



**Wood Buffalo Environmental Association**

# **OCTOBER 2015 MONTHLY REPORT**

CONTINUOUS MONITORING  
INTEGRATED MONITORING  
November 26, 2015

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



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November 26, 2015

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**RE: Monthly Ambient Air Quality Monitoring Report October 2015  
Wood Buffalo Environmental Association**

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[www.wbea.org](http://www.wbea.org)

Enclosed is the October 2015 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 - CNRL Horizon  
AMS 16 - Shell Muskeg River  
AMS 17 - Wapasu  
AMS 18 - Conklin Lookout  
AMS 19 - Firebag  
AMS 501 - Statoil Leismer  
AMS 502 - ConocoPhillips Surmont

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

<b>Member</b>	<b>EPEA Approval No.</b>
Athabasca Oil Corporation	289664-00-00
Brion Energy	254465-00-00
Canadian Natural Resources Ltd.	149968-00-01
Cenovus Energy	48522-01-00



<b>Member</b>	<b>EPEA Approval No.</b>
Connacher Oil and Gas Ltd.	240008-00-03
ConocoPhillips Canada	48263-00-00
Devon Canada Corporation	224816-00-03
Finning Canada Ltd.	Not Applicable
Hammerstone Corporation	189942-00-02
Husky Oil Operations Ltd.	206355-00-00
Imperial Oil Ltd.	00046586-00-00
MEG Energy Corporation	00216466-00-04
Nexen Energy ULC.	137467-00-00
Shell Canada Energy	20809-01-00
Statoil Canada Ltd.	241311-00-02
Suncor Energy Inc.	094-02-00
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
Williams Energy (Canada) Inc.	73203-01-00

#### **Aboriginal Communities**

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

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

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



Figure 1 shows the location of the air monitoring stations in the WBEA network.

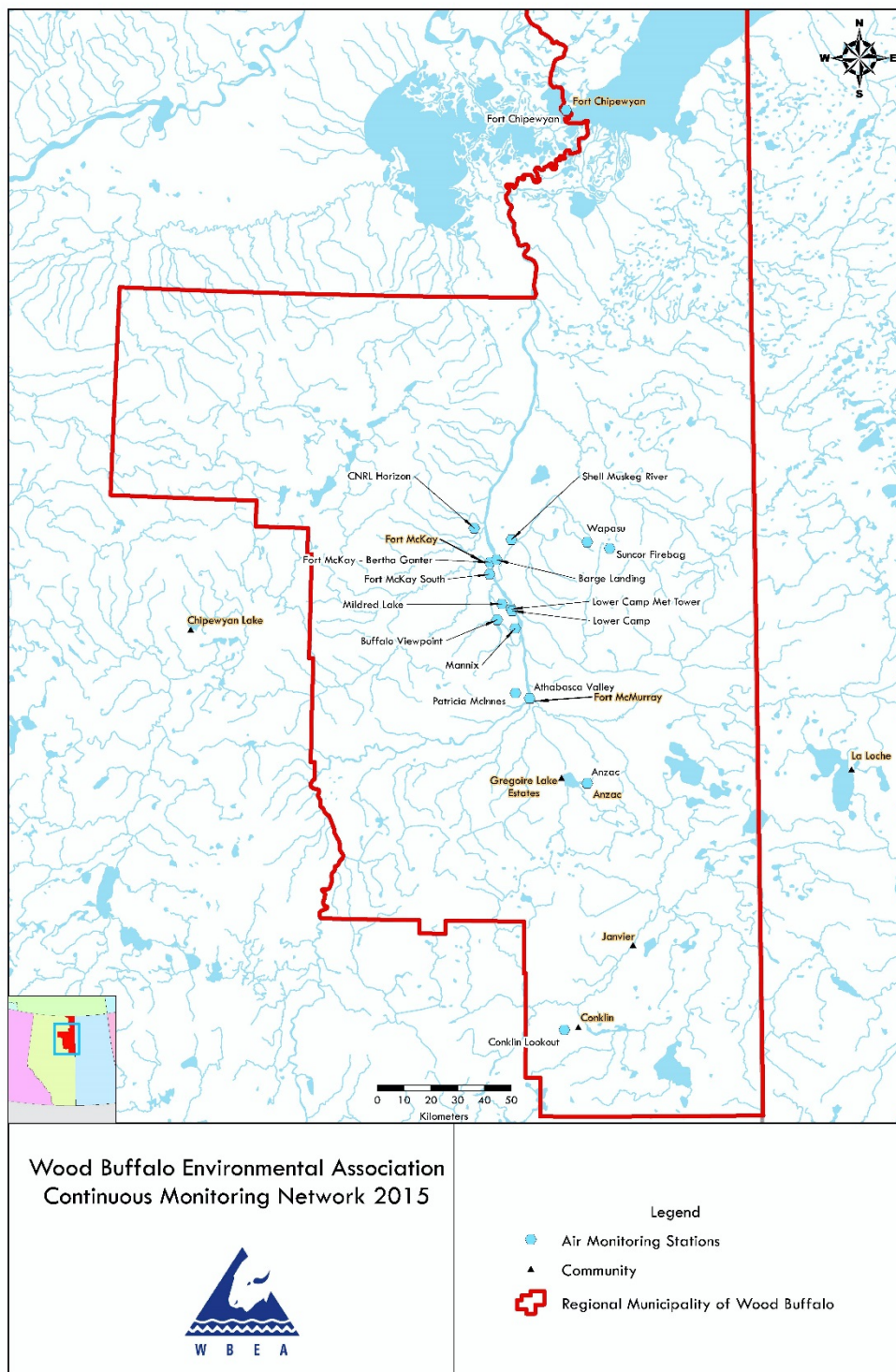


Figure 1 Map of WBEA Air Monitoring Network.

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 SO<sub>2</sub>, CO, NO<sub>2</sub>, NH<sub>3</sub> and O<sub>3</sub>.

### **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 CASA Data Warehouse**

There were no revisions to historical data stored at the CASA Data Warehouse with this monthly report.

## **2.0 Operational Status**

### **2.1 Continuous Monitoring**

In October 2015, there were no incidents of a monitoring instrument operating less than 90% of the time.

### **2.2 Intermittent Monitoring**

The results for passive and integrated monitoring of PAH, VOC, RSC, PM<sub>2.5</sub> and PM<sub>10</sub> samples were not available in time for submission with this report. These results will be submitted at a later date.

## **3.0 Monitoring Notes**

### **General Network Notes**

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 operations resulting from the properties of the NH<sub>3</sub> gas. Data for 1 to 2 hours following the daily spans have been reported as invalid for a total of 48 hours this month.

Intermittent periods of unstable operation on the THC analyzer resulted in 25 hours of invalid data this reporting period.

The PM<sub>2.5</sub> analyzer experienced multiple episodes of unstable operations due to negative baseline. This resulted in 22 hours of invalid data during this reporting period.

Station cleanup and analyzer rack organization by the station operator on October 1 interrupted the normal operations of air quality analyzers, except PM<sub>2.5</sub>, for a total of 8 to 11 hours this reporting period.

Maintenance to add an external daily span valve and test its function on October 2 interrupted the normal operations of the NH<sub>3</sub> analyzer for 1 hour. From October 14 to 18 the daily zero and span did not occur, resulting in 5 hours of invalid data; investigations and a subsequent program change to the data logger affected the normal operation of the analyzer for 5 hours.

A communication error within the station network and data logger on October 18 interrupted the data collection of all analyzers for 1 to 8 hours due to troubleshooting and program restarts.

Maintenance and cleaning of the sample manifold on October 22 interrupted the normal operations of the SO<sub>2</sub>, TRS, THC, O<sub>3</sub>, and NO<sub>2</sub> analyzers for 1 hour.

Confirmation of calibration points for the ozone calibration on October 22 interrupted the normal operations of the NO<sub>2</sub> analyzer for 1 hour.

Maintenance to replace the THC analyzer and support gas cylinders on October 24 resulted in 23 hours of invalid data.

Maintenance to remove power bars and secure sample pumps on October 26 affected the normal operations of the SO<sub>2</sub>, O<sub>3</sub>, NO<sub>2</sub>, and NH<sub>3</sub> analyzers for 1 to 2 hours.

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 14 interrupted the normal operations of the SO<sub>2</sub> and THC analyzers for 1 hour.

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

A flat-line in the output signal of the 167m elevation wind sensor on October 24 resulted in 4 hours of invalid data.

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

Station operator activities on October 2 interrupted the normal operations of the THC analyzer for 1 hour.

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

A flat-line in the output signals of the sonic wind sensors due to ice buildup at all tower elevations resulted in 2-15 hours of invalid data this reporting period.

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

### ***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 operations resulting from the properties of the NH<sub>3</sub> gas. Data for 1 to 3 hours following each daily span has been reported as invalid for a total of 48 hours this month.

A flat-line in the output signal of the wind sensor on October 27 resulted in 3 hours of invalid data.

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

Maintenance and cleaning of the sample manifold on October 9 interrupted the normal operations of the TRS, O<sub>3</sub>, and CO analyzers for 1 hour.

An episode of excessive baseline drift on October 18 resulted in the unstable operation of the PM<sub>2.5</sub> analyzer for 3 hours.

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

A power spike on October 3 interrupted the normal operations of the O<sub>3</sub> analyzer for 1 hour.

Maintenance to relocate the leaf wetness sensor and improve the earth ground cable on October 7 resulted in 7 hours of invalid data.

Normal operations of the solar radiation and leaf wetness sensors were invalidated for 31 and 36 hours, respectively, due to on-going electrical interference on sensor output signals.

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

No operational issues to report this month.

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

Data logger program updates at the station on October 8 interrupted the routine data collection of all parameters for 4 hours.

Maintenance and cleaning of the sample manifold on October 9 interrupted the normal operations of the SO<sub>2</sub> and THC analyzers for 1 hour.

An upgrade to the operating system of the H<sub>2</sub>S analyzer on October 8 resulted in data collection issues. Additional complications with analyzer response required replacement of the analyzer resulting in a total of 29 hours of invalid data. A subsequent re-calibration on October 16 to address a negative baseline interrupted the normal operations of the analyzer for 4 hours.

A flat-line in the output signal of the wind sensor on October 1 resulted in 1 hour of invalid data.

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

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

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

On September 30, the fuel cylinder was replaced interrupting the normal operations of the THC analyzer on October 1 for 7 hours. An additional multipoint calibration was required, resulting in an additional 26 hours of invalid data.

Maintenance to replace the carrier gas on October 23 interrupted the normal operations of the THC analyzer for 1 hour.

A communications error with the THC and TRS analyzers on October 27 interrupted the output signal for 3 hours. Verification of the zero and span responses after communications were restored interrupted the operations of the THC analyzer for 2 hours and TRS analyzer for 1 hour.

Data logger restarts associated with the communications error interrupted the regular operations of all other air quality analyzers for 1 hour.

The PM<sub>2.5</sub> analyzer experienced multiple episodes of unstable operation due to negative baseline. This resulted in 21 hours of invalid data during this reporting period.

Flat-lines in the output signal of the wind sensor resulted in 19 hours of invalid data this reporting period.

### ***Station 15, CNRL Horizon***

No operational issues to report this month.

### ***Station 16, Shell Muskeg River***

Maintenance to the calibrator and zero air supply on October 26 interrupted the normal operations of the NO<sub>2</sub> analyzer for 1 hour.

Maintenance to the sample inlet, flow and zero reference checks on October 28 interrupted the normal operation of the PM<sub>2.5</sub> analyzer for 3 hours.

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

### ***Station 17, Wapasu***

Maintenance and cleaning of the sample manifold on October 14 interrupted the normal operations of the H<sub>2</sub>S and O<sub>3</sub> analyzers for 1 hour.

The sample filter tape on the continuous PM<sub>2.5</sub> analyzer failed to automatically advance on October 24, resulting in 11 hours of invalid data.

### ***Station 18, Conklin Lookout***

Maintenance and cleaning of the sample manifold on October 1 interrupted the normal operations of the O<sub>3</sub> analyzer for 1 hour.

The PM<sub>2.5</sub> analyzer experienced episodes of unstable operation on October 5 and 15 due to negative baseline. This resulted in 6 hours of invalid data during this reporting period.

Flat-lines in the output signal of the wind sensor resulted in 6 hours of invalid data this reporting period.

***Station 19, Firebag***

Maintenance and cleaning of the sample manifold on October 6 interrupted the normal operations of the H<sub>2</sub>S analyzer for 1 hour.

***Station 501, Statoil Leismer***

WBEA commissioned an ambient air quality survey at the Statoil Leismer facility beginning October 1, 2015 to fulfill Alberta Environment's Environmental Protection and Enhancement Act facility approval number 241311-00-02. This station was equipped with ambient air quality analyzers for SO<sub>2</sub>, H<sub>2</sub>S, NO, NO<sub>2</sub>, NO<sub>x</sub> and meteorological sensors for ambient temperature, relative humidity, and wind speed and direction.

The SO<sub>2</sub> analyzer experienced multiple instances of unstable operation due to a negative baseline resulting in 24 hours of invalid data this reporting period.

Local power conditions caused intermittent unstable operation of the H<sub>2</sub>S analyzer for a total of 39 hours this reporting period. The station operator resolved the issue by connecting the analyzer to a line voltage regulator and un-interruptible power supply, improving the power conditions of the analyzer.

Flat-lines in the output signal of the wind sensor resulted in 4 hours of invalid data this reporting period.

***Station 502, ConocoPhillips Surmont***

The H<sub>2</sub>S analyzer experienced a single episode of unstable operation on October 17 resulting in 1 hour of invalid data.

Flat-lines in the output signal of the wind sensor resulted in 22 hours of invalid data this reporting period.

If additional information is required, please contact either Sanjay Prasad at (780) 215 4800 or the Wood Buffalo Environmental Association at (780) 799 4420.

Yours sincerely,

**Wood Buffalo Environmental Association**



Michael Martineau  
Air Quality Technologist



Sanjay Prasad  
Air Quality Scientist



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

OCTOBER 2015

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Prepared: Nov 24 2015 12:49

APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
289664-00-00	10	2015					
254465-00-00							
149968-00-01							
48522-01-00							
240008-00-03	CONTINUOUS AMBIENT MONITORING						
48263-00-00							
224816-00-03							
189942-00-02				ONE-HOUR AVERAGE		24-HOUR AVERAGE	
206355-00-00	PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
46586-00-00	SO2(ppm)	1	97.72	0.027	0	0.005	0
216466-00-04	SO2(ppm)	2	99.87	0.053	0	0.008	0
137467-00-00	SO2(ppm)	4	100.00	0.008	0	0.002	0
20809-01-00	SO2(ppm)	5	99.87	0.075	0	0.010	0
241311-00-00	SO2(ppm)	6	100.00	0.017	0	0.004	0
094-02-00	SO2(ppm)	7	100.00	0.012	0	0.003	0
305529-00-00	SO2(ppm)	8	100.00	0.006	0	0.001	0
026-02-00	SO2(ppm)	11	99.33	0.063	0	0.008	0
228044-00-00	SO2(ppm)	13	100.00	0.039	0	0.007	0
73203-01-00	SO2(ppm)	14	99.87	0.009	0	0.002	0
	SO2(ppm)	15	100.00	0.016	0	0.006	0
	SO2(ppm)	16	100.00	0.020	0	0.004	0
	SO2(ppm)	17	100.00	0.017	0	0.004	0
	SO2(ppm)	18	100.00	0.002	0	0.001	0
	SO2(ppm)	19	100.00	0.019	0	0.004	0
	SO2(ppm)	501	96.77	0.010	0	0.006	0
	SO2(ppm)	502	100.00	0.012	0	0.004	0
	H2S(ppm)	2	100.00	0.005	0	0.001	0
	H2S(ppm)	4	100.00	0.002	0	0.000	0
	H2S(ppm)	5	100.00	0.005	0	0.001	0
	H2S(ppm)	11	95.56	0.009	0	0.001	0
	H2S(ppm)	17	99.87	0.001	0	0.000	0
	H2S(ppm)	19	99.87	0.002	0	0.000	0
	H2S(ppm)	501	94.76	0.001	0	0.000	0
	H2S(ppm)	502	99.87	0.001	0	0.001	0
	TRS(ppm)	1	98.12	0.003	0	0.001	0
	TRS(ppm)	6	100.00	0.002	0	0.001	0
	TRS(ppm)	7	99.87	0.005	0	0.002	0
	TRS(ppm)	9	100.00	0.002	0	0.001	0
	TRS(ppm)	13	100.00	0.002	0	0.000	0
	TRS(ppm)	14	99.46	0.003	0	0.000	0
	TRS(ppm)	15	100.00	0.001	0	0.000	0
	TRS(ppm)	18	100.00	0.001	0	0.000	0
	THC(ppm)	1	90.19	3.1	-	2.4	-
	THC(ppm)	2	99.87	6.8	-	3.2	-
	THC(ppm)	4	99.87	7.1	-	3.1	-
	THC(ppm)	5	99.87	6.3	-	3.2	-
	THC(ppm)	6	100.00	2.8	-	2.4	-
	THC(ppm)	7	100.00	2.7	-	2.5	-
	THC(ppm)	9	100.00	4.6	-	2.7	-
	THC(ppm)	11	99.33	4.2	-	2.7	-
	THC(ppm)	13	100.00	3.5	-	2.6	-
	THC(ppm)	14	94.76	2.2	-	1.9	-
	THC(ppm)	15	100.00	3.7	-	2.5	-
	THC(ppm)	16	100.00	5.4	-	3.0	-
	THC(ppm)	17	100.00	2.8	-	2.4	-
	THC(ppm)	18	100.00	2.2	-	2.1	-
	THC(ppm)	19	100.00	2.7	-	2.3	-
	O3(ppm)	1	97.85	0.050	0	0.034	-
	O3(ppm)	6	100.00	0.050	0	0.036	-
	O3(ppm)	7	99.87	0.043	0	0.029	-
	O3(ppm)	8	99.87	0.036	0	0.029	-




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

OCTOBER 2015

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189942-00-02				ONE-HOUR AVERAGE		24-HOUR AVERAGE	
206355-00-00	PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
46586-00-00	O3(ppm)	13	100.00	0.044	0	0.028	-
216466-00-04	O3(ppm)	14	99.87	0.050	0	0.038	-
137467-00-00	O3(ppm)	17	99.87	0.044	0	0.033	-
20809-01-00	O3(ppm)	18	99.87	0.049	0	0.041	-
241311-00-02	NO2(ppm)	1	97.58	0.030	0	0.011	-
094-02-00	NO2(ppm)	6	100.00	0.025	0	0.016	-
305529-00-00	NO2(ppm)	7	100.00	0.031	0	0.018	-
026-02-00	NO2(ppm)	8	100.00	0.013	0	0.004	-
228044-00-00	NO2(ppm)	13	100.00	0.024	0	0.010	-
73203-01-00	NO2(ppm)	14	99.87	0.014	0	0.005	-
	NO2(ppm)	15	100.00	0.034	0	0.011	-
	NO2(ppm)	16	99.87	0.038	0	0.018	-
	NO2(ppm)	17	100.00	0.016	0	0.007	-
	NO2(ppm)	18	100.00	0.006	0	0.003	-
	NO2(ppm)	19	100.00	0.018	0	0.008	-
	NO2(ppm)	501	100.00	0.012	0	0.007	-
	NO2(ppm)	502	100.00	0.015	0	0.006	-
	CO(ppm)	7	99.87	0.5	0	0.1	-
	NH3(ppm)	1	90.59	0.000	-	0.000	0
	NH3(ppm)	6	93.55	0.000	-	0.000	0
	PM2.5(ug/m3)	1	96.37	40.1	-	12.6	0
	PM2.5(ug/m3)	6	100.00	54.5	-	13.0	0
	PM2.5(ug/m3)	7	99.60	20.9	-	11.4	0
	PM2.5(ug/m3)	8	100.00	16.3	-	8.3	0
	PM2.5(ug/m3)	13	100.00	22.5	-	9.3	0
	PM2.5(ug/m3)	14	97.04	40.3	-	7.5	0
	PM2.5(ug/m3)	15	100.00	27.3	-	8.3	0
	PM2.5(ug/m3)	16	99.60	51.8	-	14.7	0
	PM2.5(ug/m3)	17	98.52	19.4	-	8.1	0
	PM2.5(ug/m3)	18	99.19	9.2	-	4.7	0
	WIND	1	99.73	-	-	-	-
	WIND	2	100.00	-	-	-	-
	WIND	4	100.00	-	-	-	-
	WIND	5	99.73	-	-	-	-
	WIND	6	99.60	-	-	-	-
	WIND	7	100.00	-	-	-	-
	WIND	8	100.00	-	-	-	-
	WIND	9	100.00	-	-	-	-
	WIND	11	99.33	-	-	-	-
	WIND	13	99.87	-	-	-	-
	WIND	14	97.45	-	-	-	-
	WIND	15	100.00	-	-	-	-
	WIND	16	99.73	-	-	-	-
	WIND	17	100.00	-	-	-	-
	WIND	18	99.19	-	-	-	-
	WIND	19	100.00	-	-	-	-
	WIND	501	99.46	-	-	-	-
	WIND	502	97.04	-	-	-	-
							
SIGNATURE OF ASSOCIATION REPRESENTATIVE				FOR ALBERTA ENVIRONMENT USE ONLY			



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## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 1**  
**BERTHA GANTER FORT MCKAY**  
**OCTOBER 2015**

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

November 26, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT McKAY - BERTHA GANTER (AMS 1)  
OCTOBER 2015

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	689	38	55	97.72	27	0	5	0
TRS(ppb) Average	695	35	49	98.12	3	0	1	0
THC(ppm) Average	632	39	112	90.19	3.1	-	2.4	-
NMHC(ppm) Average	632	39	112	90.19	0.563	-	0.124	-
CH4(ppm) Average	632	39	112	90.19	2.8	-	2.3	-
O3 (ppb) Average	692	36	52	97.85	50	0	34	-
NO2 (ppb) Average	689	37	55	97.58	30	0	11	-
NO (ppb) Average	689	37	55	97.58	24	-	5	-
NOX (ppb) Average	689	37	55	97.58	45	-	15	-
NH3 (ppb) Average	636	38	108	90.59	0	0	0	-
PM2.5 (ug/m3) Average	715	2	29	96.37	40.1	-	12.6	0
Wind Speed 10 m (km/h) Average	742	0	2	99.73	18	-	11	-
Wind Direction 10 m (deg) Average	742	0	2	99.73	-	-	-	-
Temperature 2 m (C) Average	742	0	2	99.73	26.1	-	15.8	-
Temperature 10 m (C) Average	742	0	2	99.73	24.6	-	17.0	-
Relative Humidity (%) Average	742	0	2	99.73	98	-	90	-
Precipitation (mm) Total	742	0	2	99.73	0.4	-	0.7	-
Leaf Wetness (% of range) Average	743	0	1	99.87	36	-	6	-
Global Solar Radiation (W/m2) Average	743	0	1	99.87	475	-	135	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BERTHA GANTER FORT McKAY (AMS 1)  
OCTOBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	689	1.3	3	-	0	0	0	0	1	3	27
TRS (ppb) Average	695	0.4	0	-	0	0	0	0	0	1	3
THC (ppm) Average	632	1.99	0.2	-	1.8	1.8	1.9	1.9	2	2.2	3.1
NMHC(ppm) Average	632	0.027	0.067	-	0	0	0	0	0	0.1	0.563
CH4(ppm) Average	632	1.96	0.1	-	1.8	1.8	1.9	1.9	2	2.1	2.8
O3 (ppb) Average	692	19.5	9	-	5	8	12	18	26	34	50
NO2 (ppb) Average	689	5.4	5	-	0	0	1	5	8	12	30
NO (ppb) Average	689	1.4	3	-	0	0	0	0	1	5	24
NOX (ppb) Average	689	6.8	7	-	0	0	1	5	10	16	45
NH3 (ppb) Average	636	0	0	-	0	0	0	0	0	0	0
PM2.5 (ug/m3) Average	715	4.34	3.9	-	0	0.7	1.7	3.5	6	8.9	40.1
Wind Speed 10 m (km/h) Average	742	6.2	4	-	0	2	3	5	9	11	18
Wind Direction 10 m (deg) Average	742	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	742	5.08	5.7	-	-5.8	-1.3	0.9	4.3	8.1	13.4	26.1
Temperature 10 m (C) Average	742	5.62	5.4	-	-3.8	-0.7	1.4	4.8	8.4	13.6	24.6
Relative Humidity (%) Average	742	72.7	18	-	27	43	61	78	88	93	98
Precipitation (mm) Total	742	-	-	2.67	-	-	-	-	-	-	-
Leaf Wetness (% of range) Average	743	1.5	5	-	0	0	0	0	0	4	36
Global Solar Radiation (W/m2) Average	743	68.5	115	-	0	0	0	0	97	265	475

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BERTHA GANTER Fort McKAY (AMS 1)  
OCTOBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, TRS, THC, O3, NO2, PM2.5	18 Oct 2015 13:00	18 Oct 2015 17:00	5	Data logger collection interrupted
SO2, TRS, THC, O3, NO2	22 Oct 2015 10:00	22 Oct 2015 10:00	1	Maintenance - sample manifold cleaned
SO2, O3, NO2	26 Oct 2015 10:00	26 Oct 2015 11:00	2	Maintenance - sample pump outlet change
SO2	01 Oct 2015 09:00	01 Oct 2015 17:00	9	Maintenance - station wiring cleanup
TRS	01 Oct 2015 09:00	01 Oct 2015 16:00	8	Maintenance - station wiring cleanup
NMHC, CH4, THC	01 Oct 2015 09:00	01 Oct 2015 19:00	11	Maintenance - station wiring cleanup
NMHC, CH4, THC	12 Oct 2015 15:00	12 Oct 2015 19:00	5	Unstable operation - excessive baseline drift
NMHC, CH4, THC	12 Oct 2015 21:00	12 Oct 2015 21:00	1	Unstable operation - excessive baseline drift
NMHC, CH4, THC	13 Oct 2015 03:00	13 Oct 2015 03:00	1	Unstable operation - excessive baseline drift
NMHC, CH4, THC	13 Oct 2015 10:00	13 Oct 2015 10:00	1	Unstable operation - excessive baseline drift
NMHC, CH4, THC	13 Oct 2015 11:00	13 Oct 2015 14:00	4	Maintenance - adjusted carrier gas pressure
NMHC, CH4, THC	15 Oct 2015 05:00	15 Oct 2015 06:00	2	Unstable operation - excessive baseline drift
NMHC, CH4, THC	15 Oct 2015 12:00	15 Oct 2015 12:00	1	Unstable operation - excessive baseline drift
NMHC, CH4, THC	15 Oct 2015 16:00	15 Oct 2015 16:00	1	Power spike
NMHC, CH4, THC	15 Oct 2015 22:00	16 Oct 2015 01:00	4	Unstable operation - excessive baseline drift
NMHC, CH4, THC	16 Oct 2015 03:00	16 Oct 2015 09:00	7	Unstable operation - excessive baseline drift
NMHC, CH4, THC	21 Oct 2015 10:00	21 Oct 2015 12:00	3	Maintenance - calibration cylinder change out
NMHC, CH4, THC	23 Oct 2015 05:00	23 Oct 2015 05:00	1	Unstable operation - excessive baseline drift
NMHC, CH4, THC	23 Oct 2015 11:00	23 Oct 2015 11:00	1	Unstable operation - excessive baseline drift
NMHC, CH4, THC	24 Oct 2015 10:00	24 Oct 2015 10:00	1	Unstable operation - excessive baseline drift
NMHC, CH4, THC	24 Oct 2015 11:00	25 Oct 2015 09:00	23	Maintenance - analyzer and support gas replacement
O3	01 Oct 2015 09:00	01 Oct 2015 16:00	8	Maintenance - station wiring cleanup
NO2, NO, NOX	01 Oct 2015 09:00	01 Oct 2015 16:00	8	Maintenance - station wiring cleanup
NO2, NO, NOX	22 Oct 2015 10:00	22 Oct 2015 10:00	1	Maintenance - confirmed calibration points for Ozone
NH3	01 Oct 2015 08:00	31 Oct 2015 09:00	48	Stabilization after daily span
NH3	01 Oct 2015 09:00	01 Oct 2015 16:00	8	Maintenance - station wiring cleanup
NH3	02 Oct 2015 17:00	02 Oct 2015 17:00	1	Maintenance - verify daily QA response
NH3	14 Oct 2015 09:00	14 Oct 2015 09:00	1	Analyzer Failure - daily span valve did not function
NH3	15 Oct 2015 04:00	15 Oct 2015 04:00	1	Analyzer Failure - daily span valve did not function

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BERTHA GANTER Fort McKAY (AMS 1)  
OCTOBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NH3	16 Oct 2015 05:00	16 Oct 2015 05:00	1	Analyzer Failure - daily span valve did not function
NH3	16 Oct 2015 10:00	16 Oct 2015 14:00	5	Maintenance - verify daily QA response
NH3	17 Oct 2015 06:00	17 Oct 2015 06:00	1	Analyzer Failure - daily span valve did not function
NH3	18 Oct 2015 07:00	18 Oct 2015 07:00	1	Analyzer Failure - daily span valve did not function
NH3	18 Oct 2015 13:00	18 Oct 2015 14:00	2	Data logger collection interrupted
NH3	26 Oct 2015 11:00	26 Oct 2015 11:00	1	Maintenance - sample pump outlet change
PM2.5	02 Oct 2015 17:00	02 Oct 2015 19:00	3	Unstable Operation - negative baseline
PM2.5	05 Oct 2015 14:00	05 Oct 2015 15:00	2	Unstable Operation - negative baseline
PM2.5	05 Oct 2015 17:00	05 Oct 2015 17:00	1	Unstable Operation - negative baseline
PM2.5	11 Oct 2015 17:00	11 Oct 2015 20:00	4	Unstable Operation - negative baseline
PM2.5	12 Oct 2015 16:00	12 Oct 2015 18:00	3	Unstable Operation - negative baseline
PM2.5	13 Oct 2015 11:00	13 Oct 2015 11:00	1	Unstable Operation - negative baseline
PM2.5	13 Oct 2015 14:00	13 Oct 2015 15:00	2	Unstable Operation - negative baseline
PM2.5	14 Oct 2015 12:00	14 Oct 2015 12:00	1	Unstable Operation - negative baseline
PM2.5	18 Oct 2015 18:00	18 Oct 2015 18:00	1	Unstable Operation - negative baseline
PM2.5	20 Oct 2015 13:00	20 Oct 2015 16:00	4	Unstable Operation - negative baseline
Wind Speed, Wind Direction	18 Oct 2015 13:00	18 Oct 2015 14:00	2	Data logger collection interrupted
Temperature 2 m	18 Oct 2015 13:00	18 Oct 2015 14:00	2	Data logger collection interrupted
Temperature 10 m	18 Oct 2015 13:00	18 Oct 2015 14:00	2	Data logger collection interrupted
Relative Humidity	18 Oct 2015 13:00	18 Oct 2015 14:00	2	Data logger collection interrupted
Precipitation Collector	18 Oct 2015 13:00	18 Oct 2015 14:00	2	Data logger collection interrupted
Surface Leaf Wetness	18 Oct 2015 13:00	18 Oct 2015 13:00	1	Data logger collection interrupted
Solar Global Radiation	18 Oct 2015 13:00	18 Oct 2015 13:00	1	Data logger collection interrupted





Summary of Hour Averages

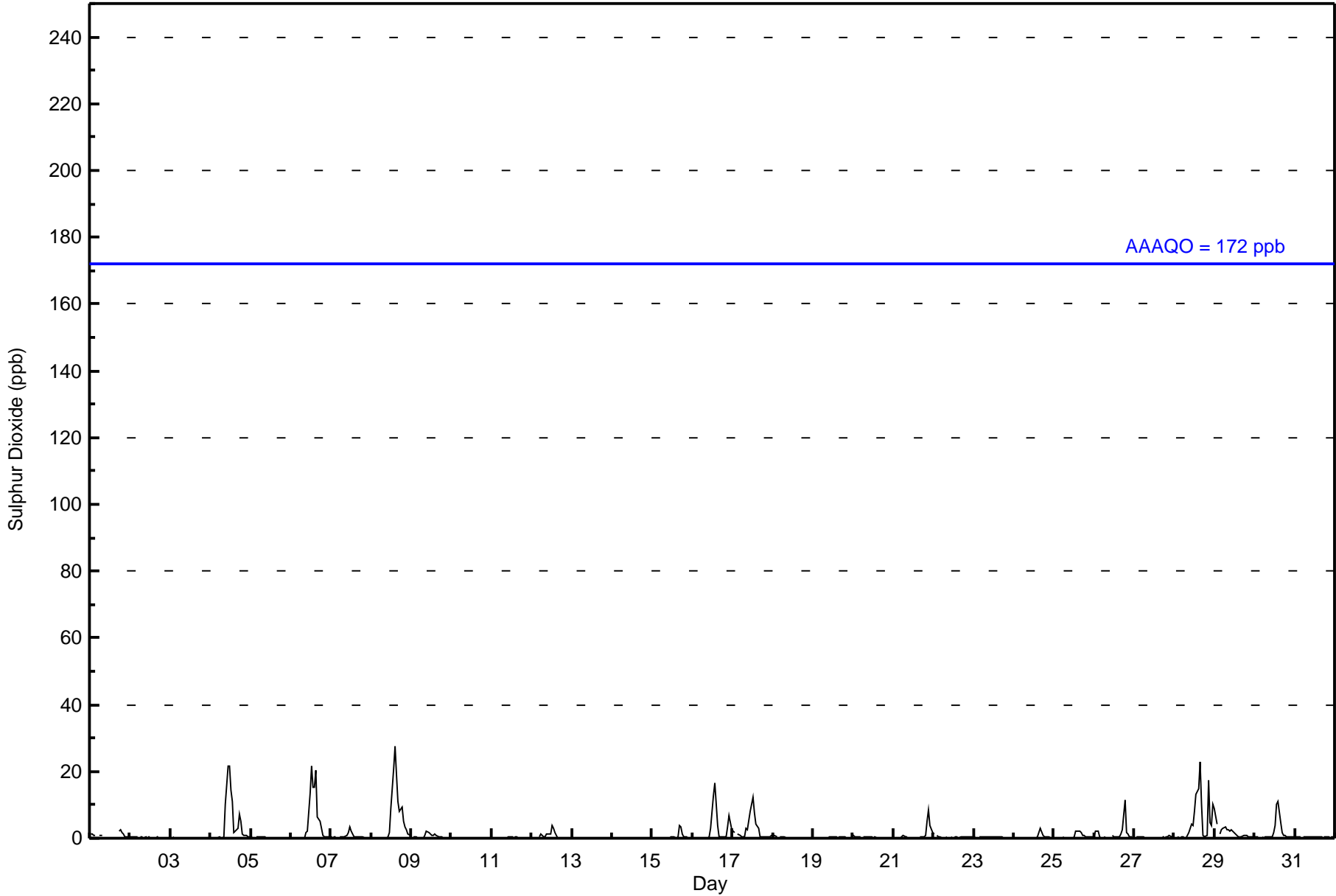
Fort McKay - Bertha Ganter - October 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 27 ppb on Oct 8 15:00	Maximum Daily Average: 5.3 ppb on Oct 28		Hours of Data:	689
Minimum Value: 0 ppb on Oct 6 02:00	Minimum Daily Average: 0.1 ppb on Oct 10		Hours of Missing Data:	55
Maximum Diurnal Average: 3.8 ppb at hour 14	Minimum Diurnal Average: 0.3 ppb at hour 8		Hours of Calibration:	38
Monthly Average: 1.3 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> = 3 P <sub>99</sub> = 20		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	1	1	1	Z	1	1	1	M	M	M	M	M	M	M	M	M	2	2	2	1	0	0	0	--	2
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	0	0	0	0	0	0	0	0.2	0
4-Oct	0	Z	0	0	0	0	0	0	0	10	22	21	14	11	1	2	3	7	5	1	1	1	0	0	4.5	22
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	2	2	14	22	15	15	20	7	5	3	1	1	0	0	0	4.7	22
7-Oct	0	0	0	0	Z	0	0	0	1	1	2	3	2	1	1	0	0	0	0	0	0	0	0	0	0.6	3
8-Oct	0	0	0	0	0	Z	0	0	0	0	0	2	9	21	27	19	11	8	9	5	3	2	1	1	5.3	27
9-Oct	Z	1	0	0	0	0	0	0	1	2	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0.6	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	1	0	0	0	0	0	0	0	0	0	0	0	0.1	1
12-Oct	0	0	0	Z	0	1	1	0	1	1	1	1	4	3	2	0	0	0	0	0	0	0	0	0	0.7	4
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	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	4	3	1	0	0	0	0	0	0.5	4
16-Oct	0	Z	0	0	0	0	0	0	0	0	0	3	13	16	10	4	1	0	0	0	0	3	7	3	2.7	16
17-Oct	2	2	Z	1	1	1	0	0	3	3	8	10	12	8	4	3	1	1	0	0	0	0	1	1	2.7	12
18-Oct	1	1	1	Z	0	0	0	0	0	0	0	0	DF	DF	DF	DF	DF	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	1	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
21-Oct	Z	0	0	0	0	0	1	1	0	C	C	C	C	C	C	C	C	1	0	0	1	5	9	4	--	9
22-Oct	1	Z	1	0	0	0	0	0	0	M	0	0	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	0.2	0
24-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	2	3	1	0	0	1	0	0	0	0.4	3
25-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	1	2	2	2	2	1	1	1	0	0	0	0	0.6	2
26-Oct	1	2	2	0	0	Z	0	0	0	M	M	1	0	0	0	0	1	2	12	2	1	0	0	0	1.3	12
27-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0.2	1
28-Oct	0	Z	0	0	0	0	0	0	2	3	4	4	8	13	15	23	10	1	1	1	17	5	4	10	5.3	23
29-Oct	9	4	Z	1	2	3	3	2	2	2	3	2	1	1	1	0	1	1	1	1	1	1	1	0	1.9	9
30-Oct	0	0	0	Z	0	0	0	0	0	0	0	2	4	10	11	4	2	1	1	1	1	0	0	0	1.7	11
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

0.7	0.6	0.3	0.3	0.3	0.4	0.3	0.3	0.5	1.0	1.7	2.3	3.4	3.8	3.4	3.0	1.7	1.2	1.3	0.6	1.1	0.8	0.7	0.7	Diurnal Average	
9	4	2	1	2	3	3	2	3	10	22	21	22	21	27	23	11	8	12	5	17	9	7	10	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**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	667	96.81	96.81
11 - 20	16	2.32	99.13
21 - 60	6	0.87	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: 689

Total Number of Hours: 744



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

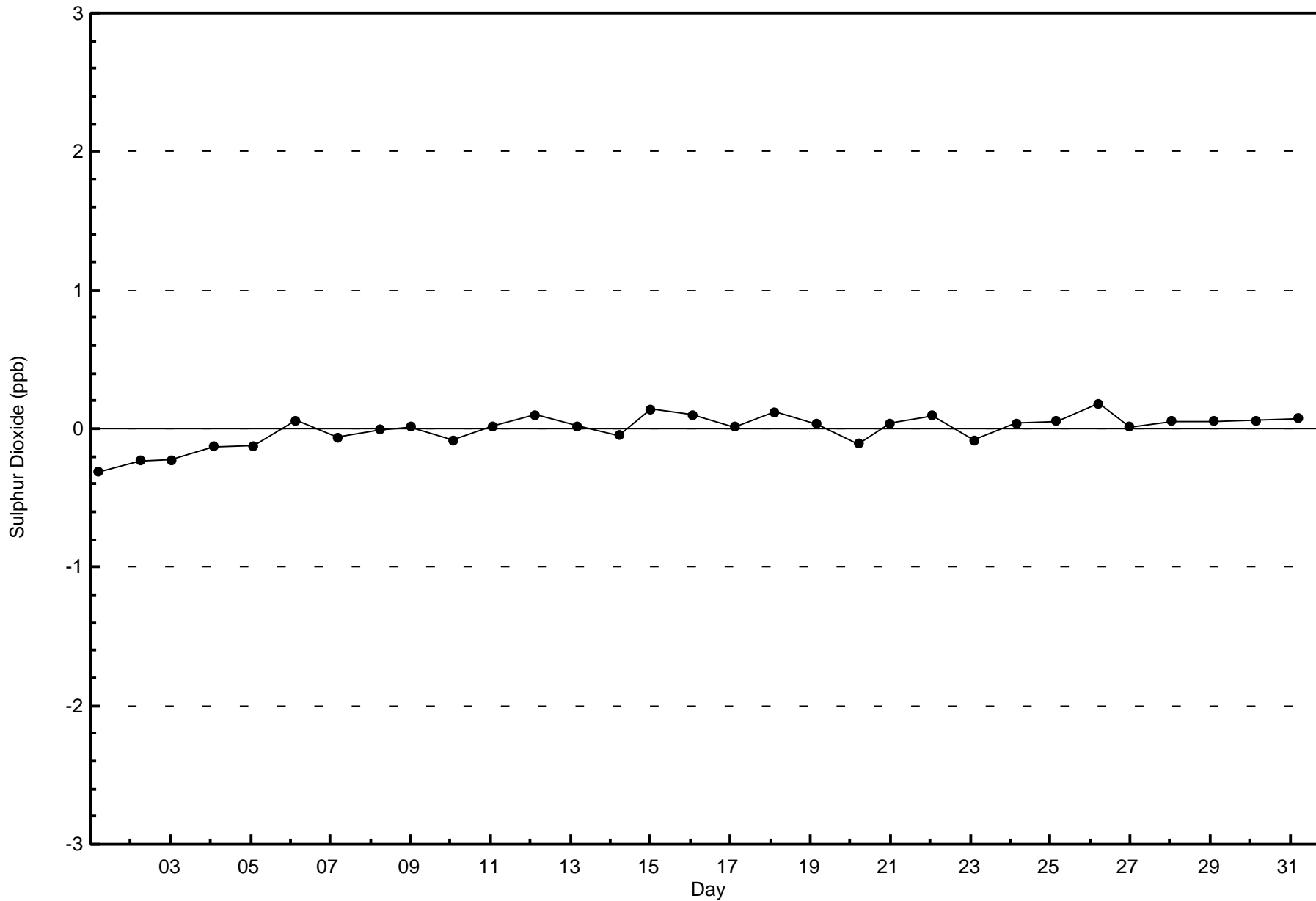
**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2015**

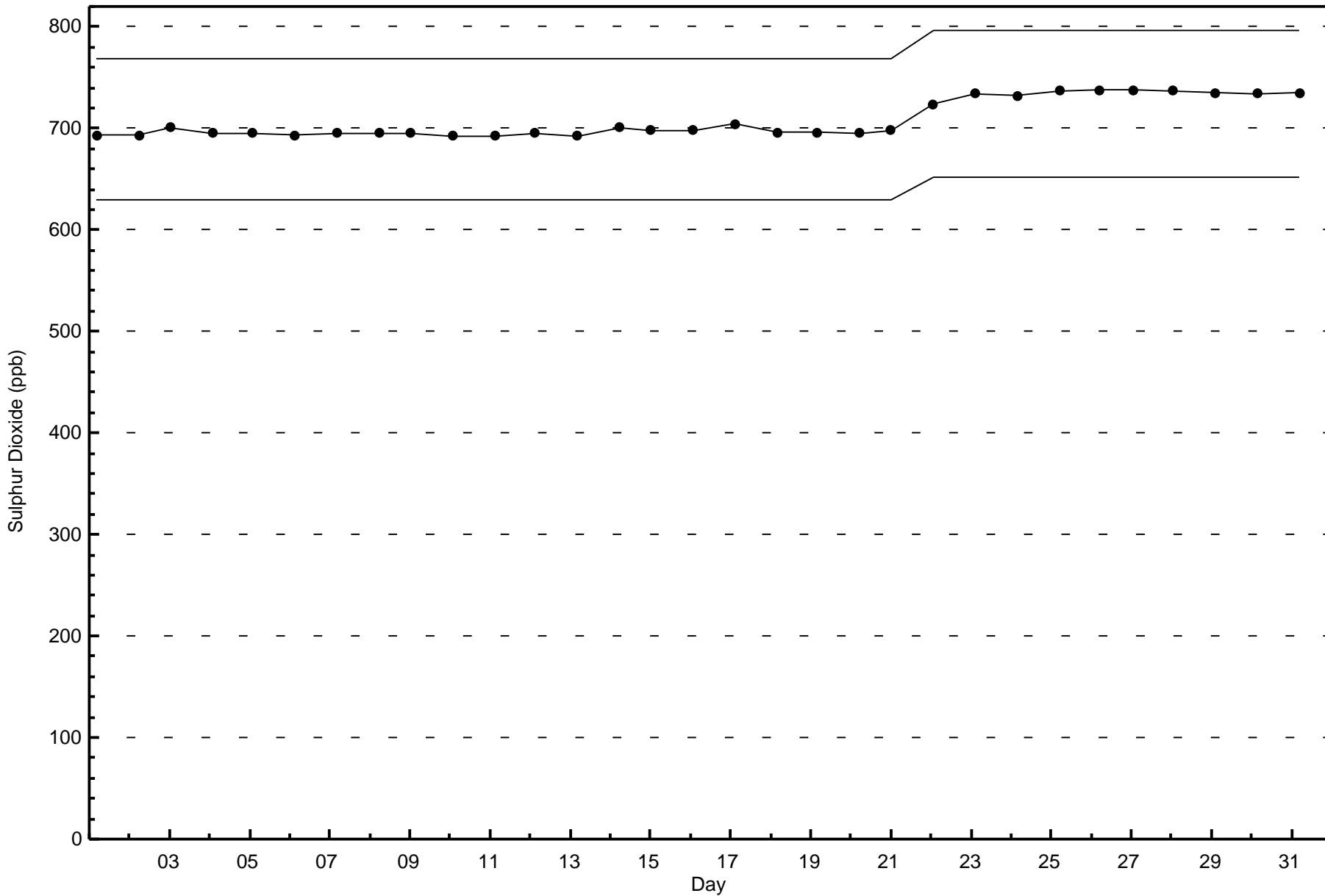
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	100	30	18	15	8	8	17	39	87	58	27	35	55	50	72	48	667
11 - 20	0	1	0	1	0	0	0	5	6	3	0	0	0	0	0	0	16
21 - 60	0	0	0	0	0	0	1	1	2	1	1	0	0	0	0	0	6
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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>	100	31	18	16	8	8	18	45	95	62	28	35	55	50	72	48	689

Total Number of Valid Hours: 689

Total Number of Hours: 744









Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 3 ppb on Oct 30 15:00	Maximum Daily Average: 0.9 ppb on Oct 30
Minimum Value: 0 ppb on Oct 16 07:00	Hours of Data: 695
Maximum Diurnal Average: 0.5 ppb at hour 15	Hours of Missing Data: 49
Monthly Average: 0.4 ppb	Hours of Calibration: 35
Minimum Daily Average: 0.3 ppb on Oct 13	Percent Operational Time: 98.1
Minimum Diurnal Average: 0.4 ppb at hour 4	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	1	1	1	1	1	Z	1	1	M	M	M	M	M	M	M	M	0	1	1	1	1	0	0	0	--	1
2-Oct	0	0	1	1	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
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	0.3	0
4-Oct	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
6-Oct	0	0	0	0	Z	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.5	1
7-Oct	0	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
8-Oct	0	0	0	0	0	0	Z	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.6	1
9-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	0.4	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	0.4	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	1	1	1	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0.4	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	0.3	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	0.3	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	0.3	0
16-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	1	1	0.4	1
17-Oct	1	1	1	Z	1	1	1	1	2	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1	0.7	2
18-Oct	1	1	0	0	Z	0	0	0	0	0	0	0	DF	DF	DF	DF	DF	0	0	0	0	0	0	0	0.4	1
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	0.3	0
20-Oct	0	1	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
21-Oct	0	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	0.5	1
22-Oct	1	1	Z	0	0	0	0	0	0	M	0	0	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	0.4	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	0.3	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	0.3	0
26-Oct	0	0	0	0	0	0	Z	0	0	C	C	C	C	0	0	0	0	1	1	1	0	0	0	0	0.4	1
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	0.4	0
28-Oct	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	1	1	1	1	0.5	1
29-Oct	1	1	1	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	0	0.6	1
30-Oct	0	0	0	0	Z	0	1	1	1	1	0	1	1	2	3	2	2	1	1	1	1	0	0	0	0.9	3
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	0.3	0

0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	Diurnal Average
1	1	1	1	1	1	1	1	1	2	1	1	1	1	2	3	2	2	1	1	1	1	1	1	1	1	1	Diurnal Maximum

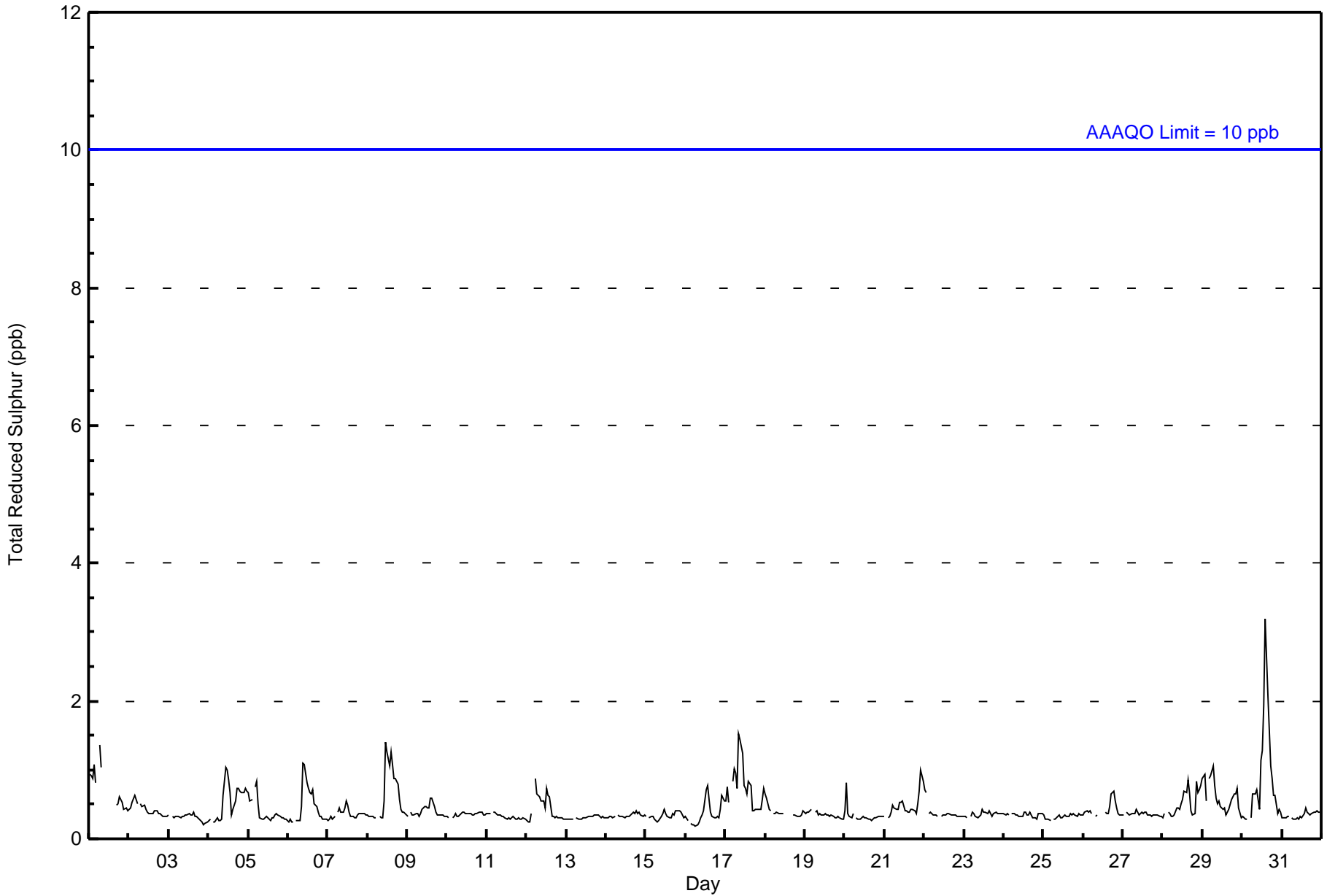
Z - zerospan      C - Calibration      M - Maintenance      DF - DAS Failure  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb      24-hr 3 ppb





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

**Total Reduced Sulphur (TRS) - ppb**  
**Fort McKay - Bertha Ganter - October 2015**





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

**Total Reduced Sulphur (TRS) - ppb**  
**Fort McKay - Bertha Ganter - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	694	99.86	99.86
3 - 4	1	0.14	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: 695

Total Number of Hours: 744



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

**Total Reduced Sulphur (TRS) - ppb**  
**Fort McKay - Bertha Ganter - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	100	34	18	16	7	8	18	45	98	62	28	34	55	53	69	49	694
3 - 4	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
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>	100	34	18	16	7	8	18	45	98	63	28	34	55	53	69	49	695

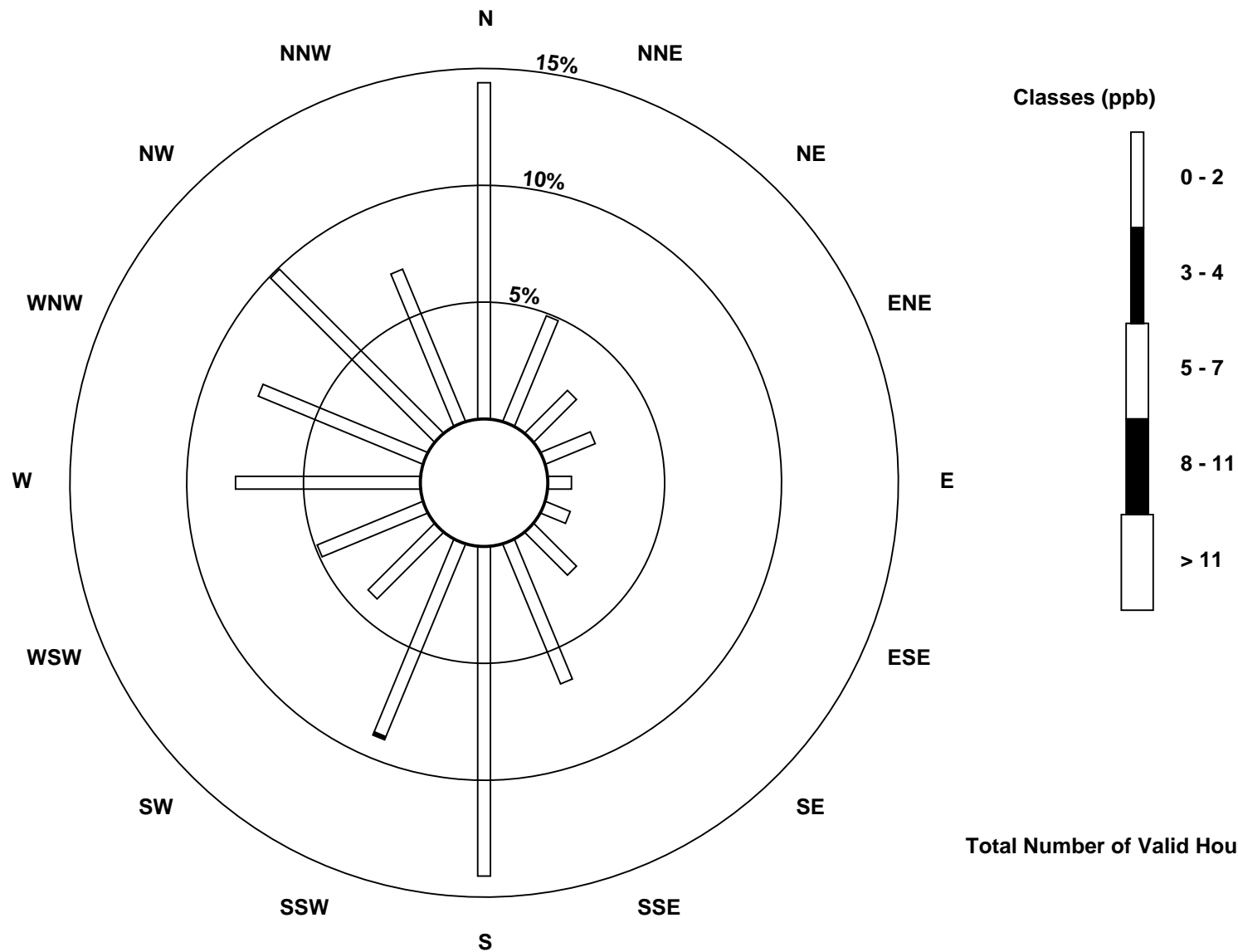
Total Number of Valid Hours: 695

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

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



Total Number of Valid Hours: 695

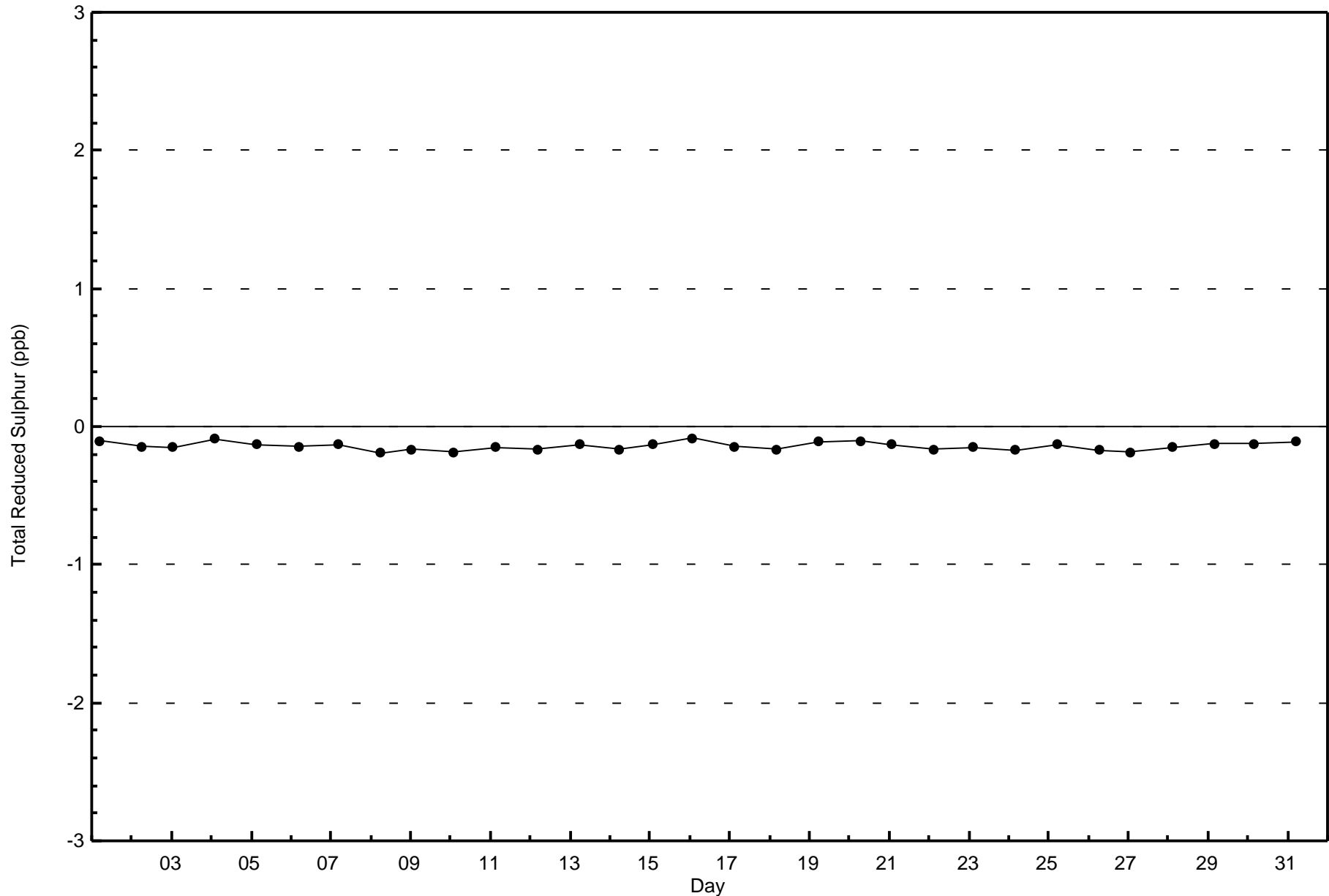


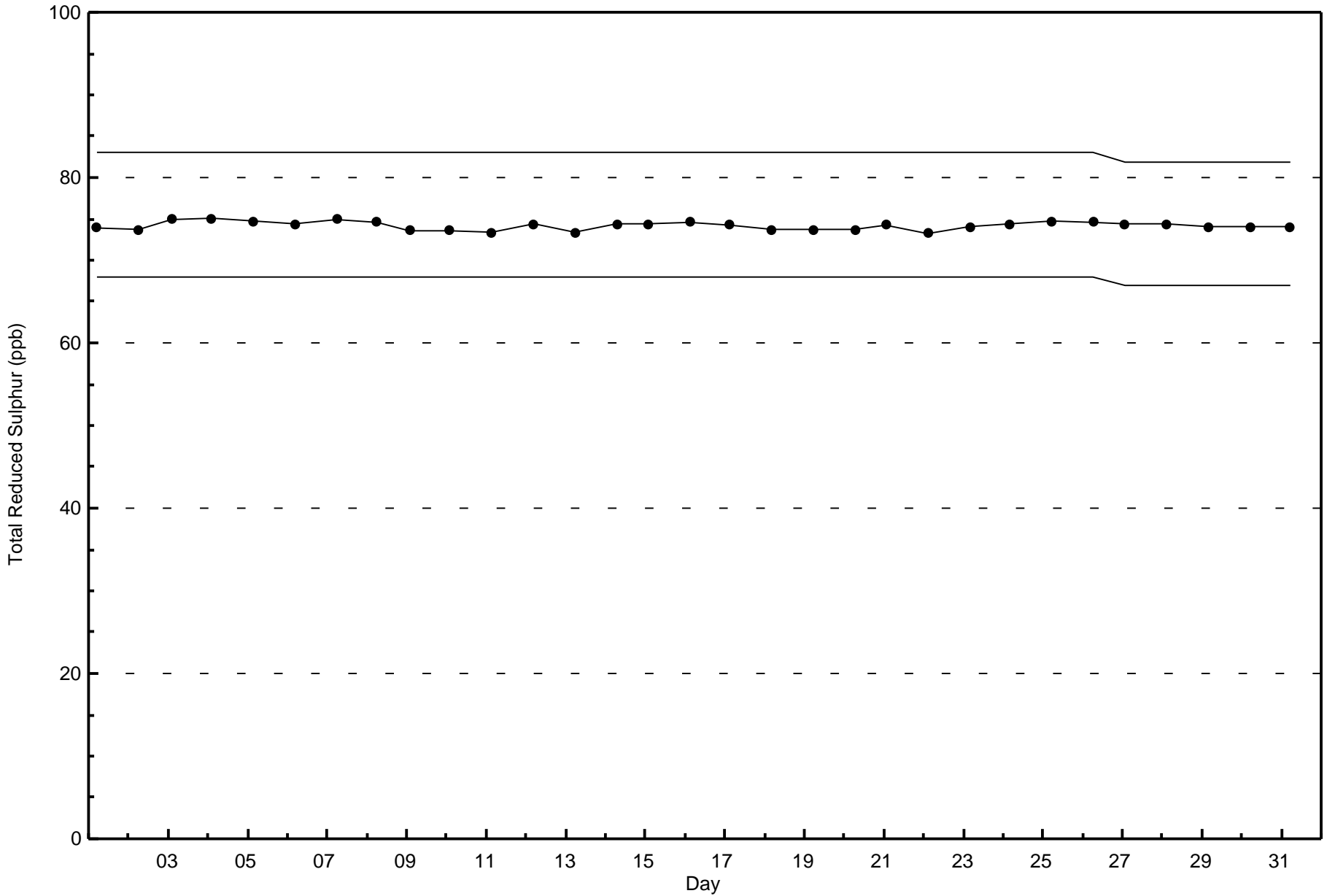
Wood Buffalo Environmental Association

Zero Responses

Total Reduced Sulphur (TRS) - ppb

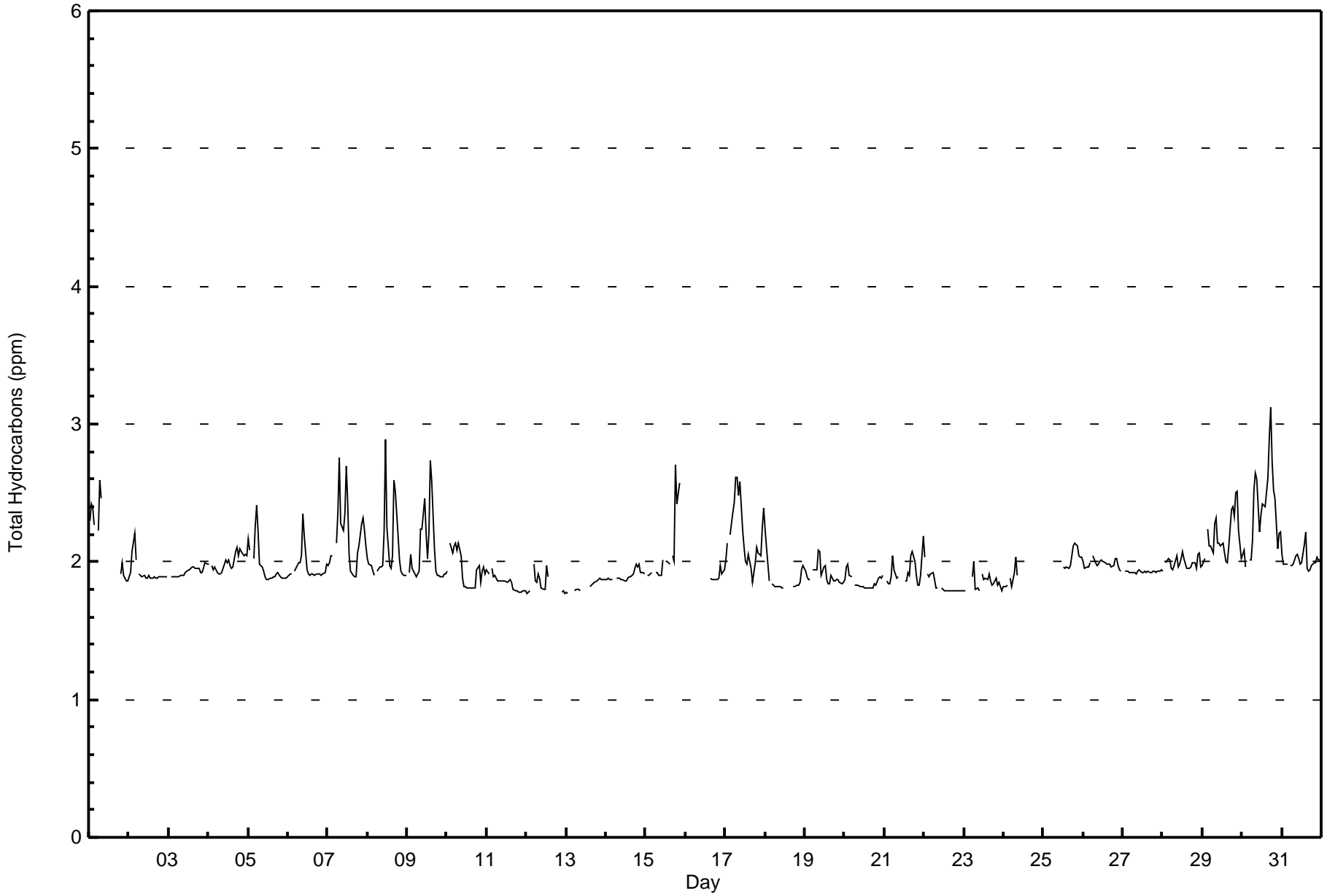
Fort McKay - Bertha Ganter - October 2015







Maximum Value: 3.1 ppm on Oct 30 18:00		Maximum Daily Average: 2.4 ppm on Oct 30		Hours in Service: 744																													
Minimum Value: 1.8 ppm on Oct 12 20:00		Minimum Daily Average: 1.8 ppm on Oct 22		Hours of Data: 632																													
Maximum Diurnal Average: 2.0 ppm at hour 8		Minimum Diurnal Average: 2.0 ppm at hour 23		Hours of Missing Data: 112																													
Monthly Average: 1.99 ppm		Percentiles: P <sub>1</sub> = 1.8 P <sub>10</sub> = 1.8 Q <sub>1</sub> = 1.9 Median = 1.9 Q <sub>3</sub> = 2.0 P <sub>90</sub> = 2.2 P <sub>99</sub> = 2.7		Hours of Calibration: 39																													
				Percent Operational Time: 90.2																													
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	2.4	2.4	2.3	Z	2.2	2.6	2.5	M	M	M	M	M	M	M	M	M	M	M	1.9	2.0	1.9	1.9	1.9	--	2.6							
2-Oct	1.9	1.9	2.1	2.2	2.0	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	2.2						
3-Oct	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	2.0	1.9	1.9	2.0	2.0	2.0	1.9	2.0	2.0						
4-Oct	2.0	Z	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	1.9	2.0	2.1	2.1	2.0	2.1	2.1	2.0	2.1	2.0	2.0	2.1	2.1						
5-Oct	2.2	2.1	Z	2.0	2.3	2.4	2.2	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	2.4	2.4						
6-Oct	1.9	1.9	1.9	Z	1.9	1.9	2.0	2.0	2.0	2.3	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	2.0	2.0	2.3	2.3						
7-Oct	2.0	2.0	2.0	2.0	Z	2.1	2.4	2.8	2.3	2.2	2.3	2.7	2.4	2.1	1.9	1.9	1.9	1.9	2.1	2.1	2.3	2.3	2.2	2.1	2.2	2.8	2.8						
8-Oct	2.0	2.0	2.0	1.9	1.9	Z	1.9	2.0	2.0	2.0	2.2	2.9	2.2	2.0	2.0	2.0	2.6	2.5	2.2	2.0	1.9	1.9	1.9	1.9	2.1	2.9	2.9						
9-Oct	Z	1.9	2.1	2.0	1.9	1.9	1.9	1.9	2.2	2.2	2.5	2.2	2.0	2.2	2.7	2.6	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.7	2.7						
10-Oct	1.9	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0	1.8	1.9	2.0	1.9	1.9	2.1	2.1						
11-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	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9						
12-Oct	1.8	1.8	1.8	Z	2.0	1.9	1.8	1.9	1.9	1.8	1.8	1.8	2.0	1.9	UO	UO	UO	UO	UO	1.8	UO	1.8	1.8	1.8	--	2.0	2.0						
13-Oct	1.8	1.8	UO	1.8	Z	1.8	1.8	1.8	1.8	1.8	UO	M	M	M	M	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	--	1.9	1.9						
14-Oct	1.9	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	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0						
15-Oct	Z	1.9	1.9	1.9	UO	UO	1.9	1.9	1.9	1.9	2.0	UO	2.0	2.0	2.0	2.0	PF	2.0	2.0	2.7	2.4	2.6	UO	UO	UO	--	2.7						
16-Oct	UO	Z	UO	UO	UO	UO	UO	UO	UO	UO	C	C	C	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	--	2.0	2.0						
17-Oct	2.0	2.1	Z	2.2	2.4	2.4	2.6	2.6	2.5	2.6	2.2	2.1	2.0	2.0	2.1	2.0	1.8	1.9	2.0	2.1	2.1	2.0	2.3	2.4	2.2	2.6	2.6						
18-Oct	2.2	2.1	1.9	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	DF	DF	DF	DF	DF	DF	1.8	1.8	1.8	1.8	1.9	2.0	1.9	2.2	2.2					
19-Oct	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	2.1	2.1	1.9	2.0	2.0	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.9	2.1	2.1						
20-Oct	1.9	2.0	2.0	1.9	1.9	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	2.0	2.0						
21-Oct	Z	1.9	1.8	1.8	1.9	2.0	1.9	1.9	1.9	1.9	M	M	M	1.9	1.9	1.9	1.9	2.0	2.1	2.0	1.9	1.8	1.8	1.9	2.2	1.9	2.2						
22-Oct	2.0	Z	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	M	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.0	2.0					
23-Oct	1.8	1.8	Z	1.8	UO	1.9	2.0	1.8	1.8	1.8	UO	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	2.0	2.0					
24-Oct	1.8	1.8	1.8	Z	1.9	1.8	1.9	2.0	1.9	UO	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	--	2.0	2.0					
25-Oct	M	M	M	M	M	M	M	M	M	M	C	C	C	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	--	2.1	2.1					
26-Oct	2.0	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	1.9	1.9	2.0	2.0	2.0					
27-Oct	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	1.9	1.9					
28-Oct	1.9	Z	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.1	2.1					
29-Oct	2.0	2.0	Z	2.2	2.1	2.1	2.1	2.3	2.3	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.4	2.4	2.3	2.5	2.5	2.2	2.0	2.2	2.2	2.5	2.5					
30-Oct	2.1	2.1	2.0	Z	2.0	2.0	2.2	2.5	2.6	2.6	2.2	2.3	2.4	2.4	2.4	2.6	2.9	3.1	2.7	2.5	2.5	2.1	2.2	2.2	2.4	2.4	3.1	3.1					
31-Oct	2.1	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.2	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.2					
																								Diurnal Average									
																								Diurnal Maximum									
Z - zerospan																								C - Calibration		M - Maintenance		DF - DAS Failure		UO - Unstable Operation		PF - Power Failure	







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

**Total Hydrocarbons (THC) - ppm**  
**Fort McKay - Bertha Ganter - October 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	503	79.59	79.59
2.1 - 3.0	128	20.25	99.84
3.1 - 10.0	1	0.16	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 632

Total Number of Hours: 744



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

**Total Hydrocarbons (THC) - ppm**  
**Fort McKay - Bertha Ganter - October 2015**

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	83	23	12	14	7	5	15	26	56	31	18	30	47	46	55	35	503
2.1 - 3.0	5	6	5	2	0	0	2	17	35	29	8	2	2	1	9	5	128
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>	88	29	17	16	7	5	17	43	91	60	27	32	49	47	64	40	632

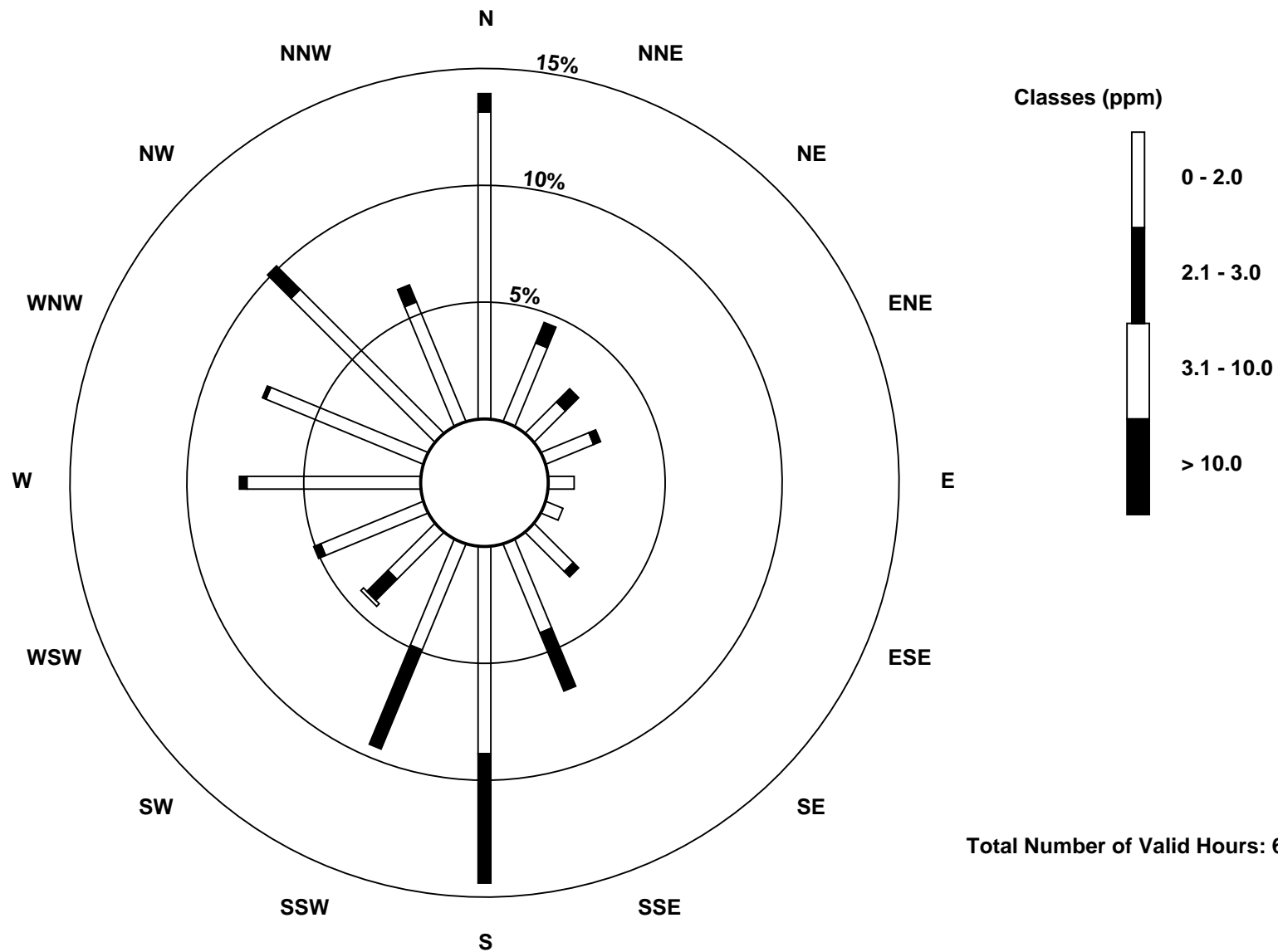
Total Number of Valid Hours: 632

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

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



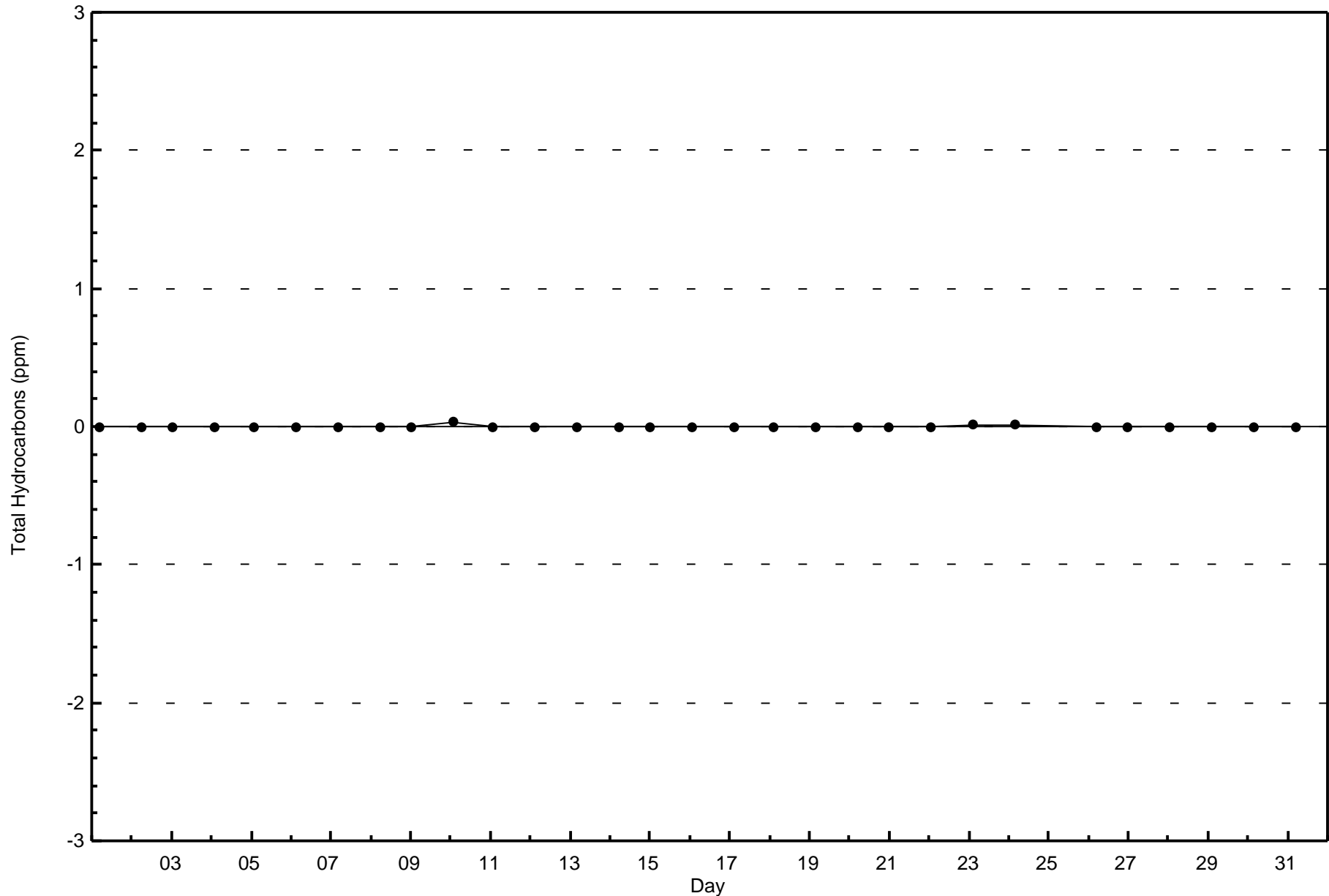


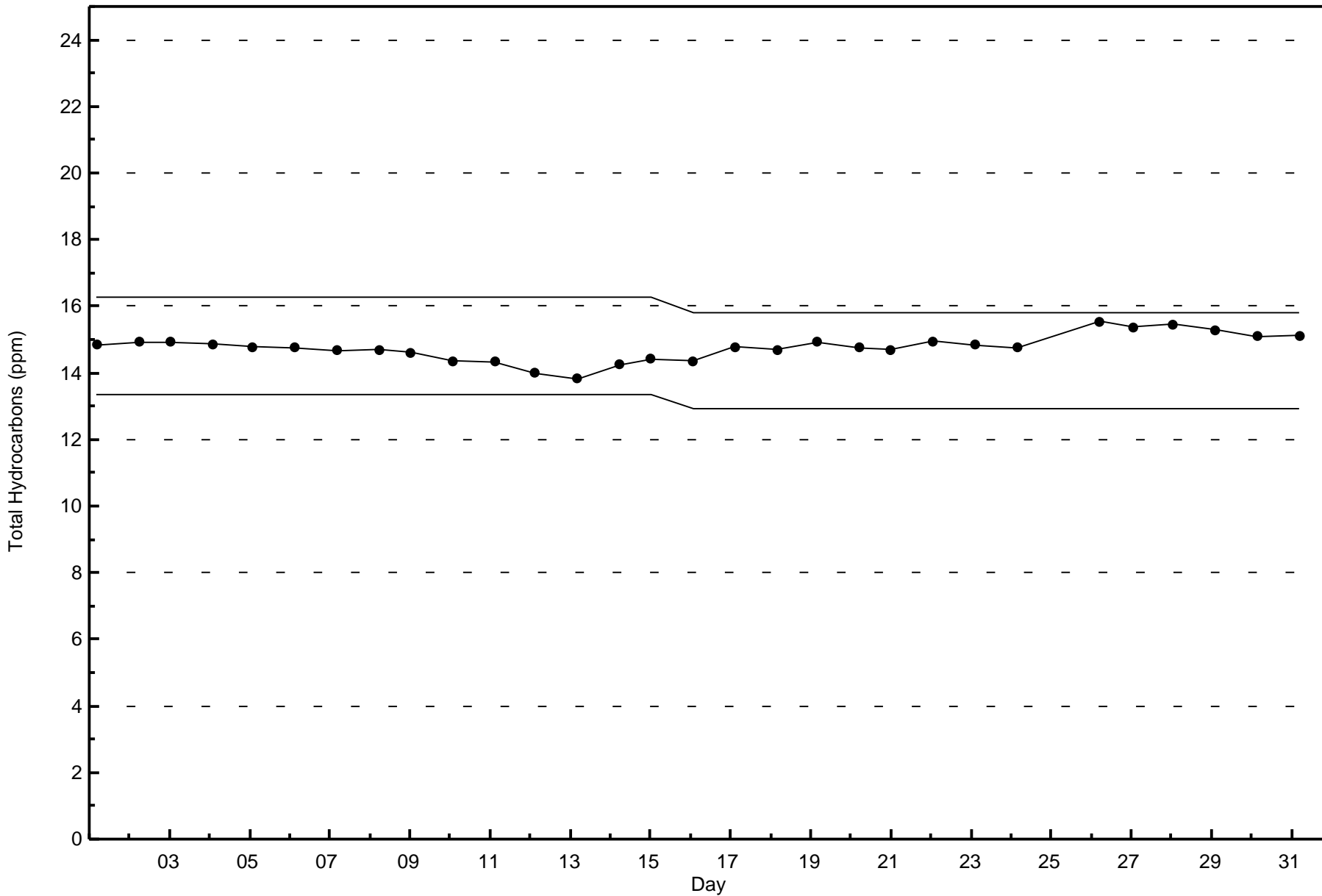
Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Fort McKay - Bertha Ganter - October 2015





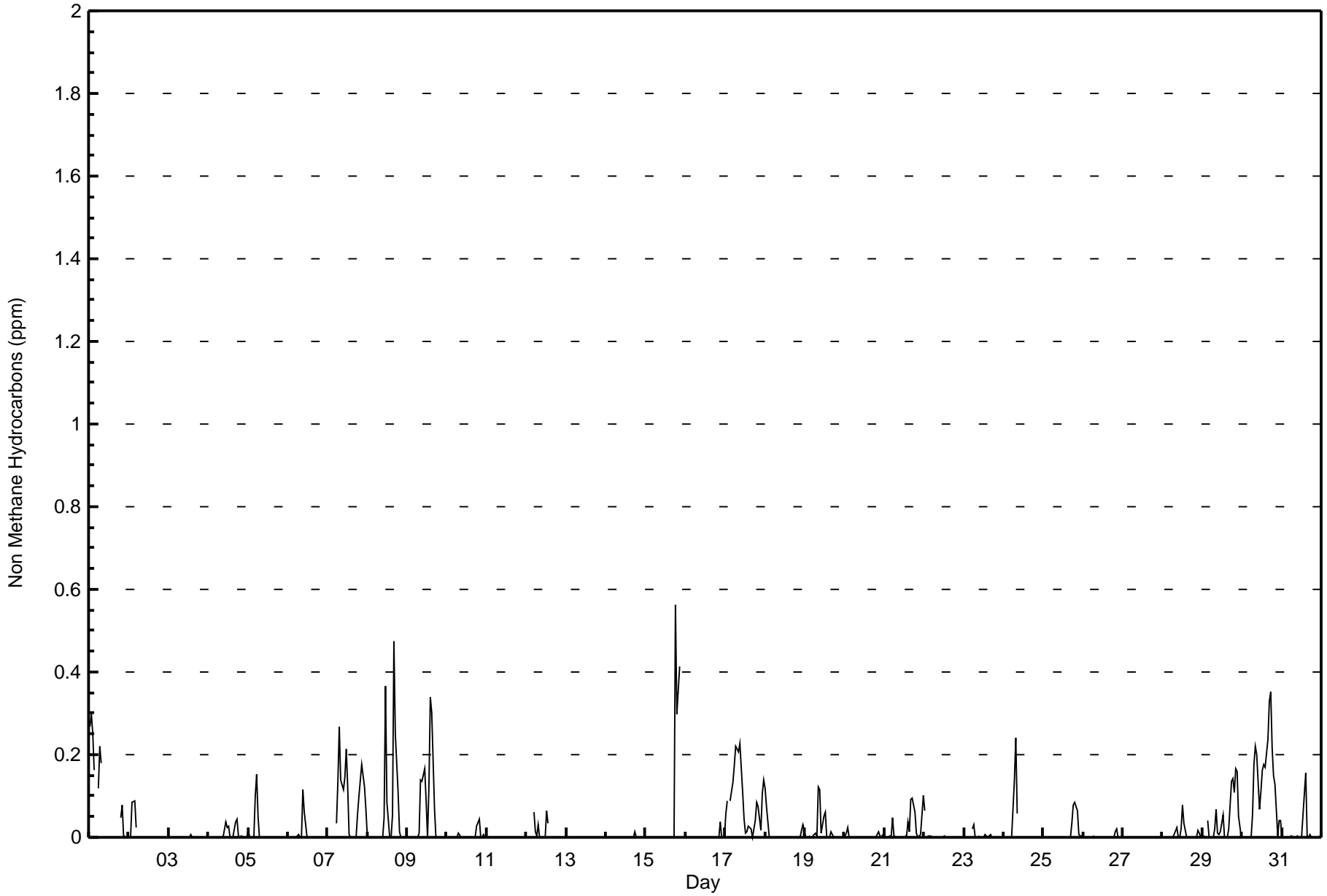


Maximum Value: 0.563 ppm on Oct 15 19:00		Maximum Daily Average: 0.124 ppm on Oct 30		Hours in Service: 744																						
Minimum Value: 0.000 ppm on Oct 1 23:00		Minimum Daily Average: 0.000 ppm on Oct 11		Hours of Data: 632																						
Maximum Diurnal Average: 0.047 ppm at hour 19		Minimum Diurnal Average: 0.013 ppm at hour 23		Hours of Missing Data: 112																						
Monthly Average: 0.027 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> = 0.1 P <sub>99</sub> = 0.3		Hours of Calibration: 39																						
				Percent Operational Time: 90.2																						
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	0.267	0.297	0.252	0.162	Z	0.119	0.222	0.179	M	M	M	M	M	M	M	M	M	M	M	0.049	0.079	0.003	0.000	0.000	--	0.297
2-Oct	0.000	0.000	0.084	0.087	0.023	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	0.008	0.087
3-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	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.006
4-Oct	0.000	Z	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.037	0.023	0.027	0.000	0.001	0.000	0.037	0.043	0.005	0.001	0.005	0.000	0.001	0.001	0.008	0.043
5-Oct	0.018	0.000	Z	0.000	0.098	0.152	0.052	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	0.014	0.152	
6-Oct	0.000	0.000	0.000	Z	0.000	0.000	0.006	0.000	0.000	0.117	0.063	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	0.117	
7-Oct	0.000	0.000	0.000	0.000	Z	0.035	0.134	0.269	0.139	0.115	0.147	0.213	0.123	0.007	0.000	0.000	0.000	0.000	0.055	0.097	0.175	0.149	0.121	0.068	0.080	0.269
8-Oct	0.005	0.000	0.000	0.000	0.000	Z	0.000	0.001	0.000	0.000	0.047	0.367	0.084	0.000	0.000	0.054	0.475	0.252	0.110	0.013	0.000	0.000	0.000	0.061	0.475	
9-Oct	Z	0.000	0.001	0.000	0.000	0.000	0.000	0.009	0.139	0.136	0.165	0.089	0.000	0.121	0.338	0.300	0.068	0.000	0.000	0.000	0.000	0.000	0.000	0.059	0.338	
10-Oct	0.000	Z	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	0.000	0.000	0.000	0.026	0.044	0.000	0.001	0.008	0.004	0.044	
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	0.060	0.012	0.002	0.030	0.000	0.000	0.000	0.000	0.064	0.034	UO	UO	UO	UO	UO	0.000	UO	0.000	0.000	0.000	--	0.064
13-Oct	0.000	0.000	UO	0.000	Z	0.000	0.000	0.000	0.000	UO	M	M	M	M	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	--	0.000	
14-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	0.014	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.014	
15-Oct	Z	0.000	0.000	0.000	UO	UO	0.000	0.000	0.000	0.001	UO	0.000	0.000	0.000	0.000	PF	0.000	0.000	0.563	0.298	0.414	UO	UO	UO	--	0.563
16-Oct	UO	Z	UO	UO	UO	UO	UO	UO	UO	C	C	C	C	C	C	0.000	0.000	0.000	0.000	0.000	0.000	0.036	0.001	0.005	--	0.036
17-Oct	0.056	0.090	Z	0.089	0.132	0.174	0.219	0.212	0.206	0.228	0.109	0.044	0.010	0.012	0.029	0.020	0.000	0.019	0.042	0.086	0.074	0.018	0.104	0.137	0.092	0.228
18-Oct	0.120	0.074	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	DF	DF	DF	DF	DF	0.000	0.000	0.000	0.000	0.000	0.019	0.030	0.014	0.120
19-Oct	0.002	0.000	0.001	0.002	Z	0.003	0.010	0.002	0.123	0.116	0.010	0.050	0.060	0.000	0.000	0.000	0.013	0.001	0.001	0.001	0.000	0.000	0.000	0.017	0.123	
20-Oct	0.002	0.011	0.025	0.000	0.001	Z	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	0.015	0.002	0.000	0.006	0.003	0.025
21-Oct	Z	0.000	0.001	0.002	0.000	0.049	0.004	0.000	0.000	M	M	M	0.005	0.004	0.037	0.013	0.093	0.097	0.061	0.011	0.000	0.002	0.005	0.102	0.024	0.102
22-Oct	0.063	Z	0.002	0.003	0.004	0.000	0.000	0.000	0.001	M	0.001	0.001	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.063
23-Oct	0.000	0.000	Z	0.001	UO	0.020	0.031	0.000	0.000	0.003	UO	0.000	0.000	0.007	0.000	0.004	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.031
24-Oct	0.000	0.000	0.000	Z	0.000	0.000	0.139	0.241	0.057	UO	M	M	M	M	M	M	M	M	M	M	M	M	M	M	--	0.241
25-Oct	M	M	M	M	M	M	M	M	M	C	C	C	0.000	0.002	0.001	0.000	0.000	0.033	0.079	0.085	0.065	0.008	0.002	0.002	--	0.085
26-Oct	0.000	0.000	0.000	0.000	0.000	Z	0.002	0.000	0.001	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.014	0.019	0.000	0.000	0.000	0.002	0.019
27-Oct	Z	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	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.001
28-Oct	0.000	Z	0.000	0.001	0.000	0.000	0.000	0.006	0.022	0.000	0.000	0.020	0.079	0.035	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.016	0.010	0.002	0.008	0.079
29-Oct	0.001	0.002	Z	0.040	0.000	0.000	0.000	0.020	0.068	0.010	0.006	0.013	0.055	0.001	0.000	0.001	0.020	0.135	0.142	0.110	0.165	0.159	0.052	0.000	0.044	0.165
30-Oct	0.001	0.000	0.000	Z	0.000	0.001	0.054	0.176	0.221	0.199	0.068	0.112	0.163	0.175	0.170	0.237	0.330	0.354	0.218	0.150	0.128	0.004	0.042	0.042	0.124	0.354
31-Oct	0.001	0.001	0.001	0.000	Z	0.003	0.002	0.001	0.000	0.002	0.000	0.000	0.000	0.104	0.157	0.002	0.000	0.006	0.000	0.002	0.001	0.000	0.000	0.004	0.012	0.157
																								Diurnal Average		
																								Diurnal Maximum		
																								Z - zerospan C - Calibration M - Maintenance DF - DAS Failure UO - Unstable Operation PF - Power Failure		



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

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Fort McKay - Bertha Ganter - October 2015**





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

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Fort McKay - Bertha Ganter - October 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.005	460	72.78	72.78
0.006 - 0.05	74	11.71	84.49
0.06 - 0.1	59	9.34	93.83
> 0.1	39	6.17	100.00

Total Number of Valid Hours: 632

Total Number of Hours: 744





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

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Fort McKay - Bertha Ganter - October 2015**

<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	73	19	8	11	7	4	14	22	48	30	18	31	44	45	52	34	460
0.006 - 0.05	10	4	2	3	0	0	0	9	24	9	2	1	3	1	6	0	74
0.06 - 0.1	5	1	5	1	0	1	2	10	12	7	3	0	2	1	6	3	59
> 0.1	0	5	2	1	0	0	1	2	7	14	4	0	0	0	0	3	39
<b>Totals</b>	88	29	17	16	7	5	17	43	91	60	27	32	49	47	64	40	632

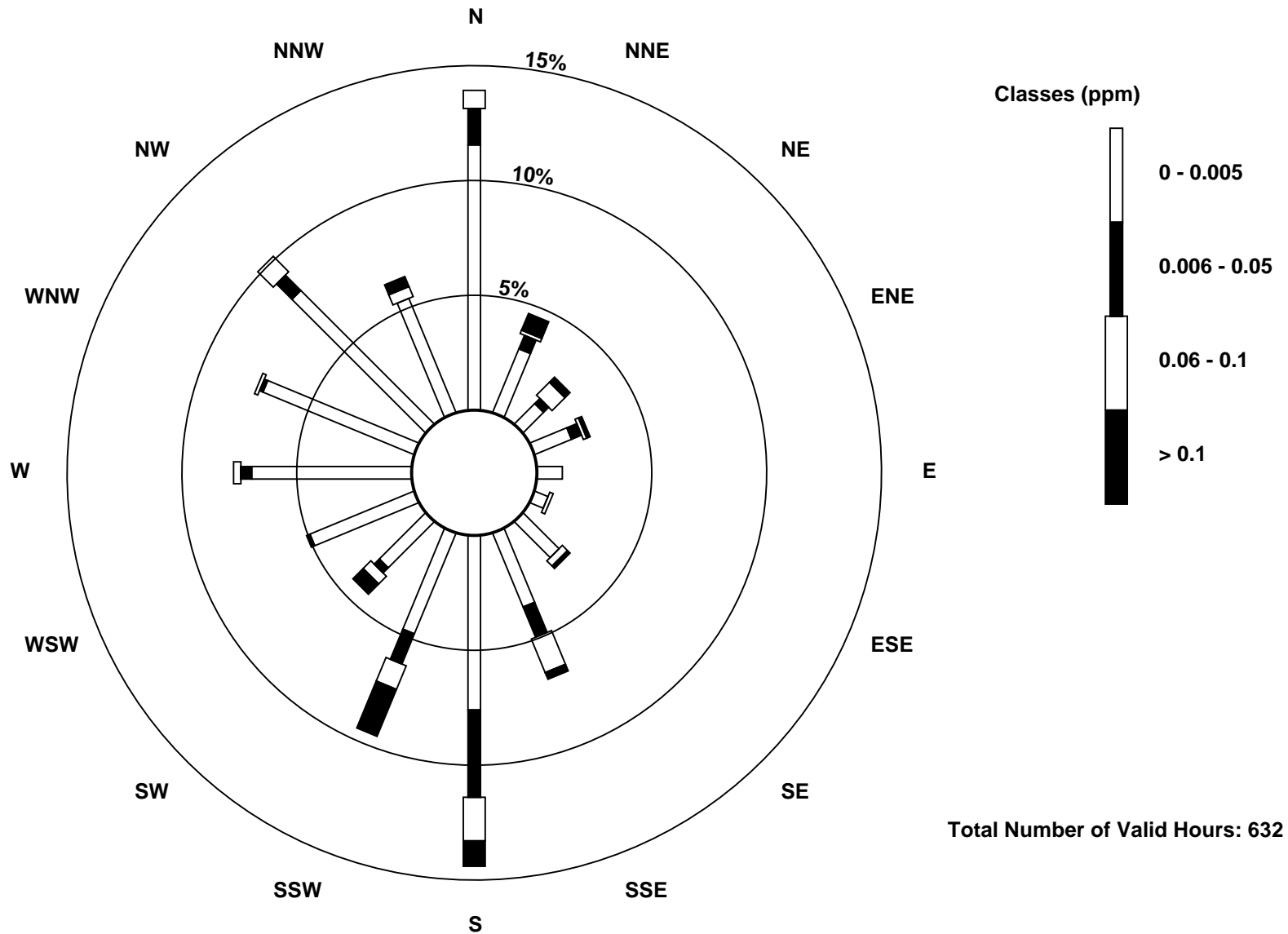
Total Number of Valid Hours: 632

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

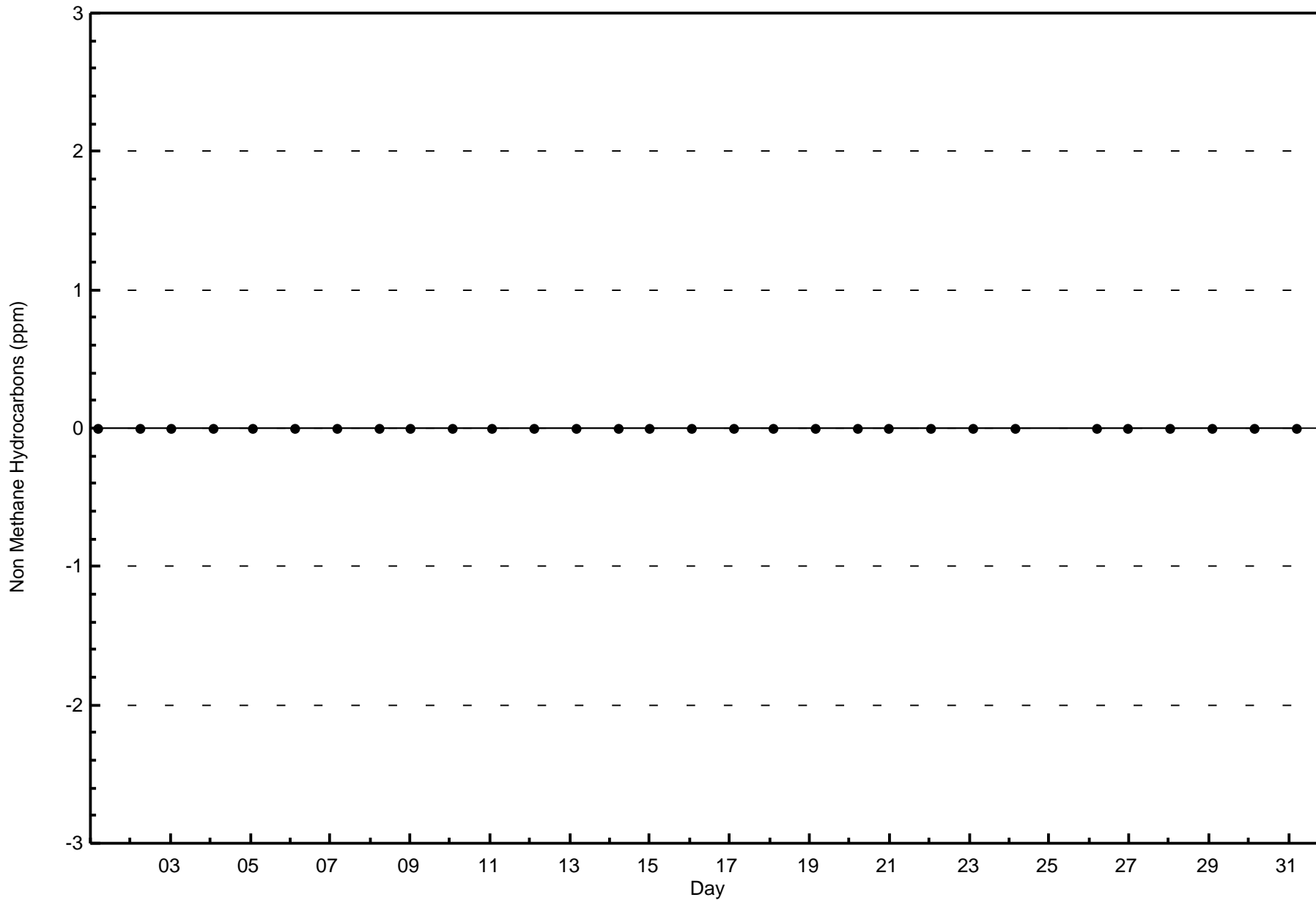
Non Methane Hydrocarbons (NMHC) - ppm  
Fort McKay - Bertha Ganter (AMS 1)

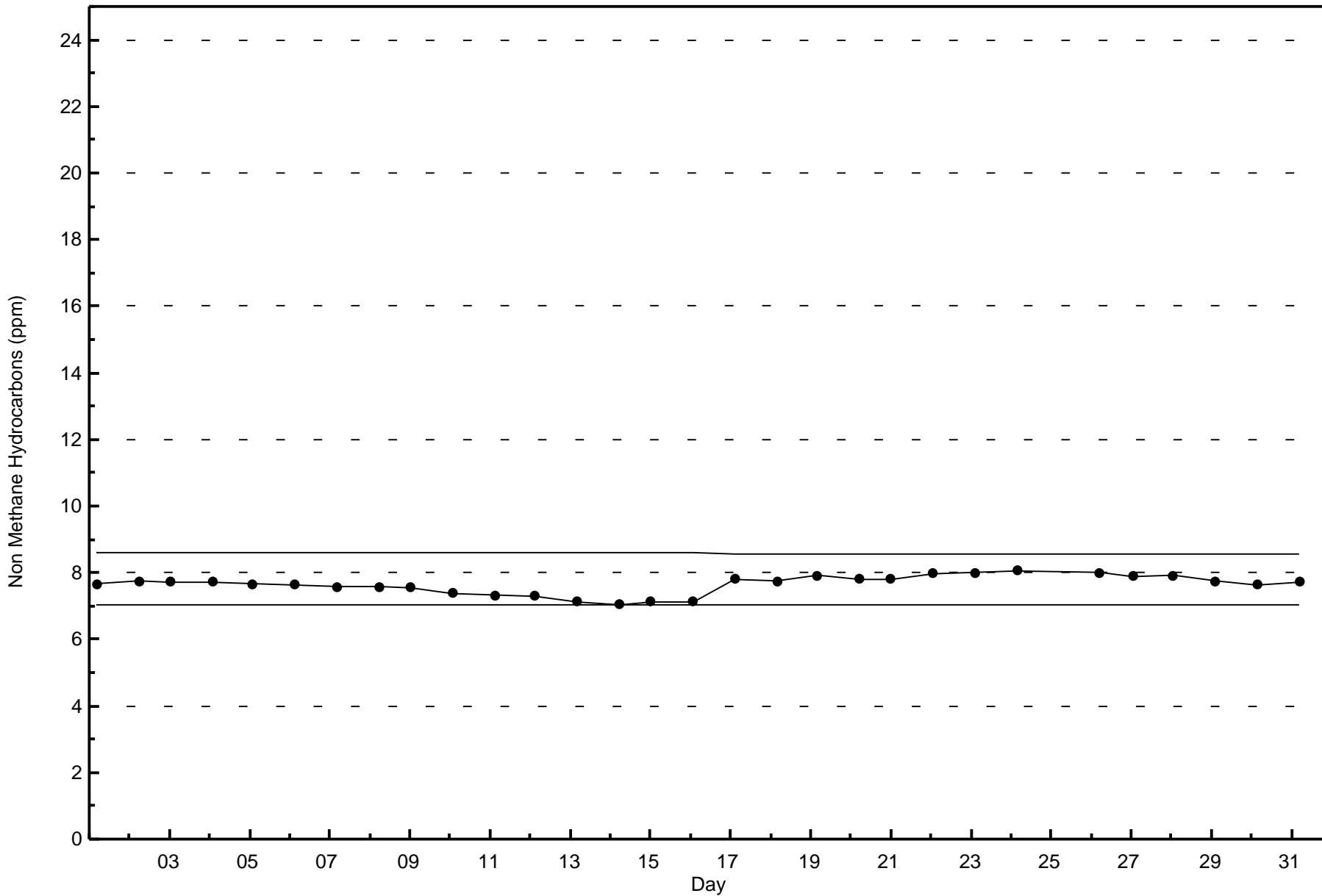




Wood Buffalo Environmental Association  
Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm  
Fort McKay - Bertha Ganter - October 2015







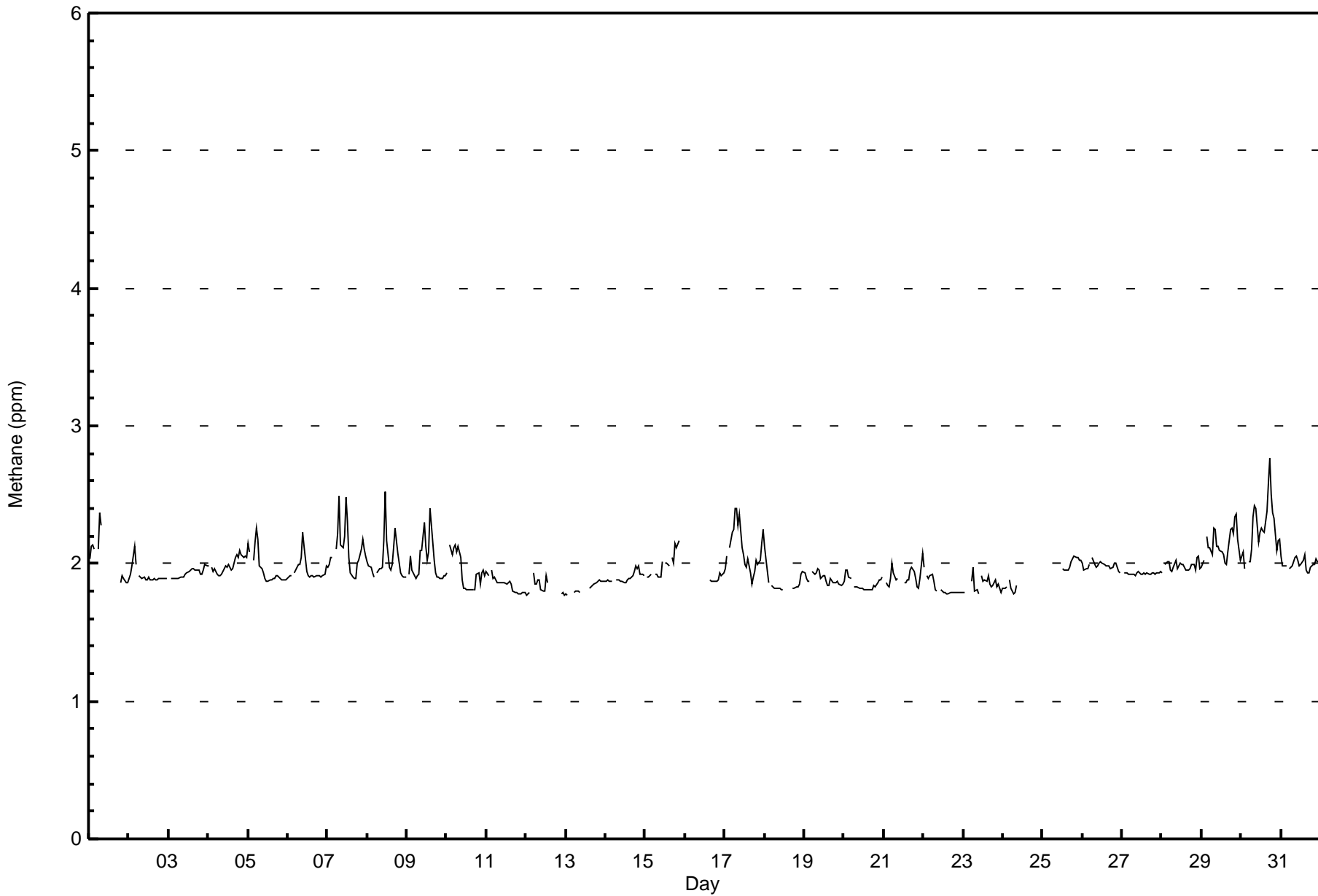
Summary of Hour Averages

Fort McKay - Bertha Ganter - October 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 2.8 ppm on Oct 30 18:00	Maximum Daily Average: 2.3 ppm on Oct 30		Hours of Data:	632
Minimum Value: 1.8 ppm on Oct 12 20:00	Minimum Daily Average: 1.8 ppm on Oct 22		Hours of Missing Data:	112
Maximum Diurnal Average: 2.0 ppm at hour 8	Minimum Diurnal Average: 1.9 ppm at hour 16		Hours of Calibration:	39
Monthly Average: 1.96 ppm	Percentiles: P <sub>1</sub> = 1.8 P <sub>10</sub> = 1.8 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> = 2.5		Percent Operational Time:	90.2

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	2.1	2.1	2.1	Z	2.1	2.4	2.3	M	M	M	M	M	M	M	M	M	M	M	1.9	1.9	1.9	1.9	1.9	--	2.4																									
2-Oct	1.9	1.9	2.0	2.1	2.0	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	2.1																								
3-Oct	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	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	1.9	2.0	2.0																								
4-Oct	2.0	Z	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.0	2.1	2.0	2.0	2.1	2.1																								
5-Oct	2.1	2.1	Z	2.0	2.2	2.3	2.2	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	2.0	2.3	2.3																								
6-Oct	1.9	1.9	1.9	Z	1.9	1.9	2.0	2.0	2.0	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	2.0	2.0	2.0	2.2	2.2																								
7-Oct	2.0	2.0	2.0	2.0	Z	2.1	2.2	2.5	2.1	2.1	2.2	2.5	2.3	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.2	2.1	2.1	2.1	2.1	2.5																								
8-Oct	2.0	2.0	2.0	1.9	1.9	Z	1.9	2.0	2.0	2.0	2.2	2.5	2.2	2.0	2.0	2.0	2.1	2.3	2.1	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.5																								
9-Oct	Z	1.9	2.1	2.0	1.9	1.9	1.9	1.9	2.1	2.1	2.3	2.1	2.0	2.1	2.4	2.3	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.4																								
10-Oct	1.9	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.8	1.9	2.0	1.9	1.9	2.0	2.1																								
11-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	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9																								
12-Oct	1.8	1.8	1.8	Z	1.9	1.9	1.8	1.9	1.9	1.8	1.8	1.8	1.9	1.9	UO	UO	UO	UO	UO	1.8	UO	1.8	1.8	1.8	--	1.9																									
13-Oct	1.8	1.8	UO	1.8	Z	1.8	1.8	1.8	1.8	UO	M	M	M	M	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	--	1.9																									
14-Oct	1.9	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	2.0	1.9	1.9	1.9	1.9	2.0	2.0																								
15-Oct	Z	1.9	1.9	1.9	UO	UO	1.9	1.9	1.9	1.9	2.0	UO	2.0	2.0	2.0	PF	2.0	2.0	2.1	2.1	2.2	UO	UO	UO	--	2.2																									
16-Oct	UO	Z	UO	UO	UO	UO	UO	UO	UO	UO	C	C	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	--	1.9																									
17-Oct	2.0	2.1	Z	2.1	2.2	2.3	2.4	2.4	2.3	2.4	2.1	2.1	2.0	2.0	2.0	1.9	1.8	1.9	1.9	2.0	2.0	2.0	2.1	2.3	2.1	2.4	2.4																								
18-Oct	2.1	2.0	1.9	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	DF	DF	DF	DF	DF	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.1	2.1																								
19-Oct	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.9	2.0	2.0																								
20-Oct	1.9	2.0	2.0	1.9	1.9	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	2.0	2.0																								
21-Oct	Z	1.9	1.8	1.8	1.9	2.0	1.9	1.9	1.9	1.9	M	M	M	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.8	1.8	1.9	1.9	2.1	2.1																								
22-Oct	2.0	Z	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	M	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.0	2.0																								
23-Oct	1.8	1.8	Z	1.8	UO	1.9	2.0	1.8	1.8	1.8	1.8	UO	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.9	1.8	1.9	1.8	1.8	1.8	2.0	2.0																								
24-Oct	1.8	1.8	1.8	Z	1.9	1.8	1.8	1.8	1.8	1.8	UO	M	M	M	M	M	M	M	M	M	M	M	M	M	M	--	1.9																								
25-Oct	M	M	M	M	M	M	M	M	M	M	C	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																								
26-Oct	2.0	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	1.9	1.9	2.0	2.0	2.0																								
27-Oct	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	1.9																								
28-Oct	1.9	Z	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.1	2.1																								
29-Oct	2.0	2.0	Z	2.2	2.1	2.1	2.1	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.2	2.3	2.2	2.3	2.4	2.2	2.0	2.1	2.4	2.4																								
30-Oct	2.1	2.1	2.0	Z	2.0	2.0	2.1	2.3	2.4	2.4	2.2	2.2	2.3	2.2	2.2	2.4	2.6	2.8	2.5	2.4	2.3	2.1	2.2	2.2	2.3	2.8	2.8																								
31-Oct	2.1	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1																								
																								1.9	1.9	1.9	2.0	2.0	2.0	2.0	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	1.9	1.9	1.9	1.9	1.9	1.9	Diurnal Average	
																								2.1	2.1	2.1	2.2	2.2	2.3	2.4	2.5	2.4	2.4	2.3	2.5	2.3	2.2	2.4	2.4	2.6	2.8	2.5	2.4	2.3	2.4	2.2	2.3	2.3	2.3	2.3	Diurnal Maximum

Z - zerospan      C - Calibration      M - Maintenance      DF - DAS Failure      UO - Unstable Operation      PF - Power Failure





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

**Methane (CH<sub>4</sub>) - ppm**  
**Fort McKay - Bertha Ganter - October 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	525	83.07	83.07
2.1 - 3.0	107	16.93	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 632

Total Number of Hours: 744



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

**Methane (CH<sub>4</sub>) - ppm**  
**Fort McKay - Bertha Ganter - October 2015**

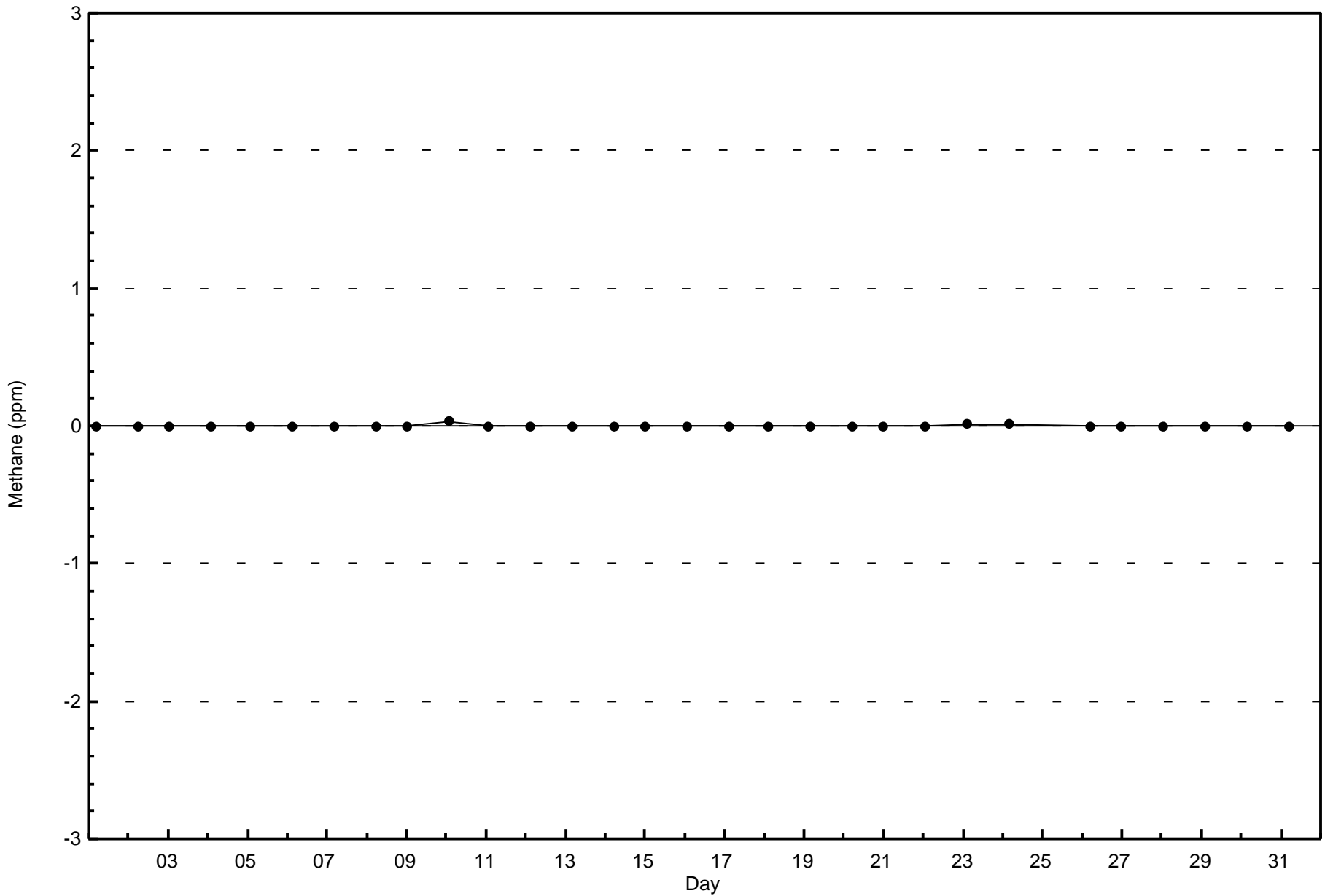
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	86	23	14	15	7	5	15	28	61	32	19	30	48	46	60	36	525
2.1 - 3.0	2	6	3	1	0	0	2	15	30	28	8	2	1	1	4	4	107
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	88	29	17	16	7	5	17	43	91	60	27	32	49	47	64	40	632

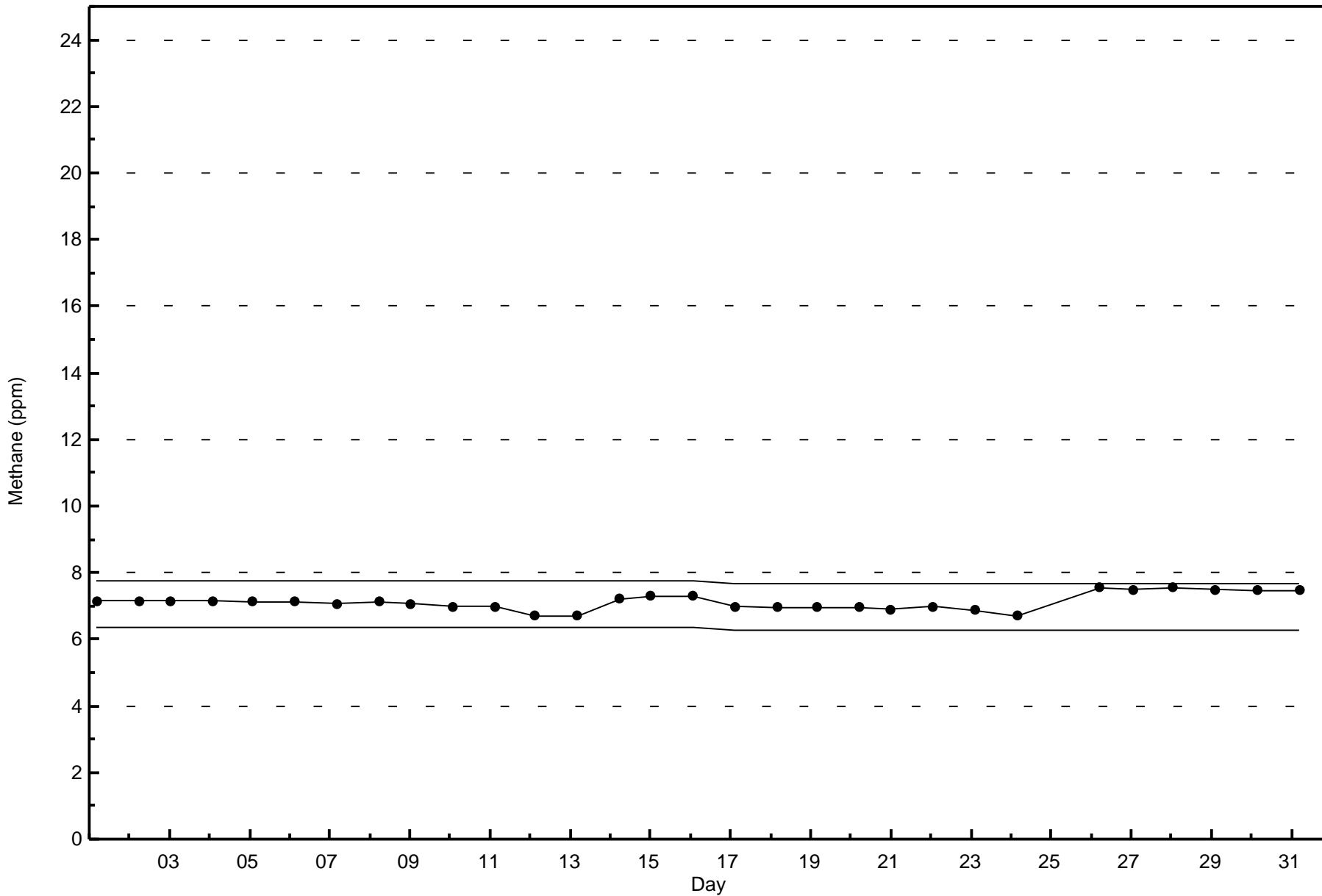
Total Number of Valid Hours: 632

Total Number of Hours: 744







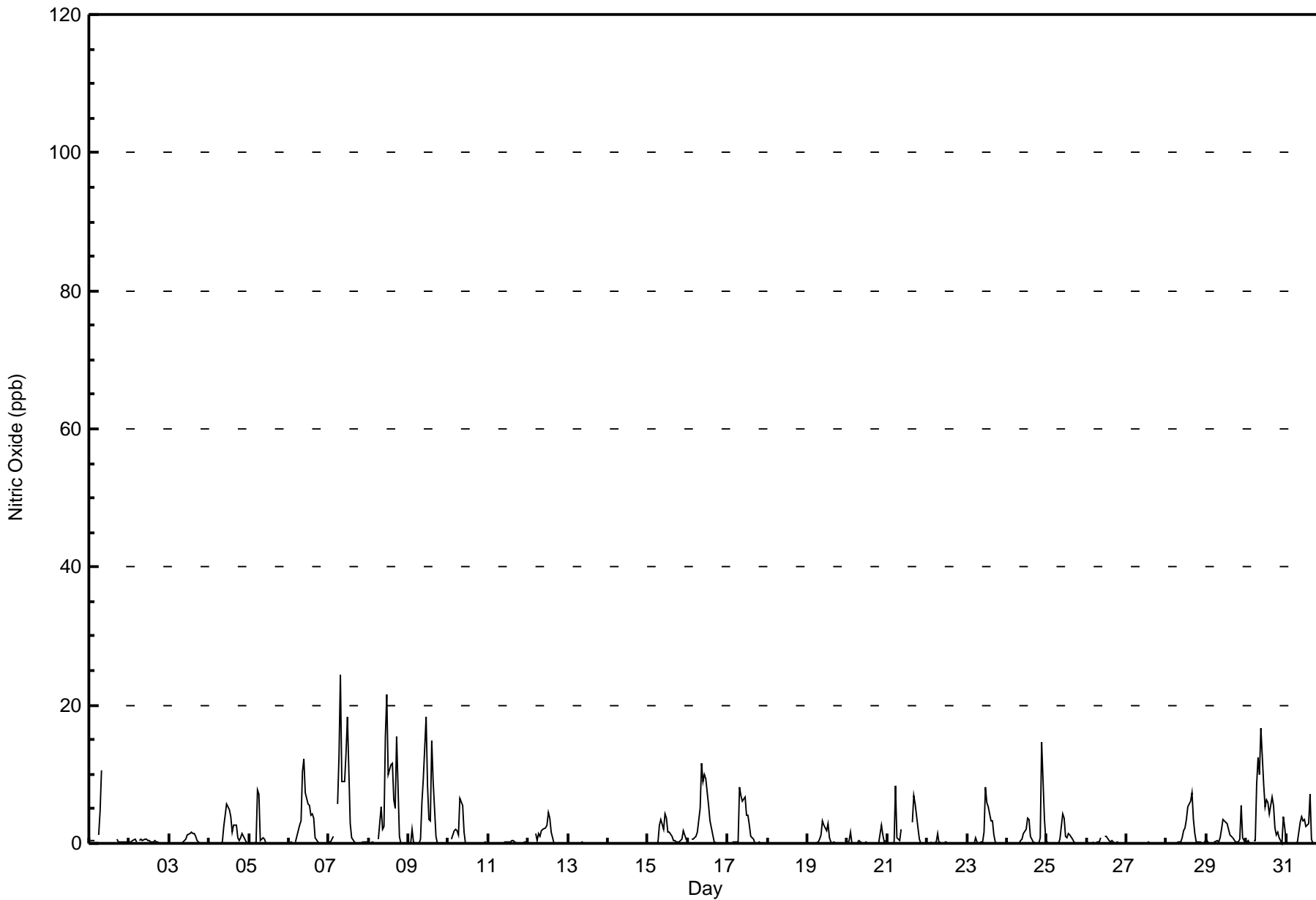




Summary of Hour Averages

Fort McKay - Bertha Ganter - October 2015

Maximum Value: 24 ppb on Oct 7 08:00		Maximum Daily Average: 4.7 ppb on Oct 7		Hours in Service: 744																							
Minimum Value: 0 ppb on Oct 3 22:00		Minimum Daily Average: 0.0 ppb on Oct 18		Hours of Data: 689																							
Maximum Diurnal Average: 4.0 ppb at hour 11		Minimum Diurnal Average: 0.1 ppb at hour 2		Hours of Missing Data: 55																							
Monthly Average: 1.4 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> = 5 P <sub>99</sub> = 15		Hours of Calibration: 37																							
				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	0	0	0	1	Z	1	5	11	M	M	M	M	M	M	M	M	1	0	0	0	0	0	0	0	--	11	
2-Oct	0	0	0	1	0	Z	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
3-Oct	Z	0	0	0	0	0	0	0	0	0	1	1	2	2	2	1	1	0	0	0	0	0	0	0	0.4	2	
4-Oct	0	Z	0	0	0	0	0	0	0	2	6	5	5	4	2	3	3	1	0	1	1	1	0	0	1.4	6	
5-Oct	0	0	Z	0	0	8	7	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	8	
6-Oct	0	0	0	Z	0	1	3	3	10	12	7	6	5	4	4	4	1	0	0	0	0	0	0	0	2.7	12	
7-Oct	0	0	1	1	Z	6	13	24	9	9	13	18	11	3	1	0	0	0	0	0	0	0	0	0	4.7	24	
8-Oct	0	0	0	0	0	Z	1	5	2	2	15	22	10	11	12	6	5	15	1	0	0	0	0	0	4.7	22	
9-Oct	Z	0	2	0	0	0	0	1	6	9	18	8	3	3	15	9	1	0	0	0	0	0	0	0	3.3	18	
10-Oct	0	Z	1	2	2	2	1	7	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	7	
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	1	0	1	1	2	2	2	3	5	4	2	0	0	0	0	0	0	0	0	0	1.0	5	
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	0.0	0	
15-Oct	Z	0	0	0	0	0	0	3	4	2	4	4	2	2	1	0	0	0	0	0	0	1	2	1	1.2	4	
16-Oct	1	Z	1	1	1	1	2	5	12	9	10	9	5	3	2	1	0	0	0	0	0	0	0	0	2.7	12	
17-Oct	0	0	Z	0	0	0	0	8	7	6	7	4	4	3	1	1	0	0	0	0	0	0	0	0	1.8	8	
18-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	DF	DF	DF	DF	DF	0	0	0	0	0	0	0	0.0	0	
19-Oct	0	0	0	0	Z	0	0	1	1	3	3	2	3	1	0	0	0	0	0	0	0	0	0	0	0.6	3	
20-Oct	0	0	2	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0.3	3	
21-Oct	Z	0	0	0	0	8	1	0	2	C	C	C	C	C	C	C	3	7	6	2	1	0	0	0	--	8	
22-Oct	0	Z	0	0	0	0	1	0	0	M	0	0	0	M	M	0	0	0	0	0	0	0	0	0	0.1	1	
23-Oct	0	0	Z	0	0	1	0	0	0	0	2	8	6	5	3	3	1	0	0	0	0	0	0	0	1.3	8	
24-Oct	0	0	0	Z	0	0	0	0	0	1	2	2	4	4	1	1	0	0	0	0	1	15	3	0	1.4	15	
25-Oct	0	0	0	0	Z	0	0	0	1	4	4	1	1	1	1	1	0	0	0	0	0	0	0	0	0.6	4	
26-Oct	0	0	0	0	0	Z	0	0	1	M	M	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	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	0.0	0	
28-Oct	0	Z	0	0	0	0	0	0	0	1	2	2	4	5	6	7	3	1	0	0	0	0	0	0	1.5	7	
29-Oct	1	0	Z	0	0	0	0	0	1	2	3	3	3	2	1	1	1	0	0	0	1	6	1	0	1.2	6	
30-Oct	0	0	0	Z	0	0	9	12	10	17	9	5	6	6	4	7	5	2	1	2	1	0	4	2	4.5	17	
31-Oct	0	0	0	0	Z	0	0	0	3	4	3	3	3	3	7	1	0	0	0	0	0	0	0	0	1.2	7	
		0.1	0.1	0.3	0.2	0.3	1.1	1.5	2.7	2.6	3.3	4.0	3.8	2.9	2.5	2.4	1.7	1.0	0.9	0.2	0.2	0.3	0.8	0.4	0.2	Diurnal Average	
		1	0	2	2	2	8	13	24	12	17	18	22	11	11	15	9	7	15	2	2	3	15	4	2	Diurnal Maximum	
Z - zerospan		C - Calibration			M - Maintenance			DF - DAS Failure																			





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

**Nitric Oxide (NO) - ppb**  
**Fort McKay - Bertha Ganter - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	687	99.71	99.71
21 - 40	2	0.29	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: 689

Total Number of Hours: 744



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

**Nitric Oxide (NO) - ppb**  
**Fort McKay - Bertha Ganter - October 2015**

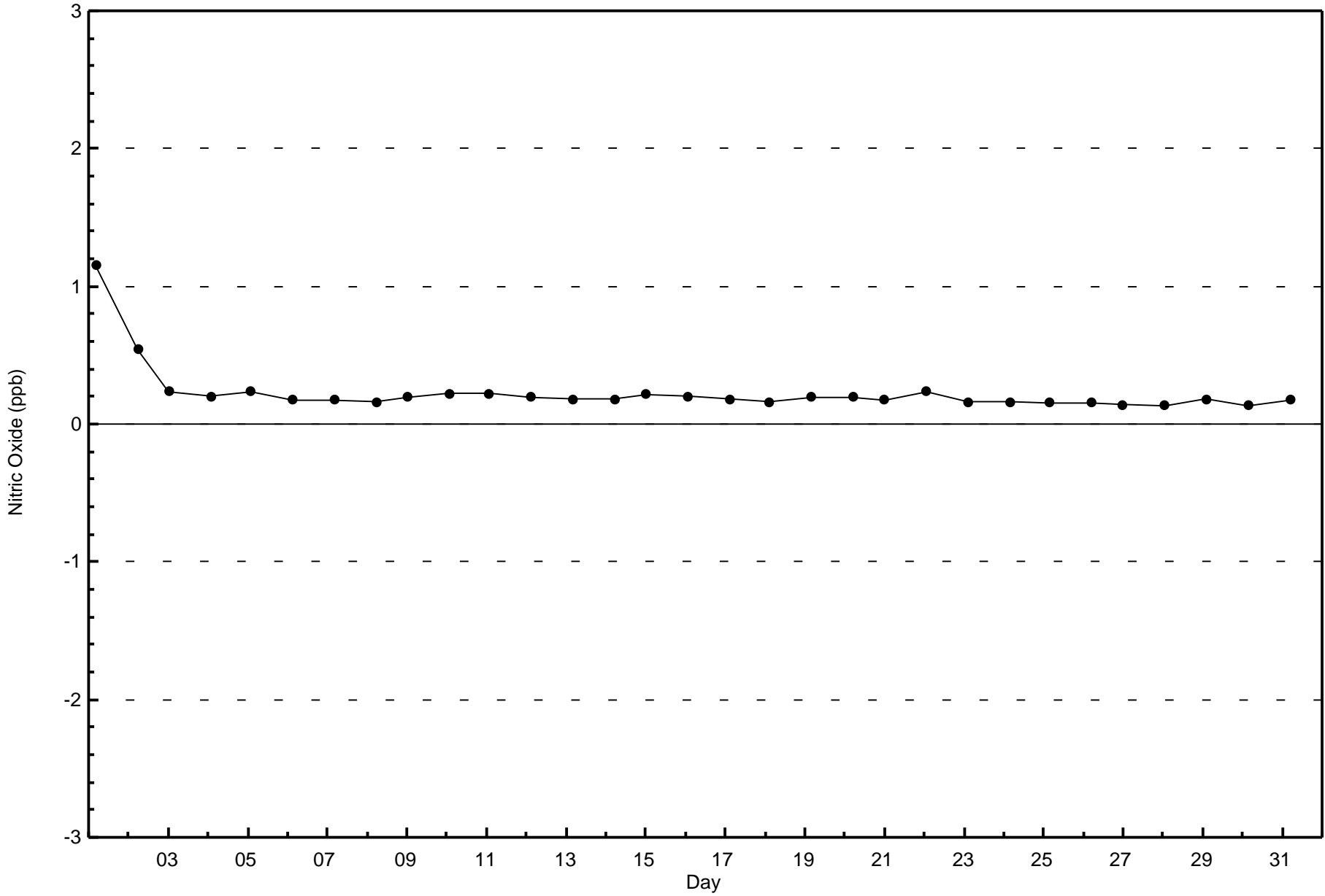
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	100	32	18	16	8	8	18	45	95	61	28	35	53	50	72	48	687
21 - 40	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	2
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	100	32	18	16	8	8	18	46	95	62	28	35	53	50	72	48	689

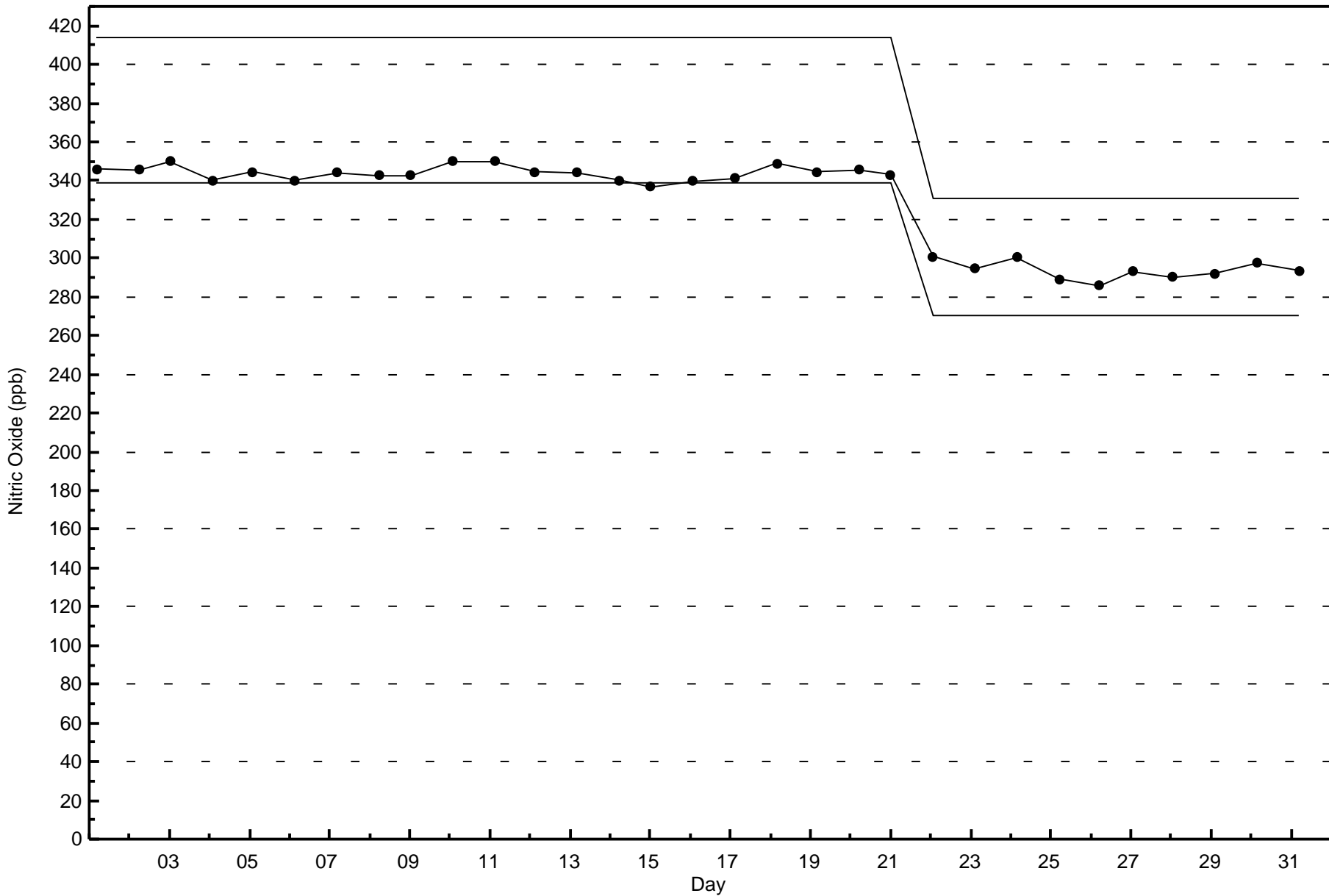
Total Number of Valid Hours: 689

Total Number of Hours: 744











Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 30 ppb on Oct 8 18:00	Maximum Daily Average: 11.0 ppb on Oct 17
Minimum Value: 0 ppb on Oct 5 12:00	Hours of Data: 689
Maximum Diurnal Average: 6.7 ppb at hour 19	Hours of Missing Data: 55
Monthly Average: 5.4 ppb	Hours of Calibration: 37
Minimum Daily Average: 0.8 ppb on Oct 27	Percent Operational Time: 97.6
Minimum Diurnal Average: 4.2 ppb at hour 2	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 5 Q <sub>3</sub> = 8 P <sub>90</sub> = 12 P <sub>99</sub> = 20

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	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	9	11	11	Z	11	15	13	M	M	M	M	M	M	M	M	4	4	5	5	9	10	5	4	--	15
2-Oct	5	6	9	12	12	Z	5	5	3	3	3	2	2	1	1	3	1	0	1	1	1	1	1	1	3.4	12
3-Oct	Z	1	0	1	0	0	1	1	1	2	2	3	4	4	4	5	6	5	4	2	2	1	3	4	2.4	6
4-Oct	4	Z	3	2	3	2	1	1	2	10	15	13	12	8	3	5	9	10	14	13	13	11	8	8	7.5	15
5-Oct	5	6	Z	5	9	15	13	3	2	1	0	0	0	0	1	1	2	2	0	0	0	0	0	0	2.8	15
6-Oct	1	3	2	Z	3	5	7	7	7	9	8	8	9	9	9	10	7	8	9	5	3	2	2	4	6.0	10
7-Oct	4	5	6	7	Z	10	11	11	8	7	10	14	13	6	3	1	1	1	9	12	17	19	14	9	8.5	19
8-Oct	6	6	5	3	1	Z	5	9	6	5	11	16	13	15	17	16	20	30	25	16	7	5	4	6	10.6	30
9-Oct	Z	7	15	10	6	4	2	2	7	7	12	8	6	9	20	21	10	5	4	3	2	2	1	2	7.1	21
10-Oct	1	Z	2	3	4	5	4	4	4	3	0	0	0	0	0	0	0	0	5	7	2	4	8	5	2.7	8
11-Oct	7	4	Z	3	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	0	1	1	2	2	1.5	7
12-Oct	1	1	1	Z	7	9	10	6	5	5	5	3	4	4	3	0	0	0	0	1	3	5	1	0	3.2	10
13-Oct	0	0	0	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	1	4	5	4	1	1	0	0.9	5
14-Oct	0	0	0	0	0	Z	1	1	0	0	0	0	0	0	0	1	4	7	4	7	1	3	2	1.5	7	
15-Oct	Z	1	1	3	3	3	3	4	5	4	5	4	3	3	3	3	6	7	13	18	20	21	16	15	7.0	21
16-Oct	15	Z	7	6	6	6	6	5	6	8	10	11	10	9	8	7	4	2	2	1	3	14	12	11	7.2	15
17-Oct	20	8	Z	13	12	12	11	14	14	12	12	8	9	7	5	4	1	5	15	19	19	10	11	11	11.0	20
18-Oct	10	9	2	Z	1	1	1	1	1	0	0	0	DF	DF	DF	DF	DF	0	0	0	1	1	8	12	2.6	12
19-Oct	8	5	5	5	Z	9	11	13	8	8	6	5	7	4	1	1	6	6	5	6	4	2	1	2	5.5	13
20-Oct	7	5	12	3	2	Z	1	1	1	0	0	1	0	0	0	0	0	0	3	1	5	10	10	7	3.0	12
21-Oct	Z	4	3	2	2	7	8	5	5	C	C	C	C	C	C	C	10	16	17	15	13	9	11	6	--	17
22-Oct	5	Z	10	5	5	6	8	2	1	M	1	1	1	M	M	0	0	1	1	1	1	1	1	0	2.5	10
23-Oct	0	1	Z	1	1	10	11	2	3	1	4	14	10	9	9	12	11	9	9	7	5	7	6	4	6.3	14
24-Oct	6	4	5	Z	9	5	4	4	6	4	7	7	10	11	6	6	7	5	4	3	5	16	12	14	6.9	16
25-Oct	11	5	4	4	Z	3	5	5	6	12	9	4	3	5	6	5	6	8	8	8	8	7	6	5	6.2	12
26-Oct	4	4	3	2	7	Z	9	5	5	M	M	3	4	4	3	7	8	4	7	2	5	1	1	1	4.2	9
27-Oct	Z	1	0	0	0	0	0	0	0	1	1	1	1	2	1	2	2	1	1	2	1	1	1	1	0.8	2
28-Oct	1	Z	8	8	6	3	3	5	7	6	9	8	8	10	13	19	20	17	10	11	14	6	6	12	9.2	20
29-Oct	17	7	Z	3	4	5	6	5	7	8	8	7	5	5	4	6	12	13	11	12	13	19	11	4	8.2	19
30-Oct	4	5	1	Z	4	5	10	10	9	13	7	10	12	12	14	15	15	14	11	9	8	3	8	11	9.1	15
31-Oct	9	6	4	3	Z	2	2	3	4	6	6	5	4	6	11	4	2	3	5	8	7	7	9	10	5.4	11

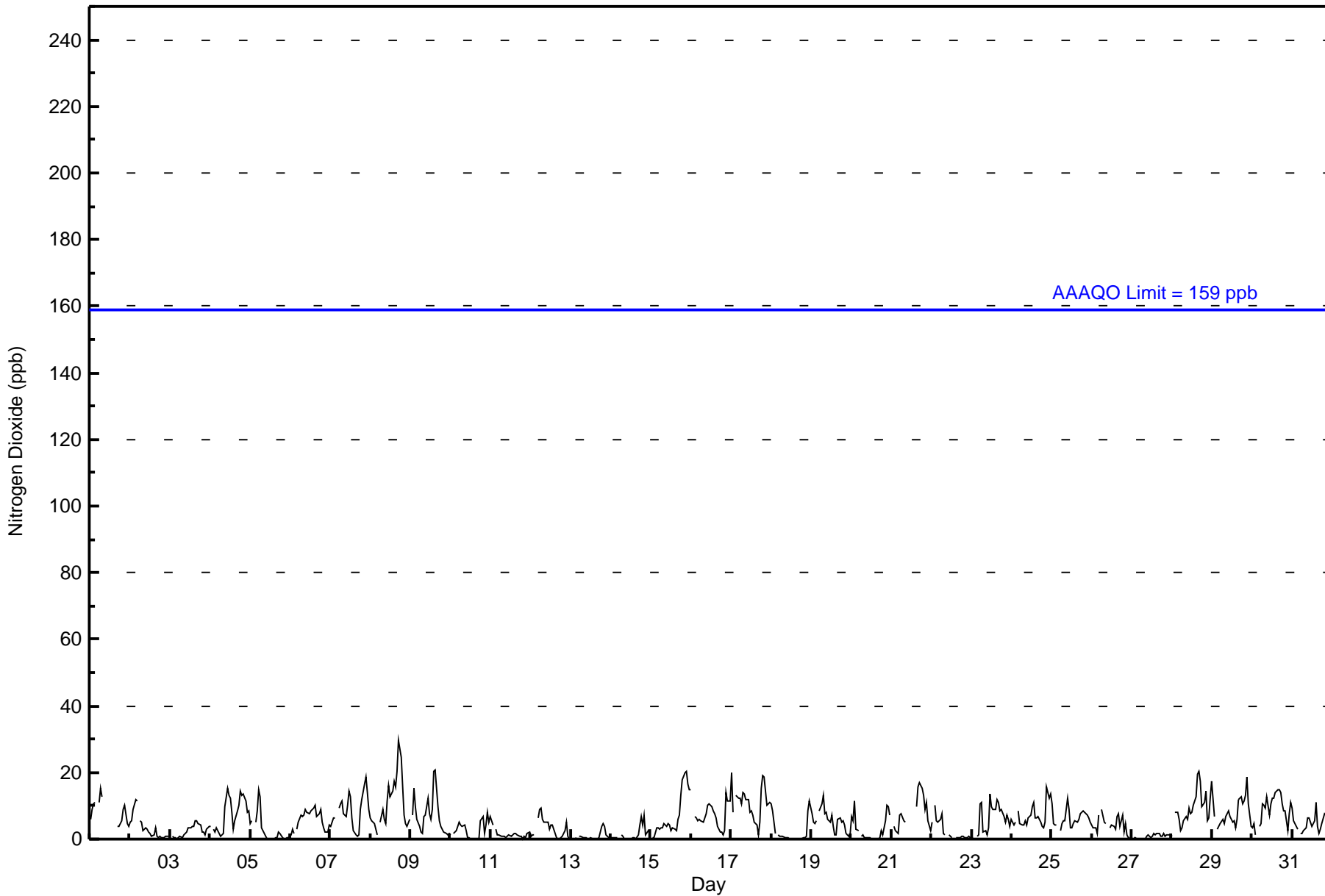
6.0	4.2	4.6	4.5	4.3	5.3	5.6	4.8	4.3	5.0	5.5	5.4	5.3	5.3	5.4	5.7	5.8	5.8	6.7	6.3	6.4	6.4	5.7	5.5	Diurnal Average	
20	9	15	13	12	15	15	14	14	13	15	16	13	15	20	21	20	30	25	19	20	21	16	15	Diurnal Maximum	

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**  
**Fort McKay - Bertha Ganter - October 2015**





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	685	99.42	99.42
21 - 40	4	0.58	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: 689

Total Number of Hours: 744



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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	99	30	18	16	8	8	18	46	95	62	28	35	53	50	72	47	685
21 - 40	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4
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>	100	32	18	16	8	8	18	46	95	62	28	35	53	50	72	48	689

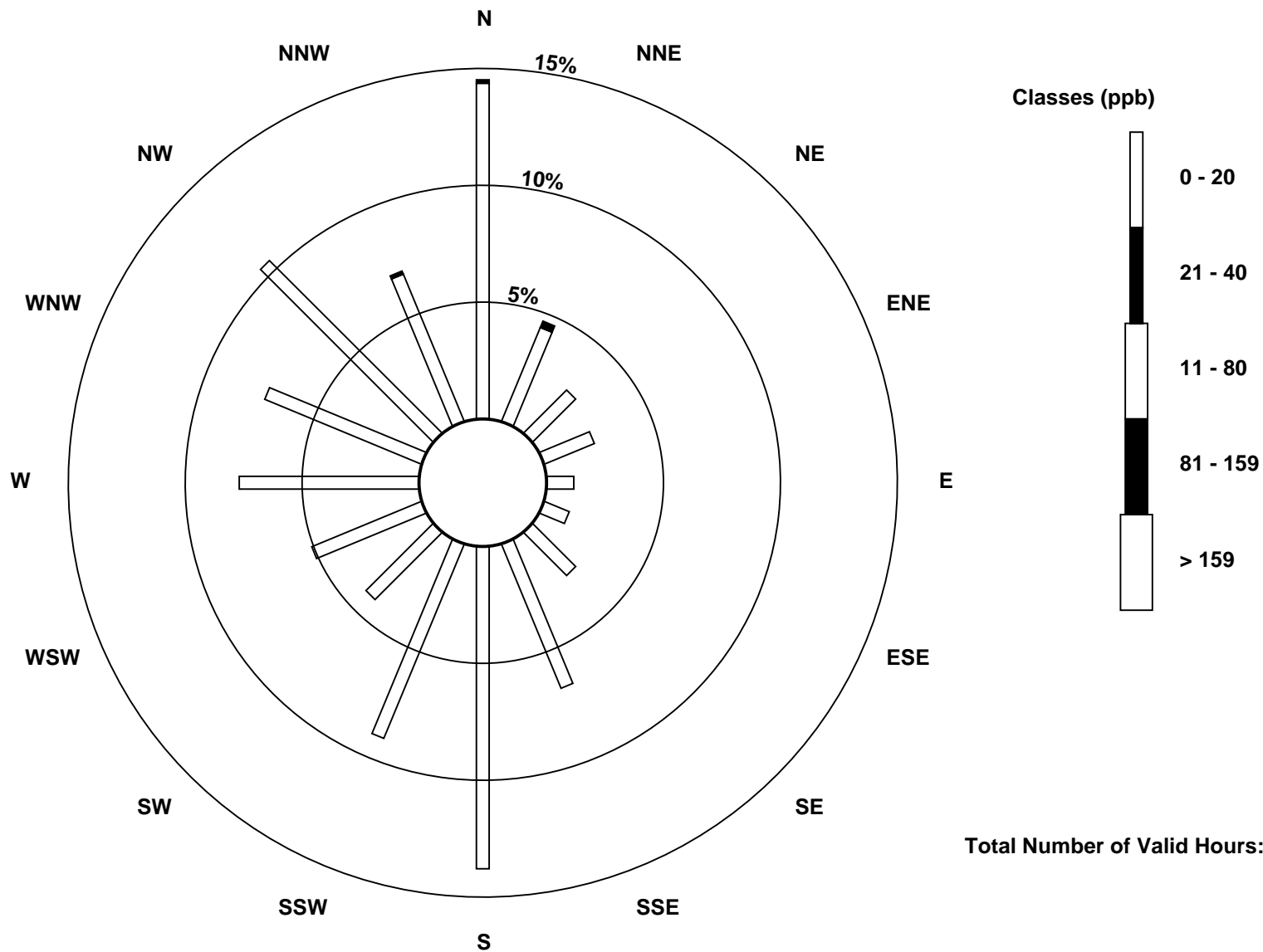
Total Number of Valid Hours: 689

Total Number of Hours: 744

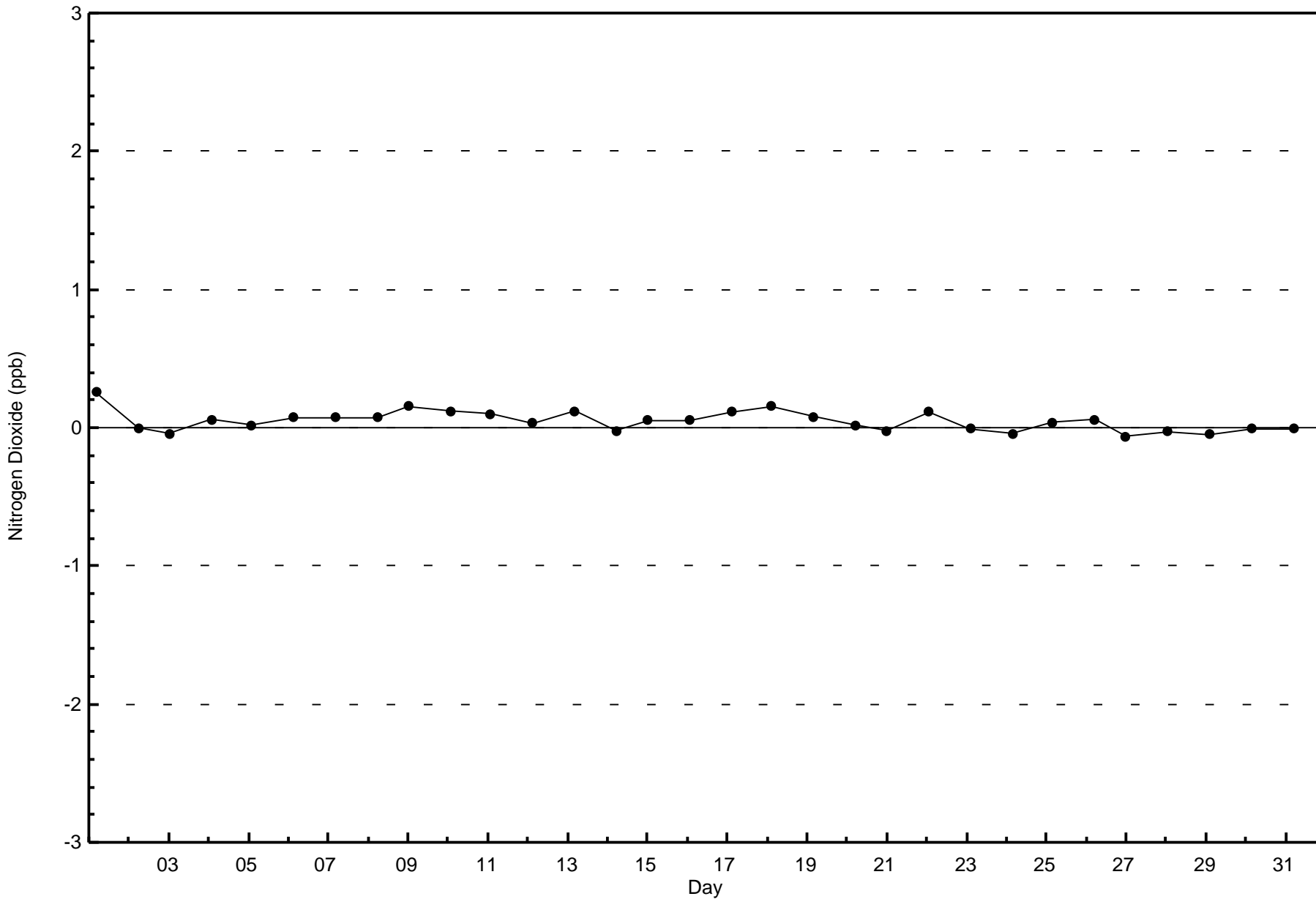


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

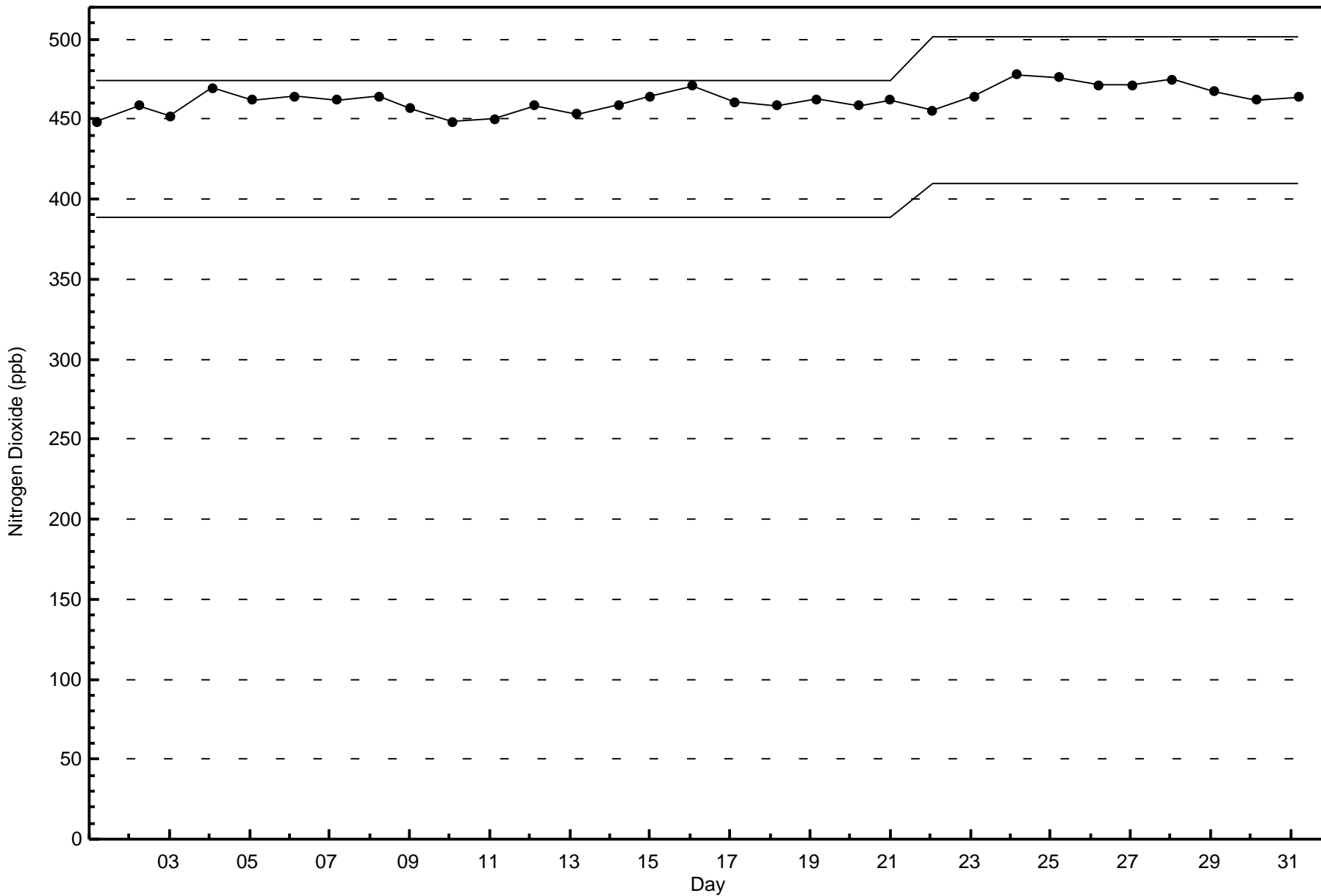
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay - Bertha Ganter (AMS 1)



Total Number of Valid Hours: 689

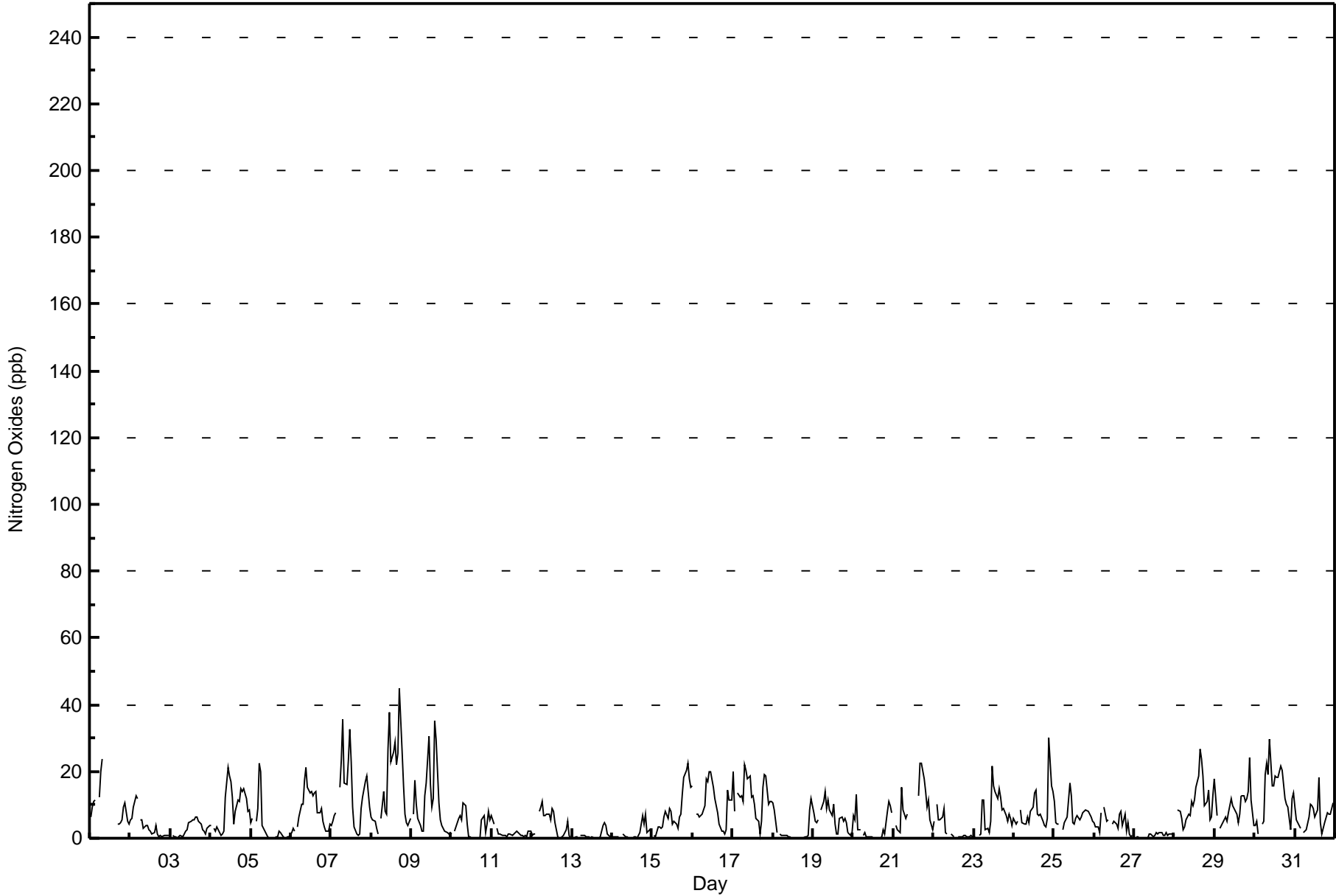








Maximum Value: 45 ppb on Oct 8 18:00																		Maximum Daily Average: 15.4 ppb on Oct 8						Hours in Service: 744			
Minimum Value: 0 ppb on Oct 5 12:00																		Minimum Daily Average: 0.9 ppb on Oct 27						Hours of Data: 689			
Maximum Diurnal Average: 9.5 ppb at hour 11																		Minimum Diurnal Average: 4.3 ppb at hour 2						Hours of Missing Data: 55			
Monthly Average: 6.8 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 5 Q <sub>3</sub> = 10 P <sub>90</sub> = 16 P <sub>99</sub> = 30						Hours of Calibration: 37			
																								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	6	9	11	11	Z	12	20	24	M	M	M	M	M	M	M	M	4	4	5	5	9	10	5	4	--	24	
2-Oct	5	6	9	13	12	Z	6	6	3	4	4	3	2	1	2	4	1	0	1	1	1	1	1	1	3.6	13	
3-Oct	Z	1	0	1	0	0	1	1	1	2	3	5	5	6	6	7	7	5	4	2	2	1	3	4	2.9	7	
4-Oct	4	Z	3	2	3	2	1	1	2	12	21	19	17	12	4	8	11	11	15	14	15	12	8	8	9.0	21	
5-Oct	4	6	Z	5	9	22	20	4	2	1	0	0	0	0	1	1	2	2	0	0	0	0	0	0	3.5	22	
6-Oct	2	3	2	Z	3	6	10	10	17	21	15	13	14	13	13	14	8	8	9	5	3	2	2	4	8.7	21	
7-Oct	4	5	7	8	Z	15	23	36	16	16	23	33	23	9	3	1	1	1	9	12	17	19	14	9	13.2	36	
8-Oct	6	6	5	3	1	Z	6	14	8	7	27	38	23	26	29	22	25	45	26	16	7	5	4	6	15.4	45	
9-Oct	Z	7	17	10	6	4	2	2	13	17	30	16	9	12	35	30	11	5	4	3	2	2	1	2	10.4	35	
10-Oct	1	Z	2	5	6	7	5	11	10	4	0	0	0	0	0	0	0	0	5	7	2	4	8	5	3.6	11	
11-Oct	7	4	Z	3	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	0	1	0	2	2	1.6	7	
12-Oct	1	1	1	Z	8	9	11	7	7	7	7	6	9	8	4	0	0	0	0	1	3	5	1	0	4.2	11	
13-Oct	0	0	0	0	Z	1	1	1	1	0	0	0	0	0	0	0	0	1	4	4	4	1	1	0	0.9	4	
14-Oct	0	0	0	0	0	Z	1	1	0	0	0	0	0	0	0	1	4	7	4	7	2	2	2	2	1.5	7	
15-Oct	Z	1	0	3	3	3	4	6	8	6	9	8	4	5	4	3	6	7	13	18	21	22	18	15	8.2	22	
16-Oct	16	Z	7	7	6	7	7	10	18	17	20	20	15	12	10	8	4	2	2	1	3	14	12	11	10.0	20	
17-Oct	20	8	Z	13	12	13	11	22	20	18	19	12	13	10	6	5	1	5	15	19	19	10	11	11	12.8	22	
18-Oct	10	9	2	Z	1	1	1	1	1	0	0	0	DF	DF	DF	DF	DF	0	0	0	0	1	8	12	2.7	12	
19-Oct	8	5	5	5	Z	9	11	14	9	11	8	7	10	4	1	1	6	6	5	6	5	2	1	2	6.1	14	
20-Oct	7	6	13	3	2	Z	1	2	1	0	0	1	0	0	0	0	0	0	3	1	8	11	10	8	3.3	13	
21-Oct	Z	4	2	2	2	15	9	6	7	C	C	C	C	C	C	C	13	23	23	18	14	9	11	5	3	--	23
22-Oct	5	Z	10	5	5	6	9	2	1	M	1	1	1	M	M	0	0	1	1	1	1	0	1	0	2.6	10	
23-Oct	0	0	Z	1	1	11	11	2	3	1	5	22	16	14	12	15	12	9	9	7	5	7	6	4	7.6	22	
24-Oct	6	4	5	Z	9	5	4	4	6	5	8	9	13	15	7	7	7	5	4	3	6	30	16	14	8.3	30	
25-Oct	11	4	4	4	Z	2	5	5	6	17	13	5	4	6	7	6	6	8	8	9	8	7	6	5	6.8	17	
26-Oct	5	4	3	2	8	Z	9	5	6	M	M	4	5	4	3	7	8	4	7	2	5	1	1	1	4.4	9	
27-Oct	Z	1	0	0	0	0	0	0	0	1	1	1	1	2	1	2	2	1	1	2	1	1	1	1	0.9	2	
28-Oct	1	Z	8	8	6	3	3	6	7	7	11	10	12	15	19	27	24	19	10	11	14	6	6	13	10.6	27	
29-Oct	18	7	Z	3	4	5	6	5	7	10	12	10	8	7	5	7	13	13	11	12	14	24	11	4	9.4	24	
30-Oct	4	5	1	Z	4	5	19	23	19	30	16	16	19	18	18	21	20	16	12	10	9	3	12	14	13.6	30	
31-Oct	9	6	4	3	Z	2	2	3	7	10	10	9	7	9	18	5	1	3	5	8	7	7	9	11	6.6	18	
																								Diurnal Average			
																								Diurnal Maximum			
6.2 4.3 4.8 4.6 4.6 6.4 7.1 7.5 6.9 8.4 9.5 9.2 8.2 7.8 7.8 7.4 6.9 6.7 6.9 6.4 6.7 7.2 6.0 5.7																											
20 9 17 13 12 22 23 36 20 30 30 38 23 26 35 30 25 45 26 19 21 30 18 15																											
Z - zerospan C - Calibration M - Maintenance DF - DAS Failure																											





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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	655	95.07	95.07
21 - 40	33	4.79	99.85
41 - 80	1	0.15	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 689

Total Number of Hours: 744



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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	96	28	17	15	8	8	15	39	90	57	27	35	52	50	72	46	655
21 - 40	4	4	1	1	0	0	3	7	5	5	1	0	1	0	0	1	33
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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>	100	32	18	16	8	8	18	46	95	62	28	35	53	50	72	48	689

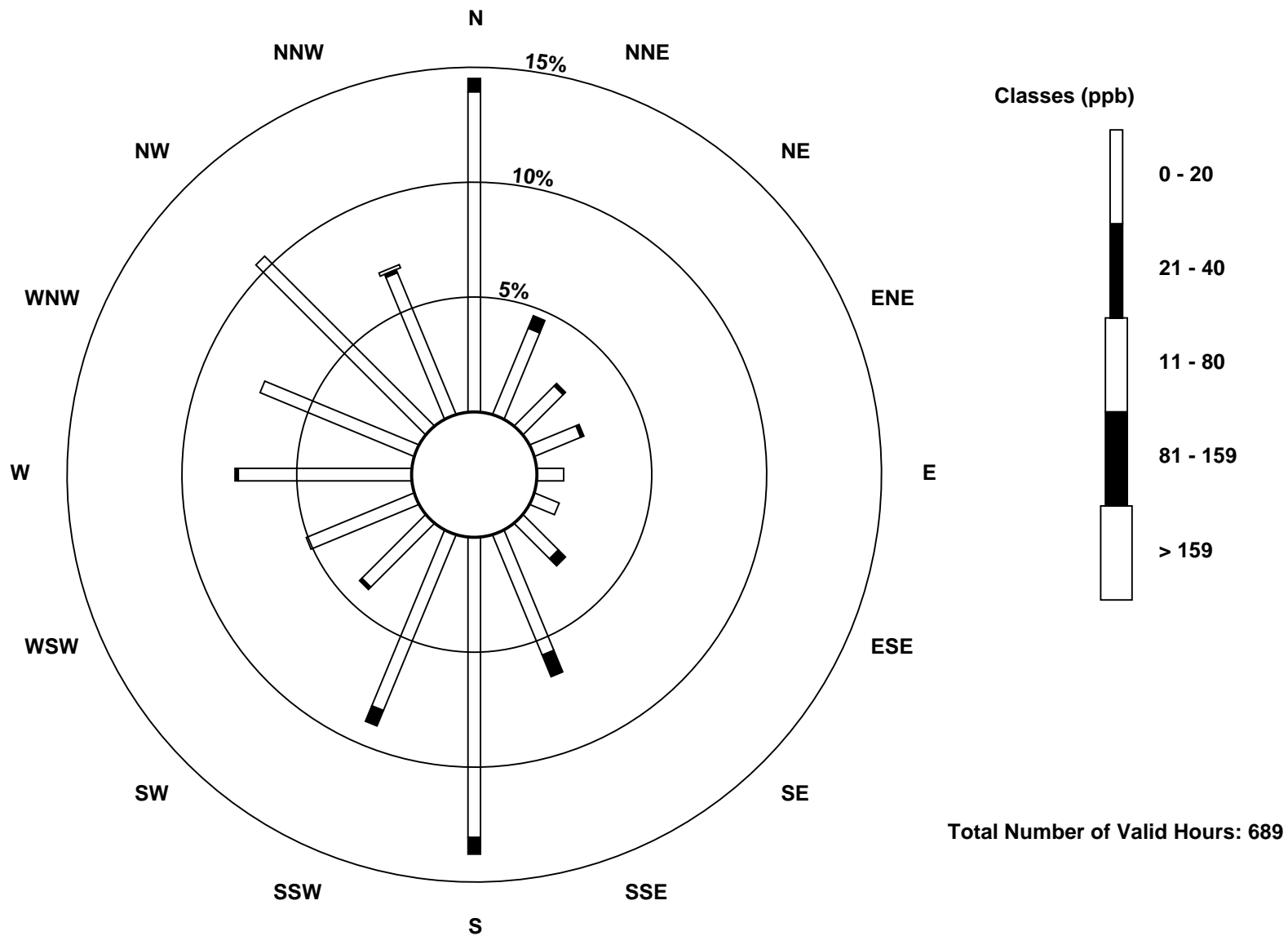
Total Number of Valid Hours: 689

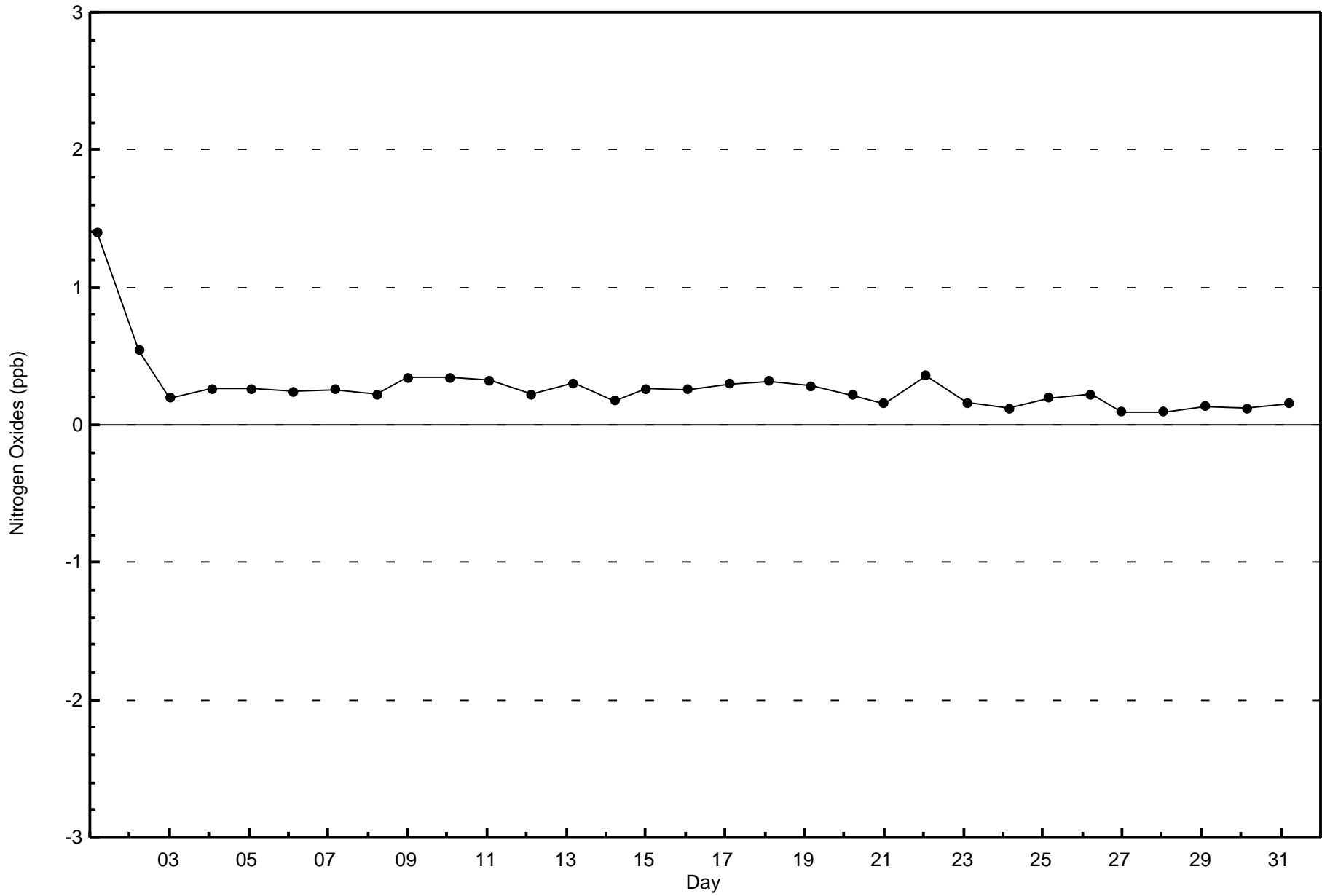
Total Number of Hours: 744

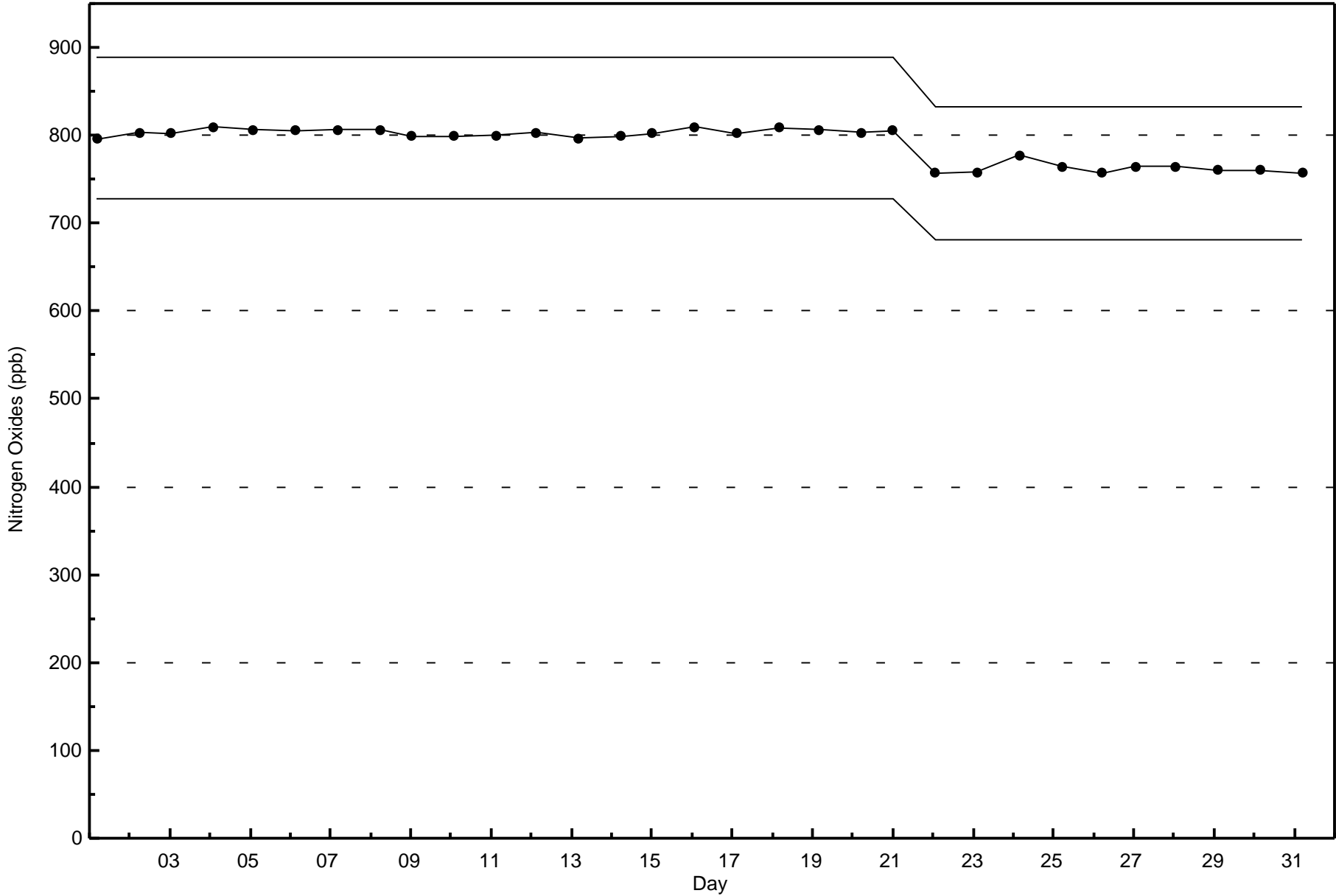


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

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











Summary of Hour Averages

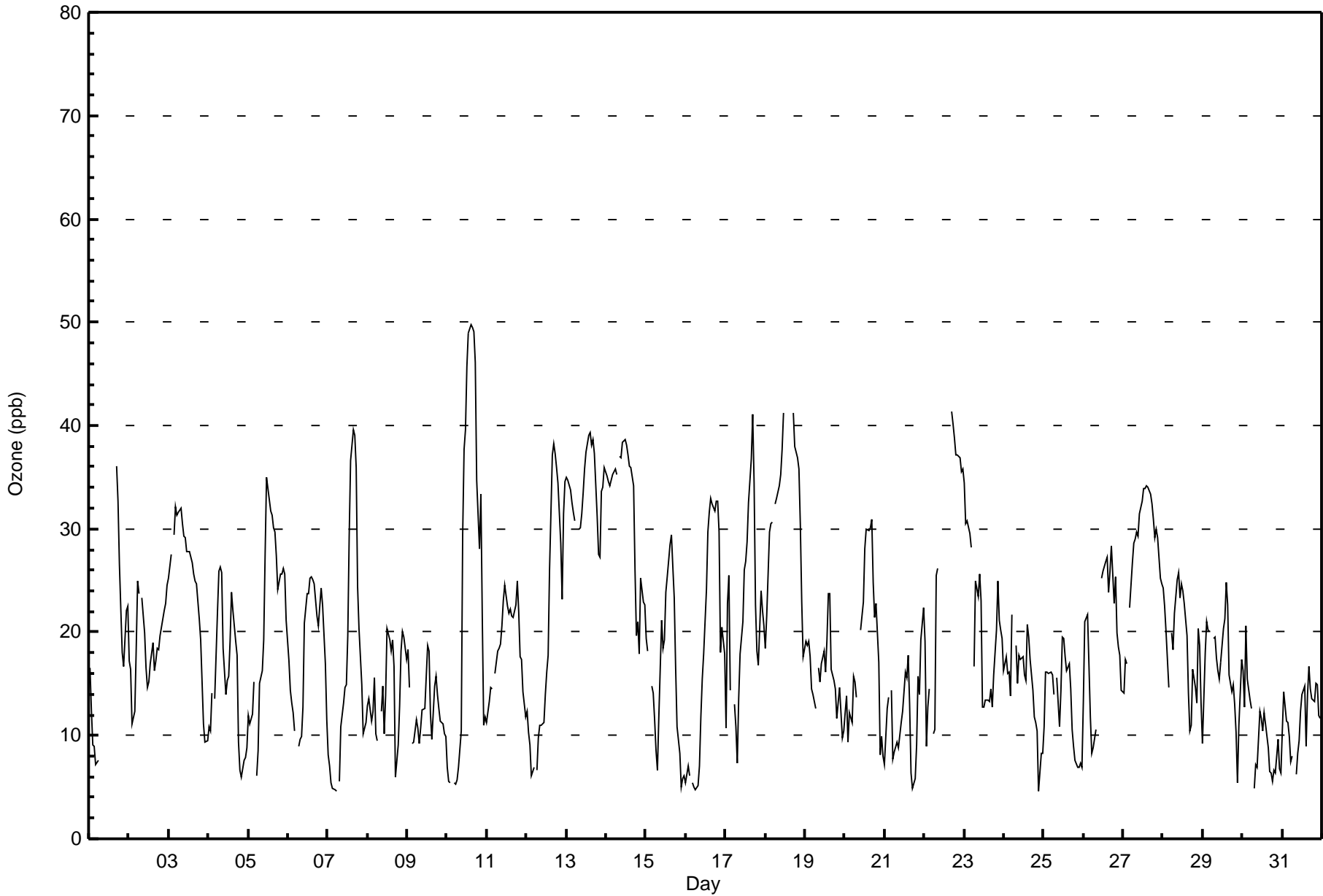
Fort McKay - Bertha Ganter - October 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 50 ppb on Oct 10 15:00	Maximum Daily Average: 33.9 ppb on Oct 13		Hours of Data:	692
Minimum Value: 5 ppb on Oct 24 22:00	Minimum Daily Average: 10.0 ppb on Oct 30		Hours of Missing Data:	52
Maximum Diurnal Average: 25.2 ppb at hour 15	Minimum Diurnal Average: 15.2 ppb at hour 6		Hours of Calibration:	36
Monthly Average: 19.5 ppb	Percentiles: P <sub>1</sub> = 5 P <sub>10</sub> = 8 Q <sub>1</sub> = 12 Median = 18 Q <sub>3</sub> = 26 P <sub>90</sub> = 34 P <sub>99</sub> = 39		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	17	12	9	9	7	8	Z	8	M	M	M	M	M	M	M	M	36	33	27	22	18	17	22	23	--	36	
2-Oct	17	16	11	12	18	25	24	Z	23	20	16	15	15	17	19	16	17	18	18	20	21	22	23	25	18.7	25	
3-Oct	25	28	Z	29	32	31	32	32	31	29	29	28	28	27	27	26	25	25	21	19	15	11	9	10	24.7	32	
4-Oct	11	10	14	Z	14	22	26	26	26	18	14	15	16	19	24	22	19	18	9	7	6	8	8	9	15.7	26	
5-Oct	12	11	12	15	Z	6	8	15	16	19	27	35	34	32	31	30	30	27	24	26	26	26	26	21	22.2	35	
6-Oct	17	14	13	12	10	Z	9	10	10	13	21	24	24	25	25	25	25	22	21	23	24	23	17	12	18.1	25	
7-Oct	8	7	5	5	5	5	Z	6	11	13	15	15	20	29	37	40	39	36	24	20	15	10	11	11	16.8	40	
8-Oct	13	14	11	12	16	10	9	Z	12	15	10	14	20	19	18	19	17	6	9	13	18	20	20	17	14.5	20	
9-Oct	18	15	Z	9	9	12	11	9	11	12	13	16	19	18	12	10	15	16	14	13	11	11	10	10	12.7	19	
10-Oct	7	5	5	Z	5	5	6	7	10	29	38	40	46	49	50	49	49	46	35	28	33	21	11	12	25.5	50	
11-Oct	11	13	15	15	Z	16	18	18	19	21	23	24	23	22	22	22	21	23	25	22	18	17	14	12	18.8	25	
12-Oct	12	10	9	6	7	Z	7	10	11	11	11	14	16	18	26	37	38	37	36	34	29	23	31	35	20.4	38	
13-Oct	35	35	34	32	32	31	Z	30	30	31	34	36	37	39	39	38	39	37	31	27	27	34	34	36	33.9	39	
14-Oct	35	35	34	35	35	36	35	Z	37	37	38	39	38	37	36	36	34	26	20	21	18	25	23	23	31.9	39	
15-Oct	19	18	Z	15	14	12	8	7	12	21	18	19	24	25	28	29	26	23	17	11	8	5	6	6	16.2	29	
16-Oct	5	7	6	Z	5	5	5	5	7	12	15	18	24	30	32	33	32	32	33	33	30	18	20	18	18.5	33	
17-Oct	11	23	26	14	Z	13	11	7	14	18	21	26	27	29	33	37	41	34	23	18	17	24	22	21	22.1	41	
18-Oct	18	22	30	31	31	Z	32	33	34	35	38	41	DF	DF	DF	DF	DF	41	38	37	36	30	23	18	31.5	41	
19-Oct	19	19	19	18	14	14	13	Z	17	15	17	18	16	19	24	24	16	15	15	12	13	15	10	10	16.1	24	
20-Oct	12	14	9	12	11	16	15	14	Z	20	22	23	28	30	30	30	31	25	21	23	17	8	10	8	18.7	31	
21-Oct	7	13	14	Z	14	8	8	9	9	10	11	12	16	16	18	13	6	5	6	9	16	14	19	22	12.0	22	
22-Oct	19	9	13	14	Z	10	11	25	26	M	27	C	C	C	C	C	41	40	39	37	37	37	36	36	--	41	
23-Oct	34	31	31	29	28	Z	17	25	23	26	23	13	13	13	13	13	15	13	16	20	25	21	20	19	20.9	34	
24-Oct	16	18	16	16	14	22	Z	17	19	15	18	17	18	16	15	21	20	17	14	12	11	10	5	8	8	15.0	22
25-Oct	11	16	16	16	16	16	14	Z	16	11	14	20	19	18	16	17	15	11	9	8	7	7	7	7	13.3	20	
26-Oct	13	21	22	17	12	8	9	11	Z	M	M	25	26	27	27	24	26	28	23	25	20	19	18	14	19.7	28	
27-Oct	14	17	17	Z	22	27	29	29	30	29	31	33	34	34	34	34	33	32	31	29	30	29	25	25	28.2	34	
28-Oct	24	23	20	15	Z	20	18	22	25	26	23	25	24	23	20	14	11	11	16	15	13	20	19	13	19.1	26	
29-Oct	9	18	21	20	20	Z	19	19	17	16	15	17	20	21	25	23	16	14	15	13	10	5	11	17	16.7	25	
30-Oct	16	13	21	15	13	13	Z	5	7	7	12	12	10	12	11	9	7	6	6	7	6	10	7	6	10.0	21	
31-Oct	10	14	11	11	10	7	8	Z	6	8	10	12	14	15	9	14	17	14	14	13	15	15	12	12	11.8	17	

16.1	16.8	16.6	16.8	16.0	15.2	15.4	16.0	18.0	19.3	20.9	22.2	23.1	24.2	25.2	25.1	25.1	23.6	20.8	19.9	19.1	17.7	17.1	16.6	Diurnal Average
35	35	34	35	35	36	35	33	37	37	38	41	46	49	50	49	49	46	39	37	37	37	36	36	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**  
**Fort McKay - Bertha Ganter - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	417	60.26	60.26
21 - 50	275	39.74	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 692

Total Number of Hours: 744



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

**Ozone (O<sub>3</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2015**

<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	78	22	12	10	4	7	13	24	65	44	21	13	19	27	29	29	417
21 - 50	23	11	5	6	4	1	6	22	29	19	9	22	32	26	40	20	275
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>	101	33	17	16	8	8	19	46	94	63	30	35	51	53	69	49	692

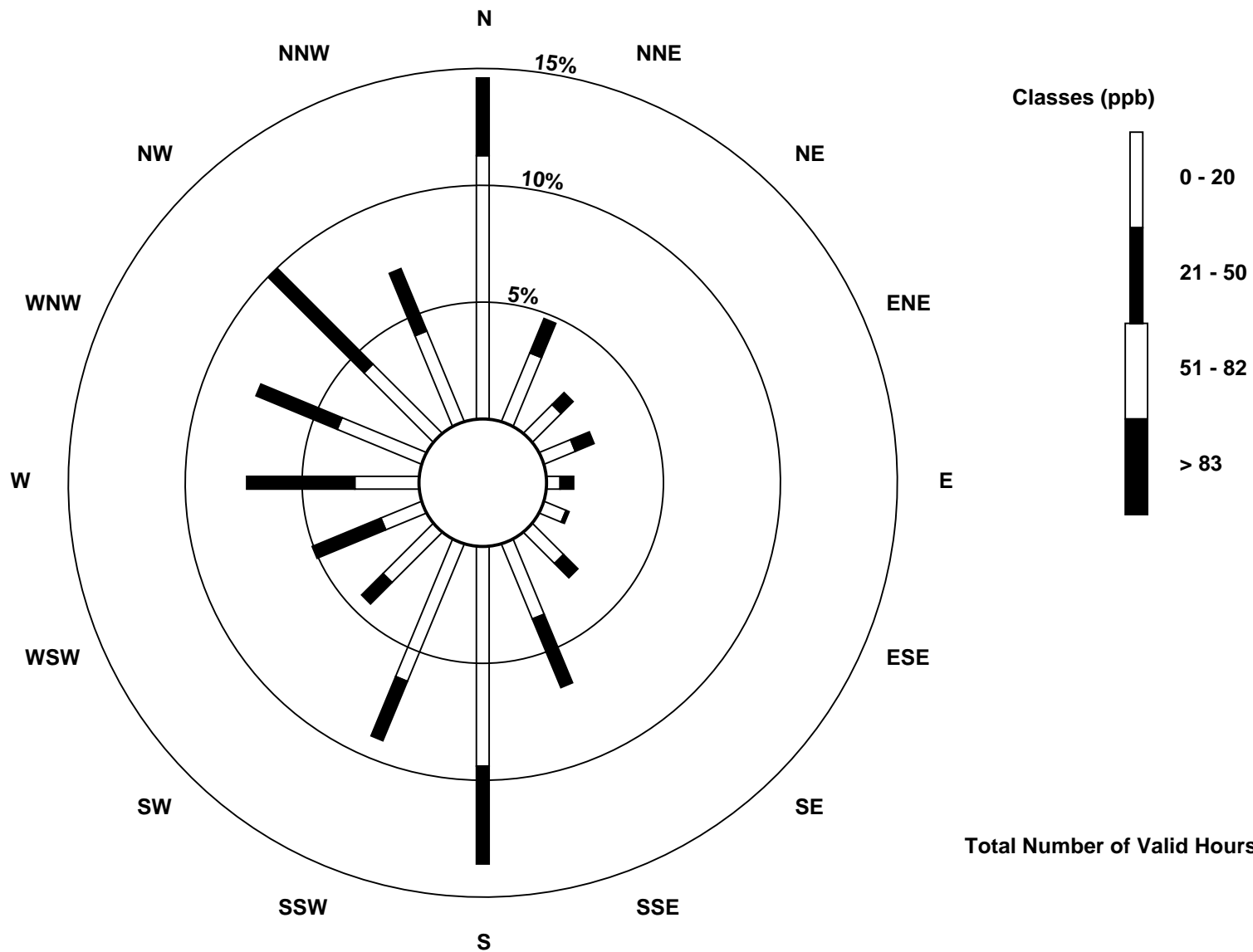
Total Number of Valid Hours: 692

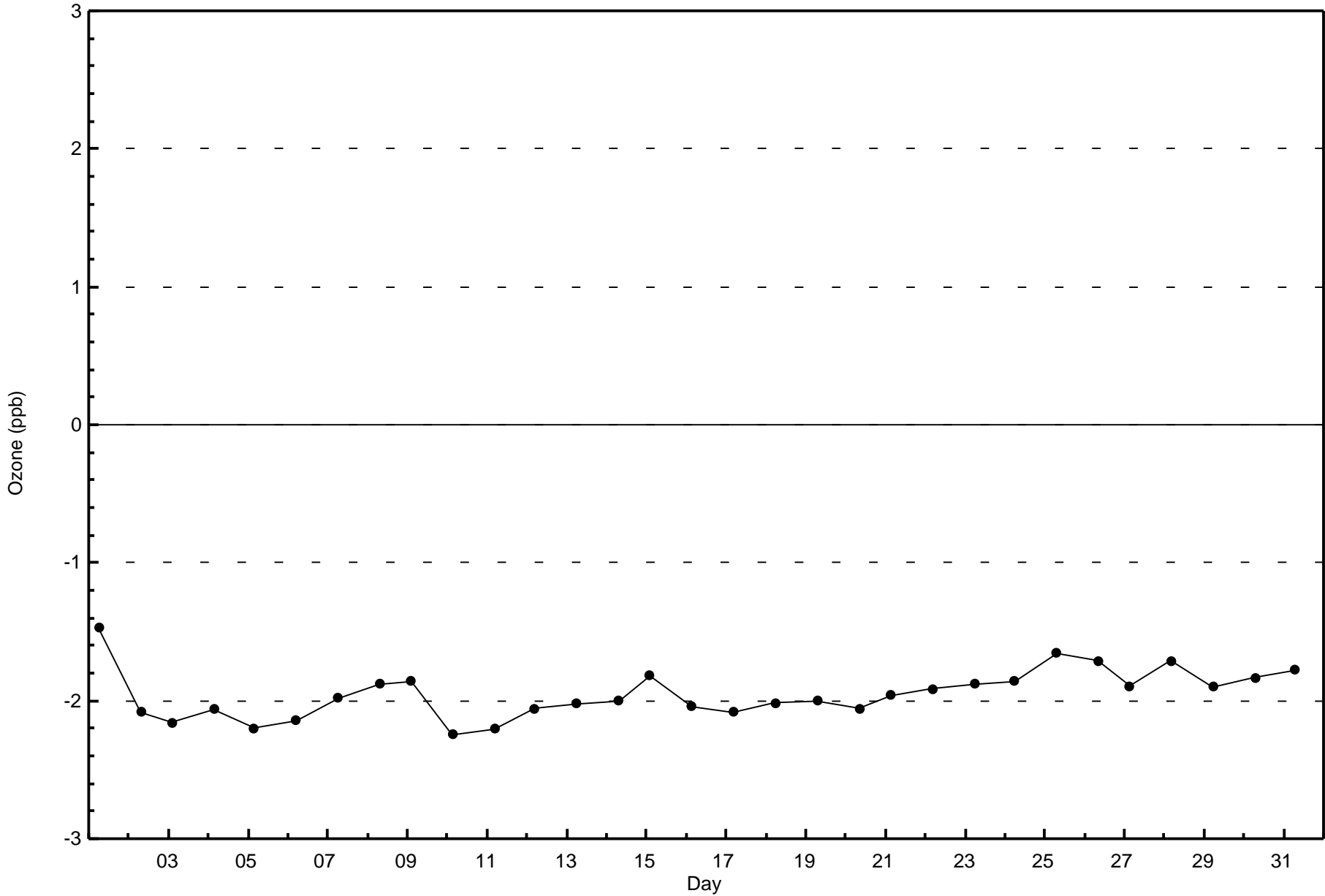
Total Number of Hours: 744

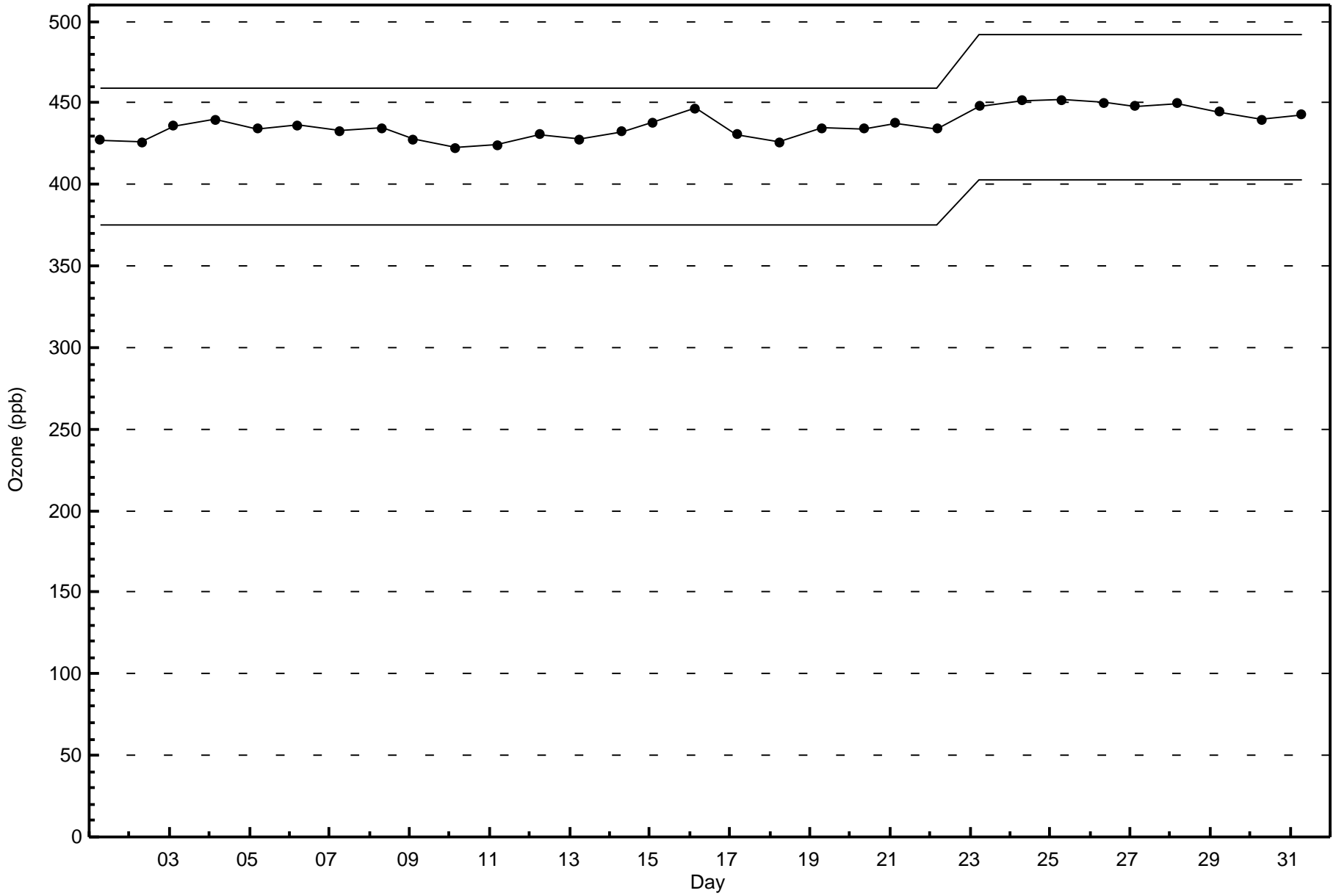


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

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 2015

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 40.1 µg/m <sup>3</sup> on Oct 4 11:00 Maximum Daily Average: 12.6 µg/m <sup>3</sup> on Oct 4		Hours in Service: 744 Hours of Data: 715 Hours of Missing Data: 29 Hours of Calibration: 2 Percent Operational Time: 96.4																								
Minimum Value: 0.0 µg/m <sup>3</sup> on Oct 10 17:00 Maximum Diurnal Average: 5.4 µg/m <sup>3</sup> at hour 18 Monthly Average: 4.34 µg/m <sup>3</sup>		Minimum Daily Average: 0.6 µg/m <sup>3</sup> on Oct 11 Minimum Diurnal Average: 3.4 µg/m <sup>3</sup> at hour 24 Percentiles: P <sub>1</sub> = 0.1 P <sub>10</sub> = 0.7 Q <sub>1</sub> = 1.7 Median = 3.5 Q <sub>3</sub> = 6.0 P <sub>90</sub> = 8.9 P <sub>99</sub> = 18.1																								
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	7.9	8.4	7.1	6.5	8.6	7.9	9.5	7.7	6.8	7.5	4.9	5.0	10.2	9.9	7.4	6.5	6.8	12.9	13.2	11.9	12.7	12.2	8.3	6.9	8.6	13.2
2-Oct	7.0	8.4	9.1	6.1	5.2	6.9	6.0	4.4	2.4	3.8	4.0	2.4	1.5	0.8	0.5	0.5	UO	UO	UO	0.5	0.4	0.4	0.4	0.4	3.4	9.1
3-Oct	1.2	1.4	1.3	1.3	1.4	1.6	1.7	2.0	1.4	1.8	1.0	1.1	1.6	1.9	1.8	1.6	1.8	1.6	2.0	2.2	2.6	2.6	2.6	2.8	1.8	2.8
4-Oct	3.5	4.0	3.7	3.4	4.3	4.8	4.2	3.8	6.2	29.8	40.1	27.1	22.8	14.1	6.1	8.5	13.1	16.0	17.8	17.7	17.1	13.6	11.3	8.2	12.6	40.1
5-Oct	4.2	6.8	4.5	2.6	3.2	4.3	3.7	2.7	2.7	1.6	0.7	0.2	0.4	UO	UO	0.4	UO	0.2	0.2	0.3	0.5	0.2	0.8	0.8	1.9	6.8
6-Oct	1.5	2.1	1.0	0.8	1.2	1.8	2.4	3.7	3.5	4.1	3.3	3.8	3.8	5.4	7.4	6.3	5.7	2.5	3.3	2.3	2.6	1.9	2.2	2.9	3.2	7.4
7-Oct	3.9	5.2	6.0	6.1	6.6	7.9	9.8	9.7	6.8	5.7	6.8	9.0	5.8	4.3	1.9	1.5	1.1	1.7	3.8	5.5	6.3	5.9	5.9	6.5	5.6	9.8
8-Oct	4.9	7.1	6.6	3.9	2.2	2.9	3.4	9.6	8.9	4.7	6.5	15.2	10.0	5.7	8.6	9.1	9.3	13.4	14.7	9.9	5.4	3.9	2.4	2.6	7.1	15.2
9-Oct	2.0	2.0	2.9	2.6	2.3	1.9	1.7	1.9	3.1	4.0	6.4	5.6	5.2	6.4	9.3	9.7	8.8	9.2	9.4	8.9	8.7	8.2	8.3	7.8	5.7	9.7
10-Oct	6.3	8.0	7.3	8.6	8.0	6.4	5.1	5.3	4.1	1.3	0.5	0.5	0.3	0.3	0.1	0.1	0.0	0.1	1.2	4.2	5.4	2.8	1.6	1.0	3.3	8.6
11-Oct	0.7	0.8	0.7	0.7	0.7	0.8	0.8	0.6	0.5	0.4	0.4	0.3	0.3	0.4	0.1	0.1	UO	UO	UO	UO	1.1	0.5	1.2	1.0	0.6	1.2
12-Oct	0.7	0.6	0.9	1.6	1.6	1.7	2.2	2.4	2.8	6.3	8.1	5.8	5.0	3.1	1.5	UO	UO	UO	0.5	1.3	3.5	4.5	0.8	0.1	2.6	8.1
13-Oct	0.1	0.1	0.1	0.2	0.2	0.2	0.7	0.9	0.4	0.2	UO	0.4	0.3	UO	UO	0.5	0.7	0.9	1.3	8.8	8.2	1.3	1.0	1.3	1.3	8.8
14-Oct	1.6	1.8	2.0	1.9	1.2	0.9	0.8	0.7	0.5	0.4	0.1	UO	0.2	0.8	0.9	0.5	0.7	1.7	2.0	1.0	1.1	0.7	0.7	0.4	1.0	2.0
15-Oct	0.6	0.4	0.4	0.7	0.9	1.3	1.3	1.9	2.6	1.4	2.3	2.6	1.7	2.1	2.4	7.4	6.2	10.3	12.1	9.8	7.6	5.4	6.4	4.8	3.9	12.1
16-Oct	4.3	3.7	3.3	3.6	4.3	4.4	4.4	4.4	5.3	4.4	4.3	4.2	4.0	5.9	5.0	6.4	6.1	4.2	4.2	2.6	2.6	7.1	6.5	6.1	4.6	7.1
17-Oct	8.3	6.4	5.1	21.8	11.9	11.0	7.9	9.1	9.1	8.6	10.3	10.2	10.3	11.1	10.2	9.7	2.8	6.3	12.4	9.6	8.6	6.4	7.4	7.9	9.3	21.8
18-Oct	8.2	7.5	5.6	5.8	5.8	5.3	5.2	5.6	4.9	3.5	1.9	0.9	DF	DF	DF	DF	DF	UO	0.5	1.1	2.9	0.6	2.5	2.0	3.9	8.2
19-Oct	2.4	3.0	3.7	4.4	4.4	5.4	8.5	7.6	4.9	4.8	4.2	4.3	6.0	4.3	4.2	5.7	5.9	5.2	4.6	4.4	4.2	4.6	4.1	4.1	4.8	8.5
20-Oct	6.7	8.7	6.8	7.1	6.8	1.8	0.5	0.6	0.5	0.8	1.0	0.5	UO	UO	UO	UO	0.8	1.0	1.3	1.2	1.3	1.2	0.9	0.8	2.5	8.7
21-Oct	2.3	2.4	1.8	2.5	2.2	3.7	12.5	18.5	13.6	11.6	7.2	3.1	1.6	1.8	2.0	3.0	3.7	3.5	3.7	3.6	3.0	2.5	2.9	2.3	4.8	18.5
22-Oct	3.8	3.3	4.2	3.7	4.1	6.0	4.9	3.8	2.6	2.3	2.8	2.9	2.1	1.3	C	C	2.7	3.1	3.8	4.2	3.6	3.8	3.6	3.4	3.5	6.0
23-Oct	4.3	5.2	5.9	5.0	5.4	7.9	7.1	5.4	5.3	3.9	3.7	3.5	3.3	2.9	3.1	3.3	2.0	1.8	2.0	1.6	1.7	1.8	1.9	1.8	3.7	7.9
24-Oct	1.8	1.8	2.1	2.1	2.2	2.1	1.8	1.9	2.2	2.3	2.6	2.8	3.3	3.2	3.8	8.9	10.0	7.2	5.6	5.7	5.0	3.3	2.7	2.7	3.6	10.0
25-Oct	1.7	1.3	1.7	1.8	1.9	2.0	2.1	2.0	2.2	2.5	2.2	1.5	1.5	1.8	2.9	3.0	3.5	3.6	3.7	4.1	3.7	3.6	5.2	7.2	2.8	7.2
26-Oct	4.8	3.4	3.7	2.5	2.9	3.1	3.5	3.5	3.3	3.0	3.4	2.9	2.4	2.5	2.5	3.3	3.1	3.1	3.3	3.6	5.3	2.8	1.5	1.7	3.1	5.3
27-Oct	1.4	1.4	1.8	2.2	2.0	1.6	1.1	1.0	1.1	1.1	1.1	1.1	1.1	1.2	1.1	1.2	1.2	1.1	1.0	1.0	1.0	1.1	1.1	1.8	1.3	2.2
28-Oct	1.5	1.3	1.5	1.8	1.9	1.8	2.0	2.6	11.2	10.3	5.9	4.3	7.9	12.7	5.8	4.2	4.2	3.1	2.1	2.6	3.2	3.1	3.7	3.5	4.3	12.7
29-Oct	3.9	4.0	3.9	4.3	5.1	5.5	5.9	5.6	8.1	10.8	10.2	6.5	4.2	4.4	3.7	4.6	7.0	9.1	8.3	7.7	6.7	7.0	9.1	6.0	6.3	10.8
30-Oct	4.9	4.6	3.5	3.7	4.0	3.5	3.5	4.7	5.1	5.1	4.3	4.6	5.6	5.6	8.4	8.9	11.0	19.1	11.0	9.9	8.4	3.6	3.7	4.5	6.3	19.1
31-Oct	5.1	5.7	5.6	6.0	6.1	6.1	6.4	6.4	9.5	8.0	7.2	6.5	5.2	4.9	5.1	4.8	3.8	3.4	3.1	2.9	3.1	2.9	3.0	3.4	5.2	9.5
																								Diurnal Average		
																								Diurnal Maximum		
3.6 3.9 3.7 4.0 3.8 3.9 4.2 4.5 4.6 5.0 5.2 4.6 4.4 4.4 4.1 4.4 4.7 5.4 5.2 5.0 4.8 3.9 3.7 3.4 8.3 8.7 9.1 21.8 11.9 11.0 12.5 18.5 13.6 29.8 40.1 27.1 22.8 14.1 10.2 9.7 13.1 19.1 17.8 17.7 17.1 13.6 11.3 8.2																										
C - Calibration      DF - DAS Failure      UO - Unstable Operation Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m <sup>3</sup>																										



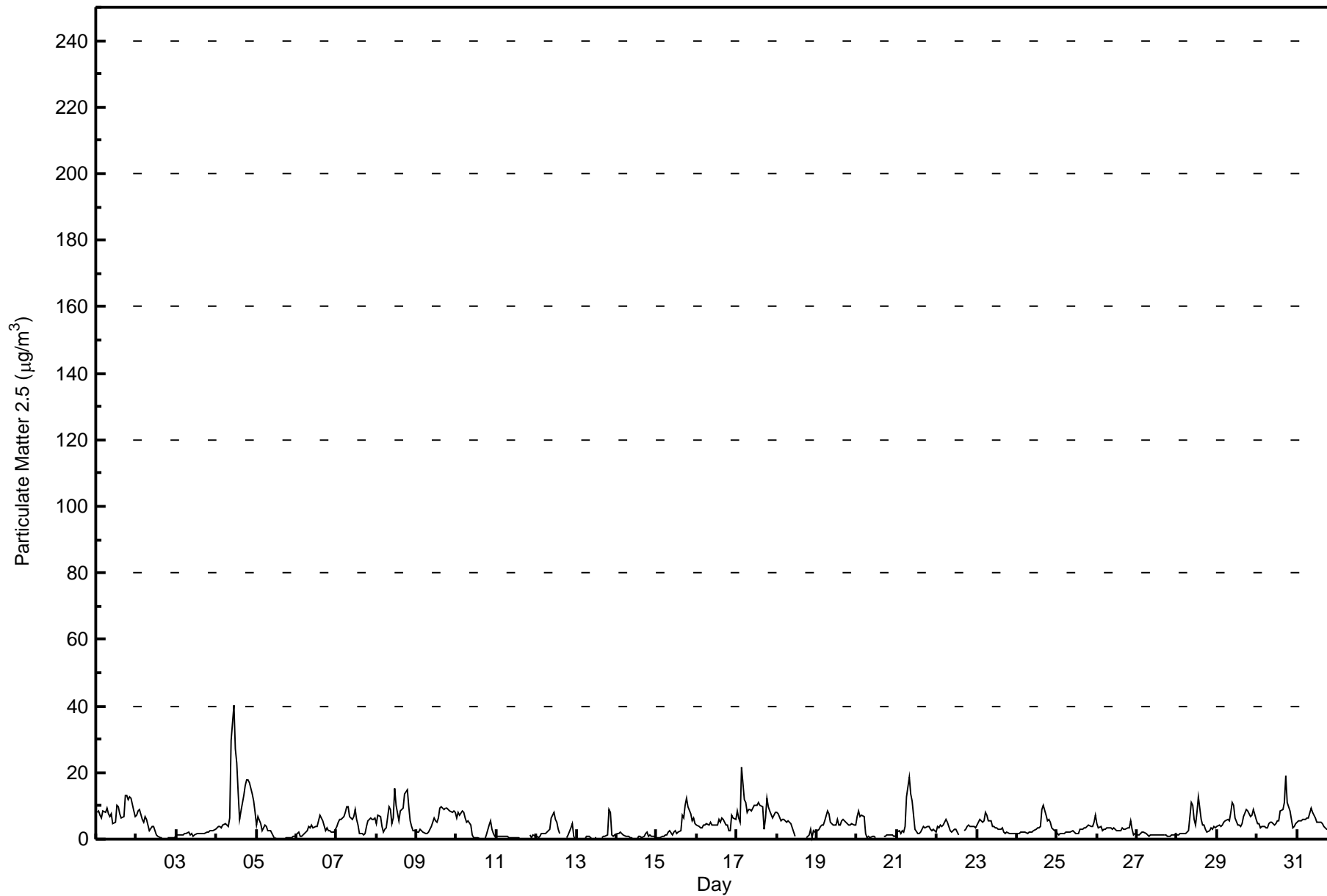


Wood Buffalo Environmental Association

Hourly Averages

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$

Fort McKay - Bertha Ganter - October 2015





**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 2015**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	405	56.64	56.64
6 - 15	197	27.55	84.20
16 - 25	8	1.12	85.31
26 - 80	3	0.42	85.73
> 81.0	0	0.00	85.73

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 McKay - Bertha Ganter - October 2015**

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	72	22	14	14	7	5	13	24	52	30	18	16	24	26	41	27	405
6 - 15	14	10	4	2	1	2	5	29	47	32	8	5	10	8	12	8	197
16 - 25	0	0	0	0	0	0	0	1	2	1	3	0	0	1	0	0	8
26 - 80	0	0	0	0	0	0	0	0	0	2	1	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>	86	32	18	16	8	7	18	54	101	65	30	21	34	35	53	35	613

Total Number of Valid Hours: 715

Total Number of Hours: 744





Summary of Hour Averages

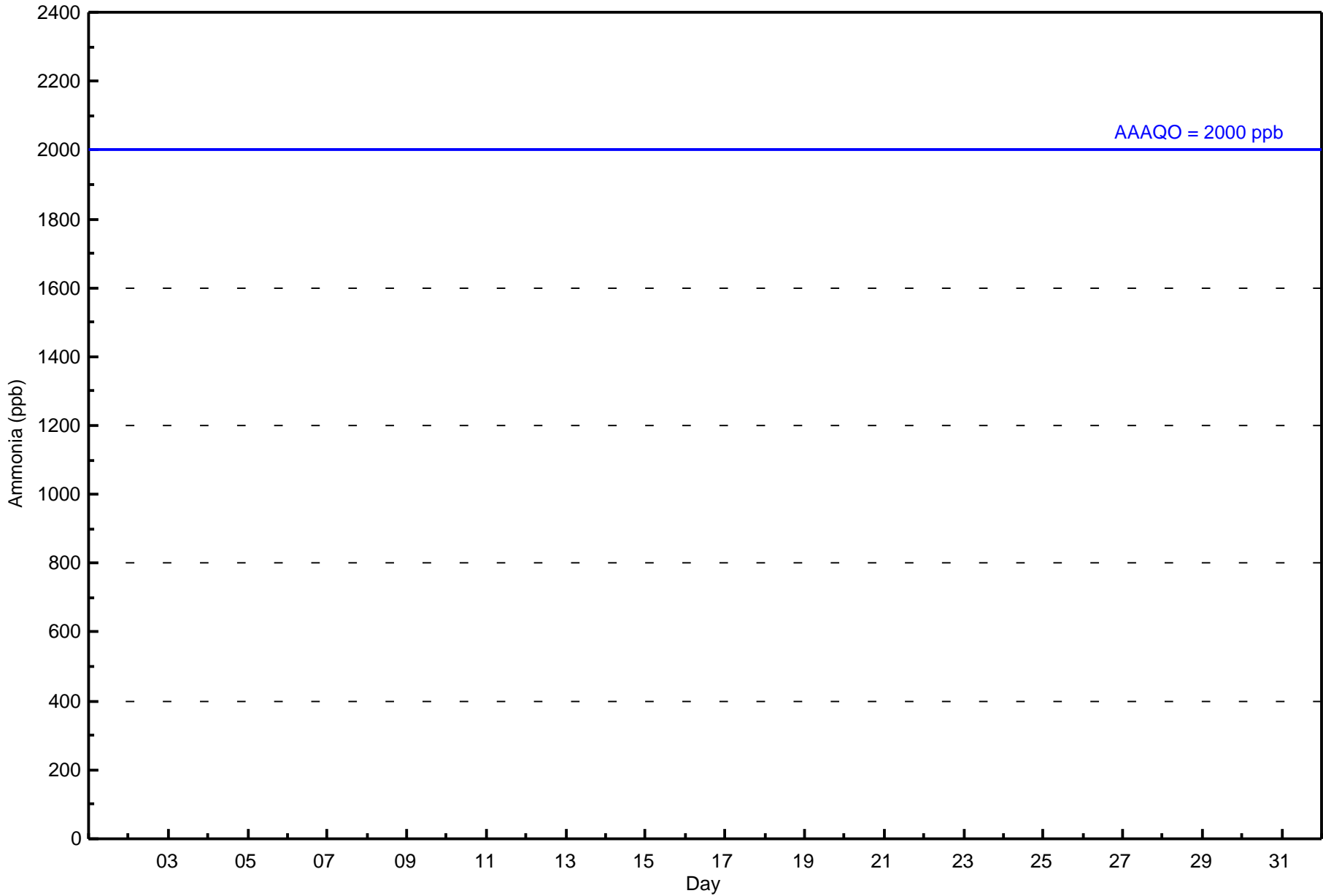
Fort McKay - Bertha Ganter - October 2015

Number of Exceedences (AAAQO): 1-hr: 0	Maximum Value: 0 ppb on Oct 1 01:00	Maximum Daily Average: 0.0 ppb on Oct 2	Hours in Service: 744
Minimum Value: 0 ppb on Oct 1 01:00	Maximum Diurnal Average: 0.0 ppb at hour 1	Minimum Diurnal Average: 0.0 ppb at hour 1	Hours of Data: 636
Monthly Average: 0.0 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		Hours of Missing Data: 108
			Hours of Calibration: 38
			Percent Operational Time: 90.6

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	RE	M	M	M	M	M	M	M	M	0	0	0	0	0	0	0	0	--	0
2-Oct	0	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0.0	0
3-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
4-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
5-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
6-Oct	0	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
7-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
8-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
9-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
10-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
11-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
12-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
13-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
14-Oct	0	0	0	0	0	0	0	0	AF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
15-Oct	0	0	0	AF	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	AF	0	0	0	0	M	M	M	M	M	0	0	0	0	0	0	0	0	0	0	0.0	0
17-Oct	0	0	0	0	0	AF	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	0	AF	0	0	0	0	0	DF	DF	0	0	0	0	0	0	0	0	0	0	0.0	0
19-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
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
21-Oct	0	0	Z	RE	RE	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	--	0
22-Oct	0	0	0	Z	RE	RE	0	0	C	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	--	0
23-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
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
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
26-Oct	0	0	0	0	0	0	0	Z	RE	RE	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
27-Oct	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
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
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
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
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Average
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Diurnal Maximum

Z - zerospan      C - Calibration      M - Maintenance      DF - DAS Failure      AF - Analyzer Failure      RE - Recovery  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 2000 ppb





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

**Ammonia (NH<sub>3</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	636	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: 636

Total Number of Hours: 744



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

**Ammonia (NH<sub>3</sub>) - ppb**  
**Fort McKay - Bertha Ganter - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	93	31	16	14	8	6	17	42	79	58	26	28	50	55	69	44	636
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>	93	31	16	14	8	6	17	42	79	58	26	28	50	55	69	44	636

Total Number of Valid Hours: 636

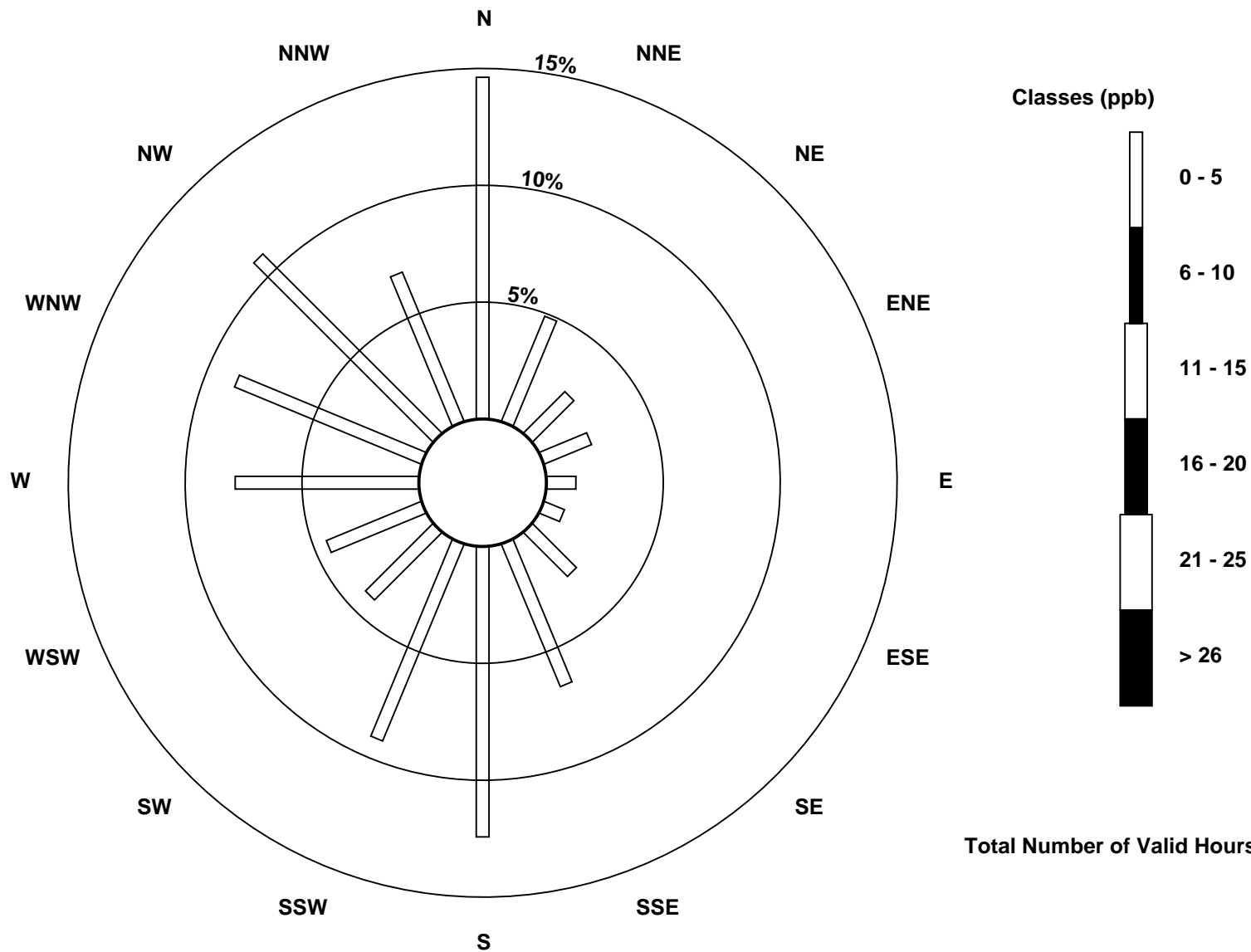
Total Number of Hours: 744

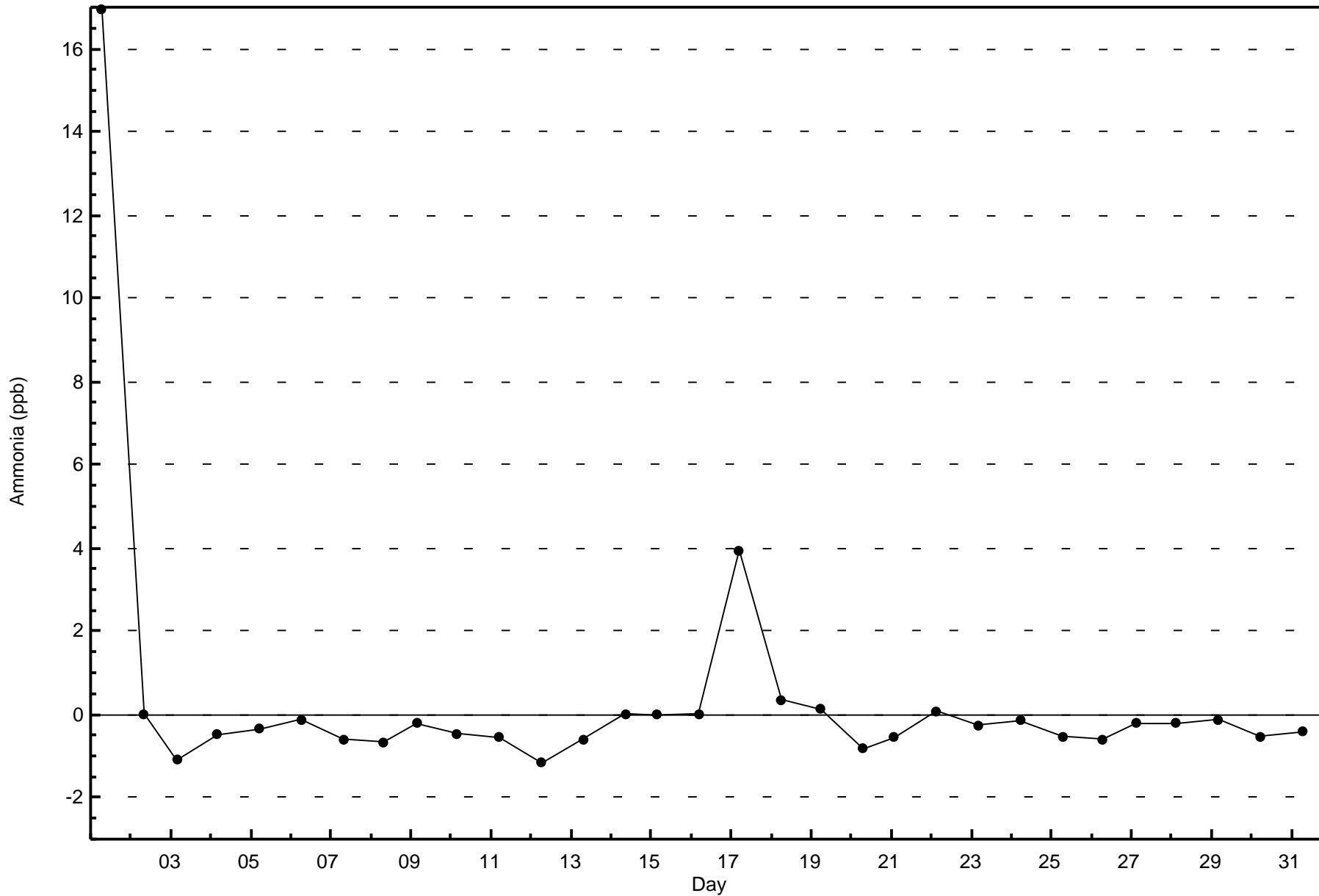


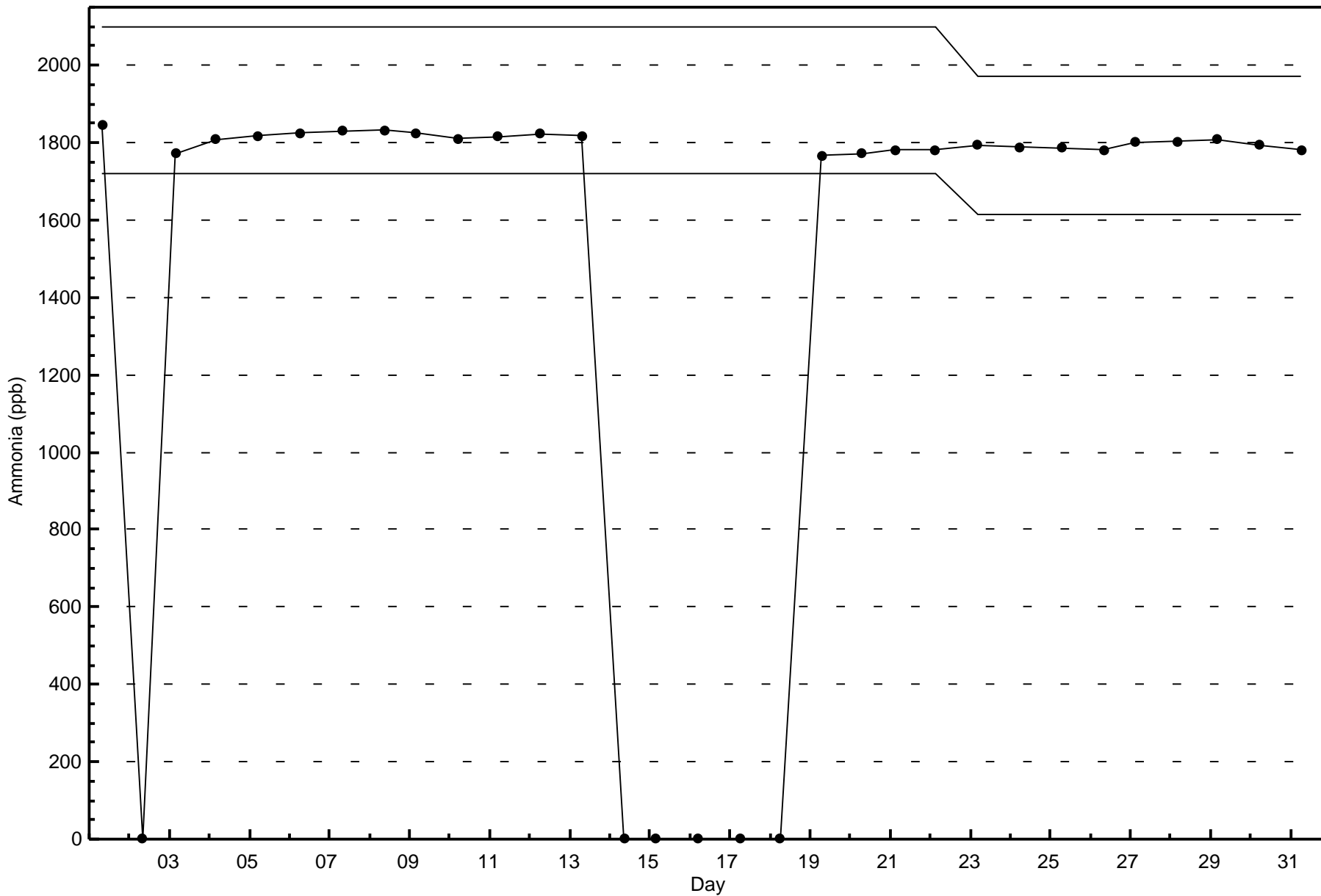


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

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







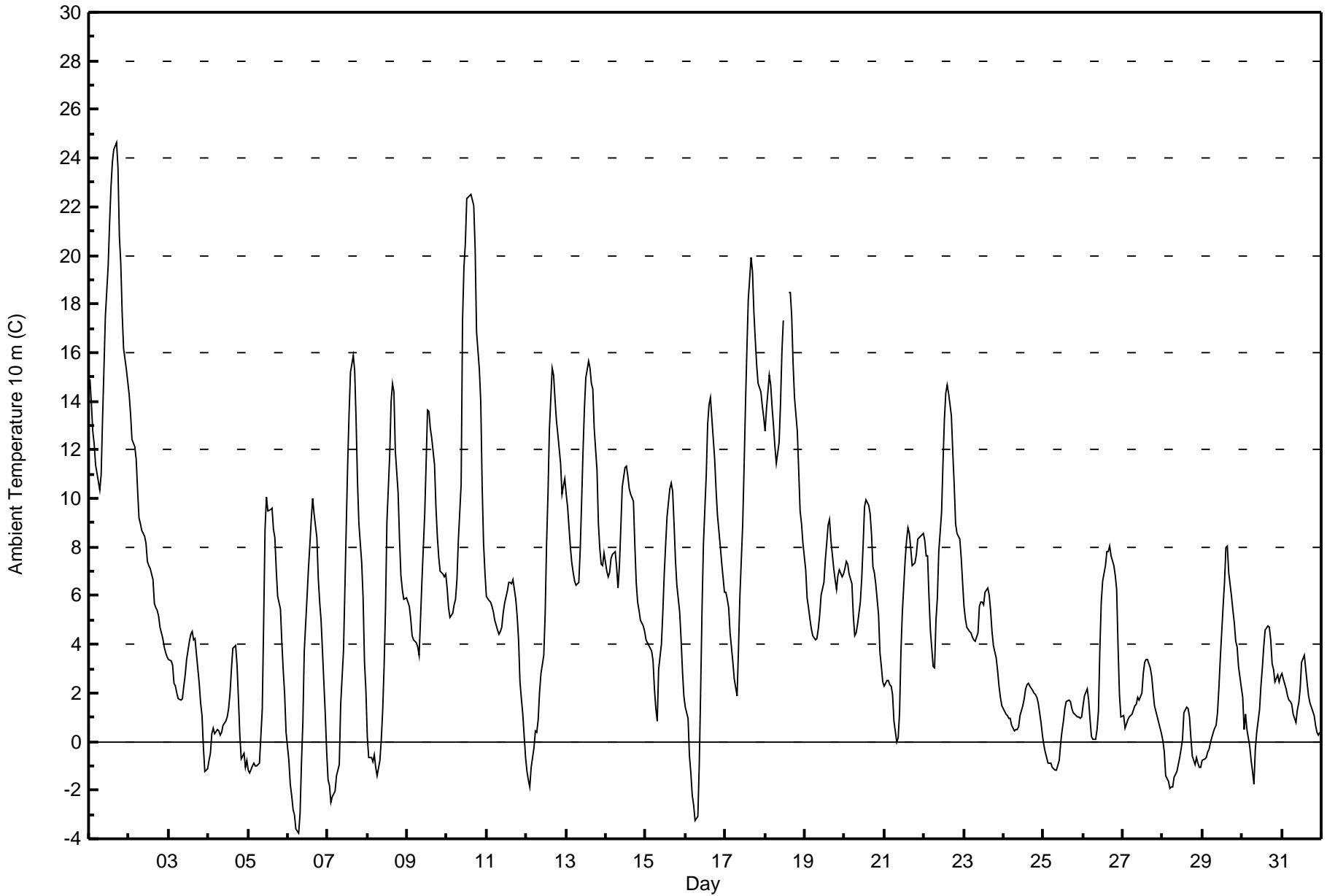


Maximum Value: 24.6 C on Oct 1 17:00		Maximum Daily Average: 17.0 C on Oct 1		Hours in Service: 744																																												
Minimum Value: -3.8 C on Oct 6 07:00		Minimum Daily Average: -0.6 C on Oct 28		Hours of Data: 742																																												
Maximum Diurnal Average: 10.0 C at hour 16		Minimum Diurnal Average: 2.3 C at hour 7		Hours of Missing Data: 2																																												
Monthly Average: 5.62 C		Percentiles: P <sub>1</sub> = -2.6 P <sub>10</sub> = -0.7 Q <sub>1</sub> = 1.4 Median = 4.8 Q <sub>3</sub> = 8.4 P <sub>90</sub> = 13.6 P <sub>99</sub> = 22.2		Hours of Calibration: 0																																												
				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	14.9	13.9	12.8	12.2	11.4	10.7	10.4	11.0	13.3	15.4	17.5	19.6	21.3	22.8	23.8	24.4	24.6	23.6	20.8	19.7	17.6	16.2	15.3	14.8	17.0	24.6																						
2-Oct	14.3	13.4	12.4	12.2	11.6	10.4	9.2	9.0	8.7	8.4	8.2	7.4	7.3	7.1	6.6	5.7	5.5	5.4	5.2	4.7	4.2	3.9	3.7	3.5	7.8	14.3																						
3-Oct	3.4	3.3	3.1	2.4	2.3	2.0	1.8	1.7	1.8	2.3	2.7	3.4	4.1	4.4	4.5	4.2	4.2	3.6	2.4	1.6	1.1	-0.3	-1.2	-1.1	2.4	4.5																						
4-Oct	-0.8	-0.5	0.3	0.6	0.3	0.5	0.5	0.3	0.4	0.7	0.8	1.0	1.4	2.0	3.0	3.8	4.0	3.2	1.7	0.2	-0.7	-0.5	-1.1	-0.8	0.8	4.0																						
5-Oct	-1.2	-1.3	-1.0	-0.9	-1.0	-1.0	-0.9	-0.9	1.3	4.9	8.7	10.1	9.5	9.5	9.6	8.8	8.4	7.1	6.0	5.5	4.1	2.9	1.9	0.4	3.8	10.1																						
6-Oct	-0.8	-1.8	-2.2	-2.8	-3.0	-3.6	-3.8	-2.9	-0.9	0.8	3.7	6.0	7.1	8.1	9.1	10.0	9.4	8.4	6.7	5.7	5.0	3.7	1.1	-0.4	2.6	10.0																						
7-Oct	-1.6	-1.8	-2.5	-2.3	-2.0	-1.4	-1.2	-0.9	1.5	3.7	6.2	8.9	11.5	13.5	15.2	15.9	15.2	13.2	10.7	8.9	7.3	5.9	3.3	2.1	5.4	15.9																						
8-Oct	0.2	-0.7	-0.7	-0.8	-0.5	-1.1	-1.4	-0.8	0.1	1.3	3.1	5.5	9.0	11.8	14.0	14.7	14.4	12.0	10.2	8.4	6.9	6.2	5.9	5.9	5.1	14.7																						
9-Oct	5.8	5.5	5.1	4.4	4.2	4.1	3.9	3.6	5.0	6.6	9.4	11.4	13.6	13.6	12.9	12.5	11.4	9.6	8.4	7.6	7.0	6.9	6.8	6.9	7.7	13.6																						
10-Oct	6.3	5.5	5.1	5.3	5.6	5.9	6.6	8.3	10.6	17.4	19.5	20.5	22.3	22.4	22.5	22.3	22.1	20.3	16.9	15.3	14.0	10.5	8.2	7.0	13.3	22.5																						
11-Oct	6.0	5.8	5.8	5.5	5.3	5.0	4.6	4.4	4.5	4.7	5.3	5.7	6.2	6.5	6.5	6.5	6.7	5.8	5.2	4.2	2.5	1.8	1.2	-0.7	4.8	6.7																						
12-Oct	-1.3	-1.6	-1.9	-1.1	-0.3	0.4	0.4	0.9	2.0	2.8	3.5	5.3	8.2	10.2	12.8	15.4	15.1	14.1	13.2	12.6	11.4	10.2	10.5	10.8	6.4	15.4																						
13-Oct	10.2	9.7	8.0	7.4	6.9	6.6	6.4	6.5	7.9	9.9	11.9	13.7	15.0	15.6	15.4	14.7	14.5	12.9	11.2	9.0	7.9	7.3	7.2	7.7	10.1	15.6																						
14-Oct	7.0	6.8	7.0	7.5	7.7	7.8	7.2	6.3	7.3	8.8	10.5	11.3	11.4	10.9	10.4	10.2	9.9	8.1	6.6	5.7	5.4	5.0	4.8	4.5	7.8	11.4																						
15-Oct	4.2	4.0	4.0	3.7	3.3	2.2	1.3	0.8	3.0	4.0	5.3	6.9	8.1	9.3	10.4	10.7	10.3	9.0	7.5	6.4	5.3	4.2	2.9	1.9	5.4	10.7																						
16-Oct	1.4	0.9	-0.6	-1.3	-2.2	-2.6	-3.2	-3.1	-0.9	2.1	5.5	8.2	11.0	13.1	13.9	14.2	13.3	11.6	10.4	9.3	8.7	8.1	7.3	6.1	5.5	14.2																						
17-Oct	6.1	5.9	5.5	4.5	3.2	2.6	2.2	1.9	3.8	6.0	8.9	11.3	13.9	16.1	18.2	19.9	19.3	17.7	16.5	15.5	14.7	14.4	13.8	13.3	10.6	19.9																						
18-Oct	12.8	13.7	15.1	14.7	13.7	13.0	12.1	11.5	12.3	13.9	16.0	17.3	DF	DF	18.5	18.5	17.5	15.5	14.1	12.8	11.1	9.5	9.0	8.2	13.7	18.5																						
19-Oct	7.0	5.9	5.5	5.0	4.7	4.4	4.2	4.2	4.6	5.2	6.0	6.5	7.5	8.1	8.9	9.1	8.3	7.1	6.6	6.3	6.8	7.1	6.8	6.9	6.4	9.1																						
20-Oct	7.1	7.4	7.3	6.9	6.5	5.2	4.3	4.5	4.8	5.7	6.7	8.1	9.7	9.9	9.7	9.4	8.5	7.2	7.0	6.5	5.2	3.7	3.1	2.5	6.5	9.9																						
21-Oct	2.3	2.5	2.5	2.3	2.3	1.9	0.9	0.0	0.1	1.2	3.7	5.3	7.5	8.3	8.8	8.6	8.0	7.3	7.4	7.7	8.3	8.4	8.4	8.6	5.1	8.8																						
22-Oct	8.2	7.6	7.6	6.0	4.6	3.1	3.1	5.0	5.9	7.8	9.4	11.5	13.2	14.3	14.7	14.3	13.4	11.9	10.6	9.0	8.5	8.4	7.6	6.5	8.8	14.7																						
23-Oct	5.5	5.0	4.7	4.6	4.4	4.3	4.2	4.2	4.5	5.6	5.8	5.7	5.6	6.1	6.3	6.0	5.4	4.5	4.0	3.4	2.9	2.3	1.8	1.5	4.5	6.3																						
24-Oct	1.4	1.2	1.1	1.0	0.9	0.7	0.4	0.5	0.5	0.6	1.1	1.5	1.7	2.2	2.4	2.4	2.3	2.1	2.0	1.9	1.8	1.6	0.8	0.3	1.3	2.4																						
25-Oct	-0.2	-0.4	-0.7	-0.9	-0.9	-1.0	-1.1	-1.2	-1.2	-0.8	-0.1	0.4	0.8	1.4	1.6	1.7	1.6	1.4	1.2	1.1	1.0	1.0	1.0	1.0	0.3	1.7																						
26-Oct	1.5	1.9	2.2	1.7	0.9	0.2	0.1	0.1	0.5	1.3	3.8	5.7	6.6	7.2	7.8	7.8	8.1	7.7	7.2	6.8	6.2	3.9	1.9	1.0	3.8	8.1																						
27-Oct	1.0	0.6	0.7	0.9	1.0	1.1	1.3	1.5	1.5	1.8	1.7	2.0	2.8	3.2	3.4	3.4	3.0	2.7	2.1	1.4	1.2	1.0	0.5	0.3	1.7	3.4																						
28-Oct	0.1	-0.4	-1.4	-1.7	-1.9	-1.9	-1.9	-1.5	-1.2	-0.9	-0.7	-0.3	0.1	1.2	1.4	1.4	1.0	0.2	-0.6	-0.9	-0.7	-0.9	-1.0	-1.1	-0.6	1.4																						
29-Oct	-0.8	-0.7	-0.6	-0.4	-0.3	0.0	0.4	0.5	0.7	1.2	2.2	3.4	5.5	6.5	8.0	8.1	7.0	6.0	5.4	4.8	4.1	3.9	3.1	2.2	2.9	8.1																						
30-Oct	1.8	0.5	1.1	0.5	-0.2	-0.8	-1.3	-1.7	-0.3	0.4	1.3	2.3	3.0	3.9	4.6	4.7	4.7	4.2	3.2	3.0	2.4	2.8	2.4	2.7	1.9	4.7																						
31-Oct	2.8	2.6	2.2	1.9	1.7	1.6	1.5	1.1	0.8	1.3	1.6	2.2	3.3	3.5	3.0	2.4	1.9	1.6	1.4	1.1	0.6	0.4	0.3	0.4	1.7	3.5																						
																								4.0	3.7	3.5	3.2	2.9	2.6	2.3	2.4	3.3	4.6	6.1	7.3	8.3	9.1	9.9	10.0	9.6	8.5	7.5	6.6	5.9	5.1	4.4	4.0	Diurnal Average
																								14.9	13.9	15.1	14.7	13.7	13.0	12.1	11.5	13.3	17.4	19.5	20.5	22.3	22.8	23.8	24.4	24.6	23.6	20.8	19.7	17.6	16.2	15.3	14.8	Diurnal Maximum
DF - DAS Failure																																																



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

**Ambient Temperature 10 m (AT 10m) - C**  
**Fort McKay - Bertha Ganter - October 2015**





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

**Ambient Temperature 10 m (AT 10m) - C**  
**Fort McKay - Bertha Ganter - October 2015**

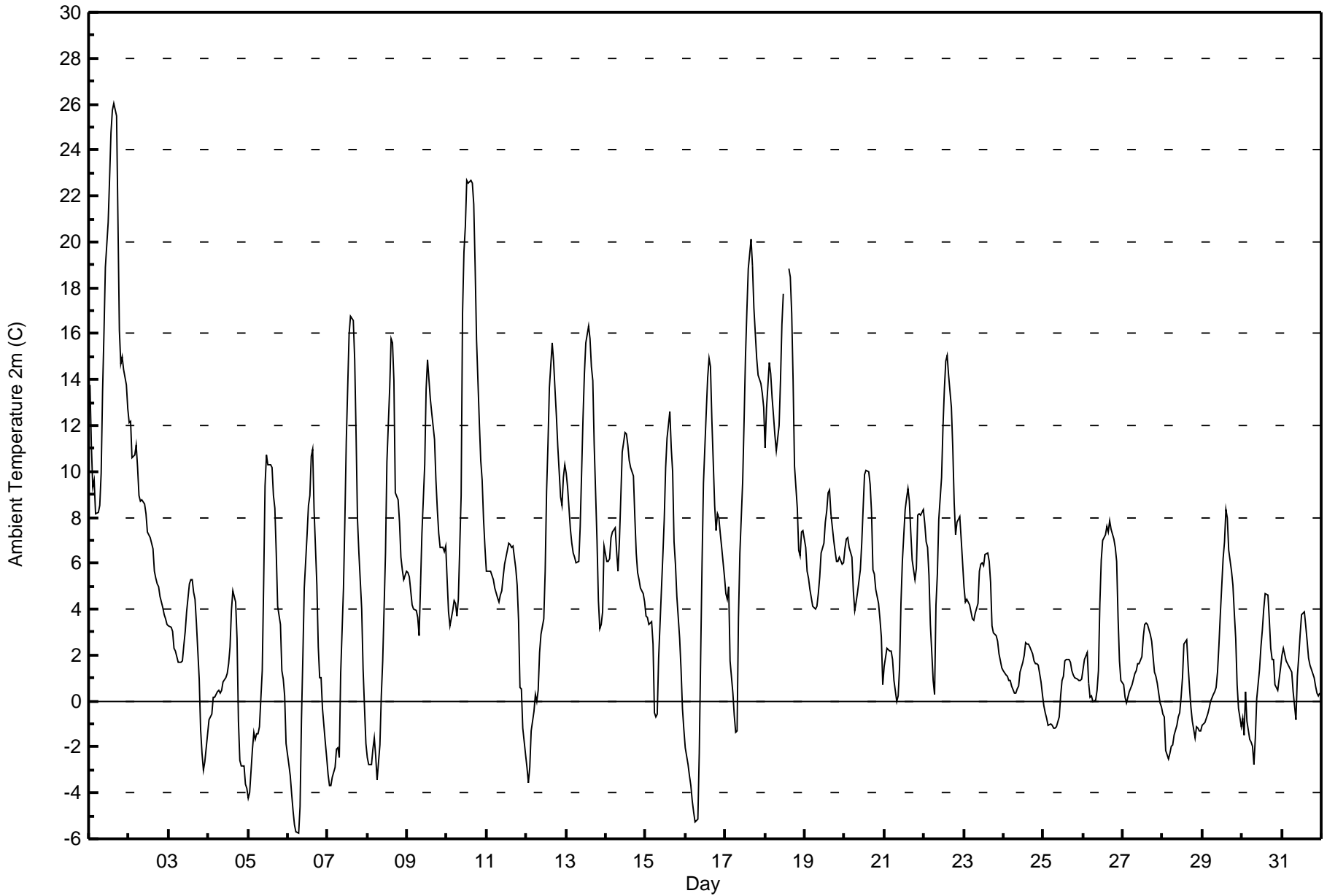
<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	94	12.67	12.67
0 - 10	506	68.19	80.86
10 - 20	128	17.25	98.11
> 20	14	1.89	100.00

Total Number of Valid Hours: 742

Total Number of Hours: 744



Maximum Value: 26.1 C on Oct 1 16:00		Maximum Daily Average: 15.8 C on Oct 1		Hours in Service: 744																																												
Minimum Value: -5.8 C on Oct 6 07:00		Minimum Daily Average: -0.6 C on Oct 28		Hours of Data: 742																																												
Maximum Diurnal Average: 10.5 C at hour 15		Minimum Diurnal Average: 1.5 C at hour 7		Hours of Missing Data: 2																																												
Monthly Average: 5.08 C		Percentiles: P <sub>1</sub> = -4.6 P <sub>10</sub> = -1.3 Q <sub>1</sub> = 0.9 Median = 4.3 Q <sub>3</sub> = 8.1 P <sub>90</sub> = 13.4 P <sub>99</sub> = 22.7		Hours of Calibration: 0																																												
				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	13.8	11.1	9.3	9.6	8.1	8.2	8.5	9.9	13.5	16.1	18.9	20.8	22.7	24.8	25.7	26.1	25.5	20.8	16.2	14.7	15.0	14.4	13.8	12.7	15.8	26.1																						
2-Oct	12.1	12.2	10.6	10.7	11.2	10.1	9.0	8.7	8.8	8.6	8.2	7.4	7.3	7.1	6.6	5.6	5.4	5.1	5.0	4.5	4.1	3.8	3.6	3.4	7.5	12.2																						
3-Oct	3.3	3.2	3.0	2.3	2.2	1.9	1.7	1.7	1.8	2.4	3.0	3.9	5.1	5.3	5.3	4.7	4.4	3.4	0.9	-1.2	-2.3	-3.0	-2.7	-1.4	2.0	5.3																						
4-Oct	-0.8	-0.7	-0.6	0.2	0.1	0.4	0.5	0.4	0.5	0.8	1.0	1.2	1.6	2.4	4.0	4.8	4.3	2.7	-0.9	-2.6	-2.8	-2.8	-3.6	-3.8	0.3	4.8																						
5-Oct	-4.2	-4.0	-2.1	-1.4	-1.6	-1.4	-1.4	-1.1	1.3	5.1	9.4	10.7	10.3	10.3	10.1	9.0	8.4	6.4	4.1	3.3	1.3	0.9	0.2	-1.8	3.0	10.7																						
6-Oct	-2.8	-3.2	-4.1	-4.8	-5.4	-5.7	-5.8	-4.6	-0.8	1.9	4.9	7.2	8.6	9.0	10.6	11.0	8.4	5.0	2.4	1.0	1.0	-0.4	-1.8	-2.4	1.2	11.0																						
7-Oct	-3.2	-3.7	-3.7	-3.3	-2.9	-2.1	-2.1	-2.5	1.2	4.9	7.9	11.3	13.6	16.0	16.8	16.5	14.9	11.6	7.9	6.4	4.0	1.4	-0.3	-1.9	4.5	16.8																						
8-Oct	-2.5	-2.8	-2.7	-2.1	-1.6	-2.4	-3.5	-1.9	0.2	1.8	4.0	6.4	10.4	13.6	15.8	15.6	13.9	9.1	8.8	7.8	6.3	5.7	5.3	5.6	4.6	15.8																						
9-Oct	5.6	5.4	4.8	4.2	4.0	3.9	3.7	2.8	5.0	7.3	10.3	13.6	14.9	14.0	13.2	12.6	11.4	9.6	8.3	7.3	6.7	6.7	6.5	6.7	7.9	14.9																						
10-Oct	5.3	3.9	3.3	3.9	4.4	4.2	3.7	4.4	9.0	16.9	19.6	20.7	22.7	22.6	22.7	22.6	21.6	18.9	15.7	12.2	10.5	9.6	7.9	6.7	12.2	22.7																						
11-Oct	5.7	5.6	5.7	5.4	5.3	4.9	4.5	4.3	4.6	4.8	5.4	5.9	6.6	6.9	6.8	6.7	6.7	5.8	5.0	3.5	0.6	0.5	-1.2	-2.3	4.5	6.9																						
12-Oct	-2.9	-3.6	-2.9	-1.3	-0.5	0.3	0.0	0.5	2.1	2.9	3.6	5.6	9.1	11.2	13.7	15.6	14.8	13.6	12.5	11.1	8.9	8.5	9.7	10.3	5.9	15.6																						
13-Oct	9.9	9.3	7.5	6.9	6.5	6.3	6.0	6.1	7.6	10.0	12.3	14.2	15.6	16.3	15.8	14.6	14.0	11.2	7.0	4.4	3.1	3.4	3.9	6.7	9.1	16.3																						
14-Oct	6.1	6.1	6.2	7.1	7.4	7.6	6.5	5.7	7.0	8.9	10.8	11.7	11.6	11.1	10.5	10.2	9.8	8.0	6.4	5.6	5.3	4.9	4.7	4.3	7.6	11.7																						
15-Oct	3.7	3.6	3.3	3.4	2.5	-0.5	-0.7	-0.6	1.9	4.9	6.3	7.9	10.2	11.4	12.6	11.0	10.0	7.0	5.9	4.6	2.7	1.4	-0.4	-1.2	4.6	12.6																						
16-Oct	-2.0	-2.7	-3.3	-3.7	-4.3	-4.9	-5.3	-5.1	-2.3	1.9	6.0	9.5	12.6	14.1	14.9	14.6	12.2	8.5	7.4	8.2	8.0	7.3	6.7	5.4	4.3	14.9																						
17-Oct	4.7	4.4	5.0	1.8	0.4	-0.6	-1.4	-1.3	3.6	6.5	9.5	12.2	15.0	17.0	18.8	20.1	19.0	17.1	16.0	14.9	14.2	13.9	13.4	12.8	9.9	20.1																						
18-Oct	11.0	12.7	14.7	14.3	13.2	12.4	11.6	10.9	12.0	13.9	16.4	17.7	DF	DF	18.8	18.5	16.9	14.0	10.2	8.4	6.6	6.3	7.4	7.4	12.5	18.8																						
19-Oct	6.7	5.6	5.3	4.9	4.5	4.1	4.0	4.1	4.7	5.4	6.4	6.9	7.8	8.2	9.1	9.2	8.2	7.0	6.5	6.1	6.1	6.3	6.0	6.0	6.2	9.2																						
20-Oct	6.6	7.0	7.1	6.7	6.2	4.8	4.0	4.3	4.7	5.7	6.9	8.4	9.8	10.0	10.0	9.4	8.2	5.7	5.5	4.8	4.3	3.6	2.8	0.7	6.1	10.0																						
21-Oct	1.5	2.3	2.2	2.2	2.2	1.8	0.9	0.0	0.2	1.4	4.2	6.1	8.3	8.9	9.3	8.7	7.3	6.2	5.3	5.8	8.1	8.1	8.1	8.3	4.9	9.3																						
22-Oct	7.7	6.9	6.7	5.5	3.3	0.9	0.3	4.2	5.5	7.9	9.7	11.9	13.6	14.8	15.1	14.2	12.8	11.0	8.6	7.2	7.8	8.0	7.0	6.0	8.2	15.1																						
23-Oct	5.0	4.3	4.4	4.2	3.9	3.6	3.5	3.8	4.3	5.6	6.0	6.0	5.9	6.4	6.5	6.1	5.2	3.3	2.9	2.9	2.6	2.1	1.7	1.4	4.2	6.5																						
24-Oct	1.3	1.1	1.1	0.9	0.9	0.7	0.4	0.4	0.5	0.7	1.3	1.7	2.0	2.6	2.5	2.5	2.3	2.0	1.8	1.6	1.6	1.6	0.8	0.3	1.4	2.6																						
25-Oct	-0.2	-0.5	-0.8	-1.0	-1.0	-1.1	-1.2	-1.2	-1.1	-0.7	0.2	0.9	1.1	1.8	1.8	1.8	1.7	1.3	1.1	1.0	1.0	0.9	0.9	1.0	0.3	1.8																						
26-Oct	1.4	1.8	2.1	0.8	0.1	0.2	0.0	0.0	0.5	1.3	4.2	6.1	7.0	7.3	7.6	7.3	7.8	7.5	7.1	6.7	6.1	3.7	1.7	0.9	3.7	7.8																						
27-Oct	0.7	0.2	-0.1	0.2	0.4	0.7	1.0	1.2	1.3	1.6	1.6	1.9	2.8	3.3	3.4	3.4	2.9	2.6	1.9	1.3	1.1	0.8	-0.1	-0.2	1.4	3.4																						
28-Oct	-0.6	-0.7	-2.2	-2.5	-2.3	-2.0	-1.9	-1.5	-1.1	-0.7	-0.5	0.1	1.0	2.5	2.7	1.6	0.6	-0.3	-0.9	-1.6	-1.1	-1.2	-1.3	-1.3	-0.6	2.7																						
29-Oct	-1.0	-0.9	-0.7	-0.5	-0.3	0.0	0.3	0.4	0.6	1.2	2.4	3.8	6.2	6.9	8.3	8.0	6.6	5.6	5.0	3.8	2.7	0.7	-0.3	-1.1	2.4	8.3																						
30-Oct	-0.8	-1.5	0.4	-0.8	-1.7	-1.8	-2.0	-2.8	-1.6	0.1	1.4	2.3	3.1	4.0	4.7	4.6	3.5	2.3	1.8	1.8	0.7	0.5	0.9	1.4	0.9	4.7																						
31-Oct	2.0	2.3	1.8	1.6	1.5	1.4	1.3	0.4	-0.8	1.1	2.0	2.9	3.7	3.9	3.3	2.6	1.9	1.6	1.4	1.0	0.6	0.4	0.2	0.3	1.6	3.9																						
																								3.0	2.7	2.6	2.4	2.1	1.8	1.5	1.7	3.1	4.8	6.6	8.0	9.0	9.8	10.5	10.3	9.4	7.5	6.0	5.0	4.3	3.8	3.3	2.9	Diurnal Average
																								13.8	12.7	14.7	14.3	13.2	12.4	11.6	10.9	13.5	16.9	19.6	20.8	22.7	24.8	25.7	26.1	25.5	20.8	16.2	14.9	15.0	14.4	13.8	12.8	Diurnal Maximum
DF - DAS Failure																																																







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C  
Fort McKay - Bertha Ganter - October 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	127	17.12	17.12
0 - 10	485	65.36	82.48
10 - 20	116	15.63	98.11
> 20	14	1.89	100.00

Total Number of Valid Hours: 742

Total Number of Hours: 744



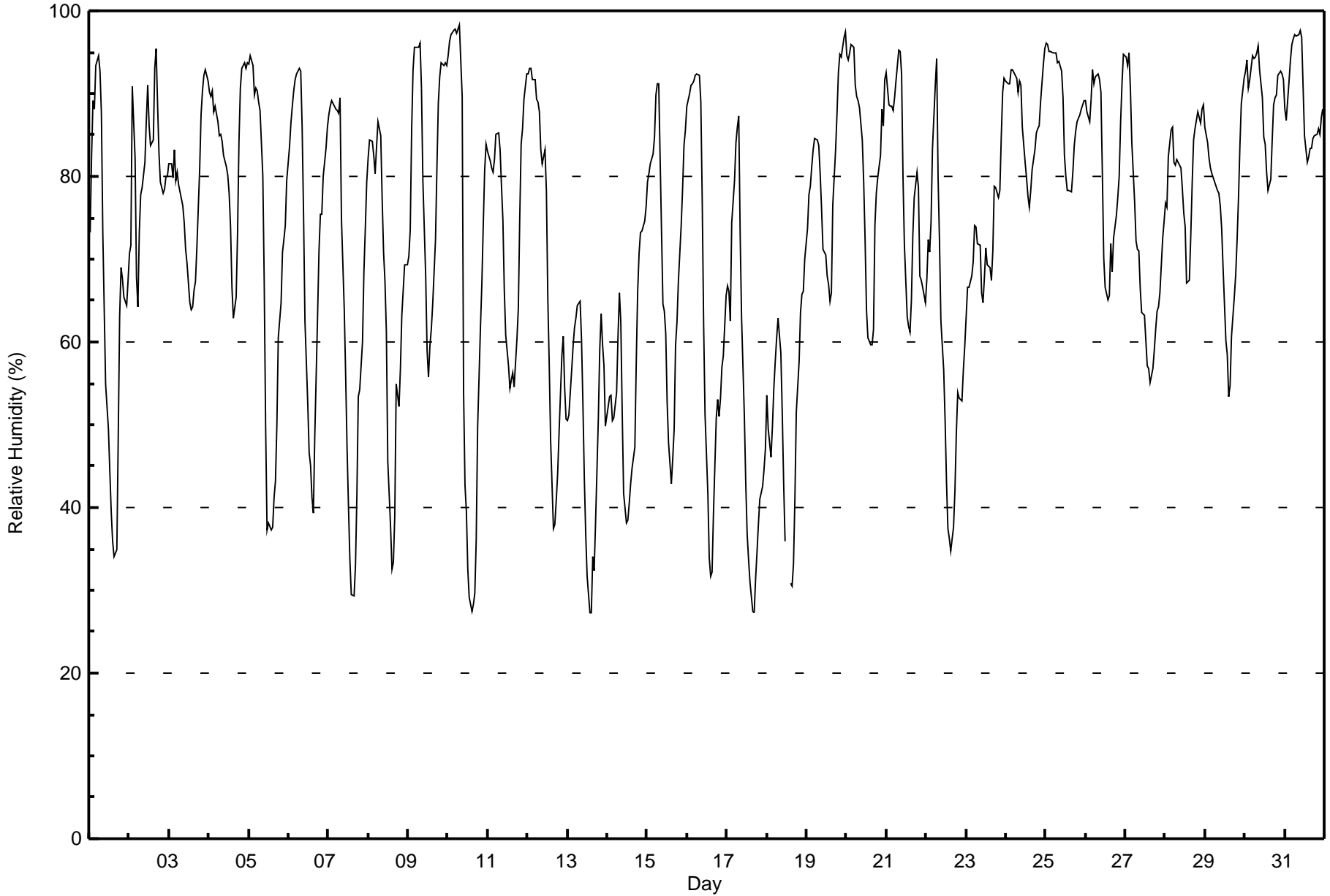
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Fort McKay - Bertha Ganter - October 2015

Maximum Value: 98 % on Oct 10 08:00																		Maximum Daily Average: 89.7 % on Oct 30																		Hours in Service: 744							
Minimum Value: 27 % on Oct 13 14:00																		Minimum Daily Average: 49.8 % on Oct 13																		Hours of Data: 742							
Maximum Diurnal Average: 85.3 % at hour 7																		Minimum Diurnal Average: 52.9 % at hour 15																		Hours of Missing Data: 2							
Monthly Average: 72.7 %																		Percentiles: P <sub>1</sub> = 29 P <sub>10</sub> = 43 Q <sub>1</sub> = 61 Median = 78 Q <sub>3</sub> = 88 P <sub>90</sub> = 93 P <sub>99</sub> = 97																		Hours of Calibration: 0							
																																				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	73	82	89	88	93	95	93	88	73	64	55	49	44	40	36	34	35	49	63	69	68	65	64	67	65.7	95																	
2-Oct	71	72	91	82	68	64	73	78	79	82	87	91	86	84	84	93	95	89	83	79	78	78	80	80	81.1	95																	
3-Oct	82	82	80	83	80	81	79	77	76	74	71	70	65	64	64	66	67	71	81	87	90	92	93	92	77.8	93																	
4-Oct	90	90	90	88	88	87	85	85	84	82	81	80	78	74	67	63	65	73	84	91	93	94	93	94	83.3	94																	
5-Oct	94	95	93	90	91	90	89	88	80	67	50	37	38	37	38	41	43	50	61	65	71	72	74	79	68.0	95																	
6-Oct	84	86	88	90	92	92	93	93	86	75	62	53	47	45	41	39	49	63	71	75	75	80	83	86	72.9	93																	
7-Oct	87	88	89	89	88	88	88	90	75	64	56	47	40	34	30	29	33	41	53	54	60	69	74	79	64.4	90																	
8-Oct	82	84	84	83	80	84	87	85	77	71	67	61	46	38	32	33	39	55	52	57	63	66	69	69	65.2	87																	
9-Oct	70	74	86	93	96	96	96	96	91	79	68	59	56	59	62	65	72	81	89	92	94	93	94	93	81.3	96																	
10-Oct	95	96	97	98	98	97	98	98	90	54	43	40	32	29	27	28	30	36	50	62	67	74	81	84	66.8	98																	
11-Oct	83	82	81	81	82	85	85	83	79	75	66	61	57	54	55	56	55	60	64	75	84	86	89	92	73.8	92																	
12-Oct	92	93	93	92	92	89	89	88	83	82	83	78	65	57	48	37	38	41	44	49	58	61	54	51	69.1	93																	
13-Oct	50	51	57	59	62	63	64	65	60	53	43	37	32	27	27	34	32	38	51	59	63	60	57	50	49.8	65																	
14-Oct	52	53	53	50	51	54	61	66	62	51	42	38	39	40	43	45	47	58	66	71	73	73	75	76	55.8	76																	
15-Oct	79	80	81	83	85	90	91	91	82	64	64	61	53	48	43	46	50	60	62	67	74	78	84	86	70.9	91																	
16-Oct	88	90	91	91	91	92	92	92	89	77	62	51	42	34	32	32	39	51	53	51	53	57	58	66	65.7	92																	
17-Oct	67	66	62	74	80	84	86	87	73	63	51	43	37	34	31	27	27	31	35	38	41	42	45	47	53.0	87																	
18-Oct	54	50	46	50	54	58	60	63	59	51	43	36	DF	DF	31	30	33	41	52	58	64	66	66	70	51.5	70																	
19-Oct	74	78	79	81	83	85	84	84	80	76	71	71	68	67	65	66	77	83	88	93	95	94	97	98	80.6	98																	
20-Oct	95	94	95	96	96	91	90	89	88	84	79	72	64	61	60	60	61	74	78	80	83	88	86	92	81.5	96																	
21-Oct	93	89	88	88	88	89	91	95	95	92	80	72	63	62	61	65	73	77	81	79	68	67	67	65	78.7	95																	
22-Oct	68	72	71	75	83	91	94	80	72	62	57	50	43	38	36	35	38	42	49	54	53	53	57	60	59.7	94																	
23-Oct	63	67	67	68	70	74	74	72	72	66	65	68	71	69	69	67	71	79	79	77	78	85	90	92	73.0	92																	
24-Oct	91	91	91	93	93	93	92	90	92	91	86	82	80	78	76	78	81	83	85	86	86	89	94	95	87.3	95																	
25-Oct	96	96	95	95	95	95	95	94	94	93	90	83	80	78	78	78	80	84	85	87	87	88	89	89	88.5	96																	
26-Oct	89	88	87	89	93	91	92	92	92	90	80	70	67	65	66	72	68	73	75	77	80	87	91	95	82.1	95																	
27-Oct	94	93	95	90	84	77	72	71	71	66	63	63	60	57	57	55	57	59	61	64	64	66	73	75	70.4	95																	
28-Oct	77	76	82	86	86	82	81	82	81	81	79	76	74	67	67	73	79	84	86	88	87	87	88	89	80.7	89																	
29-Oct	86	84	82	81	80	80	79	78	78	76	74	69	60	58	53	55	61	65	68	72	77	84	89	92	74.3	92																	
30-Oct	93	94	91	92	95	94	94	95	96	93	90	85	84	81	78	80	84	89	89	90	92	93	92	92	89.7	96																	
31-Oct	88	87	92	94	96	97	97	97	97	98	97	91	85	82	82	83	83	85	85	85	86	85	87	88	89.4	98																	
																		80.6	81.4	82.8	83.6	84.2	84.7	85.3	84.9	80.9	74.2	67.9	62.7	58.5	55.3	52.9	53.8	56.9	63.4	68.5	71.9	74.4	76.5	78.5	80.0	Diurnal Average	
																		96	96	97	98	98	97	98	98	97	98	97	91	86	84	84	93	95	89	89	93	95	94	97	98	Diurnal Maximum	
DF - DAS Failure																																											





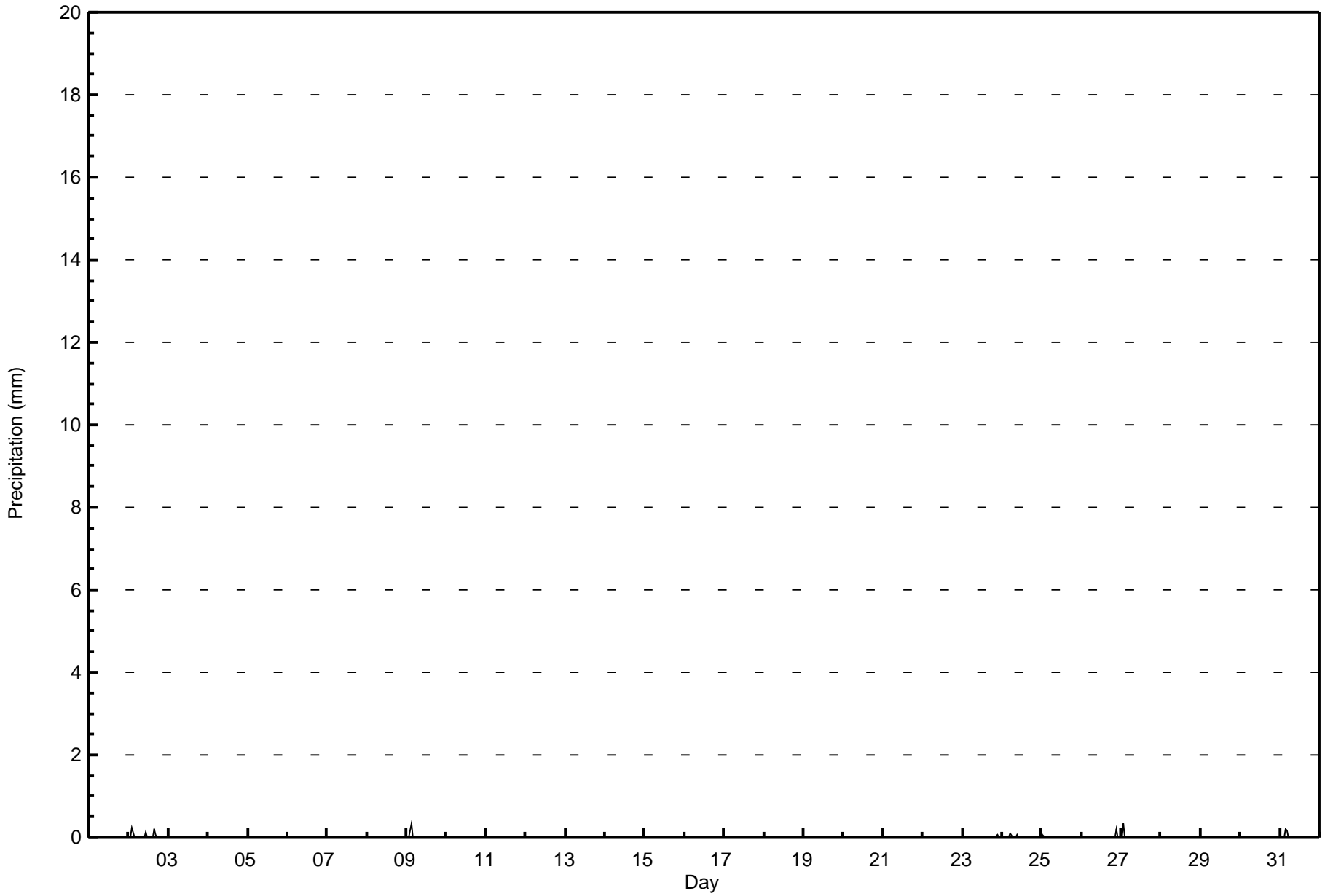
Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

Fort McKay - Bertha Ganter - October 2015

Maximum Value: 0.4 mm on Oct 9 04:00																				Maximum Daily Total: 0.7 mm on Oct 2					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: 742																								
Maximum Diurnal Total: 0.5 mm at hour 4																				Minimum Diurnal Total: 0.0 mm at hour 7					Hours of Missing Data: 2																								
Monthly Total: 2.67 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> = 0.2					Hours of Calibration: 0																								
																				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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.2																				
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	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																				
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																				
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																				
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																				
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																				
9-Oct	0.0	0.0	0.2	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.4	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	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																				
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																				
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																				
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																				
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	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	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	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	DF	DF	0.0	0.0	0.0	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																				
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																				
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																				
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																				
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	0.1	0.1	0.0	0.0																			
24-Oct	0.0	0.0	0.0	0.0	0.0	0.1	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	0.1	0.3	0.1	0.1																				
25-Oct	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	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1																				
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	0.2	0.0	0.0	0.2	0.2	0.2	0.2																				
27-Oct	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.4																				
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																				
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																				
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																				
31-Oct	0.0	0.0	0.0	0.2	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	0.4	0.2	0.2																				
																								0.1	0.4	0.4	0.5	0.2	0.1	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.1	0.3	0.0	0.1	Diurnal Average	
																								0.1	0.4	0.2	0.4	0.2	0.1	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.1	0.2	0.0	0.1	Diurnal Maximum	
DF - DAS Failure																																																	





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

**Precipitation (PC) - mm**  
**Fort McKay - Bertha Ganter - October 2015**

<b>Concentration Ranges (mm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	742	100.00	100.00
0.4 - 0.5	0	0.00	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: 742

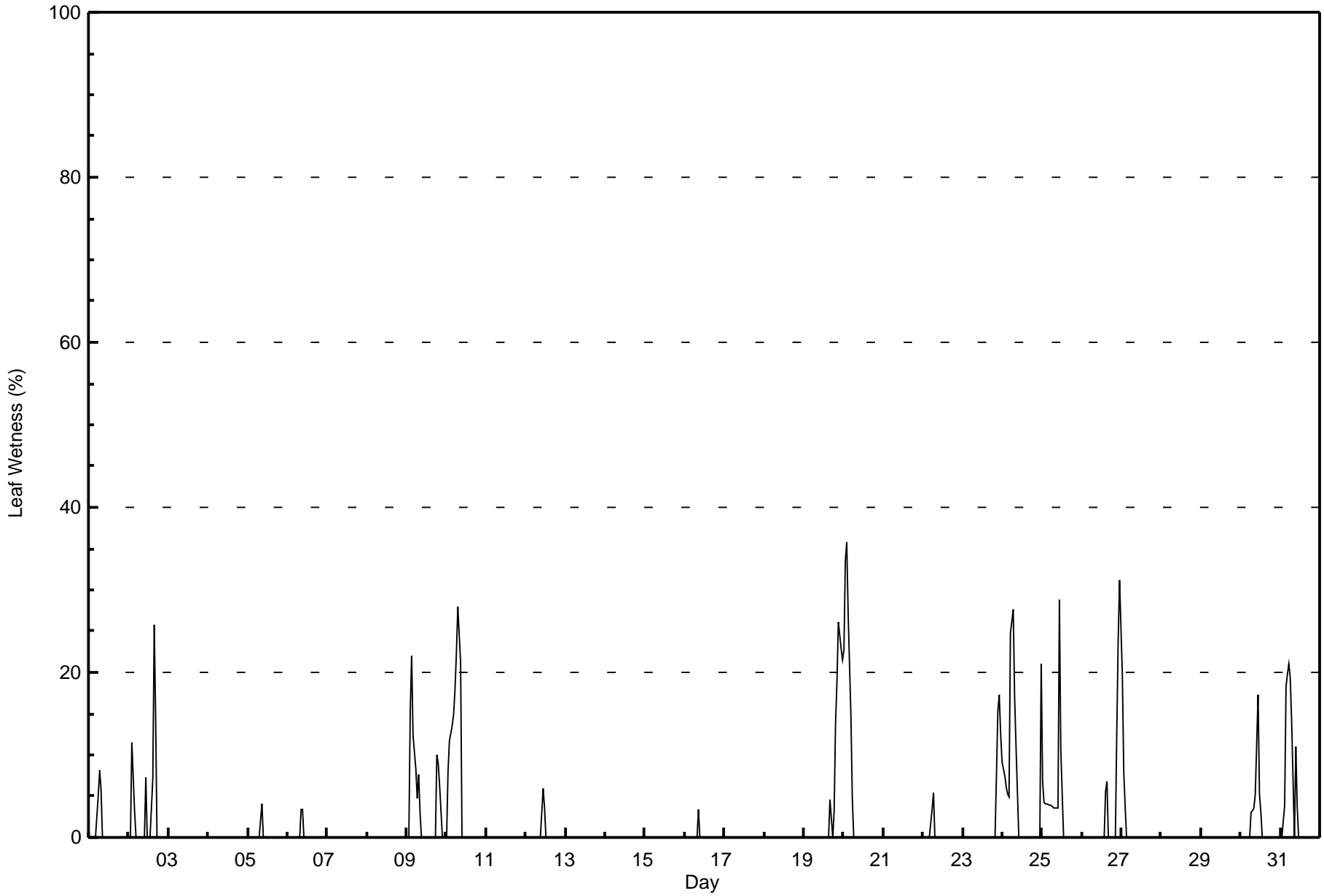
Total Number of Hours: 744



Summary of Hour Averages

Fort McKay - Bertha Ganter - October 2015

Maximum Value: 36 % on Oct 20 03:00														Maximum Daily Average: 5.8 % on Oct 24														Hours in Service: 744	
Minimum Value: 0 % on Oct 1 01:00														Minimum Daily Average: 0.0 % on Oct 3														Hours of Data: 743	
Maximum Diurnal Average: 3.0 % at hour 7														Minimum Diurnal Average: 0.0 % at hour 14														Hours of Missing Data: 1	
Monthly Average: 1.5 %														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> = 4 P <sub>99</sub> = 27														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	0	0	0	0	0	5	8	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	8			
2-Oct	0	0	12	3	0	0	0	0	0	0	7	0	0	0	7	26	15	0	0	0	0	0	0	0	2.9	26			
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			
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			
5-Oct	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	4			
6-Oct	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	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			
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	15	22	12	8	5	8	3	0	0	0	0	0	0	0	0	0	10	9	6	0	0	0	4.1	22			
10-Oct	0	8	12	13	15	18	22	28	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.7	28			
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	6	4	0	0	0	0	0	0	0	0	0	0	0	0	0.4	6			
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	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			
16-Oct	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	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			
18-Oct	0	0	0	0	0	0	0	0	0	0	0	0	DF	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	5	0	3	14	19	26	23	22	4.6	26			
20-Oct	23	33	36	27	15	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.8	36			
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			
22-Oct	0	0	0	0	0	3	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	5			
23-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	15	17	13	2.2	17			
24-Oct	9	7	6	5	5	25	28	17	11	6	0	0	0	0	0	0	0	0	0	0	0	0	0	21	5.8	28			
25-Oct	7	4	4	4	4	4	4	4	4	3	29	11	5	0	0	0	0	0	0	0	0	0	0	0	3.6	29			
26-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	6	7	0	0	0	0	0	0	13	24	31	3.3	31			
27-Oct	20	8	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.3	20			
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			
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			
30-Oct	0	0	0	0	0	0	3	3	4	5	17	5	3	0	0	0	0	0	0	0	0	0	0	0	1.7	17			
31-Oct	0	0	4	18	20	21	19	14	0	11	4	0	0	0	0	0	0	0	0	0	0	0	0	0	4.6	21			
1.9														2.0														Diurnal Average	
23														33														Diurnal Maximum	
DF - DAS Failure																													







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

**Leaf Wetness (LW) - %**  
**Fort McKay - Bertha Ganter - October 2015**

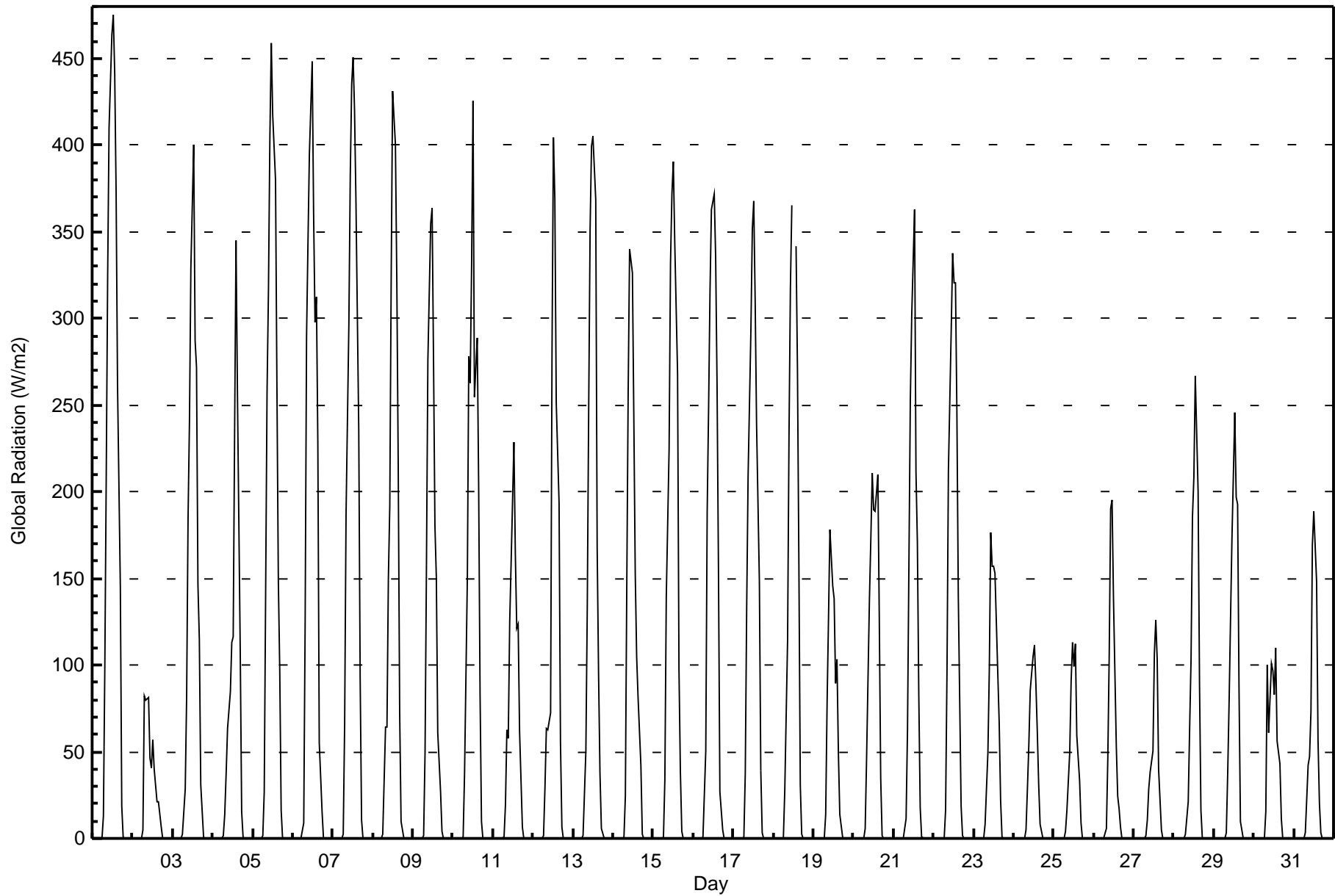
<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	644	86.68	86.68
0.4 - 0.5	0	0.00	86.68
0.6 - 0.7	0	0.00	86.68
0.8 - 1.4	0	0.00	86.68
1.5 - 10	54	7.27	93.94
> 10	45	6.06	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



Maximum Value: 475 W/m2 on Oct 1 13:00																			Maximum Daily Average: 134.7 W/m2 on Oct 1						Hours in Service: 744	
Minimum Value: 0 W/m2 on Oct 1 01:00																			Minimum Daily Average: 20.6 W/m2 on Oct 2						Hours of Data: 743	
Maximum Diurnal Average: 272.3 W/m2 at hour 13																			Minimum Diurnal Average: 0.0 W/m2 at hour 22						Hours of Missing Data: 1	
Monthly Average: 68.5 W/m2																			Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 97 P <sub>90</sub> = 265 P <sub>99</sub> = 429						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	0	0	0	0	0	0	13	99	209	324	410	464	475	442	372	262	145	18	1	0	0	0	0	0	134.7	475
2-Oct	0	0	0	0	0	0	5	82	80	82	47	41	57	40	21	21	14	6	0	0	0	0	0	0	20.6	82
3-Oct	0	0	0	0	0	0	2	28	82	185	241	329	401	287	272	146	115	31	1	0	0	0	0	0	88.4	401
4-Oct	0	0	0	0	0	0	2	14	37	63	85	113	116	234	345	258	107	16	0	0	0	0	0	0	57.9	345
5-Oct	0	0	0	0	0	0	2	27	258	316	404	458	417	380	260	149	97	16	0	0	0	0	0	0	116.1	458
6-Oct	0	0	0	0	0	0	9	125	290	344	395	448	360	298	312	228	55	15	0	0	0	0	0	0	120.0	448
7-Oct	0	0	0	0	0	0	2	66	187	297	384	435	451	421	368	236	93	11	0	0	0	0	0	0	123.0	451
8-Oct	0	0	0	0	0	0	3	65	64	149	192	324	431	400	320	213	73	10	0	0	0	0	0	0	93.5	431
9-Oct	0	0	0	0	0	0	1	50	158	275	354	364	277	181	150	61	27	4	0	0	0	0	0	0	79.3	364
10-Oct	0	0	0	0	0	0	1	38	152	278	263	330	426	255	289	203	83	10	0	0	0	0	0	0	97.0	426
11-Oct	0	0	0	0	0	0	1	20	63	58	125	159	229	165	121	123	62	7	0	0	0	0	0	0	47.2	229
12-Oct	0	0	0	0	0	0	1	30	63	63	72	280	404	370	252	193	55	7	0	0	0	0	0	0	74.6	404
13-Oct	0	0	0	0	0	0	1	50	133	249	351	399	405	369	168	96	37	6	0	0	0	0	0	0	94.4	405
14-Oct	0	0	0	0	0	0	1	24	146	259	340	326	242	153	105	81	43	2	0	0	0	0	0	0	71.7	340
15-Oct	0	0	0	0	0	0	1	34	139	225	332	372	390	344	269	98	38	4	0	0	0	0	0	0	93.6	390
16-Oct	0	0	0	0	0	0	1	51	188	248	315	363	372	335	261	155	27	5	0	0	0	0	0	0	96.7	372
17-Oct	0	0	0	0	0	0	1	38	133	209	294	351	368	311	239	148	39	3	0	0	0	0	0	0	88.9	368
18-Oct	0	0	0	0	0	0	0	28	115	233	318	365	DF	342	270	158	31	2	0	0	0	0	0	0	81.0	365
19-Oct	0	0	0	0	0	0	0	14	78	127	178	146	138	89	103	50	14	1	0	0	0	0	0	0	39.1	178
20-Oct	0	0	0	0	0	0	0	6	46	138	172	211	190	189	210	127	35	2	0	0	0	0	0	0	55.2	211
21-Oct	0	0	0	0	0	0	0	12	63	158	253	302	363	212	171	83	18	1	0	0	0	0	0	0	68.1	363
22-Oct	0	0	0	0	0	0	0	16	97	213	294	338	320	320	247	141	18	1	0	0	0	0	0	0	83.5	338
23-Oct	0	0	0	0	0	0	0	8	50	97	177	157	157	153	95	67	22	1	0	0	0	0	0	0	41.0	177
24-Oct	0	0	0	0	0	0	0	5	28	54	85	105	111	90	62	31	8	0	0	0	0	0	0	0	24.1	111
25-Oct	0	0	0	0	0	0	0	4	16	49	91	113	100	112	59	33	9	0	0	0	0	0	0	0	24.5	113
26-Oct	0	0	0	0	0	0	0	6	46	107	190	195	139	54	25	17	6	0	0	0	0	0	0	0	32.7	195
27-Oct	0	0	0	0	0	0	0	1	10	29	38	50	107	126	103	40	5	0	0	0	0	0	0	0	21.3	126
28-Oct	0	0	0	0	0	0	0	3	21	64	104	186	208	267	200	89	16	0	0	0	0	0	0	0	48.2	267
29-Oct	0	0	0	0	0	0	0	4	38	80	127	173	246	197	193	87	10	0	0	0	0	0	0	0	48.1	246
30-Oct	0	0	0	0	0	0	0	15	100	61	101	96	83	110	56	43	11	0	0	0	0	0	0	0	28.2	110
31-Oct	0	0	0	0	0	0	0	3	43	47	73	169	189	148	57	21	3	0	0	0	0	0	0	0	31.3	189
																			0.0 0.0 0.0 0.0 0.0 0.0 1.5 31.1 101.1 163.9 219.5 263.3 272.3 238.5 192.8 118.0 42.5 5.8 0.1 0.0 0.0 0.0 0.0 0.0						Diurnal Average	
																			0 0 0 0 0 0 13 125 290 344 410 464 475 442 372 262 145 31 1 0 0 0 0 0						Diurnal Maximum	
DF - DAS Failure																										





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

**Global Radiation (GR) - W/m2**  
**Fort McKay - Bertha Ganter - October 2015**

<b>Concentration Ranges (W/m2)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	463	62.31	62.31
21 - 100	100	13.46	75.77
101 - 300	121	16.29	92.06
301 - 600	59	7.94	100.00
601 - 900	0	0.00	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744

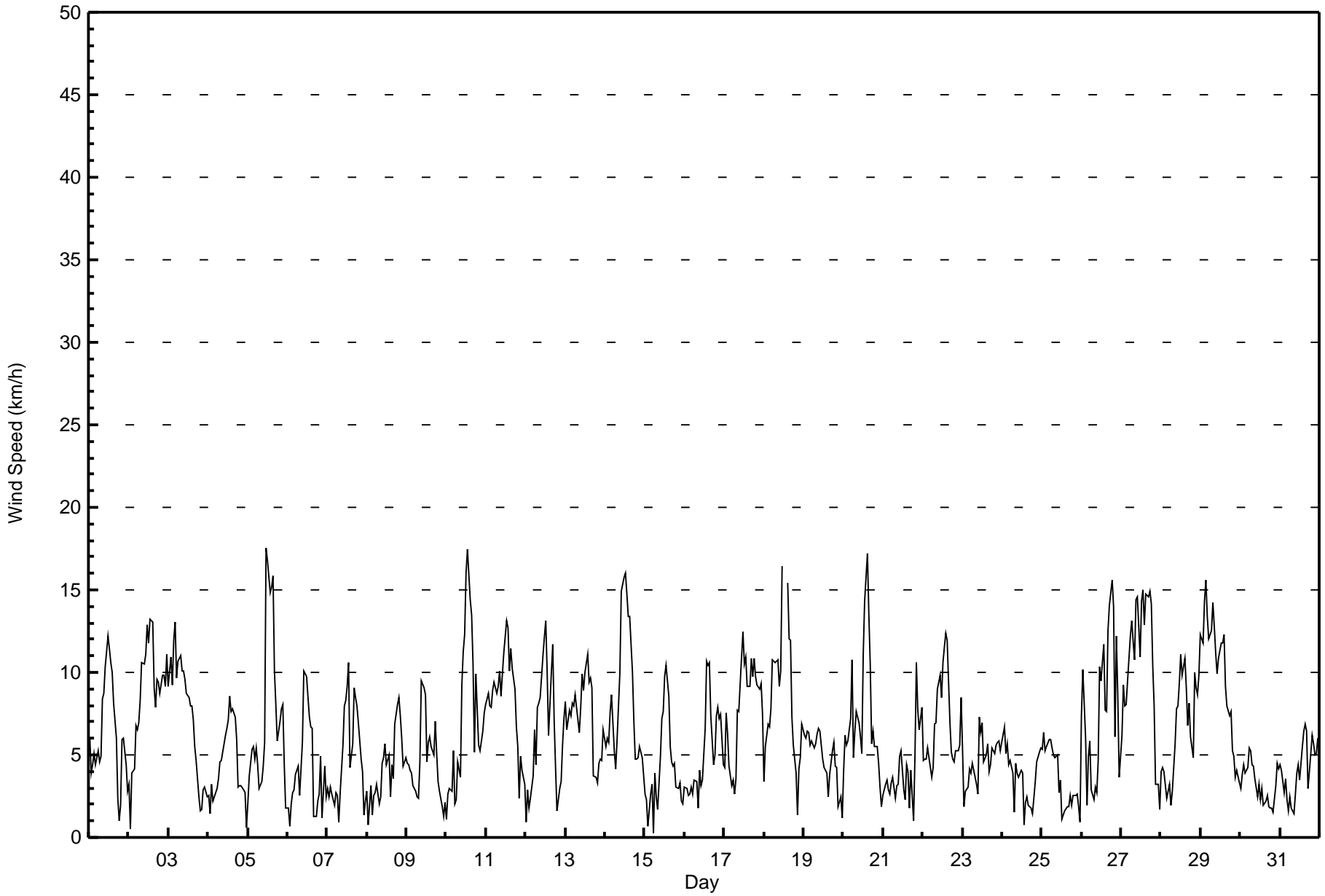


Maximum Speed: 18 km/h on Oct 5 12:00	Maximum Daily Speed Average: 10.5 km/h on Oct 27	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 15 06:00	Minimum Daily Speed Average: 0.8 km/h on Oct 8	Hours of Data: 742
Maximum Diurnal Speed Average: 2.7 km/h at hour 16	Minimum Diurnal Speed Average: 1.1 km/h at hour 21	Hours of Missing Data: 2
Monthly Average Velocity: 1.6 km/h 274.3 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 3 Median = 5 Q <sub>3</sub> = 9 P <sub>90</sub> = 11 P <sub>99</sub> = 16	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	SSW6	SSW4	SSW4	SSW5	SSW4	SSW5	SSW5	S5	S8	SSE9	SSE10	SSE12	SSE11	SSE11	SSE10	SSE8	SSE6	S2	NW1	N2	NNW6	N6	N4	N3	S4.1	SSE12
2-Oct	WNW3	ESE0	N4	N4	NNE7	NNE6	NNE7	NNE8	NNE11	N11	N11	N13	NNE12	N13	N13	N9	NNW8	NNW10	N9	NNW9	N10	N10	N9	N11	N8.3	N13
3-Oct	N9	N11	N9	N12	N13	N10	N11	N11	N10	NNE10	NNE10	NE9	ENE9	ENE8	ENE8	ENE7	NE6	NE5	NE2	ENE2	NNW2	WNW3	WNW3	WNW2	NNE6.4	N13
4-Oct	WNW3	WNW1	WNW3	WNW2	W2	WSW3	WSW4	WS5	WSW5	SSW5	SSW6	SW7	SSW7	SSW9	SSW8	S8	S7	S6	S3	SW3	SSE3	S3	NNE3	SSE1	SSW3.5	SSW9
5-Oct	WSW2	SSW4	S5	S6	S5	SSW5	SSW4	SSW3	SSW3	SW4	W6	NW18	NW17	NNW15	NW15	NW16	NW10	NW8	NW6	WNW7	WNW8	WNW8	WNW4	N2	WNW5.2	NW18
6-Oct	WSW2	SW1	WSW2	SSW3	SW3	SSW4	SW4	S3	SSE4	SE6	SSE10	S10	S8	S7	SSE7	S7	SSE1	E1	E2	E3	SSE5	WSW1	N4	WNW2	S3.1	SSE10
7-Oct	WNW3	W2	NW3	NW3	W2	SSW3	W3	SSW1	SW3	SSE6	SSE8	SE8	SSE9	SSE11	SSW4	NW6	NNW9	NW8	NW8	NW7	NNW5	NW4	WNW1	W2	W1.2	SSE11
8-Oct	W3	S1	W3	WNW1	WNW3	SW3	SW3	S2	S2	SSE4	SSE5	S6	SSE4	SSE5	SE2	ENE4	NNE4	NNW7	N8	N8	N7	N6	N4	N5	NNW0.8	N8
9-Oct	N4	NNW4	N4	NNW4	NW3	NNW3	WNW2	WNW2	S5	SSE10	S9	SSE9	ESE5	NE6	NE6	NNE6	N5	N7	NNW5	NNW3	NW3	NW2	W1	S2	N1.1	SSE10
10-Oct	WNW1	SW3	SW3	SSW3	S5	S2	SSW2	SSW5	SE4	SW9	WSW11	WSW12	W16	W17	W14	WNW13	WNW11	NW5	NW10	NW6	NW5	NNE6	NNE6	N8	W4.9	W17
11-Oct	N8	NNE9	NNE8	N8	N9	N9	N9	N9	N10	N9	NNW10	NNW11	NNW13	NNW13	NNW10	NNW11	NNW10	NW9	NW7	WNW6	W2	NW5	W4	SSW3	NNW7.5	NNW13
12-Oct	SE1	WSW3	WSW2	SSW2	SE4	SSE7	S4	S8	S8	S9	S11	S12	S13	S10	SSW6	W10	W12	WNW7	WSW4	SW2	SSW3	S3	SW6	W7	SSW4.8	S13
13-Oct	WSW8	WSW7	W8	W7	W8	W8	W9	WSW7	W6	W8	W10	WSW9	WSW10	WNW11	WNW9	W10	W9	W4	SSW4	SSW3	SSW4	SW5	SSW5	W7	W6.7	WNW11
14-Oct	W6	W6	W6	W8	WNW9	WSW5	W4	W6	WSW8	W10	WNW15	NW16	NW16	NW15	NW13	NW13	NNW10	NNE7	NNE5	NNE5	N5	N6	N5	NNW4	NW6.7	NW16
15-Oct	WNW3	WNW2	NW1	ESE3	SE3	ESE0	W4	WSW2	SSW2	SE5	S7	S8	SSW10	SSE10	SE9	E6	E5	ENE4	NNE5	NE3	NNE3	NNW2	N2	N2	SE1.7	SSE10
16-Oct	N3	NNW3	NW3	NW3	NNW3	NW3	NW4	NNW3	NNW2	NNE4	ESE3	SE3	SSE7	S11	SSE10	SSE11	SE7	SE4	S5	SSE7	S8	S7	S7	SSE4	SSE2.7	S11
17-Oct	S4	S8	SSW6	SW4	SSW3	SSW3	SW3	SW4	S8	SSE8	SSE11	SSE12	SSE10	S11	S9	SSW9	SSW11	SSW10	S11	S10	S9	S9	S9	SSE7	S7.6	SSE12
18-Oct	S3	SW6	WSW7	W7	W8	WNW11	WNW11	WNW11	WNW11	W9	W10	WNW16	DF	DF	NW15	WNW12	NW12	WNW7	WNW6	NW4	NW1	NNW4	N5	N7	WNW7.3	WNW16
19-Oct	N6	N6	N6	N6	N6	N6	N5	NNE6	NE6	NE7	ENE6	NE5	NE4	NE4	NE4	NNE2	N4	N5	N6	N4	ENE4	NE2	NNW2	E1	NNE4.3	NE7
20-Oct	S4	S6	SSW6	WSW6	W7	WNW11	W5	SSW6	SW8	WSW7	WSW6	W5	WNW11	WNW14	NW17	NW14	WNW10	NNW6	NW6	NNW5	N6	NNE5	N3	W2	WNW5.1	NW17
21-Oct	SW3	SSW3	SSE4	SSW3	SW3	W3	W4	WNW2	WSW3	SSW3	S5	S5	SE3	N2	N4	NNE4	N2	NNW4	ESE1	SSE5	S11	S8	S7	SSW8	SSW2.2	S11
22-Oct	SSW5	SW5	WSW5	SW5	S5	SSW4	SW4	WSW7	WSW7	WSW9	W10	WSW8	SW11	W12	W12	W12	W7	WSW5	SW5	WSW5	WSW5	W5	W6	WNW8	WSW6.3	W12
23-Oct	WNW5	WNW2	SSW3	SSW3	S4	S4	S4	SSW4	S3	WNW3	N7	N6	N7	N5	N5	N6	N4	NNW4	N5	N5	N6	N6	N6	N5	NNW2.4	N7
24-Oct	N6	N7	N5	N6	N4	ENE5	NE4	NNE2	NNW4	NNW4	N4	N4	NE4	SE1	SW2	W2	WNW2	NW2	NW1	NW2	NNW3	N5	N5	N5	N3.1	N7
25-Oct	N5	N6	N5	NNW6	NNW6	N6	NNW5	N5	N5	N5	NNE3	E3	NNE1	E1	WNW2	NNW2	WNW2	NW3	NW2	NW3	NW3	NW3	NW2	WNW1	NNW3.0	N6
26-Oct	S7	S10	SSW6	ESE2	SE5	SSE6	E3	ENE2	N3	N3	SE5	SSE10	SSE10	SE12	SE8	SSE8	S13	S14	S16	S14	W6	NW12	WNW9	W4	S4.8	S16
27-Oct	WNW6	NW9	NW8	NW8	NW10	NW12	NW13	NW12	NW11	NW14	NNW15	NW11	NW14	NW15	NW13	NW15	NNW15	NNW15	NNW14	NNW10	NW8	NNE3	NW3	W2	NW10.5	NW15
28-Oct	NNW4	NE4	N4	NW2	W3	W3	WSW2	S3	SSE6	S8	SSW8	S9	SSE11	SSE10	SSE11	S9	SSE7	SSE8	SSE6	SSE5	S10	S9	S9	S10	S5.0	SSE11
29-Oct	S12	S12	S14	S16	S13	S12	S13	S14	S13	S11	S10	SSE11	S12	S12	SSW12	S9	S8	S7	S8	SSW5	S5	S4	SSW4	SW3	S9.9	S16
30-Oct	WSW3	SSW4	SW4	S4	SSW4	S5	S5	S4	S4	SSW4	SSW2	SSW3	SSW2	SSW3	SSW2	SSW2	SSW3	SW2	NNW2	SW2	NNE2	NW3	NW5	NW4	SSW2.2	S5
31-Oct	NNW4	N4	NW3	WNW4	WNW2	NW2	N2	NNW2	WSW1	SSW3	SE4	SE4	ENE3	ENE5	ENE6	E7	ENE6	NE3	NE4	NNE6	NNE6	NNE5	N5	N6	NNE2.4	ENE7

WNW1.7	W1.5	W2.0	W1.9	W1.7	W1.9	W2.0	W1.8	WSW1.7	SW1.8	SW2.1	SW2.4	SSW1.6	WSW1.3	W1.8	NNW2.7	NNW2.5	NW2.1	NW1.6	NNW1.5	NNW1.1	NW1.7	NW1.7	NW1.6	Diurnal Average
S12	S12	S14	S16	S13	NW12	NW13	S14	S13	NW14	WNW15	NW18	NW17	W17	NW17	NW16	NNW15	NNW15	S16	S14	S11	NW12	S9	N11	Diurnal Maximum

DF - DAS 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 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	375	50.54	50.54
6 - 11	298	40.16	90.70
12 - 19	69	9.30	100.00
20 - 28	0	0.00	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**  
**Fort McKay - Bertha Ganter - October 2015**

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	49	18	12	8	8	7	14	13	35	52	26	20	24	29	33	27	375
6 - 11	53	16	6	8	0	1	5	39	49	15	6	16	27	22	19	16	298
12 - 19	5	1	0	0	0	0	1	2	17	1	0	1	7	5	22	7	69
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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>	107	35	18	16	8	8	20	54	101	68	32	37	58	56	74	50	742

Total Number of Valid Hours: 742

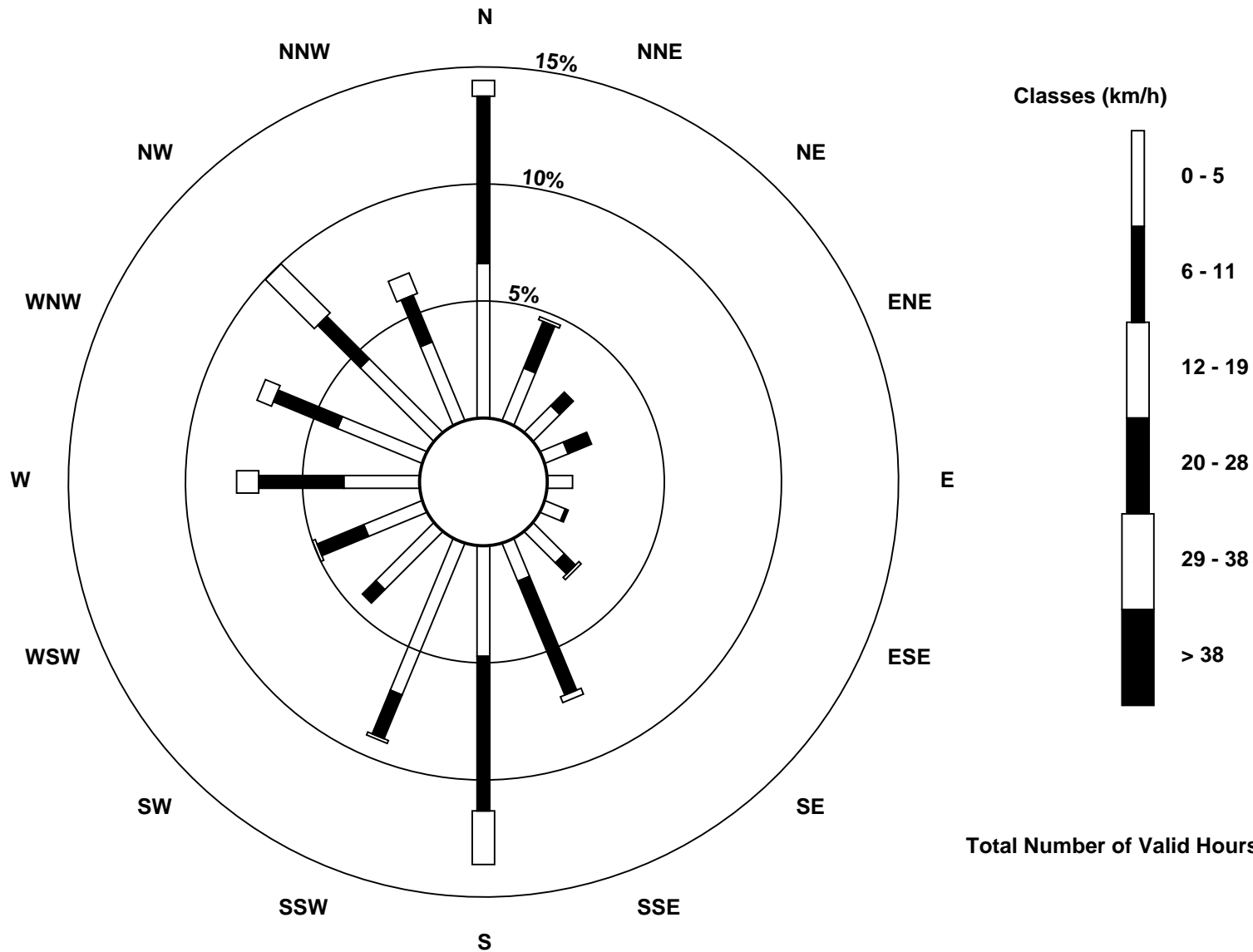
Total Number of Hours: 744





Wood Buffalo Environmental Association  
Wind Rose Oct 2015

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 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Oct 10 14:00 Minimum Value: 0 km/h on Oct 24 20:00 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> = 6																	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	1	1	1	1	1	1	2	1	2	2	2	2	2	2	2	1	1	1	1	1	3	2	2	1	3
2-Oct	2	1	1	1	3	3	3	4	4	4	4	5	5	5	5	3	3	3	3	4	3	3	3	4	5
3-Oct	4	4	3	4	5	4	4	4	4	4	4	4	3	3	3	3	2	2	1	1	1	1	2	1	5
4-Oct	1	1	2	1	1	1	2	2	2	2	2	2	2	3	3	2	1	1	1	1	1	1	1	1	3
5-Oct	2	1	1	1	1	2	1	1	1	1	3	6	5	5	5	5	4	2	1	1	1	2	3	1	6
6-Oct	1	1	1	1	1	1	1	1	2	1	2	2	2	2	2	2	2	1	1	1	1	1	2	1	2
7-Oct	1	1	1	1	1	1	1	1	1	2	2	1	2	2	3	3	3	2	1	2	1	2	1	1	3
8-Oct	1	1	1	1	1	1	1	1	1	1	1	2	1	2	1	1	1	1	2	2	2	2	1	1	2
9-Oct	1	1	1	1	1	1	1	1	2	2	2	1	1	2	2	2	2	2	1	1	1	1	1	1	2
10-Oct	1	1	1	1	1	2	1	1	1	7	5	5	7	7	6	5	4	3	3	2	3	3	3	2	7
11-Oct	3	3	3	3	3	4	3	3	4	3	4	4	5	5	3	4	4	3	2	2	1	2	1	1	5
12-Oct	1	1	1	1	2	2	1	3	2	3	3	3	3	3	3	4	4	3	2	1	1	1	2	3	4
13-Oct	3	3	3	3	3	3	3	3	3	3	4	3	4	4	4	4	4	2	1	1	1	1	1	3	4
14-Oct	2	2	2	3	3	2	2	3	3	4	6	5	5	5	5	4	3	3	2	2	2	2	2	2	6
15-Oct	1	1	1	1	1	1	1	1	1	2	2	3	2	2	2	1	2	2	2	1	1	1	1	1	3
16-Oct	1	1	1	0	1	1	1	1	1	1	1	1	2	2	3	2	3	1	1	2	2	2	2	1	3
17-Oct	2	2	2	1	1	1	1	1	2	2	3	2	2	2	2	4	3	2	2	2	2	2	2	2	4
18-Oct	2	3	3	3	3	3	3	3	4	3	5	6	DF	DF	5	4	4	3	1	1	2	2	1	2	6
19-Oct	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2	2	1	2	2
20-Oct	1	2	2	3	3	4	3	2	3	3	3	2	4	5	5	4	4	1	1	2	2	3	2	1	5
21-Oct	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	3	2	3	2	2	3
22-Oct	1	2	2	2	1	2	2	3	3	4	4	3	4	5	5	5	4	2	1	2	2	2	2	3	5
23-Oct	3	2	1	1	1	1	1	2	1	2	2	2	2	2	2	2	1	1	1	1	2	2	2	2	3
24-Oct	2	2	2	2	2	2	2	1	2	1	1	1	1	1	1	1	1	1	1	0	1	2	2	2	2
25-Oct	2	2	2	1	2	2	1	2	1	2	1	1	1	1	1	1	1	0	1	1	1	1	1	1	2
26-Oct	5	3	2	1	2	2	1	1	1	1	2	3	3	3	2	2	4	4	5	4	4	4	3	2	5
27-Oct	3	4	3	3	3	4	4	4	4	5	5	4	5	5	5	5	5	5	4	3	3	1	1	1	5
28-Oct	1	2	2	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	1	3	2	3	2	3
29-Oct	3	3	4	4	3	3	3	3	3	2	2	2	3	3	3	3	1	1	1	1	1	1	1	1	4
30-Oct	1	2	2	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
31-Oct	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	3	3	1	2	2	2	2	2	2	3
																	5 4 4 4 5 4 4 4 4 7 6 6 7 7 6 5 5 5 5 4 4 4 3 4								
Diurnal Maximum																									
DF - DAS Failure																									



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Fort McKay - Bertha Ganter - October 2015

Direction of Maximum Speed: 309 deg on Oct 5 12:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 321.0 deg on Oct 27	Hours of Data: 742
Direction of Minimum Speed: 119 deg on Oct 15 06:00	Direction of Minimum Daily Speed Average: 0.8 deg on Oct 8
Direction of Minimum Speed: 119 deg on Oct 15 06:00	Hours of Missing Data: 2
Monthly Average Direction: 281.5 deg	Percent Operational Time: 99.7

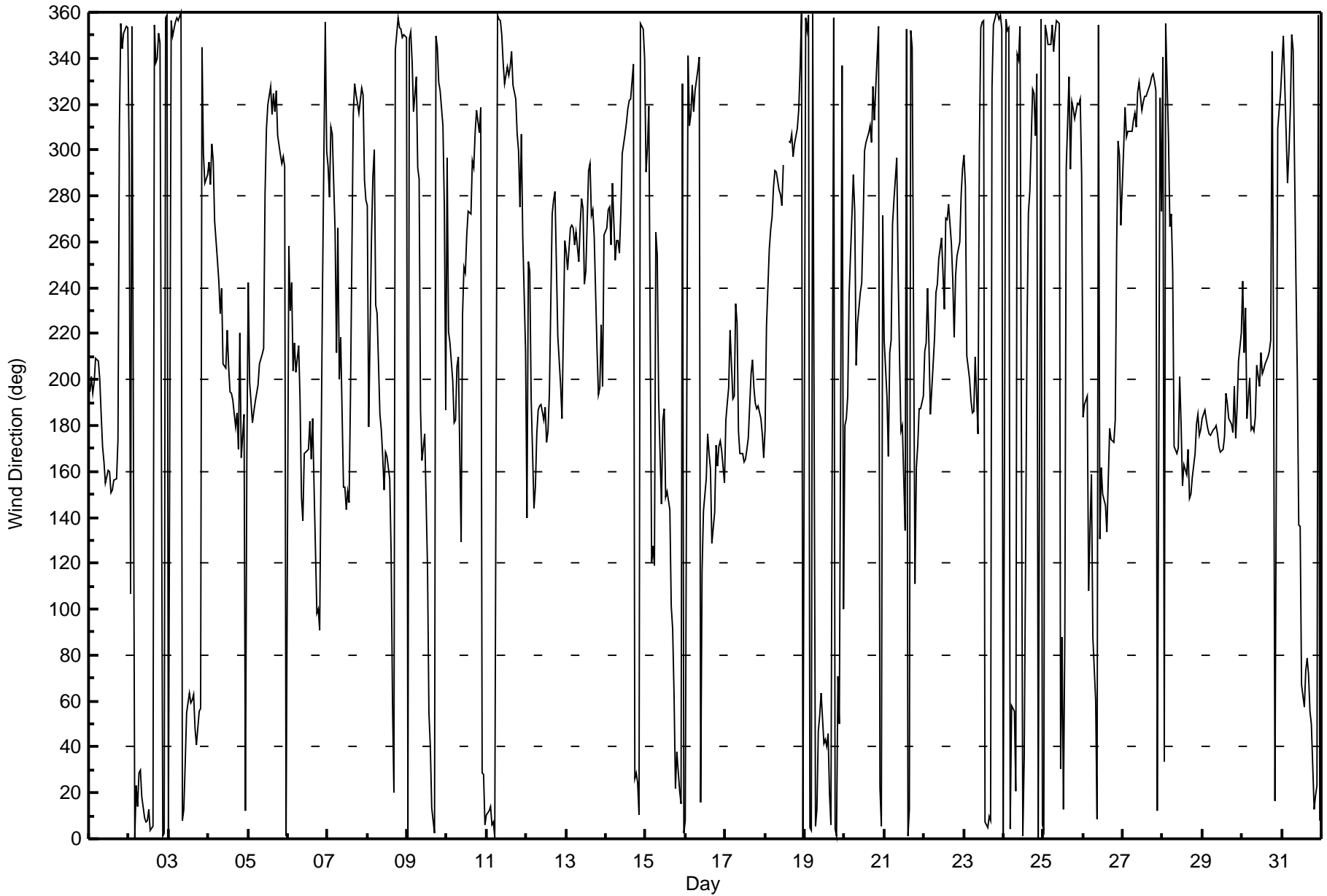
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	194	201	194	199	209	208	200	185	171	164	155	161	160	151	152	156	157	174	309	355	344	351	354	353	171.0
2-Oct	297	107	354	0	23	14	29	30	18	9	7	8	13	3	5	354	338	340	351	346	1	3	358	359	3.2
3-Oct	2	356	350	353	355	358	356	360	8	13	33	55	63	59	61	63	48	41	56	57	345	299	285	289	15.3
4-Oct	295	285	302	295	269	252	243	229	240	207	205	221	206	195	194	191	179	185	169	220	166	185	12	166	211.0
5-Oct	242	199	181	186	191	194	198	207	211	214	281	309	320	328	316	325	316	326	307	298	294	297	293	1	295.9
6-Oct	258	230	242	204	216	203	214	191	149	139	168	169	170	182	166	183	153	98	100	91	166	238	356	299	175.7
7-Oct	293	279	310	307	265	212	266	200	218	153	153	144	151	147	193	316	329	324	320	316	327	324	287	278	264.9
8-Oct	276	180	262	289	300	232	229	185	178	166	152	169	167	157	125	59	20	343	357	353	353	349	350	349	340.8
9-Oct	0	348	352	339	316	332	292	287	187	165	176	147	117	55	40	13	3	350	345	330	326	311	275	187	3.8
10-Oct	296	221	216	199	181	182	205	210	129	228	249	246	263	274	272	295	292	308	317	308	319	28	28	6	274.1
11-Oct	10	12	14	6	7	0	359	357	356	350	338	329	336	332	336	343	328	322	307	300	275	307	262	212	341.6
12-Oct	140	252	247	192	144	153	176	187	189	189	182	188	173	178	194	272	278	282	250	219	198	183	221	260	205.1
13-Oct	256	248	266	267	266	259	264	252	268	279	275	242	247	291	294	272	274	263	213	193	197	224	197	263	260.0
14-Oct	266	274	275	259	286	252	260	260	255	273	298	307	312	318	322	322	337	26	28	24	11	355	353	340	307.6
15-Oct	290	301	319	120	128	119	264	254	192	146	182	187	149	151	143	101	91	63	22	38	21	15	329	2	136.1
16-Oct	8	341	311	315	328	317	326	335	340	16	116	143	157	176	168	161	129	142	171	162	171	173	169	155	162.1
17-Oct	182	190	196	221	192	193	233	225	177	168	168	164	166	170	175	203	208	196	190	187	189	183	176	166	184.1
18-Oct	178	223	257	265	271	284	291	290	282	281	276	293	DF	DF	304	303	307	297	303	309	317	335	360	0	291.9
19-Oct	358	352	359	5	3	359	6	13	47	54	63	42	44	40	46	20	6	358	4	1	71	50	337	100	20.2
20-Oct	180	183	193	237	272	289	274	206	225	238	243	268	300	303	307	311	303	328	313	327	354	23	6	272	285.3
21-Oct	217	193	167	212	217	268	278	297	246	209	177	180	135	353	1	13	352	345	111	161	171	187	187	193	198.0
22-Oct	212	216	240	215	185	207	219	238	242	253	262	246	230	270	269	276	259	244	218	245	254	260	281	293	249.4
23-Oct	298	284	211	200	191	186	186	210	177	302	353	356	356	7	5	10	8	327	354	359	359	357	359	353	342.2
24-Oct	0	357	352	353	4	58	56	21	342	339	354	1	35	124	221	273	282	326	325	306	333	0	357	6	356.4
25-Oct	4	354	351	346	346	354	343	351	356	355	30	88	13	89	292	332	291	321	318	314	321	320	322	289	347.9
26-Oct	184	189	193	108	136	159	88	61	8	355	131	162	150	145	134	156	179	174	172	183	259	304	298	267	174.2
27-Oct	301	319	306	308	308	308	313	316	310	325	329	318	321	323	324	325	329	332	333	330	326	12	323	273	321.0
28-Oct	340	34	355	305	267	272	247	171	168	170	201	181	153	163	159	170	148	150	157	168	180	185	176	178	172.8
29-Oct	183	187	183	179	177	175	178	179	180	177	171	168	170	175	194	190	183	181	177	197	174	188	208	221	180.7
30-Oct	243	212	231	183	201	178	180	178	183	206	197	212	203	204	207	210	212	217	343	220	16	310	317	325	213.4
31-Oct	337	349	307	286	300	318	350	343	243	200	137	136	67	58	73	79	71	55	50	13	19	23	359	8	31.3

283.0 269.3 269.3 269.2 272.8 266.1 275.4 260.3 237.8 231.2 222.8 221.0 211.3 240.4 279.4 299.4 299.7 314.3 313.6 300.9 300.3 315.1 311.1 304.2

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

Fort McKay - Bertha Ganter - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																	Hours in Service: 744																								
Maximum Value: 102 deg on Oct 2 02:00																	Hours of Data: 742																								
Minimum Value: 10 deg on Oct 18 19:00																	Hours of Missing Data: 2																								
Percentiles: P <sub>1</sub> = 11 P <sub>10</sub> = 15 Q <sub>1</sub> = 21 Median = 29 O <sub>3</sub> = 41 P <sub>90</sub> = 52 P <sub>99</sub> = 87																	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	13	12	16	17	20	14	23	14	16	15	13	13	15	14	14	11	12	38	43	43	26	22	24	35	43																
2-Oct	37	102	31	44	41	41	52	49	41	34	38	33	37	31	29	30	25	23	26	28	29	30	29	30	102																
3-Oct	32	28	26	27	30	32	28	30	38	42	41	47	42	45	49	42	50	46	41	44	52	19	31	36	52																
4-Oct	54	68	38	56	25	49	46	38	46	34	31	36	31	29	37	29	18	15	24	21	17	63	26	95	95																
5-Oct	20	24	15	15	14	17	21	38	41	40	63	24	26	26	25	23	23	19	13	12	11	12	74	74	74																
6-Oct	81	86	45	26	17	13	14	24	24	20	18	21	22	26	29	22	72	47	29	36	18	74	14	36	86																
7-Oct	20	33	34	26	36	28	27	52	63	34	16	15	13	13	68	58	19	16	14	31	28	29	71	37	71																
8-Oct	27	80	18	82	26	20	13	39	38	24	21	24	34	37	72	39	42	15	24	23	24	21	24	36	82																
9-Oct	25	26	23	24	34	48	31	40	52	16	23	11	37	38	41	37	44	24	23	31	31	46	62	41	62																
10-Oct	68	35	23	39	19	77	65	21	35	51	45	44	42	40	42	24	30	25	17	14	27	64	53	34	77																
11-Oct	34	40	40	30	34	31	27	29	30	29	25	26	27	26	28	27	25	22	23	16	50	42	25	26	50																
12-Oct	63	27	87	55	55	20	24	16	21	21	18	18	20	25	62	42	34	38	38	75	67	21	31	45	87																
13-Oct	44	44	41	42	41	43	43	45	43	40	36	43	42	38	33	42	36	36	13	23	13	21	24	47	47																
14-Oct	41	34	30	40	31	41	47	42	45	41	27	24	21	21	23	22	27	42	48	50	45	36	26	34	50																
15-Oct	25	36	85	42	21	88	17	20	66	23	33	31	18	15	19	27	42	37	38	44	30	26	45	70	88																
16-Oct	23	32	24	25	22	35	28	15	51	33	52	44	21	18	18	22	18	24	18	15	15	13	16	12	52																
17-Oct	21	13	16	16	22	20	29	29	16	14	14	15	15	14	16	28	22	15	14	11	12	11	14	12	29																
18-Oct	44	44	47	40	35	27	23	22	32	35	40	24	DF	DF	22	23	19	14	10	36	82	39	21	26	82																
19-Oct	25	26	26	29	29	23	33	40	36	39	37	53	52	49	49	45	20	33	26	26	47	88	46	82	88																
20-Oct	39	19	16	41	39	25	40	25	32	44	48	48	25	24	23	21	21	17	15	18	43	54	41	31	54																
21-Oct	47	18	34	24	33	27	33	65	37	50	55	35	71	72	39	30	62	40	87	44	15	18	17	16	87																
22-Oct	31	24	33	34	21	25	31	49	51	44	45	49	38	42	42	39	45	42	20	40	40	37	32	23	51																
23-Oct	46	80	46	47	19	28	19	41	39	66	31	33	30	45	31	33	34	14	18	24	30	27	29	28	80																
24-Oct	27	28	25	24	34	43	50	66	27	35	44	43	46	94	60	36	42	55	64	21	18	29	29	33	94																
25-Oct	28	24	26	19	22	25	22	24	25	30	54	40	85	85	71	58	46	19	31	15	18	22	24	46	85																
26-Oct	23	18	19	47	19	20	29	36	25	45	43	21	21	14	18	38	16	15	16	16	56	21	22	41	56																
27-Oct	27	21	16	19	20	18	19	20	20	24	24	22	22	24	24	22	23	22	21	23	22	41	29	50	50																
28-Oct	25	50	30	33	16	26	47	45	23	17	26	23	15	19	19	17	14	14	15	21	15	15	15	14	50																
29-Oct	14	15	15	15	15	14	14	15	15	14	12	12	16	16	16	16	11	11	13	13	11	21	14	25	25																
30-Oct	32	44	47	30	31	16	17	21	25	32	51	31	47	28	62	46	22	33	60	74	74	38	20	23	74																
31-Oct	20	27	23	21	30	45	32	58	72	38	18	31	53	41	31	30	38	44	52	32	42	46	26	35	72																
																	81	102	87	82	55	88	65	66	72	66	63	53	85	94	72	58	72	55	87	75	82	88	74	95	
																	Diurnal Maximum																								
DF - DAS Failure																																									



# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	October 21, 2015	Last Calibration	September 24, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	9:40	End Time (MST)	14:45
Gas Cert Reference	LL107945	Station temp.	21 Deg C
Cal Gas Concentration	49.7 ppm	Cal Gas Exp Date	09-Aug-18
Calibrator Make/Model	Sabio 4010	Serial Number	1730512
ZAG Make/Model	API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-614	-614
Analyzer IP address	192.168.1.43		Lamp voltage	808	811
Calculated slope	1.003661	0.990093	Chamber temp	45.0	44.9
Calculated intercept	0.140513	2.591434	Pressure	681.0	683.9
Analyzer Background	12.0	11.5	Flow	0.497	0.499
Analyzer Coefficient	0.985	0.949	Intensity	90	90

Analyzer make Thermo 43i      Analyzer serial # JC1501301448

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.0	0.0	-0.1	----
as found span	5500	81.3	734.7	760.0	0.967
calibrator zero	5500	0.0	0.0	-0.1	----
high point	5500	81.3	734.7	741.0	0.991
second point	5500	45.6	412.1	411.8	1.001
third point	5500	22.8	206.0	203.2	1.014
as left zero	5500	0.0	0.0	0.9	----
as left span	5500	81.3	734.7	744.0	0.987
Average Correction Factor					1.002

Corrected As found    760.1      Previous response    731.8      % change    -3.7%

Notes:

New calibration gas cylinder. Span adjusted.

Calibration Performed By:

Devin Russell



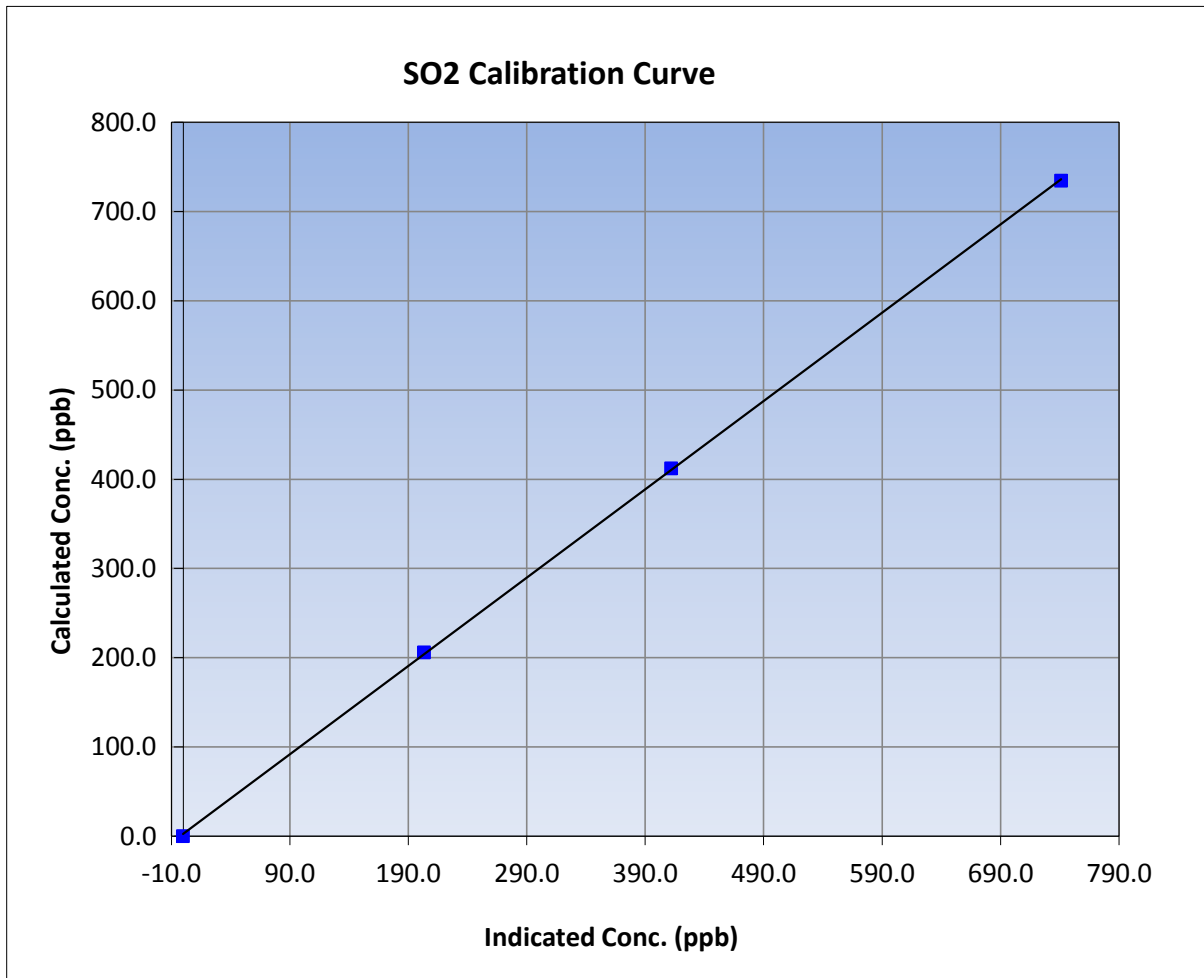
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	October 21, 2015	Previous Calibration	September 24, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:40	End Time (MST)	14:45
Analyzer make	Thermo 43i	Analyzer serial #	JC1501301448

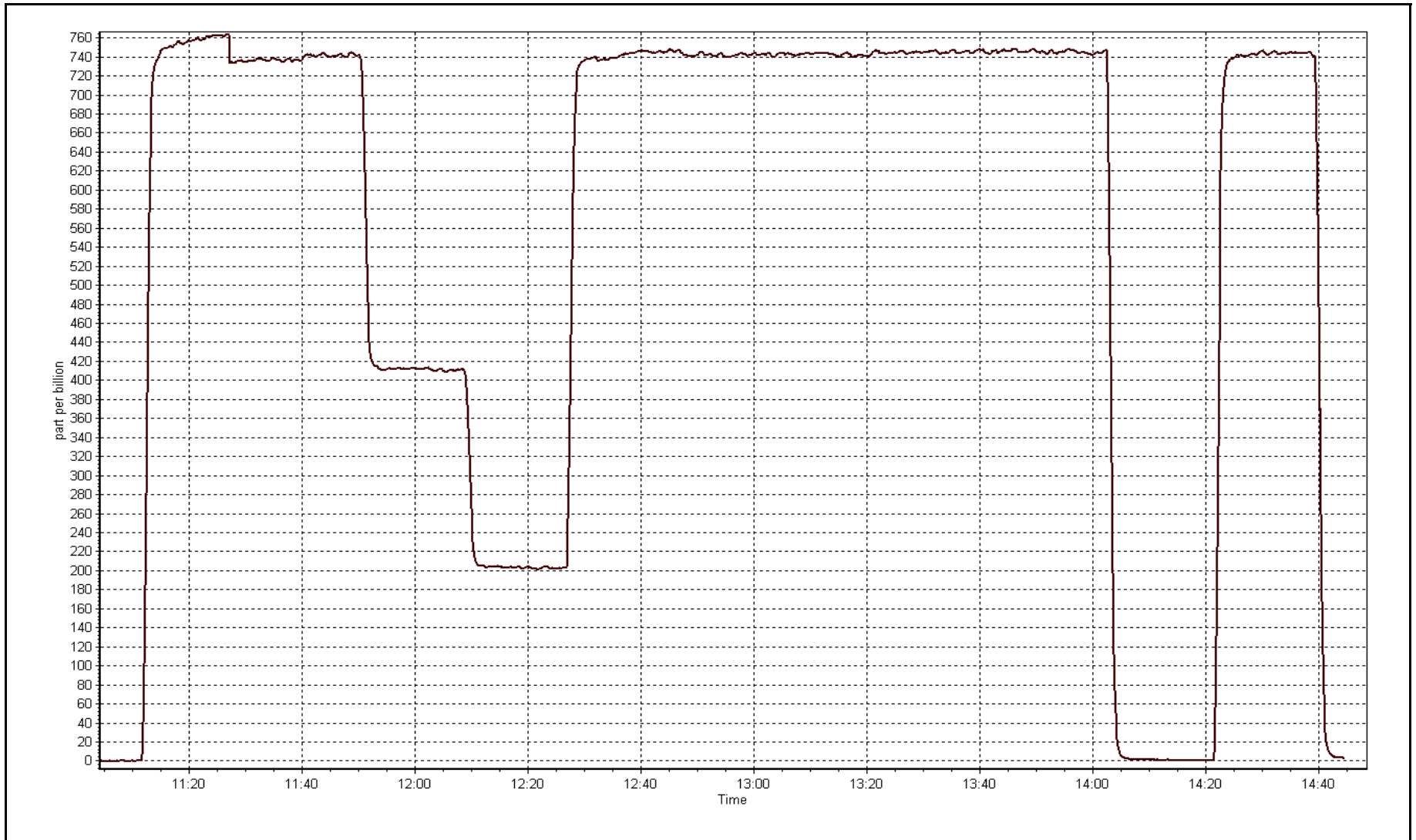
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999942
734.7	741.0	0.9914		
412.1	411.8	1.0007	Slope	0.990093
206.0	203.2	1.0141		
			Intercept	2.591434



SO2 Calibration Plot

Date: October 21, 2015







# Wood Buffalo Environmental Association TRS Calibration Report

## Station Information

Calibration Date	October 26, 2015	Last Calibration	September 14, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	9:25	End Time (MST)	12:30
Gas Cert Reference	LL27480	Station temp.	21 Deg C
Cal Gas Concentration	10.6 ppm	Cal Gas Exp Date	21/12/2012
Calibrator Make/Model	Sabio 4010	Serial Number	1730512
Dil air Make/Model	API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582
SO2 gas concentration	49.7 ppm	SO2 gas cert/exp	SA140071A 26/Sep/17

## Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-860	-859
Analyzer IP address	192.168.1.42		Lamp voltage	1134	1142
Calculated slope	0.991291	1.003740	Chamber temp	45	45
Calculated intercept	0.158225	0.122218	Pressure	709.6	678.1
Analyzer Background	1.8	1.84	Flow	0.441	0.413
Analyzer Coefficient	1.006	1.006	Intensity	80	80
			Converter temp.	800	800

Analyzer make/model	Thermo 43i-TLE	Analyzer serial #	1218153461
Converter make/model	CDN-101	Converter serial #	470

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6500	0.0	0.0	-0.2	----
as found span	6500	46.0	75.0	74.6	1.005
SO2 scrubber check	5500	22.8	206.0	0.4	----
calibrator zero	6500	0.0	0.0	0.0	----
high point	6500	46.0	75.0	74.6	1.005
second point	6500	24.6	40.1	39.9	1.005
third point	6500	12.3	20.1	19.6	1.022
as left zero	6500	0.0	0.0	0.0	----
as left span	6500	46.0	75.0	75.2	0.998
Average Correction Factor					1.011

Corrected As found	74.8	Previous response	75.5	% change	1.0%
--------------------	------	-------------------	------	----------	------

**Notes:**

Filter changed after as founds. Scrubber check completed after as founds. No adjustments made.

