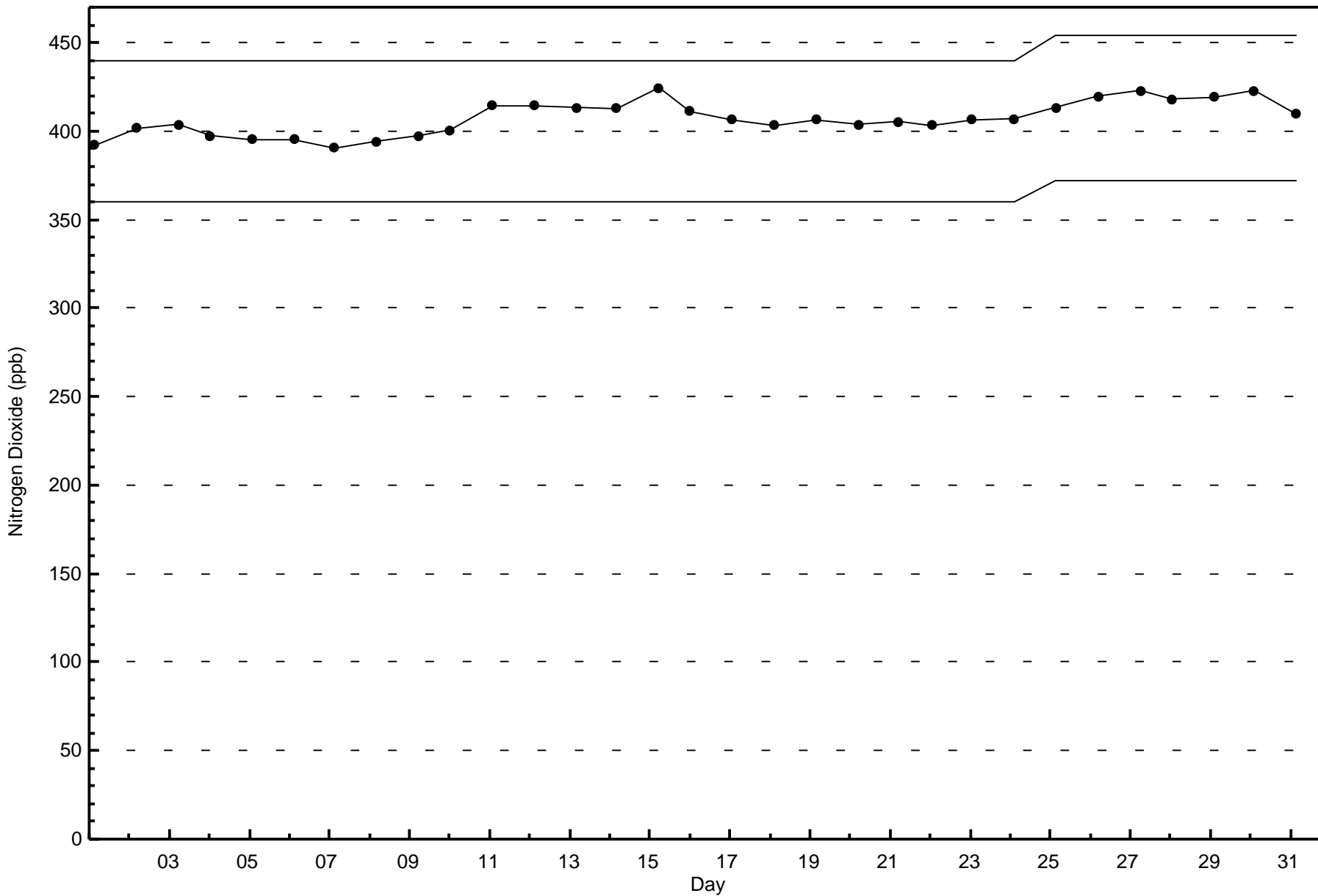


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Leismer (AMS 501)









**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

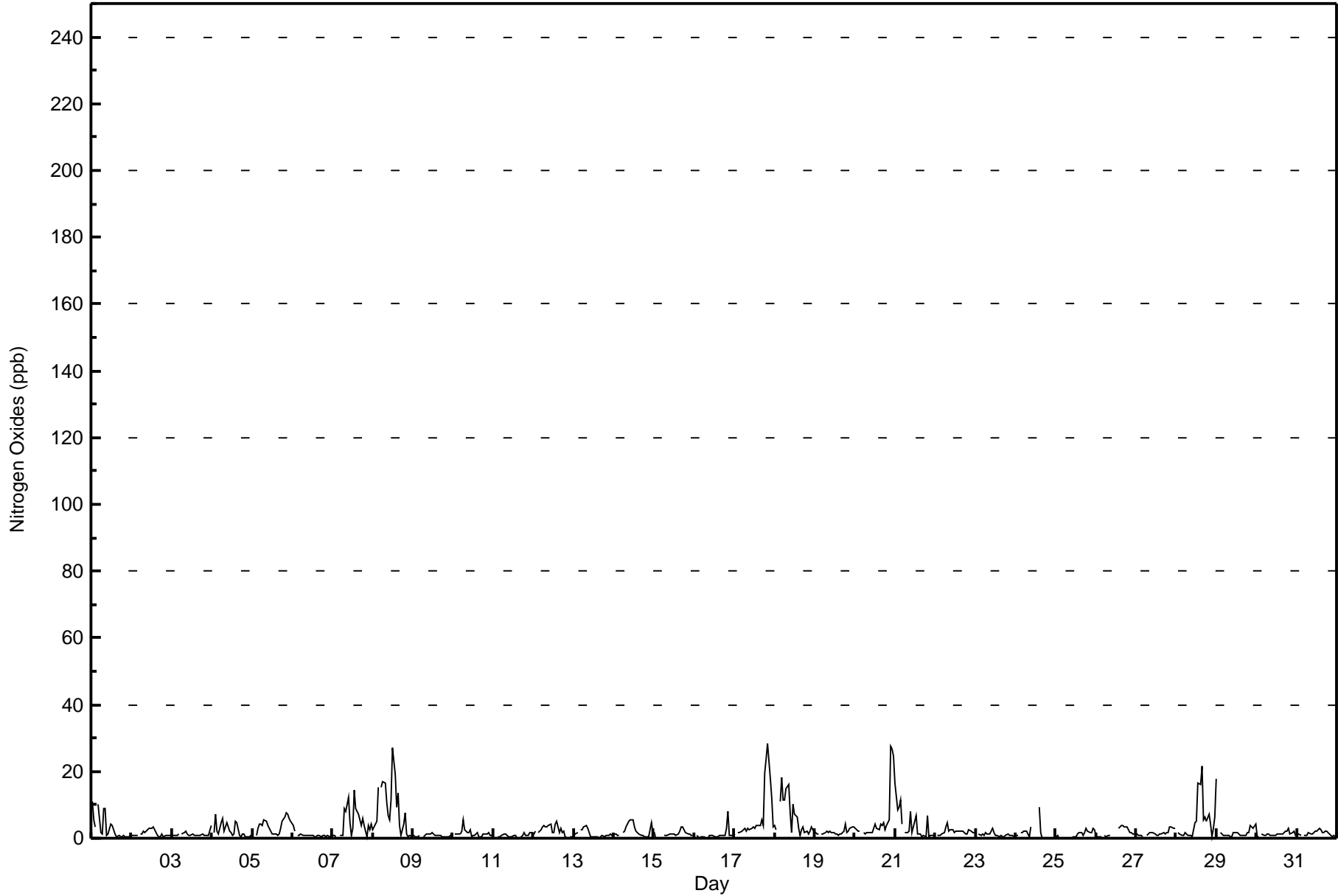
**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Leismer - October 2017**

Maximum Value: 28 ppb on Oct 17 21:00		Maximum Daily Average: 8.6 ppb on Oct 8		Hours in Service: 744																						
Minimum Value: 0 ppb on Oct 11 17:00		Minimum Daily Average: 0.8 ppb on Oct 9		Hours of Data: 705																						
Maximum Diurnal Average: 3.3 ppb at hour 14		Minimum Diurnal Average: 1.7 ppb at hour 2		Hours of Missing Data: 39																						
Monthly Average: 2.6 ppb		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 1 Q <sub>3</sub> = 3 P <sub>90</sub> = 5 P <sub>99</sub> = 21		Hours of Calibration: 39																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	11	5	3	Z	10	2	1	9	9	1	1	4	4	3	1	1	1	0	0	1	0	0	0	1	3.1	11
2-Oct	1	1	1	1	Z	1	1	2	2	2	3	3	3	3	2	1	1	0	1	1	1	1	1	1	1.5	3
3-Oct	1	1	1	1	1	Z	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	1.2	4
4-Oct	Z	2	7	2	1	5	6	2	3	5	2	2	1	1	5	5	1	0	1	1	1	0	1	1	2.3	7
5-Oct	1	Z	1	3	4	4	4	5	5	4	3	2	1	1	1	1	1	3	5	6	8	7	6	5	3.6	8
6-Oct	4	2	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1.0	4
7-Oct	1	1	1	Z	1	1	1	9	8	12	5	1	3	14	9	7	6	4	6	4	0	4	2	4	4.4	14
8-Oct	3	3	5	15	Z	15	17	17	11	7	5	11	27	19	10	14	4	1	4	8	1	1	1	0	8.6	27
9-Oct	1	1	0	0	1	Z	1	1	1	1	1	2	1	1	1	1	1	1	0	0	0	0	1	1	0.8	2
10-Oct	Z	1	1	1	1	2	5	2	2	2	2	1	1	1	2	0	1	0	1	1	1	2	1	1	1.5	5
11-Oct	1	Z	0	0	0	1	1	1	1	1	0	1	1	1	0	0	0	1	2	1	1	1	2	2	0.8	2
12-Oct	1	2	Z	2	3	4	4	3	3	4	4	2	2	4	5	2	3	2	2	0	0	0	0	1	2.3	5
13-Oct	1	1	2	Z	3	2	3	4	3	2	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1.2	4
14-Oct	1	1	1	1	Z	2	2	4	4	5	6	3	2	2	1	1	1	1	0	0	0	5	1	1	2.2	6
15-Oct	2	0	0	0	0	Z	1	1	1	1	1	1	1	1	1	2	3	3	3	2	1	1	1	1	1.3	3
16-Oct	Z	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	3	8	1	1	1	1.0	8
17-Oct	1	Z	2	2	2	3	3	2	3	3	3	4	3	4	4	4	5	4	19	24	28	18	12	4	6.7	28
18-Oct	4	2	Z	11	18	12	11	15	16	8	2	10	7	6	3	1	3	3	1	2	1	2	3	3	6.3	18
19-Oct	2	1	1	Z	1	1	2	2	1	2	2	2	1	1	1	1	1	2	4	2	2	3	3	3	1.9	4
20-Oct	3	3	2	2	Z	2	1	1	2	2	2	3	4	3	3	4	4	5	2	4	6	27	27	25	5.9	27
21-Oct	17	8	10	11	4	Z	2	1	2	8	2	3	7	1	1	1	1	1	1	7	1	1	1	1	3.9	17
22-Oct	Z	1	1	1	1	2	3	5	2	3	2	2	2	2	2	2	2	2	1	1	3	2	2	1	1.9	5
23-Oct	1	Z	1	1	1	1	2	1	1	2	3	2	1	1	0	1	0	0	1	1	1	1	1	1	1.1	3
24-Oct	1	1	Z	2	2	2	2	1	1	3	C	C	C	C	9	2	0	0	0	0	0	0	0	0	1.4	9
25-Oct	0	1	0	Z	0	0	0	0	0	0	0	0	0	1	2	2	1	2	3	2	2	3	3	3	1.1	3
26-Oct	1	0	0	0	Z	1	1	1	1	C	C	C	C	3	3	4	4	4	3	3	2	2	1	1	1.8	4
27-Oct	1	1	1	1	1	Z	1	1	2	2	2	1	1	1	1	1	2	1	2	2	3	3	3	3	1.5	3
28-Oct	Z	2	1	1	1	2	1	1	1	0	2	5	5	16	16	22	6	6	5	7	4	1	3	6	5.0	22
29-Oct	18	Z	2	1	1	1	1	1	0	0	2	2	1	1	1	1	1	1	2	2	4	4	3	4	2.3	18
30-Oct	1	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	3	1	2	2	1	1.3	3
31-Oct	1	1	1	Z	1	1	1	2	1	1	2	2	2	3	3	2	2	2	2	1	1	0	1	1	1.4	3
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration																										



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Leismer - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Leismer - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	698	99.01	99.01
21 - 40	7	0.99	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Leismer - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	<b>N</b>	<b>NNE</b>	<b>NE</b>	<b>ENE</b>	<b>E</b>	<b>ESE</b>	<b>SE</b>	<b>SSE</b>	<b>S</b>	<b>SSW</b>	<b>SW</b>	<b>WSW</b>	<b>W</b>	<b>WNW</b>	<b>NW</b>	<b>NNW</b>	
0 - 20	42	17	14	14	29	17	26	8	36	88	42	23	82	81	86	93	698
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	7
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>42</b>	<b>17</b>	<b>14</b>	<b>14</b>	<b>29</b>	<b>17</b>	<b>26</b>	<b>8</b>	<b>36</b>	<b>88</b>	<b>42</b>	<b>23</b>	<b>82</b>	<b>81</b>	<b>93</b>	<b>93</b>	<b>705</b>

Total Number of Valid Hours: 705

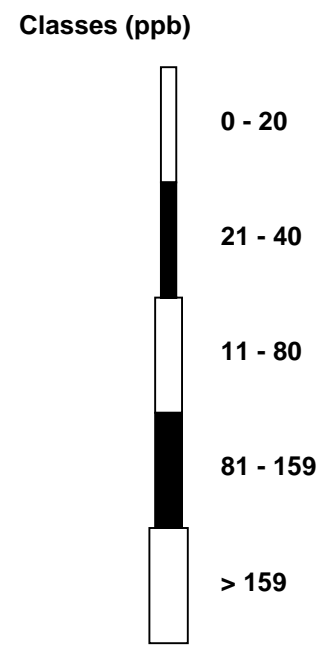
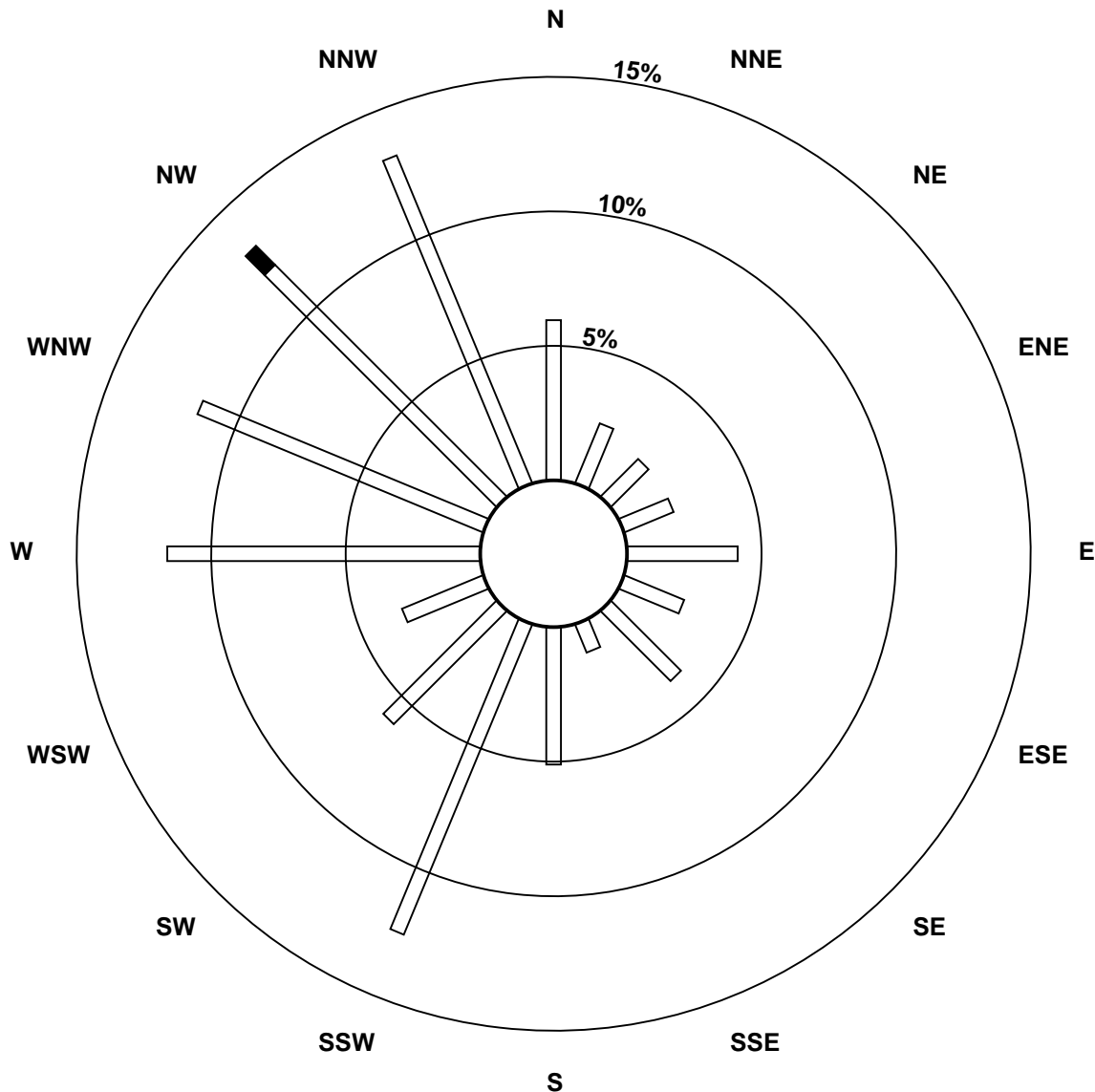
Total Number of Hours: 744



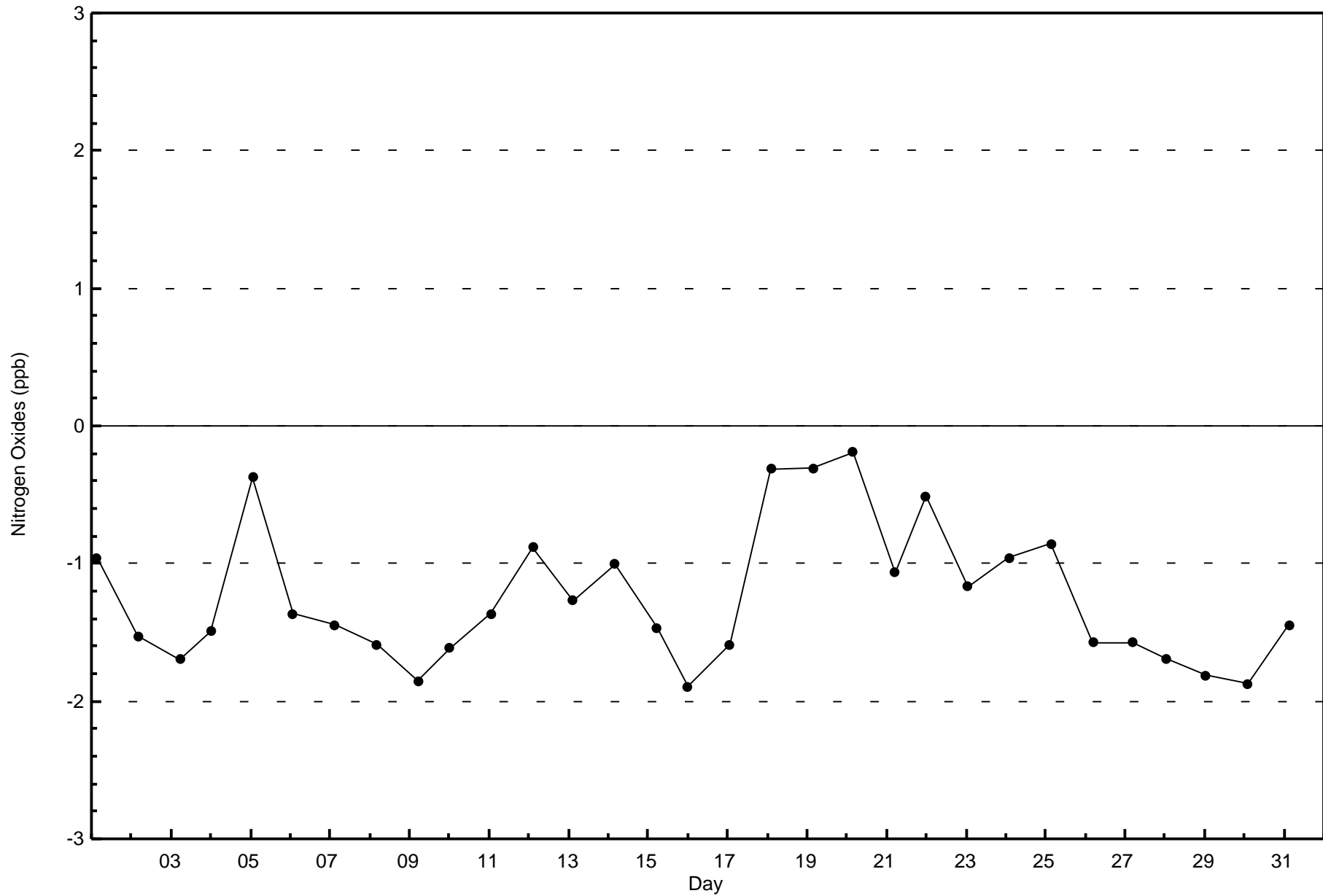


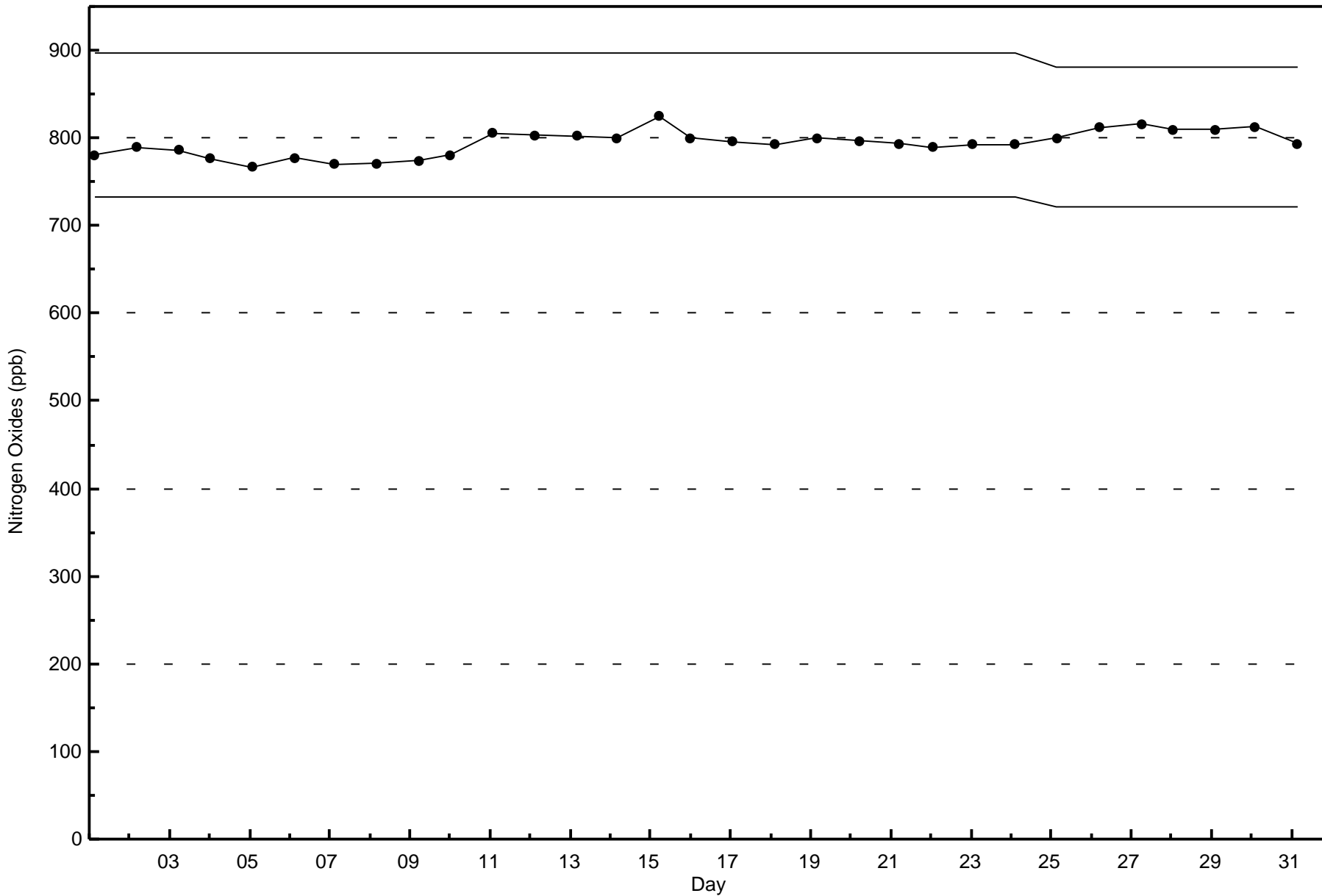
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Leismer (AMS 501)



Total Number of Valid Hours: 705







**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Ambient Temperature (AT) - C**

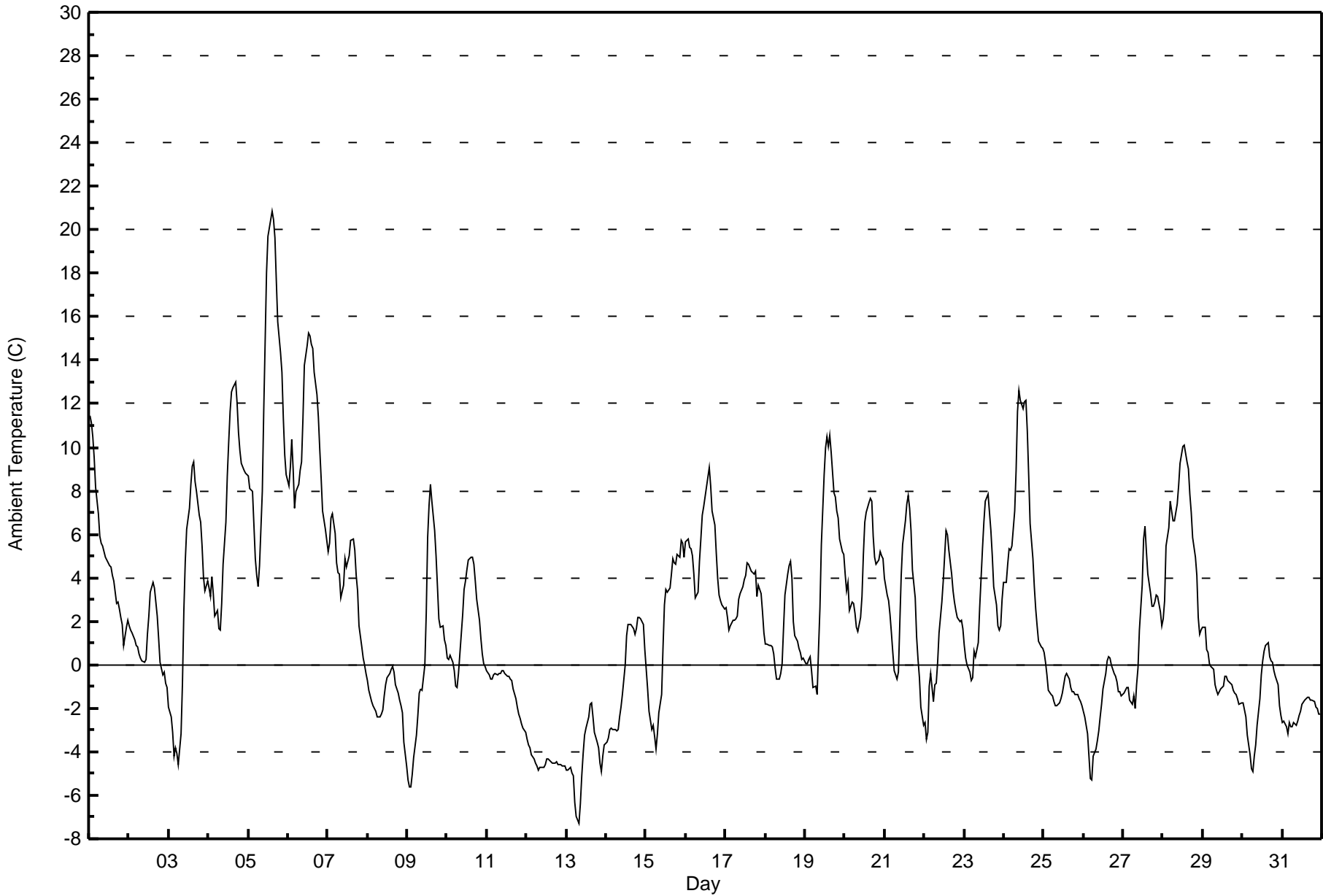
**Leismer - October 2017**

Maximum Value: 20.8 C on Oct 5 15:00		Maximum Daily Average: 12.2 C on Oct 5		Hours in Service: 744																						
Minimum Value: -7.3 C on Oct 13 08:00		Minimum Daily Average: -4.4 C on Oct 12		Hours of Data: 744																						
Maximum Diurnal Average: 5.3 C at hour 15		Minimum Diurnal Average: 0.0 C at hour 7		Hours of Missing Data: 0																						
Monthly Average: 2.20 C		Percentiles: P <sub>1</sub> = -5.3 P <sub>10</sub> = -3.1 Q <sub>1</sub> = -1.3 Median = 1.6 Q <sub>3</sub> = 5.0 P <sub>90</sub> = 8.6 P <sub>99</sub> = 17.3		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	11.4	11.1	10.5	9.5	8.2	7.0	5.9	5.6	5.5	5.2	4.9	4.7	4.6	4.5	4.1	3.8	2.8	2.9	2.5	2.2	1.9	0.9	1.7	2.0	5.1	11.4
2-Oct	1.8	1.6	1.5	1.2	0.9	0.8	0.5	0.3	0.2	0.1	0.3	1.4	2.3	3.3	3.8	3.5	2.9	2.3	1.2	0.1	-0.4	-0.3	-0.9	-1.0	1.1	3.8
3-Oct	-2.0	-2.4	-3.1	-4.2	-3.8	-4.0	-4.6	-3.2	-0.9	2.5	4.7	6.3	7.2	8.3	9.1	9.3	8.4	8.0	6.9	6.6	5.5	4.0	3.4	3.8	2.7	9.3
4-Oct	3.5	3.2	4.0	3.3	2.2	2.5	1.7	1.6	2.8	4.6	6.6	8.7	10.2	11.6	12.6	12.8	13.0	12.0	10.7	9.8	9.3	8.9	8.8	8.8	7.2	13.0
5-Oct	8.7	8.1	8.0	6.4	4.9	4.1	3.6	4.6	8.0	11.7	14.8	18.0	19.7	20.5	20.8	20.5	19.6	17.6	15.7	14.4	13.4	11.3	9.6	8.7	12.2	20.8
6-Oct	8.2	9.1	10.4	9.0	7.2	8.0	8.3	8.9	9.3	11.3	13.8	14.7	15.2	15.1	14.7	14.6	13.4	12.4	11.4	9.9	8.5	7.0	6.2	5.7	10.5	15.2
7-Oct	5.2	5.6	6.7	6.9	6.1	4.7	4.2	4.2	3.1	3.6	4.9	4.5	4.8	5.0	5.7	5.8	5.3	4.1	3.4	1.8	0.8	0.3	0.0	-0.4	4.0	6.9
8-Oct	-0.7	-1.2	-1.7	-1.9	-2.0	-2.1	-2.4	-2.4	-2.3	-2.0	-1.4	-0.9	-0.6	-0.4	-0.2	0.0	-0.3	-0.9	-1.3	-1.6	-1.9	-2.2	-3.6	-4.6	-1.6	0.0
9-Oct	-5.3	-5.6	-5.6	-5.0	-4.3	-3.2	-2.3	-1.3	-1.1	-1.2	0.0	2.4	5.8	7.4	8.3	7.5	6.1	5.0	3.6	2.1	1.7	1.8	1.1	0.9	0.8	8.3
10-Oct	0.3	0.2	0.4	0.1	-0.3	-1.0	-1.0	-0.4	1.4	2.3	3.5	3.9	4.3	4.8	4.9	4.9	4.6	3.9	3.0	2.0	1.2	0.5	0.1	-0.1	1.8	4.9
11-Oct	-0.3	-0.5	-0.7	-0.7	-0.4	-0.4	-0.5	-0.4	-0.4	-0.3	-0.3	-0.4	-0.5	-0.5	-0.6	-0.7	-1.1	-1.6	-2.0	-2.3	-2.5	-2.7	-2.9	-3.1	-1.1	-0.3
12-Oct	-3.4	-3.7	-3.8	-4.1	-4.4	-4.5	-4.7	-4.8	-4.7	-4.7	-4.7	-4.6	-4.3	-4.3	-4.4	-4.5	-4.5	-4.4	-4.4	-4.6	-4.6	-4.6	-4.6	-4.6	-4.4	-3.4
13-Oct	-4.9	-4.8	-4.7	-5.0	-5.1	-6.3	-7.0	-7.3	-6.4	-5.1	-4.1	-3.2	-2.9	-2.4	-1.8	-1.7	-2.4	-3.1	-3.5	-3.8	-4.5	-4.9	-4.2	-3.7	-4.3	-1.7
14-Oct	-3.5	-3.4	-3.0	-2.9	-3.0	-3.0	-3.1	-3.0	-2.4	-2.0	-1.4	0.0	1.4	1.9	1.9	1.8	1.7	1.4	1.7	2.2	2.2	2.1	1.9	0.7	-0.4	2.2
15-Oct	-0.2	-1.1	-2.1	-3.0	-2.8	-3.3	-3.9	-3.2	-2.2	-1.3	0.8	2.8	3.5	3.3	3.5	4.2	4.9	4.7	5.2	5.1	5.0	5.7	5.6	5.0	1.5	5.7
16-Oct	5.6	5.8	5.4	5.3	5.0	4.2	3.1	3.3	4.8	5.8	6.9	7.3	8.2	8.6	9.0	8.2	7.1	6.4	5.1	4.0	3.2	3.0	2.7	2.6	5.4	9.0
17-Oct	2.6	2.2	1.6	1.8	2.0	2.0	2.1	2.2	3.0	3.3	3.6	3.9	4.1	4.7	4.6	4.3	4.2	4.2	4.3	3.2	3.7	3.3	2.4	1.4	3.1	4.7
18-Oct	1.0	1.0	0.9	0.9	0.8	0.5	-0.2	-0.6	-0.7	-0.4	0.1	1.7	3.2	4.2	4.6	4.8	4.0	2.0	1.4	1.1	0.7	0.5	0.2	0.3	1.3	4.8
19-Oct	0.1	0.1	0.2	0.4	-0.3	-1.0	-1.0	-1.4	0.8	2.6	5.6	8.8	10.0	10.5	10.0	10.5	9.8	7.9	7.7	7.1	6.8	5.8	5.2	5.1	4.6	10.5
20-Oct	4.2	3.4	3.8	2.5	2.9	2.8	2.4	1.7	1.5	2.2	3.1	5.0	6.6	7.0	7.5	7.6	7.5	5.9	4.9	4.6	4.8	5.2	5.0	4.9	4.5	7.6
21-Oct	4.0	3.2	3.0	2.3	1.5	0.6	-0.3	-0.6	-0.4	1.9	4.1	5.5	6.6	7.4	7.8	7.2	6.2	4.4	3.1	1.3	0.2	-0.6	-2.0	-2.8	2.6	7.8
22-Oct	-2.7	-3.4	-3.1	-1.0	-0.4	-1.7	-0.9	-0.9	0.1	1.5	2.9	3.9	5.0	6.2	5.9	5.2	4.2	3.4	2.9	2.5	2.2	2.0	2.0	1.7	1.6	6.2
23-Oct	0.9	0.3	0.0	-0.4	-0.7	-0.6	0.6	0.4	1.0	2.6	4.0	5.3	6.5	7.5	7.8	7.0	6.2	5.0	3.6	2.8	1.8	1.6	1.8	3.0	2.8	7.8
24-Oct	3.8	3.8	4.6	5.3	5.3	5.4	7.1	8.9	11.6	12.6	12.2	11.8	12.1	12.2	10.7	8.7	6.5	4.9	3.6	2.6	1.8	1.1	0.8	0.7	6.6	12.6
25-Oct	0.6	0.1	-0.5	-1.2	-1.4	-1.4	-1.7	-1.9	-1.9	-1.8	-1.5	-1.3	-0.9	-0.5	-0.4	-0.7	-1.1	-1.3	-1.2	-1.4	-1.4	-1.6	-1.7	-1.9	-1.2	0.6
26-Oct	-2.1	-2.4	-3.2	-4.2	-5.3	-5.3	-4.2	-3.9	-3.5	-3.1	-2.4	-1.8	-1.1	-0.4	0.2	0.3	0.3	0.0	-0.4	-0.5	-0.8	-1.2	-1.3	-1.4	-2.0	0.3
27-Oct	-1.3	-1.2	-1.0	-1.0	-1.6	-1.8	-1.4	-2.0	-0.9	-0.1	1.6	3.7	5.8	6.4	5.2	4.2	3.3	2.7	2.7	2.9	3.2	3.1	2.4	1.8	1.5	6.4
28-Oct	2.1	2.9	5.5	6.3	7.5	7.1	6.6	6.6	7.4	8.2	9.3	9.7	10.0	10.1	9.4	9.0	7.8	7.0	5.9	4.9	4.1	2.2	1.4	1.6	6.4	10.1
29-Oct	1.7	1.8	0.7	0.5	0.1	-0.1	-0.2	-0.9	-1.2	-1.4	-1.2	-1.1	-1.0	-0.5	-0.5	-0.7	-0.8	-0.9	-1.2	-1.3	-1.4	-1.6	-1.8	-1.7	-0.6	1.8
30-Oct	-1.8	-2.1	-2.4	-3.2	-4.2	-4.8	-4.9	-4.2	-3.7	-2.8	-1.5	-0.5	0.2	0.7	0.9	1.0	0.4	0.2	0.1	-0.3	-0.6	-0.9	-1.9	-2.3	-1.6	1.0
31-Oct	-2.6	-2.6	-2.8	-3.1	-2.7	-2.9	-2.8	-2.7	-2.8	-2.6	-2.3	-2.1	-1.8	-1.6	-1.6	-1.5	-1.5	-1.6	-1.6	-1.7	-1.9	-2.0	-2.3	-2.3	-2.2	-1.5
	1.1	0.9	0.9	0.7	0.4	0.1	0.0	0.1	0.8	1.7	2.8	3.8	4.7	5.2	5.3	5.1	4.5	3.7	3.0	2.4	2.0	1.5	1.1	0.9		Diurnal Average
	11.4	11.1	10.5	9.5	8.2	8.0	8.3	8.9	11.6	12.6	14.8	18.0	19.7	20.5	20.8	20.5	19.6	17.6	15.7	14.4	13.4	11.3	9.6	8.8		Diurnal Maximum



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Leismer - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C  
Leismer - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	285	38.31	38.31
0 - 10	413	55.51	93.82
10 - 20	43	5.78	99.60
> 20	3	0.40	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %**

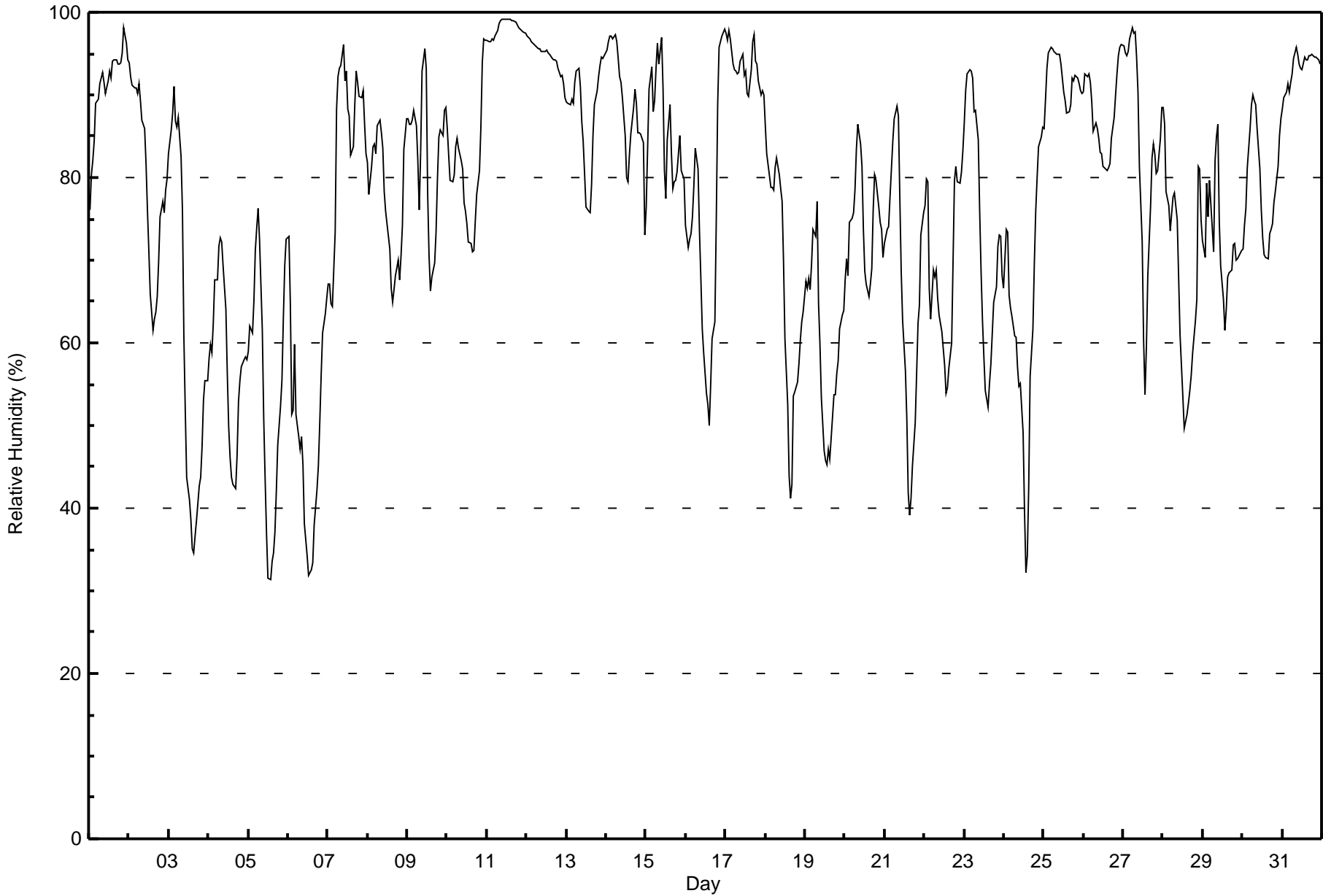
**Leismer - October 2017**

Maximum Value: 99 % on Oct 11 11:00														Maximum Daily Average: 98.1 % on Oct 11														Hours in Service: 744	
Minimum Value: 31 % on Oct 5 14:00														Minimum Daily Average: 48.6 % on Oct 6														Hours of Data: 744	
Maximum Diurnal Average: 84.5 % at hour 8														Minimum Diurnal Average: 65.1 % at hour 15														Hours of Missing Data: 0	
Monthly Average: 77.0 %														Percentiles: P <sub>1</sub> = 33 P <sub>10</sub> = 53 Q <sub>1</sub> = 67 Median = 81 Q <sub>3</sub> = 91 P <sub>90</sub> = 95 P <sub>99</sub> = 99														Hours of Calibration: 0	
																												Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Oct	76	80	82	84	89	90	91	92	93	92	90	92	93	92	94	94	94	94	94	94	95	98	96	94	91.0	98			
2-Oct	94	92	91	91	91	90	91	89	87	86	82	76	71	66	62	63	64	66	70	75	77	76	78	80	79.5	94			
3-Oct	83	86	88	91	87	86	87	82	76	61	52	44	41	39	35	35	37	38	43	44	47	53	55	55	60.2	91			
4-Oct	58	60	59	62	68	68	72	73	72	69	64	56	50	46	44	43	42	46	53	55	57	58	58	58	58.0	73			
5-Oct	59	62	61	65	71	74	76	73	62	51	44	37	32	31	34	35	37	42	48	52	55	63	69	73	54.4	76			
6-Oct	73	65	51	52	60	51	49	47	49	45	38	34	32	32	33	33	38	42	45	50	56	61	64	65	48.6	73			
7-Oct	67	67	65	64	73	88	92	93	94	96	92	93	88	87	83	84	89	93	92	90	90	90	86	83	85.0	96			
8-Oct	82	78	81	84	84	83	86	87	85	84	78	76	74	71	67	65	66	68	70	68	71	74	83	87	77.2	87			
9-Oct	87	87	86	87	88	86	82	76	83	93	96	93	78	71	66	68	70	73	80	85	86	85	88	88	82.6	96			
10-Oct	86	83	80	79	80	84	85	84	82	81	77	76	74	72	72	71	71	75	78	81	86	94	97	97	81.0	97			
11-Oct	97	96	97	97	97	97	98	99	99	99	99	99	99	99	99	99	99	99	98	98	98	98	98	97	98.1	99			
12-Oct	97	97	97	96	96	96	96	96	96	95	95	95	95	95	95	94	94	94	94	93	92	92	91	90	94.7	97			
13-Oct	89	89	89	90	89	92	93	93	91	87	84	81	76	76	79	85	89	90	92	94	95	94	95	95	87.8	95			
14-Oct	95	96	97	97	97	97	94	92	92	90	85	80	79	83	85	88	91	89	85	85	85	84	73	89.1	97				
15-Oct	76	83	91	93	88	89	93	96	94	97	91	81	77	85	89	83	79	79	80	81	85	81	80	80	85.5	97			
16-Oct	74	72	72	73	75	79	84	81	74	68	62	59	54	53	50	55	60	62	75	89	96	96	97	98	73.2	98			
17-Oct	97	97	98	97	94	93	93	93	93	94	95	92	93	90	90	93	96	97	94	94	92	90	91	90	93.5	98			
18-Oct	86	83	80	79	79	78	81	82	80	79	77	70	60	53	44	41	43	54	54	55	57	60	63	64	66.8	86			
19-Oct	67	67	68	66	69	74	73	77	65	60	53	47	46	45	47	46	48	54	54	56	58	62	63	64	59.6	77			
20-Oct	68	70	68	74	75	76	78	83	86	84	81	74	69	67	66	67	69	76	80	80	76	75	74	70	74.5	86			
21-Oct	72	74	74	78	81	84	87	89	87	78	69	63	57	51	42	39	41	45	50	56	62	65	73	76	66.3	89			
22-Oct	77	80	79	67	63	69	68	69	65	63	61	59	57	54	55	57	60	70	80	81	79	79	81	83	69.0	83			
23-Oct	87	91	93	93	93	92	88	88	85	76	69	63	58	54	52	55	57	61	65	67	72	73	73	68	73.8	93			
24-Oct	67	74	73	66	64	63	61	61	57	55	55	49	40	32	34	43	56	62	69	76	80	84	85	86	62.1	86			
25-Oct	86	89	93	95	96	96	95	95	95	95	94	92	90	89	88	89	92	92	92	92	92	91	90	90	91.9	96			
26-Oct	90	93	92	93	92	89	86	87	86	85	83	83	81	81	81	81	82	85	87	90	93	95	96	96	87.7	96			
27-Oct	96	95	95	95	97	98	97	98	95	90	81	72	60	54	60	68	77	82	84	83	81	81	85	89	83.8	98			
28-Oct	88	86	78	77	73	76	78	78	75	68	61	57	54	50	51	53	54	56	59	63	65	81	81	75	68.2	88			
29-Oct	72	70	79	75	80	77	71	82	85	86	75	69	65	62	64	68	68	69	72	72	70	70	71	71	72.7	86			
30-Oct	71	74	76	81	86	89	90	89	89	86	81	76	73	71	70	70	73	74	74	77	78	81	85	87	79.3	90			
31-Oct	88	90	90	91	90	91	93	94	96	95	94	93	93	95	94	94	95	95	95	95	95	94	94	94	93.3	96			
														80.9 81.4 81.4 81.7 82.7 83.7 84.2 84.5 82.8 80.3 76.2 72.1 68.2 65.9 65.1 66.1 68.5 71.7 74.4 76.4 78.1 80.0 81.4 81.2														Diurnal Average	
														97 97 98 97 97 98 98 99 99 99 99 99 99 99 99 99 99 99 99 98 98 98 98 98 98														Diurnal Maximum	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Leismer - October 2017**







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Relative Humidity (RH) - %**  
**Leismer - October 2017**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	22	2.96	2.96
40 - 60	103	13.84	16.80
60 - 80	241	32.39	49.19
80 - 100	378	50.81	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Wind Speed (WS) - km/h

## Leismer - October 2017

Maximum Speed: 44 km/h on Oct 24 14:00	Maximum Daily Speed Average: 25.1 km/h on Oct 28	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 31 02:00	Minimum Daily Speed Average: 1.1 km/h on Oct 22	Hours of Data: 744
Maximum Diurnal Speed Average: 10.3 km/h at hour 14	Minimum Diurnal Speed Average: 6.1 km/h at hour 24	Hours of Missing Data: 0
Monthly Average Velocity: 7.4 km/h 310.3 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 4 Q <sub>1</sub> = 6 Median = 10 Q <sub>3</sub> = 17 P <sub>90</sub> = 27 P <sub>99</sub> = 37	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	NW20	NW25	NW20	NW24	NW28	NW24	NW24	NW24	NW24	NW26	NW25	NW24	NW25	NW28	NW27	NW27	NW26	NNW26	NNW27	NNW28	NNW25	NNW19	NNW22	NNW24	NW24.3	NNW28
2-Oct	NNW26	NNW27	NNW27	N29	N26	NNW28	NNW28	NNW30	NNW33	NNW29	NNW34	N31	N28	NNW26	NNW27	NNW24	NNW25	NNW18	NNW13	NNW11	NNW11	NNW12	NNW9	NW8	NNW23.1	NNW34
3-Oct	NW4	WNW3	WNW3	WSW2	WNW6	W4	W3	S2	SSW6	SSW11	SW12	SW12	SW13	SSW15	SSW15	SSW14	SW10	SW7	SW8	WSW7	W4	W8	W11	WNW11	SW6.6	SSW15
4-Oct	WNW11	WNW13	WNW13	WNW9	WNW9	NW11	NW8	NNW8	NNW10	NNW9	NNW13	NNW13	NNW15	NNW13	NW15	NW12	WNW9	W6	SSW2	S3	S4	S5	S5	SSW6	NW7.2	NNW15
5-Oct	SSW4	S5	SSW7	SSW6	S4	S3	S4	SSW6	SSW6	SSW7	SSW10	SSW11	SW12	SSW12	SSW13	SSW15	SSW14	SSW11	SW9	SW9	SW8	SSW6	SSW6	SSW5	SSW8.0	SSW15
6-Oct	S4	WSW4	WSW5	SSW5	SSW5	SW4	WSW5	WSW6	SW3	WSW6	WSW9	W20	W25	W29	W22	W16	W19	W13	W10	W9	W10	W7	W7	W10	W9.9	W29
7-Oct	W11	W13	W15	W13	W17	W16	W14	WNW21	NW21	NW13	NW23	NW24	NW22	NW22	NW23	WNW20	NW14	WNW18	NW23	NNW29	NNW23	NNW21	NW23	NW26	NW18.2	NNW29
8-Oct	NW26	NW28	NW28	NW27	NW25	NW27	NW26	NW25	NW24	NW24	NW26	NW26	NW27	NW26	NW23	NW22	NW17	NNW16	NW15	NW14	WNW9	W5	S2	S3	NW19.8	NW28
9-Oct	S3	S4	S5	S5	S5	S7	S7	S9	SSW10	SSW9	SSW8	SW10	WSW12	W22	W21	W16	W16	W11	W5	W4	W4	WNW5	WSW2	WSW2	WSW6.4	W22
10-Oct	W3	WNW5	WNW9	W9	W7	W4	NW5	NNW9	NNW9	NNW8	NNW7	WNW6	NNW8	NNW5	NNW7	N6	NNE5	NNE6	NE8	ENE8	ENE7	NE8	NE9	NE9	NNW4.5	WNW9
11-Oct	NE10	NE11	NE12	NE12	NNE14	NNE14	NNE12	NNE10	NNE11	NNE13	NNE14	NNE15	N16	N17	N17	N18	N19	N19	N20	N21	N19	N19	N20	NNW19	N14.9	N21
12-Oct	NNW23	NNW23	NNW20	N18	N19	NNW15	NNW15	NNW17	NNW14	NNW16	NNW12	NNW13	NNW11	NW14	NW14	NW13	NW12	NNW10	NNW9	NNW10	NNW9	NNW7	NW6	NW7	NNW13.4	NNW23
13-Oct	WNW6	NW8	NNW9	NNW9	NW8	NW6	NW5	NNW3	WNW5	W8	W8	W7	W7	W7	SSW6	SSW6	SSW8	SSW7	SSW7	SSW7	SSW6	SSW5	SSW5	SSW6	W4.2	NNW9
14-Oct	SSW5	S5	SSW5	S5	SSW8	SSW8	S8	S8	SSW9	SSW8	SSW10	SSW9	SW8	WSW8	WSW7	WSW8	WSW7	WSW7	W12	W15	W17	WNW16	NW16	NW16	WSW6.9	W17
15-Oct	WNW9	W7	WSW3	SW3	W3	S3	S3	S3	S7	S6	S8	SSW11	SSW11	SSW10	SSW9	SSW10	SSW9	SSW8	SSW7	SW4	SSW4	SW6	SW4	SW5	SSW5.8	SSW11
16-Oct	WSW8	W11	W11	W19	W18	W16	W9	W10	W11	W16	W17	W12	WSW9	WSW8	SW7	SSW8	SSW8	SW6	SSW7	SSE2	E3	ENE4	E5	SE6	WSW7.5	W19
17-Oct	SE6	SE6	SE6	SSE4	SSE3	SSE4	SE4	SE4	ESE2	ESE3	ENE4	E7	E12	E10	ENE10	NW6	NNW13	NNW16	NW28	NW29	NW36	WNW38	WNW38	WNW38	NW6.9	WNW38
18-Oct	WNW40	WNW40	WNW41	WNW40	NW35	WNW36	WNW36	WNW34	NW30	WNW24	WNW22	NW21	WNW17	NW13	WNW10	W4	SE2	SE5	SE7	SE7	SE11	SE12	ESE14	ESE12	WNW15.6	WNW41
19-Oct	E14	E12	ESE13	ESE11	E8	E8	ESE7	SE5	S5	SSW5	SW4	SSW6	S8	S8	S8	SSE10	SSE9	SE8	SE7	SE8	SE8	ESE9	E7	E9	SE6.6	E14
20-Oct	E10	E10	E9	ENE6	ENE5	E7	E9	E8	ESE8	E5	E2	N4	NNW10	NNW8	NNW4	NNW4	NW8	WNW13	NNW13	NNW13	NW13	NW19	NW19	NW18	N4.8	NW19
21-Oct	NW15	NW11	NW13	NW12	WNW11	WNW11	W8	W8	W9	WNW13	WNW19	WNW18	WNW18	WNW16	WNW16	W14	W7	W7	W3	SSW1	NNW1	NE0	SE1	E1	WNW9.1	WNW19
22-Oct	ESE2	E3	ESE4	E7	ENE10	SE7	E10	E10	E10	ESE12	ESE11	SE10	SE9	SW4	W6	W8	W7	W10	WNW17	WNW18	WNW15	WNW14	WNW15	WNW14	W1.1	WNW18
23-Oct	WNW10	WNW9	W10	WNW11	WNW13	WNW16	WNW23	WNW22	WNW21	WNW24	WNW27	WNW22	WNW21	W19	WNW22	W12	W7	SW2	S1	SSW2	SSW2	S4	SSW5	SSW7	WNW11.9	WNW27
24-Oct	SSW9	S8	SSW10	SSW14	SW11	SW9	W12	W17	WNW31	WNW38	NW36	NW36	NW40	NW44	NNW37	NNW32	N25	N19	N11	N10	NNE8	NNE5	NE4	E3	NW14.0	NW44
25-Oct	ESE7	E7	ESE9	E9	E8	E10	ENE10	ENE11	ENE13	NE14	NE15	NNE17	NNE20	NNE20	N22	N22	N23	N20	N17	N17	N13	N12	NNW13	NNW8	NNE11.4	N23
26-Oct	WNW6	W5	SW3	W4	SW4	SW6	SW9	SW9	SW11	SW11	SW13	SW14	SW14	SW13	SW12	SW11	WSW8	W7	WNW11	WNW14	WNW12	WNW10	WNW8	W4	WSW8.1	SW14
27-Oct	WNW6	WNW7	WNW7	WNW3	SSW3	SW1	WNW3	WSW1	SE1	S5	SSW5	SSW6	SSW6	SSW9	SSW9	SSW7	SSW7	SSW8	SSW7	SW9	SW9	SW8	SW6	SSW3	SW4.8	SW9
28-Oct	SSW2	WSW3	WNW11	WNW21	NW27	NW25	NW22	NW20	WNW20	WNW23	NW28	NW30	NW33	NW35	NW35	NW32	NNW30	NNW32	NNW35	NNW33	NNW37	NNW30	NNW33	NNW30	NW25.1	NNW37
29-Oct	NW32	NNW34	NNW28	NNW35	NNW32	NNW34	NNW35	NNW29	NNW28	N27	N32	N30	N28	N25	N23	N21	N16	N12	NNE8	N11	N15	NNW12	NW13	NW11	NNW23.2	NNW35
30-Oct	WNW6	SW4	SW5	SSW4	SSW3	SSW3	SSW4	SW5	SSW4	SSW5	SSW6	SSW6	SSW7	SW7	WSW5	SW3	SSW2	WNW5	NNW9	NW7	N6	NNW5	W2	W2	WSW3.0	NNW9
31-Oct	W2	SW0	SW1	S1	SE3	S3	SSE4	SE5	SSE6	SE6	SE8	ESE8	ESE7	ESE7	ESE8	E8	ENE7	ENE7	ENE7	ENE8	NE8	NE9	NE9	NNE9	E4.3	NE9

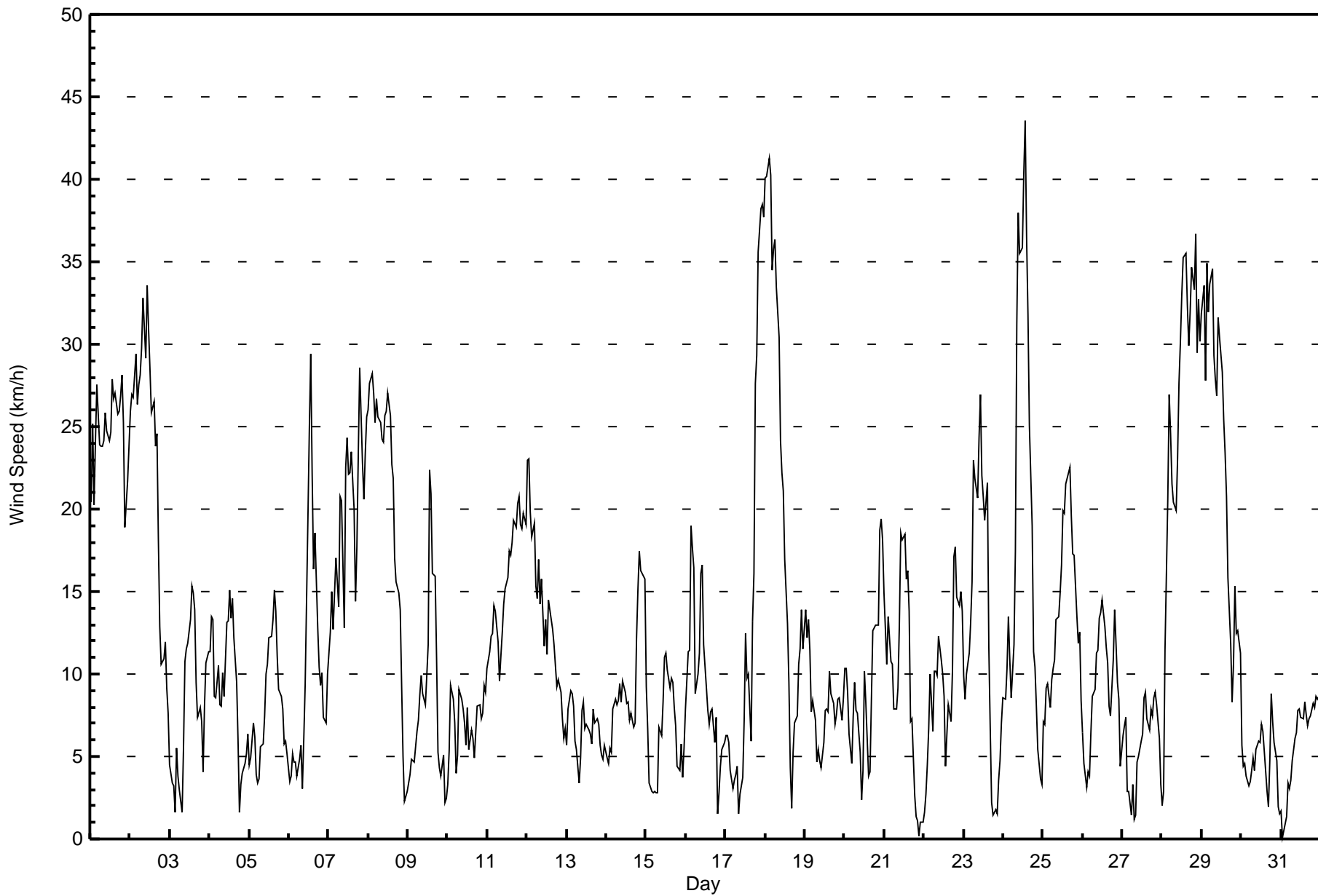
NW6.2 NW6.5 NW6.5 NW6.9 NW7.1 NW6.8 NW6.7 NW7.0 NW7.3 NW7.6 NW8.7 NW9.0 NW9.4 NW10.3 NW9.5 NW8.4 NW7.4 NW6.9 NW7.1 NW7.5 NW7.2 NW6.6 NW6.5 NW6.1	Diurnal Average
WNW40 WNW40 WNW41 WNW40 NW35 WNW36 WNW36 WNW34 NNW33 WNW38 NW36 NW36 NW40 NW44 NNW37 NW32 NNW30 NNW32 NNW35 NNW33 NNW37 WNW38 WNW38 WNW38	Diurnal Maximum

All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Leismer - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h  
Leismer - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	150	20.16	20.16
6 - 11	286	38.44	58.60
12 - 19	148	19.89	78.49
20 - 28	108	14.52	93.01
29 - 38	46	6.18	99.19
> 38	6	0.81	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Wind Speed (WS) - km/h  
Leismer - October 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	1	2	2	3	6	4	10	5	28	26	17	11	18	9	3	5	150
6 - 11	5	6	9	11	21	11	16	3	12	57	23	13	36	26	12	25	286
12 - 19	18	7	4	1	3	4	1	0	0	8	9	1	25	22	22	23	148
20 - 28	15	2	0	0	0	0	0	0	0	0	0	0	5	16	48	22	108
29 - 38	4	0	0	0	0	0	0	0	0	0	0	0	1	8	12	21	46
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	0	6
<b>Totals</b>	43	17	15	15	30	19	27	8	40	91	49	25	85	85	99	96	744

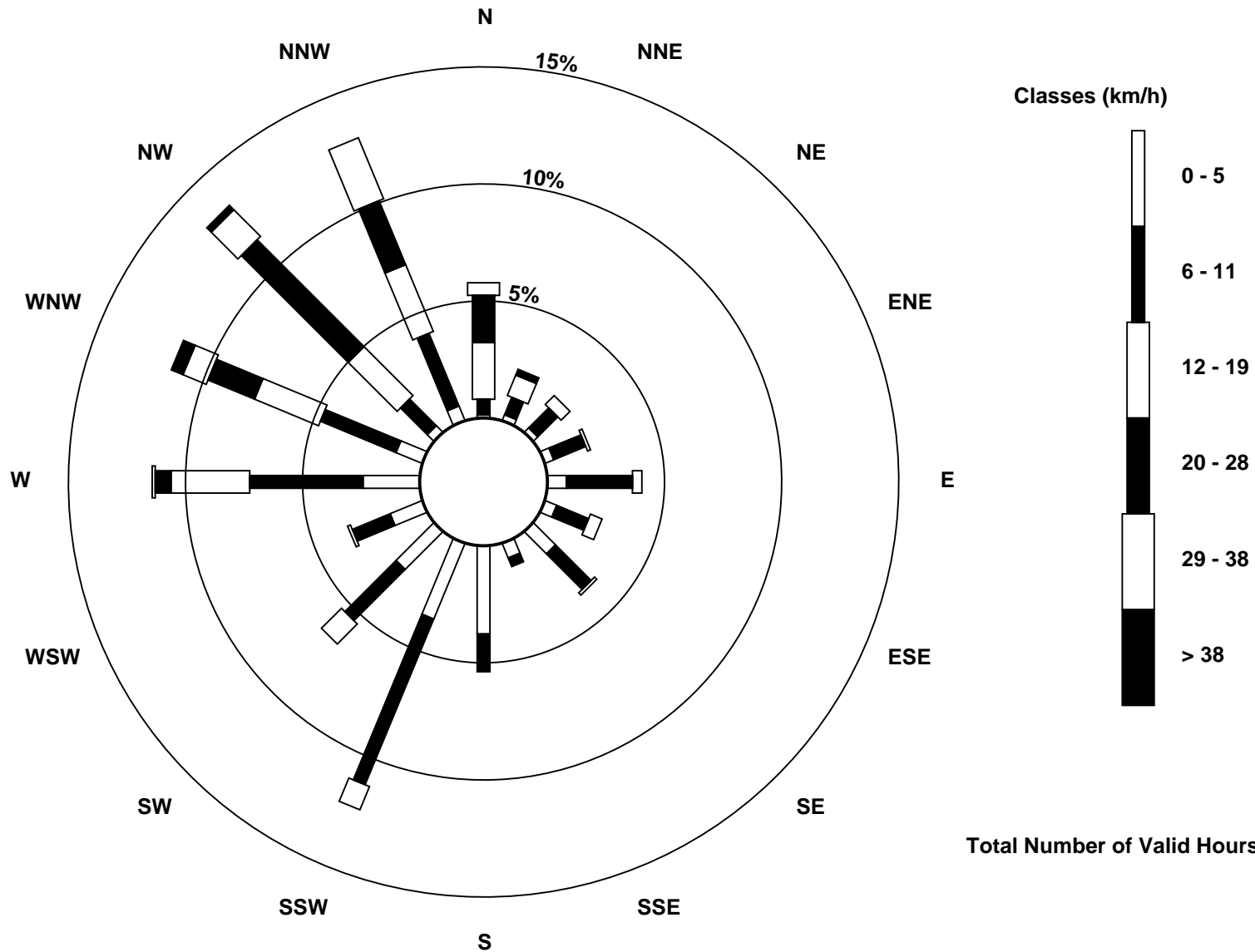
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed (WS) - km/h  
Leismer (AMS 501)





**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Speed (WS) - km/h**  
**Leismer - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Oct 24 14:00 Minimum Value: 1 km/h on Oct 15 08:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 6 P <sub>99</sub> = 8																	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	4	5	5	5	5	5	4	4	4	5	4	4	4	5	5	5	5	5	5	5	3	5	5	5	
2-Oct	6	6	6	6	7	6	6	7	6	6	7	6	7	5	5	5	5	4	2	1	2	3	2	2	7
3-Oct	3	2	1	2	1	1	1	1	2	4	4	4	5	5	5	3	3	2	3	2	3	1	2	5	
4-Oct	2	3	3	3	1	2	2	1	1	2	3	4	3	3	3	3	3	4	2	2	1	1	1	2	4
5-Oct	1	1	1	1	1	1	1	1	2	2	3	4	4	4	4	5	4	3	3	2	3	1	1	1	5
6-Oct	1	3	3	2	1	2	2	3	1	3	4	7	7	7	6	6	4	3	3	2	4	2	2	1	7
7-Oct	2	2	3	4	7	4	3	6	5	3	4	5	4	4	5	5	4	6	4	5	5	4	5	4	7
8-Oct	6	6	6	5	5	5	5	5	4	5	5	5	5	5	5	4	3	3	3	4	2	2	1	1	6
9-Oct	1	1	1	1	1	2	2	3	3	3	2	3	5	6	5	6	5	3	2	2	2	2	1	2	6
10-Oct	2	2	3	1	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	3	2	2	3	3	3
11-Oct	3	3	4	3	4	4	3	3	3	3	4	4	3	4	4	4	4	4	4	4	4	4	3	3	4
12-Oct	4	4	4	4	4	4	3	3	3	3	2	3	2	3	3	3	3	3	2	2	2	1	2	2	4
13-Oct	1	2	1	1	3	1	2	1	2	2	2	2	2	2	3	2	2	2	2	2	2	1	1	1	3
14-Oct	1	1	2	1	3	3	3	2	3	3	3	3	3	3	2	3	3	3	4	4	3	3	3	3	4
15-Oct	2	2	1	1	2	1	1	1	3	2	2	3	3	3	3	2	3	2	2	2	3	1	2	3	3
16-Oct	3	4	4	4	3	3	3	2	3	4	4	4	4	3	2	2	2	2	2	1	1	1	1	1	4
17-Oct	1	2	1	1	1	1	1	1	1	1	1	3	3	3	3	3	3	3	8	5	7	8	8	8	8
18-Oct	9	8	8	9	7	7	6	6	7	5	4	4	4	3	3	3	1	1	1	2	2	3	3	3	9
19-Oct	3	3	3	3	2	2	2	2	1	2	1	2	2	2	2	2	1	1	1	1	2	2	2	2	3
20-Oct	2	2	3	3	2	3	4	2	3	2	1	3	3	3	1	1	5	3	2	2	2	3	3	4	5
21-Oct	3	3	2	2	2	2	2	2	2	3	4	4	4	4	4	4	2	2	2	1	1	1	2	1	4
22-Oct	1	1	1	2	2	3	2	2	2	3	2	2	2	2	3	3	2	4	3	3	3	2	2	3	4
23-Oct	1	1	3	2	2	4	4	4	4	5	6	4	5	5	5	5	3	1	1	1	1	1	1	3	6
24-Oct	3	2	3	4	3	3	4	6	8	8	9	8	9	9	8	7	5	4	2	2	2	1	1	1	9
25-Oct	2	2	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	3	3	3	2	2	2	2	4
26-Oct	2	2	1	2	1	3	2	3	3	4	4	4	5	4	4	4	3	3	3	3	3	2	2	3	5
27-Oct	1	1	2	1	1	1	1	1	1	1	1	1	2	2	3	2	2	2	2	2	2	2	2	1	3
28-Oct	1	1	5	4	5	4	3	3	3	4	6	7	6	8	7	7	6	7	7	6	8	6	6	6	8
29-Oct	6	7	6	7	6	6	8	6	5	6	6	6	7	5	5	4	4	3	2	3	3	4	3	3	8
30-Oct	4	1	1	1	1	1	1	1	1	2	1	2	2	2	2	1	2	3	2	2	2	1	1	1	4
31-Oct	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	3	3	3	2	3	3
Diurnal Maximum																									



**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Wind Direction (WD) - deg**  
**Leismer - October 2017**

Direction of Maximum Speed: 322 deg on Oct 24 14:00 Direction of Maximum Daily Speed Average: 318.4 deg on Oct 28	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0
Direction of Minimum Speed: 218 deg on Oct 31 02:00 Direction of Minimum Daily Speed Average: 1.1 deg on Oct 22	Percent Operational Time: 100.0
Monthly Average Direction: 290.1 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	313	317	317	314	314	320	319	314	314	322	319	317	315	319	319	324	324	328	330	332	332	331	345	345	322.7
2-Oct	346	343	346	351	350	348	345	346	345	347	348	350	352	341	335	338	338	339	331	331	338	340	330	325	343.8
3-Oct	311	300	294	252	282	281	268	188	193	209	219	216	214	206	205	213	220	227	224	251	262	281	280	292	234.6
4-Oct	291	288	300	301	294	319	318	334	335	338	330	335	338	334	324	317	297	273	194	183	174	184	188	200	310.2
5-Oct	197	188	202	199	187	175	188	199	210	210	209	210	215	213	208	211	212	211	214	214	220	204	197	196	207.1
6-Oct	173	245	253	208	198	225	248	254	227	244	250	272	274	280	269	266	276	275	271	273	276	275	277	280	266.3
7-Oct	280	280	276	272	278	278	274	295	317	306	319	323	320	305	305	297	307	291	322	339	334	329	320	318	307.7
8-Oct	321	318	318	313	314	314	315	314	316	320	320	318	311	308	320	316	324	329	308	312	284	260	176	186	314.7
9-Oct	175	171	176	185	185	176	182	190	209	200	193	215	253	278	275	277	270	272	270	260	263	291	249	255	241.5
10-Oct	269	290	290	279	274	262	307	328	329	335	328	303	340	345	342	5	26	22	45	58	68	52	42	51	347.2
11-Oct	43	40	38	35	33	31	30	26	20	22	16	14	10	9	9	6	3	2	359	357	353	353	352	347	11.1
12-Oct	348	348	348	350	349	346	339	343	332	335	345	338	329	324	321	324	325	334	329	335	330	335	324	315	337.6
13-Oct	290	312	327	332	314	320	322	328	288	278	279	269	273	265	213	211	200	195	202	205	207	197	203	200	262.1
14-Oct	192	188	197	185	194	201	190	189	195	199	207	212	232	244	239	251	253	254	269	274	279	285	311	321	243.8
15-Oct	288	264	247	236	265	188	189	175	191	186	188	199	204	205	200	198	211	211	210	224	207	233	218	215	212.1
16-Oct	245	269	267	274	273	274	274	276	271	277	275	268	251	246	224	201	201	220	201	161	85	71	133	135	257.0
17-Oct	144	142	143	154	161	157	133	134	103	104	78	89	96	85	63	320	337	336	312	313	307	299	296	290	312.8
18-Oct	291	291	296	302	305	301	301	302	309	296	292	304	301	308	293	272	135	124	137	132	136	126	114	106	297.9
19-Oct	98	96	112	123	101	100	114	132	170	211	223	197	188	191	169	166	160	146	128	132	124	110	93	90	132.2
20-Oct	90	84	84	67	75	83	93	90	107	93	101	350	336	348	345	331	311	302	332	327	325	320	313	310	356.3
21-Oct	313	309	325	322	303	292	280	278	277	285	293	292	303	286	283	279	267	276	273	204	302	43	128	97	293.6
22-Oct	102	82	109	97	73	124	97	96	97	107	111	126	141	218	268	272	271	273	283	289	293	290	288	288	268.9
23-Oct	286	283	281	282	282	287	294	294	291	293	294	291	286	280	284	273	269	234	171	206	198	177	192	201	282.9
24-Oct	195	190	197	209	214	227	261	274	283	293	325	321	323	322	333	337	351	350	356	10	12	18	48	83	314.4
25-Oct	113	96	102	95	90	82	74	62	57	52	34	26	19	13	11	4	3	2	3	2	355	349	340	343	25.0
26-Oct	295	270	235	274	224	224	230	233	223	228	226	227	221	229	232	233	242	264	284	290	291	296	289	267	248.6
27-Oct	286	285	289	286	210	222	292	239	140	170	205	207	199	202	209	197	198	206	213	215	217	215	220	208	219.8
28-Oct	195	244	282	293	304	306	304	305	303	301	305	309	310	323	323	325	332	333	333	329	332	340	330	328	318.4
29-Oct	322	328	340	338	332	334	340	337	341	352	2	355	1	4	356	350	350	359	13	356	351	337	324	324	344.0
30-Oct	282	217	224	213	202	203	205	216	203	208	206	208	199	218	239	233	206	291	332	326	351	334	262	260	241.2
31-Oct	276	218	215	188	126	176	149	132	153	146	124	119	120	110	104	96	78	69	63	60	54	46	39	31	92.6

309.1 309.5 308.6 309.2 308.7 308.6 310.4 309.7 306.8 304.2 309.9 307.8 307.4 305.4 305.8 304.7 310.6 313.1 316.1 320.4 319.9 318.8 317.1 314.4  
 Diurnal Average

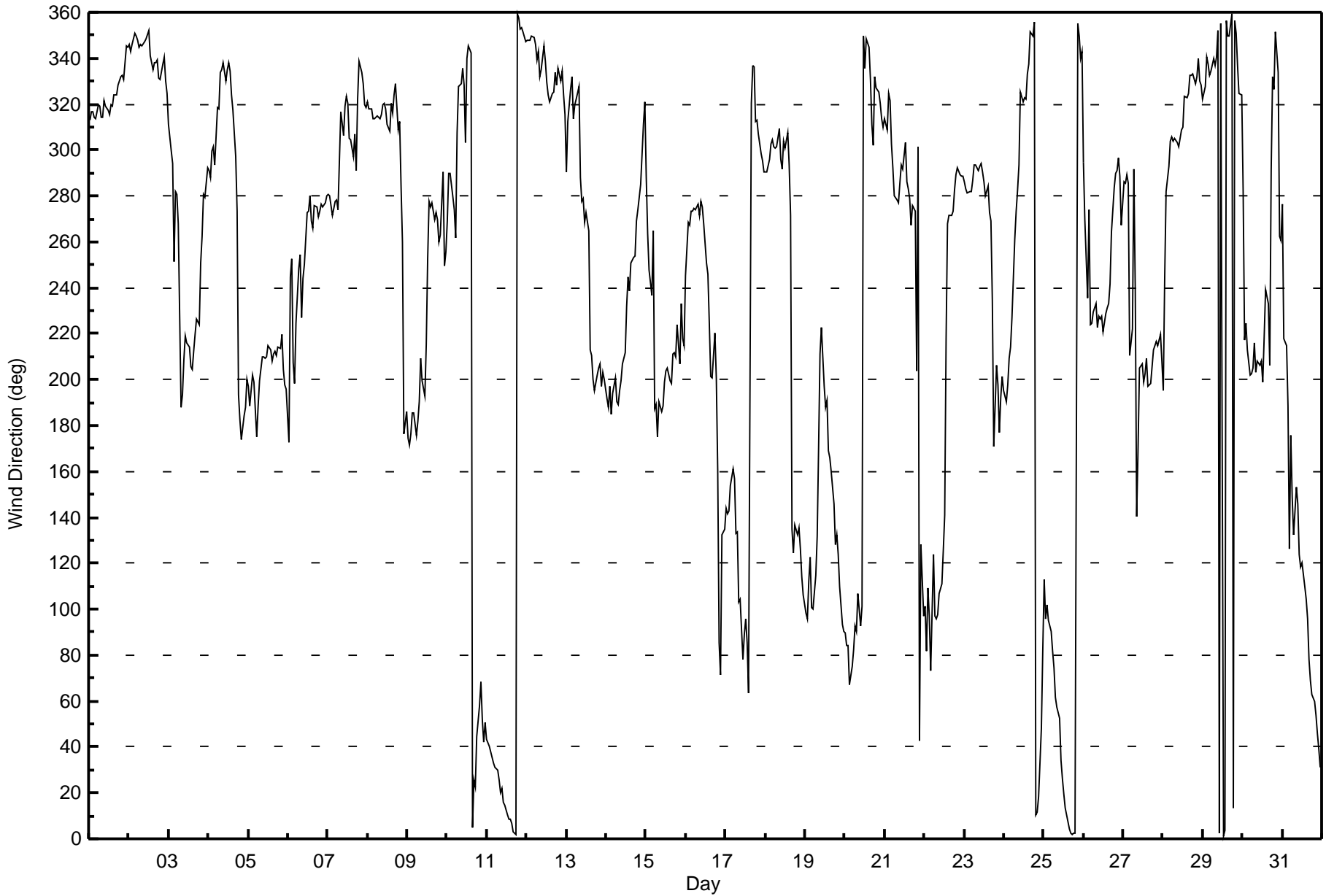
All monthly, daily, and diurnal averages have been calculated using vector methods





**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Leismer - October 2017**





**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Direction (WD) - deg**  
**Leismer - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 90 deg on Oct 31 02:00																	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 7 deg on Oct 23 01:00																									
Percentiles: P <sub>1</sub> = 8 P <sub>10</sub> = 11 Q <sub>1</sub> = 13 Median = 16 Q <sub>3</sub> = 21 P <sub>90</sub> = 32 P <sub>99</sub> = 64																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-Oct	11	10	13	10	10	11	11	10	10	11	12	11	11	11	10	11	10	10	10	11	11	10	12	13	13
2-Oct	14	13	14	17	16	15	13	13	14	14	14	16	16	16	17	16	14	10	10	9	13	10	8	10	17
3-Oct	62	38	26	59	13	14	39	47	22	23	26	27	25	22	21	22	25	29	26	32	37	20	9	12	62
4-Oct	13	9	17	21	10	13	13	8	12	15	14	20	19	18	20	18	23	28	52	12	11	12	13	14	52
5-Oct	17	15	13	11	12	9	11	14	25	25	23	26	27	26	23	22	21	18	21	20	27	16	11	16	27
6-Oct	16	52	41	41	25	44	36	32	39	33	31	18	15	14	17	22	12	13	13	13	22	18	15	9	52
7-Oct	9	10	12	14	17	12	12	16	10	17	11	11	11	14	16	15	19	16	11	11	12	15	12	12	19
8-Oct	12	11	11	11	12	11	11	11	11	11	12	12	12	16	12	13	13	13	18	16	18	21	41	15	41
9-Oct	21	9	13	13	13	13	16	19	21	16	16	24	32	15	15	18	18	14	22	41	39	27	20	35	41
10-Oct	46	12	12	9	17	25	54	18	16	21	21	29	16	28	30	25	14	13	21	23	23	22	20	22	54
11-Oct	20	20	20	20	17	17	18	19	18	17	17	17	17	16	17	17	17	16	16	16	13	15	14	10	20
12-Oct	12	11	12	14	15	15	13	13	13	14	17	16	16	13	15	13	13	11	14	13	11	17	18	18	18
13-Oct	25	21	14	9	18	18	20	20	24	14	17	24	23	29	29	22	15	16	16	17	17	14	16	15	29
14-Oct	15	17	18	16	18	20	16	17	16	18	18	20	28	31	30	30	34	33	19	12	9	10	21	10	34
15-Oct	24	16	25	24	24	23	28	16	16	16	17	18	17	16	16	15	18	16	15	36	30	36	33	28	36
16-Oct	35	19	20	11	12	10	18	13	16	13	15	22	32	31	28	14	13	28	15	40	28	23	15	17	40
17-Oct	11	9	8	19	21	22	22	15	59	39	32	21	18	24	22	45	10	18	12	10	12	12	12	11	59
18-Oct	11	11	11	11	12	11	11	11	13	13	11	16	18	22	16	40	71	11	11	14	14	16	13	14	71
19-Oct	15	17	15	16	18	16	14	39	25	31	43	30	27	21	15	12	9	8	14	13	13	10	20	15	43
20-Oct	16	15	20	32	44	28	19	21	29	26	69	41	12	19	41	30	62	18	8	9	9	8	12	13	69
21-Oct	16	18	10	12	17	11	13	12	10	11	11	15	16	16	19	14	23	8	63	55	66	68	71	52	71
22-Oct	42	26	10	18	16	31	14	15	15	13	14	20	20	53	34	19	17	14	11	11	13	9	9	9	53
23-Oct	7	8	10	8	8	10	9	10	11	11	11	12	14	15	13	18	21	42	60	56	71	21	15	19	71
24-Oct	16	14	17	19	22	26	26	17	12	13	14	14	13	13	14	13	16	15	16	13	13	21	13	32	32
25-Oct	18	22	22	21	22	23	23	22	19	18	17	15	14	14	14	15	16	16	16	15	14	12	10	15	23
26-Oct	21	32	28	33	22	19	22	21	18	21	20	20	22	21	21	21	26	29	17	11	11	11	10	40	40
27-Oct	13	12	11	37	23	40	13	57	49	17	24	22	21	20	18	16	13	15	18	16	15	16	22	25	57
28-Oct	54	53	21	11	10	10	9	9	9	10	11	14	12	13	13	12	11	12	12	12	12	15	12	11	54
29-Oct	11	16	14	14	12	11	13	11	12	16	19	17	18	19	18	15	13	15	13	16	16	15	21	23	23
30-Oct	30	18	19	14	12	14	15	16	16	16	18	18	18	21	26	43	63	17	25	18	17	21	48	47	63
31-Oct	45	90	58	51	12	20	17	14	11	16	14	16	16	18	20	23	24	21	24	23	20	18	17	15	90
																	Diurnal Maximum								



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Leismer	Station number:	AMS 501
Calibration Date:	October 4, 2017	Last Cal Date:	September 22, 2017
Start time (MST):	10:56	End time (MST):	13:23
Reason:	Routine		

### Calibration Standards

Cal Gas Concentration	<u>48.8</u>	ppm	Cal Gas Exp Date	August 18, 2020
Cal Gas Cylinder #	<u>LL34916</u>			
Calibrator Make/Model	API T700		Serial Number	622
ZAG Make/Model	API 701		Serial Number	196

### Analyzer Information

Analyzer make: Thermo 43i

Analyzer serial #: 1160290011

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Analyzer Range	0 - 1000 ppb		PMT voltage	-619	-618
Calculated slope	0.939844	0.993313	Lamp voltage	766	765
Calculated intercept	1.075651	0.577649	Pressure	692.4	688.8
Analyzer Background	15.1	14.2	Flow	0.409	0.407
Analyzer Coefficient	1.041	0.970	Intensity	90	89

### SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5005	0.0	0.0	0.7	----
as found span	4934	78.4	763.3	820.8	0.930
calibrator zero	5007	0.0	0.0	0.7	----
high point	4925	78.2	762.7	768.1	0.993
second point	4973	39.2	381.7	382.5	0.998
third point	4939	19.4	190.9	190.7	1.001
as left zero	5007	0.0	0.0	0.7	----
as left span	4820	78.3	780.1	770.5	1.012
Average Correction Factor					0.997
Corrected As found	820.10	Previous response	811.07	*% change	-1.1%

Notes:

Zero adjusted.

Calibration Performed By:

Aswin Sasi Kumar



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

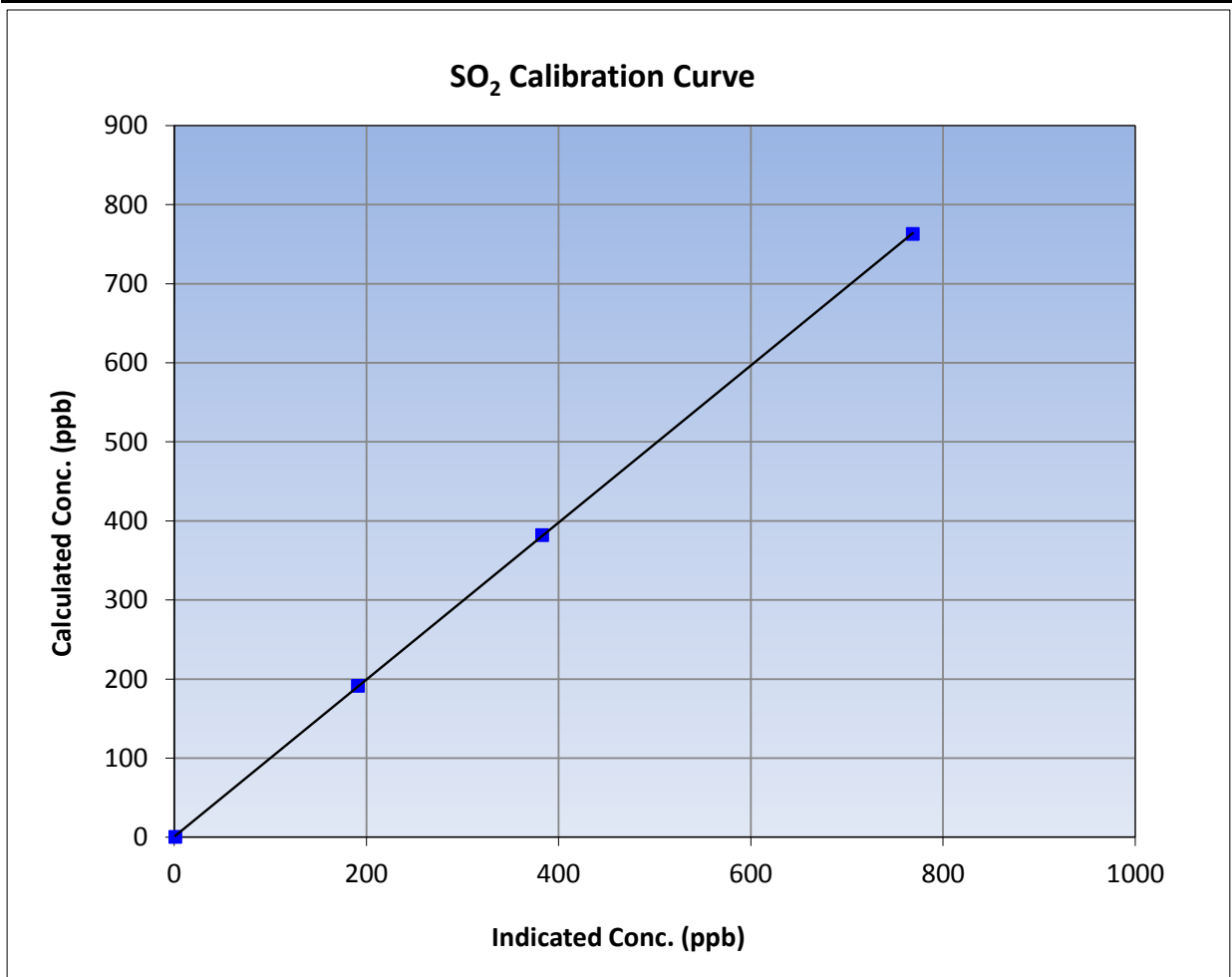
Version-03-2017

### Station Information

Calibration Date	October 4, 2017	Previous Calibration	September 22, 2017
Station Name	Leismer	Station Number	AMS 501
Start Time (MST)	10:56	End Time (MST)	13:23
Analyzer make	Thermo 43i	Analyzer serial #	1160290011

### Calibration Data

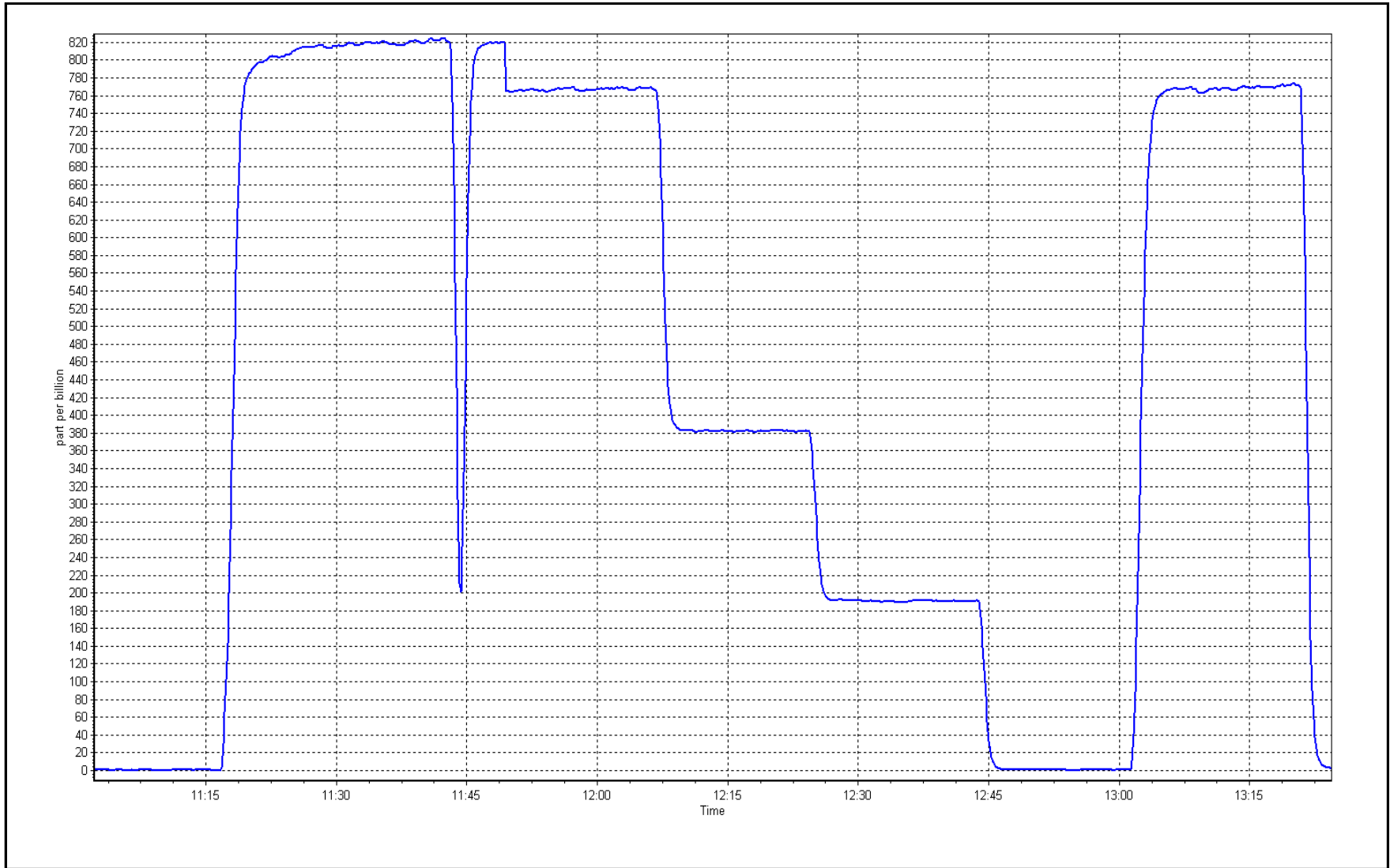
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.7	----	Correlation Coefficient	0.999986	≥0.995
762.7	768.1	0.9930	Slope	0.993313	0.90 - 1.10
381.7	382.5	0.9978	Intercept	0.577649	+/-30
190.9	190.7	1.0012			



SO2 Calibration Plot

Date: 4-Oct

Location: Leismer





# Wood Buffalo Environmental Association

## H<sub>2</sub>S Calibration Report

Version-06-2017

### Station Information

Station Name:	Leismer	Station number:	AMS 501
Calibration Date:	October 10, 2017	Last Cal Date:	September 20, 2017
Start time (MST):	12:20	End time (MST):	15:58
Reason:	Routine		

### Calibration Standards

Cal Gas Concentration	<u>5.08</u>	ppm	Cal Gas Exp Date	July 12, 2019
Cal Gas Cylinder #	<u>DR0000407</u>			
Calibrator Make/Model	API T700		Serial Number	622
ZAG Make/Model	API 701		Serial Number	196

### Analyzer Information

Analyzer make: API T101

Analyzer serial #: 197

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Analyzer Range	0 - 100 ppb		PMT voltage	497	497
Calculated slope	0.990063	1.001577	Lamp voltage	2054	2051
Calculated intercept	0.383753	0.632362	Pressure	23.2	23.0
Analyzer Background	25.4	26.6	Flow	0.625	0.593
Analyzer Coefficient	0.934	0.964	Intensity	46	46

### H<sub>2</sub>S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5007	0.0	0.0	0.4	----
as found span	4935	78.8	79.8	81.6	0.978
calibrator zero	5007	0.0	0.0	-0.2	----
high point	4935	78.8	79.8	79.4	1.006
second point	4972	39.5	40.0	38.8	1.032
third point	4993	19.8	20.1	19.2	1.045
as left zero					
as left span					

SO<sub>2</sub> Scrubber Check

				Average Correction Factor	1.028
Corrected As found	81.20	Previous response	80.26	*% change	-1.2%

*\* = > +/-5% change initiates investigation*

Notes: Zero and span adjusted. Third point failed. Re adjusted span afterwards and executed another three point calibration.