Calibration Performed By: Devin Russell



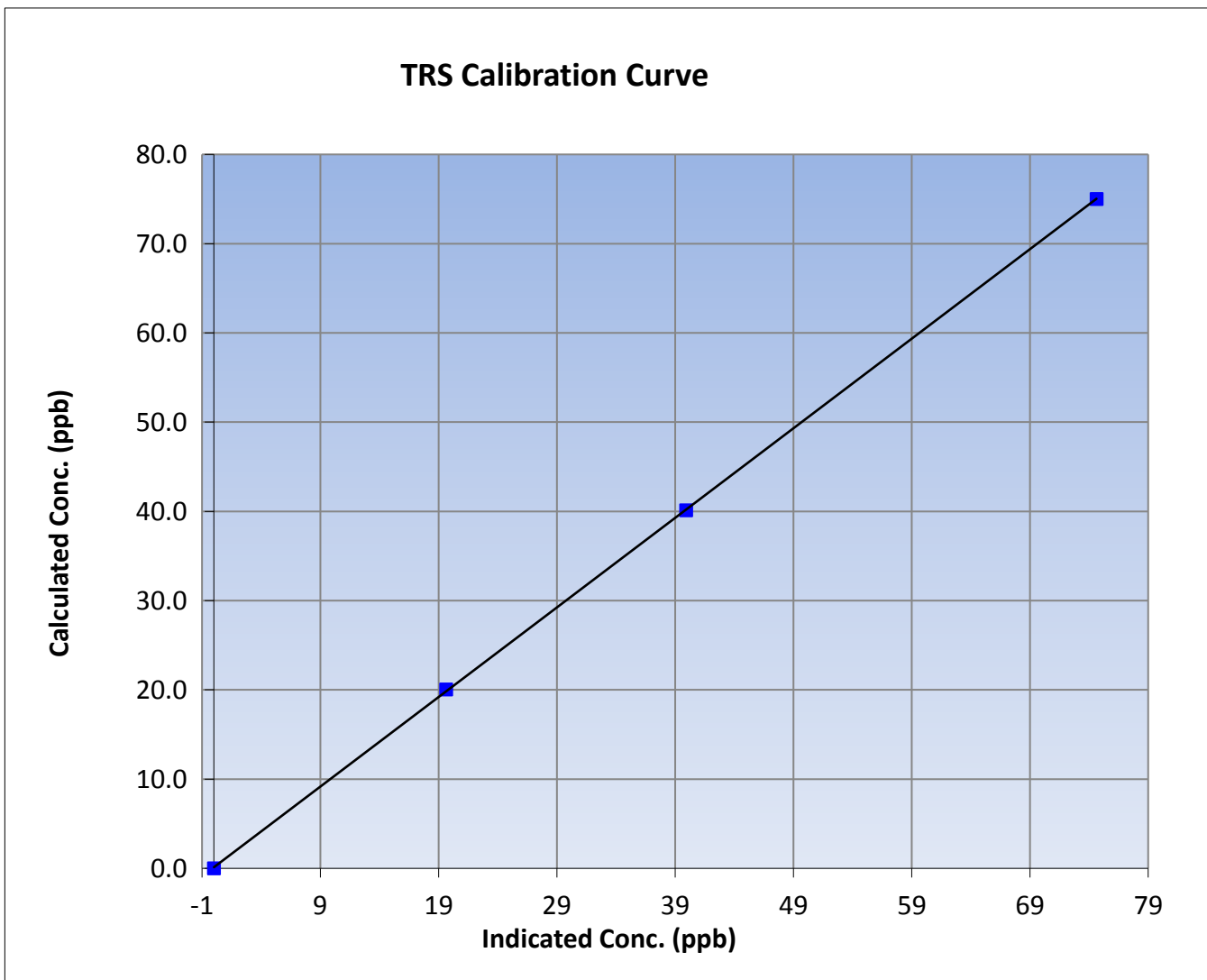
# Wood Buffalo Environmental Association TRS Calibration Report

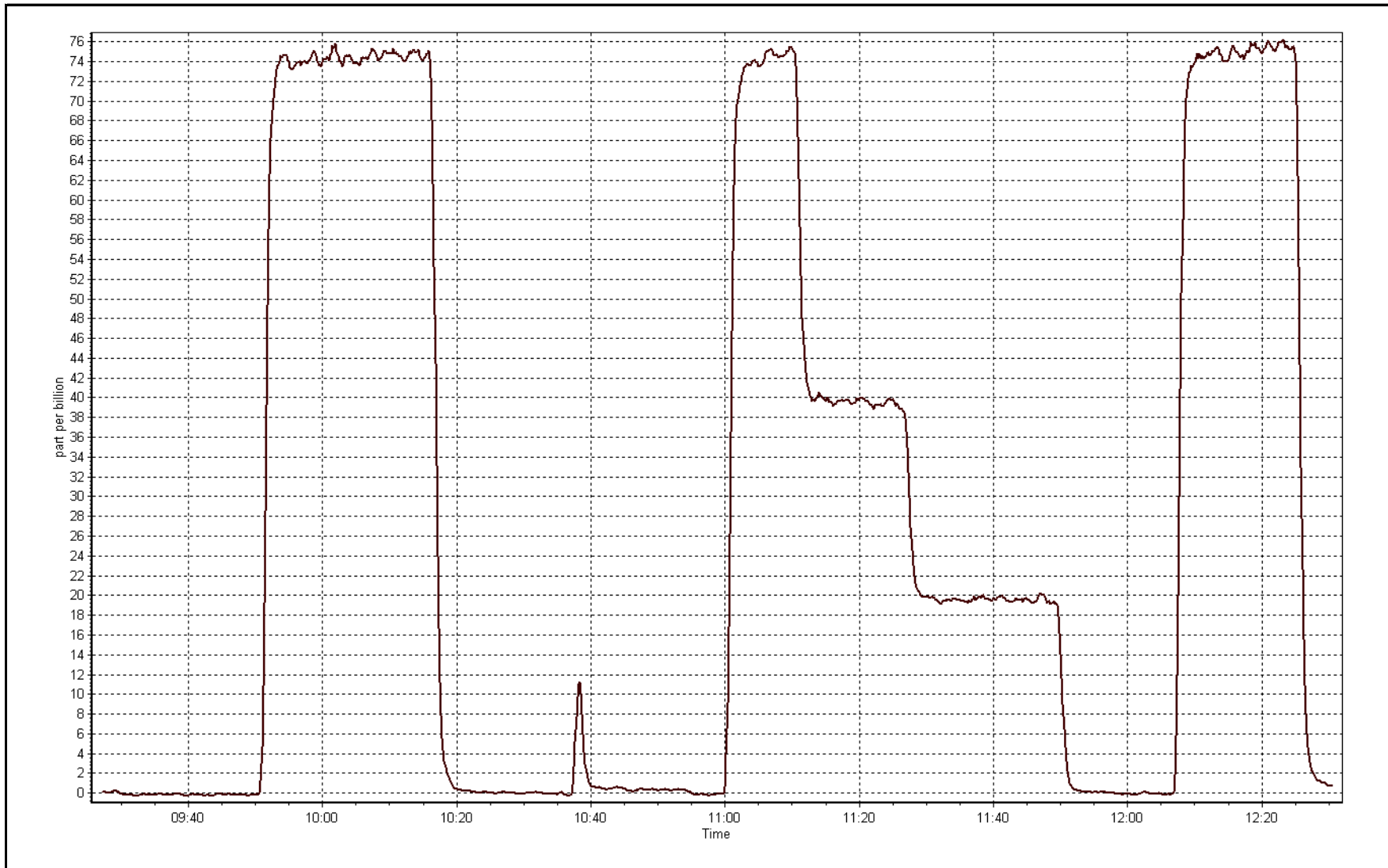
## Station Information

Calibration Date	October 26, 2015	Previous Calibration	September 14, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:25	End Time (MST)	12:30
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153461

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999974
75.0	74.6	1.0052		
40.1	39.9	1.0047	Slope	1.003740
20.1	19.6	1.0218		
			Intercept	0.122218







# Wood Buffalo Environmental Association THC / NMHC Calibration Report

### Station Information

Calibration Date	October-16-15	Last Calibration	October-13-15
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Removal		
Start Time (MST)	9:00	End Time (MST)	10:15
Gas Cert Reference	SA140071A	Cal Gas Expiry Date	September-26-17
CH4 Cal Gas Conc.	499.0 ppm	CH4 Equiv Conc.	1054.5 ppm
C3H8 Cal Gas Conc.	202.0 ppm	Station temp.	21 Deg C
Calibrator Model	Sabio 4010	Serial Number	1730512
ZAG make/model	Teledyne API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	Serial Number	2582

### Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.0	NA
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	NA
Analyzer IP address	192.168.1.55		Flame Temp	405.0	NA
THC Calc slope	0.999421	1.024983	Carrier Pressure	35.5	NA
THC Calc intercept	0.019282	0.028105	Fuel Pressure	44.3	NA
NMHC Calc slope	1.001670	1.117502	Air Pressure	32.4	NA
NMHC Calc intercept	-0.002627	0.002689			

Analyzer make Thermo 55i Analyzer serial # 1501663728

### THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.0	0.00	0.00	----
as found span	5500	78.1	14.97	14.61	1.025
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	78.1	14.97	14.61	1.025
second point	5500	43.7	8.38	8.10	1.034
third point	5500	21.9	4.20	4.06	1.034
as left zero					
as left span					
Average Correction Factor					1.031

Corrected As found 14.61 Previous response 14.96 % change 2.4%

Notes:

Removal Calibration

Calibration Performed By: Devin Russell



## Wood Buffalo Environmental Association THC / NMHC Calibration Report

### NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	----
as found span	5500	78.1	7.89	7.06	1.117
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	78.1	7.89	7.06	1.117
second point	5500	43.7	4.41	3.94	1.120
third point	5500	21.9	2.21	1.98	1.118
as left zero					
as left span					
Average Correction Factor					1.119

Corrected As found      7.06      Previous response      7.88      % change      11.6%

### CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	----
as found span	5500	78.1	7.09	7.56	0.937
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	78.1	7.09	7.56	0.937
second point	5500	43.7	3.96	4.17	0.951
third point	5500	21.9	1.99	2.07	0.960
as left zero					
as left span					
Average Correction Factor					0.949

Corrected As found      7.56      Previous response      7.09      % change      -6.3%



# Wood Buffalo Environmental Association

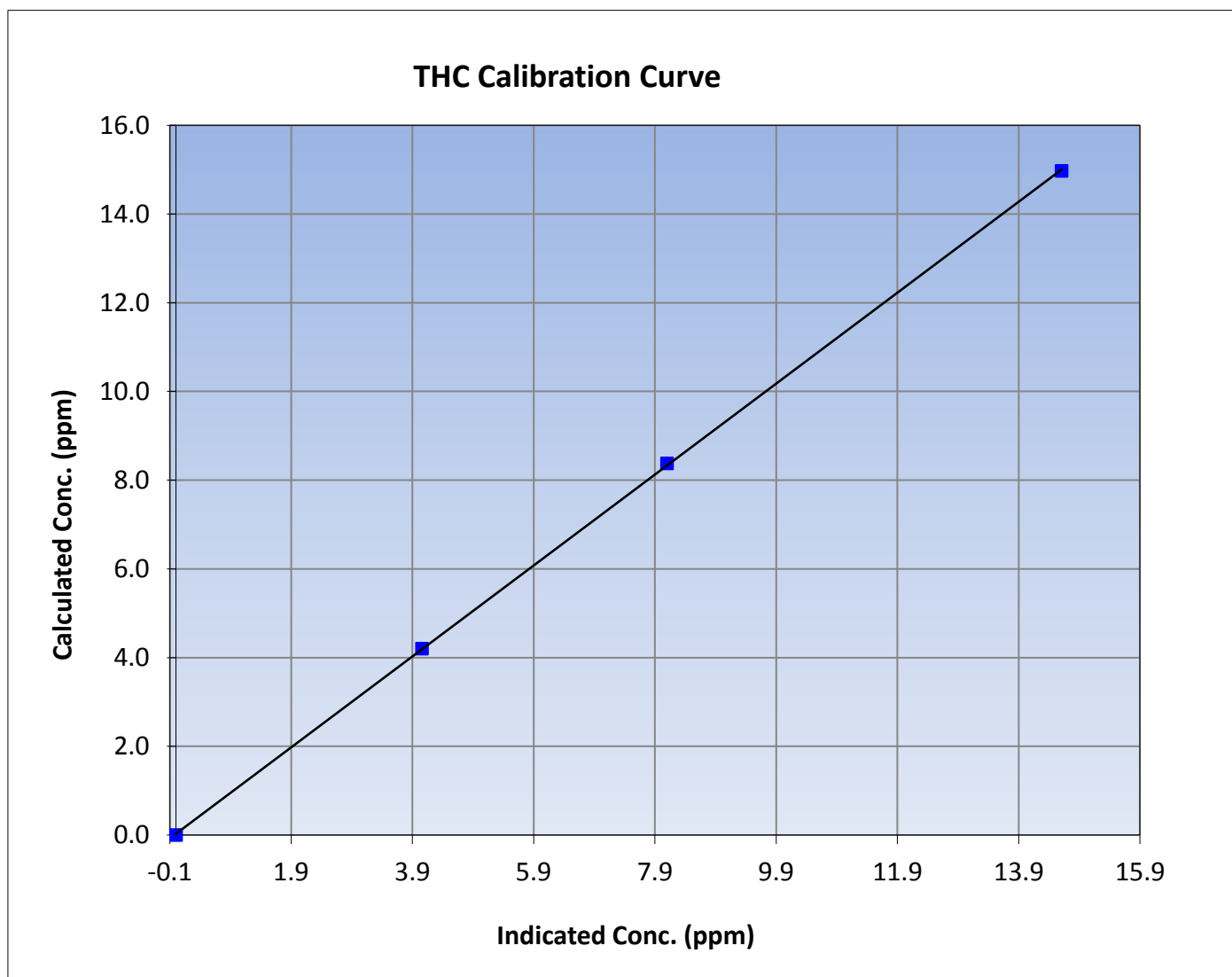
## THC Calibration Summary

### Station Information

Calibration Date	October 16, 2015	Previous Calibration	October 13, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:00	End Time (MST)	10:15
Analyzer make	Thermo 55i	Analyzer serial #	1501663728

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999967
14.97	14.61	1.0249		
8.38	8.10	1.0344	Slope	1.024983
4.20	4.06	1.0342		
			Intercept	0.028105





# Wood Buffalo Environmental Association

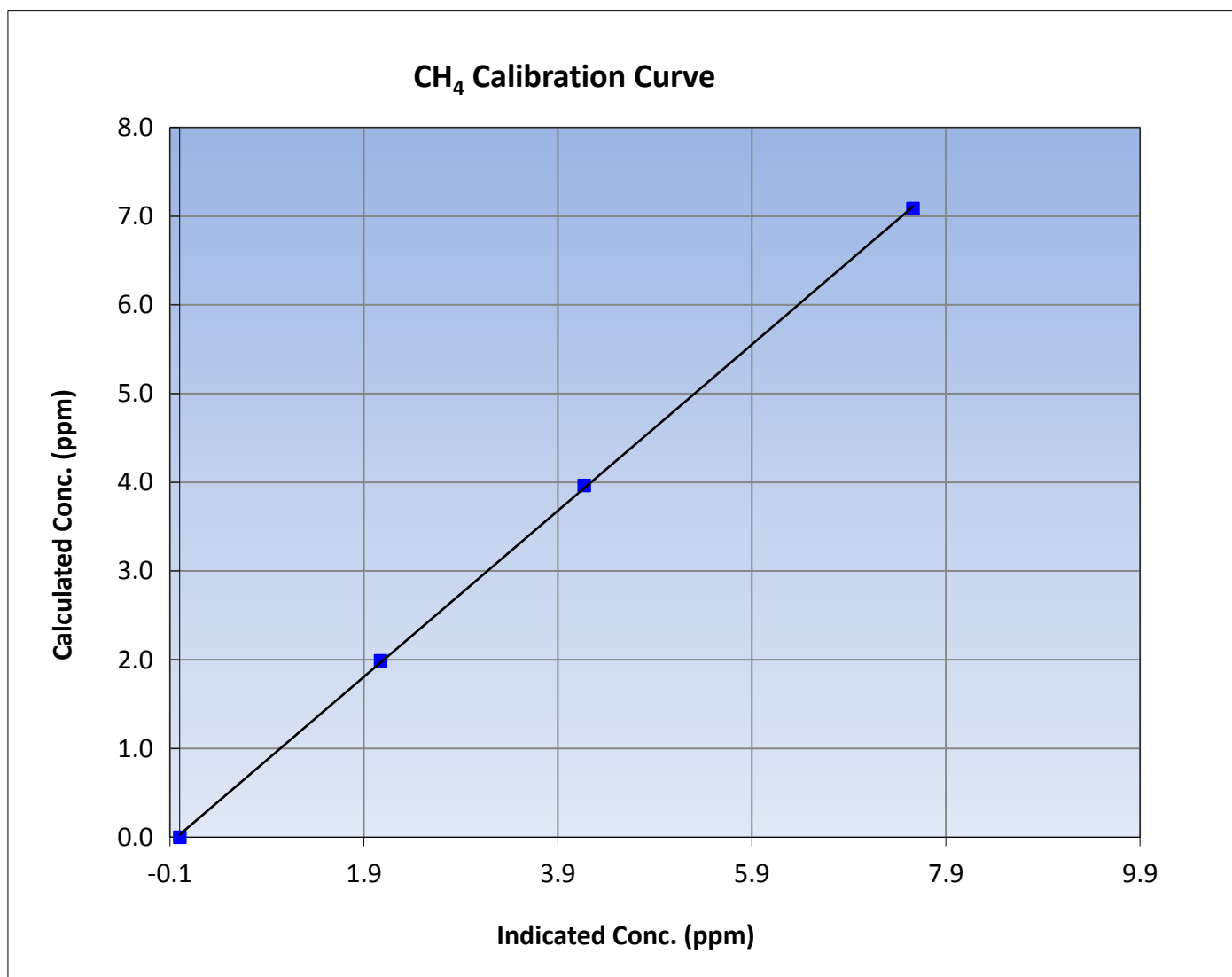
## CH<sub>4</sub> Calibration Summary

### Station Information

Calibration Date	October 16, 2015	Previous Calibration	October 13, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:00	End Time (MST)	10:15
Analyzer make	Thermo 55i	Analyzer serial #	1501663728

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999902
7.09	7.56	0.9373		
3.96	4.17	0.9508	Slope	0.936507
1.99	2.07	0.9599		
			Intercept	0.028427





# Wood Buffalo Environmental Association

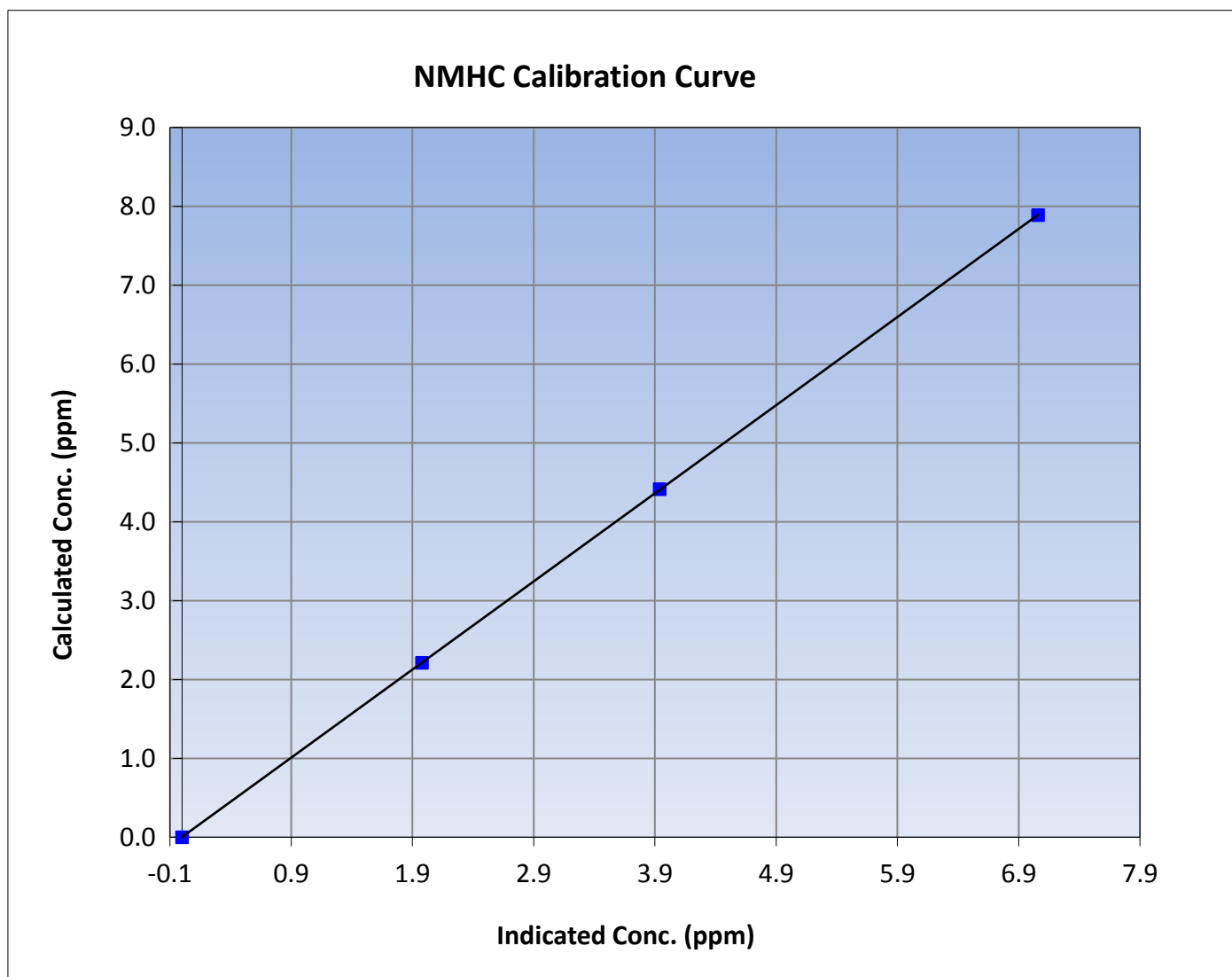
## NMHC Calibration Summary

### Station Information

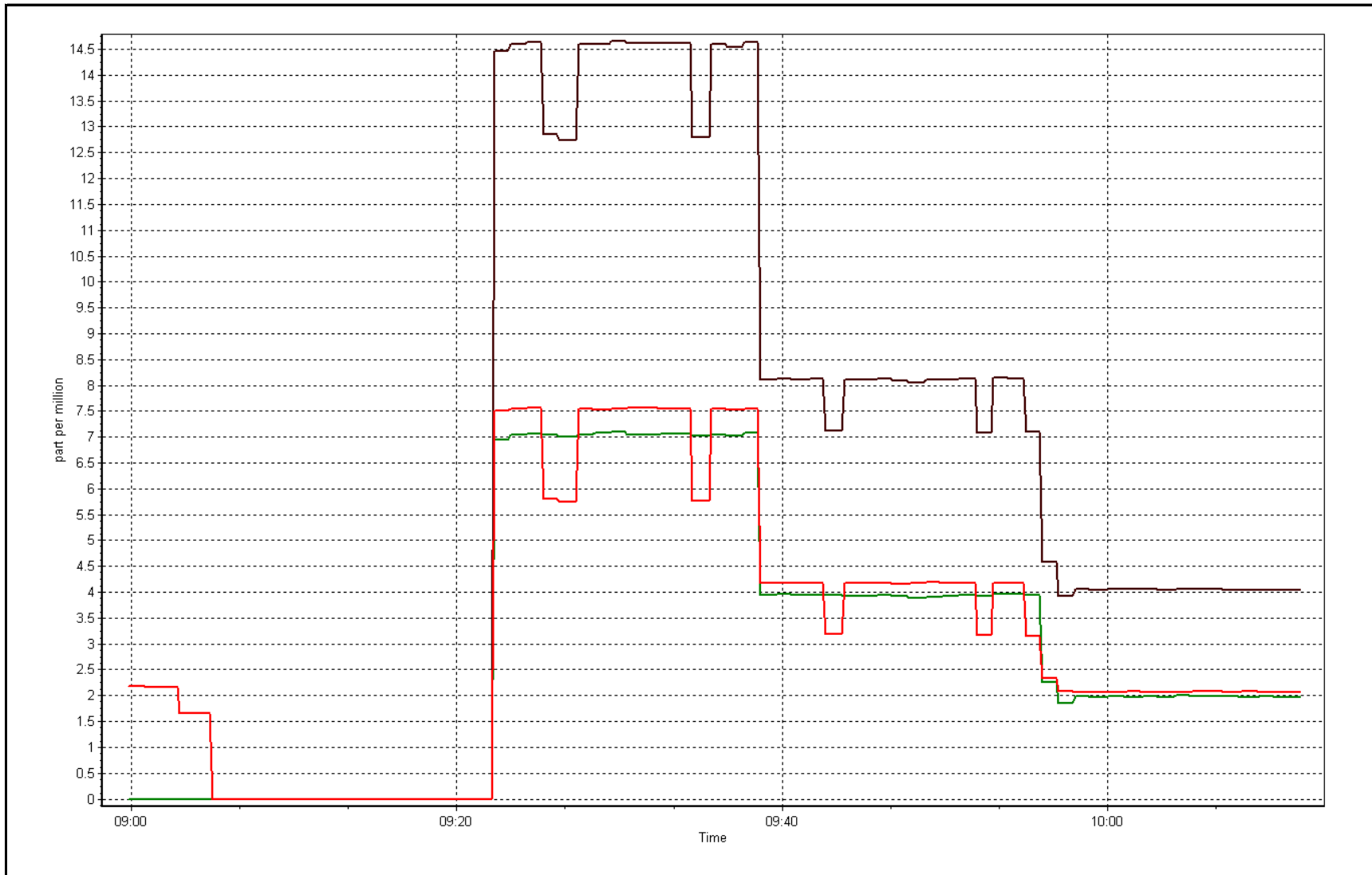
Calibration Date	October 16, 2015	Previous Calibration	October 13, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:00	End Time (MST)	10:15
Analyzer make	Thermo 55i	Analyzer serial #	1501663728

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999997
7.89	7.06	1.1173		
4.41	3.94	1.1202	Slope	1.117502
2.21	1.98	1.1183		
			Intercept	0.002689









## Wood Buffalo Environmental Association THC / NMHC Calibration Report

### Station Information

Calibration Date	October-16-15	Last Calibration	NA
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Install		
Start Time (MST)	13:00	End Time (MST)	15:00
Gas Cert Reference	SA140071A	Cal Gas Expiry Date	September-26-17
CH4 Cal Gas Conc.	499.0 ppm	CH4 Equiv Conc.	1054.5 ppm
C3H8 Cal Gas Conc.	202.0 ppm	Station temp.	21 Deg C
Calibrator Model	Sabio 4010	Serial Number	1730512
ZAG make/model	Teledyne API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	Serial Number	2582

### Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	NA	74.9
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	NA	175.0
Analyzer IP address	192.168.1.55		Flame Temp	NA	353.8
THC Calc slope	NA	1.000045	Carrier Pressure	NA	37.7
THC Calc intercept	NA	0.002494	Fuel Pressure	NA	39.5
NMHC Calc slope	NA	1.001621	Air Pressure	NA	21.7
NMHC Calc intercept	NA	-0.009963			

Analyzer make Thermo 55i Analyzer serial # 1118148494

### THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	78.1	14.97	14.97	1.000
second point	5500	43.7	8.38	8.38	1.000
third point	5500	21.9	4.20	4.19	1.002
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	78.1	14.97	14.93	1.003
Average Correction Factor					1.001

Corrected As found      NA      Previous response      NA      % change      NA

**Notes:**

Installation Calibration. Span adjusted.

Calibration Performed By: Devin Russell



## Wood Buffalo Environmental Association THC / NMHC Calibration Report

### NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	78.1	7.89	7.88	1.001
second point	5500	43.7	4.41	4.42	0.999
third point	5500	21.9	2.21	2.23	0.992
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	78.1	7.89	7.84	1.006
Average Correction Factor					0.997

Corrected As found      NA      Previous response      NA      % change      NA

### CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	78.1	7.09	7.08	1.001
second point	5500	43.7	3.96	3.96	1.001
third point	5500	21.9	1.99	1.97	1.009
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	78.1	7.09	7.09	0.999
Average Correction Factor					1.004

Corrected As found      NA      Previous response      NA      % change      NA



# Wood Buffalo Environmental Association

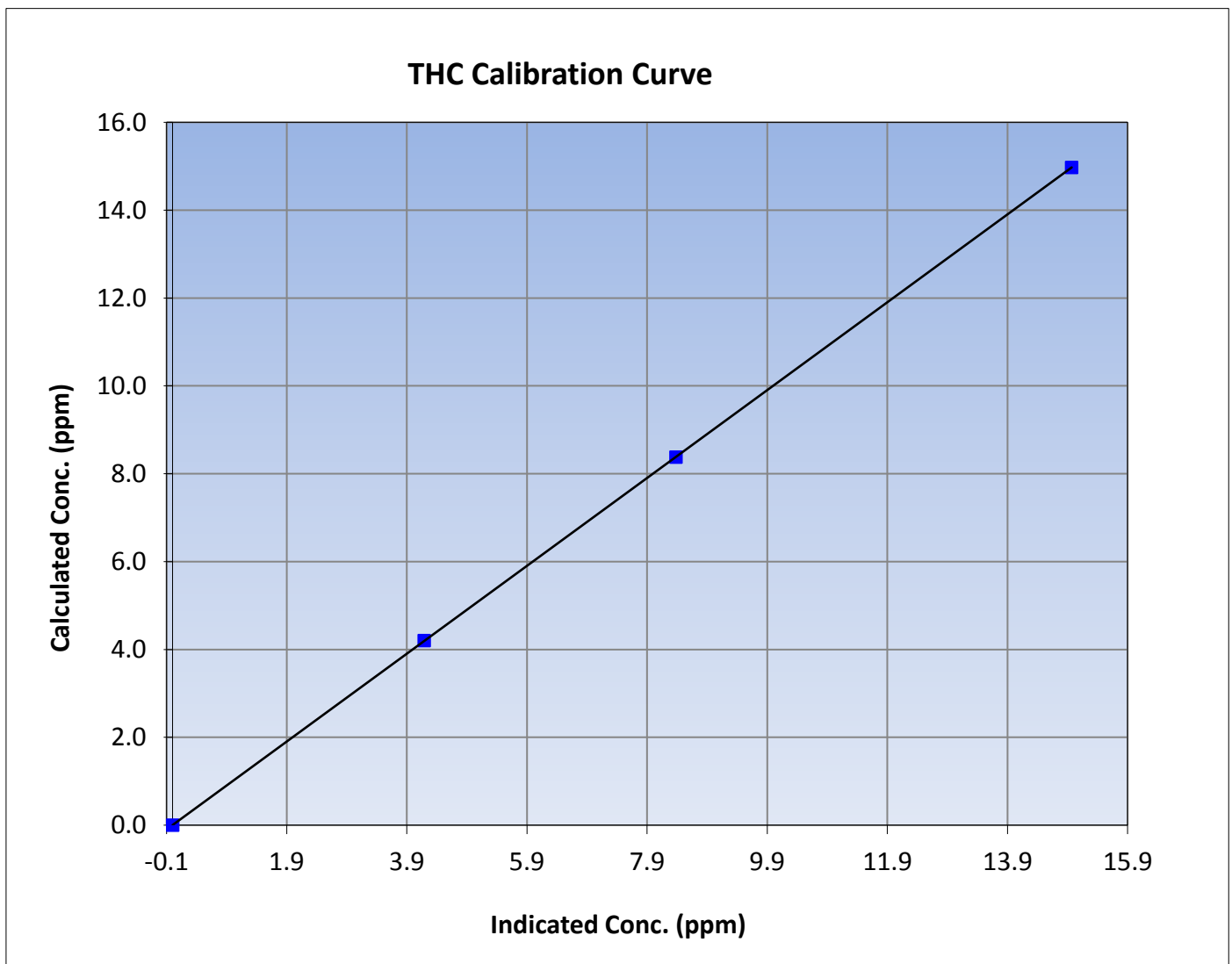
## THC Calibration Summary

### Station Information

Calibration Date	October 16, 2015	Previous Calibration	NA
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	13:00	End Time (MST)	15:00
Analyzer make	Thermo 55i	Analyzer serial #	1118148494

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999999
14.97	14.97	1.0003		
8.38	8.38	0.9998	Slope	1.000045
4.20	4.19	1.0021		
			Intercept	0.002494





# Wood Buffalo Environmental Association

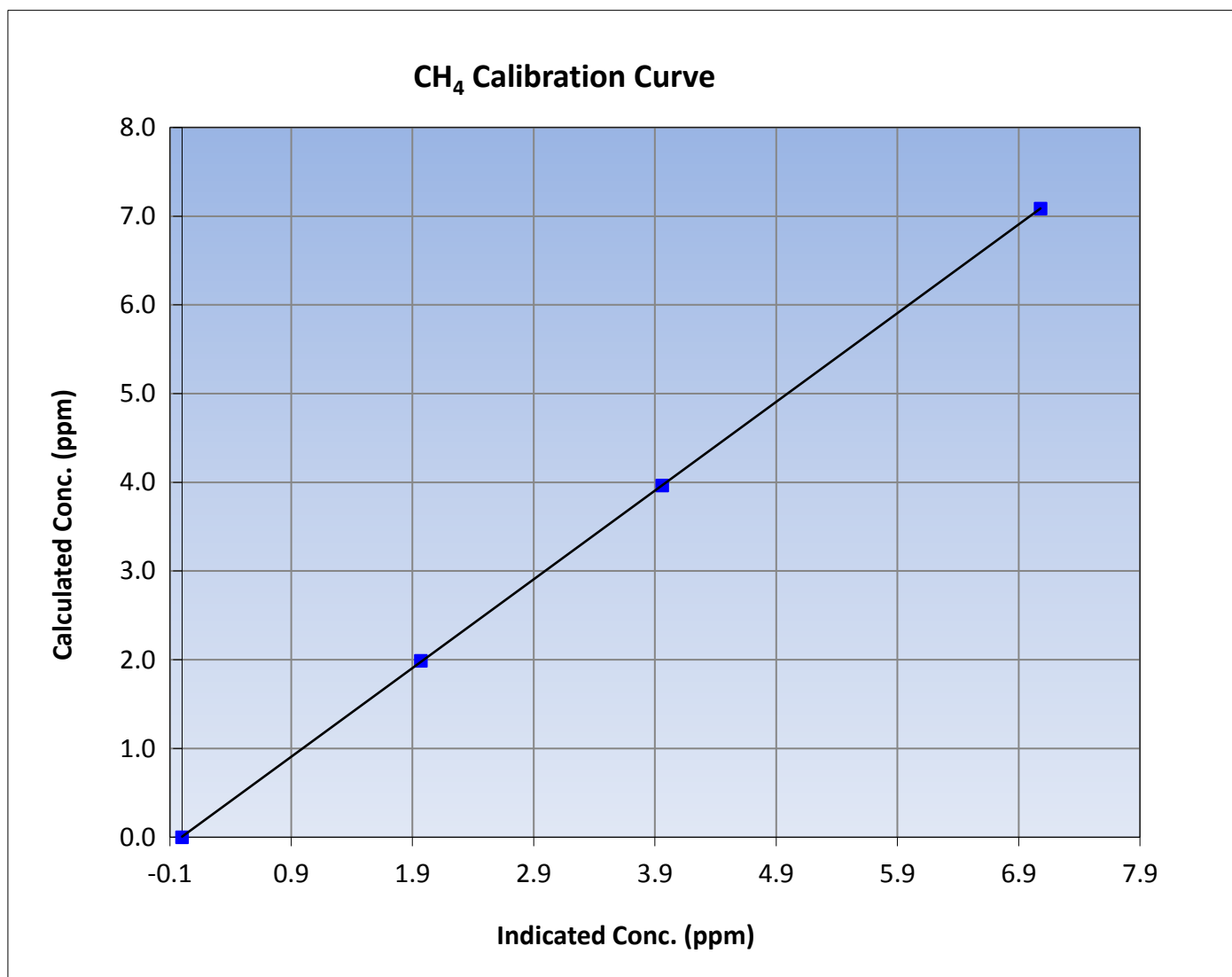
## CH<sub>4</sub> Calibration Summary

### Station Information

Calibration Date	October 16, 2015	Previous Calibration	NA
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	13:00	End Time (MST)	15:00
Analyzer make	Thermo 55i	Analyzer serial #	1118148494

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999994
7.09	7.08	1.0008		
3.96	3.96	1.0012	Slope	1.000142
1.99	1.97	1.0086		
			Intercept	0.006417





# Wood Buffalo Environmental Association

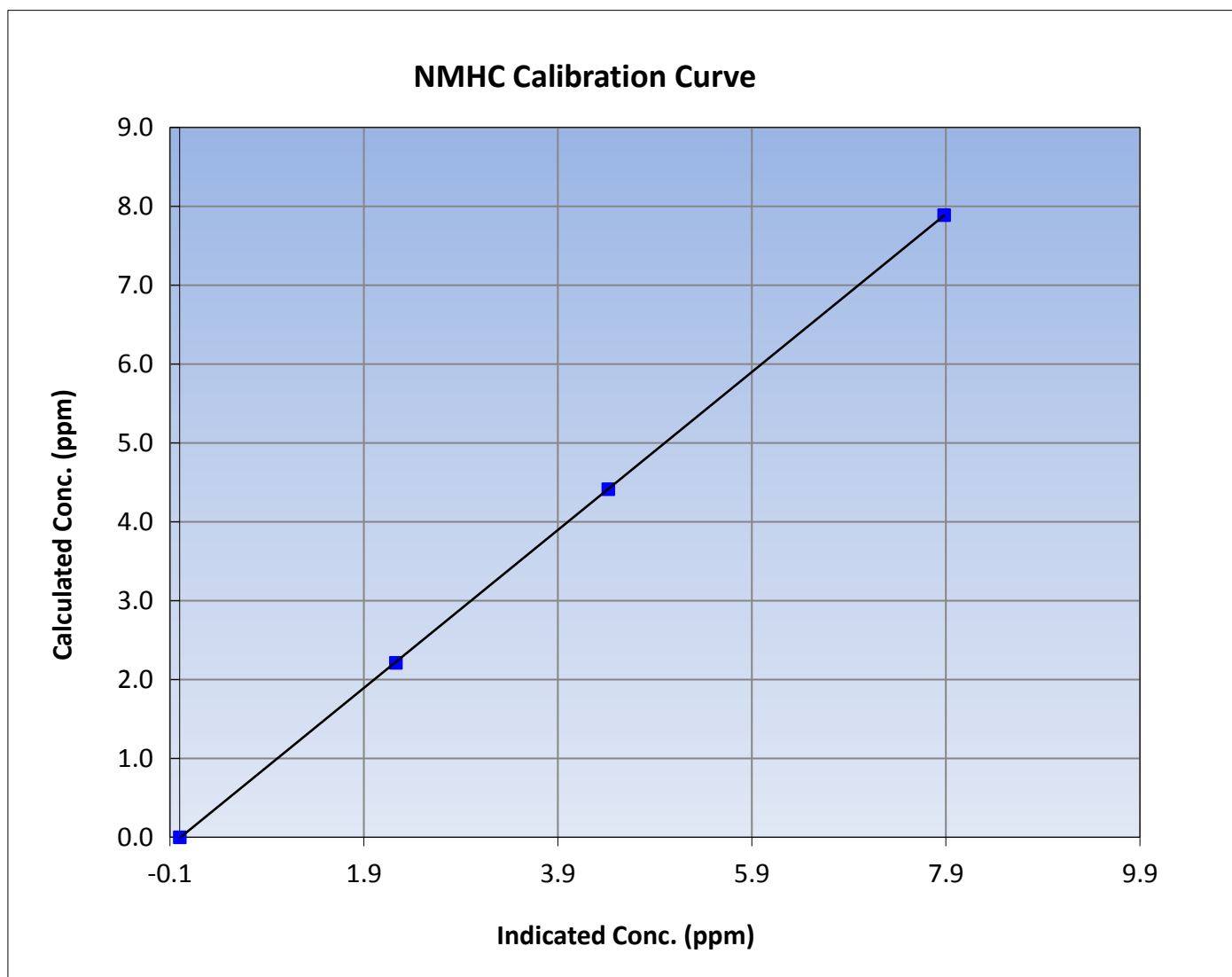
## NMHC Calibration Summary

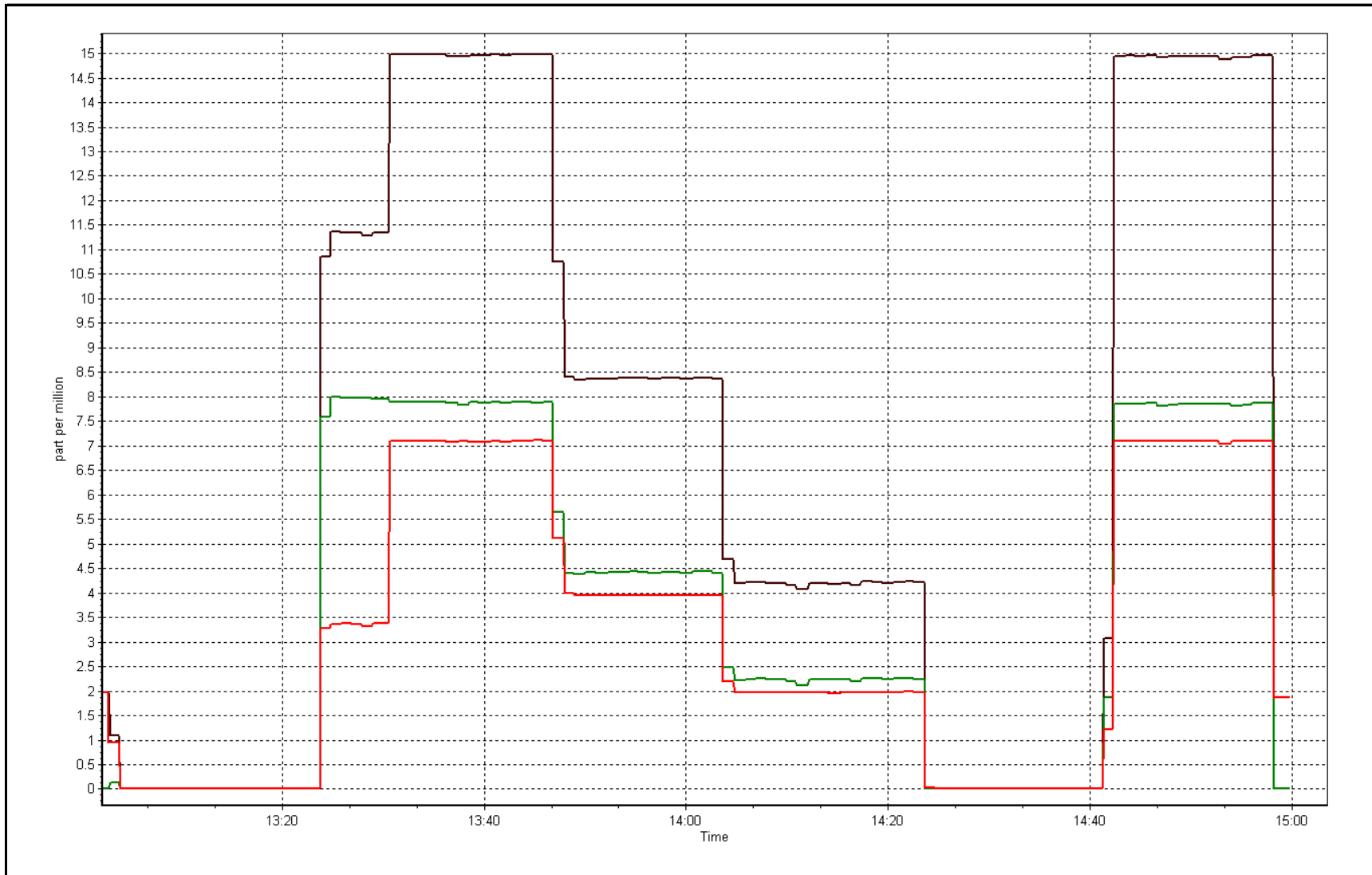
### Station Information

Calibration Date	October 16, 2015	Previous Calibration	NA
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	13:00	End Time (MST)	15:00
Analyzer make	Thermo 55i	Analyzer serial #	1118148494

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999992
7.89	7.88	1.0010		
4.41	4.42	0.9986	Slope	1.001621
2.21	2.23	0.9919		
			Intercept	-0.009963







## Wood Buffalo Environmental Association THC / NMHC Calibration Report

### Station Information

Calibration Date	October-25-15	Last Calibration	October-21-15
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	<input type="checkbox"/> Other: <input checked="" type="checkbox"/> Maintenance		
Start Time (MST)	9:45	End Time (MST)	11:55
Gas Cert Reference	LL107945	Cal Gas Expiry Date	August-09-18
CH4 Cal Gas Conc.	515.0 ppm	CH4 Equiv Conc.	1065.0 ppm
C3H8 Cal Gas Conc.	200.0 ppm	Station temp.	21 Deg C
Calibrator Model	Sabio 4010	Serial Number	1730512
ZAG make/model	Teledyne API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	Serial Number	2582

### Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	74.9	74.9
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	353.8	354.4
THC Calc slope	1.004850	1.000749	Carrier Pressure	37.7	39.7
THC Calc intercept	0.000000	0.021434	Fuel Pressure	39.5	39.5
NMHC Calc slope	0.973815	1.000445	Air Pressure	21.7	21.7
NMHC Calc intercept	0.000000	0.003335			

Analyzer make      Thermo 55i      Analyzer serial #      1118148494

### THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.0	0.00	0.00	----
as found span	5500	81.3	15.74	14.94	1.054
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	81.3	15.74	15.73	1.001
second point	5500	45.6	8.83	8.77	1.007
third point	5500	22.8	4.41	4.38	1.008
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	81.3	15.74	15.71	1.002
Average Correction Factor					1.005

Corrected As found      14.94      Previous response      15.67      % change      4.9%

**Notes:**

Maintenance performed on analyzer. Window timing settings changed, and carrier pressure adjusted. Column conditioned. First calibration adjustment since cal gas cylinder change. Span adjusted.

Calibration Performed By:      Devin Russell





## Wood Buffalo Environmental Association THC / NMHC Calibration Report

### NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	----
as found span	5500	81.3	8.13	7.88	1.031
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	81.3	8.13	8.13	1.000
second point	5500	45.6	4.56	4.54	1.004
third point	5500	22.8	2.28	2.28	1.000
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	81.3	8.13	8.12	1.001
Average Correction Factor					1.001

Corrected As found      7.88      Previous response      8.35      % change      5.9%

### CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	----
as found span	5500	81.3	7.61	7.06	1.079
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	81.3	7.61	7.60	1.002
second point	5500	45.6	4.27	4.23	1.009
third point	5500	22.8	2.13	2.10	1.017
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	81.3	7.61	7.58	1.004
Average Correction Factor					1.009

Corrected As found      7.06      Previous response      7.32      % change      3.7%



# Wood Buffalo Environmental Association

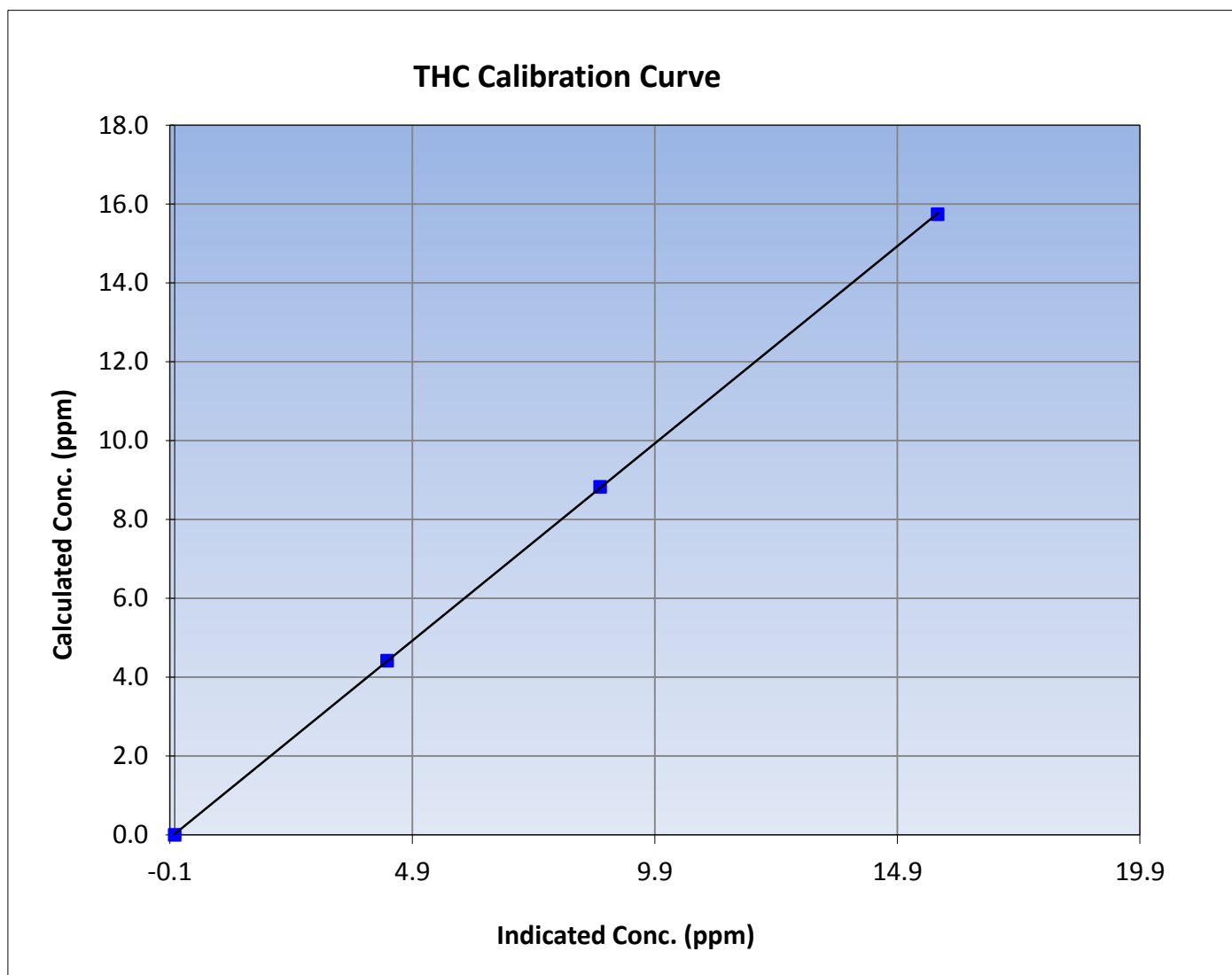
## THC Calibration Summary

### Station Information

Calibration Date	October 25, 2015	Previous Calibration	October 21, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:45	End Time (MST)	11:55
Analyzer make	Thermo 55i	Analyzer serial #	1118148494

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999985
15.74	15.73	1.0008		
8.83	8.77	1.0068	Slope	1.000749
4.41	4.38	1.0080		
			Intercept	0.021434





# Wood Buffalo Environmental Association

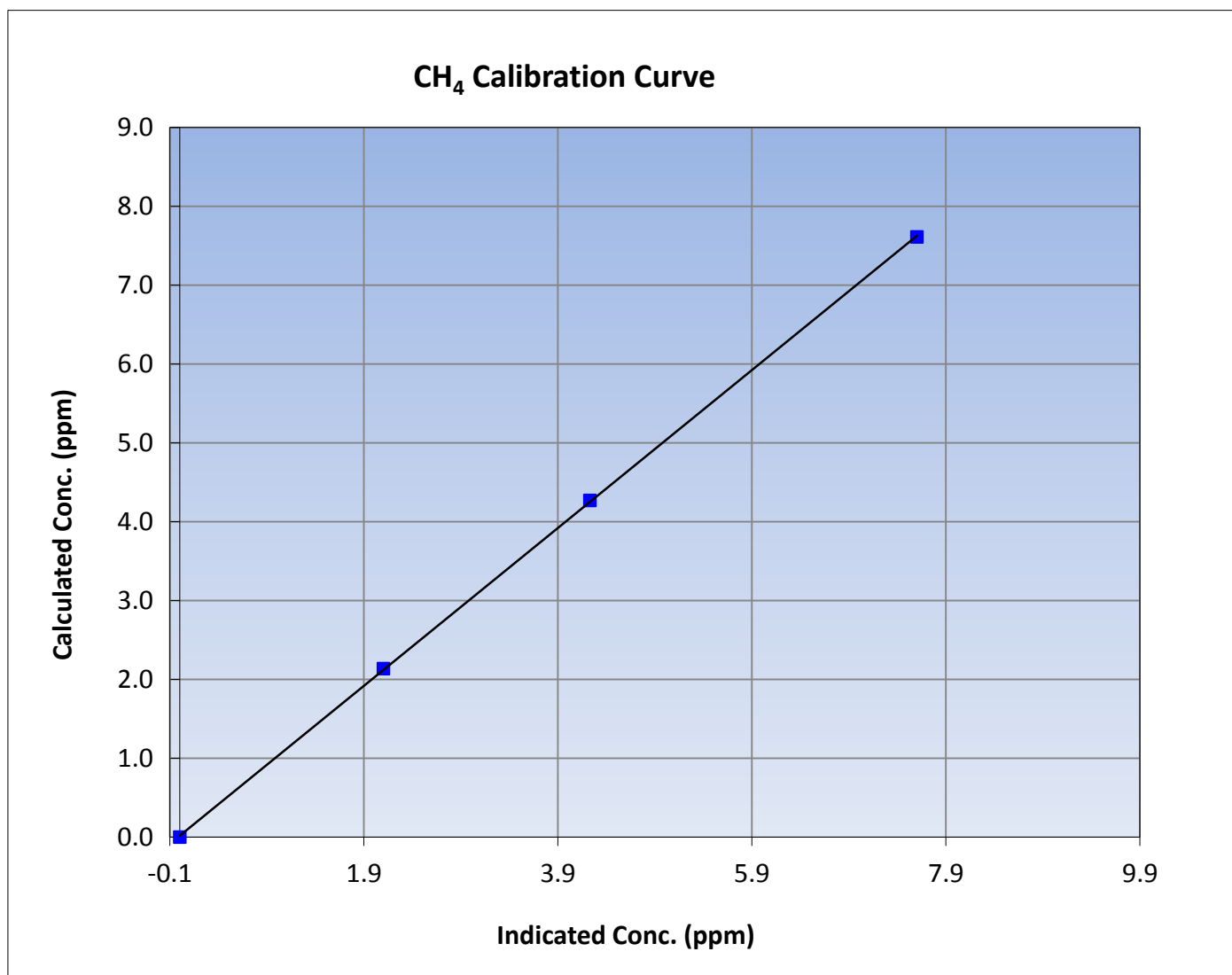
## CH<sub>4</sub> Calibration Summary

### Station Information

Calibration Date	October 25, 2015	Previous Calibration	October 21, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:45	End Time (MST)	11:55
Analyzer make	Thermo 55i	Analyzer serial #	1118148494

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999968
7.61	7.60	1.0017		
4.27	4.23	1.0094	Slope	1.001063
2.13	2.10	1.0166		
			Intercept	0.018140





# Wood Buffalo Environmental Association

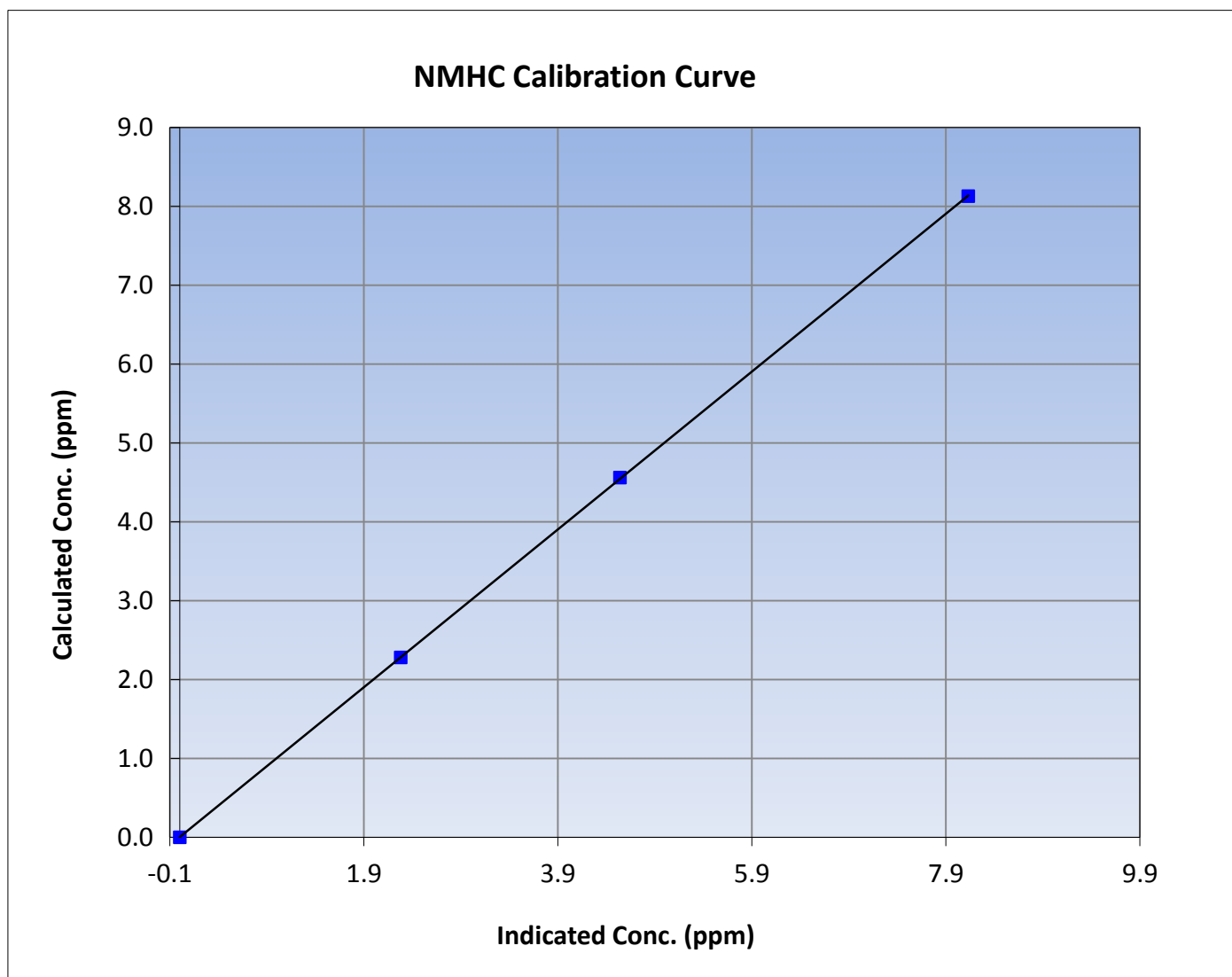
## NMHC Calibration Summary

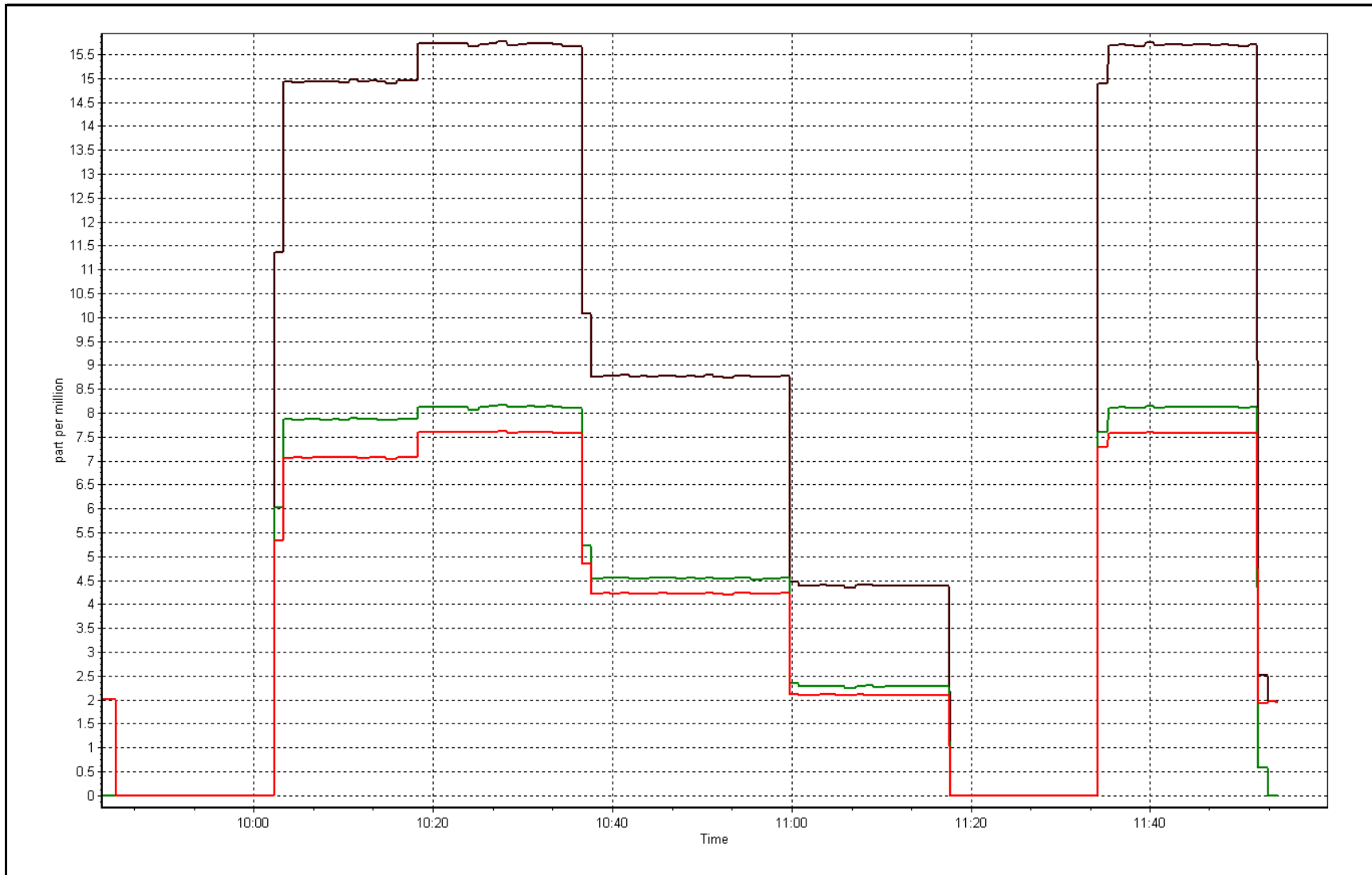
### Station Information

Calibration Date	October 25, 2015	Previous Calibration	October 21, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:45	End Time (MST)	11:55
Analyzer make	Thermo 55i	Analyzer serial #	1118148494

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999992
8.13	8.13	1.0000		
4.56	4.54	1.0044	Slope	1.000445
2.28	2.28	1.0000		
			Intercept	0.003335







# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 22, 2015	Previous Calibration	September 28, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	11:20	End Time (MST)	15:40
NO2 GPT Ref date	October-22-15	Transfer Standard	N/A
		Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	1730512
ZAG make/model	Teledyne API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	Serial Number	2582

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	27.9	27.8
Analyzer IP address	192.168.1.48		Lamp temp.	53.6	53.5
Calculated slope	1.002942	0.994886	Pressure	704.1	719.3
Calculated intercept	-2.300044	0.328016	Flow cell A	0.752	0.763
Analyzer Background	-2.4	-2.4	Flow cell B	0.743	0.759
Analyzer Coefficient	0.991	1.015	Cell A Intensity	74400	73000
			Cell B Intensity	69700	69000

Analyzer make Thermo 49i Analyzer serial # 1300156233

### Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	-0.2	----
as found span	5500	0.98	433.3	414.6	1.045
calibrator zero	5500	0.00	0.0	-0.3	----
high point	5000	0.98	433.3	435.3	0.995
second point	5000	0.56	225.1	225.7	0.997
third point	5000	0.34	117.7	118.1	0.997
as left zero	5500	0.00	0.0	0.2	----
as left span	5000	0.98	445.3	445.6	0.999
Average Correction Factor					0.997

Corrected As found 414.8 Previous response 434.3 % change 4.7%

**Notes:**

As found span rose to 430 ppb then dropped to around 415 ppb. There was no change in diagnostics. Span adjusted, second point over 5% high. Completed GPT points. Readjusted span to correspond with new GPT values.

Calibration Performed By:

Devin Russell



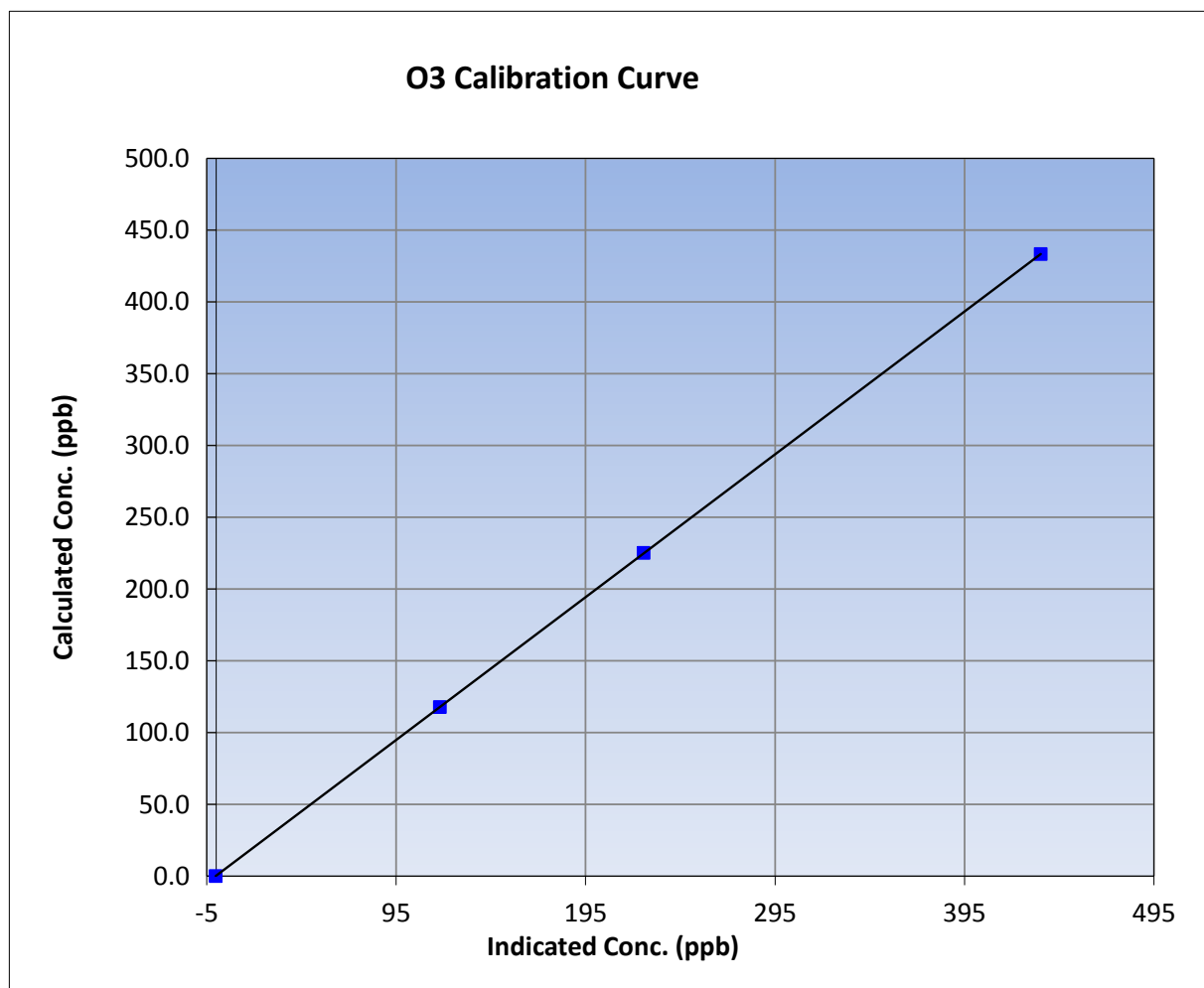
## Wood Buffalo Environmental Association O3 Calibration Report

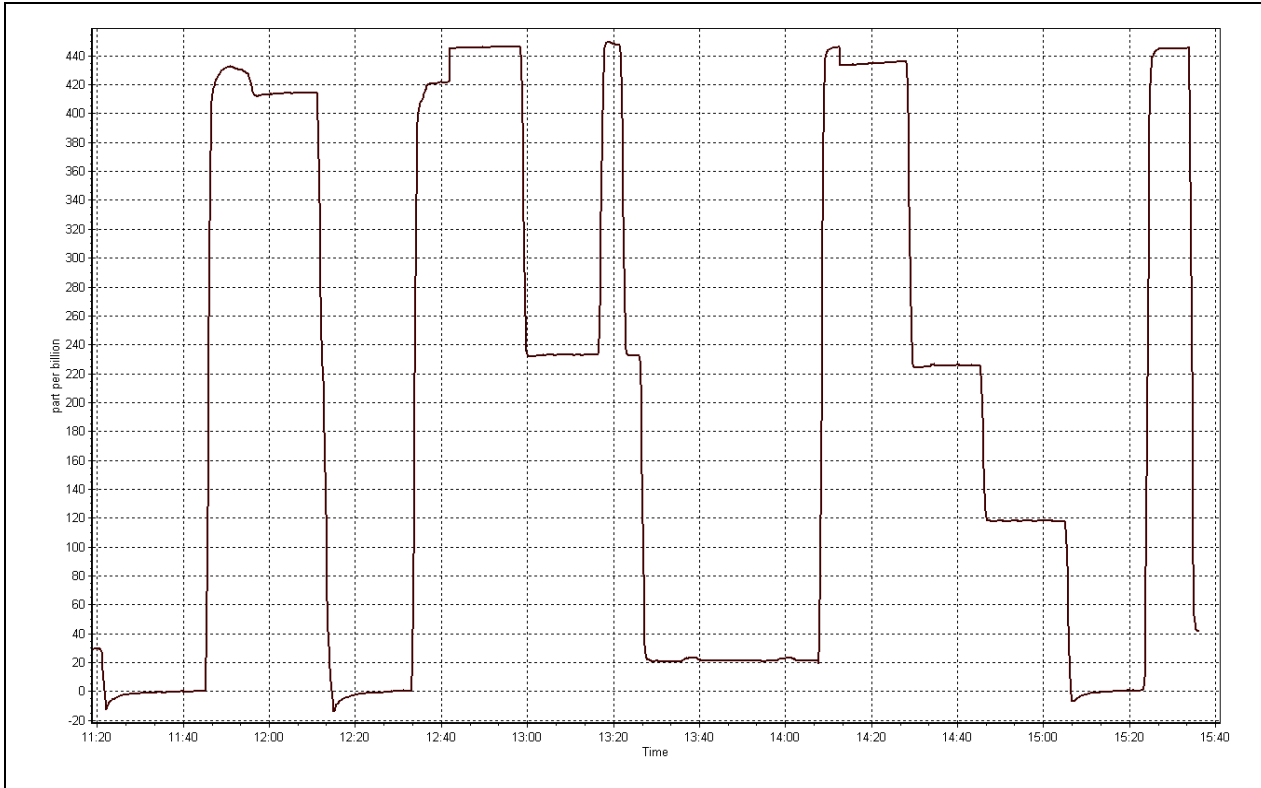
### Station Information

Calibration Date	October-22-15	Previous Calibration	September 28, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	11:20	End Time (MST)	15:40
Analyzer make	Thermo 49i	Analyzer serial #	1300156233

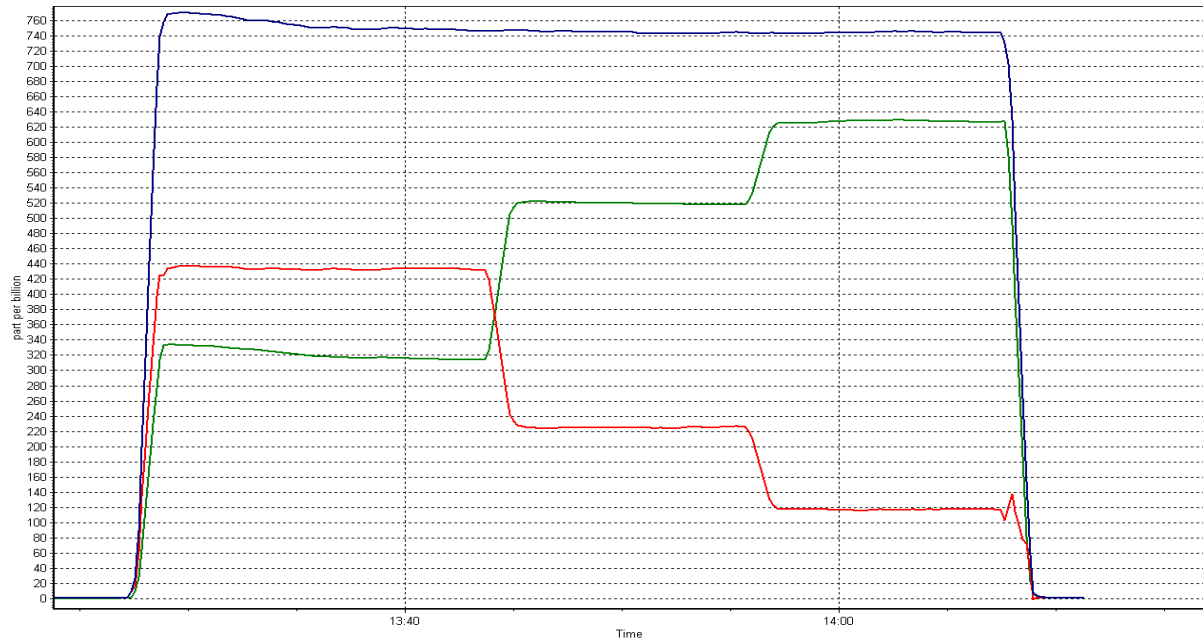
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999999
433.3	435.3	0.9954		
225.1	225.7	0.9974	Slope	0.994886
117.7	118.1	0.9970		
			Intercept	0.328016





NOX GPT test







# Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

## Station Information

Calibration Date	October 21, 2015	Previous Calibration	September 15, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	9:40	End Time (MST)	14:45
NO Cal Gas Conc	50.7 ppm	Gas Cert Reference	LL107945
NOx Cal Gas Conc	50.7 ppm	Cal Gas Expiry Date	09/08/2018
Calibrator	Sabio 4010	Serial Number	1730512
Zero air Generator	Teledyne API T701	Serial Number	587

## DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2582
-------------------	----------------------------	-----------------	------

## Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.019289	1.020330	1.001463
	Data Offset	-0.489259	-0.397929	1.067269
Current Calibration	Data Slope	0.998044	1.000003	0.996442
	Data Offset	2.172456	2.242034	-0.471053

## Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153357
---------------------	------------	-------------------	------------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.43		192.168.1.43	
NO coefficient	0.749		0.755	
NOx coefficient	0.999		1.000	
NO2 coefficient	1.000		1.000	
NO bkgrnd	5.6		5.6	
NOx bkgrnd	5.7		5.7	
Chamber Temp	50.2	Deg C	50.5	Deg C
Moly Temp	324.5	Deg C	327.6	Deg C
PMT voltage	-850.3	V	-849.9	V
PMT Temp	-2.8	Deg C	-3.1	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	186.8	mmHg	185.3	mmHg
R Cell Press Nox	186.8	mmHg	185.3	mmHg
NO sample flow	0.558	lpm	0.546	lpm
Nox sample Flow	0.558	lpm	0.546	lpm

**Notes:**

New calibration gas cylinder. Span adjusted.



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date: October 21, 2015 Station Number: AMS 1

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	0.7	0.6	0.2	----	----
as found span	5500	81.3	749.4	749.4	0.0	753.0	753.0	0.0	0.9953	0.9953
calibrator zero	5500	0.0	0.0	0.0	0.0	0.7	0.6	0.2	----	----
high point	5500	81.3	749.4	749.4	0.0	750.9	749.2	1.7	0.9981	1.0003
second point	5500	45.6	420.3	420.3	0.0	416.2	415.7	0.5	1.0099	1.0111
third point	5500	22.8	210.2	210.2	0.0	206.2	205.5	0.7	1.0195	1.0229
as left zero	5500	0.0	0.0	0.0	0.0	0.5	0.3	0.2	----	----
as left span	5500	81.3	749.4	295.8	453.6	743.2	298.6	444.7	1.0084	0.9906
Average Correction Factor									1.0092	1.0114

Corrected As found NO<sub>x</sub>= 752.3 NO= 752.4 Percent Change NO<sub>x</sub>= -2.2% NO= -2.3%  
 Previous Response NO<sub>x</sub>= 735.7 NO= 734.9

### GPT Calibration Data

Dilution Flow 5500 ccm Source Gas Flow 81.30 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.2			N/A	
1st NO2 (300)	----	295.8	445.3	742.9	295.8	447.1	0.9941	1.0000	0.9960	100.4%
2nd NO2 (200)	----	521.3	219.8	742.8	521.3	221.5	0.9942	1.0000	0.9921	100.8%
3rd NO2 (100)	----	624.9	116.1	742.0	624.9	117.1	0.9953	1.0000	0.9921	100.8%
4th NO2 (0)	741.1	----	0.6	741.7	741.1	0.6	0.9958	1.0000	N/A	----
Average Correction Factor							0.9949	1.0000	0.9934	100.7%

Calibration Performed By: Devin Russell



# Wood Buffalo Environmental Association

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

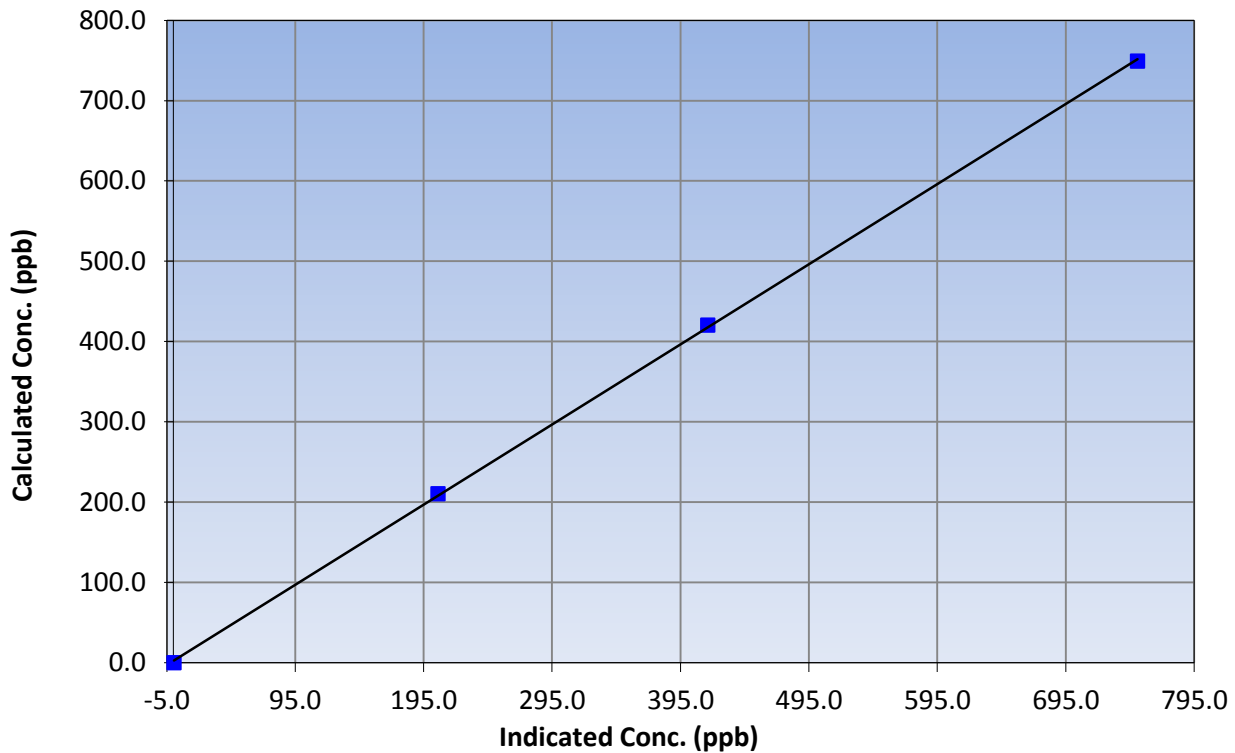
### Station Information

Calibration Date	October 21, 2015	Previous Calibration	September 15, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:40	End Time (MST)	14:45
Analyzer make	Thermo 42i	Analyzer serial #	1218153357

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.7	----	Correlation Coefficient	0.999916
749.4	750.9	0.9981		
420.3	416.2	1.0099	Slope	0.998044
210.2	206.2	1.0195		
			Intercept	2.172456

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

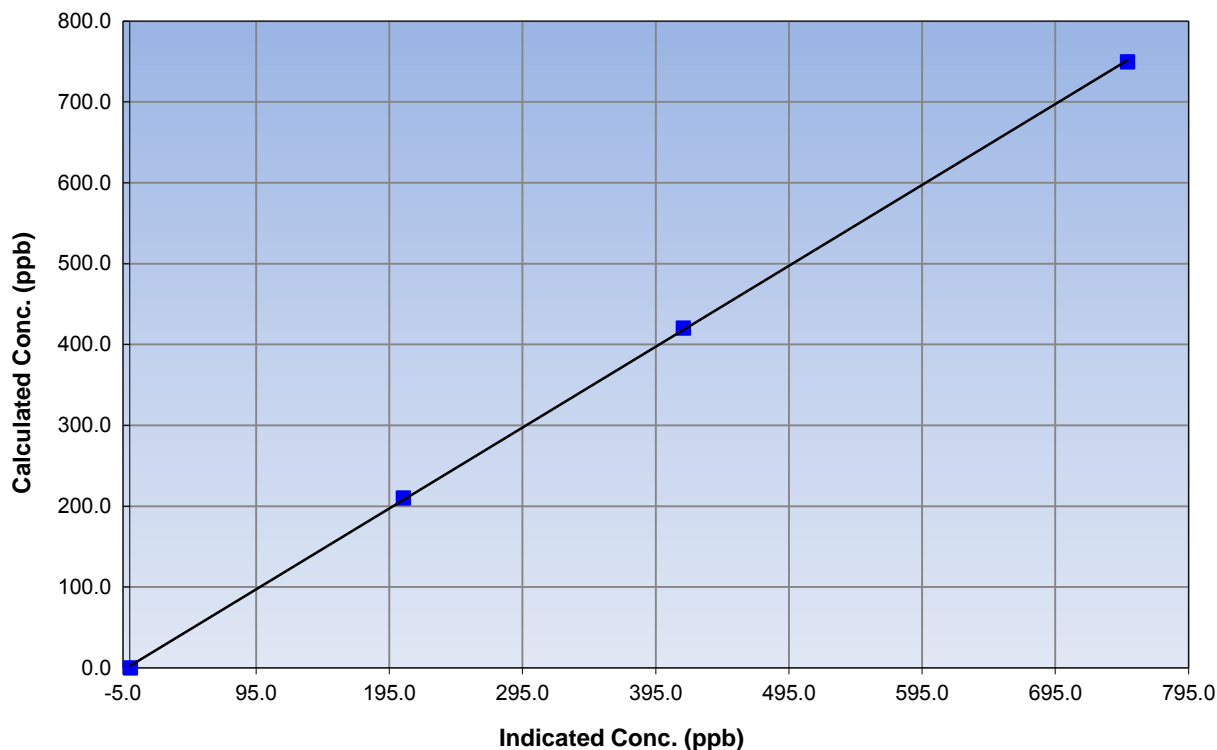
### Station Information

Calibration Date	October 21, 2015	Previous Calibration	September 15, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:40	End Time (MST)	14:45
Analyzer make	Thermo 42i	Analyzer serial #	1218153357

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.6	N/A	Correlation Coefficient	0.999923
749.4	749.2	1.0003		
420.3	415.7	1.0111	Slope	1.000003
210.2	205.5	1.0229		
			Intercept	2.242034

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

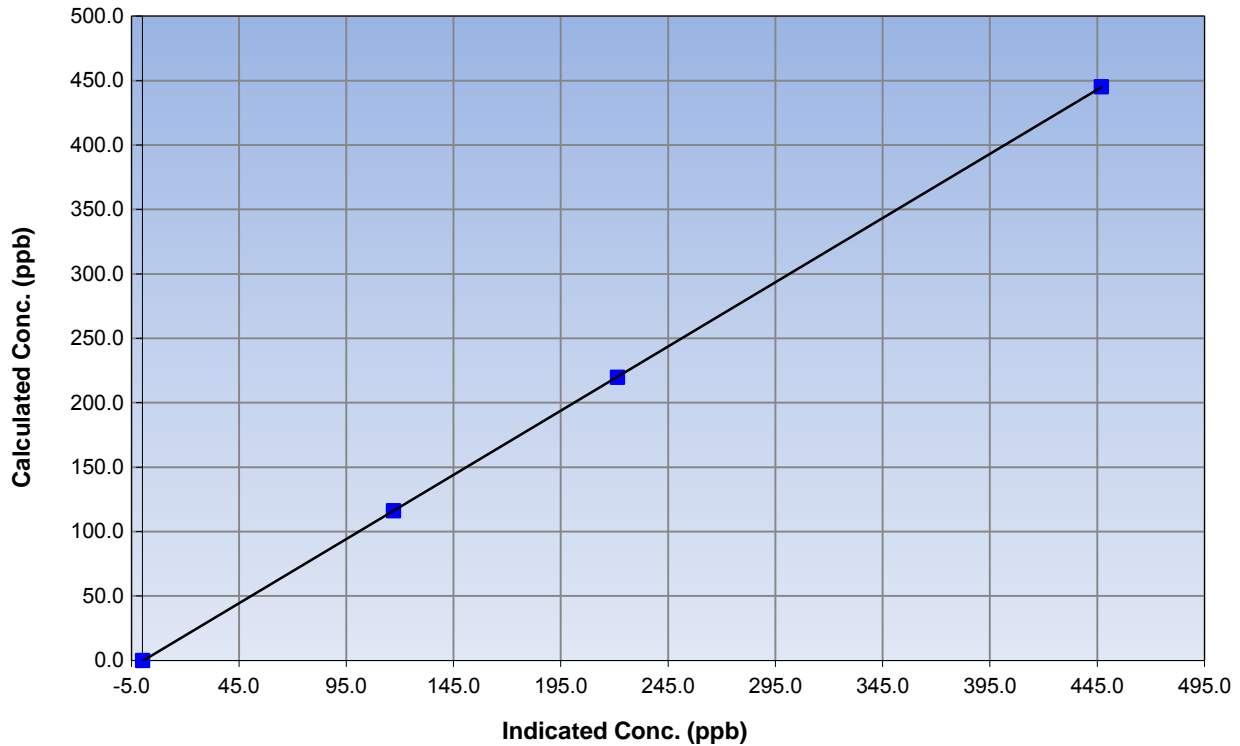
### Station Information

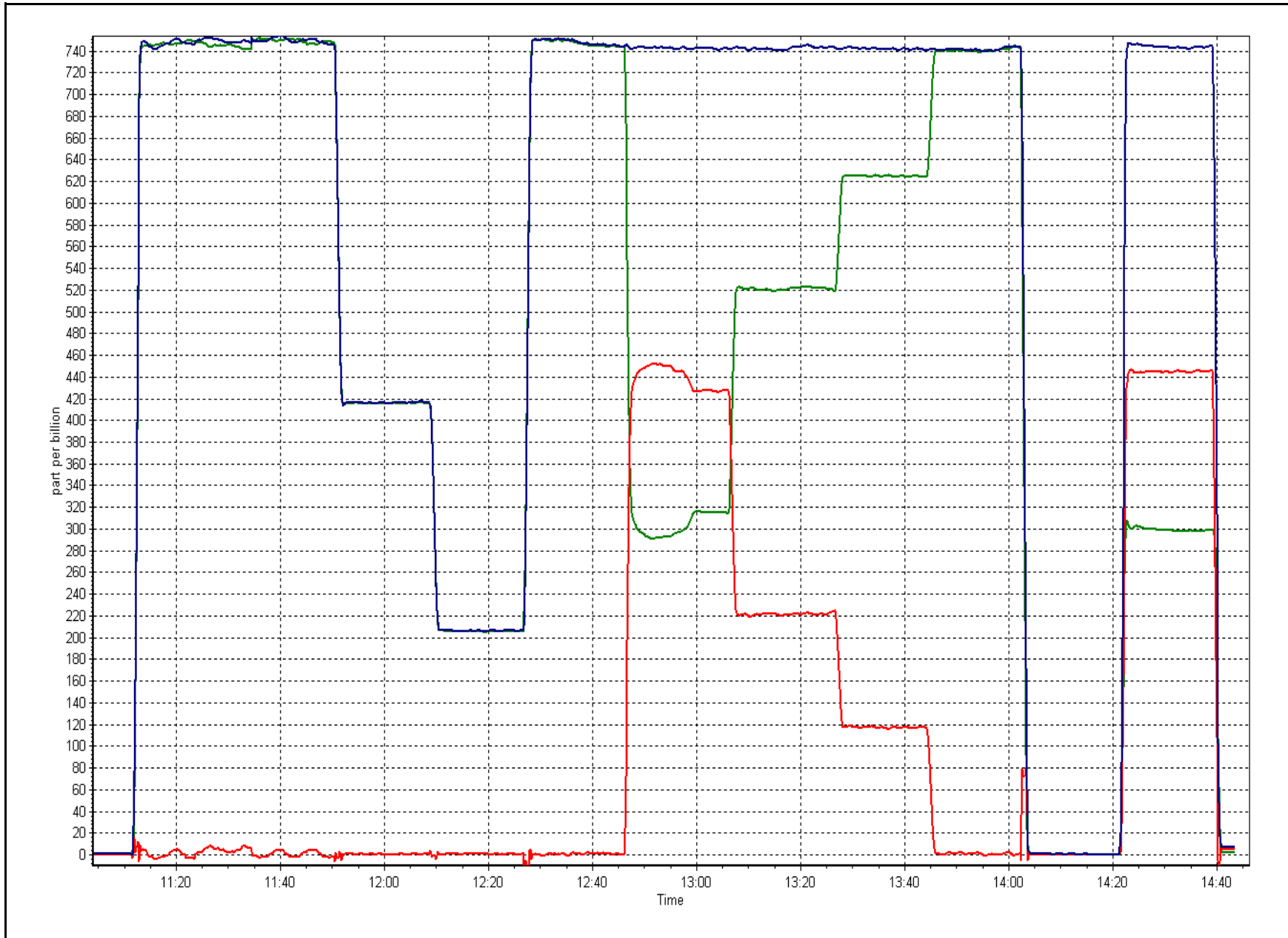
Calibration Date	October 21, 2015	Previous Calibration	September 15, 2015
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:40	End Time (MST)	14:45
Analyzer make	Thermo 42i	Analyzer serial #	1218153357

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999996
445.3	447.1	0.9960		
219.8	221.5	0.9921	Slope	0.996442
116.1	117.1	0.9921		
			Intercept	-0.471053

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







# Wood Buffalo Environmental Association

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

### Station Information

Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
NOX Calibration Date	October 21, 2015	NOX Previous Cal Date	September 15, 2015
NH3 Calibration Date	October 22, 2015	NH3 Previous Cal Date	September 29, 2015
Reason:	Routine		
Start Time (MST)	9:40	End Time (MST)	14:45
Calibrator	Sabio 4010	Station Temperature	21.0 Deg C
NH3 Cal Gas Conc	192 ppm	Serial Number	14300410
NOx Cal Gas Conc	50.7 ppm	NH3 Expiry Date / SN	3/Mar/2012 LL156612
NO Cal Gas Conc	50.7 ppm	NO Expiry Date / SN	9/Aug/2018 LL107945

### DACs Information

DACS make & model Campbell Scientific CR3000      DACS serial No. 2582

Parameter		NH3	Nt	NOx	NO	NO2
Cal Stats As Found	Data Slope	0.997477	0.985740	0.989099	0.989008	1.001994
	Data Offset	-0.111395	0.640545	0.425313	0.415383	0.489031
Cal Stats After	Data Slope	0.997960	0.985793	1.002261	1.001779	0.998354
	Data Offset	-3.422032	-3.514401	3.184247	3.539162	-0.003050
IP address		192.168.1.17				

### Analyzer Information

Analyzer make/model	API T201	Analyzer serial #	152	
Converter	API 501 NH3	Converter serial #	147	
Test Point	before		after	
NH3 Conc range	0-2500	ppb	2500	ppb
NOx Conc range	0-1000	ppb	1000	ppb
NO BKG	-0.3	ppb	-0.3	ppb
NOx BKG	-0.1	ppb	-0.1	ppb
Nt BKG	0.1		0.1	
NO coefficient	1.242		1.202	
NO2 coefficient	1.000	ppb	1.000	ppb
NOx coefficient	1.361		1.319	
NH3 coefficient	0.955		0.951	
Nt coefficient	1.366		1.360	
NH3 conv temp	825	DegC	825	Deg C
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	315.0	Deg C	316.2	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O3 flow	84.0	ccm	84.0	ccm
R Cell Press	4.5	mmHg	4.8	mmHg
PMT Voltage	645.0	v	645.0	v
Sample Flow 1 NO	516.0	ccm	529.0	ccm
Sample Flow 2 Nox	522.0	ccm	529.0	ccm
Sample Flow 3 Nt	555.0	ccm	539.0	ccm

Notes:

New calibration gas cylinder. Nox/NO Span adjusted. NH3 span adjusted.



# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date:

October 22, 2015

Station Number:

AMS 1

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

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated Nt conc (ppb)	Calculated NOx conc (ppb)	Calculated NH <sub>3</sub> conc (ppb)	Indicated Nt conc (ppb)	Indicated NOx conc (ppb)	Indicated NH <sub>3</sub> conc (ppb)	Nt Correction factor	NH <sub>3</sub> Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	2.3	1.2	1.1	----	----
as found NO	5500	81.3	749.4	749.4	----	740.0	735.7	4.3	1.013	----
calibrator zero	5500	0.0	0.0	0.0	0.0	2.0	-1.2	3.8	----	----
high NO point	5500	81.3	749.4	749.4	----	745.1	746.0	-0.9	1.006	----
NO/O <sub>3</sub> point	5500	81.3	749.4	749.4	----	737.7	739.0	-1.3	1.016	----
as found NH <sub>3</sub>	6500	67.7	1999.8	NA	1999.8	2007.7	23.3	1984.4	0.996	1.008
first NH <sub>3</sub>	6500	67.7	1999.8	NA	1999.8	2029.5	23.4	2006.2	0.985	0.997
second NH <sub>3</sub>	6500	33.9	1001.4	NA	1001.4	1025.6	15.0	1010.5	0.976	0.991
third NH <sub>3</sub>	6500	17.0	502.2	NA	502.2	510.9	7.3	503.7	0.983	0.997
Average Correction Factor									1.0109	0.9949

NH<sub>3</sub> Corrected As Found  
 Nt Corrected As Found  
 NO<sub>x</sub> Corrected As Found

NH<sub>3</sub> = 1983.3 ppb  
 Nt = 737.8 ppb  
 NO<sub>x</sub> = 734.5 ppb

Previous Response  
 Previous Response  
 Previous Response

NH<sub>3</sub> = 2004.9 ppb  
 Nt = 759.6 ppb  
 NO<sub>x</sub> = 757.3 ppb

NH<sub>3</sub> percent change 1.1%  
 Nt percent change 3.0%  
 NO<sub>x</sub> percent change 3.1%





# Wood Buffalo Environmental Association

## NO<sub>x</sub>(NH<sub>3</sub>) Calibration Report

### Station Information

Calibration Date:

October 21, 2015

Station Number:

AMS 1

### NO<sub>x</sub> / NO / Nt Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO <sub>x</sub> conc (ppb)	Calculated NO conc (ppb)	Calculated Nt conc (ppb)	Indicated NO <sub>x</sub> conc (ppb)	Indicated NO conc (ppb)	Indicated Nt conc (ppb)	NO <sub>x</sub> Correction factor	NO Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	-1.2	-1.2	2.0	----	----
as found span	5500	81.3	749.4	749.4	749.4	772.0	772.0	774.0	0.9708	0.9708
calibrator zero	5500	0.0	0.0	0.0	0.0	-1.2	-1.2	2.0	----	----
high point	5500	81.3	749.4	749.4	749.4	746.0	746.5	745.1	1.0046	1.0039
second point	5500	45.6	420.3	420.3	420.3	414.5	413.3	413.5	1.0142	1.0170
third point	5500	22.8	210.2	210.2	210.2	204.9	204.7	204.9	1.0258	1.0265
as left zero	5500	0.0	0.0	0.0	0.0	1.2	1.9	0.5	----	----
as left span	5500	81.3	749.4	294.2	749.4	738.7	297.6	741.8	1.0146	0.9883
Average Correction Factor									1.0149	1.0158

	<u>Nt</u>	<u>NOX</u>	<u>NO</u>	<u>NO2</u>
Corrected As found	772.0	773.2	773.2	445.1
Previous Response	759.6	757.3	757.4	442.9
Percent Change	-1.6%	-2.1%	-2.0%	-0.5%

### GPT Calibration Data

Total Flow 5500 ccm Source Gas Flow 81.30 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO <sub>2</sub> conc (ppb)	Indicated NO <sub>x</sub> conc (ppb)	Indicated NO conc (ppb)	Indicated NO <sub>2</sub> conc (ppb)	NO <sub>x</sub> Correction factor	NO Correction factor	NO <sub>2</sub> Correction factor	Converter Efficiency
Cal zero			0.0			0.5			----	
1st NO <sub>2</sub> (300)	----	294.2	444.3	739.7	294.2	445.6	1.0131	1.0000	0.9971	100.3%
2nd NO <sub>2</sub> (200)	----	518.0	220.5	737.7	518.0	219.7	1.0159	1.0000	1.0036	99.6%
3rd NO <sub>2</sub> (100)	----	622.0	116.5	738.8	622.0	116.8	1.0144	1.0000	0.9973	100.3%
4th NO <sub>2</sub> (0)	738.5	----	0.5	739.0	738.5	0.5	1.0142	1.0000	----	----
Average Correction Factor							1.0144	1.0000	0.9993	100.1%

Calibration Performed By: Devin Russell



# Wood Buffalo Environmental Association

## NH3 Calibration Summary

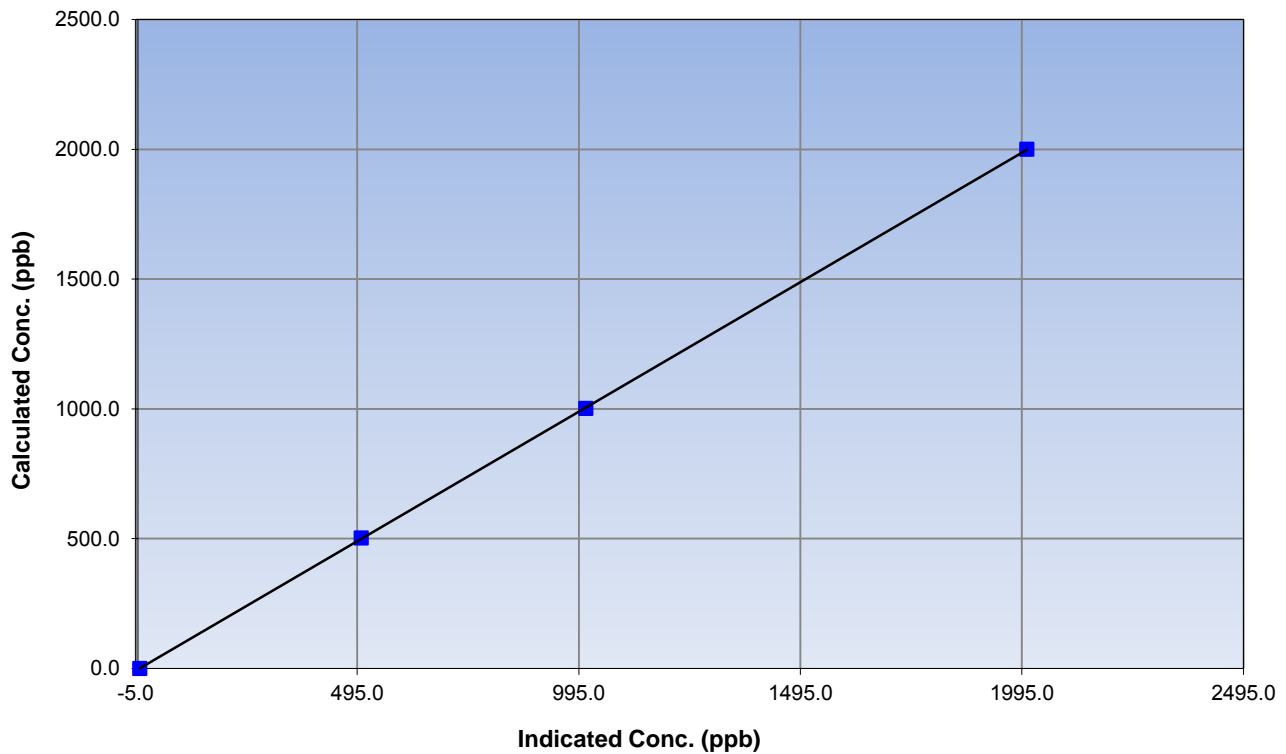
### Station Information

Calibration Date	October 22, 2015	Previous Calibration	September 15, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:40	End Time (MST)	14:45
Analyzer make	API T201	Analyzer serial #	152

### NH3 Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	3.8	----	Correlation Coefficient	0.999989
1999.8	2006.2	0.9968		
1001.4	1010.5	0.9909	Slope	0.997960
502.2	503.7	0.9970		
			Intercept	-3.422032

### NH3 Calibration Curve





# Wood Buffalo Environmental Association

## Nt Calibration Summary

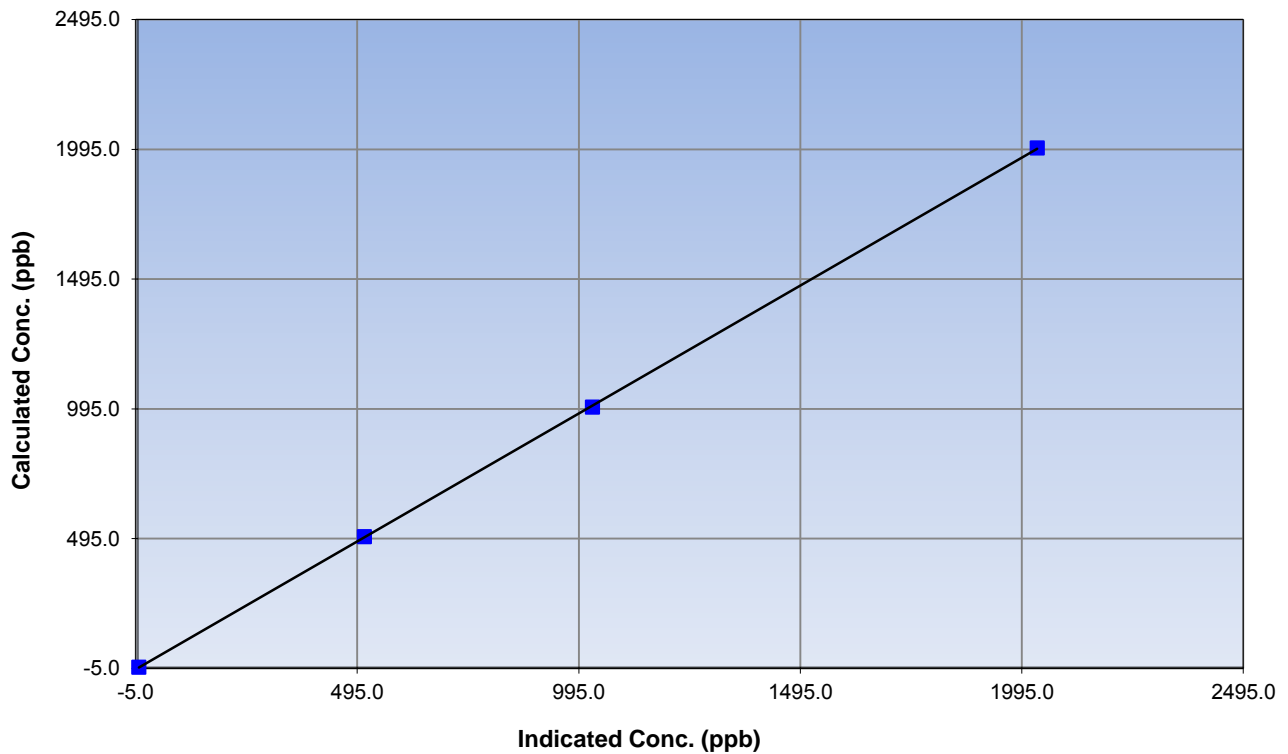
### Station Information

Calibration Date	October 22, 2015	Previous Calibration	September 15, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:40	End Time (MST)	14:45
Analyzer make	API T201	Analyzer serial #	152

### Nt (NH<sub>3</sub>) Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	2.0	----	Correlation Coefficient	0.999977
1999.8	2029.5	0.9853		
1001.4	1025.6	0.9764	Slope	0.985793
502.2	510.9	0.9828		
			Intercept	-3.514401

### Nt Calibration Curve





# Wood Buffalo Environmental Association

## NOx Calibration Summary

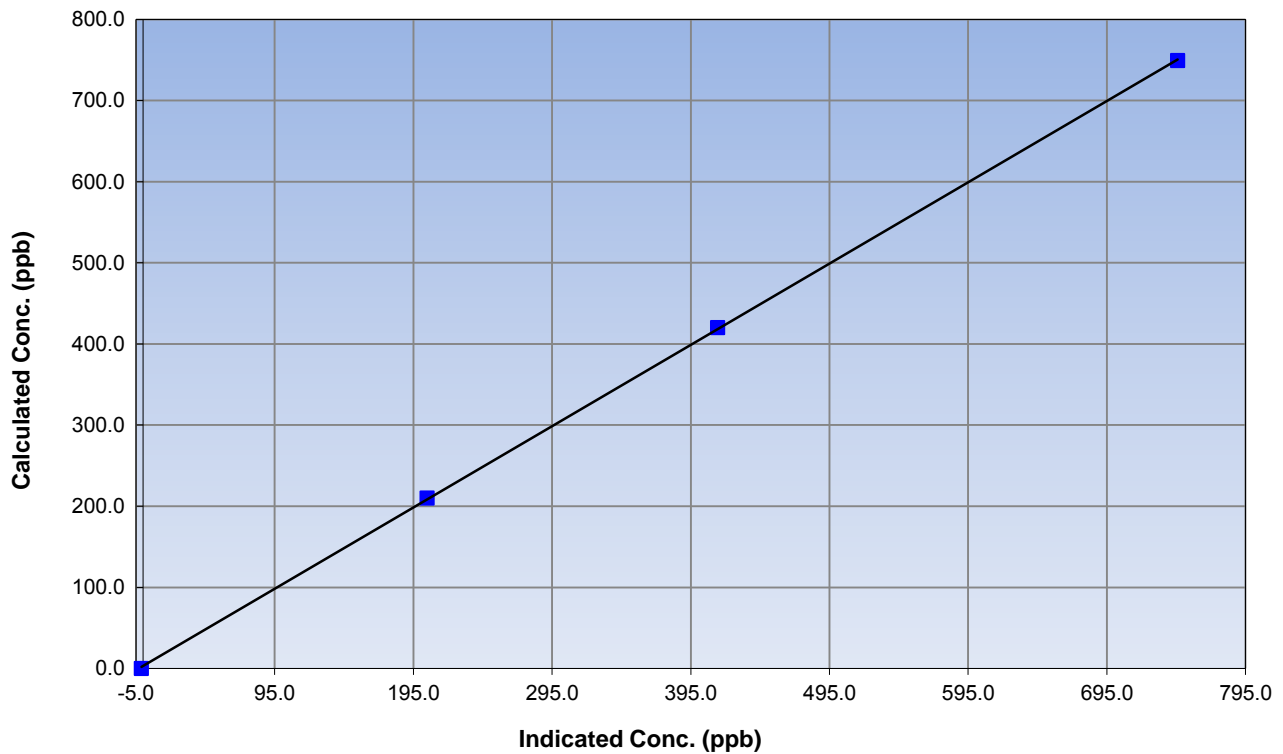
### Station Information

Calibration Date	October 21, 2015	Previous Calibration	September 15, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:40	End Time (MST)	14:45
Analyzer make	API T201	Analyzer serial #	152

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

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-1.2	----	Correlation Coefficient	0.999961
749.4	746.0	1.0046		
420.3	414.5	1.0142	Slope	1.002261
210.2	204.9	1.0258		
			Intercept	3.184247

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

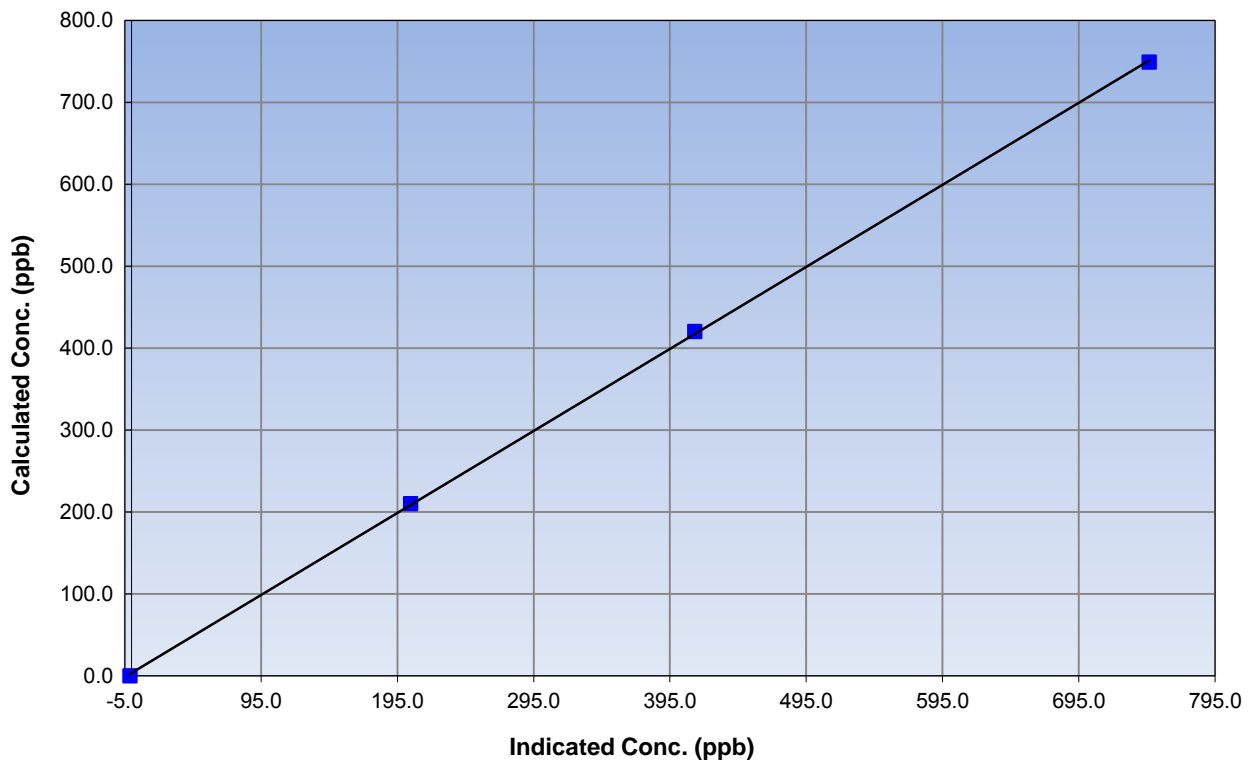
### Station Information

Calibration Date	October 21, 2015	Previous Calibration	September 15, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:40	End Time (MST)	14:45
Analyzer make	API T201	Analyzer serial #	152

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-1.2	----	Correlation Coefficient	0.999937
749.4	746.5	1.0039		
420.3	413.3	1.0170	Slope	1.001779
210.2	204.7	1.0265		
			Intercept	3.539162

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

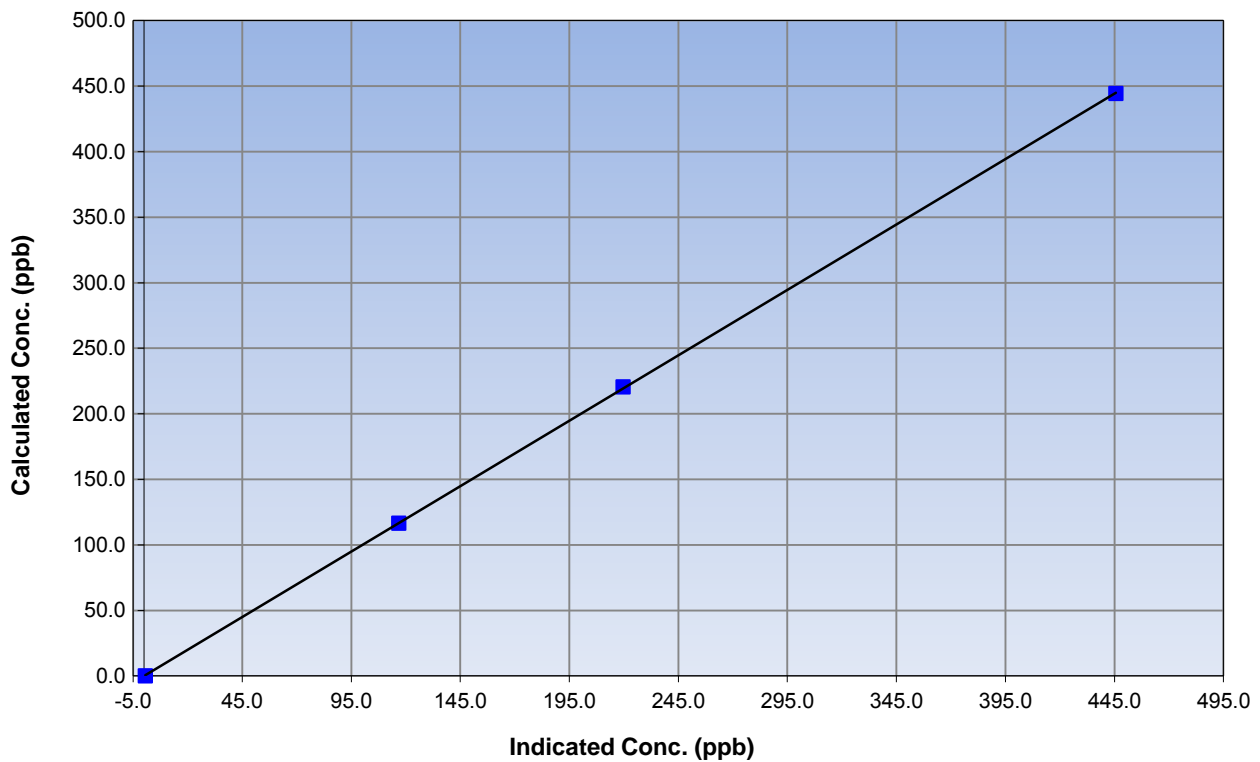
### Station Information

Calibration Date	October 21, 2015	Previous Calibration	September 15, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:40	End Time (MST)	14:45
Analyzer make	API T201	Analyzer serial #	152

### Calibration Information

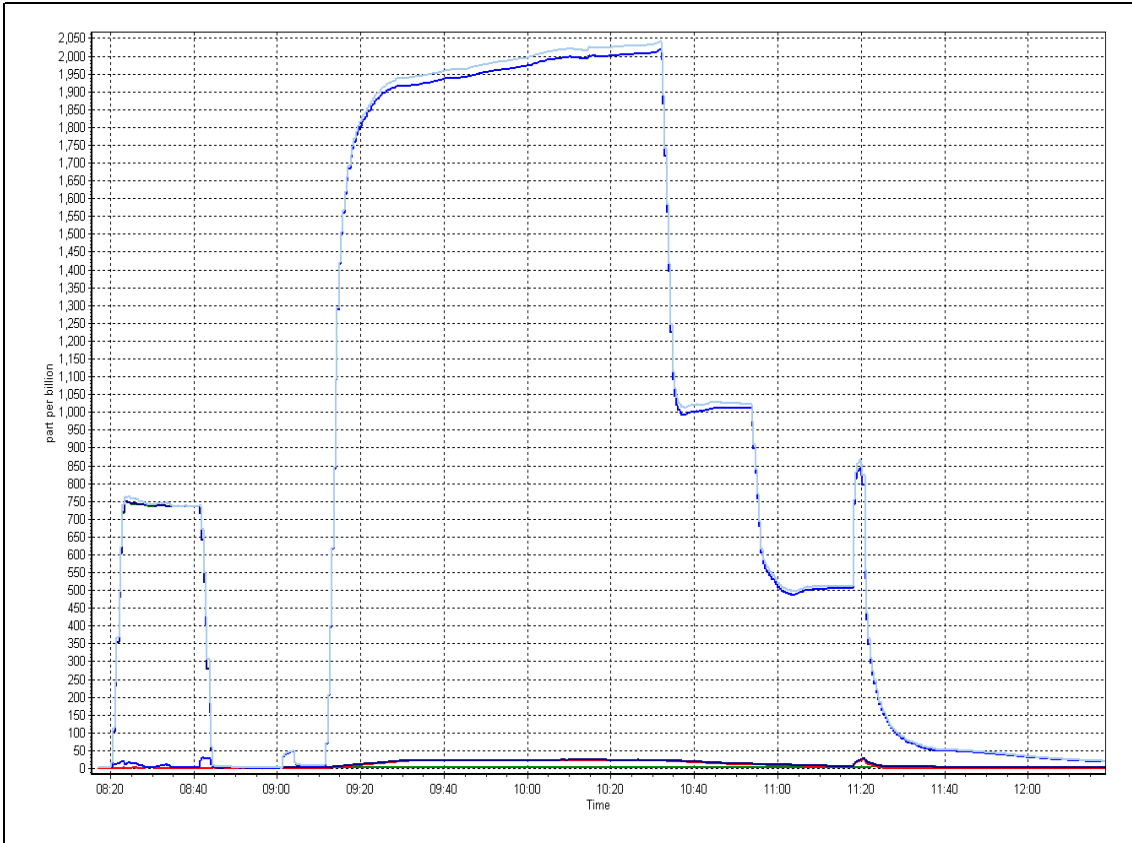
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	----	Correlation Coefficient	0.999983
444.3	445.6	0.9971		
220.5	219.7	1.0036	Slope	0.998354
116.5	116.8	0.9973		
			Intercept	-0.003050

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



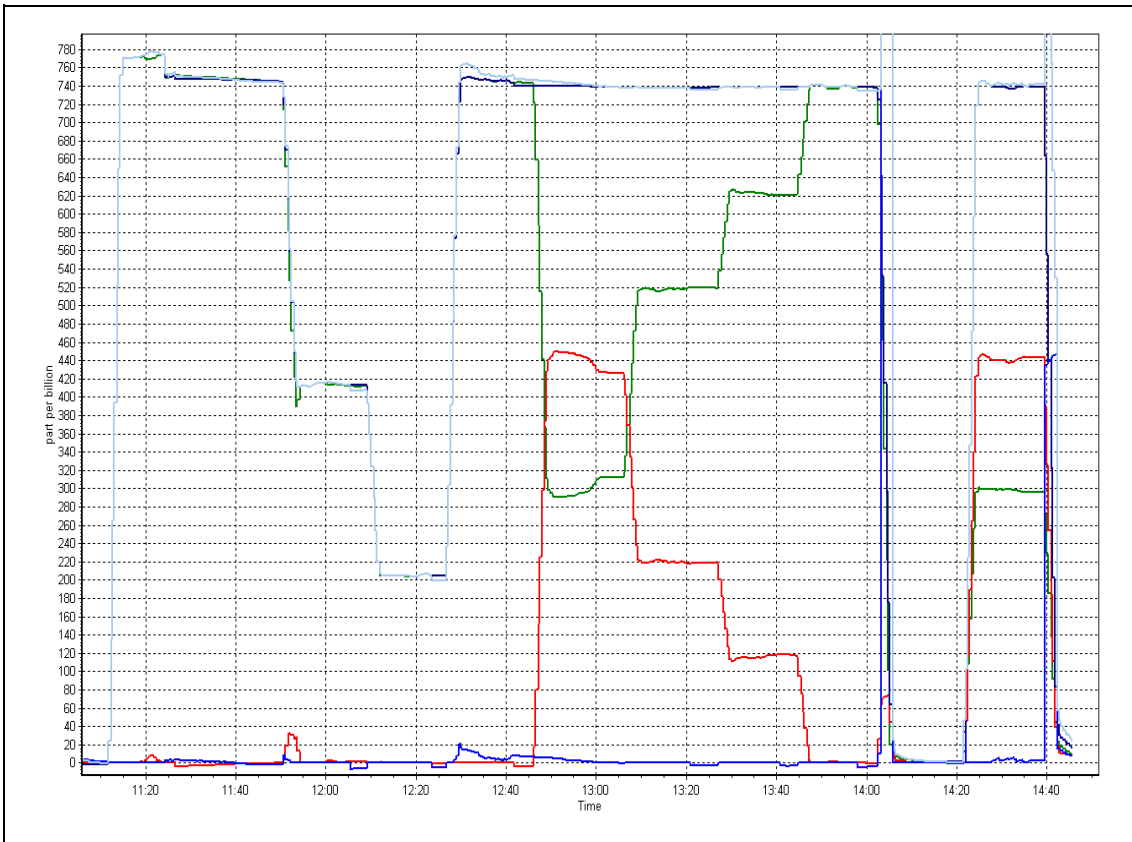
NH<sub>3</sub> Calibration Plot

Date: October 22, 2015



NO<sub>x</sub> Calibration Plot

Date: October 21, 2015





Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date: October 22, 2015 Previous Calibration: September 29, 2015  
 Station Name: Bertha Ganter - Fort McKay Station Number: AMS 1  
 Start Time (MST): 14:20 End Time (MST): 15:05  
 Calibrator Make/Model: Delta Cal Calibrator Serial Number: 954

SHARP INFORMATION

Particulate Fraction: PM2.5  
 Make/Model: Thermo / SHARP 5030  
 Serial Number:  
 C<sub>14</sub> Source SN:  
 Confirmation of Time settings: Yes  No   
 Parameters Checked:  1  T  T4  P3  Main Flow  Beta  Neph

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	14.0	14.9	0.9	14.0
T2	24.0	na	na	
T3	24.0	na	na	
T4	22.0	na	na	
RH (%)	21.0	na	na	

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	974	973.9	-0.1	974

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1000	0	1000	1000

Nephelometer Calibration

Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	219		220
Neph	-0.6		0
C14	8.9		5.7
Indicated Concentration (ug/m3)	-0.6	yes	0
Offset 1	220.8		220.2
Offset 2	34.7		34.5

Leak Check (Quarterly)

Leak Check Date: Previous Leak Check Date: April 20, 2015

Measured

Difference LPM (Limit +/- 0.42 LPM)

Flow without adaptor (LPM): 0.00  
 \*Flow with adaptor (LPM):

\*Note - do not attach adaptor without shutting off the pump first

Mass Foil Calibration (Annually)

Foil Calibration Date: Previous Foil Calibration:  
 Zeroed?:  
 Foil Mass: Mass foil set S/N:  
 Previous Correction Factor:  
 New Correction Factor:

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	22/10/2015
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

NOTES:

Cyclone head replaced with clean head. Nephelometer zeroed.

Calibration Performed By: Devin Russell





## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

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

**AMS 2  
MILDRED LAKE  
OCTOBER 2015**

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

November 26, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS 2)  
OCTOBER 2015

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	709	34	35	99.87	53	0	8	0
H2S (ppb) Average	709	35	35	100.00	5	0	1	0
THC (ppm) Average	709	34	35	99.87	6.8	-	3.2	-
Temperature (C) Average	744	0	0	100.00	24.9	-	16.8	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	91	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	28	-	17	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS 2)  
OCTOBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	709	2.4	4	-	0	0	0	1	2	7	53
H2S (ppb) Average	709	0.5	0	-	0	0	0	0	1	1	5
THC (ppm) Average	709	2.49	0.6	-	2	2.1	2.2	2.3	2.5	3	6.8
Temperature 2 m (C) Average	744	5.8	5.5	-	-3.6	-0.2	1.4	5	8.9	13.9	24.9
Relative Humidity (%) Average	744	71.3	18	-	27	42	59	75	86	92	99
Wind Speed 10 m (km/h) Average	744	10.2	5	-	0	4	6	9	14	18	28
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS 2)  
OCTOBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, THC	14 Oct 2015 12:00	14 Oct 2015 12:00	1	Maintenance - sample manifold cleaning



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0		Hours in Service: 744	
Maximum Value: 53 ppb on Oct 8 13:00		Maximum Daily Average: 8.1 ppb on Oct 16	
Minimum Value: 0 ppb on Oct 23 23:00		Hours of Data: 709	
Maximum Diurnal Average: 4.0 ppb at hour 13		Hours of Missing Data: 35	
Monthly Average: 2.4 ppb		Hours of Calibration: 34	
Minimum Daily Average: 0.3 ppb on Oct 3		Percent Operational Time: 99.9	
Minimum Diurnal Average: 1.4 ppb at hour 21		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> = 7 P <sub>99</sub> = 18	

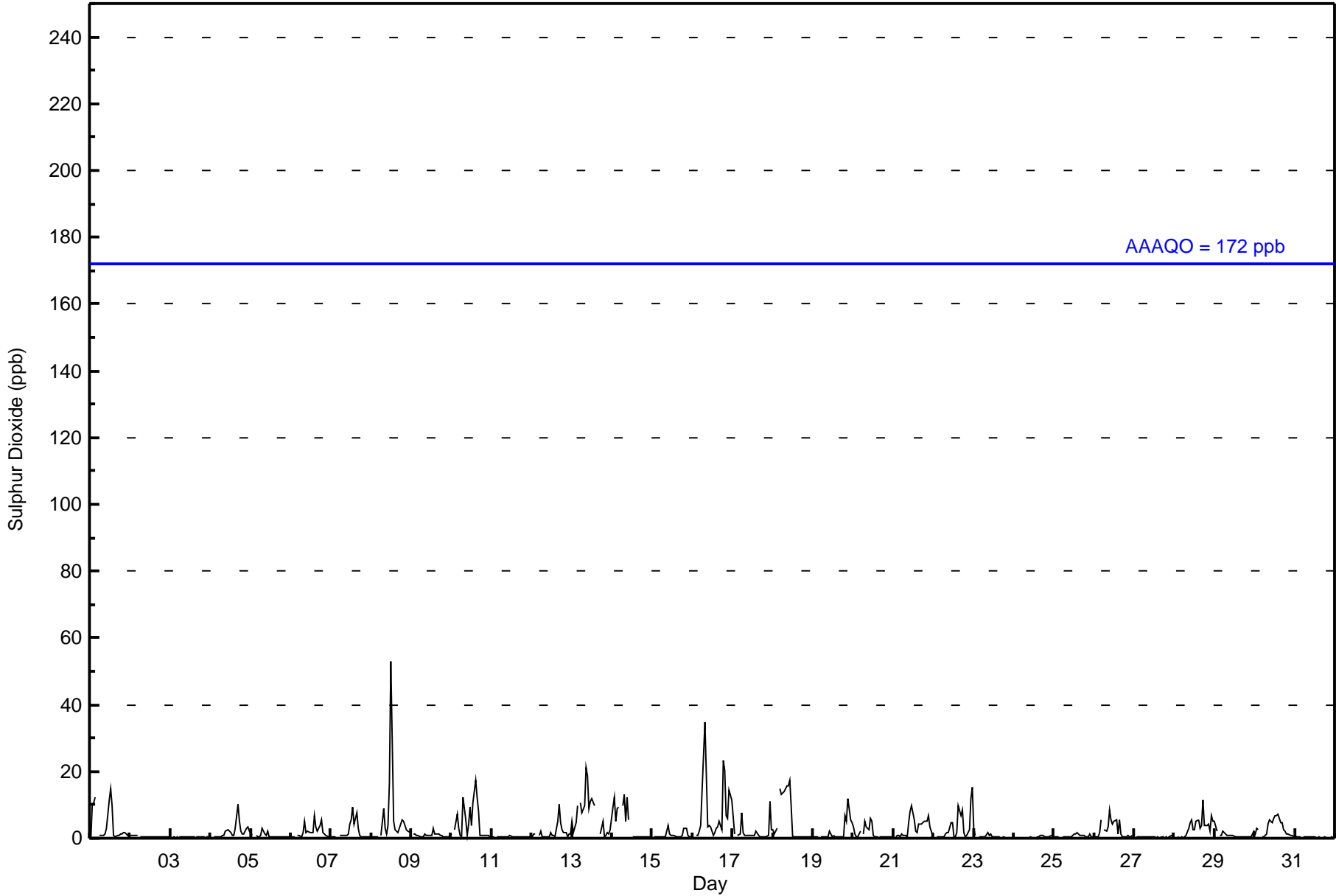
  

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Oct	0	10	11	12	Z	1	1	1	1	1	3	12	15	10	1	1	1	1	1	1	2	1	1	1	3.8	15	
2-Oct	1	1	1	1	1	Z	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1	
3-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
4-Oct	0	Z	0	0	0	0	0	1	1	2	2	2	2	1	1	3	10	5	2	1	1	3	4	2	1.9	10	
5-Oct	2	1	Z	1	1	1	1	3	1	1	2	1	0	0	0	0	0	0	0	1	1	1	0	0	0.8	3	
6-Oct	0	1	1	Z	1	1	1	2	5	2	2	2	2	1	7	3	2	4	6	1	1	1	1	1	2.0	7	
7-Oct	0	0	0	1	Z	1	1	1	1	1	1	4	6	9	4	7	3	1	1	0	0	0	0	0	2.0	9	
8-Oct	0	0	0	0	0	Z	1	9	3	1	4	17	53	5	2	2	2	3	6	5	4	3	2	2	5.4	53	
9-Oct	Z	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	0	0	1	0.9	3	
10-Oct	1	Z	3	7	3	1	1	12	5	1	4	9	4	11	17	12	8	1	1	1	1	1	1	1	4.6	17	
11-Oct	1	0	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1	
12-Oct	0	1	1	Z	1	2	0	0	1	1	1	2	1	1	1	5	10	5	3	2	2	1	1	1	1.8	10	
13-Oct	5	2	5	10	Z	10	8	10	21	19	9	11	12	10	C	C	C	1	5	0	1	2	1	2	7.2	21	
14-Oct	9	12	5	9	9	Z	10	13	5	12	5	M	0	0	0	0	0	0	0	0	0	0	0	0	4.3	13	
15-Oct	Z	0	0	0	0	0	0	0	0	4	1	1	1	1	0	0	0	0	1	3	3	1	0	0	0.9	4	
16-Oct	0	Z	1	1	2	4	14	35	19	3	4	3	1	2	3	3	5	3	23	20	7	6	14	11	8.1	35	
17-Oct	6	1	Z	1	1	7	2	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	11	2	1.9	11	
18-Oct	3	1	3	Z	15	13	13	14	16	16	17	9	1	1	0	0	1	0	0	1	1	1	0	0	5.5	17	
19-Oct	0	0	0	0	Z	0	0	0	0	0	2	1	1	1	0	0	0	0	1	7	5	12	5	5	1.9	12	
20-Oct	3	1	0	0	2	Z	1	5	3	3	6	5	1	0	0	0	0	0	0	0	0	0	0	0	1.5	6	
21-Oct	Z	0	1	1	0	1	1	1	0	5	8	10	5	2	2	4	4	4	4	5	5	5	7	3	1	3.3	10
22-Oct	1	Z	1	0	0	0	0	1	2	2	5	5	0	0	2	10	7	8	2	0	1	2	12	15	3.3	15	
23-Oct	3	1	Z	0	0	0	0	0	2	1	1	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	0	0	0	0	0	0	1	1	1	1	0	0	1	1	0.3	1
25-Oct	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	2	1	1	1	1	1	1	1	1	0	0.7	2	
26-Oct	0	0	1	2	6	Z	3	2	4	8	6	4	5	6	1	5	1	1	1	1	1	0	0	1	2.5	8	
27-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.3	1	
28-Oct	0	Z	0	0	0	0	0	1	3	5	6	3	2	5	6	3	4	12	4	4	4	2	7	5	3.3	12	
29-Oct	5	2	Z	1	1	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	2	1.0	5	
30-Oct	1	3	3	Z	0	0	1	1	4	5	5	6	7	7	7	5	5	2	2	1	1	1	1	1	3.0	7	
31-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	
1.8 1.6 1.5 2.0 1.9 1.9 2.1 3.8 3.3 3.1 3.2 3.7 4.0 2.6 2.1 2.4 2.3 1.9 2.2 1.9 1.4 1.6 2.3 1.9																								Diurnal Average			
9 12 11 12 15 13 14 35 21 19 17 17 53 11 17 12 10 12 23 20 7 12 14 15																								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  
Mildred Lake - October 2015





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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Mildred Lake - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	673	94.92	94.92
11 - 20	32	4.51	99.44
21 - 60	4	0.56	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: 709

Total Number of Hours: 744





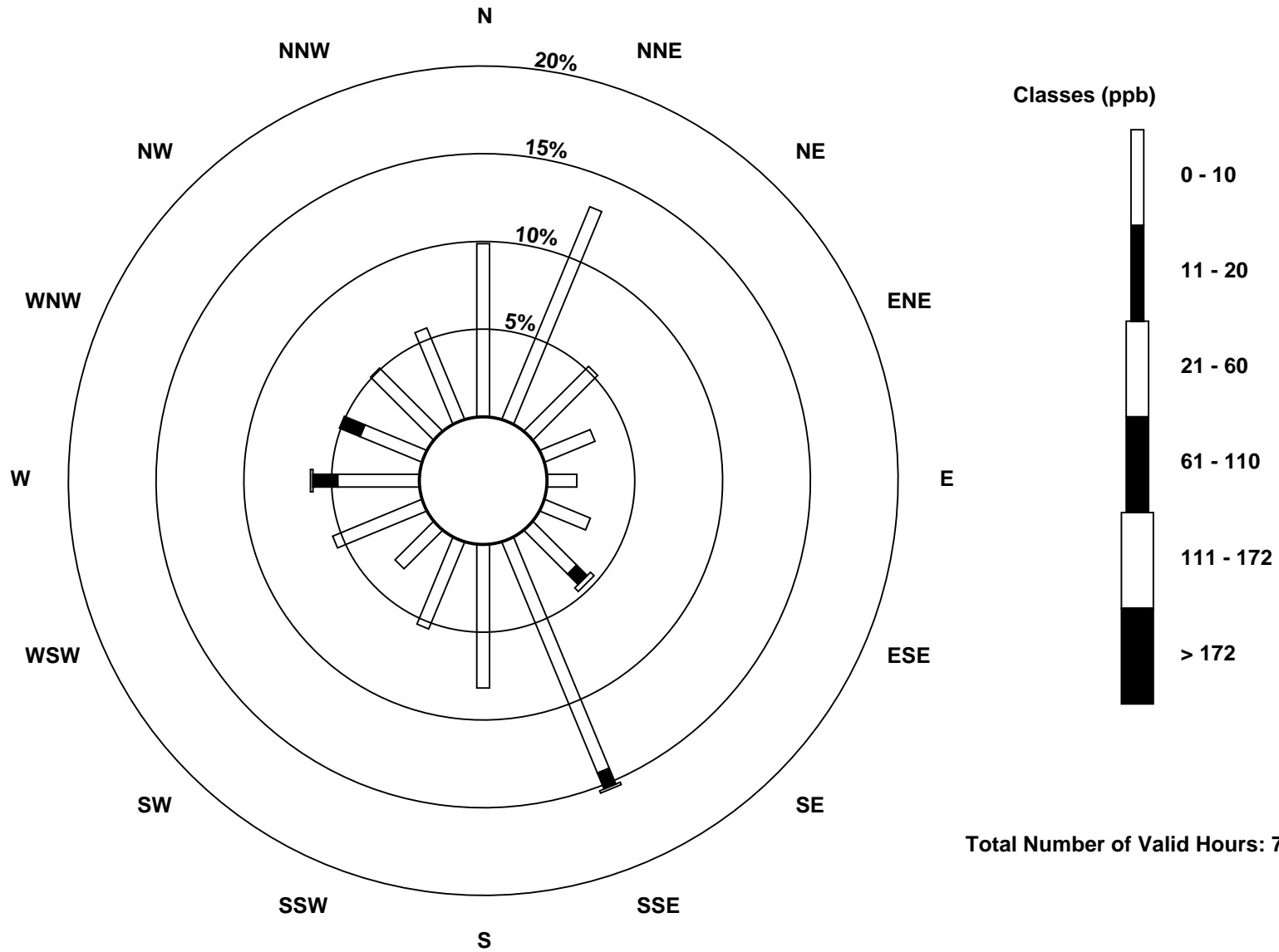
**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Mildred Lake - October 2015**

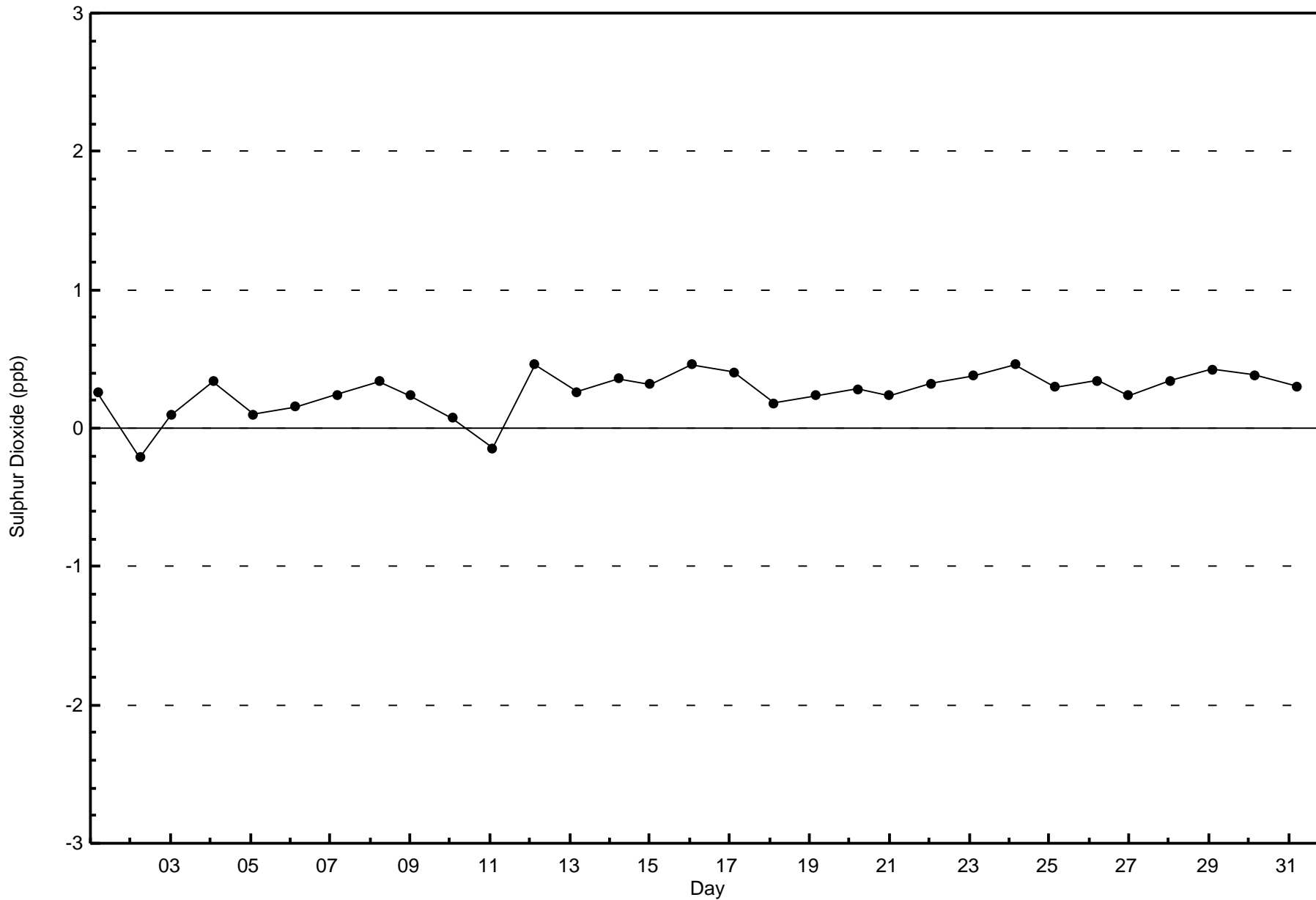
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	70	93	37	22	12	20	25	101	58	38	22	39	33	27	36	40	673
11 - 20	0	0	0	0	0	0	6	7	0	0	0	0	10	9	0	0	32
21 - 60	0	0	0	0	0	0	2	1	0	0	0	0	1	0	0	0	4
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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>	70	93	37	22	12	20	33	109	58	38	22	39	44	36	36	40	709

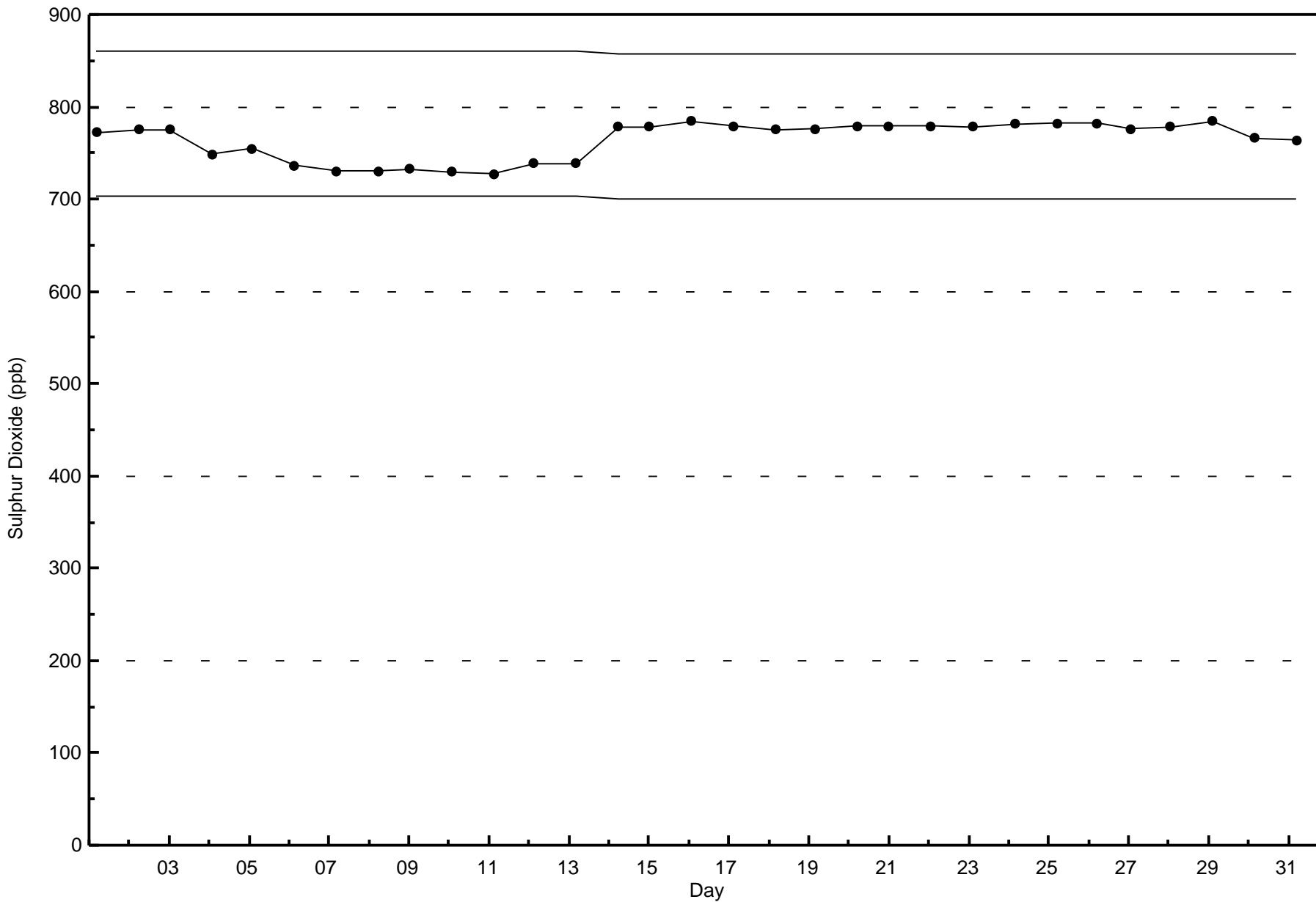
Total Number of Valid Hours: 709

Total Number of Hours: 744



Total Number of Valid Hours: 709



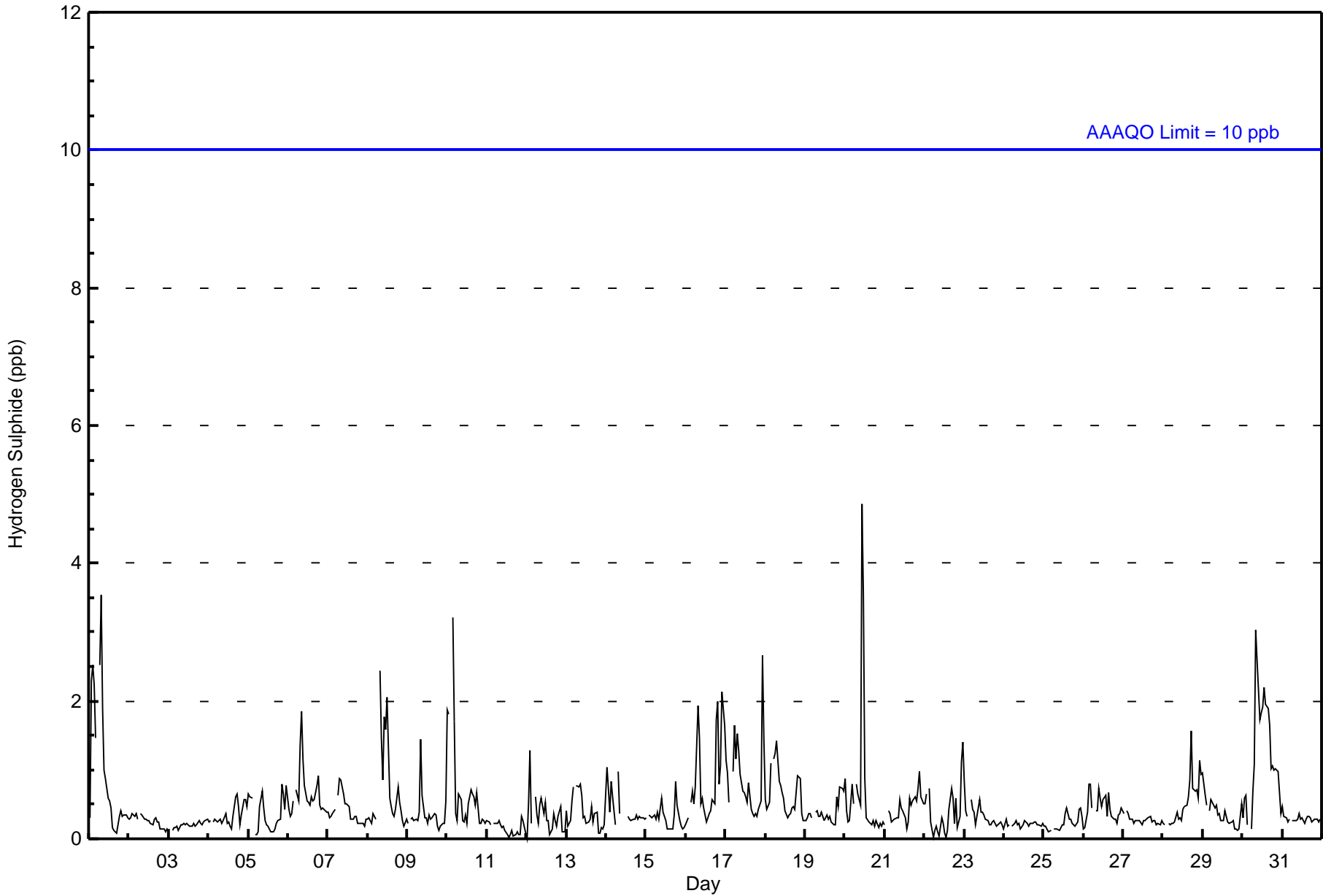




Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 5 ppb on Oct 20 11:00	Maximum Daily Average: 1.2 ppb on Oct 30		Hours of Data:	709
Minimum Value: 0 ppb on Oct 12 01:00	Minimum Daily Average: 0.2 ppb on Oct 11		Hours of Missing Data:	35
Maximum Diurnal Average: 0.7 ppb at hour 8	Minimum Diurnal Average: 0.4 ppb at hour 15		Hours of Calibration:	35
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> = 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	0	2	3	2	1	Z	3	4	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1.0	4	
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	0.3	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	0.2	0	
4-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0.3	1	
5-Oct	1	1	1	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0.4	1	
6-Oct	0	0	0	1	Z	1	1	1	2	1	1	1	1	0	1	1	1	1	1	0	0	0	0	0	0.7	2	
7-Oct	0	0	0	0	0	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
8-Oct	0	0	0	0	0	0	Z	2	1	1	2	2	2	1	0	0	0	0	1	1	0	0	0	0	0.7	2	
9-Oct	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	1	
10-Oct	2	2	Z	3	2	0	0	1	1	0	0	0	0	1	1	1	1	0	1	0	0	0	0	0	0.7	3	
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	1	1	0	Z	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
13-Oct	0	0	0	1	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
14-Oct	1	1	0	1	1	0	Z	1	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
15-Oct	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.3	1	
16-Oct	0	0	Z	1	1	1	1	2	1	1	1	0	0	0	0	0	1	1	2	2	1	1	2	2	0.9	2	
17-Oct	1	1	1	Z	1	2	1	2	1	1	1	1	1	1	1	0	0	0	0	0	0	1	3	1	0.9	3	
18-Oct	1	0	1	1	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0.7	1	
19-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0.4	1	
20-Oct	1	0	0	0	1	1	Z	1	1	0	5	4	1	0	0	0	0	0	0	0	0	0	0	0	0.7	5	
21-Oct	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	1	1	1	1	1	1	0.4	1	
22-Oct	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	1	0.4	1	
23-Oct	1	0	0	Z	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
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	1	1	0	Z	0	0	1	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0.4	1	
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	0.3	0	
28-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1	1	1	1	1	1	0.5	2	
29-Oct	1	1	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	1	
30-Oct	0	1	1	0	Z	0	1	1	3	3	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1.2	3	
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	0.3	0	
	0.5	0.5	0.5	0.6	0.5	0.4	0.5	0.7	0.7	0.6	0.6	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	Diurnal Average		
	2	2	3	3	2	2	3	4	3	3	5	4	2	2	2	2	2	2	2	2	2	1	1	3	2	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**  
**Mildred Lake - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	700	98.73	98.73
3 - 4	8	1.13	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: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Mildred Lake - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	70	93	38	21	12	20	33	101	59	38	22	39	46	34	33	41	700
3 - 4	0	0	0	0	0	0	1	4	2	0	0	0	0	1	0	0	8
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	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>	70	93	38	21	12	20	34	105	61	38	22	39	46	36	33	41	709

Total Number of Valid Hours: 709

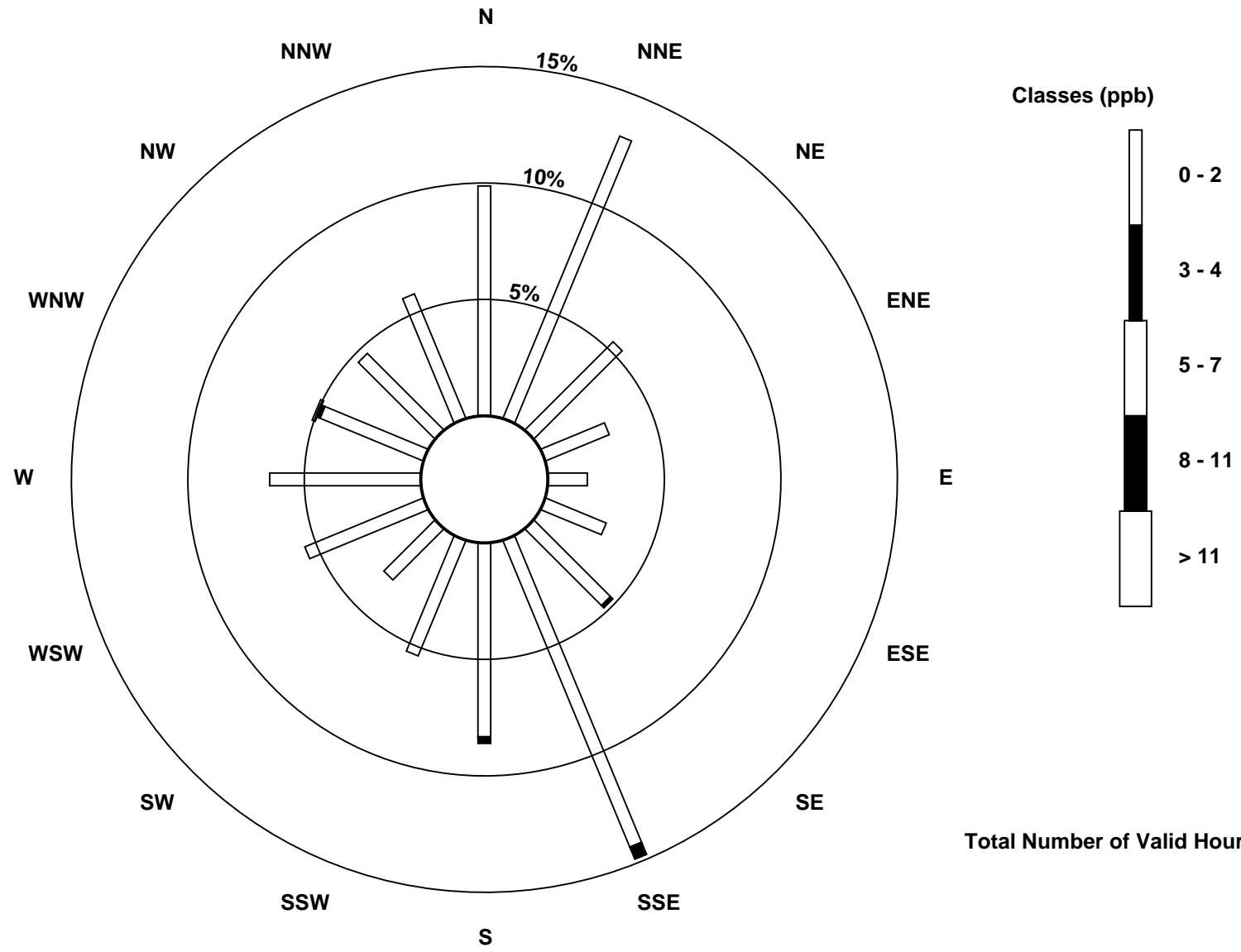
Total Number of Hours: 744

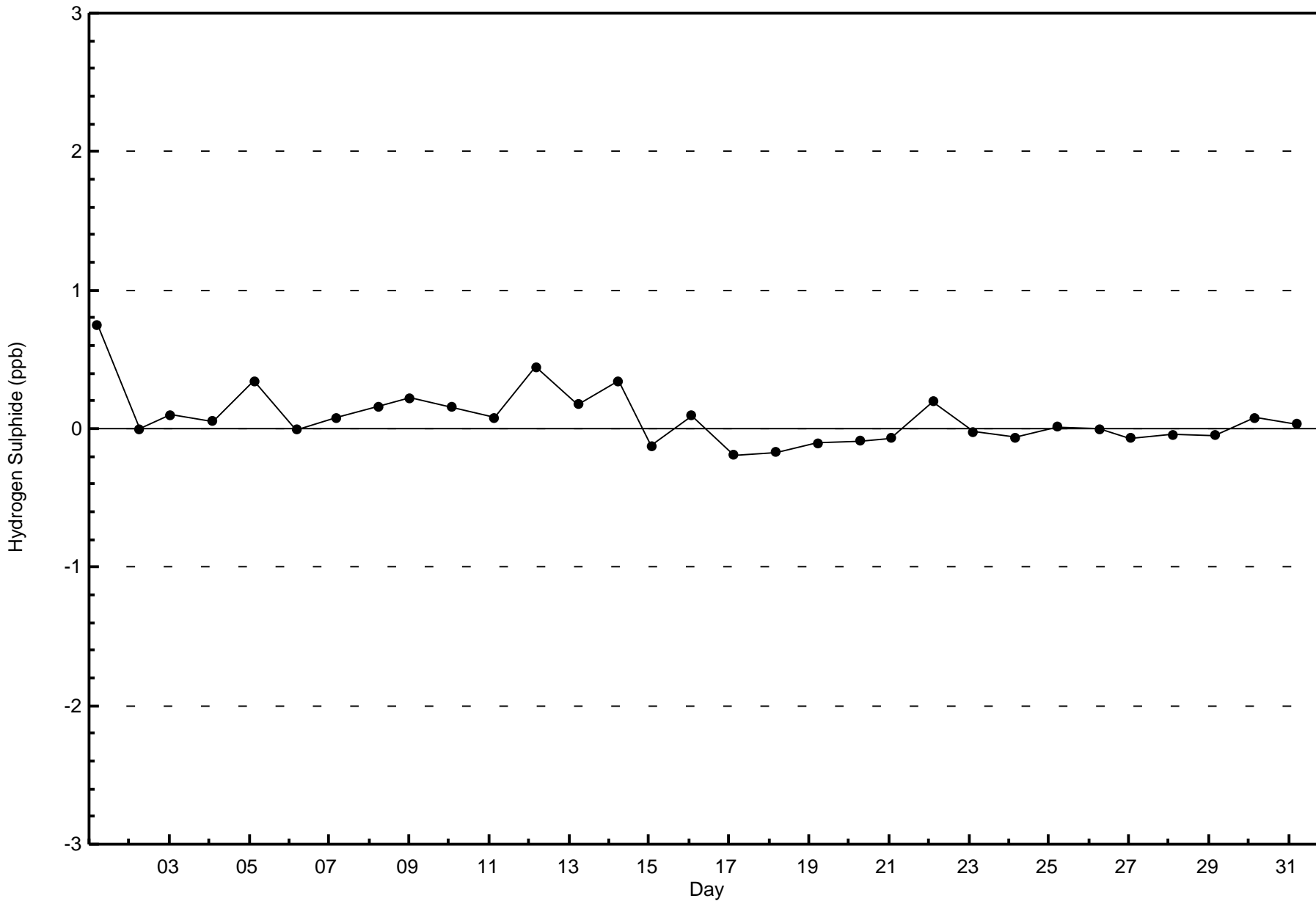


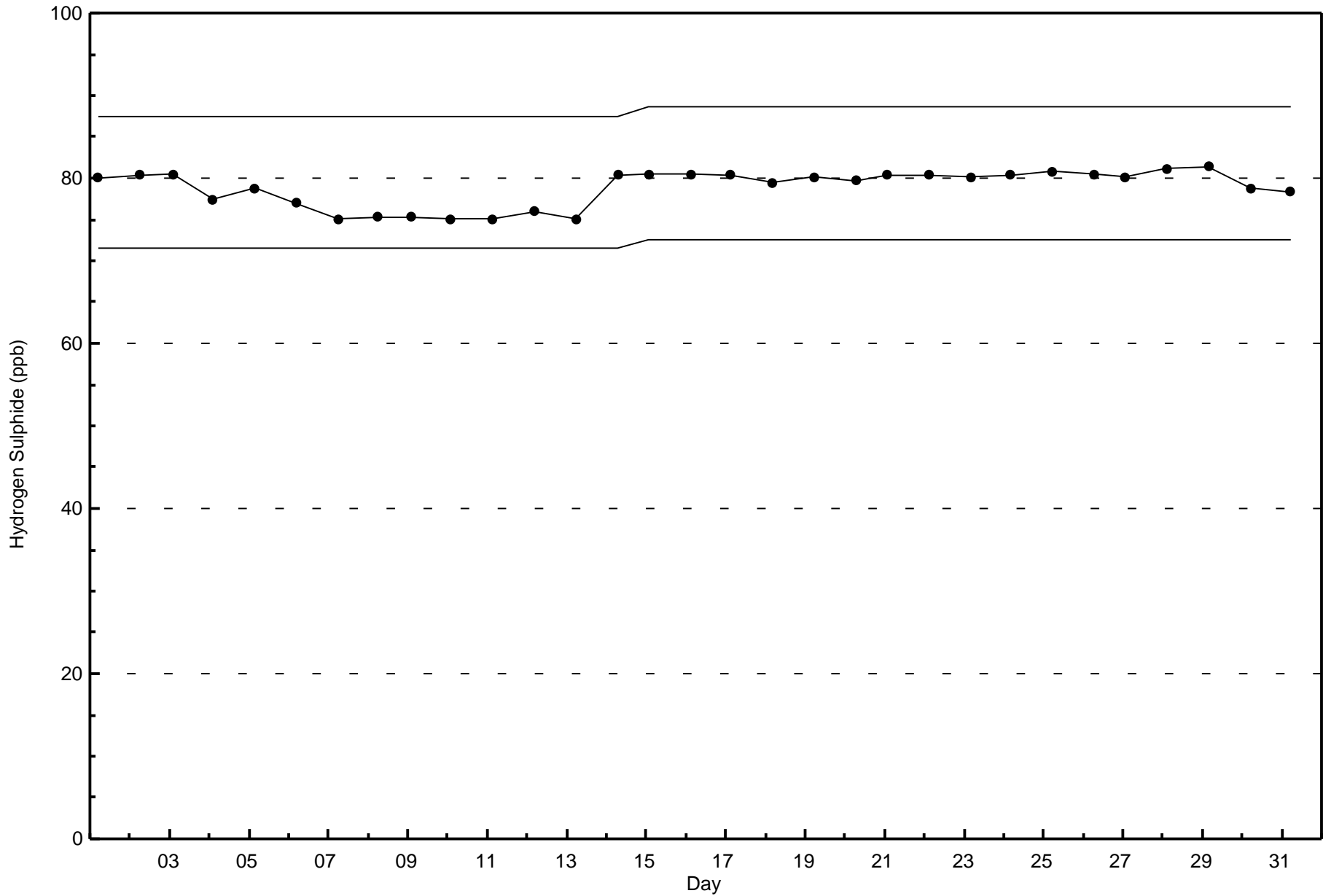


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

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

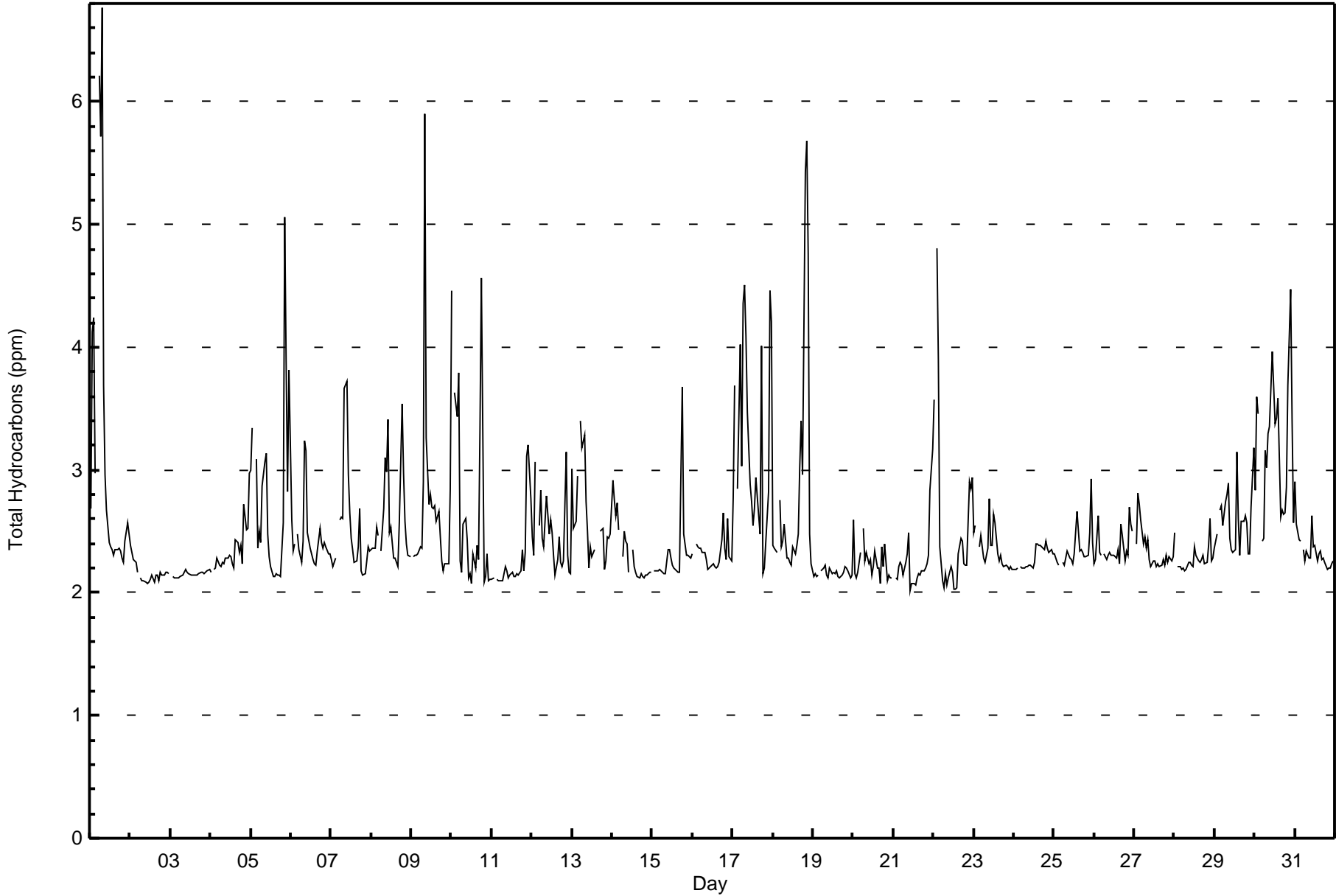








Maximum Value: 6.8 ppm on Oct 1 08:00		Maximum Daily Average: 3.2 ppm on Oct 17		Hours in Service: 744																																												
Minimum Value: 2.0 ppm on Oct 21 11:00		Minimum Daily Average: 2.2 ppm on Oct 3		Hours of Data: 709																																												
Maximum Diurnal Average: 2.7 ppm at hour 9		Minimum Diurnal Average: 2.3 ppm at hour 16		Hours of Missing Data: 35																																												
Monthly Average: 2.49 ppm		Percentiles: P <sub>1</sub> = 2.1 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> = 3.0 P <sub>99</sub> = 4.8		Hours of Calibration: 34																																												
				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	2.7	4.1	4.2	3.0	Z	6.2	5.7	6.8	3.7	3.0	2.7	2.4	2.4	2.3	2.3	2.4	2.4	2.4	2.3	2.3	2.2	2.4	2.6	2.5	3.2	6.8																						
2-Oct	2.4	2.3	2.3	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	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.4																					
3-Oct	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	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																					
4-Oct	2.2	Z	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.4	2.4	2.3	2.4	2.2	2.7	2.5	2.5	3.0	2.3	3.0																						
5-Oct	3.0	3.3	Z	3.1	2.4	2.5	2.4	2.9	3.1	3.1	2.5	2.3	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.6	5.1	3.9	2.8	3.8	2.8	5.1																						
6-Oct	2.6	2.3	2.4	Z	2.5	2.4	2.3	2.4	3.2	3.2	2.5	2.4	2.3	2.3	2.2	2.2	2.3	2.5	2.4	2.4	2.4	2.4	2.3	2.3	2.4	3.2																						
7-Oct	2.3	2.2	2.2	2.3	Z	2.6	2.6	2.6	3.7	3.7	3.0	2.7	2.4	2.4	2.2	2.3	2.4	2.7	2.2	2.1	2.2	2.3	2.4	2.3	2.5	3.7																						
8-Oct	2.3	2.4	2.4	2.5	2.5	Z	2.3	2.7	3.1	3.0	3.4	2.5	2.5	2.3	2.3	2.2	2.2	2.6	3.5	3.0	2.6	2.4	2.3	2.3	2.6	3.5																						
9-Oct	Z	2.3	2.3	2.3	2.3	2.4	2.4	2.9	5.9	3.3	2.7	2.8	2.7	2.7	2.7	2.6	2.7	2.5	2.3	2.2	2.2	2.2	2.2	2.8	2.7	5.9																						
10-Oct	4.5	Z	3.6	3.4	3.8	2.3	2.2	2.6	2.6	2.4	2.1	2.2	2.1	2.3	2.2	2.4	2.3	3.3	4.6	2.1	2.1	2.3	2.1	2.1	2.7	4.6																						
11-Oct	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.2	2.1	2.2	2.4	2.2	2.3	3.1	3.2	2.8	2.3	3.2																						
12-Oct	2.5	2.3	3.1	Z	2.5	2.8	2.4	2.4	2.6	2.8	2.5	2.6	2.5	2.3	2.1	2.3	2.5	2.2	2.2	2.3	3.1	2.3	2.2	2.2	2.5	3.1																						
13-Oct	3.0	2.5	2.6	3.0	Z	3.4	3.2	3.3	2.7	2.5	2.2	2.4	2.3	2.4	C	C	C	2.5	2.5	2.2	2.3	2.5	2.4	2.5	2.6	3.4																						
14-Oct	2.9	2.8	2.6	2.7	2.5	Z	2.3	2.5	2.4	2.2	2.4	Z	2.4	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.9																						
15-Oct	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.9	3.7	2.5	2.3	2.3	2.3	2.3	3.7																						
16-Oct	2.3	Z	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.6	2.4	2.3	2.6	2.3	2.3	2.3	2.6																						
17-Oct	2.8	3.7	Z	2.9	4.0	3.0	4.4	4.5	4.1	3.5	2.9	2.7	2.5	2.7	2.9	2.6	2.5	4.0	2.2	2.2	2.4	2.8	4.5	4.2	3.2	4.5																						
18-Oct	2.4	2.4	2.3	Z	2.8	2.4	2.4	2.6	2.3	2.3	2.2	2.2	2.4	2.3	2.4	2.5	3.0	3.4	3.0	5.4	5.7	4.8	2.5	2.2	2.9	5.7																						
19-Oct	2.1	2.2	2.1	2.1	Z	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2																						
20-Oct	2.6	2.2	2.1	2.2	2.3	Z	2.5	2.3	2.3	2.2	2.3	2.1	2.2	2.3	2.2	2.2	2.1	2.4	2.2	2.4	2.1	2.1	2.1	2.1	2.2	2.6																						
21-Oct	Z	2.1	2.1	2.2	2.3	2.2	2.1	2.2	2.3	2.5	2.0	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.3	2.8	3.2	2.3	3.2																						
22-Oct	3.6	Z	4.8	3.9	2.4	2.1	2.0	2.2	2.1	2.1	2.2	2.2	2.0	2.0	2.0	2.3	2.4	2.4	2.2	2.2	2.2	2.9	2.9	2.9	2.5	4.8																						
23-Oct	2.5	2.5	Z	2.4	2.5	2.4	2.3	2.3	2.4	2.8	2.4	2.4	2.6	2.6	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.8																						
24-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	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.4																						
25-Oct	2.3	2.3	2.2	2.2	Z	2.3	2.2	2.3	2.3	2.3	2.3	2.2	2.3	2.5	2.7	2.3	2.3	2.3	2.3	2.3	2.3	2.5	2.9	2.4	2.4	2.9																						
26-Oct	2.2	2.3	2.6	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.2	2.6	2.5	2.3	2.3	2.3	2.7	2.6	2.5	2.4	2.7																						
27-Oct	Z	2.4	2.8	2.7	2.6	2.4	2.5	2.4	2.4	2.3	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.2	2.3	2.3	2.3	2.3	2.8																						
28-Oct	2.5	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.4	2.3	2.3	2.2	2.3	2.3	2.2	2.2	2.4	2.6	2.3	2.3	2.3	2.6																						
29-Oct	2.4	2.5	Z	2.7	2.7	2.5	2.7	2.8	2.9	2.4	2.3	2.3	2.3	3.1	2.6	2.3	2.6	2.6	2.6	2.6	2.3	2.3	2.7	3.2	2.6	3.2																						
30-Oct	2.8	3.6	3.5	Z	2.4	2.4	3.2	3.0	3.3	3.4	4.0	3.7	3.4	3.4	3.6	2.6	2.7	2.6	2.7	2.9	3.7	4.5	3.4	2.6	3.2	4.5																						
31-Oct	2.9	2.6	2.4	2.4	Z	2.4	2.3	2.3	2.3	2.3	2.6	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.9																						
																								2.6	2.5	2.6	2.5	2.5	2.5	2.5	2.6	2.7	2.6	2.4	2.4	2.3	2.4	2.3	2.3	2.3	2.5	2.5	2.4	2.6	2.6	2.5	2.5	Diurnal Average
																								4.5	4.1	4.8	3.9	4.0	6.2	5.7	6.8	5.9	3.7	4.0	3.7	3.4	3.4	3.6	2.6	3.0	4.0	4.6	5.4	5.7	4.8	4.5	4.2	Diurnal Maximum
Z - zerospan      C - Calibration      M - Maintenance																																																





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

**Total Hydrocarbons (THC) - ppm**  
**Mildred Lake - October 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	5	0.71	0.71
2.1 - 3.0	636	89.70	90.41
3.1 - 10.0	68	9.59	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



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

**Total Hydrocarbons (THC) - ppm**  
**Mildred Lake - October 2015**

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	1	0	0	0	4	0	0	0	0	5
2.1 - 3.0	66	93	36	22	12	20	29	92	45	32	18	33	38	32	31	37	636
3.1 - 10.0	4	0	1	0	0	0	4	16	13	6	4	2	6	4	5	3	68
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	70	93	37	22	12	20	33	109	58	38	22	39	44	36	36	40	709

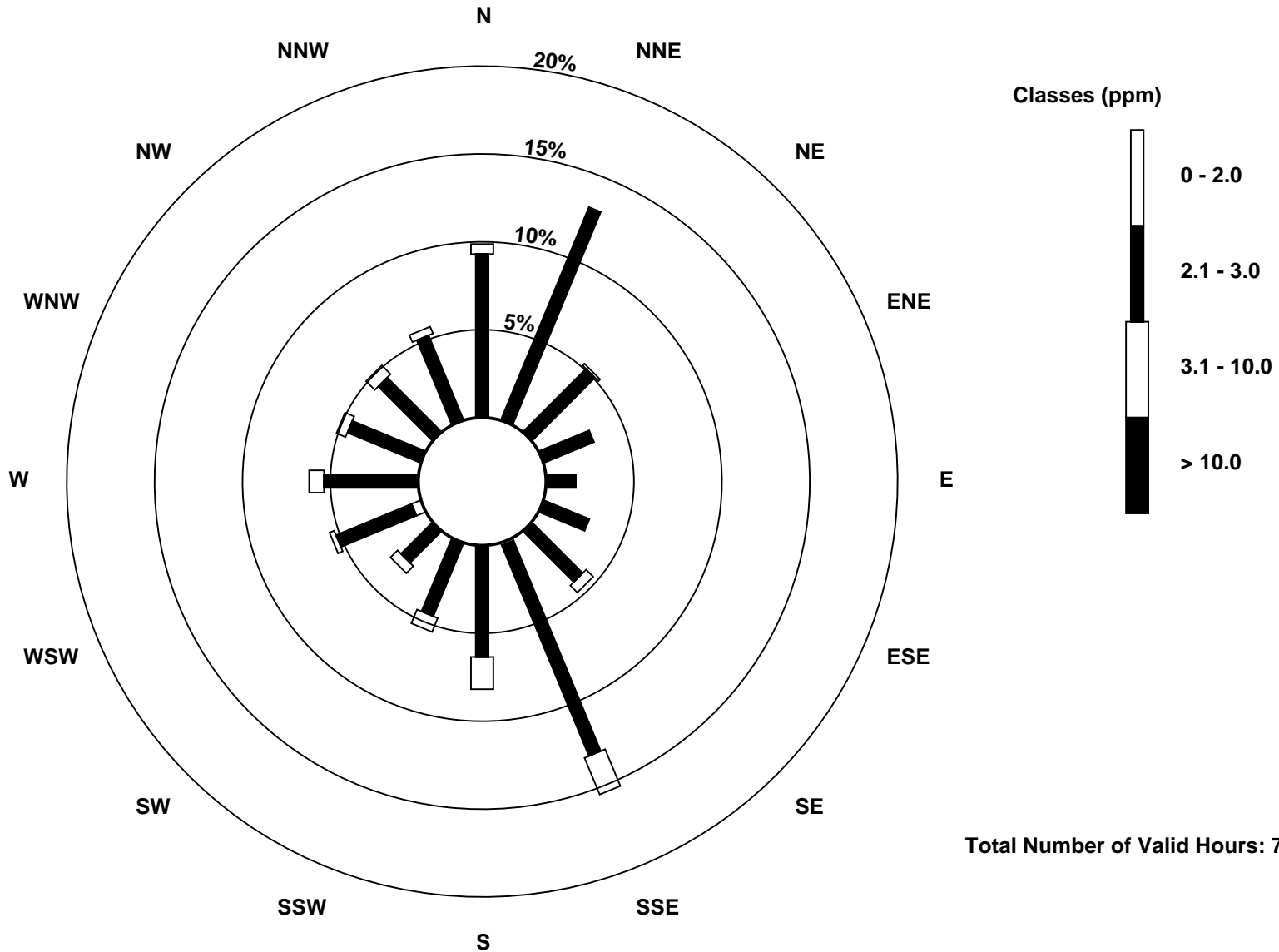
Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association**  
**Wind Rose Oct 2015**

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



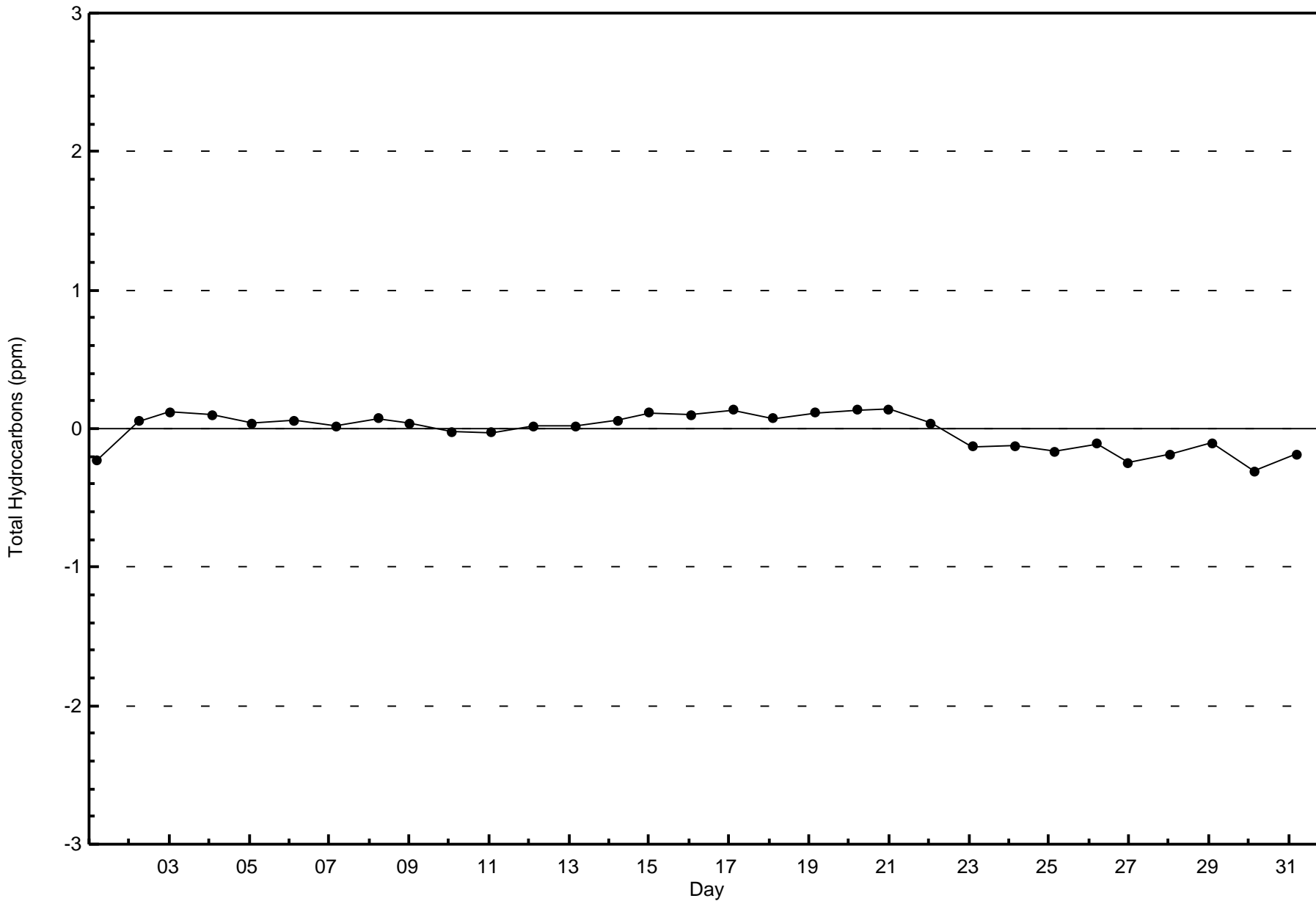
**Total Number of Valid Hours: 709**

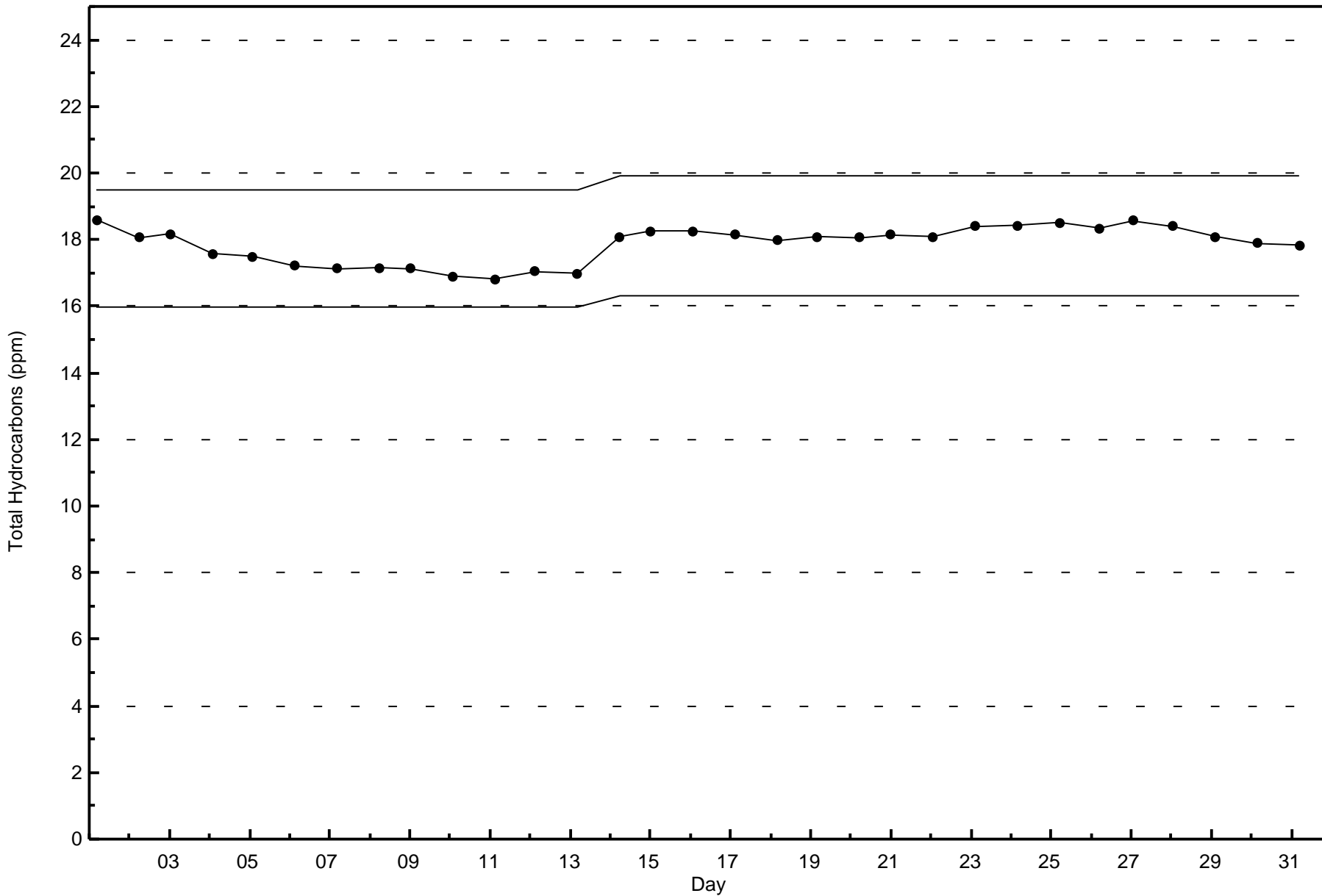




Wood Buffalo Environmental Association  
Zero Responses

Total Hydrocarbons (THC) - ppm  
Mildred Lake - October 2015







**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Ambient Temperature (AT) - C**

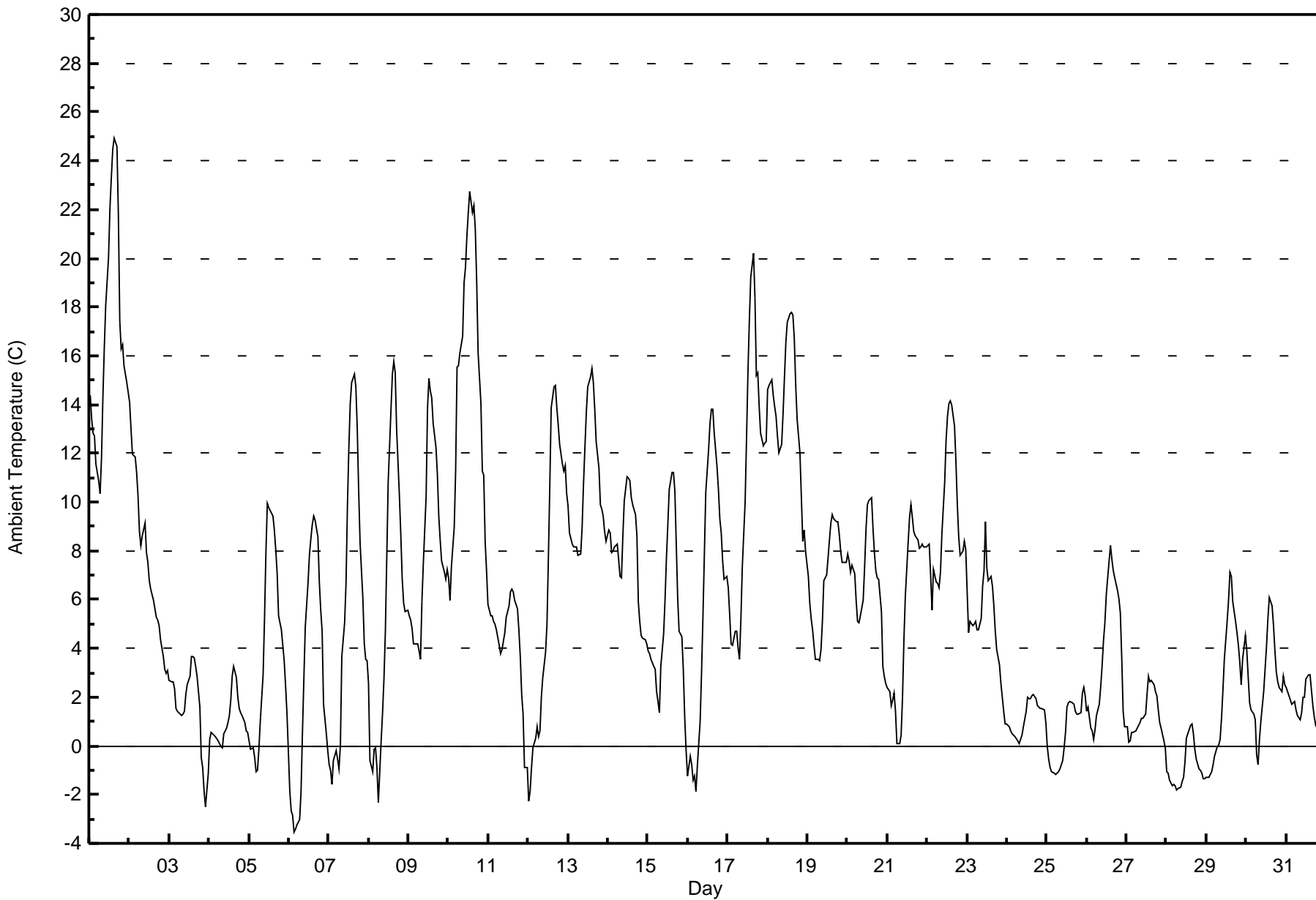
**Mildred Lake - October 2015**

Maximum Value: 24.9 C on Oct 1 16:00		Maximum Daily Average: 16.8 C on Oct 1		Hours in Service: 744																							
Minimum Value: -3.6 C on Oct 6 04:00		Minimum Daily Average: -0.9 C on Oct 28		Hours of Data: 744																							
Maximum Diurnal Average: 10.1 C at hour 15		Minimum Diurnal Average: 3.0 C at hour 7		Hours of Missing Data: 0																							
Monthly Average: 5.80 C		Percentiles: P <sub>1</sub> = -2.3 P <sub>10</sub> = -0.2 Q <sub>1</sub> = 1.4 Median = 5.0 Q <sub>3</sub> = 8.9 P <sub>90</sub> = 13.9 P <sub>99</sub> = 21.9		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	14.4	13.4	12.8	12.7	11.6	10.9	10.4	11.8	14.3	16.3	18.0	20.0	22.1	23.3	24.5	24.9	24.6	21.8	17.4	16.3	16.5	15.6	14.9	14.5	16.8	24.9	
2-Oct	14.1	13.0	12.0	11.9	11.2	10.2	8.8	8.2	8.6	9.2	7.9	7.5	6.8	6.4	6.0	5.6	5.3	5.2	4.9	4.4	3.7	3.2	3.0	3.1	7.5	14.1	
3-Oct	2.7	2.6	2.6	2.3	1.5	1.4	1.4	1.3	1.3	1.4	2.1	2.5	2.9	3.7	3.7	3.6	3.3	2.8	1.6	-0.5	-0.9	-1.9	-2.5	-1.1	1.6	3.7	
4-Oct	0.3	0.5	0.5	0.5	0.4	0.2	0.1	0.0	-0.1	0.5	0.7	0.9	1.2	1.9	2.9	3.3	2.8	2.0	1.5	1.4	1.2	0.9	0.6	0.6	1.0	3.3	
5-Oct	0.2	-0.1	-0.1	-0.5	-1.1	-1.0	-0.2	1.0	2.9	5.2	8.0	9.9	9.8	9.5	9.4	8.9	8.1	7.1	5.3	4.8	4.1	3.5	2.5	1.3	4.1	9.9	
6-Oct	-1.9	-2.7	-2.8	-3.6	-3.4	-3.3	-3.0	-1.9	0.6	2.7	4.9	6.7	7.9	8.5	9.1	9.4	9.2	8.6	6.7	5.6	4.7	1.7	0.5	-0.2	2.7	9.4	
7-Oct	-0.7	-1.0	-1.6	-0.6	-0.2	-0.6	-0.9	0.0	3.7	5.0	6.7	9.8	12.2	14.0	14.9	15.3	14.7	13.0	10.5	8.3	6.0	4.2	3.5	3.5	5.8	15.3	
8-Oct	2.5	-0.6	-1.1	-0.2	-0.1	-0.9	-2.3	0.2	1.3	2.7	4.7	7.7	10.8	13.8	15.3	15.8	15.3	13.0	10.3	8.6	6.8	5.9	5.5	5.5	5.9	15.8	
9-Oct	5.3	5.2	4.8	4.2	4.2	4.2	3.9	3.6	5.9	7.5	10.2	13.9	15.1	14.6	14.3	13.2	12.3	11.1	9.4	8.4	7.6	7.1	6.8	7.2	8.3	15.1	
10-Oct	6.9	6.0	7.3	8.9	11.3	15.5	15.6	16.1	16.8	19.0	19.6	20.9	21.9	22.7	21.9	22.2	21.2	19.0	16.1	14.1	11.3	11.1	8.4	7.2	15.0	22.7	
11-Oct	5.8	5.4	5.3	5.1	5.0	4.8	4.1	3.8	3.9	4.3	4.6	5.3	5.7	6.3	6.5	6.3	6.0	5.6	4.7	3.7	2.1	1.3	-0.9	-0.9	4.3	6.5	
12-Oct	-2.3	-1.9	-0.9	-0.1	0.3	0.8	0.4	0.6	2.0	2.8	3.8	5.0	7.7	10.6	13.9	14.7	14.8	13.9	13.2	12.4	11.5	11.3	11.5	10.4	6.5	14.8	
13-Oct	9.8	8.7	8.3	8.2	8.1	8.2	7.8	7.9	9.0	10.7	12.3	13.7	14.7	15.2	15.5	14.9	13.8	12.5	11.4	9.9	9.7	9.4	8.8	8.4	10.7	15.5	
14-Oct	8.8	8.7	7.9	8.0	8.1	8.3	7.7	6.9	6.9	8.6	10.1	11.0	11.0	10.9	10.2	9.9	9.5	8.6	5.9	5.1	4.5	4.4	4.3	4.2	7.9	11.0	
15-Oct	3.9	3.8	3.5	3.3	3.2	2.2	1.8	1.4	3.3	4.6	6.0	7.7	9.1	10.6	11.2	11.2	10.5	8.3	6.1	4.7	4.5	3.2	1.2	-0.2	5.2	11.2	
16-Oct	-1.2	-0.4	-0.8	-1.4	-1.3	-1.8	-0.9	1.0	3.0	5.3	7.9	10.4	12.2	13.2	13.8	13.8	12.9	11.4	10.5	9.3	8.8	7.6	6.8	7.0	6.1	13.8	
17-Oct	6.5	5.4	4.2	4.1	4.7	4.7	4.0	3.5	5.2	7.4	10.0	12.6	15.3	17.4	19.2	20.2	18.4	15.2	15.3	13.9	12.8	12.3	12.4	12.5	10.7	20.2	
18-Oct	14.6	14.8	15.0	14.4	13.9	13.5	12.7	12.0	12.4	13.7	15.2	16.6	17.4	17.8	17.8	17.7	16.7	14.8	13.4	12.0	10.3	8.4	8.9	8.0	13.8	17.8	
19-Oct	7.0	5.9	5.2	4.7	4.1	3.6	3.5	3.5	3.9	5.1	6.8	7.0	7.7	8.5	9.2	9.5	9.3	9.2	9.2	8.7	8.0	7.5	7.6	7.5	6.8	9.5	
20-Oct	7.9	7.6	7.1	7.4	7.1	6.0	5.1	5.1	5.3	6.0	7.3	8.9	9.9	10.1	10.2	8.9	7.9	7.2	6.9	6.8	5.5	3.2	2.9	2.6	6.8	10.2	
21-Oct	2.4	2.2	1.6	1.9	2.1	1.4	0.1	0.1	0.4	2.0	4.3	6.2	8.3	9.4	9.9	9.4	8.8	8.6	8.4	8.1	8.2	8.3	8.1	8.2	5.3	9.9	
22-Oct	8.2	8.3	7.0	5.5	7.2	6.7	6.7	6.5	7.1	8.7	10.8	12.6	13.5	14.1	14.2	14.0	13.1	11.6	9.9	8.6	7.8	8.0	8.4	8.1	9.4	14.2	
23-Oct	6.3	4.6	5.1	4.9	5.0	5.1	4.8	4.7	5.2	6.6	7.2	9.2	7.3	6.8	6.9	6.6	5.8	4.7	4.0	3.3	2.6	2.0	1.4	0.9	5.0	9.2	
24-Oct	0.9	0.8	0.6	0.5	0.4	0.4	0.2	0.1	0.3	0.4	0.8	1.4	2.0	2.0	1.9	2.0	2.1	1.9	1.7	1.6	1.5	1.5	1.5	0.9	1.1	2.1	
25-Oct	0.0	-0.5	-0.9	-1.0	-1.1	-1.2	-1.1	-1.1	-1.0	-0.6	-0.1	0.5	1.6	1.7	1.8	1.8	1.7	1.4	1.3	1.3	2.1	2.4	2.0	0.5	2.4	2.4	
26-Oct	1.4	1.6	0.7	0.6	0.3	0.7	1.2	1.7	2.4	3.3	4.3	5.0	6.2	7.6	8.2	7.7	7.2	6.9	6.4	6.0	5.4	3.6	1.4	0.8	3.8	8.2	
27-Oct	0.8	0.2	0.2	0.5	0.6	0.6	0.7	0.8	0.9	1.2	1.2	1.3	2.1	2.8	2.6	2.7	2.5	2.2	2.0	1.5	1.0	0.7	0.2	-0.1	1.2	2.8	
28-Oct	-1.1	-1.1	-1.4	-1.6	-1.6	-1.6	-1.8	-1.8	-1.7	-1.5	-1.3	-0.7	0.3	0.5	0.8	0.9	0.5	-0.2	-0.5	-1.0	-1.0	-1.1	-1.4	-1.4	-0.9	0.9	
29-Oct	-1.3	-1.3	-1.2	-1.1	-0.8	-0.5	0.0	0.1	0.3	1.1	2.3	3.6	5.1	6.0	7.1	7.0	5.9	5.1	4.6	4.1	3.4	2.5	3.5	4.5	2.5	7.1	
30-Oct	3.9	2.8	1.8	1.5	1.3	1.1	-0.3	-0.8	0.3	1.0	2.2	3.1	4.0	5.2	6.1	5.7	5.0	3.9	3.0	2.6	2.4	2.2	2.9	2.5	2.6	6.1	
31-Oct	2.4	2.2	1.9	1.7	1.8	1.8	1.5	1.2	1.1	1.3	2.0	2.0	2.8	2.9	2.9	2.3	1.6	1.2	0.8	0.6	0.2	-0.2	-0.2	-0.2	1.5	2.9	
		4.1	3.7	3.4	3.3	3.4	3.3	3.0	3.1	4.1	5.2	6.5	7.8	8.9	9.6	10.1	10.0	9.4	8.3	7.2	6.3	5.5	4.8	4.4	4.1	Diurnal Average	
		14.6	14.8	15.0	14.4	13.9	15.5	15.6	16.1	16.8	19.0	19.6	20.9	22.1	23.3	24.5	24.9	24.6	21.8	17.4	16.3	16.5	15.6	14.9	14.5	Diurnal Maximum	



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

**Ambient Temperature (AT) - C**  
**Mildred Lake - October 2015**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C  
Mildred Lake - October 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	91	12.23	12.23
0 - 10	501	67.34	79.57
10 - 20	138	18.55	98.12
> 20	14	1.88	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



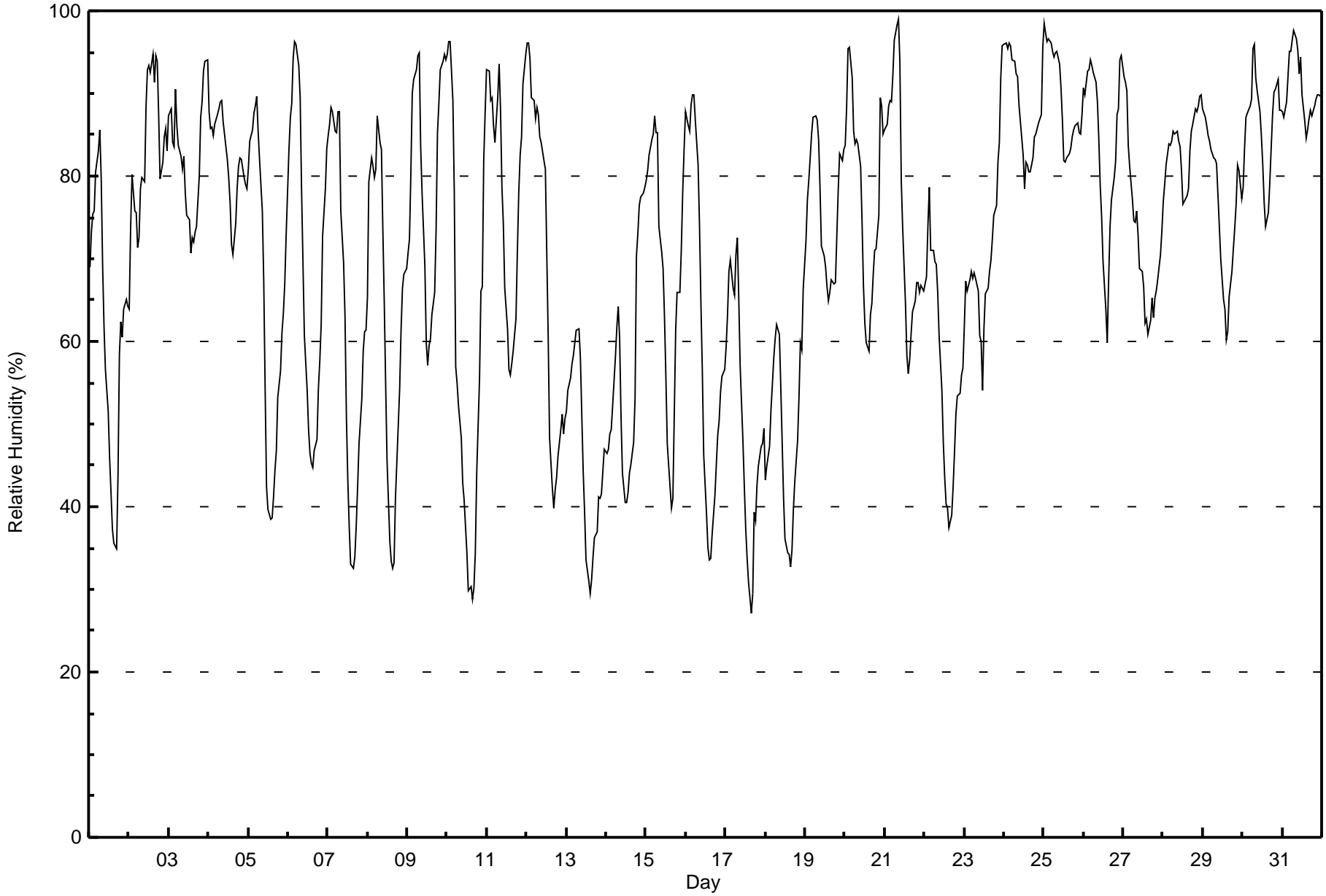
**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %**

**Mildred Lake - October 2015**

Maximum Value: 99 % on Oct 21 09:00																			Maximum Daily Average: 90.6 % on Oct 31						Hours in Service: 744	
Minimum Value: 27 % on Oct 17 16:00																			Minimum Daily Average: 45.8 % on Oct 13						Hours of Data: 744	
Maximum Diurnal Average: 82.6 % at hour 4																			Minimum Diurnal Average: 55.0 % at hour 15						Hours of Missing Data: 0	
Monthly Average: 71.3 %																			Percentiles: P <sub>1</sub> = 31 P <sub>10</sub> = 42 Q <sub>1</sub> = 59 Median = 75 Q <sub>3</sub> = 86 P <sub>90</sub> = 92 P <sub>99</sub> = 96						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	69	73	75	76	81	83	86	80	69	62	57	52	46	42	37	36	35	44	58	62	60	64	65	64	61.5	86
2-Oct	64	74	80	76	76	71	73	79	80	79	88	93	93	93	95	91	95	94	87	80	82	85	86	83	83.1	95
3-Oct	87	88	84	83	91	86	84	82	81	82	78	75	71	73	72	73	74	80	87	89	93	94	94	94	82.3	94
4-Oct	88	86	86	85	86	87	88	89	89	87	84	82	80	77	72	70	74	78	81	82	82	80	79	78	82.1	89
5-Oct	81	84	86	88	89	90	85	82	76	67	54	42	40	38	39	41	44	47	53	56	61	63	67	73	64.4	90
6-Oct	83	87	89	94	96	96	93	90	78	69	61	54	49	47	45	45	47	48	54	58	62	73	78	83	70.0	96
7-Oct	85	86	88	88	85	85	88	88	76	70	63	51	43	38	33	33	34	38	42	48	53	59	61	61	62.3	88
8-Oct	65	79	82	81	80	81	87	84	83	74	65	55	46	36	33	32	33	41	50	54	61	66	68	69	62.8	87
9-Oct	71	72	80	90	92	93	95	95	84	78	69	60	57	60	60	63	66	73	85	89	93	94	95	94	79.5	95
10-Oct	95	96	96	89	78	57	55	52	48	43	41	38	34	30	30	29	30	34	44	55	66	67	82	88	57.4	96
11-Oct	93	93	89	89	86	84	90	94	88	79	74	66	62	57	56	57	59	63	71	78	83	85	91	95	78.3	95
12-Oct	96	96	94	89	89	87	88	87	85	84	82	81	71	61	48	42	40	42	43	46	49	51	49	51	68.9	96
13-Oct	51	54	56	57	58	60	61	61	58	51	44	39	34	31	30	31	34	36	37	41	41	42	44	47	45.8	61
14-Oct	47	47	49	49	52	58	62	64	60	51	44	40	41	42	44	45	48	53	70	73	76	77	78	79	56.2	79
15-Oct	79	81	82	84	85	87	85	85	74	71	69	63	56	48	42	40	41	51	61	66	66	71	78	83	68.7	87
16-Oct	88	86	85	89	90	90	87	81	74	65	57	46	39	35	34	34	37	41	45	49	50	54	56	57	61.1	90
17-Oct	59	63	68	70	66	66	71	73	65	57	48	42	37	34	31	27	29	39	38	43	45	47	48	49	50.7	73
18-Oct	43	45	47	52	55	58	60	62	61	55	48	41	36	34	34	33	35	40	43	48	53	60	59	66	48.6	66
19-Oct	72	77	80	82	85	87	87	87	84	79	71	70	69	67	65	66	67	67	67	73	78	83	82	83	76.2	87
20-Oct	84	88	95	96	92	85	84	84	84	81	75	67	62	60	59	63	65	68	71	71	75	89	89	85	78.0	96
21-Oct	86	86	88	89	89	92	97	98	99	94	80	74	65	58	56	58	61	64	65	67	67	66	67	66	76.3	99
22-Oct	67	68	74	79	71	71	70	69	66	61	54	48	44	40	40	37	39	42	47	51	53	54	56	57	56.5	79
23-Oct	62	67	66	67	69	68	68	68	66	61	60	54	62	66	67	69	70	72	75	76	82	84	92	96	70.2	96
24-Oct	96	96	96	96	96	94	94	92	92	89	87	83	79	82	81	81	81	82	85	85	86	86	88	96	88.3	96
25-Oct	98	97	96	97	96	95	94	95	95	94	91	87	82	82	82	83	83	85	86	86	86	85	85	87	89.5	98
26-Oct	91	90	93	93	94	93	93	91	89	84	79	75	70	64	60	67	74	77	80	82	88	88	94	95	83.4	95
27-Oct	92	91	90	84	81	77	75	74	76	73	69	69	67	62	63	61	62	65	63	65	66	67	71	73	72.4	92
28-Oct	77	79	81	84	84	84	85	85	85	84	84	81	77	77	78	79	83	85	86	88	88	89	90	90	83.4	90
29-Oct	88	87	86	85	84	83	82	82	81	78	74	70	65	64	60	61	65	69	71	74	77	81	81	77	76.1	88
30-Oct	79	83	87	88	88	89	95	96	92	90	88	85	81	77	74	76	79	83	87	90	91	92	88	88	86.1	96
31-Oct	88	87	89	92	95	95	97	98	97	95	92	94	90	87	85	86	87	88	87	89	89	90	90	90	90.6	98
	78.2	80.3	82.0	82.6	82.5	81.8	82.5	82.2	78.6	73.7	68.6	63.8	59.6	56.6	55.0	55.1	57.1	60.8	65.0	68.1	70.9	73.7	75.7	77.3	Diurnal Average	
	98	97	96	97	96	96	97	98	99	95	92	94	93	93	95	91	95	94	87	90	93	94	95	96	Diurnal Maximum	





Maximum Speed: 28 km/h on Oct 27 14:00	Maximum Daily Speed Average: 16.8 km/h on Oct 27	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 1 21:00	Minimum Daily Speed Average: 1.7 km/h on Oct 30	Hours of Data: 744
Maximum Diurnal Speed Average: 3.0 km/h at hour 16	Minimum Diurnal Speed Average: 0.8 km/h at hour 21	Hours of Missing Data: 0
Monthly Average Velocity: 1.3 km/h 290.1 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> = 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	S5	SSE8	SSE9	SSE9	S9	SSE8	S7	S7	S8	S9	SSE9	SSE10	SSE8	SSE7	S5	S2	SSE3	SE3	ESE4	E5	ENE0	N10	N10	N7	SSE4.3	N10
2-Oct	NNW6	NE6	N8	NNE8	NNE11	NNE15	NNE15	NNE16	NNE16	NNE18	NNE18	NNE18	NNE21	N17	N19	N19	N14	N11	N14	NNE16	N18	N18	N18	N18	NNE14.8	NNE21
3-Oct	NNE15	N19	N18	N17	N17	N20	N17	N18	NNE16	N15	NNE13	NNE12	NE10	NE11	NE11	NE10	NNE9	NE7	NE4	NNE4	NNE4	NNE4	N4	N3	NNE11.2	N20
4-Oct	NNE5	NE5	NNE4	NNE5	ENE3	ESE2	ESE3	ESE5	ESE5	NE1	SW8	SSW8	SSW6	SSW7	S8	SSE8	SE9	SE8	S7	S8	SSE9	SE9	SSE11	SSE14	SSE4.3	SSE14
5-Oct	SSE9	S9	S7	S7	SSW7	SSW6	WSW8	W7	WNNW7	NW8WNW11	NW22	NW26	NNW27	NNW26	NNW25	NNW20	NNW16	NNW10	NW10	NW9	NW10	NW9	NNW5	NW8.7	NNW27	
6-Oct	NNE3	NNE3	W2	SSE3	S3	S4	S6	SSE4	SSE6	S10	SSE13	SSE11	SSE9	SSE8	SE8	SE8	SE5	SE7	SE8	SE8	SSE8	ESE5	ENE4	NNE5	SSE5.0	SSE13
7-Oct	N6	NNE5	ENE2	NNW1	N6	N5	S3	SSW3	SW4	SSW5	S6	SSW6	SSW6	SSW4	W2WNW11	WNNW9	NNW11	NNW11	NNW8	N7	N5	N8	N7	NW2.8	NNW11	
8-Oct	N6	N2	NW2	N3	E3	ESE3	SE3	S4	S5	S6	SE7	SE9	SE10	SSE11	SSE9	SE9	ESE7	NNE5	N12	N13	N14	N12	N9	N7	ENE2.3	N14
9-Oct	NNE6	NNE6	N9	NNE5	NNW6	N5	NNW4	NW4	N1	SSW8	SSW9	SSW7	SW3	NE5	NE8	NE9	NNE7	N9	NNE10	NNE5	N6	N2	NE1	S3	N3.0	NNE10
10-Oct	S2	SE4	SSE6	SSE6	SW6WSW12	W15	W13	SW9	SW14WSW15	W23WSW25	W27	W24	W24WNW18	WNNW9	NNW7	NNW5	NW4	NNE10	NNE13	NNE14					W8.7	W27
11-Oct	NNE14	NNE13	NNE13	NNE11	NNE13	NNE13	NNE14	N12	N13	N15	N13	N15	NNW19	N23	N17	N17	NNW17	NNW15	NW14	NNW11	NW5	WNNW3	WSW2	SW4	N11.4	N23
12-Oct	S4	S5	SSE5	S8	SSE10	SSE12	S10	SSW12	S11	S11	S12	SSE17	S15	S11	SW11WSW14	WNNW19	WNNW13	WNNW10	WNNW8	WSW7	WSW10	WSW14	WSW15	SSW7.4	WNNW19	
13-Oct	W14WSW15	WSW17	W17	W16	W19	W21	W15	W17	WNNW18	WNNW16	W13	W14	W17	W16	W20	WNNW16	WNNW9	W8WSW10	WSW14	W16	WSW15	W15	W15.0	W21		
14-Oct	W19	W18	W12	W17	WNNW18	WNNW17	WNNW13	W18	W14	WNNW19	WNNW19	NNW21	NNW20	NNW23	NNW20	NNW20	NNW15	N13	NE9	ENE8	NNE7	NNE4	NNE5	NE5	NW11.7	NW23
15-Oct	N3	NW1	NE3	ESE2	E3	ENE5	NE5	ESE3	SE3	SW5	SSW7	SSW7	SSW7	SSW8	SSW8	S7	SSW8	E3	NE2	ENE7	E6	NE4	NE4	ESE2	SSE2.0	SSW8
16-Oct	ESE4	S4	ESE3	E4	ENE3	ESE4	SE7	SSE9	SE9	SSE20	SSE14	SSE15	SSE15	SSE16	SSE16	SSE15	SSE14	SE13	SE12	SE11	SSE15	SE11	SSE11	SSE10	SSE10.1	SSE20
17-Oct	S7	S8	SSW7	S10	SSE12	SSE13	SSE14	S11	SSE14	SSE15	SSE16	SSE15	S14	SSE14	SSE13	SW10WSW10	SW8	SW9	SSW8	SSE7	S6	SE7	SSW6	S9.8	SSE16	
18-Oct	WSW11	WSW12	W16	W15	W13	WNNW16	WNNW14	WNNW13	WNNW19	WNNW18	WNNW18	WNNW20	NW22	NW22	NW19	NW18	NW16	NW13	NW13	NW8	NNW4	N5	N8	NNE11	WNNW12.8	NW22
19-Oct	NNE11	N10	NNE14	NNE13	NNE10	NNE8	NNE9	NNE8	NE7	ENE7	E9	E8	E8	ESE10	ESE6	ESE9	ESE10	E8	ESE10	SE10	SE13	SE12	SSE15	SSE11	E6.1	SSE15
20-Oct	SSE12	SSW9	SSW9	WSW11	W13	WNNW17	WNNW12	W11	W9	W14	WNNW16	WNNW18	WNNW17	NW23	NW24	NW22	NNW17	NW11	NNW8	NNW11	N12	NE11	NE8	ENE5	NW9.0	NW24
21-Oct	SE2	SSE3	SSE5	S6	S6	SSW5	SSE4	SSW3	SSW5	S5	SSE12	SSE11	SSE12	SSE12	SSE12	SSE14	SSE18	SSE18	SSE17	SSE17	SSE14	SSE14	S10	S9	SSE9.5	SSE18
22-Oct	S9	S8	S6	SSW6	SW8	SW11	WSW14	WSW13	WSW14	WSW13	W12	WSW14	WSW17	WSW19	WSW20	W17	W14	W10	WSW9	WSW10	WSW10	WSW8	WNNW10	W10	WSW10.6	WSW20
23-Oct	WNNW6	SW2	W5	WSW6	SW9	WSW11	WSW10	WSW12	W7	WNNW5	SW6	WSW6	N13	NNE10	N9	NNE8	NNE8	NNE6	NNE9	NNE9	NNE9	NNE9	NNE8	NNE7	NNW3.8	N13
24-Oct	NNE6	NNE7	NNE7	NNE6	NE7	NE6	NE6	NE5	NNE5	NE6	NNE7	NE5	NE4	N7	N5	NNE4	NNE3	NNE4	ENE3	ENE4	ENE3	ENE3	ENE5	NNE7	NNE5.0	NNE7
25-Oct	NNE10	NNE11	NNE10	NNE8	N8	NNE9	NNE8	N8	NNE8	NNE8	NNE5	NE4	N1	S1	ENE0	NNE4	NNE4	N4	NE3	NE3	NNE2	SSE5	SSE11	S12	NNE3.8	S12
26-Oct	S13	SSW10	S5	SSE8	SE12	SSE15	SSE18	SSE19	SSE20	SSE19	SSE19	SSE20	SSE18	SSE18	SSE18	SSE23	SSE19	SSE21	SSE21	S16	SW9	NW17	WNNW15	WNNW15	SSE12.4	SSE23
27-Oct	WNNW15	NW17	NW13	NW16	NW17	NW18	NW18	NW17	NW16	NNW19	NNW24	NNW19	NNW23	NNW28	NNW24	NNW23	NNW22	NNW16	NNW20	N14	NNW15	N7	NNW5	N5	NNW16.8	NNW28
28-Oct	NNW8	NE7	ENE4	E3	ENE4	SE2	ESE3	SE5	SSE7	SSW9	S8	S10	SSE11	SE12	SSE13	SSE13	SSE13	SSE14	SSE17	SSE17	SSE16	SSE16	SSE16	SSE17	SSE8.5	SSE17
29-Oct	SSE15	SSE15	S16	SSE18	SSE17	SSE16	SSE15	SSE17	S14	S14	S13	S12	S11	S11	SSW11	SSW11	S8	S8	SW3	SSW7	SW6	SSW6	WSW7	W7	S10.6	SSE18
30-Oct	W6	W5	SW5	WSW5	W5	SW6	SSW6	SE6	SSE8	SSE8	SSE6	SSE7	SE6	SE5	SSE7	NNE4	ESE3	NE3	WSW1	W2	W4	WNNW1	N7	N9	S1.7	N9
31-Oct	N6	NNE6	NNE6	N5	NNW6	N7	N6	NNE6	E4	WNNW1	SSW2	ENE6	NNE7	NE8	NE9	NE9	ENE8	ENE8	NE10	NE10	NE10	NNE9	NNE7	NNE9	NNE6.0	NE10

NNW1.3	NW1.0	NNW0.9	W1.3	WNNW1.5	WNNW2.0	W2.0	WSW2.1	SW1.9	WSW2.8	SW2.8	SW2.7	W2.3	WNNW2.4	WNNW2.4	NW3.0	NW2.5	N1.9	N1.7	NNE1.0	N0.8	N1.4	N1.5	NNW1.3		Diurnal Average
W19	N19	N18	SSE18	WNNW18	N20	W21	SSE19	SSE20	SSE20	NNW24	W23	NW26	NNW28	NNW26	NNW25	NNW22	SSE21	SSE21	SSE17	N18	N18	N18	N18		Diurnal Maximum

All monthly, daily, and diurnal averages have been calculated using vector methods





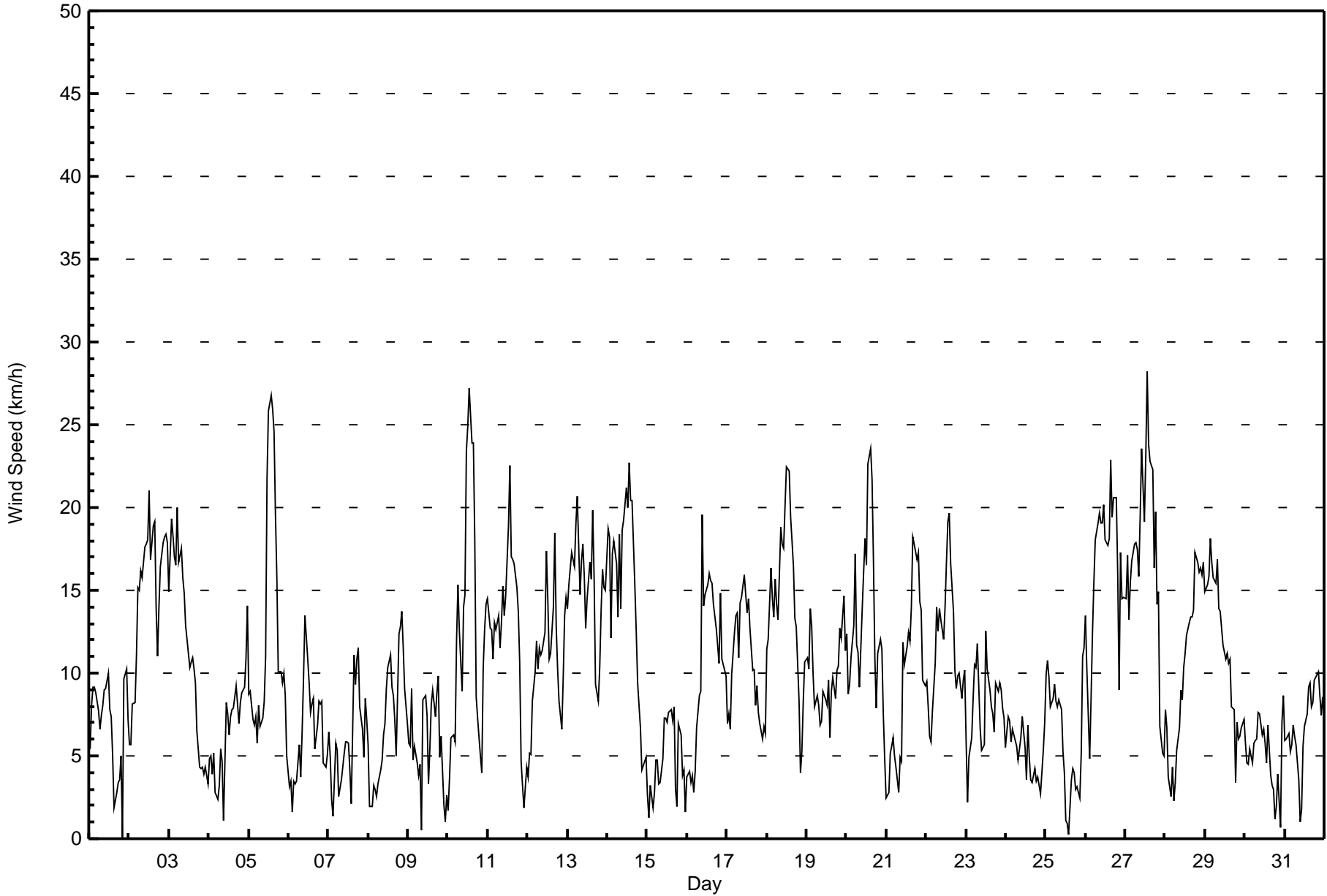
Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Mildred Lake - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Oct 10 14:00 Minimum Value: 1 km/h on Oct 16 04:00 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> = 5 P <sub>99</sub> = 6																		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	2	1	1	1	1	1	2	1	1	2	2	2	2	2	2	1	1	1	2	1	1	4	2	2	4
2-Oct	2	2	2	1	2	3	4	4	4	5	5	5	5	5	6	5	3	3	5	4	5	4	5	5	6
3-Oct	5	6	4	4	4	5	4	4	4	4	4	3	3	3	3	2	3	3	1	1	1	1	1	1	6
4-Oct	1	1	1	2	1	1	1	1	1	2	2	3	3	3	3	2	2	2	1	1	3	2	3	2	3
5-Oct	2	2	1	1	3	3	2	2	2	2	4	8	7	6	7	5	4	4	2	2	2	2	1	2	8
6-Oct	1	1	1	1	1	2	1	1	2	3	3	3	2	2	2	2	1	2	1	1	1	1	1	1	3
7-Oct	1	1	1	1	1	2	1	1	1	1	2	2	2	1	3	4	3	2	2	1	2	1	1	1	4
8-Oct	2	1	1	1	1	1	1	1	2	1	2	2	2	3	2	2	2	3	2	2	2	2	2	1	3
9-Oct	1	2	2	1	3	2	1	1	2	2	2	2	2	3	2	2	2	1	2	2	2	1	2	2	3
10-Oct	1	1	1	2	3	4	5	5	3	5	5	8	8	9	8	8	6	3	5	3	1	5	4	3	9
11-Oct	4	3	4	3	4	4	3	4	3	4	3	4	5	4	5	4	4	3	3	5	2	2	1	1	5
12-Oct	1	1	2	2	3	3	2	2	3	3	2	3	3	3	3	6	6	4	4	3	2	3	4	4	6
13-Oct	4	4	6	5	5	6	6	5	5	5	5	4	5	5	5	7	6	3	3	3	5	5	5	4	7
14-Oct	5	5	4	6	5	4	5	5	4	5	5	6	5	6	5	4	4	3	2	2	2	2	2	1	6
15-Oct	1	2	2	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	1	1	3	1	1	1	3
16-Oct	1	1	1	1	1	1	2	2	3	4	3	3	3	3	3	4	3	3	3	3	3	2	2	2	4
17-Oct	2	2	2	2	2	2	2	3	2	2	3	3	3	3	3	3	4	2	3	2	1	2	1	4	4
18-Oct	4	4	5	5	4	5	4	4	6	6	5	6	7	6	6	5	4	3	2	2	2	2	2	2	7
19-Oct	3	2	3	3	2	2	2	2	2	2	3	2	2	2	2	2	2	3	3	3	4	5	3	3	5
20-Oct	3	3	2	3	5	5	4	4	4	4	5	5	5	6	5	5	4	2	2	4	2	3	2	2	6
21-Oct	1	1	1	1	2	2	1	1	1	3	3	3	3	3	3	3	4	4	4	4	2	4	2	3	4
22-Oct	2	2	1	2	2	4	4	4	4	4	4	5	5	6	6	6	5	3	2	3	3	3	3	4	6
23-Oct	4	1	1	2	3	3	3	3	3	2	2	3	2	3	2	2	2	2	2	2	2	2	2	2	4
24-Oct	1	2	2	1	2	2	2	1	1	2	2	2	2	2	1	1	1	1	1	1	1	1	1	2	2
25-Oct	3	2	2	2	2	2	2	1	2	2	2	1	1	1	1	1	1	1	1	1	1	4	2	3	4
26-Oct	4	3	2	2	4	7	4	4	5	5	5	5	5	5	4	6	4	4	4	4	4	5	4	4	7
27-Oct	4	5	4	4	5	4	4	4	4	6	5	5	5	6	5	5	5	3	4	3	4	2	1	2	6
28-Oct	2	2	2	2	2	1	1	1	2	2	2	2	3	3	3	4	4	4	4	4	3	3	3	3	4
29-Oct	3	3	3	4	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	1	2	2	4
30-Oct	3	2	3	2	2	2	2	2	1	1	2	1	1	1	2	2	1	1	1	1	1	2	2	1	3
31-Oct	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	3	3	3	2	2	2	3
																		5 6 6 6 5 7 6 5 6 6 5 8 8 9 8 8 6 4 5 5 5 5 5 5 5							
Diurnal Maximum																									





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

**Wind Speed (WS) - km/h**  
**Mildred Lake - October 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	167	22.45	22.45
6 - 11	308	41.40	63.84
12 - 19	228	30.65	94.49
20 - 28	41	5.51	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**  
**Mildred Lake - October 2015**

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	26	17	15	7	15	9	8	16	7	7	3	7	4	4	7	167
6 - 11	27	48	22	7	5	6	20	37	37	31	14	16	9	10	7	12	308
12 - 19	29	24	0	0	0	0	6	60	11	1	1	19	27	25	15	10	228
20 - 28	2	1	0	0	0	0	0	6	0	0	0	2	6	1	11	12	41
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	99	39	22	12	21	35	111	64	39	22	40	49	40	37	41	744

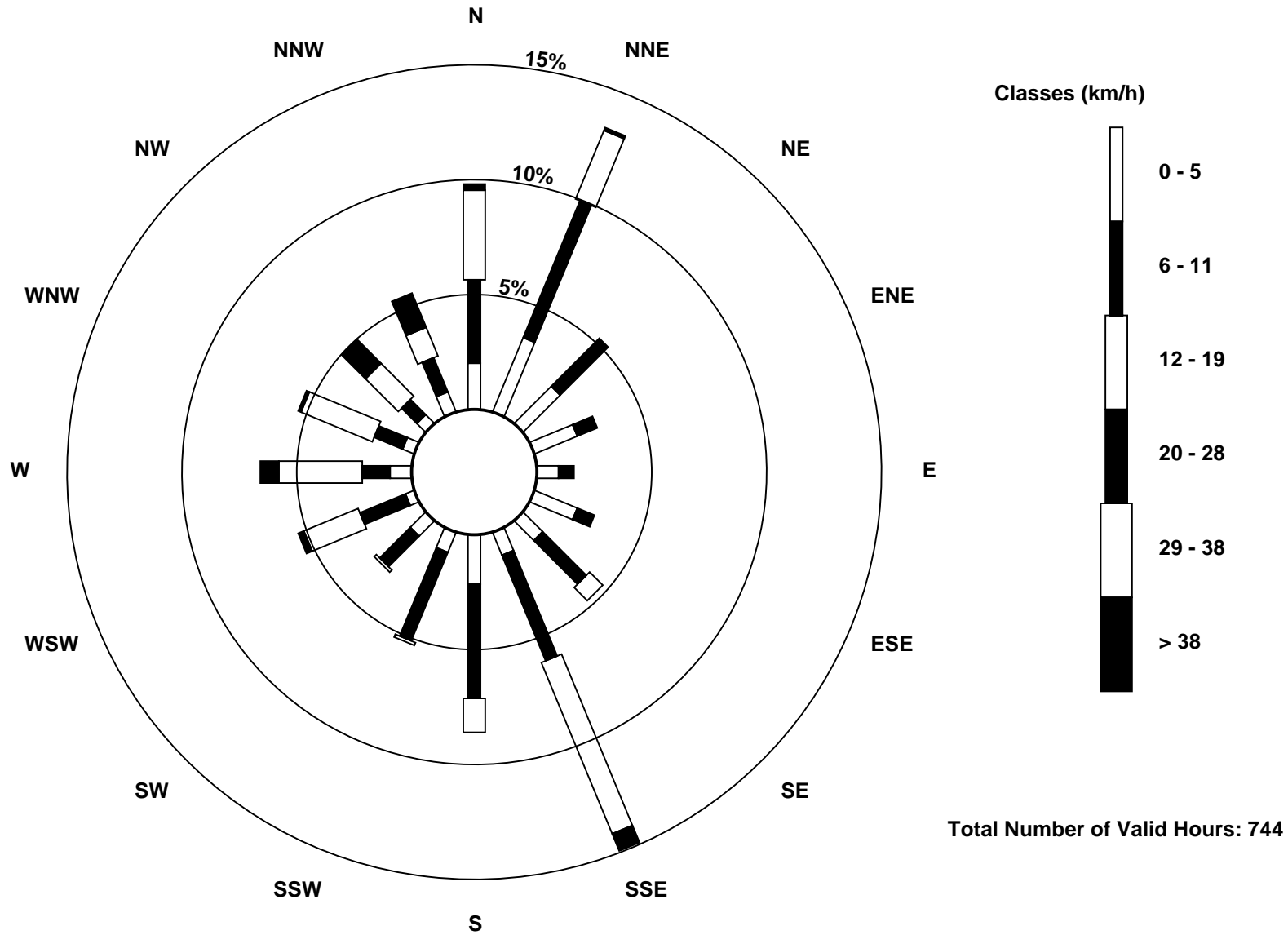
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

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





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

**Wind Direction (WD) - deg**  
**Mildred Lake - October 2015**

Direction of Maximum Speed: 332 deg on Oct 27 14:00 Direction of Maximum Daily Speed Average: 329.4 deg on Oct 27	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0
Direction of Minimum Speed: 70 deg on Oct 1 21:00 Direction of Minimum Daily Speed Average: 1.7 deg on Oct 30	Percent Operational Time: 100.0
Monthly Average Direction: 256.6 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	178	162	162	165	171	167	174	182	174	170	162	157	155	152	169	173	159	126	110	85	70	358	6	11	155.6
2-Oct	345	36	8	18	16	17	33	28	27	19	20	20	15	9	11	11	4	6	11	13	9	10	10	8	14.6
3-Oct	14	7	7	8	359	7	8	4	12	8	25	32	40	35	56	48	32	42	43	29	24	22	7	9	17.8
4-Oct	13	47	26	17	64	106	108	115	104	56	214	212	201	204	175	156	129	139	173	178	165	143	155	164	153.8
5-Oct	168	180	179	191	195	203	237	273	284	312	303	314	321	334	331	332	342	339	341	324	308	316	319	343	314.1
6-Oct	15	13	264	168	171	183	186	153	162	171	162	160	157	156	130	138	133	140	134	134	149	107	62	12	146.8
7-Oct	9	19	78	331	357	4	190	207	216	206	182	205	193	193	271	285	302	331	342	347	353	360	353	360	323.5
8-Oct	6	7	320	357	82	112	138	182	181	185	135	129	131	160	152	143	119	29	2	2	7	7	7	4	70.9
9-Oct	12	17	8	24	348	4	346	326	4	199	210	206	214	43	38	35	21	4	12	17	358	356	50	188	8.3
10-Oct	183	133	164	158	217	251	259	264	233	234	252	260	258	270	281	278	287	297	336	343	306	19	30	16	272.4
11-Oct	22	29	21	22	26	22	19	4	9	5	3	357	346	350	350	356	347	327	320	335	325	291	239	219	358.2
12-Oct	187	169	168	175	151	166	191	195	182	172	177	164	171	170	227	256	283	292	282	297	258	244	255	255	212.7
13-Oct	260	255	258	262	264	275	279	271	278	282	287	270	261	262	274	274	296	295	263	243	257	261	256	259	268.9
14-Oct	275	275	263	273	287	292	283	280	265	284	294	311	314	319	326	331	333	10	46	60	31	18	32	38	306.2
15-Oct	7	321	45	123	86	70	46	104	142	217	210	194	201	212	196	177	195	99	51	78	89	52	46	121	147.2
16-Oct	103	172	120	93	65	104	133	148	145	159	158	161	164	155	158	154	150	128	135	138	152	145	151	150	147.9
17-Oct	174	185	195	174	166	165	167	173	168	167	164	168	172	164	166	219	239	222	219	195	157	169	138	203	177.5
18-Oct	241	251	262	268	272	285	286	282	286	286	286	290	307	312	309	307	311	315	326	305	331	357	7	14	296.0
19-Oct	15	10	13	22	20	14	25	26	45	68	97	98	96	107	123	104	108	98	121	139	133	137	151	161	83.8
20-Oct	160	200	205	248	276	301	296	262	265	266	288	293	300	318	324	325	338	326	341	338	353	39	43	59	305.2
21-Oct	136	150	150	177	183	204	164	201	212	183	160	148	156	159	157	157	159	163	156	157	157	158	174	173	162.5
22-Oct	173	176	177	200	225	234	242	251	248	254	263	254	247	251	253	267	270	264	257	252	251	253	283	276	248.4
23-Oct	293	233	268	249	236	247	245	251	266	294	231	244	357	13	11	19	26	12	13	22	23	22	22	25	329.1
24-Oct	24	19	30	25	37	45	39	45	17	35	17	55	43	353	2	15	21	14	57	64	73	70	21	12	29.2
25-Oct	14	16	17	14	9	23	16	10	20	17	29	55	351	188	65	21	25	11	46	52	14	165	165	189	26.4
26-Oct	186	196	169	148	146	154	158	159	155	154	154	153	148	147	161	155	167	165	163	182	227	307	296	293	167.2
27-Oct	303	322	316	314	317	318	318	321	320	329	335	330	328	332	330	334	336	337	342	353	346	5	342	351	329.4
28-Oct	339	41	62	90	65	131	123	128	165	199	190	185	159	139	148	156	154	152	155	155	164	166	158	157	154.1
29-Oct	159	164	169	166	166	165	167	167	170	169	175	176	180	171	200	199	181	185	219	210	223	212	244	270	178.6
30-Oct	263	276	228	247	261	219	197	138	148	157	148	151	145	141	148	24	118	37	254	261	267	286	351	0	185.2
31-Oct	356	16	24	356	343	1	7	33	86	289	199	69	21	41	52	49	64	67	48	47	37	24	18	31	33.4

308.8 311.9 302.9 269.1 286.0 291.0 265.9 256.4 231.9 236.6 228.3 230.5 263.6 293.1 295.8 307.9 320.4 349.5 8.4 31.9 359.2 7.6 359.7 331.5  
 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**

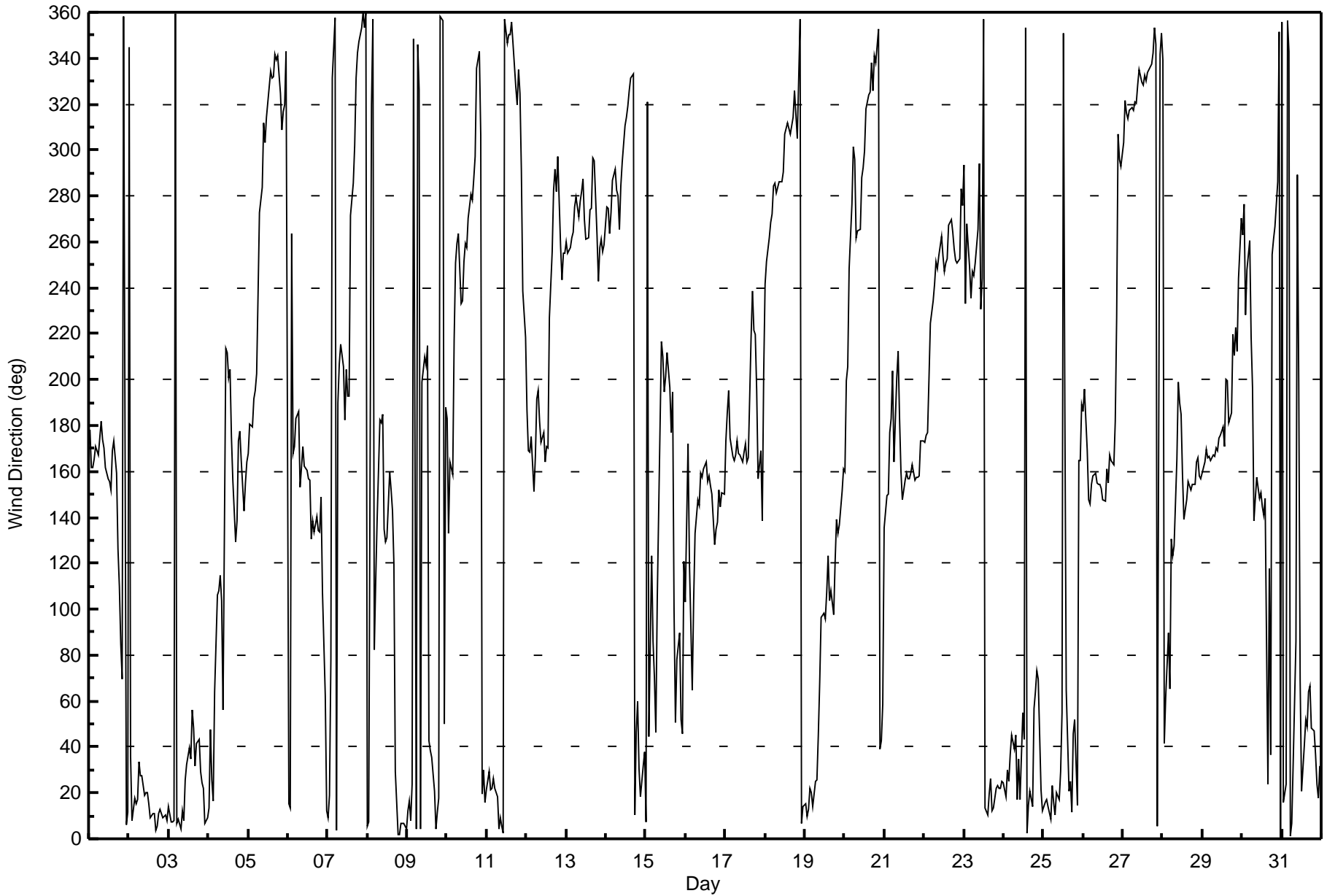
**Mildred Lake - October 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 99 deg on Oct 7 15:00 Minimum Value: 8 deg on Oct 1 05:00 Percentiles: P <sub>1</sub> = 9 P <sub>10</sub> = 12 Q <sub>1</sub> = 15 Median = 18 Q <sub>3</sub> = 23 P <sub>90</sub> = 34 P <sub>99</sub> = 82																		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	16	9	8	8	8	10	10	13	15	14	18	21	32	34	46	65	37	14	18	20	84	39	12	28	84
2-Oct	59	36	16	14	13	14	17	17	17	19	17	17	16	18	19	19	14	14	15	15	14	15	16	16	59
3-Oct	17	16	15	15	15	17	15	16	16	15	20	23	27	30	23	23	20	29	19	17	16	20	12	15	30
4-Oct	22	24	26	20	31	32	20	13	22	93	22	31	46	30	31	26	14	17	14	11	16	16	13	11	93
5-Oct	17	17	16	15	21	38	21	20	23	25	22	20	18	13	14	15	14	11	9	16	14	16	16	36	38
6-Oct	29	27	71	18	24	28	11	31	21	18	16	23	24	27	22	22	15	14	12	12	23	9	17	71	
7-Oct	9	12	37	75	9	13	50	20	32	23	29	30	38	45	99	20	18	19	8	9	10	9	8	10	99
8-Oct	14	22	36	27	33	41	25	31	25	21	23	24	23	20	27	24	13	45	10	12	11	12	12	17	45
9-Oct	14	16	12	20	31	38	23	17	84	19	19	21	68	34	20	16	15	12	15	35	26	44	92	85	92
10-Oct	65	32	14	19	43	21	21	25	31	25	24	21	21	23	19	19	19	27	48	55	27	25	19	14	65
11-Oct	17	18	18	17	18	18	16	14	17	16	15	16	15	16	16	18	17	13	14	18	19	41	51	15	51
12-Oct	28	19	35	20	15	13	22	13	19	18	17	12	15	22	23	29	19	18	23	19	21	22	22	21	35
13-Oct	21	20	22	20	20	18	17	22	20	18	21	23	23	22	21	21	18	18	25	22	23	20	22	21	25
14-Oct	18	19	21	21	20	17	22	18	23	18	19	18	16	16	14	12	10	26	16	18	27	22	20	20	27
15-Oct	32	49	27	50	35	17	13	27	26	38	26	26	27	27	25	27	15	57	74	11	21	18	13	42	74
16-Oct	19	34	23	15	33	25	13	14	19	14	16	15	13	17	16	16	16	14	16	16	15	15	13	17	34
17-Oct	18	21	13	12	9	10	10	13	11	11	12	14	15	12	17	21	23	20	16	16	14	20	18	44	44
18-Oct	24	22	20	20	21	18	20	22	18	18	19	18	18	18	17	17	15	14	10	14	78	38	17	14	78
19-Oct	15	13	15	15	15	16	15	17	20	22	23	22	19	17	29	16	12	17	17	18	17	18	16	43	43
20-Oct	11	26	12	25	23	17	21	22	25	21	21	19	19	16	15	13	13	15	15	12	14	17	18	17	26
21-Oct	31	35	13	17	17	28	26	43	21	46	17	26	24	16	17	14	13	14	13	14	12	13	20	20	46
22-Oct	17	15	14	20	25	26	20	24	22	23	25	24	24	20	21	22	23	22	21	22	21	23	23	23	26
23-Oct	76	75	23	19	23	19	18	16	28	32	24	51	14	19	18	17	19	17	14	14	17	15	15	15	76
24-Oct	17	15	17	16	17	23	19	24	17	22	17	38	48	15	26	19	23	16	29	23	28	26	19	15	48
25-Oct	13	13	14	15	13	14	15	12	15	17	28	38	87	91	90	27	24	19	27	24	28	69	11	14	91
26-Oct	17	12	33	17	18	19	13	13	15	17	17	17	18	18	13	15	12	11	12	19	52	16	16	16	52
27-Oct	18	14	15	14	14	13	15	14	14	15	12	13	12	11	12	10	9	11	12	13	12	17	23	24	24
28-Oct	17	21	37	48	41	16	15	17	32	19	25	19	19	21	18	15	15	16	15	14	11	12	13	13	48
29-Oct	12	13	12	12	12	12	12	12	14	13	15	16	17	16	18	13	14	19	67	16	21	12	29	27	67
30-Oct	42	28	47	27	35	43	28	27	17	19	21	20	19	28	18	43	41	39	69	60	29	78	12	13	78
31-Oct	13	14	14	18	9	12	12	22	27	81	70	30	18	23	16	16	19	17	17	15	17	17	16	16	81
																		76 75 71 75 43 43 50 43 84 93 70 51 87 91 99 65 41 57 74 60 84 78 92 85							
Diurnal Maximum																									



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

**Wind Direction (WD) - deg**  
**Mildred Lake - October 2015**







# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	October 13, 2015	Last Calibration	September 14, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	13:50	End Time (MST)	16:20
Gas Cert Reference	SA1301009	Station temp.	22 Deg C
Cal Gas Concentration	47.2 ppm	Cal Gas Exp Date	12/12/2016
Calibrator Make/Model	API T700	Serial Number	1185
ZAG Make/Model	API 701	Serial Number	825
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8346

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-653	-653
Analyzer IP address	192.168.1.43		Lamp voltage	783	787
Calculated slope	0.999111	0.998929	Chamber temp	44.9	44.9
Calculated intercept	2.383501	2.148310	Pressure	690.2	686.4
Analyzer Background	20.5	20.5	Flow	0.488	0.484
Analyzer Coefficient	0.965	0.965	Intensity	91	90

Analyzer make TEI 43i Analyzer serial # JC1404901075

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.3	----
as found span	5000	82.7	780.7	780.9	1.000
calibrator zero	5000	0.0	0.0	0.3	----
high point	5000	82.7	780.7	780.9	1.000
second point	5000	41.4	390.8	386.8	1.010
third point	5000	20.8	196.4	192.8	1.019
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	82.6	779.7	780.7	0.999
Average Correction Factor					1.010

Corrected As found 780.7 Previous response 779.0 % change -0.2%

**Notes:**

Changed inlet filter after as founds. No adjustments.

Calibration Performed By: Evan Magill



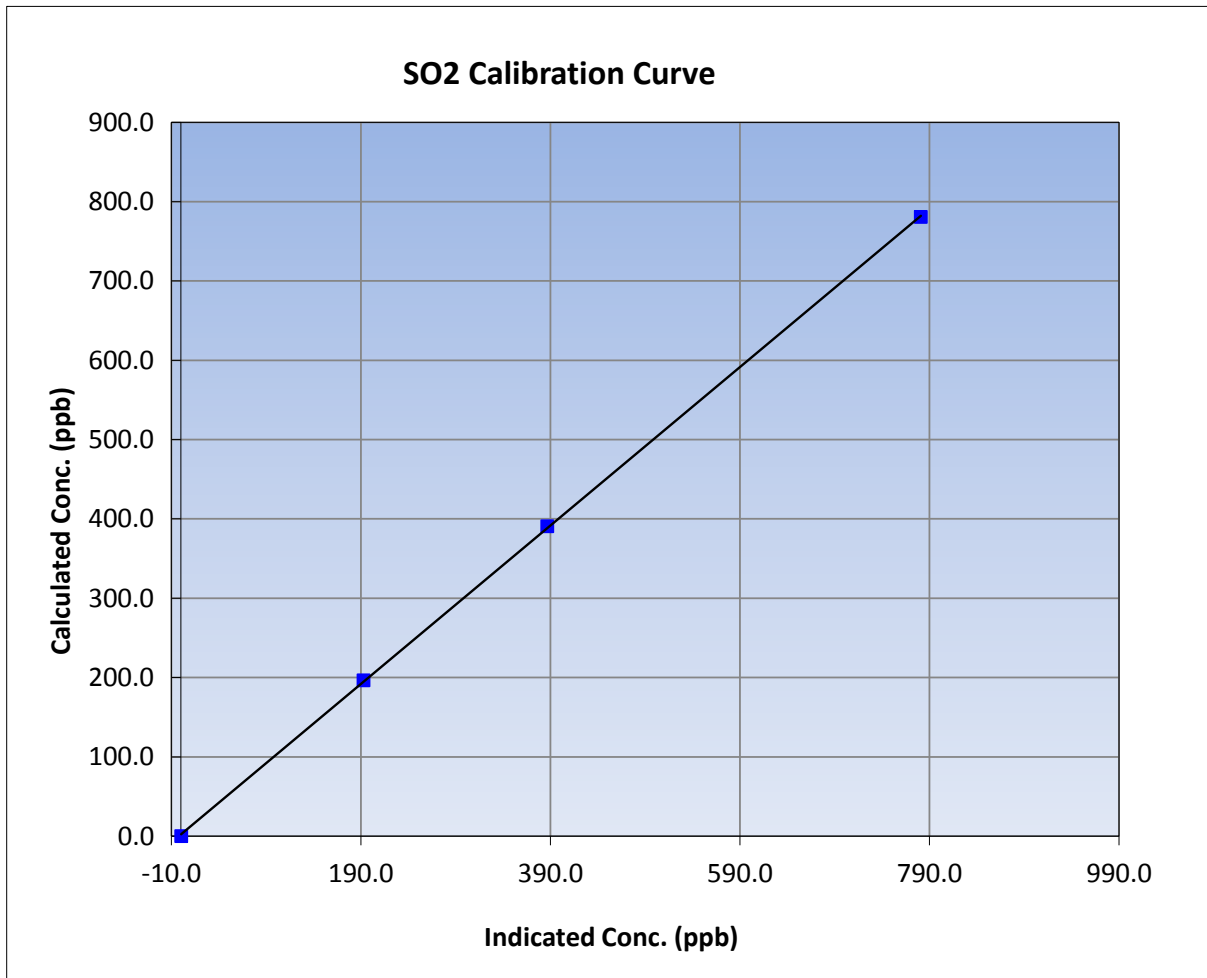
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	October 13, 2015	Previous Calibration	September 14, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	13:50	End Time (MST)	16:20
Analyzer make	TEI 43i	Analyzer serial #	JC1404901075

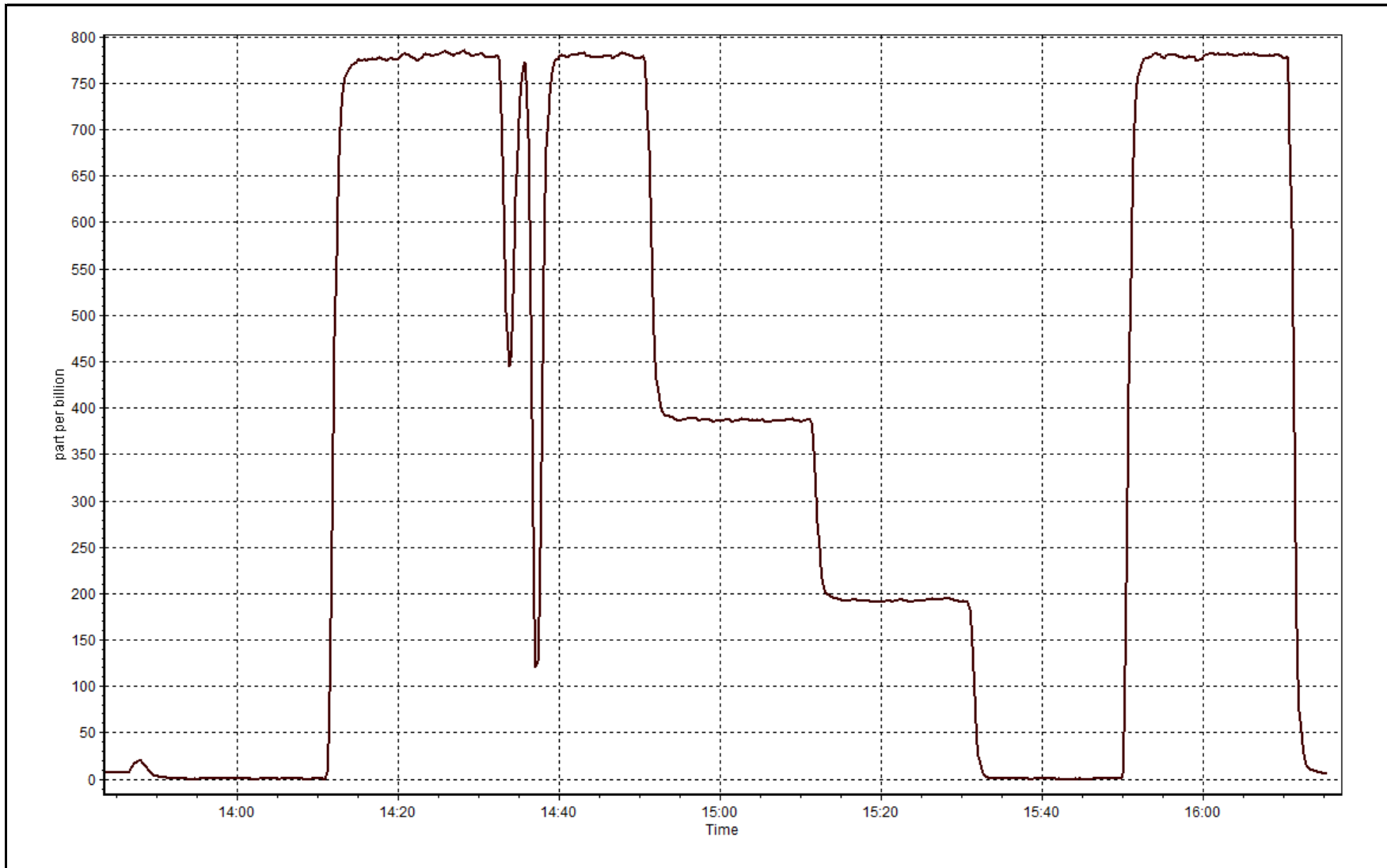
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999951
780.7	780.9	0.9997		
390.8	386.8	1.0105	Slope	0.998929
196.4	192.8	1.0186		
			Intercept	2.148310



SO2 Calibration Plot

Date: October 13, 2015





# Wood Buffalo Environmental Association H2S Calibration Report

## Station Information

Calibration Date	October 14, 2015	Last Calibration	September 11, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	8:50	End Time (MST)	12:50
Gas Cert Reference	ALM028262	Station temp.	22 Deg C
Cal Gas Concentration	5.04 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	API T700	Serial Number	1185
ZAG air Make/Model	API 701	Serial Number	825
DACS make/model	Campbell Scientific CR3000	Serial Number	8346
SO2 gas concentration	47.2 ppm	SO2 gas cert/exp	SA1301009 12-Dec-16

## Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-601	-601
Analyzer IP address	192.168.1.45		Lamp voltage	775	778
Calculated slope	0.992397	0.991643	Chamber temp	45	45
Calculated intercept	0.432944	0.362778	Pressure	579.2	594.1
Analyzer Background	14.2	14.2	Flow	0.823	0.775
Analyzer Coefficient	0.928	0.955	Intensity	88	88
			Converter temp.	325	323

Analyzer make/model	TEI 450i	Analyzer serial #	815129107
Converter make/model	NA	Converter serial #	NA

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	4000	0.0	0.0	0.2	----
as found span	4000	64.1	80.8	82.0	0.985
SO2 scrubber check	5000	21.2	200.1	1.5	----
calibrator zero	4000	0.0	0.0	-0.1	----
high point	4000	64.1	80.8	81.2	0.994
second point	4000	32.1	40.4	40.3	1.004
third point	4000	16.0	20.2	19.7	1.023
as left zero	5000	0.0	0.0	0.1	----
as left span	4000	64.1	80.8	81.6	0.989
Average Correction Factor					1.007

Corrected As found	81.8	Previous response	81.0	% change	-1.0%
--------------------	------	-------------------	------	----------	-------

**Notes:**

Changed inlet filter and scrubber check after as founds. Updated OS on analyzer and new program into the datalogger after as founds. Returned to zero after the span was considerably lower than the as found span, the OS upgrade must have had some effect on it. Adjusted zero and span.

Calibration Performed By: Evan Magill



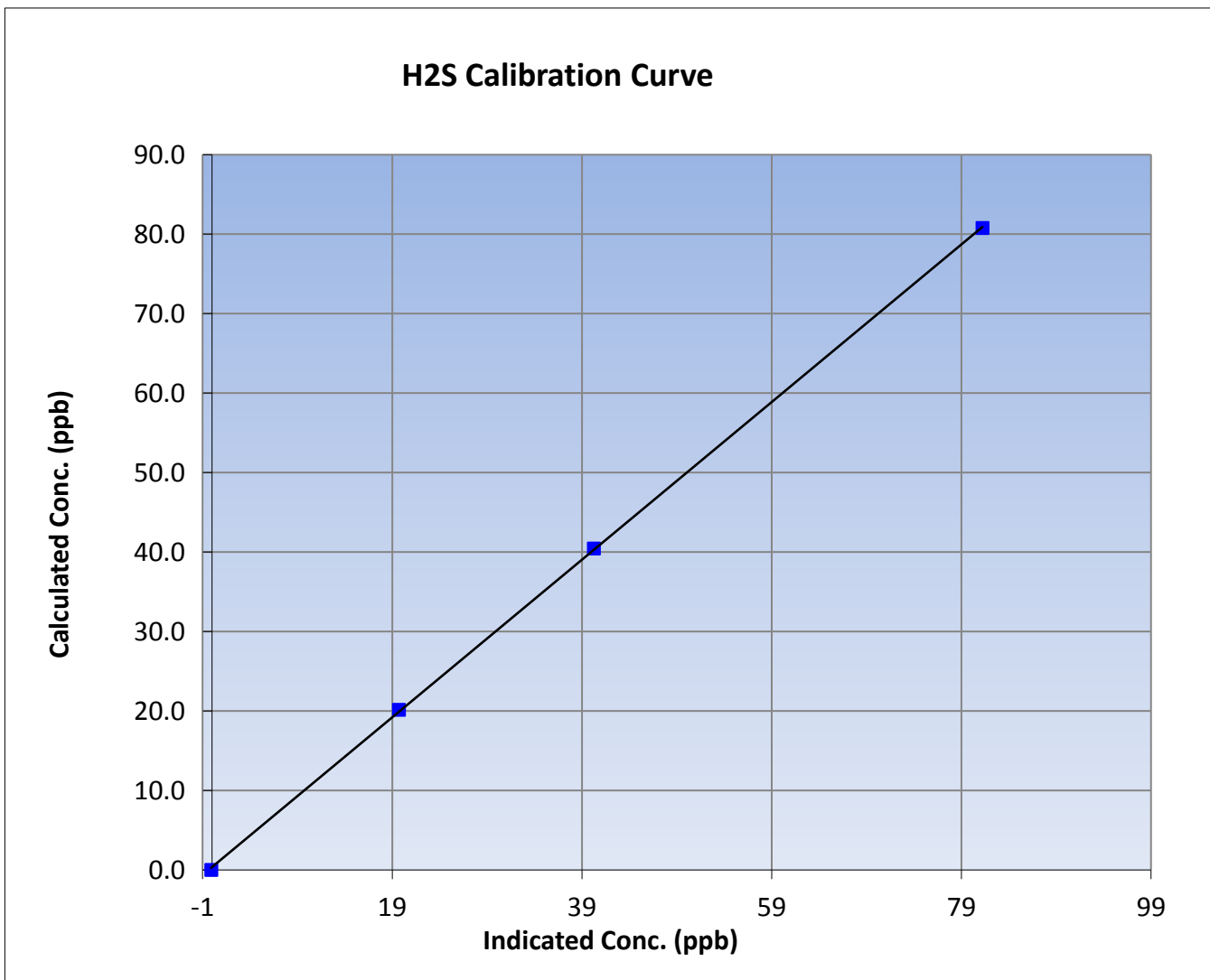
# Wood Buffalo Environmental Association H2S Calibration Report

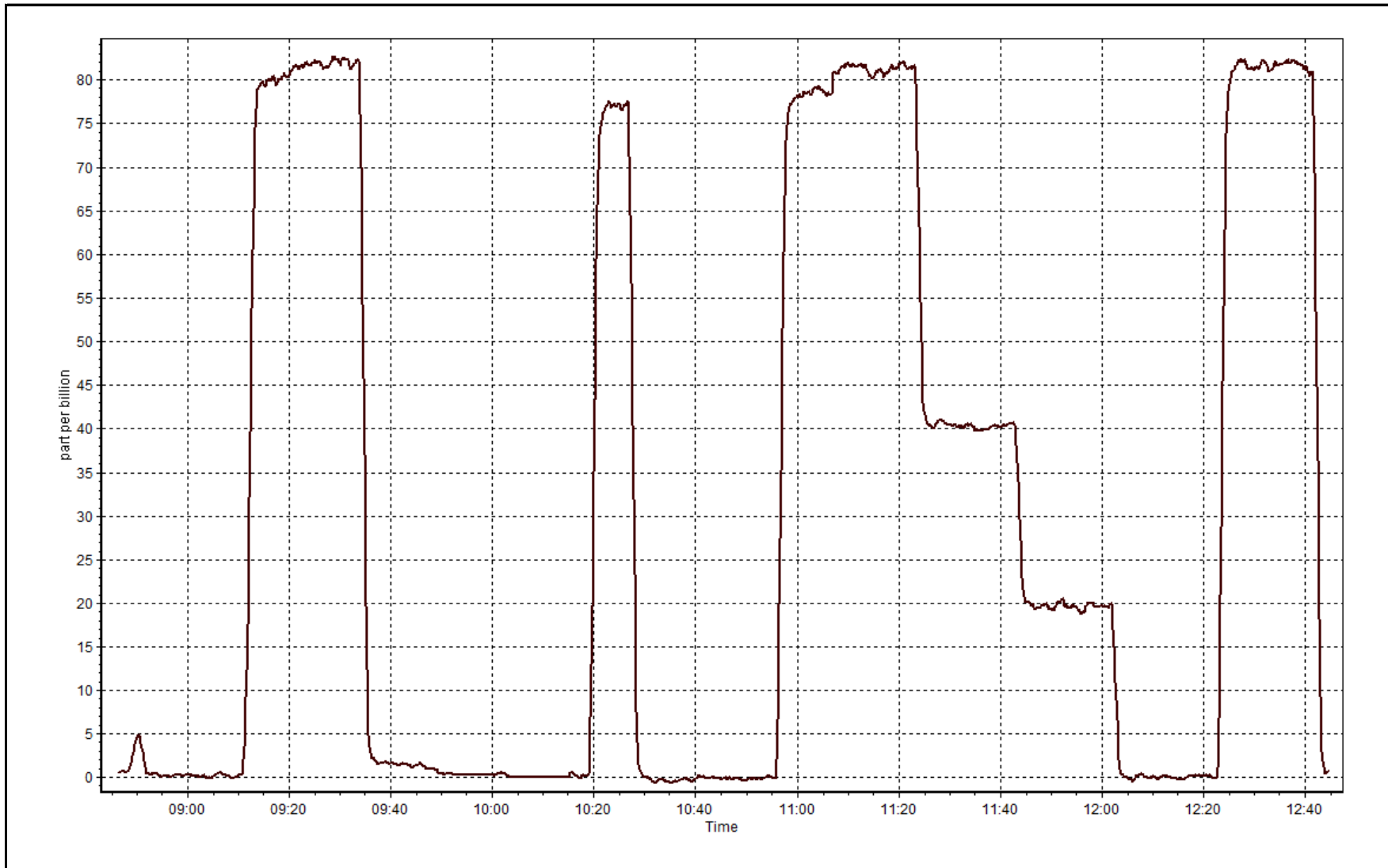
## Station Information

Calibration Date	October 14, 2015	Previous Calibration	September 11, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	8:50	End Time (MST)	12:50
Analyzer make	TEI 450i	Analyzer serial #	815129107

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999948
80.8	81.2	0.9944		
40.4	40.3	1.0044	Slope	0.991643
20.2	19.7	1.0234		
			Intercept	0.362778







# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	October-13-15	Last Calibration	September-14-15
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	13:50	End Time (MST)	16:20
Gas Cert Reference	SA1301009	Cal Gas Expiry Date	12/12/2016
CH4 Cal Gas Conc.	510 ppm	CH4 Equiv Conc.	1087.5 ppm
C3H8 Cal Gas Conc.	210 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	1185
ZAG make/model	Teledyne API 701	Serial Number	825
DACS make/model	Campbell Scientific CR3000	Serial Number	8346

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.2	8.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	39.8	39.8
Calculated slope	0.995349	0.997381	Fuel Pressure	25.7	25.7
Calculated intercept	0.033100	0.007107	Analyzer Coeff	4.7	4.7
			Analyzer BKG	2.440	2.440

Analyzer make Thermo 51i-LT Analyzer serial # 1300156231

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.02	----
as found span	5000	82.7	17.99	18.04	0.997
calibrator zero	5000	0.0	0.00	0.02	----
high point	5000	82.7	17.99	18.04	0.997
second point	5000	41.4	9.00	9.01	0.999
third point	5000	20.8	4.52	4.50	1.005
as left zero	5000	0.0	0.00	0.01	----
as left span	5000	82.6	17.97	17.82	1.008
Average Correction Factor					1.001

Corrected As found 18.02 Previous response 18.04 % change 0.1%

Notes:

Changed inlet filter after as founds. No adjustments.

Calibration Performed By:

Evan Magill



# Wood Buffalo Environmental Association THC Calibration Report

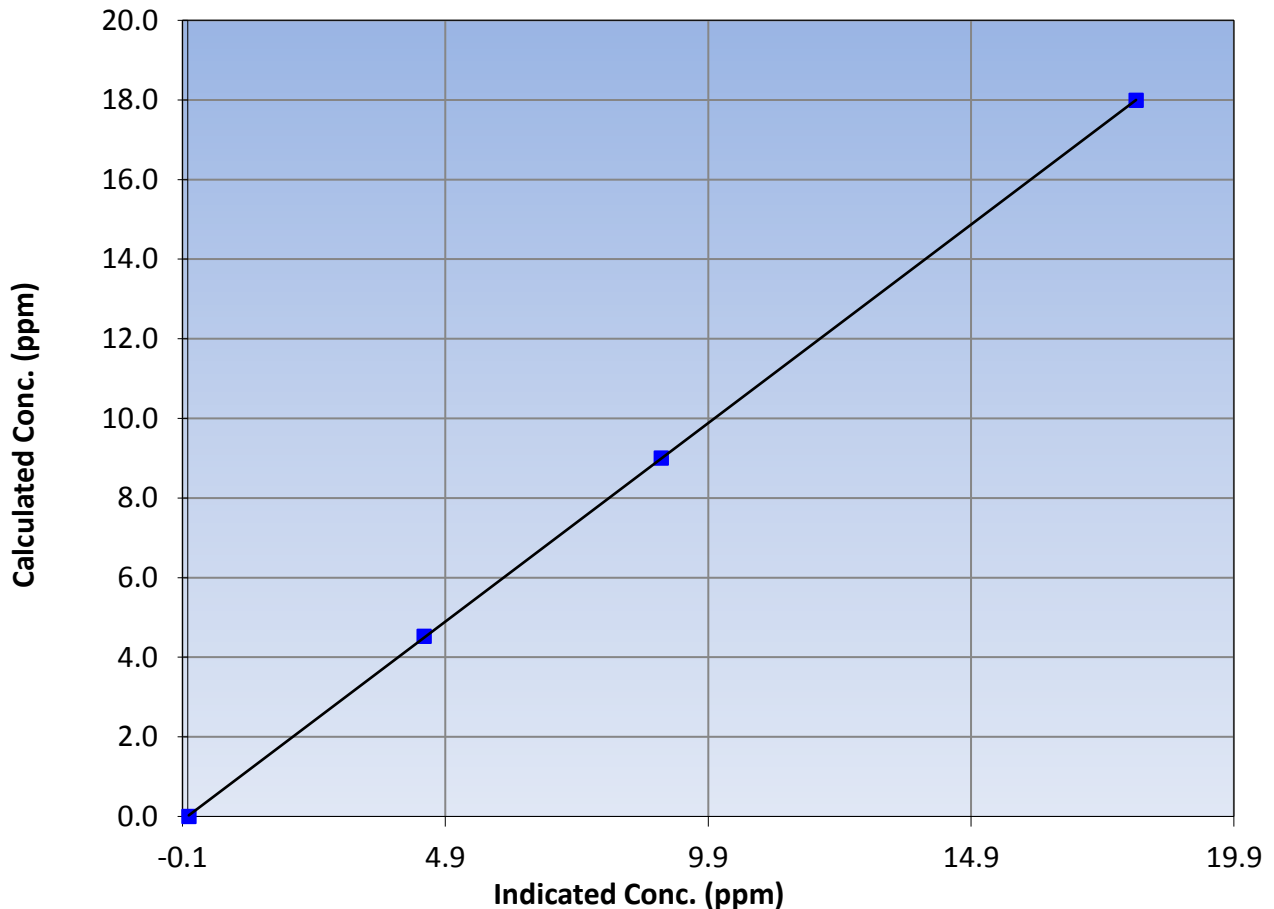
## Station Information

Calibration Date	October 13, 2015	Previous Calibration	September 14, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	13:50	End Time (MST)	16:20
Analyzer make	Thermo 51i-LT	Analyzer serial #	1300156231

## Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.02	----	Correlation Coefficient	0.999990
17.99	18.04	0.9971		
9.00	9.01	0.9994	Slope	0.997381
4.52	4.50	1.0053		
			Intercept	0.007107

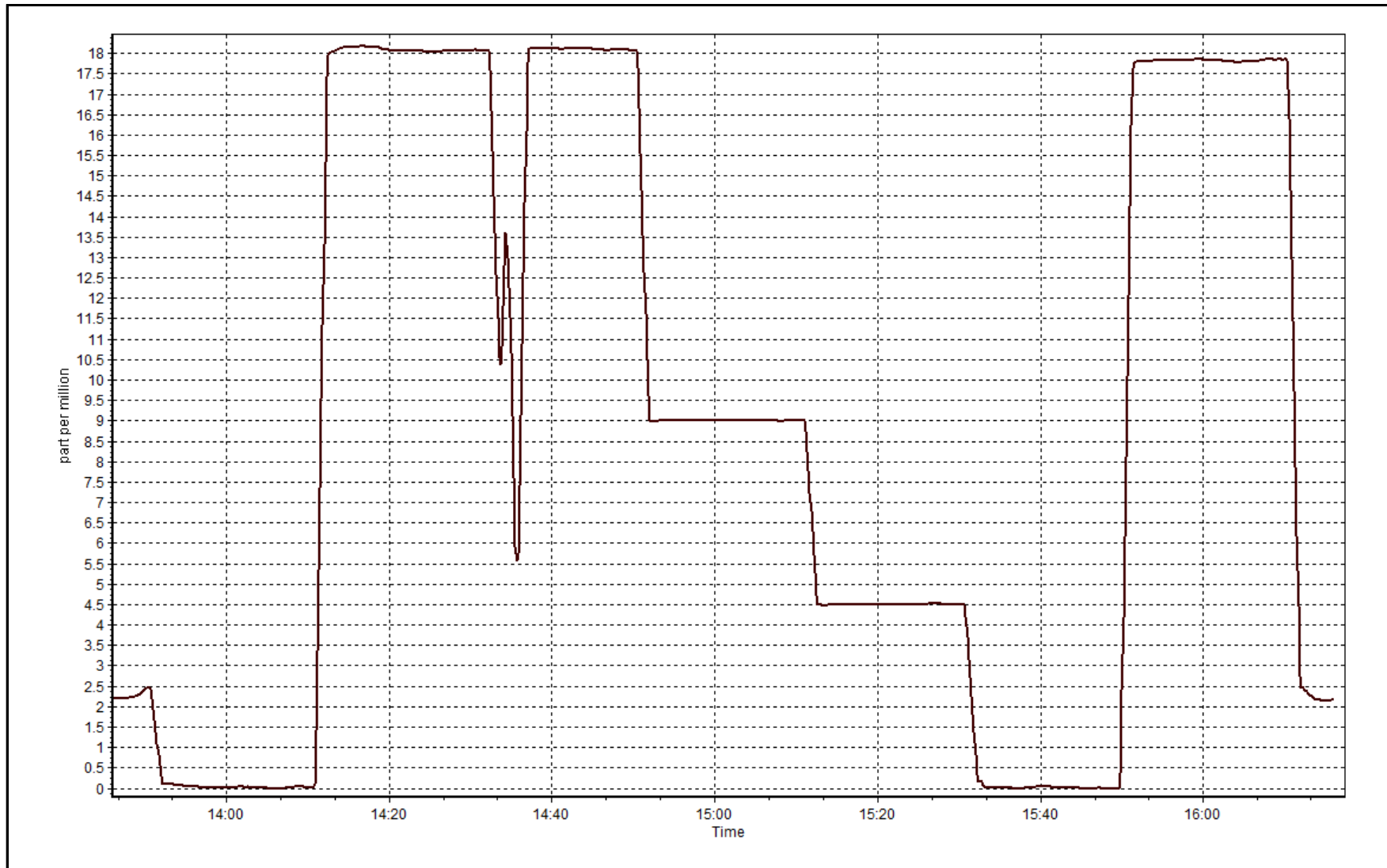
**THC Calibration Curve**





THC Calibration Plot

Date: October 13, 2015





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## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

### **AMS 3 LOWER CAMP METEOROLOGY OCTOBER 2015**

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

November 26, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS 3)  
OCTOBER 2015

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	744	0	0	100.00	26.1	-	17.0	-
Temperature 45 m (C) Average	744	0	0	100.00	25.4	-	17.2	-
Temperature 100 m (C) Average	744	0	0	100.00	25.1	-	18.2	-
Temperature 167 m (C) Average	744	0	0	100.00	24.2	-	18.6	-
Relative Humidity 20 m (%) Average	744	0	0	100.00	98	-	88.0	-
Relative Humidity 45 m (%) Average	744	0	0	100.00	97	-	87.0	-
Relative Humidity 100 m (%) Average	744	0	0	100.00	97	-	89.0	-
Relative Humidity 167 m (%) Average	744	0	0	100.00	97	-	91.0	-
Wind Speed 20 m (km/h) Average	744	0	0	100.00	27	-	16.0	-
Wind Speed 45 m (km/h) Average	744	0	0	100.00	36	-	21.0	-
Wind Speed 100 m (km/h) Average	744	0	0	100.00	46	-	30.0	-
Wind Speed 167 m (km/h) Average	740	0	4	99.46	54	-	38.0	-
Wind Direction 20 m (deg) Average	744	0	0	100.00	-	-	-	-
Wind Direction 45 m (deg) Average	744	0	0	100.00	-	-	-	-
Wind Direction 100 m (deg) Average	744	0	0	100.00	-	-	-	-
Wind Direction 167 m (deg) Average	740	0	4	99.46	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	744	0	0	100.00	0.7	-	0.1	-
Vertical Wind Speed 45 m (km/h) Average	744	0	0	100.00	1.9	-	0.8	-
Vertical Wind Speed 100 m (km/h) Average	744	0	0	100.00	3.6	-	1.5	-
Vertical Wind Speed 167 m (km/h) Average	740	0	4	99.46	6	-	1.9	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS 3)  
OCTOBER 2015

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	744	6.15	5.5	-	-2.5	0	1.7	5.3	9.5	13.9	26.1
Temperature 45 m (C) Average	744	6.19	5.4	-	-2.2	0.1	1.8	5.3	9.4	14	25.4
Temperature 100 m (C) Average	744	6.2	5.5	-	-2	0.2	1.7	5.1	9.2	14.2	25.1
Temperature 167 m (C) Average	744	6.04	5.5	-	-2.6	0	1.5	5.1	8.9	14	24.2
Relative Humidity 20 m (%) Average	744	70.4	18	-	23	42	59	75	85	91	98
Relative Humidity 45 m (%) Average	744	69.2	18	-	22	41	57	73	84	89	97
Relative Humidity 100 m (%) Average	744	67.9	18	-	22	40	57	72	83	88	97
Relative Humidity 167 m (%) Average	744	67.5	18	-	22	40	56	69	83	89	97
Wind Speed 20 m (km/h) Average	744	8.6	6	-	0	2	4	7	13	17	27
Wind Speed 45 m (km/h) Average	744	11.5	7	-	0	3	5	10	17	22	36
Wind Speed 100 m (km/h) Average	744	16.5	10	-	1	5	8	14	24	32	46
Wind Speed 167 m (km/h) Average	740	19.6	12	-	1	5	10	18	28	36	54
Wind Direction 20 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Wind Direction 100 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Wind Direction 167 m (deg) Average	740	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	744	-0.11	0.2	-	-1.2	-0.5	-0.2	-0.1	0	0.1	0.7
Vertical Wind Speed 45 m (km/h) Average	744	-0.02	0.6	-	-2	-0.9	-0.3	0	0.4	0.8	1.9
Vertical Wind Speed 100 m (km/h) Average	744	0.31	0.8	-	-1.9	-0.4	-0.1	0.1	0.6	1.4	3.6
Vertical Wind Speed 167 m (km/h) Average	740	0.6	0.9	-	-2.1	-0.2	0.1	0.4	1	1.8	6

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS 3)  
OCTOBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction, Vertical Wind Speed 167 m	24 Oct 2015 04:00	24 Oct 2015 07:00	4	Flat line in sensor output signal -sensor frozen



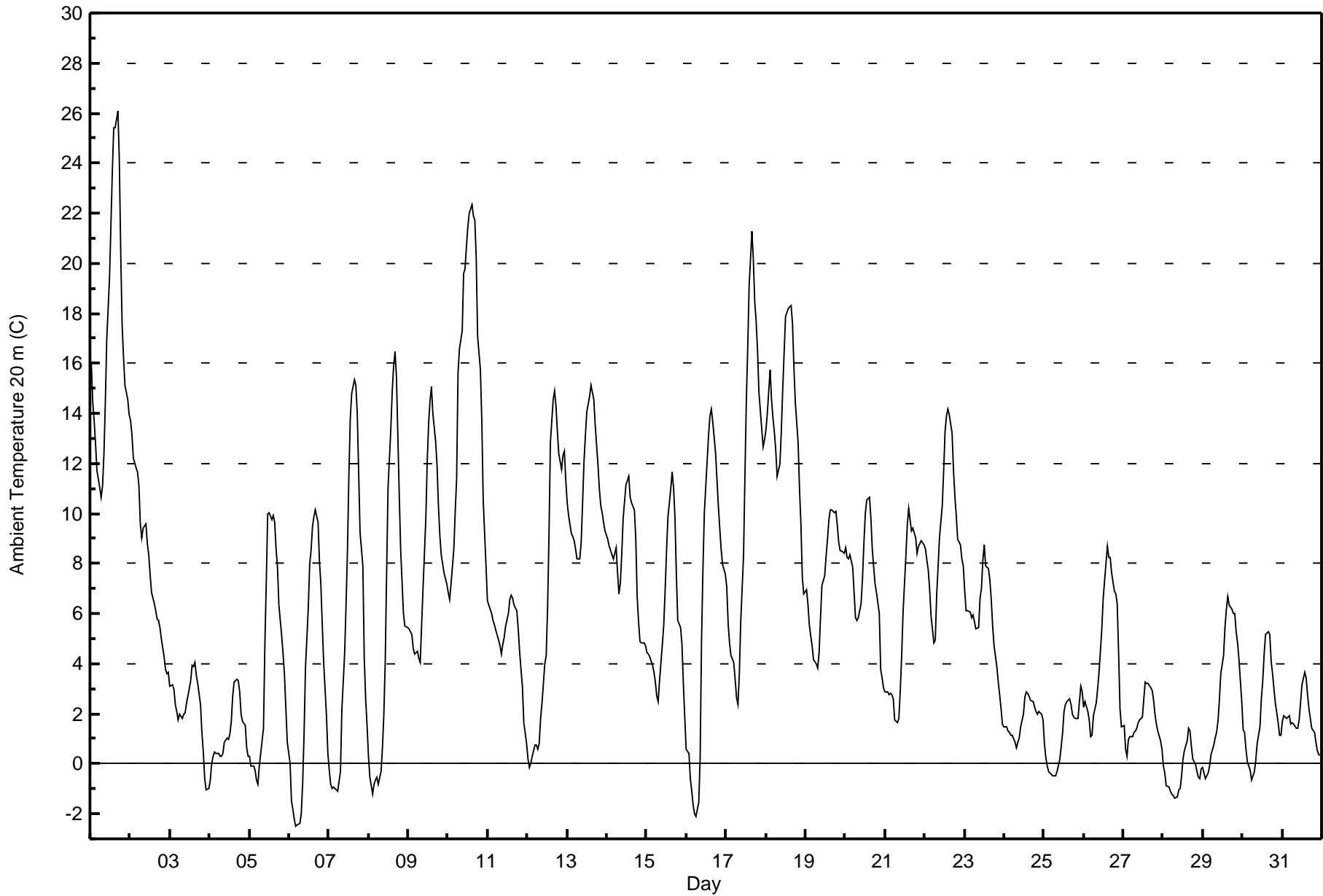
Maximum Value: 26.1 C on Oct 1 17:00		Maximum Daily Average: 17.0 C on Oct 1		Hours in Service: 744																																												
Minimum Value: -2.5 C on Oct 6 05:00		Minimum Daily Average: -0.3 C on Oct 28		Hours of Data: 744																																												
Maximum Diurnal Average: 10.4 C at hour 16		Minimum Diurnal Average: 3.3 C at hour 7		Hours of Missing Data: 0																																												
Monthly Average: 6.15 C		Percentiles: P <sub>1</sub> = -1.8 P <sub>10</sub> = 0.0 Q <sub>1</sub> = 1.7 Median = 5.3 Q <sub>3</sub> = 9.5 P <sub>90</sub> = 13.9 P <sub>99</sub> = 21.7		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	16.0	14.4	13.7	12.8	11.7	11.0	10.6	11.1	12.4	14.4	17.0	19.4	21.5	23.7	25.4	25.4	26.1	24.1	20.4	17.5	16.3	15.1	14.6	13.9	17.0	26.1																						
2-Oct	13.7	13.2	12.2	11.8	11.7	11.1	9.6	9.0	9.4	9.6	8.8	8.4	7.6	6.8	6.4	6.1	5.8	5.7	5.5	5.0	4.3	3.8	3.6	3.7	8.0	13.7																						
3-Oct	3.1	3.1	3.0	2.4	2.1	1.8	2.0	1.8	2.0	2.1	2.4	2.7	3.3	3.9	3.9	4.1	3.5	3.2	2.4	1.2	0.5	-0.6	-1.0	-1.0	2.2	4.1																						
4-Oct	-0.7	0.0	0.3	0.5	0.4	0.4	0.3	0.3	0.4	0.8	1.0	1.0	1.2	1.7	2.7	3.2	3.4	3.3	2.9	2.0	1.7	1.5	0.6	0.3	1.2	3.4																						
5-Oct	0.3	-0.1	-0.1	-0.3	-0.7	-0.8	-0.1	0.4	1.4	4.8	7.3	10.0	10.0	9.8	9.9	9.6	8.6	7.8	6.3	5.1	4.4	3.6	2.2	0.9	4.2	10.0																						
6-Oct	0.0	-1.5	-1.8	-2.2	-2.5	-2.4	-2.4	-2.0	-0.8	1.2	3.8	6.3	8.0	8.5	9.4	9.8	10.1	9.7	8.1	7.2	5.6	4.0	1.9	0.4	3.3	10.1																						
7-Oct	-0.2	-0.8	-1.0	-0.9	-1.0	-1.1	-0.7	-0.3	2.2	4.5	6.3	8.5	11.5	13.8	14.8	15.4	15.1	14.0	11.6	9.3	7.9	4.2	2.6	1.6	5.7	15.4																						
8-Oct	0.3	-0.5	-1.2	-0.8	-0.6	-0.6	-0.8	-0.3	0.6	2.0	4.1	7.7	11.0	13.4	14.9	15.9	16.4	15.4	10.8	8.6	7.3	6.0	5.5	5.5	5.9	16.4																						
9-Oct	5.4	5.3	5.2	4.6	4.4	4.5	4.2	4.0	5.5	7.0	9.8	12.1	13.6	14.5	15.1	14.0	12.9	11.9	10.3	9.2	8.4	7.6	7.4	7.2	8.5	15.1																						
10-Oct	6.9	6.6	7.2	8.6	10.1	11.4	15.6	16.6	17.3	19.6	19.7	20.7	21.4	22.0	22.3	21.9	21.7	20.2	17.1	15.8	13.6	10.6	9.2	7.9	15.2	22.3																						
11-Oct	6.5	6.1	6.0	5.7	5.6	5.3	5.0	4.7	4.4	4.8	5.1	5.5	6.0	6.5	6.8	6.6	6.3	6.1	5.4	4.5	3.8	3.1	1.6	0.8	5.1	6.8																						
12-Oct	0.2	-0.1	0.0	0.3	0.8	0.7	0.6	0.8	1.8	2.4	4.0	4.3	6.3	9.2	12.8	14.6	14.9	14.3	13.3	12.4	11.7	12.3	12.5	11.3	6.7	14.9																						
13-Oct	10.4	9.9	9.2	9.1	8.9	8.6	8.2	8.2	8.8	10.4	12.1	13.1	14.1	14.7	15.1	14.9	14.5	13.6	11.9	11.0	10.3	10.0	9.6	9.3	11.1	15.1																						
14-Oct	9.0	8.7	8.5	8.4	8.2	8.6	7.6	6.8	7.3	8.4	9.8	11.2	11.3	11.5	10.7	10.4	10.1	9.1	6.7	5.7	4.9	4.8	4.9	4.7	8.2	11.5																						
15-Oct	4.4	4.4	4.3	3.9	3.7	3.3	2.7	2.5	3.3	4.8	5.5	6.9	8.5	9.8	11.0	11.6	11.0	9.9	7.6	5.7	5.4	4.8	3.2	1.9	5.8	11.6																						
16-Oct	0.6	0.4	-0.6	-1.1	-1.6	-2.0	-2.1	-1.5	0.3	5.0	7.8	10.0	12.1	13.1	13.9	14.2	13.7	12.5	11.4	10.3	9.4	8.6	7.9	7.6	6.2	14.2																						
17-Oct	7.1	5.6	4.8	4.3	4.0	3.4	2.6	2.4	3.6	5.7	8.3	11.5	14.5	16.6	19.1	21.3	20.1	18.5	17.7	16.5	14.8	13.4	12.6	12.9	10.9	21.3																						
18-Oct	13.3	14.0	15.7	14.6	13.8	13.3	12.6	11.5	12.0	13.3	14.9	16.4	17.9	18.2	18.3	18.3	17.6	15.8	14.4	12.8	11.0	9.6	7.4	6.8	13.9	18.3																						
19-Oct	6.9	6.4	5.6	5.1	4.7	4.2	4.0	3.8	4.4	5.8	7.1	7.5	8.3	9.0	9.7	10.2	10.2	10.0	10.1	9.5	8.8	8.5	8.5	8.4	7.4	10.2																						
20-Oct	8.6	8.3	8.2	8.4	7.9	6.9	5.8	5.7	5.9	6.4	7.4	8.8	10.0	10.6	10.7	9.8	8.6	7.8	7.2	6.8	6.0	3.8	3.4	3.1	7.3	10.7																						
21-Oct	2.9	2.8	2.7	2.8	2.8	2.6	1.8	1.6	1.8	2.9	4.3	6.1	8.3	9.6	10.2	9.8	9.3	9.4	9.0	8.4	8.7	8.8	8.9	8.8	6.0	10.2																						
22-Oct	8.6	8.1	7.7	7.0	5.9	4.8	4.9	6.7	7.8	9.0	10.3	11.7	13.3	13.9	14.2	14.0	13.2	11.8	10.7	9.9	9.0	8.8	8.2	7.9	9.5	14.2																						
23-Oct	7.0	6.1	6.1	6.1	5.8	5.9	5.7	5.4	5.5	6.6	7.0	8.2	8.7	7.9	7.8	7.3	6.6	5.5	4.7	3.9	3.3	2.8	2.2	1.6	5.7	8.7																						
24-Oct	1.5	1.5	1.3	1.2	1.1	1.1	0.9	0.6	0.9	1.0	1.5	2.0	2.6	2.9	2.8	2.7	2.5	2.5	2.3	2.1	2.0	2.1	2.0	1.7	1.8	2.9																						
25-Oct	0.8	0.3	-0.1	-0.3	-0.4	-0.5	-0.5	-0.5	-0.3	0.2	0.7	1.2	2.1	2.4	2.5	2.6	2.4	2.0	1.9	1.8	1.8	2.5	3.1	2.9	1.2	3.1																						
26-Oct	2.3	2.5	2.1	1.7	1.1	1.1	1.9	2.4	3.0	3.7	4.5	5.4	6.6	8.0	8.7	8.2	8.2	7.6	6.9	6.8	6.4	4.5	2.2	1.5	4.5	8.7																						
27-Oct	1.5	0.6	0.3	1.0	1.1	1.1	1.2	1.3	1.4	1.6	1.7	1.8	2.6	3.3	3.2	3.2	3.1	2.9	2.5	2.0	1.6	1.3	0.9	0.6	1.7	3.3																						
28-Oct	-0.1	-0.4	-0.8	-0.9	-1.1	-1.2	-1.2	-1.4	-1.3	-1.0	-1.0	-0.5	0.2	0.5	0.9	1.4	1.3	0.7	0.2	-0.1	-0.3	-0.5	-0.6	-0.2	-0.3	1.4																						
29-Oct	-0.1	-0.6	-0.5	-0.4	-0.1	0.3	0.8	1.0	1.3	1.7	2.5	3.6	4.3	5.4	6.2	6.7	6.3	6.2	6.0	6.0	5.3	4.8	4.1	2.5	3.1	6.7																						
30-Oct	1.4	1.2	0.6	0.0	-0.3	-0.6	-0.5	-0.3	0.1	0.8	1.5	2.6	3.3	4.4	5.2	5.3	5.2	4.1	3.6	3.0	2.4	1.6	1.1	1.1	2.0	5.3																						
31-Oct	1.7	1.9	1.8	1.9	1.9	1.6	1.7	1.6	1.4	1.4	1.8	2.4	3.2	3.6	3.5	2.7	2.2	1.8	1.4	1.2	0.9	0.5	0.4	0.4	1.8	3.6																						
																								4.5	4.1	3.9	3.7	3.5	3.3	3.3	3.4	4.0	5.2	6.4	7.6	8.8	9.6	10.3	10.4	10.0	9.3	8.1	7.1	6.4	5.5	4.9	4.4	Diurnal Average
																								16.0	14.4	15.7	14.6	13.8	13.3	15.6	16.6	17.3	19.6	19.7	20.7	21.5	23.7	25.4	25.4	26.1	24.1	20.4	17.5	16.3	15.1	14.6	13.9	Diurnal Maximum





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

**Ambient Temperature 20 m (AT20m) - C**  
**Lower Camp Met Tower - October 2015**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature 20 m (AT20m) - C  
Lower Camp Met Tower - October 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	74	9.95	9.95
0 - 10	506	68.01	77.96
10 - 20	148	19.89	97.85
> 20	16	2.15	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

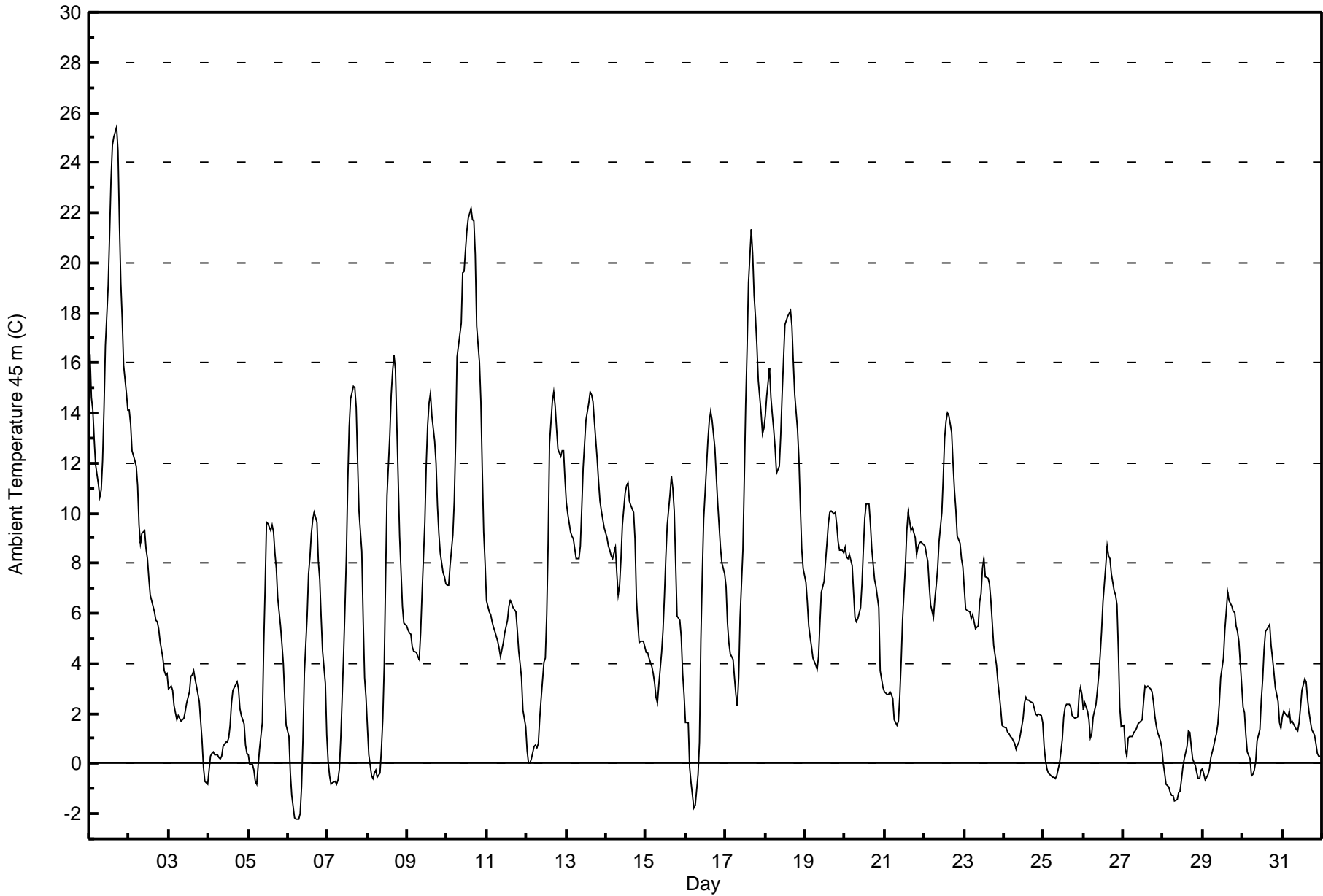


Maximum Value: 25.4 C on Oct 1 17:00		Maximum Daily Average: 17.2 C on Oct 1		Hours in Service: 744																																												
Minimum Value: -2.2 C on Oct 6 07:00		Minimum Daily Average: -0.4 C on Oct 28		Hours of Data: 744																																												
Maximum Diurnal Average: 10.2 C at hour 16		Minimum Diurnal Average: 3.4 C at hour 8		Hours of Missing Data: 0																																												
Monthly Average: 6.19 C		Percentiles: P <sub>1</sub> = -1.5 P <sub>10</sub> = 0.1 Q <sub>1</sub> = 1.8 Median = 5.3 Q <sub>3</sub> = 9.4 P <sub>90</sub> = 14.0 P <sub>99</sub> = 21.4		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	16.3	14.6	14.1	12.9	11.9	11.1	10.7	10.9	12.1	14.2	16.7	19.1	21.1	23.3	24.7	25.0	25.4	24.5	21.6	19.2	17.7	15.9	14.8	14.1	17.2	25.4																						
2-Oct	14.1	13.6	12.5	12.1	11.9	11.1	9.5	8.8	9.2	9.3	8.6	8.2	7.4	6.7	6.3	6.0	5.7	5.6	5.4	4.9	4.2	3.7	3.6	3.6	8.0	14.1																						
3-Oct	3.0	3.1	2.9	2.3	2.0	1.8	1.9	1.7	1.8	1.8	2.1	2.4	2.9	3.5	3.6	3.7	3.4	3.1	2.5	1.7	0.9	-0.2	-0.7	-0.8	2.1	3.7																						
4-Oct	-0.3	0.3	0.4	0.5	0.4	0.4	0.2	0.2	0.3	0.7	0.9	0.8	1.1	1.5	2.4	3.0	3.2	3.3	3.0	2.2	1.9	1.6	0.7	0.4	1.2	3.3																						
5-Oct	0.4	0.0	0.0	-0.2	-0.7	-0.8	-0.1	0.6	1.6	4.7	7.0	9.6	9.6	9.3	9.5	9.3	8.4	7.8	6.6	5.5	4.8	4.0	2.7	1.5	4.2	9.6																						
6-Oct	1.1	-0.4	-1.2	-1.7	-2.2	-2.2	-2.2	-2.0	-0.9	1.0	3.6	5.9	7.6	8.2	9.2	9.7	10.0	9.7	8.1	7.3	5.8	4.5	3.2	1.2	3.5	10.0																						
7-Oct	0.1	-0.5	-0.8	-0.8	-0.7	-0.8	-0.7	-0.2	1.0	4.3	6.2	8.3	11.2	13.5	14.6	15.1	15.0	14.2	12.1	10.1	8.5	5.7	3.4	2.6	5.9	15.1																						
8-Oct	1.5	0.3	-0.5	-0.6	-0.4	-0.3	-0.5	-0.3	0.6	1.8	3.9	7.4	10.7	13.1	14.7	15.7	16.3	15.7	11.3	9.1	7.7	6.3	5.6	5.5	6.0	16.3																						
9-Oct	5.4	5.2	5.1	4.7	4.5	4.5	4.3	4.2	5.2	6.8	9.6	11.9	13.5	14.4	14.8	13.9	12.9	12.0	10.3	9.2	8.4	7.6	7.5	7.2	8.5	14.8																						
10-Oct	7.1	7.1	7.9	9.1	10.5	12.9	16.3	16.7	17.6	19.6	19.7	20.5	21.3	21.8	22.2	21.7	21.7	20.3	17.5	16.0	14.4	11.7	9.2	8.0	15.4	22.2																						
11-Oct	6.5	6.1	5.9	5.6	5.5	5.3	4.9	4.6	4.3	4.5	4.8	5.2	5.7	6.3	6.5	6.4	6.2	6.0	5.3	4.5	4.0	3.5	2.2	1.5	5.1	6.5																						
12-Oct	0.5	0.0	0.0	0.2	0.7	0.7	0.6	0.8	1.8	2.6	4.0	4.2	6.0	8.8	12.8	14.5	14.9	14.3	13.4	12.6	12.3	12.5	12.5	11.3	6.8	14.9																						
13-Oct	10.4	10.0	9.2	9.1	9.0	8.6	8.2	8.2	8.7	10.2	11.8	12.8	13.7	14.4	14.8	14.7	14.4	13.7	12.2	11.3	10.5	10.1	9.7	9.4	11.0	14.8																						
14-Oct	9.0	8.7	8.5	8.3	8.2	8.7	7.6	6.8	7.1	8.2	9.5	10.8	11.1	11.2	10.5	10.3	10.0	9.0	6.6	5.6	4.9	4.9	4.6	4.6	8.1	11.2																						
15-Oct	4.4	4.4	4.2	3.9	3.6	3.2	2.6	2.4	3.2	4.4	5.3	6.7	8.3	9.5	10.7	11.5	11.0	10.1	8.0	5.9	5.7	5.1	3.6	2.8	5.9	11.5																						
16-Oct	1.6	1.6	-0.2	-0.8	-1.3	-1.8	-1.7	-0.4	0.9	5.0	7.5	9.7	11.8	12.9	13.7	14.1	13.7	12.6	11.5	10.4	9.5	8.6	8.0	7.6	6.4	14.1																						
17-Oct	7.1	5.6	4.8	4.4	4.1	3.5	2.7	2.3	3.4	5.8	8.5	11.4	14.3	16.6	19.2	21.4	20.3	18.7	17.8	16.7	15.3	14.0	13.2	13.4	11.0	21.4																						
18-Oct	13.9	14.7	15.8	14.6	13.9	13.4	12.6	11.6	11.9	13.1	14.7	16.1	17.5	17.8	18.0	18.1	17.5	16.0	14.7	13.3	12.1	10.2	8.6	7.8	14.1	18.1																						
19-Oct	7.2	6.4	5.5	5.1	4.7	4.2	4.0	3.8	4.3	5.6	6.8	7.3	8.1	8.8	9.6	10.1	10.1	10.0	10.0	9.5	8.8	8.5	8.5	8.4	7.3	10.1																						
20-Oct	8.6	8.2	8.2	8.4	7.9	6.8	5.8	5.7	5.8	6.2	7.2	8.6	9.8	10.3	10.4	9.6	8.6	8.0	7.3	7.1	6.2	3.7	3.4	3.0	7.3	10.4																						
21-Oct	2.8	2.8	2.7	2.9	2.8	2.6	1.8	1.6	1.7	2.7	4.1	5.8	7.9	9.3	10.0	9.7	9.3	9.4	9.0	8.4	8.6	8.8	8.9	8.8	5.9	10.0																						
22-Oct	8.7	8.4	8.1	7.1	6.3	5.8	6.5	7.1	7.8	8.8	10.0	11.4	13.0	13.7	14.0	13.9	13.2	12.0	10.9	10.2	9.1	8.8	8.2	7.9	9.6	14.0																						
23-Oct	7.0	6.2	6.1	6.0	5.8	5.9	5.6	5.4	5.5	6.4	6.8	7.8	8.2	7.5	7.4	7.2	6.5	5.6	4.7	3.9	3.2	2.7	2.2	1.5	5.6	8.2																						
24-Oct	1.5	1.4	1.2	1.2	1.1	1.0	0.8	0.6	0.7	0.9	1.1	1.8	2.4	2.7	2.6	2.5	2.5	2.4	2.2	2.0	1.9	2.0	1.9	1.6	1.7	2.7																						
25-Oct	0.7	0.2	-0.2	-0.4	-0.5	-0.6	-0.5	-0.6	-0.5	0.0	0.5	1.0	1.9	2.2	2.4	2.4	2.2	1.9	1.8	1.8	1.9	2.7	3.1	2.8	1.1	3.1																						
26-Oct	2.2	2.4	2.1	1.7	1.0	1.2	1.9	2.4	2.9	3.6	4.3	5.3	6.5	7.9	8.7	8.3	8.2	7.6	6.9	6.7	6.4	4.5	2.2	1.5	4.4	8.7																						
27-Oct	1.5	0.6	0.3	1.1	1.1	1.1	1.2	1.3	1.4	1.6	1.7	1.7	2.5	3.1	3.0	3.1	3.0	2.9	2.5	1.9	1.5	1.3	0.9	0.6	1.7	3.1																						
28-Oct	0.0	-0.3	-0.8	-1.0	-1.1	-1.3	-1.3	-1.5	-1.4	-1.1	-1.1	-0.7	-0.2	0.2	0.7	1.3	1.2	0.7	0.2	-0.1	-0.4	-0.6	-0.6	-0.3	-0.4	1.3																						
29-Oct	-0.2	-0.7	-0.5	-0.4	-0.2	0.3	0.7	0.9	1.2	1.6	2.4	3.5	4.2	5.3	6.1	6.8	6.5	6.3	6.1	6.0	5.5	5.3	4.9	3.1	3.1	6.8																						
30-Oct	2.2	2.0	1.1	0.5	0.2	-0.5	-0.4	-0.3	0.1	0.9	1.4	2.5	3.4	4.6	5.3	5.5	5.6	4.7	4.2	3.7	3.0	2.5	1.6	1.4	2.3	5.6																						
31-Oct	1.9	2.1	1.9	1.9	2.1	1.7	1.7	1.6	1.4	1.3	1.6	2.3	2.9	3.4	3.3	2.6	2.1	1.7	1.4	1.1	0.8	0.4	0.3	0.3	1.7	3.4																						
																								4.7	4.3	4.0	3.8	3.6	3.5	3.4	3.4	3.9	5.1	6.2	7.4	8.6	9.4	10.0	10.2	10.0	9.3	8.2	7.3	6.6	5.8	5.1	4.6	Diurnal Average
																								16.3	14.7	15.8	14.6	13.9	13.4	16.3	16.7	17.6	19.6	19.7	20.5	21.3	23.3	24.7	25.0	25.4	24.5	21.6	19.2	17.7	15.9	14.8	14.1	Diurnal Maximum



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

**Ambient Temperature 45 m (AT45m) - C**  
**Lower Camp Met Tower - October 2015**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature 45 m (AT45m) - C  
Lower Camp Met Tower - October 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	69	9.27	9.27
0 - 10	510	68.55	77.82
10 - 20	149	20.03	97.85
> 20	16	2.15	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

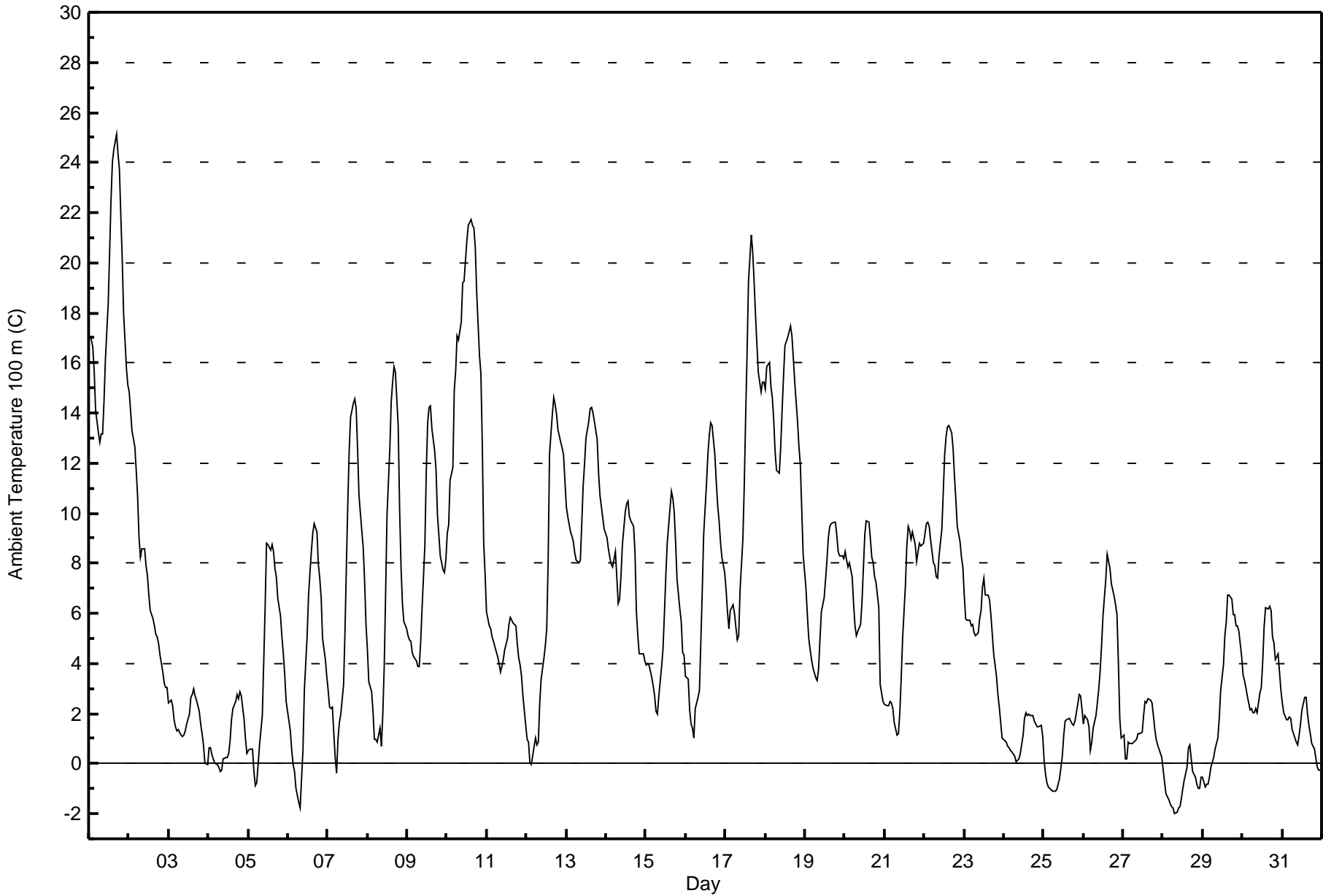


Maximum Value: 25.1 C on Oct 1 17:00		Maximum Daily Average: 18.2 C on Oct 1		Hours in Service: 744																																												
Minimum Value: -2.0 C on Oct 28 08:00		Minimum Daily Average: -0.9 C on Oct 28		Hours of Data: 744																																												
Maximum Diurnal Average: 9.7 C at hour 16		Minimum Diurnal Average: 3.6 C at hour 8		Hours of Missing Data: 0																																												
Monthly Average: 6.20 C		Percentiles: P <sub>1</sub> = -1.6 P <sub>10</sub> = 0.2 Q <sub>1</sub> = 1.7 Median = 5.1 Q <sub>3</sub> = 9.2 P <sub>90</sub> = 14.2 P <sub>99</sub> = 21.3		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	17.1	16.9	16.7	15.7	14.1	13.2	12.8	13.2	13.2	14.4	16.1	18.4	20.4	22.5	24.0	24.5	25.1	24.4	23.7	21.9	20.2	18.0	15.8	15.1	18.2	25.1																						
2-Oct	14.8	14.1	13.3	12.7	11.7	10.6	9.0	8.2	8.6	8.6	7.9	7.5	6.7	6.1	5.8	5.5	5.2	5.1	4.8	4.3	3.7	3.2	3.0	3.0	7.6	14.8																						
3-Oct	2.4	2.5	2.3	1.8	1.5	1.3	1.4	1.1	1.1	1.2	1.3	1.6	2.0	2.6	2.8	3.0	2.7	2.6	2.1	1.6	1.2	0.7	0.0	-0.1	1.7	3.0																						
4-Oct	0.6	0.6	0.4	0.2	0.0	0.0	-0.1	-0.3	-0.2	0.2	0.2	0.4	0.9	1.7	2.2	2.5	2.7	2.6	2.8	2.7	1.7	1.0	0.4	1.0	2.8	2.8																						
5-Oct	0.5	0.6	0.6	-0.3	-0.9	-0.8	0.0	0.7	1.9	4.1	6.2	8.8	8.8	8.5	8.8	8.5	7.8	7.5	6.6	5.9	5.0	4.4	3.5	2.5	4.1	8.8																						
6-Oct	1.7	1.3	0.5	0.0	-0.3	-1.0	-1.6	-1.8	-0.6	0.5	2.9	5.1	6.7	7.6	8.5	9.2	9.6	9.3	8.0	7.4	6.6	5.0	4.2	3.5	3.8	9.6																						
7-Oct	2.9	2.2	2.2	2.3	0.2	-0.4	1.0	1.6	2.0	3.2	5.3	7.9	10.4	12.5	13.8	14.4	14.6	14.2	12.6	10.7	9.3	8.6	7.3	5.6	6.8	14.6																						
8-Oct	4.5	3.3	2.9	2.1	1.0	1.0	0.9	1.4	0.7	2.0	3.9	6.8	9.9	12.6	14.4	15.2	15.8	15.6	13.5	10.1	7.8	6.4	5.7	5.4	6.8	15.8																						
9-Oct	5.1	4.9	4.9	4.4	4.3	4.1	3.9	3.9	4.9	6.2	8.7	11.6	13.6	14.2	14.3	13.4	12.5	11.7	9.9	9.2	8.3	7.7	7.6	8.1	8.2	14.3																						
10-Oct	9.2	9.5	11.3	11.8	14.9	15.7	17.1	16.9	17.6	19.2	19.3	20.1	20.9	21.5	21.7	21.5	21.4	20.6	18.8	16.3	15.5	12.8	8.8	7.6	16.2	21.7																						
11-Oct	6.0	5.5	5.4	5.1	4.9	4.7	4.3	4.0	3.7	3.9	4.2	4.6	5.0	5.6	5.8	5.8	5.6	5.5	4.8	4.2	3.9	3.5	2.7	1.5	4.6	6.0																						
12-Oct	1.0	0.9	0.0	0.0	0.7	1.0	0.8	0.9	2.4	3.4	4.2	4.7	5.4	8.1	12.4	14.0	14.6	14.4	13.9	13.3	12.8	12.6	12.3	11.2	6.9	14.6																						
13-Oct	10.3	9.8	9.2	9.1	8.8	8.4	8.2	8.0	8.2	9.6	11.1	12.0	13.0	13.7	14.2	14.2	14.0	13.7	12.9	11.6	10.7	10.3	9.8	9.4	10.8	14.2																						
14-Oct	9.0	8.6	8.2	8.0	7.8	8.5	7.5	6.4	6.6	7.5	8.8	10.0	10.4	10.5	9.8	9.7	9.5	8.4	6.1	5.1	4.4	4.4	4.4	4.1	7.7	10.5																						
15-Oct	4.0	4.0	3.9	3.4	3.1	2.7	2.1	2.0	2.7	3.9	4.6	6.0	7.5	8.8	10.2	10.8	10.6	10.0	8.8	7.3	6.2	5.6	4.4	4.3	5.7	10.8																						
16-Oct	3.5	3.4	2.1	1.6	1.4	1.0	2.2	2.6	2.9	4.9	6.9	9.2	11.2	12.3	13.1	13.6	13.5	12.3	11.3	10.3	9.7	8.8	8.3	7.6	7.2	13.6																						
17-Oct	7.0	6.0	5.4	6.1	6.4	6.0	5.5	4.9	5.1	7.0	9.0	11.2	14.0	16.4	19.3	21.1	20.4	19.2	17.9	16.7	15.6	14.9	15.2	15.2	11.9	21.1																						
18-Oct	15.0	15.9	16.0	15.1	14.6	13.7	12.4	11.7	11.6	12.7	14.1	15.5	16.7	17.0	17.2	17.5	17.1	16.2	15.2	13.7	12.7	11.9	10.1	8.4	14.3	17.5																						
19-Oct	7.0	6.0	5.0	4.6	4.2	3.8	3.4	3.3	3.8	4.9	6.1	6.6	7.4	8.1	9.0	9.5	9.6	9.6	9.6	9.2	8.5	8.3	8.3	8.2	6.8	9.6																						
20-Oct	8.5	8.1	7.9	8.0	7.5	6.4	5.5	5.1	5.3	5.6	6.4	7.8	9.1	9.7	9.6	8.9	8.2	8.0	7.4	7.2	6.2	3.2	2.8	2.5	6.9	9.7																						
21-Oct	2.4	2.3	2.3	2.5	2.4	2.2	1.6	1.1	1.2	2.0	3.4	5.0	7.1	8.7	9.5	9.3	9.0	9.2	8.7	8.1	8.5	8.8	8.7	8.8	5.5	9.5																						
22-Oct	9.2	9.6	9.6	9.5	8.9	8.0	7.9	7.5	7.4	8.3	9.4	10.8	12.3	13.0	13.5	13.5	13.2	12.6	11.5	10.6	9.5	8.8	8.2	7.9	10.0	13.5																						
23-Oct	6.7	5.8	5.8	5.7	5.5	5.6	5.2	5.1	5.2	5.8	6.1	7.0	7.4	6.7	6.7	6.6	6.0	5.2	4.4	3.5	2.8	2.3	1.6	1.0	5.2	7.4																						
24-Oct	1.0	0.9	0.7	0.6	0.5	0.5	0.3	0.1	0.1	0.2	0.4	1.1	1.8	2.0	1.9	2.0	1.9	1.9	1.7	1.6	1.5	1.5	1.5	1.1	1.1	2.0																						
25-Oct	0.1	-0.4	-0.8	-0.9	-1.0	-1.1	-1.1	-1.1	-1.0	-0.6	-0.2	0.3	1.2	1.7	1.8	1.8	1.7	1.6	1.5	1.7	2.3	2.7	2.7	2.2	0.6	2.7																						
26-Oct	1.6	1.9	1.7	1.5	0.5	0.9	1.4	1.9	2.4	3.0	3.7	4.7	5.9	7.4	8.4	8.1	7.8	7.2	6.7	6.4	6.0	4.1	1.8	1.0	4.0	8.4																						
27-Oct	1.1	0.2	0.2	0.9	0.8	0.8	0.9	0.9	1.0	1.2	1.2	1.2	1.9	2.5	2.4	2.6	2.5	2.4	1.9	1.4	1.0	0.7	0.4	0.2	1.3	2.6																						
28-Oct	-0.2	-0.8	-1.2	-1.4	-1.6	-1.7	-1.8	-2.0	-1.9	-1.8	-1.7	-1.4	-1.0	-0.6	-0.1	0.6	0.8	0.2	-0.3	-0.6	-0.8	-1.0	-1.0	-0.5	-0.9	0.8																						
29-Oct	-0.6	-0.9	-0.8	-0.8	-0.5	-0.1	0.2	0.6	0.8	1.0	1.8	2.9	4.0	5.1	5.6	6.7	6.7	6.6	6.0	6.0	5.5	5.5	5.3	4.3	2.9	6.7																						
30-Oct	3.6	3.3	3.0	2.7	2.1	2.2	2.0	2.0	2.2	2.0	2.8	3.0	4.1	5.5	6.2	6.2	6.3	6.1	5.1	4.8	4.2	4.4	3.6	3.0	3.8	6.3																						
31-Oct	2.4	2.1	1.7	1.7	1.9	1.8	1.4	1.2	0.9	0.8	1.2	1.6	2.2	2.6	2.6	2.0	1.6	1.2	0.8	0.6	0.2	-0.2	-0.3	-0.2	1.3	2.6																						
																								5.1	4.8	4.5	4.3	4.0	3.8	3.7	3.6	3.9	4.7	5.7	6.8	7.9	8.8	9.5	9.7	9.6	9.2	8.3	7.5	6.8	6.1	5.4	4.9	Diurnal Average
																								17.1	16.9	16.7	15.7	14.9	15.7	17.1	16.9	17.6	19.2	19.3	20.1	20.9	22.5	24.0	24.5	25.1	24.4	23.7	21.9	20.2	18.0	15.8	15.2	Diurnal Maximum



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

**Ambient Temperature 100 m (AT100m) - C**  
**Lower Camp Met Tower - October 2015**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature 100 m (AT100m) - C  
Lower Camp Met Tower - October 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	57	7.66	7.66
0 - 10	532	71.51	79.17
10 - 20	137	18.41	97.58
> 20	18	2.42	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



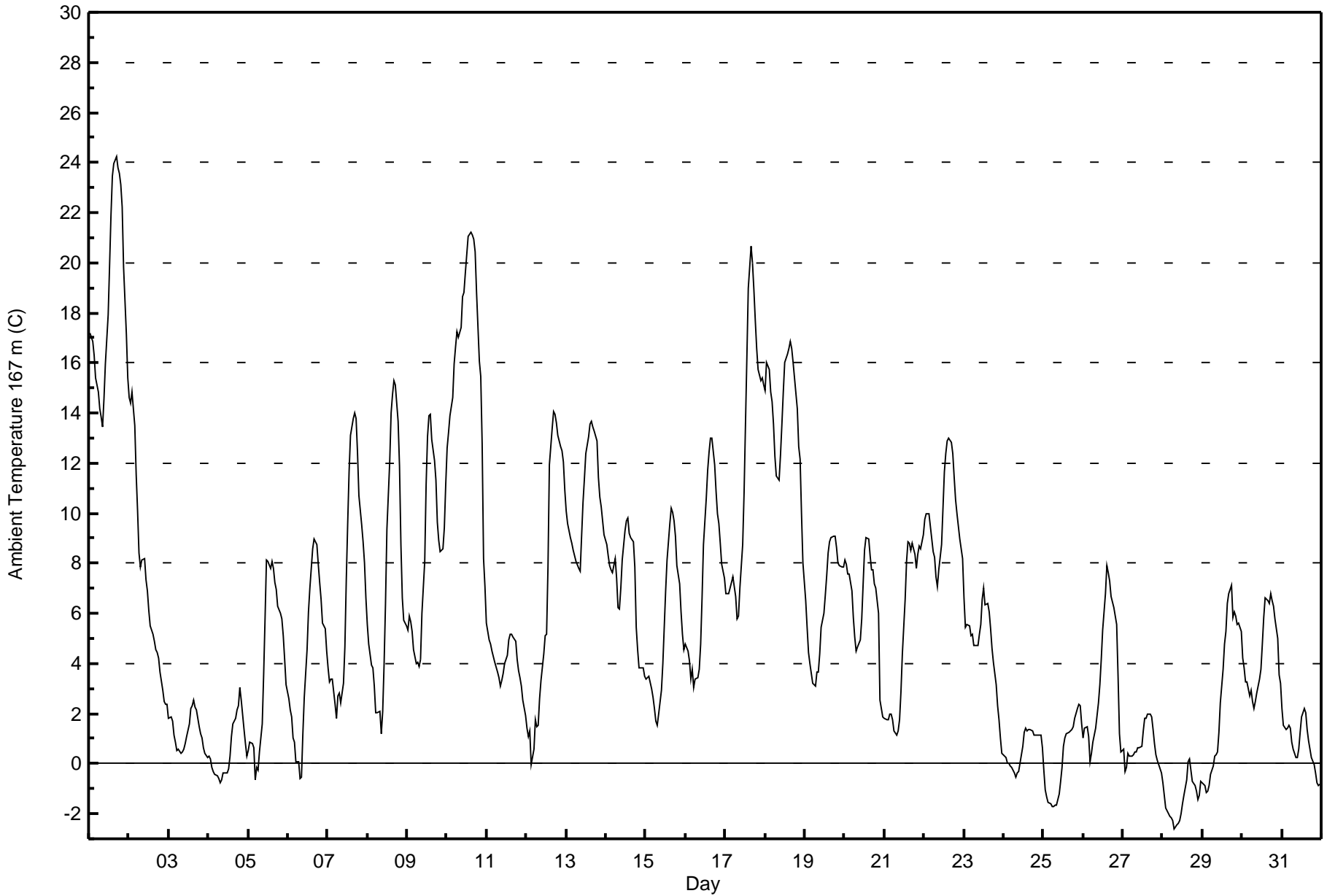


Maximum Value: 24.2 C on Oct 1 17:00		Maximum Daily Average: 18.6 C on Oct 1		Hours in Service: 744																																												
Minimum Value: -2.6 C on Oct 28 08:00		Minimum Daily Average: -1.4 C on Oct 28		Hours of Data: 744																																												
Maximum Diurnal Average: 9.2 C at hour 16		Minimum Diurnal Average: 3.5 C at hour 8		Hours of Missing Data: 0																																												
Monthly Average: 6.04 C		Percentiles: P <sub>1</sub> = -2.0 P <sub>10</sub> = 0.0 Q <sub>1</sub> = 1.5 Median = 5.1 Q <sub>3</sub> = 8.9 P <sub>90</sub> = 14.0 P <sub>99</sub> = 21.4		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	17.2	17.0	16.8	16.3	15.4	14.8	14.2	13.9	13.5	14.5	16.0	17.9	19.8	21.9	23.5	23.9	24.2	23.8	23.6	23.1	22.2	19.8	17.1	15.4	18.6	24.2																						
2-Oct	14.6	14.4	14.8	13.5	11.6	10.1	8.4	7.9	8.1	8.2	7.3	6.9	6.1	5.5	5.2	4.9	4.5	4.4	4.2	3.7	3.0	2.5	2.4	2.4	7.3	14.8																						
3-Oct	1.8	1.9	1.7	1.1	0.8	0.5	0.6	0.4	0.5	0.6	0.8	1.1	1.6	2.2	2.3	2.5	2.2	2.1	1.5	1.2	1.0	0.6	0.4	0.3	1.2	2.5																						
4-Oct	0.3	0.2	-0.2	-0.3	-0.4	-0.5	-0.6	-0.8	-0.7	-0.4	-0.4	-0.4	-0.2	0.3	1.1	1.6	1.8	2.2	2.3	3.1	2.5	1.4	0.8	0.3	0.5	3.1																						
5-Oct	0.5	0.8	0.8	0.6	-0.7	-0.1	-0.3	0.5	1.6	3.5	5.8	8.1	8.1	7.8	8.1	7.8	7.2	6.9	6.3	6.0	5.8	5.1	4.1	3.2	4.1	8.1																						
6-Oct	2.6	2.2	1.8	1.0	0.8	0.1	0.1	-0.6	-0.6	1.2	2.7	4.5	6.1	7.0	7.8	8.6	9.0	8.7	7.9	7.2	6.6	5.6	5.4	4.5	4.2	9.0																						
7-Oct	3.8	3.3	3.4	3.4	2.4	1.8	2.7	2.8	2.4	3.2	4.6	7.3	9.6	11.7	13.1	13.8	14.0	13.8	12.4	10.7	9.5	8.8	8.0	6.6	7.2	14.0																						
8-Oct	5.5	4.8	4.0	3.8	3.1	2.0	2.0	2.1	1.2	2.1	4.0	6.4	9.3	12.0	14.0	14.7	15.3	15.1	13.6	11.9	8.8	6.6	5.7	5.5	7.2	15.3																						
9-Oct	5.3	5.9	5.7	5.3	4.6	4.0	4.1	3.9	4.2	6.0	8.1	11.1	13.1	13.9	14.0	12.9	12.1	11.3	9.6	8.9	8.5	8.6	9.4	11.2	8.4	14.0																						
10-Oct	12.6	13.2	13.9	14.6	16.0	16.6	17.3	17.0	17.4	18.7	18.8	19.6	20.3	21.0	21.2	21.1	20.9	20.4	18.8	16.1	15.5	12.8	8.2	7.1	16.6	21.2																						
11-Oct	5.6	5.0	4.8	4.5	4.3	4.1	3.7	3.4	3.1	3.3	3.6	4.0	4.3	4.9	5.2	5.2	5.0	4.9	4.2	3.7	3.4	3.1	2.5	1.9	4.1	5.6																						
12-Oct	1.4	1.1	1.3	0.0	0.6	1.7	1.5	1.5	2.6	3.3	4.4	5.1	5.1	7.9	11.9	13.4	14.1	14.0	13.6	13.1	12.7	12.5	12.0	10.9	6.9	14.1																						
13-Oct	10.1	9.6	9.0	8.8	8.5	8.3	8.1	7.8	7.7	9.1	10.4	11.4	12.4	13.0	13.5	13.7	13.5	13.3	12.9	11.4	10.6	10.3	9.7	9.1	10.5	13.7																						
14-Oct	8.8	8.3	7.9	7.7	7.6	8.2	7.4	6.2	6.2	7.0	8.1	9.3	9.7	9.8	9.2	9.0	8.9	7.8	5.4	4.5	3.8	3.8	3.8	3.5	7.2	9.8																						
15-Oct	3.3	3.4	3.5	3.0	2.6	2.2	1.7	1.6	2.0	2.9	4.0	5.4	6.9	8.1	9.6	10.2	10.0	9.7	9.1	7.9	7.2	6.1	5.2	4.5	5.4	10.2																						
16-Oct	4.8	4.5	4.1	3.4	3.8	3.0	3.4	3.4	3.8	4.8	6.6	8.8	10.6	11.7	12.4	13.0	13.0	11.9	10.9	10.0	9.6	8.8	8.0	7.4	7.6	13.0																						
17-Oct	6.8	6.8	6.8	7.0	7.5	7.1	6.7	5.8	5.9	7.0	8.8	10.8	13.5	16.3	19.0	20.6	20.0	18.9	17.7	16.6	15.7	15.3	15.4	15.1	12.1	20.6																						
18-Oct	14.9	16.0	15.7	14.8	14.4	13.6	12.3	11.5	11.3	12.3	13.6	14.9	16.0	16.3	16.6	16.9	16.6	16.0	15.4	14.2	12.6	12.1	10.0	8.0	14.0	16.9																						
19-Oct	6.5	5.5	4.4	4.0	3.6	3.2	3.1	3.7	3.7	4.4	5.5	6.0	6.7	7.5	8.4	8.9	9.0	9.1	9.1	8.6	8.0	7.9	7.8	7.9	6.3	9.1																						
20-Oct	8.1	8.0	7.6	7.6	6.9	5.9	5.0	4.5	4.7	5.0	5.8	7.2	8.5	9.0	8.9	8.3	7.7	7.7	7.2	7.0	6.0	2.6	2.2	1.9	6.4	9.0																						
21-Oct	1.8	1.7	1.7	2.0	2.0	1.8	1.3	1.1	1.3	1.7	2.9	4.4	6.5	8.1	8.9	8.8	8.5	8.8	8.4	7.8	8.3	8.7	8.6	9.1	5.2	9.1																						
22-Oct	9.7	10.0	10.0	10.0	9.5	8.5	8.3	7.4	7.1	7.8	8.8	10.2	11.7	12.4	12.9	13.0	12.9	12.4	11.4	10.6	10.0	9.0	8.6	8.2	10.0	13.0																						
23-Oct	6.6	5.5	5.6	5.5	5.1	5.2	4.7	4.7	4.7	5.1	5.5	6.6	7.0	6.3	6.4	6.1	5.4	4.6	4.1	3.2	2.3	1.8	1.0	0.4	4.7	7.0																						
24-Oct	0.4	0.3	0.0	0.0	-0.1	-0.1	-0.3	-0.5	-0.4	-0.3	0.0	0.7	1.3	1.4	1.3	1.4	1.4	1.3	1.1	1.1	1.1	1.1	1.1	0.6	0.6	1.4																						
25-Oct	-0.3	-1.0	-1.3	-1.5	-1.6	-1.7	-1.7	-1.7	-1.6	-1.2	-0.7	-0.1	0.7	1.1	1.2	1.3	1.3	1.4	1.5	1.8	2.2	2.4	2.3	1.6	0.2	2.4																						
26-Oct	1.0	1.4	1.5	1.1	0.1	0.4	0.9	1.4	1.9	2.4	3.2	4.1	5.3	6.8	7.9	7.6	7.3	6.7	6.2	5.9	5.6	3.5	1.2	0.5	3.5	7.9																						
27-Oct	0.6	-0.3	-0.2	0.4	0.3	0.3	0.4	0.5	0.5	0.6	0.6	0.7	1.3	1.8	1.8	2.0	2.0	1.8	1.4	0.8	0.4	0.2	-0.2	-0.4	0.7	2.0																						
28-Oct	-0.8	-1.3	-1.7	-2.0	-2.1	-2.1	-2.3	-2.6	-2.5	-2.4	-2.3	-2.0	-1.6	-1.3	-0.7	0.1	0.2	-0.3	-0.7	-0.8	-1.1	-1.4	-1.3	-0.7	-1.4	0.2																						
29-Oct	-0.8	-0.9	-1.1	-1.1	-0.9	-0.4	-0.1	0.3	0.4	0.5	1.3	2.4	3.8	4.8	5.3	6.4	6.8	7.1	5.8	6.1	5.9	5.6	5.6	5.3	2.8	7.1																						
30-Oct	4.2	3.8	3.2	3.3	2.7	2.9	2.5	2.2	2.5	2.8	3.4	3.8	4.8	5.9	6.6	6.5	6.4	6.8	6.5	6.3	5.8	5.0	3.5	3.2	4.4	6.8																						
31-Oct	2.2	1.5	1.4	1.4	1.6	1.4	0.9	0.6	0.2	0.2	0.6	1.3	1.9	2.2	2.0	1.4	0.9	0.6	0.2	0.0	-0.4	-0.8	-0.8	-0.8	0.8	2.2																						
																								5.1	4.9	4.7	4.5	4.2	4.0	3.7	3.5	3.6	4.3	5.2	6.4	7.4	8.3	9.0	9.2	9.1	8.8	8.1	7.5	6.9	6.1	5.4	5.0	Diurnal Average
																								17.2	17.0	16.8	16.3	16.0	16.6	17.3	17.0	17.4	18.7	18.8	19.6	20.3	21.9	23.5	23.9	24.2	23.8	23.6	23.1	22.2	19.8	17.1	15.4	Diurnal Maximum



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

**Ambient Temperature 167 m (AT167m) - C**  
**Lower Camp Met Tower - October 2015**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature 167 m (AT167m) - C  
Lower Camp Met Tower - October 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	73	9.81	9.81
0 - 10	521	70.03	79.84
10 - 20	135	18.15	97.98
> 20	15	2.02	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity 20m (RH20m) - %**

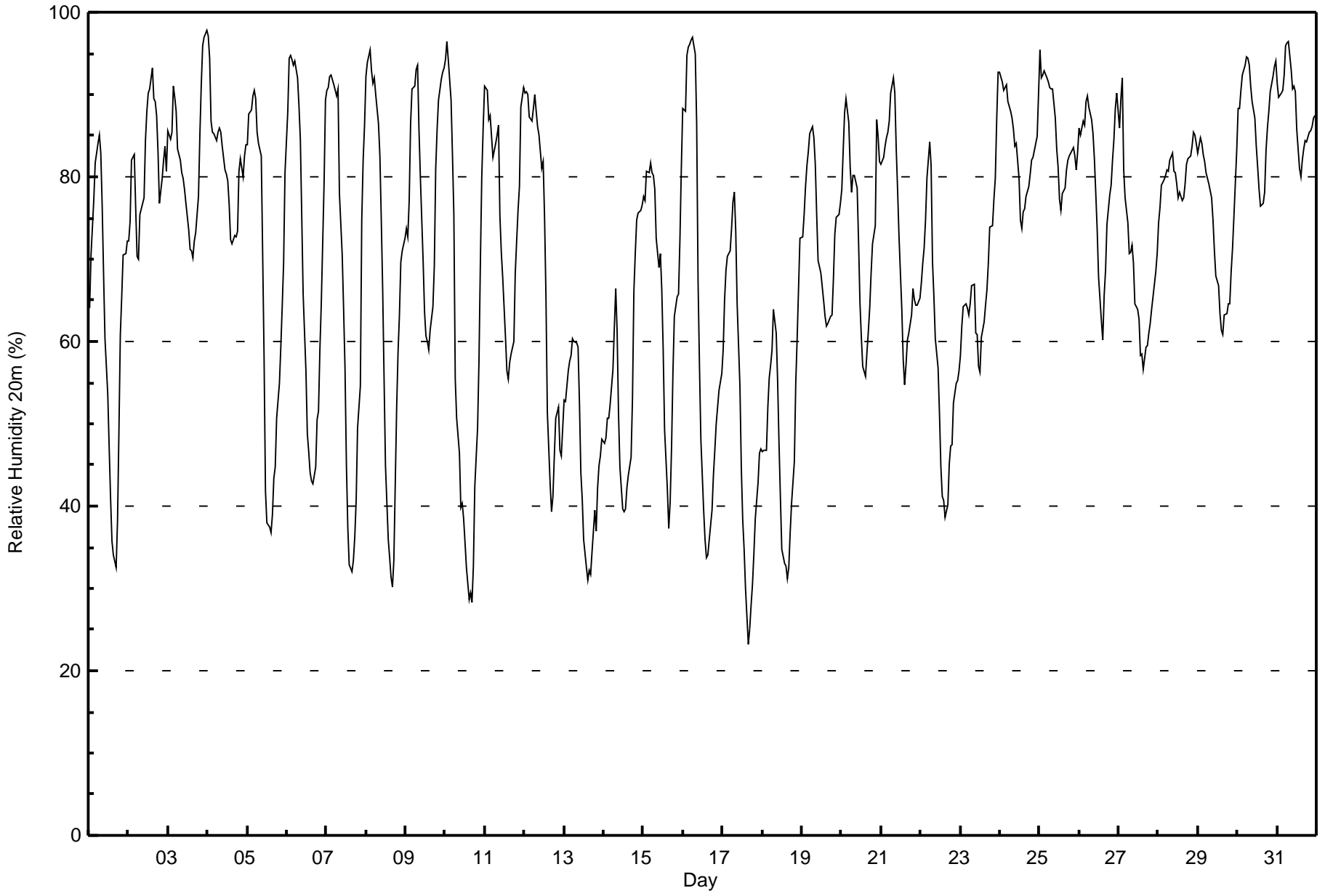
**Lower Camp Met Tower - October 2015**

Maximum Value: 98 % on Oct 4 00:00      Maximum Daily Average: 88.3 % on Oct 31																		Hours in Service: 744 Hours of Data: 744								
Minimum Value: 23 % on Oct 17 16:00      Minimum Daily Average: 46.3 % on Oct 13 Maximum Diurnal Average: 82.5 % at hour 5      Minimum Diurnal Average: 53.5 % at hour 16 Monthly Average: 70.4 %      Percentiles: P <sub>1</sub> = 30 P <sub>10</sub> = 42 Q <sub>1</sub> = 59 Median = 75 Q <sub>3</sub> = 85 P <sub>90</sub> = 91 P <sub>99</sub> = 96																		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	64	71	74	77	82	84	85	83	76	68	60	53	47	41	36	34	32	38	49	61	65	70	71	72	62.3	85
2-Oct	72	75	82	83	76	70	70	75	76	77	84	88	90	91	93	89	89	87	83	77	80	82	84	81	81.5	93
3-Oct	86	85	85	91	90	88	83	82	81	80	79	77	74	71	71	70	72	73	78	85	91	96	97	98	82.5	98
4-Oct	97	94	87	85	85	84	85	86	85	84	81	80	79	77	72	72	73	73	73	81	82	80	83	84	81.8	97
5-Oct	84	88	88	90	90	89	86	84	83	71	58	42	38	37	37	39	43	45	51	55	59	64	69	80	65.4	90
6-Oct	88	94	95	94	94	94	92	89	85	75	66	56	49	47	44	43	43	45	50	52	59	65	79	89	70.2	95
7-Oct	90	91	92	92	91	91	90	91	78	71	64	57	45	37	33	32	33	36	41	50	55	75	82	86	66.8	92
8-Oct	92	94	95	93	91	92	90	87	83	75	66	55	45	36	34	31	30	33	52	59	63	70	71	73	67.1	95
9-Oct	74	73	77	86	91	91	93	94	86	80	70	64	61	60	59	61	64	69	81	86	89	92	93	93	78.6	94
10-Oct	94	96	94	89	83	75	55	51	46	40	40	38	36	33	29	30	28	33	42	50	58	70	80	86	57.3	96
11-Oct	91	91	87	87	85	82	84	85	86	75	71	68	60	56	55	57	58	60	68	72	76	79	88	91	75.7	91
12-Oct	90	90	90	87	87	88	90	88	86	85	81	82	75	65	51	43	39	41	46	51	52	47	46	50	68.8	90
13-Oct	53	53	56	58	58	60	60	60	59	52	44	41	36	33	31	32	32	34	40	37	42	45	46	48	46.3	60
14-Oct	48	48	51	51	52	57	62	67	61	51	45	40	39	40	42	44	46	53	66	71	75	76	76	77	55.6	77
15-Oct	78	77	81	81	82	80	80	78	73	69	71	66	59	49	42	37	40	47	56	63	65	66	72	81	66.4	82
16-Oct	88	88	95	96	96	97	97	95	86	67	57	48	40	36	34	34	36	39	44	47	50	52	54	56	63.8	97
17-Oct	59	65	69	70	71	74	77	78	73	65	55	45	38	35	30	23	25	28	31	34	39	43	46	47	50.8	78
18-Oct	47	47	47	52	56	57	59	64	61	55	48	41	35	33	33	31	33	37	40	45	55	60	66	73	48.9	73
19-Oct	73	75	79	81	83	85	86	85	81	75	70	68	67	65	63	62	62	63	63	68	73	75	75	77	73.1	86
20-Oct	78	83	88	90	87	81	78	80	80	79	72	65	60	57	56	59	61	64	68	72	74	87	85	82	74.4	90
21-Oct	82	82	84	85	85	87	90	92	90	83	78	73	64	58	55	57	60	61	63	66	65	64	64	65	73.1	92
22-Oct	67	70	71	75	80	84	81	70	65	60	57	51	45	41	41	39	40	45	47	47	53	55	55	56	58.2	84
23-Oct	58	62	64	65	64	63	65	67	67	61	61	57	56	61	62	64	66	69	74	74	77	80	87	93	67.4	93
24-Oct	93	92	91	91	91	89	88	87	86	84	84	80	75	74	76	76	78	79	80	82	82	83	85	90	83.9	93
25-Oct	95	92	92	93	92	92	91	91	91	87	83	81	77	76	78	79	81	82	83	83	84	83	81	83	85.4	95
26-Oct	86	85	87	86	89	90	88	87	85	82	78	74	68	62	60	66	69	74	78	79	82	85	88	90	79.9	90
27-Oct	86	89	92	81	77	74	71	71	72	69	64	64	63	58	59	57	59	59	61	62	64	65	69	71	69.1	92
28-Oct	74	76	79	80	80	81	81	82	83	81	81	79	77	78	77	77	79	82	82	83	84	85	85	84	80.4	85
29-Oct	83	85	84	83	82	81	79	78	77	75	71	68	67	63	61	61	63	63	65	65	68	71	75	83	73.0	85
30-Oct	88	88	91	92	94	95	94	94	91	89	87	84	81	79	76	77	78	83	86	88	90	92	93	94	87.7	95
31-Oct	91	90	90	91	92	96	96	96	93	91	91	90	86	81	80	82	83	84	84	85	86	86	87	87	88.3	96
	79.0	80.3	81.8	82.4	82.5	82.3	81.5	81.1	78.3	72.8	68.3	63.7	59.1	55.8	53.9	53.5	54.8	57.5	62.1	65.4	69.0	72.3	75.3	78.1	Diurnal Average	
	97	96	95	96	96	97	97	96	93	91	91	90	90	91	93	89	89	87	86	88	91	96	97	98	Diurnal Maximum	



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

**Relative Humidity 20m (RH20m) - %**  
**Lower Camp Met Tower - October 2015**





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

**Relative Humidity 20m (RH20m) - %**  
**Lower Camp Met Tower - October 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	61	8.20	8.20
40 - 60	140	18.82	27.02
60 - 80	249	33.47	60.48
80 - 100	294	39.52	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity 45m (RH45m) - %**

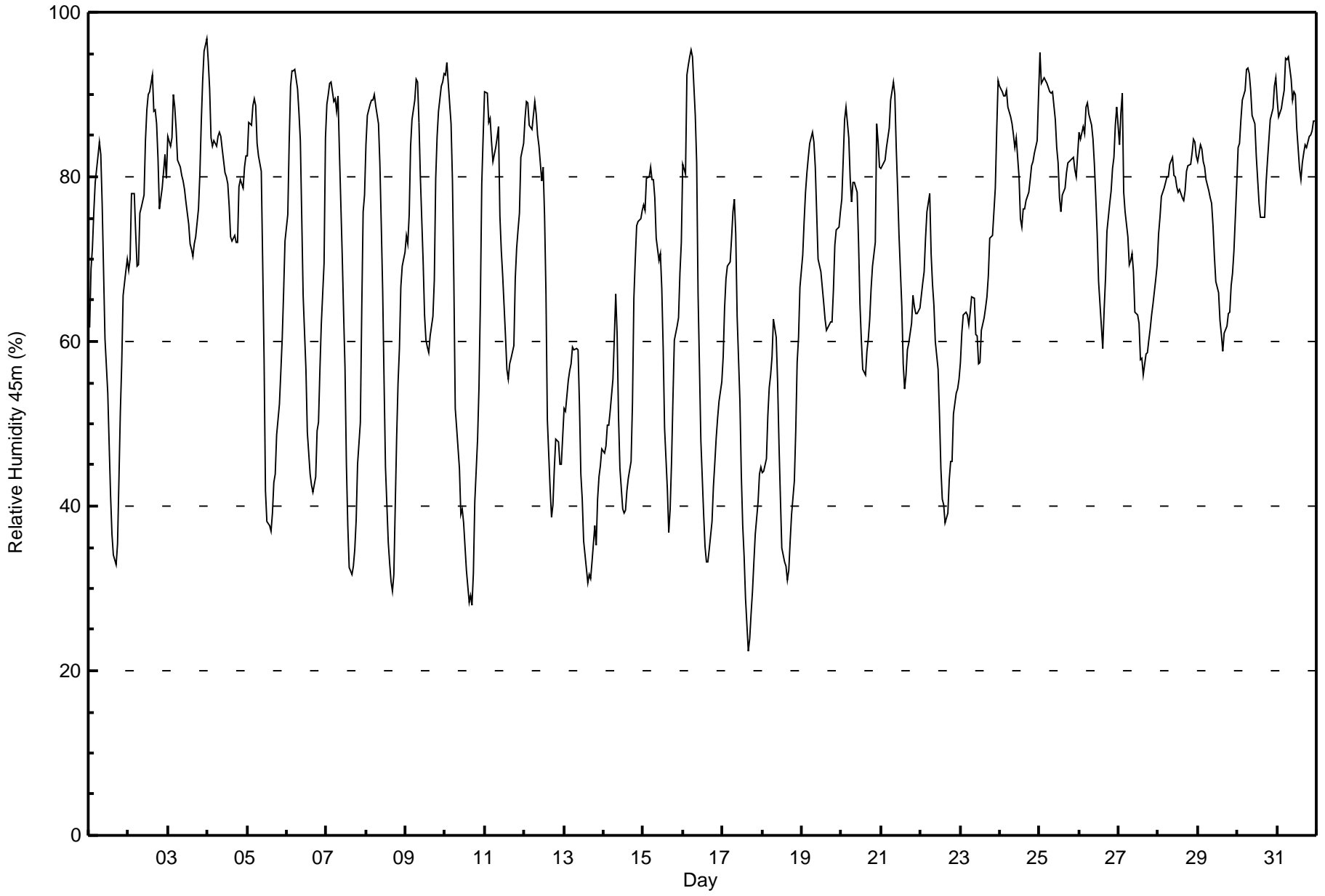
**Lower Camp Met Tower - October 2015**

Maximum Value: 97 % on Oct 4 00:00																		Maximum Daily Average: 87.4 % on Oct 31																		Hours in Service: 744							
Minimum Value: 22 % on Oct 17 16:00																		Minimum Daily Average: 45.4 % on Oct 13																		Hours of Data: 744							
Maximum Diurnal Average: 81.0 % at hour 5																		Minimum Diurnal Average: 52.9 % at hour 16																		Hours of Missing Data: 0							
Monthly Average: 69.2 %																		Percentiles: P <sub>1</sub> = 30 P <sub>10</sub> = 41 Q <sub>1</sub> = 57 Median = 73 Q <sub>3</sub> = 84 P <sub>90</sub> = 89 P <sub>99</sub> = 94																		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	62	69	71	76	79	83	84	83	77	68	60	54	47	41	37	34	33	35	43	51	57	66	69	70	60.4	84																	
2-Oct	69	70	78	78	73	69	69	76	76	78	84	88	90	90	92	88	88	86	82	76	79	81	83	80	80.2	92																	
3-Oct	85	84	85	90	88	86	82	81	80	80	78	77	74	72	71	70	72	73	76	80	87	92	95	97	81.5	97																	
4-Oct	94	91	85	84	84	84	85	85	85	83	80	80	79	76	73	72	73	72	72	79	80	79	81	83	80.8	94																	
5-Oct	82	87	86	89	90	89	84	82	81	70	58	42	38	38	37	39	43	44	49	52	56	60	66	72	63.9	90																	
6-Oct	75	84	91	93	93	93	91	88	84	75	66	57	49	46	44	42	42	44	49	50	56	62	70	85	67.9	93																	
7-Oct	89	90	91	91	89	89	88	90	83	71	63	57	45	38	33	32	33	35	38	45	50	64	76	78	64.9	91																	
8-Oct	84	87	89	89	89	90	89	86	82	74	66	55	45	36	33	31	30	32	48	55	59	67	69	71	64.8	90																	
9-Oct	73	72	75	84	87	89	92	91	87	80	70	63	60	59	59	61	63	68	80	85	88	91	92	92	77.5	92																	
10-Oct	92	94	91	86	80	67	52	49	45	39	40	38	35	32	28	29	28	32	40	48	54	65	79	85	55.4	94																	
11-Oct	90	90	87	87	84	82	84	85	86	75	71	68	61	57	55	57	58	59	68	71	74	76	82	84	74.6	90																	
12-Oct	87	89	89	86	86	87	89	88	85	84	79	81	75	66	51	42	39	40	45	48	48	45	45	48	67.6	89																	
13-Oct	52	52	55	56	57	59	59	59	59	52	44	41	36	32	31	32	31	33	38	35	41	44	45	47	45.4	59																	
14-Oct	46	47	50	50	52	55	61	66	61	51	45	40	39	40	42	43	45	53	65	70	74	75	75	76	55.0	76																	
15-Oct	77	76	80	80	81	80	80	77	73	70	71	66	59	49	42	37	40	45	53	60	62	63	68	72	65.0	81																	
16-Oct	82	80	92	94	95	95	95	87	82	66	57	48	39	35	33	33	35	38	42	45	48	51	53	55	61.7	95																	
17-Oct	58	64	68	69	70	73	76	77	73	63	53	44	38	34	29	22	24	27	30	33	37	41	44	45	49.5	77																	
18-Oct	44	44	46	51	54	56	58	63	61	55	47	41	35	33	33	31	32	36	39	43	49	57	60	67	47.3	67																	
19-Oct	71	75	78	81	82	84	85	84	81	76	70	68	67	65	63	61	62	62	62	66	72	74	74	76	72.4	85																	
20-Oct	77	82	87	88	85	80	77	79	79	78	72	65	60	57	56	59	60	63	66	69	72	86	84	81	73.5	88																	
21-Oct	81	82	82	84	85	86	89	92	90	84	78	73	64	57	54	56	59	60	62	66	64	63	63	64	72.4	92																	
22-Oct	66	67	68	73	76	78	71	67	64	60	57	51	45	41	40	38	39	43	45	45	51	54	54	55	56.2	78																	
23-Oct	57	61	63	64	63	62	64	65	65	61	61	57	57	61	63	64	65	68	73	73	76	79	86	92	66.7	92																	
24-Oct	91	90	90	90	90	89	87	86	85	84	85	80	75	74	76	76	77	78	80	81	82	83	84	90	83.5	91																	
25-Oct	95	91	92	92	91	91	90	90	90	87	84	82	77	76	78	79	81	82	82	82	82	81	80	83	84.9	95																	
26-Oct	85	85	86	85	88	89	88	86	85	82	77	73	67	62	59	64	68	73	77	78	81	82	86	88	79.0	89																	
27-Oct	84	88	90	78	76	73	69	70	71	68	64	63	62	58	58	56	58	59	60	61	63	65	68	69	67.9	90																	
28-Oct	73	75	78	79	79	80	80	81	82	80	80	79	78	79	77	77	78	81	81	82	83	85	84	83	79.8	85																	
29-Oct	82	84	83	82	81	80	78	77	77	74	70	67	66	62	61	59	61	62	63	64	67	68	71	79	71.6	84																	
30-Oct	84	84	87	89	90	93	93	93	91	87	86	83	80	77	75	75	75	79	82	84	87	88	91	92	85.2	93																	
31-Oct	89	87	88	90	91	94	94	95	92	89	90	90	86	81	80	82	83	84	84	85	85	86	87	87	87.4	95																	
																		76.6	78.1	80.1	80.9	81.0	80.8	80.1	80.0	77.7	72.4	68.0	63.5	59.0	55.6	53.6	52.9	54.0	56.3	60.5	63.4	66.6	70.0	73.0	75.6	Diurnal Average	
																		95	94	92	94	95	95	95	95	92	89	90	90	90	90	92	88	88	86	84	85	88	92	95	97	Diurnal Maximum	



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

**Relative Humidity 45m (RH45m) - %**  
**Lower Camp Met Tower - October 2015**







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

**Relative Humidity 45m (RH45m) - %**  
**Lower Camp Met Tower - October 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	66	8.87	8.87
40 - 60	145	19.49	28.36
60 - 80	270	36.29	64.65
80 - 100	263	35.35	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

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

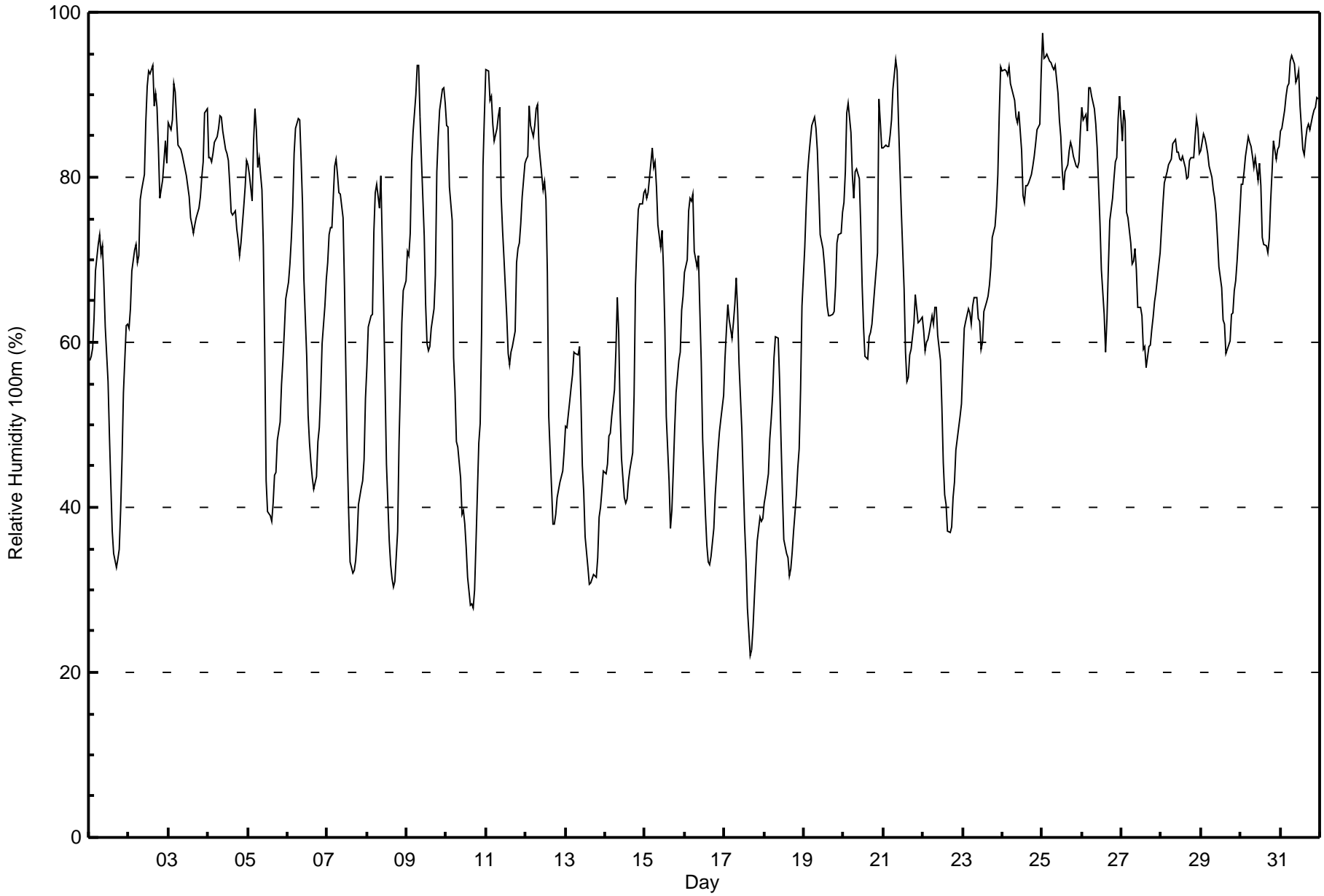
**Lower Camp Met Tower - October 2015**

Maximum Value: 97 % on Oct 25 01:00														Maximum Daily Average: 88.8 % on Oct 31														Hours in Service: 744	
Minimum Value: 22 % on Oct 17 16:00														Minimum Daily Average: 44.3 % on Oct 13														Hours of Data: 744	
Maximum Diurnal Average: 78.4 % at hour 8														Minimum Diurnal Average: 53.8 % at hour 16														Hours of Missing Data: 0	
Monthly Average: 67.9 %														Percentiles: P <sub>1</sub> = 29 P <sub>10</sub> = 40 Q <sub>1</sub> = 57 Median = 72 Q <sub>3</sub> = 83 P <sub>90</sub> = 88 P <sub>99</sub> = 94														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	58	58	59	63	69	72	73	71	72	67	62	55	49	43	37	34	33	34	35	40	46	54	62	62	54.5	73			
2-Oct	62	64	69	71	72	70	70	77	78	80	87	91	93	93	93	89	90	88	83	77	80	82	84	82	80.3	93			
3-Oct	87	86	87	91	90	87	84	83	83	82	81	80	78	75	74	73	74	75	76	78	80	82	88	88	81.8	91			
4-Oct	82	82	82	83	84	85	86	88	87	86	83	83	82	79	76	75	76	74	72	70	72	76	79	82	80.2	88			
5-Oct	82	80	77	84	88	86	81	82	78	72	59	43	40	39	38	41	44	44	48	50	55	58	61	65	62.4	88			
6-Oct	67	70	72	76	83	86	87	87	82	77	68	58	51	48	45	44	42	44	48	50	54	60	64	68	63.8	87			
7-Oct	70	73	74	74	81	82	80	78	78	75	67	56	47	39	33	32	32	34	36	40	42	43	46	53	57.0	82			
8-Oct	57	62	63	63	73	78	79	76	80	72	64	55	45	36	33	31	30	31	37	48	55	62	66	68	56.9	80			
9-Oct	71	70	73	82	85	90	93	94	87	82	73	65	60	59	59	62	64	68	81	85	88	91	91	89	77.6	94			
10-Oct	86	86	79	75	58	54	48	47	44	39	40	38	35	32	28	28	28	30	36	48	50	61	81	87	51.6	87			
11-Oct	93	93	89	90	86	84	86	88	89	78	74	70	63	59	57	59	60	61	70	71	72	74	78	82	76.0	93			
12-Oct	82	83	89	86	85	86	88	89	84	82	79	79	77	68	51	42	38	38	39	41	43	44	44	47	66.1	89			
13-Oct	50	50	53	55	56	59	59	59	60	53	45	42	36	33	31	31	31	32	31	34	39	40	42	44	44.3	60			
14-Oct	44	45	49	49	51	54	59	65	61	52	46	41	40	41	43	45	47	54	67	72	76	77	77	78	55.5	78			
15-Oct	78	77	78	82	84	81	82	79	74	72	74	69	62	51	43	37	40	44	50	54	58	59	64	66	64.9	84			
16-Oct	68	70	76	77	77	78	71	69	70	64	58	48	39	35	33	33	34	38	42	44	47	49	51	53	55.2	78			
17-Oct	58	61	65	63	60	62	65	68	64	57	49	44	38	34	28	22	23	25	29	33	36	39	38	39	45.8	68			
18-Oct	41	42	44	48	51	54	58	61	60	55	48	42	36	34	34	32	32	35	37	41	45	47	54	64	45.7	64			
19-Oct	71	77	80	83	85	86	87	86	83	78	73	71	69	67	64	63	63	63	64	67	72	73	73	76	74.0	87			
20-Oct	77	81	88	89	85	80	77	81	81	80	74	67	62	58	58	61	61	62	64	67	71	89	87	84	74.3	89			
21-Oct	84	84	84	84	85	87	91	94	93	87	81	76	66	59	55	56	58	59	62	66	64	62	63	63	73.4	94			
22-Oct	61	59	60	60	61	63	62	64	64	61	58	52	45	41	40	37	37	38	41	43	47	50	51	53	52.1	64			
23-Oct	57	62	63	64	64	62	64	65	65	63	63	59	60	64	65	66	67	69	73	74	76	80	88	93	67.7	93			
24-Oct	93	93	93	92	93	91	90	89	87	87	88	83	78	77	79	79	80	81	81	82	84	86	86	93	86.1	93			
25-Oct	97	94	95	95	94	94	93	93	93	90	87	85	81	78	81	81	83	84	84	83	81	81	82	86	87.3	97			
26-Oct	88	87	88	86	91	91	90	88	87	83	79	74	69	63	59	63	69	75	78	80	82	82	87	90	80.3	91			
27-Oct	84	88	87	76	75	72	69	70	71	69	64	64	63	59	59	57	59	60	62	63	65	66	69	71	68.5	88			
28-Oct	74	77	79	81	82	82	82	84	85	83	83	82	82	83	81	80	80	82	82	82	85	87	86	83	81.9	87			
29-Oct	83	85	85	84	83	81	80	79	77	76	72	69	67	63	62	59	59	60	63	64	66	68	70	76	72.1	85			
30-Oct	79	79	81	83	85	84	84	83	81	82	80	82	79	73	72	72	71	72	77	81	84	82	83	84	79.7	85			
31-Oct	86	86	88	90	91	91	94	95	94	91	92	93	89	83	83	85	86	86	86	88	88	88	90	90	88.8	95			
														73.3 74.3 75.7 76.7 77.7 77.9 77.9 78.4 77.2 73.4 69.3 65.1 60.7 57.0 54.8 53.8 54.6 56.1 59.2 61.8 64.6 67.5 70.5 72.8														Diurnal Average	
														97 94 95 95 94 94 94 95 94 91 92 93 93 93 93 89 90 88 86 88 88 91 91 93														Diurnal Maximum	



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

**Relative Humidity 100m (RH100m) - %**  
**Lower Camp Met Tower - October 2015**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Relative Humidity 100m (RH100m) - %  
Lower Camp Met Tower - October 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	73	9.81	9.81
40 - 60	156	20.97	30.78
60 - 80	262	35.22	65.99
80 - 100	253	34.01	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity 167m (RH167m) - %**

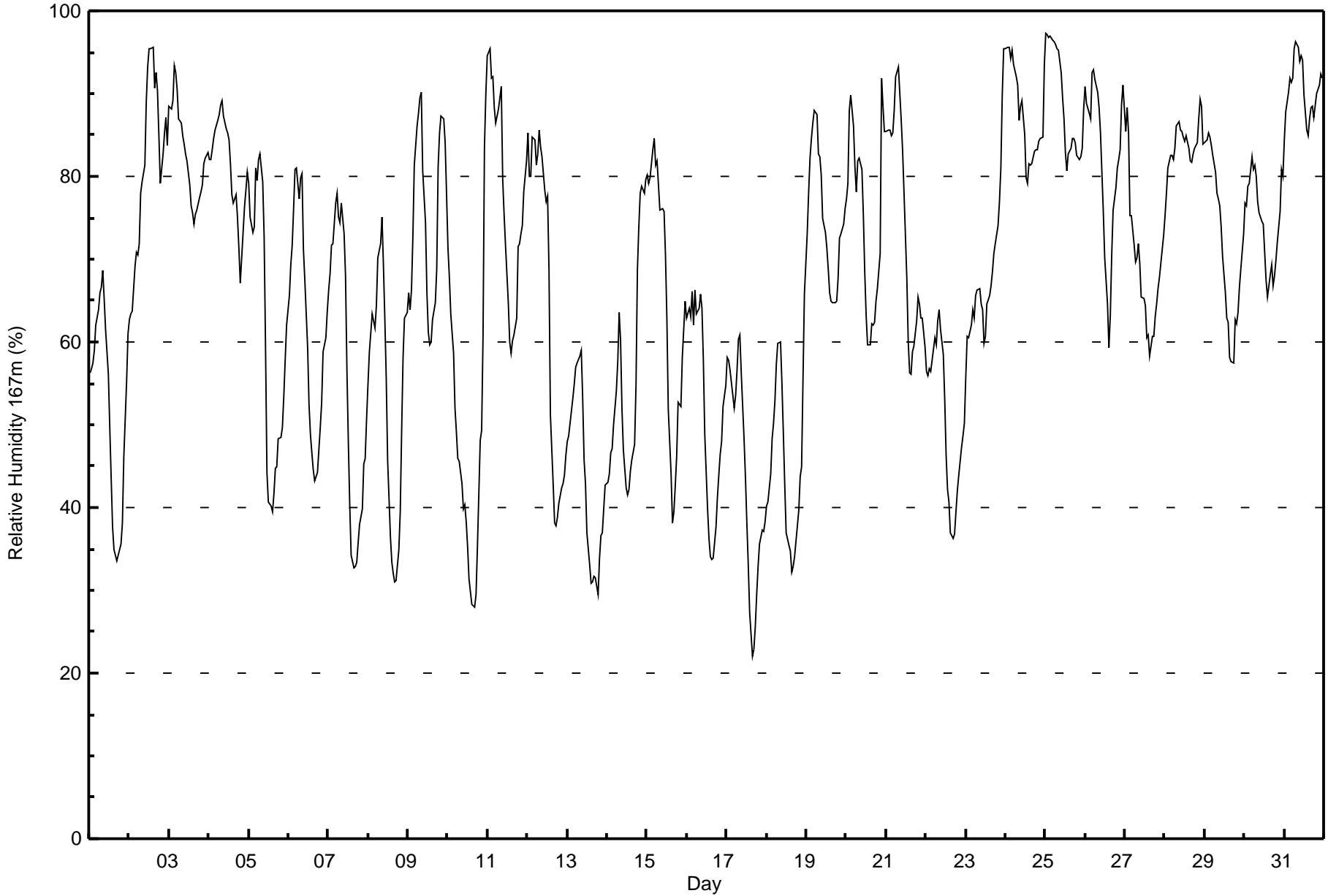
**Lower Camp Met Tower - October 2015**

Maximum Value: 97 % on Oct 25 01:00      Maximum Daily Average: 90.6 % on Oct 31																	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0									
Minimum Value: 22 % on Oct 17 16:00      Minimum Daily Average: 43.3 % on Oct 17 Maximum Diurnal Average: 77.3 % at hour 8      Minimum Diurnal Average: 54.6 % at hour 16 Monthly Average: 67.5 %      Percentiles: P <sub>1</sub> = 29 P <sub>10</sub> = 40 Q <sub>1</sub> = 56 Median = 69 Q <sub>3</sub> = 83 P <sub>90</sub> = 89 P <sub>99</sub> = 96																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	56	57	57	59	62	64	66	67	69	65	62	56	50	44	38	35	34	34	35	36	38	46	55	61	51.8	69
2-Oct	63	63	64	69	71	71	72	78	79	81	89	93	95	95	96	91	93	90	85	79	83	85	87	84	81.5	96
3-Oct	89	88	89	93	93	90	87	86	85	84	83	82	79	76	76	74	75	76	77	78	79	81	82	83	82.8	93
4-Oct	82	82	83	85	86	87	87	89	89	87	86	85	84	82	78	77	78	75	71	67	70	76	78	80	81.1	89
5-Oct	79	75	73	74	81	79	82	83	79	73	59	44	41	40	39	42	45	45	48	48	50	53	58	62	60.6	83
6-Oct	66	69	72	76	81	81	77	80	80	71	67	59	52	49	47	45	43	44	47	50	53	59	61	64	62.2	81
7-Oct	66	68	72	72	77	78	75	74	77	73	68	57	48	40	34	33	33	33	36	38	40	45	46	51	55.6	78
8-Oct	55	59	63	62	62	64	70	72	75	69	63	56	46	36	33	32	31	31	35	39	49	58	63	63	53.7	75
9-Oct	66	64	66	73	81	86	88	90	90	81	74	66	61	60	60	63	65	69	81	85	87	87	84	78	75.2	90
10-Oct	71	68	63	59	52	49	46	46	43	40	40	38	35	31	28	28	28	29	35	48	49	61	84	90	48.4	90
11-Oct	95	95	92	92	88	86	88	90	91	80	75	72	65	60	59	60	61	63	71	72	73	74	78	82	77.6	95
12-Oct	85	80	80	85	84	81	83	86	84	82	78	77	78	69	51	43	38	38	39	41	42	43	44	46	64.8	86
13-Oct	48	49	52	53	55	57	58	58	59	53	46	43	37	33	31	31	32	31	29	34	37	37	40	43	43.5	59
14-Oct	43	44	47	47	50	54	58	64	60	52	47	42	42	44	46	48	55	69	74	78	79	78	80	80	55.9	80
15-Oct	80	79	80	83	85	81	82	79	76	76	76	70	63	52	44	38	40	43	46	53	52	58	62	65	65.1	85
16-Oct	63	64	63	66	62	66	63	64	66	64	58	49	40	36	34	34	34	38	41	44	46	48	52	55	52.1	66
17-Oct	58	58	57	55	52	54	57	60	61	56	48	44	38	33	27	22	23	26	29	33	36	37	37	38	43.3	61
18-Oct	40	41	44	48	50	53	57	60	60	55	49	43	37	35	35	32	33	34	36	40	44	45	55	66	45.5	66
19-Oct	73	78	82	85	87	88	87	83	82	80	75	73	71	69	66	65	65	65	65	68	72	73	74	76	75.1	88
20-Oct	77	79	88	90	86	81	78	82	82	81	75	68	63	60	60	62	62	62	65	66	71	92	88	85	75.2	92
21-Oct	85	86	86	85	85	88	92	93	90	87	83	78	68	60	56	56	59	60	63	66	65	63	63	59	73.9	93
22-Oct	56	56	57	56	58	60	60	63	64	62	58	53	46	42	41	37	36	37	39	42	44	47	49	50	50.6	64
23-Oct	56	61	60	62	64	63	66	66	66	65	64	60	61	65	66	67	68	71	72	74	77	81	90	95	68.3	95
24-Oct	95	96	96	94	95	94	92	91	87	88	89	85	80	79	82	81	82	83	83	83	84	85	85	94	87.6	96
25-Oct	97	97	97	97	96	96	96	95	95	93	90	87	83	81	83	83	85	85	84	83	82	82	83	88	89.1	97
26-Oct	91	89	88	87	93	93	92	90	88	85	81	76	70	65	59	63	70	76	79	81	82	83	89	91	81.7	93
27-Oct	85	88	85	75	75	72	70	70	72	69	65	65	64	60	61	58	61	61	63	65	66	68	71	73	69.3	88
28-Oct	75	78	81	83	83	82	83	86	87	86	85	85	84	85	83	82	82	83	83	84	87	89	88	84	83.7	89
29-Oct	84	84	85	85	84	83	81	78	77	76	74	70	66	63	62	58	58	57	63	62	64	67	69	73	71.8	85
30-Oct	77	76	79	79	82	81	81	80	77	76	75	74	71	68	65	68	69	67	68	70	72	76	81	80	74.6	82
31-Oct	84	88	90	92	91	92	95	96	96	94	95	94	90	86	85	87	88	88	87	90	91	91	92	92	90.6	96
72.3 72.9 73.9 74.9 75.8 76.0 76.4 77.3 77.0 73.7 70.3 66.0 61.5 57.9 55.6 54.6 55.4 56.4 58.9 61.0 63.3 66.8 69.9 72.0																	Diurnal Average									
97 97 97 97 96 96 96 96 96 94 95 94 95 95 96 91 93 90 87 90 91 92 92 95																	Diurnal Maximum									



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

**Relative Humidity 167m (RH167m) - %**  
**Lower Camp Met Tower - October 2015**





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

**Relative Humidity 167m (RH167m) - %**  
**Lower Camp Met Tower - October 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	77	10.35	10.35
40 - 60	161	21.64	31.99
60 - 80	264	35.48	67.47
80 - 100	242	32.53	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 27 km/h on Oct 10 13:00	Maximum Daily Speed Average: 15.3 km/h on Oct 13	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 1 18:00	Minimum Daily Speed Average: 0.7 km/h on Oct 15	Hours of Data: 744
Maximum Diurnal Speed Average: 3.0 km/h at hour 11	Minimum Diurnal Speed Average: 0.3 km/h at hour 19	Hours of Missing Data: 0
Monthly Average Velocity: 1.3 km/h 245.9 deg	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 2 Q <sub>1</sub> = 4 Median = 7 Q <sub>3</sub> = 13 P <sub>90</sub> = 17 P <sub>99</sub> = 23	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	SSE10	SSE11	SSE13	SE10	SE8	SE9	SE8	SE8	SE9	SSE10	SSE7	SSE8	SSE7	SSE3	N3	NNE3	N1	W0	ESE0	N0	NNW2	N3	NNW3	N3	SE4.4	SSE13
2-Oct	N3	ESE1	NNW3	NNW3	NNW6	N10	N8	N9	N11	N14	N13	N12	N16	N14	N14	N14	N12	N9	N10	N14	N14	N17	N12	N14	N10.5	N17
3-Oct	N11	N12	N13	N12	NNW11	NNW12	N12	NNW13	N11	N11	NNE10	NE8	NNE7	NE6	NE7	NNE7	NNE6	NE6	NNE3	NNW2	NE1	NW2	N2	NW1	N7.3	N13
4-Oct	NW4	NNE2	ENE1	E1	SE2	E1	ESE2	SE5	SE7	SE5	SW7	SSW6	SSW6	SSW5	SSE5	SSE7	SSE8	SSE9	SSE5	SE6	SSE7	SSE5	SSE4	ESE3	SSE3.6	SSE9
5-Oct	SE6	SSE8	SSE12	SSE7	SE7	SE8	SSE7	SSE4	SE5	ESE3	W7	NW18	NW21	NW19	NW19	NNW17	NNW13	NNW10	NNW6	NNW4	N6	N6	NNE2	W0	NW3.2	NW21
6-Oct	WNW1	N1	ESE0	SSE1	SE2	SE3	SE5	SE5	SSE6	SE8	SSE8	SSE10	SE8	SSE8	SSE6	SSE7	SSE8	SSE6	S4	SE9	SE5	NNE1	N4	NNW4	SSE4.0	SSE10
7-Oct	NNW4	NW4	NW3	NW4	NW4	NW3	SW0	N1	NNW1	SSE1	SSE3	SSE4	SW2	SW3	SW7	W12	W10	NW5	NNW6	NNW2	NNW2	N1	NNW1	NNW2	WNW2.3	W12
8-Oct	W0	NNW1	NNW2	NW2	ENE1	E1	SE2	SE3	SE4	SE6	SE7	SSE8	SSE7	SSE11	SSE12	SSE9	SE7	ESE4	N8	N5	N6	N4	N3	N2	SE2.3	SSE12
9-Oct	N2	NNW3	N5	NW2	NW3	NNW3	NW3	NW4	NE1	SSE5	S2	SSE5	SSE6	NE2	N4	NNE5	N5	NNW5	NNW4	NNW4	N4	NW3	NNE3	NNW1	N1.8	SSE6
10-Oct	NNW3	NNW1	SE3	SE5	SE14	SE12	WSW7	WNW6	S6	SW15	WSW14	W24	W27	W23	W26	W22	WNW19	WNW9	NW7	W1	WNW3	N5	N7	N8	W7.4	W27
11-Oct	N8	N9	N10	N9	N10	NNE10	N10	N9	NNW10	N12	NNW10	N10	NNW15	NNW14	NNW12	N11	NNW10	NNW9	NW12	NW9	NW4	NW3	WSW1	SSE4	NNW8.4	NNW15
12-Oct	SE7	SE8	SE8	SE7	SE10	SE5	SE4	SE5	SSE12	S8	SSE9	SSE14	SE11	ESE10	SSW11	W15	W17	W14	W12	W9	WSW8	WSW12	WSW16	W16	SSW5.4	W17
13-Oct	W17	W16	W19	W18	W17	W16	NNW16	W16	W15	W15	W17	W14	W17	W20	W18	W23	WNW17	WNW9	W9	WSW6	W10	W15	W16	W17	W15.3	W23
14-Oct	W18	W18	W13	W18	W18	W15	W14	W17	W19	W20	NNW19	NNW19	NW18	NW20	NNW19	NNW13	NNW11	N9	NNE6	NE5	NNW3	NW3	N5	N3	WNW11.4	NW20
15-Oct	NW3	NNW3	NNE2	NNE2	E2	NNE2	NNE2	ESE1	SE1	WSW2	SSW5	SSE6	S3	SSW3	SSE3	SW5	SW5	S7	SSE6	NNE3	ESE2	ESE2	NNW4	NNW2	SSE0.7	S7
16-Oct	NW1	NNW4	NNW3	NNW3	NW3	NNW1	N2	N7	NNW3	SE13	SE12	SE12	SSE14	SSE15	SE15	SSE14	SE13	SE11	SSE12	SE16	SE18	SSE11	SSE7	SE9	SE6.9	SE18
17-Oct	SE4	SSE5	SSE6	SSE10	SSE13	SE12	SE11	SSE9	SSE8	SSE9	SSE15	SSE15	SSE14	SSE14	SSE15	S12	SW8	SW10	SSW7	S10	SSE13	SSE13	SSE14	SSE14	SSE10.1	SSE15
18-Oct	SSE11	SW5	W20	W18	W17	W15	WNW10	W11	W13	W16	W19	WNW20	NW19	NW20	NW19	NW18	NW14	NW12	NW9	WNW2	WNW5	W4	NNW3	N5	WNW11.0	WNW20
19-Oct	NNW4	NNW5	N7	N6	N6	N5	NNE3	NNE3	NE3	E4	SE6	ESE6	ESE6	SE6	SE8	ESE8	ESE9	ESE6	SE10	SE12	SE15	SE17	SSE19	SSE12	ESE4.7	SSE19
20-Oct	SSE10	S4	S7	WSW12	W16	WNW16	WNW12	W14	W14	W16	W17	WNW18	WNW18	NW19	NNW18	NW16	NNW14	NW9	NNW4	NNW5	NNW7	N5	NE5	ENE2	WNW8.6	NW19
21-Oct	WSW0	SE2	SSE4	S2	SSW1	SSW2	SW3	SSE3	SSE4	SE7	SE10	SE12	SE11	SSE11	SE14	SE13	SE14	SSE16	SE18	SE15	SE16	SSE14	SSE9	SSE8	SSE8.4	SE18
22-Oct	SSE13	SSE12	SSE9	SSE8	SE10	SE7	SE8	WSW4	WSW15	WSW14	W15	WSW15	W16	W19	W21	W19	W13	W10	W9	W11	W12	W15	W17	W17	WSW9.3	W21
23-Oct	WNW8	WNW4	W7	SW6	SSW6	WSW10	SSW5	S6	S4	WSW7	WSW7	W6	NNW6	N6	N6	NNE6	NNE5	N4	N7	N6	N7	N6	N5	N6	WNW3.0	WSW10
24-Oct	N5	N6	NNE6	N5	NNE4	NNE4	NE3	NNE3	NNE4	N3	N5	N2	NW2	NW4	NNW4	NNW3	NNW3	NNW3	NE2	ENE1	ENE1	NNE1	N2	N5	N3.1	N6
25-Oct	N9	N8	N8	N6	NNW5	N6	N5	NNW5	N6	NNE5	N2	NNW3	NNW0	SSW2	W2	NNW3	N4	NW3	NNW3	NW2	NNW4	SSW0	S10	S15	NNW2.5	S15
26-Oct	SSW10	S7	SSE3	SSE10	SE11	SE9	SE15	SE16	SE16	SSE20	SSE21	SSE20	SE20	SE20	SSE16	SSE22	S22	SSE23	SSE23	SSE22	SSW11	NW16	WNW18	WNW14	SSE11.9	SSE23
27-Oct	WNW15	NW14	NW9	NW13	NW15	NW16	NW17	NW14	NW15	NW15	NNW14	NW13	NW18	NW20	NW18	NNW17	NNW14	NNW11	NNW10	NNW12	NNW7	NNW5	N5	NNW5	NW12.7	NNW20
28-Oct	NNW4	NNE4	NE3	ESE2	E2	ENE1	E1	SE5	SE4	SSW7	SSW7	S9	SSE11	SSE11	SE11	SSE12	SE12	SE14	SE17	SSE19	SSE15	SSE12	SE16	SSE19	SSE8.0	SSE19
29-Oct	SSE22	SSE16	SSE9	SSE14	SSE15	SSE15	SSE17	SSE18	SSE15	SSE16	SSE17	SSE16	SSE16	SSE15	SSE15	SSE14	SSE9	SSE8	ESE6	SSE7	SSE5	SSE6	SSE6	SSE9	SSE12.5	SSE22
30-Oct	SSE7	SSE6	SSE8	SE9	SSE9	SSE9	SSE9	SE10	SE9	SSE9	SE9	SSE9	SSE10	SSE9	SSE10	SE3	SSE2	NNE2	W2	SE2	S1	SSE4	NNW3	NNW3	SSE5.6	SE10
31-Oct	W3	N3	N3	WNW2	NNW3	N3	NNW4	NNE3	ENE2	N1	ENE2	NNE2	NNE3	NNE4	ENE6	ENE7	NE5	NE5	NNE5	NNE5	NNE7	N6	N4	N5	NNE3.3	NNE7

WSW1.2	W0.8	W1.0	WSW1.5	SW1.3	NNW0.8	WSW0.8	WSW1.0	SW1.5	SW2.4	SW3.0	SW2.8	WSW2.2	W2.1	W2.2	W2.5	WNW2.1	W0.9	NNE0.3	SSE1.2	S0.6	NNW0.9	W1.0	WSW1.0	Diurnal Average
SSE2.2	W18	W20	W18	W18	WNW16	NW17	SSE18	W19	W20	SSE21	W24	W27	W23	W26	W23	S22	SSE23	SSE23	SSE22	SE18	SE17	SSE19	SSE19	Diurnal Maximum

All monthly, daily, and diurnal averages have been calculated using vector methods





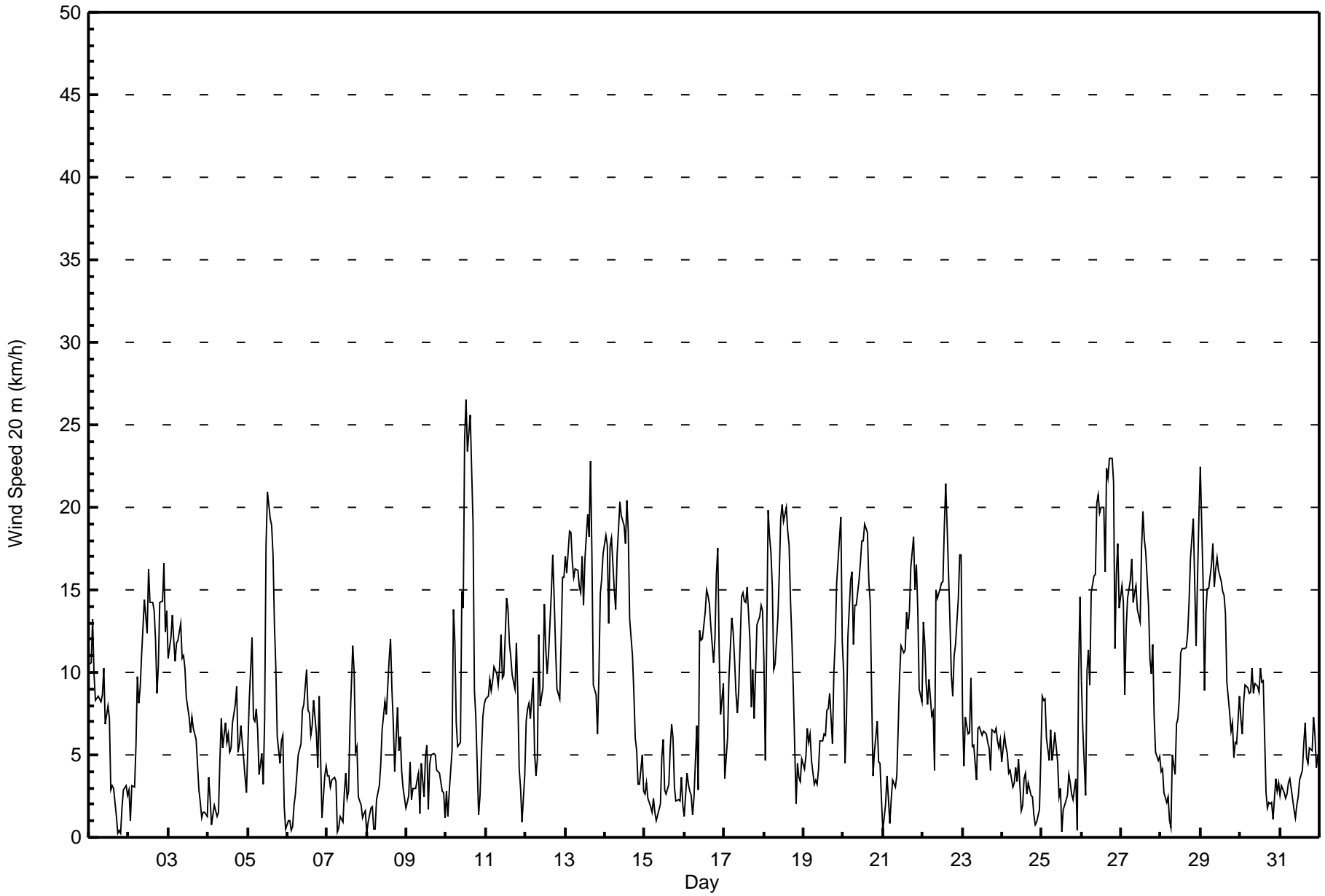
Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed 20 m (WS20m) - km/h

Lower Camp Met Tower - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Oct 10 15:00 Minimum Value: 1 km/h on Oct 1 18:00 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	2	4	3	3	2	2	2	3	3	3	3	3	2	1	2	1	1	1	1	1	3	1	1	4	
2-Oct	1	2	2	1	2	4	3	4	4	5	5	5	6	5	6	6	5	4	4	5	5	6	5	6	
3-Oct	4	5	5	4	4	4	5	5	5	4	5	4	4	3	4	3	3	3	1	1	1	1	1	5	
4-Oct	2	1	1	1	1	1	1	2	2	3	3	2	2	3	3	2	3	3	2	2	3	3	2	3	
5-Oct	3	4	3	4	3	2	2	2	2	2	5	8	9	7	7	6	5	4	2	2	2	2	1	1	
6-Oct	1	1	1	1	1	1	2	2	2	3	3	3	3	2	3	2	3	2	2	2	4	1	2	2	
7-Oct	1	1	1	1	1	1	1	1	1	1	2	2	2	2	3	5	4	2	2	1	1	1	1	1	
8-Oct	1	1	1	1	1	1	1	1	2	2	2	3	3	3	4	3	2	3	2	2	2	2	2	1	
9-Oct	1	1	2	1	2	2	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	1	1	2	
10-Oct	2	1	3	4	4	5	6	5	4	7	5	9	9	8	9	8	7	4	3	2	2	4	3	3	
11-Oct	3	3	3	3	3	4	4	3	4	5	4	3	5	5	5	4	4	4	4	4	2	2	1	1	
12-Oct	1	2	3	3	4	4	2	4	3	3	3	4	4	4	5	6	6	5	3	2	1	3	5	5	
13-Oct	5	5	6	5	6	6	6	5	6	6	6	5	6	6	6	8	7	3	2	2	5	5	5	8	
14-Oct	5	5	5	6	6	5	4	7	7	7	8	7	6	7	6	5	4	4	3	2	2	1	3	1	
15-Oct	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	3	2	3	2	1	2	1	1	1	
16-Oct	1	2	1	1	1	1	2	2	2	6	5	4	5	5	5	5	4	3	3	4	5	4	4	5	
17-Oct	3	2	2	2	3	3	2	2	2	3	3	4	4	3	3	4	3	4	2	3	2	2	4	5	
18-Oct	5	6	6	6	5	5	5	3	5	6	7	8	8	6	7	6	4	4	3	2	2	3	1	2	
19-Oct	1	2	3	2	2	2	2	1	2	3	3	3	3	2	3	3	3	3	4	4	4	5	7	8	
20-Oct	5	3	2	4	5	6	4	4	5	6	6	7	6	7	7	6	4	3	1	3	3	2	2	1	
21-Oct	1	1	1	1	1	2	2	2	2	3	4	4	4	4	5	5	5	5	5	5	6	7	3	4	
22-Oct	5	4	3	2	2	2	3	5	4	5	5	5	5	6	6	6	4	2	2	3	3	4	4	5	
23-Oct	4	2	2	2	3	3	2	2	2	3	3	3	3	2	3	2	1	2	2	2	2	2	3	4	
24-Oct	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	1	1	1	1	1	1	1	1	2	
25-Oct	3	3	3	2	2	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	2	4	4	
26-Oct	3	2	2	5	4	4	5	5	6	7	7	7	7	7	5	7	6	6	6	5	4	6	6	5	
27-Oct	5	5	3	4	4	5	5	4	4	5	5	5	6	7	6	5	5	4	4	4	3	2	2	1	
28-Oct	2	2	2	1	1	1	1	2	2	2	2	3	3	4	4	4	5	5	6	7	6	3	6	6	
29-Oct	6	6	4	5	5	5	4	5	4	5	4	3	3	3	3	2	2	3	2	2	2	3	2	3	
30-Oct	2	2	2	2	2	2	2	3	3	3	3	4	3	3	4	3	1	2	1	3	1	2	1	1	
31-Oct	1	1	1	1	1	1	1	1	1	1	1	1	2	2	3	3	3	2	2	2	3	2	2	2	
Diurnal Maximum																								6	





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

**Wind Speed 20 m (WS20m) - km/h**  
**Lower Camp Met Tower - October 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	278	37.37	37.37
6 - 11	238	31.99	69.35
12 - 19	202	27.15	96.51
20 - 28	26	3.49	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

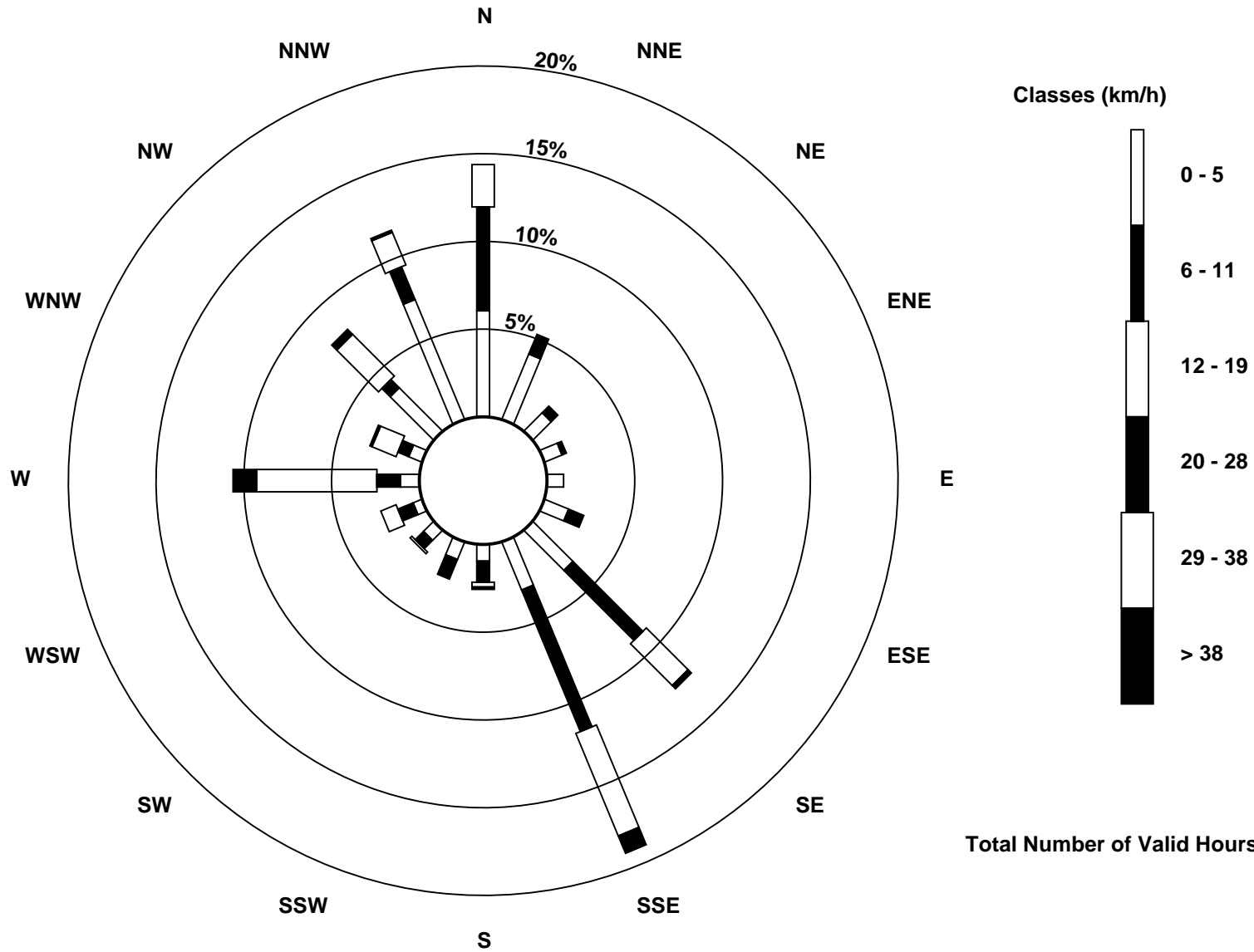
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

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





Maximum Speed: 36 km/h on Oct 10 13:00	Maximum Daily Speed Average: 20.6 km/h on Oct 13	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 21 01:00	Minimum Daily Speed Average: 0.6 km/h on Oct 15	Hours of Data: 744
Maximum Diurnal Speed Average: 3.7 km/h at hour 11	Minimum Diurnal Speed Average: 0.6 km/h at hour 21	Hours of Missing Data: 0
Monthly Average Velocity: 1.6 km/h 254.3 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 5 Median = 10 Q <sub>3</sub> = 17 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	SSE14	SSE16	SSE19	SE14	SE11	SE11	SE12	SE12	SE12	SSE14	SSE9	SSE10	SSE9	SSE3	N3	NNE4	N1	W0	ESE1	N1	NNW3	N5	NNW5	N5	SE5.9	SSE19	
2-Oct	N4	ESE2	NNW6	NNW5	NNW9	N14	N12	N13	N15	N20	N19	N18	N23	N19	N20	N20	N16	N12	N15	N19	N20	N23	N18	N19	N14.9	N23	
3-Oct	N16	N17	N18	N17	NNW15	NNW17	N17	NNW18	N15	N15	NNE15	NE12	NNE11	NE9	NE10	NNE10	NNE9	NE8	NNE5	NNW4	NE2	NW1	N1	NW1	N10.4	N18	
4-Oct	NW5	NNE4	ENE2	E2	SE3	E3	ESE3	SE6	SE9	SE7	SW8	SSW7	SSW7	SSW6	SSE6	SSE8	SSE10	SSE11	SSE7	SE8	SSE10	SSE8	SSE6	ESE4	SSE4.7	SSE11	
5-Oct	SE8	SSE10	SSE15	SSE10	SE9	SE10	SE7	SSE3	SE4	ESE2	W9	NW23	NW27	NW24	NW24	NNW22	NNW17	NNW14	NNW9	NNW8	N9	N10	NNE4	W1	NW4.7	NW27	
6-Oct	WNW2	N1	ESE1	SSE2	SE2	SE4	SE8	SE8	SSE7	SE9	SSE9	SSE12	SE9	SSE9	SSE7	SSE8	SSE11	SSE8	S5	SE12	SE10	NNE2	N4	NNW7	SE5.1	SSE12	
7-Oct	NNW6	NW5	NW3	NW4	NW6	NW4	SW1	N0	NNW1	SSE1	SSE3	SSE4	SW2	SW3	SW8	W15	W13	NW8	NNW9	NNW6	NW4	N3	NNW2	NNW3	WNW3.3	W15	
8-Oct	W1	NNW1	NNW3	NW2	ENE0	E1	SE4	SE5	SE6	SE8	SE9	SSE10	SSE9	SSE13	SSE15	SSE11	SE8	ESE6	N11	N8	N9	N6	N5	N3	ESE2.8	SSE15	
9-Oct	N4	NNW4	N7	NW3	NW4	NNW4	NW5	NW5	NE2	SSE5	S3	SSE5	SSE5	NE3	N7	NNE8	N8	NNW8	NNW6	NNW6	N6	NW4	NNE4	NNW2	N3.1	NNE8	
10-Oct	NNW4	NNW1	SE7	SE10	SE18	SE14	WSW12	WNW8	S6	SW20	WSW19	W32	W36	W32	W33	W30	WNW25	WNW11	NW10	W2	WNW5	N9	N11	N12	W9.9	W36	
11-Oct	N12	N13	N14	N13	N14	NNE15	N15	N13	NNW15	N17	NNW14	N13	NNW19	NNW19	NNW16	N15	NNW14	NNW12	NW15	NW11	NW6	NW5	WSW1	SSE4	NNW11.8	NNW19	
12-Oct	SE8	SE10	SE11	SE10	SE14	SE8	SE6	SE7	SSE15	S9	SSE11	SSE18	SE14	ESE13	SSW14	W19	W23	W19	W16	W12	WSW12	WSW17	WSW22	W22	SSW7.1	W23	
13-Oct	W22	W22	W25	W25	W23	W21	WNW22	W22	W21	W20	W22	W19	W22	W26	W24	W31	WNW22	WNW12	W12	WSW9	W14	W20	W21	W23	W20.6	W31	
14-Oct	W25	W24	W18	W25	W24	W20	W19	W23	W25	W27	WNW25	NW23	NW23	NW25	NNW23	NNW17	NNW15	N13	NNE9	NE8	NNW5	NW4	N7	N4	WNW15.1	W27	
15-Oct	NW3	NNW5	NNE4	NNE3	E2	NNE3	NNE2	ESE2	SE2	WSW3	SSW5	SSE6	S3	SSW3	SSE3	SW6	S8	SSE8	NNE3	ESE4	ESE5	NNE3	NNW4	NNW4	SE0.6	SSE8	
16-Oct	NW2	NNW5	NNW6	NNW5	NW4	NNW3	N3	N6	NNW2	SE18	SE16	SE16	SSE19	SSE20	SE20	SSE19	SE18	SE15	SSE17	SE22	SE25	SSE17	SSE13	SE15	SE9.8	SE25	
17-Oct	SE6	SSE6	SSE8	SSE12	SSE17	SE16	SE13	SSE11	SSE9	SSE11	SSE17	SSE18	SSE17	SSE17	SSE18	S15	SW12	SW15	SSW10	S12	SSE16	SSE17	SSE20	SSE18	SSE12.7	SSE20	
18-Oct	SSE11	SW7	W27	W25	W23	W21	WNW13	W15	W19	W22	W25	WNW27	NW24	NW25	NW23	NW22	NW18	NW16	NW12	WNW4	WNW8	W5	NNW6	N9	WNW14.8	W27	
19-Oct	NNW7	NNW7	N10	N8	N9	N7	NNE5	NNE5	NE4	E6	SE7	ESE7	ESE8	SE8	SE10	ESE11	ESE12	ESE8	SE13	SE16	SE20	SE22	SSE28	SSE17	ESE6.2	SSE28	
20-Oct	SSE14	S6	S9	WSW16	W21	WNW21	WNW15	W18	W19	W21	W22	WNW24	WNW23	NW24	NNW24	NW20	NNW18	NW12	NNW6	NNW7	NNW11	N6	NE6	ENE3	WNW11.3	NNW24	
21-Oct	WSW0	SE2	SSE5	S3	SSW1	SSW3	SW4	SSE4	SSE4	SE7	SE12	SE15	SE15	SSE16	SE18	SE18	SE20	SSE22	SE25	SE20	SE23	SSE21	SSE12	SSE13	SSE11.5	SE25	
22-Oct	SSE17	SSE16	SSE12	SSE11	SE13	SE10	SE6	WSW7	WSW21	WSW20	W20	WSW21	W21	W26	W29	W26	W18	W14	W12	W16	W16	W19	W23	W23	WSW12.8	W29	
23-Oct	WNW11	WNW6	W10	SW8	SSW8	WSW13	SSW7	S6	S4	WSW8	WSW9	W8	NNW8	N9	N9	NNE9	NNE9	N7	N10	N9	N10	N9	N8	N9	NW4.2	WSW13	
24-Oct	N6	N9	NNE8	N7	NNE6	NNE6	NE5	NNE5	NNE6	N4	N6	N2	NW2	NW4	NNW5	NNW3	NNW5	NNW4	NE4	ENE3	ENE2	NNE2	N3	N7	N4.3	N9	
25-Oct	N12	N12	N12	N9	NNW7	N9	N7	NNW7	N9	NNE6	N3	NNW3	NNW1	SSW2	W2	NNW3	N5	NW4	NNW4	NNW4	NNW4	SSW2	S11	S15	N3.6	S15	
26-Oct	SSW11	S8	SSE3	SSE4	SE16	SE13	SE20	SE21	SE22	SSE29	SSE29	SSE28	SE27	SE27	SSE22	SSE30	S24	SSE27	SSE31	SSE24	SSW13	NW21	WNW23	WNW18	SSE15.6	SSE31	
27-Oct	WNW20	NW18	NW11	NW16	NW18	NW19	NW21	NW18	NW18	NW19	NNW18	NW16	NW21	NW25	NW22	NNW22	NNW18	NNW14	NNW14	NNW14	NNW16	NNW10	NNW7	N7	NNW7	NW16.2	NNW25
28-Oct	NNW6	NNE7	NE5	ESE3	E3	ENE2	E2	SE6	SE5	SSW8	SSW8	S10	SSE13	SSE13	SE14	SSE15	SE17	SE20	SE23	SSE28	SSE21	SSE15	SE21	SSE28	SE10.6	SSE28	
29-Oct	SSE29	SSE22	SSE12	SSE19	SSE20	SSE20	SSE21	SSE22	SSE18	SSE19	SSE20	SSE18	SSE19	SSE17	SSE17	SSE14	SSE12	SSE10	ESE8	SSE7	SSE7	SSE8	SSE6	SSE10	SSE15.5	SSE29	
30-Oct	SSE9	SSE9	SSE10	SE12	SSE11	SSE12	SSE12	SE14	SE12	SSE13	SE14	SSE12	SSE14	SSE13	SSE14	SE4	SSE2	NNE1	W2	SE3	S2	SE7	NNW4	NNW6	SSE7.7	SE14	
31-Oct	W3	N6	N5	WNW3	NNW4	N6	NNW6	NNE5	ENE2	N2	ENE2	NNE3	NNE4	NNE6	ENE9	ENE10	NE7	NE7	NNE8	NNE8	NNE11	N9	N6	N8	NNE5.0	NNE11	

WSW1.6	WNW1.1	W1.3	WSW2.0	SW1.7	WNW1.2	W1.0	WSW1.4	SW1.9	SW3.0	SW3.7	SW3.5	WSW2.8	W2.7	W2.7	W3.2	WNW2.8	W1.2	N0.7	SE1.2	S0.6	WNW1.2	W1.4	W1.2	Diurnal Average
SSE29	W24	W27	W25	W24	W21	WNW22	W23	W25	SSE29	SSE29	W32	W36	W32	W33	W31	WNW25	SSE27	SSE31	SSE28	SE25	N23	SSE28	SSE28	Diurnal Maximum

All monthly, daily, and diurnal averages have been calculated using vector methods



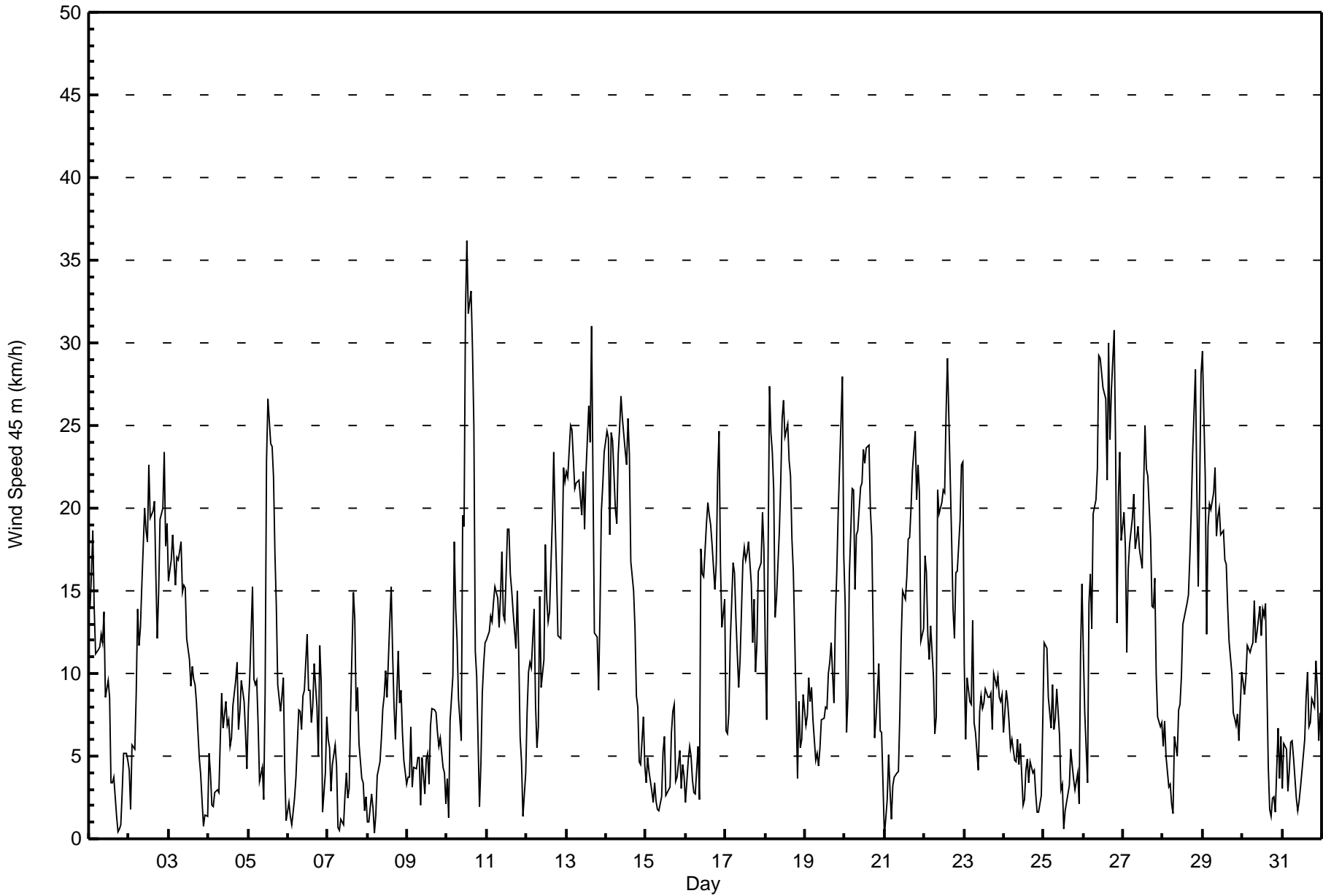
Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed 45 m (WS45m) - km/h

Lower Camp Met Tower - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Oct 20 00:00 Minimum Value: 1 km/h on Oct 1 18:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 O <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: 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	2	4	3	3	2	2	3	4	4	3	4	3	3	3	1	2	1	1	1	1	1	4	1	2	4
2-Oct	2	2	2	1	3	5	4	4	5	6	6	6	7	5	7	7	6	4	5	6	6	7	6	7	7
3-Oct	5	6	5	5	5	5	5	5	6	5	5	4	4	4	4	4	4	3	1	1	1	1	1	1	6
4-Oct	2	2	1	1	2	1	1	2	3	3	3	2	2	3	3	2	3	3	2	2	4	4	3	3	4
5-Oct	4	4	3	4	3	2	2	2	2	1	6	8	8	7	7	6	6	4	3	2	2	2	1	1	8
6-Oct	1	1	1	1	1	1	2	2	2	3	3	3	3	2	3	2	3	3	2	3	5	2	2	2	5
7-Oct	1	1	1	2	2	2	1	1	1	1	2	2	2	2	3	4	3	3	2	2	1	2	1	2	4
8-Oct	1	1	1	1	1	1	1	2	2	2	2	3	3	3	4	3	2	3	2	3	2	2	2	1	4
9-Oct	1	1	2	2	2	2	1	1	1	2	2	2	2	3	2	2	2	2	3	1	2	1	2	2	3
10-Oct	2	1	3	4	3	3	8	6	4	7	5	9	8	8	9	7	8	5	3	3	3	5	3	4	9
11-Oct	3	4	3	4	4	5	4	4	4	5	4	4	5	5	5	4	4	4	4	4	1	2	1	1	5
12-Oct	2	2	3	3	5	5	3	4	4	4	3	4	4	4	5	7	6	5	3	2	1	3	4	4	7
13-Oct	5	5	5	5	5	5	6	5	5	5	6	4	5	6	6	7	8	3	2	2	5	5	5	5	8
14-Oct	5	5	5	6	6	5	3	7	6	6	7	6	7	6	5	5	5	4	3	2	1	3	2	7	7
15-Oct	1	1	2	2	1	1	2	2	1	2	2	2	2	2	2	3	2	3	2	2	2	2	1	1	3
16-Oct	1	2	2	1	1	2	2	2	3	6	5	5	6	5	5	6	4	3	3	4	5	5	5	5	6
17-Oct	4	3	2	3	2	2	1	2	3	2	2	3	4	3	3	5	4	4	3	3	2	2	3	5	5
18-Oct	6	9	6	5	4	5	6	3	6	5	7	7	8	6	6	6	4	4	4	2	2	3	2	2	9
19-Oct	2	2	3	2	2	2	2	2	2	3	3	3	4	2	3	3	4	3	5	5	5	6	7	10	10
20-Oct	6	4	3	4	5	6	4	4	5	5	6	7	6	8	6	6	4	4	1	4	3	3	2	1	8
21-Oct	1	1	1	1	1	2	3	2	2	3	4	5	5	4	5	5	5	5	5	6	6	9	4	6	9
22-Oct	5	3	3	2	2	3	3	7	3	3	4	4	5	6	6	6	4	2	2	3	3	3	3	4	7
23-Oct	5	3	2	2	3	4	3	2	2	3	2	3	3	3	2	3	2	2	2	3	3	2	3	3	5
24-Oct	2	3	3	2	2	2	2	2	2	2	2	2	1	2	2	1	1	1	2	1	1	1	1	2	3
25-Oct	3	3	3	3	2	3	2	2	3	2	2	1	1	1	1	1	1	1	1	1	1	3	4	4	4
26-Oct	3	3	2	5	5	4	6	5	6	8	8	7	7	7	6	6	7	7	5	6	4	6	6	4	8
27-Oct	5	5	4	4	5	5	5	4	4	6	6	4	6	7	6	6	5	4	4	4	4	2	2	2	7
28-Oct	2	3	2	1	1	1	1	2	2	3	2	3	3	4	5	4	5	5	7	7	7	3	6	6	7
29-Oct	6	7	5	6	6	5	5	5	4	5	4	3	3	3	3	2	3	3	3	3	2	3	2	3	7
30-Oct	1	2	2	2	1	2	2	3	2	3	3	4	3	2	3	5	1	3	1	3	1	4	2	2	5
31-Oct	2	1	1	2	1	1	2	1	2	1	1	2	2	2	3	3	3	3	2	2	3	3	2	3	3
																		6 9 6 6 6 6 8 7 6 8 8 9 8 8 9 7 8 7 7 7 7 9 7 10							
Diurnal Maximum																									





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

**Wind Speed 45 m (WS45m) - km/h**  
**Lower Camp Met Tower - October 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	188	25.27	25.27
6 - 11	225	30.24	55.51
12 - 19	199	26.75	82.26
20 - 28	120	16.13	98.39
29 - 38	12	1.61	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

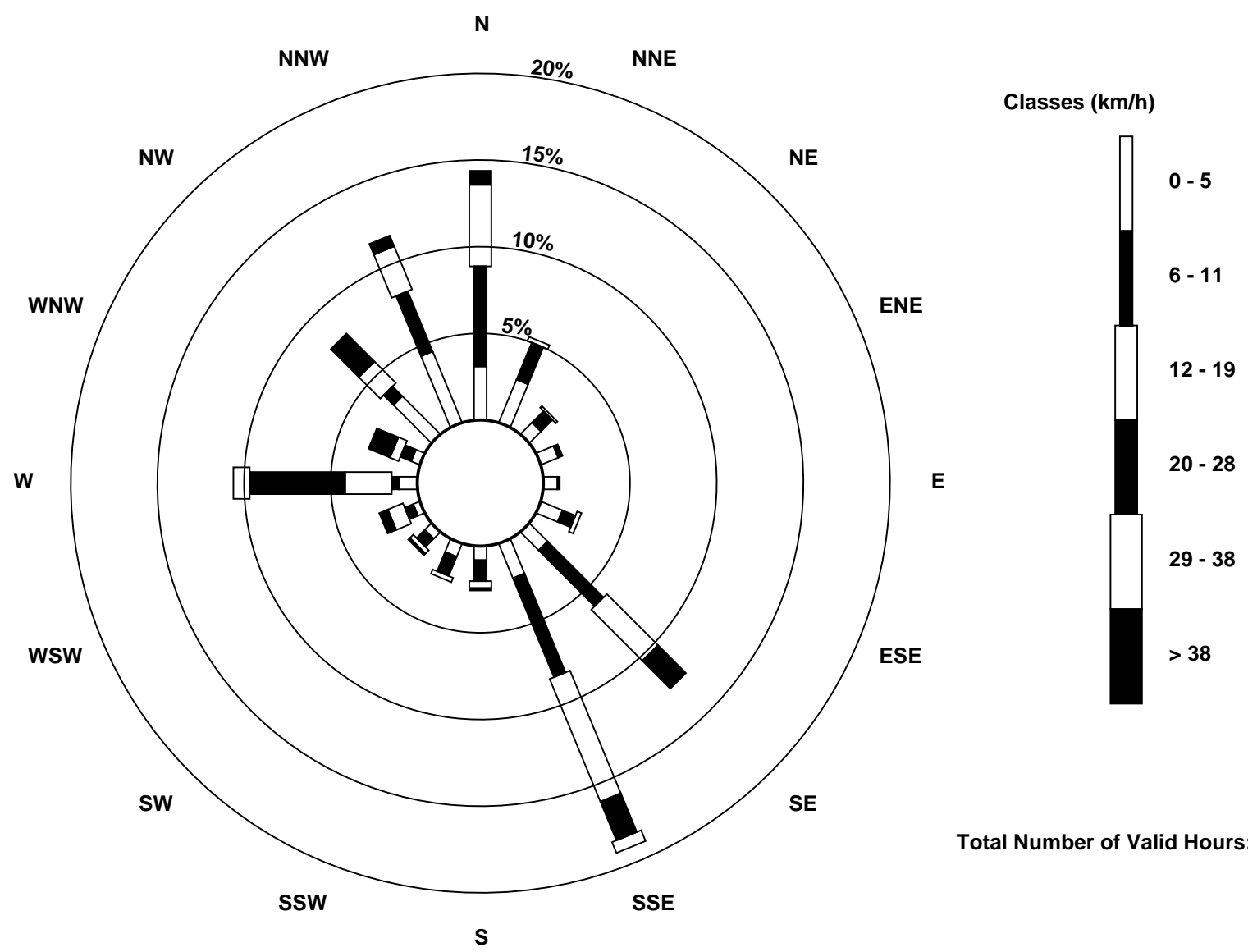
Total Number of Hours: 744





Wood Buffalo Environmental Association  
Wind Rose Oct 2015

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



Total Number of Valid Hours: 744



Maximum Speed: 46 km/h on Oct 10 15:00	Maximum Daily Speed Average: 29.7 km/h on Oct 13	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 31 11:00	Minimum Daily Speed Average: 3.0 km/h on Oct 15	Hours of Data: 744
Maximum Diurnal Speed Average: 4.7 km/h at hour 11	Minimum Diurnal Speed Average: 0.8 km/h at hour 19	Hours of Missing Data: 0
Monthly Average Velocity: 2.5 km/h 245.3 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 5 Q <sub>1</sub> = 8 Median = 14 Q <sub>3</sub> = 24 P <sub>90</sub> = 32 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	S11	SSE12	SSE12	SSE18	SSE15	SSE16	SSE15	SSE12	SSE11	SSE14	SE12	SE13	SE12	ESE5	NNW2	NNW3	WNN1	S2	ESE5	ESE6	SE5	NNW9	NNW12	NNW11	SSE6.3	SSE18
2-Oct	NNW9	NNE5	N9	NNE9	N14	N21	NNE18	N19	N21	N28	N26	N26	N31	N26	N29	N32	N23	N18	N23	N28	N29	N33	N25	N28	N22.0	N33
3-Oct	N23	N25	N26	N24	NNW23	NNW26	N24	N25	N21	N21	NNE20	NNE17	NNE15	NNE13	NE14	NNE14	NNE13	NE11	NNE9	NNE7	NNE6	NE6	N4	NNW5	N15.6	N26
4-Oct	N7	N9	NNE6	NE5	ENE6	ENE6	E5	ESE9	SE11	SE7	SSW9	SSW7	S8	SSW5	SSE7	SE10	SE13	SE14	SSE9	SSE13	SSE20	SE19	SE16	SE11	SE6.8	SSE20
5-Oct	SE14	SSE15	SSE17	SSE16	SSE11	SSE8	SW9	WSW10	WSW9	W4	W12	WNN29	NNW36	NNW32	NNW32	NNW31	NNW25	NNW23	NNW18	NW18	NW17	NW18	NW11	NNW8	NNW10.1	NW36
6-Oct	NNW8	NNW6	N4	SE2	SSE6	SSE7	SSE8	SSE11	SSE8	SE11	SE13	SE16	SE11	SE10	SE8	SE11	SE13	SE12	SE14	SE21	SE21	SE11	SE4	ENE2	SE8.4	SE21
7-Oct	NE3	NE3	E1	SSE1	NNW11	NNW10	E5	SE5	WSW3	SW2	S3	S3	SW4	WSW5	SW9	WSW19	W18	NW13	NNW20	NNW18	NNW14	NNW12	NNW13	NW10	NW5.4	NNW20
8-Oct	NNW8	NNE3	NNW3	N8	NE3	SSE4	SSE7	SSE7	SSE8	SSE7	SE10	SE16	SE13	SE17	SSE17	SE13	SE11	ESE12	NNE7	NNW16	N16	NNW12	NNW11	NNW9	ESE3.2	SSE17
9-Oct	NNW7	NNW6	NNW11	NNE4	NNW8	NNW6	NNW6	NW6	WNN3	SSE5	SW4	SSW5	WSW5	N5	NNE8	NNE10	N11	N12	N11	NNE5	NNW8	N3	NW2	SSE3	NNW4.5	NNW12
10-Oct	SSE7	SE15	SSE20	SSE15	S9	SSW7	WSW26	WSW20	SW12	SW24	WSW24	WSW39	WSW45	WSW44	W46	W43	W37	W17	WNN17	NNW11	NNW8	N15	N15	N18	WSW15.1	W46
11-Oct	N18	N18	N18	N17	NNE20	NNE21	N20	N18	NNW20	N23	NNW18	NNW17	NNW26	NNW25	NNW22	NNW20	NNW19	NW16	NW22	NW18	NW11	W9	W2	SW5	NNW16.2	NNW26
12-Oct	S4	SSE9	SSE12	SE14	SE20	SSE17	SSE14	SSE16	SSE20	SSE15	SSE15	SSE24	SE20	SE18	SSW18	WSW26	W34	W31	W27	W22	WSW18	WSW25	WSW30	WSW31	SSW12.0	W34
13-Oct	WSW33	WSW32	WSW36	WSW36	WSW34	W33	W33	W34	WSW30	W28	W31	WSW22	WSW25	WSW30	WSW30	WSW40	W30	W20	WSW23	SW16	WSW24	WSW33	WSW33	WSW34	WSW29.7	WSW40
14-Oct	W37	W36	WSW28	WSW36	W35	W28	WSW26	W35	WSW35	W37	W33	WNN30	NW30	NW33	NW32	NW26	NNW22	N18	NNE12	NE13	NNE8	NNW7	N11	N7	NNW20.3	W37
15-Oct	NNW5	NNW7	N8	NE7	ENE4	NE6	E4	ESE2	SW3	SSW6	SSE6	SSE2	SSW4	S3	SW8	SSE9	SSE12	SE4	ESE11	SE14	SE13	SE4	SE3	SE3	SE3.0	SE14
16-Oct	ESE9	SE7	SE7	ESE3	ESE6	ESE6	SE20	SE23	SE21	SE30	SE24	SE24	SE27	SE26	SE27	SE28	SE28	SE24	SE26	SE32	SE36	SE27	SE30	SE30	SE21.5	SE36
17-Oct	SE17	SE17	SSE11	SSE14	SSE19	SE20	SE18	SSE14	SE19	SSE18	SSE19	SSE19	SSE18	SSE19	SSE22	SSW19	SW20	SW29	SSW23	SSW15	S13	S11	S12	S13	SSE15.7	SW29
18-Oct	SW10	WSW21	WSW40	W40	W39	W36	W23	WSW25	W29	W32	W36	W37	WNN34	NW33	WNN30	WNN30	WNN27	NW28	NW25	NW11	WNN6	NW8	N12	N15	W23.3	WSW40
19-Oct	N11	N12	N14	N13	N13	N10	NNE8	NE8	ENE8	E9	ESE10	ESE9	ESE11	SE10	SE14	ESE15	ESE18	ESE16	SE21	SE24	SE29	SE35	SE43	SE32	ESE10.4	SE43
20-Oct	SE24	S13	SSW14	WSW22	WSW29	WNN30	WNN23	WSW24	WSW24	WSW27	W30	W31	W30	NW33	NW32	NW28	NW28	NW23	NNW13	NW16	NNW20	NNE10	NNE8	NE5	WNN15.8	NW33
21-Oct	ENE2	ESE2	SE6	SSE5	SSE4	S4	SE3	SE4	SSE5	SE12	SE18	SE21	SE20	SE21	SE25	SE27	SE31	SE33	SE37	SE33	SE36	SE36	SE24	SE21	SE17.7	SE37
22-Oct	SSE20	SSE16	SSE11	S7	SW8	SW11	SW15	WSW17	WSW26	WSW24	WSW24	WSW22	WSW24	WSW29	WSW34	WSW34	W29	WSW26	WSW23	WSW25	WSW27	WSW28	W33	W33	WSW20.4	WSW34
23-Oct	W19	W12	WSW15	WSW13	SW15	WSW19	SW13	SW12	WSW10	WSW7	WSW9	WSW7	NNW10	N10	N10	NNE10	NNE11	N10	N16	N14	N14	N12	N13	N13	WNN6.1	WSW19
24-Oct	N9	N12	NNE11	N9	NNE8	NNE8	NNE7	NNE6	N8	NNE6	N7	NNE3	NNW2	NW4	NNW5	NNW4	NNW6	N6	NE6	ENE6	E5	NE3	NE4	N9	NNE6.0	N12
25-Oct	N14	N15	N15	N13	N11	N13	N9	N10	N11	NNE8	NNE4	N3	NNW1	SSE1	WNN2	NNW3	N6	N5	NNE4	ENE3	SE5	SSE8	SSE16	SSE17	NNE4.3	SSE17
26-Oct	S15	SSE12	SE10	SE24	SE23	SE23	SE32	SE32	SE36	SE42	SE42	SE41	SE40	SE37	SE34	SE43	SSE32	SSE31	SSE37	SSE30	SSW17	WNN29	WNN31	W24	SSE22.9	SE43
27-Oct	WNN28	NW26	WNN20	WNN25	WNN27	WNN30	WNN29	NW27	NW27	NW28	NW26	NW25	NW31	NW35	NW32	NW32	NW28	NNW22	NNW21	NNW23	NNW15	NNW12	N10	NNW11	NW23.9	NW35
28-Oct	NNW10	NNE14	NNE10	E5	ENE6	ENE5	E4	ESE8	SE7	SSW9	SSW9	SSE11	SE15	SE17	SE20	SE21	SE26	SE30	SE35	SE43	SE31	SE21	SE31	SE39	SE14.9	SE43
29-Oct	SE38	SE34	SE24	SE29	SE30	SE30	SSE28	SSE28	SSE23	SSE24	SSE18	SSE17	SSE18	SSE17	SSE17	S12	S13	S16	SSE8	SSW11	SSW7	SSW8	SW10	SW4	SSE18.3	SE38
30-Oct	S2	SW6	SW7	SW9	SW6	SSE4	SSE7	SSE10	SSE14	SSE14	SSE13	SE16	SE16	SSE13	SE16	SE6	ESE5	ESE5	NW2	WSW3	WSW3	SW3	NNW9	NNW15	SSE4.9	SE16
31-Oct	NNW11	N12	N11	NNW8	NW7	NNW11	N11	NNE8	ENE4	N3	ENE1	NNE4	N6	N8	NE11	NE13	NE8	NE10	NNE12	NNE12	NNE14	N13	N9	NNE11	NNE8.2	NNE14

WSW1.8	W1.5	W2.2	WSW2.8	WSW3.4	W3.2	WSW2.7	SW3.8	SW3.9	SSW4.4	SW4.7	SW4.2	WSW3.5	W3.5	W3.5	W4.4	W3.8	W2.0	NW0.8	SE1.0	S1.2	WSW1.3	WSW1.7	W1.6	Diurnal Average	
SE38	WSW36	WSW40	W40	W39	W36	W33	W35	SE36	SE42	SE42	SE41	WSW45	WSW44	W46	W43	W37	SE33	SSE37	SE43	SE36	SE36	SE43	SE39	Diurnal Maximum	

All monthly, daily, and diurnal averages have been calculated using vector methods



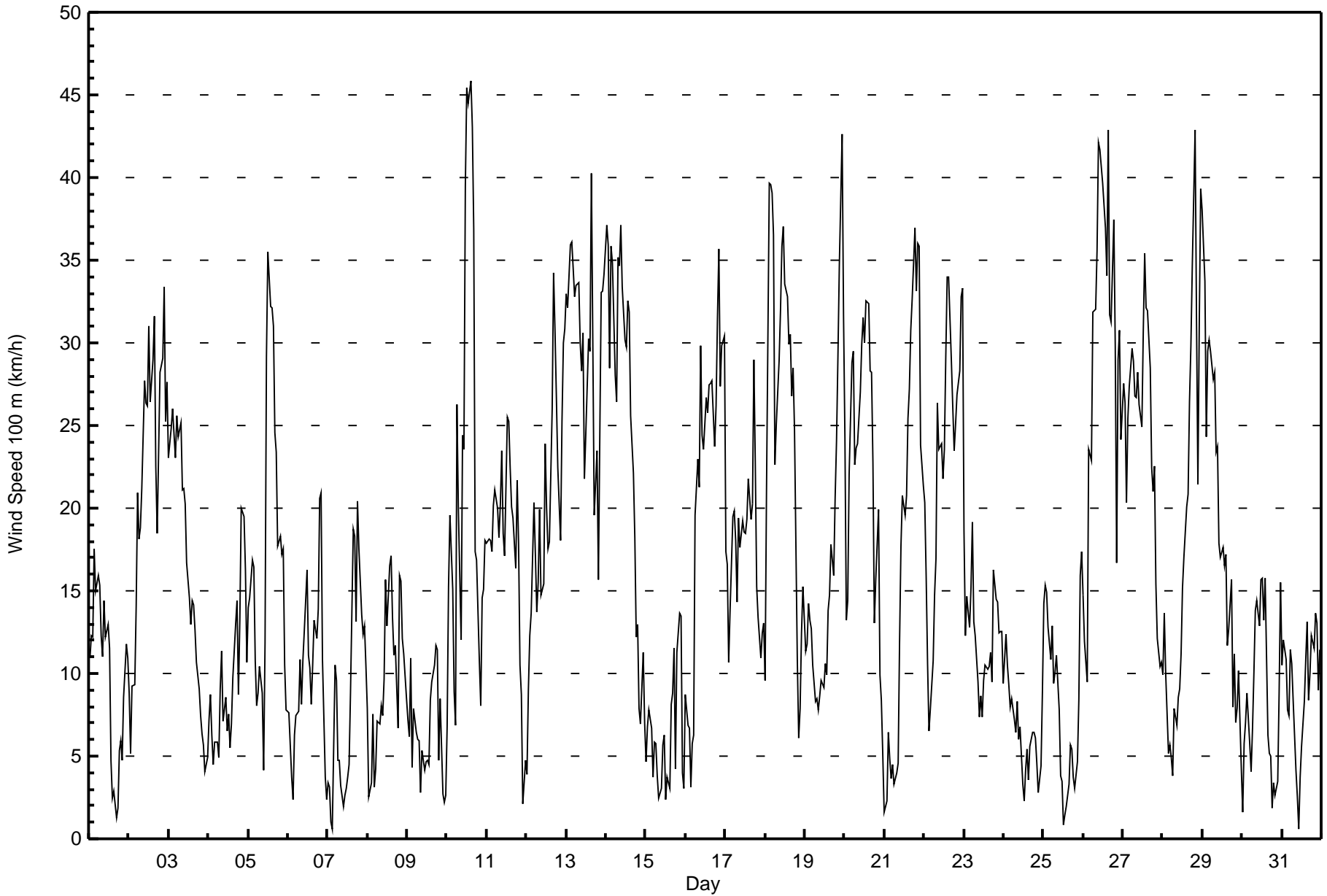
Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed 100 m (WS100m) - km/h

Lower Camp Met Tower - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Oct 20 00:00 Minimum Value: 1 km/h on Oct 4 07:00 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: 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	2	1	1	3	3	3	3	2	2	2	3	1	2	1	1	2	2	4	5	2	2	5
2-Oct	3	4	3	2	3	4	3	3	3	4	5	4	5	5	8	6	5	3	5	4	4	5	6	6	8
3-Oct	4	6	4	4	4	4	5	5	5	4	4	3	3	3	3	3	3	3	1	1	1	3	1	1	6
4-Oct	2	2	2	2	2	1	1	2	2	2	3	2	3	3	3	2	2	3	2	3	3	3	3	3	3
5-Oct	5	3	3	2	3	2	2	2	2	3	6	9	6	6	7	6	6	4	2	3	4	4	2	1	9
6-Oct	2	1	2	1	2	2	2	2	2	2	2	3	2	2	3	2	2	3	3	3	2	4	2	1	4
7-Oct	1	1	1	2	2	2	2	2	1	1	2	3	2	2	3	4	3	4	2	3	1	1	1	2	4
8-Oct	2	1	1	1	2	2	2	2	2	2	2	3	3	3	3	2	3	3	3	2	2	1	1	2	3
9-Oct	2	1	2	2	2	2	2	1	3	2	2	2	2	3	1	2	1	2	3	3	3	2	2	4	4
10-Oct	4	4	1	3	3	4	8	7	4	7	5	8	6	8	8	6	8	5	4	4	3	6	4	3	8
11-Oct	3	3	2	3	3	4	3	3	4	4	4	3	5	5	5	4	5	5	3	4	2	4	2	2	5
12-Oct	2	2	4	3	4	4	3	5	3	4	4	4	3	4	5	10	6	4	2	3	2	3	3	3	10
13-Oct	3	4	3	4	4	5	4	3	5	5	4	4	6	5	5	6	9	5	2	2	6	3	3	3	9
14-Oct	3	3	4	5	7	5	3	8	6	5	5	7	6	6	5	6	4	4	4	3	3	2	4	2	8
15-Oct	1	1	1	2	1	2	2	2	2	3	2	2	2	2	2	3	3	2	3	4	2	2	2	1	4
16-Oct	3	2	2	2	3	4	5	4	6	3	3	3	4	3	4	5	4	3	3	3	4	3	2	2	6
17-Oct	6	3	2	4	1	2	3	3	2	2	3	3	5	3	4	7	5	4	5	4	3	2	3	3	7
18-Oct	5	9	4	3	2	4	8	2	6	5	5	6	8	6	5	6	5	3	5	4	2	2	2	2	9
19-Oct	2	2	2	2	2	2	3	2	3	2	2	2	3	2	3	3	3	4	5	4	5	5	4	10	10
20-Oct	7	5	4	4	5	6	4	4	4	4	5	6	5	7	6	5	3	4	1	4	3	3	3	2	7
21-Oct	1	1	2	2	2	2	1	3	2	5	3	3	3	2	3	3	4	3	3	4	3	5	5	4	5
22-Oct	4	4	4	2	3	4	3	6	2	3	4	3	4	4	4	4	3	2	3	2	3	2	2	2	6
23-Oct	5	5	3	2	5	3	3	3	3	3	1	2	3	2	1	2	2	2	2	2	2	2	2	2	5
24-Oct	2	3	3	2	1	2	2	2	1	2	1	2	1	2	1	1	1	1	1	1	1	2	1	1	3
25-Oct	3	2	2	2	2	2	2	3	2	2	2	1	1	1	1	1	1	1	1	1	2	4	5	4	5
26-Oct	4	3	4	3	3	3	4	4	4	3	4	4	4	5	4	5	8	7	4	7	5	6	5	4	8
27-Oct	6	6	5	4	5	4	4	4	4	5	6	5	5	6	6	5	4	5	4	4	4	3	2	1	6
28-Oct	2	3	2	2	2	2	1	2	2	3	2	4	2	3	3	3	3	4	6	3	6	3	6	3	6
29-Oct	4	4	4	5	3	3	3	3	4	5	4	4	3	3	3	2	3	4	3	4	4	4	4	3	5
30-Oct	1	3	2	3	5	2	2	3	3	3	2	2	2	3	3	6	2	2	1	2	1	2	3	1	6
31-Oct	3	2	2	1	1	1	1	2	3	2	1	1	2	2	3	3	4	4	2	2	2	2	2	2	4
Diurnal Maximum																									





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

**Wind Speed 100 m (WS100m) - km/h**  
**Lower Camp Met Tower - October 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	103	13.84	13.84
6 - 11	195	26.21	40.05
12 - 19	181	24.33	64.38
20 - 28	142	19.09	83.47
29 - 38	106	14.25	97.72
> 38	17	2.28	100.00

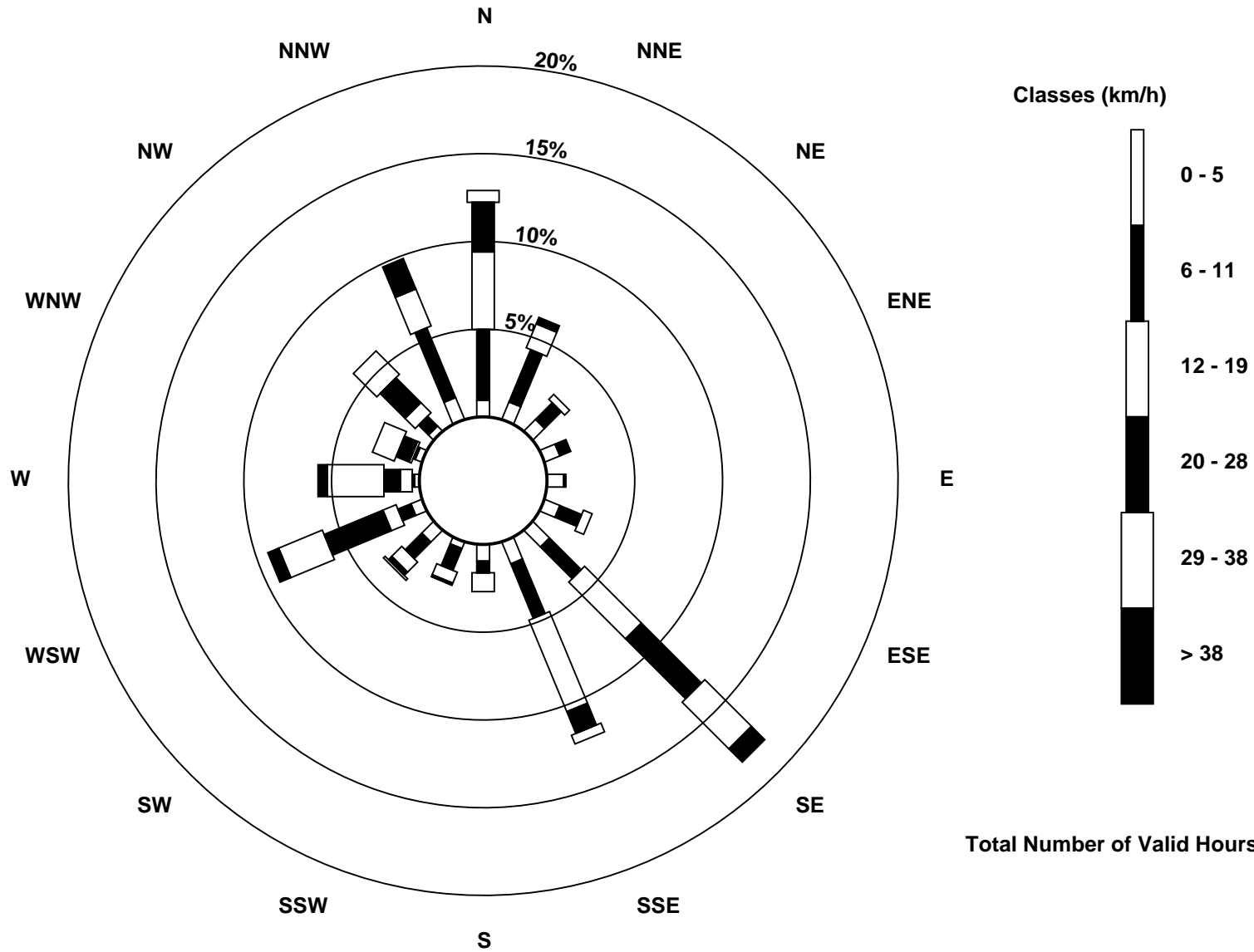
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

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





Maximum Speed: 54 km/h on Oct 10 13:00	Maximum Daily Speed Average: 37.9 km/h on Oct 13	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 25 13:00	Minimum Daily Speed Average: 1.6 km/h on Oct 9	Hours of Data: 740
Maximum Diurnal Speed Average: 6.6 km/h at hour 5	Minimum Diurnal Speed Average: 1.0 km/h at hour 20	Hours of Missing Data: 4
Monthly Average Velocity: 4.4 km/h 252.0 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 5 Q <sub>1</sub> = 10 Median = 18 Q <sub>3</sub> = 28 P <sub>90</sub> = 36 P <sub>99</sub> = 47	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	SSW17	SSW12	SSW11	SSW10	SSW9	SSW11	SSW11	SSW12	SSW9	S10	SSE11	SE13	SE11	ESE5	N1	WNW3	WSW2	SSW3	SE4	ESE10	SE14	N2	N10	NNE7	S5.6	SSW17
2-Oct	NNW8	ENE5	NE3	NE13	NNE15	NNE22	NNE20	NNE21	NNE21	N27	N28	N28	N33	N30	N33	N37	N26	N21	N27	N32	N32	N37	N28	N31	N23.6	N37
3-Oct	N27	N28	N29	N28	NNW27	NNW26	N27	N27	N23	N22	NNE21	NNE17	NNE15	NNE13	NE14	NNE14	NNE13	NE12	NNE12	NE11	NE10	ENE5	NE4	NNE4	N17.1	N29
4-Oct	N8	N10	NNE7	NNE5	ENE6	NE4	NE2	SE7	SE9	SSE5	SSW9	SSW7	SSW8	SSW6	SSE7	SE8	SE12	SE15	S13	S19	SSE21	SSE20	SE18	SE15	SSE6.8	SSE21
5-Oct	SSE17	S18	S12	S10	S11	SW11	WSW16	W17	W12	W8	NNW14	WNW32	NNW38	NNW35	NNW35	NNW34	NNW28	NNW27	NNW23	NNW28	NNW29	NNW26	NNW20	NNW15	WNW15.2	NNW38
6-Oct	NNE7	NNE3	SW1	WSW5	SW6	SW6	S7	S7	SSE10	S12	SSE14	SE16	SE11	SE10	SE9	SE12	SSE12	SE15	SE22	SE25	SE26	SE20	SE18	SE9	SSE10.3	SE26
7-Oct	ESE9	ESE12	SE8	SSE4	WSW4	NNW5	ENE1	SSE4	SW4	SSW4	SW5	WSW6	WSW7	SW11	W21	W21	NNW16	NNW27	NNW26	NNW19	NNE13	N15	N17	NW4.9	NNW27	
8-Oct	NNE14	NNE7	N3	NNW3	N5	NNW3	SSE2	S6	S7	S8	SSE8	SE16	SE14	SSE15	SSE17	SE13	SE13	SE16	ESE6	NE9	NNE18	NNE12	NNE10	N3	ESE4.3	NNE18
9-Oct	NNW4	N2	N7	ENE11	N4	NNW6	N2	W5	W5	SSW8	SW9	SW11	WSW8	NW5	NNE8	NE9	NNE12	N12	N11	ENE6	NNW3	SE2	S8	SSE16	N1.6	SSE16
10-Oct	S20	S21	S19	SSW16	SW19	WSW24	WSW43	WSW33	SW22	SW30	WSW31	WSW48	WSW54	W52	W53	W50	W42	W24	WNW22	NNW17	NNW16	N19	NNE19	NNE20	WSW22.0	WSW54
11-Oct	NNE20	NNE20	NNE20	NNE18	NNE23	NNE24	NNE22	N21	N23	N25	NNW20	NNW19	NNW28	NNW29	NNW26	NNW21	NNW22	NNW18	NW25	NW20	NNW12	WNW9	W5	WSW9	NNW18.1	NNW29
12-Oct	WSW6	S8	S13	S12	SSE20	SSE21	SSE20	SSE23	SSE20	SSE19	S21	SSE26	SSE20	SSE16	SW21	WSW30	W39	W36	W31	W28	W25	WSW37	WSW41	WSW42	SW15.8	WSW42
13-Oct	WSW43	WSW43	WSW46	WSW47	WSW45	W44	W44	W42	W38	W34	W33	WSW25	WSW29	WSW35	WSW34	WSW46	W36	W24	W32	WSW24	WSW38	WSW46	WSW46	WSW45	WSW37.9	WSW47
14-Oct	W46	W45	W38	W44	W42	W33	W44	W44	W44	W42	W37	WNW34	NW32	NW35	NW34	NW29	NNW26	N20	NE14	NE18	NNE13	N8	N14	NNE10	WNW24.1	W46
15-Oct	N6	NNW7	NNW7	NE8	ENE5	NE10	NE12	ENE8	ESE6	SW5	SSW7	S6	SSW2	SW5	SW4	SW10	S8	S12	S6	ESE8	SE19	SE18	SE12	SE9	SE3.8	SE19
16-Oct	SE18	SSE18	SE23	SE19	SE21	SE22	SE31	SE34	SE35	SE31	SE26	SE25	SE28	SE26	SE28	SE30	SE32	SE29	SE32	SE36	SSE35	SSE28	SSE28	SE29	SE27.5	SE36
17-Oct	SSE18	SSE19	SSE17	SSE17	S23	SSE22	SSE17	SSE18	SSE21	SSE16	SSE20	SSE19	S18	SSE20	S23	SSW25	SW25	SW35	SW33	SSW27	SSW20	SSW18	SSW15	SSW16	S18.9	SW35
18-Oct	WSW18	WSW34	WSW48	W47	W46	W44	W34	W34	W38	W39	W40	W40	WNW38	NW37	WNW33	WNW36	WNW34	NW36	NW36	NW22	NW12	NW14	NNE18	NNE20	WNW29.2	WSW48
19-Oct	N14	N14	N16	NNE16	NNE14	NNE11	NE12	ENE15	E13	ESE11	ESE10	ESE9	ESE11	ESE9	SE14	ESE16	ESE20	SE20	SE24	SE29	SE35	SE41	SSE44	SSE36	ESE13.0	SSE44
20-Oct	SSE25	SSW18	SW23	WSW28	W34	WNW35	W28	W28	WSW30	WSW33	W34	W36	W33	NW37	NW35	NW32	NW33	NW28	NNW17	NW22	NNW27	NNE13	NNE11	NE7	WNW19.6	NW37
21-Oct	NE4	E3	SE6	SSE6	S6	S6	SE4	SE4	SE11	SE17	SE19	SE22	SE21	SE21	SE26	SE29	SE35	SSE36	SE40	SE39	SSE34	SSE32	SSE22	SSE21	SE18.8	SE40
22-Oct	S17	SSW12	SW9	WSW12	WSW20	WSW24	WSW27	WSW28	WSW36	WSW31	WSW29	WSW26	WSW27	WSW34	WSW40	WSW40	W35	W34	W34	W37	W38	W37	W37	W39	WSW28.2	WSW40
23-Oct	W28	W20	W15	WSW13	WSW21	WSW23	WSW17	WSW18	WSW14	WSW8	WSW9	W5	NNW9	N10	N10	NNE10	NNE11	NNE11	NNE20	NNE21	NNE18	NNE16	NNE14	NNE14	NW7.2	W28
24-Oct	NNE10	NNE13	NNE12	AF	AF	AF	AF	NE8	NNE10	NNE7	NNE7	NNE4	NNW3	NW4	NNW5	NNW3	N5	N6	NNE4	NE4	E5	NE4	NNE6	NNE8	NNE5.9	NNE13
25-Oct	NNE14	NNE16	NNE15	N14	N13	NNE15	NNE11	N11	NNE12	NNE8	NNE4	NNE3	NNW1	SE1	NW2	NW2	NW3	NW1	SW2	SE5	SSE9	SSE13	S23	S21	NE3.3	S23
26-Oct	S19	SSE15	SE17	SE26	SE26	SE36	SE38	SE40	SE44	SE44	SE44	SE43	SE40	SE36	SE48	SSE34	SSE32	SSE37	SSE32	SW20	WNW34	WNW35	W28	SSE25.1	SE48	
27-Oct	WNW32	NW33	WNW28	WNW32	WNW33	NW36	NW35	NW33	NW33	NW33	NW30	NW29	NW34	NW39	NW35	NW35	NW32	NNW27	NNW25	NNW27	NNW18	NNW15	N13	NNW12	NW28.3	NW39
28-Oct	N12	NNE18	NNE14	ENE7	ENE8	ENE7	E5	ESE7	SSE7	SSW10	SSW10	S11	SE14	SE17	SE20	SE22	SE28	SE33	SE38	SE42	SSE32	SSE24	SE32	SSE38	SE14.9	SE42
29-Oct	SSE33	SSE30	SSE25	SSE27	SSE27	SSE29	SSE26	SSE27	SSE28	SSE25	S18	S19	S16	S14	S15	SSW15	SSW19	SSW27	SSW14	SW22	SW23	SW19	WSW21	WSW18	S19.3	SSE33
30-Oct	WSW13	W19	WSW18	WSW21	WSW16	SW9	SSW10	SSW10	SSW11	S10	SSW10	S11	S11	SSW9	S10	SSW5	WSW2	SSE2	N1	WSW5	W9	WNW6	NNW13	NNE17	SW6.7	WSW21
31-Oct	N14	NNE15	N15	NNW11	NNW11	NNW14	N13	NNE11	ENE6	NNW3	WSW2	N3	N7	N9	NE11	NE13	NE9	NE11	NE16	NNE13	NNE14	NNE14	NNE10	NNE14	NNE9.9	NE16

WSW3.4	WSW3.8	WSW4.4	WSW5.7	WSW6.6	W6.3	WSW5.6	WSW5.8	SW6.0	SW6.4	SW6.5	SW5.9	WSW5.3	W5.6	W5.4	W6.2	W5.3	W3.4	W2.1	SW1.0	SW1.9	WSW2.6	WSW2.4	WSW2.4	Diurnal Average
W46	W45	WSW48	W47	W46	W44	W44	W44	W44	SE44	SE44	WSW48	WSW54	W52	W53	W50	W42	NW36	SE40	SE42	W38	WSW46	WSW46	WSW45	Diurnal Maximum

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



Wood Buffalo Environmental Association

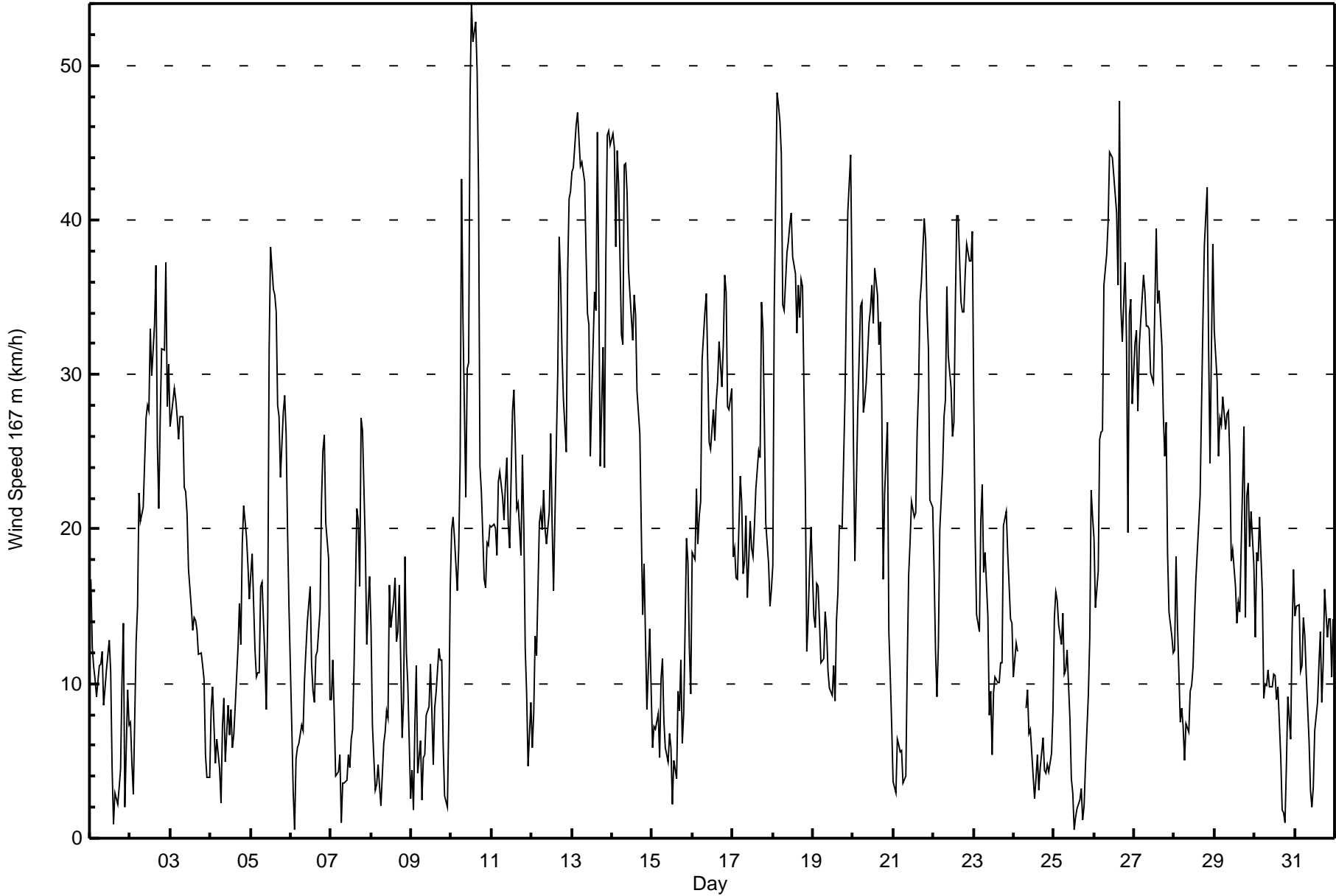
Summary of Hour Standard Deviations

Wind Speed 167 m (WS167m) - km/h

Lower Camp Met Tower - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Oct 12 16:00 Minimum Value: 0 km/h on Oct 3 06:00 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: 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	5	2	2	2	1	2	2	2	2	3	2	2	2	3	1	2	1	1	1	3	3	3	2	2	5				
2-Oct	4	3	2	3	2	4	4	4	3	4	4	4	4	4	8	7	5	4	4	5	5	5	6	7	8				
3-Oct	4	5	4	4	4	0	5	5	5	4	4	3	3	3	4	3	4	3	2	1	1	3	1	1	5				
4-Oct	2	2	2	2	1	2	1	3	2	2	3	2	3	3	2	2	2	3	4	2	3	4	3	3	4				
5-Oct	4	3	4	2	4	3	2	3	2	3	7	10	6	5	6	5	4	3	2	3	2	3	3	3	10				
6-Oct	2	1	2	1	1	2	1	2	1	3	2	3	2	2	3	3	3	4	2	3	3	2	3	3	4				
7-Oct	2	2	1	2	1	1	1	1	1	2	2	2	3	2	3	5	4	5	2	2	3	1	2	1	5				
8-Oct	2	2	1	1	2	1	2	2	2	2	2	3	2	3	3	2	3	3	3	3	1	2	3	2	3				
9-Oct	2	1	3	2	2	3	2	3	3	2	3	2	2	2	1	2	1	1	3	2	2	1	3	6	6				
10-Oct	3	2	2	3	4	6	7	7	5	7	5	7	5	7	7	6	8	5	3	5	4	7	5	4	8				
11-Oct	3	4	3	3	4	5	4	3	4	4	4	3	4	5	5	4	5	5	3	5	2	2	1	2	5				
12-Oct	1	3	3	4	3	4	5	3	3	4	4	4	4	4	4	10	5	4	2	2	2	3	3	3	10				
13-Oct	2	4	3	3	3	3	3	3	4	4	3	3	6	4	4	5	8	5	2	3	6	2	2	2	8				
14-Oct	3	2	3	3	6	6	2	6	4	4	6	6	6	6	4	5	4	4	4	3	4	2	4	2	6				
15-Oct	1	1	1	2	1	3	3	2	1	2	2	2	2	2	3	3	3	2	3	5	2	3	2	4	5				
16-Oct	2	4	2	4	3	6	5	2	2	4	3	3	3	3	4	4	4	3	4	3	6	4	2	3	6				
17-Oct	3	3	3	2	2	3	3	2	4	3	3	3	4	4	3	7	4	4	2	5	3	3	3	4	7				
18-Oct	8	7	3	2	2	2	7	2	5	3	3	5	8	6	6	6	5	3	5	4	2	3	2	3	8				
19-Oct	2	1	2	2	2	2	2	1	3	2	2	2	3	2	3	3	2	4	5	3	4	4	4	9	9				
20-Oct	5	5	2	3	3	6	4	2	3	3	4	4	5	7	6	5	3	4	1	5	4	4	3	2	7				
21-Oct	2	2	2	2	2	3	1	3	2	3	3	3	3	2	3	3	4	4	3	5	4	5	5	4	5				
22-Oct	4	4	3	3	4	3	4	4	2	3	3	3	5	3	4	3	3	2	2	2	2	1	2	5	5				
23-Oct	4	6	2	3	4	3	2	2	3	3	1	2	3	2	1	2	1	2	3	3	3	2	2	2	6				
24-Oct	1	3	3	AF	AF	AF	AF	3	1	2	1	2	1	2	2	1	1	1	2	2	1	1	1	2	3				
25-Oct	3	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2	2	2	5	4	3	5				
26-Oct	3	5	4	2	2	2	4	3	3	3	4	3	3	4	4	5	7	8	6	5	4	5	5	4	8				
27-Oct	5	5	4	5	5	4	4	4	4	5	6	4	6	6	6	4	3	5	4	4	4	3	2	1	6				
28-Oct	2	3	2	3	2	1	2	2	2	2	2	3	2	3	2	2	3	4	4	3	5	3	4	4	5				
29-Oct	5	5	4	4	4	4	4	4	5	4	4	4	3	2	2	2	4	4	6	4	5	5	2	4	6				
30-Oct	3	3	3	4	4	3	3	3	2	2	2	2	2	2	3	5	1	1	1	2	1	2	3	1	5				
31-Oct	3	3	1	1	1	1	1	1	3	1	1	1	2	2	2	2	3	4	2	2	2	2	2	3	4				
																		Diurnal Maximum						8 7 4 5 6 6 7 7 5 7 7 10 8 7 8 10 8 8 6 5 6 7 6 9					
AF - Analyzer Failure																													







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed 167 m (WS167m) - km/h  
Lower Camp Met Tower - October 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	83	11.22	11.22
6 - 11	150	20.27	31.49
12 - 19	174	23.51	55.00
20 - 28	154	20.81	75.81
29 - 38	127	17.16	92.97
> 38	52	7.03	100.00

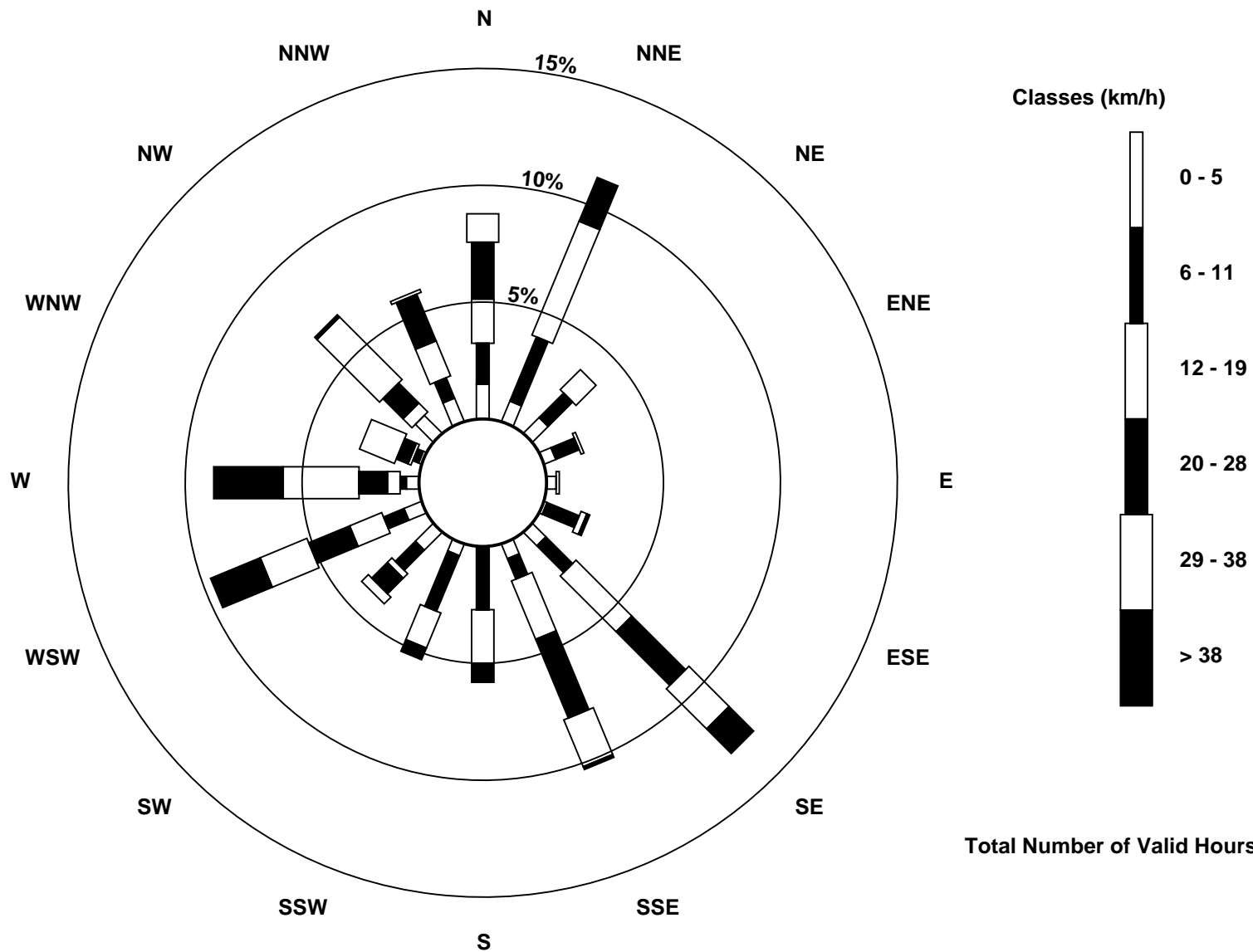
Total Number of Valid Hours: 740

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

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





Direction of Maximum Speed: 261 deg on Oct 10 13:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 271.7 deg on Oct 13	Hours of Data: 744
Direction of Minimum Speed: 271 deg on Oct 1 18:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.7 deg on Oct 15	Percent Operational Time: 100.0
Monthly Average Direction: 305.7 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	151	150	153	145	146	141	141	144	144	149	156	152	151	158	349	32	360	271	113	359	327	356	334	355	144.1
2-Oct	358	116	348	337	345	359	8	2	3	3	1	9	5	357	357	4	357	358	6	2	358	354	358	1	0.4
3-Oct	10	356	358	1	344	344	356	348	2	7	23	36	22	37	48	33	30	46	29	346	42	307	10	318	8.0
4-Oct	314	20	77	87	138	90	115	127	124	128	221	205	196	197	161	151	151	158	154	144	155	151	147	113	155.8
5-Oct	143	151	161	157	146	144	161	157	144	112	275	310	320	326	325	327	339	331	333	338	360	349	14	260	321.6
6-Oct	293	359	118	164	138	142	140	134	149	145	159	151	139	147	161	159	151	156	171	137	140	25	356	347	146.3
7-Oct	329	321	306	321	323	315	217	2	336	151	168	161	225	231	231	267	278	322	337	348	322	9	338	332	291.8
8-Oct	269	346	345	312	73	91	141	135	138	133	141	148	150	154	151	155	142	121	360	354	2	359	352	356	128.5
9-Oct	2	345	350	322	316	338	324	311	49	150	184	153	153	49	6	16	352	342	340	336	356	320	16	342	351.3
10-Oct	346	336	145	142	142	138	254	284	171	235	255	261	261	270	278	273	285	290	308	274	302	356	353	351	266.7
11-Oct	355	4	2	1	9	15	6	350	346	358	345	353	331	343	343	353	346	328	322	322	307	321	238	147	347.9
12-Oct	139	137	146	134	146	133	135	142	166	172	161	149	134	123	211	260	274	276	269	274	258	247	258	264	206.5
13-Oct	269	265	272	272	272	281	283	276	270	276	279	265	260	263	267	266	294	288	265	237	276	276	270	268	271.7
14-Oct	271	272	269	273	278	278	260	275	271	275	289	308	315	316	327	328	336	5	33	44	339	324	353	11	296.1
15-Oct	320	328	22	18	88	26	17	102	132	258	209	165	170	201	165	221	176	159	17	110	122	22	346	348	165.0
16-Oct	317	347	348	345	324	345	359	4	340	141	146	135	148	151	146	147	142	142	149	143	145	147	147	142	141.3
17-Oct	143	164	162	153	147	139	146	150	147	149	156	155	160	154	160	190	228	224	205	174	155	151	150	150	160.2
18-Oct	154	217	267	271	269	275	282	266	271	273	279	283	307	313	308	308	312	315	320	302	288	277	339	2	287.7
19-Oct	340	344	353	359	359	350	14	16	35	99	131	116	112	143	140	107	116	113	131	142	140	144	148	149	119.3
20-Oct	155	187	190	246	270	296	301	270	269	265	280	284	287	313	327	325	327	324	342	332	344	355	37	72	293.4
21-Oct	253	137	147	181	204	197	233	157	164	142	142	140	146	147	141	146	146	153	141	142	145	149	168	160	149.1
22-Oct	158	150	147	147	145	141	258	257	255	262	252	259	259	259	264	273	262	267	259	267	269	269	272	272	246.6
23-Oct	291	282	263	232	210	240	198	191	190	251	251	260	337	351	354	12	30	349	353	357	356	357	356	1	302.4
24-Oct	353	359	23	0	13	23	37	12	12	9	0	355	317	312	341	336	333	343	47	66	67	19	0	354	2.2
25-Oct	355	357	357	351	340	0	353	344	10	21	355	333	332	205	275	339	356	322	343	326	332	203	174	175	347.7
26-Oct	201	188	165	152	142	135	141	141	145	149	150	149	144	143	149	153	172	163	155	167	212	306	300	287	160.8
27-Oct	299	319	318	312	314	314	315	318	315	320	329	326	321	326	326	328	330	332	347	344	338	338	349	327	323.2
28-Oct	333	26	48	122	91	78	100	132	133	206	203	177	151	147	145	151	145	142	144	148	149	148	143	150	147.7
29-Oct	155	152	148	153	151	148	154	156	162	160	158	159	155	162	162	157	155	156	102	164	153	162	161	149	154.9
30-Oct	149	160	153	146	147	150	149	145	142	152	141	152	153	153	151	131	168	13	262	137	189	158	345	327	149.5
31-Oct	277	349	352	292	328	360	339	18	62	10	76	27	13	17	58	58	42	51	31	25	16	6	350	7	17.9

236.7 274.1 262.1 246.7 228.2 281.8 249.8 251.6 223.0 215.4 225.4 218.9 242.1 261.7 266.4 273.1 288.5 265.3 15.3 149.9 179.5 282.4 270.7 248.6  
Diurnal Average

All monthly, daily, and diurnal averages have been calculated using vector methods



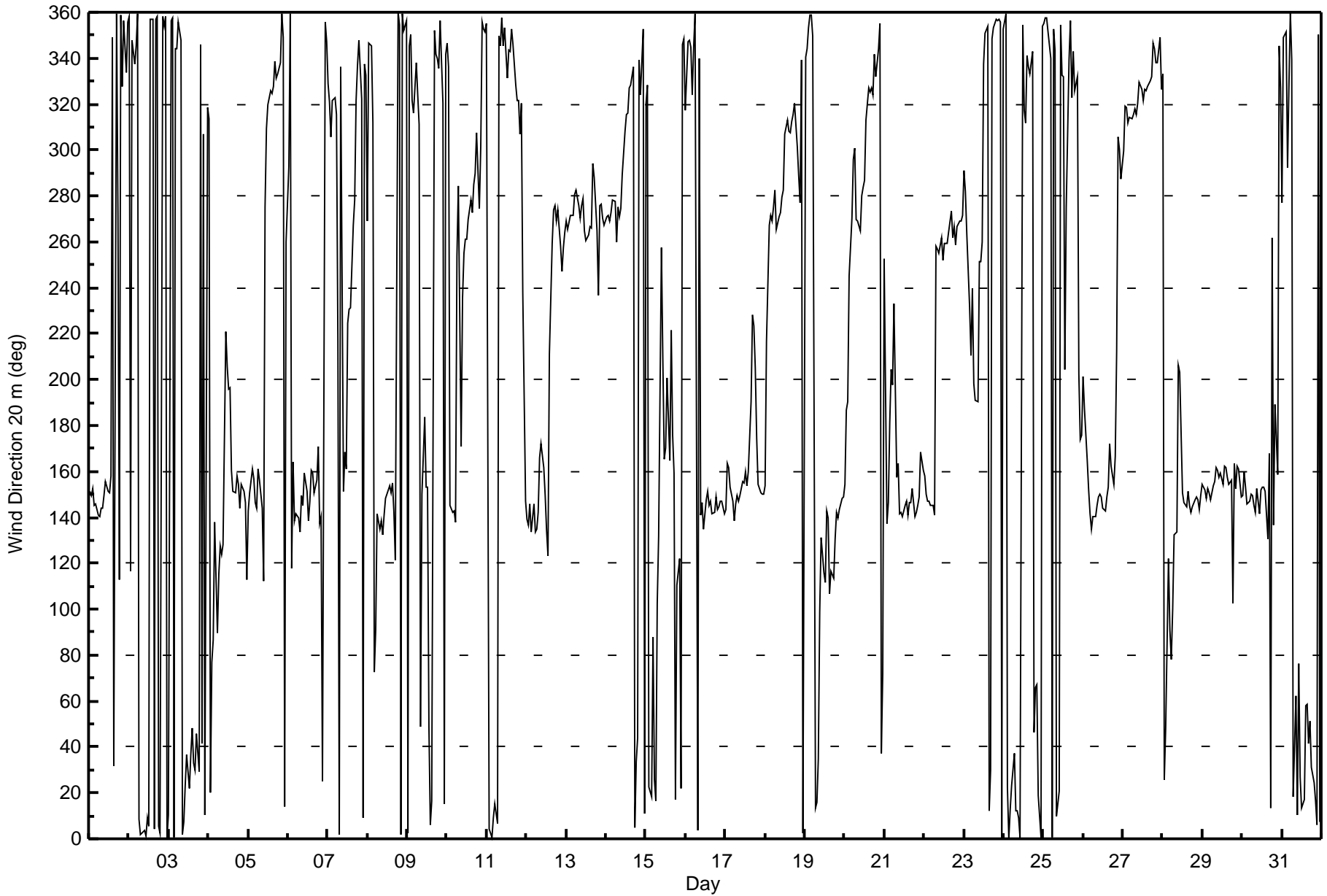
**Wood Buffalo Environmental Association**

**Summary of Hour Standard Deviations**

**Wind Direction 20 m (WD20m) - deg**

**Lower Camp Met Tower - October 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 105 deg on Oct 1 18:00 Minimum Value: 6 deg on Oct 17 22:00 Percentiles: P <sub>1</sub> = 9 P <sub>10</sub> = 13 Q <sub>1</sub> = 16 Median = 20 Q <sub>3</sub> = 32 P <sub>90</sub> = 59 P <sub>99</sub> = 90																		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	11	16	12	15	11	12	15	22	18	16	23	19	20	72	41	45	53	105	94	105	41	68	39	29	105
2-Oct	26	91	44	31	18	21	24	22	22	21	21	24	21	19	21	25	19	19	23	19	20	19	22	21	91
3-Oct	23	20	18	20	19	18	20	18	22	25	30	31	39	39	36	36	29	26	33	28	71	58	45	68	71
4-Oct	34	39	87	72	44	61	65	26	17	28	21	24	23	33	27	20	19	14	17	12	21	39	50	67	87
5-Oct	46	19	10	24	17	12	26	34	21	35	35	21	21	18	19	18	19	16	16	18	16	17	47	84	84
6-Oct	64	55	101	56	32	18	15	20	15	18	19	18	26	20	20	15	15	18	20	17	66	88	30	18	101
7-Oct	13	22	16	24	20	20	91	86	56	78	41	37	52	59	22	22	19	30	16	50	41	71	71	68	91
8-Oct	92	59	27	38	76	81	27	21	21	17	17	19	22	16	15	15	17	71	16	21	17	24	35	47	92
9-Oct	29	32	17	45	46	43	15	20	73	26	62	25	15	75	23	23	16	21	32	24	25	35	28	83	83
10-Oct	39	69	68	42	12	18	83	72	38	29	18	15	16	18	17	17	17	18	33	81	68	37	22	17	83
11-Oct	19	21	19	18	20	24	20	19	19	20	19	20	17	20	20	19	20	19	17	15	26	43	69	24	69
12-Oct	10	11	25	22	21	40	62	38	11	18	20	15	24	23	35	22	17	15	13	10	10	11	15	14	62
13-Oct	14	15	14	15	16	17	17	16	18	21	18	21	16	16	17	17	23	19	14	12	18	15	15	14	23
14-Oct	13	15	19	18	17	19	13	17	17	23	20	19	18	17	16	16	29	30	26	39	19	19	19	37	39
15-Oct	27	33	49	67	66	40	67	79	74	82	26	27	71	57	50	30	26	53	55	57	55	53	18	36	82
16-Oct	59	32	26	21	35	86	61	14	73	28	19	20	18	15	17	18	14	13	14	12	13	21	37	29	86
17-Oct	82	19	15	7	9	10	9	9	15	11	8	9	13	10	11	26	22	13	13	18	8	6	10	17	82
18-Oct	17	58	14	15	13	18	29	11	20	19	18	19	20	19	19	17	15	14	13	72	35	57	32	20	72
19-Oct	20	17	18	18	18	19	34	26	47	50	41	27	25	24	22	22	18	25	20	18	14	15	17	36	50
20-Oct	27	63	17	20	15	22	25	15	17	19	20	19	20	18	18	17	15	19	20	23	17	32	26	41	63
21-Oct	75	59	20	37	81	62	48	34	29	23	20	20	20	18	17	17	16	15	15	18	18	24	23	55	81
22-Oct	22	15	17	11	10	16	16	90	13	14	16	14	17	16	14	16	16	11	11	12	12	12	12	13	90
23-Oct	31	41	18	22	22	17	23	19	45	22	22	31	33	23	22	22	21	20	17	18	20	16	22	22	45
24-Oct	19	20	24	19	27	33	32	44	24	42	25	92	60	35	28	35	17	24	38	54	95	78	46	20	95
25-Oct	15	19	18	20	21	22	25	22	21	28	49	34	105	41	44	39	18	20	36	52	17	92	14	12	105
26-Oct	13	27	43	21	19	18	17	16	17	17	17	16	16	16	17	13	12	10	11	11	34	16	16	17	43
27-Oct	18	15	16	15	15	15	15	14	15	16	15	15	16	16	15	15	14	17	18	18	18	18	24	14	24
28-Oct	35	40	44	39	24	74	86	18	44	16	16	28	15	19	18	17	18	17	16	17	18	16	15	15	86
29-Oct	12	18	26	18	15	16	13	12	12	12	10	9	12	11	8	7	16	25	24	20	31	28	22	10	31
30-Oct	10	16	10	12	9	9	11	14	16	16	18	25	13	15	17	73	68	69	47	85	56	73	44	34	85
31-Oct	46	19	25	32	33	18	15	35	75	67	44	46	32	34	26	26	30	31	23	24	21	19	21	24	75
92 91 101 72 81 86 91 90 75 82 62 92 105 75 50 73 68 105 94 105 95 92 71 84 Diurnal Maximum																									





Direction of Maximum Speed: 252 deg on Oct 10 13:00		Hours in Service:	744
Direction of Maximum Daily Speed Average: 261.2 deg on Oct 13		Hours of Data:	744
Direction of Minimum Speed: 222 deg on Oct 21 01:00		Hours of Missing Data:	0
Direction of Minimum Daily Speed Average: 0.8 deg on Oct 15		Percent Operational Time:	100.0
Monthly Average Direction: 309.4 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	141	142	143	137	134	135	137	137	136	138	140	139	142	138	344	19	352	24	164	343	316	344	339	353	133.7
2-Oct	339	89	347	337	342	354	7	359	1	2	358	6	0	354	354	2	355	355	4	360	354	349	354	357	357.2
3-Oct	7	353	354	356	338	339	350	343	358	3	18	32	20	30	38	29	26	36	25	346	3	331	357	329	3.8
4-Oct	321	358	45	72	114	78	90	118	116	116	212	195	187	190	149	141	139	145	148	143	145	134	133	126	141.9
5-Oct	135	144	151	145	138	139	159	173	159	100	271	300	310	320	316	320	333	325	330	328	342	340	4	354	315.1
6-Oct	270	335	212	154	146	146	139	135	139	137	145	140	130	138	149	149	142	143	156	131	128	87	359	347	137.3
7-Oct	341	335	330	333	341	339	225	239	343	134	160	152	225	235	226	260	270	315	329	337	332	343	317	347	300.7
8-Oct	275	293	331	324	134	148	141	137	135	127	132	136	139	142	143	144	132	112	354	344	347	347	341	349	116.8
9-Oct	358	349	345	329	316	334	326	311	25	140	191	150	146	22	5	15	347	335	337	334	345	326	360	2	347.6
10-Oct	348	100	138	137	134	132	242	269	177	228	246	252	252	259	269	263	274	282	297	321	289	359	347	346	257.1
11-Oct	351	1	359	358	7	10	3	345	341	354	341	347	325	337	337	348	341	323	314	311	306	289	232	158	342.9
12-Oct	138	134	138	126	138	132	136	139	154	162	152	139	124	116	205	252	265	267	259	267	249	238	248	254	200.3
13-Oct	260	255	260	260	260	269	272	266	260	267	270	256	252	255	257	257	284	279	255	224	261	263	258	257	261.2
14-Oct	262	262	258	262	268	268	251	265	260	265	278	299	306	307	320	321	329	2	27	34	344	329	349	6	287.0
15-Oct	326	327	13	21	73	25	20	91	120	256	204	154	156	199	156	216	165	150	32	92	123	66	347	338	123.0
16-Oct	330	339	350	351	343	7	12	26	47	132	135	126	138	141	135	138	134	133	139	137	137	134	136	135	130.4
17-Oct	132	152	151	143	139	132	139	141	139	140	146	145	151	144	152	185	220	217	198	169	146	139	139	141	152.1
18-Oct	149	230	257	261	259	264	273	255	262	264	269	272	298	304	299	299	303	306	310	313	272	264	327	344	278.3
19-Oct	338	341	349	355	356	346	10	14	30	89	118	105	105	133	131	103	110	111	123	134	131	136	139	139	108.5
20-Oct	141	170	184	239	260	286	291	260	259	256	270	275	278	304	319	318	321	316	332	329	338	352	29	59	285.2
21-Oct	222	127	138	173	171	187	215	144	152	132	131	132	136	137	133	138	138	142	133	135	136	138	151	144	139.0
22-Oct	146	143	142	140	139	145	150	253	248	246	251	243	250	250	250	254	263	253	254	248	256	258	259	261	237.8
23-Oct	276	273	255	227	208	234	200	192	202	245	243	252	333	345	350	9	23	346	349	353	352	352	353	358	302.0
24-Oct	349	357	17	358	7	19	29	4	6	4	358	347	312	309	337	331	330	343	40	58	70	20	3	352	359.9
25-Oct	350	353	353	349	337	357	350	341	2	16	2	332	352	196	275	338	351	326	344	341	339	155	165	167	349.6
26-Oct	188	173	153	141	135	130	134	134	137	139	139	139	136	134	138	142	162	151	143	157	205	297	290	278	149.9
27-Oct	289	310	310	301	305	304	306	309	307	313	323	319	313	318	318	321	323	327	340	339	333	335	344	326	315.8
28-Oct	334	25	38	102	81	56	86	122	122	197	193	166	140	137	134	139	135	136	138	138	137	136	133	140	135.8
29-Oct	143	141	138	141	140	139	143	144	149	151	148	152	146	153	154	154	150	153	104	161	137	148	162	142	145.5
30-Oct	137	150	141	138	136	140	140	137	136	143	137	140	141	143	141	117	148	1	292	140	172	152	350	337	138.9
31-Oct	296	345	352	306	302	354	336	10	51	0	68	23	4	10	52	53	37	45	24	16	11	4	347	5	11.9

236.5 278.8 265.6 234.9 219.3 279.8 245.6 236.4 217.6 208.0 217.9 211.1 237.4 258.7 263.4 269.6 287.0 271.4 15.8 126.4 154.3 284.1 270.3 260.5

Diurnal Average

All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association

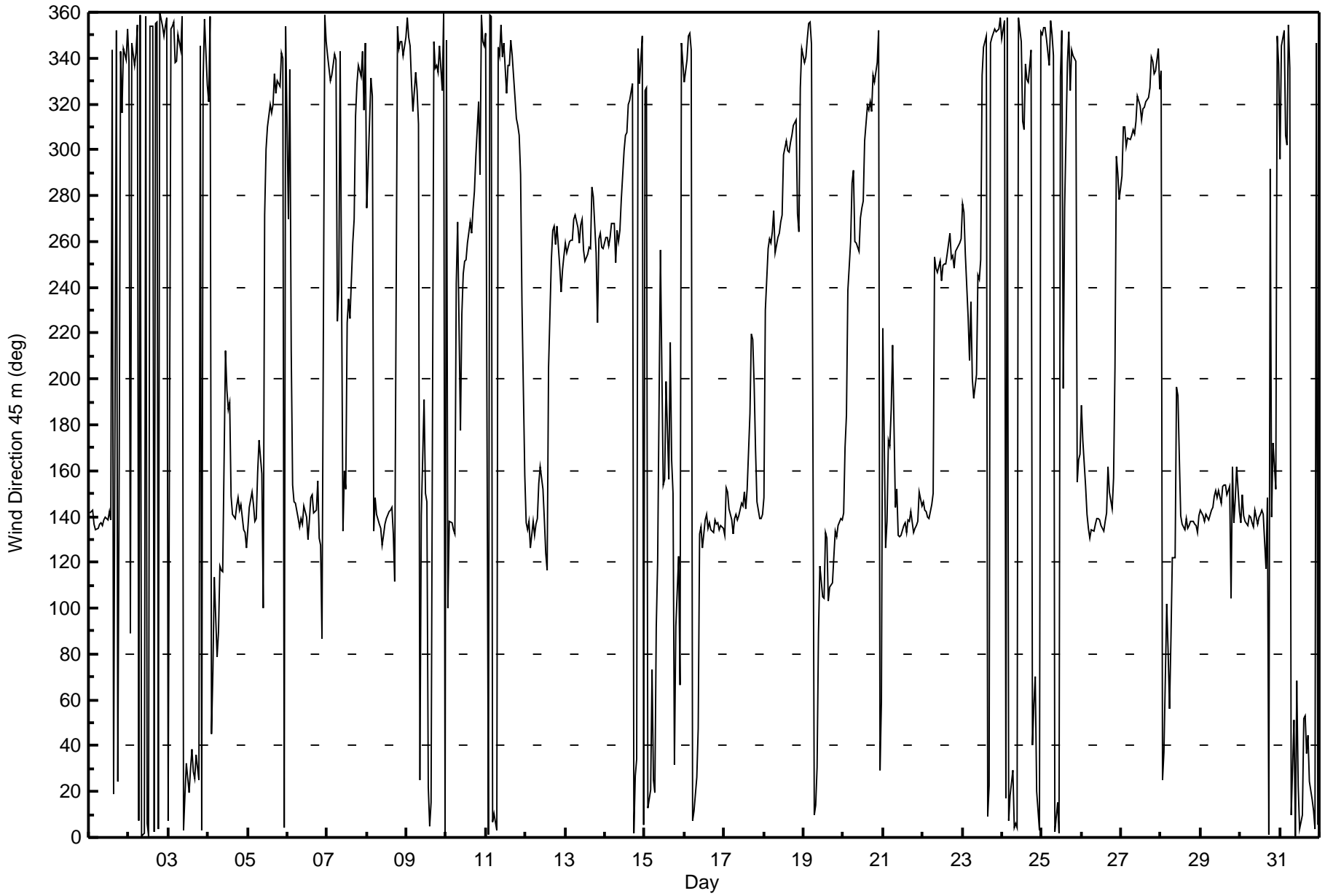
Summary of Hour Standard Deviations

Wind Direction 45 m (WD45m) - deg

Lower Camp Met Tower - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 102 deg on Oct 25 13:00 Minimum Value: 3 deg on Oct 17 22:00 Percentiles: P <sub>1</sub> = 5 P <sub>10</sub> = 9 Q <sub>1</sub> = 12 Median = 15 Q <sub>3</sub> = 25 P <sub>90</sub> = 48 P <sub>99</sub> = 85																		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	6	9	5	8	6	8	11	13	11	11	18	15	17	75	37	34	43	81	89	64	31	71	31	22	89
2-Oct	30	84	20	15	13	18	17	18	15	16	17	18	17	15	17	19	16	17	17	15	15	15	15	17	84
3-Oct	17	17	14	15	15	14	15	14	18	19	23	21	26	30	27	28	19	16	20	17	29	70	39	75	75
4-Oct	24	34	56	55	30	34	34	18	13	20	23	20	32	23	15	16	12	14	9	13	24	27	56	56	
5-Oct	34	14	7	18	13	9	25	39	35	50	31	16	18	15	16	15	16	13	10	12	14	14	16	71	71
6-Oct	33	41	62	25	17	16	9	13	12	14	16	13	19	15	18	11	11	14	18	11	31	82	27	8	82
7-Oct	8	16	16	14	13	16	61	80	52	85	45	44	58	59	21	19	15	27	10	32	23	34	59	73	85
8-Oct	52	60	19	41	83	55	13	17	15	12	12	15	17	11	11	12	14	43	8	12	11	10	19	26	83
9-Oct	15	22	13	35	40	38	11	18	67	22	59	22	20	55	16	18	11	16	21	20	16	28	28	68	68
10-Oct	30	78	18	12	7	13	57	56	38	26	13	10	11	12	13	12	13	15	36	92	50	18	18	13	92
11-Oct	15	16	13	14	15	17	14	16	15	15	14	16	13	16	15	16	17	18	14	12	19	35	62	25	62
12-Oct	10	8	16	15	15	25	46	29	9	15	18	12	15	18	34	19	12	11	8	7	9	6	9	9	46
13-Oct	9	10	9	10	11	12	12	11	11	14	13	15	11	10	12	11	21	15	13	10	14	11	11	9	21
14-Oct	9	9	12	12	13	15	8	11	11	11	17	16	17	15	14	14	13	25	24	19	33	14	15	28	33
15-Oct	22	27	22	67	56	33	57	70	66	80	26	25	78	57	50	27	27	37	56	49	26	46	11	19	80
16-Oct	50	31	11	14	21	43	56	39	78	17	13	13	10	12	13	10	8	9	7	7	13	21	19	78	
17-Oct	56	16	13	6	5	5	5	6	11	7	5	6	11	6	10	23	18	11	12	16	7	3	4	10	56
18-Oct	27	56	9	9	8	12	22	8	14	13	12	14	16	16	15	14	13	12	12	61	17	27	21	13	61
19-Oct	13	13	14	16	12	15	26	19	33	41	35	21	21	19	15	15	13	17	14	12	10	11	11	25	41
20-Oct	23	39	14	16	11	20	21	10	11	11	15	13	17	16	15	14	13	17	14	20	16	27	18	27	39
21-Oct	89	48	15	26	74	45	54	29	25	19	16	14	14	11	12	11	10	9	10	12	12	17	18	36	89
22-Oct	15	8	9	9	5	14	23	64	7	8	10	8	11	10	8	11	11	8	8	6	8	8	7	9	64
23-Oct	21	31	14	18	21	11	22	18	40	19	13	22	31	17	16	16	13	15	13	14	16	13	16	16	40
24-Oct	16	18	15	15	24	25	24	34	18	33	21	85	54	25	23	25	12	21	26	31	59	56	30	16	85
25-Oct	10	13	13	17	17	15	20	18	14	21	43	29	102	44	39	30	13	14	18	34	21	93	12	10	102
26-Oct	11	25	33	13	13	13	13	12	12	11	11	10	11	11	11	8	11	9	7	11	34	13	11	12	34
27-Oct	14	13	14	12	12	12	11	12	12	14	12	13	13	13	13	13	12	14	13	14	15	16	20	11	20
28-Oct	28	30	30	27	19	52	64	13	39	16	16	25	12	15	14	12	11	10	11	10	13	11	11	10	64
29-Oct	8	12	19	13	12	11	10	10	11	11	8	7	8	9	7	6	13	19	27	21	19	21	21	12	27
30-Oct	7	11	9	8	7	6	7	7	9	11	11	15	8	7	8	69	75	85	51	78	37	40	51	19	85
31-Oct	41	12	14	32	19	12	11	31	75	58	41	33	28	22	18	17	22	23	17	17	15	15	17	18	75
																		89 84 62 67 83 55 64 80 78 85 59 85 102 75 50 69 75 85 89 92 59 93 62 75							
																		Diurnal Maximum							







**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction 100 m (WD100m) - deg**

**Lower Camp Met Tower - October 2015**

Direction of Maximum Speed: 266 deg on Oct 10 15:00		Hours in Service:	744
Direction of Maximum Daily Speed Average: 256.8 deg on Oct 13		Hours of Data:	744
Direction of Minimum Speed: 63 deg on Oct 31 11:00		Hours of Missing Data:	0
Direction of Minimum Daily Speed Average: 3.0 deg on Oct 15		Percent Operational Time:	100.0
Monthly Average Direction: 282.3 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	171	164	163	157	156	158	158	165	150	148	136	135	131	121	341	339	286	185	103	105	142	338	334	341	148.4
2-Oct	329	18	351	17	358	4	14	9	8	6	2	8	2	356	357	4	358	358	3	1	357	353	357	0	1.2
3-Oct	7	357	358	358	341	344	353	349	360	3	17	31	23	30	36	26	27	37	28	18	29	42	353	348	6.7
4-Oct	355	354	31	44	76	70	79	121	127	128	208	194	186	199	153	133	136	143	159	161	150	143	141	144	138.2
5-Oct	142	158	159	151	152	164	218	248	254	270	276	301	310	318	315	319	333	324	331	316	304	312	312	341	302.3
6-Oct	346	347	355	137	154	157	160	150	155	139	143	139	133	137	138	144	142	138	131	138	136	132	131	59	137.7
7-Oct	38	56	99	153	337	336	95	138	245	225	187	186	235	245	230	258	269	314	328	334	336	339	335	326	309.9
8-Oct	347	13	338	351	54	153	148	155	152	151	144	131	133	144	152	140	135	123	28	347	351	344	342	340	105.3
9-Oct	341	344	348	28	334	336	344	325	303	164	222	212	239	352	19	28	5	349	349	24	344	10	322	164	347.8
10-Oct	157	143	148	149	180	210	242	246	224	229	242	248	249	258	266	261	273	278	292	343	332	357	8	357	255.1
11-Oct	360	10	6	6	12	13	7	351	346	357	344	346	327	337	336	348	341	326	311	313	322	276	270	218	344.7
12-Oct	183	156	153	143	145	148	149	148	149	159	160	147	134	129	212	252	262	265	260	264	256	240	247	250	206.5
13-Oct	254	249	253	253	254	260	262	260	257	266	267	255	249	253	256	255	279	277	258	234	251	253	251	254	256.8
14-Oct	259	259	254	257	267	271	257	260	255	263	276	299	306	306	319	322	330	4	29	40	12	348	1	11	285.8
15-Oct	348	339	9	45	72	38	44	86	116	232	203	158	159	204	180	219	168	156	144	105	125	125	132	141	125.3
16-Oct	117	137	127	107	108	112	139	143	140	138	136	135	139	139	135	138	138	133	139	140	144	144	141	140	137.8
17-Oct	141	144	154	151	147	146	145	154	144	148	154	154	157	152	159	197	220	222	212	192	173	172	169	175	166.9
18-Oct	214	243	253	259	260	263	268	257	264	265	267	271	297	304	301	299	301	306	313	309	299	309	354	0	279.6
19-Oct	354	353	358	7	5	360	12	34	60	99	109	109	111	127	128	110	116	122	130	137	135	140	143	142	111.5
20-Oct	146	171	206	241	258	284	284	257	255	254	268	273	277	304	315	314	320	313	331	326	339	15	30	53	284.6
21-Oct	57	120	140	165	163	178	137	143	150	134	134	134	135	136	135	141	141	144	139	139	141	143	144	146	140.2
22-Oct	152	159	164	179	225	229	231	246	246	244	250	239	243	246	248	252	260	258	255	252	254	254	260	260	244.0
23-Oct	269	263	253	237	228	239	229	233	242	249	238	256	337	349	354	13	25	5	358	10	5	6	4	7	302.1
24-Oct	4	4	21	6	13	25	31	17	11	14	9	17	329	317	337	340	341	359	39	57	81	35	37	3	12.7
25-Oct	1	2	1	360	355	7	4	355	11	22	18	3	329	164	302	332	356	3	19	59	142	164	165	168	11.9
26-Oct	183	162	136	140	138	141	139	138	140	140	140	140	138	137	141	144	157	152	148	158	210	297	289	277	150.6
27-Oct	289	306	303	298	301	302	303	307	305	312	323	317	313	317	318	322	323	327	340	338	336	341	349	338	315.0
28-Oct	347	26	31	82	74	64	88	120	138	198	197	165	139	136	135	139	137	138	140	141	139	140	138	144	135.1
29-Oct	146	145	143	145	145	143	147	149	153	155	157	162	157	160	158	179	178	179	160	200	194	199	222	229	156.7
30-Oct	188	236	228	232	233	161	168	155	150	154	149	144	145	150	144	129	112	113	322	240	255	216	330	343	162.2
31-Oct	342	3	3	341	309	339	351	21	59	358	63	28	8	8	52	53	46	49	30	21	15	9	359	13	13.5

258.6 261.2 262.7 237.7 252.0 272.9 237.0 226.8 216.6 212.7 223.5 214.4 242.8 265.8 266.2 270.4 279.3 264.9 304.0 128.7 169.0 254.9 257.3 267.0  
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 100 m (WD100m) - deg**

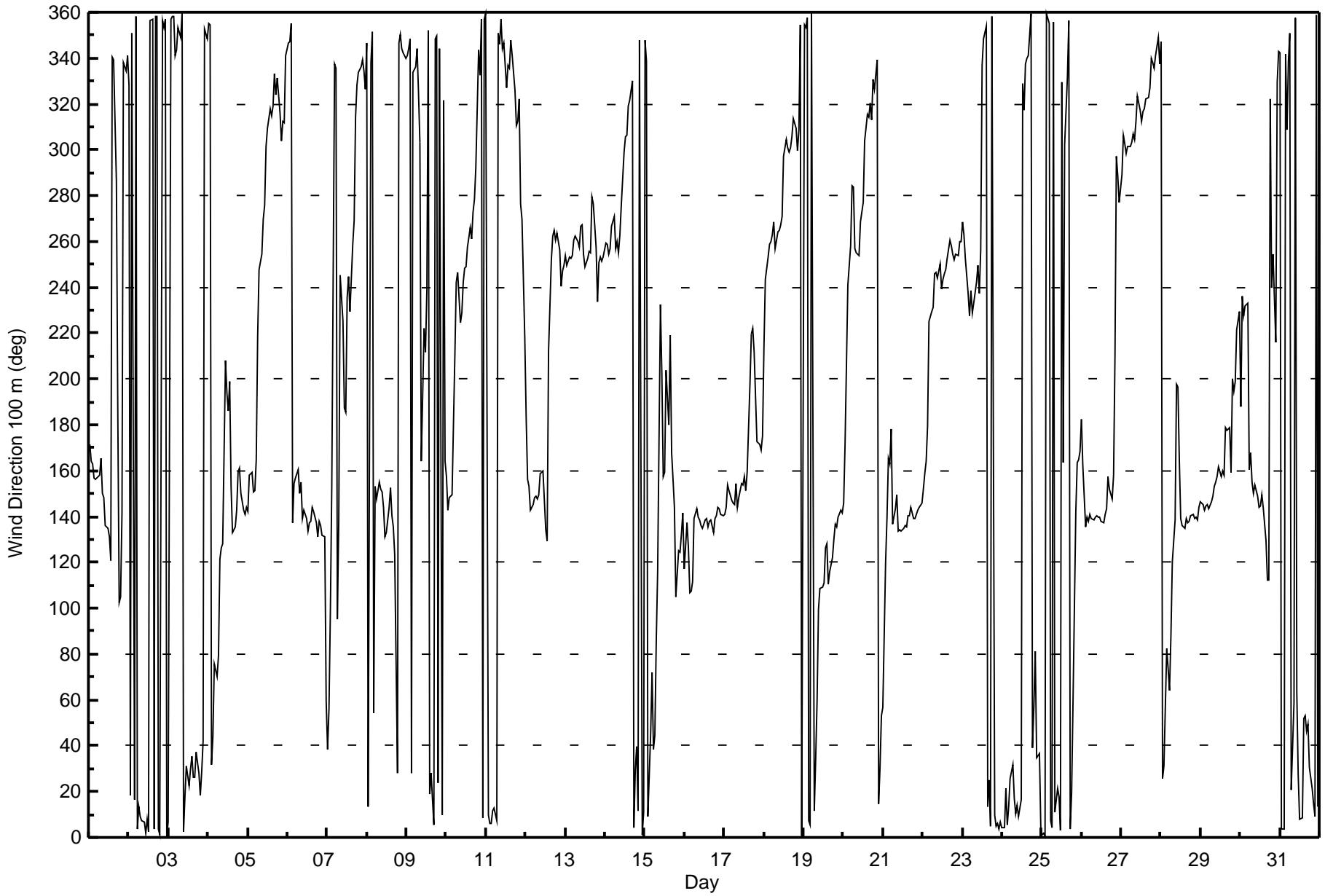
**Lower Camp Met Tower - October 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 98 deg on Oct 10 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: 2 deg on Oct 28 20:00																									
Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 4 Q <sub>1</sub> = 7 Median = 10 Q <sub>3</sub> = 16 P <sub>90</sub> = 30 P <sub>99</sub> = 68																									
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	10	8	4	4	3	5	8	17	8	9	7	6	53	54	41	59	34	19	18	50	63	11	4	63
2-Oct	13	41	10	11	8	12	10	10	9	7	12	10	10	9	10	12	10	9	8	7	8	8	9	9	41
3-Oct	9	11	7	8	9	8	10	9	10	12	14	12	19	18	17	19	11	12	9	13	16	16	16	11	19
4-Oct	18	18	22	33	22	14	23	8	6	15	23	19	17	31	21	9	7	8	14	7	7	5	6	10	33
5-Oct	11	10	6	5	8	13	13	15	13	60	20	13	14	10	11	11	13	9	4	11	8	9	8	23	60
6-Oct	12	16	26	25	10	9	8	5	7	9	7	6	8	9	12	9	7	9	9	5	3	12	28	44	44
7-Oct	26	44	71	90	6	7	33	30	15	63	49	61	45	33	20	14	13	30	5	4	4	4	4	7	90
8-Oct	15	21	23	6	52	19	5	17	11	13	12	6	8	8	9	8	10	14	35	7	4	6	5	9	52
9-Oct	7	11	9	33	13	25	13	17	80	24	35	24	19	52	11	13	9	9	8	29	11	71	60	98	98
10-Oct	34	5	4	11	19	31	13	12	23	17	9	6	8	7	8	8	9	15	41	7	14	23	16	8	41
11-Oct	7	10	8	8	9	11	7	12	11	9	10	12	8	11	12	11	13	18	9	7	11	14	42	20	42
12-Oct	26	9	9	7	5	7	10	9	6	12	12	6	10	11	29	15	7	5	4	4	7	4	5	5	29
13-Oct	4	5	3	4	5	6	6	5	5	8	7	13	9	7	9	6	17	12	6	5	7	4	4	4	17
14-Oct	4	4	5	5	11	12	6	5	5	7	14	14	12	11	8	10	8	24	19	12	27	10	10	13	27
15-Oct	19	16	11	24	39	22	26	32	45	68	21	22	75	45	43	16	32	10	43	13	10	6	21	21	75
16-Oct	11	20	12	39	42	64	7	7	10	4	5	6	5	5	6	6	5	4	5	3	3	6	3	3	64
17-Oct	16	5	11	8	3	3	4	5	6	3	6	7	11	9	7	20	9	5	6	14	12	12	9	12	20
18-Oct	38	10	5	3	3	4	14	4	8	8	7	10	11	12	11	10	9	5	5	15	24	22	19	8	38
19-Oct	9	7	9	9	7	7	18	14	25	26	23	12	13	15	9	7	7	9	8	7	6	5	3	10	26
20-Oct	12	29	11	11	6	16	17	6	7	7	10	8	14	11	12	9	7	9	5	12	15	20	15	18	29
21-Oct	44	43	13	22	25	24	38	37	21	8	6	6	6	5	4	3	3	4	4	5	4	3	5	8	44
22-Oct	8	11	19	21	17	12	7	12	5	6	5	6	9	7	6	7	5	4	3	3	3	3	3	4	21
23-Oct	11	19	8	7	10	5	9	10	15	18	10	26	24	13	9	10	8	13	8	11	10	9	9	8	26
24-Oct	10	8	10	10	14	22	16	16	8	22	16	48	58	24	24	15	9	11	17	11	24	20	25	9	58
25-Oct	7	8	7	8	11	9	13	11	10	13	31	29	89	51	44	25	9	9	16	30	17	18	11	9	89
26-Oct	10	20	14	3	5	4	4	5	4	3	4	3	4	5	4	3	8	7	4	8	35	9	7	10	35
27-Oct	11	8	9	7	7	7	7	7	7	11	7	9	8	9	7	8	5	10	9	9	10	10	14	6	14
28-Oct	18	13	16	20	13	18	38	9	30	15	15	23	7	8	6	5	4	3	4	2	4	6	4	3	38
29-Oct	3	4	7	4	4	5	5	5	8	8	9	10	8	7	6	11	11	13	32	19	32	30	15	34	34
30-Oct	66	36	18	16	32	20	15	12	9	11	11	8	6	9	5	52	35	37	33	46	24	44	23	8	66
31-Oct	10	8	4	18	13	9	5	24	62	50	88	24	18	22	13	10	14	18	14	10	11	7	11	11	88
Diurnal Maximum																									



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

**Wind Direction 100 m (WD100m) - deg**  
**Lower Camp Met Tower - October 2015**





Maximum Value: 0.7 km/h on Oct 10 06:00																				Maximum Daily Average: 0.1 km/h on Oct 1					Hours in Service: 744				
Minimum Value: -1.2 km/h on Oct 10 15:00																				Minimum Daily Average: -0.5 km/h on Oct 13					Hours of Data: 744				
Maximum Diurnal Average: -0.1 km/h at hour 22																				Minimum Diurnal Average: -0.2 km/h at hour 12					Hours of Missing Data: 0				
Monthly Average: -0.11 km/h																				Percentiles: P <sub>1</sub> = -0.7 P <sub>10</sub> = -0.5 Q <sub>1</sub> = -0.2 Median = -0.1 Q <sub>3</sub> = 0.0 P <sub>90</sub> = 0.1 P <sub>99</sub> = 0.4					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	0.3	0.1	0.2	0.0	0.2	0.0	0.1	0.2	0.1	-0.1	0.1	0.2	0.4	0.5	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.0	-0.2	0.0	0.1	0.5			
2-Oct	-0.1	0.0	0.0	-0.1	-0.1	-0.4	-0.3	-0.3	-0.3	-0.6	-0.3	-0.2	-0.6	-0.5	-0.5	-0.3	-0.5	-0.2	-0.2	-0.6	-0.5	-0.3	-0.3	-0.5	-0.3	0.0			
3-Oct	-0.4	-0.3	-0.5	-0.4	0.1	0.1	-0.3	-0.2	-0.2	-0.4	-0.3	-0.1	0.1	0.2	0.0	-0.1	0.0	-0.4	-0.2	-0.1	0.0	0.0	0.0	0.0	-0.1	0.2			
4-Oct	-0.2	-0.1	0.0	0.0	0.0	-0.1	-0.1	0.0	-0.2	-0.2	0.1	0.1	0.2	0.0	0.1	0.2	0.3	0.0	0.1	0.1	-0.1	-0.1	-0.2	-0.1	0.0	0.3			
5-Oct	-0.3	0.0	0.1	0.1	0.0	0.0	0.2	0.1	0.2	0.1	-0.2	-0.4	-0.4	-0.7	-0.2	-0.2	0.0	0.0	-0.1	-0.1	-0.2	-0.1	0.0	0.1	-0.1	0.2			
6-Oct	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1	0.2	0.0	-0.1	0.0	0.1	-0.2	0.0	0.1	0.0	-0.2	0.0	0.2				
7-Oct	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	0.1	-0.1	0.5	0.2	-0.1	-0.2	-0.2	-0.2	-0.3	-0.4	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.5			
8-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.1	-0.1	0.1	0.1	-0.1	0.0	-0.4	-0.1	-0.1	-0.1	-0.1	0.0	0.0	0.1			
9-Oct	0.0	0.0	-0.1	-0.1	0.0	0.0	0.0	-0.1	0.0	-0.1	0.2	0.3	0.3	0.0	0.1	0.0	0.0	0.0	0.1	-0.1	0.0	-0.1	0.0	-0.1	0.0	0.3			
10-Oct	-0.1	0.1	0.1	0.1	0.3	0.7	-0.1	-0.3	0.1	-0.2	-0.4	-1.0	-0.8	-0.5	-1.2	-1.0	-0.7	-0.4	-0.2	0.1	-0.1	0.0	0.0	-0.1	-0.2	0.7			
11-Oct	-0.1	-0.2	-0.3	-0.1	-0.1	-0.2	-0.2	-0.1	-0.1	-0.3	0.0	-0.4	-0.3	-0.2	-0.1	-0.3	-0.1	-0.3	-0.2	-0.2	-0.1	-0.1	0.1	0.1	-0.2	0.1			
12-Oct	0.3	0.0	-0.2	-0.3	0.0	-0.1	0.0	-0.1	-0.1	0.1	0.2	-0.3	-0.5	-0.3	-0.2	-0.4	-0.4	-0.6	-0.3	-0.3	-0.2	0.0	-0.3	-0.6	-0.2	0.3			
13-Oct	-0.7	-0.5	-0.7	-0.7	-0.6	-0.5	-0.7	-0.8	-0.6	-0.5	-0.6	-0.3	-0.5	-0.6	-0.7	-0.6	-0.6	-0.3	-0.3	-0.1	-0.5	-0.5	-0.6	-0.5	-0.5	-0.1			
14-Oct	-0.6	-0.5	-0.4	-0.4	-0.7	-0.6	-0.3	-0.5	-0.5	-0.8	-0.6	-0.5	-0.3	-0.6	-0.4	-0.1	0.0	-0.1	-0.2	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.4	0.0		
15-Oct	-0.1	0.0	0.0	-0.1	0.0	-0.1	-0.2	0.0	0.0	0.4	0.0	0.0	0.1	0.0	0.1	-0.1	0.0	0.2	-0.1	0.0	0.0	0.0	-0.1	0.0	0.0	0.4			
16-Oct	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.1	-0.2	-0.2	-0.2	0.2	0.1	0.0	0.1	-0.1	-0.1	-0.2	-0.2	-0.1	0.0	0.1	0.2	0.0	0.2			
17-Oct	0.1	0.1	0.0	-0.1	-0.4	-0.4	0.0	0.1	0.0	-0.1	-0.3	-0.3	-0.2	-0.1	0.2	0.2	-0.1	-0.1	0.1	0.3	0.2	0.1	0.1	0.2	0.0	0.3			
18-Oct	0.2	-0.1	-0.6	-0.6	-0.6	-0.4	-0.4	-0.3	-0.4	-0.6	-0.7	-0.7	-0.3	-0.6	-0.3	-0.7	-0.5	-0.2	-0.3	0.0	-0.1	-0.1	-0.1	-0.2	-0.4	0.2			
19-Oct	-0.1	0.0	0.0	0.0	-0.1	0.0	-0.1	-0.1	-0.1	0.0	0.2	-0.2	-0.2	0.1	-0.1	-0.2	-0.3	-0.1	-0.3	-0.2	-0.3	-0.3	0.0	0.0	-0.1	0.2			
20-Oct	0.1	0.3	0.2	-0.1	-0.4	-0.6	-0.2	-0.6	-0.5	-0.4	-0.7	-0.5	-0.8	-0.4	-0.1	-0.3	-0.3	-0.1	0.0	-0.1	0.0	0.0	-0.2	-0.1	-0.2	0.3			
21-Oct	0.1	0.0	0.0	0.2	0.0	0.2	0.0	0.1	0.0	-0.1	-0.2	-0.1	0.0	-0.1	0.0	0.0	-0.1	-0.3	-0.3	-0.1	-0.2	0.3	0.0	-0.3	0.0	0.3			
22-Oct	-0.3	-0.2	-0.1	0.0	0.2	0.1	0.0	-0.1	-0.3	-0.4	-0.5	-0.3	-0.4	-0.5	-0.7	-0.5	-0.5	-0.3	-0.3	-0.2	-0.4	-0.5	-0.7	-0.6	-0.3	0.2			
23-Oct	-0.3	-0.1	-0.3	-0.1	0.0	0.0	0.1	0.3	0.1	-0.1	-0.1	0.1	0.2	-0.1	-0.1	-0.1	0.0	-0.1	0.0	-0.1	0.0	-0.1	0.0	-0.1	0.0	0.3			
24-Oct	0.0	0.0	-0.2	-0.1	-0.1	-0.1	0.0	-0.1	0.0	0.1	0.0	0.0	0.1	-0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	0.1			
25-Oct	-0.3	-0.2	-0.3	0.0	0.1	-0.1	0.0	0.0	-0.2	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	-0.2	-0.2	0.1	0.4	0.3	0.0	0.0	0.4			
26-Oct	-0.1	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.2	0.1	0.1	-0.1	0.0	-0.1	-0.2	0.1	-0.3	0.5	-0.2	-0.4	0.2	0.1	-0.4	-0.4	-0.5	-0.1	0.5			
27-Oct	-0.5	-0.4	-0.2	-0.3	-0.4	-0.3	-0.5	-0.3	-0.6	-0.4	-0.1	-0.4	-0.5	-0.4	-0.5	-0.3	-0.2	-0.3	0.1	-0.3	0.0	0.2	0.0	0.0	-0.3	0.2			
28-Oct	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.1	0.2	0.0	0.1	0.1	0.0	0.1	0.0	-0.2	0.1	0.0	-0.2	-0.2	-0.3	0.0	0.2			
29-Oct	-0.2	0.2	0.1	0.1	0.0	0.0	-0.2	-0.1	-0.2	-0.1	-0.3	0.0	-0.2	0.2	0.2	0.2	0.0	0.2	-0.1	0.2	0.3	0.3	0.2	0.2	0.0	0.3			
30-Oct	0.2	0.0	-0.1	0.1	0.2	0.2	0.1	-0.1	0.0	0.0	0.0	-0.1	-0.2	-0.2	-0.3	-0.1	0.1	-0.1	0.0	0.1	0.1	0.1	-0.1	0.0	0.0	0.2			
31-Oct	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	0.0	-0.1	-0.3	-0.1	0.0	0.1	0.0	-0.2	-0.1	0.0	0.1	0.0	0.1			
																								Diurnal Average					
																								Diurnal Maximum					



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.5 km/h on Oct 10 15:00 Minimum Value: 0.1 km/h on Oct 8 03:00 Percentiles: P <sub>1</sub> = 0.1 P <sub>10</sub> = 0.4 Q <sub>1</sub> = 0.8 Median = 1.4 Q <sub>3</sub> = 2.4 P <sub>90</sub> = 3.1 P <sub>99</sub> = 4.1																								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	1.2	2.0	1.9	1.7	1.1	1.2	1.6	2.0	1.9	2.1	1.8	2.0	1.9	1.4	1.3	1.0	0.5	0.2	0.2	0.2	0.2	0.7	0.5	0.5	2.1
2-Oct	0.4	0.5	0.6	0.5	1.1	2.3	2.1	2.2	2.5	3.3	3.0	3.0	3.8	3.0	3.3	3.5	2.6	2.1	2.5	3.1	3.1	3.5	3.0	3.2	3.8
3-Oct	2.8	2.9	2.9	2.8	2.4	2.6	2.7	2.8	2.7	2.6	2.8	2.5	2.2	2.1	2.2	2.1	1.8	1.5	0.6	0.2	0.1	0.1	0.1	0.3	2.9
4-Oct	0.5	0.5	0.5	0.4	0.5	0.6	0.6	1.1	1.5	1.3	1.3	1.2	1.3	1.3	1.5	1.7	1.8	1.4	0.8	0.6	1.1	1.6	1.3	0.9	1.8
5-Oct	1.2	1.0	1.6	1.5	1.3	1.1	1.0	1.0	1.0	1.0	1.9	3.6	4.1	3.6	3.7	3.3	2.6	2.0	1.0	0.7	0.9	1.0	0.3	0.3	4.1
6-Oct	0.2	0.2	0.1	0.1	0.2	0.3	0.8	1.0	1.0	1.6	1.7	2.2	2.0	1.5	1.4	1.0	1.4	1.0	0.7	1.2	1.2	0.7	0.4	0.6	2.2
7-Oct	0.4	0.5	0.2	0.3	0.5	0.4	0.2	0.1	0.4	0.9	1.2	1.3	1.3	1.3	1.3	2.1	1.7	0.8	0.8	0.5	0.2	0.2	0.2	0.2	2.1
8-Oct	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.5	0.9	1.3	1.6	1.9	1.9	2.1	2.2	1.6	1.0	1.0	1.3	0.9	1.0	0.7	0.6	0.3	2.2
9-Oct	0.4	0.5	0.8	0.4	0.4	0.5	0.4	0.3	0.8	1.2	1.2	1.2	1.0	1.0	1.2	1.2	0.8	0.9	0.9	0.6	0.6	0.4	0.5	0.5	1.2
10-Oct	0.3	0.4	0.7	1.0	1.7	1.8	2.1	1.8	1.4	2.5	2.4	3.9	4.3	4.3	4.5	3.9	3.5	1.4	1.2	0.5	0.3	1.4	1.6	1.6	4.5
11-Oct	1.8	2.1	2.0	1.9	2.2	2.6	2.4	2.0	2.2	2.7	2.1	2.0	2.7	2.9	2.6	2.3	2.1	1.7	2.1	1.6	0.5	0.6	0.2	0.4	2.9
12-Oct	0.5	0.9	1.4	1.7	2.2	1.4	1.1	1.2	1.5	1.1	1.4	2.2	2.5	2.4	1.9	2.5	3.0	2.4	1.6	1.0	0.7	1.5	2.4	2.4	3.0
13-Oct	2.5	2.6	2.9	2.9	2.8	2.8	2.9	2.8	2.8	3.1	3.3	2.6	2.7	3.2	3.0	3.9	3.2	1.4	1.0	0.6	1.7	2.5	2.5	2.7	3.9
14-Oct	2.8	2.8	2.4	3.3	3.3	2.6	2.0	3.2	3.3	3.6	3.8	3.5	3.4	3.6	3.4	2.6	2.3	2.2	1.6	1.3	0.8	0.5	1.1	0.8	3.8
15-Oct	0.3	0.4	0.5	0.7	0.5	0.6	0.9	0.5	0.7	1.1	1.3	1.5	1.5	1.4	1.3	1.1	0.9	0.7	0.6	0.6	0.7	0.6	0.3	0.2	1.5
16-Oct	0.3	0.4	0.3	0.4	0.3	0.3	0.5	1.1	1.1	2.8	2.5	2.6	3.0	3.0	3.1	2.8	2.4	1.7	2.2	2.5	2.8	2.5	2.2	2.7	3.1
17-Oct	1.3	0.8	0.8	0.8	1.5	1.6	1.2	1.0	1.3	1.1	1.5	1.9	2.1	1.8	1.8	1.7	1.1	1.3	1.3	1.2	1.1	1.1	1.6	1.5	2.1
18-Oct	1.5	1.7	3.0	3.0	2.6	2.8	2.2	1.5	2.6	3.0	3.5	3.9	3.8	3.7	3.5	3.2	2.5	2.1	1.4	0.6	0.5	0.4	0.4	0.7	3.9
19-Oct	0.7	1.0	1.4	1.3	1.4	0.9	0.8	0.8	1.1	1.4	1.6	1.5	1.5	1.6	1.6	1.7	1.8	1.4	1.9	2.3	2.7	3.2	4.0	3.0	4.0
20-Oct	2.3	1.3	1.3	1.6	2.5	2.9	2.2	2.3	2.5	2.7	3.2	3.5	3.3	3.7	3.5	3.0	2.4	1.5	0.4	0.8	1.2	1.2	1.1	0.7	3.7
21-Oct	0.3	0.4	0.5	0.5	0.4	0.7	0.6	0.7	0.9	1.6	2.0	2.6	2.4	2.4	2.7	2.7	2.7	2.9	3.3	3.1	3.5	3.3	2.0	1.9	3.5
22-Oct	2.0	1.6	1.4	1.1	0.9	1.1	1.0	1.1	2.1	2.3	2.4	2.3	2.6	3.1	3.3	3.0	2.3	1.2	1.0	1.6	1.6	2.0	2.3	2.6	3.3
23-Oct	1.8	1.3	1.2	0.9	1.1	1.5	1.1	0.9	1.0	1.3	1.2	1.7	1.7	1.7	1.5	1.4	1.3	0.7	1.2	1.3	1.4	1.2	1.2	1.3	1.8
24-Oct	0.9	1.4	1.3	1.1	1.0	1.1	0.9	0.9	1.1	1.0	1.4	1.1	1.0	1.0	1.0	0.8	0.6	0.6	0.7	0.6	0.4	0.4	0.4	1.0	1.4
25-Oct	1.6	1.7	1.7	1.4	1.1	1.5	1.1	1.1	1.5	1.4	1.0	1.0	1.0	0.8	0.8	0.8	0.8	0.6	0.4	0.4	0.4	0.9	1.5	1.7	1.7
26-Oct	1.3	1.1	0.8	2.0	2.4	1.8	3.1	3.0	3.4	4.4	4.2	4.0	4.2	3.9	3.2	3.6	2.6	2.9	3.3	2.4	1.8	2.9	3.1	2.5	4.4
27-Oct	2.7	2.6	1.6	2.3	2.6	2.7	2.9	2.4	2.5	2.8	2.5	2.4	3.2	3.7	3.3	3.2	2.5	2.2	2.2	2.4	1.7	1.1	1.0	0.7	3.7
28-Oct	0.6	1.2	0.7	0.6	0.5	0.5	0.5	1.0	1.0	1.1	1.1	1.6	2.2	2.2	2.5	2.3	2.6	2.8	3.3	4.1	3.3	2.0	3.0	3.6	4.1
29-Oct	3.7	3.3	2.4	3.0	3.1	3.0	2.7	2.9	2.3	2.6	2.3	2.0	2.1	1.8	1.7	1.1	1.2	1.4	1.3	0.9	0.9	0.9	1.0	0.7	3.7
30-Oct	0.7	0.7	0.7	0.8	0.8	0.8	1.1	1.6	1.5	1.5	2.0	1.7	1.6	1.5	1.7	1.2	0.3	0.4	0.2	0.4	0.2	0.4	0.3	0.7	2.0
31-Oct	0.5	0.6	0.5	0.3	0.2	0.5	0.6	0.7	0.6	0.6	0.7	1.0	1.2	1.3	1.5	1.7	1.2	1.1	1.3	1.3	1.7	1.5	0.9	1.3	1.7
Diurnal Maximum																									



Maximum Value: 1.9 km/h on Oct 10 06:00																				Maximum Daily Average: 0.8 km/h on Oct 29					Hours in Service: 744				
Minimum Value: -2.0 km/h on Oct 10 15:00																				Minimum Daily Average: -0.9 km/h on Oct 13					Hours of Data: 744				
Maximum Diurnal Average: 0.1 km/h at hour 21																				Minimum Diurnal Average: -0.1 km/h at hour 14					Hours of Missing Data: 0				
Monthly Average: -0.02 km/h																				Percentiles: P <sub>1</sub> = -1.4 P <sub>10</sub> = -0.9 Q <sub>1</sub> = -0.3 Median = 0.0 Q <sub>3</sub> = 0.4 P <sub>90</sub> = 0.8 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	1.2	0.9	1.3	0.6	0.8	0.5	0.5	0.7	0.5	0.4	0.3	0.6	0.7	0.8	0.3	0.0	0.2	0.2	0.1	0.1	0.0	-0.1	-0.3	-0.1	0.4	1.3			
2-Oct	-0.2	0.1	-0.1	-0.2	-0.3	-0.6	-0.4	-0.2	-0.5	-0.6	-0.5	-0.3	-0.8	-1.0	-0.7	-0.4	-0.3	-0.1	-0.5	-0.5	-0.5	-0.6	-0.4	-0.6	-0.4	0.1			
3-Oct	-0.4	-0.5	-0.6	-0.7	-0.4	-0.4	-0.3	-0.6	-0.4	-0.4	0.0	0.0	0.1	0.4	0.1	0.2	0.1	-0.2	-0.1	-0.2	0.0	0.1	0.0	0.0	-0.2	0.4			
4-Oct	-0.3	-0.1	0.0	0.0	0.1	0.0	-0.1	0.3	0.3	0.2	0.3	0.0	0.1	0.0	0.3	0.5	0.9	0.6	0.2	0.4	0.6	0.2	-0.1	0.1	0.2	0.9			
5-Oct	0.0	0.4	0.7	0.6	0.3	0.5	0.4	0.1	0.4	0.4	-0.4	-1.2	-1.6	-1.5	-1.1	-0.8	-0.6	-0.5	0.4	-0.4	-0.5	-0.4	-0.1	0.0	-0.2	0.7			
6-Oct	0.0	0.1	0.1	0.1	0.1	0.2	0.4	0.3	0.3	0.4	0.4	0.7	0.4	0.3	0.5	0.3	0.4	0.4	0.2	0.2	0.5	0.1	0.0	-0.3	0.3	0.7			
7-Oct	-0.2	-0.3	-0.1	-0.2	-0.2	-0.2	0.0	0.1	-0.1	0.8	0.3	0.1	-0.2	-0.1	-0.1	-0.5	-0.7	-0.3	-0.3	0.0	-0.1	-0.1	-0.1	0.0	-0.1	0.8			
8-Oct	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.4	0.4	0.5	0.3	0.5	0.6	0.6	0.7	0.6	0.3	0.3	-0.6	-0.2	-0.2	-0.1	-0.1	0.0	0.2	0.7			
9-Oct	-0.1	0.0	-0.1	-0.2	-0.2	-0.1	-0.2	-0.2	0.1	0.2	0.3	0.4	0.6	0.2	0.0	0.1	-0.1	-0.2	0.0	-0.3	0.0	-0.2	-0.1	-0.1	0.0	0.6			
10-Oct	-0.2	0.0	0.5	0.7	1.5	1.9	0.2	-0.6	0.2	-0.1	-0.5	-1.3	-1.1	-1.4	-2.0	-1.4	-1.3	-0.7	-0.3	0.0	-0.2	-0.1	-0.3	-0.3	-0.3	1.9			
11-Oct	-0.2	-0.3	-0.4	-0.2	-0.2	-0.3	-0.3	-0.3	-0.2	-0.4	-0.4	-0.5	-0.6	-0.5	-0.5	-0.5	-0.2	-0.5	-0.7	-0.7	-0.3	-0.3	0.0	0.2	-0.3	0.2			
12-Oct	0.7	0.4	0.3	0.0	0.7	0.3	0.3	0.1	0.5	0.3	0.7	0.6	0.3	0.2	0.1	-0.6	-1.1	-1.1	-0.7	-0.6	-0.3	0.1	-0.4	-0.9	0.0	0.7			
13-Oct	-1.1	-0.7	-1.1	-1.2	-1.0	-1.4	-1.3	-1.3	-0.9	-0.8	-1.3	-0.6	-0.8	-1.0	-0.9	-1.2	-1.2	-0.8	-0.5	-0.2	-0.7	-0.8	-0.9	-1.0	-0.9	-0.2			
14-Oct	-1.3	-1.1	-0.5	-1.0	-1.4	-1.0	-0.6	-1.1	-0.7	-1.4	-1.6	-1.2	-1.0	-1.6	-1.2	-0.4	-0.7	-0.2	-0.1	0.1	-0.2	-0.2	-0.2	-0.1	-0.8	0.1			
15-Oct	-0.2	-0.1	0.1	0.0	0.0	0.0	-0.1	0.0	0.1	0.5	-0.1	0.2	0.6	0.0	0.1	-0.1	0.3	0.7	-0.1	0.1	0.3	0.1	-0.1	0.0	0.1	0.7			
16-Oct	0.0	-0.1	-0.1	-0.1	0.0	0.1	-0.1	0.1	0.2	0.6	0.6	0.7	1.0	1.0	0.9	1.0	0.6	0.6	0.8	0.8	1.2	0.8	0.8	0.8	0.5	1.2			
17-Oct	0.5	0.2	0.3	0.5	0.5	0.3	0.7	0.8	0.3	0.5	0.6	0.5	0.5	0.7	1.0	0.0	-0.3	-0.1	-0.2	0.5	1.2	1.1	1.5	1.3	0.5	1.5			
18-Oct	0.8	-0.1	-1.0	-1.1	-1.0	-0.9	-0.9	-0.7	-0.6	-0.9	-1.2	-1.4	-0.7	-1.4	-0.9	-1.5	-1.1	-0.8	-0.8	-0.2	-0.3	-0.2	-0.4	-0.4	-0.7	0.8			
19-Oct	-0.2	0.0	-0.2	-0.1	-0.2	-0.1	0.1	-0.1	0.1	0.2	0.6	0.3	0.2	0.4	0.4	0.5	0.4	0.3	0.3	0.4	0.8	0.8	1.3	0.9	0.3	1.3			
20-Oct	0.8	0.4	0.1	-0.1	-0.8	-1.2	-0.8	-0.9	-0.6	-0.5	-0.9	-1.1	-1.5	-1.0	-1.1	-1.1	-0.9	-0.6	-0.2	-0.3	-0.4	0.1	-0.1	0.0	-0.5	0.8			
21-Oct	0.1	0.1	0.3	0.3	0.1	0.3	0.1	0.3	0.2	0.3	0.5	0.7	0.8	0.7	0.7	0.8	0.8	0.8	0.7	0.8	1.0	1.1	0.5	0.2	0.5	1.1			
22-Oct	0.4	0.6	0.7	0.6	1.2	0.9	0.4	-0.2	-0.6	-0.6	-0.7	-0.3	-0.4	-0.9	-0.9	-0.9	-0.9	-0.5	-0.6	-0.4	-0.7	-0.9	-1.2	-1.2	-0.3	1.2			
23-Oct	-0.3	-0.3	-0.4	-0.2	0.1	0.2	0.2	0.3	0.2	-0.2	-0.1	0.0	0.2	-0.3	-0.2	-0.2	0.1	-0.2	-0.1	-0.2	-0.3	-0.1	0.0	-0.2	-0.1	0.3			
24-Oct	-0.1	-0.2	-0.1	-0.1	0.0	0.1	0.0	-0.2	0.1	0.2	0.0	0.1	0.1	-0.2	-0.2	0.1	-0.1	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.2			
25-Oct	-0.4	-0.2	-0.4	-0.1	0.0	-0.1	-0.1	-0.2	-0.3	0.1	0.0	-0.1	0.2	0.0	0.1	0.0	-0.2	-0.2	-0.1	-0.3	-0.4	0.3	0.7	0.4	0.0	0.7			
26-Oct	-0.2	0.2	0.1	0.8	0.6	0.5	0.7	0.7	1.0	1.3	1.3	1.2	1.1	1.0	1.1	1.2	1.1	1.1	1.3	1.0	-0.1	-1.2	-1.3	-1.2	0.5	1.3			
27-Oct	-1.2	-1.1	-0.6	-0.8	-1.0	-1.0	-1.4	-1.0	-1.3	-1.1	-0.9	-0.8	-1.2	-1.4	-1.3	-1.1	-0.7	-0.6	-0.4	-0.5	-0.3	0.1	-0.2	-0.3	-0.8	0.1			
28-Oct	-0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.4	0.2	0.1	0.0	0.2	0.5	0.7	0.7	0.7	0.7	0.8	1.0	1.3	1.0	0.6	0.8	1.2	0.5	1.3			
29-Oct	1.2	1.1	0.8	0.9	0.8	0.6	0.7	1.1	0.8	0.7	0.7	1.0	0.8	1.0	0.8	0.9	0.7	0.7	0.3	0.4	0.9	0.8	0.3	1.0	0.8	1.2			
30-Oct	0.9	0.5	0.7	0.9	0.9	0.9	0.8	0.6	0.7	0.6	0.8	0.4	0.4	0.5	0.4	0.2	0.2	-0.1	-0.1	0.3	0.1	0.5	-0.1	0.0	0.4	0.9			
31-Oct	-0.2	-0.2	-0.1	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.1	0.1	0.2	0.1	0.3	-0.1	0.0	0.2	0.1	0.0	-0.2	-0.1	0.1	0.0	0.0	0.3		
																								Diurnal Average					
																								Diurnal Maximum					



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.9 km/h on Oct 10 15:00 Minimum Value: 0.1 km/h on Oct 8 03:00 Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.5 Q <sub>1</sub> = 0.9 Median = 1.4 Q <sub>3</sub> = 2.5 P <sub>90</sub> = 3.2 P <sub>99</sub> = 4.2																							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	1.0	1.7	1.5	1.4	0.9	1.2	1.6	2.1	1.8	2.0	1.9	1.8	1.8	1.6	1.5	1.1	0.6	0.3	0.2	0.2	0.2	0.9	0.6	0.5	2.1	
2-Oct	0.5	0.6	0.6	0.5	1.2	2.3	2.2	2.4	2.7	3.3	3.3	3.4	3.7	3.2	3.3	3.8	2.8	2.3	2.7	3.2	3.4	3.9	3.0	3.2	3.9	
3-Oct	2.8	3.0	3.1	2.8	2.8	2.9	3.0	3.1	2.7	2.8	2.9	2.4	2.3	2.2	2.3	2.2	1.8	1.5	0.7	0.3	0.2	0.2	0.2	0.3	3.1	
4-Oct	0.4	0.6	0.7	0.5	0.5	0.7	0.7	1.1	1.4	1.4	1.5	1.3	1.4	1.4	1.7	1.7	1.7	1.4	1.0	0.7	1.3	1.9	1.5	1.0	1.9	
5-Oct	1.2	1.0	1.4	1.6	1.3	1.0	1.1	1.1	1.0	1.0	2.2	4.0	4.5	4.1	4.2	3.8	2.9	2.3	1.1	0.8	1.1	1.2	0.4	0.3	4.5	
6-Oct	0.2	0.2	0.2	0.2	0.2	0.5	0.9	1.1	1.0	1.5	1.7	2.1	2.1	1.4	1.4	1.0	1.4	1.1	0.9	1.3	1.3	0.8	0.4	0.6	2.1	
7-Oct	0.6	0.6	0.2	0.4	0.8	0.5	0.2	0.2	0.4	0.9	1.3	1.4	1.5	1.5	1.5	2.2	1.8	1.0	1.1	0.6	0.3	0.2	0.3	0.2	2.2	
8-Oct	0.2	0.2	0.1	0.1	0.2	0.2	0.3	0.5	0.9	1.2	1.5	1.7	1.8	1.9	1.8	1.4	1.1	1.3	1.2	1.0	0.9	0.6	0.6	0.4	1.9	
9-Oct	0.5	0.5	0.8	0.4	0.4	0.5	0.5	0.3	0.9	1.2	1.4	1.2	0.9	0.8	1.2	1.2	0.9	0.9	1.1	0.6	0.7	0.4	0.4	0.6	1.4	
10-Oct	0.3	0.6	1.1	1.1	1.2	1.8	2.5	2.1	1.8	2.5	2.4	3.6	4.2	4.5	4.9	4.3	3.9	1.6	1.3	0.7	0.4	1.5	2.0	1.7	4.9	
11-Oct	1.9	2.1	2.0	2.0	2.3	2.4	2.3	2.1	2.5	2.8	2.3	2.3	3.3	3.3	3.1	2.4	2.3	2.0	2.4	1.8	0.5	0.7	0.2	0.5	3.3	
12-Oct	0.5	0.8	1.3	1.6	2.1	1.4	1.2	1.3	1.3	1.0	1.3	1.9	2.4	2.3	2.2	2.9	3.3	2.7	1.7	0.9	0.4	1.5	2.4	2.4	3.3	
13-Oct	2.8	2.7	3.0	3.1	3.2	3.2	3.4	3.0	3.0	3.3	3.4	2.5	2.6	3.1	3.1	3.8	3.5	1.5	1.1	0.8	2.1	2.8	2.6	2.7	3.8	
14-Oct	2.9	3.0	2.7	3.4	3.5	2.7	1.8	3.4	3.4	4.1	4.1	3.8	4.0	3.9	3.7	3.1	2.6	2.3	1.6	1.4	1.0	0.6	1.1	0.8	4.1	
15-Oct	0.4	0.4	0.6	0.7	0.6	0.7	1.0	0.6	0.7	1.2	1.3	1.6	1.6	1.6	1.4	1.3	1.1	0.9	0.7	0.6	0.8	0.8	0.3	0.3	1.6	
16-Oct	0.5	0.6	0.4	0.4	0.4	0.5	0.8	1.5	1.5	2.5	2.4	2.4	2.9	2.6	2.8	2.7	2.0	1.5	2.0	2.1	2.4	2.3	2.7	3.0	3.0	
17-Oct	1.7	1.0	0.8	0.7	1.1	1.1	0.9	0.9	1.1	0.7	1.3	1.5	2.0	1.4	1.6	1.8	1.2	1.6	1.4	1.4	1.0	0.8	1.0	1.3	2.0	
18-Oct	1.6	1.8	3.3	3.2	2.8	3.0	2.7	1.5	2.9	3.4	4.0	4.2	4.4	4.1	3.8	3.5	2.9	2.2	1.6	0.8	0.5	0.6	0.5	0.7	4.4	
19-Oct	0.9	1.1	1.6	1.4	1.4	1.0	0.9	0.9	1.1	1.3	1.7	1.5	1.5	1.5	1.6	1.6	1.8	1.5	2.0	2.2	2.6	3.0	3.8	3.1	3.8	
20-Oct	2.5	1.6	1.5	1.9	2.8	3.4	2.4	2.3	2.6	2.8	3.7	4.0	3.6	4.1	4.1	3.6	2.8	1.7	0.5	1.0	1.4	1.5	1.2	0.8	4.1	
21-Oct	0.4	0.5	0.5	0.6	0.5	0.8	0.6	0.7	0.9	1.7	1.9	2.5	2.3	2.1	2.5	2.5	2.5	2.6	2.8	3.0	3.5	3.4	2.3	2.0	3.5	
22-Oct	1.8	1.3	1.3	1.1	1.0	1.3	1.1	1.3	1.9	2.1	2.4	2.0	2.4	2.8	3.1	3.1	2.5	1.3	1.2	1.4	1.5	1.9	2.3	2.6	3.1	
23-Oct	2.2	1.6	1.3	0.9	1.2	1.4	1.2	1.0	1.1	1.3	1.1	1.8	1.9	1.7	1.4	1.3	1.2	0.8	1.3	1.4	1.5	1.2	1.4	1.4	2.2	
24-Oct	1.1	1.4	1.3	1.1	1.2	1.2	0.9	0.9	1.1	1.2	1.4	1.2	1.1	1.2	1.1	0.9	0.6	0.8	0.8	0.7	0.6	0.5	0.4	0.5	1.1	1.4
25-Oct	1.6	1.7	1.6	1.5	1.3	1.5	1.2	1.2	1.3	1.3	1.1	1.1	1.1	0.8	1.0	0.8	0.8	0.7	0.4	0.5	0.4	1.1	1.7	1.9	1.9	
26-Oct	1.4	1.2	1.0	1.9	2.1	2.0	3.0	2.9	3.4	4.0	3.9	3.6	3.8	3.6	3.2	3.2	2.7	2.7	2.8	2.6	2.0	3.2	3.3	2.6	4.0	
27-Oct	3.0	2.9	2.0	2.6	2.9	3.1	3.0	2.7	2.7	3.2	2.9	2.8	3.7	4.2	3.8	3.5	2.9	2.6	2.5	2.8	2.0	1.5	1.1	0.8	4.2	
28-Oct	0.7	1.3	0.9	0.8	0.6	0.6	0.6	1.0	1.0	1.3	1.2	1.7	2.1	2.2	2.4	2.2	2.3	2.6	3.0	3.8	3.2	2.0	2.9	3.1	3.8	
29-Oct	3.2	3.2	2.7	2.9	2.9	2.8	2.5	2.7	2.4	2.5	2.3	2.0	1.8	1.7	1.5	1.0	1.1	1.6	1.6	1.3	1.2	1.3	1.2	0.8	3.2	
30-Oct	0.6	1.0	0.9	0.9	0.9	0.7	1.0	1.3	1.3	1.3	1.8	1.7	1.2	1.2	1.4	1.1	0.4	0.5	0.2	0.5	0.2	0.5	0.3	0.8	1.8	
31-Oct	0.6	0.7	0.6	0.4	0.3	0.5	0.8	0.7	0.8	0.7	0.7	1.0	1.2	1.4	1.5	1.7	1.3	1.2	1.4	1.3	1.6	1.4	1.0	1.3	1.7	
3.2 3.2 3.3 3.4 3.5 3.4 3.4 3.4 3.4 3.4 4.1 4.1 4.2 4.5 4.5 4.9 4.3 3.9 2.7 3.0 3.8 3.5 3.9 3.8 3.2																								Diurnal Maximum		





Maximum Value: 3.6 km/h on Oct 21 22:00																				Maximum Daily Average: 1.5 km/h on Oct 26					Hours in Service: 744	
Minimum Value: -1.9 km/h on Oct 5 14:00																				Minimum Daily Average: -0.8 km/h on Oct 27					Hours of Data: 744	
Maximum Diurnal Average: 0.5 km/h at hour 10																				Minimum Diurnal Average: 0.1 km/h at hour 17					Hours of Missing Data: 0	
Monthly Average: 0.31 km/h																				Percentiles: P <sub>1</sub> = -1.3 P <sub>10</sub> = -0.4 Q <sub>1</sub> = -0.1 Median = 0.1 Q <sub>3</sub> = 0.6 P <sub>90</sub> = 1.4 P <sub>99</sub> = 3.0					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	0.1	0.3	0.7	1.2	0.9	0.6	0.8	1.2	0.7	0.6	0.7	0.5	0.7	1.0	-0.1	-0.2	0.2	0.0	0.2	0.2	0.4	0.0	-0.1	-0.1	0.4	1.2
2-Oct	-0.2	0.1	-0.1	-0.1	0.0	0.1	0.4	0.5	0.2	0.1	0.2	0.1	-0.1	0.2	0.1	0.3	0.4	0.7	0.3	0.6	0.6	-0.1	0.6	0.0	0.2	0.7
3-Oct	0.1	0.3	0.7	0.0	-0.5	-0.5	0.3	-0.4	0.5	0.3	0.2	0.2	0.1	0.8	0.8	0.7	0.3	-0.4	0.0	-0.1	0.0	0.2	0.1	0.0	0.2	0.8
4-Oct	-0.2	0.0	0.1	0.1	0.2	0.2	0.1	0.5	0.4	0.6	0.5	0.1	0.0	0.0	-0.1	0.5	1.6	1.4	0.4	0.5	1.4	1.8	1.6	0.8	0.5	1.8
5-Oct	0.3	0.3	0.8	2.0	0.7	0.2	0.1	0.3	0.1	0.4	-0.3	-1.1	-1.7	-1.9	-1.4	-1.2	-0.5	-0.7	-0.3	-0.4	-1.0	-0.5	-0.4	0.0	-0.2	2.0
6-Oct	0.0	0.0	0.0	0.1	0.3	0.3	0.3	0.7	0.4	0.6	1.4	0.6	0.2	0.2	0.5	-0.4	-0.2	0.5	0.7	0.1	1.8	0.6	0.1	0.1	0.4	1.8
7-Oct	0.0	0.0	0.0	0.0	-0.2	-0.2	0.1	0.2	0.0	0.7	0.2	0.2	-0.1	0.0	0.2	0.1	-0.3	0.1	-0.2	-0.2	-0.2	-0.1	-0.1	-0.2	0.0	0.7
8-Oct	-0.1	0.0	0.0	0.1	0.1	0.2	0.5	0.4	0.4	0.4	0.1	0.5	0.8	1.0	0.8	0.5	-0.2	0.3	0.0	-0.1	-0.2	-0.1	-0.2	-0.1	0.2	1.0
9-Oct	-0.1	0.0	-0.1	0.0	-0.1	-0.2	-0.1	-0.1	0.2	0.1	0.0	-0.1	0.0	0.0	0.3	0.4	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.4
10-Oct	0.3	0.7	1.6	1.0	0.1	0.2	1.2	-0.2	-0.4	0.6	0.2	0.3	0.5	0.1	-0.6	-0.2	-1.1	0.0	0.3	-0.1	-0.1	0.0	-0.5	0.3	0.2	1.6
11-Oct	0.2	0.3	0.1	0.2	0.1	0.0	0.2	0.0	-0.3	0.5	-0.4	0.0	-0.9	-0.5	-0.9	-0.1	-0.4	-0.2	-0.8	-0.5	-0.3	-0.1	0.0	0.0	-0.2	0.5
12-Oct	0.1	0.3	0.7	0.3	1.6	1.2	1.1	1.0	1.0	0.4	0.9	1.2	0.8	1.1	1.3	0.4	-0.5	-0.3	-0.1	-0.3	-0.2	0.2	0.3	0.0	0.5	1.6
13-Oct	0.0	0.2	0.0	0.1	0.4	-0.2	-0.8	-0.5	0.1	0.0	-0.8	-0.1	0.0	0.5	0.1	0.1	-0.9	-0.4	-0.1	0.1	-0.3	0.3	0.5	0.1	-0.1	0.5
14-Oct	-0.4	-0.3	0.7	0.5	-0.1	-0.3	0.0	0.0	0.6	-0.1	-1.1	-1.1	-0.5	-1.2	-1.4	-0.6	-0.7	0.1	0.0	-0.1	-0.1	-0.2	0.1	0.0	-0.3	0.7
15-Oct	-0.2	-0.1	0.2	0.7	-0.2	0.0	-0.1	-0.1	0.1	0.7	-0.1	0.1	0.8	0.0	0.1	0.1	0.6	1.1	0.0	0.2	0.6	0.6	0.2	0.0	0.2	1.1
16-Oct	0.7	0.2	0.2	0.2	0.2	0.3	1.4	1.6	1.2	1.7	1.7	1.4	1.8	1.6	1.6	1.9	1.4	0.9	1.5	1.0	1.9	2.9	3.4	3.4	1.4	3.4
17-Oct	1.6	1.0	0.4	0.5	0.3	0.1	0.7	0.8	1.2	0.9	0.7	0.4	0.6	0.5	0.4	-0.3	0.3	1.3	0.5	0.2	0.1	-0.2	0.1	0.0	0.5	1.6
18-Oct	0.3	0.6	-0.1	-0.1	0.0	0.3	-0.5	-0.5	0.2	0.0	-0.5	-0.5	-1.0	-1.1	-0.6	-1.2	-1.1	-1.0	-0.5	-0.2	-0.2	-0.2	-0.2	-0.1	-0.3	0.6
19-Oct	0.0	0.0	0.2	0.4	0.2	0.0	0.1	0.3	0.1	0.6	0.7	0.6	0.6	0.8	0.6	0.6	0.4	0.7	0.7	1.2	1.4	1.8	2.6	3.2	0.7	3.2
20-Oct	3.0	1.5	0.3	0.6	0.0	-0.5	-0.4	-0.1	0.2	0.6	-0.6	-0.8	-0.7	-0.8	-1.6	-1.0	-1.0	-0.7	-0.3	-0.4	-0.3	0.8	0.0	0.0	-0.1	3.0
21-Oct	0.0	0.1	0.4	0.3	0.4	0.5	0.1	0.4	0.4	0.9	1.3	1.1	1.0	0.8	1.3	1.6	1.4	1.8	1.7	2.2	3.0	3.6	2.7	1.4	1.2	3.6
22-Oct	0.9	0.6	0.6	-0.1	-0.2	0.0	0.3	0.2	0.2	0.1	0.2	0.1	0.9	0.3	0.4	0.1	-0.1	-0.1	-0.3	0.1	-0.2	-0.3	-0.3	-0.3	0.1	0.9
23-Oct	0.6	0.1	-0.2	-0.1	0.8	1.7	1.0	1.4	0.5	0.2	-0.1	0.2	1.0	0.0	-0.2	0.0	0.1	0.1	0.1	-0.1	-0.2	0.0	0.2	0.3	0.3	1.7
24-Oct	0.2	0.1	0.0	0.2	0.1	0.2	0.1	0.1	0.3	0.2	0.0	0.2	0.1	0.1	-0.2	0.1	-0.2	0.4	0.2	0.5	0.1	-0.2	0.3	0.1	0.1	0.5
25-Oct	0.2	0.1	0.0	0.2	0.3	0.4	0.3	0.1	0.1	0.6	0.2	-0.2	0.8	0.0	0.2	0.0	-0.1	-0.1	-0.2	0.1	0.2	0.4	0.9	-0.2	0.2	0.9
26-Oct	-0.7	0.7	1.2	2.0	1.0	1.2	1.7	1.8	2.2	2.7	2.8	2.3	2.2	2.2	2.8	2.1	1.7	3.1	2.3	2.0	0.2	-0.6	-1.1	-0.4	1.5	3.1
27-Oct	-0.7	-1.3	-0.9	-1.0	-1.1	-1.1	-1.2	-1.0	-1.4	-0.8	-0.9	-0.6	-1.3	-0.8	-1.0	-1.2	-0.9	-0.5	-0.6	-0.3	-0.4	0.1	0.0	-0.2	-0.8	0.1
28-Oct	0.0	0.5	0.1	0.2	0.1	0.4	0.5	0.4	0.4	0.1	0.0	0.1	0.4	1.1	1.5	2.0	1.9	1.8	2.0	2.6	2.6	2.1	2.3	2.5	1.1	2.6
29-Oct	3.1	3.3	3.3	3.0	2.9	1.9	1.9	2.7	2.7	1.5	1.1	0.6	0.5	0.7	0.4	0.0	0.3	0.7	-0.1	0.0	0.6	0.0	-0.1	0.2	1.3	3.3
30-Oct	0.1	0.1	0.0	0.1	0.1	0.2	0.1	0.3	0.8	0.9	1.1	1.1	1.0	0.9	1.0	0.4	0.4	0.2	0.0	0.1	-0.1	0.1	0.0	0.1	0.4	1.1
31-Oct	-0.3	0.0	0.0	0.1	-0.2	-0.2	0.0	0.0	-0.3	-0.3	-0.1	0.1	0.0	0.2	0.5	-0.4	-0.4	0.1	0.1	0.1	0.1	0.4	0.1	0.3	0.0	0.5
																								Diurnal Average		
																								Diurnal Maximum		



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.4 km/h on Oct 5 13:00 Minimum Value: 0.2 km/h on Oct 9 22:00 Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.5 Q <sub>1</sub> = 1.0 Median = 1.5 Q <sub>3</sub> = 2.2 P <sub>90</sub> = 2.8 P <sub>99</sub> = 4.2																								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	1.6	1.3	1.3	1.1	0.9	1.0	1.1	1.3	1.2	1.0	1.2	1.3	1.1	1.7	1.5	1.1	0.9	0.5	0.4	0.5	0.4	0.5	0.5	0.3	1.7
2-Oct	0.5	0.6	0.3	0.6	0.7	2.1	2.4	2.4	2.3	2.4	2.7	3.1	3.0	2.7	3.0	3.7	2.7	2.2	2.5	2.8	3.0	3.5	3.0	3.5	3.7
3-Oct	2.6	3.1	2.7	2.5	2.8	2.7	2.9	2.9	2.7	2.7	3.1	2.9	2.7	2.7	2.9	2.5	2.1	1.7	0.8	0.5	0.2	0.3	0.2	0.5	3.1
4-Oct	0.9	1.1	1.2	0.7	0.7	0.7	0.5	1.1	1.0	1.3	1.7	1.6	1.6	1.9	1.8	1.5	1.8	1.3	1.5	1.2	1.7	2.0	1.6	1.5	2.0
5-Oct	1.8	1.5	1.4	1.1	1.3	1.0	1.3	1.6	1.2	1.7	2.2	4.0	4.4	4.2	4.3	3.6	3.0	1.9	0.8	1.0	1.4	1.5	1.0	0.7	4.4
6-Oct	0.3	0.3	0.2	0.2	0.4	0.6	0.7	0.8	0.8	1.2	1.4	1.8	2.1	1.7	1.5	1.3	2.0	1.3	1.6	1.3	1.0	1.3	0.8	0.5	2.1
7-Oct	0.6	0.8	0.3	0.3	0.5	0.3	0.3	0.3	0.3	1.1	1.1	1.2	1.5	1.8	1.9	1.9	1.7	1.2	0.8	0.8	0.3	0.3	0.4	0.6	1.9
8-Oct	0.3	0.2	0.2	0.2	0.3	0.4	0.4	0.6	0.7	0.9	0.9	1.3	1.4	1.8	1.6	1.4	1.5	2.0	1.5	0.8	0.8	0.6	0.5	0.4	2.0
9-Oct	0.5	0.4	0.4	0.5	0.4	0.5	0.2	0.2	0.7	0.9	1.4	1.1	1.0	0.9	0.9	1.1	0.7	0.7	0.9	0.4	0.4	0.2	0.3	1.1	1.4
10-Oct	0.8	0.8	1.0	1.0	1.1	2.0	3.3	2.5	2.2	3.3	2.9	3.3	3.5	3.6	4.4	3.4	3.3	2.0	1.5	0.6	0.7	1.7	2.8	1.6	4.4
11-Oct	1.4	2.0	1.8	1.7	2.2	2.5	2.1	2.1	2.5	2.9	2.6	2.3	3.2	3.4	3.2	2.3	2.4	1.9	2.0	1.4	0.4	0.7	0.4	0.9	3.4
12-Oct	0.8	0.8	1.4	1.3	1.5	1.4	1.3	1.8	1.4	1.6	1.6	1.7	2.3	2.0	2.8	2.3	2.3	1.9	0.9	0.7	0.6	1.4	2.1	2.0	2.8
13-Oct	2.0	2.1	1.8	2.2	2.6	2.8	2.6	2.1	2.4	2.9	2.7	2.2	2.5	3.0	2.7	3.1	3.4	1.6	0.6	1.0	2.2	2.2	2.1	2.0	3.4
14-Oct	1.8	1.7	2.4	2.5	2.8	2.3	1.6	2.5	3.1	2.8	3.6	4.2	3.9	4.1	3.2	2.8	2.7	2.2	2.0	1.7	1.4	0.7	1.0	0.9	4.2
15-Oct	0.7	0.4	0.5	0.9	0.8	1.2	1.4	1.0	0.7	1.3	1.7	1.4	1.9	1.6	1.6	1.6	1.4	1.2	1.1	0.6	0.8	0.8	0.6	0.5	1.9
16-Oct	1.0	1.0	0.9	0.9	1.4	1.4	1.4	1.9	2.8	1.8	1.9	2.1	2.1	2.1	2.4	2.3	1.7	1.5	2.0	1.6	1.9	1.7	1.3	1.5	2.8
17-Oct	2.1	1.5	0.9	0.8	0.9	1.1	0.7	0.8	1.0	0.9	1.4	1.7	2.2	1.8	1.8	2.1	1.5	1.4	1.8	1.6	1.6	1.2	1.4	1.6	2.2
18-Oct	2.1	2.0	2.2	1.4	1.4	2.2	3.5	1.3	2.8	2.9	3.1	3.5	4.2	4.2	4.0	3.1	2.8	1.8	1.7	1.6	0.9	0.7	1.0	1.0	4.2
19-Oct	1.0	1.0	1.2	1.4	1.0	0.7	0.8	1.1	1.2	1.4	1.9	1.8	2.0	1.6	1.6	1.6	1.6	1.6	2.2	2.3	2.5	2.3	2.4	2.4	2.5
20-Oct	2.4	2.0	1.8	1.9	2.1	3.1	2.3	2.1	2.5	2.7	3.1	3.5	3.3	4.1	3.8	3.4	2.0	1.1	0.3	1.1	1.2	2.2	1.6	1.3	4.1
21-Oct	0.9	0.8	0.6	0.7	0.8	1.0	0.6	0.6	0.9	1.3	1.7	1.9	1.9	1.6	1.8	1.5	1.7	2.4	2.0	2.4	2.5	2.2	2.1	1.7	2.5
22-Oct	2.2	1.5	1.4	1.1	1.1	1.3	1.9	1.9	1.5	2.1	2.0	2.3	2.8	2.4	2.6	2.4	1.8	0.9	1.0	1.1	1.0	1.2	0.9	1.1	2.8
23-Oct	2.4	2.2	1.2	0.9	1.6	1.4	1.7	1.7	1.4	1.5	1.1	1.8	2.2	1.9	1.2	1.1	1.0	0.7	0.9	1.7	1.4	1.2	1.3	1.3	2.4
24-Oct	1.2	1.3	1.5	1.1	1.3	1.6	1.3	1.2	1.1	1.4	1.4	1.4	1.6	1.5	1.0	1.2	0.4	0.8	0.4	0.6	0.7	0.5	0.8	0.7	1.6
25-Oct	1.2	1.6	1.3	1.4	1.3	1.3	1.2	1.1	1.3	1.6	1.2	1.3	1.2	1.1	1.1	0.8	0.5	0.4	0.6	1.0	0.8	1.7	2.1	2.0	2.1
26-Oct	1.7	1.6	1.4	1.4	1.5	1.6	2.2	2.4	2.2	2.3	2.4	2.4	2.6	2.9	2.2	2.5	3.5	3.4	3.0	3.2	2.2	3.2	2.8	2.6	3.5
27-Oct	2.8	2.8	1.9	2.4	2.7	2.8	2.7	2.5	2.5	3.0	2.6	2.8	3.4	4.0	3.4	3.1	2.3	2.8	2.4	2.6	2.2	1.7	1.2	0.6	4.0
28-Oct	0.7	1.7	0.9	1.1	0.9	0.8	0.9	1.0	1.1	1.4	1.6	1.9	2.1	2.3	2.0	1.8	1.5	1.7	2.0	1.9	2.2	1.7	2.0	2.1	2.3
29-Oct	2.6	2.2	2.5	2.1	2.2	2.3	2.1	2.4	3.0	2.7	2.4	2.3	1.8	1.7	1.5	1.1	1.3	1.7	2.2	1.8	2.1	2.1	1.6	0.8	3.0
30-Oct	0.7	1.6	1.5	1.1	1.0	0.5	0.8	0.9	1.3	1.3	1.2	1.2	0.9	1.0	1.0	1.0	0.5	0.2	0.2	0.5	0.3	0.5	0.4	0.6	1.6
31-Oct	0.9	1.0	0.4	0.3	0.4	0.4	0.5	0.6	1.0	0.8	0.5	0.8	1.2	1.3	1.7	1.6	1.5	1.4	1.5	1.4	1.6	1.2	1.0	1.3	1.7
Diurnal Maximum																									



Maximum Value: 6.0 km/h on Oct 3 06:00		Maximum Daily Average: 1.9 km/h on Oct 16		Hours in Service: 744																																												
Minimum Value: -2.1 km/h on Oct 5 14:00		Minimum Daily Average: -0.7 km/h on Oct 27		Hours of Data: 740																																												
Maximum Diurnal Average: 0.8 km/h at hour 6		Minimum Diurnal Average: 0.3 km/h at hour 17		Hours of Missing Data: 4																																												
Monthly Average: 0.60 km/h		Percentiles: P <sub>1</sub> = -1.2 P <sub>10</sub> = -0.2 Q <sub>1</sub> = 0.1 Median = 0.4 Q <sub>3</sub> = 1.0 P <sub>90</sub> = 1.8 P <sub>99</sub> = 3.2		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	1.0	0.7	0.7	0.5	0.5	0.8	0.9	1.2	0.7	0.3	0.6	0.6	0.6	0.7	-0.3	-0.2	0.3	0.2	0.3	0.7	0.9	0.4	0.2	0.2	0.5	1.2																						
2-Oct	0.1	0.3	0.2	0.0	0.1	0.3	0.7	0.5	0.3	0.3	0.5	0.2	0.0	0.4	0.1	0.8	0.4	0.8	0.3	0.6	0.9	0.3	1.1	0.3	0.4	1.1																						
3-Oct	0.0	0.5	0.7	0.3	-0.3	6.0	0.6	0.1	0.5	0.5	0.2	0.1	0.3	1.0	0.8	0.9	0.1	-0.3	0.2	0.1	0.1	0.2	0.1	0.1	0.5	6.0																						
4-Oct	-0.1	0.0	0.3	0.4	0.4	0.2	0.1	0.7	0.4	0.5	1.0	0.7	0.5	0.5	0.0	0.3	1.4	1.4	0.8	0.6	1.1	1.2	1.8	1.1	0.6	1.8																						
5-Oct	0.3	0.0	0.5	1.0	0.4	0.5	0.7	0.5	0.1	0.5	0.0	-0.9	-1.8	-2.1	-1.4	-1.1	-0.5	-0.6	-0.2	-0.3	-0.9	-0.8	-0.4	-0.2	-0.3	1.0																						
6-Oct	0.2	0.1	0.2	0.3	0.4	0.6	0.3	0.3	0.4	0.7	1.4	0.4	-0.1	-0.2	0.3	-0.8	-0.9	0.9	2.3	0.2	1.8	1.7	1.2	0.6	0.5	2.3																						
7-Oct	0.5	0.8	0.5	0.3	0.1	0.0	0.1	0.2	0.2	0.4	0.6	0.5	0.0	-0.3	0.6	0.5	0.5	0.7	-0.1	0.0	-0.1	0.2	0.3	0.4	0.3	0.8																						
8-Oct	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.3	0.4	0.1	0.7	1.0	1.1	0.3	0.4	-0.7	0.5	0.7	0.3	0.0	0.3	0.1	0.1	0.3	1.1																						
9-Oct	0.0	0.2	0.0	0.3	0.1	0.0	0.0	0.1	0.4	0.7	0.4	0.3	0.2	0.2	0.6	0.5	0.2	0.0	0.2	0.2	0.1	0.2	0.4	0.2	0.2	0.7																						
10-Oct	0.3	0.0	0.5	1.0	1.0	1.7	3.1	1.1	0.4	2.1	1.2	1.8	1.9	1.8	0.8	1.3	-0.3	0.7	0.6	0.1	-0.2	0.3	-1.0	0.4	0.9	3.1																						
11-Oct	0.5	0.6	0.1	0.1	0.2	0.0	0.4	0.3	0.0	0.7	-0.4	0.3	-0.9	-0.6	-0.6	0.1	-0.4	0.0	-0.9	-0.4	-0.1	0.0	0.2	0.6	0.0	0.7																						
12-Oct	0.4	0.2	0.7	0.1	1.2	1.5	1.6	1.4	0.8	0.4	0.8	1.1	0.7	1.6	2.4	1.3	0.4	0.0	0.3	-0.1	0.1	1.2	1.1	0.8	0.8	2.4																						
13-Oct	0.9	1.2	1.0	1.2	1.8	1.2	0.4	0.3	1.0	0.9	-0.1	0.9	0.6	1.2	0.9	1.3	-0.4	0.2	0.3	0.7	0.8	1.6	1.5	0.8	0.8	1.8																						
14-Oct	0.5	0.5	1.9	1.7	0.5	0.0	0.2	0.8	1.5	0.5	-0.1	-0.9	-0.4	-1.0	-1.5	-0.5	-0.7	0.3	0.0	0.1	-0.1	-0.1	0.0	-0.1	0.1	1.9																						
15-Oct	0.0	0.0	0.2	1.0	0.2	0.6	0.4	-0.2	0.3	0.7	0.2	0.4	0.5	0.0	0.1	0.5	1.3	0.9	0.6	0.4	1.4	1.0	1.1	0.6	0.5	1.4																						
16-Oct	1.4	1.2	1.3	1.0	1.6	1.3	2.3	2.7	2.3	1.7	2.1	1.9	2.0	1.7	1.8	2.2	1.6	1.5	2.0	0.7	1.7	2.8	3.4	3.5	1.9	3.5																						
17-Oct	1.8	1.0	0.8	0.4	0.1	0.3	0.5	0.8	1.2	1.0	0.6	0.1	0.5	0.4	0.2	1.8	1.8	2.7	3.2	2.8	1.9	0.8	1.3	0.9	1.1	3.2																						
18-Oct	1.0	1.7	1.1	0.5	0.2	0.5	-0.2	0.0	1.0	0.8	0.3	0.2	-0.6	-0.9	0.0	-1.0	-1.1	-0.9	-0.5	-0.1	-0.2	-0.1	0.0	0.1	0.1	1.7																						
19-Oct	0.1	0.2	0.3	0.6	0.4	0.0	0.1	0.9	0.7	1.2	0.7	0.7	0.7	1.0	0.7	1.1	0.9	1.2	1.2	1.5	1.7	2.2	3.1	4.2	1.1	4.2																						
20-Oct	3.3	2.5	2.4	1.3	0.6	0.0	0.0	0.5	0.9	1.4	0.0	0.1	0.2	-0.7	-1.3	-0.9	-1.2	-0.7	-0.3	-0.6	-0.1	1.0	-0.1	-0.1	0.3	3.3																						
21-Oct	0.1	0.0	0.4	0.5	0.3	0.6	0.2	0.3	0.8	1.6	1.7	1.3	0.9	0.4	1.6	1.6	1.3	1.6	2.3	2.9	2.9	3.1	2.4	1.2	1.2	3.1																						
22-Oct	0.5	0.5	0.7	0.3	0.4	0.9	1.6	1.2	1.2	1.2	0.6	0.8	1.5	1.4	1.6	1.1	0.7	0.6	0.4	0.6	0.2	0.4	-0.1	-0.1	0.8	1.6																						
23-Oct	1.8	1.1	0.2	0.1	1.9	2.7	2.1	2.3	1.2	0.3	0.2	0.1	1.0	0.3	-0.2	0.0	0.1	0.0	0.2	-0.3	-0.1	0.0	0.3	0.3	0.7	2.7																						
24-Oct	0.3	0.2	-0.2	AF	AF	AF	AF	0.2	0.3	0.2	-0.2	0.2	-0.1	0.6	0.0	0.1	-0.3	0.4	0.2	0.6	0.4	-0.1	0.4	0.3	0.2	0.6																						
25-Oct	0.3	0.2	0.2	0.2	0.5	0.5	0.4	0.3	0.3	0.5	0.2	0.1	0.9	0.0	0.2	0.0	0.0	-0.1	0.2	0.5	0.6	0.9	0.9	-0.2	0.3	0.9																						
26-Oct	-0.5	1.0	2.9	2.0	0.9	1.2	2.2	2.5	2.7	3.2	2.9	2.4	2.5	2.6	3.0	2.2	1.1	2.6	1.7	1.7	1.1	-0.6	-0.7	0.4	1.7	3.2																						
27-Oct	-0.4	-1.2	-1.0	-0.8	-1.0	-1.3	-1.2	-1.0	-1.1	-0.9	-0.9	-0.8	-1.0	-0.7	-0.9	-1.1	-0.6	-0.1	-0.2	-0.2	-0.3	0.2	-0.1	0.0	-0.7	0.2																						
28-Oct	0.1	1.0	0.2	0.3	0.2	1.1	0.8	0.4	0.6	0.9	0.6	0.3	-0.1	0.8	1.6	2.3	2.3	1.9	2.0	2.1	2.6	2.4	2.5	2.4	1.2	2.6																						
29-Oct	2.3	2.7	3.8	3.0	2.4	2.1	1.8	2.0	2.1	1.1	0.6	0.4	0.1	0.3	0.3	1.5	2.3	4.1	1.2	1.7	2.2	0.9	0.9	0.8	1.7	4.1																						
30-Oct	0.4	1.1	0.4	1.0	0.7	0.5	0.8	0.7	0.8	0.5	1.0	0.5	0.5	0.7	0.5	0.5	0.1	0.1	0.1	0.3	0.1	-0.1	0.1	0.5	0.5	1.1																						
31-Oct	0.1	0.1	0.1	0.2	-0.1	-0.1	-0.1	0.1	-0.2	-0.2	0.0	-0.1	0.0	0.2	0.8	-0.2	-0.6	0.0	-0.1	0.3	0.3	0.5	0.0	0.3	0.1	0.8																						
																								0.5	0.6	0.7	0.6	0.5	0.8	0.7	0.7	0.7	0.8	0.6	0.5	0.4	0.4	0.5	0.3	0.7	0.6	0.6	0.7	0.7	0.7	0.7	0.7	Diurnal Average
																								3.3	2.7	3.8	3.0	2.4	6.0	3.1	2.7	2.7	3.2	2.9	2.4	2.5	2.6	3.0	2.3	2.3	4.1	3.2	2.9	2.9	3.1	3.4	4.2	Diurnal Maximum
AF - Analyzer Failure																																																



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Vertical Wind Speed 167 m (VW167m) - km/h

Lower Camp Met Tower - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 4.8 km/h on Oct 5 13:00	Hours of Data: 740
Minimum Value: 0.0 km/h on Oct 3 06:00	Hours of Missing Data: 4
Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.6 Q <sub>1</sub> = 0.9 Median = 1.4 Q <sub>3</sub> = 2.1 P <sub>90</sub> = 2.8 P <sub>99</sub> = 4.3	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	1.6	1.2	1.2	0.9	0.8	0.8	0.9	1.0	0.8	0.9	1.2	1.4	1.0	1.8	1.5	1.3	0.9	0.6	0.6	0.5	0.6	0.8	0.5	0.3	1.8
2-Oct	0.7	0.7	0.5	0.7	0.7	2.0	2.5	2.6	2.4	2.6	2.7	3.2	2.9	2.7	2.9	3.6	2.6	2.3	2.5	3.0	3.2	3.2	3.4	3.4	3.6
3-Oct	2.6	3.5	2.9	2.7	2.7	0.0	3.0	2.9	2.8	3.0	3.1	2.9	3.2	2.9	2.9	2.7	2.0	1.5	0.7	0.3	0.2	0.2	0.3	0.6	3.5
4-Oct	1.1	1.4	1.4	0.9	0.7	0.6	0.4	1.0	1.1	1.2	1.7	1.4	1.3	1.9	1.7	1.4	1.8	1.2	1.2	0.8	1.9	2.4	2.2	1.8	2.4
5-Oct	2.2	1.4	0.9	0.8	0.8	1.3	1.4	1.3	0.8	1.8	2.4	4.5	4.8	3.9	4.3	3.4	2.8	1.7	0.8	0.8	0.8	1.1	1.2	1.1	4.8
6-Oct	0.4	0.3	0.2	0.3	0.2	0.4	0.4	0.4	0.7	0.9	1.4	2.0	2.1	1.9	1.7	1.6	2.0	1.6	1.2	1.6	1.6	1.2	1.3	1.1	2.1
7-Oct	0.7	0.9	0.4	0.3	0.3	0.2	0.2	0.2	0.3	0.7	0.8	1.1	1.4	1.5	1.9	1.9	1.7	1.4	0.8	0.7	0.4	0.6	0.5	0.3	1.9
8-Oct	0.3	0.2	0.1	0.2	0.2	0.3	0.2	0.4	0.6	0.6	0.7	1.3	1.4	1.8	1.3	1.6	1.8	2.0	1.8	1.1	0.6	0.5	0.5	0.5	2.0
9-Oct	0.8	0.6	0.4	0.6	0.6	0.6	0.3	0.3	0.7	0.9	1.3	1.3	1.1	1.1	1.1	1.1	0.7	0.5	0.4	0.4	0.3	0.3	0.6	1.5	1.5
10-Oct	1.3	0.9	0.9	1.2	1.8	2.8	2.9	2.2	2.1	3.7	2.6	2.8	2.9	3.2	3.5	2.7	2.5	2.0	1.4	0.5	1.0	1.9	3.2	1.8	3.7
11-Oct	1.7	2.5	2.2	1.9	2.2	2.7	2.2	2.1	2.3	2.9	2.5	2.5	2.8	3.3	3.0	2.5	2.2	1.7	1.9	1.3	0.4	0.6	0.5	1.0	3.3
12-Oct	0.9	0.6	0.9	1.0	1.3	1.3	1.1	1.5	1.5	1.5	1.5	1.8	2.6	2.1	3.0	2.0	1.9	1.5	1.0	0.7	0.6	1.0	1.6	1.5	3.0
13-Oct	1.1	1.9	1.7	1.6	1.6	2.1	1.7	1.6	1.7	2.4	1.9	2.0	1.7	2.3	2.4	2.6	3.4	1.7	0.7	1.2	1.5	1.3	1.4	1.4	3.4
14-Oct	1.6	1.4	1.7	1.9	2.3	2.4	1.3	2.0	2.0	2.3	3.8	4.4	4.5	4.5	3.2	2.8	2.1	2.1	2.1	1.3	1.4	1.0	1.0	0.7	4.5
15-Oct	0.7	0.4	0.4	0.9	0.9	1.3	1.7	1.5	0.8	1.3	1.6	1.3	1.7	1.5	1.6	1.8	1.5	1.0	0.7	0.6	0.8	0.8	1.1	1.0	1.8
16-Oct	0.7	1.1	1.2	1.4	1.2	1.7	1.1	1.0	1.9	2.0	2.2	2.3	2.4	2.4	2.3	2.3	1.4	1.5	2.3	1.8	2.4	2.1	1.9	2.0	2.4
17-Oct	2.2	1.4	0.9	1.0	0.9	1.2	1.0	0.9	1.0	1.1	1.4	1.5	1.6	1.3	1.2	1.8	1.4	1.2	1.5	1.4	1.2	1.1	1.2	1.9	2.2
18-Oct	2.3	2.0	1.9	1.2	0.9	1.4	2.9	1.2	2.3	2.3	2.4	3.3	4.4	4.3	4.3	2.8	2.5	1.1	1.1	1.3	1.0	0.6	1.3	1.3	4.4
19-Oct	1.2	1.0	1.1	1.6	1.1	0.8	0.7	1.0	1.2	1.5	2.1	1.9	2.2	1.8	1.8	1.6	1.5	1.8	2.3	2.5	2.3	2.3	2.8	2.7	2.8
20-Oct	2.5	2.0	1.4	1.6	1.7	3.0	2.1	1.7	1.9	2.1	2.6	3.2	3.3	4.3	3.8	3.4	1.6	0.7	0.4	1.2	1.1	2.6	1.5	1.3	4.3
21-Oct	1.1	0.9	0.9	0.7	0.7	0.9	0.5	0.6	1.0	1.0	1.8	2.0	2.0	1.8	1.5	1.8	1.7	2.6	2.0	2.3	2.8	2.7	2.4	1.5	2.8
22-Oct	1.8	1.3	1.4	1.8	1.6	1.4	1.8	1.7	1.3	1.8	1.5	1.9	2.5	2.0	2.1	1.6	1.5	0.9	0.9	0.9	0.9	1.0	0.4	0.5	2.5
23-Oct	1.9	2.1	1.0	0.9	1.5	1.3	1.5	1.4	1.3	1.4	1.0	1.5	2.2	1.9	1.0	1.3	0.9	0.8	0.9	1.5	1.5	1.1	1.2	1.2	2.2
24-Oct	1.1	1.3	1.3	AF	AF	AF	AF	1.1	0.9	1.3	1.2	1.4	1.4	1.5	1.3	1.0	0.5	0.6	0.4	0.7	0.6	0.7	0.9	0.6	1.5
25-Oct	1.1	1.7	1.2	1.3	1.5	1.3	1.3	1.1	1.1	1.5	1.2	1.2	1.2	1.2	1.0	0.7	0.6	0.4	0.7	1.3	1.1	1.6	1.6	1.4	1.7
26-Oct	1.2	1.6	1.6	1.7	1.5	1.4	1.9	1.9	1.9	2.3	2.5	2.0	2.2	2.5	2.6	2.4	3.6	3.4	3.3	2.9	2.5	3.0	2.6	2.5	3.6
27-Oct	3.0	2.7	1.7	2.1	2.4	2.4	2.5	2.4	2.3	3.0	2.5	2.7	3.4	4.0	3.3	3.0	2.1	2.9	2.3	2.4	2.1	1.6	1.2	0.8	4.0
28-Oct	0.9	1.7	0.7	1.1	0.9	1.0	1.0	0.8	1.0	1.1	1.5	1.8	2.3	2.5	2.1	1.7	1.5	1.6	2.1	2.4	2.5	2.0	2.2	2.5	2.5
29-Oct	2.9	2.9	3.0	2.4	2.3	2.5	2.4	2.7	2.7	1.9	1.6	1.4	1.0	1.1	1.1	1.0	1.2	1.6	2.3	1.6	2.1	1.9	1.1	1.3	3.0
30-Oct	1.5	1.7	1.5	0.9	0.6	0.9	1.0	0.8	0.9	0.8	0.9	0.9	0.9	0.8	0.7	1.0	0.4	0.2	0.2	0.6	0.4	0.6	0.3	0.7	1.7
31-Oct	1.1	1.2	0.4	0.3	0.4	0.4	0.5	0.6	1.2	0.8	0.6	0.5	1.0	1.4	1.7	1.3	1.6	1.3	1.3	1.4	1.6	1.3	1.0	1.3	1.7
	3.0	3.5	3.0	2.7	2.7	3.0	3.0	2.9	2.8	3.7	3.8	4.5	4.8	4.5	4.3	3.6	3.6	3.4	3.3	3.0	3.2	3.2	3.4	3.4	
	Diurnal Maximum																								

AF - Analyzer Failure



## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 4  
BUFFALO VIEWPOINT  
OCTOBER 2015**

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

November 26, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BUFFALO VIEWPOINT (AMS 4)  
OCTOBER 2015

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	100.00	8	0	2	0
H2S (ppb) Average	710	34	34	100.00	2	0	0	0
THC (ppm) Average	709	34	35	99.87	7.1	-	3.1	-
Temperature (C) Average	744	0	0	100.00	26	-	16.8	-
Relative Humidity (%) Average	744	0	0	100.00	98	-	90	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	35	-	22	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BUFFALO VIEWPOINT (AMS 4)  
 OCTOBER 2015

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	0.5	1	-	0	0	0	0	1	1	8
H2S (ppb) Average	710	0.2	0	-	0	0	0	0	0	0	2
THC (ppm) Average	709	2.31	0.4	-	2	2.1	2.2	2.2	2.3	2.5	7.1
Temperature 2 m (C) Average	744	5.73	5.7	-	-4.3	-0.7	1.3	4.9	9	13.8	26
Relative Humidity (%) Average	744	71	19	-	22	42	57	75	87	92	98
Wind Speed 10 m (km/h) Average	744	11.9	7	-	0	4	7	10	16	22	35
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BUFFALO VIEWPOINT (AMS 4)  
OCTOBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC	02 Oct 2015 14:00	02 Oct 2015 14:00	1	Maintenance - Station operator on site

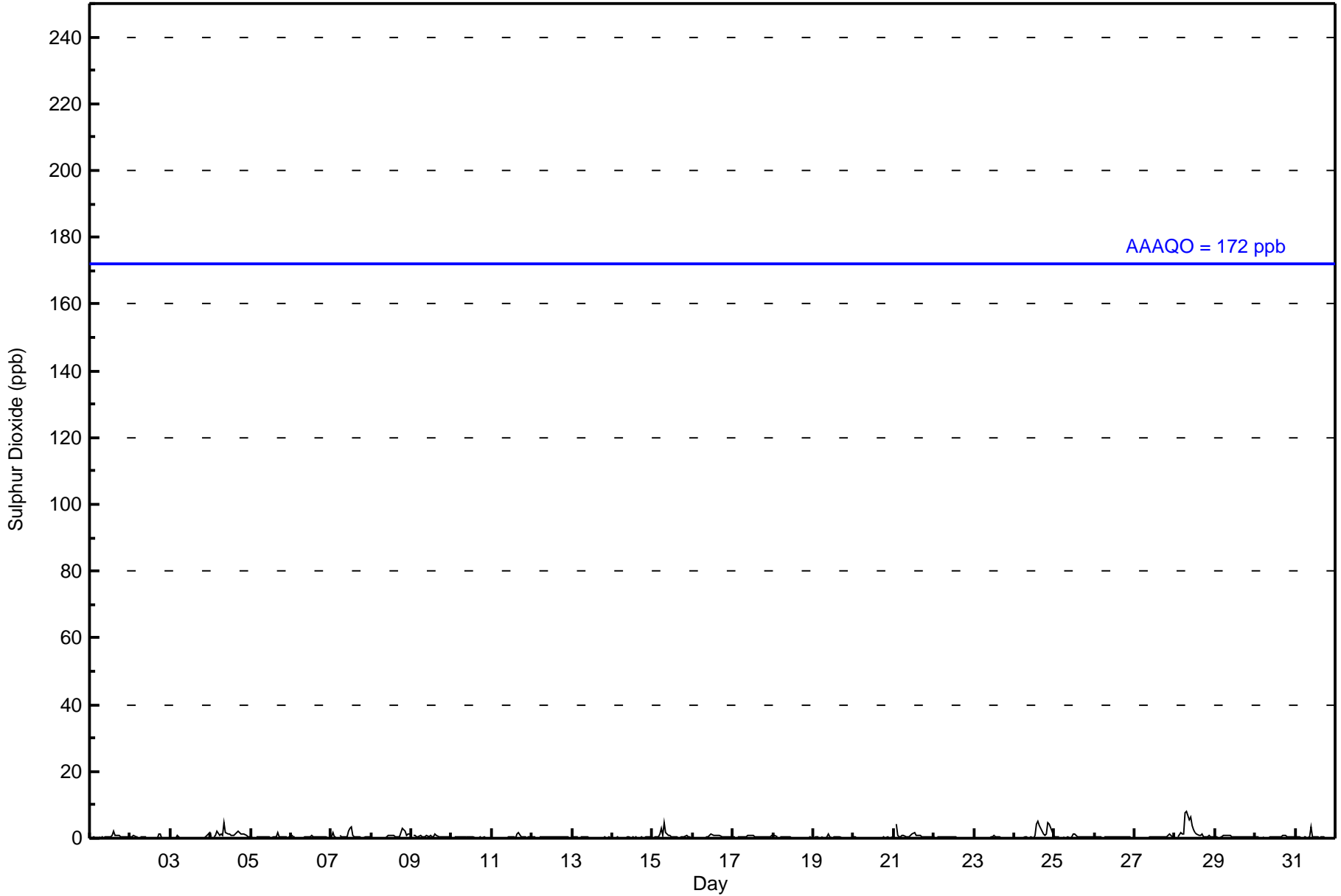


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 8 ppb on Oct 28 08:00	Maximum Daily Average: 2.1 ppb on Oct 28		Hours of Data:	710
Minimum Value: 0 ppb on Oct 22 21:00	Minimum Daily Average: 0.2 ppb on Oct 20		Hours of Missing Data:	34
Maximum Diurnal Average: 0.7 ppb at hour 10	Minimum Diurnal Average: 0.3 ppb at hour 3		Hours of Calibration:	34
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> = 5		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	1	1	1	2	1	1	1	0	1	0	0	1	0	0.5	2
2-Oct	0	1	1	0	0	Z	0	0	0	0	C	C	C	0	0	0	0	1	1	0	0	0	0	0	0.3	1
3-Oct	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0.3	2
4-Oct	1	Z	0	1	2	1	1	1	1	5	2	1	1	1	1	1	2	2	1	1	1	1	1	0	1.2	5
5-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0.3	2
6-Oct	1	1	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0.4	1
7-Oct	0	2	0	0	Z	1	1	0	0	0	2	3	3	1	0	0	0	0	0	0	0	0	0	0	0.7	3
8-Oct	0	0	0	0	0	Z	0	0	0	1	1	1	1	1	1	1	1	1	3	3	2	1	1	1	0.8	3
9-Oct	Z	1	1	1	1	1	0	1	1	1	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0.6	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	1	1	1	0	0	1	2	0	0	0	0	0	0	0	0.3	2
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	0.3	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	0	0	0	0.2	0
15-Oct	Z	0	0	0	1	3	1	4	2	1	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0.8	4
16-Oct	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	0.5	1
17-Oct	1	1	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	0.5	1
18-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	0.3	1
19-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
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	Z	4	1	0	0	1	1	0	0	0	1	1	2	1	1	1	1	1	0	0	0	0	0	0	0.8	4
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	1	0	1	0	0	0	0	0	0	0	0	0	0.3	1
24-Oct	0	0	0	Z	0	0	1	0	0	0	0	0	1	4	5	4	3	1	1	1	5	4	2	1	1.5	5
25-Oct	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1
26-Oct	0	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
27-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.3	1
28-Oct	0	Z	0	2	1	1	8	8	5	7	4	3	2	1	1	1	1	0	0	1	1	1	1	1	2.1	8
29-Oct	0	0	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
30-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0.4	1
31-Oct	0	0	0	0	Z	0	0	0	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.4	3

0.3	0.5	0.3	0.4	0.4	0.5	0.6	0.7	0.7	0.7	0.7	0.6	0.6	0.7	0.6	0.6	0.5	0.6	0.5	0.5	0.4	0.5	0.5	0.4	0.4	Diurnal Average
1	4	1	2	2	3	8	8	5	7	4	3	3	4	5	4	3	2	3	3	5	4	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**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Buffalo Viewpoint - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	710	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: 710

Total Number of Hours: 744



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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Buffalo Viewpoint - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	82	50	15	10	8	32	93	120	31	16	30	79	30	34	56	24	710
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>	82	50	15	10	8	32	93	120	31	16	30	79	30	34	56	24	710

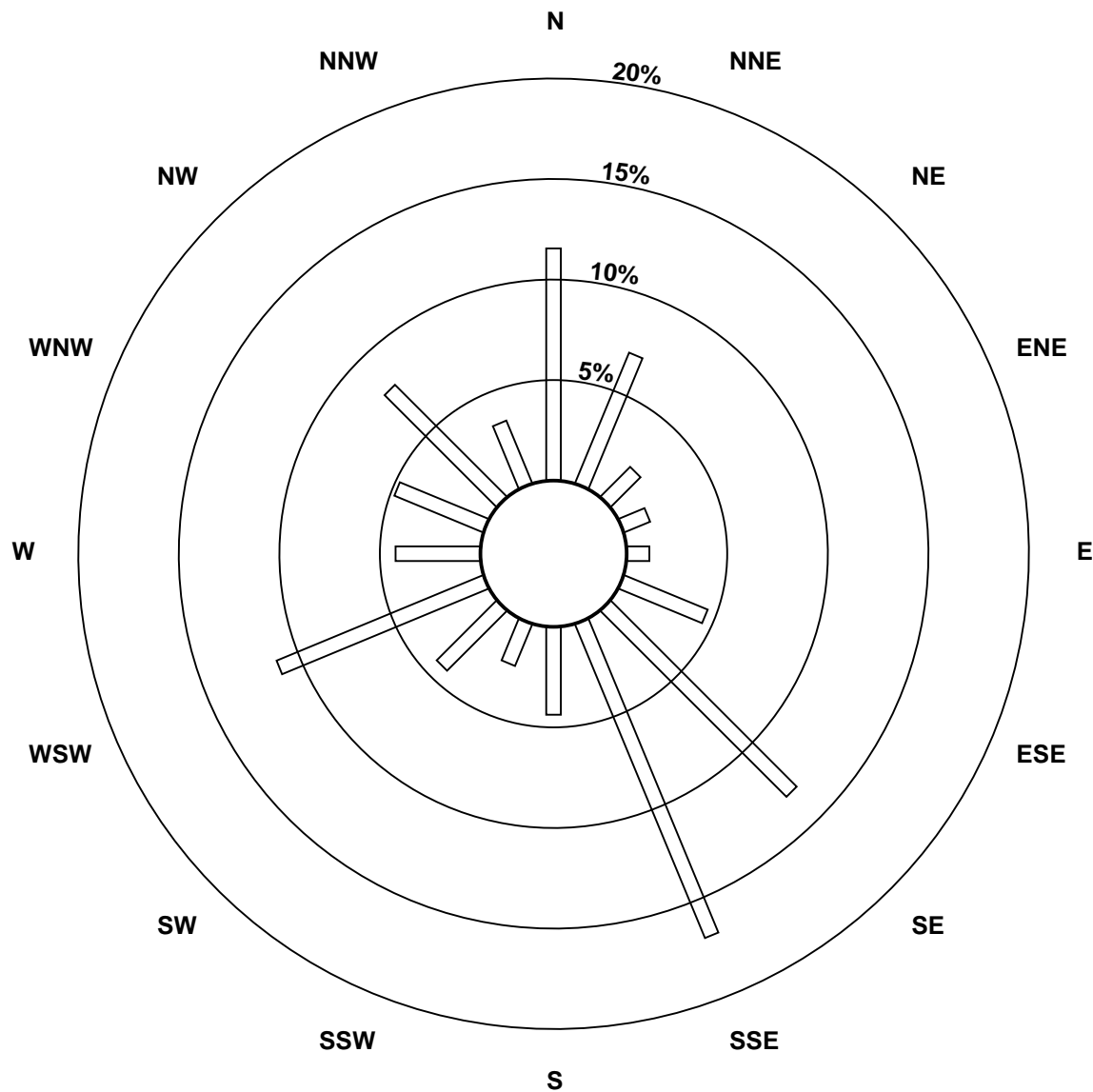
Total Number of Valid Hours: 710

Total Number of Hours: 744

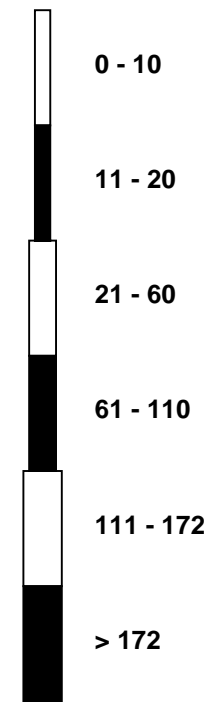


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

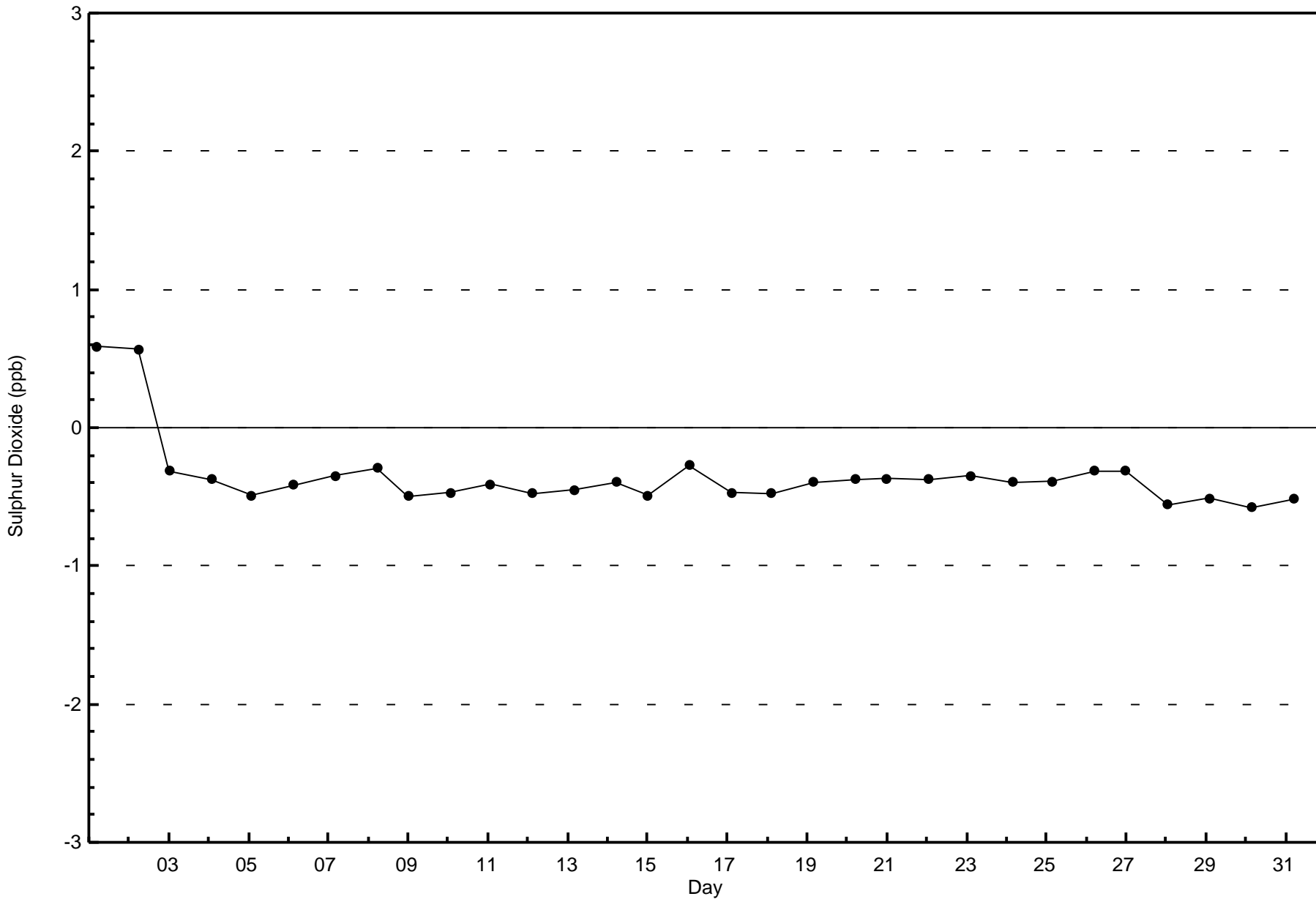
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Buffalo Viewpoint (AMS 4)

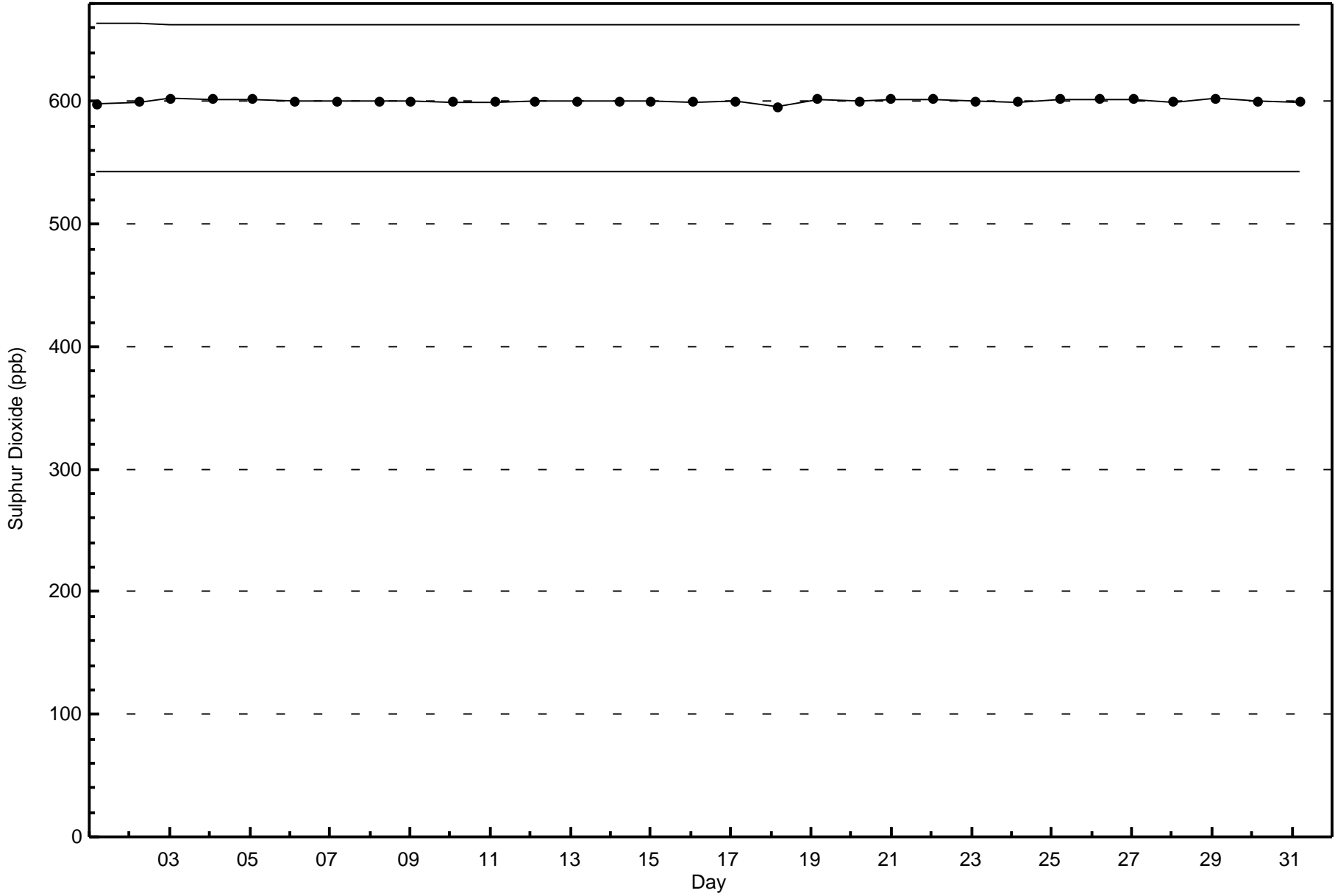


Classes (ppb)



Total Number of Valid Hours: 710





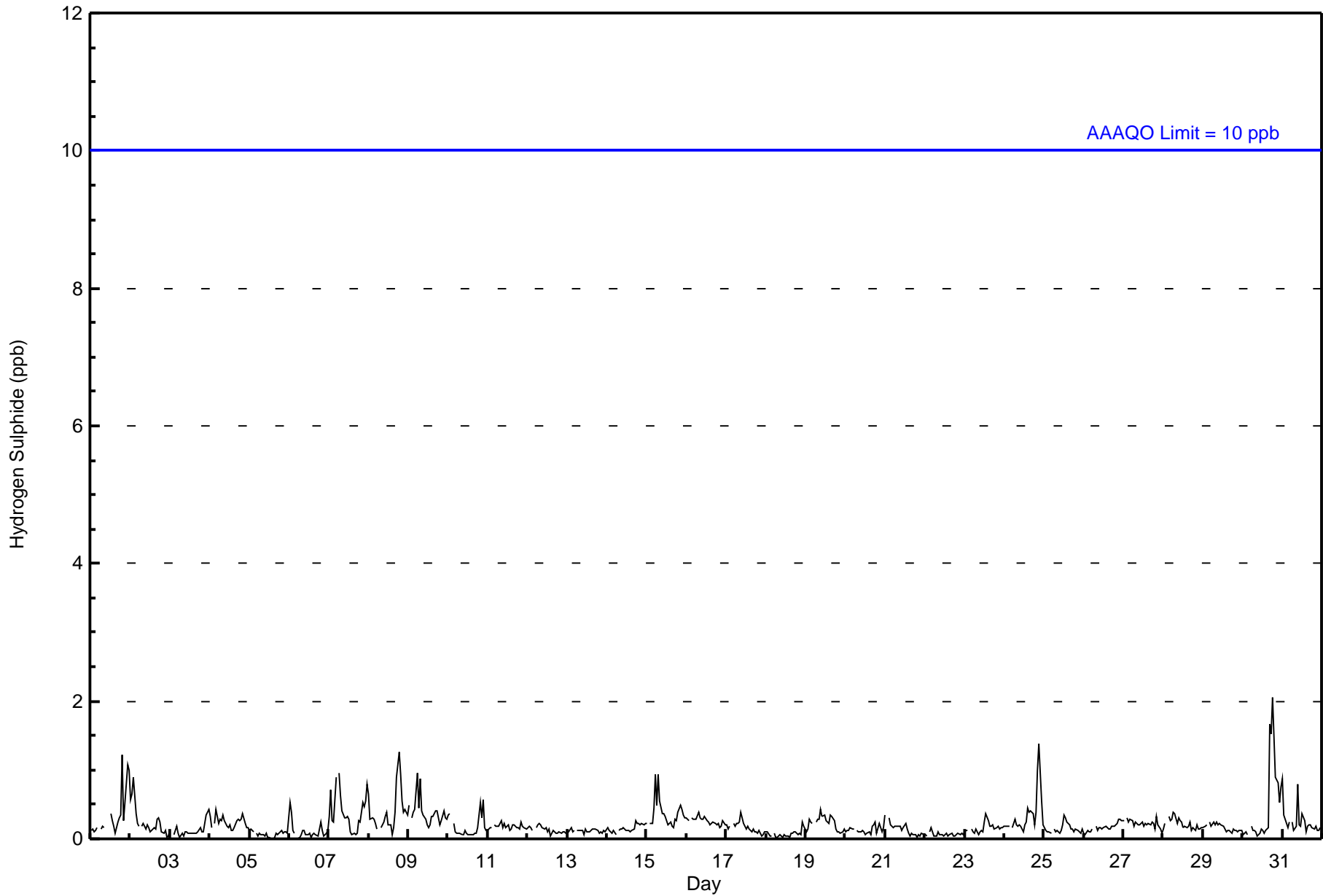




Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 2 ppb on Oct 30 19:00	Maximum Daily Average: 0.5 ppb on Oct 30		Hours of Data:	710
Minimum Value: 0 ppb on Oct 5 14:00	Minimum Daily Average: 0.1 ppb on Oct 22		Hours of Missing Data:	34
Maximum Diurnal Average: 0.3 ppb at hour 20	Minimum Diurnal Average: 0.1 ppb at hour 15		Hours of Calibration:	34
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	C	C	C	0	0	0	0	0	0	0	1	0	1	1	1	0.3	1																							
2-Oct	1	1	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
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	0	0	0	0	0	0	0.2	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	0.1	0																							
6-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	0.1	1																							
7-Oct	0	1	0	0	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0.4	1																							
8-Oct	1	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0.4	1																							
9-Oct	0	Z	0	0	0	1	0	1	0	0	0	0	0	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	1	0	1	0	0	0.2	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	0.1	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	0.1	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	0.2	0																							
15-Oct	0	Z	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	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	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	0.1	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	0.2	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	0.1	0																							
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	0.1	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	0.1	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	0.2	0																							
24-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	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	0.1	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	0.2	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	0.2	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	0.2	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	2	2	2	1	1	1	1	1	0.5	2																							
31-Oct	1	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	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	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.2	Diurnal Average
																								1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	2	2	2	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  
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Buffalo Viewpoint - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	710	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: 710

Total Number of Hours: 744



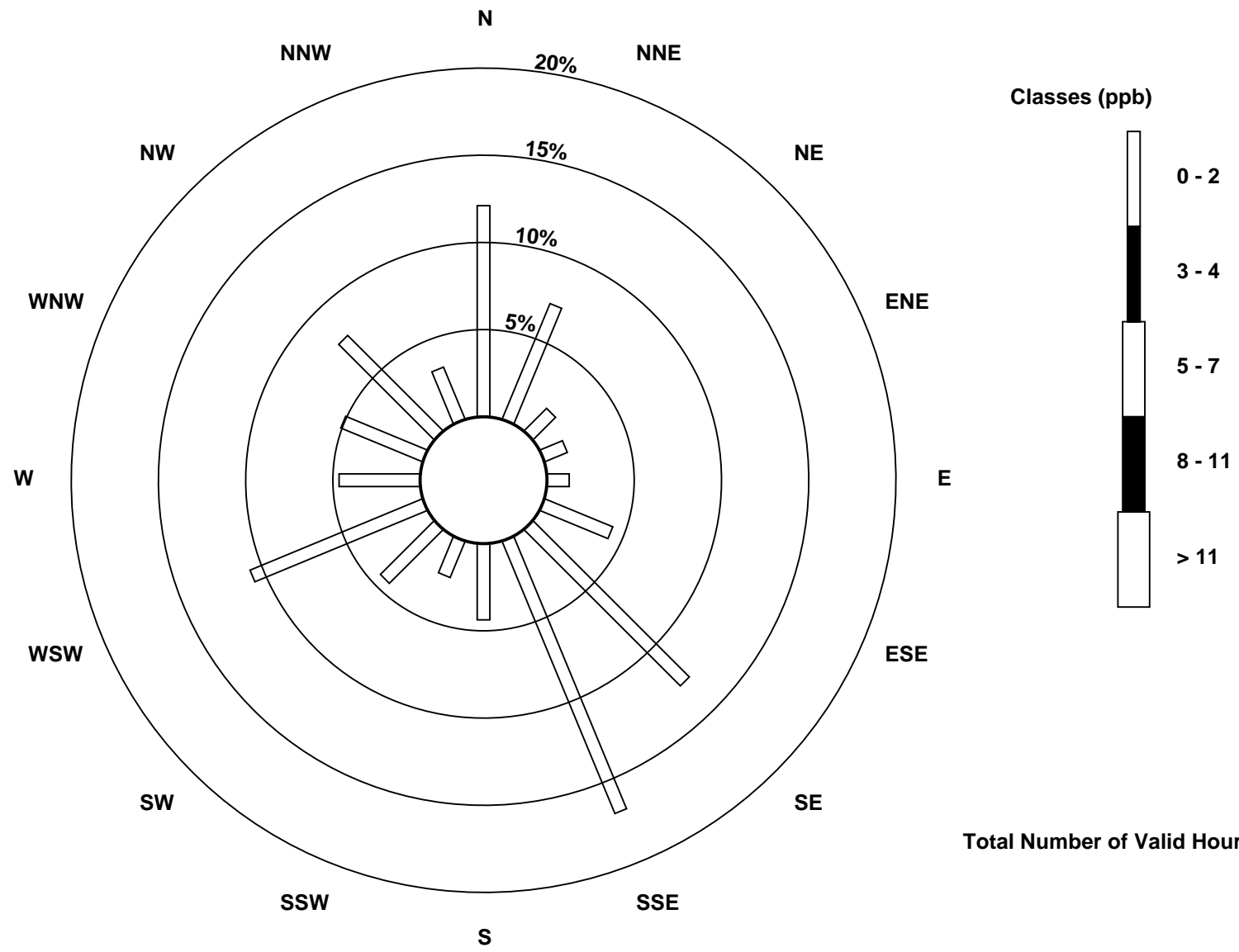
**Wood Buffalo Environmental Association  
Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Buffalo Viewpoint - October 2015**

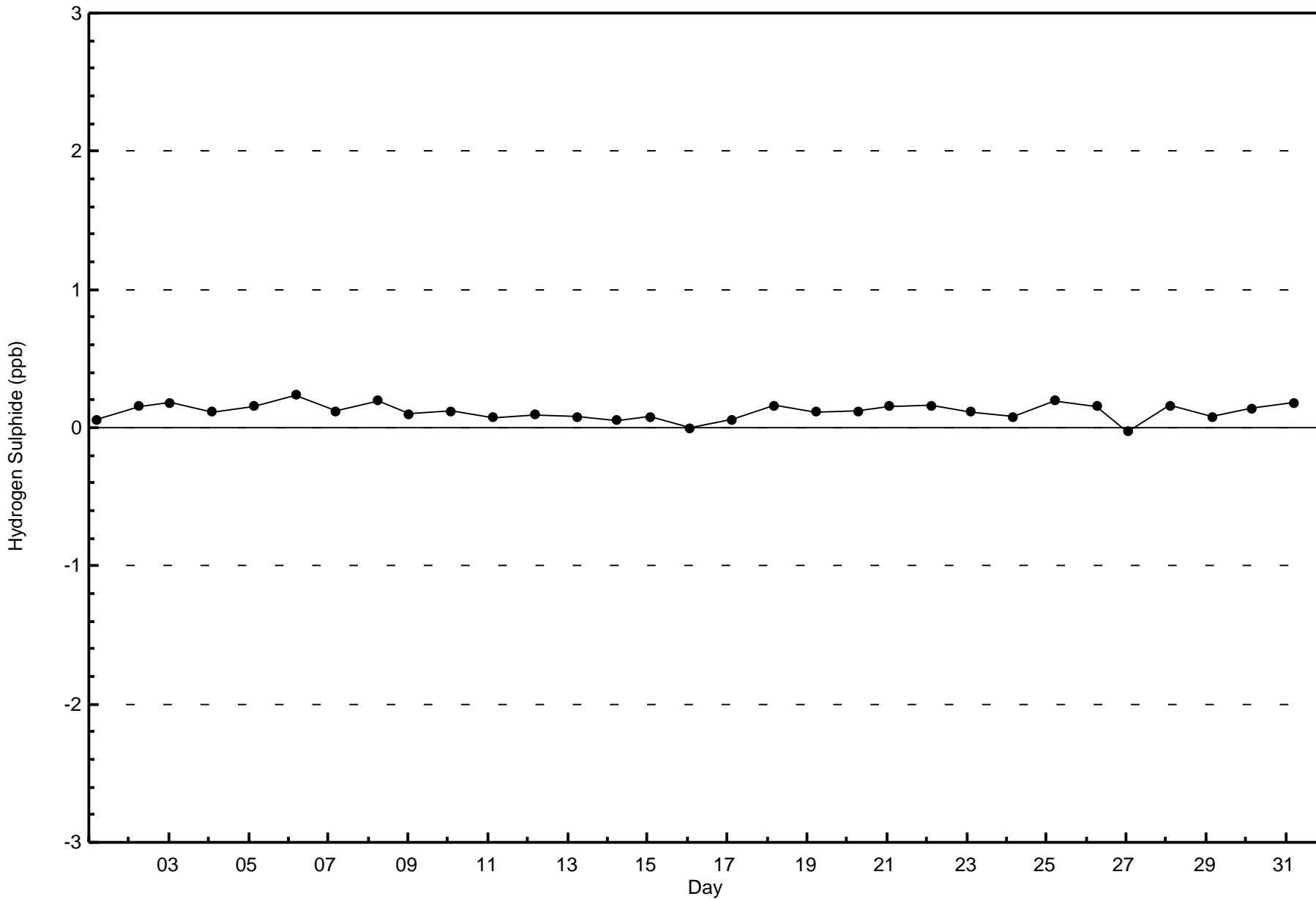
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	86	51	13	10	9	30	90	120	31	16	31	76	33	36	55	23	710
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	86	51	13	10	9	30	90	120	31	16	31	76	33	36	55	23	710

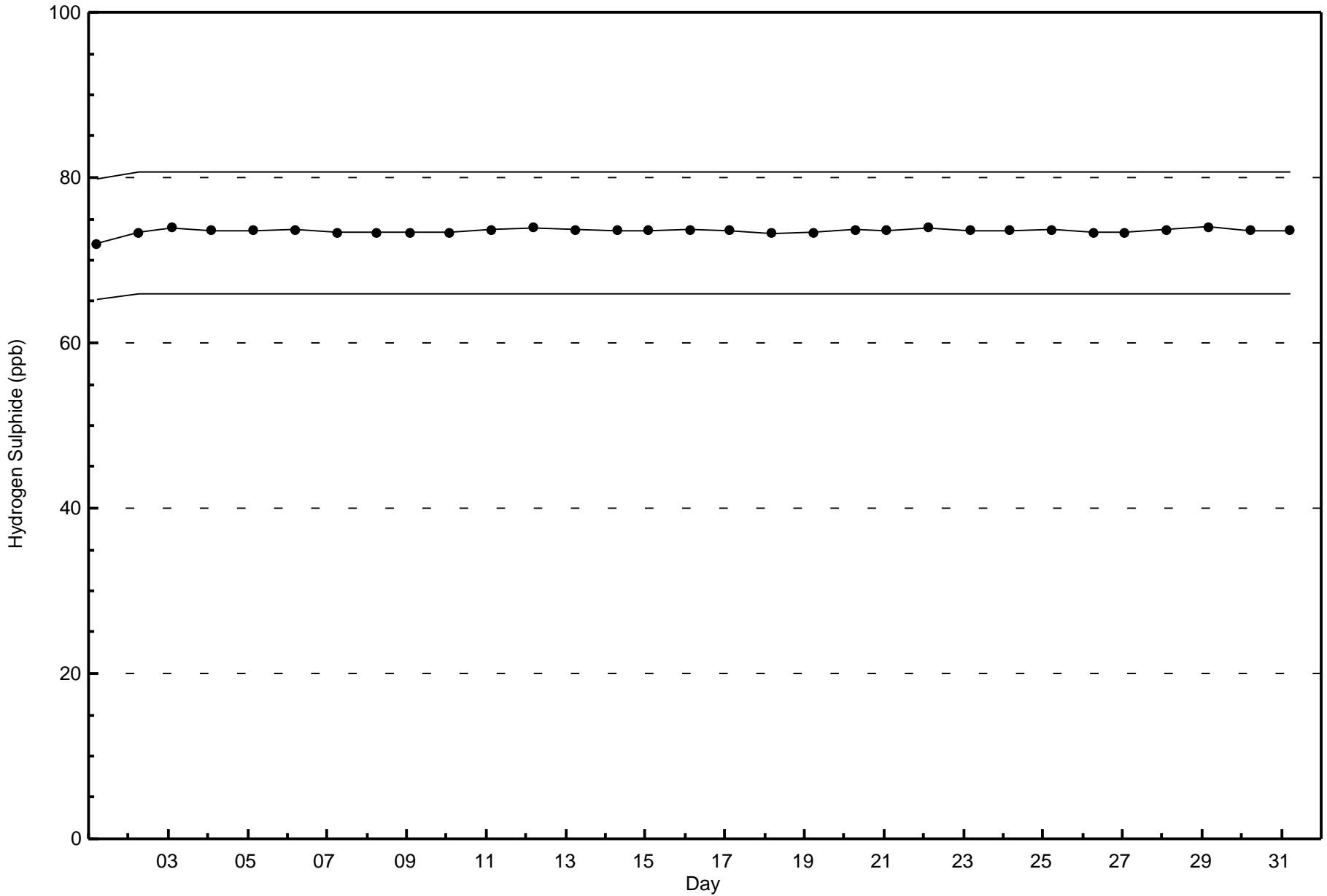
Total Number of Valid Hours: 710

Total Number of Hours: 744



Total Number of Valid Hours: 710







Wood Buffalo Environmental Association

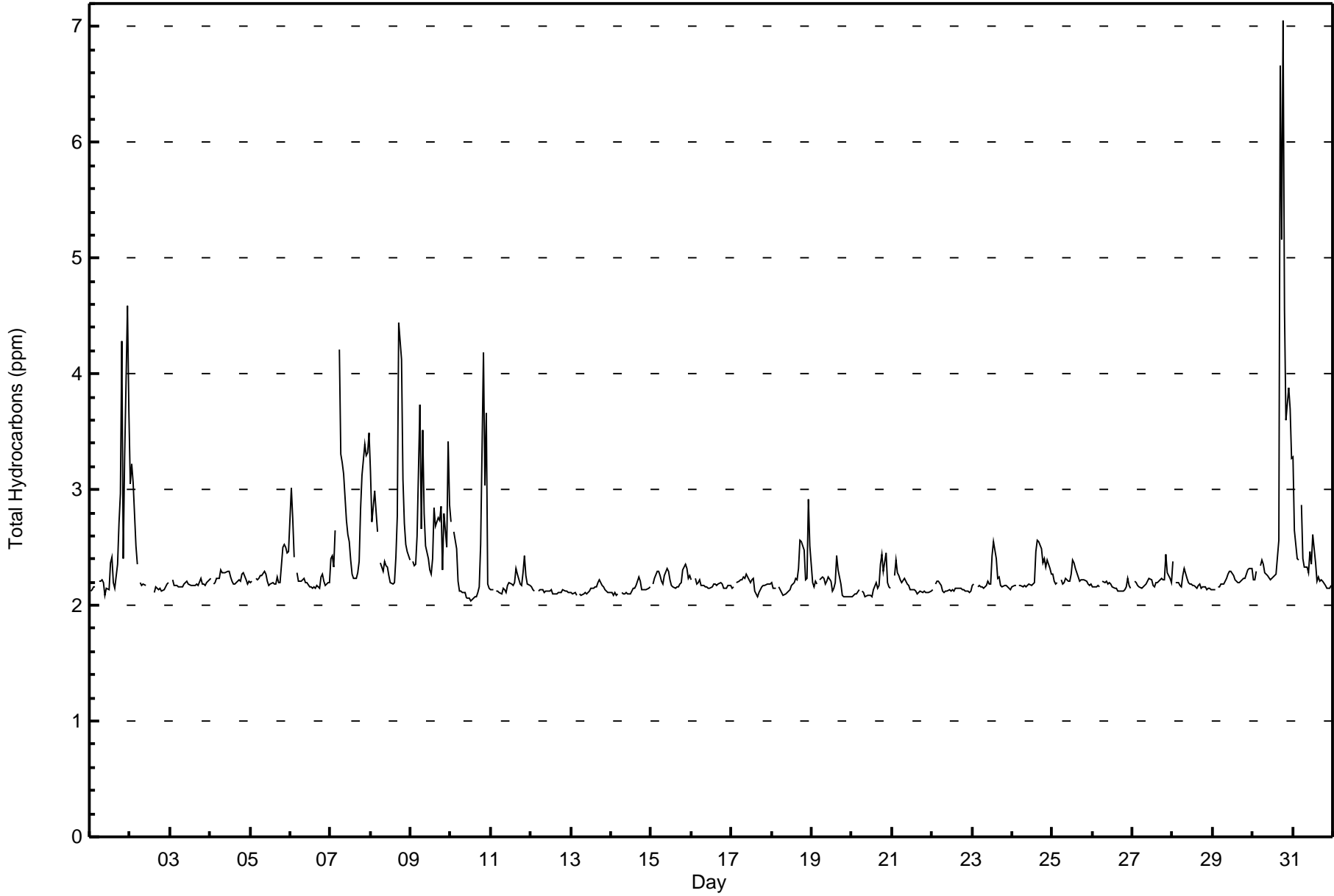
Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Buffalo Viewpoint - October 2015

Maximum Value: 7.1 ppm on Oct 30 19:00																				Maximum Daily Average: 3.1 ppm on Oct 30					Hours in Service: 744	
Minimum Value: 2.0 ppm on Oct 10 13:00																				Minimum Daily Average: 2.1 ppm on Oct 12					Hours of Data: 709	
Maximum Diurnal Average: 2.5 ppm at hour 19																				Minimum Diurnal Average: 2.2 ppm at hour 12					Hours of Missing Data: 35	
Monthly Average: 2.31 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> = 2.3 P <sub>90</sub> = 2.5 P <sub>99</sub> = 4.2					Hours of Calibration: 34	
																									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	2.1	2.1	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.4	2.4	2.2	2.2	2.4	2.7	3.0	4.3	2.4	3.3	4.6	3.7	2.6	4.6
2-Oct	3.1	3.2	3.1	2.5	2.4	Z	2.2	2.2	2.2	2.2	C	C	C	M	2.1	2.2	2.1	2.1	2.2	2.1	2.1	2.2	2.2	2.2	2.3	3.2
3-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	2.2	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	2.2	Z	2.2	2.2	2.2	2.2	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	2.3	2.3	2.2	2.2	2.2	2.3
5-Oct	2.2	2.2	Z	2.2	2.2	2.2	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	2.5	2.5	2.5	2.5	2.5	2.3	2.5
6-Oct	3.0	2.8	2.4	Z	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	2.3	2.2	2.2	2.2	2.2	2.3	3.0
7-Oct	2.4	2.4	2.3	2.6	Z	4.2	3.3	3.2	3.1	2.7	2.6	2.5	2.4	2.3	2.2	2.2	2.3	2.4	2.8	3.1	3.4	3.3	3.3	3.5	2.8	4.2
8-Oct	3.2	2.7	3.0	2.8	2.6	Z	2.4	2.3	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.4	2.8	4.4	4.1	3.1	2.7	2.5	2.5	2.4	2.7	4.4
9-Oct	Z	2.4	2.3	2.3	2.6	3.7	2.7	3.5	2.8	2.5	2.4	2.3	2.3	2.4	2.8	2.7	2.8	2.7	2.9	2.3	2.8	2.5	3.4	2.9	2.7	3.7
10-Oct	2.7	Z	2.6	2.5	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.2	2.5	4.2	3.0	3.7	2.2	2.2	2.4	4.2
11-Oct	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.3	2.4	2.3	2.2	2.2	2.2	2.4
12-Oct	2.2	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	2.2
13-Oct	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2
14-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	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.2
15-Oct	Z	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.3	2.2	2.3	2.2	2.4
16-Oct	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2
17-Oct	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3
18-Oct	2.2	2.2	2.1	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.6	2.5	2.5	2.2	2.2	2.9	2.5	2.3	2.9
19-Oct	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.4	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4
20-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	2.2	2.1	2.2	2.4	2.4	2.3	2.5	2.2	2.2	2.1	2.2	2.5
21-Oct	Z	2.3	2.4	2.3	2.3	2.2	2.2	2.2	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	2.1	2.1	2.2	2.4
22-Oct	2.1	Z	2.2	2.2	2.2	2.2	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	2.1	2.1	2.1	2.1	2.2
23-Oct	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.4	2.6	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.6
24-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	2.5	2.6	2.5	2.5	2.4	2.4	2.3	2.4	2.3	2.3	2.3	2.6
25-Oct	2.3	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4
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	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2
27-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	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.3	2.2	2.2	2.2	2.4
28-Oct	2.4	Z	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.1	2.2	2.1	2.2	2.4
29-Oct	2.1	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.3
30-Oct	2.2	2.2	2.3	Z	2.3	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.6	6.7	5.2	7.1	4.6	3.6	3.9	3.7	3.3	3.1	7.1
31-Oct	3.3	2.6	2.4	2.4	Z	2.9	2.4	2.3	2.3	2.3	2.5	2.4	2.6	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.4	3.3
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan      C - Calibration      M - Maintenance																										







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

**Total Hydrocarbons (THC) - ppm**  
**Buffalo Viewpoint - October 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	1	0.14	0.14
2.1 - 3.0	674	95.06	95.20
3.1 - 10.0	34	4.80	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



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

**Total Hydrocarbons (THC) - ppm**  
**Buffalo Viewpoint - October 2015**

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	1	0	0	0	0	1
2.1 - 3.0	81	48	15	10	6	30	91	119	29	15	30	76	29	28	50	17	674
3.1 - 10.0	0	2	0	0	2	2	2	1	2	1	0	2	1	6	6	7	34
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	81	50	15	10	8	32	93	120	31	16	30	79	30	34	56	24	709

Total Number of Valid Hours: 709

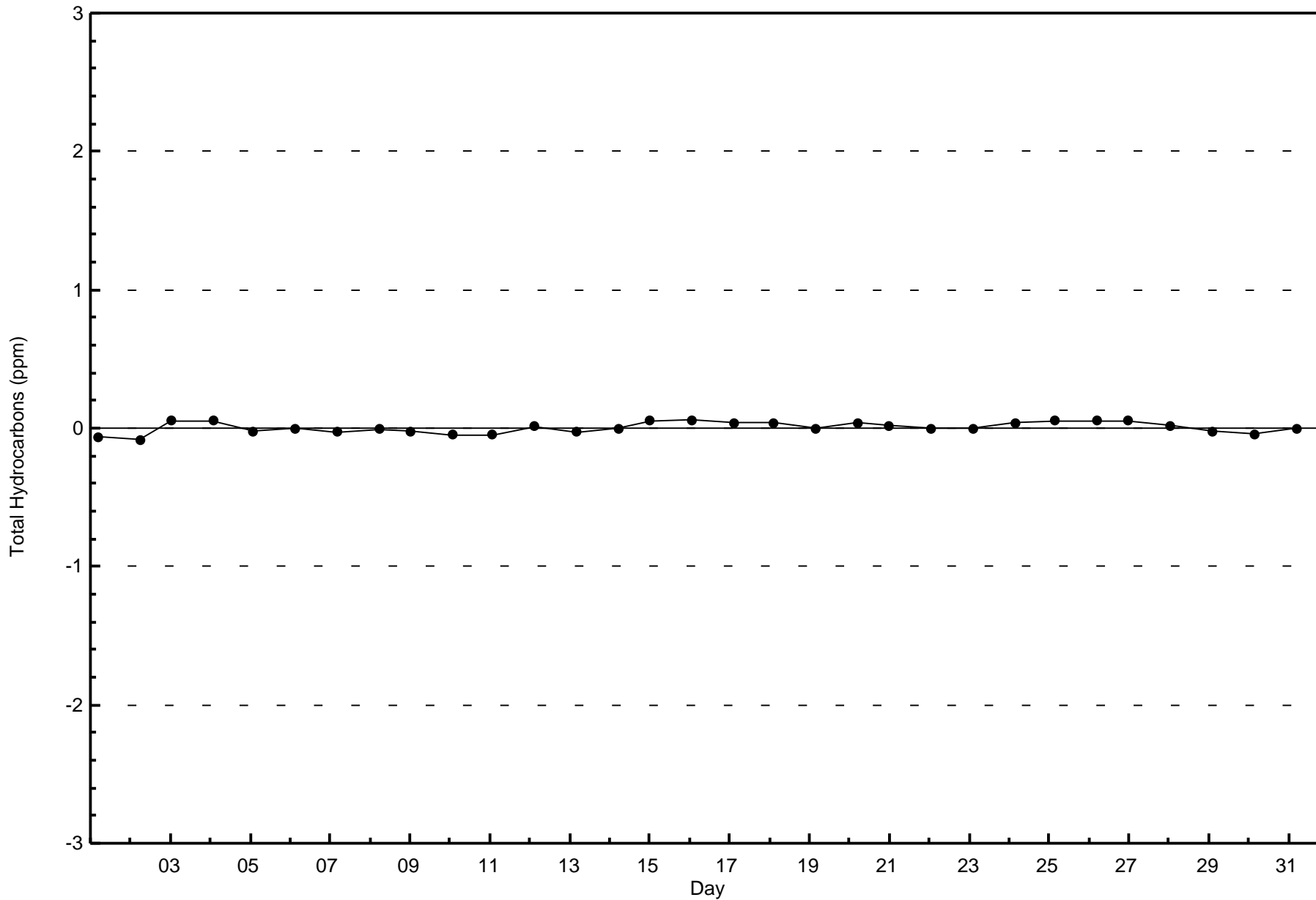
Total Number of Hours: 744

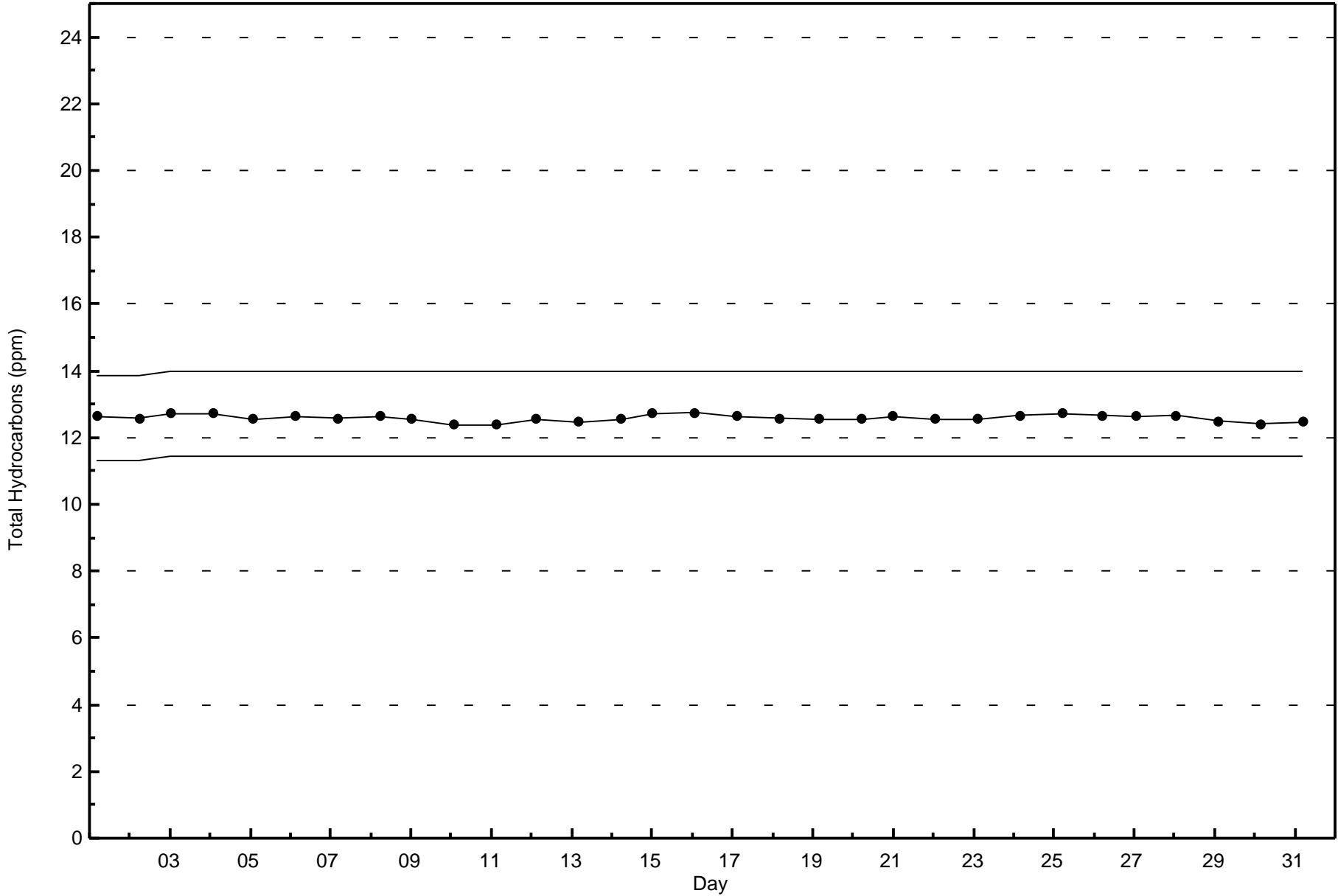




Wood Buffalo Environmental Association  
Zero Responses

Total Hydrocarbons (THC) - ppm  
Buffalo Viewpoint - October 2015







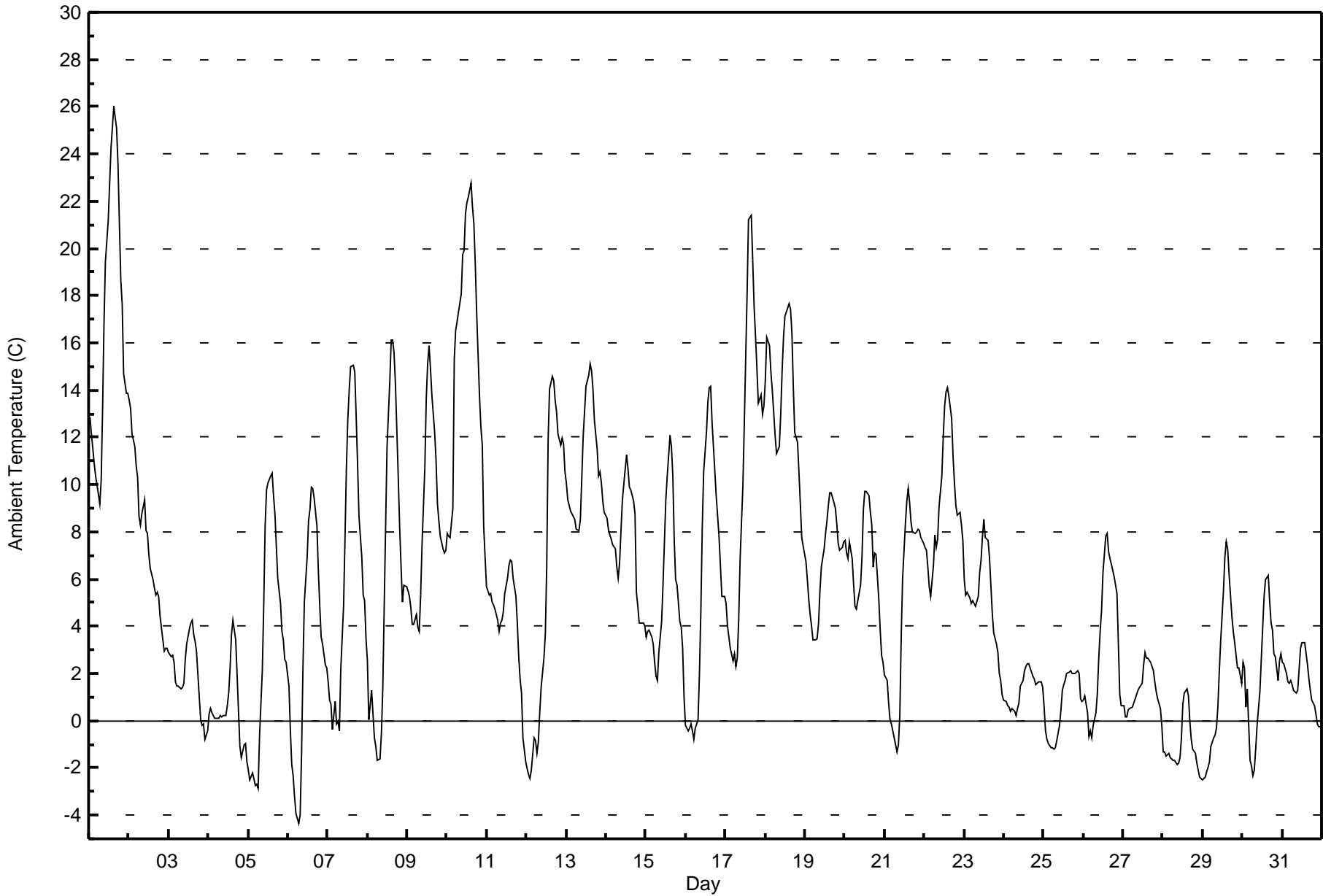
**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Ambient Temperature (AT) - C**

**Buffalo Viewpoint - October 2015**

Maximum Value: 26.0 C on Oct 1 16:00		Maximum Daily Average: 16.8 C on Oct 1		Hours in Service: 744																							
Minimum Value: -4.3 C on Oct 6 07:00		Minimum Daily Average: -1.1 C on Oct 28		Hours of Data: 744																							
Maximum Diurnal Average: 10.4 C at hour 15		Minimum Diurnal Average: 2.6 C at hour 7		Hours of Missing Data: 0																							
Monthly Average: 5.73 C		Percentiles: P <sub>1</sub> = -2.5 P <sub>10</sub> = -0.7 Q <sub>1</sub> = 1.3 Median = 4.9 Q <sub>3</sub> = 9.0 P <sub>90</sub> = 13.8 P <sub>99</sub> = 22.6		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	12.8	12.1	11.6	10.9	10.3	9.6	9.2	10.2	13.2	16.8	19.4	21.2	22.7	24.2	25.1	26.0	25.0	23.5	21.1	18.7	17.6	14.7	13.9	13.9	16.8	26.0	
2-Oct	13.5	13.2	12.1	11.6	10.8	10.3	8.6	8.3	8.8	9.4	8.0	7.9	7.0	6.5	6.0	5.6	5.3	5.4	5.2	4.4	3.4	2.9	3.1	3.0	7.5	13.5	
3-Oct	2.9	2.7	2.8	2.5	1.6	1.5	1.5	1.3	1.4	1.6	2.6	3.3	3.9	4.1	4.3	3.7	3.3	2.9	1.0	0.1	-0.2	-0.2	-0.8	-0.4	2.0	4.3	
4-Oct	0.3	0.5	0.3	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.6	1.2	2.2	3.7	4.2	3.4	2.0	0.4	-1.1	-1.5	-1.0	-1.0	-1.7	0.6	4.2		
5-Oct	-2.1	-2.5	-2.2	-2.4	-2.7	-2.7	-2.9	-0.6	2.1	4.9	8.2	9.8	10.1	10.4	10.5	9.5	8.7	7.4	6.0	5.0	3.8	3.4	2.6	2.5	3.6	10.5	
6-Oct	1.5	-0.4	-1.9	-2.4	-3.2	-3.9	-4.3	-4.0	-1.5	2.3	5.0	6.9	8.5	8.9	9.9	9.8	9.4	8.2	6.3	4.8	3.5	3.3	2.4	2.2	3.0	9.9	
7-Oct	1.7	0.9	0.7	-0.4	0.8	-0.1	0.0	-0.4	2.2	4.8	7.7	10.7	12.7	14.0	15.0	15.1	14.8	12.9	10.9	8.7	6.9	5.3	5.1	3.5	6.4	15.1	
8-Oct	2.5	0.0	1.3	0.3	-0.7	-1.1	-1.7	-1.6	-0.6	1.4	4.9	8.2	11.5	14.4	16.1	16.1	15.6	14.3	10.3	8.2	6.6	5.0	5.7	5.7	5.9	16.1	
9-Oct	5.5	5.3	4.8	4.1	4.1	4.5	3.9	3.8	5.3	7.5	10.7	13.6	15.1	15.9	14.9	13.8	12.2	11.0	9.2	8.5	7.8	7.3	7.1	7.2	8.5	15.9	
10-Oct	7.9	7.8	7.7	9.0	15.3	16.5	16.9	17.3	18.1	19.7	19.9	21.5	22.0	22.1	22.7	21.8	21.0	19.3	17.2	13.8	12.4	11.7	8.2	6.9	15.7	22.7	
11-Oct	5.7	5.3	5.4	5.0	4.9	4.7	4.3	3.8	4.1	4.3	4.6	5.4	6.1	6.6	6.8	6.7	6.0	5.2	4.1	2.7	1.8	1.2	-0.7	-1.7	4.3	6.8	
12-Oct	-2.0	-2.3	-2.4	-2.1	-0.7	-0.9	-1.4	-0.9	0.3	1.4	2.7	3.7	6.6	11.9	14.0	14.6	14.4	13.6	13.1	12.2	11.7	12.0	11.7	10.6	5.9	14.6	
13-Oct	10.0	9.4	8.9	8.8	8.6	8.5	8.1	8.1	8.5	10.2	12.0	13.1	14.2	14.7	15.1	14.8	14.0	12.7	11.5	10.4	10.6	10.1	9.3	8.8	10.8	15.1	
14-Oct	8.6	8.1	7.9	7.7	7.5	7.3	6.5	6.1	6.7	8.1	9.3	10.7	11.3	10.7	9.9	9.8	9.3	8.8	5.5	4.8	4.1	4.1	4.1	4.0	7.5	11.3	
15-Oct	3.6	3.8	3.8	3.5	3.3	2.5	1.9	1.7	2.9	4.2	5.8	7.6	9.4	10.4	12.1	11.6	10.4	7.6	6.0	5.7	4.2	3.9	3.1	1.0	5.4	12.1	
16-Oct	-0.2	-0.4	-0.3	-0.1	-0.4	-0.8	-0.3	0.0	2.0	4.7	8.2	10.5	12.2	13.5	14.1	14.1	12.6	10.6	9.5	8.6	7.7	6.5	5.2	5.3	5.9	14.1	
17-Oct	5.0	4.0	3.5	3.1	2.5	2.8	2.3	2.6	4.3	6.8	9.9	12.6	15.4	18.0	21.2	21.4	19.5	17.5	16.3	14.9	13.4	13.8	13.0	13.3	10.7	21.4	
18-Oct	14.4	16.2	15.9	14.8	14.0	13.0	12.1	11.3	11.6	13.0	14.8	16.2	17.1	17.5	17.7	17.4	16.4	14.1	12.2	11.8	10.6	9.2	7.8	7.4	13.6	17.7	
19-Oct	6.8	6.0	5.1	4.5	4.0	3.4	3.4	3.5	4.1	5.5	6.5	7.3	7.9	8.4	9.1	9.7	9.7	9.3	9.0	8.4	7.5	7.2	7.3	7.6	6.7	9.7	
20-Oct	7.7	7.1	6.9	7.6	6.9	5.8	4.9	4.7	5.1	5.7	6.9	8.9	9.7	9.7	9.6	8.8	8.3	6.5	7.1	7.1	5.1	3.9	2.8	2.5	6.6	9.7	
21-Oct	2.0	1.7	0.8	0.0	-0.1	-0.4	-0.7	-1.3	-1.0	0.2	3.6	6.0	8.4	9.3	9.8	9.2	8.4	8.0	7.9	8.0	8.1	8.0	7.8	7.5	4.6	9.8	
22-Oct	7.3	7.2	6.5	5.7	5.3	6.6	7.9	7.3	7.7	9.1	10.4	12.0	13.4	13.9	14.1	13.8	12.8	11.2	10.1	9.1	8.7	8.8	8.3	7.7	9.4	14.1	
23-Oct	6.0	5.4	5.5	5.2	5.0	5.1	4.9	4.9	5.3	6.3	6.8	7.8	8.6	7.8	7.6	6.9	5.7	4.5	3.7	3.2	2.9	2.0	1.7	1.1	5.2	8.6	
24-Oct	0.9	0.8	0.7	0.6	0.4	0.5	0.4	0.2	0.5	0.8	1.5	1.7	2.1	2.3	2.4	2.4	2.3	1.9	1.7	1.5	1.6	1.6	1.6	1.4	1.3	2.4	
25-Oct	0.6	-0.4	-0.8	-1.0	-1.2	-1.1	-1.2	-1.1	-0.8	-0.2	0.5	1.3	1.5	1.7	2.0	2.1	2.1	2.0	2.0	2.0	2.1	2.0	0.9	0.8	0.7	2.1	
26-Oct	0.9	1.0	0.3	-0.7	-0.5	-0.7	-0.2	0.3	1.2	2.6	3.8	4.6	6.2	7.8	7.9	7.2	6.9	6.6	6.1	5.8	5.4	3.3	1.1	0.7	3.2	7.9	
27-Oct	0.6	0.1	0.2	0.4	0.5	0.6	0.8	1.0	1.1	1.3	1.4	1.6	2.3	2.9	2.7	2.7	2.5	2.3	2.1	1.7	1.2	0.9	0.5	-0.2	1.3	2.9	
28-Oct	-1.3	-1.3	-1.5	-1.4	-1.6	-1.6	-1.7	-1.7	-1.8	-1.8	-1.5	-0.7	0.7	1.2	1.3	1.1	0.0	-0.8	-1.2	-1.4	-1.8	-2.1	-2.4	-2.4	-1.1	1.3	
29-Oct	-2.5	-2.4	-2.1	-2.0	-1.7	-1.1	-0.7	-0.6	-0.3	0.6	2.0	3.4	5.5	6.9	7.6	7.3	6.2	4.5	3.8	3.3	2.8	2.2	2.2	1.6	1.9	7.6	
30-Oct	2.5	2.3	0.6	1.3	-1.7	-1.9	-2.4	-2.1	-1.2	-0.2	1.2	2.6	4.0	5.3	6.0	6.1	5.0	4.1	3.8	2.8	2.7	1.7	2.5	2.8	2.0	6.1	
31-Oct	2.4	2.4	2.0	1.7	1.6	1.7	1.5	1.3	1.2	1.3	2.2	3.1	3.3	3.3	2.8	2.4	1.8	1.3	0.9	0.6	0.3	-0.1	-0.3	-0.3	1.6	3.3	
		4.0	3.7	3.4	3.1	3.0	2.9	2.6	2.7	3.6	4.9	6.4	7.8	9.0	9.9	10.4	10.2	9.5	8.3	7.2	6.3	5.5	4.9	4.3	3.9	Diurnal Average	
		14.4	16.2	15.9	14.8	15.3	16.5	16.9	17.3	18.1	19.7	19.9	21.5	22.7	24.2	25.1	26.0	25.0	23.5	21.1	18.7	17.6	14.7	13.9	13.9	Diurnal Maximum	







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C  
Buffalo Viewpoint - October 2015**

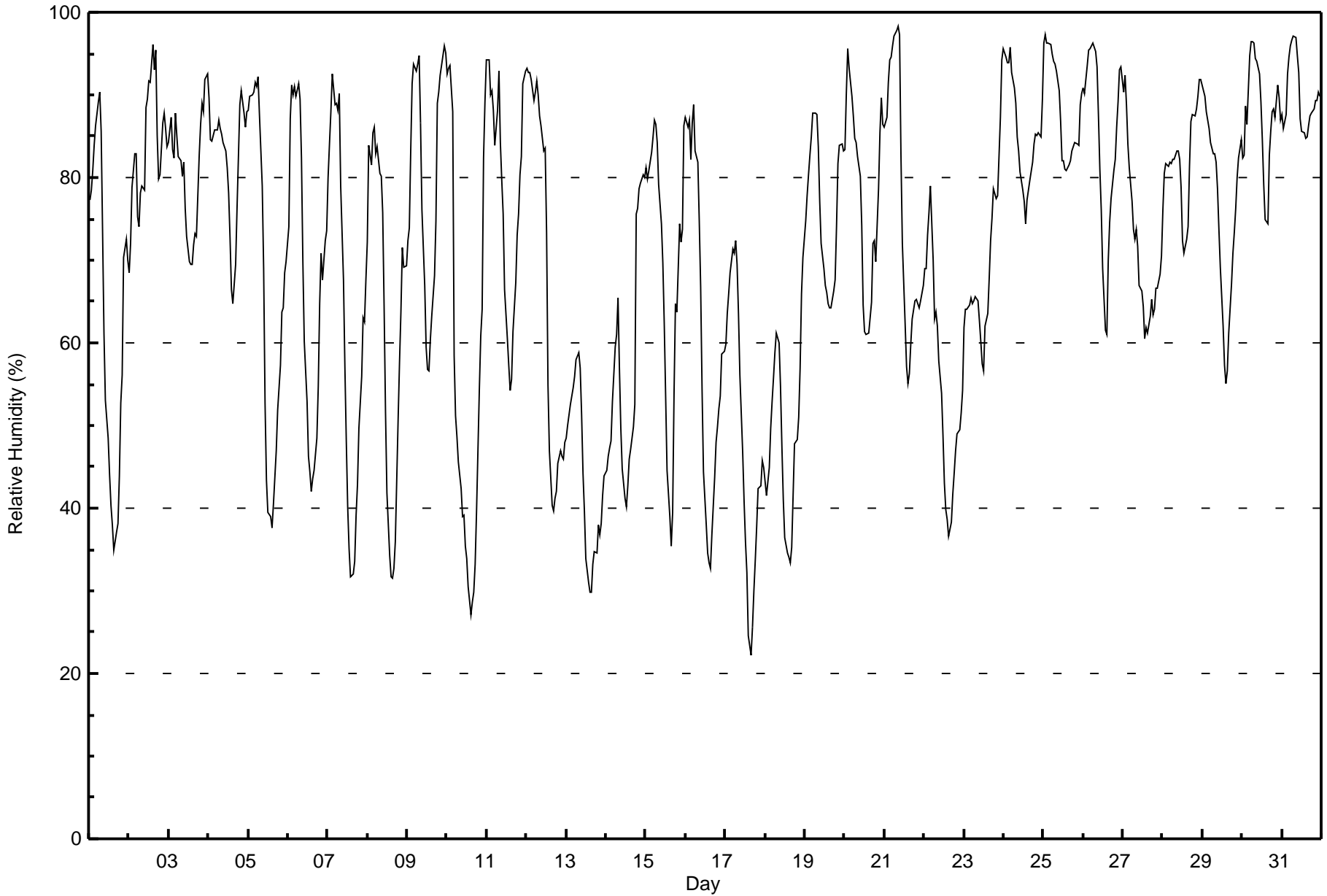
<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	108	14.52	14.52
0 - 10	482	64.78	79.30
10 - 20	138	18.55	97.85
> 20	16	2.15	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Value: 98 % on Oct 21 09:00														Maximum Daily Average: 90.0 % on Oct 31														Hours in Service: 744	
Minimum Value: 22 % on Oct 17 16:00														Minimum Daily Average: 43.7 % on Oct 13														Hours of Data: 744	
Maximum Diurnal Average: 83.0 % at hour 5														Minimum Diurnal Average: 53.5 % at hour 15														Hours of Missing Data: 0	
Monthly Average: 71.0 %														Percentiles: P <sub>1</sub> = 30 P <sub>10</sub> = 42 Q <sub>1</sub> = 57 Median = 75 Q <sub>3</sub> = 87 P <sub>90</sub> = 92 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	77	78	81	84	86	89	90	86	74	61	53	48	44	40	38	35	37	38	44	53	56	70	73	70	62.8	90			
2-Oct	69	72	79	83	83	75	74	78	79	79	89	89	92	92	96	93	95	85	80	80	87	88	86	84	83.6	96			
3-Oct	84	87	83	82	88	85	82	82	80	82	76	73	70	70	69	72	73	73	83	86	89	88	92	93	81.0	93			
4-Oct	90	85	84	85	86	86	87	86	85	84	83	81	78	73	67	65	69	76	82	89	91	88	86	88	82.3	91			
5-Oct	88	90	90	90	91	91	92	88	79	69	53	43	39	39	38	40	44	47	52	57	64	64	68	70	66.1	92			
6-Oct	74	87	91	90	91	90	91	89	82	70	60	53	46	44	42	44	45	48	55	65	71	68	72	73	68.4	91			
7-Oct	80	84	88	92	89	89	88	90	79	68	57	48	40	35	32	32	34	39	43	50	56	63	63	68	62.7	92			
8-Oct	72	84	82	86	86	83	84	81	80	76	64	52	42	34	32	32	33	36	51	58	64	71	69	69	63.3	86			
9-Oct	72	74	83	91	94	93	94	95	87	76	67	60	57	57	60	63	68	75	89	90	92	95	96	95	80.1	96			
10-Oct	93	93	94	88	58	51	49	46	42	39	39	35	34	30	27	29	30	33	40	54	61	64	82	89	54.2	94			
11-Oct	94	94	90	91	88	84	88	93	84	80	76	66	60	57	54	56	61	67	73	76	80	83	91	93	78.3	94			
12-Oct	93	93	93	92	89	90	92	90	87	86	83	84	73	55	47	40	40	41	42	45	47	46	46	48	68.5	93			
13-Oct	48	50	53	54	55	56	58	59	57	51	44	40	34	31	30	30	33	35	35	38	37	38	42	44	43.7	59			
14-Oct	45	46	47	48	53	59	61	65	57	50	45	41	40	43	46	47	50	53	76	76	79	79	80	80	56.9	80			
15-Oct	81	80	81	83	85	87	86	84	79	74	70	62	54	45	39	35	39	54	65	64	74	72	74	86	68.9	87			
16-Oct	87	86	87	82	87	89	83	82	75	67	54	44	38	35	33	33	37	44	48	50	52	54	59	59	61.0	89			
17-Oct	60	64	66	68	71	71	72	70	64	56	47	41	36	32	25	22	26	30	34	38	42	43	46	45	48.6	72			
18-Oct	43	42	45	50	53	56	59	61	60	55	48	41	36	35	34	33	35	42	48	48	51	57	66	70	48.6	70			
19-Oct	75	78	80	83	85	88	88	88	84	77	72	69	67	66	65	64	64	66	68	74	82	84	84	83	76.4	88			
20-Oct	83	90	96	93	90	87	85	84	83	80	74	65	61	61	61	63	65	72	72	70	79	85	90	86	78.2	96			
21-Oct	86	87	91	94	95	96	97	98	98	97	83	72	62	57	55	56	60	63	65	65	65	64	65	67	76.7	98			
22-Oct	69	69	73	76	79	70	63	64	62	58	54	49	43	40	39	37	38	42	44	47	49	49	52	54	54.9	79			
23-Oct	62	64	64	65	65	65	65	66	65	63	60	57	57	62	64	68	72	75	79	77	78	83	87	94	69.0	94			
24-Oct	96	95	94	94	96	93	91	89	85	83	81	79	77	74	77	79	80	82	84	85	85	85	85	89	85.7	96			
25-Oct	96	97	96	96	96	95	94	94	93	91	87	82	82	81	81	82	82	83	84	84	84	84	89	90	88.5	97			
26-Oct	91	90	93	95	96	96	96	95	93	87	81	76	69	62	61	70	75	77	81	82	86	89	93	93	84.6	96			
27-Oct	90	92	89	84	81	77	74	73	74	72	67	66	64	60	62	61	63	65	63	64	67	67	68	71	71.4	92			
28-Oct	76	80	82	81	82	82	82	82	83	83	82	79	72	71	73	74	81	87	88	88	88	90	92	92	82.1	92			
29-Oct	91	90	88	87	86	84	83	83	82	79	74	69	62	57	55	57	61	67	71	73	76	80	82	85	75.9	91			
30-Oct	82	83	89	86	95	97	96	96	94	94	92	89	85	79	75	74	83	86	88	88	87	91	90	87	87.8	97			
31-Oct	88	86	88	93	95	96	97	97	97	95	93	87	86	85	85	85	86	88	88	88	89	89	90	90	90.0	97			
																												Diurnal Average	
78.6														80.3														96	
81.9														82.8														96	
83.0														82.2														97	
82.0														81.7														97	
78.2														78.2														98	
73.6														68.0														97	
62.6														58.1														93	
54.9														53.5														92	
53.9														56.8														95	
60.3														64.9														88	
67.9														71.2														89	
73.3														76.1														90	
77.6														77.6														95	
																												Diurnal Maximum	





Maximum Speed: 35 km/h on Oct 10 14:00	Maximum Daily Speed Average: 22.1 km/h on Oct 27	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 31 10:00	Minimum Daily Speed Average: 2.1 km/h on Oct 15	Hours of Data: 744
Maximum Diurnal Speed Average: 5.0 km/h at hour 16	Minimum Diurnal Speed Average: 0.7 km/h at hour 2	Hours of Missing Data: 0
Monthly Average Velocity: 2.2 km/h 276.3 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 4 Q <sub>1</sub> = 7 Median = 10 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	SE12	SE10	SE11	SE9	SE8	SE8	SE8	SSE7	SE6	SSE6	ESE4	ESE6	ESE7	NE7	N10	N7	NNE4	E3	ESE5	SE4	SW4	NW1	NNW7	NW6	ESE3.7	SE12
2-Oct	WNW7	E3	NNW6	N9	N12	N18	NNE20	N21	N21	N24	N25	N25	N28	N27	N30	N29	N23	NNW28	N28	N25	N27	N32	N29	N28	N21.5	N32
3-Oct	N26	N26	N27	N26	N28	N29	N25	N28	N24	N21	N18	NNE13	NNE13	NNE11	NE11	NNE12	NNE13	NNE11	NNE7	NNE9	NNE6	ENE6	NE2	SSE1	N15.8	N29
4-Oct	NNE7	NNE9	NE6	ENE4	ESE4	ENE3	S3	SSW6	SSW5	SSE6	SSE7	SSW7	SSE7	S7	SSE5	SE6	ESE9	SE8	SSE7	SSE7	SSE9	SSE12	SSE13	SSE11	SE5.0	SSE13
5-Oct	SSE12	SSE9	SE6	SSE6	SSE7	SSE7	SSE7	WSW8	W11	W8	WNW13	WNW25	NW32	NW26	NW27	NW27	NNW23	NNW20	NW18	NW13	WNW14	NW15	WNW7	W6	WNW9.6	NW32
6-Oct	NNE4	SE2	S6	SSE6	SE8	SSE7	SSE9	SSE7	SSE7	SSE9	SE12	ESE10	ESE8	ESE9	ESE9	ESE10	SE8	SE8	ESE8	SE7	SE8	SE7	SE4	SW0	SE6.6	SE12
7-Oct	NNE5	NNE5	NNW2	WSW3	WNW6	NNW6	ESE1	S6	S3	S3	SW3	WSW1	WNW5	WSW9	WSW10	W13	W9	NW11	NW17	NW12	NW10	WNW6	WNW8	NW9	WNW5.0	NW17
8-Oct	NNW7	S3	WNW5	W2	S2	SE5	SSE7	SSE7	SSE8	SSE6	SE6	ESE8	ESE10	SE11	SSE11	ESE10	ESE7	E6	NNE7	NNE11	N13	NNW11	N10	NNW6	E2.8	N13
9-Oct	NNW5	N5	N8	NNE8	NW4	NW4	N5	WNW5	W4	S6	WSW6	WSW11	WSW7	NNW7	NNE11	NNE12	N10	N8	N11	N4	N4	NNE2	SE3	SSE6	NNW3.6	NNE12
10-Oct	SSE9	SSE7	SSE7	SE10	SW15	SW18	SW22	WSW22	SW16	SW18	WSW19	WSW29	WSW28	WSW35	WSW35	WSW27	W18	WSW10	W10	NW7	NW7	NNW14	NNE17	N15	WSW12.3	WSW35
11-Oct	N16	N19	N17	N19	N20	N21	N20	N20	N26	N22	NNW17	NW20	NW23	NW24	NW27	NNW19	NNW20	NW18	WNW16	NW11	W5	WSW5	S6	SSE7	NNW14.8	NW27
12-Oct	SE9	SSE9	SSE8	SSE8	SE12	SSE12	SSE12	SSE12	SSE11	SSE10	SSE11	SSE14	SSE13	S12	SSW13	WSW19	WSW20	WSW16	WSW14	WSW10	SW9	SW12	SW17	SW18	SSW9.0	WSW20
13-Oct	WSW18	SW17	SW18	WSW18	WSW21	WSW23	WSW22	WSW21	WSW23	W19	W19	WSW17	WSW19	WSW22	WSW19	WSW26	NNW19	WSW14	SW12	SW12	WSW20	WSW21	SW20	WSW20	WSW18.7	WSW26
14-Oct	WSW22	WSW19	WSW16	WSW22	W21	W15	WSW15	WSW24	WSW23	W22	W25	WNW25	WNW29	WNW29	WNW24	NW22	NW18	NNW17	NNE15	NNE10	NNE7	NNE8	NNE6	NNE6	WNW13.7	WNW29
15-Oct	NNE5	WSW3	W2	SSW1	S3	ENE4	NE5	ENE3	S4	SSW6	SSW7	SW5	W4	S5	NW1	WSW5	S6	SE7	SSE5	NNE5	SSE5	S4	S4	SSE5	S2.1	SE7
16-Oct	SE6	SSE8	SSE6	SSE6	SSE5	SE7	SE10	SE9	SSE8	SSE7	SE12	SE15	SE15	SE13	ESE13	SE14	SE11	ESE11	SE12	SE12	SE13	SSE10	SSE9	SSE11	SE10.0	SE15
17-Oct	SSE12	SSE11	SSE11	SE11	SSE13	SE13	SE13	SSE11	SSE12	SE12	SE14	SSE14	SSE15	SE11	S11	S14	SSW13	SSW13	S11	SSE9	SSE9	S8	SSE9	SSE7	SSE10.8	SSE14
18-Oct	SSW9	SW17	WSW22	WSW22	WSW21	WSW23	WSW23	WSW20	WSW24	WSW21	W21	W24	WNW27	WNW28	WNW25	WNW23	WNW19	WNW14	WNW10	W7	WSW9	W7	NNW10	N11	W15.9	WNW28
19-Oct	N12	N13	N17	NNE16	NNE14	N11	NNE10	NNE10	NE9	E6	ESE10	ESE9	ESE10	ESE10	ESE8	E9	ESE10	ESE9	ESE11	SE13	SE17	SE16	SE14	SSE10	E6.4	N17
20-Oct	SSE10	SSE7	SSE7	SW13	WSW19	W19	W14	WSW16	WSW19	WSW19	W20	W20	W22	NW24	NW24	NW26	NW19	NW11	NW11	NW17	NW13	N13	NE8	ENE5	WNW11.3	NW26
21-Oct	E4	SE5	SSE6	SSE5	SSE6	SSE6	SE6	S2	SSE5	SE6	SE8	SE12	ESE11	SE11	SE10	SE10	SE9	SE11	SE14	SSE11	SSE14	SSE13	SSE10	SSE12	SE8.4	SSE14
22-Oct	SSE7	SSE7	SE8	SE7	S8	SW12	SW15	WSW16	SW17	WSW17	WSW20	SW17	SW19	SW21	WSW23	WSW22	WSW18	WSW11	SW12	SW13	WSW14	WSW15	WSW19	WSW14	SW13.2	WSW23
23-Oct	WNW12	W12	W10	WSW9	SSW7	SW7	SW9	SW9	W9	W9	WSW8	W6	NW8	N12	N10	N10	N10	N9	N12	NNE12	N14	N11	N13	N11	NW5.7	N14
24-Oct	N10	N12	NNE12	N11	N9	NNE10	NE7	NNE8	N11	N9	N7	NNE6	N4	NW3	NW3	WNW3	NW3	NNE3	NE3	ENE4	E3	NE2	ENE4	N8	NNE5.8	NNE12
25-Oct	N13	N15	N14	N12	N11	NNE13	N11	NNE10	NNE12	N9	NNE6	NNE4	ENE1	SE3	SSE3	S3	SE2	SSE2	SE3	SE4	SE5	SE7	SSE7	SSE9	NNE4.1	N15
26-Oct	SSE10	SSE7	SSE4	SE9	SE10	SSE10	SSE12	SE13	SE15	SE19	SE19	SE20	SE18	SE19	SE17	SE19	SSE16	SSE15	SE16	SSE13	SW7	WNW25	WNW20	W15	SSE9.9	WNW25
27-Oct	WNW20	NW21	WNW22	WNW19	WNW22	WNW24	WNW22	NW25	NW23	NW24	NW29	NW24	NW27	NW33	NW29	NW27	NW26	NW22	NW24	NW19	NNW16	NNW16	NW11	NW13	NW22.1	NW33
28-Oct	NW14	N10	NE6	E5	ESE3	E3	SSE4	SSE5	S7	S7	S8	SSE9	SE10	ESE12	ESE12	SE12	SE11	SE13	SE13	SE16	SSE12	SSE14	SE13	SE16	SE7.2	SE16
29-Oct	SSE16	SSE17	SSE16	SSE15	SSE14	SSE13	SSE13	SSE14	SSE15	SSE15	SSE12	SSE12	S8	SSW10	S10	S10	SSE9	SSE9	SE10	SSE11	SSE10	SSE10	SSW9	S7	SSE11.5	SSE17
30-Oct	S5	SW4	SSW5	SW5	SE6	SE8	SSE9	SE10	SSE8	SSE8	SE10	SE7	SE7	SE6	SE7	NW2	ESE1	WSW1	W4	SSW6	WSW5	S4	WNW9	NNW11	SSE3.3	NNW11
31-Oct	NNW7	N7	NNE7	N4	W3	NW6	NNE8	NNE7	ENE4	WSW0	W6	NNW6	NNE5	NE7	NNE8	NE9	NE9	NE11	NNE11	NNE13	N13	N12	N13	N13	NNE6.8	N13

WNW1.3	NW0.7	NNW1.1	W1.1	WSW2.2	W2.0	SW2.0	WSW3.0	WSW3.3	WSW3.2	WSW3.6	WSW3.5	W3.8	WNW4.4	NNW4.4	NNW5.0	NW3.8	NW2.4	NW1.8	NNW1.0	W1.2	WNW1.8	NNW1.7	WNW1.4	Diurnal Average	
N26	N26	N27	N26	NNW28	N29	N25	N28	N26	N24	NW29	WSW29	NW32	WSW35	WSW35	N29	NW26	NNW28	N28	N25	N27	N32	N29	N28	Diurnal Maximum	

All monthly, daily, and diurnal averages have been calculated using vector methods



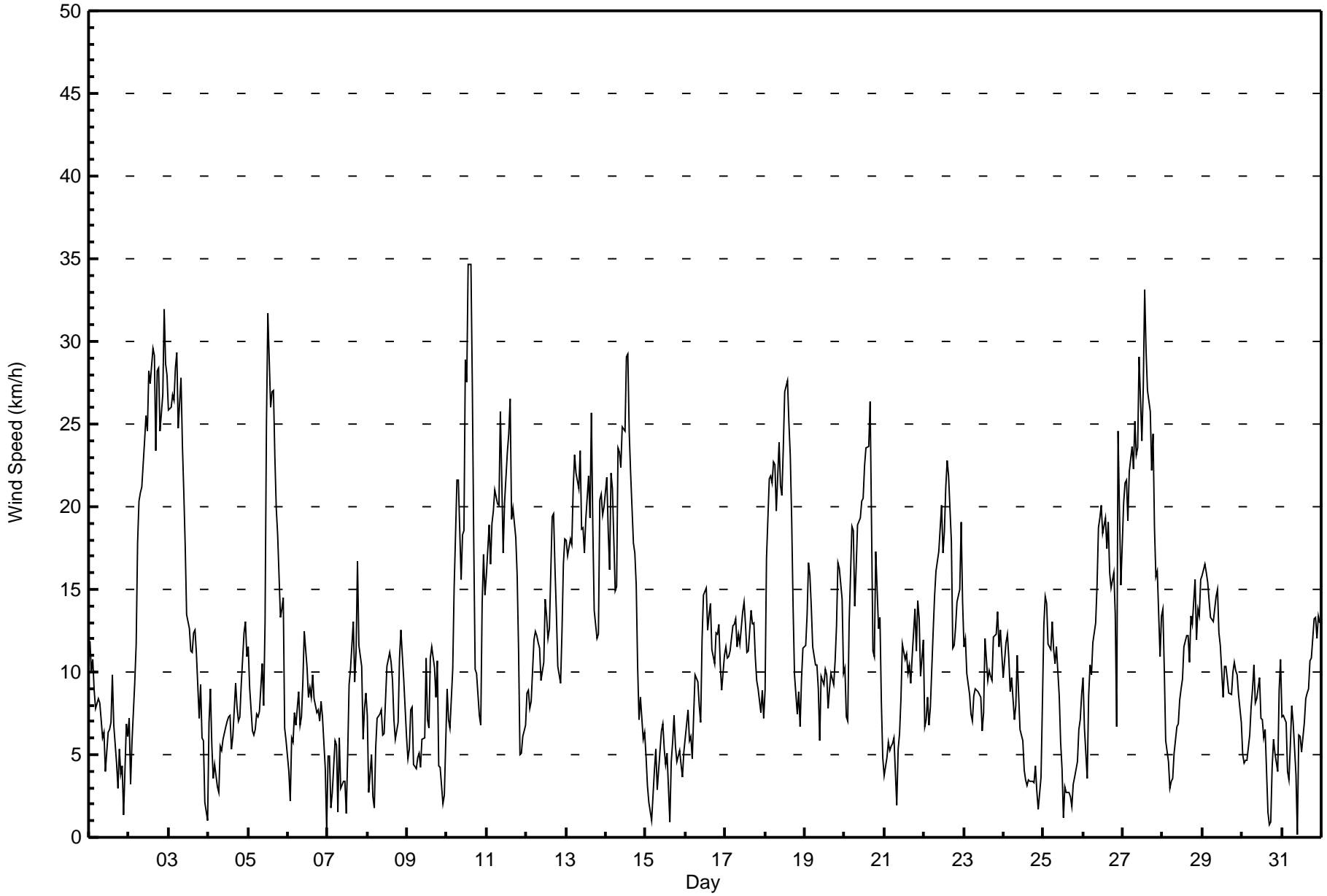
**Wood Buffalo Environmental Association**

**Summary of Hour Standard Deviations**

**Wind Speed (WS) - km/h**

**Buffalo Viewpoint - October 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Oct 10 14:00 Minimum Value: 1 km/h on Oct 1 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> = 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	1	1	1	2	1	1	1	2	2	2	2	2	3	2	2	1	1	1	1	1	1	1	1	2	3
2-Oct	2	3	1	2	3	3	3	4	4	5	5	5	5	5	6	6	5	5	6	5	5	5	7	5	7
3-Oct	6	7	5	5	5	6	4	4	5	4	4	3	3	3	3	3	4	1	2	1	1	1	1	1	7
4-Oct	3	2	2	1	1	1	2	1	2	2	3	2	2	2	2	2	2	2	1	1	1	3	2	2	3
5-Oct	2	1	2	2	1	1	1	3	2	3	5	7	6	5	6	6	4	4	3	3	2	3	3	2	7
6-Oct	2	1	1	1	1	1	1	1	2	3	3	3	3	2	2	2	2	1	1	1	1	1	2	1	3
7-Oct	1	1	2	1	1	1	1	1	1	1	2	2	3	3	4	4	3	5	2	2	1	3	2	1	5
8-Oct	1	2	1	1	2	1	1	1	2	2	1	2	3	3	4	2	2	2	1	3	2	2	2	1	4
9-Oct	1	1	2	2	2	2	1	1	2	2	2	3	2	1	2	2	2	1	2	3	1	1	1	3	3
10-Oct	2	2	2	2	5	4	5	5	5	6	5	7	7	10	8	8	5	3	3	2	2	5	5	4	10
11-Oct	3	4	3	3	4	5	3	4	4	4	3	4	5	5	5	4	4	4	4	2	2	1	1	1	5
12-Oct	1	2	2	2	3	3	3	3	3	3	3	3	3	4	3	7	4	3	3	2	2	3	4	4	7
13-Oct	4	4	4	4	5	5	5	5	5	5	4	4	6	6	5	6	7	5	3	3	5	5	4	5	7
14-Oct	4	5	3	5	6	3	3	5	6	6	6	7	6	6	5	4	4	4	6	3	2	2	2	2	7
15-Oct	2	1	1	1	1	2	1	2	1	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	2
16-Oct	1	1	1	1	1	2	2	2	2	2	3	4	4	3	4	4	3	2	3	3	3	2	1	2	4
17-Oct	3	2	2	2	2	2	2	3	3	3	3	4	3	3	3	3	3	3	3	2	2	2	2	2	4
18-Oct	4	4	5	4	4	4	4	4	5	4	5	6	7	6	5	5	4	3	2	2	1	2	1	3	7
19-Oct	2	2	3	3	3	3	2	2	3	2	3	3	2	3	2	2	3	3	3	3	4	4	3	4	4
20-Oct	2	2	2	4	4	5	4	4	4	4	5	5	6	5	6	6	4	2	4	6	2	3	3	2	6
21-Oct	1	1	1	1	1	1	1	1	2	2	3	3	3	3	3	3	2	3	3	3	4	3	2	3	4
22-Oct	3	2	2	2	2	4	3	4	4	4	4	4	5	5	6	5	4	3	3	2	3	4	4	4	6
23-Oct	4	3	3	3	2	2	2	2	3	3	2	2	3	2	2	2	2	1	3	2	3	2	2	3	4
24-Oct	2	3	3	2	2	2	2	2	3	2	2	2	1	1	1	1	1	1	1	1	1	1	1	2	3
25-Oct	3	3	3	2	2	3	2	2	2	2	1	2	1	1	1	1	1	1	1	1	1	1	1	3	3
26-Oct	3	2	1	3	3	2	3	3	4	4	5	6	5	6	5	5	4	4	4	4	6	6	4	4	6
27-Oct	5	6	5	5	5	5	5	5	5	6	6	6	6	7	6	6	5	4	5	4	3	4	2	3	7
28-Oct	3	2	2	1	1	1	1	2	2	2	2	2	3	3	3	3	2	3	3	4	3	3	3	4	4
29-Oct	3	4	4	4	4	3	3	3	3	3	3	3	3	2	2	2	2	1	1	1	1	1	1	1	4
30-Oct	2	2	2	2	2	1	1	1	2	2	1	2	1	1	2	2	1	2	1	2	2	1	4	2	4
31-Oct	2	2	2	1	1	1	2	1	2	1	2	2	2	2	2	2	2	3	3	3	3	2	2	2	3
Diurnal Maximum																									





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

**Wind Speed (WS) - km/h**  
**Buffalo Viewpoint - October 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	117	15.73	15.73
6 - 11	307	41.26	56.99
12 - 19	198	26.61	83.60
20 - 28	108	14.52	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  
Buffalo Viewpoint - October 2015**

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	10	4	9	6	6	10	14	13	4	5	9	7	4	8	2	117
6 - 11	28	28	11	1	3	23	51	78	16	9	5	13	11	8	10	12	307
12 - 19	26	14	0	0	0	3	34	36	2	3	18	26	9	8	13	6	198
20 - 28	26	1	0	0	0	0	1	0	0	0	3	30	7	14	21	5	108
29 - 38	5	0	0	0	0	0	0	0	0	0	0	3	0	2	4	0	14
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	91	53	15	10	9	32	96	128	31	16	31	81	34	36	56	25	744

Total Number of Valid Hours: 744

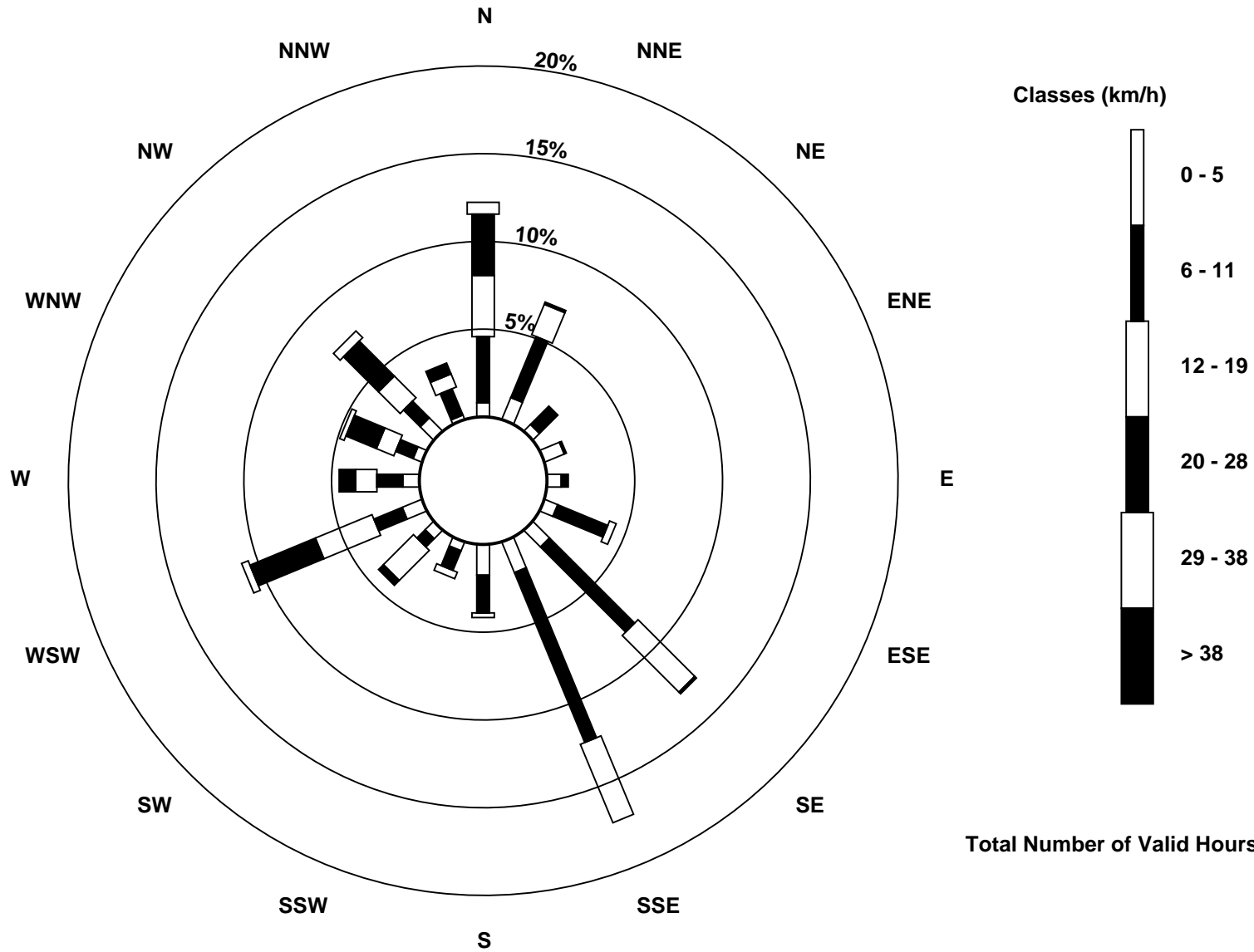
Total Number of Hours: 744





Wood Buffalo Environmental Association  
Wind Rose Oct 2015

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



Total Number of Valid Hours: 744



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg**

**Buffalo Viewpoint - October 2015**

Direction of Maximum Speed: 249 deg on Oct 10 14:00															Hours in Service: 744	
Direction of Maximum Daily Speed Average: 309.8 deg on Oct 27															Hours of Data: 744	
Direction of Minimum Speed: 240 deg on Oct 31 10:00															Hours of Missing Data: 0	
Direction of Minimum Daily Speed Average: 2.1 deg on Oct 15															Percent Operational Time: 100.0	
Monthly Average Direction: 257.0 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	135	125	129	138	137	139	139	147	143	147	120	108	112	36	5	356	28	84	115	136	223	309	330	323	115.8
2-Oct	302	81	347	8	360	5	13	7	6	358	358	2	355	353	357	357	356	347	349	358	356	353	354	355	357.0
3-Oct	355	354	357	354	349	353	356	356	356	355	5	12	14	19	36	27	18	14	32	18	24	59	55	154	3.1
4-Oct	15	27	55	61	106	69	170	200	209	166	158	198	168	172	161	139	121	139	154	150	151	150	148	152	144.8
5-Oct	153	149	145	152	165	154	164	246	273	274	285	301	312	316	314	314	328	328	324	307	302	308	289	274	301.6
6-Oct	21	131	187	159	143	159	161	158	151	148	142	122	114	115	110	122	135	130	117	130	136	143	137	236	136.2
7-Oct	17	15	329	238	300	338	121	169	175	186	233	251	282	257	249	267	267	304	310	313	304	291	293	315	288.7
8-Oct	345	169	293	278	179	137	148	148	152	153	130	118	116	130	147	106	108	99	21	18	4	345	352	339	92.4
9-Oct	346	4	6	14	316	323	353	296	260	185	247	254	251	328	28	20	8	349	358	352	351	18	134	150	341.8
10-Oct	151	154	148	135	219	225	232	237	223	223	240	241	242	249	248	257	264	254	273	321	306	328	17	354	246.0
11-Oct	357	7	0	1	5	5	2	355	353	357	337	324	326	319	318	327	340	309	293	309	280	238	172	155	339.3
12-Oct	137	149	160	147	143	153	163	159	158	152	151	150	153	185	211	257	255	252	244	248	230	227	234	234	196.5
13-Oct	238	232	236	237	239	244	243	248	248	260	264	251	258	257	253	255	287	254	234	220	242	241	235	238	247.0
14-Oct	249	246	247	248	259	259	245	248	247	260	265	288	299	303	302	307	317	334	22	32	26	18	25	29	282.9
15-Oct	23	242	279	199	178	60	36	77	182	192	197	215	269	188	306	245	178	133	152	25	155	172	182	165	175.4
16-Oct	146	158	150	148	154	142	144	146	150	161	146	141	140	138	123	141	132	123	131	133	141	155	149	157	142.1
17-Oct	160	158	159	146	147	139	146	157	153	141	145	149	148	142	174	184	213	195	183	166	155	177	168	152	160.1
18-Oct	211	233	244	248	250	251	248	242	252	255	264	275	288	296	300	292	300	303	298	259	244	274	331	6	269.7
19-Oct	358	356	1	14	12	3	18	26	37	84	106	114	115	118	106	93	102	111	118	132	134	136	143	156	79.3
20-Oct	157	166	168	236	249	276	266	248	247	248	267	272	277	304	308	304	323	324	305	307	321	8	36	70	282.8
21-Oct	91	145	150	148	149	153	145	180	157	142	144	128	121	138	134	141	136	144	142	149	148	153	164	154	143.6
22-Oct	161	148	144	145	179	222	218	237	236	238	248	234	229	236	238	250	248	240	236	229	238	240	250	257	232.2
23-Oct	285	273	262	243	212	224	235	235	259	270	253	272	325	360	356	359	3	5	358	12	11	9	5	8	318.4
24-Oct	9	9	13	10	8	14	47	19	10	11	8	28	350	323	313	296	321	14	53	59	95	49	59	6	13.1
25-Oct	7	9	4	4	2	12	9	12	12	9	19	23	66	152	162	183	136	160	138	131	141	142	147	165	26.1
26-Oct	156	159	149	136	141	147	147	143	140	140	141	143	140	140	143	139	150	148	146	160	235	299	284	271	154.4
27-Oct	286	305	303	294	296	303	299	306	305	308	315	314	309	312	311	317	314	313	325	324	328	330	310	306	309.8
28-Oct	319	10	49	83	102	101	158	149	173	172	173	156	135	115	122	141	139	138	143	143	153	150	142	145	137.9
29-Oct	149	151	154	152	151	153	154	152	152	151	155	152	181	192	190	185	167	154	144	158	160	148	193	171	159.0
30-Oct	191	233	196	233	136	136	153	142	151	154	130	136	142	135	133	317	109	239	277	211	252	187	301	335	166.5
31-Oct	336	7	12	360	270	326	17	23	74	240	263	331	27	35	31	55	45	40	32	19	11	6	5	11	14.4

299.6 310.7 296.3 263.0 248.9 273.0 233.2 246.1 245.5 237.1 245.4 251.6 276.0 285.5 290.7 292.2 309.8 313.6 325.1 334.2 274.3 295.3 288.3 285.7  
Diurnal Average

All monthly, daily, and diurnal averages have been calculated using vector methods



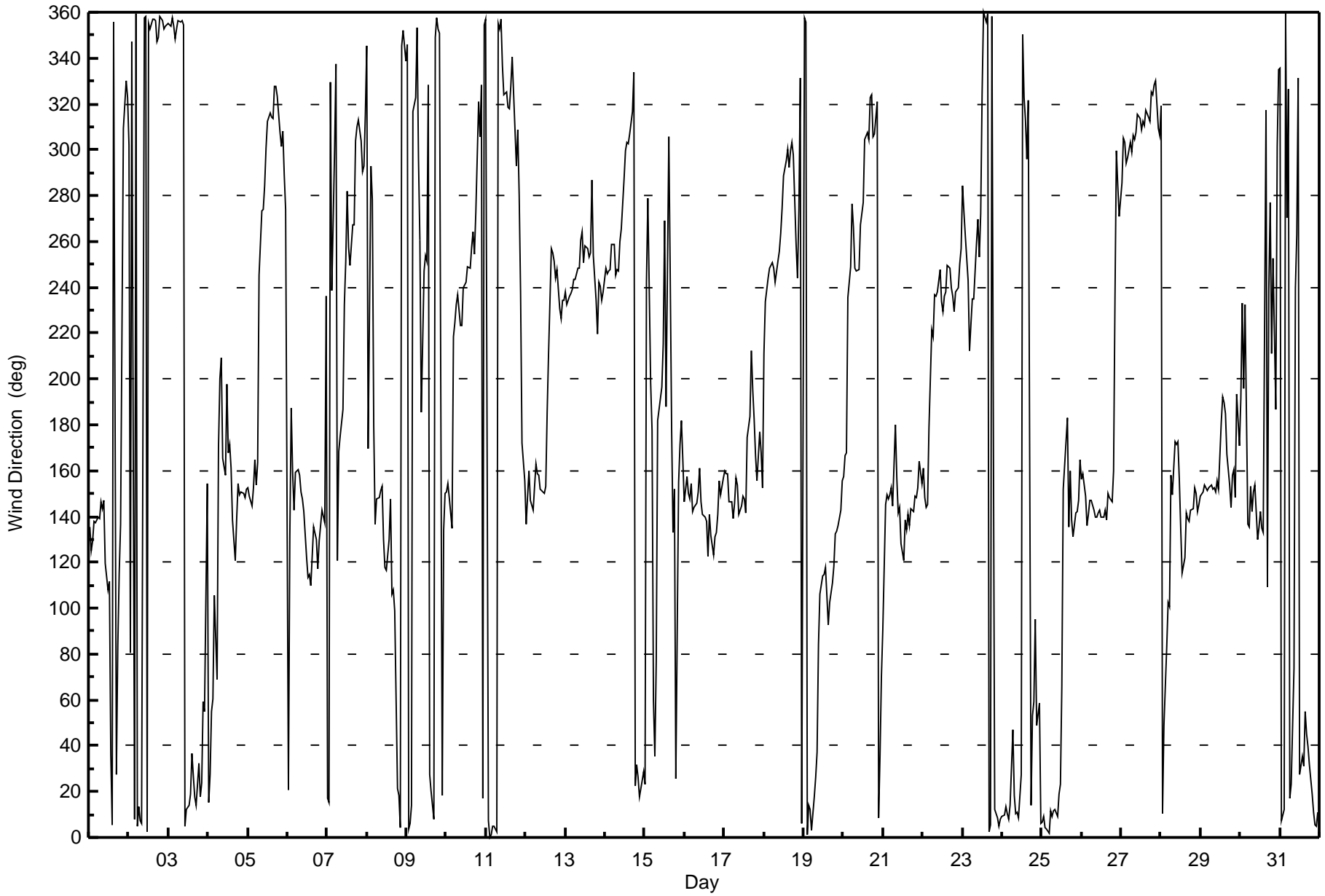
**Wood Buffalo Environmental Association**

**Summary of Hour Standard Deviations**

**Wind Direction (WD) - deg**

**Buffalo Viewpoint - October 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 94 deg on Oct 31 10:00 Minimum Value: 5 deg on Oct 29 21:00 Percentiles: P <sub>1</sub> = 8 P <sub>10</sub> = 12 Q <sub>1</sub> = 14 Median = 17 Q <sub>3</sub> = 22 P <sub>90</sub> = 36 P <sub>99</sub> = 85																		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	8	8	7	9	9	7	10	14	20	28	63	47	40	46	18	18	24	28	8	42	19	86	21	37	86
2-Oct	18	65	19	13	16	16	12	15	15	18	18	17	19	18	18	18	18	16	15	18	17	17	16	17	65
3-Oct	17	18	16	17	16	18	17	18	17	16	18	18	22	19	21	18	18	26	16	10	18	11	43	76	76
4-Oct	27	17	23	37	16	29	34	30	28	28	33	27	36	35	60	42	16	16	8	10	11	15	15	16	60
5-Oct	14	11	11	13	14	9	21	29	14	24	26	18	13	16	16	14	14	13	10	12	10	12	37	16	37
6-Oct	24	62	13	21	7	11	8	10	16	19	19	24	30	24	27	17	17	17	10	10	11	11	38	90	90
7-Oct	11	15	27	31	13	27	68	12	23	48	56	88	55	26	28	21	16	31	10	10	8	58	9	16	88
8-Oct	11	52	30	52	79	10	18	9	13	18	22	22	20	23	25	23	20	15	30	11	15	13	14	19	79
9-Oct	21	12	20	15	48	52	17	17	40	27	41	16	29	23	14	14	11	24	15	43	34	59	57	54	59
10-Oct	13	26	18	18	25	14	16	16	25	20	17	16	16	14	14	16	17	18	37	20	13	27	14	16	37
11-Oct	15	16	17	15	17	16	16	17	16	17	21	15	16	14	14	18	17	15	18	13	46	36	23	17	46
12-Oct	6	14	20	19	16	15	17	18	18	25	19	17	17	32	20	25	14	12	12	13	13	13	14	15	32
13-Oct	15	14	14	14	15	13	12	14	13	17	18	16	18	16	15	16	19	16	17	17	13	14	15	15	19
14-Oct	13	13	14	13	17	18	13	12	13	17	19	18	16	13	14	13	12	22	13	17	27	14	14	16	27
15-Oct	37	20	56	81	55	39	25	50	34	24	28	45	51	45	90	43	22	9	44	28	30	28	30	26	90
16-Oct	15	20	22	9	18	14	14	14	19	24	21	20	19	22	19	20	16	13	16	16	16	13	13	15	24
17-Oct	15	13	12	12	11	13	15	18	17	17	19	19	20	18	26	18	15	16	19	15	17	19	15	29	29
18-Oct	42	16	14	12	11	11	11	14	12	14	18	18	16	14	14	14	15	11	9	11	10	24	27	15	42
19-Oct	14	14	15	12	12	16	14	12	16	42	22	26	20	20	21	20	18	18	19	19	17	17	17	27	42
20-Oct	16	22	22	16	12	18	19	15	13	13	19	18	19	15	13	15	13	10	16	13	11	26	21	29	29
21-Oct	34	18	15	13	13	10	13	67	24	22	31	21	21	22	20	19	18	19	17	18	17	17	19	17	67
22-Oct	38	22	21	21	37	24	15	15	15	16	14	17	17	16	17	14	12	12	14	12	14	14	14	18	38
23-Oct	24	17	18	22	12	22	16	17	23	27	22	25	40	17	15	14	13	13	15	13	14	13	15	13	40
24-Oct	13	16	14	12	13	22	22	15	14	15	20	25	39	52	52	34	32	14	32	20	43	63	34	14	63
25-Oct	13	15	14	15	15	13	14	13	13	16	23	42	87	41	49	36	31	30	23	17	16	16	12	19	87
26-Oct	19	20	17	14	18	17	19	19	17	17	18	18	18	19	18	19	18	17	19	19	52	17	15	17	52
27-Oct	17	12	13	17	15	13	14	13	13	15	13	15	14	13	13	13	13	13	13	12	13	14	21	13	21
28-Oct	13	21	26	25	22	16	29	30	27	27	24	24	26	20	18	19	15	17	18	17	18	16	16	17	30
29-Oct	16	16	18	18	17	17	17	17	16	16	17	16	29	19	18	18	14	13	9	7	5	9	26	31	31
30-Oct	30	45	22	54	16	11	11	15	27	23	10	17	15	15	15	90	82	76	19	24	30	46	32	16	90
31-Oct	20	12	14	23	29	17	15	14	39	94	28	42	24	17	15	19	18	17	18	14	17	14	13	14	94
Diurnal Maximum																									





# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	October 2, 2015	Last Calibration	September 15, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	9:50	End Time (MST)	12:20
Gas Cert Reference	LL107926	Station temp.	21 Deg C
Cal Gas Concentration	51 ppm	Cal Gas Exp Date	29-May-14
Calibrator Make/Model	Sabio 4010	Serial Number	11551008
ZAG Make/Model	API 701	Serial Number	4297
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2635

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-592	-593
Analyzer IP address	192.168.1.43		Lamp voltage	832	832
Calculated slope	0.991506	0.991404	Chamber temp	45.0	44.9
Calculated intercept	-0.688778	0.126586	Pressure	694.9	698.5
Analyzer Background	9.9	10.9	Flow	0.492	0.496
Analyzer Coefficient	0.856	0.856	Intensity	85	85
Analyzer make	TEI 43i		Analyzer serial #	JC1327300932	

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.6	----
as found span	5000	58.8	599.8	603.9	0.993
calibrator zero	5000	0.0	0.0	-0.3	----
high point	5000	58.8	599.8	604.2	0.993
second point	5000	29.4	299.9	304.1	0.986
third point	5000	14.7	149.9	150.1	0.999
as left zero	5000	0.0	0.0	-0.2	----
as left span	5000	58.8	599.8	604.5	0.992
Average Correction Factor					0.993

Corrected As found      603.3      Previous response      605.6      % change      0.4%

**Notes:**

Sample inlet filter replaced after as founds. Slightly adjusted zero.

Calibration Performed By:

Asad Hidayat



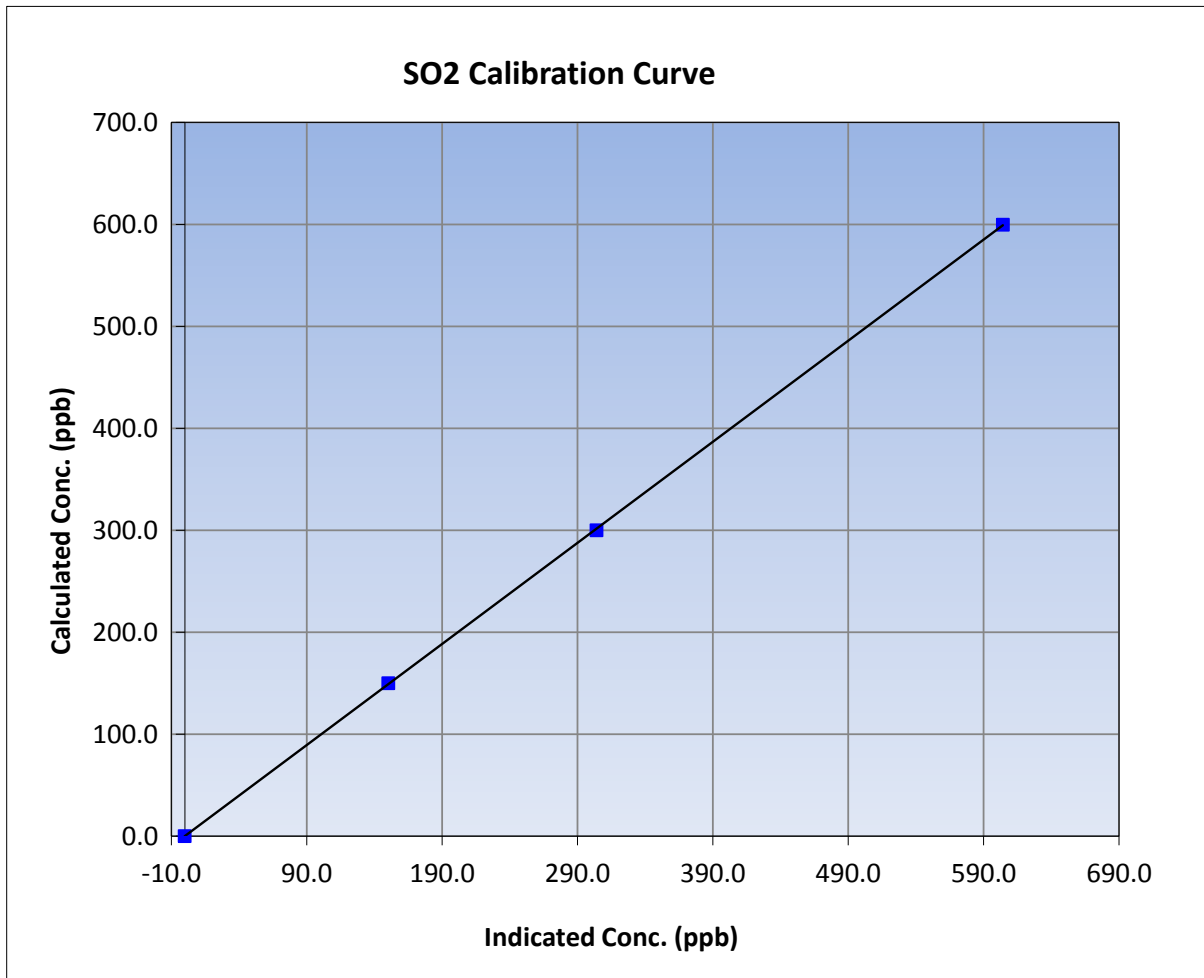
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	October 2, 2015	Previous Calibration	September 15, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	9:50	End Time (MST)	12:20
Analyzer make	TEI 43i	Analyzer serial #	JC1327300932

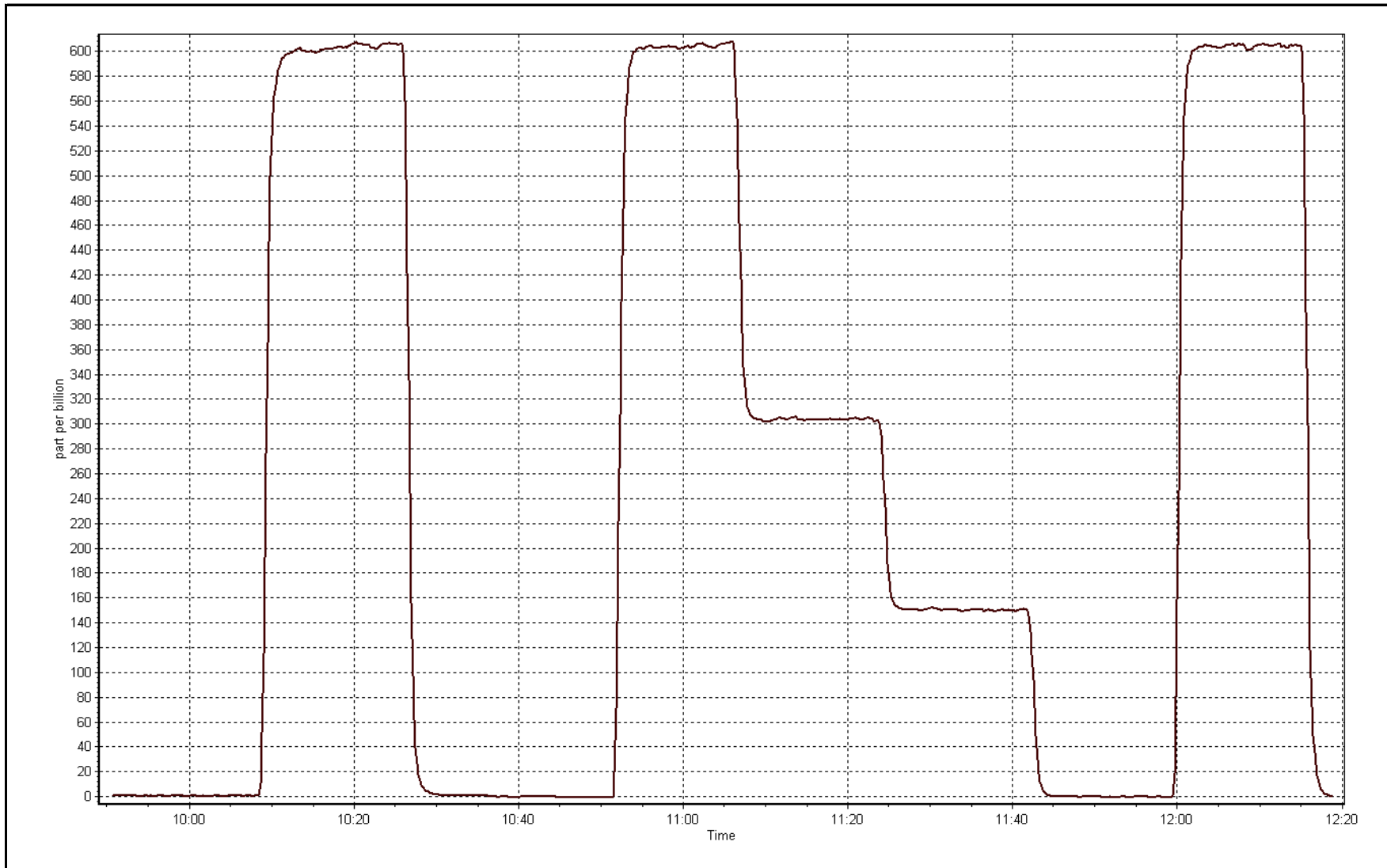
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999979
599.8	604.2	0.9926		
299.9	304.1	0.9862	Slope	0.991404
149.9	150.1	0.9987		
			Intercept	0.126586



SO2 Calibration Plot

Date: October 2, 2015





# Wood Buffalo Environmental Association H2S Calibration Report

### Station Information

Calibration Date	October 1, 2015	Last Calibration	September 15, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	11:40
Gas Cert Reference	LL101590	Station temp.	22 Deg C
Cal Gas Concentration	9.75 ppm	Cal Gas Exp Date	2/22/2015
Calibrator Make/Model	Sabio 4010	Serial Number	11551008
ZAG air Make/Model	API 701	Serial Number	4297
DACS make/model	Campbell Scientific CR3000	Serial Number	2635
SO2 gas concentration	51 ppm	SO2 gas cert/exp	LL107926 29-May-14

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-617	-617
Analyzer IP address	192.168.1.45		Lamp voltage	867	868
Calculated slope	1.005594	0.997641	Chamber temp	45	45
Calculated intercept	-0.139943	-0.190068	Pressure	558.6	554.7
Analyzer Background	13.4	13.7	Flow	1.062	1.054
Analyzer Coefficient	0.808	0.821	Intensity	95	94
			Converter temp.	331	328

Analyzer make/model	TEI 450i	Analyzer serial #	1336160094
Converter make/model	na	Converter serial #	na

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.1	----
as found span	6000	46.1	74.9	72.9	1.027
SO2 scrubber check	5000	14.7	149.9	3.0	----
calibrator zero	6000	0.0	0.0	0.1	----
high point	6000	46.1	74.9	75.1	0.997
second point	6000	25.8	41.9	42.4	0.988
third point	6000	15.4	25.0	25.3	0.988
as left zero	5000	0.0	0.0	0.4	----
as left span	6000	46.1	74.9	74.6	1.005
Average Correction Factor					0.991

Corrected As found	72.9	Previous response	74.6	% change	2.4%
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**Notes:**

Inlet filter changed and scrubber check done after as founds. Slightly adjusted span.

Calibration Performed By: Asad Hidayat





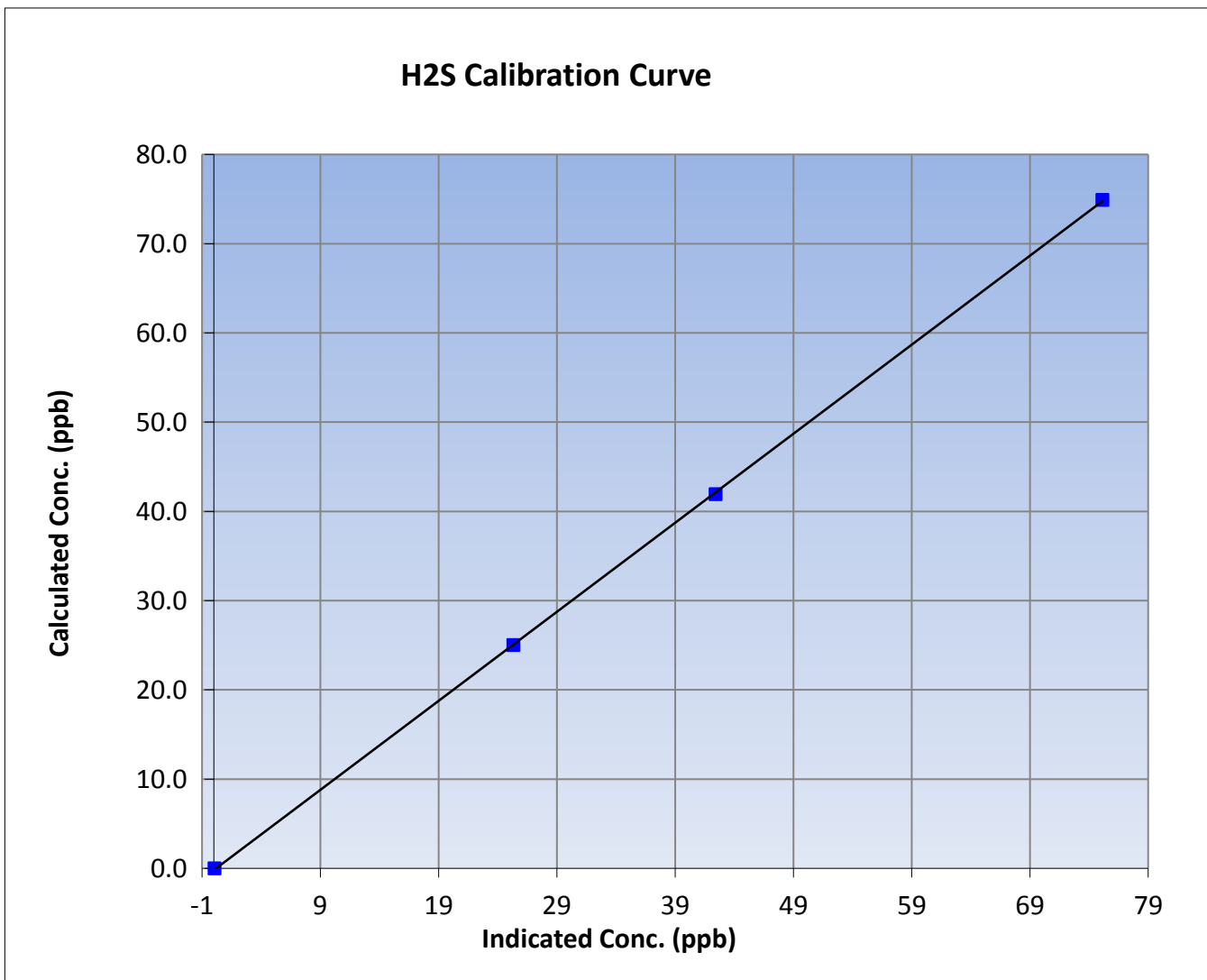
# Wood Buffalo Environmental Association H2S Calibration Report

## Station Information

Calibration Date	October 1, 2015	Previous Calibration	September 15, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	9:00	End Time (MST)	11:40
Analyzer make	TEI 450i	Analyzer serial #	1336160094

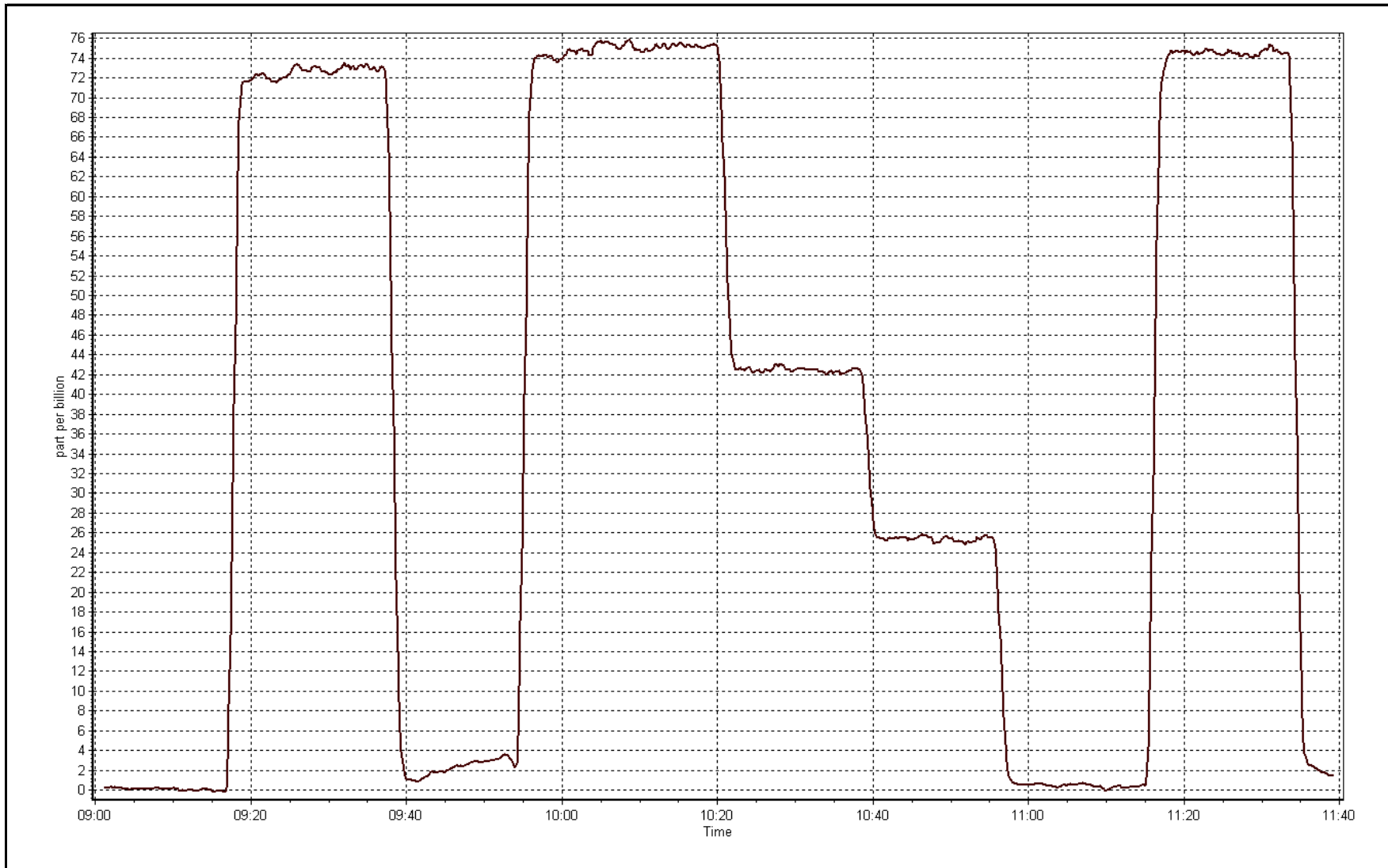
## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999971
74.9	75.1	0.9970		
41.9	42.4	0.9881	Slope	0.997641
25.0	25.3	0.9880		
			Intercept	-0.190068



H2S Calibration Plot

Date: October 1, 2015





# Wood Buffalo Environmental Association THC Calibration Report

### Station Information

Calibration Date	October-02-15	Last Calibration	September-15-15
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	9:50	End Time (MST)	12:20
Gas Cert Reference	LL107926	Cal Gas Expiry Date	29-May-14
CH4 Cal Gas Conc.	515 ppm	CH4 Equiv Conc.	1067.8 ppm
C3H8 Cal Gas Conc.	201 ppm	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11551008
ZAG make/model	Teledyne API 701	Serial Number	4297
DACS make/model	Campbell Scientific CR3000	Serial Number	2635

### Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	8.5	8.5
Analyzer IP address	192.168.1.51		Air or Bypass Press	30.4	30.4
Calculated slope	1.004096	1.003623	Fuel Pressure	19.9	19.9
Calculated intercept	-0.064098	-0.053955	Analyzer Coeff	4.1	4.1
			Analyzer BKG	0.950	0.860

Analyzer make	TEI 51i-LT	Analyzer serial #	1201650671
---------------	------------	-------------------	------------

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.08	----
as found span	5000	58.8	12.56	12.54	1.001
calibrator zero	5000	0.0	0.00	0.03	----
high point	5000	58.8	12.56	12.54	1.001
second point	5000	29.4	6.28	6.36	0.987
third point	5000	14.7	3.14	3.18	0.987
as left zero	5000	0.0	0.00	0.04	----
as left span	5000	58.8	12.56	12.62	0.995
Average Correction Factor					0.992

Corrected As found	12.62	Previous response	12.57	% change	-0.4%
--------------------	-------	-------------------	-------	----------	-------

Notes:

Inlet filter replaced after as founds. Adjusted zero.