Calibration Performed By: Aswin Sasi Kumar



# Wood Buffalo Environmental Association

## H<sub>2</sub>S Calibration Summary

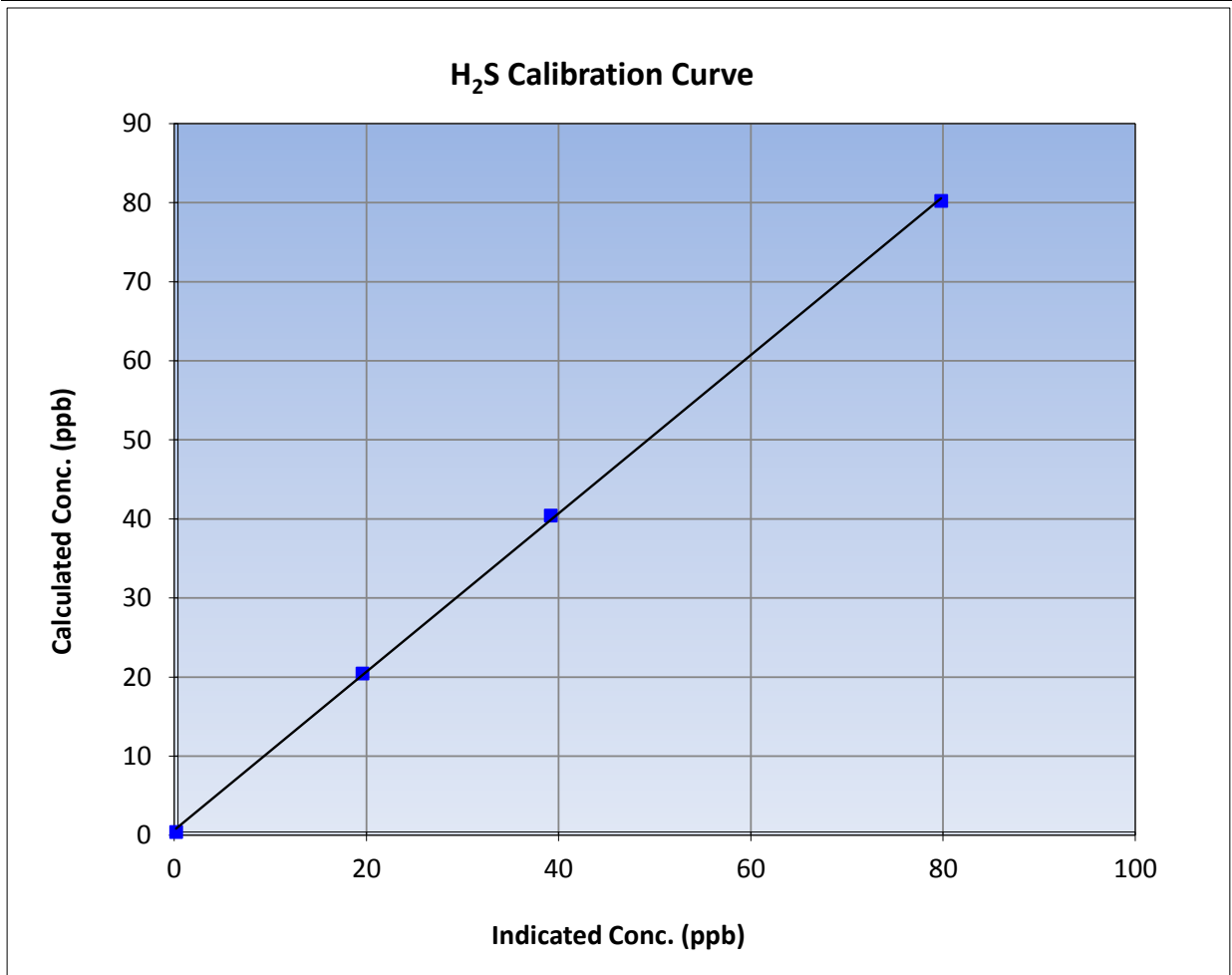
Version-03-2017

### Station Information

Calibration Date	October 10, 2017	Previous Calibration	September 20, 2017
Station Name	Surmont	Station Number	AMS 502
Start Time (MST)	12:20	End Time (MST)	15:58
Analyzer make	API T101	Analyzer serial #	197

### Calibration Data

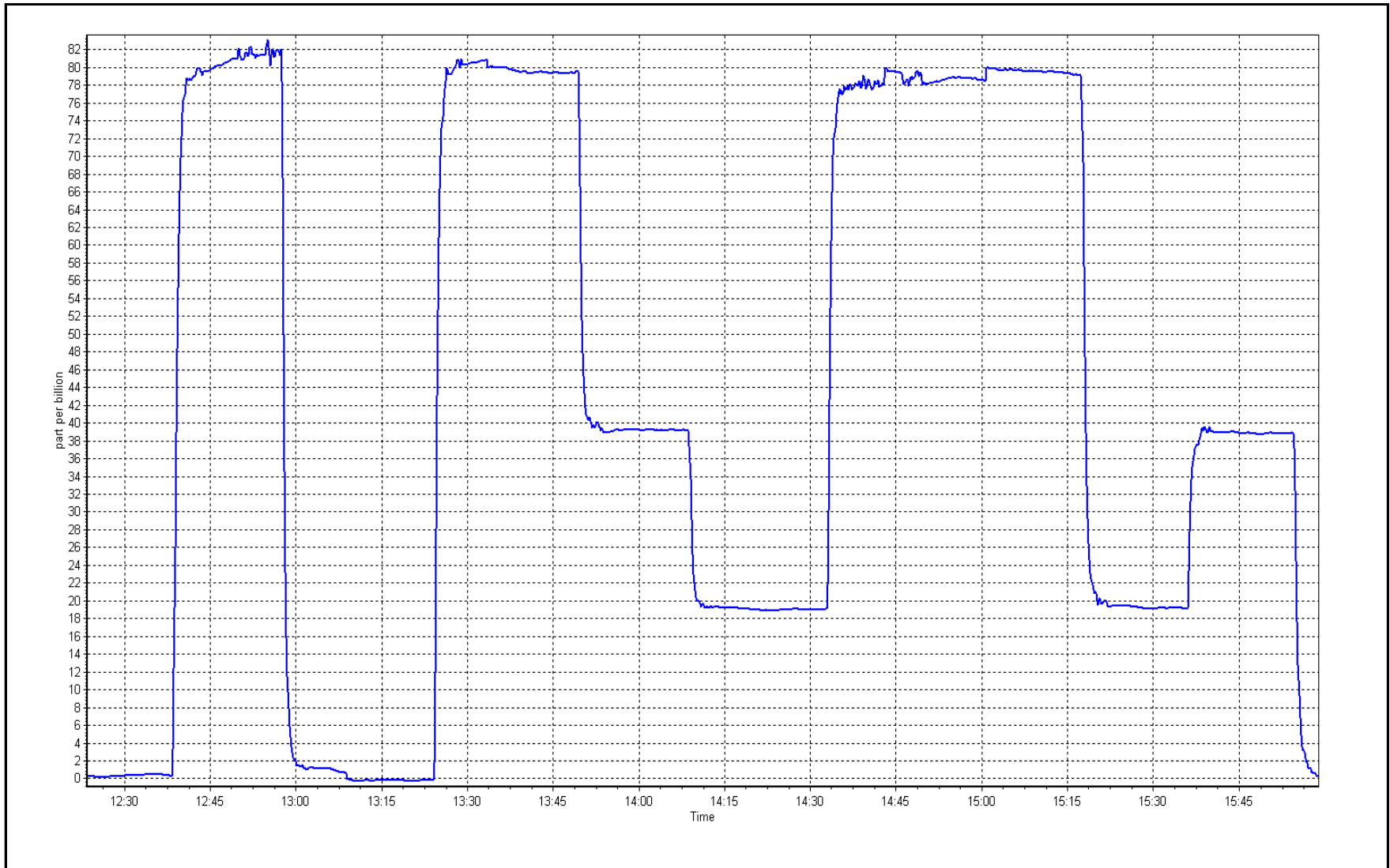
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	-0.2	----	Correlation Coefficient	0.999820	≥0.995
79.8	79.4	1.0055			
40.0	38.8	1.0320	Slope	1.001577	0.90 - 1.10
20.1	19.2	1.0451			
			Intercept	0.632362	+/-3



# H<sub>2</sub>S Calibration Plot

Date: 10-Oct

Location: Leismer







# Wood Buffalo Environmental Association

## NO<sub>x</sub> - NO - NO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Leismer	Station number:	AMS 501
Calibration Date:	October 24, 2017	Last Cal Date:	September 22, 2017
Start time (MST):	10:05	End time (MST):	14:07
Reason:	Routine		

### Calibration Standards

NO Gas Cylinder #	LL104215	Cal Gas Expiry Date	August 18, 2020
NOX Cal Gas Conc.	<u>51.1</u> ppm	NO Cal Gas Conc.	<u>51.1</u> ppm
Calibrator Model	API T700	Serial Number	622
ZAG make/model	Teledyne API T701	Serial Number	196

### Analyzer Information

Analyzer make:	Thermo 42i	Analyzer serial #:	1218153356		
	<u>Start</u>	<u>Finish</u>	<u>Start</u>	<u>Finish</u>	
NO coefficient	1.015	1.038	NOX Range (ppb)	0 - 1000 ppb	
NOX coefficient	1.000	1.000	PMT Temperature	-2.7	-2.7
NO <sub>2</sub> coefficient	1.000	1.000	Reaction cell Press	160.3	159.1
NO bkgrnd	5.7	5.8	Sample Flow	0.666	0.666
NOX bkgrnd	6.2	6.3	PMT Voltage	-866.5	-865.8

### Calibration Statistics

	<u>Start</u>	<u>Finish</u>
NO <sub>x</sub> Cal Slope	1.011458	0.995592
NO <sub>x</sub> Cal Offset	2.159511	2.277335
NO Cal Slope	1.011382	0.996388
NO Cal Offset	2.337155	1.701014
NO <sub>2</sub> Cal Slope	1.000064	1.000510
NO <sub>2</sub> Cal Offset	0.063736	-1.069321



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

Version-03-2017

### Dilution Calibration Data

Set Point	Dilution flow rate (sccm)	Source gas flow rate (sccm)	Calculated NOx concentration (ppb) (Cc)	Calculated NO concentration (ppb) (Cc)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5007	0.0	0.0	0.0	0.0	-0.8	-0.3	-0.5	----	----
as found span	4934	78.3	798.3	798.3	0.0	782.5	782.0	0.5	1.0201	1.0208
calibrator zero	5007	0.0	0.0	0.0	0.0	-0.8	-0.3	-0.5	----	----
high point	4925	78.2	798.7	798.7	0.0	800.5	800.3	0.2	0.9977	0.9980
second point	4964	39.0	398.3	398.3	0.0	397.6	398.2	-0.6	1.0019	1.0004
third point	4939	19.4	199.9	199.9	0.0	196.7	197.0	-0.3	1.0164	1.0149
as left zero	5007	0.0	0.0	0.0	0.0	-1.6	-1.2	-0.4	----	----
as left span	4820	78.3	816.8	390.3	426.5	808.7	392.1	416.6	1.0101	0.9954
Average Correction Factor									1.0053	1.0044

Corrected As found      NO<sub>x</sub> = 783.3 ppb                      NO = 782.3 ppb                      \*Percent Change                      NO<sub>x</sub> = 0.5%  
 Previous Response      NO<sub>x</sub> = 787.1 ppb                      NO = 786.9 ppb                      \*Percent Change                      NO = 0.6%  
 \* = > +/-5% change initiates investigation

### GPT Calibration Data

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 concentration (ppb) (Cc)	Indicated NOx concentration (ppb) (Ic)	Indicated NO concentration (ppb) (Ic)	Indicated NO2 concentration (ppb) (Ic)	NOx Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	NO2 Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>	Converter Efficiency <i>Limit = 96-104%</i>
1st NO ref point		0.0	802.0	800.4	1.6	0.9959	0.9979	----	----
1st NO2 (400 ppb O3)	390.3	410.1	800.6	390.3	410.2	0.9976	----	0.9998	100.0%
2nd NO2 (200 ppb O3)	586.0	214.4	801.9	586.0	215.8	0.9960	----	0.9935	100.7%
3rd NO2 (100 ppb O3)	689.0	111.4	803.3	689.0	114.3	0.9943	----	0.9746	102.6%
2nd NO ref point	----	0.0	803.4	802.9	0.4	0.9941	0.9948	----	----
Average Correction Factor						0.9955	0.9963	0.9893	101.1%

Notes:

Span adjusted.

Calibration Performed By:

Aswin Sasi Kumar



# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

Version-03-2017

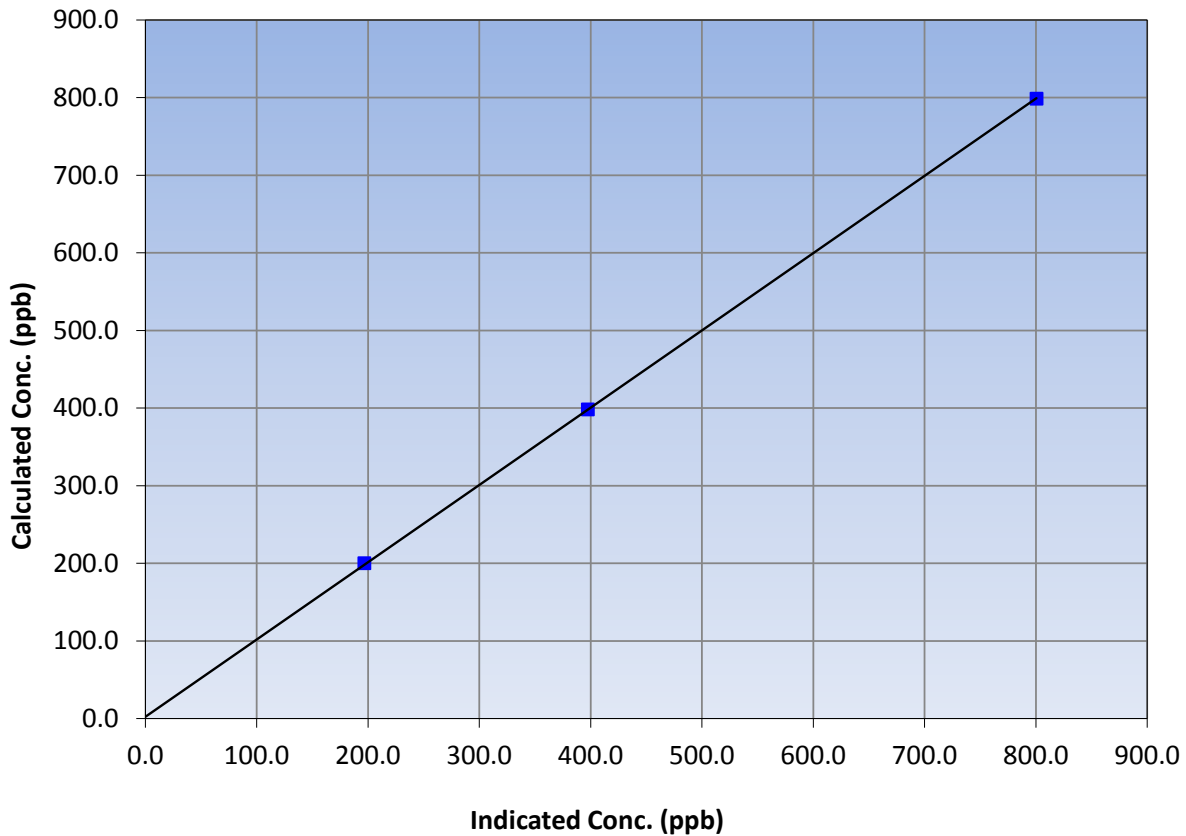
### Station Information

Calibration Date	October 24, 2017	Previous Calibration	September 22, 2017
Station Name	Leismer	Station Number	AMS 501
Start Time (MST)	10:05	End Time (MST)	14:07
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<i>Limits</i>	
0.0	-0.8	----	Correlation Coefficient	≥0.995	
798.7	800.5	0.9977			
398.3	397.6	1.0019			
199.9	196.7	1.0164			
			Slope	0.995592	0.90 - 1.10
			Intercept	2.277335	+/-20

NO<sub>x</sub> Calibration Curve





# Wood Buffalo Environmental Association

## NO Calibration Summary

Version-03-2017

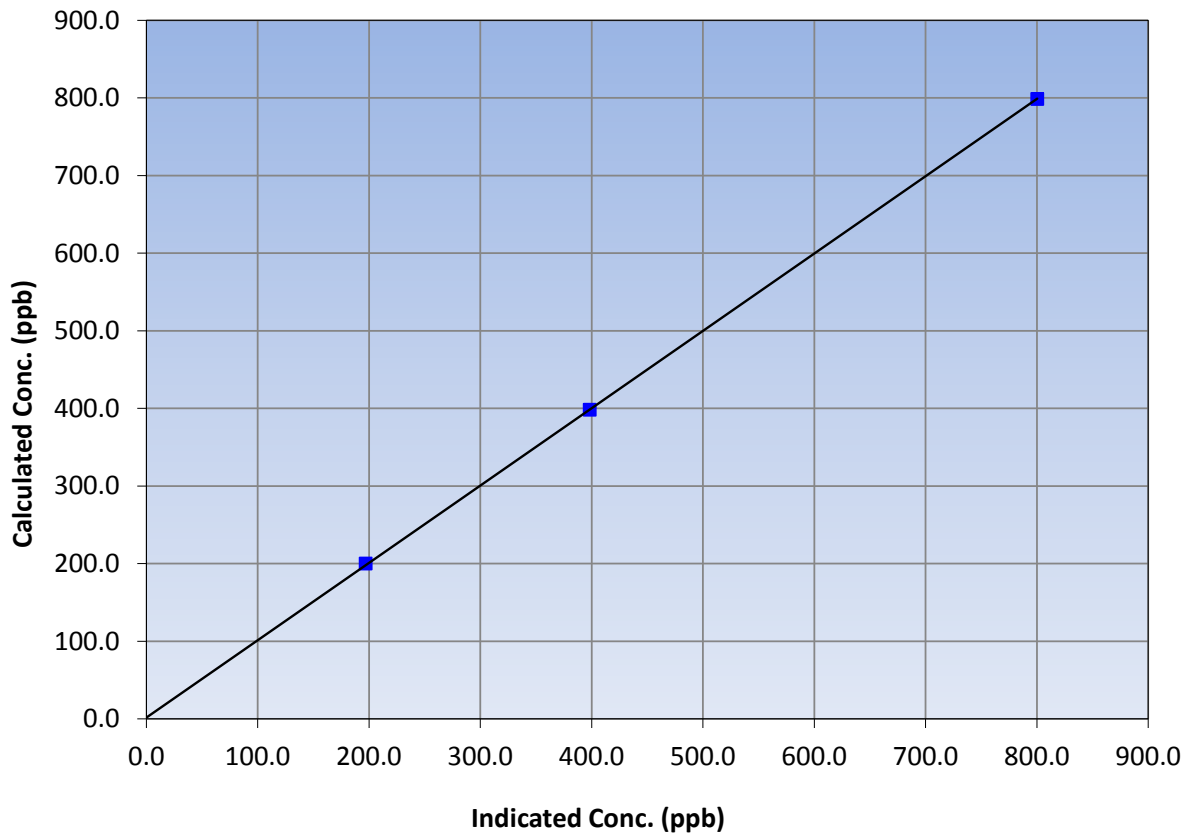
### Station Information

Calibration Date	October 24, 2017	Previous Calibration	September 22, 2017
Station Name	Leismer	Station Number	AMS 501
Start Time (MST)	10:05	End Time (MST)	14:07
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	-0.3	----	Correlation Coefficient	≥0.995	
798.7	800.3	0.9980			
398.3	398.2	1.0004			
199.9	197.0	1.0149			
			Slope	0.996388	0.90 - 1.10
			Intercept	1.701014	+/-20

NO Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

Version-03-2017

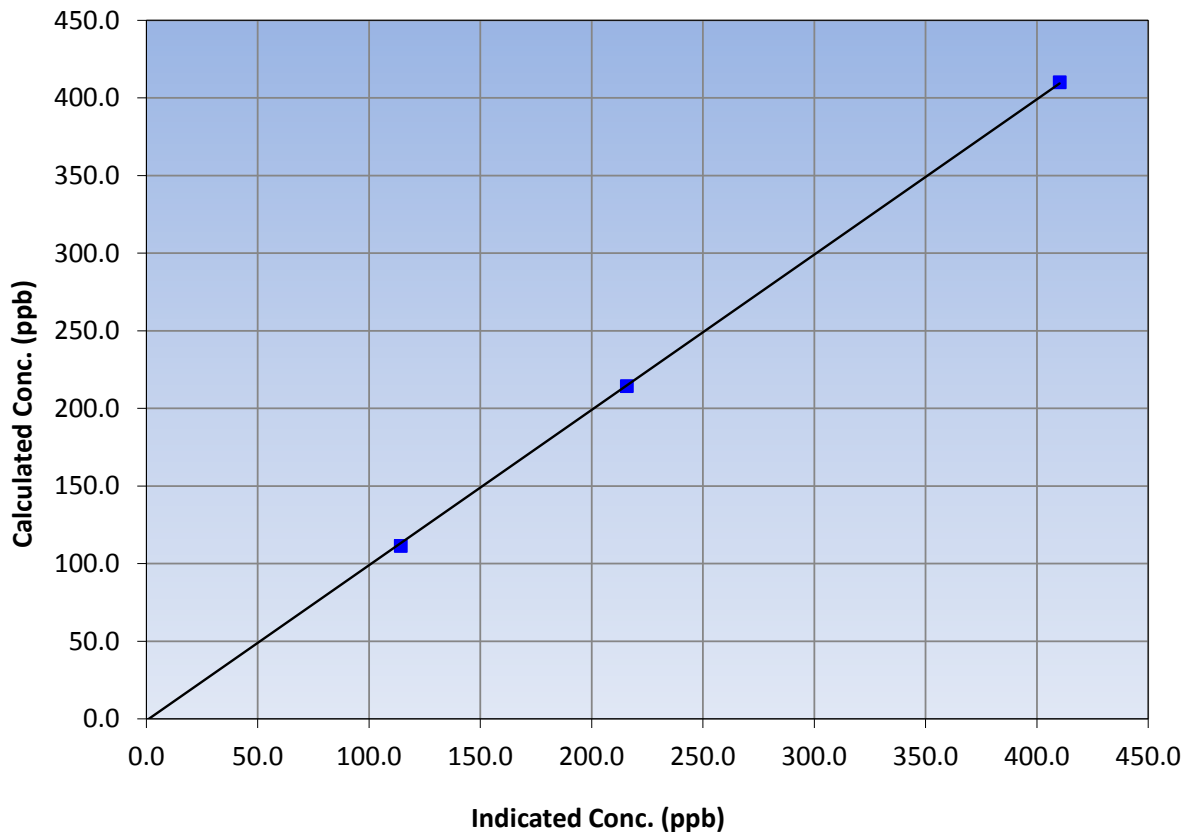
### Station Information

Calibration Date	October 24, 2017	Previous Calibration	September 22, 2017
Station Name	Leismer	Station Number	AMS 501
Start Time (MST)	10:05	End Time (MST)	14:07
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	-0.5	----	Correlation Coefficient	≥0.995	
410.1	410.2	0.9998			
214.4	215.8	0.9935			
111.4	114.3	0.9746			
			Slope	1.000510	0.90 - 1.10
			Intercept	-1.069321	+/-20

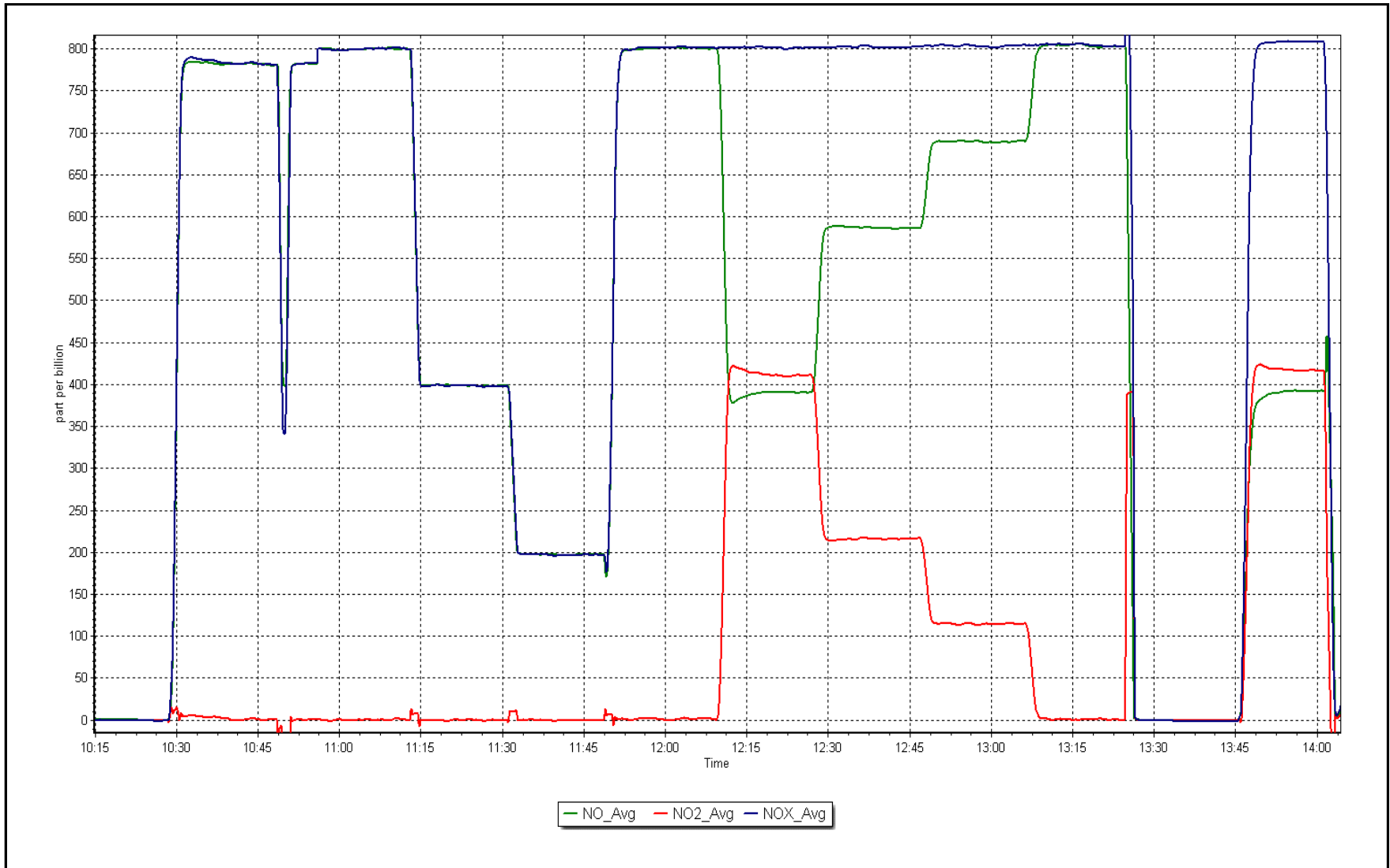
NO<sub>2</sub> Calibration Curve



NO<sub>x</sub> Calibration Plot

Date: 24-Oct

Location: Leismer





## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

### **CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT**

#### **AMS 505 SAWBONES BAY OCTOBER 2017**

Operations, Data Collection,  
QA/QC, Data Validation and Reporting by:  
Wood Buffalo Environmental Association  
Fort McMurray, Alberta

November 29, 2017

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SAWBONES BAY (AMS 505)  
OCTOBER 2017

MONTHLY SUMMARY for  
AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	705	38	39	99.87	66	0	16	0
H2S (ppb) Average	680	42	64	97.04	2	0	0	0
THC(ppm) Average	704	39	40	99.87	3.2	-	2.3	-
NO2 (ppb) Average	703	40	41	99.87	18	0	6	-
NO (ppb) Average	703	40	41	99.87	12	-	3	-
NOX (ppb) Average	703	40	41	99.87	27	-	9	-
PM2.5(ug/m3) Average	744	0	0	100	74	-	9	0
Temperature 2 m (C) Average	744	0	0	100	20.5	-	13.6	-
Relative Humidity (%) Average	744	0	0	100	97	-	97	-
Wind Speed 10 m (km/h) Average	721	0	23	96.91	45	-	24	-
Wind Direction 10 m (deg) Average	721	0	23	96.91	-	-	0	-

Note : Operational time includes periods of data collection and instrument calibration



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SAWBONES BAY (AMS 505)  
OCTOBER 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	705	1.8	7	-	0	0	0	0	1	3	66
H2S (ppb) Average	680	0.1	0	-	0	0	0	0	0	0	2
THC(ppm) Average	704	2.17	0.1	-	2	2.1	2.1	2.2	2.2	2.3	3.2
NO2 (ppb) Average	703	2.6	3	-	0	0	1	2	3	6	18
NO (ppb) Average	703	0.8	2	-	0	0	0	0	1	2	12
NOX (ppb) Average	703	3.3	5	-	0	0	1	2	4	8	27
PM2.5(ug/m3) Average	744	4.2	6	-	0	0	0	2	7	11	74
Temperature 2 m (C) Average	744	2.92	4.8	-	-4.5	-2.6	-0.6	2.1	5.9	9	20.5
Relative Humidity (%) Average	744	74.4	17	-	28	49	63	77	89	94	97
Wind Speed 10 m (km/h) Average	721	13.6	7	-	1	5	8	12	18	24	45
Wind Direction 10 m (deg) Average	721	0	0	-	0	-	-	-	-	-	0

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SAWBONES BAY (AMS 505)  
OCTOBER 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, NO2, NO, NOX, THC	20 Oct 2017 14:00	20 Oct 2017 14:00	1	Maintenance - sample manifold cleaned
H2S	21 Oct 2017 15:00	22 Oct 2017 12:00	22	Analyzer Failure - Failed audit
Wind Speed, Wind Direction	11 Oct 2017 14:00	11 Oct 2017 14:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	11 Oct 2017 16:00	12 Oct 2017 13:00	22	Flat line in sensor output signal



Wood Buffalo Environmental Association

Summary of Hour Averages

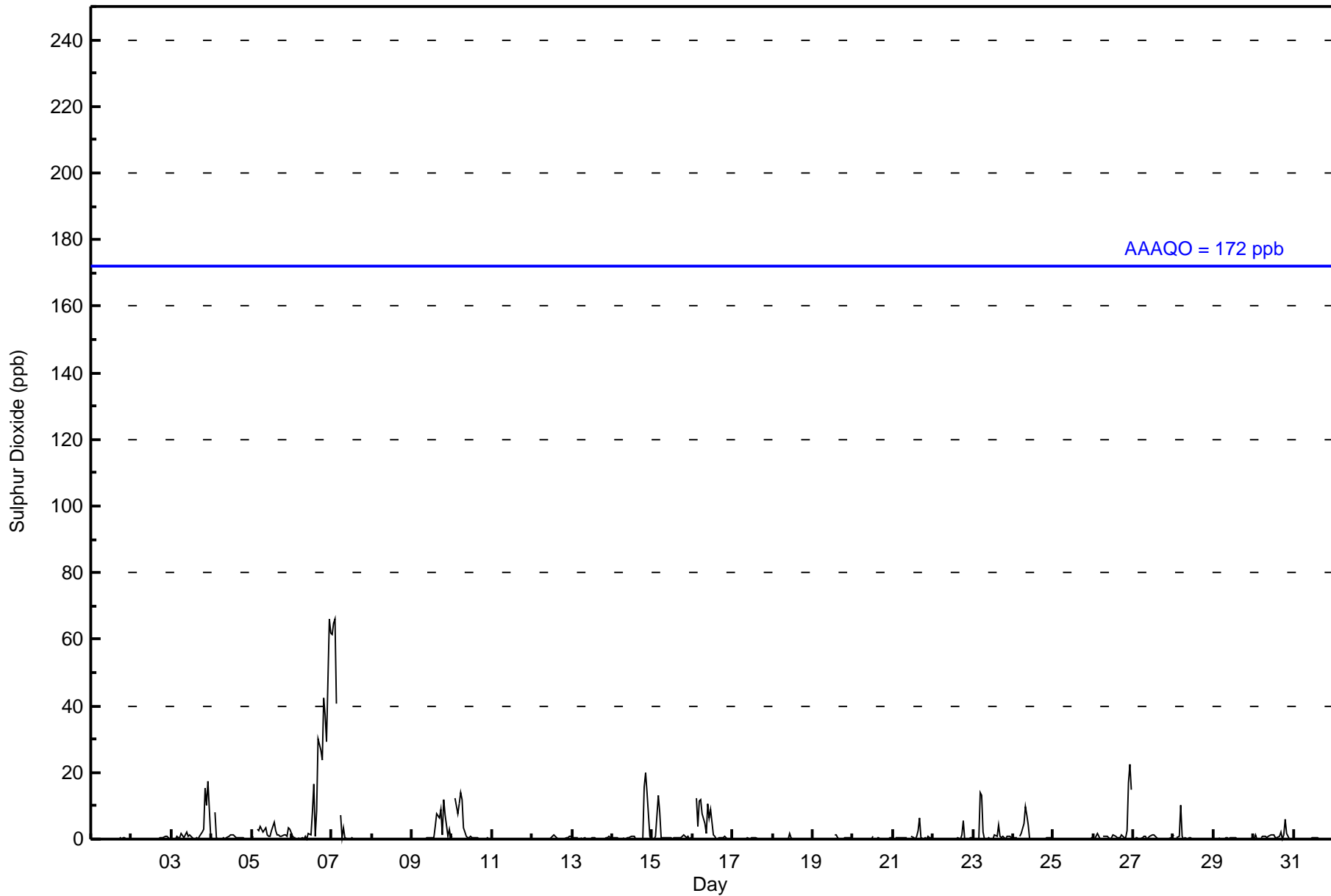
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Sawbones Bay - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 66 ppb on Oct 7 03:00      Maximum Daily Average: 15.6 ppb on Oct 6		Hours in Service: 744 Hours of Data: 705 Hours of Missing Data: 39 Hours of Calibration: 38 Percent Operational Time: 99.9																								
Minimum Value: 0 ppb on Oct 1 04:00 Maximum Diurnal Average: 4.0 ppb at hour 3 Monthly Average: 1.8 ppb		Minimum Daily Average: 0.0 ppb on Oct 11 Minimum Diurnal Average: 0.5 ppb at hour 15 Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 3 P <sub>99</sub> = 40																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0.2	1
3-Oct	Z	0	0	1	0	0	2	0	1	2	1	1	0	0	0	0	1	2	3	15	10	17	1	2.6	17	
4-Oct	0	Z	8	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.8	8	
5-Oct	0	1	Z	3	2	4	3	2	4	1	1	1	3	5	3	1	1	1	1	1	1	3	3	2.0	5	
6-Oct	1	0	1	Z	0	0	0	0	1	0	2	1	8	17	1	9	30	27	24	42	37	29	66	62	15.6	66
7-Oct	61	65	66	41	Z	7	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10.7	66	
8-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
9-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	4	7	6	9	1	12	7	1	3	2.3	12	
10-Oct	1	Z	12	8	11	14	12	3	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2.8	14	
11-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
12-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	1	0.3	1	
13-Oct	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.3	1	
14-Oct	0	1	0	0	0	Z	0	0	0	0	1	1	1	0	0	0	0	0	16	20	14	1	0	2.4	20	
15-Oct	Z	0	1	13	8	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	1	0	1.3	13	
16-Oct	0	Z	12	4	12	12	8	4	2	11	6	9	1	1	0	0	1	0	0	1	0	0	0	3.7	12	
17-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
18-Oct	0	0	0	Z	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2	
19-Oct	0	0	0	0	Z	0	0	0	C	C	C	C	C	1	1	0	0	0	0	0	0	0	0	0.3	1	
20-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	1	M	0	0	0	0	0	0	0	0	0	0.2	1	
21-Oct	Z	0	0	0	0	0	0	1	0	C	C	1	0	0	1	2	6	0	0	0	0	1	0	0.7	6	
22-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	0	0	0	0	0.4	5	
23-Oct	0	0	Z	0	14	13	2	0	0	0	0	0	1	1	4	1	0	1	0	1	1	1	1	1.8	14	
24-Oct	0	0	0	Z	1	2	5	10	7	4	0	0	0	0	0	0	0	0	0	0	0	0	0	1.4	10	
25-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
26-Oct	0	0	2	1	0	Z	1	1	1	0	0	0	1	1	1	0	1	1	0	0	3	17	22	15	3.0	22
27-Oct	Z	0	0	0	0	0	1	1	0	0	1	1	1	1	1	0	0	0	0	0	0	0	1	0.4	1	
28-Oct	1	Z	0	1	10	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	10	
29-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1	
30-Oct	0	1	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	2	0	1	6	2	0	0	1.0	6	
31-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.1	1	
2.6 2.7 4.0 2.8 2.4 2.2 1.2 0.9 0.7 0.8 0.6 0.7 0.8 1.1 0.5 0.9 1.6 1.4 1.3 2.8 2.9 2.5 3.8 2.8																								Diurnal Average		
61 65 66 41 14 14 12 10 7 11 6 9 8 17 4 9 30 27 24 42 37 29 66 62																								Diurnal Maximum		
Z - zerospan      C - Calibration      M - Maintenance																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb      24-hr 48 ppb																										



Wood Buffalo Environmental Association  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Sawbones Bay - October 2017





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Sawbones Bay - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	672	95.32	95.32
11 - 20	20	2.84	98.16
21 - 60	8	1.13	99.29
61 - 110	5	0.71	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Sawbones Bay - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	47	23	27	9	10	21	27	17	34	63	83	29	26	102	86	46	650
11 - 20	0	0	0	0	0	0	0	0	0	0	0	1	19	0	0	0	20
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	8
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	47	23	27	9	10	21	27	17	34	63	83	30	58	102	86	46	683

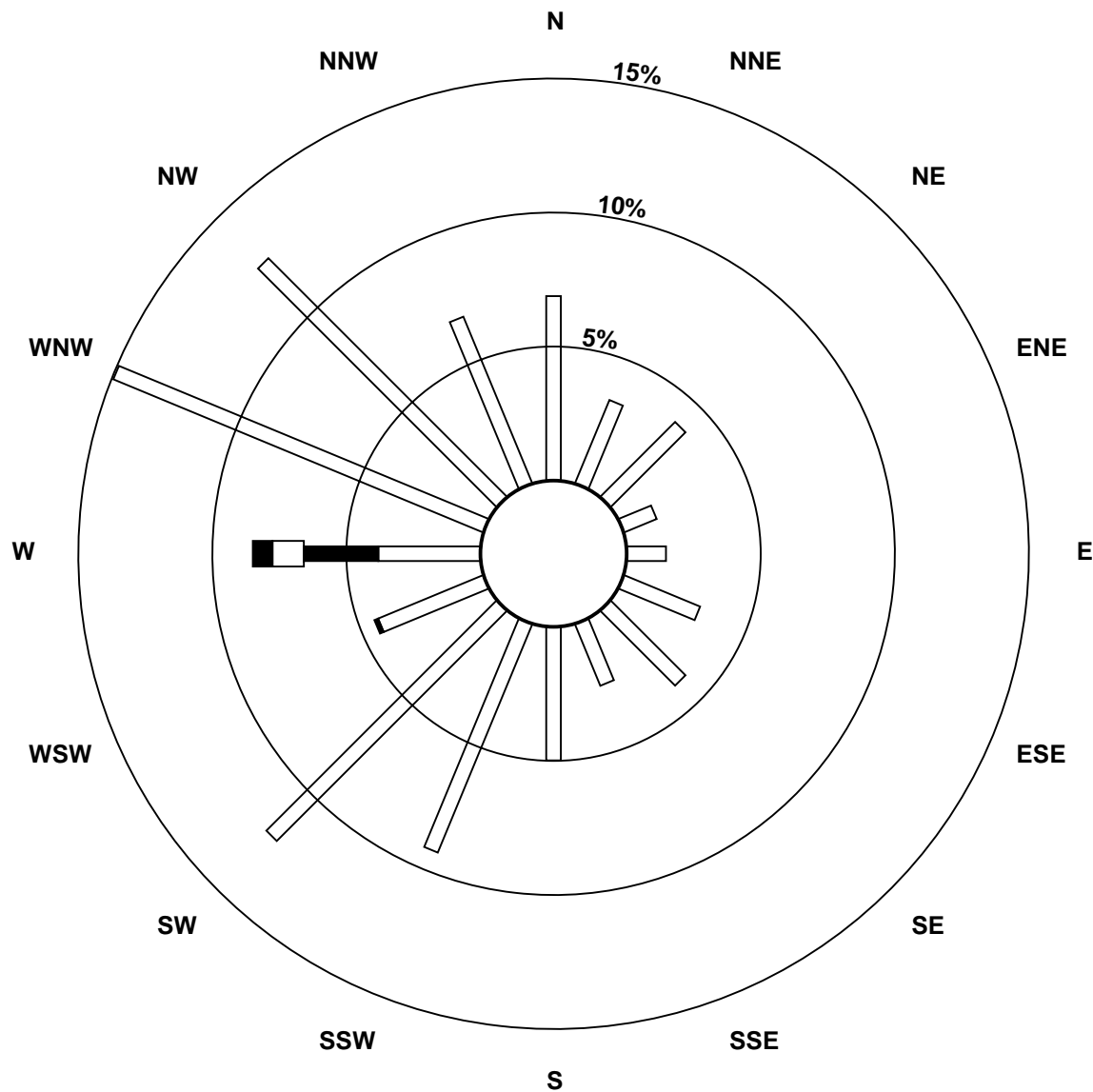
Total Number of Valid Hours: 683

Total Number of Hours: 744

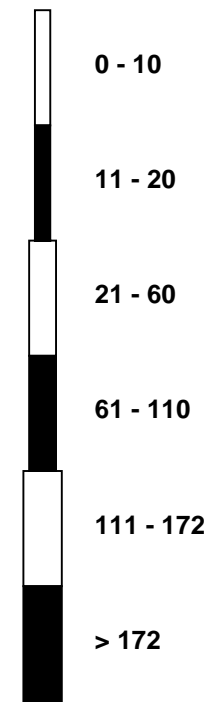


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

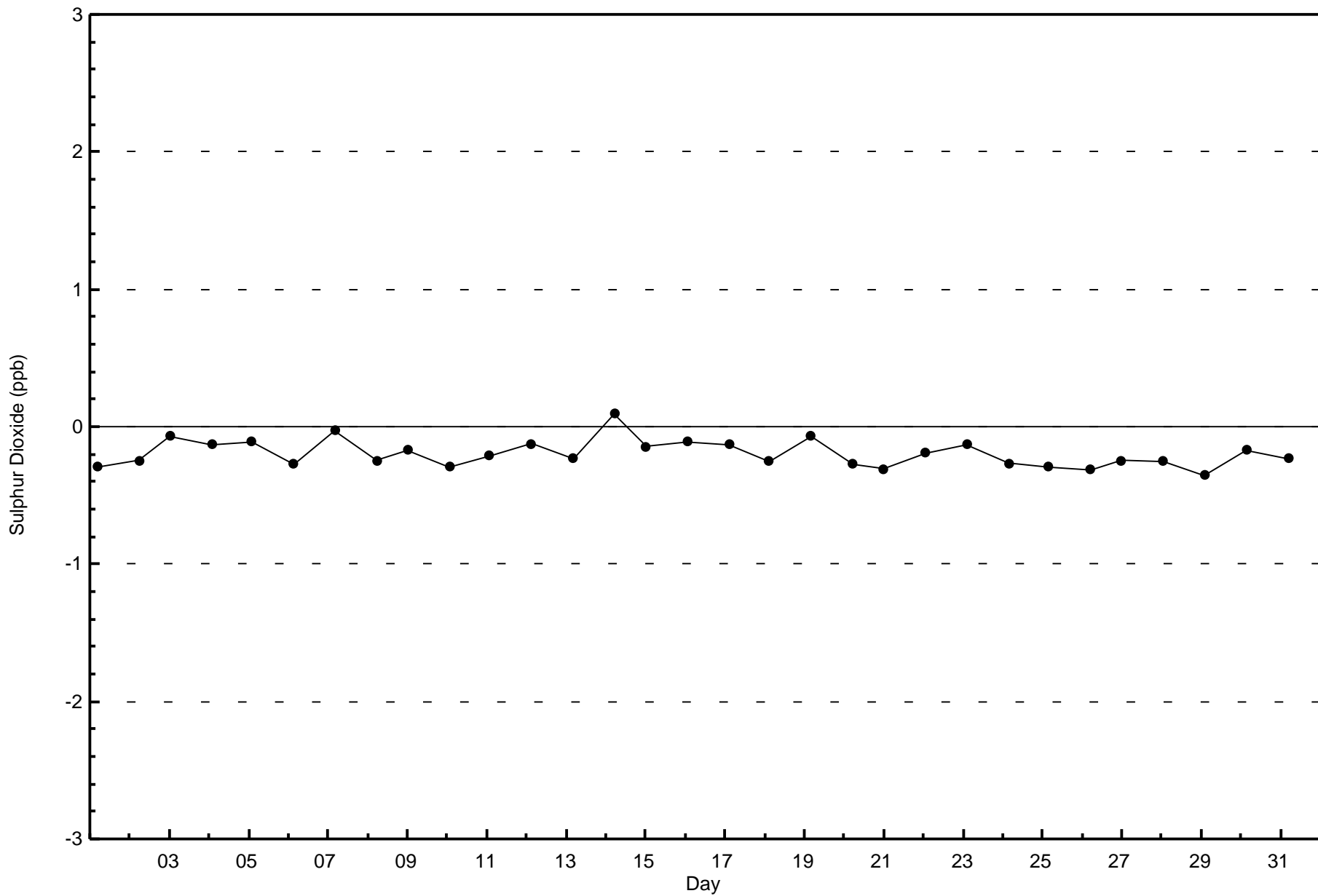
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Sawbones Bay (AMS 505)



Classes (ppb)



Total Number of Valid Hours: 683

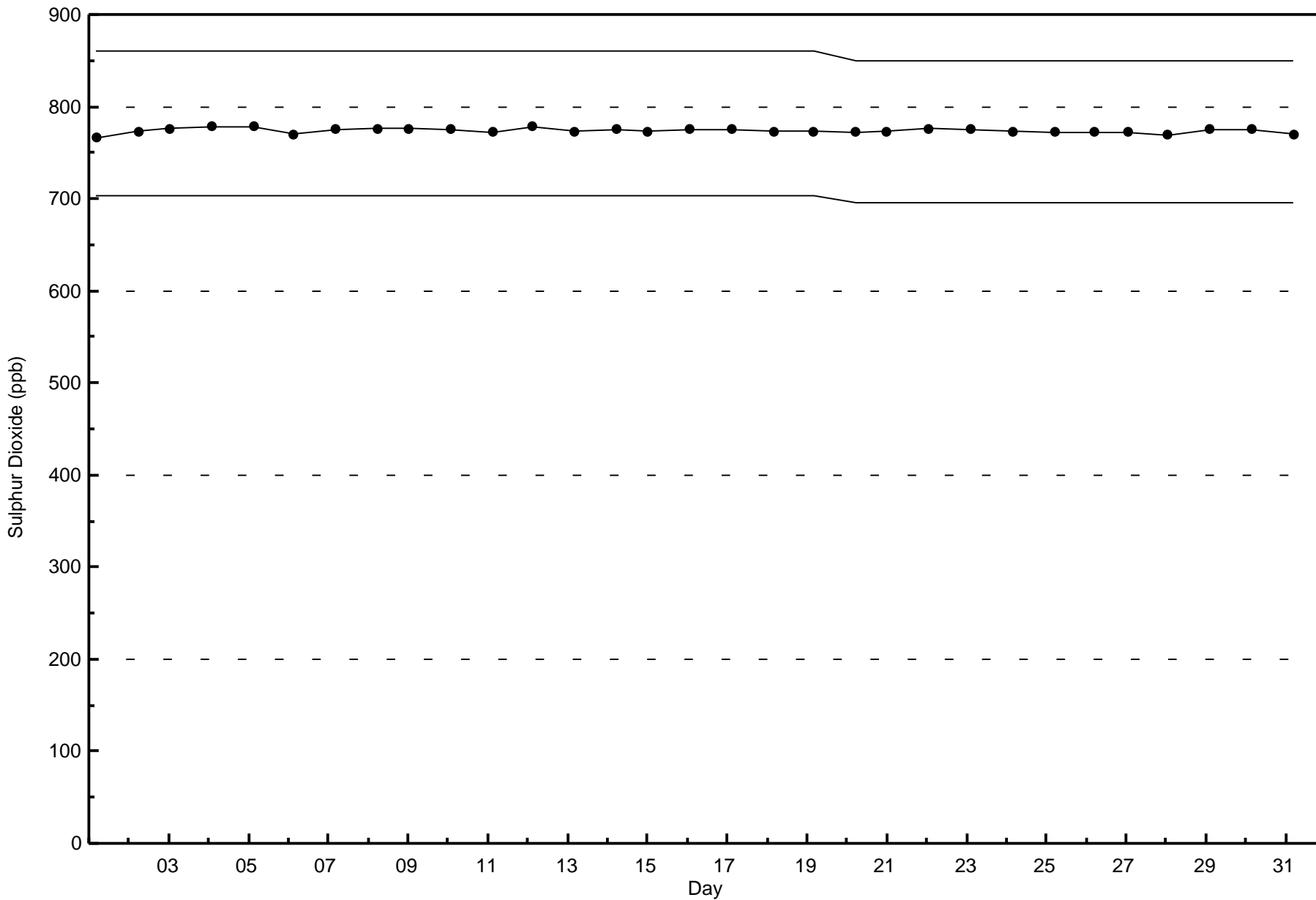






Wood Buffalo Environmental Association  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Sawbones Bay - October 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H2S) - ppb

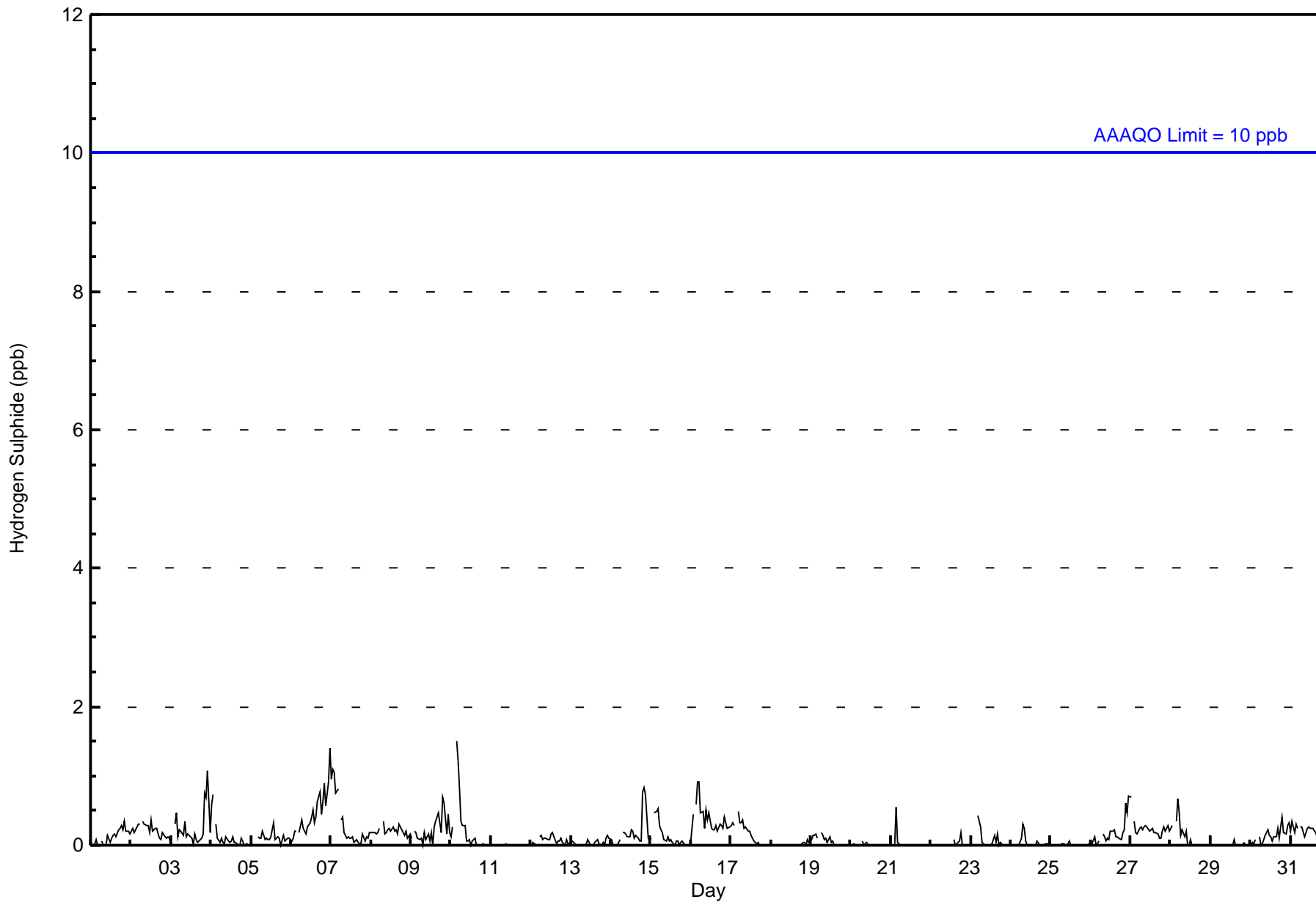
Sawbones Bay - October 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 2 ppb on Oct 10 04:00										Maximum Daily Average: 0.4 ppb on Oct 6										Hours of Data: 680						
Minimum Value: 0 ppb on Oct 1 02:00										Minimum Daily Average: 0.0 ppb on Oct 11										Hours of Missing Data: 64						
Maximum Diurnal Average: 0.3 ppb at hour 4										Minimum Diurnal Average: 0.1 ppb at hour 19										Hours of Calibration: 42						
Monthly Average: 0.1 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 1										Percent Operational Time: 97.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
3-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0.2	1
4-Oct	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
5-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
6-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	1	1	0	1	1	1	1	1	1	0.4	1
7-Oct	1	1	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
8-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
9-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.2	1
10-Oct	0	0	Z	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2
11-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
12-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
13-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
14-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0.2	1
15-Oct	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
16-Oct	0	0	Z	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
17-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
18-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
19-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
20-Oct	0	0	0	0	0	0	Z	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0.0	0
21-Oct	0	Z	0	1	0	0	0	0	0	C	C	C	C	C	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	1
22-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	C	C	0	0	0	0	0	0	0	0	0	0	0	--	0
23-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
24-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
25-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
26-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.2	1
27-Oct	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
28-Oct	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
29-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
30-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
31-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
0.1 0.2 0.1 0.3 0.3 0.2 0.2 0.2 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.2 0.2 0.2 0.2 0.1																								Diurnal Average		
1 1 1 2 1 1 0 0 0 1 0 0 0 0 1 0 0 1 1 0 1 1 1 1 1																								Diurnal Maximum		
Z - zerospan C - Calibration AF - Analyzer Failure																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Sawbones Bay - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Sawbones Bay - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	680	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 680

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Sawbones Bay - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	46	22	27	8	10	12	24	15	37	66	81	30	57	91	87	45	658
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	46	22	27	8	10	12	24	15	37	66	81	30	57	91	87	45	658

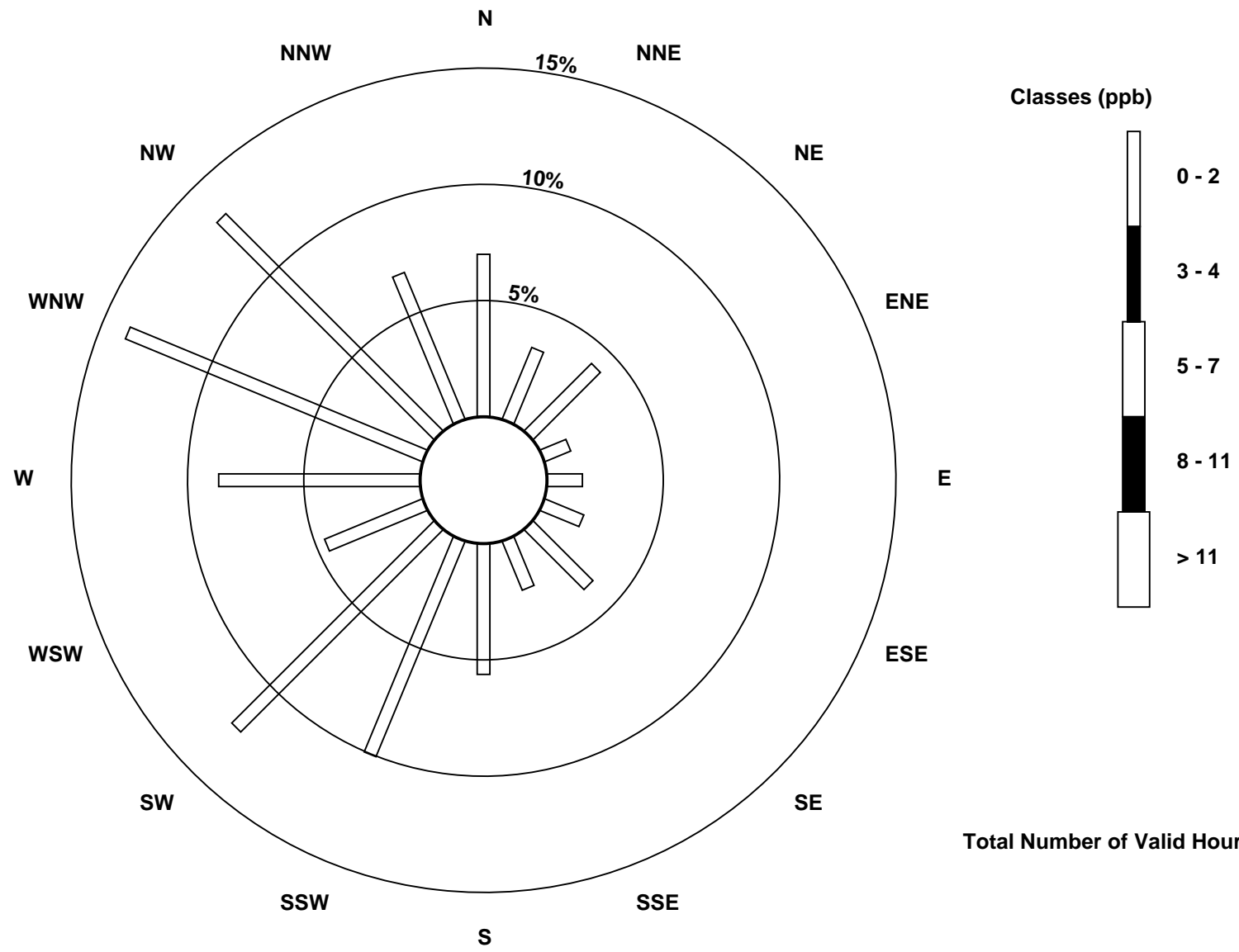
Total Number of Valid Hours: 658

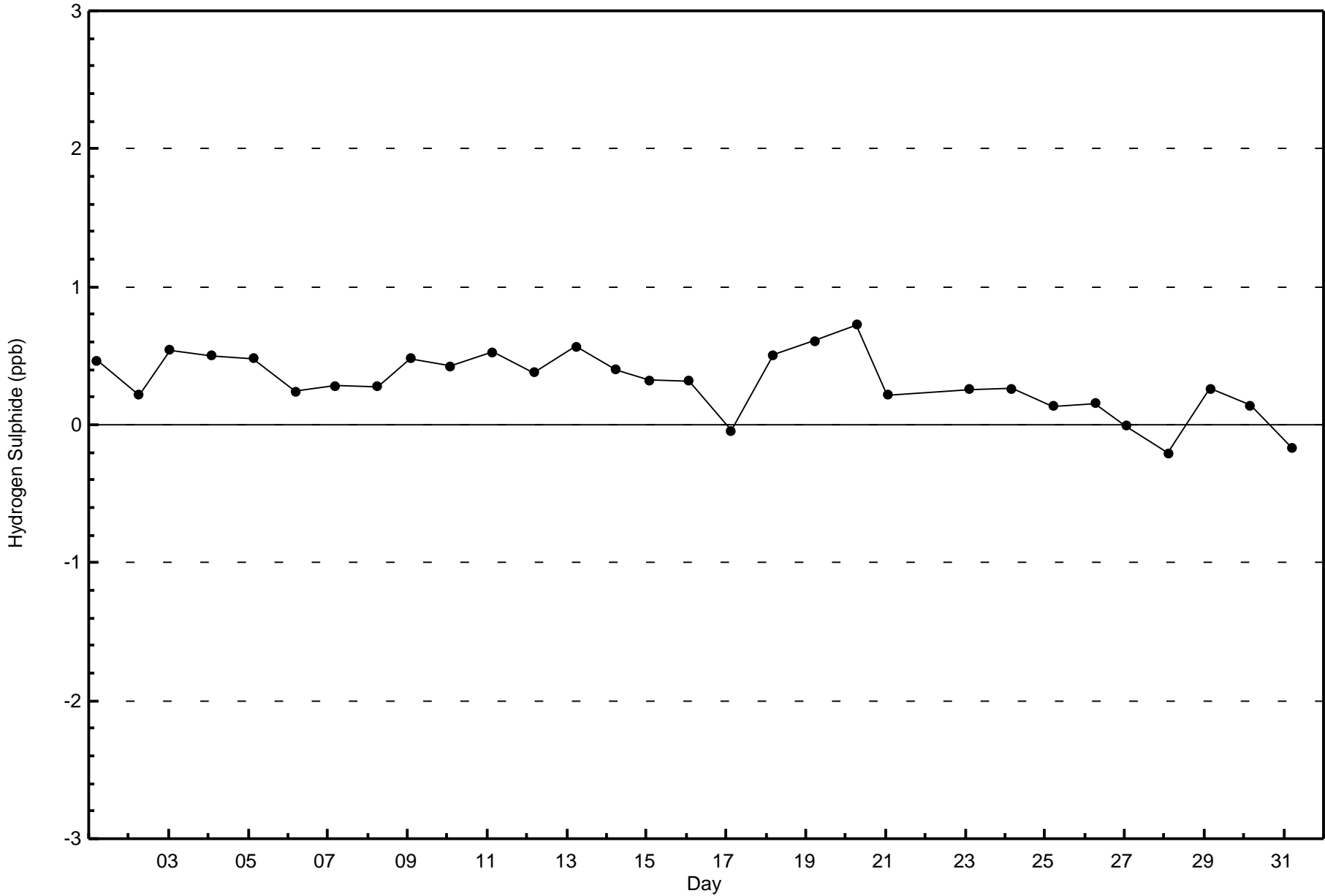
Total Number of Hours: 744

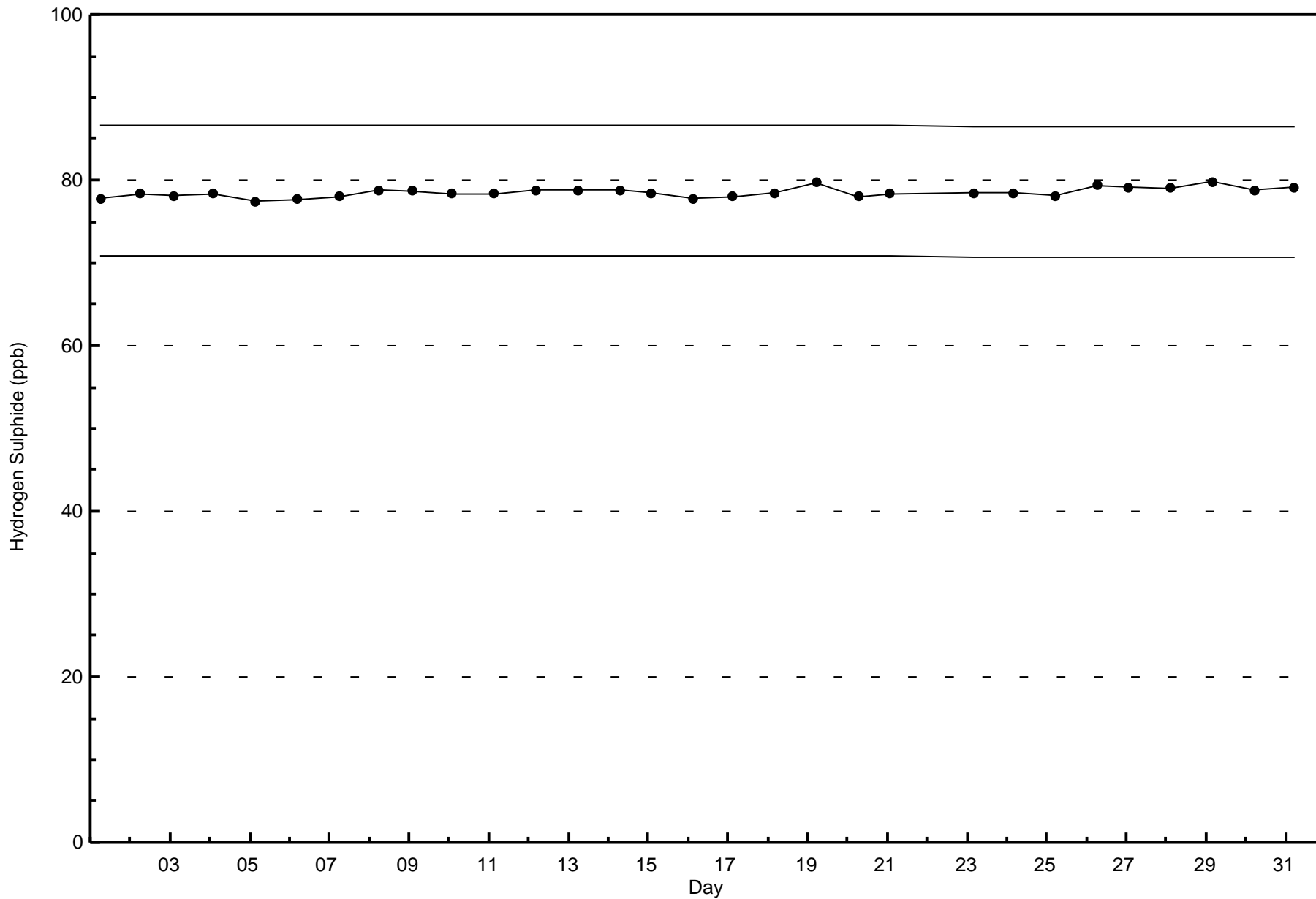


Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Sawbones Bay (AMS 505)







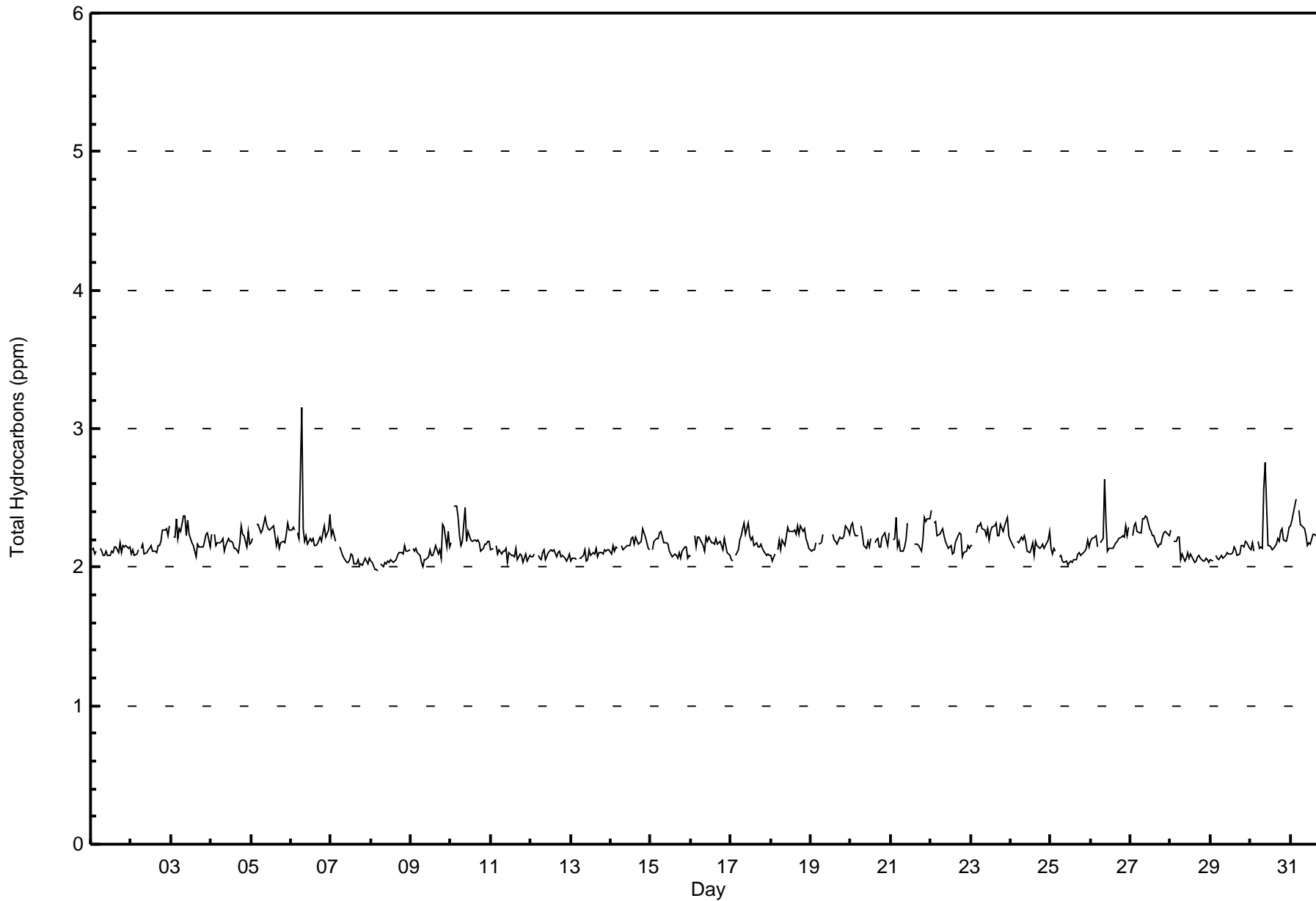






**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Sawbones Bay - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm  
Sawbones Bay - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	49	6.96	6.96
2.1 - 3.0	654	92.90	99.86
3.1 - 10.0	1	0.14	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm  
Sawbones Bay - October 2017**

<b>Concentration Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	3	3	3	0	0	0	0	2	1	0	0	0	0	7	25	3	47
2.1 - 3.0	44	20	24	9	10	21	27	15	33	63	82	30	58	94	61	43	634
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	47	23	27	9	10	21	27	17	34	63	83	30	58	101	86	46	682

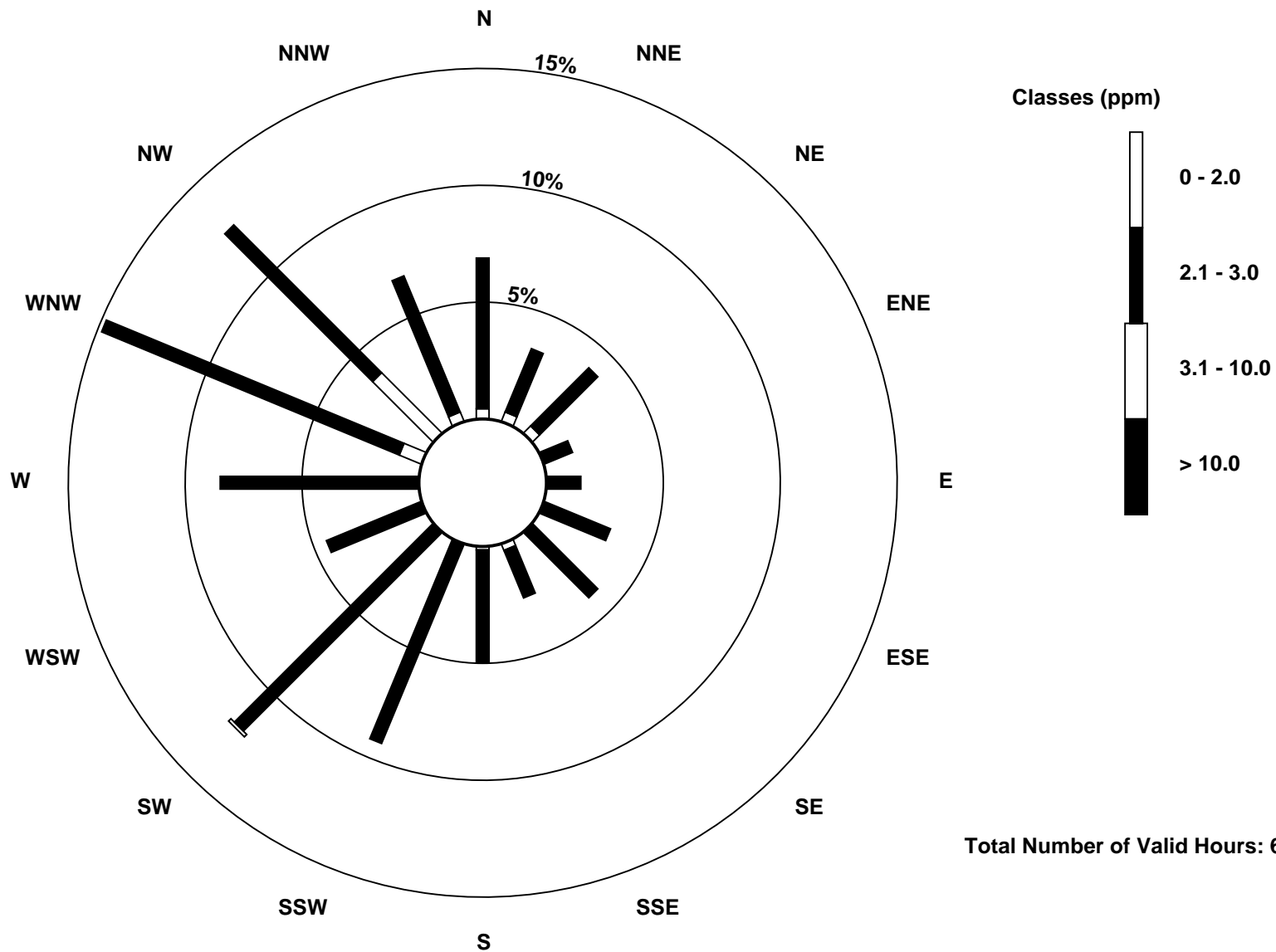
Total Number of Valid Hours: 682

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Total Hydrocarbons (THC) - ppm  
Sawbones Bay (AMS 505)



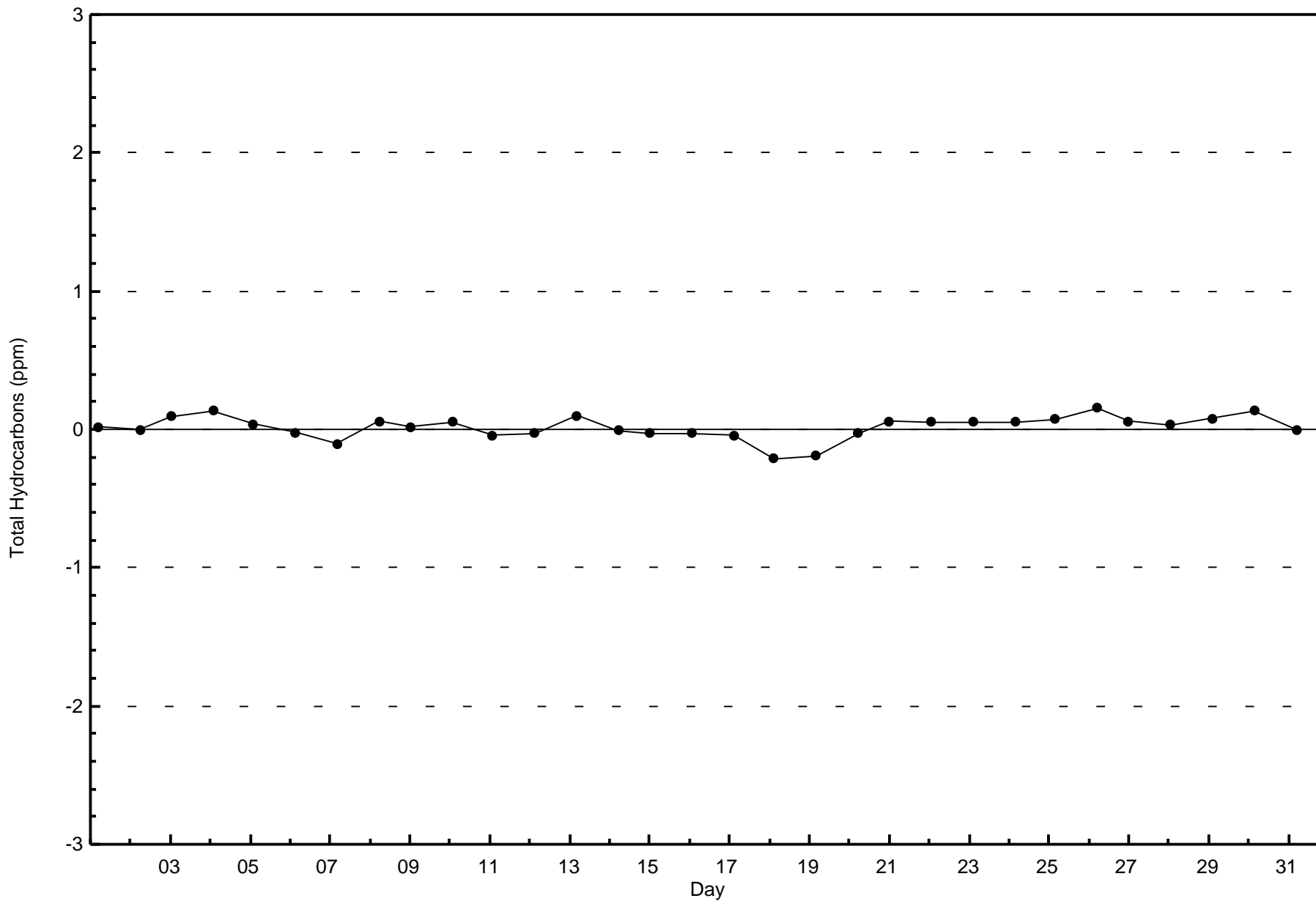


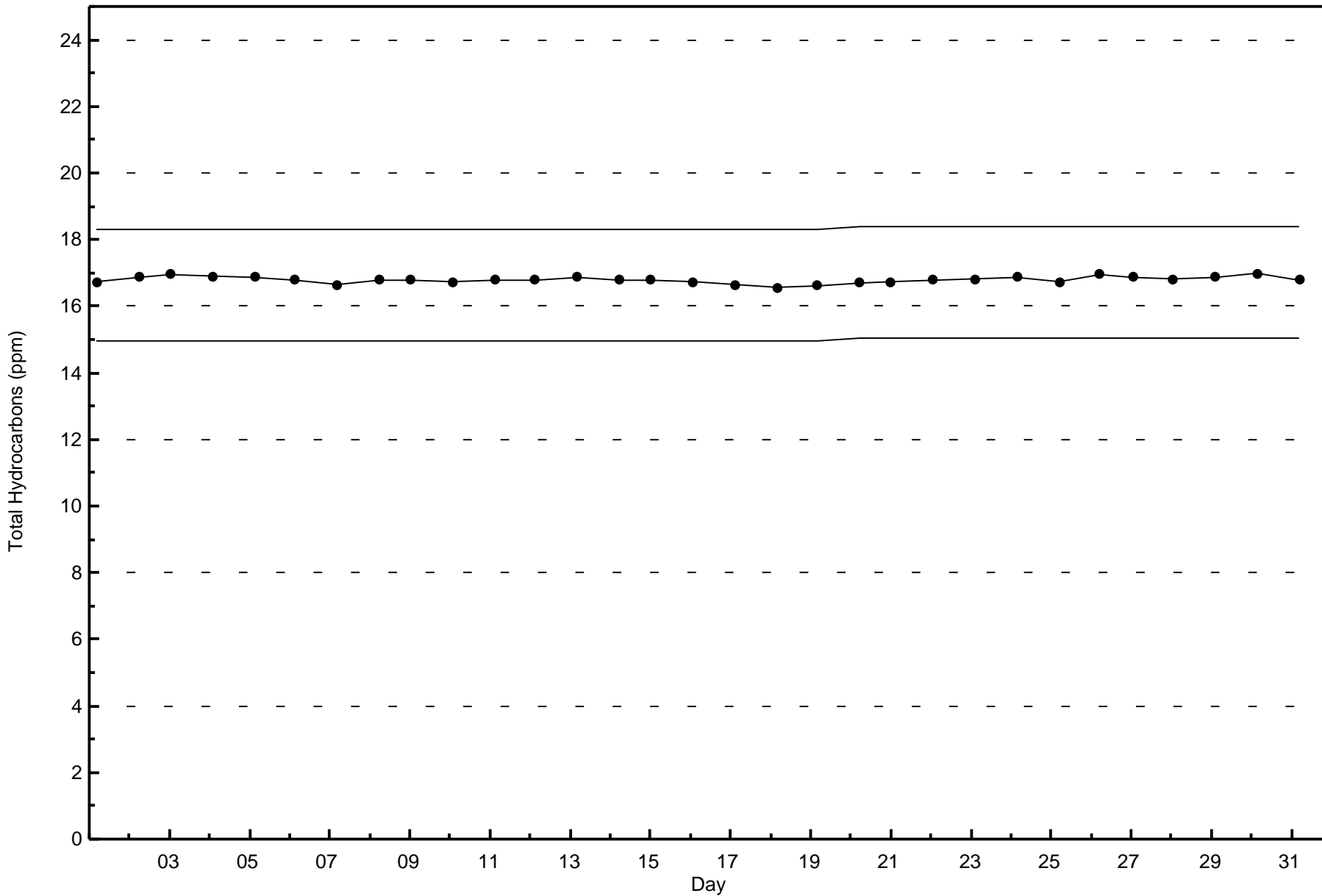
Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Sawbones Bay - October 2017







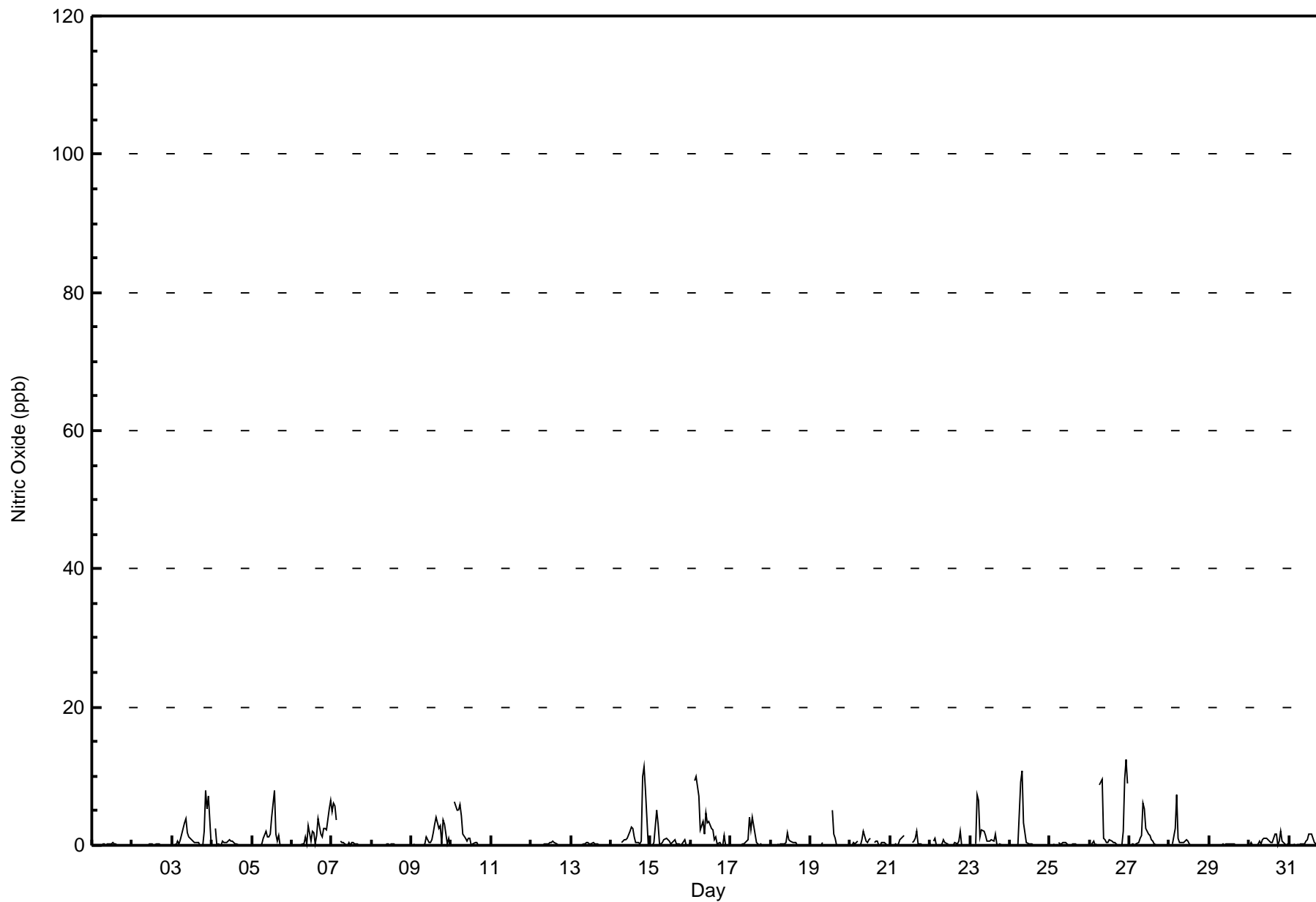
Maximum Value: 12 ppb on Oct 26 23:00		Maximum Daily Average: 2.7 ppb on Oct 16		Hours in Service: 744																							
Minimum Value: 0 ppb on Oct 1 19:00		Minimum Daily Average: 0.0 ppb on Oct 11		Hours of Data: 703																							
Maximum Diurnal Average: 1.3 ppb at hour 5		Minimum Diurnal Average: 0.2 ppb at hour 19		Hours of Missing Data: 41																							
Monthly Average: 0.8 ppb		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 2 P <sub>99</sub> = 10		Hours of Calibration: 40																							
				Percent Operational Time: 99.9																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
3-Oct	Z	0	0	1	0	1	2	3	4	2	1	1	1	0	0	0	0	0	0	2	8	5	7	0	1.7	8	
4-Oct	0	Z	3	0	0	0	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	3	
5-Oct	0	0	Z	0	0	0	0	1	2	1	1	2	4	8	2	1	1	0	0	0	0	0	0	0	1.0	8	
6-Oct	0	0	0	Z	0	0	0	0	1	0	3	1	2	2	0	1	4	2	1	3	2	2	5	6	1.6	6	
7-Oct	5	6	6	4	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	6	
8-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
9-Oct	Z	0	0	0	0	0	0	0	0	1	0	0	1	2	3	4	2	3	0	4	3	0	1	0	1.1	4	
10-Oct	0	Z	6	5	5	6	4	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1.4	6	
11-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
12-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.1	1	
13-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
14-Oct	0	0	0	0	0	Z	0	1	1	1	1	2	3	2	1	1	0	0	1	10	11	8	0	0	1.9	11	
15-Oct	Z	0	0	5	3	0	0	0	1	1	1	1	0	0	1	0	0	0	0	0	1	0	0	0	0.7	5	
16-Oct	1	Z	9	10	8	7	2	4	2	5	3	3	3	2	1	1	0	0	0	0	1	0	0	0	2.7	10	
17-Oct	0	0	Z	0	0	0	0	0	0	0	1	4	2	4	3	0	0	0	0	0	0	0	0	0	0.7	4	
18-Oct	0	0	0	Z	0	0	0	0	0	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	2	
19-Oct	0	0	0	0	Z	0	0	0	0	C	C	C	C	C	5	2	1	0	0	0	0	0	0	0	0.5	5	
20-Oct	0	0	0	0	1	Z	0	1	2	1	0	1	1	M	0	1	1	0	0	0	0	0	0	0	0.4	2	
21-Oct	Z	0	0	0	0	0	1	1	1	C	C	C	C	0	1	1	2	0	0	0	0	0	0	0	0.4	2	
22-Oct	0	Z	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0.3	2	
23-Oct	0	0	Z	0	7	7	1	2	2	1	1	1	1	1	1	2	0	0	0	0	0	0	0	0	1.2	7	
24-Oct	0	0	0	Z	0	0	9	11	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	11	
25-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
26-Oct	0	0	1	0	0	Z	9	10	1	1	0	0	1	1	0	0	0	0	0	0	2	10	12	9	2.5	12	
27-Oct	Z	0	0	0	0	0	1	1	6	5	3	2	1	1	1	0	0	0	0	0	0	0	0	0	1.0	6	
28-Oct	0	Z	0	2	7	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.6	7	
29-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
30-Oct	0	0	0	Z	0	0	1	0	1	1	1	1	1	0	0	2	2	0	1	2	1	0	0	0	0.6	2	
31-Oct	0	0	0	0	Z	0	0	0	0	0	1	1	2	2	1	0	0	0	0	0	0	0	0	0	0.4	2	
		0.2	0.3	1.0	1.1	1.3	0.9	1.1	1.3	1.0	0.9	0.8	0.8	0.9	1.1	0.6	0.6	0.5	0.2	0.2	0.7	1.0	0.8	0.9	0.5	Diurnal Average	
		5	6	9	10	8	7	9	11	6	5	3	4	4	8	3	4	4	3	2	10	11	10	12	9	Diurnal Maximum	
Z - zerospan		C - Calibration			M - Maintenance																						