Calibration Performed By:

\_\_\_\_\_ Asad Hidayat



# Wood Buffalo Environmental Association THC Calibration Report

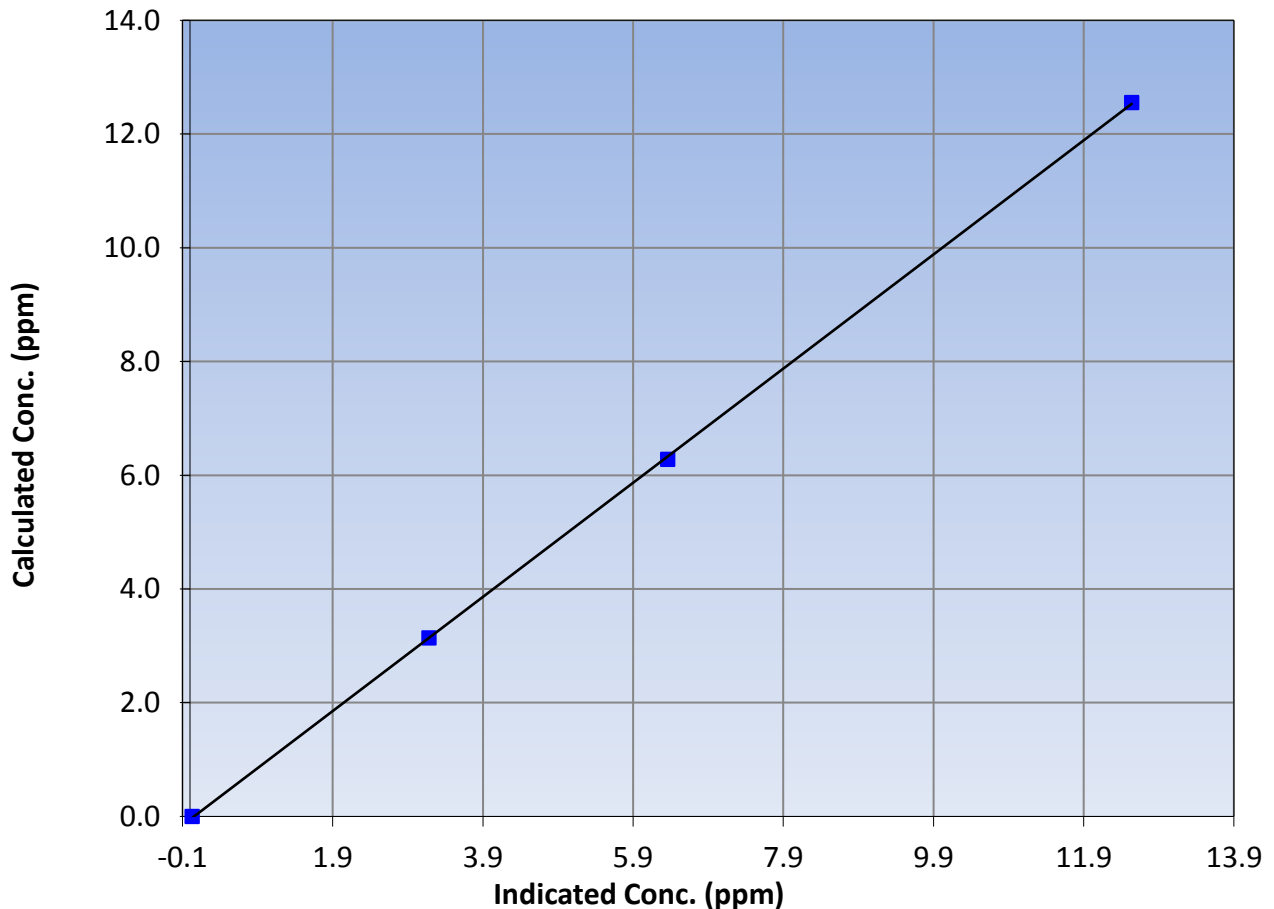
## Station Information

Calibration Date	October 2, 2015	Previous Calibration	September 15, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	9:50	End Time (MST)	12:20
Analyzer make	TEI 51i-LT	Analyzer serial #	1201650671

## Calibration Data

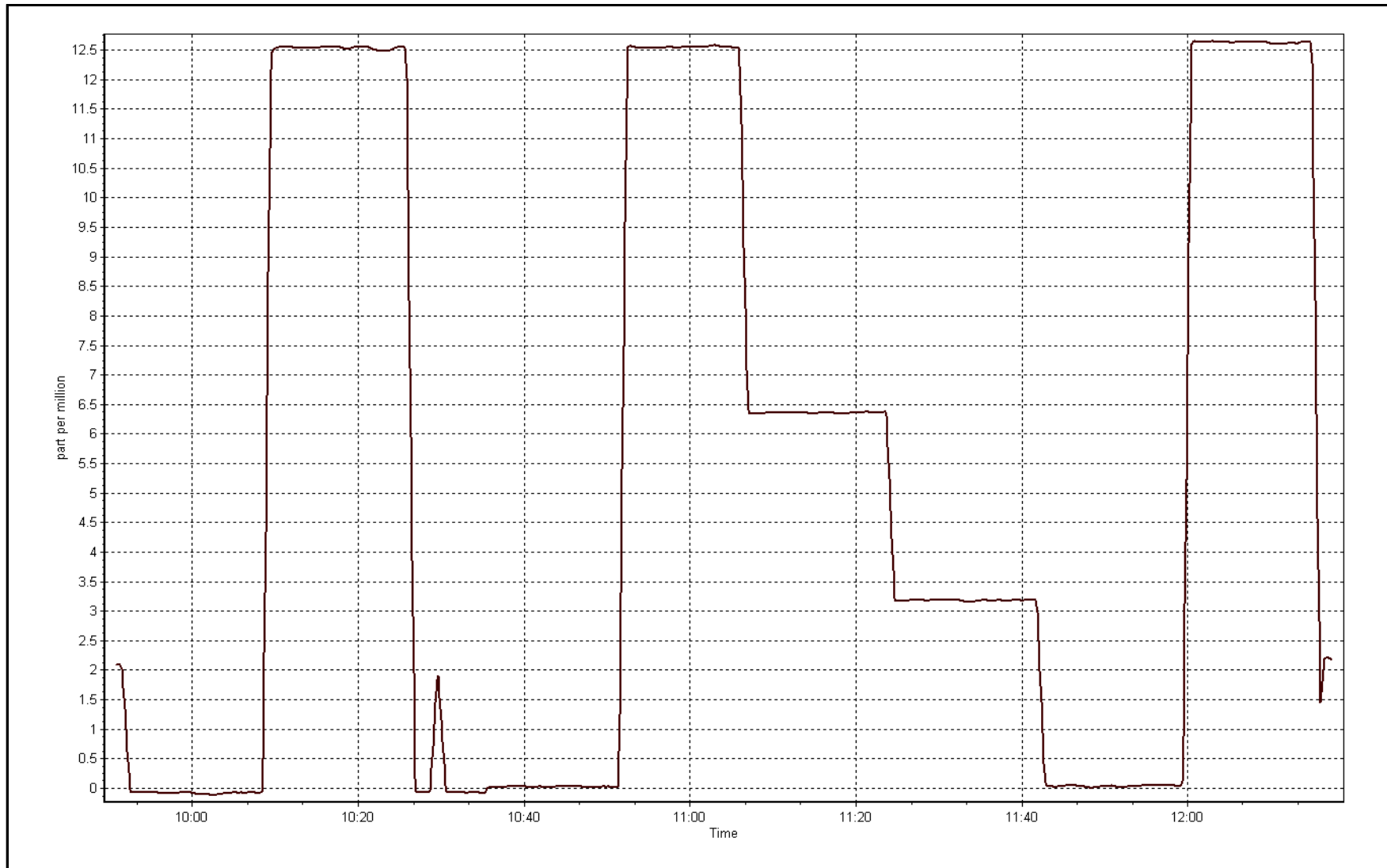
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.03	----	Correlation Coefficient	0.999956
12.56	12.54	1.0013		
6.28	6.36	0.9872	Slope	1.003623
3.14	3.18	0.9872		
			Intercept	-0.053955

**THC Calibration Curve**



THC Calibration Plot

Date: October 2, 2015





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## WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

### CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT

### **AMS 5 MANNIX OCTOBER 2015**

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

November 26, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)  
OCTOBER 2015

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	708	35	36	99.87	75	0	10	0
H2S (ppb) Average	709	35	35	100.00	5	0	1	0
THC (ppm) Average	708	35	36	99.87	6.3	-	3.2	-
Temperature 2 m (C) Average	744	0	0	100.00	25.3	-	16.6	-
Temperature 20 m (C) Average	744	0	0	100.00	25.2	-	17.8	-
Temperature 45 m (C) Average	744	0	0	100.00	24.7	-	18.1	-
Temperature 75 m (C) Average	744	0	0	100.00	24.3	-	18.5	-
Temperature 90 m (C) Average	744	0	0	100.00	24.2	-	18.6	-
Relative Humidity 2 m (%) Average	744	0	0	100.00	97	-	89	-
Relative Humidity 20 m (%) Average	744	0	0	100.00	96	-	88	-
Relative Humidity 45 m (%) Average	744	0	0	100.00	97	-	89	-
Relative Humidity 75 m (%) Average	744	0	0	100.00	98	-	90	-
Relative Humidity 90 m (%) Average	744	0	0	100.00	98	-	91	-
Wind Speed 20 m (km/h) Average	742	0	2	99.73	37	-	21	-
Wind Speed 45 m (km/h) Average	736	0	8	98.92	44	-	27	-
Wind Speed 75 m (km/h) Average	730	0	14	98.12	48	-	29	-
Wind Speed 90 m (km/h) Average	729	0	15	97.98	49	-	31	-
Wind Direction 20 m (deg) Average	742	0	2	99.73	-	-	-	-
Wind Direction 45 m (deg) Average	736	0	8	98.92	-	-	-	-
Wind Direction 75 m (deg) Average	730	0	14	98.12	-	-	-	-
Wind Direction 90 m (deg) Average	729	0	15	97.98	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	742	0	2	99.73	1	-	0.4	-
Vertical Wind Speed 45 m (km/h) Average	736	0	8	98.92	1.7	-	0.8	-
Vertical Wind Speed 75 m (km/h) Average	730	0	14	98.12	1.3	-	0.3	-
Vertical Wind Speed 90 m (km/h) Average	729	0	15	97.98	4.5	-	2.9	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)  
OCTOBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	1.8	6	-	0	0	0	0	1	4	75
H2S (ppb) Average	709	0.5	1	-	0	0	0	0	1	1	5
THC (ppm) Average	708	2.36	0.4	-	2	2.1	2.1	2.2	2.4	2.7	6.3
Temperature 2 m (C) Average	744	5.76	5.5	-	-4.1	-0.3	1.5	4.8	9.1	13.2	25.3
Temperature 20 m (C) Average	744	6.04	5.5	-	-2.8	0	1.7	5	9.2	13.7	25.2
Temperature 45 m (C) Average	744	6.04	5.5	-	-3	0	1.6	5.1	9.1	14	24.7
Temperature 75 m (C) Average	744	6	5.6	-	-2.7	-0.1	1.5	5.1	9	13.9	24.3
Temperature 90 m (C) Average	744	5.99	5.6	-	-2.8	-0.1	1.5	5.1	8.9	13.8	24.2
Relative Humidity 2 m (%) Average	744	69.8	18	-	24	42	56	75	85	91	97
Relative Humidity 20 m (%) Average	744	67.7	18	-	22	40	55	71	83	88	96
Relative Humidity 45 m (%) Average	744	67.5	18	-	22	39	55	71	83	88	97
Relative Humidity 75 m (%) Average	744	67.1	18	-	22	39	53	70	83	89	98
Relative Humidity 90 m (%) Average	744	67.2	18	-	22	39	53	70	83	89	98
Wind Speed 20 m (km/h) Average	742	11.7	7	-	0	4	7	10	16	22	37
Wind Speed 45 m (km/h) Average	736	15.5	8	-	1	5	9	15	21	27	44
Wind Speed 75 m (km/h) Average	730	17.4	10	-	0	5	10	17	25	31	48
Wind Speed 90 m (km/h) Average	729	18.9	10	-	1	5	11	18	27	32	49
Wind Direction 20 m (deg) Average	742	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	736	-	-	-	-	-	-	-	-	-	-
Wind Direction 75 m (deg) Average	730	-	-	-	-	-	-	-	-	-	-
Wind Direction 90 m (deg) Average	729	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	742	0.02	0.4	-	-1.2	-0.6	-0.3	0.1	0.4	0.5	1
Vertical Wind Speed 45 m (km/h) Average	736	0.04	0.7	-	-2	-0.9	-0.5	0	0.6	1	1.7
Vertical Wind Speed 75 m (km/h) Average	730	0.09	0.4	-	-1.6	-0.3	-0.1	0.1	0.3	0.5	1.3
Vertical Wind Speed 90 m (km/h) Average	729	0.73	1	-	-1.8	-0.3	0.2	0.5	1.1	2.1	4.5

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)  
OCTOBER 2015

OPERATIONAL NOTES

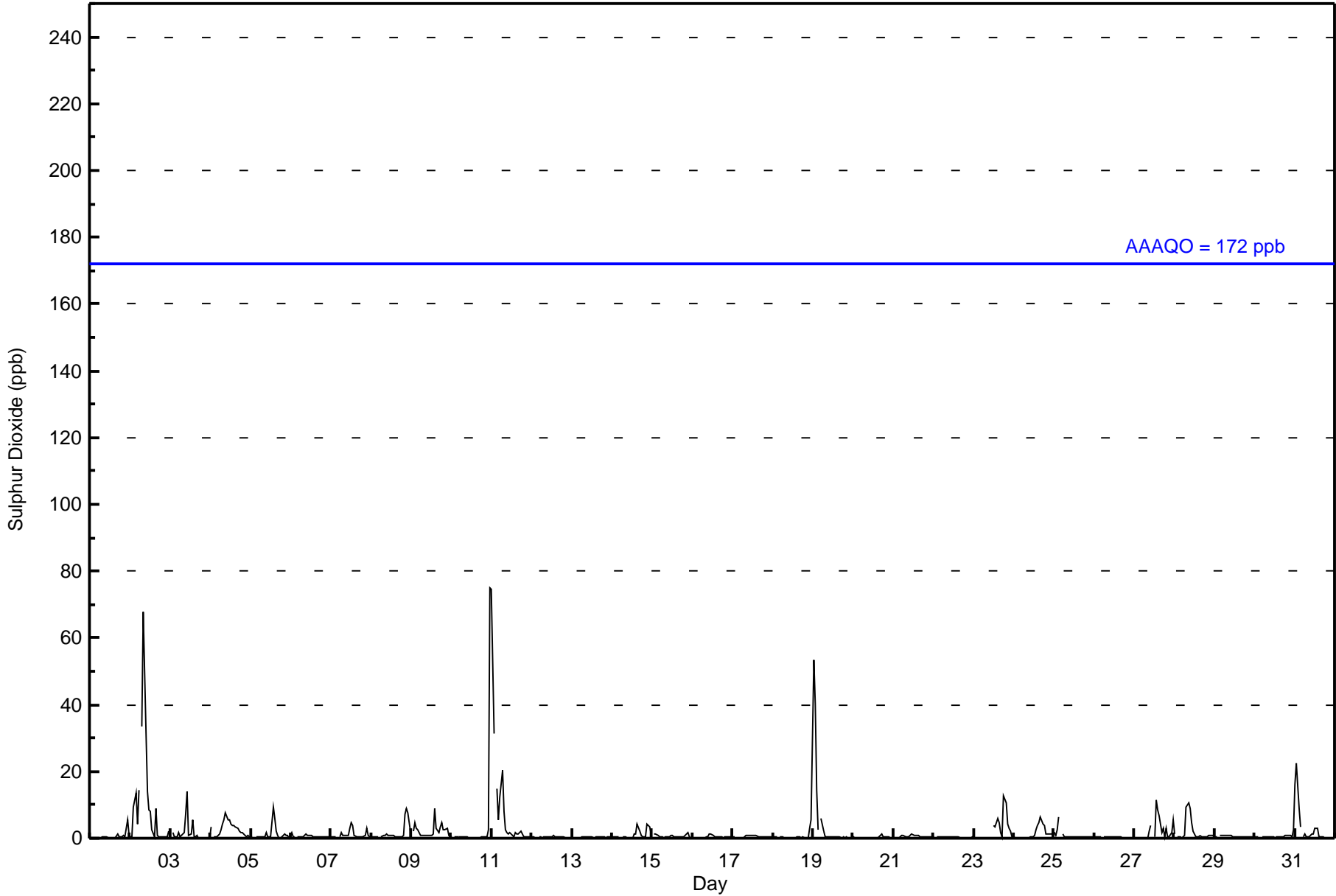
Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, THC	27 Oct 2015 12:00	27 Oct 2015 12:00	1	Maintenance - cleaned glass manifold
Wind Speed. Wind Direction, Vertical Wind Speed 20 m	27 Oct 2015 00:00	27 Oct 2015 01:00	2	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 45 m	26 Oct 2015 23:00	27 Oct 2015 06:00	8	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 75 m	25 Oct 2015 03:00	25 Oct 2015 06:00	4	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 75 m	26 Oct 2015 23:00	27 Oct 2015 08:00	10	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 90 m	03 Oct 2015 06:00	03 Oct 2015 08:00	3	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 90 m	25 Oct 2015 02:00	25 Oct 2015 05:00	4	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 90 m	25 Oct 2015 09:00	25 Oct 2015 09:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 90 m	26 Oct 2015 23:00	27 Oct 2015 05:00	7	Flat line in sensor output signal - Sensor frozen



Summary of Hour Averages

Mannix - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																																							
Maximum Value: 75 ppb on Oct 11 00:00										Maximum Daily Average: 9.7 ppb on Oct 2										Hours of Data: 708																																													
Minimum Value: 0 ppb on Oct 27 02:00										Minimum Daily Average: 0.2 ppb on Oct 13										Hours of Missing Data: 36																																													
Maximum Diurnal Average: 6.1 ppb at hour 1										Minimum Diurnal Average: 0.8 ppb at hour 5										Hours of Calibration: 35																																													
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> = 30										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	1	0	0	0	0	0	0	0	1	0	0	1	1	1	6	1	0.6	6																																							
2-Oct	0	0	9	14	4	15	Z	33	68	31	14	9	8	2	0	9	1	1	1	1	0	0	0	2	9.7	68																																							
3-Oct	Z	2	0	0	1	2	1	1	2	7	14	1	1	6	0	0	1	0	0	0	0	0	0	0	1.7	14																																							
4-Oct	3	Z	1	0	1	1	3	4	5	8	6	6	4	4	3	3	2	1	1	1	1	1	1	1	2.8	8																																							
5-Oct	1	0	Z	0	0	0	0	0	0	1	0	0	0	9	6	2	1	0	0	1	1	1	1	0	1.2	9																																							
6-Oct	2	1	0	Z	0	1	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.6	2																																							
7-Oct	0	0	0	0	Z	1	2	1	1	1	1	3	5	4	1	1	0	1	1	0	1	3	1	1	1.2	5																																							
8-Oct	0	0	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	0	1	0	1	7	9	8	2	1.6	9																																							
9-Oct	Z	2	5	3	2	1	1	1	1	1	1	1	1	1	9	3	2	3	5	2	3	3	1	1	2.2	9																																							
10-Oct	1	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	75	3.6	75																																							
11-Oct	74	31	Z	15	5	12	20	8	3	2	1	2	1	1	2	1	1	2	1	0	0	0	0	0	8.0	74																																							
12-Oct	0	0	0	Z	0	0	0	1	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.4	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	1	1	4	2	1	0	0	1	4	3	1	1.0	4																																							
15-Oct	Z	1	1	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	1	1	2	0	0	0.6	2																																							
16-Oct	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1																																							
17-Oct	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	0	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	3	6	0.6	6																																							
19-Oct	53	40	15	2	Z	6	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.4	53																																							
20-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0.3	1																																							
21-Oct	Z	0	0	0	0	1	1	1	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.5	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	0	0.3	0																																							
23-Oct	0	0	Z	0	0	0	0	0	0	C	C	C	C	4	4	6	5	1	0	13	11	4	3	2	0	2.8	13																																						
24-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	1	3	4	5	6	4	4	1	1	1	1	2	1.5	6																																							
25-Oct	2	1	2	6	Z	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.8	6																																							
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	0	0	0	0	0	0	2	4	M	1	11	8	7	2	3	0	3	1	1	2	5	2.2	11																																							
28-Oct	1	Z	0	0	0	0	1	9	11	9	5	2	1	0	1	1	1	0	0	1	1	1	1	1	2.1	11																																							
29-Oct	1	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.5	1																																							
30-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	2	0.5	2																																							
31-Oct	16	23	9	3	Z	0	1	1	0	1	1	1	3	3	0	0	0	0	0	0	0	0	0	0	2.8	23																																							
6.1										4.1										1.8		1.9		0.8		1.7		1.2		2.1		3.3		2.4		1.8		1.2		1.2		1.8		1.6		1.5		0.9		0.8		1.0		0.9		0.9		1.1		1.2		3.3		Diurnal Average	
74										40										15		15		5		15		20		33		68		31		14		9		8		11		9		9		6		4		13		11		7		9		8		75		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**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Mannix - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	686	96.89	96.89
11 - 20	13	1.84	98.73
21 - 60	6	0.85	99.58
61 - 110	3	0.42	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Mannix - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	32	54	15	12	10	20	118	111	30	20	27	59	54	45	28	50	685
11 - 20	7	3	0	0	0	0	0	1	0	0	0	0	0	1	0	1	13
21 - 60	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
61 - 110	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
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>	48	57	15	12	10	20	118	112	30	20	27	59	54	46	28	51	707

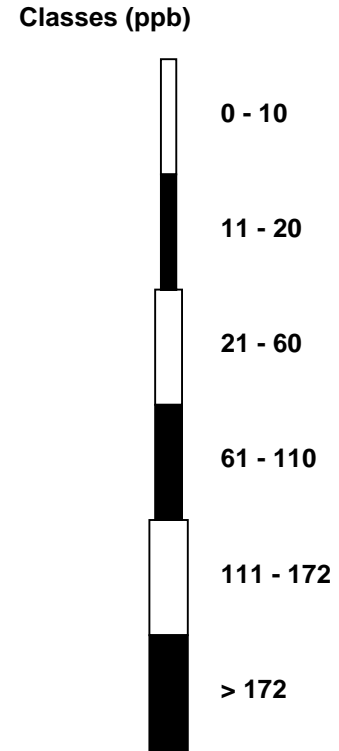
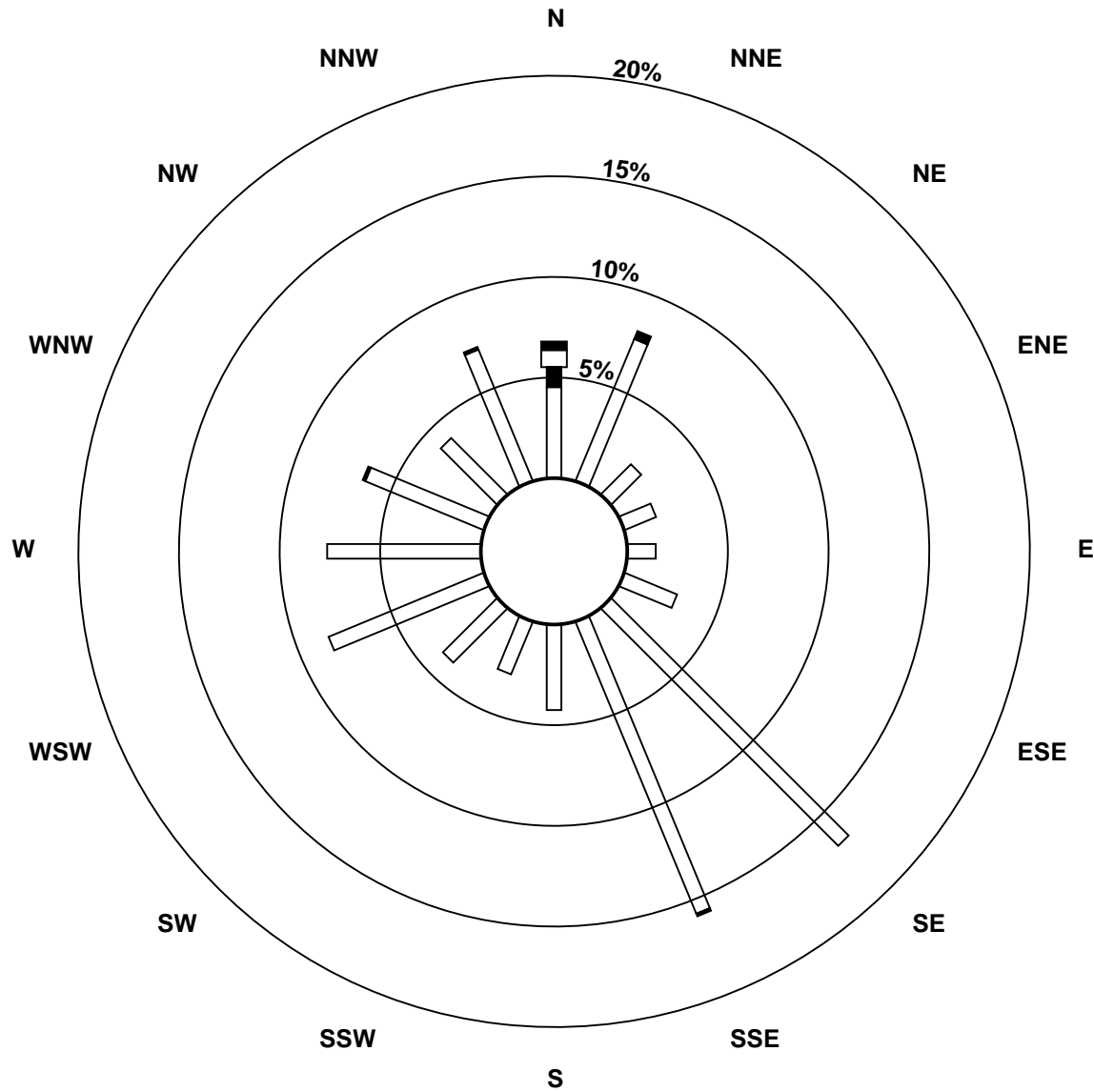
Total Number of Valid Hours: 707

Total Number of Hours: 744



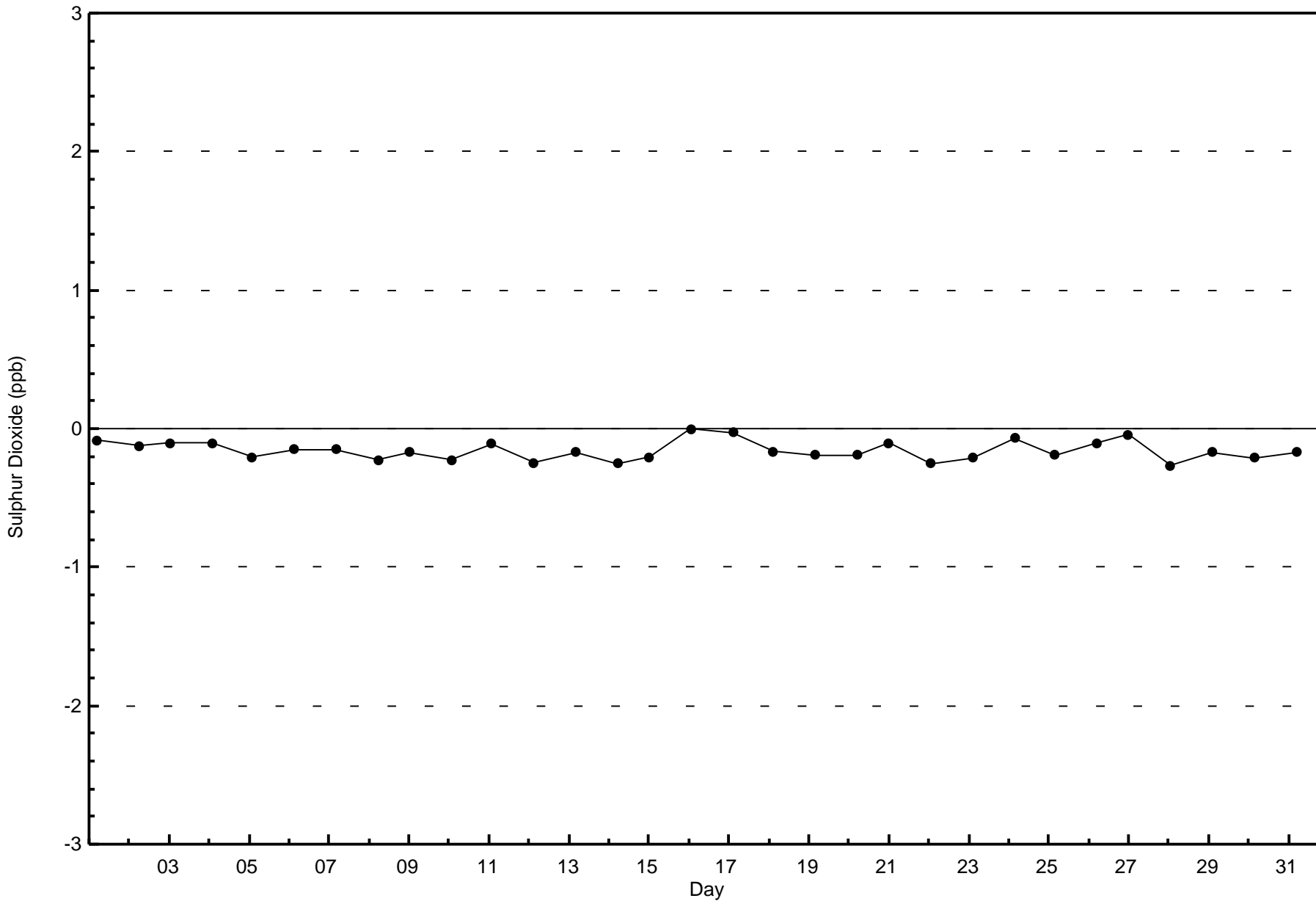
Wood Buffalo Environmental Association  
Wind Rose Oct 2015

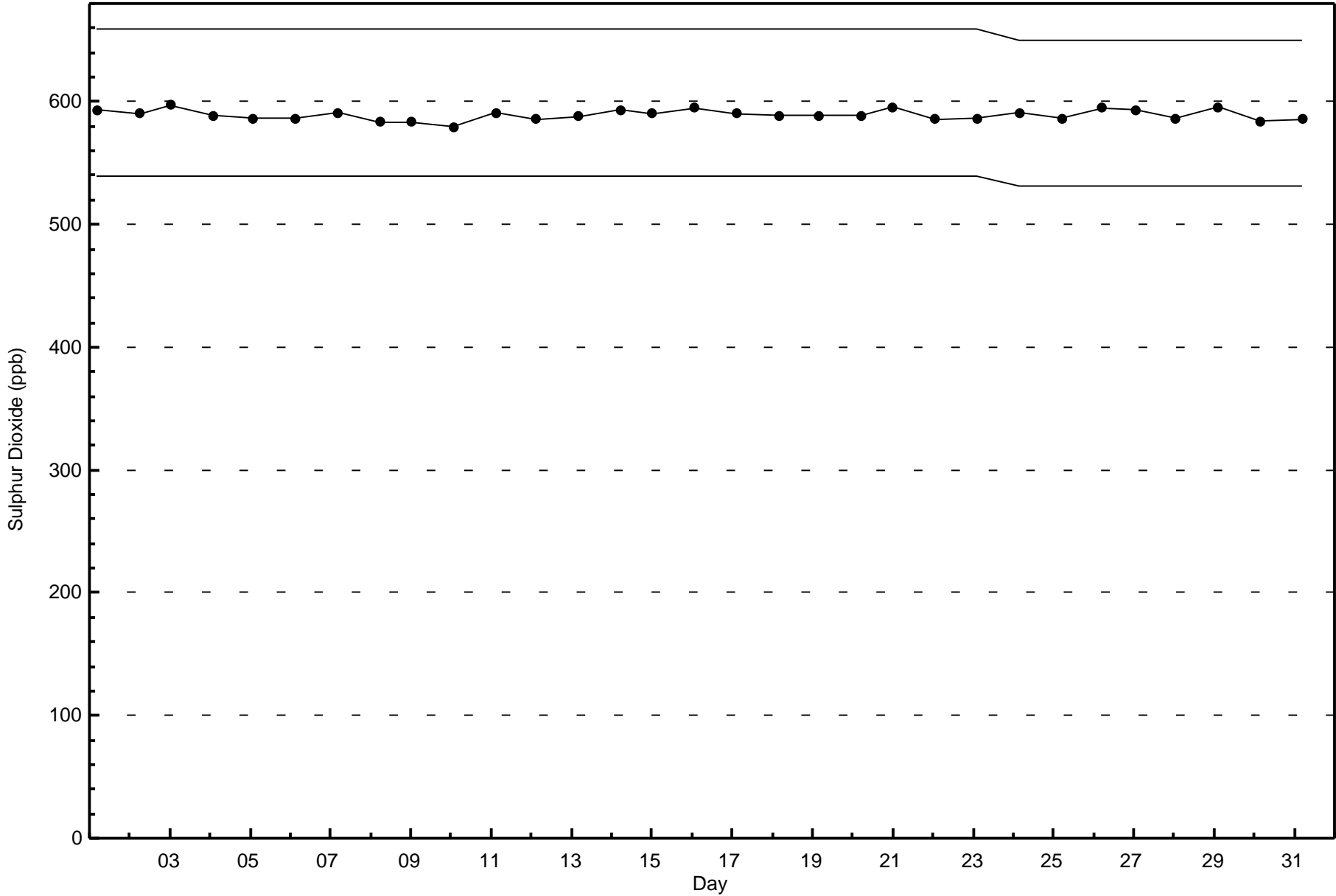
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Mannix (AMS 5)



Total Number of Valid Hours: 707









Summary of Hour Averages

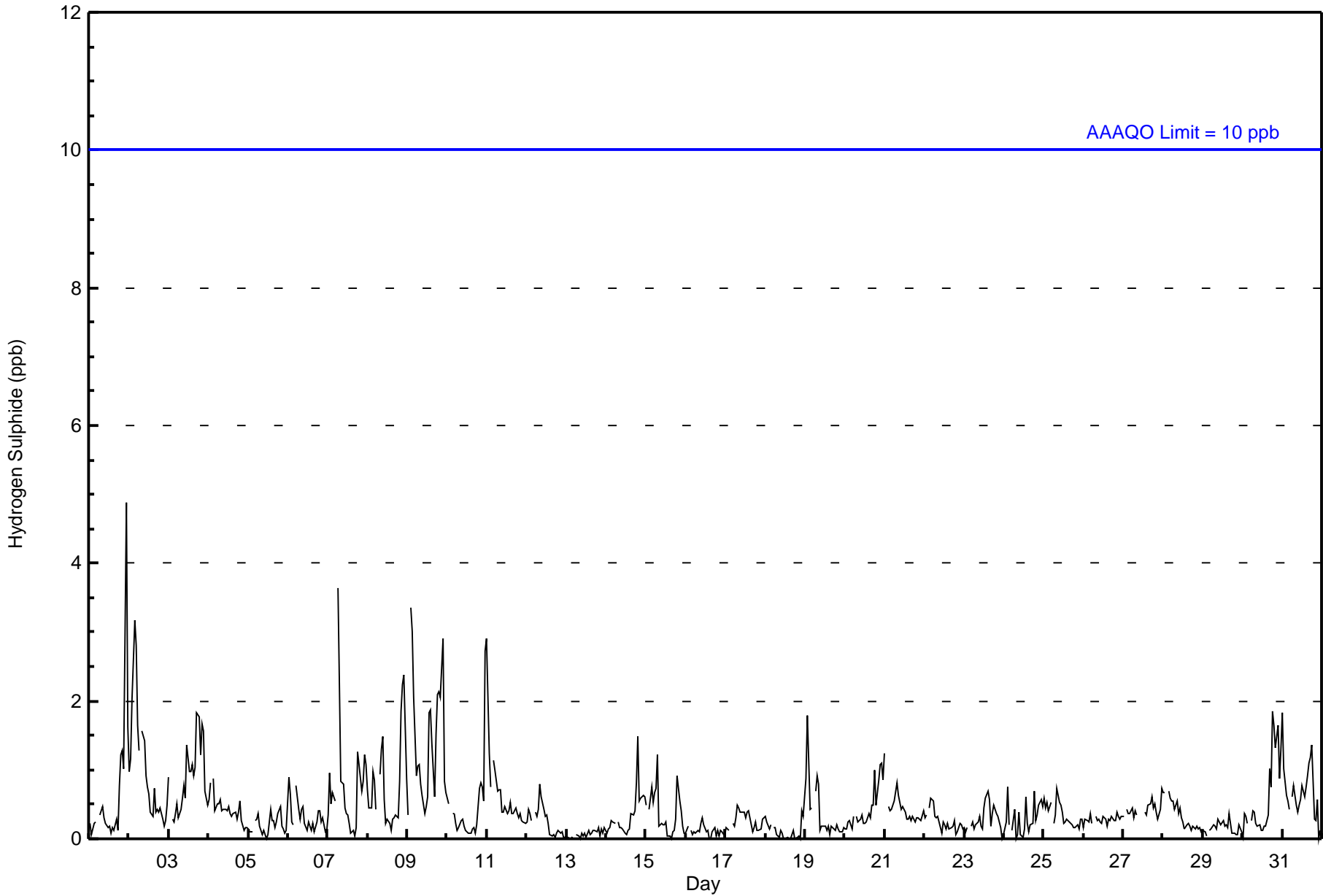
Mannix - October 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 5 ppb on Oct 1 23:00	Maximum Daily Average: 1.4 ppb on Oct 9		Hours of Data:	709
Minimum Value: 0 ppb on Oct 5 12:00	Minimum Daily Average: 0.1 ppb on Oct 13		Hours of Missing Data:	35
Maximum Diurnal Average: 0.6 ppb at hour 4	Minimum Diurnal Average: 0.3 ppb at hour 12		Hours of Calibration:	35
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> = 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	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	5	2	0.6	5	
2-Oct	1	1	2	3	3	2	1	Z	2	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	1.0	3
3-Oct	1	Z	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	2	2	1	2	2	1	0	0.9	2	
4-Oct	1	1	Z	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.4	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	0.2	0	
6-Oct	1	1	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	
7-Oct	0	1	1	1	1	Z	4	2	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0.8	4	
8-Oct	1	0	0	1	1	0	Z	1	1	1	1	0	0	0	0	0	0	0	0	1	2	2	2	1	0.8	2	
9-Oct	0	Z	3	3	2	1	1	1	1	1	0	0	1	2	2	1	1	2	2	2	2	3	1	1	1.4	3	
10-Oct	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	3	0.4	3	
11-Oct	3	1	1	Z	1	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.6	3	
12-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	0.2	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	0.1	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	1	1	0.3	1	
15-Oct	0	Z	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.4	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	0	0	0	0	0	0	0	0	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	0.1	0	
19-Oct	1	2	1	0	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2	
20-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0.4	1	
21-Oct	1	Z	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
22-Oct	0	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
23-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0.3	1	
24-Oct	0	0	1	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0.3	1	
25-Oct	1	0	1	0	1	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
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	Z	0	0	0	0	0	0	0	C	C	C	C	0	0	0	1	1	0	1	0	0	0	1	0.4	1	
28-Oct	1	1	Z	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	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	0.2	0	
30-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	1	2	1	1	0.6	2	
31-Oct	2	1	1	1	0	Z	1	1	0	0	0	1	1	1	1	1	1	1	1	1	0	0	1	0	0.7	2	

0.5	0.5	0.5	0.6	0.6	0.6	0.5	0.6	0.5	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.5	0.6	0.5	0.6	0.6	0.5	Diurnal Average
3	2	3	3	3	3	2	4	2	2	1	1	1	1	2	2	1	1	2	2	2	2	3	5	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 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	700	98.73	98.73
3 - 4	8	1.13	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: 709

Total Number of Hours: 744



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

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Mannix - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	45	55	16	11	9	20	119	109	33	21	27	60	57	41	26	49	698
3 - 4	4	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2	8
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	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>	49	56	16	11	10	20	119	109	33	21	27	60	57	42	26	51	707

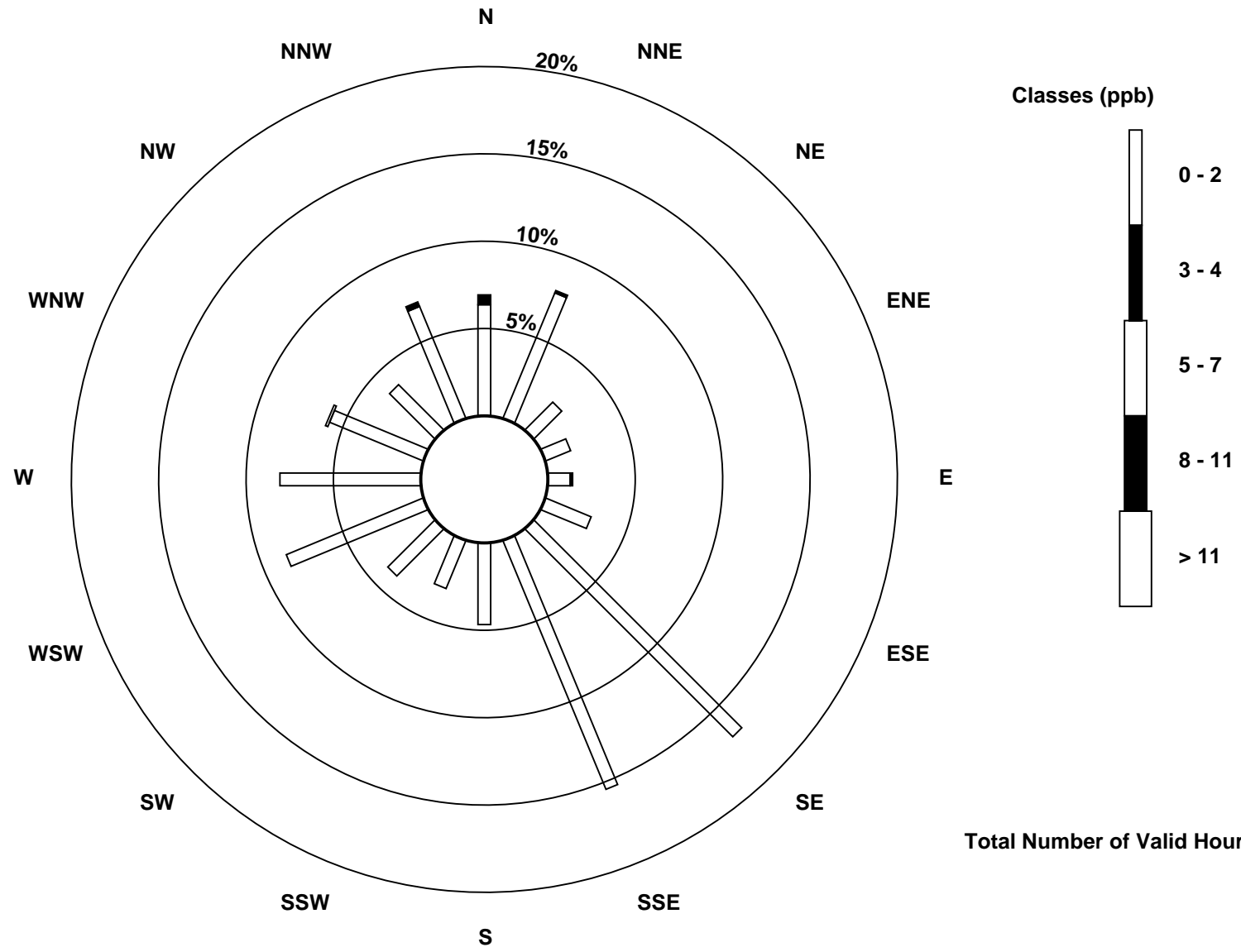
Total Number of Valid Hours: 707

Total Number of Hours: 744

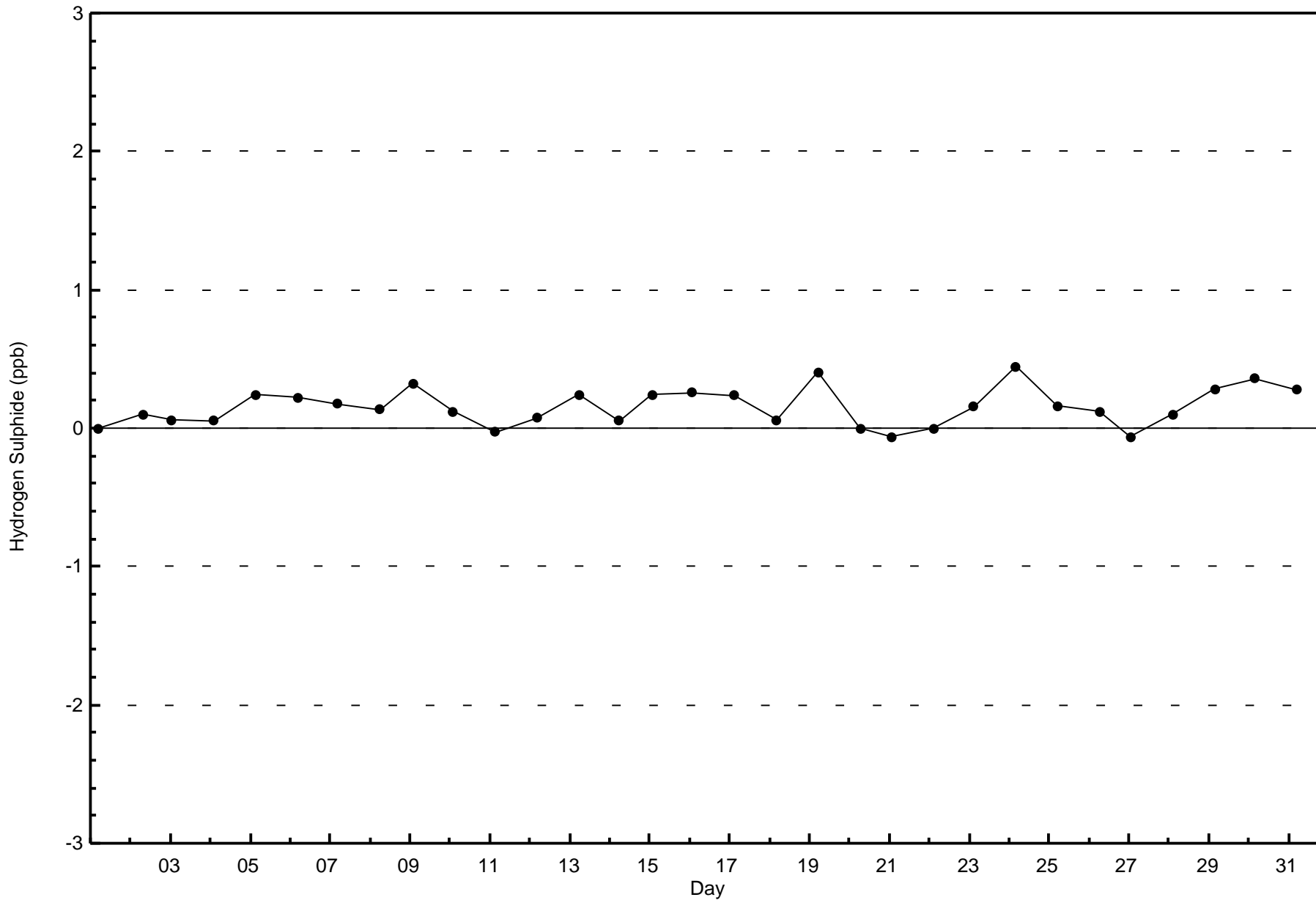


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

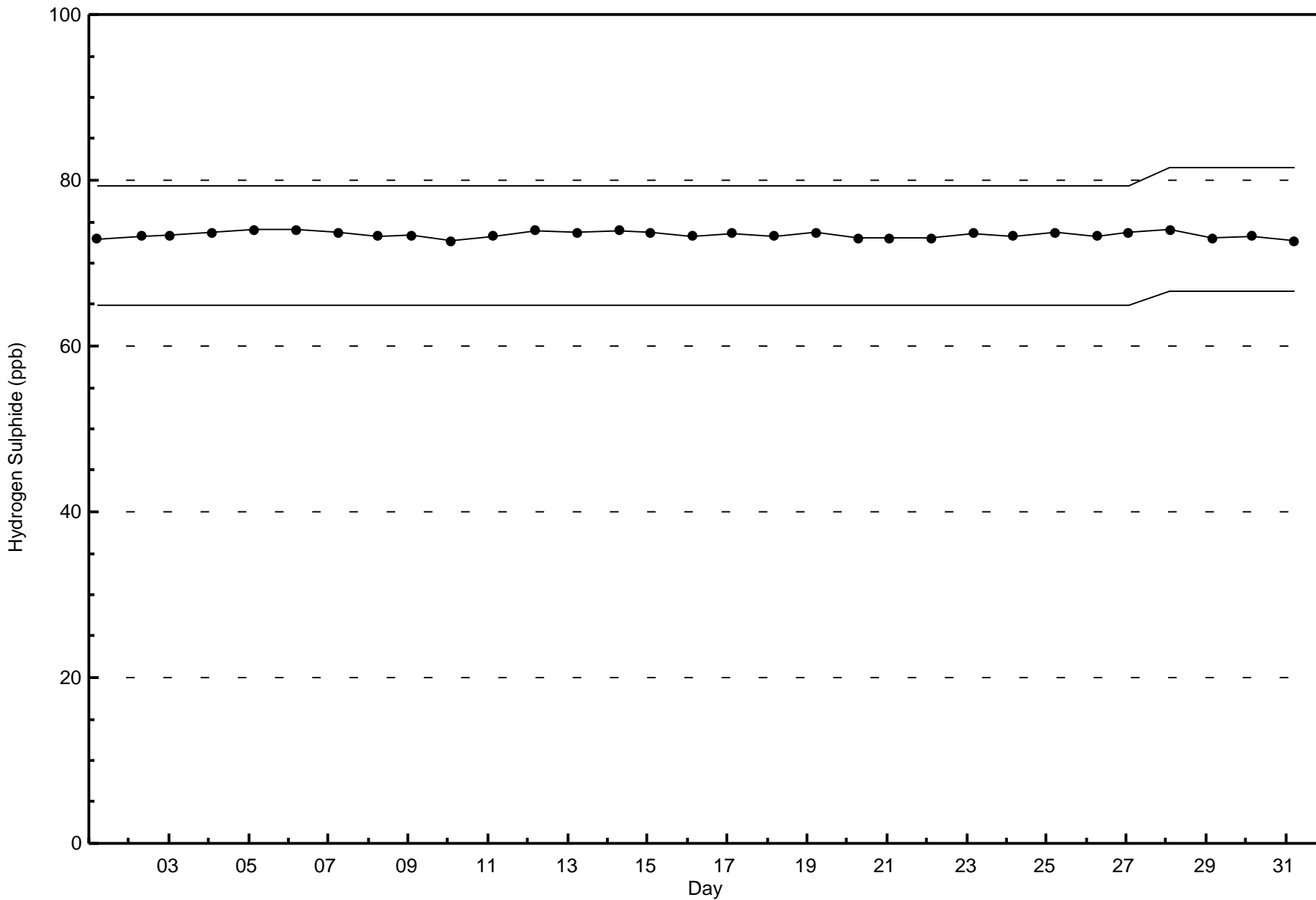
Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Mannix (AMS 5)



Total Number of Valid Hours: 707

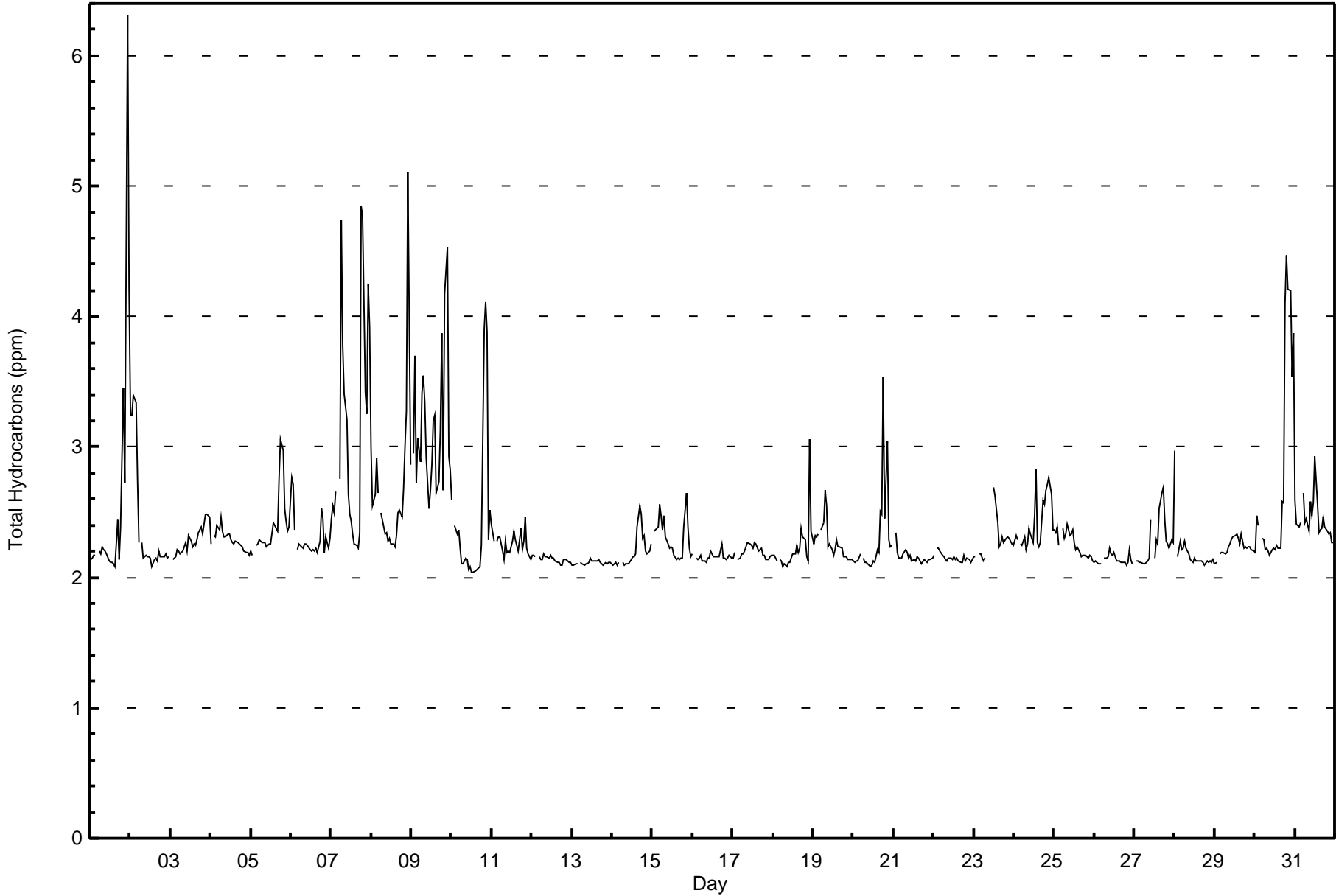








Maximum Value: 6.3 ppm on Oct 1 23:00		Maximum Daily Average: 3.2 ppm on Oct 9		Hours in Service: 744																						
Minimum Value: 2.0 ppm on Oct 10 14:00		Minimum Daily Average: 2.1 ppm on Oct 13		Hours of Data: 708																						
Maximum Diurnal Average: 2.6 ppm at hour 23		Minimum Diurnal Average: 2.2 ppm at hour 16		Hours of Missing Data: 36																						
Monthly Average: 2.36 ppm		Percentiles: P <sub>1</sub> = 2.1 P <sub>10</sub> = 2.1 Q <sub>1</sub> = 2.1 Median = 2.2 Q <sub>3</sub> = 2.4 P <sub>90</sub> = 2.7 P <sub>99</sub> = 4.4		Hours of Calibration: 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	2.1	2.1	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.4	2.1	2.4	2.9	3.4	2.7	6.3	4.2	2.6	6.3
2-Oct	3.2	3.2	3.4	3.3	2.7	2.3	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.4	3.4
3-Oct	Z	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.3	2.2	2.3	2.2	2.3	2.3	2.4	2.3	2.4	2.5	2.5	2.5	2.3	2.5
4-Oct	2.3	Z	2.3	2.3	2.4	2.4	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5
5-Oct	2.2	2.2	Z	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.4	2.4	2.4	2.4	2.8	3.1	3.0	2.5	2.4	2.4	2.4	2.4	3.1
6-Oct	2.8	2.7	2.4	Z	2.2	2.3	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5	2.4	2.2	2.3	2.2	2.3	2.3	2.8
7-Oct	2.4	2.5	2.5	2.7	Z	2.8	4.7	3.8	3.4	3.2	2.6	2.5	2.4	2.3	2.3	2.2	2.2	2.3	4.9	4.8	3.4	3.3	4.3	3.9	3.1	4.9
8-Oct	3.0	2.5	2.6	2.9	2.7	Z	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.5	2.5	2.5	2.7	3.0	3.3	5.1	2.9	2.7	5.1
9-Oct	Z	3.0	3.7	2.7	3.1	2.9	3.4	3.5	3.3	2.9	2.5	2.7	2.9	3.2	3.2	2.6	2.7	3.1	3.9	2.7	4.2	4.5	2.9	2.8	3.2	4.5
10-Oct	2.6	Z	2.4	2.3	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.3	3.9	4.1	3.9	2.3	2.5	4.1
11-Oct	2.4	2.3	Z	2.3	2.3	2.3	2.2	2.1	2.3	2.2	2.2	2.2	2.3	2.4	2.3	2.2	2.2	2.4	2.2	2.3	2.5	2.2	2.2	2.1	2.3	2.5
12-Oct	2.2	2.2	2.2	Z	2.2	2.1	2.1	2.2	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	2.2
13-Oct	2.1	2.1	2.1	2.1	Z	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	2.1	2.1	2.1	2.1	2.2
14-Oct	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.4	2.6	2.5	2.3	2.2	2.2	2.2	2.3	2.2	2.6
15-Oct	Z	2.4	2.4	2.4	2.6	2.5	2.4	2.5	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.4	2.6	2.4	2.2	2.2	2.3	2.6
16-Oct	2.2	Z	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3
17-Oct	2.1	2.2	Z	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.3
18-Oct	2.2	2.2	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.3	2.3	2.2	2.1	3.1	2.4	2.2	3.1
19-Oct	2.3	2.3	2.3	2.3	Z	2.4	2.4	2.7	2.5	2.2	2.3	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.3	2.7
20-Oct	2.1	2.1	2.1	2.1	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.5	2.5	3.5	2.4	3.0	2.3	2.2	2.2	2.3	3.5
21-Oct	Z	2.3	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.2	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	2.3
22-Oct	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2
23-Oct	2.2	2.2	Z	2.2	2.2	2.1	2.1	2.1	2.1	C	C	C	C	2.7	2.6	2.4	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.7
24-Oct	2.2	2.3	2.3	Z	2.3	2.2	2.3	2.2	2.3	2.4	2.3	2.3	2.3	2.5	2.8	2.3	2.2	2.3	2.6	2.6	2.7	2.7	2.8	2.6	2.4	2.8
25-Oct	2.4	2.3	2.4	2.3	Z	2.4	2.3	2.3	2.4	2.3	2.3	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.3	2.4
26-Oct	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2
27-Oct	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4	M	2.1	2.3	2.3	2.5	2.6	2.7	2.4	2.3	2.3	2.2	2.3	2.3	2.3	2.7
28-Oct	3.0	Z	2.2	2.3	2.2	2.2	2.3	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	2.1	2.1	2.2	3.0
29-Oct	2.1	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3
30-Oct	2.2	2.5	2.4	Z	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.6	2.6	4.1	4.5	4.2	4.2	3.5	3.9	2.8	4.5
31-Oct	2.6	2.4	2.4	2.4	Z	2.6	2.4	2.5	2.4	2.6	2.5	2.6	2.9	2.6	2.3	2.4	2.4	2.5	2.4	2.4	2.3	2.3	2.3	2.3	2.4	2.9
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan      C - Calibration      M - Maintenance																										





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

**Total Hydrocarbons (THC) - ppm**  
**Mannix - October 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	3	0.42	0.42
2.1 - 3.0	663	93.64	94.07
3.1 - 10.0	42	5.93	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**  
**Mannix - October 2015**

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	3	0	0	0	0	3
2.1 - 3.0	46	57	13	11	9	20	118	111	29	19	26	53	45	42	21	42	662
3.1 - 10.0	2	0	2	1	1	0	0	1	1	1	1	3	9	4	7	9	42
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	48	57	15	12	10	20	118	112	30	20	27	59	54	46	28	51	707

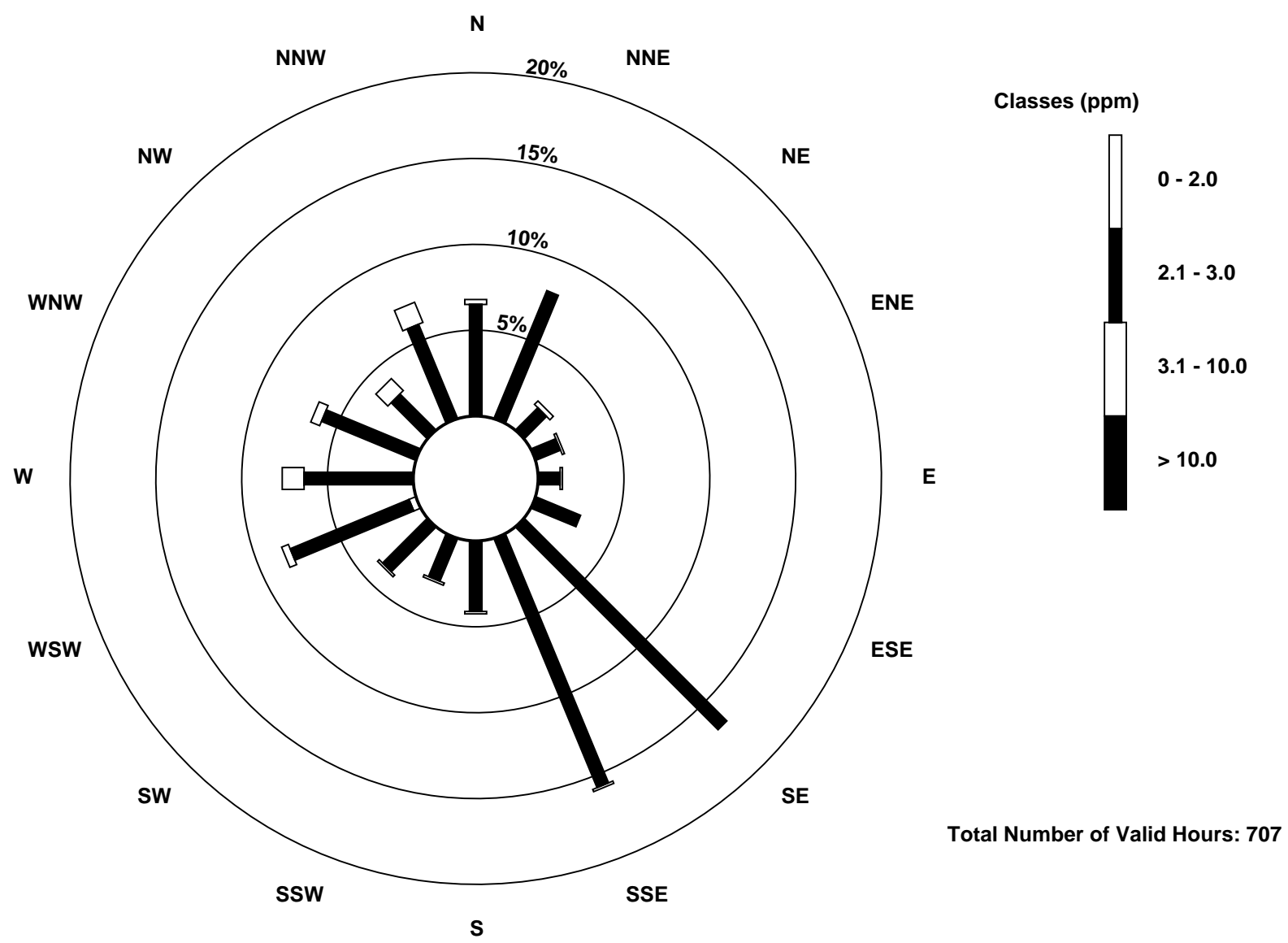
Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Total Hydrocarbons (THC) - ppm  
Mannix (AMS 5)



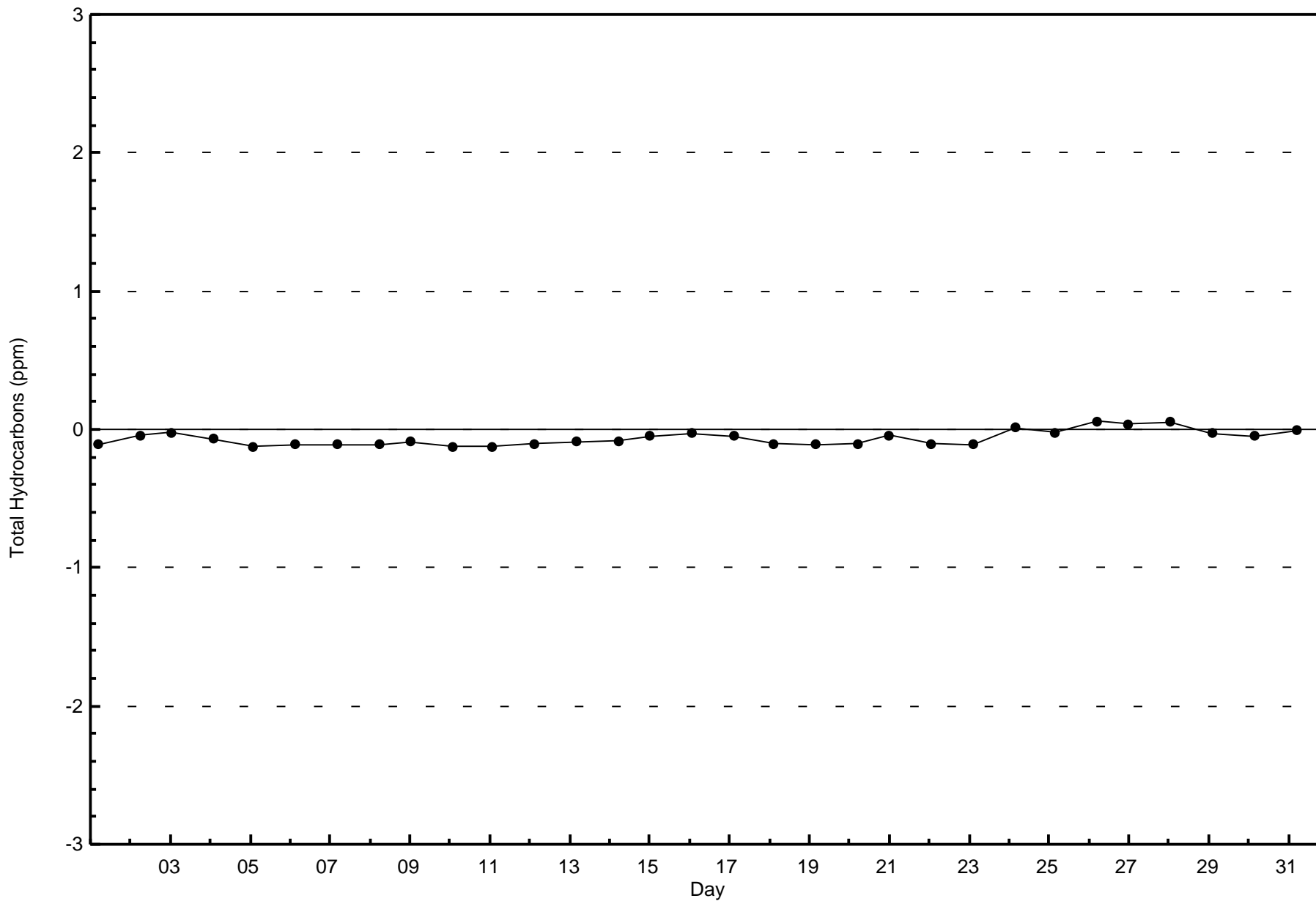


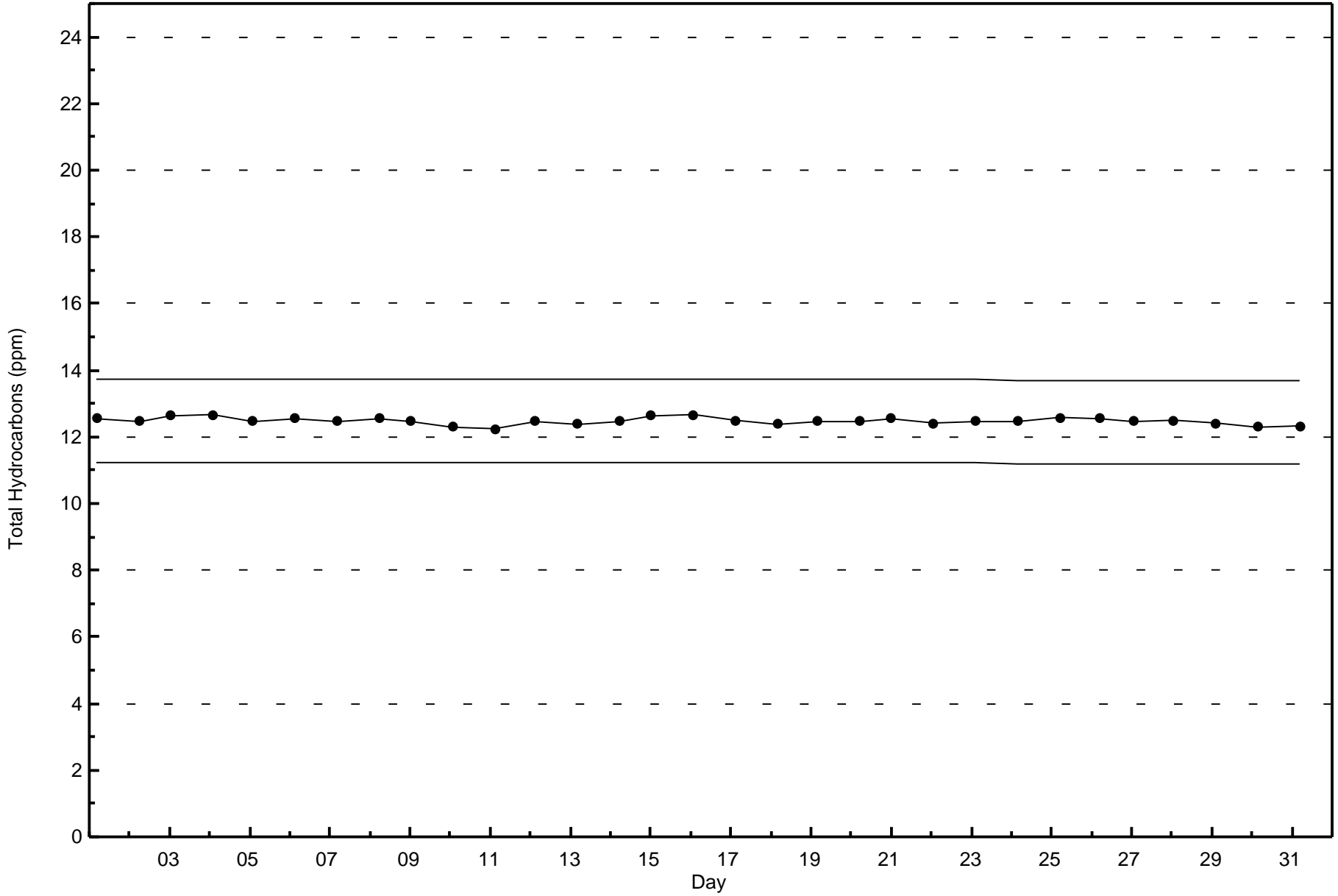
Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Mannix - October 2015

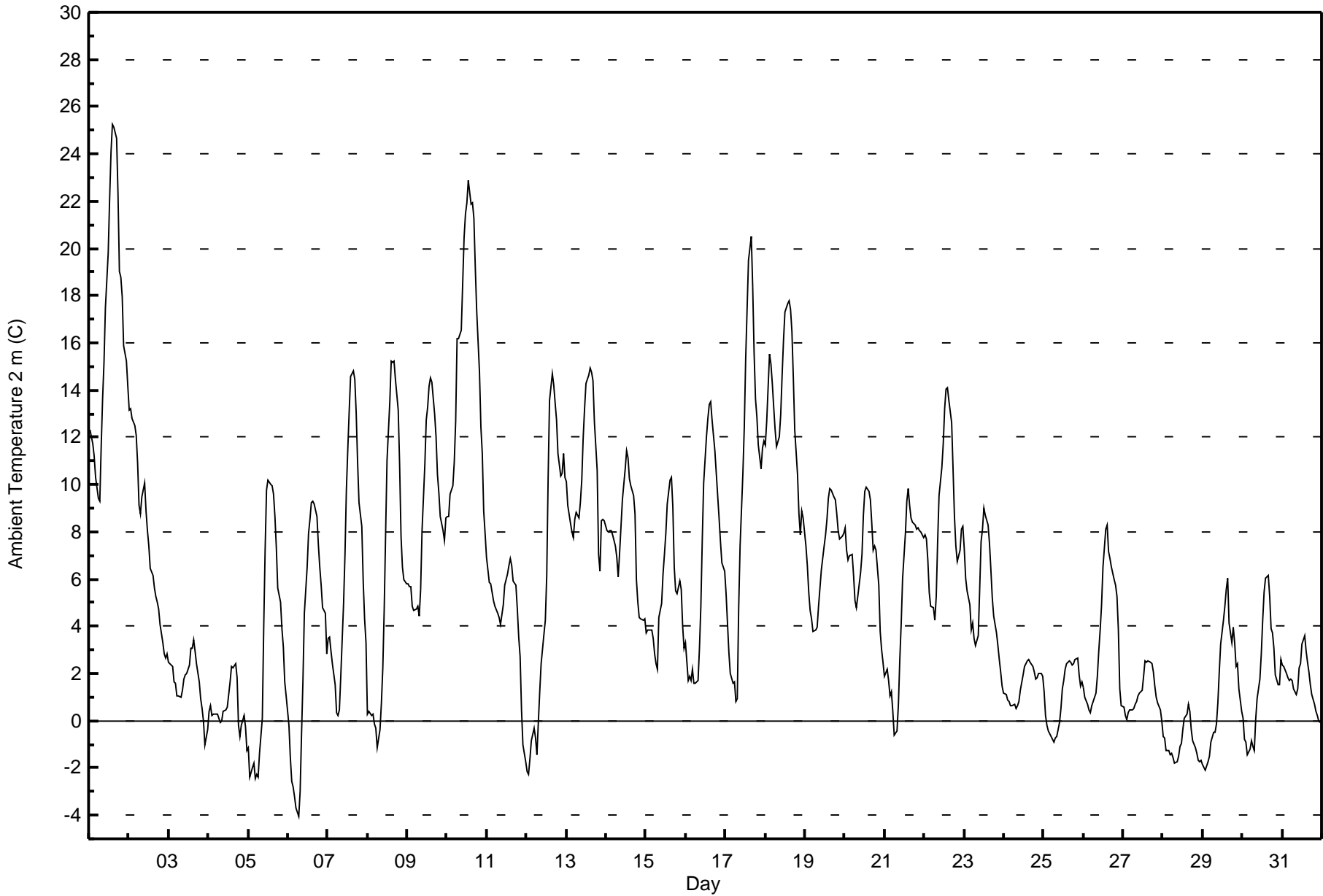








Maximum Value: 25.3 C on Oct 1 15:00		Maximum Daily Average: 16.6 C on Oct 1		Hours in Service: 744																																												
Minimum Value: -4.1 C on Oct 6 07:00		Minimum Daily Average: -1.0 C on Oct 28		Hours of Data: 744																																												
Maximum Diurnal Average: 10.0 C at hour 15		Minimum Diurnal Average: 2.7 C at hour 7		Hours of Missing Data: 0																																												
Monthly Average: 5.76 C		Percentiles: P <sub>1</sub> = -2.4 P <sub>10</sub> = -0.3 Q <sub>1</sub> = 1.5 Median = 4.8 Q <sub>3</sub> = 9.1 P <sub>90</sub> = 13.2 P <sub>99</sub> = 21.9		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	12.3	12.0	11.8	11.2	10.3	9.4	9.3	11.6	13.6	15.2	17.5	19.8	22.1	24.1	25.3	25.1	24.7	22.3	19.0	18.8	18.0	15.9	15.2	14.2	16.6	25.3																						
2-Oct	13.1	13.2	12.8	12.5	12.1	10.9	9.1	8.7	9.5	10.1	8.9	8.0	7.4	6.5	6.1	5.6	5.3	5.0	4.7	4.1	3.3	2.8	2.7	2.8	7.7	13.2																						
3-Oct	2.5	2.4	2.3	1.6	1.6	1.1	1.1	1.0	1.3	1.8	2.0	2.0	2.4	3.1	3.1	3.4	3.0	2.4	1.7	0.9	0.5	0.0	-1.0	-0.4	1.6	3.4																						
4-Oct	0.4	0.6	0.2	0.3	0.3	0.3	0.1	-0.1	0.0	0.4	0.5	0.6	1.1	1.6	2.3	2.2	2.4	1.8	-0.2	-0.7	-0.2	0.2	-0.2	-1.3	0.5	2.4																						
5-Oct	-1.1	-2.4	-2.0	-1.8	-2.4	-2.3	-2.4	-1.4	0.1	3.9	7.2	9.8	10.2	10.0	9.9	9.6	8.7	7.4	5.6	5.0	3.9	3.1	1.7	1.1	3.4	10.2																						
6-Oct	-0.2	-1.6	-2.6	-2.8	-3.2	-3.7	-4.1	-3.0	-0.6	1.7	4.5	6.5	7.9	8.5	9.2	9.3	9.2	8.7	7.5	6.5	5.7	4.8	4.6	2.8	3.2	9.3																						
7-Oct	3.5	3.6	3.0	2.4	1.5	0.4	0.2	0.4	1.9	5.0	7.0	9.8	11.5	13.1	14.6	14.8	14.4	13.0	11.0	9.2	8.2	5.9	4.3	3.3	6.8	14.8																						
8-Oct	0.3	0.4	0.2	0.3	-0.1	-0.3	-1.2	-0.4	0.8	2.2	4.7	7.9	11.0	13.5	15.2	15.2	15.2	14.5	13.2	10.8	7.8	6.5	6.0	5.8	6.2	15.2																						
9-Oct	5.8	5.7	5.7	4.8	4.7	4.7	4.8	4.4	5.6	8.0	10.8	12.7	13.3	14.1	14.5	14.3	13.0	12.0	10.5	9.6	8.7	8.0	7.6	8.6	8.8	14.5																						
10-Oct	8.6	8.6	9.6	10.0	11.0	12.7	16.2	16.2	16.5	18.5	20.5	21.4	21.9	22.9	21.9	21.9	21.3	19.2	17.4	14.8	12.4	11.3	8.9	7.9	15.5	22.9																						
11-Oct	6.9	5.9	5.8	5.4	5.1	4.8	4.5	4.4	4.1	4.5	4.9	5.7	6.2	6.6	6.9	6.6	5.9	5.8	4.7	3.5	2.7	0.4	-1.1	-1.7	4.5	6.9																						
12-Oct	-2.2	-2.3	-1.6	-0.9	-0.3	-0.7	-1.5	-0.1	1.2	2.4	3.6	4.3	6.1	10.3	13.6	14.7	14.2	13.5	12.7	11.3	10.4	10.5	11.3	10.3	5.9	14.7																						
13-Oct	10.2	9.1	8.4	8.0	7.8	8.6	8.8	8.6	9.2	10.2	12.0	13.2	14.3	14.7	14.9	14.7	14.4	12.7	10.6	7.0	6.4	8.5	8.5	8.5	10.4	14.9																						
14-Oct	8.0	8.0	8.0	8.0	7.9	7.4	6.9	6.1	7.1	8.2	9.3	10.7	11.4	11.1	10.2	9.9	9.5	8.8	6.0	5.1	4.3	4.3	4.3	4.3	7.7	11.4																						
15-Oct	3.7	3.9	3.9	3.8	3.5	2.8	2.4	2.2	4.3	5.0	6.2	7.1	7.9	9.2	10.2	10.3	9.1	6.5	5.5	5.4	5.9	5.6	4.0	3.1	5.5	10.3																						
16-Oct	3.3	1.7	1.9	1.7	2.2	1.6	1.6	1.7	3.0	4.9	7.7	10.0	12.0	12.8	13.4	13.5	12.7	11.4	10.5	9.5	8.6	7.6	6.7	6.3	6.9	13.5																						
17-Oct	5.4	4.1	2.9	2.0	1.6	1.6	0.8	0.9	4.8	7.4	10.5	12.4	15.3	17.4	19.5	20.5	18.4	15.6	13.7	12.8	11.6	10.6	11.6	11.9	9.7	20.5																						
18-Oct	11.7	12.7	15.5	15.1	14.3	13.3	12.3	11.6	12.0	13.0	14.6	16.1	17.3	17.7	17.8	17.4	16.5	14.5	12.3	10.4	8.8	7.9	8.9	8.6	13.3	17.8																						
19-Oct	7.4	6.5	5.4	4.7	4.3	3.8	3.8	3.9	4.9	5.6	6.4	7.4	7.8	8.5	9.4	9.8	9.8	9.5	9.3	8.8	8.0	7.7	7.8	8.0	7.0	9.8																						
20-Oct	8.2	7.2	6.8	7.0	7.0	6.2	5.1	4.8	5.3	6.3	7.0	8.7	9.7	9.9	9.7	9.4	8.3	7.2	7.4	7.2	5.7	3.8	3.0	2.5	6.8	9.9																						
21-Oct	1.9	2.2	1.7	1.1	1.3	0.4	-0.6	-0.4	0.7	2.6	4.1	6.1	7.9	9.3	9.8	9.1	8.6	8.4	8.3	8.1	8.2	8.1	8.0	7.8	5.1	9.8																						
22-Oct	7.9	7.7	6.8	5.4	4.8	4.8	4.2	5.3	7.6	9.5	10.7	11.7	13.2	14.0	14.1	13.6	12.6	10.6	8.7	7.4	6.8	7.2	8.1	8.2	8.8	14.1																						
23-Oct	7.3	6.1	5.5	4.9	3.8	4.2	3.5	3.2	3.6	5.5	7.6	8.1	9.0	8.7	8.3	7.5	6.4	5.2	4.4	3.7	3.2	2.6	2.1	1.4	5.2	9.0																						
24-Oct	1.2	1.1	0.9	0.8	0.6	0.7	0.7	0.5	0.7	0.8	1.3	2.0	2.3	2.4	2.5	2.6	2.5	2.3	2.1	1.8	1.8	2.0	2.0	1.9	1.6	2.6																						
25-Oct	1.2	0.2	-0.2	-0.4	-0.7	-0.8	-0.9	-0.7	-0.7	-0.1	0.5	1.4	1.7	2.2	2.4	2.5	2.5	2.4	2.4	2.6	2.7	2.0	1.5	1.6	1.1	2.7																						
26-Oct	1.4	1.0	0.7	0.5	0.3	0.7	0.8	1.2	1.9	2.9	3.8	4.9	6.5	8.1	8.3	7.2	6.8	6.5	6.0	5.8	5.3	3.8	1.3	0.6	3.6	8.3																						
27-Oct	0.6	0.2	0.0	0.4	0.4	0.5	0.5	0.7	0.8	1.1	1.2	1.3	1.9	2.5	2.5	2.5	2.5	2.4	2.1	1.5	1.0	0.7	0.4	0.0	1.2	2.5																						
28-Oct	-0.7	-0.8	-1.2	-1.3	-1.4	-1.4	-1.6	-1.8	-1.7	-1.5	-1.1	-0.9	-0.4	0.1	0.3	0.7	0.4	-0.4	-0.9	-1.1	-1.4	-1.7	-1.7	-1.7	-1.0	0.7																						
29-Oct	-1.8	-2.1	-1.9	-1.7	-1.5	-0.9	-0.5	-0.5	-0.1	0.7	2.0	3.3	4.3	4.8	5.5	6.0	4.1	3.3	3.9	3.3	2.3	2.4	1.3	0.4	1.5	6.0																						
30-Oct	0.1	-0.8	-0.9	-1.4	-1.2	-0.9	-1.1	-1.2	0.1	0.9	1.8	2.9	4.3	5.4	6.0	6.1	5.3	3.9	3.7	3.1	1.9	1.5	1.5	2.6	1.8	6.1																						
31-Oct	2.4	2.3	2.0	1.8	1.7	1.8	1.7	1.3	1.1	1.3	2.3	2.4	3.3	3.6	2.9	2.5	2.1	1.5	1.1	0.7	0.4	0.2	0.0	-0.1	1.7	3.6																						
																								4.2	3.8	3.6	3.3	3.1	2.9	2.7	2.9	3.8	5.1	6.5	7.6	8.7	9.6	10.0	10.0	9.3	8.3	7.3	6.4	5.6	5.0	4.5	4.2	Diurnal Average
																								13.1	13.2	15.5	15.1	14.3	13.3	16.2	16.2	16.5	18.5	20.5	21.4	22.1	24.1	25.3	25.1	24.7	22.3	19.0	18.8	18.0	15.9	15.2	14.2	Diurnal Maximum





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

**Ambient Temperature 2 m (AT2m) - C**  
**Mannix - October 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	88	11.83	11.83
0 - 10	506	68.01	79.84
10 - 20	136	18.28	98.12
> 20	14	1.88	100.00

Total Number of Valid Hours: 744

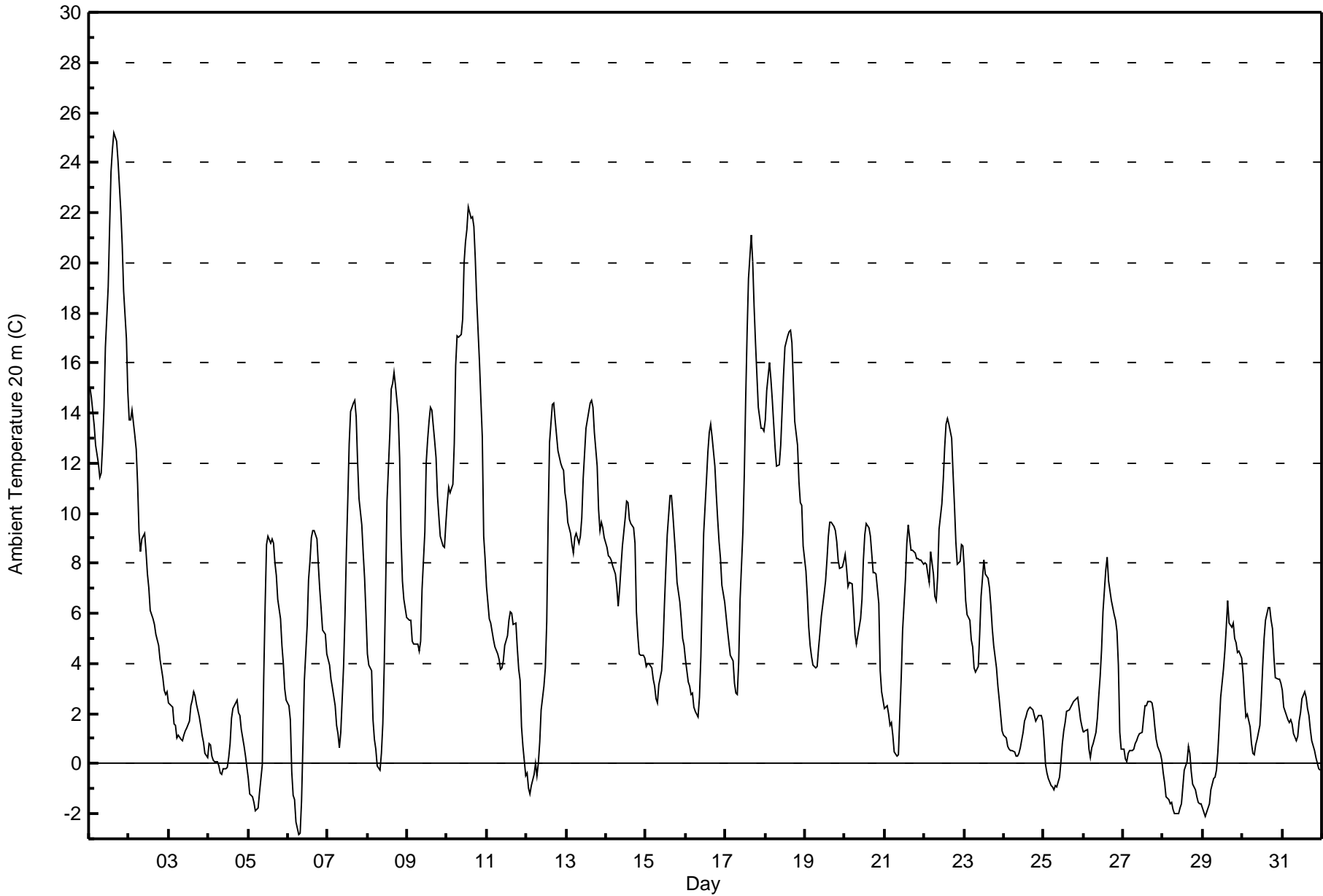
Total Number of Hours: 744



Summary of Hour Averages

Mannix - October 2015

Maximum Value: 25.2 C on Oct 1 16:00		Maximum Daily Average: 17.8 C on Oct 1		Hours in Service: 744																																												
Minimum Value: -2.8 C on Oct 6 07:00		Minimum Daily Average: -1.1 C on Oct 28		Hours of Data: 744																																												
Maximum Diurnal Average: 9.8 C at hour 16		Minimum Diurnal Average: 3.1 C at hour 8		Hours of Missing Data: 0																																												
Monthly Average: 6.04 C		Percentiles: P <sub>1</sub> = -2.0 P <sub>10</sub> = 0.0 Q <sub>1</sub> = 1.7 Median = 5.0 Q <sub>3</sub> = 9.2 P <sub>90</sub> = 13.7 P <sub>99</sub> = 21.4		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	15.0	14.6	14.1	13.5	12.7	12.0	11.4	11.6	12.7	14.2	16.6	19.0	21.4	23.6	24.5	25.2	24.9	24.1	23.1	22.1	20.7	18.9	17.0	14.8	17.8	25.2																						
2-Oct	13.7	13.7	14.1	13.1	12.5	11.1	9.3	8.5	9.0	9.2	8.5	7.6	7.0	6.1	5.8	5.6	5.1	5.0	4.7	4.2	3.4	2.9	2.8	2.9	7.7	14.1																						
3-Oct	2.4	2.3	2.2	1.6	1.5	1.1	1.1	1.0	0.9	1.1	1.3	1.4	1.7	2.3	2.5	2.9	2.7	2.4	1.8	1.5	1.1	0.9	0.4	0.2	1.6	2.9																						
4-Oct	0.8	0.7	0.3	0.2	0.1	0.1	-0.1	-0.4	-0.4	-0.2	-0.2	-0.1	0.2	0.8	1.8	2.2	2.4	2.6	2.1	1.9	1.4	0.7	0.3	-0.1	0.7	2.6																						
5-Oct	-0.6	-1.2	-1.3	-1.5	-1.9	-1.8	-1.8	-1.2	0.0	3.4	6.3	8.8	9.1	8.8	9.0	8.8	8.0	7.5	6.5	5.8	4.7	4.0	3.0	2.5	3.5	9.1																						
6-Oct	2.3	1.8	-0.3	-1.2	-1.5	-2.3	-2.8	-2.8	-1.5	0.8	3.3	5.5	7.3	8.1	9.0	9.3	9.3	9.0	7.9	6.9	6.2	5.3	5.1	4.4	3.7	9.3																						
7-Oct	4.2	3.9	3.4	3.0	2.3	1.5	1.2	0.6	1.3	3.9	5.9	8.5	10.6	12.8	14.0	14.4	14.5	13.8	12.1	10.6	9.5	8.4	7.4	6.0	7.2	14.5																						
8-Oct	4.4	3.9	3.7	1.7	1.0	0.6	-0.1	-0.3	0.4	1.6	3.9	7.0	10.5	13.1	15.0	15.2	15.6	15.1	13.9	12.2	9.1	7.3	6.5	5.8	7.0	15.6																						
9-Oct	5.8	5.7	5.7	4.9	4.8	4.8	4.8	4.5	4.9	6.9	9.3	12.1	13.0	13.7	14.2	14.1	12.9	12.2	10.7	9.8	9.1	8.7	8.6	9.6	8.8	14.2																						
10-Oct	10.4	11.0	10.8	11.2	12.8	15.9	17.1	17.0	17.2	17.8	20.0	20.8	21.3	22.2	21.8	21.8	21.5	20.2	18.5	16.0	14.5	13.1	9.1	8.2	16.3	22.2																						
11-Oct	7.1	5.8	5.6	5.3	4.9	4.7	4.4	4.1	3.7	3.8	4.1	4.7	5.1	5.7	6.1	6.0	5.6	5.6	4.6	3.8	3.3	1.5	0.7	-0.5	4.4	7.1																						
12-Oct	-0.4	-1.0	-1.2	-0.9	-0.4	0.0	-0.5	0.0	0.9	2.2	3.1	3.8	5.7	9.7	12.8	14.3	14.4	13.8	13.1	12.5	12.0	11.8	11.7	10.8	6.2	14.4																						
13-Oct	10.4	9.6	9.2	8.7	8.4	9.0	9.2	8.8	9.1	9.8	11.4	12.4	13.4	14.0	14.4	14.5	14.2	13.2	11.9	10.1	9.3	9.6	9.4	9.0	10.8	14.5																						
14-Oct	8.6	8.3	8.2	8.1	7.9	7.6	7.1	6.3	7.0	7.8	8.7	9.8	10.5	10.4	9.8	9.6	9.4	8.8	6.1	5.1	4.4	4.3	4.4	4.2	7.6	10.5																						
15-Oct	3.9	4.0	4.0	3.8	3.4	3.1	2.6	2.4	3.2	3.7	4.7	6.3	7.8	9.2	10.7	10.7	10.0	9.2	8.3	7.2	6.5	5.8	5.0	4.7	5.8	10.7																						
16-Oct	4.2	3.2	3.1	2.8	2.8	2.3	2.1	1.9	2.7	4.3	6.9	9.2	11.3	12.5	13.2	13.6	13.1	11.9	10.8	9.8	8.9	8.2	7.1	6.5	7.2	13.6																						
17-Oct	5.9	5.3	4.8	4.3	4.1	3.2	2.8	2.8	4.1	6.6	9.2	11.5	14.5	17.2	19.4	21.1	20.0	18.3	16.8	15.5	14.2	13.4	13.4	13.3	10.9	21.1																						
18-Oct	13.7	14.9	16.0	15.3	14.5	13.5	12.6	11.9	11.9	12.7	14.1	15.5	16.6	17.1	17.2	17.3	16.8	15.2	13.7	12.7	11.3	10.4	10.3	8.7	13.9	17.3																						
19-Oct	7.7	6.7	5.5	4.7	4.3	3.9	3.8	3.9	4.6	5.2	5.9	6.8	7.3	8.1	9.1	9.6	9.7	9.5	9.3	8.8	8.1	7.8	7.9	8.1	6.9	9.7																						
20-Oct	8.4	7.8	7.1	7.2	7.2	6.2	5.2	4.8	5.1	5.8	6.6	8.2	9.1	9.6	9.4	9.1	8.3	7.6	7.6	7.6	6.4	3.7	2.9	2.5	6.8	9.6																						
21-Oct	2.2	2.3	2.0	1.5	1.6	1.1	0.5	0.3	0.4	1.9	3.4	5.3	7.4	8.8	9.5	9.0	8.5	8.5	8.4	8.2	8.2	8.2	8.1	8.0	5.1	9.5																						
22-Oct	8.0	8.0	7.6	7.2	8.4	7.6	6.7	6.5	7.5	9.3	10.4	11.3	12.6	13.5	13.8	13.6	13.0	11.6	10.3	8.9	8.0	8.1	8.7	8.7	9.6	13.8																						
23-Oct	7.8	6.5	6.0	5.7	4.9	4.7	3.8	3.7	3.9	5.2	6.7	7.4	8.1	7.6	7.4	7.0	6.3	5.4	4.7	3.8	3.1	2.6	1.9	1.3	5.2	8.1																						
24-Oct	1.1	1.0	0.7	0.6	0.5	0.5	0.3	0.3	0.4	0.7	1.2	1.7	1.9	2.1	2.2	2.2	2.2	2.2	1.9	1.7	1.8	1.9	1.9	1.7	1.3	2.2																						
25-Oct	0.9	0.0	-0.4	-0.6	-0.9	-0.9	-1.0	-0.9	-0.9	-0.5	0.1	0.8	1.3	1.6	2.1	2.1	2.3	2.4	2.5	2.6	2.6	2.2	1.7	1.5	0.9	2.6																						
26-Oct	1.2	1.3	1.4	0.6	0.3	0.6	0.8	1.3	1.8	2.7	3.5	4.5	6.1	7.8	8.2	7.3	6.9	6.5	6.0	5.7	5.3	3.9	1.3	0.6	3.6	8.2																						
27-Oct	0.6	0.2	0.1	0.4	0.5	0.5	0.6	0.8	0.9	1.1	1.2	1.2	1.8	2.3	2.3	2.5	2.5	2.4	2.1	1.5	1.0	0.7	0.4	0.1	1.2	2.5																						
28-Oct	-0.4	-0.8	-1.3	-1.4	-1.6	-1.6	-1.8	-2.0	-2.0	-2.0	-1.8	-1.6	-0.9	-0.3	0.1	0.7	0.4	-0.3	-0.8	-1.1	-1.3	-1.5	-1.6	-1.6	-1.1	0.7																						
29-Oct	-1.8	-2.1	-2.0	-1.8	-1.6	-1.0	-0.6	-0.5	-0.3	0.4	1.5	2.6	3.8	4.5	5.5	6.5	5.6	5.4	5.6	5.0	4.8	4.4	4.5	4.2	2.2	6.5																						
30-Oct	3.6	2.6	1.9	2.0	1.5	0.8	0.4	0.4	0.7	1.0	1.5	2.6	3.9	5.0	5.7	6.2	6.2	5.7	5.4	4.3	3.4	3.4	3.4	3.2	3.1	6.2																						
31-Oct	2.9	2.3	1.9	1.8	1.6	1.7	1.6	1.2	0.9	1.1	1.7	2.0	2.6	2.9	2.7	2.2	1.9	1.3	0.9	0.5	0.2	0.0	-0.2	-0.2	1.5	2.9																						
																								5.0	4.6	4.3	3.9	3.8	3.6	3.2	3.1	3.5	4.6	5.8	7.0	8.1	9.1	9.6	9.8	9.5	8.9	8.1	7.3	6.5	5.8	5.3	4.8	Diurnal Average
																								15.0	14.9	16.0	15.3	14.5	15.9	17.1	17.0	17.2	17.8	20.0	20.8	21.4	23.6	24.5	25.2	24.9	24.1	23.1	22.1	20.7	18.9	17.0	14.8	Diurnal Maximum





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

**Ambient Temperature 20 m (AT20m) - C**  
**Mannix - October 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	74	9.95	9.95
0 - 10	517	69.49	79.44
10 - 20	134	18.01	97.45
> 20	19	2.55	100.00

Total Number of Valid Hours: 744

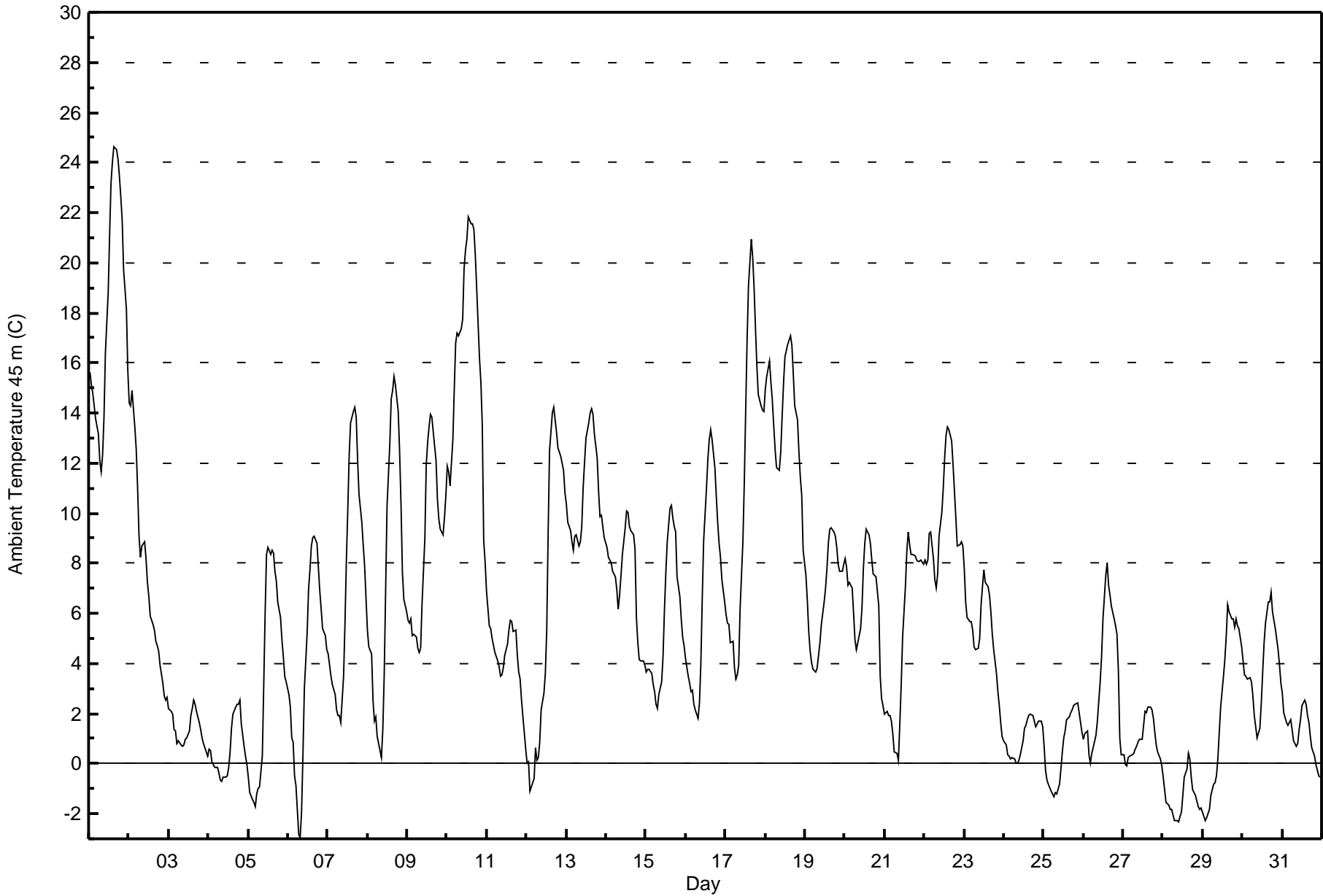
Total Number of Hours: 744



Summary of Hour Averages

Mannix - October 2015

Maximum Value: 24.7 C on Oct 1 16:00		Maximum Daily Average: 18.1 C on Oct 1		Hours in Service: 744																							
Minimum Value: -3.0 C on Oct 6 08:00		Minimum Daily Average: -1.3 C on Oct 28		Hours of Data: 744																							
Maximum Diurnal Average: 9.6 C at hour 16		Minimum Diurnal Average: 3.2 C at hour 8		Hours of Missing Data: 0																							
Monthly Average: 6.04 C		Percentiles: P <sub>1</sub> = -2.1 P <sub>10</sub> = 0.0 Q <sub>1</sub> = 1.6 Median = 5.1 Q <sub>3</sub> = 9.1 P <sub>90</sub> = 14.0 P <sub>99</sub> = 22.2		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	15.6	15.1	14.8	14.3	13.8	13.2	12.1	11.7	12.3	13.8	16.4	18.8	21.1	23.2	24.0	24.7	24.5	24.1	23.5	22.6	21.7	19.7	18.1	15.7	18.1	24.7	
2-Oct	14.4	14.3	14.9	13.5	12.6	11.0	9.1	8.2	8.7	8.8	8.2	7.2	6.7	5.9	5.6	5.4	4.9	4.7	4.5	3.9	3.2	2.7	2.6	2.6	7.6	14.9	
3-Oct	2.2	2.1	2.0	1.4	1.3	0.8	0.9	0.7	0.7	0.8	1.0	1.0	1.3	1.9	2.2	2.5	2.4	2.1	1.6	1.3	1.0	0.8	0.6	0.3	1.4	2.5	
4-Oct	0.6	0.5	0.1	-0.1	-0.2	-0.2	-0.4	-0.6	-0.7	-0.5	-0.5	-0.2	0.4	1.4	2.0	2.3	2.4	2.4	2.5	1.6	0.7	0.3	0.0	0.0	0.6	2.5	
5-Oct	-0.5	-1.1	-1.4	-1.6	-1.7	-1.2	-1.0	-0.9	0.3	3.1	6.0	8.4	8.7	8.4	8.5	8.4	7.7	7.3	6.5	5.8	5.0	4.3	3.5	3.2	3.6	8.7	
6-Oct	2.8	2.3	1.0	0.9	-0.5	-0.9	-2.8	-3.0	-1.9	0.3	3.0	5.2	7.0	7.7	8.7	9.0	9.1	8.8	7.9	6.9	6.2	5.4	5.1	4.6	3.9	9.1	
7-Oct	4.4	3.9	3.5	3.2	2.8	2.2	1.9	1.9	1.7	3.5	5.6	8.1	10.2	12.3	13.6	14.0	14.2	13.8	12.2	10.8	9.6	8.7	7.9	6.6	7.4	14.2	
8-Oct	5.4	4.7	4.4	2.5	1.7	1.9	1.1	0.5	0.2	1.4	3.5	6.9	10.3	12.8	14.5	14.9	15.5	15.1	14.0	12.4	10.3	7.6	6.6	6.0	7.3	15.5	
9-Oct	5.7	5.6	5.8	5.1	5.1	5.0	4.6	4.5	4.6	6.4	9.0	12.0	12.8	13.4	14.0	13.9	12.7	12.1	10.6	9.7	9.3	9.2	9.8	10.7	8.8	14.0	
10-Oct	11.9	11.7	11.1	13.0	14.9	16.8	17.2	17.1	17.4	17.8	19.8	20.5	21.0	21.8	21.5	21.6	21.3	20.3	19.0	16.2	15.2	13.5	8.9	8.1	16.6	21.8	
11-Oct	6.9	5.5	5.4	5.0	4.7	4.4	4.1	3.9	3.5	3.5	3.8	4.3	4.8	5.4	5.7	5.7	5.3	5.3	4.3	3.6	3.4	2.5	1.9	0.6	4.3	6.9	
12-Oct	0.0	0.1	-1.1	-0.9	-0.6	0.7	0.1	0.3	0.9	2.2	2.8	3.6	5.3	9.2	12.5	14.0	14.2	13.7	13.2	12.6	12.3	12.0	11.7	10.8	6.2	14.2	
13-Oct	10.3	9.6	9.3	8.8	8.5	9.1	9.1	8.7	8.9	9.5	11.0	12.0	13.0	13.6	14.0	14.2	14.0	13.2	12.2	10.9	9.8	9.9	9.5	9.0	10.8	14.2	
14-Oct	8.6	8.2	8.1	8.0	7.7	7.5	7.0	6.2	6.7	7.5	8.4	9.4	10.1	9.5	9.3	9.2	8.6	5.8	4.8	4.2	4.1	4.1	4.0	4.0	7.4	10.1	
15-Oct	3.7	3.8	3.8	3.6	3.2	2.9	2.4	2.2	2.7	3.3	4.3	6.1	7.6	8.9	10.2	10.3	9.8	9.5	9.3	7.5	6.7	5.8	5.1	4.7	5.7	10.3	
16-Oct	4.2	3.5	3.2	2.9	2.9	2.4	2.2	1.8	2.4	4.0	6.6	8.9	11.0	12.1	12.9	13.3	12.9	11.8	10.7	9.7	8.8	8.2	7.4	6.4	7.1	13.3	
17-Oct	6.0	5.6	5.6	4.8	4.9	3.8	3.4	3.5	4.0	6.2	8.8	11.2	14.1	16.9	19.1	20.9	20.2	19.0	17.3	15.9	14.7	14.3	14.1	14.1	11.2	20.9	
18-Oct	15.0	15.4	16.0	15.3	14.5	13.5	12.5	11.8	11.7	12.5	13.8	15.2	16.3	16.7	16.9	17.1	16.7	15.5	14.3	13.7	12.4	11.4	10.7	8.5	14.1	17.1	
19-Oct	7.5	6.5	5.3	4.5	4.1	3.8	3.7	3.8	4.3	4.9	5.6	6.5	7.0	7.8	8.8	9.3	9.4	9.3	9.1	8.7	8.0	7.7	7.7	8.0	6.7	9.4	
20-Oct	8.2	7.8	7.1	7.2	7.0	6.0	5.0	4.6	4.9	5.4	6.2	7.8	8.8	9.3	9.1	8.8	8.1	7.6	7.5	7.5	6.3	3.5	2.6	2.3	6.6	9.3	
21-Oct	2.0	2.1	1.9	1.9	1.7	1.2	0.5	0.4	0.2	1.6	3.1	5.0	7.1	8.5	9.3	8.8	8.3	8.3	8.3	8.1	8.1	8.1	8.1	8.0	5.0	9.3	
22-Oct	8.1	8.0	8.1	9.2	9.2	8.2	7.4	7.0	7.5	9.1	10.1	11.0	12.2	13.1	13.4	13.3	12.9	11.9	10.9	9.8	8.7	8.7	8.9	8.7	9.8	13.4	
23-Oct	7.8	6.4	5.9	5.7	5.7	5.3	4.7	4.5	4.6	5.0	6.3	7.1	7.7	7.2	7.1	6.8	6.0	5.2	4.6	3.6	2.9	2.3	1.7	1.1	5.2	7.8	
24-Oct	0.9	0.7	0.4	0.3	0.2	0.2	0.0	0.0	0.0	0.1	0.4	0.9	1.4	1.6	1.8	1.9	2.0	1.9	1.7	1.5	1.6	1.7	1.7	1.5	1.0	2.0	
25-Oct	0.7	-0.3	-0.6	-0.8	-1.1	-1.2	-1.3	-1.2	-1.2	-0.8	-0.2	0.5	1.0	1.3	1.7	1.9	2.0	2.1	2.3	2.4	2.4	2.0	1.6	1.2	0.6	2.4	
26-Oct	1.0	1.2	1.3	0.4	0.0	0.4	0.6	1.2	1.7	2.5	3.2	4.3	5.8	7.5	8.0	7.1	6.7	6.3	5.8	5.5	5.2	3.7	1.0	0.4	3.4	8.0	
27-Oct	0.4	-0.1	-0.1	0.3	0.3	0.3	0.4	0.6	0.7	0.9	1.0	1.0	1.5	2.1	2.1	2.3	2.3	2.2	1.8	1.2	0.7	0.5	0.2	-0.1	0.9	2.3	
28-Oct	-0.5	-1.0	-1.6	-1.7	-1.8	-1.8	-2.1	-2.3	-2.3	-2.3	-2.1	-1.9	-1.3	-0.5	-0.2	0.4	0.2	-0.5	-1.0	-1.2	-1.5	-1.7	-1.8	-1.8	-1.3	0.4	
29-Oct	-1.9	-2.3	-2.2	-2.0	-1.8	-1.3	-0.8	-0.8	-0.5	0.2	1.2	2.3	3.5	4.2	5.1	6.3	6.1	5.8	5.8	5.5	5.8	5.5	5.4	4.7	2.2	6.3	
30-Oct	4.1	3.5	3.5	3.4	3.5	3.3	2.7	1.9	1.5	1.0	1.4	2.4	3.6	4.8	5.6	6.5	6.4	6.8	6.1	5.7	5.4	4.5	3.9	3.2	3.9	6.8	
31-Oct	2.8	2.0	1.6	1.6	1.6	1.7	1.4	0.9	0.7	0.8	1.4	1.7	2.3	2.5	2.4	1.9	1.6	1.1	0.7	0.3	0.0	-0.3	-0.5	-0.5	1.2	2.8	
		5.1	4.7	4.4	4.2	4.0	3.8	3.4	3.2	3.4	4.3	5.5	6.7	7.8	8.7	9.3	9.6	9.3	8.9	8.1	7.4	6.7	6.0	5.4	4.9	Diurnal Average	
		15.6	15.4	16.0	15.3	14.9	16.8	17.2	17.1	17.4	17.8	19.8	20.5	21.1	23.2	24.0	24.7	24.5	24.1	23.5	22.6	21.7	19.7	18.1	15.7	Diurnal Maximum	







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature 45 m (AT45m) - C  
Mannix - October 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	75	10.08	10.08
0 - 10	514	69.09	79.17
10 - 20	137	18.41	97.58
> 20	18	2.42	100.00

Total Number of Valid Hours: 744

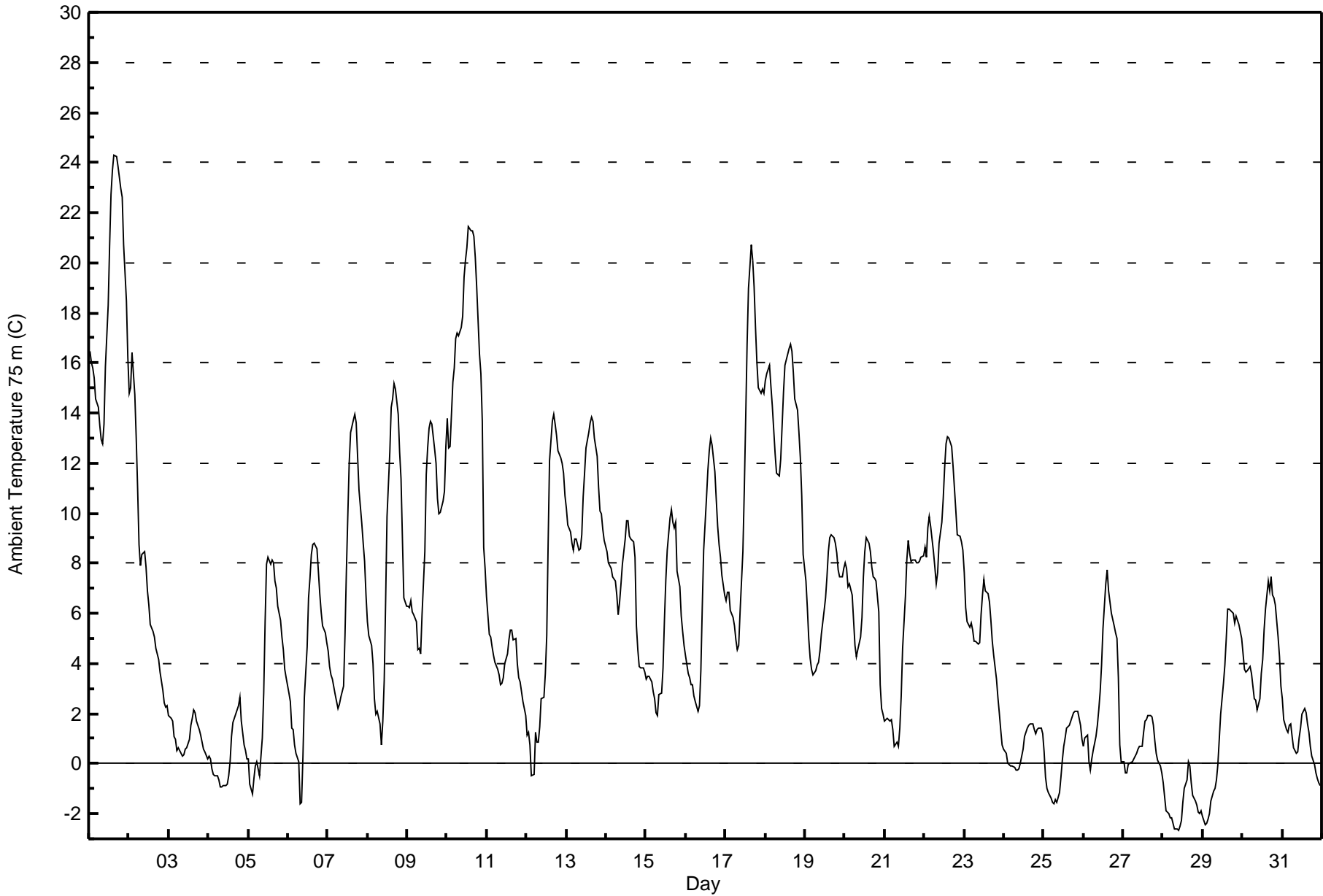
Total Number of Hours: 744



Summary of Hour Averages

Mannix - October 2015

Maximum Value: 24.3 C on Oct 1 16:00		Maximum Daily Average: 18.5 C on Oct 1		Hours in Service: 744																																												
Minimum Value: -2.7 C on Oct 28 10:00		Minimum Daily Average: -1.6 C on Oct 28		Hours of Data: 744																																												
Maximum Diurnal Average: 9.3 C at hour 16		Minimum Diurnal Average: 3.3 C at hour 8		Hours of Missing Data: 0																																												
Monthly Average: 6.00 C		Percentiles: P <sub>1</sub> = -2.3 P <sub>10</sub> = -0.1 Q <sub>1</sub> = 1.5 Median = 5.1 Q <sub>3</sub> = 9.0 P <sub>90</sub> = 13.9 P <sub>99</sub> = 22.6		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	16.5	16.0	15.8	15.4	14.6	14.2	13.5	12.9	12.8	13.6	15.9	18.3	20.7	22.7	23.7	24.3	24.2	23.8	23.4	22.9	22.6	20.7	18.5	16.2	18.5	24.3																						
2-Oct	14.8	15.0	16.4	14.8	13.0	11.0	8.8	7.9	8.4	8.5	7.8	6.9	6.3	5.6	5.3	5.1	4.6	4.4	4.2	3.6	2.9	2.4	2.3	2.3	7.6	16.4																						
3-Oct	1.9	1.8	1.7	1.1	1.0	0.5	0.6	0.4	0.3	0.4	0.6	0.6	0.9	1.6	1.8	2.2	2.0	1.7	1.3	1.1	0.9	0.6	0.5	0.2	1.1	2.2																						
4-Oct	0.3	0.2	-0.2	-0.4	-0.5	-0.5	-0.7	-0.9	-0.9	-0.9	-0.9	-0.8	-0.5	0.1	1.1	1.7	2.0	2.2	2.3	2.6	1.7	0.7	0.5	0.2	0.4	2.6																						
5-Oct	0.2	-0.8	-1.2	-0.6	-0.1	0.1	-0.2	-0.5	1.1	2.8	5.7	8.0	8.2	7.9	8.1	8.0	7.3	7.0	6.3	5.7	5.1	4.6	3.8	3.5	3.7	8.2																						
6-Oct	2.8	2.5	1.4	1.4	0.8	0.4	0.1	-1.6	-1.6	0.3	2.7	4.7	6.6	7.4	8.4	8.7	8.8	8.6	7.7	6.8	6.1	5.5	5.2	4.8	4.1	8.8																						
7-Oct	4.5	3.9	3.6	3.4	2.8	2.5	2.2	2.4	2.7	3.1	5.1	7.7	9.9	12.0	13.2	13.7	13.9	13.6	12.3	10.9	9.6	8.8	8.1	6.7	7.4	13.9																						
8-Oct	5.7	5.1	4.7	4.0	2.6	2.0	2.1	1.6	0.7	1.7	3.3	6.5	9.9	12.4	14.2	14.6	15.2	14.9	13.9	12.4	11.4	9.0	6.6	6.3	7.5	15.2																						
9-Oct	6.3	6.2	6.5	6.1	6.0	5.6	4.5	4.6	4.4	6.0	8.5	11.6	12.6	13.4	13.7	13.6	12.5	12.0	10.6	10.0	10.1	10.5	10.9	12.7	9.1	13.7																						
10-Oct	13.8	12.6	12.6	15.2	15.8	17.0	17.2	17.1	17.4	17.9	19.4	20.1	20.6	21.4	21.3	21.3	21.0	20.2	19.1	16.4	15.6	13.7	8.7	7.8	16.8	21.4																						
11-Oct	6.7	5.2	5.0	4.7	4.3	4.1	3.8	3.6	3.2	3.2	3.4	4.0	4.4	5.0	5.3	5.3	5.0	5.0	4.0	3.4	3.3	2.9	2.5	1.9	4.1	6.7																						
12-Oct	1.2	1.2	0.7	-0.5	-0.4	1.3	0.9	0.9	1.5	2.6	2.6	3.6	5.1	8.8	12.1	13.6	13.9	13.5	13.1	12.5	12.2	12.0	11.6	10.7	6.4	13.9																						
13-Oct	10.2	9.5	9.3	8.8	8.5	9.0	9.0	8.5	8.6	9.1	10.6	11.6	12.6	13.2	13.6	13.8	13.6	13.0	12.3	11.0	10.1	10.0	9.4	8.9	10.6	13.8																						
14-Oct	8.5	8.0	7.9	7.8	7.5	7.3	6.7	6.0	6.5	7.2	8.0	9.0	9.7	9.7	9.1	9.0	8.8	8.3	5.5	4.5	3.9	3.8	3.8	3.6	7.1	9.7																						
15-Oct	3.4	3.5	3.5	3.3	2.9	2.6	2.1	1.9	2.7	2.8	3.8	5.7	7.3	8.5	9.8	10.1	9.7	9.4	9.6	7.7	7.0	5.9	5.3	4.7	5.6	10.1																						
16-Oct	4.3	3.6	3.4	3.2	3.2	2.7	2.5	2.1	2.3	3.7	6.2	8.5	10.6	11.7	12.5	13.0	12.7	11.6	10.5	9.5	8.7	8.2	7.5	6.8	7.0	13.0																						
17-Oct	6.5	6.8	6.8	6.1	5.9	5.5	5.0	4.5	4.7	6.0	8.5	10.9	13.8	16.8	19.0	20.7	20.1	19.0	17.4	16.0	15.0	14.8	14.9	14.8	11.7	20.7																						
18-Oct	15.3	15.6	15.9	15.1	14.3	13.3	12.4	11.6	11.5	12.1	13.5	14.8	15.9	16.4	16.6	16.8	16.5	15.6	14.6	14.1	13.2	12.2	10.7	8.3	14.0	16.8																						
19-Oct	7.3	6.3	5.0	4.2	3.8	3.5	3.7	3.9	4.1	4.5	5.2	6.1	6.6	7.4	8.5	9.0	9.1	9.0	8.8	8.4	7.7	7.4	7.5	7.8	6.5	9.1																						
20-Oct	8.0	7.8	7.1	7.2	6.8	5.8	4.7	4.3	4.6	5.0	5.9	7.4	8.5	9.0	8.8	8.5	7.8	7.5	7.4	7.3	6.1	3.1	2.2	2.0	6.4	9.0																						
21-Oct	1.7	1.8	1.7	1.7	1.8	1.4	0.7	0.9	0.7	1.4	2.7	4.6	6.7	8.1	8.9	8.4	8.1	8.1	8.1	8.0	8.0	8.1	8.3	8.3	4.9	8.9																						
22-Oct	8.7	8.3	9.4	9.8	9.4	8.5	7.9	7.2	7.6	8.8	9.6	10.6	11.8	12.8	13.1	13.0	12.7	11.9	11.0	10.1	9.1	9.1	8.8	8.5	9.9	13.1																						
23-Oct	7.6	6.2	5.7	5.4	5.6	5.3	4.9	4.9	4.8	4.8	5.9	6.7	7.4	6.9	6.8	6.4	5.7	4.9	4.3	3.4	2.7	2.0	1.3	0.8	5.0	7.6																						
24-Oct	0.6	0.4	0.0	0.0	-0.1	-0.1	-0.1	-0.3	-0.2	-0.2	0.0	0.6	1.1	1.2	1.4	1.6	1.6	1.6	1.4	1.2	1.3	1.4	1.4	1.2	0.7	1.6																						
25-Oct	0.5	-0.5	-1.0	-1.1	-1.4	-1.5	-1.6	-1.5	-1.5	-1.2	-0.5	0.1	0.7	1.0	1.4	1.5	1.7	1.9	2.0	2.1	2.1	1.8	1.5	1.0	0.3	2.1																						
26-Oct	0.7	1.0	1.1	0.1	-0.2	0.2	0.5	1.1	1.5	2.1	2.9	3.9	5.4	7.2	7.7	6.9	6.5	6.0	5.5	5.2	5.0	3.5	0.7	0.1	3.1	7.7																						
27-Oct	0.1	-0.3	-0.3	0.0	0.0	0.1	0.2	0.3	0.4	0.6	0.7	0.7	1.2	1.7	1.7	1.9	1.9	1.8	1.5	0.9	0.4	0.1	-0.1	-0.4	0.6	1.9																						
28-Oct	-0.8	-1.3	-1.9	-2.0	-2.1	-2.2	-2.4	-2.6	-2.6	-2.7	-2.5	-2.3	-1.5	-1.0	-0.6	0.0	-0.1	-0.8	-1.3	-1.5	-1.7	-1.9	-2.0	-1.9	-1.6	0.0																						
29-Oct	-2.1	-2.4	-2.4	-2.2	-2.0	-1.5	-1.1	-1.0	-0.7	0.0	1.0	2.0	3.2	3.9	5.0	6.2	6.2	6.0	6.0	5.6	5.9	5.7	5.5	5.0	2.2	6.2																						
30-Oct	4.4	3.8	3.6	3.7	3.9	3.6	3.1	2.6	2.5	2.2	2.6	3.6	4.2	5.3	6.2	7.3	6.9	7.4	6.7	6.6	6.3	5.1	4.2	3.1	4.5	7.4																						
31-Oct	2.6	1.7	1.3	1.3	1.5	1.6	1.1	0.6	0.4	0.5	1.0	1.4	2.0	2.2	2.0	1.6	1.3	0.7	0.3	0.0	-0.4	-0.6	-0.8	-0.9	0.9	2.6																						
																								5.2	4.8	4.6	4.4	4.2	4.0	3.6	3.3	3.5	4.1	5.1	6.4	7.5	8.4	9.0	9.3	9.1	8.7	8.1	7.4	6.8	6.2	5.5	5.0	Diurnal Average
																								16.5	16.0	16.4	15.4	15.8	17.0	17.2	17.1	17.4	17.9	19.4	20.1	20.7	22.7	23.7	24.3	24.2	23.8	23.4	22.9	22.6	20.7	18.5	16.2	Diurnal Maximum





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

**Ambient Temperature 75 m (AT75m) - C**  
**Mannix - October 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	82	11.02	11.02
0 - 10	508	68.28	79.30
10 - 20	135	18.15	97.45
> 20	19	2.55	100.00

Total Number of Valid Hours: 744

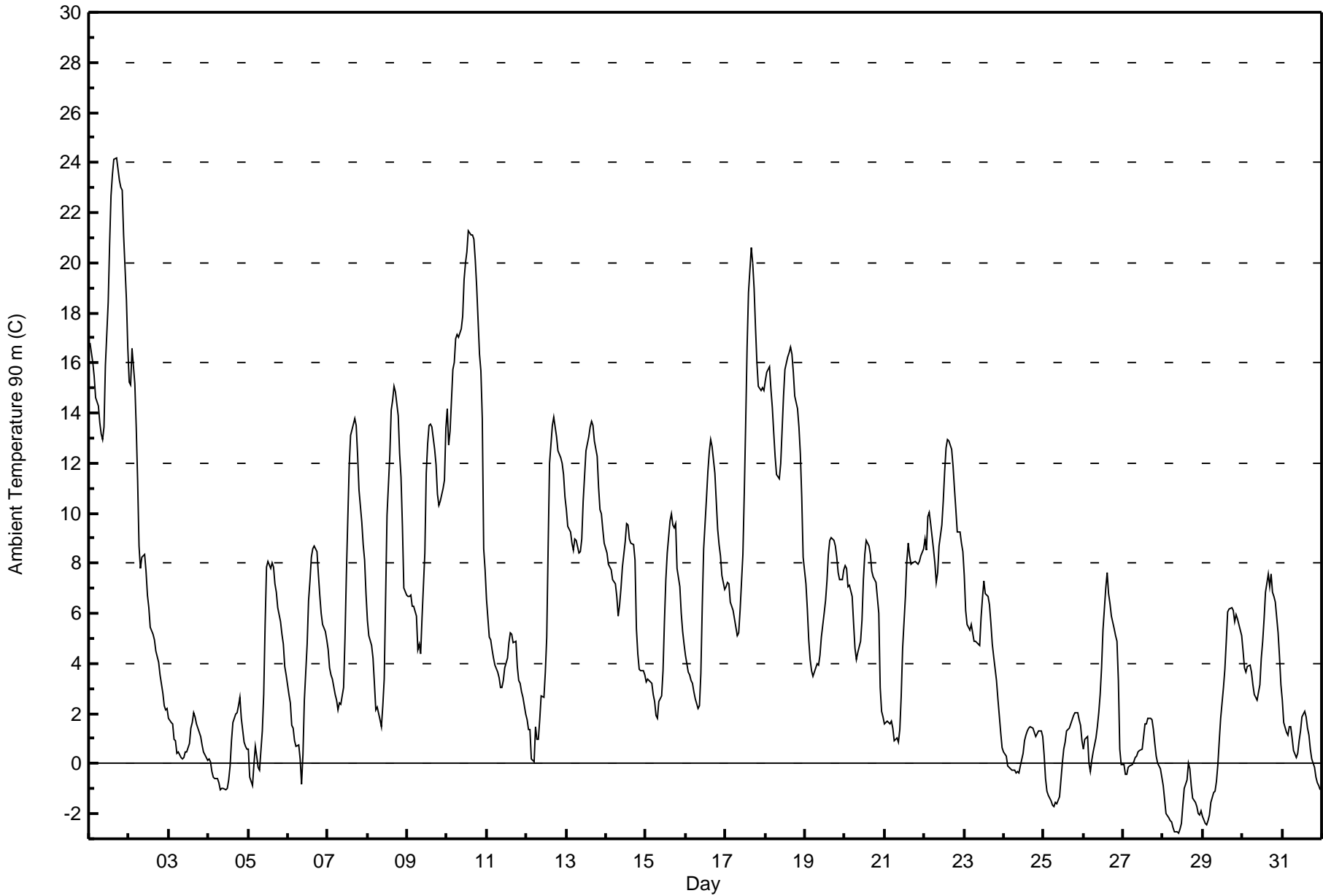
Total Number of Hours: 744



Summary of Hour Averages

Mannix - October 2015

Maximum Value: 24.2 C on Oct 1 17:00		Maximum Daily Average: 18.6 C on Oct 1		Hours in Service: 744																																												
Minimum Value: -2.8 C on Oct 28 10:00		Minimum Daily Average: -1.7 C on Oct 28		Hours of Data: 744																																												
Maximum Diurnal Average: 9.2 C at hour 16		Minimum Diurnal Average: 3.4 C at hour 8		Hours of Missing Data: 0																																												
Monthly Average: 5.99 C		Percentiles: P <sub>1</sub> = -2.4 P <sub>10</sub> = -0.1 Q <sub>1</sub> = 1.5 Median = 5.1 Q <sub>3</sub> = 8.9 P <sub>90</sub> = 13.8 P <sub>99</sub> = 22.8		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	16.8	16.4	16.0	15.5	14.6	14.3	13.6	13.1	12.9	13.5	15.9	18.4	20.7	22.7	23.5	24.1	24.2	23.7	23.3	23.0	22.9	21.1	18.5	16.6	18.6	24.2																						
2-Oct	15.3	15.1	16.6	15.2	13.4	11.3	8.7	7.8	8.2	8.3	7.7	6.7	6.2	5.5	5.2	5.0	4.5	4.3	4.0	3.5	2.8	2.3	2.1	2.2	7.6	16.6																						
3-Oct	1.8	1.7	1.6	1.0	0.9	0.4	0.5	0.3	0.2	0.2	0.5	0.5	0.8	1.4	1.7	2.0	1.9	1.6	1.2	1.1	0.8	0.5	0.4	0.1	0.9	2.0																						
4-Oct	0.2	0.1	-0.3	-0.5	-0.6	-0.6	-0.8	-1.0	-1.0	-1.0	-1.0	-1.0	-0.6	-0.1	0.9	1.6	2.0	2.1	2.3	2.7	1.8	0.9	0.7	0.6	0.3	2.7																						
5-Oct	0.6	-0.5	-0.9	0.0	0.7	0.3	-0.1	-0.3	1.3	2.7	5.6	7.8	8.1	7.8	8.0	7.9	7.2	6.9	6.2	5.7	5.2	4.7	3.9	3.5	3.8	8.1																						
6-Oct	2.8	2.4	1.5	1.4	0.9	0.7	0.8	0.2	-0.8	0.4	2.6	4.8	6.5	7.3	8.3	8.6	8.7	8.5	7.6	6.7	6.0	5.5	5.3	5.0	4.2	8.7																						
7-Oct	4.6	3.8	3.6	3.4	2.8	2.5	2.2	2.4	2.4	3.0	5.0	7.6	9.7	11.9	13.1	13.6	13.8	13.5	12.3	11.0	9.6	8.8	8.1	6.8	7.3	13.8																						
8-Oct	5.7	5.1	4.7	4.2	3.2	2.2	2.3	1.7	1.5	2.3	3.4	6.6	9.9	12.3	14.1	14.5	15.1	14.9	13.9	12.4	11.5	9.5	7.0	6.7	7.7	15.1																						
9-Oct	6.7	6.7	6.7	6.3	6.3	5.9	4.6	4.8	4.4	5.8	8.4	11.6	12.8	13.5	13.5	13.4	12.6	11.9	10.8	10.3	10.5	11.0	11.3	13.4	9.3	13.5																						
10-Oct	14.2	12.7	13.3	15.8	16.0	17.0	17.1	17.0	17.4	17.9	19.3	20.0	20.4	21.3	21.1	21.1	20.9	20.1	19.0	16.4	15.7	13.8	8.6	7.7	16.8	21.3																						
11-Oct	6.6	5.1	4.9	4.6	4.2	3.9	3.7	3.4	3.0	3.1	3.3	3.8	4.2	4.8	5.2	5.2	4.8	4.9	3.9	3.3	3.2	2.9	2.6	2.0	4.0	6.6																						
12-Oct	1.7	1.4	1.3	0.2	0.1	1.5	1.0	1.0	1.7	2.7	2.6	3.7	5.1	8.6	12.0	13.5	13.8	13.5	13.0	12.5	12.2	12.0	11.5	10.6	6.6	13.8																						
13-Oct	10.1	9.5	9.2	8.8	8.5	8.9	8.9	8.4	8.5	9.0	10.5	11.5	12.5	13.1	13.5	13.7	13.5	12.9	12.2	11.0	10.2	10.0	9.4	8.8	10.5	13.7																						
14-Oct	8.4	8.0	7.8	7.7	7.4	7.2	6.7	5.9	6.3	7.0	7.8	8.9	9.6	9.5	8.9	8.8	8.7	8.1	5.4	4.4	3.8	3.7	3.7	3.5	7.0	9.6																						
15-Oct	3.3	3.4	3.3	3.2	2.8	2.5	1.9	1.8	2.5	2.7	3.7	5.6	7.4	8.4	9.7	10.0	9.5	9.4	9.6	7.8	7.1	6.0	5.3	4.8	5.5	10.0																						
16-Oct	4.3	3.7	3.5	3.3	3.2	2.9	2.6	2.2	2.3	3.6	6.3	8.6	10.6	11.7	12.5	12.9	12.6	11.6	10.5	9.4	8.8	8.3	7.5	7.0	7.1	12.9																						
17-Oct	7.1	7.2	7.2	6.4	6.1	5.8	5.4	5.1	5.2	6.1	8.4	10.8	13.6	16.6	18.8	20.6	20.0	19.0	17.4	16.0	15.1	14.9	15.0	14.9	11.8	20.6																						
18-Oct	15.3	15.6	15.9	15.0	14.2	13.2	12.3	11.5	11.4	12.0	13.4	14.7	15.7	16.2	16.4	16.7	16.4	15.6	14.7	14.2	13.4	12.4	10.7	8.3	14.0	16.7																						
19-Oct	7.2	6.2	4.9	4.2	3.7	3.5	3.8	4.0	4.0	4.3	5.1	6.0	6.5	7.3	8.3	8.9	9.0	8.9	8.7	8.3	7.6	7.3	7.4	7.7	6.4	9.0																						
20-Oct	7.9	7.8	7.1	7.1	6.7	5.6	4.6	4.2	4.4	4.9	5.7	7.3	8.3	8.9	8.7	8.3	7.7	7.4	7.4	7.2	6.0	3.0	2.1	1.9	6.3	8.9																						
21-Oct	1.6	1.7	1.6	1.6	1.7	1.4	0.9	1.0	0.9	1.3	2.7	4.6	6.7	8.1	8.8	8.3	8.0	8.0	8.1	8.0	8.0	8.1	8.3	8.6	4.9	8.8																						
22-Oct	8.9	8.5	9.9	10.0	9.6	8.6	8.0	7.3	7.6	8.7	9.5	10.5	11.7	12.6	12.9	12.9	12.6	11.9	11.0	10.1	9.3	9.2	8.8	8.5	9.9	12.9																						
23-Oct	7.5	6.1	5.6	5.3	5.6	5.2	4.9	4.9	4.8	4.7	5.8	6.6	7.3	6.8	6.7	6.3	5.6	4.8	4.3	3.3	2.6	1.9	1.2	0.7	4.9	7.5																						
24-Oct	0.5	0.3	-0.1	-0.1	-0.2	-0.2	-0.3	-0.4	-0.3	-0.4	-0.1	0.4	0.9	1.1	1.3	1.4	1.5	1.4	1.2	1.1	1.2	1.3	1.3	1.1	0.6	1.5																						
25-Oct	0.4	-0.6	-1.1	-1.2	-1.5	-1.6	-1.7	-1.6	-1.6	-1.3	-0.7	0.0	0.6	0.9	1.3	1.4	1.6	1.8	1.9	2.0	2.0	1.8	1.5	0.9	0.2	2.0																						
26-Oct	0.6	1.0	1.1	0.0	-0.3	0.1	0.5	1.0	1.5	2.0	2.8	3.8	5.3	7.0	7.6	6.8	6.4	5.9	5.4	5.1	4.9	3.3	0.6	0.0	3.0	7.6																						
27-Oct	0.0	-0.5	-0.4	-0.1	-0.1	0.0	0.1	0.2	0.3	0.5	0.5	0.6	1.1	1.6	1.6	1.8	1.8	1.7	1.4	0.8	0.3	0.0	-0.2	-0.5	0.5	1.8																						
28-Oct	-0.9	-1.5	-2.0	-2.2	-2.3	-2.3	-2.5	-2.7	-2.7	-2.8	-2.6	-2.4	-1.7	-1.0	-0.6	0.0	-0.2	-0.9	-1.4	-1.6	-1.7	-2.0	-2.0	-1.9	-1.7	0.0																						
29-Oct	-2.1	-2.4	-2.4	-2.3	-2.1	-1.6	-1.2	-1.1	-0.7	0.0	0.9	1.8	3.1	3.8	4.9	6.1	6.2	6.2	6.1	5.7	6.0	5.8	5.6	5.1	2.1	6.2																						
30-Oct	4.5	3.8	3.7	3.9	3.9	3.6	3.1	2.7	2.6	2.5	3.2	4.2	4.9	5.8	6.8	7.6	7.1	7.6	6.8	6.7	6.5	5.2	4.3	3.1	4.8	7.6																						
31-Oct	2.5	1.6	1.2	1.2	1.4	1.5	1.0	0.5	0.3	0.4	0.9	1.3	1.9	2.1	1.9	1.4	1.1	0.6	0.2	-0.2	-0.5	-0.8	-0.9	-1.0	0.8	2.5																						
																								5.3	4.8	4.7	4.5	4.2	4.0	3.6	3.4	3.5	4.0	5.1	6.3	7.4	8.3	8.9	9.2	9.0	8.6	8.0	7.3	6.9	6.2	5.5	5.0	Diurnal Average
																								16.8	16.4	16.6	15.8	16.0	17.0	17.1	17.0	17.4	17.9	19.3	20.0	20.7	22.7	23.5	24.1	24.2	23.7	23.3	23.0	22.9	21.1	18.5	16.6	Diurnal Maximum





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

**Ambient Temperature 90 m (AT90m) - C**  
**Mannix - October 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	86	11.56	11.56
0 - 10	502	67.47	79.03
10 - 20	138	18.55	97.58
> 20	18	2.42	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

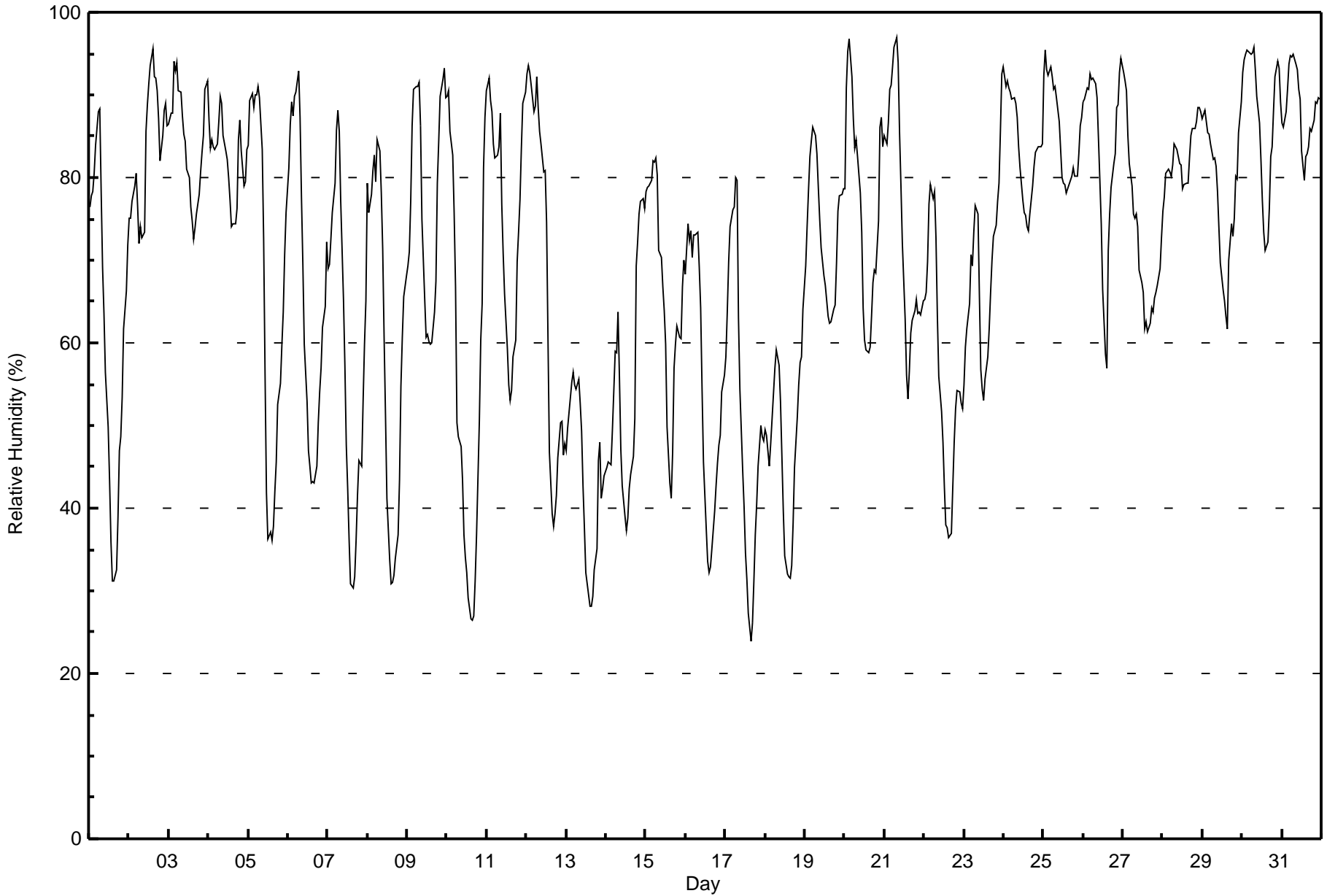
**Summary of Hour Averages**

**Relative Humidity (RH) - %**

**Mannix - October 2015**

Maximum Value: 97 % on Oct 21 08:00														Maximum Daily Average: 88.5 % on Oct 31														Hours in Service: 744											
Minimum Value: 24 % on Oct 17 16:00														Minimum Daily Average: 43.5 % on Oct 13														Hours of Data: 744											
Maximum Diurnal Average: 81.8 % at hour 5														Minimum Diurnal Average: 53.1 % at hour 15														Hours of Missing Data: 0											
Monthly Average: 69.8 %														Percentiles: P <sub>1</sub> = 28 P <sub>10</sub> = 42 Q <sub>1</sub> = 56 Median = 75 Q <sub>3</sub> = 85 P <sub>90</sub> = 91 P <sub>99</sub> = 95														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	78	78	80	84	88	88	78	69	64	56	50	43	36	31	31	33	39	47	49	53	62	66	72	60.5	88													
2-Oct	75	75	77	79	80	77	72	74	73	73	86	89	91	94	96	92	92	91	87	82	85	88	89	86	83.5	96													
3-Oct	86	88	88	94	93	94	90	90	87	85	84	81	80	76	75	73	74	76	78	81	83	85	91	92	84.4	94													
4-Oct	87	84	85	84	83	84	87	90	89	85	83	82	80	77	74	74	76	76	85	87	83	79	79	83	82.3	90													
5-Oct	84	89	90	88	90	90	91	90	83	73	56	42	36	37	36	38	42	46	53	55	60	64	71	76	65.8	91													
6-Oct	81	87	89	87	90	90	93	87	78	70	60	53	47	45	43	43	43	45	50	54	57	62	64	72	66.3	93													
7-Oct	69	69	72	76	79	86	88	86	77	65	57	48	42	36	31	30	32	36	41	46	45	53	60	65	58.0	88													
8-Oct	79	76	78	81	83	80	85	83	78	71	61	51	41	34	31	31	32	34	37	43	55	61	66	68	59.9	85													
9-Oct	69	71	77	86	91	91	91	92	86	75	65	61	61	60	60	60	64	68	79	84	90	92	93	90	77.3	93													
10-Oct	90	91	86	83	76	67	50	49	47	43	37	34	32	29	27	26	27	31	37	50	60	65	81	87	54.4	91													
11-Oct	91	92	89	88	84	82	83	84	88	77	71	66	59	55	53	54	58	60	70	73	77	84	89	90	75.7	92													
12-Oct	93	94	93	91	88	89	92	88	86	84	81	81	75	60	47	39	38	39	42	46	50	51	46	48	68.3	94													
13-Oct	47	50	53	55	56	55	54	56	53	49	43	38	32	29	28	29	33	35	46	48	41	42	44	44	43.5	56													
14-Oct	45	46	45	45	49	59	59	64	56	47	43	39	37	39	42	44	46	51	69	72	76	77	78	76	54.3	78													
15-Oct	78	79	79	80	82	82	82	80	71	70	67	64	60	50	43	41	47	57	60	62	61	61	67	70	66.3	82													
16-Oct	68	74	72	73	70	73	73	73	69	64	54	46	37	34	32	33	35	40	43	46	48	49	54	56	54.9	74													
17-Oct	58	64	70	74	76	76	80	80	63	54	45	40	35	31	27	24	26	31	37	40	45	50	49	48	51.0	80													
18-Oct	50	49	45	48	51	54	57	59	57	53	46	40	34	32	32	32	33	38	45	51	55	58	58	64	47.5	64													
19-Oct	69	74	79	83	84	86	85	83	79	75	71	68	67	65	63	62	63	64	65	70	76	78	78	79	73.5	86													
20-Oct	79	91	95	97	92	87	84	85	83	78	73	64	60	59	59	59	63	67	69	68	75	86	87	84	76.9	97													
21-Oct	85	84	87	91	91	93	96	97	94	85	79	72	63	56	53	57	61	63	64	65	64	64	63	65	74.6	97													
22-Oct	65	66	70	77	79	78	78	73	63	56	52	48	43	38	38	36	37	42	48	52	54	54	53	52	56.3	79													
23-Oct	55	59	62	65	71	69	73	77	76	66	57	54	53	56	58	62	66	70	73	74	77	79	86	93	67.9	93													
24-Oct	93	91	92	91	90	89	90	89	87	84	81	77	76	75	74	74	76	79	81	83	83	84	84	84	84	83.6	93												
25-Oct	92	95	93	92	93	92	91	91	90	87	83	80	79	79	78	79	80	80	81	80	80	83	86	87	85.6	95													
26-Oct	89	90	91	91	93	92	92	91	90	85	80	74	66	59	57	71	76	79	82	83	89	89	93	94	83.0	94													
27-Oct	93	92	90	85	82	79	76	75	76	74	69	67	66	62	63	61	62	64	64	65	66	67	69	73	72.5	93													
28-Oct	76	78	81	81	81	80	82	84	83	83	82	82	79	79	79	79	82	85	86	86	87	88	88	88	82.4	88													
29-Oct	87	88	87	85	85	84	82	82	81	78	74	70	66	65	63	62	70	74	73	75	80	80	85	89	77.8	89													
30-Oct	93	94	95	95	95	95	95	96	93	90	87	82	77	73	71	72	76	82	84	88	92	94	93	89	87.6	96													
31-Oct	87	86	88	91	94	95	95	95	94	93	91	90	83	80	82	83	84	86	86	87	89	89	90	90	88.5	95													
														77.1	78.8	79.9	81.2	81.8	81.8	81.8	81.3	77.4	72.1	66.9	62.3	58.2	54.9	53.1	53.3	55.5	58.9	62.8	66.0	69.1	71.4	74.2	75.9	Diurnal Average	
														93	95	95	97	95	95	96	97	94	93	91	90	91	94	96	92	92	91	87	88	92	94	93	94	Diurnal Maximum	







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

**Relative Humidity (RH) - %**  
**Mannix - October 2015**

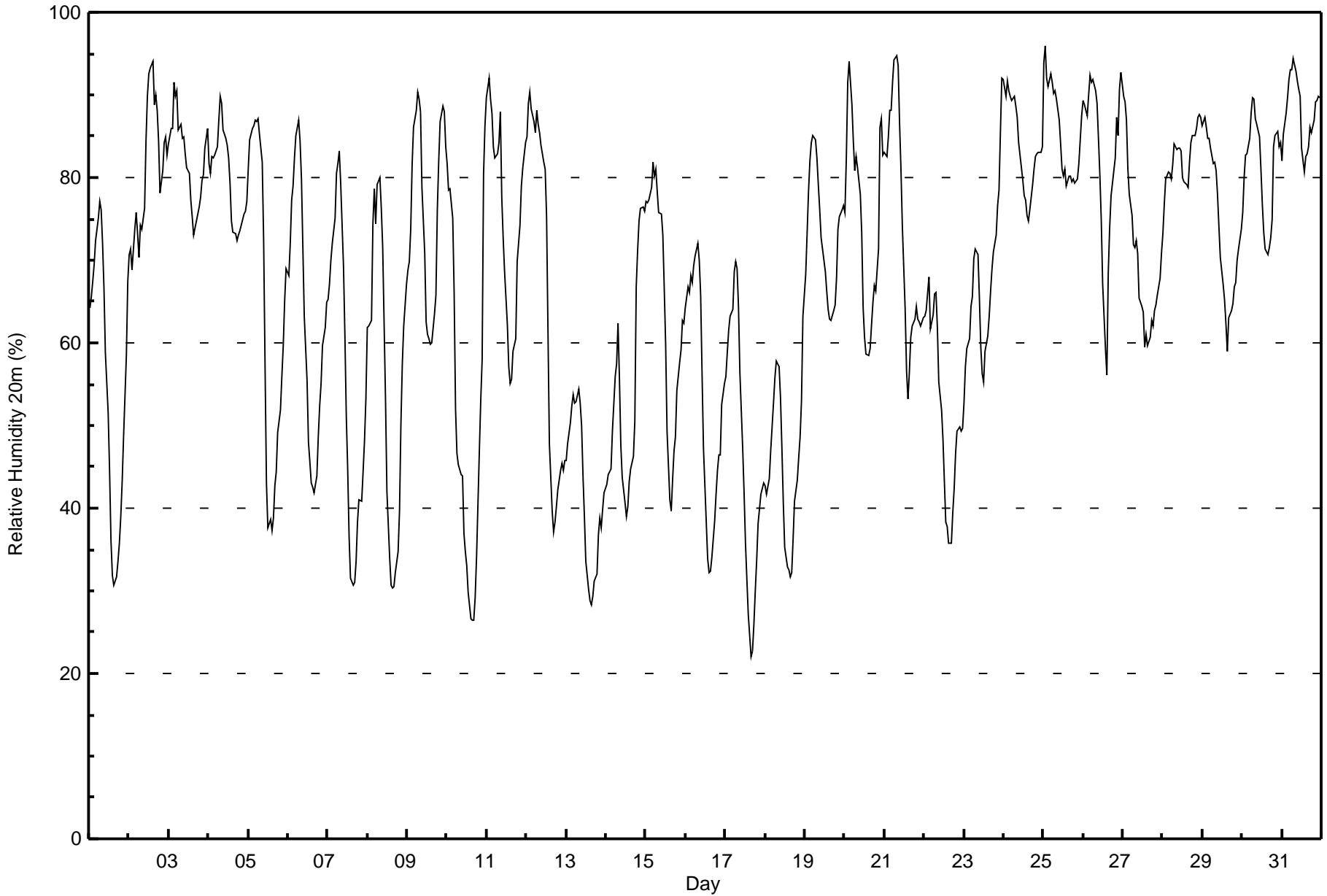
<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	67	9.01	9.01
40 - 60	151	20.30	29.30
60 - 80	247	33.20	62.50
80 - 100	279	37.50	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Value: 96 % on Oct 25 02:00																	Maximum Daily Average: 88.0 % on Oct 31																	Hours in Service: 744								
Minimum Value: 22 % on Oct 17 16:00																	Minimum Daily Average: 41.8 % on Oct 13																	Hours of Data: 744								
Maximum Diurnal Average: 78.9 % at hour 8																	Minimum Diurnal Average: 52.9 % at hour 16																	Hours of Missing Data: 0								
Monthly Average: 67.7 %																	Percentiles: P <sub>1</sub> = 28 P <sub>10</sub> = 40 Q <sub>1</sub> = 55 Median = 71 Q <sub>3</sub> = 83 P <sub>90</sub> = 88 P <sub>99</sub> = 94																	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	64	66	67	69	72	75	77	76	72	67	59	52	45	36	32	31	32	34	36	39	43	49	58	68	54.9	77																
2-Oct	71	71	69	74	76	73	70	74	74	76	84	90	92	93	94	89	90	88	84	78	81	84	85	83	81.0	94																
3-Oct	84	86	86	91	90	91	86	86	85	85	83	81	81	77	75	73	74	75	76	78	80	80	84	86	82.2	91																
4-Oct	82	80	82	82	83	84	87	90	89	86	85	84	82	79	75	73	72	73	74	74	76	76	77	79.9	90																	
5-Oct	81	85	86	86	87	87	87	85	82	72	57	43	38	39	37	39	43	44	49	52	56	60	65	69	63.7	87																
6-Oct	68	72	77	79	82	85	87	84	80	71	63	55	48	46	43	43	42	44	49	52	55	60	62	65	63.0	87																
7-Oct	65	67	70	72	75	81	82	83	79	69	61	51	45	37	32	31	31	34	38	41	41	44	48	53	55.4	83																
8-Oct	62	62	63	74	79	74	79	80	76	72	62	53	42	34	31	30	31	32	35	40	50	57	62	67	56.2	80																
9-Oct	69	70	74	81	86	88	90	90	88	79	71	63	61	61	60	60	63	66	76	82	87	89	88	84	76.0	90																
10-Oct	82	78	79	75	66	52	47	45	44	44	37	35	33	30	27	26	26	29	34	47	53	58	80	86	50.6	86																
11-Oct	90	92	90	88	84	82	83	84	88	78	73	69	62	57	55	56	59	60	70	72	74	79	81	84	75.4	92																
12-Oct	85	89	90	88	87	85	88	86	85	84	82	81	75	61	48	40	37	38	40	42	45	45	45	46	66.4	90																
13-Oct	46	48	50	52	54	53	53	54	53	50	44	39	34	30	29	28	29	31	32	37	39	38	40	42	41.8	54																
14-Oct	43	44	44	45	49	56	57	62	56	48	44	41	39	40	43	45	46	51	67	71	75	76	76	76	53.9	76																
15-Oct	77	77	77	79	82	80	81	78	76	76	73	67	60	49	41	40	44	47	49	54	58	59	63	62	64.5	82																
16-Oct	64	67	66	68	67	69	71	72	70	66	56	47	38	34	32	32	34	38	42	45	46	46	53	55	53.3	72																
17-Oct	56	59	62	63	64	69	70	69	64	56	47	42	36	31	27	22	23	26	30	34	38	42	42	43	46.5	70																
18-Oct	43	42	43	47	50	53	56	58	57	53	47	41	35	33	32	32	32	36	41	43	46	49	53	63	45.2	63																
19-Oct	68	73	78	82	84	85	85	82	79	76	73	70	69	66	64	63	63	64	64	68	74	75	76	77	73.3	85																
20-Oct	76	82	92	94	89	84	81	83	81	78	73	64	61	59	58	59	62	65	67	66	71	86	87	83	75.1	94																
21-Oct	83	83	85	88	88	92	94	95	93	87	81	74	64	57	53	56	61	62	63	64	63	63	62	63	73.9	95																
22-Oct	63	64	66	68	62	63	66	66	62	55	52	48	43	38	38	36	36	39	42	47	49	50	49	50	52.2	68																
23-Oct	53	57	59	60	64	66	70	71	71	65	59	56	55	59	61	63	66	69	71	73	77	78	85	92	66.8	92																
24-Oct	92	90	92	91	90	89	90	89	87	84	83	80	78	77	75	75	76	79	81	83	83	83	83	84	83.8	92																
25-Oct	94	96	92	91	93	91	90	91	90	87	84	81	80	81	79	80	80	80	80	79	80	82	85	87	85.5	96																
26-Oct	89	89	88	90	92	92	92	91	89	85	80	75	67	59	56	68	74	78	81	82	87	85	91	93	82.2	93																
27-Oct	90	89	87	81	78	75	72	71	72	71	65	64	64	59	61	60	61	63	62	64	65	66	68	71	69.9	90																
28-Oct	73	77	80	81	80	80	82	84	83	84	84	83	80	80	79	79	82	84	85	85	86	87	88	87	82.2	88																
29-Oct	86	87	86	85	85	84	82	82	81	78	74	70	67	65	62	59	63	64	65	67	67	70	71	74	73.9	87																
30-Oct	76	80	83	83	85	88	90	90	87	86	85	81	77	73	71	71	71	73	75	84	85	86	84	84	81.1	90																
31-Oct	82	85	88	90	92	93	93	94	93	92	91	90	84	81	83	83	84	86	86	87	89	89	90	90	88.0	94																
																	72.8	74.4	75.8	77.4	77.9	78.0	78.6	78.9	77.0	72.9	68.2	63.6	59.1	55.5	53.4	52.9	54.4	56.5	59.4	62.2	65.0	67.4	70.3	72.3	Diurnal Average	
																	94	96	92	94	93	93	94	95	93	92	91	90	92	93	94	89	90	88	86	87	89	89	91	93	Diurnal Maximum	





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

**Relative Humidity 20m (RH20m) - %**  
**Mannix - October 2015**

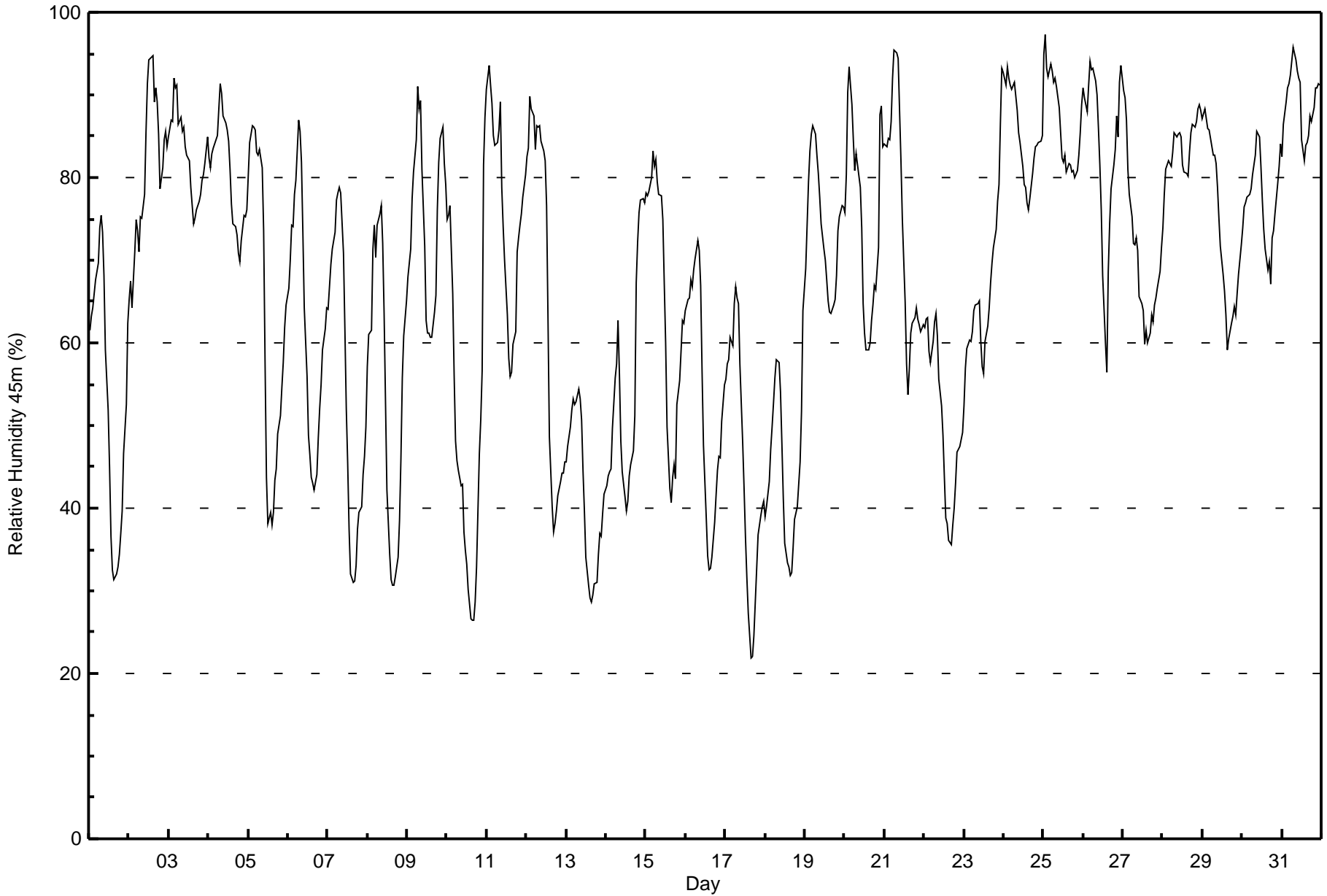
<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	76	10.22	10.22
40 - 60	154	20.70	30.91
60 - 80	265	35.62	66.53
80 - 100	249	33.47	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Value: 97 % on Oct 25 02:00																	Maximum Daily Average: 89.2 % on Oct 31																	Hours in Service: 744								
Minimum Value: 22 % on Oct 17 16:00																	Minimum Daily Average: 41.6 % on Oct 13																	Hours of Data: 744								
Maximum Diurnal Average: 78.4 % at hour 8																	Minimum Diurnal Average: 53.5 % at hour 16																	Hours of Missing Data: 0								
Monthly Average: 67.5 %																	Percentiles: P <sub>1</sub> = 29 P <sub>10</sub> = 39 Q <sub>1</sub> = 55 Median = 71 Q <sub>3</sub> = 83 P <sub>90</sub> = 88 P <sub>99</sub> = 94																	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	62	63	64	66	68	70	74	75	73	68	59	52	45	37	32	31	32	33	34	37	40	47	53	62	53.2	75																
2-Oct	65	68	64	71	75	74	71	75	75	78	85	91	94	94	95	89	91	89	85	79	81	85	86	84	81.0	95																
3-Oct	85	87	87	92	91	91	86	87	86	86	84	83	82	79	77	74	75	76	77	78	80	80	82	85	82.9	92																
4-Oct	82	81	83	84	84	85	88	91	90	87	87	86	84	81	77	74	74	73	71	70	72	75	75	76	80.5	91																
5-Oct	80	84	86	86	86	83	83	83	81	74	58	44	38	39	38	40	43	45	49	51	55	58	62	65	62.9	86																
6-Oct	67	70	74	74	78	80	87	86	82	73	64	56	49	46	44	43	42	44	49	52	55	59	62	64	62.5	87																
7-Oct	64	67	70	71	73	77	78	79	78	71	62	52	45	37	32	31	31	33	37	39	40	44	46	50	54.6	79																
8-Oct	57	61	61	71	74	70	74	76	77	72	64	53	42	34	31	31	31	32	34	39	46	56	61	65	54.7	77																
9-Oct	68	70	71	77	81	85	91	88	89	81	72	63	61	61	61	61	64	66	76	82	85	86	82	79	74.9	91																
10-Oct	75	75	77	66	56	48	46	45	43	43	37	35	33	30	27	26	26	29	33	47	51	57	81	87	48.9	87																
11-Oct	91	94	91	89	85	84	84	86	89	79	74	70	63	58	56	56	60	61	71	73	74	76	78	80	75.9	94																
12-Oct	83	84	90	88	88	83	86	86	86	84	83	82	77	63	49	40	37	38	40	42	43	44	44	46	66.1	90																
13-Oct	46	48	50	52	53	53	53	54	53	51	45	40	34	31	29	29	29	31	31	34	37	37	39	42	41.6	54																
14-Oct	43	44	44	45	50	56	58	63	56	48	44	41	40	41	44	45	47	51	67	72	76	77	77	77	54.4	77																
15-Oct	78	78	78	80	83	81	82	80	78	78	75	67	60	50	42	41	44	45	44	52	55	59	63	62	64.8	83																
16-Oct	64	65	65	68	67	69	70	72	71	67	57	48	39	34	33	33	34	38	42	45	46	46	50	55	53.2	72																
17-Oct	56	57	58	61	60	65	67	65	65	57	48	42	36	32	27	22	22	25	29	33	37	39	40	41	45.1	67																
18-Oct	39	40	43	47	50	53	56	58	58	54	48	41	36	33	33	32	32	35	39	40	43	46	52	64	44.6	64																
19-Oct	69	74	79	83	85	86	85	83	81	78	74	71	70	68	65	64	63	65	65	68	74	75	77	76	74.1	86																
20-Oct	76	80	90	93	89	85	81	83	82	79	74	65	61	59	59	60	63	65	67	66	72	88	89	84	75.3	93																
21-Oct	84	84	85	85	87	92	96	95	94	88	82	75	65	58	54	57	61	62	63	64	63	62	61	62	74.1	96																
22-Oct	62	63	63	59	58	60	63	63	61	56	52	49	44	39	38	36	36	38	40	43	47	47	48	49	50.6	63																
23-Oct	52	57	59	60	60	61	64	65	65	65	60	57	56	60	62	64	67	70	71	74	77	79	87	93	66.1	93																
24-Oct	93	91	93	92	91	91	91	90	88	85	84	81	79	79	77	76	77	80	82	84	84	84	84	85	85.2	93																
25-Oct	95	97	93	92	94	93	92	92	91	88	85	82	82	83	81	82	81	81	81	80	81	83	85	89	86.8	97																
26-Oct	91	90	88	91	94	93	93	92	90	86	82	76	68	60	56	69	74	79	82	83	87	85	92	94	83.1	94																
27-Oct	90	90	87	81	78	75	72	72	73	71	66	65	64	60	61	60	61	63	63	65	65	67	69	72	70.4	90																
28-Oct	74	78	81	82	82	81	83	85	85	85	85	85	82	81	81	80	83	85	86	86	87	88	89	88	83.5	89																
29-Oct	87	88	87	86	86	85	83	83	82	79	75	72	68	66	63	59	61	62	63	64	63	66	68	72	73.7	88																
30-Oct	74	76	77	78	78	79	80	81	83	86	85	81	77	74	71	69	70	67	73	74	76	79	81	84	77.2	86																
31-Oct	83	86	89	91	91	92	94	96	94	93	92	91	85	82	84	84	85	88	87	88	91	91	91	91	89.2	96																
																	72.0	73.9	75.2	76.2	76.6	76.7	77.7	78.4	77.4	73.9	69.1	64.4	60.0	56.4	54.1	53.5	54.8	56.4	59.0	61.4	63.9	66.6	69.5	71.7	Diurnal Average	
																	95	97	93	93	94	93	96	96	94	93	92	91	94	94	95	89	91	89	87	88	91	91	92	94	Diurnal Maximum	





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

**Relative Humidity 45m (RH45m) - %**  
**Mannix - October 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	80	10.75	10.75
40 - 60	150	20.16	30.91
60 - 80	266	35.75	66.67
80 - 100	248	33.33	100.00

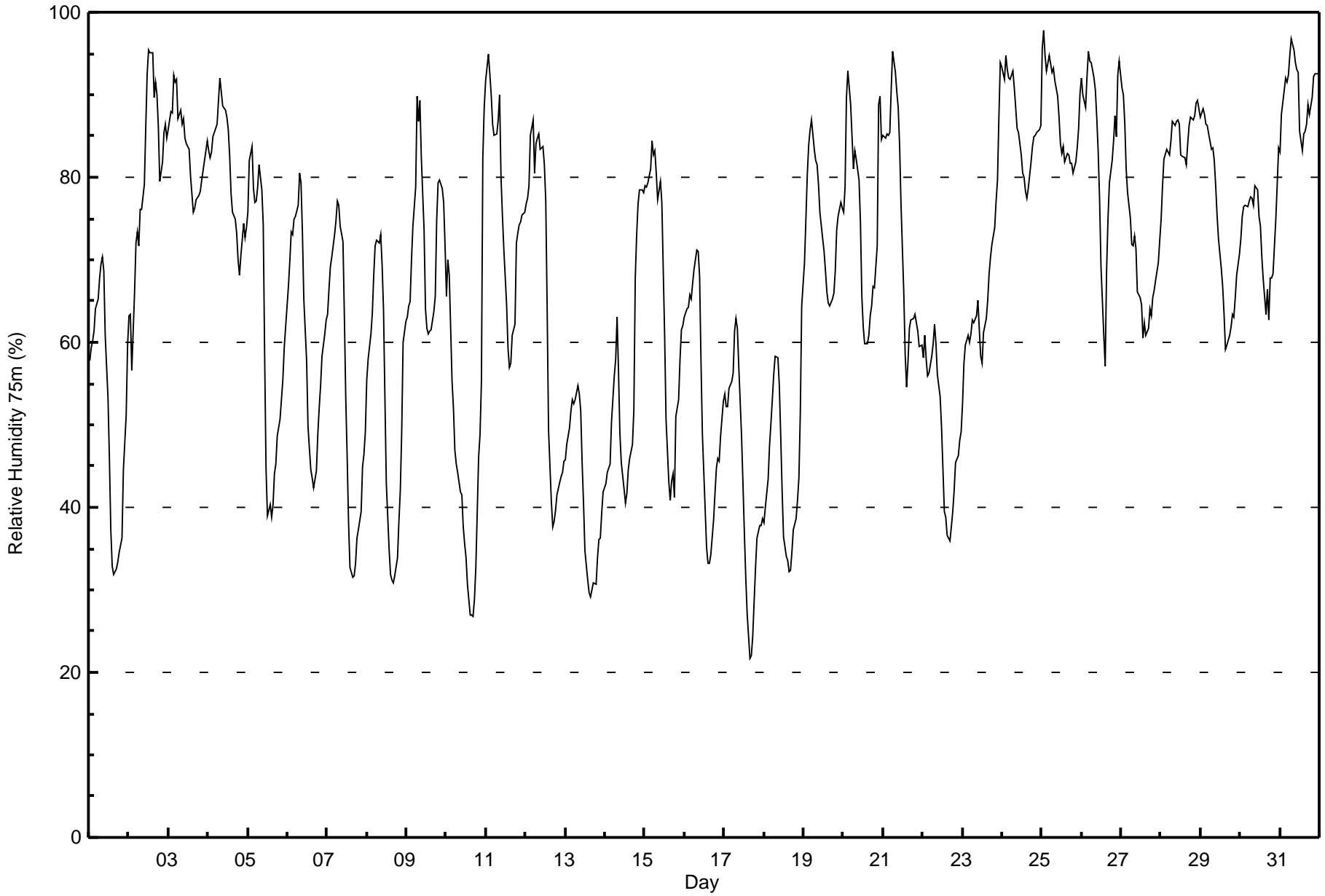
Total Number of Valid Hours: 744

Total Number of Hours: 744





Maximum Value: 98 % on Oct 25 02:00																	Maximum Daily Average: 90.2 % on Oct 31																	Hours in Service: 744								
Minimum Value: 22 % on Oct 17 16:00																	Minimum Daily Average: 41.8 % on Oct 13																	Hours of Data: 744								
Maximum Diurnal Average: 77.6 % at hour 8																	Minimum Diurnal Average: 54.0 % at hour 16																	Hours of Missing Data: 0								
Monthly Average: 67.1 %																	Percentiles: P <sub>1</sub> = 29 P <sub>10</sub> = 39 Q <sub>1</sub> = 53 Median = 70 Q <sub>3</sub> = 83 P <sub>90</sub> = 89 P <sub>99</sub> = 95																	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	58	59	60	61	64	65	68	69	70	69	61	53	46	37	33	32	32	33	35	35	36	45	51	60	51.4	70																
2-Oct	63	63	57	66	72	73	72	76	76	79	86	93	95	95	95	90	91	90	86	79	82	85	86	85	80.7	95																
3-Oct	86	88	88	92	92	92	87	88	86	87	85	84	83	80	78	76	76	77	78	78	80	81	82	84	83.7	92																
4-Oct	83	82	83	85	85	86	89	92	90	89	88	87	86	82	78	76	75	73	70	68	71	74	73	74	80.9	92																
5-Oct	76	82	84	79	77	77	79	82	78	74	58	45	39	40	39	40	44	45	49	51	53	55	59	62	61.1	84																
6-Oct	67	70	73	73	75	75	77	80	79	73	65	58	50	47	45	44	42	44	49	52	55	58	61	63	61.5	80																
7-Oct	63	67	69	70	73	75	77	77	74	72	63	53	46	38	33	32	32	33	36	37	40	45	46	49	54.2	77																
8-Oct	55	58	61	64	68	72	72	72	73	69	64	53	43	35	32	31	31	32	34	38	42	49	60	63	53.0	73																
9-Oct	63	64	65	70	74	79	90	87	89	83	74	64	62	61	61	61	64	66	75	79	80	79	77	72	72.4	90																
10-Oct	66	70	68	55	52	47	45	44	42	42	38	36	34	31	27	27	27	29	33	46	49	55	82	88	47.2	88																
11-Oct	92	95	93	90	86	85	85	87	90	80	75	71	65	59	57	57	61	62	72	73	74	75	75	76	76.5	95																
12-Oct	77	78	79	85	87	80	84	85	85	83	84	82	77	64	49	41	38	38	40	42	43	44	44	46	64.7	87																
13-Oct	46	48	50	52	53	52	53	55	54	52	45	40	35	31	30	29	30	31	31	34	36	36	39	42	41.8	55																
14-Oct	43	44	45	45	50	56	58	63	57	49	45	42	41	42	45	46	48	52	68	73	77	78	78	78	55.1	78																
15-Oct	79	79	79	81	84	83	83	81	77	80	77	69	61	51	43	41	43	44	41	51	53	58	61	62	65.0	84																
16-Oct	63	64	64	66	65	67	69	71	71	68	58	49	40	35	33	33	34	39	42	45	46	46	49	53	52.9	71																
17-Oct	54	52	52	54	55	56	61	63	62	57	49	43	37	32	27	22	22	24	29	33	36	38	38	39	43.1	63																
18-Oct	38	40	43	47	50	53	56	58	58	55	49	42	36	34	33	32	32	35	37	39	41	43	51	64	44.6	64																
19-Oct	70	75	80	84	86	87	83	82	82	79	76	73	71	69	66	65	64	65	66	69	74	75	77	76	74.7	87																
20-Oct	76	79	90	93	89	85	81	83	82	80	75	66	62	60	60	61	63	64	67	67	72	89	90	85	75.6	93																
21-Oct	85	85	85	85	85	91	95	93	90	88	84	77	66	58	55	58	62	63	63	63	62	61	60	60	73.9	95																
22-Oct	58	61	58	56	56	58	60	62	60	56	53	50	45	39	39	37	36	38	40	42	45	46	48	49	49.7	62																
23-Oct	52	57	60	61	60	61	63	62	63	65	61	58	57	61	63	65	68	70	72	74	77	80	87	94	66.4	94																
24-Oct	93	92	95	93	92	92	93	91	88	86	85	83	81	80	78	77	79	82	84	85	85	85	86	86	86.3	95																
25-Oct	96	98	95	93	95	94	93	93	92	90	87	84	83	84	82	83	83	82	82	81	82	83	86	90	87.8	98																
26-Oct	92	90	88	92	95	94	94	92	91	87	83	77	69	61	57	69	75	79	82	84	87	85	92	94	83.8	95																
27-Oct	91	90	87	81	78	75	72	72	73	71	66	65	65	60	62	61	62	64	63	65	66	67	70	72	70.8	91																
28-Oct	75	79	82	83	83	83	84	87	86	87	87	86	83	83	82	81	84	86	87	87	87	89	89	88	84.6	89																
29-Oct	87	88	88	86	86	85	83	83	82	79	75	73	69	67	63	59	60	61	62	63	63	65	68	71	73.7	88																
30-Oct	73	75	76	77	76	77	78	78	77	79	79	75	74	70	68	63	66	63	68	68	68	75	79	84	73.5	84																
31-Oct	83	88	90	92	91	92	95	97	96	94	93	93	86	83	85	86	87	89	88	90	92	93	93	93	90.2	97																
																	71.0	72.9	73.8	74.6	75.4	75.8	76.8	77.6	76.6	74.3	70.0	65.3	60.8	57.1	54.8	54.0	55.2	56.6	58.9	61.0	63.0	65.8	69.0	71.0	Diurnal Average	
																	96	98	95	93	95	94	95	97	96	94	93	93	95	95	95	90	91	90	88	90	92	93	93	94	Diurnal Maximum	





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

**Relative Humidity 75m (RH75m) - %**  
**Mannix - October 2015**

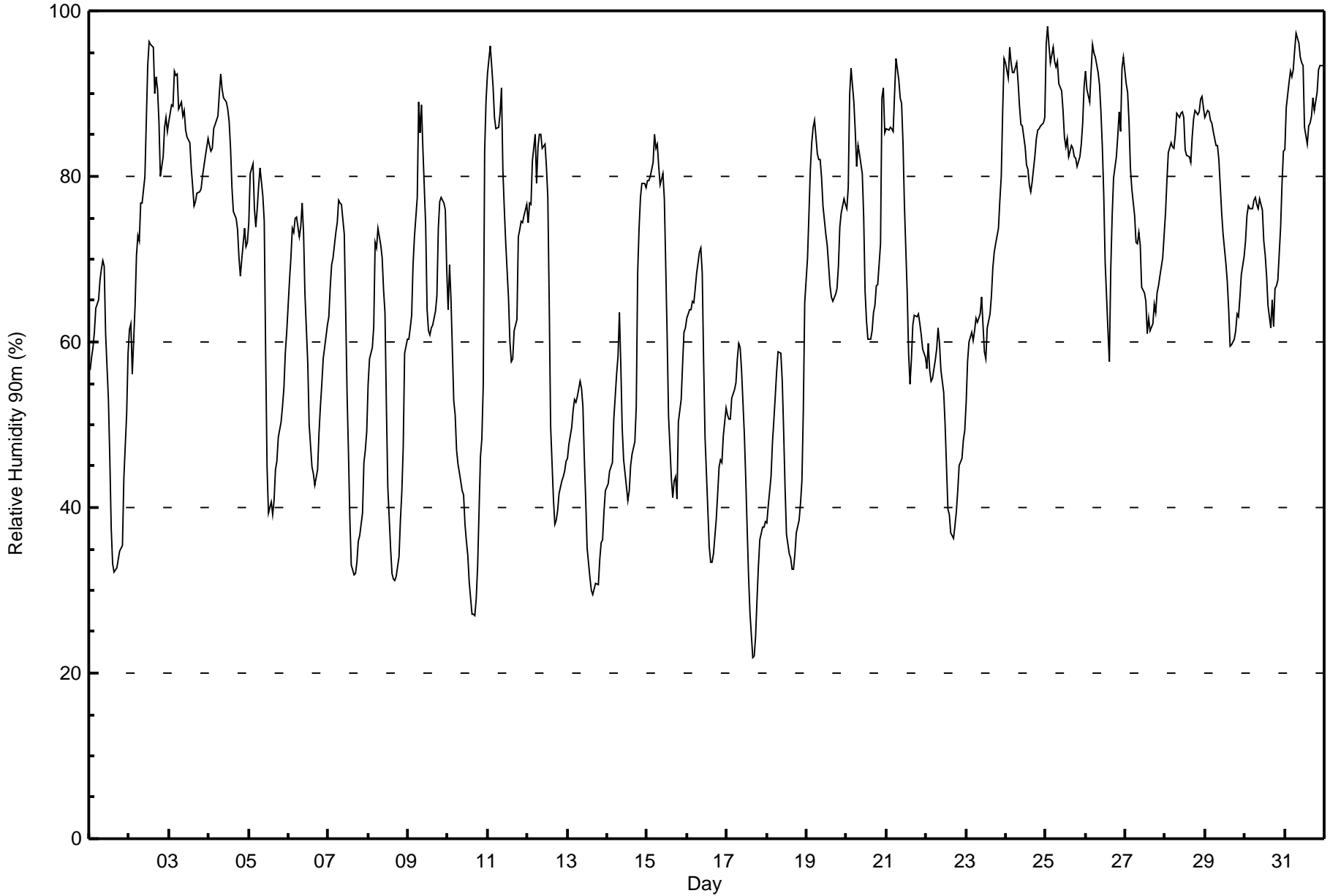
<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	81	10.89	10.89
40 - 60	163	21.91	32.80
60 - 80	271	36.42	69.22
80 - 100	229	30.78	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Value: 98 % on Oct 25 02:00														Maximum Daily Average: 90.9 % on Oct 31														Hours in Service: 744	
Minimum Value: 22 % on Oct 17 16:00														Minimum Daily Average: 42.0 % on Oct 13														Hours of Data: 744	
Maximum Diurnal Average: 77.4 % at hour 8														Minimum Diurnal Average: 54.3 % at hour 16														Hours of Missing Data: 0	
Monthly Average: 67.2 %														Percentiles: P <sub>1</sub> = 29 P <sub>10</sub> = 39 Q <sub>1</sub> = 53 Median = 70 Q <sub>3</sub> = 83 P <sub>90</sub> = 89 P <sub>99</sub> = 96														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	57	58	59	61	64	65	67	69	70	69	61	53	46	37	33	32	33	34	35	35	35	44	51	59	51.1	70			
2-Oct	61	62	56	64	71	73	72	77	77	80	87	93	96	96	96	90	92	90	87	80	82	86	87	85	80.9	96			
3-Oct	87	89	88	93	92	92	88	89	87	88	86	85	84	81	79	76	77	78	78	79	80	81	82	85	84.3	93			
4-Oct	84	83	83	86	86	87	90	92	91	90	89	88	87	83	79	76	75	74	70	68	70	74	72	72	81.1	92			
5-Oct	74	80	82	76	74	76	79	81	78	75	59	45	39	41	39	41	45	46	49	50	52	54	59	61	60.6	82			
6-Oct	68	70	74	73	75	75	73	74	77	73	66	57	50	47	45	44	43	45	49	52	55	58	61	62	61.0	77			
7-Oct	63	67	69	70	73	74	77	77	77	73	64	54	47	38	33	32	32	33	36	37	39	45	47	49	54.4	77			
8-Oct	55	58	59	62	72	71	74	72	70	66	64	52	43	35	32	31	31	32	34	38	42	47	59	60	52.5	74			
9-Oct	60	62	63	69	73	77	89	85	89	83	74	64	61	61	62	62	64	66	74	77	78	77	76	69	71.4	89			
10-Oct	64	69	65	53	51	47	45	44	42	41	38	36	34	31	27	27	27	29	33	46	48	55	83	89	46.9	89			
11-Oct	92	96	93	91	87	86	86	88	91	81	76	72	65	60	58	58	61	63	73	74	75	74	75	77	77.1	96			
12-Oct	74	77	77	82	85	79	84	85	85	83	84	81	78	65	50	41	38	38	40	42	43	44	44	46	64.3	85			
13-Oct	46	48	50	52	53	53	53	55	54	52	46	41	35	32	30	29	30	31	31	34	36	36	39	42	42.0	55			
14-Oct	43	44	45	45	51	56	58	64	57	50	46	43	41	42	45	46	48	52	68	74	78	79	79	79	55.5	79			
15-Oct	79	79	80	82	85	83	84	81	79	80	77	69	61	51	43	41	43	44	41	50	53	57	61	62	65.3	85			
16-Oct	63	64	64	65	65	67	68	71	71	68	57	49	40	35	33	33	34	39	42	45	46	45	49	52	52.7	71			
17-Oct	51	51	51	53	54	55	58	60	59	57	49	43	37	32	27	22	22	24	29	33	36	38	38	38	42.4	60			
18-Oct	38	40	44	48	50	53	56	59	59	55	49	42	37	34	34	32	33	34	37	38	40	43	52	65	44.8	65			
19-Oct	70	75	81	84	86	87	83	82	82	80	76	73	72	69	67	65	65	66	66	69	74	76	77	77	75.1	87			
20-Oct	76	79	90	93	89	85	81	84	83	80	75	66	62	60	60	61	64	64	67	67	72	90	91	85	76.0	93			
21-Oct	86	86	86	86	85	90	94	92	90	89	84	77	66	59	55	58	62	63	63	63	62	61	59	58	73.9	94			
22-Oct	57	60	57	55	56	58	59	62	60	57	54	50	45	40	39	37	36	38	40	42	45	46	48	49	49.5	62			
23-Oct	53	58	60	61	60	61	63	62	63	65	62	59	58	62	63	66	69	71	72	74	77	80	88	94	66.7	94			
24-Oct	94	92	96	94	93	92	94	91	89	86	86	83	81	81	79	78	79	83	85	86	86	86	87	87	86.9	96			
25-Oct	96	98	96	94	96	94	93	94	91	90	88	85	84	85	82	84	83	82	82	81	82	84	86	91	88.4	98			
26-Oct	93	91	89	93	96	95	94	93	91	88	84	78	70	61	58	69	75	80	82	85	88	85	93	94	84.3	96			
27-Oct	91	90	87	81	78	75	72	72	73	72	67	66	65	61	63	61	62	65	64	66	67	68	70	73	71.2	91			
28-Oct	76	80	83	84	84	83	85	88	87	88	88	87	83	83	82	82	85	87	88	87	88	89	90	88	85.1	90			
29-Oct	87	88	88	87	86	85	84	84	82	79	76	73	70	67	64	60	60	60	61	63	63	65	68	70	73.8	88			
30-Oct	72	75	76	76	76	77	77	77	76	77	76	72	71	68	64	62	65	62	66	67	67	74	79	83	72.4	83			
31-Oct	83	88	91	93	92	93	95	97	96	94	94	93	86	84	86	86	87	90	88	90	93	93	93	93	90.9	97			
70.7														72.8														Diurnal Average	
96														98														Diurnal Maximum	





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

**Relative Humidity 90m (RH90m) - %**  
**Mannix - October 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	81	10.89	10.89
40 - 60	167	22.45	33.33
60 - 80	264	35.48	68.82
80 - 100	232	31.18	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 37 km/h on Oct 10 15:00	Maximum Daily Speed Average: 20.1 km/h on Oct 27	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 9 22:00	Minimum Daily Speed Average: 1.0 km/h on Oct 9	Hours of Data: 742
Maximum Diurnal Speed Average: 4.3 km/h at hour 16	Minimum Diurnal Speed Average: 0.3 km/h at hour 20	Hours of Missing Data: 2
Monthly Average Velocity: 2.1 km/h 244.7 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 4 Q <sub>1</sub> = 7 Median = 10 Q <sub>3</sub> = 16 P <sub>90</sub> = 22 P <sub>99</sub> = 31	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	SSE9	SSE9	SE8	SSE10	SSE9	SSE10	SSE9	SSE10	SSE7	SE8	SE7	SE9	SE8	S5	SSW8	SSW4	WNW4	W3	E3	E4	S2	WSW3	WNW4	W5	SSE4.9	SSE10
2-Oct	W5	NW0	NE2	N4	NNW4	N12	NNE18	N18	N18	N17	N17	N24	N22	NNW21	NNW22	N24	NNW20	NNW16	NNW17	NNW22	NNW22	NNW22	NNW22	NNW19	N15.7	N24
3-Oct	N20	NNW18	NNW20	NNW20	NNW16	NNW18	NNW19	NNW16	N16	NNE14	N15	NNE17	NNE13	NNE12	NNE13	NNE11	NNE11	NNE11	NNE9	NNE8	NE7	ENE5	WNW1	WNW2	N11.8	N20
4-Oct	N6	N7	NNE6	NNE6	ENE5	ENE3	ESE5	SSE7	SSE9	S5	SSE8	SSE6	SSE7	SSE7	SSE6	SE7	SE9	SSE8	SSE9	SSE9	SSE13	SSE14	SSE15	SSE13	SE5.6	SSE15
5-Oct	SSE12	SSE7	SE8	SSE13	SSE10	SSE9	SSE7	SSW4	WSW7	W9	W12	WNW24	WNW33	NW28	NW27	NW25	NNW19	NW17	NW13	NW13	WNW13	WNW12	W10	WNW7	WNW8.5	WNW33
6-Oct	N3	N2	SW6	SW5	SSE7	SSE8	SSE7	SE7	SE5	SE7	SSE11	SE9	ESE8	ESE8	SE6	SE6	SSE9	SE10	ESE8	ESE9	SE11	SE8	SE9	ESE5	SE6.3	SSE11
7-Oct	E8	E5	ESE5	SE4	S3	NW3	N1	SW4	WSW5	SSW3	WSW4	SSW3	W4	W4	W9	W16	W14	W9	NW13	NW12	NNW9	NW5	NW7	WNW6	WNW3.6	W16
8-Oct	NNE2	NW3	NNW4	ENE2	SE3	SSW4	SSE5	SSE7	SSE8	SSE7	SE8	SE10	SE8	SE10	SSE9	E9	E6	E9	E8	ENE3	N7	NW5	W3	WSW4	SE3.4	SE10
9-Oct	W3	N1	NNW5	NNE4	W7	W2	W3	W6	W5	S4	SSW5	ESE3	E4	NE6	ENE6	NE7	N8	NNW5	NNW6	N3	W4	E0	S3	SSE9	NNW1.0	SSE9
10-Oct	SSE12	SSE10	SSE11	SSE12	SE8	SW11	SW22	SW15	S11	SSW14	SW18	WSW32	WSW34	WSW31	WSW37	WSW33	W26	WSW15	W13	NW11	WNW8	NNW10	NNE17	N16	WSW11.8	WSW37
11-Oct	N12	N18	N17	NNE17	NNE17	NNE19	N21	NNW16	NNW16	NNW20	NNW15	NNW14	NW19	NW23	NNW17	NNW17	NNW15	NW17	WNW18	WNW11	W7	WSW8	SW7	SW6	NNW12.5	NW23
12-Oct	SSE5	SSE10	SSE10	SSE10	SSE13	SSE12	SSE10	SSE13	SSE12	SSE11	S7	SE12	SSE16	S14	SSW18	WSW21	WSW21	WSW16	WSW12	SW7	SW7	SW12	WSW17	SW18	SSW9.3	WSW21
13-Oct	WSW19	WSW17	WSW17	WSW18	WSW18	WSW21	WSW22	WSW23	WSW27	WSW24	WSW19	W19	WSW19	WSW23	WSW24	WSW27	W22	W15	SW12	SSW12	SW11	SW16	SW18	WSW20	WSW18.9	WSW27
14-Oct	WSW15	WSW17	WSW20	WSW22	W28	W21	WSW16	WSW19	WSW22	W30	W30	W28	WNW27	WNW26	WNW23	NW19	NW17	NNW13	NNE15	NE12	NNE10	N7	N4	NNE8	WNW14.6	W30
15-Oct	N5	WNW4	NNW3	NE4	ENE2	NNE5	NNE7	NE4	SSE4	SSW7	S7	SSE4	ESE4	WNW2	SE2	SSE3	SSE8	SSE8	S7	NE3	ESE7	SE8	SE8	SE9	SE2.7	SE9
16-Oct	SE8	SSE8	SE10	SE9	SE9	SE9	SE11	SE12	SE14	SE10	SE10	SE11	SE12	SE14	SE15	SE15	SE14	SE12	SE17	SE16	SE17	SE12	SE10	SE11	SE11.9	SE17
17-Oct	SSE11	SSE11	SSE11	SSE9	SSE12	SSE11	SSE7	SSE9	SE9	SSE7	SSE12	SE12	SSE14	SE11	SSE12	S11	SSW11	SSW12	SSW10	SSE10	SSE12	SSE11	SSE11	SSE12	SSE10.1	SSE14
18-Oct	S9	SSW11	WSW23	WSW24	WSW25	WSW26	W26	W24	W30	W29	W29	W30	WNW31	WNW28	WNW25	W23	WNW20	WNW15	W9	W9	WSW10	W7	NNW10	NNE15	W18.1	WNW31
19-Oct	N9	N8	N10	N13	N12	N8	NNE8	NNE9	ENE7	ESE9	ESE10	SE11	SE10	ESE11	ESE10	E10	ESE12	ESE11	SE15	SE17	ESE15	SE17	SE17	SE12	E7.5	SE17
20-Oct	SE11	S9	S8	SW10	WSW18	W21	W18	WSW15	WSW17	WSW21	W24	W29	W27	WNW25	WNW24	WNW25	NW18	WNW14	NW11	WNW17	NW13	NNE14	NE9	NNE8	W12.2	W29
21-Oct	NE4	ENE3	SSE4	S5	S5	S5	SSE3	SSE3	S3	SE8	SE11	SE12	SE12	SE12	SE13	SE13	SE14	SE18	SE12	SE12	SE14	SE13	SE12	SSE10	SE8.7	SE18
22-Oct	SE11	SE9	SE7	SE9	S7	SSW8	SW12	SW11	SW9	SW14	WSW17	WSW19	SW20	SW24	WSW27	WSW22	WSW19	WSW12	SW12	SW13	WSW12	WSW13	W14	W16	SW12.2	WSW27
23-Oct	W14	W9	WSW6	SW5	SSW8	SSW8	S7	S6	S3	SE4	WSW4	WNW7	WNW6	NNW10	NNW8	N7	NNE9	N8	N12	NNE14	N14	NNE12	N12	N11	NNW3.6	N14
24-Oct	N9	NNE11	NNE11	NNE10	NNE9	NNE8	NE7	N7	NNE8	NNE7	N5	N4	W4	W5	W4	W3	W4	WNW3	NNE4	NNE4	ENE0	WNW2	N2	NNW5	N4.5	NNE11
25-Oct	NNW8	N10	NNE13	N11	NNW8	N13	NNE10	N8	NNE11	NNE7	NNE3	ESE1	SSE2	SW3	SSE3	SSE4	S3	S3	SSE3	SE8	SE8	SE11	SE11	SSE11	NE2.5	NNE13
26-Oct	SSE10	SSE9	SE10	SE12	SE14	SE16	SE15	SE14	SE14	SE18	SE18	SE18	SE19	SE20	SE19	SE20	SSE17	SE18	SE19	SSE18	S11	WNW23	W27	AF	SE12.2	W27
27-Oct	AF	WNW22	WNW21	W20	WNW23	WNW23	WNW23	WNW23	WNW23	WNW23	NW25	NW24	WNW25	WNW32	WNW27	NW23	NW21	NW22	NW20	NNW14	NNW15	NNW13	NNW10	NNW9	WNW20.1	WNW32
28-Oct	NW6	NNE10	NNE5	NE5	NNE5	NE6	ENE6	SSE5	SSE6	S7	S8	SE11	SE10	SE11	SE12	SE11	SE12	SE15	SE16	SE17	SE19	SSE16	SE17	SE17	SE8.1	SE19
29-Oct	SE16	SE16	SE16	SE16	SE13	SE15	SE13	SSE15	SSE15	SSE16	SSE14	SSE13	SE10	SSE13	SSE11	SSE8	SSE9	SSE11	S8	S9	SSW10	S7	SSW7	SSW7	SSE11.5	SE16
30-Oct	SW7	SSE5	SSE7	S6	SSE9	SSE9	SSE12	SSE10	SSE10	SSE12	SSE9	SSE10	SSE7	SSE8	SSE10	S5	ENE1	ESE3	WSW2	WSW7	WNW5	SSE2	W8	NNW8	SSE4.9	SSE12
31-Oct	NNW8	N9	N5	NNW4	W8	WNW6	N6	NNE8	NNE5	NW3	WNW5	NNE2	NNW5	N7	NE8	NE11	NE10	NNE10	NNE11	NNE14	NNE14	NNE12	NNE12	NNE15	N7.0	NNE15

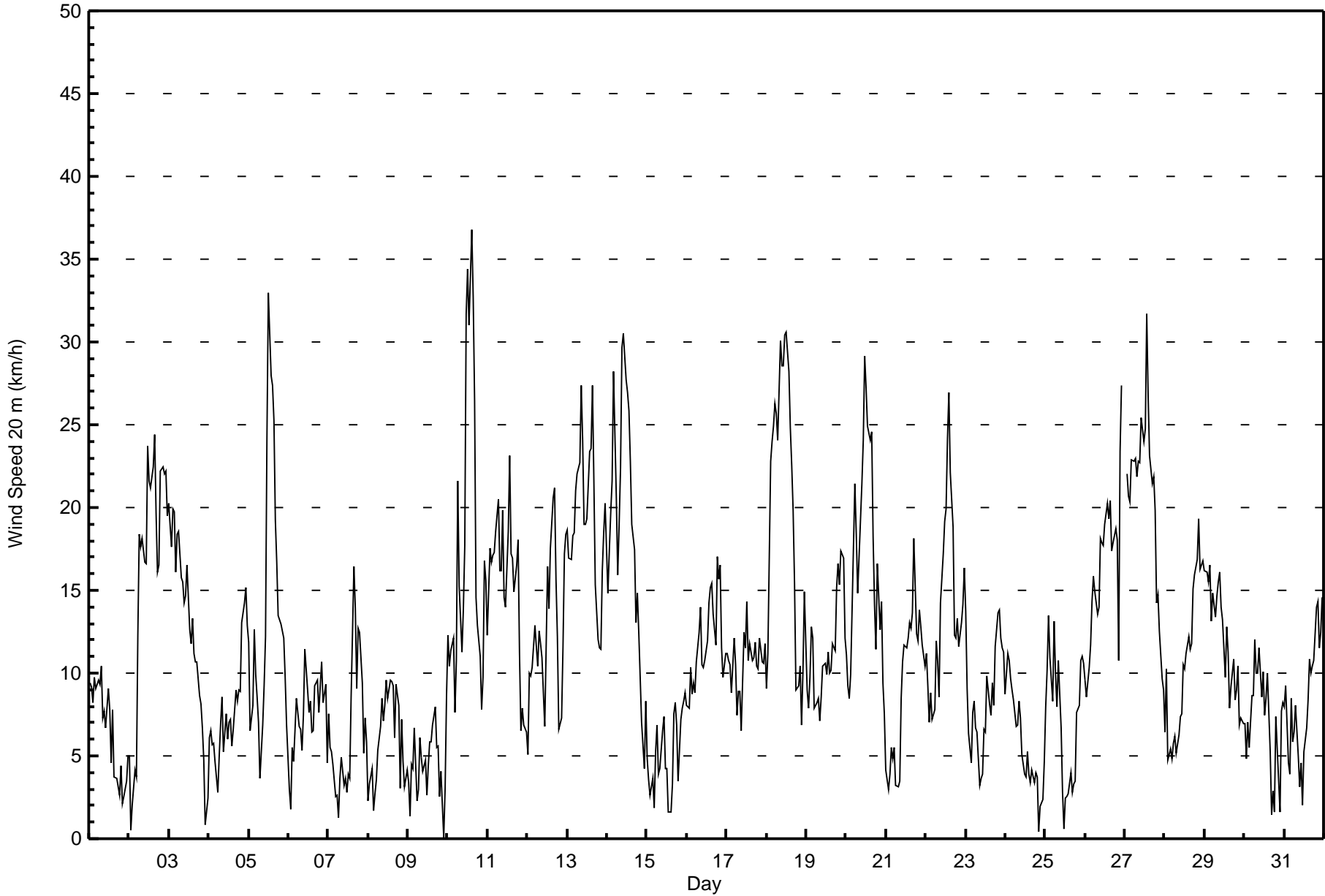
S1.0 SW0.4 SW1.0 SW1.5 SW2.8WSW2.4WSW2.1 SW2.8 SW3.1 SW3.7 SW4.2WSW3.6WSW4.1 W4.3 W4.2 W4.3WNW3.4 W2.0 W0.6NNE0.3 SSW0.7WSW0.9WSW1.4WSW0.5	Diurnal Average
N20WNW22WSW23WSW24 W28WSW26WSW26 W24 W30 W30 W30WSW32WSW34WNW32WSW37WSW33 W26 NW22 NW20 NNW22 NNW22WNW23 W27WSW20	Diurnal Maximum

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 Maximum Value: 10 km/h on Oct 12 16:00 Minimum Value: 1 km/h on Oct 6 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> = 6 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	2	2	2	2	2	2	3	3	3	2	3	3	4	4	3	2	2	1	2	1	2	2	2	4	4
2-Oct	3	2	1	2	2	6	4	5	5	6	6	7	7	7	7	8	6	5	6	7	7	7	6	6	8	
3-Oct	6	6	6	6	5	5	5	5	5	5	5	4	4	4	3	3	3	2	2	2	2	3	1	1	6	
4-Oct	2	2	1	2	2	1	2	2	2	2	3	2	4	3	3	2	2	2	1	1	3	3	3	3	4	
5-Oct	3	2	3	3	2	2	2	1	2	2	6	7	7	6	6	6	7	5	4	3	3	2	2	7		
6-Oct	1	1	3	1	1	2	1	2	2	3	3	3	3	3	3	2	2	3	3	3	3	3	3	2	3	
7-Oct	2	2	2	2	1	1	1	2	1	2	2	2	2	2	4	4	4	2	3	3	3	1	1	2	4	
8-Oct	1	1	1	1	2	1	2	2	3	2	3	3	3	3	4	3	3	3	3	2	2	2	1	2	4	
9-Oct	2	1	2	2	4	2	2	2	2	2	3	2	2	2	1	2	2	2	2	2	2	1	1	3	4	
10-Oct	3	2	3	3	2	6	5	5	4	5	7	9	9	10	8	8	7	4	3	3	2	5	4	4	10	
11-Oct	5	5	4	4	5	5	6	5	4	5	5	5	5	6	5	5	4	5	5	2	2	3	1	3	6	
12-Oct	2	2	3	3	3	2	2	3	3	3	3	4	4	5	5	10	6	4	3	2	1	4	4	4	10	
13-Oct	4	4	3	3	3	5	5	5	6	6	5	5	6	5	5	7	7	4	3	2	3	3	4	5	7	
14-Oct	3	4	4	5	5	5	3	6	5	6	5	6	7	7	6	5	5	4	4	3	3	3	2	3	7	
15-Oct	2	2	1	2	1	2	1	2	1	3	3	2	2	2	1	2	2	1	2	2	2	3	2	2	3	
16-Oct	3	3	3	3	3	3	3	4	4	4	3	4	4	5	5	5	4	4	6	5	4	3	3	3	6	
17-Oct	3	2	2	1	2	2	1	1	2	2	4	3	4	4	3	4	3	2	3	2	2	2	2	3	4	
18-Oct	2	2	7	5	5	5	5	4	5	5	5	6	7	7	6	5	5	3	2	1	2	2	3	4	7	
19-Oct	4	3	3	3	3	3	2	2	2	4	4	4	4	4	4	4	4	5	5	6	6	6	6	5	6	
20-Oct	5	3	2	3	5	5	4	3	4	5	5	5	5	6	6	7	6	3	3	4	3	4	3	3	7	
21-Oct	2	2	2	1	1	1	1	2	2	3	4	4	4	4	4	4	5	5	4	4	3	3	3	3	5	
22-Oct	3	3	2	1	2	2	2	2	2	4	5	5	6	6	7	7	6	2	1	2	1	2	2	3	7	
23-Oct	5	3	2	2	2	3	2	1	2	2	2	2	2	3	3	2	2	2	3	3	3	3	3	3	5	
24-Oct	4	3	3	3	2	2	2	2	2	2	2	2	1	2	1	1	1	1	1	1	1	1	1	2	4	
25-Oct	3	4	3	3	2	4	3	3	3	2	1	2	2	1	2	1	1	1	1	2	2	3	3	3	4	
26-Oct	3	2	4	3	5	5	4	4	5	6	6	6	7	6	5	6	5	5	5	5	4	6	4	7	7	
27-Oct	AF	5	5	4	5	5	5	5	5	5	7	7	6	8	6	6	6	5	6	5	5	4	3	2	8	
28-Oct	2	3	3	2	2	1	1	2	2	3	3	3	3	4	4	3	4	5	5	4	5	4	4	4	5	
29-Oct	4	4	4	4	3	4	3	4	4	4	3	3	3	3	3	2	1	2	3	2	2	2	1	2	4	
30-Oct	2	2	1	2	2	2	2	3	2	3	2	3	3	2	2	5	1	1	2	1	2	1	2	3	5	
31-Oct	3	3	3	2	1	2	2	3	2	2	1	2	3	2	3	2	2	3	3	3	3	3	3	3	3	
Diurnal Maximum																								6		
AF - Analyzer Failure																										







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

**Wind Speed 20 m (WS20m) - km/h**  
**Mannix - October 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	139	18.73	18.73
6 - 11	287	38.68	57.41
12 - 19	216	29.11	86.52
20 - 28	85	11.46	97.98
29 - 38	15	2.02	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 20 m (WS20m) - km/h**  
**Mannix - October 2015**

<b>Wind Speed</b> <b>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	12	10	6	9	5	7	5	15	14	6	4	6	16	10	5	9	139
6 - 11	20	28	9	3	5	11	57	72	18	12	11	5	13	7	4	12	287
12 - 19	16	22	1	0	0	2	59	30	1	3	10	25	10	6	10	21	216
20 - 28	5	0	0	0	0	0	2	0	0	0	3	22	12	21	10	10	85
29 - 38	0	0	0	0	0	0	0	0	0	0	0	5	7	3	0	0	15
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>53</b>	<b>60</b>	<b>16</b>	<b>12</b>	<b>10</b>	<b>20</b>	<b>123</b>	<b>117</b>	<b>33</b>	<b>21</b>	<b>28</b>	<b>63</b>	<b>58</b>	<b>47</b>	<b>29</b>	<b>52</b>	<b>742</b>

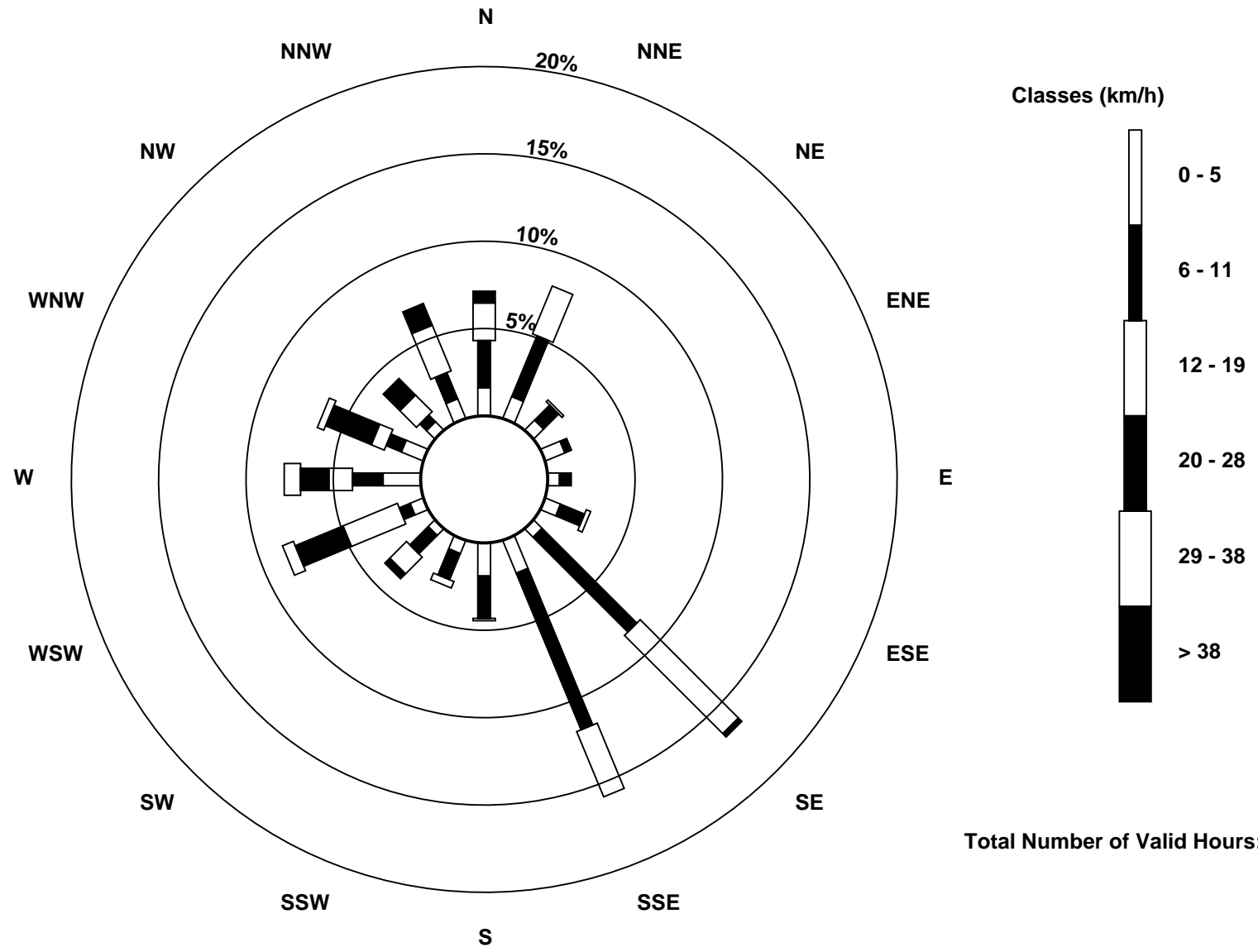
Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Wind Speed 20 m (WS20m) - km/h  
Mannix (AMS 5)



Total Number of Valid Hours: 742



Maximum Speed: 44 km/h on Oct 10 15:00	Maximum Daily Speed Average: 25.9 km/h on Oct 27	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 25 12:00	Minimum Daily Speed Average: 1.4 km/h on Oct 9	Hours of Data: 736
Maximum Diurnal Speed Average: 5.4 km/h at hour 15	Minimum Diurnal Speed Average: 0.4 km/h at hour 20	Hours of Missing Data: 8
Monthly Average Velocity: 2.7 km/h 234.5 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 5 Q <sub>1</sub> = 9 Median = 15 Q <sub>3</sub> = 21 P <sub>90</sub> = 27 P <sub>99</sub> = 37	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	SSE17	SSE16	SSE14	SSE17	SSE16	SSE17	SSE17	SSE16	SE9	SE9	ESE8	ESE10	ESE9	S6	SSW11	SSW5	WNW4	WSW5	E3	E8	ESE6	SE4	NW3	WNW4	SSE7.9	SSE17
2-Oct	WNW8	NE3	NE4	N9	NNW7	N19	N25	N25	N24	N22	N23	N32	N30	NNW28	NNW30	NNW33	NNW27	NNW22	NNW23	NNW29	NNW30	NNW30	NNW29	NNW26	NNW21.8	NNW33
3-Oct	NNW27	NNW23	NNW27	NNW27	NNW21	NNW25	NNW24	NNW21	N21	N18	N19	NNE21	NNE15	NNE14	NNE16	NNE14	NNE14	NNE14	NNE12	NNE12	NE10	NE6	NE4	NNW3	N15.8	NNW27
4-Oct	NNW8	N9	NNE8	NNE7	NE5	NE3	ESE6	SE8	SSE10	S6	SSE9	SSE8	SSE9	SSE9	SSE6	ESE7	SE10	SE11	SSE15	SSE16	SE20	SE21	SE22	SE19	SE7.6	SE22
5-Oct	SE19	SE11	SE12	SE18	SSE15	SSE12	S10	SW8	W12	W11	W14	WNW29	WNW41	WNW35	WNW34	WNW31	NW25	NW23	NW19	WNW20	WNW20	WNW20	W14	WNW12	WNW11.6	WNW41
6-Oct	N6	N5	SW4	SW6	S6	SSE11	SSE11	SE9	SE7	SE9	SE13	SE10	ESE8	ESE9	ESE7	SE8	SE12	ESE13	ESE11	ESE12	ESE15	ESE13	SE13	ESE6	SE7.9	ESE15
7-Oct	E10	E8	ESE8	ESE7	SE4	NW2	NNW4	SSE1	SW4	S4	WSW4	SSW4	W5	WSW5	WSW10	W18	WSW17	W12	NW19	NW19	NNW15	NNW8	NNW11	NW10	WNW4.1	NW19
8-Oct	N9	N6	N7	N4	ENE2	SSE3	SE6	SSE10	SSE10	SSE9	SE9	ESE10	ESE10	SE12	SE12	E10	E7	E12	E11	E5	N13	NNW8	NW3	W3	ESE4.1	N13
9-Oct	WNW4	NNE1	NNW7	NNE7	W6	WNW3	WNW4	W7	W5	S5	SSW6	SE2	E4	NNE6	NE6	NNE8	N11	NNW9	NNW9	NNE4	W4	E2	SSE9	SSE18	NNW1.4	SSE18
10-Oct	SSE23	SSE18	SSE19	SSE19	S12	SW19	SW29	SW21	S17	SSW21	SW22	SW40	SW42	WSW37	WSW44	WSW37	WSW31	WSW20	WSW20	NW18	NW11	NNW16	N22	N21	SW15.6	WSW44
11-Oct	N17	N23	N22	N22	N23	N24	N28	NNW22	NNW21	NNW26	NNW19	NNW18	NW24	NW29	NW22	NNW22	NNW21	WNW21	W22	WNW15	WNW9	WSW11	WSW9	SW13	NNW16.9	NW29
12-Oct	S6	SSE16	SSE16	SSE16	SE18	SE18	SE17	SE19	SE16	SSE17	SSE10	SE16	SSE21	SSE19	SSW23	WSW24	WSW27	WSW22	WSW18	WSW10	WSW12	SW18	SW24	SW25	S12.8	WSW27
13-Oct	WSW25	SW23	SW24	SW25	SW26	WSW28	WSW29	WSW29	WSW32	WSW29	WSW22	WSW22	WSW23	WSW28	WSW28	WSW33	W26	WSW20	SW19	SSW21	SW20	SW24	SW26	SW27	WSW24.9	WSW33
14-Oct	WSW20	WSW22	WSW26	WSW27	WSW33	W25	WSW21	WSW25	WSW28	WSW33	W35	W32	WNW32	WNW32	WNW29	NW25	NW22	NNW17	NNE19	NNE16	NNE13	N9	N6	N10	W18.1	W35
15-Oct	N7	WNW5	NW4	NNE4	ENE2	NNE6	NNE8	NE4	SSE5	S8	S9	SSE5	ESE4	W2	SE2	SSE4	SSE9	SSE14	S17	E4	E10	ESE12	SE13	SE13	E4.0	S17
16-Oct	ESE13	SE14	SE16	SE15	SE15	SE14	SE16	SE18	SE19	SE13	SE13	SE13	SE15	ESE18	ESE19	SE20	SE19	ESE16	ESE23	ESE21	SE23	SE17	SE16	SE17	SE16.7	ESE23
17-Oct	SE17	SE18	SE16	SSE14	SSE18	SE18	SE13	SE14	SE12	SE8	SSE15	SE14	SSE18	SE15	SE16	S18	SSW19	SSW21	S21	S18	SSE19	S17	SSE17	SSE18	SSE15.3	S21
18-Oct	SSW14	SW18	WSW30	WSW30	WSW31	WSW33	WSW32	WSW29	WSW34	WSW32	WSW32	W34	W36	W34	WNW31	W27	WNW26	WNW24	WNW15	WNW16	WSW14	W12	NNW16	N20	W23.1	W36
19-Oct	N13	N12	N14	N17	N16	N11	NNE10	NE12	ENE8	ESE10	E13	ESE13	ESE12	E14	E12	E13	E15	ESE15	ESE20	ESE21	ESE20	ESE23	SE23	SE18	E9.7	ESE23
20-Oct	SE16	S16	S16	SW16	WSW23	W26	W22	WSW19	WSW22	WSW26	WSW28	W32	W31	WNW30	WNW30	WNW31	NW25	WNW20	WNW16	WNW23	NW18	NNE18	NNE11	NNE10	W15.5	W32
21-Oct	NE6	ENE4	SSE6	SSE11	S9	S10	SSE5	SSE7	SSE7	SE10	SE12	SE14	SE13	SE14	SE17	SE17	ESE19	SE24	ESE18	ESE17	SE19	SE18	SE17	SE15	SE12.0	SE24
22-Oct	SE18	SE15	SSE13	SSE12	SW11	SW15	SW22	SW18	SW15	SW19	WSW21	SW24	SW25	SW30	SW34	WSW27	WSW25	WSW19	SW19	SW22	WSW19	WSW21	WSW18	W20	SW17.6	SW34
23-Oct	W18	WSW12	WSW10	SW7	SW10	SW13	S11	SSW11	SW7	ESE3	WSW4	WNW7	WNW7	NNW12	NNW10	NNW9	N11	N11	N17	N18	N18	N16	N15	N15	NW5.2	N18
24-Oct	N12	NNE14	NNE14	NNE12	N11	NNE11	NNE8	N8	N10	NNE8	N6	N5	W4	W5	W4	W4	W5	WNW4	NNE4	NNE4	E1	W3	NNW2	NNW6	N5.5	NNE14
25-Oct	NNW10	N13	N17	N14	NNW11	N16	N12	N10	NNE13	NNE8	N3	E1	SSE3	SW3	SE4	SSE5	SSE3	S5	SSE5	SE11	SE11	SE15	SE16	SSE15	NE3.1	N17
26-Oct	SSE13	SE12	SE15	SE16	ESE18	SE22	SE21	SE20	ESE20	ESE23	ESE23	ESE25	SE27	SE24	SE27	SSE23	SE23	SE25	SSE23	S16	WNW29	AF	AF	SE18.3	WNW29	
27-Oct	AF	AF	AF	AF	AF	AF	WNW30	WNW28	WNW30	WNW30	NW33	WNW30	WNW33	WNW41	WNW33	NW30	NW28	NW28	NW26	NNW19	NNW20	NW16	NW13	NW12	WNW25.9	WNW41
28-Oct	NW9	N13	NNE7	NNE6	NNE6	NE6	ENE7	SE6	SSE8	S10	S10	SE13	SE11	ESE13	ESE14	SE14	ESE15	SE20	SE21	SE22	SE26	SE21	SE22	SE23	SE10.2	SE26
29-Oct	SE21	SE21	SE21	SE21	SE18	SE19	SE18	SE20	SE20	SSE22	SSE18	SSE17	SE12	SE16	SSE14	S12	SSE16	SSE19	S18	S18	SSW20	SSW14	SW13	SW12	SSE15.8	SSE22
30-Oct	SW14	SSW7	SSW8	SSW8	SSW10	S12	S15	SSE15	SSE15	SSE17	SE12	SSE14	SE11	SSE12	SE14	S11	NW1	E4	E2	SW7	W10	W2	WNW11	NNW12	S6.7	SSE17
31-Oct	NNW12	N12	N6	NW5	W11	WNW10	NNW9	N9	NNE5	NW4	W5	N3	NW6	N8	NE10	NE12	NE12	NNE13	NNE14	NNE18	NNE18	NNE15	N16	N19	N9.0	N19

S1.4 SSE1.6 S1.8 S2.2 SSW3.6 SW3.2 SW3.1 SW3.7 SW4.1 SSW4.5 SW4.8 SW4.2 WSW5.1 WSW5.3 WSW5.4 W5.2 W4.4 W2.8 WSW1.2 WNW0.4 SW0.9 WSW1.4 SSW0.7 SW0.5	Diurnal Average
NNW27 NNW23 WSW30 WSW30 WSW33 WSW33 WSW32 WSW29 WSW34 WSW33 W35 SW40 SW42 WNW41 WSW44 WSW37 WSW31 NW28 NW26 NNW29 NNW30 NNW30 NNW29 SW27	Diurnal Maximum

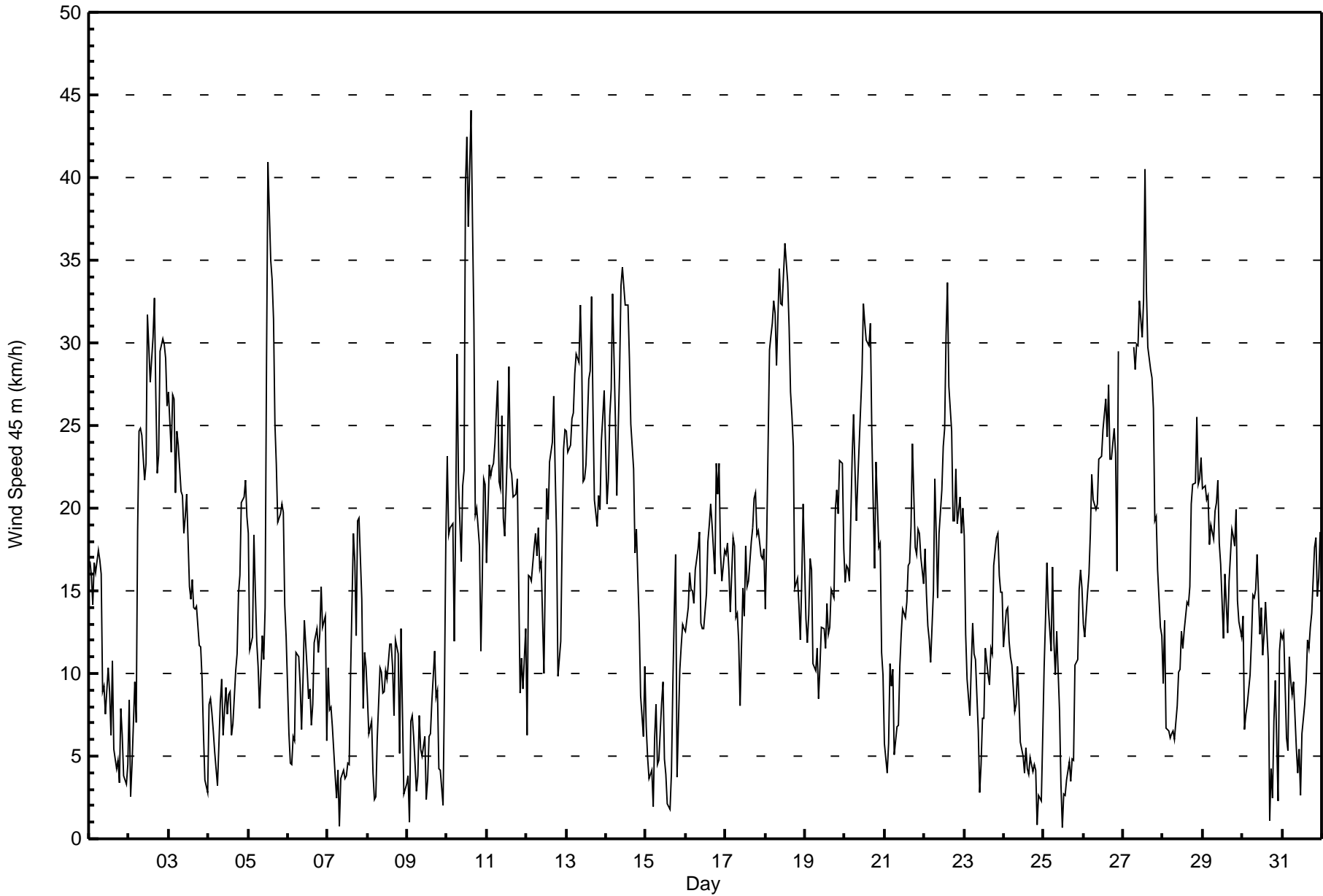
AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Oct 10 14:00	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 6 02:00	
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> = 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	1	2	2	1	2	1	1	2	4	3	2	3	3	4	4	4	3	2	2	2	2	2	2	3	4
2-Oct	4	2	1	2	3	6	4	4	5	6	6	6	7	6	6	8	6	5	6	7	6	6	6	5	8
3-Oct	6	5	6	5	5	5	4	5	5	5	5	4	4	4	4	3	3	2	2	2	1	3	2	3	6
4-Oct	1	2	1	2	2	1	2	2	2	2	2	2	3	2	4	2	2	3	1	1	3	3	2	3	4
5-Oct	3	3	2	3	2	2	2	2	2	3	7	7	5	5	5	5	6	6	4	4	2	2	2	3	7
6-Oct	2	1	3	1	1	2	2	2	2	3	3	3	3	3	3	2	2	3	4	3	4	4	4	2	4
7-Oct	2	2	2	3	1	2	2	1	1	2	2	2	2	2	4	4	3	4	3	3	5	2	2	3	5
8-Oct	2	1	1	1	1	1	3	2	3	3	2	3	3	3	5	3	2	2	3	2	2	4	1	2	5
9-Oct	2	1	2	3	3	3	2	3	3	2	3	2	1	2	1	2	2	1	2	2	1	2	2	3	3
10-Oct	3	2	3	3	3	7	5	5	5	5	7	10	10	10	9	8	7	4	3	3	2	5	4	4	10
11-Oct	5	5	4	4	6	5	5	5	4	5	5	4	4	5	5	5	4	4	4	2	3	3	3	3	6
12-Oct	1	3	3	3	3	3	2	2	3	5	3	4	4	5	5	9	6	4	2	3	1	5	3	4	9
13-Oct	4	4	3	3	3	5	5	5	5	6	5	4	6	5	5	7	6	4	3	2	3	3	4	5	7
14-Oct	4	3	4	4	4	5	3	7	5	5	5	6	6	6	5	6	4	4	4	3	4	3	3	3	7
15-Oct	2	2	2	2	1	3	1	2	2	2	2	3	2	2	2	2	2	3	1	4	3	4	2	2	4
16-Oct	3	3	3	3	4	4	4	3	5	4	3	4	4	5	5	5	4	5	6	5	4	3	2	2	6
17-Oct	2	2	3	2	1	2	1	1	2	2	4	3	4	4	3	3	2	2	3	2	2	1	2	2	4
18-Oct	2	2	7	5	5	4	5	4	5	5	5	5	6	6	6	4	4	3	3	3	1	2	3	3	7
19-Oct	5	3	4	3	3	3	2	2	2	4	3	4	4	3	4	3	4	4	5	6	5	6	6	5	6
20-Oct	5	3	2	2	5	4	4	3	4	5	5	5	5	5	5	6	6	3	4	4	3	3	4	4	6
21-Oct	2	1	2	1	2	1	1	2	3	4	4	3	4	4	4	4	4	5	4	4	4	3	3	3	5
22-Oct	3	3	1	3	3	2	2	2	2	4	5	5	6	6	6	7	6	2	1	2	1	2	2	3	7
23-Oct	5	3	2	2	2	3	2	1	4	1	2	1	2	3	2	2	2	2	3	3	3	3	2	3	5
24-Oct	4	3	3	3	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	2	4
25-Oct	3	4	3	3	2	4	3	2	3	2	2	2	2	2	2	1	1	1	1	2	2	3	3	3	4
26-Oct	2	2	4	3	4	4	3	3	4	6	6	6	7	6	5	6	5	4	5	4	4	6	AF	AF	7
27-Oct	AF	AF	AF	AF	AF	AF	4	5	5	4	7	7	6	7	6	5	6	5	6	5	4	3	2	2	7
28-Oct	2	4	4	2	2	1	1	2	2	3	3	3	3	4	3	3	4	5	5	4	4	4	4	4	5
29-Oct	4	4	4	4	3	4	3	4	3	3	3	3	2	3	2	2	2	2	2	2	1	2	1	3	4
30-Oct	2	2	2	2	2	1	2	2	2	3	2	3	3	2	2	6	2	2	1	2	1	2	3	3	6
31-Oct	3	3	3	2	2	2	2	3	2	2	1	2	3	2	3	3	2	4	3	3	2	2	2	3	4
Diurnal Maximum																									

AF - Analyzer Failure





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

**Wind Speed 45 m (WS45m) - km/h**  
**Mannix - October 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	88	11.96	11.96
6 - 11	170	23.10	35.05
12 - 19	260	35.33	70.38
20 - 28	155	21.06	91.44
29 - 38	58	7.88	99.32
> 38	5	0.68	100.00

Total Number of Valid Hours: 736

Total Number of Hours: 744





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

**Wind Speed 45 m (WS45m) - km/h**  
**Mannix - October 2015**

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	6	6	3	9	2	5	10	3	2	3	4	13	7	7	3	88
6 - 11	22	17	6	2	7	16	19	20	13	8	5	6	4	7	4	14	170
12 - 19	26	21	3	0	6	20	68	45	14	3	15	9	7	5	8	10	260
20 - 28	15	1	0	0	0	12	27	5	1	5	16	28	7	9	10	19	155
29 - 38	2	0	0	0	0	0	0	0	0	0	3	19	7	18	3	6	58
> 38	0	0	0	0	0	0	0	0	0	0	2	1	0	2	0	0	5
<b>Totals</b>	70	45	15	5	22	50	119	80	31	18	44	67	38	48	32	52	736

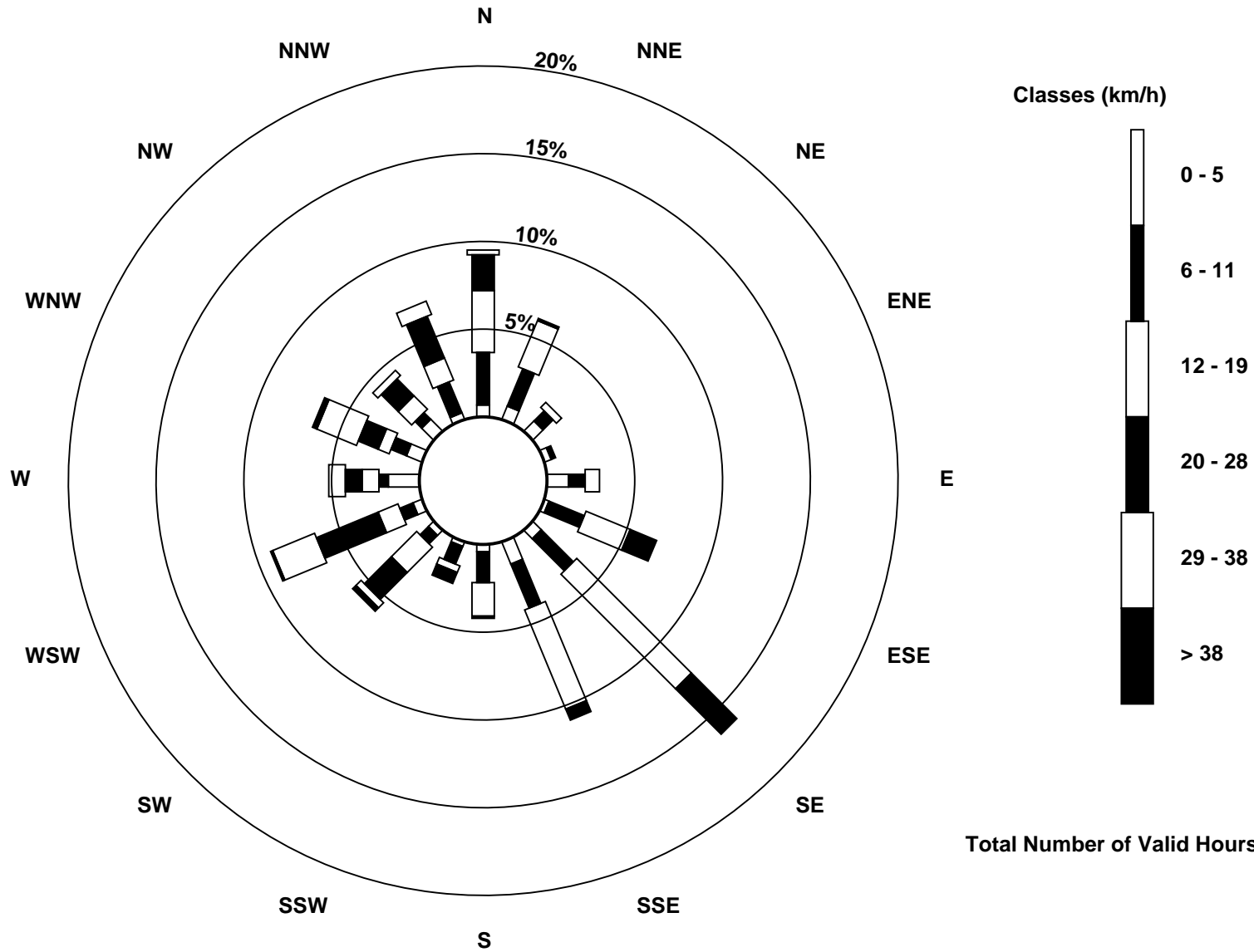
Total Number of Valid Hours: 736

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Wind Speed 45 m (WS45m) - km/h  
Mannix (AMS 5)





Maximum Speed: 48 km/h on Oct 10 15:00	Maximum Daily Speed Average: 29.1 km/h on Oct 13	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 7 08:00	Minimum Daily Speed Average: 1.8 km/h on Oct 9	Hours of Data: 730
Maximum Diurnal Speed Average: 6.2 km/h at hour 15	Minimum Diurnal Speed Average: 0.3 km/h at hour 24	Hours of Missing Data: 14
Monthly Average Velocity: 3.1 km/h 239.5 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 5 Q <sub>1</sub> = 10 Median = 17 Q <sub>3</sub> = 25 P <sub>90</sub> = 31 P <sub>99</sub> = 60	Percent Operational Time: 98.1

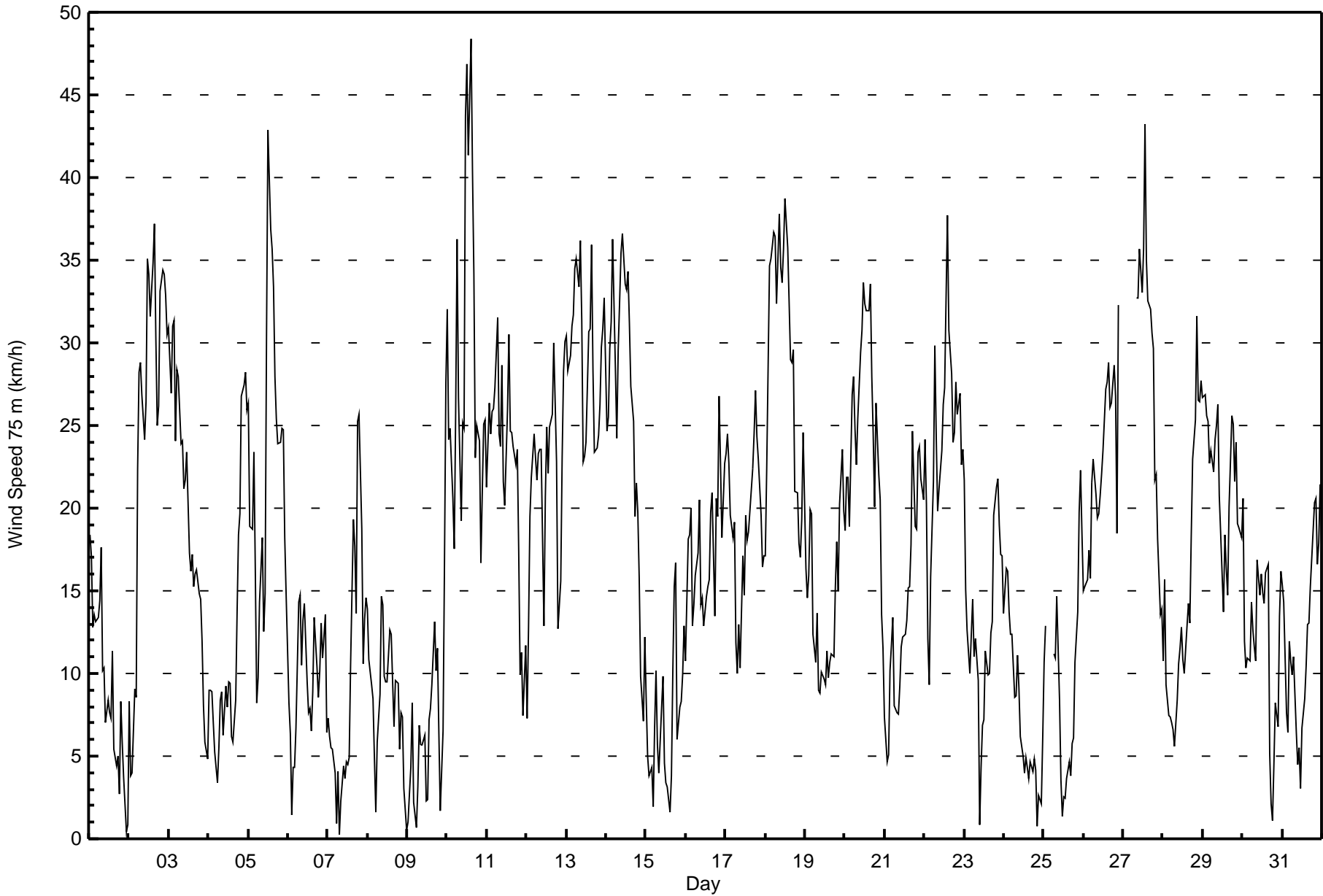
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	S18	S17	S13	SSE14	S13	S13	SSE14	SSE18	SSE10	SE10	SE7	ESE8	ESE8	S7	SSW11	SSW5	W4	WSW5	ESE3	E8	ESE6	ESE4	NNE0	NNW1	SSE7.6	S18
2-Oct	NW8	ENE4	ENE4	NNE9	N9	N22	N28	N29	N27	N24	N26	N35	N34	NNW32	NNW35	N37	NNW30	NNW25	NNW26	NNW33	NNW34	NNW34	NNW33	NNW30	N24.7	N37
3-Oct	N31	NNW27	NNW31	NNW31	NNW24	NNW28	NNW28	NNW24	N24	N21	N22	NNE23	NNE17	NNE16	NNE17	NNE15	NNE16	NNE16	NNE15	NNE14	NE12	NE8	NE6	NNE5	N18.4	NNW31
4-Oct	N9	N9	NNE9	NNE7	NE5	NE3	ESE5	SE8	S9	S6	SSE9	SSE8	SSE10	SSE9	SSE6	ESE6	SE8	SE14	SSE18	SE20	SE27	SE27	SE28	SE26	SE9.1	SE31
5-Oct	SE26	SSE19	SSE19	SSE23	S16	S8	SW10	WSW14	W18	W13	W15	WNW30	WNW43	NW37	WNW36	NW33	NNW28	NW25	NW24	NW24	WNW25	WNW25	WNW18	WNW15	WNW13.8	WNW43
6-Oct	NNE8	NE6	SE1	SSW4	SSW4	SSE7	S14	SSE15	SSE11	SSE13	SE14	SE9	ESE8	ESE8	ESE7	SE9	SE13	ESE10	ESE9	ESE10	ESE13	ESE11	SE14	ESE6	SE8.0	SSE15
7-Oct	ESE7	E6	ESE6	ESE5	SE4	SSE1	N4	ENE0	S2	S4	WSW4	SSW5	W5	W5	W11	W19	WSW18	W14	NW25	NW26	NNW19	N11	N13	NNW15	NW4.8	NW26
8-Oct	N14	NNE11	NNE9	N8	N5	SE2	SE6	SSE9	SSE15	SSE14	SE10	ESE9	SE9	SE13	SSE12	E10	E7	E10	E9	E5	NNE8	NNE7	N3	SSE0	E4.8	SSE15
9-Oct	NE1	ESE3	N4	NE8	W2	WNW1	NW3	WNW7	W6	S6	SSW6	SSE2	E2	N7	NNE8	NNE9	NNE13	N10	N12	NE6	SE2	SE6	SSE17	SE28	ENE1.8	SE28
10-Oct	SSE32	SSE24	SSE25	SSW21	SSW18	SW26	SW36	SW27	SSW19	SSW25	SW25	SW44	SW47	WSW41	WSW48	WSW40	WSW34	WSW23	W25	NNW24	NW17	NNW21	NNE25	N25	WSW19.0	WSW48
11-Oct	N21	N26	N25	N26	NNE26	N27	N32	NNW24	NNW24	NNW29	NNW22	NNW20	NW26	NW31	NNW25	NNW25	NNW24	NW23	WNW24	WNW17	NW10	W11	W7	WSW12	NNW19.4	N32
12-Oct	SW7	SE13	SSE19	SSE22	SE24	SE23	SE22	SE23	SE24	SE24	SSE13	SE21	SSE25	S22	SSW25	WSW26	WSW30	WSW26	WSW23	WSW13	WSW16	SW23	SW28	SW30	S14.9	SW30
13-Oct	WSW30	SW28	WSW29	SW31	WSW32	WSW34	WSW35	WSW33	WSW36	WSW31	WSW23	WSW23	WSW24	WSW31	WSW31	WSW36	W28	W23	WSW24	SW24	SW26	WSW30	SW31	WSW33	WSW29.1	WSW36
14-Oct	WSW25	WSW26	WSW30	WSW31	W36	W28	WSW24	WSW30	WSW32	W35	W37	W34	WNW33	WNW34	WNW31	NW27	NW25	NNW19	NNE21	NNE20	NNE16	N10	N7	N12	W20.0	W37
15-Oct	N8	WNW5	NNW4	NNE4	ENE2	NNE7	NE10	NE6	SSE4	S8	S10	SSE5	SE3	W3	SE2	SSE4	SSE10	SSE15	S17	SE6	E8	ESE8	ESE10	SE13	SE3.7	S17
16-Oct	ESE11	SE18	SE18	SE20	ESE13	SE14	SE16	SE17	SE20	SE14	SE15	SE13	SE15	SE15	ESE16	SE20	SE21	ESE13	SE21	SE19	SE27	SE23	SE18	SE23	SE17.4	SE27
17-Oct	SE23	SE25	SE23	SE20	SE18	SE19	SE12	SE10	SE13	SE10	SSE17	SSE15	SSE20	SSE18	SSE19	S21	SSW22	SSW24	SSW27	S24	S23	S20	S16	S17	SSE17.3	SSW27
18-Oct	SSW17	SSW22	WSW35	WSW35	WSW36	WSW37	WSW36	WSW32	WSW38	W35	WSW34	W36	W39	W36	WNW32	W29	WNW29	WNW30	WNW21	WNW21	W18	WNW17	NNW19	N25	W26.1	W39
19-Oct	N16	N15	N16	N20	N20	N12	NE11	NE14	ENE9	ESE9	E10	ESE10	ESE9	E11	E10	E11	E11	ESE11	ESE15	ESE18	ESE15	SE20	SE24	SE20	E9.0	SE24
20-Oct	SE19	S22	S22	SW19	WSW27	W28	W25	WSW23	WSW25	WSW29	WSW31	W34	W32	WNW32	WNW32	WNW34	NW28	WNW25	WNW20	WNW26	NW22	NNE21	NNE14	NNE11	W17.3	W34
21-Oct	NE7	ENE5	SE5	SSE10	S12	S13	S8	SE8	SE8	ESE9	SE12	SE12	SE12	SE13	SE15	SE15	SE18	SE25	SE19	SE19	SE23	SE24	SE22	SE21	SE13.0	SE25
22-Oct	SE24	SSE20	S12	SSW9	SW16	SW22	SW30	SW24	SW20	SW21	WSW23	SW26	SW27	SW33	WSW38	WSW31	WSW28	WSW24	WSW25	WSW28	WSW26	WSW27	WSW23	W24	SW21.8	WSW38
23-Oct	W22	WSW15	WSW13	WSW10	SW12	SW14	SW11	SW12	WSW10	SE1	WSW4	WNW7	WNW7	NNW11	NNW10	N10	NNE12	N13	N20	NNE21	N22	NNE19	N17	N17	NW6.6	N22
24-Oct	N14	NNE16	NNE16	NNE14	NNE12	NNE12	NE9	NNE9	NNE11	NNE9	N6	N5	WNW4	W5	W4	W4	W5	WNW4	NNE5	NNE4	E1	W3	NNW2	N6	N6.1	NNE16
25-Oct	N11	N13	AF	AF	AF	AF	NNE11	N11	NNE15	NNE8	NNE4	ENE1	SE3	SSW2	SE4	SSE5	SSE4	S6	SSE6	SE11	SE14	SE20	SE22	SSE18	ESE3.9	SE22
26-Oct	SSE15	SE15	SE16	SE17	ESE16	SE22	SE23	SE21	SE19	ESE20	SE21	SE22	SE23	SE27	SE28	SE29	SE26	SE26	SE29	SSE27	S19	WNW32	AF	AF	SE19.0	WNW32
27-Oct	AF	AF	AF	AF	AF	AF	AF	AF	WNW33	WNW33	NW36	WNW33	WNW36	WNW43	WNW35	NW33	NW32	NW31	NW30	NNW22	NNW22	NNW18	NNW14	NNW14	----	WNW43
28-Oct	NW11	N16	NNE9	NNE7	NNE7	NE7	ENE7	SE6	SSE8	S11	SSE12	SE13	SE11	ESE10	SE13	SE14	ESE13	SE18	SE23	SE25	SE32	SE26	SE26	SE28	SE10.9	SE32
29-Oct	SE27	SE27	SE26	SE25	SE23	SE23	SE22	SE24	SE25	SSE26	SSE21	SSE18	SSE14	SSE18	SSE16	S15	S20	S26	S25	SSW22	SSW24	SW19	SW19	SW18	SSE18.9	SE27
30-Oct	WSW21	SW12	SW10	WSW11	SW11	SSW14	SSW13	S12	S11	SSE17	SSE15	SSE16	SSE15	SSE14	SSE16	S17	W5	S2	E1	SW5	W8	WNW7	WNW13	NNW16	SSW7.9	WSW21
31-Oct	N15	N14	N8	NNW6	WNW12	NW11	N10	NNE11	NNE6	NW4	W6	N3	NW7	N8	NE10	NE13	NE13	NNE15	NNE17	NNE20	NNE21	NNE17	N18	NNE21	N10.6	NNE21

S1.8 SSE2.4 S3.2 SSW3.2 SW4.4 SW4.2 SW3.3 SW4.0 SW4.5 SW5.1 SW5.3 WSW4.8 WSW5.7 W6.2 W6.2 W6.0 W5.2 W3.9 W2.3 NW1.3 WSW1.0 W1.7 SSE0.5 SSE0.3	Diurnal Average
SSE32 SW28 WSW35 WSW35 W36 WSW37 WSW36 WSW33 WSW38 W35 W37 SW44 SW47 WNW43 WSW48 WSW40 WSW34 NW31 NW30 NNW33 NNW34 NNW34 NNW33 WSW33	Diurnal Maximum

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 Maximum Value: 10 km/h on Oct 12 16:00 Minimum Value: 1 km/h on Oct 6 05:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 O <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: 730 Hours of Missing Data: 14 Hours of Calibration: 0 Percent Operational Time: 98.1								
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	1	2	2	1	2	2	3	2	3	3	3	5	4	4	2	2	1	2	2	2	2	2	2	5
2-Oct	3	2	2	2	3	6	3	4	5	6	6	6	6	6	6	7	6	5	6	7	6	6	6	6	6	7
3-Oct	6	6	6	5	5	5	4	5	5	5	5	4	4	3	3	3	3	2	2	2	1	3	2	2	6	
4-Oct	1	1	1	1	2	1	2	1	2	2	2	2	3	2	4	2	3	3	1	2	2	3	2	2	4	
5-Oct	2	3	2	1	4	2	1	3	1	3	7	7	5	5	5	5	6	6	4	3	2	2	2	3	7	
6-Oct	2	1	2	1	1	3	1	1	2	3	3	4	3	3	3	2	3	4	3	4	5	5	5	3	5	
7-Oct	2	2	2	2	2	2	2	1	1	2	2	2	2	2	4	4	3	5	3	3	6	2	2	3	6	
8-Oct	2	1	1	2	3	2	2	1	3	4	2	4	4	4	5	3	3	3	4	3	2	3	2	1	5	
9-Oct	1	1	3	3	2	2	2	3	4	2	3	2	1	2	1	1	1	2	2	4	1	4	2	4	4	
10-Oct	3	1	2	3	4	7	5	5	4	5	7	9	9	9	8	8	7	4	3	3	2	6	4	3	9	
11-Oct	4	5	3	3	6	5	4	5	4	5	5	4	4	6	5	5	4	4	4	2	3	2	1	1	6	
12-Oct	2	3	2	4	4	4	3	3	3	6	3	5	3	5	5	10	5	3	2	4	2	5	4	4	10	
13-Oct	4	4	3	3	3	5	5	5	5	5	4	4	6	5	5	6	6	5	3	2	3	3	4	4	6	
14-Oct	4	4	4	4	5	5	3	7	5	5	5	5	6	6	5	6	4	5	4	3	4	3	3	3	7	
15-Oct	2	2	2	3	1	3	1	2	2	2	2	3	2	2	2	2	3	2	2	6	3	3	4	4	6	
16-Oct	4	3	5	4	5	5	6	6	6	5	4	4	5	6	6	7	6	6	8	7	6	3	3	3	8	
17-Oct	2	2	2	2	1	3	4	3	4	3	4	3	5	4	3	3	3	3	3	2	2	2	2	2	5	
18-Oct	2	3	6	5	4	5	5	5	5	5	5	5	6	6	5	4	3	2	4	3	1	3	4	2	6	
19-Oct	5	2	4	2	3	3	1	1	2	3	3	4	4	4	3	3	4	4	6	7	5	8	8	6	8	
20-Oct	5	3	1	3	4	4	4	3	4	4	5	5	5	4	5	5	5	2	3	4	4	3	4	4	5	
21-Oct	2	2	2	1	1	1	2	2	2	4	4	4	5	5	5	5	7	7	7	5	4	3	3	3	7	
22-Oct	3	4	3	2	4	2	2	3	2	4	5	5	6	5	6	6	6	2	2	2	1	2	3	3	6	
23-Oct	5	3	2	2	2	2	1	1	4	2	2	1	2	3	2	2	2	2	3	3	3	3	2	3	5	
24-Oct	4	3	3	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	4	
25-Oct	3	3	AF	AF	AF	AF	2	2	2	3	1	1	2	2	2	1	1	1	2	3	3	3	2	3	3	
26-Oct	2	2	7	4	5	7	4	5	6	8	8	8	9	8	6	8	5	5	5	4	4	6	AF	AF	9	
27-Oct	AF	AF	AF	AF	AF	AF	AF	AF	4	4	7	8	5	7	5	5	6	5	6	4	5	3	3	2	8	
28-Oct	2	4	5	2	2	2	2	2	2	3	3	3	4	4	4	4	5	7	6	5	4	4	4	4	7	
29-Oct	4	4	4	4	3	4	3	4	3	3	3	2	2	2	2	3	2	3	2	2	2	2	2	3	4	
30-Oct	2	3	2	3	2	2	2	2	2	5	1	2	3	2	3	7	1	1	1	2	1	2	2	3	7	
31-Oct	2	3	3	2	2	2	2	3	2	1	1	2	2	2	3	2	2	4	2	2	2	2	2	2	4	
Diurnal Maximum																								6		
AF - Analyzer Failure																										





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

**Wind Speed 75 m (WS75m) - km/h**  
**Mannix - October 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	80	10.96	10.96
6 - 11	161	22.05	33.01
12 - 19	185	25.34	58.36
20 - 28	203	27.81	86.16
29 - 38	93	12.74	98.90
> 38	8	1.10	100.00

Total Number of Valid Hours: 730

Total Number of Hours: 744



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

**Wind Speed 75 m (WS75m) - km/h**  
**Mannix - October 2015**

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	6	3	6	4	5	10	8	3	5	1	3	11	4	2	3	80
6 - 11	18	22	12	2	12	24	18	13	10	5	4	3	6	4	5	3	161
12 - 19	17	22	3	1	0	10	41	32	17	5	9	7	6	6	1	8	185
20 - 28	19	10	0	0	0	2	58	12	10	8	15	23	8	8	11	19	203
29 - 38	6	0	0	0	0	0	3	1	0	0	5	33	9	17	8	11	93
> 38	0	0	0	0	0	0	0	0	0	0	2	3	1	2	0	0	8
<b>Totals</b>	66	60	18	9	16	41	130	66	40	23	36	72	41	41	27	44	730

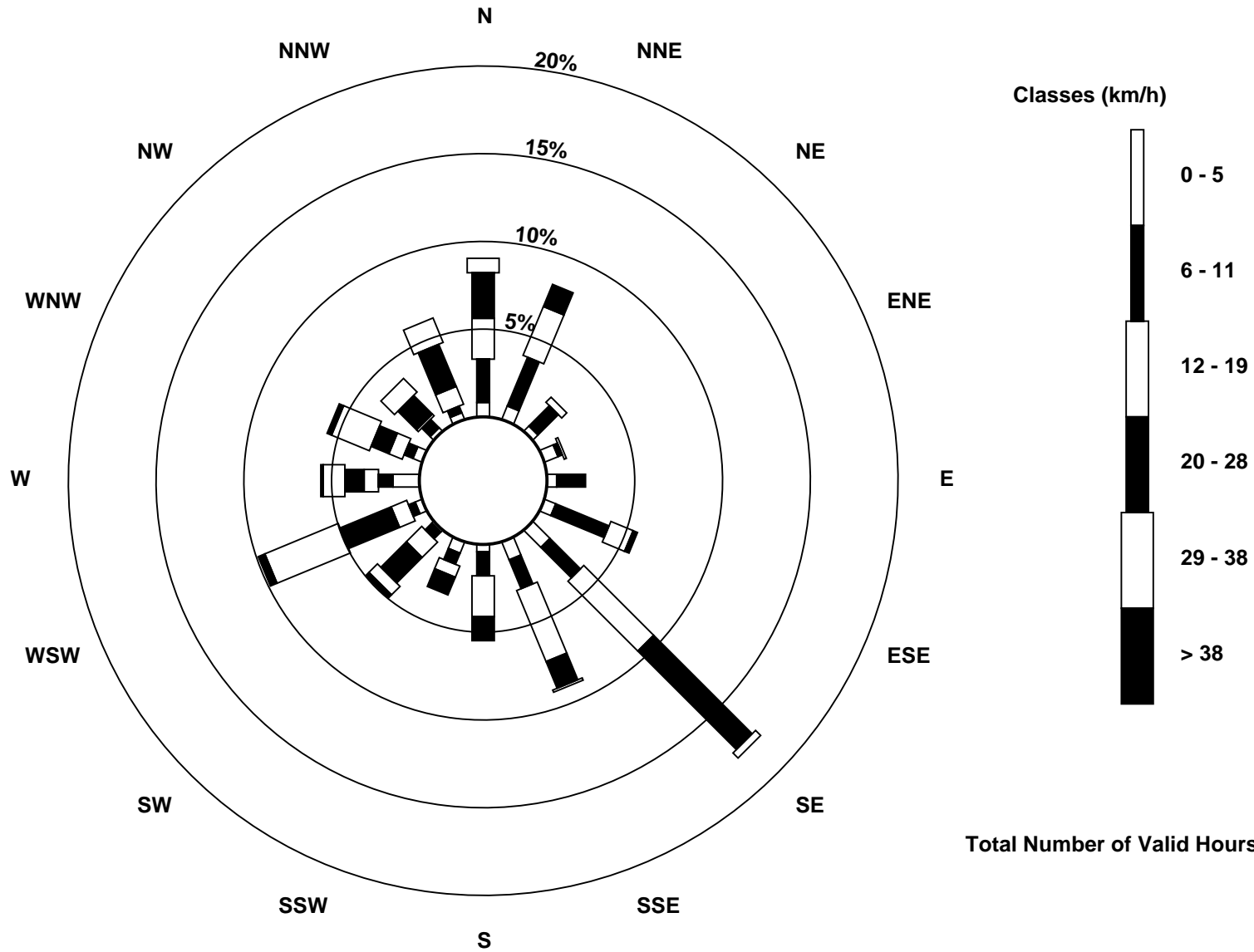
Total Number of Valid Hours: 730

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Wind Speed 75 m (WS75m) - km/h  
Mannix (AMS 5)







Maximum Speed: 49 km/h on Oct 10 15:00	Maximum Daily Speed Average: 30.5 km/h on Oct 13	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 30 19:00	Minimum Daily Speed Average: 2.6 km/h on Oct 9	Hours of Data: 729
Maximum Diurnal Speed Average: 6.1 km/h at hour 15	Minimum Diurnal Speed Average: 0.7 km/h at hour 20	Hours of Missing Data: 15
Monthly Average Velocity: 3.3 km/h 231.6 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 5 Q <sub>1</sub> = 11 Median = 18 Q <sub>3</sub> = 27 P <sub>90</sub> = 32 P <sub>99</sub> = 39	Percent Operational Time: 98.0

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	SSW21	SSW17	SSW14	S13	S13	S13	S13	S16	S11	SE11	SE9	SE11	SE10	S8	SSW12	SSW6	W4	SW5	ESE3	E12	ESE13	ESE7	ESE1	ESE2	SSE8.2	SSW21
2-Oct	NW7	E5	E4	NE7	N7	N22	N30	N30	N27	N25	N28	N36	N35	NNW33	NNW37	N39	NNW32	NNW26	NNW27	N35	NNW36	NNW36	NNW35	N32	N25.5	N39
3-Oct	N32	NNW28	NNW32	NNW33	NNW25	AF	AF	AF	N25	N22	N22	NNE24	NNE18	NNE17	NNE18	NNE16	NNE17	NNE17	NNE16	NNE15	NE12	NE9	NE7	NNE6	N18.4	NNW33
4-Oct	N9	N9	NNE9	NNE7	ENE5	ENE4	ESE6	SSE9	S9	S7	SSE10	SSE9	S10	SSE10	SSE7	SE7	SE10	SE15	SSE20	SE22	SSE31	SE32	SE32	SE30	SE10.2	SE32
5-Oct	SSE31	SSE24	SSE21	S21	SSW13	SW8	SW11	W17	W20	W13	W15	WNW30	WNW43	NW37	NW36	NW33	NNW29	NW26	NW25	NNW25	WNW26	WNW19	NW15	WNW14.7	WNW43	
6-Oct	NNE8	NE7	E2	S5	S5	SSE7	S17	SSE17	SSE16	SSE17	SE16	SE11	SE9	ESE9	ESE8	SE10	SE15	ESE14	ESE13	ESE15	ESE17	ESE15	SE17	ESE11	SE10.3	ESE17
7-Oct	ESE14	ESE11	ESE9	ESE8	SE4	SE3	N3	SE2	SSE3	S5	WSW4	SSW5	W5	WSW5	W10	W19	W18	W14	NNW27	NNW28	NNW21	N12	N14	NNW16	NW4.1	NNW28
8-Oct	N15	NNE11	NNE10	N9	N5	E1	SE6	SSE9	SSE15	SSE18	SSE11	SE14	SE12	SE14	SSE14	E12	ESE10	ESE17	ESE15	ESE8	NE7	NE7	NNE3	SE4	ESE6.5	SSE18
9-Oct	ESE3	SE7	NNE3	ENE8	S2	S2	NW3	W5	W6	S6	SSW7	S2	ESE2	N8	NNE8	NNE9	NNE13	N10	N12	ENE8	ESE5	SE11	SSE21	SSE32	ESE2.6	SSE32
10-Oct	SSE35	S25	S25	SSW22	SW21	SW28	WSW39	SW29	SSW20	SSW27	SW25	WSW45	WSW48	WSW42	WSW49	WSW41	WSW35	WSW24	W26	NNW26	NNW19	NNW23	NNE26	N27	WSW20.4	WSW49
11-Oct	N23	N28	N26	N27	NNE27	N29	N33	NNW26	NNW24	NNW29	NNW22	NNW21	NW26	NW31	NNW26	NNW25	NNW24	NW23	WNW24	WNW17	NW10	WNW11	WNW6	WSW10	NNW20.2	N33
12-Oct	SW7	SSE12	SSE21	S26	SSE29	SE26	SE25	SE26	SE28	SE27	SSE15	SSE24	SSE27	S24	SSW25	WSW26	WSW31	WSW28	WSW24	WSW14	WSW17	SW25	WSW30	WSW32	SSW16.2	WSW32
13-Oct	WSW32	WSW30	WSW32	WSW33	WSW34	WSW37	WSW37	WSW35	WSW37	WSW31	WSW23	WSW23	WSW24	WSW31	WSW31	WSW36	W28	W24	WSW25	SW26	WSW29	WSW32	WSW33	WSW35	WSW30.5	WSW37
14-Oct	WSW26	WSW27	WSW31	WSW32	W37	W29	WSW25	WSW31	WSW33	W35	W36	W33	WNW33	WNW34	WNW31	NW28	NW26	NNW20	NNE22	NNE21	NNE17	N10	N7	N13	WNW20.5	W37
15-Oct	N9	WNW5	NNW4	NNE4	E2	NNE7	NE11	ENE6	SE4	S8	S10	SSE5	SE4	WSW4	SSE2	SSE4	SSE11	SE16	S15	SE7	ESE13	ESE14	ESE14	ESE14	SE4.4	SSE16
16-Oct	ESE15	SE21	SE20	SE24	ESE17	ESE18	ESE21	ESE21	SE24	SE18	SE17	SE15	SE17	ESE19	ESE20	SE23	SE25	ESE18	SE26	SE24	SE31	SE26	SE22	SE27	SE21.1	SE31
17-Oct	SE28	SE28	SE27	SE24	SE22	SE24	SE20	SE17	SE20	SE13	SSE19	SSE16	SSE21	SSE20	SSE20	S22	SSW24	SSW26	SSW29	S27	S25	SSW21	S16	S17	SSE19.9	SSW29
18-Oct	SW19	SW24	WSW36	WSW36	WSW37	WSW38	WSW38	WSW33	W39	W35	W34	W35	W39	WNW36	WNW32	WNW29	WNW29	WNW31	WNW23	WNW22	WNW19	WNW18	NNW21	N26	W26.9	W39
19-Oct	N18	N15	N17	N21	N21	N13	NE10	ENE15	E11	ESE12	ESE16	ESE13	ESE12	E16	ESE14	E16	ESE18	ESE19	ESE23	ESE25	ESE25	ESE27	SE28	SE24	E12.4	SE28
20-Oct	SE21	S24	SSW22	SW22	WSW28	W28	W25	WSW23	WSW26	WSW30	W31	W33	W32	WNW32	WNW32	WNW34	NW29	WNW26	NW21	WNW27	NW24	NNE22	NNE14	NNE12	W17.9	WNW34
21-Oct	NE8	ENE5	SE5	SSE10	S12	S14	SSE9	SE9	SE9	ESE12	SE14	SE15	SE14	SE16	SE18	SE19	SE22	SE28	SE24	SE23	SE27	SE27	SE24	SE24	SE15.3	SE28
22-Oct	SSE27	SSE22	SSW11	SW10	WSW19	SW25	SW33	WSW27	SW22	SW22	WSW24	WSW27	SW28	SW33	WSW38	WSW32	WSW29	WSW26	WSW27	WSW29	WSW28	WSW29	W24	W25	WSW23.6	WSW38
23-Oct	W23	W16	WSW14	WSW11	SW13	SW15	SW12	WSW13	WSW11	W1	WSW4	WNW7	WNW7	NNW11	NNW10	N10	NNE12	N14	N20	NNE23	NNE23	NNE20	N18	N18	NW7.1	W23
24-Oct	N15	NNE17	NNE17	NNE14	NNE13	NNE13	NE9	NNE9	NNE11	NNE9	NNE6	NNE5	WNW4	W4	W4	W4	WNW4	N4	NNE4	ESE1	W3	NNW2	N6	N6	N6.1	NNE17
25-Oct	N10	AF	AF	AF	AF	N18	NNE15	N11	AF	NNE8	NE3	E2	SSE3	S3	SE4	SSE5	SSE4	S7	SSE7	SE12	SE16	SE3	SSE25	SSE20	ESE4.8	SSE25
26-Oct	SSE17	SE17	SE19	SE20	ESE20	SE25	SE27	SE24	SE23	ESE25	SE26	SE27	SE29	SE31	SE31	SE34	SSE29	SE29	SE32	SSE29	S19	WNW33	AF	AF	SE22.2	SE34
27-Oct	AF	AF	AF	AF	AF	WNW32	WNW33	WNW32	WNW33	WNW33	NW36	NW34	WNW36	WNW43	WNW35	NW33	NW33	NW31	NW31	NNW23	NNW23	NNW19	NNW13	NNW14	NW29.0	WNW43
28-Oct	NW11	NNE16	NNE10	NNE8	NNE8	NE7	ENE7	SE6	SSE9	S11	S12	SE14	SE12	ESE13	SE16	SE16	ESE17	SE23	SE27	SE29	SE35	SE30	SE30	SE32	SE12.7	SE35
29-Oct	SE31	SE31	SE29	SE29	SE26	SE27	SE25	SE28	SSE28	SSE29	SSE22	SSE19	SSE15	SSE20	SSE17	S16	S22	S29	S27	SSW24	SW26	SW21	WSW22	WSW21	SSE20.8	SE31
30-Oct	WSW24	SW14	WSW11	WSW13	SW12	SW15	SW14	SSW13	SSW11	S15	S14	S14	S16	S14	S16	SSW18	WSW7	SSW4	NW1	WSW4	W9	W9	NW13	NNW18	SW9.1	WSW24
31-Oct	N17	N15	N8	NNW7	WNW12	NW11	N11	NNE12	NNE7	NW5	W6	NNW3	NW7	N8	NE11	NE13	NE13	NNE16	NNE18	NNE21	NNE21	NNE17	NNE19	NNE22	N11.0	NNE22

S2.5 SSE3.5 S3.6 SSW3.7 SW4.8 SW4.6 SW4.3 SW4.9 SW5.4 SSW5.4 SW5.4 SW4.8 WSW5.7 WSW6.0 WSW6.1 W5.6 W4.7 W3.2 WSW1.7 NNW0.7 SSW0.8 WSW1.4 SE1.2 SE1.0	Diurnal Average
SSE35 SE31 WSW36 WSW36 W37 WSW38 WSW39 WSW35 W39 W35 W36 WSW45 WSW48 WNW43 WSW49 WSW41 WSW35 NW31 SE32 NNW35 NNW36 NNW36 NNW35 WSW35	Diurnal Maximum

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



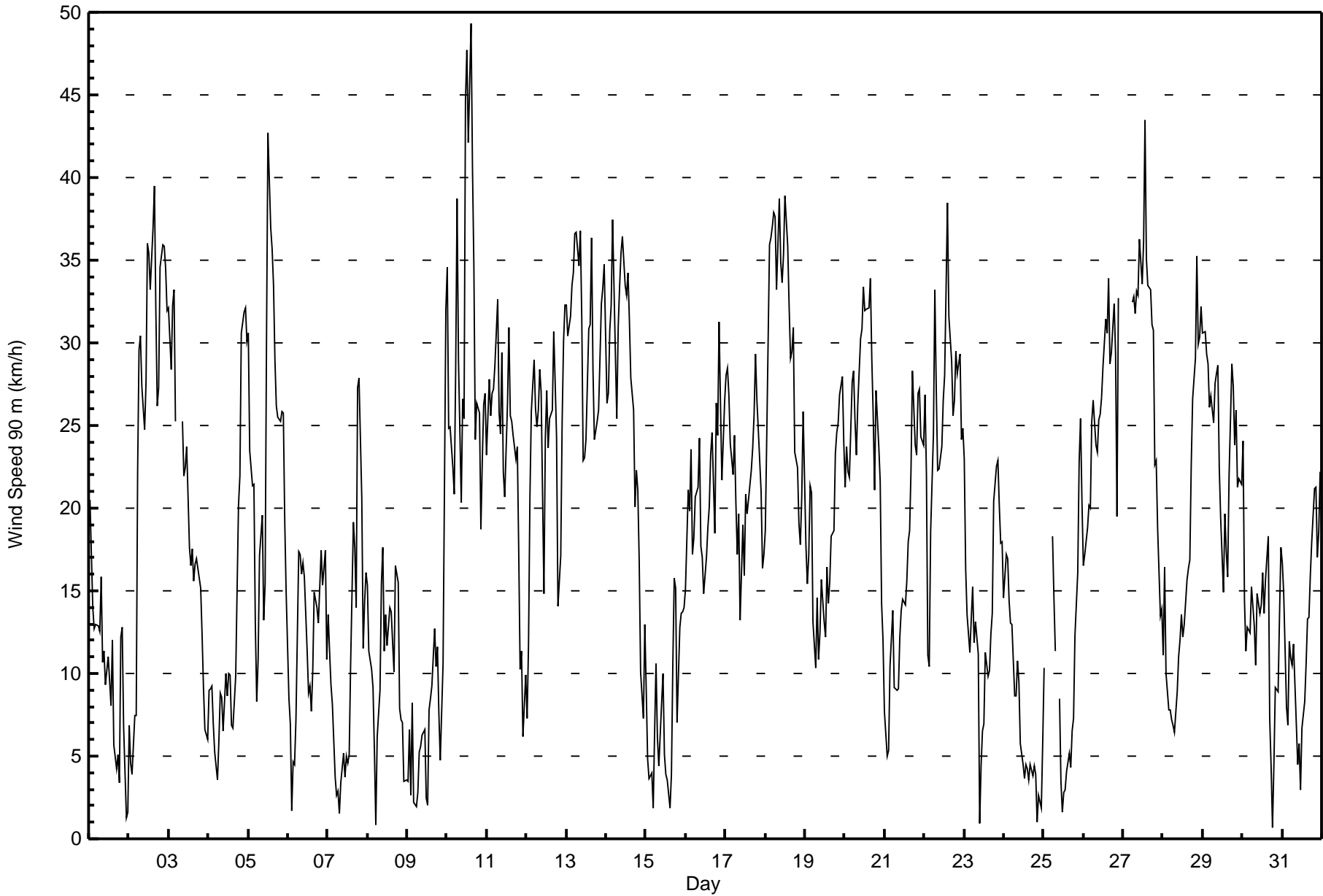
Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed 90 m (WS90m) - km/h

Mannix - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Oct 12 16:00 Minimum Value: 1 km/h on Oct 6 05:00 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: 729 Hours of Missing Data: 15 Hours of Calibration: 0 Percent Operational Time: 98.0						
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	2	1	1	1	2	1	2	1	3	2	2	3	3	4	4	5	2	2	1	4	3	3	2	1	5
2-Oct	3	3	1	1	3	7	3	3	5	6	6	5	6	6	6	7	5	5	6	7	6	6	6	6	7
3-Oct	7	6	6	5	5	AF	AF	AF	5	5	5	4	4	4	3	3	3	2	1	1	1	3	2	2	7
4-Oct	2	2	1	2	2	1	2	1	2	2	2	2	3	3	4	2	3	3	1	2	2	3	2	2	4
5-Oct	2	3	1	2	2	2	1	2	1	3	7	6	5	4	5	5	6	5	4	3	2	2	1	3	7
6-Oct	2	1	2	1	1	3	2	2	3	3	3	4	3	3	4	2	2	3	3	4	4	4	4	3	4
7-Oct	2	3	2	2	1	2	2	1	1	2	2	2	2	2	5	4	3	5	3	2	7	2	2	3	7
8-Oct	2	1	1	2	3	1	1	1	2	4	3	3	3	3	4	3	3	3	4	3	2	2	2	2	4
9-Oct	2	2	2	3	2	3	2	2	3	2	3	2	2	2	2	1	2	2	2	3	3	4	3	4	4
10-Oct	3	1	2	3	5	7	5	6	4	5	7	9	9	9	8	8	7	4	3	2	2	6	4	3	9
11-Oct	4	5	3	3	6	5	4	5	4	5	5	4	4	6	5	5	4	4	4	2	3	1	1	1	6
12-Oct	1	2	3	4	3	3	2	4	2	6	4	6	3	5	5	9	5	3	2	4	2	5	4	4	9
13-Oct	4	4	4	4	4	5	5	5	6	5	4	4	6	5	5	5	6	6	3	2	3	3	4	4	6
14-Oct	4	4	4	5	5	5	3	7	5	5	5	6	6	6	5	5	4	5	3	3	4	3	3	3	7
15-Oct	2	2	2	3	1	3	1	2	2	2	3	3	2	2	2	3	3	1	2	7	2	3	3	3	7
16-Oct	3	3	6	5	3	4	5	5	5	4	4	4	4	4	4	5	5	5	6	5	5	3	2	3	6
17-Oct	2	2	2	2	1	1	2	4	4	3	4	3	5	5	3	3	3	4	3	2	2	2	2	2	5
18-Oct	2	3	6	5	4	5	5	5	5	5	5	6	6	5	4	3	2	4	3	1	4	4	2	6	
19-Oct	5	2	4	2	3	2	1	1	3	4	3	3	4	4	4	4	4	5	5	6	5	6	6	5	6
20-Oct	5	2	1	2	4	4	3	3	4	4	5	5	5	4	5	5	5	2	4	4	4	3	5	5	5
21-Oct	2	2	2	1	1	1	1	2	2	3	3	3	4	4	4	4	5	5	5	4	4	3	3	3	5
22-Oct	2	5	2	2	3	1	2	3	3	4	5	4	5	5	6	6	5	2	2	2	2	2	3	3	6
23-Oct	5	3	2	2	2	2	1	1	4	2	2	1	2	3	2	2	3	2	3	3	2	2	2	3	5
24-Oct	4	3	3	2	2	3	2	2	2	3	2	2	2	2	2	1	1	1	2	1	1	1	1	1	4
25-Oct	4	AF	AF	AF	AF	3	3	2	AF	3	1	1	2	2	2	1	1	1	2	2	2	3	2	4	4
26-Oct	2	2	6	3	4	5	4	5	4	5	6	7	7	7	5	7	5	4	4	4	4	6	AF	AF	7
27-Oct	AF	AF	AF	AF	AF	4	4	4	4	4	7	7	5	7	5	5	6	5	6	4	5	3	3	2	7
28-Oct	2	4	5	2	2	1	1	2	2	2	3	3	3	3	3	3	3	6	5	4	4	4	3	3	6
29-Oct	3	4	4	3	3	3	3	3	3	2	3	2	2	2	2	2	2	2	2	1	2	2	3	3	4
30-Oct	2	3	2	3	2	2	2	2	2	4	1	2	3	3	3	6	1	3	1	2	2	1	1	2	6
31-Oct	3	3	3	2	2	2	2	3	2	1	1	2	2	2	3	2	2	4	2	2	2	2	2	2	4
Diurnal Maximum																								6	
AF - Analyzer Failure																									





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

**Wind Speed 90 m (WS90m) - km/h**  
**Mannix - October 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	73	10.01	10.01
6 - 11	130	17.83	27.85
12 - 19	179	24.55	52.40
20 - 28	206	28.26	80.66
29 - 38	130	17.83	98.49
> 38	11	1.51	100.00

Total Number of Valid Hours: 729

Total Number of Hours: 744



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

**Wind Speed 90 m (WS90m) - km/h**  
**Mannix - October 2015**

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	5	1	3	6	7	7	8	7	2	0	6	9	3	3	3	73
6 - 11	16	18	12	4	1	11	14	14	10	4	4	5	5	4	4	4	130
12 - 19	13	28	3	1	3	29	27	15	20	6	8	6	7	5	2	6	179
20 - 28	16	12	0	0	0	9	48	19	11	10	12	24	9	6	11	19	206
29 - 38	8	0	0	0	0	0	19	8	1	1	3	37	11	20	11	11	130
> 38	1	0	0	0	0	0	0	0	0	0	0	6	2	2	0	0	11
<b>Totals</b>	57	63	16	8	10	56	115	64	49	23	27	84	43	40	31	43	729

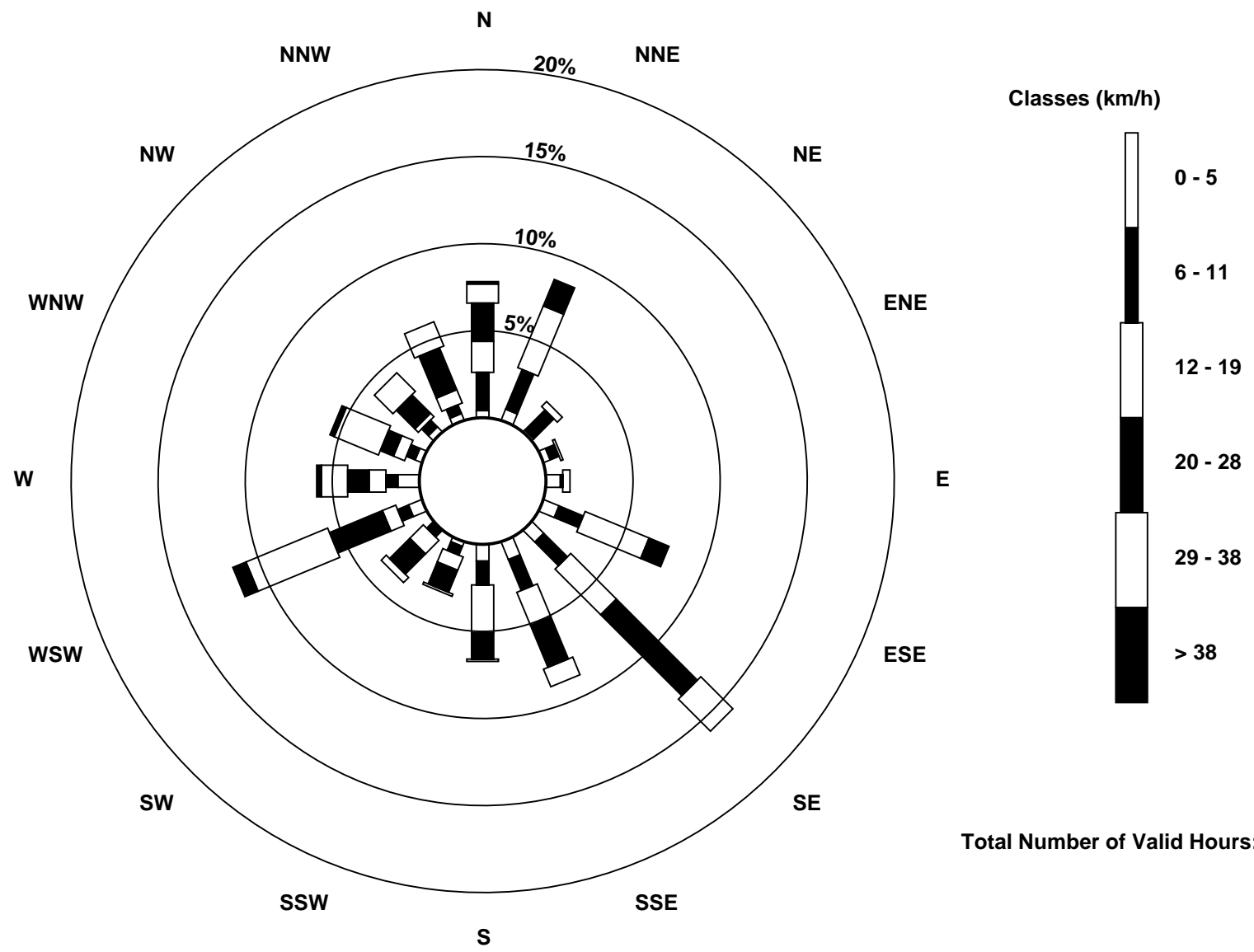
Total Number of Valid Hours: 729

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

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 2015

Direction of Maximum Speed: 253 deg on Oct 10 15:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 302.1 deg on Oct 27	Hours of Data: 742
Direction of Minimum Speed: 93 deg on Oct 9 22:00	Hours of Missing Data: 2
Direction of Minimum Daily Speed Average: 1.0 deg on Oct 9	Percent Operational Time: 99.7
Monthly Average Direction: 252.1 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	159	153	142	147	149	148	151	154	147	134	126	124	131	177	210	199	296	264	82	99	180	245	284	261	155.1
2-Oct	272	317	40	353	336	356	14	10	5	1	359	8	7	342	345	351	345	343	345	346	344	344	345	346	352.5
3-Oct	352	343	343	342	335	333	340	337	356	12	359	27	25	25	33	27	21	33	30	24	41	58	300	297	1.5
4-Oct	349	357	14	23	58	63	118	153	165	179	156	161	165	156	147	125	132	148	165	156	149	150	150	154	143.0
5-Oct	147	148	143	152	155	154	164	206	253	269	276	288	299	308	305	306	330	321	326	306	292	292	265	284	289.8
6-Oct	356	357	221	230	163	155	150	140	143	142	149	132	117	120	126	140	151	129	123	123	131	128	134	104	138.1
7-Oct	95	89	120	134	187	311	358	225	240	196	248	207	275	260	260	267	259	277	317	324	329	312	314	302	281.3
8-Oct	31	312	332	77	143	208	148	160	161	150	137	127	127	134	149	96	96	101	101	60	358	326	280	240	125.3
9-Oct	275	6	336	12	265	265	261	268	273	178	201	116	101	50	59	34	9	330	340	5	279	93	170	154	331.4
10-Oct	161	147	149	154	146	215	235	229	186	196	234	238	238	246	253	258	259	258	261	325	283	329	15	10	240.7
11-Oct	3	8	8	12	17	14	8	345	331	345	342	336	325	316	330	335	343	305	286	293	275	238	226	225	337.0
12-Oct	157	155	155	162	149	154	161	149	155	158	169	145	157	171	211	255	250	249	244	233	232	227	237	236	196.4
13-Oct	244	237	238	238	239	244	247	253	256	255	257	259	254	251	252	252	275	264	235	207	221	236	236	241	247.5
14-Oct	249	258	252	255	264	266	256	252	254	263	264	280	294	292	296	310	315	343	25	34	18	5	359	17	282.9
15-Oct	360	301	338	36	75	27	30	47	168	192	175	154	113	282	125	148	156	160	176	53	103	125	138	142	128.5
16-Oct	130	151	138	141	135	134	135	138	137	129	136	136	136	129	127	131	134	132	130	129	138	142	128	135	134.2
17-Oct	149	148	156	156	156	150	152	158	145	152	155	144	155	141	148	189	200	211	194	167	159	163	151	155	160.4
18-Oct	172	212	250	254	256	257	259	260	262	262	261	266	282	284	290	280	286	290	280	272	242	272	335	15	268.4
19-Oct	355	4	354	8	8	7	23	33	70	114	108	124	128	103	103	99	103	112	126	129	121	128	131	136	94.4
20-Oct	138	170	181	216	248	265	269	250	248	247	262	265	269	289	302	297	308	295	307	301	325	22	34	32	276.7
21-Oct	42	69	152	183	179	182	161	161	184	141	136	135	136	136	133	131	129	136	129	128	138	140	144	147	138.6
22-Oct	143	146	145	146	190	206	222	232	220	232	244	240	231	231	241	245	252	240	231	230	238	243	266	265	230.9
23-Oct	265	259	242	224	198	207	176	177	172	130	256	292	290	333	343	349	15	5	1	13	11	16	11	10	331.2
24-Oct	8	19	27	18	13	19	40	9	13	25	3	3	264	274	278	267	273	292	23	21	76	294	354	347	2.8
25-Oct	347	7	18	1	343	11	14	4	21	20	18	110	148	235	147	155	171	187	165	136	142	145	144	162	47.5
26-Oct	163	152	138	137	131	133	137	134	129	127	128	130	130	134	143	133	155	140	137	155	190	290	277	AF	145.2
27-Oct	AF	289	289	279	288	289	290	293	292	292	308	305	296	300	299	310	313	311	322	333	332	331	327	330	302.1
28-Oct	318	17	27	37	26	50	72	151	157	176	175	144	142	129	130	133	129	131	135	142	145	147	140	137	131.1
29-Oct	142	143	143	141	144	139	145	147	150	156	157	154	144	150	148	168	160	167	176	186	197	185	201	207	155.7
30-Oct	224	148	151	172	159	150	163	157	152	155	147	150	147	149	147	176	61	102	258	252	283	158	274	332	165.6
31-Oct	344	2	0	330	274	293	350	21	17	316	285	31	328	5	46	52	43	27	29	19	18	21	14	16	10.1

182.7 225.6 215.6 214.8 227.6 244.2 239.3 229.0 227.4 221.5 233.3 237.3 247.4 263.2 260.7 274.2 283.5 267.0 266.7 19.3 199.6 238.2 247.7 241.5

Diurnal Average

AF - Analyzer Failure

All monthly, daily, and diurnal averages have been calculated using vector methods

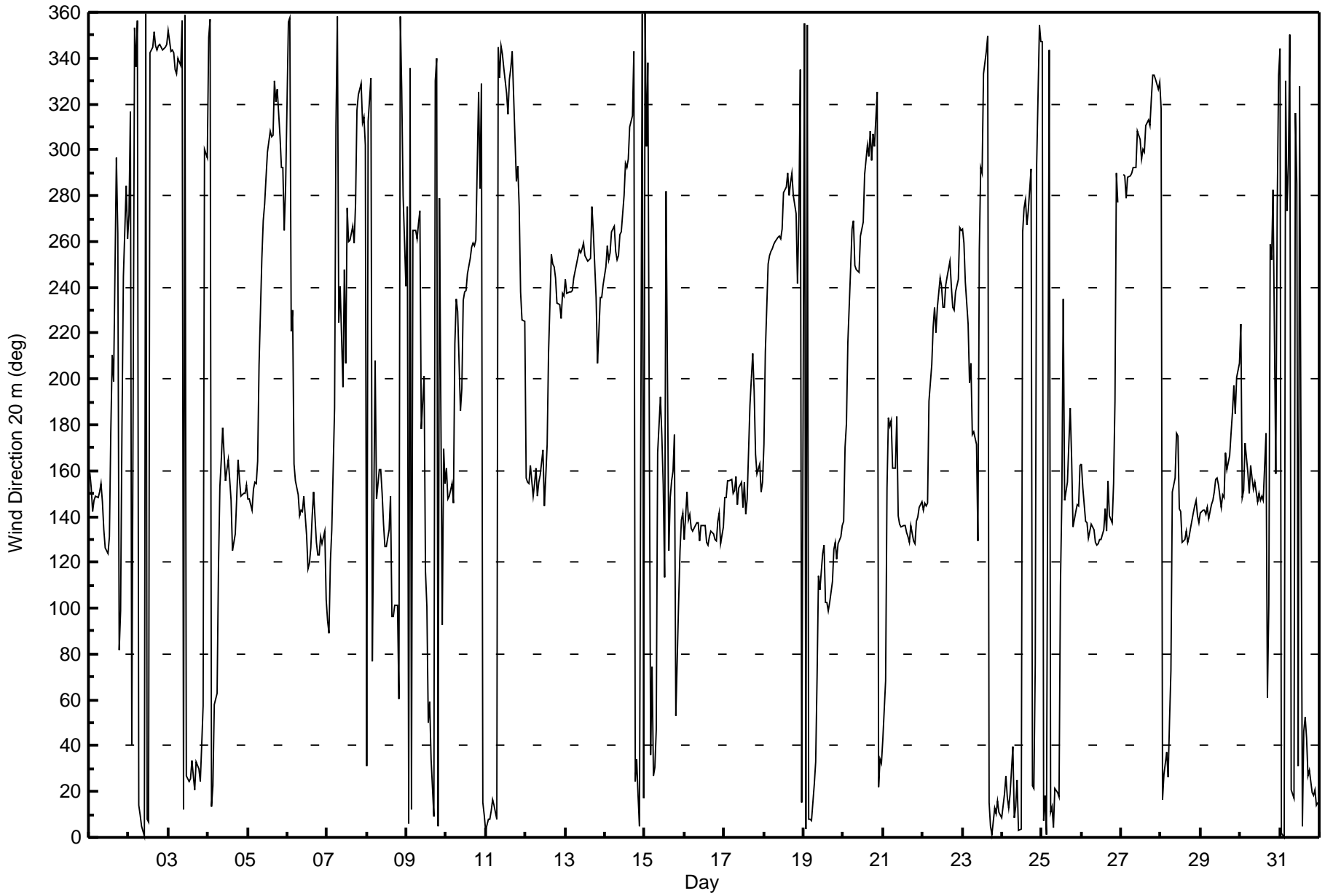


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 92 deg on Oct 2 02:00			Hours of Data:	742
Minimum Value: 5 deg on Oct 17 05:00			Hours of Missing Data:	2
			Hours of Calibration:	0
			Percent Operational Time:	99.7
Percentiles: P <sub>1</sub> = 6 P <sub>10</sub> = 9 Q <sub>1</sub> = 11 Median = 13 Q <sub>3</sub> = 19 P <sub>90</sub> = 35 P <sub>99</sub> = 82				

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	9	9	9	9	7	9	10	15	14	15	17	19	63	39	70	40	45	12	17	59	70	46	30	70
2-Oct	81	92	57	24	35	16	10	12	13	15	17	14	15	13	13	14	14	14	14	14	13	13	12	14	92
3-Oct	15	14	13	13	15	13	13	14	22	19	21	14	16	19	16	16	17	12	11	13	12	15	76	47	76
4-Oct	12	16	13	18	28	31	35	16	11	32	23	33	32	21	38	19	11	11	6	6	8	10	8	9	38
5-Oct	9	12	10	9	9	10	10	30	11	15	16	15	11	11	12	16	14	12	12	16	8	8	11	31	31
6-Oct	41	56	43	36	12	7	8	12	15	15	13	16	27	25	23	16	11	14	14	14	12	13	13	19	56
7-Oct	10	16	13	16	48	36	84	35	15	47	42	61	32	49	24	13	10	21	12	9	20	26	11	22	84
8-Oct	48	19	27	48	64	40	17	14	12	15	13	12	14	16	24	18	20	11	17	56	14	37	31	20	64
9-Oct	22	53	41	43	26	85	48	20	28	36	35	72	22	13	17	15	10	28	19	57	40	92	50	20	92
10-Oct	11	9	10	9	14	24	11	14	28	27	19	13	13	14	11	13	12	11	24	11	18	39	10	11	39
11-Oct	21	13	12	14	14	13	11	15	13	13	15	16	18	13	16	16	16	15	14	11	25	9	8	27	27
12-Oct	21	12	12	11	11	11	13	9	11	28	25	14	10	17	18	22	12	11	9	9	9	10	9	10	28
13-Oct	10	10	9	8	9	11	10	11	10	11	12	14	19	11	12	11	17	17	15	9	13	8	9	9	19
14-Oct	11	9	10	10	9	13	10	10	10	9	11	12	13	13	11	15	12	26	12	12	16	18	19	15	26
15-Oct	22	24	27	26	57	46	14	29	21	24	23	44	36	89	79	59	15	11	11	57	18	14	11	11	89
16-Oct	13	17	10	12	13	15	10	10	10	11	13	13	14	12	12	12	10	11	11	11	11	10	10	11	17
17-Oct	9	8	9	6	5	7	8	6	11	14	12	12	14	16	11	17	11	12	14	14	7	7	10	8	17
18-Oct	23	14	12	10	9	9	9	9	8	9	10	10	10	11	12	9	11	10	14	20	7	17	36	10	36
19-Oct	18	16	16	9	10	14	11	12	26	21	17	19	18	15	17	15	14	15	14	13	14	13	12	22	26
20-Oct	11	13	12	19	11	12	12	11	11	12	12	9	11	12	9	11	16	13	13	9	11	22	15	29	29
21-Oct	18	46	35	12	16	13	30	43	35	14	13	13	15	13	12	12	12	11	12	12	8	9	18	12	46
22-Oct	10	11	11	5	25	12	10	9	12	13	12	14	14	11	13	13	11	8	6	6	7	10	7	7	25
23-Oct	12	13	14	20	13	19	11	11	60	48	41	14	27	20	19	14	11	17	13	11	10	12	11	12	60
24-Oct	17	11	13	12	11	16	18	13	13	15	28	41	40	16	49	27	22	34	18	13	75	35	22	14	75
25-Oct	12	16	11	18	13	11	11	15	12	17	48	88	47	44	38	20	25	24	21	12	11	11	10	15	88
26-Oct	11	10	12	11	11	11	8	10	11	12	12	12	13	11	11	11	11	10	10	13	28	14	7	AF	28
27-Oct	AF	9	9	11	9	9	10	11	10	11	12	14	10	10	9	12	11	11	13	14	14	12	20	14	20
28-Oct	27	19	40	21	20	15	19	28	19	21	28	18	16	13	12	10	12	11	11	9	9	10	9	9	40
29-Oct	10	9	10	9	10	9	10	10	11	9	9	10	12	11	12	19	9	8	13	11	8	11	18	17	19
30-Oct	9	19	12	27	13	10	6	9	10	11	10	11	13	11	9	54	59	18	83	10	36	72	27	16	83
31-Oct	15	14	23	34	9	23	16	17	19	36	22	70	39	31	17	11	12	13	12	9	9	10	9	10	70
Diurnal Maximum																									
81 92 57 48 64 85 84 43 60 48 48 88 47 89 79 70 59 45 83 57 75 92 76 47																									

AF - Analyzer Failure







Direction of Maximum Speed: 247 deg on Oct 10 15:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 302.0 deg on Oct 27	Hours of Data: 736
Direction of Minimum Speed: 98 deg on Oct 25 12:00	Hours of Missing Data: 8
Direction of Minimum Daily Speed Average: 1.4 deg on Oct 9	Percent Operational Time: 98.9
Monthly Average Direction: 258.5 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	164	154	149	148	152	152	149	150	145	130	119	117	122	176	202	199	286	245	83	89	119	129	308	287	150.0
2-Oct	289	44	34	354	346	352	7	3	360	356	354	2	1	337	340	346	341	340	341	342	340	340	341	343	348.3
3-Oct	348	338	339	338	331	330	336	331	351	5	353	19	16	17	24	19	14	23	21	17	34	50	35	336	356.0
4-Oct	345	351	13	17	52	52	109	146	163	173	150	157	166	155	147	119	125	141	154	148	143	142	142	146	138.0
5-Oct	143	142	143	149	156	157	174	234	261	266	270	283	294	303	300	302	324	316	320	302	291	292	276	290	283.6
6-Oct	359	4	220	236	176	156	147	137	142	142	142	125	114	112	116	135	144	121	116	116	123	122	125	110	130.9
7-Oct	95	91	114	120	144	313	341	160	219	184	242	197	270	255	258	261	254	274	313	321	328	338	330	326	292.9
8-Oct	3	360	351	7	59	165	139	159	154	149	132	118	122	130	145	88	92	96	99	82	358	343	312	272	101.5
9-Oct	293	16	337	12	272	300	282	277	272	176	196	136	100	29	40	26	5	338	340	13	277	97	151	150	346.0
10-Oct	154	148	147	163	183	220	231	227	188	194	230	233	234	241	247	252	253	254	257	324	309	331	10	2	234.5
11-Oct	359	2	2	5	9	7	3	342	328	340	336	331	320	312	326	328	337	301	281	292	289	258	243	232	331.7
12-Oct	178	148	152	161	145	140	145	137	144	147	164	141	154	168	206	248	245	245	242	239	239	228	234	232	189.9
13-Oct	239	233	234	234	235	242	243	248	251	250	251	252	249	247	246	247	270	258	235	213	225	233	233	236	242.3
14-Oct	244	253	248	249	258	262	252	248	248	257	259	275	288	287	291	305	310	337	17	25	12	359	353	9	278.2
15-Oct	357	297	326	26	63	24	28	51	159	188	173	152	123	260	134	148	149	154	170	96	98	119	127	130	130.1
16-Oct	122	142	129	130	125	127	125	128	128	124	131	131	129	121	121	126	128	123	123	123	132	137	124	130	127.3
17-Oct	142	143	143	147	150	143	138	137	131	145	149	143	150	141	146	184	195	206	191	172	165	171	155	155	157.8
18-Oct	193	218	245	249	250	252	253	254	256	257	256	260	275	278	284	276	282	289	287	284	257	277	334	6	265.2
19-Oct	353	358	351	1	1	1	18	35	68	106	100	114	116	95	99	93	98	106	117	120	114	121	125	129	86.1
20-Oct	133	169	182	215	245	260	265	246	245	243	257	260	263	284	297	292	304	293	302	296	321	13	25	22	271.1
21-Oct	34	60	147	166	175	178	167	157	165	128	128	128	129	128	126	124	123	129	123	121	132	134	138	142	133.5
22-Oct	140	145	148	159	221	221	223	230	225	228	239	235	227	226	236	240	247	239	235	234	238	242	258	259	227.9
23-Oct	260	256	246	234	214	219	190	199	215	121	251	284	290	328	338	345	9	1	357	6	4	9	4	4	316.2
24-Oct	2	12	20	13	10	15	32	6	9	21	1	359	271	270	271	263	268	286	14	20	85	277	340	344	358.6
25-Oct	344	3	9	357	343	6	8	359	13	14	8	98	149	224	142	148	168	178	158	128	134	139	140	158	47.6
26-Oct	159	143	128	128	123	126	128	126	123	120	122	123	123	128	137	126	148	135	132	147	184	284	AF	AF	134.2
27-Oct	AF	AF	AF	AF	AF	AF	284	288	288	288	304	300	291	296	293	306	309	306	316	327	327	325	323	326	302.0
28-Oct	316	9	17	28	22	41	64	142	154	172	170	139	134	120	123	127	121	124	128	134	138	138	133	130	124.5
29-Oct	136	137	137	134	137	134	139	140	145	152	154	150	142	145	149	170	168	167	173	187	204	202	223	223	156.7
30-Oct	234	205	202	209	193	186	170	159	151	151	144	148	146	148	146	173	309	83	93	229	260	278	289	331	177.1
31-Oct	345	355	355	326	281	294	344	11	18	311	280	357	322	357	36	45	36	21	21	13	12	13	7	9	2.0

183.0 149.5 170.5 189.4 213.7 222.2 228.8 219.6 220.8 213.0 227.4 232.8 244.8 257.2 255.8 267.4 277.3 260.8 240.7 300.9 224.5 244.7 195.3 236.2

Diurnal Average

AF - Analyzer Failure

All monthly, daily, and diurnal averages have been calculated using vector methods



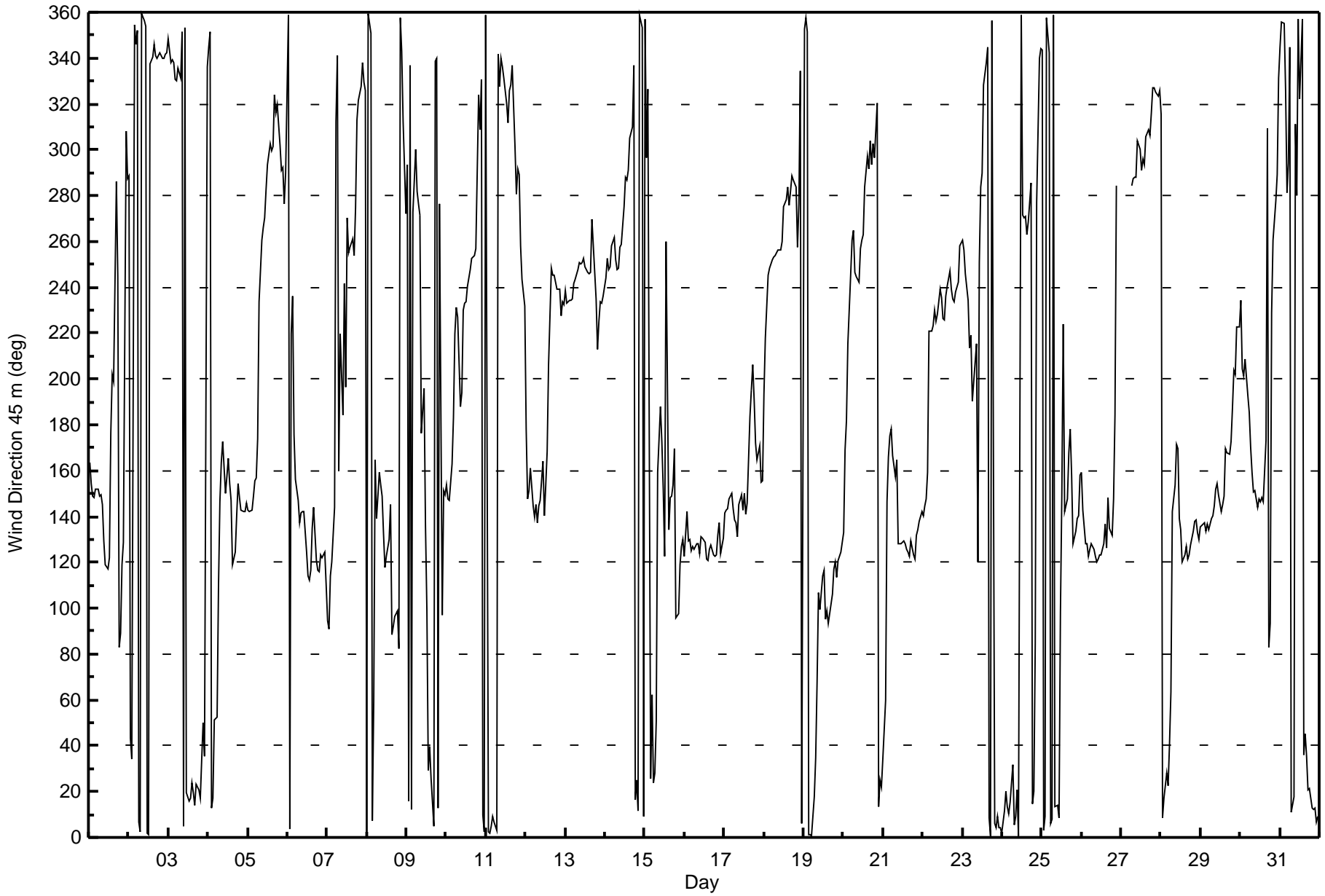
Summary of Hour Standard Deviations

Mannix - October 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 95 deg on Oct 30 17:00			Hours of Data:	736
Minimum Value: 2 deg on Oct 17 05:00			Hours of Missing Data:	8
Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 6 Q <sub>1</sub> = 8 Median = 10 Q <sub>3</sub> = 15 P <sub>90</sub> = 28 P <sub>99</sub> = 72			Hours of Calibration:	0
			Percent Operational Time:	98.9

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	4	4	4	3	3	5	12	10	12	13	15	59	32	59	40	13	39	14	15	62	59	34	62
2-Oct	60	58	35	9	20	11	6	8	7	11	13	10	11	10	9	11	9	10	10	10	9	9	9	11	60
3-Oct	12	11	9	9	12	9	10	10	19	14	17	10	11	16	12	14	13	8	8	9	11	9	54	81	81
4-Oct	10	13	9	13	22	26	33	15	9	29	19	31	25	19	35	17	7	8	3	3	5	7	5	5	35
5-Oct	5	8	7	5	5	7	12	22	5	13	15	12	8	8	10	14	11	9	8	12	4	5	6	23	23
6-Oct	14	11	71	16	22	4	6	9	12	12	10	13	28	21	23	12	10	10	11	11	8	9	7	15	71
7-Oct	8	12	10	10	20	67	18	57	27	35	42	52	28	44	22	11	8	21	8	6	16	16	9	10	67
8-Oct	8	10	13	19	53	36	10	13	10	11	10	10	12	13	21	17	18	9	14	40	6	26	52	34	53
9-Oct	23	71	33	23	64	77	43	18	29	28	26	65	24	13	14	10	7	22	15	51	36	65	18	12	77
10-Oct	7	4	6	12	19	10	9	10	26	23	17	10	10	12	9	11	10	9	24	7	11	28	7	7	28
11-Oct	12	9	8	10	10	9	7	13	9	9	12	13	14	10	12	14	13	13	12	9	20	9	11	9	20
12-Oct	25	8	9	8	8	7	8	6	8	24	21	10	8	14	14	20	9	7	6	8	6	7	6	8	25
13-Oct	7	7	7	6	6	8	8	8	8	9	11	12	16	9	10	9	17	15	13	5	7	5	7	7	17
14-Oct	8	7	7	8	8	11	7	7	8	8	10	11	11	11	9	13	9	23	9	10	12	15	14	12	23
15-Oct	18	21	20	23	53	46	12	28	21	18	18	38	45	82	73	51	13	9	2	65	16	9	6	7	82
16-Oct	9	14	6	7	7	10	6	6	7	8	10	10	12	8	8	8	7	8	8	8	8	7	3	6	14
17-Oct	6	4	7	3	2	5	5	4	8	12	9	10	12	11	9	11	7	9	7	9	6	5	6	6	12
18-Oct	19	9	8	8	6	7	7	7	6	7	8	9	8	8	10	7	9	7	8	13	6	11	31	6	31
19-Oct	12	9	11	6	6	9	11	11	22	18	14	17	16	12	14	12	11	11	10	10	10	9	8	17	22
20-Oct	8	10	6	17	8	10	11	8	8	9	10	8	10	10	8	9	13	10	11	8	9	20	12	23	23
21-Oct	16	39	36	8	12	9	29	30	17	11	10	10	12	10	9	8	8	8	9	8	6	6	9	10	39
22-Oct	6	7	7	12	14	5	4	5	8	10	10	12	12	9	11	11	8	4	3	2	2	6	6	6	14
23-Oct	10	8	9	12	9	12	7	11	73	58	33	11	23	16	13	10	8	12	9	7	6	9	8	8	73
24-Oct	13	8	11	8	9	13	14	10	9	12	20	27	41	15	46	20	19	28	16	11	57	22	29	11	57
25-Oct	8	12	8	15	9	8	9	11	9	13	37	84	46	46	34	13	23	19	17	9	8	8	6	11	84
26-Oct	7	8	7	7	7	6	5	5	6	8	8	8	8	9	9	7	9	8	8	12	27	12	AF	AF	27
27-Oct	AF	AF	AF	AF	AF	AF	7	8	7	9	10	12	8	7	7	10	8	8	10	11	10	9	16	11	16
28-Oct	21	16	28	16	14	14	18	27	18	15	22	16	15	10	8	7	8	7	7	8	7	8	7	6	28
29-Oct	7	7	8	7	7	7	8	7	8	6	7	8	10	8	10	13	7	6	5	8	3	9	11	8	13
30-Oct	4	22	12	19	15	9	9	6	8	8	7	7	10	6	5	29	95	14	51	13	18	64	16	14	95
31-Oct	10	11	17	30	9	20	11	15	17	33	18	57	30	28	15	8	12	10	11	6	6	7	6	6	57
60 71 71 30 64 77 43 57 73 58 42 84 46 82 73 59 95 28 51 65 57 65 59 81																									
Diurnal Maximum																									

AF - Analyzer Failure





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 75 m (WD75m) - deg

Mannix - October 2015

Direction of Maximum Speed: 248 deg on Oct 10 15:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 243.8 deg on Oct 13	Hours of Data: 730
Direction of Minimum Speed: 64 deg on Oct 7 08:00	Direction of Minimum Daily Speed Average: 1.8 deg on Oct 9
Direction of Minimum Speed: 64 deg on Oct 7 08:00	Hours of Missing Data: 14
Monthly Average Direction: 252.8 deg	Percent Operational Time: 98.1

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	186	177	180	166	173	170	161	160	160	136	126	121	123	181	201	197	280	239	103	86	105	107	31	347	163.1
2-Oct	308	74	62	19	3	358	10	7	2	360	357	5	3	341	344	350	346	345	345	346	344	343	346	347	352.8
3-Oct	352	342	343	342	335	333	339	335	354	8	355	21	18	19	24	22	16	23	22	21	40	52	40	15	359.6
4-Oct	350	357	19	24	53	51	107	146	172	172	150	158	168	158	149	121	125	139	151	144	143	142	140	144	137.3
5-Oct	142	147	152	163	178	191	214	254	272	273	272	284	295	304	301	304	327	318	322	306	296	299	290	301	285.0
6-Oct	14	35	142	192	204	166	170	151	150	150	141	126	119	114	118	137	142	120	114	118	123	121	125	116	132.9
7-Oct	102	101	115	120	141	152	357	64	172	176	247	193	274	259	260	262	257	277	317	325	336	359	350	339	305.0
8-Oct	5	21	13	359	2	135	131	154	153	154	138	122	127	138	147	90	96	98	100	95	30	27	350	157	98.9
9-Oct	39	117	358	42	279	291	312	284	278	173	199	168	101	9	32	30	16	355	355	42	130	128	152	145	62.9
10-Oct	158	161	163	196	213	224	233	231	200	201	231	234	234	241	248	253	254	255	260	331	325	336	14	5	237.6
11-Oct	3	7	5	9	12	10	7	345	333	342	339	335	323	315	328	331	338	305	282	299	306	276	275	249	336.7
12-Oct	223	142	163	167	145	133	132	130	138	140	161	144	160	170	208	249	246	247	245	246	245	232	236	234	190.0
13-Oct	239	235	237	236	237	243	245	249	251	251	251	252	249	247	247	247	270	259	240	224	234	237	234	237	243.8
14-Oct	246	253	249	250	260	265	254	250	250	259	260	276	289	289	293	308	313	338	19	27	14	3	359	11	280.0
15-Oct	5	301	332	23	62	29	34	54	153	187	175	150	138	260	134	151	151	155	174	135	100	118	122	126	129.7
16-Oct	121	138	128	128	123	124	124	125	127	126	133	132	129	124	123	127	129	121	124	125	133	139	129	132	128.2
17-Oct	138	137	138	137	138	131	126	124	126	142	150	149	152	148	151	184	195	205	193	180	177	187	176	176	159.8
18-Oct	212	228	247	250	252	254	254	254	258	259	258	261	277	281	285	279	285	293	295	296	277	288	344	9	268.9
19-Oct	359	1	359	5	6	5	34	56	75	107	99	114	115	96	100	96	100	108	119	121	115	124	128	132	80.9
20-Oct	136	172	190	219	247	263	267	248	246	244	258	262	265	286	298	294	307	297	303	299	324	15	27	24	272.3
21-Oct	36	60	130	158	171	174	169	146	131	123	128	127	129	127	126	125	125	130	127	127	133	134	136	141	133.2
22-Oct	146	152	172	197	236	230	228	234	231	231	240	235	227	227	237	242	248	243	241	242	245	247	257	259	232.1
23-Oct	261	258	251	240	224	230	217	228	247	136	251	283	294	330	341	350	12	7	2	12	9	14	9	8	317.7
24-Oct	7	15	22	17	16	20	37	14	14	27	10	9	284	275	272	268	274	289	12	28	85	278	345	355	5.6
25-Oct	351	6	AF	AF	AF	AF	13	5	17	19	22	75	144	201	140	147	164	172	151	128	133	139	143	158	105.4
26-Oct	159	139	128	129	123	126	128	127	125	123	124	126	126	130	137	128	146	135	133	147	186	286	AF	AF	136.0
27-Oct	AF	AF	AF	AF	AF	AF	AF	AF	290	291	307	303	294	298	296	308	312	309	319	328	329	328	327	330	--
28-Oct	322	11	23	29	29	42	63	142	154	170	168	140	135	122	125	128	122	125	129	133	137	137	132	130	123.8
29-Oct	135	136	138	134	137	135	139	140	146	154	160	154	147	149	157	177	176	173	177	197	212	218	233	233	161.4
30-Oct	238	227	226	240	223	208	202	191	174	165	164	163	159	161	161	185	263	176	81	224	261	284	302	339	203.3
31-Oct	352	359	358	330	297	308	349	13	26	318	281	354	324	360	38	48	40	26	25	17	16	17	10	13	6.4

184.7 154.4 183.5 198.8 225.4 231.1 228.1 217.7 226.7 215.0 230.3 237.1 248.7 260.1 259.0 269.2 279.9 267.9 268.2 317.6 252.0 260.9 167.7 146.4

Diurnal Average

AF - Analyzer Failure

All monthly, daily, and diurnal averages have been calculated using vector methods



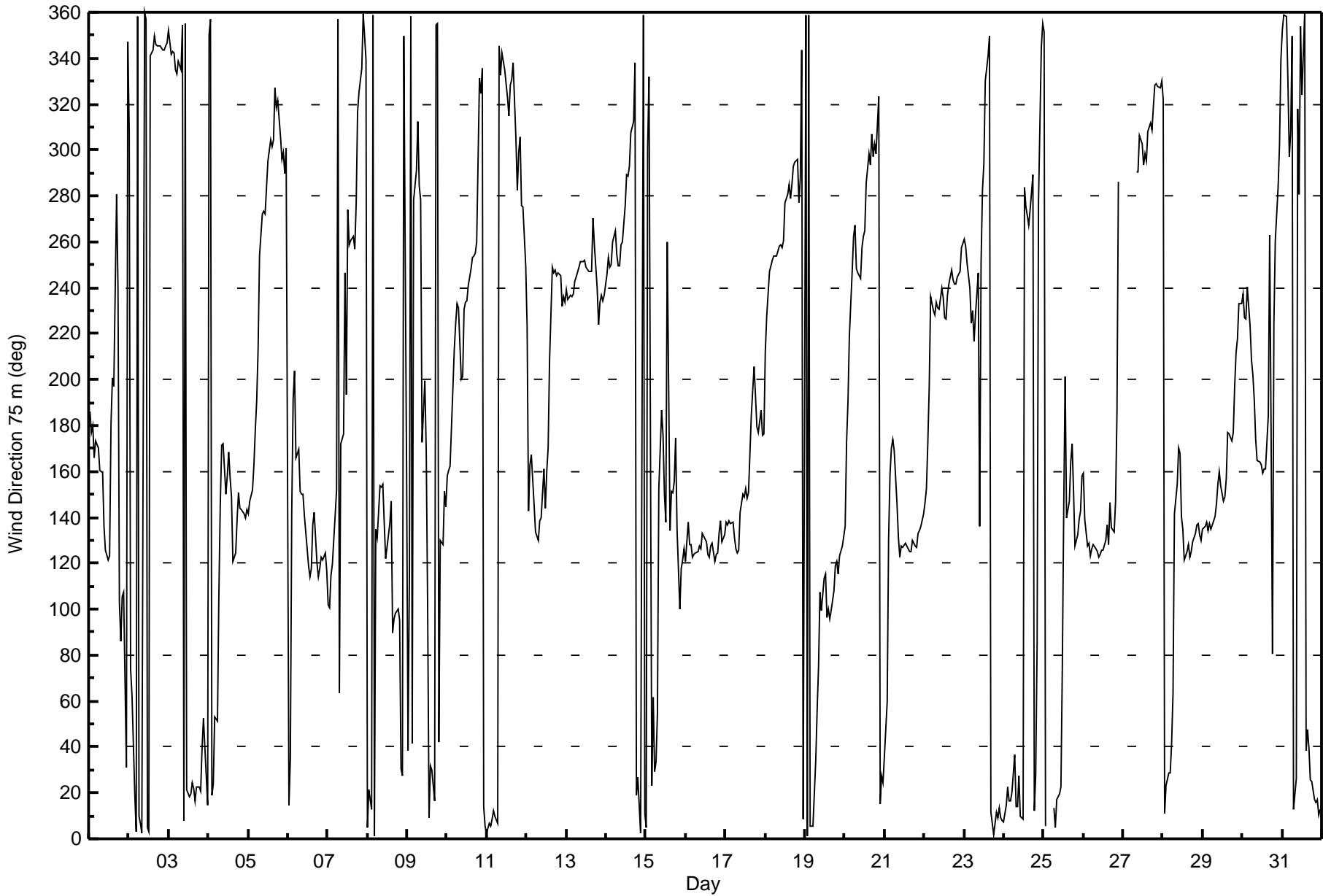
Summary of Hour Standard Deviations

Mannix - October 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 100 deg on Oct 7 08:00			Hours of Data:	730
Minimum Value: 2 deg on Oct 6 07:00			Hours of Missing Data:	14
Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 5 O <sub>1</sub> = 7 Median = 9 O <sub>3</sub> = 14 P <sub>90</sub> = 26 P <sub>99</sub> = 84			Hours of Calibration:	0
			Percent Operational Time:	98.1

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	10	9	8	9	5	5	5	12	10	14	14	15	55	29	61	44	13	37	14	15	43	99	88	99
2-Oct	44	24	28	8	14	7	5	6	5	10	11	8	9	8	7	10	8	9	9	8	8	7	7	9	44
3-Oct	10	10	8	7	11	8	8	9	17	12	16	8	9	16	10	11	11	6	5	7	9	8	10	32	32
4-Oct	11	12	9	12	20	22	31	17	10	28	17	26	20	17	35	16	10	6	3	3	3	4	3	3	35
5-Oct	3	6	4	4	12	13	14	8	4	12	14	11	7	7	9	13	10	8	6	10	4	4	5	19	19
6-Oct	18	10	72	17	12	14	2	8	9	10	9	14	25	20	22	14	10	12	14	13	11	12	9	16	72
7-Oct	14	16	14	16	21	98	26	100	20	25	40	43	29	37	24	10	7	23	7	4	14	7	10	7	100
8-Oct	7	9	10	9	39	75	8	12	5	7	11	13	14	13	20	17	17	13	16	25	13	23	47	93	93
9-Oct	76	24	63	18	83	98	61	19	37	23	27	63	34	17	10	6	6	20	11	52	77	27	7	7	98
10-Oct	8	3	8	12	13	9	7	9	24	19	16	9	9	11	8	10	10	8	25	4	7	23	6	5	25
11-Oct	9	7	7	9	9	8	5	11	9	7	10	12	13	10	12	13	11	12	11	7	18	11	22	4	22
12-Oct	32	6	9	9	5	7	6	5	7	15	19	9	7	11	11	21	8	5	5	7	5	5	6	6	32
13-Oct	6	6	5	5	5	7	6	7	7	7	11	11	15	8	9	7	16	14	10	5	5	4	5	6	16
14-Oct	8	7	6	7	8	10	6	6	7	7	10	10	10	8	12	8	22	7	7	10	13	14	10	22	22
15-Oct	15	22	21	28	44	35	8	24	28	17	18	39	50	73	76	54	13	10	3	64	19	13	11	9	76
16-Oct	12	11	7	6	10	10	10	8	7	10	9	10	10	9	10	8	7	13	9	10	8	6	6	4	13
17-Oct	4	4	4	5	3	6	8	9	8	13	8	9	10	11	9	9	6	7	6	6	6	5	7	9	13
18-Oct	15	8	7	7	6	6	6	6	6	7	7	9	7	7	10	7	9	5	4	8	6	10	27	4	27
19-Oct	9	7	9	5	5	7	18	10	19	17	16	17	16	15	16	14	14	14	12	12	12	10	8	13	19
20-Oct	7	12	4	15	6	10	11	7	7	7	10	7	9	10	7	8	12	8	9	7	7	18	10	18	18
21-Oct	13	32	35	9	10	10	23	23	11	12	10	11	12	11	10	9	9	8	9	8	5	5	7	10	35
22-Oct	4	4	15	20	5	4	3	5	7	9	8	11	12	8	10	9	7	3	2	3	3	5	5	6	20
23-Oct	9	7	7	10	6	4	9	7	31	85	37	12	21	17	10	10	7	9	6	6	5	8	6	6	85
24-Oct	10	7	8	6	7	10	13	9	8	8	17	34	42	18	38	20	18	26	17	10	55	22	36	10	55
25-Oct	8	9	AF	AF	AF	AF	10	8	7	13	31	69	52	57	29	12	22	15	14	9	7	6	4	9	69
26-Oct	6	8	10	7	9	7	5	7	8	10	9	9	9	9	8	8	8	7	6	10	29	11	AF	AF	29
27-Oct	AF	AF	AF	AF	AF	AF	AF	AF	6	8	10	11	7	7	6	9	7	8	9	9	9	8	14	10	14
28-Oct	19	14	18	13	11	14	18	26	17	13	20	15	15	12	9	8	11	9	7	7	5	6	5	6	26
29-Oct	6	6	6	5	6	6	6	6	6	5	7	7	9	6	11	8	5	5	4	9	2	7	7	4	11
30-Oct	3	8	6	14	14	6	10	10	19	16	8	5	8	6	4	20	31	49	72	11	21	17	11	15	72
31-Oct	7	9	14	27	7	19	9	14	14	33	19	45	24	26	12	7	10	7	8	4	5	5	5	4	45
	76	32	72	28	83	98	61	100	37	85	40	69	52	73	76	61	44	49	72	64	77	43	99	93	
	Diurnal Maximum																								

AF - Analyzer Failure





Summary of Hour Standard Deviations

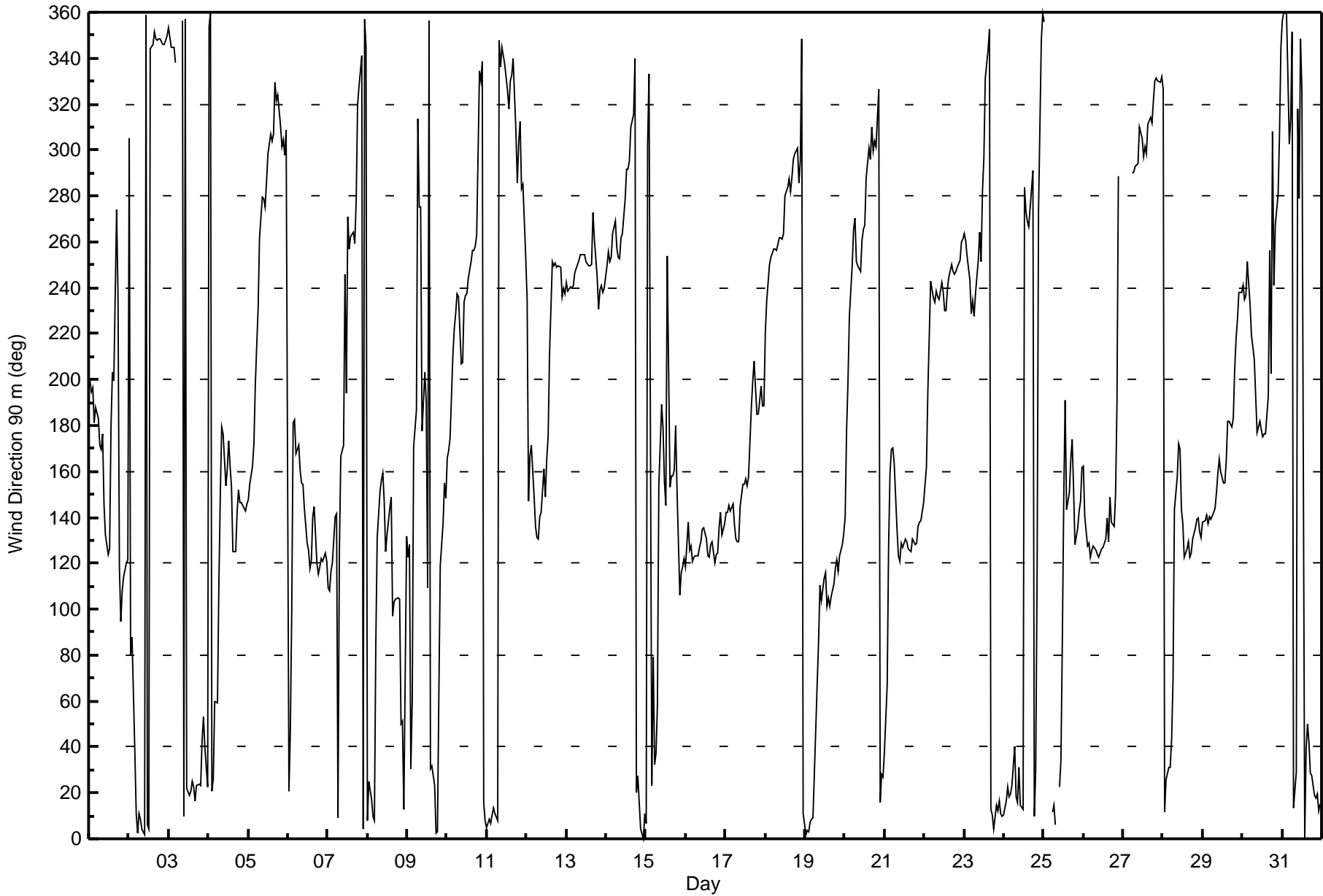
Mannix - October 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 87 deg on Oct 9 06:00			Hours of Data:	729
Minimum Value: 1 deg on Oct 6 07:00			Hours of Missing Data:	15
Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 5 Q <sub>1</sub> = 6 Median = 8 Q <sub>3</sub> = 13 P <sub>90</sub> = 25 P <sub>99</sub> = 74			Hours of Calibration:	0
			Percent Operational Time:	98.0

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	7	10	9	10	10	5	7	6	11	12	13	11	14	53	26	62	62	14	31	9	4	39	84	73	84
2-Oct	47	29	29	12	17	8	5	5	5	9	10	7	8	7	6	9	7	8	8	8	7	6	7	9	47
3-Oct	10	9	7	6	10	AF	AF	AF	16	11	15	7	10	15	10	11	10	5	4	7	8	7	9	26	26
4-Oct	12	13	8	12	22	24	30	18	10	27	17	24	20	18	31	16	7	6	2	3	2	3	2	3	31
5-Oct	2	6	4	5	16	13	12	7	5	11	14	11	7	7	8	13	10	8	6	9	4	4	5	17	17
6-Oct	22	7	64	9	7	9	1	8	7	8	8	13	28	21	27	14	9	8	10	8	7	7	5	8	64
7-Oct	5	7	7	11	24	62	34	52	10	17	37	39	32	34	22	10	8	23	6	4	13	6	9	7	62
8-Oct	7	6	8	7	22	82	9	13	3	7	11	10	12	14	19	15	14	7	10	18	14	23	65	38	82
9-Oct	33	9	78	18	65	87	57	28	38	21	24	61	69	18	8	5	6	18	11	37	46	14	6	5	87
10-Oct	7	4	11	9	10	8	7	8	22	17	14	9	8	11	8	10	10	8	25	3	5	22	6	5	25
11-Oct	7	7	7	8	8	7	5	10	8	6	9	11	12	9	11	12	11	12	10	8	16	11	20	5	20
12-Oct	20	5	9	11	3	8	4	5	6	10	18	8	6	11	11	21	8	5	4	7	5	5	5	6	21
13-Oct	5	6	5	5	4	6	6	7	7	7	10	11	14	8	9	7	16	14	8	4	4	4	5	5	16
14-Oct	7	7	6	6	8	10	6	6	7	7	10	9	10	9	8	12	7	21	7	6	10	13	14	9	21
15-Oct	14	22	23	35	46	34	7	25	26	15	17	31	47	66	81	57	13	10	3	67	15	6	7	6	81
16-Oct	6	10	4	4	5	6	5	5	5	7	8	9	10	7	6	7	6	9	6	7	7	6	3	4	10
17-Oct	2	4	3	3	3	6	3	6	5	12	8	9	10	11	9	8	6	6	5	6	6	5	9	11	12
18-Oct	13	7	7	7	5	6	6	6	6	7	7	9	7	7	9	6	8	4	4	5	5	10	25	4	25
19-Oct	7	6	7	4	4	6	23	10	18	15	13	15	16	12	14	10	9	9	7	8	6	7	6	11	23
20-Oct	7	14	6	12	6	10	11	6	7	6	9	7	8	9	7	8	12	8	9	7	7	17	9	18	18
21-Oct	15	31	34	8	9	9	21	21	9	8	9	10	13	9	7	7	6	7	7	7	4	4	6	11	34
22-Oct	4	6	17	17	3	3	3	4	7	9	7	11	12	8	9	9	7	4	3	2	2	4	5	6	17
23-Oct	8	7	6	9	6	4	7	6	25	86	35	12	22	17	9	11	7	9	6	5	5	7	6	5	86
24-Oct	8	6	7	6	7	10	14	9	7	8	18	39	42	21	48	18	18	25	19	11	51	19	43	10	51
25-Oct	8	AF	AF	AF	AF	7	8	2	AF	14	32	66	47	43	26	12	17	13	12	7	6	5	2	8	66
26-Oct	6	8	8	5	6	5	3	4	5	5	6	7	7	8	7	6	8	7	6	10	30	10	AF	AF	30
27-Oct	AF	AF	AF	AF	AF	5	6	7	6	8	9	11	6	6	6	9	6	8	8	9	8	8	13	10	13
28-Oct	18	13	14	13	11	15	19	25	16	12	19	14	14	10	6	6	7	6	6	5	4	5	4	4	25
29-Oct	4	5	6	5	5	5	6	5	6	5	6	7	8	6	11	6	5	5	4	8	3	6	6	3	11
30-Oct	2	7	6	11	13	6	8	9	21	19	10	6	7	8	4	18	30	26	76	12	18	12	10	16	76
31-Oct	6	8	14	26	7	17	9	13	13	33	18	46	22	24	11	7	10	6	7	4	4	4	4	4	46
Diurnal Maximum																									

AF - Analyzer Failure







Summary of Hour Averages

Mannix - October 2015

Maximum Value: 1.0 km/h on Oct 19 10:00		Maximum Daily Average: 0.4 km/h on Oct 16		Hours in Service: 744																							
Minimum Value: -1.2 km/h on Oct 10 13:00		Minimum Daily Average: -0.6 km/h on Oct 13		Hours of Data: 742																							
Maximum Diurnal Average: 0.1 km/h at hour 1		Minimum Diurnal Average: 0.0 km/h at hour 16		Hours of Missing Data: 2																							
Monthly Average: 0.02 km/h		Percentiles: P <sub>1</sub> = -0.9 P <sub>10</sub> = -0.6 Q <sub>1</sub> = -0.3 Median = 0.1 Q <sub>3</sub> = 0.4 P <sub>90</sub> = 0.5 P <sub>99</sub> = 0.7		Hours of Calibration: 0																							
				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	0.3	0.4	0.4	0.6	0.5	0.5	0.4	0.5	0.3	0.2	0.1	0.3	0.4	0.2	0.0	0.1	0.0	0.0	0.2	0.3	0.1	0.0	-0.1	-0.1	0.2	0.6	
2-Oct	0.0	0.0	0.1	0.0	0.0	-0.1	0.0	0.2	-0.3	-0.4	-0.1	-0.4	-0.3	-0.6	-0.8	-0.6	-0.6	-0.2	-0.1	-0.5	-0.6	-0.6	-0.8	-0.5	-0.3	0.2	
3-Oct	-0.5	-0.3	-0.5	-0.6	-0.3	-0.5	-0.6	-0.2	-0.2	0.2	0.0	0.4	0.3	0.4	0.5	0.3	0.3	0.4	0.2	0.2	0.4	0.3	0.1	0.0	0.0	0.5	
4-Oct	-0.2	-0.1	0.1	0.3	0.3	0.4	0.4	0.4	0.2	0.1	0.3	0.3	0.4	0.4	0.4	0.3	0.1	0.4	0.3	0.4	0.4	0.5	0.6	0.6	0.3	0.6	
5-Oct	0.5	0.4	0.5	0.6	0.4	0.3	0.1	0.0	-0.2	-0.1	-0.3	-0.4	-0.9	-0.8	-0.8	-0.4	-0.7	-0.4	-0.5	-0.5	-0.4	-0.3	-0.3	-0.2	-0.1	-0.2	0.6
6-Oct	0.0	0.0	-0.1	-0.1	0.1	0.2	0.4	0.5	0.4	0.3	0.1	0.3	0.6	0.6	0.5	0.4	0.4	0.3	0.4	0.3	0.4	0.4	0.4	0.2	0.3	0.6	
7-Oct	0.4	0.4	0.3	0.3	0.1	-0.1	0.0	-0.1	-0.2	0.2	0.0	0.1	-0.3	-0.3	-0.1	-0.4	-0.3	-0.1	-0.4	-0.5	-0.2	-0.1	-0.1	-0.1	-0.1	0.4	
8-Oct	0.1	-0.1	-0.1	0.2	0.1	-0.1	0.2	0.2	0.3	0.3	0.4	0.1	0.1	0.4	0.2	0.5	0.5	0.4	0.5	0.1	-0.1	-0.1	0.0	-0.1	0.2	0.5	
9-Oct	0.0	0.1	0.0	0.1	-0.1	0.0	0.0	0.0	0.0	0.3	0.0	0.3	0.3	0.2	0.4	0.4	0.0	-0.1	-0.1	0.1	0.0	0.1	0.1	0.3	0.1	0.4	
10-Oct	0.6	0.6	0.7	0.3	0.1	-0.2	-0.6	-0.5	0.1	0.1	-0.7	-1.0	-1.2	-0.9	-1.1	-0.9	-0.7	-0.3	-0.5	-0.4	-0.1	-0.2	0.0	-0.2	-0.3	0.7	
11-Oct	-0.1	-0.1	-0.2	0.0	0.1	0.0	-0.2	-0.4	-0.4	-0.7	-0.2	-0.2	-0.4	-0.8	-0.1	-0.5	-0.4	-0.3	-0.3	-0.3	-0.1	-0.2	-0.1	-0.1	-0.3	0.1	
12-Oct	0.2	0.5	0.4	0.5	0.4	0.6	0.3	0.6	0.4	0.4	0.3	0.5	0.7	0.3	-0.5	-0.4	-0.7	-0.5	-0.6	-0.2	-0.2	-0.4	-0.6	-0.6	0.1	0.7	
13-Oct	-0.7	-0.5	-0.5	-0.7	-0.7	-0.8	-0.9	-0.8	-0.9	-0.5	-0.3	-0.2	-0.6	-0.7	-0.6	-0.9	-0.4	-0.5	-0.5	-0.4	-0.3	-0.6	-0.6	-0.8	-0.6	-0.2	
14-Oct	-0.4	-0.3	-0.7	-0.8	-0.7	-0.7	-0.5	-0.7	-0.6	-0.5	-0.7	-0.5	-0.8	-0.3	-0.5	-0.4	-0.4	-0.2	0.2	0.2	0.1	-0.1	-0.1	0.0	-0.4	0.2	
15-Oct	0.1	0.0	0.0	0.5	0.3	0.1	0.3	0.3	0.2	0.0	0.1	0.3	0.1	-0.1	0.3	0.1	0.4	0.3	0.0	0.2	0.3	0.4	0.6	0.3	0.2	0.6	
16-Oct	0.4	0.3	0.4	0.5	0.4	0.6	0.6	0.7	0.7	0.1	0.2	0.4	0.5	0.4	0.2	0.5	0.6	0.5	0.3	0.4	0.6	0.5	0.4	0.4	0.4	0.7	
17-Oct	0.5	0.3	0.4	0.4	0.5	0.5	0.3	0.3	0.2	0.2	0.6	0.4	0.6	0.4	0.6	0.0	-0.1	-0.3	-0.1	0.3	0.6	0.4	0.6	0.7	0.3	0.7	
18-Oct	0.0	-0.4	-0.8	-0.7	-0.9	-0.9	-0.6	-0.7	-0.7	-0.7	-0.9	-0.6	-0.7	-0.5	-0.5	-0.5	-0.6	-0.3	-0.2	-0.2	-0.3	-0.1	-0.1	0.0	-0.5	0.0	
19-Oct	-0.1	0.1	-0.1	0.0	0.0	-0.1	0.2	0.4	0.7	1.0	0.4	0.6	0.8	0.4	0.7	0.8	0.5	0.6	0.4	0.4	0.6	0.6	0.5	0.4	0.4	1.0	
20-Oct	0.5	0.2	0.0	-0.3	-0.7	-0.5	-0.4	-0.5	-0.5	-0.5	-0.4	-0.5	-0.5	-0.8	-0.6	-0.5	-0.3	-0.4	-0.2	-0.4	-0.5	0.1	0.5	0.5	-0.3	0.5	
21-Oct	0.2	0.4	0.1	-0.1	0.0	0.0	0.1	0.1	0.0	0.2	0.3	0.3	0.2	0.5	0.3	0.5	0.4	0.4	0.5	0.5	0.3	0.7	0.4	0.5	0.3	0.7	
22-Oct	0.6	0.5	0.3	0.3	-0.2	-0.4	-0.5	-0.4	-0.3	-0.6	-0.5	-0.5	-0.6	-0.7	-0.6	-0.7	-0.5	-0.5	-0.4	-0.5	-0.4	-0.5	-0.2	-0.3	-0.3	0.6	
23-Oct	-0.3	-0.1	-0.1	-0.1	-0.3	-0.3	-0.1	0.0	0.1	0.4	-0.2	-0.1	-0.1	0.0	0.1	-0.1	0.0	0.0	-0.1	0.0	-0.1	0.2	0.1	-0.1	-0.1	0.4	
24-Oct	0.0	0.1	0.3	0.1	0.0	0.1	0.4	0.0	0.2	0.2	-0.1	0.3	0.1	-0.2	0.0	0.1	0.1	0.1	0.2	0.3	0.1	0.1	0.0	0.0	0.1	0.4	
25-Oct	-0.1	-0.1	0.2	-0.1	0.0	-0.1	-0.2	0.0	0.2	0.1	0.2	0.1	0.2	0.2	0.2	0.1	0.0	0.0	0.1	0.2	0.4	0.4	0.4	0.4	0.1	0.4	
26-Oct	0.3	0.3	0.5	0.6	0.4	0.7	0.5	0.5	0.3	0.2	0.3	0.6	0.4	0.7	0.7	0.7	0.6	0.6	0.7	0.4	-0.1	-0.7	-0.8	AF	0.4	0.7	
27-Oct	AF	-0.8	-0.7	-0.3	-0.7	-0.6	-0.7	-0.6	-0.6	-0.6	-0.7	-0.8	-0.4	-0.8	-0.9	-0.5	-0.4	-0.7	-0.5	-0.2	-0.2	-0.4	-0.2	-0.3	-0.5	-0.2	
28-Oct	-0.1	0.1	0.4	0.5	0.3	0.5	0.5	0.2	0.3	0.0	0.3	0.3	0.3	0.3	0.2	0.4	0.3	0.4	0.8	0.6	0.7	0.5	0.5	0.4	0.4	0.8	
29-Oct	0.5	0.6	0.5	0.3	0.4	0.5	0.5	0.6	0.5	0.8	0.6	0.6	0.5	0.4	0.6	0.2	0.4	0.3	0.1	-0.1	-0.1	-0.1	-0.2	-0.2	0.3	0.8	
30-Oct	-0.2	0.1	0.2	0.0	0.0	0.1	0.1	0.2	0.4	0.5	0.3	0.4	0.4	0.5	0.4	0.3	0.2	0.2	0.0	-0.2	0.1	0.1	0.0	-0.1	0.2	0.5	
31-Oct	-0.1	-0.2	0.1	-0.1	-0.1	-0.1	0.0	0.2	0.0	0.0	0.1	0.3	-0.1	0.3	0.6	0.4	0.5	0.2	0.3	0.1	0.1	0.2	0.1	0.0	0.1	0.6	
																								Diurnal Average			
																								Diurnal Maximum			
AF - Analyzer Failure																											



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.3 km/h on Oct 10 15:00 Minimum Value: 0.2 km/h on Oct 6 02:00 Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.5 Q <sub>1</sub> = 0.9 Median = 1.4 Q <sub>3</sub> = 2.1 P <sub>90</sub> = 2.7 P <sub>99</sub> = 3.2																							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	0.9	1.0	0.8	1.0	0.9	0.8	1.0	1.1	1.1	1.4	1.5	1.8	1.6	1.8	1.8	1.3	0.7	0.3	0.2	0.4	0.5	0.4	0.3	0.3	1.8
2-Oct	0.6	0.5	0.3	0.6	0.7	1.9	2.5	2.7	2.8	2.4	2.7	3.3	3.3	3.2	3.2	3.8	3.0	2.4	2.7	3.4	3.3	3.3	3.2	2.9	3.8
3-Oct	3.2	2.7	2.9	3.0	2.4	2.7	2.6	2.4	2.6	2.4	2.4	2.1	2.1	2.0	1.8	1.8	1.6	1.3	1.0	0.9	0.6	0.3	0.4	3.2	
4-Oct	0.8	0.9	0.8	1.0	0.8	0.7	0.8	1.0	0.9	1.0	1.3	1.3	1.4	1.4	1.6	1.5	1.3	0.9	0.6	0.5	1.4	1.8	1.6	1.4	1.8
5-Oct	1.5	0.9	1.1	1.4	1.1	0.8	0.6	0.6	0.8	1.4	1.6	2.7	3.6	3.1	3.1	2.9	2.9	2.2	1.8	1.6	1.4	1.1	0.5	0.3	3.6
6-Oct	0.3	0.2	0.4	0.2	0.3	0.5	0.7	1.0	1.1	1.4	1.7	1.8	1.8	1.7	1.5	1.0	1.1	1.5	1.5	1.6	1.7	1.4	1.4	0.5	1.8
7-Oct	0.9	0.8	0.9	0.7	0.3	0.4	0.3	0.4	0.7	1.2	1.3	1.5	1.5	1.3	1.5	1.6	1.5	0.8	1.4	1.4	1.2	0.3	0.4	0.5	1.6
8-Oct	0.4	0.2	0.2	0.2	0.3	0.4	0.4	0.7	0.8	1.0	1.4	1.7	1.6	1.8	1.7	1.4	0.9	1.2	1.2	0.7	0.7	0.7	0.2	0.3	1.8
9-Oct	0.4	0.2	0.6	0.7	0.7	0.6	0.6	0.5	0.9	1.3	1.4	1.2	1.0	0.9	0.8	1.0	0.9	0.6	0.8	0.5	0.3	0.3	0.5	1.0	1.4
10-Oct	1.2	1.1	1.3	1.2	0.9	2.0	2.7	2.2	1.9	2.3	2.7	4.1	4.2	3.7	4.3	3.3	2.8	1.2	1.5	1.3	0.4	1.4	2.0	2.0	4.3
11-Oct	2.0	2.5	2.3	2.4	2.4	2.6	2.9	2.5	2.2	2.8	2.3	2.3	2.6	2.8	2.6	2.4	2.4	1.9	1.8	1.2	0.6	0.4	0.4	0.5	2.9
12-Oct	0.3	0.9	1.1	1.2	1.5	1.1	0.8	1.4	1.3	1.4	1.1	1.5	2.0	2.4	2.4	2.4	2.7	2.1	1.5	0.4	0.5	1.3	2.1	2.2	2.7
13-Oct	2.5	2.1	2.0	2.0	2.1	2.8	3.1	2.7	3.3	3.0	2.2	2.1	2.4	3.0	2.9	3.3	2.4	1.9	1.2	1.2	1.3	1.8	2.1	2.8	3.3
14-Oct	1.9	1.9	2.4	2.7	2.6	1.9	1.9	2.5	2.9	2.8	2.8	2.8	2.9	2.8	2.7	2.4	2.2	1.9	1.9	1.7	1.5	1.0	0.8	1.3	2.9
15-Oct	0.8	0.4	0.3	0.9	0.6	0.6	1.0	0.6	0.9	1.5	1.6	1.4	1.4	1.5	1.2	1.0	0.6	0.6	0.9	0.6	1.0	1.4	1.1	1.1	1.6
16-Oct	1.3	1.0	1.4	1.3	1.4	1.4	1.5	1.7	2.1	1.8	1.7	1.8	2.2	2.4	2.7	2.4	2.1	1.8	2.8	2.5	2.3	1.3	1.4	1.6	2.8
17-Oct	1.3	1.2	0.7	0.5	0.7	1.0	0.6	0.5	1.2	1.1	1.8	1.6	2.0	1.8	1.6	1.7	1.4	1.1	1.4	1.1	0.9	0.7	0.9	1.1	2.0
18-Oct	0.8	1.1	3.1	2.9	2.9	2.9	2.7	2.4	2.6	2.5	2.7	2.7	3.0	2.9	2.8	2.2	1.9	1.6	0.6	0.5	0.4	0.2	1.3	1.8	3.1
19-Oct	1.4	1.2	1.4	1.5	1.6	1.0	0.9	1.0	1.4	1.9	2.1	1.9	1.8	2.0	1.9	1.8	1.9	2.2	2.9	2.9	3.0	3.1	2.7	2.1	3.1
20-Oct	1.5	1.2	1.2	1.2	2.4	2.2	1.8	2.0	2.4	2.9	2.6	2.5	2.4	2.5	2.5	2.7	2.3	1.6	1.3	1.8	1.7	2.0	1.6	1.2	2.9
21-Oct	0.7	0.7	0.6	0.5	0.5	0.6	0.4	0.6	0.8	1.4	1.8	1.8	1.9	1.9	2.0	2.1	2.4	2.6	2.0	2.3	1.6	1.6	1.4	1.1	2.6
22-Oct	1.4	1.1	0.8	0.5	0.6	0.7	1.2	1.0	1.1	1.9	2.3	2.5	2.6	2.9	3.3	2.9	2.5	1.2	0.7	1.0	0.6	0.9	0.9	1.2	3.3
23-Oct	1.6	1.0	0.8	0.5	0.6	0.8	0.8	0.6	0.5	1.0	1.2	1.1	1.4	1.4	1.2	1.1	1.1	1.1	1.6	1.7	1.7	1.6	1.4	1.5	1.7
24-Oct	1.3	1.5	1.7	1.2	1.2	1.2	1.1	0.8	1.1	1.2	1.0	1.2	1.2	1.1	0.9	0.8	0.7	0.6	0.7	0.5	0.3	0.4	0.2	0.6	1.7
25-Oct	1.0	1.4	1.7	1.4	1.2	1.5	1.3	1.0	1.4	1.1	1.0	1.1	1.1	0.9	0.9	0.7	0.6	0.5	0.4	1.0	1.1	1.4	1.3	1.4	1.7
26-Oct	1.1	0.9	1.5	1.6	2.2	2.4	1.9	2.0	2.2	3.1	3.0	2.9	3.1	3.2	2.5	3.0	2.2	2.2	2.6	2.3	1.6	2.5	1.8	AF	3.2
27-Oct	AF	2.4	2.3	1.9	2.5	2.5	2.7	2.6	2.7	2.7	2.9	2.7	3.0	3.2	3.0	2.8	2.7	2.5	2.6	2.1	2.2	1.7	1.3	1.1	3.2
28-Oct	0.9	1.6	1.1	1.0	0.9	1.0	1.0	1.0	0.9	1.2	1.3	1.5	1.6	2.0	1.9	1.7	2.0	2.5	2.4	2.2	2.4	2.0	2.0	2.2	2.5
29-Oct	2.1	2.1	2.1	2.0	1.9	1.9	1.8	1.9	1.9	1.9	1.6	1.7	1.3	1.6	1.3	1.2	0.6	1.0	1.3	1.1	1.0	0.7	0.4	0.4	2.1
30-Oct	0.5	0.3	0.3	0.3	0.5	0.5	0.7	0.7	0.9	1.2	1.1	1.2	1.2	1.1	1.1	0.9	0.3	0.3	0.3	0.4	0.3	0.2	0.4	1.1	1.2
31-Oct	1.2	1.4	0.8	0.6	0.6	0.7	0.9	1.0	0.8	0.6	1.1	0.9	1.0	1.4	1.3	1.3	1.3	1.4	1.5	1.6	1.7	1.4	1.4	1.7	1.7
3.2 2.7 3.1 3.0 2.9 2.9 3.1 2.7 3.3 3.1 3.0 4.1 4.2 3.7 4.3 3.8 3.0 2.6 2.9 3.4 3.3 3.3 3.2 2.9																									
Diurnal Maximum																									
AF - Analyzer Failure																									



Summary of Hour Averages

Mannix - October 2015

Maximum Value: 1.7 km/h on Oct 10 01:00      Maximum Daily Average: 0.8 km/h on Oct 26																								Hours in Service: 744 Hours of Data: 736			
Minimum Value: -2.0 km/h on Oct 2 22:00      Minimum Daily Average: -1.1 km/h on Oct 2																								Hours of Missing Data: 8 Hours of Calibration: 0			
Maximum Diurnal Average: 0.1 km/h at hour 2      Minimum Diurnal Average: -0.1 km/h at hour 17																								Percent Operational Time: 98.9			
Monthly Average: 0.04 km/h      Percentiles: P <sub>1</sub> = -1.7 P <sub>10</sub> = -0.9 Q <sub>1</sub> = -0.5 Median = 0.0 Q <sub>3</sub> = 0.6 P <sub>90</sub> = 1.0 P <sub>99</sub> = 1.4																											
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	1.1	1.0	1.2	1.2	1.0	1.1	1.1	0.5	0.5	0.2	0.4	0.5	0.6	0.1	0.2	-0.1	0.0	0.1	0.2	0.2	0.2	0.0	0.0	0.5	1.2	
2-Oct	-0.1	0.0	0.1	-0.4	-0.3	-0.7	-1.0	-1.1	-1.3	-1.0	-1.0	-1.7	-1.3	-1.9	-2.0	-1.8	-1.6	-1.2	-1.1	-1.6	-1.8	-2.0	-1.8	-1.2	-1.1	0.1	
3-Oct	-1.4	-1.1	-1.6	-1.6	-1.1	-1.3	-1.5	-1.0	-0.9	-0.3	-0.7	-0.3	0.0	0.0	0.3	-0.2	0.0	-0.1	-0.2	-0.1	0.0	0.1	0.2	0.0	-0.5	0.3	
4-Oct	-0.4	-0.5	-0.2	0.1	0.1	0.4	0.4	0.8	0.5	0.4	0.8	0.5	0.6	0.7	0.5	-0.1	0.7	0.8	1.0	1.2	1.1	1.2	1.2	1.2	0.5	1.2	
5-Oct	1.2	0.7	0.9	1.3	0.8	0.5	0.2	-0.1	-0.3	-0.4	-0.5	-0.5	-1.6	-1.5	-1.5	-1.3	-1.3	-1.2	-1.2	-0.8	-0.8	-0.7	-0.4	-0.5	-0.4	1.3	
6-Oct	-0.2	-0.1	0.1	0.0	0.1	0.6	0.8	0.8	0.7	0.5	0.2	0.3	1.2	1.1	1.1	0.6	0.7	0.7	1.0	0.6	0.8	0.8	0.8	0.5	0.6	1.2	
7-Oct	0.3	0.2	0.2	0.6	0.4	0.0	-0.2	0.1	0.0	0.4	0.1	0.2	-0.7	-0.6	-0.2	-0.3	-0.3	-0.3	-1.1	-1.2	-0.7	-0.2	-0.4	-0.5	-0.2	0.6	
8-Oct	-0.4	-0.2	-0.3	-0.1	0.0	0.1	0.4	0.4	0.5	0.6	0.6	0.1	0.2	0.6	0.4	0.5	0.7	0.3	0.7	0.1	-0.3	-0.3	0.0	0.0	0.2	0.7	
9-Oct	-0.1	0.0	-0.2	-0.2	0.0	0.0	0.1	-0.1	0.0	0.6	0.2	0.3	0.5	-0.1	0.2	0.1	-0.3	-0.3	-0.4	0.0	0.0	0.1	0.6	1.1	0.1	1.1	
10-Oct	1.7	1.4	1.5	0.9	0.2	0.1	-0.4	-0.2	0.5	0.5	-0.2	-0.6	-0.7	-0.2	-0.8	-0.6	-0.6	-0.3	-0.5	-1.2	-0.5	-0.9	-0.9	-0.8	-0.1	1.7	
11-Oct	-0.7	-0.9	-1.1	-0.8	-0.6	-1.0	-1.3	-1.1	-1.2	-1.7	-0.6	-0.8	-1.1	-1.4	-0.7	-1.2	-1.3	-0.3	-0.5	-0.5	-0.2	-0.2	0.0	0.0	-0.8	0.0	
12-Oct	0.2	1.2	1.0	1.0	1.1	1.2	1.0	1.2	1.0	0.9	0.6	1.1	1.4	1.5	0.1	-0.3	-0.5	-0.6	-0.4	-0.1	-0.2	-0.2	-0.5	-0.3	0.5	1.5	
13-Oct	-0.5	-0.3	-0.4	-0.5	-0.6	-0.5	-0.5	-0.7	-0.7	-0.4	-0.1	-0.1	-0.4	-0.5	-0.4	-0.6	-0.4	-0.5	-0.4	-0.3	-0.3	-0.4	-0.5	-0.7	-0.4	-0.1	
14-Oct	-0.5	-0.4	-0.5	-0.7	-0.8	-0.7	-0.5	-0.4	-0.5	-0.5	-0.8	-0.8	-1.2	-0.7	-0.7	-0.7	-0.6	-0.7	-0.5	-0.2	-0.4	-0.5	-0.5	-0.4	-0.6	-0.2	
15-Oct	-0.2	0.0	-0.1	0.4	0.3	0.0	0.0	0.2	0.5	0.4	0.1	0.7	0.2	-0.2	0.3	0.3	0.5	0.8	0.5	0.3	0.3	0.7	0.9	0.6	0.3	0.9	
16-Oct	0.8	0.8	1.0	0.9	0.9	1.1	1.0	1.3	1.1	0.2	0.6	0.7	0.6	0.5	0.3	0.8	0.9	0.6	0.8	0.7	1.2	1.0	0.9	1.0	0.8	1.3	
17-Oct	1.2	0.9	1.0	0.8	1.1	1.0	0.7	0.8	0.5	0.4	1.3	0.8	1.4	0.9	1.0	0.6	0.2	-0.1	0.4	0.7	1.0	0.7	1.3	1.4	0.8	1.4	
18-Oct	0.2	-0.2	-0.5	-0.5	-0.8	-0.8	-0.5	-0.6	-0.6	-0.7	-0.7	-0.7	-0.7	-0.6	-0.7	-0.7	-0.9	-0.9	-0.6	-0.6	-0.2	-0.4	-0.7	-0.8	-0.6	0.2	
19-Oct	-0.6	-0.4	-0.6	-0.7	-0.7	-0.3	0.0	0.1	0.6	1.3	0.5	1.0	1.4	0.4	1.1	0.8	0.6	0.9	0.6	1.0	0.9	0.9	1.0	0.6	0.4	1.4	
20-Oct	1.0	0.7	0.4	-0.2	-0.6	-0.5	-0.4	-0.4	-0.2	-0.4	-0.1	-0.3	-0.6	-1.1	-1.2	-0.9	-0.9	-0.8	-0.4	-0.8	-0.9	-0.6	0.2	0.1	-0.4	1.0	
21-Oct	-0.1	0.2	0.4	0.4	0.3	0.2	0.1	0.3	0.4	0.4	0.5	0.3	0.5	0.7	0.6	1.0	0.7	1.1	0.8	0.5	0.9	1.0	0.9	0.9	0.5	1.1	
22-Oct	1.3	1.0	0.8	0.5	-0.3	-0.4	-0.3	-0.3	-0.1	-0.2	-0.3	-0.2	0.1	-0.1	-0.3	-0.4	-0.5	-0.5	-0.4	-0.4	-0.4	-0.6	-0.5	-0.5	-0.1	1.3	
23-Oct	-0.4	0.1	-0.1	-0.1	-0.1	-0.2	0.0	-0.1	-0.1	0.5	-0.3	-0.3	-0.2	-0.3	-0.1	-0.4	-0.4	-0.4	-0.7	-0.6	-0.8	-0.4	-0.5	-0.5	-0.3	0.5	
24-Oct	-0.4	-0.4	-0.1	-0.2	-0.4	-0.2	0.3	-0.2	-0.2	0.0	-0.4	0.2	0.2	0.2	-0.5	0.0	-0.1	0.2	0.0	0.1	0.4	0.1	0.2	-0.1	-0.2	-0.1	0.4
25-Oct	-0.5	-0.3	-0.7	-0.7	-0.5	-0.7	-0.6	-0.3	-0.3	-0.2	0.0	0.0	0.3	0.4	0.3	0.0	0.0	0.2	0.2	0.3	0.7	0.9	1.0	1.0	0.0	1.0	
26-Oct	0.8	0.6	0.8	0.9	0.6	1.1	0.9	1.0	0.8	0.4	0.6	0.9	0.9	1.0	1.3	1.0	1.3	1.3	1.4	1.0	0.5	-0.9	AF	AF	0.8	1.4	
27-Oct	AF	AF	AF	AF	AF	AF	-1.3	-1.0	-1.1	-1.0	-1.3	-1.4	-1.2	-1.3	-1.3	-0.9	-1.1	-1.4	-1.2	-1.0	-1.0	-1.1	-0.6	-0.8	-1.1	-0.6	
28-Oct	-0.1	-0.5	0.3	0.3	-0.1	0.5	0.4	0.3	0.5	0.2	0.7	0.7	0.5	0.4	0.2	0.6	0.6	0.7	1.2	1.1	1.4	1.1	1.1	1.2	0.6	1.4	
29-Oct	1.0	1.1	1.0	0.9	1.0	0.9	1.1	1.2	1.4	1.4	1.3	1.1	0.8	0.9	1.1	0.9	0.8	0.9	0.7	0.3	-0.1	0.0	-0.3	-0.2	0.8	1.4	
30-Oct	-0.2	0.0	0.1	0.0	0.1	0.1	0.4	0.5	0.9	1.2	0.8	1.0	0.8	1.0	1.0	0.6	0.0	0.2	0.2	0.0	0.1	0.0	-0.3	-0.6	0.3	1.2	
31-Oct	-0.6	-0.4	-0.1	-0.3	-0.3	-0.3	-0.4	0.0	-0.2	-0.1	-0.1	0.1	-0.5	0.1	0.7	0.1	0.1	0.0	-0.3	-0.5	-0.5	-0.4	-0.6	-0.7	-0.2	0.7	
																								Diurnal Average			
																								Diurnal Maximum			
AF - Analyzer Failure																											



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 4.8 km/h on Oct 10 15:00			Hours of Data:	736
Minimum Value: 0.1 km/h on Oct 7 08:00			Hours of Missing Data:	8
			Hours of Calibration:	0
			Percent Operational Time:	98.9
Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.5 Q <sub>1</sub> = 0.9 Median = 1.5 Q <sub>3</sub> = 2.3 P <sub>90</sub> = 2.9 P <sub>99</sub> = 3.5				

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	0.5	0.7	0.7	0.7	0.8	0.6	0.8	1.0	1.1	1.4	1.4	1.8	1.8	2.2	2.2	1.7	0.9	0.2	0.2	0.6	0.7	0.6	0.5	0.2	2.2
2-Oct	0.5	0.5	0.3	0.6	0.8	1.7	2.2	2.4	2.1	2.4	2.8	2.9	3.1	3.2	3.5	4.1	3.3	2.7	3.1	3.5	3.6	3.6	3.4	3.3	4.1
3-Oct	3.4	3.0	3.1	3.2	2.9	3.1	2.9	2.9	2.9	2.7	2.7	2.4	2.3	2.3	2.1	2.0	1.6	1.4	1.0	0.8	0.5	0.4	0.6	3.4	
4-Oct	0.8	1.0	0.8	1.2	1.2	0.9	1.0	1.1	0.8	1.2	1.6	1.6	1.9	1.8	1.9	1.7	1.3	1.0	0.4	0.4	1.4	2.0	1.5	1.4	2.0
5-Oct	1.3	1.3	1.2	1.2	0.8	0.6	0.4	0.7	0.6	1.5	1.9	3.1	3.6	3.4	3.2	3.3	3.2	2.5	2.0	1.5	1.0	0.9	0.4	0.4	3.6
6-Oct	0.3	0.2	0.3	0.2	0.2	0.4	0.7	1.2	1.2	1.5	2.0	1.9	2.3	2.1	1.8	1.2	1.1	1.7	1.7	1.6	1.8	1.4	1.5	0.8	2.3
7-Oct	1.1	0.9	1.1	1.0	0.4	0.5	0.4	0.1	0.5	1.5	1.6	1.9	1.5	1.5	1.8	1.8	1.4	0.9	1.6	1.6	1.5	0.6	0.6	0.7	1.9
8-Oct	0.6	0.2	0.2	0.2	0.3	0.2	0.4	0.7	0.8	1.1	1.4	1.7	1.6	1.9	1.9	1.6	1.2	1.5	1.5	0.9	0.6	0.6	0.3	0.2	1.9
9-Oct	0.4	0.2	0.5	0.5	0.4	0.6	0.4	0.4	1.0	1.5	1.8	1.4	1.1	0.7	0.9	1.0	0.7	0.6	0.7	0.6	0.3	0.2	0.5	1.0	1.8
10-Oct	1.0	0.9	1.3	1.3	1.5	2.5	3.2	2.6	2.4	2.7	3.4	4.3	4.5	4.4	4.8	3.8	2.9	1.3	1.3	1.4	0.6	1.5	2.2	1.9	4.8
11-Oct	2.4	2.7	2.3	2.3	2.4	2.7	2.5	2.8	2.5	2.7	2.6	2.8	2.9	3.3	3.2	2.7	2.5	2.4	1.9	1.1	0.7	0.3	0.3	0.6	3.3
12-Oct	0.4	0.7	1.0	1.0	1.6	1.0	0.7	1.4	1.5	1.4	1.3	1.6	2.2	2.6	2.7	2.7	2.6	2.0	1.2	0.4	0.5	1.2	2.2	2.3	2.7
13-Oct	2.5	2.1	2.0	2.1	2.0	3.2	3.3	2.9	3.4	3.1	2.7	2.5	2.6	2.9	3.2	3.4	2.7	1.9	1.1	0.8	1.3	1.7	2.2	2.8	3.4
14-Oct	2.0	2.1	2.5	2.6	2.7	1.9	1.9	2.5	2.8	2.9	3.1	3.1	3.1	3.2	2.8	2.7	2.6	2.1	1.8	1.7	1.8	1.2	1.0	1.5	3.2
15-Oct	1.0	0.5	0.4	1.0	0.7	0.7	0.9	0.8	1.1	1.7	1.8	1.8	1.7	1.8	1.5	1.4	0.6	0.4	0.7	1.1	1.3	1.1	1.3	1.8	
16-Oct	1.4	1.1	1.3	1.6	1.4	1.5	1.4	1.7	2.1	1.8	2.0	2.3	2.3	2.2	2.3	2.4	2.0	2.1	2.7	2.5	2.4	1.4	0.8	1.3	2.7
17-Oct	1.2	0.9	0.7	0.5	0.3	0.8	0.6	0.6	1.1	1.2	2.3	1.8	2.4	2.0	1.6	1.5	1.2	0.7	1.3	1.3	0.9	0.6	0.9	0.9	2.4
18-Oct	1.0	0.9	3.2	3.1	2.8	2.8	2.9	2.5	2.8	2.9	3.0	3.2	3.3	3.3	2.9	2.3	1.9	1.4	0.7	0.7	0.3	0.3	1.4	1.7	3.3
19-Oct	1.6	1.2	1.3	1.4	1.4	1.0	0.9	0.9	1.4	2.1	2.2	2.1	2.0	2.2	1.9	2.0	2.0	2.2	2.8	2.9	3.1	2.9	2.7	2.0	3.1
20-Oct	1.7	1.1	1.0	1.2	2.3	2.4	1.7	2.1	2.5	3.0	2.9	2.8	2.7	2.6	2.9	3.0	2.5	1.5	1.5	1.8	2.0	1.9	1.8	1.4	3.0
21-Oct	0.9	0.9	0.7	0.5	0.4	0.4	0.4	0.6	0.8	1.6	2.0	2.1	2.2	2.1	2.1	2.0	2.2	2.7	1.9	2.0	1.7	1.6	1.3	1.3	2.7
22-Oct	1.4	1.2	0.7	0.6	0.7	0.7	1.0	1.0	1.2	2.1	2.6	2.6	2.8	2.9	3.3	3.1	2.3	1.1	0.6	0.6	0.5	0.8	1.2	1.6	3.3
23-Oct	1.8	1.2	0.8	0.6	0.5	0.4	0.4	0.4	0.5	1.1	1.4	1.2	1.7	1.9	1.6	1.1	1.0	1.0	1.4	1.5	1.5	1.7	1.3	1.5	1.9
24-Oct	1.3	1.6	1.9	1.4	1.3	1.4	1.4	0.9	1.0	1.4	1.2	1.6	1.5	1.4	1.2	0.9	0.8	0.7	0.9	0.9	0.4	0.5	0.4	0.6	1.9
25-Oct	0.8	1.6	1.8	1.3	1.1	1.4	1.3	1.0	1.5	1.3	1.2	1.2	1.3	1.2	1.3	0.9	0.7	0.6	0.6	0.9	1.3	1.5	1.5	1.5	1.8
26-Oct	1.1	1.0	1.6	1.6	1.9	2.2	1.8	1.7	1.9	2.8	2.8	2.8	3.1	3.2	2.8	3.0	2.6	2.4	2.7	2.4	1.8	2.3	AF	AF	3.2
27-Oct	AF	AF	AF	AF	AF	AF	2.6	2.7	2.6	2.6	3.1	2.9	3.0	3.4	2.9	3.2	3.2	2.6	3.2	2.5	2.5	1.8	1.5	1.2	3.4
28-Oct	1.0	1.8	1.2	1.3	1.2	1.4	1.2	1.3	1.3	1.3	1.6	1.8	1.9	2.3	1.9	1.7	2.0	2.2	2.3	2.4	2.6	2.2	2.3	2.3	2.6
29-Oct	2.3	2.4	2.6	2.3	2.0	2.0	2.0	2.1	2.1	1.9	1.7	1.8	1.5	1.6	1.4	1.2	0.6	0.9	1.2	0.7	0.4	0.6	0.5	0.5	2.6
30-Oct	0.5	0.6	0.4	0.4	0.7	0.5	0.6	0.6	0.8	1.0	1.0	1.1	1.2	1.1	0.8	1.0	0.2	0.3	0.3	0.3	0.4	0.2	0.5	1.2	1.2
31-Oct	1.2	1.5	1.0	0.7	0.5	0.5	0.9	1.3	0.9	0.7	1.2	1.3	1.1	1.8	1.5	1.4	1.3	1.5	1.6	1.5	1.6	1.4	1.4	1.6	1.8
3.4 3.0 3.2 3.2 2.9 3.2 3.3 2.9 3.4 3.1 3.4 4.3 4.5 4.4 4.8 4.1 3.3 2.7 3.2 3.5 3.6 3.6 3.4 3.3																									
Diurnal Maximum																									

AF - Analyzer Failure



Summary of Hour Averages

Mannix - October 2015

Maximum Value: 1.3 km/h on Oct 6 13:00		Maximum Daily Average: 0.3 km/h on Oct 20		Hours in Service: 744																						
Minimum Value: -1.6 km/h on Oct 2 15:00		Minimum Daily Average: -0.5 km/h on Oct 2		Hours of Data: 730																						
Maximum Diurnal Average: 0.2 km/h at hour 13		Minimum Diurnal Average: 0.0 km/h at hour 22		Hours of Missing Data: 14																						
Monthly Average: 0.09 km/h		Percentiles: P <sub>1</sub> = -0.9 P <sub>10</sub> = -0.3 Q <sub>1</sub> = -0.1 Median = 0.1 Q <sub>3</sub> = 0.3 P <sub>90</sub> = 0.5 P <sub>99</sub> = 1.0		Hours of Calibration: 0																						
				Percent Operational Time: 98.1																						
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	0.2	0.4	0.2	0.4	0.3	0.2	0.4	0.7	0.4	0.2	-0.3	-0.1	0.2	0.7	0.0	0.3	0.3	0.1	0.1	0.1	0.7	0.0	0.2	0.1	0.2	0.7
2-Oct	0.3	0.1	0.1	0.1	0.1	0.0	-0.3	-0.4	-0.4	-0.2	-0.2	-0.9	-0.6	-1.0	-1.6	-1.0	-0.9	-0.6	-0.4	-0.5	-0.9	-1.1	-0.8	-0.2	-0.5	0.3
3-Oct	-0.5	-0.3	-1.0	-1.1	-0.4	-0.9	-1.0	-0.4	-0.1	0.5	0.2	-0.2	0.5	0.3	0.5	-0.1	0.3	0.0	-0.1	0.1	0.1	0.1	0.1	0.1	-0.1	0.5
4-Oct	-0.2	-0.3	0.0	0.3	0.2	0.7	0.1	0.3	0.2	0.4	0.7	0.4	0.4	0.5	0.1	-0.7	0.1	0.6	0.4	0.3	0.2	0.0	0.5	0.2	0.2	0.7
5-Oct	0.5	0.5	0.8	0.9	0.3	-0.1	-0.1	0.2	0.2	0.0	0.0	0.8	0.2	-0.1	0.0	0.3	-0.3	-0.1	-0.3	0.2	0.3	0.3	0.1	0.1	0.2	0.9
6-Oct	0.0	0.1	0.1	0.2	0.1	0.2	0.4	0.7	0.5	0.4	-0.2	-0.3	1.3	0.8	1.1	0.2	0.3	0.1	0.6	0.0	-0.2	0.0	-0.1	0.1	0.3	1.3
7-Oct	0.5	0.2	0.0	0.4	0.3	0.2	0.0	0.1	0.1	0.3	0.2	0.1	-0.6	-0.7	-0.1	0.4	0.3	0.2	-0.2	-0.5	-0.2	0.0	0.0	-0.1	0.0	0.5
8-Oct	-0.2	0.0	-0.1	0.0	0.0	0.0	0.0	0.2	0.5	0.5	0.2	-0.3	-0.3	0.4	-0.2	0.2	0.6	0.1	0.4	0.1	0.2	0.2	0.0	0.1	0.1	0.6
9-Oct	0.1	0.1	0.2	0.0	0.3	0.2	0.2	0.1	0.2	0.4	0.2	0.2	0.3	-0.2	0.1	0.2	0.1	0.0	0.0	0.1	0.2	0.1	0.8	0.6	0.2	0.8
10-Oct	1.2	1.0	1.1	0.1	0.1	0.3	-0.1	0.2	0.2	0.2	0.1	0.0	-0.3	0.6	0.2	0.4	0.2	0.2	0.2	-0.5	-0.3	-0.3	-0.5	-0.2	0.2	1.2
11-Oct	-0.1	-0.5	-0.6	-0.2	-0.2	-0.4	-0.6	-0.4	-0.5	-0.9	-0.1	-0.3	-0.2	0.0	0.2	-0.6	-0.6	0.7	0.4	0.3	0.2	0.1	0.2	0.4	-0.2	0.7
12-Oct	0.1	0.4	0.7	0.7	0.5	0.0	-0.1	-0.1	0.2	0.1	0.4	0.4	1.0	1.2	0.1	0.6	0.1	0.0	0.0	0.1	0.0	-0.1	-0.1	0.1	0.3	1.2
13-Oct	0.0	0.0	-0.1	-0.3	-0.3	0.0	0.0	0.0	0.3	0.1	0.7	0.3	0.4	0.2	0.3	0.1	0.7	0.2	0.0	-0.1	0.0	-0.1	-0.1	-0.1	0.1	0.7
14-Oct	0.0	0.0	-0.1	0.2	0.2	0.1	0.3	0.3	0.3	0.5	0.2	0.5	0.4	0.8	0.9	0.4	0.5	0.1	-0.2	0.0	-0.3	-0.4	-0.4	-0.2	0.2	0.9
15-Oct	-0.1	0.2	0.0	0.4	0.4	0.2	0.0	0.1	0.4	0.4	-0.2	0.5	0.0	-0.2	0.3	0.2	0.3	0.5	0.4	0.3	0.1	0.0	0.0	-0.3	0.1	0.5
16-Oct	-0.1	0.2	-0.2	-0.1	0.0	0.2	-0.1	0.1	0.1	-0.5	0.0	0.2	-0.3	-0.6	-0.8	-0.4	-0.3	-0.3	-0.4	-0.6	0.0	0.0	-0.2	0.0	-0.2	0.2
17-Oct	0.3	0.0	0.1	0.1	0.1	-0.2	-0.2	-0.2	-0.3	0.2	0.7	0.6	0.8	0.4	0.7	0.5	0.1	-0.1	0.1	0.4	0.4	0.2	0.4	0.6	0.2	0.8
18-Oct	0.0	-0.1	0.3	0.1	0.0	0.1	0.4	0.3	0.5	0.3	0.1	0.2	0.5	0.8	0.7	0.4	0.2	0.3	0.3	0.1	0.2	0.1	-0.1	-0.4	0.2	0.8
19-Oct	-0.1	-0.1	-0.1	-0.4	-0.2	0.0	0.3	0.4	0.5	0.9	0.2	0.5	1.0	0.0	0.8	0.7	0.7	0.8	-0.1	0.0	0.1	-0.4	-0.5	-0.5	0.2	1.0
20-Oct	0.2	0.5	0.8	0.8	0.2	0.5	0.5	0.0	0.1	0.2	0.8	0.7	0.4	0.4	0.2	0.5	0.2	0.3	0.5	0.3	-0.2	-0.2	0.3	0.2	0.3	0.8
21-Oct	-0.3	0.1	0.4	0.3	0.3	0.2	0.1	0.1	0.4	-0.2	-0.2	-0.5	-0.2	-0.1	-0.4	-0.1	-0.4	-0.3	-0.4	-0.3	-0.3	-0.1	0.2	0.2	-0.1	0.4
22-Oct	1.0	0.8	0.2	0.1	-0.2	-0.1	0.0	0.0	0.2	0.4	0.2	0.3	0.7	0.1	0.3	0.3	0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.1	1.0
23-Oct	0.3	0.3	0.2	0.0	0.0	0.0	-0.1	-0.1	0.1	0.4	-0.1	0.0	0.2	0.1	0.1	-0.1	-0.1	-0.2	-0.2	-0.3	-0.4	-0.1	-0.2	-0.2	0.0	0.4
24-Oct	-0.2	-0.2	0.1	0.0	-0.1	-0.1	0.4	0.0	0.1	0.1	-0.1	0.2	0.2	-0.4	0.1	-0.1	0.3	0.4	0.0	0.3	0.1	0.3	-0.1	0.0	0.1	0.4
25-Oct	-0.3	0.4	AF	AF	AF	AF	-0.3	-0.1	-0.1	-0.1	0.2	-0.1	0.1	0.4	0.0	-0.3	0.0	0.1	0.1	-0.4	0.0	0.2	0.4	0.6	0.0	0.6
26-Oct	0.5	0.0	-0.1	-0.2	-0.5	-0.4	-0.3	-0.3	-0.5	-0.8	-0.5	-0.3	-0.2	-0.6	0.1	-0.6	0.7	0.0	0.0	0.2	0.4	0.3	AF	AF	-0.1	0.7
27-Oct	AF	AF	AF	AF	AF	AF	AF	AF	0.3	0.3	0.3	0.0	0.3	0.4	0.6	0.7	0.2	-0.2	0.0	-0.3	-0.3	-0.6	0.0	-0.4	--	0.7
28-Oct	0.4	-0.4	0.5	0.2	-0.2	0.3	0.5	0.3	0.3	-0.1	0.4	0.3	0.0	-0.3	-0.7	-0.4	-0.3	-0.6	0.0	-0.1	-0.1	0.0	-0.1	-0.1	0.0	0.5
29-Oct	-0.1	0.0	0.0	-0.3	-0.1	-0.1	0.2	0.4	0.6	1.0	0.9	0.6	0.4	0.6	0.7	0.7	0.4	0.5	0.6	0.0	-0.1	0.0	-0.1	-0.1	0.3	1.0
30-Oct	0.0	0.1	0.1	0.0	0.0	-0.1	-0.1	0.0	0.3	0.5	0.4	0.7	0.6	0.5	0.6	0.3	0.1	0.1	0.1	0.0	0.3	0.2	0.2	-0.2	0.2	0.7
31-Oct	-0.1	0.0	0.0	-0.2	0.1	0.0	0.0	0.1	-0.2	0.0	0.1	0.2	-0.3	0.5	1.0	0.1	0.3	0.1	-0.1	-0.2	0.0	0.0	-0.3	-0.4	0.0	1.0
																								Diurnal Average		
																								Diurnal Maximum		
AF - Analyzer Failure																										



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 4.7 km/h on Oct 10 15:00			Hours of Data:	730
Minimum Value: 0.1 km/h on Oct 7 08:00			Hours of Missing Data:	14
			Hours of Calibration:	0
			Percent Operational Time:	98.1
Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.5 Q <sub>1</sub> = 0.8 Median = 1.4 Q <sub>3</sub> = 2.3 P <sub>90</sub> = 2.9 P <sub>99</sub> = 3.5				

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	0.6	0.7	0.8	0.8	0.9	0.5	0.6	0.6	0.7	1.1	1.2	1.9	2.0	2.4	2.4	1.9	1.1	0.2	0.5	1.5	1.7	0.9	0.5	0.4	2.4
2-Oct	0.5	0.8	0.5	0.5	0.8	1.1	1.8	1.8	1.7	2.3	2.5	2.3	2.6	2.8	2.9	3.7	3.1	2.7	3.0	3.5	3.1	3.3	3.3	3.3	3.7
3-Oct	3.3	3.2	2.8	3.0	2.8	2.9	2.6	2.6	2.7	2.7	2.5	2.4	2.4	2.5	2.1	1.9	1.4	0.9	0.6	0.4	0.5	0.4	0.7	3.3	
4-Oct	0.9	1.2	0.8	1.3	1.3	1.1	1.2	1.0	0.8	1.5	1.9	1.6	2.1	2.0	2.1	1.8	1.4	0.8	0.3	0.4	1.0	1.6	1.0	1.0	2.1
5-Oct	0.7	1.2	0.8	0.6	0.5	0.5	0.5	0.7	0.6	1.3	2.0	3.4	3.6	3.2	3.3	3.3	2.9	2.3	1.7	1.5	0.9	0.8	0.6	0.4	3.6
6-Oct	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.8	0.9	1.2	2.0	2.0	2.7	2.5	2.1	1.4	1.1	2.1	2.2	2.2	2.2	1.9	1.8	1.4	2.7
7-Oct	2.1	1.8	1.4	1.1	0.4	0.4	0.2	0.1	0.3	1.5	1.7	2.0	1.4	1.5	2.2	2.2	1.5	1.0	1.3	1.2	1.5	0.7	0.8	0.7	2.2
8-Oct	0.6	0.2	0.2	0.2	0.3	0.2	0.4	0.4	0.8	0.9	1.2	1.7	1.6	1.9	1.8	1.9	1.7	2.6	2.5	1.3	0.7	0.5	0.3	0.3	2.6
9-Oct	0.5	0.5	0.5	0.4	0.8	0.7	0.4	0.4	0.8	1.4	1.8	1.6	1.0	0.5	0.9	0.7	0.4	0.4	0.6	0.5	0.5	0.6	0.4	1.1	1.8
10-Oct	1.1	0.7	0.9	1.4	2.0	2.7	3.2	2.8	2.6	3.0	3.5	4.4	4.4	4.4	4.7	3.8	3.1	1.7	1.4	0.8	0.5	1.2	2.1	1.8	4.7
11-Oct	2.4	2.5	2.2	1.9	2.3	2.7	2.3	2.7	2.3	2.3	2.5	2.8	2.9	3.0	3.3	2.3	2.2	2.4	1.9	1.2	0.8	0.3	0.3	0.5	3.3
12-Oct	0.3	0.5	0.6	0.9	1.3	1.1	1.1	1.3	1.2	1.0	1.2	1.6	1.9	2.6	2.5	3.0	2.6	2.0	1.2	0.5	0.8	1.3	2.1	2.4	3.0
13-Oct	2.2	2.1	2.2	2.1	2.0	2.8	3.0	2.9	3.3	3.1	2.8	2.3	2.8	2.9	3.0	3.1	2.7	1.9	0.9	0.9	1.4	1.7	2.3	2.7	3.3
14-Oct	2.2	2.3	2.2	2.5	2.7	2.0	1.9	2.4	2.6	3.1	3.3	3.4	3.5	3.1	2.9	2.6	2.3	2.0	1.5	1.4	1.7	1.4	1.2	1.6	3.5
15-Oct	0.9	0.6	0.6	0.9	0.8	0.6	0.6	0.7	1.1	1.9	1.9	2.1	1.8	1.9	1.6	1.6	0.5	0.3	0.2	0.7	1.7	1.8	1.7	1.5	2.1
16-Oct	1.9	1.4	1.7	1.6	1.9	1.9	2.1	2.0	2.0	1.8	2.1	2.5	2.4	2.2	2.4	2.5	2.2	2.5	3.0	2.7	2.3	1.3	1.2	0.9	3.0
17-Oct	0.7	0.6	0.6	0.6	0.5	1.1	1.3	1.3	1.5	1.3	2.1	1.9	2.2	2.0	1.5	1.5	1.1	0.7	1.4	1.2	1.1	0.7	0.9	1.0	2.2
18-Oct	1.2	1.1	3.0	3.0	2.6	2.9	2.9	2.8	3.1	2.9	3.1	3.3	3.2	3.2	3.0	2.3	1.9	1.2	0.8	0.8	0.3	0.4	1.3	1.3	3.3
19-Oct	1.5	1.0	1.2	1.2	1.2	0.9	0.7	0.8	1.7	2.6	2.9	2.5	2.5	3.0	2.6	2.8	3.0	3.2	3.1	3.3	3.5	3.0	2.7	2.1	3.5
20-Oct	1.7	1.0	0.7	1.5	2.3	2.3	1.7	2.0	2.4	2.8	3.0	3.2	3.0	2.7	2.7	3.0	2.2	1.2	1.4	1.8	1.8	1.6	1.7	1.3	3.2
21-Oct	0.9	1.1	0.9	0.5	0.4	0.3	0.3	0.8	1.0	1.7	2.0	2.2	2.5	2.2	2.1	2.2	2.4	2.7	2.2	2.0	1.6	1.4	1.1	1.4	2.7
22-Oct	1.0	0.8	0.7	0.8	0.6	0.7	0.9	1.1	1.3	2.4	2.4	2.2	2.9	2.7	3.3	3.0	2.3	1.0	0.7	0.8	0.5	0.9	1.4	1.9	3.3
23-Oct	1.9	1.4	0.8	0.7	0.5	0.4	0.3	0.3	0.7	1.2	1.4	1.3	1.8	2.0	1.6	1.1	0.9	0.8	1.1	1.3	1.2	1.4	1.1	1.2	2.0
24-Oct	1.3	1.3	1.7	1.2	1.2	1.5	1.5	0.9	0.8	1.2	1.3	1.7	1.6	1.6	1.3	1.0	0.9	0.8	0.9	0.9	0.4	0.5	0.5	0.6	1.7
25-Oct	0.6	1.5	AF	AF	AF	AF	1.2	0.9	1.2	1.3	1.2	1.2	1.3	1.3	1.4	1.1	0.8	0.7	0.7	1.1	1.2	1.2	1.0	1.3	1.5
26-Oct	1.1	0.8	1.7	1.6	2.1	2.4	1.8	2.0	2.1	2.9	2.9	2.9	3.2	3.1	2.7	3.2	2.7	2.2	2.7	2.2	1.9	2.2	AF	AF	3.2
27-Oct	AF	AF	AF	AF	AF	AF	AF	AF	2.6	2.4	2.9	2.7	3.0	3.2	3.0	3.1	2.8	2.4	2.9	2.4	2.4	1.8	1.5	1.0	3.2
28-Oct	1.2	1.8	1.2	1.3	1.4	1.4	1.4	1.4	1.5	1.5	1.7	1.9	2.1	2.4	1.9	1.7	2.1	2.2	2.2	2.2	2.2	1.9	1.9	1.9	2.4
29-Oct	2.0	2.0	2.3	2.1	1.8	1.8	1.8	2.0	1.9	1.5	1.5	1.5	1.4	1.1	1.1	1.3	0.6	0.8	1.0	0.7	0.4	0.5	0.7	0.5	2.3
30-Oct	0.7	0.6	0.5	0.6	0.7	0.5	0.8	0.8	0.8	0.6	0.7	0.7	0.8	0.7	0.5	0.5	0.4	0.4	0.3	0.2	0.4	0.4	0.5	1.1	1.1
31-Oct	1.2	1.4	1.0	0.9	0.7	0.5	1.0	1.2	0.9	0.7	1.0	1.2	1.1	2.0	1.5	1.3	1.2	1.2	1.2	1.2	1.4	1.2	1.2	1.3	2.0
3.3 3.2 3.0 3.0 2.8 2.9 3.2 2.9 3.3 3.1 3.5 4.4 4.4 4.4 4.7 3.8 3.1 3.2 3.1 3.5 3.5 3.3 3.3 3.3																									
Diurnal Maximum																									

AF - Analyzer Failure



Summary of Hour Averages

Mannix - October 2015

Maximum Value: 4.5 km/h on Oct 27 14:00																				Maximum Daily Average: 2.9 km/h on Oct 27					Hours in Service: 744	
Minimum Value: -1.8 km/h on Oct 26 10:00																				Minimum Daily Average: -0.5 km/h on Oct 16					Hours of Data: 729	
Maximum Diurnal Average: 1.0 km/h at hour 15																				Minimum Diurnal Average: 0.5 km/h at hour 4					Hours of Missing Data: 15	
Monthly Average: 0.73 km/h																				Percentiles: P <sub>1</sub> = -1.1 P <sub>10</sub> = -0.3 Q <sub>1</sub> = 0.2 Median = 0.5 Q <sub>3</sub> = 1.1 P <sub>90</sub> = 2.1 P <sub>99</sub> = 3.6					Hours of Calibration: 0	
																									Percent Operational Time: 98.0	
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	0.2	-0.1	0.1	0.1	0.1	0.2	0.4	0.3	0.3	-0.3	-0.5	-0.2	0.5	0.1	0.4	0.6	0.2	0.1	-0.2	-0.1	0.0	0.3	0.2	0.1	0.6
2-Oct	1.1	0.0	0.1	0.3	0.6	1.7	1.5	1.5	1.4	1.6	1.8	1.3	1.7	1.7	1.4	2.3	1.8	1.9	2.0	2.3	2.1	1.7	2.1	2.4	1.5	2.4
3-Oct	2.1	2.1	1.5	1.5	2.0	AF	AF	AF	1.8	2.1	2.0	0.9	1.4	1.0	1.0	0.7	1.3	0.8	0.4	0.7	0.3	0.2	0.3	0.4	1.2	2.1
4-Oct	0.4	0.4	0.5	0.5	0.2	0.7	0.1	0.3	0.2	0.5	0.8	0.9	0.2	0.3	0.3	-0.2	-0.8	0.2	0.5	0.6	0.6	0.5	0.2	0.8	0.4	0.9
5-Oct	1.0	0.7	0.7	0.7	0.2	-0.1	0.2	1.2	2.0	1.1	1.2	3.3	4.1	3.4	3.4	3.4	2.3	2.4	2.0	2.6	2.9	2.9	2.1	1.6	1.9	4.1
6-Oct	0.4	0.2	0.2	0.2	0.2	0.2	0.5	0.8	0.6	0.6	-0.1	-0.6	0.8	0.3	0.6	0.1	0.4	-0.5	0.2	-0.5	-0.6	-0.3	-0.5	-0.1	0.1	0.8
7-Oct	0.0	-0.2	-0.1	0.4	0.3	0.3	0.3	0.1	0.1	0.4	0.3	0.2	-0.4	-0.6	0.5	1.7	1.5	1.4	2.4	2.1	1.7	0.7	1.1	1.4	0.6	2.4
8-Oct	0.8	0.4	0.4	0.6	0.3	0.1	-0.1	0.2	0.6	0.6	0.2	-0.4	-0.4	0.5	-0.2	0.0	0.4	-0.4	0.0	0.0	0.3	0.5	0.2	0.2	0.2	0.8
9-Oct	0.2	0.0	0.3	0.2	0.3	0.4	0.4	0.5	0.6	0.4	0.2	0.2	0.2	0.3	0.4	0.4	0.6	0.7	0.9	0.2	0.1	0.1	1.0	0.9	0.4	1.0
10-Oct	1.1	0.6	0.7	0.0	0.3	0.7	0.5	0.6	0.3	-0.1	0.6	0.7	0.4	1.9	2.1	2.3	1.9	1.4	1.6	1.9	1.4	1.7	0.9	1.5	1.0	2.3
11-Oct	1.5	1.2	1.0	1.4	1.2	1.4	1.4	1.7	1.8	1.5	1.8	1.4	2.3	3.0	2.7	1.6	1.5	2.8	2.5	2.1	1.2	1.3	0.9	0.8	1.7	3.0
12-Oct	0.3	0.5	0.7	0.8	0.7	0.1	-0.1	-0.2	0.4	0.4	0.5	0.6	0.9	1.1	0.0	1.8	1.2	0.9	0.9	0.6	0.6	0.3	0.6	0.5	0.6	1.8
13-Oct	0.8	0.5	0.7	0.5	0.4	1.1	1.4	1.5	2.0	1.5	1.8	1.3	1.4	1.3	1.5	1.5	2.9	1.5	0.8	0.2	0.6	0.7	0.5	0.7	1.1	2.9
14-Oct	1.0	1.1	1.2	1.7	2.3	2.1	1.6	1.7	1.7	2.5	2.3	2.9	3.4	4.0	3.8	3.2	3.0	2.1	0.9	0.8	0.5	0.3	0.2	0.6	1.9	4.0
15-Oct	0.5	0.6	0.4	0.5	0.3	0.4	0.2	0.1	0.4	0.5	-0.3	0.4	-0.1	0.0	0.3	0.2	0.4	0.4	0.5	0.5	-0.2	-0.2	-0.3	-0.7	0.2	0.6
16-Oct	-0.5	0.2	-0.6	-0.4	-0.7	-0.4	-0.8	-0.5	-0.3	-0.6	-0.1	0.1	-0.5	-1.3	-1.4	-0.8	-0.7	-1.1	-1.1	-1.3	0.1	0.3	0.0	0.5	-0.5	0.5
17-Oct	0.7	0.6	0.5	0.5	0.5	0.1	-0.2	-0.3	-0.3	0.3	0.7	0.6	0.8	0.6	0.8	0.5	-0.1	-0.3	-0.1	0.3	0.4	0.0	0.2	0.4	0.3	0.8
18-Oct	-0.1	0.3	1.6	1.6	1.6	1.9	2.4	2.0	2.6	2.2	2.0	2.5	3.5	3.6	3.5	2.7	2.8	3.5	2.8	2.5	2.0	2.0	1.7	1.2	2.2	3.6
19-Oct	1.1	1.0	1.1	0.9	1.3	0.9	0.5	0.5	0.4	0.3	-0.2	0.1	0.4	-0.3	0.4	0.2	-0.1	0.1	-0.9	-0.9	-0.8	-1.0	-0.9	-0.5	0.2	1.3
20-Oct	0.4	0.5	0.0	0.3	1.2	2.5	2.3	1.0	1.1	1.2	2.4	2.8	2.4	3.2	3.3	3.6	3.0	3.0	2.7	3.1	1.9	0.9	0.8	0.7	1.8	3.6
21-Oct	-0.1	0.1	0.4	0.3	0.4	0.3	0.2	0.1	0.3	-0.6	-0.4	-0.7	-0.5	-0.3	-0.8	-0.5	-0.8	-0.6	-0.8	-0.5	0.0	0.3	0.6	0.4	-0.1	0.6
22-Oct	1.2	0.7	0.1	0.1	0.3	0.2	0.4	0.6	0.6	0.8	0.9	0.7	1.1	0.4	0.9	1.3	1.1	0.7	0.7	0.8	0.9	1.1	1.0	1.1	0.7	1.3
23-Oct	1.7	1.1	0.8	0.3	0.1	0.2	0.0	0.2	0.6	0.5	0.1	0.4	0.8	1.1	0.9	0.8	0.6	0.6	1.2	0.9	0.9	1.0	1.0	0.8	0.7	1.7
24-Oct	0.7	0.6	1.0	0.6	0.6	0.5	0.6	0.4	0.7	0.4	0.3	0.3	0.5	-0.2	0.3	0.1	0.7	0.7	0.3	0.3	0.1	0.5	0.1	0.5	0.4	1.0
25-Oct	0.5	AF	AF	AF	AF	0.4	0.6	0.3	AF	0.2	0.4	-0.1	0.0	0.5	-0.1	-0.3	0.0	0.0	0.1	-0.7	0.1	0.3	0.6	0.6	0.2	0.6
26-Oct	0.4	0.1	-0.4	-0.4	-1.2	-1.1	-0.7	-1.0	-1.3	-1.8	-1.0	-0.7	-0.7	-0.9	0.2	-0.9	0.7	0.1	0.1	0.3	0.5	3.3	AF	AF	-0.3	3.3
27-Oct	AF	AF	AF	AF	AF	3.4	3.2	3.4	3.2	3.2	3.7	3.2	3.6	4.5	3.9	4.0	3.3	2.9	2.7	1.8	1.8	1.1	1.1	0.8	2.9	4.5
28-Oct	1.7	0.6	0.9	0.4	0.0	0.4	0.5	0.4	0.3	-0.1	0.3	0.4	0.0	-0.8	-1.1	-0.4	-0.8	-1.0	-0.1	0.1	0.3	0.2	0.0	-0.3	0.1	1.7
29-Oct	0.3	0.3	0.2	0.0	0.2	0.2	0.5	0.6	0.7	1.0	0.8	0.6	0.5	0.6	0.6	0.6	0.4	0.6	0.5	-0.2	0.0	0.2	0.3	0.4	0.4	1.0
30-Oct	0.5	0.4	0.4	0.6	0.3	0.0	-0.1	-0.2	0.0	0.3	0.1	0.4	0.5	0.3	0.4	0.4	0.5	0.1	0.2	0.1	1.0	1.1	1.5	1.4	0.4	1.5
31-Oct	1.3	1.2	0.7	0.4	1.2	1.1	0.9	0.7	0.0	0.6	0.5	0.5	0.2	1.1	1.3	0.3	0.5	0.6	0.5	0.9	1.0	0.8	0.8	0.9	0.7	1.3
																								Diurnal Average		
																								Diurnal Maximum		
AF - Analyzer Failure																										





Summary of Hour Standard Deviations

Mannix - October 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 4.8 km/h on Oct 10 15:00			Hours of Data:	729
Minimum Value: 0.1 km/h on Oct 7 08:00			Hours of Missing Data:	15
			Hours of Calibration:	0
			Percent Operational Time:	98.0
Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.5 Q <sub>1</sub> = 0.8 Median = 1.4 Q <sub>3</sub> = 2.2 P <sub>90</sub> = 2.9 P <sub>99</sub> = 3.7				

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	0.6	0.7	0.8	0.8	0.9	0.5	0.6	0.6	0.6	0.9	1.0	1.6	1.8	2.4	2.4	2.0	1.2	0.3	0.4	0.5	0.9	0.9	0.6	0.4	2.4
2-Oct	0.8	0.5	0.5	0.5	0.8	1.1	1.8	1.8	1.8	2.3	2.7	2.5	2.7	2.9	2.8	3.8	3.1	2.8	3.1	3.5	3.2	3.3	3.3	3.3	3.8
3-Oct	3.6	3.3	2.7	2.9	2.8	AF	AF	AF	2.6	2.8	2.8	2.4	2.5	2.4	2.2	1.9	1.3	0.7	0.5	0.3	0.4	0.4	0.9	3.6	
4-Oct	1.0	1.3	0.7	1.2	1.1	1.1	1.0	1.0	0.9	1.5	2.0	1.7	2.1	2.0	2.1	1.6	1.4	0.8	0.3	0.4	0.8	1.3	0.6	0.8	2.1
5-Oct	0.7	1.3	0.6	0.5	0.5	0.5	0.6	0.7	0.6	1.3	2.2	3.3	3.5	3.2	3.1	3.2	2.9	2.3	1.6	1.5	0.9	0.8	0.7	0.6	3.5
6-Oct	0.5	0.2	0.3	0.2	0.2	0.2	0.3	0.6	0.8	1.2	1.9	1.8	2.3	2.1	1.9	1.3	1.1	1.8	2.0	2.0	2.0	1.8	1.5	1.3	2.3
7-Oct	1.3	1.4	1.1	0.9	0.4	0.5	0.3	0.1	0.2	1.5	1.5	1.9	1.3	1.4	2.3	2.3	1.7	1.2	1.2	1.1	1.8	0.8	1.0	0.8	2.3
8-Oct	0.6	0.2	0.2	0.2	0.3	0.2	0.4	0.4	0.7	0.9	1.0	1.5	1.5	2.0	1.8	1.4	1.2	1.7	1.9	1.1	0.7	0.6	0.4	0.4	2.0
9-Oct	0.7	0.6	0.6	0.5	0.7	0.7	0.4	0.5	0.7	1.3	1.8	1.5	0.8	0.6	0.9	0.7	0.4	0.5	0.7	0.5	0.6	0.7	0.4	1.2	1.8
10-Oct	1.1	0.7	0.9	1.5	2.3	3.0	3.3	3.0	2.7	3.1	3.8	4.6	4.4	4.7	4.8	4.1	3.2	1.8	1.5	0.7	0.6	1.3	2.3	1.9	4.8
11-Oct	2.4	2.6	2.3	2.0	2.2	2.8	2.4	2.8	2.3	2.4	2.5	2.7	2.9	3.0	3.3	2.3	2.2	2.3	1.8	1.2	0.9	0.3	0.3	0.5	3.3
12-Oct	0.3	0.4	0.4	0.9	1.1	0.8	0.8	1.1	1.0	0.9	1.2	1.5	2.0	2.6	2.6	3.1	2.7	2.0	1.3	0.7	0.9	1.3	2.2	2.5	3.1
13-Oct	2.3	2.1	2.4	2.2	2.2	3.1	3.2	3.1	3.4	3.1	2.9	2.5	3.1	3.2	3.2	3.2	2.8	2.0	1.0	1.0	1.5	1.7	2.3	2.8	3.4
14-Oct	2.4	2.5	2.3	2.6	2.9	2.2	1.9	2.5	2.8	3.2	3.5	3.4	3.2	2.9	2.7	2.5	2.2	2.0	1.5	1.3	1.7	1.5	1.4	1.5	3.5
15-Oct	1.0	0.7	0.7	0.8	0.7	0.7	0.5	0.6	1.0	1.9	2.0	2.1	1.7	2.0	1.5	1.5	0.5	0.3	0.8	1.3	1.5	1.6	1.3	2.1	2.1
16-Oct	1.8	1.4	1.2	1.1	1.6	1.9	1.9	1.9	1.7	1.5	2.0	2.4	2.3	2.0	2.1	2.4	1.9	2.4	2.9	2.5	2.1	1.2	0.8	0.7	2.9
17-Oct	0.6	0.7	0.7	0.6	0.6	0.6	0.7	1.0	1.0	1.2	2.0	1.8	2.2	2.0	1.5	1.4	1.1	0.8	1.4	1.3	1.3	0.8	1.0	1.1	2.2
18-Oct	1.3	1.2	3.1	3.1	2.8	3.1	3.1	3.0	3.2	3.0	3.2	3.5	3.0	3.0	3.0	2.3	1.9	1.2	1.1	0.8	0.5	0.6	1.4	1.4	3.5
19-Oct	1.6	1.1	1.1	1.1	1.2	0.9	0.7	0.8	1.4	2.0	2.1	2.1	2.1	1.9	1.8	2.0	1.9	2.4	2.8	3.2	3.1	2.9	2.4	1.9	3.2
20-Oct	1.6	1.1	0.9	1.4	2.2	2.5	1.9	2.1	2.4	2.8	3.1	3.4	3.1	2.6	2.6	2.8	2.3	1.1	1.5	1.8	1.6	1.5	1.7	1.2	3.4
21-Oct	0.8	1.0	0.9	0.5	0.4	0.3	0.3	0.7	1.1	1.6	2.0	2.2	2.4	2.1	1.9	2.0	2.2	2.6	1.9	1.8	1.3	1.2	1.2	1.4	2.6
22-Oct	1.0	0.8	0.8	0.9	0.5	0.7	0.9	1.2	1.6	2.4	2.5	2.3	3.0	2.9	3.4	3.0	2.4	1.1	0.8	0.9	0.6	1.1	1.5	2.0	3.4
23-Oct	2.0	1.5	0.8	0.8	0.5	0.5	0.3	0.4	0.8	1.2	1.6	1.3	1.8	2.0	1.6	1.1	0.9	0.7	1.2	1.3	1.2	1.4	1.2	1.2	2.0
24-Oct	1.3	1.2	1.6	1.1	1.2	1.4	1.5	0.9	0.7	1.2	1.4	1.8	1.7	1.6	1.4	1.1	1.0	0.8	0.9	0.8	0.4	0.5	0.6	0.6	1.8
25-Oct	0.8	AF	AF	AF	AF	1.5	1.2	0.4	AF	1.2	1.2	1.2	1.2	1.4	1.5	1.1	0.8	0.7	0.8	0.9	1.0	1.0	0.8	1.2	1.5
26-Oct	1.1	0.7	1.5	1.3	1.9	2.0	1.2	1.6	1.9	2.5	2.8	2.7	2.9	3.1	2.6	2.9	2.7	2.0	2.5	2.3	2.0	2.3	AF	AF	3.1
27-Oct	AF	AF	AF	AF	AF	2.2	2.4	2.5	2.4	2.5	2.8	2.8	3.0	3.1	2.9	3.0	2.6	2.4	2.8	2.4	2.4	1.8	1.5	1.0	3.1
28-Oct	1.3	1.8	1.2	1.3	1.3	1.3	1.3	1.3	1.5	1.5	1.7	2.0	2.2	2.1	1.7	1.5	1.9	2.0	2.0	1.9	1.9	1.6	1.4	1.4	2.2
29-Oct	1.6	1.7	2.3	1.8	1.5	1.6	1.7	1.8	1.8	1.5	1.6	1.4	1.3	1.0	1.1	1.2	0.6	0.8	1.1	0.6	0.4	0.6	0.8	0.5	2.3
30-Oct	0.7	0.7	0.7	0.8	0.8	0.5	1.0	0.9	0.9	0.6	0.7	0.6	0.7	0.7	0.5	0.6	0.6	0.4	0.2	0.2	0.6	0.5	0.5	1.3	1.3
31-Oct	1.3	1.5	1.1	1.0	0.9	0.7	1.1	1.3	0.9	0.7	1.0	1.1	1.2	2.0	1.6	1.2	1.1	1.0	0.9	1.0	1.3	1.2	1.1	1.3	2.0
Diurnal Maximum																									

AF - Analyzer Failure



# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	October 23, 2015	Last Calibration	September 11, 2015
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	8:20	End Time (MST)	11:05
Gas Cert Reference	S9610161A	Station temp.	22 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
ZAG Make/Model	API 701	Serial Number	1083
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2633

## Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	-635	-635
Analyzer IP address	192.168.1.43		Lamp voltage	865	867
Calculated slope	0.991071	1.007763	Chamber temp	45.0	45.1
Calculated intercept	1.228849	0.907331	Pressure	689.4	692.2
Analyzer Background	7.8	7.7	Flow	0.477	0.486
Analyzer Coefficient	1.033	1.033	Intensity	90	89

Analyzer make TEI 43i Analyzer serial # 1008841399

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.2	----
as found span	5000	60.0	600.0	594.0	1.010
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	60.0	600.0	594.0	1.010
second point	5000	30.0	300.0	298.7	1.004
third point	5000	15.0	150.0	145.8	1.029
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	60.0	600.0	598.0	1.003
Average Correction Factor					1.014

Corrected As found 594.3 Previous response 604.2 % change 1.7%

**Notes:**

Changed inlet filter after as founds. No adjustments made.

Calibration Performed By: Evan Magill



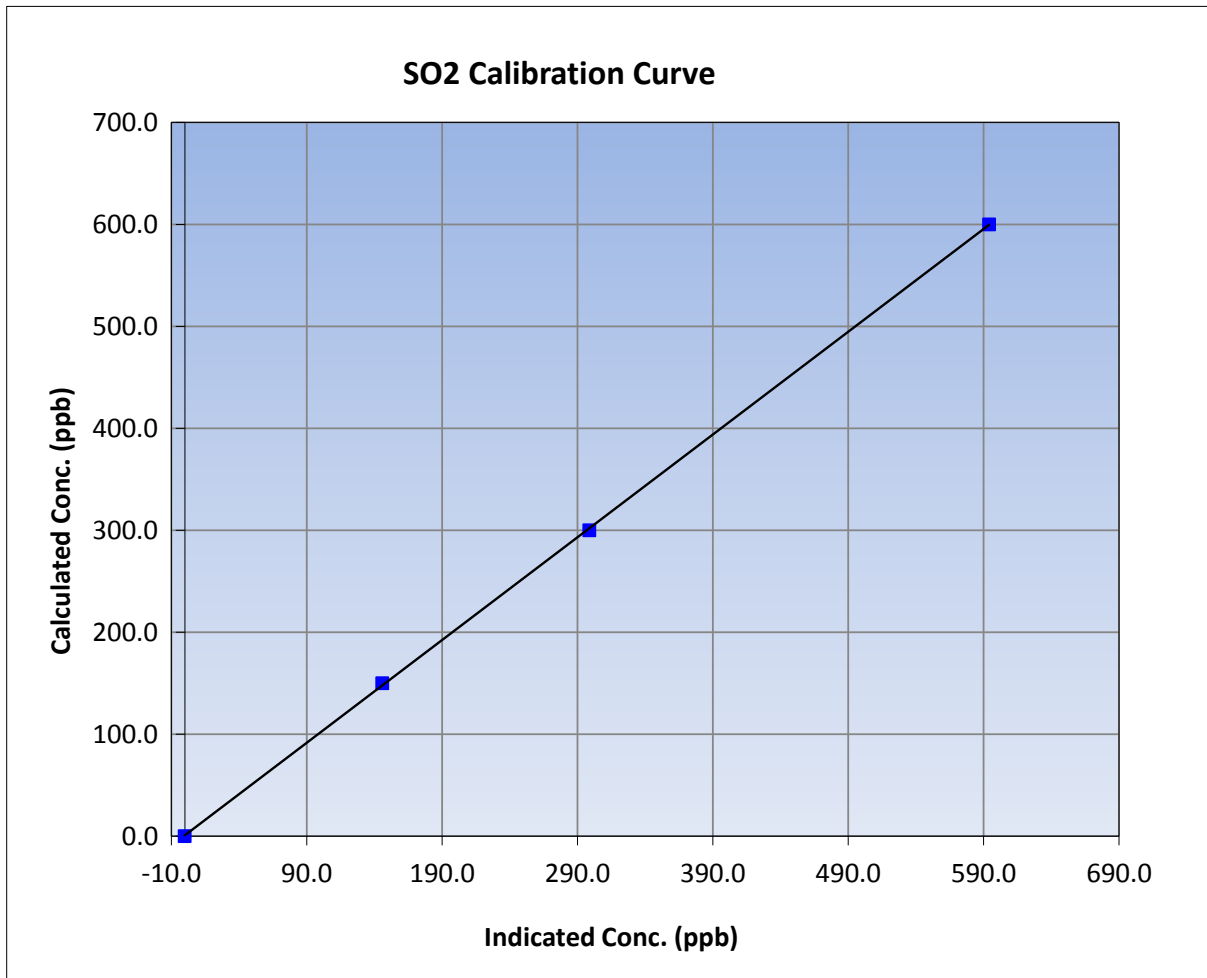
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	October 23, 2015	Previous Calibration	September 11, 2015
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	8:20	End Time (MST)	11:05
Analyzer make	TEI 43i	Analyzer serial #	1008841399

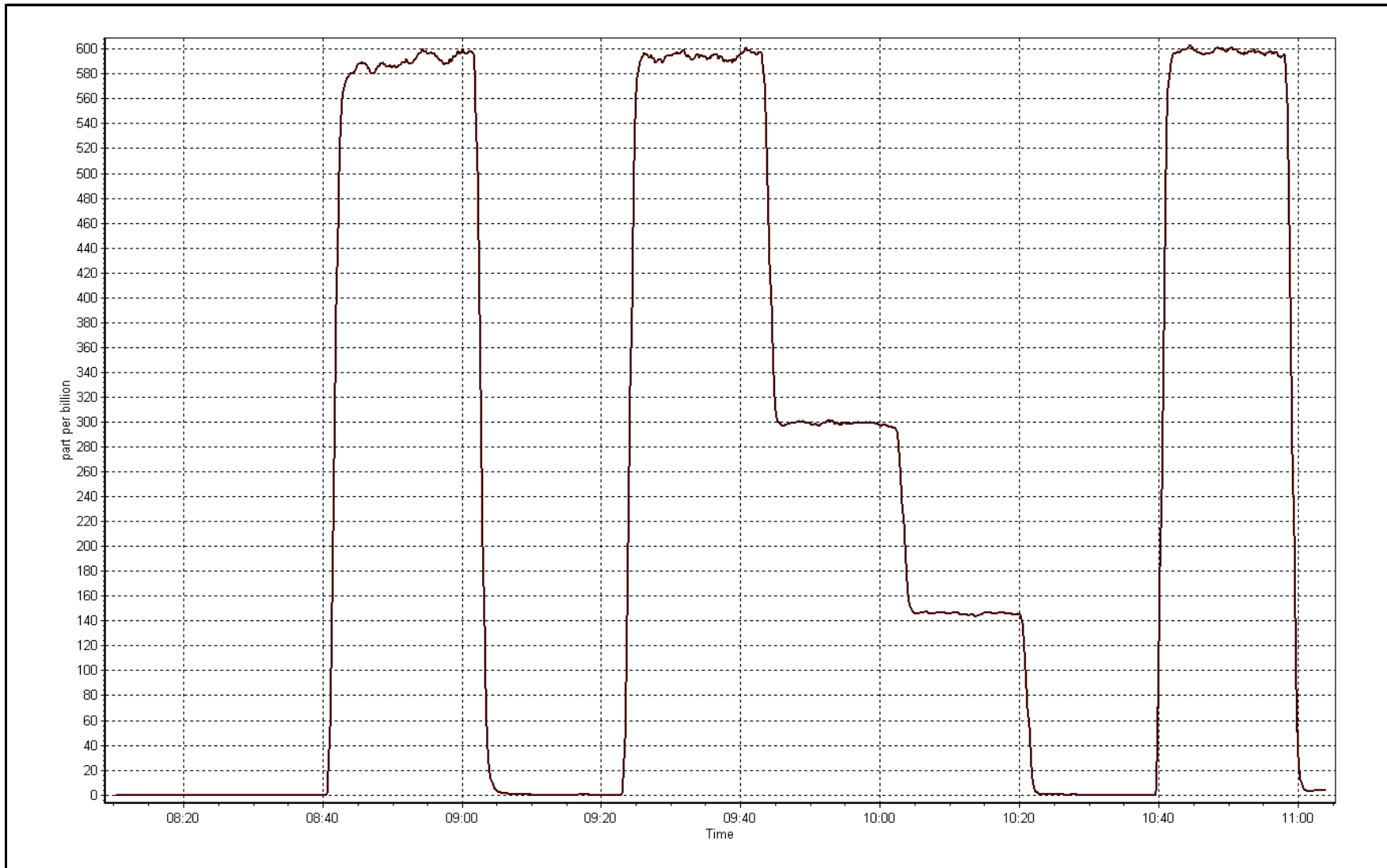
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999953
600.0	594.0	1.0100		
300.0	298.7	1.0042	Slope	1.007763
150.0	145.8	1.0290		
			Intercept	0.907331



SO2 Calibration Plot

Date: October 23, 2015





# Wood Buffalo Environmental Association H2S Calibration Report

## Station Information

Calibration Date	October 27, 2015	Last Calibration	September 10, 2015
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	12:00
Gas Cert Reference	CC62844	Station temp.	21 Deg C
Cal Gas Concentration	5.04 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
ZAG air Make/Model	API 701	Serial Number	138
DACS make/model	Campbell Scientific CR3000	Serial Number	2633
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S960161A 09-Sep-17

## Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-658	-657
Analyzer IP address	192.168.1.45		Lamp voltage	802	805
Calculated slope	0.996828	1.005679	Chamber temp	45	45
Calculated intercept	-0.050060	-0.081671	Pressure	518.6	518.0
Analyzer Background	18.8	18.8	Flow	1.066	1.067
Analyzer Coefficient	1.235	1.235	Intensity	90	90
			Converter temp.	326	324

Analyzer make/model	Thermo 450i	Analyzer serial #	815129108
Converter make/model	NA	Converter serial #	NA

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	----
as found span	5000	74.4	75.0	74.7	1.004
SO2 scrubber check	5000	15.0	150.0	1.5	----
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	74.4	75.0	74.7	1.004
second point	5000	41.7	42.0	41.8	1.005
third point	5000	24.8	25.0	25.0	0.999
as left zero	5000	0.0	0.0	0.5	----
as left span	5000	74.4	75.0	74.8	1.002
Average Correction Factor					1.003

Corrected As found	74.6	Previous response	75.3	% change	0.9%
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**Notes:**

Changed inlet filter and scrubber check after as founds. No adjustments.

Calibration Performed By: Evan Magill



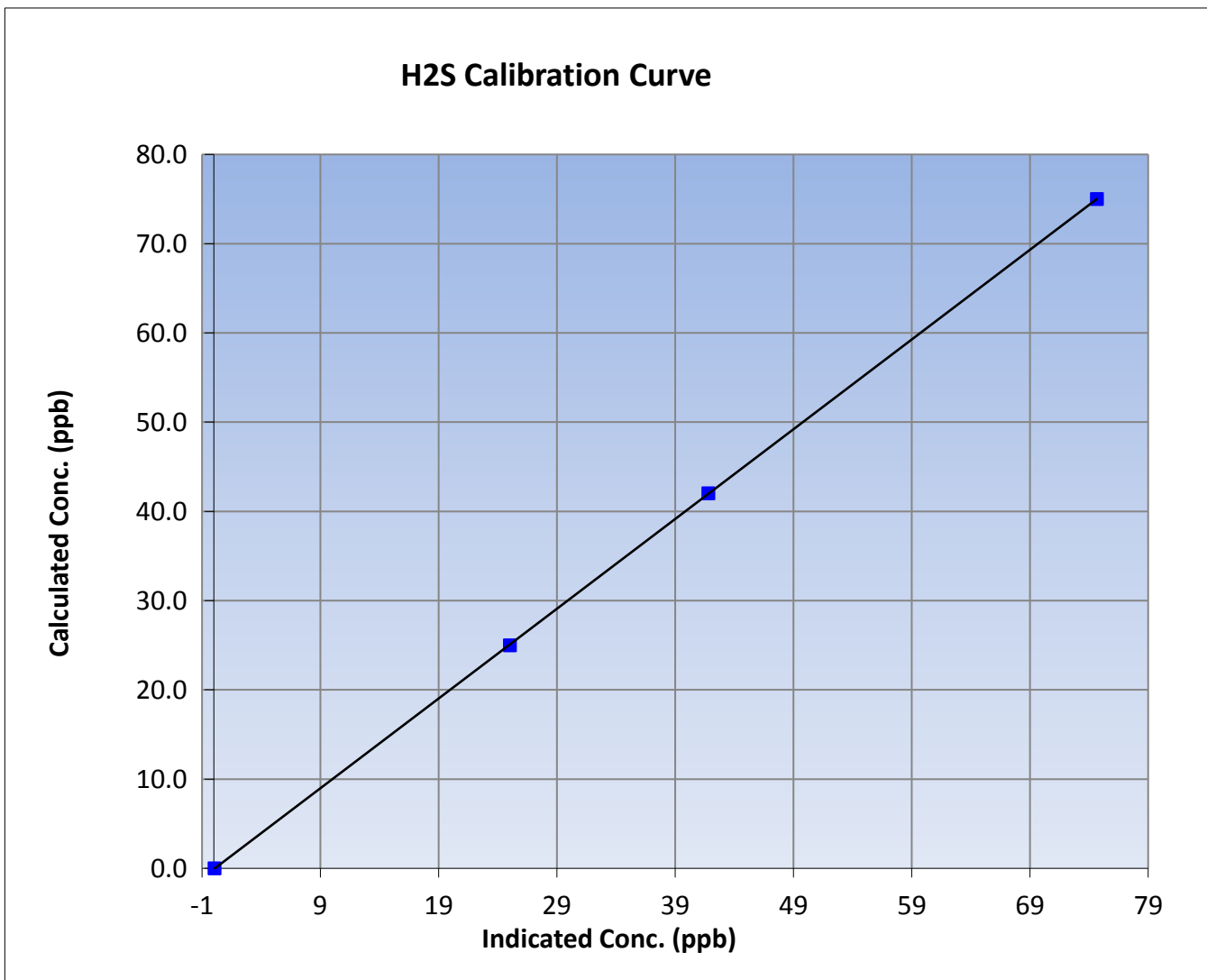
# Wood Buffalo Environmental Association H2S Calibration Report

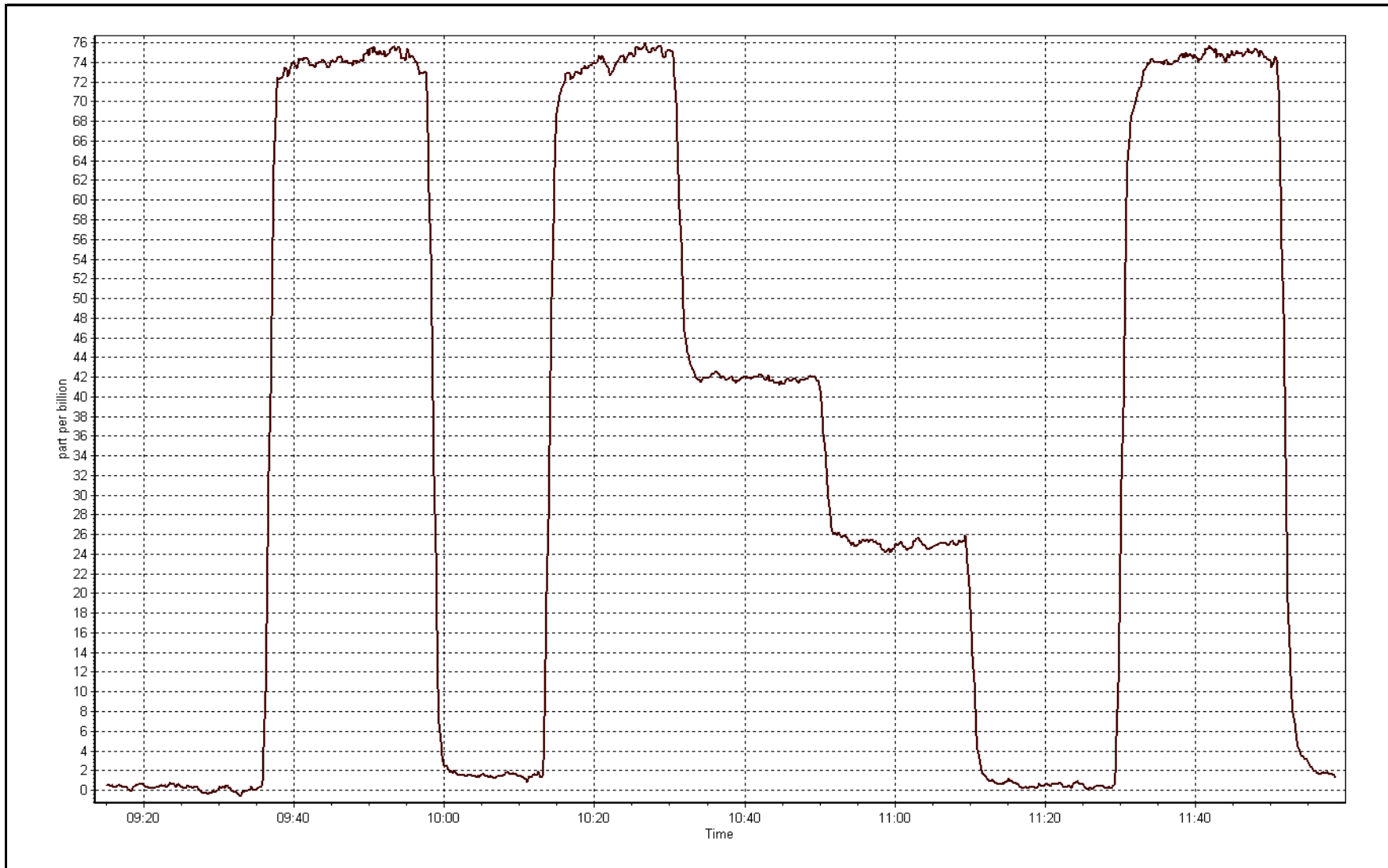
## Station Information

Calibration Date	October 27, 2015	Previous Calibration	September 10, 2015
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	9:15	End Time (MST)	12:00
Analyzer make	Thermo 450i	Analyzer serial #	815129108

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999995
75.0	74.7	1.0045		
42.0	41.8	1.0053	Slope	1.005679
25.0	25.0	0.9987		
			Intercept	-0.081671







# Wood Buffalo Environmental Association THC Calibration Report

### Station Information

Calibration Date	October-23-15	Last Calibration	September-11-15
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	8:20	End Time (MST)	11:05
Gas Cert Reference	S961061A	Cal Gas Expiry Date	Sept-26-2017
CH4 Cal Gas Conc.	499 ppm	CH4 Equiv Conc.	1038.0 ppm
C3H8 Cal Gas Conc.	196 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
ZAG make/model	Teledyne API 701	Serial Number	1083
DACS make/model	Campbell Scientific CR3000	Serial Number	2633

### Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	9.4	9.4
Analyzer IP address	192.168.1.51		Air or Bypass Press	42.3	42.3
Calculated slope	0.999996	1.005879	Fuel Pressure	20.2	20.2
Calculated intercept	0.012023	-0.030026	Analyzer Coeff	3.9	3.8
			Analyzer BKG	3.310	3.150

Analyzer make: Thermo 51i-LT      Analyzer serial #: 1317958295

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.12	----
as found span	5000	60.0	12.46	12.42	1.003
calibrator zero	5000	0.0	0.00	0.03	----
high point	5000	60.0	12.46	12.40	1.005
second point	5000	30.0	6.23	6.26	0.995
third point	5000	15.0	3.11	3.10	1.005
as left zero	5000	0.0	0.00	0.06	----
as left span	5000	60.0	12.46	12.45	1.000
<b>Average Correction Factor</b>					<b>1.001</b>

Corrected As found: 12.54      Previous response: 12.44      % change: -0.8%

**Notes:**

Changed inlet filter after as founds. Adjusted zero.

Calibration Performed By:

Evan Magill





# Wood Buffalo Environmental Association THC Calibration Report

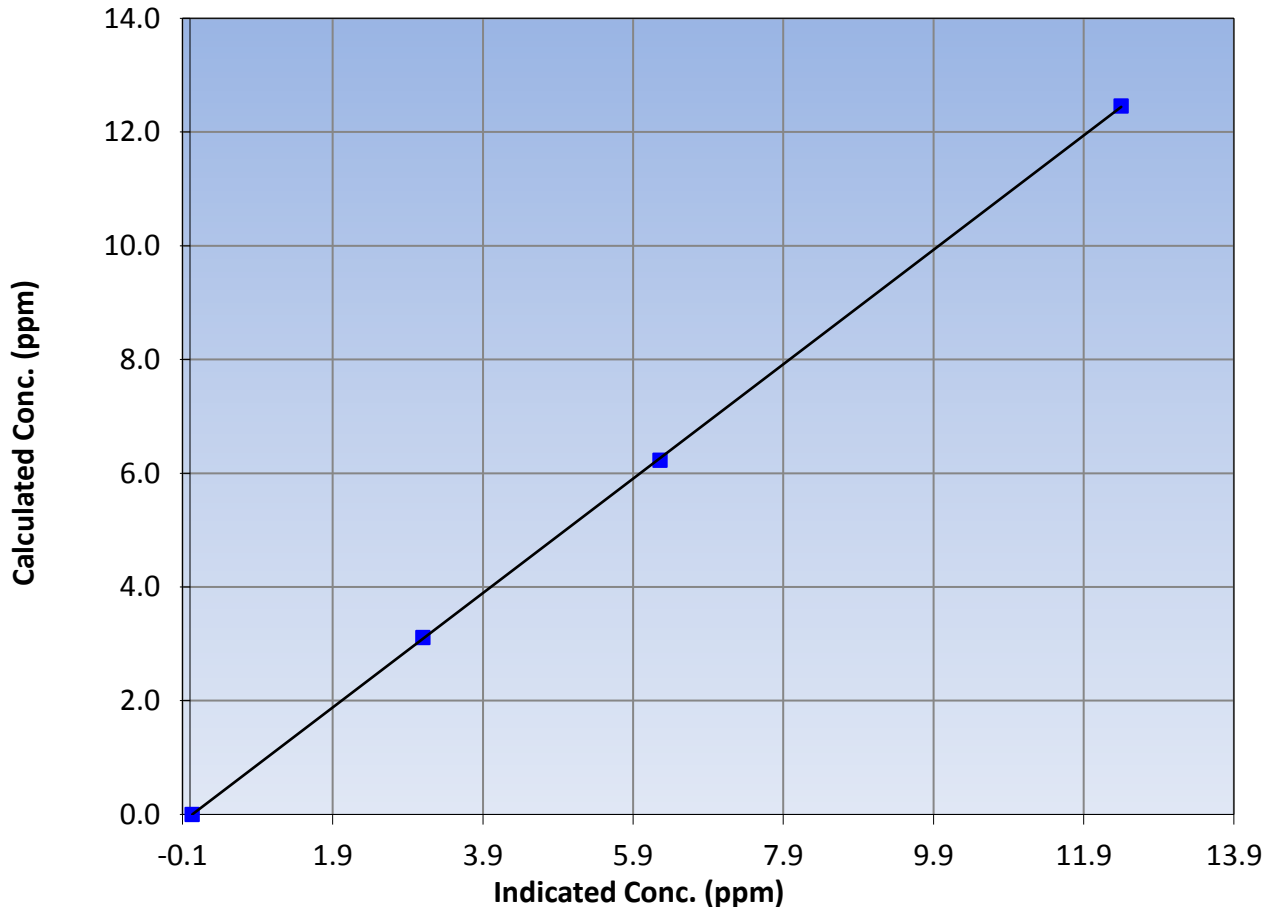
## Station Information

Calibration Date	October 23, 2015	Previous Calibration	September 11, 2015
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	8:20	End Time (MST)	11:05
Analyzer make	Thermo 51i-LT	Analyzer serial #	1317958295

## Calibration Data

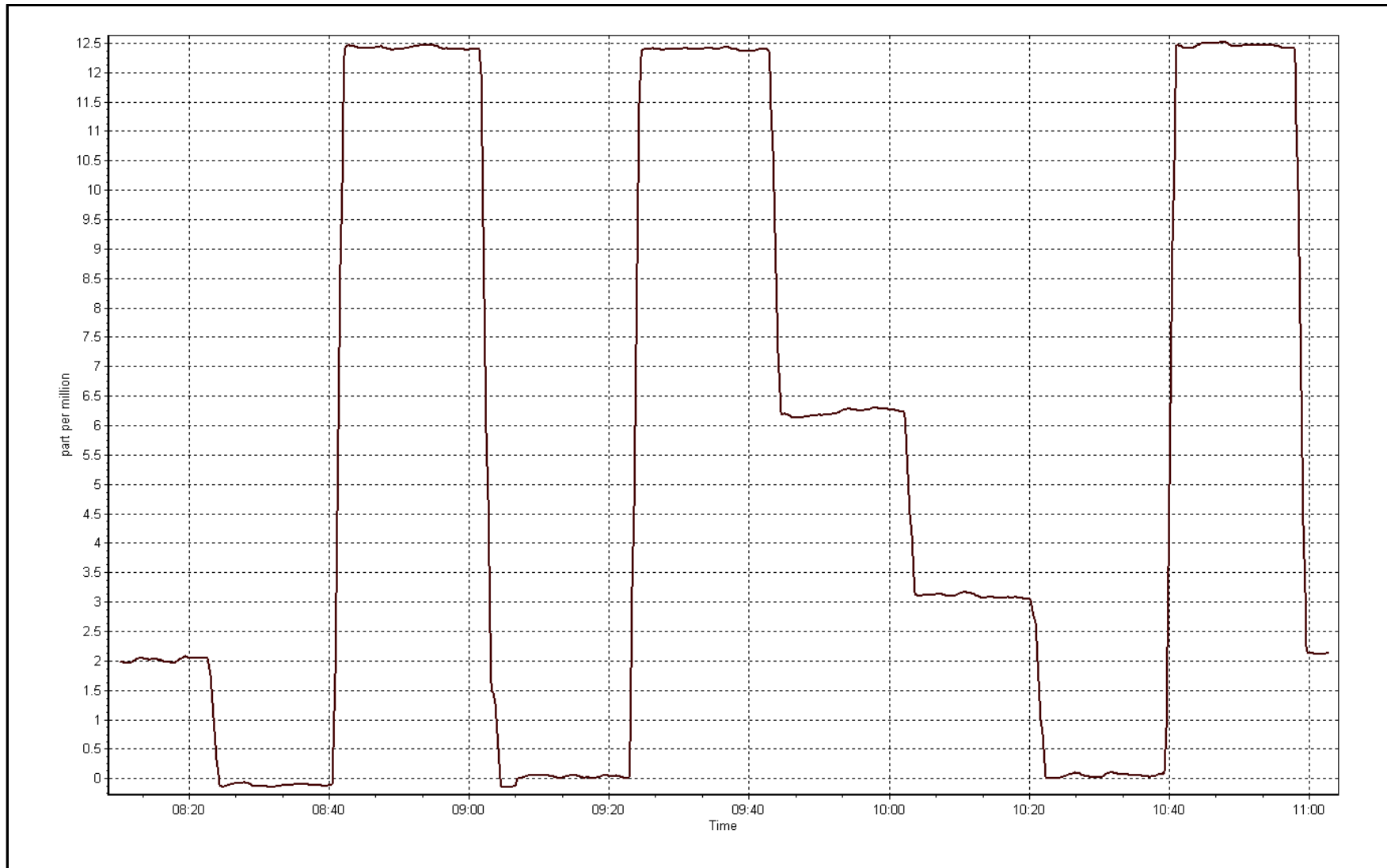
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.03	----	Correlation Coefficient	0.999972
12.46	12.40	1.0045		
6.23	6.26	0.9949	Slope	1.005879
3.11	3.10	1.0045		
			Intercept	-0.030026

**THC Calibration Curve**



THC Calibration Plot

Date: October 23, 2015





## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 6**  
**PATRICIA MCINNES**  
**OCTOBER 2015**

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

November 26, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)  
OCTOBER 2015

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	100.00	17	0	4	0
TRS (ppb) Average	708	36	36	100.00	2	0	1	0
THC (ppm) Average	707	37	37	100.00	2.8	-	2.4	-
NMHC(ppm) Average	707	37	37	100.00	0.339	-	0.03	-
CH4(ppm) Average	707	37	37	100.00	2.7	-	2.3	-
O3 (ppb) Average	710	34	34	100.00	50	0	36	-
NO2 (ppb) Average	707	37	37	100.00	25	0	16	-
NO (ppb) Average	707	37	37	100.00	37	-	7	-
NOX (ppb) Average	707	37	37	100.00	60	-	24	-
NH3 (ppb) Average	656	40	88	93.55	0	0	0	-
PM2.5 (ug/m3) Average	742	2	2	100.00	54.5	-	13	0
Temperature 2 m (C) Average	744	0	0	100.00	25.2	-	16.9	-
Relative Humidity (%) Average	744	0	0	100.00	98	-	87	-
Wind Speed 10 m (km/h) Average	741	0	3	99.60	34	-	17	-
Wind Direction 10 m (deg) Average	741	0	3	99.60	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)  
OCTOBER 2015

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	17
TRS (ppb) Average	708	0.2	0	-	0	0	0	0	0	0	2
THC (ppm) Average	707	2.01	0.1	-	1.9	1.9	2	2	2	2.1	2.8
NMHC(ppm) Average	707	0.001	0.015	-	0	0	0	0	0	0	0.339
CH4(ppm) Average	707	2.01	0.1	-	1.9	1.9	2	2	2	2.1	2.7
O3 (ppb) Average	710	22.8	10	-	4	10	15	22	30	36	50
NO2 (ppb) Average	707	4.7	5	-	0	0	1	3	7	11	25
NO (ppb) Average	707	1.7	3	-	0	0	0	1	2	5	37
NOX (ppb) Average	707	6.4	7	-	0	0	1	4	9	15	60
NH3 (ppb) Average	656	0	0	-	0	0	0	0	0	0	0
PM2.5 (ug/m3) Average	742	4.15	4.7	-	0	0.9	1.6	2.8	4.9	8.8	54.5
Temperature 2 m (C) Average	744	5.59	5.8	-	-5.4	-0.8	1.2	4.9	9.1	13.9	25.2
Relative Humidity (%) Average	744	70.1	18	-	21	42	58	74	85	90	98
Wind Speed 10 m (km/h) Average	741	10.4	6	-	0	3	6	9	14	20	34
Wind Direction 10 m (deg) Average	741	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)  
OCTOBER 2015

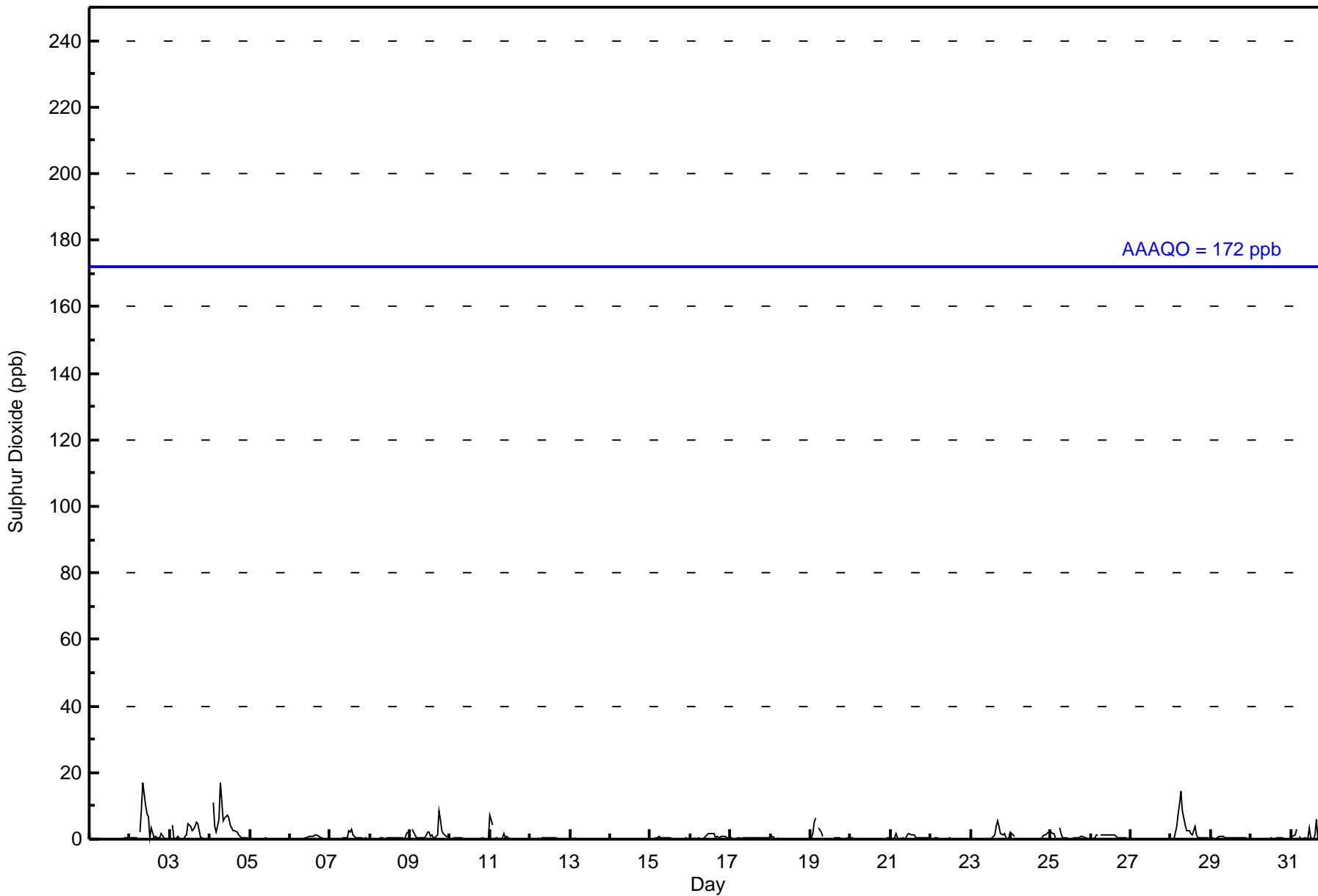
OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NH3	01 Oct 2015 08:00	31 Oct 2015 08:00	48	Stabilization after daily span
Wind Speed, Wind Direction	27 Oct 2015 03:00	27 Oct 2015 05:00	3	Flat line in sensor output signal -sensor frozen



Number of Exceedences (AAAQO):		1-hr: 0    24-hr: 0		Hours in Service:		744																									
Maximum Value: 17 ppb on Oct 2 09:00		Maximum Daily Average: 4.1 ppb on Oct 4		Hours of Data:		707																									
Minimum Value: 0 ppb on Oct 5 13:00		Minimum Daily Average: 0.0 ppb on Oct 14		Hours of Missing Data:		37																									
Maximum Diurnal Average: 1.4 ppb at hour 7		Minimum Diurnal Average: 0.2 ppb at hour 22		Hours of Calibration:		37																									
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		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	1	0.2	1					
2-Oct	0	0	0	0	1	Z	2	9	17	10	8	7	1	3	0	1	0	0	0	2	0	0	0	0	2.7	17					
3-Oct	Z	4	0	0	0	1	0	0	0	1	1	4	4	3	3	4	5	4	0	0	0	0	0	0	1.6	5					
4-Oct	0	Z	11	4	2	6	17	12	5	6	7	7	4	3	2	2	2	1	1	0	1	0	0	0	4.1	17					
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	1	1	1	1	1	1	1	1	0	0	0	0	0	0.4	1					
7-Oct	0	0	0	0	Z	0	0	0	0	0	1	3	2	3	1	0	0	0	0	0	0	0	0	0	0.6	3					
8-Oct	0	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	3	0.4	3					
9-Oct	Z	3	2	1	1	0	0	0	1	1	2	2	1	1	1	0	1	8	6	2	2	1	1	1	1.7	8					
10-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					
11-Oct	7	4	Z	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	7					
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	0.2	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	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0					
15-Oct	Z	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1					
16-Oct	0	Z	0	0	0	0	0	0	0	1	1	2	2	2	2	0	1	1	1	1	1	1	0	0	0.7	2					
17-Oct	1	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1					
18-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	0.1	1					
19-Oct	1	2	5	6	Z	4	2	1	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	1	--	6					
20-Oct	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1	1					
21-Oct	Z	0	1	2	1	0	0	0	0	0	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0.6	2					
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	1	4	5	4	2	1	2	0	0	0	0.9	5					
24-Oct	2	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	2	0.6	2					
25-Oct	2	2	2	0	Z	3	2	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.7	3					
26-Oct	0	0	0	1	1	Z	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.8	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	0.0	0					
28-Oct	0	Z	0	4	8	11	14	8	4	3	2	3	1	1	4	1	0	0	0	1	0	0	0	0	3.0	14					
29-Oct	0	0	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	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	0.2	0					
31-Oct	1	1	1	3	Z	1	0	0	0	0	1	3	0	0	1	6	1	0	0	0	0	0	0	0	0.9	6					
		0.7	0.8	1.0	1.0	0.7	1.1	1.4	1.2	1.2	0.9	1.0	1.2	0.7	0.8	0.7	0.8	0.7	0.8	0.5	0.4	0.3	0.2	0.3	0.4	Diurnal Average					
		7	4	11	6	8	11	17	12	17	10	8	7	4	3	4	6	5	8	6	2	2	1	2	3	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 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	701	99.15	99.15
11 - 20	6	0.85	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**  
**Patricia McInnes - October 2015**

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	18	5	8	17	69	66	34	32	46	73	62	44	57	48	60	698
11 - 20	1	0	2	0	0	0	0	0	0	0	0	0	0	0	1	2	6
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>	60	18	7	8	17	69	66	34	32	46	73	62	44	57	49	62	704

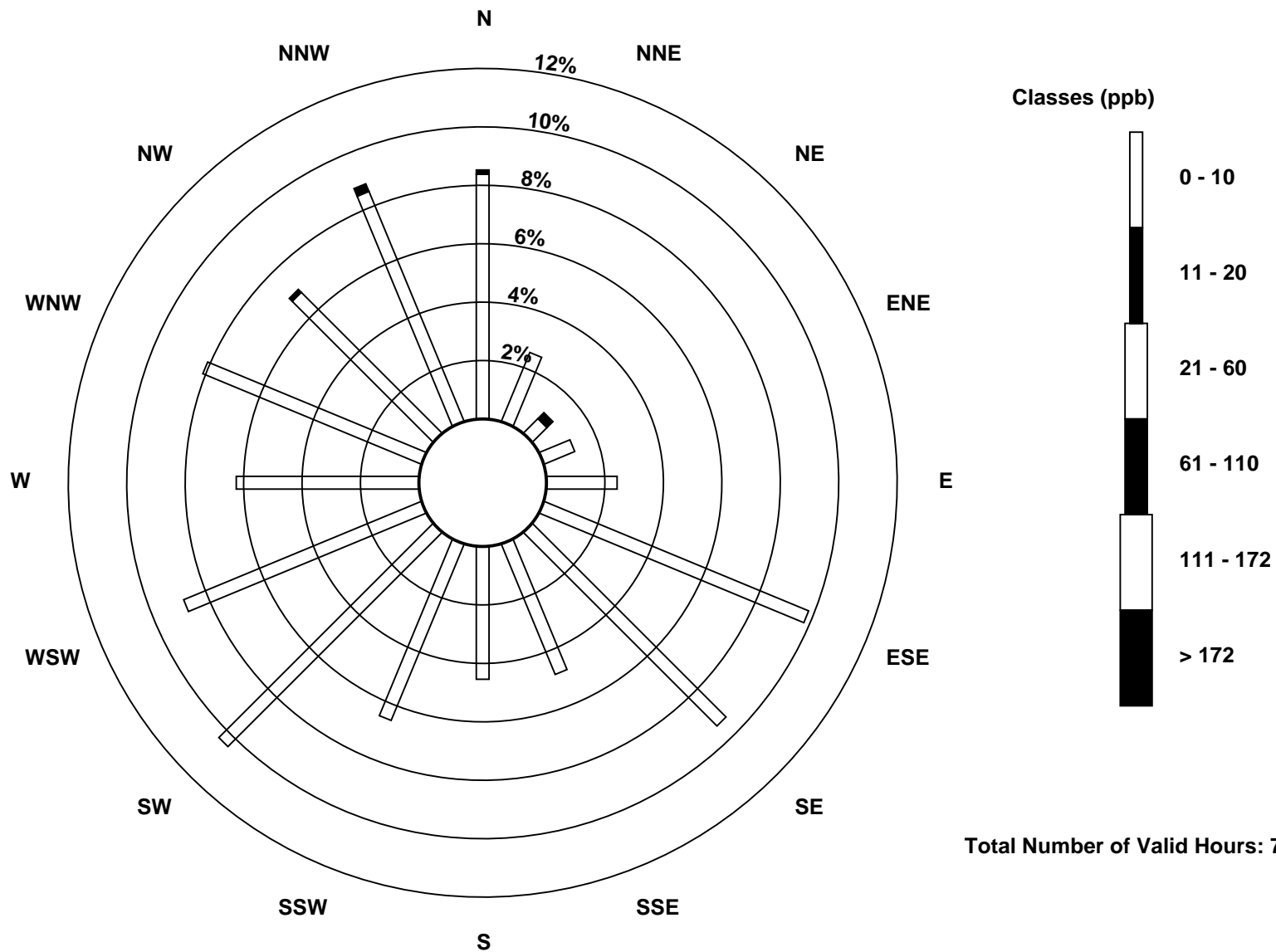
Total Number of Valid Hours: 704

Total Number of Hours: 744

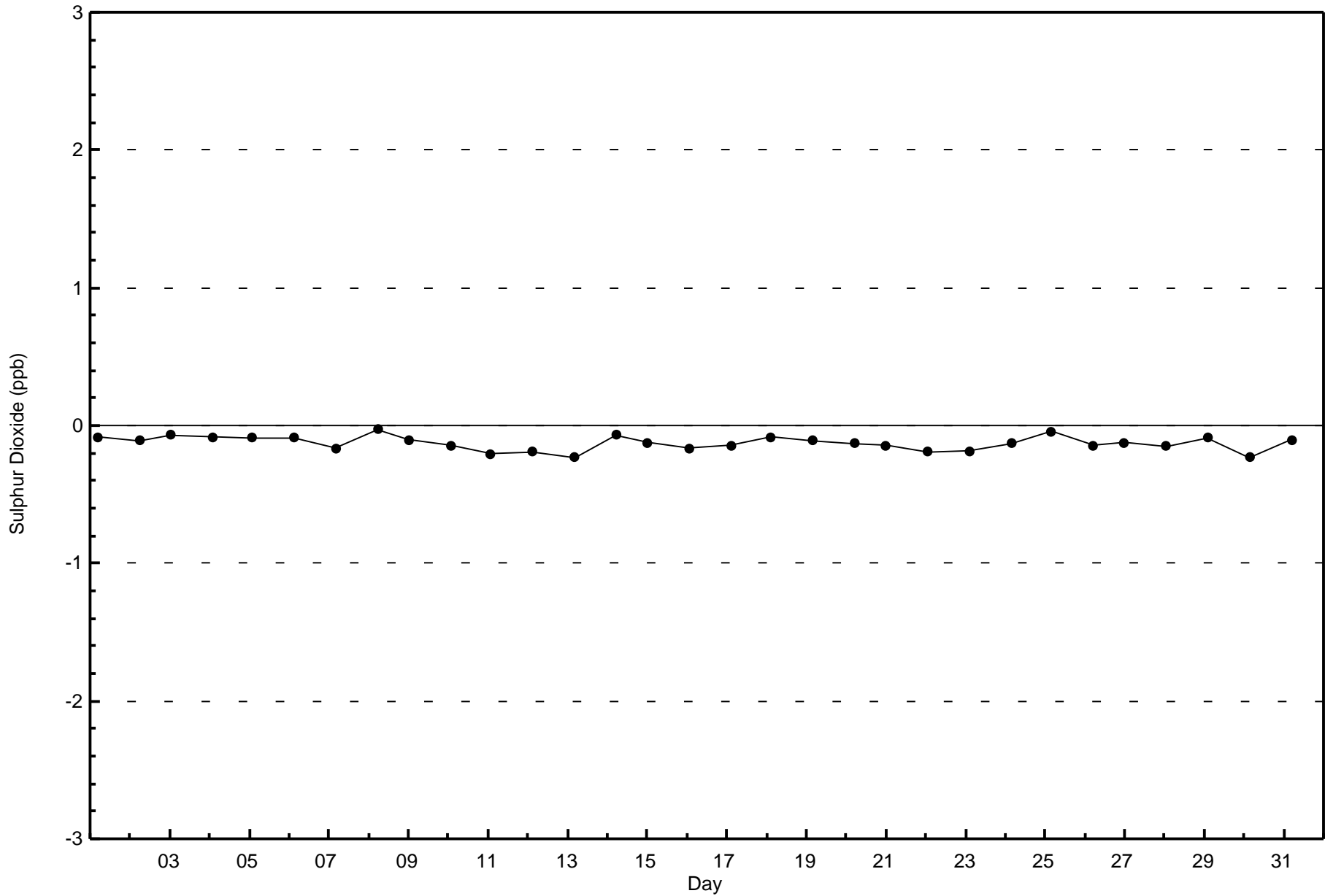


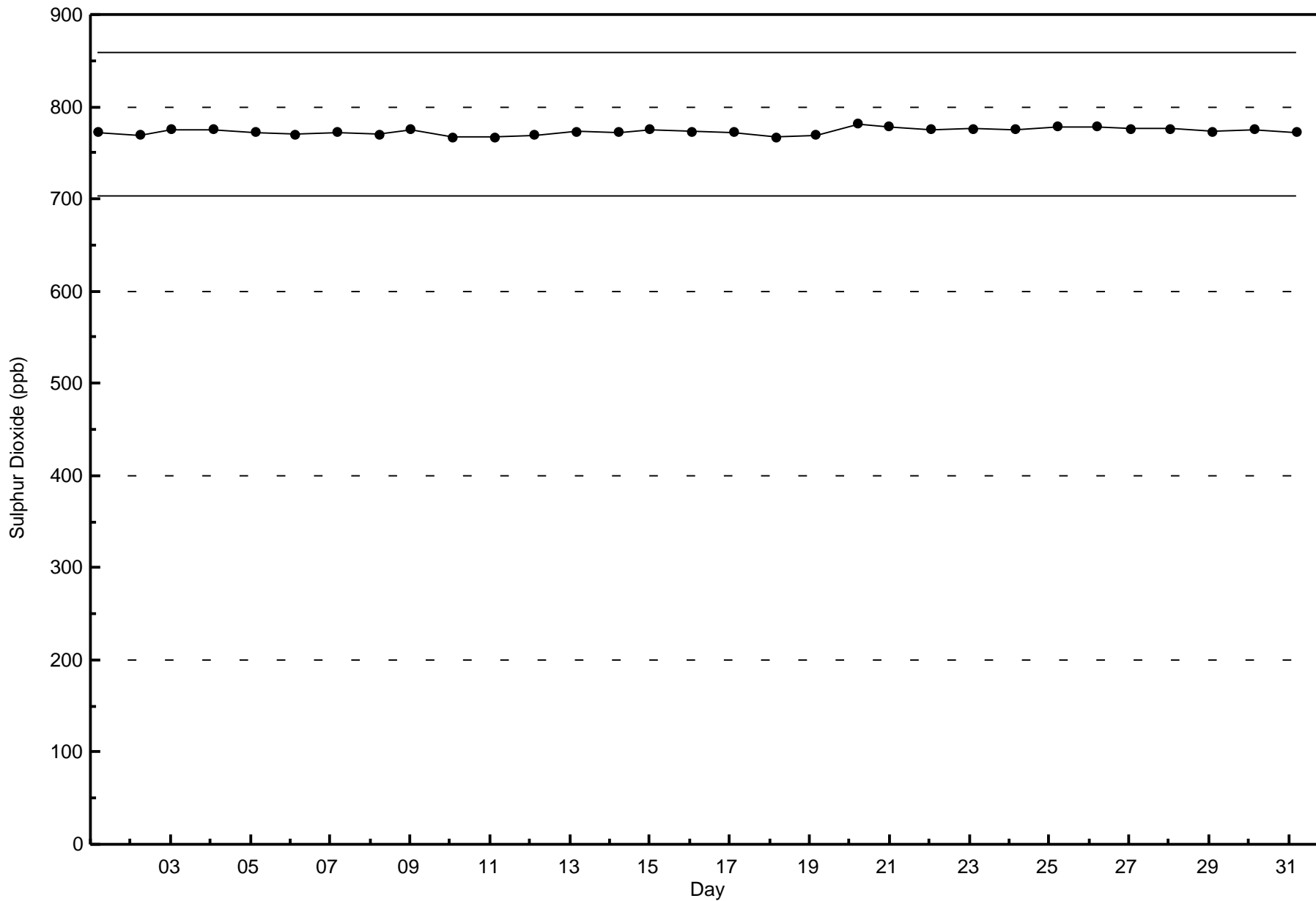
Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Patricia McInnes (AMS 6)



Total Number of Valid Hours: 704



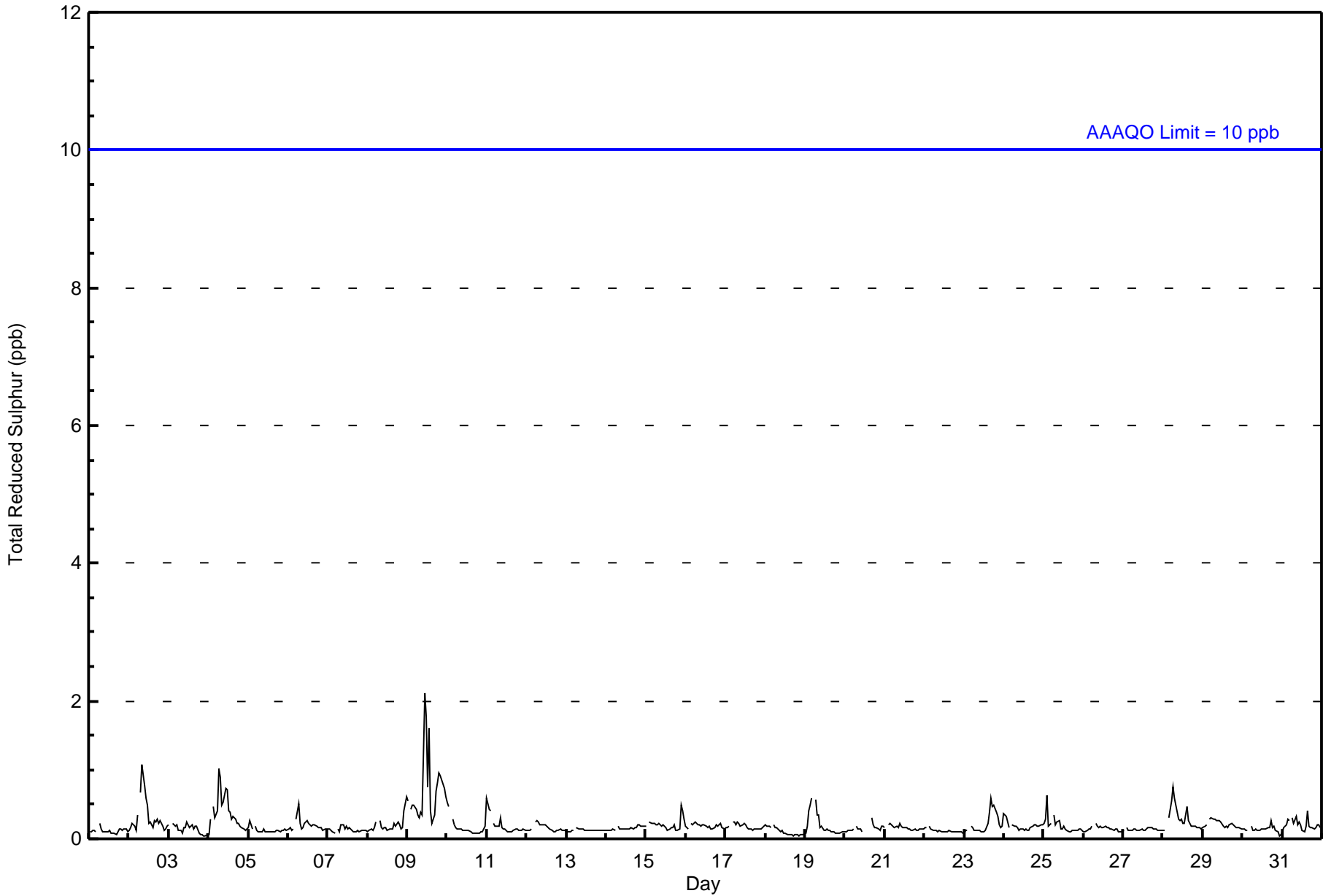




Summary of Hour Averages

Patricia McInnes - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 2 ppb on Oct 9 11:00										Maximum Daily Average: 0.7 ppb on Oct 9										Hours of Data: 708						
Minimum Value: 0 ppb on Oct 30 23:00										Minimum Daily Average: 0.1 ppb on Oct 18										Hours of Missing Data: 36						
Maximum Diurnal Average: 0.3 ppb at hour 7										Minimum Diurnal Average: 0.2 ppb at hour 16										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	0.1	0
2-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	0.3	1
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	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
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	1	0.2	1
9-Oct	1	Z	0	0	0	0	0	0	0	0	2	2	1	2	0	0	0	1	1	1	1	1	1	1	0.7	2
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	0.2	1
11-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	0.2	1
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	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	0.2	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	0.2	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	0.2	0
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	0.1	0
19-Oct	0	0	0	0	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
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	0.2	0
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	0.2	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	0.1	0
23-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.2	1
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	1	0	0	Z	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	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	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
28-Oct	0	0	Z	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	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	0.2	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	0.1	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
0.2																								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**  
**Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Patricia McInnes - October 2015**

<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**  
**Patricia McInnes - October 2015**

<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 - 2	62	17	7	9	18	72	66	34	33	45	73	63	39	55	51	61	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>	62	17	7	9	18	72	66	34	33	45	73	63	39	55	51	61	705

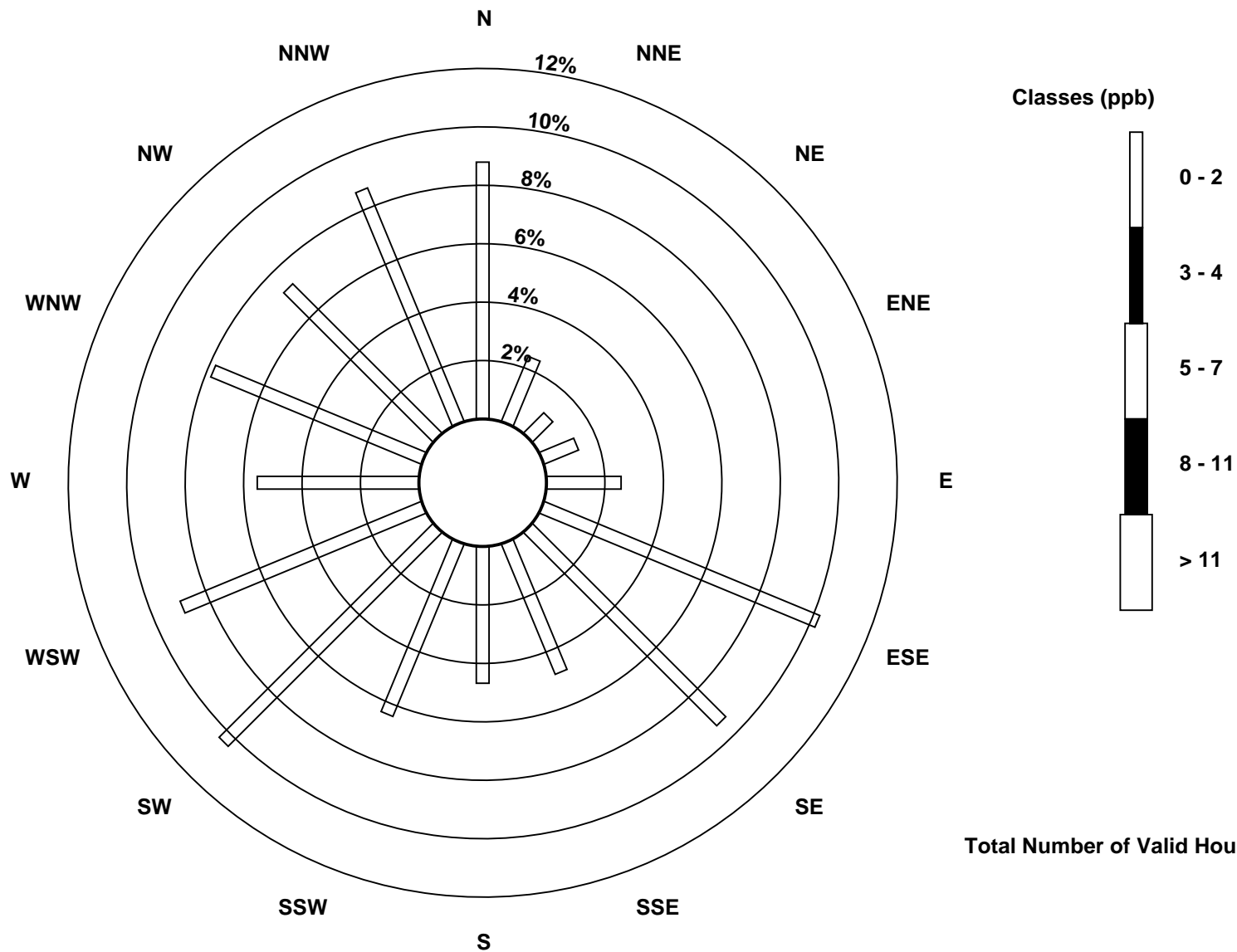
Total Number of Valid Hours: 705

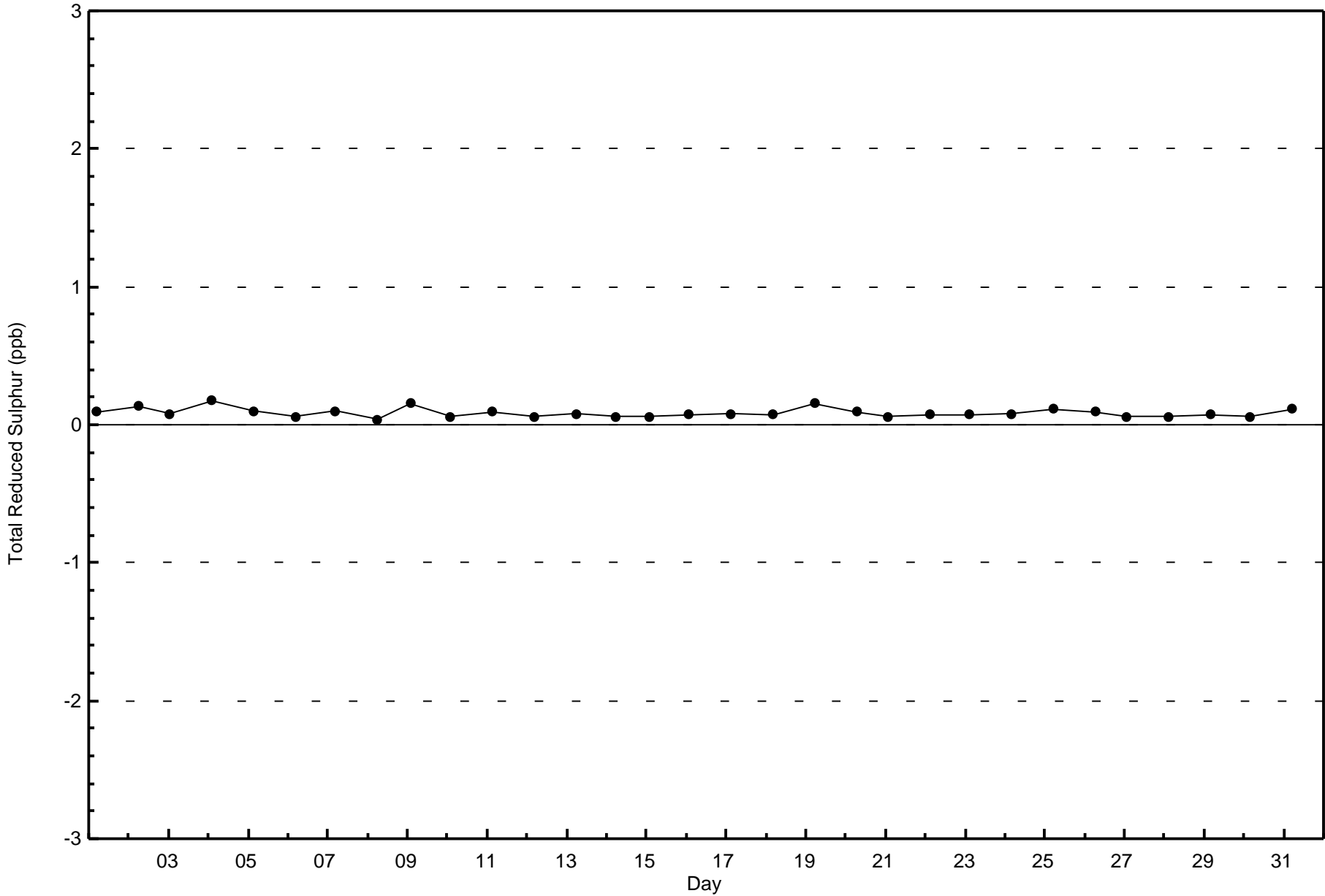
Total Number of Hours: 744

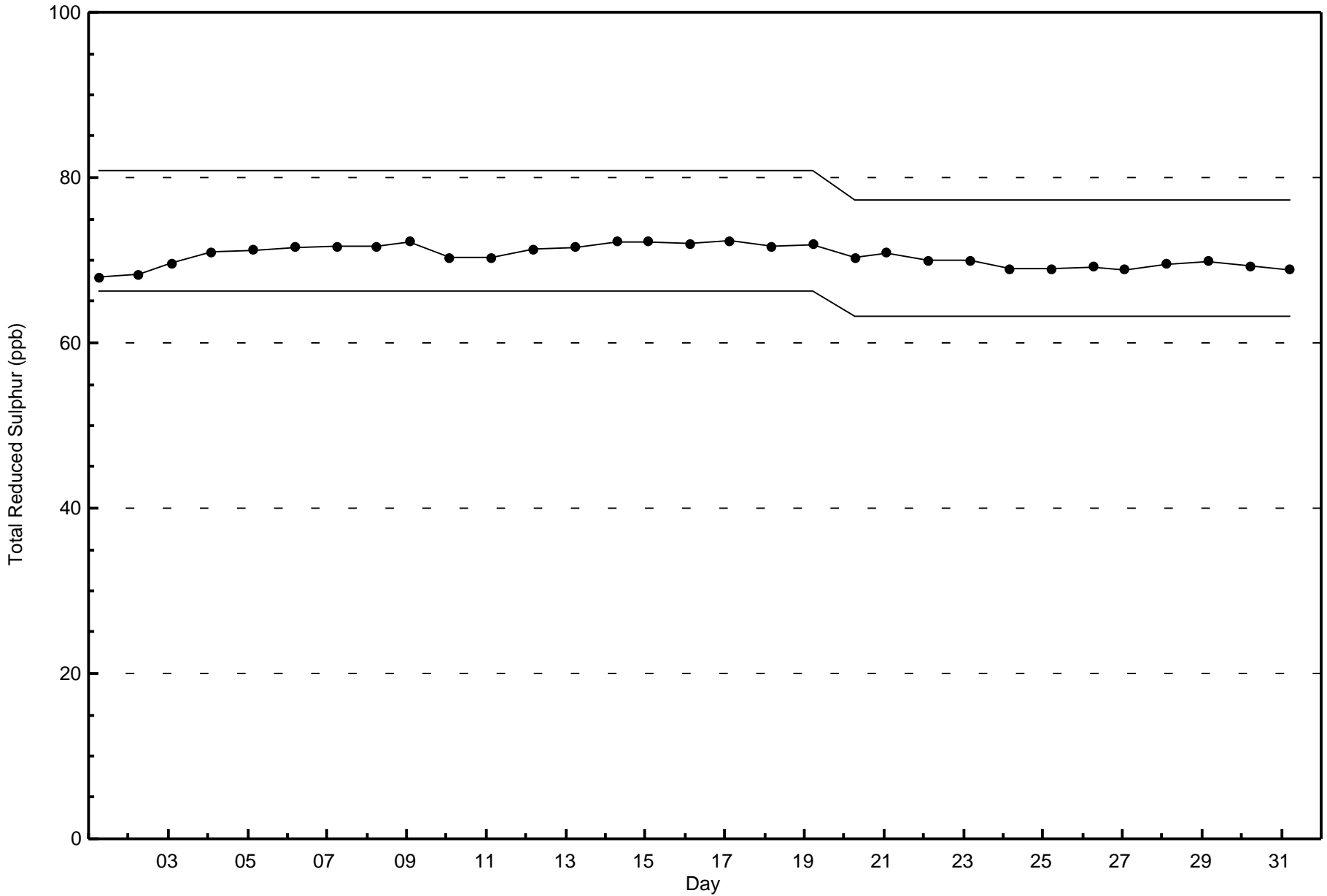


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Total Reduced Sulphur (TRS) - ppb  
Patricia McInnes (AMS 6)









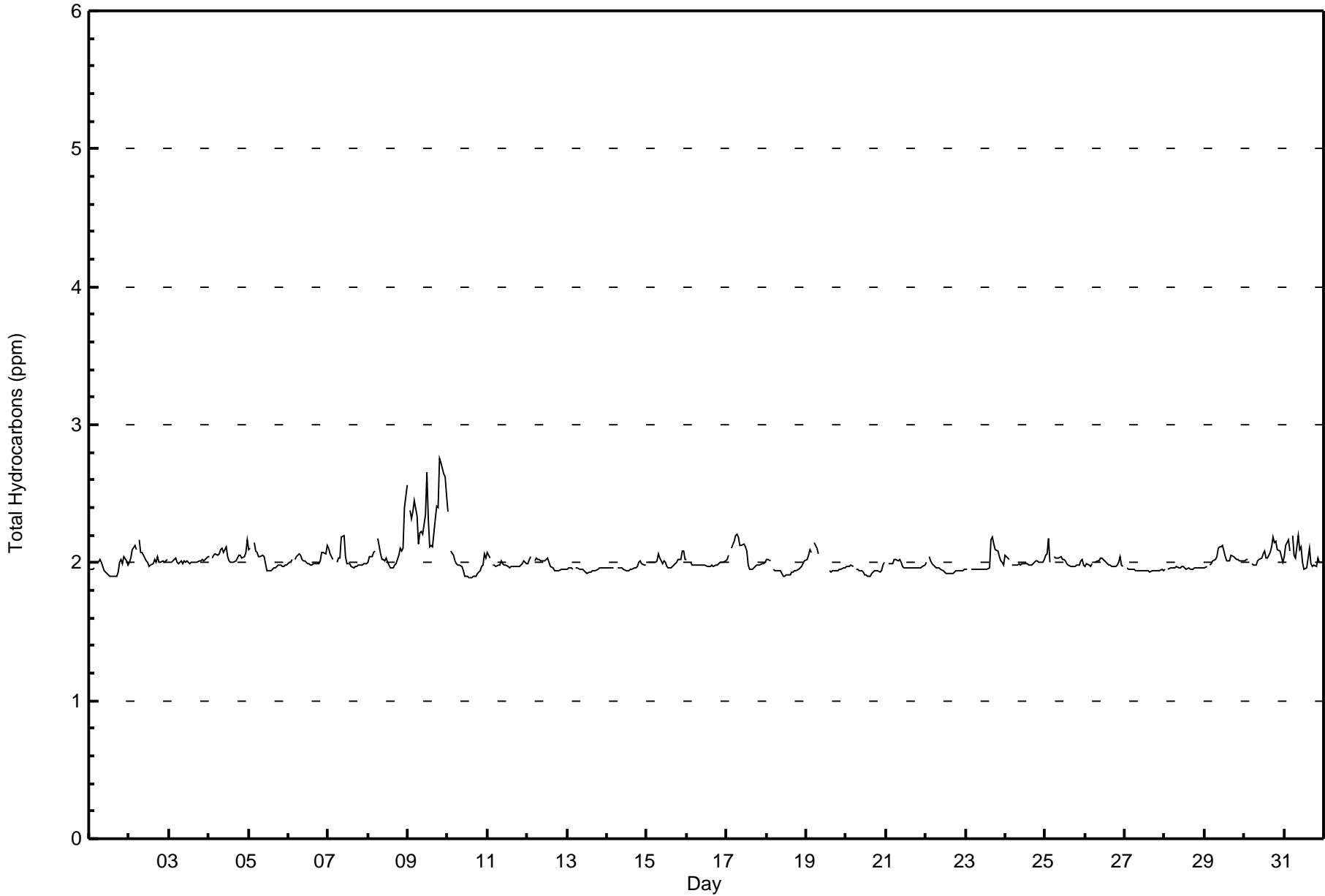
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Patricia McInnes - October 2015

Maximum Value: 2.8 ppm on Oct 9 20:00		Maximum Daily Average: 2.4 ppm on Oct 9		Hours in Service: 744																						
Minimum Value: 1.9 ppm on Oct 10 14:00		Minimum Daily Average: 1.9 ppm on Oct 27		Hours of Data: 707																						
Maximum Diurnal Average: 2.0 ppm at hour 3		Minimum Diurnal Average: 2.0 ppm at hour 14		Hours of Missing Data: 37																						
Monthly Average: 2.01 ppm		Percentiles: P <sub>1</sub> = 1.9 P <sub>10</sub> = 1.9 Q <sub>1</sub> = 2.0 Median = 2.0 Q <sub>3</sub> = 2.0 P <sub>90</sub> = 2.1 P <sub>99</sub> = 2.4		Hours of Calibration: 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	2.0	2.0	2.0	2.0	Z	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
2-Oct	2.0	2.0	2.1	2.1	2.1	Z	2.2	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	2.0
3-Oct	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
4-Oct	2.0	Z	2.0	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	2.0	2.0	2.1	2.2	2.1	2.2
5-Oct	2.1	2.1	Z	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
6-Oct	2.0	2.0	2.0	Z	2.0	2.0	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	2.1	2.1	2.1	2.1	2.1	2.0
7-Oct	2.1	2.1	2.0	2.0	Z	2.0	2.0	2.0	2.2	2.2	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
8-Oct	2.0	2.0	2.0	2.1	2.1	Z	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.4	2.6	2.1	2.6
9-Oct	Z	2.4	2.3	2.4	2.4	2.3	2.1	2.2	2.2	2.2	2.3	2.7	2.3	2.1	2.1	2.1	2.3	2.4	2.4	2.8	2.7	2.6	2.6	2.5	2.4	2.8
10-Oct	2.4	Z	2.1	2.1	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	2.0	2.1	2.0	2.0	2.4
11-Oct	2.1	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	2.1
12-Oct	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	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0
13-Oct	2.0	2.0	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
14-Oct	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
15-Oct	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.1
16-Oct	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
17-Oct	2.0	2.1	Z	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
18-Oct	2.0	2.0	2.0	Z	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	2.0	2.0	2.0	2.0	2.0	2.0
19-Oct	2.0	2.1	2.1	2.1	Z	2.1	2.1	2.1	C	C	C	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	--	2.1
20-Oct	2.0	2.0	2.0	2.0	2.0	Z	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	2.0	1.9	2.0
21-Oct	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
22-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
23-Oct	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	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.2
24-Oct	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
25-Oct	2.1	2.1	2.2	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	2.2
26-Oct	2.0	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
27-Oct	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
28-Oct	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
29-Oct	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
30-Oct	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.1	2.1	2.2	2.1	2.2	2.1	2.1	2.0	2.0	2.1	2.2
31-Oct	2.0	2.1	2.2	2.1	Z	2.2	2.0	2.0	2.2	2.1	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration																										





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

**Total Hydrocarbons (THC) - ppm**  
**Patricia McInnes - October 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	585	82.74	82.74
2.1 - 3.0	122	17.26	100.00
3.1 - 10.0	0	0.00	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**  
**Patricia McInnes - October 2015**

<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	47	10	4	3	12	63	57	18	21	40	66	59	42	56	41	43	582
2.1 - 3.0	13	8	3	5	5	6	9	16	11	6	7	3	2	1	8	19	122
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>	60	18	7	8	17	69	66	34	32	46	73	62	44	57	49	62	704

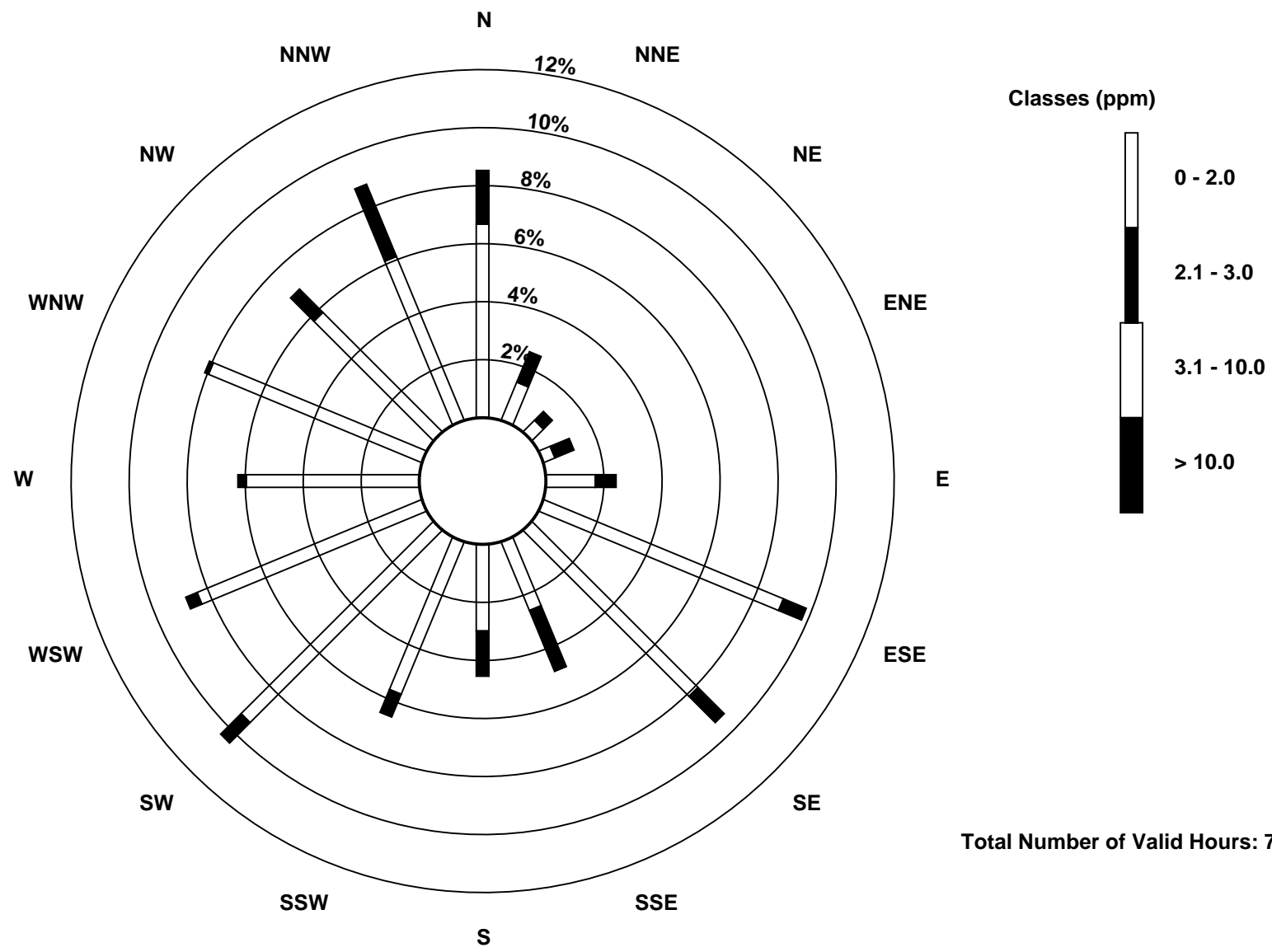
Total Number of Valid Hours: 704

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Total Hydrocarbons (THC) - ppm  
Patricia McInnes (AMS 6)



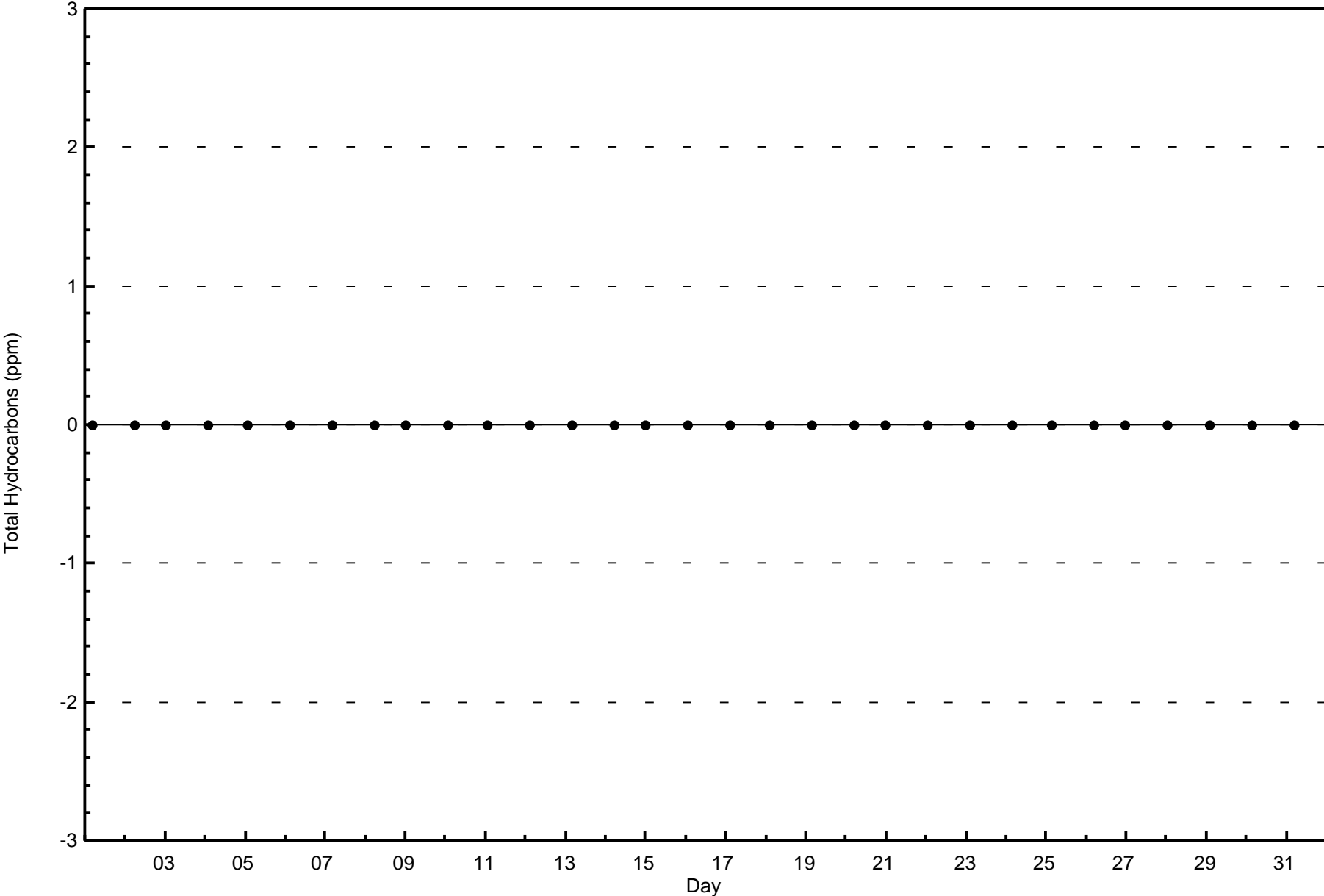


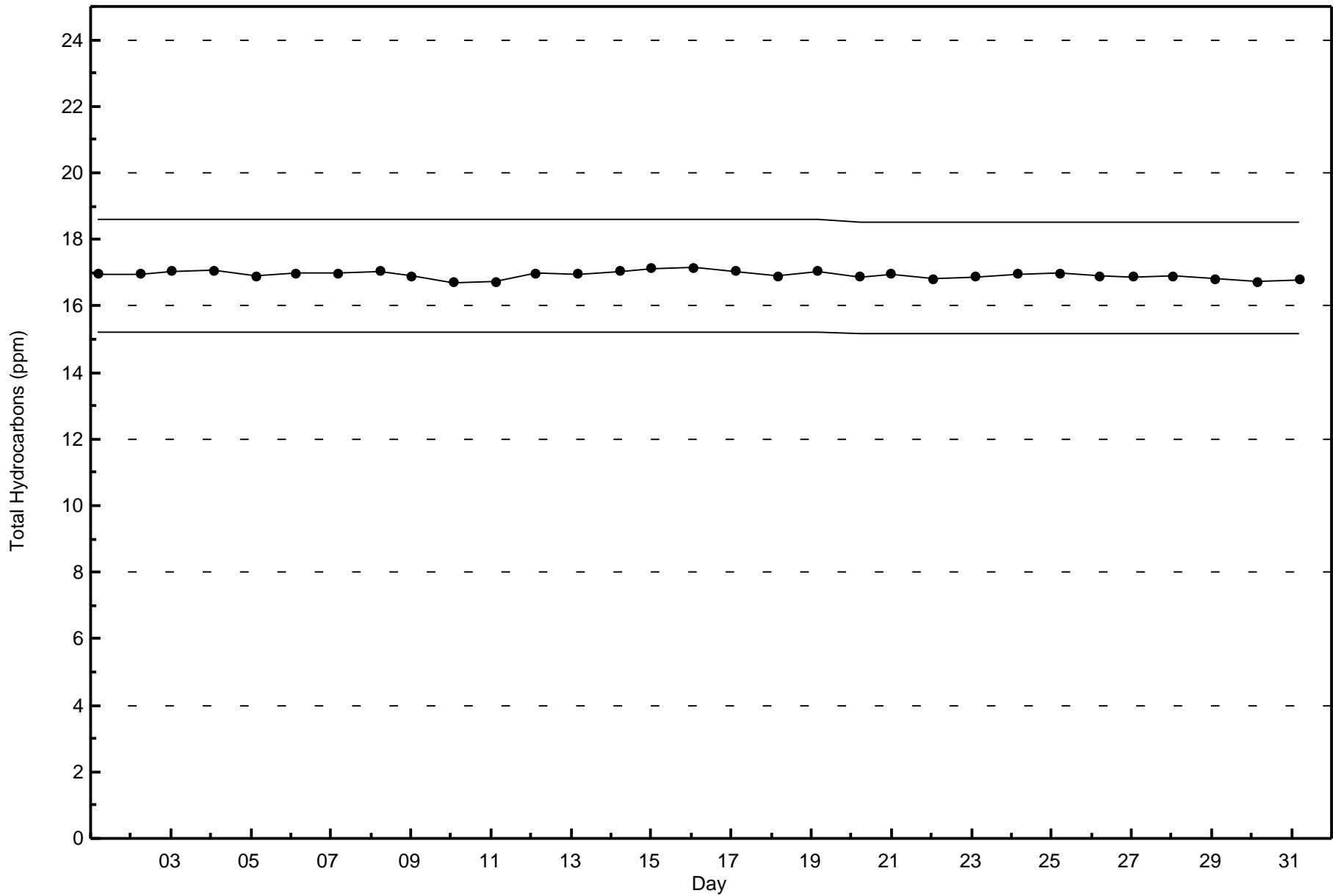
Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

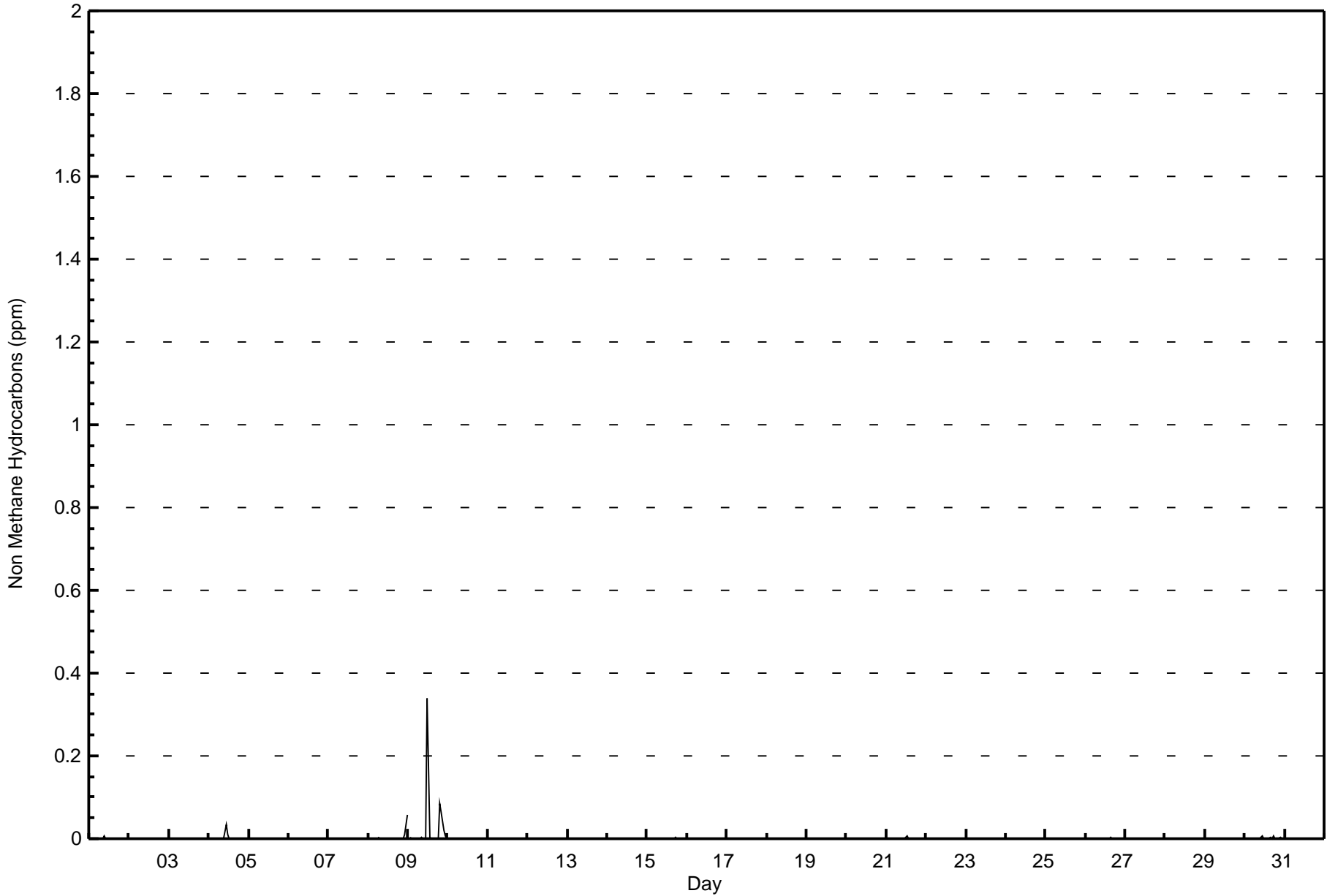
Patricia McInnes - October 2015







Maximum Value: 0.339 ppm on Oct 9 12:00		Maximum Daily Average: 0.030 ppm on Oct 9		Hours in Service:	744																													
Minimum Value: 0.000 ppm on Oct 1 01:00		Minimum Daily Average: 0.000 ppm on Oct 2		Hours of Data:	707																													
Maximum Diurnal Average: 0.012 ppm at hour 12		Minimum Diurnal Average: 0.000 ppm at hour 1		Hours of Missing Data:	37																													
Monthly Average: 0.001 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:	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	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.006	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	0.006
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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
3-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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
4-Oct	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.034	0.010	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	0.034	
5-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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
6-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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
7-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	0.000	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	
8-Oct	0.000	0.000	0.000	0.000	0.000	Z	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	0.000	0.000	0.000	0.000	0.011	0.058	0.003	0.058		
9-Oct	Z	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.339	0.175	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.085	0.065	0.020	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.339		
10-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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
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	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	0.000	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		
13-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	0.000	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		
14-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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
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	0.004	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		
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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
17-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	0.000	0.000	0.000	0.000	0.000	0.000		
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	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	C	C	C	C	C	C	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		
20-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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
21-Oct	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	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		
22-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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
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	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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
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	0.000	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		
26-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	0.003	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	0.003		
27-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	0.000	0.000	0.000	0.000	0.000	0.000		
28-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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
30-Oct	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.000	0.001	0.003	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007		
31-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	0.000	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		
																								Diurnal Average										
																								Diurnal Maximum										
Z - zerospan C - Calibration																																		





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

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Patricia McInnes - October 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.005	695	98.30	98.30
0.006 - 0.05	7	0.99	99.29
0.06 - 0.1	3	0.42	99.72
> 0.1	2	0.28	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



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

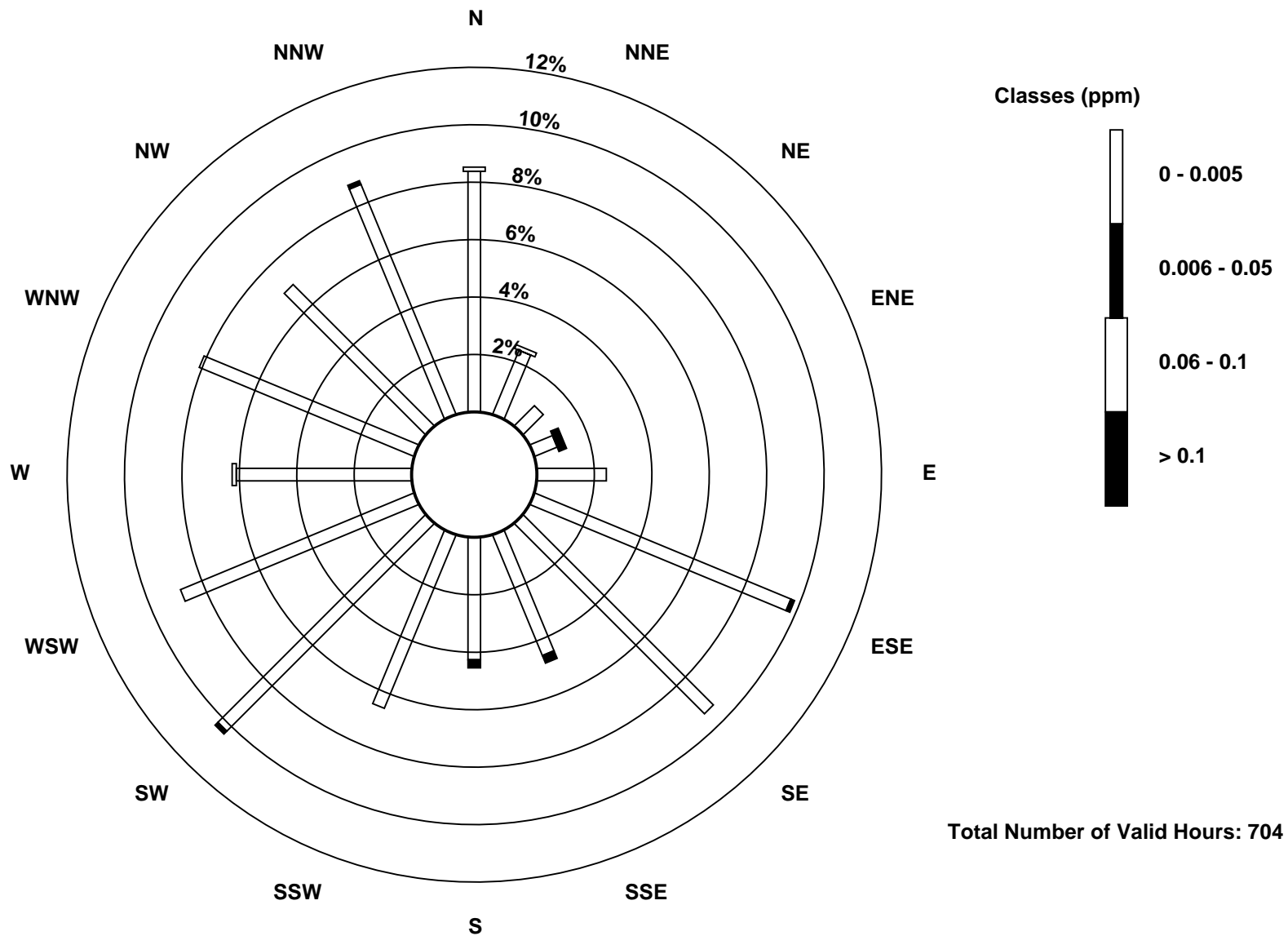
**Non Methane Hydrocarbons (NMHC) - ppm**  
**Patricia McInnes - October 2015**

<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	59	17	7	6	17	68	66	32	30	46	72	62	43	57	49	61	692
0.006 - 0.05	0	0	0	0	0	1	0	2	2	0	1	0	0	0	0	1	7
0.06 - 0.1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3
> 0.1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
<b>Totals</b>	<b>60</b>	<b>18</b>	<b>7</b>	<b>8</b>	<b>17</b>	<b>69</b>	<b>66</b>	<b>34</b>	<b>32</b>	<b>46</b>	<b>73</b>	<b>62</b>	<b>44</b>	<b>57</b>	<b>49</b>	<b>62</b>	<b>704</b>

Total Number of Valid Hours: 704

Total Number of Hours: 744





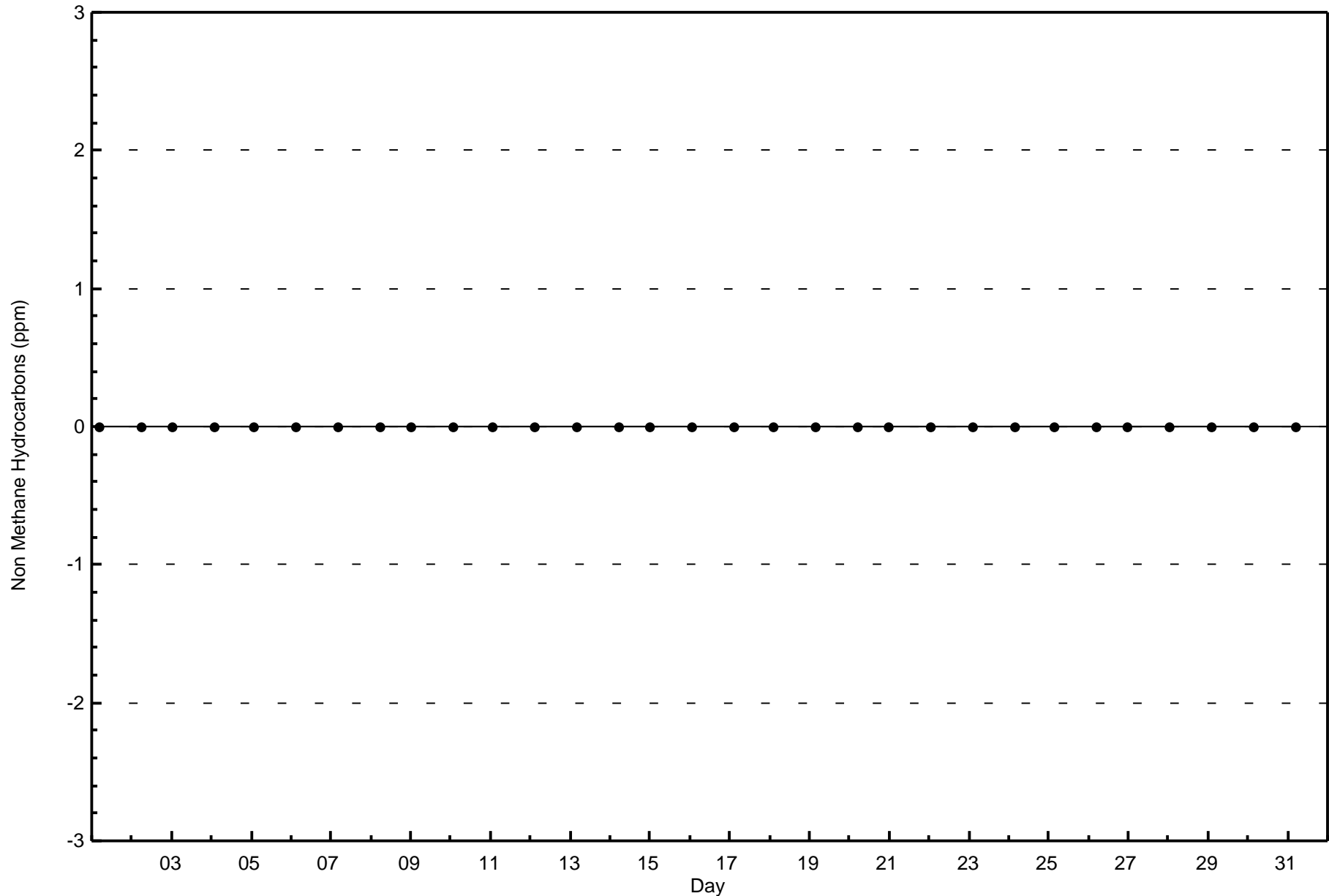


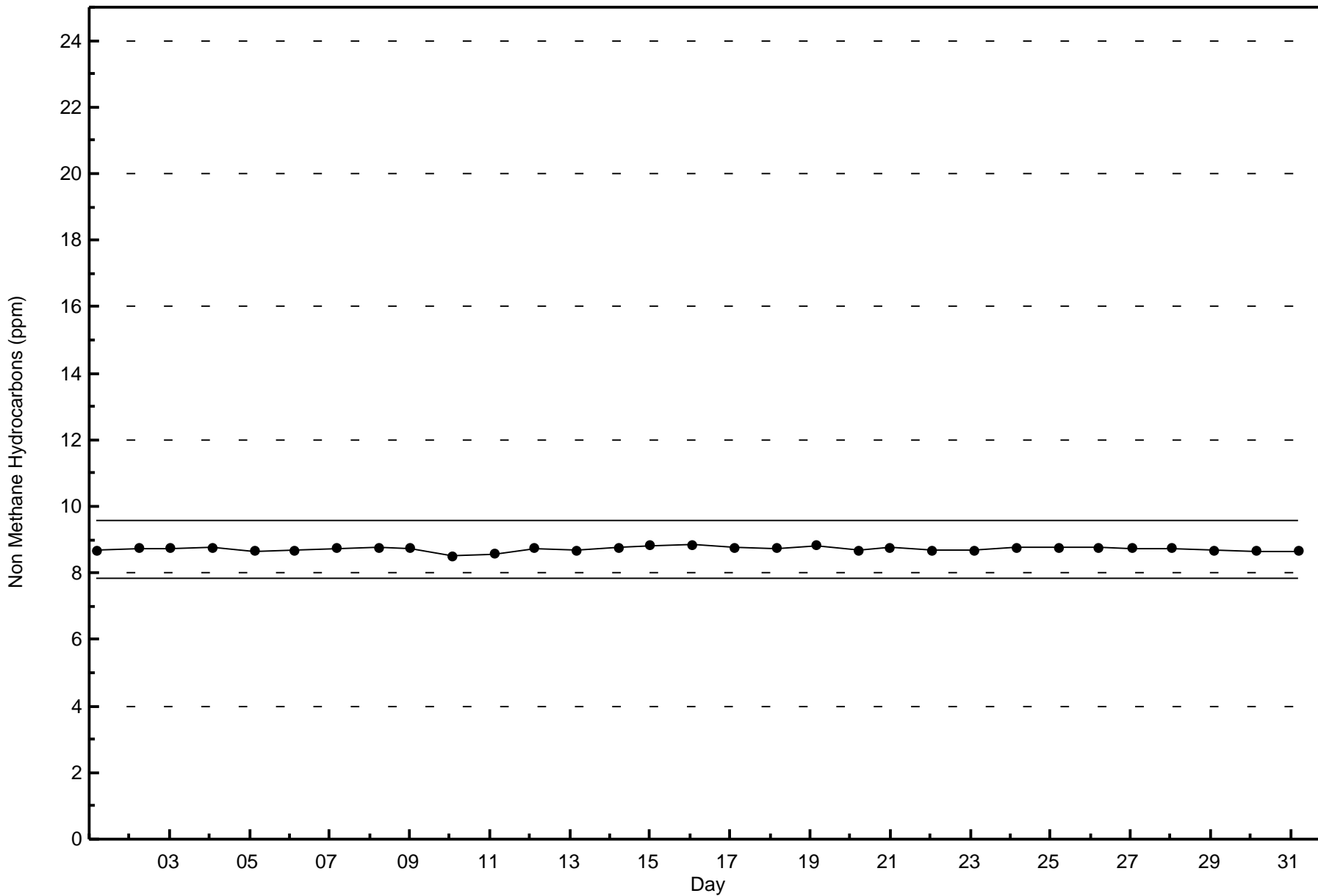
Wood Buffalo Environmental Association

Zero Responses

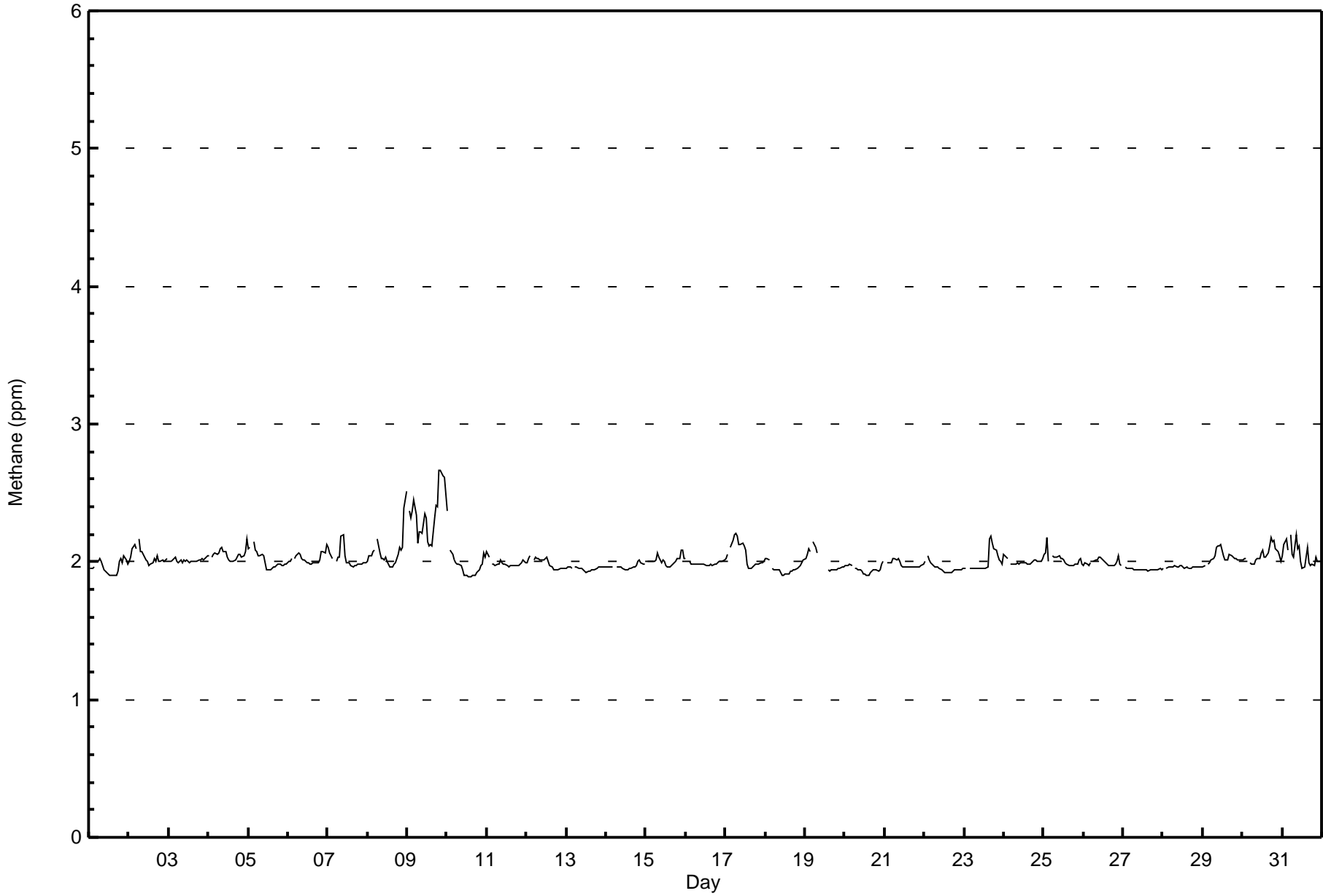
Non Methane Hydrocarbons (NMHC) - ppm

Patricia McInnes - October 2015











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

**Methane (CH<sub>4</sub>) - ppm**  
**Patricia McInnes - October 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	585	82.74	82.74
2.1 - 3.0	122	17.26	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



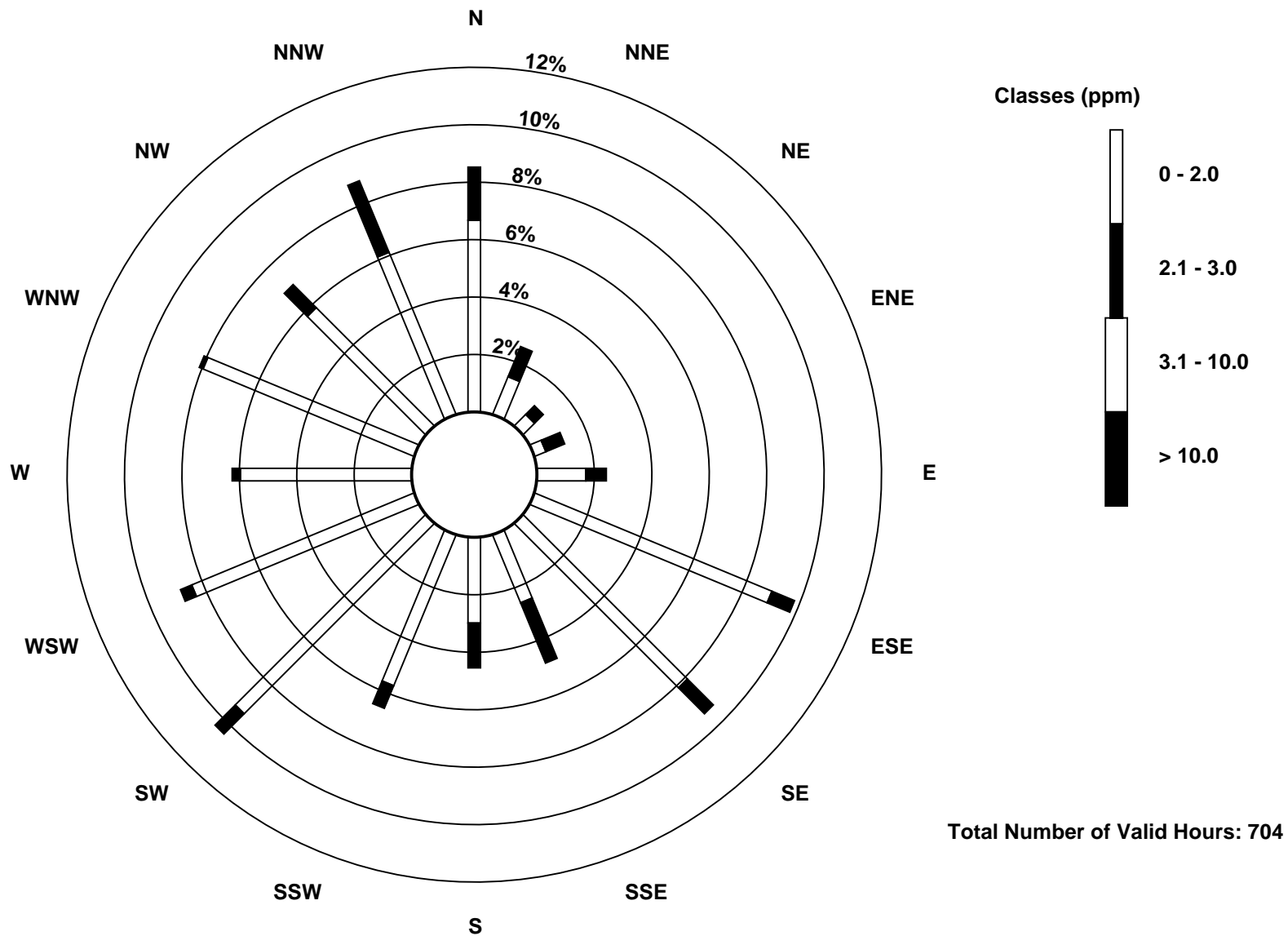
**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Patricia McInnes - October 2015**

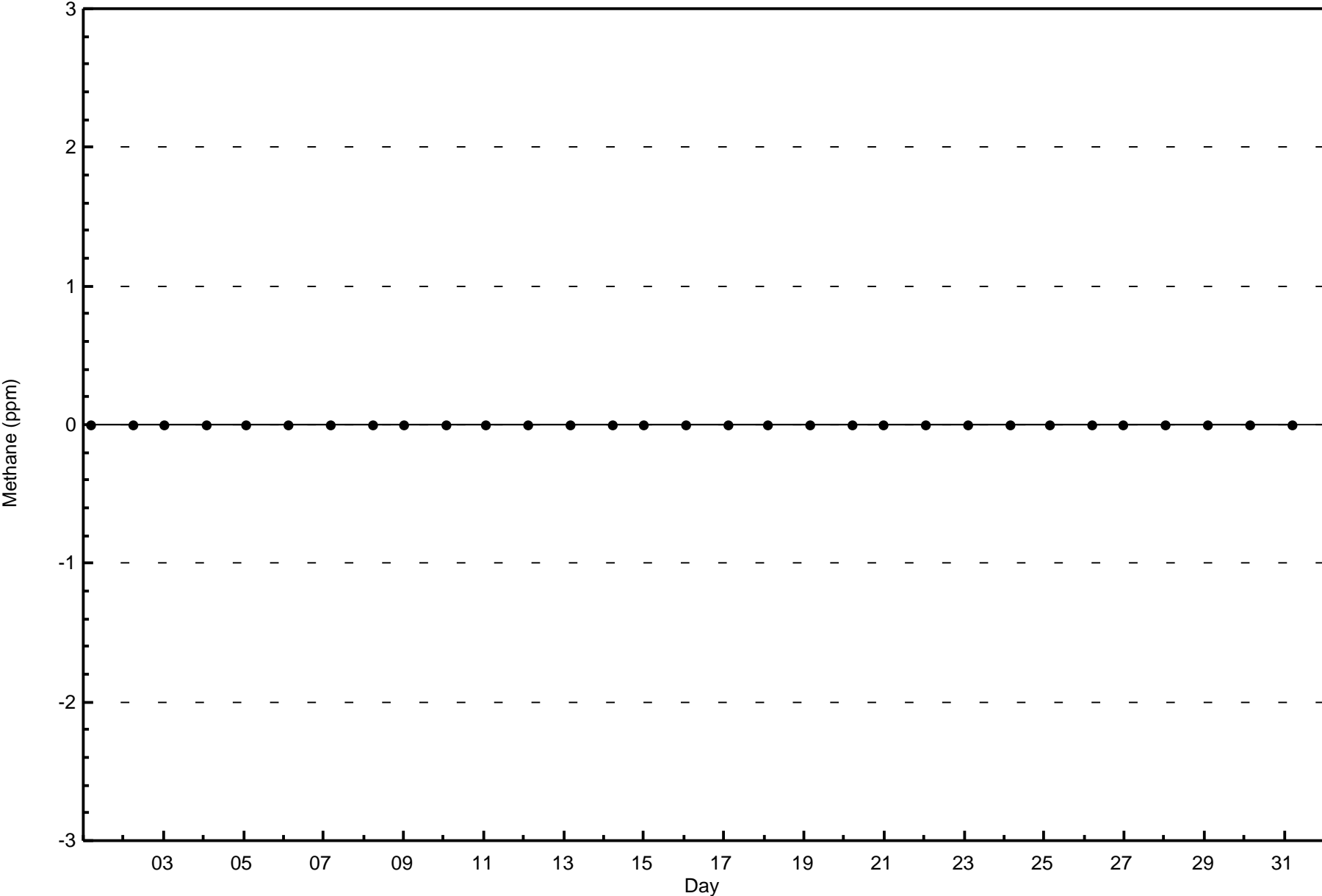
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	47	10	4	3	12	63	57	18	21	40	66	59	42	56	41	43	582
2.1 - 3.0	13	8	3	5	5	6	9	16	11	6	7	3	2	1	8	19	122
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	60	18	7	8	17	69	66	34	32	46	73	62	44	57	49	62	704

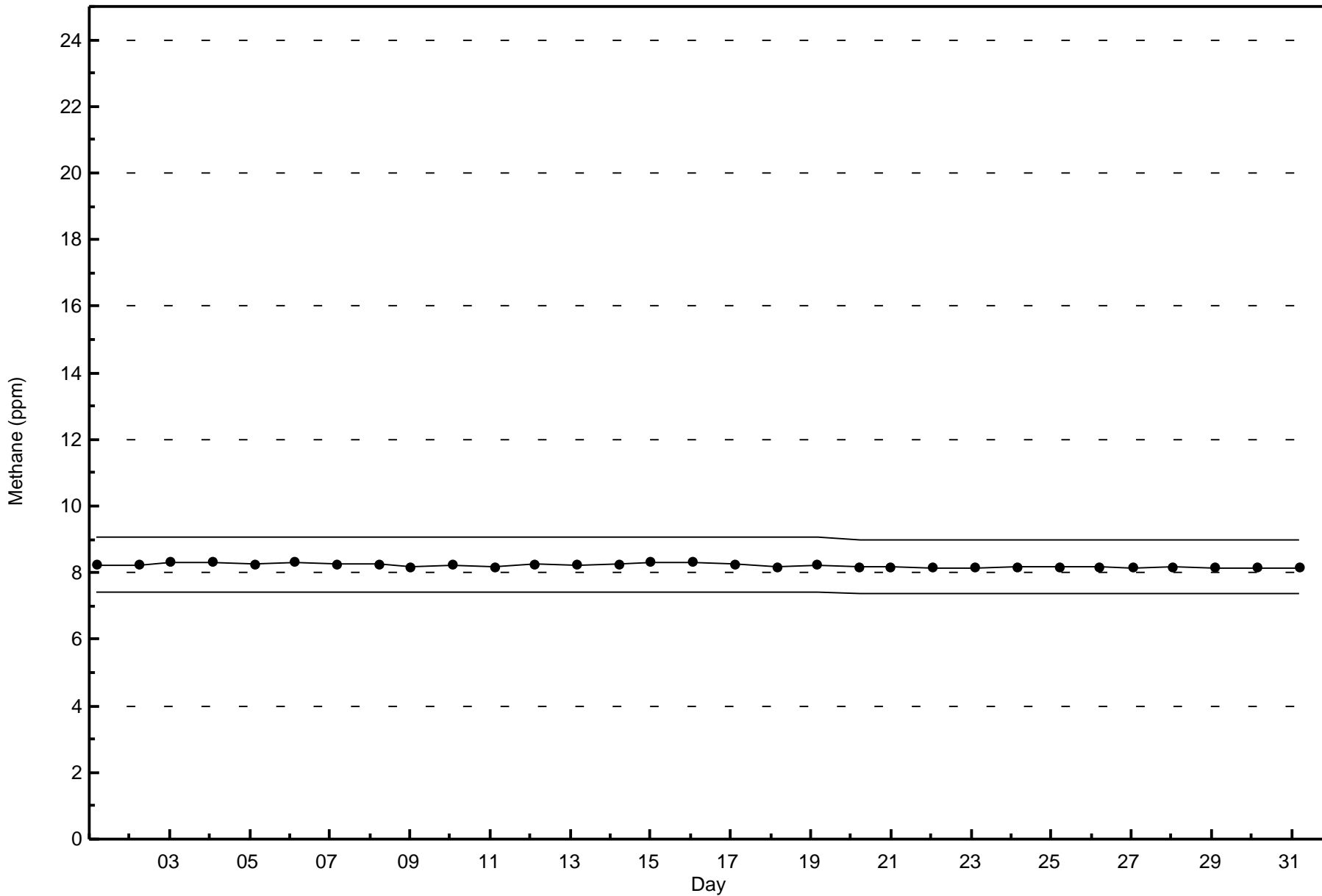
Total Number of Valid Hours: 704

Total Number of Hours: 744











Summary of Hour Averages

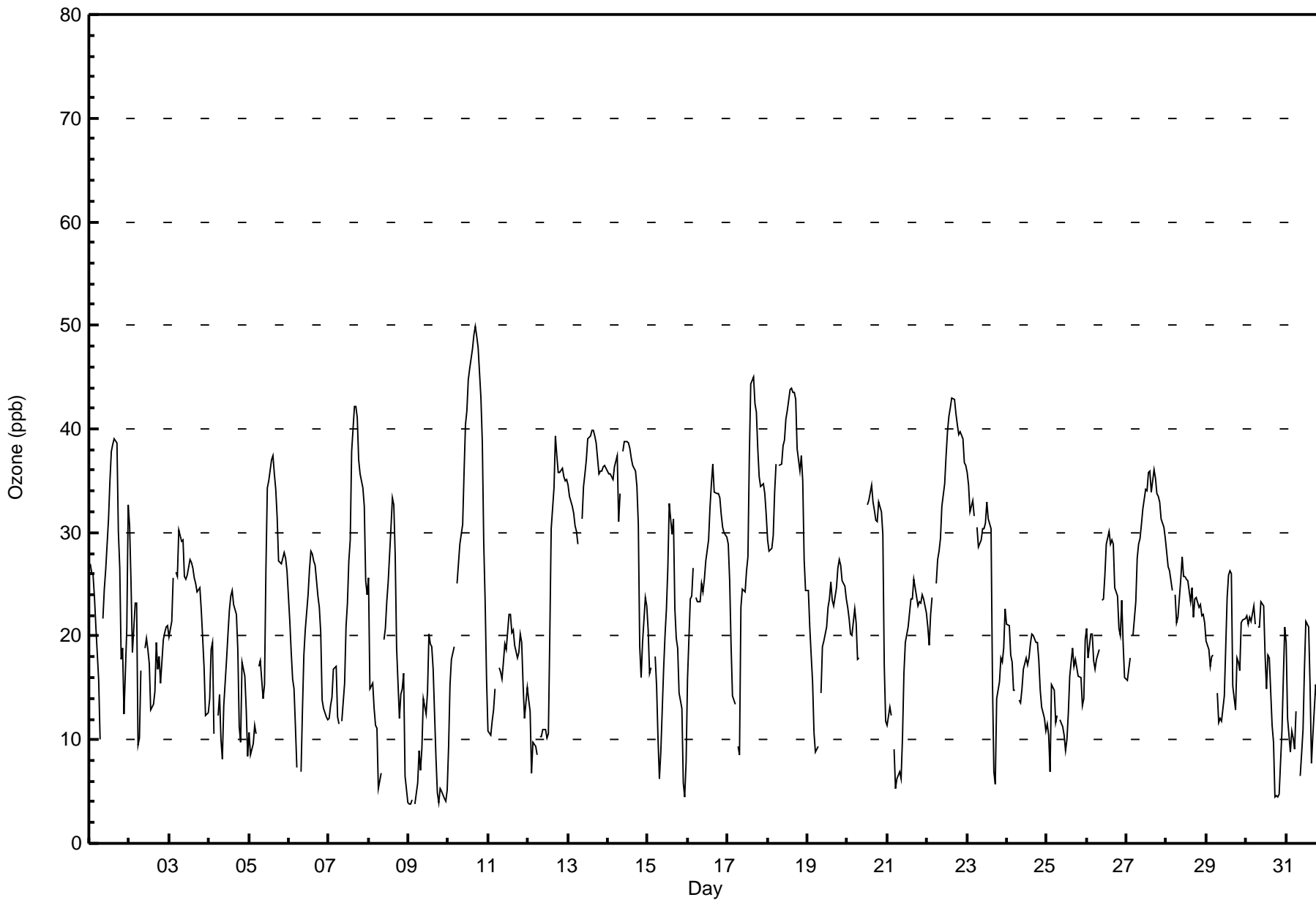
Patricia McInnes - October 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 50 ppb on Oct 10 17:00	Maximum Daily Average: 36.3 ppb on Oct 18		Hours of Data:	710
Minimum Value: 4 ppb on Oct 9 05:00	Minimum Daily Average: 8.9 ppb on Oct 9		Hours of Missing Data:	34
Maximum Diurnal Average: 29.8 ppb at hour 15	Minimum Diurnal Average: 17.4 ppb at hour 7		Hours of Calibration:	34
Monthly Average: 22.8 ppb	Percentiles: P <sub>1</sub> = 4 P <sub>10</sub> = 10 Q <sub>1</sub> = 15 Median = 22 Q <sub>3</sub> = 30 P <sub>90</sub> = 36 P <sub>99</sub> = 45		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	27	26	26	24	21	16	10	Z	22	24	26	31	35	38	39	39	39	30	27	18	19	13	21	33	26.2	39
2-Oct	31	25	18	23	23	10	10	17	Z	19	20	19	17	13	13	15	19	17	18	15	20	20	21	21	18.5	31
3-Oct	20	21	26	Z	26	26	30	29	29	26	26	26	27	27	27	26	25	24	25	22	20	17	12	13	23.9	30
4-Oct	14	19	19	11	Z	12	14	10	8	13	18	20	23	24	24	23	22	19	11	10	18	16	13	8	16.1	24
5-Oct	11	9	10	11	11	Z	17	18	14	15	26	34	35	37	37	36	34	31	27	27	28	28	28	26	23.9	37
6-Oct	21	18	16	15	11	7	Z	7	13	18	21	24	27	28	28	27	27	24	23	20	14	13	12	12	18.5	28
7-Oct	12	13	14	17	17	12	12	Z	12	15	21	23	27	29	38	42	42	41	37	36	34	33	25	24	25.1	42
8-Oct	26	15	15	13	11	11	5	7	Z	20	21	23	25	30	33	33	28	19	12	14	15	16	7	4	17.6	33
9-Oct	4	4	4	Z	4	6	9	7	9	14	13	15	20	19	19	17	8	5	4	5	5	4	4	5	8.9	20
10-Oct	9	15	18	19	Z	25	27	29	31	36	40	42	45	46	48	49	50	49	48	43	39	29	23	16	33.7	50
11-Oct	11	10	12	13	15	Z	17	17	16	17	19	19	22	22	20	21	19	18	18	20	19	15	12	15	16.9	22
12-Oct	14	13	7	10	9	9	Z	10	10	11	11	10	11	20	30	34	39	37	36	36	36	35	35	35	21.7	39
13-Oct	35	33	33	32	31	30	29	Z	31	34	36	37	39	39	40	40	39	39	36	36	36	37	36	36	35.4	40
14-Oct	36	36	35	35	36	37	31	34	Z	38	39	39	39	38	37	36	36	34	31	19	16	19	24	23	32.5	39
15-Oct	21	16	17	Z	18	15	10	6	9	17	20	23	27	33	30	31	23	20	19	15	13	6	4	8	17.4	33
16-Oct	16	24	24	27	Z	24	23	23	25	24	25	27	29	32	35	37	34	34	34	33	32	30	30	30	28.4	37
17-Oct	29	25	19	14	13	Z	9	8	23	24	24	26	28	37	44	45	43	42	38	35	34	35	34	32	28.8	45
18-Oct	29	28	28	30	34	37	Z	36	37	38	39	41	42	44	44	44	44	43	38	36	37	35	27	24	36.3	44
19-Oct	24	21	18	16	11	9	9	Z	15	19	20	21	23	24	25	24	23	25	27	27	27	25	25	24	20.8	27
20-Oct	23	22	20	20	23	21	18	18	Z	C	C	C	33	33	35	33	32	31	31	33	32	30	17	12	25.8	35
21-Oct	11	13	12	Z	9	5	6	7	6	10	16	19	21	22	24	24	26	25	23	23	23	24	24	22	17.2	26
22-Oct	21	19	22	24	Z	25	27	28	29	32	35	37	40	41	42	43	43	41	40	39	40	39	37	36	34.0	43
23-Oct	36	35	32	33	32	Z	31	29	29	30	30	31	33	31	30	16	7	6	14	16	18	17	19	23	25.1	36
24-Oct	21	21	18	17	15	15	Z	14	14	15	17	18	17	18	19	20	20	19	19	18	15	13	12	11	16.8	21
25-Oct	12	10	7	15	15	12	12	Z	12	11	10	9	10	13	16	19	17	18	17	16	16	13	14	20	13.7	20
26-Oct	21	18	20	20	18	17	18	19	Z	24	24	26	29	30	29	29	29	25	24	21	20	24	19	16	22.5	30
27-Oct	16	17	18	Z	20	23	28	29	29	31	32	34	34	36	36	34	36	35	34	33	33	31	31	29	29.5	36
28-Oct	28	27	26	24	Z	24	21	22	25	28	26	26	26	25	23	25	22	24	24	23	23	22	22	21	24.2	28
29-Oct	20	19	17	18	18	Z	15	12	12	12	13	14	24	26	26	26	15	13	18	17	17	21	22	22	18.1	26
30-Oct	22	21	22	21	23	21	Z	21	21	23	23	18	15	18	18	11	10	5	5	5	5	11	16	21	16.3	23
31-Oct	19	12	9	11	10	9	13	Z	7	9	11	17	21	21	15	8	10	13	15	12	6	9	11	13	12.2	21

20.6	19.5	18.8	19.7	18.2	17.6	17.4	18.2	18.8	21.7	23.4	25.0	27.1	28.9	29.8	29.2	27.8	25.9	24.9	23.4	22.8	22.0	20.5	20.5	Diurnal Average
36	36	35	35	36	37	31	36	37	38	40	42	45	46	48	49	50	49	48	43	40	39	37	36	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**  
**Patricia McInnes - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	318	44.79	44.79
21 - 50	392	55.21	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



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

**Ozone (O<sub>3</sub>) - ppb**  
**Patricia McInnes - October 2015**

<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	45	15	5	6	9	25	26	24	17	20	18	13	12	13	20	48	316
21 - 50	13	3	2	3	9	48	38	11	13	28	53	47	32	45	31	16	392
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	18	7	9	18	73	64	35	30	48	71	60	44	58	51	64	708

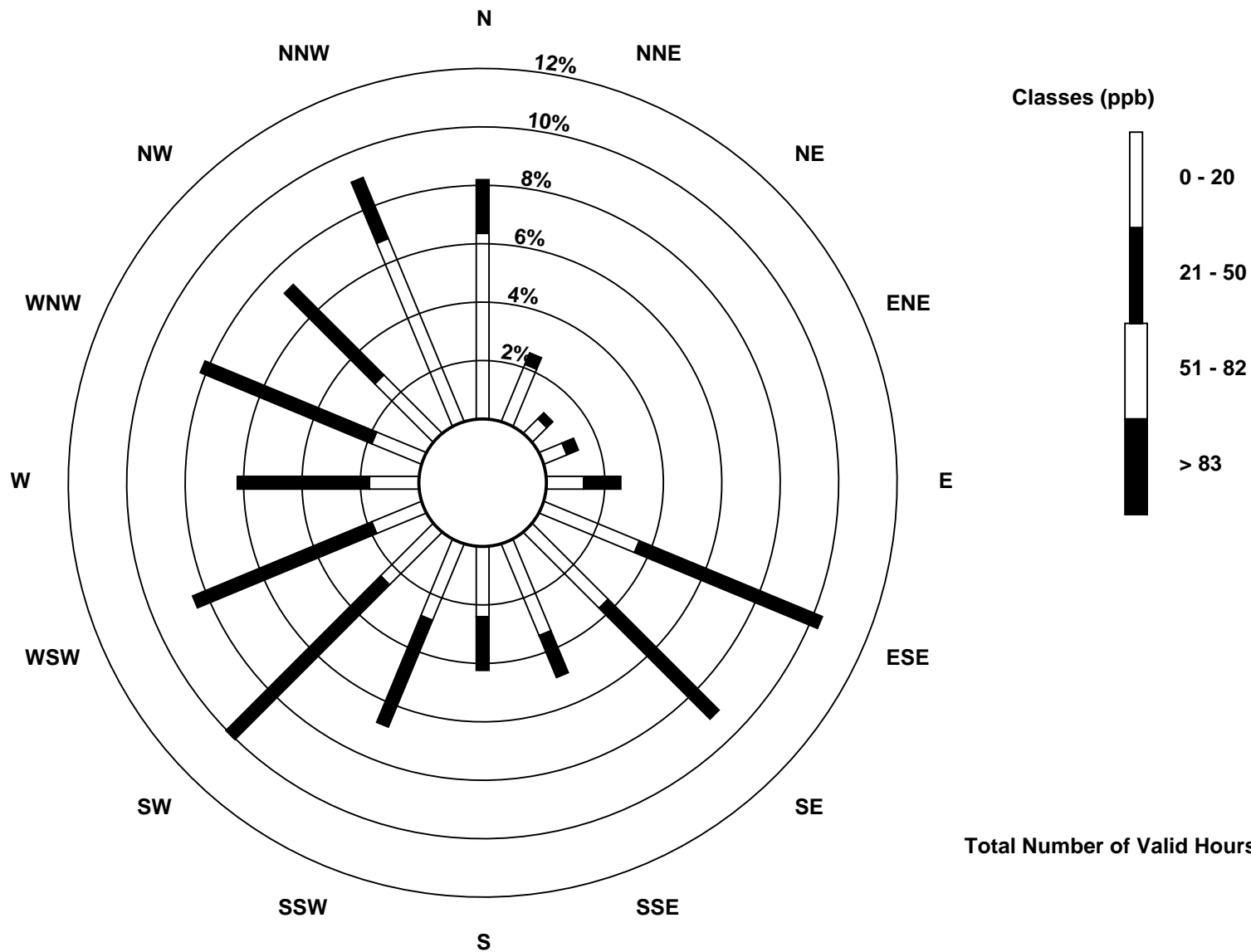
Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Ozone (O<sub>3</sub>) - ppb  
Patricia McInnes (AMS 6)



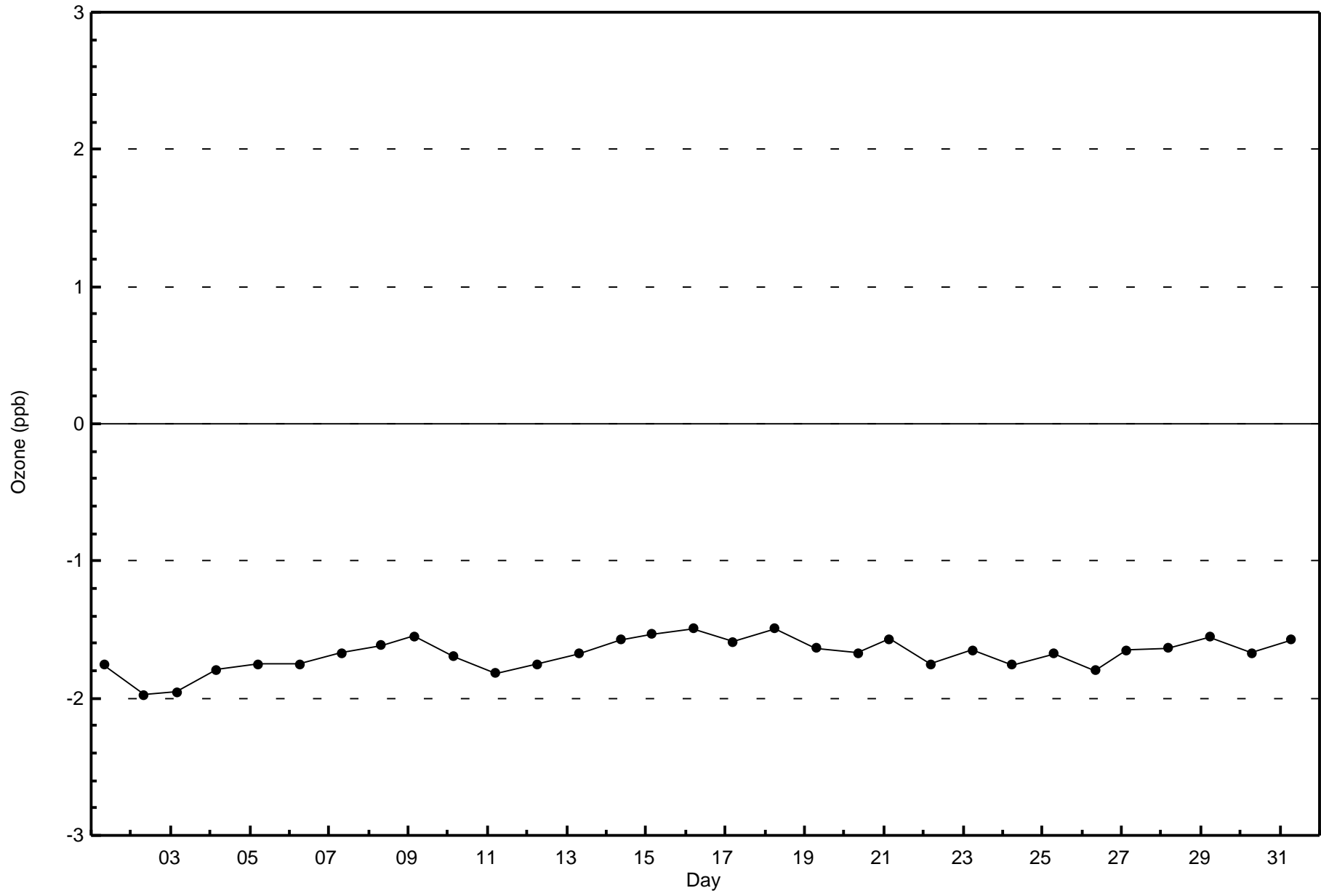


Wood Buffalo Environmental Association

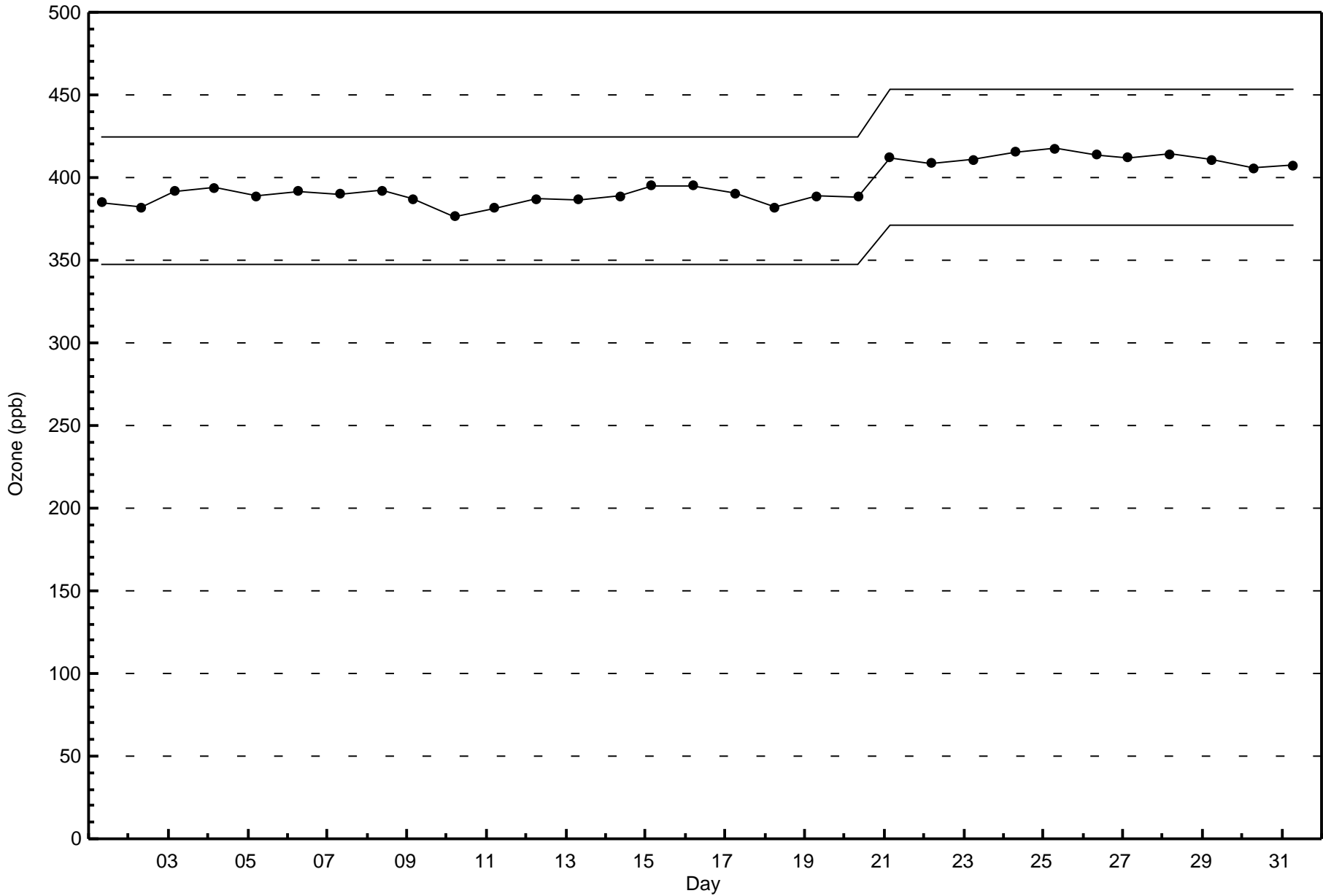
Zero Responses

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

Patricia McInnes - October 2015

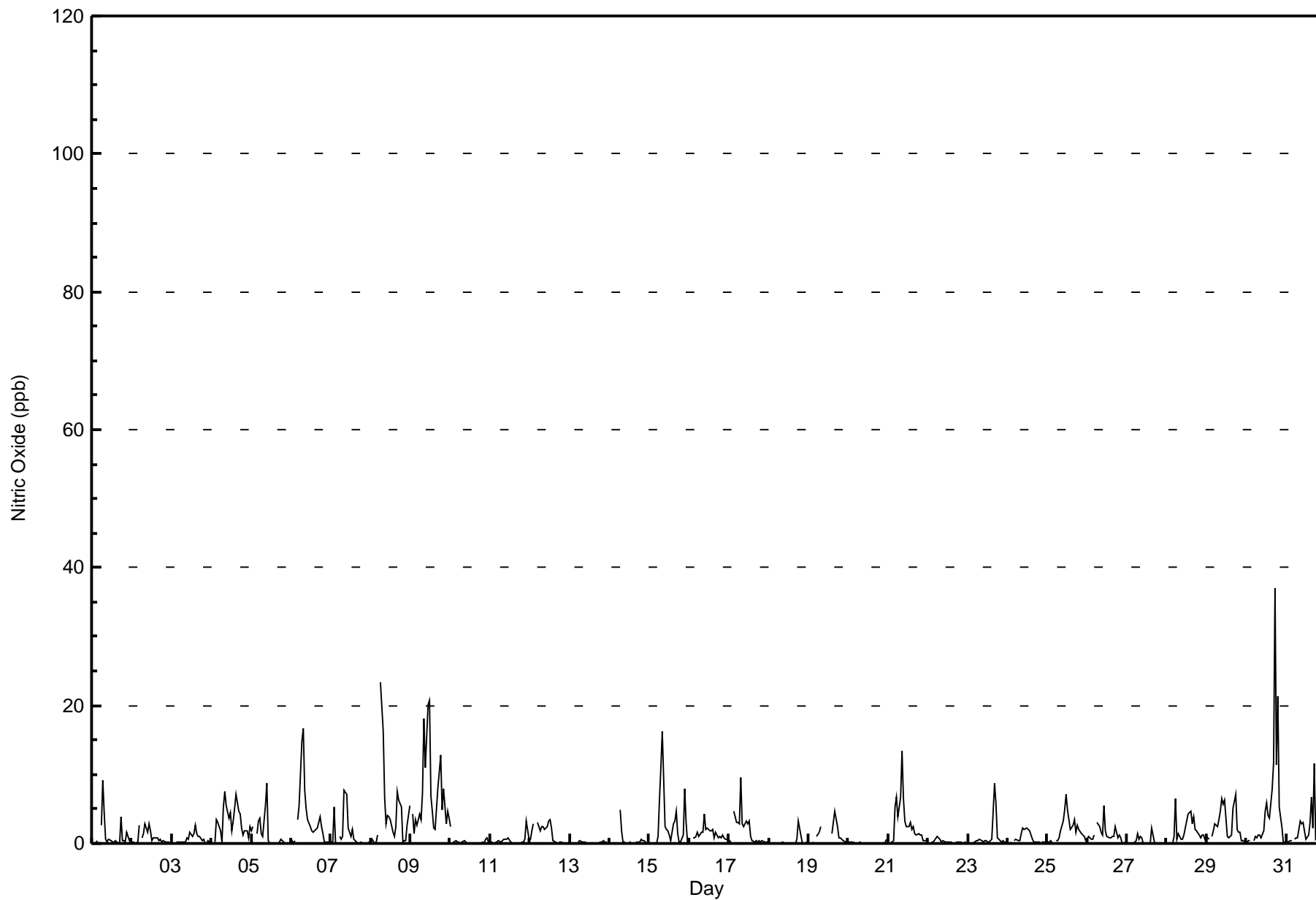








Maximum Value: 37 ppb on Oct 30 18:00																		Maximum Daily Average: 7.3 ppb on Oct 9																		Hours in Service: 744			
Minimum Value: 0 ppb on Oct 10 17:00																		Minimum Daily Average: 0.1 ppb on Oct 20																		Hours of Data: 707			
Maximum Diurnal Average: 3.7 ppb at hour 9																		Minimum Diurnal Average: 0.4 ppb at hour 1																		Hours of Missing Data: 37			
Monthly Average: 1.7 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> = 5 P <sub>99</sub> = 16																		Hours of Calibration: 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	0	0	0	0	Z	3	9	4	1	0	1	0	0	0	0	0	0	4	0	0	0	2	0	0	1.2	9													
2-Oct	0	0	0	0	3	Z	1	1	3	2	3	2	0	1	1	1	0	1	0	0	0	0	0	0	0.9	3													
3-Oct	Z	0	0	0	0	0	0	0	0	1	1	2	1	1	3	1	1	1	0	1	0	0	0	0	0.6	3													
4-Oct	0	Z	0	3	3	2	0	5	8	5	4	5	2	3	5	7	5	4	2	1	2	2	1	3	3.1	8													
5-Oct	2	2	Z	2	3	4	1	1	6	9	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1.3	9													
6-Oct	0	0	0	Z	3	5	15	17	8	5	3	3	2	2	2	2	2	4	2	1	0	0	0	0	3.4	17													
7-Oct	0	0	5	0	Z	1	1	1	8	7	2	2	1	2	1	0	0	0	0	0	0	0	0	0	1.4	8													
8-Oct	0	1	0	0	1	Z	23	16	7	3	4	4	3	2	1	2	8	6	5	0	0	0	3	6	4.2	23													
9-Oct	Z	4	1	4	3	4	3	7	18	11	20	21	7	5	2	2	8	10	13	5	8	3	5	4	7.3	21													
10-Oct	2	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.3	2													
11-Oct	0	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	1	3	1	0.4	3													
12-Oct	1	2	3	Z	3	2	2	2	2	2	2	3	4	2	0	0	0	0	0	0	0	0	0	0	1.4	4													
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	5	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.4	5													
15-Oct	Z	0	0	0	0	1	6	11	16	2	2	2	1	0	3	3	5	1	0	0	1	8	3	0	3.0	16													
16-Oct	1	Z	1	1	1	2	1	2	2	4	2	2	2	2	2	1	2	1	1	1	1	1	1	1	1.4	4													
17-Oct	0	0	Z	5	3	3	3	9	3	3	3	3	3	1	0	0	0	0	0	0	0	0	0	0	1.8	9													
18-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	1	0	0	0	0.2	3													
19-Oct	0	0	0	0	Z	1	2	2	C	C	C	C	C	C	2	3	5	2	1	1	1	0	0	0	--	5													
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	1	0.1	1													
21-Oct	Z	0	0	0	5	7	4	7	13	6	3	2	3	3	2	2	1	1	2	1	1	0	0	0	2.9	13													
22-Oct	0	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1													
23-Oct	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	1	5	9	6	1	0	0	0	0	0	1.1	9													
24-Oct	0	0	0	Z	0	1	0	0	2	2	2	2	2	2	1	1	0	0	0	0	0	0	0	0	0.8	2													
25-Oct	0	0	0	0	Z	1	0	1	2	3	5	7	5	3	2	3	3	2	3	2	1	1	1	0	2.0	7													
26-Oct	1	1	1	1	1	Z	3	2	2	1	6	2	1	1	1	1	1	2	1	1	1	0	0	0	1.3	6													
27-Oct	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0.3	2													
28-Oct	0	Z	0	0	1	7	1	1	1	1	1	2	3	4	5	3	4	2	2	1	1	1	1	1	1.8	7													
29-Oct	1	1	Z	1	2	3	3	3	5	7	6	6	1	1	1	1	5	7	2	2	2	0	0	0	2.6	7													
30-Oct	0	0	0	Z	0	1	1	1	1	1	2	5	6	4	4	8	12	37	11	21	5	2	0	0	5.4	37													
31-Oct	0	0	0	0	Z	1	1	1	3	3	3	2	1	1	3	7	2	12	1	1	2	1	0	0	2.0	12													
0.4																		0.5																		Diurnal Average			
2																		4																		Diurnal Maximum			
0.5																		0.8																					
1.4																		1.9																					
2.9																		3.3																					
3.7																		2.7																					
2.6																		2.6																					
1.6																		1.4																					
1.3																		1.8																					
2.4																		3.4																					
1.7																		1.4																					
0.9																		0.8																					
0.8																		0.7																					
0.6																																							
Z - zerospan																								C - Calibration															





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

**Nitric Oxide (NO) - ppb**  
**Patricia McInnes - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	703	99.43	99.43
21 - 40	4	0.57	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: 707

Total Number of Hours: 744



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

**Nitric Oxide (NO) - ppb**  
**Patricia McInnes - October 2015**

<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	60	18	7	7	17	68	66	33	32	46	73	62	44	57	49	61	700
21 - 40	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	1	4
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>	60	18	7	8	17	69	66	34	32	46	73	62	44	57	49	62	704

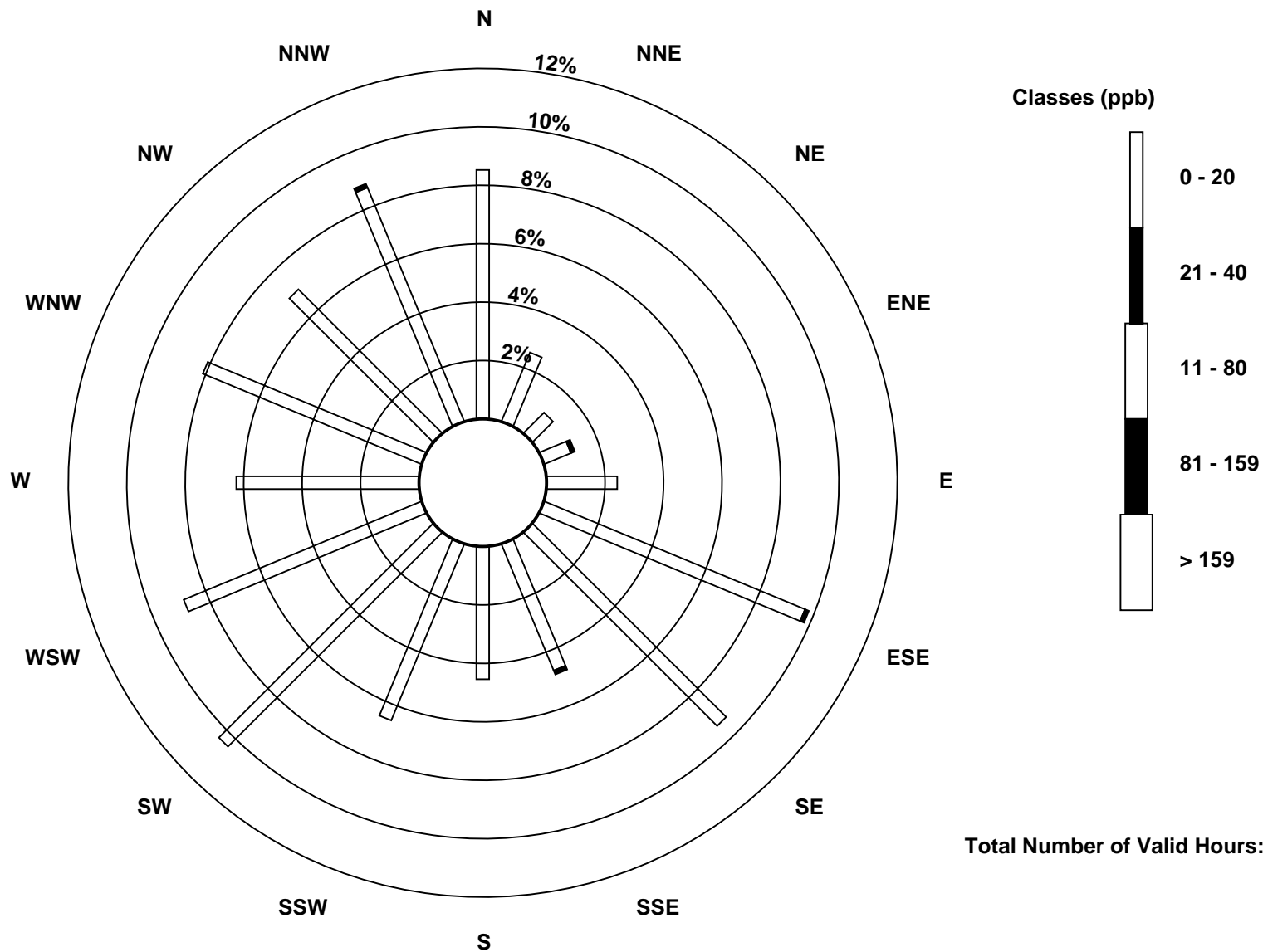
Total Number of Valid Hours: 704

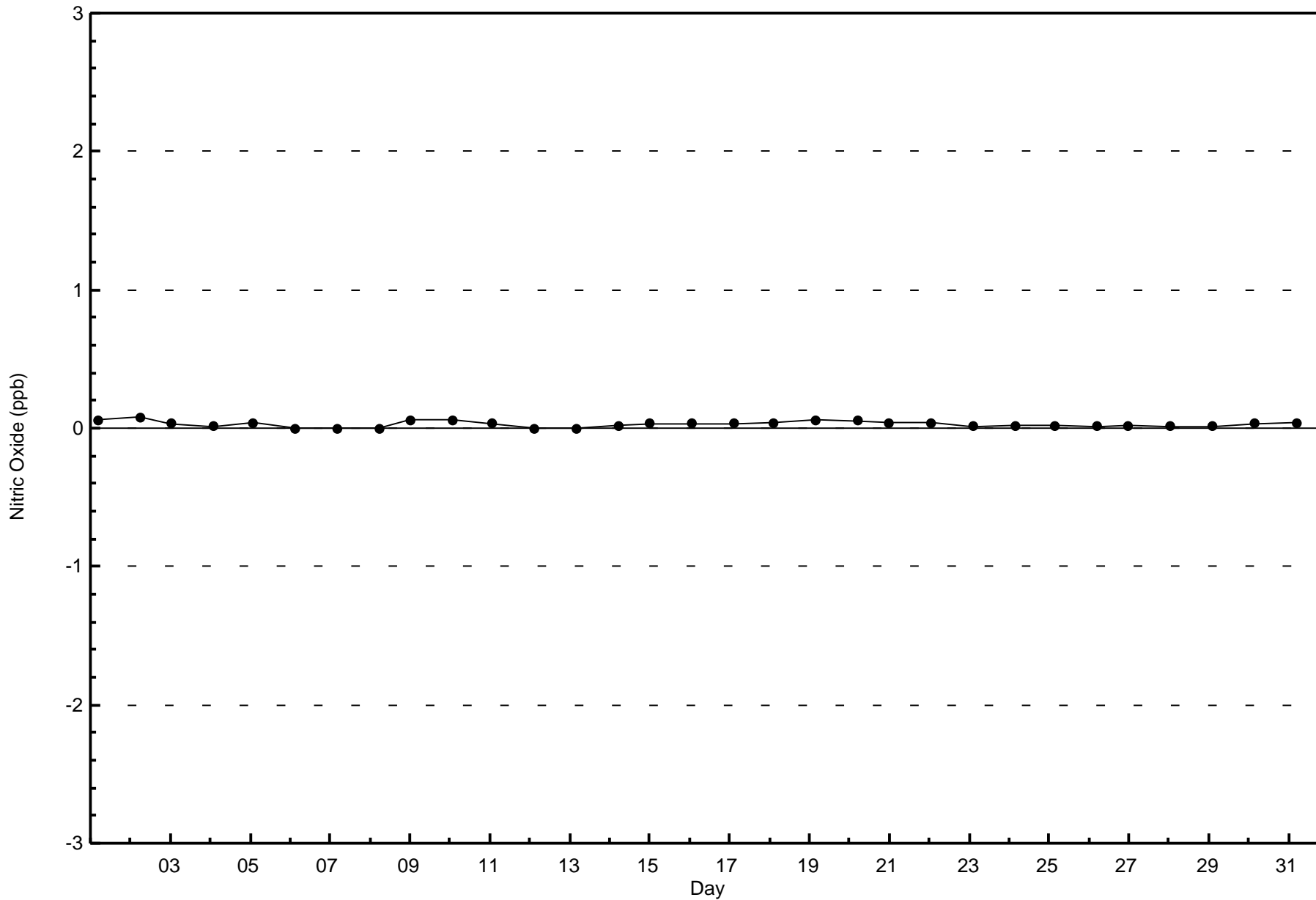
Total Number of Hours: 744

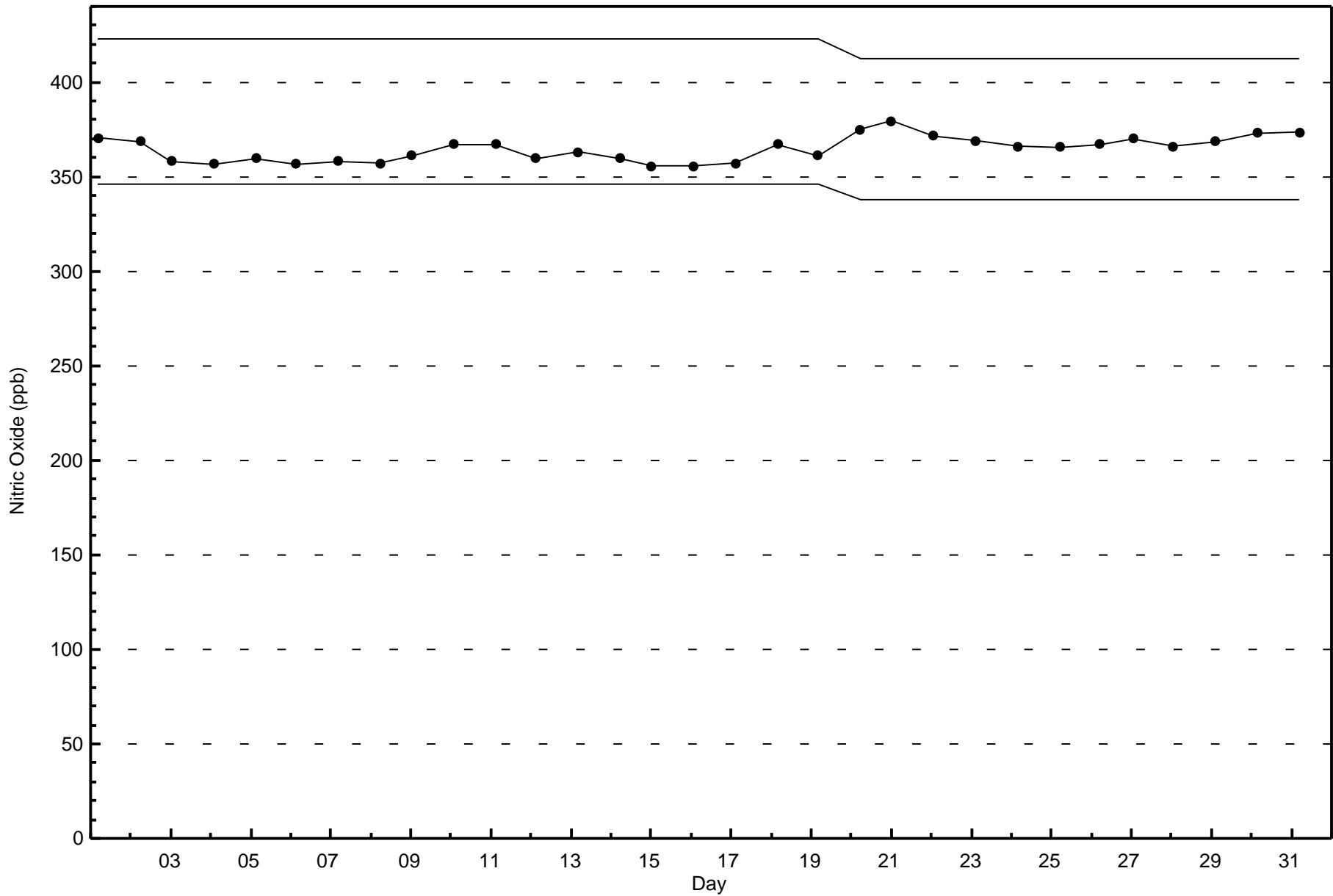


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

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 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 25 ppb on Oct 9 19:00	Maximum Daily Average: 16.3 ppb on Oct 9		Hours of Data:	707
Minimum Value: 0 ppb on Oct 1 17:00	Minimum Daily Average: 0.3 ppb on Oct 27		Hours of Missing Data:	37
Maximum Diurnal Average: 6.8 ppb at hour 7	Minimum Diurnal Average: 2.6 ppb at hour 14		Hours of Calibration:	37
Monthly Average: 4.7 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> = 11 P <sub>99</sub> = 21		Percent Operational Time:	100.0

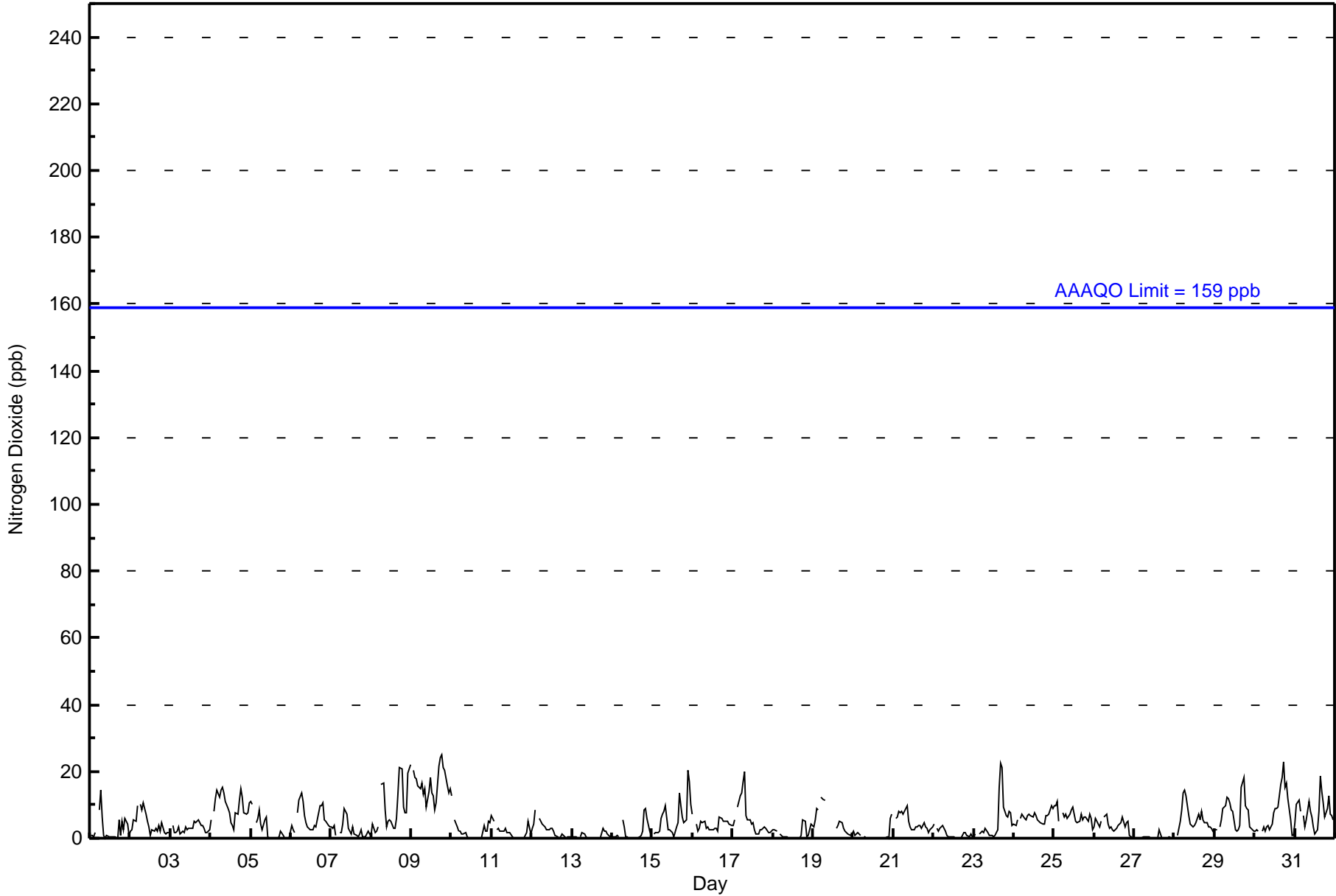
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	1	1	1	2	Z	9	14	6	1	0	1	1	0	0	1	0	0	6	1	5	3	6	4	1	2.7	14
2-Oct	2	3	6	5	10	Z	10	9	10	7	5	3	1	2	2	3	2	4	2	5	2	1	2	2	4.2	10
3-Oct	Z	4	2	2	2	3	1	2	2	3	2	3	3	3	5	5	5	6	4	4	3	2	2	3	3.0	6
4-Oct	6	Z	8	12	14	12	15	15	14	11	9	8	5	4	3	8	7	12	15	12	8	7	8	11	9.6	15
5-Oct	11	10	Z	5	6	9	4	3	5	6	0	0	0	0	0	0	0	2	1	0	0	0	0	0	2.7	11
6-Oct	4	3	2	Z	8	12	14	11	7	5	3	3	3	3	4	4	5	10	10	10	6	5	4	4	5.9	14
7-Oct	3	3	4	1	Z	2	2	4	9	7	3	2	1	4	1	1	1	1	3	1	0	1	2	1	2.4	9
8-Oct	1	4	2	2	3	Z	16	17	8	4	5	6	5	3	3	6	13	21	21	9	8	8	20	22	9.0	22
9-Oct	Z	21	18	18	16	15	17	13	15	9	14	18	14	13	9	11	22	24	25	21	20	16	14	15	16.3	25
10-Oct	13	Z	5	4	2	2	1	1	2	1	0	0	0	0	0	0	0	0	0	4	2	2	5	5	2.1	13
11-Oct	7	5	Z	3	3	2	2	2	3	2	2	2	0	0	0	0	0	0	0	0	1	2	5	1	1.8	7
12-Oct	3	4	8	Z	6	5	4	4	3	3	2	3	3	2	1	1	0	1	1	1	0	0	1	0	2.4	8
13-Oct	0	0	0	0	Z	1	2	1	0	0	0	0	0	0	0	0	0	0	3	2	2	1	1	1	0.7	3
14-Oct	1	1	1	1	1	Z	6	3	0	0	0	0	0	0	0	0	0	1	2	9	9	6	2	1	1.9	9
15-Oct	Z	1	2	2	2	6	7	8	10	3	3	2	2	1	3	5	13	10	6	5	6	21	17	10	6.2	21
16-Oct	7	Z	4	2	3	5	5	5	3	3	3	2	3	3	3	2	6	6	5	5	5	5	4	4	4.1	7
17-Oct	4	5	Z	10	13	13	17	20	7	5	6	4	5	3	1	1	3	3	3	4	3	2	2	2	5.8	20
18-Oct	2	3	2	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	1	5	5	0	1	3	4	1.3	5
19-Oct	3	5	9	9	Z	12	12	12	C	C	C	C	C	C	3	4	5	5	3	2	2	1	1	1	--	12
20-Oct	2	1	1	2	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	6	7	0.9	7
21-Oct	Z	6	6	8	8	8	7	9	10	5	3	3	3	4	3	4	4	3	5	3	3	2	3	4	4.8	10
22-Oct	4	Z	3	2	3	4	3	2	1	1	0	0	0	0	0	0	0	1	2	2	1	1	1	1	1.4	4
23-Oct	1	1	Z	1	2	2	2	3	2	1	1	1	1	1	3	15	23	21	9	7	7	8	8	4	5.3	23
24-Oct	4	4	5	Z	6	7	6	6	7	7	7	6	8	7	6	5	5	4	4	7	7	7	10	9	6.2	10
25-Oct	10	10	11	5	Z	8	7	7	6	7	9	10	7	5	5	5	7	5	7	7	5	7	6	3	6.8	11
26-Oct	4	6	4	3	5	Z	7	7	4	3	4	2	2	3	4	4	5	7	3	5	5	1	1	0	3.8	7
27-Oct	Z	0	0	0	0	1	1	0	0	1	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0.3	3
28-Oct	0	Z	1	5	9	14	14	13	7	4	4	3	4	5	7	5	8	6	5	5	3	3	3	2	5.6	14
29-Oct	3	3	Z	4	6	9	10	12	12	11	8	8	3	2	3	4	15	18	10	9	9	3	3	2	7.2	18
30-Oct	2	3	2	Z	2	3	2	3	4	3	4	8	9	9	9	16	18	23	15	17	12	5	1	1	7.4	23
31-Oct	5	10	12	8	Z	7	3	6	11	8	6	4	1	3	8	19	14	10	6	9	13	7	7	6	7.8	19
3.9 4.4 4.5 4.4 5.2 6.5 6.8 6.6 5.4 4.0 3.5 3.4 2.7 2.6 2.8 4.2 5.8 6.7 5.7 5.6 4.6 4.3 4.6 4.0																								Diurnal Average		
13 21 18 18 16 15 17 20 15 11 14 18 14 13 9 19 23 24 25 21 20 21 20 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**  
**Patricia McInnes - October 2015**





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Patricia McInnes - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	695	98.30	98.30
21 - 40	12	1.70	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: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Patricia McInnes - October 2015**

<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	57	16	6	7	16	68	66	34	32	46	73	62	44	57	48	60	692
21 - 40	3	2	1	1	1	1	0	0	0	0	0	0	0	0	1	2	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>	<b>60</b>	<b>18</b>	<b>7</b>	<b>8</b>	<b>17</b>	<b>69</b>	<b>66</b>	<b>34</b>	<b>32</b>	<b>46</b>	<b>73</b>	<b>62</b>	<b>44</b>	<b>57</b>	<b>49</b>	<b>62</b>	<b>704</b>

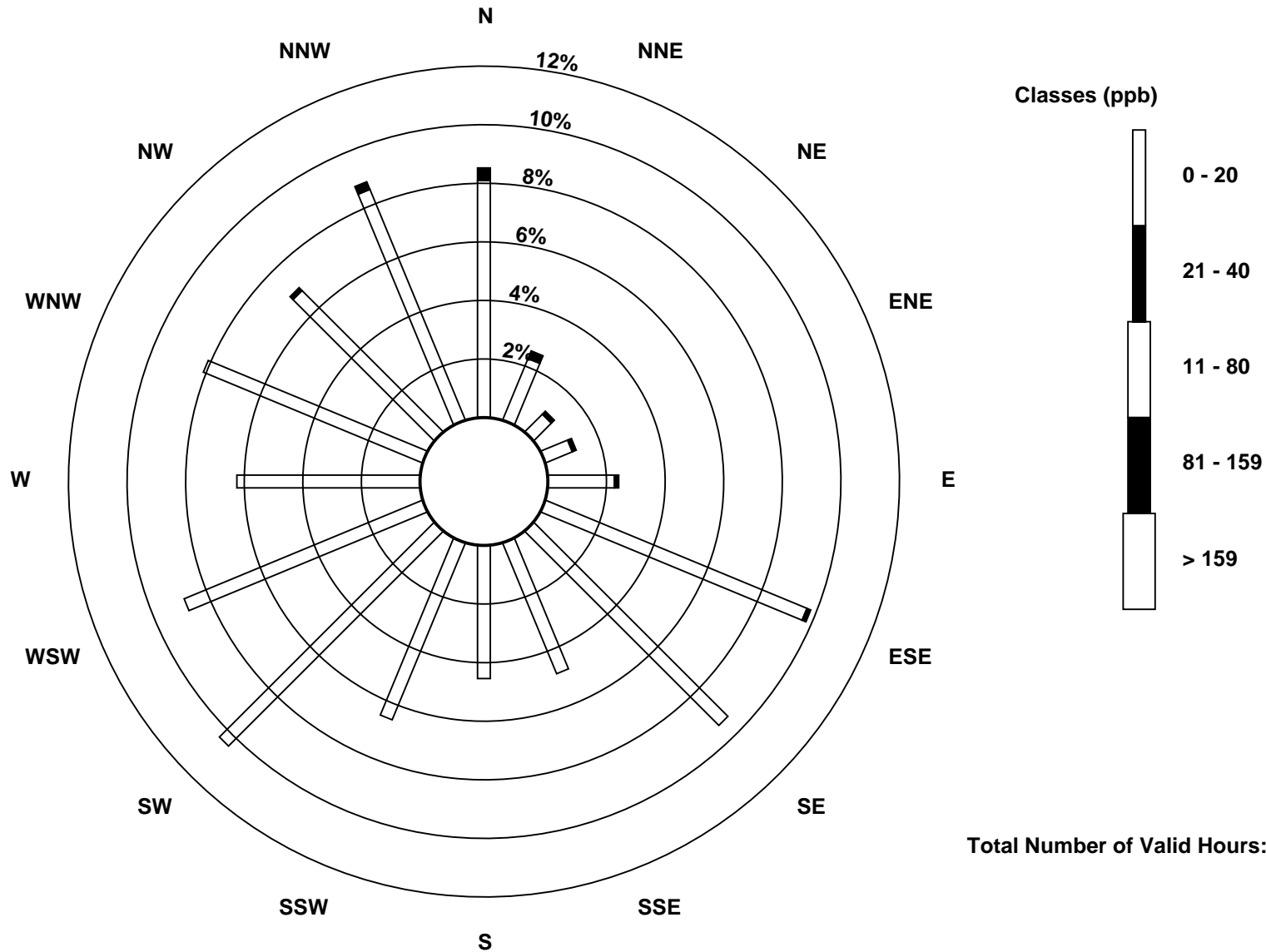
Total Number of Valid Hours: 704

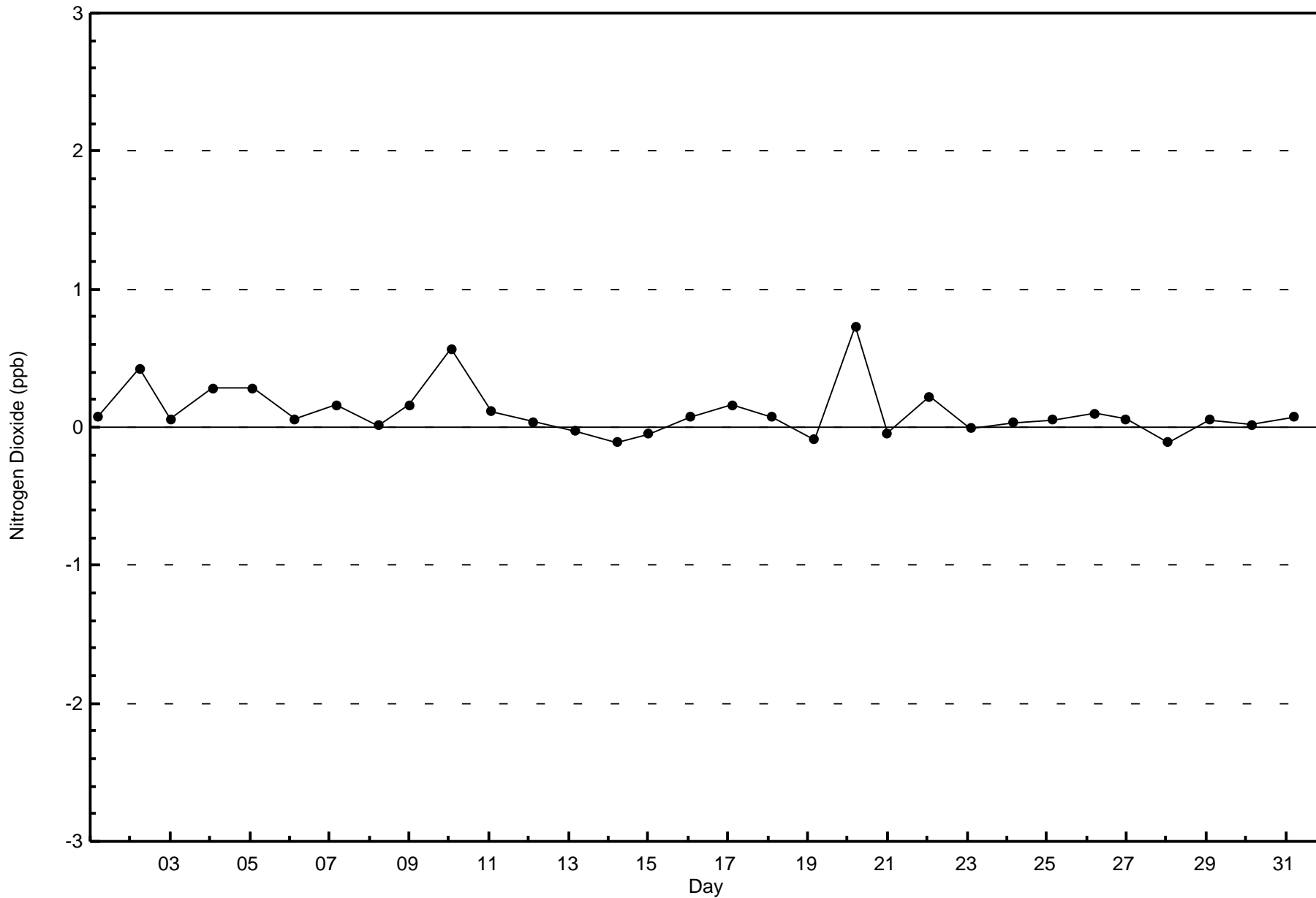
Total Number of Hours: 744

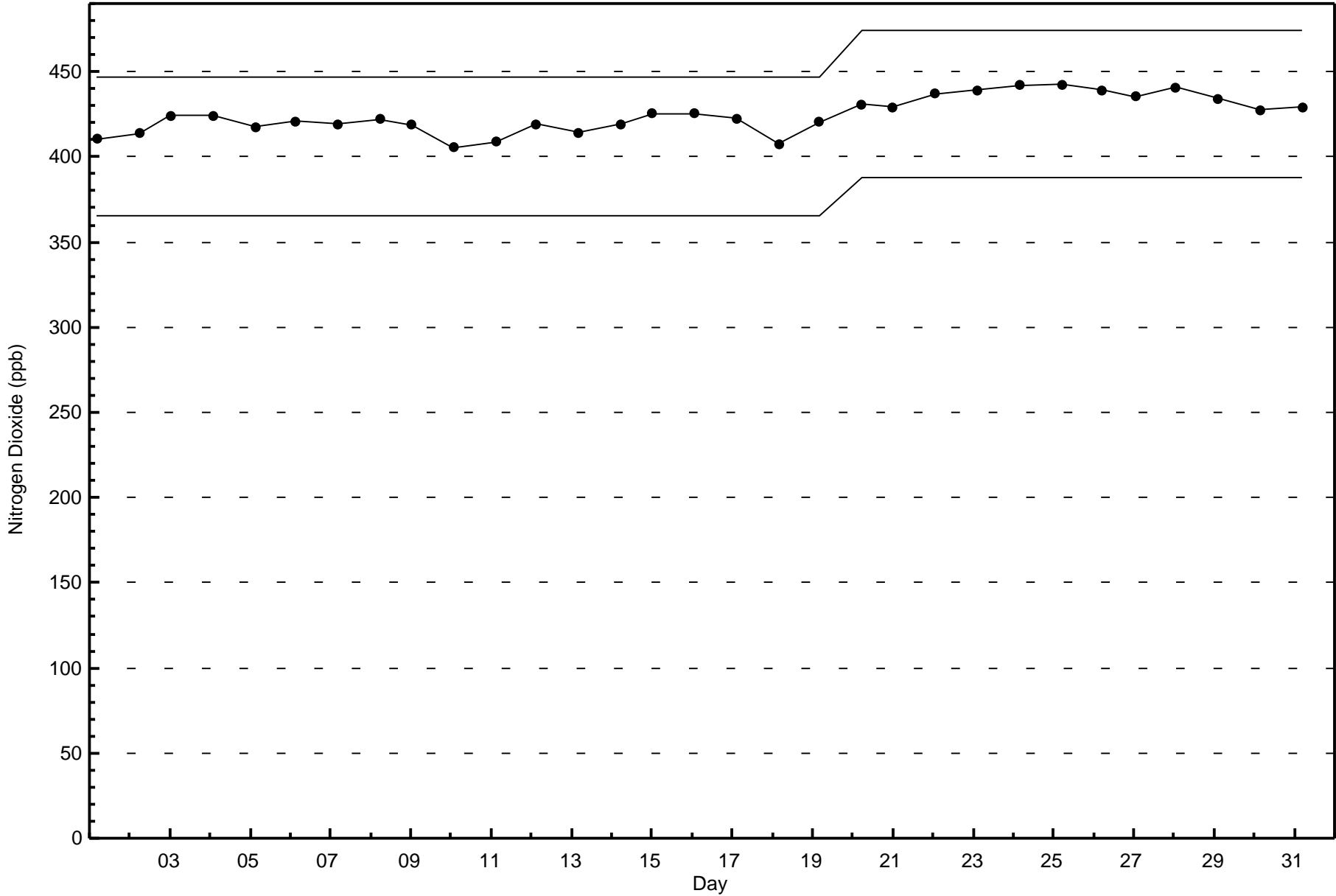


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Patricia McInnes (AMS 6)



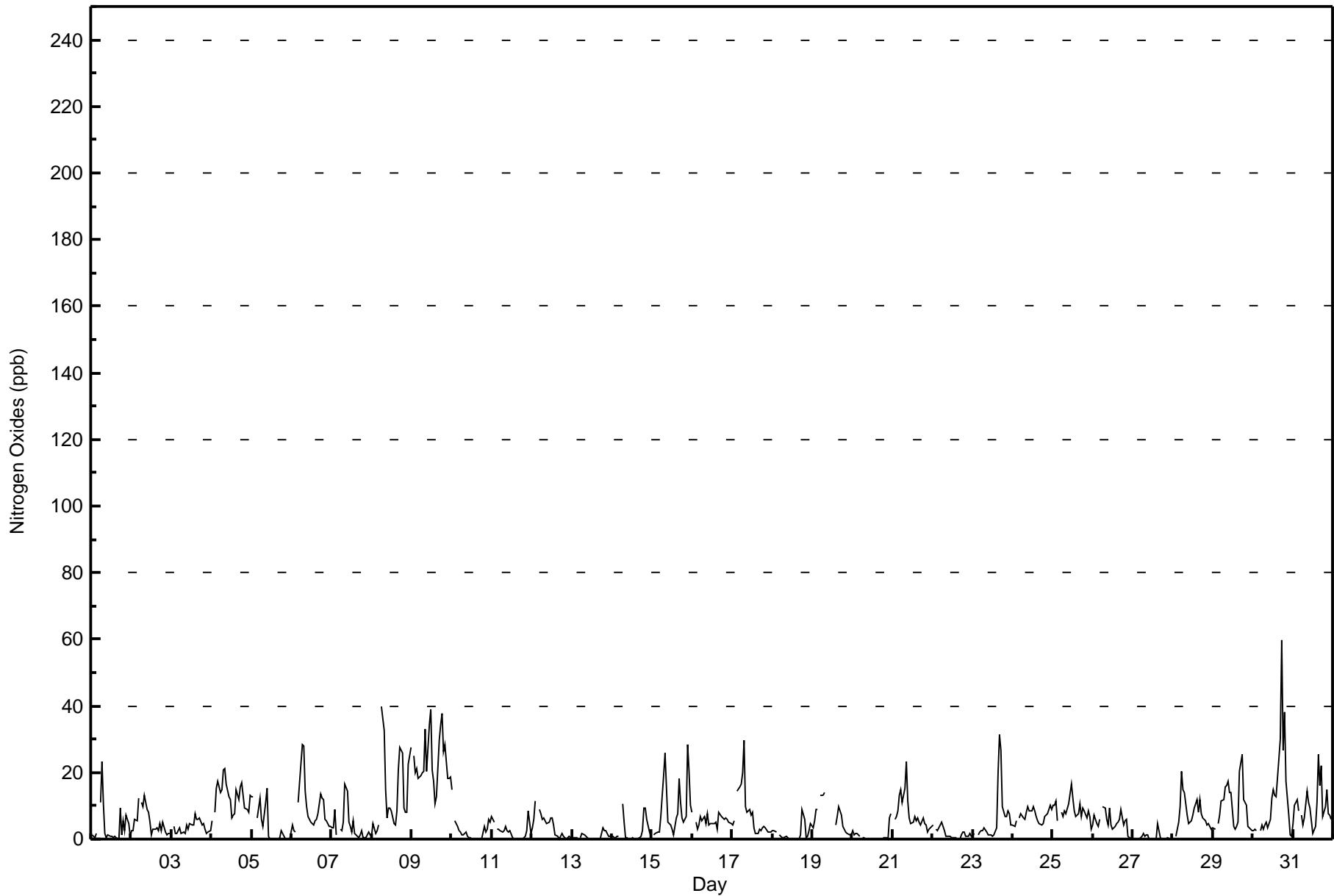






Maximum Value: 60 ppb on Oct 30 18:00																		Maximum Daily Average: 23.6 ppb on Oct 9																		Hours in Service: 744	
Minimum Value: 0 ppb on Oct 10 17:00																		Minimum Daily Average: 0.6 ppb on Oct 27																		Hours of Data: 707	
Maximum Diurnal Average: 10.1 ppb at hour 18																		Minimum Diurnal Average: 4.0 ppb at hour 14																		Hours of Missing Data: 37	
Monthly Average: 6.4 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 4 Q <sub>3</sub> = 9 P <sub>90</sub> = 15 P <sub>99</sub> = 34																		Hours of Calibration: 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	1	1	1	2	Z	11	23	11	2	0	1	1	1	1	1	1	0	10	1	5	3	7	5	1	3.8	23											
2-Oct	2	3	6	6	12	Z	11	10	13	9	8	5	1	3	3	3	3	5	2	5	2	1	2	2	5.1	13											
3-Oct	Z	4	2	2	2	3	2	2	2	4	3	5	4	4	8	6	6	6	4	5	3	2	2	3	3.6	8											
4-Oct	6	Z	8	15	17	14	15	21	21	17	13	12	6	7	8	15	12	16	17	13	10	9	8	13	12.7	21											
5-Oct	13	13	Z	6	9	12	6	4	11	15	1	0	0	0	0	0	0	1	3	1	0	0	0	0	4.1	15											
6-Oct	4	3	2	Z	11	17	28	28	14	10	7	5	4	4	6	6	8	13	12	12	6	5	4	4	9.3	28											
7-Oct	3	3	9	1	Z	3	2	5	17	14	5	4	2	6	2	1	1	1	3	0	0	1	2	1	3.8	17											
8-Oct	1	5	2	3	4	Z	40	33	15	6	9	9	8	5	4	9	21	27	26	9	8	8	22	27	13.1	40											
9-Oct	Z	25	20	21	18	19	20	20	33	20	34	39	21	17	11	13	30	35	38	26	28	18	18	19	23.6	39											
10-Oct	15	Z	6	4	3	2	1	1	2	1	0	0	0	0	0	0	0	0	0	4	2	3	6	5	2.4	15											
11-Oct	7	5	Z	3	3	3	2	3	4	2	2	3	1	0	0	0	0	0	0	0	1	3	8	2	2.2	8											
12-Oct	3	6	11	Z	9	8	6	6	6	4	5	6	6	4	1	1	0	1	2	1	0	0	1	0	3.9	11											
13-Oct	0	0	0	0	Z	1	2	1	1	0	0	0	0	0	0	0	0	0	3	2	2	1	1	1	0.8	3											
14-Oct	1	1	1	1	1	Z	10	5	0	0	0	0	0	0	0	0	1	1	2	9	9	6	2	1	2.3	10											
15-Oct	Z	1	2	2	2	7	13	19	26	5	5	4	3	1	6	8	18	11	6	5	7	28	20	10	9.1	28											
16-Oct	8	Z	5	3	4	7	6	7	5	8	4	5	4	5	5	3	8	7	6	6	6	6	5	4	5.5	8											
17-Oct	4	6	Z	14	16	17	20	29	10	8	9	7	8	3	2	2	3	3	4	4	3	2	2	2	7.7	29											
18-Oct	3	2	2	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	9	6	0	1	3	4	1.6	9										
19-Oct	3	5	9	9	Z	13	13	14	C	C	C	C	C	C	4	7	10	7	4	3	2	2	1	1	--	14											
20-Oct	2	1	2	2	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	8	1.0	8											
21-Oct	Z	6	7	8	13	15	11	15	23	11	7	5	5	7	5	6	5	4	6	4	4	2	3	4	7.8	23											
22-Oct	4	Z	3	3	4	5	4	3	1	1	1	1	0	0	0	0	0	1	2	2	1	1	2	1	1.7	5											
23-Oct	1	2	Z	1	2	3	2	4	2	1	1	1	1	1	3	20	31	27	10	7	7	8	8	4	6.4	31											
24-Oct	4	4	5	Z	6	7	6	6	8	10	9	8	10	9	7	5	5	4	5	7	7	8	10	9	6.9	10											
25-Oct	10	10	11	5	Z	8	7	8	8	11	13	17	12	9	7	8	10	7	9	8	6	9	7	3	8.8	17											
26-Oct	4	7	5	4	6	Z	10	10	6	4	9	4	3	4	5	5	6	9	4	6	6	1	0	1	5.1	10											
27-Oct	Z	0	0	0	0	1	2	1	1	1	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0.6	5											
28-Oct	0	Z	1	5	10	20	15	14	7	5	5	6	7	9	12	8	12	8	6	6	4	5	4	3	7.4	20											
29-Oct	4	3	Z	5	7	12	12	16	16	17	14	14	4	3	4	5	20	26	12	11	10	4	3	3	9.7	26											
30-Oct	2	3	3	Z	3	4	3	4	5	3	6	12	15	13	13	24	30	60	26	38	17	7	1	1	12.8	60											
31-Oct	5	10	12	8	Z	7	4	6	14	11	9	5	2	4	11	25	16	22	7	10	15	8	7	6	9.8	25											
4.3 4.9 5.1 5.1 6.6 8.4 9.6 9.9 9.1 6.7 6.0 6.0 4.3 4.0 4.1 6.0 8.2 10.1 7.4 7.0 5.5 5.1 5.3 4.6																								Diurnal Average													
15 25 20 21 18 20 40 33 33 20 34 39 21 17 13 25 31 60 38 38 28 28 22 27																								Diurnal Maximum													
Z - zerospan C - Calibration																																					







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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Patricia McInnes - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	670	94.77	94.77
21 - 40	36	5.09	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: 707

Total Number of Hours: 744



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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Patricia McInnes - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	56	15	4	4	15	66	65	28	30	44	73	62	43	57	47	58	667
21 - 40	4	3	3	4	2	2	1	6	2	2	0	0	1	0	2	4	36
11 - 80	0	0	0	0	0	1	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>	60	18	7	8	17	69	66	34	32	46	73	62	44	57	49	62	704

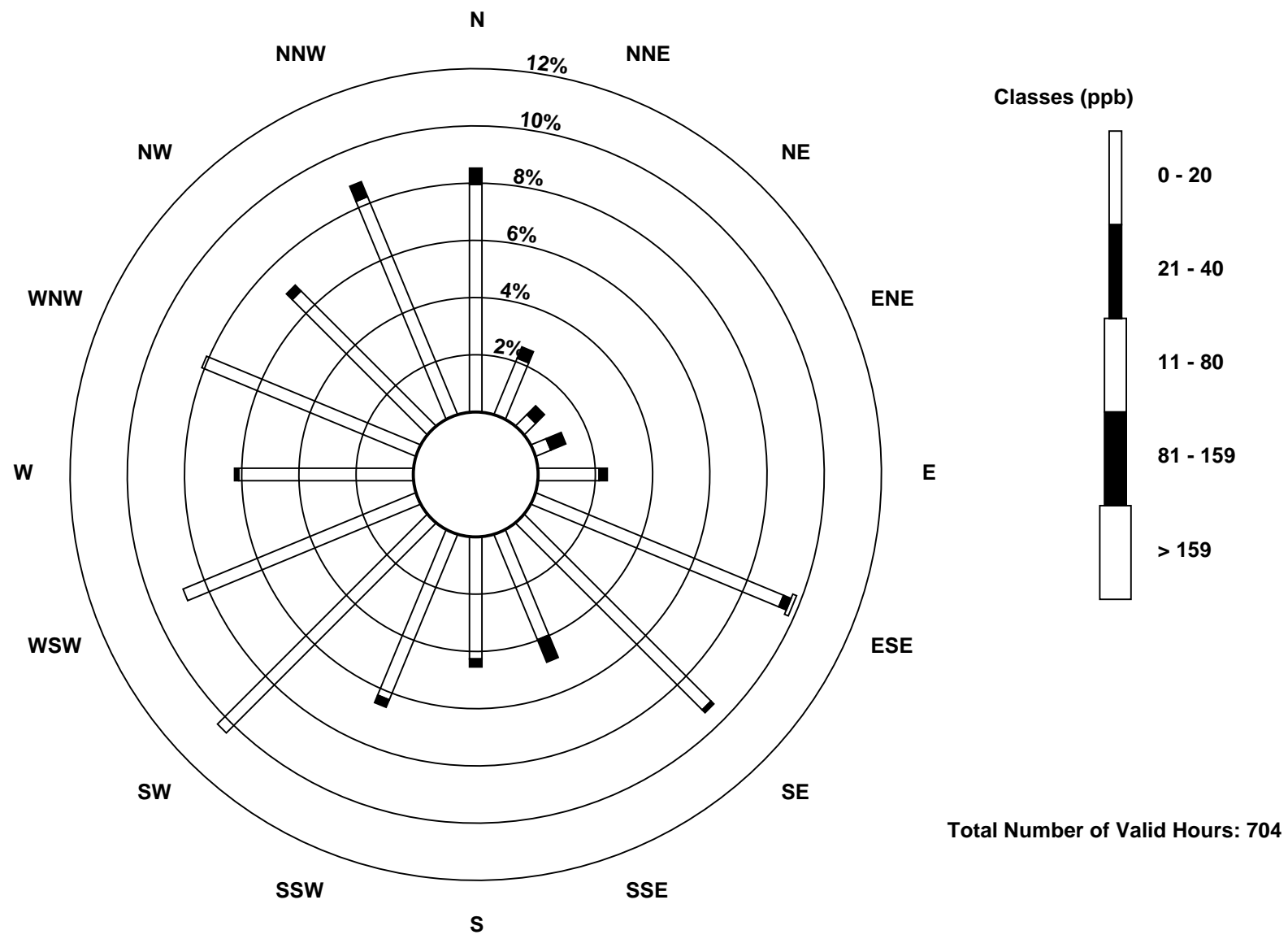
Total Number of Valid Hours: 704

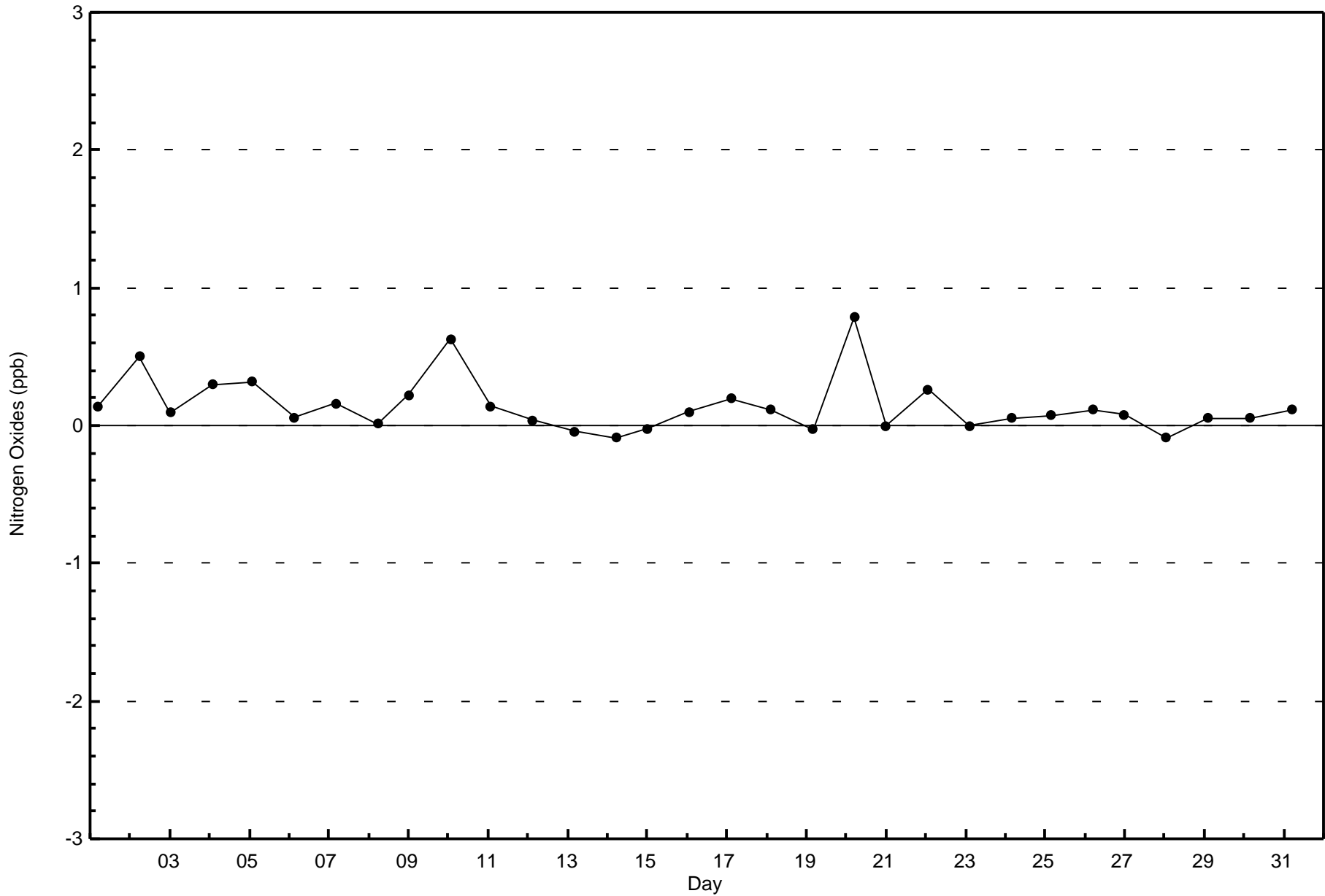
Total Number of Hours: 744

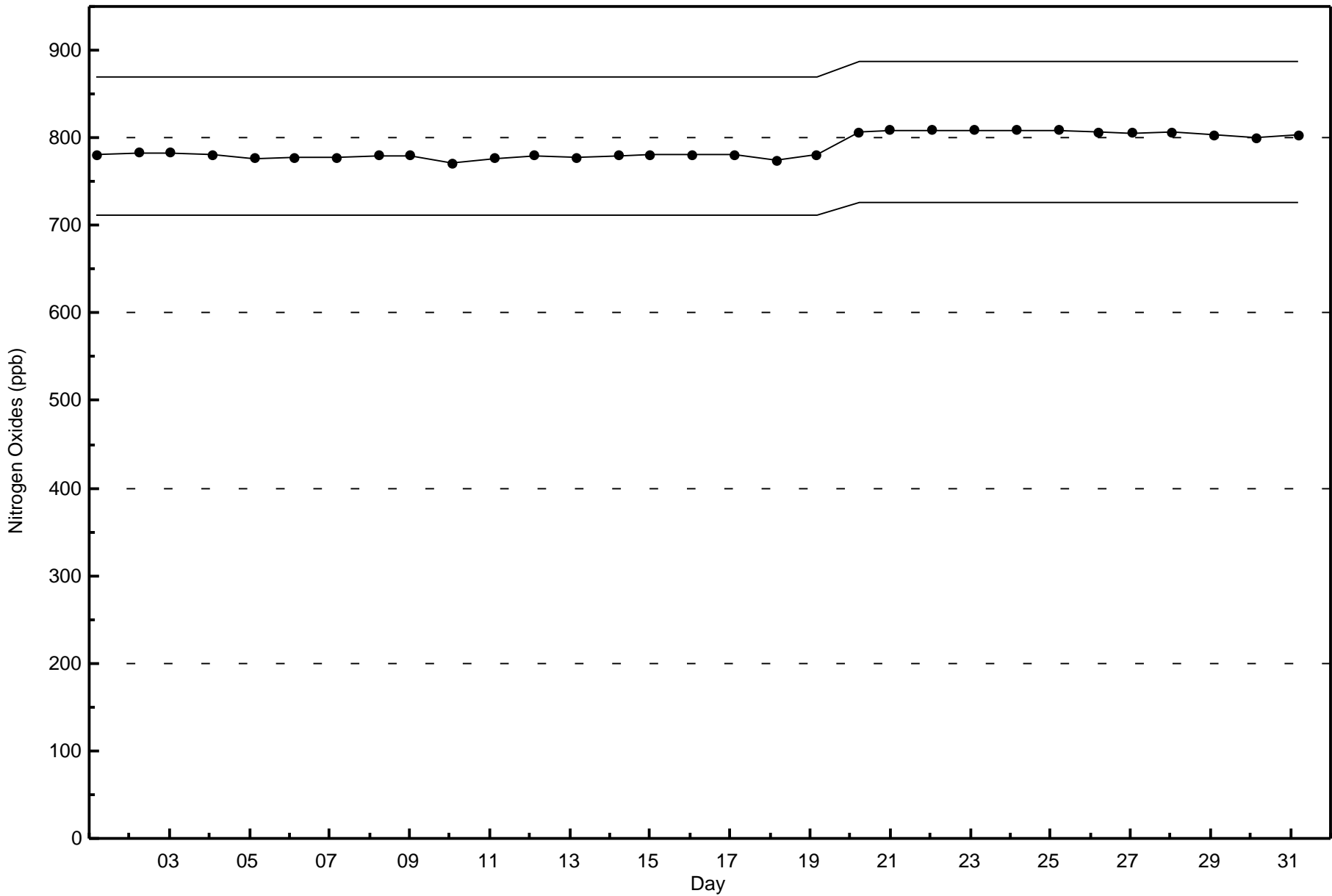


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Patricia McInnes (AMS 6)





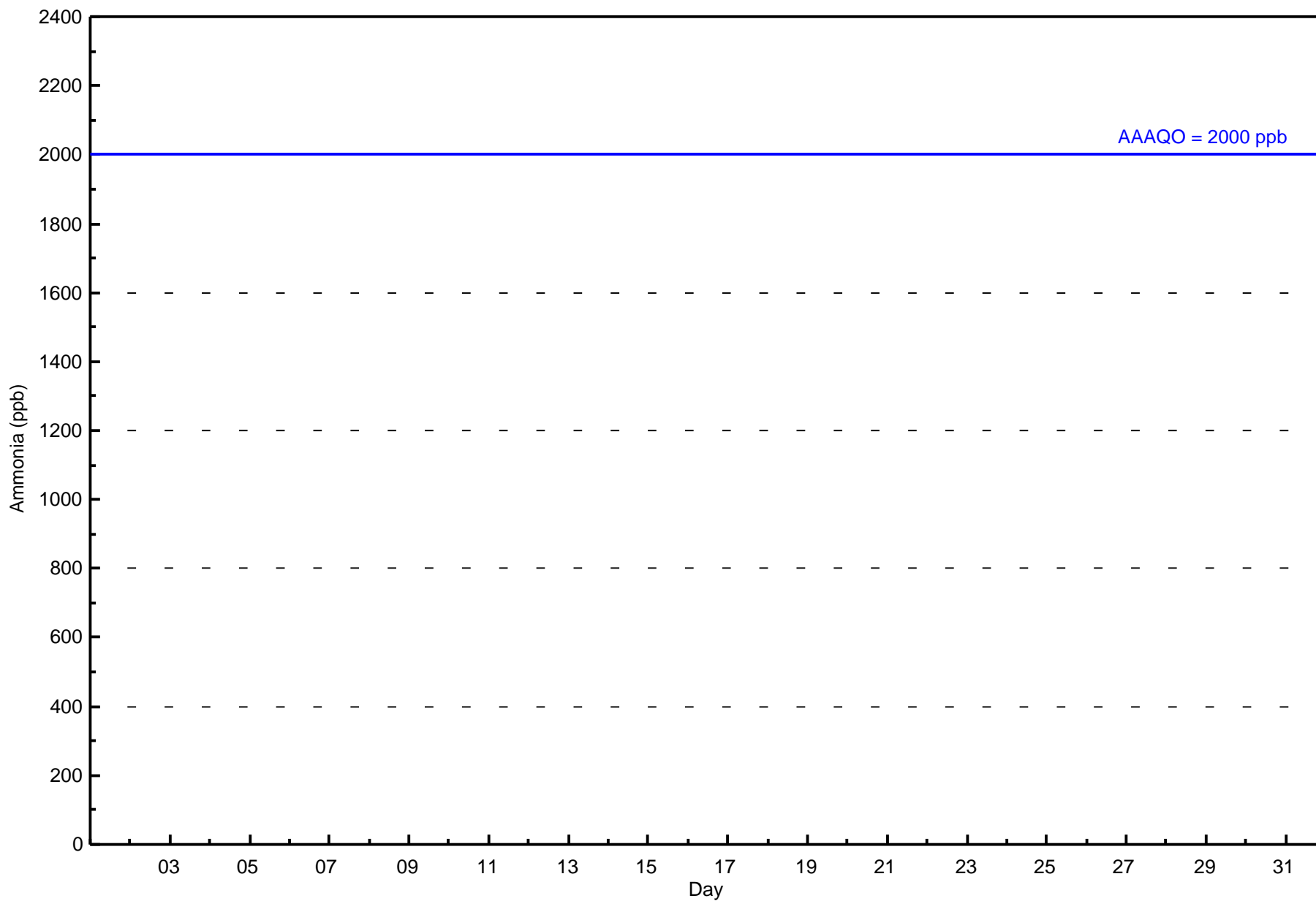






Wood Buffalo Environmental Association  
Hourly Averages

Ammonia (NH<sub>3</sub>) - ppb  
Patricia McInnes - October 2015







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

**Ammonia (NH<sub>3</sub>) - ppb**  
**Patricia McInnes - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	656	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: 656

Total Number of Hours: 744



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

**Ammonia (NH<sub>3</sub>) - ppb**  
**Patricia McInnes - October 2015**

<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	54	18	7	8	14	65	60	31	28	43	63	57	43	58	48	58	655
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>	<b>54</b>	<b>18</b>	<b>7</b>	<b>8</b>	<b>14</b>	<b>65</b>	<b>60</b>	<b>31</b>	<b>28</b>	<b>43</b>	<b>63</b>	<b>57</b>	<b>43</b>	<b>58</b>	<b>48</b>	<b>58</b>	<b>655</b>

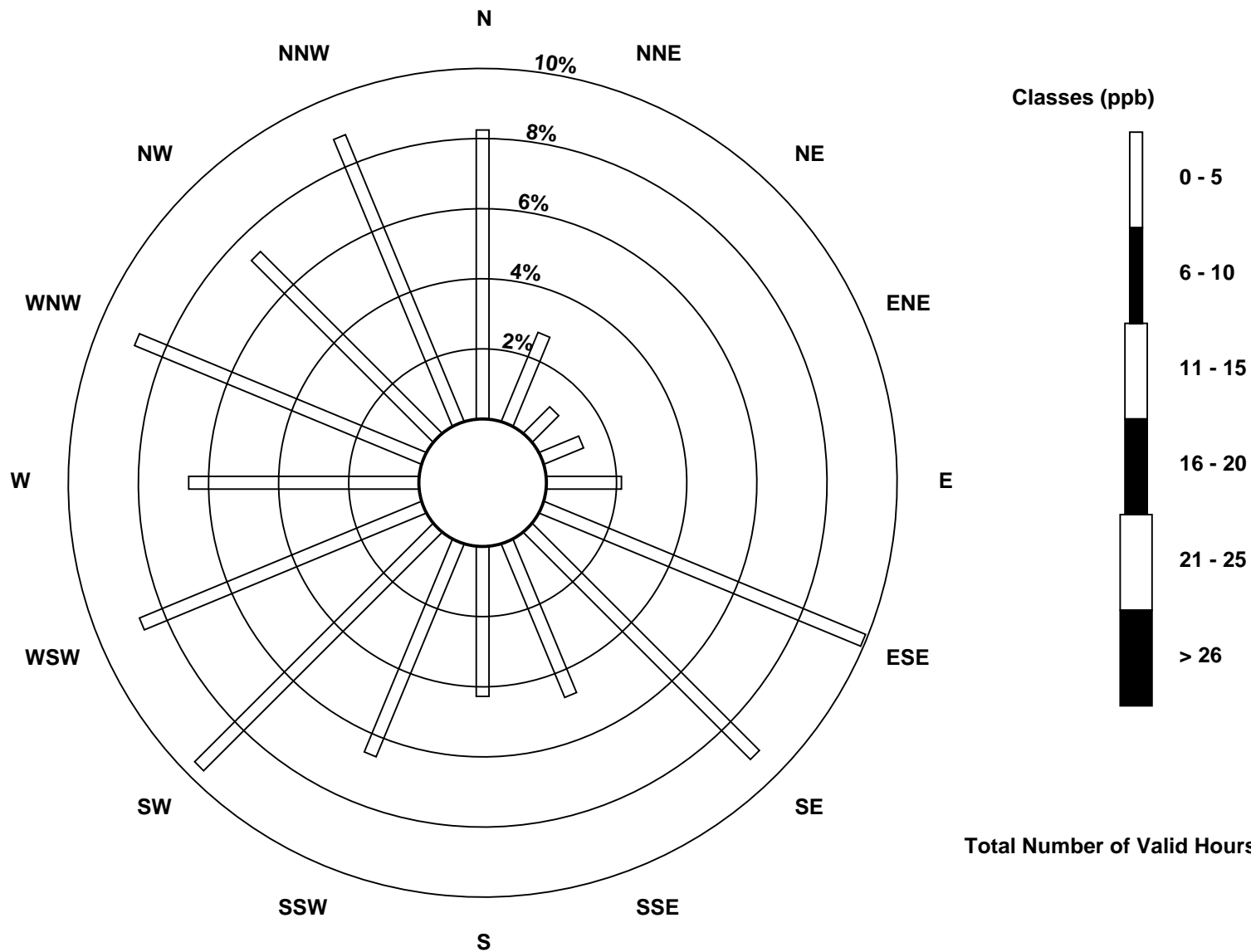
Total Number of Valid Hours: 655

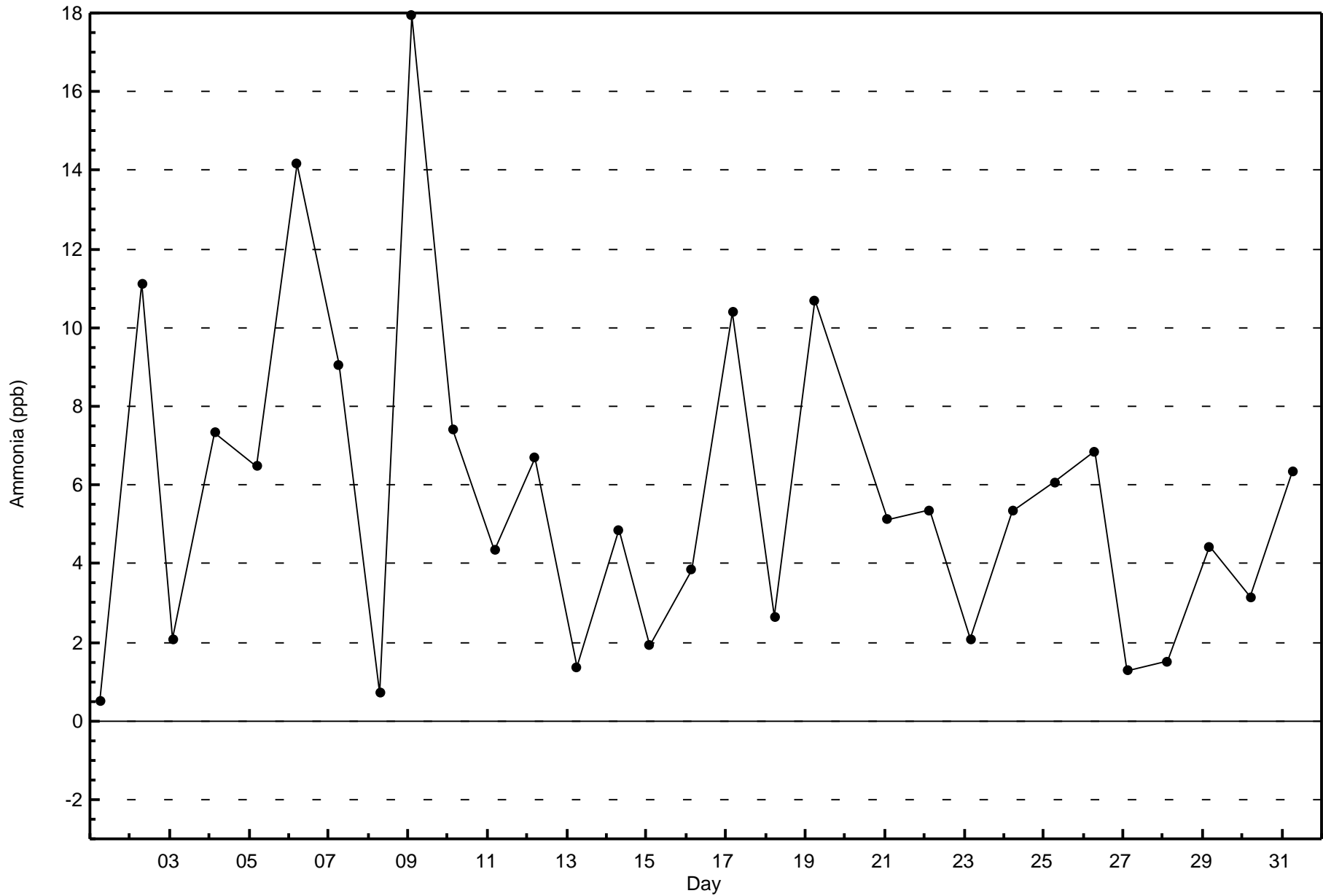
Total Number of Hours: 744

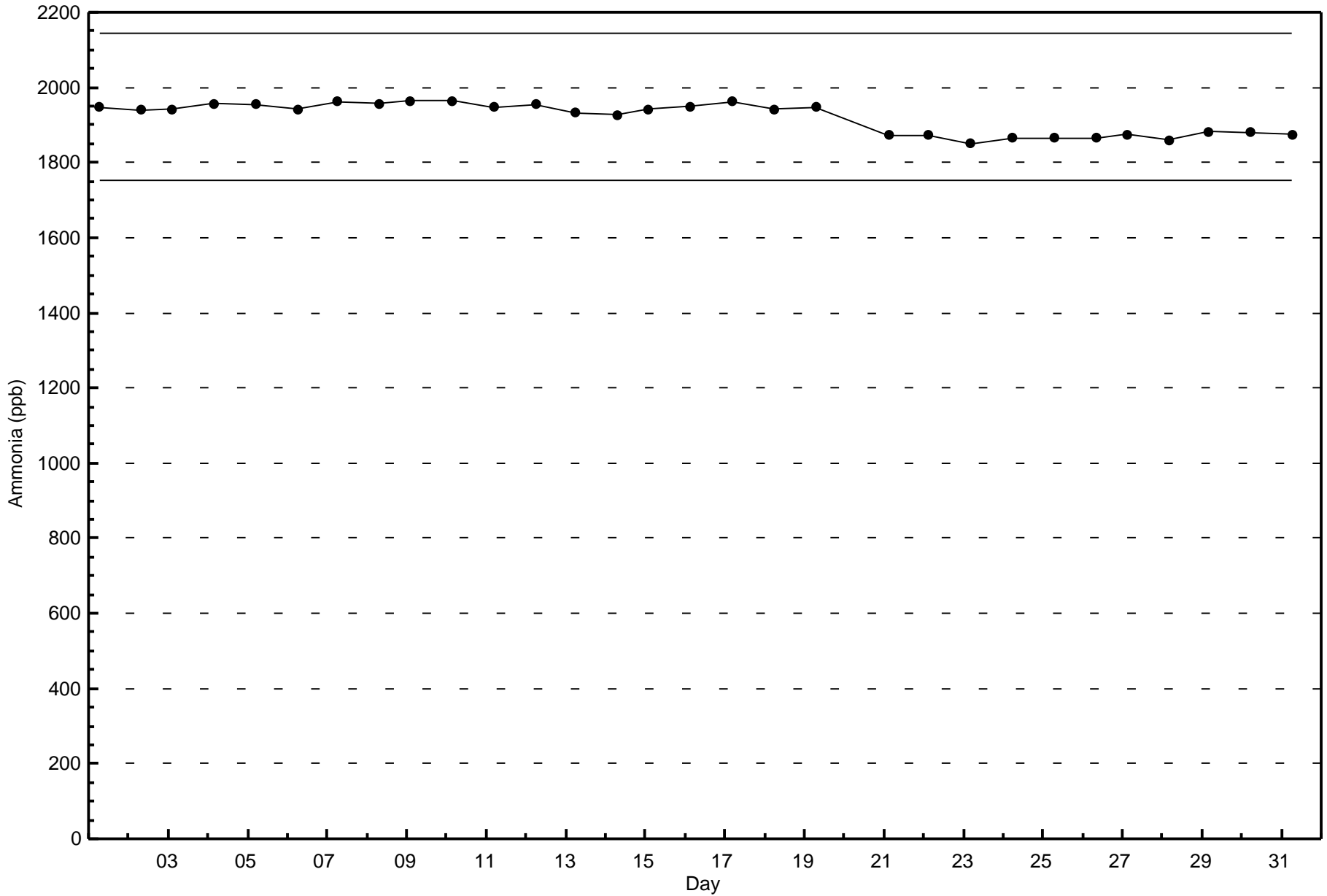


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Ammonia (NH<sub>3</sub>) - ppb  
Patricia McInnes (AMS 6)









Summary of Hour Averages

Patricia McInnes - October 2015

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 54.5 µg/m <sup>3</sup> on Oct 15 05:00 Minimum Value: 0.0 µg/m <sup>3</sup> on Oct 5 14:00 Maximum Diurnal Average: 5.7 µg/m <sup>3</sup> at hour 21 Monthly Average: 4.15 µg/m <sup>3</sup>		Maximum Daily Average: 13.0 µg/m <sup>3</sup> on Oct 4 Minimum Daily Average: 0.8 µg/m <sup>3</sup> on Oct 27 Minimum Diurnal Average: 2.6 µg/m <sup>3</sup> at hour 15 Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.9 Q <sub>1</sub> = 1.6 Median = 2.8 Q <sub>3</sub> = 4.9 P <sub>90</sub> = 8.8 P <sub>99</sub> = 25.3		Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 2 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	6.1	6.8	6.1	6.1	6.3	6.8	8.4	6.3	3.6	2.4	1.7	1.8	1.7	1.7	1.7	1.6	2.1	4.4	4.9	14.3	10.7	14.1	9.5	4.9	5.6	14.3																						
2-Oct	5.8	2.9	2.3	4.7	7.2	11.4	11.9	9.4	11.1	9.6	8.8	8.0	6.9	6.7	1.9	1.9	1.1	2.9	5.1	1.1	1.1	1.3	1.4	1.5	5.2	11.9																						
3-Oct	0.9	2.2	2.0	1.4	1.7	12.4	1.4	1.5	0.9	1.6	1.4	1.8	2.5	2.5	4.9	2.6	2.1	3.1	3.1	3.8	3.3	3.1	2.5	3.2	2.7	12.4																						
4-Oct	3.1	5.0	5.5	6.9	8.4	9.0	18.7	17.7	14.5	18.9	24.1	21.4	13.2	10.9	8.7	9.9	7.3	10.1	20.0	17.4	16.3	7.5	4.7	32.0	13.0	32.0																						
5-Oct	2.5	1.6	1.4	1.2	1.6	1.9	1.5	1.5	1.9	2.2	0.7	0.2	0.1	0.0	0.1	0.5	0.7	0.9	0.7	0.3	0.2	0.1	0.1	0.1	0.9	2.5																						
6-Oct	3.0	1.7	0.2	0.3	0.6	1.1	2.1	3.0	1.2	0.9	0.8	0.5	0.5	0.8	1.5	1.9	2.0	3.1	4.0	3.5	4.4	4.9	3.5	3.8	2.1	4.9																						
7-Oct	2.7	2.0	5.9	1.2	1.6	2.3	1.7	2.4	4.0	2.4	0.9	1.5	1.5	2.1	1.8	1.7	1.7	2.5	3.6	3.4	2.6	3.0	3.3	4.4	2.5	5.9																						
8-Oct	3.0	5.0	4.4	5.3	5.5	6.8	9.9	7.6	5.1	2.3	2.6	2.8	2.6	2.2	2.0	2.5	4.7	9.0	9.0	8.7	9.7	7.9	13.5	13.5	6.1	13.5																						
9-Oct	12.6	12.2	10.4	9.5	9.1	8.6	7.8	7.7	9.2	7.0	12.5	15.1	8.8	8.8	6.0	6.0	8.6	9.5	12.8	24.9	42.1	15.8	20.0	14.7	12.5	42.1																						
10-Oct	9.7	6.1	4.9	3.8	2.9	2.6	2.4	2.3	2.1	1.4	0.9	0.9	0.6	0.5	0.5	0.5	0.4	0.4	0.4	1.8	2.0	1.4	3.0	3.5	2.3	9.7																						
11-Oct	5.1	5.7	4.6	3.5	2.3	1.4	1.1	1.2	1.6	1.0	2.4	1.4	0.5	0.5	0.4	0.4	0.3	0.4	0.7	1.0	0.8	1.0	4.9	0.8	1.8	5.7																						
12-Oct	1.4	1.9	2.5	0.9	1.4	1.3	1.0	0.8	2.2	4.7	1.9	3.0	1.9	1.6	1.1	1.6	1.4	1.5	1.5	1.5	1.5	1.6	1.7	1.7	1.7	4.7																						
13-Oct	1.8	1.0	1.0	0.9	1.0	1.0	1.2	1.2	1.1	0.9	1.6	1.5	1.5	1.4	1.3	1.2	1.4	1.5	3.4	4.5	2.5	1.8	1.8	1.7	1.6	4.5																						
14-Oct	2.7	3.1	2.9	3.1	2.9	2.0	3.5	2.2	2.3	1.6	1.3	2.4	2.3	2.1	2.1	2.1	2.3	2.4	4.6	6.0	9.4	4.9	2.0	1.1	3.0	9.4																						
15-Oct	10.6	1.7	2.1	12.8	54.5	25.3	6.6	6.5	3.6	1.0	1.7	1.1	1.0	0.8	1.2	1.3	4.0	4.9	2.7	2.1	11.5	12.1	6.7	4.3	7.5	54.5																						
16-Oct	2.9	2.3	2.1	1.9	1.8	2.5	5.0	5.7	4.6	3.7	3.0	2.1	1.5	1.4	1.3	1.2	2.2	2.6	4.8	5.3	5.8	5.3	1.9	1.8	3.0	5.8																						
17-Oct	1.6	1.6	2.5	2.0	2.6	6.1	4.1	8.3	2.5	2.1	3.8	5.1	5.6	2.1	1.9	1.5	1.9	2.5	3.2	4.0	4.3	4.5	4.0	4.4	3.4	8.3																						
18-Oct	4.6	4.8	4.8	4.6	4.5	4.8	5.5	6.5	6.0	3.9	2.8	1.9	1.1	0.8	0.8	0.8	1.0	1.6	2.5	2.2	1.7	2.0	2.6	2.8	3.1	6.5																						
19-Oct	2.1	3.4	4.5	4.9	6.4	7.7	7.6	6.3	6.1	6.0	6.9	4.2	3.7	3.8	4.4	3.2	3.8	3.5	3.0	3.7	5.9	5.3	6.0	3.5	4.8	7.7																						
20-Oct	3.6	2.3	2.7	2.1	1.3	1.2	1.2	0.7	0.6	0.7	0.7	1.1	1.1	1.1	1.0	1.1	1.1	0.6	0.5	0.5	0.6	1.2	2.1	1.2	3.6	3.6																						
21-Oct	2.2	2.1	3.5	6.7	6.8	5.4	6.2	5.2	6.2	4.5	1.9	1.3	1.1	1.1	1.2	1.8	2.0	2.1	2.7	3.0	2.9	2.6	2.7	2.6	3.2	6.8																						
22-Oct	7.0	9.7	5.1	4.5	4.4	4.3	4.3	4.3	3.6	3.3	2.9	3.1	3.4	3.2	2.9	2.7	3.2	4.0	4.1	3.9	3.3	2.9	2.7	2.4	4.0	9.7																						
23-Oct	2.5	3.0	3.7	2.6	2.6	2.8	2.6	2.6	2.7	3.0	3.6	3.1	2.3	3.3	4.8	10.4	21.1	30.4	8.9	3.8	2.3	2.0	1.8	1.3	5.3	30.4																						
24-Oct	2.0	2.8	4.2	1.8	2.0	2.2	2.1	1.8	2.2	2.0	2.4	2.4	2.4	2.6	1.9	2.4	2.7	3.3	3.8	3.3	3.3	3.7	7.3	6.0	2.9	7.3																						
25-Oct	20.6	25.3	17.3	3.7	2.5	3.5	3.9	2.9	2.6	2.5	2.3	3.6	3.9	2.7	2.6	2.9	3.8	4.5	3.8	4.3	3.6	4.8	5.3	2.8	5.7	25.3																						
26-Oct	2.4	2.9	3.4	4.0	3.9	4.5	5.3	6.1	5.8	4.8	4.2	3.1	1.9	1.5	1.8	2.5	2.8	3.4	3.4	4.3	3.7	3.2	1.3	0.8	3.4	6.1																						
27-Oct	0.7	0.9	1.5	1.5	1.5	1.3	0.8	0.6	0.7	0.8	C	C	0.7	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.5	0.5	0.8	1.5																						
28-Oct	0.4	0.5	0.5	1.7	2.8	3.7	4.7	4.3	3.1	2.7	3.0	3.7	3.4	3.6	4.0	2.7	3.2	2.4	2.8	2.7	2.3	2.3	1.9	1.7	2.7	4.7																						
29-Oct	1.8	1.9	2.1	2.3	2.8	3.3	3.6	5.6	5.9	4.8	4.8	4.9	3.2	3.8	4.6	5.9	12.3	28.1	5.8	6.7	3.3	2.3	2.1	1.8	5.2	28.1																						
30-Oct	1.7	1.7	1.6	1.5	1.2	1.4	1.5	1.8	7.0	8.1	2.5	3.5	4.3	4.1	5.8	6.4	7.0	11.8	10.1	12.7	6.5	5.1	2.0	1.8	4.6	12.7																						
31-Oct	3.0	6.3	6.1	6.4	5.9	5.9	3.9	4.2	8.0	9.4	10.0	6.5	2.9	3.3	6.3	11.8	5.2	6.5	7.4	7.9	9.1	7.0	6.4	6.3	6.5	11.8																						
																								4.2	4.2	3.9	3.7	5.2	5.0	4.6	4.5	4.2	3.9	3.9	3.8	2.8	2.6	2.6	3.0	3.7	5.3	4.6	5.3	5.7	4.3	4.1	4.3	Diurnal Average
																								20.6	25.3	17.3	12.8	54.5	25.3	18.7	17.7	14.5	18.9	24.1	21.4	13.2	10.9	8.7	11.8	21.1	30.4	20.0	24.9	42.1	15.8	20.0	32.0	Diurnal Maximum
C - Calibration																																																
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m <sup>3</sup>																																																

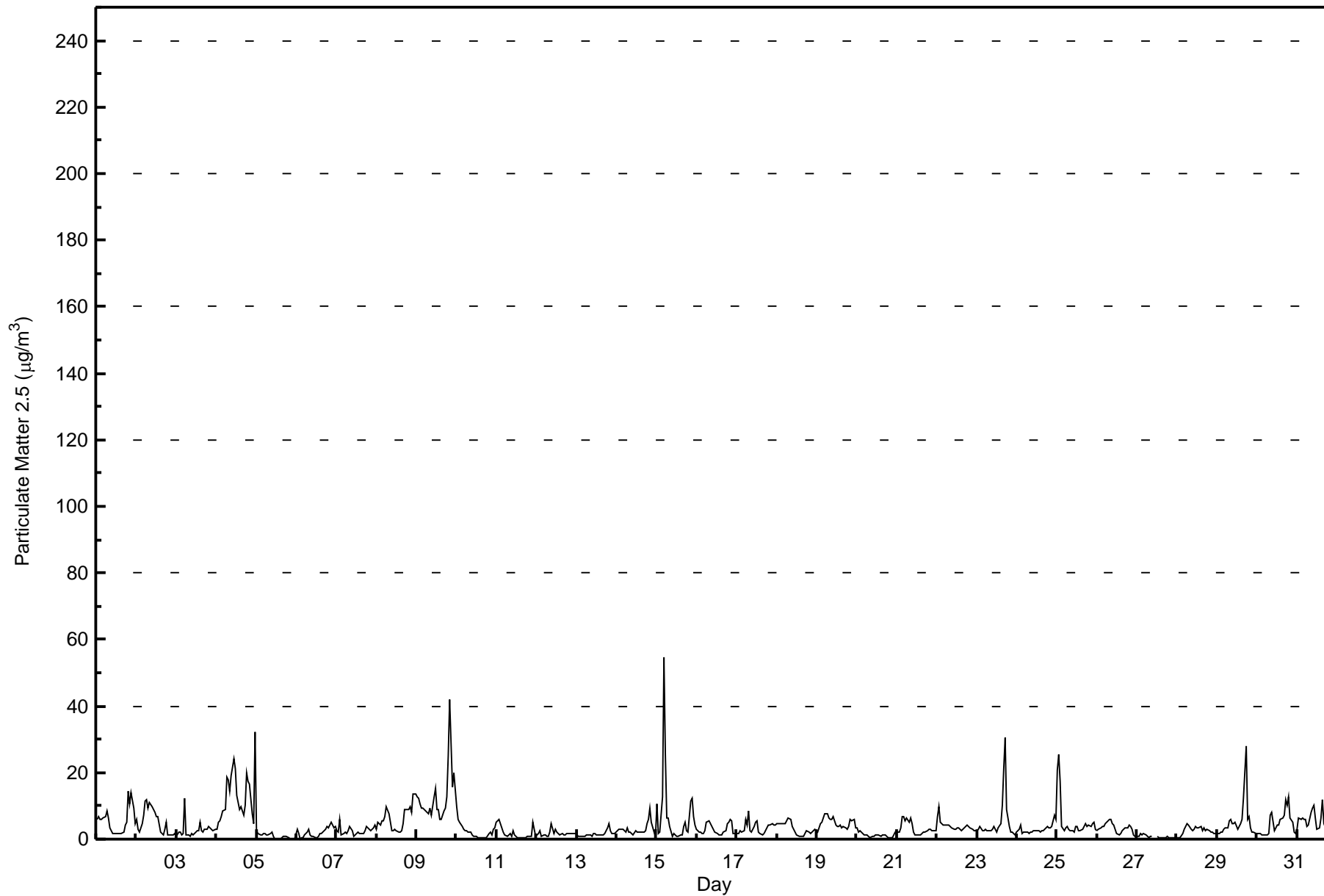


Wood Buffalo Environmental Association

Hourly Averages

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$

Patricia McInnes - October 2015





**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 2015**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	495	66.71	66.71
6 - 15	140	18.87	85.58
16 - 25	16	2.16	87.74
26 - 80	5	0.67	88.41
> 81.0	0	0.00	88.41

Total Number of Valid Hours: 742

Total Number of Hours: 744





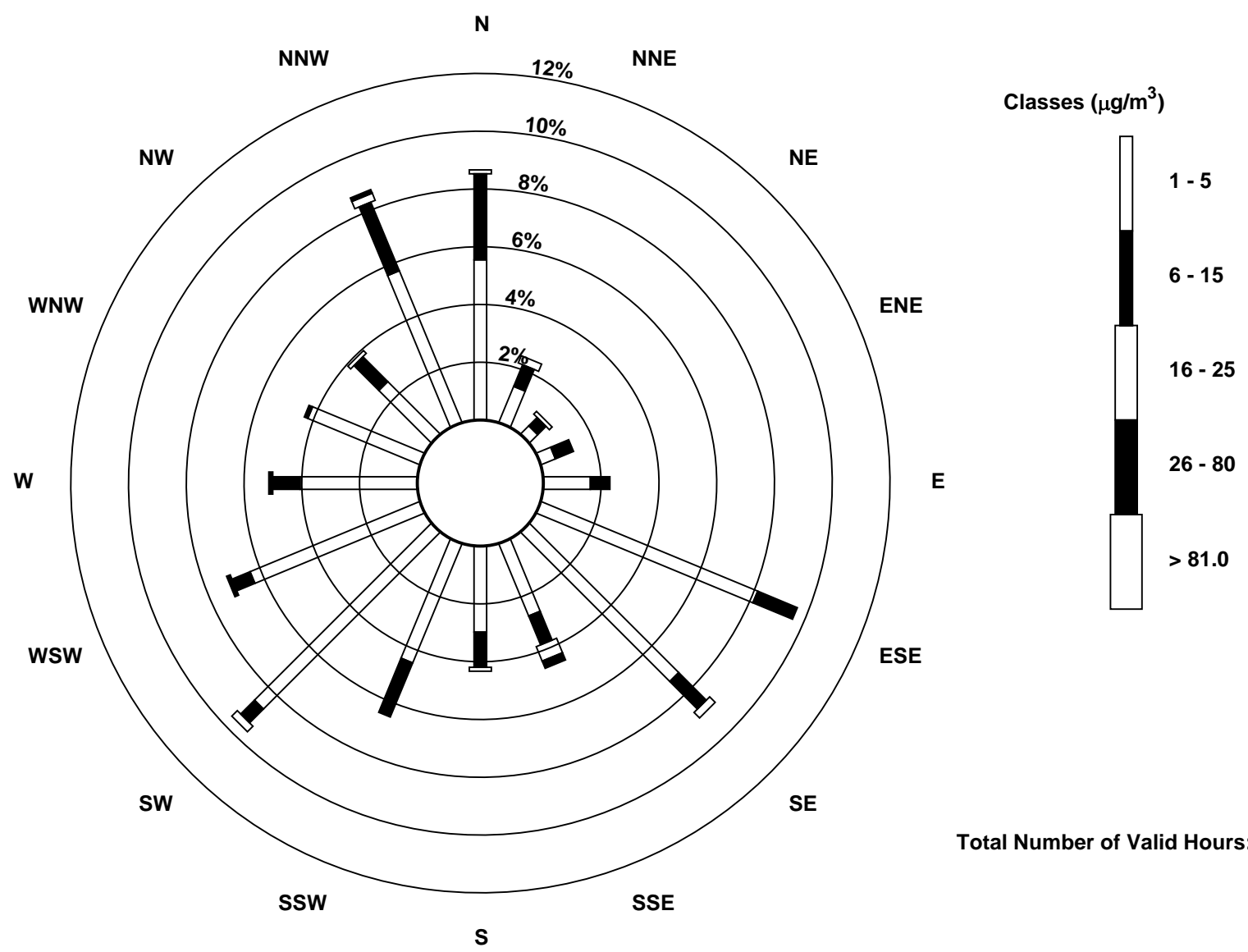
**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Patricia McInnes - October 2015**

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	41	10	3	4	12	60	54	20	22	33	64	47	30	31	19	42	492
6 - 15	22	6	3	5	5	11	10	8	9	15	5	5	7	1	9	19	140
16 - 25	1	2	1	0	0	0	2	4	1	0	2	0	0	0	1	2	16
26 - 80	0	0	0	0	0	0	0	2	0	0	0	1	1	0	0	1	5
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	64	18	7	9	17	71	66	34	32	48	71	53	38	32	29	64	653

Total Number of Valid Hours: 739

Total Number of Hours: 744





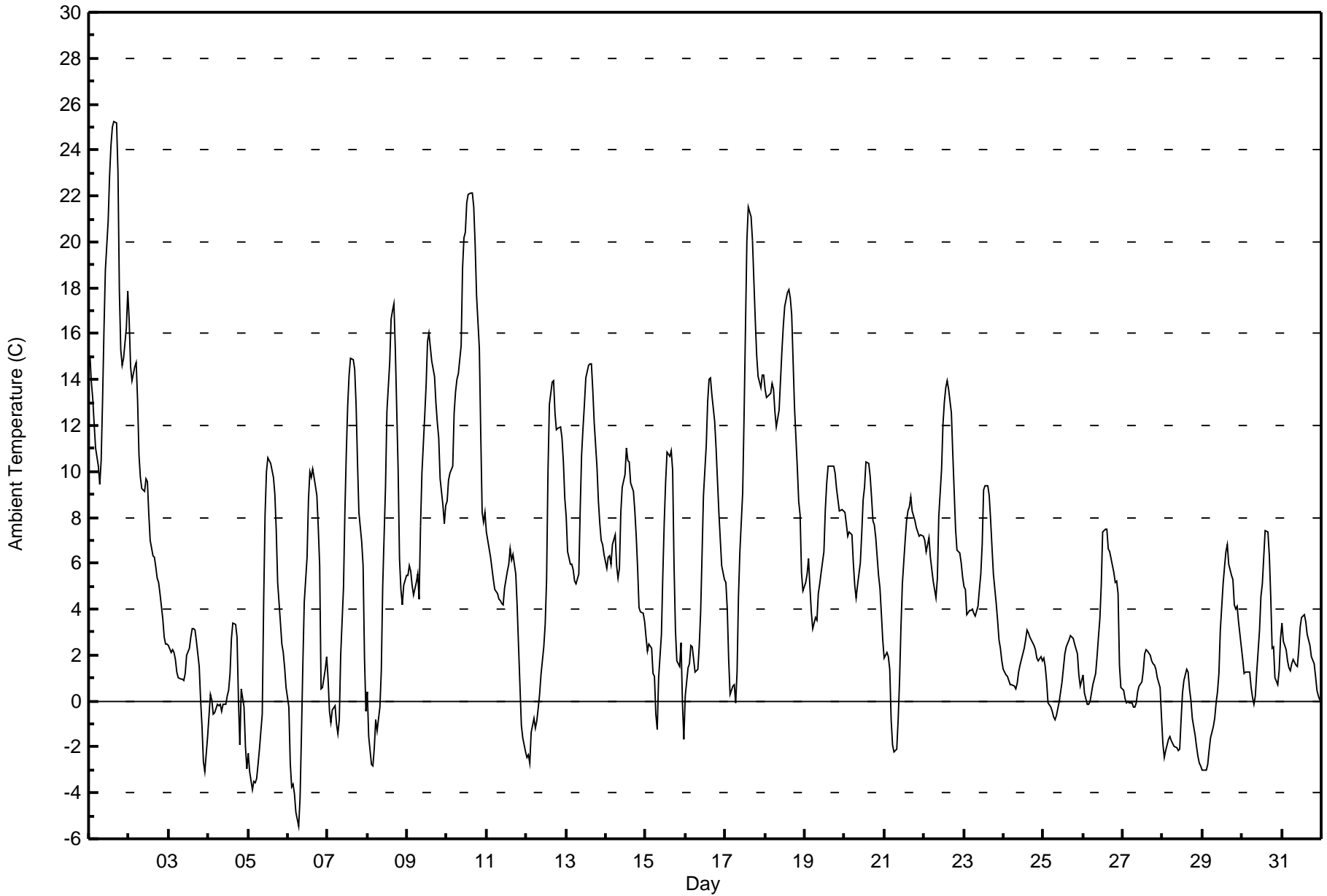
**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Ambient Temperature (AT) - C**

**Patricia McInnes - October 2015**

Maximum Value: 25.2 C on Oct 1 16:00		Maximum Daily Average: 16.9 C on Oct 1		Hours in Service: 744																							
Minimum Value: -5.4 C on Oct 6 07:00		Minimum Daily Average: -1.2 C on Oct 28		Hours of Data: 744																							
Maximum Diurnal Average: 10.4 C at hour 15		Minimum Diurnal Average: 2.3 C at hour 7		Hours of Missing Data: 0																							
Monthly Average: 5.59 C		Percentiles: P <sub>1</sub> = -3.6 P <sub>10</sub> = -0.8 Q <sub>1</sub> = 1.2 Median = 4.9 Q <sub>3</sub> = 9.1 P <sub>90</sub> = 13.9 P <sub>99</sub> = 21.5		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	15.1	13.9	13.2	12.1	11.0	10.2	9.5	10.5	13.1	16.2	18.8	20.9	22.9	24.2	25.0	25.2	25.2	23.1	17.8	15.3	14.6	15.0	16.3	17.8	16.9	25.2	
2-Oct	16.6	14.6	14.0	14.6	14.7	13.1	10.7	9.7	9.3	9.1	9.7	9.5	8.2	7.0	6.3	6.2	5.8	5.3	5.2	4.7	3.6	2.8	2.5	2.5	8.6	16.6	
3-Oct	2.4	2.1	2.3	2.1	1.8	1.2	1.0	1.0	1.0	0.9	1.2	2.0	2.3	2.8	3.2	3.2	3.1	2.6	1.5	0.0	-1.1	-2.6	-3.1	-1.5	1.2	3.2	
4-Oct	-0.6	0.3	0.0	-0.6	-0.5	-0.2	-0.2	-0.2	-0.5	-0.1	-0.1	0.2	0.5	1.2	2.7	3.4	3.3	2.8	0.1	-1.9	0.5	-0.3	-2.0	-3.0	0.2	3.4	
5-Oct	-2.3	-3.1	-3.8	-3.5	-3.6	-3.4	-2.8	-2.1	-0.5	4.2	8.1	10.0	10.6	10.3	10.1	9.8	9.0	7.4	5.2	3.4	2.5	2.1	1.5	0.6	2.9	10.6	
6-Oct	-0.3	-2.7	-3.8	-3.6	-4.1	-4.8	-5.4	-4.2	-1.4	1.6	4.3	6.3	8.7	10.0	9.7	10.1	9.8	8.9	7.5	5.9	0.6	0.6	1.4	1.9	2.4	10.1	
7-Oct	1.0	-0.5	-0.9	-0.4	-0.2	-1.0	-1.4	-0.8	2.0	4.9	8.2	10.8	12.8	14.2	14.9	14.8	14.4	12.9	10.4	8.2	6.9	5.9	1.9	-0.4	5.8	14.9	
8-Oct	0.4	-1.6	-2.8	-2.8	-2.0	-0.8	-1.3	-0.3	1.3	5.0	7.2	9.3	12.6	14.8	16.6	17.0	17.3	15.3	10.1	6.2	4.9	4.2	5.0	5.5	5.9	17.3	
9-Oct	5.4	5.9	5.7	5.0	4.6	5.2	5.5	4.4	7.6	9.9	12.4	13.8	15.7	16.0	15.4	14.8	14.2	13.0	12.1	11.5	9.7	8.5	7.8	8.5	9.7	16.0	
10-Oct	8.7	9.6	9.9	10.2	12.5	13.4	14.0	14.2	15.5	18.8	20.1	20.4	21.7	22.1	22.1	22.2	21.5	19.9	17.7	15.4	11.7	8.2	7.8	8.2	15.2	22.2	
11-Oct	7.4	6.7	6.3	5.8	5.3	4.9	4.7	4.4	4.4	4.3	4.2	4.9	5.7	6.0	6.7	6.1	6.4	5.6	4.1	2.3	0.6	-1.1	-1.6	-2.2	4.2	7.4	
12-Oct	-2.5	-2.3	-2.7	-1.4	-0.7	-1.2	-0.9	-0.3	0.3	1.2	2.4	3.4	5.3	10.0	12.9	13.9	13.9	12.6	11.8	11.9	11.9	11.5	10.4	8.8	5.4	13.9	
13-Oct	8.0	6.5	5.9	6.0	5.7	5.3	5.1	5.6	8.3	10.7	11.9	12.9	14.1	14.6	14.7	14.7	13.5	12.1	10.2	8.7	7.7	7.0	6.8	6.4	9.3	14.7	
14-Oct	5.7	6.2	6.3	6.0	6.8	7.3	5.9	5.4	5.8	8.2	9.3	9.9	11.0	10.5	10.4	9.5	9.1	8.2	7.2	5.8	4.1	3.9	3.8	3.5	7.1	11.0	
15-Oct	2.8	2.2	2.5	2.3	1.2	1.1	-0.6	-1.3	1.0	2.9	5.6	7.8	9.5	10.8	10.7	10.9	10.0	5.9	3.1	1.7	1.5	2.6	-0.1	-1.7	3.9	10.9	
16-Oct	0.2	1.5	1.6	2.4	2.4	1.8	1.3	1.4	2.4	3.9	6.4	8.9	11.2	13.1	14.0	14.1	13.3	12.2	11.0	9.6	8.2	7.1	5.9	5.3	6.6	14.1	
17-Oct	5.2	4.0	1.8	0.3	0.7	0.7	-0.1	1.2	4.5	6.5	9.1	12.4	16.3	20.1	21.5	21.1	20.1	18.3	16.6	15.1	14.1	13.6	14.2	14.2	10.5	21.5	
18-Oct	13.6	13.2	13.3	13.4	13.9	13.6	12.6	11.9	12.7	14.0	15.2	16.3	17.2	17.8	17.9	17.5	16.8	14.8	12.8	10.2	8.7	8.1	5.6	4.8	13.2	17.9	
19-Oct	5.2	5.5	6.2	5.0	3.9	3.2	3.6	3.5	4.7	5.1	5.6	6.5	8.3	9.5	10.2	10.2	10.3	10.2	9.9	9.3	8.8	8.3	8.3	8.3	7.1	10.3	
20-Oct	8.2	7.8	7.2	7.4	7.3	6.0	5.0	4.5	5.0	6.0	7.3	8.8	9.3	10.4	10.4	9.8	8.9	7.9	7.7	7.1	5.4	4.9	3.8	2.7	7.0	10.4	
21-Oct	1.9	2.1	2.0	1.4	-0.8	-1.9	-2.2	-2.1	-0.8	0.9	3.2	5.1	7.0	7.8	8.3	8.4	8.9	8.3	7.9	7.6	7.4	7.2	7.2	7.2	4.2	8.9	
22-Oct	7.0	6.5	6.8	7.1	6.3	5.2	4.9	4.5	5.4	8.0	10.1	12.1	13.0	13.6	14.0	13.6	12.5	10.8	9.1	7.5	6.6	6.4	6.0	5.4	8.4	14.0	
23-Oct	5.0	4.8	3.8	4.0	3.9	4.0	3.8	3.7	4.2	4.9	5.5	6.8	9.2	9.3	9.4	8.9	7.9	6.7	5.5	4.2	3.5	2.7	2.3	1.8	5.2	9.4	
24-Oct	1.4	1.1	1.1	0.9	0.7	0.7	0.6	0.5	0.8	1.2	1.6	2.1	2.3	2.7	3.1	3.0	2.8	2.6	2.4	2.2	1.9	1.8	1.9	1.7	1.7	3.1	
25-Oct	1.9	1.5	0.8	-0.1	-0.3	-0.4	-0.7	-0.8	-0.6	0.0	0.4	0.8	1.4	2.1	2.4	2.7	2.8	2.8	2.7	2.5	2.1	1.1	0.6	0.9	1.1	2.8	
26-Oct	1.2	0.3	-0.1	-0.1	0.0	0.4	0.7	1.2	1.9	2.8	3.6	5.0	7.4	7.5	7.5	6.6	6.5	6.2	5.6	5.2	5.3	4.7	1.6	0.6	3.4	7.5	
27-Oct	0.5	0.1	-0.1	0.0	-0.1	-0.1	-0.2	-0.2	-0.1	0.4	0.7	0.9	1.3	2.1	2.3	2.2	2.0	1.8	1.6	1.6	1.4	1.0	0.6	-0.7	0.8	2.3	
28-Oct	-1.9	-2.4	-2.1	-1.7	-1.6	-1.7	-1.9	-2.0	-2.0	-2.2	-2.1	-0.8	0.4	0.9	1.4	1.3	0.6	0.1	-0.8	-1.5	-2.0	-2.4	-2.7	-2.8	-1.2	1.4	
29-Oct	-3.0	-3.0	-3.0	-2.8	-2.1	-1.6	-1.1	-0.7	-0.1	0.4	1.2	3.1	5.1	5.9	6.5	6.8	6.0	5.5	5.3	4.2	4.0	4.1	3.5	2.3	1.9	6.8	
30-Oct	1.8	1.2	1.3	1.3	1.3	0.6	0.2	-0.1	0.2	1.2	3.1	4.6	5.1	6.3	7.4	7.4	6.3	4.5	2.3	2.4	1.0	0.7	1.3	2.7	2.7	7.4	
31-Oct	3.4	2.6	2.2	1.8	1.4	1.3	1.6	1.8	1.6	1.5	2.3	3.2	3.6	3.7	3.4	2.9	2.7	2.4	1.9	1.6	1.1	0.5	0.2	0.0	2.0	3.7	
		3.8	3.4	3.1	3.0	2.9	2.6	2.3	2.4	3.4	4.9	6.3	7.7	9.0	9.9	10.4	10.3	9.8	8.7	7.3	6.1	5.1	4.5	3.8	3.5	Diurnal Average	
		16.6	14.6	14.0	14.6	14.7	13.6	14.0	14.2	15.5	18.8	20.1	20.9	22.9	24.2	25.0	25.2	25.2	23.1	17.8	15.4	14.6	15.0	16.3	17.8	Diurnal Maximum	





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

**Ambient Temperature (AT) - C**  
**Patricia McInnes - October 2015**

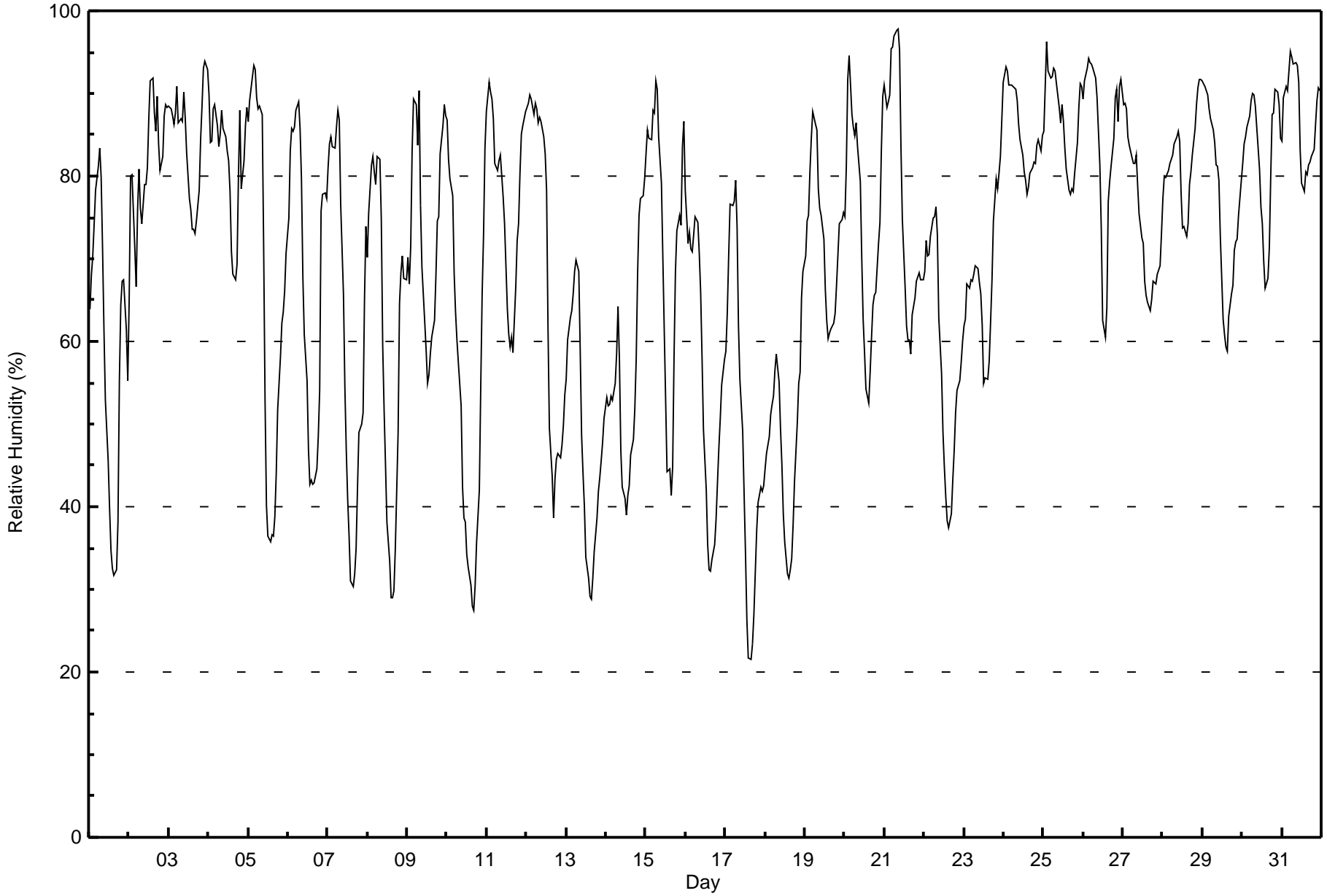
<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	117	15.73	15.73
0 - 10	470	63.17	78.90
10 - 20	139	18.68	97.58
> 20	18	2.42	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Value: 98 % on Oct 21 09:00																		Maximum Daily Average: 87.3 % on Oct 31																		Hours in Service: 744							
Minimum Value: 21 % on Oct 17 16:00																		Minimum Daily Average: 47.5 % on Oct 18																		Hours of Data: 744							
Maximum Diurnal Average: 82.2 % at hour 7																		Minimum Diurnal Average: 53.0 % at hour 15																		Hours of Missing Data: 0							
Monthly Average: 70.1 %																		Percentiles: P <sub>1</sub> = 29 P <sub>10</sub> = 42 Q <sub>1</sub> = 58 Median = 74 Q <sub>3</sub> = 85 P <sub>90</sub> = 90 P <sub>99</sub> = 95																		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	64	68	70	74	78	81	83	80	71	61	53	46	40	35	33	32	32	38	55	64	67	68	61	55	58.8	83																	
2-Oct	65	80	80	71	67	76	81	76	74	79	79	81	87	92	92	88	85	90	84	81	82	87	89	88	81.4	92																	
3-Oct	88	88	87	86	88	91	86	87	87	90	87	83	77	76	74	74	73	75	78	84	89	93	94	93	84.5	94																	
4-Oct	90	84	84	88	89	86	84	85	88	86	85	83	82	78	71	68	67	69	80	88	78	82	86	88	82.1	90																	
5-Oct	87	89	92	93	93	89	88	88	88	72	53	40	36	36	37	36	39	44	52	58	62	64	66	71	65.5	93																	
6-Oct	75	83	86	85	86	88	89	86	80	68	61	55	47	43	43	43	43	45	48	54	76	78	77	77	67.3	89																	
7-Oct	81	84	85	84	83	86	88	87	77	66	54	47	41	36	31	30	32	35	42	49	50	51	65	74	60.7	88																	
8-Oct	70	76	81	82	80	79	82	82	75	60	52	45	38	33	29	29	30	35	49	65	68	70	68	67	60.3	82																	
9-Oct	70	67	72	83	89	89	84	90	76	69	62	59	55	56	58	60	63	68	74	75	83	86	89	87	73.6	90																	
10-Oct	87	82	80	78	68	64	60	58	52	42	39	38	34	33	31	28	27	31	36	42	55	66	73	83	53.5	87																	
11-Oct	88	91	90	89	87	81	81	82	83	80	77	74	64	61	59	61	59	67	72	74	80	85	86	88	77.5	91																	
12-Oct	88	89	90	89	88	89	88	86	87	87	85	83	78	62	49	44	39	43	46	46	46	47	50	54	68.9	90																	
13-Oct	55	60	63	64	66	68	70	69	59	49	44	40	34	31	29	29	31	35	39	42	44	46	48	51	48.5	70																	
14-Oct	53	52	52	53	53	55	58	64	58	47	42	41	39	41	43	46	48	52	58	68	75	77	78	80	55.6	80																	
15-Oct	83	86	85	84	88	88	91	91	85	79	70	61	53	44	45	41	45	58	68	73	75	74	84	87	72.4	91																	
16-Oct	78	72	73	71	71	73	75	74	71	66	58	49	42	36	32	32	34	35	38	43	47	51	55	58	55.6	78																	
17-Oct	59	63	70	77	76	77	79	74	62	55	49	42	34	26	22	21	23	27	32	37	40	42	42	43	48.9	79																	
18-Oct	45	46	48	51	52	53	56	58	55	50	45	39	36	32	31	32	34	38	43	50	55	56	65	68	47.5	68																	
19-Oct	70	75	75	80	85	88	86	86	78	76	75	72	66	63	60	61	62	62	63	67	70	74	75	76	72.8	88																	
20-Oct	75	81	92	95	87	86	85	86	84	79	70	63	59	54	52	56	60	64	66	66	72	74	83	90	74.2	95																	
21-Oct	91	88	89	90	95	96	97	98	98	95	84	75	66	62	60	60	58	63	65	67	68	68	67	67	77.9	98																	
22-Oct	69	72	70	70	73	75	75	76	73	63	56	49	45	41	38	37	39	43	47	51	54	55	58	60	57.9	76																	
23-Oct	62	63	67	66	67	67	68	69	69	67	66	62	55	56	55	58	62	67	75	80	78	80	82	87	67.9	87																	
24-Oct	91	93	93	91	91	91	91	91	89	86	84	83	81	80	78	79	80	81	82	82	84	84	83	85	85.5	93																	
25-Oct	86	91	96	93	92	92	93	93	91	88	86	89	87	83	81	78	78	78	78	80	84	88	91	91	87.0	96																	
26-Oct	89	91	93	94	94	94	93	92	89	85	81	74	63	61	64	77	79	81	85	90	90	87	91	92	84.5	94																	
27-Oct	89	89	88	85	84	82	82	81	82	79	75	73	72	67	66	65	64	65	67	67	67	68	69	73	74.9	89																	
28-Oct	77	80	80	81	82	82	83	84	85	85	84	78	74	74	73	74	79	81	83	86	89	91	92	92	81.9	92																	
29-Oct	92	91	90	90	88	87	86	84	81	81	79	73	63	61	59	59	63	66	67	71	72	72	75	79	76.2	92																	
30-Oct	81	84	85	86	87	89	90	90	88	86	81	76	74	70	66	68	71	80	87	88	91	90	89	85	82.6	91																	
31-Oct	84	89	91	90	93	95	94	94	94	93	91	83	79	78	80	80	81	82	82	83	86	89	91	90	87.3	95																	
																		76.8	79.0	80.6	81.2	81.3	81.8	82.2	81.9	78.3	73.2	68.1	63.1	58.1	54.8	53.0	53.1	54.3	58.0	62.6	66.8	70.3	72.4	74.9	76.7	Diurnal Average	
																		92	93	96	95	95	96	97	98	98	95	91	89	87	92	92	88	85	90	87	90	91	93	94	93	Diurnal Maximum	





Maximum Speed: 34 km/h on Oct 10 14:00	Maximum Daily Speed Average: 16.4 km/h on Oct 13	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 5 10:00	Minimum Daily Speed Average: 1.5 km/h on Oct 8	Hours of Data: 741
Maximum Diurnal Speed Average: 3.7 km/h at hour 14	Minimum Diurnal Speed Average: 1.0 km/h at hour 20	Hours of Missing Data: 3
Monthly Average Velocity: 2.7 km/h 262.8 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 6 Median = 9 Q <sub>3</sub> = 14 P <sub>90</sub> = 20 P <sub>99</sub> = 28	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	SSW8	SW9	SW9	SSW8	SSW6	S8	SSW6	SSW6	SSW8	SW11	S10	S12	SSW13	S12	SSW11	SSW9	W7	WNV5	NW3	W2	W3	SW3	SSW6	SW12	SSW7.0	SSW13
2-Oct	S4	ESE2	E3	SE6	E5	N6	NNW11	NNW12	NNW13	NNW13	NNW20	NNW21	N24	NNW25	N23	N23	N23	N18	N17	N20	N23	NNW21	NNW24	NNW17	N14.1	NNW25
3-Oct	N14	N15	N20	N16	N16	NNW17	N20	N16	NNW16	NNE14	N14	N15	N17	NNE14	NNE14	N13	N13	N12	N9	NNW7	NNW5	WNV3	WNV4	WNV6	N12.3	N20
4-Oct	NW5	NNW9	NNW6	E1	SE3	NW3	NW5	NE2	ESE4	SE5	SSE6	SSE6	SSW6	SSE6	SE6	ESE7	E9	ESE6	SSE2	SSE2	SE8	SE6	SE5	SSE6	SE2.4	ESE9
5-Oct	SSE6	S6	SSW5	SSW7	SSW6	S7	SSW9	SSW6	SW1	NNW0	WNV7	NW24	WNV28	NW28	NW27	NW25	NW23	NW15	NW9	WNV9	WNV10	WNV11	WNV10	WNV9	WNV8.9	WNV28
6-Oct	NNW4	WSW3	WSW4	SW4	SSW4	SSW4	S4	SSE3	SSE4	SE7	ESE9	ESE10	E8	ESE10	ESE12	E11	ESE12	ESE9	SE9	SE6	NNE2	NE2	ENE3	E3	ESE4.4	ESE12
7-Oct	NNE2	NW5	NW6	NW5	WNV5	W3	NW4	WNV3	SW2	S4	SW3	S5	S5	ENE7	WNV9	WNV14	W12	WSW8	W9	WNV11	NW11	NW6	W3	WNV5	WNV4.4	WNV14
8-Oct	WNV7	SW2	WSW3	SW3	WSW3	WSW3	SSE4	SSE4	S6	SSE6	SE7	SE7	ESE5	ESE6	ENE3	ENE6	E6	E6	ENE3	E5	N2	NW6	NNW4	N2	ESE1.5	WNV7
9-Oct	NW3	N3	NNW5	N6	W3	S2	SE5	S1	ESE3	SSE3	ENE6	ENE8	ENE6	NNE7	NNE9	NNE8	N5	NW6	N5	NNE4	W1	SW3	S4	SSW5	NNE1.9	NNE9
10-Oct	SSW8	SW9	SW10	SW10	SW11	SW13	WSW13	SW14	SSW10	SW16	WSW22	SW29	WSW31	WSW34	WSW30	W25	W24	W14	WSW11	WNV8	NW7	WNV5	NNW7	NNW13	WSW13.6	WSW34
11-Oct	NNW13	N14	N18	N18	N21	N19	N19	N17	NNW16	NNW20	NNW17	NNW15	NNW21	NW18	NW18	NW16	WNV16	WNV15	NW18	NW10	WNV5	W5	SSW5	SW6	NNW13.2	NNW21
12-Oct	SSW5	S5	SSE3	S4	ESE7	SE7	SE8	SE9	SE9	SE10	SE8	SSE8	S8	SSW12	SW18	WSW17	W20	WSW14	WSW11	WSW13	WSW14	WSW13	SW14	WSW16	SSW7.4	W20
13-Oct	SW15	SW13	WSW16	WSW18	WSW17	WSW19	SW15	WSW12	WSW13	W23	WSW23	WSW20	W19	W22	W23	W22	WSW21	WSW15	WSW10	SW12	SW12	SW13	SW14	SW15	WSW16.4	W23
14-Oct	SW14	WSW14	WSW14	WSW14	WSW17	W16	WSW12	WSW20	WSW24	W23	W24	WNV25	WNV28	WNV26	NW24	NW18	NW16	NW12	NNW9	N9	NNW5	N7	N7	WNV4	W13.3	WNV28
15-Oct	W4	W5	W3	WSW4	WSW5	SW6	W1	N2	S6	S8	S7	S6	SSE6	SW4	E9	E8	ESE5	SSW1	WSW3	WS3	SSE1	NE5	WSW2	WSW3	SSW2.0	E9
16-Oct	SE5	SE7	SE8	SE11	SE12	ESE12	SE11	SE11	SE14	SE12	ESE13	ESE15	ESE16	ESE17	ESE18	SE18	ESE13	SE12	SE15	SE12	SE13	SE9	SE7	SE7	ESE11.9	SE18
17-Oct	SE8	SSE7	SSE5	SSW5	S6	S6	S6	SSE7	SE9	SE10	SSE9	SSE8	SE6	S11	S17	SSW18	SSW12	SSW13	SSW12	SSW10	SSW9	SSW11	SW14	SW15	S8.8	SSW18
18-Oct	SW14	SW15	WSW17	WSW16	W18	W20	W22	W23	W25	W25	W22	W27	WNV25	WNV28	WNV25	WNV23	W17	W10	WNV10	WNV7	WNV9	W8	WSW3	SSW4	W16.2	WNV28
19-Oct	NW6	NNW7	NNW11	NNW10	N9	NNW6	N9	N5	ENE5	E10	ESE13	ESE12	ESE12	ESE11	ESE12	E13	E12	ESE14	ESE21	ESE21	ESE17	ESE16	SE13	ESE12	E7.6	ESE21
20-Oct	SSE10	SSW9	SSW8	SW9	W17	W17	W15	WSW13	WSW17	WSW18	W23	W22	W22	W23	WNV24	WNV20	WNV18	WNV9	WNV10	NW10	WNV8	WNV9	N10	NNE7	W12.0	WNV24
21-Oct	NNW4	NNE2	SW3	SW3	SSW1	SW2	WSW2	SSE2	SE3	ESE8	ESE13	ESE14	ESE13	ESE14	ESE16	ESE14	ESE18	SE14	ESE11	SE11	SE10	SE11	SE7	SSE6	SE7.3	ESE18
22-Oct	S6	S5	SW8	SW11	SW10	SW12	SW13	SW13	SW15	SW16	WSW18	WSW19	WSW22	SW24	SW25	WSW24	WSW17	WSW12	WSW11	WSW11	WSW14	WSW13	SW11	SW14	SW14.0	WSW25
23-Oct	SW12	SW5	SSW10	SW12	SW9	SW11	SW12	SW8	SW11	SW12	SW8	SW11	SW12	WSW9	WNV5	N6	NNE6	NNW8	NNW7	NNW9	NNW11	N10	NNW10	NNW11	WSW5.0	SW12
24-Oct	NNW7	NNW9	N12	N12	NNW10	NNW9	N8	NNW7	N9	N8	N5	N4	NNE2	W2	NNW3	WNV3	NW3	NNW4	N6	NNW4	WNV3	NW4	N3	NW4	NNW5.6	N12
25-Oct	NNW4	N8	NNW12	NNW12	NNW9	NNW9	NNW10	NNW8	NNW8	N8	NNE6	E3	E3	E5	SE5	ESE4	ESE6	ESE9	ESE8	ESE8	SE8	SE7	SE8	SSE6	NE2.6	NNW12
26-Oct	SSE5	ESE5	ESE10	ESE12	ESE11	ESE13	ESE13	ESE12	ESE15	ESE18	ESE17	ESE17	SE20	SE21	SE16	SE17	SSE12	ESE13	SE13	SE8	SSW5	WNV14	WNV19	W14	SE9.2	SE21
27-Oct	WNV17	WNV15	AF	AF	AF	WNV10	WNV10	W8	WNV13	W17	WNV17	NW17	WNV18	WNV22	NW23	NW21	NW20	WNV13	WNV12	NW11	NW13	NW11	NW12	NW10	WNV14.5	NW23
28-Oct	WNV8	NW4	W4	NNW5	N8	N4	NE2	SSE5	S7	SSW8	S8	SSE8	ESE11	E12	ESE11	ESE13	ESE11	ESE16	SE14	ESE13	ESE12	SE9	SE12	SE12	ESE5.7	ESE16
29-Oct	SE11	SE11	SE11	SE12	SE12	SE11	SE10	SE10	SSE8	ESE8	ESE8	SE7	SSW10	SSW13	SSW11	SSW10	S7	SSE7	S8	SSW5	SW7	SW9	SW10	SW10	SSE7.2	SSW13
30-Oct	SW10	SW9	SW10	SW9	SW9	SW7	SW11	SW8	SSW6	SSW7	S5	SE4	ESE5	ESE5	SE3	SSE5	SSW2	ESE3	NW3	NNW2	WSW5	SW5	WSW5	NW8	SW4.3	SW11
31-Oct	NNW13	NW9	N6	N7	NNW5	WNV5	NW4	N5	N7	NW5	NNW4	NNW8	N6	NE6	NE9	NNE11	NNE9	NE11	NNE8	NNE11	N10	N11	N11	N13	N7.2	NNW13

WSW3.1	W2.8	W2.8	WSW2.6	WSW2.8	WSW3.5	W3.0	WSW2.9	WSW3.2	WSW3.4	WSW3.0	WSW3.0	W3.6	W3.7	W3.6	WNV3.4	WNV3.4	WNV1.3	W1.1	WNV1.0	W2.0	W2.6	W2.5	W3.2	Diurnal Average	
WNV17	WNV15	N20	N18	N21	W20	W22	W23	W25	WNV25	W24	SW29	WSW31	WSW34	WSW30	W25	W24	N18	ESE21	ESE21	N23	NNW21	NNW24	NNW17	Diurnal Maximum	

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





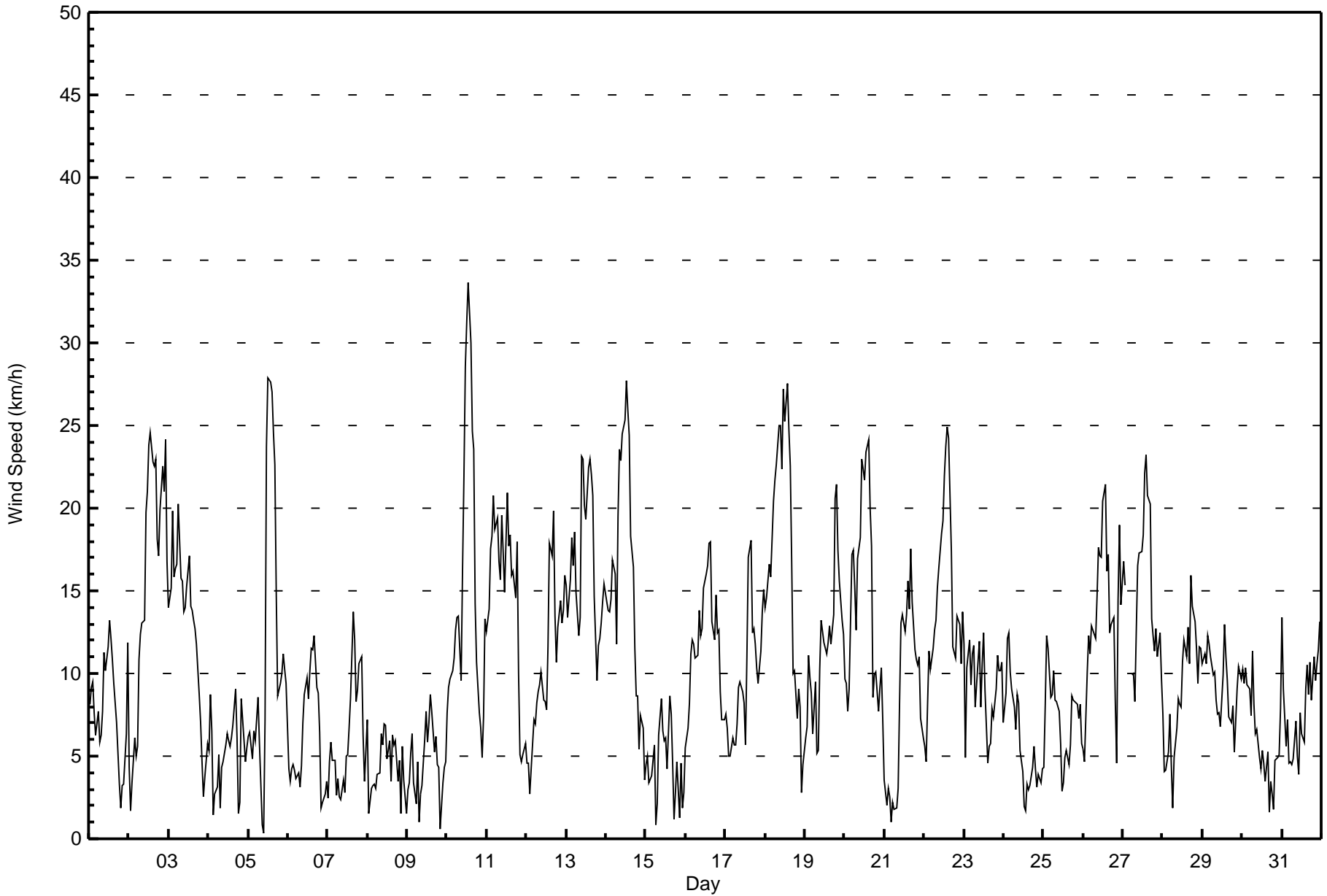
Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Patricia McInnes - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Oct 10 14:00  Minimum Value: 0 km/h on Oct 1 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> = 5 P <sub>99</sub> = 6																	Hours in Service: 744 Hours of Data: 741 Hours of Missing Data: 3 Hours of Calibration: 0 Percent Operational Time: 99.6								
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	1	2	2	1	1	1	1	2	2	2	3	3	3	3	2	2	1	1	1	0	1	2	3	3
2-Oct	2	2	2	1	1	1	2	2	2	3	5	4	5	5	5	5	5	4	4	5	5	5	5	4	5
3-Oct	4	3	5	4	4	4	4	3	3	3	3	3	3	3	3	3	2	2	1	1	1	1	1	1	5
4-Oct	1	2	1	1	1	2	2	1	1	1	3	3	3	3	2	2	2	2	1	2	2	1	1	2	3
5-Oct	1	1	1	1	1	2	2	2	1	2	6	5	7	6	6	5	5	4	2	1	1	1	1	1	7
6-Oct	2	1	2	1	1	1	1	1	1	3	2	2	3	3	3	3	3	2	2	2	1	1	1	1	3
7-Oct	1	1	1	1	1	1	1	1	1	1	1	2	2	2	4	3	3	1	2	1	1	2	1	3	4
8-Oct	1	2	1	1	1	2	1	1	1	1	2	2	2	2	2	2	2	2	2	1	2	1	1	1	2
9-Oct	1	1	2	2	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	2	1	1	1	1	2
10-Oct	1	1	1	2	2	2	4	2	3	6	6	7	7	7	7	6	7	4	1	2	1	1	5	2	7
11-Oct	3	3	4	3	4	4	4	4	4	5	4	3	5	4	4	4	4	3	4	2	1	1	1	1	5
12-Oct	1	1	2	1	2	2	2	2	2	2	2	2	2	6	4	6	4	2	2	3	2	2	2	3	6
13-Oct	2	2	2	3	3	3	2	2	3	6	4	4	5	5	5	5	5	3	1	2	2	2	2	2	6
14-Oct	2	2	2	2	4	4	2	5	4	5	6	6	6	5	6	4	3	3	3	2	1	1	2	1	6
15-Oct	1	1	2	1	1	3	2	1	2	2	2	2	3	4	3	2	1	1	1	1	1	2	1	0	4
16-Oct	2	2	2	2	3	3	2	3	3	3	3	4	4	4	4	4	3	2	3	3	3	2	1	1	4
17-Oct	1	1	1	1	1	1	1	1	2	2	2	2	2	4	4	5	3	3	3	2	2	2	3	3	5
18-Oct	3	3	3	2	4	4	4	4	5	6	5	6	6	6	5	5	3	2	2	1	1	1	3	2	6
19-Oct	2	2	2	2	2	2	2	1	2	3	3	3	3	2	3	3	3	4	5	4	5	4	4	3	5
20-Oct	2	2	2	2	4	3	3	2	4	5	5	5	5	5	6	5	4	3	2	4	2	2	4	3	6
21-Oct	1	2	2	2	1	2	2	2	1	3	3	3	3	3	4	3	4	4	4	3	2	3	2	1	4
22-Oct	2	2	1	2	1	1	2	3	3	3	4	4	5	5	5	5	5	2	2	1	2	2	2	2	5
23-Oct	2	4	3	3	2	2	3	2	2	2	2	2	2	3	3	2	1	1	3	2	2	2	2	2	4
24-Oct	1	1	2	2	2	1	2	1	2	2	1	1	2	1	1	1	1	1	1	1	2	1	1	1	2
25-Oct	1	3	2	3	1	2	2	2	1	2	2	2	2	2	1	1	2	2	2	2	2	1	2	1	3
26-Oct	1	1	3	3	2	3	3	3	4	4	4	4	5	6	4	4	4	4	4	3	2	4	5	3	6
27-Oct	4	5	AF	AF	AF	6	5	5	6	4	4	4	4	5	5	5	5	3	2	3	3	2	3	3	6
28-Oct	1	2	1	1	2	2	2	2	2	3	2	2	2	2	3	3	2	4	3	3	2	2	2	2	4
29-Oct	2	3	3	3	2	2	2	2	2	2	1	1	2	3	2	3	1	1	1	1	2	1	2	1	3
30-Oct	2	1	2	2	2	2	2	2	1	1	1	1	1	2	1	1	2	1	1	2	2	1	1	2	2
31-Oct	2	3	2	2	2	1	1	1	1	1	1	3	2	2	2	2	2	2	2	2	2	2	2	2	3
Diurnal Maximum																									
AF - Analyzer Failure																									





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

**Wind Speed (WS) - km/h**  
**Patricia McInnes - October 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	176	23.75	23.75
6 - 11	288	38.87	62.62
12 - 19	203	27.40	90.01
20 - 28	70	9.45	99.46
29 - 38	4	0.54	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 741

Total Number of Hours: 744



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

**Wind Speed (WS) - km/h**  
**Patricia McInnes - October 2015**

<b>Wind Speed</b> <b>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	5	4	4	8	10	9	14	12	13	15	14	13	13	15	16	176
6 - 11	24	10	3	5	7	24	40	20	19	29	31	7	5	20	16	28	288
12 - 19	21	3	0	0	3	38	17	1	3	7	29	31	10	14	11	15	203
20 - 28	9	0	0	0	0	2	2	0	0	0	0	10	19	12	9	7	70
29 - 38	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	4
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>65</b>	<b>18</b>	<b>7</b>	<b>9</b>	<b>18</b>	<b>74</b>	<b>68</b>	<b>35</b>	<b>34</b>	<b>49</b>	<b>76</b>	<b>65</b>	<b>47</b>	<b>59</b>	<b>51</b>	<b>66</b>	<b>741</b>

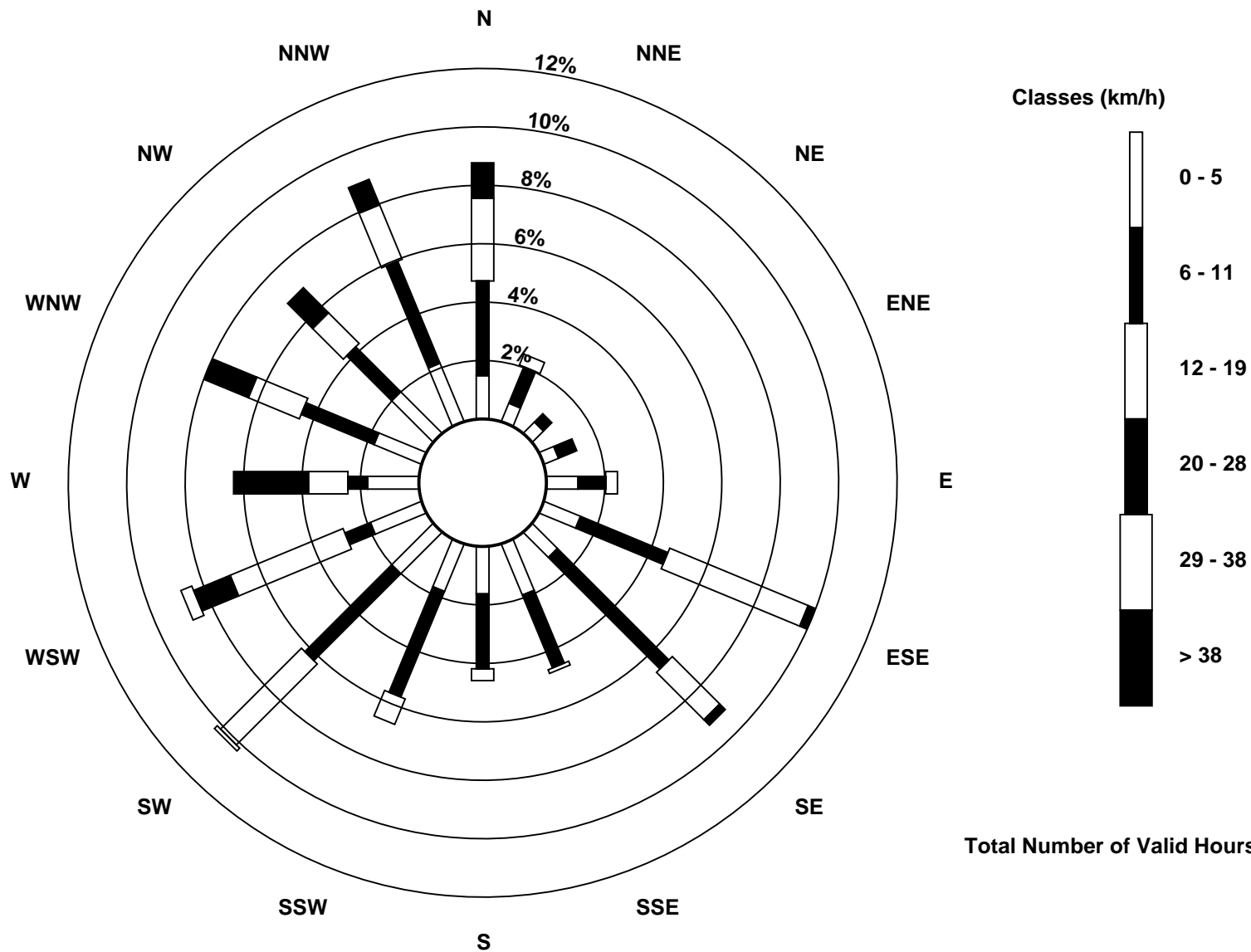
Total Number of Valid Hours: 741

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Wind Speed (WS) - km/h  
Patricia McInnes (AMS 6)





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg  
Patricia McInnes - October 2015**

Direction of Maximum Speed: 250 deg on Oct 10 14:00		Hours in Service:	744
Direction of Maximum Daily Speed Average: 246.6 deg on Oct 13		Hours of Data:	741
Direction of Minimum Speed: 334 deg on Oct 5 10:00		Hours of Missing Data:	3
Direction of Minimum Daily Speed Average: 1.5 deg on Oct 8		Percent Operational Time:	99.6
Monthly Average Direction: 275.1 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	204	220	221	208	192	183	194	202	206	219	183	185	197	189	193	212	260	297	305	270	264	219	197	230	209.1
2-Oct	172	113	100	124	91	4	342	341	332	342	344	345	356	348	352	350	352	354	350	358	352	347	347	347	351.1
3-Oct	359	352	350	360	354	344	350	349	346	14	356	0	6	22	20	5	7	3	352	335	343	285	296	298	355.8
4-Oct	313	347	329	85	145	304	312	46	113	131	162	152	194	154	136	110	101	115	156	155	132	125	141	151	128.8
5-Oct	156	184	201	204	192	184	203	212	234	334	285	306	297	309	314	322	323	323	308	301	293	287	291	298	295.1
6-Oct	339	249	237	218	207	192	181	164	165	125	123	122	96	103	121	97	109	106	125	132	26	36	74	79	122.6
7-Oct	15	309	313	307	296	277	319	286	227	190	230	180	179	68	307	287	277	256	264	296	306	319	270	297	286.3
8-Oct	302	232	249	233	243	237	160	158	182	147	137	138	112	106	58	73	86	82	77	99	5	321	332	351	123.6
9-Oct	325	1	336	354	276	175	135	187	118	151	74	68	74	33	18	20	6	322	349	18	267	236	178	192	25.8
10-Oct	200	215	215	219	226	231	240	231	212	228	240	236	241	250	252	263	262	270	256	287	324	290	347	340	247.8
11-Oct	344	351	349	354	1	6	5	2	343	342	342	344	332	322	312	326	298	300	312	314	298	272	210	229	335.0
12-Oct	202	183	160	170	119	143	143	141	135	137	139	147	177	197	216	243	259	244	239	240	248	243	236	239	209.2
13-Oct	230	232	237	243	241	243	236	240	245	259	254	252	264	260	262	262	258	256	237	235	232	228	228	230	246.6
14-Oct	235	237	239	237	251	261	240	246	248	264	267	284	288	298	304	304	312	306	334	4	344	349	349	297	277.2
15-Oct	263	274	266	256	255	235	281	355	188	190	185	172	152	219	84	87	121	193	251	227	147	50	254	250	198.8
16-Oct	146	125	127	127	126	122	130	124	124	128	118	116	112	106	108	132	117	124	135	128	128	131	124	132	123.1
17-Oct	142	154	168	195	190	183	173	150	139	142	154	147	138	181	190	197	197	199	192	193	196	208	219	221	183.7
18-Oct	229	231	241	246	259	263	265	264	272	281	273	280	283	295	302	296	281	269	283	286	284	281	251	213	272.3
19-Oct	309	338	344	346	352	340	8	352	76	98	110	105	103	107	110	97	95	105	115	115	116	120	124	123	93.5
20-Oct	148	208	202	222	265	260	261	249	258	255	271	270	274	278	296	303	303	298	289	305	284	295	2	14	274.3
21-Oct	342	13	216	228	195	226	256	164	141	111	120	122	115	111	116	116	121	128	119	126	130	133	142	147	124.8
22-Oct	170	187	214	224	218	229	233	228	229	226	238	237	243	236	236	246	251	242	241	238	240	238	233	228	234.0
23-Oct	232	215	194	217	219	221	221	220	225	228	231	216	229	251	290	5	13	346	335	334	340	353	344	341	257.4
24-Oct	332	343	350	354	344	348	359	337	353	5	4	12	259	328	285	309	345	358	344	293	323	349	316		343.8
25-Oct	348	350	347	345	334	342	346	341	342	352	17	92	86	88	134	116	106	115	106	115	134	140	164	168	39.3
26-Oct	153	112	122	121	114	118	118	119	118	116	115	115	132	135	133	124	148	123	127	127	205	292	297	280	128.4
27-Oct	282	287	AF	AF	AF	286	283	280	283	281	300	305	293	300	309	309	307	295	302	307	315	322	314	307	299.0
28-Oct	302	305	280	334	358	8	54	157	187	208	176	147	109	97	103	120	112	120	126	122	122	129	126	128	123.5
29-Oct	129	127	128	127	127	128	135	144	152	123	121	146	196	212	199	198	172	155	185	208	222	226	228	236	165.1
30-Oct	230	222	224	226	227	217	232	226	209	208	172	130	106	123	129	159	200	123	311	343	258	230	247	319	216.5
31-Oct	328	324	351	4	337	297	314	3	358	308	330	346	349	38	47	31	23	35	30	19	355	353	4	5	0.5

253.4 261.4 260.7 249.9 256.4 254.4 260.3 247.0 238.5 237.3 240.9 248.8 261.8 269.3 280.3 290.2 292.2 288.5 271.6 298.5 277.0 276.5 273.0 264.6

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

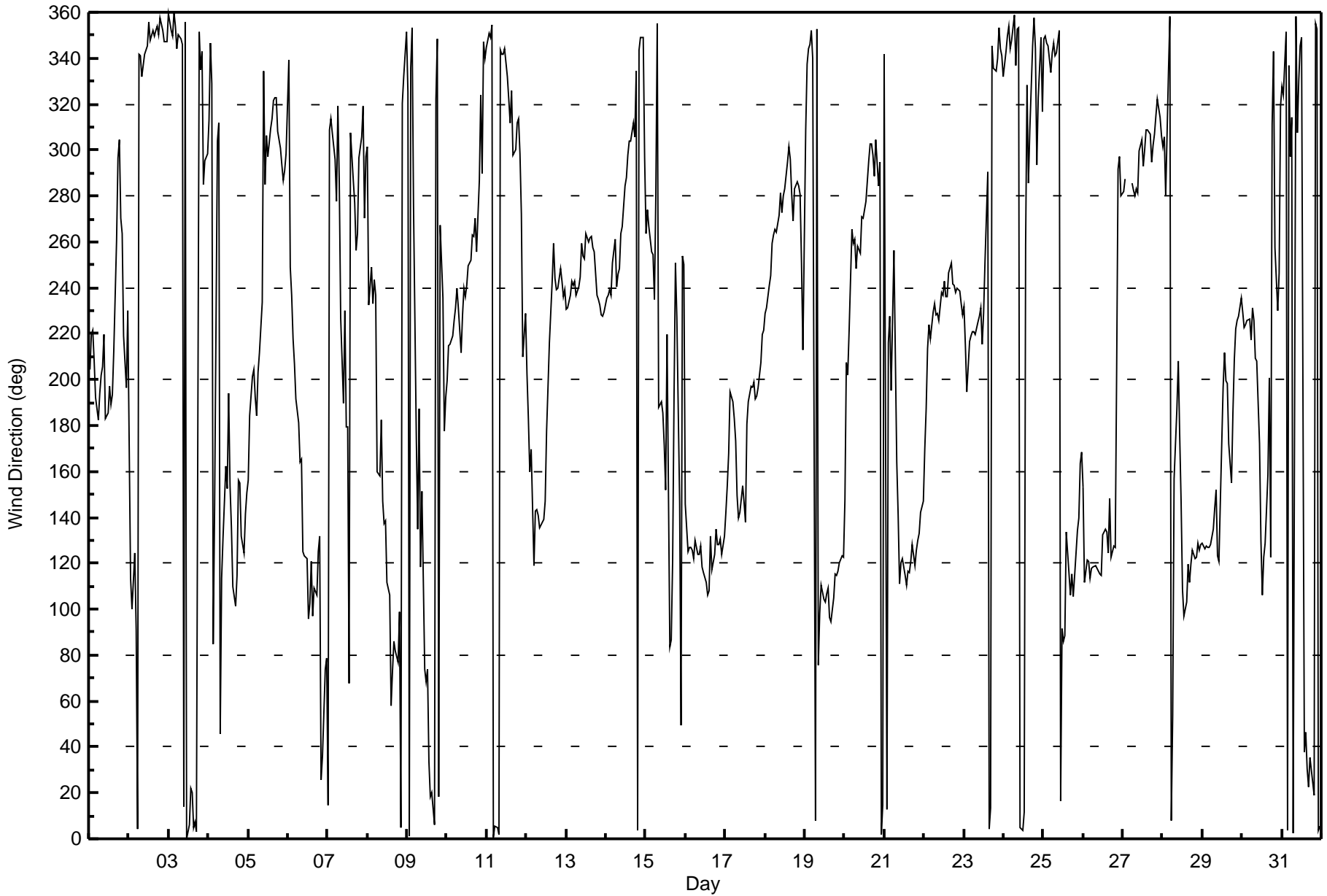
Wind Direction (WD) - deg

Patricia McInnes - October 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value:	89 deg on Oct 2 02:00		Hours of Data:	30
Minimum Value:	9 deg on Oct 1 02:00		Hours of Missing Data:	714
Percentiles: P <sub>1</sub> = 9 P <sub>10</sub> = 9 Q <sub>1</sub> = 14 Median = 17 Q <sub>3</sub> = 24 P <sub>90</sub> = 39 P <sub>99</sub> = 89			Hours of Calibration:	0
			Percent Operational Time:	4.0

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	9	9	12	14	10	12	16	16	17	22	18	22	19	24	25	18	14	42	59	11	40	27	14	59
2-Oct	46	89	20	16	21	23	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	89
3-Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
4-Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
5-Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
6-Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
7-Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
8-Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
9-Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
10-Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
11-Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
12-Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
13-Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
14-Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
15-Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
16-Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
17-Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
18-Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
19-Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
20-Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
21-Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
22-Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
23-Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
24-Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
25-Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
26-Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
27-Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
28-Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
29-Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
30-Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
31-Oct	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	--
Diurnal Maximum																									
46 89 20 16 21 23 12 16 16 17 22 18 22 19 24 25 18 14 42 59 11 40 27 14																									

NF - Not Flagged







# Wood Buffalo Environmental Association

## SO2 Calibration Report

### Station Information

Calibration Date	October 19, 2015	Last Calibration	September 22, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	8:20	End Time (MST)	13:30
Gas Cert Reference	EY0000355	Station temp.	21 Deg C
Cal Gas Concentration	49.8 ppm	Cal Gas Exp Date	18/09/2018
Calibrator Make/Model	Sabio 4010	Serial Number	14300410
ZAG Make/Model	API 701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9036

### Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	-678	-678
Analyzer IP address	192.168.1.43		Lamp voltage	760	762
Calculated slope	0.998170	0.998173	Chamber temp	45.3	45.2
Calculated intercept	0.676652	0.645560	Pressure	699.7	692.8
Analyzer Background	5.8	5.8	Flow	0.448	0.441
Analyzer Coefficient	1.095	1.101	Intensity	92	91

Analyzer make Termo 43i Analyzer serial # 1008841397

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.0	----
as found span	6000	94.7	786.0	779.2	1.009
calibrator zero	6000	0.0	0.0	0.2	----
high point	6000	94.7	786.0	786.9	0.999
second point	6000	47.3	392.6	393.2	0.999
third point	6000	23.7	196.7	194.9	1.009
as left zero	6000	0.0	0.0	0.6	----
as left span	6000	94.7	786.0	781.1	1.006
Average Correction Factor					1.002

Corrected As found 779.2 Previous response 786.8 % change 1.0%

**Notes:**

Inlet filter changed after as founds. Span adjusted.

Calibration Performed By: Devin Russell



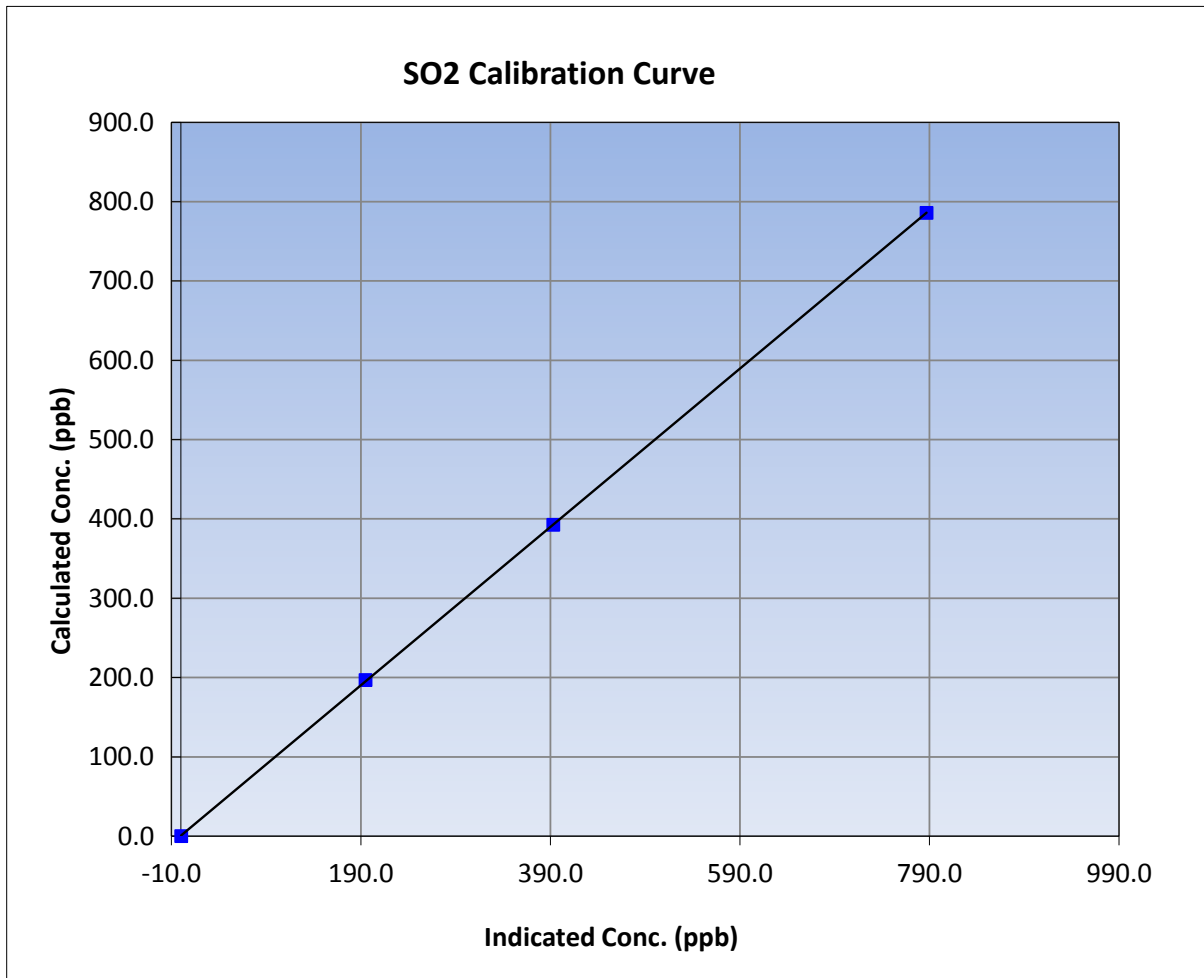
## Wood Buffalo Environmental Association SO2 Calibration Report

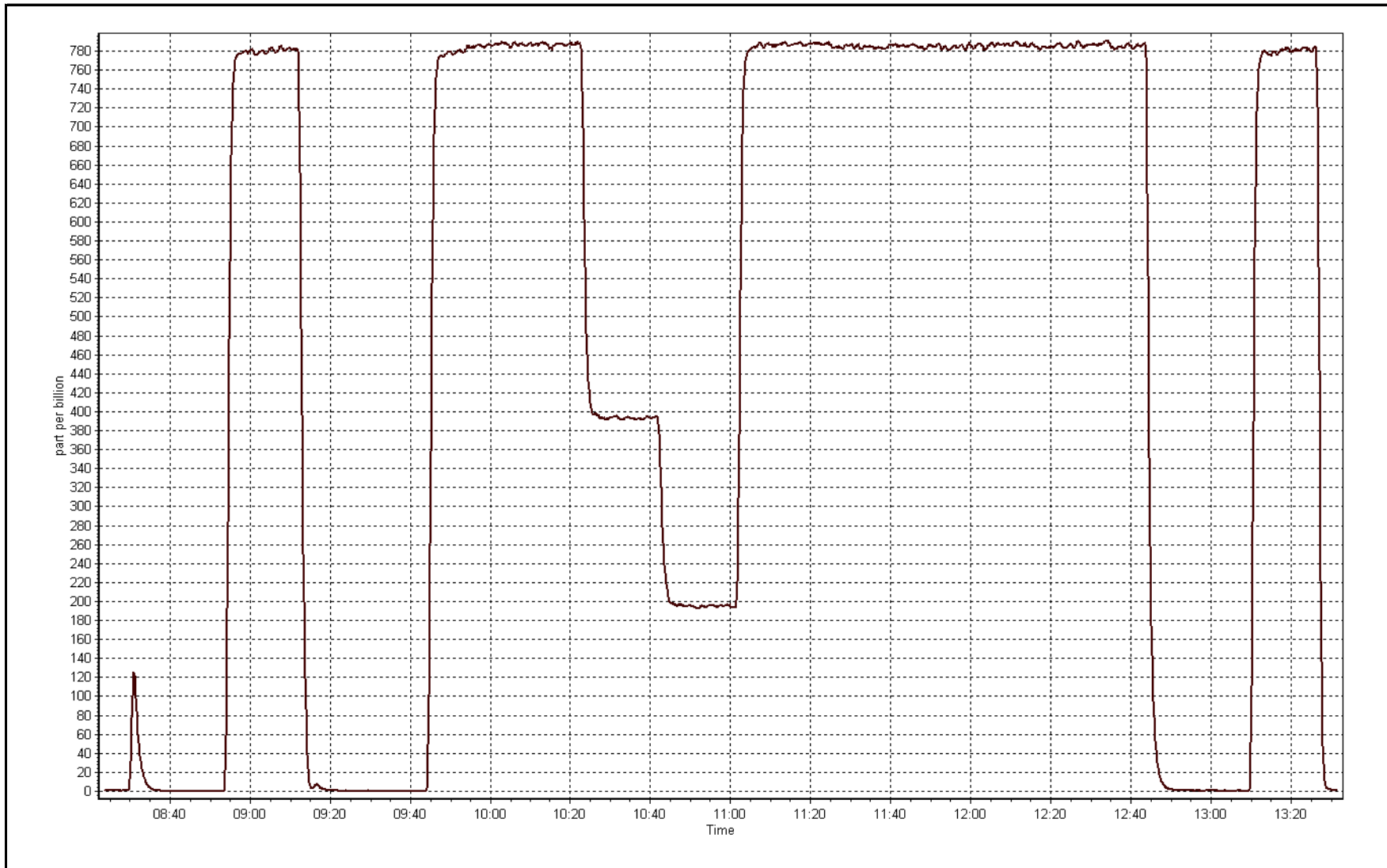
### Station Information

Calibration Date	October 19, 2015	Previous Calibration	September 22, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:20	End Time (MST)	13:30
Analyzer make	Termo 43i	Analyzer serial #	1008841397

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999991
786.0	786.9	0.9988		
392.6	393.2	0.9986	Slope	0.998173
196.7	194.9	1.0091		
			Intercept	0.645560







# Wood Buffalo Environmental Association

## TRS Calibration Report

### Station Information

Calibration Date	October 2, 2015	Last Calibration	September 21, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	11:20	End Time (MST)	15:00
Gas Cert Reference	SA5551	Station temp.	22 Deg C
Cal Gas Concentration	5.28 ppm	Cal Gas Exp Date	13/02/2018
Calibrator Make/Model	Sabio 4010	Serial Number	14300410
Dil air Make/Model	API T701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9036
SO2 gas concentration	49.8 ppm	SO2 gas cert/exp	SA130110A December-12-16

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-720	-720
Analyzer IP address	192.168.1.42		Lamp voltage	988	993
Calculated slope	1.001386	0.997073	Chamber temp	45	45
Calculated intercept	-0.096709	-0.208104	Pressure	693.6	694.6
Analyzer Background	2.29	2.19	Flow	0.438	0.439
Analyzer Coefficient	1.273	1.216	Intensity	90	90
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1218153358	
Converter make/model	CDN-101		Converter serial #	520	

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.1	----
as found span	6000	79.5	70.0	72.9	0.960
SO2 scrubber check	6000	23.7	196.7	2.8	----
calibrator zero	6000	0.0	0.0	0.1	----
high point	6000	79.5	70.0	70.2	0.996
second point	6000	39.8	35.0	35.6	0.983
third point	6000	20.5	18.0	18.3	0.985
as left zero	6000	0.0	0.0	0.6	----
as left span	6000	79.5	70.0	69.0	1.014
Average Correction Factor					0.988

Corrected As found	72.9	Previous response	70.0	% change	-4.0%
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**Notes:**

Filter changed after as founds. Scrubber check completed after as founds. Span 4% high. Calibration cylinder was changed last month.

Calibration Performed By:

Devin Russell



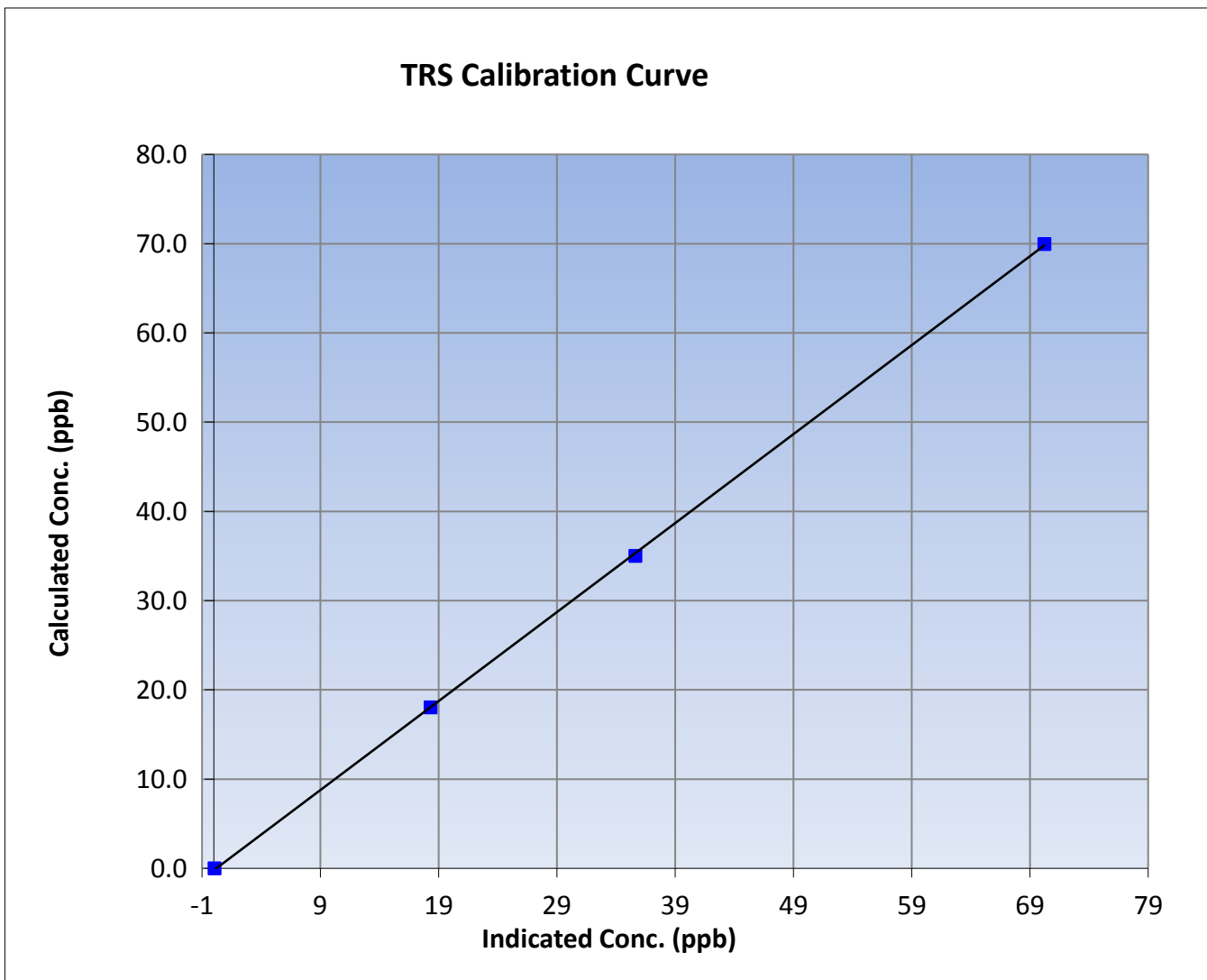
# Wood Buffalo Environmental Association TRS Calibration Report

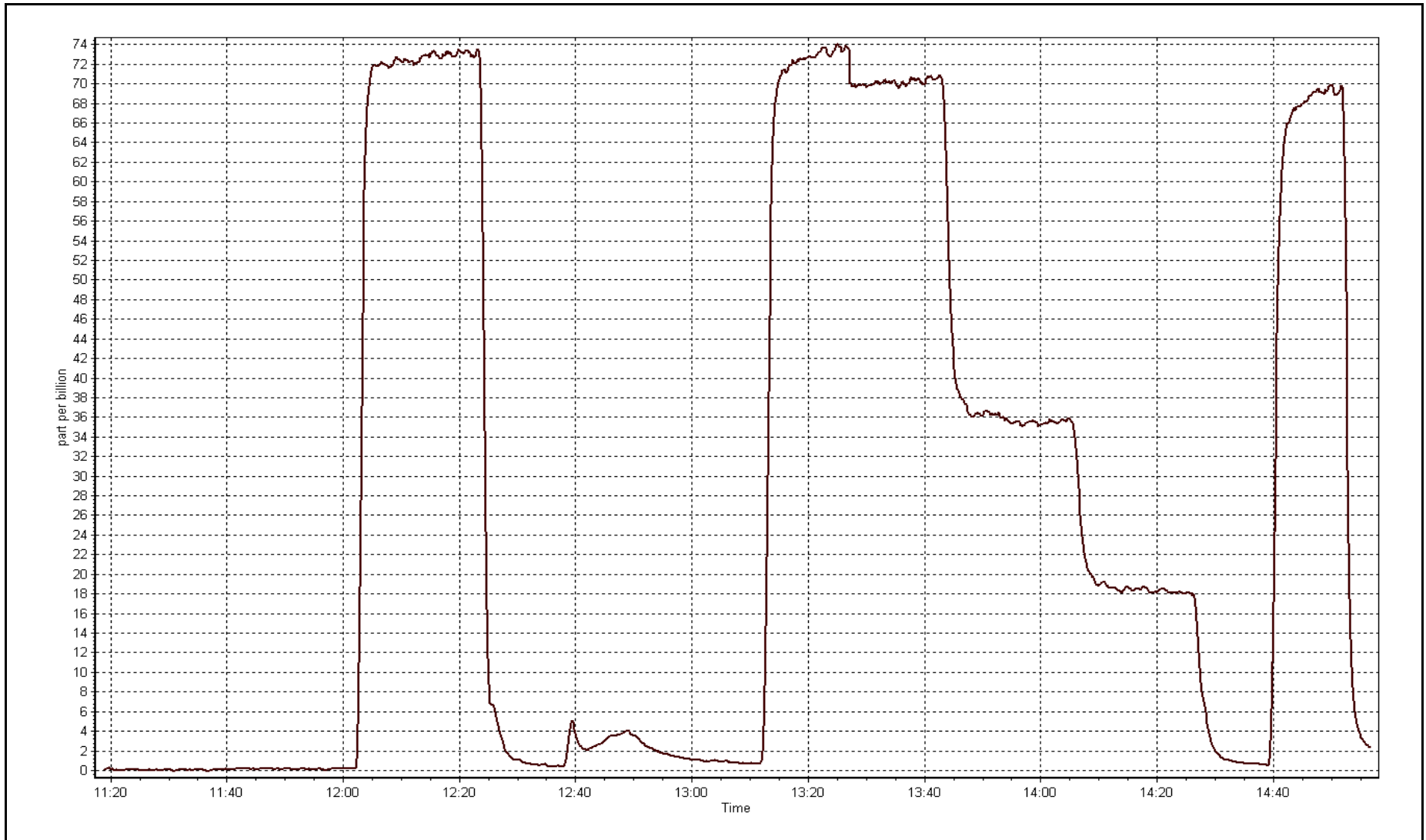
## Station Information

Calibration Date	October 2, 2015	Previous Calibration	September 21, 2015
Station Name	AMS 6	Station Number	AMS 6
Start Time (MST)	11:20	End Time (MST)	15:00
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153358

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999949
70.0	70.2	0.9963		
35.0	35.6	0.9830	Slope	0.997073
18.0	18.3	0.9847		
			Intercept	-0.208104







## Wood Buffalo Environmental Association THC / NMHC Calibration Report

### Station Information

Calibration Date	October-19-15	Last Calibration	September-22-15
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	8:20	End Time (MST)	13:30
Gas Cert Reference	EY0000355	Cal Gas Expiry Date	September-18-18
CH4 Cal Gas Conc.	518.0 ppm	CH4 Equiv Conc.	1068.0 ppm
C3H8 Cal Gas Conc.	200.0 ppm	Station temp.	21 Deg C
Calibrator Model	Sabio 4010	Serial Number	14300410
ZAG make/model	Teledyne API 701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	Serial Number	9036

### Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.3	75.0
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	0.995849	0.997619	Carrier Pressure	34.5	34.5
THC Calc intercept	0.054157	0.046142	Fuel Pressure	42.3	42.3
NMHC Calc slope	0.995294	0.999641	Air Pressure	32.4	32.4
NMHC Calc intercept	0.030105	0.026146			

Analyzer make Thermo 55i Analyzer serial # 1331259521

### THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.00	0.00	----
as found span	6000	94.7	16.86	17.02	0.990
calibrator zero	6000	0.0	0.00	0.00	----
high point	6000	94.7	16.86	16.87	0.999
second point	6000	47.3	8.42	8.38	1.005
third point	6000	23.7	4.22	4.13	1.021
as left zero	6000	0.0	0.00	0.00	----
as left span	6000	94.7	16.86	16.69	1.010
Average Correction Factor					1.008

Corrected As found 17.02 Previous response 16.87 % change -0.9%

**Notes:**

Inlter filter changed fater as founds. Span adjusted.