**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitric Oxide (NO) - ppb**  
**Sawbones Bay - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Sawbones Bay - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	703	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitric Oxide (NO) - ppb  
Sawbones Bay - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	47	23	27	9	10	21	27	17	34	63	83	30	58	100	86	46	681
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	47	23	27	9	10	21	27	17	34	63	83	30	58	100	86	46	681

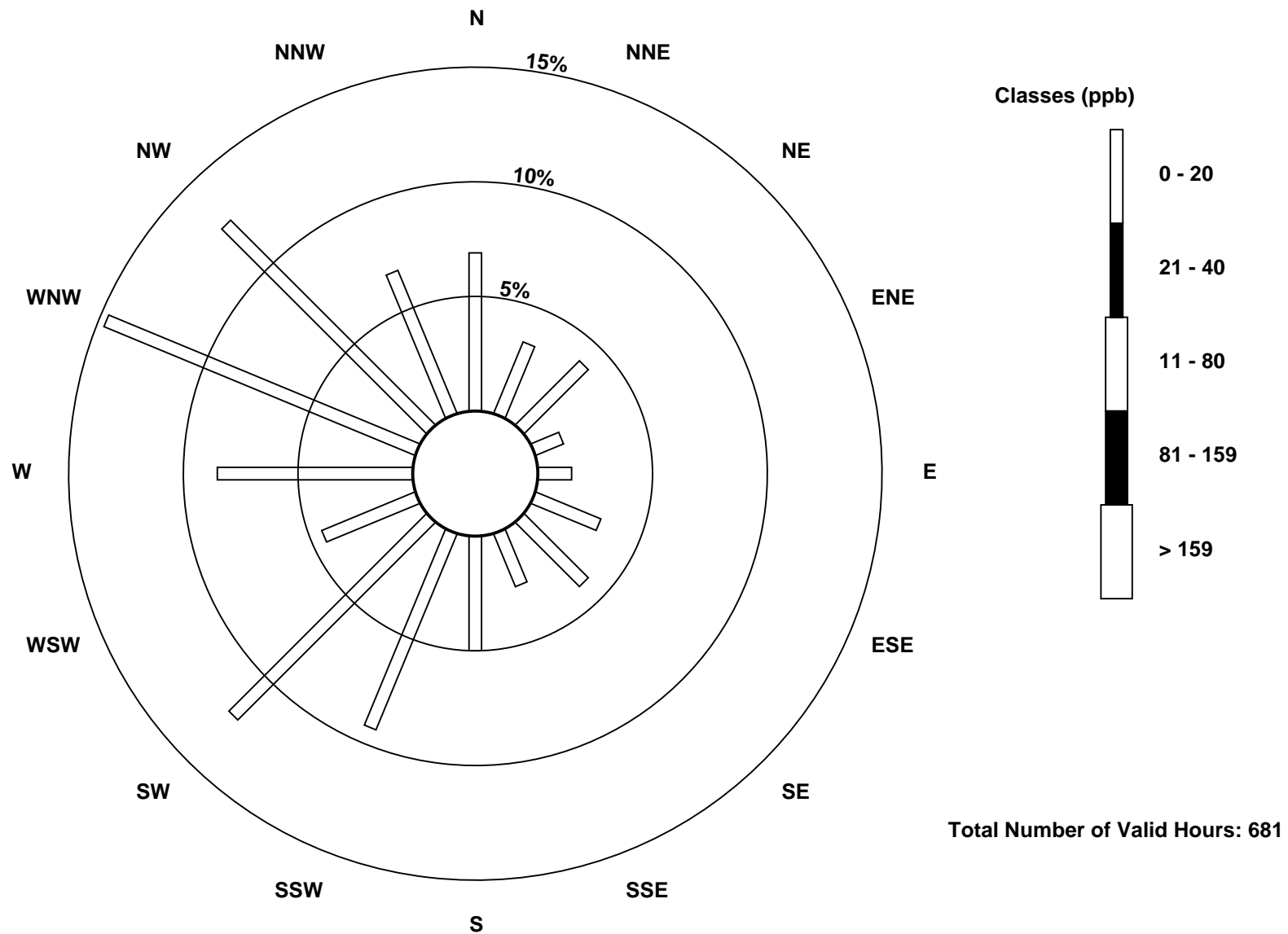
Total Number of Valid Hours: 681

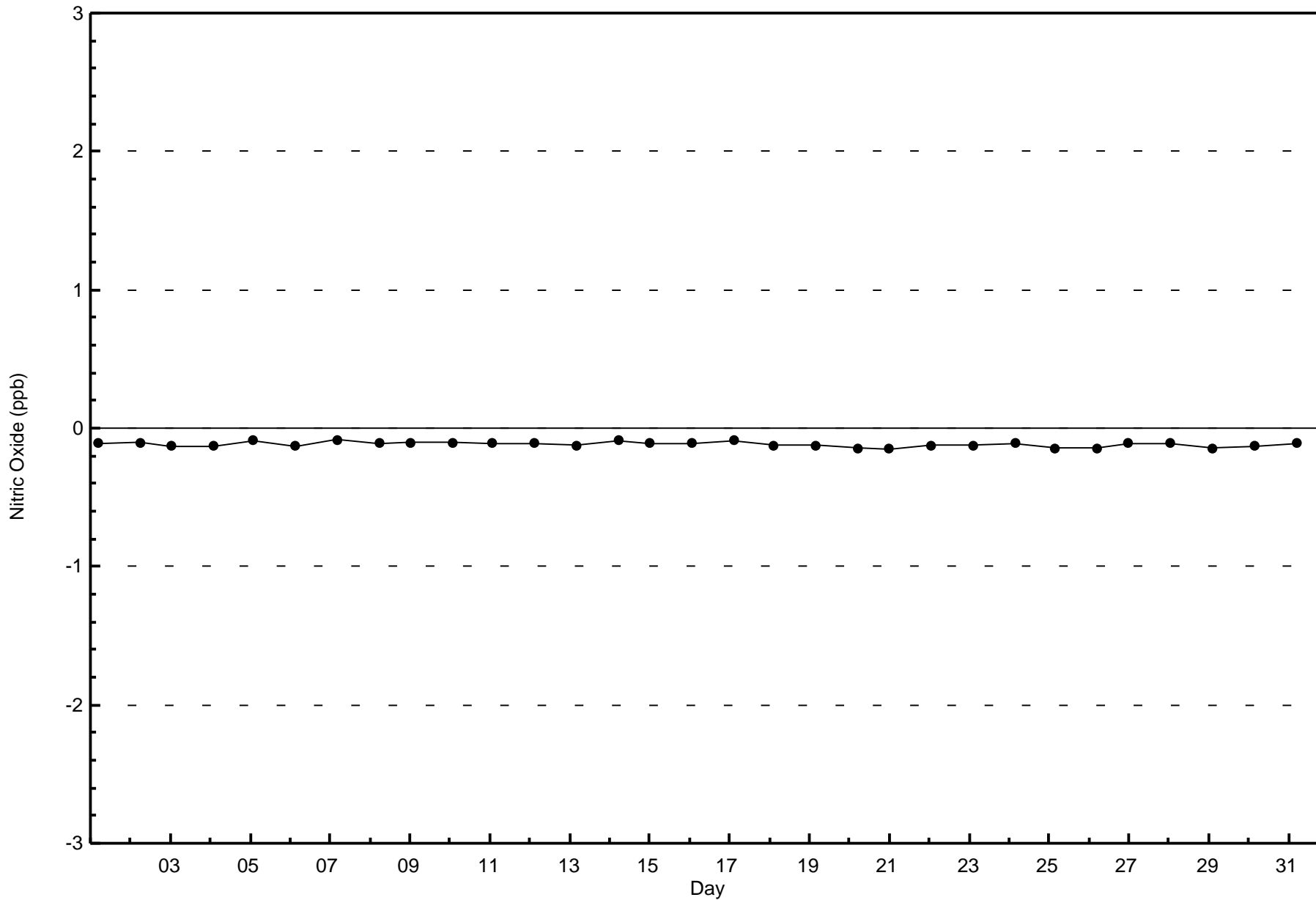
Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Wind Rose Oct 2017**

**Nitric Oxide (NO) - ppb**  
**Sawbones Bay (AMS 505)**

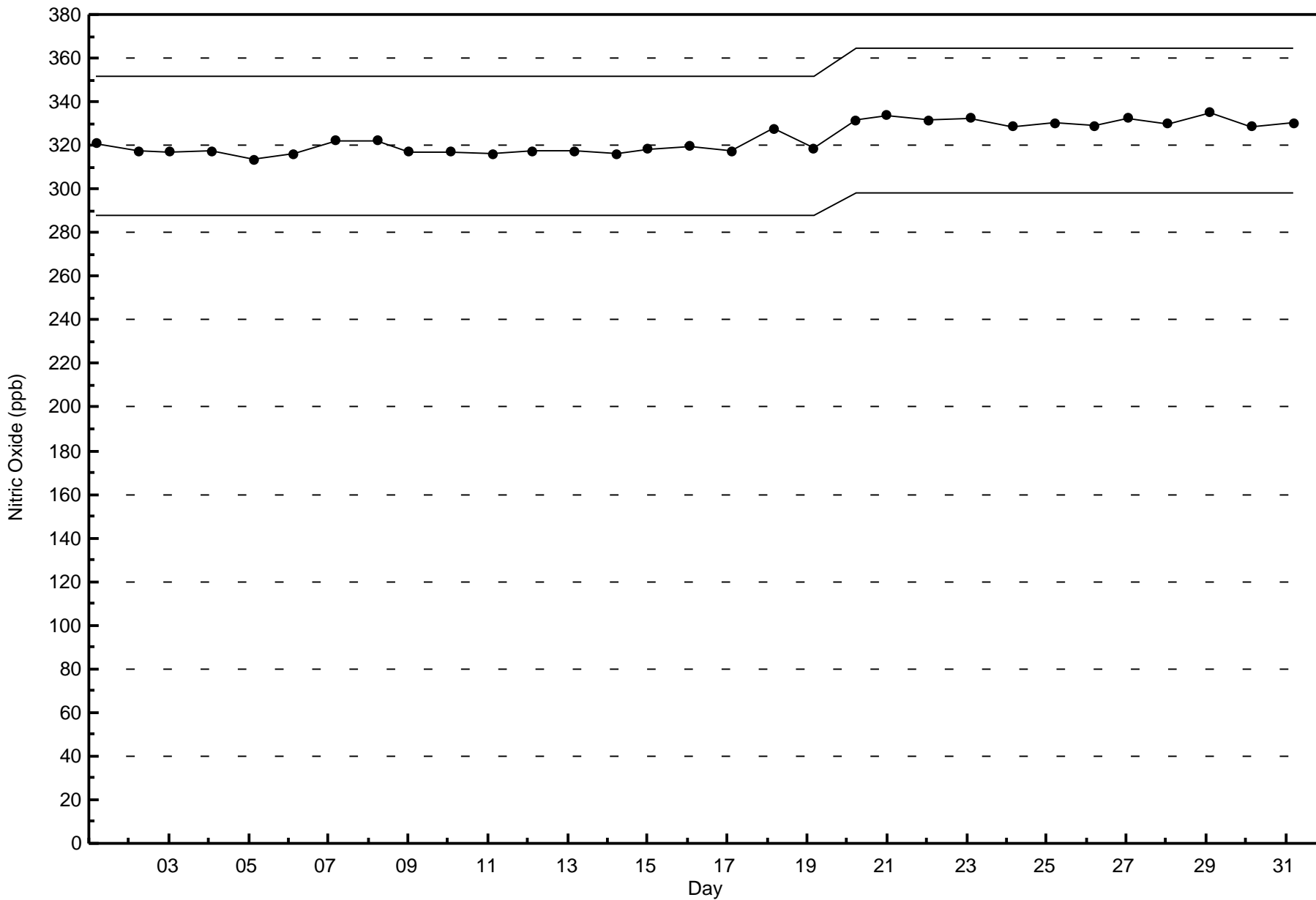






Wood Buffalo Environmental Association  
Span Responses

Nitric Oxide (NO) - ppb  
Sawbones Bay - October 2017





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**

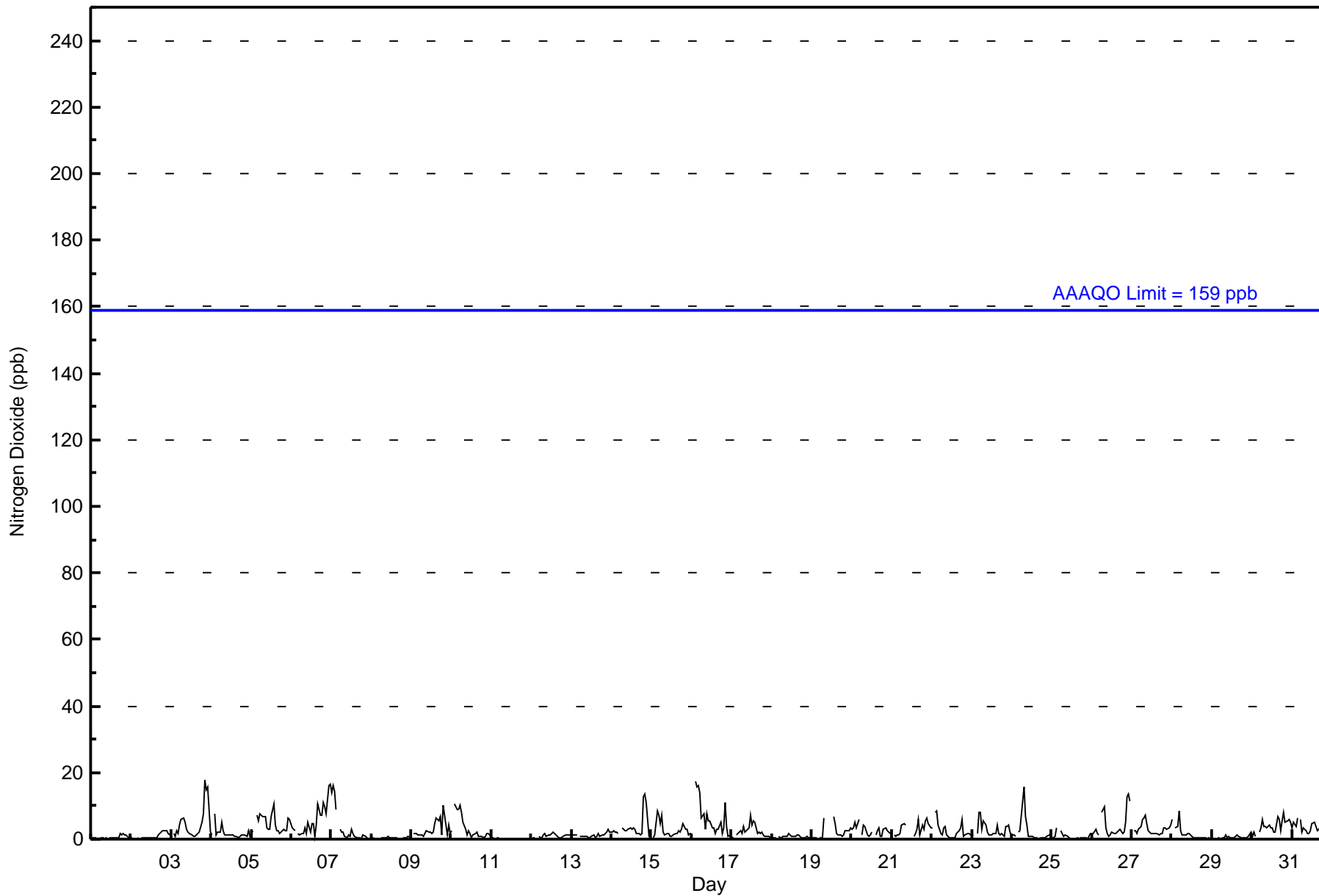
**Sawbones Bay - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 18 ppb on Oct 3 21:00      Maximum Daily Average: 6.1 ppb on Oct 16		Hours in Service: 744 Hours of Data: 703 Hours of Missing Data: 41 Hours of Calibration: 40 Percent Operational Time: 99.9																								
Minimum Value: 0 ppb on Oct 8 05:00 Maximum Diurnal Average: 3.6 ppb at hour 8 Monthly Average: 2.6 ppb		Minimum Daily Average: 0.2 ppb on Oct 11 Minimum Diurnal Average: 1.6 ppb at hour 15 Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 3 P <sub>90</sub> = 6 P <sub>99</sub> = 15																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	1	1	1	0	Z	0	1	0	0	0	0	0	1	0	0	0	2	1	2	1	1	1	1	1	0.6	2
2-Oct	0	0	0	0	1	Z	1	0	0	0	1	0	0	0	0	1	1	2	2	3	3	3	2	1	1.0	3
3-Oct	Z	2	1	3	2	4	6	7	5	3	2	2	1	1	1	1	2	2	5	8	18	15	16	2	4.6	18
4-Oct	1	Z	8	1	2	2	5	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1.8	8
5-Oct	2	3	Z	7	5	8	7	7	7	4	3	3	7	11	4	2	3	2	2	3	2	3	6	6	4.6	11
6-Oct	4	3	3	Z	2	1	2	2	3	2	5	2	5	5	1	4	11	7	7	11	10	8	16	17	5.5	17
7-Oct	14	16	15	9	Z	3	2	2	1	1	1	1	3	2	1	1	1	1	0	1	1	0	0	0	3.2	16
8-Oct	0	0	0	0	0	Z	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	1	1	0.4	1
9-Oct	Z	2	2	2	1	1	1	1	2	3	2	2	2	2	5	6	5	7	1	10	7	1	4	2	3.1	10
10-Oct	3	Z	11	9	9	10	8	5	3	1	2	2	0	1	2	2	1	1	1	1	1	2	2	1	3.3	11
11-Oct	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
12-Oct	0	0	0	Z	1	1	1	1	2	1	1	1	2	2	2	1	0	0	0	1	1	1	1	1	0.9	2
13-Oct	1	1	1	1	Z	1	1	1	1	1	1	0	1	1	1	1	2	1	1	1	2	2	3	2	1.2	3
14-Oct	2	2	2	2	2	Z	3	3	3	2	3	4	3	3	3	2	2	1	2	13	14	11	1	1	3.6	14
15-Oct	Z	1	1	9	7	5	7	2	1	2	2	1	1	1	2	2	2	2	3	5	3	3	1	2	2.7	9
16-Oct	2	Z	17	16	16	14	6	8	3	8	5	6	3	4	2	3	3	5	2	3	11	4	1	1	6.1	17
17-Oct	1	1	Z	1	2	2	2	4	2	3	3	7	4	6	5	2	2	2	2	1	1	1	1	1	2.4	7
18-Oct	1	0	0	Z	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	0	0	0.7	2
19-Oct	1	1	1	1	Z	1	1	7	C	C	C	C	C	7	5	2	1	1	1	1	2	3	3	3	2.1	7
20-Oct	3	3	5	3	6	Z	1	4	4	1	1	1	2	M	1	3	3	1	1	3	3	3	2	2	2.6	6
21-Oct	Z	1	1	1	1	2	4	5	4	C	C	C	C	1	2	3	6	1	4	3	6	6	5	3	3.2	6
22-Oct	3	Z	8	8	4	2	1	3	4	1	1	1	1	1	1	2	3	3	6	1	1	2	2	1	2.5	8
23-Oct	1	1	Z	2	8	8	3	5	4	2	1	1	1	2	2	4	2	1	2	1	4	4	4	2	2.9	8
24-Oct	1	1	1	Z	2	3	11	16	7	4	1	1	1	1	0	0	0	0	1	0	1	1	1	1	2.4	16
25-Oct	1	1	1	4	Z	2	2	1	1	1	0	0	0	0	0	1	0	0	1	1	0	0	1	2	0.8	4
26-Oct	2	2	3	2	1	Z	8	10	3	2	1	1	2	2	2	2	3	3	2	2	5	13	14	11	4.1	14
27-Oct	Z	3	3	2	3	4	6	6	7	5	3	2	2	2	2	2	1	2	2	3	4	3	4	4	3.1	7
28-Oct	6	Z	3	4	9	3	1	1	1	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	1.6	9
29-Oct	0	0	Z	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	2	0.6	2
30-Oct	1	2	1	Z	2	4	6	4	4	4	4	4	4	2	2	7	6	3	6	8	5	6	6	5	4.1	8
31-Oct	3	5	4	6	Z	6	2	4	2	2	2	3	5	5	4	3	3	4	2	1	1	1	1	0	2.9	6
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan      C - Calibration      M - Maintenance Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Sawbones Bay - October 2017**







**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Sawbones Bay - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	703	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Sawbones Bay - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	47	23	27	9	10	21	27	17	34	63	83	30	58	100	86	46	681
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	47	23	27	9	10	21	27	17	34	63	83	30	58	100	86	46	681

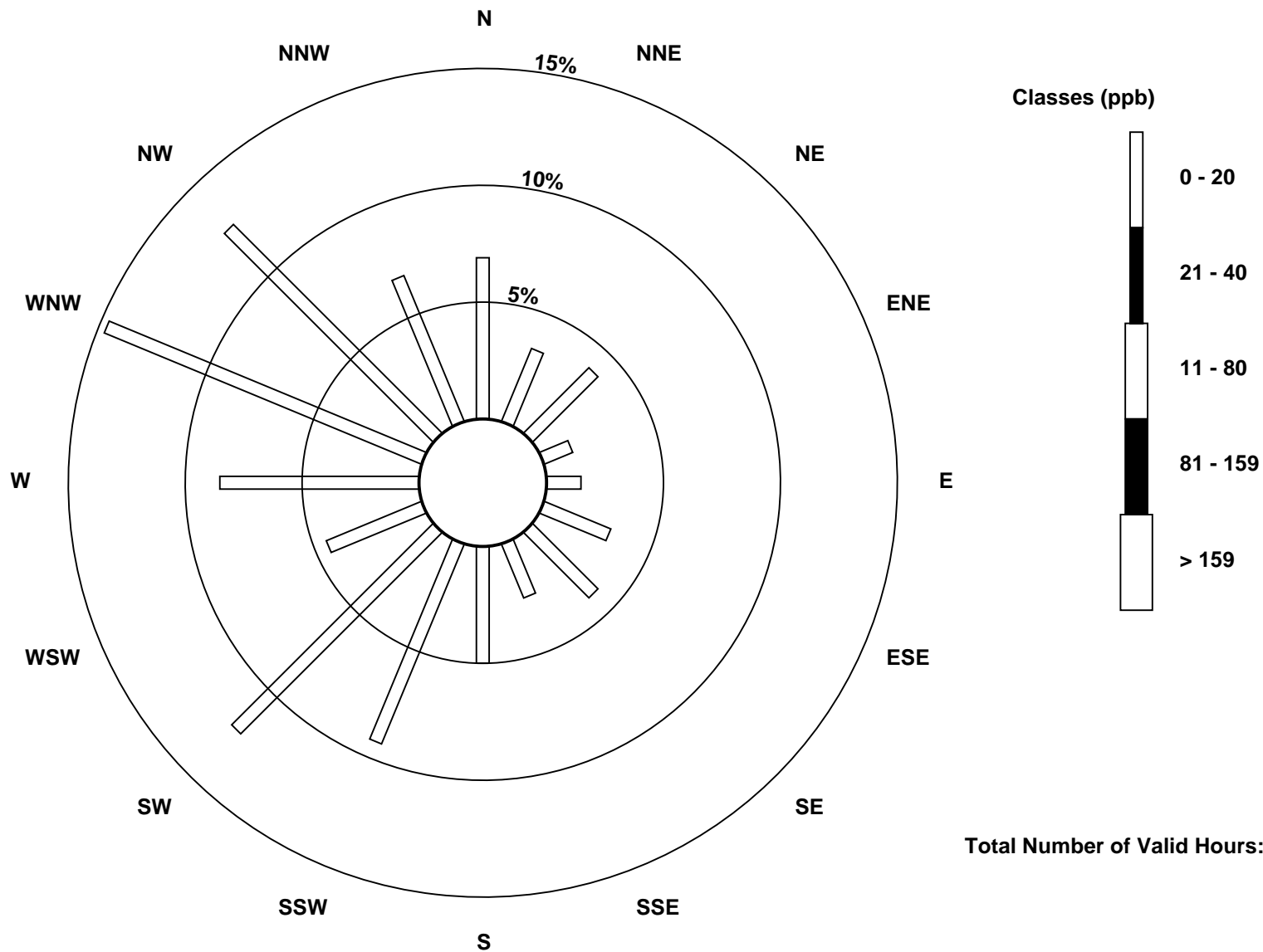
Total Number of Valid Hours: 681

Total Number of Hours: 744

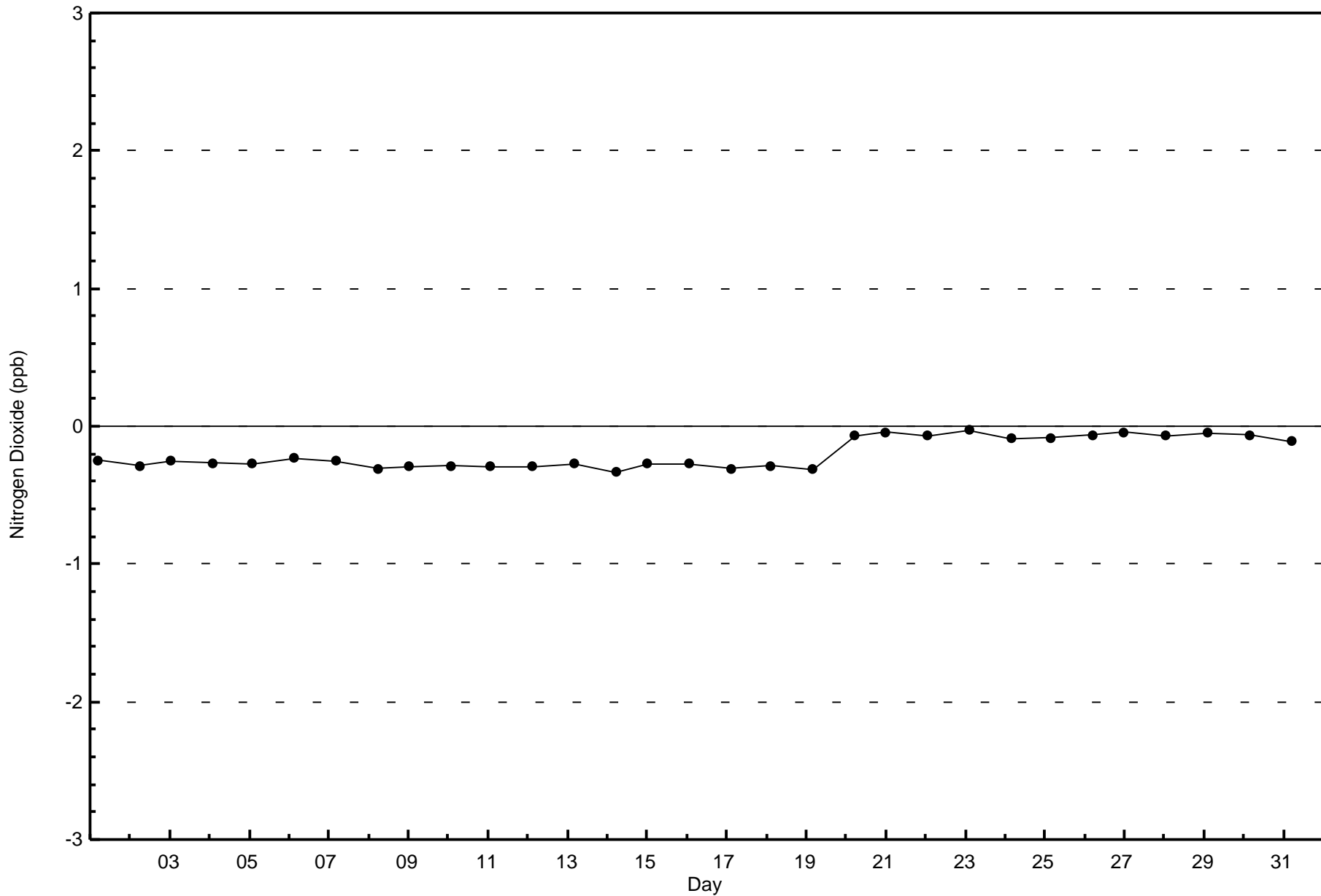


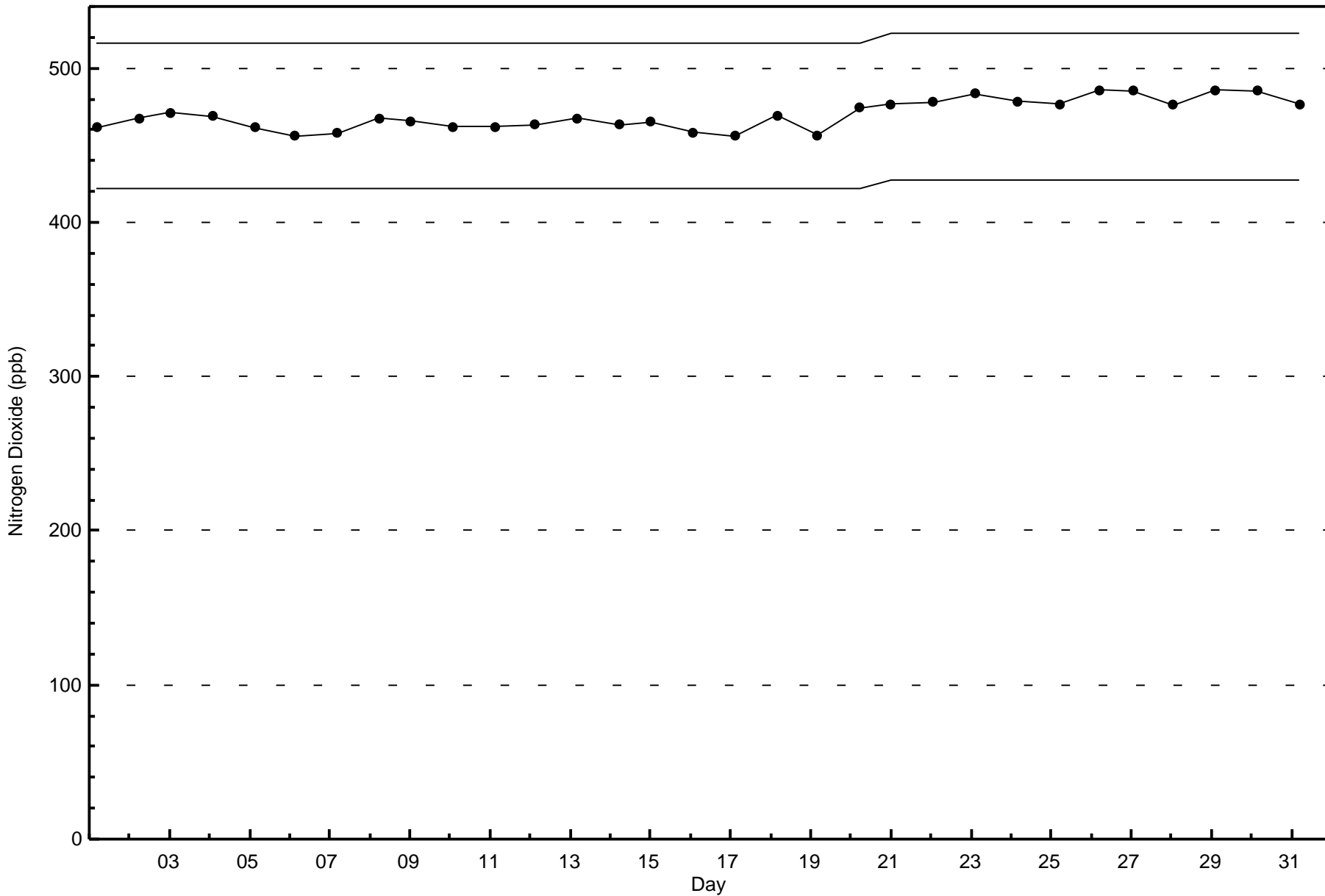
Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Sawbones Bay (AMS 505)



Total Number of Valid Hours: 681







**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

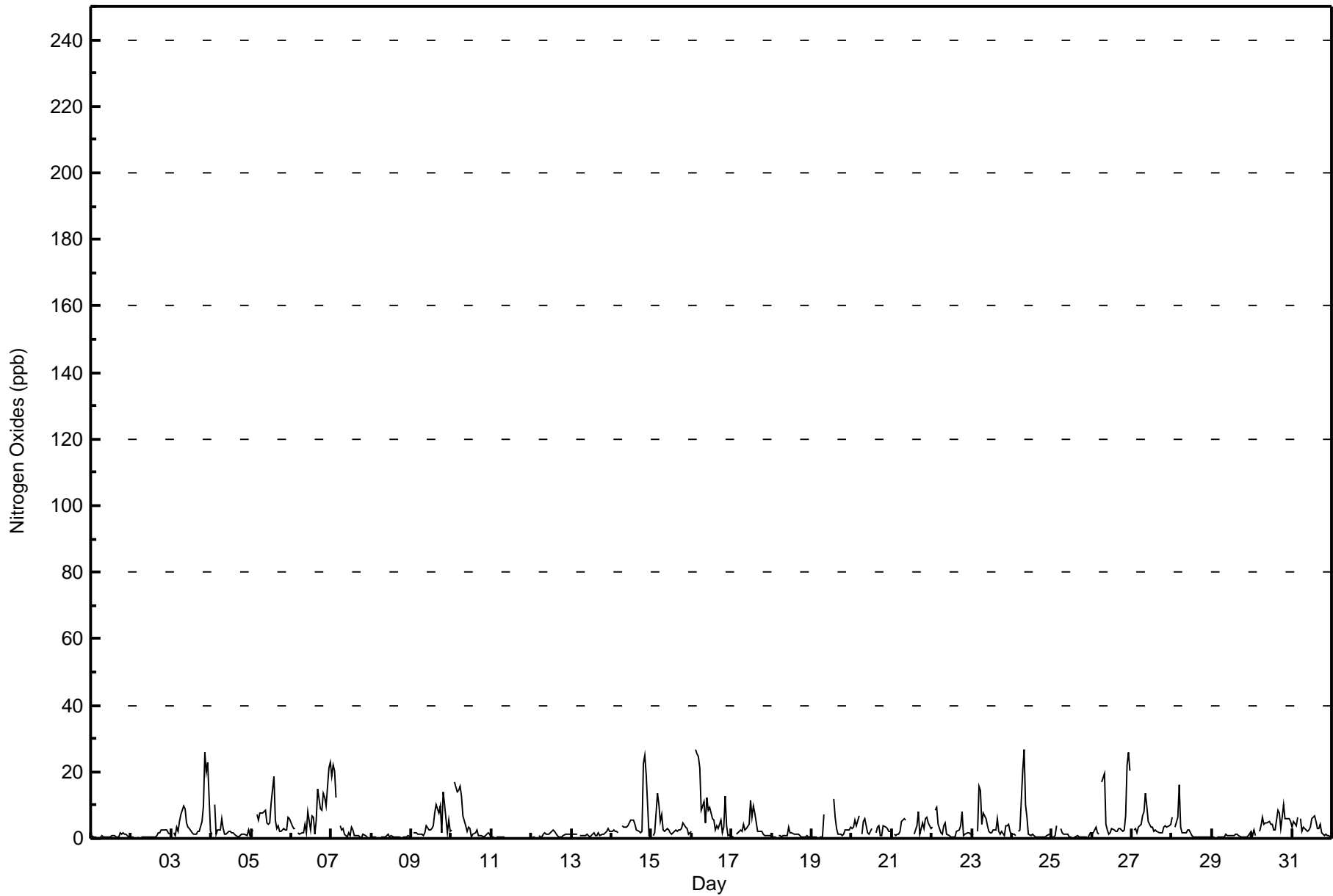
**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Sawbones Bay - October 2017**

Maximum Value: 27 ppb on Oct 16 03:00		Maximum Daily Average: 8.9 ppb on Oct 16		Hours in Service: 744																						
Minimum Value: 0 ppb on Oct 11 20:00		Minimum Daily Average: 0.2 ppb on Oct 11		Hours of Data: 703																						
Maximum Diurnal Average: 4.9 ppb at hour 8		Minimum Diurnal Average: 2.1 ppb at hour 19		Hours of Missing Data: 41																						
Monthly Average: 3.3 ppb		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 O <sub>1</sub> = 1 Median = 2 O <sub>3</sub> = 4 P <sub>90</sub> = 8 P <sub>99</sub> = 24		Hours of Calibration: 40																						
				Percent Operational Time: 99.9																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	1	1	0	0	Z	0	1	1	0	0	0	1	1	1	1	0	0	1	1	2	1	1	1	1	0.7	2
2-Oct	0	0	0	0	1	Z	0	0	1	1	1	1	1	0	1	1	2	2	2	3	3	3	2	1	1.0	3
3-Oct	Z	2	1	3	2	5	7	10	9	5	3	3	2	1	1	1	2	2	5	10	26	20	23	2	6.3	26
4-Oct	1	Z	10	1	2	2	6	3	1	1	2	2	2	1	1	1	1	1	1	1	1	1	2	1	2.1	10
5-Oct	2	3	Z	7	5	8	8	8	9	5	4	5	11	19	6	3	4	2	2	3	2	3	6	6	5.6	19
6-Oct	4	3	3	Z	2	1	2	2	4	2	8	3	7	6	1	6	15	9	8	13	12	10	21	23	7.2	23
7-Oct	19	22	20	12	Z	4	3	3	1	0	2	1	3	2	1	1	1	1	0	1	1	0	0	0	4.3	22
8-Oct	0	0	0	0	0	Z	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	1	0	0.4	1
9-Oct	Z	2	2	2	1	1	1	1	2	4	3	3	3	4	8	10	8	10	2	14	10	2	5	2	4.2	14
10-Oct	3	Z	17	14	14	16	13	7	4	2	3	3	0	1	2	3	1	1	1	1	1	1	2	1	4.8	17
11-Oct	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
12-Oct	0	0	0	Z	1	1	1	1	2	1	1	2	2	3	2	1	0	0	0	1	1	1	1	1	1.0	3
13-Oct	1	1	1	1	Z	1	1	1	1	1	1	1	1	2	1	1	2	1	1	1	2	2	3	2	1.3	3
14-Oct	2	2	2	2	2	Z	4	4	4	3	4	6	6	6	4	2	2	2	2	22	25	19	1	1	5.5	25
15-Oct	Z	1	2	14	10	5	7	3	2	3	3	2	1	2	2	2	3	3	3	5	3	3	1	2	3.4	14
16-Oct	2	Z	27	25	25	21	9	11	5	12	9	9	6	6	2	4	3	5	2	3	13	4	1	1	8.9	27
17-Oct	1	1	Z	1	2	2	2	4	2	3	4	11	7	10	8	2	2	2	2	1	1	1	1	1	3.1	11
18-Oct	1	0	0	Z	1	1	1	1	1	1	4	2	2	1	1	1	1	1	1	0	1	1	0	0	1.0	4
19-Oct	1	1	1	1	Z	1	1	7	C	C	C	C	C	12	6	3	1	1	1	1	2	3	2	3	2.6	12
20-Oct	3	3	6	4	7	Z	1	5	6	2	1	2	3	M	2	3	4	1	1	4	4	3	2	2	3.1	7
21-Oct	Z	1	1	1	1	2	5	6	6	C	C	C	C	1	3	4	8	1	4	3	6	6	5	3	3.6	8
22-Oct	4	Z	9	9	4	2	1	4	4	1	1	1	1	1	1	2	3	4	8	1	1	1	2	1	2.8	9
23-Oct	1	1	Z	2	16	15	4	8	6	4	2	2	2	3	2	6	2	1	2	1	4	4	4	2	4.1	16
24-Oct	1	1	1	Z	2	3	20	27	10	6	1	1	1	1	0	0	0	0	1	0	1	1	1	1	3.5	27
25-Oct	1	0	1	4	Z	3	2	1	1	1	1	0	0	0	0	1	0	0	1	1	0	0	1	2	0.9	4
26-Oct	2	2	4	2	1	Z	17	19	4	2	1	2	3	3	2	2	3	3	2	2	7	22	26	20	6.6	26
27-Oct	Z	3	3	2	3	4	7	8	14	10	5	4	3	2	2	2	1	2	2	3	4	3	4	4	4.1	14
28-Oct	6	Z	4	6	16	4	2	2	2	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	2.2	16
29-Oct	0	0	Z	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	2	0.7	2
30-Oct	1	2	1	Z	2	4	7	4	4	5	5	4	4	2	3	8	7	3	6	10	6	6	6	5	4.6	10
31-Oct	3	5	4	6	Z	6	2	4	3	2	2	4	6	7	5	3	3	4	2	1	1	1	1	0	3.3	7
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan      C - Calibration      M - Maintenance																										



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Sawbones Bay - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Sawbones Bay - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	689	98.01	98.01
21 - 40	14	1.99	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744





**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Sawbones Bay - October 2017**

<b>Concentration Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	47	23	27	9	10	21	27	17	34	63	83	28	46	100	86	46	667
21 - 40	0	0	0	0	0	0	0	0	0	0	0	2	12	0	0	0	14
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	47	23	27	9	10	21	27	17	34	63	83	30	58	100	86	46	681

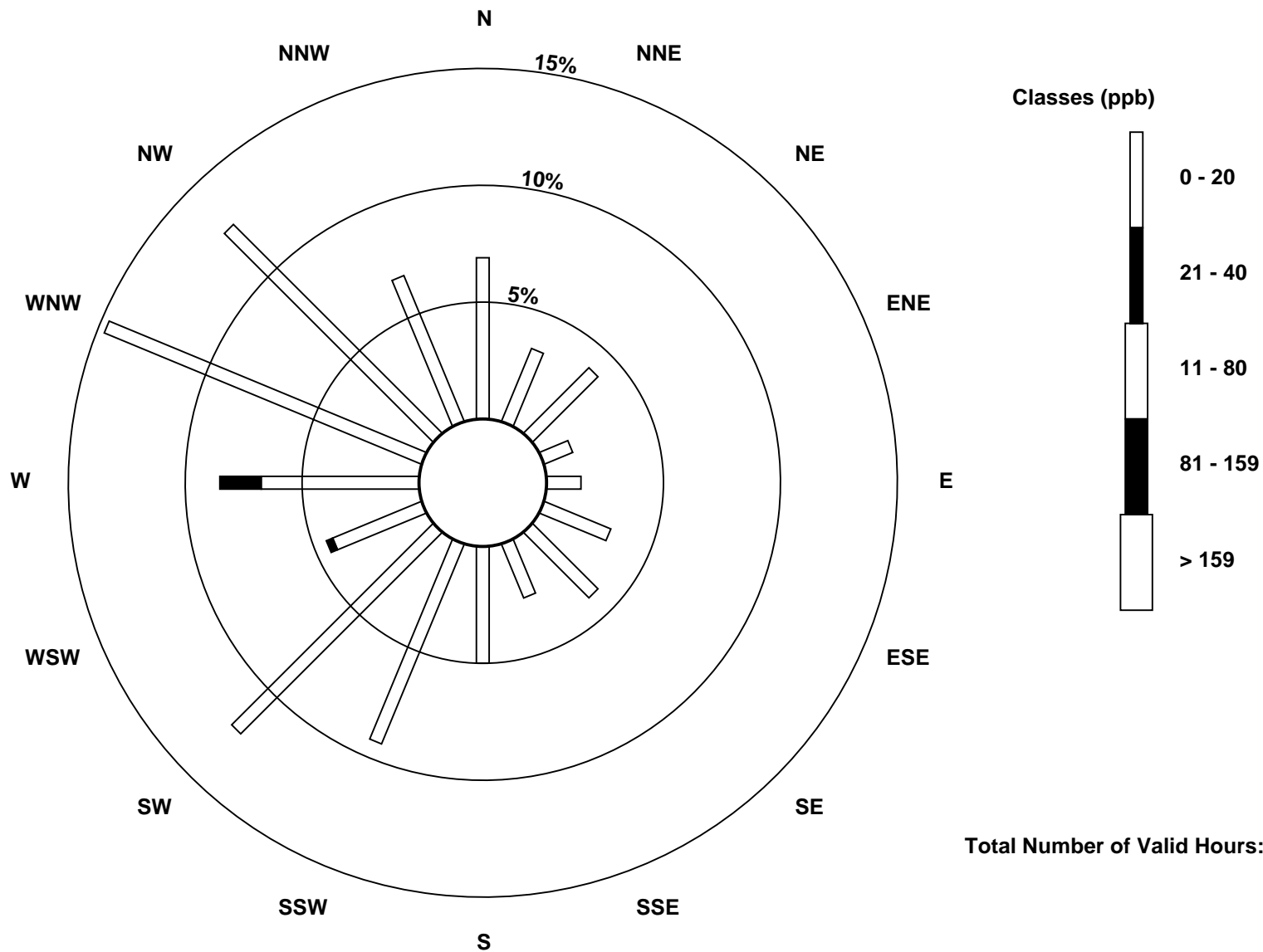
Total Number of Valid Hours: 681

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

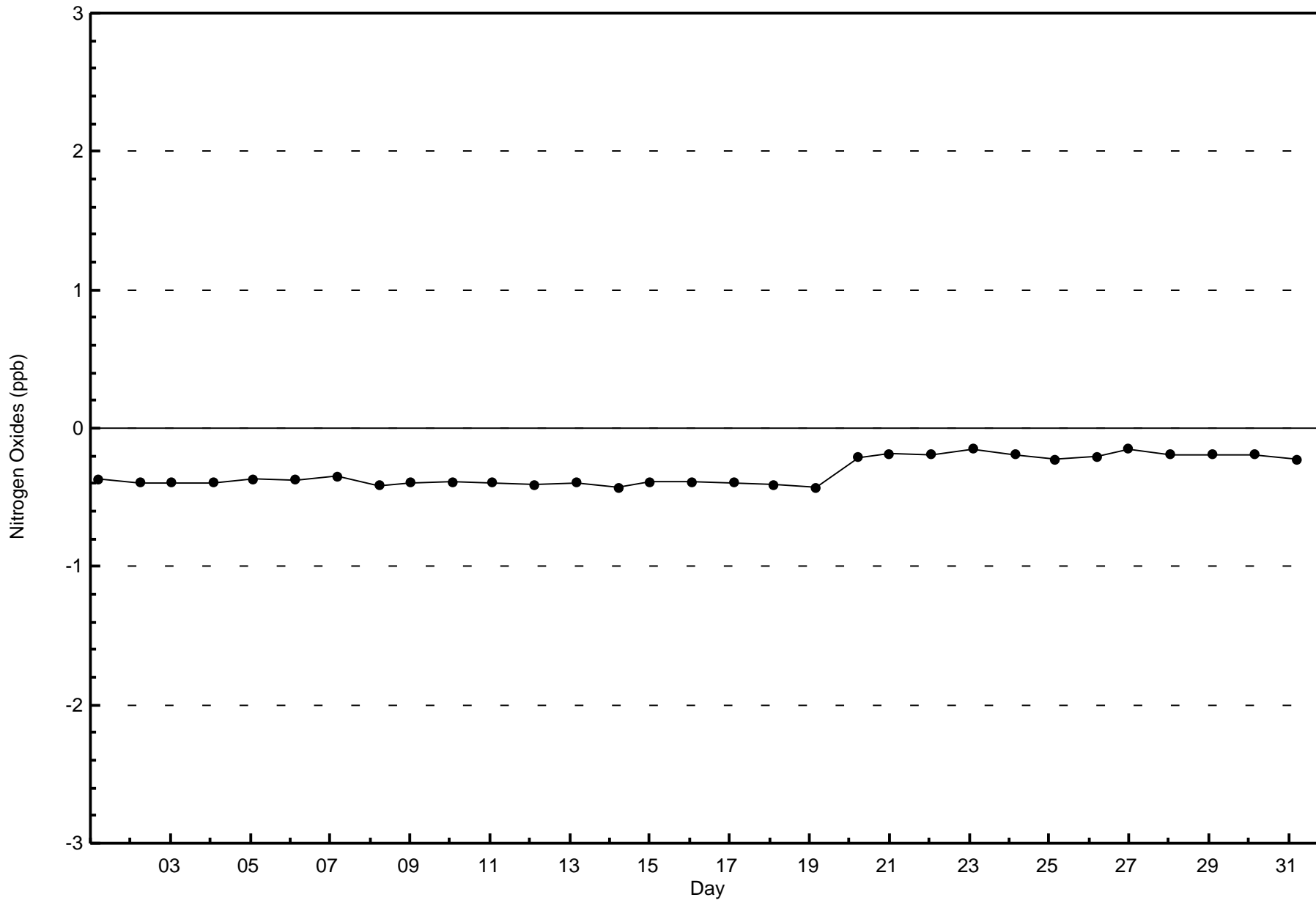
Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Sawbones Bay (AMS 505)

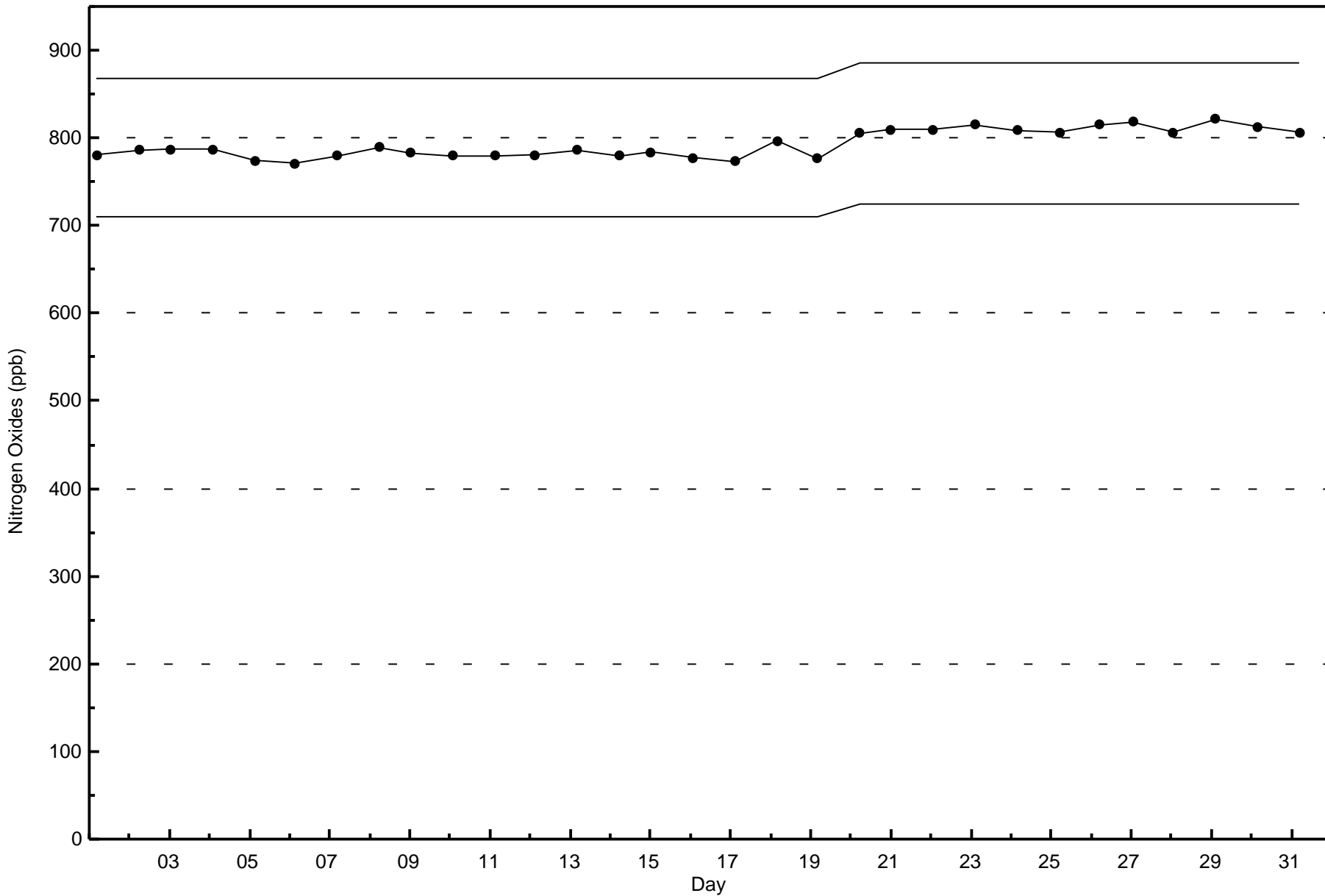




Wood Buffalo Environmental Association  
Zero Responses

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Sawbones Bay - October 2017







**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - µg/m<sup>3</sup>**

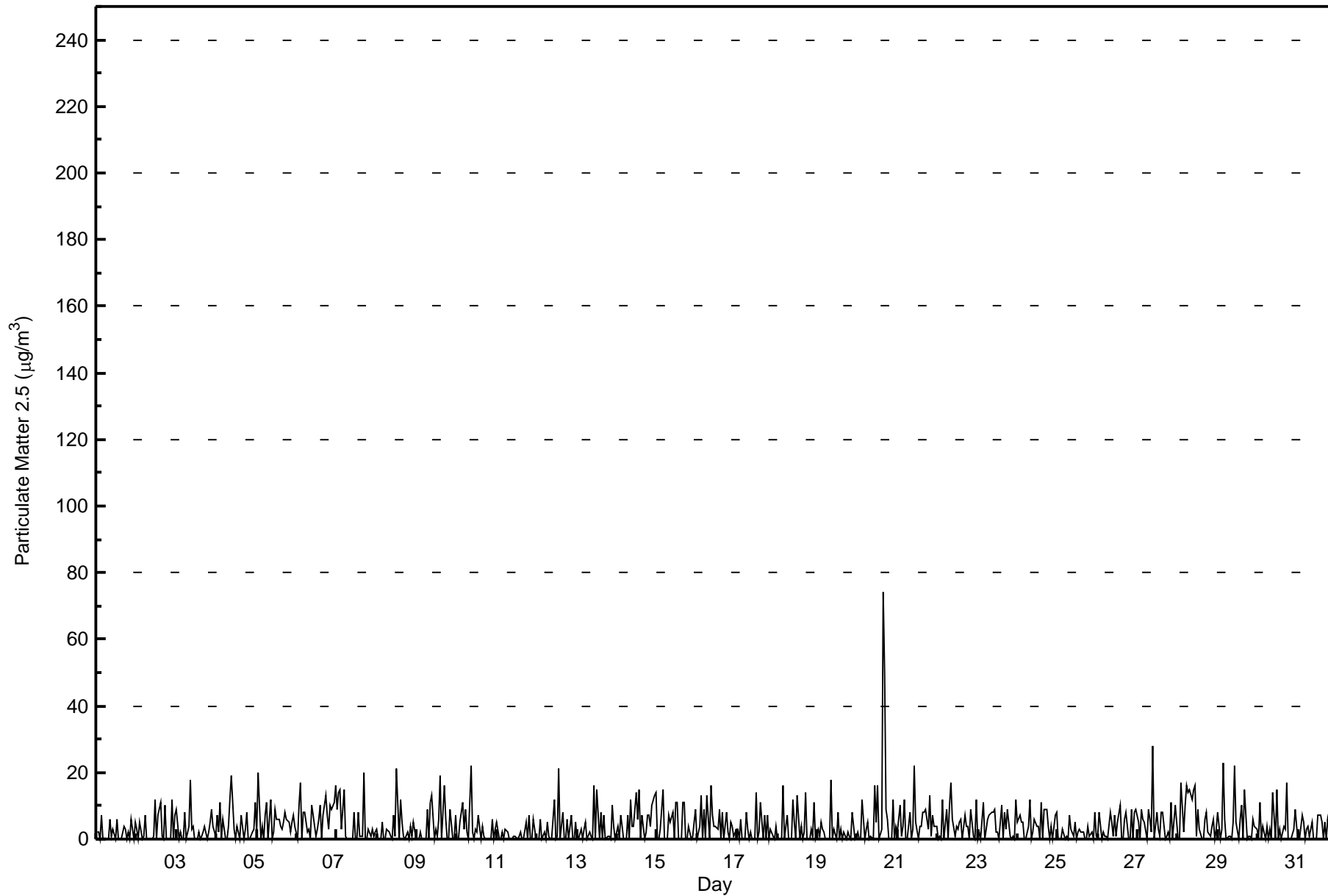
**Sawbones Bay - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 74 µg/m <sup>3</sup> on Oct 20 16:00 Maximum Daily Average: 9.1 µg/m <sup>3</sup> on Oct 20																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 0 µg/m <sup>3</sup> on Oct 1 03:00 Maximum Diurnal Average: 6.5 µg/m <sup>3</sup> at hour 17 Monthly Average: 4.2 µg/m <sup>3</sup>																		Minimum Daily Average: 1.5 µg/m <sup>3</sup> on Oct 11 Minimum Diurnal Average: 1.7 µg/m <sup>3</sup> at hour 20 Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 2 Q <sub>3</sub> = 7 P <sub>90</sub> = 11 P <sub>99</sub> = 22								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	2	2	0	7	0	0	0	0	6	1	3	0	6	0	0	0	4	3	0	2	0	6	0	5	2.0	7
2-Oct	3	0	5	0	1	7	0	0	0	0	1	12	0	7	11	1	0	10	0	0	0	12	0	7	3.2	12
3-Oct	9	0	2	0	0	8	0	4	18	3	4	0	0	2	0	1	2	4	0	2	5	9	4	1	3.3	18
4-Oct	7	2	11	0	6	0	0	4	12	19	3	0	4	2	0	7	0	3	8	0	0	2	3	11	4.3	19
5-Oct	2	20	0	4	0	7	11	0	12	0	2	9	6	6	4	3	5	8	6	5	2	5	7	4	5.3	20
6-Oct	0	10	17	0	8	8	2	3	0	10	7	1	3	6	10	0	7	13	7	3	10	9	11	16	6.7	17
7-Oct	9	14	15	3	15	1	0	0	0	0	8	0	0	8	1	1	20	0	0	3	1	3	1	2	4.4	20
8-Oct	3	0	0	5	0	0	3	2	1	0	7	1	21	0	12	5	1	0	2	0	4	1	5	0	3.0	21
9-Oct	0	0	2	0	0	0	9	0	11	13	0	3	1	6	19	0	16	6	0	0	9	0	0	7	4.3	19
10-Oct	0	0	5	11	3	9	2	0	22	2	0	3	2	7	0	4	1	0	0	0	0	6	0	3	3.3	22
11-Oct	5	0	0	2	0	3	2	0	0	0	1	1	0	1	2	0	0	5	0	7	0	0	6	0	1.5	7
12-Oct	0	0	6	0	2	0	5	1	0	0	12	0	1	21	0	8	0	0	6	0	7	0	0	5	3.1	21
13-Oct	0	0	3	0	3	5	0	2	1	0	16	0	15	0	8	0	7	0	1	1	0	10	4	0	3.2	16
14-Oct	4	0	7	4	0	0	7	0	12	4	4	14	6	15	0	7	0	2	7	7	4	10	13	14	5.9	15
15-Oct	0	0	3	15	0	0	0	7	5	8	0	11	11	0	0	11	11	0	0	4	0	1	5	9	4.2	15
16-Oct	0	4	13	0	9	0	13	0	16	7	4	4	3	9	0	8	0	8	2	0	5	4	1	3	4.7	16
17-Oct	3	0	6	0	0	8	3	0	2	0	0	14	0	2	11	0	7	0	7	0	3	1	0	4	3.0	14
18-Oct	0	0	0	16	0	4	7	0	0	12	5	0	13	0	4	0	2	14	0	0	3	1	11	0	3.8	16
19-Oct	3	1	5	3	2	0	0	0	18	0	3	0	8	0	3	0	2	0	2	1	0	8	0	1	2.5	18
20-Oct	2	0	0	12	0	3	5	0	1	0	16	5	16	0	3	74	50	9	6	0	0	12	0	4	9.1	74
21-Oct	2	10	1	4	12	0	0	8	0	3	22	5	0	4	4	8	8	9	3	13	1	7	4	4	5.5	22
22-Oct	0	1	0	12	0	9	0	10	17	6	1	4	3	5	6	0	7	4	4	0	9	1	0	12	4.6	17
23-Oct	0	2	0	11	0	3	6	7	8	8	9	2	2	0	10	0	8	3	9	1	0	1	0	12	4.3	12
24-Oct	5	7	5	5	0	0	4	12	0	2	6	4	4	0	11	0	9	9	4	0	4	0	7	8	4.4	12
25-Oct	0	0	0	3	0	1	0	7	3	1	5	0	2	3	2	2	0	0	4	1	2	0	8	1	1.9	8
26-Oct	1	8	0	2	1	1	0	8	5	1	7	1	5	10	0	0	6	8	0	0	9	0	8	9	3.8	10
27-Oct	5	0	9	6	5	0	9	6	2	28	0	8	3	1	8	8	0	1	2	0	11	0	10	5	5.3	28
28-Oct	0	0	17	2	10	16	14	15	12	15	16	1	9	3	0	0	6	8	2	1	4	6	0	3	6.7	17
29-Oct	8	0	3	23	6	0	1	1	0	5	22	5	0	6	10	0	15	0	1	1	0	6	4	3	5.0	23
30-Oct	0	11	0	4	0	4	0	3	0	14	0	15	0	3	0	4	3	17	0	0	0	3	9	4	3.9	17
31-Oct	0	0	7	5	0	3	4	1	5	0	0	0	7	7	5	0	5	0	6	1	0	7	1	6	2.9	7
2.4 3.0 4.6 5.1 2.7 3.2 3.5 3.3 6.1 5.2 5.9 4.0 4.9 4.3 4.6 4.9 6.5 4.6 2.9 1.7 3.0 4.2 3.9 5.3 9 20 17 23 15 16 14 15 22 28 22 15 21 21 19 74 50 17 9 13 11 12 13 16																		Diurnal Average								
																		Diurnal Maximum								
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m <sup>3</sup>																										



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Sawbones Bay - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Sawbones Bay - October 2017**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	251	33.74	33.74
6 - 15	196	26.34	60.08
16 - 25	25	3.36	63.44
26 - 80	3	0.40	63.84
> 81.0	0	0.00	63.84

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**Sawbones Bay - October 2017**

Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	21	9	8	4	5	5	19	6	11	23	31	8	17	36	25	17	245
6 - 15	11	2	7	2	0	8	2	1	14	17	24	11	29	31	22	11	192
16 - 25	1	1	0	0	2	0	0	0	1	2	3	2	3	5	2	3	25
26 - 80	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	3
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>33</b>	<b>12</b>	<b>15</b>	<b>6</b>	<b>7</b>	<b>13</b>	<b>21</b>	<b>7</b>	<b>27</b>	<b>42</b>	<b>58</b>	<b>21</b>	<b>49</b>	<b>72</b>	<b>51</b>	<b>31</b>	<b>465</b>

Total Number of Valid Hours: 721

Total Number of Hours: 744







**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

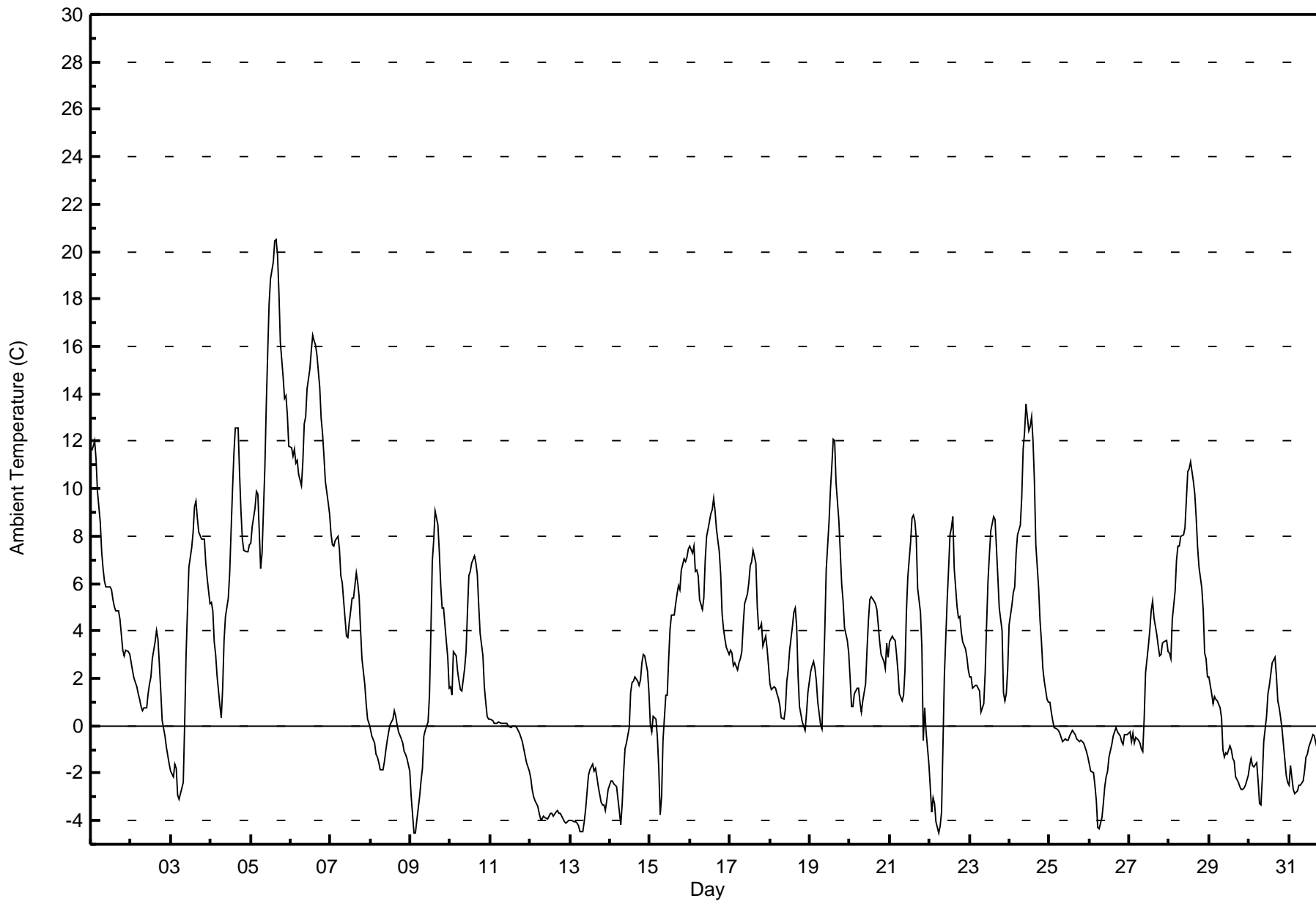
**Ambient Temperature (AT) - C**  
**Sawbones Bay - October 2017**

Maximum Value: 20.5 C on Oct 5 16:00		Maximum Daily Average: 13.6 C on Oct 5		Hours in Service: 744																						
Minimum Value: -4.5 C on Oct 9 04:00		Minimum Daily Average: -3.6 C on Oct 12		Hours of Data: 744																						
Maximum Diurnal Average: 5.9 C at hour 15		Minimum Diurnal Average: 0.8 C at hour 7		Hours of Missing Data: 0																						
Monthly Average: 2.92 C		Percentiles: P <sub>1</sub> = -4.2 P <sub>10</sub> = -2.6 Q <sub>1</sub> = -0.6 Median = 2.1 Q <sub>3</sub> = 5.9 P <sub>90</sub> = 9.0 P <sub>99</sub> = 17.3		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	11.6	11.8	12.0	11.3	9.9	8.6	7.3	6.6	6.1	5.9	5.9	5.9	5.7	5.3	5.0	4.9	4.8	4.5	3.8	3.2	3.0	3.2	3.1	3.0	6.4	12.0
2-Oct	2.7	2.3	2.0	1.6	1.3	1.1	0.8	0.7	0.8	0.7	1.4	1.8	2.0	2.8	3.5	4.0	3.7	2.6	1.5	0.2	-0.4	-0.9	-1.3	-1.6	1.4	4.0
3-Oct	-1.9	-2.2	-1.6	-1.8	-2.9	-3.1	-2.9	-2.4	0.1	3.0	4.9	6.7	7.5	8.2	9.2	9.5	8.7	8.2	7.9	7.9	7.9	6.9	6.2	5.1	3.7	9.5
4-Oct	5.2	4.8	3.5	3.0	2.1	0.8	0.3	1.6	3.6	4.6	5.4	6.4	8.3	9.9	11.5	12.6	12.6	10.7	9.0	7.9	7.4	7.3	7.3	7.6	6.4	12.6
5-Oct	7.7	8.4	9.2	9.9	9.8	8.2	6.6	7.3	10.9	13.5	15.7	17.8	18.8	19.6	20.5	20.5	19.9	18.3	16.1	14.7	13.8	13.9	13.1	11.8	13.6	20.5
6-Oct	11.7	11.4	11.6	11.1	11.2	10.6	10.1	11.2	12.7	13.0	14.2	15.0	15.8	16.5	16.2	16.1	15.7	14.3	13.0	12.3	11.4	10.3	9.4	9.0	12.7	16.5
7-Oct	8.1	7.6	7.5	7.8	8.0	7.5	6.3	6.1	5.3	3.8	3.7	4.4	4.9	5.4	5.4	6.4	6.0	5.4	4.1	2.8	1.8	0.9	0.3	0.1	5.0	8.1
8-Oct	-0.1	-0.4	-0.7	-1.2	-1.3	-1.6	-1.9	-1.8	-1.5	-1.0	-0.6	-0.3	0.0	0.3	0.7	0.4	0.1	-0.3	-0.6	-0.7	-1.1	-1.2	-1.4	-1.9	-0.8	0.7
9-Oct	-3.0	-3.7	-4.5	-4.5	-4.0	-3.0	-2.3	-1.8	-0.4	-0.2	0.1	1.3	3.9	6.9	7.8	9.1	8.4	7.3	5.9	5.0	5.0	3.5	2.9	1.6	1.7	9.1
10-Oct	1.6	1.3	3.1	2.9	2.3	1.9	1.6	1.5	2.4	3.1	4.8	6.3	6.5	6.9	7.2	6.9	6.4	5.1	3.9	2.9	1.6	1.0	0.4	0.3	3.4	7.2
11-Oct	0.3	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.0	-0.1	0.0	0.0	0.0	-0.1	-0.3	-0.5	-0.7	-0.9	-1.3	-1.6	-1.9	-0.2	0.3
12-Oct	-2.2	-2.7	-3.0	-3.1	-3.4	-3.7	-3.9	-4.0	-3.8	-3.9	-4.0	-3.8	-3.7	-3.7	-3.8	-3.6	-3.6	-3.7	-3.7	-3.8	-4.1	-4.1	-4.1	-4.0	-3.6	-2.2
13-Oct	-4.0	-4.0	-4.0	-4.1	-4.1	-4.2	-4.5	-4.5	-4.0	-3.5	-2.8	-2.1	-1.9	-1.6	-1.9	-1.8	-2.1	-2.6	-3.2	-3.3	-3.4	-3.6	-3.1	-2.7	-3.2	-1.6
14-Oct	-2.3	-2.3	-2.4	-2.5	-2.6	-3.6	-4.2	-3.3	-2.0	-1.0	-0.7	-0.1	1.4	1.8	1.9	2.1	1.9	1.7	1.9	2.7	3.0	2.9	2.3	1.4	-0.1	3.0
15-Oct	0.1	-0.2	0.4	0.3	-0.5	-1.8	-3.7	-3.0	-0.6	1.3	1.3	2.8	4.0	4.7	4.7	5.2	5.6	5.9	5.7	6.6	7.1	6.9	7.1	7.5	2.8	7.5
16-Oct	7.6	7.3	7.6	6.5	6.6	6.4	5.3	4.9	5.4	7.0	8.0	8.3	8.9	9.1	9.6	9.0	8.3	7.4	6.4	4.7	4.1	3.7	3.3	3.0	6.6	9.6
17-Oct	3.2	3.0	2.5	2.6	2.3	2.7	2.8	3.1	4.2	5.1	5.6	6.0	6.8	6.9	7.4	6.9	5.0	4.1	4.1	4.3	3.4	3.8	3.2	2.5	4.2	7.4
18-Oct	1.8	1.5	1.6	1.6	1.3	1.2	0.9	0.4	0.3	0.7	1.9	2.3	3.2	4.2	4.8	4.9	4.2	2.1	0.8	0.2	0.0	-0.2	0.5	1.4	1.7	4.9
19-Oct	2.3	2.5	2.7	2.4	1.9	1.0	0.0	-0.1	2.0	4.0	6.6	8.6	9.9	11.0	12.1	12.0	10.3	8.7	7.4	6.0	5.3	4.1	3.6	3.0	5.3	12.1
20-Oct	2.0	0.8	0.8	1.4	1.6	1.6	1.0	0.6	1.1	1.8	3.2	4.5	5.3	5.4	5.2	5.1	4.9	4.2	3.5	3.0	2.7	2.4	3.5	2.9	2.9	5.4
21-Oct	3.5	3.8	3.7	3.6	3.0	2.3	1.3	1.0	1.3	2.4	4.8	6.3	7.8	8.7	8.9	8.6	7.9	5.8	4.8	3.3	-0.6	0.8	-0.3	-1.6	3.8	8.9
22-Oct	-2.6	-3.6	-3.0	-3.3	-4.0	-4.5	-4.2	-3.6	-0.8	2.1	5.3	6.6	8.0	8.4	8.8	6.6	5.0	4.6	4.6	3.9	3.5	3.2	2.9	2.4	1.9	8.8
23-Oct	2.1	2.1	1.6	1.7	1.7	1.6	1.4	0.6	0.9	2.3	4.3	6.1	7.2	8.3	8.8	8.7	7.5	6.3	4.9	4.0	1.4	1.0	1.3	2.3	3.7	8.8
24-Oct	4.3	5.1	5.6	5.9	7.3	8.1	8.5	9.6	11.7	12.4	13.6	12.5	12.6	13.0	12.0	10.3	7.6	5.8	4.4	3.5	2.4	1.9	1.1	1.0	7.5	13.6
25-Oct	1.0	0.6	0.2	-0.1	-0.1	-0.2	-0.3	-0.5	-0.6	-0.6	-0.6	-0.6	-0.4	-0.3	-0.2	-0.4	-0.5	-0.6	-0.7	-0.6	-0.7	-0.9	-1.1	-1.3	-0.4	1.0
26-Oct	-1.6	-1.9	-2.0	-2.5	-3.2	-4.3	-4.4	-3.9	-3.3	-2.6	-2.2	-1.9	-1.3	-0.8	-0.4	-0.2	-0.1	-0.2	-0.4	-0.7	-0.8	-0.4	-0.4	-0.4	-1.7	-0.1
27-Oct	-0.3	-0.7	-0.3	-0.7	-0.5	-0.6	-0.7	-0.9	-1.1	0.3	2.3	3.4	4.0	4.9	5.2	4.6	3.9	3.4	3.0	3.0	3.5	3.5	3.6	3.1	1.9	5.2
28-Oct	3.0	2.8	4.5	5.7	7.0	7.6	7.6	8.0	8.0	8.3	9.6	10.7	10.9	11.1	10.3	9.8	8.8	7.5	6.7	5.8	4.8	3.1	2.9	2.1	6.9	11.1
29-Oct	2.1	1.3	0.9	1.2	1.1	1.0	0.7	0.3	-1.0	-1.3	-1.1	-1.2	-0.9	-1.0	-1.4	-1.5	-2.1	-2.4	-2.6	-2.7	-2.7	-2.6	-2.5	-2.1	-0.8	2.1
30-Oct	-1.7	-1.4	-1.7	-1.8	-1.6	-2.3	-3.3	-3.3	-2.2	-0.7	0.4	1.3	1.7	2.2	2.6	2.9	2.1	1.0	0.7	0.3	-0.2	-1.4	-2.1	-2.4	-0.4	2.9
31-Oct	-2.5	-1.7	-2.7	-2.9	-2.8	-2.7	-2.5	-2.5	-2.3	-1.9	-1.3	-1.2	-0.9	-0.6	-0.3	-0.4	-0.8	-1.0	-1.3	-1.4	-1.4	-1.5	-1.5	-1.7	-1.7	-0.3
	1.9	1.7	1.8	1.7	1.5	1.2	0.8	0.9	1.7	2.5	3.5	4.3	5.0	5.6	5.9	5.8	5.2	4.3	3.6	3.0	2.5	2.1	1.9	1.6		Diurnal Average
	11.7	11.8	12.0	11.3	11.2	10.6	10.1	11.2	12.7	13.5	15.7	17.8	18.8	19.6	20.5	20.5	19.9	18.3	16.1	14.7	13.8	13.9	13.1	11.8		Diurnal Maximum



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Sawbones Bay - October 2017**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C  
Sawbones Bay - October 2017**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	240	32.26	32.26
0 - 10	442	59.41	91.67
10 - 20	60	8.06	99.73
> 20	2	0.27	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

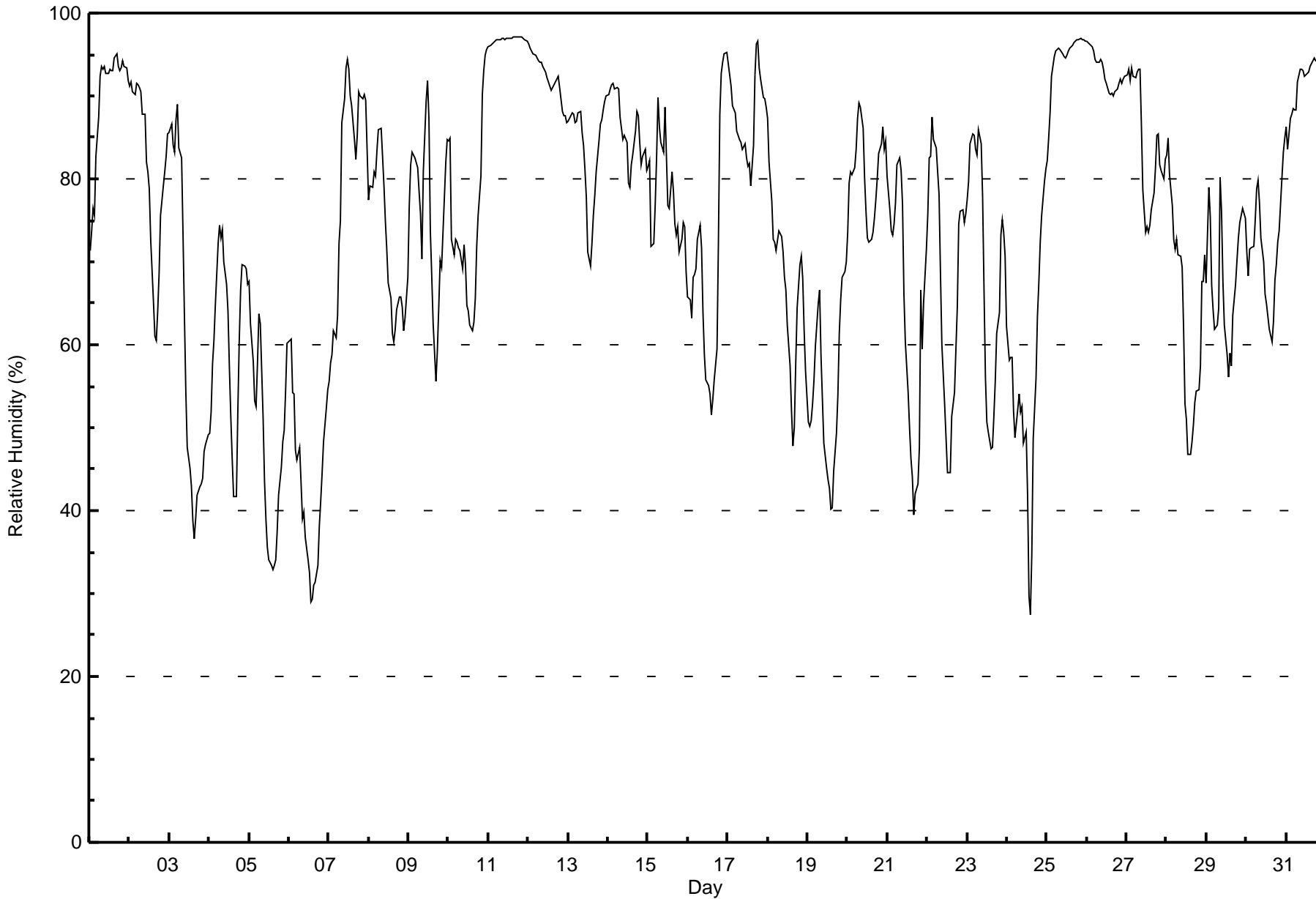
**Relative Humidity (RH) - %  
Sawbones Bay - October 2017**

Maximum Value: 97 % on Oct 11 18:00																		Maximum Daily Average: 96.8 % on Oct 11																		Hours in Service: 744								
Minimum Value: 28 % on Oct 24 15:00																		Minimum Daily Average: 42.9 % on Oct 6																		Hours of Data: 744								
Maximum Diurnal Average: 80.2 % at hour 7																		Minimum Diurnal Average: 64.2 % at hour 15																		Hours of Missing Data: 0								
Monthly Average: 74.4 %																		Percentiles: P <sub>1</sub> = 33 P <sub>10</sub> = 49 Q <sub>1</sub> = 63 Median = 77 Q <sub>3</sub> = 89 P <sub>90</sub> = 94 P <sub>99</sub> = 97																		Hours of Calibration: 0								
																																				Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																				
1-Oct	71	74	76	76	83	87	92	94	93	93	93	93	93	93	95	95	94	93	93	94	94	93	92	89.5	95																			
2-Oct	91	92	90	90	92	91	91	90	88	88	82	81	79	73	65	61	60	64	69	76	79	81	83	85	80.9	92																		
3-Oct	86	87	84	83	87	89	84	82	73	64	54	48	45	43	39	37	39	42	43	43	44	47	48	49	60.0	89																		
4-Oct	49	52	58	61	65	72	74	73	74	70	67	64	57	51	46	42	42	52	60	67	70	69	69	67	61.3	74																		
5-Oct	68	63	58	53	52	58	64	63	51	44	39	36	34	33	33	33	34	38	42	45	48	50	54	60	48.0	68																		
6-Oct	60	61	54	54	47	46	48	43	39	40	37	34	33	29	29	31	31	33	38	41	45	48	52	55	42.9	61																		
7-Oct	56	58	59	62	61	64	72	75	87	90	93	94	93	90	89	85	82	85	91	90	90	90	89	83	80.3	94																		
8-Oct	78	79	79	81	80	83	86	86	83	79	75	71	67	66	61	60	62	64	66	66	65	62	63	68	72.1	86																		
9-Oct	77	82	83	83	83	81	78	76	70	81	89	92	87	74	68	62	56	59	65	70	69	78	82	85	76.3	92																		
10-Oct	85	85	73	71	73	72	72	71	69	72	70	65	64	62	62	63	66	72	76	80	90	93	95	96	74.8	96																		
11-Oct	96	96	96	96	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	96.8	97																		
12-Oct	96	96	95	95	95	94	94	94	94	94	93	92	92	91	91	91	92	92	92	91	88	88	88	87	92.3	96																		
13-Oct	87	87	88	88	87	87	88	88	86	84	81	78	71	70	72	76	78	81	85	87	87	88	89	90	83.4	90																		
14-Oct	90	91	91	92	91	91	91	87	86	85	85	84	80	79	82	83	86	88	88	84	82	83	83	81	85.9	92																		
15-Oct	81	82	72	72	77	83	90	86	84	83	89	83	77	77	81	78	75	73	74	71	73	75	74	69	78.3	90																		
16-Oct	66	65	63	68	68	69	73	74	72	64	59	56	55	54	52	53	56	60	72	88	93	94	95	95	69.3	95																		
17-Oct	94	93	91	89	88	86	85	85	84	84	84	83	82	82	79	84	93	96	97	93	92	90	90	89	88.0	97																		
18-Oct	87	82	77	73	72	71	73	74	73	71	68	67	62	58	52	48	50	58	64	70	71	68	62	57	66.9	87																		
19-Oct	51	50	51	53	56	60	65	67	59	53	48	45	44	43	40	40	45	49	54	61	65	68	69	70	54.4	70																		
20-Oct	74	80	81	80	81	84	87	89	89	86	80	76	73	72	73	74	75	77	80	83	84	86	84	85	80.6	89																		
21-Oct	80	76	74	73	75	77	82	83	81	77	66	60	54	50	46	44	40	42	43	48	67	59	65	72	63.9	83																		
22-Oct	76	83	83	87	85	84	81	78	69	60	53	49	44	45	45	51	54	59	65	75	76	76	75	76	67.8	87																		
23-Oct	78	80	84	85	85	84	83	86	84	78	67	56	51	49	48	48	51	56	61	64	73	75	73	71	69.5	86																		
24-Oct	62	58	59	58	52	49	52	54	52	53	48	49	42	30	28	35	49	56	63	67	72	76	80	81	55.2	81																		
25-Oct	82	85	88	92	95	95	96	96	96	95	95	95	95	95	96	96	96	97	97	97	97	97	97	97	94.4	97																		
26-Oct	97	96	96	96	95	94	94	94	94	94	93	92	92	90	90	90	90	91	91	92	92	92	92	92	92.9	97																		
27-Oct	93	93	92	93	92	92	93	93	93	86	79	74	74	74	74	76	78	81	85	85	82	81	80	82	84.5	93																		
28-Oct	83	85	80	77	73	71	73	71	71	69	62	53	51	47	47	48	50	53	54	55	57	68	68	71	64.0	85																		
29-Oct	67	79	75	67	64	62	62	64	80	76	68	62	59	56	59	58	64	67	70	73	75	76	76	75	68.1	80																		
30-Oct	71	68	72	72	72	75	79	80	77	73	70	66	65	63	62	60	63	68	70	72	74	80	83	85	71.6	85																		
31-Oct	86	84	87	88	88	88	88	92	93	93	93	92	93	93	94	94	94	95	94	94	94	94	95	94	91.7	95																		
																		78.0	78.7	77.8	77.7	77.8	78.6	80.2	80.2	78.7	76.6	73.4	70.5	67.9	65.4	64.2	64.3	65.9	69.0	72.2	74.8	76.9	78.1	78.8	79.2	Diurnal Average		
																		97	96	96	96	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	Diurnal Maximum	



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Sawbones Bay - October 2017**





**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Relative Humidity (RH) - %**  
**Sawbones Bay - October 2017**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	26	3.49	3.49
40 - 60	130	17.47	20.97
60 - 80	249	33.47	54.44
80 - 100	339	45.56	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