Calibration Performed By: Devin Russell



## Wood Buffalo Environmental Association THC / NMHC Calibration Report

### NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0	0.00	0.00	----
as found span	6000	94.7	8.68	8.81	0.985
calibrator zero	6000	0.0	0.00	0.00	----
high point	6000	94.7	8.68	8.67	1.001
second point	6000	47.3	4.34	4.30	1.008
third point	6000	23.7	2.17	2.12	1.025
as left zero	6000	0.0	0.00	0.00	----
as left span	6000	94.7	8.68	8.64	1.005
Average Correction Factor					1.011

Corrected As found      8.81      Previous response      8.69      % change      -1.3%

### CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0	0.00	0.00	----
as found span	6000	94.7	8.18	8.21	0.996
calibrator zero	6000	0.0	0.00	0.00	----
high point	6000	94.7	8.18	8.20	0.997
second point	6000	47.3	4.08	4.07	1.003
third point	6000	23.7	2.05	2.01	1.018
as left zero	6000	0.0	0.00	0.00	----
as left span	6000	94.7	8.18	8.05	1.016
Average Correction Factor					1.006

Corrected As found      8.21      Previous response      8.18      % change      -0.4%





# Wood Buffalo Environmental Association

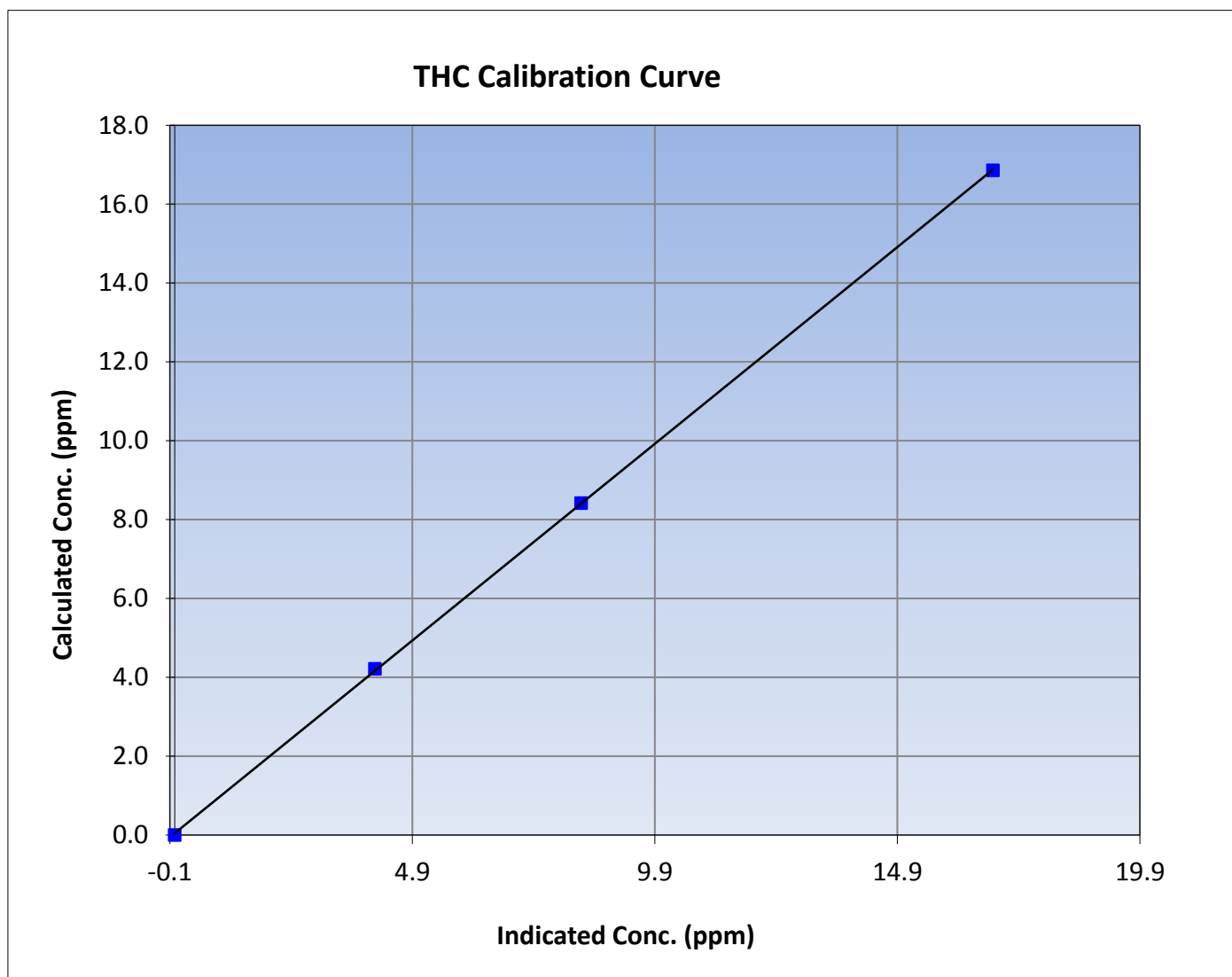
## THC Calibration Summary

### Station Information

Calibration Date	October 19, 2015	Previous Calibration	September 22, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:20	End Time (MST)	13:30
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999965
16.86	16.87	0.9992		
8.42	8.38	1.0047	Slope	0.997619
4.22	4.13	1.0215		
			Intercept	0.046142





# Wood Buffalo Environmental Association

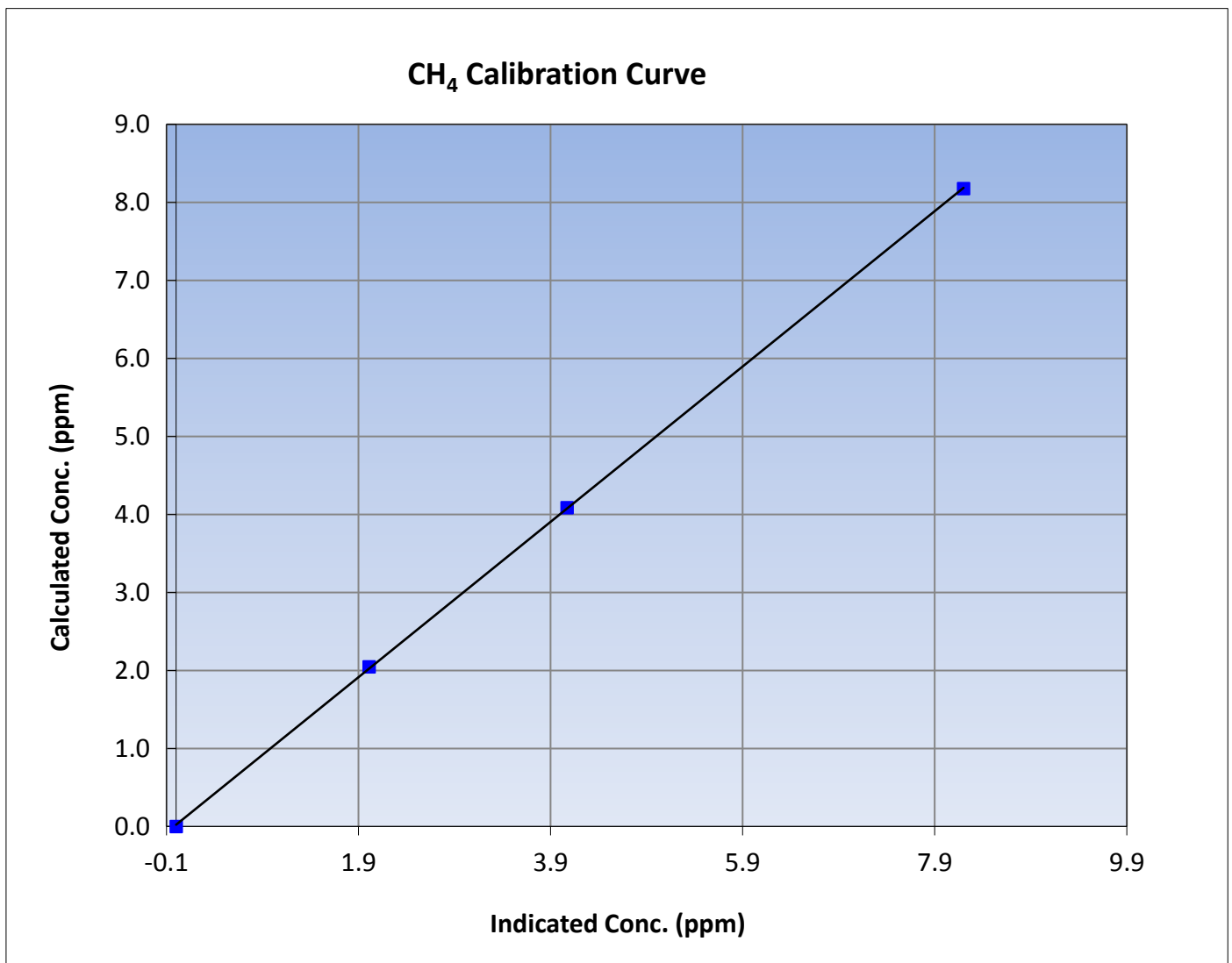
## CH<sub>4</sub> Calibration Summary

### Station Information

Calibration Date	October 19, 2015	Previous Calibration	September 22, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:20	End Time (MST)	13:30
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999967
8.18	8.20	0.9970		
4.08	4.07	1.0033	Slope	0.995613
2.05	2.01	1.0180		
			Intercept	0.022020





# Wood Buffalo Environmental Association

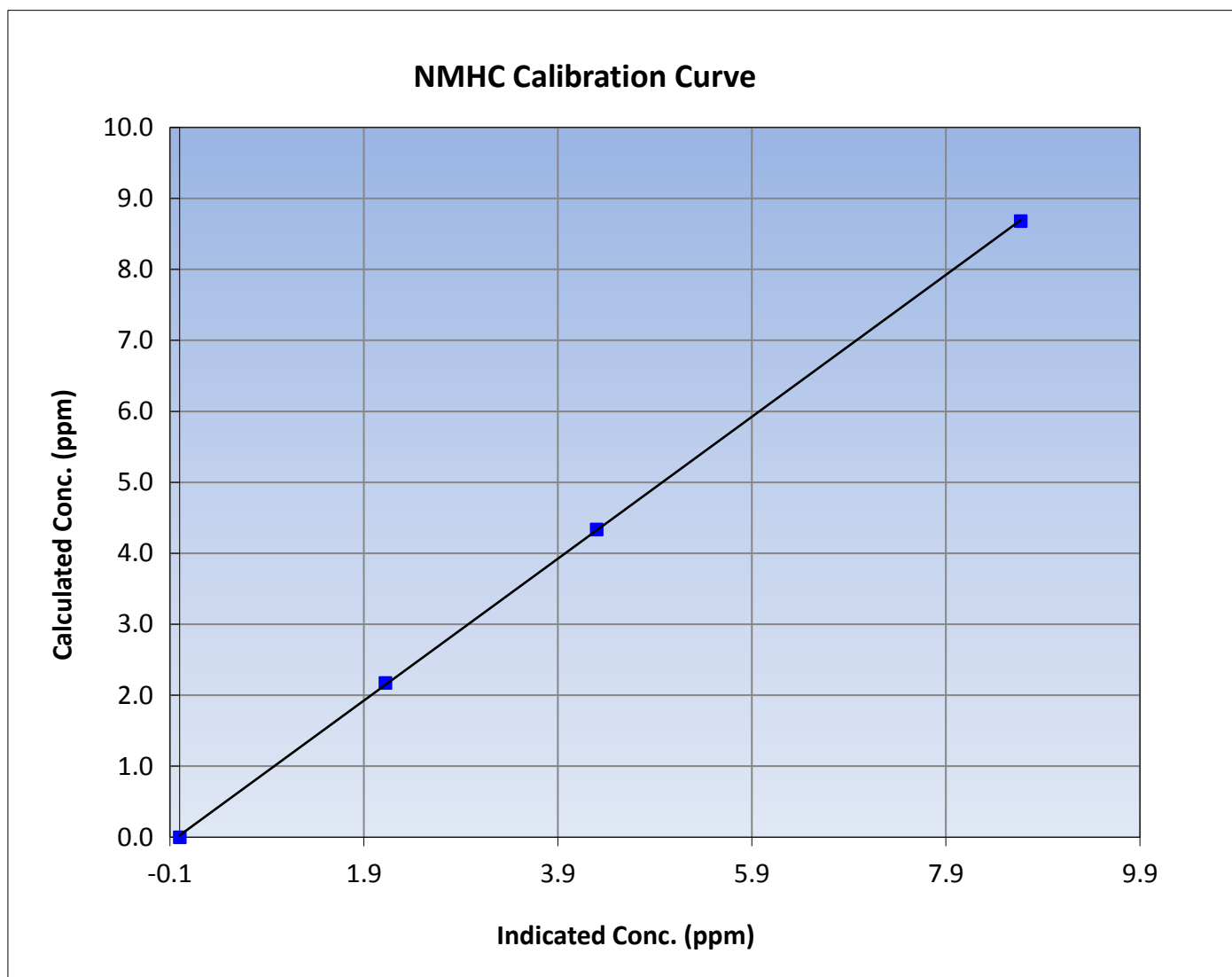
## NMHC Calibration Summary

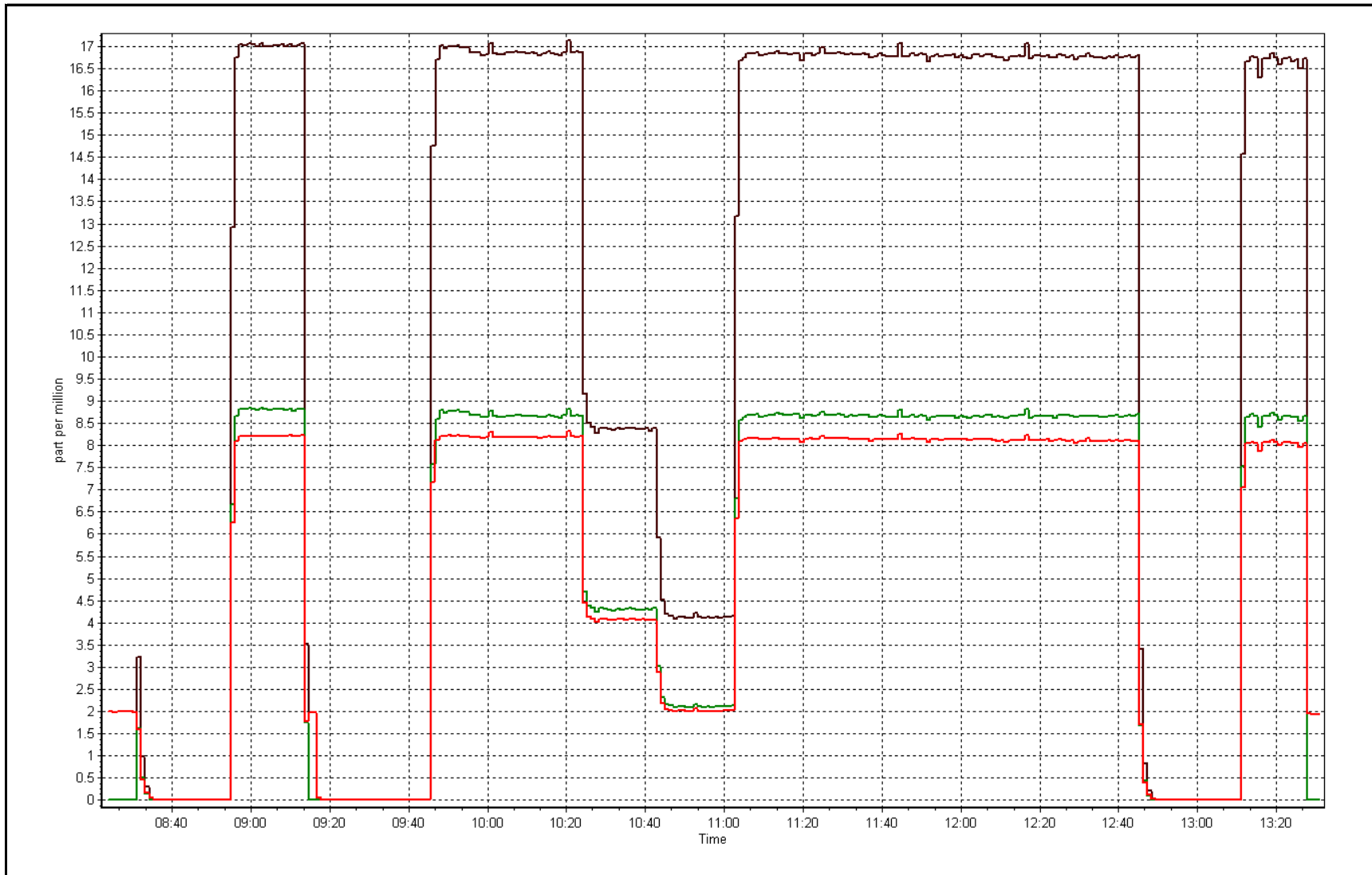
### Station Information

Calibration Date	October 19, 2015	Previous Calibration	September 22, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:20	End Time (MST)	13:30
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999959
8.68	8.67	1.0012		
4.34	4.30	1.0083	Slope	0.999641
2.17	2.12	1.0248		
			Intercept	0.026146







# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 20, 2015	Previous Calibration	September 25, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	12:05
NO2 GPT Ref date	October-19-15	Transfer Standard	23
		Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	14300410
ZAG make/model	Teledyne API 701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	Serial Number	9036

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	25.7	26.1
Analyzer IP address	192.168.1.48		Lamp temp.	53.4	53.5
Calculated slope	0.998285	0.998304	Pressure	668.5	670.0
Calculated intercept	-0.866702	-1.330325	Flow cell A	0.709	0.709
Analyzer Background	-1.6	-1.7	Flow cell B	0.730	0.731
Analyzer Coefficient	0.995	1.050	Cell A Intensity	79200	78540
			Cell B Intensity	74250	73335

Analyzer make Thermo 49i      Analyzer serial # 1300156234

### Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.00	0.0	0.4	----
as found span	6000	0.78	410.9	391.9	1.048
calibrator zero	6000	0.00	0.0	0.4	----
high point	6000	0.78	410.9	411.9	0.998
second point	6000	0.52	256.8	260.0	0.988
third point	6000	0.26	109.1	111.3	0.981
as left zero	6000	0.00	0.0	-0.1	----
as left span	6000	0.78	410.9	406.6	1.011
Average Correction Factor					0.989

Corrected As found 391.6      Previous response 412.5      % change 5.3%

**Notes:**

Filter changed after as founds. Span adjusted.

Calibration Performed By: Devin Russell



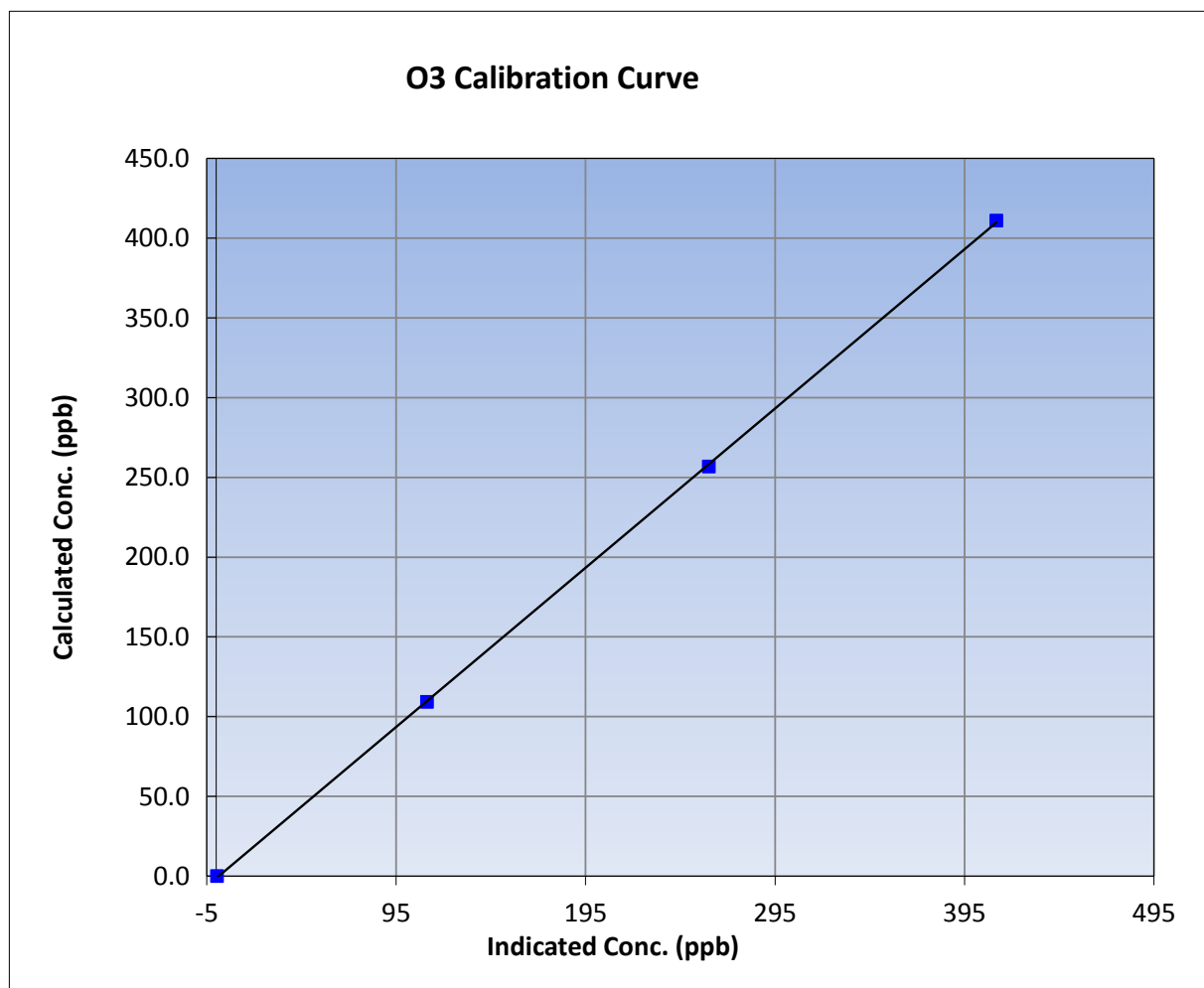
## Wood Buffalo Environmental Association O3 Calibration Report

### Station Information

Calibration Date	October-20-15	Previous Calibration	September 25, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:00	End Time (MST)	12:05
Analyzer make	Thermo 49i	Analyzer serial #	1300156234

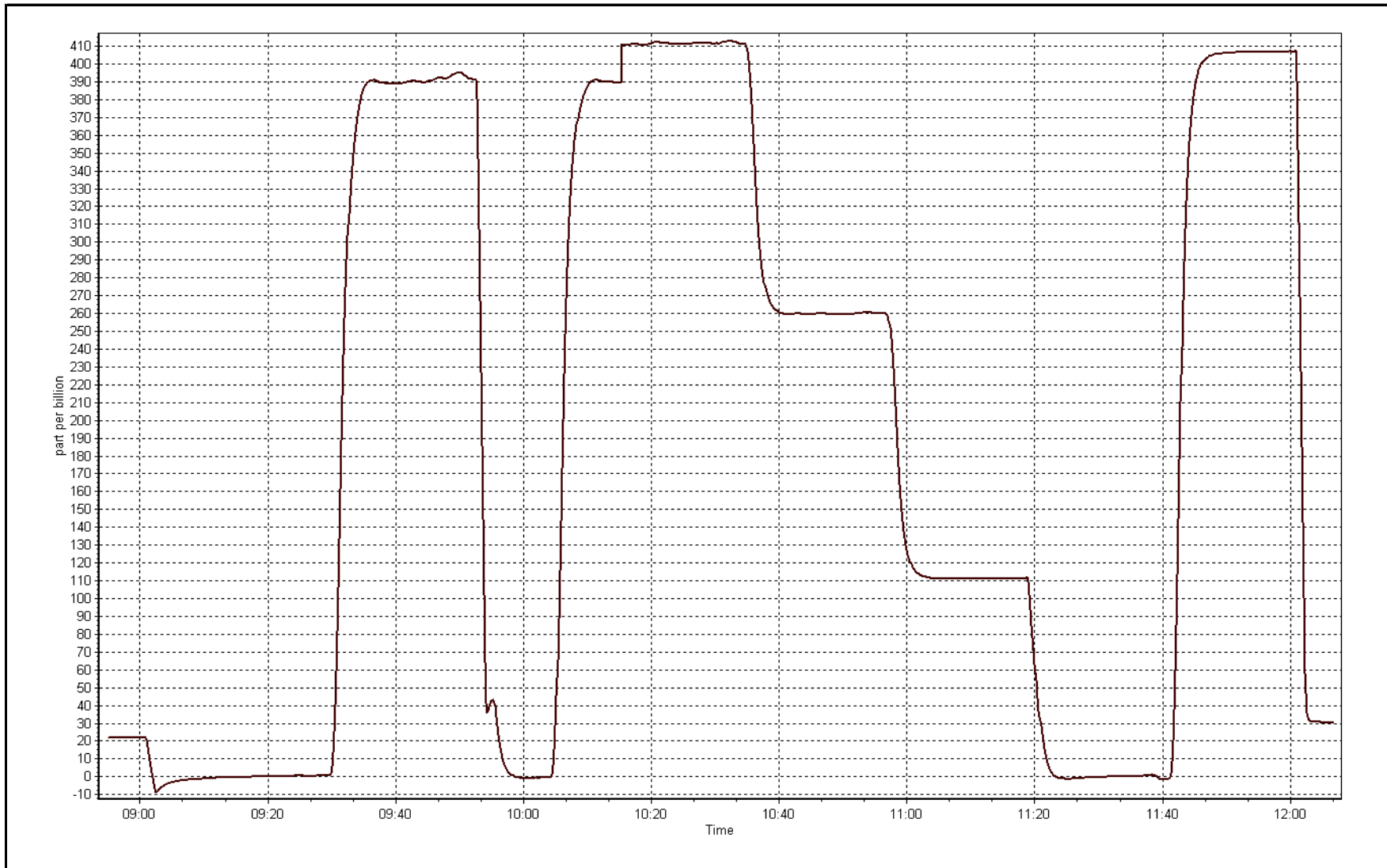
### Calibration Data

Calculated concentration (ppb) (Cc)	19-Oct-15	Correction factor (Cc/lc)	Statistical Evaluation	
0.0	0.4	----	Correlation Coefficient	0.999953
410.9	411.9	0.9976		
256.8	260.0	0.9878	Slope	0.998304
109.1	111.3	0.9807		
			Intercept	-1.330325



O3 Calibration Plot

Date: October 20, 2015





# Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

## Station Information

Calibration Date	October 19, 2015	Previous Calibration	September 22, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	8:20	End Time (MST)	13:30
NO Cal Gas Conc	50.7 ppm	Gas Cert Reference	EY0000355
NOx Cal Gas Conc	50.7 ppm	Cal Gas Expiry Date	18/09/2018
Calibrator	Sabio 4010	Serial Number	14300410
Zero air Generator	Teledyne API T701	Serial Number	60

## DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9036
-------------------	----------------------------	-----------------	------

## Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.998144	0.992328	1.002938
	Data Offset	-0.242261	0.034875	0.981015
Current Calibration	Data Slope	0.996091	1.000149	1.000146
	Data Offset	0.323623	0.784267	-0.841005

## Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153460
---------------------	------------	-------------------	------------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.43		192.168.1.43	
NO coefficient	1.019		1.044	
NOx coefficient	0.993		1.002	
NO2 coefficient	1.000		1.000	
NO bkgrnd	2.5		2.600	
NOx bkgrnd	2.8		2.900	
Chamber Temp	50.6	Deg C	50.500	Deg C
Moly Temp	327.4	Deg C	326.800	Deg C
PMT voltage	-761.5	V	-761.100	V
PMT Temp	-2.9	Deg C	-3.000	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	166.7	mmHg	165.800	mmHg
R Cell Press Nox	166.7	mmHg	165.800	mmHg
NO sample flow	0.874	lpm	0.871	lpm
Nox sample Flow	0.874	lpm	0.871	lpm

**Notes:**

Inlter filter changed after as founds. Span adjusted. Second High NO point used for GPT reference.





# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date: October 19, 2015 Station Number: AMS 6

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	6000	0.0	0.0	0.0	0.0	0.1	0.1	0.0	----	----
as found span	6000	94.7	800.2	800.2	0.0	776.3	780.2	-3.9	1.0308	1.0257
calibrator zero	6000	0.0	0.0	0.0	0.0	0.2	0.1	0.1	----	----
high point	6000	94.7	800.2	800.2	0.0	802.7	799.1	3.5	0.9969	1.0014
second point	6000	47.3	399.7	399.7	0.0	402.5	400.2	2.3	0.9930	0.9986
third point	6000	23.7	200.3	200.3	0.0	199.0	197.4	1.6	1.0065	1.0148
as left zero	6000	0.0	0.0	0.0	0.0	0.3	0.1	0.2	----	----
as left span	6000	94.7	800.2	391.6	408.6	808.0	409.3	398.7	0.9904	0.9569
Average Correction Factor									0.9988	1.0049

Corrected As found NO<sub>x</sub>= 776.2 NO= 780.1 Percent Change NO<sub>x</sub>= 3.3% NO= 3.4%  
 Previous Response NO<sub>x</sub>= 801.9 NO= 806.4

### GPT Calibration Data

Dilution Flow 6000 ccm Source Gas Flow 94.70 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.1			N/A	
1st NO2 (300)	----	391.6	410.9	802.8	391.6	411.2	0.9814	1.0000	0.9992	100.1%
2nd NO2 (200)	----	545.7	256.8	803.7	545.7	258.0	0.9802	1.0000	0.9953	100.5%
3rd NO2 (100)	----	693.4	109.1	804.1	693.4	110.7	0.9797	1.0000	0.9851	101.5%
4th NO2 (0)	802.5	----	2.6	805.1	802.5	2.7	0.9784	1.0000	N/A	----
Average Correction Factor							0.9799	1.0000	0.9932	100.7%

Calibration Performed By: Devin Russell



# Wood Buffalo Environmental Association

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

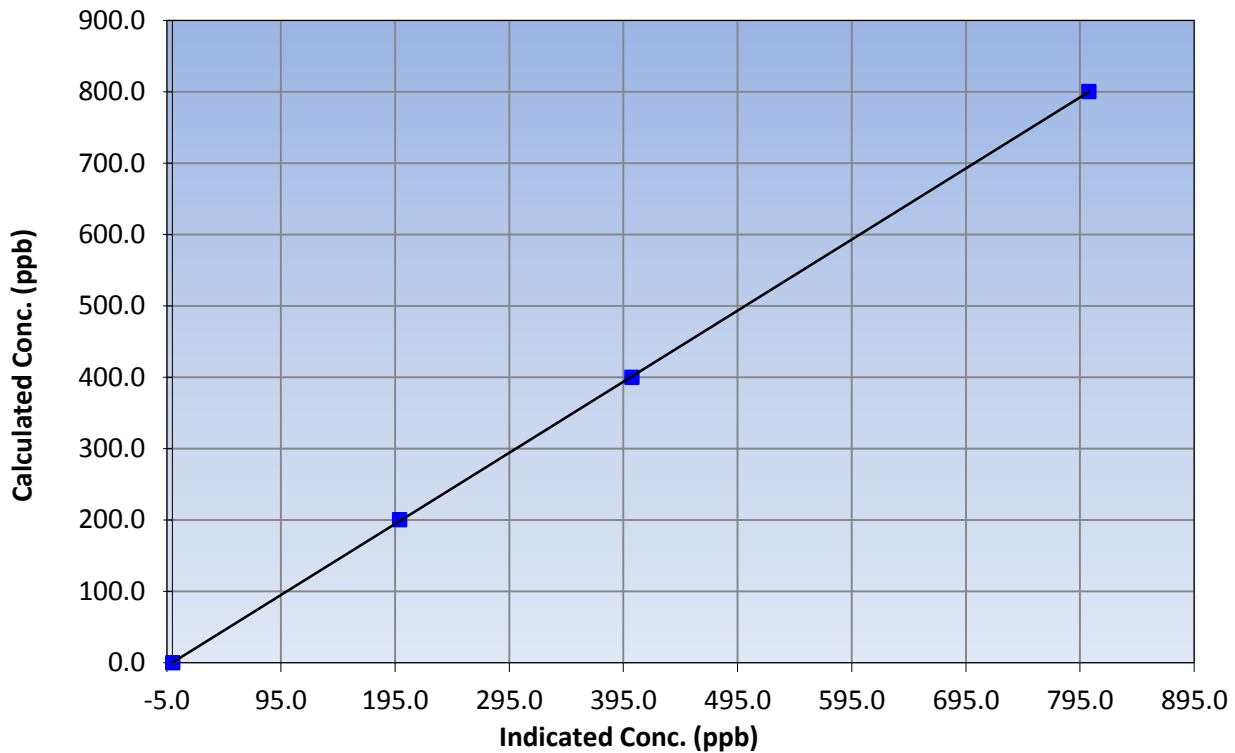
### Station Information

Calibration Date	October 19, 2015	Previous Calibration	September 22, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:20	End Time (MST)	13:30
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999983
800.2	802.7	0.9969		
399.7	402.5	0.9930	Slope	0.996091
200.3	199.0	1.0065		
			Intercept	0.323623

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

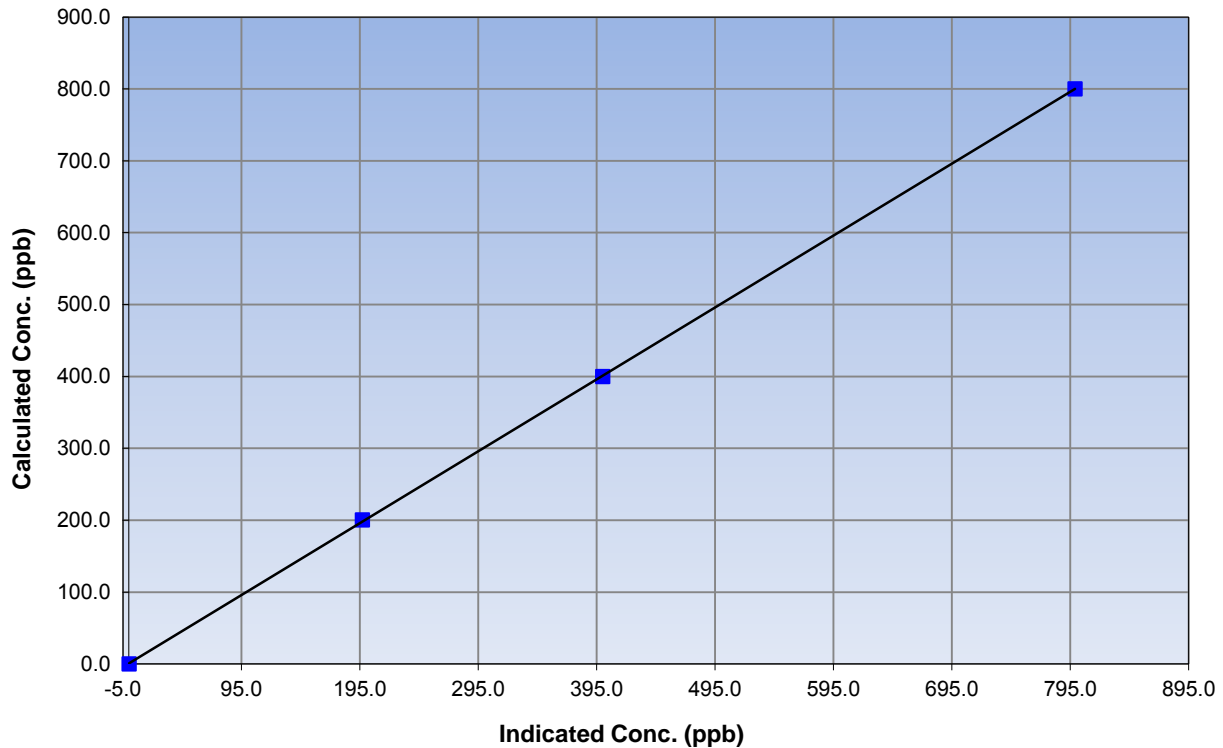
### Station Information

Calibration Date	October 19, 2015	Previous Calibration	September 22, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:20	End Time (MST)	13:30
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999979
800.2	799.1	1.0014		
399.7	400.2	0.9986	Slope	1.000149
200.3	197.4	1.0148		
			Intercept	0.784267

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

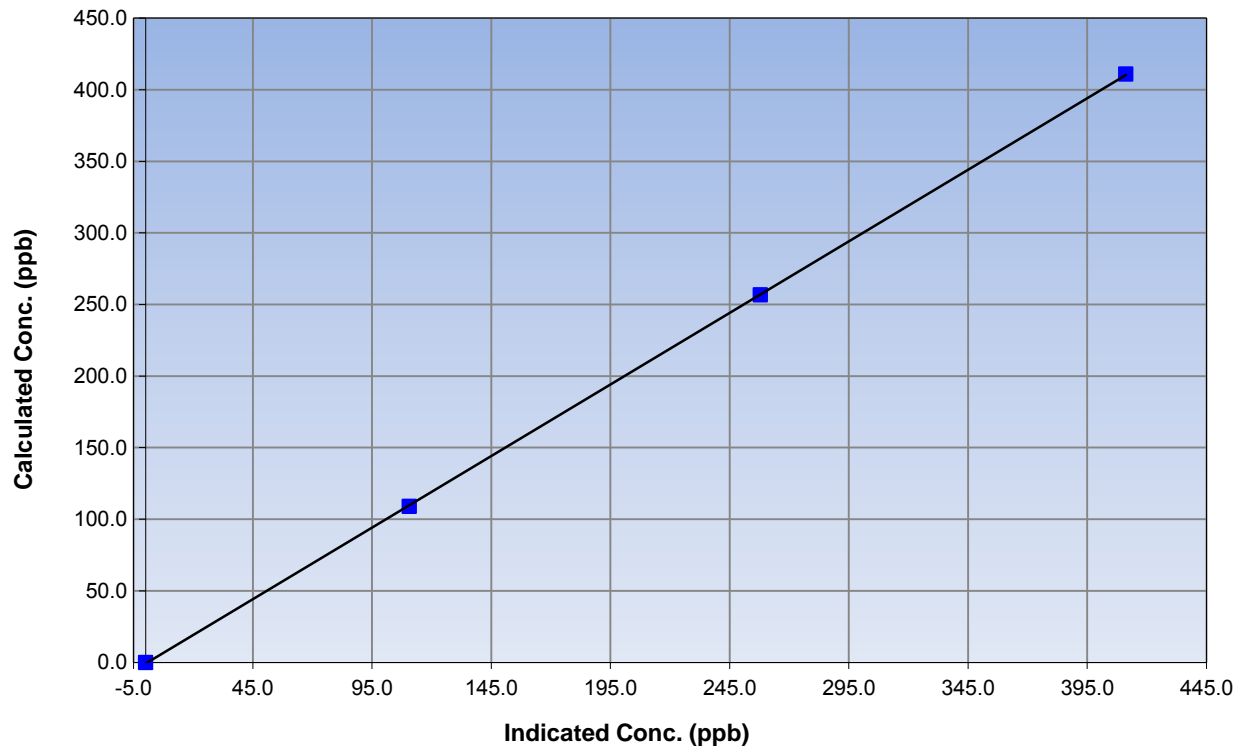
### Station Information

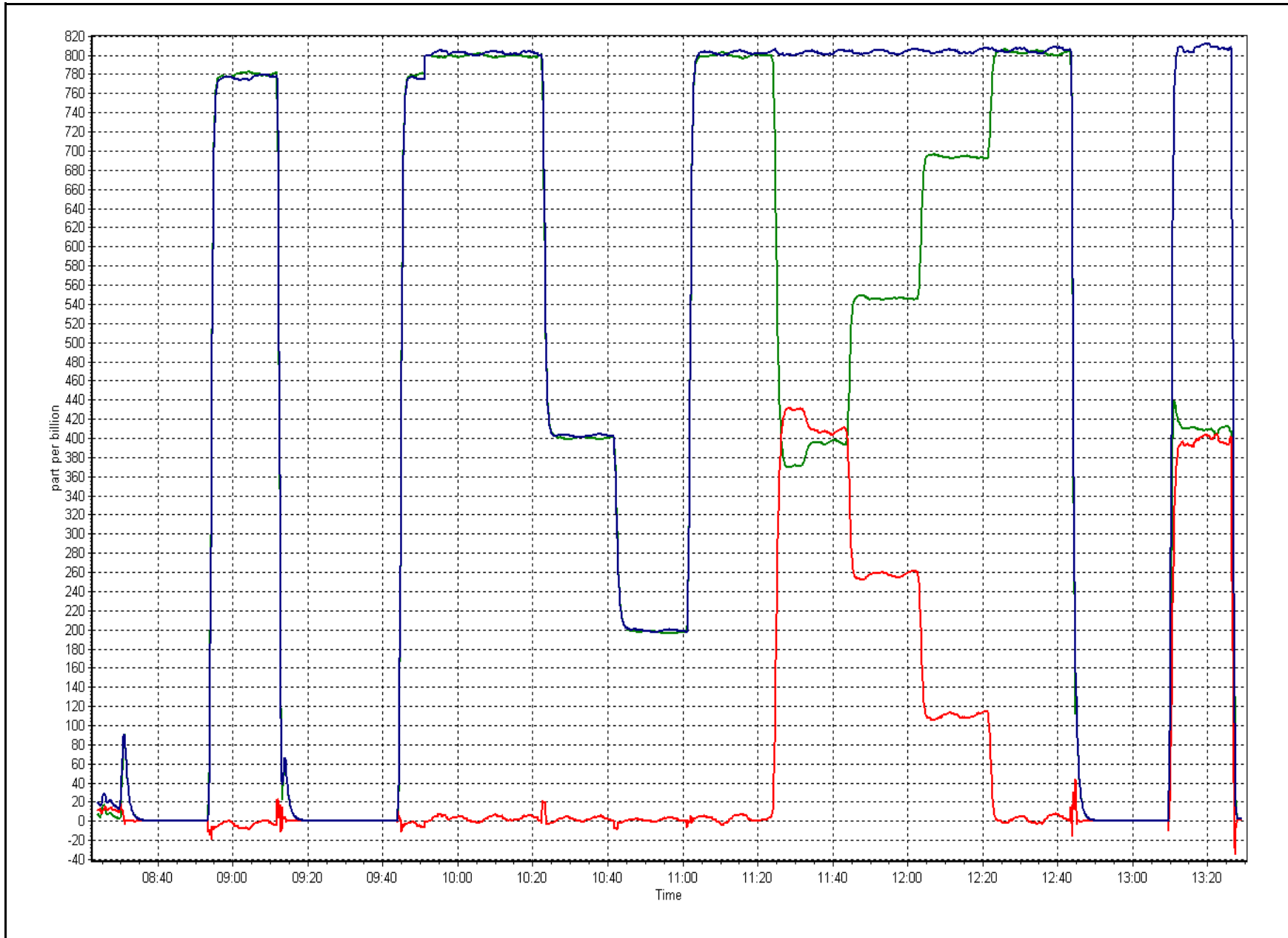
Calibration Date	October 19, 2015	Previous Calibration	September 22, 2015
Station Number	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:20	End Time (MST)	13:30
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999983
410.9	411.2	0.9992		
256.8	258.0	0.9953	Slope	1.000146
109.1	110.7	0.9851		
			Intercept	-0.841005

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







# Wood Buffalo Environmental Association

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

### Station Information

Station Name	Patricia McInnis	Station Number	AMS 6
NOx Calibration Date	October 19, 2015	NOx Previous Cal Date	September 22, 2015
NH3 Calibration Date	October 19, 2015	NH3 Previous Cal Date	September 23, 2015
Reason:	Routine		
Start Time (MST)	8:20	End Time (MST)	16:00
Calibrator	Sabio 4010	Station Temperature	21.0 Deg C
NH3 Cal Gas Conc	75.1 ppm	Serial Number	14300410
NOx Cal Gas Conc	50.7 ppm	NH3 Expiry Date / SN	4/Aug/2012 SGAL-3617
NO Cal Gas Conc	50.7 ppm	NO Expiry Date / SN	18/Sep/2018 EY0000355

### DACs Information

DACS make & model Campbell Scientific CR3000      DACS serial No. 9036

Parameter		NH3	Nt	NOx	NO	NO2
Cal Stats As Found	Data Slope	0.952121	0.940780	0.998053	0.995976	1.008884
	Data Offset	-5.813997	-6.604802	-1.018915	-0.343045	-0.097960
Cal Stats After	Data Slope	0.998912	0.986107	1.010122	1.003429	1.005609
	Data Offset	-4.365037	-5.032690	0.362104	1.939237	0.186767
IP address		192.168.1.17				

### Analyzer Information

Analyzer make/model	API T201	Analyzer serial #	215
Converter	API 501 NH#	Converter serial #	217

Test Point	before		after	
NH3 Conc range	2500	ppb	2500	ppb
NOx Conc range	1000	ppb	1000	ppb
NO BKG	-1.2	ppb	-1.2	ppb
NOx BKG	-0.6	ppb	-0.6	ppb
Nt BKG	-0.4		-0.4	
NO coefficient	1.074		1.069	
NO2 coefficient	1.000	ppb	1.000	ppb
NOx coefficient	1.084		1.072	
NH3 coefficient	NA		0.964	
Nt coefficient	1.072		1.066	
NH3 conv temp	825	DegC	825	Deg C
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	314.4	Deg C	314.8	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O3 flow	86.0	ccm	85.0	ccm
R Cell Press	4.5	mmHg	4.4	mmHg
PMT Voltage	693.0	v	693.0	v
Sample Flow 1 NO	555.0	ccm	553.0	ccm
Sample Flow 2 Nox	555.0	ccm	553.0	ccm
Sample Flow 3 Nt	555.0	ccm	553.0	ccm

Notes:

Inler filter changed after as founds. NO/Nox span adjusted. NH3 span adjusted.



# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date:

October 19, 2015

Station Number:

AMS 6

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

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated Nt conc (ppb)	Calculated NOx conc (ppb)	Calculated NH <sub>3</sub> conc (ppb)	Indicated Nt conc (ppb)	Indicated NOx conc (ppb)	Indicated NH <sub>3</sub> conc (ppb)	Nt Correction factor	NH <sub>3</sub> Correction factor
as found zero	6000	0.0	0.0	0.0	0.0	-0.9	-1.1	0.3	----	----
as found NO	6000	94.7	800.2	800.2	----	798.7	798.1	0.5	1.002	----
calibrator zero	6000	0.0	0.0	0.0	0.0	0.5	-0.3	0.7	----	----
high NO point	6000	94.7	800.2	800.2	----	788.8	791.3	-2.6	1.014	----
NO/O <sub>3</sub> point	6000	94.7	800.2	800.2	----	796.2	796.0	0.3	1.005	----
as found NH <sub>3</sub>	3500	93.2	1999.8	NA	1999.8	2040.5	25.5	2015.0	0.980	0.992
first NH <sub>3</sub>	3500	93.2	1999.8	NA	1999.8	2029.0	25.8	2003.1	0.986	0.998
second NH <sub>3</sub>	3500	46.6	999.9	NA	999.9	1026.7	15.3	1011.3	0.974	0.989
third NH <sub>3</sub>	3500	23.3	500.0	NA	500.0	513.3	7.5	505.8	0.974	0.988
Average Correction Factor									1.0097	0.9918

NH<sub>3</sub> Corrected As Found  
 Nt Corrected As Found  
 NO<sub>x</sub> Corrected As Found

NH<sub>3</sub> = 2014.7 ppb  
 Nt = 799.6 ppb  
 NO<sub>x</sub> = 799.3 ppb

Previous Response  
 Previous Response  
 Previous Response

NH<sub>3</sub> = 2106.2 ppb  
 Nt = 857.2 ppb  
 NO<sub>x</sub> = 802.8 ppb

NH<sub>3</sub> percent change 4.5%  
 Nt percent change 7.2%  
 NO<sub>x</sub> percent change 0.4%



# Wood Buffalo Environmental Association

## NO<sub>x</sub>(NH<sub>3</sub>) Calibration Report

### Station Information

Calibration Date:

October 19, 2015

Station Number:

AMS 6

### NO<sub>x</sub> / NO / Nt Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO <sub>x</sub> conc (ppb)	Calculated NO conc (ppb)	Calculated Nt conc (ppb)	Indicated NO <sub>x</sub> conc (ppb)	Indicated NO conc (ppb)	Indicated Nt conc (ppb)	NO <sub>x</sub> Correction factor	NO Correction factor
as found zero	6000	0.0	0.0	0.0	0.0	-1.1	-1.1	-0.9	----	----
as found span	6000	94.7	800.2	800.2	800.2	798.1	797.3	798.7	1.0026	1.0037
calibrator zero	6000	0.0	0.0	0.0	0.0	-0.3	-0.2	0.5	----	----
high point	6000	94.7	800.2	800.2	800.2	791.3	796.1	788.8	1.0113	1.0051
second point	6000	47.3	399.7	399.7	399.7	397.1	396.4	398.3	1.0064	1.0083
third point	6000	23.7	200.3	200.3	200.3	196.6	195.3	197.3	1.0189	1.0255
as left zero	6000	0.0	0.0	0.0	0.0	-0.8	-0.8	3.1	----	----
as left span	6000	94.7	800.2	390.3	800.2	784.3	408.0	799.4	1.0203	0.9566
Average Correction Factor									1.0122	1.0130

	<u>Nt</u>	<u>NOX</u>	<u>NO</u>	<u>NO2</u>
Corrected As found	799.6	799.3	798.4	402.0
Previous Response	857.2	802.8	803.8	401.5
Percent Change	7.2%	0.4%	0.7%	-0.1%

### GPT Calibration Data

Total Flow 6000 ccm Source Gas Flow 94.70 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO <sub>2</sub> conc (ppb)	Indicated NO <sub>x</sub> conc (ppb)	Indicated NO conc (ppb)	Indicated NO <sub>2</sub> conc (ppb)	NO <sub>x</sub> Correction factor	NO Correction factor	NO <sub>2</sub> Correction factor	Converter Efficiency
Cal zero			0.0			0.7			----	
1st NO <sub>2</sub> (300)	----	390.3	405.0	793.0	390.3	402.7	1.0091	1.0000	1.0058	99.4%
2nd NO <sub>2</sub> (200)	----	543.4	251.9	794.0	543.4	250.6	1.0078	1.0000	1.0049	99.5%
3rd NO <sub>2</sub> (100)	----	689.0	106.3	793.2	689.0	104.2	1.0089	1.0000	1.0202	98.0%
4th NO <sub>2</sub> (0)	795.3	----	0.7	796.0	795.3	0.7	1.0053	1.0000	----	----
Average Correction Factor							1.0078	1.0000	1.0103	99.0%

Calibration Performed By: Devin Russell





# Wood Buffalo Environmental Association

## NH3 Calibration Summary

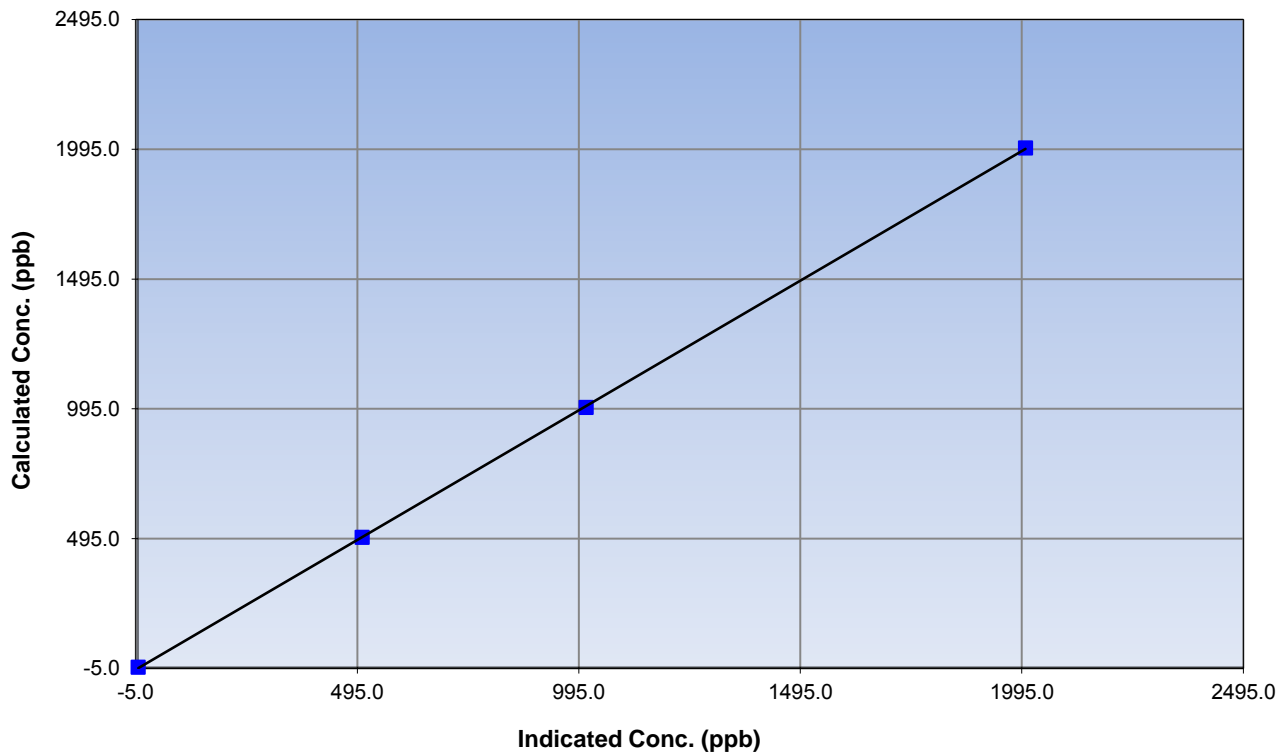
### Station Information

Calibration Date	October 19, 2015	Previous Calibration	September 22, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	8:20	End Time (MST)	16:00
Analyzer make	API T201	Analyzer serial #	215

### NH3 Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.7	----	Correlation Coefficient	0.999972
1999.8	2003.1	0.9984		
999.9	1011.3	0.9887	Slope	0.998912
500.0	505.8	0.9884		
			Intercept	-4.365037

### NH3 Calibration Curve





# Wood Buffalo Environmental Association

## Nt Calibration Summary

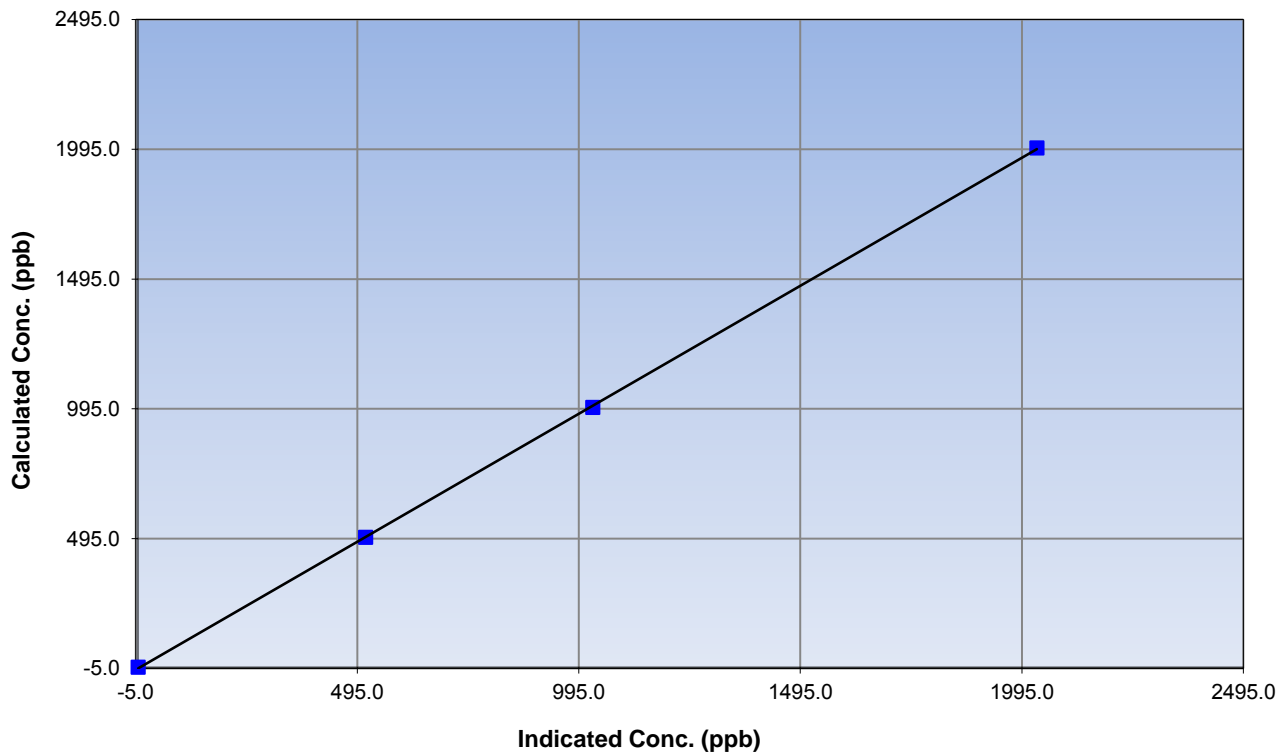
### Station Information

Calibration Date	October 19, 2015	Previous Calibration	September 22, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	8:20	End Time (MST)	16:00
Analyzer make	API T201	Analyzer serial #	215

### Nt (NH<sub>3</sub>) Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	----	Correlation Coefficient	0.999957
1999.8	2029.0	0.9856		
999.9	1026.7	0.9739	Slope	0.986107
500.0	513.3	0.9739		
			Intercept	-5.032690

### Nt Calibration Curve





# Wood Buffalo Environmental Association

## NOx Calibration Summary

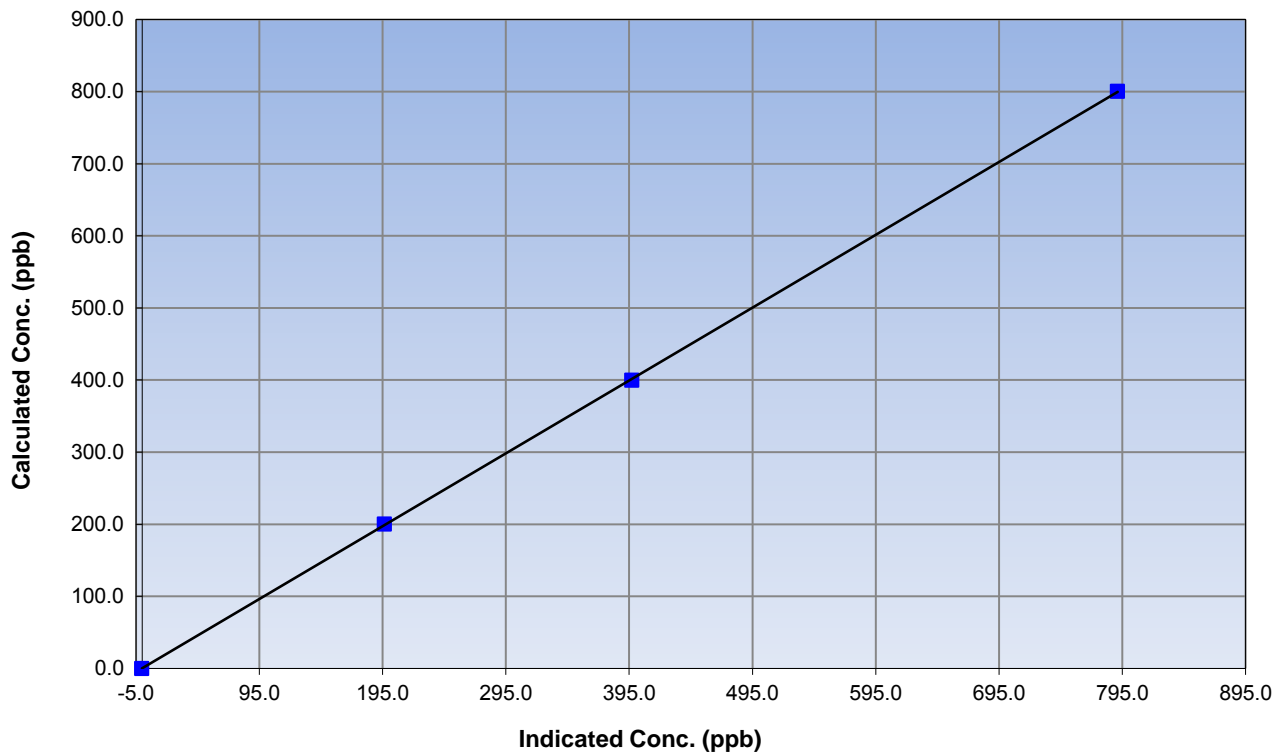
### Station Information

Calibration Date	October 19, 2015	Previous Calibration	September 22, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	8:20	End Time (MST)	16:00
Analyzer make	API T201	Analyzer serial #	215

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

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999984
800.2	791.3	1.0113		
399.7	397.1	1.0064	Slope	1.010122
200.3	196.6	1.0189		
			Intercept	0.362104

### NOx Calibration Curve





# Wood Buffalo Environmental Association

## NO Calibration Summary

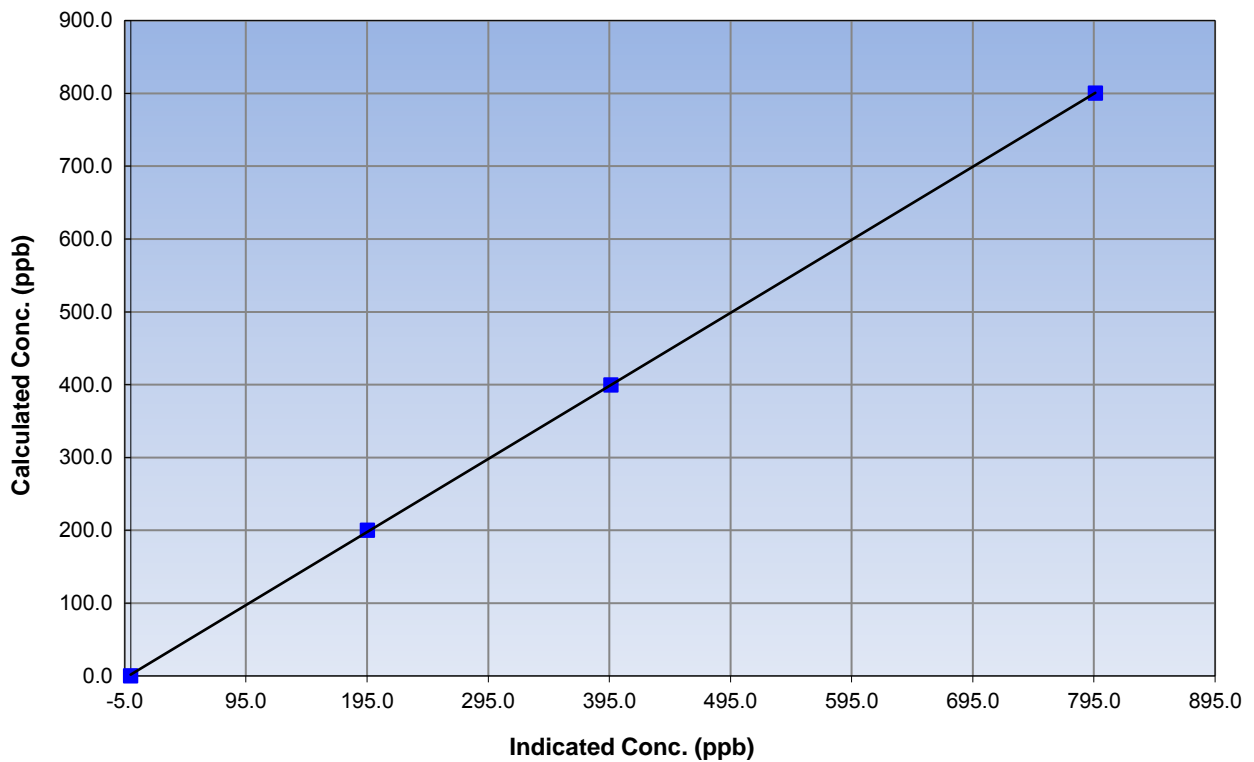
### Station Information

Calibration Date	October 19, 2015	Previous Calibration	September 22, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	8:20	End Time (MST)	16:00
Analyzer make	API T201	Analyzer serial #	215

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999974
800.2	796.1	1.0051		
399.7	396.4	1.0083	Slope	1.003429
200.3	195.3	1.0255		
			Intercept	1.939237

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

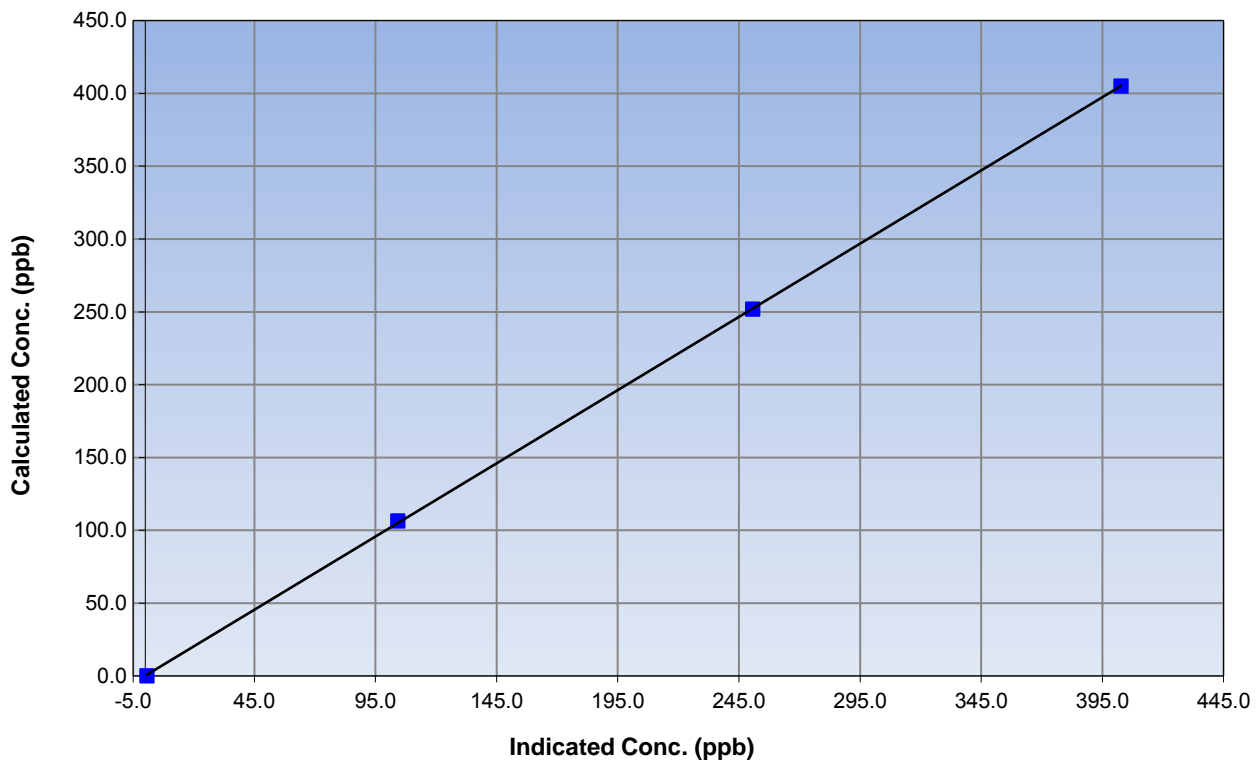
### Station Information

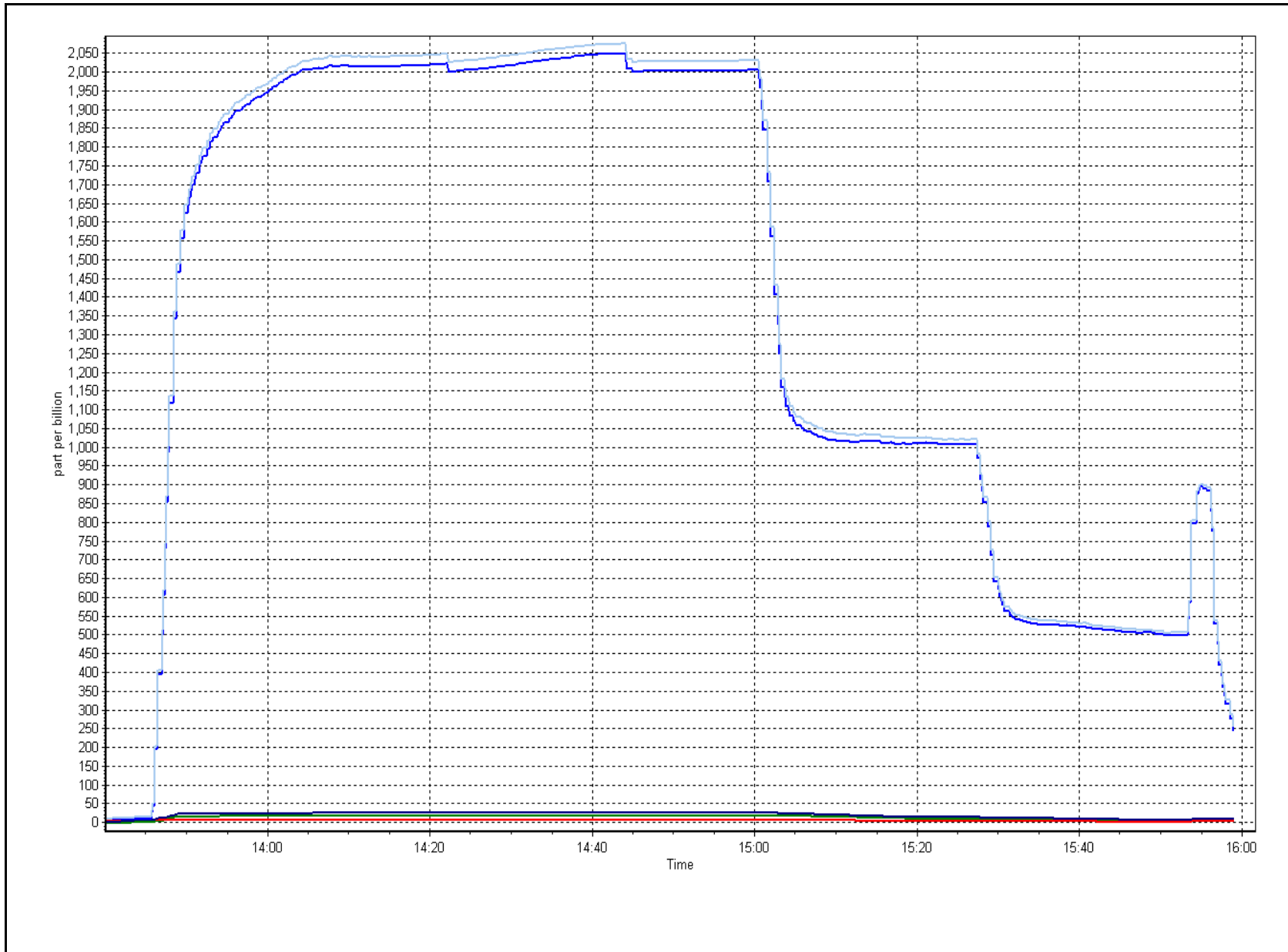
Calibration Date	October 19, 2015	Previous Calibration	September 22, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	8:20	End Time (MST)	16:00
Analyzer make	API T201	Analyzer serial #	215

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.7	----	Correlation Coefficient	0.999971
405.0	402.7	1.0058		
251.9	250.6	1.0049	Slope	1.005609
106.3	104.2	1.0202		
			Intercept	0.186767

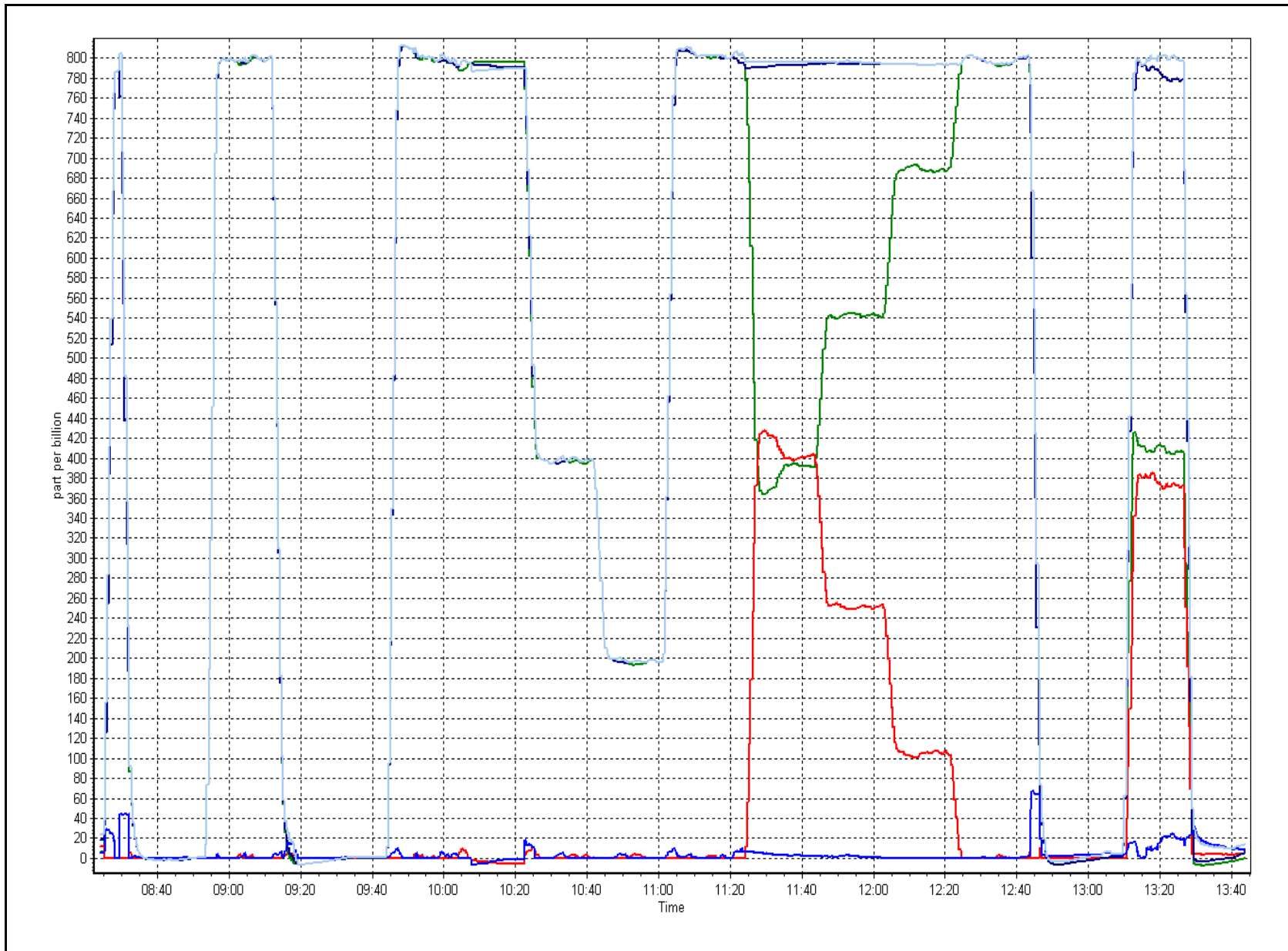
### NO<sub>2</sub> Calibration Curve





NOx Calibration Plot

Date: October 19, 2015





# Wood Buffalo Environmental Association

## SHARP CALIBRATION

### STATION INFORMATION

Calibration Date: October 27, 2015 Previous Calibration: September 28, 2015  
 Station Name: Patricia McInnis Station Number: AMS 6  
 Start Time (MST): 10:20 End Time (MST): 11:00  
 Calibrator Make/Model: Delta Cal Calibrator Serial Number: 1212

### SHARP INFORMATION

Particulate Fraction: PM2.5  
 Make/Model: Thermo / SHARP 5030  
 Serial Number:  
 C<sub>14</sub> Source SN:  
 Confirmation of Time settings: Yes  No   
 Parameters Checked:  T1  T2  T3  T4  P3  Main Flow  Beta  Neph

### CALIBRATION DATA

#### Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	2.0	2.4	0.4	2.0
T2	18.0	na	na	21.0
T3	20.0	na	na	22.0
T4	11.0	na	na	15.0
RH (%)	26.0	na	na	20.0

#### Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	971	969.3	-1.8	971

#### Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	992	-8	992	1000

#### Nephelometer Calibration

Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	202		202
Neph	0.3		0.3
C14	6.9		6.9
Indicated Concentration (ug/m3)	<b>0.2</b>	<b>no</b>	<b>0.2</b>
Offset 1	202.2		202.2
Offset 2	32		32

#### Leak Check (Quarterly)

Leak Check Date: 28/9/15 Previous Leak Check Date:

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	17.10	
*Flow with adaptor (LPM):	16.73	0.37

\*Note - do not attach adaptor without shutting off the pump first

#### Mass Foil Calibration (Annually)

Foil Calibration Date: Previous Foil Calibration: May 20, 2015  
 Zeroed?:  
 Foil Mass: Mass foil set S/N:  
 Previous Correction Factor:  
 New Correction Factor:

### INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

### NOTES:

Cyclone head replaced with new, clean head.

Calibration Performed By: Devin Russell





## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 7  
ATHABASCA VALLEY  
OCTOBER 2015**

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

November 26, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)  
OCTOBER 2015

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	708	36	36	100.00	12	0	3	0
TRS (ppb) Average	709	34	35	99.87	5	0	2	0
THC (ppm) Average	708	36	36	100.00	2.7	-	2.5	-
NMHC (ppm) Average	708	36	36	100.00	0.348	-	0.249	-
CH4(ppm) Average	708	36	36	100.00	2.4	-	2.2	-
O3 (ppb) Average	709	34	35	99.87	43	0	29	-
NO2 (ppb) Average	708	36	36	100.00	31	0	18	-
NO (ppb) Average	708	36	36	100.00	41	-	13	-
NOX (ppb) Average	708	36	36	100.00	62	-	31	-
PM2.5 (ug/m3) Average	739	2	5	99.60	20.9	-	11.4	0
CO(ppm) Average	709	34	35	99.87	0.5	0	0.1	-
Temperature 2 m (C) Average	744	0	0	100.00	26.2	-	16.4	-
Barometric Pressure (inHg) Average	744	0	0	100.00	29.5	-	29.5	-
Relative Humidity (%) Average	744	0	0	100.00	96	-	89	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	33	-	19	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)  
OCTOBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

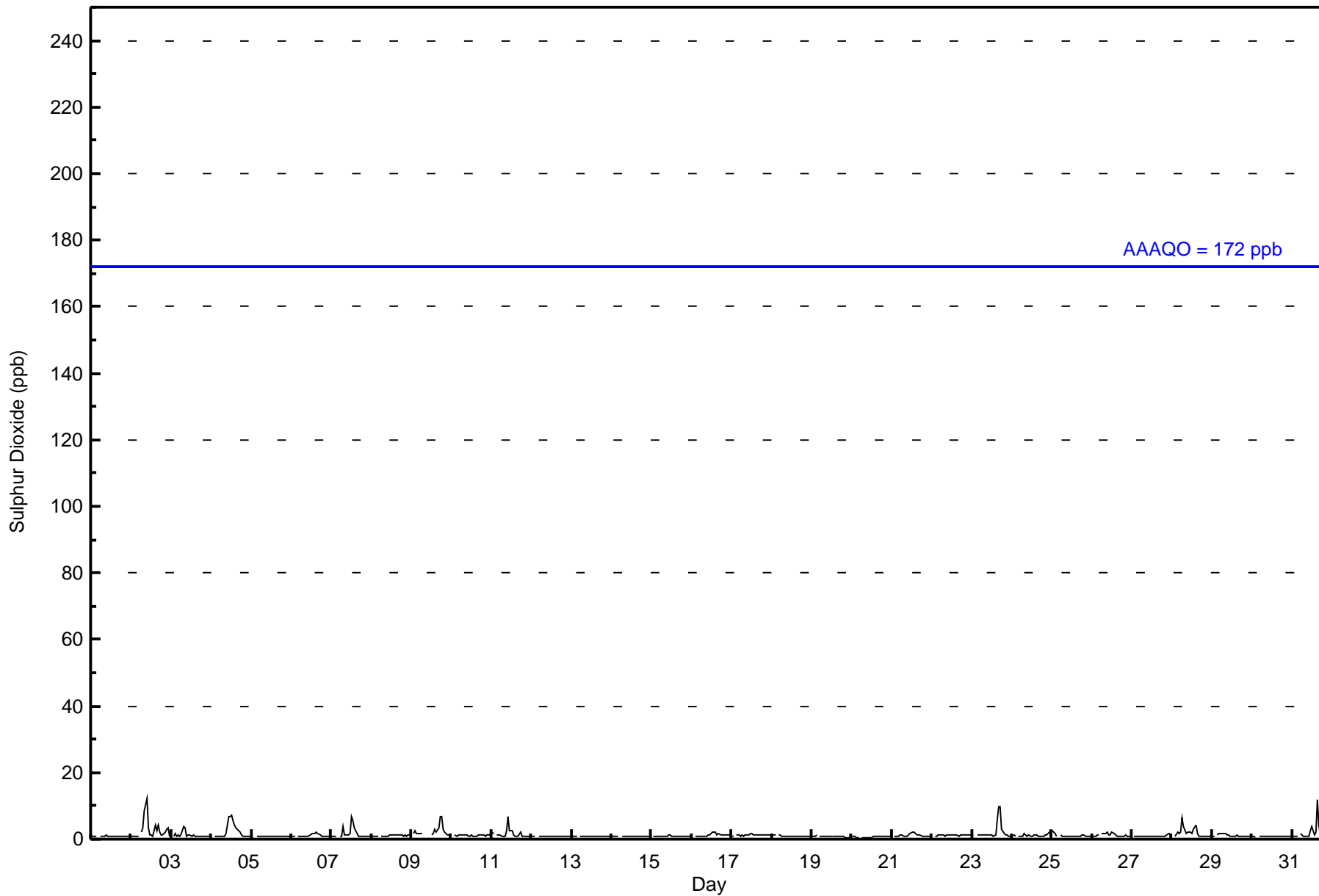
Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	1.3	1	-	0	1	1	1	1	2	12
TRS (ppb) Average	709	0.3	0	-	0	0	0	0	0	0	5
THC (ppm) Average	708	1.94	0.1	-	1.8	1.8	1.9	1.9	2	2.1	2.7
NMHC (ppm) Average	708	0.013	0.05	-	0	0	0	0	0	0	0.348
CH4(ppm) Average	708	1.93	0.1	-	1.8	1.8	1.9	1.9	1.9	2.1	2.4
O3 (ppb) Average	709	14.5	10	-	0	2	6	13	21	29	43
NO2 (ppb) Average	708	7.1	5	-	0	2	3	6	10	13	31
NO (ppb) Average	708	3.3	5	-	0	0	0	1	4	10	41
NOX (ppb) Average	708	10.4	9	-	0	2	4	8	14	23	62
PM2.5 (ug/m3) Average	739	4.6	3.2	-	0.3	1.7	2.5	3.8	5.7	8.8	20.9
CO(ppm) Average	709	0.06	0.1	-	0	0	0	0	0.1	0.1	0.5
Temperature 2 m (C) Average	744	6.11	5.6	-	-3.8	-0.4	1.9	5.3	9.5	13.9	26.2
Barometric Pressure (inHg) Average	744	28.91	0.3	-	28.2	28.5	28.7	28.9	29.1	29.3	29.5
Relative Humidity (%) Average	744	70.3	18	-	21	41	58	76	85	90	96
Wind Speed 10 m (km/h) Average	744	9.9	7	-	0	3	4	8	14	19	33
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)  
OCTOBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS, O3, CO	09 Oct 2015 08:00	09 Oct 2015 08:00	1	Maintenance - sample manifold cleaned
PM2.5	18 Oct 2015 14:00	18 Oct 2015 16:00	3	Unstable operation - excessive baseline drift







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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Athabasca Valley - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	706	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: 708

Total Number of Hours: 744





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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Athabasca Valley - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	39	17	6	11	21	35	165	73	28	21	28	50	44	41	31	96	706
11 - 20	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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>	39	18	6	11	21	35	165	73	28	21	28	50	44	41	31	97	708

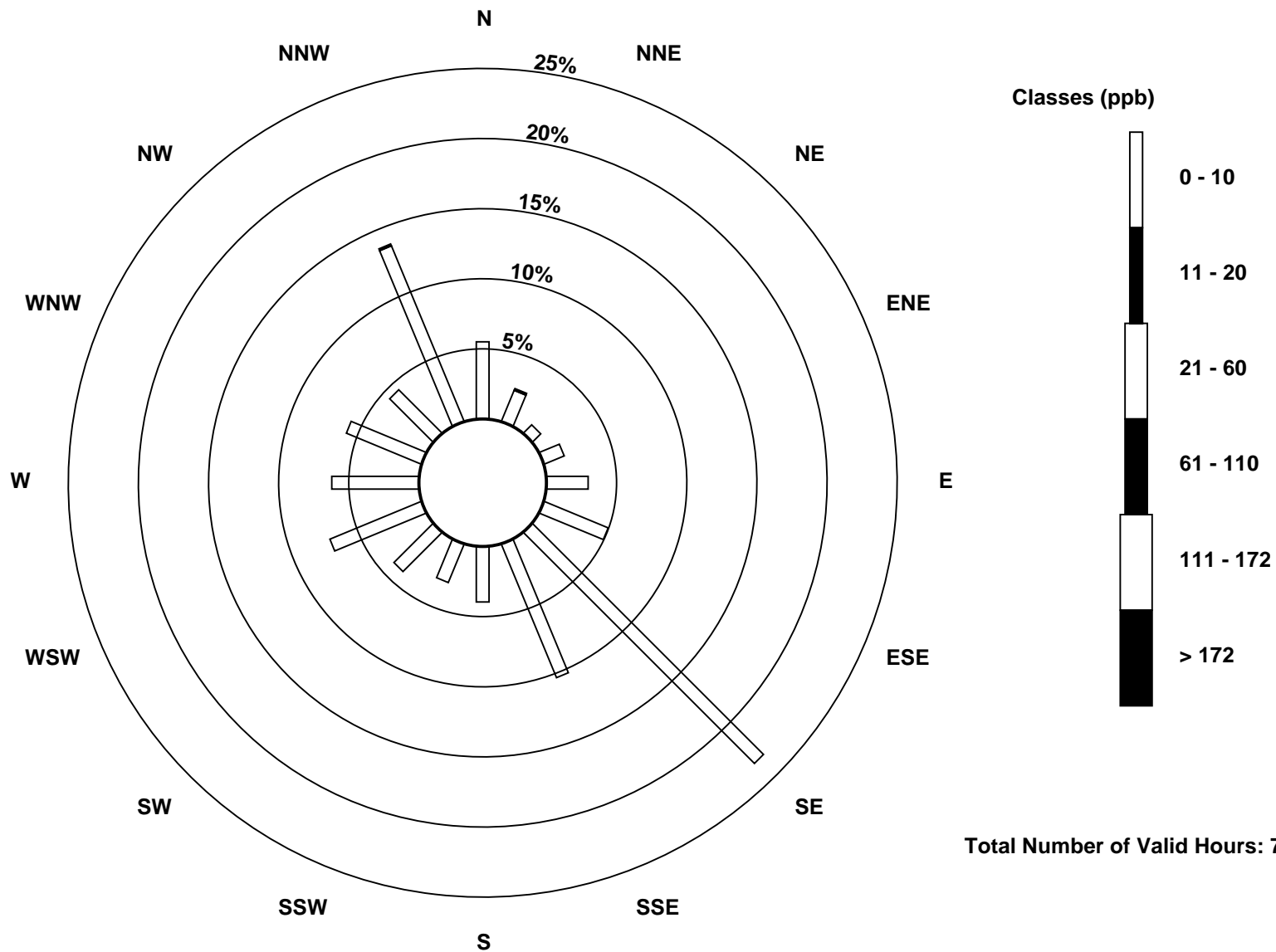
Total Number of Valid Hours: 708

Total Number of Hours: 744

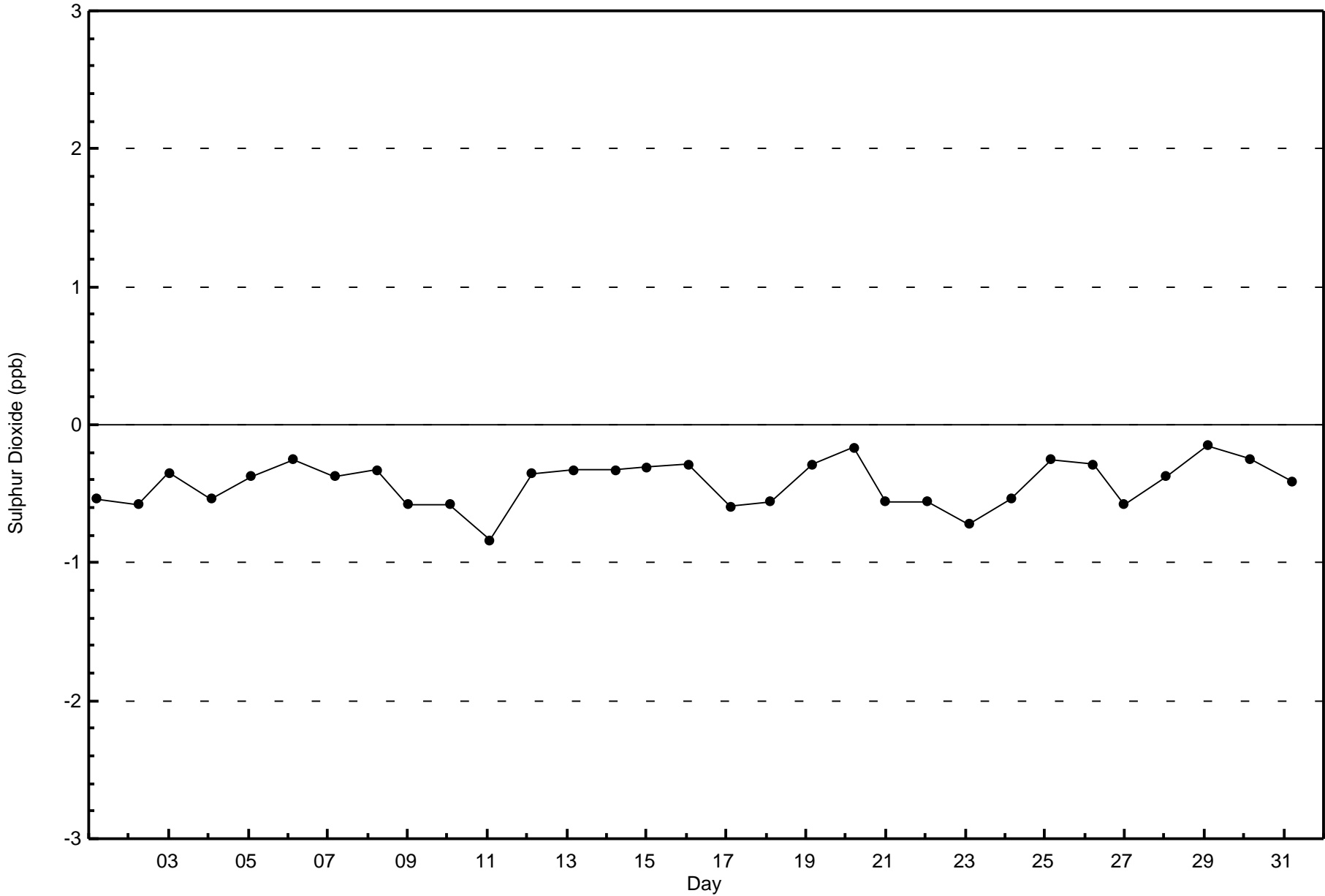


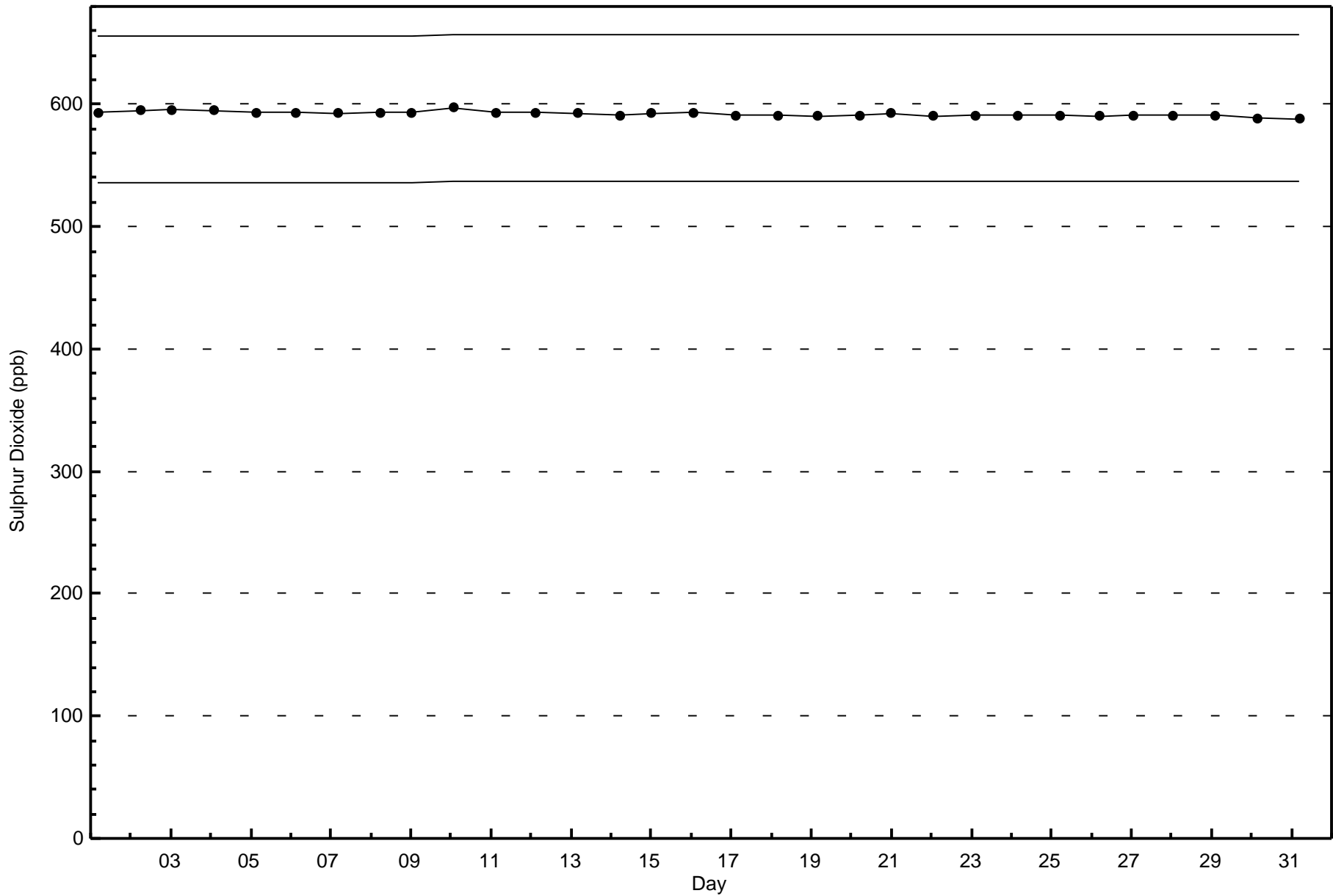
Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Athabasca Valley (AMS 7)



Total Number of Valid Hours: 708





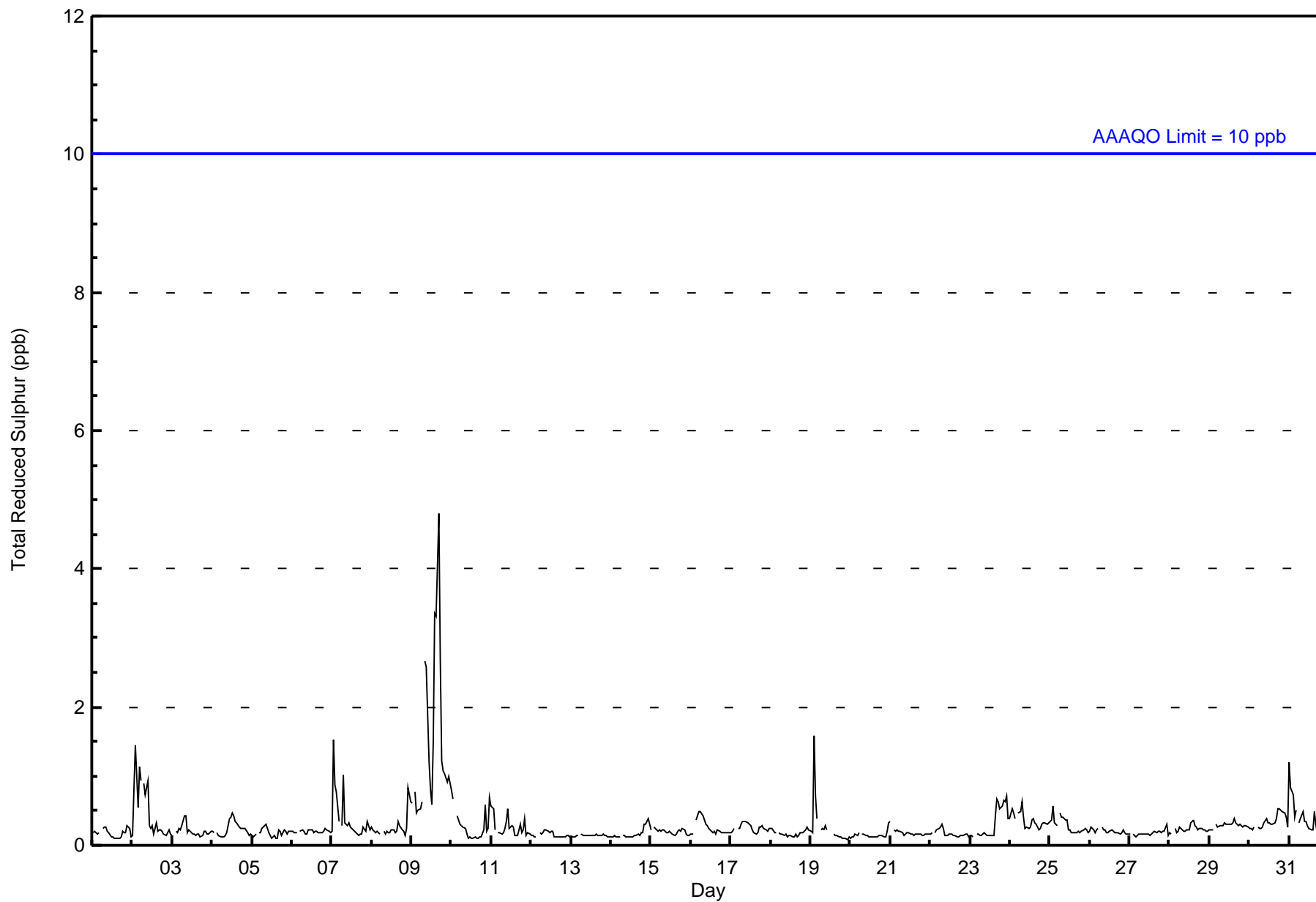


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 5 ppb on Oct 9 17:00	Maximum Daily Average: 1.5 ppb on Oct 9		Hours of Data:	709
Minimum Value: 0 ppb on Oct 19 23:00	Minimum Daily Average: 0.1 ppb on Oct 13		Hours of Missing Data:	35
Maximum Diurnal Average: 0.4 ppb at hour 3	Minimum Diurnal Average: 0.2 ppb at hour 13		Hours of Calibration:	34
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:	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	0.2	0
2-Oct	0	1	1	1	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
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	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
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	0.2	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	0.2	0
7-Oct	0	2	1	1	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
8-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.3	1
9-Oct	1	Z	1	0	1	1	1	M	3	3	1	1	1	1	3	3	5	3	1	1	1	1	1	1	1.5	5
10-Oct	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.3	1
11-Oct	1	1	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
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	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	0.2	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	0.2	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	0.3	0
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	0.3	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	0.2	0
19-Oct	0	0	2	1	0	Z	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0.3	2
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	0.1	0
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	0.2	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	0.2	0
23-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0.3	1
24-Oct	0	1	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
25-Oct	0	0	1	0	0	Z	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	0	Z	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	0.2	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	0.2	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	0.3	0
30-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0.3	1
31-Oct	1	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1

0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.3	0.4	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	Diurnal Average
1	2	2	1	1	1	1	1	1	3	3	1	1	1	1	3	3	5	3	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**  
**Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Athabasca Valley - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	703	99.15	99.15
3 - 4	5	0.71	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: 709

Total Number of Hours: 744



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

**Total Reduced Sulphur (TRS) - ppb**  
**Athabasca Valley - October 2015**

<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	42	17	6	11	22	34	163	73	27	21	27	49	43	43	33	92	703
3 - 4	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	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>	44	18	6	11	22	34	163	73	27	21	27	49	43	43	33	95	709

Total Number of Valid Hours: 709

Total Number of Hours: 744

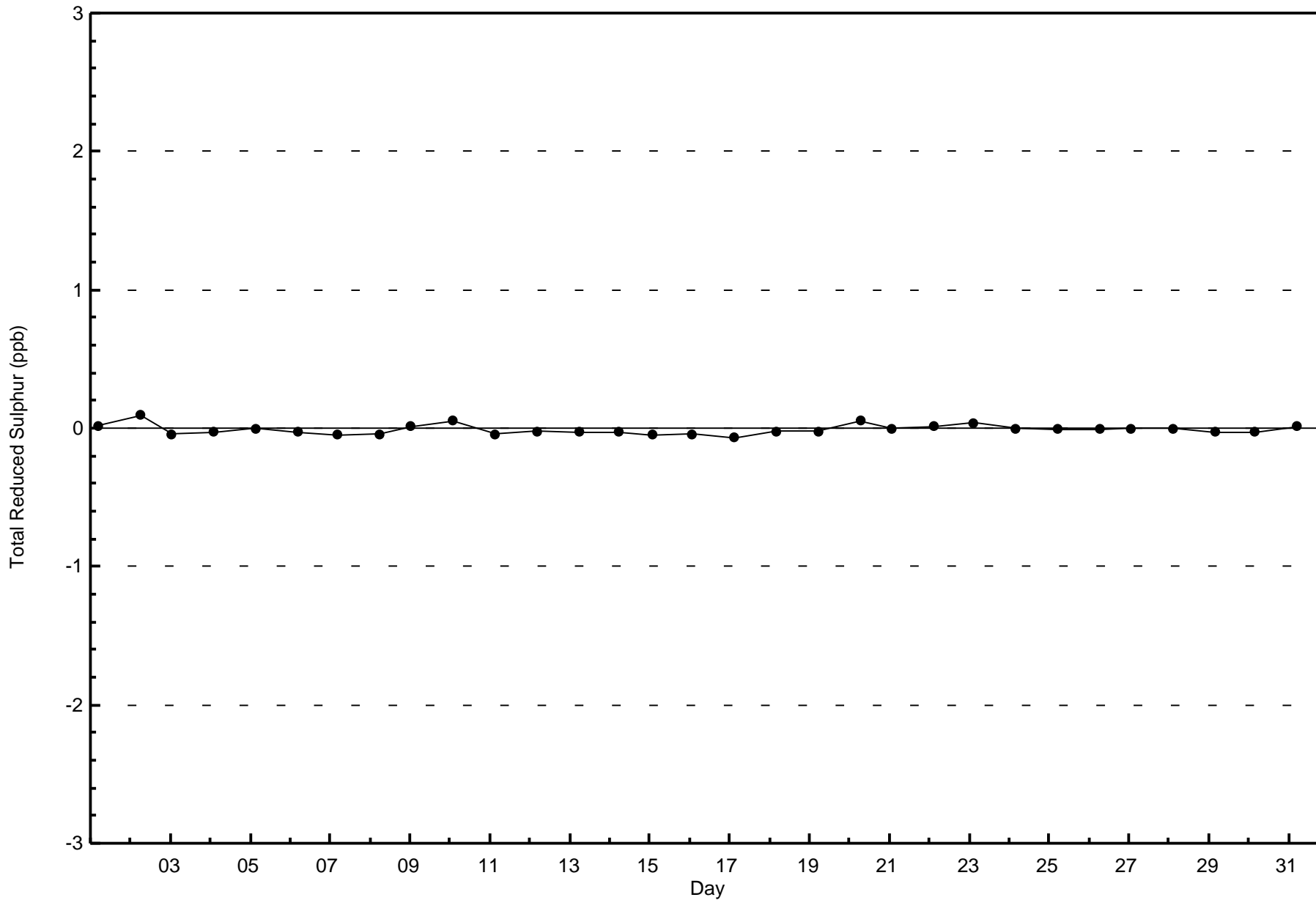


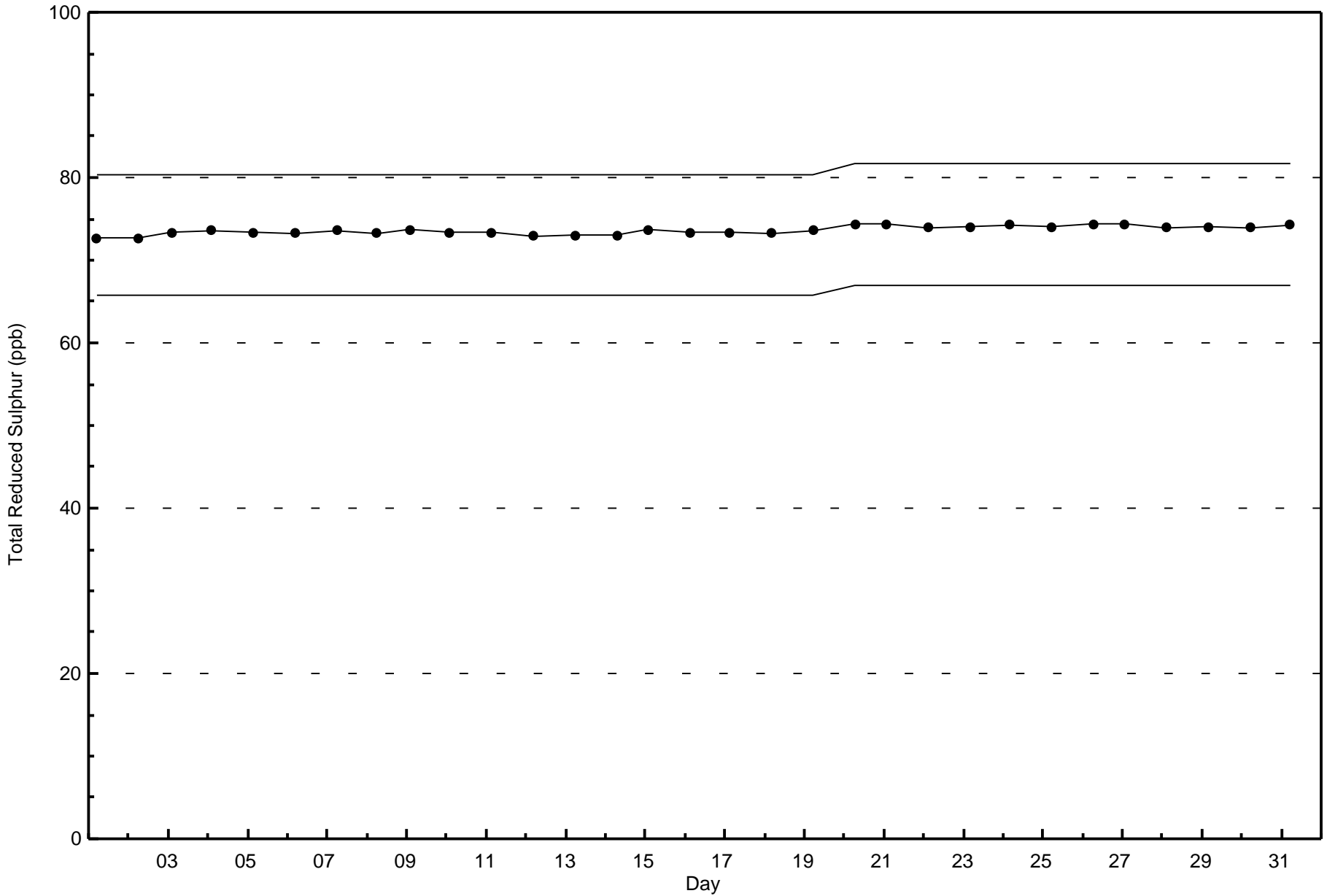




Wood Buffalo Environmental Association  
Zero Responses

Total Reduced Sulphur (TRS) - ppb  
Athabasca Valley - October 2015



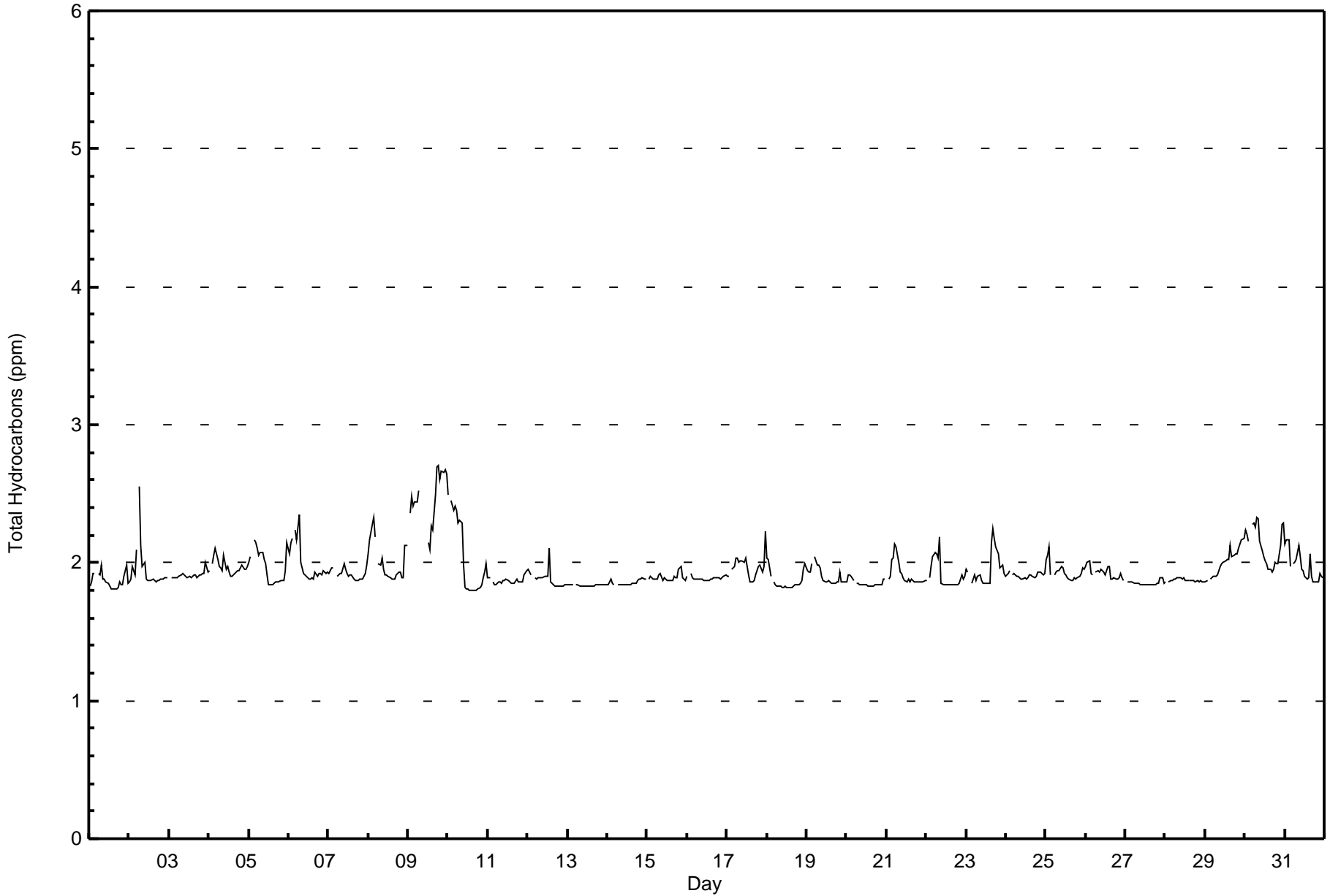






**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Athabasca Valley - October 2015**





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

**Total Hydrocarbons (THC) - ppm**  
**Athabasca Valley - October 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	616	87.01	87.01
2.1 - 3.0	92	12.99	100.00
3.1 - 10.0	0	0.00	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**  
**Athabasca Valley - October 2015**

<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	32	16	6	11	21	30	135	57	26	19	25	49	43	41	29	76	616
2.1 - 3.0	7	2	0	0	0	5	30	16	2	2	3	1	1	0	2	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>	39	18	6	11	21	35	165	73	28	21	28	50	44	41	31	97	708

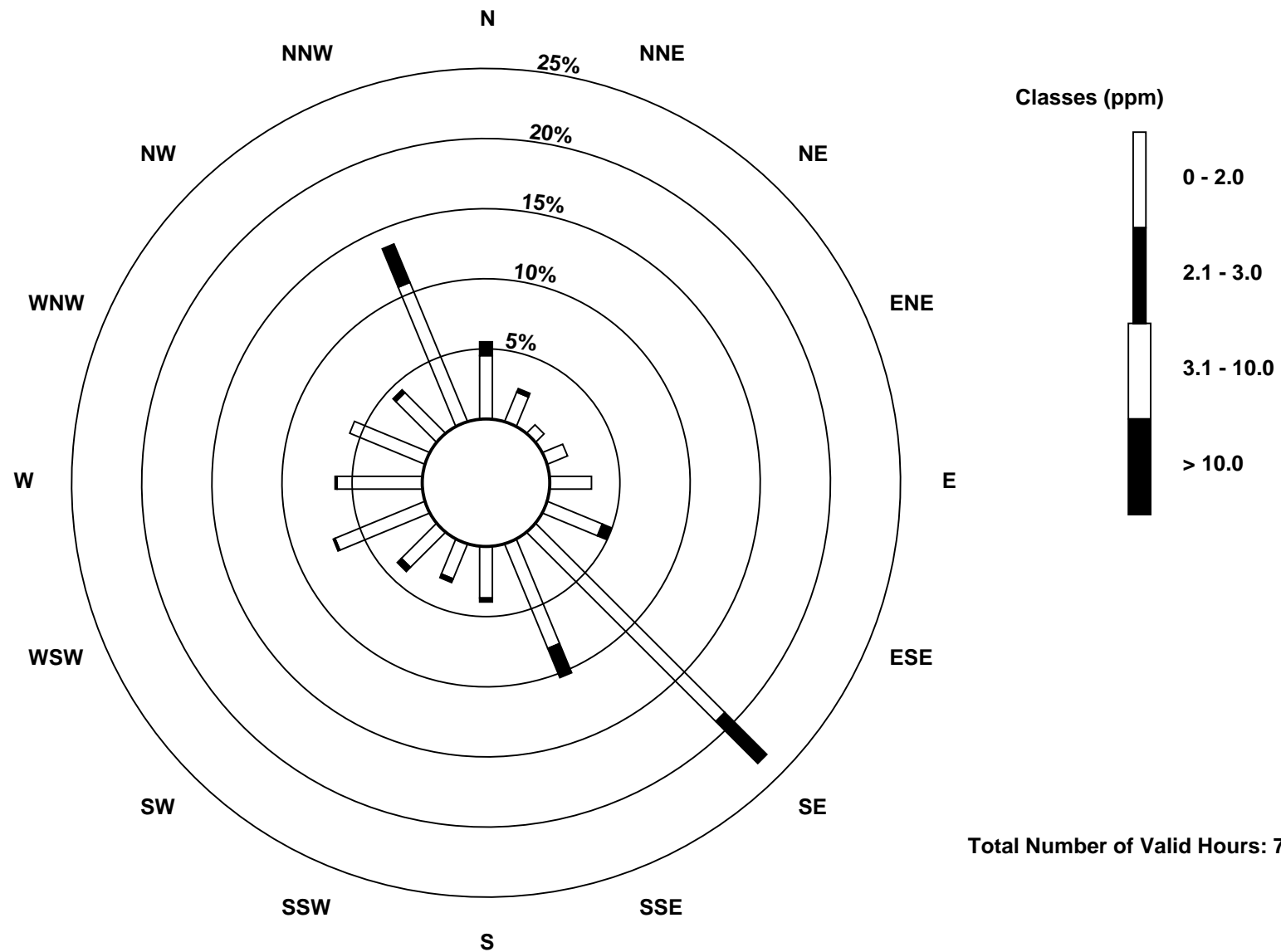
Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Total Hydrocarbons (THC) - ppm  
Athabasca Valley (AMS 7)



Total Number of Valid Hours: 708



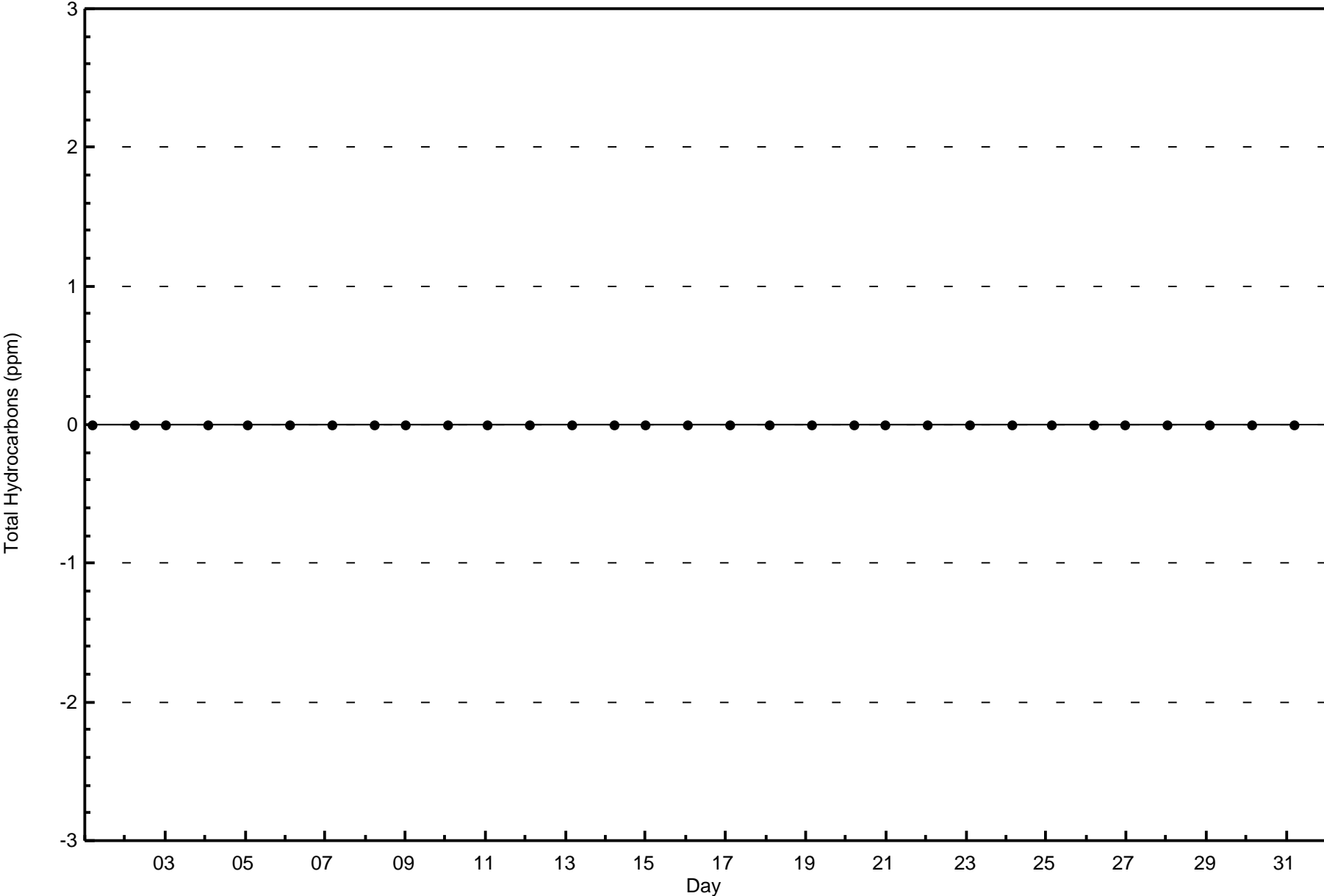


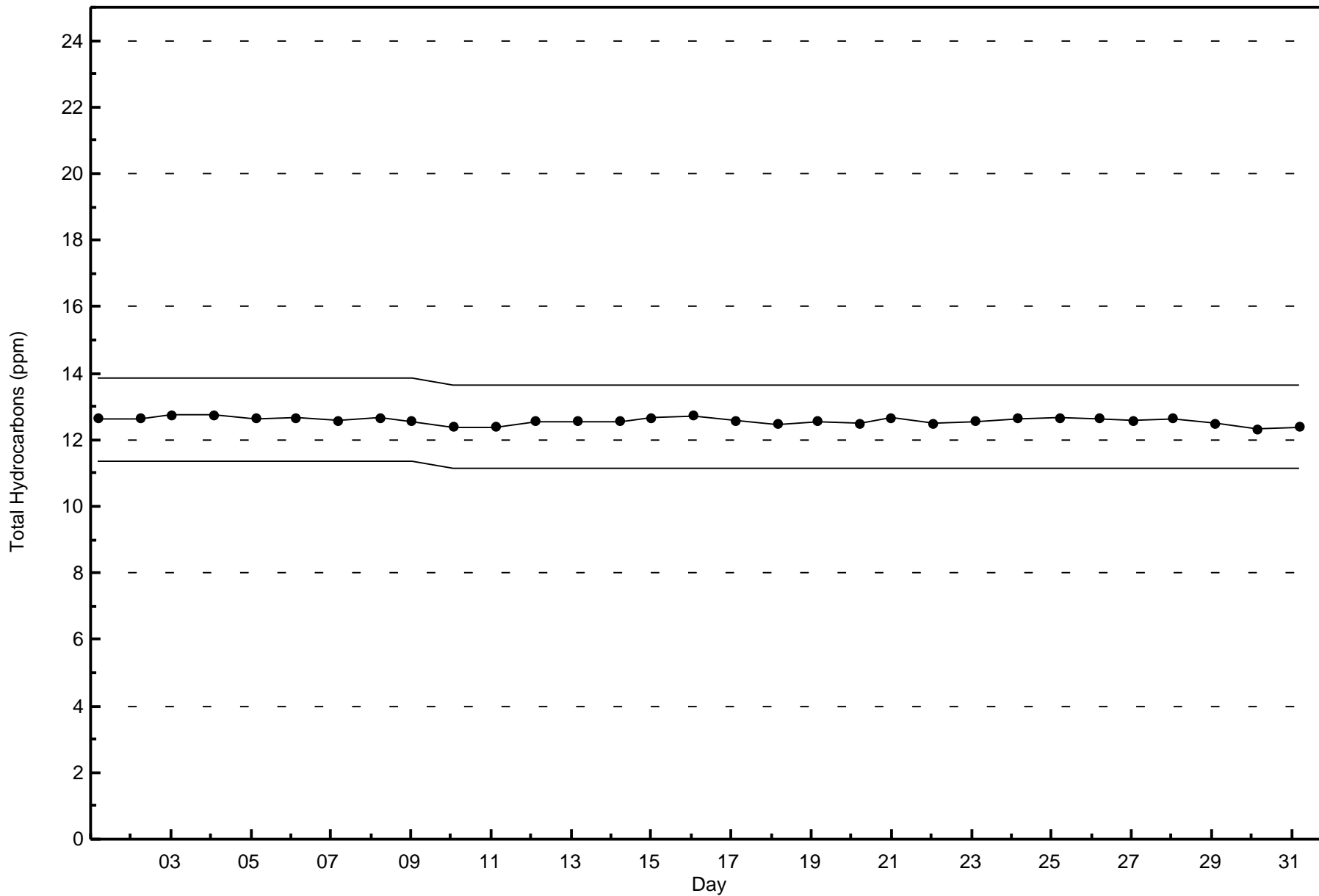
Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

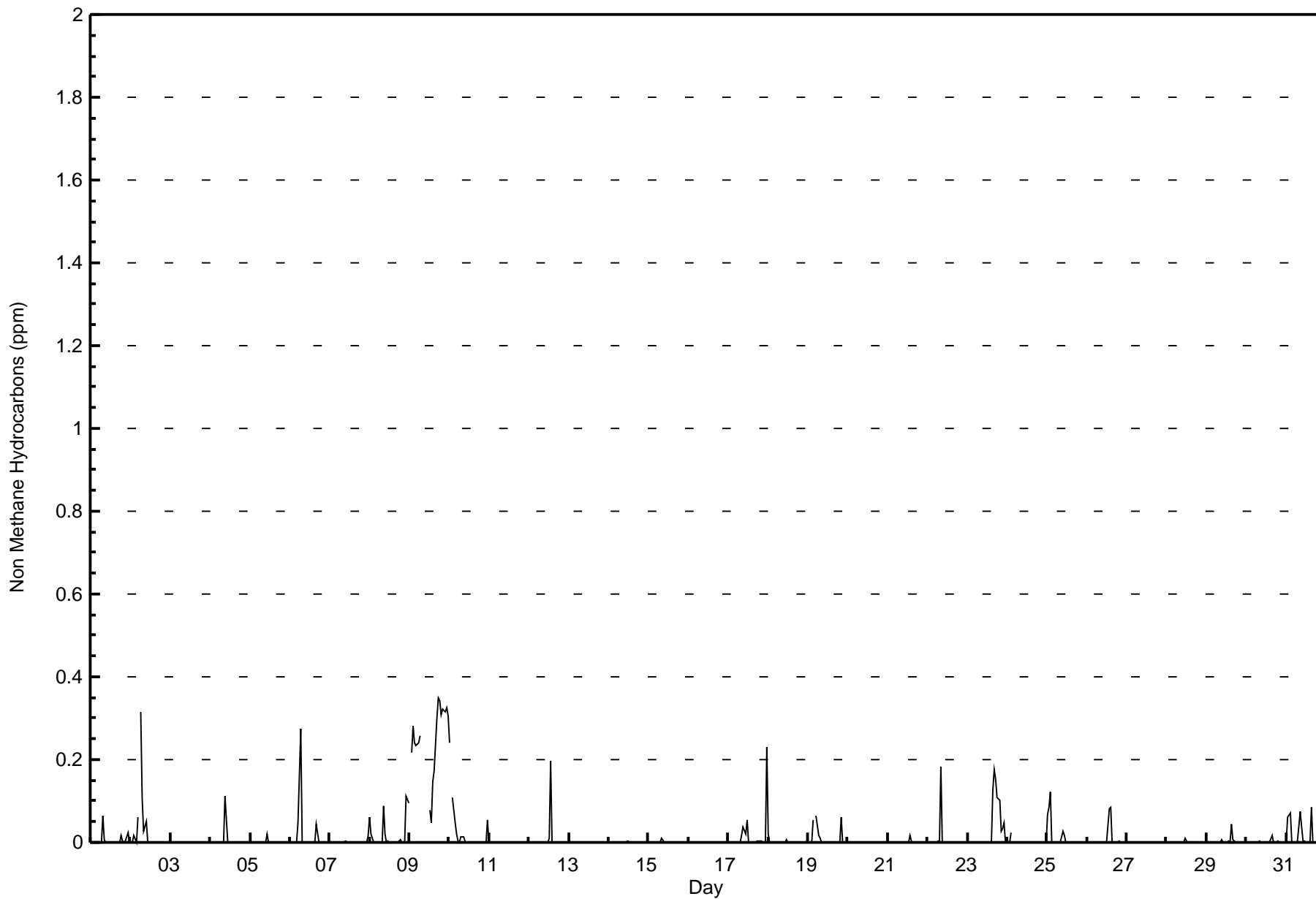
Athabasca Valley - October 2015







Maximum Value: 0.348 ppm on Oct 9 18:00		Maximum Daily Average: 0.249 ppm on Oct 9		Hours in Service: 744																						
Minimum Value: 0.000 ppm on Oct 1 01:00		Minimum Daily Average: 0.000 ppm on Oct 13		Hours of Data: 708																						
Maximum Diurnal Average: 0.028 ppm at hour 7		Minimum Diurnal Average: 0.002 ppm at hour 11		Hours of Missing Data: 36																						
Monthly Average: 0.013 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> = 0.3		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	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.065	0.008	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.018	0.004	0.000	0.004	0.023	0.000	0.005	0.065
2-Oct	0.000	0.000	0.017	0.000	0.062	Z	0.315	0.109	0.026	0.052	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	0.025	0.315
3-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
4-Oct	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.113	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.005	0.113
5-Oct	0.000	0.000	Z	0.001	0.001	0.000	0.000	0.001	0.000	0.000	0.021	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	0.021
6-Oct	0.000	0.000	0.000	Z	0.000	0.049	0.274	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.044	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.016	0.274	
7-Oct	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.017	0.001	0.017	
8-Oct	0.060	0.020	0.000	0.000	0.001	Z	0.000	0.000	0.089	0.020	0.000	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.007	0.001	0.000	0.000	0.112	0.096	0.018	0.112
9-Oct	Z	0.216	0.282	0.240	0.235	0.239	0.258	C	C	C	C	C	0.079	0.049	0.146	0.172	0.303	0.348	0.341	0.310	0.320	0.316	0.326	0.304	0.249	0.348
10-Oct	0.240	Z	0.108	0.046	0.022	0.004	0.000	0.014	0.012	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.054	0.022	0.240	
11-Oct	0.001	0.001	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	0.001
12-Oct	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.196	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.196	
13-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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
14-Oct	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.002	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
15-Oct	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.010	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	0.010
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	0.000	0.000	0.000	0.000	0.000	0.000	0.000
17-Oct	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.002	0.017	0.038	0.021	0.056	0.000	0.000	0.000	0.000	0.003	0.002	0.004	0.003	0.000	0.000	0.230	0.016	0.230	
18-Oct	0.022	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.022	0.022
19-Oct	0.000	0.000	0.000	0.054	Z	0.065	0.017	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.060	0.000	0.000	0.000	0.009	0.065	
20-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	0.000	0.000	0.000	0.000	0.000	0.000
21-Oct	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.016	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.016	0.016
22-Oct	0.000	Z	0.000	0.000	0.000	0.000	0.003	0.005	0.182	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	0.182	
23-Oct	0.000	0.000	Z	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.124	0.177	0.152	0.109	0.101	0.027	0.033	0.047	0.001	0.033	0.177	
24-Oct	0.001	0.000	0.024	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	0.001	0.000	0.000	0.001	0.024	0.024
25-Oct	0.069	0.086	0.123	0.000	Z	0.000	0.001	0.000	0.000	0.026	0.018	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.014	0.123	
26-Oct	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.082	0.084	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.007	0.084	
27-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
28-Oct	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.001	0.010	0.010
29-Oct	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.000	0.000	0.002	0.000	0.043	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.003	0.043	0.043
30-Oct	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.016	0.000	0.000	0.000	0.003	0.000	0.000	0.001	0.000	0.001	0.016	0.016
31-Oct	0.000	0.061	0.072	0.000	Z	0.000	0.002	0.005	0.074	0.039	0.002	0.004	0.000	0.000	0.004	0.085	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.015	0.085	
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan      C - Calibration																										





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

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Athabasca Valley - October 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.005	617	87.15	87.15
0.006 - 0.05	42	5.93	93.08
0.06 - 0.1	26	3.67	96.75
> 0.1	23	3.25	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



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

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Athabasca Valley - October 2015**

<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	31	15	6	10	17	32	142	67	26	19	25	48	43	40	28	68	617
0.006 - 0.05	1	0	0	1	4	2	14	4	1	1	1	1	0	1	1	10	42
0.06 - 0.1	1	3	0	0	0	0	6	2	0	0	1	0	1	0	1	11	26
> 0.1	6	0	0	0	0	1	3	0	1	1	1	1	0	0	1	8	23
<b>Totals</b>	39	18	6	11	21	35	165	73	28	21	28	50	44	41	31	97	708

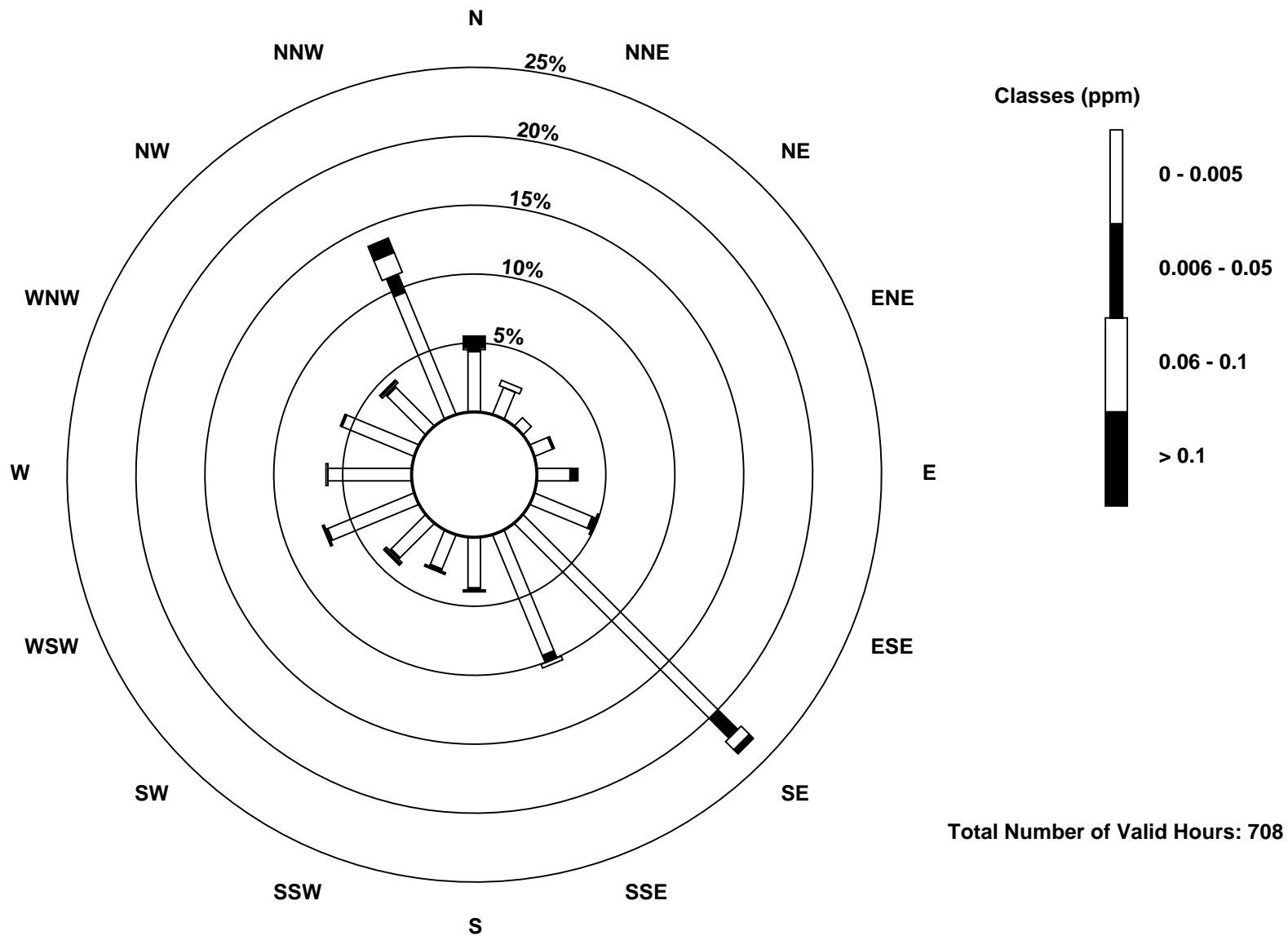
Total Number of Valid Hours: 708

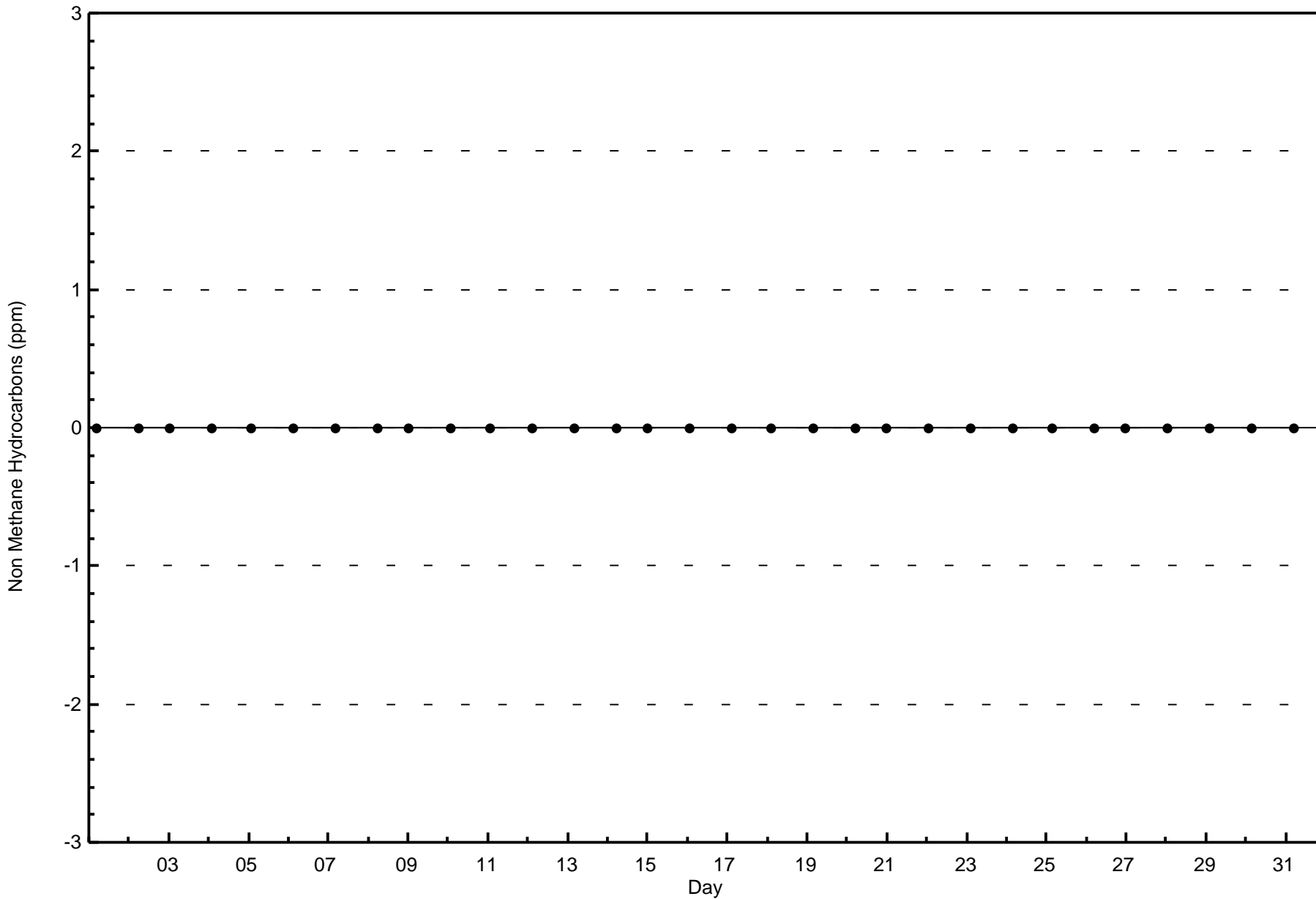
Total Number of Hours: 744



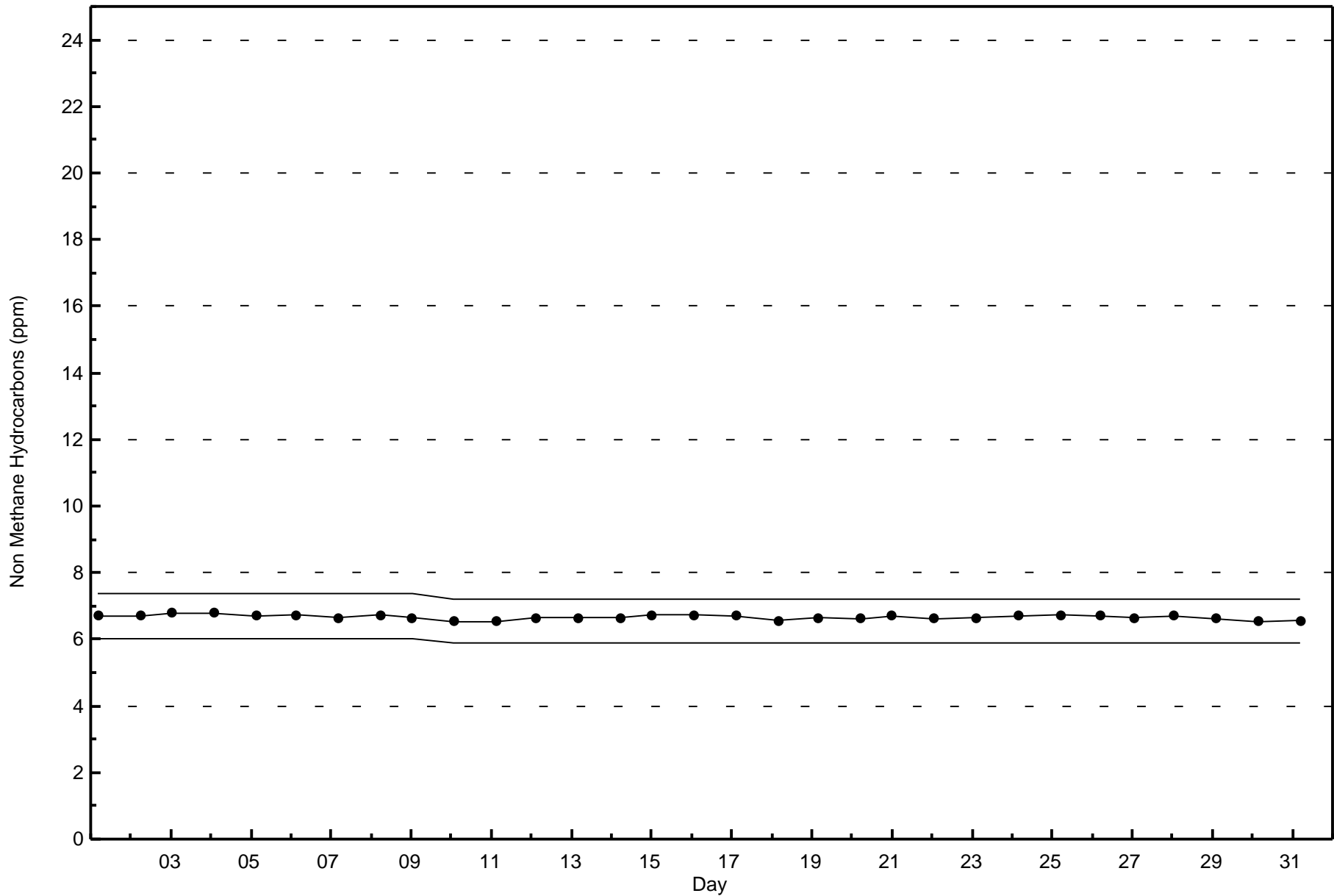
Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Non Methane Hydrocarbons (NMHC) - ppm  
Athabasca Valley (AMS 7)







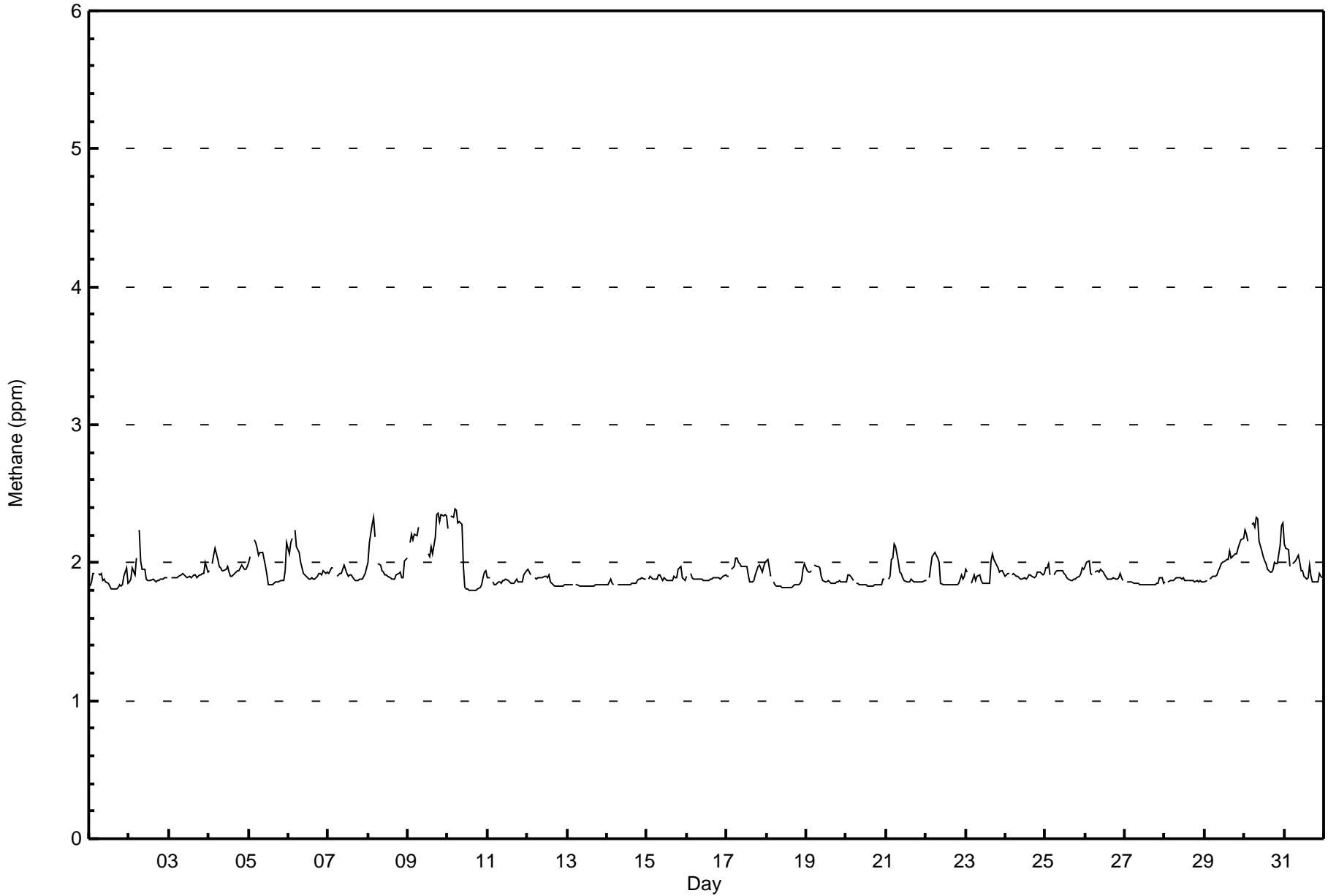




Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 2.4 ppm on Oct 10 05:00	Maximum Daily Average: 2.2 ppm on Oct 9		Hours of Data:	708
Minimum Value: 1.8 ppm on Oct 10 15:00	Minimum Daily Average: 1.8 ppm on Oct 13		Hours of Missing Data:	36
Maximum Diurnal Average: 2.0 ppm at hour 5	Minimum Diurnal Average: 1.9 ppm at hour 15		Hours of Calibration:	36
Monthly Average: 1.93 ppm	Percentiles: P <sub>1</sub> = 1.8 P <sub>10</sub> = 1.8 Q <sub>1</sub> = 1.9 Median = 1.9 Q <sub>3</sub> = 1.9 P <sub>90</sub> = 2.1 P <sub>99</sub> = 2.3		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	1.8	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0	1.8	1.9	2.0																							
2-Oct	1.9	1.9	2.0	1.9	2.0	Z	2.2	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	2.2																						
3-Oct	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	2.0	1.9	1.9	2.0	2.0																						
4-Oct	1.9	Z	2.0	2.1	2.1	2.0	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	2.0	2.0	2.0	2.0	2.0	2.0	2.1																						
5-Oct	2.0	2.0	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.0	1.9	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.0	2.2																							
6-Oct	2.1	2.1	2.2	Z	2.2	2.1	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	1.9	1.9	1.9	2.2																							
7-Oct	1.9	1.9	2.0	2.0	Z	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	1.9	1.9	1.9	1.9	2.0	1.9	2.0																							
8-Oct	2.0	2.2	2.3	2.3	2.2	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	1.9	1.9	1.9	2.0	2.0	2.0	2.3																							
9-Oct	Z	2.1	2.2	2.2	2.2	2.2	2.3	C	C	C	C	C	2.1	2.0	2.1	2.1	2.2	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.4																							
10-Oct	2.3	Z	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.0	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.0	2.4																							
11-Oct	1.9	1.9	Z	1.9	1.8	1.8	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																							
12-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	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.0																							
13-Oct	1.8	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8																							
14-Oct	1.8	1.9	1.9	1.9	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9																							
15-Oct	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	2.0	1.9	1.9	1.9	2.0																							
16-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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9																							
17-Oct	1.9	1.9	Z	2.0	2.0	2.0	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	2.0	2.0	1.9	2.0	2.0	2.0																							
18-Oct	2.0	2.0	1.9	Z	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0	2.0	1.9	2.0																							
19-Oct	1.9	1.9	1.9	1.9	Z	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0																							
20-Oct	1.9	1.9	1.9	1.9	1.9	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9																							
21-Oct	Z	1.9	1.9	2.0	2.0	2.1	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	2.1																							
22-Oct	1.9	Z	1.9	2.0	2.0	2.1	2.1	2.0	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	2.1																							
23-Oct	2.0	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.9	2.0	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.1																							
24-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	1.9	1.9	1.9																							
25-Oct	2.0	2.0	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	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0																							
26-Oct	2.0	2.0	2.0	1.9	1.9	Z	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	2.0																							
27-Oct	Z	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9																							
28-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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9																							
29-Oct	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	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2																							
30-Oct	2.2	2.2	2.2	Z	2.3	2.3	2.3	2.3	2.3	2.2	2.1	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.3	2.3	2.1	2.3																							
31-Oct	2.1	2.1	2.1	2.0	Z	2.0	2.0	2.0	2.1	2.0	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	2.0	2.1																							
																								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	Diurnal Average	
																								2.3	2.2	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.2	2.1	2.0	2.1	2.0	2.1	2.1	2.2	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	Diurnal Maximum

Z - zerospan      C - Calibration





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

**Methane (CH<sub>4</sub>) - ppm**  
**Athabasca Valley - October 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	633	89.41	89.41
2.1 - 3.0	75	10.59	100.00
3.1 - 10.0	0	0.00	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**

**Methane (CH<sub>4</sub>) - ppm**  
**Athabasca Valley - October 2015**

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	34	18	6	11	21	31	138	58	26	19	25	49	44	41	29	83	633
2.1 - 3.0	5	0	0	0	0	4	27	15	2	2	3	1	0	0	2	14	75
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>	39	18	6	11	21	35	165	73	28	21	28	50	44	41	31	97	708

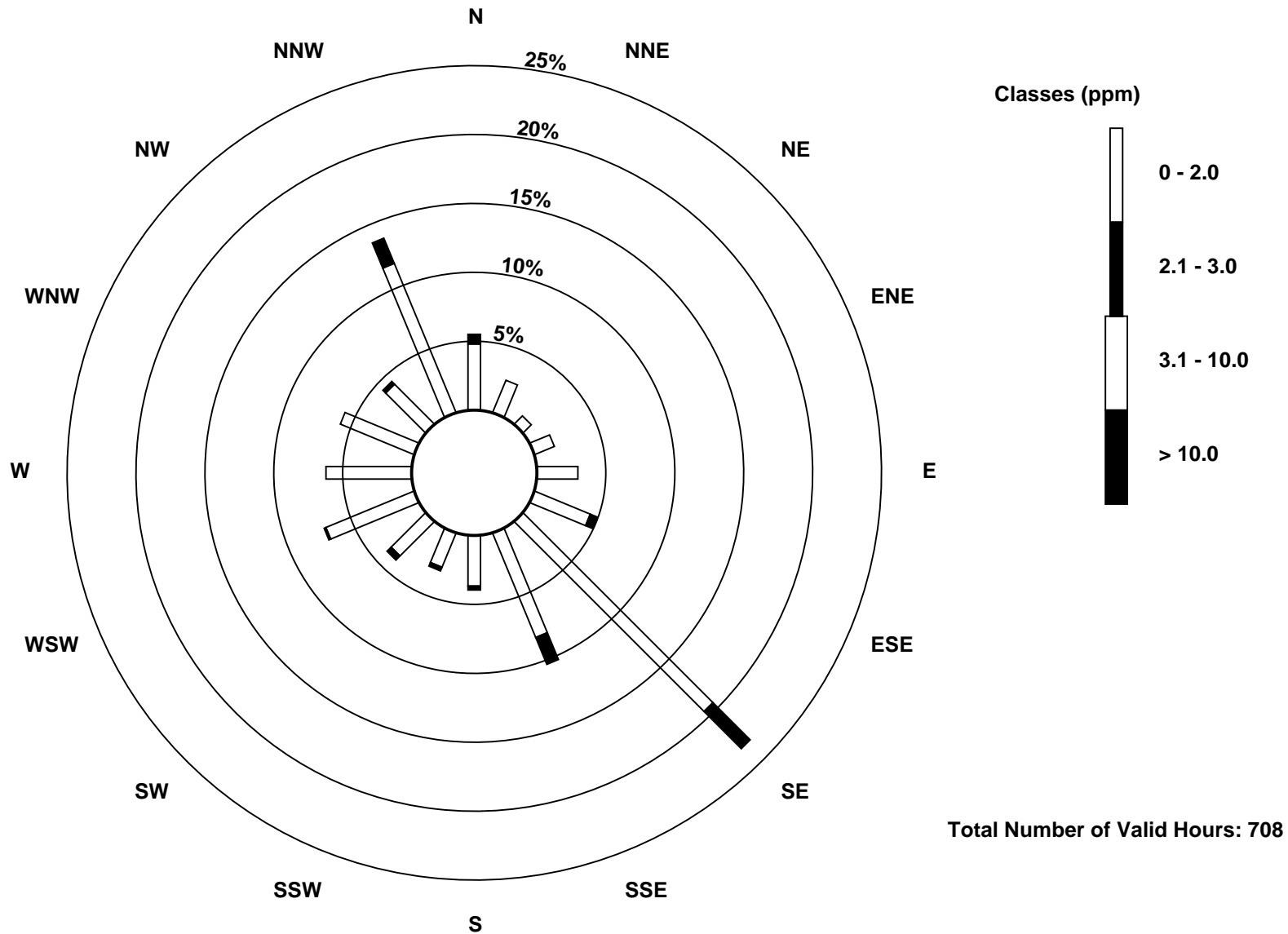
Total Number of Valid Hours: 708

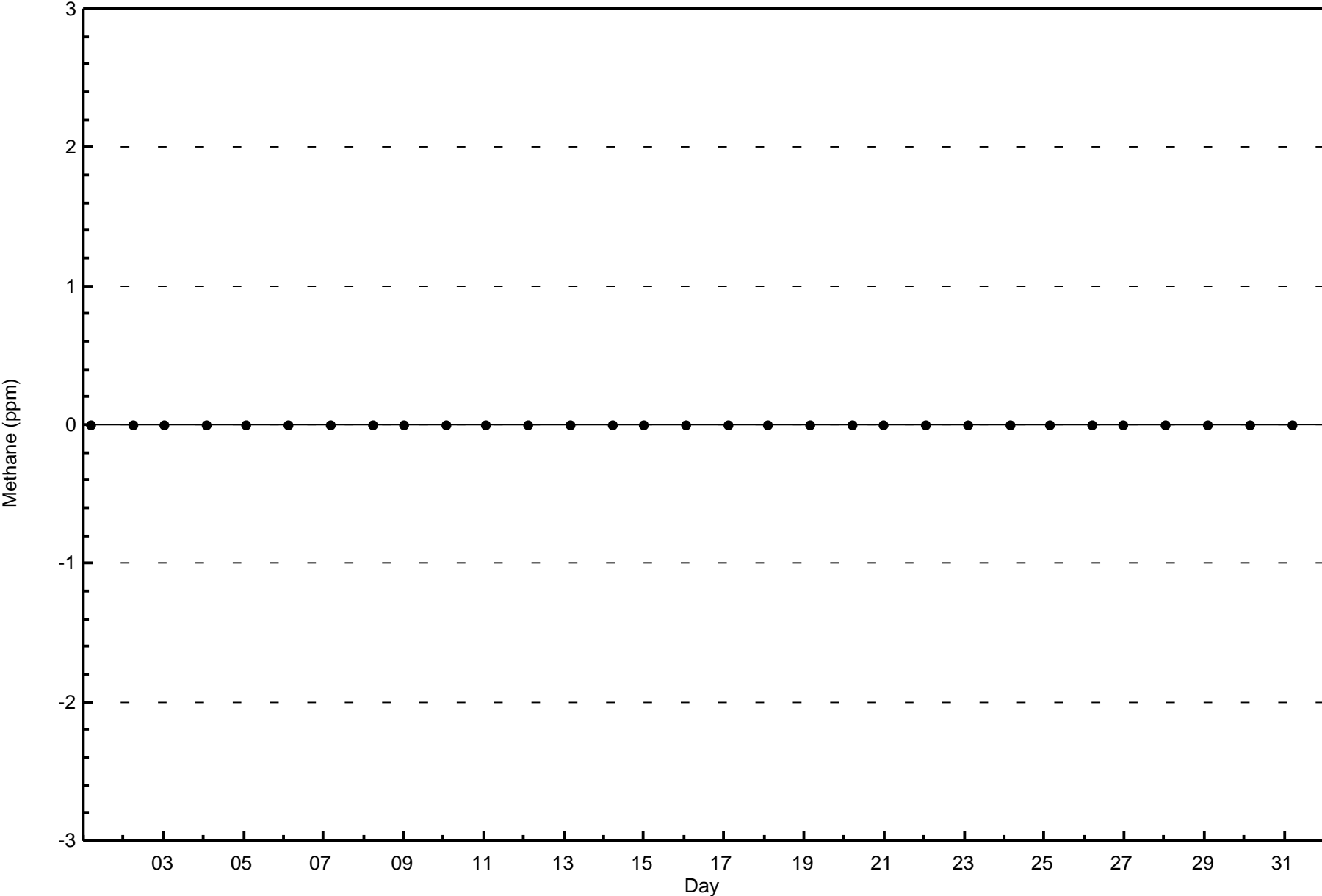
Total Number of Hours: 744

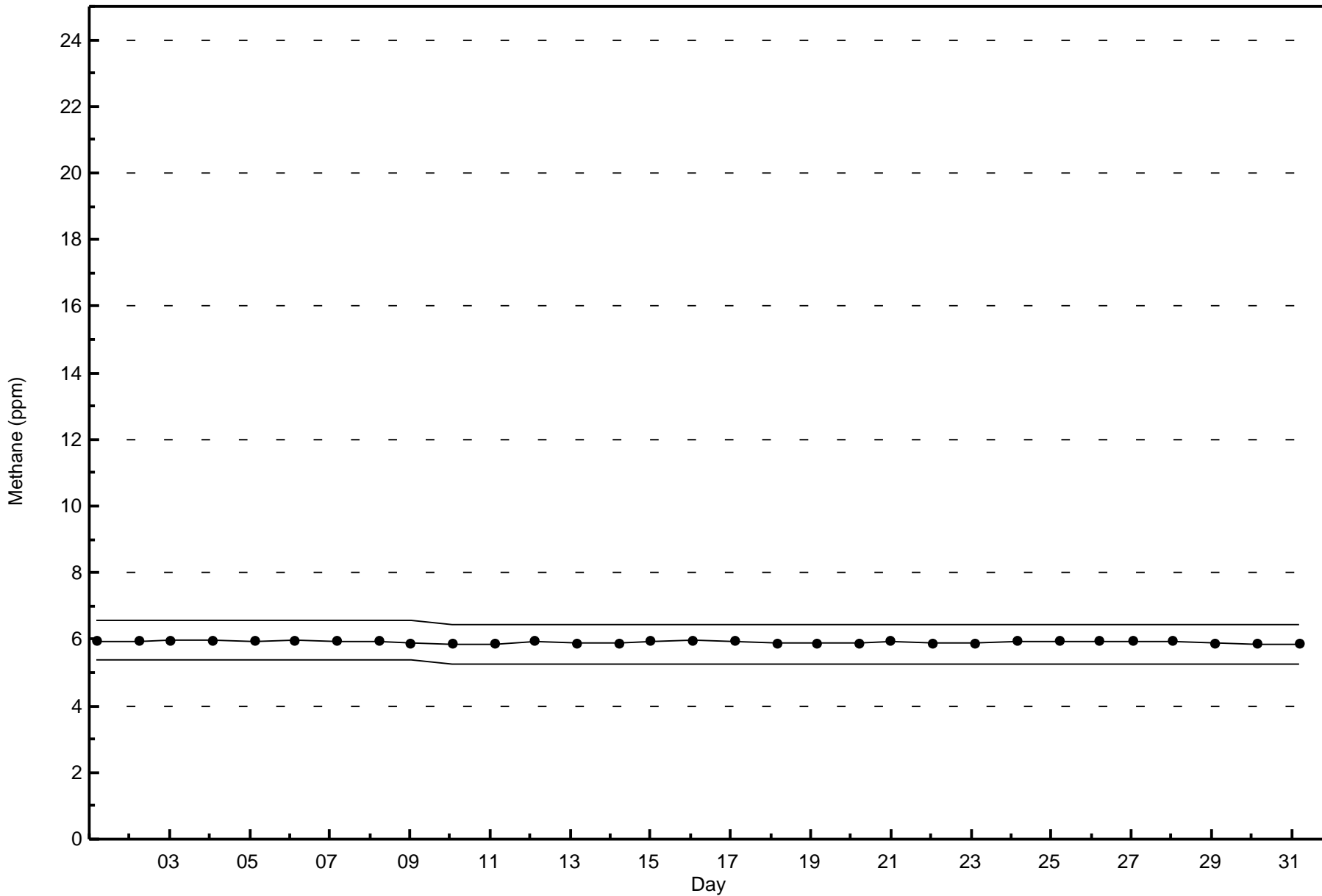


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Methane (CH<sub>4</sub>) - ppm  
Athabasca Valley (AMS 7)









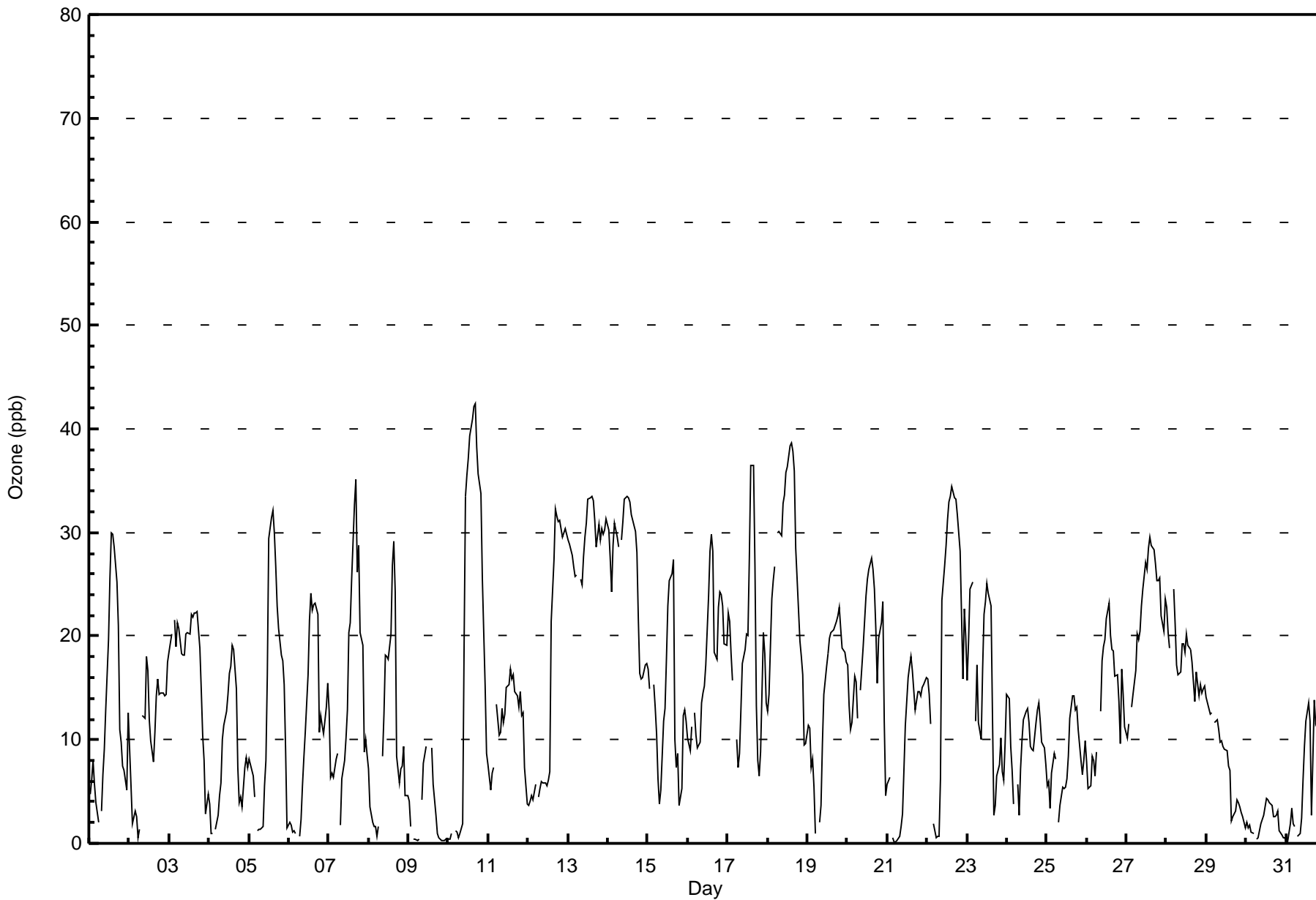


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 43 ppb on Oct 10 17:00	Maximum Daily Average: 29.5 ppb on Oct 13		Hours of Data:	709
Minimum Value: 0 ppb on Oct 31 01:00	Minimum Daily Average: 2.1 ppb on Oct 30		Hours of Missing Data:	35
Maximum Diurnal Average: 22.7 ppb at hour 15	Minimum Diurnal Average: 7.8 ppb at hour 8		Hours of Calibration:	34
Monthly Average: 14.5 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 2 Q <sub>1</sub> = 6 Median = 13 Q <sub>3</sub> = 21 P <sub>90</sub> = 29 P <sub>99</sub> = 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	6	8	6	4	2	Z	3	7	9	13	20	26	30	30	29	25	21	11	10	7	7	5	13	12.8	30	
2-Oct	9	6	2	3	3	1	1	Z	12	12	18	17	12	10	8	11	14	16	14	15	15	14	14	17	10.6	18	
3-Oct	18	20	Z	22	19	21	21	18	18	18	20	20	20	22	22	22	22	22	19	15	10	8	3	5	17.7	22	
4-Oct	4	1	1	Z	1	3	5	6	10	11	13	14	16	17	19	15	7	4	4	3	7	8	7	8.6	19		
5-Oct	8	8	7	4	Z	1	1	1	2	6	8	16	29	31	32	30	27	23	21	18	18	15	9	1	13.8	32	
6-Oct	2	2	1	1	1	Z	1	2	6	8	11	16	22	24	23	23	23	22	11	12	11	11	13	15	11.4	24	
7-Oct	13	6	7	6	8	9	Z	2	6	8	10	13	20	21	26	33	35	26	29	20	19	9	10	9	15.0	35	
8-Oct	7	4	2	2	2	1	2	Z	8	12	18	18	18	20	27	29	24	8	6	7	7	9	5	5	10.5	29	
9-Oct	4	2	Z	0	0	0	0	M	4	8	9	C	C	C	9	6	3	1	1	0	0	0	0	0	2.6	9	
10-Oct	0	0	1	Z	1	1	1	1	2	19	33	35	37	39	41	42	43	38	36	34	26	20	15	9	20.6	43	
11-Oct	8	5	7	7	Z	13	10	11	13	12	12	15	15	17	16	16	15	14	13	15	12	13	7	4	11.8	17	
12-Oct	4	4	5	4	6	Z	5	5	6	6	6	6	6	7	21	27	32	32	31	31	30	30	30	30	15.8	32	
13-Oct	29	29	28	27	26	26	Z	26	25	28	30	31	33	33	34	33	34	33	31	29	31	29	30	30	31	29.5	34
14-Oct	30	28	24	29	31	30	29	Z	29	31	33	34	33	33	32	31	30	28	22	16	16	16	17	17	26.9	34	
15-Oct	17	15	Z	15	13	11	6	4	5	12	13	18	23	25	26	27	10	7	9	4	5	12	13	12	13.1	27	
16-Oct	10	9	11	Z	13	10	9	10	14	14	15	17	24	28	30	28	18	18	23	24	24	23	19	19	17.9	30	
17-Oct	22	21	18	16	Z	10	7	9	13	17	19	20	20	28	36	36	27	13	8	7	9	20	18	14	17.8	36	
18-Oct	13	14	24	25	27	Z	30	30	30	33	34	36	36	38	39	38	36	28	25	20	18	16	9	10	26.5	39	
19-Oct	11	11	7	8	5	1	Z	2	4	10	14	17	18	20	20	20	21	21	22	23	21	19	18	17	14.4	23	
20-Oct	17	13	11	12	16	16	12	Z	15	19	21	24	26	26	28	26	25	21	16	20	21	23	12	5	18.4	28	
21-Oct	6	6	Z	1	0	0	0	1	2	3	7	11	16	17	18	17	15	13	15	15	14	15	15	16	9.7	18	
22-Oct	16	14	12	Z	2	1	1	1	6	23	27	29	31	33	33	34	33	33	32	30	28	16	23	20	20.8	34	
23-Oct	16	20	25	25	Z	12	17	12	10	17	22	23	25	24	23	12	3	4	7	8	10	7	6	10	14.6	25	
24-Oct	14	14	9	7	4	Z	6	3	7	10	12	13	13	12	9	9	9	12	13	14	12	10	9	8	9.9	14	
25-Oct	6	6	3	7	9	8	Z	2	4	5	5	5	6	8	12	14	14	13	13	11	8	7	8	10	8.0	14	
26-Oct	8	5	6	8	8	6	9	Z	13	18	19	20	22	23	20	19	19	16	16	14	10	17	14	11	13.9	23	
27-Oct	10	12	Z	13	14	17	20	20	23	25	27	26	28	30	29	28	27	25	25	26	22	20	24	24	22.2	30	
28-Oct	23	20	19	Z	25	21	17	16	17	19	19	19	20	19	19	17	16	14	17	14	15	15	15	15	17.8	25	
29-Oct	14	13	12	13	Z	12	12	11	10	10	9	9	9	7	7	2	3	3	4	4	4	3	3	2	7.6	14	
30-Oct	2	1	2	1	1	Z	0	1	1	2	3	4	4	4	4	4	3	3	3	3	1	1	1	1	2.1	4	
31-Oct	0	0	2	3	2	2	Z	1	1	2	6	9	12	14	12	3	8	14	11	12	9	2	5	8	6.0	14	

11.2	10.2	9.7	10.2	9.2	9.0	8.9	7.8	10.3	13.7	16.3	18.5	20.7	22.1	22.7	22.2	20.2	17.7	16.3	15.3	14.2	13.4	12.2	11.7	Diurnal Average
30	29	28	29	31	30	30	30	30	33	34	36	37	39	41	42	43	38	36	34	30	30	30	31	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**  
**Athabasca Valley - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	523	73.77	73.77
21 - 50	186	26.23	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**  
**Athabasca Valley - October 2015**

<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	37	18	4	9	20	31	148	69	21	17	14	7	14	18	13	83	523
21 - 50	4	2	2	1	3	5	15	5	4	4	15	42	29	25	18	12	186
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>	41	20	6	10	23	36	163	74	25	21	29	49	43	43	31	95	709

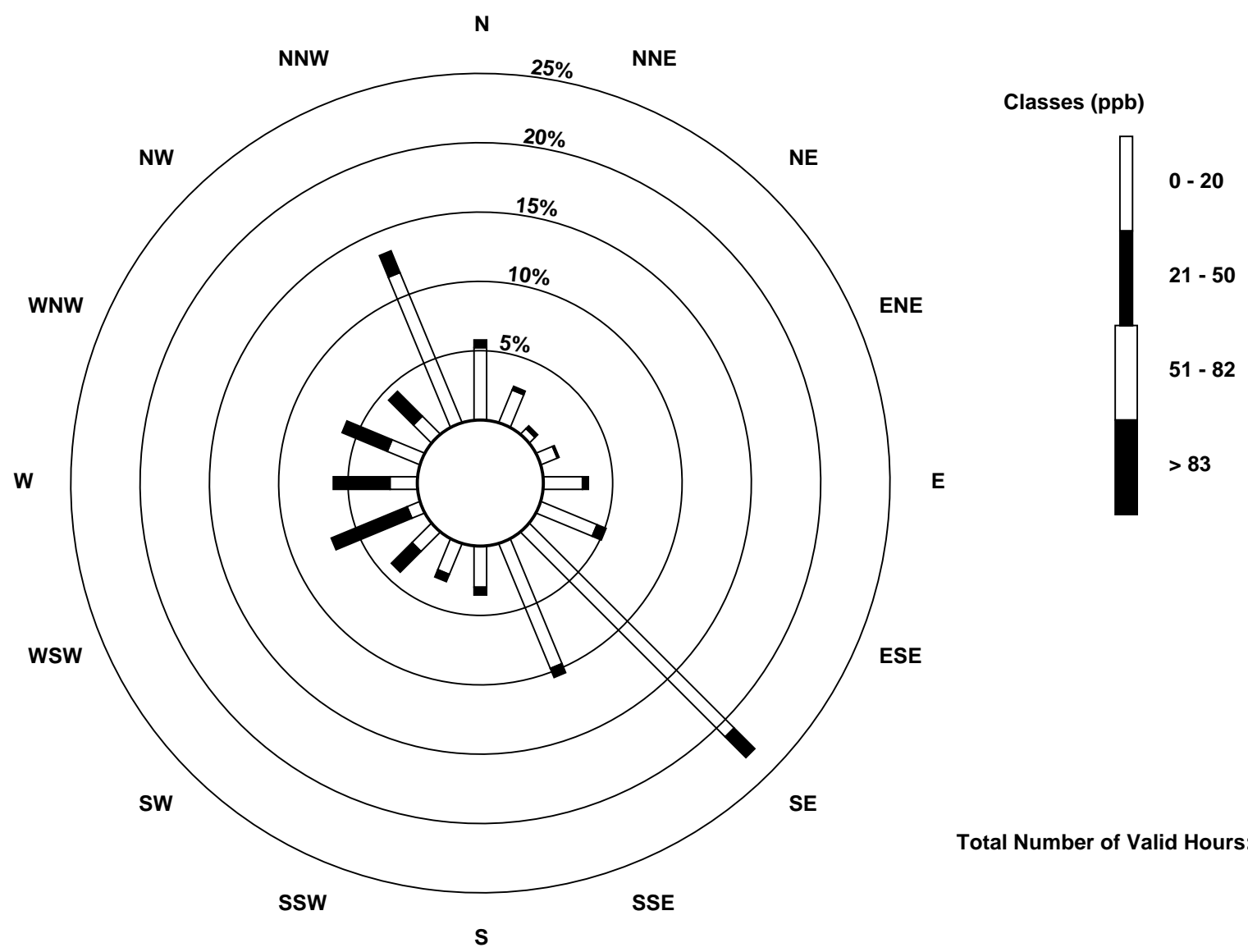
Total Number of Valid Hours: 709

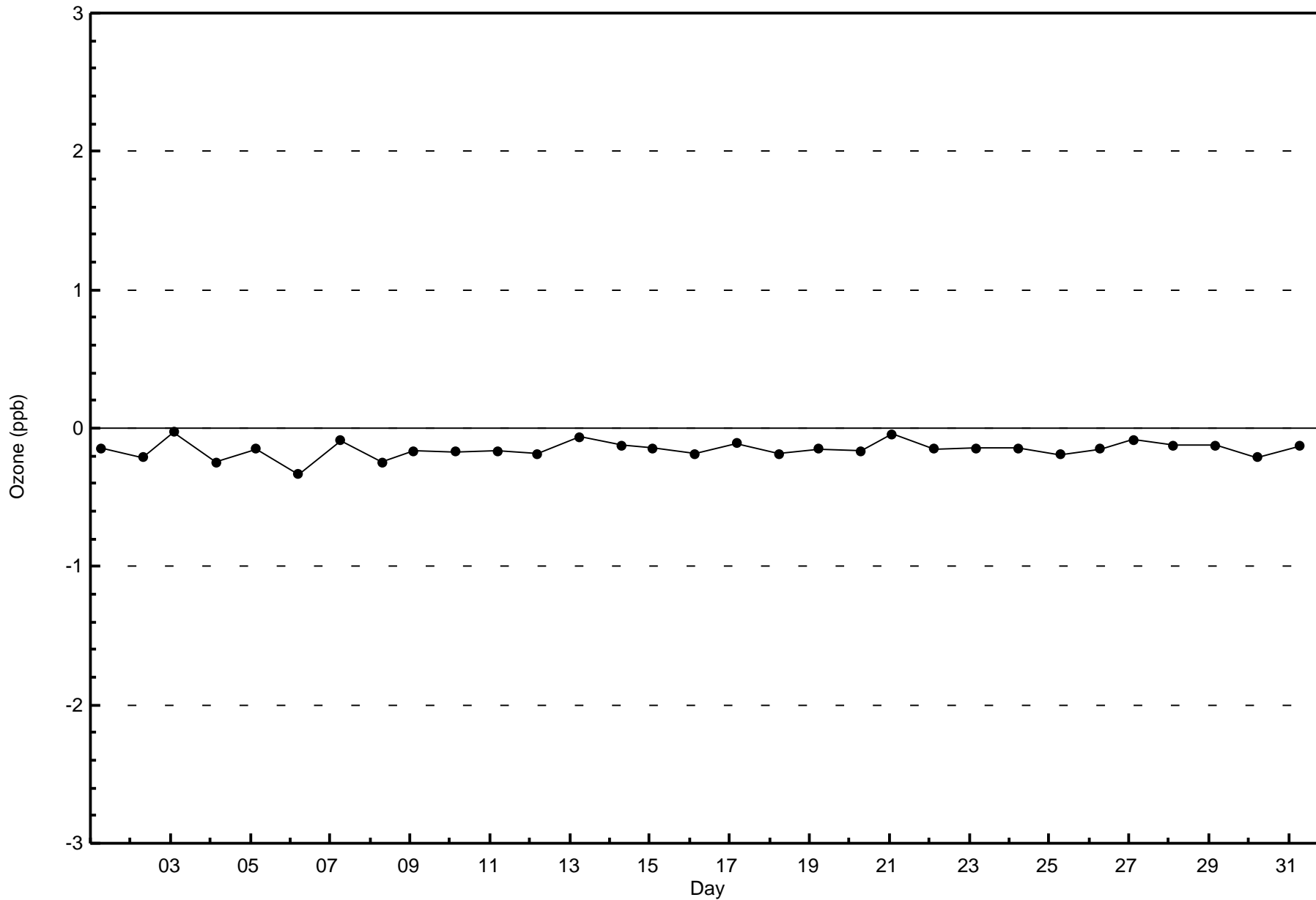
Total Number of Hours: 744

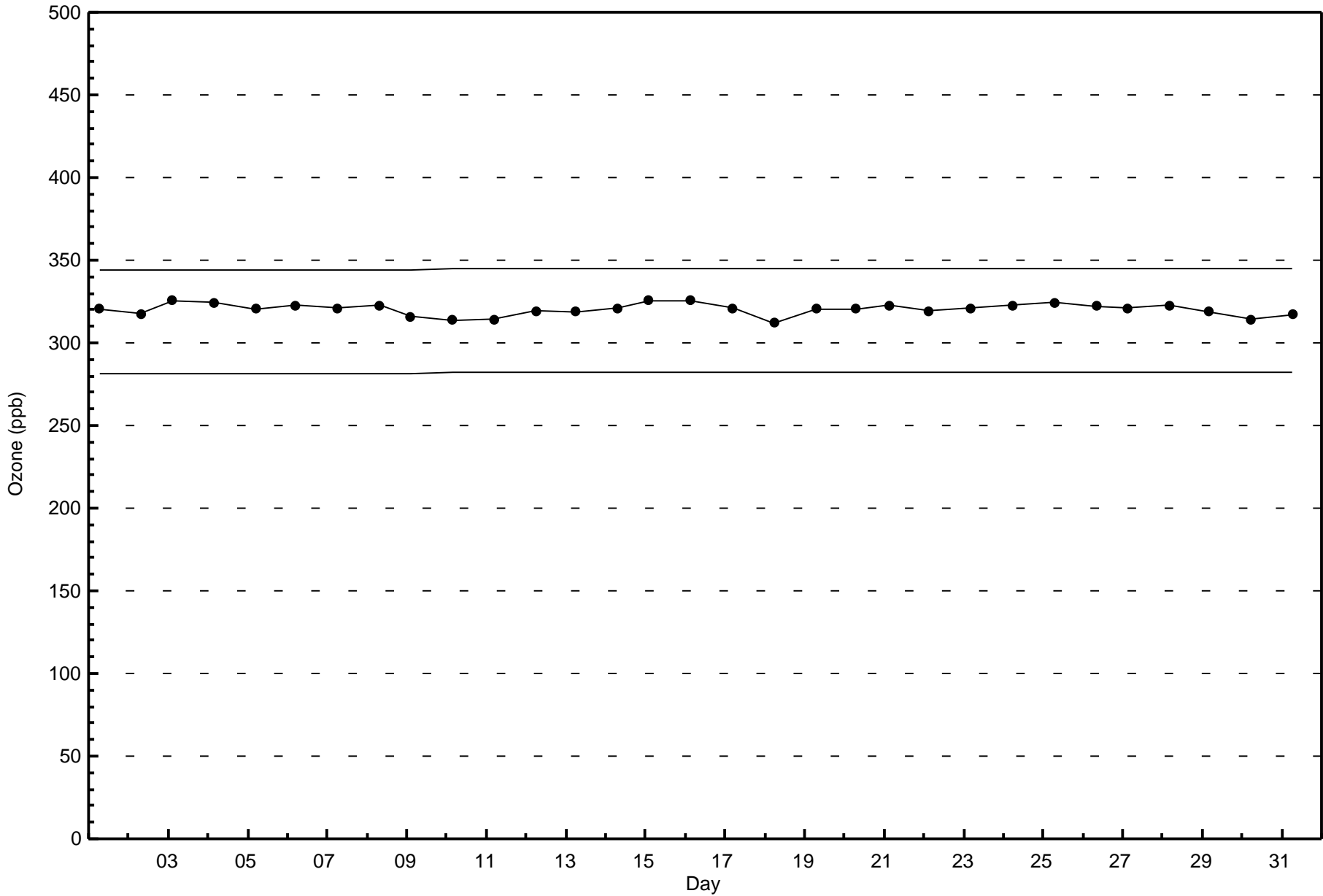


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Ozone (O<sub>3</sub>) - ppb  
Athabasca Valley (AMS 7)









Maximum Value: 41 ppb on Oct 29 16:00																		Maximum Daily Average: 12.8 ppb on Oct 9																		Hours in Service: 744													
Minimum Value: 0 ppb on Oct 2 14:00																		Minimum Daily Average: 0.0 ppb on Oct 27																		Hours of Data: 708													
Maximum Diurnal Average: 8.4 ppb at hour 8																		Minimum Diurnal Average: 1.2 ppb at hour 2																		Hours of Missing Data: 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> = 4 P <sub>90</sub> = 10 P <sub>99</sub> = 25																		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	4	2	1	2	Z	16	19	14	8	7	6	3	1	1	1	1	1	0	1	1	2	1	4	0	4.2	19																							
2-Oct	0	1	1	0	7	Z	9	4	2	2	1	1	1	0	1	0	0	0	0	0	0	0	0	0	1.3	9																							
3-Oct	Z	0	0	0	0	0	0	0	4	1	1	1	1	1	2	1	1	0	0	0	2	1	4	1	0.9	4																							
4-Oct	1	Z	7	5	4	3	2	2	2	3	3	2	2	2	3	5	7	6	4	15	17	2	2	2	4.4	17																							
5-Oct	1	1	Z	4	5	11	14	21	25	22	14	7	0	0	0	0	0	0	0	0	0	1	4	4	5.7	25																							
6-Oct	5	5	7	Z	13	17	23	18	13	9	9	5	2	2	2	2	1	1	4	2	1	1	1	0	6.3	23																							
7-Oct	0	0	0	0	Z	1	8	22	13	13	12	8	3	3	2	1	0	1	0	0	0	6	1	0	4.1	22																							
8-Oct	0	1	3	5	7	Z	13	11	7	7	4	4	6	4	1	1	1	16	11	4	2	0	1	0	4.8	16																							
9-Oct	Z	2	7	9	10	15	19	C	C	C	C	C	4	3	6	7	18	23	23	11	17	17	20	20	12.8	23																							
10-Oct	12	Z	2	1	7	10	21	21	24	9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	4.8	24																							
11-Oct	0	0	Z	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	3	0.3	3																							
12-Oct	3	3	2	Z	1	2	3	4	3	4	4	5	6	9	1	0	0	0	0	0	0	0	0	0	2.1	9																							
13-Oct	0	0	0	0	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
14-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	0.1	1																							
15-Oct	Z	0	0	0	1	1	7	12	16	2	4	3	1	1	1	1	8	9	3	10	5	0	0	0	3.8	16																							
16-Oct	0	Z	0	0	1	1	2	3	4	5	6	5	2	2	2	2	4	3	2	1	1	1	0	0	2.1	6																							
17-Oct	0	0	Z	0	1	2	4	3	5	4	5	4	5	3	1	1	3	9	9	6	6	1	0	1	3.2	9																							
18-Oct	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	1	0	0.2	2																							
19-Oct	0	0	0	0	Z	6	3	9	14	5	2	1	1	1	1	0	1	1	0	0	0	0	0	0	2.0	14																							
20-Oct	0	0	1	1	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
21-Oct	Z	0	1	6	12	26	25	15	15	10	7	5	2	2	1	2	2	2	2	2	1	1	1	1	0	6.1	26																						
22-Oct	0	Z	1	4	10	17	27	35	17	1	1	1	1	0	1	0	0	0	0	0	1	1	0	1	5.0	35																							
23-Oct	1	0	Z	0	2	4	1	3	7	3	1	1	1	1	1	2	6	2	1	0	0	0	0	0	1.6	7																							
24-Oct	0	0	0	Z	0	1	0	3	3	2	1	2	1	2	4	2	1	0	0	1	0	0	0	0	1.0	4																							
25-Oct	0	0	0	0	Z	0	0	2	5	4	5	5	4	2	1	1	1	1	1	2	2	3	2	0	1.8	5																							
26-Oct	0	0	2	2	1	Z	2	4	3	2	1	2	2	1	2	2	2	2	1	1	2	0	0	0	1.5	4																							
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	0																							
28-Oct	0	Z	0	0	0	0	0	1	1	2	2	3	2	3	3	3	2	2	2	2	2	2	1	1	1.5	3																							
29-Oct	1	1	Z	1	2	2	2	2	3	4	6	7	7	9	10	41	12	10	7	7	6	7	6	7	7.0	41																							
30-Oct	6	4	4	Z	11	20	28	34	21	13	11	9	8	10	9	10	9	7	6	3	7	16	11	9	11.5	34																							
31-Oct	20	10	3	0	Z	2	2	6	8	6	4	4	2	1	1	9	1	0	0	0	0	0	0	0	3.5	20																							
																								2.1	1.2	1.6	1.6	3.8	6.0	7.7	8.4	7.5	4.8	3.8	3.0	2.1	2.1	1.8	2.9	2.5	3.1	2.6	2.0	2.4	2.5	1.8	1.6	Diurnal Average	
																								20	10	7	9	13	26	28	35	25	22	14	9	8	10	10	41	18	23	23	11	17	17	20	20	Diurnal Maximum	
Z - zerospan																								C - Calibration																									



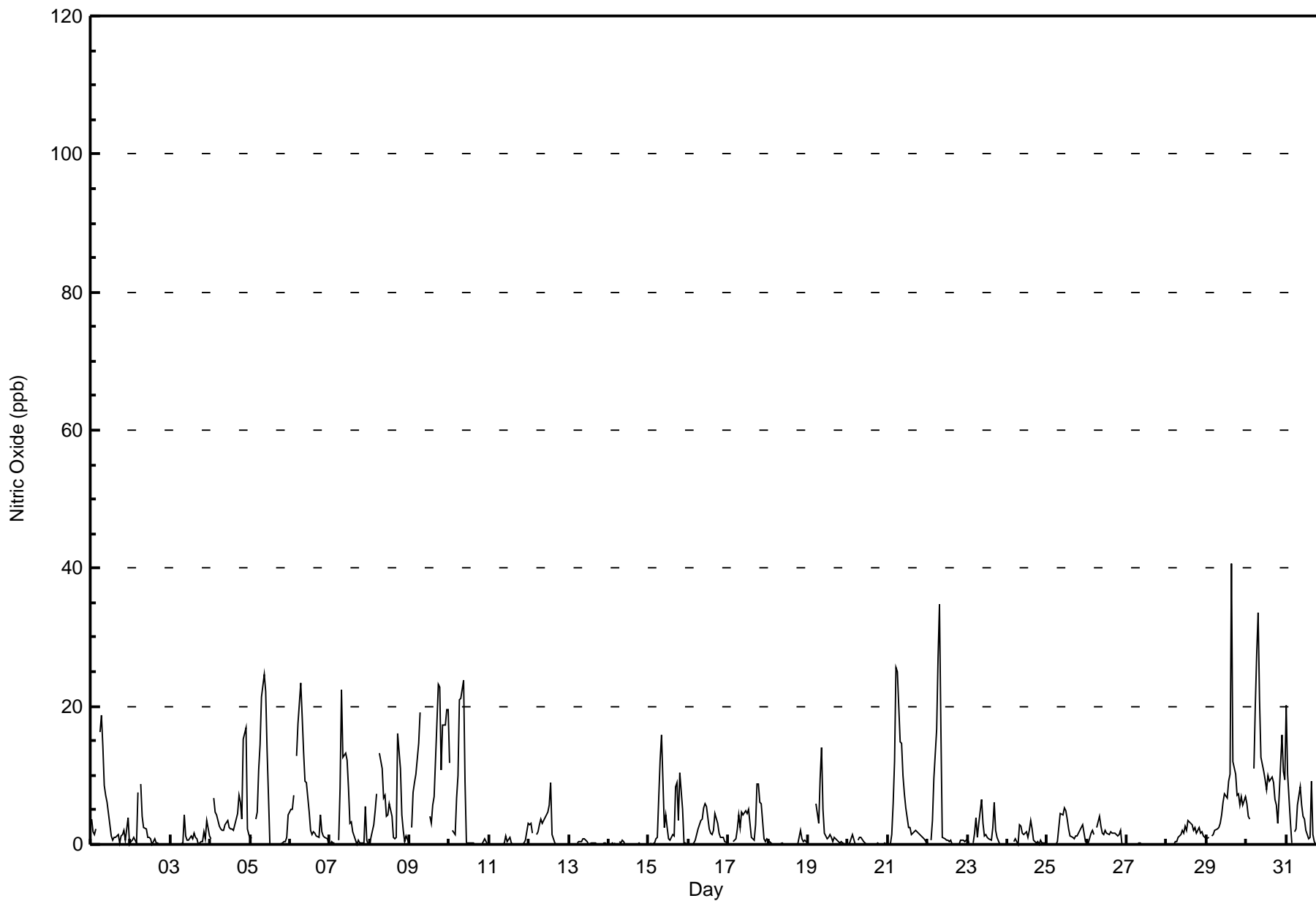


Wood Buffalo Environmental Association

Hourly Averages

Nitric Oxide (NO) - ppb

Athabasca Valley - October 2015





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

**Nitric Oxide (NO) - ppb**  
**Athabasca Valley - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	690	97.46	97.46
21 - 40	17	2.40	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: 708

Total Number of Hours: 744



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

**Nitric Oxide (NO) - ppb**  
**Athabasca Valley - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	38	18	6	11	21	34	155	70	27	21	28	50	43	41	31	96	690
21 - 40	1	0	0	0	0	1	9	3	1	0	0	0	1	0	0	1	17
41 - 80	0	0	0	0	0	0	1	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>	39	18	6	11	21	35	165	73	28	21	28	50	44	41	31	97	708

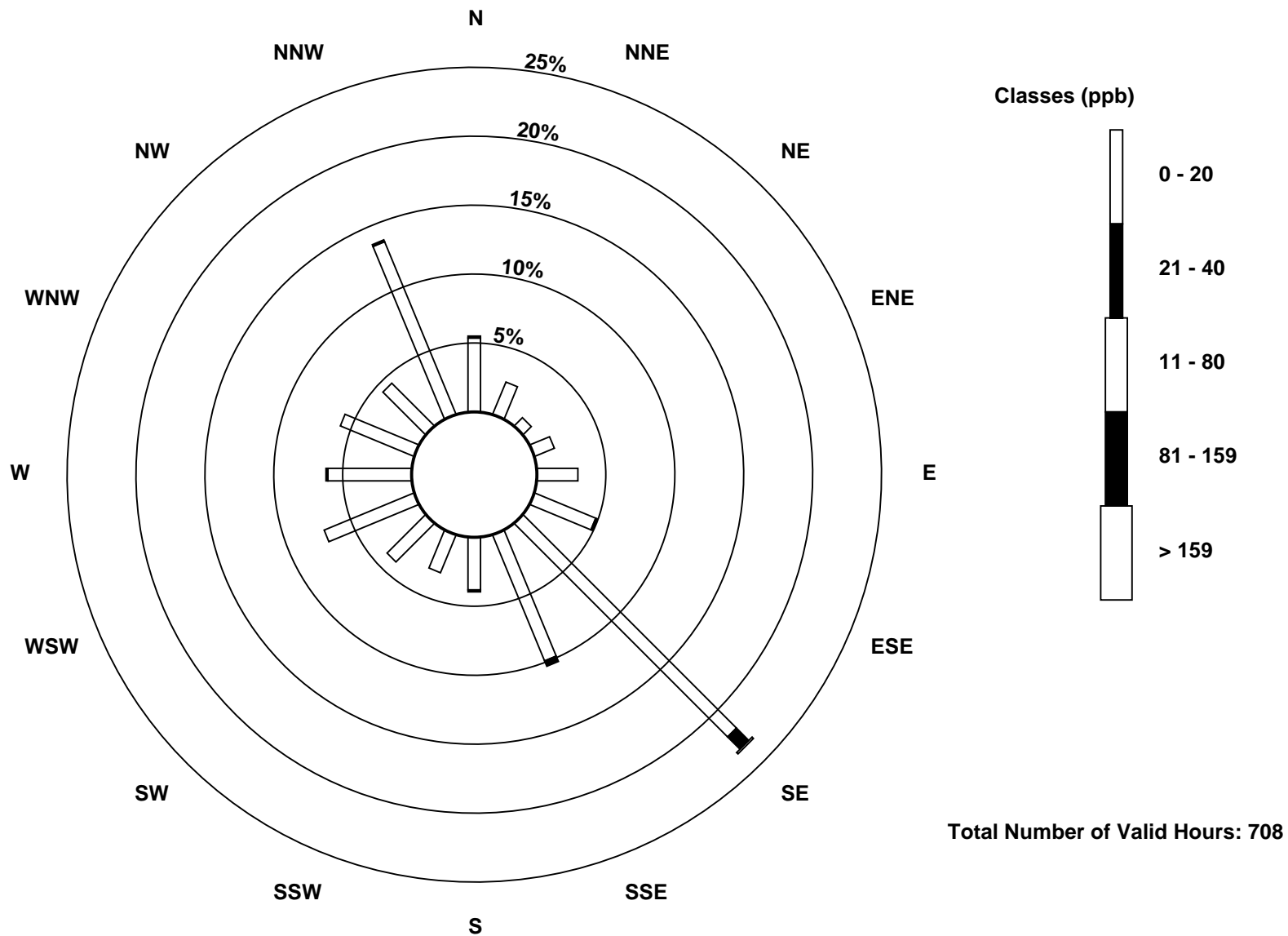
Total Number of Valid Hours: 708

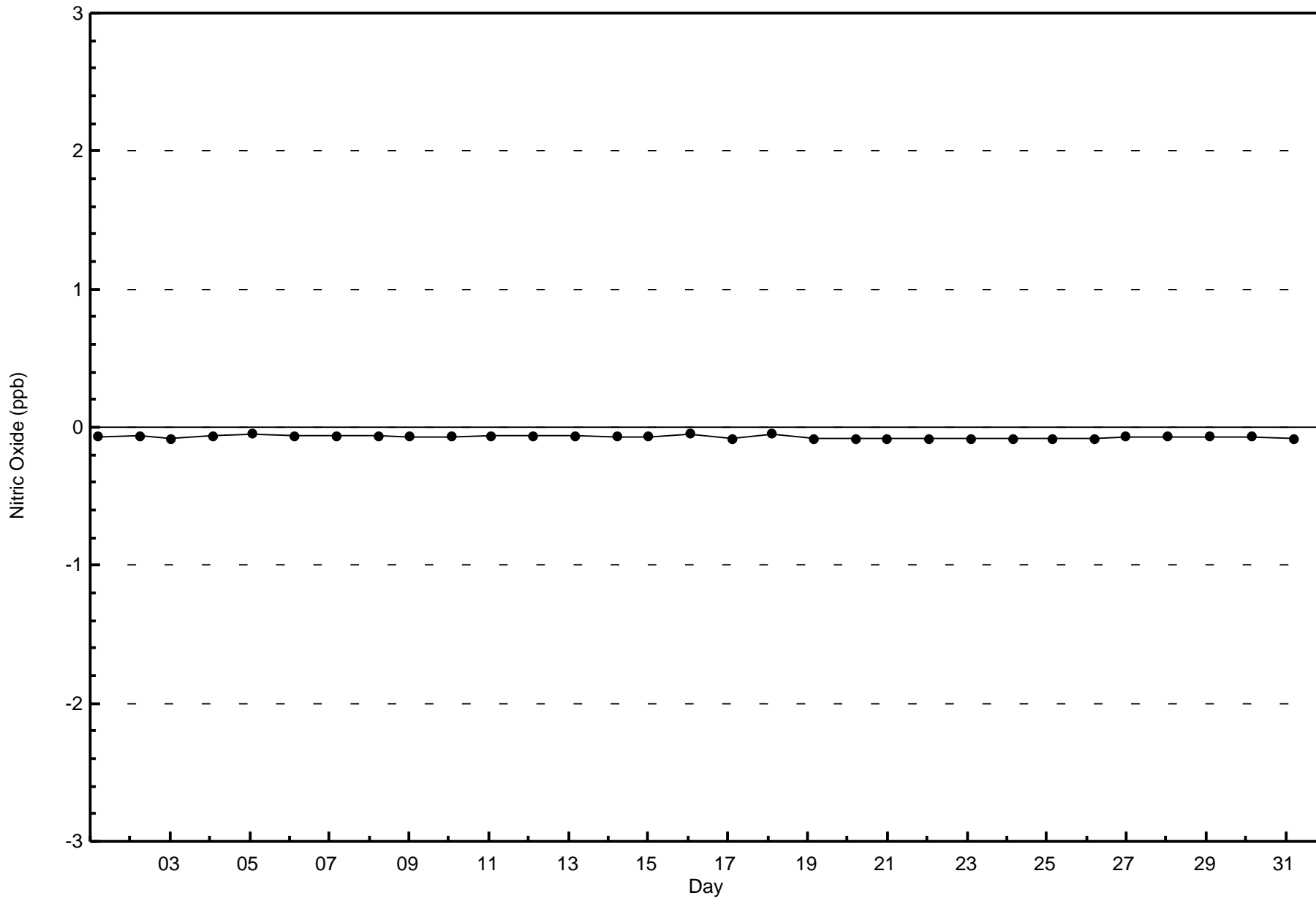
Total Number of Hours: 744

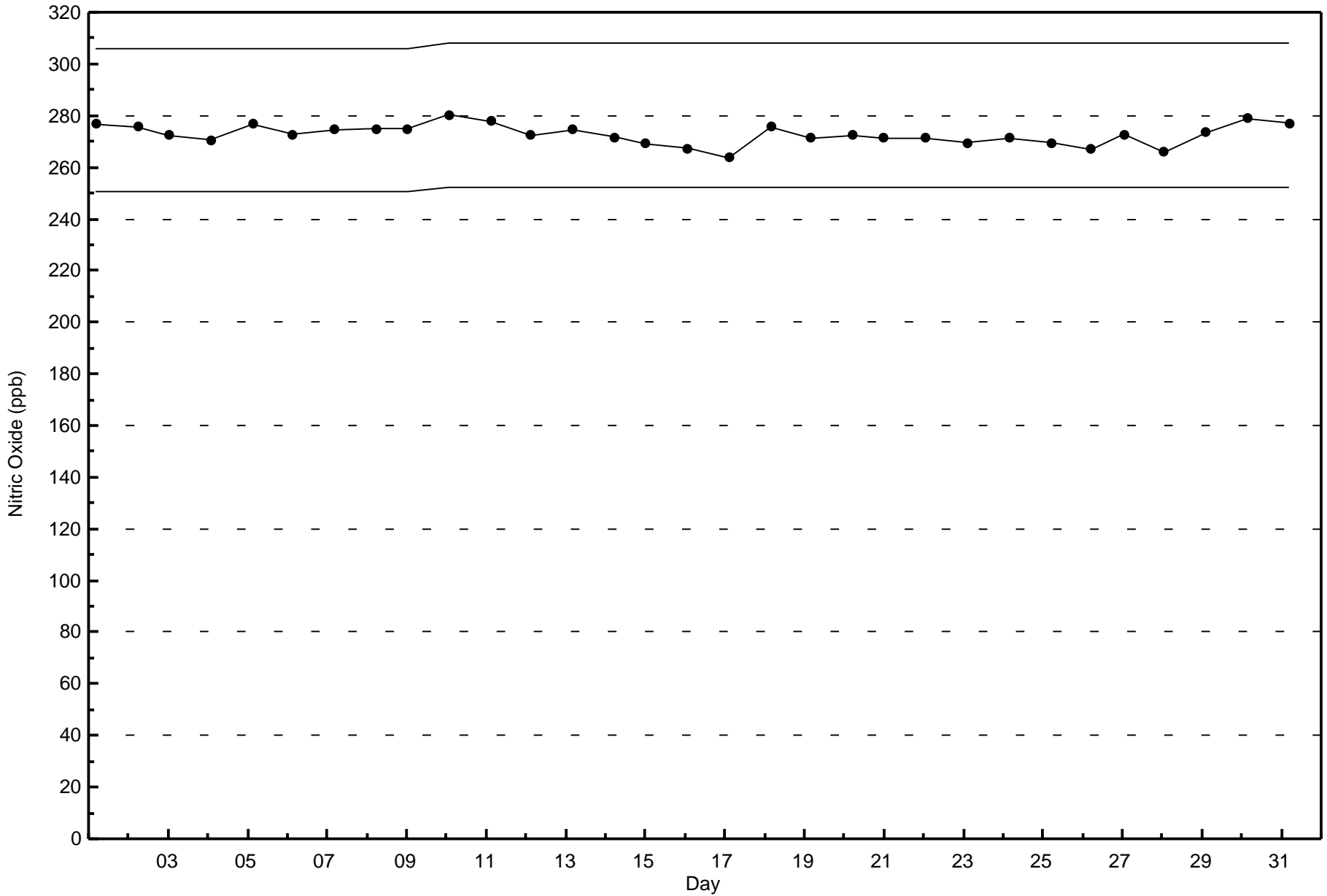


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Nitric Oxide (NO) - ppb  
Athabasca Valley (AMS 7)









Wood Buffalo Environmental Association

Summary of Hour Averages

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

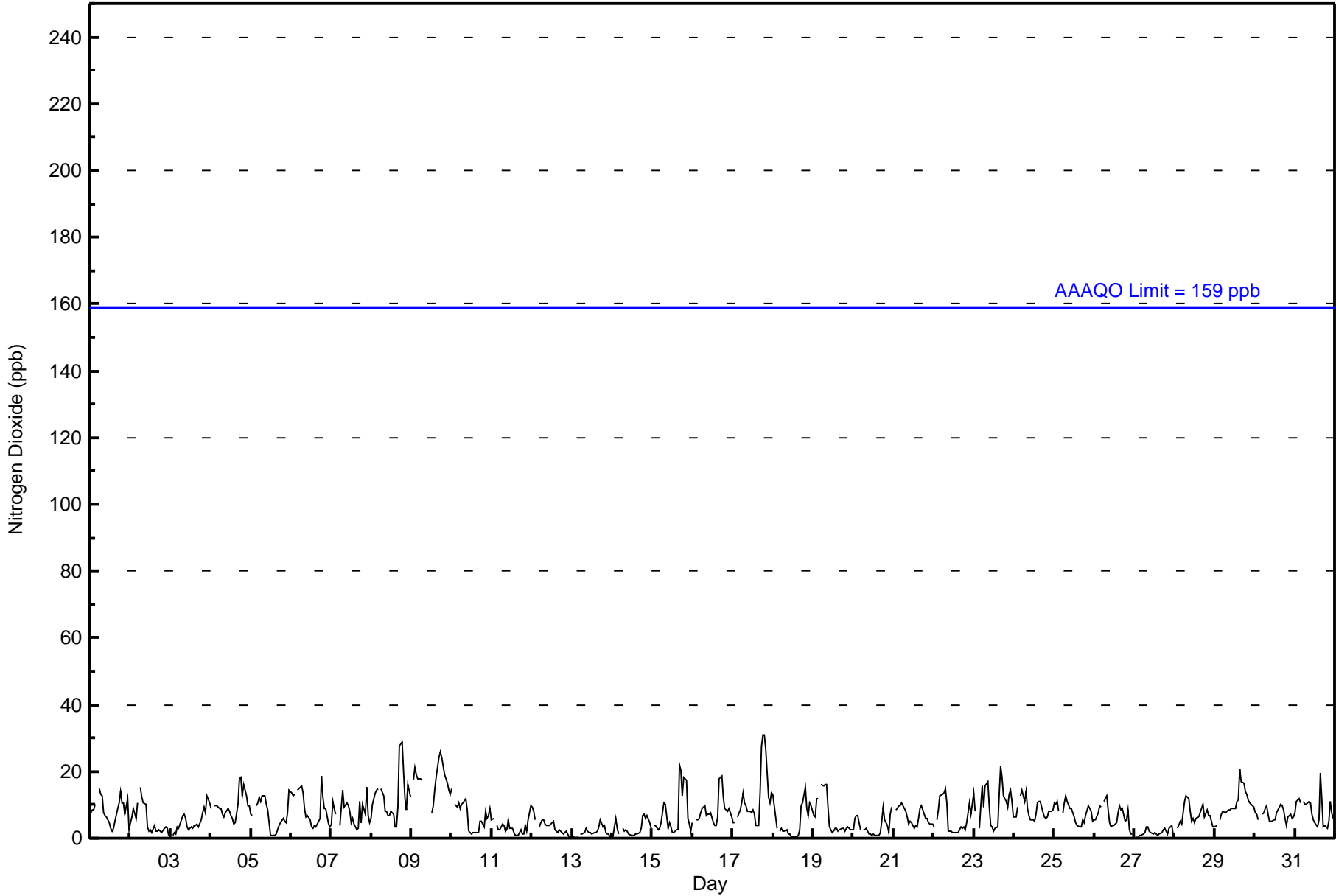
Athabasca Valley - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 31 ppb on Oct 17 19:00										Maximum Daily Average: 17.7 ppb on Oct 9										Hours of Data: 708						
Minimum Value: 0 ppb on Oct 13 01:00										Minimum Daily Average: 1.7 ppb on Oct 27										Hours of Missing Data: 36						
Maximum Diurnal Average: 9.8 ppb at hour 18										Minimum Diurnal Average: 3.8 ppb at hour 13										Hours of Calibration: 36						
Monthly Average: 7.1 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 2 Q <sub>1</sub> = 3 Median = 6 Q <sub>3</sub> = 10 P <sub>90</sub> = 13 P <sub>99</sub> = 26										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	8	8	8	10	Z	15	13	13	8	7	6	5	3	2	3	5	9	10	14	11	11	7	12	3	8.2	15
2-Oct	5	6	9	6	11	Z	15	12	11	10	3	2	3	2	4	2	2	3	2	2	3	3	3	1	5.2	15
3-Oct	Z	1	2	1	4	3	4	7	7	6	3	3	4	3	4	4	4	3	6	8	9	8	13	10	5.0	13
4-Oct	9	Z	10	10	10	9	9	7	6	8	9	8	7	6	4	5	10	18	18	13	16	13	10	10	9.7	18
5-Oct	7	7	Z	10	11	12	11	13	13	10	8	5	1	1	1	2	4	5	6	5	5	8	15	6.9	15	
6-Oct	14	13	13	Z	14	15	16	14	9	6	7	5	3	3	4	3	4	6	19	12	9	9	4	3	8.9	19
7-Oct	4	11	9	7	Z	4	9	14	9	10	10	8	5	6	4	3	3	11	5	10	7	15	7	5	7.7	15
8-Oct	6	10	14	14	15	Z	15	13	8	8	7	7	8	7	3	4	10	28	29	20	12	9	16	12	11.9	29
9-Oct	Z	17	21	19	18	18	17	C	C	C	C	C	8	10	14	18	24	26	24	21	19	16	14	13	17.7	26
10-Oct	15	Z	10	9	10	9	10	11	12	8	2	2	1	2	2	2	2	5	5	3	8	6	7	9	6.5	15
11-Oct	5	6	Z	4	3	2	4	4	2	3	6	3	3	2	1	1	1	3	1	1	4	2	5	10	3.3	10
12-Oct	9	8	6	Z	3	5	6	5	4	4	4	4	5	5	2	2	3	2	2	1	2	1	0	0	3.6	9
13-Oct	0	0	0	1	Z	1	1	2	3	2	2	2	1	2	2	2	3	6	3	4	2	1	1	0	1.8	6
14-Oct	0	3	6	3	1	Z	3	2	2	2	1	1	1	1	1	2	3	7	7	6	7	5	3	3	3.0	7
15-Oct	Z	4	4	3	3	5	8	11	10	3	5	4	2	2	3	3	22	20	13	18	17	6	4	2	7.4	22
16-Oct	5	Z	6	6	6	8	9	10	7	7	7	8	5	4	4	7	18	19	12	9	9	8	9	6	8.1	19
17-Oct	5	5	Z	7	8	10	14	11	10	8	8	8	9	7	4	4	14	27	31	31	27	12	11	14	12.3	31
18-Oct	13	10	3	Z	2	3	2	2	3	1	1	1	1	0	1	1	2	10	11	15	9	7	11	10	5.1	15
19-Oct	7	6	12	12	Z	16	16	16	16	9	3	2	2	3	3	2	3	3	3	2	3	3	3	3	6.4	16
20-Oct	2	6	7	7	3	Z	3	3	3	1	1	1	1	1	1	1	2	5	9	5	4	2	7	10	3.6	10
21-Oct	Z	9	9	10	10	11	10	8	6	4	5	5	3	4	3	6	9	10	7	6	6	5	4	4	6.6	11
22-Oct	4	Z	6	8	13	13	14	15	11	2	2	2	2	2	2	2	3	3	4	2	5	11	7	10	6.1	15
23-Oct	14	8	Z	3	10	16	9	16	17	9	4	3	2	3	4	13	22	18	13	11	9	13	14	11	10.5	22
24-Oct	6	6	10	Z	13	14	11	14	9	7	6	5	5	7	11	11	8	6	6	7	8	8	9	9	8.5	14
25-Oct	11	10	11	8	Z	8	11	13	11	9	8	6	5	4	3	3	5	5	7	10	9	8	5	5	7.7	13
26-Oct	5	6	8	10	9	Z	11	13	8	5	4	4	4	5	8	10	9	9	5	6	9	3	1	1	6.5	13
27-Oct	Z	0	0	1	1	1	2	4	4	2	2	1	2	1	1	1	2	2	3	2	1	3	4	1	1.7	4
28-Oct	1	Z	3	5	4	8	11	13	12	8	5	6	5	6	6	8	9	10	6	8	7	7	5	3	6.7	13
29-Oct	3	4	Z	5	7	8	8	8	9	8	9	9	9	11	12	21	17	17	14	13	11	11	10	9	10.1	21
30-Oct	8	7	6	Z	7	8	9	10	7	5	5	6	6	8	9	10	10	8	6	4	6	7	6	6	7.1	10
31-Oct	8	11	12	11	Z	11	10	10	11	11	7	5	5	3	6	20	12	4	4	3	5	11	8	6	8.4	20
6.7 7.0 7.7 7.2 7.8 8.9 9.3 9.7 8.2 6.1 5.0 4.3 3.8 3.9 4.1 5.6 7.9 9.8 9.4 8.6 8.3 7.3 7.3 6.6																								Diurnal Average		
15 17 21 19 18 18 17 16 17 11 10 9 9 11 14 21 24 28 31 31 27 16 16 15																								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  
Athabasca Valley - October 2015







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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Athabasca Valley - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	694	98.02	98.02
21 - 40	14	1.98	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: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Athabasca Valley - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	36	18	6	11	21	35	161	69	28	21	28	50	44	41	31	94	694
21 - 40	3	0	0	0	0	0	4	4	0	0	0	0	0	0	0	3	14
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>39</b>	<b>18</b>	<b>6</b>	<b>11</b>	<b>21</b>	<b>35</b>	<b>165</b>	<b>73</b>	<b>28</b>	<b>21</b>	<b>28</b>	<b>50</b>	<b>44</b>	<b>41</b>	<b>31</b>	<b>97</b>	<b>708</b>

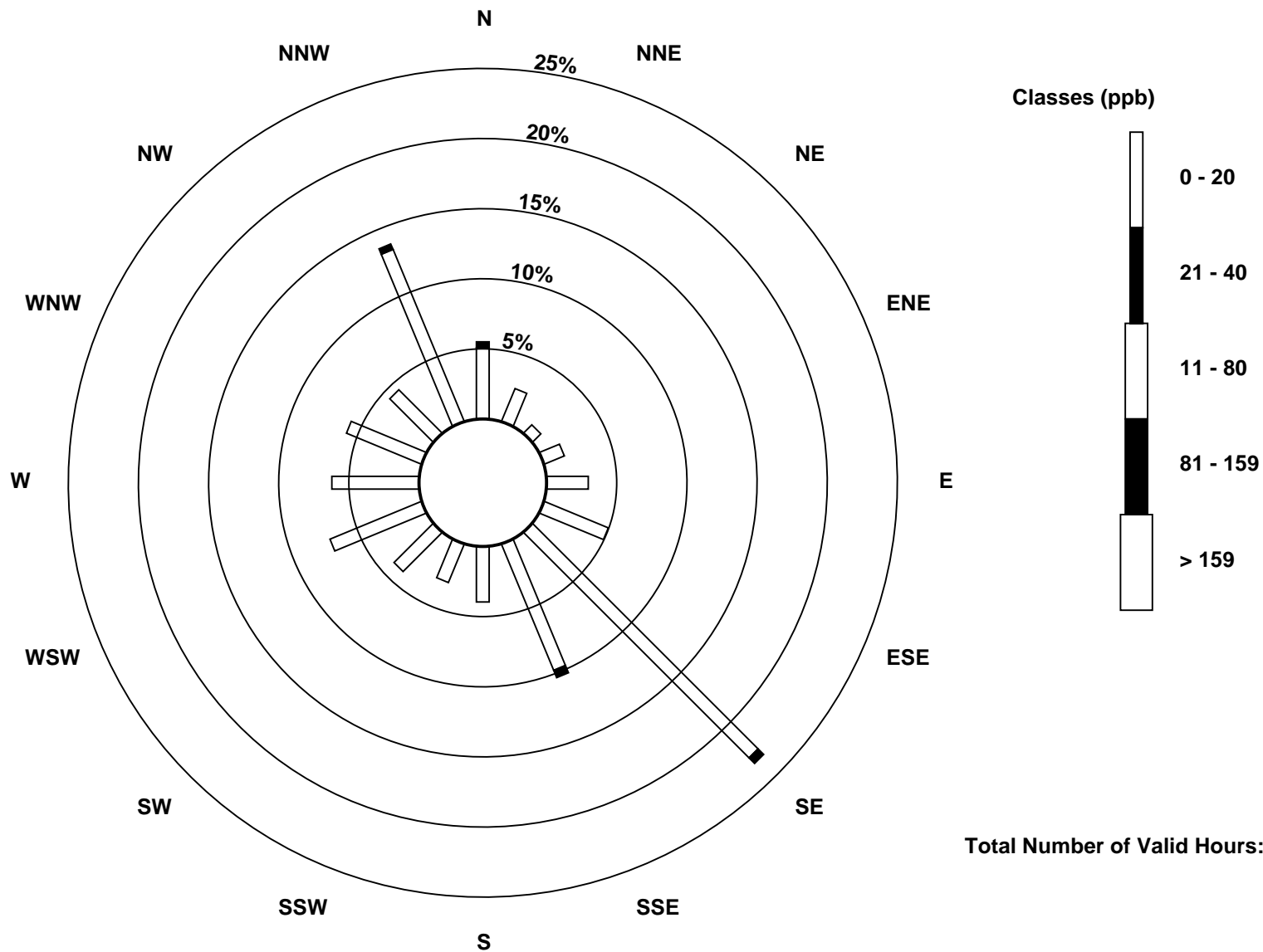
Total Number of Valid Hours: 708

Total Number of Hours: 744

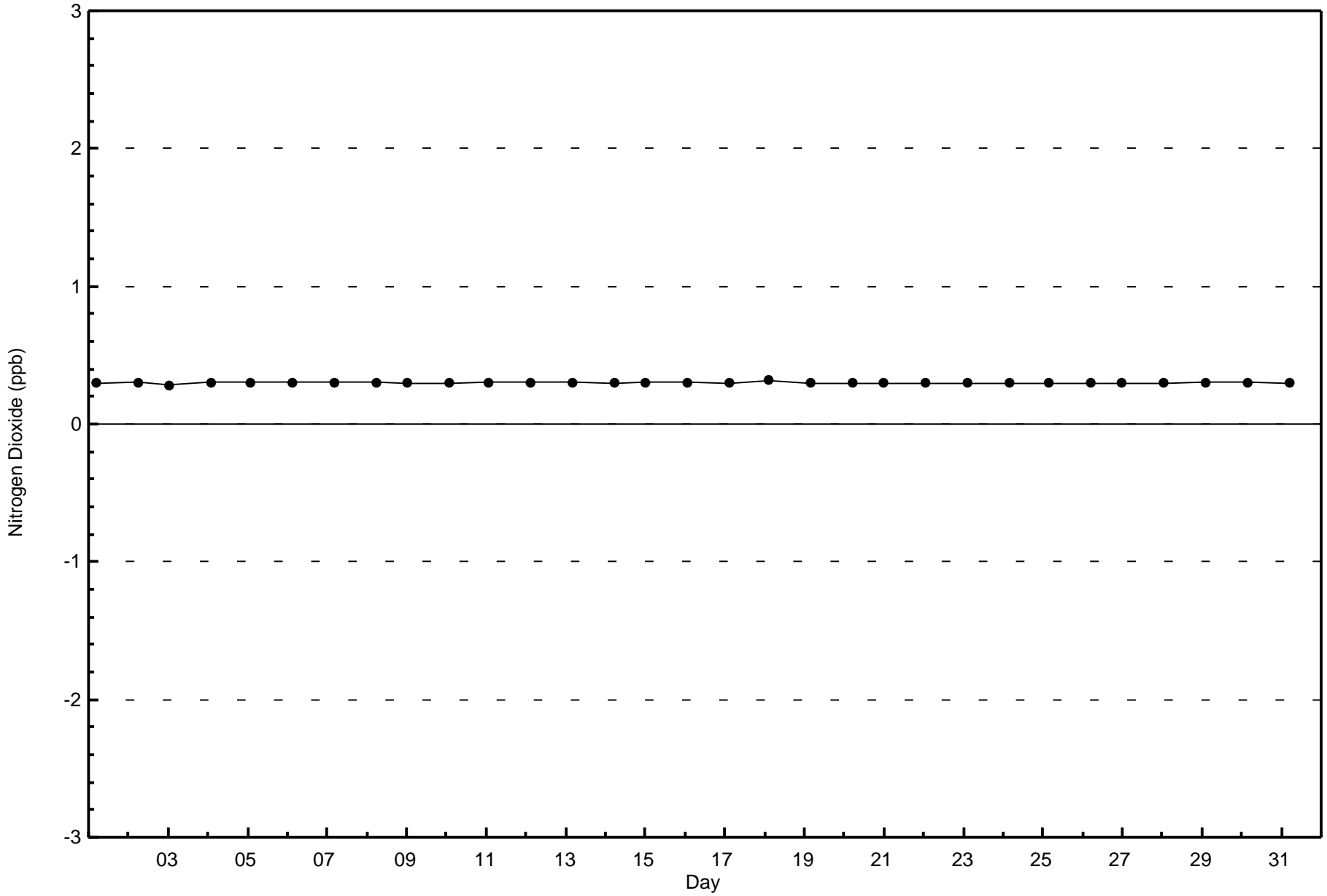


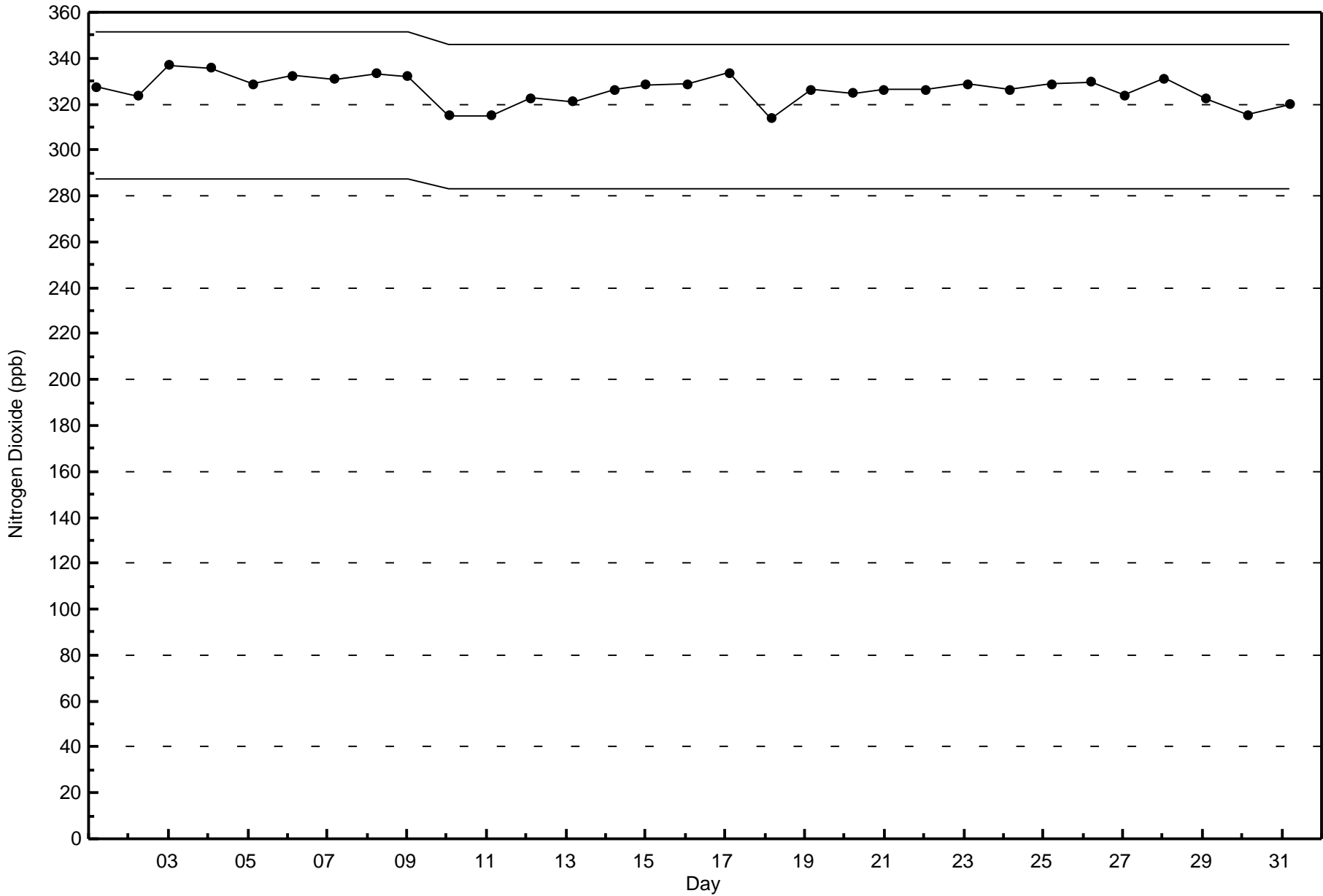
Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Athabasca Valley (AMS 7)



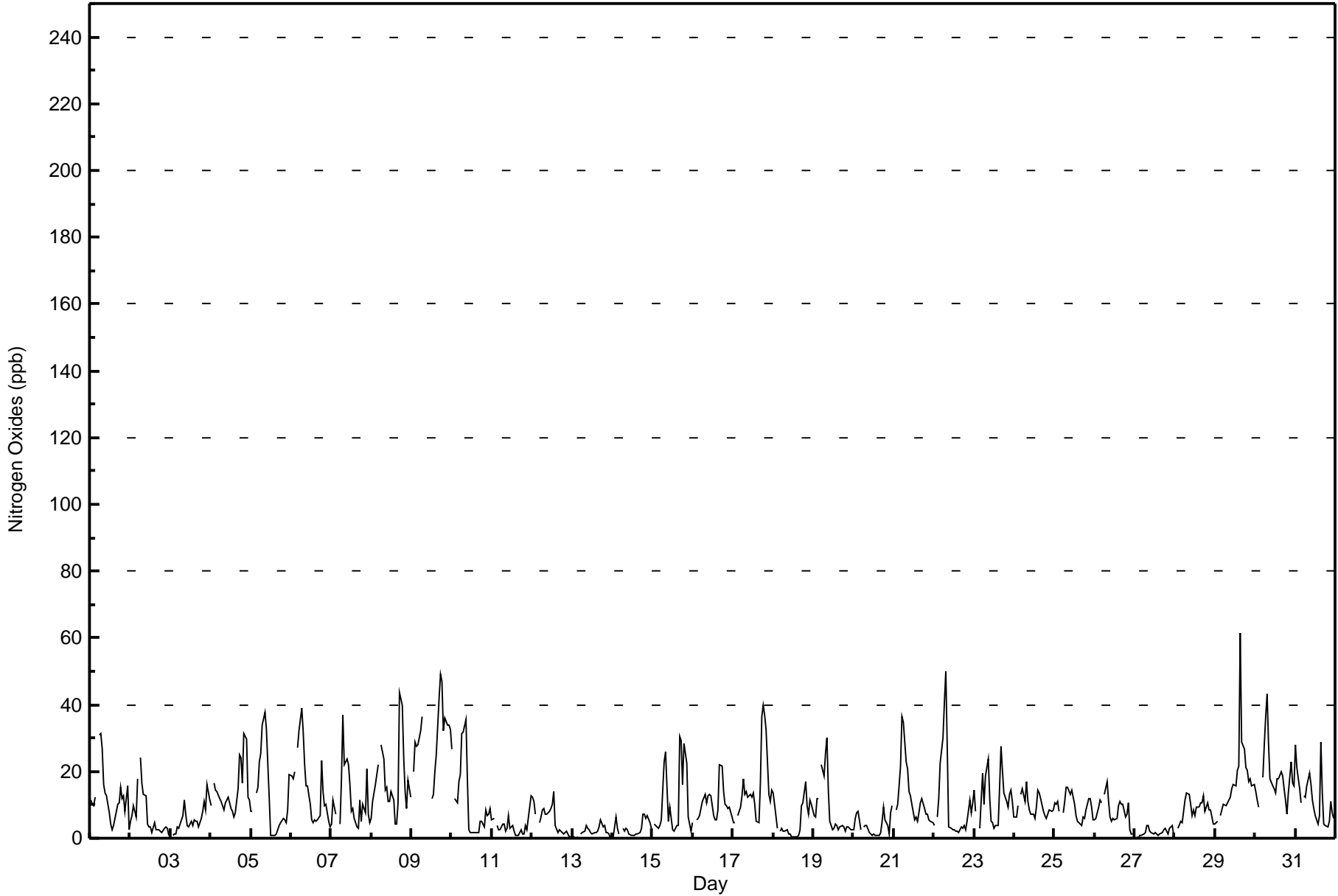
Total Number of Valid Hours: 708







Maximum Value: 62 ppb on Oct 29 16:00		Maximum Daily Average: 30.5 ppb on Oct 9		Hours in Service: 744																																												
Minimum Value: 0 ppb on Oct 14 00:00		Minimum Daily Average: 1.7 ppb on Oct 27		Hours of Data: 708																																												
Maximum Diurnal Average: 18.1 ppb at hour 8		Minimum Diurnal Average: 5.9 ppb at hour 15		Hours of Missing Data: 36																																												
Monthly Average: 10.4 ppb		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 2 Q <sub>1</sub> = 4 Median = 8 Q <sub>3</sub> = 14 P <sub>90</sub> = 23 P <sub>99</sub> = 41		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	11	10	10	12	Z	31	32	27	16	14	13	8	4	3	4	6	10	11	15	12	13	8	16	3	12.4	32																						
2-Oct	5	7	10	6	18	Z	24	16	13	13	4	3	3	2	5	2	2	2	2	2	3	3	3	1	6.5	24																						
3-Oct	Z	1	1	1	4	3	4	7	12	7	4	3	5	4	6	5	5	4	6	8	11	9	16	12	5.9	16																						
4-Oct	10	Z	17	14	14	12	11	10	8	11	12	11	9	8	6	8	15	25	24	16	31	30	12	11	14.1	31																						
5-Oct	8	8	Z	13	15	23	26	34	38	33	22	12	1	1	1	2	4	5	6	6	5	8	19	12.6	38																							
6-Oct	19	18	20	Z	27	32	39	32	22	16	16	10	5	5	6	5	5	7	23	14	10	10	5	3	15.2	39																						
7-Oct	4	11	9	7	Z	4	17	37	22	24	22	16	8	9	6	3	3	11	5	10	7	21	7	5	11.7	37																						
8-Oct	6	11	16	19	22	Z	28	24	15	15	11	11	14	11	4	4	11	44	40	24	14	9	17	12	16.7	44																						
9-Oct	Z	20	29	28	28	32	36	C	C	C	C	C	12	13	20	25	42	49	47	32	36	34	34	33	30.5	49																						
10-Oct	26	Z	12	11	17	19	31	32	36	18	3	2	2	2	2	2	2	5	5	3	8	7	7	9	11.3	36																						
11-Oct	5	6	Z	4	3	2	4	4	2	3	7	3	4	2	1	1	1	3	1	1	4	2	6	13	3.6	13																						
12-Oct	12	11	7	Z	5	6	9	9	7	7	8	9	10	14	4	2	3	2	2	1	2	1	0	0	5.8	14																						
13-Oct	0	0	0	0	Z	1	2	2	4	3	2	2	1	2	2	2	3	6	3	4	2	1	1	0	2.0	6																						
14-Oct	0	3	6	3	1	Z	3	2	3	2	1	1	1	1	1	1	2	3	7	7	6	7	5	3	3.1	7																						
15-Oct	Z	4	4	3	4	6	14	23	26	5	9	6	3	2	4	4	30	29	16	29	23	6	4	2	11.1	30																						
16-Oct	5	Z	6	6	7	9	11	13	11	13	13	13	7	6	6	9	22	22	14	10	10	9	9	7	10.2	22																						
17-Oct	5	5	Z	7	9	13	18	13	14	12	13	12	14	10	5	5	16	36	40	37	33	13	11	14	15.4	40																						
18-Oct	14	10	3	Z	2	3	2	2	3	1	1	1	1	0	0	1	2	10	11	17	10	7	11	10	5.3	17																						
19-Oct	7	6	12	12	Z	22	19	26	30	14	5	2	3	4	4	3	3	4	3	2	3	4	3	3	8.4	30																						
20-Oct	2	6	8	8	3	Z	3	4	4	2	1	1	1	1	1	1	2	5	9	5	4	1	8	10	3.9	10																						
21-Oct	Z	9	10	16	22	36	35	23	21	14	13	10	6	6	5	8	11	12	9	7	7	6	5	4	12.7	36																						
22-Oct	4	Z	6	12	22	30	41	50	28	3	3	3	2	2	2	2	3	3	4	2	5	12	8	11	11.2	50																						
23-Oct	14	8	Z	3	11	20	10	18	24	12	5	5	3	4	4	15	28	20	14	11	9	13	14	11	12.1	28																						
24-Oct	6	6	10	Z	13	15	11	17	11	8	7	7	6	9	14	13	12	8	7	6	7	8	8	9	9.5	17																						
25-Oct	11	10	11	8	Z	8	11	15	15	13	14	12	10	7	5	4	4	7	6	8	12	12	10	6	9.5	15																						
26-Oct	6	6	9	12	11	Z	13	17	11	6	5	6	5	6	10	11	10	10	6	7	10	2	1	1	8.0	17																						
27-Oct	Z	0	0	1	1	1	2	4	4	2	2	1	2	1	1	1	2	2	3	2	1	3	4	1	1.7	4																						
28-Oct	1	Z	3	5	5	8	12	14	13	10	7	9	7	9	9	10	11	13	8	11	8	8	6	4	8.3	14																						
29-Oct	4	5	Z	7	9	10	10	11	12	12	15	16	16	20	22	62	29	27	21	20	17	18	16	16	17.1	62																						
30-Oct	14	11	9	Z	18	28	36	43	28	18	16	15	14	18	18	20	19	15	11	7	13	23	17	16	18.5	43																						
31-Oct	28	21	15	11	Z	13	12	16	19	16	11	9	7	4	7	29	13	4	4	3	5	11	8	6	11.9	29																						
																								8.8	8.3	9.3	8.8	11.6	14.9	17.0	18.1	15.7	10.9	8.8	7.3	5.9	6.0	5.9	8.5	10.4	12.9	12.0	10.6	10.7	9.8	9.1	8.2	Diurnal Average
																								28	21	29	28	36	41	50	38	33	22	16	16	20	22	62	42	49	47	37	36	34	34	33	Diurnal Maximum	
Z - zerospan      C - Calibration																																																





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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Athabasca Valley - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	619	87.43	87.43
21 - 40	81	11.44	98.87
41 - 80	8	1.13	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744





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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Athabasca Valley - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	35	16	6	10	18	29	129	58	24	20	24	49	43	41	30	87	619
21 - 40	3	2	0	1	3	6	32	14	4	1	4	1	1	0	1	8	81
11 - 80	1	0	0	0	0	0	4	1	0	0	0	0	0	0	0	2	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>	39	18	6	11	21	35	165	73	28	21	28	50	44	41	31	97	708

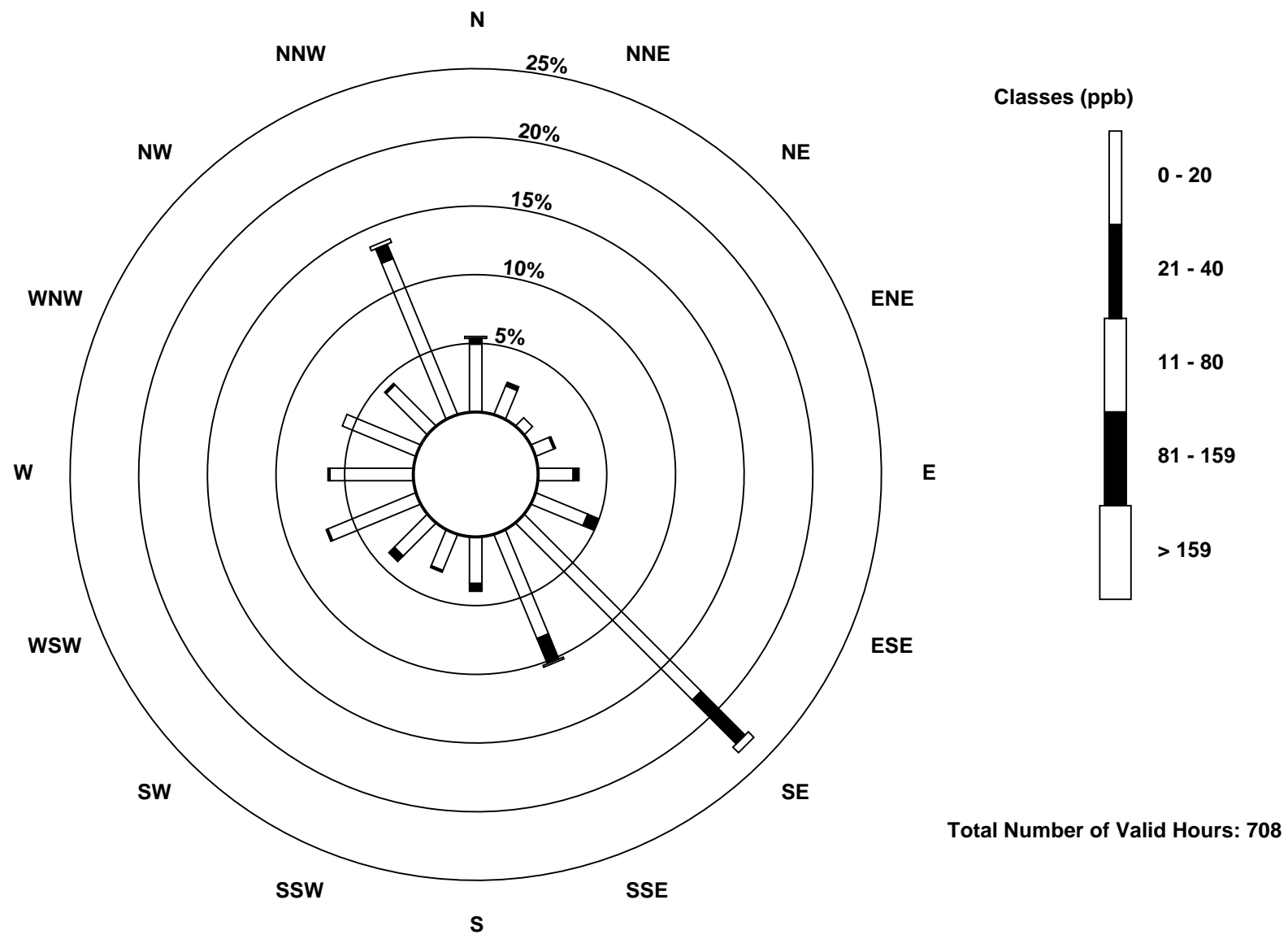
Total Number of Valid Hours: 708

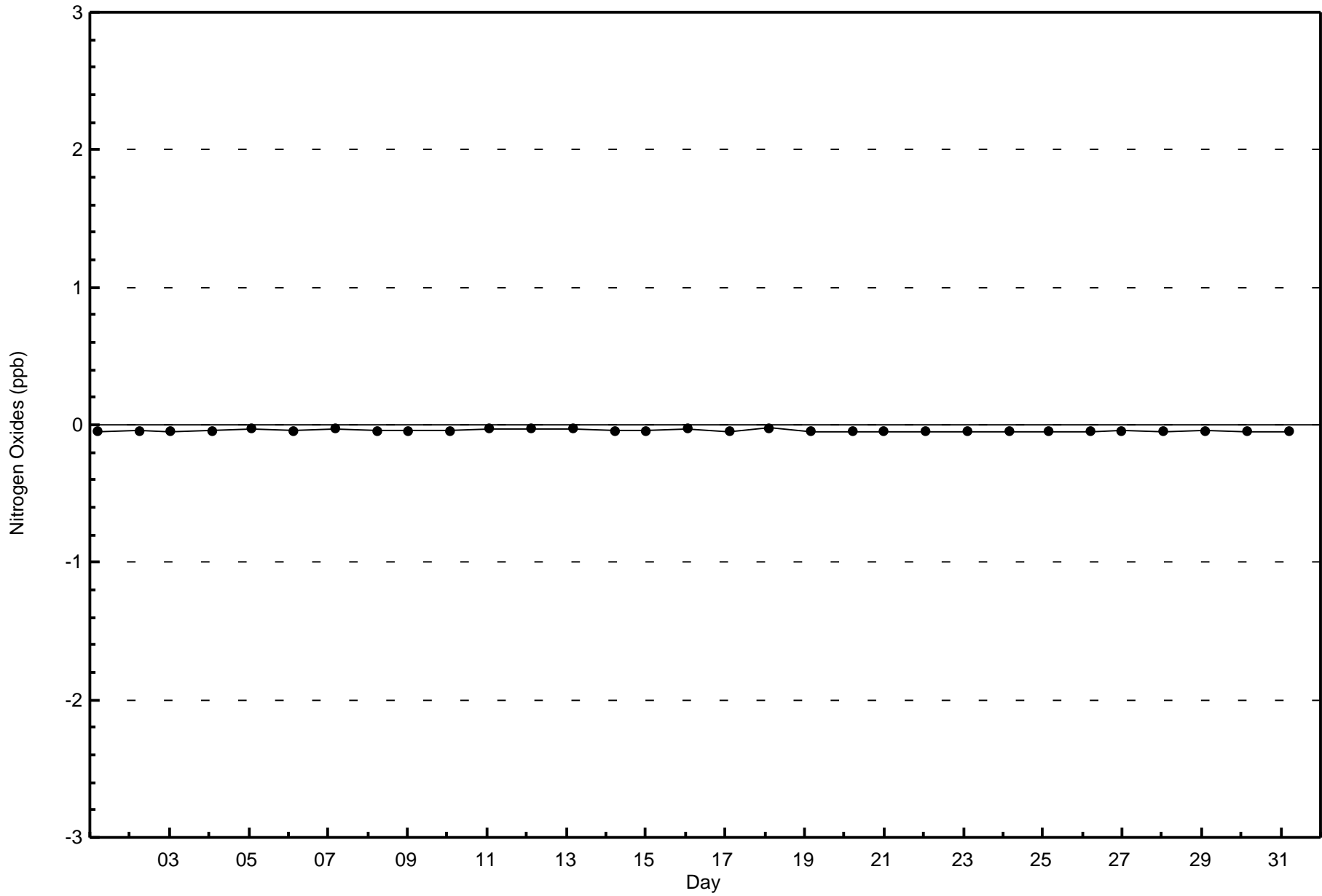
Total Number of Hours: 744

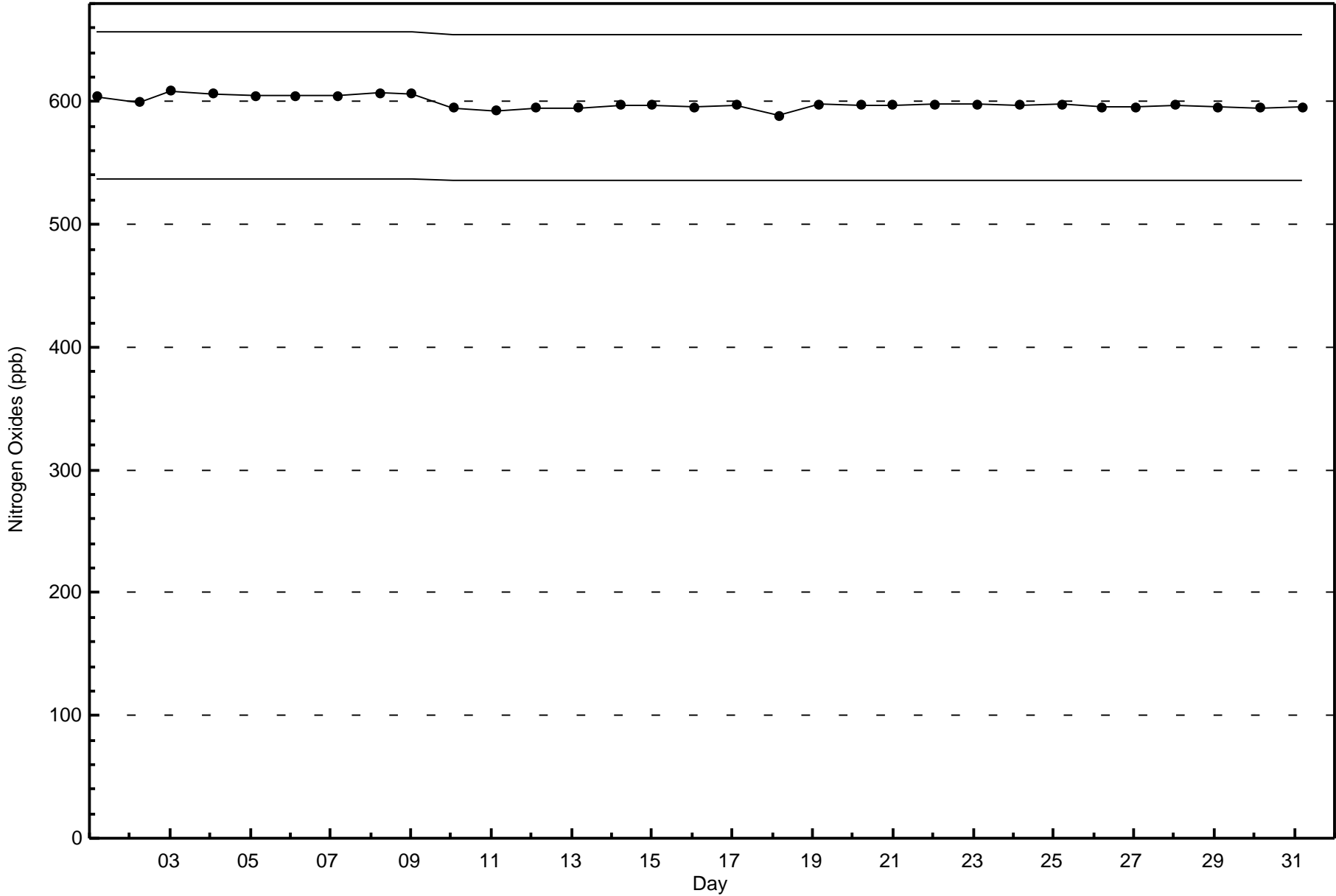


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Athabasca Valley (AMS 7)









Number of Exceedences (AAAQO):	24-hr: 0	Hours in Service:	744
Maximum Value: 20.9 µg/m <sup>3</sup> on Oct 23 17:00	Maximum Daily Average: 11.4 µg/m <sup>3</sup> on Oct 9	Hours of Data:	739
Minimum Value: 0.3 µg/m <sup>3</sup> on Oct 10 15:00	Minimum Daily Average: 1.2 µg/m <sup>3</sup> on Oct 13	Hours of Missing Data:	5
Maximum Diurnal Average: 5.3 µg/m <sup>3</sup> at hour 20	Minimum Diurnal Average: 3.6 µg/m <sup>3</sup> at hour 15	Hours of Calibration:	2
Monthly Average: 4.60 µg/m <sup>3</sup>	Percentiles: P <sub>1</sub> = 0.4 P <sub>10</sub> = 1.7 Q <sub>1</sub> = 2.5 Median = 3.8 Q <sub>3</sub> = 5.7 P <sub>90</sub> = 8.8 P <sub>99</sub> = 16.3	Percent Operational Time:	99.6

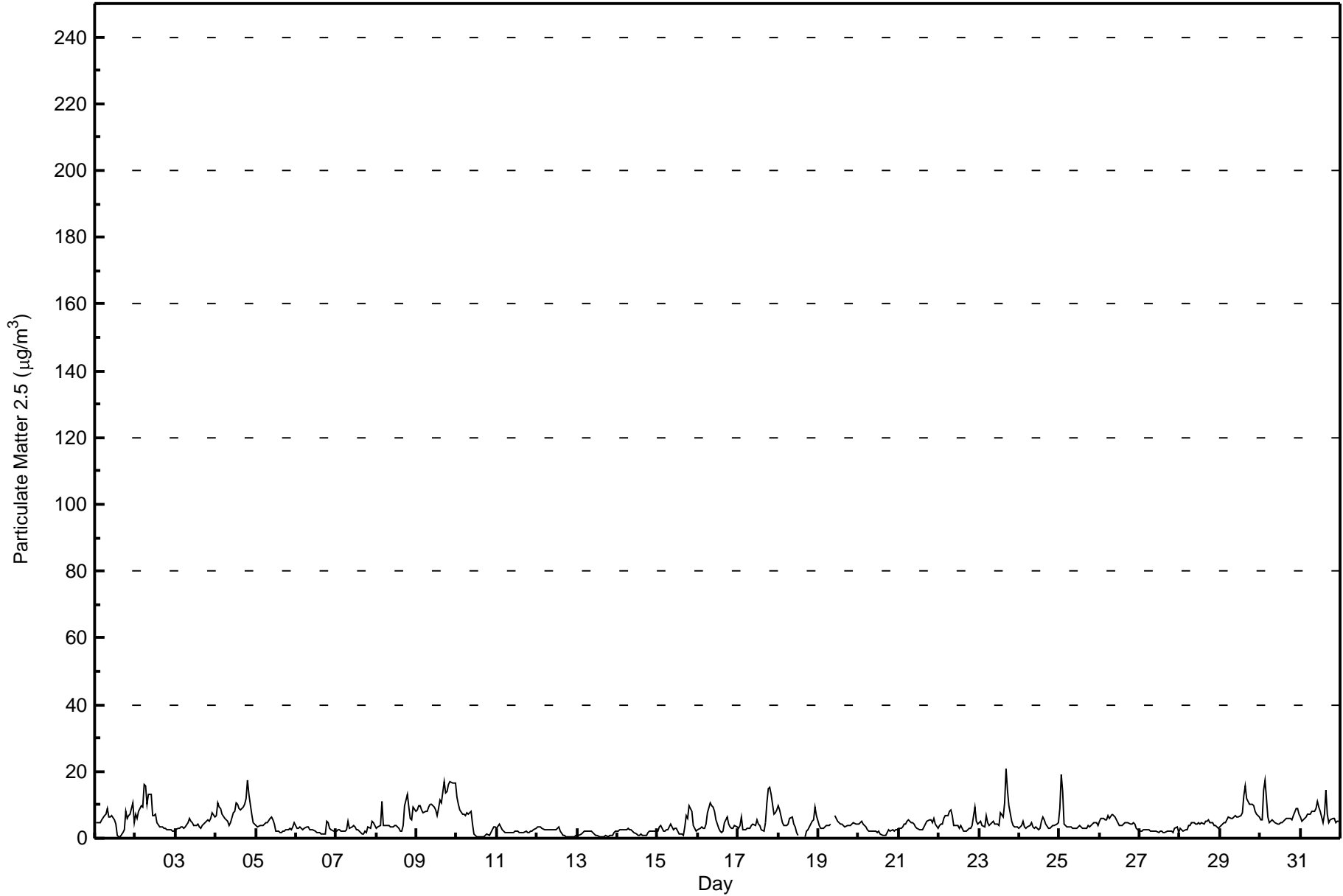
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	4.5	4.6	4.6	4.7	5.7	6.9	7.4	9.0	6.5	6.2	6.6	5.3	4.1	0.6	0.4	0.3	1.6	2.7	8.0	6.0	6.6	7.0	10.8	4.7	5.2	10.8																						
2-Oct	7.2	5.8	7.9	9.9	9.3	16.1	15.7	10.1	13.1	13.2	6.6	6.6	7.3	4.9	3.5	3.2	3.3	3.1	2.8	2.5	2.4	2.5	2.3	2.2	6.7	16.1																						
3-Oct	2.6	3.0	3.2	3.2	3.2	3.1	3.3	4.5	6.0	4.9	4.7	3.8	3.7	4.1	3.5	3.0	3.7	4.2	5.1	5.4	5.2	5.8	7.8	6.4	4.3	7.8																						
4-Oct	6.7	10.8	9.5	8.9	7.3	5.8	5.4	5.1	4.0	4.6	7.7	8.2	10.6	10.1	8.7	8.5	9.2	10.4	12.1	17.4	13.2	7.2	4.8	4.2	8.3	17.4																						
5-Oct	3.7	3.6	3.7	3.7	3.9	4.4	4.5	4.8	5.9	6.4	5.7	4.1	1.9	1.9	1.6	1.7	2.3	2.1	2.6	2.7	2.8	2.5	3.5	4.8	3.5	6.4																						
6-Oct	3.2	3.2	3.5	2.9	2.6	2.8	3.6	3.3	2.6	2.5	2.6	2.2	1.7	1.7	1.8	1.3	1.1	1.2	5.2	4.8	2.9	2.7	2.0	2.0	2.6	5.2																						
7-Oct	2.1	2.5	2.4	2.3	2.1	2.1	2.5	5.1	3.0	3.5	3.8	3.3	2.6	2.6	2.0	1.1	1.1	2.2	1.8	3.4	3.1	5.2	4.6	3.7	2.8	5.2																						
8-Oct	3.1	3.2	3.8	10.8	3.9	3.8	3.9	3.9	3.5	3.5	3.4	3.7	3.7	3.0	2.3	2.1	3.8	9.8	13.1	9.4	5.9	5.7	9.2	8.0	5.3	13.1																						
9-Oct	8.5	9.7	9.9	8.6	7.8	8.0	8.2	9.5	10.1	10.2	9.4	8.3	7.0	8.8	11.2	10.5	16.8	13.5	14.0	16.0	16.8	16.5	16.5	16.4	11.4	16.8																						
10-Oct	12.2	10.4	8.4	7.3	7.4	6.9	7.5	7.2	8.2	4.4	1.1	0.7	0.5	0.3	0.3	0.3	0.4	0.8	1.2	0.9	1.7	2.7	3.2	3.2	4.1	12.2																						
11-Oct	3.2	4.2	3.4	2.7	2.2	1.9	1.8	1.7	1.8	1.8	1.9	2.3	2.1	1.7	1.5	1.5	1.5	2.1	1.6	1.7	2.0	2.0	2.6	3.0	2.2	4.2																						
12-Oct	3.3	3.3	3.3	3.1	2.4	2.4	2.5	2.5	2.5	2.6	2.7	2.7	3.0	3.5	2.0	1.0	0.7	0.6	0.5	0.5	0.6	0.6	0.6	0.7	2.0	3.5																						
13-Oct	0.8	1.0	1.3	1.8	1.9	2.0	2.1	2.1	2.1	1.7	1.2	1.0	0.8	0.6	0.4	0.4	0.6	0.7	0.6	0.7	0.7	1.0	1.5	2.1	1.2	2.1																						
14-Oct	2.3	2.5	2.7	2.7	2.7	2.7	2.8	2.4	2.5	2.2	1.8	1.2	0.9	0.7	1.2	0.7	0.8	1.0	1.7	2.1	2.2	2.2	2.2	2.2	1.9	2.8																						
15-Oct	2.2	3.4	3.8	2.2	2.3	2.4	2.7	3.4	4.1	2.5	3.1	2.8	2.1	1.5	1.1	1.0	3.4	6.7	5.9	9.6	8.0	4.0	3.0	2.2	3.5	9.6																						
16-Oct	2.4	2.8	3.5	3.0	3.0	4.1	7.6	10.4	9.7	9.4	8.1	5.5	2.9	2.0	1.6	2.0	4.6	6.6	4.3	3.3	2.9	3.0	3.9	3.3	4.6	10.4																						
17-Oct	2.8	3.7	6.3	2.6	2.6	2.8	2.9	3.0	3.7	4.2	3.7	5.5	4.4	3.9	2.4	2.3	4.5	10.4	14.8	15.1	13.1	7.2	7.5	8.5	5.7	15.1																						
18-Oct	9.6	8.3	4.6	3.7	3.7	3.7	4.4	6.1	6.4	4.1	3.4	1.8	1.0	UO	UO	UO	0.6	2.1	2.4	4.1	4.9	5.6	9.3	6.7	4.6	9.6																						
19-Oct	3.9	2.8	2.8	2.9	3.5	3.9	3.9	4.2	C	C	6.9	5.0	4.7	4.3	4.2	3.8	3.6	3.9	3.8	3.7	4.4	4.8	4.4	4.2	4.1	6.9																						
20-Oct	4.4	4.6	5.0	4.4	3.4	2.5	2.0	2.1	2.1	2.3	2.0	1.9	1.9	1.4	1.0	0.9	1.0	1.5	2.5	2.3	2.4	2.2	2.5	2.7	2.5	5.0																						
21-Oct	3.0	3.1	3.5	4.1	4.4	4.9	5.5	4.7	4.7	4.2	3.2	2.9	2.4	2.5	2.6	3.5	4.4	5.2	5.5	5.3	4.5	5.7	4.1	3.0	4.0	5.7																						
22-Oct	3.8	4.4	4.4	5.7	6.9	6.8	8.3	8.4	6.9	3.8	3.8	3.7	3.2	3.6	2.8	2.0	2.1	2.7	2.9	3.0	3.7	9.1	5.1	4.1	4.6	9.1																						
23-Oct	4.8	4.9	3.9	3.5	6.8	4.8	3.8	4.3	4.9	4.3	4.0	4.2	3.6	7.6	6.2	10.5	20.9	14.4	9.7	5.3	3.8	3.6	3.5	3.2	6.1	20.9																						
24-Oct	3.1	3.7	4.9	3.5	3.0	3.2	3.8	4.8	3.3	2.9	3.4	2.6	2.8	5.2	6.4	5.3	4.4	3.1	3.1	3.3	3.9	3.9	4.0	4.8	3.9	6.4																						
25-Oct	8.8	19.3	14.0	4.2	3.5	3.2	3.4	3.4	3.1	3.0	3.1	3.3	3.7	3.4	3.0	2.9	3.1	3.8	3.3	3.9	4.6	4.8	4.6	3.8	4.9	19.3																						
26-Oct	5.1	5.9	5.8	5.7	5.5	6.6	5.8	7.0	6.6	6.2	5.6	4.8	3.8	3.7	4.4	4.8	4.8	4.6	4.2	4.3	4.6	4.2	2.8	2.4	5.0	7.0																						
27-Oct	2.1	2.3	2.7	2.6	2.7	2.4	2.0	2.0	2.0	2.0	2.0	1.9	2.0	1.9	1.8	1.9	1.9	2.0	2.1	2.1	1.9	2.9	3.3	1.8	2.2	3.3																						
28-Oct	3.2	2.4	1.9	2.4	2.7	3.6	4.0	4.6	4.7	4.1	4.2	4.9	4.4	4.6	4.4	5.0	5.0	5.6	4.9	4.8	4.0	3.8	3.5	3.1	4.0	5.6																						
29-Oct	3.4	4.3	4.6	4.8	5.6	6.2	6.0	6.1	6.2	6.9	6.5	6.4	6.8	7.5	12.6	15.7	12.0	10.1	10.3	10.2	9.6	7.9	7.4	6.5	7.6	15.7																						
30-Oct	5.7	5.4	14.3	17.2	6.4	4.7	5.1	5.6	4.9	4.7	4.4	4.4	4.7	4.7	5.2	6.0	5.9	6.0	5.9	5.7	6.7	8.8	8.9	7.4	6.6	17.2																						
31-Oct	6.3	4.9	5.8	6.4	7.1	7.4	7.3	7.8	8.1	9.0	11.2	9.3	7.9	4.8	7.0	14.2	7.0	4.7	5.7	6.1	5.9	4.8	5.0	5.1	7.0	14.2																						
																								4.4	5.0	5.1	4.9	4.4	4.6	4.8	5.1	5.1	4.7	4.4	4.0	3.6	3.6	3.6	3.9	4.4	4.8	5.2	5.3	5.0	4.8	5.0	4.4	Diurnal Average
																								12.2	19.3	14.3	17.2	9.3	16.1	15.7	10.4	13.1	13.2	11.2	9.3	10.6	10.1	12.6	15.7	20.9	14.4	14.8	17.4	16.8	16.5	16.5	16.4	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>) -  $\mu\text{g}/\text{m}^3$   
Athabasca Valley - October 2015





**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 2015**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	501	67.79	67.79
6 - 15	186	25.17	92.96
16 - 25	13	1.76	94.72
26 - 80	0	0.00	94.72
> 81.0	0	0.00	94.72

Total Number of Valid Hours: 739

Total Number of Hours: 744



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

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Athabasca Valley - October 2015**

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	29	14	5	8	16	26	105	54	16	17	21	32	26	37	22	73	501
6 - 15	14	6	1	3	6	9	64	22	11	3	7	6	5	1	6	22	186
16 - 25	2	0	0	0	1	0	2	0	1	1	0	1	0	0	0	5	13
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	20	6	11	23	35	171	76	28	21	28	39	31	38	28	100	700

Total Number of Valid Hours: 739

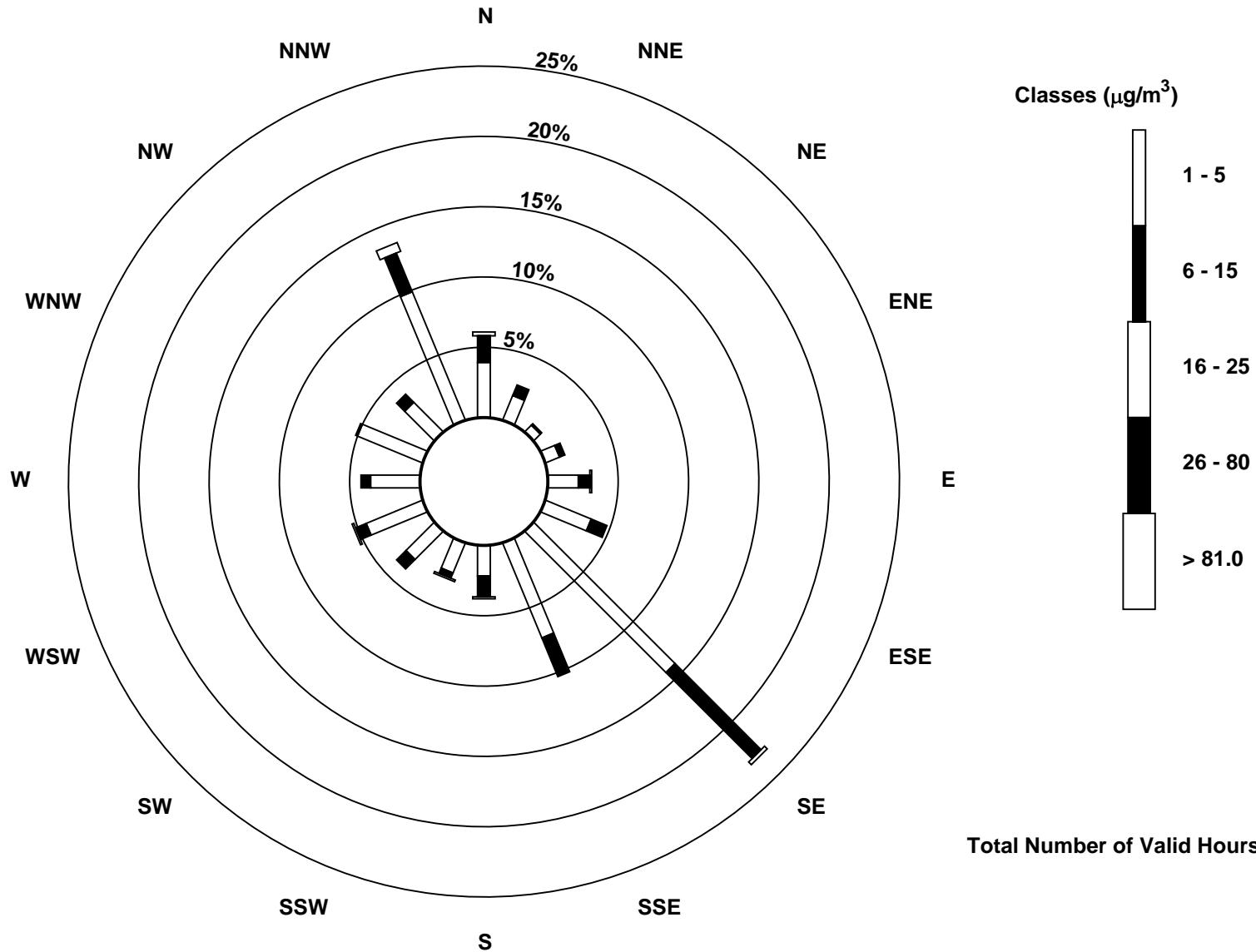
Total Number of Hours: 744





Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Athabasca Valley (AMS 7)



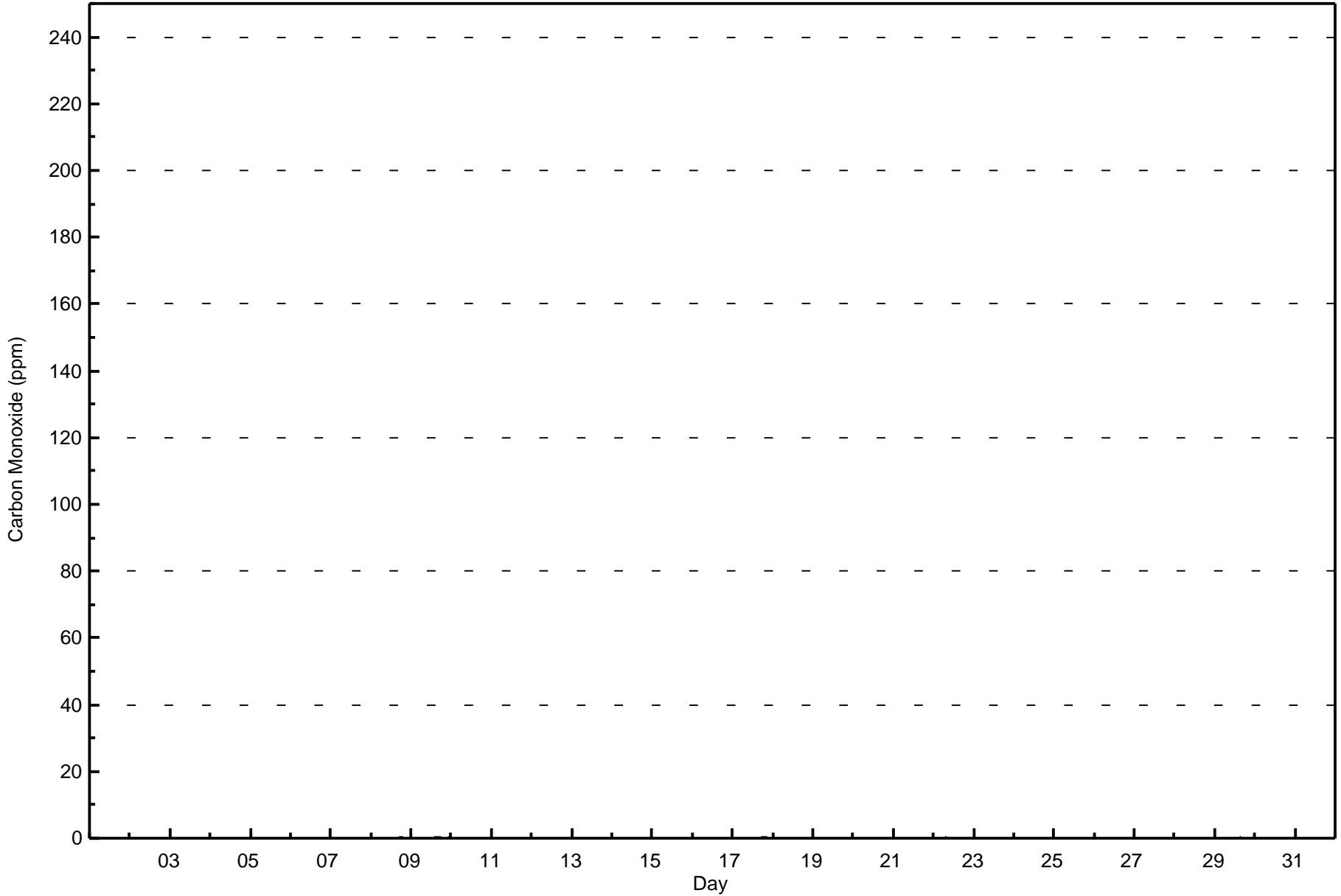


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 0.5 ppm on Oct 9 17:00      Maximum Daily Average: 0.1 ppm on Oct 9																	Hours in Service: 744 Hours of Data: 709 Hours of Missing Data: 35 Hours of Calibration: 34 Percent Operational Time: 99.9									
Minimum Value: 0.0 ppm on Oct 7 17:00      Minimum Daily Average: 0.0 ppm on Oct 13 Maximum Diurnal Average: 0.1 ppm at hour 8      Minimum Diurnal Average: 0.0 ppm at hour 13 Monthly Average: 0.06 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> = 0.1 P <sub>90</sub> = 0.1 P <sub>99</sub> = 0.3																										
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	0.0	0.0	0.1	0.1	0.1	0.1	0.2	Z	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.0	0.1	0.2
2-Oct	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	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	0.0	0.0	0.0	0.0	0.0
3-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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.1	0.0
4-Oct	0.1	0.2	0.1	0.1	0.1	Z	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1
5-Oct	0.0	0.0	0.0	0.0	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
6-Oct	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1
7-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	Z	0.1	0.1	0.1	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
8-Oct	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	Z	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1
9-Oct	0.1	0.1	0.0	0.0	Z	0.0	0.1	M	0.2	0.2	0.1	0.1	0.0	0.1	0.2	0.3	0.5	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1
10-Oct	0.2	0.1	0.1	0.1	0.1	Z	0.2	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1
11-Oct	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0
12-Oct	0.1	0.1	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.1	0.1	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
13-Oct	0.0	0.0	0.0	0.0	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	0.0	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	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
15-Oct	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.1	0.2	0.2	0.0	0.0	0.0	0.0	0.1
16-Oct	0.0	0.0	0.0	0.0	0.0	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
17-Oct	0.0	0.0	0.0	0.0	0.0	0.0	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.3	0.3	0.3	0.3	0.1	0.1	0.1	0.1	0.1
18-Oct	0.1	0.1	0.0	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	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1
19-Oct	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.1	Z	C	C	C	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
20-Oct	0.0	0.0	0.0	0.0	0.0	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	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
21-Oct	0.0	0.0	0.0	0.1	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1
22-Oct	0.0	0.0	0.0	0.1	0.1	Z	0.2	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
23-Oct	0.1	0.1	0.0	0.0	0.1	0.1	Z	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
24-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Z	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	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	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	0.1	0.1	0.0	0.0	0.0
26-Oct	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	Z	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
27-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	0.0	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	Z	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	0.1	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	Z	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.4	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1
30-Oct	0.1	0.1	0.1	0.1	0.1	0.1	0.2	Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1
31-Oct	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Z	0.1	0.1	0.1	0.1	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
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan      C - Calibration      M - Maintenance Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 13 ppm																										



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

**Carbon Monoxide (CO) - ppm**  
**Athabasca Valley - October 2015**





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

**Carbon Monoxide (CO) - ppm**  
**Athabasca Valley - October 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	707	99.72	99.72
0.4 - 0.5	2	0.28	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: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Carbon Monoxide (CO) - ppm  
Athabasca Valley - October 2015**

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	43	20	5	11	23	33	160	73	26	21	28	51	43	43	32	95	707
0.4 - 0.5	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	2
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>	43	20	5	11	23	33	161	73	26	21	28	51	43	43	32	96	709

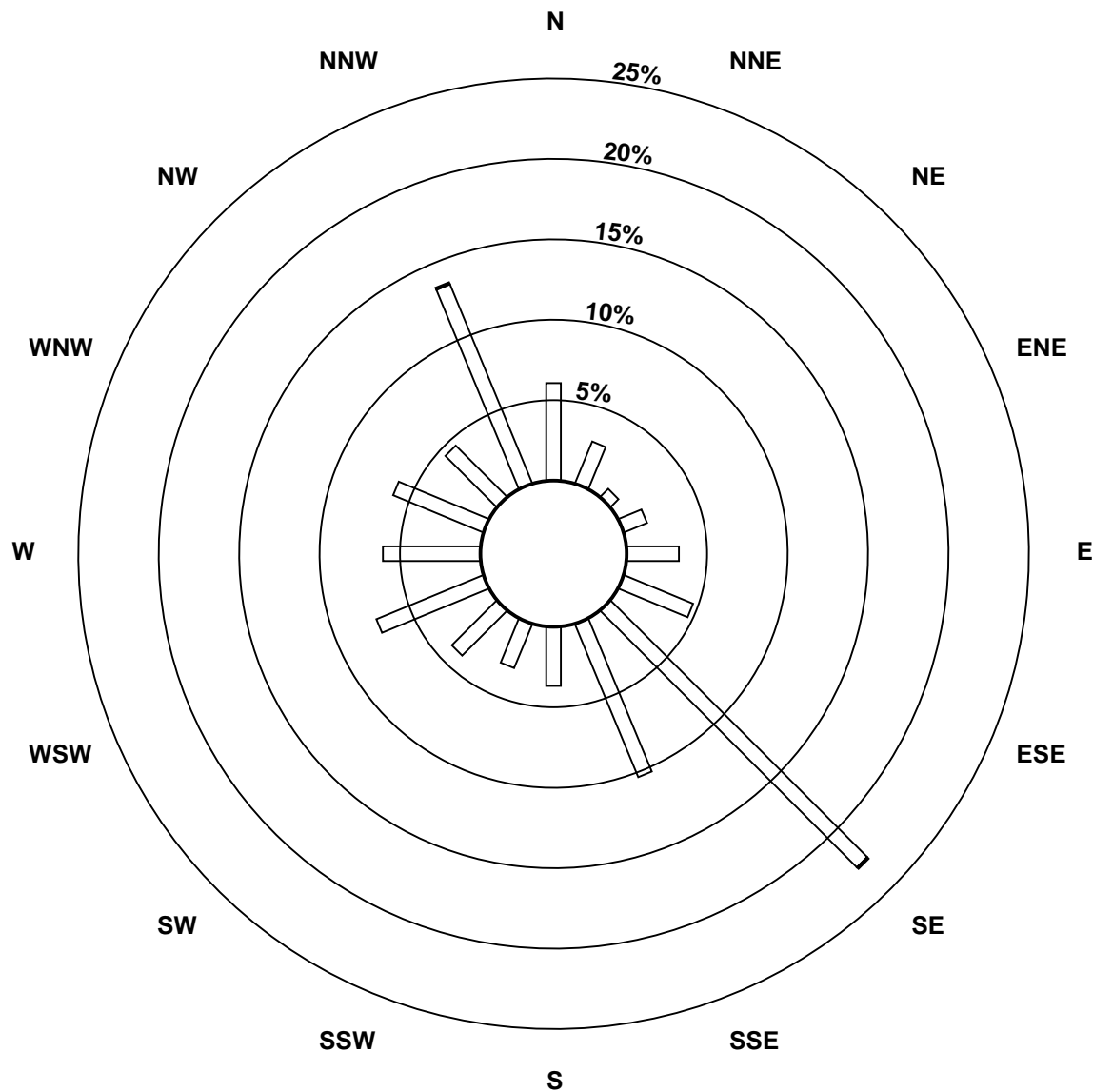
Total Number of Valid Hours: 709

Total Number of Hours: 744

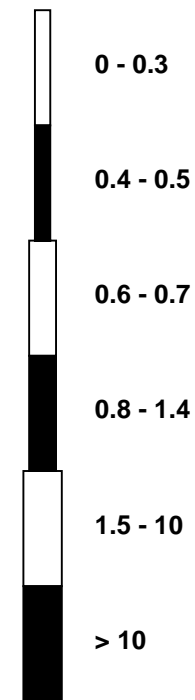


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

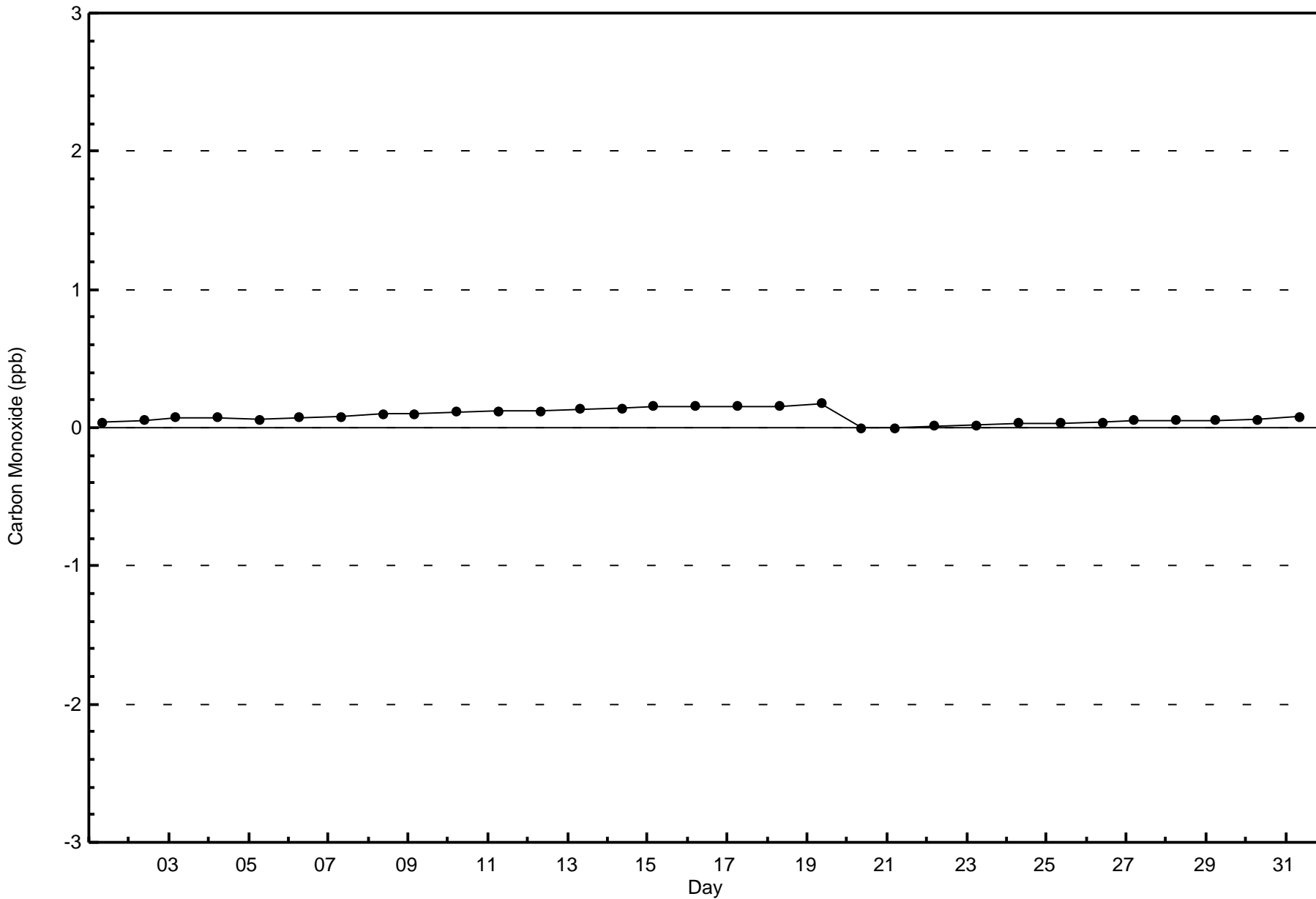
Carbon Monoxide (CO) - ppm  
Athabasca Valley (AMS 7)

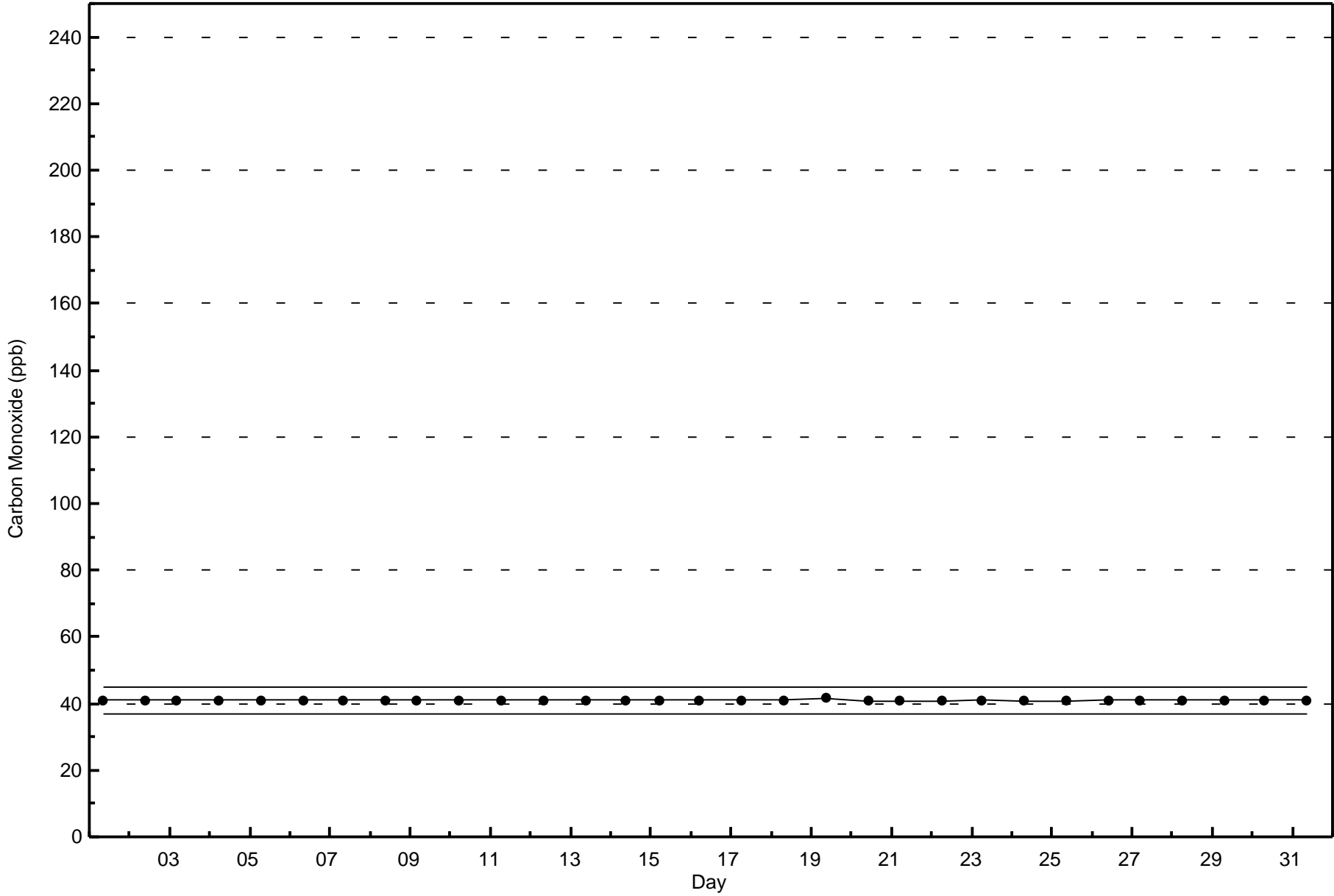


Classes (ppm)



Total Number of Valid Hours: 709









**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Ambient Temperature (AT) - C**

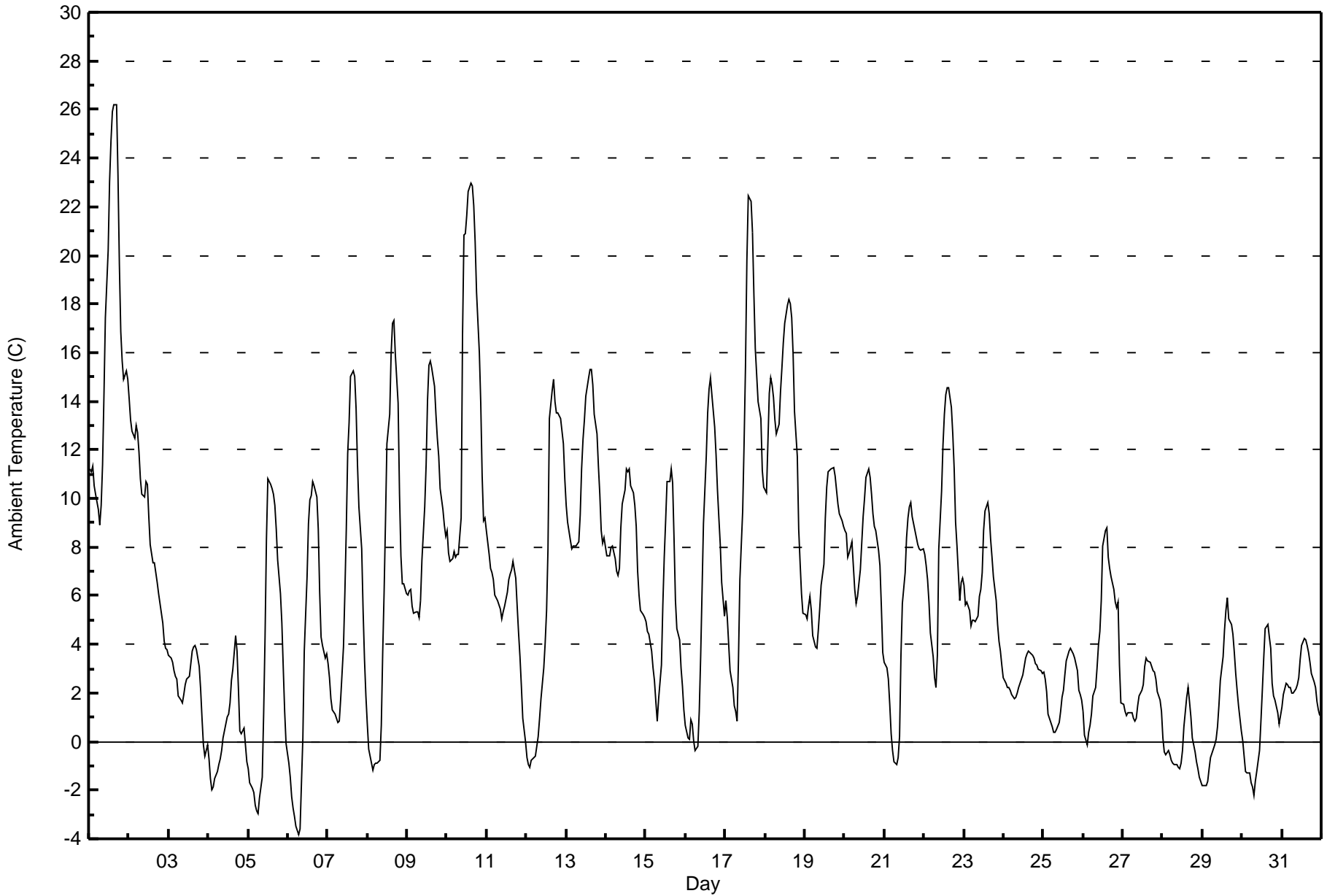
**Athabasca Valley - October 2015**

Maximum Value: 26.2 C on Oct 1 16:00		Maximum Daily Average: 16.4 C on Oct 1		Hours in Service: 744																																												
Minimum Value: -3.8 C on Oct 6 07:00		Minimum Daily Average: -0.3 C on Oct 28		Hours of Data: 744																																												
Maximum Diurnal Average: 10.9 C at hour 16		Minimum Diurnal Average: 2.7 C at hour 8		Hours of Missing Data: 0																																												
Monthly Average: 6.11 C		Percentiles: P <sub>1</sub> = -2.6 P <sub>10</sub> = -0.4 Q <sub>1</sub> = 1.9 Median = 5.3 Q <sub>3</sub> = 9.5 P <sub>90</sub> = 13.9 P <sub>99</sub> = 22.9		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	11.2	11.1	11.3	10.5	10.2	9.6	8.9	9.7	11.4	14.3	17.4	20.2	23.0	24.7	25.9	26.2	26.2	23.3	19.6	16.9	15.7	14.9	15.3	14.9	16.4	26.2																						
2-Oct	14.1	13.2	12.8	12.5	13.0	12.7	11.9	10.8	10.2	10.1	10.7	10.6	9.2	8.1	7.3	7.3	7.0	6.6	6.1	5.7	4.9	4.1	3.8	3.8	9.0	14.1																						
3-Oct	3.5	3.4	3.3	2.9	2.7	2.5	1.9	1.7	1.6	1.9	2.3	2.6	2.7	3.2	3.7	3.9	3.9	3.8	3.1	2.1	1.0	-0.1	-0.6	-0.1	2.4	3.9																						
4-Oct	-0.7	-1.5	-2.0	-1.9	-1.5	-1.2	-1.0	-0.7	-0.3	0.2	0.7	1.0	1.1	1.6	2.5	3.0	4.3	3.7	2.1	0.5	0.3	0.5	-0.2	-0.8	0.4	4.3																						
5-Oct	-1.1	-1.7	-1.9	-2.1	-2.6	-2.8	-3.0	-2.3	-1.5	1.1	4.3	8.4	10.8	10.6	10.4	10.2	9.7	8.7	7.5	6.1	4.9	3.1	1.2	-0.1	3.2	10.8																						
6-Oct	-0.9	-1.5	-2.3	-2.7	-3.1	-3.5	-3.8	-3.6	-1.7	0.2	3.7	6.8	9.0	10.0	10.1	10.7	10.5	10.1	8.7	6.2	4.3	4.0	3.5	3.6	3.3	10.7																						
7-Oct	3.2	2.6	1.8	1.3	1.2	1.0	0.8	0.8	1.7	3.9	6.1	8.8	11.9	13.1	15.0	15.2	15.0	13.7	11.4	9.7	7.9	5.4	3.4	1.9	6.5	15.2																						
8-Oct	0.7	-0.3	-0.9	-1.2	-1.0	-0.9	-0.9	-0.7	0.7	3.7	6.1	9.1	12.3	13.4	15.9	17.2	17.3	16.0	13.9	10.2	7.7	6.5	6.5	6.1	6.6	17.3																						
9-Oct	6.0	6.2	6.3	5.6	5.3	5.3	5.3	5.1	5.8	7.5	9.7	11.4	14.0	15.5	15.6	15.4	14.6	13.4	12.5	11.7	10.4	9.6	8.9	8.5	9.6	15.6																						
10-Oct	8.7	7.7	7.4	7.5	7.8	7.6	7.7	7.7	9.2	16.8	20.8	20.9	21.7	22.6	22.9	22.8	22.1	20.5	18.5	16.0	13.9	10.9	9.1	9.2	14.2	22.9																						
11-Oct	8.7	7.7	7.1	7.0	6.7	6.0	5.8	5.6	5.5	5.1	5.3	5.6	6.2	6.7	6.9	7.1	7.4	6.7	5.5	4.5	3.5	2.3	0.9	0.0	5.6	8.7																						
12-Oct	-0.7	-1.0	-1.1	-0.8	-0.7	-0.6	-0.2	0.2	1.0	1.7	3.0	4.0	5.4	7.9	13.3	14.4	14.9	14.0	13.5	13.5	13.3	12.8	12.2	10.8	6.3	14.9																						
13-Oct	9.7	9.0	8.3	7.9	8.0	8.0	8.1	8.2	9.3	11.2	12.4	13.2	14.2	15.0	15.3	15.3	14.7	13.5	12.7	11.3	10.2	8.7	8.2	8.4	10.9	15.3																						
14-Oct	7.6	7.7	7.6	8.0	8.1	7.5	7.0	6.8	7.1	8.8	9.8	10.4	11.2	11.1	11.2	10.5	10.2	9.7	8.9	7.0	6.0	5.4	5.2	5.1	8.2	11.2																						
15-Oct	5.0	4.5	4.4	3.7	3.0	2.5	1.6	0.8	1.8	3.1	5.6	7.6	9.1	10.7	10.7	11.2	10.6	8.3	5.8	4.6	4.2	3.0	2.3	1.3	5.2	11.2																						
16-Oct	0.7	0.2	0.1	0.9	0.7	0.0	-0.4	-0.2	1.2	3.5	6.2	9.0	11.7	13.5	14.5	15.0	14.3	13.0	11.8	10.3	9.2	8.1	6.6	5.2	6.5	15.0																						
17-Oct	5.8	5.1	4.0	2.9	2.2	1.5	1.2	0.8	3.4	6.7	9.5	12.3	15.4	19.8	22.5	22.2	20.9	18.4	16.2	15.1	14.0	13.3	11.2	10.5	10.6	22.5																						
18-Oct	10.3	10.2	14.3	15.0	14.7	14.1	13.2	12.6	13.1	14.4	15.3	16.4	17.2	18.0	18.2	18.0	17.5	15.9	13.6	11.7	8.7	7.3	6.1	5.3	13.4	18.2																						
19-Oct	5.2	5.0	5.5	6.0	5.4	4.4	3.9	3.8	4.6	5.4	6.4	7.3	9.2	10.5	11.1	11.2	11.2	11.3	10.9	10.3	9.8	9.4	9.1	8.8	7.7	11.3																						
20-Oct	8.7	8.6	7.6	7.8	8.2	7.3	6.3	5.7	6.0	7.1	8.2	9.3	10.0	10.9	11.2	10.9	10.2	9.3	8.8	8.7	7.9	7.2	5.5	3.6	8.1	11.2																						
21-Oct	3.2	3.1	2.6	1.5	0.3	-0.4	-0.8	-1.0	-0.7	0.2	3.6	5.7	6.9	8.4	9.2	9.7	9.8	9.2	8.7	8.4	8.1	7.9	7.9	8.0	5.0	9.8																						
22-Oct	7.7	7.2	6.7	5.7	4.5	3.5	2.6	2.2	3.6	7.9	10.3	12.2	13.5	14.2	14.6	14.6	13.8	12.7	11.2	9.0	8.1	5.8	6.6	6.7	8.5	14.6																						
23-Oct	6.4	5.6	5.8	5.4	4.7	5.0	5.0	4.9	5.2	6.0	6.3	7.0	8.7	9.5	9.8	9.4	8.3	7.6	6.8	5.8	4.8	4.1	3.7	3.1	6.2	9.8																						
24-Oct	2.6	2.4	2.2	2.2	2.1	2.0	1.8	1.8	2.0	2.2	2.4	2.7	3.1	3.4	3.6	3.7	3.7	3.6	3.4	3.2	3.1	3.0	2.9	2.8	2.7	3.7																						
25-Oct	2.9	2.6	2.0	1.1	0.8	0.6	0.4	0.4	0.5	0.8	1.3	1.8	2.1	2.7	3.3	3.7	3.8	3.7	3.6	3.5	2.9	2.1	2.0	1.7	2.1	3.8																						
26-Oct	1.3	0.2	-0.2	0.4	0.6	1.1	1.9	2.2	3.1	4.0	4.5	5.8	8.0	8.7	8.8	7.6	7.1	6.8	6.2	5.7	5.5	5.7	3.2	1.6	4.2	8.8																						
27-Oct	1.5	1.2	1.1	1.2	1.2	1.2	1.0	0.8	1.0	1.5	1.9	2.1	2.3	3.1	3.4	3.3	3.3	3.1	2.9	2.9	2.6	2.0	1.7	1.2	2.0	3.4																						
28-Oct	0.2	-0.4	-0.5	-0.4	-0.6	-0.8	-0.9	-0.9	-1.0	-1.1	-1.1	-0.9	-0.4	0.6	1.8	2.2	1.7	1.0	0.2	-0.4	-0.9	-1.1	-1.5	-1.7	-0.3	2.2																						
29-Oct	-1.8	-1.8	-1.8	-1.7	-1.1	-0.6	-0.3	-0.2	0.1	0.6	1.5	2.5	3.5	4.6	5.4	5.9	5.0	4.8	4.4	3.6	2.8	2.1	1.5	0.4	1.6	5.9																						
30-Oct	0.0	-0.6	-1.2	-1.3	-1.3	-1.7	-1.9	-2.2	-1.6	-1.2	-0.4	0.9	2.1	3.4	4.6	4.8	4.3	3.8	2.4	1.9	1.7	1.2	0.7	1.1	0.8	4.8																						
31-Oct	1.4	1.9	2.4	2.3	2.2	2.2	2.0	2.0	2.1	2.4	2.6	3.4	4.0	4.2	4.2	4.0	3.7	3.2	2.8	2.5	2.2	1.7	1.3	1.1	2.6	4.2																						
																								4.2	3.8	3.6	3.5	3.3	3.0	2.7	2.7	3.4	4.8	6.3	7.7	9.0	10.0	10.8	10.9	10.6	9.7	8.5	7.4	6.4	5.5	4.8	4.3	Diurnal Average
																								14.1	13.2	14.3	15.0	14.7	14.1	13.2	12.6	13.1	16.8	20.8	20.9	23.0	24.7	25.9	26.2	26.2	23.3	19.6	16.9	15.7	14.9	15.3	14.9	Diurnal Maximum



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

**Ambient Temperature (AT) - C**  
**Athabasca Valley - October 2015**





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

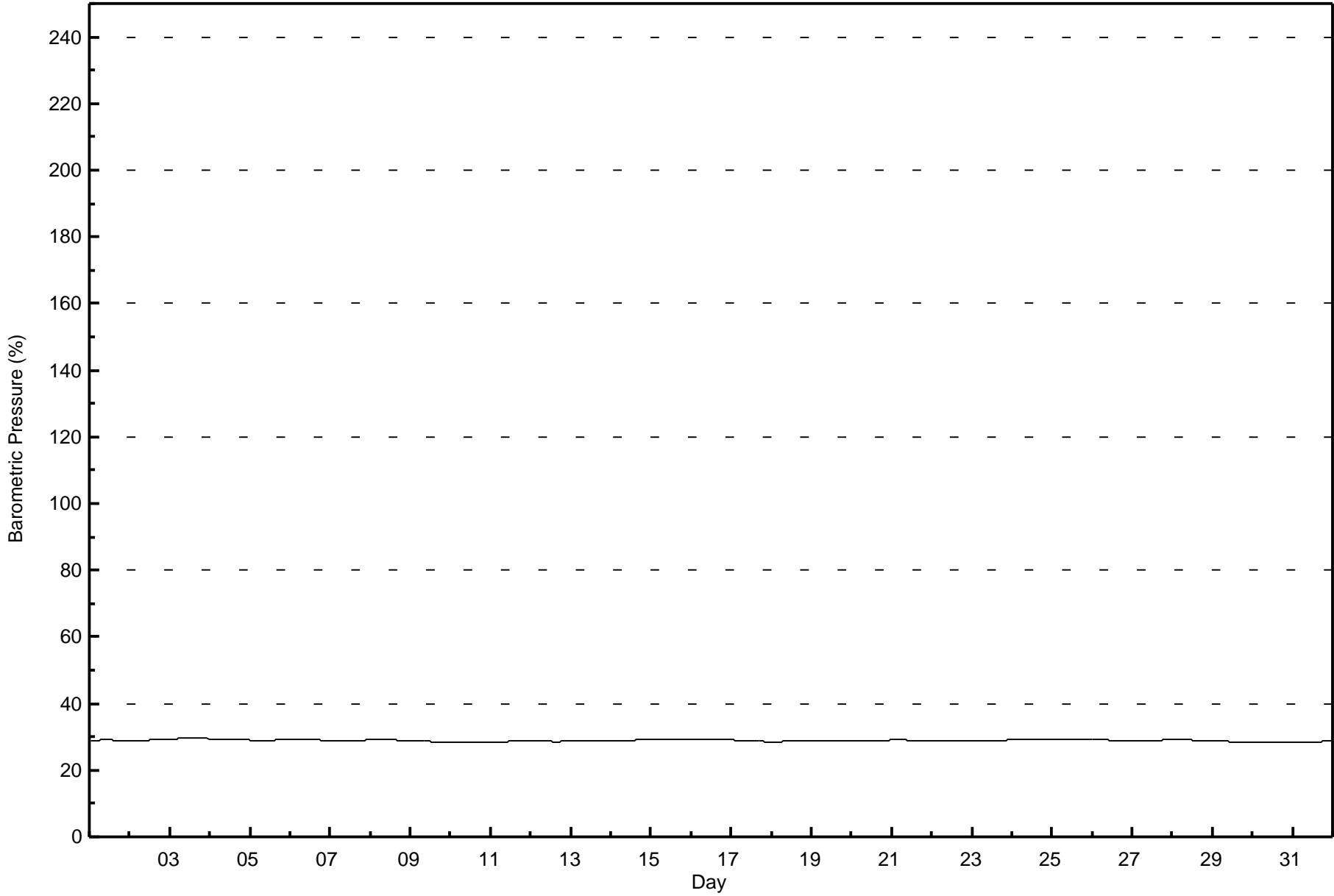
**Ambient Temperature (AT) - C**  
**Athabasca Valley - October 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	90	12.10	12.10
0 - 10	481	64.65	76.75
10 - 20	155	20.83	97.58
> 20	18	2.42	100.00

Total Number of Valid Hours: 744

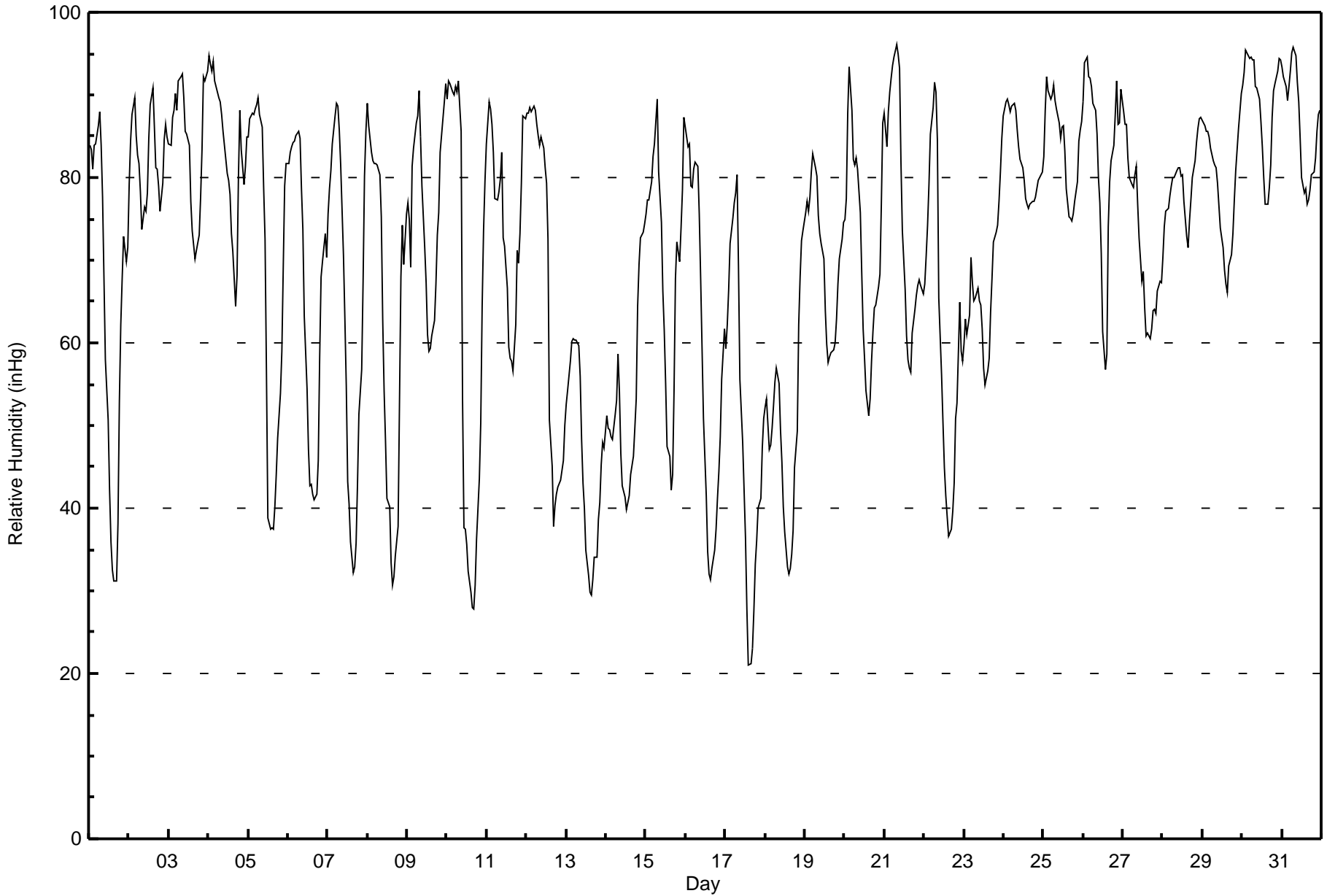
Total Number of Hours: 744







Maximum Value: 96 inHg on Oct 21 08:00																		Maximum Daily Average: 89.1 inHg on Oct 30																		Hours in Service: 744	
Minimum Value: 21 inHg on Oct 17 15:00																		Minimum Daily Average: 45.8 inHg on Oct 13																		Hours of Data: 744	
Maximum Diurnal Average: 82.8 inHg at hour 7																		Minimum Diurnal Average: 52.8 inHg at hour 16																		Hours of Missing Data: 0	
Monthly Average: 70.3 inHg																		Percentiles: P <sub>1</sub> = 29 P <sub>10</sub> = 41 Q <sub>1</sub> = 58 Median = 76 Q <sub>3</sub> = 85 P <sub>90</sub> = 90 P <sub>99</sub> = 95																		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	83	81	84	84	86	88	84	78	68	58	51	42	36	33	31	31	38	53	62	68	73	70	72	64.0	88											
2-Oct	79	84	88	90	85	83	82	78	74	76	76	78	85	89	91	86	81	81	79	76	79	85	86	85	82.3	91											
3-Oct	84	84	87	88	90	88	92	92	93	90	86	85	84	77	74	72	70	71	73	78	83	92	92	93	84.0	93											
4-Oct	95	94	93	94	92	90	90	89	88	86	82	81	80	78	73	71	64	68	80	88	83	79	81	85	83.5	95											
5-Oct	85	87	88	88	88	89	90	88	86	79	73	56	39	37	38	37	40	44	48	54	59	69	79	82	67.6	90											
6-Oct	82	83	84	84	84	85	86	85	79	74	63	54	47	43	43	42	41	42	46	58	68	70	73	70	66.0	86											
7-Oct	76	79	81	84	87	89	89	86	81	70	63	55	43	41	36	32	33	36	43	51	57	67	80	86	64.3	89											
8-Oct	89	86	83	82	82	82	82	80	75	63	54	48	41	40	33	31	32	34	38	53	68	74	69	76	62.3	89											
9-Oct	77	75	69	81	83	87	88	91	85	79	71	67	61	59	59	61	63	67	73	76	83	87	89	91	75.9	91											
10-Oct	90	92	91	90	90	91	90	92	86	53	38	37	36	32	30	28	28	31	36	44	50	64	74	79	61.3	92											
11-Oct	84	89	88	86	83	77	77	78	80	83	73	72	67	60	58	58	57	62	71	70	73	79	88	87	75.0	89											
12-Oct	88	88	89	88	89	88	86	85	84	85	84	81	79	73	51	45	38	40	42	43	43	45	46	50	67.8	89											
13-Oct	53	54	58	60	61	60	60	60	56	48	43	40	35	32	30	29	31	34	34	39	41	45	48	47	45.8	61											
14-Oct	51	50	50	49	48	51	53	59	54	47	43	41	40	41	42	44	46	50	53	64	70	73	73	74	52.7	74											
15-Oct	76	77	77	79	83	84	87	90	81	75	66	62	55	47	46	42	44	54	68	72	70	74	78	87	69.8	90											
16-Oct	86	84	84	79	79	81	82	81	76	68	59	51	42	35	32	31	33	35	37	41	44	49	56	62	58.6	86											
17-Oct	59	62	67	72	75	77	78	80	69	56	48	42	36	28	21	21	23	28	33	36	40	41	47	51	49.6	80											
18-Oct	52	53	47	48	50	52	55	57	55	50	46	40	37	33	32	33	34	37	45	49	62	68	72	74	49.2	74											
19-Oct	76	77	76	78	81	83	81	80	75	73	72	70	64	60	58	58	59	59	60	63	67	70	73	75	70.3	83											
20-Oct	75	77	88	93	88	82	82	82	81	76	69	62	58	54	51	53	58	61	64	65	67	68	77	87	71.6	93											
21-Oct	88	84	88	90	92	93	95	96	95	93	82	74	66	61	58	57	56	61	64	66	67	68	67	66	76.1	96											
22-Oct	67	70	74	79	85	88	92	90	85	65	56	50	45	41	39	37	37	40	43	51	53	65	59	58	61.3	92											
23-Oct	60	63	61	63	70	67	65	66	67	65	65	62	57	55	57	58	64	68	72	73	74	77	81	85	66.4	85											
24-Oct	87	89	90	89	88	89	89	88	86	84	82	81	80	78	77	76	77	77	77	78	79	80	80	81	82.5	90											
25-Oct	82	88	92	91	89	90	91	89	88	87	85	86	86	83	79	75	75	75	76	77	80	84	86	87	84.2	92											
26-Oct	89	94	95	92	92	91	89	88	85	80	77	71	61	57	59	74	79	82	84	88	92	86	87	91	82.6	95											
27-Oct	88	87	86	82	80	79	79	80	81	77	73	67	69	64	61	61	61	62	64	64	63	66	67	67	72.1	88											
28-Oct	70	74	76	76	78	79	80	80	81	81	81	80	80	77	73	71	75	77	80	82	84	86	87	87	79.1	87											
29-Oct	87	86	86	86	85	84	82	82	81	79	77	74	71	69	67	66	69	71	73	77	81	83	86	90	78.8	90											
30-Oct	91	93	95	95	94	95	94	94	91	91	89	87	84	80	77	77	79	81	87	90	91	93	94	94	89.1	95											
31-Oct	93	92	91	89	91	93	95	96	95	91	89	85	80	78	79	77	77	78	80	81	82	86	88	88	86.4	96											
78.8																		80.0																		Diurnal Average	
95																		95																		Diurnal Maximum	





Maximum Speed: 33 km/h on Oct 5 14:00	Maximum Daily Speed Average: 18.3 km/h on Oct 27	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 17 08:00	Minimum Daily Speed Average: 1.6 km/h on Oct 7	Hours of Data: 744
Maximum Diurnal Speed Average: 5.3 km/h at hour 16	Minimum Diurnal Speed Average: 0.3 km/h at hour 20	Hours of Missing Data: 0
Monthly Average Velocity: 1.9 km/h 264.4 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 4 Median = 8 Q <sub>3</sub> = 14 P <sub>90</sub> = 19 P <sub>99</sub> = 30	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	SSW2	S4	SSE6	SSE4	SSE5	SSE6	SSE5	SE7	SE9	ESE7	ESE7	E6	SW4	WSW7	SW6	WSW6	WSW4	WNW3	WSW1	WSW3	S1	S1	S3	SSW2	S2.8	SE9	
2-Oct	SSW2	NW3	E1	NNW2	NNE3	N7	NNW12	NNW13	NNW13	NNW11	N16	NNW24	NNW26	NNW29	NNW23	NNW24	N23	N19	N16	N23	N23	N21	NNW23	NNW17	NNW15.2	NNW29	
3-Oct	N17	NNW18	N19	N17	NNW16	NNW17	NNW15	NNW11	N11	N9	NNW12	NNW15	N12	NNE12	NNE10	N12	N12	N11	NNE8	NNE5	NE3	ESE2	E2	SW4	N10.5	N19	
4-Oct	E2	ESE4	SE5	SE5	SE8	SE7	SE7	SE8	SE8	SE8	SE8	SE5	SSW5	SSE5	SW6	S2	E5	S6	S4	S2	E3	SE6	SE6	SSE5	SSE4	SE4.6	SE8
5-Oct	SSE4	S4	SSE2	SSE5	SE6	SE6	SSE8	SE6	SE5	ESE5	E7	N5	NW30	NW33	NW30	NNW29	NNW23	NNW18	NW12	NNW4	WNW4	W2	ESE1	ESE3	NNW5.3	NW33	
6-Oct	SSE3	SE4	SE4	SE6	SE6	SE6	SE7	SE7	SE5	ESE6	SE5	SE8	SE9	SE11	SE10	ESE10	ESE10	SE9	SE8	ESE5	ENE1	E1	ENE4	NE4	SE5.9	SE11	
7-Oct	ENE3	N5	N4	NNE2	E1	E1	NW2	W5	SW6	SW2	E4	E4	S3	E6	ENE3	NW9	WNW16	W9	WSW9	WNW6	WNW3	SW3	SE1	E2	WNW1.6	WNW16	
8-Oct	SSE1	ESE3	ESE3	ESE3	SE3	SE6	SE8	SE9	SE11	SE8	SE7	SE7	S3	WNW4	NNW4	NNW6	NNW3	SE4	SE5	ENE2	WSW3	W4	W3	NNW0	SE2.3	SE11	
9-Oct	N1	N2	N6	NNW7	N3	NW3	NNW4	WNW3	N4	NNE2	NNE3	NW4	NNW3	N7	NNW9	NNW8	NNW6	N6	NNW5	NNW4	SSW1	NNW1	WSW2	S2	NNW3.5	NNW9	
10-Oct	SW3	SW7	SW6	SW6	SSW3	SSE3	S4	SE5	SE5	SSW9	WSW13	WSW22	WSW23	WSW29	W31	W29	W26	W13	W11	W7	WNW3	SW2	WNW2	NNW11	WSW9.3	W31	
11-Oct	NNW12	NNW13	N17	NNW19	N17	N16	N14	N13	NNW18	NNW18	N16	N15	NNW19	NNW24	NW22	NW20	NW18	NNW16	NW18	NNW11	WNW4	SW8	SE3	SE4	NNW13.2	NNW24	
12-Oct	SSE5	SE8	SE6	SE6	SE9	SE8	SE9	SE13	SE16	SSE17	SSE14	SSE12	SE12	SE6	SW10	WSW16	W20	WSW14	WSW12	WSW14	W13	WSW14	WSW17	WSW18	SSW7.3	W20	
13-Oct	WSW19	SW15	WSW17	WSW16	WSW17	WSW19	WSW21	WSW17	WSW12	W24	W25	W24	W23	W23	W24	W26	W21	W13	W13	WSW10	WSW12	SW12	SW17	WSW23	WSW17.8	W26	
14-Oct	WSW16	SSW5	S5	SW14	WSW22	WSW15	WSW12	WSW20	WSW22	W26	W30	NNW30	NNW28	NNW29	NW26	NW23	NW21	NW15	NNW8	N9	NNW8	NNW9	NNW6	NW5	WNW13.6	WNW30	
15-Oct	WNW3	SW6	WSW6	SW9	SW9	SSW6	SSW5	SSE3	SSE4	SW6	ENE1	SSW4	SW8	S4	E6	E4	SSE5	SE3	S2	SE2	SE4	ESE6	ESE3	ESE1	S2.7	SW9	
16-Oct	ESE4	E4	ESE5	SE7	SE7	SE9	SE9	SE8	SE11	SSE10	SSE9	SE11	SE15	SE17	SE19	SE15	SE9	SE12	SE15	SE16	SE13	SSE8	SE6	SSE4	SE9.9	SE19	
17-Oct	SSE11	SSE9	SSE6	S4	S2	SSW3	S3	W0	SSE8	SSE12	SSE11	SSE10	SSE9	S7	S14	SSE13	SSE9	SSE8	SE9	SSE8	SE9	SE13	SE10	SE8	SSE7.9	S14	
18-Oct	SE7	ESE6	WSW16	WSW17	WSW18	W17	WSW16	WSW14	WSW11	W25	W28	NNW31	NNW28	NNW31	NW27	NNW23	NNW17	W13	W11	WSW3	SSW3	SSE2	SE4	ENE1	W12.8	WNW31	
19-Oct	ENE1	NW1	NW5	NNW10	NNW11	NNE4	NE4	E5	ESE3	SE5	SE12	ESE11	SE12	SE12	SE11	ESE11	ESE8	ESE11	SE16	ESE14	SE10	SE12	SE13	SSE14	ESE6.5	SE16	
20-Oct	SSE15	SSE7	SSE8	SSW6	W14	W20	W18	WSW12	W14	W19	W26	NNW30	NNW26	NNW28	NNW26	NW25	NW17	WNW11	W8	WNW11	WNW13	WNW13	NNW9	N6	WNW12.7	WNW30	
21-Oct	N4	NE3	SE2	ESE5	ESE5	SE4	SSE4	SE3	ESE5	E5	SE8	SSE11	SE17	SE14	ESE12	SE11	SE11	SSE10	SE12	SE12	SSE12	SE15	SSE12	SSE9	SE7.9	SE17	
22-Oct	SSE8	SE10	SSE8	S4	SSE4	SE4	SSE6	SE4	ESE2	SW13	SW13	WSW16	WSW17	WSW20	WSW22	W23	W15	W13	WSW10	WSW8	SW8	SE1	SSW11	SSW8	SW8.1	W23	
23-Oct	SE4	SSE3	SW8	SW7	S2	SSE4	S4	SE4	SE4	SSW3	SSW6	SSW8	SW12	SW9	W7	NNW8	N7	N6	NNW7	NNW10	NNW13	NNW13	NNW12	NNW12	WNW2.2	NNW13	
24-Oct	NNW9	NNW9	NNW14	NNW13	NNW11	NNW10	NNW9	NNW7	N7	NNW8	NNW6	NNW5	WNW3	NNW3	N5	NNW3	NNW5	N4	NNE5	NNE4	ENE2	NNE3	NE4	NNE3	NNW5.9	NNW14	
25-Oct	N4	NNW9	NNW15	NNW14	NNW12	NNW12	NNW13	NNW10	NNW9	NNW6	S1	N3	NNE4	SSW1	E4	E6	ESE7	ESE7	SE8	SE9	SSE6	S8	S5	N3.1	NNW15		
26-Oct	SSW3	SSE0	SE7	SE4	SE5	SE5	SE8	SE12	SE16	SE19	SE17	SE18	SE20	SE14	SE14	SSE15	SE12	SE17	SE15	SSE8	NNW13	NW23	NNW11	SE7.9	NW23		
27-Oct	WNW15	WNW18	WNW18	WNW22	WNW24	WNW22	WNW19	W16	W18	WNW20	WNW21	NW23	WNW17	WNW24	NW31	NW25	NW22	WNW17	WNW16	NW15	NNW16	NNW12	NW13	NW13	WNW18.3	NW31	
28-Oct	NNW9	WNW7	WSW6	NNW5	NE7	NE6	E4	SSE6	SSE6	SSE7	S7	SE9	ESE10	SE11	SE9	SE11	SE12	SE13	SE14	SE10	SE11	SE12	SE13	SE13	SE6.3	SE14	
29-Oct	SSE12	SE14	SE14	SE16	SE15	SE17	SE19	SE20	SE18	SE16	SE14	SE13	SE10	SE9	SE9	SE6	SE10	SE11	SE9	SE8	SSE9	SSE7	SSE7	SSE3	SE11.9	SE20	
30-Oct	SE7	SSE4	SSE3	SE4	SE8	SSE5	SE4	SE6	SE10	SE13	SE13	SE12	SE9	SE8	SE8	SE10	SE9	SE10	ESE4	E3	SSE1	SE3	SE2	NNW3	SE6.2	SE13	
31-Oct	NNW5	NNW7	NW7	NNW8	NW4	W3	W0	WSW1	NW2	NW6	N6	NNE5	N4	NNW3	ENE5	NNE6	NE5	NNE6	NNW5	NNE6	NNW8	NNW11	NNW11	NNW11	N4.9	NNW11	

SSW1.1	WSW0.6	W1.4	W2.2	WSW1.8	WSW1.7	SW1.6	SSW1.9	S1.7	SW2.8	WSW2.6	W3.4	W3.8	WNW4.8	WNW4.7	NNW5.3	NNW4.3	NNW1.9	WSW1.3	NW0.3	SW0.8	SW0.8	WSW1.0	WSW1.2	Diurnal Average
WSW19	NNW18	N19	WNW22	WNW24	WNW22	WSW21	WSW20	WSW22	W26	WNW30	NNW31	NW30	NW33	NW31	W29	W26	N19	NW18	N23	N23	N21	NW23	WSW23	Diurnal Maximum

All monthly, daily, and diurnal averages have been calculated using vector methods





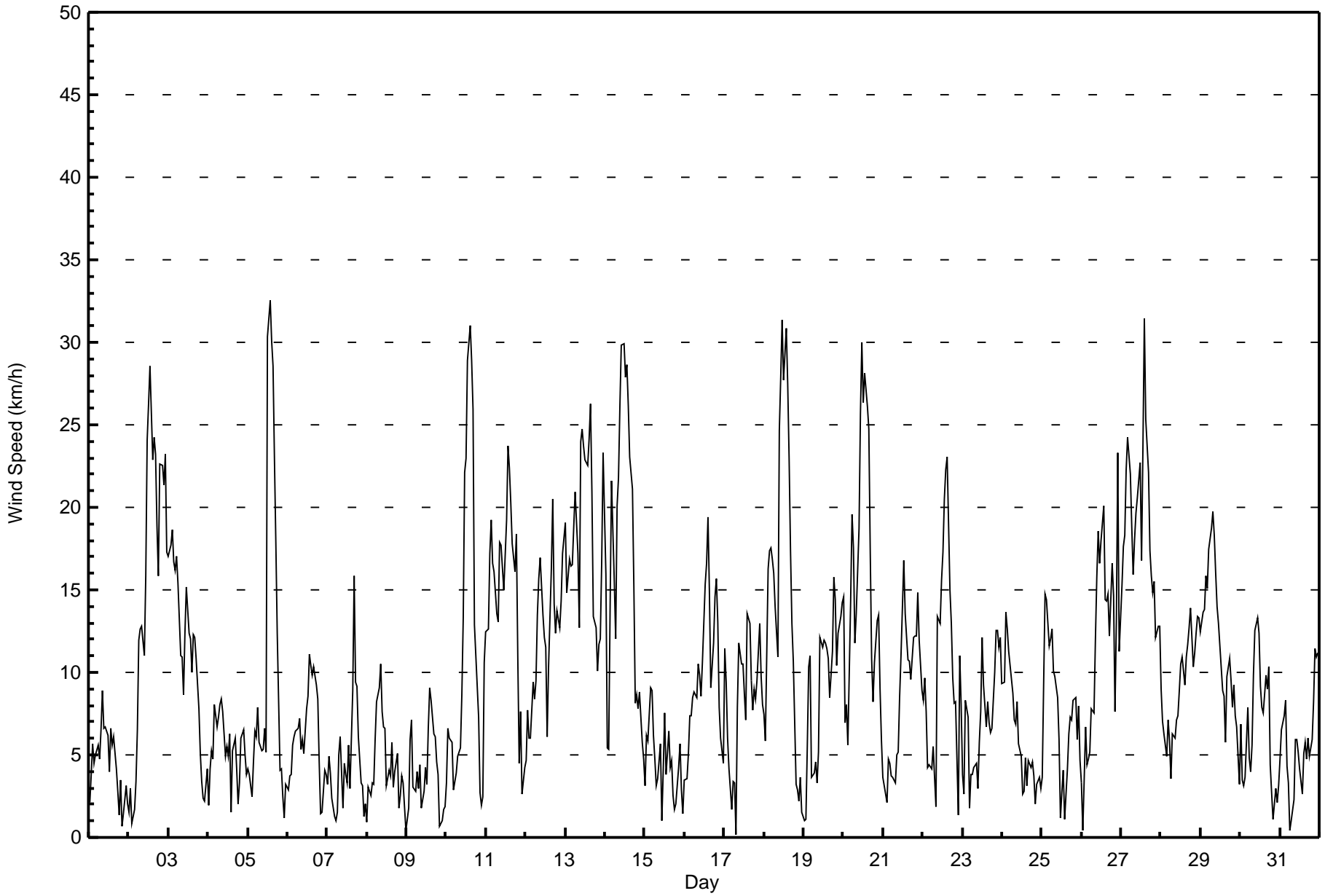
Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Athabasca Valley - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Oct 10 14:00 Minimum Value: 1 km/h on Oct 6 23:00 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> = 5 P <sub>99</sub> = 6																	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	1	1	2	2	2	2	2	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	2	2	2	2
2-Oct	2	2	2	2	2	3	3	4	2	3	5	5	5	6	5	7	6	5	4	7	6	5	6	6	6	7
3-Oct	5	4	5	5	3	4	2	4	3	3	3	3	4	4	3	3	3	3	2	1	1	1	2	1	5	
4-Oct	1	1	2	2	2	2	2	2	2	1	2	2	3	2	2	2	1	1	1	2	2	2	2	2	3	
5-Oct	2	1	2	2	1	2	2	2	2	1	1	2	8	5	6	6	5	4	3	2	3	4	2	2	1	8
6-Oct	1	1	1	1	1	1	1	1	2	1	2	2	3	3	2	3	3	2	2	2	1	1	1	1	3	
7-Oct	1	1	1	1	1	1	2	1	2	2	1	2	2	2	1	5	3	1	2	3	1	2	1	1	5	
8-Oct	1	1	1	1	1	2	2	2	2	1	2	2	2	1	2	1	1	2	2	2	2	1	1	1	2	
9-Oct	1	1	2	3	1	1	2	1	1	2	1	1	1	3	1	2	1	1	1	2	2	1	2	2	3	
10-Oct	3	1	3	2	1	1	2	3	2	4	5	5	6	9	8	7	7	4	1	3	2	2	2	2	9	
11-Oct	3	4	4	4	4	4	4	4	4	4	5	3	5	4	4	4	3	4	5	3	2	3	1	1	5	
12-Oct	1	2	2	2	2	2	3	3	3	4	4	3	3	3	5	5	5	3	2	3	2	3	3	3	5	
13-Oct	3	3	3	3	3	3	3	4	4	5	5	5	5	5	6	6	3	3	2	3	3	5	3	6		
14-Oct	5	3	3	6	5	3	2	4	5	5	6	6	7	6	5	5	4	3	3	3	2	2	1	1	7	
15-Oct	2	1	2	2	2	2	2	1	1	2	1	2	2	3	2	1	2	2	1	2	3	1	1	1	3	
16-Oct	3	1	1	2	2	2	2	2	3	3	2	2	4	4	5	4	4	3	3	3	3	2	2	3	5	
17-Oct	2	3	2	2	1	1	2	1	6	2	2	2	2	4	4	4	3	2	2	1	2	2	2	2	6	
18-Oct	2	2	4	3	3	3	3	3	5	6	6	7	6	7	5	5	5	2	4	2	2	3	2	2	7	
19-Oct	1	1	2	3	2	2	2	2	2	3	3	3	3	3	3	3	2	4	4	5	4	3	4	4	5	
20-Oct	4	1	1	3	5	5	4	3	3	4	6	5	5	5	7	5	3	3	2	2	2	5	3	2	7	
21-Oct	1	1	1	2	1	2	2	2	1	2	3	3	4	4	4	3	3	3	3	3	3	2	3	2	4	
22-Oct	4	2	2	2	2	2	2	2	3	3	3	4	5	5	5	6	4	3	3	1	3	2	6	6	6	
23-Oct	2	4	3	2	2	1	2	1	2	3	2	3	3	3	2	2	2	2	3	2	2	3	2	2	4	
24-Oct	2	2	3	3	1	1	2	2	3	2	1	2	1	1	1	1	2	1	1	1	2	1	1	1	3	
25-Oct	1	3	3	3	2	2	2	2	1	2	2	1	1	1	1	1	2	2	2	2	2	2	2	2	3	
26-Oct	2	1	3	2	1	2	2	2	4	4	5	4	5	5	4	4	5	3	4	3	3	5	6	2	6	
27-Oct	3	3	3	4	4	3	3	3	3	3	3	4	3	5	6	4	4	4	3	4	5	3	3	3	6	
28-Oct	1	2	2	2	2	2	2	2	2	3	2	3	2	3	3	3	3	3	3	3	3	2	3	3	3	
29-Oct	3	3	3	3	3	3	3	3	3	3	2	3	2	1	2	2	2	2	2	2	2	2	3	1	3	
30-Oct	2	2	1	1	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	2	1	3	
31-Oct	1	3	2	1	1	1	1	1	1	2	2	2	1	2	2	2	2	2	2	1	3	2	2	2	3	
Diurnal Maximum																										





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

**Wind Speed (WS) - km/h**  
**Athabasca Valley - October 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	238	31.99	31.99
6 - 11	248	33.33	65.32
12 - 19	182	24.46	89.78
20 - 28	61	8.20	97.98
29 - 38	15	2.02	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  
Athabasca Valley - October 2015**

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	13	13	4	11	18	20	34	30	23	14	6	7	7	10	9	19	238
6 - 11	13	5	2	0	5	14	84	35	4	7	17	9	6	5	2	40	248
12 - 19	15	2	0	0	0	2	52	11	1	0	7	27	14	12	8	31	182
20 - 28	4	0	0	0	0	0	2	0	0	0	0	9	16	12	10	8	61
29 - 38	0	0	0	0	0	0	0	0	0	0	0	1	2	6	4	2	15
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	45	20	6	11	23	36	172	76	28	21	30	53	45	45	33	100	744

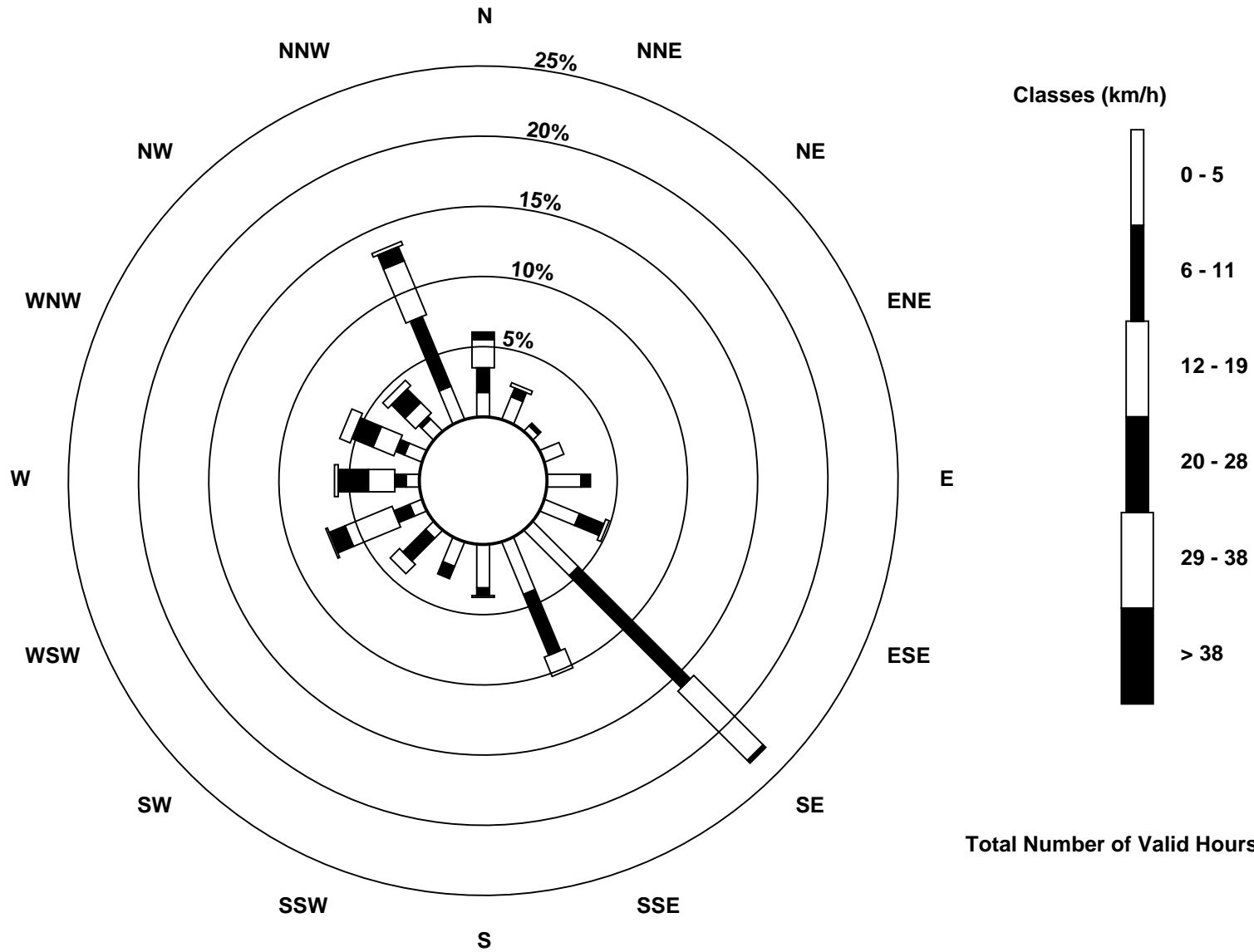
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Wind Speed (WS) - km/h  
Athabasca Valley (AMS 7)





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg**

**Athabasca Valley - October 2015**

Direction of Maximum Speed: 326 deg on Oct 5 14:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 297.6 deg on Oct 27	Hours of Data: 744
Direction of Minimum Speed: 274 deg on Oct 17 08:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 1.6 deg on Oct 7	Percent Operational Time: 100.0
Monthly Average Direction: 282.1 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	202	183	154	152	158	157	161	142	133	123	112	80	226	241	235	242	253	296	249	250	176	172	179	204	173.4
2-Oct	195	325	91	331	24	352	344	344	339	344	350	342	341	343	346	345	352	355	0	355	355	349	340	348	347.4
3-Oct	2	343	351	349	341	340	337	348	350	352	346	341	11	12	18	356	2	358	19	20	36	102	86	227	354.1
4-Oct	91	115	129	124	138	142	134	132	134	138	130	205	152	230	182	98	175	182	172	96	141	146	151	147	143.9
5-Oct	148	177	157	150	137	140	147	146	127	102	96	353	309	326	319	328	340	330	307	336	287	273	114	107	326.5
6-Oct	152	126	126	138	137	138	131	132	126	120	136	130	126	142	132	113	118	125	145	108	68	83	66	53	125.7
7-Oct	59	7	2	16	97	100	315	267	230	225	94	96	186	79	60	304	288	261	250	298	293	215	137	93	288.4
8-Oct	159	102	115	113	136	128	137	139	136	137	143	143	181	303	340	348	331	129	141	76	258	277	276	331	137.0
9-Oct	7	4	360	340	6	322	334	289	354	31	21	322	332	354	346	346	344	352	339	342	204	332	242	188	343.7
10-Oct	219	234	233	226	203	168	175	132	126	203	241	244	240	258	265	269	280	281	266	278	293	224	295	345	255.1
11-Oct	343	346	350	343	357	9	9	359	344	344	351	349	344	331	326	312	309	335	318	332	294	227	141	146	338.6
12-Oct	150	142	134	138	140	141	143	142	144	147	157	159	141	140	230	244	270	251	254	252	259	248	246	243	199.7
13-Oct	238	235	240	243	243	245	247	248	255	265	266	266	275	271	271	276	274	269	259	258	244	234	231	238	255.7
14-Oct	238	195	175	229	244	244	237	250	258	270	281	287	299	301	315	318	314	307	342	354	342	347	328	316	284.4
15-Oct	299	231	253	230	230	213	206	150	168	227	66	201	222	174	90	85	157	133	171	140	131	102	121	110	189.8
16-Oct	120	95	116	124	126	125	129	133	138	149	147	146	132	128	127	141	136	144	145	144	145	152	145	147	136.6
17-Oct	148	150	159	178	169	212	181	274	147	155	150	154	156	190	174	168	158	159	146	147	145	138	135	139	155.4
18-Oct	137	112	245	249	249	260	255	246	256	278	277	285	289	302	310	303	283	267	280	237	197	166	132	71	274.4
19-Oct	75	306	322	335	347	15	56	85	109	135	132	120	130	132	128	117	109	119	125	120	126	138	145	147	119.7
20-Oct	147	162	148	210	268	269	267	255	264	274	280	282	282	284	300	310	317	302	270	294	293	287	346	357	282.1
21-Oct	353	34	143	119	123	142	160	143	121	85	142	150	143	137	123	126	134	152	142	145	149	141	147	152	137.7
22-Oct	154	145	158	188	150	146	147	145	104	232	234	241	241	238	238	263	261	262	254	248	225	129	211	200	227.3
23-Oct	137	165	217	223	173	151	176	135	124	196	209	202	218	219	278	342	9	355	336	339	339	342	339	336	291.2
24-Oct	335	340	342	342	338	339	344	341	356	336	334	340	302	332	4	345	347	2	25	13	68	15	45	19	347.2
25-Oct	3	344	340	335	339	342	342	340	336	339	340	174	354	29	201	93	98	116	112	124	139	155	170	178	2.8
26-Oct	202	150	138	140	125	136	139	141	131	128	129	135	134	141	145	135	151	138	136	139	161	287	305	288	143.8
27-Oct	282	287	286	284	283	285	284	273	278	282	299	308	289	302	314	311	307	296	292	310	328	344	323	316	297.6
28-Oct	331	289	248	335	35	50	96	155	149	161	190	133	118	135	130	133	129	131	139	144	144	139	136	143	136.1
29-Oct	149	143	140	140	143	141	138	139	142	146	144	142	141	140	135	145	135	139	146	141	147	154	148	154	142.2
30-Oct	146	151	160	136	145	151	143	134	141	140	138	132	130	133	125	139	135	137	105	82	168	138	125	335	136.0
31-Oct	337	342	326	329	325	274	271	247	314	312	358	12	6	340	62	31	50	30	333	13	342	345	346	344	348.8

206.3 241.1 259.6 270.4 257.5 246.7 223.8 195.4 181.6 230.0 245.6 259.5 264.1 284.6 296.3 302.7 300.8 288.5 239.1 320.7 230.6 227.3 243.8 253.1  
Diurnal Average

All monthly, daily, and diurnal averages have been calculated using vector methods



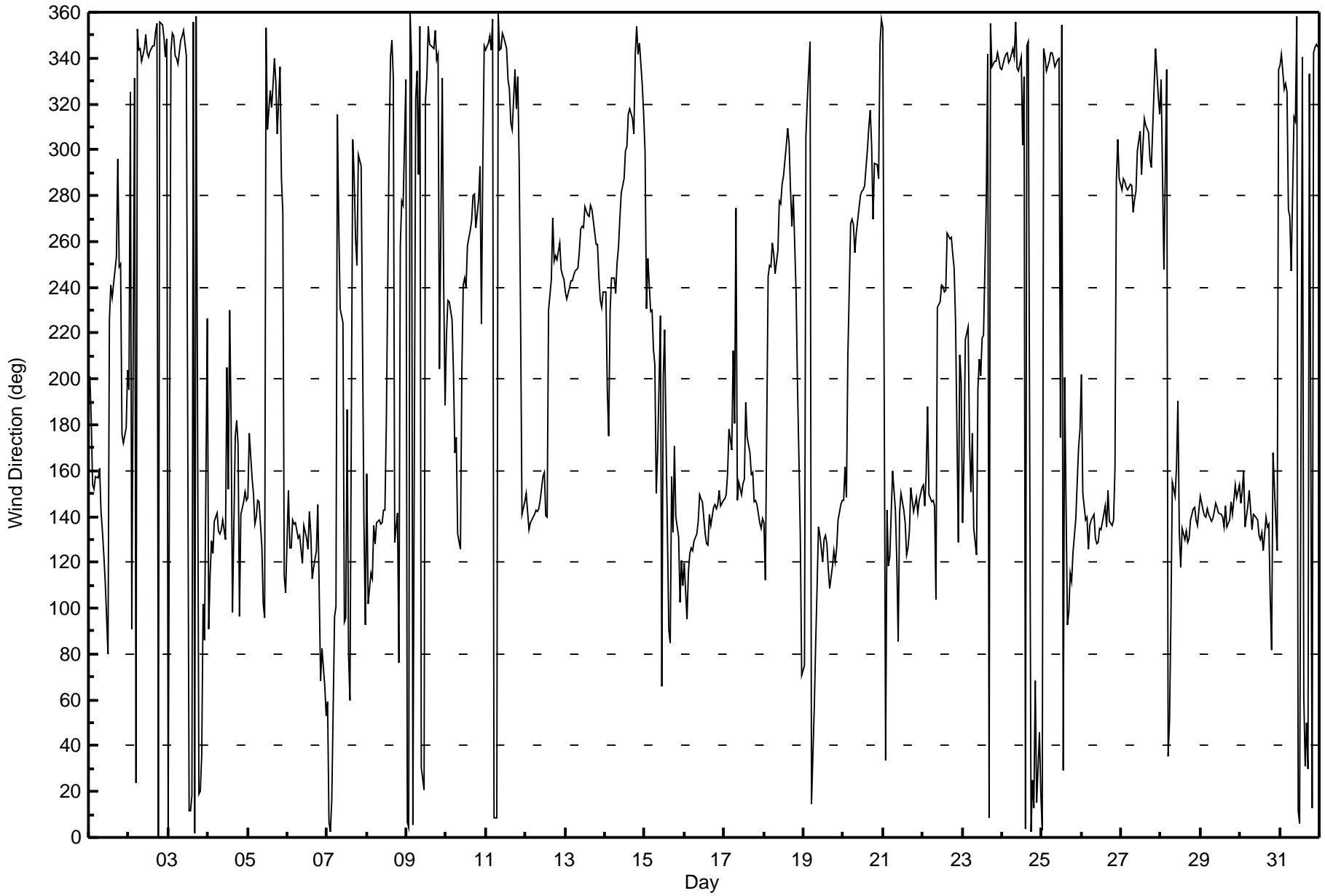
**Wood Buffalo Environmental Association**

**Summary of Hour Standard Deviations**

**Wind Direction (WD) - deg**

**Athabasca Valley - October 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 98 deg on Oct 5 23:00 Minimum Value: 8 deg on Oct 18 18:00 Percentiles: P <sub>1</sub> = 9 P <sub>10</sub> = 11 Q <sub>1</sub> = 14 Median = 19 Q <sub>3</sub> = 33 P <sub>90</sub> = 56 P <sub>99</sub> = 80																		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	56	25	18	27	19	21	27	18	12	19	23	12	69	22	38	23	19	23	78	47	94	77	52	80	94
2-Oct	78	56	69	79	32	21	13	17	14	16	17	14	11	13	15	17	18	20	20	19	20	17	12	18	79
3-Oct	20	16	17	19	13	15	11	26	26	33	18	16	21	22	28	20	18	17	18	23	35	61	56	24	61
4-Oct	71	26	17	24	19	21	16	12	12	15	48	50	55	44	95	40	16	19	53	54	26	18	28	37	95
5-Oct	54	39	53	31	14	19	18	23	21	27	21	75	13	16	12	12	10	11	10	40	68	85	98	40	98
6-Oct	45	59	29	15	12	13	13	13	34	31	38	21	32	21	22	24	19	18	14	37	79	74	19	22	79
7-Oct	26	15	26	43	71	73	84	35	13	86	38	45	59	18	57	43	15	12	38	32	49	60	75	58	86
8-Oct	86	48	48	26	42	24	18	14	14	16	25	23	62	29	53	21	34	49	27	65	31	24	26	60	86
9-Oct	49	56	20	28	25	43	23	39	18	73	51	20	38	19	10	9	15	17	29	19	98	71	56	70	98
10-Oct	64	9	25	20	23	41	46	31	37	39	25	14	16	16	16	16	10	13	10	52	55	75	80	15	80
11-Oct	14	20	15	12	18	18	18	20	14	14	17	16	12	13	13	11	11	17	17	12	47	31	61	29	61
12-Oct	24	16	23	29	16	18	16	13	12	11	17	19	14	39	34	21	11	11	11	13	10	10	10	9	39
13-Oct	11	14	12	9	10	10	10	11	15	12	13	14	16	18	14	13	11	13	11	15	13	14	12	10	18
14-Oct	12	51	58	31	10	11	12	12	12	12	11	15	17	13	15	11	10	9	45	16	19	13	22	21	58
15-Oct	46	22	34	11	9	29	33	57	55	27	83	56	17	64	26	17	34	59	86	59	43	24	35	46	86
16-Oct	54	42	21	20	24	20	19	21	15	18	19	16	16	16	15	15	16	12	11	11	14	21	24	45	54
17-Oct	12	18	30	37	83	45	49	95	56	14	15	16	18	41	22	18	15	20	12	9	9	10	15	22	95
18-Oct	22	46	20	10	10	10	13	16	33	11	11	14	17	16	11	15	15	8	27	64	70	74	43	77	77
19-Oct	85	69	15	11	14	51	31	11	41	26	17	23	20	17	20	20	20	19	16	19	19	17	16	15	85
20-Oct	19	20	11	33	20	12	13	15	14	13	13	12	12	13	15	11	11	13	10	15	15	16	34	19	34
21-Oct	22	44	53	29	30	39	51	63	35	17	30	20	14	17	17	15	16	19	16	16	14	10	14	18	63
22-Oct	29	19	23	26	20	22	25	30	75	13	16	16	18	14	14	15	13	12	12	12	32	82	55	46	82
23-Oct	66	65	36	17	68	33	53	22	34	80	21	27	10	15	38	39	18	20	35	16	10	10	9	8	80
24-Oct	13	12	10	11	8	9	12	15	23	11	22	29	41	49	32	39	16	20	21	24	73	35	23	27	73
25-Oct	26	11	9	10	11	11	10	14	10	14	18	81	54	31	86	38	21	19	19	16	16	21	19	43	86
26-Oct	32	67	35	32	24	28	18	19	15	16	15	16	16	15	16	15	16	17	15	15	37	20	11	16	67
27-Oct	12	12	10	9	10	10	10	12	10	9	15	10	11	12	11	12	11	13	10	14	10	12	12	9	15
28-Oct	13	25	20	43	18	29	38	41	28	34	34	23	21	19	24	18	15	14	14	17	14	12	12	16	43
29-Oct	16	14	14	11	11	11	11	11	10	10	11	12	11	10	10	16	10	11	13	15	15	18	26	55	55
30-Oct	15	27	39	28	16	33	26	30	12	11	10	11	13	17	15	14	13	17	33	40	78	38	49	45	78
31-Oct	19	29	15	9	24	17	86	93	56	26	27	26	33	39	39	25	30	41	36	24	15	11	11	13	93
86 69 69 79 83 73 86 95 75 86 83 81 69 64 95 43 34 59 86 65 98 85 98 80																									
Diurnal Maximum																									







# Wood Buffalo Environmental Association

## SO2 Calibration Report

### Station Information

Calibration Date	October 8, 2015	Last Calibration	September 24, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	6:50	End Time (MST)	11:34
Gas Cert Reference	S970259A	Station temp.	18 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11021107
ZAG Make/Model	API 701	Serial Number	1864
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5564

### Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	-619	-619
Analyzer IP address	192.168.1.103		Lamp voltage	803	802
Calculated slope	0.992664	0.996596	Chamber temp	43.9	43.9
Calculated intercept	0.589501	0.907044	Pressure	697.5	689.6
Analyzer Background	17.9	17.9	Flow	0.479	0.479
Analyzer Coefficient	1.065	1.065	Intensity	43818	43818

Analyzer make Thermo 45C Analyzer serial # 630718530

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.5	----
as found span	5000	60.7	607.0	602.9	1.007
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	60.7	607.0	608.9	0.997
second point	5000	30.4	304.0	302.6	1.005
third point	5000	15.2	152.0	151.7	1.002
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	60.7	607.0	606.3	1.001
Average Correction Factor					1.001

Corrected As found 603.4 Previous response 610.9 % change 1.2%

**Notes:**

filter changed out, no maintenance or adjustments done

Calibration Performed By: Melissa Lemay



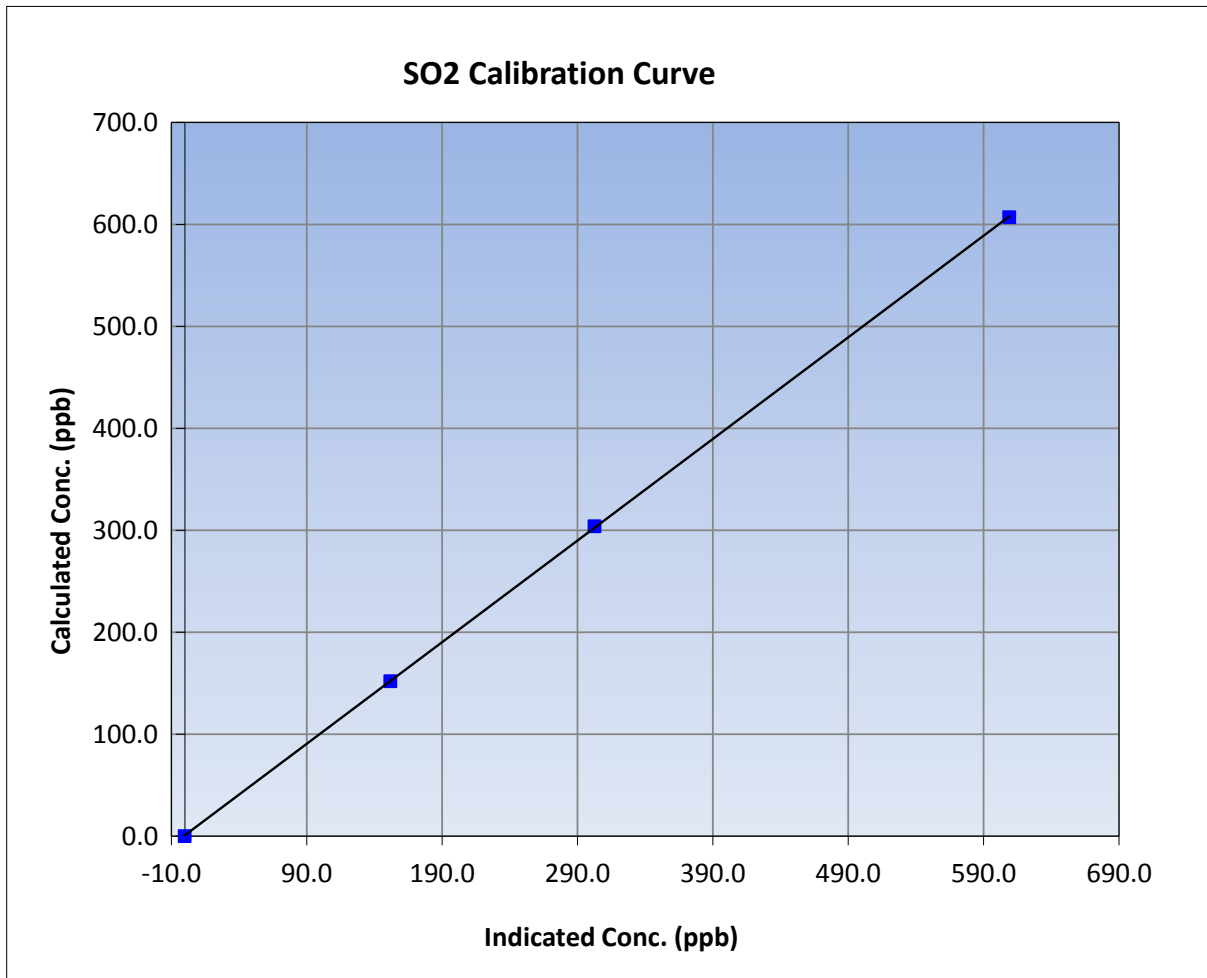
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	October 8, 2015	Previous Calibration	September 24, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	6:50	End Time (MST)	11:34
Analyzer make	Thermo 45C	Analyzer serial #	630718530

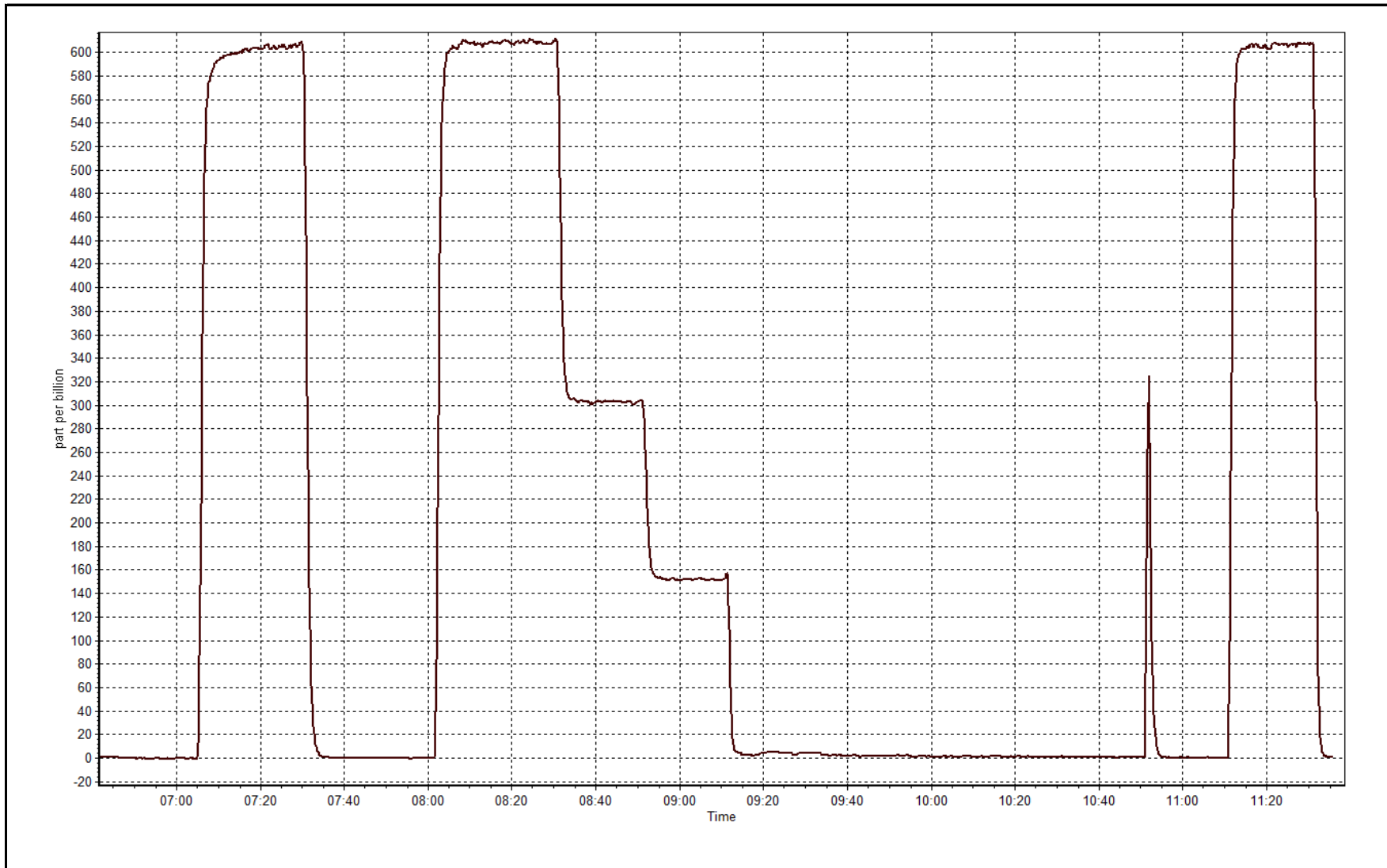
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999983
607.0	608.9	0.9969		
304.0	302.6	1.0046	Slope	0.996596
152.0	151.7	1.0020		
			Intercept	0.907044



SO2 Calibration Plot

Date: October 8, 2015





# Wood Buffalo Environmental Association

## TRS Calibration Report

### Station Information

Calibration Date	October 19, 2015	Last Calibration	September 24, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	11:26	End Time (MST)	13:45
Gas Cert Reference	ALM052589	Station temp.	22 Deg C
Cal Gas Concentration	5.02 ppm	Cal Gas Exp Date	21/12/2012
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
Dil air Make/Model	API 701	Serial Number	1864
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5564
SO2 gas concentration	50.8 ppm	SO2 gas cert/exp	8400311 9/Sep/17

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-699	-699
Analyzer IP address	192.168.1.44		Lamp voltage	1094	1086
Calculated slope	1.003768	1.001726	Chamber temp	45	45
Calculated intercept	-0.165787	0.001923	Pressure	735.9	701.0
Analyzer Background	2.42	2.42	Flow	0.454	0.434
Analyzer Coefficient	1.118	1.118	Intensity	72	72
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-LTE		Analyzer serial #	1507864683	
Converter make/model	CDN-101		Converter serial #	503	

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.0	----
as found span	6000	89.6	75.0	74.8	1.002
SO2 scrubber check	5000	15.2	154.4	0.4	----
calibrator zero	6000	0.0	0.0	0.0	----
high point	6000	89.6	75.0	74.8	1.002
second point	6000	50.2	42.0	42.0	1.000
third point	6000	29.9	25.0	25.0	1.003
as left zero	6000	0.0	0.0	0.1	----
as left span	6000	89.6	75.0	75.1	0.999
Average Correction Factor					1.002

Corrected As found	74.8	Previous response	74.8	% change	0.0%
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Notes:

no adjustments or maintenance done, filter changed out

Calibration Performed By:

Melissa Lemay



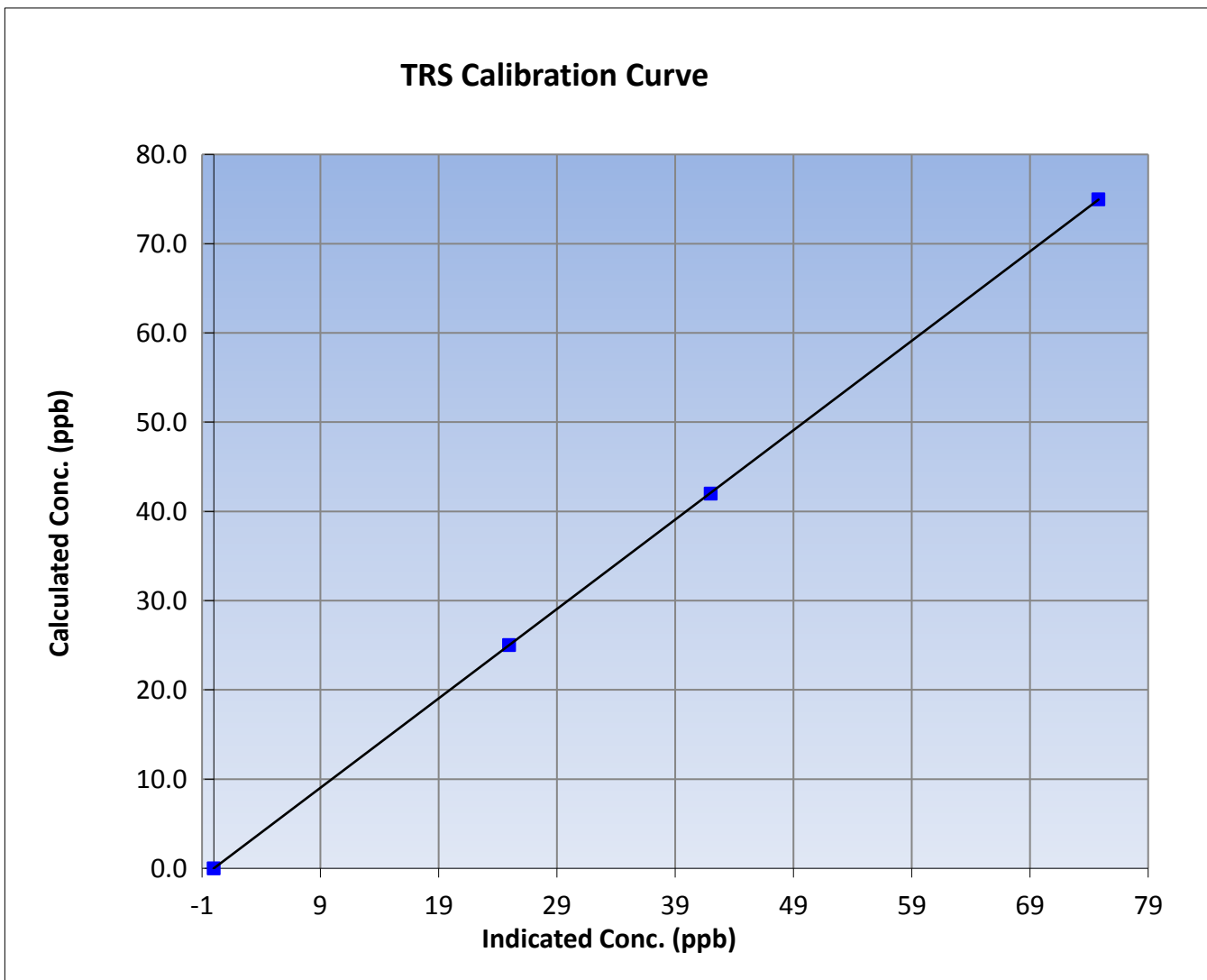
# Wood Buffalo Environmental Association TRS Calibration Report

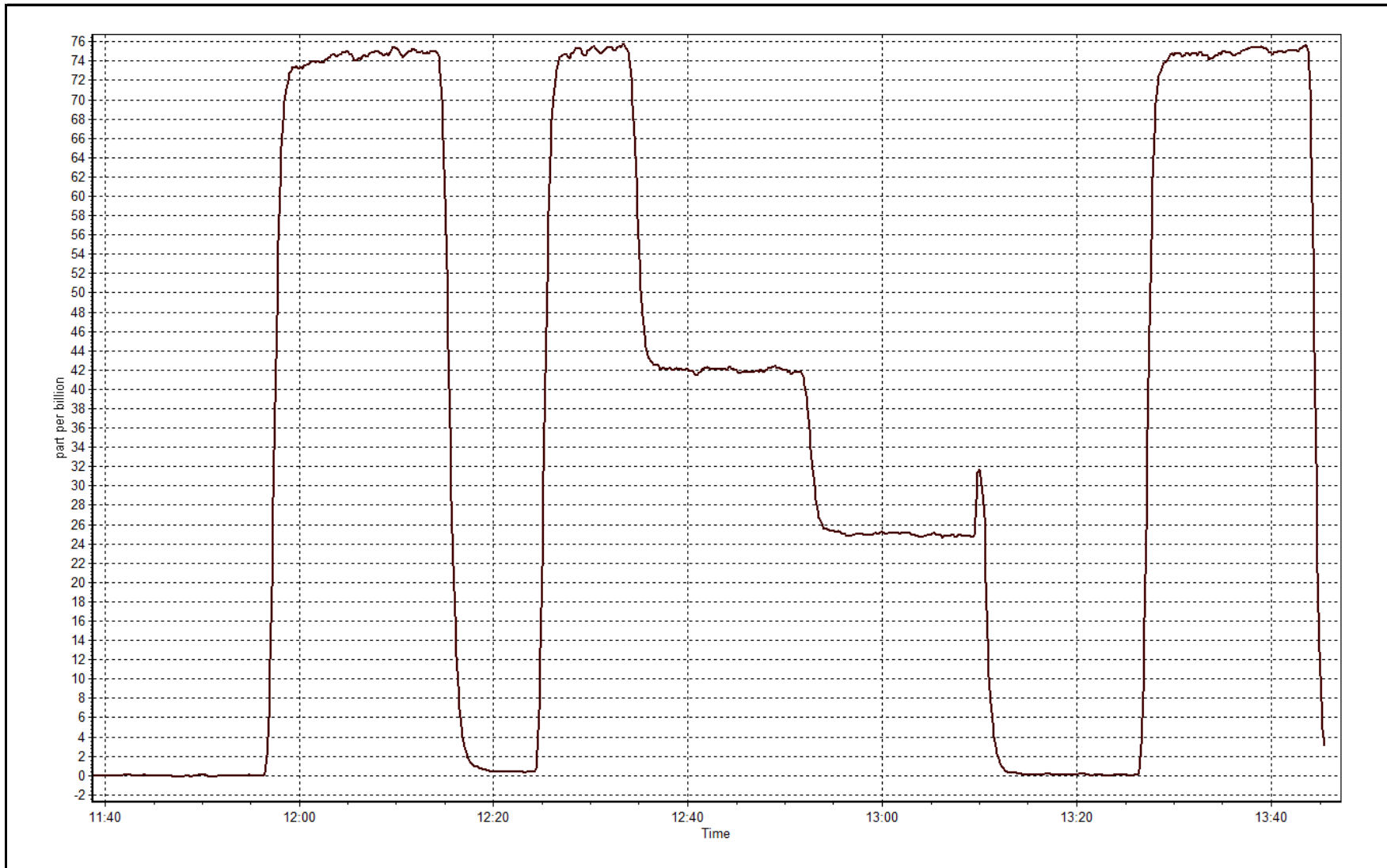
## Station Information

Calibration Date	October 19, 2015	Previous Calibration	September 24, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	11:26	End Time (MST)	13:45
Analyzer make	Thermo 43i-LTE	Analyzer serial #	1507864683

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999998
75.0	74.8	1.0022		
42.0	42.0	1.0000	Slope	1.001726
25.0	25.0	1.0027		
			Intercept	0.001923







## Wood Buffalo Environmental Association THC / NMHC Calibration Report

### Station Information

Calibration Date	October-09-15	Last Calibration	September-08-15
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	6:50	End Time (MST)	11:34
Gas Cert Reference	S970259A	Cal Gas Expiry Date	9/26/2017
CH4 Cal Gas Conc.	490.0 ppm	CH4 Equiv Conc.	1040.0 ppm
C3H8 Cal Gas Conc.	200.0 ppm	Station temp.	22 Deg C
Calibrator Model	Sabio 4010	Serial Number	11021107
ZAG make/model	Teledyne API 701	Serial Number	1864
DACS make/model	Campbell Scientific CR3000	Serial Number	5564

### Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.0	75.0
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.1	175.0
Analyzer IP address	192.168.1.55		Flame Temp	293.0	288.0
THC Calc slope	0.992331	1.008096	Carrier Pressure	36.8	36.8
THC Calc intercept	0.010238	0.008275	Fuel Pressure	42.1	42.1
NMHC Calc slope	0.990338	1.008284	Air Pressure	32.2	32.2
NMHC Calc intercept	-0.005673	-0.005815			

Analyzer make Thermo 55i Analyzer serial # 1426262594

### THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	----
as found span	5000	60.7	12.63	12.51	1.009
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	60.7	12.63	12.53	1.008
second point	5000	30.4	6.32	6.23	1.015
third point	5000	15.2	3.16	3.14	1.007
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	60.7	12.63	12.45	1.014
Average Correction Factor					1.010

Corrected As found 12.51 Previous response 12.71 % change 1.6%

**Notes:**

hydrogen changed out, filter changed out, no adjustments done

Calibration Performed By: Melissa Lemay



## Wood Buffalo Environmental Association THC / NMHC Calibration Report

### NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	60.7	6.68	6.62	1.009
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	60.7	6.68	6.63	1.007
second point	5000	30.4	3.34	3.31	1.010
third point	5000	15.2	1.67	1.68	0.995
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	60.7	6.68	6.58	1.015
Average Correction Factor					1.004

Corrected As found      6.62      Previous response      6.75      % change      1.9%

### CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	60.7	5.95	5.89	1.010
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	60.7	5.95	5.90	1.008
second point	5000	30.4	2.98	2.92	1.020
third point	5000	15.2	1.49	1.46	1.020
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	60.7	5.95	5.87	1.013
Average Correction Factor					1.016

Corrected As found      5.89      Previous response      5.97      % change      1.3%





# Wood Buffalo Environmental Association

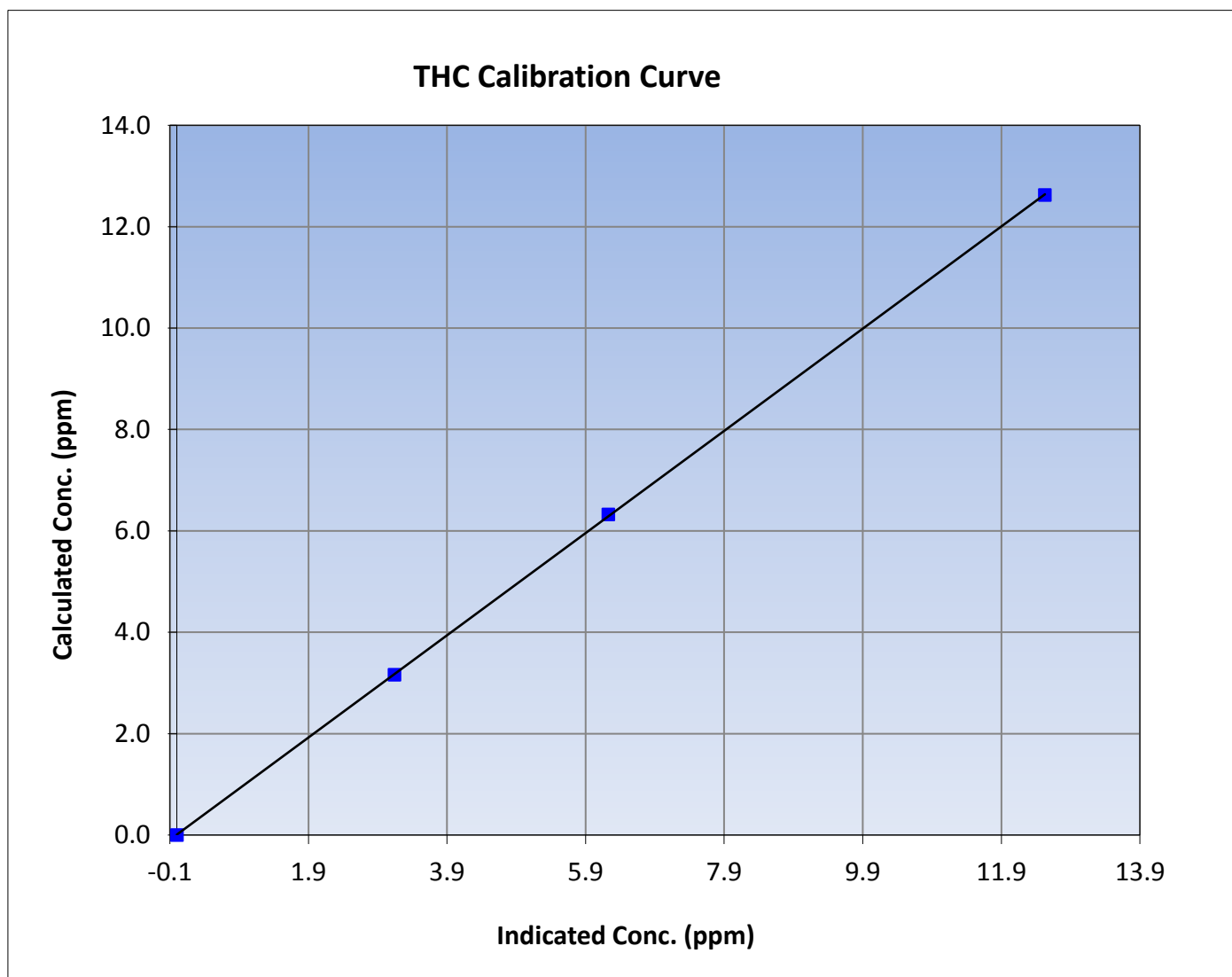
## THC Calibration Summary

### Station Information

Calibration Date	October 9, 2015	Previous Calibration	September 8, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	6:50	End Time (MST)	11:34
Analyzer make	Thermo 55i	Analyzer serial #	1426262594

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999982
12.63	12.53	1.0076		
6.32	6.23	1.0150	Slope	1.008096
3.16	3.14	1.0069		
			Intercept	0.008275





# Wood Buffalo Environmental Association

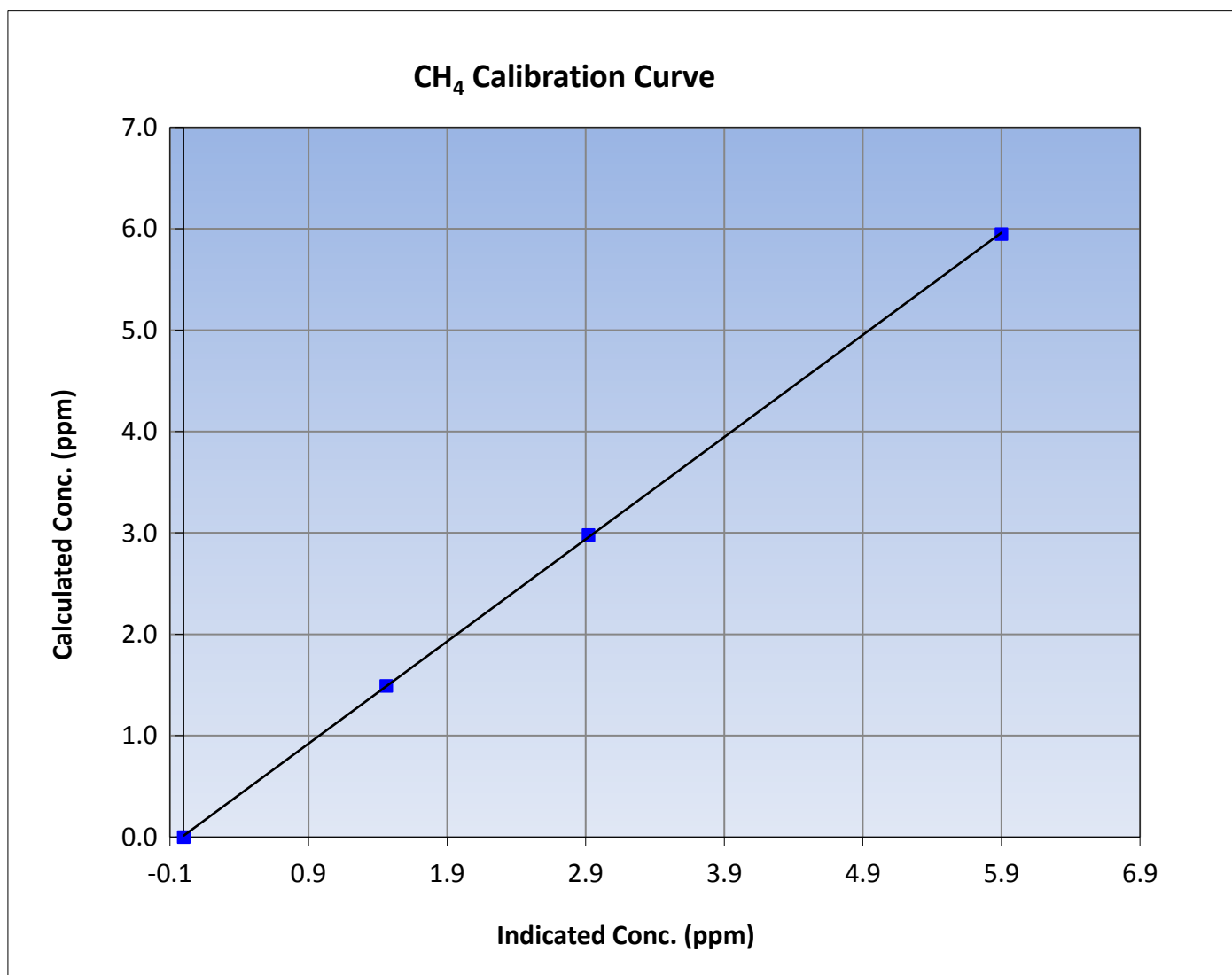
## CH<sub>4</sub> Calibration Summary

### Station Information

Calibration Date	October 9, 2015	Previous Calibration	September 8, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	6:50	End Time (MST)	11:34
Analyzer make	Thermo 55i	Analyzer serial #	1426262594

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999956
5.95	5.90	1.0082		
2.98	2.92	1.0203	Slope	1.007859
1.49	1.46	1.0203		
			Intercept	0.014152





# Wood Buffalo Environmental Association

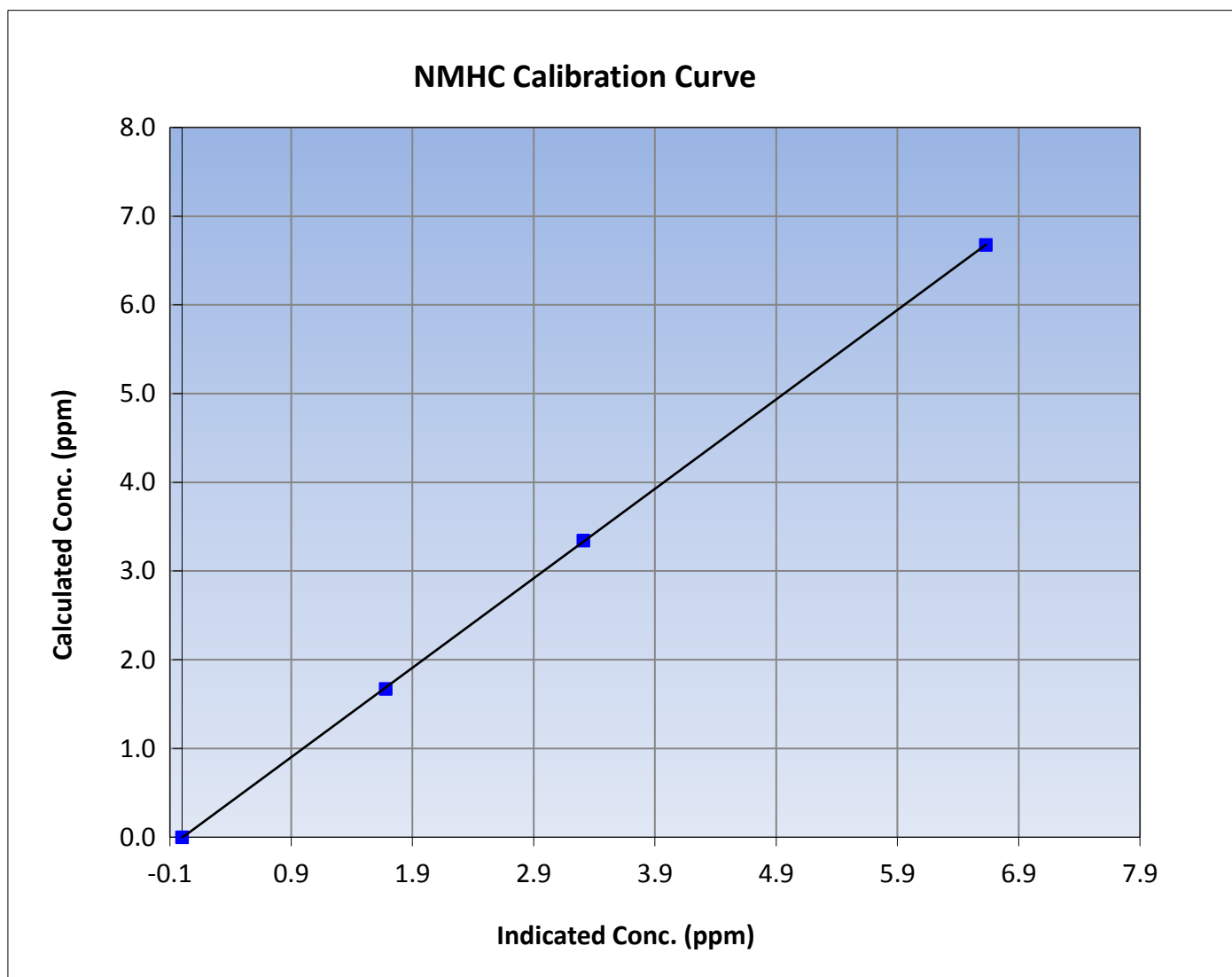
## NMHC Calibration Summary

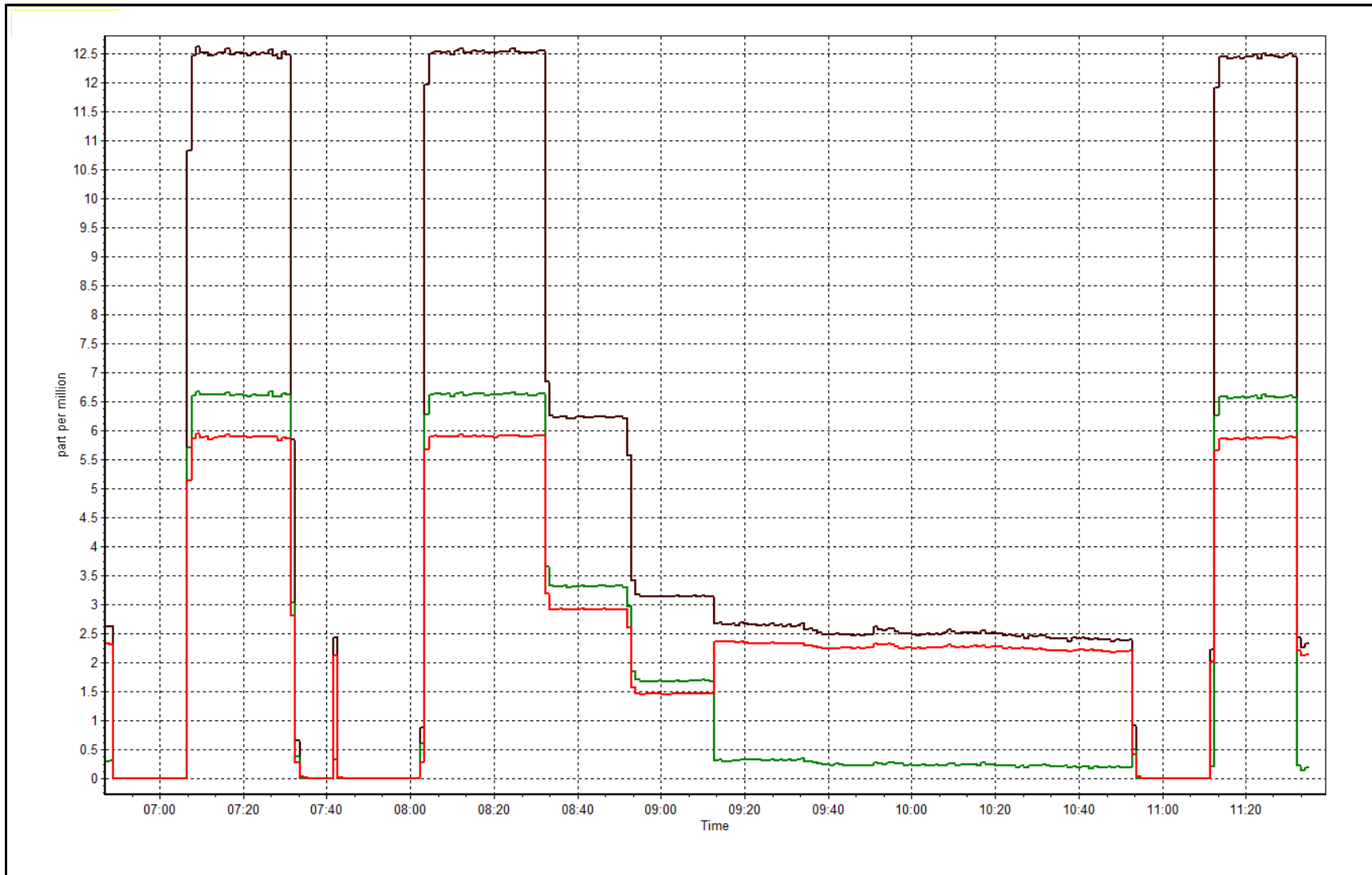
### Station Information

Calibration Date	October 9, 2015	Previous Calibration	September 8, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	6:50	End Time (MST)	11:34
Analyzer make	Thermo 55i	Analyzer serial #	1426262594

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999981
6.68	6.63	1.0071		
3.34	3.31	1.0103	Slope	1.008284
1.67	1.68	0.9952		
			Intercept	-0.005815







# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 9, 2015	Previous Calibration	September 11, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	11:33	End Time (MST)	13:34
NO2 GPT Ref date	October-09-15	Transfer Standard	GPT
Calibrator Make/Model	Sabio 4010	Station temp.	22 Deg C
ZAG make/model	Teledyne API 701	Serial Number	11021107
DACS make/model	Campbell Scientific CR3000	Serial Number	1864
		Serial Number	5564

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	28.4	27.9
Analyzer IP address	192.168.1.48		Lamp temp.	67.9	67.9
Calculated slope	0.998927	1.013937	Pressure	712.3	706.8
Calculated intercept	0.704537	-0.250553	Flow cell A	0.736	0.732
Analyzer Background	0.2	0.2	Flow cell B	0.747	0.744
Analyzer Coefficient	0.939	0.939	Cell A Intensity	91365	90642
			Cell B Intensity	95083	89949

Analyzer make	TEI 49i	Analyzer serial #	1507964700
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### Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	-0.3	----
as found span	5000	1.22	328.4	323.1	1.016
calibrator zero	5000	0.00	0.0	-0.3	----
high point	5000	1.22	328.4	323.1	1.016
second point	5000	0.70	166.4	166.8	0.998
third point	5000	0.43	84.2	82.4	1.022
as left zero	5000	0.00	0.0	-0.1	----
as left span	5000	1.22	328.4	313.2	1.049
Average Correction Factor					1.012

Corrected As found	323.4	Previous response	328.0	% change	1.4%
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**Notes:**

Filter changed out, span adjusted, no maintenance done

Calibration Performed By:

Melissa Lemay



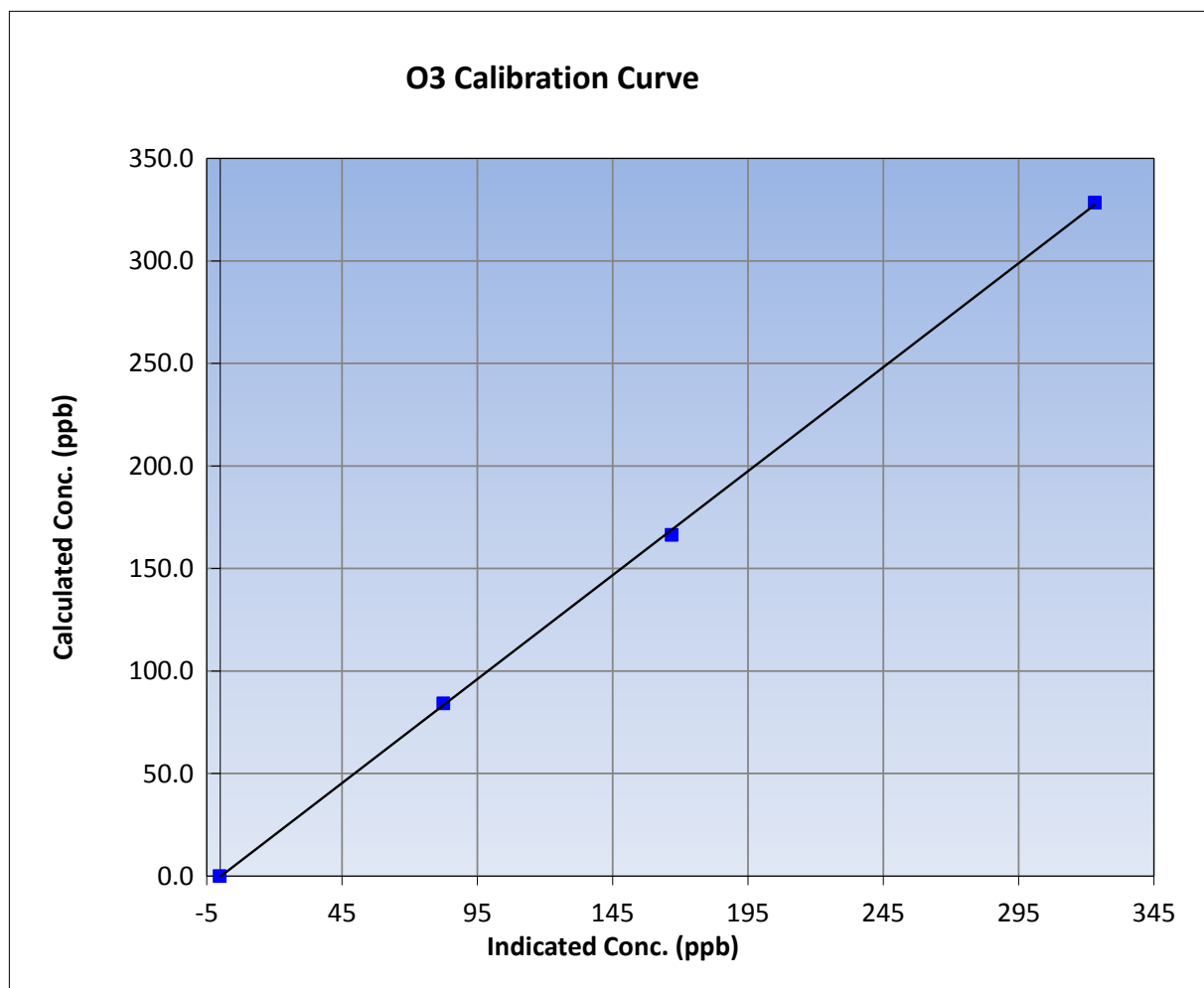
## Wood Buffalo Environmental Association O3 Calibration Report

### Station Information

Calibration Date	October-09-15	Previous Calibration	September 11, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	11:33	End Time (MST)	13:34
Analyzer make	TEI 49i	Analyzer serial #	1507964700

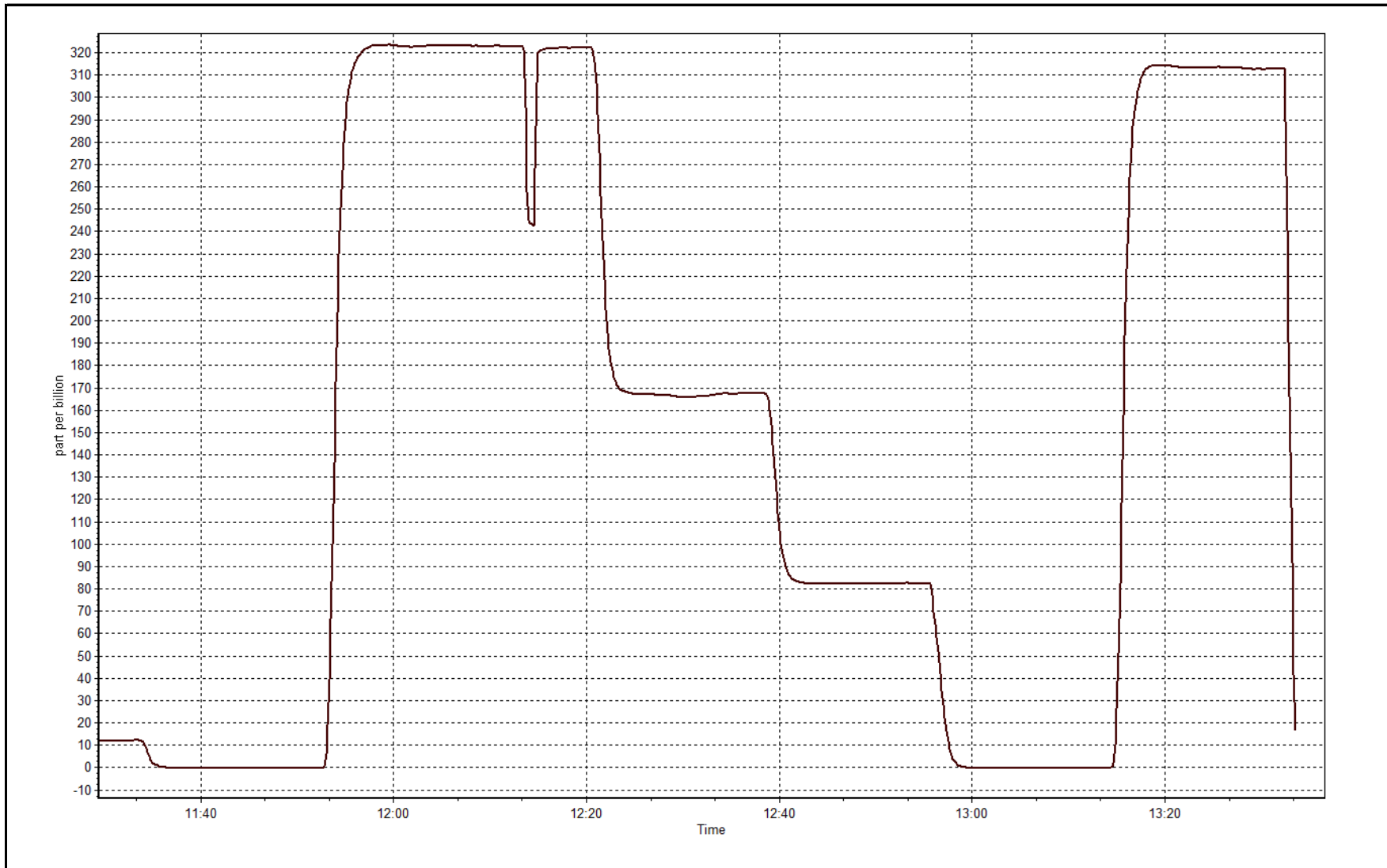
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999859
328.4	323.1	1.0164		
166.4	166.8	0.9976	Slope	1.013937
84.2	82.4	1.0218		
			Intercept	-0.250553



O3 Calibration Plot

Date: October 9, 2015





# Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

## Station Information

Calibration Date	October 9, 2015	Previous Calibration	September 8, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	6:50	End Time (MST)	11:34
NO Cal Gas Conc	49.4 ppm	Gas Cert Reference	S970259A
NOX Cal Gas Conc	49.4 ppm	Cal Gas Expiry Date	9/26/2017
Calibrator	Sabio 4010	Serial Number	11021107
Zero air Generator	Teledyne API T701	Serial Number	1864

## DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	5564
-------------------	----------------------------	-----------------	------

## Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.997886	0.999493	0.998652
	Data Offset	1.421768	1.555850	-0.581575
Current Calibration	Data Slope	1.000619	0.997941	1.007316
	Data Offset	1.011740	1.142740	0.451912

## Analyzer Information

Analyzer make/model	Thermo 42C	Analyzer serial #	601114773
---------------------	------------	-------------------	-----------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.103		192.168.1.103	
NO coefficient	0.790		0.786	
NOX coefficient	0.997		0.996	
NO2 coefficient	1.000		1.000	
NO bkgrnd	2.5		2.7	
NOX bkgrnd	2.7		2.7	
Chamber Temp	49.7	Deg C	49.5	Deg C
Moly Temp	323	Deg C	323	Deg C
PMT voltage	-805	V	-805	V
PMT Temp	-3.6	Deg C	-3.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	137.2	mmHg	135.7	mmHg
R Cell Press Nox	137.2	mmHg	135.7	mmHg
NO sample flow	0.918	lpm	0.91	lpm
Nox sample Flow	0.918	lpm	0.910	lpm

**Notes:**

No maintenance done, filter changed out, span adjusted,





# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date: October 9, 2015 Station Number: AMS 7

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.3	----	----
as found span	5000	60.7	599.7	599.7	0.0	613.0	610.9	2.6	0.9783	0.9817
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.3	----	----
high point	5000	60.7	599.7	599.7	0.0	599.1	600.7	-1.3	1.0010	0.9984
second point	5000	30.4	300.4	300.4	0.0	297.8	298.2	-0.3	1.0086	1.0072
third point	5000	15.2	150.2	150.2	0.0	148.7	149.0	-0.2	1.0099	1.0079
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.3	----	----
as left span	5000	60.7	599.7	270.9	328.8	590.4	278.4	312.3	1.0158	0.9731
Average Correction Factor									1.0065	1.0045

Corrected As found NO<sub>x</sub>= 613.0 NO= 611.0 Percent Change NO<sub>x</sub>= -2.2% NO= -2.0%  
 Previous Response NO<sub>x</sub>= 599.6 NO= 598.5

### GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 60.70 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.3			N/A	
1st NO2 (300)	----	270.9	328.4	596.7	270.9	325.9	0.9930	1.0000	1.0077	99.2%
2nd NO2 (200)	----	432.9	166.4	597.1	432.9	164.5	0.9923	1.0000	1.0116	98.9%
3rd NO2 (100)	----	515.1	84.2	597.2	515.1	82.3	0.9922	1.0000	1.0231	97.7%
4th NO2 (0)	599.3	----	-1.6	597.7	599.3	-1.4	0.9913	1.0000	N/A	----
Average Correction Factor							0.9922	1.0000	1.0141	98.6%

Calibration Performed By: Melissa Lemay



# Wood Buffalo Environmental Association

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

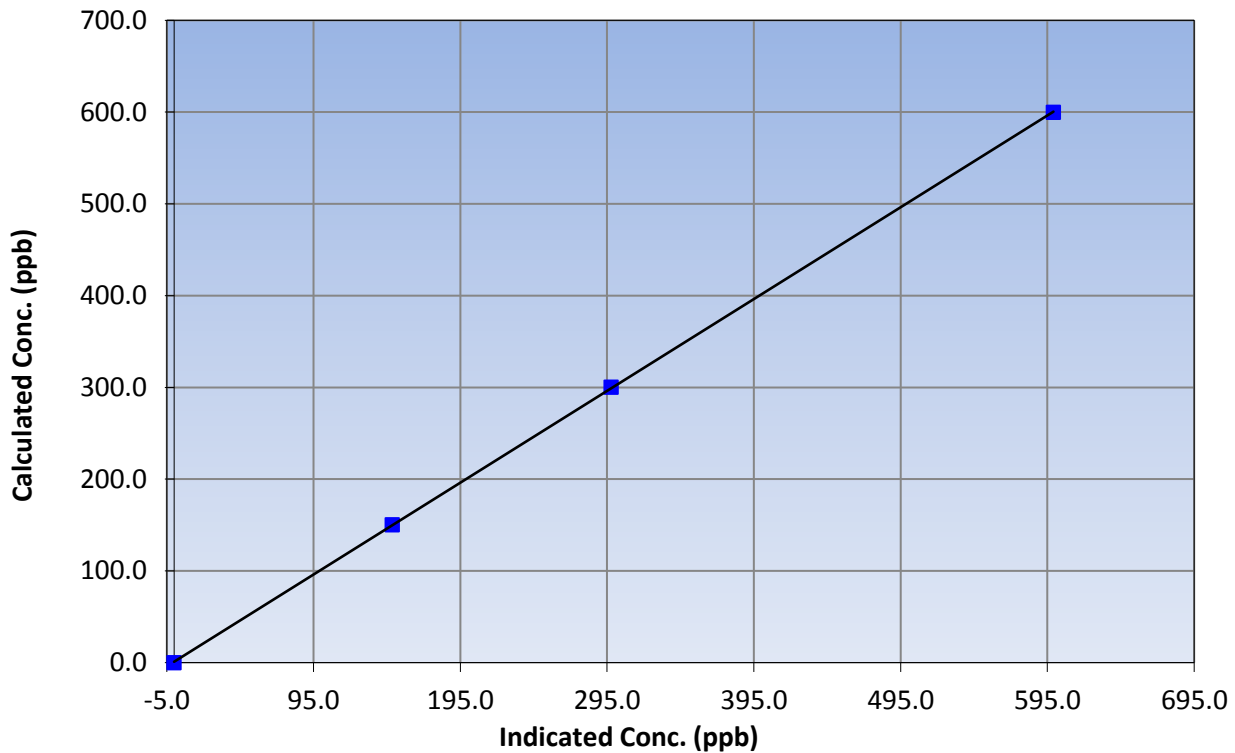
### Station Information

Calibration Date	October 9, 2015	Previous Calibration	September 8, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	6:50	End Time (MST)	11:34
Analyzer make	Thermo 42C	Analyzer serial #	601114773

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999982
599.7	599.1	1.0010		
300.4	297.8	1.0086	Slope	1.000619
150.2	148.7	1.0099		
			Intercept	1.011740

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

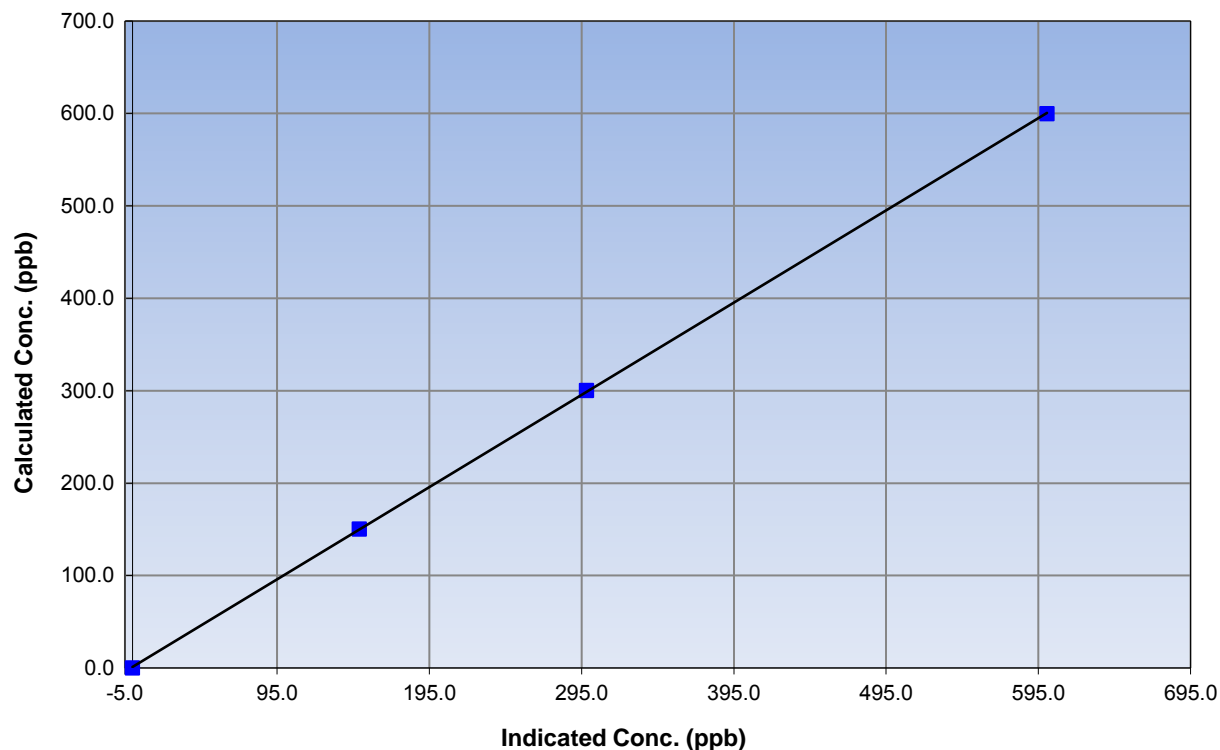
### Station Information

Calibration Date	October 9, 2015	Previous Calibration	September 8, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	6:50	End Time (MST)	11:34
Analyzer make	Thermo 42C	Analyzer serial #	601114773

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999976
599.7	600.7	0.9984		
300.4	298.2	1.0072	Slope	0.997941
150.2	149.0	1.0079		
			Intercept	1.142740

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

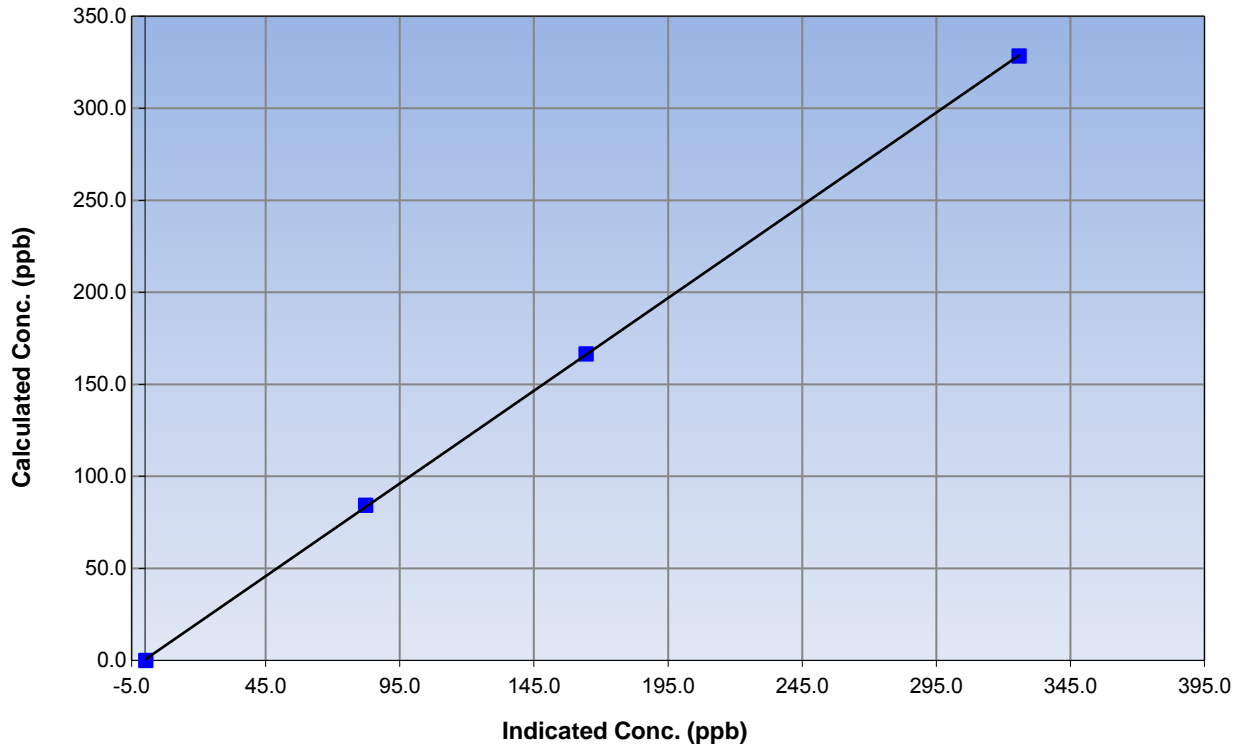
### Station Information

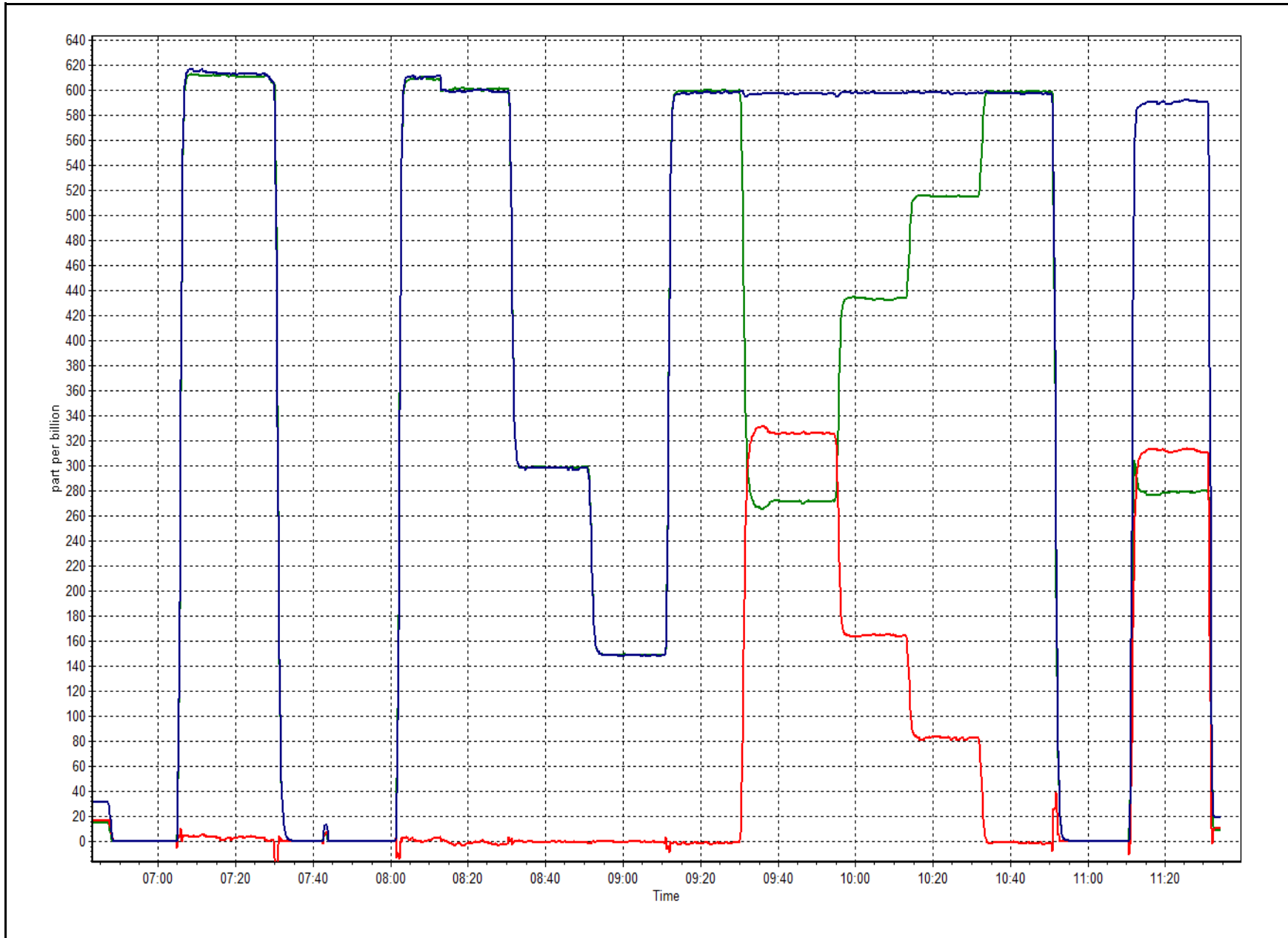
Calibration Date	October 9, 2015	Previous Calibration	September 8, 2015
Station Number	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	6:50	End Time (MST)	11:34
Analyzer make	Thermo 42C	Analyzer serial #	601114773

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999975
328.4	325.9	1.0077		
166.4	164.5	1.0116	Slope	1.007316
84.2	82.3	1.0231		
			Intercept	0.451912

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







# Wood Buffalo Environmental Association

## SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	October 19, 2015	Previous Calibration:	09/23/15
Station Name:	Athabasca Valley	Station Number:	AMS 7
Start Time (MST):	8:35	End Time (MST):	9:14
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1097

SHARP INFORMATION			
Particulate Fraction:		PM2.5	
Make/Model:		Thermo / SHARP 5030	
Serial Number		E515	
C <sub>14</sub> Source SN:		3256	
Confirmation of Time settings:		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Parameters Checked:	T1 <input checked="" type="checkbox"/> T2 <input type="checkbox"/> T3 <input type="checkbox"/> T4 <input type="checkbox"/> P3 <input checked="" type="checkbox"/> Main Flow <input checked="" type="checkbox"/> Beta <input type="checkbox"/> Neph <input checked="" type="checkbox"/>		

### CALIBRATION DATA

Temperature (°C)				
Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	7.0	5.2	-1.8	5.0
T2	15.0	na	na	15.0
T3	18.0	na	na	18.0
T4	21.0	na	na	23.0
RH (%)	23.0	na	na	25.0

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	983	979.0	-4.0	983

Main Flow (Lph)				
Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1010	10	1010	1000

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	248		248
Neph	1.8		1.8
C14	2		2
Indicated Concentration (ug/m3)	0.8	No	0.8
Offset 1			
Offset 2			

Leak Check (Quarterly)			
Leak Check Date:	September 23, 2015	Previous Leak Check Date:	June 22, 2015

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.78	
*Flow with adaptor (LPM):	16.66	0.12

\*Note - do not attach adaptor without shutting off the pump first

Mass Foil Calibration (Annually)	
Foil Calibration Date:	Previous Foil Calibration:
Zeroed?:	
Foil Mass:	Mass foil set S/N:
Previous Correction Factor:	
New Correction Factor:	

INSPECTION DATA		
Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

### NOTES:

T1 adjusted, sample head cleaned. no other adjustments done.

Calibration Performed By: Melissa Lemay



# Wood Buffalo Environmental Association CO Calibration Report

## Station Information

Calibration Date	October 19, 2015	Last Calibration	September 23, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	8:40	End Time (MST)	11:30
Gas Cert Reference	CC101396	Station temp.	22 Deg C
Cal Gas Concentration	2970 ppm	Cal Gas Exp Date	02/02/2023
Calibrator Make/Model	Sabio 4010	Serial Number	11021107
ZAG Make/Model	API 701	Serial Number	5564
DACS make/model	Campbell Scientific CR3000	Serial Number	1864

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		Chamber temp.	47.8	47.9
Analyzer IP address	192.168.1.48		Pressure	737.3	728.3
Calculated slope	1.008405	1.008937	Flow	0.489	0.483
Calculated intercept	0.051622	0.039718	Intensity	199635	199681
Analyzer Background	3.554	3.664	S/R ratio	1.175694	1.175164
Analyzer Coefficient	1.040	1.040			

Analyzer make Thermo 48i-TLE      Analyzer serial # 1408761381

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.2	----
as found span	5000	69.7	41.4	41.6	0.996
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	69.7	41.4	41.0	1.009
second point	5000	35.2	20.9	20.6	1.013
third point	5000	15.2	9.0	8.9	1.014
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	69.7	41.4	40.7	1.016
Average Correction Factor					1.012

Corrected As found    41.4      Previous response    41.0      % change    -1.0%

**Notes:**

zero adjusted, No Maintenance done, Filter changed out

Calibration Performed By:

Melissa Lemay



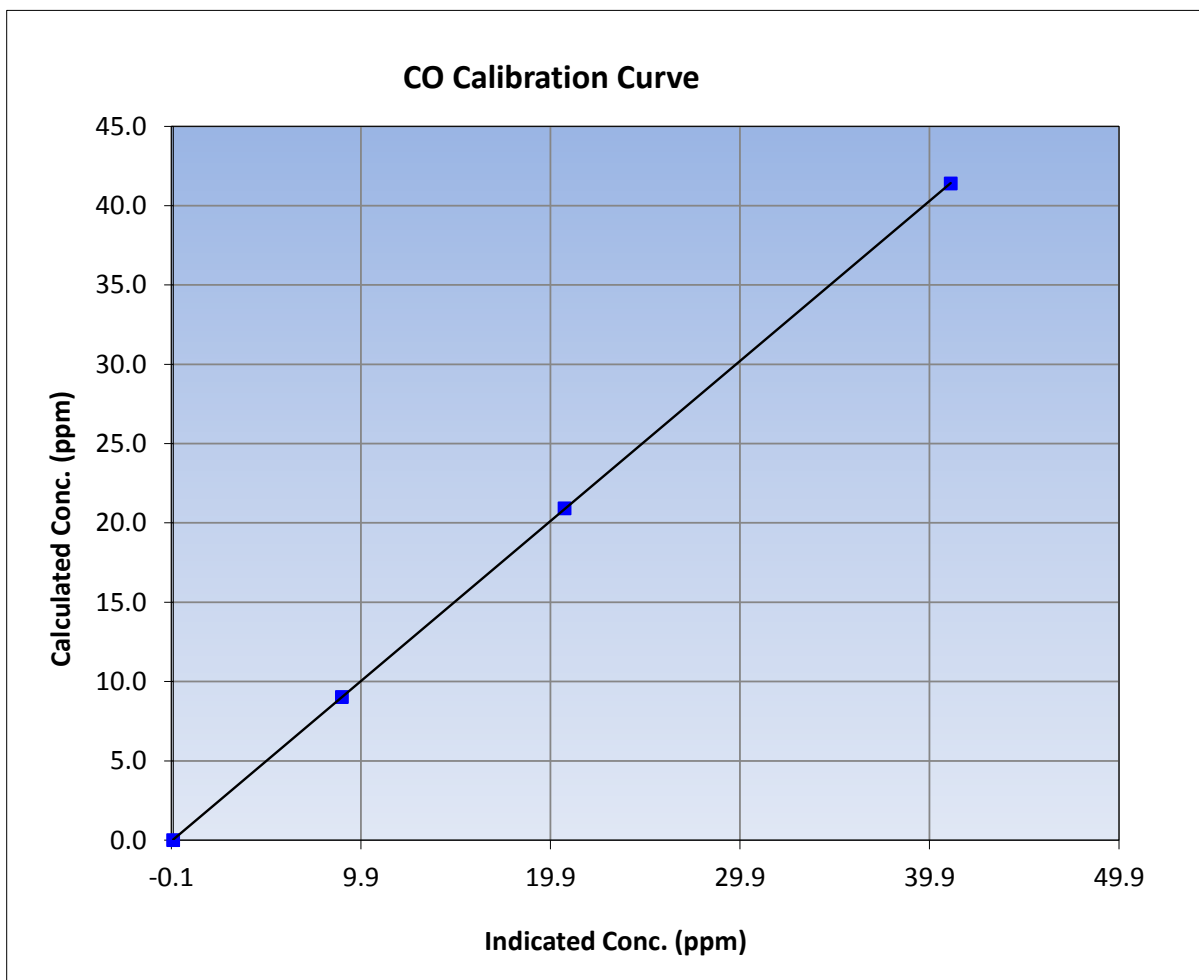
## Wood Buffalo Environmental Association CO Calibration Report

### Station Information

Calibration Date	October 19, 2015	Previous Calibration	September 23, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:40	End Time (MST)	11:30
Analyzer make	Thermo 48i-TLE	Analyzer serial #	1408761381

### Calibration Data

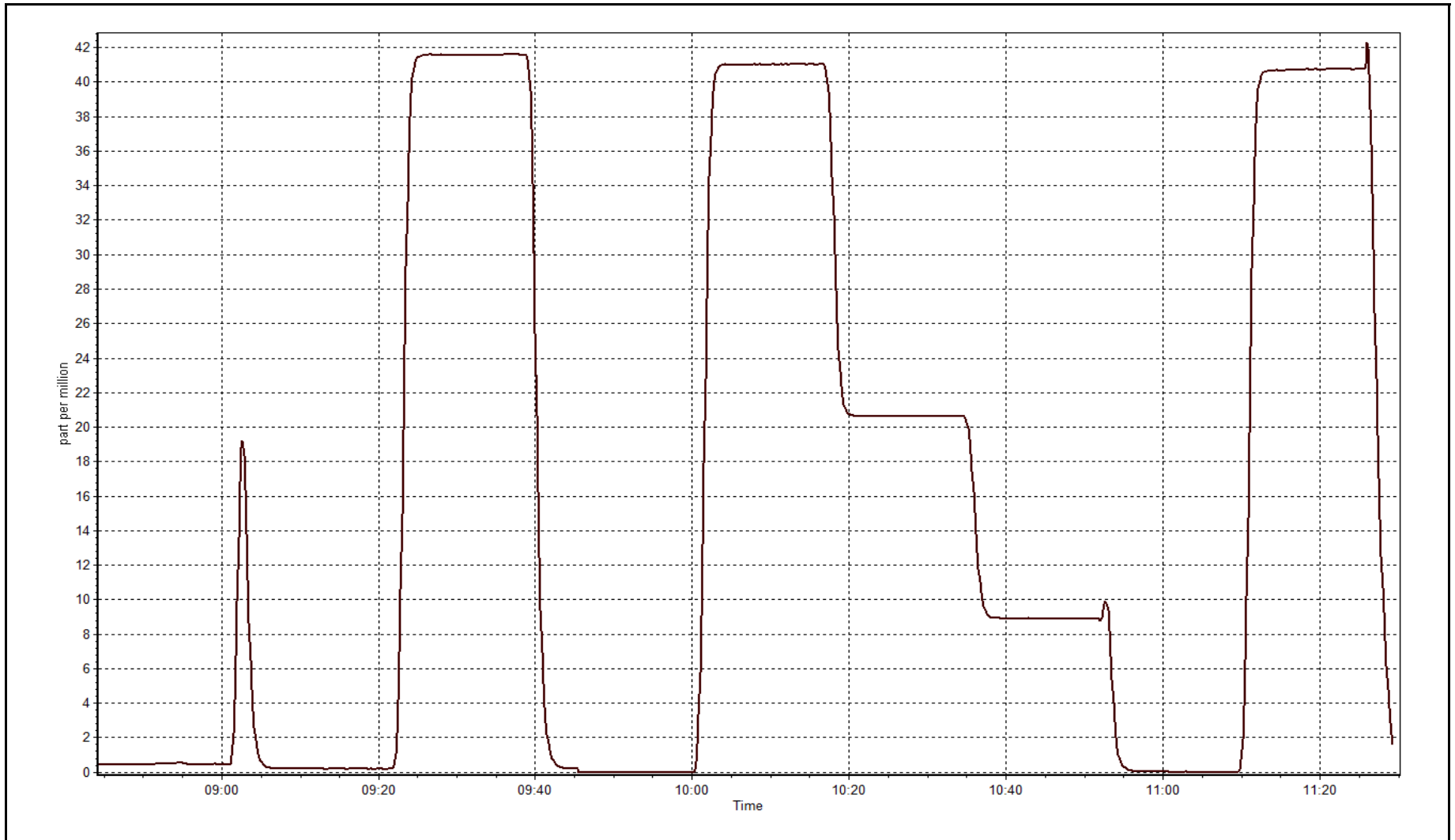
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999996
41.4	41.0	1.0093		
20.9	20.6	1.0130	Slope	1.008937
9.0	8.9	1.0145		
			Intercept	0.039718





CO Calibration Plot

Date: October 19, 2015





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## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 8  
FORT CHIPEWYAN  
OCTOBER 2015**

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

November 26, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)  
OCTOBER 2015

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	708	36	36	100.00	6	0	1	0
O3(ppb) Average	707	36	37	99.87	36	0	29	-
NO2(ppb) Average	708	36	36	100.00	13	0	4	-
NO(ppb) Average	708	36	36	100.00	4	-	1	-
NOX(ppb) Average	708	36	36	100.00	13	-	5	-
PM2.5(ug/m3) Average	742	2	2	100.00	16.3	-	8.3	0
Wind Speed 10 m (km/h) Average	744	0	0	100.00	42	-	29	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100.00	20.2	-	15	-
Relative Humidity (%) Average	744	0	0	100.00	100	-	96	-
Precipitation (mm) Total	744	0	0	100.00	3	-	7.6	-
Leaf Wetness (% of range) Average	701	0	43	94.22	68	-	48	-
Global Solar Radiation (W/m2) Average	713	0	31	95.83	531	-	154	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)  
OCTOBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile							
					Min	P10	Q1	Median	Q3	P90	Max	
SO2(ppb) Average	708	0.2	1	-	0	0	0	0	0	0	0	6
O3(ppb) Average	707	20.4	7	-	5	11	16	21	25	29	36	36
NO2(ppb) Average	708	0.9	2	-	0	0	0	0	1	3	13	13
NO(ppb) Average	708	0.1	0	-	0	0	0	0	0	0	4	4
NOX(ppb) Average	708	1	2	-	0	0	0	0	1	3	13	13
PM2.5(ug/m3) Average	742	3.47	2.6	-	0.4	0.8	1.6	2.7	4.8	7	16.3	16.3
Wind Speed 10 m (km/h) Average	744	14.2	7	-	1	6	9	13	18	24	42	42
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	3.37	4.3	-	-2.9	-1.3	0.4	2.5	5	10.3	20.2	20.2
Relative Humidity (%) Average	744	81.1	14	-	38	60	75	85	91	95	100	100
Precipitation (mm) Total	744	-	-	38.1	-	-	-	-	-	-	-	-
Leaf Wetness (% of range) Average	701	5	13	-	0	0	0	0	0	21	68	68
Global Solar Radiation (W/m2) Average	713	59.5	111	-	0	0	0	0	71	227	531	531

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)  
OCTOBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
O3	03 Oct 2015 07:00	03 Oct 2015 07:00	1	Power spike
Surface Leaf Wetness	01 Oct 2015 17:00	01 Oct 2015 18:00	2	Unstable Operation
Surface Leaf Wetness	07 Oct 2015 11:00	07 Oct 2015 11:00	1	Unstable Operation
Surface Leaf Wetness	07 Oct 2015 14:00	07 Oct 2015 20:00	7	Maintenance - sensor and ground wire relocated
Surface Leaf Wetness	10 Oct 2015 10:00	11 Oct 2015 14:00	29	Unstable Operation
Surface Leaf Wetness	12 Oct 2015 21:00	12 Oct 2015 21:00	1	Unstable Operation
Surface Leaf Wetness	12 Oct 2015 23:00	12 Oct 2015 23:00	1	Unstable Operation
Surface Leaf Wetness	13 Oct 2015 01:00	13 Oct 2015 01:00	1	Unstable Operation
Surface Leaf Wetness	13 Oct 2015 03:00	13 Oct 2015 03:00	1	Unstable Operation
Solar Global Radiation	01 Oct 2015 18:00	01 Oct 2015 18:00	1	Unstable Operation
Solar Global Radiation	07 Oct 2015 15:00	07 Oct 2015 20:00	6	Unstable Operation
Solar Global Radiation	10 Oct 2015 10:00	10 Oct 2015 23:00	14	Unstable Operation
Solar Global Radiation	11 Oct 2015 01:00	11 Oct 2015 01:00	1	Unstable Operation
Solar Global Radiation	11 Oct 2015 03:00	11 Oct 2015 04:00	2	Unstable Operation
Solar Global Radiation	11 Oct 2015 06:00	11 Oct 2015 11:00	6	Unstable Operation
Solar Global Radiation	12 Oct 2015 23:00	12 Oct 2015 23:00	1	Unstable Operation



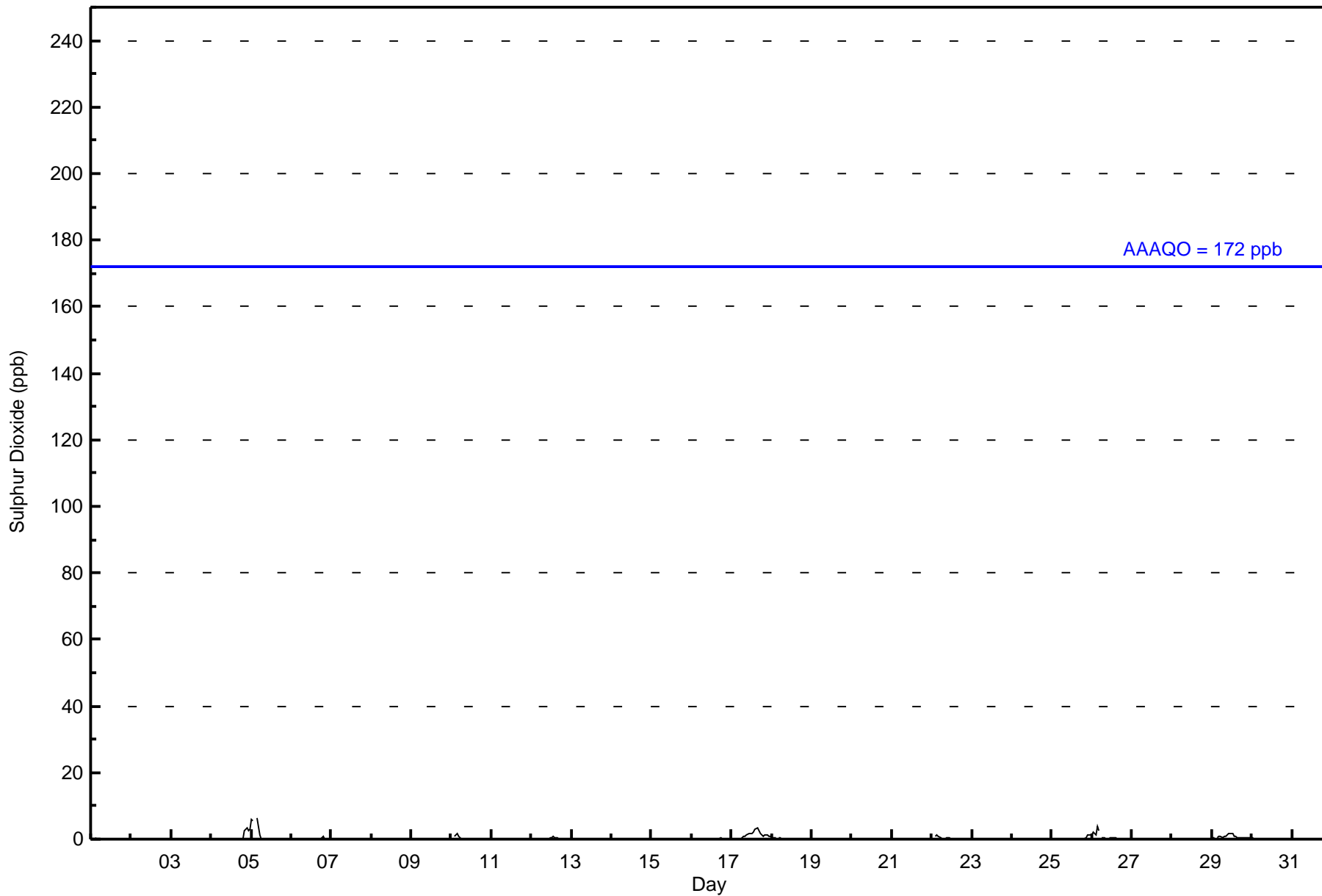
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 6 ppb on Oct 5 04:00      Maximum Daily Average: 1.2 ppb on Oct 17																	Hours in Service: 744 Hours of Data: 708									
Minimum Value: 0 ppb on Oct 1 22:00      Minimum Daily Average: 0.0 ppb on Oct 19 Maximum Diurnal Average: 0.5 ppb at hour 4      Minimum Diurnal Average: 0.1 ppb at hour 7 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> = 4																	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	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	0.0	0
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
4-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	4	3	0.5	4
5-Oct	6	5	Z	6	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	6
6-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	0.1	1
7-Oct	0	0	0	0	Z	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.1	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	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	0
10-Oct	0	Z	1	2	1	0	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	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	1	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	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	0.0	0
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	0.0	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	1	1	1	2	2	2	2	3	4	3	2	1	1	1	1	1	1	1.2	4
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	0	0	0	0	0	0	0.0	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	0
22-Oct	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	0.0	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	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	1	1	0.2	1
26-Oct	1	2	1	4	2	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	4
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	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
29-Oct	0	0	Z	1	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	0	0	0	0	0.8	2
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	0.0	0
0.3   0.3   0.2   0.5   0.4   0.1   0.1   0.1   0.1   0.1   0.1   0.2   0.2   0.2   0.2   0.2   0.2   0.1   0.1   0.1   0.1   0.2   0.2   0.2   0.2   Diurnal Average																								6   5   1   6   4   1   1   1   1   1   1   2   2   2   2   3   4   3   2   1   1   3   4   3   3   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 Chipewyan - October 2015





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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort Chipewyan - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	708	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: 708

Total Number of Hours: 744



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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort Chipewyan - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	18	10	3	40	67	70	34	36	26	18	41	31	81	64	99	70	708
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>	18	10	3	40	67	70	34	36	26	18	41	31	81	64	99	70	708

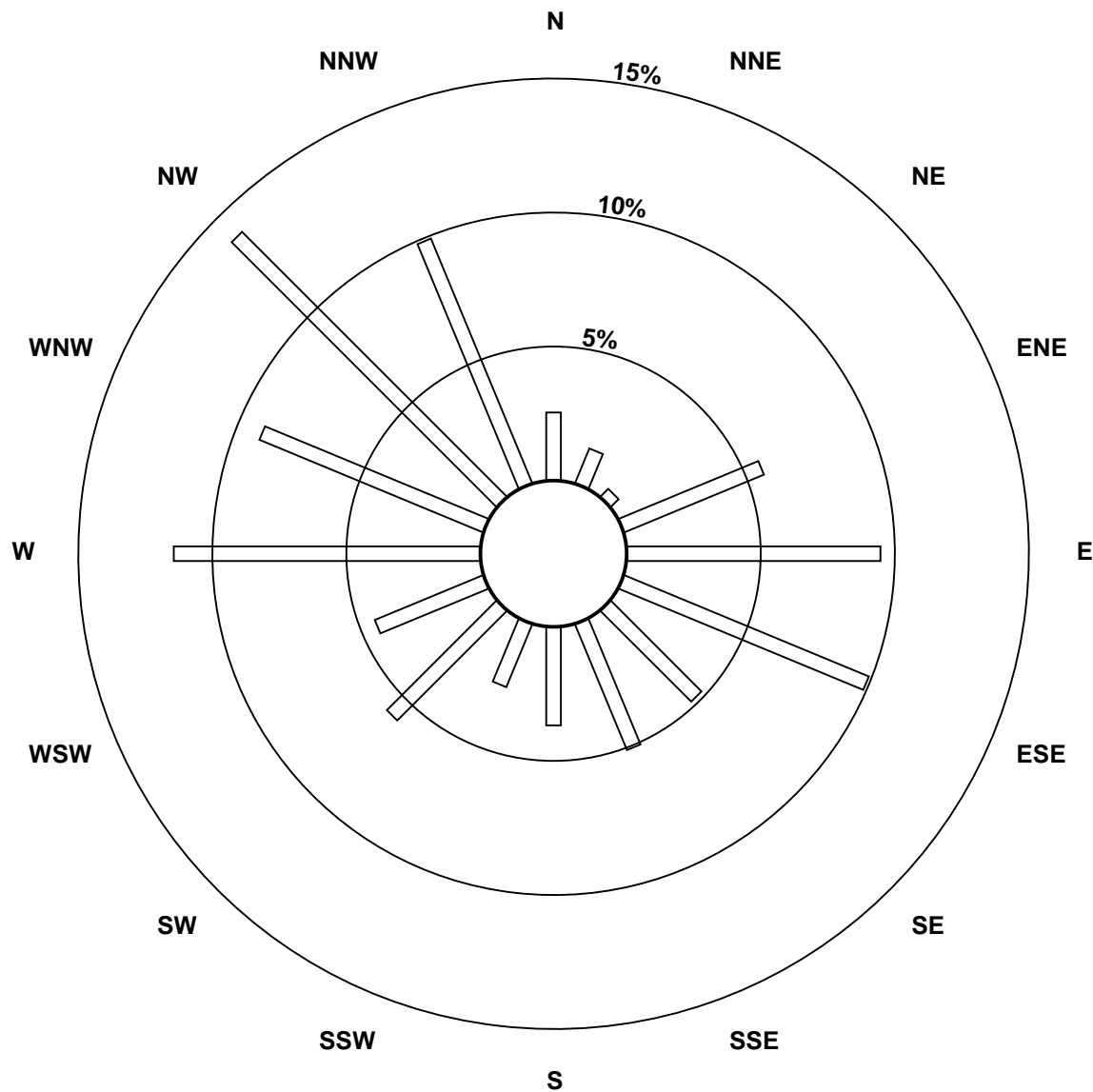
Total Number of Valid Hours: 708

Total Number of Hours: 744

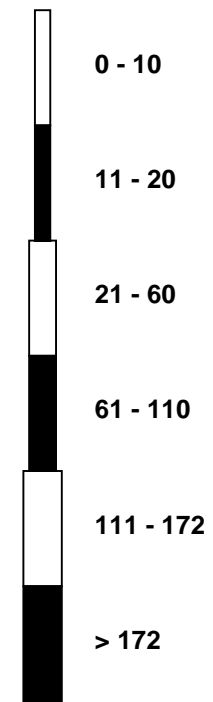


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

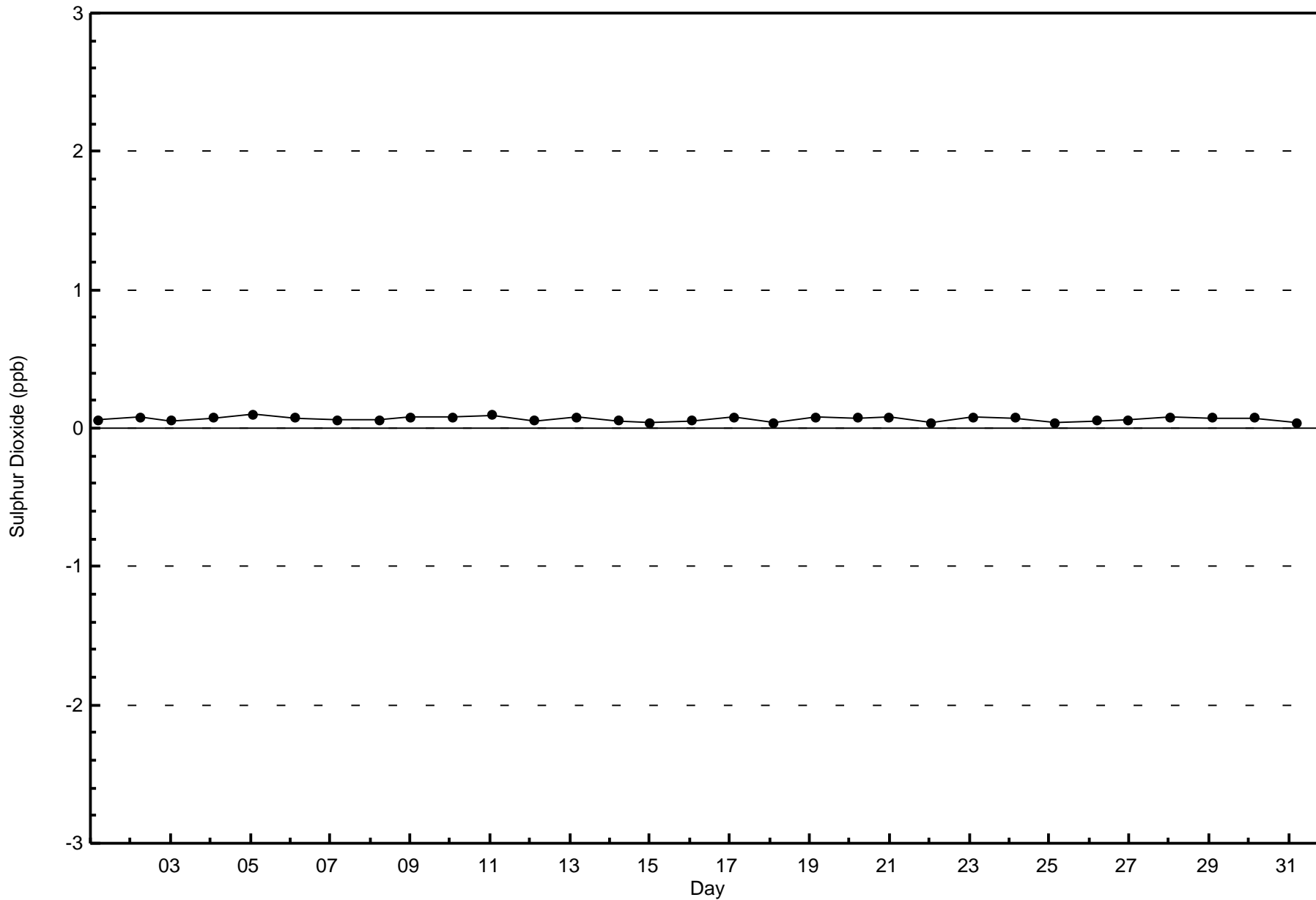
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort Chipewyan (AMS 8)

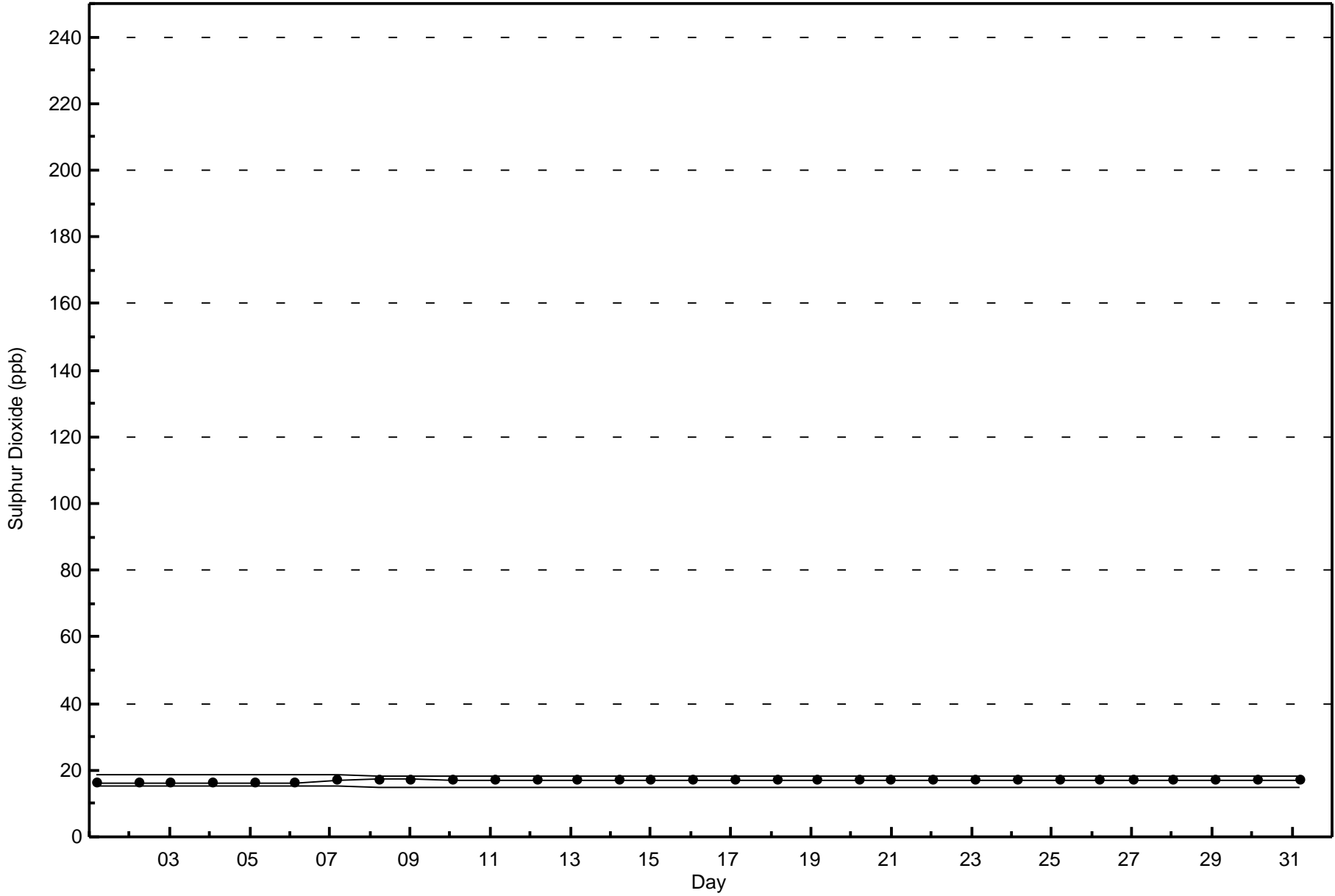


Classes (ppb)



Total Number of Valid Hours: 708







Maximum Value: 4 ppb on Oct 30 13:00																	Maximum Daily Average: 0.9 ppb on Oct 30																	Hours in Service: 744	
Minimum Value: 0 ppb on Oct 1 01:00																	Minimum Daily Average: 0.0 ppb on Oct 19																	Hours of Data: 708	
Maximum Diurnal Average: 0.4 ppb at hour 13																	Minimum Diurnal Average: 0.0 ppb at hour 24																	Hours of Missing Data: 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> = 2																	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	Z	0	0	1	1	0	0	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	0								
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	0.0	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	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	0.0	0								
7-Oct	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	0.1	0								
8-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	0.1	1								
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	0.0	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	0	1	1	0	1	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	0.0	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	0.0	0								
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	0.0	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	0								
17-Oct	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	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	0.0	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	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	0.0	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	0.0	0								
22-Oct	0	Z	0	0	0	0	0	0	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2								
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	0.0	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	0.0	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	0.1	0								
29-Oct	0	0	Z	0	0	0	0	0	0	1	2	3	3	2	1	0	0	0	0	0	0	0	0	0	0	0.6	3								
30-Oct	0	0	0	Z	0	0	0	0	2	1	2	3	4	3	2	2	1	0	0	0	0	0	0	0	0	0.9	4								
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								
																								Diurnal Average											
																								Diurnal Maximum											
Z - zerospan      C - Calibration																																			

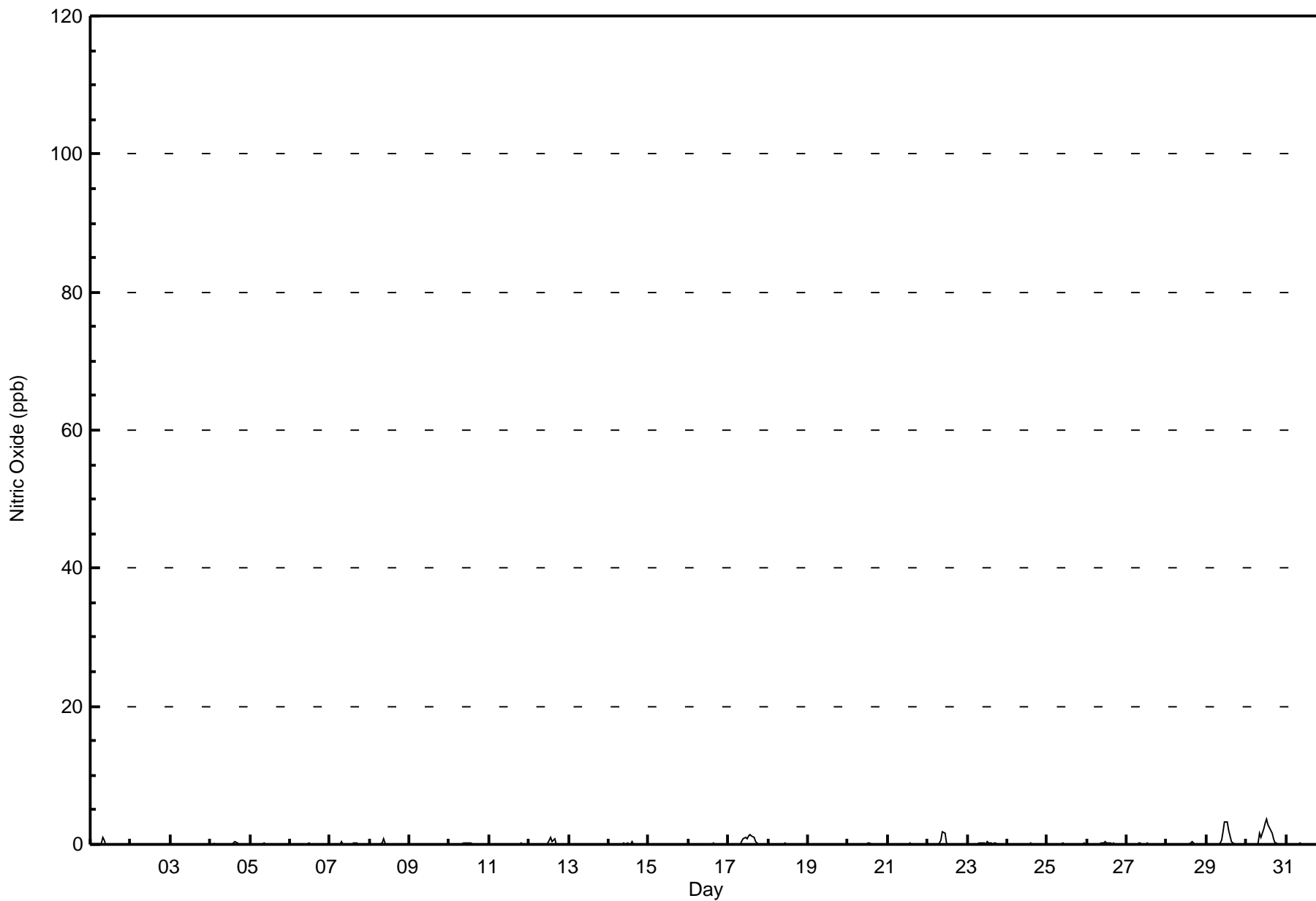


Wood Buffalo Environmental Association

Hourly Averages

Nitric Oxide (NO) - ppb

Fort Chipewyan - October 2015







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

**Nitric Oxide (NO) - ppb**  
**Fort Chipewyan - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	708	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: 708

Total Number of Hours: 744



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

**Nitric Oxide (NO) - ppb**  
**Fort Chipewyan - October 2015**

<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	18	10	3	40	67	70	34	36	26	18	41	31	81	64	99	70	708
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>	18	10	3	40	67	70	34	36	26	18	41	31	81	64	99	70	708

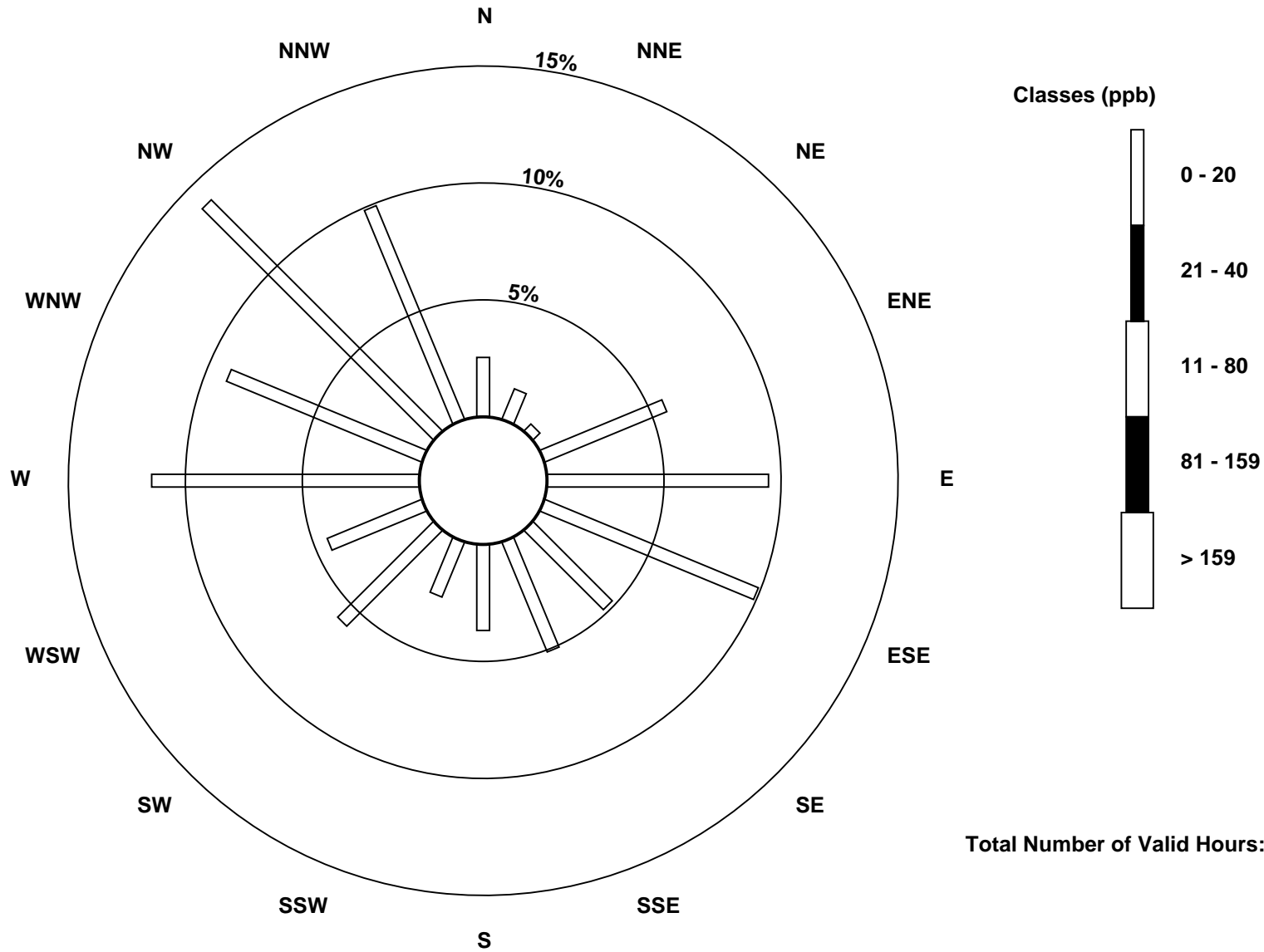
Total Number of Valid Hours: 708

Total Number of Hours: 744

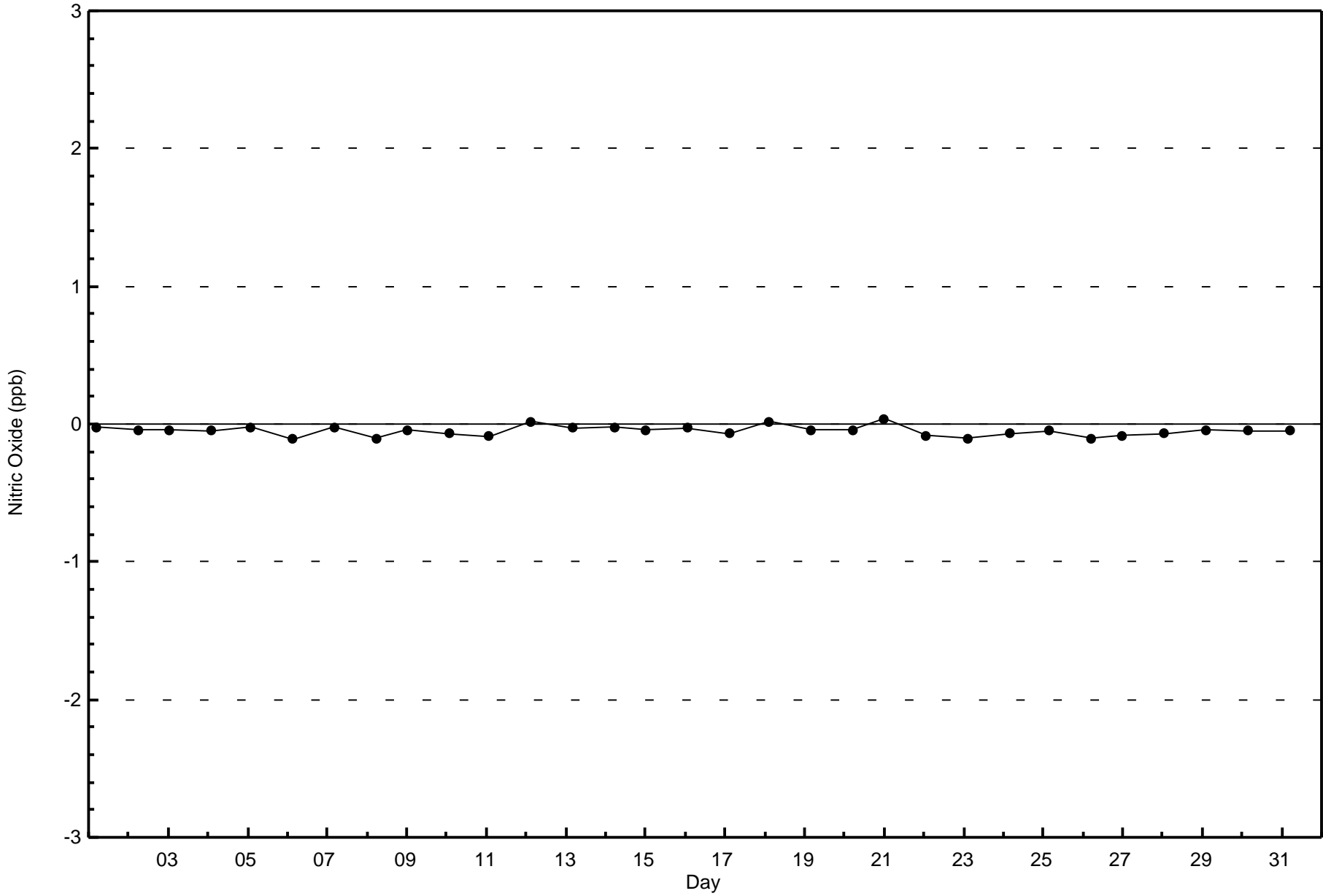


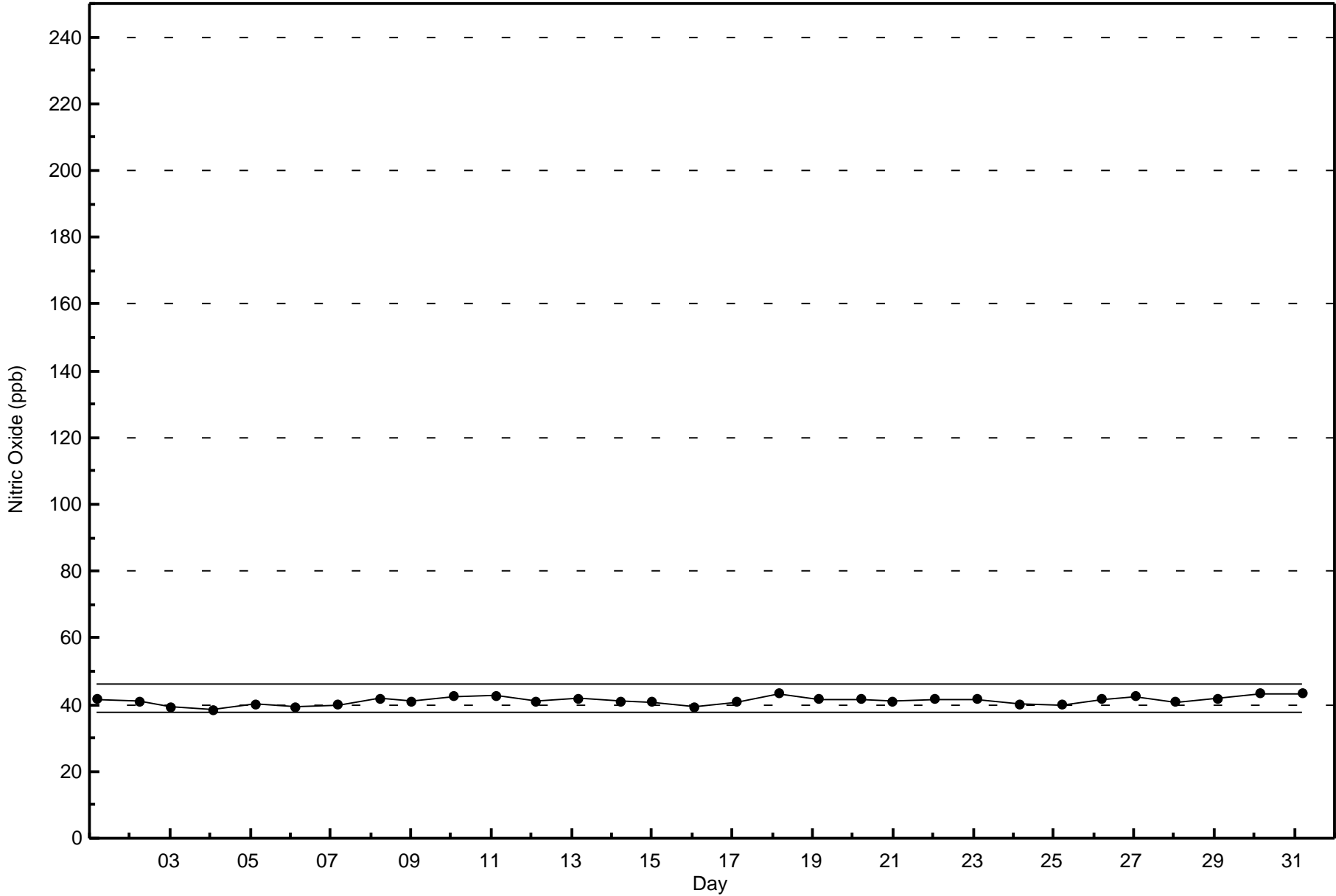
Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Nitric Oxide (NO) - ppb  
Fort Chipewyan (AMS 8)



Total Number of Valid Hours: 708







Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 13 ppb on Oct 4 22:00	Maximum Daily Average: 4.0 ppb on Oct 30		Hours of Data:	708
Minimum Value: 0 ppb on Oct 3 00:00	Minimum Daily Average: 0.1 ppb on Oct 19		Hours of Missing Data:	36
Maximum Diurnal Average: 1.6 ppb at hour 5	Minimum Diurnal Average: 0.6 ppb at hour 12		Hours of Calibration:	36
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> = 3 P <sub>99</sub> = 9		Percent Operational Time:	100.0

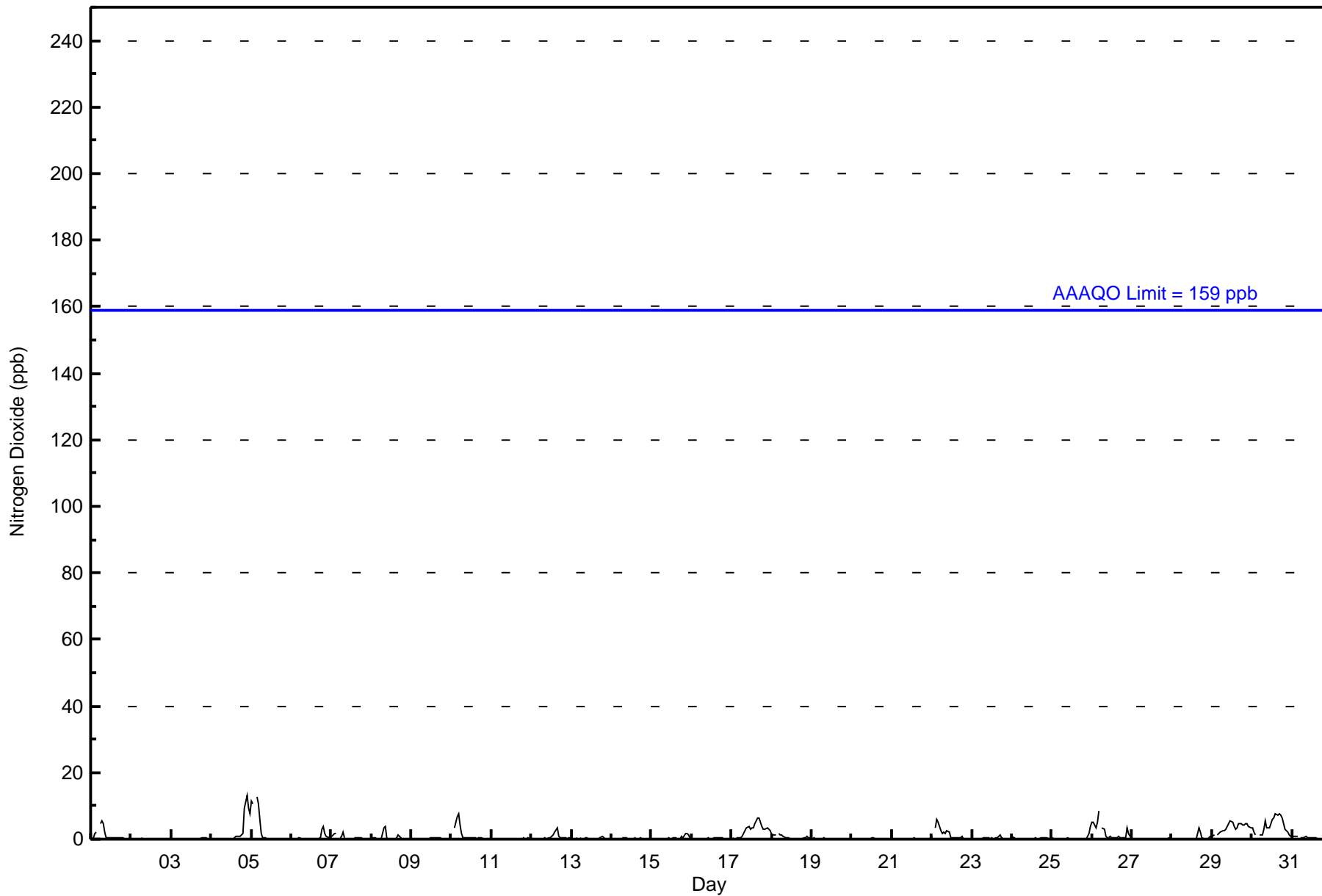
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	2	2	Z	5	5	5	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	5
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
4-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2	9	13	10	8	2.0	13
5-Oct	12	11	Z	13	11	6	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.4	13
6-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	4	2	1	1	1	0.6	4
7-Oct	1	1	2	2	Z	0	1	2	0	C	C	C	C	C	1	1	0	0	0	0	0	0	0	0	0.7	2
8-Oct	0	0	0	0	0	Z	0	3	4	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.5	4
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	0.2	0
10-Oct	0	Z	3	7	8	4	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2	8
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	1	1	1	2	4	1	0	0	0	0	0	0	0	0.6	4
13-Oct	0	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.3	1
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	0	0	0	0	0	0	0	1	1	2	2	1	0	0.4	2
16-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.2	1
17-Oct	0	0	Z	0	0	1	1	2	2	4	4	3	4	4	5	7	6	5	4	3	3	3	3	3	2.8	7
18-Oct	1	1	1	Z	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0.6	2
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	0.1	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	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
22-Oct	1	Z	3	6	5	3	2	2	2	3	2	1	0	0	0	0	0	0	1	0	0	0	0	0	1.4	6
23-Oct	0	0	Z	0	0	0	0	0	0	1	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0.3	1
24-Oct	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	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	1	2	4	0.4	4
26-Oct	5	5	3	5	9	Z	3	3	1	0	1	1	1	0	1	0	1	1	1	0	0	3	2	1	2.0	9
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	0.1	0
28-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	2	0	0	0	0	1	1	0.5	3
29-Oct	1	1	Z	1	2	2	2	3	3	4	5	5	5	4	3	4	5	5	4	4	5	5	4	4	3.5	5
30-Oct	3	2	1	Z	1	1	1	3	6	4	4	5	6	7	8	7	8	7	6	5	3	2	1	1	4.0	8
31-Oct	1	1	1	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
	1.1	1.0	0.8	1.5	1.6	1.0	0.8	0.9	0.8	0.7	0.7	0.6	0.7	0.7	0.8	0.9	1.0	0.9	0.8	0.8	0.9	1.1	0.9	0.8	Diurnal Average	
	12	11	3	13	11	6	5	5	6	4	5	5	6	7	8	7	8	7	6	5	9	13	10	8	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 Chipewyan - October 2015**





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort Chipewyan - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	708	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: 708

Total Number of Hours: 744





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort Chipewyan - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	18	10	3	40	67	70	34	36	26	18	41	31	81	64	99	70	708
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>	18	10	3	40	67	70	34	36	26	18	41	31	81	64	99	70	708

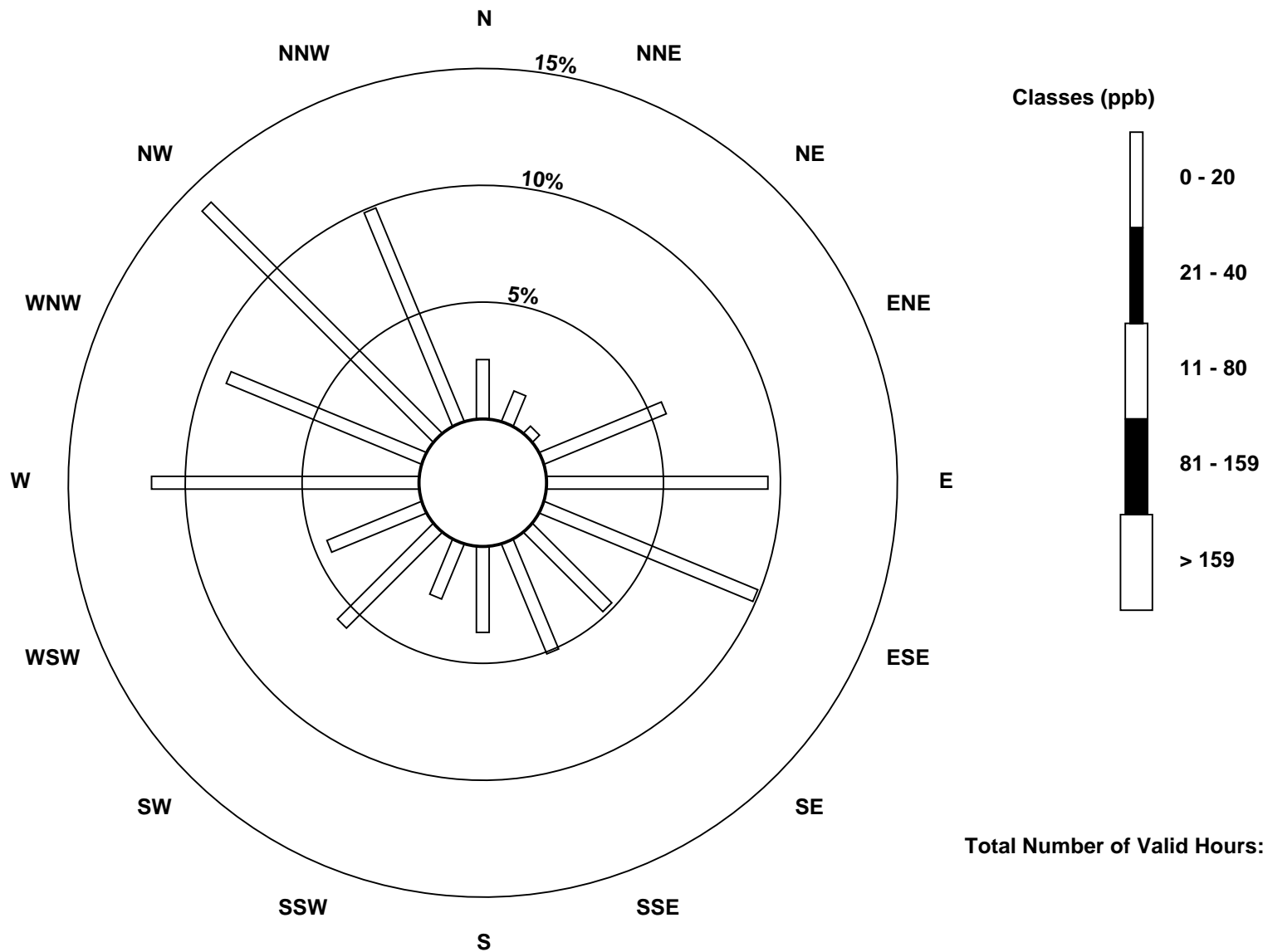
Total Number of Valid Hours: 708

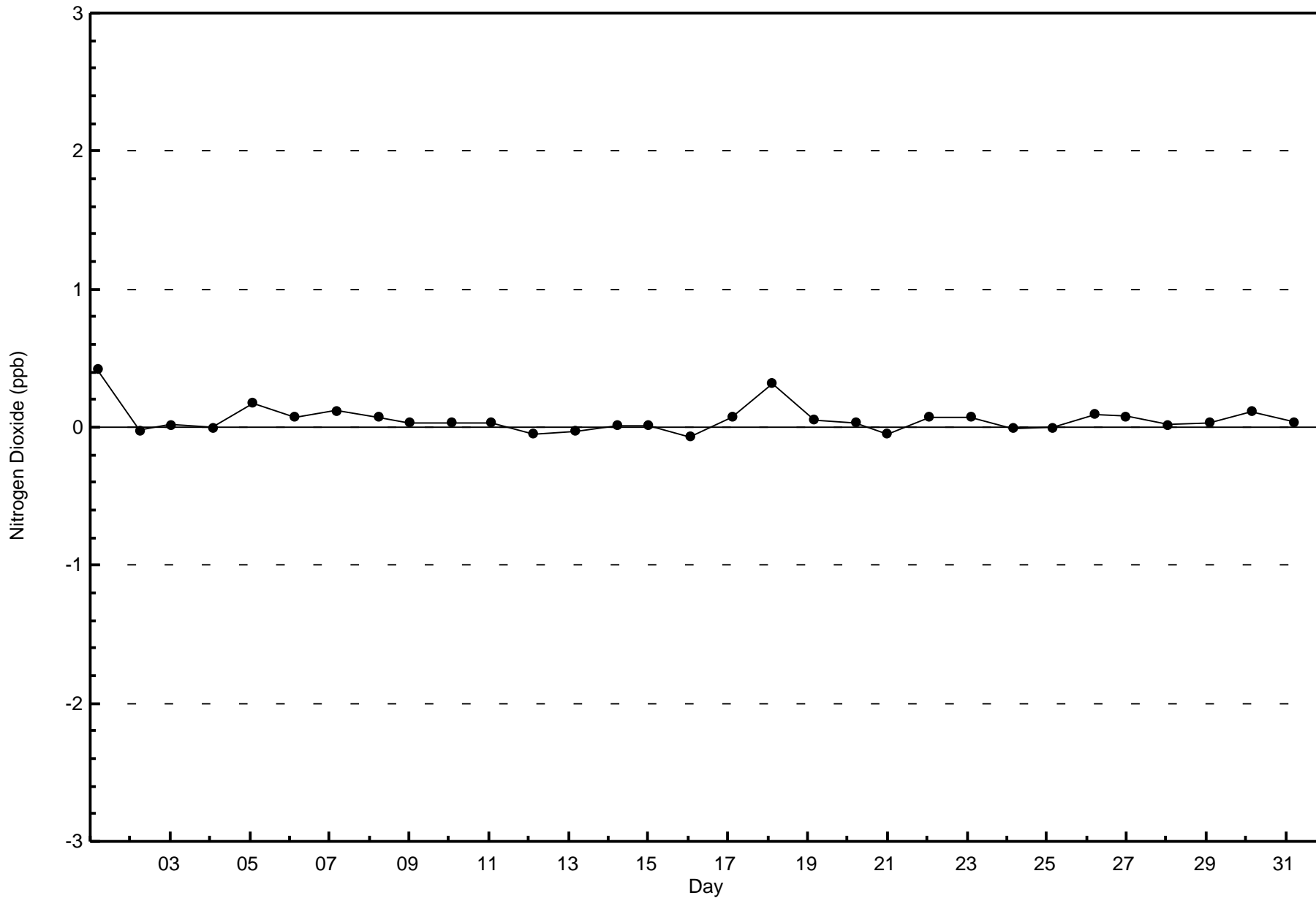
Total Number of Hours: 744

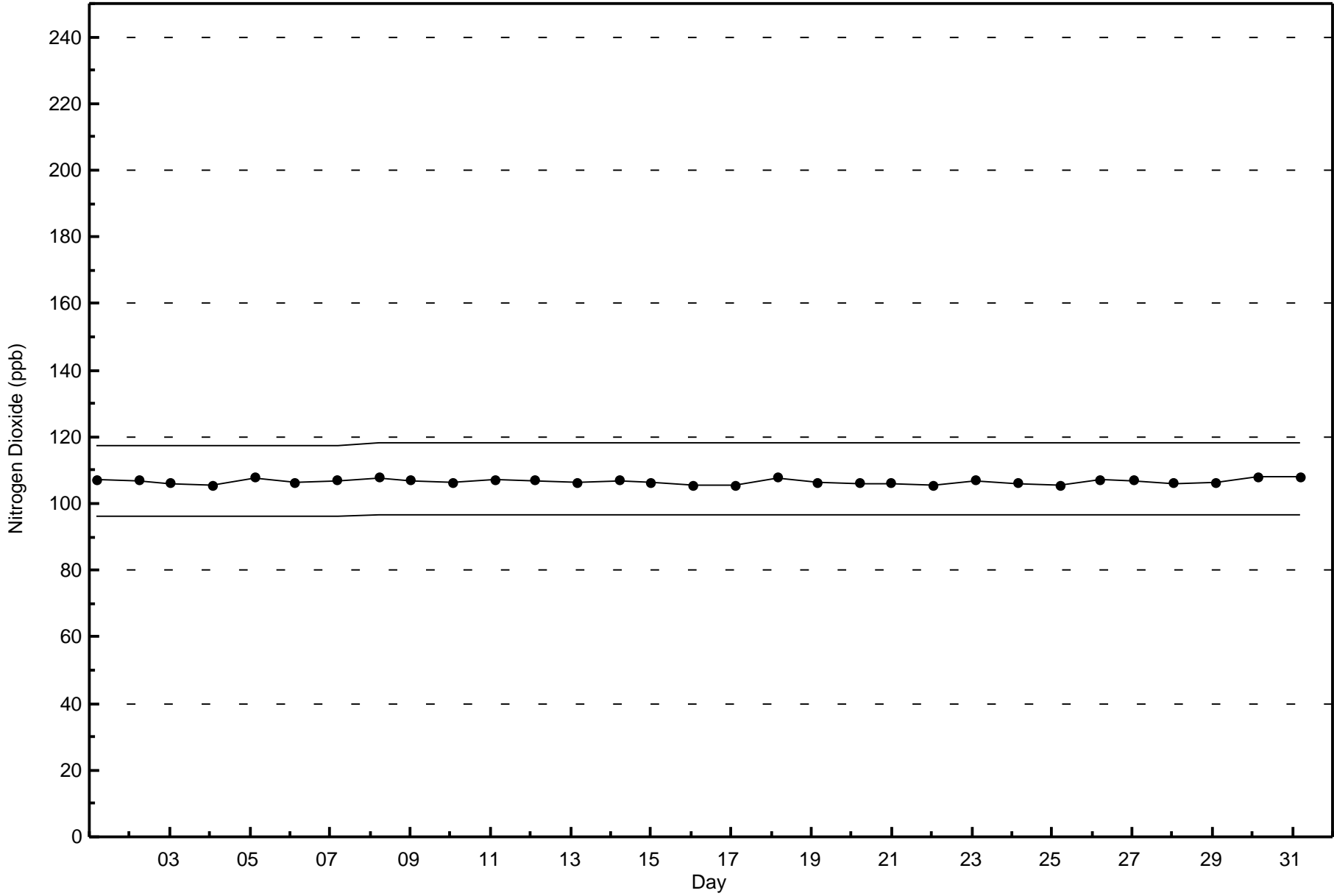


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort Chipewyan (AMS 8)

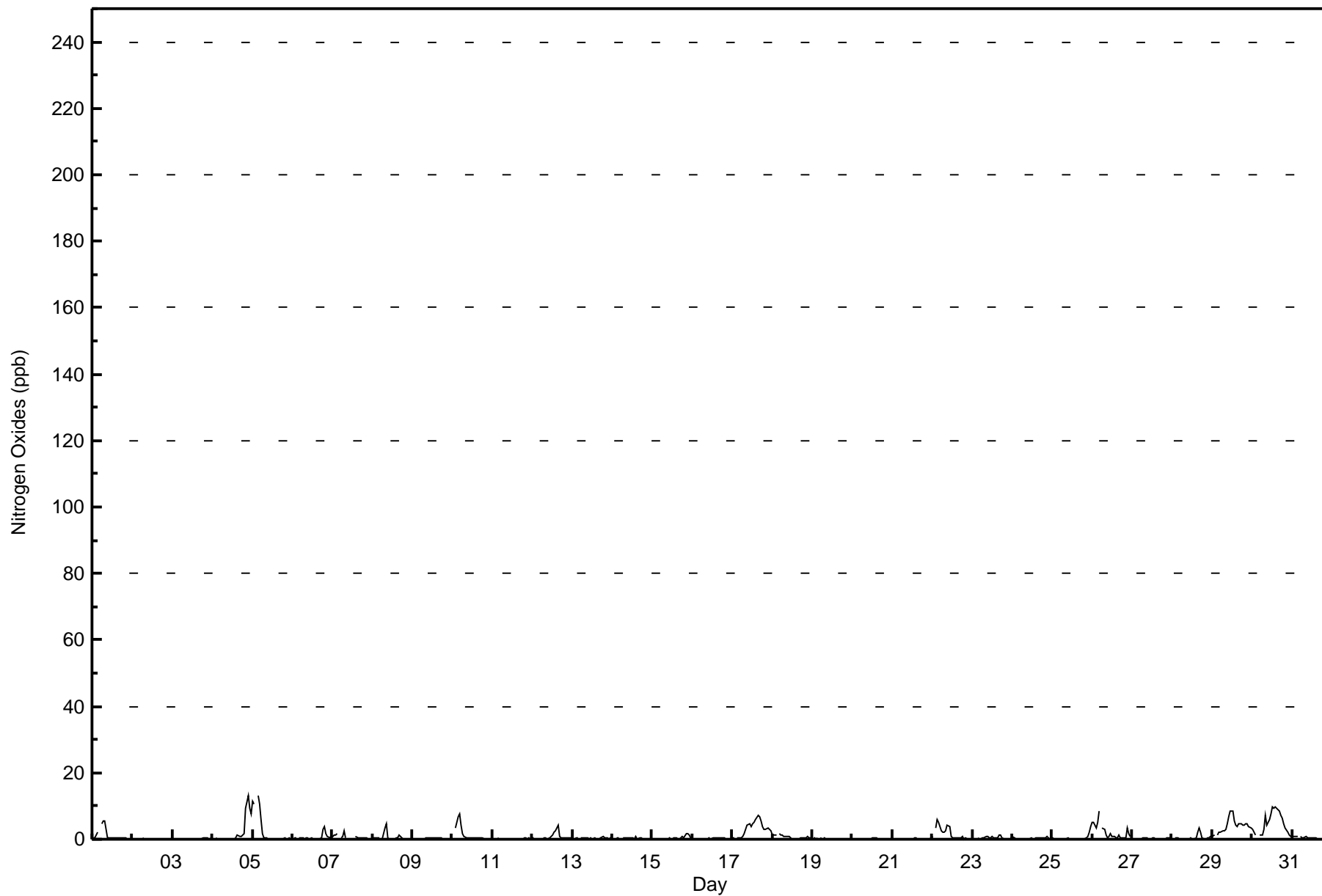








Maximum Value: 13 ppb on Oct 4 22:00																	Maximum Daily Average: 4.8 ppb on Oct 30																	Hours in Service: 744														
Minimum Value: 0 ppb on Oct 19 15:00																	Minimum Daily Average: 0.1 ppb on Oct 19																	Hours of Data: 708														
Maximum Diurnal Average: 1.6 ppb at hour 5																	Minimum Diurnal Average: 0.8 ppb at hour 3																	Hours of Missing Data: 36														
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> = 10																	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	1	2	Z	5	5	5	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2	5																						
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	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	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2	9	13	9	8	2.1	13																						
5-Oct	12	11	Z	13	11	6	2	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2.5	13																						
6-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	4	2	1	1	1	0.6	4																						
7-Oct	1	1	1	2	Z	0	1	2	0	C	C	C	C	C	1	1	1	0	0	0	0	0	0	0	0.7	2																						
8-Oct	0	0	0	0	0	Z	0	4	5	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0.6	5																						
9-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.2	1																						
10-Oct	0	Z	4	7	8	4	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1.3	8																						
11-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.2	1																						
12-Oct	0	0	0	Z	0	0	0	0	0	0	0	1	1	2	3	4	1	0	0	0	0	0	0	0	0.7	4																						
13-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.3	1																						
14-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	0.2	1																						
15-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	1	0	0.4	2																						
16-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.2	1																						
17-Oct	0	0	Z	0	0	0	1	2	3	4	5	4	5	5	6	7	7	5	4	3	3	3	3	2	3.2	7																						
18-Oct	1	1	1	Z	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0.6	2																						
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	0.1	0																						
20-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	0.1	1																						
21-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.1	1																						
22-Oct	1	Z	3	6	5	3	2	2	2	4	4	1	1	0	1	0	0	0	1	0	0	0	0	0	1.7	6																						
23-Oct	0	0	Z	0	0	0	0	1	1	1	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0.4	1																						
24-Oct	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	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	1	2	4	0.4	4																						
26-Oct	5	5	3	5	9	Z	3	3	1	1	1	2	1	1	1	1	1	1	0	0	0	3	2	1	2.1	9																						
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	1	2	3	2	0	0	0	0	1	1	0.6	3																						
29-Oct	1	1	Z	1	2	2	2	3	3	5	7	9	8	6	4	4	5	5	4	4	5	5	4	4	4.0	9																						
30-Oct	3	2	1	Z	1	1	1	3	7	4	6	8	10	9	10	9	9	7	6	5	3	2	1	1	4.8	10																						
31-Oct	1	1	1	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1																						
																								1.1	1.0	0.8	1.5	1.6	1.0	0.8	1.0	1.0	0.8	0.9	0.9	1.0	1.0	1.0	1.1	1.1	0.9	0.9	0.8	0.9	1.1	0.9	0.8	Diurnal Average
																								12	11	4	13	11	6	5	5	7	5	7	9	10	9	10	9	9	7	6	5	9	13	9	8	Diurnal Maximum
Z - zerospan      C - Calibration																																																





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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort Chipewyan - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	708	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: 708

Total Number of Hours: 744



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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort Chipewyan - October 2015**

<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	18	10	3	40	67	70	34	36	26	18	41	31	81	64	99	70	708
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>	18	10	3	40	67	70	34	36	26	18	41	31	81	64	99	70	708

Total Number of Valid Hours: 708

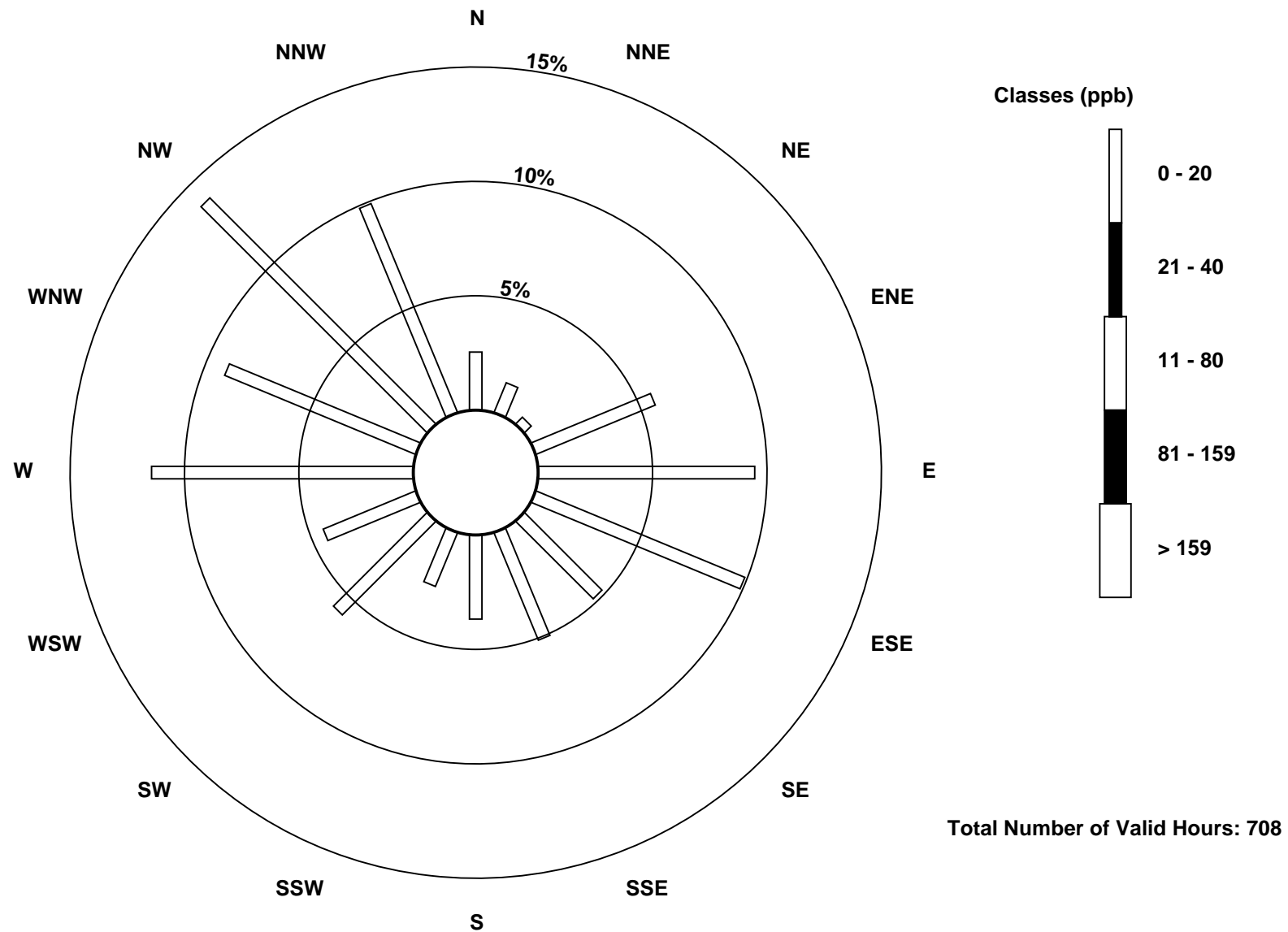
Total Number of Hours: 744

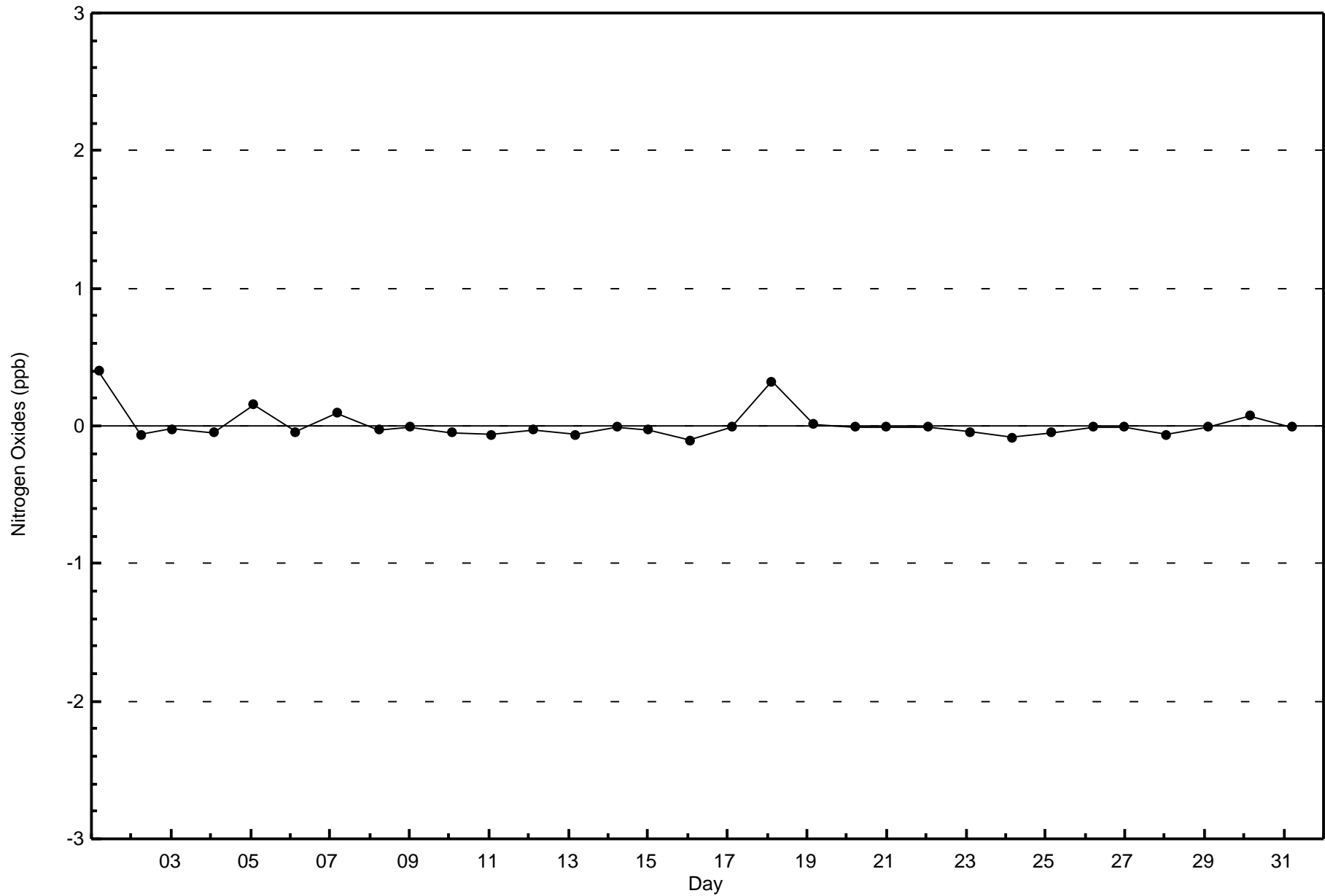


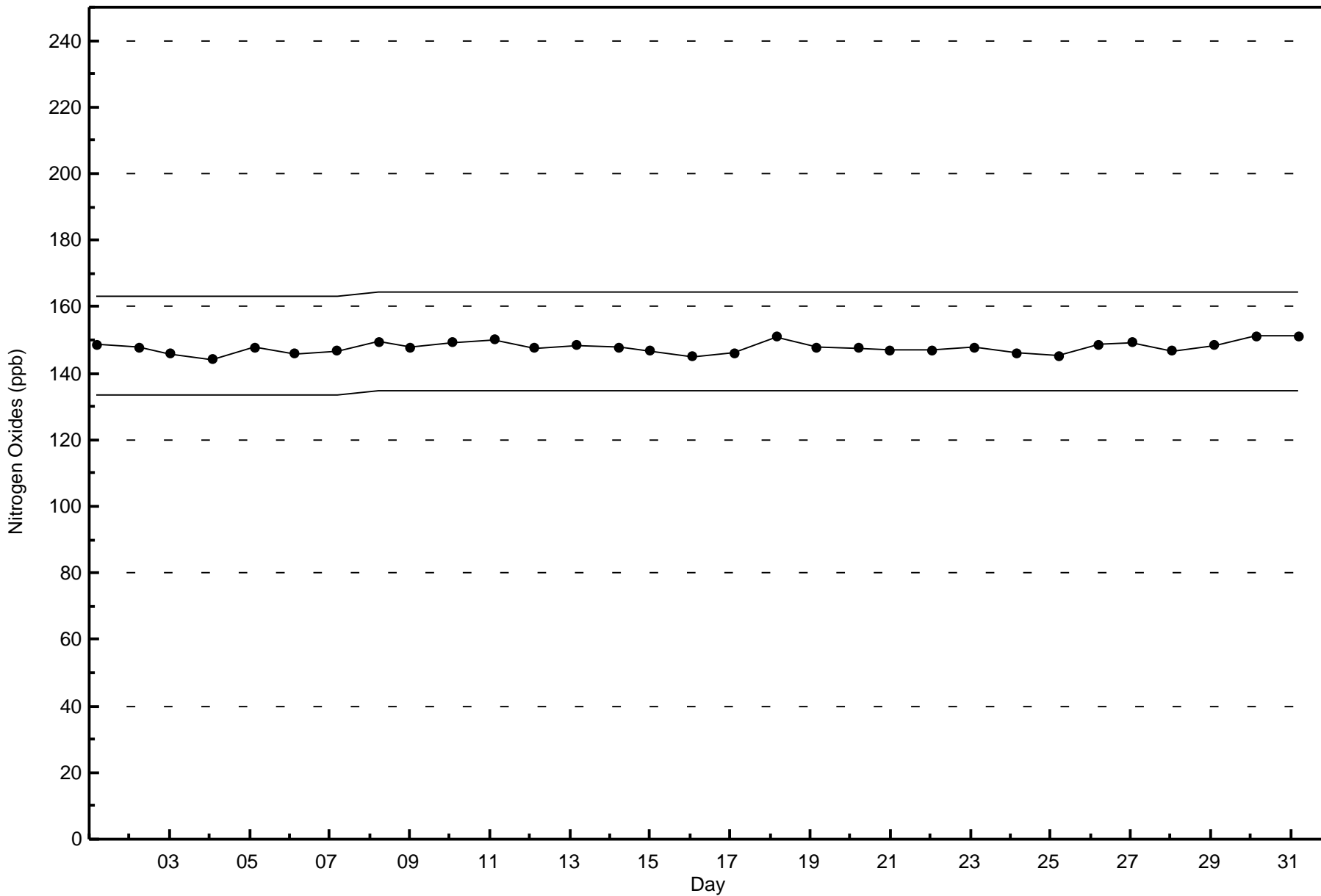


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort Chipewyan (AMS 8)

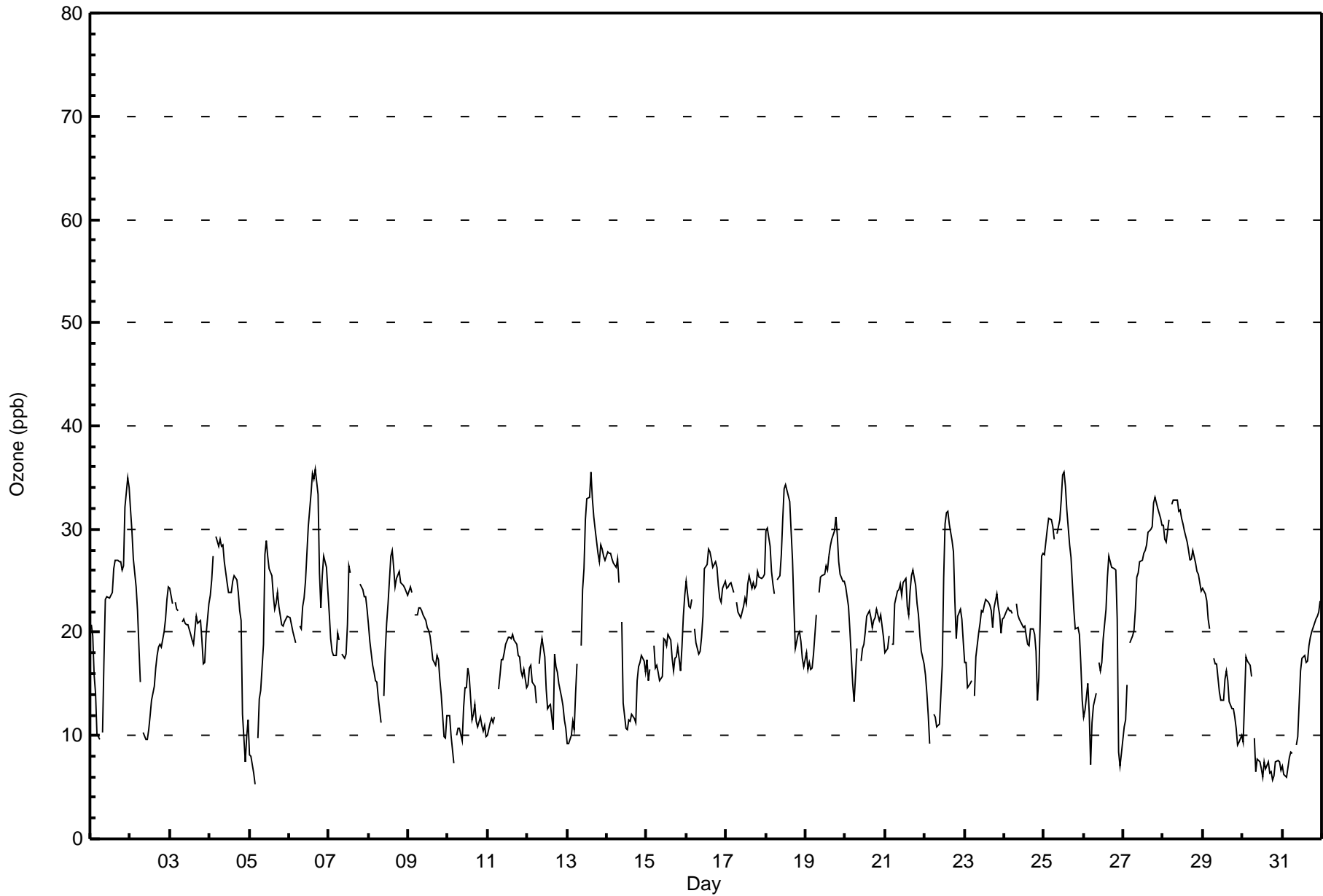








Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 36 ppb on Oct 6 17:00      Maximum Daily Average: 29.2 ppb on Oct 28		Hours in Service: 744 Hours of Data: 707 Hours of Missing Data: 37 Hours of Calibration: 36 Percent Operational Time: 99.9																								
Minimum Value: 5 ppb on Oct 5 04:00 Maximum Diurnal Average: 22.9 ppb at hour 14 Monthly Average: 20.4 ppb		Minimum Daily Average: 9.1 ppb on Oct 30 Minimum Diurnal Average: 18.0 ppb at hour 4 Percentiles: P <sub>1</sub> = 6 P <sub>10</sub> = 11 Q <sub>1</sub> = 16 Median = 21 Q <sub>3</sub> = 25 P <sub>90</sub> = 29 P <sub>99</sub> = 35																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	21	20	16	14	10	10	Z	10	17	23	23	23	24	24	26	27	27	27	27	26	26	32	35	34	22.7	35
2-Oct	32	30	27	24	22	19	15	Z	10	10	10	11	12	13	15	16	18	19	19	19	20	21	23	24	18.6	32
3-Oct	24	23	Z	23	22	22	PF	21	21	21	21	21	20	19	19	20	22	21	21	19	17	17	20	23	20.7	24
4-Oct	24	25	27	Z	29	28	29	28	29	27	25	24	24	24	25	25	25	24	22	21	12	7	10	12	22.9	29
5-Oct	8	8	6	5	Z	10	14	14	19	27	29	27	26	25	24	22	23	24	22	21	21	21	22	22	19.1	29
6-Oct	21	21	20	19	19	Z	21	20	22	23	25	30	32	33	35	35	36	33	26	22	25	27	26	24	26.0	36
7-Oct	22	19	18	18	18	20	19	Z	18	18	18	21	27	26	C	C	C	C	C	25	24	24	23	22	21.0	27
8-Oct	21	19	17	16	15	15	14	11	Z	14	18	21	23	27	28	26	24	25	26	25	25	25	24	24	21.0	28
9-Oct	24	24	24	Z	22	22	22	22	22	22	21	21	20	20	19	17	17	18	17	15	14	10	10	12	18.9	24
10-Oct	12	12	10	7	Z	10	11	11	9	13	15	15	16	16	12	12	13	11	11	12	11	10	11	10	11.7	16
11-Oct	10	11	12	11	12	Z	15	16	17	17	18	19	20	20	19	20	19	19	18	18	16	16	16	15	16.2	20
12-Oct	15	17	17	15	15	13	Z	17	18	19	18	15	13	13	13	11	18	17	16	15	14	13	11	11	14.9	19
13-Oct	9	9	10	11	11	14	17	Z	19	24	26	31	33	33	35	33	31	30	28	27	29	28	27	27	23.6	35
14-Oct	28	28	28	27	27	26	27	25	Z	21	13	11	11	12	11	12	12	11	15	17	17	18	17	16	18.6	28
15-Oct	17	15	16	Z	19	17	17	16	15	16	19	19	19	20	19	17	16	17	18	19	16	19	22	24	17.9	24
16-Oct	25	23	22	23	Z	20	19	18	18	20	22	26	27	28	28	27	26	27	26	25	23	23	24	25	23.7	28
17-Oct	24	24	25	25	24	Z	23	22	22	21	22	23	23	25	25	24	25	24	25	26	25	25	25	26	24.1	26
18-Oct	30	30	28	26	25	24	Z	25	25	28	31	34	34	33	33	30	27	23	18	20	20	19	18	17	25.9	34
19-Oct	18	16	17	16	17	18	22	Z	24	25	25	26	26	26	27	28	29	30	31	29	27	26	25	25	24.1	31
20-Oct	24	23	23	20	15	13	16	18	Z	17	18	19	20	22	22	21	20	21	21	22	21	22	21	19	20.0	24
21-Oct	18	18	20	Z	19	19	23	24	24	25	24	25	25	22	22	24	26	26	25	23	22	20	18	17	22.0	26
22-Oct	16	14	12	9	Z	12	12	11	11	11	17	25	31	32	32	31	29	28	23	19	22	22	21	19	19.9	32
23-Oct	17	17	15	15	15	Z	14	18	20	21	22	22	23	23	23	23	22	21	22	24	23	22	20	21	20.0	24
24-Oct	21	22	22	22	22	22	Z	23	22	21	21	20	21	20	19	19	20	20	20	18	13	16	27	28	20.9	28
25-Oct	28	29	30	31	31	30	29	Z	30	31	33	35	36	34	32	29	27	25	22	20	21	20	17	13	27.4	36
26-Oct	12	12	15	12	7	11	13	14	Z	17	16	17	19	22	25	27	27	26	26	26	21	8	7	8	17.1	27
27-Oct	11	12	15	Z	19	20	20	22	25	26	27	27	28	28	29	30	30	30	33	33	33	32	31	30	25.6	33
28-Oct	30	29	29	31	Z	32	33	33	33	32	32	31	31	30	29	28	27	27	28	27	26	26	25	24	29.2	33
29-Oct	24	24	23	21	20	Z	17	17	17	16	14	13	13	16	16	15	13	13	13	12	11	9	9	10	15.5	24
30-Oct	9	13	18	17	17	16	Z	10	7	8	7	7	6	7	7	8	6	6	6	6	7	8	7	7	9.1	18
31-Oct	7	6	6	7	8	8	8	Z	9	10	13	16	17	18	17	17	19	20	20	21	21	22	22	23	14.6	23
																								Diurnal Average	Diurnal Maximum	
19.5 19.2 18.9 18.0 18.4 18.1 18.7 18.7 19.4 20.1 20.8 21.7 22.5 22.9 22.8 22.5 22.5 22.1 21.5 21.0 20.1 19.5 19.9 19.7																								22.7	35	
32 30 30 31 31 32 33 33 33 32 33 35 36 34 35 35 36 33 33 33 33 32 35 34																								22.7	35	
Z - zerospan      C - Calibration      PF - Power Failure																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																										





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

**Ozone (O<sub>3</sub>) - ppb**  
**Fort Chipewyan - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	340	48.09	48.09
21 - 50	367	51.91	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 Chipewyan - October 2015**

<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	7	5	1	12	22	24	13	10	19	15	24	19	35	32	64	38	340
21 - 50	9	5	2	29	45	47	19	29	9	4	15	13	41	33	34	33	367
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>	16	10	3	41	67	71	32	39	28	19	39	32	76	65	98	71	707

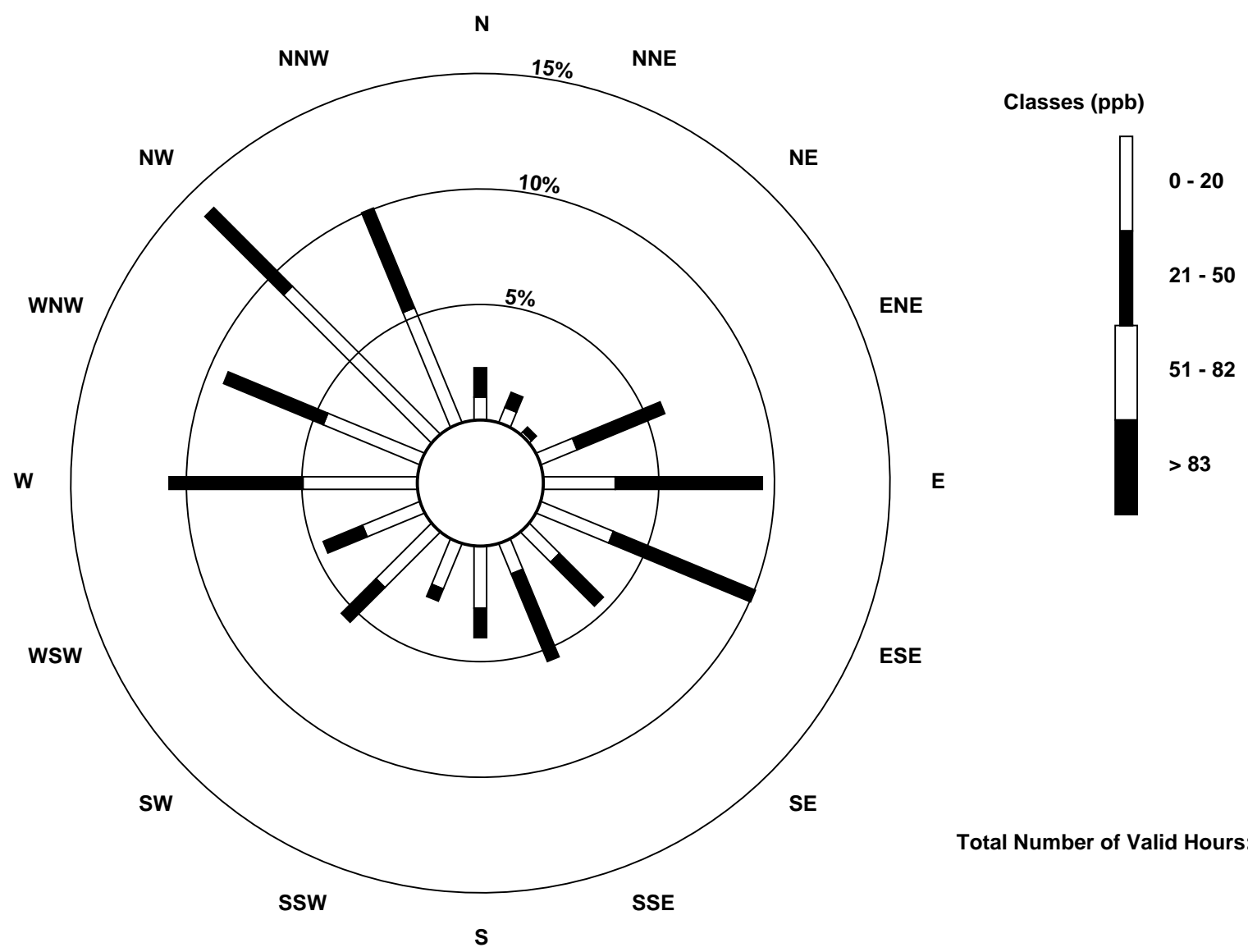
Total Number of Valid Hours: 707

Total Number of Hours: 744



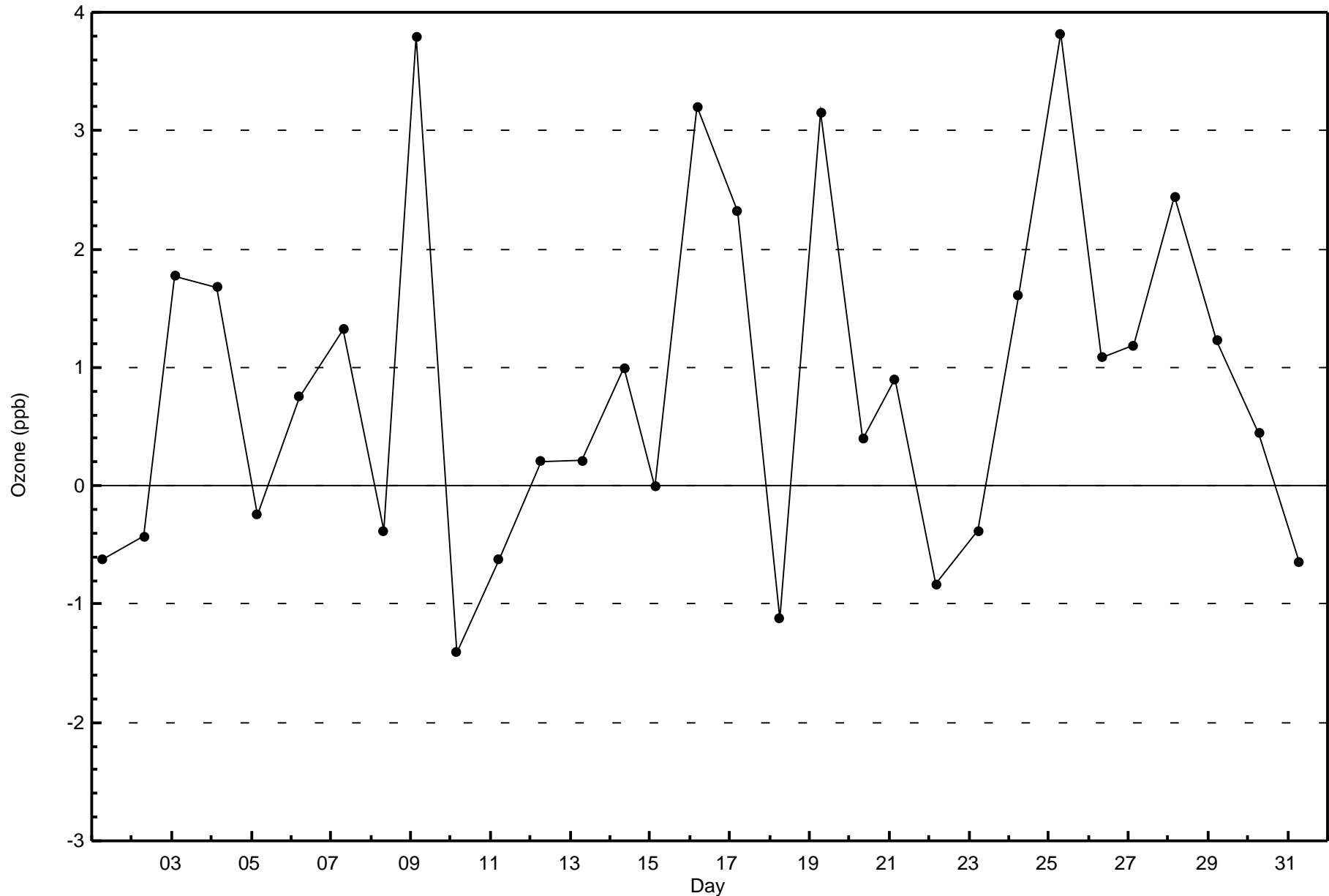
Wood Buffalo Environmental Association  
Wind Rose Oct 2015

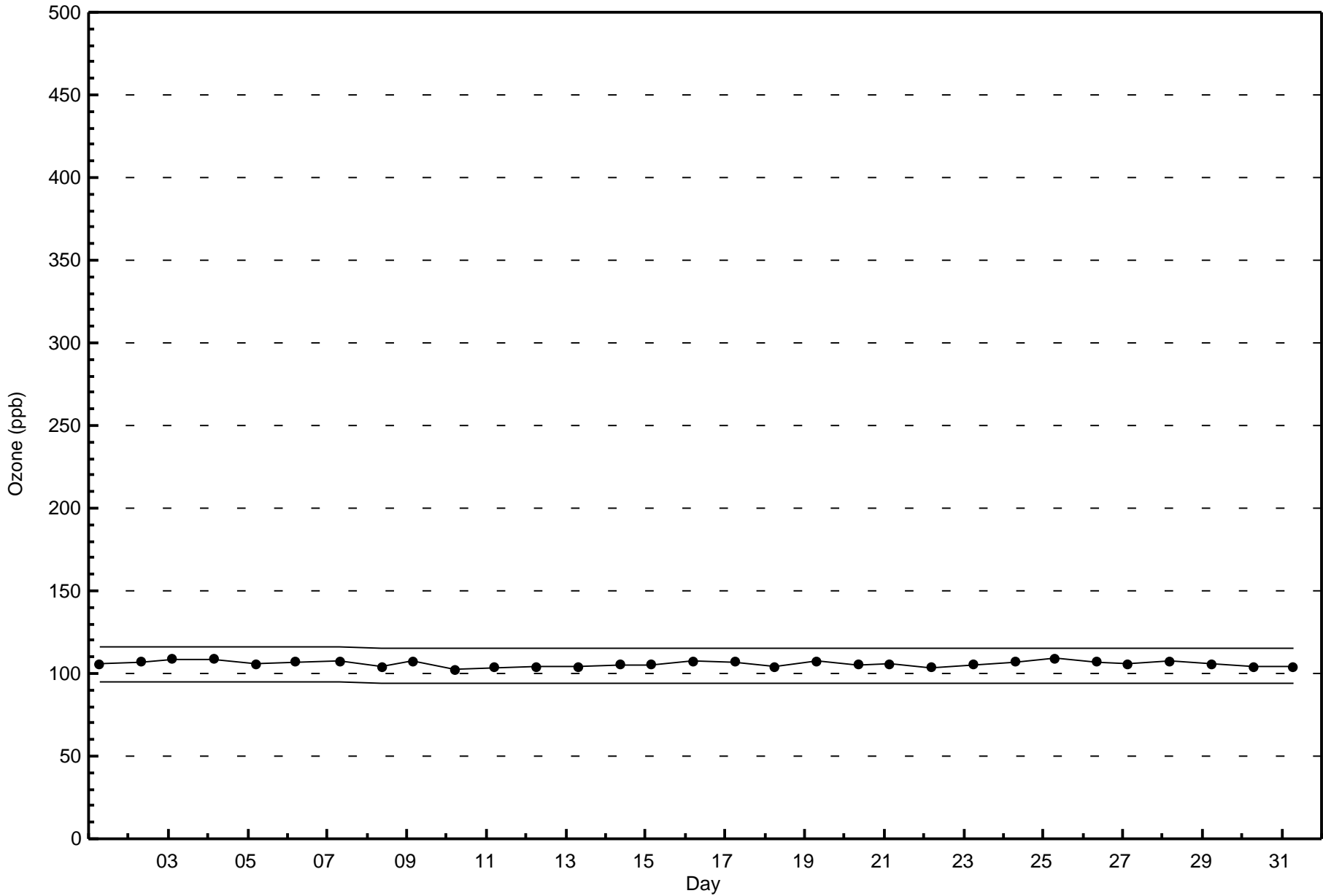
Ozone (O<sub>3</sub>) - ppb  
Fort Chipewyan (AMS 8)



Total Number of Valid Hours: 707









Summary of Hour Averages

Fort Chipewyan - October 2015

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 16.3 µg/m <sup>3</sup> on Oct 3 16:00 Maximum Daily Average: 8.3 µg/m <sup>3</sup> on Oct 3																	Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 2 Percent Operational Time: 100.0																															
Minimum Value: 0.4 µg/m <sup>3</sup> on Oct 11 22:00 Maximum Diurnal Average: 3.9 µg/m <sup>3</sup> at hour 4 Monthly Average: 3.47 µg/m <sup>3</sup>																	Minimum Daily Average: 0.8 µg/m <sup>3</sup> on Oct 9 Minimum Diurnal Average: 3.1 µg/m <sup>3</sup> at hour 14 Percentiles: P <sub>1</sub> = 0.5 P <sub>10</sub> = 0.8 Q <sub>1</sub> = 1.6 Median = 2.7 Q <sub>3</sub> = 4.8 P <sub>90</sub> = 7.0 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	4.4	4.4	5.2	5.9	6.3	5.7	5.9	5.9	5.1	5.7	6.4	7.0	7.8	8.6	6.3	5.8	5.9	5.9	6.8	7.0	6.5	5.6	5.7	5.4	6.0	8.6																						
2-Oct	5.7	5.9	5.8	5.8	5.6	7.0	6.9	5.0	5.9	5.8	6.0	5.7	5.5	5.4	4.6	4.6	5.2	5.8	5.9	5.3	4.7	4.1	4.1	3.4	5.4	7.0																						
3-Oct	3.5	4.2	4.0	4.0	3.9	3.8	3.7	8.6	9.1	9.4	10.3	9.6	9.6	10.2	12.0	16.3	13.6	12.7	10.1	11.1	9.0	7.9	6.7	6.5	8.3	16.3																						
4-Oct	6.7	6.8	6.2	5.9	5.4	5.2	4.6	4.4	3.4	3.0	2.5	2.5	2.5	2.5	2.8	2.7	3.6	5.2	5.3	4.8	7.3	9.7	10.5	11.9	5.2	11.9																						
5-Oct	15.4	12.3	9.9	9.2	9.6	10.0	9.1	9.8	8.1	5.4	5.6	5.5	5.5	5.3	4.6	4.5	3.8	3.6	3.6	3.9	4.6	4.3	4.0	4.1	6.7	15.4																						
6-Oct	5.4	6.5	5.7	5.5	5.2	4.7	3.9	3.6	3.3	2.9	2.5	2.6	2.5	2.5	2.6	2.5	2.5	2.6	3.0	3.0	2.8	2.6	2.6	2.6	3.5	6.5																						
7-Oct	3.1	3.4	3.8	3.7	3.3	3.4	3.2	3.0	2.7	2.8	2.8	C	C	1.2	1.7	2.2	1.3	1.1	1.1	1.1	1.2	1.5	1.0	0.8	2.3	3.8																						
8-Oct	0.7	0.7	0.8	0.8	0.7	0.7	0.8	0.9	1.3	0.8	0.7	0.9	0.8	0.9	0.9	0.8	0.9	0.8	0.8	0.7	0.7	0.7	0.7	0.8	0.8	1.3																						
9-Oct	0.7	0.8	0.8	1.0	0.8	0.7	0.8	0.8	0.8	0.7	0.7	0.8	0.8	0.8	0.9	0.9	1.0	0.9	0.7	0.7	0.8	0.7	0.7	0.8	0.8	1.0																						
10-Oct	1.1	1.6	1.9	2.2	2.3	2.1	2.0	1.6	1.5	1.4	1.4	1.8	1.9	1.8	1.6	1.4	1.6	3.4	2.7	1.2	1.0	1.1	0.7	0.6	1.7	3.4																						
11-Oct	0.7	0.8	0.6	0.9	0.6	0.7	1.1	1.5	0.4	0.4	1.0	1.7	1.9	0.6	0.7	1.1	0.5	0.7	0.4	0.5	0.5	0.4	0.7	0.5	0.8	1.9																						
12-Oct	0.5	0.5	0.6	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.8	0.9	1.0	0.8	1.3	1.7	1.5	1.5	1.5	1.9	1.4	0.9	0.9	1.0	1.0	1.9																						
13-Oct	1.0	1.1	1.1	1.1	1.1	1.2	1.2	1.4	1.5	1.2	1.0	1.2	1.5	1.4	1.3	1.4	1.4	1.5	1.6	1.6	1.0	1.0	1.1	1.2	1.3	1.6																						
14-Oct	1.4	1.2	1.1	1.6	2.2	2.2	2.7	3.5	3.5	2.7	1.0	1.2	0.9	1.0	0.8	0.7	1.0	0.8	0.7	0.8	0.7	0.6	1.2	1.4	1.5	3.5																						
15-Oct	0.8	1.0	0.7	0.9	1.0	1.6	2.1	1.3	0.8	0.6	0.6	0.6	0.6	0.7	1.1	1.1	0.9	1.0	1.1	1.3	2.2	1.9	3.0	1.6	1.2	3.0																						
16-Oct	1.2	1.3	1.2	1.2	1.2	1.2	1.3	1.4	1.4	1.3	1.2	1.2	1.0	0.9	1.3	2.0	2.1	2.3	1.6	1.8	1.9	1.8	1.8	1.9	1.5	2.3																						
17-Oct	1.9	2.0	2.2	2.2	2.3	2.6	3.0	3.6	4.0	4.4	4.8	4.9	4.4	4.4	4.5	5.4	7.1	7.4	6.4	6.3	6.3	6.5	6.2	6.2	4.5	7.4																						
18-Oct	5.4	6.2	7.1	8.3	8.7	8.7	7.8	6.8	6.8	6.3	5.9	4.3	3.4	3.0	3.0	2.9	2.9	3.4	4.5	5.6	5.1	5.2	5.0	4.8	5.5	8.7																						
19-Oct	4.4	4.0	3.7	3.6	3.2	2.7	2.6	2.4	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.3	2.2	2.3	2.4	2.5	2.5	2.5	2.3	2.3	2.6	4.4																						
20-Oct	3.1	4.3	4.4	4.7	3.9	3.0	2.5	2.5	2.6	2.9	2.9	3.5	2.7	2.7	2.3	3.3	3.1	3.2	3.4	3.2	3.1	4.1	3.6	2.3	3.2	4.7																						
21-Oct	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.2	2.4	2.7	3.0	2.6	2.5	2.5	2.4	2.3	2.3	2.9	3.6	3.4	3.6	2.6	3.6																						
22-Oct	3.7	4.0	4.3	4.9	4.8	5.1	5.5	5.7	4.8	3.8	3.2	3.2	4.0	4.4	4.6	4.4	4.7	5.4	4.6	2.7	2.6	2.5	2.3	2.3	4.1	5.7																						
23-Oct	2.4	2.4	2.7	2.7	2.5	2.6	3.3	3.4	2.4	2.1	2.3	2.1	2.2	2.2	2.7	3.0	3.8	2.3	2.2	2.3	2.4	2.7	3.1	2.6	2.6	3.8																						
24-Oct	2.5	2.3	2.3	2.3	2.3	2.3	2.6	2.7	2.7	2.6	2.5	2.6	2.3	2.3	2.4	2.7	3.0	3.1	3.0	13.8	3.7	3.3	2.7	2.6	3.1	13.8																						
25-Oct	2.7	2.5	2.4	2.5	2.6	2.6	2.7	2.8	2.8	2.7	2.7	2.8	2.7	2.7	2.6	2.5	2.5	2.4	2.5	2.5	2.6	3.2	4.4	6.3	2.9	6.3																						
26-Oct	7.6	10.0	9.2	13.0	8.5	6.7	6.7	6.7	6.1	5.6	5.1	4.8	4.2	4.2	4.2	4.0	4.2	4.6	5.1	4.8	4.5	5.6	4.2	2.9	5.9	13.0																						
27-Oct	3.2	2.8	2.9	2.9	2.7	2.4	2.4	2.5	2.2	2.2	2.8	2.5	2.4	2.6	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.9	2.6	2.6	2.5	3.2																						
28-Oct	2.5	2.3	2.3	2.3	2.3	2.4	2.5	2.5	2.5	2.4	2.4	2.3	2.3	2.4	5.4	3.0	3.2	2.8	2.4	2.4	2.8	2.6	2.8	2.5	2.6	5.4																						
29-Oct	2.5	2.6	2.7	2.8	3.0	3.2	3.3	3.3	3.5	3.9	4.2	4.1	3.8	4.0	3.9	4.4	5.2	5.8	5.7	5.5	5.2	5.5	4.9	5.2	4.1	5.8																						
30-Oct	5.6	6.8	8.7	9.6	10.1	9.6	9.2	8.9	9.5	7.7	7.8	7.6	7.4	7.6	8.0	7.4	7.9	7.9	9.1	7.6	7.9	8.3	8.5	7.7	8.2	10.1																						
31-Oct	9.6	11.2	7.8	5.8	5.3	5.2	7.6	7.9	8.8	7.0	5.6	5.2	5.2	4.8	4.6	3.2	2.7	2.7	2.6	2.6	2.3	2.2	2.2	2.3	5.2	11.2																						
																								3.6	3.8	3.7	3.9	3.7	3.6	3.7	3.8	3.6	3.3	3.3	3.3	3.2	3.1	3.2	3.3	3.3	3.5	3.4	3.6	3.3	3.4	3.3	3.3	Diurnal Average
																								15.4	12.3	9.9	13.0	10.1	10.0	9.2	9.8	9.5	9.4	10.3	9.6	9.6	10.2	12.0	16.3	13.6	12.7	10.1	13.8	9.0	9.7	10.5	11.9	Diurnal Maximum
C - Calibration																																																
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m <sup>3</sup>																																																

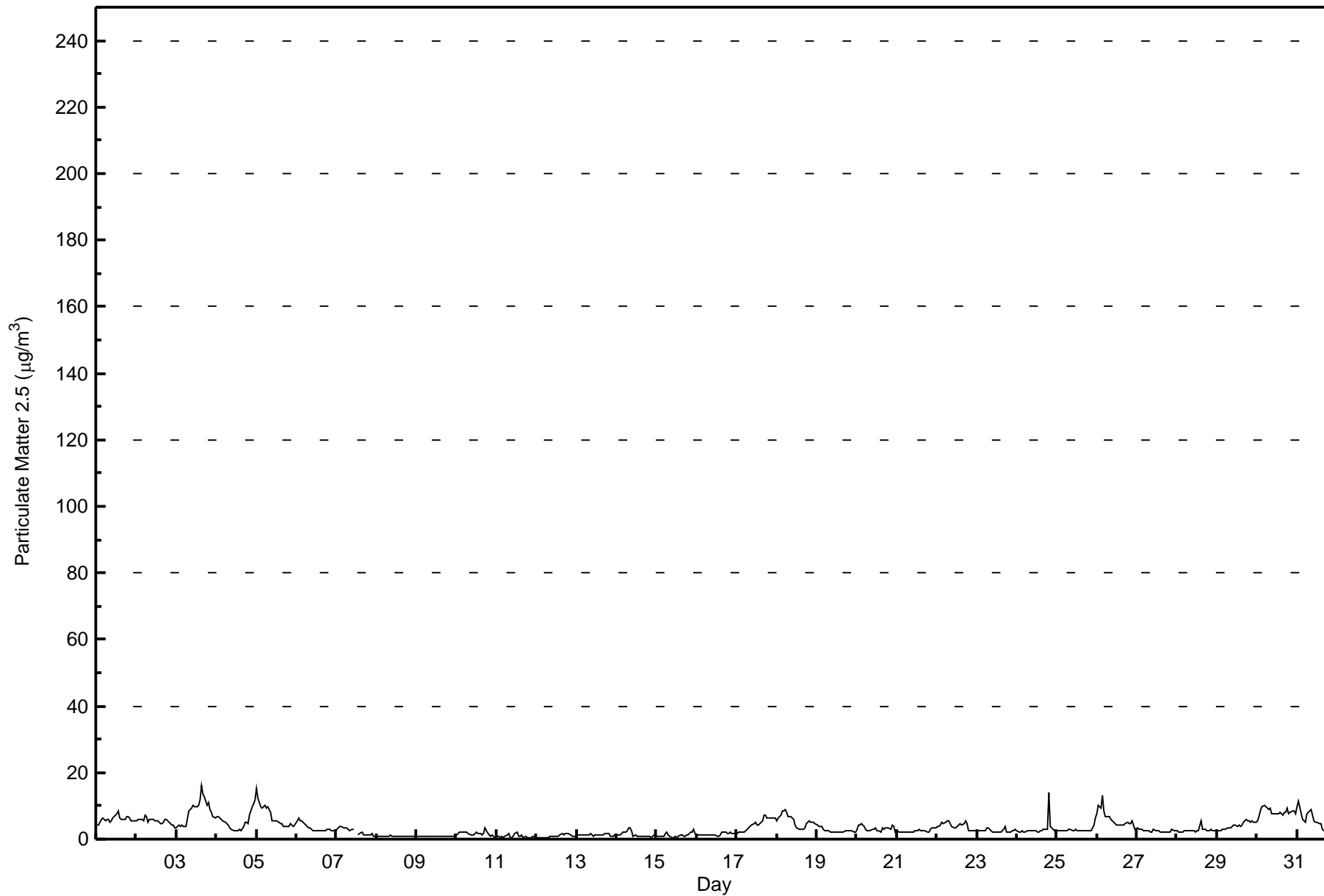


Wood Buffalo Environmental Association

Hourly Averages

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$

Fort Chipewyan - October 2015





**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 2015**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	491	66.17	66.17
6 - 15	139	18.73	84.91
16 - 25	1	0.13	85.04
26 - 80	0	0.00	85.04
> 81.0	0	0.00	85.04

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 Chipewyan - October 2015**

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	13	7	1	15	47	60	27	33	12	12	21	21	62	55	63	42	491
6 - 15	4	2	2	2	10	4	3	5	15	7	20	6	17	6	15	21	139
16 - 25	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
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>	17	9	3	18	57	64	30	38	27	19	41	27	79	61	78	63	631

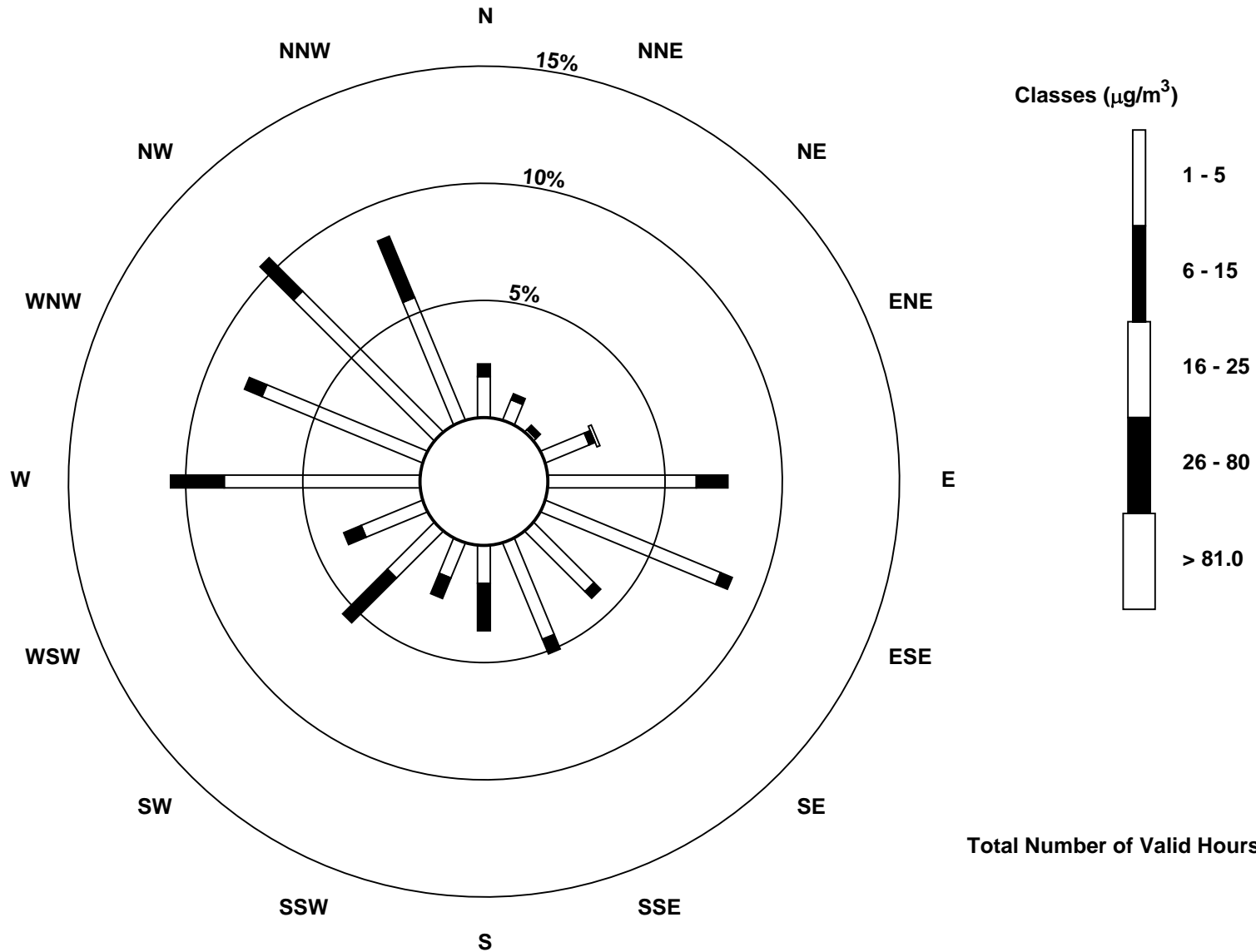
Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Fort Chipewyan (AMS 8)

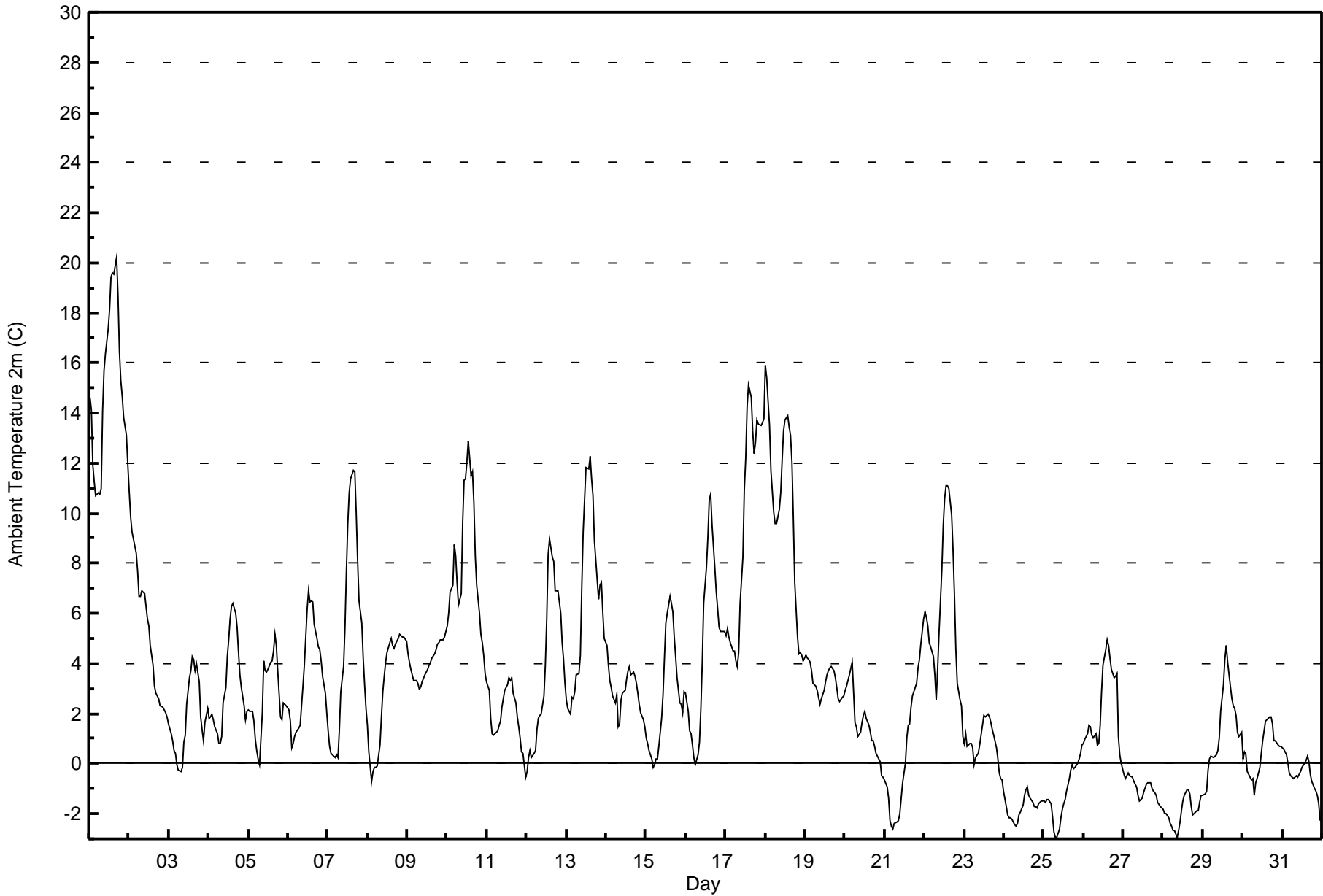


Total Number of Valid Hours: 742



Maximum Value: 20.2 C on Oct 1 17:00		Maximum Daily Average: 15.0 C on Oct 1		Hours in Service: 744																																												
Minimum Value: -2.9 C on Oct 25 08:00		Minimum Daily Average: -1.9 C on Oct 28		Hours of Data: 744																																												
Maximum Diurnal Average: 5.7 C at hour 15		Minimum Diurnal Average: 1.6 C at hour 8		Hours of Missing Data: 0																																												
Monthly Average: 3.37 C		Percentiles: P <sub>1</sub> = -2.6 P <sub>10</sub> = -1.3 Q <sub>1</sub> = 0.4 Median = 2.5 Q <sub>3</sub> = 5.0 P <sub>90</sub> = 10.3 P <sub>99</sub> = 16.6		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	14.6	14.1	12.0	11.3	10.7	10.8	10.8	11.0	14.1	15.7	16.3	17.3	18.2	19.4	19.6	19.5	20.2	18.7	16.5	15.3	14.6	13.8	13.1	11.9	15.0	20.2																						
2-Oct	10.9	9.8	9.2	8.7	8.4	7.7	6.7	6.7	6.9	6.8	6.3	5.8	5.5	4.7	3.9	3.1	2.8	2.7	2.6	2.3	2.3	2.1	2.0	1.9	5.4	10.9																						
3-Oct	1.6	1.2	0.9	0.5	0.4	0.0	-0.2	-0.3	-0.1	0.9	1.1	2.4	3.4	3.7	4.3	4.2	3.7	4.0	3.2	1.9	1.3	0.9	1.6	2.2	1.8	4.3																						
4-Oct	1.8	1.9	2.0	1.8	1.5	1.2	0.8	0.8	1.1	2.4	3.0	4.2	5.0	5.8	6.3	6.4	6.0	5.5	4.4	3.5	3.0	2.3	1.7	2.1	3.1	6.4																						
5-Oct	2.2	2.1	2.1	1.7	1.0	0.5	0.2	0.0	2.0	4.1	3.7	3.7	3.8	4.1	4.1	4.5	5.2	4.7	3.7	1.9	1.8	2.4	2.4	2.3	2.7	5.2																						
6-Oct	2.2	1.7	0.6	0.8	1.1	1.2	1.4	1.5	2.3	3.1	3.9	6.2	6.9	6.4	6.5	6.4	5.5	5.0	4.7	4.5	4.1	3.5	2.8	2.0	3.5	6.9																						
7-Oct	1.3	0.7	0.4	0.4	0.3	0.4	0.2	1.4	2.9	3.9	5.4	7.7	9.6	10.8	11.4	11.7	11.6	10.0	8.1	6.5	5.6	4.2	3.2	2.2	5.0	11.7																						
8-Oct	1.5	0.5	-0.7	-0.3	-0.2	-0.1	-0.1	0.7	1.9	2.9	3.5	4.0	4.4	4.8	5.0	4.7	4.6	4.7	5.0	5.2	5.1	5.0	5.0	4.9	3.0	5.2																						
9-Oct	4.4	4.1	3.8	3.6	3.3	3.3	3.2	3.0	3.0	3.3	3.5	3.7	3.8	3.9	4.0	4.2	4.4	4.5	4.8	4.8	5.0	4.9	5.1	5.3	4.0	5.3																						
10-Oct	5.5	6.0	6.9	7.1	8.8	8.3	7.2	6.4	6.8	9.6	11.3	11.4	12.0	12.9	11.5	11.6	10.4	8.3	7.1	6.0	5.1	4.8	4.3	3.6	8.0	12.9																						
11-Oct	3.3	2.9	1.8	1.2	1.1	1.2	1.3	1.5	1.7	2.2	2.6	2.9	3.2	3.4	3.3	3.5	2.8	2.4	1.9	1.5	1.0	0.5	0.4	-0.5	2.0	3.5																						
12-Oct	-0.3	0.3	0.5	0.2	0.4	0.5	1.4	1.8	1.9	2.0	2.7	3.9	5.8	8.4	9.0	8.2	8.1	6.9	6.9	6.9	6.0	4.8	4.2	3.2	3.9	9.0																						
13-Oct	2.6	2.2	2.0	2.6	2.6	2.9	3.5	3.6	4.3	7.0	9.3	10.6	11.8	11.8	12.3	11.4	10.7	8.9	7.3	6.6	7.1	7.3	6.1	5.0	6.6	12.3																						
14-Oct	4.7	3.9	3.3	3.0	2.7	2.4	2.8	1.5	1.6	2.6	2.8	2.9	3.4	3.7	3.9	3.6	3.7	3.5	3.2	2.8	2.4	2.0	1.8	1.5	2.9	4.7																						
15-Oct	1.0	0.8	0.5	0.2	-0.1	-0.1	0.2	0.2	0.7	1.8	2.8	4.2	5.6	6.0	6.7	6.4	6.1	5.0	4.3	3.4	2.4	2.3	2.0	2.9	2.7	6.7																						
16-Oct	2.8	2.1	1.3	1.2	0.8	0.3	0.0	0.3	0.9	2.2	4.1	6.4	7.9	9.0	10.6	10.7	9.6	7.8	6.9	6.2	5.4	5.3	5.3	5.3	4.7	10.7																						
17-Oct	5.1	5.4	5.0	4.8	4.5	4.5	4.1	3.9	4.5	6.4	8.3	10.9	12.2	14.2	15.1	14.6	13.3	12.4	12.8	13.7	13.6	13.5	13.6	13.8	9.6	15.1																						
18-Oct	15.9	15.4	13.5	11.7	10.9	10.1	9.6	9.6	10.1	10.8	12.1	13.3	13.7	13.9	13.5	13.1	12.1	9.8	7.2	5.0	4.4	4.4	4.3	4.1	10.3	15.9																						
19-Oct	4.4	4.2	4.2	4.1	3.7	3.2	3.1	2.9	2.6	2.3	2.6	2.9	3.3	3.6	3.7	3.8	3.9	3.7	3.4	3.0	2.6	2.5	2.6	2.7	3.3	4.4																						
20-Oct	2.9	3.1	3.3	3.6	4.1	2.9	1.6	1.5	1.1	1.3	1.6	1.9	2.1	1.8	1.5	1.2	0.9	0.9	0.7	0.4	0.2	0.1	-0.5	-0.6	1.6	4.1																						
21-Oct	-0.7	-1.0	-1.4	-2.3	-2.5	-2.6	-2.4	-2.3	-2.2	-2.0	-1.4	-0.8	0.0	1.0	1.5	1.6	2.3	2.7	3.0	3.2	3.8	4.2	4.8	5.8	0.5	5.8																						
22-Oct	6.0	5.8	5.5	4.8	4.6	4.3	3.5	2.5	3.8	5.2	7.7	9.5	10.6	11.1	11.1	11.0	9.9	8.5	6.7	4.5	3.2	2.6	2.3	1.1	6.1	11.1																						
23-Oct	0.8	1.2	0.7	0.8	0.8	0.6	0.0	0.2	0.4	0.8	1.2	1.5	1.9	1.9	2.0	1.9	1.7	1.4	1.2	0.6	0.2	-0.3	-0.6	-0.7	0.8	2.0																						
24-Oct	-1.1	-1.7	-2.0	-2.1	-2.2	-2.2	-2.4	-2.5	-2.4	-2.0	-1.9	-1.7	-1.3	-1.0	-0.9	-1.2	-1.4	-1.6	-1.7	-1.7	-1.8	-1.6	-1.5	-1.5	-1.7	-0.9																						
25-Oct	-1.5	-1.5	-1.4	-1.4	-1.6	-2.1	-2.7	-2.9	-2.9	-2.6	-2.2	-1.8	-1.6	-1.4	-1.1	-0.6	-0.3	0.0	-0.2	-0.1	0.0	0.2	0.4	0.7	-1.2	0.7																						
26-Oct	0.8	1.0	1.2	1.5	1.5	1.2	1.0	1.2	0.8	0.8	1.5	2.9	3.9	4.5	5.0	4.7	4.2	3.8	3.4	3.5	3.6	1.1	0.4	0.0	2.2	5.0																						
27-Oct	-0.4	-0.6	-0.5	-0.4	-0.5	-0.5	-0.7	-0.8	-1.0	-1.3	-1.5	-1.4	-1.2	-1.0	-0.8	-0.8	-0.8	-1.0	-1.1	-1.2	-1.3	-1.6	-1.7	-1.8	-1.0	-0.4																						
28-Oct	-1.8	-2.0	-2.0	-2.2	-2.4	-2.5	-2.7	-2.7	-2.9	-2.6	-2.3	-1.9	-1.5	-1.3	-1.1	-1.0	-1.2	-1.7	-2.0	-2.0	-1.9	-1.9	-1.5	-1.3	-1.9	-1.0																						
29-Oct	-1.3	-1.2	-1.1	-0.3	0.2	0.3	0.2	0.3	0.4	0.5	1.0	2.1	3.2	4.2	4.7	4.0	3.5	2.6	2.3	2.2	1.9	1.3	1.1	1.2	1.4	4.7																						
30-Oct	0.2	0.4	0.4	-0.3	-0.5	-0.7	-0.6	-1.3	-0.7	-0.6	-0.1	0.4	0.9	1.3	1.7	1.8	1.9	1.9	1.6	0.9	0.9	0.8	0.7	0.7	0.5	1.9																						
31-Oct	0.6	0.6	0.3	0.0	-0.3	-0.5	-0.5	-0.6	-0.5	-0.5	-0.4	-0.3	-0.1	0.0	0.1	0.3	0.1	-0.4	-0.7	-1.0	-1.1	-1.3	-1.6	-2.3	-0.4	0.6																						
																								2.9	2.7	2.3	2.1	2.0	1.8	1.6	1.6	2.0	2.8	3.5	4.4	5.0	5.5	5.7	5.6	5.3	4.7	4.1	3.6	3.2	2.9	2.7	2.5	Diurnal Average
																								15.9	15.4	13.5	11.7	10.9	10.8	10.8	11.0	14.1	15.7	16.3	17.3	18.2	19.4	19.6	19.5	20.2	18.7	16.5	15.3	14.6	13.8	13.6	13.8	Diurnal Maximum







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C  
Fort Chipewyan - October 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	153	20.56	20.56
0 - 10	514	69.09	89.65
10 - 20	76	10.22	99.87
> 20	1	0.13	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

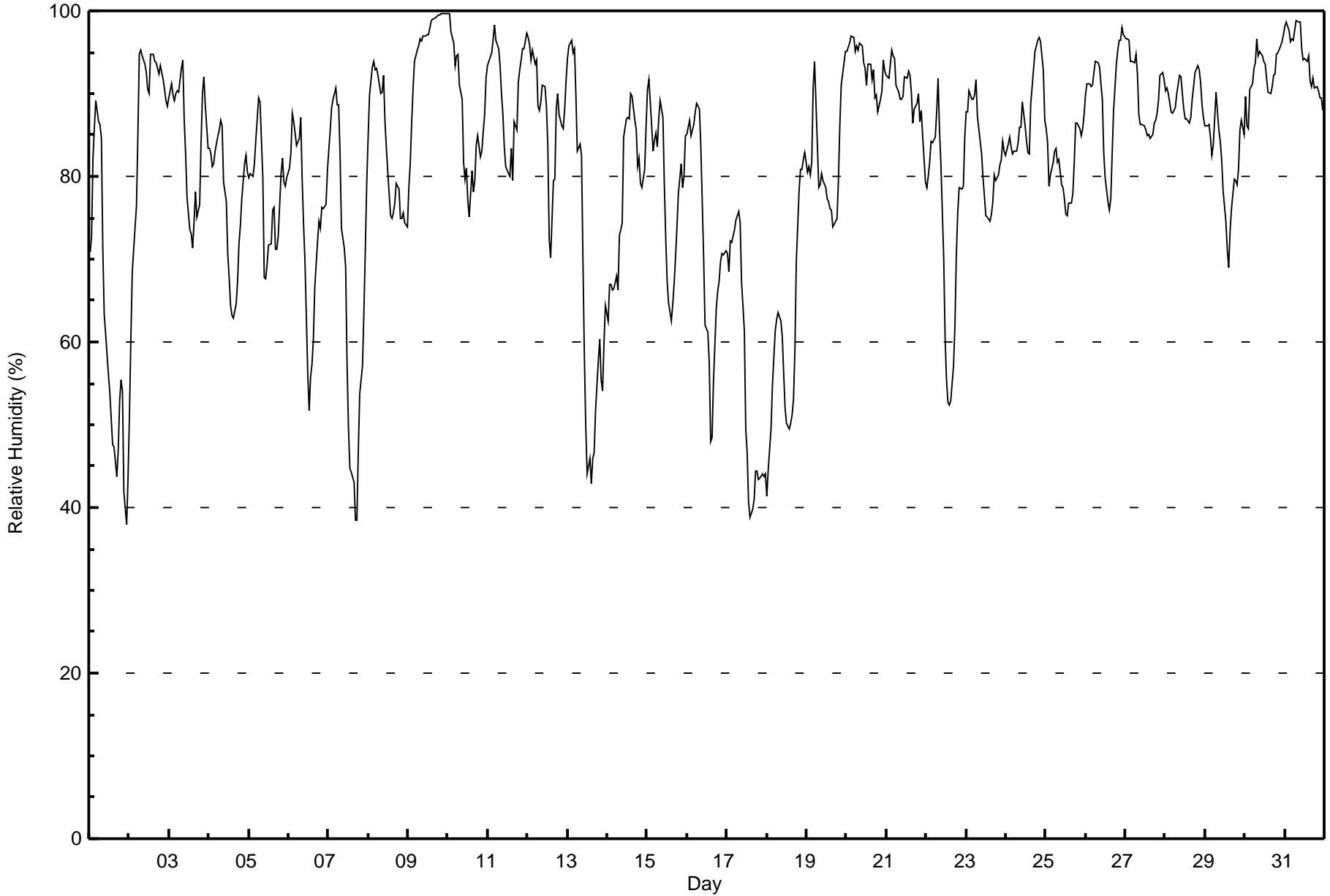


Maximum Value: 100 % on Oct 10 00:00																			Maximum Daily Average: 95.6 % on Oct 9						Hours in Service: 744																			
Minimum Value: 38 % on Oct 1 23:00																			Minimum Daily Average: 56.3 % on Oct 17						Hours of Data: 744																			
Maximum Diurnal Average: 87.8 % at hour 7																			Minimum Diurnal Average: 72.4 % at hour 15						Hours of Missing Data: 0																			
Monthly Average: 81.1 %																			Percentiles: P <sub>1</sub> = 41 P <sub>10</sub> = 60 Q <sub>1</sub> = 75 Median = 85 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	71	73	82	86	89	87	86	85	71	63	61	56	54	51	48	47	44	47	53	55	54	42	38	44	61.9	89																		
2-Oct	51	61	68	74	77	85	95	95	95	94	92	91	90	95	95	94	94	93	92	93	92	91	89	89	86.8	95																		
3-Oct	89	91	90	89	90	90	90	93	94	87	83	77	74	73	71	74	78	75	77	84	90	92	89	83	84.3	94																		
4-Oct	83	83	81	81	83	85	86	87	86	79	77	71	68	64	63	63	65	67	72	74	77	82	83	81	76.7	87																		
5-Oct	80	80	80	82	84	87	90	89	80	68	68	69	72	72	76	76	71	71	73	80	82	79	79	80	77.8	90																		
6-Oct	81	83	88	87	85	84	85	87	80	74	70	56	52	56	57	60	67	72	75	74	76	76	77	81	74.2	88																		
7-Oct	83	86	88	89	91	89	89	83	74	71	69	57	50	45	44	43	38	39	47	54	57	64	71	79	66.6	91																		
8-Oct	85	90	93	94	93	93	92	90	90	92	87	83	81	75	75	76	77	79	78	75	75	76	74	74	83.2	94																		
9-Oct	79	82	87	91	94	95	96	97	96	97	97	97	97	98	99	99	99	99	99	100	100	100	100	100	95.6	100																		
10-Oct	100	100	97	96	93	95	95	91	89	82	80	81	77	75	81	78	80	84	85	82	83	85	87	92	87.0	100																		
11-Oct	93	94	95	96	98	96	95	93	90	88	84	81	80	80	83	79	87	86	91	93	94	95	95	97	90.3	98																		
12-Oct	97	96	94	95	94	94	89	88	89	91	91	88	84	72	70	80	80	88	90	87	86	86	88	92	87.8	97																		
13-Oct	94	96	97	95	95	90	83	84	83	70	59	50	44	46	43	46	47	52	58	60	55	54	60	64	67.7	97																		
14-Oct	63	67	67	66	66	68	66	73	74	74	85	87	87	87	90	90	87	86	81	82	79	79	81	86	77.9	90																		
15-Oct	90	92	89	83	84	85	84	87	89	87	79	73	67	65	63	65	67	70	74	78	82	79	80	85	79.0	92																		
16-Oct	85	87	85	86	86	88	89	88	84	77	70	62	61	57	48	48	55	64	66	67	70	71	70	71	72.3	89																		
17-Oct	71	68	72	72	74	75	75	76	74	67	61	50	47	41	39	40	41	44	44	43	44	44	44	44	56.3	76																		
18-Oct	41	45	50	55	58	61	63	64	63	61	56	52	50	49	50	51	53	59	70	78	81	81	82	83	60.6	83																		
19-Oct	81	81	80	82	91	94	84	79	79	80	80	79	77	77	76	76	74	75	75	79	86	91	94	95	81.8	95																		
20-Oct	95	96	96	97	97	95	96	95	96	96	94	93	91	94	94	92	93	90	90	88	89	90	94	93	93.4	97																		
21-Oct	92	92	94	95	95	94	91	90	89	89	90	92	92	93	92	90	86	88	89	90	87	88	85	79	90.1	95																		
22-Oct	79	80	82	84	84	85	88	92	86	81	70	60	55	53	52	53	57	62	70	76	79	79	85	73.7	92																			
23-Oct	88	88	90	89	89	90	92	87	84	83	80	78	75	75	75	75	77	80	79	80	81	82	84	83	82.7	92																		
24-Oct	83	84	85	84	83	83	83	84	86	86	89	86	84	83	83	89	91	95	96	96	97	96	93	87	87.7	97																		
25-Oct	86	84	79	80	82	83	83	82	82	79	79	77	76	75	77	77	78	82	87	86	86	85	86	87	81.5	87																		
26-Oct	90	91	91	91	91	93	94	94	93	91	89	83	80	77	76	77	83	88	94	95	96	96	98	97	89.5	98																		
27-Oct	97	97	97	94	94	94	95	92	87	86	86	86	86	85	85	85	85	86	87	88	89	92	93	92	89.9	97																		
28-Oct	90	91	90	88	88	88	88	90	92	92	90	88	87	87	86	87	89	91	92	93	93	91	89	87	89.5	93																		
29-Oct	86	86	86	85	83	84	90	88	86	84	82	78	75	71	69	73	76	80	79	79	81	86	87	85	81.6	90																		
30-Oct	90	86	86	91	91	93	94	97	95	95	95	94	94	92	90	90	91	92	92	95	95	96	96	97	92.7	97																		
31-Oct	98	99	98	96	97	97	98	99	99	99	95	94	94	94	95	91	91	92	91	91	90	90	89	88	94.3	99																		
																			83.6	84.7	85.7	86.2	87.0	87.7	87.8	87.6	85.6	82.7	80.2	76.5	74.1	72.8	72.4	73.1	74.2	76.6	78.9	80.6	81.5	81.8	82.3	83.2	Diurnal Average	
																			100	100	98	97	98	97	98	99	99	99	97	97	97	98	99	99	99	99	99	100	100	100	100	100	Diurnal Maximum	



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

**Relative Humidity (RH) - %**  
**Fort Chipewyan - October 2015**





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

**Relative Humidity (RH) - %**  
**Fort Chipewyan - October 2015**

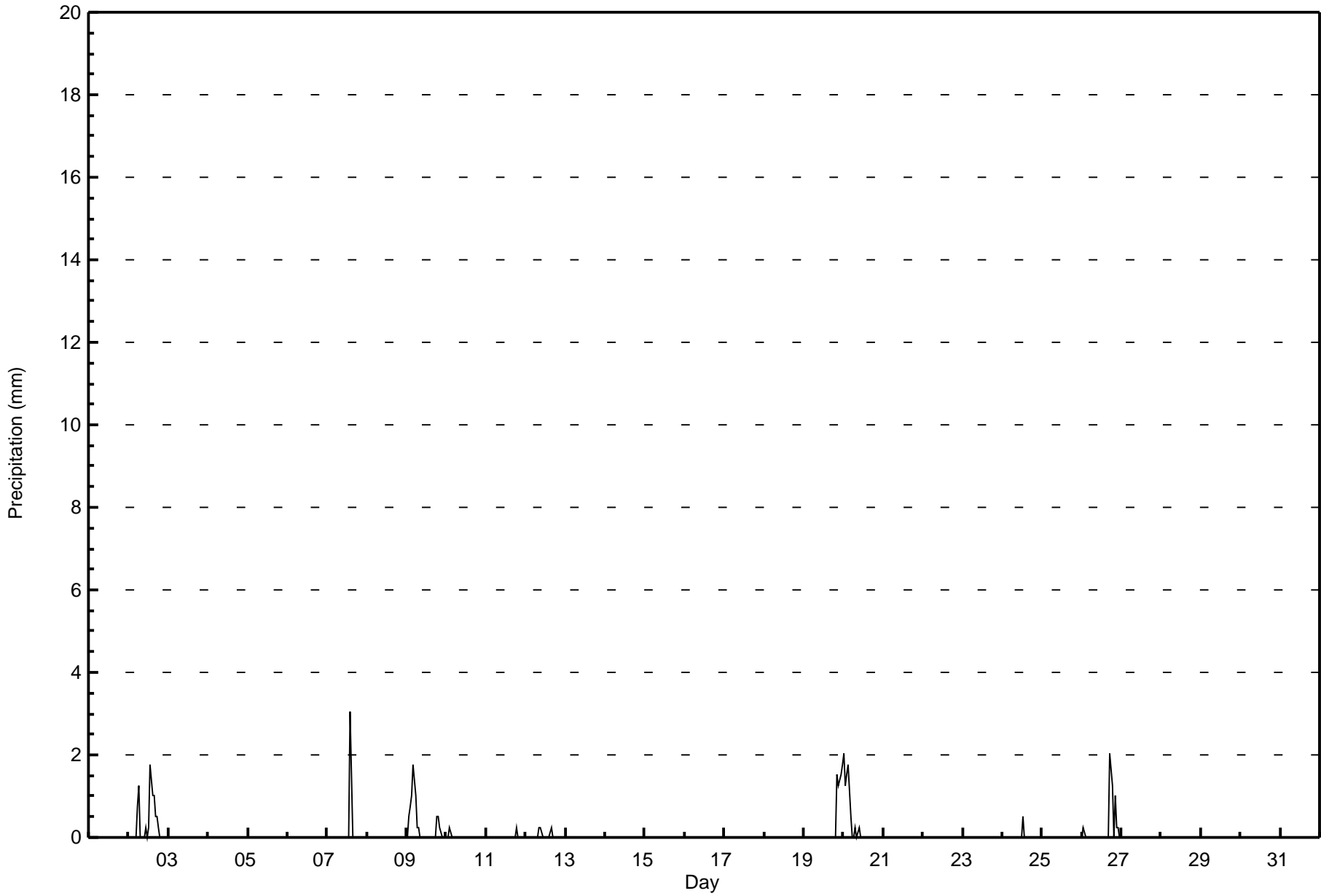
<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	5	0.67	0.67
40 - 60	70	9.41	10.08
60 - 80	194	26.08	36.16
80 - 100	475	63.84	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Value: 3.0 mm on Oct 7 15:00		Maximum Daily Total: 7.6 mm on Oct 2		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: 4.1 mm at hour 15		Minimum Diurnal Total: 0.0 mm at hour 12		Hours of Missing Data: 0																																													
Monthly Total: 38.10 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> = 1.8		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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.8	1.3	0.0	0.0	0.0	0.3	0.0	0.3	1.8	1.0	1.0	0.5	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.6	1.8																					
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																					
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																					
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																					
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																					
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	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	3.0																					
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																					
9-Oct	0.0	0.5	0.8	1.0	1.8	1.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.3	0.0	0.0	0.0	0.0	6.9	1.8																						
10-Oct	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	0.0	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	0.0	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																						
12-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	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	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	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																					
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	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																					
18-Oct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	1.5	1.3	1.5	1.8	6.1	1.8																						
20-Oct	2.0	1.3	1.5	1.8	0.5	0.0	0.0	0.3	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	7.6	2.0																						
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																					
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																					
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																					
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	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5																						
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	0.0	0.0																					
26-Oct	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	2.0	1.3	0.0	1.0	0.3	0.3	0.0	5.1	2.0																							
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																					
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																					
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																					
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																					
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	0.0	0.0																					
																								2.0	2.0	2.5	2.8	2.3	1.8	1.5	0.5	0.3	0.5	0.3	0.0	0.8	1.8	4.1	1.3	0.5	2.5	2.3	0.5	2.8	1.5	1.8	1.8	Diurnal Average	
																								2.0	1.3	1.5	1.8	1.8	1.0	1.3	0.3	0.3	0.3	0.3	0.0	0.5	1.8	3.0	1.0	0.5	2.0	1.3	0.5	1.5	1.3	1.5	1.8	Diurnal Maximum	





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

**Precipitation (PC) - mm**  
**Fort Chipewyan - October 2015**

<b>Concentration Ranges (mm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	716	96.24	96.24
0.4 - 0.5	7	0.94	97.18
0.6 - 0.7	0	0.00	97.18
0.8 - 1.4	11	1.48	98.66
1.5 - 10	10	1.34	100.00
> 10	0	0.00	100.00

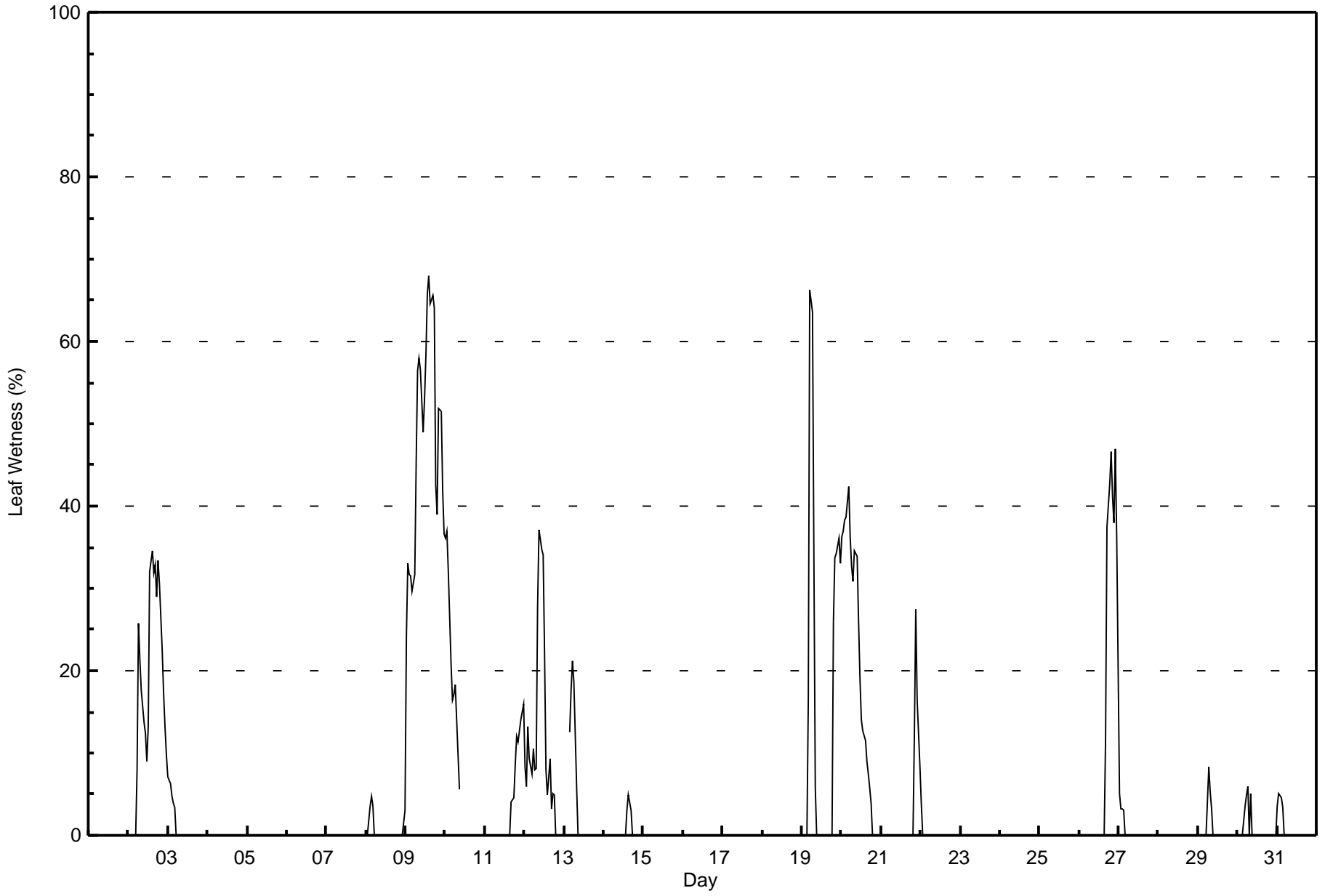
Total Number of Valid Hours: 744

Total Number of Hours: 744





Maximum Value: 68 % on Oct 9 15:00														Maximum Daily Average: 47.9 % on Oct 9										Hours in Service: 744			
Minimum Value: 0 % on Oct 1 01:00														Minimum Daily Average: 0.0 % on Oct 1										Hours of Data: 701			
Maximum Diurnal Average: 7.5 % at hour 7														Minimum Diurnal Average: 3.7 % at hour 13										Hours of Missing Data: 43			
Monthly Average: 5.0 %														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> = 21 P <sub>99</sub> = 63										Hours of Calibration: 0			
																								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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	UO	UO	0	0	0	0	0	0	0	0.0	0
2-Oct	0	0	0	0	0	8	26	21	18	14	12	9	13	32	35	32	33	29	33	31	23	17	13	10	17.0	35	
3-Oct	7	6	5	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	7	
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	
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	
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	
7-Oct	0	0	0	0	0	0	0	0	0	0	UO	0	0	M	M	M	M	M	M	M	0	0	0	0	--	0	
8-Oct	0	0	4	5	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0.6	5	
9-Oct	24	33	32	32	30	32	45	56	58	57	49	53	58	66	68	65	66	64	43	39	52	51	42	37	47.9	68	
10-Oct	36	37	32	21	16	17	18	14	6	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	37	
11-Oct	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	0	0	4	5	9	12	11	13	14	16	--	16	
12-Oct	8	6	13	9	8	11	8	8	28	37	35	34	22	8	5	9	3	5	5	0	UO	0	UO	0	11.9	37	
13-Oct	UO	6	UO	12	18	21	19	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.7	21	
14-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5	3	0	0	0	0	0	0	0	0.5	5	
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	
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	
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	
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	
19-Oct	0	0	0	0	16	66	64	34	6	0	0	0	0	0	0	0	0	0	0	26	34	34	36	33	14.5	66	
20-Oct	36	37	38	39	42	36	33	31	35	34	26	19	14	13	12	9	7	6	4	0	0	0	0	0	19.6	42	
21-Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	28	16	8	2.7	28	
22-Oct	4	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	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	0.0	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	
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	12	37	43	47	41	38	47	36	12.5	47	
27-Oct	5	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	5	
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	
29-Oct	0	0	0	0	0	0	8	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	8	
30-Oct	0	0	0	0	3	5	6	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	6	
31-Oct	3	5	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	5	
4.3 4.4 4.5 4.3 4.7 6.5 7.5 5.9 5.3 4.9 4.4 4.0 3.7 4.2 4.2 4.1 4.6 5.2 4.7 5.3 6.0 6.0 5.8 4.8																								Diurnal Average			
36 37 38 39 42 66 64 56 58 57 49 53 58 66 68 65 66 64 43 47 52 51 47 37																								Diurnal Maximum			
M - Maintenance UO - Unstable Operation																											





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

**Leaf Wetness (SW) - %**  
**Fort Chipewyan - October 2015**

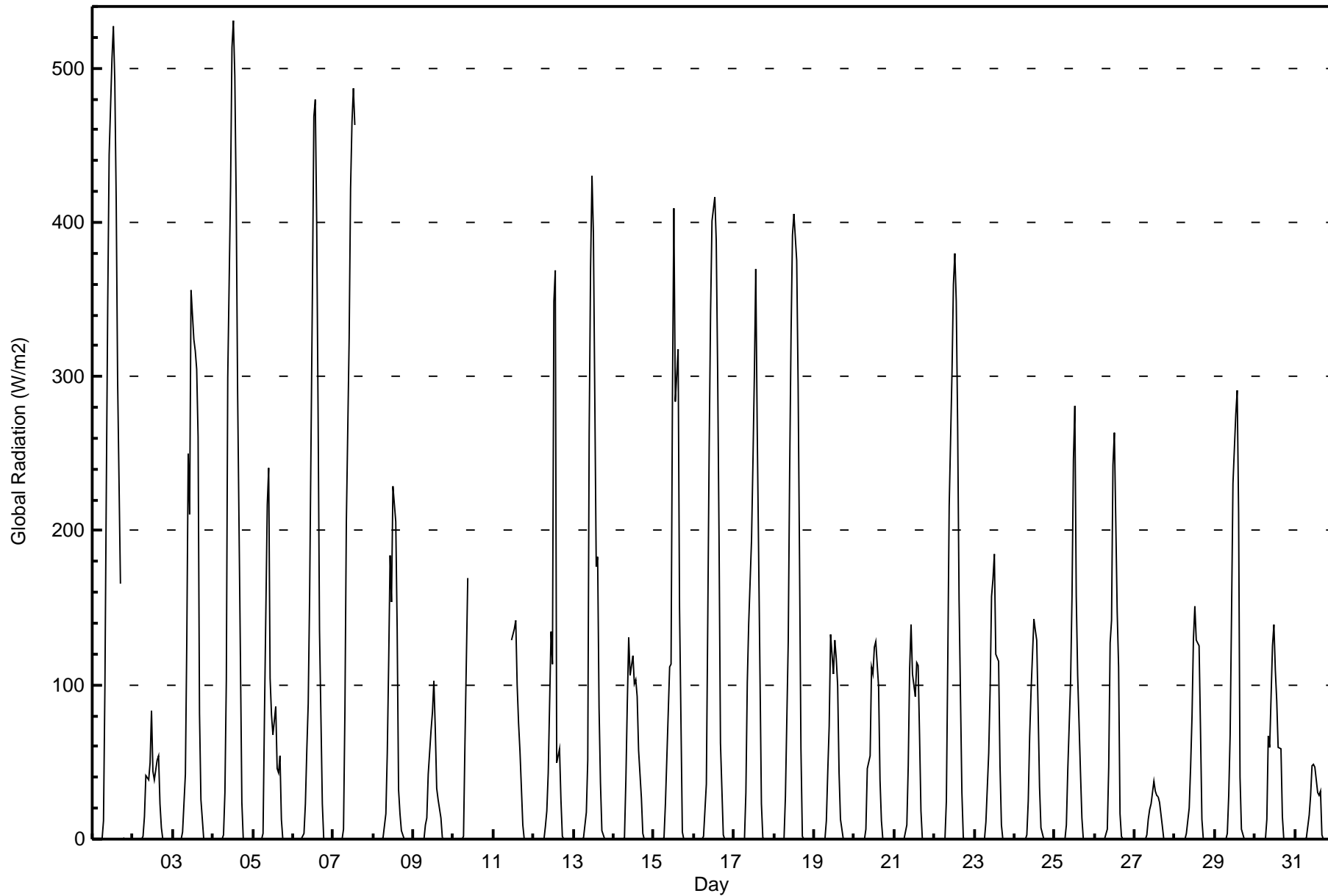
<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	547	78.03	78.03
0.4 - 0.5	0	0.00	78.03
0.6 - 0.7	0	0.00	78.03
0.8 - 1.4	0	0.00	78.03
1.5 - 10	55	7.85	85.88
> 10	99	14.12	100.00

Total Number of Valid Hours: 701

Total Number of Hours: 744



Maximum Value: 531 W/m2 on Oct 4 13:00														Maximum Daily Average: 153.6 W/m2 on Oct 1														Hours in Service: 744	
Minimum Value: 0 W/m2 on Oct 1 01:00														Minimum Daily Average: 9.0 W/m2 on Oct 27														Hours of Data: 713	
Maximum Diurnal Average: 249.9 W/m2 at hour 13														Minimum Diurnal Average: 0.0 W/m2 at hour 6														Hours of Missing Data: 31	
Monthly Average: 59.5 W/m2														Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 71 P <sub>90</sub> = 227 P <sub>99</sub> = 483														Hours of Calibration: 0	
																												Percent Operational Time: 95.8	
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	0	12	99	228	348	444	507	527	492	414	297	166	UO	1	0	0	0	0	0	153.6	527			
2-Oct	0	0	0	0	0	0	2	15	41	38	49	83	44	39	51	54	23	7	0	0	0	0	0	0	18.6	83			
3-Oct	0	0	0	0	0	0	4	42	129	250	210	356	324	316	305	261	81	26	0	0	0	0	0	0	96.1	356			
4-Oct	0	0	0	0	0	0	3	30	104	299	423	514	531	495	413	289	116	24	0	0	0	0	0	0	135.0	531			
5-Oct	0	0	0	0	0	0	4	79	217	240	105	81	68	86	46	43	54	13	0	0	0	0	0	0	43.2	240			
6-Oct	0	0	0	0	0	0	3	23	58	88	158	358	469	479	400	276	135	23	0	0	0	0	0	0	103.0	479			
7-Oct	0	0	0	0	0	0	6	83	205	325	422	465	487	464	UO	UO	UO	UO	UO	UO	UO	0	0	0	136.5	487			
8-Oct	0	0	0	0	0	0	1	17	56	115	184	154	229	206	136	32	16	5	0	0	0	0	0	0	48.0	229			
9-Oct	0	0	0	0	0	0	0	9	13	42	71	83	102	71	33	25	14	1	0	0	0	0	0	0	19.4	102			
10-Oct	0	0	0	0	0	0	2	61	169	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	169			
11-Oct	UO	0	UO	UO	0	UO	UO	UO	UO	UO	UO	129	136	142	99	75	57	9	0	0	0	0	0	0	--	142			
12-Oct	0	0	0	0	0	0	0	9	18	43	134	114	349	369	49	59	26	2	0	0	0	0	UO	0	50.9	369			
13-Oct	0	0	0	0	0	0	1	18	52	263	371	430	393	177	183	85	37	5	0	0	0	0	0	0	83.9	430			
14-Oct	0	0	0	0	0	0	1	38	88	131	106	119	101	104	92	58	27	3	0	0	0	0	0	0	36.1	131			
15-Oct	0	0	0	0	0	0	1	23	52	111	114	289	410	283	318	150	78	4	0	0	0	0	0	0	76.3	410			
16-Oct	0	0	0	0	0	0	2	36	142	255	342	401	417	388	303	194	62	3	0	0	0	0	0	0	106.0	417			
17-Oct	0	0	0	0	0	0	0	30	101	140	194	245	300	370	268	106	23	1	0	0	0	0	0	0	74.1	370			
18-Oct	0	0	0	0	0	0	0	27	128	238	328	392	405	375	295	181	59	2	0	0	0	0	0	0	101.3	405			
19-Oct	0	0	0	0	0	0	0	12	44	73	133	107	129	117	100	43	13	0	0	0	0	0	0	0	32.1	133			
20-Oct	0	0	0	0	0	0	0	6	46	54	112	107	125	128	99	38	12	0	0	0	0	0	0	0	30.3	128			
21-Oct	0	0	0	0	0	0	0	9	48	110	139	107	93	114	113	68	19	0	0	0	0	0	0	0	34.1	139			
22-Oct	0	0	0	0	0	0	0	24	116	216	303	360	380	349	267	155	30	1	0	0	0	0	0	0	91.7	380			
23-Oct	0	0	0	0	0	0	0	11	56	97	157	168	185	120	115	48	9	0	0	0	0	0	0	0	40.3	185			
24-Oct	0	0	0	0	0	0	0	3	24	67	96	143	135	129	83	34	8	0	0	0	0	0	0	0	30.1	143			
25-Oct	0	0	0	0	0	0	0	9	45	103	157	246	281	157	107	43	14	0	0	0	0	0	0	0	48.4	281			
26-Oct	0	0	0	0	0	0	0	6	47	127	142	243	264	147	111	17	2	0	0	0	0	0	0	0	46.1	264			
27-Oct	0	0	0	0	0	0	0	3	13	20	23	37	32	29	27	24	8	0	0	0	0	0	0	0	9.0	37			
28-Oct	0	0	0	0	0	0	0	4	20	46	80	130	151	129	126	71	12	0	0	0	0	0	0	0	32.1	151			
29-Oct	0	0	0	0	0	0	0	3	28	68	146	231	275	291	212	41	7	0	0	0	0	0	0	0	54.3	291			
30-Oct	0	0	0	0	0	0	0	13	67	59	126	139	110	90	60	59	15	0	0	0	0	0	0	0	30.7	139			
31-Oct	0	0	0	0	0	0	0	1	16	29	48	48	47	30	28	32	3	0	0	0	0	0	0	0	11.7	48			
																								Diurnal Average					
																								Diurnal Maximum					
UO - Unstable Operation																													





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

**Global Radiation (GR) - W/m2**  
**Fort Chipewyan - October 2015**

<b>Concentration Ranges (W/m2)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	453	63.53	63.53
21 - 100	108	15.15	78.68
101 - 300	107	15.01	93.69
301 - 600	45	6.31	100.00
601 - 900	0	0.00	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 713

Total Number of Hours: 744



Maximum Speed: 42 km/h on Oct 19 20:00	Maximum Daily Speed Average: 27.8 km/h on Oct 19	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 21 07:00	Minimum Daily Speed Average: 2.0 km/h on Oct 30	Hours of Data: 744
Maximum Diurnal Speed Average: 3.0 km/h at hour 20	Minimum Diurnal Speed Average: 0.4 km/h at hour 1	Hours of Missing Data: 0
Monthly Average Velocity: 0.2 km/h 38.6 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 6 Q <sub>1</sub> = 9 Median = 13 Q <sub>3</sub> = 18 P <sub>90</sub> = 24 P <sub>99</sub> = 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	SW8	SW2	E6	E6	E4	SW6	SW12	SW12WSW11	SW11	SW15WSW14	SW15	SW11	SW12	SW10	WSW7	WSW6	W7	NNW7	N13	N15	NNW15	NNW16	WSW5.0	NNW16		
2-Oct	NNW17	NNW18	NNW18	NNW18	NNW14	NW10	NNW17	NNW17	NNW12	NNW11	NNW20	NNW23	NNW20	NNW19	NNW19	NNW19	NNW16	NNW15	NNW15	NW12	NNW13	NW13	NNW13	NNW14	NNW15.9	NNW23
3-Oct	NNW13	NNW12	NNW12	NNW11	NNW10	N10	NNW9	NW8	NNW9	NNW10	NW11	NNE7	N2	NW9	NNW7	ENE8	SE9	S4	NE4	WNN6	SSW2	SW7	SSW7	S8	NNW4.6	NNW13
4-Oct	SSW6	SSE10	SSE11	SE13	SE15	SSE15	SE17	SE18	SE19	SSE17	S18	S16	SSE15	SSE14	SSE16	SSE20	SSE18	SSE19	SSE18	SSE18	SSE20	S18	S18	S17	SSE15.6	SSE20
5-Oct	S12	S10	S10	SSW9	SW11	W10	W12	W12	W15	WNNW21	WNNW22	WNNW23	WNNW22	WNNW24	WNNW20	WNNW21	WNNW18	WNNW13	W13	W13	W12	W12	W12	W12	W13.5	WNNW24
6-Oct	WNNW11	W8	WNNW5	WNNW6	WNNW6	W5	SW5	SW8	SW8	SW8	SW7	S7	SE7	ESE14	E14	E16	ENE18	ENE12	E9	E10	ESE13	ESE13	ESE8	ENE8	ESE3.0	ENE18
7-Oct	ESE8	E8	ESE6	E8	ESE8	ESE8	ESE7	SSE4	S4	S5	S5WSW11	W13WSW12	W13	W14WNNW15	NNW12	NW11	NW9	NNW10	N10	NNW10	NNW12	WNNW2.9	WNNW15			
8-Oct	N5	NNW4	NW5	NNW8	NNW6	NNW8	NNE4	E4	E6	E12	E15	E19	E22	ENE23	ENE22	ENE19	ENE17	ENE20	ENE19	ENE21	ENE25	ENE26	ENE28	ENE30	ENE13.6	ENE30
9-Oct	ENE32	ENE32	ENE35	E38	E40	E41	E38	ENE30	ENE28	ENE29	ENE26	ENE22	ENE23	ENE19	ENE14	ENE11	ENE11	E11	ESE12	ESE16	ESE13	ESE13	E12	E20	ENE23.0	E41
10-Oct	E24	E22	ESE15	SE8	WSW8	WSW11	WSW10	W13	WSW8	SW11	W9WNNW10	W11	NW12	NNW10	NW10	NW13	NW10	NW11	NW12	NW9	NW11	NW10	NW10	WNNW4.9	E24	
11-Oct	NW9	NNW9	NNW6	NW6	NW7	NW11	NW11	NW13	NW15	NW16	NW17	NW18	NW19	NW18	NW14	NW17	NW12	WNNW13	WNNW11	NW10	NW8	NW4	NW2	WSW7	NW11.1	NW19
12-Oct	SW5	S7	SSE6	SE11	SE16	SE21	SE25	ESE26	ESE27	ESE24	ESE22	SE20	SSE21	S19	SW10WSW10	W18	W12WNNW12	NW13	NW13	NW14	WNNW9	WSW6	SSE6.6	ESE27		
13-Oct	SW8	SW8	SSW5	SE4	SSE6	SW6WSW12	W17	W15	W22	W23	W32	W28	W26	W28	W17	W19	W14	W12	W13	W13	W12	W12	W14	W14.1	W32	
14-Oct	W15	W15	W15	W12	W13WNNW14	WNNW12	W12	W11WNNW12	NW13	NW14	NW13	NW14	NW11	NW11	NW10	NW7	NNW8	NNW7	NNW6	NNW6	WNNW6	WNNW9	WNNW10.5	W15		
15-Oct	WNNW9	WNNW10	WNNW11	WNNW11	W8	W8	W9WSW10	WSW10	WSW12	WSW12	WSW15	WSW16	W14	W14	W12	W9	W8	W7	NW3	ENE3	ENE7	ENE10	E21	W6.7	E21	
16-Oct	E23	ESE23	ESE25	E23	ESE20	ESE20	ESE19	ESE18	SE17	SE18	SE18	ESE16	ESE16	SE18	SE15	ESE13	E17	ESE18	ESE17	SE16	ESE15	ESE14	E13	ESE17.6	ESE25	
17-Oct	E11	ESE10	ESE13	ESE15	ESE13	ESE18	ESE15	ESE15	ESE17	ESE12	ESE12	SSE17	SSE16	SSE18	SSE17	S13	S12	S10	SW13	SSW15	SW14	SW14	SW8	WSW9	SSE9.6	ESE18
18-Oct	W20	W22	W17	W15	W14	W17	W17	W20	W20	W25WNNW21	WNNW27	WNNW23	WNNW21	NW21	NW15	NW12	NNW11	NNE11	NNE9	NNE6	NW2	W5	NW5	WNNW13.6	WNNW27	
19-Oct	N3	NNW4	N7	NNE4	ENE13	ENE21	ENE26	ENE26	E28	E30	E31	E36	E34	E38	E41	E41	E41	E41	E41	E42	E38	E36	E35	E34	E27.8	E42
20-Oct	E31	E29	E26	ESE17	SW14WSW23	W22	W21	W19	W19WNNW19	WNNW18	WNNW17	WNNW18	WNNW17	WNNW17	WNNW15	NW18	NW15	NW15	WNNW11	NW15	NW10	NW7	WNNW8.6	E31		
21-Oct	NW6	NNW7	NNW5	N5	NNW4	N3	W1	SSW4	SSE3	ESE15	SE16	E23	ESE26	ESE27	ESE31	E32	E33	E33	E33	E29	ESE25	ESE20	SE16	SSE13	E14.4	E33
22-Oct	SSE10	S9	SW10	SW14WSW14	WSW10	WSW8	SW7	SW7	SSW5	SW11WSW20	WSW21	W21WSW19	WSW16	WSW12	W13	NW14	NNW11	NW9	NW9	WNNW7	W8	WSW9.7	W21			
23-Oct	W9	W11	W11	W10	W9	W9	WNNW9	NW11	NW14	NW11	NW12	NW11	NW11	NW9	NW8	NW7	WNNW7	NW5	NNW6	N7	NNE8	N7	N6	NNE9	NW7.7	NW14
24-Oct	NE9	NNE9	N9NNW10	NNW6	NNW6	N6	NNE7	NW6	NNW5	NNW4	NW5	W1	WNNW4	WNNW5	NW6	WNNW4	WNNW4	WNNW3	NNW2	E8	ENE14	ENE14	ENE14	N4.1	ENE14	
25-Oct	ENE13	ENE14	ENE15	ESE16	ESE18	ESE16	ESE14	SE13	SE8	ESE9	ESE18	ESE19	ESE17	E14	ESE13	ESE10	ESE14	SE13	SE15	SE15	SE15	SE13	SSE12	S15	ESE13.0	ESE19
26-Oct	S14	S16	S10	S13	SSE14	SSE16	SE18	ESE17	ESE22	ESE23	ESE23	SE22	SE24	ESE24	ESE27	ESE26	E19	E15	E19	E17	SSW8	W19	W17	W19	SE12.2	ESE27
27-Oct	WNNW20	W19	W21WNNW23	WNNW21	WNNW21	WNNW21	WNNW26	WNNW29	NW30	NW28	NW29	NW26	NW27	NW26	NW27	NW24	NNW22	NNW23	NNW19	NW17	NW14WNNW11	WNNW9	NW21.5	NW30		
28-Oct	WNNW9	WNNW9	WNNW6	WNNW4	WNNW5	WSW6	WSW4	SSE7	SSE11	SSE14	SSE16	SSE17	SSE17	SSE17	SE18	SE22	ESE23	ESE25	ESE24	ESE21	SE22	SE20	SSE18	SSE21	SE11.1	ESE25
29-Oct	SSE21	SSE22	SSE18	S21	S21	S18	S21	S22	SSW23	SSW24	SSW21	SSW18	SSW18	SW17	SW14	SW11	SSW9	SSW8	SSW8	SSW6	SSE4	ESE4	E4	SW6	S14.0	SSW24
30-Oct	SW7	WSW8	W7	SW7	SW10	WSW7	SW4	E2	E6	E7	E9	E7	E10	E11	ENE11	E13	ENE9	NE7	N6	NNW9	NNW8	NNW8	NW10	NW10	NE2.0	E13
31-Oct	NW10	NW10	NW11	NW13	NW14	NW13	NW12	NW9	NW9	NW11	NW9	NW9	NW9	NW8	NNW7	NNW7	NNW9	NNW9	N10	NNW10	NNW10	NNW11	N12	NNW11	NW9.7	NW14

ENE0.4	ESE0.6	ENE0.8	ESE0.7	SSW1.5	SSW1.6	SSW1.3	SW1.3	SW1.1	SW1.3	SW1.3	WSW1.8	SW1.4	W1.3	NW1.2	NNE0.9	NNE1.5	NE2.2	NE2.9	NE3.0	ENE2.2	NE1.4	NE1.6	NE1.1	Diurnal Average	
ENE32	ENE32	ENE35	E38	E40	E41	E38	ENE30	WNNW29	E30	E31	E36	E34	E38	E41	E41	E41	E41	E41	E41	E42	E38	E36	E35	E34	Diurnal Maximum

All monthly, daily, and diurnal averages have been calculated using vector methods



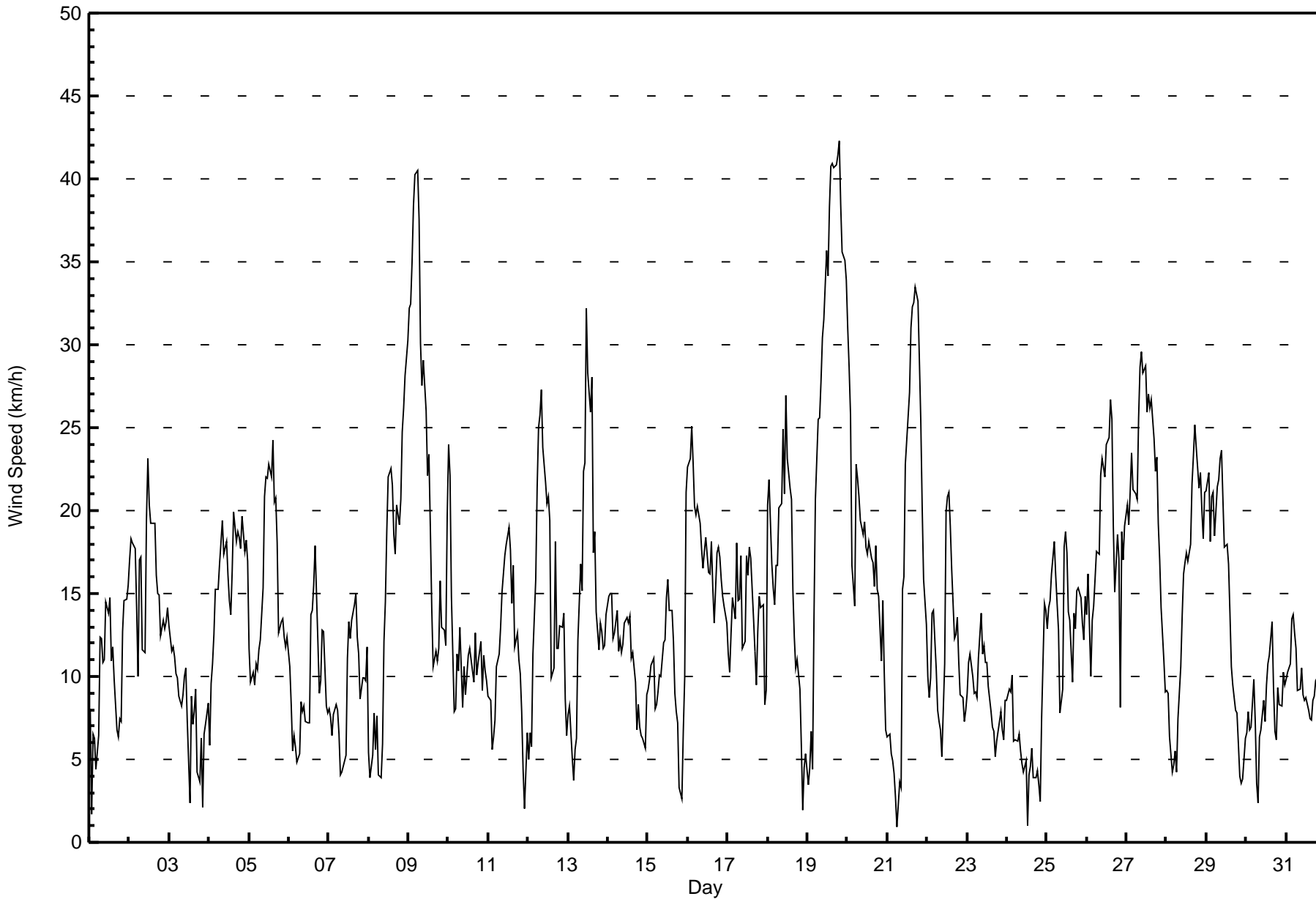
Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h  
Fort Chipewyan - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Oct 27 10:00 Minimum Value: 1 km/h on Oct 7 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> = 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	1	2	1	1	1	3	2	2	3	3	3	3	2	2	2	1	1	1	2	3	3	4	4	4	4
2-Oct	4	5	5	5	5	3	5	6	4	4	6	8	7	6	6	6	6	5	5	4	5	4	4	5	8
3-Oct	5	4	5	4	3	3	4	3	3	3	4	3	3	3	3	3	2	2	1	2	1	3	3	2	5
4-Oct	2	2	2	3	3	3	2	3	2	3	3	3	3	3	3	3	2	2	2	3	2	2	3	3	3
5-Oct	2	2	2	2	2	2	2	2	4	6	6	5	6	6	6	5	6	5	3	3	3	3	2	2	6
6-Oct	2	2	2	1	1	1	2	2	2	2	1	2	3	3	2	4	3	2	1	2	2	2	2	1	4
7-Oct	1	1	1	1	1	1	1	1	1	1	1	3	3	3	4	4	4	3	3	2	3	3	3	3	4
8-Oct	6	2	2	2	2	1	1	1	2	1	2	2	3	3	3	3	3	3	3	3	4	4	4	5	6
9-Oct	4	5	4	4	4	4	5	5	5	5	4	4	4	4	3	2	2	1	1	2	4	2	3	3	5
10-Oct	3	3	3	2	2	2	2	3	2	3	3	3	3	3	4	4	4	3	3	4	3	3	3	2	4
11-Oct	2	3	2	2	2	3	3	4	4	5	6	6	5	5	4	5	4	3	3	2	2	2	1	1	6
12-Oct	1	3	1	2	2	3	2	2	2	2	3	3	5	4	3	3	4	3	3	3	4	4	2	1	5
13-Oct	1	1	3	2	2	2	4	3	4	5	7	8	7	7	8	5	5	4	2	2	3	2	3	2	8
14-Oct	2	3	3	2	2	3	2	2	2	3	4	4	4	5	3	3	3	2	3	2	2	2	1	2	5
15-Oct	2	2	2	3	2	2	3	2	2	3	3	4	4	4	3	3	2	1	1	2	1	2	1	5	5
16-Oct	2	1	2	2	2	2	2	2	2	2	1	2	2	3	3	2	2	2	2	2	2	2	2	1	3
17-Oct	2	2	1	2	2	2	2	1	1	3	2	4	4	3	3	3	2	1	2	1	2	2	1	3	4
18-Oct	6	5	4	3	3	4	4	5	5	6	6	8	7	7	7	4	4	3	4	3	1	1	1	1	8
19-Oct	1	1	2	1	5	4	4	4	4	4	4	3	4	4	4	4	3	3	4	3	3	3	3	3	5
20-Oct	3	2	2	4	7	6	6	5	5	4	5	5	5	5	5	5	4	5	5	5	3	5	3	3	7
21-Oct	2	2	2	1	1	2	1	2	2	4	2	3	2	4	2	2	3	3	3	2	2	2	2	2	4
22-Oct	2	3	2	2	2	2	3	2	2	3	4	6	5	5	5	4	2	3	4	4	2	3	2	2	6
23-Oct	2	2	2	2	2	2	2	3	3	3	4	3	4	3	2	2	2	1	2	2	2	2	1	2	4
24-Oct	2	3	4	3	3	2	2	2	2	2	1	1	1	1	1	2	1	1	1	1	1	6	2	2	6
25-Oct	2	3	4	2	1	2	3	4	2	2	5	2	2	2	2	1	2	2	1	1	1	2	2	3	5
26-Oct	3	2	3	2	3	3	3	2	2	2	2	3	2	2	2	3	2	2	2	3	5	5	4	4	5
27-Oct	5	5	5	5	5	5	6	7	7	8	8	8	8	8	7	7	7	7	7	7	5	4	3	2	8
28-Oct	2	2	3	1	2	2	2	3	3	3	3	3	3	3	3	2	3	2	3	2	2	2	3	3	3
29-Oct	3	4	3	3	4	3	3	3	3	3	3	3	3	2	2	2	1	1	2	1	1	1	1	2	4
30-Oct	3	2	3	2	2	3	1	2	1	3	1	1	1	2	2	2	2	1	1	2	2	2	2	3	3
31-Oct	3	3	3	3	3	3	3	3	2	3	3	2	2	2	2	2	3	3	3	3	3	3	3	3	3
Diurnal Maximum																									







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

**Wind Speed (WS) - km/h**  
**Fort Chipewyan - October 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	59	7.93	7.93
6 - 11	256	34.41	42.34
12 - 19	277	37.23	79.57
20 - 28	115	15.46	95.03
29 - 38	29	3.90	98.92
> 38	8	1.08	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 Chipewyan - October 2015**

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	1	3	3	5	4	1	4	10	7	7	59
6 - 11	10	8	2	8	16	9	5	7	8	8	26	19	20	24	48	38	256
12 - 19	3	0	0	13	14	38	22	24	14	3	12	11	45	16	38	24	277
20 - 28	0	0	0	14	10	24	7	6	4	3	0	3	14	18	7	5	115
29 - 38	0	0	0	6	18	1	0	0	0	0	0	0	1	1	2	0	29
> 38	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	8
<b>Totals</b>	18	10	3	42	69	74	35	40	29	19	42	34	84	69	102	74	744

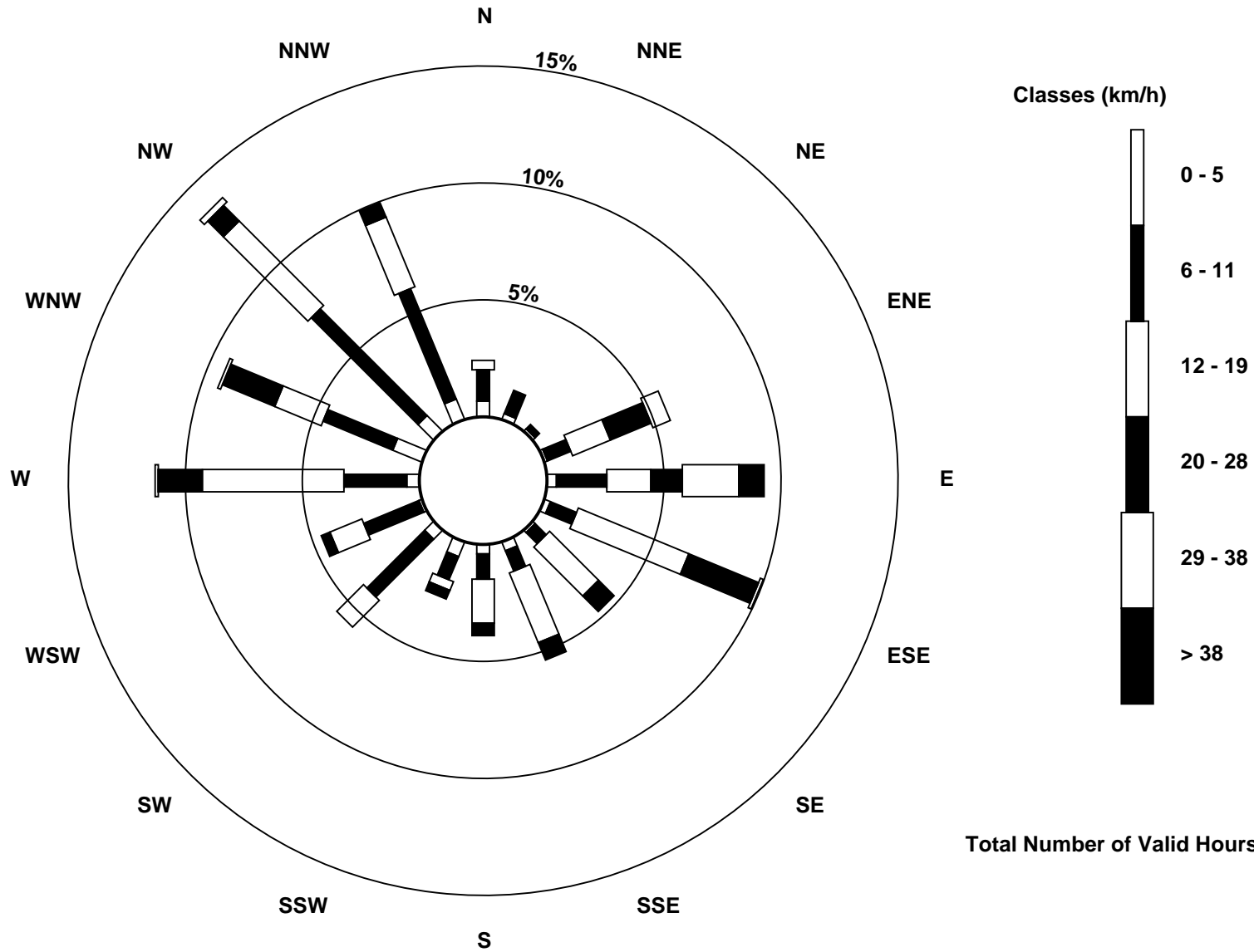
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Wind Speed (WS) - km/h  
Fort Chipewyan (AMS 8)





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg  
Fort Chipewyan - October 2015**

Direction of Maximum Speed: 95 deg on Oct 19 20:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 84.9 deg on Oct 19	Hours of Data: 744
Direction of Minimum Speed: 260 deg on Oct 21 07:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 2.0 deg on Oct 30	Percent Operational Time: 100.0
Monthly Average Direction: 293.0 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	223	227	88	89	96	219	223	224	242	236	227	237	225	222	228	220	247	252	272	344	350	356	345	348	253.8
2-Oct	342	343	340	339	338	310	342	343	345	327	332	334	335	327	329	328	330	329	329	324	330	326	336	333	333.5
3-Oct	332	336	344	348	330	353	331	321	331	331	317	28	351	309	333	78	127	184	53	298	197	232	196	186	331.9
4-Oct	196	158	158	146	140	151	139	145	144	152	170	170	160	150	149	150	153	151	152	155	160	178	180	189	157.2
5-Oct	181	175	187	212	233	266	279	276	279	285	288	285	284	284	284	287	294	298	290	280	277	273	279	280	275.2
6-Oct	282	276	285	293	285	267	227	224	233	235	219	181	146	106	93	80	74	70	93	85	113	108	102	76	115.2
7-Oct	103	95	102	89	106	110	117	150	186	191	190	255	259	257	272	275	299	306	309	320	335	349	342	344	296.8
8-Oct	351	334	324	345	332	348	21	81	84	95	94	84	80	73	74	63	60	64	69	71	77	75	74	74	67.9
9-Oct	74	72	78	82	82	85	81	73	70	71	69	65	64	66	62	57	62	82	107	104	120	109	91	88	78.2
10-Oct	86	89	107	129	238	240	257	273	257	231	264	287	280	310	333	325	319	314	320	320	316	304	318	312	302.5
11-Oct	311	330	332	305	320	313	318	311	305	307	314	312	308	309	314	309	323	298	300	304	322	319	324	246	310.3
12-Oct	236	177	159	131	142	128	130	121	116	118	118	127	151	190	233	238	263	274	282	305	307	308	288	255	158.5
13-Oct	230	224	207	131	147	216	246	273	273	266	263	264	264	268	280	269	273	279	274	278	275	275	271	276	265.2
14-Oct	280	278	279	275	281	284	291	281	276	294	321	316	311	308	311	315	310	312	336	327	342	328	303	293	298.8
15-Oct	298	292	296	300	278	269	272	257	254	251	250	246	258	278	274	265	259	267	274	304	67	74	74	89	272.0
16-Oct	99	113	107	99	104	112	111	111	115	124	127	127	115	121	145	141	119	95	108	122	125	121	107	94	114.4
17-Oct	91	115	109	113	107	105	111	106	103	106	104	158	156	165	167	174	189	182	219	213	214	216	217	240	148.9
18-Oct	265	266	271	272	266	264	262	266	274	278	287	295	302	303	312	313	319	342	14	22	24	308	268	320	289.9
19-Oct	1	344	359	14	61	66	72	75	80	82	81	85	82	84	84	88	93	96	93	95	96	95	93	90	84.9
20-Oct	93	95	97	110	226	252	261	268	272	279	282	289	297	300	302	296	298	305	313	311	303	316	317	319	292.7
21-Oct	305	339	344	356	339	4	260	206	154	113	125	96	102	102	102	96	97	91	90	91	106	116	129	149	100.0
22-Oct	159	191	217	229	237	248	257	227	227	202	233	256	244	260	255	255	245	259	309	338	316	317	301	274	253.1
23-Oct	273	281	279	268	263	279	288	315	317	309	306	306	313	318	317	314	288	306	345	3	19	4	1	17	309.6
24-Oct	35	29	3	346	340	345	9	14	325	339	342	305	273	287	282	315	289	303	301	299	346	86	76	74	2.0
25-Oct	65	74	78	111	118	120	123	126	137	116	112	112	102	97	103	117	115	130	134	143	141	139	147	169	117.6
26-Oct	173	173	183	173	159	152	141	113	103	109	119	127	126	117	108	106	86	85	86	94	204	259	269	281	128.8
27-Oct	283	276	280	286	288	293	295	300	303	306	308	306	306	309	312	313	320	329	332	333	324	313	303	291	305.1
28-Oct	291	299	295	282	283	238	249	161	167	154	164	159	152	151	143	128	119	115	112	120	124	125	148	159	142.6
29-Oct	163	166	166	175	185	185	182	186	192	194	196	203	202	215	216	219	212	213	211	200	151	105	101	216	189.1
30-Oct	222	239	260	230	229	245	231	80	80	96	97	87	82	81	64	80	68	52	357	345	348	333	324	324	36.6
31-Oct	322	320	324	319	314	315	315	314	304	312	311	310	312	317	335	345	339	347	352	342	338	332	352	338	325.8
67.7 108.8 71.1 118.3 194.4 209.4 203.4 227.0 226.6 220.2 226.5 248.7 234.0 278.1 324.6 23.7 24.4 36.6 39.2 43.7 63.5 42.2 47.3 42.0																									
Diurnal Average																									

All monthly, daily, and diurnal averages have been calculated using vector methods

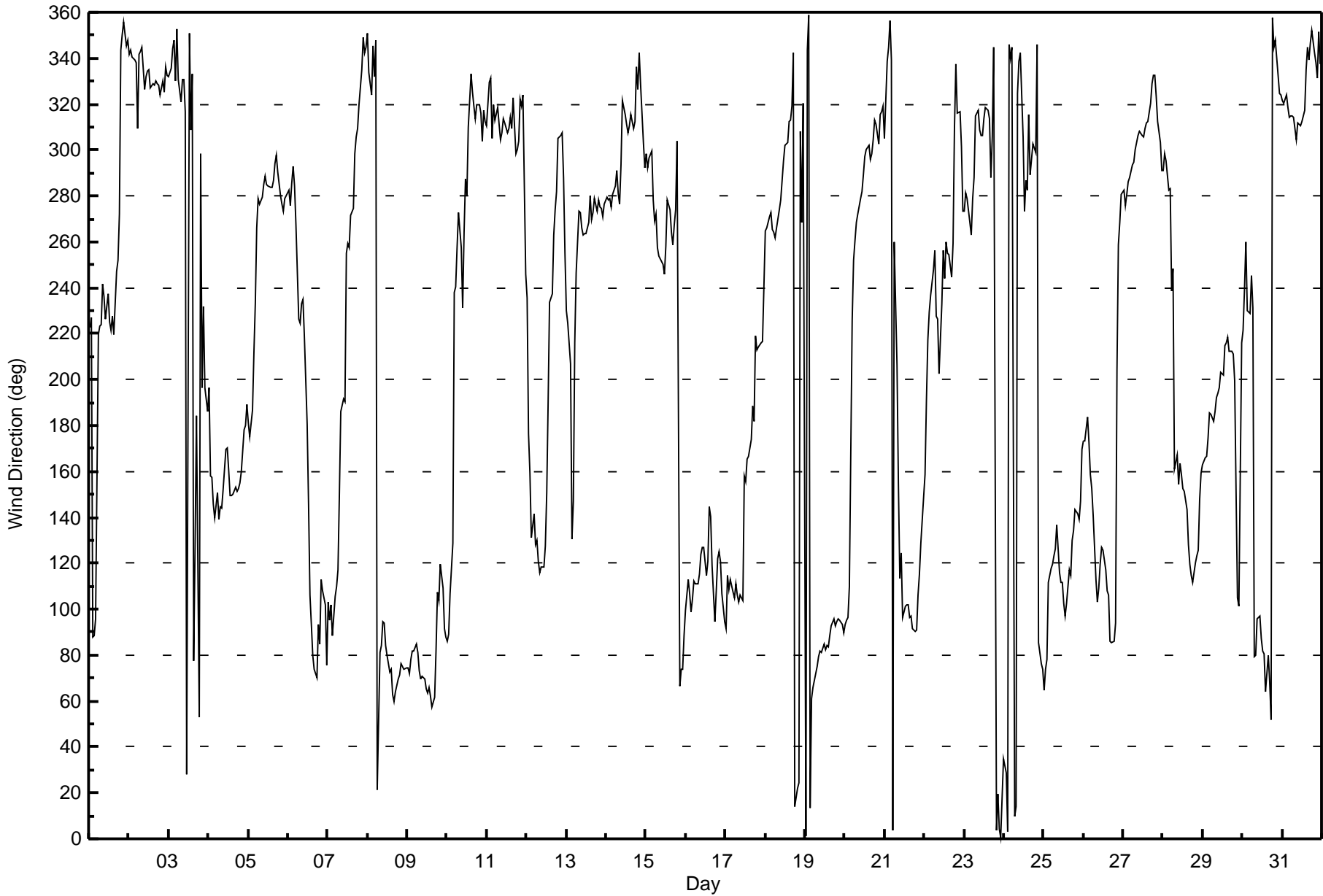


Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg  
Fort Chipewyan - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 97 deg on Oct 24 13:00 Minimum Value: 4 deg on Oct 9 20:00 Percentiles: P <sub>1</sub> = 5 P <sub>10</sub> = 6 Q <sub>1</sub> = 10 Median = 15 Q <sub>3</sub> = 20 P <sub>90</sub> = 25 P <sub>99</sub> = 71																	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	75	8	11	28	48	9	10	19	23	14	19	12	22	17	13	18	12	19	22	20	21	20	22	75
2-Oct	19	20	19	18	25	31	21	24	26	22	23	22	23	21	23	23	25	24	24	22	24	22	24	23	31
3-Oct	23	26	26	24	25	25	24	28	27	29	23	49	84	28	37	37	14	40	44	31	59	19	34	22	84
4-Oct	30	10	14	15	16	14	14	12	10	12	18	15	18	15	13	10	9	7	7	9	10	7	7	9	30
5-Oct	14	11	11	15	11	17	12	12	14	15	15	15	15	15	14	15	16	15	16	12	13	13	13	13	17
6-Oct	14	14	23	15	20	35	25	15	21	15	13	17	40	16	9	10	7	7	14	13	6	6	27	16	40
7-Oct	7	9	11	6	15	11	17	19	16	17	22	23	18	20	23	18	18	14	15	13	17	19	19	17	23
8-Oct	88	47	18	22	28	15	31	17	12	9	7	6	9	9	9	10	9	9	9	8	7	7	7	8	88
9-Oct	8	8	7	6	6	5	6	8	9	9	8	10	10	10	10	10	10	9	8	4	17	7	9	6	17
10-Oct	6	7	12	30	19	13	16	19	31	15	20	26	17	26	23	25	21	19	20	23	22	16	21	18	31
11-Oct	17	27	26	20	20	16	20	18	17	18	19	17	16	19	21	18	25	16	23	14	16	78	73	16	78
12-Oct	19	35	23	15	10	5	6	6	5	6	16	12	12	18	15	23	14	14	16	16	16	15	20	11	35
13-Oct	10	10	26	18	30	27	13	14	16	14	14	14	15	15	15	14	13	16	11	13	12	14	13	30	
14-Oct	12	12	12	17	12	13	14	11	12	17	24	21	19	20	20	19	15	16	21	19	20	22	20	15	24
15-Oct	15	15	16	16	17	13	14	13	13	14	15	15	21	17	18	16	13	9	6	45	48	12	6	9	48
16-Oct	9	5	7	5	5	5	5	6	6	9	6	11	17	20	10	10	26	9	6	8	7	13	8	8	26
17-Oct	9	18	6	7	11	6	8	7	5	21	21	13	10	11	13	15	12	14	9	6	8	7	10	17	21
18-Oct	14	14	13	14	14	14	15	14	14	14	15	16	17	21	19	18	21	23	23	22	19	65	23	27	65
19-Oct	22	14	18	23	11	9	9	8	7	6	7	5	6	5	5	5	5	5	5	5	5	5	4	4	23
20-Oct	5	5	4	11	39	14	14	14	14	14	14	15	16	16	16	16	15	15	18	18	17	18	20	25	39
21-Oct	20	27	28	23	24	31	88	37	67	15	18	7	6	6	7	4	5	5	4	4	7	6	10	11	88
22-Oct	14	17	10	9	12	13	14	13	16	48	22	16	18	15	15	13	12	15	26	22	19	20	20	13	48
23-Oct	14	20	11	14	14	12	17	16	17	18	20	21	22	31	24	19	16	24	23	20	20	20	19	18	31
24-Oct	18	19	22	20	23	27	24	25	21	30	35	29	97	36	34	17	29	22	18	15	22	40	15	12	97
25-Oct	9	11	12	10	6	8	10	14	16	15	7	7	6	8	13	12	7	16	6	6	6	7	9	11	16
26-Oct	11	10	17	11	13	13	11	9	7	5	7	8	5	7	6	5	6	7	5	7	46	15	15	14	46
27-Oct	14	14	14	14	14	14	15	15	16	15	16	16	17	16	17	16	19	22	22	22	20	16	18	15	22
28-Oct	16	16	23	26	28	33	37	21	22	16	16	14	14	14	14	6	6	8	5	6	5	7	9	10	37
29-Oct	9	9	11	9	9	11	7	8	7	6	7	8	8	9	8	8	6	10	10	12	29	38	43	15	43
30-Oct	13	15	15	12	7	15	40	67	13	29	9	7	6	10	8	9	9	12	21	20	18	16	15	20	67
31-Oct	19	16	18	16	15	16	17	23	17	17	17	19	20	21	23	24	21	21	22	20	21	20	21	21	24
																	88 75 28 30 39 48 88 67 67 48 35 49 97 36 37 37 29 40 44 45 59 78 73 27								
Diurnal Maximum																									





# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	October 7, 2015	Last Calibration	September 2, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	8:50	End Time (MST)	14:05
Gas Cert Reference	LL103809	Station temp.	22 Deg C
Cal Gas Concentration	2.45 ppm	Cal Gas Exp Date	16/09/2015
Calibrator Make/Model	Teledyne API T700	Serial Number	747
ZAG Make/Model	Teledyne API T701	Serial Number	4698
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8205

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-827	-827
Analyzer IP address	192.168.1.43		Lamp voltage	974	982
Calculated slope	1.001379	0.996190	Chamber temp	45.0	44.9
Calculated intercept	-0.032193	-0.041894	Pressure	704.6	714.3
Analyzer Background	1.12	1.13	Flow	0.429	0.435
Analyzer Coefficient	1.004	1.013	Intensity	93	93

Analyzer make Thermo 43i-TLE Analyzer serial # 1136451241

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.1	----
as found span	6000	44.6	18.2	18.0	1.012
calibrator zero	6000	0.0	0.0	0.1	----
high point	6000	44.6	18.2	18.3	0.994
second point	6000	23.8	9.7	9.8	0.986
third point	6000	11.9	4.9	4.8	1.005
as left zero	6000	0.0	0.0	0.1	----
as left span	6000	44.6	18.2	17.9	1.018
Average Correction Factor					0.995

Corrected As found 17.9 Previous response 18.2 % change 1.7%

**Notes:**

Filter change after As Found. Span adjusted.

Calibration Performed By: Devin Russell





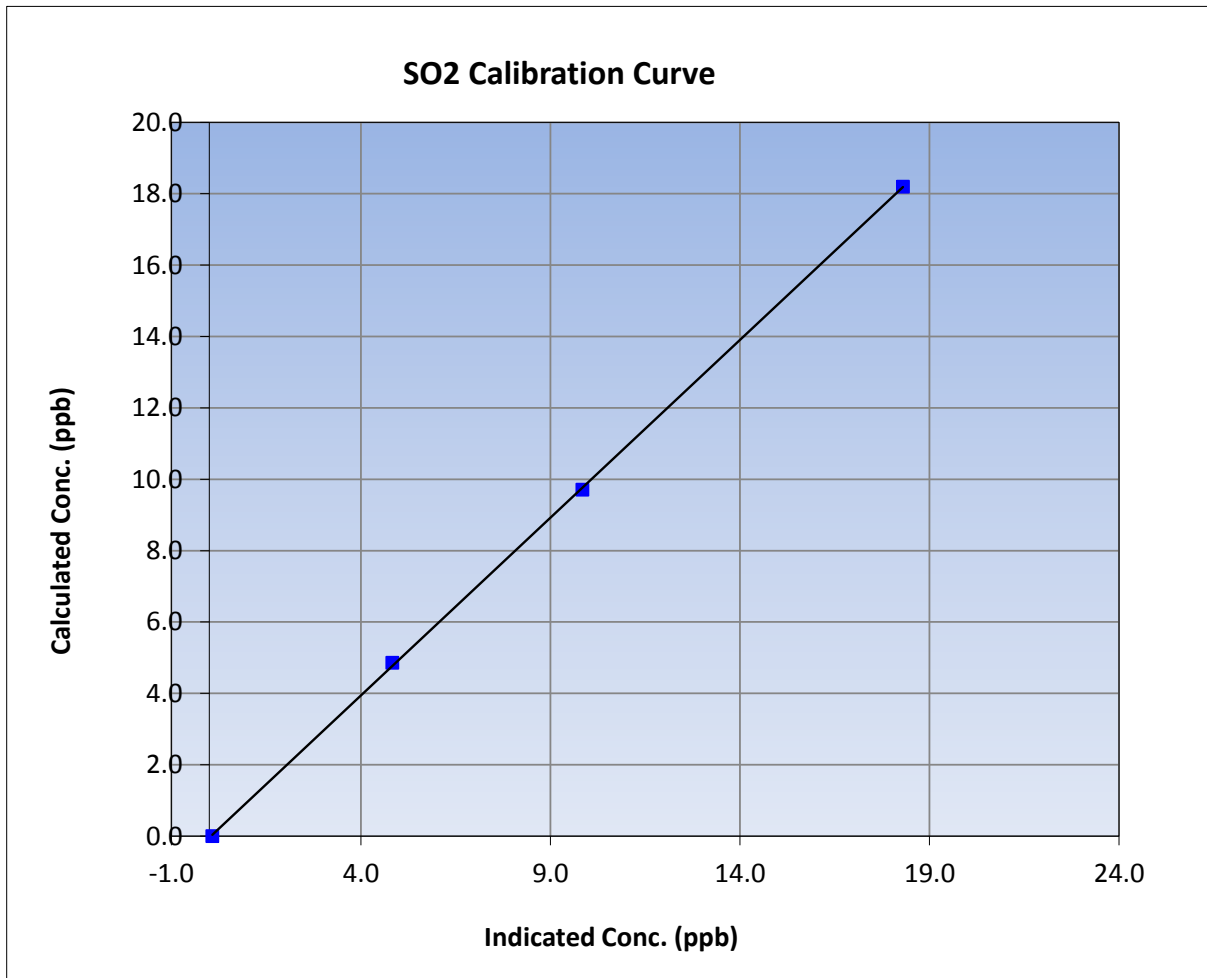
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	October 7, 2015	Previous Calibration	September 2, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	8:50	End Time (MST)	14:05
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1136451241

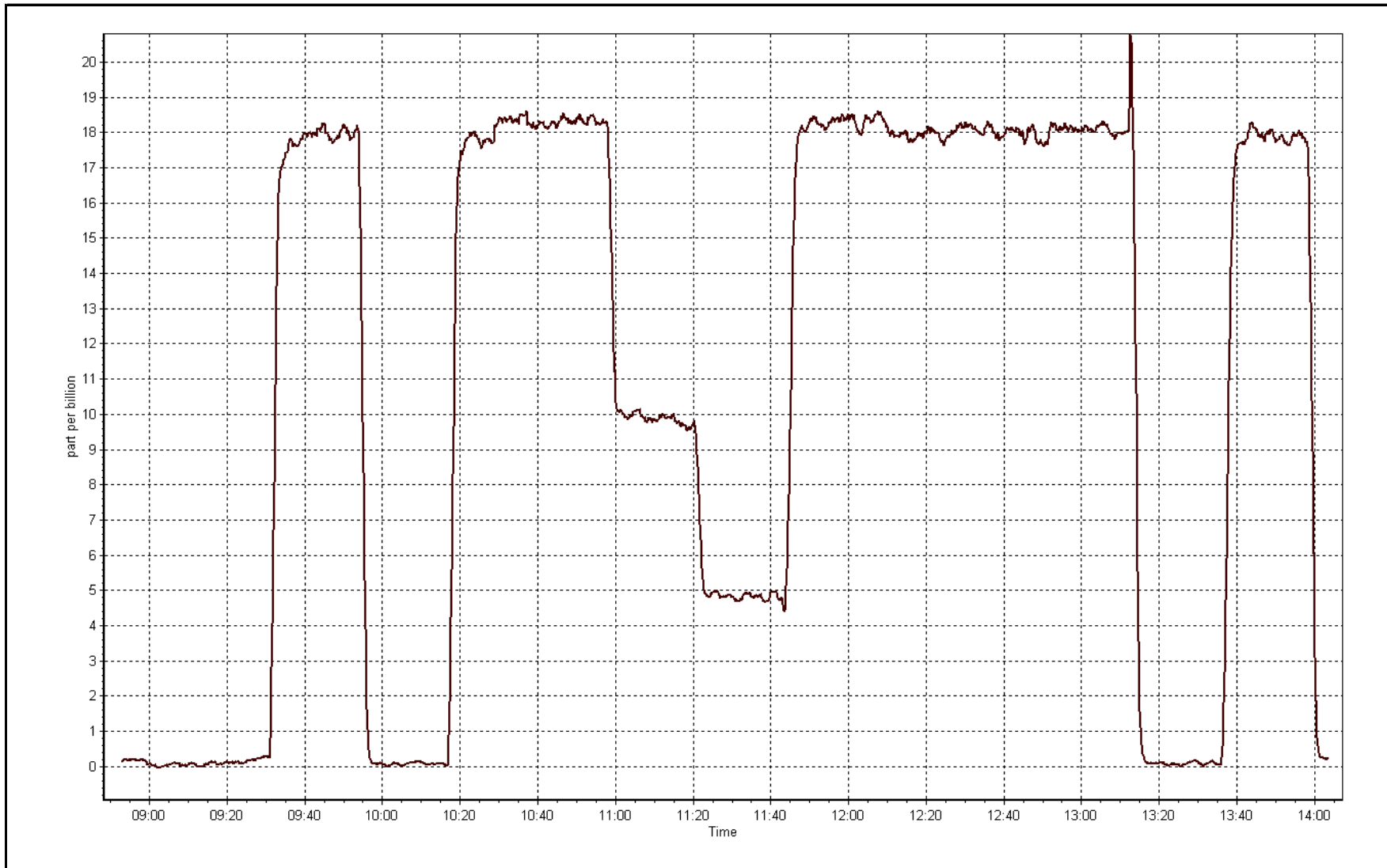
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999935
18.2	18.3	0.9943		
9.7	9.8	0.9864	Slope	0.996190
4.9	4.8	1.0052		
			Intercept	-0.041894



SO2 Calibration Plot

Date: October 7, 2015





# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 7, 2015	Previous Calibration	September 2, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	14:15	End Time (MST)	19:05
NO2 GPT Ref date	October-07-15	Transfer Standard	NO2
		Station temp.	23 Deg C
Calibrator Make/Model	Teledyne API 700	Serial Number	735
ZAG make/model	Teledyne API 701	Serial Number	4698
DACS make/model	Campbell Scientific CR3000	Serial Number	8205

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	38.0	38.7
Analyzer IP address	192.168.1.48		Lamp temp.	58.0	58.0
Calculated slope	0.988206	1.004873	Pressure	27.1	27.4
Calculated intercept	0.102207	-0.210053	Flow cell A	0.819	0.822
Analyzer Background	1.0	1.6	Flow cell B	0.819	0.822
Analyzer Coefficient	1.304	1.281	Cell A Intensity	NA	NA
			Cell B Intensity	NA	NA

Analyzer make	Teledyne API T400	Analyzer serial #	1107
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### Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.00	0.0	1.2	----
as found span	6000	235.0 - 832.2	105.8	107.7	0.982
calibrator zero	6000	0.00	0.0	0.1	----
high point	6000	235.0 - 832.2	105.8	105.5	1.002
second point	6000	178.2 - 792.9	85.2	84.8	1.005
third point	6000	114.1 - 736.9	53.6	53.9	0.995
as left zero	6000	0.00	0.0	0.7	----
as left span	6000	235.0 - 832.2	105.8	106.1	0.997
Average Correction Factor					1.001

Corrected As found	106.5	Previous response	107.0	% change	0.4%
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**Notes:**

Sample inlet filter changed after as founds. Zero and span adjusted. Second point was around 3% high. Ran another span point and adjusted again.

Calibration Performed By: Devin Russell



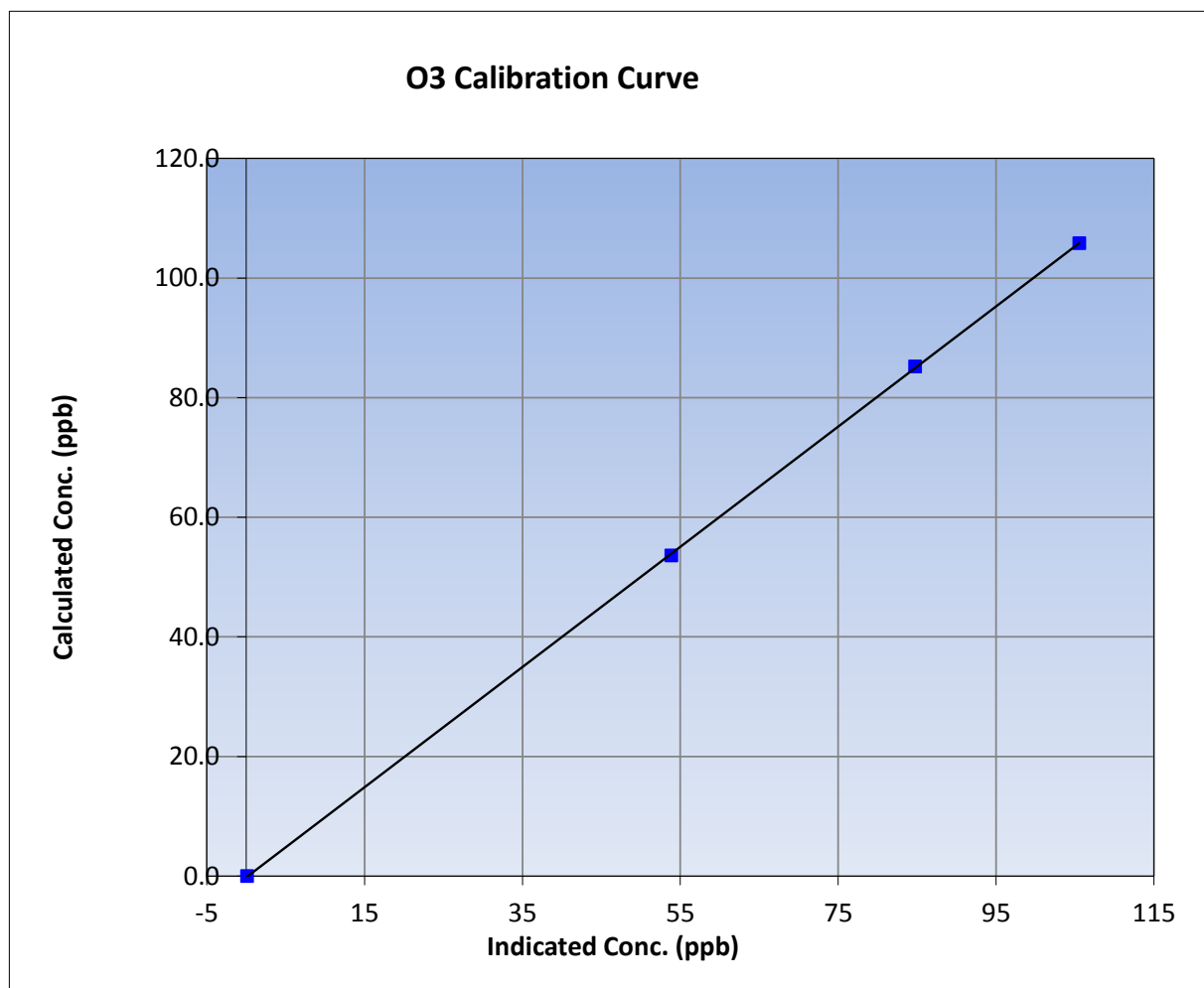
## Wood Buffalo Environmental Association O3 Calibration Report

### Station Information

Calibration Date	October-07-15	Previous Calibration	September 2, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	14:15	End Time (MST)	19:05
Analyzer make	Teledyne API T400	Analyzer serial #	1107

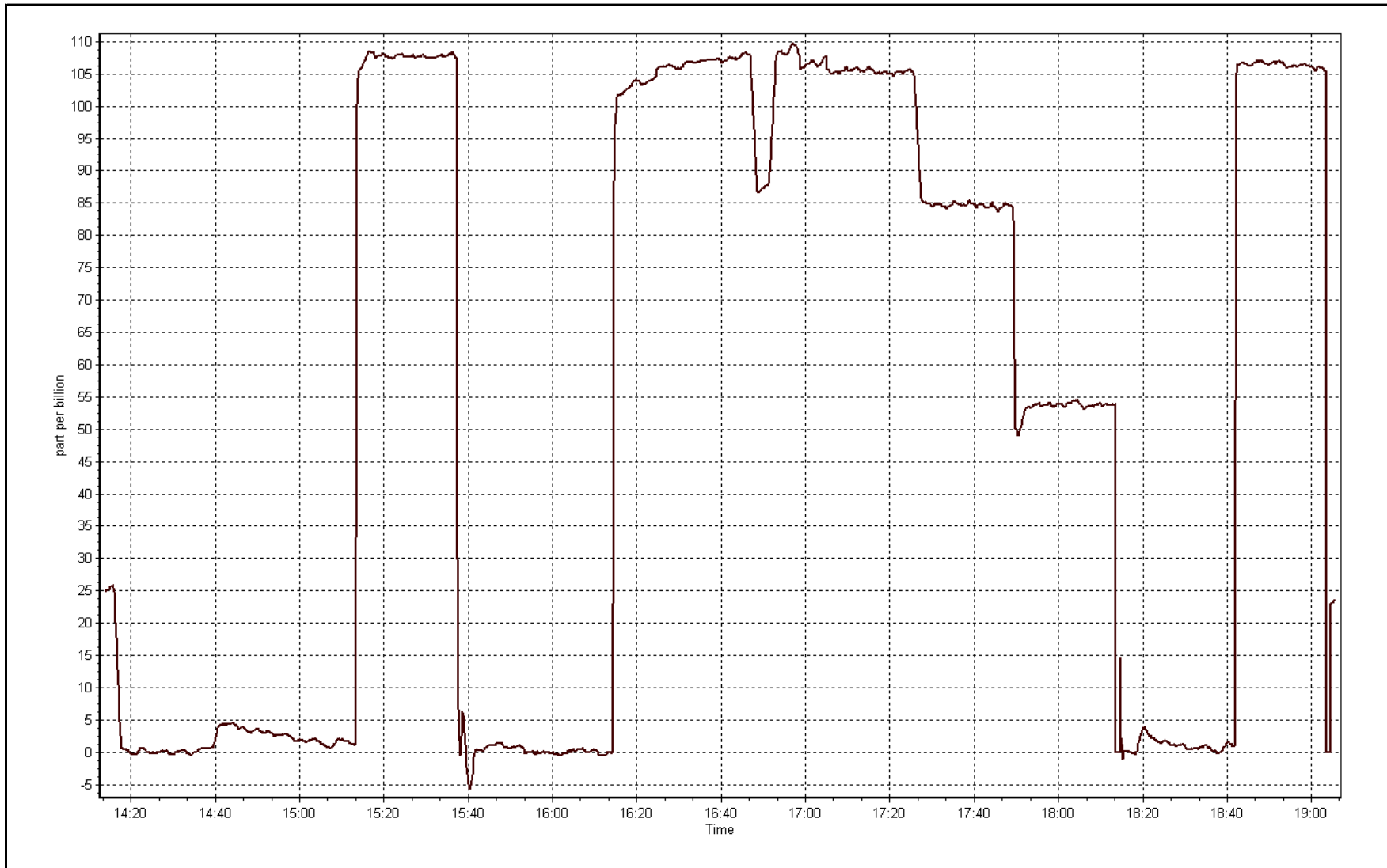
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999974
105.8	105.5	1.0025		
85.2	84.8	1.0053	Slope	1.004873
53.6	53.9	0.9954		
			Intercept	-0.210053



O3 Calibration Plot

Date: October 7, 2015





# Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

## Station Information

Calibration Date	October 7, 2015	Previous Calibration	September 2, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	8:50	End Time (MST)	14:00
NO Cal Gas Conc	20.2 ppm	Gas Cert Reference	LL103809
NOx Cal Gas Conc	20.2 ppm	Cal Gas Expiry Date	16/09/2016
Calibrator	Teledyne API T700	Serial Number	747
Zero air Generator	Teledyne API T701	Serial Number	4698

## DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	8205
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## Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.997428	1.004061	0.994235
	Data Offset	0.606079	0.665139	-0.010864
Current Calibration	Data Slope	0.997392	0.996801	1.007629
	Data Offset	0.733116	0.850012	-0.129017

## Analyzer Information

Analyzer make/model	Teledyne API T200u	Analyzer serial #	172
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Test Point	before		after	
		ppb		ppb
Concentration range	0-200		0-200	
Analyzer IP	192.168.1.72		192.168.1.72	
NO coefficient	1.150		1.173	
NOx coefficient	1.167		1.183	
NO2 coefficient	1.000		1.000	
NO bkgrnd	0.1		0.1	
NOx bkgrnd	0.2		0.2	
Chamber Temp	40	Deg C	40	Deg C
Moly Temp	315	Deg C	314.2	Deg C
HVPS	502	V	502	V
PMT Temp	5	Deg C	5.1	Deg C
O3 flow	88	ccm	88	ccm
R Cell press NO	3.8	"Hg	3.8	"Hg
R Cell Press Nox	3.8	"Hg	3.8	"Hg
NO sample flow	1117	ccm	1111	ccm
Nox sample Flow	1094	ccm	1088	ccm

Notes:

Filter changed after As Finds. Span adjusted.



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date:

October 7, 2015

Station Number:

AMS 8

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	6000	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	----	----
as found span	6000	44.6	150.2	150.2	0.0	148.2	147.2	1.0	1.0129	1.0199
calibrator zero	6000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
high point	6000	44.6	150.2	150.2	0.0	150.2	150.3	-0.1	0.9994	0.9991
second point	6000	23.8	80.1	80.1	0.0	79.0	78.8	0.2	1.0144	1.0164
third point	6000	11.9	40.1	40.1	0.0	39.0	38.8	0.2	1.0267	1.0326
as left zero	6000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
as left span	6000	44.6	150.2	43.6	106.6	151.2	44.9	106.3	0.9932	0.9699
Average Correction Factor									1.0135	1.0160

Corrected As found

NO<sub>x</sub>= 148.3

NO= 147.3

Percent Change

NO<sub>x</sub>= 1.1%

NO= 1.1%

Previous Response

NO<sub>x</sub>= 149.9

NO= 148.9

### GPT Calibration Data

Dilution Flow

6000

ccm

Source Gas Flow

44.60

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO2 (300)	----	43.6	105.8	148.4	43.6	104.8	1.0044	1.0000	1.0096	99.0%
2nd NO2 (200)	----	64.2	85.2	149.2	64.2	85.0	0.9992	1.0000	1.0026	99.7%
3rd NO2 (100)	----	95.8	53.6	149.3	95.8	53.5	0.9982	1.0000	1.0017	99.8%
4th NO2 (0)	149.4	----	0.1	149.5	149.4	0.1	0.9970	1.0000	N/A	----
Average Correction Factor							0.9997	1.0000	1.0046	99.5%

Calibration Performed By:

Devin Russell



# Wood Buffalo Environmental Association

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

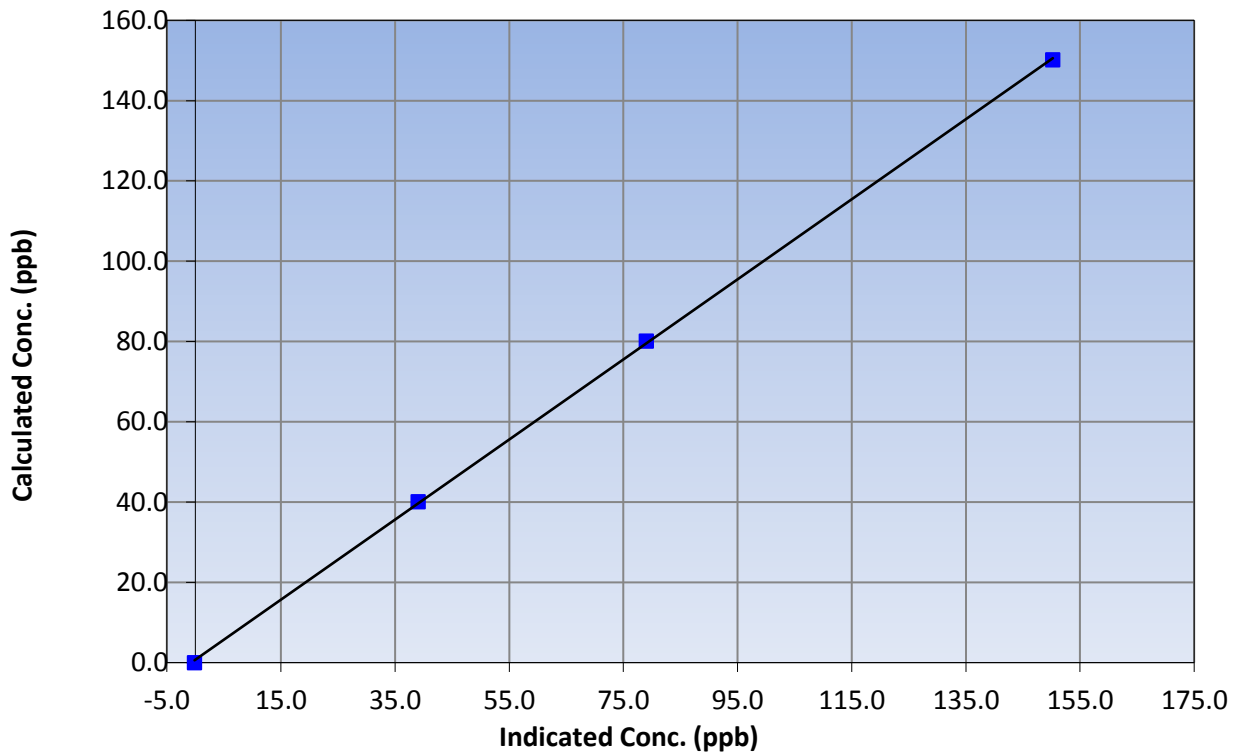
### Station Information

Calibration Date	October 7, 2015	Previous Calibration	September 2, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	8:50	End Time (MST)	14:00
Analyzer make	Teledyne API T200u	Analyzer serial #	172

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999912
150.2	150.2	0.9994		
80.1	79.0	1.0144	Slope	0.997392
40.1	39.0	1.0267		
			Intercept	0.733116

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







# Wood Buffalo Environmental Association

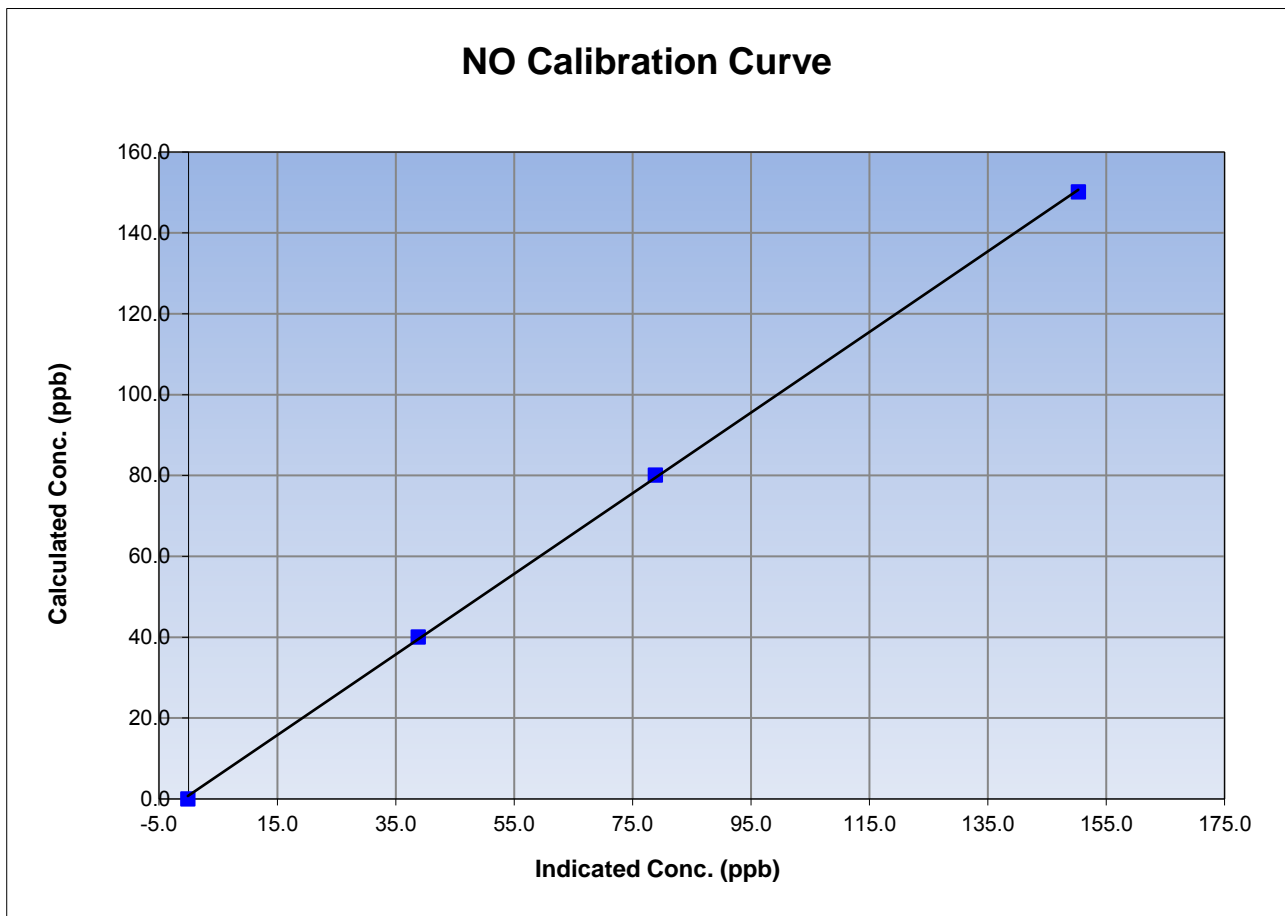
## NO Calibration Summary

### Station Information

Calibration Date	October 7, 2015	Previous Calibration	September 2, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	8:50	End Time (MST)	14:00
Analyzer make	Teledyne API T200u	Analyzer serial #	172

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999873
150.2	150.3	0.9991		
80.1	78.8	1.0164	Slope	0.996801
40.1	38.8	1.0326		
			Intercept	0.850012





# Wood Buffalo Environmental Association

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

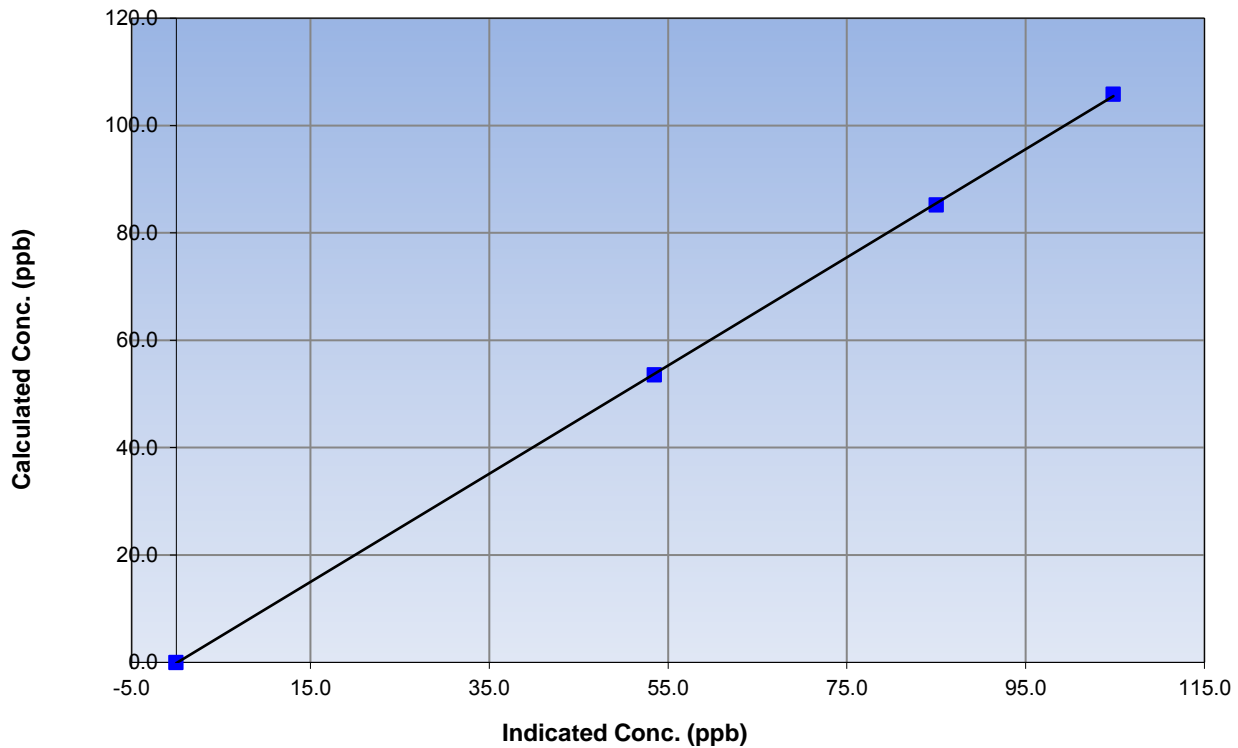
### Station Information

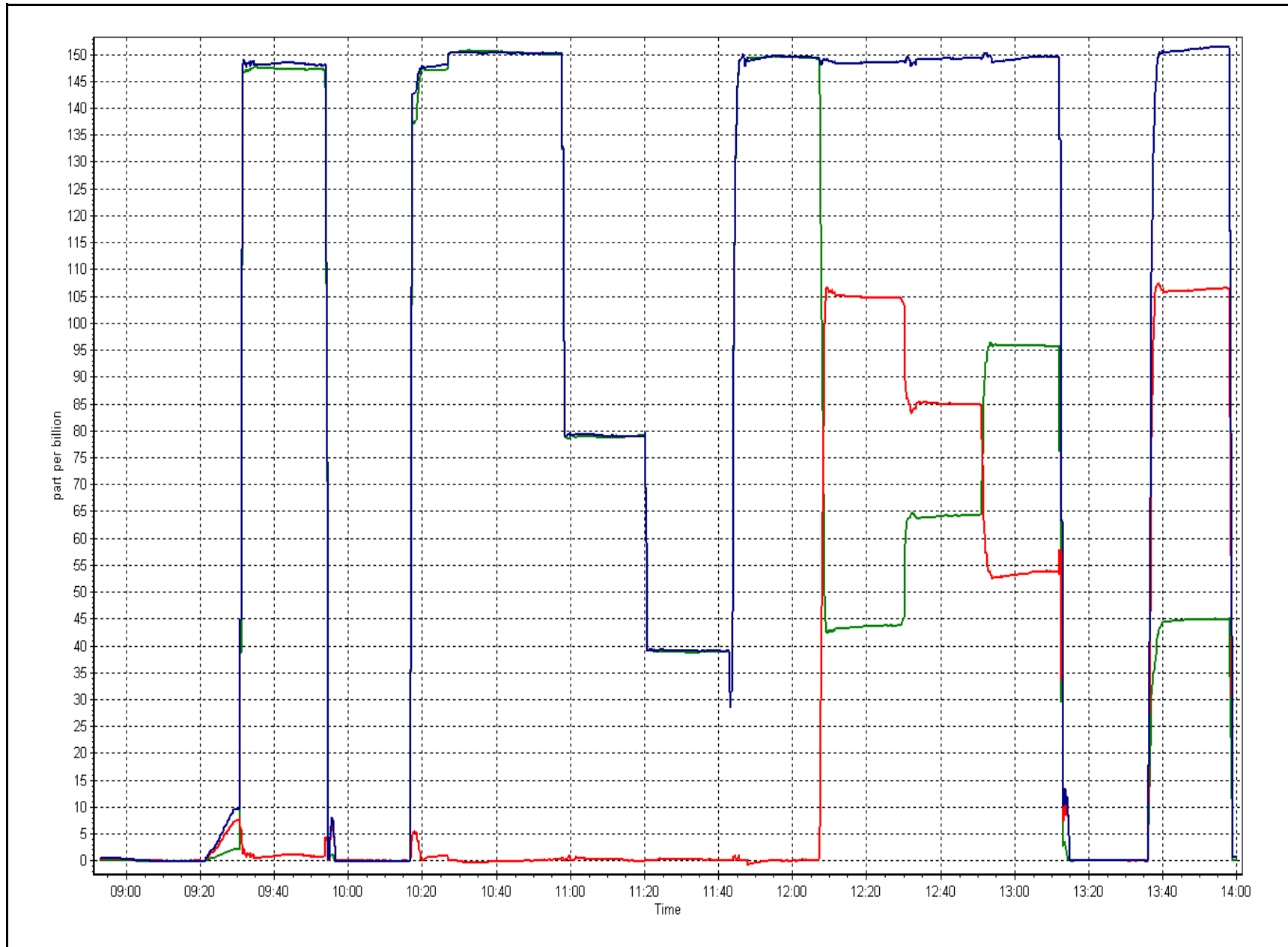
Calibration Date	October 7, 2015	Previous Calibration	September 2, 2015
Station Number	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	8:50	End Time (MST)	14:00
Analyzer make	Teledyne API T200u	Analyzer serial #	172

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999959
105.8	104.8	1.0096		
85.2	85.0	1.0026	Slope	1.007629
53.6	53.5	1.0017		
			Intercept	-0.129017

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







## Wood Buffalo Environmental Association

### SHARP CALIBRATION

#### STATION INFORMATION

Calibration Date:	<u>October 7, 2015</u>	Previous Calibration:	<u>September 2, 2015</u>
Station Name:	<u>Fort Chipewyan</u>	Station Number:	<u>AMS 8</u>
Start Time (MST):	<u>10:53</u>	End Time (MST):	<u>12:45</u>
Calibrator Make/Model:	<u>Delta Cal</u>	Calibrator Serial Number:	<u>954</u>

#### SHARP INFORMATION

Particulate Fraction:	<u>PM2.5</u>
Make/Model:	<u>Thermo / SHARP 5030</u>
Serial Number	<u>E-2025</u>
C <sub>14</sub> Source SN:	<u>7414</u>
Confirmation of Time settings:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Parameters Checked:	T1 <input type="checkbox"/> T2 <input type="checkbox"/> T3 <input type="checkbox"/> T4 <input type="checkbox"/> P3 <input type="checkbox"/> Main Flow <input checked="" type="checkbox"/> Beta <input type="checkbox"/> Neph <input checked="" type="checkbox"/>

#### CALIBRATION DATA

##### Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	7.0	6.9	-0.1	7.0
T2	21.0	na	na	21.0
T3	20.0	na	na	20.0
T4	25.0	na	na	25.0
RH (%)	27.0	na	na	27.0

##### Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	985	983.9	-1.1	985

##### Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1012	12	1003	1000

#### Nephelometer Calibration

Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	181		180
Neph	7.7		0
C14	40.3		30.4
Indicated Concentration (ug/m3)	<b>1.2</b>	<b>yes</b>	<b>0</b>
Offset 1	181		180.6
Offset 2	30.5		30.7

#### Leak Check (Quarterly)

Leak Check Date:	<u>October 7, 2015</u>	Previous Leak Check Date:	<u>August 5, 2015</u>
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	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.72	
*Flow with adaptor (LPM):	16.63	0.09

\*Note - do not attach adaptor without shutting off the pump first

#### Mass Foil Calibration (Annually)

Foil Calibration Date:	<u>May 6, 2015</u>	Previous Foil Calibration:	NA
Zeroed?:			
Foil Mass:	<u>1324</u>		<u>Mass foil set S/N:</u>
Previous Correction Factor:	<u>7081</u>		
New Correction Factor:	<u>7022</u>		

#### INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	02/09/2015
Pump	Good	NA
Filter Tape	Good	NA
Mass Foil Cal Set	na	NA
HEPA filter	Good	NA

#### NOTES:

Cyclone head cleaned. Leak check completed. Nephelometer adjusted. Flow adjusted.