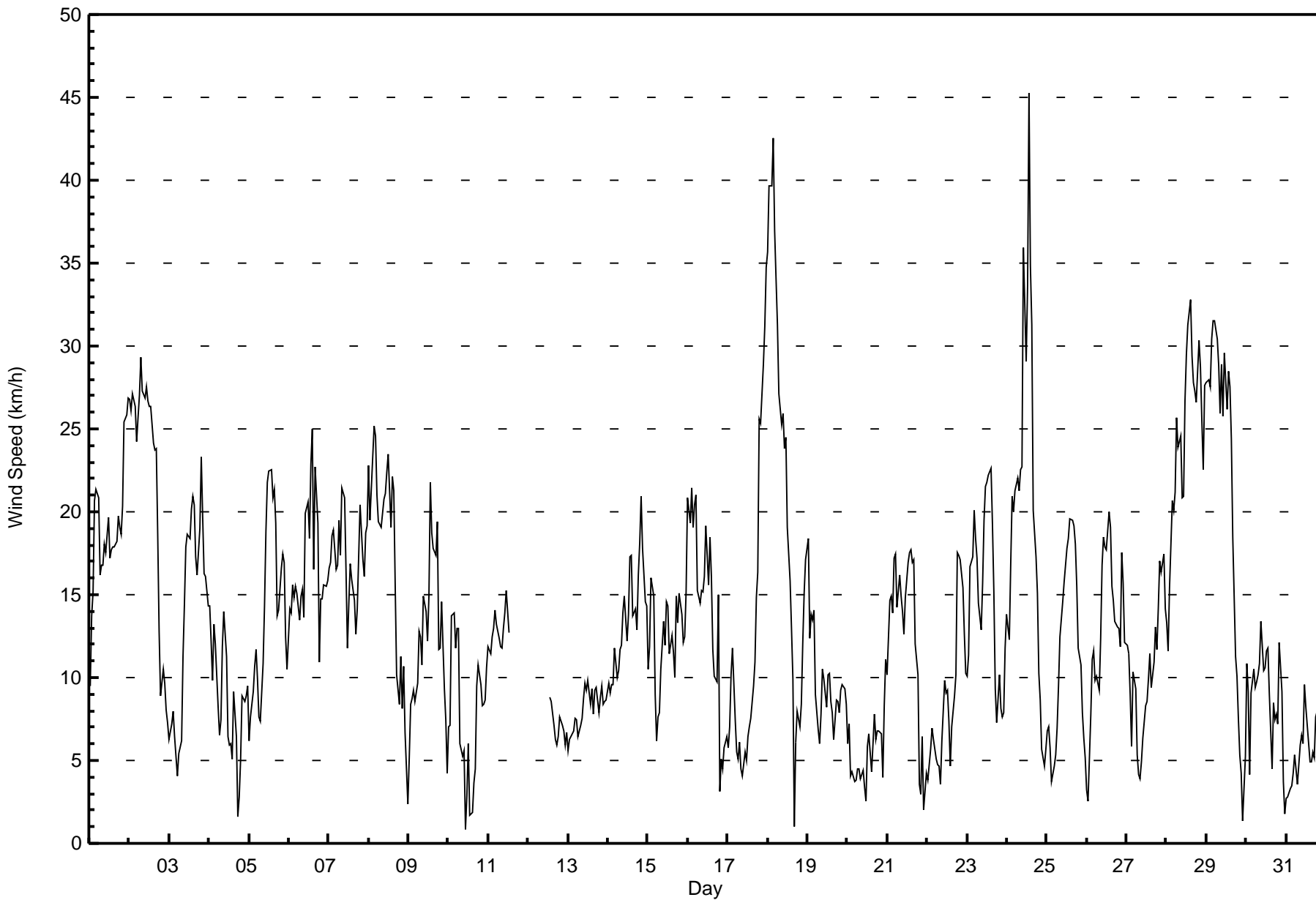
Maximum Speed: 45 km/h on Oct 24 14:00	Maximum Daily Speed Average: 21.6 km/h on Oct 28	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 10 11:00	Minimum Daily Speed Average: 1.2 km/h on Oct 22	Hours of Data: 721
Maximum Diurnal Speed Average: 9.8 km/h at hour 14	Minimum Diurnal Speed Average: 4.7 km/h at hour 24	Hours of Missing Data: 23
Monthly Average Velocity: 7.0 km/h 287.2 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 5 Q <sub>1</sub> = 8 Median = 12 Q <sub>3</sub> = 18 P <sub>90</sub> = 24 P <sub>99</sub> = 35	Percent Operational Time: 96.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	WNW9	NNW14	NW15	NW21	NW21	NNW21	NW16	NW17	NW17	NW18	NW18	NW20	NW17	NW18	NW18	NNW18	NNW18	NNW20	NNW19	NNW19	NNW20	N25	N26	N27	NNW18.1	N27
2-Oct	N27	N26	N27	N26	N24	N26	N27	N29	N27	N27	N28	N27	N26	NNW26	N24	N24	NNW24	NNW19	NNW13	NW9	NW11	NNW10	NW8	NW7	N21.2	N29
3-Oct	NW6	WNW7	WNW8	W6	SSW5	SW4	SSW5	SSW6	SSW11	SW14	SW18	SW19	SW18	SW20	SW21	SW20	SW17	SW16	SW19	WSW23	W20	W16	W16	WNW14	WSW12.6	WSW23
4-Oct	WNW14	W12	W10	WNW13	WNW12	NW8	NW6	NW7	N12	N14	N11	NNW6	NW6	NNW6	NW5	NW9	N6	E2	SE3	SSE5	S9	S9	S9	S10	NW4.0	WNW14
5-Oct	SSW6	SSW8	SSW9	SW11	SW12	NW10	SSW8	S7	SW11	SW14	WSW19	WSW22	WSW22	WSW23	WSW21	SW21	SW19	SW14	SW14	SSW17	SSW17	SW17	SW12	SW10	SW13.9	WSW23
6-Oct	SW14	SW14	SW16	SW15	SW16	SW15	SW14	SW15	WSW15	SW14	WSW20	SW21	W18	W23	WNW25	WSW17	W23	W19	W11	W15	W15	W16	W16	W16	WSW15.8	WNW25
7-Oct	W17	W17	W19	W19	W17	WNW17	WNW20	WNW17	WNW21	NW21	WNW16	NW12	NNW14	NNW17	NW16	NW15	NW13	WNW14	NW17	N20	NNW17	NW16	NNW19	NW19	NW15.5	WNW21
8-Oct	NNW23	NW19	NW23	NW25	NW25	NW21	NW19	NW19	NW20	NW21	NW21	NNW22	NNW23	NW19	NW22	NW21	NNW15	NNW10	NNW8	NW11	NNW8	NW11	NNW7	ESE2	NW17.1	NW25
9-Oct	S5	SSW8	SSW9	S9	S9	S10	S13	SSE12	S11	SSW15	SSW14	SSW12	SW15	WSW22	WSW19	W18	W17	W19	WNW12	WSW12	WSW15	WSW9	W7	SSW4	SW9.6	WSW22
10-Oct	SW7	SW7	W14	W14	W12	W13	W13	WSW6	W5	WNW6	WNW1	W3	NNW6	NE2	ENE2	NNE4	NNE4	NNE9	NE11	NE10	NE8	NE8	NE9	NE11	NW3.0	W14
11-Oct	NE12	NNE11	NNE12	NE13	NE14	NE13	NE12	NNE12	NNE12	NNE13	NNE14	NNE15	NNE13	AF	NNE11	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	NNE15
12-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	NNW9	NNW9	NNW7	NNW6	NNW6	NW6	WNW8	NW7	WNW7	NW6	WNW7	----	NNW9
13-Oct	NW6	NW6	NW7	WNW7	WNW8	WNW7	WNW6	WNW7	WNW8	WNW9	WNW10	NW9	NW10	W8	WNW9	SW8	SW9	SW9	SSW8	SW9	SSW9	SSW8	SSW9	SW9	W6.0	NW10
14-Oct	SSW10	SSW9	SSW10	SSW10	SSW12	S10	SSW10	SSW12	SSW12	SSW14	SSW15	SW12	SW14	SW17	SW17	SW14	SW14	SW13	WSW16	W18	W21	W18	NW15	NW14	SW11.3	W21
15-Oct	NW10	WNW12	WNW16	W15	WSW9	SSW6	S8	S8	S10	SSW13	SSW12	S15	SSW14	SW11	SSW13	S11	SSW10	SSW15	SSW13	SW15	SW14	SW12	SW12	SW15	SW10.0	WNW16
16-Oct	WSW21	WSW19	W21	WSW19	W20	W21	W15	WSW14	WSW15	W15	W16	W19	WSW16	WSW18	SW16	SW12	SW10	SW10	SW15	SE3	ENE5	SE4	SSE6	SE6	WSW12.1	W21
17-Oct	SE6	SSE7	S10	S12	SSE7	SSE6	SSE5	SSE6	SE4	ESE4	E5	ENE5	E6	NE7	NE8	NNE10	NNW11	NNW15	NW16	NW26	NW25	NW29	NW31	WNW35	NW4.9	WNW35
18-Oct	WNW36	WNW40	WNW40	WNW43	WNW37	WNW34	WNW31	WNW27	NW25	NW26	WNW24	WNW24	WNW19	WNW16	WNW13	NW10	SE1	SE6	SE8	SE7	SE8	SE12	ESE15	SE17	WNW15.3	WNW43
19-Oct	SE18	SE12	SE14	SSE13	SSE14	SSE9	SSE7	SSE6	S8	SSW11	SSW10	SSW8	SSW10	SSW10	SSW9	SSE8	SE6	ESE9	SE9	SE8	SE9	ESE10	ESE9	ESE8	SSE8.6	SE18
20-Oct	ESE6	ESE7	E4	ENE4	NE4	E4	E5	E5	ENE4	NE4	E3	NW3	NNE6	N7	N4	NW6	NW8	N6	N7	NW7	WNW4	WNW8	WNW11	N2.7	WNW11	
21-Oct	WNW10	WNW15	WNW15	WNW14	WNW17	WNW17	WNW14	WNW16	WNW15	WNW14	WNW13	WNW15	WNW17	WNW18	WNW18	WNW17	W17	WNW12	WNW10	WSW4	SSW3	SSW6	S2	SSE4	WNW11.6	WNW18
22-Oct	SSE4	ESE5	ESE6	ESE7	ESE6	ESE5	ESE5	ESE5	E4	ESE6	ESE10	ESE9	SE9	SE7	S5	WNW7	NNW9	WNW10	W18	WNW17	WNW17	WNW15	WNW13	WNW10	W1.2	W18
23-Oct	NW10	WNW11	WNW17	WNW17	W20	W18	WNW17	WNW15	WNW13	WNW16	WNW19	WNW21	WNW22	WNW22	WNW23	W19	WNW15	WNW9	SW7	SW10	S8	S8	S8	S12	W12.6	WNW23
24-Oct	SSW14	S12	SSW17	SSW21	SSW20	SW21	WSW22	WSW21	W23	WNW23	NW36	NW29	WNW34	WNW45	NW35	NW31	NNW20	NNW17	NNW15	NNW10	N9	NNE6	NNE5	NE6	WNW13.5	WNW45
25-Oct	NE7	NE7	NE6	ENE4	E5	ENE5	NE7	NE9	NE12	NE15	NNE16	NNE17	N18	N18	N20	N19	N19	N18	N16	N12	N11	NNE8	N6	N5	NNE10.9	N20
26-Oct	N3	W3	SW8	SW11	SW12	SSW10	SSW10	SSW9	SW12	SW17	SW18	SW18	SW18	SW20	SW19	SW16	SW15	SW13	SW13	SW13	WSW12	W18	W16	W12	SW12.2	SW20
27-Oct	W12	WNW11	WNW9	NW6	WNW10	WNW9	W5	S4	SSE4	S5	SSW6	S8	S9	S10	S11	S9	SSW11	S13	S12	S14	S17	SSW16	SSW17	SSW14	SSW7.2	SSW17
28-Oct	SSW13	SSW12	SW15	WSW21	W20	W21	WNW26	WNW24	WNW25	WNW21	WNW21	WNW27	WNW29	NW31	NW33	NW29	NW28	NW27	NW27	NW30	NW29	NNW25	NW23	NW28	WNW21.6	NW33
29-Oct	NW28	NW28	NW28	NW30	NW32	NNW32	NNW30	NNW29	N26	NNW29	NNW26	N30	N26	N28	NNW28	N24	N18	N11	NNE10	N8	N5	N4	S1	W5	NNW20.4	NNW32
30-Oct	NW11	WNW9	SSW4	SSW9	SW11	SSW9	SSW10	SW10	SW11	SW13	SSW10	SW11	SSW12	SSW12	SSW9	WSW5	SW8	SW7	W8	W7	WNW12	WNW9	WNW4	SW2	SW7.2	SW13
31-Oct	SW3	W3	S3	S3	S4	SE5	SE5	SE4	SE6	SSE7	SE6	ESE10	ESE8	ESE6	E5	E5	E5	ENE5	NE8	NE8	NE8	NE7	NNE9	NNE11	E3.8	NNE11

WNW6.7	WNW6.7	W7.4	W8.0	W8.0	W7.4	WNW6.8	WNW6.1	WNW6.3	WNW7.1	WNW7.4	WNW7.8	WNW8.3	WNW9.8	WNW9.2	WNW8.5	WNW7.5	WNW6.2	WNW6.0	WNW6.2	WNW6.1	WNW5.7	WNW5.1	WNW4.7	Diurnal Average
WNW36	WNW40	WNW40	WNW43	WNW37	WNW34	WNW31	N29	N27	NNW29	NW36	N30	WNW34	WNW45	NW35	NW31	NW28	NW27	NW27	NW30	NW29	NW29	NW31	WNW35	Diurnal Maximum

AF - Analyzer Failure  
All monthly, daily, and diurnal averages have been calculated using vector methods







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h  
Sawbones Bay - October 2017**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	80	11.10	11.10
6 - 11	248	34.40	45.49
12 - 19	255	35.37	80.86
20 - 28	108	14.98	95.84
29 - 38	26	3.61	99.45
> 38	4	0.55	100.00

Total Number of Valid Hours: 721

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Wind Speed (WS) - km/h  
Sawbones Bay - October 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	5	3	3	9	11	6	8	5	9	5	3	2	6	3	2	0	80
6 - 11	9	11	18	0	1	15	14	10	22	39	23	3	7	32	28	16	248
12 - 19	10	10	6	0	0	1	5	3	8	26	52	15	38	44	23	14	255
20 - 28	23	0	0	0	0	0	0	0	0	2	7	11	10	18	25	12	108
29 - 38	2	0	0	0	0	0	0	0	0	0	0	0	0	7	13	4	26
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4
<b>Totals</b>	49	24	27	9	12	22	27	18	39	72	85	31	61	108	91	46	721

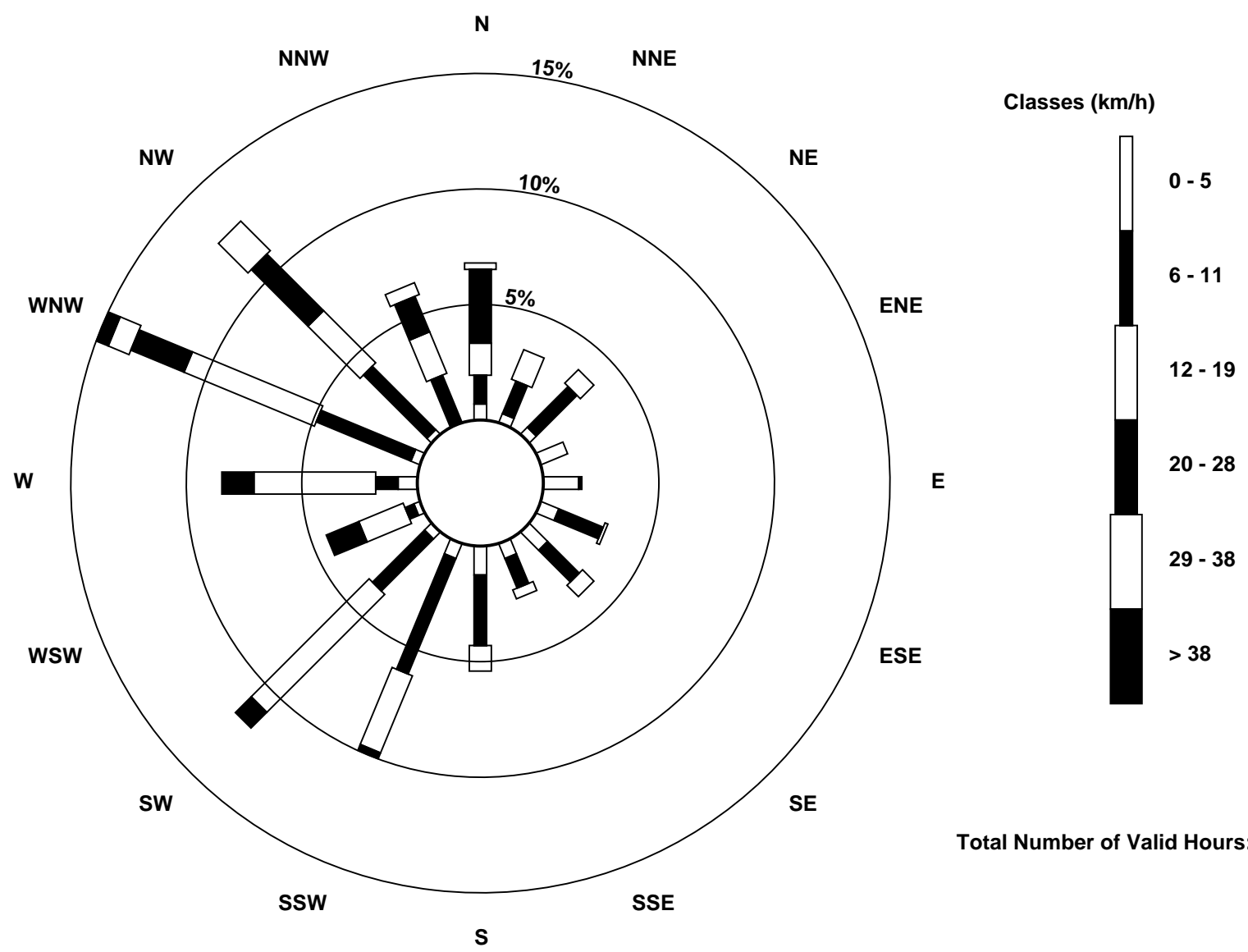
Total Number of Valid Hours: 721

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2017

Wind Speed (WS) - km/h  
Sawbones Bay (AMS 505)





**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Speed (WS) - km/h**  
**Sawbones Bay - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 9 km/h on Oct 24 14:00	Hours of Data: 721
Minimum Value: 1 km/h on Oct 10 17:00	Hours of Missing Data: 23
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 6 P <sub>99</sub> = 8	Hours of Calibration: 0
	Percent Operational Time: 96.9

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	2	3	3	5	5	5	3	4	4	4	4	4	4	4	4	3	3	5	4	4	4	6	6	6	6
2-Oct	6	6	6	6	6	6	6	6	7	6	6	6	6	6	5	6	5	4	4	1	1	2	1	1	7
3-Oct	1	2	3	2	1	1	2	3	2	4	4	4	4	5	5	5	4	3	4	5	4	4	4	5	
4-Oct	3	2	3	3	3	2	1	2	3	3	3	3	3	2	2	3	2	1	2	1	1	1	2	3	
5-Oct	1	2	2	2	3	1	2	1	2	4	4	5	5	5	4	5	4	3	3	3	3	3	2	5	
6-Oct	2	3	3	3	3	3	3	3	3	3	4	4	5	6	6	6	5	6	3	4	4	4	3	6	
7-Oct	3	4	5	4	4	5	4	4	4	5	3	2	4	3	4	4	4	4	4	6	4	3	4	6	
8-Oct	5	4	5	5	5	4	4	4	4	5	5	5	5	5	5	5	4	3	2	3	3	3	1	5	
9-Oct	3	1	1	2	1	2	2	2	3	3	3	3	4	5	5	5	5	6	4	4	5	2	2	6	
10-Oct	2	2	3	3	3	3	3	4	2	2	1	2	2	2	1	1	1	3	3	3	3	2	2	4	
11-Oct	2	3	3	3	3	3	3	3	2	3	3	3	4	AF	3	AF	AF	AF	AF	AF	AF	AF	AF	4	
12-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	2	1	1	1	1	1	1	1	1	2	
13-Oct	1	1	1	1	1	1	1	1	1	1	1	1	3	2	2	2	2	2	2	2	1	1	1	3	
14-Oct	2	2	2	2	2	2	1	2	2	3	3	2	3	3	3	3	2	2	3	4	4	4	3	4	
15-Oct	3	4	3	4	2	3	1	1	2	3	2	3	3	3	2	2	3	2	2	4	4	2	2	4	
16-Oct	3	5	5	4	5	5	6	5	3	4	4	4	4	3	3	3	2	5	5	2	1	1	1	6	
17-Oct	2	3	2	1	3	2	1	3	2	1	2	2	2	2	2	2	2	4	3	7	6	7	7	8	
18-Oct	7	8	8	9	8	7	6	6	5	5	5	4	4	3	3	3	1	1	1	1	2	2	3	9	
19-Oct	4	4	3	4	3	2	2	2	4	2	2	2	3	2	2	1	1	1	1	1	1	1	1	4	
20-Oct	1	2	1	2	1	2	2	2	1	1	2	3	1	2	1	3	1	1	1	1	2	1	2	3	
21-Oct	2	3	2	4	3	3	3	3	3	2	2	3	3	4	4	4	4	3	1	3	2	3	1	4	
22-Oct	2	1	2	1	1	1	1	1	1	2	2	3	3	2	3	3	1	5	5	4	3	2	3	5	
23-Oct	3	3	3	4	4	4	3	4	2	3	4	4	4	5	5	4	3	2	3	2	1	1	2	5	
24-Oct	3	2	3	4	5	6	7	5	5	6	7	7	8	9	9	8	6	4	3	3	2	1	1	9	
25-Oct	2	1	2	1	2	2	2	3	3	3	3	4	4	4	4	4	4	4	3	3	2	2	2	4	
26-Oct	1	1	3	2	2	1	2	2	3	3	4	4	4	4	4	4	4	3	3	2	3	4	4	4	
27-Oct	3	3	3	1	3	3	2	1	1	2	1	2	2	2	2	1	2	2	2	2	3	2	3	3	
28-Oct	2	2	4	3	5	5	4	4	4	4	6	6	6	7	7	6	6	6	7	8	7	7	6	8	
29-Oct	6	7	6	7	7	7	7	7	6	7	6	6	6	5	6	5	5	3	2	2	1	1	1	7	
30-Oct	2	3	3	1	2	2	1	2	2	3	2	2	3	2	3	3	3	2	2	3	3	1	3	3	
31-Oct	1	2	1	1	1	1	1	1	1	1	1	2	2	2	1	2	2	2	2	2	2	2	2	2	
	7	8	8	9	8	7	7	7	7	7	7	7	8	9	9	8	6	6	7	8	7	7	7	8	
	Diurnal Maximum																								

AF - Analyzer Failure



**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Wind Direction (WD) - deg**  
**Sawbones Bay - October 2017**

Direction of Maximum Speed: 300 deg on Oct 24 14:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 298.4 deg on Oct 28	Hours of Data: 721
Direction of Minimum Speed: 297 deg on Oct 10 11:00	Hours of Missing Data: 23
Direction of Minimum Daily Speed Average: 1.2 deg on Oct 22	Percent Operational Time: 96.9
Monthly Average Direction: 280.2 deg	

Day	Hourly Period Ending At (MST)																								Daily Average	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	297	294	314	309	322	333	322	319	316	321	323	324	324	322	325	328	333	343	343	343	346	351	354	357	330.3	
2-Oct	358	0	359	1	359	355	358	358	1	1	0	355	350	348	359	354	339	342	332	308	318	328	313	307	352.0	
3-Oct	305	300	289	260	207	230	212	196	209	216	228	222	228	223	220	229	229	231	234	242	263	262	264	294	238.7	
4-Oct	287	270	280	293	296	306	323	325	4	6	8	339	314	327	315	323	11	86	130	157	170	171	173	176	307.9	
5-Oct	192	202	208	218	222	214	200	189	220	236	241	242	243	243	238	229	224	220	215	208	213	224	230	218	224.9	
6-Oct	233	233	235	232	233	233	228	232	237	231	242	235	270	276	286	253	265	271	267	264	270	274	264	259	252.6	
7-Oct	271	262	268	276	260	283	295	287	294	312	300	314	335	329	322	319	310	302	316	350	330	322	328	324	304.5	
8-Oct	327	320	320	319	316	312	314	317	319	321	325	330	329	320	318	320	332	334	337	325	330	321	338	108	322.5	
9-Oct	182	195	194	178	180	184	173	168	186	196	197	198	223	239	251	269	277	275	298	255	254	245	266	208	226.8	
10-Oct	225	231	261	259	260	265	278	255	272	301	297	265	342	48	67	27	24	27	38	40	42	43	42	38	316.7	
11-Oct	35	33	33	34	35	37	35	29	25	26	25	23	21	AF	15	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
12-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	331	339	337	341	335	310	301	305	298	305	303	--
13-Oct	305	313	316	302	300	303	302	300	301	300	301	307	305	276	292	230	218	223	212	219	211	212	208	214	268.7	
14-Oct	212	210	200	194	194	189	193	196	198	198	202	218	221	233	236	229	230	225	237	266	263	265	306	324	229.1	
15-Oct	319	292	286	274	254	212	186	189	190	202	195	190	194	216	194	191	196	203	208	225	233	222	222	230	220.3	
16-Oct	239	251	262	252	263	264	260	252	243	272	270	272	239	241	235	226	216	215	232	125	64	131	147	138	246.6	
17-Oct	137	148	174	172	164	162	150	162	125	106	96	69	81	56	43	14	341	335	309	315	309	309	308	300	316.6	
18-Oct	296	296	294	298	302	303	296	298	306	307	285	294	302	300	302	313	127	128	130	129	124	125	120	125	297.3	
19-Oct	127	132	135	151	153	149	150	168	184	193	201	197	193	195	194	159	139	123	137	140	128	117	117	122	152.3	
20-Oct	112	113	79	59	51	88	93	86	64	35	101	319	15	1	359	309	318	2	354	312	306	302	292	294	2.4	
21-Oct	291	290	286	286	290	289	294	296	299	299	301	291	298	303	293	289	276	297	303	244	193	200	178	155	289.5	
22-Oct	159	107	119	106	119	123	117	110	90	110	123	113	141	132	177	287	329	288	278	296	296	296	299	303	273.5	
23-Oct	308	303	297	290	269	271	282	299	302	300	297	302	295	286	284	280	290	295	234	215	191	190	173	188	281.0	
24-Oct	201	191	193	195	212	225	243	257	274	285	304	315	295	300	315	325	346	337	332	343	4	14	18	40	289.5	
25-Oct	43	41	50	64	87	64	53	43	39	35	28	19	10	8	7	1	1	358	2	3	11	19	355	4	18.1	
26-Oct	354	277	219	220	217	207	204	206	217	217	218	220	223	224	226	221	226	228	226	226	245	270	271	270	228.9	
27-Oct	281	300	295	313	294	291	272	188	159	186	195	188	177	176	178	180	192	189	172	184	191	195	198	201	207.3	
28-Oct	207	203	228	244	268	281	290	291	290	288	291	297	297	309	307	306	307	312	319	318	326	330	323	321	298.4	
29-Oct	316	315	322	322	326	328	332	342	354	348	348	357	356	355	344	358	359	7	13	6	353	354	184	264	340.5	
30-Oct	304	291	200	202	215	212	208	218	216	227	213	218	195	198	195	240	235	215	275	264	293	296	295	233	231.8	
31-Oct	231	273	173	170	181	132	145	143	138	152	128	119	112	107	94	86	88	62	43	43	50	41	31	32	93.0	

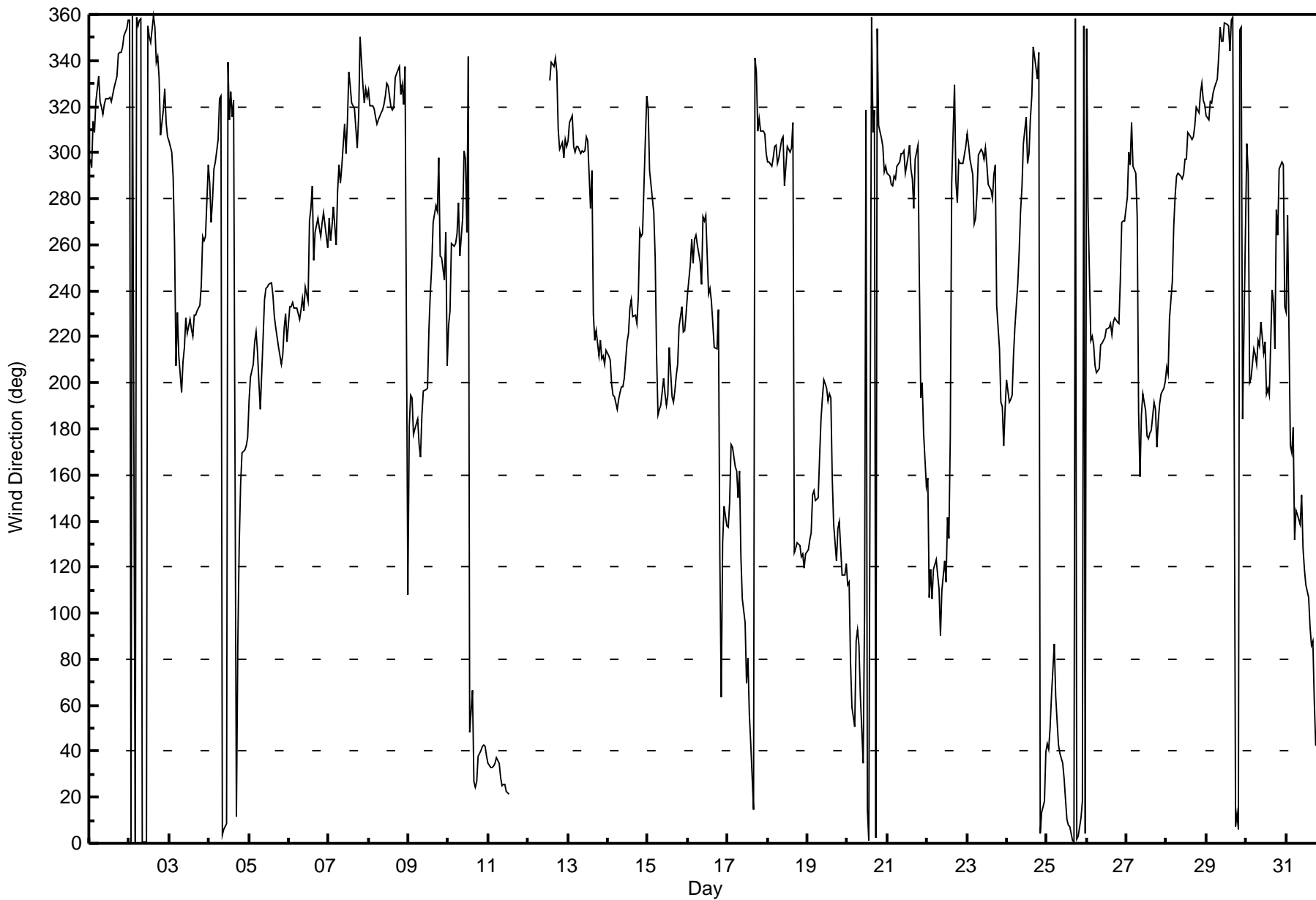
285.9 283.3 279.0 275.2 275.4 281.2 283.4 286.0 289.4 291.0 287.3 291.8 290.5 288.2 292.6 294.0 294.0 292.8 289.7 286.3 287.6 287.8 291.7 291.5  
 Diurnal Average

AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Sawbones Bay - October 2017**





**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Direction (WD) - deg**  
**Sawbones Bay - October 2017**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 91 deg on Oct 10 14:00	Hours of Data: 721
Minimum Value: 7 deg on Oct 13 11:00	Hours of Missing Data: 23
	Hours of Calibration: 0
	Percent Operational Time: 96.9
Percentiles: P <sub>1</sub> = 7 P <sub>10</sub> = 10 Q <sub>1</sub> = 11 Median = 13 Q <sub>3</sub> = 17 P <sub>90</sub> = 29 P <sub>99</sub> = 74	

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	11	10	12	12	11	14	13	13	11	11	13	11	12	11	12	12	12	13	15	15	16	16	17	18	18
2-Oct	16	18	18	18	18	17	18	18	18	17	18	18	17	16	19	19	15	15	15	10	9	8	8	10	19
3-Oct	8	10	21	25	16	31	29	58	13	18	17	18	17	15	16	13	12	11	11	13	12	13	11	58	
4-Oct	12	13	23	12	11	11	10	14	18	19	24	47	65	47	49	24	20	65	62	17	7	7	9	65	
5-Oct	11	12	10	13	13	10	12	15	13	12	11	12	14	14	13	14	14	11	11	10	12	13	11	15	
6-Oct	10	11	10	11	11	10	12	12	13	11	11	12	23	15	13	24	16	12	25	12	14	14	11	25	
7-Oct	11	12	10	13	14	15	10	15	11	12	12	13	14	13	13	16	14	23	16	18	13	10	12	23	
8-Oct	12	12	12	12	12	12	12	12	12	12	12	13	13	13	14	13	14	14	13	11	15	14	13	74	
9-Oct	55	9	10	10	10	11	11	10	17	11	11	14	14	12	19	19	15	21	21	20	15	13	22	55	
10-Oct	16	21	14	14	15	13	12	42	37	25	87	73	34	91	81	29	11	13	16	18	18	19	17	91	
11-Oct	13	14	13	13	13	14	13	13	13	12	12	12	14	AF	14	AF	AF	AF	AF	AF	AF	AF	AF	14	
12-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	15	12	12	11	11	11	9	10	10	10	15	
13-Oct	12	10	10	11	10	8	9	9	7	9	7	10	12	30	15	26	12	12	20	13	10	10	11	30	
14-Oct	11	11	14	10	10	10	9	9	11	11	11	12	12	11	9	11	11	13	11	10	13	11	10	14	
15-Oct	11	7	11	13	17	35	10	11	10	12	11	11	11	18	12	11	14	10	10	15	13	12	11	35	
16-Oct	9	14	12	12	11	12	18	18	14	13	16	13	20	11	12	13	11	18	13	55	20	31	12	55	
17-Oct	15	21	9	8	18	14	21	48	28	29	27	38	35	31	22	20	14	14	10	12	11	11	11	48	
18-Oct	10	10	11	11	11	12	10	10	12	11	14	12	15	17	16	18	87	11	10	16	14	12	12	87	
19-Oct	12	14	15	17	14	13	13	16	15	13	18	23	21	17	23	18	13	8	12	12	11	9	8	23	
20-Oct	18	16	36	43	36	35	33	30	36	38	62	84	27	20	26	20	16	11	12	14	10	15	9	84	
21-Oct	8	7	8	12	9	9	9	9	9	10	10	16	13	13	16	16	13	12	7	61	71	43	89	89	
22-Oct	57	20	15	14	19	20	24	25	36	27	17	22	26	27	59	57	8	22	13	9	9	10	12	59	
23-Oct	11	13	9	10	10	10	14	11	10	9	12	12	13	15	14	14	14	29	27	11	9	10	11	29	
24-Oct	10	11	11	10	16	13	17	15	12	15	13	17	11	12	14	15	17	12	12	13	13	12	15	17	
25-Oct	18	15	22	32	35	35	24	18	15	12	12	14	15	16	16	16	16	16	16	16	14	15	20	35	
26-Oct	23	51	25	13	10	10	10	11	11	13	12	14	14	12	12	13	12	11	11	11	16	9	11	51	
27-Oct	24	11	15	10	9	22	30	44	29	26	13	13	15	14	11	11	10	10	12	10	10	9	9	44	
28-Oct	10	10	16	10	13	12	8	9	8	11	11	12	13	15	12	12	11	12	12	12	13	13	14	16	
29-Oct	12	14	12	12	13	12	13	17	17	16	16	18	18	18	16	19	15	16	15	15	15	43	77	77	
30-Oct	13	29	63	11	15	11	9	9	11	12	15	14	15	12	17	52	29	19	23	26	12	7	47	65	
31-Oct	42	60	19	25	14	15	12	21	12	14	17	14	15	22	29	32	34	32	17	17	23	17	12	60	
57 60 63 43 36 35 33 58 37 38 87 84 65 91 81 57 87 65 62 61 71 43 89 74																									
Diurnal Maximum																									

AF - Analyzer Failure





# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

Version-03-2017

### Station Information

Station Name:	Sawbones Bay	Station number:	AMS 505
Calibration Date:	October 19, 2017	Last Cal Date:	September 19, 2017
Start time (MST):	8:03	End time (MST):	12:41
Reason:	Routine		

### Calibration Standards

Cal Gas Concentration	<u>49.6</u>	ppm	Cal Gas Exp Date	February 22, 2020
Cal Gas Cylinder #	<u>EY0000793</u>			
Calibrator Make/Model	Teledyne API T700		Serial Number	621
ZAG Make/Model	Teledyne API 701		Serial Number	4428

### Analyzer Information

Analyzer make: Thermo 43i

Analyzer serial #: 710321323

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Analyzer Range	0 - 1000 ppb		PMT voltage	-628	-628
Calculated slope	0.992849	1.004735	Lamp voltage	783	788
Calculated intercept	0.877953	0.707974	Pressure	664.4	659.6
Analyzer Background	16.1	16.2	Flow	0.402	0.398
Analyzer Coefficient	1.015	1.015	Intensity	91	91

### SO<sub>2</sub> Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	-0.2	----
as found span	4928	78.9	781.6	778.9	1.003
calibrator zero	5000	0.0	0.0	0.0	----
high point	4930	78.8	780.3	776.7	1.005
second point	4967	39.5	391.3	387.2	1.011
third point	4988	19.8	196.1	194.6	1.008
as left zero	5000	0.0	0.0	-0.1	----
as left span	4928	78.9	781.6	775.1	1.008
Average Correction Factor					1.008
Corrected As found	779.10	Previous response	786.36	*% change	0.9%

\* = > +/-5% change initiates investigation

#### Notes:

Sample inlet filter replaced after as founds. Slightly adjusted zero.

Calibration Performed By: Ryan Power



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

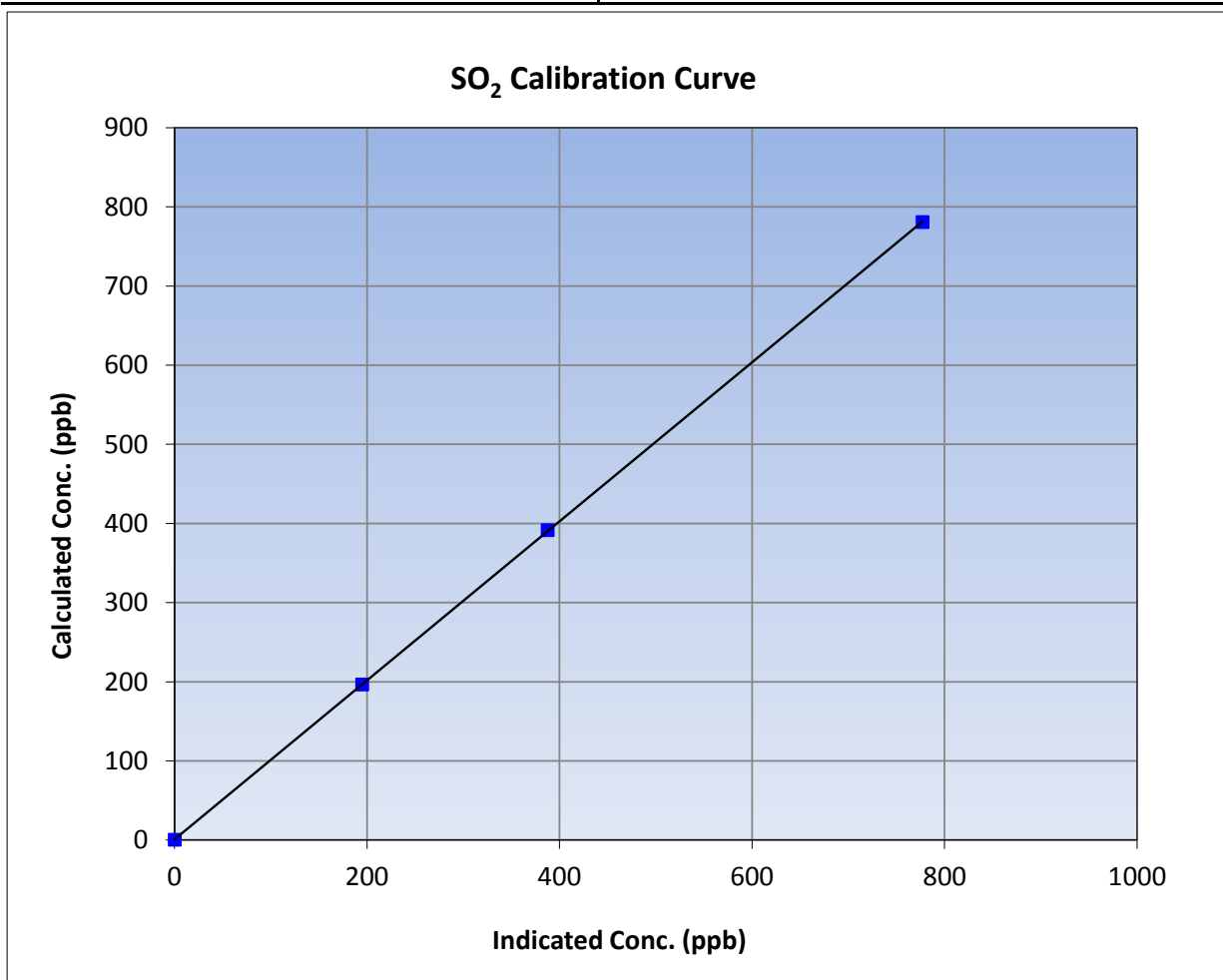
Version-03-2017

### Station Information

Calibration Date	October 19, 2017	Previous Calibration	September 19, 2017
Station Name	Sawbones Bay	Station Number	AMS 505
Start Time (MST)	8:03	End Time (MST)	12:41
Analyzer make	Thermo 43i	Analyzer serial #	710321323

### Calibration Data

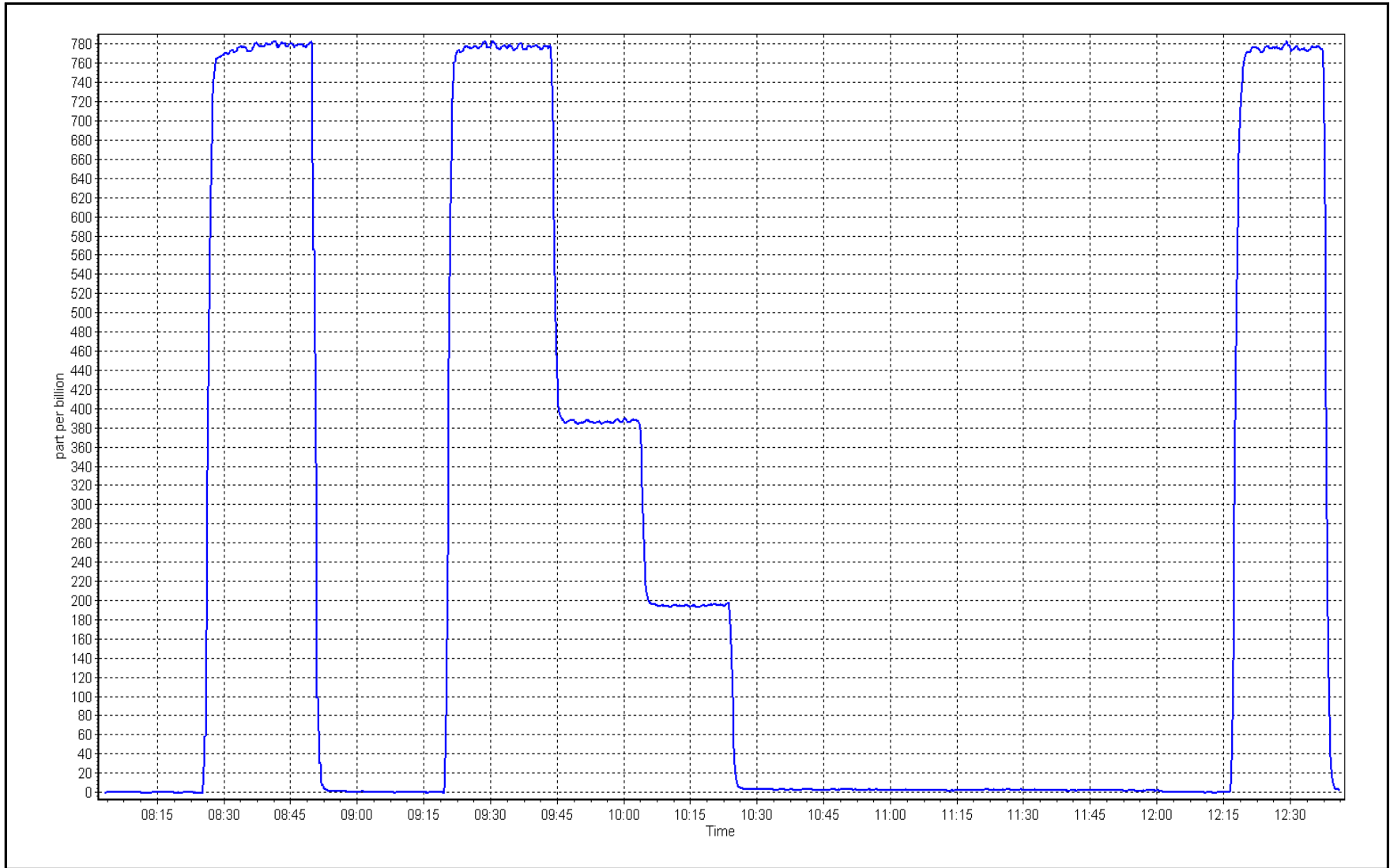
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	<u>Limits</u>	
0.0	0.0	----	Correlation Coefficient	0.999989	
780.3	776.7	1.0047			≥0.995
391.3	387.2	1.0107	Slope	1.004735	
196.1	194.6	1.0078			0.90 - 1.10
			Intercept	0.707974	+/-30



SO2 Calibration Plot

Date: October 19, 2017

Location: Sawbones Bay





# Wood Buffalo Environmental Association

## H<sub>2</sub>S Calibration Report

Version-06-2017

### Station Information

Station Name:	Sawbones Bay	Station number:	AMS 505
Calibration Date:	October 20, 2017	Last Cal Date:	September 20, 2017
Start time (MST):	11:33	End time (MST):	15:13
Reason:	Routine		

### Calibration Standards

Cal Gas Concentration	<u>5.03</u>	ppm	Cal Gas Exp Date	December 7, 2019
Cal Gas Cylinder #	<u>DR0000386</u>			
Calibrator Make/Model	Teledyne T700		Serial Number	621
ZAG Make/Model	Teledyne 701		Serial Number	4428

### Analyzer Information

Analyzer make: Thermo 450i

Analyzer serial #: 922436966

	<u>Start</u>	<u>Finish</u>		<u>Start</u>	<u>Finish</u>
Analyzer Range	0 - 100 ppb		PMT voltage	-650	-650
Calculated slope	0.992618	0.999884	Lamp voltage	869	876
Calculated intercept	-0.167240	-0.191829	Pressure	535.3	528
Analyzer Background	26.2	27.0	Flow	1.079	1.067
Analyzer Coefficient	1.090	1.092	Intensity	91	90

### H<sub>2</sub>S Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.0	0.6	----
as found span	4925	79.6	80.0	78.8	1.015
calibrator zero	5000	0.0	0.0	0.2	----
high point	4929	79.6	79.9	80.0	0.999
second point	4967	39.8	40.0	40.6	0.985
third point	4987	20.0	20.1	20.0	1.005
as left zero	5000	0.0	0.0	0.3	----
as left span	4925	79.6	80.0	81.0	0.988
SO2 Scrubber Check	4974	19.7	197.2	0.6	----
Average Correction Factor					0.996
Corrected As found	78.20	Previous response	80.77	*% change	3.3%

\* = > +/-5% change initiates investigation

#### Notes:

Scrubber check after As Finds, filter change after check. Slight adjustments to both zero and span

Calibration Performed By: Ryan Power



# Wood Buffalo Environmental Association

## H<sub>2</sub>S Calibration Summary

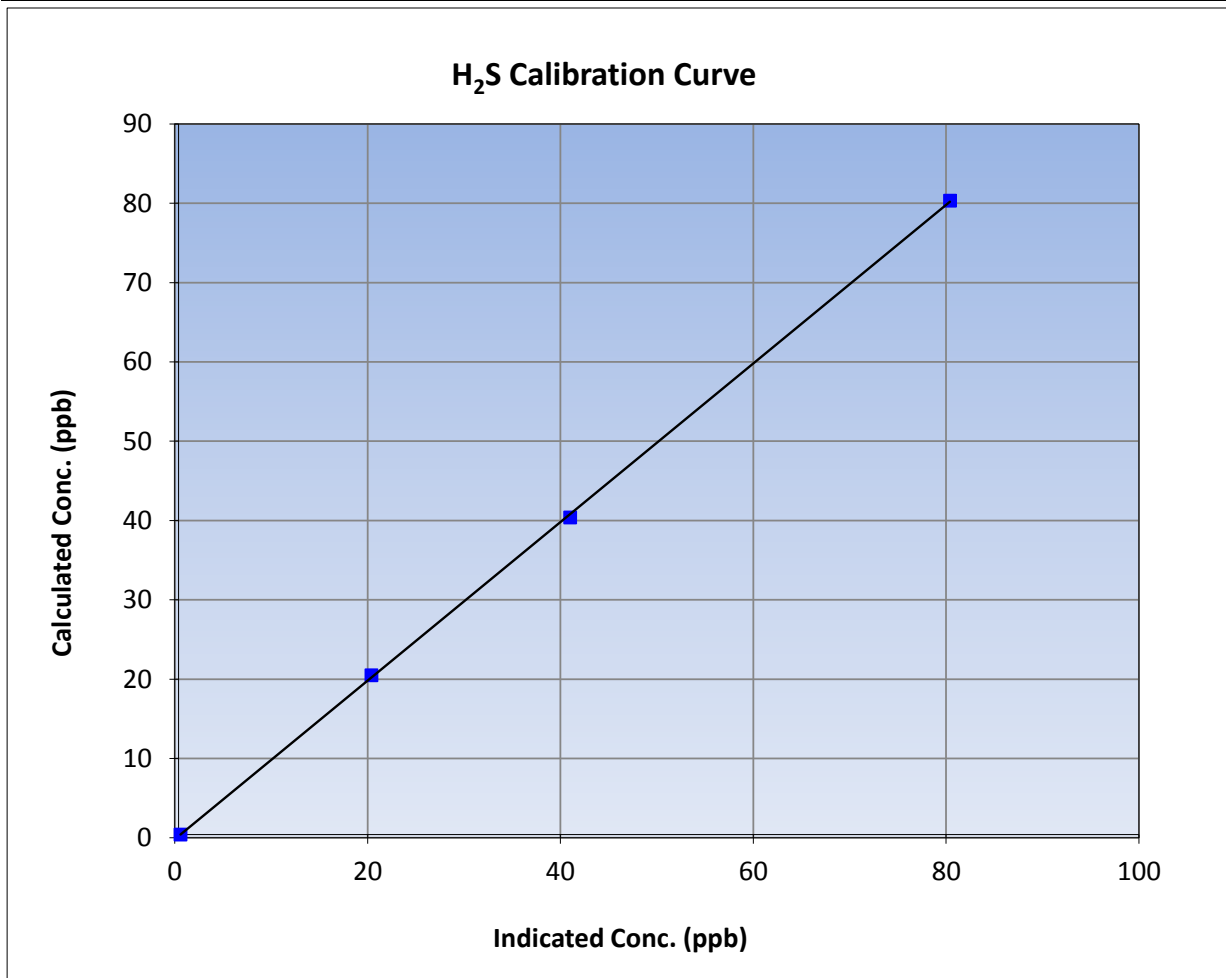
Version-03-2017

### Station Information

Calibration Date	October 20, 2017	Previous Calibration	September 20, 2017
Station Name	Sawbones Bay	Station Number	AMS 505
Start Time (MST)	11:33	End Time (MST)	15:13
Analyzer make	Thermo 450i	Analyzer serial #	922436966

### Calibration Data

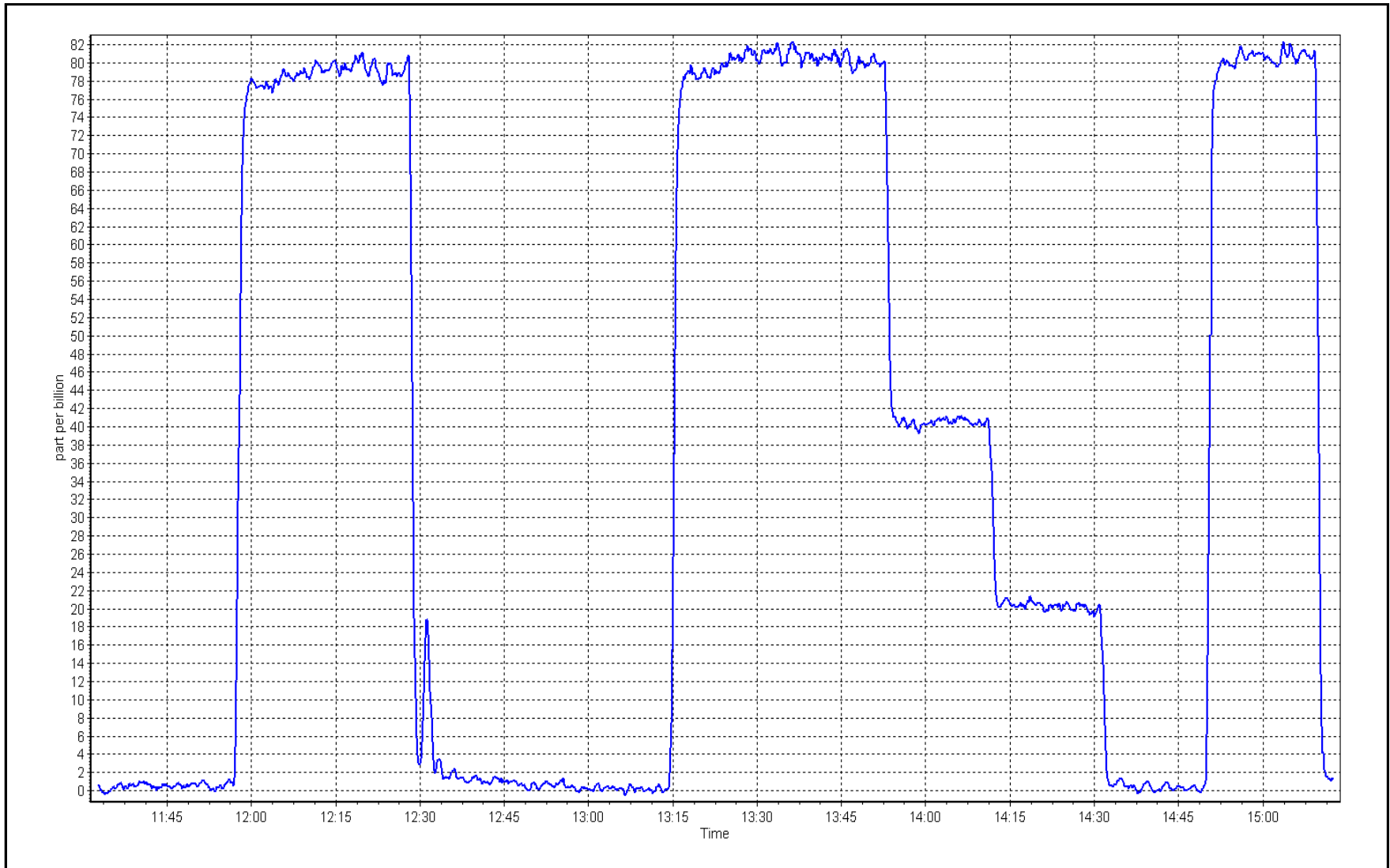
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	Limits	
0.0	0.2	----	Correlation Coefficient	0.999921	≥0.995
79.9	80.0	0.9993			
40.0	40.6	0.9848	Slope	0.999884	0.90 - 1.10
20.1	20.0	1.0046			
			Intercept	-0.191829	+/-3



# H<sub>2</sub>S Calibration Plot

Date: October 20, 2017

Location: Sawbones Bay





# Wood Buffalo Environmental Association

## THC Calibration Report

Version-03-2017

### Station Information

Station Name:	Sawbones Bay	Station number:	AMS 505
Calibration Date:	October 19, 2017	Last Cal Date:	September 19, 2017
Start time (MST):	8:03	End time (MST):	12:39
Reason:	Routine		

### Calibration Standards

Gas Cert Reference	EY0000793	Cal Gas Expiry Date	February 22, 2020
CH4 Cal Gas Conc.	<u>504.0</u> ppm	CH4 Equiv Conc.	1054.0 ppm
C3H8 Cal Gas Conc.	<u>200.0</u> ppm	Station temp.	22 Deg C
Calibrator Make/Model	Teledyne API T700	Serial Number	621
ZAG Make/Model	Teledyne API 701	Serial Number	4428

### Analyzer Information

Analyzer make:	Thermo 51i	Analyzer serial #:	1327059297
	<u>Start</u>	<u>Finish</u>	<u>Start</u>
Analyzer Range	0 - 25 ppm	Bias voltage supply	-288
Calculated slope	0.995840	Sample pressure	8.0
Calculated intercept	0.056696	Fuel pressure	23.3
Analyzer Background	2.640	Air pressure	34.5
Analyzer Coefficient	5.020	Flame temperature	154.0
			<u>Finish</u>

### THC Calibration Data

Set Point	Dilution air flow rate (sccm)	Source gas flow rate (sccm)	Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (Ic)	Correction factor (Cc/Ic) <i>Limit = 0.95-1.05</i>
as found zero	5000	0.0	0.00	-0.14	----
as found span	4928	78.9	16.61	16.54	1.004
calibrator zero	5000	0.0	0.00	0.05	----
high point	4930	78.8	16.58	16.68	0.994
second point	4967	39.5	8.32	8.30	1.002
third point	4988	19.8	4.17	4.17	0.999
as left zero	5000	0.0	0.00	0.09	----
as left span	4928	78.9	16.61	16.64	0.998
Average Correction Factor					0.998
Corrected As found	16.68	Previous response	16.62	*% change	-0.4%

\* = > +/-5% change initiates investigation

Notes: Sample inlet filter was replaced after as founds. Adjusted zero and span.

Calibration Performed By: Ryan Power



# Wood Buffalo Environmental Association

## THC Calibration Summary

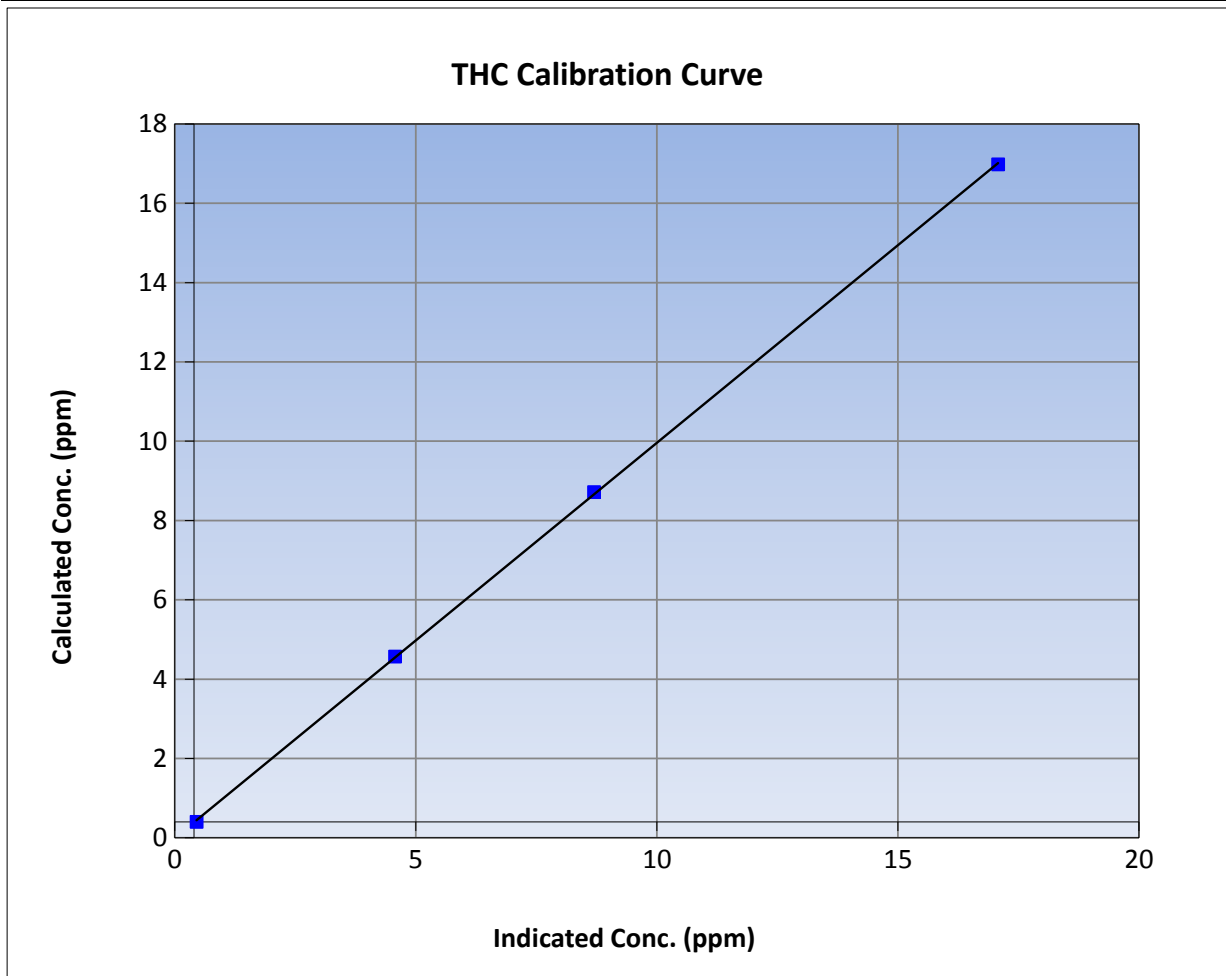
Version-03-2017

### Station Information

Calibration Date	October 19, 2017	Previous Calibration	September 19, 2017
Station Name	Sawbones Bay	Station Number	AMS 505
Start Time (MST)	8:03	End Time (MST)	12:39
Analyzer make	Thermo 51i	Analyzer serial #	1327059297

### Calibration Data

Calculated Concentration (ppm) (Cc)	Indicated Concentration (ppm) (lc)	Correction factor (Cc/lc)	Statistical Evaluation	<u>Limits</u>	
0.0	0.1	----	Correlation Coefficient	0.999959	
16.6	16.7	0.9942			≥0.995
8.3	8.3	1.0023	Slope	0.996751	
4.2	4.2	0.9989			0.90 - 1.10
			Intercept	-0.009786	+/-1.5

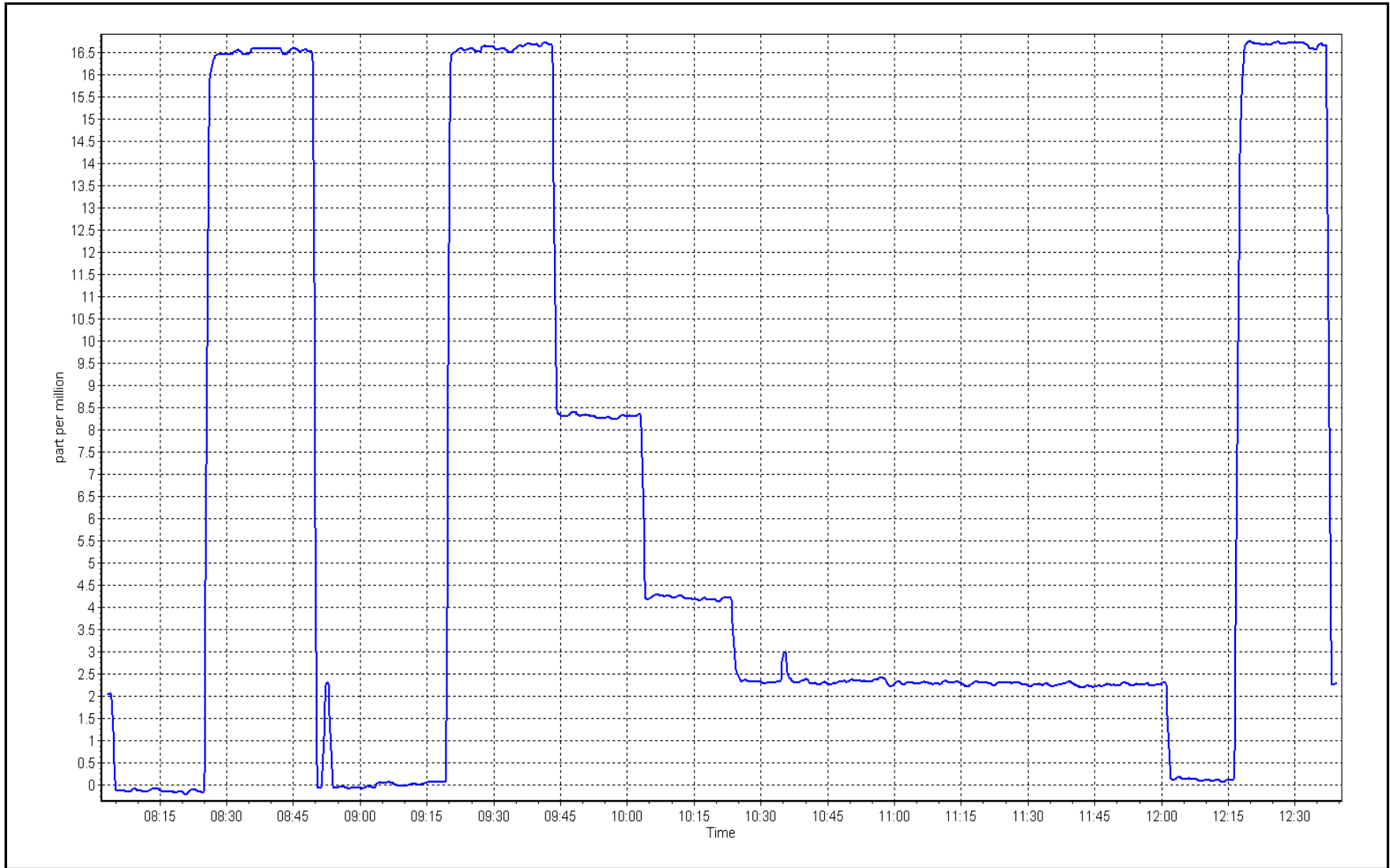




THC Calibration Plot

Date: October 19, 2017

Location: Sawbones Bay





## WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

### INTEGRATED MONITORING PROGRAM MONTHLY REPORT

#### DATA SUMMARY SEPTEMBER 2017

Prepared  
November 29, 2017

#### SAMPLE COLLECTION AND DATA COMPILATION BY:

**Wood Buffalo Environmental Association**  
Fort McMurray, Alberta

#### LABORATORY ANALYSIS BY:

Passive Measurements: Maxxam Analytics Ltd  
Edmonton, Alberta

VOCs: InnoTech Alberta, Inc.  
Vegreville, Alberta

Particulate Matter: Atmospheric Research & Analysis, Inc.  
Morrisville, NC

PAHs: Airzone One Ltd  
Mississauga, Ontario

Precipitation: InnoTech Alberta, Inc.  
Vegreville, Alberta



## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

### **INTEGRATED MONITORING PROGRAM MONTHLY REPORT**

### **HNO<sub>3</sub>, NH<sub>3</sub>, NO<sub>2</sub>, O<sub>3</sub> AND SO<sub>2</sub> PASSIVE MEASUREMENTS DATA SUMMARY AUGUST - SEPTEMBER 2017**

Prepared  
November 29, 2017

#### **SAMPLE COLLECTION AND DATA COMPILATION BY:**

**Wood Buffalo Environmental Association**  
Fort McMurray, Alberta

#### **LABORATORY ANALYSIS BY:**

Passive measurements: Maxxam Analytics Ltd  
Edmonton, Alberta



FILE CONTENTS DESCRIPTION	Passive Measurements of SO <sub>2</sub> , NO <sub>2</sub> , O <sub>3</sub> , NH <sub>3</sub> and HNO <sub>3</sub>
SAMPLING INTERVAL	Bimonthly
SAMPLING FREQUENCY OF DATA	Bimonthly
EXPLANATION OF ZERO VALUES	Zero values are contained in this file and should be treated as values below detection
UNITS	ppbv or µg/m <sup>3</sup>
OBSERVATION TYPE	Gas
FIELD SAMPLING OR MEASUREMENT PRINCIPLE	Diffusion
MEDIUM	Filter
ANALYTICAL METHODS	IONS by Ion Chromatography (IC)
SAMPLE PREPARATION	DI water extraction
ANALYTICAL LABORATORY	MAXXAM Analytics Inc
USER NOTE 1	Data are not blank corrected
USER NOTE 2	Concentrations are calculated by equations developed by lab
SAMPLING INSTRUMENT TYPE	SO <sub>2</sub> all-season SO <sub>2</sub> passive sampling system NO <sub>2</sub> all-season NO <sub>2</sub> passive sampling system O <sub>3</sub> all-season O <sub>3</sub> passive sampling system NH <sub>3</sub> Ogawa passive sampler HNO <sub>3</sub> Ogawa passive sampler
FLAGS USED	
M1	Missing value because no value is available
M2	Missing value because invalidated by Data Originator



Wood Buffalo Environmental Association

Passive Measurements      Ambient Air Monitoring Stations

Site ID	Site Name	Start Date/Time	End Date/Time	Species			Passive Measurements		Ambient Air Monitoring Stations		
				Ammonia ppb	Nitric Acid $\mu\text{g}/\text{m}^3$	Nitrogen Dioxide ppb	Ozone ppb	Sulfur Dioxide ppb	RH %	Temp K	Wind Speed cm/sec
AMS 1	Fort McKay-Bertha Ganter	2017/08/01 10:10	2017/09/29 15:30	1.1	0.4	2	22.1	1.1	65	288	130
AMS 1	Fort McKay-Bertha Ganter	2017/08/01 10:10	2017/09/29 15:30	0.8	0.2	1.8	19.6	1.2	65	288	130
AMS 1	Fort McKay-Bertha Ganter	2017/08/01 10:10	2017/09/29 15:30	0.7	0.3	1.3	21.1	1	65	288	130
AMS 2	Mildred Lake	2017/08/01 12:40	2017/10/06 09:30	3	0.4	2.5	18.2	3.2	65	288	130
AMS 2	Mildred Lake	2017/08/01 12:40	2017/10/06 09:30	2.7	0.5	2.6	21.6	3.4	65	288	130
AMS 2	Mildred Lake	2017/08/01 12:40	2017/10/06 09:30	3	0.7	2.7	16.7	3.6	65	288	130



Wood Buffalo Environmental Association

Site ID	Start Date/Time	End Date/Time	Passive Measurements				Remote sites			
			Ammonia ppb	Nitric Acid µg/m <sup>3</sup>	Nitrogen Dioxide ppb	Ozone ppb	Sulfur Dioxide ppb	RH %	Temp K	Wind Speed cm/sec
AS103	2017/08/02 14:45	2017/10/02 17:00	1.3	0.3	0.3	28	0.4	65	287	130
AS103	2017/08/02 14:45	2017/10/02 17:00	1.3	0.3	0.5	26.1	0.4	65	287	130
AS107	2017/07/31 17:05	2017/10/02 16:20	1.3	0.4	0.5	29.6	1.1	65	287	130
AS107	2017/07/31 17:05	2017/10/02 16:20	1.3	0.3	0.8	29.1	1.1	65	287	130
JP101	2017/07/31 10:05	2017/10/02 01:15	1	0.4	0.3	22.8	0.4	65	287	130
JP101	2017/07/31 10:05	2017/10/02 01:15	1	0.4	0.2	29.4	0.3	65	287	130
JP102	2017/07/31 18:10	2017/10/04 11:55	1.5	0.2	0.8	27.3	1.4	70	289	130
JP102	2017/07/31 18:10	2017/10/04 11:55	1.2	0.2	1	27.8	1.2	70	289	130
JP104	2017/07/31 13:20	2017/09/29 08:30	1.9	0.4	2	22.1	1.8	70	289	130
JP104	2017/07/31 13:20	2017/09/29 08:30	1.7	0.4	2.6	22.7	2	70	289	130
JP107	2017/08/01 12:15	2017/09/28 11:45	2.4	0.3	1	25.9	0.6	72	290	130
JP107	2017/08/01 12:15	2017/09/28 11:45	2.4	0.8	0.9	26.1	0.6	72	290	130
JP108	2017/08/02 10:45	2017/10/01 08:35	1.4	0.3	0.1	19.8	0.2	72	290	130
JP108	2017/08/02 10:45	2017/10/01 08:35	1.3	0.2	0.1	24.3	0.3	72	290	130
JP201	2017/07/31 12:35	2017/09/27 08:50	1.3	0.3	0.2	30.4	0.4	72	291	130
JP201	2017/07/31 12:35	2017/09/27 08:50	1.2	0.3	0.1	23.5	0.2	72	291	130
JP205	2017/08/01 12:10	2017/08/09 11:55	1.1	M2	0.2	22.3	M1	72	290	130
JP205	2017/08/01 12:01	2017/08/01 11:55	1.5	0.4	0.2	26.5	0.5	72	290	130
JP210	2017/08/02 13:50	2017/10/01 12:50	2.1	0.3	0.2	28.6	0.3	74	288	130
JP210	2017/08/02 13:50	2017/10/01 12:50	M2	0.2	0.1	29	0.2	74	288	130
JP213	2017/08/02 09:40	2017/09/30 11:30	1.5	0.4	0.1	27.6	0.5	72	290	130
JP213	2017/08/02 09:40	2017/09/30 11:30	1.9	0.4	0.1	27.5	0.5	72	290	130
JP309	2017/07/31 15:45	2017/10/04 08:40	1	0.3	0.2	21	0.2	70	289	130
JP309	2017/07/31 15:45	2017/10/04 08:40	0.9	0.2	0.2	22.3	0.3	70	289	130
JP311	2017/07/31 09:20	2017/10/02 14:35	0.9	0.3	0.2	23.9	0.5	65	287	130
JP311	2017/07/31 09:20	2017/10/02 14:35	1	0.3	0.2	23.8	0.5	65	287	130
JP316	2017/08/02 12:25	2017/10/01 10:40	M2	0.5	0.2	25.4	0.3	74	288	130
JP316	2017/08/02 12:25	2017/10/01 10:40	1.7	0.4	0.1	22.1	0.3	74	288	130
BM7	2017/08/01 08:25	2017/09/28 08:40	1.5	0.3	0.2	23	0.2	72	290	130
BM10	2017/07/31 14:20	2017/09/27 15:40	1.5	0.2	0.2	16.9	0.2	72	291	130
BM11	2017/08/01 07:35	2017/09/28 08:10	1.5	0.2	0.4	18.7	0.5	72	290	130
JE306	2017/08/01 15:10	2017/09/28 14:00	1.4	0.2	0.7	17.3	0.6	72	290	130
JE308	2017/07/31 13:30	2017/09/27 12:35	1.3	0.2	<0.1	18.6	0.2	72	291	130
JE312	2017/08/02 07:55	2017/09/30 07:55	2.6	0.1	0.2	M1	0.3	74	288	130
JE316	2017/08/02 13:00	2017/10/01 12:05	3.1	0.5	0.2	20.9	0.2	74	288	130
JE323	2017/08/01 16:25	2017/10/03 12:50	0.8	0.3	0.5	16.1	0.4	64	287	130
JP212	2017/08/01 15:00	2017/10/04 10:15	1.4	0.4	3	18.5	2.1	70	289	130
NE7	2017/08/01 14:40	2017/10/03 12:10	0.2	0.3	0.6	26.1	0.8	70	289	130
NE10	2017/08/02 11:35	2017/09/30 14:55	0.9	0.2	0.2	21.1	0.3	74	288	130
NE11	2017/08/01 13:45	2017/10/03 11:50	0.6	0.4	1.2	18.8	0.1	70	289	130
R2	2017/07/31 15:05	2017/09/29 13:45	3.2	0.2	2.1	17.1	1.6	70	289	130
SM7	2017/08/03 09:30	2017/10/03 08:30	0.9	0.3	0.3	22.8	0.2	65	287	130
SM8	2017/08/03 12:15	2017/10/03 09:15	0.7	0.4	0.2	26	0.3	65	287	130
WF4	2017/07/31 16:05	2017/09/27 14:10	3.3	0.6	0.3	17.6	0.5	70	289	130
BLANK			0.8	0.2	<0.1	<0.1	<0.1	74	288	130
BLANK			M1	0.08	<0.1	<0.1	<0.1	65	288	130
BLANK			1	0.08	<0.1	<0.1	<0.1	74	288	130



## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

### **INTEGRATED MONITORING PROGRAM MONTHLY REPORT**

### **VOLATILE ORGANIC COMPOUNDS DATA SUMMARY SEPTEMBER 2017**

Prepared  
November 29, 2017

#### **SAMPLE COLLECTION AND DATA COMPILATION BY:**

**Wood Buffalo Environmental Association**  
Fort McMurray, Alberta

#### **LABORATORY ANALYSIS BY:**

VOCs: InnoTech Alberta, Inc.  
Vegreville, Alberta



FILE CONTENTS DESCRIPTION	VOC - Speciated Volatile Organic Compounds
SAMPLING INTERVAL	24 hour
SAMPLING FREQUENCY OF DATA	Once every 6 days
EXPLANATION OF ZERO VALUES	Zero values are contained in this file and should be treated as values below detection - Method Detection Limits (MDL) are provided with each observation
UNITS	ppbv (parts per billion volume)
OBSERVATION TYPE	Gas
FIELD SAMPLING OR MEASUREMENT PRINCIPLE	Evacuated canister
ANALYTICAL METHODS	GC/MS - Gas chromatography/mass spectrometer
ANALYTICAL LABORATORY	InnoTech Alberta Inc
USER NOTE 1	Data are not blank corrected
SAMPLING INSTRUMENT TYPE	Tisch TE123
FLOW RATE	10.0 cc/min (cubic centimeters per minute)
FLAGS USED	
V0	Valid value
V1	Valid value but comprised wholly or partially of below detection limit data
V4	Valid value despite failing to meet some QC or statistical criteria
V5	Valid value but qualified because of possible contamination
V6	Valid value but qualified due to non-standard sampling conditions
M1	Missing value because no value is available
M2	Missing value because invalidated by Data Originator





Station Name Station # Sample Date	Bertha Ganter - Fort McKay AMS 1 04-Sep			Patricia McInnes AMS 6 04-Sep	
	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
	Compound Name				
1,2,4-Trimethylbenzene	0.03	0	V1	0.03	V0
1,3,5-Trimethylbenzene	0.02	0	V1	0	V1
1,3-Butadiene	0.02	0	V1	0	V1
1-Butene	0.02	0	V1	0	V1
1-Pentene	0.01	0	V1	0	V1
2,2,4-Trimethylpentane	0.01	0.42	V0	0.03	V0
2,2-Dimethylbutane	0.01	0	V1	0	V1
2,3,4-Trimethylpentane	0.01	0	V1	0.01	V0
2,3-Dimethylbutane	0.02	0	V1	0	V1
2,3-Dimethylpentane	0.02	0	V1	0.02	V0
2,4-Dimethylpentane	0.01	0	V1	0.01	V0
2-Methyl-1-pentene	0.3	0	V1	0	V1
2-Methyl-2-butene	0.3	0	V1	0	V1
2-Methylheptane	0.01	0.03	V0	0	V1
2-Methylhexane	0.01	0.02	V0	0	V1
2-Methylpentane	0.01	0	V1	0.04	V0
3-Methyl-1-butene	0.3	0	V1	0	V1
3-Methylheptane	0.02	0.03	V0	0	V1
3-Methylhexane	0.02	0.03	V0	0	V1
3-Methylpentane	0.01	0.02	V0	0.02	V0
4-Methyl-1-pentene	0.3	0	V1	0	V1
Acetaldehyde	3	3	V0	7	V0
Acetone	0.4	2.3	V0	3.1	V0
alpha-Pinene	0.3	0	V1	0	V1
Benzene	0.01	0.04	V0	0.15	V0
beta-Pinene	0.3	0	V1	0	V1
cis-2-Butene	0.02	0	V1	0	V1
cis-2-Hexene	0.3	0	V1	0	V1
cis-2-Pentene	0.02	0	V1	0	V1
Cyclohexane	0.02	0.02	V0	0	V1
Cyclopentane	0.01	0	V1	0	V1
Cyclopentene	0.3	0	V1	0	V1
Ethanol	0.3	1.8	V0	2.4	V0
Ethylbenzene	0.01	0.13	V0	0.02	V0
Formaldehyde	3	0	V1	0	V1
Isobutane	0.02	0.05	V0	0.46	V0
Isobutylene	0.3	0	V1	0	V1
Isopentane	0.03	0.22	V0	0.26	V0
Isoprene	0.01	0.53	V0	0.37	V0
Isopropylalcohol	0.4	0	V1	0	V1
Isopropylbenzene	0.01	0	V1	0	V1
m,p-Xylene	0.03	0.12	V0	0.06	V0
Methanol	3	4	V0	6	V0
Methylcyclohexane	0.01	0.01	V0	0	V1
Methylcyclopentane	0.02	0	V1	0.02	V0
Methylethylketone	0.3	0	V1	0	V1
Methylisobutylketone	0.4	0	V1	0	V1
Methylvinylketone	0.3	0	V1	0	V1
n-Butane	0.03	0.05	V0	0.27	V0
n-Decane	0.06	0	V1	0	V1
n-Dodecane	0.4	0	V1	0	V1
n-Heptane	0.01	0.06	V0	0.03	V0
n-Hexane	0.01	0.03	V0	0.04	V0
n-Nonane	0.01	0.01	V0	0	V1
n-Octane	0.02	0.03	V0	0	V1
n-Pentane	0.1	0	V1	0	V1
n-Propylbenzene	0.05	0	V1	0	V1
n-Undecane	0.5	0	V1	0	V1
Naphthalene	0.5	0	V1	0	V1
o-Xylene	0.01	0.03	V0	0.03	V0
Styrene	0.04	0	V1	0	V1
Toluene	0.01	0.85	V0	0.12	V0
trans-2-Butene	0.01	0	V1	0	V1
trans-2-Hexene	0.3	0	V1	0	V1
trans-2-Pentene	0.02	0	V1	0	V1



Station Name Station # Sample Date	Athabasca Valley AMS 7 04-Sep			Anzac AMS 14 04-Sep	
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0.04	V0	0	V1
1,3,5-Trimethylbenzene	0.02	0	V1	0	V1
1,3-Butadiene	0.02	0	V1	0	V1
1-Butene	0.02	0.05	V0	0	V1
1-Pentene	0.01	0.02	V0	0	V1
2,2,4-Trimethylpentane	0.01	0.23	V0	0.02	V0
2,2-Dimethylbutane	0.01	0	V1	0	V1
2,3,4-Trimethylpentane	0.01	0.07	V0	0	V1
2,3-Dimethylbutane	0.02	0.09	V0	0	V1
2,3-Dimethylpentane	0.02	0.16	V0	0.03	V0
2,4-Dimethylpentane	0.01	0.07	V0	0	V1
2-Methyl-1-pentene	0.3	0	V1	0	V1
2-Methyl-2-butene	0.3	0	V1	0	V1
2-Methylheptane	0.01	0.01	V0	0	V1
2-Methylhexane	0.01	0	V1	0.01	V0
2-Methylpentane	0.01	0.11	V0	0	V1
3-Methyl-1-butene	0.3	0	V1	0	V1
3-Methylheptane	0.02	0	V1	0	V1
3-Methylhexane	0.02	0.04	V0	0.02	V0
3-Methylpentane	0.01	0.06	V0	0.03	V0
4-Methyl-1-pentene	0.3	0	V1	0	V1
Acetaldehyde	3	8	V0	0	V1
Acetone	0.4	3.1	V0	3.3	V0
alpha-Pinene	0.3	0	V1	0	V1
Benzene	0.01	0.22	V0	0.12	V0
beta-Pinene	0.3	0	V1	0	V1
cis-2-Butene	0.02	0	V1	0	V1
cis-2-Hexene	0.3	0	V1	0	V1
cis-2-Pentene	0.02	0	V1	0	V1
Cyclohexane	0.02	0	V1	0	V1
Cyclopentane	0.01	0.02	V0	0	V1
Cyclopentene	0.3	0	V1	0	V1
Ethanol	0.3	2.1	V0	1.8	V0
Ethylbenzene	0.01	0.03	V0	0.01	V0
Formaldehyde	3	0	V1	0	V1
Isobutane	0.02	0.14	V0	0.04	V0
Isobutylene	0.3	0	V1	0	V1
Isopentane	0.03	0.81	V0	0.33	V0
Isoprene	0.01	0.28	V0	0.24	V0
Isopropylalcohol	0.4	0	V1	0	V1
Isopropylbenzene	0.01	0	V1	0	V1
m,p-Xylene	0.03	0.09	V0	0.03	V0
Methanol	3	6	V0	5	V0
Methylcyclohexane	0.01	0.02	V0	0.01	V0
Methylcyclopentane	0.02	0.05	V0	0.02	V0
Methylethylketone	0.3	0.3	V0	0	V1
Methylisobutylketone	0.4	0	V1	0	V1
Methylvinylketone	0.3	0	V1	0	V1
n-Butane	0.03	1.48	V0	0.26	V0
n-Decane	0.06	0	V1	0	V1
n-Dodecane	0.4	0	V1	0	V1
n-Heptane	0.01	0.05	V0	0.05	V0
n-Hexane	0.01	0.07	V0	0.07	V0
n-Nonane	0.01	0.01	V0	0	V1
n-Octane	0.02	0.03	V0	0	V1
n-Pentane	0.1	0.2	V0	0.1	V0
n-Propylbenzene	0.05	0	V1	0	V1
n-Undecane	0.5	0	V1	0	V1
Naphthalene	0.5	0	V1	0	V1
o-Xylene	0.01	0.04	V0	0.02	V0
Styrene	0.04	0	V1	0	V1
Toluene	0.01	0.17	V0	0.13	V0
trans-2-Butene	0.01	0	V1	0	V1
trans-2-Hexene	0.3	0	V1	0	V1
trans-2-Pentene	0.02	0	V1	0	V1



Station Name Station # Sample Date	Barge Landing AMS 9 04-Sep	Fort McKay South AMS 13 04-Sep			
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0	V1	0	V1
1,3,5-Trimethylbenzene	0.02	0	V1	0	V1
1,3-Butadiene	0.02	0	V1	0	V1
1-Butene	0.02	0	V1	0	V1
1-Pentene	0.01	0	V1	0	V1
2,2,4-Trimethylpentane	0.01	0	V1	0.13	V0
2,2-Dimethylbutane	0.01	0.02	V0	0	V1
2,3,4-Trimethylpentane	0.01	0	V1	0	V1
2,3-Dimethylbutane	0.02	0.06	V0	0	V1
2,3-Dimethylpentane	0.02	0.02	V0	0	V1
2,4-Dimethylpentane	0.01	0	V1	0	V1
2-Methyl-1-pentene	0.3	0	V1	0	V1
2-Methyl-2-butene	0.3	0	V1	0	V1
2-Methylheptane	0.01	0.04	V0	0.02	V0
2-Methylhexane	0.01	0	V1	0	V1
2-Methylpentane	0.01	0.02	V0	0	V1
3-Methyl-1-butene	0.3	0	V1	0	V1
3-Methylheptane	0.02	0	V1	0	V1
3-Methylhexane	0.02	0.03	V0	0.02	V0
3-Methylpentane	0.01	0.06	V0	0	V1
4-Methyl-1-pentene	0.3	0	V1	0	V1
Acetaldehyde	3	6	V0	0	V1
Acetone	0.4	2.4	V0	1.9	V0
alpha-Pinene	0.3	0	V1	0	V1
Benzene	0.01	0.04	V0	0.04	V0
beta-Pinene	0.3	0	V1	0	V1
cis-2-Butene	0.02	0	V1	0	V1
cis-2-Hexene	0.3	0	V1	0	V1
cis-2-Pentene	0.02	0	V1	0	V1
Cyclohexane	0.02	0.06	V0	0	V1
Cyclopentane	0.01	0.02	V0	0	V1
Cyclopentene	0.3	0	V1	0	V1
Ethanol	0.3	1.4	V0	0.7	V0
Ethylbenzene	0.01	0	V1	0.04	V0
Formaldehyde	3	0	V1	0	V1
Isobutane	0.02	0.26	V0	0	V1
Isobutylene	0.3	0	V1	0	V1
Isopentane	0.03	0.3	V0	0.07	V0
Isoprene	0.01	0.54	V0	1.07	V0
Isopropylalcohol	0.4	0	V1	0	V1
Isopropylbenzene	0.01	0	V1	0	V1
m,p-Xylene	0.03	0	V1	0.04	V0
Methanol	3	6	V0	4	V0
Methylcyclohexane	0.01	0.05	V0	0.01	V0
Methylcyclopentane	0.02	0.04	V0	0	V1
Methylethylketone	0.3	0	V1	0	V1
Methylisobutylketone	0.4	0	V1	0	V1
Methylvinylketone	0.3	0	V1	0	V1
n-Butane	0.03	0.05	V0	0	V1
n-Decane	0.06	0	V1	0	V1
n-Dodecane	0.4	0	V1	0	V1
n-Heptane	0.01	0.06	V0	0.03	V0
n-Hexane	0.01	0.01	V0	0	V1
n-Nonane	0.01	0.02	V0	0.01	V0
n-Octane	0.02	0.09	V0	0.03	V0
n-Pentane	0.1	0	V1	0	V1
n-Propylbenzene	0.05	0	V1	0	V1
n-Undecane	0.5	0	V1	0	V1
Naphthalene	0.5	0	V1	0	V1
o-Xylene	0.01	0.01	V0	0.02	V0
Styrene	0.04	0	V1	0	V1
Toluene	0.01	0.05	V0	0.2	V0
trans-2-Butene	0.01	0	V1	0	V1
trans-2-Hexene	0.3	0	V1	0	V1
trans-2-Pentene	0.02	0	V1	0	V1



Station Name Station # Sample Date	Horizon AMS 15 04-Sep	Janvier AMS 22 04-Sep			
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0	V1	0	V1
1,3,5-Trimethylbenzene	0.02	0	V1	0	V1
1,3-Butadiene	0.02	0	V1	0	V1
1-Butene	0.02	0	V1	0	V1
1-Pentene	0.01	0	V1	0	V1
2,2,4-Trimethylpentane	0.01	0	V1	0.04	V0
2,2-Dimethylbutane	0.01	0.11	V0	0	V1
2,3,4-Trimethylpentane	0.01	0.02	V0	0	V1
2,3-Dimethylbutane	0.02	0.21	V0	0	V1
2,3-Dimethylpentane	0.02	0.13	V0	0	V1
2,4-Dimethylpentane	0.01	0.02	V0	0	V1
2-Methyl-1-pentene	0.3	0	V1	0	V1
2-Methyl-2-butene	0.3	0	V1	0	V1
2-Methylheptane	0.01	0.08	V0	0	V1
2-Methylhexane	0.01	0.05	V0	0.01	V0
2-Methylpentane	0.01	0.19	V0	0	V1
3-Methyl-1-butene	0.3	0	V1	0	V1
3-Methylheptane	0.02	0.03	V0	0	V1
3-Methylhexane	0.02	0.1	V0	0	V1
3-Methylpentane	0.01	0.41	V0	0.01	V0
4-Methyl-1-pentene	0.3	0	V1	0	V1
Acetaldehyde	3	0	V1	0	V1
Acetone	0.4	2.1	V0	1.9	V0
alpha-Pinene	0.3	0	V1	0	V1
Benzene	0.01	0.06	V0	0.06	V0
beta-Pinene	0.3	0	V1	0	V1
cis-2-Butene	0.02	0	V1	0	V1
cis-2-Hexene	0.3	0	V1	0	V1
cis-2-Pentene	0.02	0	V1	0	V1
Cyclohexane	0.02	0.39	V0	0	V1
Cyclopentane	0.01	0.11	V0	0	V1
Cyclopentene	0.3	0	V1	0	V1
Ethanol	0.3	0.7	V0	1	V0
Ethylbenzene	0.01	0.03	V0	0.01	V0
Formaldehyde	3	0	V1	9	V0
Isobutane	0.02	1.3	V0	0	V1
Isobutylene	0.3	0	V1	0	V1
Isopentane	0.03	2.06	V4	0.19	V0
Isoprene	0.01	0.37	V0	0.5	V0
Isopropylalcohol	0.4	0	V1	0	V1
Isopropylbenzene	0.01	0	V1	0	V1
m,p-Xylene	0.03	0.07	V0	0	V1
Methanol	3	4	V0	6	V0
Methylcyclohexane	0.01	0.23	V0	0	V1
Methylcyclopentane	0.02	0.25	V0	0	V1
Methylethylketone	0.3	0	V1	0	V1
Methylisobutylketone	0.4	0	V1	0	V1
Methylvinylketone	0.3	0	V1	0	V1
n-Butane	0.03	0.2	V0	0.09	V0
n-Decane	0.06	0	V1	0	V1
n-Dodecane	0.4	0	V1	0	V1
n-Heptane	0.01	0.21	V0	0.04	V0
n-Hexane	0.01	0.1	V0	0.04	V0
n-Nonane	0.01	0.05	V0	0	V1
n-Octane	0.02	0.1	V0	0	V1
n-Pentane	0.1	0.3	V0	0.1	V0
n-Propylbenzene	0.05	0	V1	0	V1
n-Undecane	0.5	0	V1	0	V1
Naphthalene	0.5	0	V1	0	V1
o-Xylene	0.01	0.02	V0	0.01	V0
Styrene	0.04	0	V1	0	V1
Toluene	0.01	0.12	V0	0.11	V0
trans-2-Butene	0.01	0	V1	0	V1
trans-2-Hexene	0.3	0	V1	0	V1
trans-2-Pentene	0.02	0	V1	0	V1



Station Name Station # Sample Date	Bertha Ganter - Fort McKay AMS 1 10-Sep			Patricia McInnes AMS 6 10-Sep	
	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0	V1	0	V1
1,3,5-Trimethylbenzene	0.02	0	V1	0	V1
1,3-Butadiene	0.02	0	V1	0	V1
1-Butene	0.02	0	V1	0	V1
1-Pentene	0.01	0	V1	0	V1
2,2,4-Trimethylpentane	0.01	0	V1	0	V1
2,2-Dimethylbutane	0.01	0.01	V0	0.02	V0
2,3,4-Trimethylpentane	0.01	0	V1	0	V1
2,3-Dimethylbutane	0.02	0.03	V0	0.04	V0
2,3-Dimethylpentane	0.02	0	V1	0.02	V0
2,4-Dimethylpentane	0.01	0	V1	0	V1
2-Methyl-1-pentene	0.3	0	V1	0	V1
2-Methyl-2-butene	0.3	0	V1	0	V1
2-Methylheptane	0.01	0.02	V0	0.03	V0
2-Methylhexane	0.01	0	V1	0	V1
2-Methylpentane	0.01	0.06	V0	0.09	V0
3-Methyl-1-butene	0.3	0	V1	0	V1
3-Methylheptane	0.02	0	V1	0	V1
3-Methylhexane	0.02	0.03	V0	0.04	V0
3-Methylpentane	0.01	0.04	V0	0.06	V0
4-Methyl-1-pentene	0.3	0	V1	0	V1
Acetaldehyde	3	9	V0	5	V0
Acetone	0.4	2.9	V0	7.3	V0
alpha-Pinene	0.3	0	V1	0	V1
Benzene	0.01	0.1	V0	0.09	V0
beta-Pinene	0.3	0	V1	0	V1
cis-2-Butene	0.02	0	V1	0	V1
cis-2-Hexene	0.3	0	V1	0	V1
cis-2-Pentene	0.02	0	V1	0	V1
Cyclohexane	0.02	0	V1	0.04	V0
Cyclopentane	0.01	0.02	V0	0.03	V0
Cyclopentene	0.3	0	V1	0	V1
Ethanol	0.3	2.3	V0	1.7	V0
Ethylbenzene	0.01	0.01	V0	0	V1
Formaldehyde	3	0	V1	0	V1
Isobutane	0.02	0.58	V0	0.09	V0
Isobutylene	0.3	0	V1	0	V1
Isopentane	0.03	0.28	V0	0.34	V0
Isoprene	0.01	0.22	V0	0.24	V0
Isopropylalcohol	0.4	0	V1	0	V1
Isopropylbenzene	0.01	0	V1	0	V1
m,p-Xylene	0.03	0	V1	0	V1
Methanol	3	7	V0	5	V0
Methylcyclohexane	0.01	0.03	V0	0.04	V0
Methylcyclopentane	0.02	0.02	V0	0.04	V0
Methylethylketone	0.3	0.3	V0	0.3	V0
Methylisobutylketone	0.4	0	V1	0	V1
Methylvinylketone	0.3	0	V1	0	V1
n-Butane	0.03	0.19	V0	0.19	V0
n-Decane	0.06	0	V1	0	V1
n-Dodecane	0.4	0	V1	0	V1
n-Heptane	0.01	0.05	V0	0.07	V0
n-Hexane	0.01	0.04	V0	0.07	V0
n-Nonane	0.01	0.02	V0	0.01	V0
n-Octane	0.02	0.04	V0	0.04	V0
n-Pentane	0.1	0.1	V0	0.2	V0
n-Propylbenzene	0.05	0	V1	0	V1
n-Undecane	0.5	0	V1	0	V1
Naphthalene	0.5	0	V1	0	V1
o-Xylene	0.01	0.01	V0	0.01	V0
Styrene	0.04	0	V1	0	V1
Toluene	0.01	0.07	V0	0.07	V0
trans-2-Butene	0.01	0	V1	0	V1
trans-2-Hexene	0.3	0	V1	0	V1
trans-2-Pentene	0.02	0	V1	0	V1



Station Name Station # Sample Date	Athabasca Valley AMS 7 10-Sep			Anzac AMS 14 10-Sep	
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0	V1	0	V1
1,3,5-Trimethylbenzene	0.02	0	V1	0	V1
1,3-Butadiene	0.02	0	V1	0	V1
1-Butene	0.02	0	V1	0	V1
1-Pentene	0.01	0	V1	0	V1
2,2,4-Trimethylpentane	0.01	0	V1	0	V1
2,2-Dimethylbutane	0.01	0.02	V0	0.04	V0
2,3,4-Trimethylpentane	0.01	0	V1	0	V1
2,3-Dimethylbutane	0.02	0.07	V0	0.06	V0
2,3-Dimethylpentane	0.02	0.02	V0	0.02	V0
2,4-Dimethylpentane	0.01	0	V1	0	V1
2-Methyl-1-pentene	0.3	0	V1	0	V1
2-Methyl-2-butene	0.3	0	V1	0	V1
2-Methylheptane	0.01	0.04	V0	0.03	V0
2-Methylhexane	0.01	0	V1	0	V1
2-Methylpentane	0.01	0.11	V0	0.21	V0
3-Methyl-1-butene	0.3	0	V1	0	V1
3-Methylheptane	0.02	0	V1	0	V1
3-Methylhexane	0.02	0.05	V0	0.03	V0
3-Methylpentane	0.01	0.08	V0	0.11	V0
4-Methyl-1-pentene	0.3	0	V1	0	V1
Acetaldehyde	3	9	V0	0	V1
Acetone	0.4	2.8	V0	2.1	V0
alpha-Pinene	0.3	0	V1	0	V1
Benzene	0.01	0.09	V0	0.15	V0
beta-Pinene	0.3	0	V1	0	V1
cis-2-Butene	0.02	0	V1	0	V1
cis-2-Hexene	0.3	0	V1	0	V1
cis-2-Pentene	0.02	0	V1	0	V1
Cyclohexane	0.02	0.04	V0	0.02	V0
Cyclopentane	0.01	0.03	V0	0.05	V0
Cyclopentene	0.3	0	V1	0	V1
Ethanol	0.3	2.2	V0	0.7	V0
Ethylbenzene	0.01	0.01	V0	0.02	V0
Formaldehyde	3	0	V1	0	V1
Isobutane	0.02	0.06	V0	0.08	V0
Isobutylene	0.3	0	V1	0	V1
Isopentane	0.03	0.39	V0	0.41	V0
Isoprene	0.01	0.22	V0	0.27	V0
Isopropylalcohol	0.4	0	V1	0	V1
Isopropylbenzene	0.01	0	V1	0	V1
m,p-Xylene	0.03	0.03	V0	0.04	V0
Methanol	3	8	V0	5	V0
Methylcyclohexane	0.01	0.06	V0	0.04	V0
Methylcyclopentane	0.02	0.04	V0	0.05	V0
Methylethylketone	0.3	0	V1	0	V1
Methylisobutylketone	0.4	0	V1	0	V1
Methylvinylketone	0.3	0	V1	0	V1
n-Butane	0.03	0.23	V0	0.28	V0
n-Decane	0.06	0	V1	0	V1
n-Dodecane	0.4	0	V1	0	V1
n-Heptane	0.01	0.1	V0	0.06	V0
n-Hexane	0.01	0.07	V0	0.12	V0
n-Nonane	0.01	0.02	V0	0.02	V0
n-Octane	0.02	0.06	V0	0.05	V0
n-Pentane	0.1	0.2	V0	0.4	V0
n-Propylbenzene	0.05	0	V1	0	V1
n-Undecane	0.5	0	V1	0	V1
Naphthalene	0.5	0	V1	0.6	V0
o-Xylene	0.01	0.01	V0	0.02	V0
Styrene	0.04	0	V1	0	V1
Toluene	0.01	0.07	V0	0.18	V0
trans-2-Butene	0.01	0	V1	0	V1
trans-2-Hexene	0.3	0	V1	0	V1
trans-2-Pentene	0.02	0	V1	0	V1



Station Name	Fort McKay South		
Station #	AMS 13		
Sample Date	10-Sep		
Compound Name	MDL (ppbv)	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0	V1
1,3,5-Trimethylbenzene	0.02	0	V1
1,3-Butadiene	0.02	0	V1
1-Butene	0.02	0	V1
1-Pentene	0.01	0	V1
2,2,4-Trimethylpentane	0.01	0	V1
2,2-Dimethylbutane	0.01	0.02	V0
2,3,4-Trimethylpentane	0.01	0	V1
2,3-Dimethylbutane	0.02	0.02	V0
2,3-Dimethylpentane	0.02	0	V1
2,4-Dimethylpentane	0.01	0	V1
2-Methyl-1-pentene	0.3	0	V1
2-Methyl-2-butene	0.3	0	V1
2-Methylheptane	0.01	0.04	V0
2-Methylhexane	0.01	0	V1
2-Methylpentane	0.01	0.07	V0
3-Methyl-1-butene	0.3	0	V1
3-Methylheptane	0.02	0	V1
3-Methylhexane	0.02	0.04	V0
3-Methylpentane	0.01	0.05	V0
4-Methyl-1-pentene	0.3	0	V1
Acetaldehyde	3	12	V0
Acetone	0.4	3.3	V0
alpha-Pinene	0.3	0	V1
Benzene	0.01	0.09	V0
beta-Pinene	0.3	0	V1
cis-2-Butene	0.02	0	V1
cis-2-Hexene	0.3	0	V1
cis-2-Pentene	0.02	0	V1
Cyclohexane	0.02	0.03	V0
Cyclopentane	0.01	0.02	V0
Cyclopentene	0.3	0	V1
Ethanol	0.3	1.4	V0
Ethylbenzene	0.01	0	V1
Formaldehyde	3	0	V1
Isobutane	0.02	0.71	V0
Isobutylene	0.3	0	V1
Isopentane	0.03	0.34	V0
Isoprene	0.01	0.39	V0
Isopropylalcohol	0.4	0	V1
Isopropylbenzene	0.01	0	V1
m,p-Xylene	0.03	0	V1
Methanol	3	5	V0
Methylcyclohexane	0.01	0.06	V0
Methylcyclopentane	0.02	0.04	V0
Methylethylketone	0.3	0	V1
Methylisobutylketone	0.4	0	V1
Methylvinylketone	0.3	0	V1
n-Butane	0.03	0.18	V0
n-Decane	0.06	0	V1
n-Dodecane	0.4	0	V1
n-Heptane	0.01	0.07	V0
n-Hexane	0.01	0.05	V0
n-Nonane	0.01	0.02	V0
n-Octane	0.02	0.05	V0
n-Pentane	0.1	0.2	V0
n-Propylbenzene	0.05	0	V1
n-Undecane	0.5	0	V1
Naphthalene	0.5	0	V1
o-Xylene	0.01	0.01	V0
Styrene	0.04	0	V1
Toluene	0.01	0.08	V0
trans-2-Butene	0.01	0	V1
trans-2-Hexene	0.3	0	V1
trans-2-Pentene	0.02	0	V1



Station Name Station # Sample Date	Horizon AMS 15 10-Sep	Janvier AMS 22 10-Sep			
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0	V1	0	V1
1,3,5-Trimethylbenzene	0.02	0	V1	0	V1
1,3-Butadiene	0.02	0	V1	0	V1
1-Butene	0.02	0	V1	0	V1
1-Pentene	0.01	0	V1	0	V1
2,2,4-Trimethylpentane	0.01	0	V1	0	V1
2,2-Dimethylbutane	0.01	0.03	V0	0	V1
2,3,4-Trimethylpentane	0.01	0	V1	0	V1
2,3-Dimethylbutane	0.02	0.06	V0	0	V1
2,3-Dimethylpentane	0.02	0	V1	0	V1
2,4-Dimethylpentane	0.01	0	V1	0	V1
2-Methyl-1-pentene	0.3	0	V1	0	V1
2-Methyl-2-butene	0.3	0	V1	0	V1
2-Methylheptane	0.01	0.02	V0	0	V1
2-Methylhexane	0.01	0.01	V0	0	V1
2-Methylpentane	0.01	0.1	V0	0.02	V0
3-Methyl-1-butene	0.3	0	V1	0	V1
3-Methylheptane	0.02	0	V1	0	V1
3-Methylhexane	0.02	0.03	V0	0	V1
3-Methylpentane	0.01	0.09	V0	0	V1
4-Methyl-1-pentene	0.3	0	V1	0	V1
Acetaldehyde	3	4	V0	5	V0
Acetone	0.4	1.9	V0	1.9	V0
alpha-Pinene	0.3	0	V1	0	V1
Benzene	0.01	0.09	V0	0.08	V0
beta-Pinene	0.3	0	V1	0	V1
cis-2-Butene	0.02	0	V1	0	V1
cis-2-Hexene	0.3	0	V1	0	V1
cis-2-Pentene	0.02	0	V1	0	V1
Cyclohexane	0.02	0.05	V0	0	V1
Cyclopentane	0.01	0.03	V0	0	V1
Cyclopentene	0.3	0	V1	0	V1
Ethanol	0.3	0.7	V0	1.1	V0
Ethylbenzene	0.01	0	V1	0.02	V0
Formaldehyde	3	0	V1	11	V0
Isobutane	0.02	0.22	V0	0.02	V0
Isobutylene	0.3	0	V1	0	V1
Isopentane	0.03	0.38	V0	0.11	V0
Isoprene	0.01	0.32	V0	0.26	V0
Isopropylalcohol	0.4	0	V1	0	V1
Isopropylbenzene	0.01	0	V1	0	V1
m,p-Xylene	0.03	0	V1	0.04	V0
Methanol	3	4	V0	6	V0
Methylcyclohexane	0.01	0.04	V0	0	V1
Methylcyclopentane	0.02	0.05	V0	0	V1
Methylethylketone	0.3	0	V1	0	V1
Methylisobutylketone	0.4	0	V1	0	V1
Methylvinylketone	0.3	0	V1	0	V1
n-Butane	0.03	0.13	V0	0.14	V0
n-Decane	0.06	0	V1	0	V1
n-Dodecane	0.4	0	V1	0	V1
n-Heptane	0.01	0.04	V0	0.01	V0
n-Hexane	0.01	0.05	V0	0.02	V0
n-Nonane	0.01	0.01	V0	0	V1
n-Octane	0.02	0.03	V0	0	V1
n-Pentane	0.1	0.2	V0	0	V1
n-Propylbenzene	0.05	0	V1	0	V1
n-Undecane	0.5	0	V1	0	V1
Naphthalene	0.5	0	V1	0	V1
o-Xylene	0.01	0	V1	0.02	V0
Styrene	0.04	0	V1	0	V1
Toluene	0.01	0.08	V0	0.14	V0
trans-2-Butene	0.01	0	V1	0	V1
trans-2-Hexene	0.3	0	V1	0	V1
trans-2-Pentene	0.02	0	V1	0	V1





Station Name Station # Sample Date	Bertha Ganter - Fort McKay			Patricia McInnes AMS 6	
	MDL (ppbv)	Results (ppbv)	Flag	AMS 6	
				16-Sep	
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0.05	V0	0.04	V0
1,3,5-Trimethylbenzene	0.02	0.02	V0	0	V1
1,3-Butadiene	0.02	0	V1	0	V1
1-Butene	0.02	0	V1	0	V1
1-Pentene	0.01	0	V1	0	V1
2,2,4-Trimethylpentane	0.01	0	V1	0	V1
2,2-Dimethylbutane	0.01	0.04	V0	0	V1
2,3,4-Trimethylpentane	0.01	0.02	V0	0.01	V0
2,3-Dimethylbutane	0.02	0.09	V0	0.02	V0
2,3-Dimethylpentane	0.02	0.09	V0	0.04	V0
2,4-Dimethylpentane	0.01	0.02	V0	0.02	V0
2-Methyl-1-pentene	0.3	0	V1	0	V1
2-Methyl-2-butene	0.3	0	V1	0	V1
2-Methylheptane	0.01	0.35	V0	0	V1
2-Methylhexane	0.01	0.18	V0	0.02	V0
2-Methylpentane	0.01	0.23	V0	0.06	V0
3-Methyl-1-butene	0.3	0	V1	0	V1
3-Methylheptane	0.02	0.15	V0	0	V1
3-Methylhexane	0.02	0.3	V0	0.02	V0
3-Methylpentane	0.01	0.14	V0	0.03	V0
4-Methyl-1-pentene	0.3	0	V1	0	V1
Acetaldehyde	3	0	V1	0	V1
Acetone	0.4	1.6	V0	1.9	V0
alpha-Pinene	0.3	0	V1	0	V1
Benzene	0.01	0.09	V0	0	V1
beta-Pinene	0.3	0	V1	0	V1
cis-2-Butene	0.02	0	V1	0	V1
cis-2-Hexene	0.3	0	V1	0	V1
cis-2-Pentene	0.02	0	V1	0	V1
Cyclohexane	0.02	0.12	V0	0	V1
Cyclopentane	0.01	0.03	V0	0.01	V0
Cyclopentene	0.3	0	V1	0	V1
Ethanol	0.3	0.8	V0	2.3	V0
Ethylbenzene	0.01	0.09	V0	0.02	V0
Formaldehyde	3	0	V1	0	V1
Isobutane	0.02	0.18	V0	0.13	V0
Isobutylene	0.3	0	V1	0	V1
Isopentane	0.03	0.28	V0	0.37	V0
Isoprene	0.01	0.11	V0	0.05	V0
Isopropylalcohol	0.4	0	V1	0	V1
Isopropylbenzene	0.01	0	V1	0	V1
m,p-Xylene	0.03	0.24	V0	0.05	V0
Methanol	3	4	V0	5	V0
Methylcyclohexane	0.01	0.33	V0	0.01	V0
Methylcyclopentane	0.02	0.27	V0	0.03	V0
Methylethylketone	0.3	0	V1	0	V1
Methylisobutylketone	0.4	0	V1	0	V1
Methylvinylketone	0.3	0	V1	0	V1
n-Butane	0.03	0.4	V0	0.21	V0
n-Decane	0.06	0	V1	0	V1
n-Dodecane	0.4	0	V1	0	V1
n-Heptane	0.01	0.75	V0	0.03	V0
n-Hexane	0.01	0.52	V0	0.05	V0
n-Nonane	0.01	0.16	V0	0	V1
n-Octane	0.02	0.56	V0	0	V1
n-Pentane	0.1	0.2	V0	0.2	V0
n-Propylbenzene	0.05	0	V1	0	V1
n-Undecane	0.5	0	V1	0	V1
Naphthalene	0.5	0	V1	0	V1
o-Xylene	0.01	0.1	V0	0.02	V0
Styrene	0.04	0	V1	0	V1
Toluene	0.01	0.34	V0	0.09	V0
trans-2-Butene	0.01	0.01	V0	0	V1
trans-2-Hexene	0.3	0	V1	0	V1
trans-2-Pentene	0.02	0	V1	0	V1



Station Name Station # Sample Date	Athabasca Valley AMS 7 16-Sep			Anzac AMS 14 16-Sep	
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0.03	V0	0	V1
1,3,5-Trimethylbenzene	0.02	0	V1	0	V1
1,3-Butadiene	0.02	0	V1	0	V1
1-Butene	0.02	0	V1	0	V1
1-Pentene	0.01	0	V1	0	V1
2,2,4-Trimethylpentane	0.01	0.04	V0	0.02	V0
2,2-Dimethylbutane	0.01	0	V1	0	V1
2,3,4-Trimethylpentane	0.01	0.01	V0	0	V1
2,3-Dimethylbutane	0.02	0.04	V0	0	V1
2,3-Dimethylpentane	0.02	0.03	V0	0	V1
2,4-Dimethylpentane	0.01	0.02	V0	0	V1
2-Methyl-1-pentene	0.3	0	V1	0	V1
2-Methyl-2-butene	0.3	0	V1	0	V1
2-Methylheptane	0.01	0.01	V0	0	V1
2-Methylhexane	0.01	0	V1	0.01	V0
2-Methylpentane	0.01	0.06	V0	0.05	V0
3-Methyl-1-butene	0.3	0	V1	0	V1
3-Methylheptane	0.02	0	V1	0	V1
3-Methylhexane	0.02	0.03	V0	0.02	V0
3-Methylpentane	0.01	0.04	V0	0.03	V0
4-Methyl-1-pentene	0.3	0	V1	0	V1
Acetaldehyde	3	0	V1	0	V1
Acetone	0.4	1.5	V0	1.6	V0
alpha-Pinene	0.3	0	V1	0	V1
Benzene	0.01	0.08	V0	0.05	V0
beta-Pinene	0.3	0	V1	0	V1
cis-2-Butene	0.02	0	V1	0	V1
cis-2-Hexene	0.3	0	V1	0	V1
cis-2-Pentene	0.02	0	V1	0	V1
Cyclohexane	0.02	0	V1	0.02	V0
Cyclopentane	0.01	0.01	V0	0.02	V0
Cyclopentene	0.3	0	V1	0	V1
Ethanol	0.3	1.6	V0	0.6	V0
Ethylbenzene	0.01	0.02	V0	0.01	V0
Formaldehyde	3	0	V1	0	V1
Isobutane	0.02	0.2	V0	0.37	V0
Isobutylene	0.3	0	V1	0	V1
Isopentane	0.03	0.36	V0	0.22	V0
Isoprene	0.01	0.05	V0	0.07	V0
Isopropylalcohol	0.4	0	V1	0	V1
Isopropylbenzene	0.01	0	V1	0	V1
m,p-Xylene	0.03	0.06	V0	0.04	V0
Methanol	3	4	V0	4	V0
Methylcyclohexane	0.01	0.02	V0	0.02	V0
Methylcyclopentane	0.02	0.04	V0	0.04	V0
Methylethylketone	0.3	0	V1	0	V1
Methylisobutylketone	0.4	0	V1	0	V1
Methylvinylketone	0.3	0	V1	0	V1
n-Butane	0.03	0.47	V0	0.35	V0
n-Decane	0.06	0	V1	0	V1
n-Dodecane	0.4	0	V1	0	V1
n-Heptane	0.01	0.03	V0	0.03	V0
n-Hexane	0.01	0.06	V0	0.06	V0
n-Nonane	0.01	0	V1	0	V1
n-Octane	0.02	0	V1	0	V1
n-Pentane	0.1	0.2	V0	0.2	V0
n-Propylbenzene	0.05	0	V1	0	V1
n-Undecane	0.5	0	V1	0	V1
Naphthalene	0.5	0	V1	0	V1
o-Xylene	0.01	0.02	V0	0.01	V0
Styrene	0.04	0	V1	0	V1
Toluene	0.01	0.1	V0	0.13	V0
trans-2-Butene	0.01	0	V1	0	V1
trans-2-Hexene	0.3	0	V1	0	V1
trans-2-Pentene	0.02	0	V1	0	V1



Station Name Station # Sample Date	Barge Landing AMS 9 16-Sep	Fort McKay South AMS 13 16-Sep			
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0.04	V0	0.04	V0
1,3,5-Trimethylbenzene	0.02	0	V1	0.02	V0
1,3-Butadiene	0.02	0	V1	0	V1
1-Butene	0.02	0	V1	0	V1
1-Pentene	0.01	0	V1	0	V1
2,2,4-Trimethylpentane	0.01	0	V1	0	V1
2,2-Dimethylbutane	0.01	0.04	V0	0.04	V0
2,3,4-Trimethylpentane	0.01	0	V1	0.02	V0
2,3-Dimethylbutane	0.02	0.08	V0	0.07	V0
2,3-Dimethylpentane	0.02	0.04	V0	0.09	V0
2,4-Dimethylpentane	0.01	0.01	V0	0.02	V0
2-Methyl-1-pentene	0.3	0	V1	0	V1
2-Methyl-2-butene	0.3	0	V1	0	V1
2-Methylheptane	0.01	0.11	V0	0.36	V0
2-Methylhexane	0.01	0.09	V0	0.15	V0
2-Methylpentane	0.01	0.11	V0	0.18	V0
3-Methyl-1-butene	0.3	0	V1	0	V1
3-Methylheptane	0.02	0.05	V0	0.16	V0
3-Methylhexane	0.02	0.11	V0	0.27	V0
3-Methylpentane	0.01	0.06	V0	0.11	V0
4-Methyl-1-pentene	0.3	0	V1	0	V1
Acetaldehyde	3	0	V1	0	V1
Acetone	0.4	2	V0	1.4	V0
alpha-Pinene	0.3	0	V1	0	V1
Benzene	0.01	0	V1	0.1	V0
beta-Pinene	0.3	0	V1	0	V1
cis-2-Butene	0.02	0	V1	0	V1
cis-2-Hexene	0.3	0	V1	0	V1
cis-2-Pentene	0.02	0	V1	0	V1
Cyclohexane	0.02	0.04	V0	0.13	V0
Cyclopentane	0.01	0.02	V0	0.03	V0
Cyclopentene	0.3	0	V1	0	V1
Ethanol	0.3	1.1	V0	0.3	V0
Ethylbenzene	0.01	0.03	V0	0.09	V0
Formaldehyde	3	0	V1	0	V1
Isobutane	0.02	0.52	V0	0.14	V0
Isobutylene	0.3	0	V1	0	V1
Isopentane	0.03	0.22	V0	0.22	V0
Isoprene	0.01	0.13	V0	0.1	V0
Isopropylalcohol	0.4	0	V1	0	V1
Isopropylbenzene	0.01	0	V1	0	V1
m,p-Xylene	0.03	0.08	V0	0.27	V0
Methanol	3	7	V0	5	V0
Methylcyclohexane	0.01	0.09	V0	0.38	V0
Methylcyclopentane	0.02	0.1	V0	0.24	V0
Methylethylketone	0.3	0	V1	0	V1
Methylisobutylketone	0.4	0	V1	0	V1
Methylvinylketone	0.3	0	V1	0	V1
n-Butane	0.03	0.04	V0	0.28	V0
n-Decane	0.06	0	V1	0	V1
n-Dodecane	0.4	0	V1	0	V1
n-Heptane	0.01	0.3	V0	0.69	V0
n-Hexane	0.01	0.22	V0	0.41	V0
n-Nonane	0.01	0.07	V0	0.16	V0
n-Octane	0.02	0.13	V0	0.59	V0
n-Pentane	0.1	0.2	V0	0.2	V0
n-Propylbenzene	0.05	0	V1	0	V1
n-Undecane	0.5	0	V1	0	V1
Naphthalene	0.5	0	V1	0	V1
o-Xylene	0.01	0.04	V0	0.12	V0
Styrene	0.04	0	V1	0	V1
Toluene	0.01	0.18	V0	0.41	V0
trans-2-Butene	0.01	0	V1	0	V1
trans-2-Hexene	0.3	0	V1	0	V1
trans-2-Pentene	0.02	0	V1	0	V1



Station Name Station # Sample Date	Horizon AMS 15 16-Sep	Janvier AMS 22 16-Sep			
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0	V1	0	V1
1,3,5-Trimethylbenzene	0.02	0	V1	0	V1
1,3-Butadiene	0.02	0	V1	0	V1
1-Butene	0.02	0	V1	0	V1
1-Pentene	0.01	0	V1	0	V1
2,2,4-Trimethylpentane	0.01	0	V1	0	V1
2,2-Dimethylbutane	0.01	0	V1	0	V1
2,3,4-Trimethylpentane	0.01	0	V1	0	V1
2,3-Dimethylbutane	0.02	0.03	V0	0.02	V0
2,3-Dimethylpentane	0.02	0	V1	0	V1
2,4-Dimethylpentane	0.01	0	V1	0	V1
2-Methyl-1-pentene	0.3	0	V1	0	V1
2-Methyl-2-butene	0.3	0	V1	0	V1
2-Methylheptane	0.01	0.02	V0	0	V1
2-Methylhexane	0.01	0	V1	0	V1
2-Methylpentane	0.01	0	V1	0.05	V0
3-Methyl-1-butene	0.3	0	V1	0	V1
3-Methylheptane	0.02	0	V1	0	V1
3-Methylhexane	0.02	0	V1	0	V1
3-Methylpentane	0.01	0	V1	0.03	V0
4-Methyl-1-pentene	0.3	0	V1	0	V1
Acetaldehyde	3	0	V1	3	V0
Acetone	0.4	1.8	V0	1.5	V0
alpha-Pinene	0.3	0	V1	0	V1
Benzene	0.01	0	V1	0.08	V0
beta-Pinene	0.3	0	V1	0	V1
cis-2-Butene	0.02	0	V1	0	V1
cis-2-Hexene	0.3	0	V1	0	V1
cis-2-Pentene	0.02	0	V1	0	V1
Cyclohexane	0.02	0	V1	0	V1
Cyclopentane	0.01	0	V1	0.02	V0
Cyclopentene	0.3	0	V1	0	V1
Ethanol	0.3	0.7	V0	1	V0
Ethylbenzene	0.01	0	V1	0	V1
Formaldehyde	3	0	V1	10	V0
Isobutane	0.02	0	V1	0.13	V0
Isobutylene	0.3	0	V1	0	V1
Isopentane	0.03	0.09	V0	0.43	V0
Isoprene	0.01	0.08	V0	0.19	V0
Isopropylalcohol	0.4	0	V1	0	V1
Isopropylbenzene	0.01	0	V1	0	V1
m,p-Xylene	0.03	0	V1	0	V1
Methanol	3	3	V0	5	V0
Methylcyclohexane	0.01	0.02	V0	0.02	V0
Methylcyclopentane	0.02	0	V1	0.02	V0
Methylethylketone	0.3	0	V1	0	V1
Methylisobutylketone	0.4	0	V1	0	V1
Methylvinylketone	0.3	0	V1	0	V1
n-Butane	0.03	0	V1	0.22	V0
n-Decane	0.06	0	V1	0	V1
n-Dodecane	0.4	0	V1	0	V1
n-Heptane	0.01	0.02	V0	0.01	V0
n-Hexane	0.01	0.02	V0	0.04	V0
n-Nonane	0.01	0.01	V0	0	V1
n-Octane	0.02	0	V1	0	V1
n-Pentane	0.1	0	V1	0.3	V0
n-Propylbenzene	0.05	0	V1	0	V1
n-Undecane	0.5	0	V1	0	V1
Naphthalene	0.5	0	V1	0	V1
o-Xylene	0.01	0	V1	0	V1
Styrene	0.04	0	V1	0	V1
Toluene	0.01	0.03	V0	0.08	V0
trans-2-Butene	0.01	0	V1	0	V1
trans-2-Hexene	0.3	0	V1	0	V1
trans-2-Pentene	0.02	0	V1	0	V1



Station Name Station # Sample Date	Bertha Ganter - Fort McKay AMS 1 22-Sep			Patricia McInnes AMS 6 22-Sep	
	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0	V1	0	V1
1,3,5-Trimethylbenzene	0.02	0	V1	0	V1
1,3-Butadiene	0.02	0	V1	0	V1
1-Butene	0.02	0	V1	0	V1
1-Pentene	0.01	0	V1	0	V1
2,2,4-Trimethylpentane	0.01	0	V1	0	V1
2,2-Dimethylbutane	0.01	0.01	V0	0	V1
2,3,4-Trimethylpentane	0.01	0	V1	0	V1
2,3-Dimethylbutane	0.02	0.04	V0	0.03	V0
2,3-Dimethylpentane	0.02	0.02	V0	0.03	V0
2,4-Dimethylpentane	0.01	0	V1	0	V1
2-Methyl-1-pentene	0.3	0	V1	0	V1
2-Methyl-2-butene	0.3	0	V1	0	V1
2-Methylheptane	0.01	0.05	V0	0.02	V0
2-Methylhexane	0.01	0.04	V0	0.03	V0
2-Methylpentane	0.01	0.04	V0	0.08	V0
3-Methyl-1-butene	0.3	0	V1	0	V1
3-Methylheptane	0.02	0.02	V0	0	V1
3-Methylhexane	0.02	0.04	V0	0.03	V0
3-Methylpentane	0.01	0.02	V0	0.04	V0
4-Methyl-1-pentene	0.3	0	V1	0	V1
Acetaldehyde	3	0	V1	0	V1
Acetone	0.4	1.2	V0	1.5	V0
alpha-Pinene	0.3	0	V1	0	V1
Benzene	0.01	0	V1	0	V1
beta-Pinene	0.3	0	V1	0	V1
cis-2-Butene	0.02	0	V1	0	V1
cis-2-Hexene	0.3	0	V1	0	V1
cis-2-Pentene	0.02	0	V1	0	V1
Cyclohexane	0.02	0.02	V0	0	V1
Cyclopentane	0.01	0	V1	0.02	V0
Cyclopentene	0.3	0	V1	0	V1
Ethanol	0.3	1.1	V0	1.3	V0
Ethylbenzene	0.01	0.01	V0	0.01	V0
Formaldehyde	3	0	V1	0	V1
Isobutane	0.02	0	V1	0	V1
Isobutylene	0.3	0	V1	0	V1
Isopentane	0.03	0.09	V0	0.18	V0
Isoprene	0.01	0.04	V0	0.01	V0
Isopropylalcohol	0.4	0	V1	0	V1
Isopropylbenzene	0.01	0	V1	0	V1
m,p-Xylene	0.03	0.03	V0	0.04	V0
Methanol	3	3	V0	0	V1
Methylcyclohexane	0.01	0.04	V0	0.02	V0
Methylcyclopentane	0.02	0.03	V0	0.03	V0
Methylethylketone	0.3	0	V1	0	V1
Methylisobutylketone	0.4	0	V1	0	V1
Methylvinylketone	0.3	0	V1	0	V1
n-Butane	0.03	0	V1	0	V1
n-Decane	0.06	0	V1	0	V1
n-Dodecane	0.4	0	V1	0	V1
n-Heptane	0.01	0.1	V0	0.05	V0
n-Hexane	0.01	0.06	V0	0.06	V0
n-Nonane	0.01	0.03	V0	0.01	V0
n-Octane	0.02	0.06	V0	0.03	V0
n-Pentane	0.1	0	V1	0.1	V0
n-Propylbenzene	0.05	0	V1	0	V1
n-Undecane	0.5	0	V1	0	V1
Naphthalene	0.5	0	V1	0	V1
o-Xylene	0.01	0.02	V0	0.02	V0
Styrene	0.04	0	V1	0	V1
Toluene	0.01	0.05	V0	0.08	V0
trans-2-Butene	0.01	0	V1	0	V1
trans-2-Hexene	0.3	0	V1	0	V1
trans-2-Pentene	0.02	0	V1	0	V1



Station Name Station # Sample Date	Athabasca Valley AMS 7 22-Sep			Anzac AMS 14 22-Sep	
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0.06	V0	0	V1
1,3,5-Trimethylbenzene	0.02	0.02	V0	0	V1
1,3-Butadiene	0.02	0	V1	0	V1
1-Butene	0.02	0	V1	0	V1
1-Pentene	0.01	0	V1	0	V1
2,2,4-Trimethylpentane	0.01	0	V1	0	V1
2,2-Dimethylbutane	0.01	0.01	V0	0.02	V0
2,3,4-Trimethylpentane	0.01	0.01	V0	0	V1
2,3-Dimethylbutane	0.02	0.04	V0	0.04	V0
2,3-Dimethylpentane	0.02	0	V1	0.02	V0
2,4-Dimethylpentane	0.01	0.01	V0	0	V1
2-Methyl-1-pentene	0.3	0	V1	0	V1
2-Methyl-2-butene	0.3	0	V1	0	V1
2-Methylheptane	0.01	0.02	V0	0.02	V0
2-Methylhexane	0.01	0.02	V0	0.02	V0
2-Methylpentane	0.01	0.04	V0	0.12	V0
3-Methyl-1-butene	0.3	0	V1	0	V1
3-Methylheptane	0.02	0	V1	0	V1
3-Methylhexane	0.02	0.03	V0	0.02	V0
3-Methylpentane	0.01	0.03	V0	0.06	V0
4-Methyl-1-pentene	0.3	0	V1	0	V1
Acetaldehyde	3	3	V0	0	V1
Acetone	0.4	3.1	V0	1.2	V0
alpha-Pinene	0.3	0	V1	0	V1
Benzene	0.01	0.2	V0	0	V1
beta-Pinene	0.3	0	V1	0	V1
cis-2-Butene	0.02	0	V1	0	V1
cis-2-Hexene	0.3	0	V1	0	V1
cis-2-Pentene	0.02	0	V1	0	V1
Cyclohexane	0.02	0.02	V0	0	V1
Cyclopentane	0.01	0.03	V0	0.03	V0
Cyclopentene	0.3	0	V1	0	V1
Ethanol	0.3	1.3	V0	0.6	V0
Ethylbenzene	0.01	0.04	V0	0	V1
Formaldehyde	3	0	V1	0	V1
Isobutane	0.02	0	V1	0	V1
Isobutylene	0.3	0	V1	0	V1
Isopentane	0.03	0.17	V0	0.21	V0
Isoprene	0.01	0.08	V0	0.01	V0
Isopropylalcohol	0.4	2.9	V4	0	V1
Isopropylbenzene	0.01	0.01	V0	0	V1
m,p-Xylene	0.03	0.07	V0	0	V1
Methanol	3	9	V0	0	V1
Methylcyclohexane	0.01	0.01	V0	0.02	V0
Methylcyclopentane	0.02	0.03	V0	0.03	V0
Methylethylketone	0.3	0	V1	0	V1
Methylisobutylketone	0.4	0	V1	0	V1
Methylvinylketone	0.3	0	V1	0	V1
n-Butane	0.03	0	V1	0	V1
n-Decane	0.06	0	V1	0	V1
n-Dodecane	0.4	0	V1	0	V1
n-Heptane	0.01	0.05	V0	0.06	V0
n-Hexane	0.01	0.06	V0	0.08	V0
n-Nonane	0.01	0.02	V0	0.01	V0
n-Octane	0.02	0.02	V0	0.03	V0
n-Pentane	0.1	0	V1	0.3	V0
n-Propylbenzene	0.05	0	V1	0	V1
n-Undecane	0.5	0	V1	0	V1
Naphthalene	0.5	0	V1	0	V1
o-Xylene	0.01	0.04	V0	0.01	V0
Styrene	0.04	0	V1	0	V1
Toluene	0.01	0.26	V0	0.06	V0
trans-2-Butene	0.01	0	V1	0	V1
trans-2-Hexene	0.3	0	V1	0	V1
trans-2-Pentene	0.02	0	V1	0	V1



Station Name Station # Sample Date	Barge Landing AMS 9 22-Sep	Fort McKay South AMS 13 22-Sep			
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0	V1	0	V1
1,3,5-Trimethylbenzene	0.02	0	V1	0	V1
1,3-Butadiene	0.02	0	V1	0	V1
1-Butene	0.02	0	V1	0	V1
1-Pentene	0.01	0	V1	0	V1
2,2,4-Trimethylpentane	0.01	0	V1	0	V1
2,2-Dimethylbutane	0.01	0	V1	0.01	V0
2,3,4-Trimethylpentane	0.01	0	V1	0	V1
2,3-Dimethylbutane	0.02	0.05	V0	0.02	V0
2,3-Dimethylpentane	0.02	0.03	V0	0.02	V0
2,4-Dimethylpentane	0.01	0	V1	0	V1
2-Methyl-1-pentene	0.3	0	V1	0	V1
2-Methyl-2-butene	0.3	0	V1	0	V1
2-Methylheptane	0.01	0.05	V0	0.08	V0
2-Methylhexane	0.01	0.03	V0	0.03	V0
2-Methylpentane	0.01	0.04	V0	0.02	V0
3-Methyl-1-butene	0.3	0	V1	0	V1
3-Methylheptane	0.02	0	V1	0.02	V0
3-Methylhexane	0.02	0.03	V0	0.04	V0
3-Methylpentane	0.01	0.03	V0	0.01	V0
4-Methyl-1-pentene	0.3	0	V1	0	V1
Acetaldehyde	3	0	V1	0	V1
Acetone	0.4	1.1	V0	0.9	V0
alpha-Pinene	0.3	0	V1	0	V1
Benzene	0.01	0	V1	0	V1
beta-Pinene	0.3	0	V1	0	V1
cis-2-Butene	0.02	0	V1	0	V1
cis-2-Hexene	0.3	0	V1	0	V1
cis-2-Pentene	0.02	0	V1	0	V1
Cyclohexane	0.02	0.02	V0	0.02	V0
Cyclopentane	0.01	0.01	V0	0	V1
Cyclopentene	0.3	0	V1	0	V1
Ethanol	0.3	0.7	V0	0.7	V0
Ethylbenzene	0.01	0	V1	0.01	V0
Formaldehyde	3	0	V1	0	V1
Isobutane	0.02	0.22	V0	0	V1
Isobutylene	0.3	0	V1	0	V1
Isopentane	0.03	0.28	V0	0.05	V0
Isoprene	0.01	0.03	V0	0.06	V0
Isopropylalcohol	0.4	0	V1	0	V1
Isopropylbenzene	0.01	0	V1	0	V1
m,p-Xylene	0.03	0	V1	0	V1
Methanol	3	0	V1	0	V1
Methylcyclohexane	0.01	0.05	V0	0.07	V0
Methylcyclopentane	0.02	0.04	V0	0.03	V0
Methylethylketone	0.3	0	V1	0	V1
Methylisobutylketone	0.4	0	V1	0	V1
Methylvinylketone	0.3	0	V1	0	V1
n-Butane	0.03	0.54	V0	0	V1
n-Decane	0.06	0	V1	0	V1
n-Dodecane	0.4	0	V1	0	V1
n-Heptane	0.01	0.09	V0	0.11	V0
n-Hexane	0.01	0.05	V0	0.04	V0
n-Nonane	0.01	0.02	V0	0.03	V0
n-Octane	0.02	0.06	V0	0.07	V0
n-Pentane	0.1	0	V1	0	V1
n-Propylbenzene	0.05	0	V1	0	V1
n-Undecane	0.5	0	V1	0	V1
Naphthalene	0.5	0	V1	0	V1
o-Xylene	0.01	0.01	V0	0.01	V0
Styrene	0.04	0	V1	0	V1
Toluene	0.01	0.04	V0	0.06	V0
trans-2-Butene	0.01	0	V1	0	V1
trans-2-Hexene	0.3	0	V1	0	V1
trans-2-Pentene	0.02	0	V1	0	V1



Station Name Station # Sample Date	Janvier AMS 22 22-Sep		
Compound Name	MDL (ppbv)	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0	V1
1,3,5-Trimethylbenzene	0.02	0	V1
1,3-Butadiene	0.02	0	V1
1-Butene	0.02	0	V1
1-Pentene	0.01	0	V1
2,2,4-Trimethylpentane	0.01	0	V1
2,2-Dimethylbutane	0.01	0	V1
2,3,4-Trimethylpentane	0.01	0	V1
2,3-Dimethylbutane	0.02	0.03	V0
2,3-Dimethylpentane	0.02	0	V1
2,4-Dimethylpentane	0.01	0	V1
2-Methyl-1-pentene	0.3	0	V1
2-Methyl-2-butene	0.3	0	V1
2-Methylheptane	0.01	0	V1
2-Methylhexane	0.01	0	V1
2-Methylpentane	0.01	0.04	V0
3-Methyl-1-butene	0.3	0	V1
3-Methylheptane	0.02	0	V1
3-Methylhexane	0.02	0	V1
3-Methylpentane	0.01	0.02	V0
4-Methyl-1-pentene	0.3	0	V1
Acetaldehyde	3	0	V1
Acetone	0.4	1.4	V0
alpha-Pinene	0.3	0	V1
Benzene	0.01	0	V1
beta-Pinene	0.3	0	V1
cis-2-Butene	0.02	0	V1
cis-2-Hexene	0.3	0	V1
cis-2-Pentene	0.02	0	V1
Cyclohexane	0.02	0	V1
Cyclopentane	0.01	0.01	V0
Cyclopentene	0.3	0	V1
Ethanol	0.3	0.5	V0
Ethylbenzene	0.01	0	V1
Formaldehyde	3	6	V0
Isobutane	0.02	0	V1
Isobutylene	0.3	0	V1
Isopentane	0.03	0.13	V0
Isoprene	0.01	0.03	V0
Isopropylalcohol	0.4	0	V1
Isopropylbenzene	0.01	0	V1
m,p-Xylene	0.03	0	V1
Methanol	3	0	V1
Methylcyclohexane	0.01	0	V1
Methylcyclopentane	0.02	0	V1
Methylethylketone	0.3	0	V1
Methylisobutylketone	0.4	0	V1
Methylvinylketone	0.3	0	V1
n-Butane	0.03	0	V1
n-Decane	0.06	0	V1
n-Dodecane	0.4	0	V1
n-Heptane	0.01	0.01	V0
n-Hexane	0.01	0.03	V0
n-Nonane	0.01	0	V1
n-Octane	0.02	0	V1
n-Pentane	0.1	0.2	V0
n-Propylbenzene	0.05	0	V1
n-Undecane	0.5	0	V1
Naphthalene	0.5	0	V1
o-Xylene	0.01	0	V1
Styrene	0.04	0	V1
Toluene	0.01	0.04	V0
trans-2-Butene	0.01	0	V1
trans-2-Hexene	0.3	0	V1
trans-2-Pentene	0.02	0	V1





Station Name Station # Sample Date	Bertha Ganter -			Patricia McInnes	
	Fort McKay			AMS 6	
	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0.05	V0	0.04	V0
1,3,5-Trimethylbenzene	0.02	0	V1	0	V1
1,3-Butadiene	0.02	0	V1	0	V1
1-Butene	0.02	0	V1	0	V1
1-Pentene	0.01	0	V1	0	V1
2,2,4-Trimethylpentane	0.01	0	V1	0	V1
2,2-Dimethylbutane	0.01	0.02	V0	0	V1
2,3,4-Trimethylpentane	0.01	0.01	V0	0.01	V0
2,3-Dimethylbutane	0.02	0.07	V0	0.03	V0
2,3-Dimethylpentane	0.02	0.05	V0	0.04	V0
2,4-Dimethylpentane	0.01	0.01	V0	0.02	V0
2-Methyl-1-pentene	0.3	0	V1	0	V1
2-Methyl-2-butene	0.3	0	V1	0	V1
2-Methylheptane	0.01	0.17	V0	0.02	V0
2-Methylhexane	0.01	0.11	V0	0.05	V0
2-Methylpentane	0.01	0.13	V0	0.09	V0
3-Methyl-1-butene	0.3	0	V1	0	V1
3-Methylheptane	0.02	0.06	V0	0	V1
3-Methylhexane	0.02	0.15	V0	0.05	V0
3-Methylpentane	0.01	0	V1	0.04	V0
4-Methyl-1-pentene	0.3	0	V1	0	V1
Acetaldehyde	3	4	V0	7	V0
Acetone	0.4	4.9	V0	3	V0
alpha-Pinene	0.3	0	V1	0	V1
Benzene	0.01	0	V1	0	V1
beta-Pinene	0.3	0	V1	0	V1
cis-2-Butene	0.02	0	V1	0	V1
cis-2-Hexene	0.3	0	V1	0	V1
cis-2-Pentene	0.02	0	V1	0	V1
Cyclohexane	0.02	0.05	V0	0	V1
Cyclopentane	0.01	0.03	V0	0.02	V0
Cyclopentene	0.3	0	V1	0	V1
Ethanol	0.3	1.6	V0	3.8	V0
Ethylbenzene	0.01	0.04	V0	0.02	V0
Formaldehyde	3	0	V1	0	V1
Isobutane	0.02	0.09	V0	0.33	V0
Isobutylene	0.3	0	V1	0	V1
Isopentane	0.03	0.3	V0	0.52	V0
Isoprene	0.01	0.07	V0	0.05	V0
Isopropylalcohol	0.4	0	V1	0	V1
Isopropylbenzene	0.01	0	V1	0	V1
m,p-Xylene	0.03	0.12	V0	0.06	V0
Methanol	3	6	V0	8	V0
Methylcyclohexane	0.01	0.14	V0	0.02	V0
Methylcyclopentane	0.02	0.12	V0	0.05	V0
Methylethylketone	0.3	0	V1	0	V1
Methylisobutylketone	0.4	0	V1	0	V1
Methylvinylketone	0.3	0	V1	0	V1
n-Butane	0.03	0.05	V0	0.55	V0
n-Decane	0.06	0	V1	0	V1
n-Dodecane	0.4	0	V1	0	V1
n-Heptane	0.01	0.42	V0	0.07	V0
n-Hexane	0.01	0.23	V0	0.08	V0
n-Nonane	0.01	0.1	V0	0.02	V0
n-Octane	0.02	0.23	V0	0.02	V0
n-Pentane	0.1	0.2	V0	0.2	V0
n-Propylbenzene	0.05	0	V1	0	V1
n-Undecane	0.5	0	V1	0	V1
Naphthalene	0.5	0	V1	0	V1
o-Xylene	0.01	0.06	V0	0.03	V0
Styrene	0.04	0	V1	0	V1
Toluene	0.01	0.16	V0	0.15	V0
trans-2-Butene	0.01	0	V1	0	V1
trans-2-Hexene	0.3	0	V1	0	V1
trans-2-Pentene	0.02	0	V1	0	V1



Station Name Station # Sample Date	Athabasca Valley AMS 7 28-Sep			Anzac AMS 14 28-Sep	
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0.05	V0	0	V1
1,3,5-Trimethylbenzene	0.02	0	V1	0	V1
1,3-Butadiene	0.02	0	V1	0	V1
1-Butene	0.02	0	V1	0	V1
1-Pentene	0.01	0	V1	0	V1
2,2,4-Trimethylpentane	0.01	0	V1	0	V1
2,2-Dimethylbutane	0.01	0.02	V0	0	V1
2,3,4-Trimethylpentane	0.01	0.02	V0	0	V1
2,3-Dimethylbutane	0.02	0.06	V0	0	V1
2,3-Dimethylpentane	0.02	0.05	V0	0	V1
2,4-Dimethylpentane	0.01	0.02	V0	0	V1
2-Methyl-1-pentene	0.3	0	V1	0	V1
2-Methyl-2-butene	0.3	0	V1	0	V1
2-Methylheptane	0.01	0.02	V0	0.01	V0
2-Methylhexane	0.01	0.04	V0	0.02	V0
2-Methylpentane	0.01	0.09	V0	0.06	V0
3-Methyl-1-butene	0.3	0	V1	0	V1
3-Methylheptane	0.02	0	V1	0	V1
3-Methylhexane	0.02	0.04	V0	0.02	V0
3-Methylpentane	0.01	0.05	V0	0.03	V0
4-Methyl-1-pentene	0.3	0	V1	0	V1
Acetaldehyde	3	4	V0	4	V0
Acetone	0.4	2.8	V0	2.5	V0
alpha-Pinene	0.3	0	V1	0	V1
Benzene	0.01	0	V1	0	V1
beta-Pinene	0.3	0	V1	0	V1
cis-2-Butene	0.02	0	V1	0	V1
cis-2-Hexene	0.3	0	V1	0	V1
cis-2-Pentene	0.02	0	V1	0	V1
Cyclohexane	0.02	0	V1	0	V1
Cyclopentane	0.01	0.02	V0	0.02	V0
Cyclopentene	0.3	0	V1	0	V1
Ethanol	0.3	3.2	V0	1.9	V0
Ethylbenzene	0.01	0.02	V0	0.01	V0
Formaldehyde	3	0	V1	0	V1
Isobutane	0.02	0.16	V0	0	V1
Isobutylene	0.3	0	V1	0	V1
Isopentane	0.03	0.44	V0	0.35	V0
Isoprene	0.01	0.05	V0	0.05	V0
Isopropylalcohol	0.4	0	V1	0	V1
Isopropylbenzene	0.01	0	V1	0	V1
m,p-Xylene	0.03	0.07	V0	0	V1
Methanol	3	9	V0	5	V0
Methylcyclohexane	0.01	0.02	V0	0.02	V0
Methylcyclopentane	0.02	0.04	V0	0.03	V0
Methylethylketone	0.3	0	V1	0	V1
Methylisobutylketone	0.4	0	V1	0	V1
Methylvinylketone	0.3	0	V1	0	V1
n-Butane	0.03	0.35	V0	0	V1
n-Decane	0.06	0	V1	0	V1
n-Dodecane	0.4	0	V1	0	V1
n-Heptane	0.01	0.06	V0	0.04	V0
n-Hexane	0.01	0.08	V0	0.06	V0
n-Nonane	0.01	0.01	V0	0	V1
n-Octane	0.02	0.02	V0	0	V1
n-Pentane	0.1	0.3	V0	0.2	V0
n-Propylbenzene	0.05	0	V1	0	V1
n-Undecane	0.5	0	V1	0	V1
Naphthalene	0.5	0	V1	0	V1
o-Xylene	0.01	0.04	V0	0.01	V0
Styrene	0.04	0	V1	0	V1
Toluene	0.01	0.11	V0	0.11	V0
trans-2-Butene	0.01	0	V1	0	V1
trans-2-Hexene	0.3	0	V1	0	V1
trans-2-Pentene	0.02	0	V1	0	V1



Station Name Station # Sample Date	Barge Landing AMS 9 28-Sep	Fort McKay South AMS 13 28-Sep			
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0.06	V0	0.03	V0
1,3,5-Trimethylbenzene	0.02	0	V1	0	V1
1,3-Butadiene	0.02	0	V1	0	V1
1-Butene	0.02	0	V1	0	V1
1-Pentene	0.01	0	V1	0	V1
2,2,4-Trimethylpentane	0.01	0	V1	0	V1
2,2-Dimethylbutane	0.01	0.05	V0	0.05	V0
2,3,4-Trimethylpentane	0.01	0.01	V0	0.01	V0
2,3-Dimethylbutane	0.02	0.1	V0	0.09	V0
2,3-Dimethylpentane	0.02	0.05	V0	0.05	V0
2,4-Dimethylpentane	0.01	0.01	V0	0.01	V0
2-Methyl-1-pentene	0.3	0	V1	0	V1
2-Methyl-2-butene	0.3	0	V1	0	V1
2-Methylheptane	0.01	0.19	V0	0.16	V0
2-Methylhexane	0.01	0.12	V0	0.08	V0
2-Methylpentane	0.01	0.26	V0	0.22	V0
3-Methyl-1-butene	0.3	0	V1	0	V1
3-Methylheptane	0.02	0.07	V0	0.06	V0
3-Methylhexane	0.02	0.15	V0	0.1	V0
3-Methylpentane	0.01	0.14	V0	0.12	V0
4-Methyl-1-pentene	0.3	0	V1	0	V1
Acetaldehyde	3	0	V1	0	V1
Acetone	0.4	3.8	V0	1.9	V0
alpha-Pinene	0.3	0	V1	0	V1
Benzene	0.01	0	V1	0	V1
beta-Pinene	0.3	0	V1	0	V1
cis-2-Butene	0.02	0	V1	0	V1
cis-2-Hexene	0.3	0	V1	0	V1
cis-2-Pentene	0.02	0	V1	0	V1
Cyclohexane	0.02	0.05	V0	0.06	V0
Cyclopentane	0.01	0.05	V0	0.06	V0
Cyclopentene	0.3	0	V1	0	V1
Ethanol	0.3	1.3	V0	0.9	V0
Ethylbenzene	0.01	0.04	V0	0.03	V0
Formaldehyde	3	0	V1	0	V1
Isobutane	0.02	0.17	V0	0.04	V0
Isobutylene	0.3	0	V1	0	V1
Isopentane	0.03	0.52	V0	0.33	V0
Isoprene	0.01	0.1	V0	0.08	V0
Isopropylalcohol	0.4	0	V1	0	V1
Isopropylbenzene	0.01	0	V1	0	V1
m,p-Xylene	0.03	0.12	V0	0.1	V0
Methanol	3	6	V0	5	V0
Methylcyclohexane	0.01	0.16	V0	0.15	V0
Methylcyclopentane	0.02	0.13	V0	0.11	V0
Methylethylketone	0.3	0	V1	0	V1
Methylisobutylketone	0.4	0	V1	0	V1
Methylvinylketone	0.3	0	V1	0	V1
n-Butane	0.03	0.1	V0	0	V1
n-Decane	0.06	0	V1	0	V1
n-Dodecane	0.4	0	V1	0	V1
n-Heptane	0.01	0.46	V0	0.33	V0
n-Hexane	0.01	0.29	V0	0.2	V0
n-Nonane	0.01	0.11	V0	0.08	V0
n-Octane	0.02	0.24	V0	0.23	V0
n-Pentane	0.1	0.4	V0	0.4	V0
n-Propylbenzene	0.05	0	V1	0	V1
n-Undecane	0.5	0	V1	0	V1
Naphthalene	0.5	0	V1	0	V1
o-Xylene	0.01	0.06	V0	0.05	V0
Styrene	0.04	0	V1	0	V1
Toluene	0.01	0.17	V0	0.18	V0
trans-2-Butene	0.01	0	V1	0	V1
trans-2-Hexene	0.3	0	V1	0	V1
trans-2-Pentene	0.02	0	V1	0	V1



Station Name Station # Sample Date	Horizon AMS 15 28-Sep	Janvier AMS 22 28-Sep			
Compound Name	MDL (ppbv)	Results (ppbv)	Flag	Results (ppbv)	Flag
1,2,4-Trimethylbenzene	0.03	0.04	V0	0	V1
1,3,5-Trimethylbenzene	0.02	0	V1	0	V1
1,3-Butadiene	0.02	0	V1	0	V1
1-Butene	0.02	0	V1	0	V1
1-Pentene	0.01	0	V1	0	V1
2,2,4-Trimethylpentane	0.01	0	V1	0	V1
2,2-Dimethylbutane	0.01	0.03	V0	0	V1
2,3,4-Trimethylpentane	0.01	0.01	V0	0	V1
2,3-Dimethylbutane	0.02	0.08	V0	0.03	V0
2,3-Dimethylpentane	0.02	0.05	V0	0	V1
2,4-Dimethylpentane	0.01	0.01	V0	0	V1
2-Methyl-1-pentene	0.3	0	V1	0	V1
2-Methyl-2-butene	0.3	0	V1	0	V1
2-Methylheptane	0.01	0.16	V0	0	V1
2-Methylhexane	0.01	0.07	V0	0.02	V0
2-Methylpentane	0.01	0.07	V0	0.05	V0
3-Methyl-1-butene	0.3	0	V1	0	V1
3-Methylheptane	0.02	0.06	V0	0	V1
3-Methylhexane	0.02	0.1	V0	0	V1
3-Methylpentane	0.01	0.07	V0	0.02	V0
4-Methyl-1-pentene	0.3	0	V1	0	V1
Acetaldehyde	3	0	V1	3	V0
Acetone	0.4	1.8	V0	2.5	V0
alpha-Pinene	0.3	0	V1	0	V1
Benzene	0.01	0	V1	0	V1
beta-Pinene	0.3	0	V1	0	V1
cis-2-Butene	0.02	0	V1	0	V1
cis-2-Hexene	0.3	0	V1	0	V1
cis-2-Pentene	0.02	0	V1	0	V1
Cyclohexane	0.02	0.08	V0	0	V1
Cyclopentane	0.01	0.03	V0	0.02	V0
Cyclopentene	0.3	0	V1	0	V1
Ethanol	0.3	1.2	V0	2.2	V0
Ethylbenzene	0.01	0.03	V0	0	V1
Formaldehyde	3	0	V1	10	V0
Isobutane	0.02	0.26	V0	0	V1
Isobutylene	0.3	0	V1	0	V1
Isopentane	0.03	0.36	V0	0.19	V0
Isoprene	0.01	0.05	V0	0.09	V0
Isopropylalcohol	0.4	0	V1	0	V1
Isopropylbenzene	0.01	0	V1	0	V1
m,p-Xylene	0.03	0.09	V0	0	V1
Methanol	3	4	V0	6	V0
Methylcyclohexane	0.01	0.15	V0	0.01	V0
Methylcyclopentane	0.02	0.1	V0	0.02	V0
Methylethylketone	0.3	0	V1	0	V1
Methylisobutylketone	0.4	0	V1	0	V1
Methylvinylketone	0.3	0	V1	0	V1
n-Butane	0.03	0.05	V0	0	V1
n-Decane	0.06	0	V1	0	V1
n-Dodecane	0.4	0	V1	0	V1
n-Heptane	0.01	0.33	V0	0.03	V0
n-Hexane	0.01	0.12	V0	0.05	V0
n-Nonane	0.01	0.09	V0	0	V1
n-Octane	0.02	0.21	V0	0	V1
n-Pentane	0.1	0.1	V0	0.2	V0
n-Propylbenzene	0.05	0	V1	0	V1
n-Undecane	0.5	0	V1	0	V1
Naphthalene	0.5	0	V1	0	V1
o-Xylene	0.01	0.04	V0	0.01	V0
Styrene	0.04	0	V1	0	V1
Toluene	0.01	0.15	V0	0.06	V0
trans-2-Butene	0.01	0	V1	0	V1
trans-2-Hexene	0.3	0	V1	0	V1
trans-2-Pentene	0.02	0	V1	0	V1



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION  
Volatile Organic Compounds (VOCs) - Summary

2017  
Indicated Sites and Dates

Station Name Station # Sample Date	Bertha Ganter - Fort McKay AMS 1 Sep 04 - Sep 28 Average	Bertha Ganter - Fort McKay AMS 1 Sep 04 - Sep 28 Std Dev	Bertha Ganter - Fort McKay AMS 1 Sep 04 - Sep 28 Total Samples (#)	Bertha Ganter - Fort McKay AMS 1 Sep 04 - Sep 28 Total ≥ MDL (#)
Compound Name	ppbv	ppbv		
1,2,4-Trimethylbenzene	0.02	0.03	5	2
1,3,5-Trimethylbenzene	0.00	0.01	5	1
1,3-Butadiene	0.00	0.00	5	0
1-Butene	0.00	0.00	5	0
1-Pentene	0.00	0.00	5	0
2,2,4-Trimethylpentane	0.08	0.19	5	1
2,2-Dimethylbutane	0.02	0.02	5	4
2,3,4-Trimethylpentane	0.01	0.01	5	2
2,3-Dimethylbutane	0.05	0.04	5	4
2,3-Dimethylpentane	0.03	0.04	5	3
2,4-Dimethylpentane	0.01	0.01	5	2
2-Methyl-1-pentene	0.00	0.00	5	0
2-Methyl-2-butene	0.00	0.00	5	0
2-Methylheptane	0.12	0.14	5	5
2-Methylhexane	0.07	0.07	5	4
2-Methylpentane	0.09	0.09	5	4
3-Methyl-1-butene	0.00	0.00	5	0
3-Methylheptane	0.05	0.06	5	4
3-Methylhexane	0.11	0.12	5	5
3-Methylpentane	0.04	0.06	5	4
4-Methyl-1-pentene	0.00	0.00	5	0
Acetaldehyde	3.20	3.70	5	3
Acetone	2.58	1.45	5	5
alpha-Pinene	0.00	0.00	5	0
Benzene	0.05	0.05	5	3
beta-Pinene	0.00	0.00	5	0
cis-2-Butene	0.00	0.00	5	0
cis-2-Hexene	0.00	0.00	5	0
cis-2-Pentene	0.00	0.00	5	0
Cyclohexane	0.04	0.05	5	4
Cyclopentane	0.02	0.02	5	3
Cyclopentene	0.00	0.00	5	0
Ethanol	1.52	0.59	5	5
Ethylbenzene	0.06	0.05	5	5
Formaldehyde	0.00	0.00	5	0
Isobutane	0.18	0.23	5	4
Isobutylene	0.00	0.00	5	0
Isopentane	0.23	0.09	5	5
Isoprene	0.19	0.20	5	5
Isopropylalcohol	0.00	0.00	5	0
Isopropylbenzene	0.00	0.00	5	0
m,p-Xylene	0.10	0.09	5	4
Methanol	4.80	1.64	5	5
Methylcyclohexane	0.11	0.13	5	5
Methylcyclopentane	0.09	0.11	5	4
Methylethylketone	0.06	0.13	5	1
Methylisobutylketone	0.00	0.00	5	0
Methylvinylketone	0.00	0.00	5	0
n-Butane	0.14	0.16	5	4
n-Decane	0.00	0.00	5	0
n-Dodecane	0.00	0.00	5	0
n-Heptane	0.28	0.31	5	5
n-Hexane	0.18	0.21	5	5
n-Nonane	0.06	0.06	5	5
n-Octane	0.18	0.23	5	5
n-Pentane	0.10	0.10	5	3
n-Propylbenzene	0.00	0.00	5	0
n-Undecane	0.00	0.00	5	0
Naphthalene	0.00	0.00	5	0
o-Xylene	0.04	0.04	5	5
Styrene	0.00	0.00	5	0
Toluene	0.29	0.33	5	5
trans-2-Butene	0.00	0.00	5	1
trans-2-Hexene	0.00	0.00	5	0
trans-2-Pentene	0.00	0.00	5	0



Station Name Station # Sample Date	Patricia McInnes AMS 6 Sep 04 - Sep 28 Average	Patricia McInnes AMS 6 Sep 04 - Sep 28 Std Dev	Patricia McInnes AMS 6 Sep 04 - Sep 28 Total Samples (#)	Patricia McInnes AMS 6 Sep 04 - Sep 28 Total ≥ MDL (#)
Compound Name	ppbv	ppbv		
1,2,4-Trimethylbenzene	0.02	0.02	5	3
1,3,5-Trimethylbenzene	0.00	0.00	5	0
1,3-Butadiene	0.00	0.00	5	0
1-Butene	0.00	0.00	5	0
1-Pentene	0.00	0.00	5	0
2,2,4-Trimethylpentane	0.01	0.01	5	1
2,2-Dimethylbutane	0.00	0.01	5	1
2,3,4-Trimethylpentane	0.01	0.01	5	3
2,3-Dimethylbutane	0.02	0.02	5	4
2,3-Dimethylpentane	0.03	0.01	5	5
2,4-Dimethylpentane	0.01	0.01	5	3
2-Methyl-1-pentene	0.00	0.00	5	0
2-Methyl-2-butene	0.00	0.00	5	0
2-Methylheptane	0.01	0.01	5	3
2-Methylhexane	0.02	0.02	5	3
2-Methylpentane	0.07	0.02	5	5
3-Methyl-1-butene	0.00	0.00	5	0
3-Methylheptane	0.00	0.00	5	0
3-Methylhexane	0.03	0.02	5	4
3-Methylpentane	0.04	0.01	5	5
4-Methyl-1-pentene	0.00	0.00	5	0
Acetaldehyde	3.80	3.56	5	3
Acetone	3.36	2.31	5	5
alpha-Pinene	0.00	0.00	5	0
Benzene	0.05	0.07	5	2
beta-Pinene	0.00	0.00	5	0
cis-2-Butene	0.00	0.00	5	0
cis-2-Hexene	0.00	0.00	5	0
cis-2-Pentene	0.00	0.00	5	0
Cyclohexane	0.01	0.02	5	1
Cyclopentane	0.02	0.01	5	4
Cyclopentene	0.00	0.00	5	0
Ethanol	2.30	0.95	5	5
Ethylbenzene	0.01	0.01	5	4
Formaldehyde	0.00	0.00	5	0
Isobutane	0.20	0.19	5	4
Isobutylene	0.00	0.00	5	0
Isopentane	0.33	0.13	5	5
Isoprene	0.14	0.15	5	5
Isopropylalcohol	0.00	0.00	5	0
Isopropylbenzene	0.00	0.00	5	0
m,p-Xylene	0.04	0.02	5	4
Methanol	4.80	2.95	5	4
Methylcyclohexane	0.02	0.01	5	4
Methylcyclopentane	0.03	0.01	5	5
Methylethylketone	0.06	0.13	5	1
Methylisobutylketone	0.00	0.00	5	0
Methylvinylketone	0.00	0.00	5	0
n-Butane	0.24	0.20	5	4
n-Decane	0.00	0.00	5	0
n-Dodecane	0.00	0.00	5	0
n-Heptane	0.05	0.02	5	5
n-Hexane	0.06	0.02	5	5
n-Nonane	0.01	0.01	5	3
n-Octane	0.02	0.02	5	3
n-Pentane	0.14	0.09	5	4
n-Propylbenzene	0.00	0.00	5	0
n-Undecane	0.00	0.00	5	0
Naphthalene	0.00	0.00	5	0
o-Xylene	0.02	0.01	5	5
Styrene	0.00	0.00	5	0
Toluene	0.10	0.03	5	5
trans-2-Butene	0.00	0.00	5	0
trans-2-Hexene	0.00	0.00	5	0
trans-2-Pentene	0.00	0.00	5	0



Station Name Station # Sample Date	Athabasca Valley AMS 7 Sep 04 - Sep 28 Average	Athabasca Valley AMS 7 Sep 04 - Sep 28 Std Dev	Athabasca Valley AMS 7 Sep 04 - Sep 28 Total Samples (#)	Athabasca Valley AMS 7 Sep 04 - Sep 28 Total ≥ MDL (#)
Compound Name	ppbv	ppbv		
1,2,4-Trimethylbenzene	0.04	0.02	5	4
1,3,5-Trimethylbenzene	0.00	0.01	5	1
1,3-Butadiene	0.00	0.00	5	0
1-Butene	0.01	0.02	5	1
1-Pentene	0.00	0.01	5	1
2,2,4-Trimethylpentane	0.05	0.10	5	2
2,2-Dimethylbutane	0.01	0.01	5	3
2,3,4-Trimethylpentane	0.02	0.03	5	4
2,3-Dimethylbutane	0.06	0.02	5	5
2,3-Dimethylpentane	0.05	0.06	5	4
2,4-Dimethylpentane	0.02	0.03	5	4
2-Methyl-1-pentene	0.00	0.00	5	0
2-Methyl-2-butene	0.00	0.00	5	0
2-Methylheptane	0.02	0.01	5	5
2-Methylhexane	0.01	0.02	5	2
2-Methylpentane	0.08	0.03	5	5
3-Methyl-1-butene	0.00	0.00	5	0
3-Methylheptane	0.00	0.00	5	0
3-Methylhexane	0.04	0.01	5	5
3-Methylpentane	0.05	0.02	5	5
4-Methyl-1-pentene	0.00	0.00	5	0
Acetaldehyde	4.80	3.70	5	4
Acetone	2.66	0.67	5	5
alpha-Pinene	0.00	0.00	5	0
Benzene	0.12	0.09	5	4
beta-Pinene	0.00	0.00	5	0
cis-2-Butene	0.00	0.00	5	0
cis-2-Hexene	0.00	0.00	5	0
cis-2-Pentene	0.00	0.00	5	0
Cyclohexane	0.01	0.02	5	2
Cyclopentane	0.02	0.01	5	5
Cyclopentene	0.00	0.00	5	0
Ethanol	2.08	0.73	5	5
Ethylbenzene	0.02	0.01	5	5
Formaldehyde	0.00	0.00	5	0
Isobutane	0.11	0.08	5	4
Isobutylene	0.00	0.00	5	0
Isopentane	0.43	0.23	5	5
Isoprene	0.14	0.11	5	5
Isopropylalcohol	0.58	1.30	5	1
Isopropylbenzene	0.00	0.00	5	1
m,p-Xylene	0.06	0.02	5	5
Methanol	7.20	2.17	5	5
Methylcyclohexane	0.03	0.02	5	5
Methylcyclopentane	0.04	0.01	5	5
Methylethylketone	0.06	0.13	5	1
Methylisobutylketone	0.00	0.00	5	0
Methylvinylketone	0.00	0.00	5	0
n-Butane	0.51	0.57	5	4
n-Decane	0.00	0.00	5	0
n-Dodecane	0.00	0.00	5	0
n-Heptane	0.06	0.03	5	5
n-Hexane	0.07	0.01	5	5
n-Nonane	0.01	0.01	5	4
n-Octane	0.03	0.02	5	4
n-Pentane	0.18	0.11	5	4
n-Propylbenzene	0.00	0.00	5	0
n-Undecane	0.00	0.00	5	0
Naphthalene	0.00	0.00	5	0
o-Xylene	0.03	0.01	5	5
Styrene	0.00	0.00	5	0
Toluene	0.14	0.08	5	5
trans-2-Butene	0.00	0.00	5	0
trans-2-Hexene	0.00	0.00	5	0
trans-2-Pentene	0.00	0.00	5	0



Station Name Station # Sample Date	Anzac AMS 14 Sep 04 - Sep 28 Average	Anzac AMS 14 Sep 04 - Sep 28 Std Dev	Anzac AMS 14 Sep 04 - Sep 28 Total Samples (#)	Anzac AMS 14 Sep 04 - Sep 28 Total ≥ MDL (#)
Compound Name	ppbv	ppbv		
1,2,4-Trimethylbenzene	0.00	0.00	5	0
1,3,5-Trimethylbenzene	0.00	0.00	5	0
1,3-Butadiene	0.00	0.00	5	0
1-Butene	0.00	0.00	5	0
1-Pentene	0.00	0.00	5	0
2,2,4-Trimethylpentane	0.01	0.01	5	2
2,2-Dimethylbutane	0.01	0.02	5	2
2,3,4-Trimethylpentane	0.00	0.00	5	0
2,3-Dimethylbutane	0.02	0.03	5	2
2,3-Dimethylpentane	0.01	0.01	5	3
2,4-Dimethylpentane	0.00	0.00	5	0
2-Methyl-1-pentene	0.00	0.00	5	0
2-Methyl-2-butene	0.00	0.00	5	0
2-Methylheptane	0.01	0.01	5	3
2-Methylhexane	0.01	0.01	5	4
2-Methylpentane	0.09	0.08	5	4
3-Methyl-1-butene	0.00	0.00	5	0
3-Methylheptane	0.00	0.00	5	0
3-Methylhexane	0.02	0.00	5	5
3-Methylpentane	0.05	0.03	5	5
4-Methyl-1-pentene	0.00	0.00	5	0
Acetaldehyde	0.80	1.79	5	1
Acetone	2.14	0.81	5	5
alpha-Pinene	0.00	0.00	5	0
Benzene	0.06	0.07	5	3
beta-Pinene	0.00	0.00	5	0
cis-2-Butene	0.00	0.00	5	0
cis-2-Hexene	0.00	0.00	5	0
cis-2-Pentene	0.00	0.00	5	0
Cyclohexane	0.01	0.01	5	2
Cyclopentane	0.02	0.02	5	4
Cyclopentene	0.00	0.00	5	0
Ethanol	1.12	0.67	5	5
Ethylbenzene	0.01	0.01	5	4
Formaldehyde	0.00	0.00	5	0
Isobutane	0.10	0.16	5	3
Isobutylene	0.00	0.00	5	0
Isopentane	0.30	0.09	5	5
Isoprene	0.13	0.12	5	5
Isopropylalcohol	0.00	0.00	5	0
Isopropylbenzene	0.00	0.00	5	0
m,p-Xylene	0.02	0.02	5	3
Methanol	3.80	2.17	5	4
Methylcyclohexane	0.02	0.01	5	5
Methylcyclopentane	0.03	0.01	5	5
Methylethylketone	0.00	0.00	5	0
Methylisobutylketone	0.00	0.00	5	0
Methylvinylketone	0.00	0.00	5	0
n-Butane	0.18	0.17	5	3
n-Decane	0.00	0.00	5	0
n-Dodecane	0.00	0.00	5	0
n-Heptane	0.05	0.01	5	5
n-Hexane	0.08	0.02	5	5
n-Nonane	0.01	0.01	5	2
n-Octane	0.02	0.02	5	2
n-Pentane	0.24	0.11	5	5
n-Propylbenzene	0.00	0.00	5	0
n-Undecane	0.00	0.00	5	0
Naphthalene	0.12	0.27	5	1
o-Xylene	0.01	0.01	5	5
Styrene	0.00	0.00	5	0
Toluene	0.12	0.04	5	5
trans-2-Butene	0.00	0.00	5	0
trans-2-Hexene	0.00	0.00	5	0
trans-2-Pentene	0.00	0.00	5	0





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION  
Volatile Organic Compounds (VOCs) - Summary

2017  
Indicated Sites and Dates

Station Name Station # Sample Date	Barge Landing AMS 9 Sep 04 - Sep 28 Average	Barge Landing AMS 9 Sep 04 - Sep 28 Std Dev	Barge Landing AMS 9 Sep 04 - Sep 28 Total Samples (#)	Barge Landing AMS 9 Sep 04 - Sep 28 Total ≥ MDL (#)
Compound Name	ppbv	ppbv		
1,2,4-Trimethylbenzene	0.03	0.03	4	2
1,3,5-Trimethylbenzene	0.00	0.00	4	0
1,3-Butadiene	0.00	0.00	4	0
1-Butene	0.00	0.00	4	0
1-Pentene	0.00	0.00	4	0
2,2,4-Trimethylpentane	0.00	0.00	4	0
2,2-Dimethylbutane	0.03	0.02	4	3
2,3,4-Trimethylpentane	0.00	0.01	4	1
2,3-Dimethylbutane	0.07	0.02	4	4
2,3-Dimethylpentane	0.04	0.01	4	4
2,4-Dimethylpentane	0.01	0.01	4	2
2-Methyl-1-pentene	0.00	0.00	4	0
2-Methyl-2-butene	0.00	0.00	4	0
2-Methylheptane	0.10	0.07	4	4
2-Methylhexane	0.06	0.05	4	3
2-Methylpentane	0.11	0.11	4	4
3-Methyl-1-butene	0.00	0.00	4	0
3-Methylheptane	0.03	0.04	4	2
3-Methylhexane	0.08	0.06	4	4
3-Methylpentane	0.07	0.05	4	4
4-Methyl-1-pentene	0.00	0.00	4	0
Acetaldehyde	1.50	3.00	4	1
Acetone	2.33	1.12	4	4
alpha-Pinene	0.00	0.00	4	0
Benzene	0.01	0.02	4	1
beta-Pinene	0.00	0.00	4	0
cis-2-Butene	0.00	0.00	4	0
cis-2-Hexene	0.00	0.00	4	0
cis-2-Pentene	0.00	0.00	4	0
Cyclohexane	0.04	0.02	4	4
Cyclopentane	0.03	0.02	4	4
Cyclopentene	0.00	0.00	4	0
Ethanol	1.13	0.31	4	4
Ethylbenzene	0.02	0.02	4	2
Formaldehyde	0.00	0.00	4	0
Isobutane	0.29	0.16	4	4
Isobutylene	0.00	0.00	4	0
Isopentane	0.33	0.13	4	4
Isoprene	0.20	0.23	4	4
Isopropylalcohol	0.00	0.00	4	0
Isopropylbenzene	0.00	0.00	4	0
m,p-Xylene	0.05	0.06	4	2
Methanol	4.75	3.20	4	3
Methylcyclohexane	0.09	0.05	4	4
Methylcyclopentane	0.08	0.05	4	4
Methylethylketone	0.00	0.00	4	0
Methylisobutylketone	0.00	0.00	4	0
Methylvinylketone	0.00	0.00	4	0
n-Butane	0.18	0.24	4	4
n-Decane	0.00	0.00	4	0
n-Dodecane	0.00	0.00	4	0
n-Heptane	0.23	0.19	4	4
n-Hexane	0.14	0.13	4	4
n-Nonane	0.06	0.04	4	4
n-Octane	0.13	0.08	4	4
n-Pentane	0.15	0.19	4	2
n-Propylbenzene	0.00	0.00	4	0
n-Undecane	0.00	0.00	4	0
Naphthalene	0.00	0.00	4	0
o-Xylene	0.03	0.02	4	4
Styrene	0.00	0.00	4	0
Toluene	0.11	0.08	4	4
trans-2-Butene	0.00	0.00	4	0
trans-2-Hexene	0.00	0.00	4	0
trans-2-Pentene	0.00	0.00	4	0



Station Name Station # Sample Date	Fort McKay South AMS 13 Sep 04 - Sep 28 Average	Fort McKay South AMS 13 Sep 04 - Sep 28 Std Dev	Fort McKay South AMS 13 Sep 04 - Sep 28 Total Samples (#)	Fort McKay South AMS 13 Sep 04 - Sep 28 Total ≥ MDL (#)
Compound Name	ppbv	ppbv		
1,2,4-Trimethylbenzene	0.01	0.02	5	2
1,3,5-Trimethylbenzene	0.00	0.01	5	1
1,3-Butadiene	0.00	0.00	5	0
1-Butene	0.00	0.00	5	0
1-Pentene	0.00	0.00	5	0
2,2,4-Trimethylpentane	0.03	0.06	5	1
2,2-Dimethylbutane	0.02	0.02	5	4
2,3,4-Trimethylpentane	0.01	0.01	5	2
2,3-Dimethylbutane	0.04	0.04	5	4
2,3-Dimethylpentane	0.03	0.04	5	3
2,4-Dimethylpentane	0.01	0.01	5	2
2-Methyl-1-pentene	0.00	0.00	5	0
2-Methyl-2-butene	0.00	0.00	5	0
2-Methylheptane	0.13	0.14	5	5
2-Methylhexane	0.05	0.06	5	3
2-Methylpentane	0.10	0.10	5	4
3-Methyl-1-butene	0.00	0.00	5	0
3-Methylheptane	0.05	0.07	5	3
3-Methylhexane	0.09	0.10	5	5
3-Methylpentane	0.06	0.06	5	4
4-Methyl-1-pentene	0.00	0.00	5	0
Acetaldehyde	2.40	5.37	5	1
Acetone	1.88	0.90	5	5
alpha-Pinene	0.00	0.00	5	0
Benzene	0.05	0.05	5	3
beta-Pinene	0.00	0.00	5	0
cis-2-Butene	0.00	0.00	5	0
cis-2-Hexene	0.00	0.00	5	0
cis-2-Pentene	0.00	0.00	5	0
Cyclohexane	0.05	0.05	5	4
Cyclopentane	0.02	0.02	5	3
Cyclopentene	0.00	0.00	5	0
Ethanol	0.80	0.40	5	5
Ethylbenzene	0.03	0.04	5	4
Formaldehyde	0.00	0.00	5	0
Isobutane	0.18	0.30	5	3
Isobutylene	0.00	0.00	5	0
Isopentane	0.20	0.14	5	5
Isoprene	0.34	0.43	5	5
Isopropylalcohol	0.00	0.00	5	0
Isopropylbenzene	0.00	0.00	5	0
m,p-Xylene	0.08	0.11	5	3
Methanol	3.80	2.17	5	4
Methylcyclohexane	0.13	0.15	5	5
Methylcyclopentane	0.08	0.10	5	4
Methylethylketone	0.00	0.00	5	0
Methylisobutylketone	0.00	0.00	5	0
Methylvinylketone	0.00	0.00	5	0
n-Butane	0.09	0.13	5	2
n-Decane	0.00	0.00	5	0
n-Dodecane	0.00	0.00	5	0
n-Heptane	0.25	0.27	5	5
n-Hexane	0.14	0.17	5	4
n-Nonane	0.06	0.06	5	5
n-Octane	0.19	0.24	5	5
n-Pentane	0.16	0.17	5	3
n-Propylbenzene	0.00	0.00	5	0
n-Undecane	0.00	0.00	5	0
Naphthalene	0.00	0.00	5	0
o-Xylene	0.04	0.05	5	5
Styrene	0.00	0.00	5	0
Toluene	0.19	0.14	5	5
trans-2-Butene	0.00	0.00	5	0
trans-2-Hexene	0.00	0.00	5	0
trans-2-Pentene	0.00	0.00	5	0



Station Name Station # Sample Date	Horizon AMS 15 Sep 04 - Sep 28 Average	Horizon AMS 15 Sep 04 - Sep 28 Std Dev	Horizon AMS 15 Sep 04 - Sep 28 Total Samples (#)	Horizon AMS 15 Sep 04 - Sep 28 Total ≥ MDL (#)
Compound Name	ppbv	ppbv		
1,2,4-Trimethylbenzene	0.01	0.02	4	1
1,3,5-Trimethylbenzene	0.00	0.00	4	0
1,3-Butadiene	0.00	0.00	4	0
1-Butene	0.00	0.00	4	0
1-Pentene	0.00	0.00	4	0
2,2,4-Trimethylpentane	0.00	0.00	4	0
2,2-Dimethylbutane	0.04	0.05	4	3
2,3,4-Trimethylpentane	0.01	0.01	4	2
2,3-Dimethylbutane	0.10	0.08	4	4
2,3-Dimethylpentane	0.05	0.06	4	2
2,4-Dimethylpentane	0.01	0.01	4	2
2-Methyl-1-pentene	0.00	0.00	4	0
2-Methyl-2-butene	0.00	0.00	4	0
2-Methylheptane	0.07	0.07	4	4
2-Methylhexane	0.03	0.03	4	3
2-Methylpentane	0.09	0.08	4	3
3-Methyl-1-butene	0.00	0.00	4	0
3-Methylheptane	0.02	0.03	4	2
3-Methylhexane	0.06	0.05	4	3
3-Methylpentane	0.14	0.18	4	3
4-Methyl-1-pentene	0.00	0.00	4	0
Acetaldehyde	1.00	2.00	4	1
Acetone	1.90	0.14	4	4
alpha-Pinene	0.00	0.00	4	0
Benzene	0.04	0.05	4	2
beta-Pinene	0.00	0.00	4	0
cis-2-Butene	0.00	0.00	4	0
cis-2-Hexene	0.00	0.00	4	0
cis-2-Pentene	0.00	0.00	4	0
Cyclohexane	0.13	0.18	4	3
Cyclopentane	0.04	0.05	4	3
Cyclopentene	0.00	0.00	4	0
Ethanol	0.83	0.25	4	4
Ethylbenzene	0.02	0.02	4	2
Formaldehyde	0.00	0.00	4	0
Isobutane	0.45	0.58	4	3
Isobutylene	0.00	0.00	4	0
Isopentane	0.72	0.90	4	4
Isoprene	0.21	0.16	4	4
Isopropylalcohol	0.00	0.00	4	0
Isopropylbenzene	0.00	0.00	4	0
m,p-Xylene	0.04	0.05	4	2
Methanol	3.75	0.50	4	4
Methylcyclohexane	0.11	0.10	4	4
Methylcyclopentane	0.10	0.11	4	3
Methylethylketone	0.00	0.00	4	0
Methylisobutylketone	0.00	0.00	4	0
Methylvinylketone	0.00	0.00	4	0
n-Butane	0.10	0.09	4	3
n-Decane	0.00	0.00	4	0
n-Dodecane	0.00	0.00	4	0
n-Heptane	0.15	0.15	4	4
n-Hexane	0.07	0.05	4	4
n-Nonane	0.04	0.04	4	4
n-Octane	0.09	0.09	4	3
n-Pentane	0.15	0.13	4	3
n-Propylbenzene	0.00	0.00	4	0
n-Undecane	0.00	0.00	4	0
Naphthalene	0.00	0.00	4	0
o-Xylene	0.02	0.02	4	2
Styrene	0.00	0.00	4	0
Toluene	0.10	0.05	4	4
trans-2-Butene	0.00	0.00	4	0
trans-2-Hexene	0.00	0.00	4	0
trans-2-Pentene	0.00	0.00	4	0



Station Name Station # Sample Date	Janvier AMS 22 Sep 04 - Sep 28 Average	Janvier AMS 22 Sep 04 - Sep 28 Std Dev	Janvier AMS 22 Sep 04 - Sep 28 Total Samples (#)	Janvier AMS 22 Sep 04 - Sep 28 Total ≥ MDL (#)
Compound Name	ppbv	ppbv		
1,2,4-Trimethylbenzene	0.00	0.00	5	0
1,3,5-Trimethylbenzene	0.00	0.00	5	0
1,3-Butadiene	0.00	0.00	5	0
1-Butene	0.00	0.00	5	0
1-Pentene	0.00	0.00	5	0
2,2,4-Trimethylpentane	0.01	0.02	5	1
2,2-Dimethylbutane	0.00	0.00	5	0
2,3,4-Trimethylpentane	0.00	0.00	5	0
2,3-Dimethylbutane	0.02	0.02	5	3
2,3-Dimethylpentane	0.00	0.00	5	0
2,4-Dimethylpentane	0.00	0.00	5	0
2-Methyl-1-pentene	0.00	0.00	5	0
2-Methyl-2-butene	0.00	0.00	5	0
2-Methylheptane	0.00	0.00	5	0
2-Methylhexane	0.01	0.01	5	2
2-Methylpentane	0.03	0.02	5	4
3-Methyl-1-butene	0.00	0.00	5	0
3-Methylheptane	0.00	0.00	5	0
3-Methylhexane	0.00	0.00	5	0
3-Methylpentane	0.02	0.01	5	4
4-Methyl-1-pentene	0.00	0.00	5	0
Acetaldehyde	2.20	2.17	5	3
Acetone	1.84	0.43	5	5
alpha-Pinene	0.00	0.00	5	0
Benzene	0.04	0.04	5	3
beta-Pinene	0.00	0.00	5	0
cis-2-Butene	0.00	0.00	5	0
cis-2-Hexene	0.00	0.00	5	0
cis-2-Pentene	0.00	0.00	5	0
Cyclohexane	0.00	0.00	5	0
Cyclopentane	0.01	0.01	5	3
Cyclopentene	0.00	0.00	5	0
Ethanol	1.16	0.63	5	5
Ethylbenzene	0.01	0.01	5	2
Formaldehyde	9.20	1.92	5	5
Isobutane	0.03	0.06	5	2
Isobutylene	0.00	0.00	5	0
Isopentane	0.21	0.13	5	5
Isoprene	0.21	0.18	5	5
Isopropylalcohol	0.00	0.00	5	0
Isopropylbenzene	0.00	0.00	5	0
m,p-Xylene	0.01	0.02	5	1
Methanol	4.60	2.61	5	4
Methylcyclohexane	0.01	0.01	5	2
Methylcyclopentane	0.01	0.01	5	2
Methylethylketone	0.00	0.00	5	0
Methylisobutylketone	0.00	0.00	5	0
Methylvinylketone	0.00	0.00	5	0
n-Butane	0.09	0.09	5	3
n-Decane	0.00	0.00	5	0
n-Dodecane	0.00	0.00	5	0
n-Heptane	0.02	0.01	5	5
n-Hexane	0.04	0.01	5	5
n-Nonane	0.00	0.00	5	0
n-Octane	0.00	0.00	5	0
n-Pentane	0.16	0.11	5	4
n-Propylbenzene	0.00	0.00	5	0
n-Undecane	0.00	0.00	5	0
Naphthalene	0.00	0.00	5	0
o-Xylene	0.01	0.01	5	3
Styrene	0.00	0.00	5	0
Toluene	0.09	0.04	5	5
trans-2-Butene	0.00	0.00	5	0
trans-2-Hexene	0.00	0.00	5	0
trans-2-Pentene	0.00	0.00	5	0



Wood Buffalo Environmental Association

VOC (ppb) summary

2017 September

Compound	% Det	N	N < Det.	Min.	10%	25%	50%	60%	75%	80%	90%	95%	99%	Max.	Mean	Std. Dev.	Median	Outlier	Test
1,2,4-Trimethylbenzene	36.8%	38	24	0.00	0.00	0.00	0.00	0.00	0.04	0.04	0.05	0.06	0.06	0.06	0.02	0.02	0.00	0.00	0.12
1,3,5-Trimethylbenzene	7.9%	38	35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.00	0.01	0.00	0.00	0.03
1,3-Butadiene	0.0%	38	38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1-Butene	2.6%	38	37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.00	0.01	0.00	0.00	0.04
1-Pentene	2.6%	38	37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.02
2,2,4-Trimethylpentane	21.1%	38	30	0.00	0.00	0.00	0.00	0.00	0.02	0.04	0.23	0.42	0.42	0.42	0.02	0.08	0.00	0.00	0.42
2,2-Dimethylbutane	52.6%	38	18	0.00	0.00	0.01	0.02	0.02	0.03	0.04	0.05	0.11	0.11	0.11	0.02	0.02	0.01	0.00	0.13
2,3,4-Trimethylpentane	36.8%	38	24	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.02	0.07	0.07	0.07	0.01	0.01	0.00	0.00	0.07
2,3-Dimethylbutane	78.9%	38	8	0.00	0.02	0.04	0.04	0.07	0.07	0.09	0.10	0.21	0.21	0.21	0.04	0.04	0.04	0.04	0.25
2,3-Dimethylpentane	63.2%	38	14	0.00	0.00	0.02	0.03	0.04	0.05	0.09	0.13	0.16	0.16	0.16	0.03	0.04	0.02	0.00	0.21
2,4-Dimethylpentane	39.5%	38	23	0.00	0.00	0.00	0.00	0.01	0.02	0.02	0.02	0.07	0.07	0.07	0.01	0.01	0.00	0.00	0.07
2-Methyl-1-pentene	0.0%	38	38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2-Methyl-2-butene	0.0%	38	38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2-Methylheptane	76.3%	38	9	0.00	0.01	0.02	0.03	0.05	0.08	0.17	0.35	0.36	0.36	0.36	0.06	0.09	0.02	0.00	0.50
2-Methylhexane	63.2%	38	14	0.00	0.00	0.02	0.02	0.04	0.05	0.11	0.15	0.18	0.18	0.18	0.03	0.04	0.02	0.00	0.26
2-Methylpentane	86.8%	38	5	0.00	0.04	0.06	0.08	0.11	0.12	0.21	0.23	0.26	0.26	0.26	0.08	0.07	0.06	0.00	0.43
3-Methyl-1-butene	0.0%	38	38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3-Methylheptane	28.9%	38	27	0.00	0.00	0.00	0.00	0.02	0.03	0.06	0.15	0.16	0.16	0.16	0.02	0.04	0.00	0.00	0.21
3-Methylhexane	81.6%	38	7	0.00	0.02	0.03	0.04	0.05	0.10	0.15	0.27	0.30	0.30	0.30	0.05	0.07	0.03	0.00	0.39
3-Methylpentane	89.5%	38	4	0.00	0.02	0.04	0.05	0.06	0.08	0.12	0.14	0.41	0.41	0.41	0.06	0.07	0.04	0.00	0.41
4-Methyl-1-pentene	0.0%	38	38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acetaldehyde	44.7%	38	21	0.00	0.00	0.00	3.00	4.00	5.00	8.00	9.00	12.00	12.00	12.00	2.53	3.33	0.00	0.00	19.20
Acetone	100.0%	38	0	0.90	1.20	1.60	2.00	2.30	2.90	3.10	3.30	4.90	7.30	7.30	2.35	1.18	2.00	0.00	8.23
alpha-Pinene	0.0%	38	38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene	55.3%	38	17	0.00	0.00	0.04	0.06	0.09	0.09	0.15	0.20	0.22	0.22	0.22	0.05	0.06	0.04	0.00	0.35
beta-Pinene	0.0%	38	38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
cis-2-Butene	0.0%	38	38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
cis-2-Hexene	0.0%	38	38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
cis-2-Pentene	0.0%	38	38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cyclohexane	52.6%	38	18	0.00	0.00	0.02	0.02	0.04	0.05	0.08	0.13	0.39	0.39	0.39	0.03	0.07	0.02	0.00	0.37
Cyclopentane	76.3%	38	9	0.00	0.01	0.02	0.02	0.03	0.03	0.05	0.06	0.11	0.11	0.11	0.02	0.02	0.02	0.00	0.13
Cyclopentene	0.0%	38	38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ethanol	100.0%	38	0	0.30	0.60	0.70	1.30	1.40	1.80	2.10	2.30	3.20	3.80	3.80	1.39	0.77	1.30	0.00	5.25
Ethylbenzene	73.7%	38	10	0.00	0.00	0.02	0.02	0.03	0.03	0.04	0.09	0.13	0.13	0.13	0.02	0.03	0.02	0.00	0.16
Formaldehyde	13.2%	38	33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.00	10.00	11.00	11.00	1.21	3.21	0.00	0.00	17.28
Isobutane	71.1%	38	11	0.00	0.00	0.13	0.14	0.22	0.26	0.52	0.71	1.30	1.30	1.30	0.18	0.26	0.13	0.00	1.47
Isobutylene	0.0%	38	38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Isopentane	100.0%	38	0	0.05	0.09	0.19	0.30	0.33	0.37	0.39	0.52	0.81	2.06	2.06	0.34	0.32	0.30	0.00	1.95
Isoprene	100.0%	38	0	0.01	0.03	0.05	0.10	0.19	0.27	0.32	0.50	0.54	1.07	1.07	0.19	0.21	0.10	0.00	1.24
Isopropylalcohol	2.6%	38	37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.90	2.90	0.08	0.47	0.00	0.00	2.43
Isopropylbenzene	2.6%	38	37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.01
m,p-Xylene	63.2%	38	14	0.00	0.00	0.04	0.05	0.07	0.09	0.12	0.24	0.27	0.27	0.27	0.05	0.06	0.04	0.00	0.36
Methanol	86.8%	38	5	0.00	4.00	5.00	5.00	6.00	6.00	8.00	9.00	9.00	9.00	9.00	4.71	2.35	5.00	0.00	16.45
Methylcyclohexane	89.5%	38	4	0.00	0.01	0.02	0.04	0.06	0.09	0.16	0.33	0.38	0.38	0.38	0.06	0.09	0.02	0.00	0.50
Methylcyclopentane	84.2%	38	6	0.00	0.02	0.04	0.04	0.05	0.10	0.13	0.25	0.27	0.27	0.27	0.06	0.07	0.04	0.00	0.39
Methylethylketone	7.9%	38	35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.30	0.30	0.30	0.02	0.08	0.00	0.00	0.43
Methylisobutylketone	0.0%	38	38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Methylvinylketone	0.0%	38	38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
n-Butane	71.1%	38	11	0.00	0.00	0.14	0.19	0.27	0.28	0.47	0.55	1.48	1.48	1.48	0.19	0.27	0.14	0.00	1.53
n-Decane	0.0%	38	38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
n-Dodecane	0.0%	38	38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
n-Heptane	100.0%	38	0	0.01	0.02	0.03	0.06	0.10	0.21	0.42	0.69	0.75	0.75	0.75	0.13	0.18	0.06	0.00	1.04
n-Hexane	97.4%	38	1	0.00	0.02	0.04	0.06	0.07	0.08	0.12	0.23	0.41	0.52	0.52	0.10	0.11	0.06	0.00	0.64
n-Nonane	71.1%	38	11	0.00	0.00	0.01	0.02	0.03	0.05	0.10	0.16	0.16	0.16	0.16	0.03	0.04	0.01	0.00	0.24
n-Octane	68.4%	38	12	0.00	0.00	0.03	0.04	0.07	0.10	0.23	0.56	0.59	0.59	0.59	0.08	0.14	0.03	0.00	0.76
n-Pentane	73.7%	38	10	0.00	0.00	0.20	0.20	0.20	0.20	0.30	0.40	0.40	0.40	0.40	0.16	0.12	0.20	0.00	0.77
n-Propylbenzene	0.0%	38	38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
n-Undecane	0.0%	38	38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Naphthalene	2.6%	38	37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60	0.60	0.60	0.02	0.10	0.00	0.00	0.50
o-Xylene	89.5%	38	4	0.00	0.01	0.02	0.02	0.04	0.04	0.06	0.10	0.12	0.12	0.12	0.03	0.03	0.02	0.00	0.15
Styrene	0.0%	38	38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Toluene	100.0%	38	0	0.03	0.05	0.07	0.11	0.13	0.17	0.18	0.26	0.41	0.85	0.85	0.14	0.14	0.11	0.00	0.85
trans-2-Butene	2.6%	38	37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.01
trans-2-Hexene	0.0%	38	38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
trans-2-Pentene	0.0%	38	38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

### **INTEGRATED MONITORING PROGRAM MONTHLY REPORT**

### **PARTICULATE MATTER - IONS DATA SUMMARY SEPTEMBER 2017**

Prepared  
November 29, 2017

#### **SAMPLE COLLECTION AND DATA COMPILATION BY:**

**Wood Buffalo Environmental Association**  
Fort McMurray, Alberta

#### **LABORATORY ANALYSIS BY:**

PM ions: Atmospheric Research & Analysis, Inc.  
Morrisville, NC



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## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

### **INTEGRATED MONITORING PROGRAM MONTHLY REPORT**

### **PARTICULATE MATTER (PM<sub>2.5</sub>) - IONS DATA SUMMARY SEPTEMBER 2017**

Prepared  
November 29, 2017

#### **SAMPLE COLLECTION AND DATA COMPILATION BY:**

**Wood Buffalo Environmental Association**  
Fort McMurray, Alberta

#### **LABORATORY ANALYSIS BY:**

PM ions: Atmospheric Research & Analysis, Inc.  
Morrisville, NC





FILE CONTENTS DESCRIPTION	Partisol Sampler Measurements of Mass, Ions by IC and Metals by ICP-MS
SAMPLING INTERVAL	24 hour
SAMPLING FREQUENCY OF DATA	Once every 6 days
EXPLANATION OF ZERO VALUES	Zero values are contained in this file and should be treated as values below detection - Method Detection Limits (MDL) are provided with each observation
UNITS	$\mu\text{g}/\text{m}^3$ (microgram per cubic meter)
OBSERVATION TYPE	Particles
FIELD SAMPLING OR MEASUREMENT PRINCIPLE	Filtration with $\text{PM}_{10}$ Inlet for $\text{PM}_{10}$ and with $\text{PM}_{10}$ Inlet/Very Sharp Cut Cyclone for $\text{PM}_{2.5}$
PARTICLE DIAMETER	$< 2.5 \mu\text{m}$ or $< 10 \mu\text{m}$
MEDIUM	47 mm Teflon Filter
ANALYTICAL METHODS	MASS by Microbalance ELEMENTS by Inductively Coupled Plasma Mass Spectrometry (ICP/MS) IONS by Ion Chromatography (IC)
SAMPLE PREPARATION	DI Water extraction for IC analysis and Acid Digestion for ICP/MS Analysis
ANALYTICAL LABORATORY	Atmospheric Research & Analysis Inc
USER NOTE 1	Data are not blank corrected
USER NOTE 2	Volume is given at actual conditions of temperature and pressure during sampling as measured by the sampler
USER NOTE 3	Blank sample concentration ( $\mu\text{g}/\text{m}^3$ ) is calculated using expected actual volume of sampler
VOLUME STANDARDIZATION	Actual Volume at Ambient Conditions (since 01-Jan-2011)
SAMPLING INSTRUMENT TYPE	For $\text{PM}_{10}$ FRM Partisol $\text{PM}_{10}$ sampler For $\text{PM}_{2.5}$ FRM Partisol $\text{PM}_{2.5}$ sampler
FLAGS USED	
V0	Valid value
V1	Valid value but comprised wholly or partially of below detection limit data
V4	Valid value despite failing to meet some QC or statistical criteria
V5	Valid value but qualified because of possible contamination
V6	Valid value but qualified due to non-standard sampling conditions
M1	Missing value because no value is available
M2	Missing value because invalidated by Data Originator



Bertha Ganter - Fort							
Station Name	McKay			Patricia McInnes		Travel Blank	
Station #	AMS 1			AMS 6			
Sample Date	04-Sep			04-Sep		04-Sep	
Particulate Size	PM2.5			PM2.5			
Total Air Volume (m <sup>3</sup> )	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	2.01	V0	8.65	V0	-0.04	V1
Calcium	0.16	0.07	V0	0.13	V0	0.00	V1
Magnesium	0.03	0.00	V0	0.02	V0	0.00	V1
Potassium	0.09	0.00	V0	0.01	V0	0.00	V1
Sodium	0.05	0.00	V0	0.01	V0	0.00	V1
Chloride	0.12	0.00	V1	0.01	V0	0.00	V1
Fluoride	0.15	0.00	V1	0.00	V1	0.00	V1
Nitrate	0.20	0.00	V1	0.01	V0	0.04	V0
Sulphate	0.25	0.11	V0	0.19	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.03	V0	0.06	V0	0.00	V1



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		04-Sep	
Sample Date	04-Sep			04-Sep		04-Sep	
Particulate Size	PM2.5			PM2.5		PM2.5	
Total Air Volume (m <sup>3</sup> )	24			23.9		24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	11.49	V0	7.04	V0	-0.04	V1
Calcium	0.16	0.09	V0	0.02	V0	0.00	V1
Magnesium	0.03	0.01	V0	0.00	V0	0.00	V1
Potassium	0.09	0.02	V0	0.02	V0	0.00	V1
Sodium	0.05	0.01	V0	0.00	V0	0.00	V1
Chloride	0.12	0.01	V0	0.00	V1	0.00	V1
Fluoride	0.15	0.00	V1	0.00	V1	0.00	V1
Nitrate	0.20	0.02	V0	0.01	V0	0.04	V0
Sulphate	0.25	0.40	V0	0.43	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.11	V0	0.12	V0	0.00	V1



Bertha Ganter - Fort							
Station Name	McKay			Patricia McInnes		Travel Blank	
Station #	AMS 1			AMS 6		10-Sep	
Sample Date	10-Sep			10-Sep		10-Sep	
Particulate Size	PM2.5			PM2.5		PM2.5	
Total Air Volume (m <sup>3</sup> )	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	4.76	V0	5.11	V0	-0.04	V1
Calcium	0.16	0.01	V0	0.01	V0	0.00	V1
Magnesium	0.03	0.00	V0	0.00	V0	0.00	V1
Potassium	0.09	0.01	V0	0.01	V0	0.00	V1
Sodium	0.05	0.00	V0	0.00	V0	0.00	V1
Chloride	0.12	0.00	V1	0.00	V1	0.00	V1
Fluoride	0.15	0.00	V1	0.00	V1	0.00	V1
Nitrate	0.20	0.00	V1	0.01	V0	0.00	V1
Sulphate	0.25	0.41	V0	0.69	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.12	V0	0.20	V0	0.00	V1



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		10-Sep	
Sample Date	10-Sep			10-Sep		10-Sep	
Particulate Size	PM2.5			PM2.5		PM2.5	
Total Air Volume (m <sup>3</sup> )	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	5.27	V0	4.57	V0	-0.04	V1
Calcium	0.16	0.02	V0	0.01	V0	0.00	V1
Magnesium	0.03	0.00	V0	0.00	V0	0.00	V1
Potassium	0.09	0.01	V0	0.01	V0	0.00	V1
Sodium	0.05	0.00	V0	0.00	V0	0.00	V1
Chloride	0.12	0.00	V1	0.00	V1	0.00	V1
Fluoride	0.15	-9999	M2	0.00	V1	0.00	V1
Nitrate	0.20	0.01	V0	0.01	V0	0.00	V1
Sulphate	0.25	0.71	V0	0.49	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.20	V0	0.14	V0	0.00	V1



Bertha Ganter - Fort							
Station Name	McKay			Patricia McInnes		Travel Blank	
Station #	AMS 1			AMS 6			
Sample Date	16-Sep			16-Sep		16-Sep	
Particulate Size	PM2.5			PM2.5			
Total Air Volume (m <sup>3</sup> )	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	5.95	V0	3.94	V0	0.11	V0
Calcium	0.16	0.20	V0	0.08	V0	0.00	V1
Magnesium	0.03	0.01	V0	0.01	V0	0.00	V1
Potassium	0.09	0.03	V0	0.02	V0	0.00	V1
Sodium	0.05	0.04	V0	0.00	V0	0.00	V1
Chloride	0.12	0.00	V1	0.00	V1	0.00	V1
Fluoride	0.15	0.00	V1	0.00	V1	0.00	V1
Nitrate	0.20	0.02	V0	0.01	V0	0.04	V0
Sulphate	0.25	1.42	V0	0.54	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.40	V0	0.17	V0	0.00	V1



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		16-Sep	
Sample Date	16-Sep			16-Sep		16-Sep	
Particulate Size	PM2.5			PM2.5		PM2.5	
Total Air Volume (m <sup>3</sup> )	24			-9999		24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	3.84	V0	-9999	M2	0.11	V0
Calcium	0.16	0.09	V0	-9999	M2	0.00	V1
Magnesium	0.03	0.01	V0	-9999	M2	0.00	V1
Potassium	0.09	0.02	V0	-9999	M2	0.00	V1
Sodium	0.05	0.01	V0	-9999	M2	0.00	V1
Chloride	0.12	0.00	V1	-9999	M2	0.00	V1
Fluoride	0.15	0.00	V1	-9999	M2	0.00	V1
Nitrate	0.20	0.02	V0	-9999	M2	0.04	V0
Sulphate	0.25	0.54	V0	-9999	M2	0.00	V1
Phosphate	0.26	0.00	V1	-9999	M2	0.00	V1
Ammonium (as N)	0.02	0.16	V0	-9999	M2	0.00	V1



Bertha Ganter - Fort							
Station Name	McKay			Patricia McInnes		Travel Blank	
Station #	AMS 1			AMS 6		22-Sep	
Sample Date	22-Sep			22-Sep		22-Sep	
Particulate Size	PM2.5			PM2.5		24	
Total Air Volume (m <sup>3</sup> )	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	3.66	V0	4.06	V0	0.08	V0
Calcium	0.16	0.05	V0	0.02	V0	0.00	V1
Magnesium	0.03	0.00	V0	0.00	V0	0.00	V1
Potassium	0.09	0.01	V0	0.01	V0	0.00	V1
Sodium	0.05	0.01	V0	0.01	V0	0.00	V1
Chloride	0.12	0.00	V1	0.00	V1	0.00	V1
Fluoride	0.15	0.00	V1	0.00	V1	0.00	V1
Nitrate	0.20	0.02	V0	0.01	V0	0.00	V1
Sulphate	0.25	1.18	V0	1.43	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.34	V0	0.43	V0	0.00	V1





Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		22-Sep	
Sample Date	22-Sep			22-Sep		22-Sep	
Particulate Size	PM2.5			PM2.5		24	
Total Air Volume (m <sup>3</sup> )	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	3.99	V0	2.63	V0	0.08	V0
Calcium	0.16	0.06	V0	0.01	V0	0.00	V1
Magnesium	0.03	0.01	V0	0.00	V0	0.00	V1
Potassium	0.09	0.01	V0	0.01	V0	0.00	V1
Sodium	0.05	0.01	V0	0.01	V0	0.00	V1
Chloride	0.12	0.00	V1	0.00	V1	0.00	V1
Fluoride	0.15	0.00	V1	0.00	V1	0.00	V1
Nitrate	0.20	0.03	V0	0.00	V1	0.00	V1
Sulphate	0.25	1.43	V0	0.78	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.41	V0	0.21	V0	0.00	V1



Bertha Ganter - Fort							
Station Name	McKay			Patricia McInnes		Travel Blank	
Station #	AMS 1			AMS 6			
Sample Date	28-Sep			28-Sep		28-Sep	
Particulate Size	PM2.5			PM2.5			
Total Air Volume (m <sup>3</sup> )	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	6.48	V0	4.31	V0	0.00	V1
Calcium	0.16	0.22	V0	0.05	V0	0.00	V1
Magnesium	0.03	0.01	V0	0.01	V0	0.00	V1
Potassium	0.09	0.02	V0	0.02	V0	0.00	V1
Sodium	0.05	0.01	V0	0.01	V0	0.00	V1
Chloride	0.12	0.00	V1	0.00	V1	0.00	V1
Fluoride	0.15	0.00	V1	0.00	V1	0.00	V1
Nitrate	0.20	0.02	V0	0.01	V0	0.01	V0
Sulphate	0.25	1.04	V0	0.32	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.29	V0	0.10	V0	0.00	V1



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		28-Sep	
Sample Date	28-Sep			28-Sep		28-Sep	
Particulate Size	PM2.5			PM2.5		PM2.5	
Total Air Volume (m <sup>3</sup> )	24			23.9		24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	4.98	V0	3.66	V0	0.00	V1
Calcium	0.16	0.07	V0	0.02	V0	0.00	V1
Magnesium	0.03	0.01	V0	0.00	V0	0.00	V1
Potassium	0.09	0.02	V0	0.01	V0	0.00	V1
Sodium	0.05	0.01	V0	0.00	V0	0.00	V1
Chloride	0.12	0.00	V1	0.00	V1	0.00	V1
Fluoride	0.15	0.00	V1	0.00	V1	0.00	V1
Nitrate	0.20	0.02	V0	0.01	V0	0.01	V0
Sulphate	0.25	0.32	V0	0.29	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.09	V0	0.09	V0	0.00	V1



Station Name	Bertha Ganter - Fort McKay	Bertha Ganter - Fort McKay	Bertha Ganter - Fort McKay	Bertha Ganter - Fort McKay
Station #	AMS 1	AMS 1	AMS 1	AMS 1
Sample Date	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28
Particulate Size	PM2.5	PM2.5	PM2.5	PM2.5
Compound Name	Average µg/m <sup>3</sup>	Std Dev µg/m <sup>3</sup>	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	4.57	1.80	5	5
Calcium	0.11	0.09	5	5
Magnesium	0.01	0.00	5	5
Potassium	0.01	0.01	5	5
Sodium	0.01	0.01	5	5
Chloride	0.00	0.00	5	0
Fluoride	0.00	0.00	5	0
Nitrate	0.01	0.01	5	3
Sulphate	0.83	0.55	5	5
Phosphate	0.00	0.00	5	0
Ammonium (as N)	0.24	0.15	5	5



Station Name	Patricia McInnes	Patricia McInnes	Patricia McInnes	Patricia McInnes
Station #	AMS 6	AMS 6	AMS 6	AMS 6
Sample Date	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28
Particulate Size	PM2.5	PM2.5	PM2.5	PM2.5
Compound Name	Average µg/m <sup>3</sup>	Std Dev µg/m <sup>3</sup>	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	5.21	1.97	5	5
Calcium	0.06	0.05	5	5
Magnesium	0.01	0.01	5	5
Potassium	0.01	0.00	5	5
Sodium	0.01	0.00	5	5
Chloride	0.00	0.00	5	1
Fluoride	0.00	0.00	5	0
Nitrate	0.01	0.00	5	5
Sulphate	0.63	0.49	5	5
Phosphate	0.00	0.00	5	0
Ammonium (as N)	0.19	0.15	5	5



Station Name	Athabasca Valley	Athabasca Valley	Athabasca Valley	Athabasca Valley
Station #	AMS 7	AMS 7	AMS 7	AMS 7
Sample Date	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28
Particulate Size	PM2.5	PM2.5	PM2.5	PM2.5
Compound Name	Average µg/m <sup>3</sup>	Std Dev µg/m <sup>3</sup>	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	5.91	3.18	5	5
Calcium	0.06	0.03	5	5
Magnesium	0.01	0.00	5	5
Potassium	0.02	0.00	5	5
Sodium	0.01	0.00	5	5
Chloride	0.00	0.00	5	1
Fluoride	0.00	0.00	4	0
Nitrate	0.02	0.01	5	5
Sulphate	0.68	0.44	5	5
Phosphate	0.00	0.00	5	0
Ammonium (as N)	0.19	0.13	5	5



Station Name	Anzac	Anzac	Anzac	Anzac
Station #	AMS 14	AMS 14	AMS 14	AMS 14
Sample Date	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28
Particulate Size	PM2.5	PM2.5	PM2.5	PM2.5
Compound Name	Average µg/m <sup>3</sup>	Std Dev µg/m <sup>3</sup>	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	4.47	1.89	4	4
Calcium	0.01	0.01	4	4
Magnesium	0.00	0.00	4	4
Potassium	0.01	0.00	4	4
Sodium	0.00	0.00	4	4
Chloride	0.00	0.00	4	0
Fluoride	0.00	0.00	4	0
Nitrate	0.01	0.01	4	3
Sulphate	0.50	0.21	4	4
Phosphate	0.00	0.00	4	0
Ammonium (as N)	0.14	0.05	4	4



**Wood Buffalo Environmental Association**

**PM2.5 Ion (µg/sample) Summary**

**2017 September**

Compound	% Det	N	N < Det.	Min.	10%	25%	50%	60%	75%	80%	90%	95%	99%	Max.	Mean	Std. Dev.	Median	Outlier Test
Particulate Matter	100.0%	19	0	48	63	92	110	120	143	156	208	276	276	276	122	52	110	384
Calcium	100.0%	19	0	0.18	0.18	0.39	1.23	1.56	2.04	2.07	4.89	5.16	5.16	5.16	1.53	1.48	1.23	8.95
Magnesium	100.0%	19	0	0.03	0.03	0.03	0.09	0.12	0.21	0.21	0.27	0.36	0.36	0.36	0.13	0.10	0.09	0.61
Potassium	100.0%	19	0	0.09	0.12	0.27	0.30	0.36	0.39	0.39	0.48	0.63	0.63	0.63	0.32	0.13	0.30	0.96
Sodium	100.0%	19	0	0.06	0.06	0.09	0.15	0.15	0.18	0.18	0.30	0.84	0.84	0.84	0.17	0.17	0.15	1.03
Chloride	10.5%	19	17	0.03	0.03	0.06	0.06	0.06	0.06	0.06	0.12	0.12	0.12	0.12	0.06	0.03	0.06	0.19
Fluoride	0.0%	18	18	0.00	0.03	0.03	0.03	0.03	0.06	0.06	0.06	0.09	0.09	0.09	0.04	0.02	0.03	
Nitrate	84.2%	19	3	0.09	0.15	0.21	0.33	0.33	0.45	0.48	0.48	0.63	0.63	0.63	0.32	0.14	0.33	1.01
Sulphate	100.0%	19	0	2.61	4.65	7.59	12.84	16.47	24.99	28.35	34.29	34.35	34.35	34.35	16.04	10.32	12.84	67.65
Phosphate	0.0%	19	19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	
Ammonium (as N)	100.0%	19	0	0.82	1.33	2.42	3.89	4.78	6.99	8.11	9.81	10.41	10.41	10.41	4.64	2.97	3.89	19.48





## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

### **INTEGRATED MONITORING PROGRAM MONTHLY REPORT**

### **PARTICULATE MATTER (PM<sub>10</sub>) - IONS DATA SUMMARY AUGUST 2017**

Prepared  
November 29, 2017

#### **SAMPLE COLLECTION AND DATA COMPILATION BY:**

**Wood Buffalo Environmental Association**  
Fort McMurray, Alberta

#### **LABORATORY ANALYSIS BY:**

PM ions: Atmospheric Research & Analysis, Inc.  
Morrisville, NC



FILE CONTENTS DESCRIPTION	Partisol Sampler Measurements of Mass, Ions by IC and Metals by ICP-MS
SAMPLING INTERVAL	24 hour
SAMPLING FREQUENCY OF DATA	Once every 6 days
EXPLANATION OF ZERO VALUES	Zero values are contained in this file and should be treated as values below detection - Method Detection Limits (MDL) are provided with each observation
UNITS	$\mu\text{g}/\text{m}^3$ (microgram per cubic meter)
OBSERVATION TYPE	Particles
FIELD SAMPLING OR MEASUREMENT PRINCIPLE	Filtration with $\text{PM}_{10}$ Inlet for $\text{PM}_{10}$ and with $\text{PM}_{10}$ Inlet/Very Sharp Cut Cyclone for $\text{PM}_{2.5}$
PARTICLE DIAMETER MEDIUM	< 2.5 $\mu\text{m}$ or < 10 $\mu\text{m}$ 47 mm Teflon Filter
ANALYTICAL METHODS	MASS by Microbalance ELEMENTS by Inductively Coupled Plasma Mass Spectrometry (ICP/MS) IONS by Ion Chromatography (IC)
SAMPLE PREPARATION	DI Water extraction for IC analysis and Acid Digestion for ICP/MS Analysis
ANALYTICAL LABORATORY	Atmospheric Research & Analysis Inc
USER NOTE 1	Data are not blank corrected
USER NOTE 2	Volume is given at actual conditions of temperature and pressure during sampling as measured by the sampler
USER NOTE 3	Blank sample concentration ( $\mu\text{g}/\text{m}^3$ ) is calculated using expected actual volume of sampler
VOLUME STANDARDIZATION	Actual Volume at Ambient Conditions (since 01-Jan-2011)
SAMPLING INSTRUMENT TYPE	For $\text{PM}_{10}$ FRM Partisol $\text{PM}_{10}$ sampler For $\text{PM}_{2.5}$ FRM Partisol $\text{PM}_{2.5}$ sampler
FLAGS USED	
V0	Valid value
V1	Valid value but comprised wholly or partially of below detection limit data
V4	Valid value despite failing to meet some QC or statistical criteria
V5	Valid value but qualified because of possible contamination
V6	Valid value but qualified due to non-standard sampling conditions
M1	Missing value because no value is available
M2	Missing value because invalidated by Data Originator



Bertha Ganter - Fort							
Station Name	McKay			Patricia McInnes		Travel Blank	
Station #	AMS 1			AMS 6			
Sample Date	04-Sep			04-Sep		04-Sep	
Particulate Size	PM10			PM10			
Total Air Volume (m <sup>3</sup> )	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	9.29	V0	58.29	V0	0.36	V0
Calcium	0.16	0.63	V0	2.85	V0	0.00	V1
Magnesium	0.03	0.02	V0	0.14	V0	0.00	V1
Potassium	0.09	0.01	V0	0.04	V0	0.00	V1
Sodium	0.05	0.02	V0	0.19	V0	0.00	V1
Chloride	0.12	0.01	V0	0.33	V4	0.00	V1
Fluoride	0.15	0.00	V1	0.01	V0	0.00	V1
Nitrate	0.20	0.02	V0	0.06	V0	0.00	V1
Sulphate	0.25	0.15	V0	0.38	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.04	V0	0.05	V0	0.00	V1



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		04-Sep	
Sample Date	04-Sep			04-Sep		04-Sep	
Particulate Size	PM10			PM10		PM10	
Total Air Volume (m <sup>3</sup> )	24			23.6		24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	22.97	V0	13.08	V0	0.36	V0
Calcium	0.16	0.70	V0	0.29	V0	0.00	V1
Magnesium	0.03	0.10	V0	0.04	V0	0.00	V1
Potassium	0.09	0.03	V0	0.03	V0	0.00	V1
Sodium	0.05	0.04	V0	0.02	V0	0.00	V1
Chloride	0.12	0.03	V0	0.02	V0	0.00	V1
Fluoride	0.15	0.01	V0	0.00	V1	0.00	V1
Nitrate	0.20	0.07	V0	0.03	V0	0.00	V1
Sulphate	0.25	0.47	V0	0.45	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.11	V0	0.12	V0	0.00	V1



Station Name	Fort McKay South			Horizon		Travel Blank	
Station #	AMS 13			AMS 15		04-Sep	
Sample Date	04-Sep			04-Sep		04-Sep	
Particulate Size	PM10			PM10		24	
Total Air Volume (m <sup>3</sup> )	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	3.59	V0	21.09	V0	0.36	V0
Calcium	0.16	0.06	V0	0.60	V0	0.00	V1
Magnesium	0.03	0.01	V0	0.07	V0	0.00	V1
Potassium	0.09	0.01	V0	0.02	V0	0.00	V1
Sodium	0.05	0.01	V0	0.13	V0	0.00	V1
Chloride	0.12	0.00	V1	0.03	V0	0.00	V1
Fluoride	0.15	0.00	V1	0.00	V1	0.00	V1
Nitrate	0.20	0.00	V1	0.03	V0	0.00	V1
Sulphate	0.25	0.12	V0	0.24	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.04	V0	0.03	V0	0.00	V1



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Station Name	Muskeg River			Travel Blank	
Station #	AMS 16			04-Sep	
Sample Date	04-Sep			04-Sep	
Particulate Size	PM10			24	
Total Air Volume (m <sup>3</sup> )	24			24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	44.28	V0	0.36	V0
Calcium	0.16	2.08	V0	0.00	V1
Magnesium	0.03	0.11	V0	0.00	V1
Potassium	0.09	0.02	V0	0.00	V1
Sodium	0.05	0.10	V0	0.00	V1
Chloride	0.12	0.13	V0	0.00	V1
Fluoride	0.15	0.00	V1	0.00	V1
Nitrate	0.20	0.08	V0	0.00	V1
Sulphate	0.25	0.44	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.04	V0	0.00	V1



Bertha Ganter - Fort							
Station Name	McKay			Patricia McInnes		Travel Blank	
Station #	AMS 1			AMS 6		10-Sep	
Sample Date	10-Sep			10-Sep		10-Sep	
Particulate Size	PM10			PM10		PM10	
Total Air Volume (m <sup>3</sup> )	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	7.83	V0	10.14	V0	-0.03	V1
Calcium	0.16	0.05	V0	0.19	V0	0.00	V1
Magnesium	0.03	0.01	V0	0.02	V0	0.00	V1
Potassium	0.09	0.04	V0	0.03	V0	0.00	V1
Sodium	0.05	0.01	V0	0.01	V0	0.00	V1
Chloride	0.12	0.00	V1	0.01	V0	0.00	V1
Fluoride	0.15	0.00	V1	0.00	V1	0.00	V1
Nitrate	0.20	0.02	V0	0.03	V0	0.00	V1
Sulphate	0.25	0.43	V0	0.72	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.13	V0	0.22	V0	0.00	V1



Compound Name	MDL (µg/sample)	Athabasca Valley		Anzac		Travel Blank	
		Results (µg/m³)	QC Flag	Results (µg/m³)	QC Flag	Results (µg/m³)	QC Flag
Particulate Matter	1.00	10.94	V0	7.44	V0	-0.03	V1
Calcium	0.16	0.16	V0	0.04	V0	0.00	V1
Magnesium	0.03	0.02	V0	0.01	V0	0.00	V1
Potassium	0.09	0.04	V0	0.03	V0	0.00	V1
Sodium	0.05	0.01	V0	0.01	V0	0.00	V1
Chloride	0.12	0.01	V0	0.01	V0	0.00	V1
Fluoride	0.15	0.00	V1	0.00	V1	0.00	V1
Nitrate	0.20	0.03	V0	0.03	V0	0.00	V1
Sulphate	0.25	0.74	V0	0.51	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.22	V0	0.14	V0	0.00	V1





Station Name	Fort McKay South			Horizon		Travel Blank	
Station #	AMS 13			AMS 15		10-Sep	
Sample Date	10-Sep			10-Sep		10-Sep	
Particulate Size	PM10			PM10		24	
Total Air Volume (m <sup>3</sup> )	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	7.65	V0	11.93	V0	-0.03	V1
Calcium	0.16	0.02	V0	0.07	V0	0.00	V1
Magnesium	0.03	0.00	V0	0.01	V0	0.00	V1
Potassium	0.09	0.04	V0	0.04	V0	0.00	V1
Sodium	0.05	0.00	V0	0.03	V0	0.00	V1
Chloride	0.12	0.00	V1	0.01	V0	0.00	V1
Fluoride	0.15	0.00	V1	0.00	V1	0.00	V1
Nitrate	0.20	0.02	V0	0.02	V0	0.00	V1
Sulphate	0.25	0.46	V0	0.42	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.14	V0	0.11	V0	0.00	V1



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Station Name	Muskeg River			Travel Blank	
Station #	AMS 16			10-Sep	
Sample Date	10-Sep			10-Sep	
Particulate Size	PM10			24	
Total Air Volume (m <sup>3</sup> )	24			24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	11.59	V0	-0.03	V1
Calcium	0.16	0.21	V0	0.00	V1
Magnesium	0.03	0.03	V0	0.00	V1
Potassium	0.09	0.04	V0	0.00	V1
Sodium	0.05	0.02	V0	0.00	V1
Chloride	0.12	0.01	V0	0.00	V1
Fluoride	0.15	0.00	V1	0.00	V1
Nitrate	0.20	0.03	V0	0.00	V1
Sulphate	0.25	0.55	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.14	V0	0.00	V1



Bertha Ganter - Fort							
Station Name	McKay			Patricia McInnes		Travel Blank	
Station #	AMS 1			AMS 6			
Sample Date	16-Sep			16-Sep		16-Sep	
Particulate Size	PM10			PM10			
Total Air Volume (m <sup>3</sup> )	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	28.00	V0	16.84	V0	0.10	V0
Calcium	0.16	2.32	V0	0.90	V0	0.00	V1
Magnesium	0.03	0.06	V0	0.07	V0	0.00	V1
Potassium	0.09	0.05	V0	0.03	V0	0.00	V1
Sodium	0.05	0.30	V0	0.02	V0	0.00	V1
Chloride	0.12	0.08	V0	0.02	V0	0.00	V1
Fluoride	0.15	0.00	V1	0.00	V1	0.00	V1
Nitrate	0.20	0.15	V0	0.08	V0	0.00	V1
Sulphate	0.25	2.04	V0	0.61	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.40	V0	0.16	V0	0.00	V1



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		16-Sep	
Sample Date	16-Sep			16-Sep		16-Sep	
Particulate Size	PM10			PM10		PM10	
Total Air Volume (m <sup>3</sup> )	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	19.45	V0	7.19	V0	0.10	V0
Calcium	0.16	0.96	V0	0.33	V0	0.00	V1
Magnesium	0.03	0.07	V0	0.05	V0	0.00	V1
Potassium	0.09	0.03	V0	0.01	V0	0.00	V1
Sodium	0.05	0.04	V0	0.03	V0	0.00	V1
Chloride	0.12	0.04	V0	0.01	V0	0.00	V1
Fluoride	0.15	0.00	V1	0.00	V1	0.00	V1
Nitrate	0.20	0.10	V0	0.04	V0	0.00	V1
Sulphate	0.25	0.63	V0	0.61	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.17	V0	0.17	V0	0.00	V1



Station Name	Fort McKay South			Horizon		Travel Blank	
Station #	AMS 13			AMS 15		16-Sep	
Sample Date	16-Sep			16-Sep		16-Sep	
Particulate Size	PM10			PM10		PM10	
Total Air Volume (m <sup>3</sup> )	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	17.62	V0	12.13	V0	0.10	V0
Calcium	0.16	0.62	V0	0.34	V0	0.00	V1
Magnesium	0.03	0.05	V0	0.03	V0	0.00	V1
Potassium	0.09	0.03	V0	0.01	V0	0.00	V1
Sodium	0.05	0.30	V0	0.10	V0	0.00	V1
Chloride	0.12	0.04	V0	0.02	V0	0.00	V1
Fluoride	0.15	0.00	V1	0.00	V1	0.00	V1
Nitrate	0.20	0.07	V0	0.05	V0	0.00	V1
Sulphate	0.25	2.10	V0	0.68	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.44	V0	0.16	V0	0.00	V1



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Station Name	Muskeg River			Travel Blank	
Station #	AMS 16			16-Sep	
Sample Date	16-Sep			16-Sep	
Particulate Size	PM10			24	
Total Air Volume (m <sup>3</sup> )	24			24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	33.13	V0	0.10	V0
Calcium	0.16	1.55	V0	0.00	V1
Magnesium	0.03	0.08	V0	0.00	V1
Potassium	0.09	0.02	V0	0.00	V1
Sodium	0.05	0.19	V0	0.00	V1
Chloride	0.12	0.08	V0	0.00	V1
Fluoride	0.15	0.00	V1	0.00	V1
Nitrate	0.20	0.15	V0	0.00	V1
Sulphate	0.25	1.49	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.32	V0	0.00	V1



Bertha Ganter - Fort							
Station Name	McKay			Patricia McInnes		Travel Blank	
Station #	AMS 1			AMS 6		22-Sep	
Sample Date	22-Sep			22-Sep		22-Sep	
Particulate Size	PM10			PM10		24	
Total Air Volume (m <sup>3</sup> )	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	8.96	V0	9.79	V0	0.19	V0
Calcium	0.16	0.69	V0	0.28	V0	0.01	V0
Magnesium	0.03	0.02	V0	0.04	V0	0.00	V1
Potassium	0.09	0.02	V0	0.02	V0	0.00	V1
Sodium	0.05	0.03	V0	0.02	V0	0.00	V0
Chloride	0.12	0.01	V0	0.01	V0	0.00	V1
Fluoride	0.15	0.00	V1	0.00	V1	0.00	V1
Nitrate	0.20	0.10	V0	0.09	V0	0.00	V1
Sulphate	0.25	1.31	V0	1.60	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.37	V0	0.46	V0	0.00	V1



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		22-Sep	
Sample Date	22-Sep			22-Sep		22-Sep	
Particulate Size	PM10			PM10		24	
Total Air Volume (m <sup>3</sup> )	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	15.12	V0	3.90	V0	0.19	V0
Calcium	0.16	0.60	V0	0.02	V0	0.01	V0
Magnesium	0.03	0.05	V0	0.01	V0	0.00	V1
Potassium	0.09	0.02	V0	0.02	V0	0.00	V1
Sodium	0.05	0.04	V0	0.02	V0	0.00	V0
Chloride	0.12	0.02	V0	0.00	V1	0.00	V1
Fluoride	0.15	0.00	V1	0.00	V1	0.00	V1
Nitrate	0.20	0.15	V0	0.03	V0	0.00	V1
Sulphate	0.25	1.69	V0	0.89	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.47	V0	0.22	V0	0.00	V1





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Station Name	Fort McKay South			Horizon		Travel Blank	
Station #	AMS 13			AMS 15		22-Sep	
Sample Date	22-Sep			22-Sep		22-Sep	
Particulate Size	PM10			PM10		24	
Total Air Volume (m <sup>3</sup> )	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	7.34	V0	5.30	V0	0.19	V0
Calcium	0.16	0.46	V0	0.12	V0	0.01	V0
Magnesium	0.03	0.02	V0	0.01	V0	0.00	V1
Potassium	0.09	0.03	V0	0.02	V0	0.00	V1
Sodium	0.05	0.02	V0	0.02	V0	0.00	V0
Chloride	0.12	0.01	V0	0.01	V0	0.00	V1
Fluoride	0.15	0.00	V1	0.00	V1	0.00	V1
Nitrate	0.20	0.07	V0	0.05	V0	0.00	V1
Sulphate	0.25	1.10	V0	1.30	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.32	V0	0.29	V0	0.00	V1



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Station Name	Muskeg River			Travel Blank	
Station #	AMS 16			22-Sep	
Sample Date	22-Sep			22-Sep	
Particulate Size	PM10			24	
Total Air Volume (m <sup>3</sup> )	24			24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	7.69	V0	0.19	V0
Calcium	0.16	0.47	V0	0.01	V0
Magnesium	0.03	0.02	V0	0.00	V1
Potassium	0.09	0.02	V0	0.00	V1
Sodium	0.05	0.04	V0	0.00	V0
Chloride	0.12	0.01	V0	0.00	V1
Fluoride	0.15	0.00	V1	0.00	V1
Nitrate	0.20	0.07	V0	0.00	V1
Sulphate	0.25	1.24	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.33	V0	0.00	V1



Bertha Ganter - Fort							
Station Name	McKay			Patricia McInnes		Travel Blank	
Station #	AMS 1			AMS 6			
Sample Date	28-Sep			28-Sep		28-Sep	
Particulate Size	PM10			PM10			
Total Air Volume (m <sup>3</sup> )	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	36.55	V0	16.88	V0	0.08	V0
Calcium	0.16	3.37	V0	0.68	V0	0.00	V1
Magnesium	0.03	0.05	V0	0.06	V0	0.00	V1
Potassium	0.09	0.04	V0	0.04	V0	0.00	V1
Sodium	0.05	0.13	V0	0.02	V0	0.00	V1
Chloride	0.12	0.07	V0	0.02	V0	0.00	V1
Fluoride	0.15	0.00	V1	0.00	V1	0.00	V1
Nitrate	0.20	0.15	V0	0.08	V0	0.00	V1
Sulphate	0.25	1.41	V0	0.37	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.29	V0	0.10	V0	0.00	V1



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		28-Sep	
Sample Date	28-Sep			28-Sep		28-Sep	
Particulate Size	PM10			PM10		24	
Total Air Volume (m <sup>3</sup> )	24			23.5		24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	24.35	V0	8.20	V0	0.08	V0
Calcium	0.16	1.11	V0	0.23	V0	0.00	V1
Magnesium	0.03	0.07	V0	0.03	V0	0.00	V1
Potassium	0.09	0.05	V0	0.03	V0	0.00	V1
Sodium	0.05	0.04	V0	0.01	V0	0.00	V1
Chloride	0.12	0.04	V0	0.01	V0	0.00	V1
Fluoride	0.15	0.00	V1	0.00	V1	0.00	V1
Nitrate	0.20	0.10	V0	0.05	V0	0.00	V1
Sulphate	0.25	0.41	V0	0.31	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.09	V0	0.08	V0	0.00	V1



Station Name	Fort McKay South			Horizon		Travel Blank	
Station #	AMS 13			AMS 15		28-Sep	
Sample Date	28-Sep			28-Sep		28-Sep	
Particulate Size	PM10			PM10		24	
Total Air Volume (m <sup>3</sup> )	24			24		24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	23.94	V0	19.60	V0	0.08	V0
Calcium	0.16	1.07	V0	0.75	V0	0.00	V1
Magnesium	0.03	0.06	V0	0.07	V0	0.00	V1
Potassium	0.09	0.04	V0	0.03	V0	0.00	V1
Sodium	0.05	0.13	V0	0.07	V0	0.00	V1
Chloride	0.12	0.04	V0	0.02	V0	0.00	V1
Fluoride	0.15	0.00	V1	0.00	V1	0.00	V1
Nitrate	0.20	0.09	V0	0.09	V0	0.00	V1
Sulphate	0.25	1.82	V0	1.12	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.41	V0	0.25	V0	0.00	V1



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Station Name	Muskeg River			Travel Blank	
Station #	AMS 16			28-Sep	
Sample Date	28-Sep			28-Sep	
Particulate Size	PM10			24	
Total Air Volume (m <sup>3</sup> )	24			24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	22.97	V0	0.08	V0
Calcium	0.16	1.35	V0	0.00	V1
Magnesium	0.03	0.06	V0	0.00	V1
Potassium	0.09	0.03	V0	0.00	V1
Sodium	0.05	0.08	V0	0.00	V1
Chloride	0.12	0.03	V0	0.00	V1
Fluoride	0.15	0.00	V1	0.00	V1
Nitrate	0.20	0.11	V0	0.00	V1
Sulphate	0.25	0.82	V0	0.00	V1
Phosphate	0.26	0.00	V1	0.00	V1
Ammonium (as N)	0.02	0.17	V0	0.00	V1



Station Name	Bertha Ganter - Fort McKay	Bertha Ganter - Fort McKay	Bertha Ganter - Fort McKay	Bertha Ganter - Fort McKay
Station #	AMS 1	AMS 1	AMS 1	AMS 1
Sample Date	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m <sup>3</sup>	Std Dev µg/m <sup>3</sup>	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	18.13	13.28	5	5
Calcium	1.41	1.38	5	5
Magnesium	0.03	0.02	5	5
Potassium	0.03	0.01	5	5
Sodium	0.10	0.13	5	5
Chloride	0.03	0.04	5	4
Fluoride	0.00	0.00	5	0
Nitrate	0.09	0.07	5	5
Sulphate	1.07	0.77	5	5
Phosphate	0.00	0.00	5	0
Ammonium (as N)	0.25	0.16	5	5



<b>Station Name</b>	<b>Patricia McInnes</b>	<b>Patricia McInnes</b>	<b>Patricia McInnes</b>	<b>Patricia McInnes</b>
<b>Station #</b>	<b>AMS 6</b>	<b>AMS 6</b>	<b>AMS 6</b>	<b>AMS 6</b>
<b>Sample Date</b>	<b>Sep 04 - Sep 28</b>	<b>Sep 04 - Sep 28</b>	<b>Sep 04 - Sep 28</b>	<b>Sep 04 - Sep 28</b>
<b>Particulate Size</b>	<b>PM10</b>	<b>PM10</b>	<b>PM10</b>	<b>PM10</b>
<b>Compound Name</b>	<b>Average</b>	<b>Std Dev</b>	<b>Total Samples (#)</b>	<b>Total ≥ MDL (#)</b>
	<b>µg/m<sup>3</sup></b>	<b>µg/m<sup>3</sup></b>		
Particulate Matter	22.39	20.36	5	5
Calcium	0.98	1.08	5	5
Magnesium	0.07	0.05	5	5
Potassium	0.03	0.01	5	5
Sodium	0.05	0.08	5	5
Chloride	0.08	0.14	5	5
Fluoride	0.00	0.00	5	1
Nitrate	0.07	0.03	5	5
Sulphate	0.73	0.51	5	5
Phosphate	0.00	0.00	5	0
Ammonium (as N)	0.20	0.16	5	5





Station Name	Athabasca Valley	Athabasca Valley	Athabasca Valley	Athabasca Valley
Station #	AMS 7	AMS 7	AMS 7	AMS 7
Sample Date	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m <sup>3</sup>	Std Dev µg/m <sup>3</sup>	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	18.56	5.56	5	5
Calcium	0.71	0.37	5	5
Magnesium	0.06	0.03	5	5
Potassium	0.04	0.01	5	5
Sodium	0.03	0.01	5	5
Chloride	0.03	0.01	5	5
Fluoride	0.00	0.00	5	1
Nitrate	0.09	0.04	5	5
Sulphate	0.79	0.52	5	5
Phosphate	0.00	0.00	5	0
Ammonium (as N)	0.21	0.15	5	5



<b>Station Name</b>	<b>Anzac</b>	<b>Anzac</b>	<b>Anzac</b>	<b>Anzac</b>
<b>Station #</b>	<b>AMS 14</b>	<b>AMS 14</b>	<b>AMS 14</b>	<b>AMS 14</b>
<b>Sample Date</b>	<b>Sep 04 - Sep 28</b>	<b>Sep 04 - Sep 28</b>	<b>Sep 04 - Sep 28</b>	<b>Sep 04 - Sep 28</b>
<b>Particulate Size</b>	<b>PM10</b>	<b>PM10</b>	<b>PM10</b>	<b>PM10</b>
<b>Compound Name</b>	<b>Average</b>	<b>Std Dev</b>	<b>Total Samples (#)</b>	<b>Total ≥ MDL (#)</b>
	<b>µg/m<sup>3</sup></b>	<b>µg/m<sup>3</sup></b>		
Particulate Matter	7.96	3.30	5	5
Calcium	0.18	0.14	5	5
Magnesium	0.02	0.02	5	5
Potassium	0.02	0.01	5	5
Sodium	0.01	0.01	5	5
Chloride	0.01	0.01	5	4
Fluoride	0.00	0.00	5	0
Nitrate	0.04	0.01	5	5
Sulphate	0.55	0.22	5	5
Phosphate	0.00	0.00	5	0
Ammonium (as N)	0.15	0.05	5	5



Station Name	Fort McKay South	Fort McKay South	Fort McKay South	Fort McKay South
Station #	AMS 13	AMS 13	AMS 13	AMS 13
Sample Date	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m <sup>3</sup>	Std Dev µg/m <sup>3</sup>	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	12.03	8.45	5	5
Calcium	0.45	0.43	5	5
Magnesium	0.03	0.02	5	5
Potassium	0.03	0.01	5	5
Sodium	0.09	0.13	5	5
Chloride	0.02	0.02	5	3
Fluoride	0.00	0.00	5	0
Nitrate	0.05	0.04	5	4
Sulphate	1.12	0.85	5	5
Phosphate	0.00	0.00	5	0
Ammonium (as N)	0.27	0.17	5	5



Station Name	Horizon	Horizon	Horizon	Horizon
Station #	AMS 15	AMS 15	AMS 15	AMS 15
Sample Date	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m <sup>3</sup>	Std Dev µg/m <sup>3</sup>	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	14.01	6.43	5	5
Calcium	0.38	0.30	5	5
Magnesium	0.04	0.03	5	5
Potassium	0.02	0.01	5	5
Sodium	0.07	0.05	5	5
Chloride	0.02	0.01	5	5
Fluoride	0.00	0.00	5	0
Nitrate	0.05	0.03	5	5
Sulphate	0.75	0.45	5	5
Phosphate	0.00	0.00	5	0
Ammonium (as N)	0.17	0.11	5	5



Station Name	Muskeg River	Muskeg River	Muskeg River	Muskeg River
Station #	AMS 16	AMS 16	AMS 16	AMS 16
Sample Date	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m <sup>3</sup>	Std Dev µg/m <sup>3</sup>	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	23.93	15.13	5	5
Calcium	1.13	0.77	5	5
Magnesium	0.06	0.04	5	5
Potassium	0.03	0.01	5	5
Sodium	0.09	0.07	5	5
Chloride	0.05	0.05	5	5
Fluoride	0.00	0.00	5	0
Nitrate	0.09	0.04	5	5
Sulphate	0.91	0.45	5	5
Phosphate	0.00	0.00	5	0
Ammonium (as N)	0.20	0.12	5	5



**Wood Buffalo Environmental Association**

**PM10 Ion (µg/sample) Summary**

**2017 September**

Compound	% Det	N	N < Det.	Min.	10%	25%	50%	60%	75%	80%	90%	95%	99% Max.	Mean	Std. Dev.	Median	Outlier Test	
Particulate Matter	100.0%	35	0	86	172	188	291	405	551	574	795	1063	1399	1399	401	288	291	1838
Calcium	100.0%	35	0	0.48	1.26	4.59	14.31	16.26	22.92	26.73	49.80	68.28	80.76	80.76	17.92	19.48	14.31	115.32
Magnesium	100.0%	35	0	0.09	0.15	0.42	0.90	1.26	1.56	1.65	1.95	2.67	3.36	3.36	1.04	0.78	0.90	4.95
Potassium	100.0%	35	0	0.24	0.33	0.45	0.69	0.75	0.87	0.90	1.02	1.11	1.11	1.11	0.67	0.25	0.69	1.90
Sodium	100.0%	35	0	0.09	0.15	0.36	0.60	0.99	2.31	3.18	4.50	7.08	7.26	7.26	1.51	1.88	0.60	10.88
Chloride	88.6%	35	4	0.06	0.09	0.15	0.42	0.51	0.90	1.02	1.83	3.00	8.01	8.01	0.80	1.41	0.42	7.86
Fluoride	5.7%	35	33	0.00	0.03	0.03	0.03	0.06	0.06	0.06	0.09	0.15	0.18	0.18	0.05	0.04	0.03	0.24
Nitrate	97.1%	35	1	0.15	0.45	0.78	1.56	1.80	2.25	2.43	3.48	3.69	3.69	3.69	1.59	1.00	1.56	6.60
Sulphate	100.0%	35	0	2.79	7.29	10.41	15.03	19.59	31.23	33.87	40.44	48.90	50.43	50.43	20.29	13.25	15.03	86.54
Phosphate	0.0%	35	35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	
Ammonium (as N)	100.0%	35	0	0.79	0.98	2.66	4.12	5.26	7.57	7.90	9.76	11.11	11.39	11.39	4.96	3.15	4.12	20.70



## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

### **INTEGRATED MONITORING PROGRAM MONTHLY REPORT**

### **PARTICULATE MATTER - METALS DATA SUMMARY SEPTEMBER 2017**

Prepared  
November 29, 2017

**SAMPLE COLLECTION AND DATA COMPILATION BY:**

**Wood Buffalo Environmental Association**  
Fort McMurray, Alberta

**LABORATORY ANALYSIS BY:**

PM ions: Atmospheric Research & Analysis, Inc.  
Morrisville, NC



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## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

### **INTEGRATED MONITORING PROGRAM MONTHLY REPORT**

### **PARTICULATE MATTER (PM<sub>2.5</sub>) - METALS DATA SUMMARY SEPTEMBER 2017**

Prepared  
November 29, 2017

#### **SAMPLE COLLECTION AND DATA COMPILATION BY:**

**Wood Buffalo Environmental Association**  
Fort McMurray, Alberta

#### **LABORATORY ANALYSIS BY:**

PM metals: Atmospheric Research & Analysis, Inc.  
Morrisville, NC



FILE CONTENTS DESCRIPTION	Partisol Sampler Measurements of Mass, Ions by IC and Metals by ICP-MS
SAMPLING INTERVAL	24 hour
SAMPLING FREQUENCY OF DATA	Once every 6 days
EXPLANATION OF ZERO VALUES	Zero values are contained in this file and should be treated as values below detection - Method Detection Limits (MDL) are provided with each observation
UNITS	$\mu\text{g}/\text{m}^3$ (microgram per cubic meter)
OBSERVATION TYPE	Particles
FIELD SAMPLING OR MEASUREMENT PRINCIPLE	Filtration with $\text{PM}_{10}$ Inlet for $\text{PM}_{10}$ and with $\text{PM}_{10}$ Inlet/Very Sharp Cut Cyclone for $\text{PM}_{2.5}$
PARTICLE DIAMETER	$< 2.5 \mu\text{m}$ or $< 10 \mu\text{m}$
MEDIUM	47 mm Teflon Filter
ANALYTICAL METHODS	MASS by Microbalance ELEMENTS by Inductively Coupled Plasma Mass Spectrometry (ICP/MS) IONS by Ion Chromatography (IC)
SAMPLE PREPARATION	DI Water extraction for IC analysis and Acid Digestion for ICP/MS Analysis
ANALYTICAL LABORATORY	Atmospheric Research & Analysis Inc
USER NOTE 1	Data are not blank corrected
USER NOTE 2	Volume is given at actual conditions of temperature and pressure during sampling as measured by the sampler
USER NOTE 3	Blank sample concentration ( $\mu\text{g}/\text{m}^3$ ) is calculated using expected actual volume of sampler
VOLUME STANDARDIZATION	Actual Volume at Ambient Conditions (since 01-Jan-2011)
SAMPLING INSTRUMENT TYPE	For $\text{PM}_{10}$ FRM Partisol $\text{PM}_{10}$ sampler For $\text{PM}_{2.5}$ FRM Partisol $\text{PM}_{2.5}$ sampler
FLAGS USED	
V0	Valid value
V1	Valid value but comprised wholly or partially of below detection limit data
V4	Valid value despite failing to meet some QC or statistical criteria
V5	Valid value but qualified because of possible contamination
V6	Valid value but qualified due to non-standard sampling conditions
M1	Missing value because no value is available
M2	Missing value because invalidated by Data Originator



Compound Name	Bertha Ganter - Fort						
	Station Name	McKay		Patricia McInnes		Travel Blank	
	Station #	AMS 1		AMS 6		04-Sep	
	Sample Date	04-Sep		04-Sep			
Particulate Size	PM2.5		PM2.5				
Total Air Volume (m <sup>3</sup> )	24		24				
MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	
Particulate Matter	1.00	2.52	V0	8.93	V0	0.00	V1
Aluminum	0.1380326	0.0461345	V0	0.1154305	V0	0.0000000	V1
Antimony	0.0001784	-9999	M2	0.0000350	V0	0.0000000	V1
Arsenic	0.0001060	0.0000326	V0	0.0000500	V0	0.0000055	V0
Barium	0.0092847	0.0004596	V0	0.0012574	V0	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000061	V0	0.0000000	V1
Bismuth	0.0000093	0.0000004	V0	0.0000192	V0	0.0000004	V0
Cadmium	0.0000174	0.0000023	V0	0.0000079	V0	0.0000000	V1
Calcium	0.4112124	0.0931648	V0	0.1218046	V0	0.0000000	V1
Cerium	0.0000174	0.0000487	V0	0.0001275	V0	0.0000000	V1
Cesium	0.0000100	0.0000034	V0	0.0000084	V0	0.0000000	V1
Chromium	0.0022262	0.0001608	V0	0.0001946	V0	0.0000000	V1
Cobalt	0.0000273	0.0000152	V0	0.0000310	V0	0.0000022	V0
Copper	0.0017171	0.0003565	V0	0.0004022	V0	0.0000789	V0
Iron	0.0393063	0.0479830	V0	0.1131285	V0	0.0000000	V1
Lanthanum	0.0000130	0.0000238	V0	0.0000630	V0	0.0000000	V1
Lead	0.0008577	0.0000718	V0	0.0000582	V0	0.0000000	V1
Lithium	0.0000374	0.0000418	V0	0.0000990	V0	0.0000028	V0
Magnesium	0.0091409	0.0093604	V0	0.0316073	V0	0.0000000	V1
Manganese	0.0006949	0.0008136	V0	0.0018784	V0	0.0000000	V1
Molybdenum	0.0007116	0.0000000	V1	0.0000852	V0	0.0000000	V1
Neodymium	0.0000140	0.0000204	V0	0.0000528	V0	0.0000000	V1
Nickel	0.0005429	0.0001003	V0	0.0001522	V0	0.0000554	V0
Niobium	0.0000202	0.0000056	V0	0.0000110	V0	0.0000000	V1
Palladium	0.0000632	0.0000043	V0	0.0000057	V0	0.0000043	V0
Phosphorus	0.0459574	0.0097952	V0	0.0104224	V0	0.0085940	V0
Platinum	0.0000088	0.0000013	V0	0.0000019	V0	0.0000011	V0
Potassium	0.0061261	0.0172927	V0	0.0452857	V0	0.0003636	V0
Praseodymium	0.0000070	0.0000051	V0	0.0000140	V0	0.0000000	V1
Rubidium	0.0000184	0.0000614	V0	0.0001615	V0	0.0000008	V0
Samarium	0.0000133	0.0000040	V0	0.0000086	V0	0.0000000	V1
Selenium	0.0003366	0.0000296	V0	0.0000784	V0	0.0000000	V1
Silicon	0.7676322	0.0894501	V0	0.3136308	V0	0.0346973	V0
Silver	0.0000100	0.0000008	V0	0.0000017	V0	0.0000005	V0
Sodium	0.0169447	0.0067365	V0	0.0165656	V0	0.0009873	V0
Strontium	0.0003375	0.0002106	V0	0.0005452	V0	0.0000000	V1
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000005	V0	0.0000018	V0	0.0000000	V1
Thorium	0.0000059	0.0000061	V0	0.0000173	V0	0.0000000	V1
Tin	0.0004414	0.0000592	V0	0.0000869	V0	0.0000000	V1
Titanium	0.0015201	0.0021027	V0	0.0050817	V0	0.0005791	V0
Tungsten	0.0000938	0.0000051	V0	0.0000150	V0	0.0000000	V1
Uranium	0.0000048	0.0000018	V0	0.0000043	V0	0.0000000	V1
Vanadium	0.0007697	0.0000864	V0	0.0002340	V0	0.0000000	V1
Zinc	0.0055897	0.0007219	V0	0.0011700	V0	0.0000000	V1



Station Name Station # Sample Date Particulate Size Total Air Volume (m <sup>3</sup> )	Athabasca Valley			Anzac		Travel Blank	
	AMS 7 04-Sep PM2.5 24	Results (µg/m <sup>3</sup> )	QC Flag	AMS 14 04-Sep PM2.5 23.6	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	11.30	V0	7.16	V0	0.00	V1
Aluminum	0.1380326	0.0392301	V0	0.0132597	V0	0.0000000	V1
Antimony	0.0001784	0.0001002	V0	0.0000000	V1	0.0000000	V1
Arsenic	0.0001060	0.0001302	V0	0.0000357	V0	0.0000055	V0
Barium	0.0092847	0.0011749	V0	0.0000000	V1	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000041	V0	0.0000009	V0	0.0000004	V0
Cadmium	0.0000174	0.0000116	V0	0.0000088	V0	0.0000000	V1
Calcium	0.4112124	0.0614641	V0	0.0180109	V0	0.0000000	V1
Cerium	0.0000174	0.0000541	V0	0.0000170	V0	0.0000000	V1
Cesium	0.0000100	0.0000037	V0	0.0000014	V0	0.0000000	V1
Chromium	0.0022262	0.0001688	V0	0.0001705	V0	0.0000000	V1
Cobalt	0.0000273	0.0000148	V0	0.0000063	V0	0.0000022	V0
Copper	0.0017171	0.0006855	V0	0.0001706	V0	0.0000789	V0
Iron	0.0393063	0.0574393	V0	0.0221643	V0	0.0000000	V1
Lanthanum	0.0000130	0.0000251	V0	0.0000080	V0	0.0000000	V1
Lead	0.0008577	0.0002752	V0	0.0000368	V0	0.0000000	V1
Lithium	0.0000374	0.0000337	V0	0.0000107	V0	0.0000028	V0
Magnesium	0.0091409	0.0137245	V0	0.0036191	V0	0.0000000	V1
Manganese	0.0006949	0.0009171	V0	0.0003971	V0	0.0000000	V1
Molybdenum	0.0007116	0.0000416	V0	0.0000555	V0	0.0000000	V1
Neodymium	0.0000140	0.0000196	V0	0.0000079	V0	0.0000000	V1
Nickel	0.0005429	0.0001113	V0	0.0000805	V0	0.0000554	V0
Niobium	0.0000202	0.0000048	V0	0.0000021	V0	0.0000000	V1
Palladium	0.0000632	0.0000072	V0	0.0000000	V1	0.0000043	V0
Phosphorus	0.0459574	0.0111514	V0	0.0111034	V0	0.0085940	V0
Platinum	0.0000088	0.0000020	V0	0.0000015	V0	0.0000011	V0
Potassium	0.0061261	0.0306784	V0	0.0163939	V0	0.0003636	V0
Praseodymium	0.0000070	0.0000057	V0	0.0000018	V0	0.0000000	V1
Rubidium	0.0000184	0.0000769	V0	0.0000360	V0	0.0000008	V0
Samarium	0.0000133	0.0000038	V0	0.0000011	V0	0.0000000	V1
Selenium	0.0003366	0.0000504	V0	0.0000368	V0	0.0000000	V1
Silicon	0.7676322	0.1268717	V0	0.0467829	V0	0.0346973	V0
Silver	0.0000100	0.0000019	V0	0.0000008	V0	0.0000005	V0
Sodium	0.0169447	0.0101084	V0	0.0035586	V0	0.0009873	V0
Strontium	0.0003375	0.0002101	V0	0.0000600	V0	0.0000000	V1
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000013	V0	0.0000006	V0	0.0000000	V1
Thorium	0.0000059	0.0000062	V0	0.0000021	V0	0.0000000	V1
Tin	0.0004414	0.0001435	V0	0.0000568	V0	0.0000000	V1
Titanium	0.0015201	0.0019858	V0	0.0014940	V0	0.0005791	V0
Tungsten	0.0000938	0.0000252	V0	0.0000047	V0	0.0000000	V1
Uranium	0.0000048	0.0000018	V0	0.0000007	V0	0.0000000	V1
Vanadium	0.0007697	0.0000894	V0	0.0000483	V0	0.0000000	V1
Zinc	0.0055897	0.0030003	V0	0.0009129	V0	0.0000000	V1



Compound Name	Bertha Ganter - Fort								
	Station Name	McKay			Patricia McInnes			Travel Blank	
	Station #	AMS 1		AMS 6			10-Sep		
	Sample Date	10-Sep		10-Sep					
Particulate Size	PM2.5		PM2.5						
Total Air Volume (m <sup>3</sup> )	24		24						
MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag			
Particulate Matter	1.00	5.43	V0	5.32	V0	-0.09	V1		
Aluminum	0.1380326	0.0154850	V0	0.0139013	V0	0.0000000	V1		
Antimony	0.0001784	0.0000000	V1	0.0000643	V0	0.0000000	V1		
Arsenic	0.0001060	0.0000413	V0	0.0000524	V0	0.0000000	V1		
Barium	0.0092847	0.0000000	V1	0.0000000	V1	0.0000000	V1		
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1		
Bismuth	0.0000093	-9999	M2	0.0000136	V0	0.0000000	V1		
Cadmium	0.0000174	0.0000092	V0	0.0000113	V0	0.0000000	V1		
Calcium	0.4112124	0.0449173	V0	0.0209757	V0	0.0000000	V1		
Cerium	0.0000174	0.0000163	V0	0.0000165	V0	0.0000011	V0		
Cesium	0.0000100	0.0000016	V0	0.0000014	V0	0.0000000	V1		
Chromium	0.0022262	-9999	M2	0.0001973	V0	0.0000000	V1		
Cobalt	0.0000273	0.0000058	V0	0.0000063	V0	0.0000015	V0		
Copper	0.0017171	0.0005261	V0	0.0003307	V0	0.0000000	V1		
Iron	0.0393063	0.0165409	V0	0.0151243	V0	0.0017694	V0		
Lanthanum	0.0000130	0.0000077	V0	0.0000076	V0	0.0000000	V1		
Lead	0.0008577	0.0000000	V1	0.0001110	V0	0.0000000	V1		
Lithium	0.0000374	0.0000130	V0	0.0000094	V0	0.0000000	V1		
Magnesium	0.0091409	0.0039259	V0	0.0049072	V0	0.0006359	V0		
Manganese	0.0006949	0.0003188	V0	0.0002992	V0	0.0000000	V1		
Molybdenum	0.0007116	0.0000451	V0	-9999	M2	0.0000000	V1		
Neodymium	0.0000140	0.0000068	V0	0.0000059	V0	0.0000000	V1		
Nickel	0.0005429	0.0000739	V0	0.0001228	V0	0.0000440	V0		
Niobium	0.0000202	-9999	M2	0.0000016	V0	0.0000000	V1		
Palladium	0.0000632	-9999	M2	0.0000000	V1	0.0000000	V1		
Phosphorus	0.0459574	0.0103604	V0	0.0111643	V0	0.0057178	V0		
Platinum	0.0000088	0.0000009	V0	0.0000013	V0	0.0000016	V0		
Potassium	0.0061261	0.0179550	V0	0.0201148	V0	0.0007906	V0		
Praseodymium	0.0000070	0.0000017	V0	0.0000019	V0	0.0000000	V1		
Rubidium	0.0000184	0.0000380	V0	0.0000372	V0	0.0000025	V0		
Samarium	0.0000133	0.0000010	V0	0.0000009	V0	0.0000000	V1		
Selenium	0.0003366	0.0000319	V0	0.0000409	V0	0.0000000	V1		
Silicon	0.7676322	0.0897667	V0	0.1208296	V0	0.1212064	V0		
Silver	0.0000100	0.0000008	V0	0.0000012	V0	0.0000000	V1		
Sodium	0.0169447	0.0040398	V0	0.0067750	V0	0.0009564	V0		
Strontium	0.0003375	0.0000892	V0	0.0000739	V0	0.0000180	V0		
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1		
Thallium	0.0000090	0.0000006	V0	0.0000008	V0	0.0000000	V1		
Thorium	0.0000059	0.0000019	V0	0.0000014	V0	0.0000000	V1		
Tin	0.0004414	0.0000391	V0	0.0001538	V0	0.0000000	V1		
Titanium	0.0015201	0.0009863	V0	0.0015264	V0	0.0007438	V0		
Tungsten	0.0000938	0.0000000	V1	0.0000000	V1	0.0000000	V1		
Uranium	0.0000048	0.0000004	V0	0.0000003	V0	0.0000000	V1		
Vanadium	0.0007697	0.0000409	V0	0.0000608	V0	0.0000000	V1		
Zinc	0.0055897	0.0006487	V0	0.0029640	V0	0.0000000	V1		



Station Name Station # Sample Date Particulate Size Total Air Volume (m <sup>3</sup> )	Athabasca Valley			Anzac		Travel Blank	
	AMS 7 10-Sep PM2.5 24	AMS 14 10-Sep PM2.5 24	AMS 14 10-Sep PM2.5 24	AMS 14 10-Sep PM2.5 24	AMS 14 10-Sep PM2.5 24	AMS 14 10-Sep PM2.5 24	AMS 14 10-Sep PM2.5 24
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	5.10	V0	4.50	V0	-0.09	V1
Aluminum	0.1380326	0.0085078	V0	0.0080121	V0	0.0000000	V1
Antimony	0.0001784	0.0000279	V0	0.0000000	V1	0.0000000	V1
Arsenic	0.0001060	0.0000339	V0	0.0000458	V0	0.0000000	V1
Barium	0.0092847	0.0004199	V0	0.0000000	V1	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000013	V0	0.0000013	V0	0.0000000	V1
Cadmium	0.0000174	0.0000076	V0	0.0000088	V0	0.0000000	V1
Calcium	0.4112124	0.0000000	V1	0.0000000	V1	0.0000000	V1
Cerium	0.0000174	0.0000093	V0	0.0000092	V0	0.0000011	V0
Cesium	0.0000100	0.0000009	V0	0.0000011	V0	0.0000000	V1
Chromium	0.0022262	0.0001193	V0	0.0000000	V1	0.0000000	V1
Cobalt	0.0000273	0.0000047	V0	0.0000045	V0	0.0000015	V0
Copper	0.0017171	0.0003076	V0	0.0004996	V0	0.0000000	V1
Iron	0.0393063	0.0115168	V0	0.0080825	V0	0.0017694	V0
Lanthanum	0.0000130	0.0000041	V0	0.0000047	V0	0.0000000	V1
Lead	0.0008577	0.0000000	V1	0.0000414	V0	0.0000000	V1
Lithium	0.0000374	0.0000054	V0	0.0000039	V0	0.0000000	V1
Magnesium	0.0091409	0.0026414	V0	0.0022818	V0	0.0006359	V0
Manganese	0.0006949	0.0002074	V0	0.0002425	V0	0.0000000	V1
Molybdenum	0.0007116	0.0000444	V0	0.0000432	V0	0.0000000	V1
Neodymium	0.0000140	0.0000038	V0	0.0000035	V0	0.0000000	V1
Nickel	0.0005429	0.0000824	V0	0.0001181	V0	0.0000440	V0
Niobium	0.0000202	0.0000009	V0	0.0000013	V0	0.0000000	V1
Palladium	0.0000632	-9999	M2	0.0000000	V1	0.0000000	V1
Phosphorus	0.0459574	0.0104812	V0	0.0117391	V0	0.0057178	V0
Platinum	0.0000088	0.0000011	V0	0.0000014	V0	0.0000016	V0
Potassium	0.0061261	0.0143320	V0	0.0164051	V0	0.0007906	V0
Praseodymium	0.0000070	0.0000009	V0	0.0000009	V0	0.0000000	V1
Rubidium	0.0000184	0.0000253	V0	0.0000323	V0	0.0000025	V0
Samarium	0.0000133	0.0000000	V1	0.0000006	V0	0.0000000	V1
Selenium	0.0003366	0.0000304	V0	0.0000445	V0	0.0000000	V1
Silicon	0.7676322	0.0590657	V0	0.0000000	V1	0.1212064	V0
Silver	0.0000100	0.0000011	V0	0.0000012	V0	0.0000000	V1
Sodium	0.0169447	0.0040850	V0	0.0053092	V0	0.0009564	V0
Strontium	0.0003375	0.0000536	V0	0.0000410	V0	0.0000180	V0
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000004	V0	0.0000007	V0	0.0000000	V1
Thorium	0.0000059	0.0000008	V0	0.0000013	V0	0.0000000	V1
Tin	0.0004414	0.0000667	V0	-9999	M2	0.0000000	V1
Titanium	0.0015201	0.0009250	V0	0.0009031	V0	0.0007438	V0
Tungsten	0.0000938	0.0000061	V0	0.0000043	V0	0.0000000	V1
Uranium	0.0000048	0.0000000	V1	0.0000004	V0	0.0000000	V1
Vanadium	0.0007697	0.0000588	V0	0.0000935	V0	0.0000000	V1
Zinc	0.0055897	0.0007249	V0	0.0008651	V0	0.0000000	V1



Compound Name	Bertha Ganter - Fort						
	Station Name	McKay		Patricia McInnes		Travel Blank	
	Station #	AMS 1		AMS 6			
	Sample Date	16-Sep		16-Sep			16-Sep
Particulate Size	PM2.5		PM2.5				
Total Air Volume (m <sup>3</sup> )	24		24			24	
MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	
Particulate Matter	1.00	6.39	V0	3.96	V0	0.15	V0
Aluminum	0.1380326	0.1152539	V0	0.0396886	V0	0.0000000	V1
Antimony	0.0001784	0.0000475	V0	0.0000626	V0	0.0000000	V1
Arsenic	0.0001060	0.0000694	V0	0.0008738	V0	0.0000079	V0
Barium	0.0092847	0.0010338	V0	0.0009772	V0	0.0000000	V1
Beryllium	0.0000946	0.0000044	V0	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000078	V0	0.0000040	V0	0.0000014	V0
Cadmium	0.0000174	0.0000076	V0	0.0000187	V0	0.0000000	V1
Calcium	0.4112124	0.1678995	V0	0.0636359	V0	0.0000000	V1
Cerium	0.0000174	0.0002644	V0	0.0000571	V0	0.0000000	V1
Cesium	0.0000100	0.0000072	V0	0.0000025	V0	0.0000000	V1
Chromium	0.0022262	0.0004638	V0	0.0001870	V0	0.0000987	V0
Cobalt	0.0000273	0.0000367	V0	0.0000155	V0	0.0000025	V0
Copper	0.0017171	-9999	M2	0.0010993	V0	0.0120504	V0
Iron	0.0393063	0.0966241	V0	0.0536020	V0	0.0000000	V1
Lanthanum	0.0000130	0.0000537	V0	0.0000273	V0	0.0000000	V1
Lead	0.0008577	-9999	M2	0.0001105	V0	0.0000000	V1
Lithium	0.0000374	0.0001039	V0	0.0000317	V0	0.0000016	V0
Magnesium	0.0091409	0.0199673	V0	0.0124446	V0	0.0005552	V0
Manganese	0.0006949	0.0020542	V0	0.0008932	V0	0.0000000	V1
Molybdenum	0.0007116	0.0001106	V0	0.0000495	V0	0.0000388	V0
Neodymium	0.0000140	0.0000475	V0	0.0000211	V0	0.0000000	V1
Nickel	0.0005429	0.0004225	V0	0.0001016	V0	0.0000997	V0
Niobium	0.0000202	0.0000143	V0	0.0000043	V0	0.0000000	V1
Palladium	0.0000632	0.0000049	V0	0.0000096	V0	0.0000115	V0
Phosphorus	0.0459574	0.0129197	V0	0.0124582	V0	0.0095068	V0
Platinum	0.0000088	0.0000013	V0	0.0000027	V0	0.0000017	V0
Potassium	0.0061261	0.0575137	V0	0.0320013	V0	0.0004680	V0
Praseodymium	0.0000070	0.0000121	V0	0.0000057	V0	0.0000000	V1
Rubidium	0.0000184	0.0001670	V0	0.0000751	V0	0.0000008	V0
Samarium	0.0000133	0.0000089	V0	0.0000038	V0	0.0000000	V1
Selenium	0.0003366	0.0001348	V0	0.0001043	V0	0.0000173	V0
Silicon	0.7676322	0.2572966	V0	0.0608795	V0	0.0000000	V1
Silver	0.0000100	-9999	M2	0.0000024	V0	0.0000007	V0
Sodium	0.0169447	0.0408035	V0	0.0079936	V0	0.0014617	V0
Strontium	0.0003375	0.0004405	V0	0.0002017	V0	0.0000211	V0
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000011	V0	0.0000006	V0	0.0000000	V1
Thorium	0.0000059	0.0000130	V0	0.0000065	V0	0.0000003	V0
Tin	0.0004414	0.0001675	V0	0.0001400	V0	0.0000217	V0
Titanium	0.0015201	0.0041300	V0	0.0017544	V0	0.0004868	V0
Tungsten	0.0000938	0.0000097	V0	0.0000154	V0	0.0000000	V1
Uranium	0.0000048	0.0000042	V0	0.0000017	V0	0.0000002	V0
Vanadium	0.0007697	0.0002972	V0	0.0000839	V0	0.0000000	V1
Zinc	0.0055897	-9999	M2	0.0064602	V0	0.0000000	V1



Compound Name	MDL (µg/sample)	Athabasca Valley		Anzac		Travel Blank	
		AMS 7		AMS 14		16-Sep	
		16-Sep		16-Sep		16-Sep	
		PM2.5		PM2.5		PM2.5	
Total Air Volume (m <sup>3</sup> )		24	QC Flag	24	QC Flag	24	QC Flag
Results (µg/m <sup>3</sup> )		Results (µg/m <sup>3</sup> )		Results (µg/m <sup>3</sup> )		Results (µg/m <sup>3</sup> )	
Particulate Matter	1.00	4.09	V0	2.58	V0	0.15	V0
Aluminum	0.1380326	0.0429434	V0	0.0186053	V0	0.0000000	V1
Antimony	0.0001784	0.0001641	V0	0.0000103	V0	0.0000000	V1
Arsenic	0.0001060	0.0001467	V0	0.0000204	V0	0.0000079	V0
Barium	0.0092847	0.0019729	V0	0.0000000	V1	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000064	V0	0.0000000	V1	0.0000014	V0
Cadmium	0.0000174	0.0000139	V0	0.0000022	V0	0.0000000	V1
Calcium	0.4112124	0.0692012	V0	0.0299195	V0	0.0000000	V1
Cerium	0.0000174	0.0000685	V0	0.0000271	V0	0.0000000	V1
Cesium	0.0000100	0.0000028	V0	0.0000010	V0	0.0000000	V1
Chromium	0.0022262	0.0001870	V0	0.0001095	V0	0.0000987	V0
Cobalt	0.0000273	0.0000177	V0	0.0000089	V0	0.0000025	V0
Copper	0.0017171	0.0022977	V0	0.0001558	V0	0.0120504	V0
Iron	0.0393063	0.0773902	V0	0.0211729	V0	0.0000000	V1
Lanthanum	0.0000130	0.0000310	V0	0.0000137	V0	0.0000000	V1
Lead	0.0008577	0.0001291	V0	0.0000375	V0	0.0000000	V1
Lithium	0.0000374	0.0000335	V0	0.0000119	V0	0.0000016	V0
Magnesium	0.0091409	0.0142816	V0	0.0062892	V0	0.0005552	V0
Manganese	0.0006949	0.0020706	V0	0.0004683	V0	0.0000000	V1
Molybdenum	0.0007116	0.0000894	V0	0.0000356	V0	0.0000388	V0
Neodymium	0.0000140	0.0000223	V0	0.0000109	V0	0.0000000	V1
Nickel	0.0005429	0.0001212	V0	0.0000862	V0	0.0000997	V0
Niobium	0.0000202	0.0000068	V0	0.0000022	V0	0.0000000	V1
Palladium	0.0000632	0.0000133	V0	0.0000000	V1	0.0000115	V0
Phosphorus	0.0459574	0.0105938	V0	0.0096412	V0	0.0095068	V0
Platinum	0.0000088	0.0000024	V0	0.0000013	V0	0.0000017	V0
Potassium	0.0061261	0.0265177	V0	0.0078478	V0	0.0004680	V0
Praseodymium	0.0000070	0.0000061	V0	0.0000031	V0	0.0000000	V1
Rubidium	0.0000184	0.0000647	V0	0.0000251	V0	0.0000008	V0
Samarium	0.0000133	0.0000040	V0	0.0000019	V0	0.0000000	V1
Selenium	0.0003366	0.0001067	V0	0.0000654	V0	0.0000173	V0
Silicon	0.7676322	0.2259358	V0	0.1129871	V0	0.0000000	V1
Silver	0.0000100	0.0000028	V0	0.0000006	V0	0.0000007	V0
Sodium	0.0169447	0.0116606	V0	0.0036729	V0	0.0014617	V0
Strontium	0.0003375	0.0002374	V0	0.0000850	V0	0.0000211	V0
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000008	V0	0.0000000	V1	0.0000000	V1
Thorium	0.0000059	0.0000067	V0	0.0000037	V0	0.0000003	V0
Tin	0.0004414	0.0002034	V0	0.0000640	V0	0.0000217	V0
Titanium	0.0015201	0.0030868	V0	0.0012036	V0	0.0004868	V0
Tungsten	0.0000938	0.0000136	V0	0.0000054	V0	0.0000000	V1
Uranium	0.0000048	0.0000018	V0	0.0000009	V0	0.0000002	V0
Vanadium	0.0007697	0.0000993	V0	0.0000438	V0	0.0000000	V1
Zinc	0.0055897	0.0084796	V0	0.0003793	V0	0.0000000	V1





Compound Name	Bertha Ganter - Fort						
	Station Name	McKay			Patricia McInnes		Travel Blank
	Station #	AMS 1		AMS 6			
	Sample Date	22-Sep		22-Sep		22-Sep	
Particulate Size	PM2.5		PM2.5				
Total Air Volume (m <sup>3</sup> )	24		24			24	
MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	
Particulate Matter	1.00	3.68	V0	4.16	V0	0.02	V1
Aluminum	0.1380326	0.0324851	V0	0.0281270	V0	0.0000000	V1
Antimony	0.0001784	0.0000238	V0	0.0000428	V0	0.0000000	V1
Arsenic	0.0001060	0.0000322	V0	0.0001553	V0	0.0000000	V1
Barium	0.0092847	0.0000000	V1	0.0006089	V0	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000104	V0	0.0000022	V0	0.0000000	V1
Cadmium	0.0000174	0.0000018	V0	0.0000038	V0	0.0000014	V0
Calcium	0.4112124	0.0422462	V0	0.0225326	V0	0.0000000	V1
Cerium	0.0000174	0.0000222	V0	0.0000261	V0	0.0000000	V1
Cesium	0.0000100	0.0000014	V0	0.0000010	V0	0.0000000	V1
Chromium	0.0022262	0.0002401	V0	0.0002523	V0	0.0000000	V1
Cobalt	0.0000273	0.0000077	V0	0.0000071	V0	0.0000000	V1
Copper	0.0017171	0.0012666	V0	0.0005598	V0	0.0000929	V0
Iron	0.0393063	0.0249488	V0	0.0216844	V0	0.0000000	V1
Lanthanum	0.0000130	0.0000108	V0	0.0000114	V0	0.0000000	V1
Lead	0.0008577	0.0000453	V0	0.0000703	V0	0.0000000	V1
Lithium	0.0000374	0.0000137	V0	0.0000128	V0	0.0000000	V1
Magnesium	0.0091409	0.0051709	V0	0.0058069	V0	0.0000000	V1
Manganese	0.0006949	0.0006739	V0	0.0004376	V0	0.0000000	V1
Molybdenum	0.0007116	0.0001089	V0	0.0000600	V0	0.0000000	V1
Neodymium	0.0000140	0.0000069	V0	0.0000070	V0	0.0000000	V1
Nickel	0.0005429	0.0001723	V0	0.0001223	V0	0.0000508	V0
Niobium	0.0000202	0.0000028	V0	0.0000027	V0	0.0000000	V1
Palladium	0.0000632	0.0000000	V1	0.0000033	V0	0.0000000	V1
Phosphorus	0.0459574	0.0135385	V0	0.0126240	V0	0.0050384	V0
Platinum	0.0000088	0.0000013	V0	0.0000027	V0	0.0000015	V0
Potassium	0.0061261	0.0122561	V0	0.0125548	V0	0.0006009	V0
Praseodymium	0.0000070	0.0000019	V0	0.0000018	V0	0.0000000	V1
Rubidium	0.0000184	0.0000307	V0	0.0000254	V0	0.0000021	V0
Samarium	0.0000133	0.0000014	V0	0.0000011	V0	0.0000000	V1
Selenium	0.0003366	0.0000773	V0	0.0000590	V0	0.0000172	V0
Silicon	0.7676322	0.0613815	V0	0.0677108	V0	0.0527132	V0
Silver	0.0000100	0.0000005	V0	0.0000008	V0	0.0000000	V1
Sodium	0.0169447	0.0101260	V0	0.0102668	V0	0.0018945	V0
Strontium	0.0003375	0.0000914	V0	0.0000904	V0	0.0000000	V1
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thorium	0.0000059	0.0000020	V0	0.0000018	V0	0.0000000	V1
Tin	0.0004414	0.0000788	V0	0.0001233	V0	0.0000297	V0
Titanium	0.0015201	0.0013766	V0	0.0013873	V0	0.0004008	V0
Tungsten	0.0000938	0.0000043	V0	0.0000083	V0	0.0000000	V1
Uranium	0.0000048	0.0000007	V0	0.0000006	V0	0.0000000	V1
Vanadium	0.0007697	0.0002189	V0	0.0001441	V0	0.0000000	V1
Zinc	0.0055897	0.0008335	V0	0.0010835	V0	0.0000000	V1



Station Name Station # Sample Date Particulate Size Total Air Volume (m <sup>3</sup> )	Athabasca Valley			Anzac		Travel Blank	
	AMS 7	AMS 14	AMS 14	AMS 14	AMS 14	AMS 14	AMS 14
	22-Sep	22-Sep	22-Sep	22-Sep	22-Sep	22-Sep	22-Sep
	PM2.5	PM2.5	PM2.5	PM2.5	PM2.5	PM2.5	PM2.5
	24	24	24	24	24	24	24
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	4.11	V0	-9999	M2	0.02	V1
Aluminum	0.1380326	0.0262683	V0	-9999	M2	0.0000000	V1
Antimony	0.0001784	0.0001547	V0	-9999	M2	0.0000000	V1
Arsenic	0.0001060	0.0000344	V0	-9999	M2	0.0000000	V1
Barium	0.0092847	0.0016908	V0	-9999	M2	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	-9999	M2	0.0000000	V1
Bismuth	0.0000093	0.0000096	V0	-9999	M2	0.0000000	V1
Cadmium	0.0000174	0.0000017	V0	-9999	M2	0.0000014	V0
Calcium	0.4112124	0.0383572	V0	-9999	M2	0.0000000	V1
Cerium	0.0000174	0.0000387	V0	-9999	M2	0.0000000	V1
Cesium	0.0000100	0.0000015	V0	-9999	M2	0.0000000	V1
Chromium	0.0022262	0.0001799	V0	-9999	M2	0.0000000	V1
Cobalt	0.0000273	0.0000109	V0	-9999	M2	0.0000000	V1
Copper	0.0017171	0.0012159	V0	-9999	M2	0.0000929	V0
Iron	0.0393063	0.0420158	V0	-9999	M2	0.0000000	V1
Lanthanum	0.0000130	0.0000144	V0	-9999	M2	0.0000000	V1
Lead	0.0008577	0.0000805	V0	-9999	M2	0.0000000	V1
Lithium	0.0000374	0.0000169	V0	-9999	M2	0.0000000	V1
Magnesium	0.0091409	0.0079692	V0	-9999	M2	0.0000000	V1
Manganese	0.0006949	0.0005587	V0	-9999	M2	0.0000000	V1
Molybdenum	0.0007116	0.0000732	V0	-9999	M2	0.0000000	V1
Neodymium	0.0000140	0.0000110	V0	-9999	M2	0.0000000	V1
Nickel	0.0005429	0.0001355	V0	-9999	M2	0.0000508	V0
Niobium	0.0000202	0.0000038	V0	-9999	M2	0.0000000	V1
Palladium	0.0000632	0.0000067	V0	-9999	M2	0.0000000	V1
Phosphorus	0.0459574	0.0123227	V0	-9999	M2	0.0050384	V0
Platinum	0.0000088	0.0000016	V0	-9999	M2	0.0000015	V0
Potassium	0.0061261	0.0122363	V0	-9999	M2	0.0006009	V0
Praseodymium	0.0000070	0.0000040	V0	-9999	M2	0.0000000	V1
Rubidium	0.0000184	0.0000321	V0	-9999	M2	0.0000021	V0
Samarium	0.0000133	0.0000023	V0	-9999	M2	0.0000000	V1
Selenium	0.0003366	0.0000589	V0	-9999	M2	0.0000172	V0
Silicon	0.7676322	0.0566168	V0	-9999	M2	0.0527132	V0
Silver	0.0000100	0.0000026	V0	-9999	M2	0.0000000	V1
Sodium	0.0169447	0.0137917	V0	-9999	M2	0.0018945	V0
Strontium	0.0003375	0.0001468	V0	-9999	M2	0.0000000	V1
Tantalum	0.0000394	0.0000000	V1	-9999	M2	0.0000000	V1
Thallium	0.0000090	0.0000000	V1	-9999	M2	0.0000000	V1
Thorium	0.0000059	0.0000032	V0	-9999	M2	0.0000000	V1
Tin	0.0004414	0.0002108	V0	-9999	M2	0.0000297	V0
Titanium	0.0015201	0.0018792	V0	-9999	M2	0.0004008	V0
Tungsten	0.0000938	0.0000145	V0	-9999	M2	0.0000000	V1
Uranium	0.0000048	0.0000013	V0	-9999	M2	0.0000000	V1
Vanadium	0.0007697	0.0001834	V0	-9999	M2	0.0000000	V1
Zinc	0.0055897	0.0010973	V0	-9999	M2	0.0000000	V1



Compound Name	Bertha Ganter - Fort							
	Station Name	McKay		Patricia McInnes		Travel Blank		
	Station #	AMS 1	AMS 6	AMS 6	AMS 6	AMS 6	AMS 6	
	Sample Date	28-Sep	28-Sep	28-Sep	28-Sep	28-Sep	28-Sep	
Particulate Size	PM2.5	PM2.5	PM2.5	PM2.5	PM2.5	PM2.5	PM2.5	
Total Air Volume (m <sup>3</sup> )	24	24	24	24	24	24	24	
MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	7.04	V0	4.39	V0	0.04	V0	
Aluminum	0.1380326	0.1074748	V0	0.0292304	V0	0.0000000	V1	
Antimony	0.0001784	0.0000493	V0	0.0000763	V0	0.0000000	V1	
Arsenic	0.0001060	0.0001234	V0	0.0001066	V0	0.0000000	V1	
Barium	0.0092847	0.0011816	V0	0.0010118	V0	0.0000000	V1	
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1	
Bismuth	0.0000093	0.0000028	V0	0.0000031	V0	0.0000000	V1	
Cadmium	0.0000174	0.0000087	V0	0.0000094	V0	0.0000000	V1	
Calcium	0.4112124	0.2448456	V0	0.0387101	V0	0.0000000	V1	
Cerium	0.0000174	0.0001208	V0	0.0000615	V0	0.0000000	V1	
Cesium	0.0000100	0.0000074	V0	0.0000021	V0	0.0000000	V1	
Chromium	0.0022262	0.0002599	V0	0.0001702	V0	0.0000000	V1	
Cobalt	0.0000273	0.0000338	V0	0.0000126	V0	0.0000013	V0	
Copper	0.0017171	0.0006540	V0	0.0005395	V0	0.0000000	V1	
Iron	0.0393063	0.1259276	V0	0.0392645	V0	0.0000000	V1	
Lanthanum	0.0000130	0.0000938	V0	0.0000526	V0	0.0000000	V1	
Lead	0.0008577	0.0001250	V0	0.0000738	V0	0.0000000	V1	
Lithium	0.0000374	0.0000913	V0	0.0000275	V0	0.0000000	V1	
Magnesium	0.0091409	0.0252675	V0	0.0083534	V0	0.0004307	V0	
Manganese	0.0006949	0.0022004	V0	0.0006732	V0	0.0000000	V1	
Molybdenum	0.0007116	0.0001317	V0	0.0000406	V0	0.0000000	V1	
Neodymium	0.0000140	0.0000503	V0	0.0000142	V0	0.0000000	V1	
Nickel	0.0005429	0.0002327	V0	0.0001043	V0	0.0000646	V0	
Niobium	0.0000202	0.0000132	V0	0.0000029	V0	0.0000000	V1	
Palladium	0.0000632	0.0000040	V0	0.0000036	V0	0.0000040	V0	
Phosphorus	0.0459574	0.0158246	V0	0.0146476	V0	0.0090182	V0	
Platinum	0.0000088	0.0000035	V0	0.0000034	V0	0.0000021	V0	
Potassium	0.0061261	0.0507751	V0	0.0243451	V0	0.0008648	V0	
Praseodymium	0.0000070	0.0000134	V0	0.0000037	V0	0.0000000	V1	
Rubidium	0.0000184	0.0001577	V0	0.0000569	V0	0.0000014	V0	
Samarium	0.0000133	0.0000095	V0	0.0000028	V0	0.0000000	V1	
Selenium	0.0003366	0.0001238	V0	0.0000606	V0	0.0000174	V0	
Silicon	0.7676322	0.3047050	V0	0.1804397	V0	0.0364724	V0	
Silver	0.0000100	0.0000013	V0	0.0000007	V0	0.0000000	V1	
Sodium	0.0169447	0.0234965	V0	0.0068068	V0	0.0013139	V0	
Strontium	0.0003375	0.0005193	V0	0.0001416	V0	0.0000000	V1	
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1	
Thallium	0.0000090	0.0000016	V0	0.0000005	V0	0.0000000	V1	
Thorium	0.0000059	0.0000144	V0	0.0000042	V0	0.0000000	V1	
Tin	0.0004414	0.0000878	V0	0.0001427	V0	0.0000196	V0	
Titanium	0.0015201	0.0046686	V0	0.0013498	V0	0.0007062	V0	
Tungsten	0.0000938	0.0000104	V0	0.0000096	V0	0.0000000	V1	
Uranium	0.0000048	0.0000041	V0	0.0000012	V0	0.0000000	V1	
Vanadium	0.0007697	0.0003898	V0	0.0000896	V0	0.0000000	V1	
Zinc	0.0055897	0.0026233	V0	0.0016371	V0	0.0002937	V0	



Station Name Station # Sample Date Particulate Size Total Air Volume (m <sup>3</sup> )	Athabasca Valley			Anzac		Travel Blank	
	AMS 7			AMS 14		28-Sep	
	28-Sep			28-Sep			
	PM2.5			PM2.5			
	24			23.6		24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	5.16	V0	3.63	V0	0.04	V0
Aluminum	0.1380326	0.0553590	V0	0.0091852	V0	0.0000000	V1
Antimony	0.0001784	0.0002802	V0	0.0000129	V0	0.0000000	V1
Arsenic	0.0001060	0.0000872	V0	0.0000174	V0	0.0000000	V1
Barium	0.0092847	0.0026690	V0	0.0000000	V1	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000089	V0	0.0000011	V0	0.0000000	V1
Cadmium	0.0000174	0.0000108	V0	0.0000041	V0	0.0000000	V1
Calcium	0.4112124	0.0835119	V0	0.0000000	V1	0.0000000	V1
Cerium	0.0000174	0.0000800	V0	0.0000106	V0	0.0000000	V1
Cesium	0.0000100	0.0000039	V0	0.0000007	V0	0.0000000	V1
Chromium	0.0022262	0.0003321	V0	0.0000959	V0	0.0000000	V1
Cobalt	0.0000273	0.0000220	V0	0.0000044	V0	0.0000013	V0
Copper	0.0017171	0.0017119	V0	0.0001256	V0	0.0000000	V1
Iron	0.0393063	0.0843490	V0	0.0123728	V0	0.0000000	V1
Lanthanum	0.0000130	0.0000689	V0	0.0000075	V0	0.0000000	V1
Lead	0.0008577	0.0001640	V0	0.0000000	V1	0.0000000	V1
Lithium	0.0000374	0.0000421	V0	0.0000036	V0	0.0000000	V1
Magnesium	0.0091409	0.0169530	V0	0.0029408	V0	0.0004307	V0
Manganese	0.0006949	0.0014756	V0	0.0002511	V0	0.0000000	V1
Molybdenum	0.0007116	0.0000771	V0	0.0000000	V1	0.0000000	V1
Neodymium	0.0000140	0.0000257	V0	0.0000046	V0	0.0000000	V1
Nickel	0.0005429	0.0001778	V0	0.0000671	V0	0.0000646	V0
Niobium	0.0000202	0.0000076	V0	0.0000016	V0	0.0000000	V1
Palladium	0.0000632	0.0000090	V0	0.0000068	V0	0.0000040	V0
Phosphorus	0.0459574	0.0152802	V0	0.0104973	V0	0.0090182	V0
Platinum	0.0000088	0.0000014	V0	0.0000018	V0	0.0000021	V0
Potassium	0.0061261	0.0378023	V0	0.0109888	V0	0.0008648	V0
Praseodymium	0.0000070	0.0000072	V0	0.0000011	V0	0.0000000	V1
Rubidium	0.0000184	0.0000896	V0	0.0000214	V0	0.0000014	V0
Samarium	0.0000133	0.0000048	V0	0.0000008	V0	0.0000000	V1
Selenium	0.0003366	0.0001096	V0	0.0000313	V0	0.0000174	V0
Silicon	0.7676322	0.2301930	V0	0.0679789	V0	0.0364724	V0
Silver	0.0000100	0.0000020	V0	-9999	M2	0.0000000	V1
Sodium	0.0169447	0.0150980	V0	0.0036491	V0	0.0013139	V0
Strontium	0.0003375	0.0002998	V0	0.0000481	V0	0.0000000	V1
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000008	V0	0.0000000	V1	0.0000000	V1
Thorium	0.0000059	0.0000076	V0	0.0000015	V0	0.0000000	V1
Tin	0.0004414	0.0002631	V0	0.0000382	V0	0.0000196	V0
Titanium	0.0015201	0.0030029	V0	0.0005475	V0	0.0007062	V0
Tungsten	0.0000938	0.0000186	V0	0.0000044	V0	0.0000000	V1
Uranium	0.0000048	0.0000022	V0	0.0000004	V0	0.0000000	V1
Vanadium	0.0007697	0.0001607	V0	0.0000000	V1	0.0000000	V1
Zinc	0.0055897	0.0026621	V0	0.0004880	V0	0.0002937	V0



**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

**Particulate Matter (PM2.5) - METALS - Summary**

**2017**

**Indicated Sites and Dates**

Station Name	Bertha Ganter - Fort McKay	Bertha Ganter - Fort McKay	Bertha Ganter - Fort McKay	Bertha Ganter - Fort McKay
Station #	AMS 1	AMS 1	AMS 1	AMS 1
Sample Date	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28
Particulate Size	PM2.5	PM2.5	PM2.5	PM2.5
Compound Name	Average µg/m <sup>3</sup>	Std Dev µg/m <sup>3</sup>	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	5.01	1.88	5	5
Aluminum	0.0633667	0.0452247	5	5
Antimony	0.0000302	0.0000232	4	3
Arsenic	0.0000598	0.0000387	5	5
Barium	0.0005350	0.0005579	5	3
Beryllium	0.0000009	0.0000020	5	1
Bismuth	0.0000053	0.0000045	4	4
Cadmium	0.0000059	0.0000036	5	5
Calcium	0.1186147	0.0869977	5	5
Cerium	0.0000945	0.0001037	5	5
Cesium	0.0000042	0.0000030	5	5
Chromium	0.0002812	0.0001291	4	4
Cobalt	0.0000198	0.0000145	5	5
Copper	0.0007008	0.0003964	4	4
Iron	0.0624049	0.0472243	5	5
Lanthanum	0.0000379	0.0000361	5	5
Lead	0.0000605	0.0000522	4	3
Lithium	0.0000527	0.0000428	5	5
Magnesium	0.0127384	0.0094283	5	5
Manganese	0.0012122	0.0008562	5	5
Molybdenum	0.0000792	0.0000549	5	4
Neodymium	0.0000264	0.0000213	5	5
Nickel	0.0002003	0.0001389	5	5
Niobium	0.0000089	0.0000056	4	4
Palladium	0.0000033	0.0000022	4	3
Phosphorus	0.0124877	0.0024597	5	5
Platinum	0.0000017	0.0000010	5	5
Potassium	0.0311585	0.0212326	5	5
Praseodymium	0.0000068	0.0000056	5	5
Rubidium	0.0000910	0.0000663	5	5
Samarium	0.0000049	0.0000040	5	5
Selenium	0.0000795	0.0000495	5	5
Silicon	0.1605200	0.1118486	5	5
Silver	0.0000008	0.0000003	4	4
Sodium	0.0170405	0.0152427	5	5
Strontium	0.0002702	0.0001996	5	5
Tantalum	0.0000000	0.0000000	5	0
Thallium	0.0000008	0.0000006	5	4
Thorium	0.0000075	0.0000060	5	5
Tin	0.0000865	0.0000490	5	5
Titanium	0.0026528	0.0016548	5	5
Tungsten	0.0000059	0.0000043	5	4
Uranium	0.0000022	0.0000018	5	5
Vanadium	0.0002067	0.0001447	5	5
Zinc	0.0012069	0.0009474	4	4



Station Name	Patricia McInnes	Patricia McInnes	Patricia McInnes	Patricia McInnes
Station #	AMS 6	AMS 6	AMS 6	AMS 6
Sample Date	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28
Particulate Size	PM2.5	PM2.5	PM2.5	PM2.5
Compound Name	Average µg/m <sup>3</sup>	Std Dev µg/m <sup>3</sup>	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	5.35	2.06	5	5
Aluminum	0.0452756	0.0402765	5	5
Antimony	0.0000562	0.0000169	5	5
Arsenic	0.0002476	0.0003527	5	5
Barium	0.0007711	0.0004893	5	4
Beryllium	0.0000012	0.0000027	5	1
Bismuth	0.0000084	0.0000076	5	5
Cadmium	0.0000102	0.0000055	5	5
Calcium	0.0535318	0.0418444	5	5
Cerium	0.0000577	0.0000435	5	5
Cesium	0.0000031	0.0000030	5	5
Chromium	0.0002003	0.0000309	5	5
Cobalt	0.0000145	0.0000100	5	5
Copper	0.0005863	0.0003022	5	5
Iron	0.0485607	0.0391189	5	5
Lanthanum	0.0000324	0.0000246	5	5
Lead	0.0000847	0.0000244	5	5
Lithium	0.0000361	0.0000364	5	5
Magnesium	0.0126239	0.0110075	5	5
Manganese	0.0008363	0.0006251	5	5
Molybdenum	0.0000588	0.0000193	4	4
Neodymium	0.0000202	0.0000192	5	5
Nickel	0.0001206	0.0000202	5	5
Niobium	0.0000045	0.0000037	5	5
Palladium	0.0000044	0.0000035	5	4
Phosphorus	0.0122633	0.0016163	5	5
Platinum	0.0000024	0.0000008	5	5
Potassium	0.0268603	0.0124740	5	5
Praseodymium	0.0000054	0.0000051	5	5
Rubidium	0.0000712	0.0000539	5	5
Samarium	0.0000034	0.0000032	5	5
Selenium	0.0000686	0.0000240	5	5
Silicon	0.1486981	0.1039928	5	5
Silver	0.0000014	0.0000007	5	5
Sodium	0.0096815	0.0041016	5	5
Strontium	0.0002106	0.0001936	5	5
Tantalum	0.0000000	0.0000000	5	0
Thallium	0.0000007	0.0000007	5	4
Thorium	0.0000063	0.0000065	5	5
Tin	0.0001293	0.0000261	5	5
Titanium	0.0022199	0.0016076	5	5
Tungsten	0.0000096	0.0000062	5	4
Uranium	0.0000016	0.0000016	5	5
Vanadium	0.0001225	0.0000694	5	5
Zinc	0.0026630	0.0022520	5	5



Station Name	Athabasca Valley	Athabasca Valley	Athabasca Valley	Athabasca Valley
Station #	AMS 7	AMS 7	AMS 7	AMS 7
Sample Date	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28
Particulate Size	PM2.5	PM2.5	PM2.5	PM2.5
Compound Name	Average µg/m <sup>3</sup>	Std Dev µg/m <sup>3</sup>	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	5.95	3.04	5	5
Aluminum	0.0344617	0.0178333	5	5
Antimony	0.0001454	0.0000928	5	5
Arsenic	0.0000865	0.0000525	5	5
Barium	0.0015855	0.0008459	5	5
Beryllium	0.0000000	0.0000000	5	0
Bismuth	0.0000060	0.0000034	5	5
Cadmium	0.0000091	0.0000047	5	5
Calcium	0.0505069	0.0326245	5	4
Cerium	0.0000501	0.0000276	5	5
Cesium	0.0000026	0.0000013	5	5
Chromium	0.0001974	0.0000798	5	5
Cobalt	0.0000140	0.0000066	5	5
Copper	0.0012437	0.0007935	5	5
Iron	0.0545422	0.0292702	5	5
Lanthanum	0.0000287	0.0000247	5	5
Lead	0.0001298	0.0001020	5	4
Lithium	0.0000263	0.0000148	5	5
Magnesium	0.0111139	0.0057580	5	5
Manganese	0.0010459	0.0007402	5	5
Molybdenum	0.0000651	0.0000211	5	5
Neodymium	0.0000165	0.0000089	5	5
Nickel	0.0001256	0.0000351	5	5
Niobium	0.0000048	0.0000027	5	5
Palladium	0.0000091	0.0000030	4	4
Phosphorus	0.0119659	0.0019914	5	5
Platinum	0.0000017	0.0000005	5	5
Potassium	0.0243133	0.0108721	5	5
Praseodymium	0.0000048	0.0000025	5	5
Rubidium	0.0000577	0.0000280	5	5
Samarium	0.0000030	0.0000019	5	4
Selenium	0.0000712	0.0000353	5	5
Silicon	0.1397366	0.0854325	5	5
Silver	0.0000021	0.0000006	5	5
Sodium	0.0109488	0.0042902	5	5
Strontium	0.0001896	0.0000938	5	5
Tantalum	0.0000000	0.0000000	5	0
Thallium	0.0000007	0.0000005	5	4
Thorium	0.0000049	0.0000028	5	5
Tin	0.0001775	0.0000751	5	5
Titanium	0.0021759	0.0008948	5	5
Tungsten	0.0000156	0.0000070	5	5
Uranium	0.0000014	0.0000009	5	4
Vanadium	0.0001183	0.0000519	5	5
Zinc	0.0031928	0.0031125	5	5



Station Name	Anzac	Anzac	Anzac	Anzac
Station #	AMS 14	AMS 14	AMS 14	AMS 14
Sample Date	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28
Particulate Size	PM2.5	PM2.5	PM2.5	PM2.5
Compound Name	Average µg/m <sup>3</sup>	Std Dev µg/m <sup>3</sup>	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	4.47	1.96	4	4
Aluminum	0.0122656	0.0047875	4	4
Antimony	0.0000058	0.0000068	4	2
Arsenic	0.0000298	0.0000133	4	4
Barium	0.0000000	0.0000000	4	0
Beryllium	0.0000000	0.0000000	4	0
Bismuth	0.0000008	0.0000006	4	3
Cadmium	0.0000060	0.0000034	4	4
Calcium	0.0119826	0.0146656	4	2
Cerium	0.0000160	0.0000082	4	4
Cesium	0.0000011	0.0000003	4	4
Chromium	0.0000940	0.0000706	4	3
Cobalt	0.0000060	0.0000021	4	4
Copper	0.0002379	0.0001754	4	4
Iron	0.0159481	0.0068457	4	4
Lanthanum	0.0000085	0.0000038	4	4
Lead	0.0000289	0.0000194	4	3
Lithium	0.0000075	0.0000044	4	4
Magnesium	0.0037827	0.0017579	4	4
Manganese	0.0003398	0.0001112	4	4
Molybdenum	0.0000336	0.0000238	4	3
Neodymium	0.0000067	0.0000033	4	4
Nickel	0.0000880	0.0000216	4	4
Niobium	0.0000018	0.0000004	4	4
Palladium	0.0000017	0.0000034	4	1
Phosphorus	0.0107452	0.0008937	4	4
Platinum	0.0000015	0.0000002	4	4
Potassium	0.0129089	0.0042296	4	4
Praseodymium	0.0000017	0.0000010	4	4
Rubidium	0.0000287	0.0000066	4	4
Samarium	0.0000011	0.0000006	4	4
Selenium	0.0000445	0.0000150	4	4
Silicon	0.0569372	0.0469342	4	3
Silver	0.0000009	0.0000003	3	3
Sodium	0.0040475	0.0008426	4	4
Strontium	0.0000585	0.0000193	4	4
Tantalum	0.0000000	0.0000000	4	0
Thallium	0.0000003	0.0000004	4	2
Thorium	0.0000022	0.0000011	4	4
Tin	0.0000530	0.0000133	3	3
Titanium	0.0010371	0.0004059	4	4
Tungsten	0.0000047	0.0000005	4	4
Uranium	0.0000006	0.0000002	4	4
Vanadium	0.0000464	0.0000382	4	3
Zinc	0.0006613	0.0002673	4	4





Wood Buffalo Environmental Association

PM2.5 Metal (µg/sample) Summary

2017 September

Compound	% Det	N	N < Det.	Min.	10%	25%	50%	60%	75%	80%	90%	95%	99% Max.	Mean	Std. Dev.	Median	Outlier	Test
Particulate Matter	100.0%	19	0	61	62	95	108	124	153	169	214	271	271	125	52	108	386	
Aluminium	100.0%	19	0	0.1923	0.2042	0.3336	0.7015	0.9415	1.1072	1.3286	2.7661	2.7703	2.7703	0.9653	0.8415	0.7015	5.1730	
Antimony	83.3%	18	3	0.0001	0.0001	0.0003	0.0011	0.0012	0.0018	0.0024	0.0039	0.0067	0.0067	0.0016	0.0017	0.0011	0.0101	
Arsenic	100.0%	19	0	0.0004	0.0005	0.0008	0.0012	0.0017	0.0030	0.0031	0.0037	0.0210	0.0210	0.0210	0.0026	0.0046	0.0012	0.0255
Barium	63.2%	19	7	0.0030	0.0034	0.0053	0.0146	0.0243	0.0284	0.0302	0.0473	0.0641	0.0641	0.0641	0.0201	0.0170	0.0146	0.1052
Beryllium	10.5%	19	17	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0001	0.0002	
Bismuth	94.4%	18	1	0.0000	0.0000	0.0000	0.0001	0.0001	0.0002	0.0002	0.0003	0.0005	0.0005	0.0005	0.0001	0.0001	0.0008	
Cadmium	100.0%	19	0	0.0000	0.0000	0.0001	0.0002	0.0002	0.0003	0.0003	0.0003	0.0004	0.0004	0.0004	0.0002	0.0001	0.0002	0.0007
Calcium	84.2%	19	3	0.2378	0.3015	0.5034	1.0139	1.4751	2.0043	2.2360	4.0296	5.8763	5.8763	5.8763	1.5133	1.4434	1.0139	8.7302
Cerium	100.0%	19	0	0.0002	0.0002	0.0004	0.0009	0.0013	0.0016	0.0019	0.0031	0.0063	0.0063	0.0063	0.0014	0.0015	0.0009	0.0087
Cesium	100.0%	19	0	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0001	0.0001	0.0004	
Chromium	94.4%	18	1	0.0020	0.0023	0.0039	0.0045	0.0045	0.0058	0.0061	0.0080	0.0111	0.0111	0.0111	0.0048	0.0022	0.0045	0.0156
Cobalt	100.0%	19	0	0.0001	0.0001	0.0001	0.0003	0.0004	0.0004	0.0005	0.0008	0.0009	0.0009	0.0009	0.0003	0.0002	0.0003	0.0016
Copper	100.0%	18	0	0.0030	0.0037	0.0079	0.0129	0.0134	0.0264	0.0292	0.0411	0.0551	0.0551	0.0551	0.0172	0.0141	0.0129	0.0876
Iron	100.0%	19	0	0.1940	0.2764	0.3970	0.9423	1.1516	1.8574	2.0244	2.7151	3.0223	3.0223	3.0223	1.1252	0.8760	0.9423	5.5053
Lanthanum	100.0%	19	0	0.0001	0.0001	0.0002	0.0003	0.0006	0.0013	0.0013	0.0017	0.0023	0.0023	0.0023	0.0007	0.0006	0.0003	0.0038
Lead	83.3%	18	3	0.0007	0.0008	0.0009	0.0017	0.0018	0.0027	0.0030	0.0039	0.0066	0.0066	0.0066	0.0020	0.0015	0.0017	0.0095
Lithium	100.0%	19	0	0.0001	0.0001	0.0003	0.0004	0.0008	0.0010	0.0010	0.0024	0.0025	0.0025	0.0025	0.0008	0.0008	0.0004	0.0046
Magnesium	100.0%	19	0	0.0548	0.0634	0.0942	0.1913	0.2247	0.3428	0.4069	0.6064	0.7586	0.7586	0.7586	0.2494	0.1971	0.1913	1.2346
Manganese	100.0%	19	0	0.0050	0.0058	0.0077	0.0162	0.0195	0.0354	0.0451	0.0497	0.0528	0.0528	0.0528	0.0212	0.0166	0.0162	0.1042
Molybdenum	88.9%	18	2	0.0003	0.0006	0.0010	0.0013	0.0014	0.0020	0.0021	0.0027	0.0032	0.0032	0.0032	0.0015	0.0008	0.0013	0.0054
Neodymium	100.0%	19	0	0.0001	0.0001	0.0002	0.0003	0.0005	0.0005	0.0006	0.0012	0.0013	0.0013	0.0013	0.0004	0.0004	0.0003	0.0023
Nickel	100.0%	19	0	0.0016	0.0018	0.0021	0.0028	0.0029	0.0037	0.0041	0.0056	0.0101	0.0101	0.0101	0.0033	0.0019	0.0028	0.0129
Niobium	100.0%	18	0	0.0000	0.0000	0.0000	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0003	0.0003	0.0001	0.0001	0.0006	
Palladium	70.6%	17	5	0.0000	0.0000	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003	0.0001	0.0001	0.0005	
Phosphorus	100.0%	19	0	0.2314	0.2351	0.2501	0.2679	0.2957	0.3101	0.3249	0.3667	0.3798	0.3798	0.3798	0.2857	0.0444	0.2679	0.5075
Platinum	100.0%	19	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000	0.0001	0.0001
Potassium	100.0%	19	0	0.1883	0.2593	0.3013	0.4309	0.5843	0.7680	0.9073	1.2186	1.3803	1.3803	1.3803	0.5846	0.3463	0.4309	2.3163
Praseodymium	100.0%	19	0	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0002	0.0003	0.0003	0.0003	0.0003	0.0001	0.0001	0.0006	
Rubidium	100.0%	19	0	0.0005	0.0006	0.0007	0.0009	0.0015	0.0018	0.0022	0.0039	0.0040	0.0040	0.0040	0.0015	0.0012	0.0009	0.0073
Samarium	94.7%	19	1	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0001	0.0001	0.0004	
Selenium	100.0%	19	0	0.0007	0.0007	0.0009	0.0014	0.0016	0.0025	0.0026	0.0030	0.0032	0.0032	0.0032	0.0016	0.0008	0.0014	0.0057
Silicon	94.7%	19	1	0.0000	1.1041	1.4611	2.1544	2.8999	5.4225	5.5246	7.3129	7.5271	7.5271	7.5271	3.1208	2.2458	2.1544	14.3495
Silver	100.0%	17	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000	0.0001	0.0001
Sodium	100.0%	19	0	0.0840	0.0861	0.0980	0.1918	0.2430	0.3310	0.3624	0.5639	0.9793	0.9793	0.9793	0.2582	0.2160	0.1918	1.3381
Strontium	100.0%	19	0	0.0010	0.0011	0.0018	0.0034	0.0048	0.0057	0.0072	0.0125	0.0131	0.0131	0.0131	0.0045	0.0038	0.0034	0.0235
Tantalum	0.0%	19	19	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Thallium	73.7%	19	5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	
Thorium	100.0%	19	0	0.0000	0.0000	0.0000	0.0001	0.0001	0.0002	0.0002	0.0003	0.0004	0.0004	0.0004	0.0001	0.0001	0.0007	
Tin	100.0%	18	0	0.0009	0.0009	0.0015	0.0030	0.0034	0.0037	0.0040	0.0051	0.0063	0.0063	0.0063	0.0028	0.0016	0.0030	0.0106
Titanium	100.0%	19	0	0.0129	0.0217	0.0289	0.0366	0.0451	0.0721	0.0741	0.1120	0.1220	0.1220	0.1220	0.0497	0.0316	0.0366	0.2077
Tungsten	89.5%	19	2	0.0001	0.0001	0.0001	0.0002	0.0002	0.0003	0.0004	0.0004	0.0006	0.0006	0.0006	0.0002	0.0001	0.0002	0.0010
Uranium	94.7%	19	1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000	0.0002	
Vanadium	94.7%	19	1	0.0007	0.0010	0.0014	0.0022	0.0024	0.0044	0.0053	0.0071	0.0094	0.0094	0.0094	0.0031	0.0023	0.0022	0.0147
Zinc	100.0%	18	0	0.0091	0.0115	0.0174	0.0263	0.0281	0.0639	0.0711	0.1550	0.2035	0.2035	0.2035	0.0490	0.0524	0.0263	0.3109



## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

### **INTEGRATED MONITORING PROGRAM MONTHLY REPORT**

### **PARTICULATE MATTER (PM<sub>10</sub>) - METALS DATA SUMMARY SEPTEMBER 2017**

Prepared  
November 29, 2017

#### **SAMPLE COLLECTION AND DATA COMPILATION BY:**

**Wood Buffalo Environmental Association**  
Fort McMurray, Alberta

#### **LABORATORY ANALYSIS BY:**

PM metals: Atmospheric Research & Analysis, Inc.  
Morrisville, NC



FILE CONTENTS DESCRIPTION	Partisol Sampler Measurements of Mass, Ions by IC and Metals by ICP-MS
SAMPLING INTERVAL	24 hour
SAMPLING FREQUENCY OF DATA	Once every 6 days
EXPLANATION OF ZERO VALUES	Zero values are contained in this file and should be treated as values below detection - Method Detection Limits (MDL) are provided with each observation
UNITS	$\mu\text{g}/\text{m}^3$ (microgram per cubic meter)
OBSERVATION TYPE	Particles
FIELD SAMPLING OR MEASUREMENT PRINCIPLE	Filtration with $\text{PM}_{10}$ Inlet for $\text{PM}_{10}$ and with $\text{PM}_{10}$ Inlet/Very Sharp Cut Cyclone for $\text{PM}_{2.5}$
PARTICLE DIAMETER MEDIUM	< 2.5 $\mu\text{m}$ or < 10 $\mu\text{m}$ 47 mm Teflon Filter
ANALYTICAL METHODS	MASS by Microbalance ELEMENTS by Inductively Coupled Plasma Mass Spectrometry (ICP/MS) IONS by Ion Chromatography (IC)
SAMPLE PREPARATION	DI Water extraction for IC analysis and Acid Digestion for ICP/MS Analysis
ANALYTICAL LABORATORY	Atmospheric Research & Analysis Inc
USER NOTE 1	Data are not blank corrected
USER NOTE 2	Volume is given at actual conditions of temperature and pressure during sampling as measured by the sampler
USER NOTE 3	Blank sample concentration ( $\mu\text{g}/\text{m}^3$ ) is calculated using expected actual volume of sampler
VOLUME STANDARDIZATION	Actual Volume at Ambient Conditions (since 01-Jan-2011)
SAMPLING INSTRUMENT TYPE	For $\text{PM}_{10}$ FRM Partisol $\text{PM}_{10}$ sampler For $\text{PM}_{2.5}$ FRM Partisol $\text{PM}_{2.5}$ sampler
FLAGS USED	
V0	Valid value
V1	Valid value but comprised wholly or partially of below detection limit data
V4	Valid value despite failing to meet some QC or statistical criteria
V5	Valid value but qualified because of possible contamination
V6	Valid value but qualified due to non-standard sampling conditions
M1	Missing value because no value is available
M2	Missing value because invalidated by Data Originator



Compound Name	Bertha Ganter - Fort						
	Station Name	McKay		Patricia McInnes		Travel Blank	
	Station #	AMS 1		AMS 6		04-Sep	
	Sample Date	04-Sep		04-Sep			
Particulate Size	PM10		PM10				
Total Air Volume (m <sup>3</sup> )	24		24				
MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	
Particulate Matter	1.00	9.36	V0	58.85	V0	-0.30	V1
Aluminum	0.1380326	0.2103023	V0	1.7855518	V0	0.0000000	V1
Antimony	0.0001784	0.0000135	V0	0.0001675	V0	0.0000000	V1
Arsenic	0.0001060	0.0000561	V0	0.0004608	V0	0.0000072	V0
Barium	0.0092847	0.0017509	V0	0.0200902	V0	0.0000000	V1
Beryllium	0.0000946	0.0000082	V0	0.0000535	V0	0.0000000	V1
Bismuth	0.0000093	0.0000013	V0	0.0000138	V0	0.0000000	V1
Cadmium	0.0000174	0.0000024	V0	0.0000154	V0	0.0000000	V1
Calcium	0.4112124	0.2889357	V0	3.7161664	V0	0.0000000	V1
Cerium	0.0000174	0.0002249	V0	0.0022847	V0	0.0000000	V1
Cesium	0.0000100	0.0000155	V0	0.0001228	V0	0.0000000	V1
Chromium	0.0022262	0.0003619	V0	0.0020063	V0	0.0001144	V0
Cobalt	0.0000273	0.0000616	V0	0.0005134	V0	0.0000024	V0
Copper	0.0017171	0.0004790	V0	0.0023284	V0	0.0027427	V0
Iron	0.0393063	0.1989942	V0	2.5319993	V0	0.0039313	V0
Lanthanum	0.0000130	0.0001067	V0	0.0011383	V0	0.0000000	V1
Lead	0.0008577	0.0001408	V0	0.0007311	V0	0.0001080	V0
Lithium	0.0000374	0.0002058	V0	0.0014088	V0	0.0000023	V0
Magnesium	0.0091409	0.0377940	V0	0.8188466	V0	0.0004653	V0
Manganese	0.0006949	0.0035488	V0	0.0387821	V0	0.0000342	V0
Molybdenum	0.0007116	0.0000543	V0	0.0001964	V0	0.0000438	V0
Neodymium	0.0000140	0.0000942	V0	0.0009541	V0	0.0000000	V1
Nickel	0.0005429	0.0006601	V0	0.0021161	V0	0.0000646	V0
Niobium	0.0000202	0.0000246	V0	0.0002389	V0	0.0000000	V1
Palladium	0.0000632	0.0000092	V0	0.0000355	V0	0.0000051	V0
Phosphorus	0.0459574	0.0126678	V0	0.0347817	V0	0.0084689	V0
Platinum	0.0000088	0.0000020	V0	0.0000033	V0	0.0000014	V0
Potassium	0.0061261	0.0660385	V0	0.5777614	V0	0.0006774	V0
Praseodymium	0.0000070	0.0000253	V0	0.0002561	V0	0.0000000	V1
Rubidium	0.0000184	0.0002932	V0	0.0024404	V0	0.0000010	V0
Samarium	0.0000133	0.0000179	V0	0.0001721	V0	0.0000000	V1
Selenium	0.0003366	0.0001299	V0	0.0010857	V0	0.0000000	V1
Silicon	0.7676322	0.7509467	V0	5.3005311	V0	0.0000000	V1
Silver	0.0000100	0.0000018	V0	0.0000088	V0	0.0000005	V0
Sodium	0.0169447	0.0253650	V0	0.3484948	V0	0.0007502	V0
Strontium	0.0003375	0.0007463	V0	0.0100598	V0	0.0000000	V1
Tantalum	0.0000394	0.0000000	V1	0.0000171	V0	0.0000000	V1
Thallium	0.0000090	0.0000024	V0	0.0000231	V0	0.0000000	V1
Thorium	0.0000059	0.0000289	V0	0.0003258	V0	0.0000000	V1
Tin	0.0004414	0.0000562	V0	0.0002121	V0	0.0000265	V0
Titanium	0.0015201	0.0083545	V0	0.0736485	V0	0.0010418	V0
Tungsten	0.0000938	0.0000097	V0	0.0004604	V0	0.0000041	V0
Uranium	0.0000048	0.0000079	V0	0.0000900	V0	0.0000000	V1
Vanadium	0.0007697	0.0004159	V0	0.0042614	V0	0.0000000	V1
Zinc	0.0055897	0.0008903	V0	0.0077684	V0	0.0016790	V0



Station Name Station # Sample Date Particulate Size Total Air Volume (m <sup>3</sup> )	Athabasca Valley			Anzac		Travel Blank	
	AMS 7 04-Sep PM10 24	Results (µg/m <sup>3</sup> )	QC Flag	AMS 14 04-Sep PM10 23.5	QC Flag	24	QC Flag
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	23.08	V0	13.93	V0	-0.30	V1
Aluminum	0.1380326	0.4625340	V0	0.2236383	V0	0.0000000	V1
Antimony	0.0001784	0.0003649	V0	0.0000228	V0	0.0000000	V1
Arsenic	0.0001060	0.0002851	V0	0.0001084	V0	0.0000072	V0
Barium	0.0092847	0.0077251	V0	0.0027852	V0	0.0000000	V1
Beryllium	0.0000946	0.0000142	V0	0.0000076	V0	0.0000000	V1
Bismuth	0.0000093	0.0000129	V0	0.0000015	V0	0.0000000	V1
Cadmium	0.0000174	0.0000173	V0	0.0000147	V0	0.0000000	V1
Calcium	0.4112124	0.6920319	V0	0.2776610	V0	0.0000000	V1
Cerium	0.0000174	0.0005564	V0	0.0002813	V0	0.0000000	V1
Cesium	0.0000100	0.0000339	V0	0.0000156	V0	0.0000000	V1
Chromium	0.0022262	0.0007888	V0	0.0003421	V0	0.0001144	V0
Cobalt	0.0000273	0.0001391	V0	0.0000791	V0	0.0000024	V0
Copper	0.0017171	0.0023210	V0	0.0004662	V0	0.0027427	V0
Iron	0.0393063	0.6107858	V0	0.3004435	V0	0.0039313	V0
Lanthanum	0.0000130	0.0002700	V0	0.0001326	V0	0.0000000	V1
Lead	0.0008577	0.0006002	V0	0.0001455	V0	0.0001080	V0
Lithium	0.0000374	0.0003777	V0	0.0001787	V0	0.0000023	V0
Magnesium	0.0091409	0.1665520	V0	0.0739461	V0	0.0004653	V0
Manganese	0.0006949	0.0092332	V0	0.0061780	V0	0.0000342	V0
Molybdenum	0.0007116	0.0001229	V0	0.0001082	V0	0.0000438	V0
Neodymium	0.0000140	0.0002393	V0	0.0001191	V0	0.0000000	V1
Nickel	0.0005429	0.0005466	V0	0.0002870	V0	0.0000646	V0
Niobium	0.0000202	0.0000574	V0	0.0000255	V0	0.0000000	V1
Palladium	0.0000632	0.0000161	V0	0.0000064	V0	0.0000051	V0
Phosphorus	0.0459574	0.0212174	V0	0.0193426	V0	0.0084689	V0
Platinum	0.0000088	0.0000030	V0	0.0000025	V0	0.0000014	V0
Potassium	0.0061261	0.1769463	V0	0.0976709	V0	0.0006774	V0
Praseodymium	0.0000070	0.0000627	V0	0.0000303	V0	0.0000000	V1
Rubidium	0.0000184	0.0006619	V0	0.0003438	V0	0.0000010	V0
Samarium	0.0000133	0.0000419	V0	0.0000219	V0	0.0000000	V1
Selenium	0.0003366	0.0002980	V0	0.0001499	V0	0.0000000	V1
Silicon	0.7676322	1.2881461	V0	0.6411580	V0	0.0000000	V1
Silver	0.0000100	0.0000057	V0	0.0000065	V0	0.0000005	V0
Sodium	0.0169447	0.0701528	V0	0.0405543	V0	0.0007502	V0
Strontium	0.0003375	0.0020311	V0	0.0008870	V0	0.0000000	V1
Tantalum	0.0000394	0.0000041	V0	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000063	V0	0.0000036	V0	0.0000000	V1
Thorium	0.0000059	0.0000736	V0	0.0000335	V0	0.0000000	V1
Tin	0.0004414	0.0003182	V0	0.0000841	V0	0.0000265	V0
Titanium	0.0015201	0.0188504	V0	0.0094245	V0	0.0010418	V0
Tungsten	0.0000938	0.0000895	V0	0.0000905	V0	0.0000041	V0
Uranium	0.0000048	0.0000193	V0	0.0000103	V0	0.0000000	V1
Vanadium	0.0007697	0.0010006	V0	0.0005077	V0	0.0000000	V1
Zinc	0.0055897	0.0100917	V0	0.0022245	V0	0.0016790	V0



Compound Name	Station Name	Fort McKay South		Horizon		Travel Blank	
	Station #	AMS 13		AMS 15		04-Sep	
	Sample Date	04-Sep		04-Sep			
	Particulate Size	PM10		PM10			
	Total Air Volume (m <sup>3</sup> )	24		24		24	
	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	3.78	V0	20.80	V0	-0.30	V1
Aluminum	0.1380326	0.0977671	V0	1.1860377	V0	0.0000000	V1
Antimony	0.0001784	0.0000000	V1	0.0000310	V0	0.0000000	V1
Arsenic	0.0001060	0.0000247	V0	0.0001792	V0	0.0000072	V0
Barium	0.0092847	0.0007469	V0	0.0082093	V0	0.0000000	V1
Beryllium	0.0000946	0.0000044	V0	0.0000355	V0	0.0000000	V1
Bismuth	0.0000093	0.0000008	V0	0.0000047	V0	0.0000000	V1
Cadmium	0.0000174	0.0000033	V0	0.0000040	V0	0.0000000	V1
Calcium	0.4112124	0.0488106	V0	0.5646771	V0	0.0000000	V1
Cerium	0.0000174	0.0000871	V0	0.0011413	V0	0.0000000	V1
Cesium	0.0000100	0.0000079	V0	0.0000932	V0	0.0000000	V1
Chromium	0.0022262	0.0001848	V0	0.0014136	V0	0.0001144	V0
Cobalt	0.0000273	0.0000251	V0	0.0002952	V0	0.0000024	V0
Copper	0.0017171	0.0002008	V0	0.0006867	V0	0.0027427	V0
Iron	0.0393063	0.0534685	V0	0.9321656	V0	0.0039313	V0
Lanthanum	0.0000130	0.0000417	V0	0.0005386	V0	0.0000000	V1
Lead	0.0008577	0.0000000	V1	0.0003025	V0	0.0001080	V0
Lithium	0.0000374	0.0000833	V0	0.0013833	V0	0.0000023	V0
Magnesium	0.0091409	0.0163298	V0	0.1822931	V0	0.0004653	V0
Manganese	0.0006949	0.0009747	V0	0.0147792	V0	0.0000342	V0
Molybdenum	0.0007116	0.0000299	V0	0.0001337	V0	0.0000438	V0
Neodymium	0.0000140	0.0000380	V0	0.0004905	V0	0.0000000	V1
Nickel	0.0005429	0.0001191	V0	0.0010680	V0	0.0000646	V0
Niobium	0.0000202	0.0000111	V0	0.0001483	V0	0.0000000	V1
Palladium	0.0000632	0.0000032	V0	0.0000205	V0	0.0000051	V0
Phosphorus	0.0459574	0.0155991	V0	0.0227166	V0	0.0084689	V0
Platinum	0.0000088	0.0000020	V0	0.0000021	V0	0.0000014	V0
Potassium	0.0061261	0.0407611	V0	0.3062221	V0	0.0006774	V0
Praseodymium	0.0000070	0.0000101	V0	0.0001287	V0	0.0000000	V1
Rubidium	0.0000184	0.0001445	V0	0.0014555	V0	0.0000010	V0
Samarium	0.0000133	0.0000075	V0	0.0000953	V0	0.0000000	V1
Selenium	0.0003366	0.0000627	V0	0.0006208	V0	0.0000000	V1
Silicon	0.7676322	0.1752144	V0	2.8334831	V0	0.0000000	V1
Silver	0.0000100	0.0000007	V0	0.0000044	V0	0.0000005	V0
Sodium	0.0169447	0.0124378	V0	0.1001962	V0	0.0007502	V0
Strontium	0.0003375	0.0002827	V0	0.0033612	V0	0.0000000	V1
Tantalum	0.0000394	0.0000000	V1	0.0000100	V0	0.0000000	V1
Thallium	0.0000090	0.0000011	V0	0.0000105	V0	0.0000000	V1
Thorium	0.0000059	0.0000119	V0	0.0001589	V0	0.0000000	V1
Tin	0.0004414	0.0000353	V0	0.0001140	V0	0.0000265	V0
Titanium	0.0015201	0.0039352	V0	0.0466565	V0	0.0010418	V0
Tungsten	0.0000938	0.0000058	V0	0.0000316	V0	0.0000041	V0
Uranium	0.0000048	0.0000036	V0	0.0000472	V0	0.0000000	V1
Vanadium	0.0007697	0.0001862	V0	0.0022260	V0	0.0000000	V1
Zinc	0.0055897	0.0005785	V0	0.0028699	V0	0.0016790	V0



Station Name	Muskeg River			Travel Blank	
Station #	AMS 16			04-Sep	
Sample Date	04-Sep			04-Sep	
Particulate Size	PM10			24	
Total Air Volume (m <sup>3</sup> )	24			24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	45.09	V0	-0.30	V1
Aluminum	0.1380326	1.8515229	V0	0.0000000	V1
Antimony	0.0001784	0.0000257	V0	0.0000000	V1
Arsenic	0.0001060	0.0002869	V0	0.0000072	V0
Barium	0.0092847	0.0140976	V0	0.0000000	V1
Beryllium	0.0000946	0.0000544	V0	0.0000000	V1
Bismuth	0.0000093	0.0000073	V0	0.0000000	V1
Cadmium	0.0000174	0.0000051	V0	0.0000000	V1
Calcium	0.4112124	2.0478261	V0	0.0000000	V1
Cerium	0.0000174	0.0021463	V0	0.0000000	V1
Cesium	0.0000100	0.0001240	V0	0.0000000	V1
Chromium	0.0022262	0.0020578	V0	0.0001144	V0
Cobalt	0.0000273	0.0005182	V0	0.0000024	V0
Copper	0.0017171	0.0009587	V0	0.0027427	V0
Iron	0.0393063	2.1395398	V0	0.0039313	V0
Lanthanum	0.0000130	0.0010143	V0	0.0000000	V1
Lead	0.0008577	0.0005638	V0	0.0001080	V0
Lithium	0.0000374	0.0022316	V0	0.0000023	V0
Magnesium	0.0091409	0.3898352	V0	0.0004653	V0
Manganese	0.0006949	0.0345171	V0	0.0000342	V0
Molybdenum	0.0007116	0.0002324	V0	0.0000438	V0
Neodymium	0.0000140	0.0009156	V0	0.0000000	V1
Nickel	0.0005429	0.0017111	V0	0.0000646	V0
Niobium	0.0000202	0.0002369	V0	0.0000000	V1
Palladium	0.0000632	0.0000320	V0	0.0000051	V0
Phosphorus	0.0459574	0.0283443	V0	0.0084689	V0
Platinum	0.0000088	0.0000024	V0	0.0000014	V0
Potassium	0.0061261	0.4844067	V0	0.0006774	V0
Praseodymium	0.0000070	0.0002424	V0	0.0000000	V1
Rubidium	0.0000184	0.0021711	V0	0.0000010	V0
Samarium	0.0000133	0.0001673	V0	0.0000000	V1
Selenium	0.0003366	0.0010422	V0	0.0000000	V1
Silicon	0.7676322	4.4930701	V0	0.0000000	V1
Silver	0.0000100	0.0000079	V0	0.0000005	V0
Sodium	0.0169447	0.1435993	V0	0.0007502	V0
Strontium	0.0003375	0.0058311	V0	0.0000000	V1
Tantalum	0.0000394	0.0000149	V0	0.0000000	V1
Thallium	0.0000090	0.0000200	V0	0.0000000	V1
Thorium	0.0000059	0.0002789	V0	0.0000000	V1
Tin	0.0004414	0.0001358	V0	0.0000265	V0
Titanium	0.0015201	0.0712434	V0	0.0010418	V0
Tungsten	0.0000938	0.0000787	V0	0.0000041	V0
Uranium	0.0000048	0.0000717	V0	0.0000000	V1
Vanadium	0.0007697	0.0034302	V0	0.0000000	V1
Zinc	0.0055897	0.0033730	V0	0.0016790	V0



Compound Name	Bertha Ganter - Fort						
	Station Name	McKay			Patricia McInnes		Travel Blank
	Station #	AMS 1		AMS 6			
	Sample Date	10-Sep		10-Sep		10-Sep	
Particulate Size	PM10		PM10				
Total Air Volume (m <sup>3</sup> )	24		24			24	
MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	
Particulate Matter	1.00	7.65	V0	10.29	V0	0.07	V0
Aluminum	0.1380326	0.0115191	V0	0.1382612	V0	0.0000000	V1
Antimony	0.0001784	0.0000000	V1	0.0000825	V0	0.0000000	V1
Arsenic	0.0001060	0.0000422	V0	0.0000827	V0	0.0000046	V0
Barium	0.0092847	0.0000000	V1	0.0018579	V0	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000045	V0	0.0000000	V1
Bismuth	0.0000093	0.0000008	V0	0.0000266	V0	0.0000000	V1
Cadmium	0.0000174	0.0000114	V0	0.0000134	V0	0.0000000	V1
Calcium	0.4112124	0.0457948	V0	0.1840734	V0	0.0000000	V1
Cerium	0.0000174	0.0000213	V0	0.0001149	V0	0.0000008	V0
Cesium	0.0000100	0.0000023	V0	0.0000102	V0	0.0000000	V1
Chromium	0.0022262	0.0000000	V1	0.0002356	V0	0.0000000	V1
Cobalt	0.0000273	0.0000072	V0	0.0000318	V0	0.0000015	V0
Copper	0.0017171	0.0005645	V0	0.0004954	V0	0.0000882	V0
Iron	0.0393063	0.0203972	V0	0.0863665	V0	0.0000000	V1
Lanthanum	0.0000130	0.0000100	V0	0.0000554	V0	0.0000000	V1
Lead	0.0008577	0.0000388	V0	0.0001497	V0	0.0000000	V1
Lithium	0.0000374	0.0000152	V0	0.0000725	V0	0.0000000	V1
Magnesium	0.0091409	0.0075192	V0	0.0415996	V0	0.0009451	V0
Manganese	0.0006949	0.0008140	V0	0.0019740	V0	0.0000000	V1
Molybdenum	0.0007116	0.0000569	V0	0.0000377	V0	0.0000542	V0
Neodymium	0.0000140	0.0000094	V0	0.0000483	V0	0.0000000	V1
Nickel	0.0005429	0.0000781	V0	0.0002927	V0	0.0000585	V0
Niobium	0.0000202	0.0000011	V0	0.0000137	V0	0.0000000	V1
Palladium	0.0000632	0.0000000	V1	0.0000038	V0	0.0000038	V0
Phosphorus	0.0459574	0.0232694	V0	0.0254552	V0	0.0088098	V0
Platinum	0.0000088	0.0000017	V0	0.0000027	V0	0.0000010	V0
Potassium	0.0061261	0.0385501	V0	0.0748255	V0	0.0013020	V0
Praseodymium	0.0000070	0.0000023	V0	0.0000141	V0	0.0000000	V1
Rubidium	0.0000184	0.0000551	V0	0.0001993	V0	0.0000017	V0
Samarium	0.0000133	0.0000018	V0	0.0000093	V0	0.0000000	V1
Selenium	0.0003366	0.0000462	V0	0.0000940	V0	0.0000000	V1
Silicon	0.7676322	0.2519753	V0	0.4271306	V0	0.0524593	V0
Silver	0.0000100	0.0000125	V0	0.0000018	V0	0.0000000	V1
Sodium	0.0169447	0.0052565	V0	0.0270348	V0	0.0014238	V0
Strontium	0.0003375	0.0001056	V0	0.0007455	V0	0.0000153	V0
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000005	V0	0.0000019	V0	0.0000000	V1
Thorium	0.0000059	0.0000026	V0	0.0000178	V0	0.0000000	V1
Tin	0.0004414	0.0000691	V0	0.0001206	V0	0.0000195	V0
Titanium	0.0015201	0.0009244	V0	0.0047614	V0	0.0011911	V0
Tungsten	0.0000938	0.0000052	V0	0.0000165	V0	0.0000000	V1
Uranium	0.0000048	0.0000009	V0	0.0000061	V0	0.0000000	V1
Vanadium	0.0007697	0.0000479	V0	0.0002882	V0	0.0000000	V1
Zinc	0.0055897	0.0008295	V0	0.0039781	V0	0.0002870	V0





Compound Name	Station Name Station # Sample Date Particulate Size Total Air Volume (m <sup>3</sup> )	Athabasca Valley			Anzac		Travel Blank	
		MDL (µg/sample)	AMS 7	QC Flag	AMS 14	QC Flag	10-Sep	
			10-Sep		10-Sep			
			PM10		PM10			
			24		24		24	
		Results (µg/m <sup>3</sup> )	Results (µg/m <sup>3</sup> )	Results (µg/m <sup>3</sup> )	Results (µg/m <sup>3</sup> )	Results (µg/m <sup>3</sup> )	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	10.70	V0	8.11	V0	0.07	V0	
Aluminum	0.1380326	0.0630260	V0	0.0512718	V0	0.0000000	V1	
Antimony	0.0001784	0.0000705	V0	0.0000080	V0	0.0000000	V1	
Arsenic	0.0001060	0.0000452	V0	0.0000477	V0	0.0000046	V0	
Barium	0.0092847	0.0015425	V0	0.0007606	V0	0.0000000	V1	
Beryllium	0.0000946	0.0000051	V0	0.0000000	V1	0.0000000	V1	
Bismuth	0.0000093	0.0000029	V0	0.0000014	V0	0.0000000	V1	
Cadmium	0.0000174	0.0000083	V0	0.0000100	V0	0.0000000	V1	
Calcium	0.4112124	0.1093051	V0	0.0518630	V0	0.0000000	V1	
Cerium	0.0000174	0.0000687	V0	0.0000447	V0	0.0000008	V0	
Cesium	0.0000100	0.0000047	V0	0.0000043	V0	0.0000000	V1	
Chromium	0.0022262	0.0001858	V0	0.0001483	V0	0.0000000	V1	
Cobalt	0.0000273	0.0000207	V0	0.0000150	V0	0.0000015	V0	
Copper	0.0017171	0.0005657	V0	0.0003346	V0	0.0000882	V0	
Iron	0.0393063	0.0784597	V0	0.0421737	V0	0.0000000	V1	
Lanthanum	0.0000130	0.0000316	V0	0.0000228	V0	0.0000000	V1	
Lead	0.0008577	0.0000604	V0	0.0000508	V0	0.0000000	V1	
Lithium	0.0000374	0.0000495	V0	0.0000364	V0	0.0000000	V1	
Magnesium	0.0091409	0.0237907	V0	0.0143999	V0	0.0009451	V0	
Manganese	0.0006949	0.0014971	V0	0.0011350	V0	0.0000000	V1	
Molybdenum	0.0007116	0.0000493	V0	0.0000894	V0	0.0000542	V0	
Neodymium	0.0000140	0.0000294	V0	0.0000193	V0	0.0000000	V1	
Nickel	0.0005429	0.0001406	V0	0.0001621	V0	0.0000585	V0	
Niobium	0.0000202	0.0000072	V0	0.0000057	V0	0.0000000	V1	
Palladium	0.0000632	0.0000029	V0	0.0000000	V1	0.0000038	V0	
Phosphorus	0.0459574	0.0249657	V0	0.0238351	V0	0.0088098	V0	
Platinum	0.0000088	0.0000014	V0	0.0000021	V0	0.0000010	V0	
Potassium	0.0061261	0.0553595	V0	0.0506109	V0	0.0013020	V0	
Praseodymium	0.0000070	0.0000075	V0	0.0000052	V0	0.0000000	V1	
Rubidium	0.0000184	0.0001102	V0	0.0001072	V0	0.0000017	V0	
Samarium	0.0000133	0.0000053	V0	0.0000035	V0	0.0000000	V1	
Selenium	0.0003366	0.0000660	V0	0.0000636	V0	0.0000000	V1	
Silicon	0.7676322	0.2374604	V0	0.0780475	V0	0.0524593	V0	
Silver	0.0000100	0.0000042	V0	0.0000019	V0	0.0000000	V1	
Sodium	0.0169447	0.0110610	V0	0.0115139	V0	0.0014238	V0	
Strontium	0.0003375	0.0003370	V0	0.0001959	V0	0.0000153	V0	
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1	
Thallium	0.0000090	0.0000013	V0	0.0000015	V0	0.0000000	V1	
Thorium	0.0000059	0.0000089	V0	0.0000066	V0	0.0000000	V1	
Tin	0.0004414	0.0000796	V0	0.0000432	V0	0.0000195	V0	
Titanium	0.0015201	0.0027050	V0	0.0030546	V0	0.0011911	V0	
Tungsten	0.0000938	0.0000195	V0	0.0000102	V0	0.0000000	V1	
Uranium	0.0000048	0.0000028	V0	0.0000022	V0	0.0000000	V1	
Vanadium	0.0007697	0.0001904	V0	0.0001750	V0	0.0000000	V1	
Zinc	0.0055897	0.0023377	V0	0.0010731	V0	0.0002870	V0	



Compound Name	Station Name Station # Sample Date Particulate Size Total Air Volume (m <sup>3</sup> )	Fort McKay South			Horizon		Travel Blank	
		AMS 13 10-Sep PM10 24	Results (µg/m <sup>3</sup> )	QC Flag	AMS 15 10-Sep PM10 24	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	7.90	V0	11.83	V0	0.07	V0	
Aluminum	0.1380326	0.0376547	V0	0.2996818	V0	0.0000000	V1	
Antimony	0.0001784	0.0000000	V1	0.0000104	V0	0.0000000	V1	
Arsenic	0.0001060	0.0000574	V0	0.0000839	V0	0.0000046	V0	
Barium	0.0092847	0.0004564	V0	0.0022739	V0	0.0000000	V1	
Beryllium	0.0000946	0.0000000	V1	0.0000088	V0	0.0000000	V1	
Bismuth	0.0000093	0.0000008	V0	0.0000019	V0	0.0000000	V1	
Cadmium	0.0000174	0.0000107	V0	0.0000112	V0	0.0000000	V1	
Calcium	0.4112124	0.0275760	V0	0.0665025	V0	0.0000000	V1	
Cerium	0.0000174	0.0000326	V0	0.0002578	V0	0.0000008	V0	
Cesium	0.0000100	0.0000037	V0	0.0000241	V0	0.0000000	V1	
Chromium	0.0022262	0.0001502	V0	0.0004267	V0	0.0000000	V1	
Cobalt	0.0000273	0.0000107	V0	0.0000725	V0	0.0000015	V0	
Copper	0.0017171	0.0003368	V0	0.0004154	V0	0.0000882	V0	
Iron	0.0393063	0.0244044	V0	0.1594199	V0	0.0000000	V1	
Lanthanum	0.0000130	0.0000163	V0	0.0001232	V0	0.0000000	V1	
Lead	0.0008577	0.0000444	V0	0.0001046	V0	0.0000000	V1	
Lithium	0.0000374	0.0000282	V0	0.0002953	V0	0.0000000	V1	
Magnesium	0.0091409	0.0094738	V0	0.0442522	V0	0.0009451	V0	
Manganese	0.0006949	0.0008741	V0	0.0027519	V0	0.0000000	V1	
Molybdenum	0.0007116	0.0000486	V0	0.0000523	V0	0.0000542	V0	
Neodymium	0.0000140	0.0000147	V0	0.0001171	V0	0.0000000	V1	
Nickel	0.0005429	0.0001079	V0	0.0003459	V0	0.0000585	V0	
Niobium	0.0000202	0.0000035	V0	0.0000323	V0	0.0000000	V1	
Palladium	0.0000632	0.0000000	V1	0.0000057	V0	0.0000038	V0	
Phosphorus	0.0459574	0.0256000	V0	0.0281761	V0	0.0088098	V0	
Platinum	0.0000088	0.0000021	V0	0.0000019	V0	0.0000010	V0	
Potassium	0.0061261	0.0536386	V0	0.1183347	V0	0.0013020	V0	
Praseodymium	0.0000070	0.0000039	V0	0.0000297	V0	0.0000000	V1	
Rubidium	0.0000184	0.0000981	V0	0.0004118	V0	0.0000017	V0	
Samarium	0.0000133	0.0000029	V0	0.0000225	V0	0.0000000	V1	
Selenium	0.0003366	0.0000548	V0	0.0001618	V0	0.0000000	V1	
Silicon	0.7676322	0.0394309	V0	0.7507291	V0	0.0524593	V0	
Silver	0.0000100	0.0000016	V0	0.0000154	V0	0.0000000	V1	
Sodium	0.0169447	0.0079728	V0	0.0403016	V0	0.0014238	V0	
Strontium	0.0003375	0.0001440	V0	0.0007724	V0	0.0000153	V0	
Tantalum	0.0000394	0.0000000	V1	0.0000022	V0	0.0000000	V1	
Thallium	0.0000090	0.0000011	V0	0.0000037	V0	0.0000000	V1	
Thorium	0.0000059	0.0000040	V0	0.0000362	V0	0.0000000	V1	
Tin	0.0004414	0.0000450	V0	0.0000873	V0	0.0000195	V0	
Titanium	0.0015201	0.0019699	V0	0.0100529	V0	0.0011911	V0	
Tungsten	0.0000938	0.0000000	V1	0.0000066	V0	0.0000000	V1	
Uranium	0.0000048	0.0000013	V0	0.0000113	V0	0.0000000	V1	
Vanadium	0.0007697	0.0000982	V0	0.0005993	V0	0.0000000	V1	
Zinc	0.0055897	0.0010373	V0	0.0012641	V0	0.0002870	V0	



Compound Name	Station Name Station # Sample Date Particulate Size Total Air Volume (m <sup>3</sup> )	Muskeg River		Travel Blank	
		AMS 16 10-Sep PM10 24	Results (µg/m <sup>3</sup> )	QC Flag	24 Results (µg/m <sup>3</sup> )
Particulate Matter	1.00	10.20	V0	0.07	V0
Aluminum	0.1380326	0.1518785	V0	0.0000000	V1
Antimony	0.0001784	0.0000086	V0	0.0000000	V1
Arsenic	0.0001060	0.0000512	V0	0.0000046	V0
Barium	0.0092847	0.0011903	V0	0.0000000	V1
Beryllium	0.0000946	0.0000054	V0	0.0000000	V1
Bismuth	0.0000093	0.0000012	V0	0.0000000	V1
Cadmium	0.0000174	0.0000092	V0	0.0000000	V1
Calcium	0.4112124	0.1277412	V0	0.0000000	V1
Cerium	0.0000174	0.0001661	V0	0.0000008	V0
Cesium	0.0000100	0.0000105	V0	0.0000000	V1
Chromium	0.0022262	0.0002558	V0	0.0000000	V1
Cobalt	0.0000273	0.0000420	V0	0.0000015	V0
Copper	0.0017171	0.0002849	V0	0.0000882	V0
Iron	0.0393063	0.1375643	V0	0.0000000	V1
Lanthanum	0.0000130	0.0000785	V0	0.0000000	V1
Lead	0.0008577	0.0000807	V0	0.0000000	V1
Lithium	0.0000374	0.0001682	V0	0.0000000	V1
Magnesium	0.0091409	0.0304619	V0	0.0009451	V0
Manganese	0.0006949	0.0026468	V0	0.0000000	V1
Molybdenum	0.0007116	0.0000986	V0	0.0000542	V0
Neodymium	0.0000140	0.0000703	V0	0.0000000	V1
Nickel	0.0005429	0.0002251	V0	0.0000585	V0
Niobium	0.0000202	0.0000172	V0	0.0000000	V1
Palladium	0.0000632	0.0000032	V0	0.0000038	V0
Phosphorus	0.0459574	0.0215613	V0	0.0088098	V0
Platinum	0.0000088	0.0000017	V0	0.0000010	V0
Potassium	0.0061261	0.0666030	V0	0.0013020	V0
Praseodymium	0.0000070	0.0000184	V0	0.0000000	V1
Rubidium	0.0000184	0.0002030	V0	0.0000017	V0
Samarium	0.0000133	0.0000130	V0	0.0000000	V1
Selenium	0.0003366	0.0001145	V0	0.0000000	V1
Silicon	0.7676322	0.2902770	V0	0.0524593	V0
Silver	0.0000100	0.0000015	V0	0.0000000	V1
Sodium	0.0169447	0.0203217	V0	0.0014238	V0
Strontium	0.0003375	0.0004918	V0	0.0000153	V0
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000020	V0	0.0000000	V1
Thorium	0.0000059	0.0000203	V0	0.0000000	V1
Tin	0.0004414	0.0000949	V0	0.0000195	V0
Titanium	0.0015201	0.0066475	V0	0.0011911	V0
Tungsten	0.0000938	0.0000303	V0	0.0000000	V1
Uranium	0.0000048	0.0000056	V0	0.0000000	V1
Vanadium	0.0007697	0.0003057	V0	0.0000000	V1
Zinc	0.0055897	0.0011438	V0	0.0002870	V0



Compound Name	Bertha Ganter - Fort								
	Station Name	McKay			Patricia McInnes			Travel Blank	
	Station #	AMS 1	AMS 6	AMS 6	AMS 6	AMS 6	16-Sep		
	Sample Date	16-Sep	16-Sep	16-Sep	16-Sep	16-Sep	16-Sep		
Particulate Size	PM10	PM10	PM10	PM10	PM10	PM10	PM10		
Total Air Volume (m <sup>3</sup> )	24	24	24	24	24	24	24		
MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	
Particulate Matter	1.00	26.70	V0	21.34	V0	0.16	V0		
Aluminum	0.1380326	0.8596045	V0	0.4899109	V0	0.0000000	V1		
Antimony	0.0001784	0.0000934	V0	0.0002484	V0	0.0000000	V1		
Arsenic	0.0001060	0.0001738	V0	0.0011116	V0	0.0000000	V1		
Barium	0.0092847	0.0078786	V0	0.0074884	V0	0.0000000	V1		
Beryllium	0.0000946	0.0000215	V0	0.0000148	V0	0.0000000	V1		
Bismuth	0.0000093	0.0000107	V0	0.0000103	V0	0.0000000	V1		
Cadmium	0.0000174	0.0000118	V0	0.0000187	V0	0.0000000	V1		
Calcium	0.4112124	1.9032118	V0	0.9589058	V0	0.0000000	V1		
Cerium	0.0000174	0.0009681	V0	0.0006135	V0	0.0000000	V1		
Cesium	0.0000100	0.0000616	V0	0.0000321	V0	0.0000000	V1		
Chromium	0.0022262	0.0011583	V0	0.0007493	V0	0.0001400	V0		
Cobalt	0.0000273	0.0002477	V0	0.0001630	V0	0.0000030	V0		
Copper	0.0017171	0.0014020	V0	0.0021339	V0	0.0002192	V0		
Iron	0.0393063	0.8059351	V0	0.7528893	V0	0.0000000	V1		
Lanthanum	0.0000130	0.0004717	V0	0.0003034	V0	0.0000000	V1		
Lead	0.0008577	0.0003542	V0	0.0003143	V0	0.0000000	V1		
Lithium	0.0000374	0.0008550	V0	0.0004148	V0	0.0000000	V1		
Magnesium	0.0091409	0.2066056	V0	0.1973870	V0	0.0007659	V0		
Manganese	0.0006949	0.0140564	V0	0.0116299	V0	0.0000000	V1		
Molybdenum	0.0007116	0.0002002	V0	0.0001314	V0	0.0000388	V0		
Neodymium	0.0000140	0.0004219	V0	0.0002581	V0	0.0000000	V1		
Nickel	0.0005429	0.0011234	V0	0.0005578	V0	0.0000499	V0		
Niobium	0.0000202	0.0001038	V0	0.0000584	V0	0.0000000	V1		
Palladium	0.0000632	0.0000197	V0	0.0000162	V0	0.0000029	V0		
Phosphorus	0.0459574	0.0233295	V0	0.0214116	V0	0.0108601	V0		
Platinum	0.0000088	0.0000024	V0	0.0000034	V0	0.0000020	V0		
Potassium	0.0061261	0.2617130	V0	0.1818096	V0	0.0008723	V0		
Praseodymium	0.0000070	0.0001098	V0	0.0000684	V0	0.0000000	V1		
Rubidium	0.0000184	0.0011635	V0	0.0006710	V0	0.0000022	V0		
Samarium	0.0000133	0.0000784	V0	0.0000464	V0	0.0000000	V1		
Selenium	0.0003366	0.0005758	V0	0.0003828	V0	0.0000195	V0		
Silicon	0.7676322	2.1474696	V0	1.6778342	V0	0.0000000	V1		
Silver	0.0000100	0.0000055	V0	0.0000048	V0	0.0000000	V1		
Sodium	0.0169447	0.2837678	V0	0.0647442	V0	0.0030613	V0		
Strontium	0.0003375	0.0040116	V0	0.0026932	V0	0.0000000	V1		
Tantalum	0.0000394	0.0000071	V0	0.0000043	V0	0.0000000	V1		
Thallium	0.0000090	0.0000094	V0	0.0000065	V0	0.0000000	V1		
Thorium	0.0000059	0.0001254	V0	0.0000844	V0	0.0000000	V1		
Tin	0.0004414	0.0001793	V0	0.0002280	V0	0.0000215	V0		
Titanium	0.0015201	0.0333012	V0	0.0188202	V0	0.0005024	V0		
Tungsten	0.0000938	0.0000871	V0	0.0001445	V0	0.0000000	V1		
Uranium	0.0000048	0.0000353	V0	0.0000271	V0	0.0000000	V1		
Vanadium	0.0007697	0.0023209	V0	0.0010643	V0	0.0000000	V1		
Zinc	0.0055897	0.0049823	V0	0.0119334	V0	0.0000000	V1		



Compound Name	Station Name	Athabasca Valley			Anzac		Travel Blank	
	Station #	AMS 7		AMS 14		16-Sep		
	Sample Date	16-Sep		16-Sep				
	Particulate Size	PM10		PM10				
Total Air Volume (m <sup>3</sup> )		24		24		24		
MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	QC Flag	
Particulate Matter	1.00	18.29	V0	7.26	V0	0.16	V0	
Aluminum	0.1380326	0.5150220	V0	0.1813723	V0	0.0000000	V1	
Antimony	0.0001784	0.0005519	V0	0.0000231	V0	0.0000000	V1	
Arsenic	0.0001060	0.0002496	V0	0.0000669	V0	0.0000000	V1	
Barium	0.0092847	0.0107443	V0	0.0021872	V0	0.0000000	V1	
Beryllium	0.0000946	0.0000158	V0	0.0000067	V0	0.0000000	V1	
Bismuth	0.0000093	0.0000213	V0	0.0000011	V0	0.0000000	V1	
Cadmium	0.0000174	0.0000178	V0	0.0000037	V0	0.0000000	V1	
Calcium	0.4112124	0.8615880	V0	0.2858934	V0	0.0000000	V1	
Cerium	0.0000174	0.0006863	V0	0.0002518	V0	0.0000000	V1	
Cesium	0.0000100	0.0000357	V0	0.0000109	V0	0.0000000	V1	
Chromium	0.0022262	0.0009578	V0	0.0002891	V0	0.0001400	V0	
Cobalt	0.0000273	0.0001793	V0	0.0000554	V0	0.0000030	V0	
Copper	0.0017171	0.0038264	V0	0.0003476	V0	0.0002192	V0	
Iron	0.0393063	0.6833264	V0	0.2005781	V0	0.0000000	V1	
Lanthanum	0.0000130	0.0003343	V0	0.0001285	V0	0.0000000	V1	
Lead	0.0008577	0.0004318	V0	0.0001172	V0	0.0000000	V1	
Lithium	0.0000374	0.0003959	V0	0.0001297	V0	0.0000000	V1	
Magnesium	0.0091409	0.2115887	V0	0.0750500	V0	0.0007659	V0	
Manganese	0.0006949	0.0114997	V0	0.0045130	V0	0.0000000	V1	
Molybdenum	0.0007116	0.0001769	V0	0.0000698	V0	0.0000388	V0	
Neodymium	0.0000140	0.0002783	V0	0.0001077	V0	0.0000000	V1	
Nickel	0.0005429	0.0006774	V0	0.0002080	V0	0.0000499	V0	
Niobium	0.0000202	0.0000643	V0	0.0000224	V0	0.0000000	V1	
Palladium	0.0000632	0.0000251	V0	0.0000044	V0	0.0000029	V0	
Phosphorus	0.0459574	0.0230512	V0	0.0170711	V0	0.0108601	V0	
Platinum	0.0000088	0.0000025	V0	0.0000027	V0	0.0000020	V0	
Potassium	0.0061261	0.1725686	V0	0.0638230	V0	0.0008723	V0	
Praseodymium	0.0000070	0.0000744	V0	0.0000282	V0	0.0000000	V1	
Rubidium	0.0000184	0.0007044	V0	0.0002499	V0	0.0000022	V0	
Samarium	0.0000133	0.0000513	V0	0.0000208	V0	0.0000000	V1	
Selenium	0.0003366	0.0003779	V0	0.0001918	V0	0.0000195	V0	
Silicon	0.7676322	1.6820836	V0	0.6944156	V0	0.0000000	V1	
Silver	0.0000100	0.0000057	V0	0.0000014	V0	0.0000000	V1	
Sodium	0.0169447	0.0809575	V0	0.0274990	V0	0.0030613	V0	
Strontium	0.0003375	0.0024239	V0	0.0007780	V0	0.0000000	V1	
Tantalum	0.0000394	0.0000050	V0	0.0000000	V1	0.0000000	V1	
Thallium	0.0000090	0.0000064	V0	0.0000025	V0	0.0000000	V1	
Thorium	0.0000059	0.0000846	V0	0.0000354	V0	0.0000000	V1	
Tin	0.0004414	0.0004704	V0	0.0000972	V0	0.0000215	V0	
Titanium	0.0015201	0.0213414	V0	0.0078138	V0	0.0005024	V0	
Tungsten	0.0000938	0.0001693	V0	0.0000639	V0	0.0000000	V1	
Uranium	0.0000048	0.0000233	V0	0.0000086	V0	0.0000000	V1	
Vanadium	0.0007697	0.0011317	V0	0.0003579	V0	0.0000000	V1	
Zinc	0.0055897	0.0199406	V0	0.0010666	V0	0.0000000	V1	



Compound Name	Station Name Station # Sample Date Particulate Size Total Air Volume (m <sup>3</sup> )	Fort McKay South			Horizon		Travel Blank	
		AMS 13 16-Sep PM10 24	Results (µg/m <sup>3</sup> )	QC Flag	AMS 15 16-Sep PM10 24	Results (µg/m <sup>3</sup> )	QC Flag	24 Results (µg/m <sup>3</sup> ) QC Flag
Particulate Matter	1.00	18.42	V0	14.66	V0	0.16	V0	
Aluminum	0.1380326	0.7270051	V0	0.6966005	V0	0.0000000	V1	
Antimony	0.0001784	0.0000504	V0	0.0000279	V0	0.0000000	V1	
Arsenic	0.0001060	0.0001408	V0	0.0001182	V0	0.0000000	V1	
Barium	0.0092847	0.0055169	V0	0.0054784	V0	0.0000000	V1	
Beryllium	0.0000946	0.0000232	V0	0.0000171	V0	0.0000000	V1	
Bismuth	0.0000093	0.0000051	V0	0.0000029	V0	0.0000000	V1	
Cadmium	0.0000174	0.0000082	V0	0.0000054	V0	0.0000000	V1	
Calcium	0.4112124	0.5248478	V0	0.3164613	V0	0.0000000	V1	
Cerium	0.0000174	0.0007460	V0	0.0006632	V0	0.0000000	V1	
Cesium	0.0000100	0.0000489	V0	0.0000557	V0	0.0000000	V1	
Chromium	0.0022262	0.0008633	V0	0.0008839	V0	0.0001400	V0	
Cobalt	0.0000273	0.0001965	V0	0.0001721	V0	0.0000030	V0	
Copper	0.0017171	0.0008061	V0	0.0006328	V0	0.0002192	V0	
Iron	0.0393063	0.4755070	V0	0.4135674	V0	0.0000000	V1	
Lanthanum	0.0000130	0.0003523	V0	0.0003263	V0	0.0000000	V1	
Lead	0.0008577	0.0002750	V0	0.0002216	V0	0.0000000	V1	
Lithium	0.0000374	0.0007073	V0	0.0006477	V0	0.0000000	V1	
Magnesium	0.0091409	0.1115930	V0	0.1150572	V0	0.0007659	V0	
Manganese	0.0006949	0.0080516	V0	0.0064676	V0	0.0000000	V1	
Molybdenum	0.0007116	0.0001407	V0	0.0001087	V0	0.0000388	V0	
Neodymium	0.0000140	0.0003179	V0	0.0002915	V0	0.0000000	V1	
Nickel	0.0005429	0.0007370	V0	0.0007194	V0	0.0000499	V0	
Niobium	0.0000202	0.0000750	V0	0.0000804	V0	0.0000000	V1	
Palladium	0.0000632	0.0000128	V0	0.0000155	V0	0.0000029	V0	
Phosphorus	0.0459574	0.0223081	V0	0.0199784	V0	0.0108601	V0	
Platinum	0.0000088	0.0000027	V0	0.0000028	V0	0.0000020	V0	
Potassium	0.0061261	0.1949012	V0	0.1839034	V0	0.0008723	V0	
Praseodymium	0.0000070	0.0000877	V0	0.0000772	V0	0.0000000	V1	
Rubidium	0.0000184	0.0008881	V0	0.0008657	V0	0.0000022	V0	
Samarium	0.0000133	0.0000593	V0	0.0000566	V0	0.0000000	V1	
Selenium	0.0003366	0.0004412	V0	0.0004324	V0	0.0000195	V0	
Silicon	0.7676322	1.8384341	V0	1.7126543	V0	0.0000000	V1	
Silver	0.0000100	0.0000031	V0	0.0000030	V0	0.0000000	V1	
Sodium	0.0169447	0.2822984	V0	0.1377692	V0	0.0030613	V0	
Strontium	0.0003375	0.0022359	V0	0.0020628	V0	0.0000000	V1	
Tantalum	0.0000394	0.0000048	V0	0.0000054	V0	0.0000000	V1	
Thallium	0.0000090	0.0000068	V0	0.0000061	V0	0.0000000	V1	
Thorium	0.0000059	0.0000908	V0	0.0000905	V0	0.0000000	V1	
Tin	0.0004414	0.0001315	V0	0.0001115	V0	0.0000215	V0	
Titanium	0.0015201	0.0226433	V0	0.0272686	V0	0.0005024	V0	
Tungsten	0.0000938	0.0000356	V0	0.0000425	V0	0.0000000	V1	
Uranium	0.0000048	0.0000264	V0	0.0000272	V0	0.0000000	V1	
Vanadium	0.0007697	0.0016397	V0	0.0014558	V0	0.0000000	V1	
Zinc	0.0055897	0.0034805	V0	0.0022764	V0	0.0000000	V1	



Compound Name	MDL (µg/sample)	Muskeg River		Travel Blank		
		AMS 16	QC Flag	16-Sep	QC Flag	
Station Name	Station #	Sample Date	Particulate Size	Total Air Volume (m³)	24	24
AMS 16	16-Sep	PM10	24	24	Results (µg/m³)	QC Flag
Particulate Matter	1.00	32.49	V0	0.16	V0	
Aluminum	0.1380326	1.4057892	V0	0.0000000	V1	
Antimony	0.0001784	0.0000379	V0	0.0000000	V1	
Arsenic	0.0001060	0.0002623	V0	0.0000000	V1	
Barium	0.0092847	0.0103636	V0	0.0000000	V1	
Beryllium	0.0000946	0.0000356	V0	0.0000000	V1	
Bismuth	0.0000093	0.0000067	V0	0.0000000	V1	
Cadmium	0.0000174	0.0000075	V0	0.0000000	V1	
Calcium	0.4112124	1.2576328	V0	0.0000000	V1	
Cerium	0.0000174	0.0013828	V0	0.0000000	V1	
Cesium	0.0000100	0.0001041	V0	0.0000000	V1	
Chromium	0.0022262	0.0017288	V0	0.0001400	V0	
Cobalt	0.0000273	0.0003882	V0	0.0000030	V0	
Copper	0.0017171	0.0010824	V0	0.0002192	V0	
Iron	0.0393063	1.0770096	V0	0.0000000	V1	
Lanthanum	0.0000130	0.0006711	V0	0.0000000	V1	
Lead	0.0008577	0.0004695	V0	0.0000000	V1	
Lithium	0.0000374	0.0014154	V0	0.0000000	V1	
Magnesium	0.0091409	0.2503226	V0	0.0007659	V0	
Manganese	0.0006949	0.0161921	V0	0.0000000	V1	
Molybdenum	0.0007116	0.0003825	V0	0.0000388	V0	
Neodymium	0.0000140	0.0006155	V0	0.0000000	V1	
Nickel	0.0005429	0.0017828	V0	0.0000499	V0	
Niobium	0.0000202	0.0001758	V0	0.0000000	V1	
Palladium	0.0000632	0.0000247	V0	0.0000029	V0	
Phosphorus	0.0459574	0.0275279	V0	0.0108601	V0	
Platinum	0.0000088	0.0000063	V0	0.0000020	V0	
Potassium	0.0061261	0.3804585	V0	0.0008723	V0	
Praseodymium	0.0000070	0.0001611	V0	0.0000000	V1	
Rubidium	0.0000184	0.0017833	V0	0.0000022	V0	
Samarium	0.0000133	0.0001163	V0	0.0000000	V1	
Selenium	0.0003366	0.0008072	V0	0.0000195	V0	
Silicon	0.7676322	3.4256593	V0	0.0000000	V1	
Silver	0.0000100	0.0000069	V0	0.0000000	V1	
Sodium	0.0169447	0.2151817	V0	0.0030613	V0	
Strontium	0.0003375	0.0044012	V0	0.0000000	V1	
Tantalum	0.0000394	0.0000120	V0	0.0000000	V1	
Thallium	0.0000090	0.0000142	V0	0.0000000	V1	
Thorium	0.0000059	0.0001859	V0	0.0000000	V1	
Tin	0.0004414	0.0001153	V0	0.0000215	V0	
Titanium	0.0015201	0.0576720	V0	0.0005024	V0	
Tungsten	0.0000938	0.0000891	V0	0.0000000	V1	
Uranium	0.0000048	0.0000564	V0	0.0000000	V1	
Vanadium	0.0007697	0.0036166	V0	0.0000000	V1	
Zinc	0.0055897	0.0042550	V0	0.0000000	V1	



Compound Name	Bertha Ganter - Fort						
	Station Name	McKay		Patricia McInnes		Travel Blank	
	Station #	AMS 1		AMS 6			
	Sample Date	22-Sep		22-Sep			
Particulate Size	PM10		PM10				
Total Air Volume (m <sup>3</sup> )	24		24				
MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	QC Flag
Particulate Matter	1.00	7.92	V0	10.05	V0	0.12	V0
Aluminum	0.1380326	0.0827699	V0	0.1985691	V0	0.0000000	V1
Antimony	0.0001784	0.0000320	V0	0.0001903	V0	0.0000000	V1
Arsenic	0.0001060	0.0000434	V0	0.0002348	V0	0.0000000	V1
Barium	0.0092847	0.0010842	V0	0.0037463	V0	0.0000000	V1
Beryllium	0.0000946	0.0000000	V1	0.0000084	V0	0.0000000	V1
Bismuth	0.0000093	0.0000071	V0	0.0000084	V0	0.0000000	V1
Cadmium	0.0000174	0.0000021	V0	0.0000065	V0	0.0000000	V1
Calcium	0.4112124	0.3769295	V0	0.3388113	V0	0.0000000	V1
Cerium	0.0000174	0.0000941	V0	0.0002707	V0	0.0000000	V1
Cesium	0.0000100	0.0000063	V0	0.0000117	V0	0.0000000	V1
Chromium	0.0022262	0.0002656	V0	0.0004427	V0	0.0001090	V0
Cobalt	0.0000273	0.0000290	V0	0.0000571	V0	0.0000058	V0
Copper	0.0017171	0.0010817	V0	0.0015661	V0	0.0000000	V1
Iron	0.0393063	0.1155988	V0	0.2642225	V0	0.0000000	V1
Lanthanum	0.0000130	0.0000459	V0	0.0001289	V0	0.0000000	V1
Lead	0.0008577	0.0000591	V0	0.0001684	V0	0.0000000	V1
Lithium	0.0000374	0.0000752	V0	0.0001425	V0	0.0000000	V1
Magnesium	0.0091409	0.0288470	V0	0.0889879	V0	0.0005655	V0
Manganese	0.0006949	0.0021078	V0	0.0040496	V0	0.0000000	V1
Molybdenum	0.0007116	0.0001099	V0	0.0001069	V0	0.0000000	V1
Neodymium	0.0000140	0.0000377	V0	0.0001091	V0	0.0000000	V1
Nickel	0.0005429	0.0002058	V0	0.0003530	V0	0.0000394	V0
Niobium	0.0000202	0.0000094	V0	0.0000221	V0	0.0000000	V1
Palladium	0.0000632	0.0000030	V0	0.0000117	V0	0.0000000	V1
Phosphorus	0.0459574	0.0202259	V0	0.0243589	V0	0.0101951	V0
Platinum	0.0000088	0.0000023	V0	0.0000030	V0	0.0000013	V0
Potassium	0.0061261	0.0468419	V0	0.0832111	V0	0.0003705	V0
Praseodymium	0.0000070	0.0000102	V0	0.0000293	V0	0.0000000	V1
Rubidium	0.0000184	0.0001333	V0	0.0002612	V0	0.0000022	V0
Samarium	0.0000133	0.0000075	V0	0.0000175	V0	0.0000000	V1
Selenium	0.0003366	0.0001014	V0	0.0001890	V0	0.0000000	V1
Silicon	0.7676322	0.3188320	V0	0.6346040	V0	0.0000000	V1
Silver	0.0000100	0.0000012	V0	0.0000021	V0	0.0000000	V1
Sodium	0.0169447	0.0217954	V0	0.0457157	V0	0.0009093	V0
Strontium	0.0003375	0.0005565	V0	0.0009460	V0	0.0000000	V1
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000009	V0	0.0000019	V0	0.0000000	V1
Thorium	0.0000059	0.0000115	V0	0.0000359	V0	0.0000000	V1
Tin	0.0004414	0.0001114	V0	0.0003169	V0	0.0000000	V1
Titanium	0.0015201	0.0035250	V0	0.0080367	V0	0.0004294	V0
Tungsten	0.0000938	0.0000216	V0	0.0000788	V0	0.0000000	V1
Uranium	0.0000048	0.0000034	V0	0.0000092	V0	0.0000000	V1
Vanadium	0.0007697	0.0003053	V0	0.0005383	V0	0.0000000	V1
Zinc	0.0055897	0.0012793	V0	0.0051343	V0	0.0003386	V0





Compound Name	Station Name Station # Sample Date Particulate Size Total Air Volume (m <sup>3</sup> )	Athabasca Valley			Anzac		Travel Blank	
		MDL (µg/sample)	AMS 7 22-Sep PM10 24	Results (µg/m <sup>3</sup> )	QC Flag	AMS 14 22-Sep PM10 24	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter		1.00	15.26	V0	4.07	V0	0.12	V0
Aluminum		0.1380326	0.4006283	V0	0.0173502	V0	0.0000000	V1
Antimony		0.0001784	0.0005501	V0	0.0000135	V0	0.0000000	V1
Arsenic		0.0001060	0.0001451	V0	0.0000324	V0	0.0000000	V1
Barium		0.0092847	0.0099666	V0	0.0000000	V1	0.0000000	V1
Beryllium		0.0000946	0.0000138	V0	0.0000000	V1	0.0000000	V1
Bismuth		0.0000093	0.0000223	V0	0.0000008	V0	0.0000000	V1
Cadmium		0.0000174	0.0000058	V0	0.0000039	V0	0.0000000	V1
Calcium		0.4112124	0.6584362	V0	0.0262248	V0	0.0000000	V1
Cerium		0.0000174	0.0005238	V0	0.0000135	V0	0.0000000	V1
Cesium		0.0000100	0.0000272	V0	0.0000012	V0	0.0000000	V1
Chromium		0.0022262	0.0007547	V0	0.0001646	V0	0.0001090	V0
Cobalt		0.0000273	0.0001286	V0	0.0000068	V0	0.0000058	V0
Copper		0.0017171	0.0043486	V0	0.0002797	V0	0.0000000	V1
Iron		0.0393063	0.5352250	V0	0.0206393	V0	0.0000000	V1
Lanthanum		0.0000130	0.0002478	V0	0.0000067	V0	0.0000000	V1
Lead		0.0008577	0.0003310	V0	0.0000493	V0	0.0000000	V1
Lithium		0.0000374	0.0002958	V0	0.0000079	V0	0.0000000	V1
Magnesium		0.0091409	0.1460230	V0	0.0076825	V0	0.0005655	V0
Manganese		0.0006949	0.0076300	V0	0.0003918	V0	0.0000000	V1
Molybdenum		0.0007116	0.0001639	V0	0.0000433	V0	0.0000000	V1
Neodymium		0.0000140	0.0002149	V0	0.0000077	V0	0.0000000	V1
Nickel		0.0005429	0.0005181	V0	0.0000995	V0	0.0000394	V0
Niobium		0.0000202	0.0000505	V0	0.0000030	V0	0.0000000	V1
Palladium		0.0000632	0.0000259	V0	0.0000090	V0	0.0000000	V1
Phosphorus		0.0459574	0.0297865	V0	0.0190608	V0	0.0101951	V0
Platinum		0.0000088	0.0000021	V0	0.0000019	V0	0.0000013	V0
Potassium		0.0061261	0.1401840	V0	0.0229037	V0	0.0003705	V0
Praseodymium		0.0000070	0.0000559	V0	0.0000015	V0	0.0000000	V1
Rubidium		0.0000184	0.0005078	V0	0.0000375	V0	0.0000022	V0
Samarium		0.0000133	0.0000360	V0	0.0000007	V0	0.0000000	V1
Selenium		0.0003366	0.0003327	V0	0.0000480	V0	0.0000000	V1
Silicon		0.7676322	1.1362639	V0	0.0883730	V0	0.0000000	V1
Silver		0.0000100	0.0000061	V0	0.0000007	V0	0.0000000	V1
Sodium		0.0169447	0.0904307	V0	0.0198131	V0	0.0009093	V0
Strontium		0.0003375	0.0018721	V0	0.0000901	V0	0.0000000	V1
Tantalum		0.0000394	0.0000040	V0	0.0000000	V1	0.0000000	V1
Thallium		0.0000090	0.0000043	V0	0.0000000	V1	0.0000000	V1
Thorium		0.0000059	0.0000602	V0	0.0000018	V0	0.0000000	V1
Tin		0.0004414	0.0005460	V0	0.0001110	V0	0.0000000	V1
Titanium		0.0015201	0.0180971	V0	0.0009423	V0	0.0004294	V0
Tungsten		0.0000938	0.0001774	V0	0.0000839	V0	0.0000000	V1
Uranium		0.0000048	0.0000171	V0	0.0000004	V0	0.0000000	V1
Vanadium		0.0007697	0.0010669	V0	0.0001326	V0	0.0000000	V1
Zinc		0.0055897	0.0113528	V0	0.0010864	V0	0.0003386	V0



Compound Name	Station Name	Fort McKay South		Horizon		Travel Blank	
	Station #	AMS 13		AMS 15		22-Sep	
	Sample Date	22-Sep		22-Sep			
	Particulate Size	PM10		PM10			
	Total Air Volume (m <sup>3</sup> )	24		24		24	
	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	7.50	V0	5.27	V0	0.12	V0
Aluminum	0.1380326	0.1057164	V0	0.0358159	V0	0.0000000	V1
Antimony	0.0001784	0.0000393	V0	0.0000189	V0	0.0000000	V1
Arsenic	0.0001060	0.0000503	V0	0.0000285	V0	0.0000000	V1
Barium	0.0092847	0.0012611	V0	0.0003966	V0	0.0000000	V1
Beryllium	0.0000946	0.0000045	V0	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000014	V0	0.0000057	V0	0.0000000	V1
Cadmium	0.0000174	0.0000026	V0	0.0000023	V0	0.0000000	V1
Calcium	0.4112124	0.3989921	V0	0.0855424	V0	0.0000000	V1
Cerium	0.0000174	0.0000953	V0	0.0000287	V0	0.0000000	V1
Cesium	0.0000100	0.0000065	V0	0.0000020	V0	0.0000000	V1
Chromium	0.0022262	0.0005347	V0	0.0002732	V0	0.0001090	V0
Cobalt	0.0000273	0.0000300	V0	0.0000111	V0	0.0000058	V0
Copper	0.0017171	0.0007685	V0	0.0004488	V0	0.0000000	V1
Iron	0.0393063	0.1131070	V0	0.0435911	V0	0.0000000	V1
Lanthanum	0.0000130	0.0000462	V0	0.0000137	V0	0.0000000	V1
Lead	0.0008577	0.0000717	V0	0.0000474	V0	0.0000000	V1
Lithium	0.0000374	0.0000760	V0	0.0000227	V0	0.0000000	V1
Magnesium	0.0091409	0.0334039	V0	0.0112446	V0	0.0005655	V0
Manganese	0.0006949	0.0020586	V0	0.0009725	V0	0.0000000	V1
Molybdenum	0.0007116	0.0000850	V0	0.0000868	V0	0.0000000	V1
Neodymium	0.0000140	0.0000419	V0	0.0000124	V0	0.0000000	V1
Nickel	0.0005429	0.0002315	V0	0.0001953	V0	0.0000394	V0
Niobium	0.0000202	0.0000093	V0	0.0000035	V0	0.0000000	V1
Palladium	0.0000632	0.0000050	V0	0.0000033	V0	0.0000000	V1
Phosphorus	0.0459574	0.0300816	V0	0.0174236	V0	0.0101951	V0
Platinum	0.0000088	0.0000016	V0	0.0000026	V0	0.0000013	V0
Potassium	0.0061261	0.0649918	V0	0.0265452	V0	0.0003705	V0
Praseodymium	0.0000070	0.0000106	V0	0.0000030	V0	0.0000000	V1
Rubidium	0.0000184	0.0001564	V0	0.0000499	V0	0.0000022	V0
Samarium	0.0000133	0.0000076	V0	0.0000020	V0	0.0000000	V1
Selenium	0.0003366	0.0000887	V0	0.0000642	V0	0.0000000	V1
Silicon	0.7676322	0.2208322	V0	0.1059820	V0	0.0000000	V1
Silver	0.0000100	0.0000007	V0	0.0000000	V1	0.0000000	V1
Sodium	0.0169447	0.0241625	V0	0.0223111	V0	0.0009093	V0
Strontium	0.0003375	0.0006416	V0	0.0001667	V0	0.0000000	V1
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000008	V0	0.0000000	V1	0.0000000	V1
Thorium	0.0000059	0.0000121	V0	0.0000033	V0	0.0000000	V1
Tin	0.0004414	0.0001297	V0	0.0001075	V0	0.0000000	V1
Titanium	0.0015201	0.0036506	V0	0.0057440	V0	0.0004294	V0
Tungsten	0.0000938	0.0000170	V0	0.0000078	V0	0.0000000	V1
Uranium	0.0000048	0.0000034	V0	0.0000013	V0	0.0000000	V1
Vanadium	0.0007697	0.0003141	V0	0.0001643	V0	0.0000000	V1
Zinc	0.0055897	0.0018729	V0	0.0008351	V0	0.0003386	V0



Station Name	Muskeg River			Travel Blank	
Station #	AMS 16			22-Sep	
Sample Date	22-Sep			22-Sep	
Particulate Size	PM10			24	
Total Air Volume (m <sup>3</sup> )	24			24	
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	7.28	V0	0.12	V0
Aluminum	0.1380326	0.0954108	V0	0.0000000	V1
Antimony	0.0001784	0.0000439	V0	0.0000000	V1
Arsenic	0.0001060	0.0000590	V0	0.0000000	V1
Barium	0.0092847	0.0011667	V0	0.0000000	V1
Beryllium	0.0000946	0.0000045	V0	0.0000000	V1
Bismuth	0.0000093	0.0000040	V0	0.0000000	V1
Cadmium	0.0000174	0.0000026	V0	0.0000000	V1
Calcium	0.4112124	0.3566063	V0	0.0000000	V1
Cerium	0.0000174	0.0001065	V0	0.0000000	V1
Cesium	0.0000100	0.0000060	V0	0.0000000	V1
Chromium	0.0022262	0.0004760	V0	0.0001090	V0
Cobalt	0.0000273	0.0000334	V0	0.0000058	V0
Copper	0.0017171	0.0006390	V0	0.0000000	V1
Iron	0.0393063	0.1420488	V0	0.0000000	V1
Lanthanum	0.0000130	0.0000523	V0	0.0000000	V1
Lead	0.0008577	0.0000757	V0	0.0000000	V1
Lithium	0.0000374	0.0000747	V0	0.0000000	V1
Magnesium	0.0091409	0.0349973	V0	0.0005655	V0
Manganese	0.0006949	0.0027025	V0	0.0000000	V1
Molybdenum	0.0007116	0.0001737	V0	0.0000000	V1
Neodymium	0.0000140	0.0000448	V0	0.0000000	V1
Nickel	0.0005429	0.0003143	V0	0.0000394	V0
Niobium	0.0000202	0.0000141	V0	0.0000000	V1
Palladium	0.0000632	0.0000000	V1	0.0000000	V1
Phosphorus	0.0459574	0.0211651	V0	0.0101951	V0
Platinum	0.0000088	0.0000023	V0	0.0000013	V0
Potassium	0.0061261	0.0486696	V0	0.0003705	V0
Praseodymium	0.0000070	0.0000119	V0	0.0000000	V1
Rubidium	0.0000184	0.0001331	V0	0.0000022	V0
Samarium	0.0000133	0.0000085	V0	0.0000000	V1
Selenium	0.0003366	0.0001109	V0	0.0000000	V1
Silicon	0.7676322	0.2502184	V0	0.0000000	V1
Silver	0.0000100	0.0000005	V0	0.0000000	V1
Sodium	0.0169447	0.0472523	V0	0.0009093	V0
Strontium	0.0003375	0.0005760	V0	0.0000000	V1
Tantalum	0.0000394	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000008	V0	0.0000000	V1
Thorium	0.0000059	0.0000127	V0	0.0000000	V1
Tin	0.0004414	0.0001020	V0	0.0000000	V1
Titanium	0.0015201	0.0045007	V0	0.0004294	V0
Tungsten	0.0000938	0.0000131	V0	0.0000000	V1
Uranium	0.0000048	0.0000036	V0	0.0000000	V1
Vanadium	0.0007697	0.0004215	V0	0.0000000	V1
Zinc	0.0055897	0.0023676	V0	0.0003386	V0



Compound Name	Bertha Ganter - Fort						
	Station Name	McKay			Patricia McInnes		Travel Blank
	Station #	AMS 1		AMS 6			
	Sample Date	28-Sep		28-Sep		28-Sep	
Particulate Size	PM10		PM10				
Total Air Volume (m <sup>3</sup> )	24		24		24		
MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	
Particulate Matter	1.00	37.45	V0	16.52	V0	-0.01	V1
Aluminum	0.1380326	1.1694491	V0	0.3987568	V0	0.0000000	V1
Antimony	0.0001784	0.0000896	V0	0.0003022	V0	0.0000000	V1
Arsenic	0.0001060	0.0002953	V0	0.0001919	V0	0.0000000	V1
Barium	0.0092847	0.0111919	V0	0.0065426	V0	0.0000000	V1
Beryllium	0.0000946	0.0000333	V0	0.0000114	V0	0.0000000	V1
Bismuth	0.0000093	0.0000065	V0	0.0000111	V0	0.0000000	V1
Cadmium	0.0000174	0.0000142	V0	0.0000162	V0	0.0000000	V1
Calcium	0.4112124	3.4565638	V0	0.6193030	V0	0.0000000	V1
Cerium	0.0000174	0.0013572	V0	0.0005131	V0	0.0000000	V1
Cesium	0.0000100	0.0000839	V0	0.0000242	V0	0.0000000	V1
Chromium	0.0022262	0.0013444	V0	0.0029358	V0	0.0000990	V0
Cobalt	0.0000273	0.0003336	V0	0.0001221	V0	0.0000019	V0
Copper	0.0017171	0.0014407	V0	0.0020450	V0	0.0011691	V0
Iron	0.0393063	1.2703048	V0	0.5098995	V0	0.0000000	V1
Lanthanum	0.0000130	0.0007202	V0	0.0002814	V0	0.0000000	V1
Lead	0.0008577	0.0004609	V0	0.0002383	V0	0.0000000	V1
Lithium	0.0000374	0.0010568	V0	0.0002908	V0	0.0000000	V1
Magnesium	0.0091409	0.3249394	V0	0.1434649	V0	0.0000000	V1
Manganese	0.0006949	0.0208786	V0	0.0080950	V0	0.0000000	V1
Molybdenum	0.0007116	0.0002137	V0	0.0001232	V0	0.0000399	V0
Neodymium	0.0000140	0.0005816	V0	0.0001947	V0	0.0000000	V1
Nickel	0.0005429	0.0013150	V0	0.0005326	V0	0.0000583	V0
Niobium	0.0000202	0.0001247	V0	0.0000359	V0	0.0000000	V1
Palladium	0.0000632	0.0000197	V0	0.0000138	V0	0.0000067	V0
Phosphorus	0.0459574	0.0370723	V0	0.0287319	V0	0.0082411	V0
Platinum	0.0000088	0.0000085	V0	0.0000042	V0	0.0000020	V0
Potassium	0.0061261	0.3977405	V0	0.1566615	V0	0.0004705	V0
Praseodymium	0.0000070	0.0001534	V0	0.0000493	V0	0.0000000	V1
Rubidium	0.0000184	0.0015459	V0	0.0005045	V0	0.0000000	V1
Samarium	0.0000133	0.0001067	V0	0.0000352	V0	0.0000000	V1
Selenium	0.0003366	0.0007122	V0	0.0002673	V0	0.0000155	V0
Silicon	0.7676322	2.6633367	V0	1.1512029	V0	0.0000000	V1
Silver	0.0000100	0.0000061	V0	0.0000034	V0	0.0000000	V1
Sodium	0.0169447	0.1965432	V0	0.0565488	V0	0.0008799	V0
Strontium	0.0003375	0.0058240	V0	0.0016274	V0	0.0000000	V1
Tantalum	0.0000394	0.0000087	V0	0.0000026	V0	0.0000000	V1
Thallium	0.0000090	0.0000121	V0	0.0000045	V0	0.0000000	V1
Thorium	0.0000059	0.0001639	V0	0.0000579	V0	0.0000000	V1
Tin	0.0004414	0.0001215	V0	0.0002762	V0	0.0000471	V0
Titanium	0.0015201	0.0416032	V0	0.0130533	V0	0.0009128	V0
Tungsten	0.0000938	0.0001124	V0	0.0001162	V0	0.0000000	V1
Uranium	0.0000048	0.0000455	V0	0.0000155	V0	0.0000000	V1
Vanadium	0.0007697	0.0027123	V0	0.0008870	V0	0.0000000	V1
Zinc	0.0055897	0.0051608	V0	0.0081926	V0	0.0000000	V1



Station Name Station # Sample Date Particulate Size Total Air Volume (m <sup>3</sup> )	Athabasca Valley			Anzac		Travel Blank	
	AMS 7 28-Sep PM10 24	Results (µg/m <sup>3</sup> )	QC Flag	AMS 14 28-Sep PM10 23.5	QC Flag	24	QC Flag
Compound Name	MDL (µg/sample)	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag	Results (µg/m <sup>3</sup> )	QC Flag
Particulate Matter	1.00	25.18	V0	9.23	V0	-0.01	V1
Aluminum	0.1380326	0.4850727	V0	0.1410675	V0	0.0000000	V1
Antimony	0.0001784	0.0005772	V0	0.0000304	V0	0.0000000	V1
Arsenic	0.0001060	0.0001657	V0	0.0000538	V0	0.0000000	V1
Barium	0.0092847	0.0100737	V0	0.0019707	V0	0.0000000	V1
Beryllium	0.0000946	0.0000148	V0	0.0000000	V1	0.0000000	V1
Bismuth	0.0000093	0.0000204	V0	0.0000041	V0	0.0000000	V1
Cadmium	0.0000174	0.0000122	V0	0.0000096	V0	0.0000000	V1
Calcium	0.4112124	0.9265768	V0	0.2025635	V0	0.0000000	V1
Cerium	0.0000174	0.0005961	V0	0.0001798	V0	0.0000000	V1
Cesium	0.0000100	0.0000324	V0	0.0000093	V0	0.0000000	V1
Chromium	0.0022262	0.0008811	V0	0.0005437	V0	0.0000990	V0
Cobalt	0.0000273	0.0001671	V0	0.0000458	V0	0.0000019	V0
Copper	0.0017171	0.0037156	V0	0.0004060	V0	0.0011691	V0
Iron	0.0393063	0.6856092	V0	0.1562831	V0	0.0000000	V1
Lanthanum	0.0000130	0.0003133	V0	0.0000954	V0	0.0000000	V1
Lead	0.0008577	0.0003677	V0	0.0001125	V0	0.0000000	V1
Lithium	0.0000374	0.0003848	V0	0.0000970	V0	0.0000000	V1
Magnesium	0.0091409	0.1999606	V0	0.0495962	V0	0.0000000	V1
Manganese	0.0006949	0.0106559	V0	0.0031546	V0	0.0000000	V1
Molybdenum	0.0007116	0.0001815	V0	0.0000492	V0	0.0000399	V0
Neodymium	0.0000140	0.0002501	V0	0.0000767	V0	0.0000000	V1
Nickel	0.0005429	0.0006243	V0	0.0003271	V0	0.0000583	V0
Niobium	0.0000202	0.0000603	V0	0.0000199	V0	0.0000000	V1
Palladium	0.0000632	0.0000190	V0	0.0000047	V0	0.0000067	V0
Phosphorus	0.0459574	0.0304610	V0	0.0231508	V0	0.0082411	V0
Platinum	0.0000088	0.0000029	V0	0.0000022	V0	0.0000020	V0
Potassium	0.0061261	0.1954624	V0	0.0705771	V0	0.0004705	V0
Praseodymium	0.0000070	0.0000641	V0	0.0000206	V0	0.0000000	V1
Rubidium	0.0000184	0.0006359	V0	0.0002231	V0	0.0000000	V1
Samarium	0.0000133	0.0000451	V0	0.0000142	V0	0.0000000	V1
Selenium	0.0003366	0.0003498	V0	0.0001272	V0	0.0000155	V0
Silicon	0.7676322	1.9503405	V0	0.4223904	V0	0.0000000	V1
Silver	0.0000100	0.0000044	V0	0.0000026	V0	0.0000000	V1
Sodium	0.0169447	0.0799956	V0	0.0247385	V0	0.0008799	V0
Strontium	0.0003375	0.0022793	V0	0.0006061	V0	0.0000000	V1
Tantalum	0.0000394	0.0000047	V0	0.0000000	V1	0.0000000	V1
Thallium	0.0000090	0.0000056	V0	0.0000020	V0	0.0000000	V1
Thorium	0.0000059	0.0000668	V0	0.0000277	V0	0.0000000	V1
Tin	0.0004414	0.0004590	V0	0.0001084	V0	0.0000471	V0
Titanium	0.0015201	0.0208099	V0	0.0068970	V0	0.0009128	V0
Tungsten	0.0000938	0.0001543	V0	0.0000413	V0	0.0000000	V1
Uranium	0.0000048	0.0000216	V0	0.0000075	V0	0.0000000	V1
Vanadium	0.0007697	0.0011684	V0	0.0002972	V0	0.0000000	V1
Zinc	0.0055897	0.0117055	V0	0.0018152	V0	0.0000000	V1



Compound Name	Station Name Station # Sample Date Particulate Size Total Air Volume (m <sup>3</sup> )	Fort McKay South			Horizon		Travel Blank	
		AMS 13 28-Sep PM10 24	Results (µg/m <sup>3</sup> )	QC Flag	AMS 15 28-Sep PM10 24	QC Flag	24	QC Flag
Particulate Matter	1.00	21.68	V0	21.00	V0	-0.01	V1	
Aluminum	0.1380326	0.4561164	V0	0.5825196	V0	0.0000000	V1	
Antimony	0.0001784	0.0000595	V0	0.0000782	V0	0.0000000	V1	
Arsenic	0.0001060	0.0001397	V0	0.0001641	V0	0.0000000	V1	
Barium	0.0092847	0.0042372	V0	0.0066391	V0	0.0000000	V1	
Beryllium	0.0000946	0.0000122	V0	0.0000204	V0	0.0000000	V1	
Bismuth	0.0000093	0.0000044	V0	0.0000051	V0	0.0000000	V1	
Cadmium	0.0000174	0.0000084	V0	0.0000103	V0	0.0000000	V1	
Calcium	0.4112124	0.5597085	V0	0.6226101	V0	0.0000000	V1	
Cerium	0.0000174	0.0004884	V0	0.0006577	V0	0.0000000	V1	
Cesium	0.0000100	0.0000333	V0	0.0000457	V0	0.0000000	V1	
Chromium	0.0022262	0.0006350	V0	0.0015903	V0	0.0000990	V0	
Cobalt	0.0000273	0.0001433	V0	0.0001880	V0	0.0000019	V0	
Copper	0.0017171	0.0006312	V0	0.0008647	V0	0.0011691	V0	
Iron	0.0393063	0.4217351	V0	0.7283353	V0	0.0000000	V1	
Lanthanum	0.0000130	0.0002675	V0	0.0003534	V0	0.0000000	V1	
Lead	0.0008577	0.0002081	V0	0.0002612	V0	0.0000000	V1	
Lithium	0.0000374	0.0005065	V0	0.0005950	V0	0.0000000	V1	
Magnesium	0.0091409	0.1002947	V0	0.1531471	V0	0.0000000	V1	
Manganese	0.0006949	0.0071281	V0	0.0112725	V0	0.0000000	V1	
Molybdenum	0.0007116	0.0001011	V0	0.0004466	V0	0.0000399	V0	
Neodymium	0.0000140	0.0002156	V0	0.0002926	V0	0.0000000	V1	
Nickel	0.0005429	0.0005853	V0	0.0018613	V0	0.0000583	V0	
Niobium	0.0000202	0.0000651	V0	0.0001128	V0	0.0000000	V1	
Palladium	0.0000632	0.0000123	V0	0.0000185	V0	0.0000067	V0	
Phosphorus	0.0459574	0.0239299	V0	0.0261199	V0	0.0082411	V0	
Platinum	0.0000088	0.0000022	V0	0.0000024	V0	0.0000020	V0	
Potassium	0.0061261	0.1458331	V0	0.1808113	V0	0.0004705	V0	
Praseodymium	0.0000070	0.0000563	V0	0.0000774	V0	0.0000000	V1	
Rubidium	0.0000184	0.0006118	V0	0.0007619	V0	0.0000000	V1	
Samarium	0.0000133	0.0000410	V0	0.0000554	V0	0.0000000	V1	
Selenium	0.0003366	0.0003001	V0	0.0004132	V0	0.0000155	V0	
Silicon	0.7676322	1.3075829	V0	1.6983662	V0	0.0000000	V1	
Silver	0.0000100	0.0000034	V0	0.0000046	V0	0.0000000	V1	
Sodium	0.0169447	0.1049002	V0	0.1011304	V0	0.0008799	V0	
Strontium	0.0003375	0.0018226	V0	0.0023781	V0	0.0000000	V1	
Tantalum	0.0000394	0.0000042	V0	0.0000061	V0	0.0000000	V1	
Thallium	0.0000090	0.0000053	V0	0.0000073	V0	0.0000000	V1	
Thorium	0.0000059	0.0000634	V0	0.0000873	V0	0.0000000	V1	
Tin	0.0004414	0.0000811	V0	0.0000833	V0	0.0000471	V0	
Titanium	0.0015201	0.0206337	V0	0.0268725	V0	0.0009128	V0	
Tungsten	0.0000938	0.0000335	V0	0.0000444	V0	0.0000000	V1	
Uranium	0.0000048	0.0000203	V0	0.0000279	V0	0.0000000	V1	
Vanadium	0.0007697	0.0011678	V0	0.0014353	V0	0.0000000	V1	
Zinc	0.0055897	0.0028591	V0	0.0027022	V0	0.0000000	V1	



Compound Name	MDL (µg/sample)	Muskeg River		Travel Blank		
		AMS 16	QC Flag	28-Sep	QC Flag	
Station Name	Station #	Sample Date	Particulate Size	Total Air Volume (m³)	24	24
AMS 16	28-Sep	PM10	24	24	Results (µg/m³)	QC Flag
Particulate Matter	1.00	20.78	V0	-0.01	V1	
Aluminum	0.1380326	0.6947273	V0	0.0000000	V1	
Antimony	0.0001784	0.0000555	V0	0.0000000	V1	
Arsenic	0.0001060	0.0001314	V0	0.0000000	V1	
Barium	0.0092847	0.0060360	V0	0.0000000	V1	
Beryllium	0.0000946	0.0000239	V0	0.0000000	V1	
Bismuth	0.0000093	0.0000057	V0	0.0000000	V1	
Cadmium	0.0000174	0.0000094	V0	0.0000000	V1	
Calcium	0.4112124	1.1119325	V0	0.0000000	V1	
Cerium	0.0000174	0.0007978	V0	0.0000000	V1	
Cesium	0.0000100	0.0000495	V0	0.0000000	V1	
Chromium	0.0022262	0.0009595	V0	0.0000990	V0	
Cobalt	0.0000273	0.0002056	V0	0.0000019	V0	
Copper	0.0017171	0.0008456	V0	0.0011691	V0	
Iron	0.0393063	0.7244578	V0	0.0000000	V1	
Lanthanum	0.0000130	0.0004479	V0	0.0000000	V1	
Lead	0.0008577	0.0002818	V0	0.0000000	V1	
Lithium	0.0000374	0.0007604	V0	0.0000000	V1	
Magnesium	0.0091409	0.1626536	V0	0.0000000	V1	
Manganese	0.0006949	0.0122444	V0	0.0000000	V1	
Molybdenum	0.0007116	0.0002831	V0	0.0000399	V0	
Neodymium	0.0000140	0.0003498	V0	0.0000000	V1	
Nickel	0.0005429	0.0010896	V0	0.0000583	V0	
Niobium	0.0000202	0.0001092	V0	0.0000000	V1	
Palladium	0.0000632	0.0000184	V0	0.0000067	V0	
Phosphorus	0.0459574	0.0275660	V0	0.0082411	V0	
Platinum	0.0000088	0.0000034	V0	0.0000020	V0	
Potassium	0.0061261	0.2124322	V0	0.0004705	V0	
Praseodymium	0.0000070	0.0000900	V0	0.0000000	V1	
Rubidium	0.0000184	0.0009026	V0	0.0000000	V1	
Samarium	0.0000133	0.0000630	V0	0.0000000	V1	
Selenium	0.0003366	0.0005147	V0	0.0000155	V0	
Silicon	0.7676322	1.6693433	V0	0.0000000	V1	
Silver	0.0000100	0.0000047	V0	0.0000000	V1	
Sodium	0.0169447	0.1017000	V0	0.0008799	V0	
Strontium	0.0003375	0.0028121	V0	0.0000000	V1	
Tantalum	0.0000394	0.0000073	V0	0.0000000	V1	
Thallium	0.0000090	0.0000081	V0	0.0000000	V1	
Thorium	0.0000059	0.0001060	V0	0.0000000	V1	
Tin	0.0004414	0.0001529	V0	0.0000471	V0	
Titanium	0.0015201	0.0331638	V0	0.0009128	V0	
Tungsten	0.0000938	0.0000648	V0	0.0000000	V1	
Uranium	0.0000048	0.0000312	V0	0.0000000	V1	
Vanadium	0.0007697	0.0021487	V0	0.0000000	V1	
Zinc	0.0055897	0.0031768	V0	0.0000000	V1	



Station Name	Bertha Ganter - Fort McKay	Bertha Ganter - Fort McKay	Bertha Ganter - Fort McKay	Bertha Ganter - Fort McKay
Station #	AMS 1	AMS 1	AMS 1	AMS 1
Sample Date	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m <sup>3</sup>	Std Dev µg/m <sup>3</sup>	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	17.82	13.58	5	5
Aluminum	0.4667290	0.5168564	5	5
Antimony	0.0000457	0.0000433	5	4
Arsenic	0.0001221	0.0001114	5	5
Barium	0.0043811	0.0048888	5	4
Beryllium	0.0000126	0.0000145	5	3
Bismuth	0.0000053	0.0000042	5	5
Cadmium	0.0000084	0.0000057	5	5
Calcium	1.2142871	1.4513131	5	5
Cerium	0.0005331	0.0005954	5	5
Cesium	0.0000339	0.0000366	5	5
Chromium	0.0006260	0.0005897	5	4
Cobalt	0.0001358	0.0001459	5	5
Copper	0.0009936	0.0004537	5	5
Iron	0.4822460	0.5370701	5	5
Lanthanum	0.0002709	0.0003114	5	5
Lead	0.0002107	0.0001875	5	5
Lithium	0.0004416	0.0004799	5	5
Magnesium	0.1211411	0.1389360	5	5
Manganese	0.0082811	0.0087794	5	5
Molybdenum	0.0001270	0.0000764	5	5
Neodymium	0.0002289	0.0002572	5	5
Nickel	0.0006765	0.0005448	5	5
Niobium	0.0000527	0.0000573	5	5
Palladium	0.0000103	0.0000092	5	4
Phosphorus	0.0233130	0.0088342	5	5
Platinum	0.0000034	0.0000029	5	5
Potassium	0.1621768	0.1606440	5	5
Praseodymium	0.0000602	0.0000675	5	5
Rubidium	0.0006382	0.0006734	5	5
Samarium	0.0000425	0.0000472	5	5
Selenium	0.0003131	0.0003073	5	5
Silicon	1.2265121	1.1081962	5	5
Silver	0.0000054	0.0000045	5	5
Sodium	0.1065456	0.1260354	5	5
Strontium	0.0022488	0.0025300	5	5
Tantalum	0.0000032	0.0000044	5	2
Thallium	0.0000051	0.0000053	5	5
Thorium	0.0000665	0.0000733	5	5
Tin	0.0001075	0.0000487	5	5
Titanium	0.0175416	0.0186033	5	5
Tungsten	0.0000472	0.0000492	5	5
Uranium	0.0000186	0.0000204	5	5
Vanadium	0.0011604	0.0012528	5	5
Zinc	0.0026284	0.0022378	5	5





Station Name	Patricia McInnes	Patricia McInnes	Patricia McInnes	Patricia McInnes
Station #	AMS 6	AMS 6	AMS 6	AMS 6
Sample Date	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m <sup>3</sup>	Std Dev µg/m <sup>3</sup>	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	23.41	20.36	5	5
Aluminum	0.6022099	0.6768450	5	5
Antimony	0.0001982	0.0000833	5	5
Arsenic	0.0004164	0.0004123	5	5
Barium	0.0079451	0.0071478	5	5
Beryllium	0.0000185	0.0000199	5	5
Bismuth	0.0000140	0.0000073	5	5
Cadmium	0.0000140	0.0000046	5	5
Calcium	1.1634520	1.4571807	5	5
Cerium	0.0007594	0.0008750	5	5
Cesium	0.0000402	0.0000471	5	5
Chromium	0.0012739	0.0011557	5	5
Cobalt	0.0001775	0.0001948	5	5
Copper	0.0017138	0.0007366	5	5
Iron	0.8290754	0.9846703	5	5
Lanthanum	0.0003815	0.0004356	5	5
Lead	0.0003204	0.0002386	5	5
Lithium	0.0004659	0.0005435	5	5
Magnesium	0.2580572	0.3188790	5	5
Manganese	0.0129061	0.0149356	5	5
Molybdenum	0.0001191	0.0000568	5	5
Neodymium	0.0003129	0.0003673	5	5
Nickel	0.0007705	0.0007608	5	5
Niobium	0.0000738	0.0000938	5	5
Palladium	0.0000162	0.0000118	5	5
Phosphorus	0.0269479	0.0051023	5	5
Platinum	0.0000033	0.0000006	5	5
Potassium	0.2148538	0.2080372	5	5
Praseodymium	0.0000834	0.0000987	5	5
Rubidium	0.0008153	0.0009280	5	5
Samarium	0.0000561	0.0000665	5	5
Selenium	0.0004038	0.0003957	5	5
Silicon	1.8382606	1.9953182	5	5
Silver	0.0000042	0.0000028	5	5
Sodium	0.1085077	0.1348976	5	5
Strontium	0.0032144	0.0039016	5	5
Tantalum	0.0000048	0.0000071	5	3
Thallium	0.0000076	0.0000089	5	5
Thorium	0.0001044	0.0001263	5	5
Tin	0.0002308	0.0000741	5	5
Titanium	0.0236640	0.0284430	5	5
Tungsten	0.0001633	0.0001728	5	5
Uranium	0.0000296	0.0000347	5	5
Vanadium	0.0014078	0.0016234	5	5
Zinc	0.0074013	0.0030886	5	5



Station Name	Athabasca Valley	Athabasca Valley	Athabasca Valley	Athabasca Valley
Station #	AMS 7	AMS 7	AMS 7	AMS 7
Sample Date	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m <sup>3</sup>	Std Dev µg/m <sup>3</sup>	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	18.50	5.85	5	5
Aluminum	0.3852566	0.1849614	5	5
Antimony	0.0004229	0.0002146	5	5
Arsenic	0.0001781	0.0000942	5	5
Barium	0.0080104	0.0037906	5	5
Beryllium	0.0000127	0.0000043	5	5
Bismuth	0.0000160	0.0000082	5	5
Cadmium	0.0000123	0.0000053	5	5
Calcium	0.6495876	0.3222779	5	5
Cerium	0.0004863	0.0002412	5	5
Cesium	0.0000268	0.0000127	5	5
Chromium	0.0007136	0.0003056	5	5
Cobalt	0.0001270	0.0000629	5	5
Copper	0.0029554	0.0015322	5	5
Iron	0.5186812	0.2537346	5	5
Lanthanum	0.0002394	0.0001211	5	5
Lead	0.0003582	0.0001959	5	5
Lithium	0.0003007	0.0001460	5	5
Magnesium	0.1495830	0.0750115	5	5
Manganese	0.0081032	0.0039747	5	5
Molybdenum	0.0001389	0.0000551	5	5
Neodymium	0.0002024	0.0000993	5	5
Nickel	0.0005014	0.0002113	5	5
Niobium	0.0000479	0.0000233	5	5
Palladium	0.0000178	0.0000093	5	5
Phosphorus	0.0258964	0.0040872	5	5
Platinum	0.0000024	0.0000007	5	5
Potassium	0.1481042	0.0555371	5	5
Praseodymium	0.0000529	0.0000262	5	5
Rubidium	0.0005240	0.0002427	5	5
Samarium	0.0000359	0.0000180	5	5
Selenium	0.0002849	0.0001257	5	5
Silicon	1.2588589	0.6550588	5	5
Silver	0.0000052	0.0000009	5	5
Sodium	0.0665195	0.0318224	5	5
Strontium	0.0017887	0.0008392	5	5
Tantalum	0.0000036	0.0000020	5	4
Thallium	0.0000048	0.0000021	5	5
Thorium	0.0000588	0.0000293	5	5
Tin	0.0003746	0.0001843	5	5
Titanium	0.0163608	0.0077507	5	5
Tungsten	0.0001220	0.0000669	5	5
Uranium	0.0000168	0.0000082	5	5
Vanadium	0.0009116	0.0004082	5	5
Zinc	0.0110857	0.0062526	5	5



Station Name	Anzac	Anzac	Anzac	Anzac
Station #	AMS 14	AMS 14	AMS 14	AMS 14
Sample Date	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m <sup>3</sup>	Std Dev µg/m <sup>3</sup>	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	8.52	3.58	5	5
Aluminum	0.1229400	0.0868456	5	5
Antimony	0.0000196	0.0000088	5	5
Arsenic	0.0000619	0.0000288	5	5
Barium	0.0015407	0.0011329	5	4
Beryllium	0.0000029	0.0000039	5	2
Bismuth	0.0000018	0.0000014	5	5
Cadmium	0.0000084	0.0000046	5	5
Calcium	0.1688411	0.1231904	5	5
Cerium	0.0001542	0.0001205	5	5
Cesium	0.0000083	0.0000056	5	5
Chromium	0.0002976	0.0001602	5	5
Cobalt	0.0000404	0.0000297	5	5
Copper	0.0003668	0.0000714	5	5
Iron	0.1440235	0.1155562	5	5
Lanthanum	0.0000772	0.0000591	5	5
Lead	0.0000951	0.0000430	5	5
Lithium	0.0000899	0.0000691	5	5
Magnesium	0.0441350	0.0319657	5	5
Manganese	0.0030745	0.0023804	5	5
Molybdenum	0.0000720	0.0000272	5	5
Neodymium	0.0000661	0.0000506	5	5
Nickel	0.0002167	0.0000921	5	5
Niobium	0.0000153	0.0000103	5	5
Palladium	0.0000049	0.0000033	5	4
Phosphorus	0.0204921	0.0028860	5	5
Platinum	0.0000023	0.0000003	5	5
Potassium	0.0611171	0.0274027	5	5
Praseodymium	0.0000172	0.0000132	5	5
Rubidium	0.0001923	0.0001209	5	5
Samarium	0.0000122	0.0000098	5	5
Selenium	0.0001161	0.0000600	5	5
Silicon	0.3848769	0.2936666	5	5
Silver	0.0000026	0.0000023	5	5
Sodium	0.0248237	0.0106873	5	5
Strontium	0.0005114	0.0003529	5	5
Tantalum	0.0000000	0.0000000	5	0
Thallium	0.0000019	0.0000013	5	4
Thorium	0.0000210	0.0000157	5	5
Tin	0.0000888	0.0000276	5	5
Titanium	0.0056264	0.0035135	5	5
Tungsten	0.0000580	0.0000329	5	5
Uranium	0.0000058	0.0000043	5	5
Vanadium	0.0002941	0.0001500	5	5
Zinc	0.0014532	0.0005372	5	5



Station Name	Fort McKay South	Fort McKay South	Fort McKay South	Fort McKay South
Station #	AMS 13	AMS 13	AMS 13	AMS 13
Sample Date	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m <sup>3</sup>	Std Dev µg/m <sup>3</sup>	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	11.86	7.74	5	5
Aluminum	0.2848519	0.2970807	5	5
Antimony	0.0000298	0.0000282	5	3
Arsenic	0.0000826	0.0000540	5	5
Barium	0.0024437	0.0022852	5	5
Beryllium	0.0000088	0.0000091	5	4
Bismuth	0.0000025	0.0000021	5	5
Cadmium	0.0000066	0.0000035	5	5
Calcium	0.3119870	0.2570977	5	5
Cerium	0.0002899	0.0003133	5	5
Cesium	0.0000201	0.0000200	5	5
Chromium	0.0004736	0.0003040	5	5
Cobalt	0.0000811	0.0000835	5	5
Copper	0.0005487	0.0002680	5	5
Iron	0.2176444	0.2141084	5	5
Lanthanum	0.0001448	0.0001541	5	5
Lead	0.0001198	0.0001165	5	4
Lithium	0.0002803	0.0003072	5	5
Magnesium	0.0542190	0.0481813	5	5
Manganese	0.0038174	0.0034902	5	5
Molybdenum	0.0000810	0.0000437	5	5
Neodymium	0.0001256	0.0001342	5	5
Nickel	0.0003562	0.0002876	5	5
Niobium	0.0000328	0.0000343	5	5
Palladium	0.0000067	0.0000057	5	4
Phosphorus	0.0235037	0.0052858	5	5
Platinum	0.0000021	0.0000004	5	5
Potassium	0.1000252	0.0670655	5	5
Praseodymium	0.0000337	0.0000367	5	5
Rubidium	0.0003797	0.0003524	5	5
Samarium	0.0000237	0.0000251	5	5
Selenium	0.0001895	0.0001732	5	5
Silicon	0.7162989	0.8070338	5	5
Silver	0.0000019	0.0000013	5	5
Sodium	0.0863543	0.1164186	5	5
Strontium	0.0010254	0.0009456	5	5
Tantalum	0.0000018	0.0000025	5	2
Thallium	0.0000030	0.0000028	5	5
Thorium	0.0000364	0.0000385	5	5
Tin	0.0000845	0.0000454	5	5
Titanium	0.0105665	0.0101600	5	5
Tungsten	0.0000184	0.0000160	5	4
Uranium	0.0000110	0.0000115	5	5
Vanadium	0.0006812	0.0006846	5	5
Zinc	0.0019657	0.0012132	5	5



Station Name Station # Sample Date Particulate Size Compound Name	Horizon AMS 15 Sep 04 - Sep 28 PM10 Average µg/m <sup>3</sup>	Horizon AMS 15 Sep 04 - Sep 28 PM10 Std Dev µg/m <sup>3</sup>	Horizon AMS 15 Sep 04 - Sep 28 PM10 Total Samples (#)	Horizon AMS 15 Sep 04 - Sep 28 PM10 Total ≥ MDL (#)
Particulate Matter	14.71	6.60	5	5
Aluminum	0.5601311	0.4340578	5	5
Antimony	0.0000333	0.0000264	5	5
Arsenic	0.0001148	0.0000612	5	5
Barium	0.0045995	0.0032029	5	5
Beryllium	0.0000164	0.0000133	5	4
Bismuth	0.0000041	0.0000016	5	5
Cadmium	0.0000066	0.0000039	5	5
Calcium	0.3311587	0.2598370	5	5
Cerium	0.0005497	0.0004275	5	5
Cesium	0.0000441	0.0000344	5	5
Chromium	0.0009175	0.0005822	5	5
Cobalt	0.0001478	0.0001099	5	5
Copper	0.0006097	0.0001838	5	5
Iron	0.4554159	0.3744128	5	5
Lanthanum	0.0002710	0.0002059	5	5
Lead	0.0001875	0.0001076	5	5
Lithium	0.0005888	0.0005102	5	5
Magnesium	0.1011988	0.0721139	5	5
Manganese	0.0072487	0.0057689	5	5
Molybdenum	0.0001656	0.0001599	5	5
Neodymium	0.0002408	0.0001837	5	5
Nickel	0.0008380	0.0006651	5	5
Niobium	0.0000755	0.0000587	5	5
Palladium	0.0000127	0.0000078	5	5
Phosphorus	0.0228829	0.0043808	5	5
Platinum	0.0000024	0.0000004	5	5
Potassium	0.1631633	0.1023249	5	5
Praseodymium	0.0000632	0.0000486	5	5
Rubidium	0.0007089	0.0005262	5	5
Samarium	0.0000463	0.0000358	5	5
Selenium	0.0003385	0.0002239	5	5
Silicon	1.4202430	1.0411094	5	5
Silver	0.0000055	0.0000059	5	4
Sodium	0.0803417	0.0476840	5	5
Strontium	0.0017483	0.0012797	5	5
Tantalum	0.0000047	0.0000038	5	4
Thallium	0.0000055	0.0000039	5	4
Thorium	0.0000752	0.0000593	5	5
Tin	0.0001007	0.0000143	5	5
Titanium	0.0233189	0.0162614	5	5
Tungsten	0.0000266	0.0000183	5	5
Uranium	0.0000230	0.0000176	5	5
Vanadium	0.0011761	0.0008069	5	5
Zinc	0.0019895	0.0008978	5	5



Station Name	Muskeg River	Muskeg River	Muskeg River	Muskeg River
Station #	AMS 16	AMS 16	AMS 16	AMS 16
Sample Date	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28
Particulate Size	PM10	PM10	PM10	PM10
Compound Name	Average µg/m <sup>3</sup>	Std Dev µg/m <sup>3</sup>	Total Samples (#)	Total ≥ MDL (#)
Particulate Matter	23.17	15.76	5	5
Aluminum	0.8398657	0.7733570	5	5
Antimony	0.0000343	0.0000180	5	5
Arsenic	0.0001582	0.0001112	5	5
Barium	0.0065708	0.0056894	5	5
Beryllium	0.0000248	0.0000211	5	5
Bismuth	0.0000050	0.0000025	5	5
Cadmium	0.0000068	0.0000029	5	5
Calcium	0.9803478	0.7664370	5	5
Cerium	0.0009199	0.0008607	5	5
Cesium	0.0000588	0.0000536	5	5
Chromium	0.0010956	0.0007801	5	5
Cobalt	0.0002375	0.0002135	5	5
Copper	0.0007621	0.0003127	5	5
Iron	0.8441240	0.8274651	5	5
Lanthanum	0.0004528	0.0004073	5	5
Lead	0.0002943	0.0002219	5	5
Lithium	0.0009301	0.0009042	5	5
Magnesium	0.1736541	0.1520387	5	5
Manganese	0.0136606	0.0130842	5	5
Molybdenum	0.0002341	0.0001078	5	5
Neodymium	0.0003992	0.0003707	5	5
Nickel	0.0010246	0.0007407	5	5
Niobium	0.0001107	0.0000978	5	5
Palladium	0.0000156	0.0000137	5	4
Phosphorus	0.0252329	0.0035503	5	5
Platinum	0.0000032	0.0000018	5	5
Potassium	0.2385140	0.1916286	5	5
Praseodymium	0.0001048	0.0000980	5	5
Rubidium	0.0010386	0.0009184	5	5
Samarium	0.0000736	0.0000682	5	5
Selenium	0.0005179	0.0004144	5	5
Silicon	2.0257136	1.8933317	5	5
Silver	0.0000043	0.0000032	5	5
Sodium	0.1056110	0.0776919	5	5
Strontium	0.0028224	0.0023464	5	5
Tantalum	0.0000069	0.0000068	5	3
Thallium	0.0000090	0.0000082	5	5
Thorium	0.0001207	0.0001132	5	5
Tin	0.0001202	0.0000240	5	5
Titanium	0.0346455	0.0298514	5	5
Tungsten	0.0000552	0.0000324	5	5
Uranium	0.0000337	0.0000303	5	5
Vanadium	0.0019845	0.0015844	5	5
Zinc	0.0028632	0.0011723	5	5



Wood Buffalo Environmental Association

PM10 Metal (µg/sample) Summary

2017 September

Compound	% Det	N	N < Det.	Min.	10%	25%	50%	60%	75%	80%	90%	95%	99% Max.	Mean	Std. Dev.	Median	Outlier Test	
Particulate Matter	100.0%	35	0	91	174	190	327	439	512	554	780	1082	1412	1412	404	289	327	1848
Aluminum	100.0%	35	0	0.2765	0.9037	2.3464	7.1924	11.1008	16.6735	17.4481	28.4649	42.8532	44.4366	44.4366	11.1787	11.7808	7.1924	70.0827
Antimony	91.4%	35	3	0.0001	0.0002	0.0005	0.0009	0.0014	0.0022	0.0046	0.0088	0.0132	0.0139	0.0139	0.0027	0.0039	0.0009	0.0223
Arsenic	100.0%	35	0	0.0006	0.0010	0.0012	0.0028	0.0035	0.0046	0.0060	0.0069	0.0111	0.0267	0.0267	0.0039	0.0046	0.0028	0.0271
Barium	94.3%	35	2	0.0069	0.0110	0.0286	0.0899	0.1449	0.1891	0.2392	0.2579	0.3383	0.4822	0.4822	0.1221	0.1123	0.0899	0.6835
Beryllium	80.0%	35	7	0.0000	0.0001	0.0001	0.0002	0.0003	0.0005	0.0006	0.0009	0.0013	0.0013	0.0013	0.0003	0.0003	0.0002	0.0020
Bismuth	100.0%	35	0	0.0000	0.0000	0.0000	0.0001	0.0002	0.0002	0.0003	0.0005	0.0005	0.0006	0.0006	0.0002	0.0002	0.0001	0.0010
Cadmium	100.0%	35	0	0.0001	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0004	0.0004	0.0002	0.0001	0.0002	0.0008
Calcium	100.0%	35	0	0.6294	1.1715	3.0658	9.0463	13.5523	20.6781	23.0137	45.6771	82.9575	89.1880	89.1880	16.5177	20.9587	9.0463	121.3114
Cerium	100.0%	35	0	0.0003	0.0008	0.0023	0.0066	0.0134	0.0165	0.0191	0.0326	0.0515	0.0548	0.0548	0.0127	0.0136	0.0066	0.0806
Cesium	100.0%	35	0	0.0000	0.0001	0.0002	0.0006	0.0008	0.0012	0.0013	0.0022	0.0029	0.0030	0.0030	0.0008	0.0008	0.0006	0.0050
Chromium	97.1%	35	1	0.0016	0.0040	0.0064	0.0128	0.0189	0.0230	0.0323	0.0415	0.0494	0.0705	0.0705	0.0185	0.0159	0.0128	0.0979
Cobalt	100.0%	35	0	0.0002	0.0003	0.0007	0.0019	0.0034	0.0045	0.0049	0.0080	0.0123	0.0124	0.0124	0.0032	0.0033	0.0019	0.0197
Copper	100.0%	35	0	0.0048	0.0080	0.0108	0.0165	0.0208	0.0346	0.0491	0.0559	0.0918	0.1044	0.1044	0.0272	0.0255	0.0165	0.1547
Iron	100.0%	35	0	0.4895	1.0122	2.7146	7.0604	12.2376	17.3870	18.0693	25.8482	51.3490	60.7680	60.7680	11.9633	13.6571	7.0604	80.2489
Lanthanum	100.0%	35	0	0.0002	0.0004	0.0011	0.0031	0.0068	0.0085	0.0107	0.0161	0.0243	0.0273	0.0273	0.0063	0.0067	0.0031	0.0398
Lead	97.1%	35	1	0.0008	0.0011	0.0017	0.0040	0.0063	0.0079	0.0088	0.0113	0.0144	0.0175	0.0175	0.0055	0.0044	0.0040	0.0272
Lithium	100.0%	35	0	0.0002	0.0007	0.0018	0.0070	0.0092	0.0155	0.0183	0.0332	0.0340	0.0536	0.0536	0.0106	0.0124	0.0070	0.0725
Magnesium	100.0%	35	0	0.1805	0.2699	0.7311	2.1357	3.4432	4.3750	4.7991	6.0077	9.3560	19.6523	19.6523	3.0908	3.6744	2.1357	21.4627
Manganese	100.0%	35	0	0.0094	0.0233	0.0494	0.1452	0.1932	0.2760	0.2939	0.3886	0.8284	0.9308	0.9308	0.1956	0.2117	0.1452	1.2542
Molybdenum	100.0%	35	0	0.0007	0.0012	0.0014	0.0026	0.0032	0.0042	0.0047	0.0056	0.0092	0.0107	0.0107	0.0022	0.0022	0.0026	0.0144
Neodymium	100.0%	35	0	0.0002	0.0004	0.0010	0.0028	0.0057	0.0070	0.0084	0.0140	0.0220	0.0229	0.0229	0.0054	0.0058	0.0028	0.0344
Nickel	100.0%	35	0	0.0019	0.0029	0.0050	0.0124	0.0140	0.0177	0.0262	0.0411	0.0447	0.0508	0.0508	0.0150	0.0133	0.0124	0.0815
Niobium	100.0%	35	0	0.0000	0.0001	0.0003	0.0008	0.0014	0.0019	0.0026	0.0036	0.0057	0.0057	0.0057	0.0014	0.0015	0.0008	0.0090
Palladium	88.6%	35	4	0.0000	0.0001	0.0001	0.0003	0.0004	0.0005	0.0005	0.0006	0.0008	0.0009	0.0009	0.0003	0.0002	0.0003	0.0014
Phosphorus	100.0%	35	0	0.3040	0.4182	0.5080	0.5599	0.5992	0.6616	0.6803	0.7220	0.8348	0.8897	0.8897	0.5763	0.1235	0.5599	1.1940
Platinum	100.0%	35	0	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0001	0.0000	0.0001	0.0002
Potassium	100.0%	35	0	0.5497	0.9783	1.3286	2.8400	4.1416	4.6776	5.0984	9.1310	11.6258	13.8663	13.8663	3.7277	3.2192	2.8400	19.8238
Praseodymium	100.0%	35	0	0.0000	0.0001	0.0003	0.0007	0.0015	0.0019	0.0022	0.0037	0.0058	0.0061	0.0061	0.0014	0.0015	0.0007	0.0091
Rubidium	100.0%	35	0	0.0009	0.0024	0.0035	0.0099	0.0153	0.0208	0.0217	0.0371	0.0521	0.0586	0.0586	0.0147	0.0148	0.0099	0.0886
Samarium	100.0%	35	0	0.0000	0.0001	0.0002	0.0005	0.0010	0.0014	0.0015	0.0026	0.0040	0.0041	0.0041	0.0010	0.0011	0.0005	0.0063
Selenium	100.0%	35	0	0.0011	0.0015	0.0023	0.0046	0.0080	0.0104	0.0124	0.0171	0.0250	0.0261	0.0261	0.0074	0.0067	0.0046	0.0407
Silicon	100.0%	35	0	0.9463	2.5436	6.0474	18.0227	31.3820	41.1037	46.8082	68.0036	107.8337	127.2127	127.2127	30.3989	30.3169	18.0227	181.9835
Silver	97.1%	35	1	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0002	0.0003	0.0004	0.0004	0.0001	0.0001	0.0001	0.0005
Sodium	100.0%	35	0	0.1262	0.2763	0.5355	1.1341	1.9199	2.4408	3.3065	5.1644	6.8104	8.3639	8.3639	1.9832	2.0800	1.1341	12.3830
Strontium	100.0%	35	0	0.0022	0.0040	0.0134	0.0227	0.0487	0.0582	0.0675	0.1056	0.1399	0.2414	0.2414	0.0458	0.0503	0.0227	0.2971
Tantalum	51.4%	35	17	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0002	0.0002	0.0004	0.0004	0.0004	0.0001	0.0001	0.0001	0.0006
Thallium	94.3%	35	2	0.0000	0.0000	0.0000	0.0001	0.0001	0.0002	0.0002	0.0003	0.0005	0.0006	0.0006	0.0001	0.0001	0.0001	0.0008
Thorium	100.0%	35	0	0.0000	0.0001	0.0003	0.0009	0.0016	0.0022	0.0025	0.0039	0.0067	0.0078	0.0078	0.0017	0.0018	0.0009	0.0108
Tin	100.0%	35	0	0.0008	0.0013	0.0020	0.0027	0.0029	0.0043	0.0055	0.0076	0.0113	0.0131	0.0131	0.0038	0.0030	0.0027	0.0188
Titanium	100.0%	35	0	0.0222	0.0649	0.1080	0.2413	0.4524	0.6449	0.7959	1.1198	1.7098	1.7676	1.7676	0.4514	0.4633	0.2413	2.7681
Tungsten	97.1%	35	1	0.0001	0.0002	0.0004	0.0010	0.0019	0.0021	0.0027	0.0037	0.0043	0.0110	0.0110	0.0017	0.0020	0.0010	0.0118
Uranium	100.0%	35	0	0.0000	0.0000	0.0001	0.0003	0.0005	0.0007	0.0007	0.0011	0.0017	0.0022	0.0022	0.0005	0.0005	0.0003	0.0030
Vanadium	100.0%	35	0	0.0011	0.0039	0.0070	0.0144	0.0256	0.0349	0.0516	0.0651	0.0868	0.1023	0.1023	0.0261	0.0263	0.0144	0.1576
Zinc	100.0%	35	0	0.0139	0.0214	0.0275	0.0649	0.0810	0.1232	0.1864	0.2725	0.2864	0.4786	0.4786	0.1007	0.1031	0.0649	0.6162



## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

### **INTEGRATED MONITORING PROGRAM MONTHLY REPORT**

### **POLYCYCLIC AROMATIC HYDROCARBONS DATA SUMMARY SEPTEMBER 2017**

Prepared  
November 29, 2017

#### **SAMPLE COLLECTION AND DATA COMPILATION BY:**

**Wood Buffalo Environmental Association**  
Fort McMurray, Alberta

#### **LABORATORY ANALYSIS BY:**

PAHs: Airzone One Ltd  
Mississauga, Ontario





FILE CONTENTS DESCRIPTION	PAH - Speciated PAH Gas + Particle Phase Measurements
SAMPLING INTERVAL	24 hour
SAMPLING FREQUENCY OF DATA	Once every 6 days
UNITS	ng/m <sup>3</sup> (nanogram per cubic meter)
OBSERVATION TYPE	Particles + gas
FIELD SAMPLING OR MEASUREMENT PRINCIPLE	filtration and adsorbent
PARTICLE DIAMETER	TSP (total suspended particle)
MEDIUM	a glass fiber filter + PUF/XAD-2/PUF
ANALYTICAL METHOD	Gas Chromatograph/Mass Spectrometer (GC/MS)
SAMPLE PREPARATION	Solvent Extraction
ANALYTICAL LABORATORY	AIRZONE One Inc.
USER NOTE 1	Data are recovery corrected
USER NOTE 2	Volume is given at actual conditions of temperature and pressure during sampling as measured by the sampler
USER NOTE 3	Blank sample concentration (ng/m <sup>3</sup> ) is calculated using expected actual volume of sampler
VOLUME STANDARDIZATION	Actual Volume at Ambient Conditions
SAMPLING INSTRUMENT TYPE	Tisch TE-1000 High-Volume Sampler
FLAGS USED	
V0	Valid value
V1	Valid value but comprised wholly or partially of below detection limit data
V4	Valid value despite failing to meet some QC or statistical criteria
V5	Valid value but qualified because of possible contamination
V6	Valid value but qualified due to non-standard sampling conditions
M1	Missing value because no value is available
M2	Missing value because invalidated by Data Originator



Station Name	Bertha Ganter -						
	Station #	Fort McKay			Patricia McInnes		Travel Blank
Sample Date	AMS 1	AMS 6			AMS 6		04-Sep
Total Air Volume (m <sup>3</sup> )	04-Sep	04-Sep			04-Sep		04-Sep
	315.98	315.96			315.96		316
Compound Name	MDL (ng/m <sup>3</sup> )	Results (ng/m <sup>3</sup> )	QC Flag	Results (ng/m <sup>3</sup> )	QC Flag	Results (ng/m <sup>3</sup> )	QC Flag
Naphthalene	0.008	5.822	V0	21.719	V0	0.175	V0
Acenaphthylene	0.011	1.108	V0	4.625	V0	0.051	V0
Acenaphthene	0.006	1.680	V0	1.562	V0	0.057	V0
Fluorene	0.007	0.525	V0	0.850	V0	0.043	V0
Phenanthrene	0.007	0.664	V0	1.465	V0	0.032	V0
Anthracene	0.017	0.086	V0	0.151	V0	0.011	V1
Acridine	0.019	0.047	V0	0.029	V0	0.005	V1
Fluoranthene	0.007	0.122	V0	0.300	V0	0.006	V1
Pyrene	0.008	0.109	V0	0.722	V0	0.008	V1
Benzo(c)phenanthrene	0.015	0.011	V1	0.026	V0	0.003	V1
Benz(a)anthracene	0.014	0.044	V0	0.270	V0	0.006	V1
Chrysene	0.013	0.044	V0	0.262	V0	0.004	V1
7,12-Dimethylbenz(a)anthracene	0.013	0.040	V0	0.102	V0	0.003	V1
Benzo(b)fluoranthene	0.020	0.020	V0	0.093	V0	0.004	V1
Benzo(k)fluoranthene	0.013	0.020	V0	0.128	V0	0.003	V1
Benzo(a)pyrene	0.016	0.020	V0	0.075	V0	0.003	V1
3-Methylcholanthrene	0.022	0.018	V1	0.045	V0	0.002	V1
Indeno(123-cd)pyrene	0.017	0.011	V1	0.052	V0	0.002	V1
Dibenz(a,h)anthracene	0.020	0.010	V1	0.021	V0	0.002	V1
Benzo(ghi)perylene	0.020	0.014	V1	0.031	V0	0.002	V1
Dibenzo(a,l)pyrene	0.024	0.007	V1	0.013	V1	0.001	V1
Dibenzo(a,i)pyrene	0.025	0.011	V1	0.008	V1	0.001	V1
Dibenzo(a,h)pyrene	0.020	0.007	V1	0.007	V1	0.001	V1



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		04-Sep	
Sample Date	04-Sep			04-Sep		316	
Total Air Volume (m <sup>3</sup> )	315.99			315.99		316	
Compound Name	MDL (ng/m <sup>3</sup> )	Results (ng/m <sup>3</sup> )	QC Flag	Results (ng/m <sup>3</sup> )	QC Flag	Results (ng/m <sup>3</sup> )	QC Flag
Naphthalene	0.008	15.414	V0	23.996	V0	0.175	V0
Acenaphthylene	0.011	6.492	V0	6.191	V0	0.051	V0
Acenaphthene	0.006	1.679	V0	7.590	V0	0.057	V0
Fluorene	0.007	1.375	V0	3.620	V0	0.043	V0
Phenanthrene	0.007	2.019	V0	4.025	V0	0.032	V0
Anthracene	0.017	0.233	V0	0.470	V0	0.011	V1
Acridine	0.019	0.041	V0	0.019	V0	0.005	V1
Fluoranthene	0.007	0.362	V0	0.391	V0	0.006	V1
Pyrene	0.008	1.395	V0	0.716	V0	0.008	V1
Benzo(c)phenanthrene	0.015	0.018	V0	0.011	V1	0.003	V1
Benz(a)anthracene	0.014	0.214	V0	0.156	V0	0.006	V1
Chrysene	0.013	0.196	V0	0.154	V0	0.004	V1
7,12-Dimethylbenz(a)anthracene	0.013	0.067	V0	0.057	V0	0.003	V1
Benzo(b)fluoranthene	0.020	0.077	V0	0.034	V0	0.004	V1
Benzo(k)fluoranthene	0.013	0.077	V0	0.034	V0	0.003	V1
Benzo(a)pyrene	0.016	0.028	V0	0.015	V1	0.003	V1
3-Methylcholanthrene	0.022	0.031	V0	0.044	V0	0.002	V1
Indeno(123-cd)pyrene	0.017	0.020	V0	0.013	V1	0.002	V1
Dibenz(a,h)anthracene	0.020	0.017	V1	0.013	V1	0.002	V1
Benzo(ghi)perylene	0.020	0.033	V0	0.015	V1	0.002	V1
Dibenzo(a,l)pyrene	0.024	0.007	V1	0.007	V1	0.001	V1
Dibenzo(a,i)pyrene	0.025	0.009	V1	0.009	V1	0.001	V1
Dibenzo(a,h)pyrene	0.020	0.008	V1	0.009	V1	0.001	V1



Station Name	Bertha Ganter -						
	Station #	Fort McKay			Patricia McInnes		Travel Blank
Sample Date	AMS 1	AMS 6			AMS 6		10-Sep
Total Air Volume (m <sup>3</sup> )	10-Sep	10-Sep			10-Sep		316
	315.98	315.96			315.96		316
Compound Name	MDL (ng/m <sup>3</sup> )	Results (ng/m <sup>3</sup> )	QC Flag	Results (ng/m <sup>3</sup> )	QC Flag	Results (ng/m <sup>3</sup> )	QC Flag
Naphthalene	0.008	14.142	V0	3.620	V0	0.158	V0
Acenaphthylene	0.011	1.265	V0	1.322	V0	0.037	V0
Acenaphthene	0.006	0.508	V0	0.729	V0	0.073	V0
Fluorene	0.007	0.792	V0	0.391	V0	0.035	V0
Phenanthrene	0.007	0.791	V0	0.694	V0	0.029	V0
Anthracene	0.017	0.062	V0	0.058	V0	0.012	V1
Acridine	0.019	0.025	V0	0.011	V1	0.004	V1
Fluoranthene	0.007	0.076	V0	0.157	V0	0.007	V0
Pyrene	0.008	0.166	V0	0.190	V0	0.003	V1
Benzo(c)phenanthrene	0.015	0.017	V0	0.008	V1	0.004	V1
Benz(a)anthracene	0.014	0.036	V0	0.054	V0	0.004	V1
Chrysene	0.013	0.038	V0	0.062	V0	0.004	V1
7,12-Dimethylbenz(a)anthracene	0.013	0.029	V0	0.031	V0	0.003	V1
Benzo(b)fluoranthene	0.020	0.013	V1	0.024	V0	0.002	V1
Benzo(k)fluoranthene	0.013	0.013	V1	0.024	V0	0.002	V1
Benzo(a)pyrene	0.016	0.016	V0	0.022	V0	0.003	V1
3-Methylcholanthrene	0.022	0.022	V1	0.021	V1	0.002	V1
Indeno(123-cd)pyrene	0.017	0.028	V0	0.007	V1	0.002	V1
Dibenz(a,h)anthracene	0.020	0.025	V0	0.021	V0	0.003	V1
Benzo(ghi)perylene	0.020	0.007	V1	0.008	V1	0.002	V1
Dibenzo(a,l)pyrene	0.024	0.009	V1	0.010	V1	0.002	V1
Dibenzo(a,i)pyrene	0.025	0.007	V1	0.007	V1	0.001	V1
Dibenzo(a,h)pyrene	0.020	0.007	V1	0.008	V1	0.001	V1



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		10-Sep	
Sample Date	10-Sep			10-Sep		316	
Total Air Volume (m <sup>3</sup> )	315.98			316		316	
Compound Name	MDL (ng/m <sup>3</sup> )	Results (ng/m <sup>3</sup> )	QC Flag	Results (ng/m <sup>3</sup> )	QC Flag	Results (ng/m <sup>3</sup> )	QC Flag
Naphthalene	0.008	3.270	V0	5.074	V0	0.158	V0
Acenaphthylene	0.011	2.083	V0	1.735	V0	0.037	V0
Acenaphthene	0.006	1.000	V0	1.504	V0	0.073	V0
Fluorene	0.007	0.325	V0	0.727	V0	0.035	V0
Phenanthrene	0.007	0.638	V0	0.889	V0	0.029	V0
Anthracene	0.017	0.065	V0	0.067	V0	0.012	V1
Acridine	0.019	0.027	V0	0.014	V1	0.004	V1
Fluoranthene	0.007	0.116	V0	0.141	V0	0.007	V0
Pyrene	0.008	0.163	V0	0.117	V0	0.003	V1
Benzo(c)phenanthrene	0.015	0.013	V1	0.002	V1	0.004	V1
Benz(a)anthracene	0.014	0.056	V0	0.034	V0	0.004	V1
Chrysene	0.013	0.051	V0	0.033	V0	0.004	V1
7,12-Dimethylbenz(a)anthracene	0.013	0.018	V0	0.045	V0	0.003	V1
Benzo(b)fluoranthene	0.020	0.015	V1	0.016	V1	0.002	V1
Benzo(k)fluoranthene	0.013	0.015	V0	0.016	V0	0.002	V1
Benzo(a)pyrene	0.016	0.021	V0	0.042	V0	0.003	V1
3-Methylcholanthrene	0.022	0.016	V1	0.030	V0	0.002	V1
Indeno(123-cd)pyrene	0.017	0.008	V1	0.005	V1	0.002	V1
Dibenz(a,h)anthracene	0.020	0.011	V1	0.014	V1	0.003	V1
Benzo(ghi)perylene	0.020	0.008	V1	0.011	V1	0.002	V1
Dibenzo(a,l)pyrene	0.024	0.011	V1	0.015	V1	0.002	V1
Dibenzo(a,i)pyrene	0.025	0.007	V1	0.010	V1	0.001	V1
Dibenzo(a,h)pyrene	0.020	0.010	V1	0.010	V1	0.001	V1



Station Name	Bertha Ganter -						
	Station #	Fort McKay			Patricia McInnes		Travel Blank
Sample Date	AMS 1	AMS 6		AMS 6			AMS 6
Total Air Volume (m <sup>3</sup> )	16-Sep	16-Sep		16-Sep			16-Sep
	315.99	315.97		315.97			316
Compound Name	MDL (ng/m <sup>3</sup> )	Results (ng/m <sup>3</sup> )	QC Flag	Results (ng/m <sup>3</sup> )	QC Flag	Results (ng/m <sup>3</sup> )	QC Flag
Naphthalene	0.008	10.387	V0	13.173	V0	0.201	V0
Acenaphthylene	0.011	1.439	V0	3.626	V0	0.035	V0
Acenaphthene	0.006	2.998	V0	1.186	V0	0.045	V0
Fluorene	0.007	1.131	V0	1.526	V0	0.030	V0
Phenanthrene	0.007	2.157	V0	3.680	V0	0.027	V0
Anthracene	0.017	0.228	V0	0.424	V0	0.014	V1
Acridine	0.019	0.087	V0	0.039	V0	0.003	V1
Fluoranthene	0.007	0.309	V0	1.106	V0	0.006	V1
Pyrene	0.008	0.402	V0	1.197	V0	0.006	V1
Benzo(c)phenanthrene	0.015	0.024	V0	0.065	V0	0.006	V1
Benz(a)anthracene	0.014	0.357	V0	0.156	V0	0.004	V1
Chrysene	0.013	0.270	V0	0.309	V0	0.006	V1
7,12-Dimethylbenz(a)anthracene	0.013	0.036	V0	0.030	V0	0.003	V1
Benzo(b)fluoranthene	0.020	0.095	V0	0.163	V0	0.004	V1
Benzo(k)fluoranthene	0.013	0.095	V0	0.163	V0	0.004	V1
Benzo(a)pyrene	0.016	0.043	V0	0.040	V0	0.002	V1
3-Methylcholanthrene	0.022	0.035	V0	0.010	V1	0.002	V1
Indeno(123-cd)pyrene	0.017	0.037	V0	0.020	V0	0.003	V1
Dibenz(a,h)anthracene	0.020	0.014	V1	0.018	V1	0.003	V1
Benzo(ghi)perylene	0.020	0.035	V0	0.037	V0	0.002	V1
Dibenzo(a,l)pyrene	0.024	0.017	V1	0.013	V1	0.002	V1
Dibenzo(a,i)pyrene	0.025	0.011	V1	0.011	V1	0.002	V1
Dibenzo(a,h)pyrene	0.020	0.010	V1	0.009	V1	0.001	V1



Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		16-Sep	
Sample Date	16-Sep			16-Sep		16-Sep	
Total Air Volume (m <sup>3</sup> )	315.99			316		316	
Compound Name	MDL (ng/m <sup>3</sup> )	Results (ng/m <sup>3</sup> )	QC Flag	Results (ng/m <sup>3</sup> )	QC Flag	Results (ng/m <sup>3</sup> )	QC Flag
Naphthalene	0.008	14.967	V0	6.772	V0	0.201	V0
Acenaphthylene	0.011	0.924	V0	0.432	V0	0.035	V0
Acenaphthene	0.006	1.191	V0	5.270	V0	0.045	V0
Fluorene	0.007	0.605	V0	0.755	V0	0.030	V0
Phenanthrene	0.007	1.584	V0	2.372	V0	0.027	V0
Anthracene	0.017	0.144	V0	0.275	V0	0.014	V1
Acridine	0.019	0.021	V0	0.009	V1	0.003	V1
Fluoranthene	0.007	0.426	V0	0.322	V0	0.006	V1
Pyrene	0.008	0.514	V0	0.149	V0	0.006	V1
Benzo(c)phenanthrene	0.015	0.022	V0	0.006	V1	0.006	V1
Benz(a)anthracene	0.014	0.060	V0	0.028	V0	0.004	V1
Chrysene	0.013	0.136	V0	0.028	V0	0.006	V1
7,12-Dimethylbenz(a)anthracene	0.013	0.030	V0	0.016	V0	0.003	V1
Benzo(b)fluoranthene	0.020	0.108	V0	0.016	V1	0.004	V1
Benzo(k)fluoranthene	0.013	0.108	V0	0.016	V0	0.004	V1
Benzo(a)pyrene	0.016	0.030	V0	0.010	V1	0.002	V1
3-Methylcholanthrene	0.022	0.002	V1	0.001	V1	0.002	V1
Indeno(123-cd)pyrene	0.017	0.018	V0	0.008	V1	0.003	V1
Dibenz(a,h)anthracene	0.020	0.020	V0	0.013	V1	0.003	V1
Benzo(ghi)perylene	0.020	0.025	V0	0.012	V1	0.002	V1
Dibenzo(a,l)pyrene	0.024	0.011	V1	0.008	V1	0.002	V1
Dibenzo(a,i)pyrene	0.025	0.013	V1	0.011	V1	0.002	V1
Dibenzo(a,h)pyrene	0.020	0.013	V1	0.007	V1	0.001	V1



Compound Name	Bertha Ganter -						
	Station Name	Fort McKay			Patricia McInnes		Travel Blank
	Station #	AMS 1		AMS 6			
	Sample Date	22-Sep		22-Sep		22-Sep	
Total Air Volume (m <sup>3</sup> )	315.99		315.97		316		
	MDL (ng/m <sup>3</sup> )	Results (ng/m <sup>3</sup> )	QC Flag	Results (ng/m <sup>3</sup> )	QC Flag	Results (ng/m <sup>3</sup> )	QC Flag
Naphthalene	0.008	6.332	V0	10.689	V0	0.195	V0
Acenaphthylene	0.011	0.801	V0	0.952	V0	0.053	V0
Acenaphthene	0.006	1.789	V0	0.995	V0	0.024	V0
Fluorene	0.007	0.543	V0	0.760	V0	0.051	V0
Phenanthrene	0.007	0.903	V0	1.626	V0	0.026	V0
Anthracene	0.017	0.099	V0	0.217	V0	0.014	V1
Acridine	0.019	0.029	V0	0.015	V1	0.002	V1
Fluoranthene	0.007	0.191	V0	0.472	V0	0.005	V1
Pyrene	0.008	0.250	V0	0.484	V0	0.005	V1
Benzo(c)phenanthrene	0.015	0.010	V1	0.021	V0	0.004	V1
Benz(a)anthracene	0.014	0.029	V0	0.072	V0	0.004	V1
Chrysene	0.013	0.078	V0	0.158	V0	0.005	V1
7,12-Dimethylbenz(a)anthracene	0.013	0.012	V1	0.024	V0	0.002	V1
Benzo(b)fluoranthene	0.020	0.046	V0	0.116	V0	0.002	V1
Benzo(k)fluoranthene	0.013	0.046	V0	0.116	V0	0.002	V1
Benzo(a)pyrene	0.016	0.020	V0	0.027	V0	0.003	V1
3-Methylcholanthrene	0.022	0.012	V1	0.004	V1	0.001	V1
Indeno(123-cd)pyrene	0.017	0.011	V1	0.023	V0	0.002	V1
Dibenz(a,h)anthracene	0.020	0.008	V1	0.018	V1	0.002	V1
Benzo(ghi)perylene	0.020	0.016	V1	0.052	V0	0.002	V1
Dibenzo(a,l)pyrene	0.024	0.009	V1	0.010	V1	0.002	V1
Dibenzo(a,i)pyrene	0.025	0.010	V1	0.014	V1	0.002	V1
Dibenzo(a,h)pyrene	0.020	0.009	V1	0.013	V1	0.001	V1





Station Name	Athabasca Valley			Anzac		Travel Blank	
Station #	AMS 7			AMS 14		22-Sep	
Sample Date	22-Sep			22-Sep		316	
Total Air Volume (m <sup>3</sup> )	315.99			316		316	
Compound Name	MDL (ng/m <sup>3</sup> )	Results (ng/m <sup>3</sup> )	QC Flag	Results (ng/m <sup>3</sup> )	QC Flag	Results (ng/m <sup>3</sup> )	QC Flag
Naphthalene	0.008	8.464	V0	6.229	V0	0.195	V0
Acenaphthylene	0.011	2.212	V0	1.554	V0	0.053	V0
Acenaphthene	0.006	1.210	V0	2.658	V0	0.024	V0
Fluorene	0.007	0.728	V0	1.325	V0	0.051	V0
Phenanthrene	0.007	0.886	V0	1.565	V0	0.026	V0
Anthracene	0.017	0.082	V0	0.089	V0	0.014	V1
Acridine	0.019	0.019	V0	0.013	V1	0.002	V1
Fluoranthene	0.007	0.224	V0	0.281	V0	0.005	V1
Pyrene	0.008	0.297	V0	0.199	V0	0.005	V1
Benzo(c)phenanthrene	0.015	0.009	V1	0.008	V1	0.004	V1
Benz(a)anthracene	0.014	0.024	V0	0.010	V1	0.004	V1
Chrysene	0.013	0.079	V0	0.039	V0	0.005	V1
7,12-Dimethylbenz(a)anthracene	0.013	0.018	V0	0.012	V1	0.002	V1
Benzo(b)fluoranthene	0.020	0.042	V0	0.018	V1	0.002	V1
Benzo(k)fluoranthene	0.013	0.042	V0	0.018	V0	0.002	V1
Benzo(a)pyrene	0.016	0.029	V0	0.016	V0	0.003	V1
3-Methylcholanthrene	0.022	0.029	V0	0.027	V0	0.001	V1
Indeno(123-cd)pyrene	0.017	0.012	V1	0.008	V1	0.002	V1
Dibenz(a,h)anthracene	0.020	0.015	V1	0.013	V1	0.002	V1
Benzo(ghi)perylene	0.020	0.022	V0	0.009	V1	0.002	V1
Dibenzo(a,l)pyrene	0.024	0.015	V1	0.012	V1	0.002	V1
Dibenzo(a,i)pyrene	0.025	0.011	V1	0.011	V1	0.002	V1
Dibenzo(a,h)pyrene	0.020	0.011	V1	0.010	V1	0.001	V1



Compound Name	Bertha Ganter -						
	Station Name	Fort McKay		Patricia McInnes		Travel Blank	
	Station #	AMS 1		AMS 6		28-Sep	
	Sample Date	28-Sep		28-Sep		316	
Total Air Volume (m <sup>3</sup> )	315.98		315.95				
MDL (ng/m <sup>3</sup> )	Results (ng/m <sup>3</sup> )	QC Flag	Results (ng/m <sup>3</sup> )	QC Flag	Results (ng/m <sup>3</sup> )	QC Flag	
Naphthalene	0.008	7.118	V0	8.989	V0	0.225	V0
Acenaphthylene	0.011	2.119	V0	1.327	V0	0.068	V0
Acenaphthene	0.006	2.850	V0	0.815	V0	0.023	V0
Fluorene	0.007	1.516	V0	0.815	V0	0.059	V0
Phenanthrene	0.007	2.044	V0	2.150	V0	0.039	V0
Anthracene	0.017	0.230	V0	0.164	V0	0.017	V0
Acridine	0.019	0.039	V0	0.023	V0	0.002	V1
Fluoranthene	0.007	0.196	V0	0.515	V0	0.005	V1
Pyrene	0.008	0.321	V0	0.561	V0	0.007	V1
Benzo(c)phenanthrene	0.015	0.011	V1	0.019	V0	0.003	V1
Benz(a)anthracene	0.014	0.042	V0	0.047	V0	0.004	V1
Chrysene	0.013	0.159	V0	0.111	V0	0.004	V1
7,12-Dimethylbenz(a)anthracene	0.013	0.040	V0	0.022	V0	0.002	V1
Benzo(b)fluoranthene	0.020	0.047	V0	0.062	V0	0.004	V1
Benzo(k)fluoranthene	0.013	0.046	V0	0.062	V0	0.004	V1
Benzo(a)pyrene	0.016	0.025	V0	0.022	V0	0.002	V1
3-Methylcholanthrene	0.022	0.061	V0	0.041	V0	0.002	V1
Indeno(123-cd)pyrene	0.017	0.015	V1	0.014	V1	0.003	V1
Dibenz(a,h)anthracene	0.020	0.007	V1	0.016	V1	0.003	V1
Benzo(ghi)perylene	0.020	0.033	V0	0.035	V0	0.002	V1
Dibenzo(a,l)pyrene	0.024	0.011	V1	0.009	V1	0.001	V1
Dibenzo(a,i)pyrene	0.025	0.009	V1	0.006	V1	0.002	V1
Dibenzo(a,h)pyrene	0.020	0.008	V1	0.010	V1	0.002	V1



Station Name	Athabasca Valley			Anzac		Travel Blank	
	Station #	AMS 7		AMS 14		28-Sep	
Sample Date	28-Sep			28-Sep		28-Sep	
Total Air Volume (m <sup>3</sup> )	316			316		316	
Compound Name	MDL (ng/m <sup>3</sup> )	Results (ng/m <sup>3</sup> )	QC Flag	Results (ng/m <sup>3</sup> )	QC Flag	Results (ng/m <sup>3</sup> )	QC Flag
Naphthalene	0.008	13.103	V0	4.532	V0	0.225	V0
Acenaphthylene	0.011	2.040	V0	1.706	V0	0.068	V0
Acenaphthene	0.006	1.288	V0	4.011	V0	0.023	V0
Fluorene	0.007	0.728	V0	2.030	V0	0.059	V0
Phenanthrene	0.007	1.507	V0	3.643	V0	0.039	V0
Anthracene	0.017	0.119	V0	0.267	V0	0.017	V0
Acridine	0.019	0.035	V0	0.007	V1	0.002	V1
Fluoranthene	0.007	0.391	V0	0.566	V0	0.005	V1
Pyrene	0.008	0.521	V0	0.267	V0	0.007	V1
Benzo(c)phenanthrene	0.015	0.014	V1	0.002	V1	0.003	V1
Benz(a)anthracene	0.014	0.053	V0	0.042	V0	0.004	V1
Chrysene	0.013	0.143	V0	0.042	V0	0.004	V1
7,12-Dimethylbenz(a)anthracene	0.013	0.030	V0	0.009	V1	0.002	V1
Benzo(b)fluoranthene	0.020	0.094	V0	0.016	V1	0.004	V1
Benzo(k)fluoranthene	0.013	0.094	V0	0.016	V0	0.004	V1
Benzo(a)pyrene	0.016	0.027	V0	0.015	V1	0.002	V1
3-Methylcholanthrene	0.022	0.068	V0	0.019	V1	0.002	V1
Indeno(123-cd)pyrene	0.017	0.034	V0	0.014	V1	0.003	V1
Dibenz(a,h)anthracene	0.020	0.016	V1	0.014	V1	0.003	V1
Benzo(ghi)perylene	0.020	0.052	V0	0.015	V1	0.002	V1
Dibenzo(a,l)pyrene	0.024	0.014	V1	0.010	V1	0.001	V1
Dibenzo(a,i)pyrene	0.025	0.013	V1	0.011	V1	0.002	V1
Dibenzo(a,h)pyrene	0.020	0.014	V1	0.012	V1	0.002	V1



Station Name Station # Sample Date	Bertha Ganter - Fort McKay AMS 1 Sep 04 - Sep 28	Bertha Ganter - Fort McKay AMS 1 Sep 04 - Sep 28	Bertha Ganter - Fort McKay AMS 1 Sep 04 - Sep 28	Bertha Ganter - Fort McKay AMS 1 Sep 04 - Sep 28
	Average ng/m <sup>3</sup>	Std Dev ng/m <sup>3</sup>	Total Samples (#)	Total ≥ MDL (#)
Compound Name				
Naphthalene	8.760	3.494	5	5
Acenaphthylene	1.346	0.491	5	5
Acenaphthene	1.965	1.011	5	5
Fluorene	0.901	0.422	5	5
Phenanthrene	1.312	0.726	5	5
Anthracene	0.141	0.082	5	5
Acridine	0.045	0.025	5	5
Fluoranthene	0.179	0.088	5	5
Pyrene	0.250	0.117	5	5
Benzo(c)phenanthrene	0.015	0.006	5	2
Benz(a)anthracene	0.101	0.143	5	5
Chrysene	0.118	0.098	5	5
7,12-Dimethylbenz(a)anthracene	0.031	0.012	5	4
Benzo(b)fluoranthene	0.044	0.032	5	4
Benzo(k)fluoranthene	0.044	0.032	5	4
Benzo(a)pyrene	0.025	0.011	5	5
3-Methylcholanthrene	0.029	0.019	5	2
Indeno(123-cd)pyrene	0.020	0.012	5	2
Dibenz(a,h)anthracene	0.013	0.007	5	1
Benzo(ghi)perylene	0.021	0.013	5	2
Dibenzo(a,l)pyrene	0.011	0.004	5	0
Dibenzo(a,i)pyrene	0.010	0.002	5	0
Dibenzo(a,h)pyrene	0.008	0.001	5	0



Station Name Station # Sample Date	Patricia McInnes AMS 6 Sep 04 - Sep 28 Average ng/m <sup>3</sup>	Patricia McInnes AMS 6 Sep 04 - Sep 28 Std Dev ng/m <sup>3</sup>	Patricia McInnes AMS 6 Sep 04 - Sep 28 Total Samples (#)	Patricia McInnes AMS 6 Sep 04 - Sep 28 Total ≥ MDL (#)
Compound Name				
Naphthalene	11.638	6.637	5	5
Acenaphthylene	2.370	1.648	5	5
Acenaphthene	1.057	0.332	5	5
Fluorene	0.868	0.411	5	5
Phenanthrene	1.923	1.112	5	5
Anthracene	0.203	0.136	5	5
Acridine	0.024	0.011	5	3
Fluoranthene	0.510	0.362	5	5
Pyrene	0.631	0.371	5	5
Benzo(c)phenanthrene	0.028	0.022	5	4
Benz(a)anthracene	0.120	0.095	5	5
Chrysene	0.181	0.103	5	5
7,12-Dimethylbenz(a)anthracene	0.042	0.034	5	5
Benzo(b)fluoranthene	0.092	0.053	5	5
Benzo(k)fluoranthene	0.099	0.055	5	5
Benzo(a)pyrene	0.037	0.022	5	5
3-Methylcholanthrene	0.024	0.018	5	2
Indeno(123-cd)pyrene	0.023	0.017	5	3
Dibenz(a,h)anthracene	0.019	0.002	5	2
Benzo(ghi)perylene	0.033	0.016	5	4
Dibenzo(a,l)pyrene	0.011	0.002	5	0
Dibenzo(a,i)pyrene	0.009	0.003	5	0
Dibenzo(a,h)pyrene	0.010	0.002	5	0



Station Name	Athabasca Valley	Athabasca Valley	Athabasca Valley	Athabasca Valley
Station #	AMS 7	AMS 7	AMS 7	AMS 7
Sample Date	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28	Sep 04 - Sep 28
Compound Name	Average ng/m <sup>3</sup>	Std Dev ng/m <sup>3</sup>	Total Samples (#)	Total ≥ MDL (#)
Naphthalene	11.044	5.143	5	5
Acenaphthylene	2.750	2.155	5	5
Acenaphthene	1.274	0.250	5	5
Fluorene	0.752	0.385	5	5
Phenanthrene	1.327	0.558	5	5
Anthracene	0.129	0.066	5	5
Acridine	0.029	0.010	5	5
Fluoranthene	0.304	0.130	5	5
Pyrene	0.578	0.481	5	5
Benzo(c)phenanthrene	0.015	0.005	5	2
Benz(a)anthracene	0.081	0.076	5	5
Chrysene	0.121	0.057	5	5
7,12-Dimethylbenz(a)anthracene	0.032	0.020	5	5
Benzo(b)fluoranthene	0.067	0.038	5	4
Benzo(k)fluoranthene	0.067	0.038	5	5
Benzo(a)pyrene	0.027	0.004	5	5
3-Methylcholanthrene	0.029	0.025	5	3
Indeno(123-cd)pyrene	0.018	0.010	5	3
Dibenz(a,h)anthracene	0.016	0.003	5	1
Benzo(ghi)perylene	0.028	0.016	5	4
Dibenzo(a,l)pyrene	0.012	0.003	5	0
Dibenzo(a,i)pyrene	0.010	0.003	5	0
Dibenzo(a,h)pyrene	0.011	0.002	5	0



Station Name Station # Sample Date	Anzac AMS 14 Sep 04 - Sep 28 Average ng/m <sup>3</sup>	Anzac AMS 14 Sep 04 - Sep 28 Std Dev ng/m <sup>3</sup>	Anzac AMS 14 Sep 04 - Sep 28 Total Samples (#)	Anzac AMS 14 Sep 04 - Sep 28 Total ≥ MDL (#)
Compound Name				
Naphthalene	9.321	8.252	5	5
Acenaphthylene	2.324	2.228	5	5
Acenaphthene	4.207	2.362	5	5
Fluorene	1.691	1.202	5	5
Phenanthrene	2.499	1.334	5	5
Anthracene	0.234	0.164	5	5
Acridine	0.012	0.005	5	1
Fluoranthene	0.340	0.155	5	5
Pyrene	0.289	0.245	5	5
Benzo(c)phenanthrene	0.006	0.004	5	0
Benz(a)anthracene	0.054	0.058	5	4
Chrysene	0.059	0.053	5	5
7,12-Dimethylbenz(a)anthracene	0.028	0.022	5	3
Benzo(b)fluoranthene	0.020	0.008	5	1
Benzo(k)fluoranthene	0.020	0.008	5	5
Benzo(a)pyrene	0.020	0.013	5	2
3-Methylcholanthrene	0.024	0.016	5	3
Indeno(123-cd)pyrene	0.010	0.004	5	0
Dibenz(a,h)anthracene	0.013	0.001	5	0
Benzo(ghi)perylene	0.012	0.003	5	0
Dibenzo(a,l)pyrene	0.010	0.003	5	0
Dibenzo(a,i)pyrene	0.010	0.001	5	0
Dibenzo(a,h)pyrene	0.010	0.002	5	0

## Wood Buffalo Environmental Association

PAH (ng/m<sup>3</sup>) Summary

2017 September

Compound	% Det	N	N < Det.	Min.	10%	25%	50%	60%	75%	80%	90%	95%	99%	Max.	Mean	Std. Dev.	Median	Outlier Test
Naphthalene	100.0%	20	0	3.2699	4.5315	6.2293	8.9895	10.6893	14.1425	14.9674	21.7192	23.9960	23.9960	23.9960	10.1906	5.7646	8.9895	39.0136
Acenaphthylene	100.0%	20	0	0.4325	0.9244	1.2650	1.7060	2.0404	2.2123	3.6261	6.1907	6.4917	6.4917	6.4917	2.1977	1.7111	1.7060	10.7531
Acenaphthene	100.0%	20	0	0.5083	0.8148	1.1863	1.5617	1.6797	2.8504	2.9976	5.2698	7.5898	7.5898	7.5898	2.1257	1.7503	1.5617	10.8772
Fluorene	100.0%	20	0	0.3253	0.5250	0.7269	0.7919	0.8503	1.3746	1.5164	2.0303	3.6201	3.6201	3.6201	1.0533	0.7446	0.7919	4.7762
Phenanthrene	100.0%	20	0	0.6379	0.6941	0.8894	1.5844	2.0192	2.1574	2.3718	3.6798	4.0249	4.0249	4.0249	1.7651	1.0317	1.5844	6.9234
Anthracene	100.0%	20	0	0.0577	0.0654	0.0863	0.1508	0.2175	0.2330	0.2667	0.4239	0.4704	0.4704	0.4704	0.1765	0.1178	0.1508	0.7654
Acridine	70.0%	20	6	0.0066	0.0113	0.0150	0.0246	0.0289	0.0387	0.0392	0.0471	0.0873	0.0873	0.0873	0.0275	0.0182	0.0246	0.1183
Fluoranthene	100.0%	20	0	0.0762	0.1220	0.1911	0.3093	0.3622	0.4262	0.4722	0.5657	1.1057	1.1057	1.1057	0.3332	0.2295	0.3093	1.4807
Pyrene	100.0%	20	0	0.1087	0.1493	0.1903	0.3212	0.4837	0.5610	0.7158	1.1970	1.3946	1.3946	1.3946	0.4370	0.3510	0.3212	2.1920
Benzo(c)phenanthrene	40.0%	20	12	0.0015	0.0059	0.0087	0.0131	0.0166	0.0213	0.0225	0.0264	0.0649	0.0649	0.0649	0.0159	0.0135	0.0131	0.0835
Benzo(a)anthracene	95.0%	20	1	0.0097	0.0282	0.0357	0.0527	0.0558	0.1558	0.1564	0.2700	0.3569	0.3569	0.3569	0.0891	0.0935	0.0527	0.5566
Chrysene	100.0%	20	0	0.0281	0.0385	0.0438	0.1114	0.1427	0.1588	0.1963	0.2695	0.3094	0.3094	0.3094	0.1196	0.0865	0.1114	0.5522
7,12-Dimethylbenz(a)anthracene	85.0%	20	3	0.0089	0.0124	0.0180	0.0296	0.0308	0.0402	0.0445	0.0665	0.1024	0.1024	0.1024	0.0333	0.0220	0.0296	0.1433
Benzo(b)fluoranthene	70.0%	20	6	0.0133	0.0159	0.0180	0.0463	0.0620	0.0936	0.0954	0.1158	0.1628	0.1628	0.1628	0.0558	0.0432	0.0463	0.2716
Benzo(k)fluoranthene	95.0%	20	1	0.0133	0.0158	0.0180	0.0463	0.0620	0.0954	0.1077	0.1275	0.1628	0.1628	0.1628	0.0575	0.0453	0.0463	0.2842
Benzo(a)pyrene	85.0%	20	3	0.0096	0.0154	0.0198	0.0249	0.0274	0.0304	0.0399	0.0426	0.0747	0.0747	0.0747	0.0271	0.0145	0.0249	0.0994
3-Methylcholanthrene	50.0%	20	10	0.0011	0.0039	0.0163	0.0266	0.0302	0.0413	0.0439	0.0609	0.0683	0.0683	0.0683	0.0268	0.0184	0.0266	0.1188
Indeno(123-cd)pyrene	40.0%	20	12	0.0047	0.0080	0.0106	0.0142	0.0178	0.0233	0.0285	0.0368	0.0519	0.0519	0.0519	0.0179	0.0119	0.0142	0.0772
Dibenz(a,h)anthracene	20.0%	20	16	0.0069	0.0102	0.0129	0.0152	0.0158	0.0181	0.0197	0.0210	0.0250	0.0250	0.0250	0.0152	0.0045	0.0152	0.0376
Benzo(ghi)perylene	50.0%	20	10	0.0068	0.0083	0.0118	0.0221	0.0308	0.0353	0.0354	0.0521	0.0524	0.0524	0.0524	0.0236	0.0144	0.0221	0.0955
Dibenzo(a,l)pyrene	0.0%	20	20	0.0071	0.0074	0.0087	0.0106	0.0115	0.0133	0.0141	0.0150	0.0175	0.0175	0.0175	0.0110	0.0029	0.0106	
Dibenzo(a,i)pyrene	0.0%	20	20	0.0058	0.0068	0.0087	0.0106	0.0110	0.0112	0.0114	0.0126	0.0143	0.0143	0.0143	0.0099	0.0022	0.0106	
Dibenzo(a,h)pyrene	0.0%	20	20	0.0068	0.0073	0.0080	0.0100	0.0103	0.0108	0.0115	0.0132	0.0140	0.0140	0.0140	0.0096	0.0021	0.0100	





## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

### **INTEGRATED MONITORING PROGRAM MONTHLY REPORT**

### **PRECIPITATION DATA SUMMARY SEPTEMBER 2017**

Prepared  
November 29, 2017

#### **SAMPLE COLLECTION AND DATA COMPILATION BY:**

**Wood Buffalo Environmental Association**  
Fort McMurray, Alberta

#### **LABORATORY ANALYSIS BY:**

Precipitation: InnoTech Alberta, Inc.  
Vegreville, Alberta



FILE CONTENTS DESCRIPTION	Precipitation Measurement of ions, pH and conductivity
SAMPLING INTERVAL	A week
SAMPLING FREQUENCY OF DATA	A week
EXPLANATION OF ZERO VALUES	Zero values are contained in this file and should be treated as values below detection - Method Detection values (MDL.) are provided with each observation
UNITS	mg/L (milligram per liter)
OBSERVATION TYPE	Wet Precipitation
FIELD SAMPLING OR MEASUREMENT PRINCIPLE	moveable cover with precipitation sensors
MEDIUM	Polyethylene Collection bucket
ANALYTICALMETHODS	pH by pH meter Conductivity by Conductivity meter IONS by Ion Chromatography (IC)
ANALYTICAL LABORATORY	InnoTech Alberta Inc
USER NOTE 1	Data are not blank corrected
SAMPLING INSTRUMENT TYPE	Total Precipitation Collector (TPC-3000)
<b>FLAGS USED</b>	
V0	Valid value
V1	Valid value but comprised wholly or partially of below detection limit data
V4	Valid value despite failing to meet some QC or statistical criteria
V5	Valid value but qualified because of possible contamination
V6	Valid value but qualified due to non-standard sampling conditions
V8	Dry Week
V9	Insufficient sample collected for analyzes
V10	Insufficient data to conduct all quality control checks
M1	Missing value because no value is available
M2	Missing value because invalidated by Data Originator



Wood Buffalo Environmental Association  
Precipitation summary

2017 September

Fort McKay-Bertha Ganter AMS 1	Start Date End Date Dry Week Precip	05-Sep-17 11-Sep-17			11-Sep-17 18-Sep-17			18-Sep-17 26-Sep-17			26-Sep-17 03-Oct-17		
		X			X			X			X		
		Results	MDL	Flag	Results	MDL	Flag	Results	MDL	Flag	Results	MDL	Flag
Acidity	µeq/L	32	2	V0	18	2	V0	23	2	V0	-9999	2	V9
Ammonium	mg/L	0.445	0.009	V0	<0.009	0.009	V1	0.126	0.009	V0	-9999	0.009	V9
Bicarbonate (calc)	µeq/L	4.05			66.2			7.37					
Calcium	mg/L	0.528	0.005	V0	1.12	0.005	V0	0.272	0.005	V0	-9999	0.005	V9
Chloride	mg/L	0.174	0.004	V0	0.179	0.004	V0	0.098	0.004	V0	-9999	0.004	V9
Conductivity (25°C)	µS/cm	9	1	V0	9	1	V0	3	1	V0	-9999	1	V9
Conductivity (calc)	µS/cm	7.79			9.52			3.79					
Conductivity Difference%		-13.0		V0	9.03		V0	8.8		V0	-9999		V10
Magnesium	mg/L	0.081	0.009	V0	0.162	0.009	V0	0.061	0.009	V0	-9999	0.069	V9
Nitrate	mg/L	0.699	0.004	V0	0.32	0.004	V0	0.221	0.004	V0	-9999	0.004	V9
pH		5.9		V0	7.12		V0	6.16		V0	-9999		V9
Phosphate	mg/L	<0.04	0.04	V1	<0.04	0.04	V1	<0.01	0.04	V1	-9999	0.04	V9
Potassium	mg/L	0.106	0.006	V0	0.108	0.006	V0	0.066	0.006	V0	-9999	0.006	V9
Sodium	mg/L	0.109	0.006	V0	0.147	0.006	V0	0.06	0.006	V0	-9999	0.006	V9
Sulfate	mg/L	1.12	0.004	V0	0.732	0.004	V0	0.483	0.004	V0	-9999	0.004	V9
Sum Anions	µeq/L	44.1			92.1			23.8					
Sum Cations	µeq/L	66.4			78.5			30.5					
Total Ions	µeq/L	110.5			170.6			54.3					
Ion Difference	%	20.2		V4	-7.94		V0	12.5					V10
Ion Difference	µeq/L	22.3			-13.6			6.7		V0			