Calibration Performed By:	<u>Devin Russell</u>
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## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 9  
BARGE LANDING  
OCTOBER 2015**

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

November 26, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)  
OCTOBER 2015

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	709	35	35	100.00	2	0	1	0
THC(ppm) Average	708	36	36	100.00	4.6	-	2.7	-
Temperature (C) Average	744	0	0	100.00	24.9	-	17	-
Relative Humidity (%) Average	744	0	0	100.00	98	-	90	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	26	-	9	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)  
 OCTOBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
TRS(ppb) Average	709	0.3	0	-	0	0	0	0	0	1	2
THC(ppm) Average	708	2.26	0.2	-	2	2.1	2.1	2.2	2.4	2.5	4.6
Temperature (C) Average	744	5.46	5.6	-	-4.4	-0.9	1.3	4.6	8.3	13.4	24.9
Relative Humidity (%) Average	744	72.2	18	-	28	43	60	76	87	94	98
Wind Speed 10 m (km/h) Average	744	6.4	4	-	0	2	4	6	8	11	26
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)  
OCTOBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
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No operational issues to report



Summary of Hour Averages

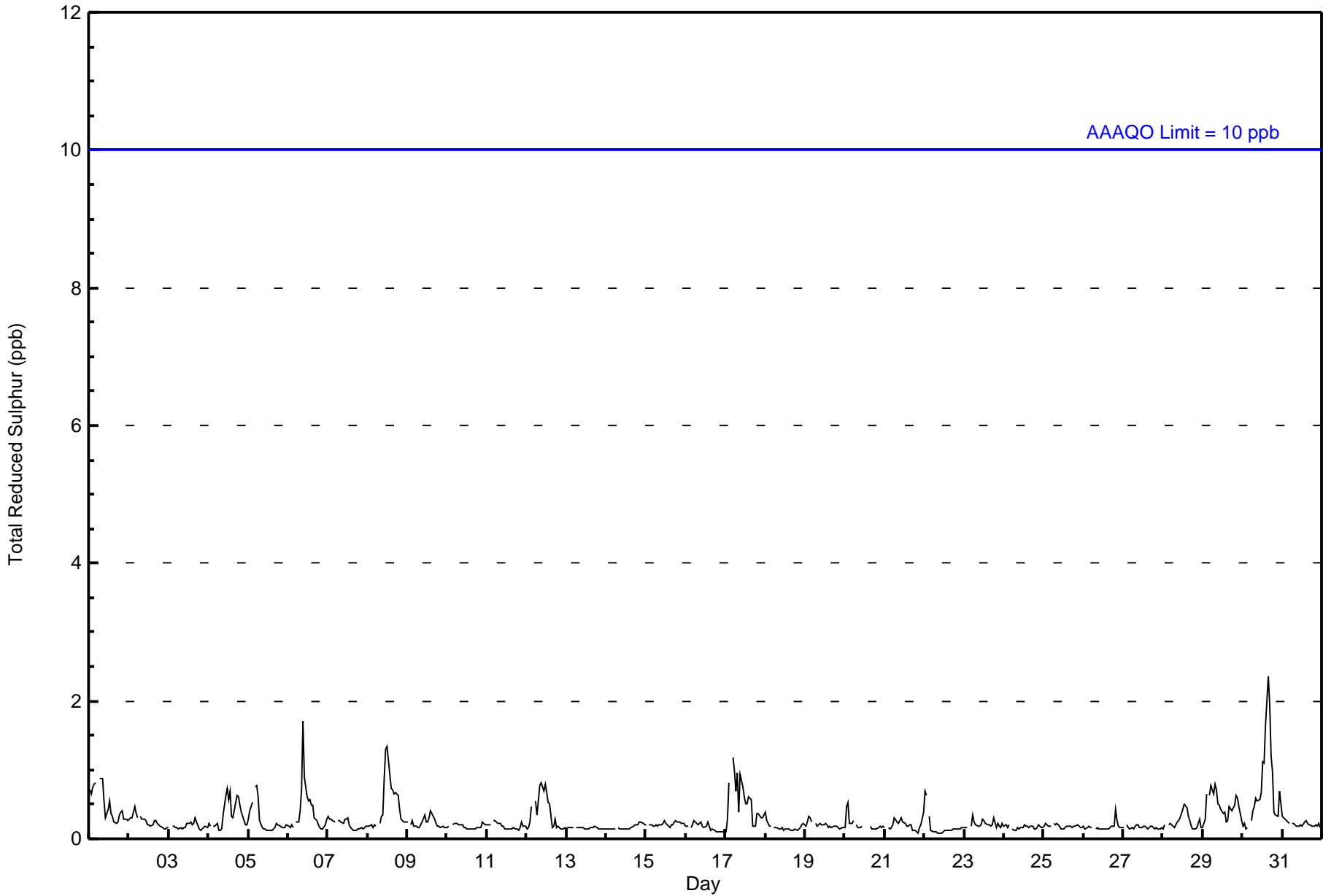
Barge Landing - October 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 2 ppb on Oct 30 16:00	Maximum Daily Average: 0.7 ppb on Oct 30		Hours of Data:	709
Minimum Value: 0 ppb on Oct 21 21:00	Minimum Daily Average: 0.2 ppb on Oct 13		Hours of Missing Data:	35
Maximum Diurnal Average: 0.3 ppb at hour 13	Minimum Diurnal Average: 0.2 ppb at hour 22		Hours of Calibration:	35
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	1	1	1	1	1	Z	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
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	0.2	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	0.2	0
4-Oct	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	0	0	1	1	1	0	0	0	0	0	0	0.4	1
5-Oct	0	0	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.3	1
6-Oct	0	0	0	0	Z	0	0	0	1	2	1	1	1	1	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	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	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.5	1
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	0.2	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	0.2	0
12-Oct	0	0	0	0	Z	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	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	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	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	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	0.2	0
17-Oct	0	0	1	Z	1	1	1	1	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.5	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	0.2	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	0.2	0
20-Oct	0	0	1	0	0	0	Z	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.2	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	0.2	0
22-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	0.2	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	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	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
29-Oct	0	0	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.5	1
30-Oct	0	0	0	0	Z	0	0	0	1	1	1	1	1	1	2	2	2	1	1	0	0	0	1	1	0	0.7	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	0.2	0

0.2	0.3	0.3	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	0.2	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	1	1	1	1	2	1	1	1	1	2	2	2	1	1	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**  
**Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Barge Landing - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	709	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: 709

Total Number of Hours: 744



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

**Total Reduced Sulphur (TRS) - ppb**  
**Barge Landing - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	83	51	34	24	14	13	34	49	86	50	38	66	33	27	44	63	709
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>	83	51	34	24	14	13	34	49	86	50	38	66	33	27	44	63	709

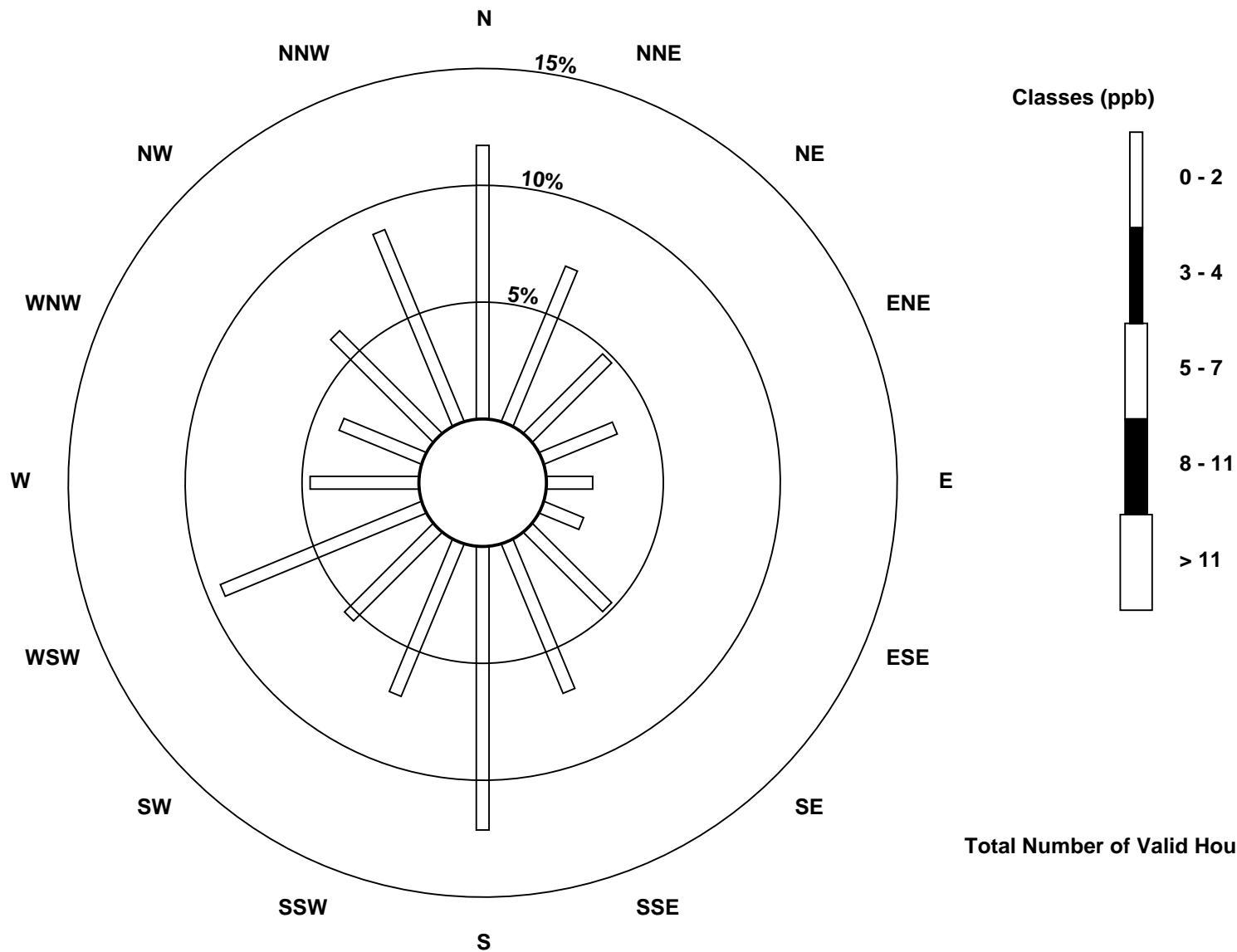
Total Number of Valid Hours: 709

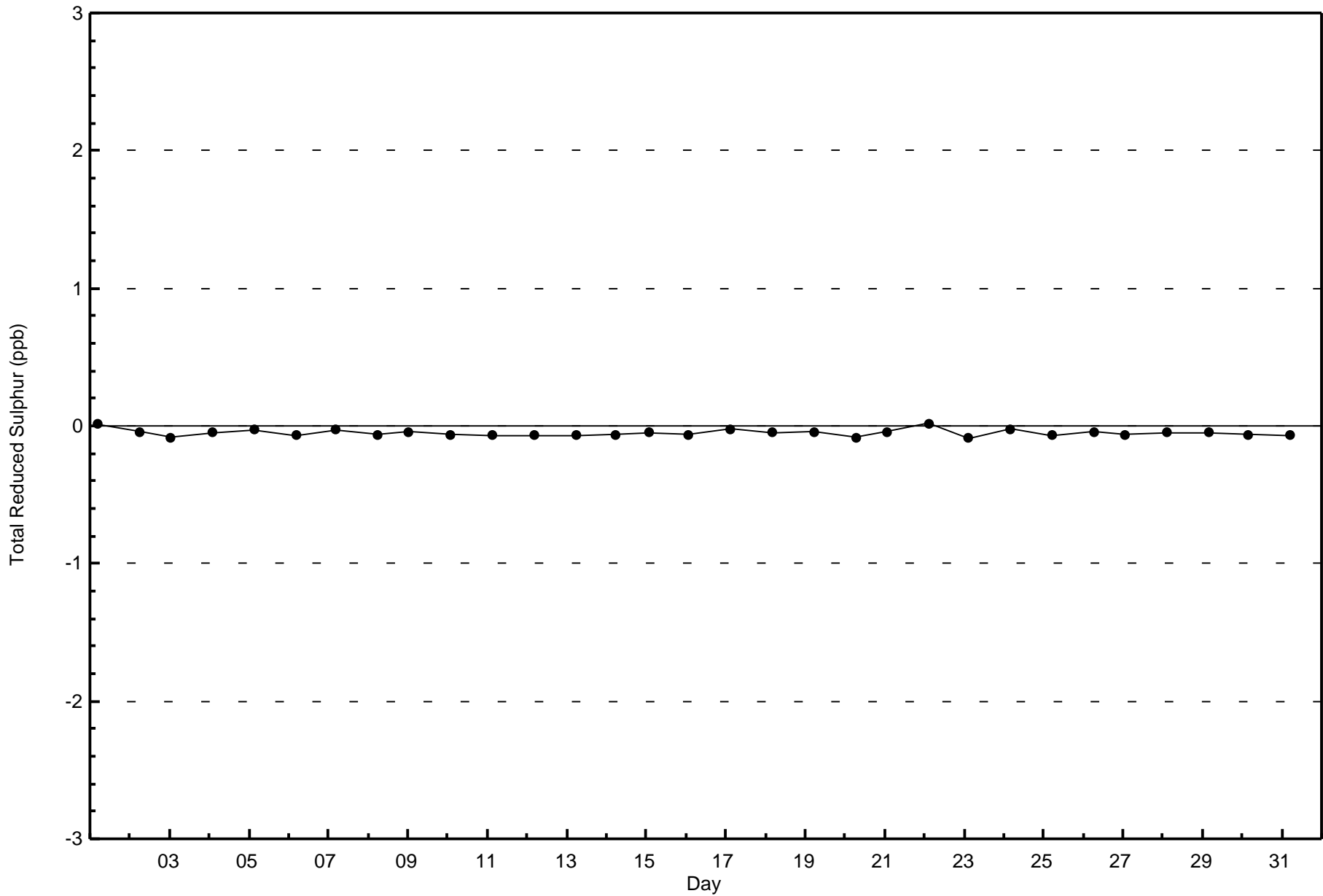
Total Number of Hours: 744

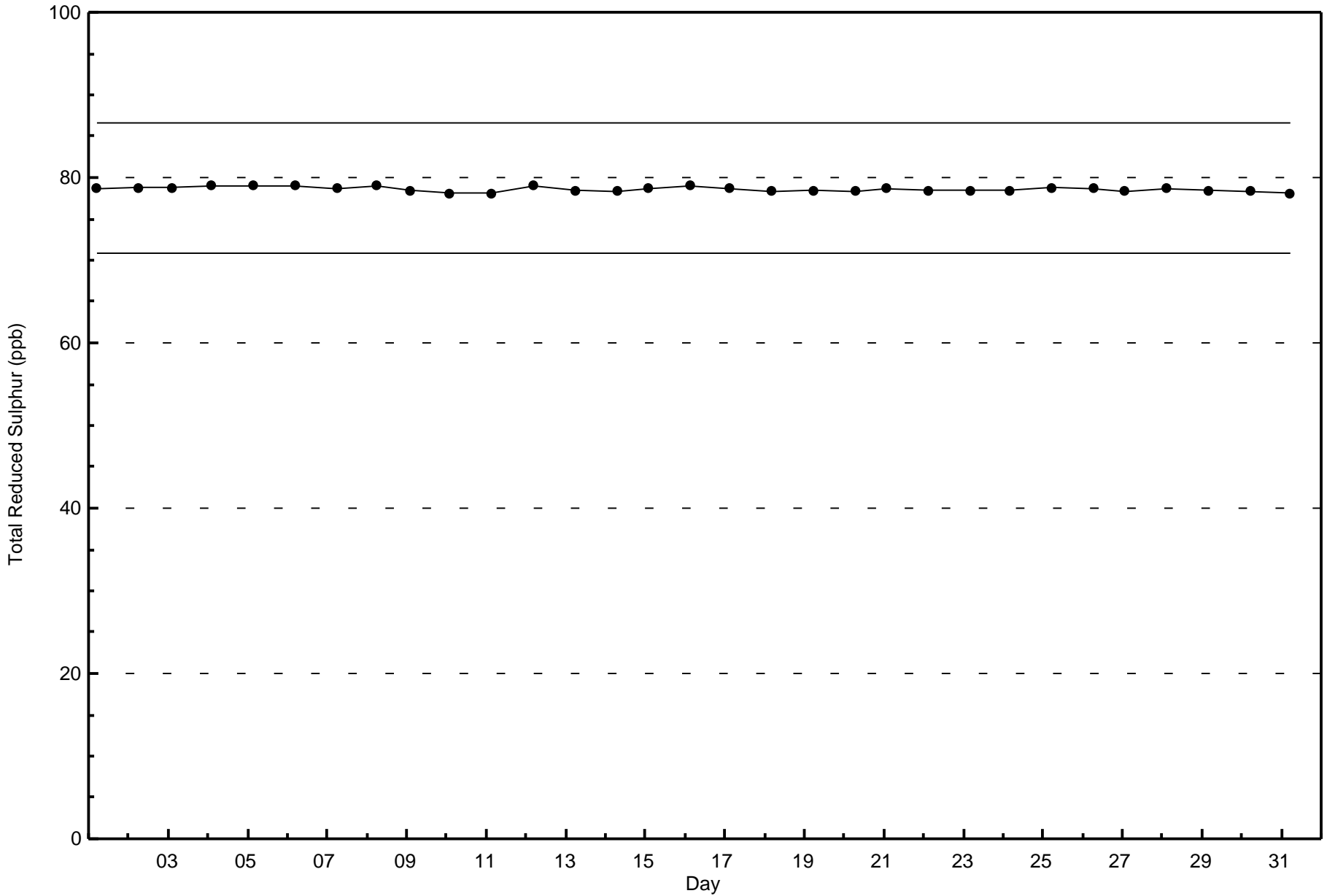


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Total Reduced Sulphur (TRS) - ppb  
Barge Landing (AMS 9)









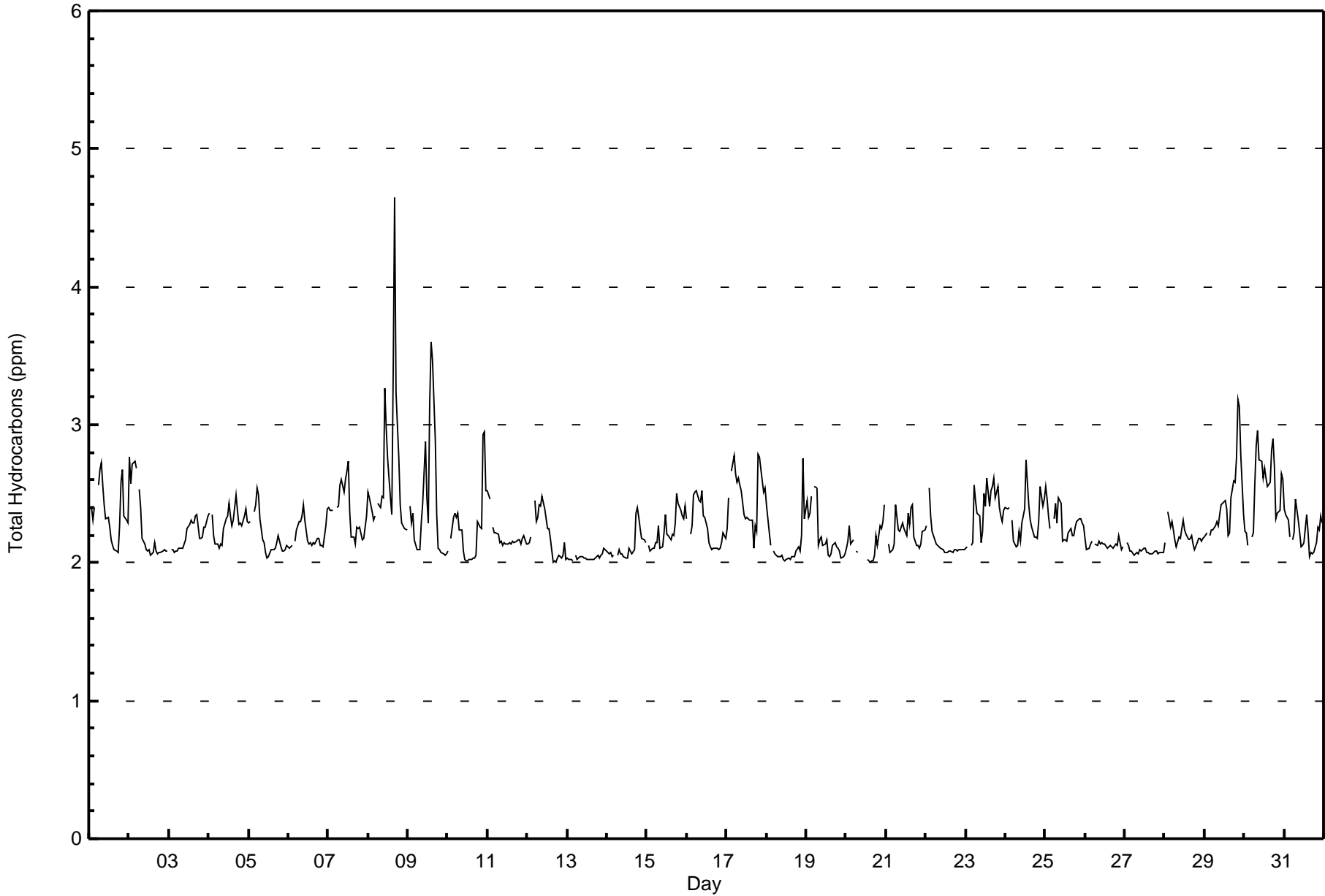


Maximum Value: 4.6 ppm on Oct 8 17:00		Maximum Daily Average: 2.7 ppm on Oct 8		Hours in Service: 744																																												
Minimum Value: 2.0 ppm on Oct 12 18:00		Minimum Daily Average: 2.0 ppm on Oct 13		Hours of Data: 708																																												
Maximum Diurnal Average: 2.3 ppm at hour 1		Minimum Diurnal Average: 2.2 ppm at hour 15		Hours of Missing Data: 36																																												
Monthly Average: 2.26 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> = 2.4 P <sub>90</sub> = 2.5 P <sub>99</sub> = 3.2		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	2.4	2.4	2.3	2.4	Z	2.6	2.7	2.7	2.6	2.4	2.3	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.3	2.6	2.7	2.3	2.3	2.3	2.4	2.7																						
2-Oct	2.8	2.6	2.7	2.7	2.7	Z	2.5	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	2.1	2.1	2.1	2.1	2.8																						
3-Oct	Z	2.1	2.1	2.1	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	2.4	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.4																						
4-Oct	2.4	Z	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.4	2.3	2.3	2.3	2.5	2.4	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.5																						
5-Oct	2.3	2.3	Z	2.4	2.4	2.5	2.5	2.3	2.2	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.5																						
6-Oct	2.1	2.1	2.1	Z	2.2	2.2	2.3	2.3	2.3	2.4	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.3	2.4	2.4	2.7																						
7-Oct	2.4	2.4	2.4	2.4	Z	2.4	2.4	2.6	2.6	2.5	2.6	2.7	2.7	2.4	2.2	2.2	2.1	2.3	2.2	2.3	2.2	2.2	2.3	2.3	2.7																							
8-Oct	2.5	2.5	2.4	2.3	2.3	Z	2.4	2.4	2.5	2.5	3.3	3.0	2.8	2.5	2.3	3.4	4.6	3.2	2.8	2.4	2.3	2.3	2.2	2.2	4.6																							
9-Oct	Z	2.4	2.3	2.4	2.2	2.1	2.1	2.1	2.3	2.4	2.9	2.5	2.3	3.2	3.6	3.5	2.9	2.3	2.1	2.1	2.1	2.1	2.1	2.1	3.6																							
10-Oct	2.1	Z	2.2	2.3	2.4	2.3	2.4	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.3	2.2	2.9	2.9	2.5	2.9																							
11-Oct	2.5	2.5	Z	2.3	2.2	2.2	2.2	2.1	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.5																							
12-Oct	2.1	2.1	2.2	Z	2.5	2.3	2.3	2.4	2.4	2.5	2.4	2.3	2.3	2.2	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.5																							
13-Oct	2.0	2.0	2.0	2.0	Z	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	2.1	2.0	2.1	2.1	2.1	2.1	2.1																							
14-Oct	2.1	2.1	2.1	2.0	2.1	Z	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.4	2.4	2.3	2.2	2.2	2.2	2.1	2.4																							
15-Oct	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.1	2.1	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.5	2.4	2.4	2.3	2.3	2.4	2.5																							
16-Oct	2.3	Z	2.2	2.3	2.5	2.5	2.5	2.5	2.4	2.5	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.5																							
17-Oct	2.2	2.5	Z	2.7	2.8	2.6	2.6	2.6	2.6	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.1	2.3	2.2	2.8	2.8	2.6	2.5	2.5	2.8																							
18-Oct	2.4	2.3	2.1	Z	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.8	2.3	2.8																							
19-Oct	2.4	2.3	2.4	2.5	Z	2.6	2.5	2.1	2.2	2.2	2.1	2.1	2.2	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.6																							
20-Oct	2.1	2.2	2.3	2.1	2.2	Z	2.1	2.1	C	C	C	C	C	2.0	2.0	2.0	2.0	2.1	2.2	2.1	2.3	2.2	2.3	2.4	2.4																							
21-Oct	Z	2.1	2.1	2.1	2.1	2.1	2.4	2.2	2.2	2.3	2.3	2.2	2.2	2.4	2.3	2.4	2.4	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.4																							
22-Oct	2.3	Z	2.5	2.3	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	2.1	2.1	2.1	2.1	2.1	2.5																							
23-Oct	2.1	2.1	Z	2.1	2.1	2.6	2.5	2.4	2.3	2.1	2.2	2.5	2.4	2.6	2.4	2.5	2.6	2.6	2.5	2.6	2.4	2.3	2.3	2.4	2.6																							
24-Oct	2.4	2.4	2.4	Z	2.3	2.2	2.1	2.1	2.2	2.2	2.3	2.4	2.7	2.6	2.4	2.3	2.3	2.2	2.2	2.2	2.3	2.6	2.4	2.5	2.7																							
25-Oct	2.6	2.5	2.3	2.2	Z	2.3	2.4	2.3	2.5	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.6																							
26-Oct	2.2	2.1	2.1	2.1	2.2	Z	2.1	2.1	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2																							
27-Oct	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	2.1																							
28-Oct	2.1	Z	2.4	2.3	2.3	2.2	2.2	2.1	2.2	2.2	2.2	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	2.4																							
29-Oct	2.2	2.2	Z	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.4	2.4	2.5	2.4	2.2	2.2	2.5	2.6	2.6	2.8	3.2	3.1	2.8	2.3	3.2																							
30-Oct	2.2	2.2	2.1	Z	2.2	2.2	2.6	2.9	3.0	2.7	2.7	2.6	2.7	2.6	2.6	2.6	2.8	2.9	2.7	2.3	2.4	2.4	2.6	2.6	3.0																							
31-Oct	2.4	2.3	2.3	2.2	Z	2.2	2.2	2.5	2.3	2.2	2.1	2.1	2.1	2.3	2.2	2.0	2.1	2.1	2.1	2.1	2.3	2.2	2.3	2.3	2.5																							
																								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	2.2	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	Diurnal Average
																								2.8	2.6	2.7	2.7	2.8	2.6	2.7	2.9	3.0	2.7	3.3	3.0	2.8	3.2	3.6	3.5	4.6	3.2	2.8	2.8	3.2	3.1	2.9	2.6	Diurnal Maximum
Z - zerospan      C - Calibration																																																



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

**Total Hydrocarbons (THC) - ppm**  
**Barge Landing - October 2015**





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

**Total Hydrocarbons (THC) - ppm**  
**Barge Landing - October 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	55	7.77	7.77
2.1 - 3.0	644	90.96	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**

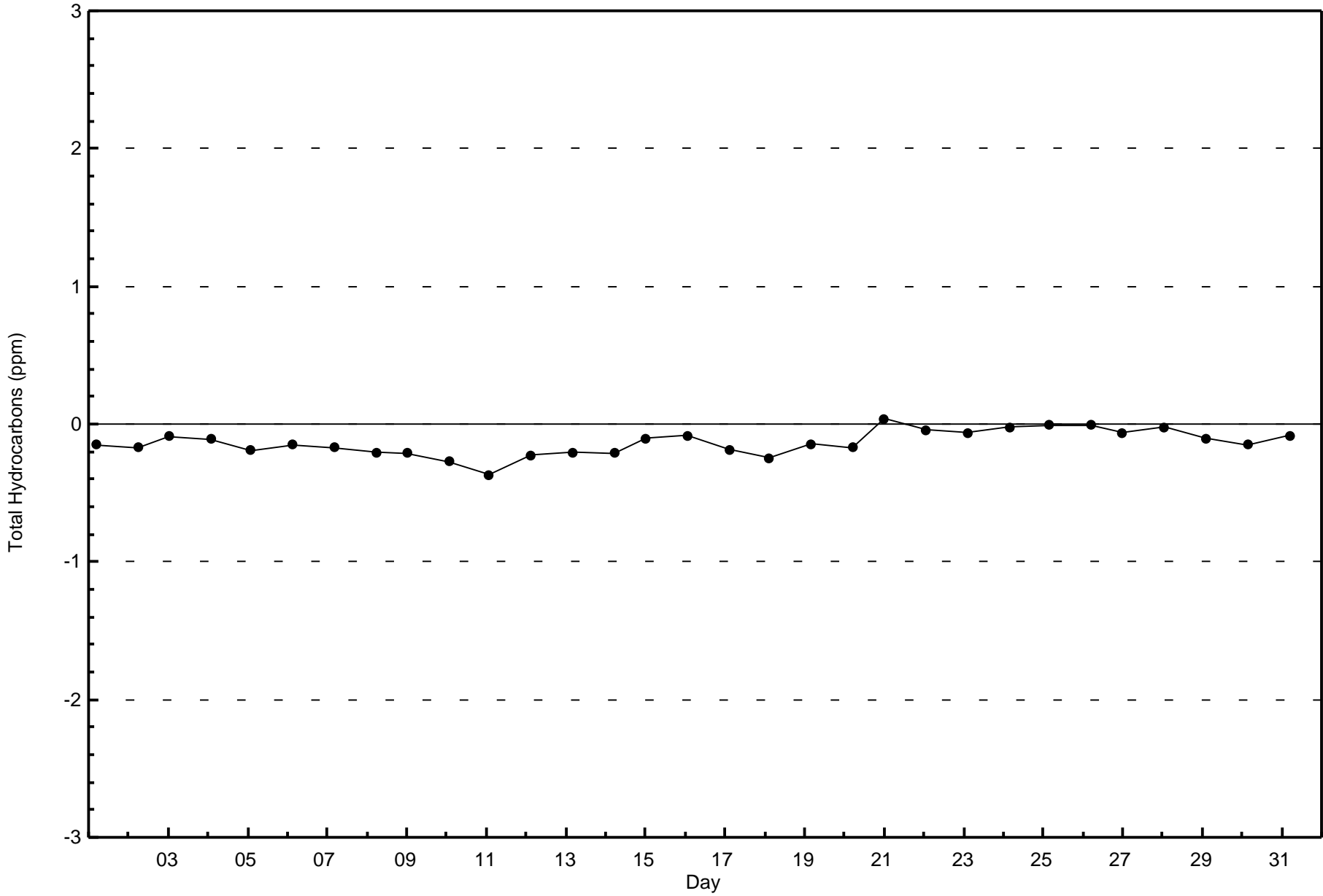
**Total Hydrocarbons (THC) - ppm**  
**Barge Landing - October 2015**

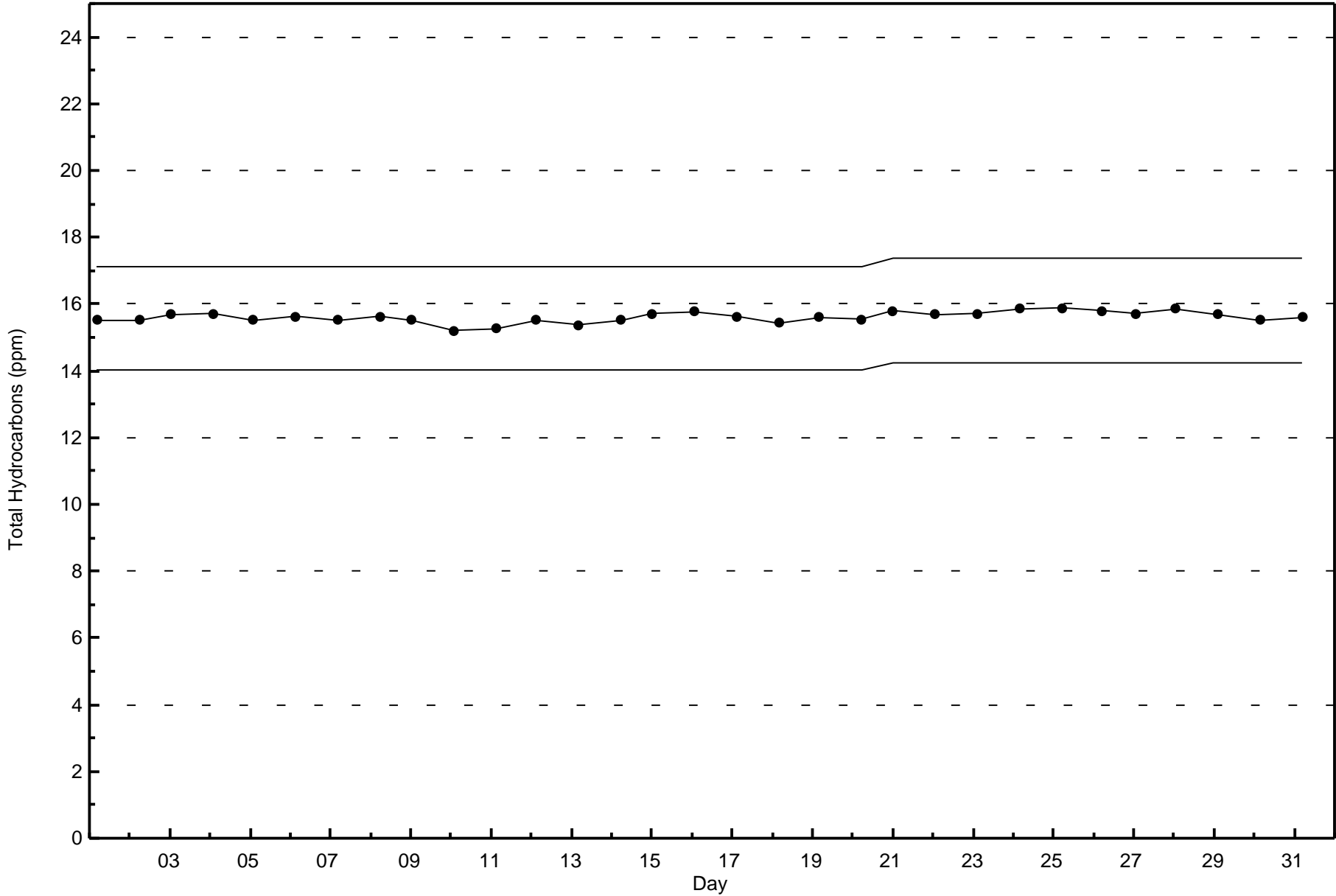
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	2	1	0	1	0	0	1	2	18	10	10	10	0	55
2.1 - 3.0	83	48	32	22	14	13	32	52	82	48	35	46	24	17	36	60	644
3.1 - 10.0	0	2	3	0	0	0	0	0	2	1	0	0	0	0	0	1	9
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	83	50	35	24	15	13	33	52	84	50	37	64	34	27	46	61	708

Total Number of Valid Hours: 708

Total Number of Hours: 744









**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Ambient Temperature (AT) - C**

**Barge Landing - October 2015**

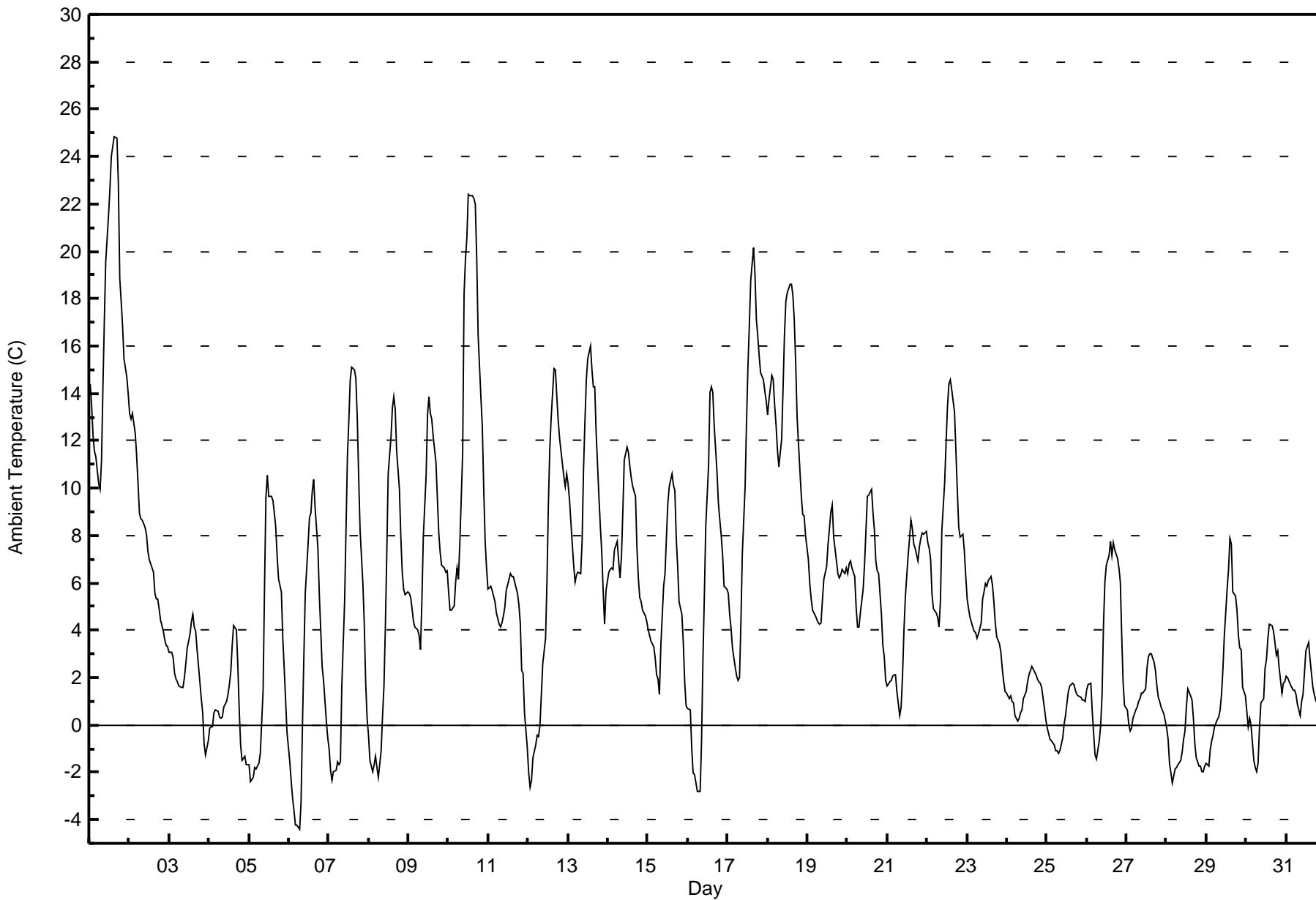
Maximum Value: 24.9 C on Oct 1 16:00		Maximum Daily Average: 17.0 C on Oct 1		Hours in Service: 744																																												
Minimum Value: -4.4 C on Oct 6 07:00		Minimum Daily Average: -0.9 C on Oct 28		Hours of Data: 744																																												
Maximum Diurnal Average: 9.9 C at hour 15		Minimum Diurnal Average: 2.1 C at hour 7		Hours of Missing Data: 0																																												
Monthly Average: 5.46 C		Percentiles: P <sub>1</sub> = -2.8 P <sub>10</sub> = -0.9 Q <sub>1</sub> = 1.3 Median = 4.6 Q <sub>3</sub> = 8.3 P <sub>90</sub> = 13.4 P <sub>99</sub> = 22.1		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	14.4	13.4	12.2	11.5	11.3	10.2	9.9	11.2	14.2	17.0	19.6	21.5	22.7	24.0	24.5	24.9	24.8	22.9	18.8	17.9	16.8	15.4	14.7	14.0	17.0	24.9																						
2-Oct	13.2	12.9	13.1	12.3	11.4	10.2	9.0	8.7	8.6	8.3	8.0	7.4	7.0	6.8	6.5	5.6	5.3	5.3	4.9	4.5	4.0	3.6	3.4	3.3	7.6	13.2																						
3-Oct	3.1	3.1	2.8	2.2	1.9	1.8	1.6	1.6	1.6	2.0	2.6	3.2	3.8	4.4	4.7	4.1	3.9	3.2	1.8	1.1	0.5	-0.8	-1.3	-0.7	2.2	4.7																						
4-Oct	-0.1	-0.1	-0.1	0.5	0.6	0.6	0.4	0.3	0.3	0.8	1.0	1.3	1.7	2.3	3.4	4.2	4.0	2.6	0.6	-0.9	-1.5	-1.3	-1.7	-1.7	0.7	4.2																						
5-Oct	-1.7	-2.4	-2.2	-1.8	-1.9	-1.7	-1.6	-1.2	1.5	5.8	9.6	10.5	9.7	9.7	9.5	8.9	8.3	7.1	6.2	5.6	3.7	2.4	1.0	-0.3	3.5	10.5																						
6-Oct	-1.6	-2.4	-3.1	-3.6	-4.2	-4.2	-4.4	-3.3	0.0	2.9	5.6	7.6	8.8	8.9	9.9	10.3	9.2	7.5	5.5	4.0	2.4	1.9	0.2	-0.6	2.4	10.3																						
7-Oct	-1.0	-1.9	-2.3	-2.0	-1.9	-1.6	-1.7	-1.5	1.7	5.2	8.3	11.3	12.8	14.6	15.1	15.0	14.6	13.0	10.5	8.2	5.9	4.2	1.7	0.3	5.4	15.1																						
8-Oct	-0.4	-1.5	-2.0	-1.7	-1.3	-1.8	-2.2	-1.1	0.4	1.6	4.1	7.2	10.6	12.1	13.4	13.8	13.3	11.6	10.0	7.9	6.5	5.7	5.5	5.6	4.9	13.8																						
9-Oct	5.5	5.4	4.9	4.4	4.1	4.0	3.8	3.2	5.3	8.0	10.5	13.1	13.9	13.2	12.9	12.2	11.1	9.6	8.1	7.3	6.7	6.7	6.5	6.5	7.8	13.9																						
10-Oct	5.6	4.8	4.8	5.0	6.0	6.6	6.1	7.7	11.5	18.2	19.7	20.6	22.4	22.4	22.3	22.2	22.0	19.7	16.5	13.8	12.6	10.0	7.8	6.6	13.1	22.4																						
11-Oct	5.7	5.8	5.7	5.5	5.2	4.7	4.2	4.1	4.3	4.6	5.0	5.7	6.2	6.4	6.3	6.3	6.1	5.5	5.1	4.3	2.3	2.2	0.5	-0.9	4.6	6.4																						
12-Oct	-2.0	-2.6	-2.3	-1.4	-0.8	-0.4	-0.5	0.0	1.3	2.6	3.6	6.1	9.3	11.7	13.0	15.1	15.0	13.9	12.8	12.1	11.0	10.5	10.1	10.6	6.2	15.1																						
13-Oct	10.2	9.5	7.7	6.7	6.0	6.3	6.4	6.4	7.7	10.8	12.8	14.6	15.4	16.0	15.0	14.3	14.3	12.3	9.6	8.3	7.3	5.6	4.3	5.7	9.7	16.0																						
14-Oct	6.4	6.6	6.7	6.6	7.4	7.7	6.9	6.2	7.1	9.1	11.2	11.7	11.5	10.9	10.4	10.1	9.6	7.5	6.2	5.4	5.2	4.8	4.6	4.4	7.7	11.7																						
15-Oct	4.0	3.8	3.5	3.3	2.9	2.1	1.9	1.3	3.3	5.9	6.4	7.9	9.3	10.1	10.6	10.1	9.9	7.9	6.7	5.2	4.7	3.5	1.8	0.8	5.3	10.6																						
16-Oct	0.7	0.7	-1.0	-2.0	-2.1	-2.5	-2.8	-2.8	-0.7	2.9	5.5	8.4	11.0	14.0	14.3	14.0	12.6	10.7	9.4	8.6	8.0	7.1	5.9	5.7	5.2	14.3																						
17-Oct	5.6	4.6	4.1	3.2	2.4	2.1	1.9	2.0	4.3	7.2	10.1	12.8	15.1	16.9	18.8	20.1	19.0	17.1	16.4	15.6	14.9	14.6	14.1	13.7	10.7	20.1																						
18-Oct	13.1	13.7	14.7	14.5	13.5	12.7	11.6	10.9	12.1	14.2	16.5	17.9	18.2	18.6	18.6	18.1	17.1	15.2	12.9	10.7	9.7	8.9	8.8	8.0	13.8	18.6																						
19-Oct	7.0	6.0	5.3	4.8	4.7	4.6	4.3	4.2	4.3	5.3	6.1	6.7	7.6	8.3	9.0	9.3	7.9	7.0	6.4	6.2	6.3	6.6	6.4	6.6	6.3	9.3																						
20-Oct	6.4	6.8	6.9	6.6	6.2	5.0	4.1	4.1	4.7	5.8	6.8	8.2	9.7	9.7	10.0	9.0	8.2	6.9	6.5	6.4	4.7	3.3	2.9	1.9	6.3	10.0																						
21-Oct	1.6	1.8	1.9	2.1	2.1	2.1	1.4	0.4	0.7	2.0	4.0	5.4	7.1	7.9	8.7	8.3	7.6	7.5	6.9	7.5	7.9	8.1	8.1	8.1	5.0	8.7																						
22-Oct	7.7	7.4	7.0	5.5	4.9	4.7	4.5	4.1	5.2	8.2	10.2	11.9	13.4	14.4	14.6	14.2	13.2	11.5	9.9	8.3	7.9	8.0	7.4	6.3	8.8	14.6																						
23-Oct	5.3	4.9	4.6	4.1	4.0	3.9	3.7	3.8	4.3	5.3	5.6	6.0	5.8	6.1	6.2	5.9	5.2	4.3	3.7	3.4	3.1	2.3	1.8	1.4	4.4	6.2																						
24-Oct	1.3	1.1	1.2	1.0	0.9	0.4	0.1	0.3	0.5	0.7	1.1	1.4	1.8	2.1	2.3	2.5	2.4	2.1	1.9	1.8	1.7	1.6	0.7	0.2	1.3	2.5																						
25-Oct	-0.1	-0.4	-0.6	-0.7	-0.8	-1.1	-1.1	-1.2	-1.1	-0.5	0.1	0.4	0.9	1.4	1.7	1.8	1.7	1.5	1.3	1.2	1.2	1.1	1.0	1.0	0.4	1.8																						
26-Oct	1.5	1.7	1.7	0.6	-0.4	-1.3	-1.5	-0.7	0.0	1.3	4.2	6.1	6.8	7.2	7.8	7.2	7.7	7.4	7.1	6.6	6.0	3.7	1.7	0.8	3.5	7.8																						
27-Oct	0.6	0.0	-0.3	-0.2	0.3	0.6	0.8	1.0	1.1	1.3	1.3	1.5	2.4	2.9	3.0	3.0	2.7	2.3	1.7	1.2	1.0	0.8	0.4	0.2	1.2	3.0																						
28-Oct	-0.1	-0.6	-1.6	-2.4	-2.1	-1.8	-1.8	-1.7	-1.5	-1.1	-0.6	-0.2	0.8	1.5	1.2	1.1	0.3	-0.8	-1.4	-1.8	-1.7	-2.0	-2.0	-1.7	-0.9	1.5																						
29-Oct	-1.6	-1.7	-1.0	-0.7	-0.5	-0.1	0.2	0.3	0.6	1.3	2.4	3.8	5.7	6.6	7.9	7.6	5.6	5.4	4.9	3.8	3.3	3.2	1.6	1.3	2.5	7.9																						
30-Oct	0.6	-0.1	0.3	0.0	-1.5	-1.8	-2.0	-1.6	-0.2	0.9	1.1	2.4	2.8	3.6	4.3	4.2	3.9	3.5	3.0	3.2	2.4	1.4	1.8	1.8	1.4	4.3																						
31-Oct	2.1	2.0	1.7	1.6	1.5	1.5	1.3	0.9	0.4	1.0	1.3	2.2	3.1	3.5	2.8	2.2	1.6	1.3	1.1	0.8	0.4	0.3	0.4	0.4	1.5	3.5																						
																								3.6	3.3	3.0	2.8	2.6	2.4	2.1	2.2	3.4	5.1	6.6	7.9	8.9	9.6	9.9	9.9	9.3	8.1	6.9	6.1	5.3	4.6	3.9	3.5	Diurnal Average
																								14.4	13.7	14.7	14.5	13.5	12.7	11.6	11.2	14.2	18.2	19.7	21.5	22.7	24.0	24.5	24.9	24.8	22.9	18.8	17.9	16.8	15.4	14.7	14.0	Diurnal Maximum





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

**Ambient Temperature (AT) - C**  
**Barge Landing - October 2015**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C  
Barge Landing - October 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	109	14.65	14.65
0 - 10	492	66.13	80.78
10 - 20	129	17.34	98.12
> 20	14	1.88	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

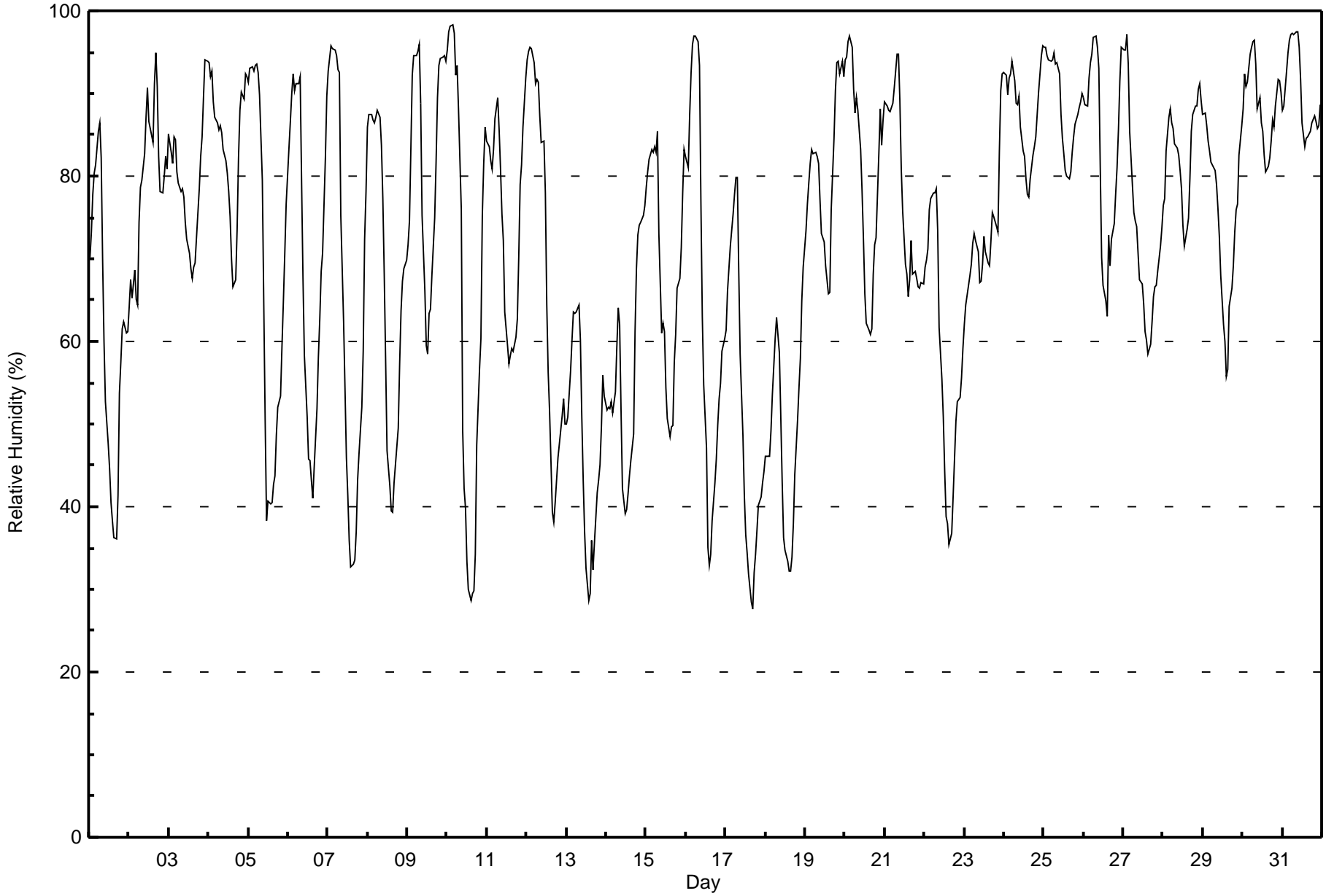
**Relative Humidity (RH) - %  
Barge Landing - October 2015**

Maximum Value: 98 % on Oct 10 04:00      Maximum Daily Average: 90.2 % on Oct 31																		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 17 17:00      Minimum Daily Average: 47.8 % on Oct 13 Maximum Diurnal Average: 85.0 % at hour 7      Minimum Diurnal Average: 55.2 % at hour 15 Monthly Average: 72.2 %      Percentiles: P <sub>1</sub> = 30 P <sub>10</sub> = 43 Q <sub>1</sub> = 60 Median = 76 Q <sub>3</sub> = 87 P <sub>90</sub> = 94 P <sub>99</sub> = 97																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	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	73	78	80	81	86	87	82	70	60	53	48	45	41	38	36	36	41	54	57	62	62	61	61	60.9	87
2-Oct	64	67	65	69	65	64	74	79	79	83	87	91	87	86	84	91	95	91	82	78	78	80	82	81	79.3	95
3-Oct	85	83	82	85	84	81	79	78	78	77	74	72	71	69	68	69	70	72	78	82	85	90	94	94	79.2	94
4-Oct	94	92	93	89	87	86	86	86	85	83	82	80	78	75	70	67	67	73	82	88	90	89	92	92	83.7	94
5-Oct	91	93	93	93	93	93	92	90	79	65	51	38	41	40	41	43	44	49	52	53	59	65	70	77	66.9	93
6-Oct	83	87	90	92	90	91	91	92	79	68	58	51	46	46	43	41	45	52	58	63	69	71	82	90	69.9	92
7-Oct	93	94	96	95	95	95	93	93	75	62	54	46	41	36	33	33	34	37	43	47	52	59	72	78	64.8	96
8-Oct	86	87	88	87	86	87	88	87	84	77	68	58	47	43	39	39	43	45	49	57	64	67	69	70	67.3	88
9-Oct	72	75	83	92	95	95	95	96	89	75	66	60	59	63	64	68	75	82	90	93	94	94	95	94	81.8	96
10-Oct	95	97	98	98	97	92	93	88	76	49	42	40	33	30	29	29	30	34	47	57	60	75	82	86	65.0	98
11-Oct	84	84	82	81	83	87	89	86	81	75	72	64	59	57	58	59	59	61	63	70	79	81	86	92	74.7	92
12-Oct	94	95	96	95	94	91	92	91	87	84	84	78	64	56	51	39	38	40	43	46	49	51	53	50	69.3	96
13-Oct	50	51	56	60	64	63	64	64	60	51	43	37	33	29	29	36	32	36	42	43	45	50	56	53	47.8	64
14-Oct	52	52	52	53	51	54	59	64	62	52	42	39	40	41	44	46	49	61	69	73	74	74	75	76	56.4	76
15-Oct	79	80	82	83	83	84	83	85	73	61	62	61	54	51	49	50	50	57	61	66	68	71	78	83	68.9	85
16-Oct	82	81	87	93	96	97	97	96	93	77	63	55	47	35	33	34	38	43	46	50	53	55	59	60	65.4	97
17-Oct	61	66	69	72	75	78	80	80	69	59	49	41	37	34	32	28	28	32	34	37	40	41	43	44	51.2	80
18-Oct	46	46	46	49	54	57	60	63	59	51	43	36	35	33	32	32	34	38	44	51	54	58	65	69	48.1	69
19-Oct	73	77	79	82	83	83	83	82	82	77	73	72	69	68	66	66	76	85	90	94	94	92	94	92	80.5	94
20-Oct	94	94	96	97	96	91	88	90	88	83	78	72	66	62	61	61	62	68	72	73	83	88	84	87	80.5	97
21-Oct	89	88	88	88	88	89	91	95	95	89	81	76	69	68	65	68	72	68	69	68	67	66	67	67	77.9	95
22-Oct	69	70	71	76	77	78	78	78	73	62	55	51	44	39	38	35	37	41	46	50	53	53	56	59	57.9	78
23-Oct	62	64	66	68	69	72	73	72	71	67	67	69	73	71	70	69	72	76	75	74	73	83	90	92	72.5	92
24-Oct	93	92	90	92	92	94	91	89	89	90	86	83	82	80	78	77	80	83	84	85	88	90	95	96	87.3	96
25-Oct	96	96	95	94	94	94	95	94	94	92	87	85	83	81	80	80	80	83	85	86	87	88	89	90	88.6	96
26-Oct	89	89	89	92	94	95	97	97	96	93	81	70	67	65	63	73	69	72	74	78	81	86	92	96	83.1	97
27-Oct	95	95	97	94	85	79	76	75	74	71	67	67	65	61	60	59	60	62	65	67	67	68	71	74	73.1	97
28-Oct	76	77	83	87	88	86	86	84	83	83	81	79	74	71	74	75	80	85	87	89	89	91	91	89	82.8	91
29-Oct	87	88	86	84	83	82	81	81	79	76	73	68	62	60	56	57	64	66	69	73	76	77	83	86	74.9	88
30-Oct	88	92	91	91	95	96	96	96	94	88	89	86	85	83	81	81	82	84	87	86	88	92	91	90	88.9	96
31-Oct	88	88	93	95	96	97	97	97	97	97	96	92	86	84	85	85	85	85	86	87	87	86	86	89	90.2	97
80.1   81.1   82.5   84.0   84.4   84.4   85.0   84.8   80.4   73.5   68.1   63.3   59.4   56.7   55.2   55.7   57.6   61.4   65.4   68.4   71.2   74.0   77.5   79.3																		Diurnal Average								
96   97   98   98   97   97   97   97   97   97   96   92   87   86   85   91   95   91   90   94   94   94   95   96																		Diurnal Maximum								



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

**Relative Humidity (RH) - %**  
**Barge Landing - October 2015**





Maximum Speed: 26 km/h on Oct 10 14:00	Maximum Daily Speed Average: 9.2 km/h on Oct 2	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 26 00:00	Minimum Daily Speed Average: 1.2 km/h on Oct 7	Hours of Data: 744
Maximum Diurnal Speed Average: 2.9 km/h at hour 12	Minimum Diurnal Speed Average: 0.4 km/h at hour 20	Hours of Missing Data: 0
Monthly Average Velocity: 1.3 km/h 269.3 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 4 Median = 6 Q <sub>3</sub> = 8 P <sub>90</sub> = 11 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	SSE7	SSE5	SE5	SSE5	S6	SSE6	S6	SSE6	S7	SSW8	S7	S9	S8	SSE8	SSE8	SSE6	SSE5	SE3	E3	E5	N5	N6	N5	N3	SSE4.0	S9
2-Oct	WNW1	E2	NNE4	NE4	NNE7	NE10	NE10	NE10	NNE11	NNE11	NNE12	NNE13	NNE15	N13	NNE14	N10	N7	N6	N11	N10	N11	N11	N11	N11	NNE9.2	NNE15
3-Oct	NNE9	N12	N12	N12	N11	N12	N12	N13	N11	NNE11	NE11	NE10	NE8	NE8	NE8	NE8	NE7	NE6	ENE5	ENE4	NE3	NE1	NNW2	W2	NNE7.5	N13
4-Oct	WNW3	NNW1	W3	WNW2	WSW2	WSW4	WSW5	WSW6	WSW6	SW6	SW6	SSW7	SSW7	SW8	SW7	SW7	S6	SSE5	SE5	SE4	SE6	SSE4	SE3	SSE4	SSW3.6	SW8
5-Oct	S5	S5	SSE6	S6	S5	S5	S4	SSW3	SW4	SW5	W6	NW17	NW15	NNW13	NW13	NNW13	NW10	NNW9	NW6	NW6	NNW3	NW3	NW3	W2	WNW3.8	NW17
6-Oct	WSW3	W3	WSW3	SW4	SSW2	SSW4	SSW4	SSE2	SSE4	SSE6	S9	S8	SSW6	SSE6	S6	S6	SE4	ESE4	ESE5	ESE3	ESE2	NNW1	N3	N3	S2.7	S9
7-Oct	NNW4	N1	NNW2	NNW4	NNW2	SSE3	WSW2	WSW2	SW4	SW5	S5	SSW6	S6	SSW6	SSE6	ENE4	NW8	NW7	NNW6	NNW5	N3	NNW3	NNE1	W1	WNW1.2	NW8
8-Oct	WSW2	WSW2	WSW3	W2	SE1	S3	SSE4	S2	SSE2	SSW4	SSW4	S5	W3	WNW4	N4	NE5	NNE4	NNW6	N7	N9	N6	NNW5	N4	N4	NNW1.4	N9
9-Oct	N4	N3	N4	NNW3	NNW4	NNW4	WNW2	W3	S4	S7	SSW8	S5	E3	NE6	NE6	NNE6	NNE6	N5	NNW5	NNW3	NNW3	NW3	WNW1	S2	N1.4	SSW8
10-Oct	W1	SE4	SSW4	SW4	SSW6	S3	S4	SSW5	SE4	SW12	WSW17	WSW18	WSW24	WSW26	WSW22	WNW13	WNW10	WNW4	NNW7	NW3	NNW4	NNE7	NE7	NNE7	W5.9	WSW26
11-Oct	NNE8	NNE10	NNE9	NNE8	NNE10	NNE10	N8	N9	N10	N8	N6	NNW11	NNW12	N11	N9	NNW9	N8	NNW9	NW6	WNW4	WNW3	WNW4	WSW2	SW4	N6.8	NNW12
12-Oct	S2	SSE2	SE3	S4	SE5	SSE5	S5	S5	SSW5	SSW5	S7	S11	S11	S8	SSW7	W14	W15	W11	WSW8	W5	SW4	SSW5	WSW7	WSW13	SW5.4	W15
13-Oct	WSW15	WSW10	WSW10	WSW9	WSW9	WSW12	WSW16	WSW13	WSW6	WSW7	WSW11	WSW11	WSW14	WNW12	WNW8	W10	W12	W7	WSW5	SW6	SW6	SW5	S5	WSW7	WSW9.0	WSW16
14-Oct	WSW9	WSW10	WSW7	SSW5	WSW9	WSW9	WSW8	WSW11	WSW14	W15	WNW12	NW13	NW14	NW14	NW12	NW11	NNW8	NE9	NE7	NE6	NNE7	N5	N5	N4	WNW6.1	W15
15-Oct	NNW3	NW1	E2	ESE4	ESE3	E4	ESE2	SE3	SE4	SW4	SSW7	SSW8	SSW6	SSE8	SE7	E6	ESE6	E5	ENE6	E4	NE4	ENE2	N0	NE2	SE2.3	SSW8
16-Oct	ESE5	E4	E3	E2	N3	NNE2	N3	N3	NNW3	NNW4	NNW5	NNW4	NNW4	S7	SSE10	SE11	SE8	SE8	SE8	SE10	SSE9	SSE6	SE7	SSE7	SE3.1	SE11
17-Oct	S6	S6	S5	S4	SSE5	SSE5	SSW4	S6	S7	S8	S10	S10	S10	S9	S8	SW8	SW13	SSW10	SSW11	SSW10	SSW9	SSW10	S9	S8	S7.7	SW13
18-Oct	S5	SW7	WSW11	WSW12	WSW13	W11	WNW7	W8	W12	W12	W13	WNW15	WNW15	NW12	WNW13	NW10	NW9	WNW8	NW4	N3	NNW3	N4	N5	NNE7	WNW7.4	WNW15
19-Oct	NNE6	N6	N6	NNE6	NNE6	NNE7	NE7	NE7	NE6	NE6	ENE6	NE5	ENE4	ENE4	ENE4	NE3	NNW4	N5	N5	NNW3	E3	E2	SE2	SSE4	NE4.0	NE7
20-Oct	SSE4	S7	SSW6	SW8	WSW11	W11	W8	SW7	SW10	WSW12	WSW12	WSW10	WNW9	NW12	WNW14	NW15	NW10	NNW5	NNW5	NW8	NNE6	NE6	NNE5	NE2	W5.4	NW15
21-Oct	SSW2	SSE3	SSE4	SSW4	S3	SSW2	W4	W2	SW4	WSW4	W3	N4	N5	NNW4	NNW5	N4	N2	SE4	ESE2	SSE6	SSE9	S6	S7	S7	SSW1.6	SSE9
22-Oct	S5	SSW6	WSW4	SW6	SW7	SW8	SW7	SW7	SW8	SW11	WSW11	WSW13	SW12	WSW17	WSW16	W15	WSW12	WSW9	WSW7	WSW8	WSW7	WSW8	WSW6	W4	WSW8.5	WSW17
23-Oct	W4	W6	WSW5	SW4	SSW5	S4	SSW5	SSW5	SSW2	WNW3	N7	N5	N6	NNE5	NNE5	NNE6	NE4	N4	N5	NNE5	NNE6	N6	NNE5	N5	NNW2.1	N7
24-Oct	NNE4	N6	NNE5	N5	NE6	ENE7	ENE6	ENE3	N4	N4	N3	NNE4	N4	NNE3	NW2	WNW1	W2	NNW2	NW0	NW1	ENE3	NNE2	ENE5	NNE5	NNE3.0	ENE7
25-Oct	NNE5	N5	N6	N5	N6	N6	N4	N5	N4	NE4	E4	NE3	NNE2	NNE2	N2	NW2	SW1	NW2	NW1	NNW1	NNW2	NNW3	NNW2	NW0	N2.8	N6
26-Oct	S7	SSW9	SSW4	E3	SE7	SE3	E1	ESE3	ENE3	ENE3	SE7	SSE9	SE10	SE10	SE10	SSE8	S10	S12	S11	S10	WSW6	NW10	WNW8	WSW7	SSE4.7	S12
27-Oct	WNW6	NW7	WNW6	NW8	NW9	NW10	NW9	NW11	NW10	NNW10	NNW12	NW9	NW11	NNW14	NNW11	NNW14	NNW12	NNW13	NNW11	NNW9	NNW8	NNE5	N5	NNW1	NW8.9	NNW14
28-Oct	N4	NE7	NE3	S1	SW2	WSW3	SSW2	S4	SSE4	SSE6	SSW6	S8	S8	SE9	SSE10	SE8	SE6	SE8	SSE7	SSE6	S6	S6	SSE8	SSE9	SSE4.6	SSE10
29-Oct	S7	S6	S8	S10	S9	S10	S9	SSE10	S11	S10	S8	S9	S9	S8	SSW11	SSW8	SSE6	S8	S8	SSE5	S6	S5	S4	SW4	S7.8	SSW11
30-Oct	SSW3	SSW5	SW5	SSW5	S5	SSE5	SSE5	SSE6	SSE5	SSW3	WSW2	WSW2	W2	WNW2	NW2	SSW2	SSW3	SSW3	WNW1	SW3	WSW2	NNW2	NNW4	NNW3	SSW2.1	SSE6
31-Oct	NNW4	NNW3	NW2	W3	NW2	NNW2	N3	NNE2	SE2	S3	SE4	ESE3	NNE3	ENE6	ENE7	ENE7	ENE7	ENE5	ENE6	ENE6	NNE8	NE8	NNE6	NNE6	NE3.1	NNE8

WSW0.9	WSW0.8	WSW1.2	WSW1.5	WSW1.4	WSW1.5	SW1.7	WSW2.7	WSW2.9	WSW2.9	W2.8	WNW2.2	WNW1.7	WNW2.3	WNW2.1	WNW1.0	NW0.4	N0.6	NNW1.1	N0.9	WNW0.8					Diurnal Average	
WSW15	N12	N12	WSW12	WSW13	WSW12	WSW16	N13	WSW14	W15	WSW17	WSW18	WSW24	WSW26	WSW22	W15	W15	NNW13	N11	S10	N11	N11	N11	WSW13			Diurnal Maximum

All monthly, daily, and diurnal averages have been calculated using vector methods



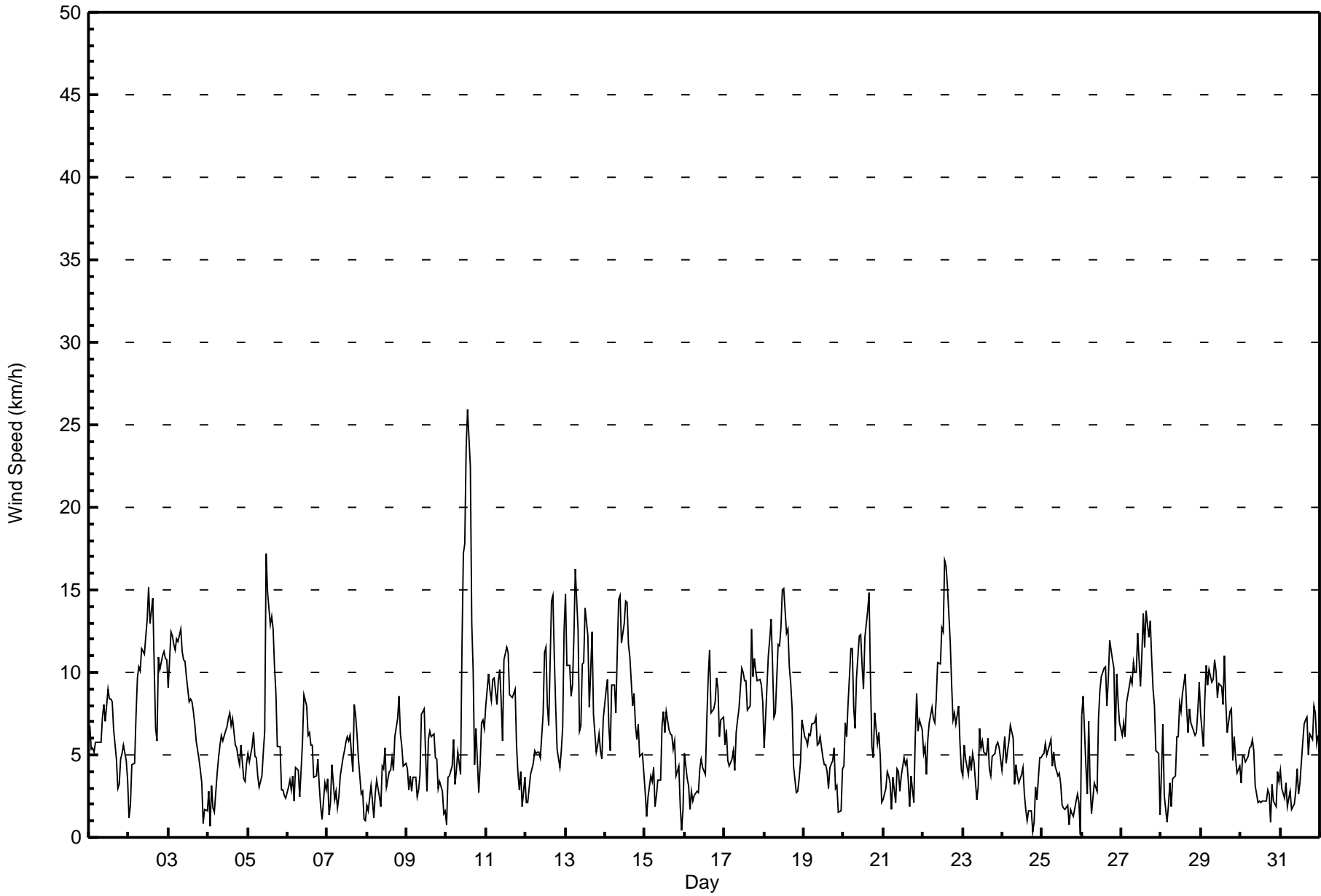
Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Barge Landing - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Oct 10 13:00  Minimum Value: 1 km/h on Oct 1 19:00  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> = 6																	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	1	1	1	1	1	1	1	2	2	3	3	3	3	3	3	3	2	1	1	1	2	1	1	1	3
2-Oct	2	1	1	1	3	3	3	3	3	3	4	4	4	4	4	3	2	2	4	4	4	4	3	4	4
3-Oct	3	4	4	4	4	4	4	4	4	3	3	3	3	3	2	2	2	1	1	1	1	1	1	1	4
4-Oct	1	1	1	1	1	1	2	2	2	2	2	2	3	3	3	2	2	1	1	1	1	2	1	1	3
5-Oct	1	1	1	1	1	2	1	1	1	2	3	6	5	4	4	5	4	3	2	2	1	1	1	1	6
6-Oct	1	2	1	1	1	1	1	1	2	2	3	3	2	3	2	2	1	1	1	1	1	1	1	1	3
7-Oct	1	1	1	1	1	1	1	1	1	1	2	2	3	2	2	2	3	2	1	2	1	1	1	1	3
8-Oct	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	2	2	2	1	1	2
9-Oct	1	1	1	1	1	1	1	1	2	3	3	2	1	2	2	2	1	1	1	1	1	1	1	1	3
10-Oct	1	1	1	1	1	2	2	1	1	6	6	6	8	8	7	4	4	4	4	1	1	3	3	2	8
11-Oct	2	3	3	2	3	3	2	3	3	3	2	4	4	4	3	3	3	3	2	1	1	2	1	1	4
12-Oct	1	1	1	1	1	1	1	2	2	2	3	4	4	3	3	5	5	4	2	3	1	2	2	4	5
13-Oct	4	4	3	3	3	4	4	4	3	3	4	3	4	5	3	4	4	2	1	1	1	2	1	3	5
14-Oct	2	3	3	2	3	3	2	3	4	4	5	5	5	5	4	4	3	3	2	2	2	2	1	1	5
15-Oct	1	1	2	1	1	1	2	1	1	2	3	3	2	2	2	2	2	2	2	1	1	1	1	1	3
16-Oct	1	1	1	1	1	1	1	1	1	1	1	1	4	3	3	2	2	2	2	2	2	1	1	2	4
17-Oct	1	2	1	1	1	1	1	2	2	2	3	3	3	3	3	4	4	3	3	3	3	3	3	2	4
18-Oct	2	3	3	3	4	4	3	3	4	4	5	6	6	5	5	3	3	4	1	1	1	1	2	2	6
19-Oct	2	2	2	2	2	2	2	3	2	2	2	2	1	1	1	1	1	1	1	1	1	2	1	1	3
20-Oct	1	2	2	3	3	5	2	2	3	3	3	3	4	5	5	5	4	1	2	2	2	2	2	2	5
21-Oct	1	1	1	1	1	1	1	2	1	1	1	1	2	1	1	1	1	1	1	2	3	2	2	2	3
22-Oct	1	2	1	3	2	2	2	2	3	3	3	4	4	5	6	6	4	2	2	2	2	2	2	3	6
23-Oct	3	2	1	1	1	1	1	2	1	1	2	2	2	2	2	2	1	1	1	2	1	2	1	1	3
24-Oct	1	2	2	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2
25-Oct	2	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
26-Oct	3	3	2	1	2	2	1	1	1	1	3	3	3	3	4	3	4	5	4	4	3	4	3	2	5
27-Oct	2	4	3	3	4	4	4	4	4	4	5	3	4	4	4	4	4	4	3	3	3	2	2	1	5
28-Oct	2	3	2	1	1	1	1	1	2	2	2	2	3	3	3	3	2	2	2	2	2	2	2	3	3
29-Oct	2	2	3	4	3	4	3	3	4	3	3	3	3	3	4	3	1	2	2	1	1	1	1	1	4
30-Oct	1	1	2	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2
31-Oct	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2
Diurnal Maximum																									





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

**Wind Speed (WS) - km/h**  
**Barge Landing - October 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	351	47.18	47.18
6 - 11	325	43.68	90.86
12 - 19	65	8.74	99.60
20 - 28	3	0.40	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 2015**

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	48	21	12	14	16	11	18	24	30	30	17	19	18	14	16	43	351
6 - 11	31	28	25	10	0	2	17	29	58	23	19	32	9	8	21	13	325
12 - 19	7	4	0	0	0	0	0	0	1	0	3	17	8	7	10	8	65
20 - 28	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	3
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>	86	53	37	24	16	13	35	53	89	53	39	71	35	29	47	64	744

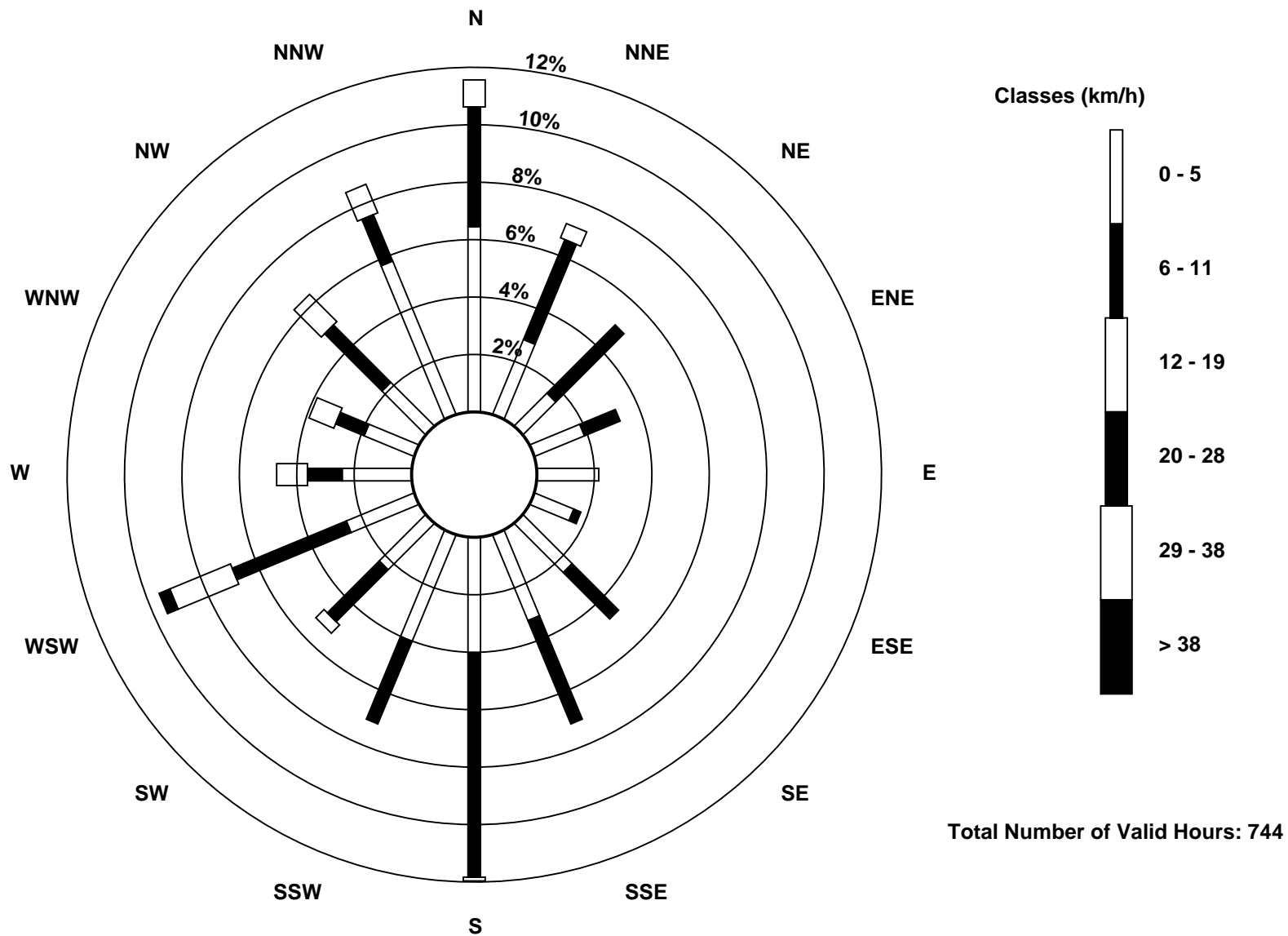
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Wind Speed (WS) - km/h  
Barge Landing (AMS 9)





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg  
Barge Landing - October 2015**

Direction of Maximum Speed: 257 deg on Oct 10 14:00 Direction of Maximum Daily Speed Average: 16.0 deg on Oct 2																								Hours in Service: 744	
Direction of Minimum Speed: 320 deg on Oct 26 00:00												Direction of Minimum Daily Speed Average: 1.2 deg on Oct 7												Hours of Data: 744	
Monthly Average Direction: 272.8 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	165	158	144	158	174	156	169	167	183	192	184	184	176	161	152	161	158	132	85	87	351	354	351	358	161.8
2-Oct	285	82	32	51	31	37	37	35	22	21	15	16	17	4	14	7	357	8	7	1	5	11	9	6	16.0
3-Oct	17	5	359	356	359	8	4	359	11	24	36	43	43	40	40	43	49	74	72	56	39	328	269	20.9	
4-Oct	296	348	270	299	244	252	240	242	239	215	220	209	206	224	218	222	189	165	136	142	137	160	141	161	207.2
5-Oct	186	182	163	173	173	176	184	211	215	229	260	315	319	330	323	330	319	330	315	309	332	317	319	263	296.4
6-Oct	250	261	256	232	196	197	195	162	153	168	170	182	199	157	171	179	125	103	106	111	114	341	349	351	174.9
7-Oct	346	1	328	335	334	168	248	238	234	225	189	211	177	193	148	61	325	325	335	336	350	330	31	269	281.6
8-Oct	249	243	248	268	143	189	151	188	149	192	196	183	276	289	4	37	22	343	350	357	352	346	356	351	329.3
9-Oct	359	355	351	348	332	338	290	276	178	175	207	170	89	44	45	22	18	351	343	330	331	313	300	184	352.5
10-Oct	276	144	210	226	208	180	182	211	125	227	249	247	258	257	257	285	284	303	335	313	344	29	39	16	259.1
11-Oct	27	33	23	14	16	12	10	6	5	8	2	340	340	351	352	347	355	340	324	303	300	285	240	215	356.8
12-Oct	176	163	145	174	139	153	182	186	208	199	178	188	191	187	197	261	264	268	255	265	225	202	237	253	217.0
13-Oct	252	245	245	237	237	244	253	248	246	250	258	245	244	282	302	274	263	264	241	227	229	224	184	245	250.3
14-Oct	249	250	238	210	258	256	254	252	259	293	317	320	325	319	318	345	35	37	36	16	2	355	10		297.5
15-Oct	327	308	98	122	113	87	122	145	129	223	207	207	206	167	138	101	102	93	65	82	56	67	5	52	127.9
16-Oct	110	97	95	92	351	16	1	352	343	337	340	333	338	172	152	132	127	127	135	144	151	157	143	151	128.5
17-Oct	180	173	182	186	164	163	199	187	186	188	180	181	190	174	182	215	224	203	200	197	195	200	190	190	190.7
18-Oct	177	224	248	253	254	269	287	274	267	266	269	291	296	307	302	320	310	299	323	357	327	353	10	13	285.1
19-Oct	27	10	1	16	24	27	40	44	56	56	60	42	61	74	60	34	348	351	352	346	95	87	126	168	35.5
20-Oct	165	188	197	233	256	272	263	225	233	245	252	255	287	307	303	316	306	330	331	321	33	47	33	55	276.9
21-Oct	193	162	156	206	186	203	271	273	235	255	267	358	8	341	340	351	359	142	118	166	160	184	181	187	198.6
22-Oct	190	203	241	229	218	220	227	214	229	235	246	239	235	257	261	253	252	245	243	238	243	251	262		240.8
23-Oct	279	265	243	223	212	176	199	207	208	293	357	2	3	13	20	21	43	353	4	20	15	11	12	359	345.1
24-Oct	25	10	22	4	45	62	59	359	356	358	12	1	23	305	289	279	333	323	305	65	29	59	24		23.2
25-Oct	22	359	4	357	352	3	353	355	10	37	87	55	33	18	1	317	232	316	324	327	333	338	335	320	3.3
26-Oct	176	194	192	99	141	137	91	108	66	76	138	150	136	145	140	148	179	172	177	181	240	305	288	257	167.4
27-Oct	285	322	299	307	308	305	315	318	314	327	328	323	323	329	331	337	333	337	333	333	333	15	351	345	325.1
28-Oct	7	47	47	183	236	246	196	169	156	157	197	184	180	140	147	144	144	143	154	162	171	173	159	166	158.5
29-Oct	169	169	182	170	171	169	170	167	176	180	179	187	174	176	201	193	165	188	182	166	178	171	177	231	178.2
30-Oct	206	207	216	195	191	165	166	161	166	195	244	251	279	289	310	208	198	201	284	233	249	341	340	346	208.7
31-Oct	345	341	317	271	318	332	349	33	131	189	133	107	29	71	76	78	71	73	65	58	33	36	13	33	47.7
240.3 239.8 249.6 245.0 244.7 244.9 253.1 241.3 234.2 236.6 241.1 252.5 271.0 282.8 288.2 310.2 298.8 317.1 347.4 324.6 359.0 341.4 351.2 282.8																									
Diurnal Average																									
All monthly, daily, and diurnal averages have been calculated using vector methods																									

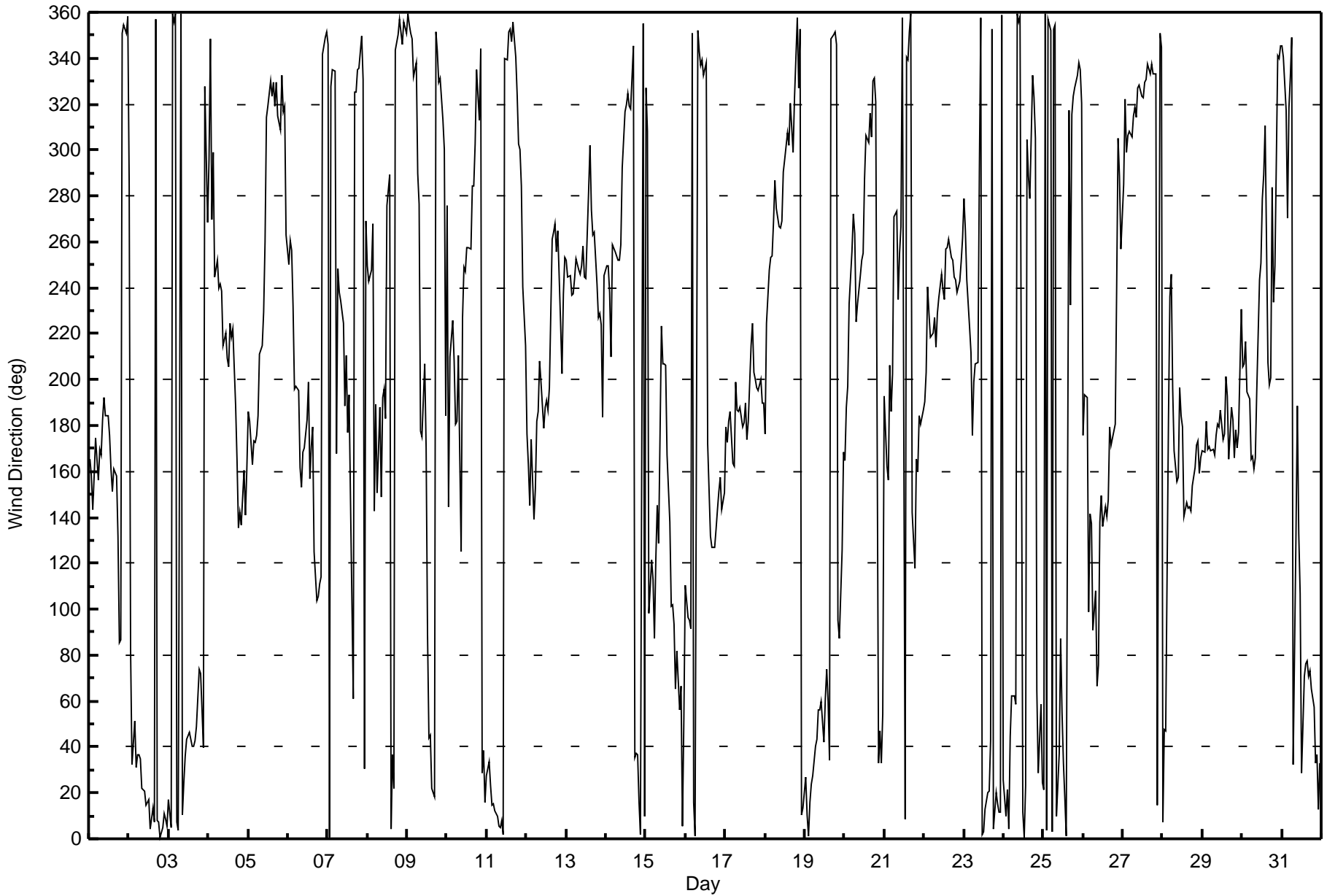


**Wood Buffalo Environmental Association**

**Summary of Hour Standard Deviations**

**Wind Direction (WD) - deg  
Barge Landing - October 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 91 deg on Oct 28 04:00 Minimum Value: 7 deg on Oct 4 21:00 Percentiles: P <sub>1</sub> = 11 P <sub>10</sub> = 17 Q <sub>1</sub> = 19 Median = 23 Q <sub>3</sub> = 31 P <sub>90</sub> = 46 P <sub>99</sub> = 83																			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	13	10	13	17	17	18	21	25	31	34	30	30	30	28	30	32	25	9	12	40	17	16	14	40
2-Oct	77	76	23	21	18	20	18	18	20	19	21	20	21	22	23	22	20	19	20	21	22	21	22	22	77
3-Oct	22	21	23	20	22	22	22	22	22	21	21	21	28	24	23	22	23	22	18	16	18	84	30	49	84
4-Oct	33	80	22	63	67	28	24	28	21	34	33	35	33	30	43	32	33	20	8	13	7	52	23	19	80
5-Oct	17	13	13	16	20	27	29	29	31	24	35	25	25	25	24	23	24	19	25	26	26	24	30	61	61
6-Oct	40	41	19	13	27	17	17	25	34	32	33	36	39	35	45	40	21	12	16	19	38	78	40	26	78
7-Oct	8	72	45	13	20	29	50	10	17	28	40	35	46	44	35	55	22	18	14	12	15	18	76	76	76
8-Oct	41	46	17	46	84	39	23	31	41	38	35	37	59	48	31	23	26	15	18	18	19	19	18	34	84
9-Oct	19	26	18	20	27	48	25	29	46	28	29	45	57	19	21	17	15	23	18	23	20	30	60	71	71
10-Oct	75	26	23	20	23	36	41	25	38	39	19	19	21	19	19	29	29	39	17	25	13	24	21	22	75
11-Oct	18	18	19	18	19	19	20	21	22	22	22	22	22	23	23	24	22	23	20	28	25	48	56	20	56
12-Oct	36	38	39	39	19	20	24	27	29	34	33	26	30	37	47	24	24	21	18	20	22	24	18	16	47
13-Oct	16	18	18	24	21	18	16	17	31	29	26	22	20	36	32	32	22	17	14	15	14	17	27	31	36
14-Oct	19	19	29	36	25	18	16	15	17	19	33	25	23	21	23	22	31	22	22	24	22	24	19	23	36
15-Oct	16	68	60	20	20	22	74	27	32	62	35	31	38	35	31	18	19	25	26	34	14	57	62	63	74
16-Oct	15	16	12	33	12	29	15	15	11	17	24	27	33	55	28	15	16	13	13	15	16	15	9	15	55
17-Oct	18	19	26	16	14	17	19	17	24	26	27	28	29	28	29	29	21	22	23	23	22	22	22	21	29
18-Oct	29	27	16	16	17	33	46	41	27	23	29	29	31	30	30	22	24	28	20	47	38	40	22	19	47
19-Oct	15	20	19	18	17	17	20	20	26	26	26	27	31	31	24	26	16	21	15	22	59	81	91	34	91
20-Oct	34	21	21	25	18	25	19	21	19	17	17	18	32	26	29	22	25	17	19	20	39	23	24	57	57
21-Oct	36	27	21	26	30	51	21	86	20	26	80	40	36	32	23	24	27	38	35	21	20	25	23	22	86
22-Oct	24	26	29	32	22	22	19	23	21	22	23	19	21	22	22	25	18	17	14	13	19	17	27	72	72
23-Oct	57	35	22	28	21	31	27	29	73	52	29	26	27	26	23	20	18	19	20	22	19	21	20	20	73
24-Oct	25	23	22	20	23	18	20	32	19	30	37	28	30	47	74	73	45	20	70	33	24	38	23	23	74
25-Oct	19	19	19	18	19	19	22	19	20	36	27	38	60	79	62	64	76	36	35	36	15	21	16	77	79
26-Oct	28	25	26	18	14	47	56	17	18	24	25	26	20	20	19	39	28	25	28	26	54	27	29	19	56
27-Oct	33	22	26	25	27	25	24	22	23	24	21	22	22	20	20	19	20	21	20	19	21	28	23	67	67
28-Oct	22	22	73	91	37	15	48	33	28	23	35	31	31	31	22	19	14	15	19	21	26	22	18	22	91
29-Oct	22	23	29	24	24	24	23	23	25	24	26	24	25	32	25	26	18	18	18	19	21	19	19	35	35
30-Oct	44	40	30	32	29	23	17	20	25	41	45	64	47	37	34	55	33	43	84	37	88	44	15	14	88
31-Oct	15	16	26	23	47	22	23	47	48	29	19	65	43	28	21	20	21	20	20	23	16	17	21	20	65
Diurnal Maximum																									





# Wood Buffalo Environmental Association TRS Calibration Report

### Station Information

Calibration Date	October 20, 2015	Last Calibration	September 2, 2015
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	11:40	End Time (MST)	14:30
Gas Cert Reference	CC62993	Station temp.	22 Deg C
Cal Gas Concentration	4.77 ppm	Cal Gas Exp Date	10/06/2014
Calibrator Make/Model	Sabio 4010	Serial Number	11071107
Dil air Make/Model	API 701	Serial Number	4888
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6466
SO2 gas concentration	47.8 ppm	SO2 gas cert/exp	LL104180 12/Feb/18

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-690	-690
Analyzer IP address	192.168.1.44		Lamp voltage	993	1001
Calculated slope	1.004010	1.015056	Chamber temp	45	45
Calculated intercept	-0.183794	-0.222826	Pressure	683.3	685.1
Analyzer Background	1.97	1.97	Flow	0.435	0.435
Analyzer Coefficient	1.033	1.033	Intensity	90	91
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1218153461	
Converter make/model	CDN-101		Converter serial #	519	

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	83.7	79.8	78.7	1.015
SO2 scrubber check	5000	15.4	147.2	0.7	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	83.7	79.8	78.7	1.015
second point	5000	41.9	40.0	39.9	1.002
third point	5000	21.0	20.0	20.1	0.995
as left zero	6000	0.0	0.0	0.1	----
as left span	5000	83.7	79.8	79.3	1.007
Average Correction Factor					1.004

Corrected As found	78.8	Previous response	79.7	% change	1.2%
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**Notes:**

Replaced inlet filter and conducted scrubber check after as founds. No adjustments made.

Calibration Performed By:

Evan Magill



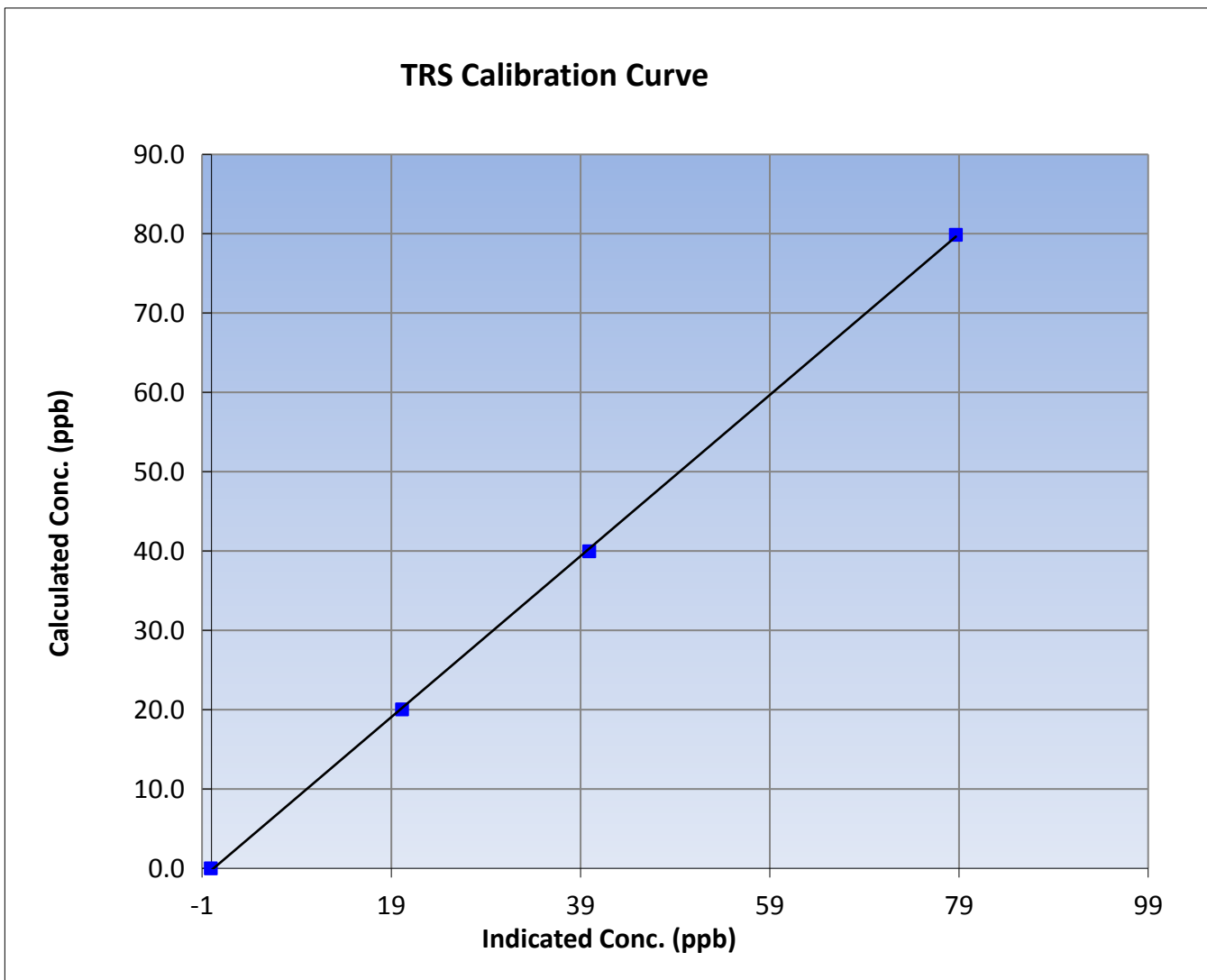
# Wood Buffalo Environmental Association TRS Calibration Report

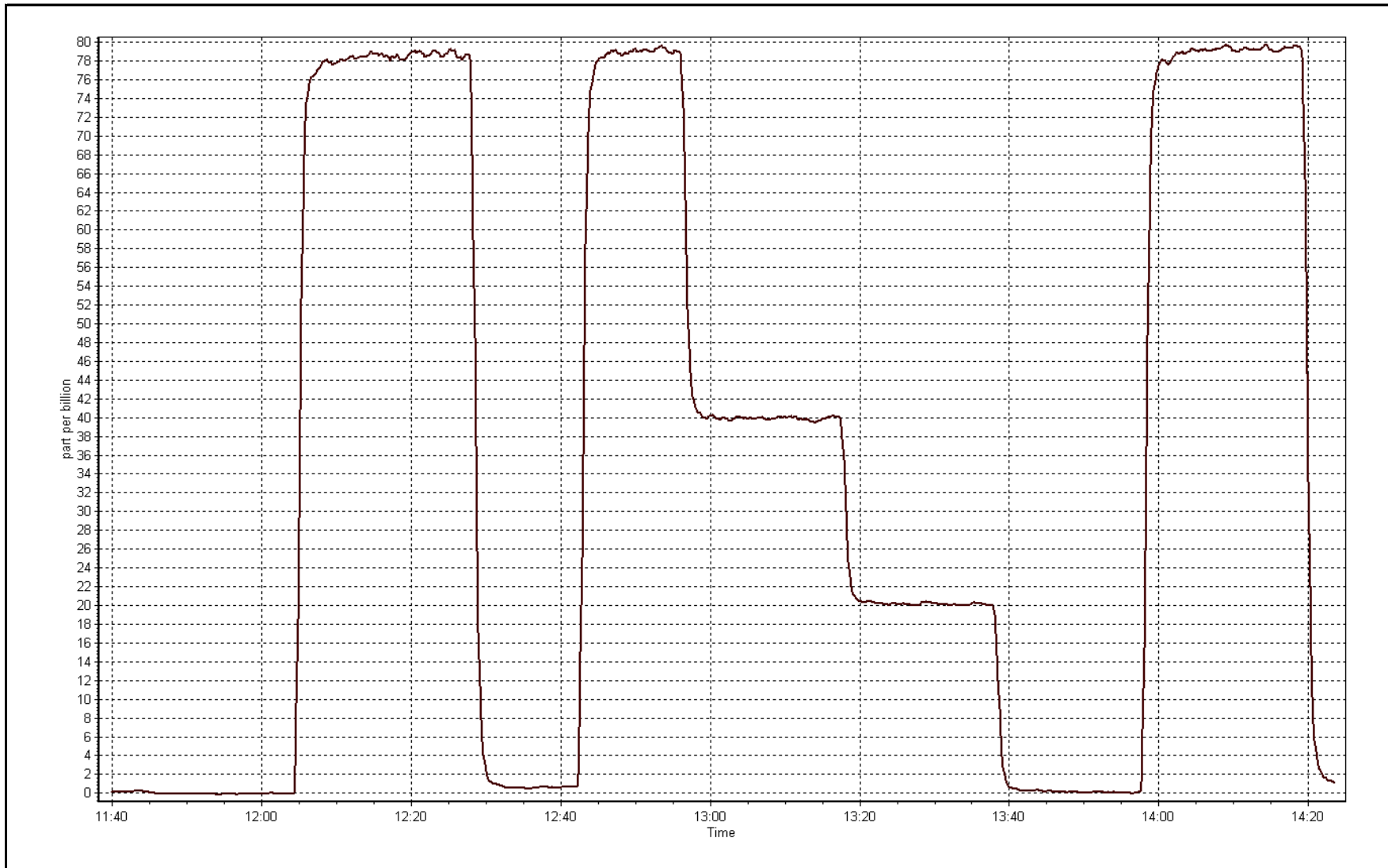
## Station Information

Calibration Date	October 20, 2015	Previous Calibration	September 2, 2015
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	11:40	End Time (MST)	14:30
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153461

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999924
79.8	78.7	1.0149		
40.0	39.9	1.0016	Slope	1.015056
20.0	20.1	0.9947		
			Intercept	-0.222826









# Wood Buffalo Environmental Association THC Calibration Report

### Station Information

Calibration Date	October-20-15	Last Calibration	September-04-15
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	8:40	End Time (MST)	11:43
Gas Cert Reference	LL104180	Cal Gas Expiry Date	12/02/2018
CH4 Cal Gas Conc.	490 ppm	CH4 Equiv Conc.	1023.5 ppm
C3H8 Cal Gas Conc.	194 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11071107
ZAG make/model	Teledyne API 701	Serial Number	4888
DACS make/model	Campbell Scientific CR3000	Serial Number	6466

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	9.2	9.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.7	34.7
Calculated slope	1.002985	1.000003	Fuel Pressure	24.1	24.1
Calculated intercept	0.006035	-0.026243	Analyzer Coeff	4.3	4.3
			Analyzer BKG	5.680	5.610

Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296
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### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.15	----
as found span	5000	76.6	15.68	15.55	1.008
calibrator zero	5000	0.0	0.00	0.02	----
high point	5000	76.6	15.68	15.70	0.999
second point	5000	41.0	8.39	8.43	0.996
third point	5000	15.4	3.15	3.18	0.991
as left zero	5000	0.0	0.00	-0.04	----
as left span	5000	76.6	15.68	15.68	1.000
Average Correction Factor					0.995

Corrected As found	15.70	Previous response	15.63	% change	-0.5%
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**Notes:**

Replaced inlet filter after as founds. Adjusted zero, small adjustment on span.

Calibration Performed By:

Evan Magill



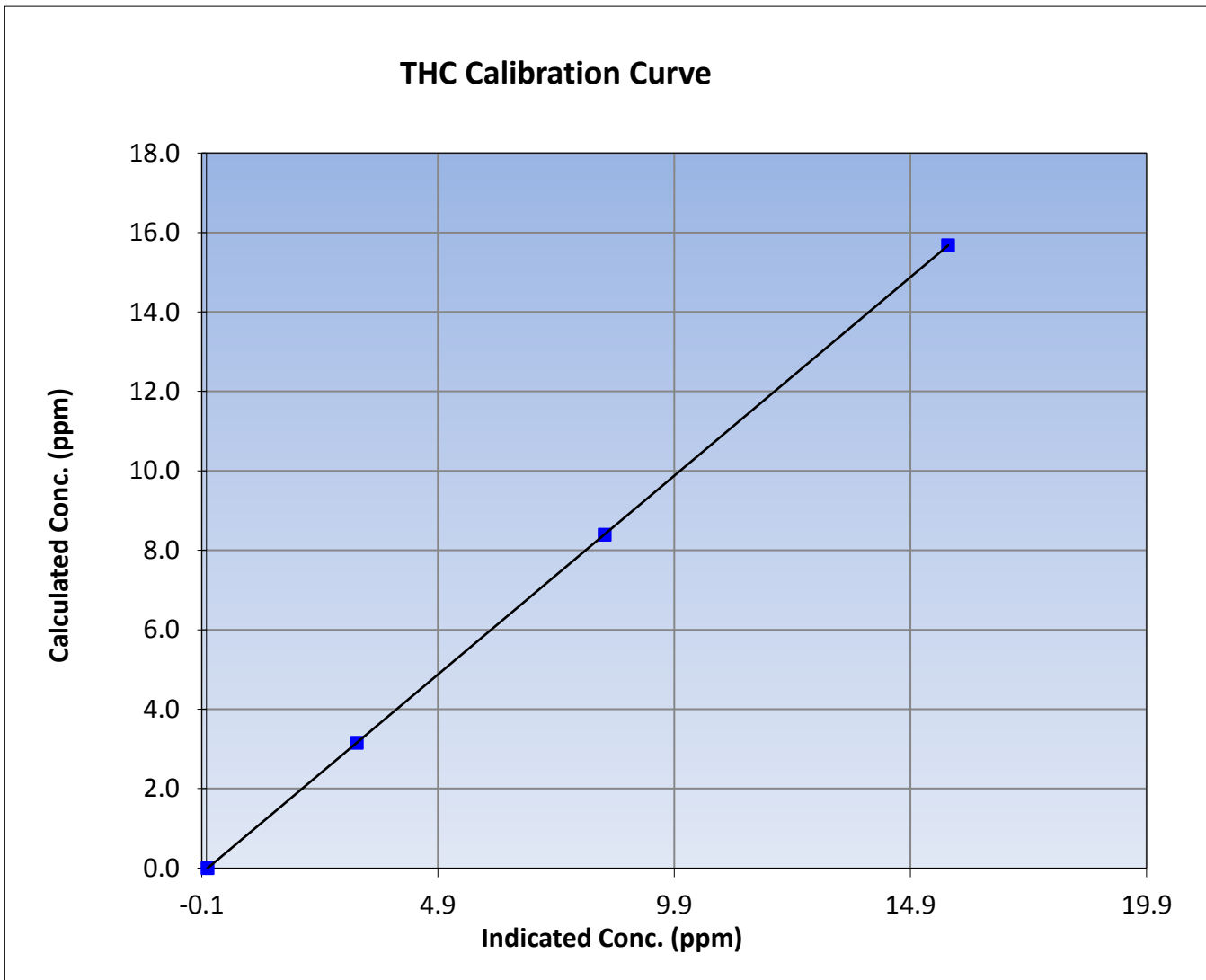
# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	October 20, 2015	Previous Calibration	September 4, 2015
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	8:40	End Time (MST)	11:43
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296

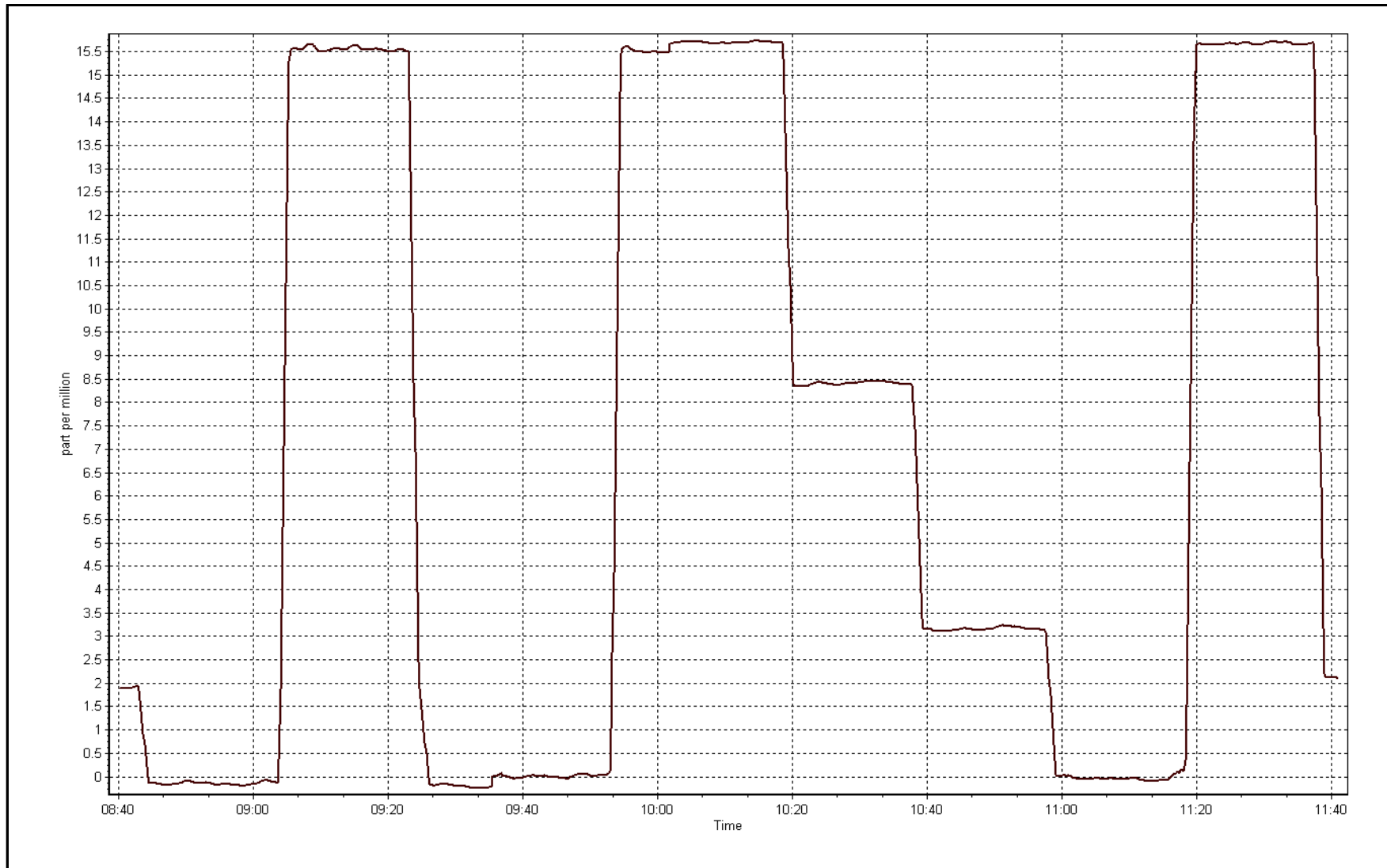
## Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.02	----	Correlation Coefficient	0.999999
15.68	15.70	0.9987		
8.39	8.43	0.9956	Slope	1.000003
3.15	3.18	0.9913		
			Intercept	-0.026243



THC Calibration Plot

Date: October 20, 2015





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## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 11  
LOWER CAMP  
OCTOBER 2015**

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

November 26, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)  
OCTOBER 2015

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	35	40	99.33	63	0	8	0
H2S (ppb) Average	678	33	66	95.56	9	0	1	0
THC (ppm) Average	704	35	40	99.33	4.2	-	2.7	-
Temperature (C) Average	740	0	4	99.46	24.3	-	16.2	-
Relative Humidity (%) Average	740	0	4	99.46	98	-	91	-
Wind Speed 10 m (km/h) Average	739	0	5	99.33	31	-	20	-
Wind Direction 10 m (deg) Average	739	0	5	99.33	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)  
 OCTOBER 2015

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	2	5	-	0	0	0	1	1	5	63
H2S (ppb) Average	678	0.5	1	-	0	0	0	0	1	1	9
THC (ppm) Average	704	2.28	0.3	-	2	2.1	2.1	2.2	2.3	2.6	4.2
Temperature 2 m (C) Average	740	6.02	5.3	-	-3.3	-0.1	1.8	5.1	9.2	13.7	24.3
Relative Humidity (%) Average	740	72.6	17	-	25	44	61	77	86	92	98
Wind Speed 10 m (km/h) Average	739	10.6	7	-	0	2	5	9	16	21	31
Wind Direction 10 m (deg) Average	739	-	-	-	-	-	-	-	-	-	-



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)  
OCTOBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
ALL PARAMETERS	08 Oct 2015 12:00	08 Oct 2015 13:00	2	Data logger program uploaded - data not recorded
ALL PARAMETERS	08 Oct 2015 18:00	08 Oct 2015 19:00	2	Data logger program uploaded - data not recorded
SO2, THC	09 Oct 2015 17:00	09 Oct 2015 17:00	1	Maintenance - sample manifold cleaned
H2S	08 Oct 2015 11:00	09 Oct 2015 15:00	29	Maintenance - analyzer replaced
H2S	16 Oct 2015 10:00	16 Oct 2015 13:00	4	Recalibration to adjust negative baseline
Wind Speed, Wind Direction	01 Oct 2015 20:00	01 Oct 2015 20:00	1	Flat line in sensor output signal -sensor frozen



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 63 ppb on Oct 17 18:00	Maximum Daily Average: 8.5 ppb on Oct 29		Hours of Data:	704
Minimum Value: 0 ppb on Oct 28 04:00	Minimum Daily Average: 0.2 ppb on Oct 27		Hours of Missing Data:	40
Maximum Diurnal Average: 5.4 ppb at hour 18	Minimum Diurnal Average: 1.0 ppb at hour 21		Hours of Calibration:	35
Monthly Average: 2.0 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> = 5 P <sub>99</sub> = 22		Percent Operational Time:	99.3

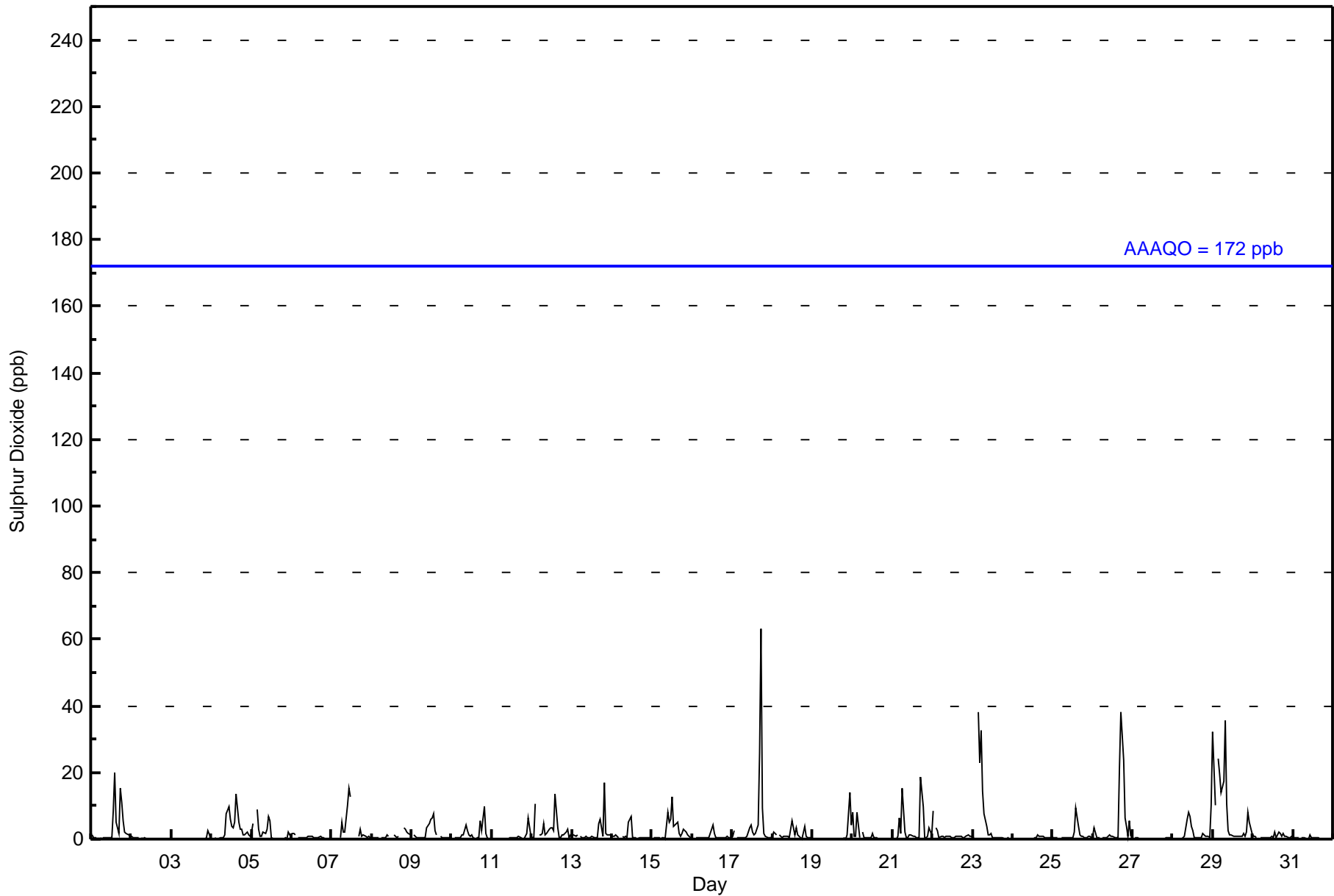
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	1	1	0	0	Z	0	0	0	1	0	0	0	0	8	20	5	2	15	11	5	2	2	1	1	3.4	20																						
2-Oct	1	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
3-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0.3	3																						
4-Oct	0	Z	0	0	0	0	1	1	1	7	10	6	4	3	5	13	5	3	1	1	2	1	1	1	3.0	13																						
5-Oct	2	5	Z	9	3	1	1	2	2	3	7	5	0	0	0	0	0	0	0	0	0	2	1	1	1.9	9																						
6-Oct	2	2	1	Z	1	1	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.6	2																						
7-Oct	0	0	0	0	Z	0	5	2	2	10	15	13	C	C	C	C	1	3	1	1	1	1	1	0	2.9	15																						
8-Oct	1	0	1	0	0	Z	0	0	0	1	1	M	M	1	1	1	1	M	M	4	3	2	2	1	1.1	4																						
9-Oct	Z	1	1	1	0	0	0	0	0	3	4	6	6	8	2	1	M	1	1	0	0	0	0	0	1.8	8																						
10-Oct	0	Z	0	0	0	0	1	1	4	2	1	1	1	0	0	0	0	5	2	10	2	0	0	0	1.5	10																						
11-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	1	1	6	1	0.6	6																						
12-Oct	0	0	10	Z	1	1	2	5	1	2	3	3	4	2	14	3	0	1	1	1	2	3	1	1	2.7	14																						
13-Oct	1	1	1	1	Z	1	0	0	1	0	0	0	1	0	1	1	5	6	1	17	2	1	1	1	1.9	17																						
14-Oct	1	1	1	1	0	Z	1	1	1	1	5	7	0	0	0	0	0	0	0	0	0	0	0	0	1.0	7																						
15-Oct	Z	0	0	0	0	0	0	0	0	8	5	6	13	4	5	5	2	1	2	3	2	1	1	1	2.6	13																						
16-Oct	1	Z	0	0	0	0	0	0	0	1	0	2	4	2	1	1	0	0	0	0	1	1	0	0	0.7	4																						
17-Oct	1	3	Z	1	0	1	0	0	1	1	3	4	2	1	2	4	26	63	9	2	1	1	1	1	5.5	63																						
18-Oct	1	2	1	Z	1	1	1	1	1	1	0	3	6	1	3	1	1	0	0	4	1	0	0	0	1.4	6																						
19-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	14	4	1.0	14																						
20-Oct	8	1	1	8	1	Z	2	0	1	1	0	0	2	1	0	0	0	0	0	0	0	0	0	0	1.2	8																						
21-Oct	Z	0	0	1	6	2	15	2	1	1	1	1	1	0	1	0	19	10	0	0	1	3	1	1	3.0	19																						
22-Oct	9	Z	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1.2	9																						
23-Oct	0	0	Z	38	23	33	14	8	4	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	5.6	38																						
24-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	1	0.4	1																						
25-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	2	9	4	1	1	1	1	0	1	1	0	1.0	9																						
26-Oct	1	3	1	0	0	Z	0	0	0	1	1	1	1	0	0	1	21	38	24	6	4	1	5	1	4.8	38																						
27-Oct	Z	0	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																						
28-Oct	0	Z	0	0	0	0	1	1	6	8	7	4	2	0	0	1	0	0	2	1	1	1	0	10	2.0	10																						
29-Oct	32	10	Z	24	19	14	17	36	11	3	1	1	1	1	1	1	1	1	2	1	2	8	5	2	8.5	36																						
30-Oct	1	1	0	Z	0	0	0	0	0	0	0	1	1	2	1	2	2	1	2	1	1	1	1	1	0.8	2																						
31-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																						
																								2.4	1.3	1.0	3.5	2.4	2.2	2.1	2.0	1.3	1.8	2.4	2.3	1.8	1.5	2.3	1.6	2.4	5.4	2.5	2.0	1.0	1.1	1.7	1.1	Diurnal Average
																								32	10	10	38	23	33	17	36	11	10	15	13	13	8	20	13	26	63	24	17	4	8	14	10	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 2015





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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Lower Camp - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	676	96.02	96.02
11 - 20	17	2.41	98.44
21 - 60	10	1.42	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: 704

Total Number of Hours: 744



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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Lower Camp - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	54	34	15	14	11	57	153	20	10	5	3	51	61	61	62	64	675
11 - 20	0	0	0	0	2	2	7	1	0	2	1	0	1	0	0	1	17
21 - 60	0	0	0	0	0	0	5	1	0	3	1	0	0	0	0	0	10
61 - 110	0	0	0	0	0	0	0	0	0	1	0	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>	54	34	15	14	13	59	165	22	10	11	5	51	62	61	62	65	703

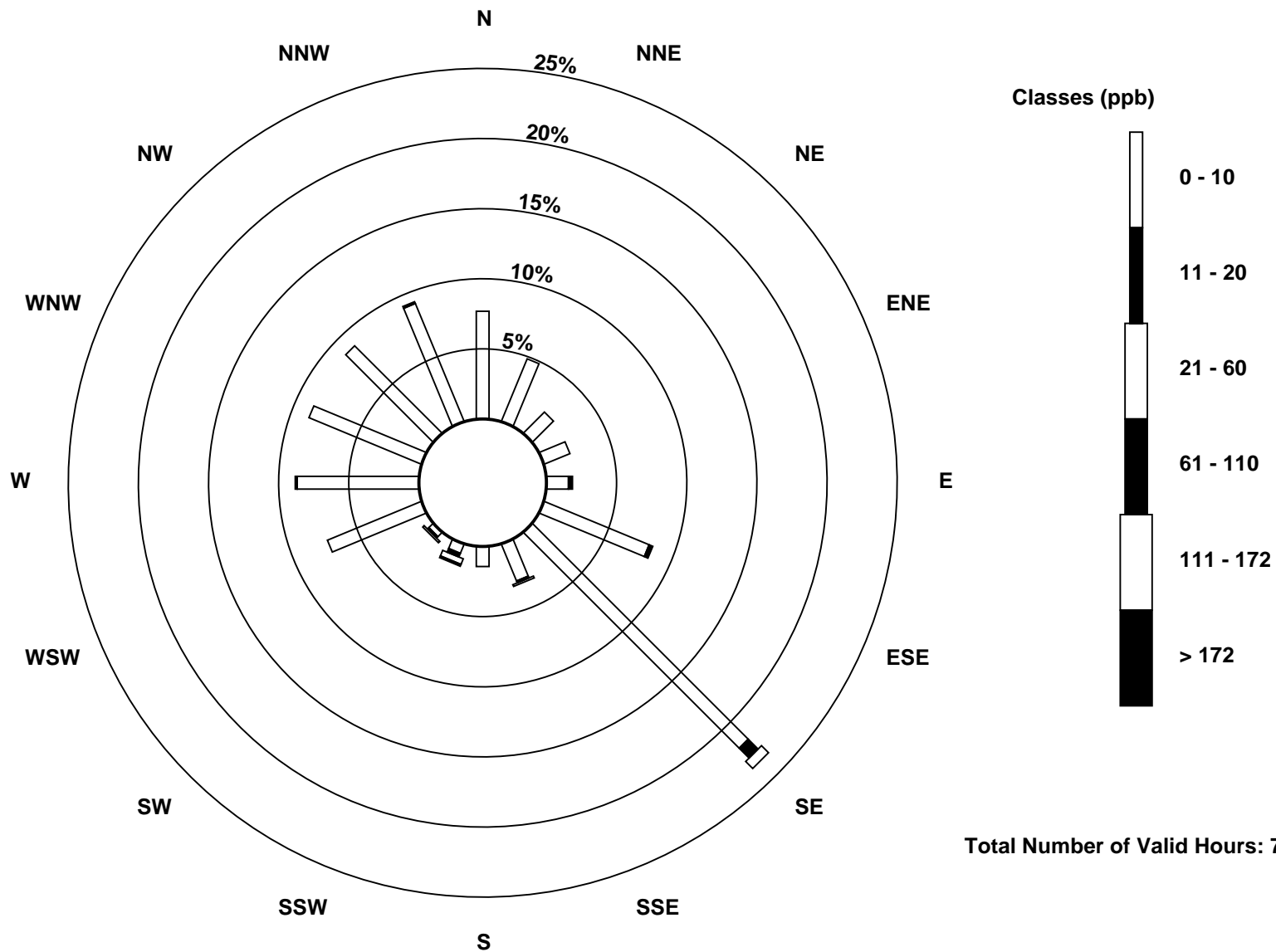
Total Number of Valid Hours: 703

Total Number of Hours: 744

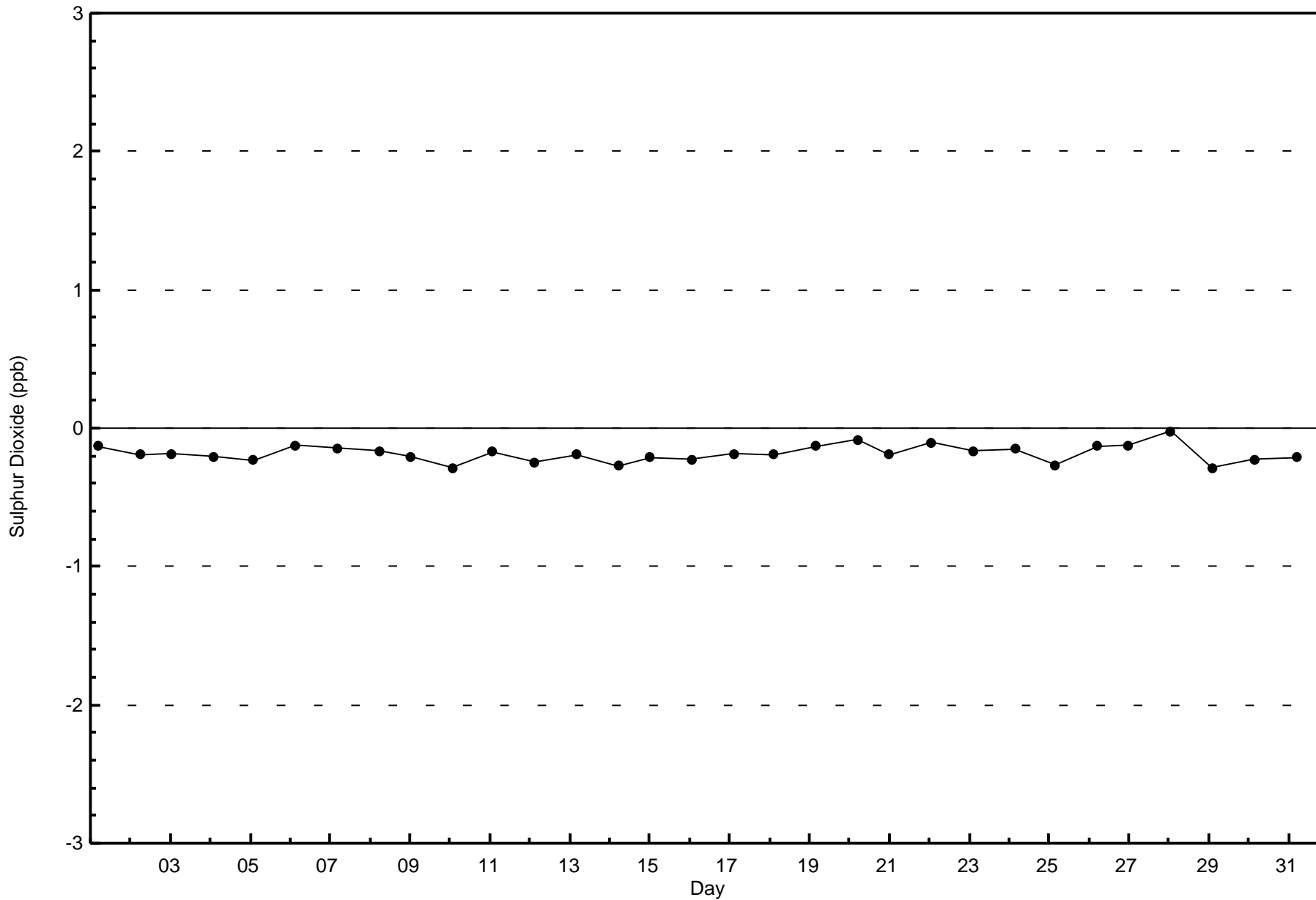


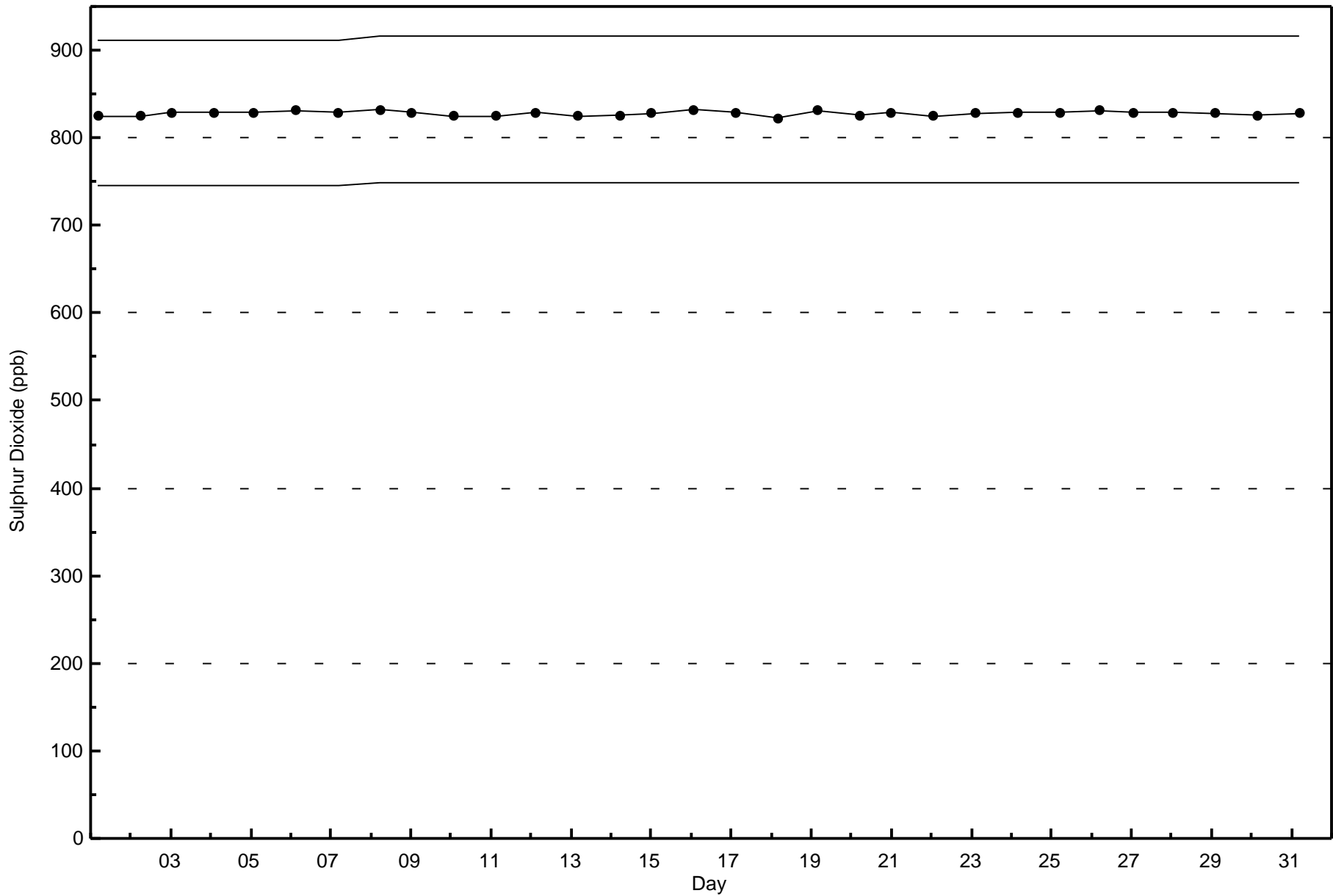
Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Lower Camp (AMS 11)



Total Number of Valid Hours: 703







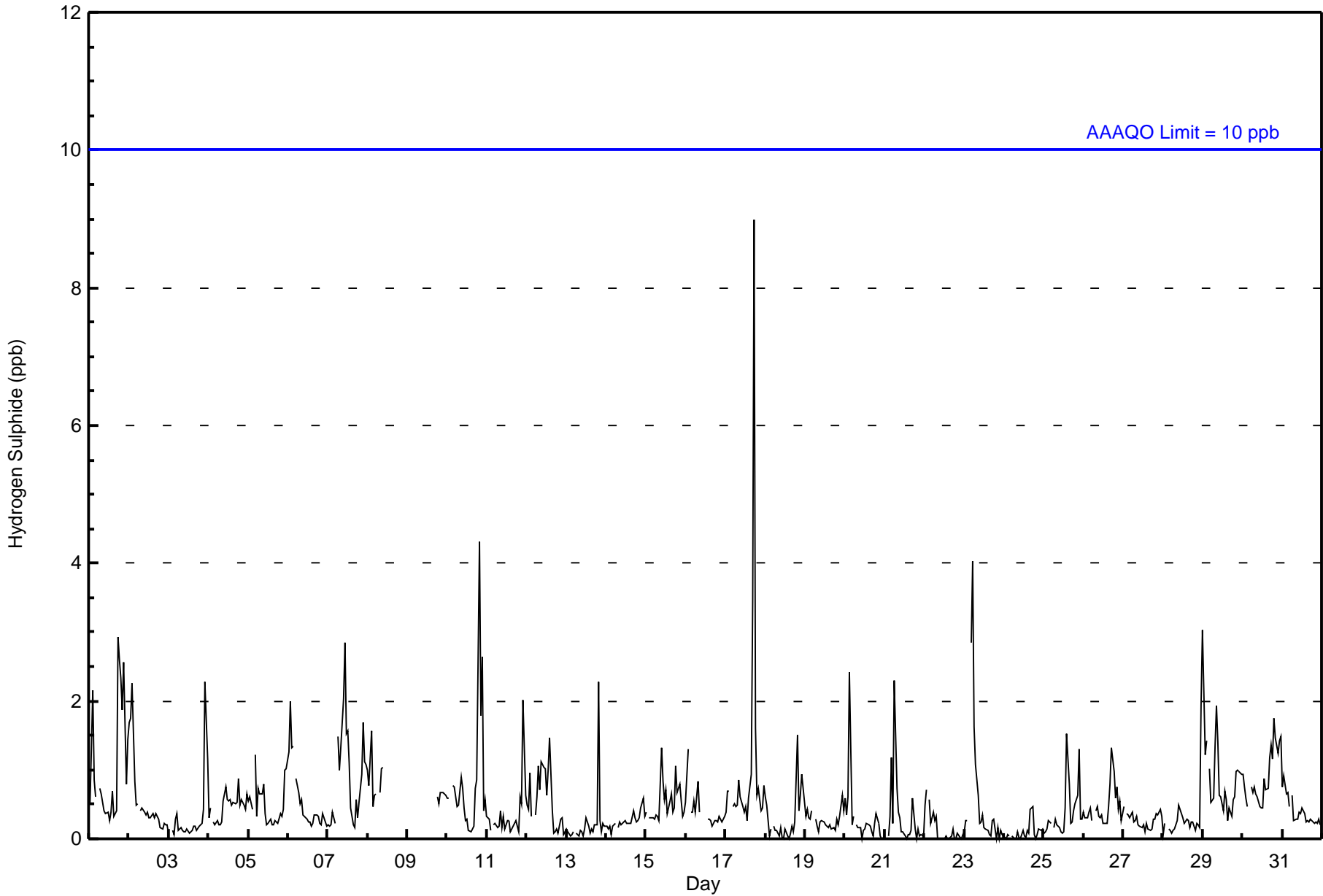


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 9 ppb on Oct 17 18:00	Maximum Daily Average: 1.1 ppb on Oct 17		Hours of Data:	678
Minimum Value: 0 ppb on Oct 18 12:00	Minimum Daily Average: 0.1 ppb on Oct 24		Hours of Missing Data:	66
Maximum Diurnal Average: 0.8 ppb at hour 18	Minimum Diurnal Average: 0.3 ppb at hour 16		Hours of Calibration:	33
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> = 3		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	1	1	2	1	1	Z	1	1	1	0	0	0	0	0	1	0	0	3	3	2	2	3	1	1	1.1	3
2-Oct	2	2	2	1	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	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	2	1	0.3	2
4-Oct	0	0	Z	0	0	0	0	0	0	1	1	1	1	0	1	1	1	1	1	1	0	1	0	1	0.5	1
5-Oct	1	1	0	Z	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.5	1
6-Oct	1	2	1	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2
7-Oct	0	0	0	0	0	Z	1	1	1	2	3	2	2	1	0	0	0	1	0	1	1	2	1	1	0.9	3
8-Oct	1	1	2	0	1	1	Z	1	1	1	M	M	M	M	M	M	M	M	M	M	M	M	M	M	--	2
9-Oct	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	C	C	C	1	1	1	1	1	1	--	1
10-Oct	1	1	Z	1	1	1	0	0	1	1	0	0	0	0	0	0	0	1	1	4	2	3	0	1	0.8	4
11-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1	0.3	2
12-Oct	0	0	1	0	Z	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.6	1
13-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
14-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.3	1
15-Oct	0	Z	0	0	0	0	0	0	0	1	1	1	1	0	1	1	0	0	1	1	1	1	0	0	0.5	1
16-Oct	1	1	Z	0	0	1	0	1	0	M	M	M	M	0	0	0	0	0	0	0	0	0	0	0	0.4	1
17-Oct	0	1	1	Z	0	1	0	0	1	1	0	0	0	0	1	1	3	9	2	1	1	0	0	1	1.1	9
18-Oct	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	1	1	0.3	2
19-Oct	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
20-Oct	1	0	1	2	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
21-Oct	0	Z	0	0	1	0	2	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.3	2
22-Oct	0	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
23-Oct	0	0	0	Z	3	4	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	4
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	0.1	0
25-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	2	1	0	0	0	1	1	1	0	0	0.4	2
26-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	0	0.5	1
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	0.3	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	2	0	0.3	2
29-Oct	3	1	1	Z	1	1	1	1	2	1	1	1	0	1	1	0	0	0	1	1	1	1	1	1	0.9	3
30-Oct	1	1	1	0	Z	1	1	1	1	1	0	0	0	1	1	1	1	1	1	2	1	1	1	1	0.9	2
31-Oct	1	1	1	1	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1

0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.3	0.3	0.3	0.4	0.3	0.4	0.8	0.5	0.7	0.5	0.6	0.6	0.6	Diurnal Average
3	2	2	2	3	4	2	1	2	2	2	3	2	2	1	2	1	3	9	3	4	2	3	2	2	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**  
**Cumulative Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Lower Camp - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	667	98.38	98.38
3 - 4	10	1.47	99.85
5 - 7	0	0.00	99.85
8 - 11	1	0.15	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 678

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Lower Camp - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	50	33	15	12	13	54	155	22	10	7	5	51	62	55	58	64	666
3 - 4	0	0	0	0	1	1	1	0	0	3	0	1	2	0	0	1	10
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	1	0	0	0	0	0	0	1
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	50	33	15	12	14	55	156	22	10	11	5	52	64	55	58	65	677

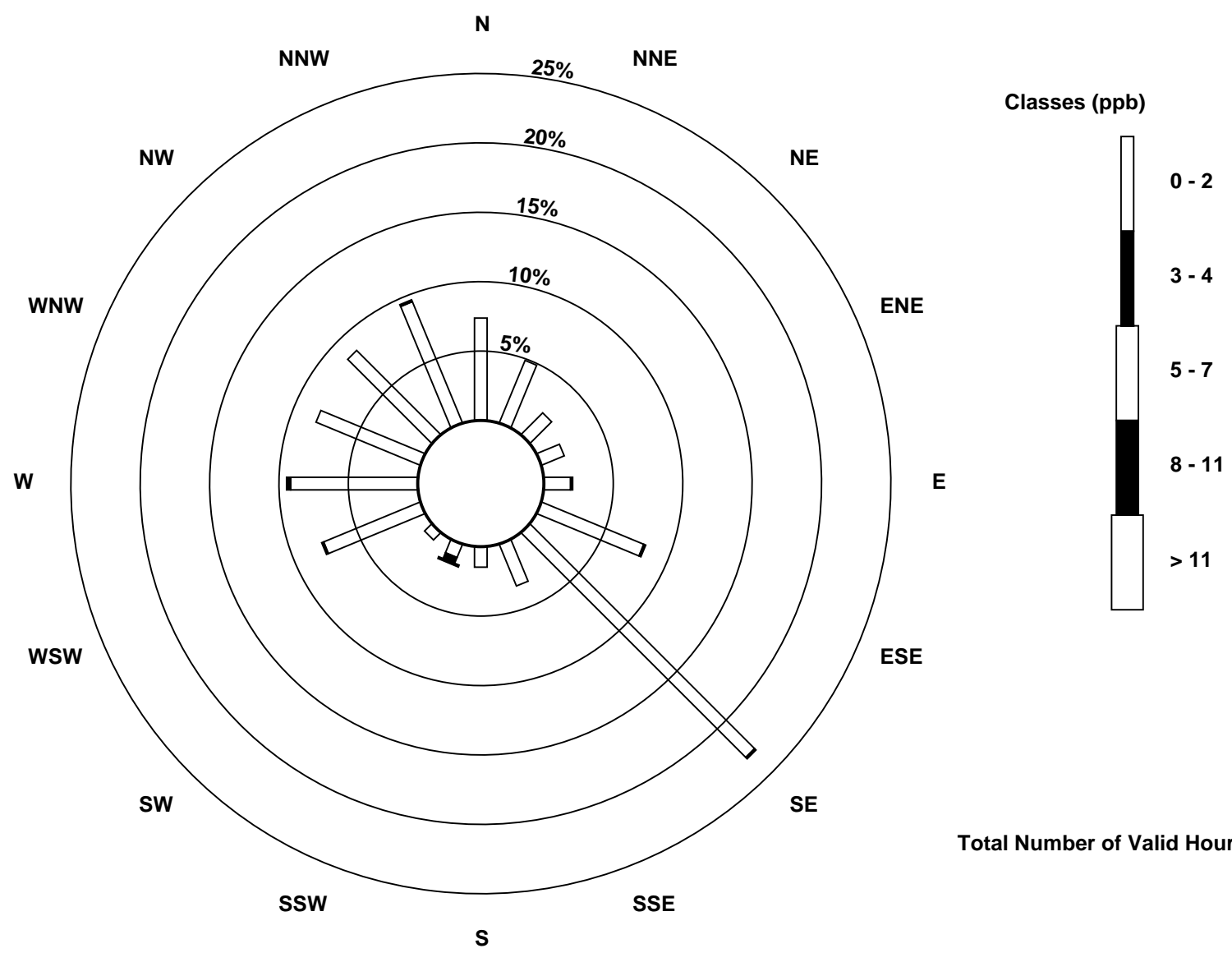
Total Number of Valid Hours: 677

Total Number of Hours: 744

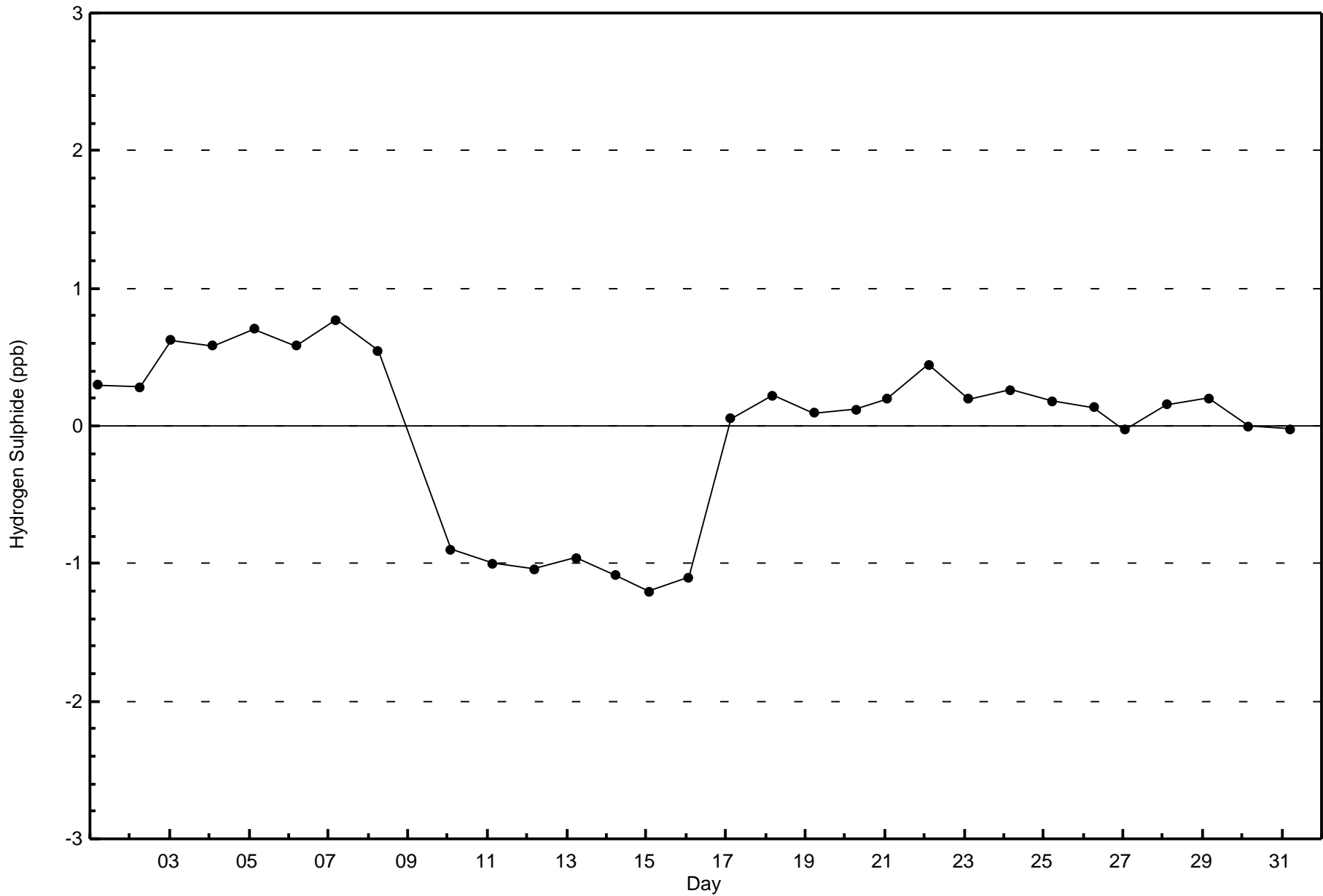


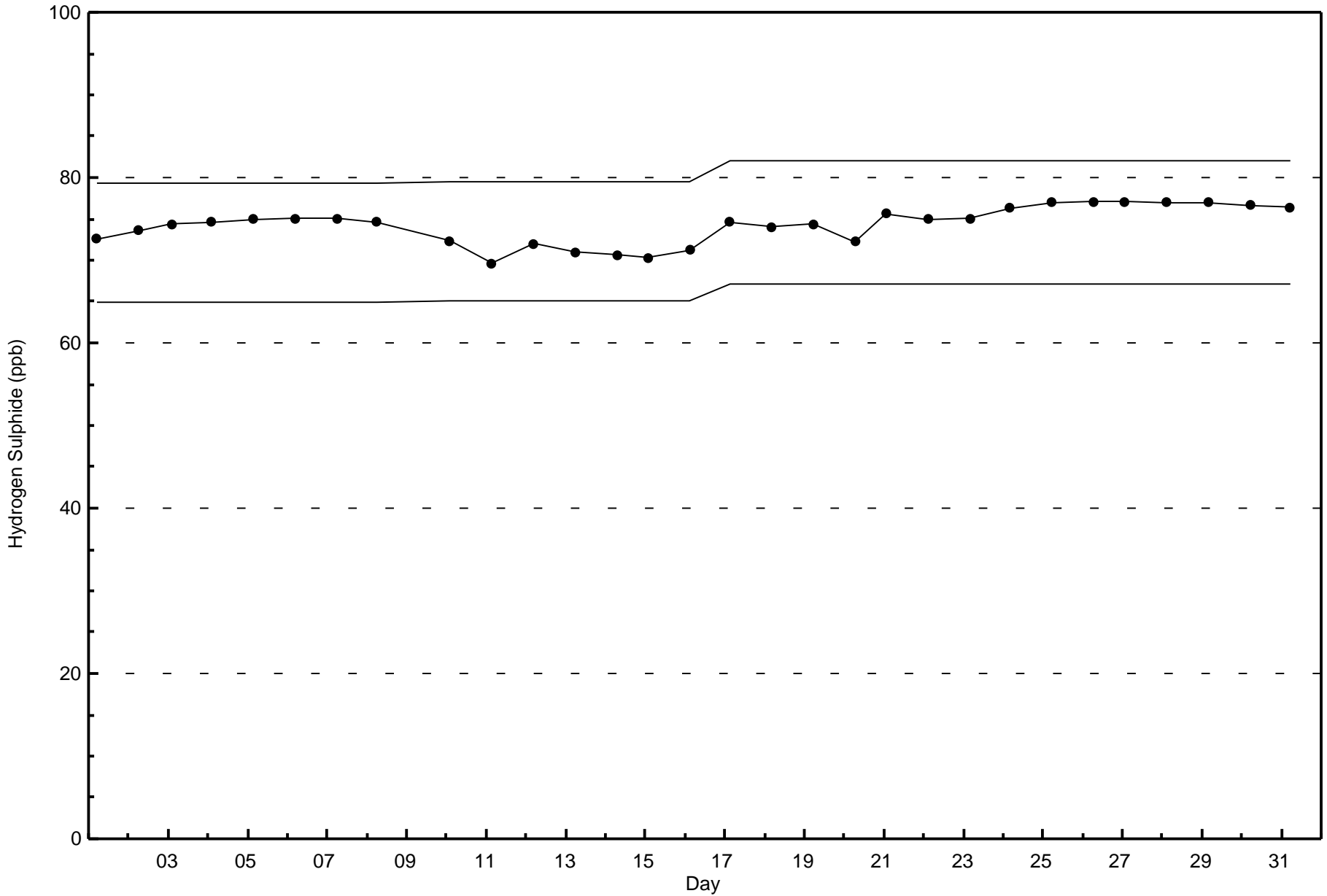
Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Lower Camp (AMS 11)



Total Number of Valid Hours: 677







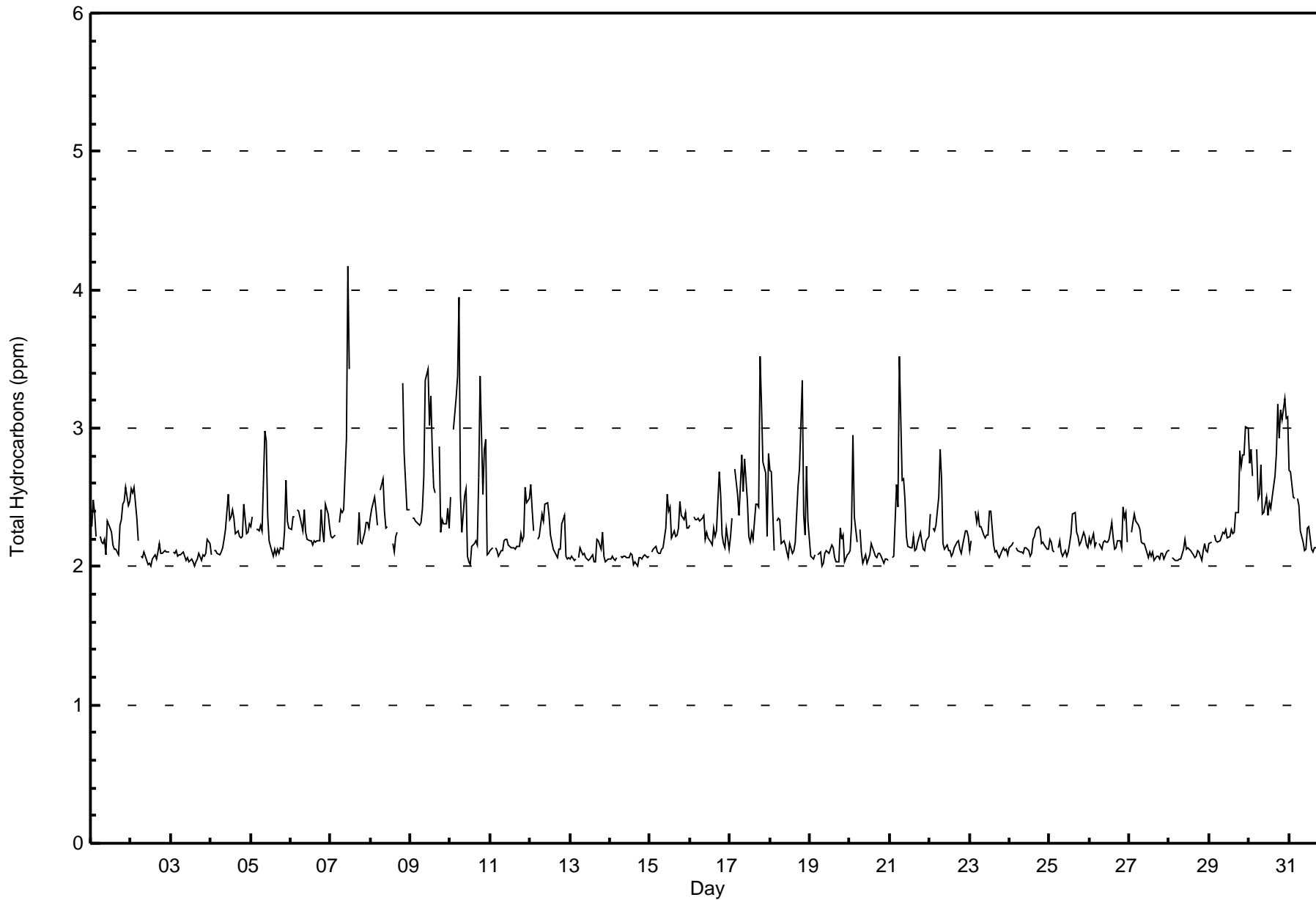
Maximum Value: 4.2 ppm on Oct 7 11:00      Maximum Daily Average: 2.7 ppm on Oct 30																				Hours in Service: 744 Hours of Data: 704 Hours of Missing Data: 40 Hours of Calibration: 35 Percent Operational Time: 99.3						
Minimum Value: 2.0 ppm on Oct 14 17:00      Minimum Daily Average: 2.1 ppm on Oct 14 Maximum Diurnal Average: 2.3 ppm at hour 20      Minimum Diurnal Average: 2.2 ppm at hour 16 Monthly Average: 2.28 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> = 2.3 P <sub>90</sub> = 2.6 P <sub>99</sub> = 3.4																										
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	2.3	2.5	2.4	2.2	Z	2.2	2.2	2.2	2.2	2.1	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.3	2.3	2.5	2.5	2.6	2.4	2.5	2.3	2.6
2-Oct	2.6	2.5	2.6	2.3	2.2	Z	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.6
3-Oct	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.1	2.0	2.0	2.0	2.1	2.1	2.0	2.1	2.1	2.1	2.2	2.2	2.1	2.2
4-Oct	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.5	2.3	2.4	2.4	2.3	2.2	2.3	2.2	2.2	2.2	2.5	2.2	2.3	2.3	2.2	2.5
5-Oct	2.3	2.4	Z	2.3	2.3	2.3	2.3	2.3	3.0	2.9	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.6	2.3	2.3	2.3	3.0
6-Oct	2.3	2.4	2.4	Z	2.4	2.4	2.3	2.3	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.3	2.2	2.5	2.4	2.3	2.3	2.5
7-Oct	2.2	2.2	2.2	2.2	Z	2.3	2.4	2.4	2.4	2.9	4.2	3.4	C	C	C	C	2.2	2.4	2.2	2.2	2.3	2.3	2.3	2.3	2.5	4.2
8-Oct	2.4	2.4	2.5	2.4	2.3	Z	2.6	2.6	2.4	2.3	2.3	M	M	2.2	2.1	2.2	2.3	M	M	3.3	2.8	2.6	2.4	2.4	2.4	3.3
9-Oct	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.7	3.3	3.4	3.0	3.2	2.8	2.6	2.5	M	2.9	2.3	2.3	2.3	2.3	2.4	2.3	2.6	3.4
10-Oct	2.5	Z	3.0	3.2	3.4	4.0	2.5	2.2	2.5	2.6	2.1	2.0	2.0	2.1	2.2	2.2	2.2	2.6	3.4	2.5	2.9	2.9	2.1	2.1	2.6	4.0
11-Oct	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.6	2.5	2.5	2.2	2.6
12-Oct	2.6	2.4	2.3	Z	2.2	2.2	2.3	2.4	2.3	2.5	2.5	2.4	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.3	2.4	2.1	2.0	2.1	2.3	2.6
13-Oct	2.1	2.1	2.0	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.0	2.0	2.2	2.2	2.1	2.2	2.1	2.0	2.0	2.1	2.1	2.2
14-Oct	2.1	2.1	2.1	2.0	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	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
15-Oct	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.5	2.4	2.4	2.2	2.3	2.2	2.2	2.3	2.5	2.4	2.3	2.4	2.3	2.3	2.3	2.5
16-Oct	2.3	Z	2.4	2.3	2.3	2.4	2.3	2.4	2.4	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.7	2.5	2.2	2.2	2.1	2.3	2.1	2.3	2.7
17-Oct	2.2	2.4	Z	2.7	2.5	2.4	2.6	2.8	2.5	2.8	2.5	2.2	2.2	2.3	2.2	2.4	2.4	2.4	3.5	3.2	2.8	2.7	2.2	2.8	2.6	3.5
18-Oct	2.7	2.7	2.1	Z	2.3	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.2	2.4	2.6	2.7	3.3	2.4	2.2	2.7	2.3	2.4	3.3
19-Oct	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.0	2.0	2.3	2.2	2.2	2.0	2.1	2.1	2.1	2.3
20-Oct	2.1	2.3	2.9	2.4	2.2	Z	2.3	2.1	2.0	2.1	2.0	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.1	2.9
21-Oct	Z	2.1	2.1	2.3	2.6	2.4	3.5	2.6	2.6	2.5	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.3	3.5
22-Oct	2.4	Z	2.3	2.3	2.3	2.5	2.8	2.6	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.2	2.3	2.3	2.2	2.2	2.8
23-Oct	2.1	2.2	Z	2.4	2.3	2.4	2.3	2.3	2.2	2.2	2.2	2.4	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4
24-Oct	2.1	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	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.2	2.3
25-Oct	2.2	2.2	2.1	2.1	Z	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.4	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.4
26-Oct	2.2	2.2	2.2	2.1	2.2	Z	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.1	2.1	2.2	2.2	2.1	2.4	2.4	2.4	2.2	2.2	2.4
27-Oct	Z	2.2	2.3	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4
28-Oct	2.1	Z	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.2	2.1	2.1	2.1	2.2
29-Oct	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.2	2.2	2.4	2.4	2.8	2.7	2.8	2.8	3.0	3.0	2.4	3.0
30-Oct	2.7	2.8	2.7	Z	2.8	2.5	2.5	2.7	2.4	2.4	2.5	2.4	2.5	2.4	2.5	2.7	2.8	3.2	2.9	3.1	3.1	3.2	3.1	3.1	2.7	3.2
31-Oct	2.7	2.7	2.5	2.5	Z	2.5	2.4	2.3	2.2	2.1	2.1	2.3	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.2	2.7
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan      C - Calibration      M - Maintenance																										





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

**Total Hydrocarbons (THC) - ppm**  
**Lower Camp - October 2015**





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

**Total Hydrocarbons (THC) - ppm**  
**Lower Camp - October 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	41	5.82	5.82
2.1 - 3.0	643	91.34	97.16
3.1 - 10.0	20	2.84	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**

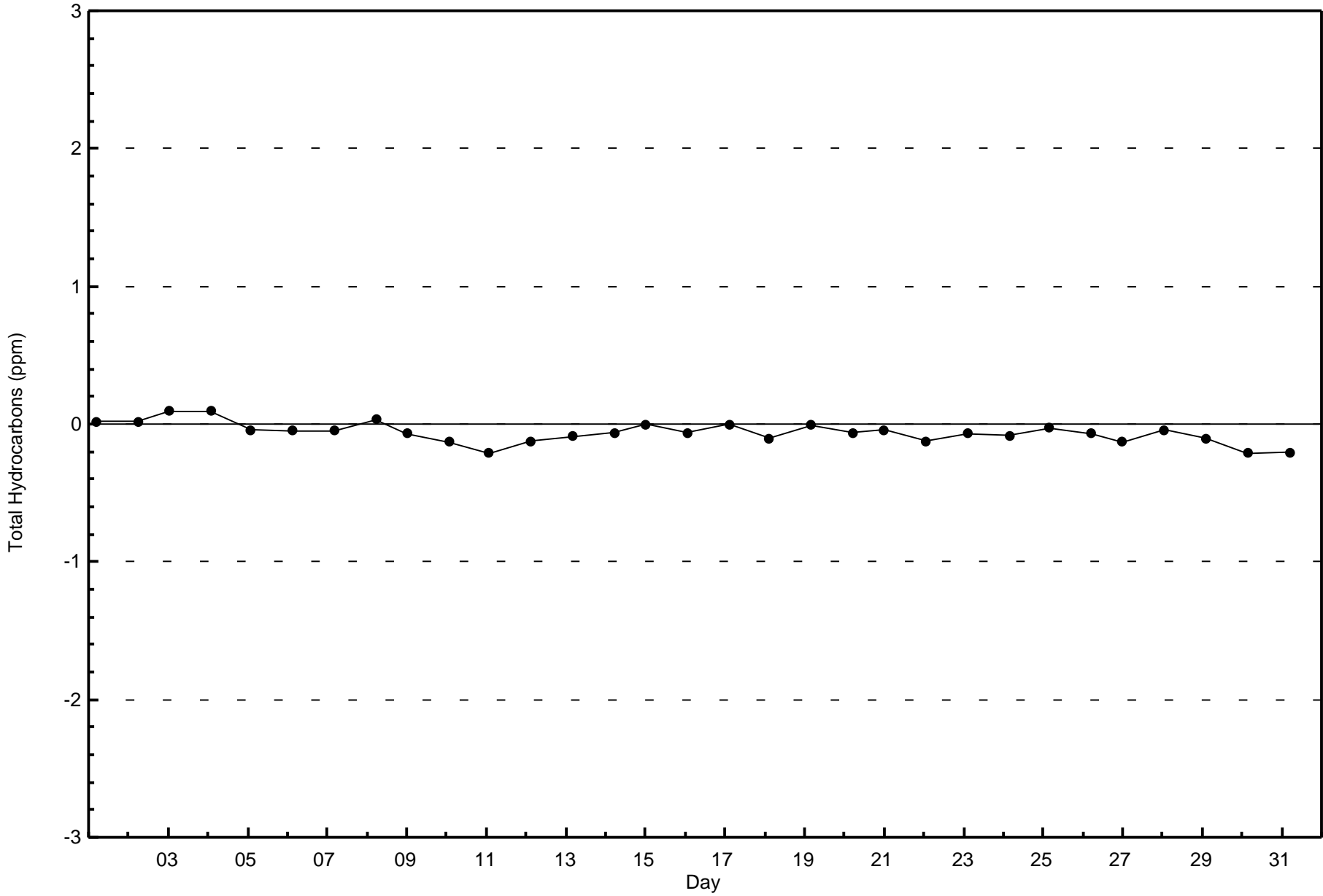
**Total Hydrocarbons (THC) - ppm**  
**Lower Camp - October 2015**

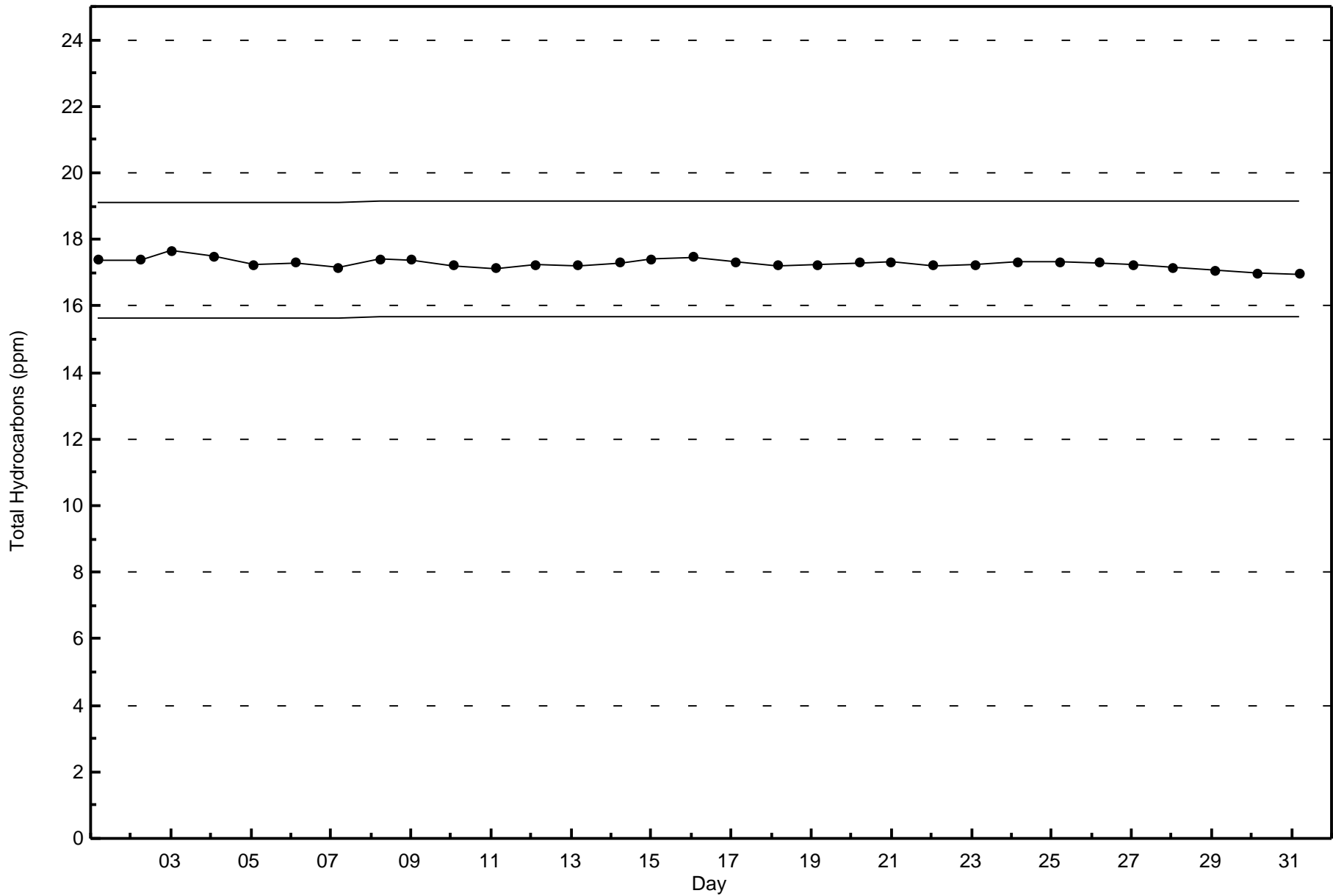
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	6	4	6	0	3	2	2	0	0	0	0	9	4	0	5	0	41
2.1 - 3.0	48	30	9	13	9	54	157	21	9	10	4	42	58	57	56	65	642
3.1 - 10.0	0	0	0	1	1	3	6	1	1	1	1	0	0	4	1	0	20
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	54	34	15	14	13	59	165	22	10	11	5	51	62	61	62	65	703

Total Number of Valid Hours: 703

Total Number of Hours: 744









Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

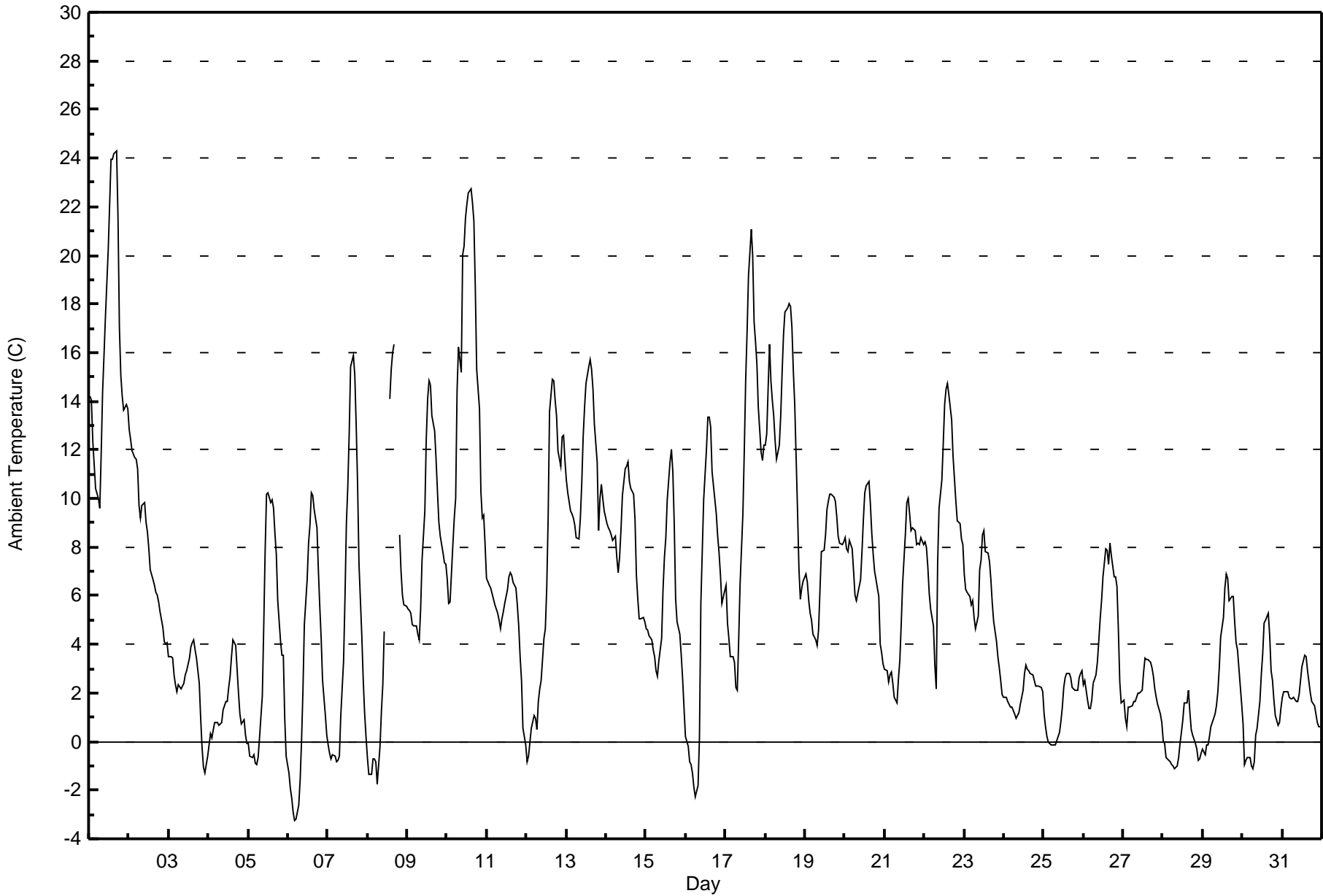
Lower Camp - October 2015

Maximum Value: 24.3 C on Oct 1 17:00		Maximum Daily Average: 16.2 C on Oct 1		Hours in Service: 744																																												
Minimum Value: -3.3 C on Oct 6 05:00		Minimum Daily Average: 0.0 C on Oct 28		Hours of Data: 740																																												
Maximum Diurnal Average: 10.4 C at hour 15		Minimum Diurnal Average: 3.2 C at hour 7		Hours of Missing Data: 4																																												
Monthly Average: 6.02 C		Percentiles: P <sub>1</sub> = -1.9 P <sub>10</sub> = -0.1 Q <sub>1</sub> = 1.8 Median = 5.1 Q <sub>3</sub> = 9.2 P <sub>90</sub> = 13.7 P <sub>99</sub> = 21.8		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	14.2	14.0	12.4	11.4	10.4	10.0	9.6	11.8	14.4	15.9	17.4	20.2	22.0	24.0	24.0	24.2	24.3	21.6	17.0	15.1	14.2	13.6	13.8	13.7	16.2	24.3																						
2-Oct	12.8	12.4	11.9	11.7	11.6	11.2	9.7	9.2	9.7	9.8	9.1	8.6	7.9	7.1	6.7	6.5	6.2	6.0	5.8	5.4	4.7	4.1	4.0	4.1	8.2	12.8																						
3-Oct	3.5	3.5	3.4	2.8	2.3	2.0	2.3	2.2	2.3	2.4	2.7	2.9	3.4	3.9	4.0	4.2	3.8	3.4	2.4	1.0	-0.3	-1.1	-1.3	-0.6	2.3	4.2																						
4-Oct	-0.1	0.3	0.2	0.5	0.8	0.8	0.7	0.7	0.8	1.3	1.7	1.6	2.2	2.7	3.5	4.2	4.0	3.0	2.0	1.1	0.7	0.9	0.2	-0.1	1.4	4.2																						
5-Oct	-0.1	-0.6	-0.7	-0.5	-0.9	-1.0	-0.7	0.2	1.9	4.7	7.8	10.2	10.2	9.8	10.0	9.6	8.6	7.7	5.8	4.1	3.5	3.6	1.0	-0.6	3.9	10.2																						
6-Oct	-1.3	-1.9	-2.3	-2.9	-3.3	-3.2	-2.6	-1.6	0.1	2.1	4.8	6.6	8.2	8.9	10.2	10.1	9.6	8.8	7.1	5.6	4.2	2.5	1.1	0.3	3.0	10.2																						
7-Oct	-0.2	-0.5	-0.7	-0.6	-0.6	-0.9	-0.8	-0.6	1.1	3.3	5.9	9.0	10.5	12.7	15.4	15.9	15.1	13.0	10.6	7.3	4.4	2.6	1.2	0.2	5.1	15.9																						
8-Oct	-0.7	-1.3	-1.3	-0.7	-0.7	-0.8	-1.7	-0.2	1.2	2.3	4.5	M	M	14.1	15.3	16.0	16.4	M	M	8.5	7.0	6.0	5.6	5.6	4.8	16.4																						
9-Oct	5.5	5.4	5.3	4.8	4.7	4.8	4.4	4.2	5.5	7.5	9.5	12.4	14.1	14.9	14.7	13.4	12.8	11.6	10.3	9.1	8.4	7.7	7.4	7.3	8.6	14.9																						
10-Oct	6.7	5.7	5.7	8.1	9.2	10.0	14.5	16.2	15.2	20.0	20.4	21.5	22.1	22.5	22.7	22.2	21.4	18.7	15.3	13.7	10.3	9.2	9.3	8.1	14.5	22.7																						
11-Oct	6.7	6.5	6.3	6.1	5.8	5.6	5.3	5.0	4.6	5.0	5.3	5.7	6.3	6.8	7.0	6.8	6.6	6.3	5.6	4.7	3.5	2.5	0.5	-0.2	5.2	7.0																						
12-Oct	-0.8	-0.6	0.0	0.6	1.1	0.9	0.5	1.7	2.2	2.5	4.2	4.6	6.3	9.2	13.6	14.9	14.9	14.0	13.4	11.9	11.4	12.5	12.6	11.5	6.8	14.9																						
13-Oct	10.7	10.2	9.5	9.4	9.2	8.9	8.4	8.4	9.2	10.6	12.5	13.8	14.7	15.4	15.7	15.3	14.5	13.1	11.5	8.7	10.0	10.6	10.0	9.5	11.2	15.7																						
14-Oct	9.0	8.8	8.6	8.5	8.3	8.5	7.6	7.0	7.6	8.7	10.1	11.2	11.3	11.5	10.7	10.4	10.2	9.1	6.8	5.8	5.0	5.0	5.1	4.9	8.3	11.5																						
15-Oct	4.6	4.6	4.3	4.2	3.8	3.5	2.9	2.7	3.3	4.2	6.3	7.6	8.4	10.0	11.5	12.0	11.1	9.0	5.8	4.9	4.4	3.6	2.5	1.4	5.7	12.0																						
16-Oct	0.2	-0.2	-0.8	-1.0	-1.3	-1.9	-2.3	-1.8	0.2	5.7	7.8	9.9	12.0	13.4	13.3	13.0	11.1	9.9	9.4	8.4	7.7	6.8	5.7	6.2	5.5	13.4																						
17-Oct	6.4	4.9	4.2	3.5	3.5	3.2	2.2	2.1	4.2	6.5	9.4	12.0	14.9	16.8	19.2	21.1	20.0	17.3	16.5	15.5	13.7	11.9	11.5	12.2	10.5	21.1																						
18-Oct	12.2	12.7	16.3	14.8	14.1	13.4	12.3	11.6	12.2	13.4	15.2	16.7	17.7	17.8	18.0	17.9	17.0	15.3	13.9	9.5	7.1	5.9	6.3	6.6	13.2	18.0																						
19-Oct	6.9	6.5	5.8	5.3	5.0	4.4	4.2	3.9	4.6	6.2	7.8	7.9	8.5	9.5	9.9	10.2	10.2	10.0	9.9	9.3	8.4	8.1	8.1	8.2	7.5	10.2																						
20-Oct	8.4	7.9	7.8	8.3	7.9	7.0	6.0	5.8	6.1	6.7	7.8	9.2	10.2	10.5	10.7	9.8	8.6	7.7	7.0	6.7	6.0	4.0	3.7	3.2	7.4	10.7																						
21-Oct	3.0	2.9	2.4	2.8	2.9	2.4	1.8	1.6	2.6	3.3	4.8	6.5	8.6	9.8	10.0	9.4	8.7	8.8	8.7	8.1	8.2	8.1	8.4	8.1	5.9	10.0																						
22-Oct	8.2	8.0	7.2	6.1	5.4	4.7	3.2	2.2	7.4	9.6	10.8	12.3	13.8	14.5	14.7	14.3	13.2	11.7	10.8	9.9	9.1	8.9	8.3	8.1	9.3	14.7																						
23-Oct	6.9	6.2	6.1	6.0	5.6	5.8	5.1	4.6	5.1	7.1	7.5	8.5	8.7	7.8	7.7	7.4	6.7	5.7	4.9	4.1	3.5	3.0	2.5	1.9	5.8	8.7																						
24-Oct	1.8	1.8	1.6	1.6	1.4	1.4	1.1	0.9	1.1	1.2	1.5	2.1	2.8	3.1	3.0	2.9	2.8	2.7	2.5	2.3	2.3	2.3	2.2	2.0	2.0	3.1																						
25-Oct	1.1	0.6	0.2	0.0	-0.1	-0.1	-0.2	-0.2	0.0	0.4	0.8	1.4	2.2	2.6	2.8	2.8	2.6	2.3	2.2	2.1	2.1	2.6	2.8	2.9	1.4	2.9																						
26-Oct	2.4	2.5	1.7	1.4	1.3	1.7	2.4	2.8	3.3	4.1	5.1	5.8	6.8	7.9	7.9	7.3	8.2	7.7	6.8	6.8	6.4	4.6	2.5	1.6	4.5	8.2																						
27-Oct	1.7	0.9	0.6	1.4	1.4	1.5	1.6	1.6	1.8	2.0	2.0	2.1	2.9	3.4	3.4	3.4	3.2	3.1	2.7	2.2	1.8	1.5	1.2	0.8	2.0	3.4																						
28-Oct	0.0	-0.1	-0.6	-0.8	-0.9	-1.0	-1.0	-1.1	-1.0	-0.6	-0.1	0.4	0.9	1.6	1.6	2.1	1.2	0.5	0.2	-0.1	-0.3	-0.8	-0.7	-0.5	0.0	2.1																						
29-Oct	-0.3	-0.5	-0.1	-0.1	0.2	0.6	0.9	1.1	1.5	2.0	3.0	4.3	5.1	6.3	6.9	6.7	5.8	6.0	5.9	4.9	4.1	3.8	3.0	1.5	3.0	6.9																						
30-Oct	0.7	-0.9	-0.8	-0.7	-0.6	-1.0	-1.1	-0.8	0.3	0.6	1.7	2.7	3.6	4.9	5.0	5.3	4.3	2.9	2.5	1.7	1.1	0.7	0.8	1.3	1.4	5.3																						
31-Oct	1.8	2.0	2.1	2.0	1.8	1.8	1.8	1.8	1.6	1.6	2.0	2.5	3.1	3.6	3.5	2.9	2.4	2.0	1.7	1.5	1.1	0.8	0.6	0.6	1.9	3.6																						
																								4.3	3.9	3.8	3.7	3.5	3.4	3.2	3.3	4.2	5.5	6.8	8.0	9.0	9.9	10.4	10.4	9.9	8.6	7.5	6.4	5.6	5.0	4.5	4.2	Diurnal Average
																								14.2	14.0	16.3	14.8	14.1	13.4	14.5	16.2	15.2	20.0	20.4	21.5	22.1	24.0	24.0	24.2	24.3	21.6	17.0	15.5	14.2	13.6	13.8	13.7	Diurnal Maximum
M - Maintenance																																																



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

**Ambient Temperature (AT) - C**  
**Lower Camp - October 2015**







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

**Ambient Temperature (AT) - C**  
**Lower Camp - October 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	79	10.68	10.68
0 - 10	507	68.51	79.19
10 - 20	138	18.65	97.84
> 20	16	2.16	100.00

Total Number of Valid Hours: 740

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

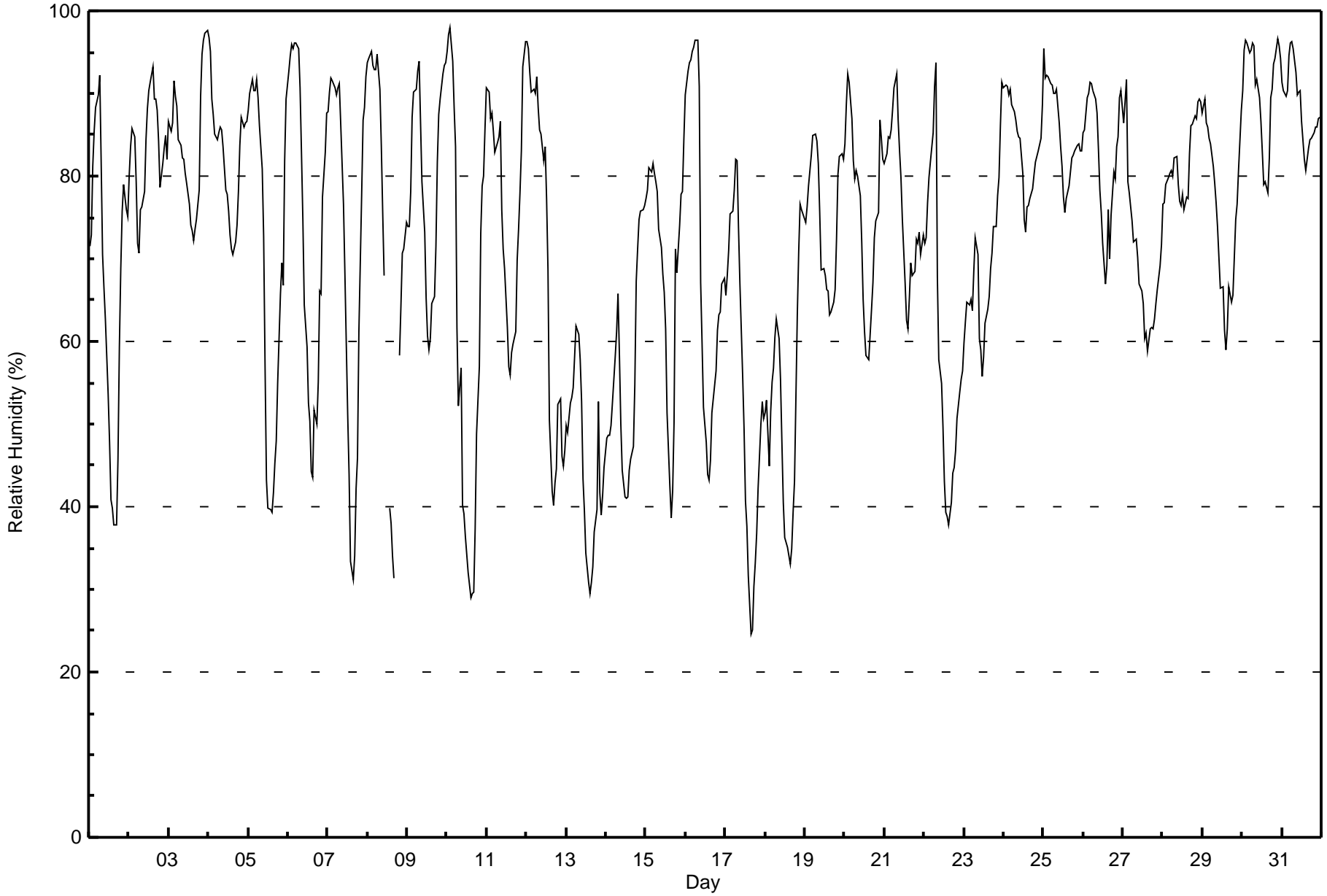
Lower Camp - October 2015

Maximum Value: 98 % on Oct 10 03:00																	Maximum Daily Average: 90.6 % on Oct 30																	Hours in Service: 744	
Minimum Value: 25 % on Oct 17 16:00																	Minimum Daily Average: 45.3 % on Oct 13																	Hours of Data: 740	
Maximum Diurnal Average: 83.5 % at hour 5																	Minimum Diurnal Average: 55.3 % at hour 16																	Hours of Missing Data: 4	
Monthly Average: 72.6 %																	Percentiles: P <sub>1</sub> = 31 P <sub>10</sub> = 44 Q <sub>1</sub> = 61 Median = 77 Q <sub>3</sub> = 86 P <sub>90</sub> = 92 P <sub>99</sub> = 96																	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	72	73	81	85	88	90	92	82	71	67	63	54	48	41	40	38	38	46	59	69	76	79	76	75	66.7	92									
2-Oct	80	84	86	85	79	72	71	76	76	78	84	88	90	91	93	89	89	88	84	79	82	83	85	82	83.1	93									
3-Oct	87	85	86	92	90	88	84	84	82	82	80	79	77	74	73	72	74	75	78	90	95	96	97	98	84.1	98									
4-Oct	97	95	89	87	85	84	85	86	86	84	78	78	76	73	71	70	72	74	78	84	87	86	86	87	82.5	97									
5-Oct	88	90	92	90	90	92	89	86	81	73	57	43	40	40	39	42	45	48	55	66	69	67	82	89	68.9	92									
6-Oct	93	95	96	95	96	96	95	91	83	75	64	59	53	50	44	44	52	50	55	66	66	78	83	88	73.6	96									
7-Oct	88	90	92	92	91	90	91	91	86	77	68	60	51	44	33	31	34	42	46	61	78	87	88	92	70.9	92									
8-Oct	94	94	95	93	93	93	95	90	84	76	68	M	M	40	38	34	31	M	M	58	64	71	71	74	72.8	95									
9-Oct	74	74	78	87	90	91	93	94	87	79	73	65	61	59	60	65	65	71	82	87	89	92	93	94	79.3	94									
10-Oct	95	97	98	94	88	84	62	52	57	40	39	36	34	32	29	29	30	37	49	57	73	79	80	86	60.7	98									
11-Oct	91	90	87	88	85	83	84	85	87	76	71	69	62	57	56	59	60	61	70	73	78	83	93	96	76.8	96									
12-Oct	96	95	93	90	91	90	92	88	86	85	82	84	77	69	51	42	40	43	45	52	53	46	45	47	70.0	96									
13-Oct	50	49	52	53	54	58	62	61	58	53	43	40	34	31	29	31	33	37	40	53	42	39	41	45	45.3	62									
14-Oct	48	49	49	50	53	58	61	66	58	50	44	41	41	41	44	46	47	55	67	71	75	76	76	76	55.9	76									
15-Oct	77	78	81	80	82	80	79	78	74	71	68	66	61	51	42	39	42	50	71	68	74	78	78	84	69.0	84									
16-Oct	90	93	94	94	95	96	96	96	91	67	60	52	48	44	43	46	51	55	56	61	63	64	67	68	70.4	96									
17-Oct	66	68	71	75	76	78	82	82	74	67	56	49	41	38	32	25	25	30	33	37	42	50	53	51	54.2	82									
18-Oct	51	53	45	51	55	57	60	63	60	55	48	41	36	35	34	33	35	39	43	63	71	77	76	75	52.4	77									
19-Oct	74	76	79	81	82	85	85	84	81	76	69	69	68	66	66	63	64	65	66	72	80	82	83	82	75.0	85									
20-Oct	84	89	92	91	87	82	80	81	80	78	72	65	61	58	58	61	64	67	73	75	76	87	85	82	76.1	92									
21-Oct	82	83	85	85	86	88	91	92	87	83	80	75	67	63	62	65	69	68	68	72	72	73	70	73	76.6	92									
22-Oct	72	73	77	80	82	85	91	94	68	58	55	50	43	39	39	38	40	44	45	47	51	54	55	56	59.8	94									
23-Oct	60	62	65	64	65	64	69	73	70	60	59	56	58	62	64	65	69	71	74	74	78	80	86	91	68.3	91									
24-Oct	91	91	91	90	90	89	88	87	85	85	85	80	75	73	76	76	77	78	80	82	82	83	85	89	83.7	91									
25-Oct	95	92	92	92	91	91	90	90	90	86	84	81	77	76	77	79	81	82	82	83	84	84	83	83	85.3	95									
26-Oct	85	86	89	90	91	91	90	89	88	83	78	76	72	67	69	76	70	75	81	80	84	85	89	90	82.3	91									
27-Oct	86	89	92	79	78	75	72	72	72	70	67	66	65	60	61	59	62	62	61	63	65	66	69	72	70.1	92									
28-Oct	77	77	79	80	80	81	80	82	82	79	77	76	78	76	77	77	83	86	86	87	87	89	89	89	81.5	89									
29-Oct	88	89	86	86	85	84	81	79	77	74	70	66	67	61	59	61	67	65	66	70	75	77	81	88	75.0	89									
30-Oct	90	95	97	96	95	95	96	96	91	92	89	87	83	79	79	78	82	89	91	94	94	97	96	94	90.6	97									
31-Oct	91	90	90	90	95	96	96	95	93	90	90	90	87	82	81	82	83	84	85	85	86	86	87	87	88.4	96									
																	81.0 82.1 83.1 83.5 83.5 83.4 83.3 82.7 78.8 73.2 68.5 64.7 61.0 57.2 55.5 55.3 57.2 61.3 65.6 70.3 73.8 76.5 78.4 80.1																	Diurnal Average	
																	97 97 98 96 96 96 96 96 96 93 92 90 90 90 91 93 89 89 89 91 94 95 97 97 98																	Diurnal Maximum	
M - Maintenance																																			



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

**Relative Humidity (RH) - %**  
**Lower Camp - October 2015**





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Lower Camp - October 2015

Maximum Speed: 31 km/h on Oct 26 11:00	Maximum Daily Speed Average: 17.8 km/h on Oct 13	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 10 03:00	Minimum Daily Speed Average: 0.8 km/h on Oct 15	Hours of Data: 739
Maximum Diurnal Speed Average: 2.7 km/h at hour 16	Minimum Diurnal Speed Average: 0.4 km/h at hour 19	Hours of Missing Data: 5
Monthly Average Velocity: 0.8 km/h 247.6 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 5 Median = 9 Q <sub>3</sub> = 16 P <sub>90</sub> = 21 P <sub>99</sub> = 28	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	SE8	SE11	SE10	SE11	SE9	SE10	SE11	SE11	SE13	SE11	SE11	SE11	SE11	ESE4	NNW5	NNW5	NW2	W1	ESE2	AF	WNNW2	W1	WNNW4	WNNW3	SE5.3	SE13	
2-Oct	NW4	WSW1	WNNW4	W4	WNNW6	NNW10	N10	N10	N13	N18	N18	N18	N20	NNW16	NNW18	N19	N14	N12	N14	N20	N19	NNW19	N17	N18	N13.0	N20	
3-Oct	N16	N14	N18	N15	NNW15	NNW15	NNW16	NNW14	N16	N16	NNE17	NE14	NNE13	NNE12	NE12	NE12	NNE11	NE8	NNE4	NNE2	ESE2	N1	NNE1	WNNW2	N10.2	N18	
4-Oct	W6	NNE2	ENE3	ENE2	E6	ENE5	E5	ESE9	ESE10	E8	S6	S5	SSW5	SE7	SE9	SE10	SE9	SE4	SE5	SE9	SE11	ESE9	SE7	SE5.1	ESE11		
5-Oct	SE8	ESE7	SE12	SE12	SE7	SE8	SSE6	SE5	SE8	SE5	W8	WNNW22	WNNW27	NW25	NW25	NW23	NW18	NW13	WNNW8	NW3	NNW6	NNW7	W1	NE0	WNNW4.4	WNNW27	
6-Oct	NNE1	WNNW1	ENE1	ENE1	ENE1	ESE1	SE5	ESE7	ESE7	SE11	SE11	SE13	ESE11	SE9	SE7	SE6	ESE8	SE4	S3	ESE6	SE6	W2	WNNW4	W5	SE4.4	SE13	
7-Oct	WNNW5	W5	W4	WNNW5	W5	W5	SSW1	NNE1	NNW3	NNE2	E3	ESE5	ENE4	E4	SW3	WSW13	W12	WNNW7	WNNW6	W2	NNW2	NNW1	WNNW2	NNW2	WNNW2.4	WSW13	
8-Oct	NNE1	NNE1	NW2	WNNW2	ENE2	ESE1	ENE1	ESE4	SE8	ESE9	SE10	M	M	SE12	SE12	SE9	SE5	M	M	WNNW4	NW4	NW4	NW4	NNW2	ESE2.4	SE12	
9-Oct	N1	NW3	NW5	NW4	WNNW4	NNW4	WNNW5	WNNW5	NNE4	SE6	ENE3	SE8	SE9	ESE2	N8	N8	NW5	NW6	NW5	WNNW4	NW3	WNNW4	N2	WNNW1	NNW2.0	SE9	
10-Oct	WNNW3	WNNW2	NNE0	ESE8	SE14	SE15	WSW9	W6	SE8	SW12	WSW15	WSW26	WSW29	WSW28	W28	W25	W21	W8	WNNW7	WSW4	NW3	NNW6	NNW9	NNW10	WSW8.2	WSW29	
11-Oct	NNW10	N11	N11	N12	N13	N14	N14	NNW11	NNW13	N17	NNW12	NNW12	NW20	NNW18	NNW15	NNW15	NNW14	NW12	NW16	NW11	W4	WNNW3	E1	ESE3	NNW10.8	NW20	
12-Oct	SE5	SE8	SE10	ESE14	SE16	SE11	SE8	SE10	SE12	SE7	SE9	SE16	ESE17	ESE17	SSW10	WSW18	W20	W15	WSW13	W7	WSW8	WSW13	WSW17	WSW17	S5.9	W20	
13-Oct	W20	WSW18	W20	W21	WSW21	W20	W18	W17	W20	W18	W20	WSW16	WSW18	WSW22	WSW21	WSW26	W21	W10	WSW9	SW2	W13	W21	WSW19	WSW19	W17.8	WSW26	
14-Oct	W19	WSW20	WSW17	W21	W22	W18	WSW15	W22	WSW24	W25	W24	WNNW25	WNNW24	WNNW25	NW23	NW19	NW15	N12	NNE10	NNE7	NNW4	NW5	NNW6	N5	WNNW14.2	WNNW25	
15-Oct	NW4	WNNW2	NE3	NNE3	ENE3	NNE4	N3	E4	ENE2	W2	SSW5	SE8	E4	ENE2	ESE3	S3	SSE6	SSE5	NW3	ESE1	ENE2	WNNW2	WNNW5	NW2	E0.8	SE8	
16-Oct	WNNW2	NW3	W4	W4	W5	W3	NW2	NW5	NW3	ESE20	ESE18	ESE18	SE20	SE18	SE20	SE18	ESE17	ESE12	SE15	SE17	SE18	SE14	SE14	SE16	SE9.4	ESE20	
17-Oct	SE10	SE7	SE6	ESE8	ESE13	ESE14	ESE11	SE9	SE12	SE10	SE12	SE12	SE13	SE13	SE15	SE12	S10	SSW7	S5	S6	SSE8	SE10	SE11	SE13	SE12	SE9.6	SE15
18-Oct	SE11	SSE6	WSW24	W21	WSW20	W19	W13	W13	W19	WSW21	W23	W26	WNNW25	WNNW26	WNNW24	WNNW22	WNNW20	WNNW14	WNNW10	SW1	NNE2	NNW2	WNNW4	NW4	W13.5	WNNW26	
19-Oct	WNNW6	NW6	NNW7	NNW7	NNW7	NNW6	N4	NNE4	NNE4	E7	ESE9	ESE8	ESE9	SE10	ESE12	E11	E13	ESE13	ESE14	ESE17	ESE20	SE23	SE26	SE22	ESE7.4	SE26	
20-Oct	SE14	SE8	SSE5	SW11	WSW18	W21	WNNW15	W16	WSW17	WSW19	W20	W24	W21	WNNW28	NW24	NW20	NW17	NW11	NW5	NW6	NW8	N8	NE7	NE4	WNNW10.6	WNNW28	
21-Oct	NNW1	ESE2	SE3	SSE2	SE3	S3	SSW2	SE4	SE7	ESE10	ESE15	ESE19	ESE18	SE18	SE21	SE19	SE20	SE19	ESE25	ESE23	SE22	SE22	SE13	SE14	SE12.4	ESE25	
22-Oct	SE14	SE12	SE9	SE10	SE9	SE6	ESE3	WSW12	WSW13	W17	WSW17	WSW18	WSW21	WSW21	WSW20	WSW16	WSW12	WSW13	WSW15	WSW13	W15	WSW18	W19	WSW9.7	WSW21		
23-Oct	W12	W9	WSW7	SW8	SSW5	SSW6	SSE5	SSE5	SSE5	WSW6	WSW8	W8	NNW8	NNW10	NNW9	N9	NNE9	NNW6	NNW8	NNW8	NNW8	NNW7	NNW8	N8	NW4.0	W12	
24-Oct	NNW6	N8	NNE8	N7	N6	NNE7	NE5	N5	N7	NNE6	N7	N4	NW3	NW4	NNW6	NNW4	NNW5	NNW5	NNE5	ENE4	E3	N3	NNE3	N7	N4.8	NNE8	
25-Oct	NNW10	NNW10	NNW9	NNW8	NW7	N9	NNW6	NNW7	N9	NNE8	NNE4	NNW3	NW2	NNW1	WNNW4	NNW4	NNW5	NW6	NW4	NW3	NW4	NW1	SSE7	SSE10	NNW4.2	SSE10	
26-Oct	SSW9	SSE6	ESE2	SE13	SE17	SE17	SE25	SE24	SE26	SE30	SE31	SE30	SE30	SE27	SE19	SE25	SSE17	SE18	SE21	SSE16	SSW10	WNNW22	W20	W19	SE14.7	SE31	
27-Oct	W20	WNNW20	WNNW12	WNNW19	WNNW20	WNNW22	WNNW22	WNNW19	WNNW21	WNNW21	NW18	NW17	WNNW22	NW27	NW23	NW23	NW20	NW14	NNW13	NNW14	NW11	NW8	NNW7	NW7	NW17.1	NW27	
28-Oct	NNW5	NNE7	NNE4	ESE4	E4	NE2	E2	ESE8	ESE5	S6	S7	SSE8	SE15	SE16	SE19	SE16	SE19	SE21	SE25	SE29	SE20	SE12	SE20	SE24	SE10.9	SE29	
29-Oct	SE23	SE21	SE17	SE19	SE18	SE17	SE17	SE16	SE12	SE16	SE18	SE14	SE13	SSE10	SSE11	SE10	SE10	SSE10	SE6	ESE6	ESE6	SE8	SSE6	SE7	SE12.9	SE23	
30-Oct	SE6	ESE3	SE5	SE8	SE9	SE10	SE8	SE12	SE13	SE12	SE15	SE14	SE13	SE11	SE12	ESE3	SSE3	NW2	WSW2	ESE1	SE1	SE2	WNNW3	WNNW4	SE6.3	SE15	
31-Oct	WNNW5	NW4	NW3	W4	NNW3	NNW4	NW5	N4	NE2	N2	NE4	NNE4	N4	N7	NE10	NE11	NE7	NE8	NNE8	NNE8	N11	N10	NNW7	N8	N4.9	N11	

WSW1.4	W0.8	W1.2	SW1.4	SW1.5	W0.8	W0.6	SSW0.6	S1.1	S1.7	SSW2.1	SSW2.0	SW1.4	W1.7	WNNW1.9	WNNW2.7	WNNW2.5	WNNW1.0	NNE0.4	ESE1.5	ESE0.8	WNNW0.9	WSW0.8	SW0.9		Diurnal Average
SE23	SE21	WSW24	W21	W22	WNNW22	SE25	SE24	SE26	SE30	SE31	SE30	SE30	WNNW28	W28	WSW26	W21	SE21	SE25	SE29	SE22	SE23	SE26	SE24		Diurnal Maximum

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



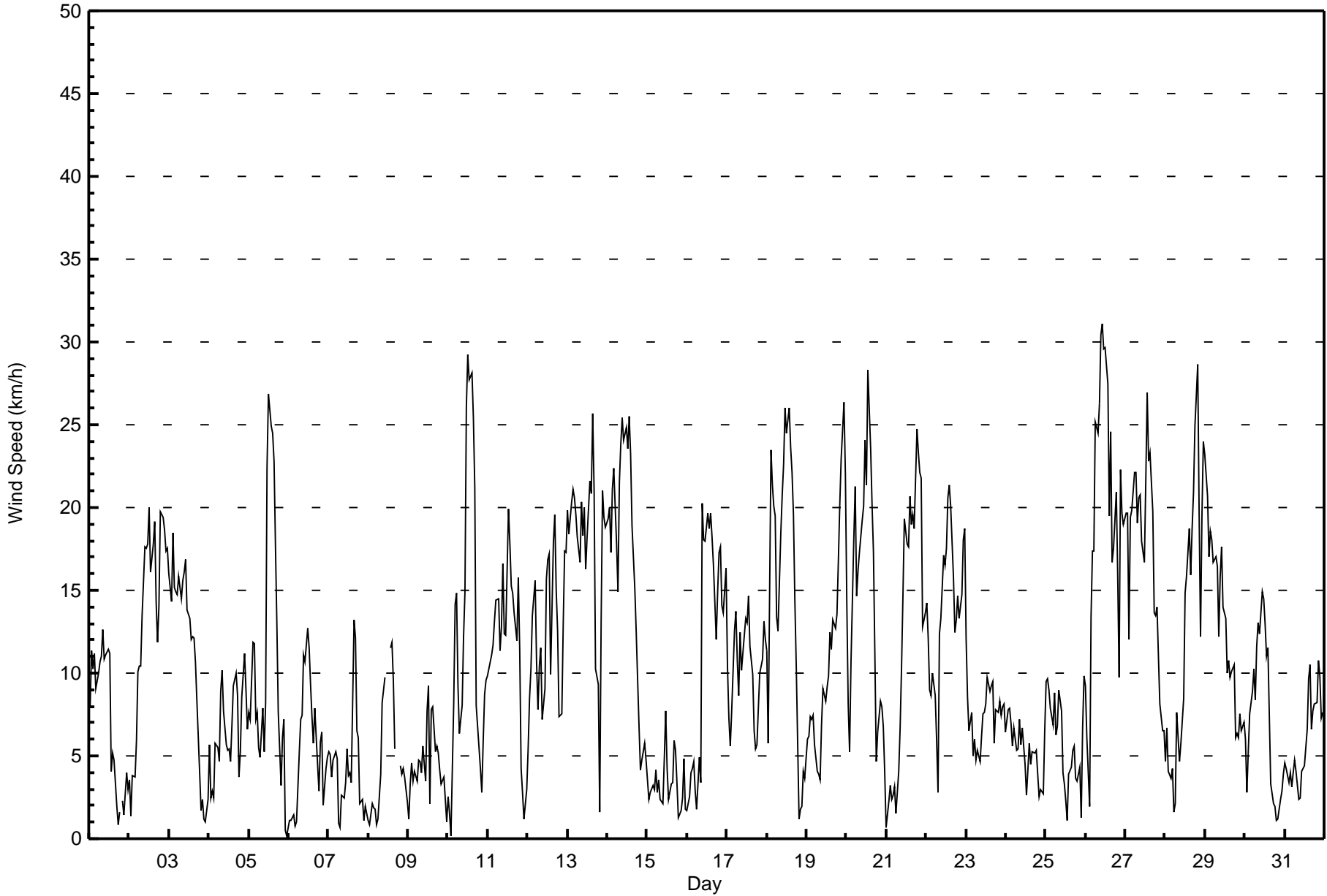
Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Lower Camp - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Oct 20 00:00 Minimum Value: 1 km/h on Oct 7 10:00 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																		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	2	2	2	2	2	2	2	3	2	3	2	2	2	2	1	1	1	1	1	AF	1	2	1	1	3																						
2-Oct	1	2	1	1	1	3	2	3	3	4	5	5	5	4	6	5	3	3	4	4	5	5	4	5	6																						
3-Oct	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	2	2	1	1	1	1	1	4																							
4-Oct	2	2	1	2	1	1	1	2	2	3	2	2	2	2	2	2	2	2	1	2	2	4	3	2	4																						
5-Oct	3	3	2	2	2	2	2	1	2	2	2	7	6	5	5	5	4	3	1	2	2	2	1	2	7																						
6-Oct	2	1	1	1	1	1	2	2	2	2	2	3	2	2	2	2	2	2	2	3	2	1	1	1	3																						
7-Oct	1	1	1	1	1	1	1	1	1	1	1	2	1	1	3	3	3	2	2	1	1	1	1	2	3																						
8-Oct	1	1	1	1	2	1	1	3	2	2	2	M	M	3	3	4	2	M	M	2	2	1	1	1	4																						
9-Oct	1	1	1	2	2	2	1	1	2	1	1	2	1	2	2	2	1	2	2	1	2	1	2	2	2																						
10-Oct	2	1	1	3	3	2	6	5	3	6	5	7	7	6	6	6	5	4	3	2	2	5	2	3	7																						
11-Oct	2	3	2	2	3	3	3	3	4	4	3	3	4	5	4	4	4	4	3	4	2	2	1	1	5																						
12-Oct	1	2	3	3	4	3	3	3	3	3	3	4	3	3	4	7	4	4	3	1	1	2	4	4	7																						
13-Oct	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	6	7	3	2	2	6	4	4	4	7																						
14-Oct	4	4	4	4	5	4	3	6	5	5	6	6	5	5	5	4	3	4	3	1	2	1	2	2	6																						
15-Oct	1	1	2	1	2	1	2	2	1	2	2	2	2	2	2	2	2	1	2	1	2	1	1	1	2																						
16-Oct	1	1	1	1	1	1	1	2	3	3	3	3	3	3	4	4	3	2	3	3	4	3	3	3	4																						
17-Oct	3	2	2	2	2	3	3	2	2	2	2	2	3	2	3	3	3	2	2	2	2	2	2	3	3																						
18-Oct	3	5	5	4	4	4	4	3	4	4	5	5	6	5	5	4	4	4	3	1	1	2	1	2	6																						
19-Oct	1	1	2	2	2	1	2	1	1	2	2	2	2	2	2	2	2	2	4	4	4	4	5	8	8																						
20-Oct	5	4	2	3	4	5	4	3	4	4	4	5	5	6	6	4	3	3	1	3	3	3	2	1	6																						
21-Oct	1	1	1	1	1	1	1	2	2	3	3	3	2	3	3	3	3	4	4	4	4	4	5	3	5																						
22-Oct	4	2	3	3	2	2	2	1	4	3	4	4	5	5	6	4	3	2	2	2	2	4	3	3	6																						
23-Oct	4	2	2	2	2	2	2	2	1	3	1	2	3	2	2	2	2	1	2	2	2	1	2	2	4																						
24-Oct	1	3	2	2	2	2	1	2	1	2	1	2	1	2	1	1	1	1	1	1	1	1	1	1	3																						
25-Oct	2	2	2	2	1	2	2	2	2	2	1	1	1	1	1	2	1	1	1	1	1	2	2	3	3																						
26-Oct	3	2	2	4	3	4	5	4	5	5	5	5	5	5	4	5	6	6	4	4	4	5	4	3	6																						
27-Oct	4	5	4	4	4	4	4	4	4	4	4	4	4	6	5	5	4	3	4	4	3	2	1	1	6																						
28-Oct	2	2	2	2	2	1	2	2	2	2	2	4	2	3	3	4	4	4	5	5	7	3	6	4	7																						
29-Oct	4	4	4	4	4	4	4	4	3	4	3	3	3	3	3	2	2	2	3	2	2	2	2	3	4																						
30-Oct	2	2	1	3	1	2	2	2	3	3	2	2	2	1	2	3	1	2	2	1	1	2	2	2	3																						
31-Oct	2	1	1	2	1	1	1	1	2	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2																						
Diurnal Maximum																								5	5	5	4	5	5	6	6	5	6	6	7	7	6	6	7	7	6	5	5	7	5	6	8
M - Maintenance AF - Analyzer Failure																																															





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

**Wind Speed (WS) - km/h**  
**Lower Camp - October 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	225	30.45	30.45
6 - 11	221	29.91	60.35
12 - 19	189	25.58	85.93
20 - 28	98	13.26	99.19
29 - 38	6	0.81	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 2015**

<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	12	22	6	16	9	18	14	7	5	6	3	3	18	31	34	21	225
6 - 11	21	11	6	0	4	22	68	13	5	5	2	6	8	7	11	32	221
12 - 19	23	3	3	0	1	16	64	2	0	0	1	28	17	5	10	16	189
20 - 28	2	0	0	0	0	5	21	0	0	0	0	16	24	19	11	0	98
29 - 38	0	0	0	0	0	0	5	0	0	0	0	1	0	0	0	0	6
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	58	36	15	16	14	61	172	22	10	11	6	54	67	62	66	69	739

Total Number of Valid Hours: 739

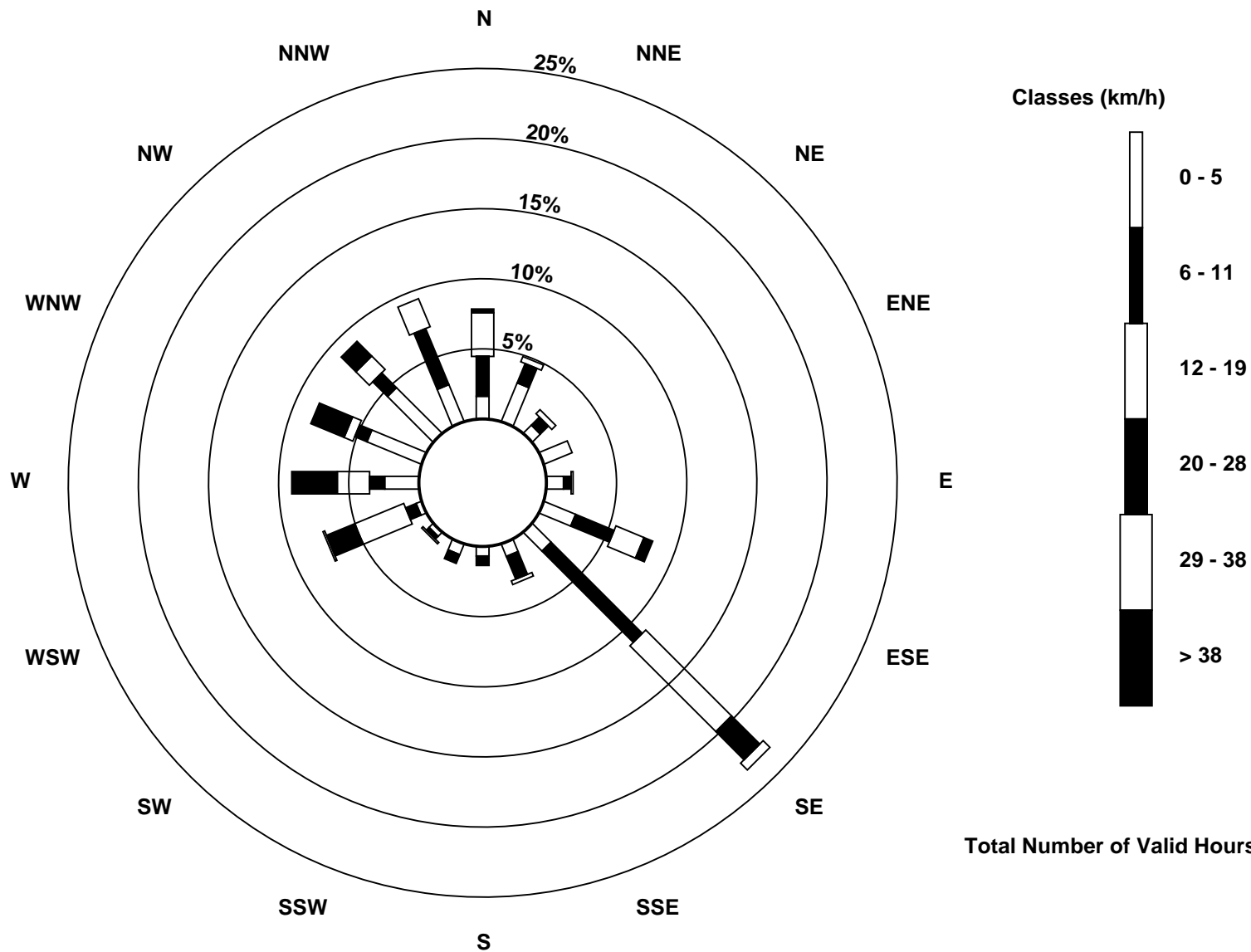
Total Number of Hours: 744





Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Wind Speed (WS) - km/h  
Lower Camp (AMS 11)



Total Number of Valid Hours: 739



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

**Wind Direction (WD) - deg**  
**Lower Camp - October 2015**

Direction of Maximum Speed: 132 deg on Oct 26 11:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 260.4 deg on Oct 13	Hours of Data: 739
Direction of Minimum Speed: 12 deg on Oct 10 03:00	Hours of Missing Data: 5
Direction of Minimum Daily Speed Average: 0.8 deg on Oct 15	Percent Operational Time: 99.3
Monthly Average Direction: 301.2 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	135	140	135	134	135	134	134	136	137	129	131	134	133	115	336	342	323	265	106	AF	288	265	300	301	133.6
2-Oct	321	250	296	269	303	345	360	351	356	355	355	2	356	347	347	358	353	358	1	1	357	346	356	356	352.0
3-Oct	4	352	358	355	329	329	347	341	357	1	12	36	31	33	43	34	25	39	21	20	59	5	20	301	5.9
4-Oct	275	33	70	71	100	66	79	108	105	99	191	184	179	198	127	133	135	141	142	143	141	124	121	144	128.2
5-Oct	143	115	137	143	137	135	148	145	139	141	265	295	302	314	308	312	325	312	298	311	344	330	279	34	302.1
6-Oct	28	291	63	67	68	119	138	118	114	129	134	124	120	124	136	143	122	146	172	109	128	280	285	278	128.3
7-Oct	282	279	278	298	274	277	194	22	340	33	85	118	63	94	216	257	264	291	303	270	343	334	297	346	283.3
8-Oct	30	28	310	302	66	106	58	105	125	121	124	M	M	133	133	135	130	M	M	301	318	320	308	328	119.6
9-Oct	350	321	311	307	296	331	303	295	18	125	71	133	137	118	356	10	324	310	316	301	307	293	360	297	335.0
10-Oct	298	294	12	119	132	133	244	273	137	222	248	254	251	258	262	259	272	276	291	249	320	329	338	333	255.1
11-Oct	333	358	351	356	360	7	359	338	330	350	335	345	319	330	329	341	334	315	309	304	275	282	83	105	337.1
12-Oct	130	126	131	119	127	131	141	132	141	146	139	136	117	120	198	250	262	261	257	272	250	241	250	257	181.2
13-Oct	260	256	261	260	256	265	270	266	259	262	267	256	252	254	256	256	277	272	255	227	263	261	257	257	260.4
14-Oct	259	258	258	259	261	261	248	260	257	260	269	296	295	295	312	314	321	356	21	31	332	304	332	355	282.5
15-Oct	317	302	41	32	74	29	1	82	72	259	203	128	80	74	104	182	150	154	320	110	77	291	284	315	88.6
16-Oct	283	320	274	270	277	281	317	316	310	114	116	115	127	130	127	128	122	117	127	126	126	124	126	128	124.9
17-Oct	127	140	143	114	106	113	119	129	125	129	134	133	136	135	142	174	202	191	176	149	142	134	136	139	136.0
18-Oct	138	164	256	260	257	260	271	260	259	256	264	269	291	297	291	293	294	293	293	227	30	339	282	312	272.9
19-Oct	296	314	332	342	347	327	11	24	28	88	120	109	108	130	118	96	100	104	111	119	123	129	130	128	107.7
20-Oct	134	146	156	235	258	280	284	259	258	258	269	272	274	298	311	310	312	308	313	305	322	5	34	50	282.9
21-Oct	334	114	139	168	142	169	205	141	138	117	122	122	122	126	124	127	126	130	120	123	125	129	136	132	127.0
22-Oct	137	137	131	135	139	138	124	112	249	249	259	244	244	250	251	255	257	248	253	249	257	260	258	260	237.3
23-Oct	277	281	256	225	196	207	155	155	148	247	253	264	328	345	347	3	12	331	336	344	338	340	343	351	309.3
24-Oct	345	350	13	359	357	17	34	5	6	12	2	352	310	304	337	328	329	342	33	62	89	8	25	352	0.3
25-Oct	344	348	345	340	322	358	347	336	4	13	13	333	323	348	296	338	348	308	320	315	312	323	148	165	341.6
26-Oct	195	156	121	127	129	124	128	126	129	132	132	129	127	126	129	132	154	141	134	147	192	291	279	271	139.4
27-Oct	281	302	301	292	297	299	301	301	301	302	315	311	303	308	311	314	314	315	330	329	321	322	341	312	306.9
28-Oct	327	18	33	112	84	41	93	112	113	187	190	153	125	127	124	129	126	130	129	129	124	124	126	131	125.8
29-Oct	135	133	133	135	137	132	138	141	144	143	139	140	135	149	148	141	144	149	133	116	118	142	147	137	137.9
30-Oct	127	123	132	130	139	138	136	134	130	137	132	131	134	133	128	107	159	317	250	117	141	126	290	292	134.0
31-Oct	288	313	313	273	330	338	308	7	40	359	40	18	351	5	52	44	42	38	21	14	9	359	343	355	6.2

242.4 277.8 276.9 235.2 223.5 268.1 270.4 200.8 184.1 181.2 199.3 200.8 233.5 273.0 289.2 291.2 298.1 295.4 18.1 104.9 101.8 290.4 247.9 233.0  
 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 (WD) - deg

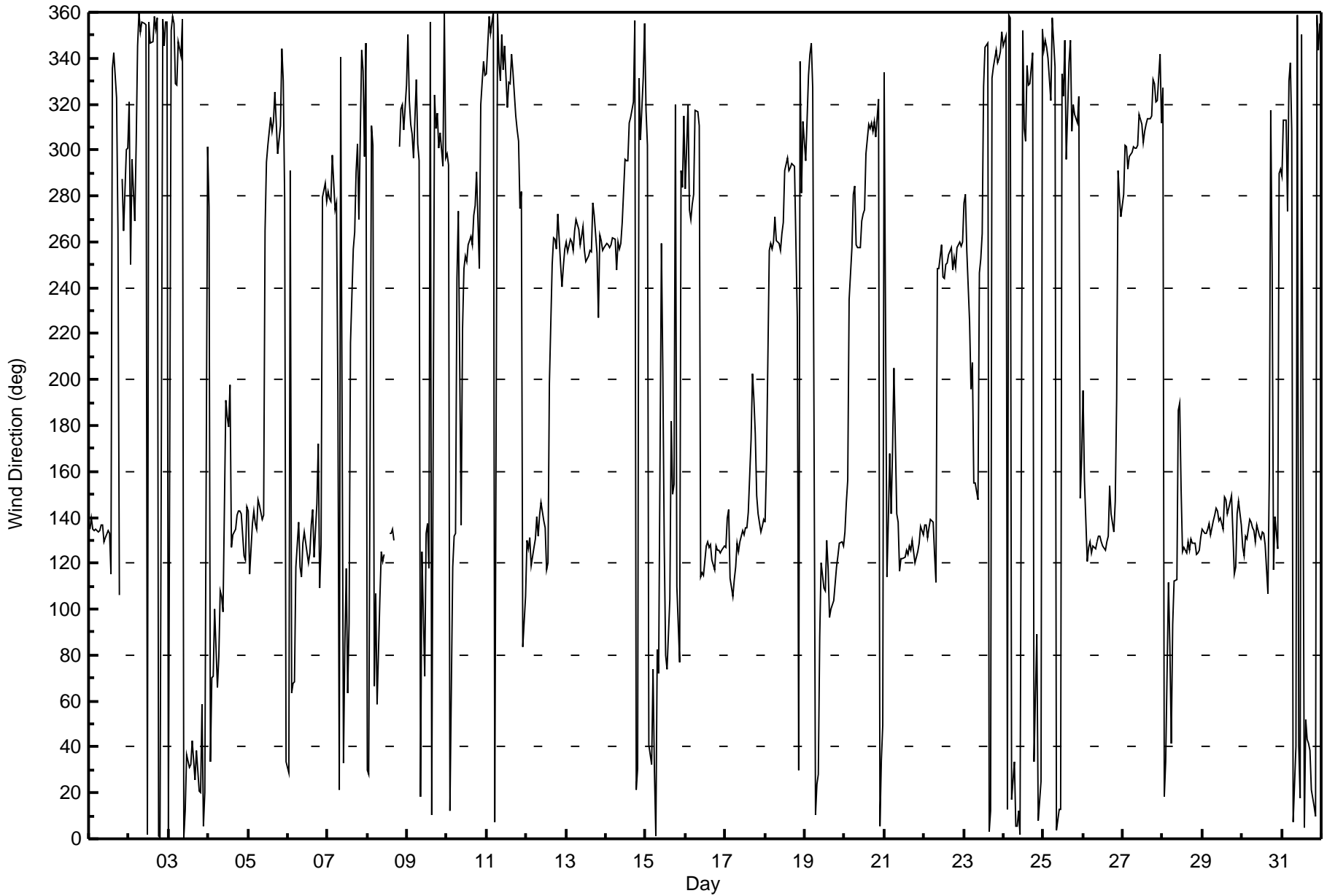
Lower Camp - October 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 99 deg on Oct 5 23:00			Hours of Data:	739
Minimum Value: 6 deg on Oct 9 13:00			Hours of Missing Data:	5
Percentiles: P <sub>1</sub> = 8 P <sub>10</sub> = 10 Q <sub>1</sub> = 12 Median = 18 Q <sub>3</sub> = 30 P <sub>90</sub> = 55 P <sub>99</sub> = 90			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	14	13	10	10	12	12	14	14	10	18	10	10	9	49	28	31	56	68	67	AF	38	77	37	24	77
2-Oct	22	78	29	21	23	25	18	23	18	18	19	18	19	20	20	22	19	18	18	17	18	19	19	20	78
3-Oct	17	20	18	18	16	15	20	20	18	19	20	20	22	28	25	20	19	19	30	37	28	57	39	47	57
4-Oct	18	57	47	79	16	15	29	14	9	20	36	44	48	54	31	13	14	16	26	16	17	23	26	30	79
5-Oct	33	27	14	14	25	20	27	22	14	58	20	13	17	14	15	15	18	12	12	76	27	22	99	97	99
6-Oct	90	64	60	75	81	80	22	23	24	14	14	11	12	11	12	23	15	27	58	28	21	59	27	15	90
7-Oct	14	17	25	26	18	24	70	82	41	44	39	34	17	25	87	15	18	28	19	51	45	59	49	49	87
8-Oct	61	60	43	60	52	89	60	59	18	14	12	M	M	14	13	17	25	M	M	31	39	14	27	52	89
9-Oct	64	34	24	31	46	57	15	18	36	20	39	16	6	68	14	21	25	26	31	33	52	34	55	90	90
10-Oct	65	61	98	35	10	10	78	84	21	38	18	14	14	12	12	12	11	24	39	52	45	47	21	18	98
11-Oct	17	24	18	16	15	19	16	21	17	19	19	19	13	18	18	21	21	20	14	14	46	69	49	24	69
12-Oct	17	18	20	14	15	18	23	19	16	25	20	12	11	11	42	19	11	11	11	15	11	12	13	12	42
13-Oct	11	12	11	11	13	11	11	13	12	12	12	14	15	13	12	12	16	18	12	84	16	11	12	12	84
14-Oct	12	11	12	12	13	13	11	12	12	12	14	16	12	13	14	12	12	29	24	20	47	20	20	25	47
15-Oct	26	77	50	65	42	33	61	44	61	63	48	33	49	80	72	52	24	35	41	86	73	68	12	54	86
16-Oct	52	53	30	14	16	35	57	29	62	7	9	10	8	8	9	9	9	8	13	9	13	14	16	14	62
17-Oct	26	23	22	18	11	11	10	11	9	9	10	8	15	6	16	31	23	27	27	19	12	8	8	12	31
18-Oct	17	59	12	11	11	12	15	12	12	12	12	12	13	12	12	11	10	9	16	81	73	66	37	39	81
19-Oct	20	17	19	19	18	18	31	32	38	39	21	22	20	11	13	12	10	11	11	12	10	10	10	17	39
20-Oct	22	25	28	25	12	19	17	11	12	13	14	12	13	12	14	14	12	16	23	16	15	27	20	33	33
21-Oct	75	56	28	31	52	33	79	33	21	16	11	8	8	7	7	9	7	13	8	9	12	11	18	14	79
22-Oct	12	10	23	16	10	18	36	53	23	16	12	14	14	14	14	12	11	10	12	11	12	11	11	11	53
23-Oct	17	20	20	18	37	32	27	28	40	47	17	21	35	18	16	18	10	22	18	19	18	17	22	18	47
24-Oct	19	19	15	19	23	28	30	28	15	31	20	28	59	49	26	21	14	26	17	21	45	31	41	20	59
25-Oct	19	19	18	20	21	19	22	22	14	14	35	46	53	83	25	32	20	12	28	29	18	94	27	26	94
26-Oct	21	41	90	18	11	12	9	9	9	9	8	8	8	9	10	10	22	17	11	18	38	12	11	11	90
27-Oct	13	11	14	10	11	10	11	10	10	12	12	13	12	12	12	11	11	13	15	16	14	14	25	16	25
28-Oct	39	35	37	40	24	68	66	14	46	30	30	39	10	12	10	13	11	9	9	9	15	18	12	10	68
29-Oct	11	12	16	13	13	15	13	14	19	17	11	14	14	21	18	10	13	16	52	24	18	17	26	29	52
30-Oct	20	35	15	13	9	10	15	11	10	13	9	8	7	8	8	74	52	61	90	91	70	83	52	37	91
31-Oct	33	25	32	18	37	22	12	39	83	46	30	18	24	31	23	14	24	14	19	15	16	13	21	20	83

90	78	98	79	81	89	79	84	83	63	48	46	59	83	87	74	56	68	90	91	73	94	99	97	
Diurnal Maximum																								

M - Maintenance      AF - Analyzer Failure





# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	October 7, 2015	Last Calibration	September 10, 2015
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	12:40	End Time (MST)	15:32
Gas Cert Reference	LL110099	Station temp.	Deg C
Cal Gas Concentration	51.3 ppm	Cal Gas Exp Date	25/03/2016
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
ZAG Make/Model	API 701	Serial Number	3411
DACS make/model	Campbell Scientific CR3000	DACS serial No.	3492

## Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	-675	-675
Analyzer IP address	192.168.1.43		Lamp voltage	798	800
Calculated slope	1.000005	1.001264	Chamber temp	44.8	45.1
Calculated intercept	2.635228	1.230449	Pressure	716.9	707.5
Analyzer Background	11.0	11.1	Flow	0.498	0.486
Analyzer Coefficient	1.013	1.013	Intensity	90	90

Analyzer make TEI 43i Analyzer serial # 100841398

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.2	----
as found span	5000	80.9	830.0	828.3	1.002
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	80.9	830.0	828.3	1.002
second point	5000	40.9	419.6	417.3	1.005
third point	5000	20.5	210.3	207.8	1.012
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	80.9	830.0	829.3	1.001
Average Correction Factor					1.007

Corrected As found 828.5 Previous response 827.4 % change -0.1%

**Notes:**

Changed inlet filter after as founds, no adjustments made.

Calibration Performed By: Evan Magill



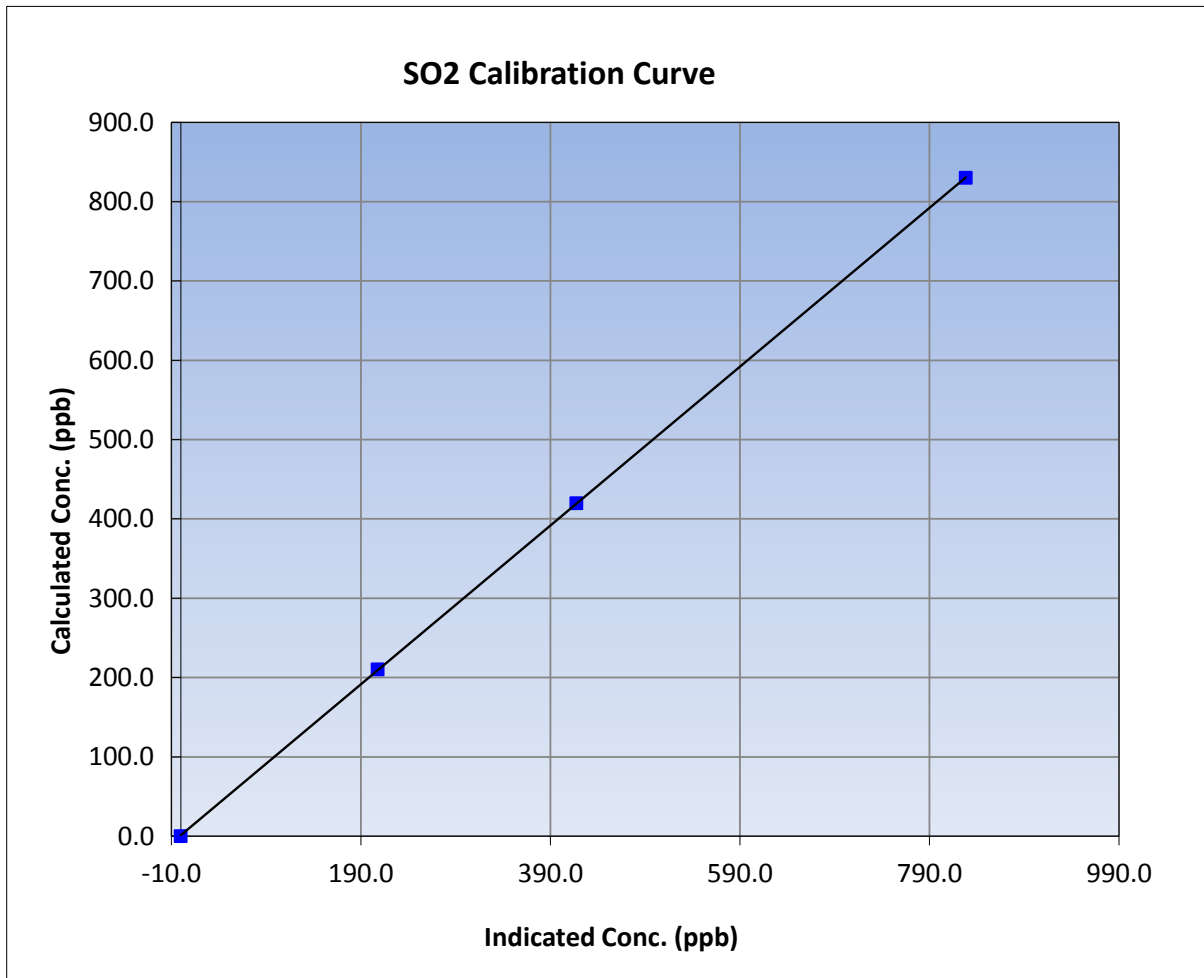
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	October 7, 2015	Previous Calibration	September 10, 2015
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	12:40	End Time (MST)	15:32
Analyzer make	TEI 43i	Analyzer serial #	100841398

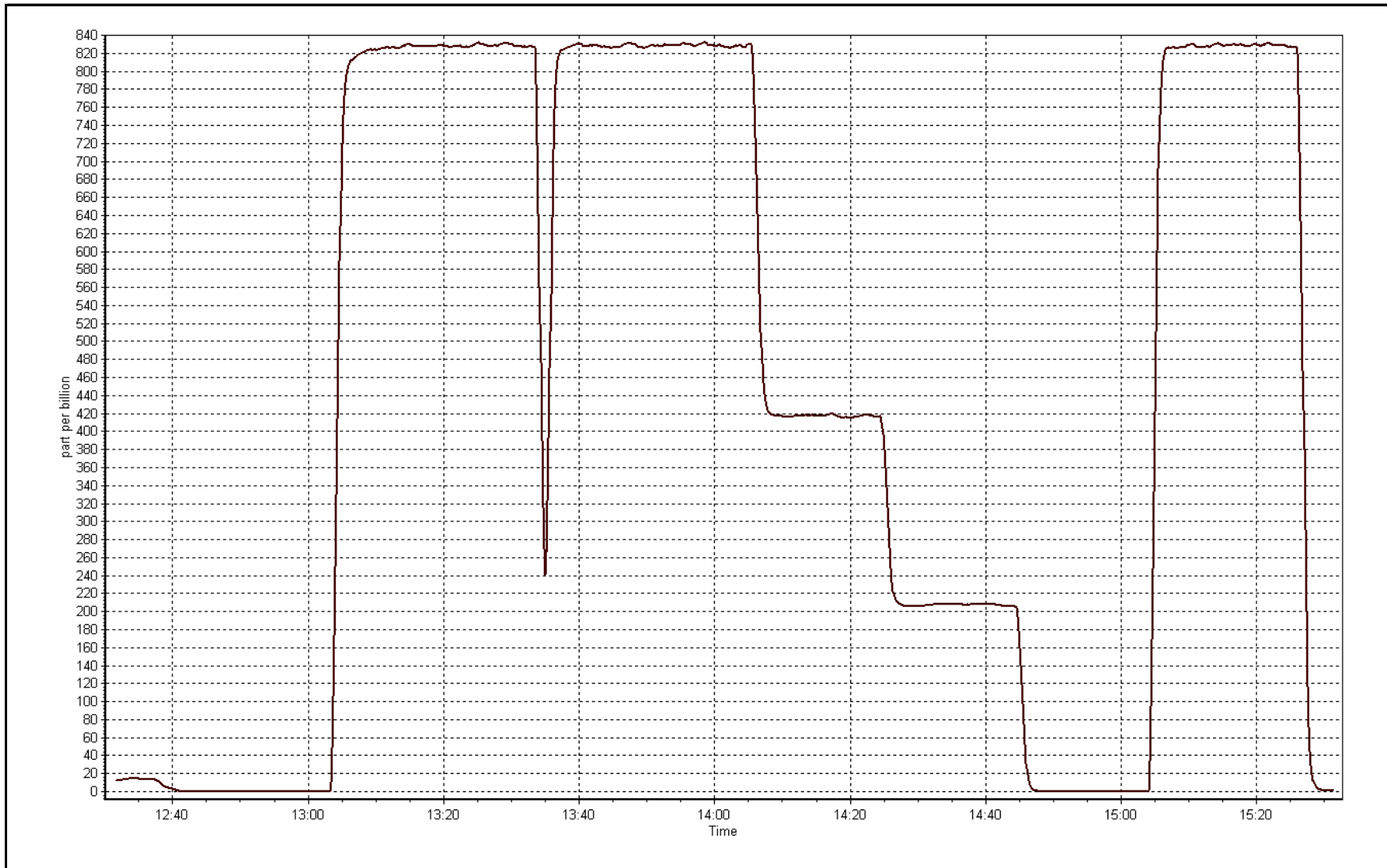
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999992
830.0	828.3	1.0021		
419.6	417.3	1.0055	Slope	1.001264
210.3	207.8	1.0124		
			Intercept	1.230449



SO2 Calibration Plot

Date: October 7, 2015





# Wood Buffalo Environmental Association H2S Calibration Report

### Station Information

Calibration Date	October 8, 2015	Last Calibration	September 9, 2015
Station Name	Lower Camp	Station Number	AMS 11
Reason:	As Found		
Start Time (MST)	9:50	End Time (MST)	11:00
Gas Cert Reference	ALM061435	Station temp.	22 Deg C
Cal Gas Concentration	5.15 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
ZAG air Make/Model	API 701	Serial Number	3411
DACS make/model	Campbell Scientific CR3000	Serial Number	3492
SO2 gas concentration	51.4 ppm	SO2 gas cert/exp	LL110099 25/03/2016

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-633	-634
Analyzer IP address	192.168.1.42		Lamp voltage	894	895
Calculated slope	0.996820	0.991902	Chamber temp	45	45
Calculated intercept	-0.277348	-0.614979	Pressure	576.8	578.2
Analyzer Background	20.7	20.7	Flow	1.116	1.097
Analyzer Coefficient	1.194	1.194	Intensity	60	60
			Converter temp.	342	340

Analyzer make/model	Thermo 450i	Analyzer serial #	922436966
Converter make/model	NA	Converter serial #	NA

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.6	----
as found span	5000	72.9	75.1	76.3	0.984
SO2 scrubber check					
calibrator zero	5000	0.0	0.0	0.6	0.000
high point	5000	72.9	75.1	76.3	0.984
second point					
third point					
as left zero					
as left span					
Average Correction Factor					0.984

Corrected As found	75.7	Previous response	75.6	% change	-0.1%
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**Notes:**

Captured As Found values before updating the OS of the H2S analyzer, a full calibration will be conducted after the OS has been successfully updated. Changed inlet filter after as founds.

Calibration Performed By: Evan Magill





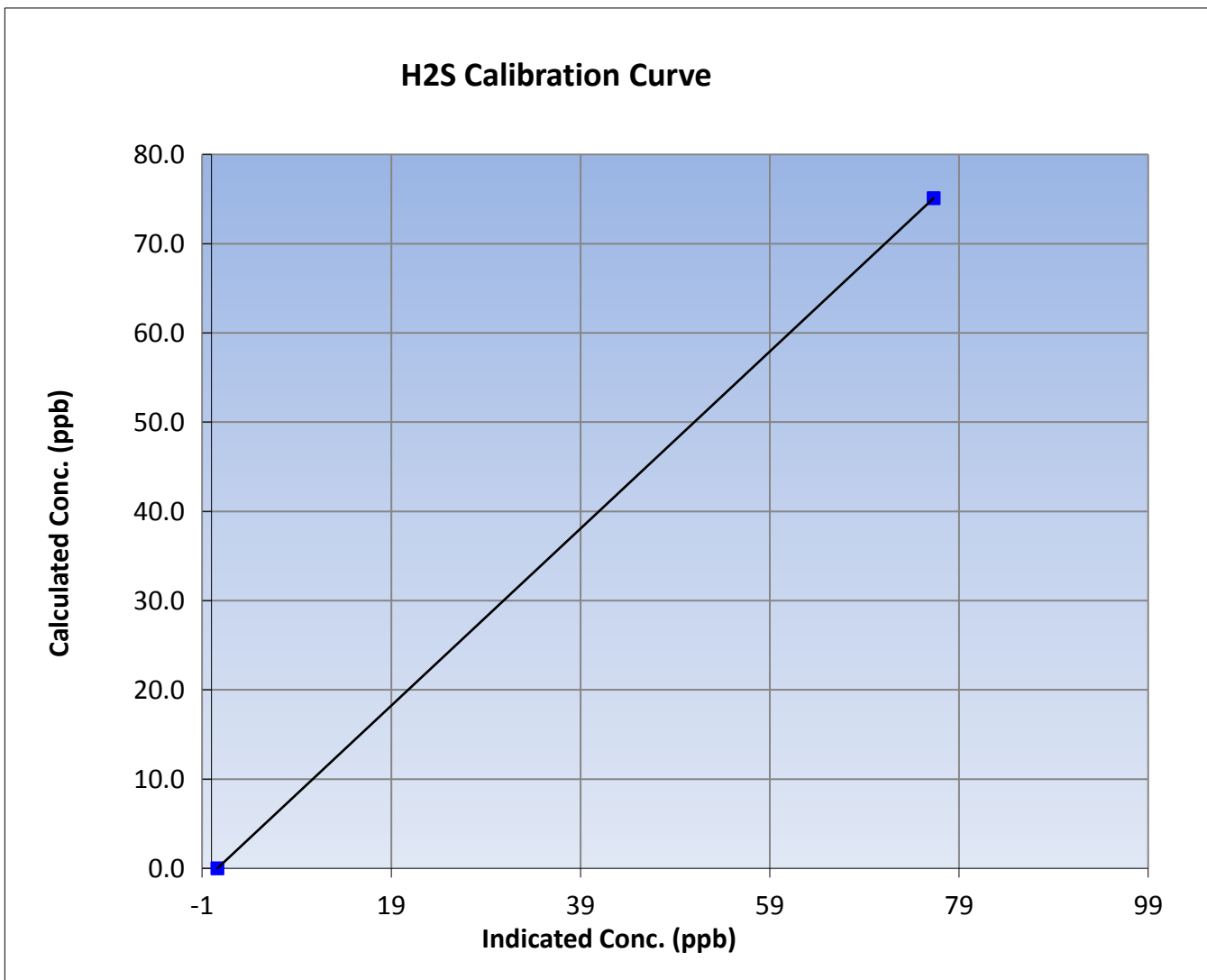
# Wood Buffalo Environmental Association H2S Calibration Report

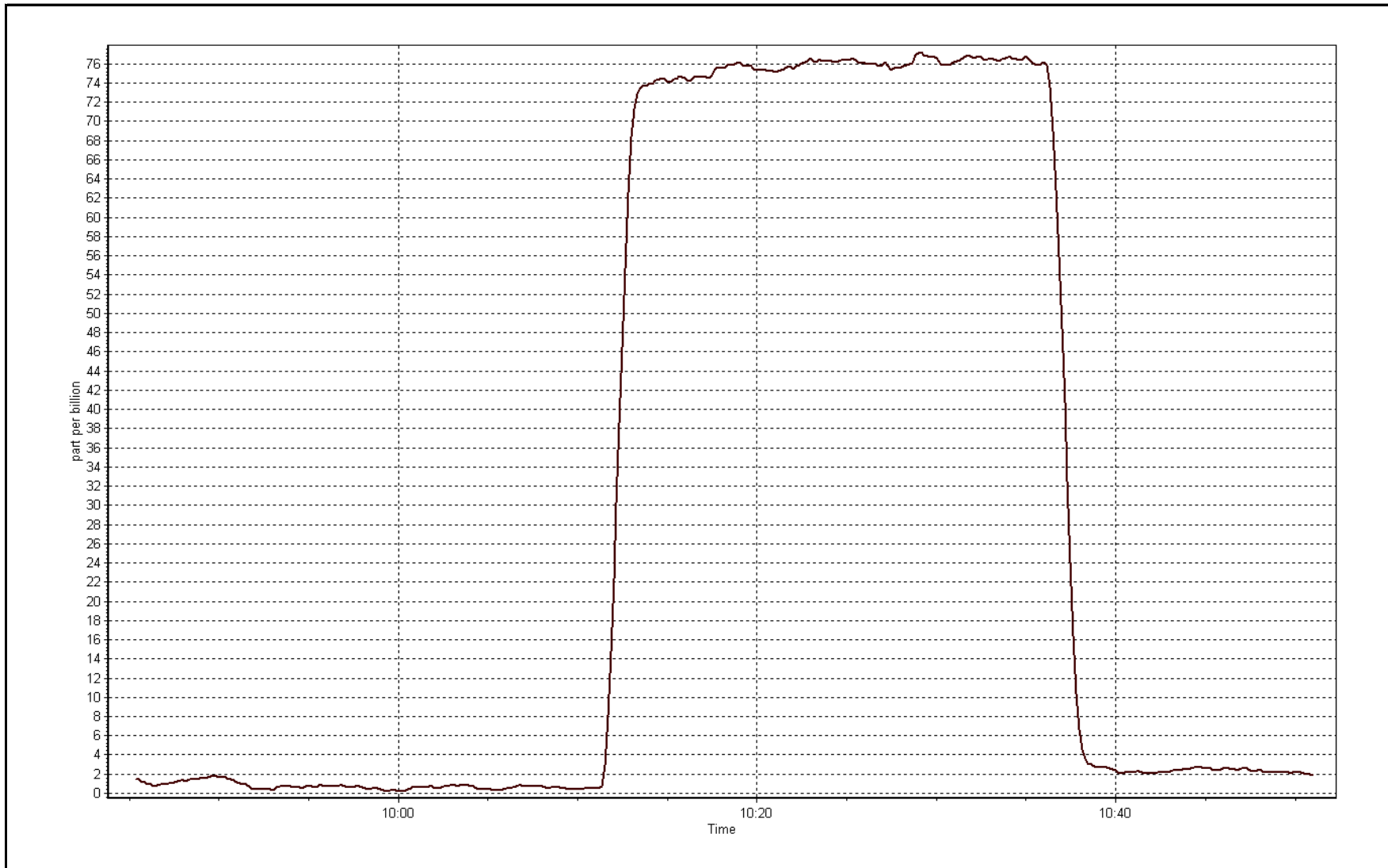
## Station Information

Calibration Date	October 8, 2015	Previous Calibration	September 9, 2015
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	9:50	End Time (MST)	11:00
Analyzer make	Thermo 450i	Analyzer serial #	922436966

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.6	----	Correlation Coefficient	1.000000
75.1	76.3	0.9838		
			Slope	0.991902
			Intercept	-0.614979







# Wood Buffalo Environmental Association H2S Calibration Report

### Station Information

Calibration Date	October 9, 2015	Last Calibration	October 8, 2015
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Install		
Start Time (MST)	9:50	End Time (MST)	17:20
Gas Cert Reference	ALM061435	Station temp.	22 Deg C
Cal Gas Concentration	5.15 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
ZAG air Make/Model	API 701	Serial Number	3411
DACS make/model	Campbell Scientific CR3000	Serial Number	3492
SO2 gas concentration	51.4 ppm	SO2 gas cert/exp	LL110099 25/03/2016

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-634	-670
Analyzer IP address	192.168.1.45		Lamp voltage	895	775
Calculated slope	0.996820	0.986954	Chamber temp	45	45
Calculated intercept	-0.277348	0.349844	Pressure	578.2	585.3
Analyzer Background	20.7	20.7	Flow	1.097	1.035
Analyzer Coefficient	1.194	1.194	Intensity	60	90
			Converter temp.	340	323

Analyzer make/model	Thermo 450i	Analyzer serial #	1410661328
Converter make/model	NA	Converter serial #	NA

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
SO2 scrubber check	5000	20.5	210.7	0.8	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	72.9	75.1	75.9	0.989
second point	5000	38.8	40.0	39.9	1.001
third point	5000	19.4	20.0	19.7	1.015
as left zero	5000	0.0	0.0	-0.7	----
as left span	5000	72.9	75.1	75.6	0.994
Average Correction Factor					1.002

Corrected As found	NA	Previous response	NA	% change	NA
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**Notes:**

Installed new 450i analyzer prior to calibration. Adjusted zero and span. Conducted scrubber check after 3rd point.

Calibration Performed By: Evan Magill



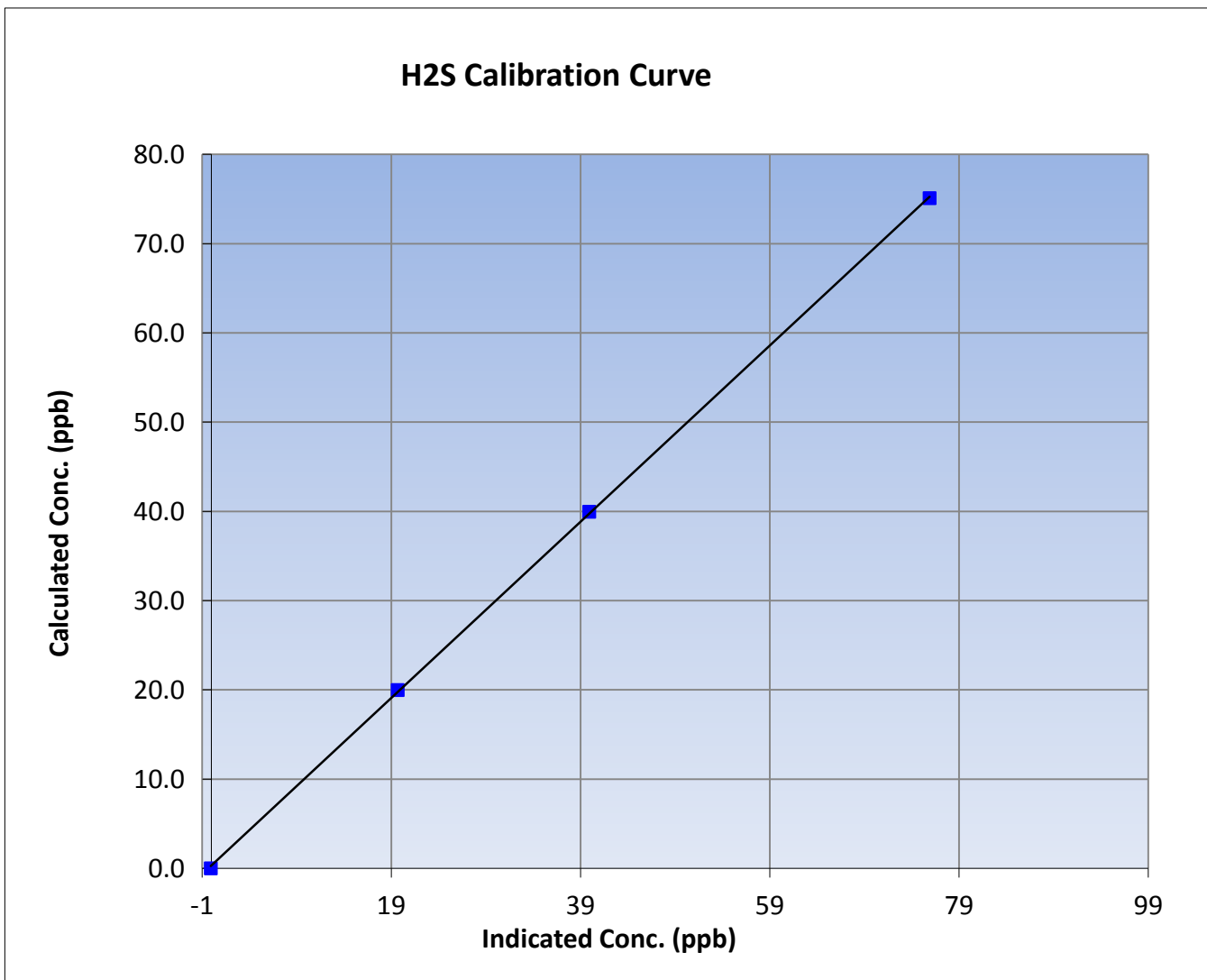
# Wood Buffalo Environmental Association H2S Calibration Report

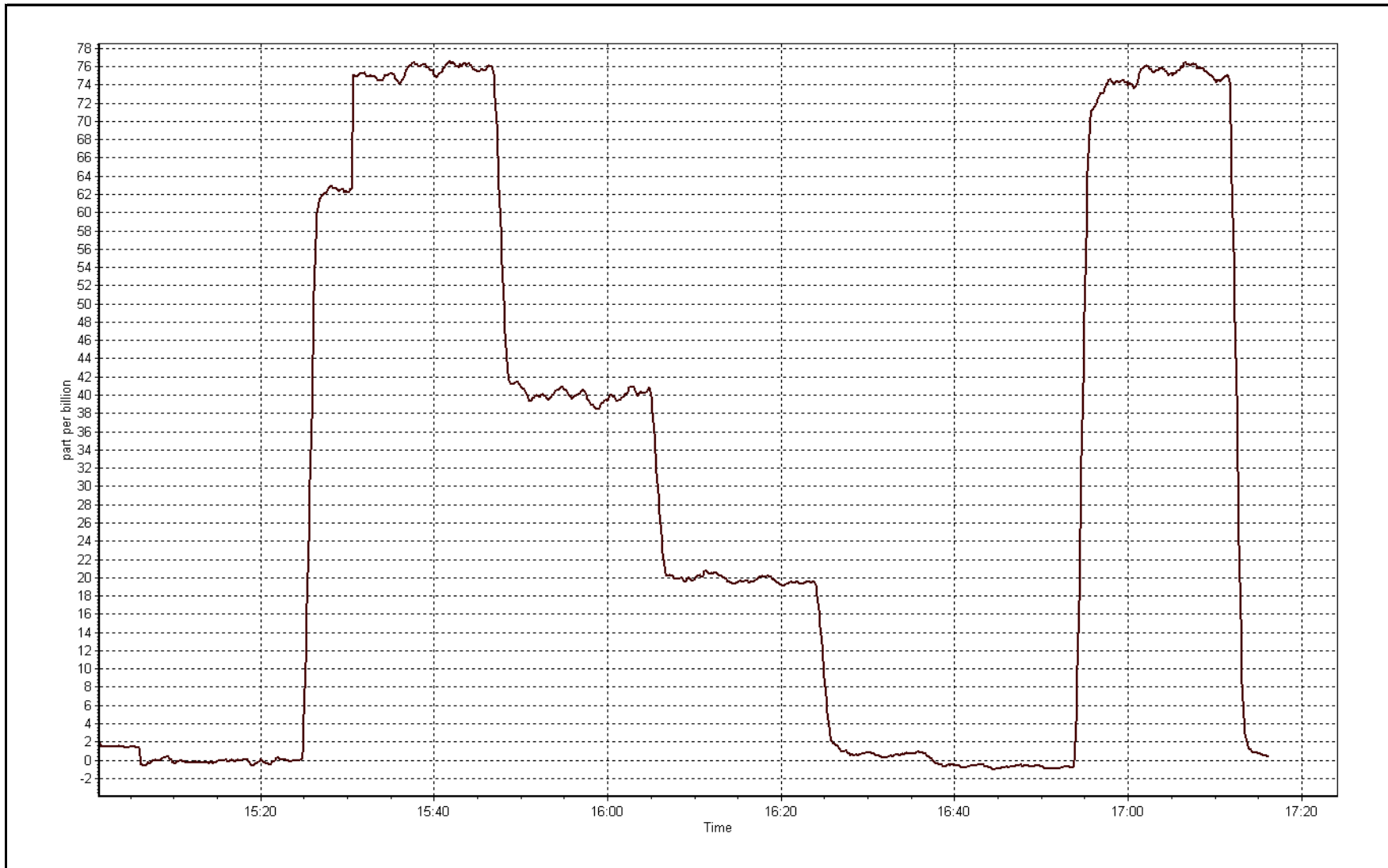
## Station Information

Calibration Date	October 9, 2015	Previous Calibration	October 8, 2015
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	9:50	End Time (MST)	17:20
Analyzer make	Thermo 450i	Analyzer serial #	1410661328

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999938
75.1	75.9	0.9893		
40.0	39.9	1.0014	Slope	0.986954
20.0	19.7	1.0153		
			Intercept	0.349844







# Wood Buffalo Environmental Association H2S Calibration Report

## Station Information

Calibration Date	October 16, 2015	Last Calibration	October 9, 2015
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Other: Baseline has been low since installing new analyzer on Oct 9		
Start Time (MST)	9:00	End Time (MST)	12:30
Gas Cert Reference	ALM061435	Station temp.	22 Deg C
Cal Gas Concentration	5.15 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
ZAG air Make/Model	API 701	Serial Number	3411
DACS make/model	Campbell Scientific CR3000	Serial Number	3492
SO2 gas concentration	51.4 ppm	SO2 gas cert/exp	LL110099 25/03/2016

## Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-670	-671
Analyzer IP address	192.168.1.42		Lamp voltage	775	786
Calculated slope	0.986954	0.998289	Chamber temp	45	45
Calculated intercept	0.349844	-0.171103	Pressure	585.3	598.9
Analyzer Background	20.7	9.8	Flow	1.035	1.053
Analyzer Coefficient	1.194	1.238	Intensity	90	91
			Converter temp.	323	324

Analyzer make/model	Thermo 450i	Analyzer serial #	1410661328
Converter make/model	NA	Converter serial #	NA

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-1.1	----
as found span	5000	72.9	75.1	73.1	1.028
SO2 scrubber check	5000	20.5	210.7	0.6	----
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	72.9	75.1	75.3	0.997
second point	5000	38.8	40.0	40.4	0.990
third point	5000	19.4	20.0	20.1	0.997
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	72.9	75.1	76.1	0.987
Average Correction Factor					0.994

Corrected As found	74.1	Previous response	75.7	% change	2.2%
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**Notes:**

Re-calibrating because baseline has been low since analyser was installed on Oct 9. Scrubber check done after as founds. Adjusted zero and span.

Calibration Performed By: Evan Magill



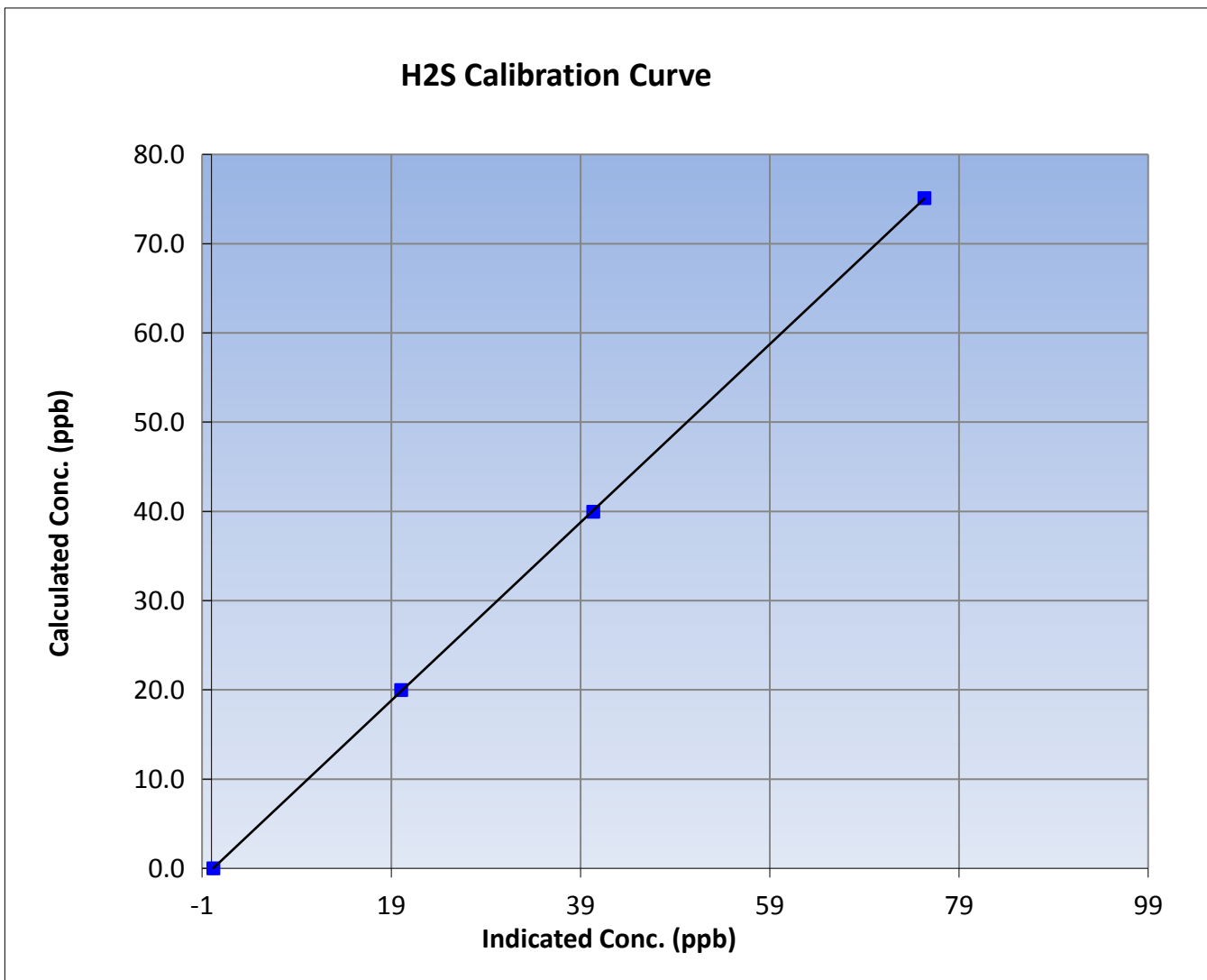
# Wood Buffalo Environmental Association H2S Calibration Report

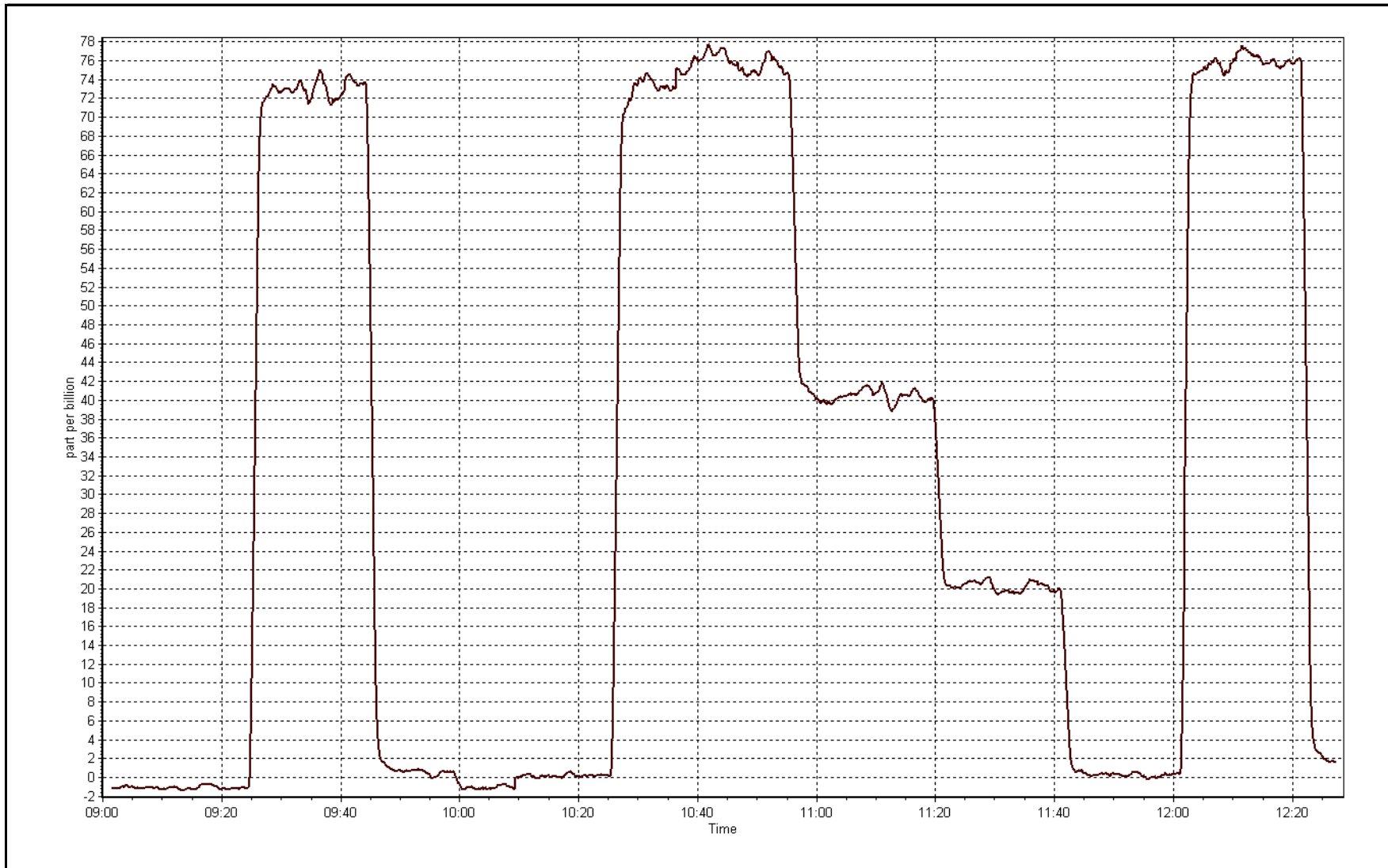
## Station Information

Calibration Date	October 16, 2015	Previous Calibration	October 9, 2015
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	9:00	End Time (MST)	12:30
Analyzer make	Thermo 450i	Analyzer serial #	1410661328

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999985
75.1	75.3	0.9966		
40.0	40.4	0.9902	Slope	0.998289
20.0	20.1	0.9966		
			Intercept	-0.171103









# Wood Buffalo Environmental Association THC Calibration Report

### Station Information

Calibration Date	October-07-15	Last Calibration	September-10-15
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	12:40	End Time (MST)	15:32
Gas Cert Reference	LL110099	Cal Gas Expiry Date	25/03/2016
CH4 Cal Gas Conc.	515 ppm	CH4 Equiv Conc.	1070.5 ppm
C3H8 Cal Gas Conc.	202 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
ZAG make/model	Teledyne API 701	Serial Number	3411
DACS make/model	Campbell Scientific CR3000	Serial Number	3492

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.5	8.5
Analyzer IP address	192.168.1.51		Air or Bypass Press	37.3	37.3
Calculated slope	0.996885	1.000903	Fuel Pressure	24.0	24.0
Calculated intercept	0.012870	0.024757	Analyzer Coeff	4.2	4.2
			Analyzer BKG	6.290	6.380

Analyzer make	51i-LT	Analyzer serial #	1410661326
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### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.01	----
as found span	5000	80.9	17.32	17.13	1.011
calibrator zero	5000	0.0	0.00	0.01	----
high point	5000	80.9	17.32	17.30	1.001
second point	5000	40.9	8.76	8.70	1.007
third point	5000	20.5	4.39	4.33	1.014
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	80.9	17.32	17.33	0.999
Average Correction Factor					1.007

Corrected As found	17.12	Previous response	17.36	% change	1.4%
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**Notes:**

Changed hydrogen cylinder after as founds, flame stayed lit and no change in THC value. Inlet filter changed after as founds and hydrogen change. Small adjustment made on span.

Calibration Performed By:

Evan Magill



# Wood Buffalo Environmental Association THC Calibration Report

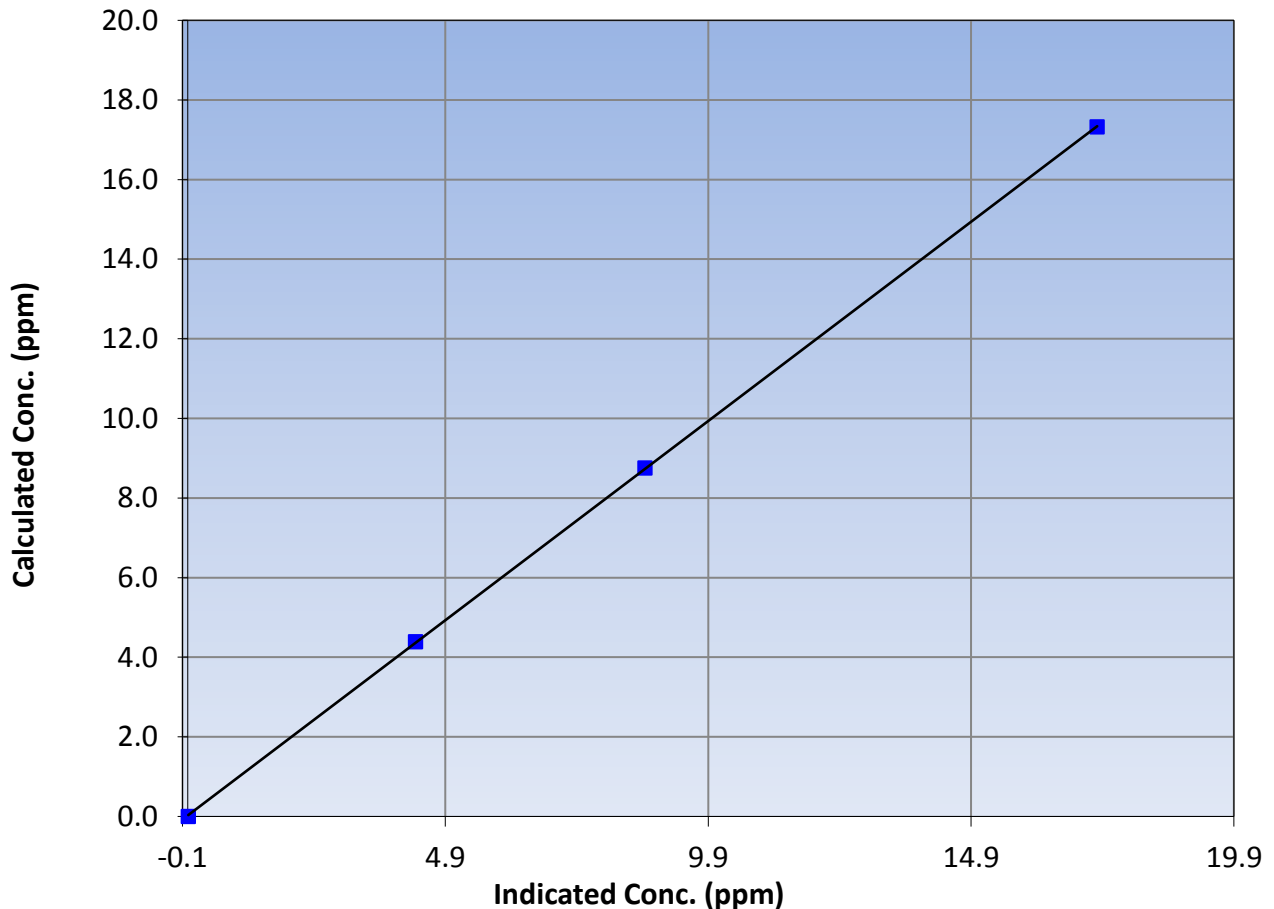
## Station Information

Calibration Date	October 7, 2015	Previous Calibration	September 10, 2015
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	12:40	End Time (MST)	15:32
Analyzer make	51i-LT	Analyzer serial #	1410661326

## Calibration Data

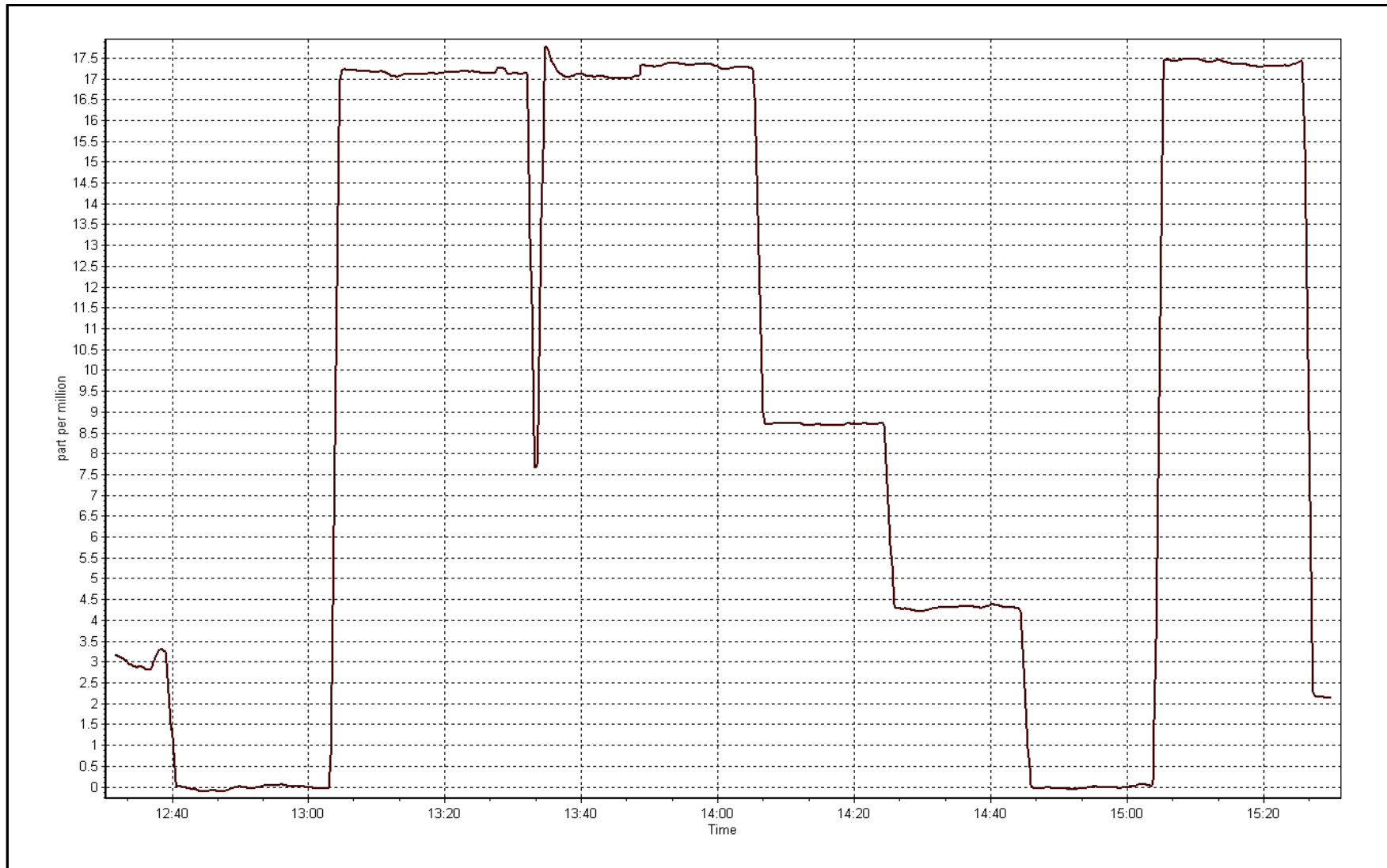
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	----	Correlation Coefficient	0.999981
17.32	17.30	1.0012		
8.76	8.70	1.0065	Slope	1.000903
4.39	4.33	1.0136		
			Intercept	0.024757

**THC Calibration Curve**



THC Calibration Plot

Date: October 7, 2015





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## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 13  
FORT MCKAY SOUTH  
OCTOBER 2015**

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

November 26, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)  
OCTOBER 2015

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	708	36	36	100.00	39	0	7	0
TRS(ppb) Average	710	34	34	100.00	2	0	0	0
THC(ppm) Average	708	36	36	100.00	3.5	-	2.6	-
O3(ppb) Average	710	34	34	100.00	44	0	28	-
NO2(ppb) Average	708	36	36	100.00	24	0	10	-
NO(ppb) Average	708	36	36	100.00	32	-	5	-
NOX(ppb) Average	708	36	36	100.00	48	-	13	-
PM2.5(ug/m3) Average	743	1	1	100.00	22.5	-	9.3	0
ET(C) Average	744	0	0	100.00	25.3	-	14.1	-
RH(%) Average	744	0	0	100.00	98	-	91	-
WS(km/h) Average	743	0	1	99.87	20	-	9	-
WD(deg) Average	743	0	1	99.87	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)  
OCTOBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	708	1.1	3	-	0	0	0	0	1	2	39
TRS(ppb) Average	710	0.2	0	-	0	0	0	0	0	0	2
THC(ppm) Average	708	2.19	0.2	-	1.9	2	2.1	2.1	2.2	2.4	3.5
O3(ppb) Average	710	13.3	10	-	0	2	5	12	19	29	44
NO2(ppb) Average	708	4	4	-	0	0	1	3	6	10	24
NO(ppb) Average	708	1.2	3	-	0	0	0	0	1	4	32
NOX(ppb) Average	708	5.2	6	-	0	0	1	3	7	13	48
PM2.5(ug/m3) Average	743	3.99	3	-	0.1	0.9	1.9	3.2	5.6	7.8	22.5
Temperature 2 m (C) Average	744	4.52	6	-	-7.7	-2.6	0.4	3.9	7.6	12.7	25.3
Relative Humidity (%) Average	744	74.6	18	-	27	46	63	80	90	94	98
Wind Speed 10 m (km/h) Average	743	5.2	3	-	0	1	2	5	7	10	20
Wind Direction 10 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -FORT McKAY SOUTH (AMS 13)  
OCTOBER 2015

OPERATIONAL NOTES

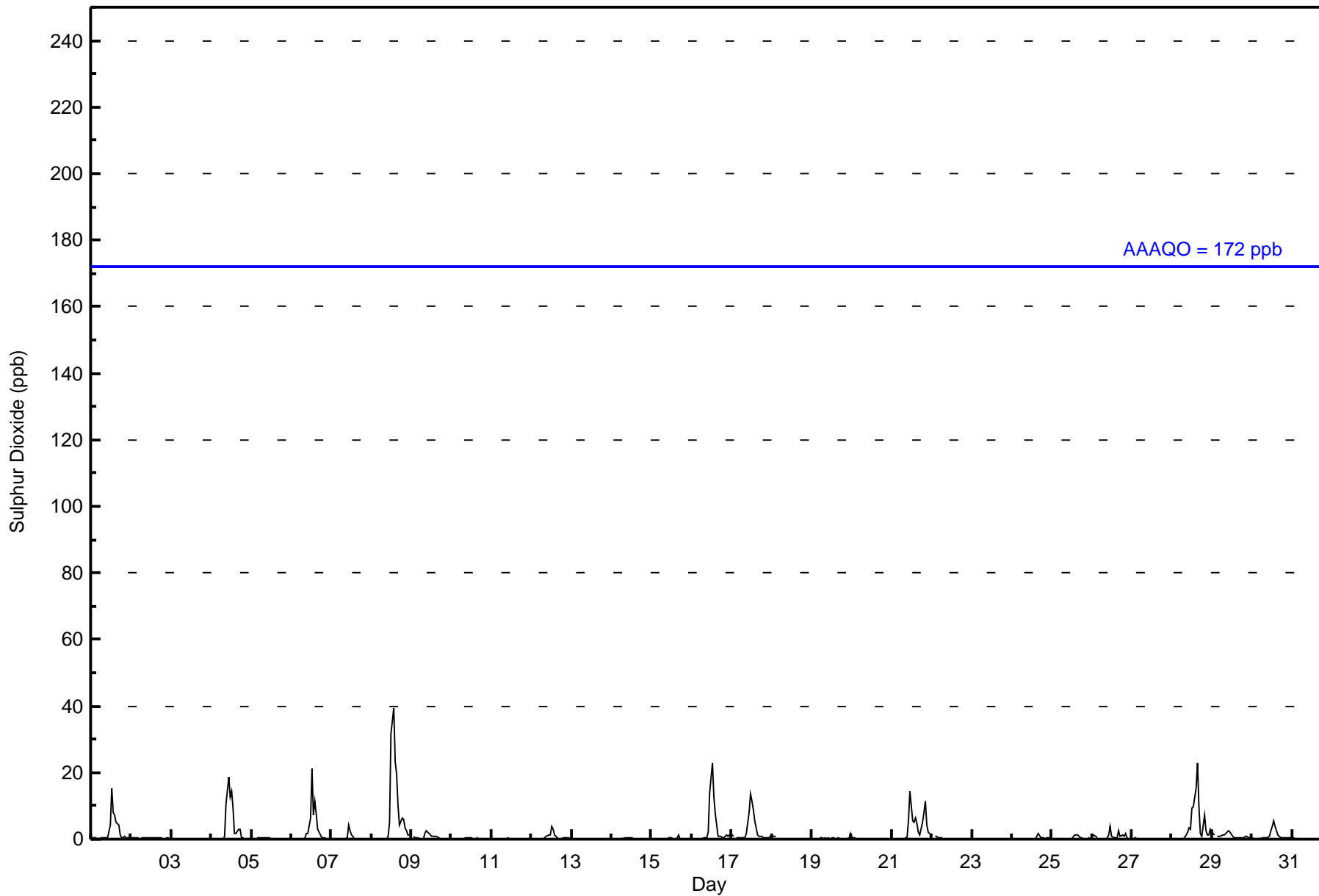
Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	08 Oct 2015 09:00	08 Oct 2015 09:00	1	Flat line in sensor output signal -sensor frozen



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 39 ppb on Oct 8 14:00	Maximum Daily Average: 6.7 ppb on Oct 8		Hours of Data:	708
Minimum Value: 0 ppb on Oct 3 02:00	Minimum Daily Average: 0.0 ppb on Oct 3		Hours of Missing Data:	36
Maximum Diurnal Average: 4.7 ppb at hour 13	Minimum Diurnal Average: 0.2 ppb at hour 8		Hours of Calibration:	36
Monthly Average: 1.1 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> = 2 P <sub>99</sub> = 19		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	0	Z	0	0	0	0	0	0	4	15	8	7	5	4	1	0	0	1	1	0	0	2.2	15
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	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
4-Oct	0	Z	0	0	0	0	0	0	1	11	19	13	15	9	2	2	3	3	1	0	0	0	0	0	3.4	19
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	2	2	6	21	7	11	8	3	1	0	0	0	0	0	0	2.8	21
7-Oct	0	0	0	0	Z	0	0	0	0	1	4	2	1	1	0	0	0	0	0	0	0	0	0	0	0.5	4
8-Oct	0	0	0	0	0	Z	0	0	0	0	1	5	32	39	23	20	10	4	6	6	3	2	1	1	6.7	39
9-Oct	Z	1	0	0	0	0	0	0	2	2	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0.6	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	0.2	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	0.0	0
12-Oct	0	0	0	Z	0	0	0	0	0	1	1	1	4	3	1	0	0	0	0	0	0	0	0	0	0.6	4
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	0.2	0
15-Oct	Z	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	1
16-Oct	0	Z	0	0	0	0	0	0	0	1	2	14	23	13	8	4	1	1	1	0	1	1	1	2	3.2	23
17-Oct	1	1	Z	0	0	0	0	0	1	2	8	14	12	9	6	1	1	1	1	1	1	1	1	1	2.6	14
18-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	0.1	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	2	0.2	2
20-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	0.1	1
21-Oct	Z	0	0	0	0	0	0	0	0	1	5	14	6	5	6	4	2	1	5	8	12	4	2	1	3.4	14
22-Oct	1	Z	1	1	1	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	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	0.0	0
24-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	2	1	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	1	1	1	1	0	0	0	0	0	0	0.3	1
26-Oct	1	1	1	0	0	Z	0	0	0	0	1	4	1	1	1	1	3	1	1	1	1	0	0	0	0.8	4
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	0.1	0
28-Oct	0	Z	0	0	0	0	0	0	1	2	3	3	9	10	15	23	10	2	1	7	2	1	1	3	4.1	23
29-Oct	2	1	Z	1	1	1	1	1	2	2	3	2	1	1	1	1	0	0	0	1	1	1	1	0	1.0	3
30-Oct	0	0	0	Z	0	0	0	0	0	0	1	2	4	5	4	1	1	1	1	1	1	0	0	0	1.0	5
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
	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.9	1.8	3.0	4.7	3.7	2.9	2.4	1.4	0.6	0.6	0.9	0.8	0.4	0.3	0.4	Diurnal Average	
	2	1	1	1	1	1	1	1	2	11	19	14	32	39	23	23	10	4	6	8	12	4	2	3	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**  
**Fort McKay South - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	688	97.18	97.18
11 - 20	14	1.98	99.15
21 - 60	6	0.85	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: 708

Total Number of Hours: 744



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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort McKay South - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	83	52	14	1	2	9	20	35	85	61	64	100	38	39	42	42	687
11 - 20	0	1	0	0	0	1	4	3	1	2	2	0	0	0	0	0	14
21 - 60	0	0	0	0	1	1	2	2	0	0	0	0	0	0	0	0	6
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>	83	53	14	1	3	11	26	40	86	63	66	100	38	39	42	42	707

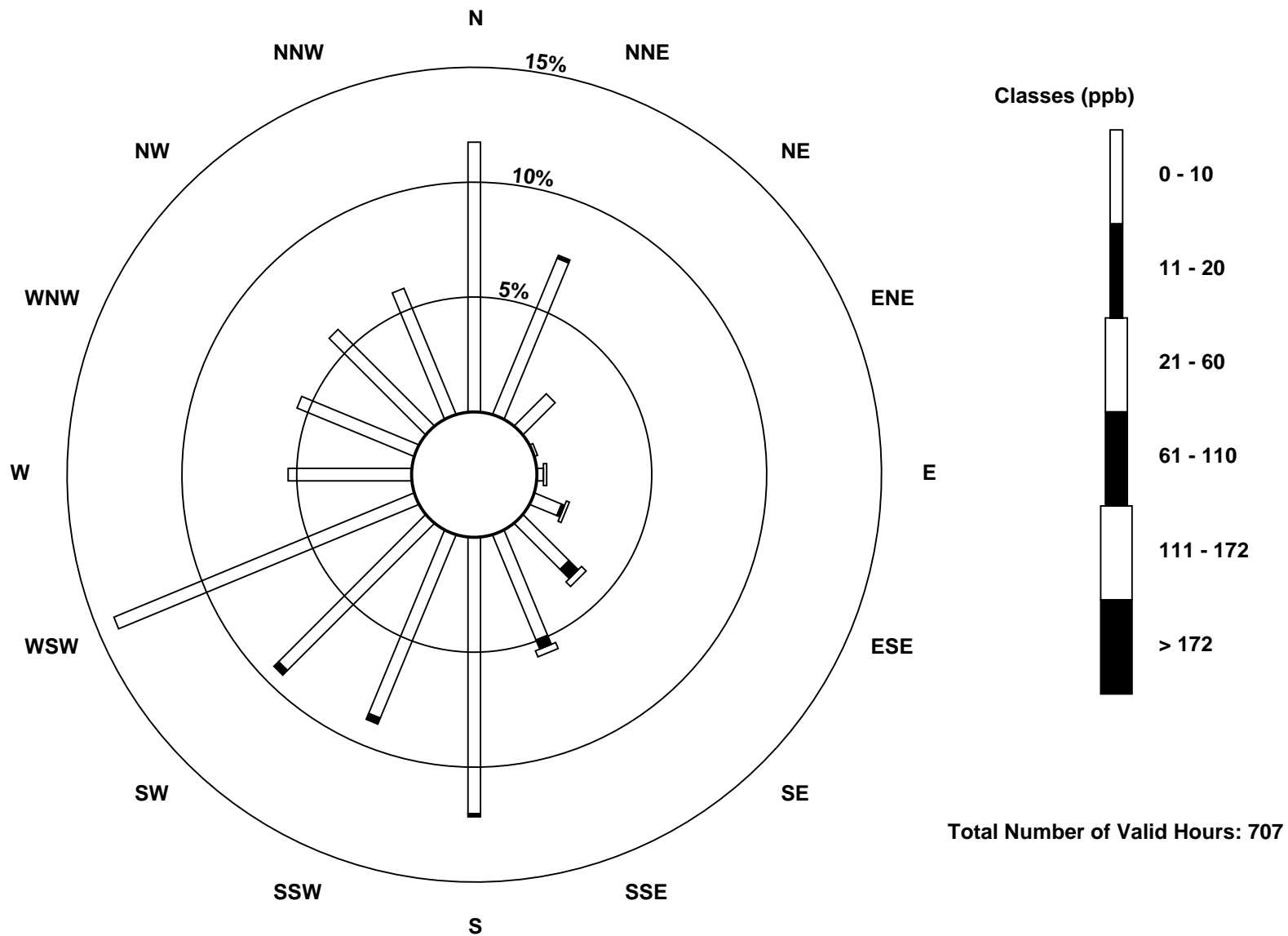
Total Number of Valid Hours: 707

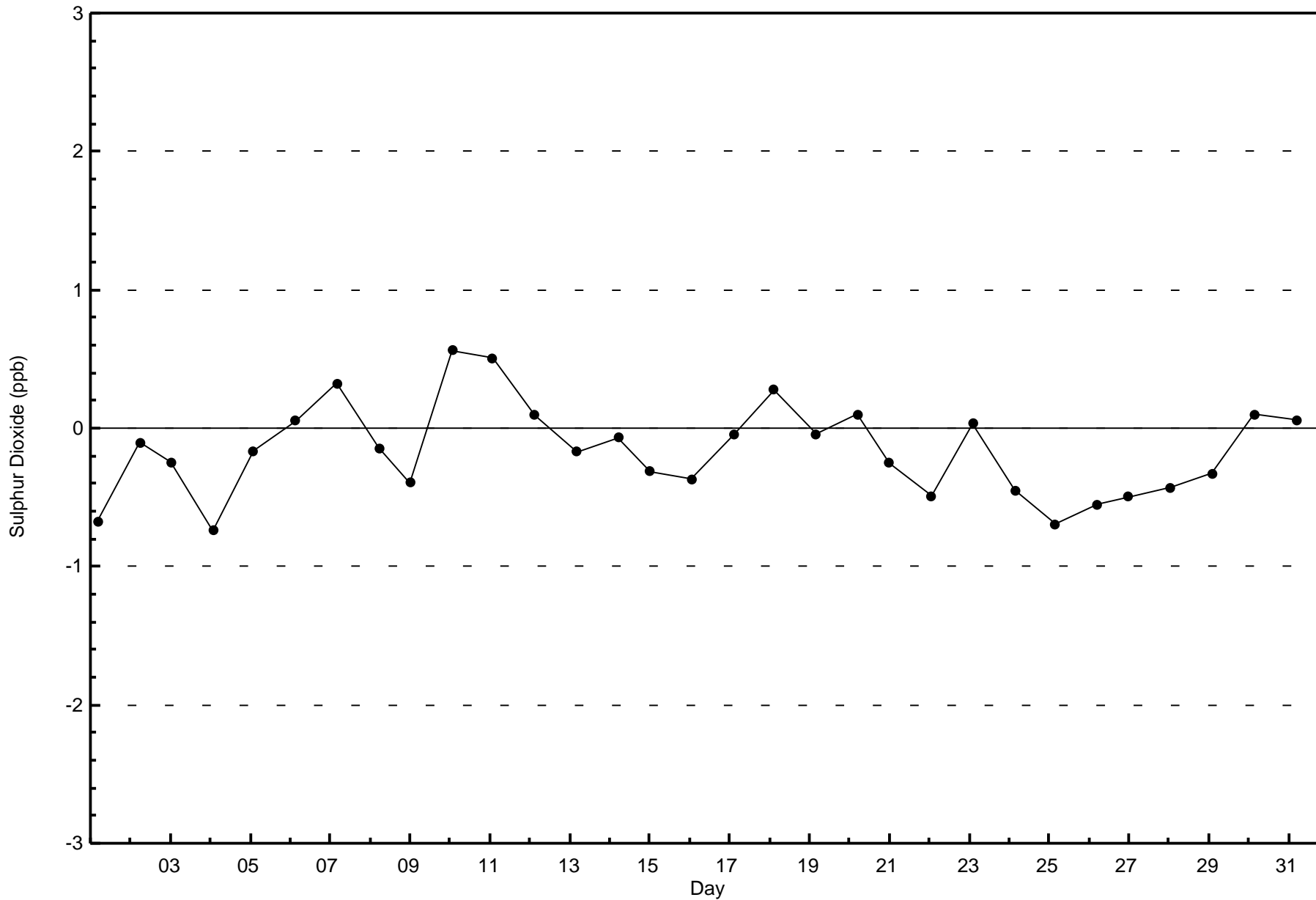
Total Number of Hours: 744

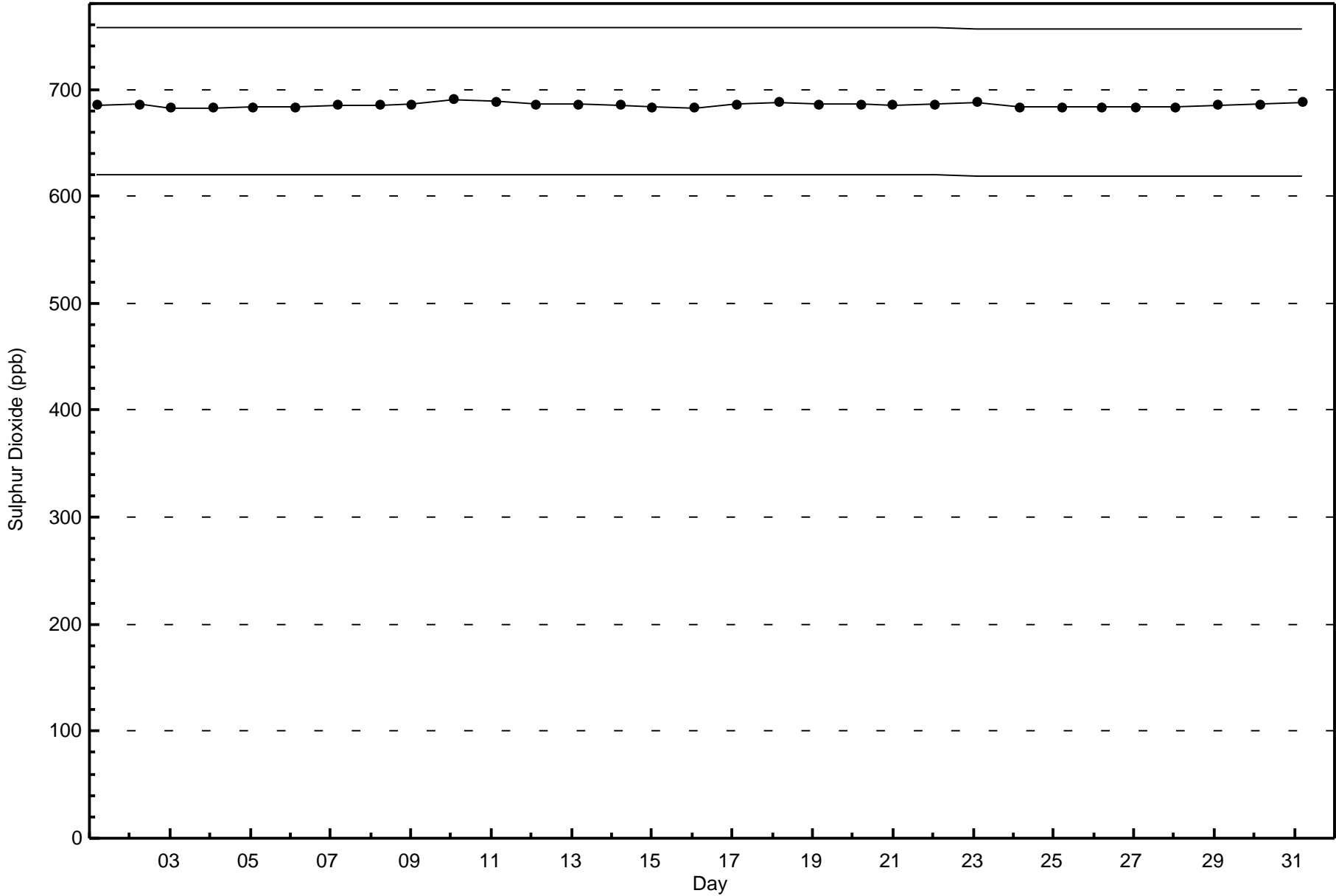


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort McKay South (AMS 13)

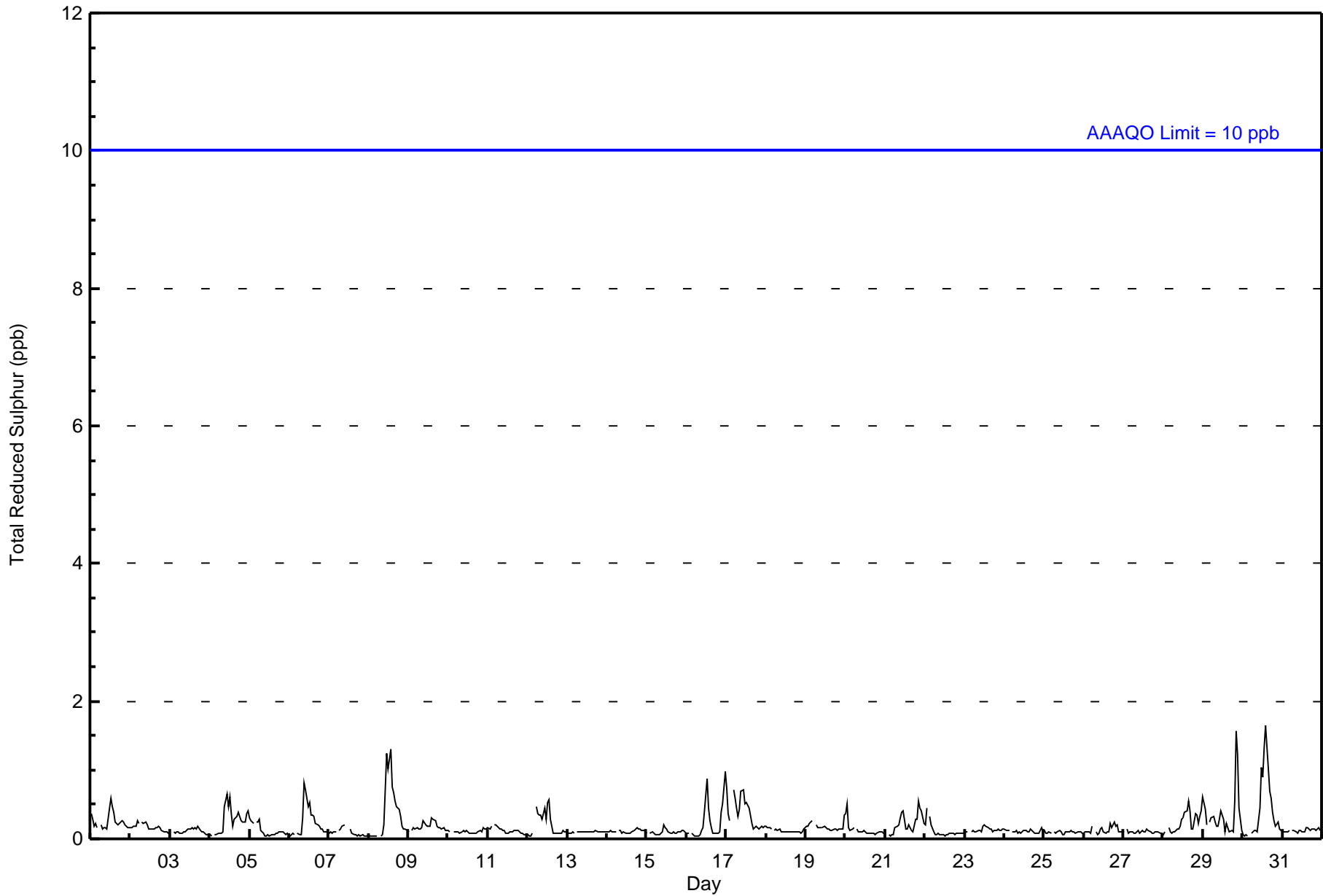














**Wood Buffalo Environmental Association**  
**Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Fort McKay South - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	710	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: 710

Total Number of Hours: 744



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

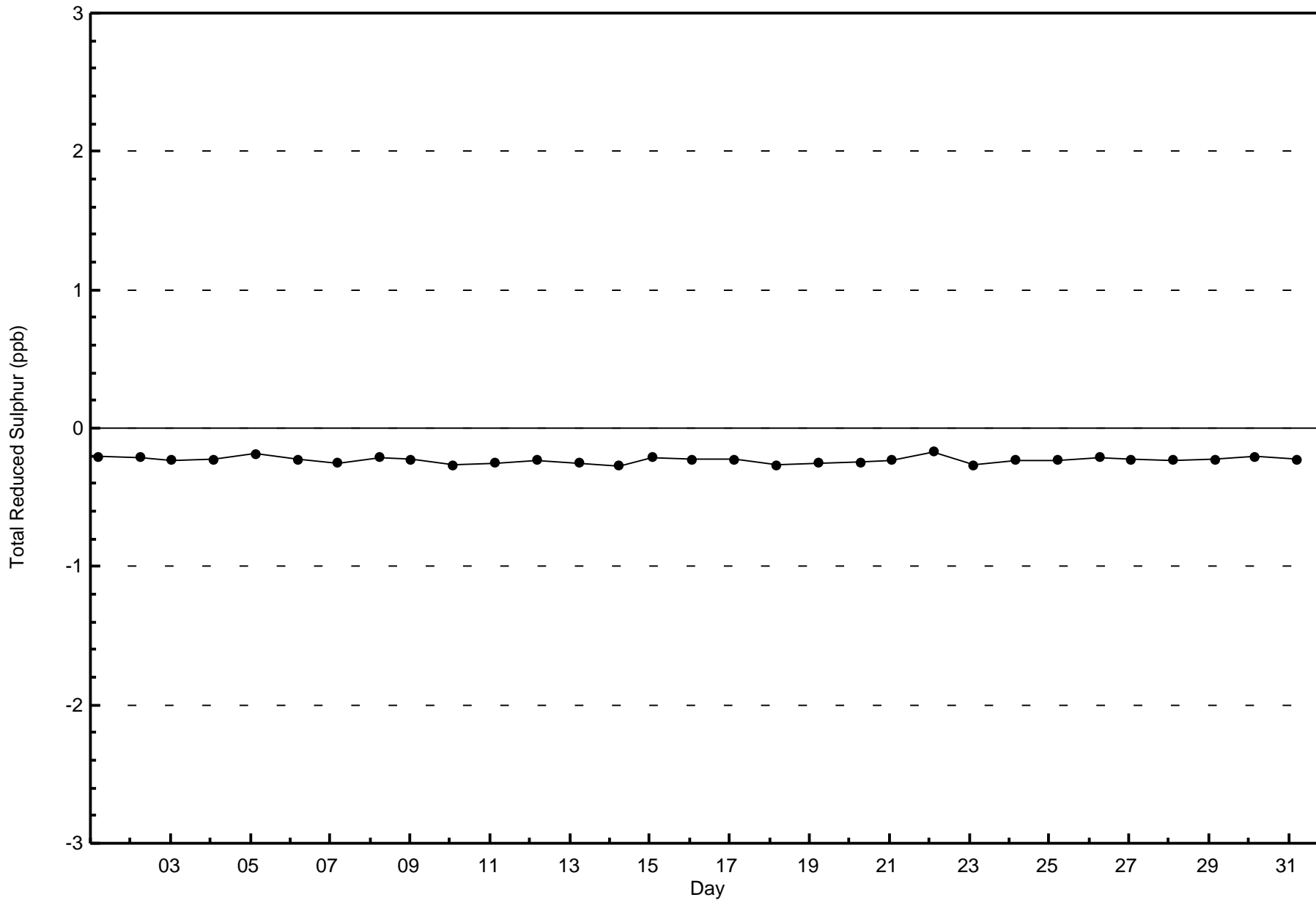
**Total Reduced Sulphur (TRS) - ppb**  
**Fort McKay South - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	83	53	14	1	4	11	26	39	84	63	70	101	40	38	40	42	709
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>	83	53	14	1	4	11	26	39	84	63	70	101	40	38	40	42	709

Total Number of Valid Hours: 709

Total Number of Hours: 744





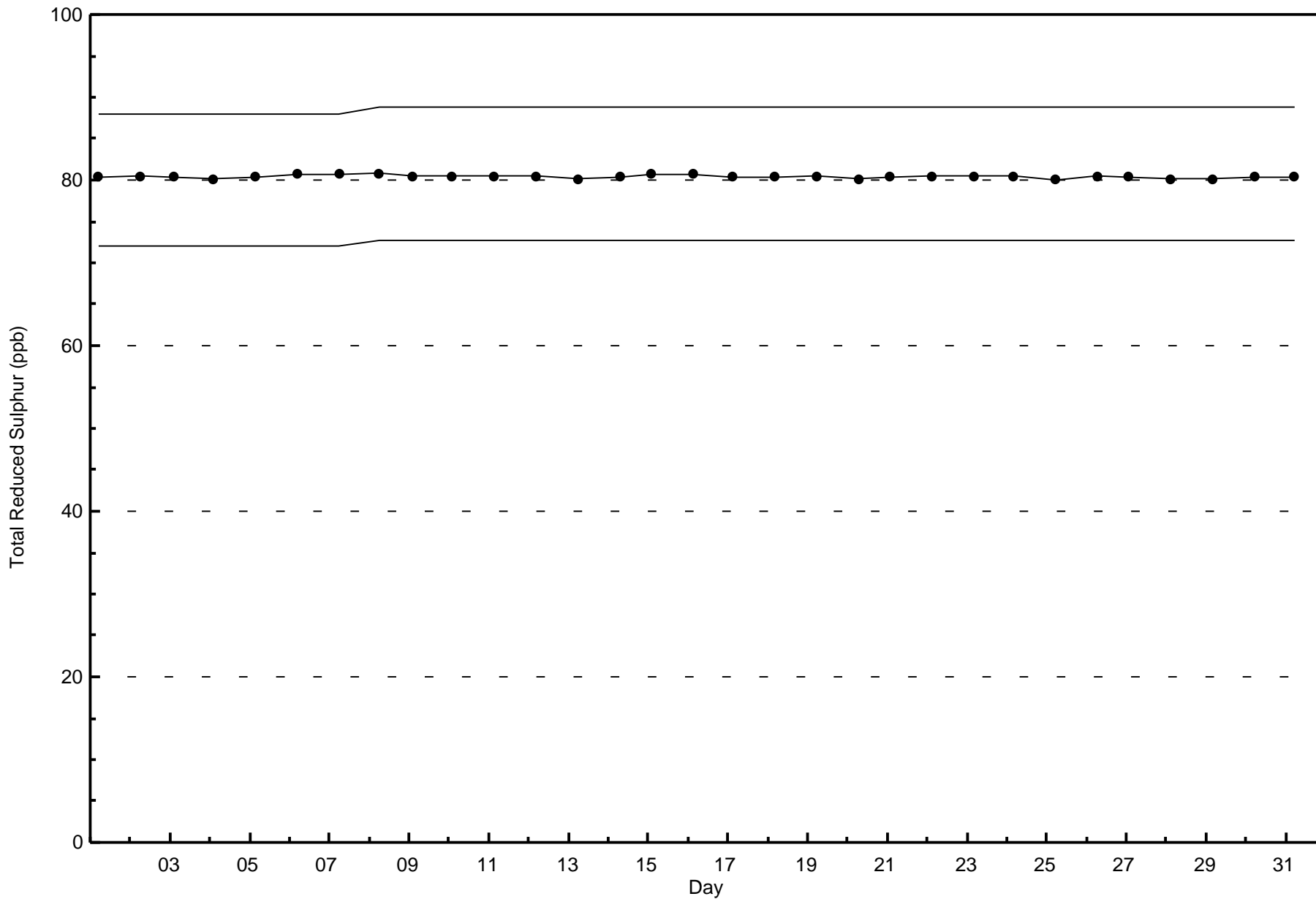


Wood Buffalo Environmental Association

Span Responses

Total Reduced Sulphur (TRS) - ppb

Fort McKay South - October 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

Fort McKay South - October 2015

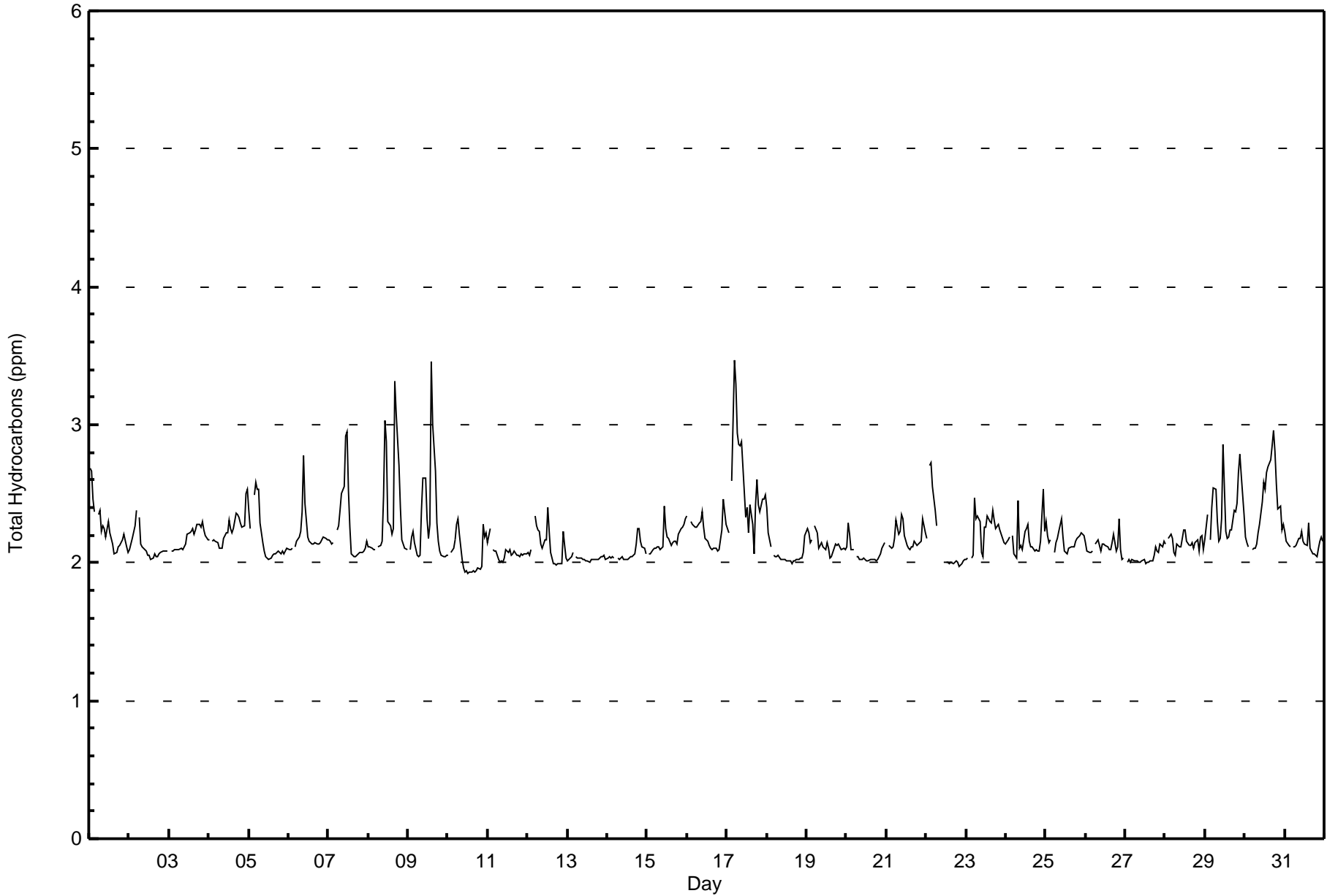
Maximum Value: 3.5 ppm on Oct 17 05:00		Maximum Daily Average: 2.6 ppm on Oct 17		Hours in Service: 744																							
Minimum Value: 1.9 ppm on Oct 10 13:00		Minimum Daily Average: 2.0 ppm on Oct 13		Hours of Data: 708																							
Maximum Diurnal Average: 2.2 ppm at hour 6		Minimum Diurnal Average: 2.1 ppm at hour 14		Hours of Missing Data: 36																							
Monthly Average: 2.19 ppm		Percentiles: P <sub>1</sub> = 1.9 P <sub>10</sub> = 2.0 Q <sub>1</sub> = 2.1 Median = 2.1 Q <sub>3</sub> = 2.2 P <sub>90</sub> = 2.4 P <sub>99</sub> = 3.0		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	2.7	2.7	2.5	2.4	Z	2.4	2.4	2.2	2.3	2.3	2.2	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.3	2.7	
2-Oct	2.1	2.1	2.2	2.3	2.4	Z	2.3	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4	
3-Oct	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.3	
4-Oct	2.2	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.4	2.3	2.3	2.3	2.3	2.3	2.5	2.5	2.5	2.5	
5-Oct	2.4	2.2	Z	2.5	2.6	2.5	2.5	2.3	2.1	2.1	2.0	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	2.2	2.6	
6-Oct	2.1	2.1	2.1	Z	2.1	2.2	2.2	2.2	2.4	2.8	2.4	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.8	
7-Oct	2.2	2.2	2.1	2.1	Z	2.2	2.3	2.4	2.5	2.6	2.9	2.9	2.5	2.3	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.9	
8-Oct	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.2	2.5	3.0	2.9	2.3	2.3	2.2	2.2	3.3	3.1	2.7	2.4	2.2	2.1	2.1	2.1	2.4	3.3	
9-Oct	Z	2.1	2.2	2.2	2.1	2.1	2.0	2.1	2.4	2.6	2.6	2.3	2.2	2.3	3.5	3.0	2.7	2.3	2.2	2.1	2.1	2.0	2.0	2.1	2.3	3.5	
10-Oct	2.1	Z	2.1	2.1	2.2	2.3	2.3	2.2	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.3	2.2	2.2	2.3	
11-Oct	2.1	2.2	Z	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.2	
12-Oct	2.1	2.1	2.1	Z	2.3	2.3	2.2	2.2	2.1	2.1	2.2	2.2	2.4	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.1	2.0	2.1	2.4	
13-Oct	2.0	2.0	2.0	2.1	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	2.1	2.0	2.0	2.1	
14-Oct	2.0	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	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	
15-Oct	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.1	2.2	2.2	2.3	2.3	2.3	2.2	2.4	
16-Oct	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.5	2.3	2.2	2.5	
17-Oct	2.2	2.2	Z	2.6	3.5	3.3	2.9	2.9	2.8	2.9	2.5	2.3	2.4	2.2	2.4	2.3	2.1	2.4	2.6	2.4	2.4	2.5	2.5	2.5	2.6	3.5	
18-Oct	2.4	2.2	2.1	Z	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.1	2.4	
19-Oct	2.3	2.2	2.1	2.2	Z	2.3	2.2	2.1	2.1	2.1	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	2.3	
20-Oct	2.1	2.3	2.2	2.1	2.1	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	2.1	2.1	2.1	2.1	2.1	2.3	
21-Oct	Z	2.1	2.1	2.1	2.1	2.2	2.3	2.2	2.2	2.4	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.3	2.2	2.2	2.4	
22-Oct	2.2	Z	2.7	2.7	2.6	2.4	2.3	C	C	C	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	2.2	2.7	
23-Oct	2.0	2.0	Z	2.0	2.1	2.5	2.3	2.3	2.3	2.1	2.0	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.1	2.2	2.5	
24-Oct	2.1	2.2	2.2	Z	2.2	2.1	2.0	2.5	2.1	2.1	2.1	2.2	2.2	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.5	2.2	2.2	2.5	
25-Oct	2.3	2.2	2.1	2.2	Z	2.1	2.1	2.2	2.2	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3	
26-Oct	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.3	2.1	2.0	2.0	2.1	2.3	
27-Oct	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	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.0	2.2	
28-Oct	2.1	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.1	2.1	2.2	
29-Oct	2.2	2.4	Z	2.2	2.4	2.5	2.5	2.3	2.2	2.2	2.3	2.9	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.4	2.4	2.7	2.8	2.6	2.3	2.4	2.9
30-Oct	2.2	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.3	2.4	2.6	2.5	2.7	2.7	2.7	2.9	3.0	2.8	2.6	2.4	2.4	2.2	2.3	2.4	3.0	
31-Oct	2.2	2.2	2.1	2.1	Z	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.3	2.1	2.1	2.1	2.1	2.0	2.1	2.2	2.2	2.2	2.1	2.3	
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration																											





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

**Total Hydrocarbons (THC) - ppm**  
**Fort McKay South - October 2015**





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

**Total Hydrocarbons (THC) - ppm**  
**Fort McKay South - October 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	144	20.34	20.34
2.1 - 3.0	559	78.95	99.29
3.1 - 10.0	5	0.71	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**  
**Fort McKay South - October 2015**

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	8	3	1	0	0	0	1	0	0	6	22	41	17	22	20	3	144
2.1 - 3.0	74	49	13	1	3	11	25	40	86	57	42	59	21	17	22	38	558
3.1 - 10.0	1	1	0	0	0	0	0	0	0	0	2	0	0	0	0	1	5
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	83	53	14	1	3	11	26	40	86	63	66	100	38	39	42	42	707

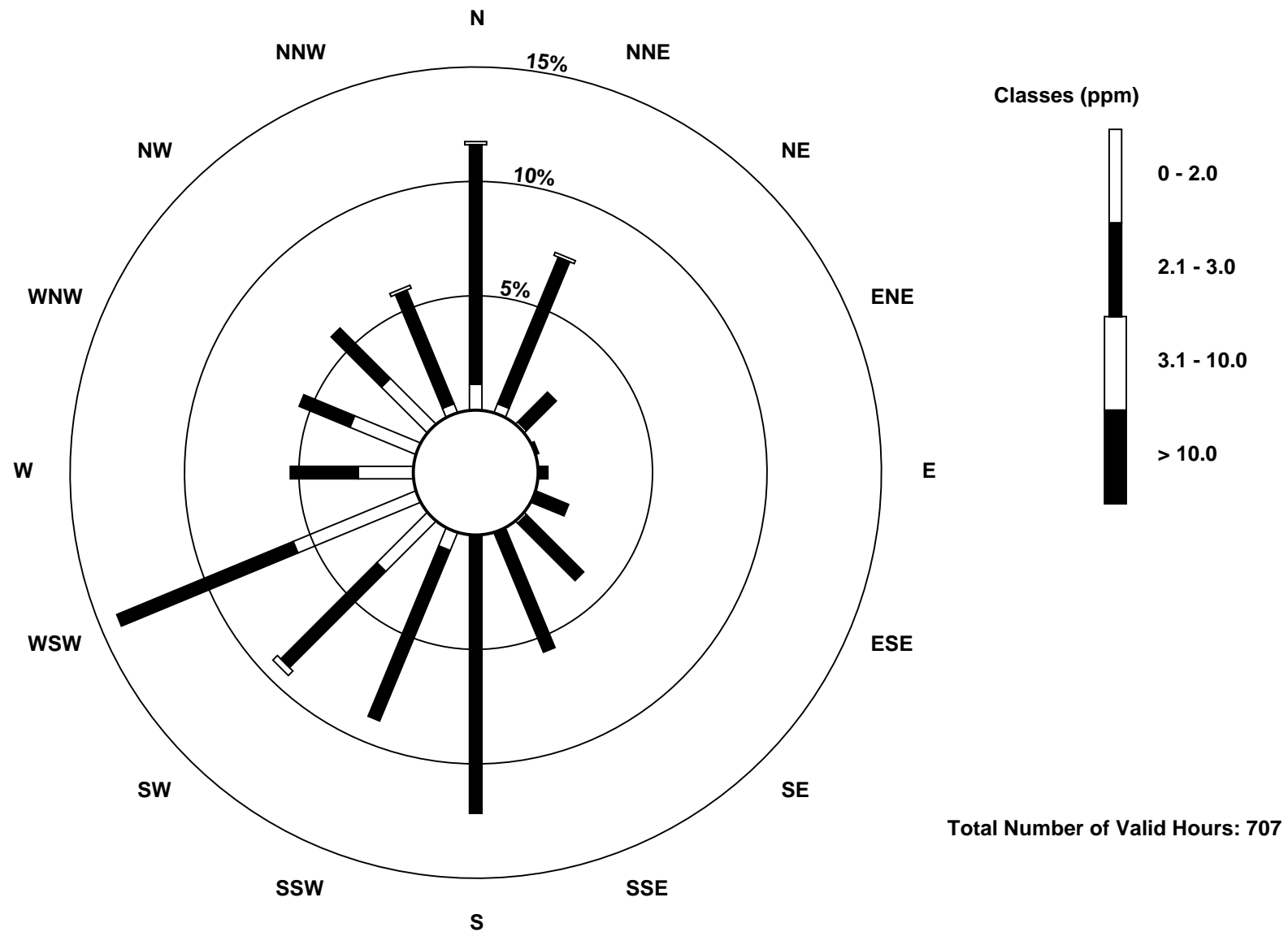
Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

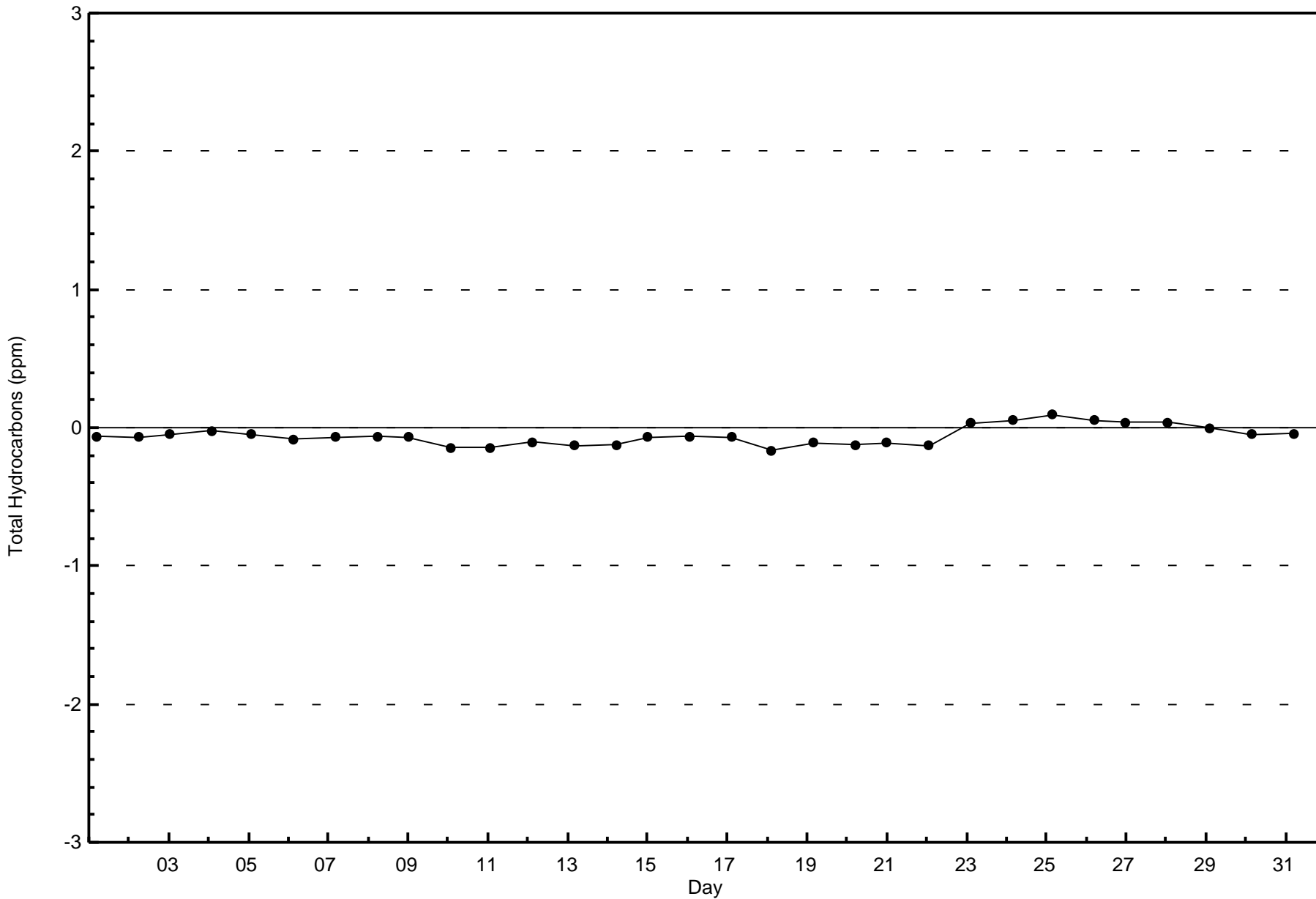
Total Hydrocarbons (THC) - ppm  
Fort McKay South (AMS 13)

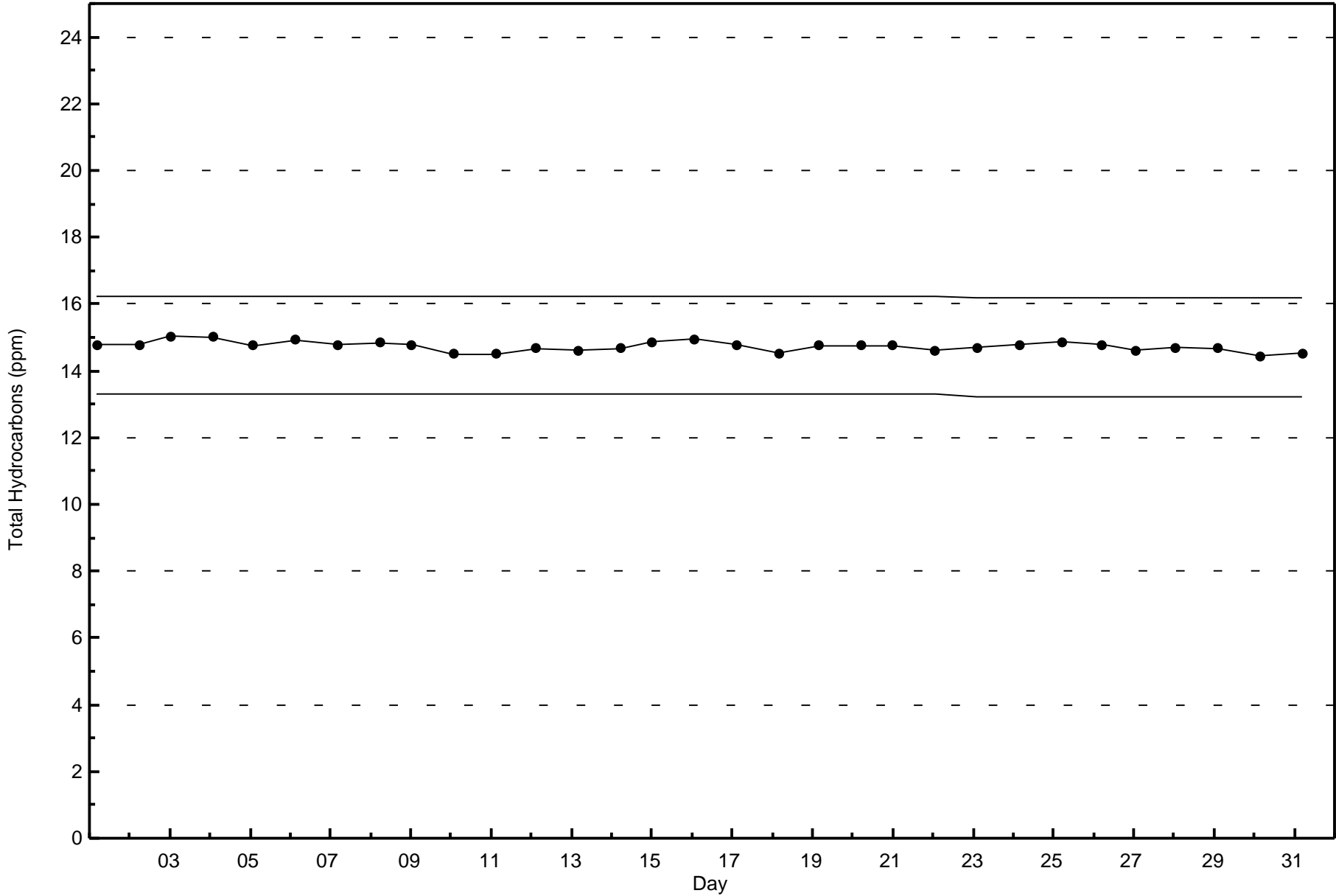




Wood Buffalo Environmental Association  
Zero Responses

Total Hydrocarbons (THC) - ppm  
Fort McKay South - October 2015







Summary of Hour Averages

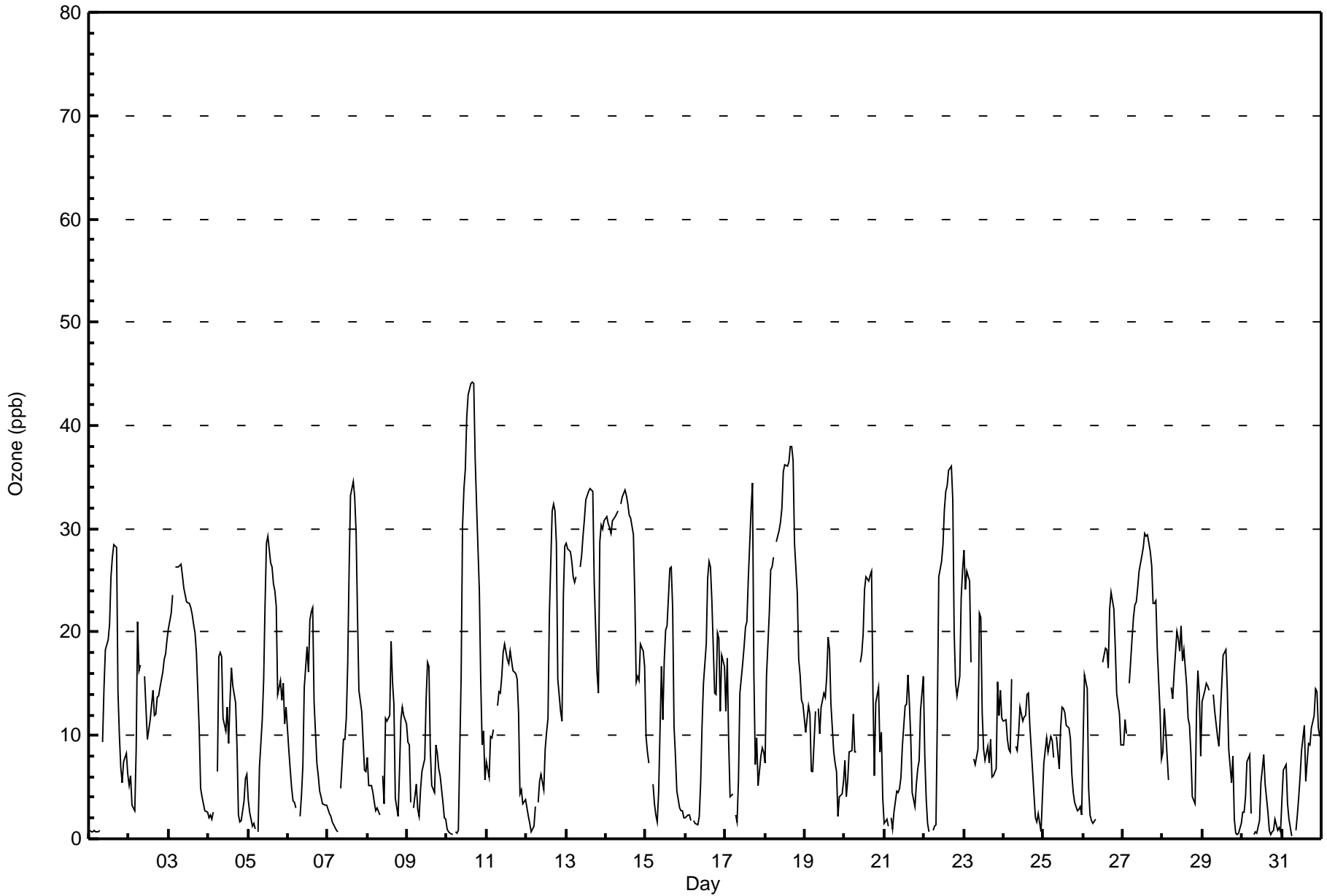
Fort McKay South - October 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 44 ppb on Oct 10 16:00	Maximum Daily Average: 28.0 ppb on Oct 13		Hours of Data:	710
Minimum Value: 0 ppb on Oct 31 07:00	Minimum Daily Average: 2.9 ppb on Oct 30		Hours of Missing Data:	34
Maximum Diurnal Average: 21.7 ppb at hour 15	Minimum Diurnal Average: 8.3 ppb at hour 4		Hours of Calibration:	34
Monthly Average: 13.3 ppb	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 5 Median = 12 Q <sub>3</sub> = 19 P <sub>90</sub> = 29 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	1	1	1	1	1	1	1	Z	9	15	18	19	21	25	27	29	28	14	10	7	5	8	8	6	11.1	29
2-Oct	5	6	3	3	9	21	16	17	Z	16	13	10	11	12	14	12	12	14	14	15	16	17	18	19	12.7	21
3-Oct	20	22	24	Z	26	26	26	27	25	24	24	23	23	22	22	21	20	18	11	5	4	3	3	3	18.3	27
4-Oct	2	2	2	3	Z	6	18	18	18	12	10	13	9	13	16	15	13	9	2	2	2	4	6	6	8.7	18
5-Oct	4	3	1	2	1	Z	1	7	12	15	23	29	29	27	26	25	24	22	14	15	13	15	11	13	14.4	29
6-Oct	9	7	5	4	4	3	Z	2	4	7	15	19	16	21	22	22	13	7	6	5	4	3	3	3	8.8	22
7-Oct	3	3	2	2	1	1	1	Z	5	10	10	12	17	26	33	35	33	30	22	14	12	9	7	7	12.7	35
8-Oct	8	5	5	4	3	3	3	2	Z	6	3	12	11	12	19	15	13	4	2	7	11	13	12	11	8.1	19
9-Oct	9	9	4	Z	3	5	3	2	5	7	8	14	17	17	9	5	5	9	8	7	6	3	2	2	6.8	17
10-Oct	1	1	1	0	Z	1	1	1	16	30	34	36	41	43	44	44	44	37	32	24	15	9	10	6	20.4	44
11-Oct	7	6	10	10	11	Z	13	14	14	16	18	19	17	17	18	17	16	16	15	12	4	5	3	4	12.3	19
12-Oct	3	2	1	1	1	3	Z	3	6	6	5	9	10	12	22	32	32	32	29	15	12	11	24	28	13.0	32
13-Oct	29	28	28	27	25	25	25	Z	26	27	29	31	33	34	34	34	34	25	16	14	29	30	30	31	28.0	34
14-Oct	31	30	30	30	31	31	31	32	Z	32	33	34	33	32	31	31	29	23	15	16	15	19	18	17	27.2	34
15-Oct	10	8	7	Z	5	3	2	2	4	17	12	17	20	21	26	26	22	11	8	5	3	3	3	2	10.3	26
16-Oct	2	2	2	2	Z	2	1	1	2	5	11	15	19	25	27	26	23	14	14	20	19	12	18	17	12.2	27
17-Oct	12	18	9	4	4	Z	2	2	6	14	17	19	21	21	25	32	34	16	7	10	5	8	9	8	13.2	34
18-Oct	7	16	22	26	26	27	Z	29	30	31	32	35	36	36	37	38	38	37	29	24	17	16	13	13	26.7	38
19-Oct	10	12	13	12	7	6	12	Z	13	10	13	14	14	16	20	18	13	8	7	7	2	4	4	6	10.5	20
20-Oct	8	4	6	8	9	12	8	8	Z	17	18	20	24	25	25	25	26	14	6	13	15	8	10	4	13.7	26
21-Oct	2	2	1	Z	2	1	3	5	4	5	6	9	13	13	16	13	10	5	3	5	7	8	12	16	6.9	16
22-Oct	8	4	1	1	Z	1	1	1	12	25	27	28	32	34	34	36	36	33	20	15	14	16	23	26	18.6	36
23-Oct	28	24	26	25	17	Z	8	7	9	22	21	12	9	8	9	7	10	6	6	7	15	12	14	12	13.6	28
24-Oct	11	11	10	9	8	15	Z	9	8	10	13	11	12	12	14	14	11	7	4	2	2	1	4	8.7	15	
25-Oct	7	9	10	8	10	9	8	Z	10	7	11	13	13	12	11	11	10	6	4	3	3	3	3	2	7.9	13
26-Oct	9	16	14	5	2	2	1	2	Z	C	C	C	17	18	18	17	22	24	22	19	14	13	12	9	12.9	24
27-Oct	9	12	10	Z	15	19	21	23	23	24	26	27	28	30	29	29	28	26	23	23	23	18	12	8	21.2	30
28-Oct	8	13	10	6	Z	15	14	16	20	19	18	21	17	18	15	12	11	8	4	3	12	16	14	8	13.0	21
29-Oct	13	14	15	15	14	Z	14	12	11	10	9	12	18	18	18	14	9	5	8	2	1	0	1	1	10.2	18
30-Oct	3	3	4	7	8	2	Z	0	1	1	2	5	7	8	5	3	1	0	1	1	2	1	1	1	2.9	8
31-Oct	4	7	7	3	2	1	0	Z	1	2	4	6	9	11	6	7	9	9	11	12	14	14	11	10	7.0	14

9.2	9.6	9.2	8.3	9.5	9.3	9.0	9.7	11.3	14.8	16.0	18.1	19.2	20.6	21.7	21.5	20.3	15.8	12.1	10.5	10.3	9.9	10.2	9.7	Diurnal Average
31	30	30	30	31	31	31	32	30	32	34	36	41	43	44	44	44	37	32	24	29	30	30	31	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**  
**Fort McKay South - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	546	76.90	76.90
21 - 50	164	23.10	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



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

**Ozone (O<sub>3</sub>) - ppb**  
**Fort McKay South - October 2015**

<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	76	46	11	1	3	8	17	34	80	55	47	66	26	20	22	34	546
21 - 50	8	6	3	0	0	3	8	4	6	8	19	42	13	18	20	6	164
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>	84	52	14	1	3	11	25	38	86	63	66	108	39	38	42	40	710

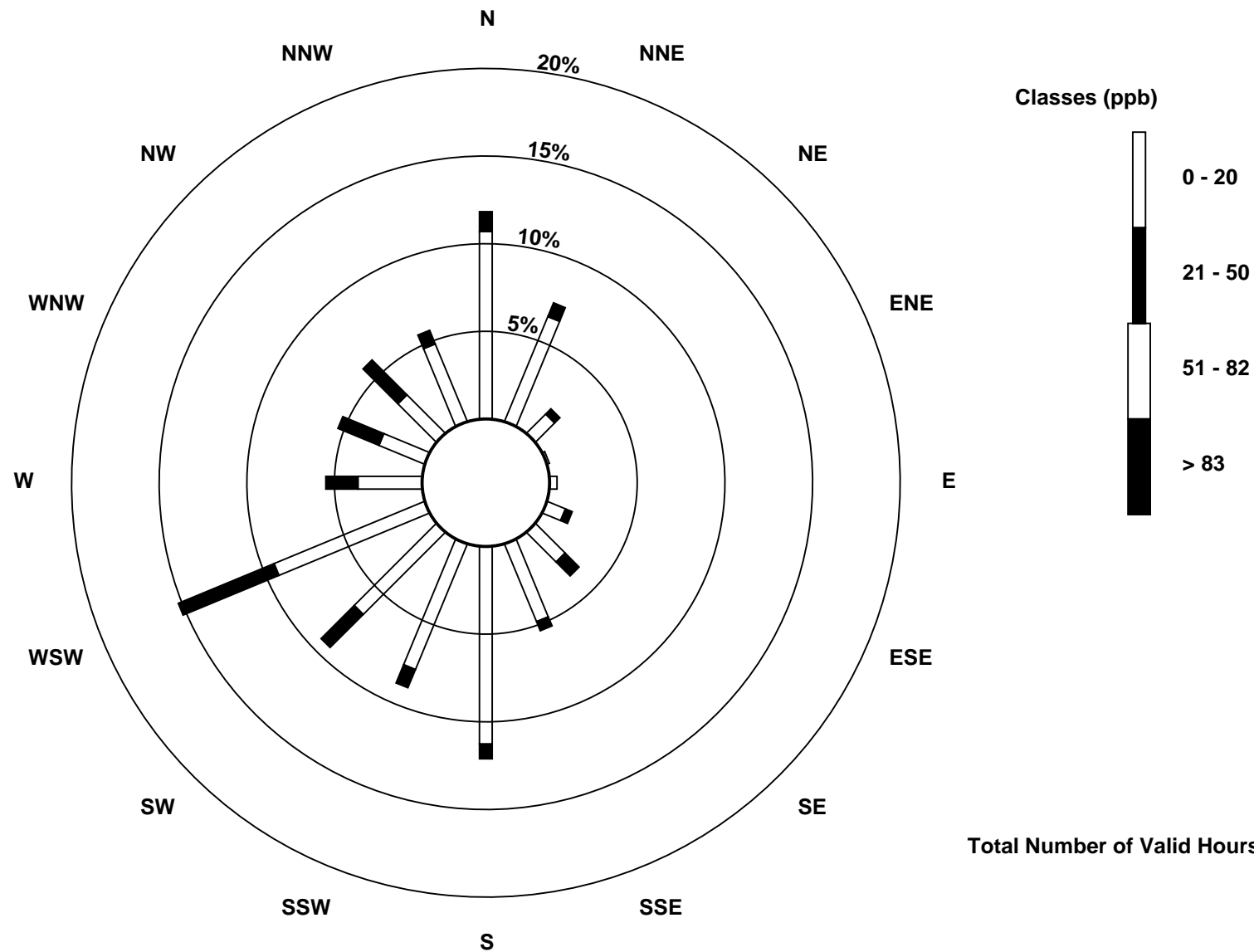
Total Number of Valid Hours: 710

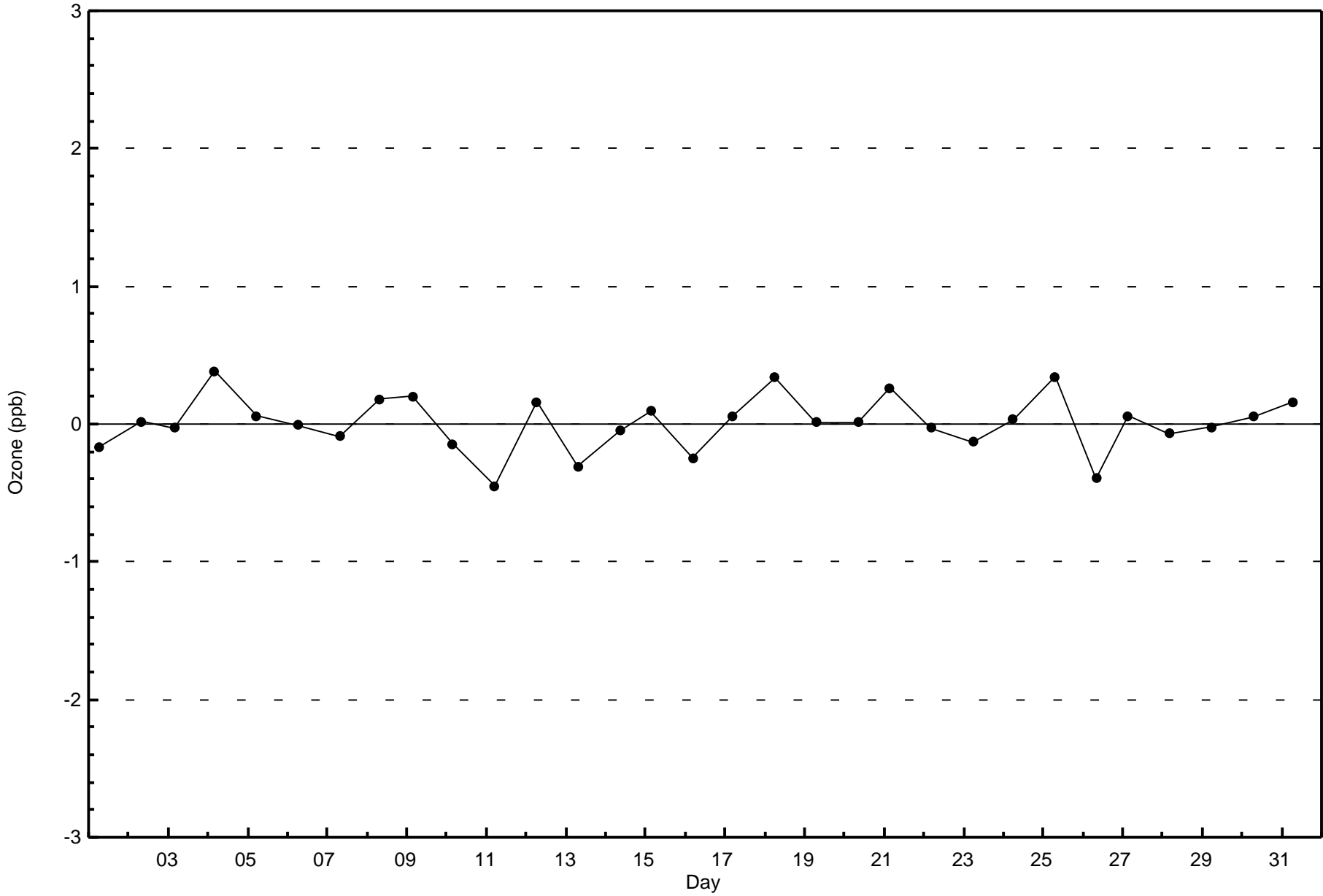
Total Number of Hours: 744

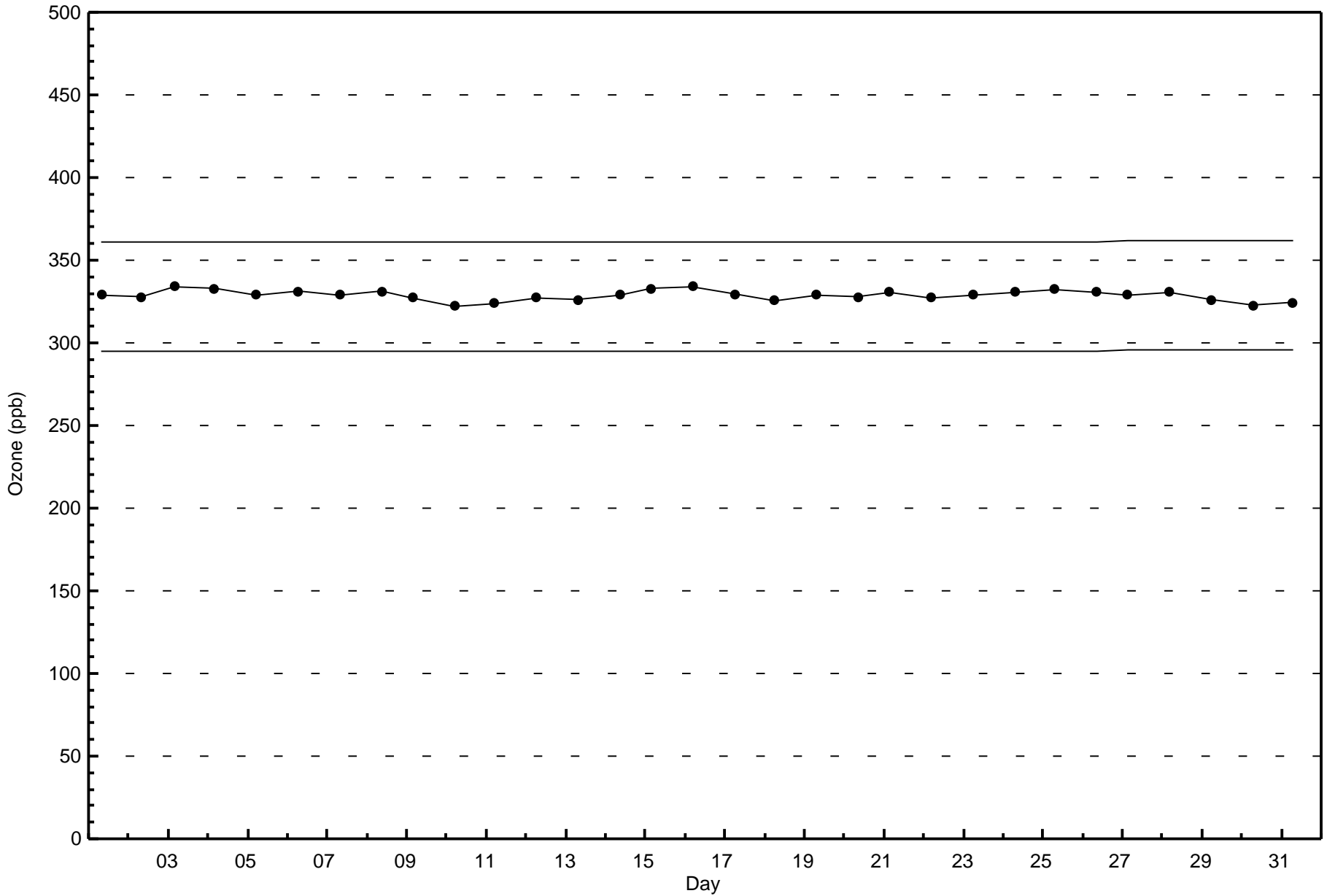


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Ozone (O<sub>3</sub>) - ppb  
Fort McKay South (AMS 13)

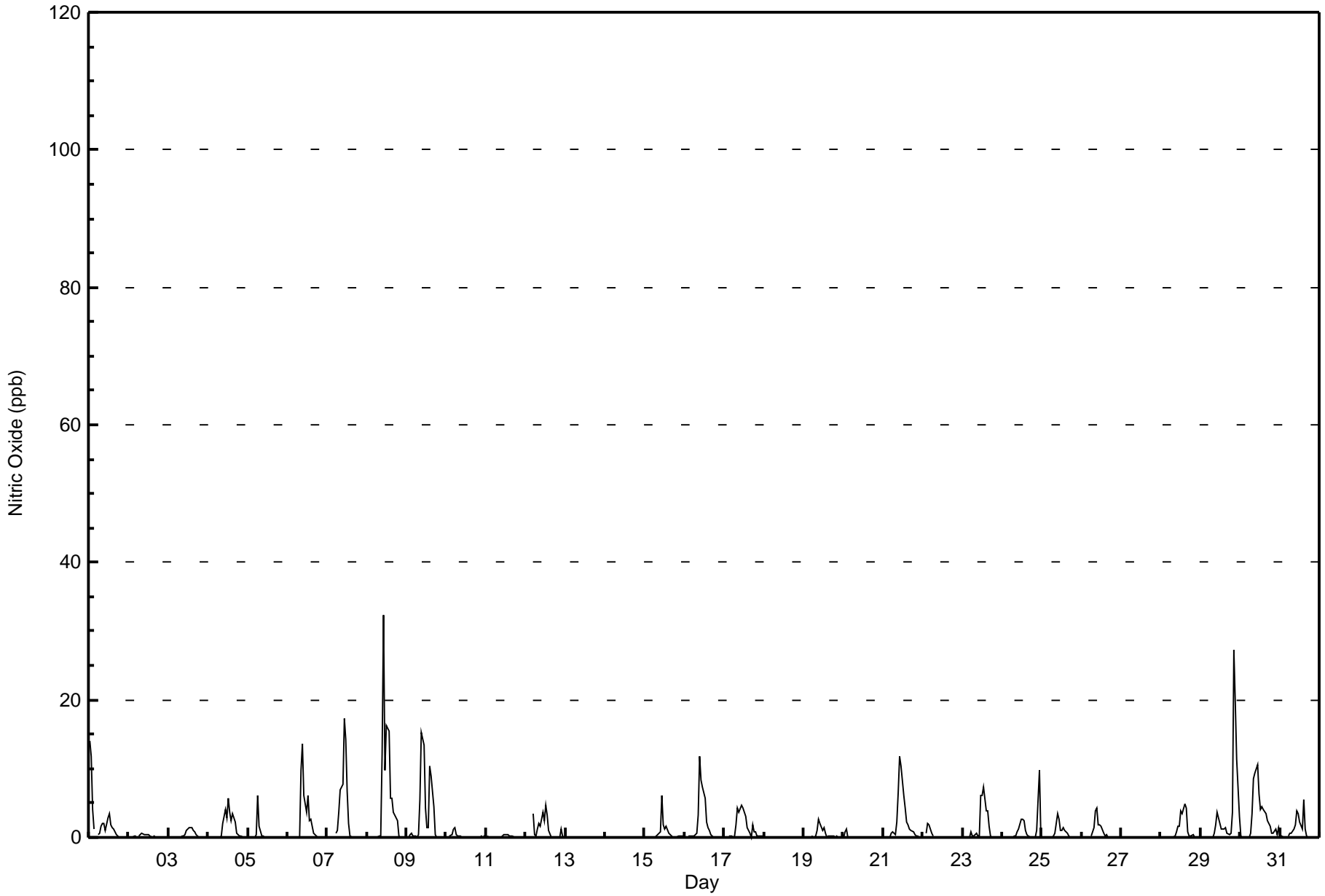








Maximum Value: 32 ppb on Oct 8 11:00																		Maximum Daily Average: 4.7 ppb on Oct 8																		Hours in Service: 744			
Minimum Value: 0 ppb on Oct 1 19:00																		Minimum Daily Average: 0.0 ppb on Oct 27																		Hours of Data: 708			
Maximum Diurnal Average: 4.6 ppb at hour 11																		Minimum Diurnal Average: 0.2 ppb at hour 24																		Hours of Missing Data: 36			
Monthly Average: 1.2 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> = 15																		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	14	12	4	1	Z	0	1	2	2	2	1	3	3	2	1	1	0	0	0	0	0	0	0	0	2.2	14													
2-Oct	0	0	0	0	0	Z	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1													
3-Oct	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.4	1													
4-Oct	0	Z	0	0	0	0	0	0	0	2	4	3	6	4	2	3	2	1	0	0	0	0	0	0	1.2	6													
5-Oct	0	0	Z	0	0	0	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	6													
6-Oct	0	0	0	Z	0	0	0	0	10	14	6	4	6	2	3	2	1	0	0	0	0	0	0	0	2.1	14													
7-Oct	0	0	0	0	Z	1	1	4	7	8	17	14	7	2	0	0	0	0	0	0	0	0	0	0	2.6	17													
8-Oct	0	0	0	0	0	Z	0	0	0	12	32	10	16	15	6	6	4	3	2	0	0	0	0	0	4.7	32													
9-Oct	Z	0	0	1	0	0	0	0	6	15	13	4	1	1	10	9	5	0	0	0	0	0	0	0	2.9	15													
10-Oct	0	Z	0	0	1	2	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	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	4	0	0	1	2	2	4	2	5	3	1	0	0	0	0	0	0	1	0	0	1.1	5													
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	0.0	0													
15-Oct	Z	0	0	0	0	0	0	0	0	1	6	2	1	2	1	0	0	0	0	0	0	0	0	0	0.6	6													
16-Oct	0	Z	0	0	0	0	0	1	3	12	8	7	6	2	1	1	0	0	0	0	0	0	0	0	1.9	12													
17-Oct	0	0	Z	0	0	0	0	2	4	4	5	4	4	3	1	1	0	2	1	1	0	0	0	0	1.4	5													
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	0													
19-Oct	0	0	0	0	Z	0	0	0	1	3	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	3													
20-Oct	0	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1													
21-Oct	Z	0	0	0	0	1	1	0	2	6	12	10	6	4	2	2	1	1	1	1	0	0	0	0	2.2	12													
22-Oct	0	Z	1	2	2	1	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2													
23-Oct	0	0	Z	0	0	1	0	0	1	0	0	6	6	7	4	4	2	0	0	0	0	0	0	0	1.4	7													
24-Oct	0	0	0	Z	0	0	0	0	0	1	1	3	3	2	1	1	0	0	0	0	1	10	0	1.0	10														
25-Oct	0	0	0	0	Z	0	0	0	1	3	3	1	1	1	1	1	0	0	0	0	0	0	0	0	0.6	3													
26-Oct	0	0	0	0	0	Z	0	1	4	4	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0.7	4													
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	0													
28-Oct	0	Z	0	0	0	0	0	0	0	1	2	2	4	3	5	4	1	0	0	0	0	0	0	0	1.0	5													
29-Oct	0	0	Z	0	0	0	0	0	1	2	4	3	1	1	1	1	1	0	1	4	27	20	11	3	3.5	27													
30-Oct	0	0	0	Z	0	0	1	4	8	9	11	6	4	4	4	4	2	2	2	1	1	1	0	1	2.9	11													
31-Oct	0	0	0	0	Z	0	1	1	1	2	4	3	2	1	6	1	0	0	0	0	0	0	0	0	1.0	6													
																								Diurnal Average															
																								Diurnal Maximum															
0.6 0.5 0.3 0.2 0.3 0.3 0.4 0.6 1.8 3.5 4.6 3.1 2.8 2.1 1.7 1.4 0.7 0.4 0.2 0.2 0.9 0.8 0.7 0.2																																							
14 12 4 2 4 2 6 4 10 15 32 14 16 15 10 9 5 3 2 4 27 20 11 3																																							
Z - zerospan C - Calibration																																							





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

**Nitric Oxide (NO) - ppb**  
**Fort McKay South - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	706	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: 708

Total Number of Hours: 744





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

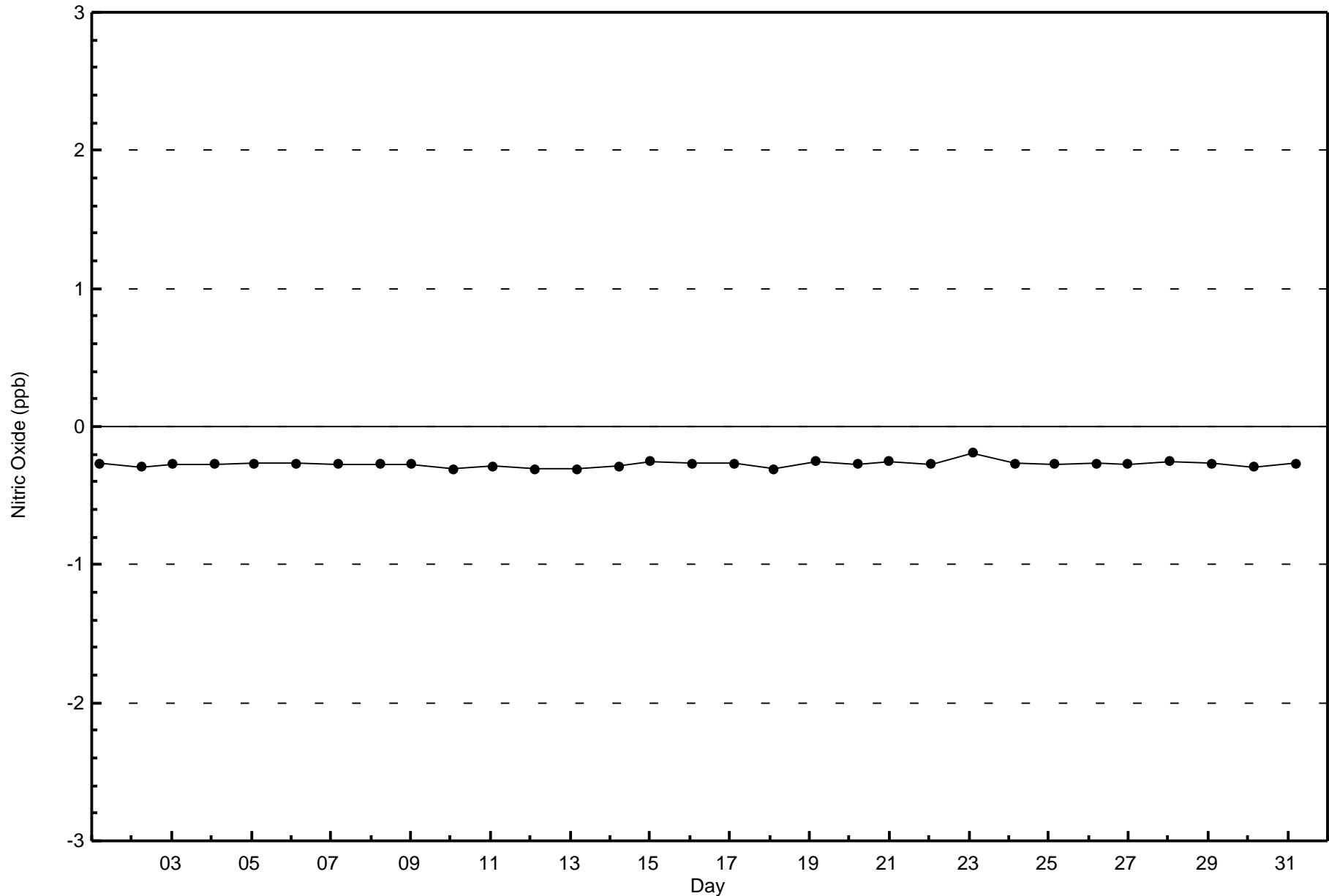
**Nitric Oxide (NO) - ppb**  
**Fort McKay South - October 2015**

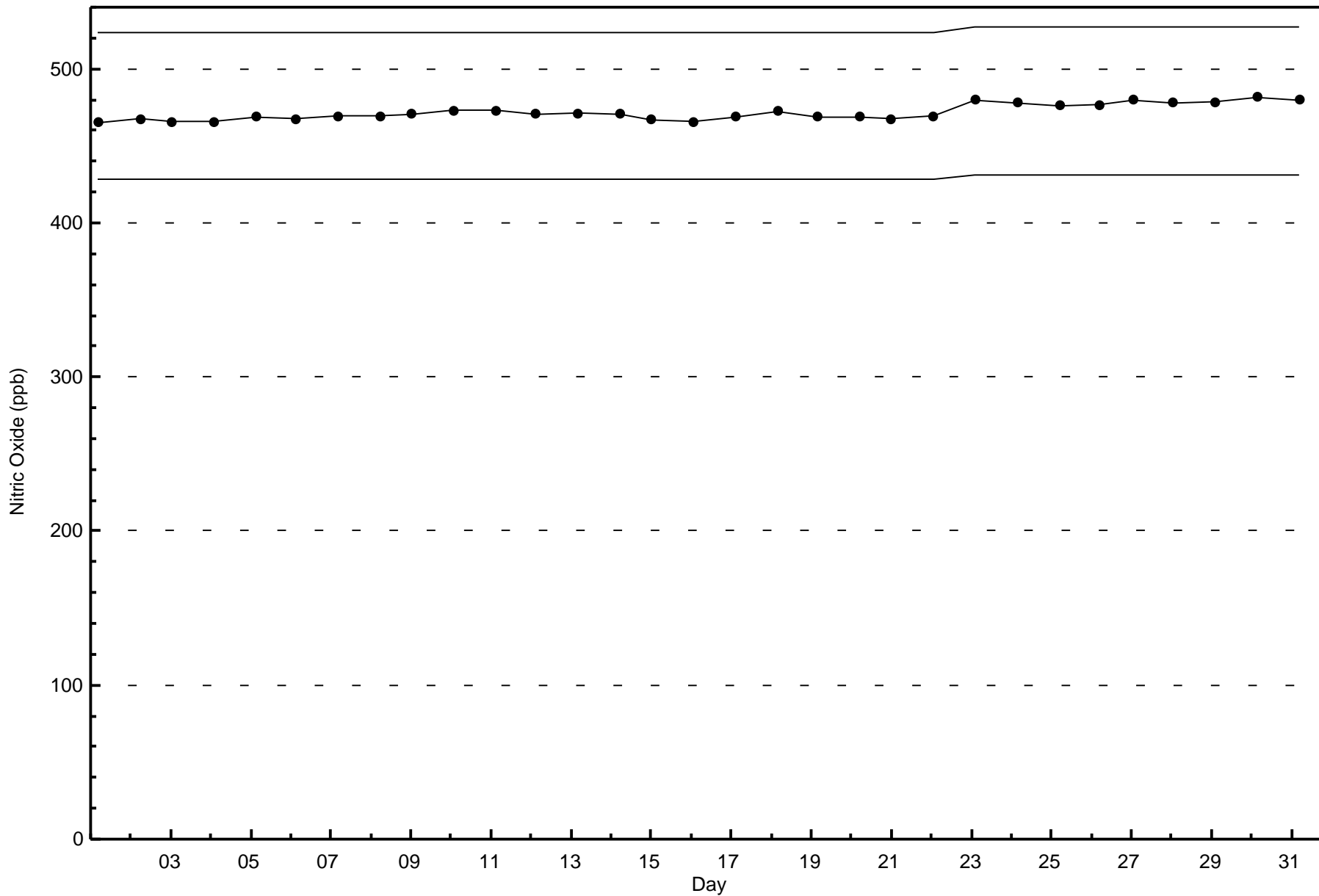
<b>Concentration</b> <b>Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	83	53	14	1	2	11	26	40	86	62	66	100	38	39	42	42	705
21 - 40	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	2
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	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>	83	53	14	1	3	11	26	40	86	63	66	100	38	39	42	42	707

Total Number of Valid Hours: 707

Total Number of Hours: 744









Wood Buffalo Environmental Association

Summary of Hour Averages

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

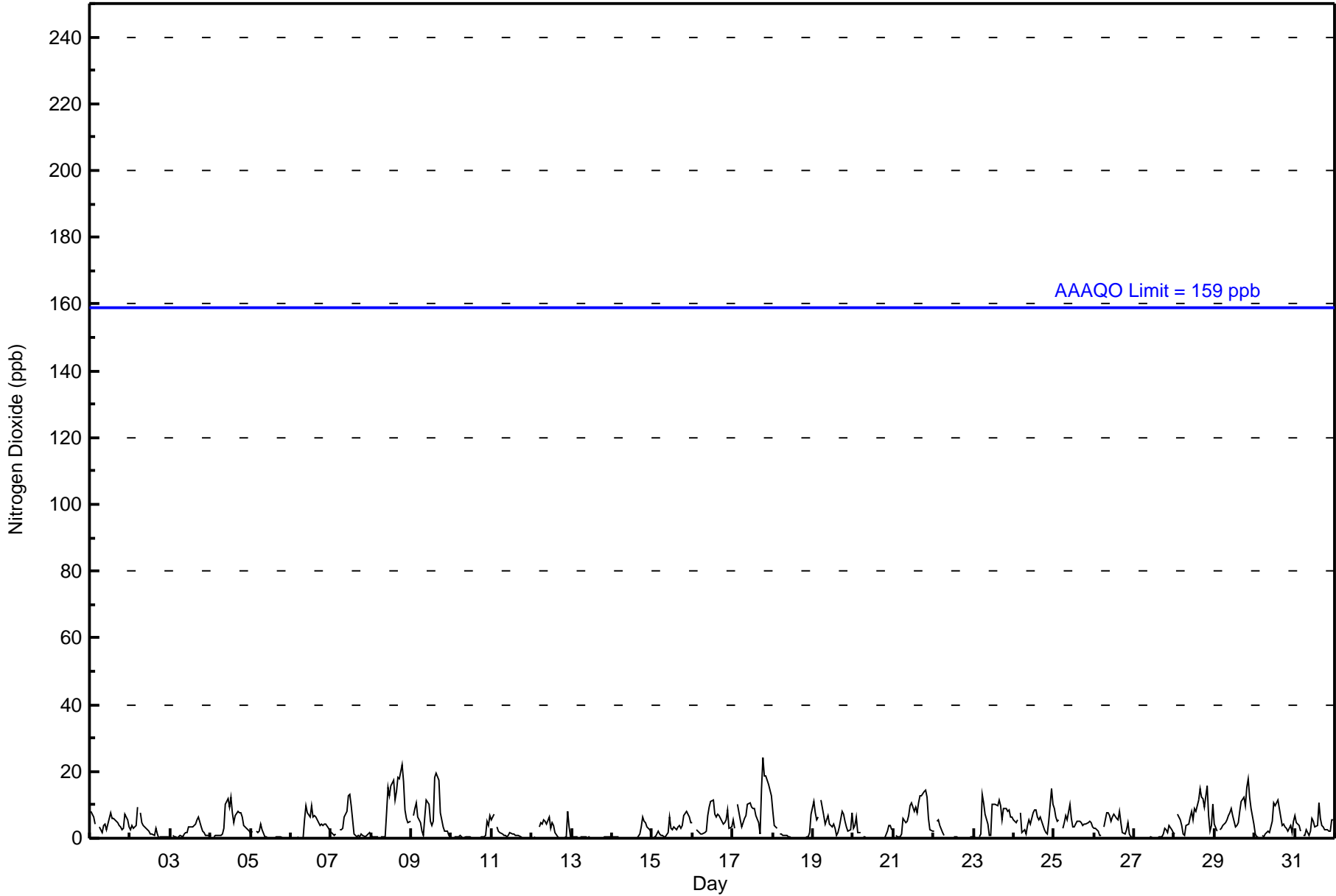
Fort McKay South - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 24 ppb on Oct 17 19:00										Maximum Daily Average: 9.8 ppb on Oct 17																
Minimum Value: 0 ppb on Oct 11 22:00										Minimum Daily Average: 0.3 ppb on Oct 13																
Maximum Diurnal Average: 5.3 ppb at hour 11										Minimum Diurnal Average: 2.3 ppb at hour 5																
Monthly Average: 4.0 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 3 Q <sub>3</sub> = 6 P <sub>90</sub> = 10 P <sub>99</sub> = 18																
										Hours of Data: 708																
										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	8	7	6	4	Z	3	2	2	4	4	3	6	8	6	6	5	5	4	3	3	3	7	6	3	4.7	8
2-Oct	3	4	3	4	9	Z	8	5	4	3	2	2	1	1	1	3	1	0	1	0	1	1	1	1	2.5	9
3-Oct	Z	1	0	0	0	0	1	1	1	2	2	3	4	4	4	5	6	4	2	2	1	1	1	2.1	6	
4-Oct	1	Z	1	1	1	1	1	1	3	10	12	9	12	8	5	7	8	8	7	4	3	2	2	4.9	12	
5-Oct	1	2	Z	2	2	2	4	3	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.9	4	
6-Oct	0	0	0	Z	0	0	0	0	6	10	8	6	10	6	7	7	5	4	4	4	4	4	3	2	3.9	10
7-Oct	2	1	1	1	Z	3	3	3	6	8	13	13	10	5	1	1	1	1	1	1	1	1	1	2	3.4	13
8-Oct	1	1	0	0	0	Z	0	0	1	8	15	13	16	18	11	14	18	18	22	17	8	6	5	5	8.6	22
9-Oct	Z	7	9	11	6	5	2	1	6	11	10	5	4	5	18	20	17	8	5	4	2	2	1	1	6.9	20
10-Oct	0	Z	0	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	1	1	1	5	4	7	1.0	7
11-Oct	5	7	Z	3	2	2	1	1	1	1	1	2	1	1	1	1	1	1	0	0	0	0	0	0	1.4	7
12-Oct	0	0	0	Z	3	5	4	5	5	4	6	3	5	4	2	0	0	0	0	0	0	8	3	0	2.6	8
13-Oct	0	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0.3	1
14-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	3	6	5	5	3	3	2	1.4	6
15-Oct	Z	1	1	2	1	1	1	1	1	2	6	3	2	4	2	3	4	3	4	7	8	7	6	5	3.2	8
16-Oct	5	Z	3	2	2	1	1	2	2	7	9	11	11	7	6	7	7	5	4	5	5	9	3	3	5.1	11
17-Oct	6	3	Z	10	6	4	5	6	7	10	11	9	9	9	7	5	1	15	24	19	19	16	14	13	9.8	24
18-Oct	8	4	3	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	2	7	7	1.4	8
19-Oct	11	8	6	6	Z	11	7	4	5	7	4	3	4	3	1	2	4	8	7	5	4	2	2	8	5.3	11
20-Oct	3	4	7	2	2	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	4	3	1.4	7
21-Oct	Z	1	0	0	0	1	6	5	5	7	10	11	8	9	8	10	13	13	14	14	12	6	3	2	6.9	14
22-Oct	2	Z	5	5	4	2	1	C	C	C	C	C	1	0	0	0	0	0	0	0	0	0	0	0	1.3	5
23-Oct	0	0	Z	0	1	13	11	7	4	1	1	10	10	10	10	11	10	5	9	9	8	9	7	6	6.6	13
24-Oct	5	5	6	Z	8	2	3	1	4	6	4	8	8	9	6	6	6	4	3	2	1	5	15	10	5.4	15
25-Oct	9	6	5	6	Z	3	5	7	6	10	6	4	4	4	5	5	5	4	4	5	5	5	4	4	5.1	10
26-Oct	3	3	2	1	1	Z	3	8	8	7	5	6	7	6	6	8	5	2	1	3	5	1	1	0	3.9	8
27-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	3	2	4	2	2	0.8	4
28-Oct	1	Z	7	6	4	1	1	4	4	6	8	6	9	8	12	15	12	12	9	16	7	2	4	10	7.1	16
29-Oct	4	2	Z	3	3	4	5	6	7	8	9	7	4	4	5	8	11	12	10	15	18	12	9	4	7.3	18
30-Oct	1	1	1	Z	1	0	1	2	2	2	5	11	10	11	12	7	4	4	3	3	2	4	2	5	4.0	12
31-Oct	7	5	4	2	Z	1	1	3	1	2	6	5	4	4	10	6	4	3	3	2	2	2	6	6	3.8	10
3.3 2.8 2.7 2.8 2.3 2.6 2.5 2.6 3.1 4.5 5.3 5.2 5.2 4.7 4.7 5.0 4.8 4.7 5.0 4.8 4.2 4.2 3.6 3.6																								Diurnal Average		
11 8 9 11 9 13 11 8 8 11 15 13 16 18 18 20 18 18 24 19 19 19 16 15 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  
Fort McKay South - October 2015





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort McKay South - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	706	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: 708

Total Number of Hours: 744



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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort McKay South - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	82	53	14	1	3	11	26	40	85	63	66	100	38	39	42	42	705
21 - 40	1	0	0	0	0	0	0	0	1	0	0	0	0	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>	83	53	14	1	3	11	26	40	86	63	66	100	38	39	42	42	707

Total Number of Valid Hours: 707

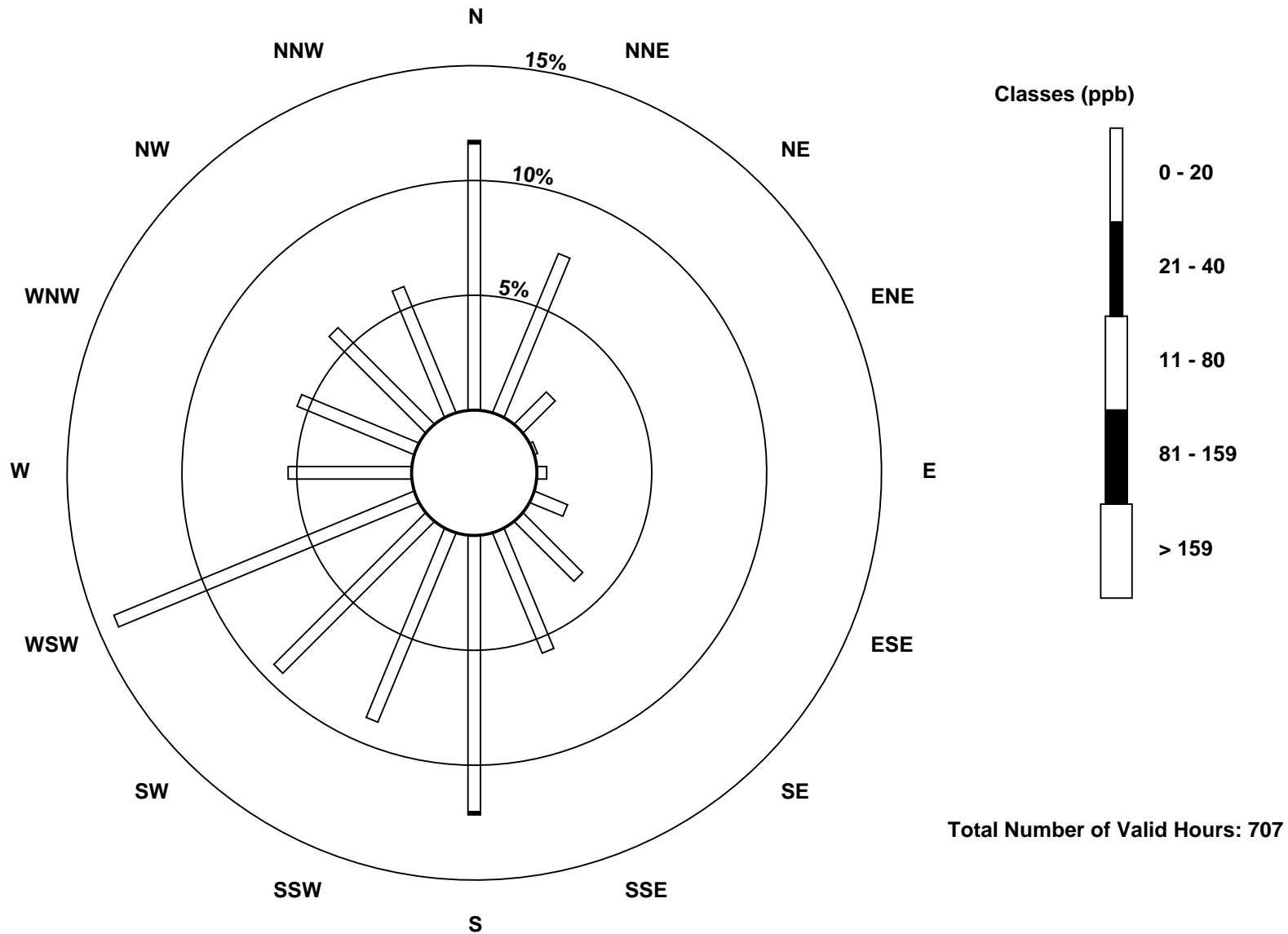
Total Number of Hours: 744

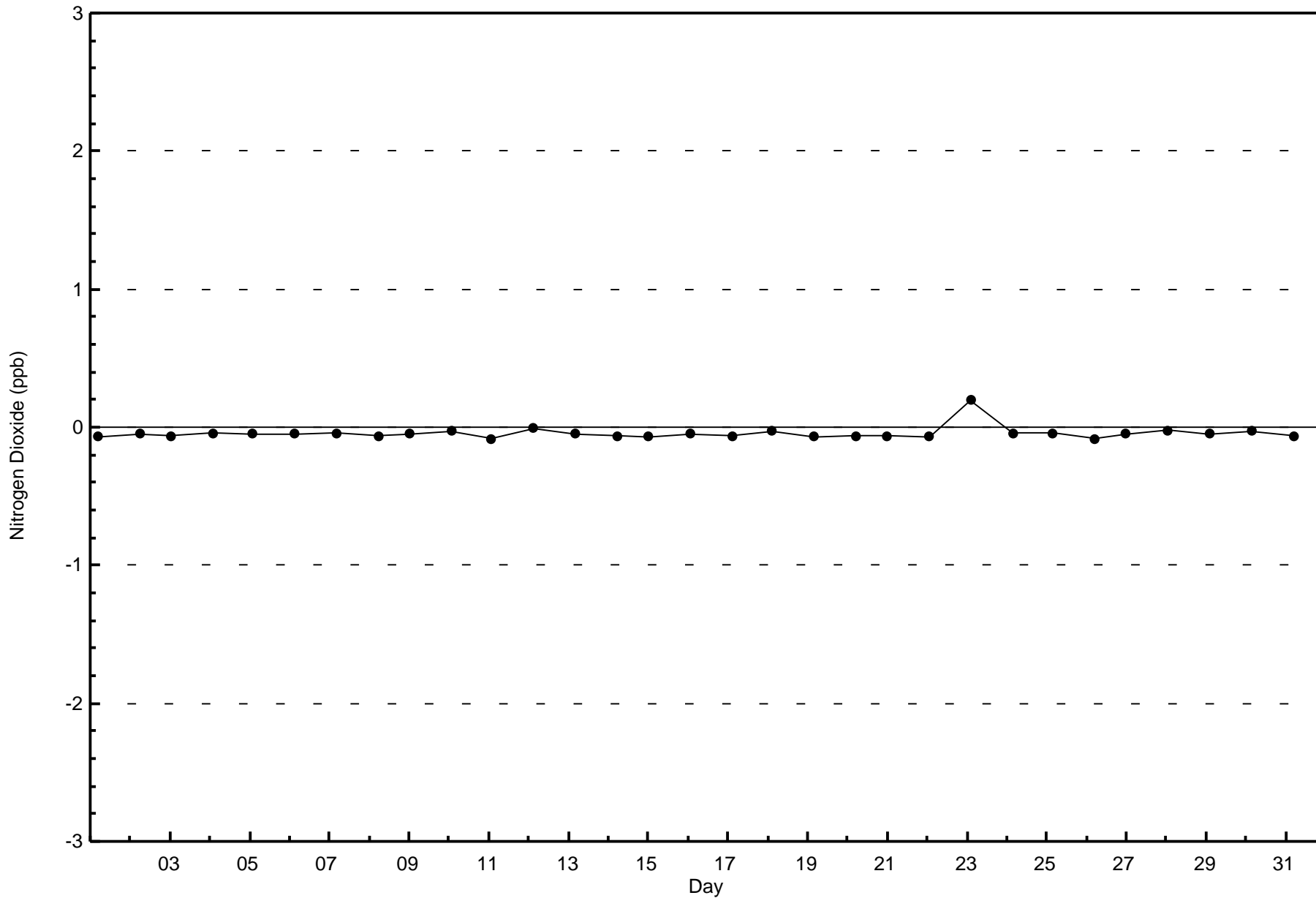


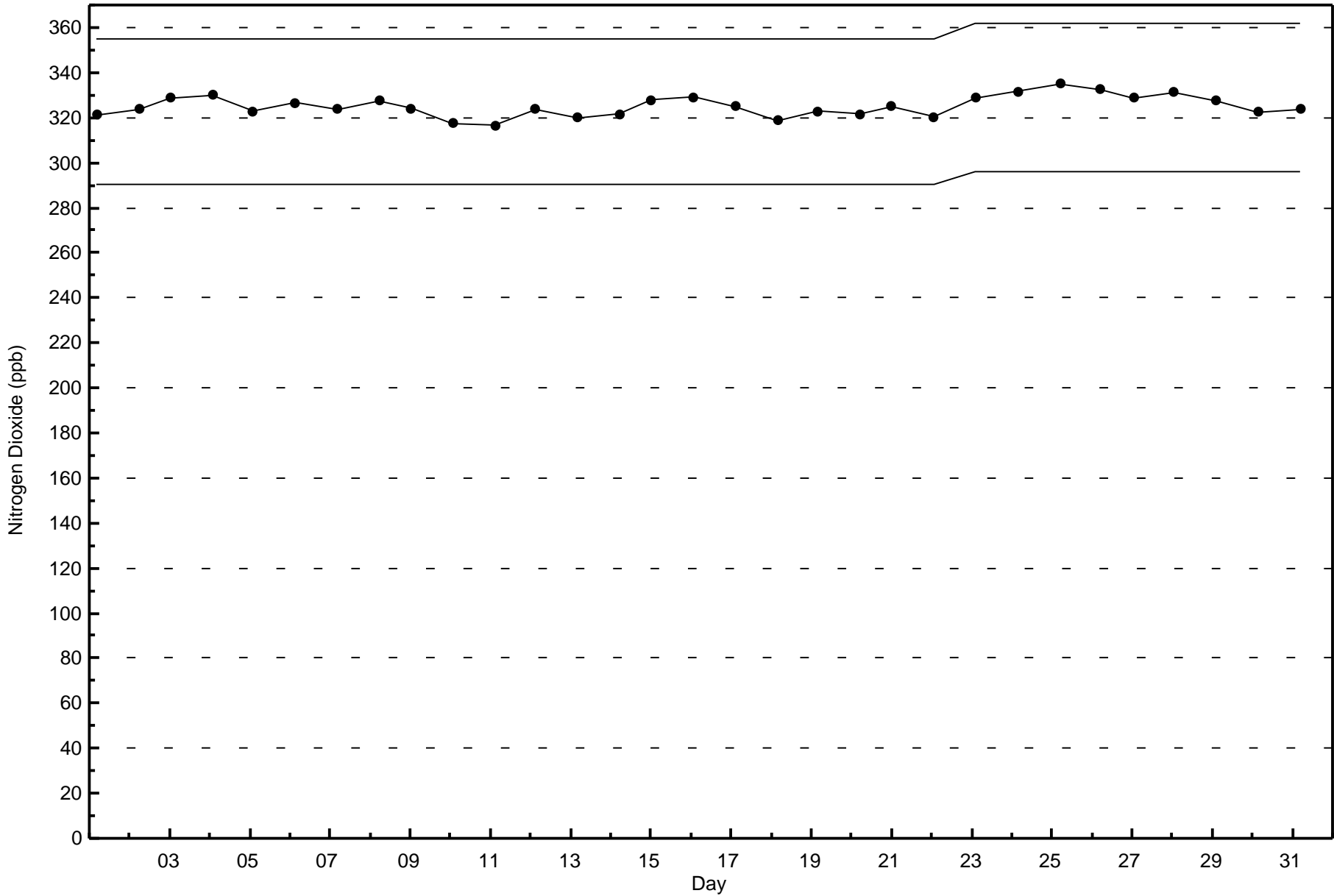


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay South (AMS 13)









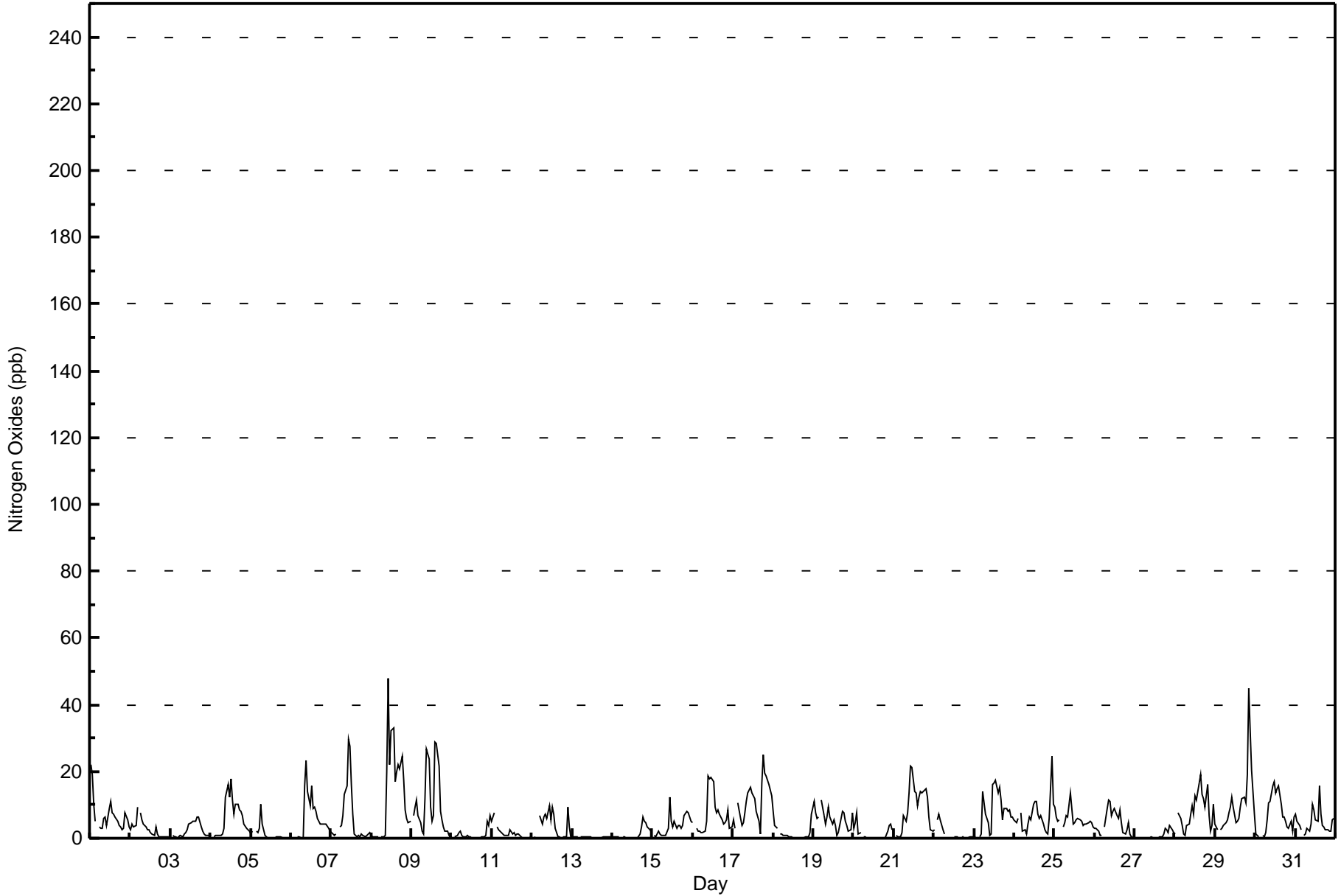
Maximum Value: 48 ppb on Oct 8 11:00														Maximum Daily Average: 13.3 ppb on Oct 8										Hours in Service: 744					
Minimum Value: 0 ppb on Oct 27 07:00														Minimum Daily Average: 0.3 ppb on Oct 13										Hours of Data: 708					
Maximum Diurnal Average: 9.9 ppb at hour 11														Minimum Diurnal Average: 2.6 ppb at hour 5										Hours of Missing Data: 36					
Monthly Average: 5.2 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> = 13 P <sub>99</sub> = 28										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	22	19	10	5	Z	4	3	3	6	6	4	9	11	8	7	6	5	4	3	3	3	8	6	3	6.9	22			
2-Oct	2	4	3	4	9	Z	8	5	4	3	3	3	2	1	1	3	1	0	1	0	0	1	1	1	2.7	9			
3-Oct	Z	1	0	0	0	0	1	1	1	2	2	4	5	5	5	5	6	7	3	2	1	1	1	1	2.4	7			
4-Oct	1	Z	1	1	1	1	1	1	3	12	16	12	18	11	7	10	10	8	8	7	4	3	2	2	6.1	18			
5-Oct	1	2	Z	2	2	3	10	4	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1.2	10			
6-Oct	0	0	0	Z	0	0	0	0	16	23	14	10	16	9	9	8	6	4	4	4	4	4	3	2	6.0	23			
7-Oct	2	1	1	1	Z	3	4	7	13	16	30	28	16	7	1	1	1	1	1	1	1	1	1	2	6.0	30			
8-Oct	1	1	0	0	0	Z	1	1	1	20	48	22	32	33	17	20	22	21	24	17	9	6	5	5	13.3	48			
9-Oct	Z	7	9	11	7	5	2	1	12	27	24	9	5	7	29	29	22	8	5	4	2	2	1	1	9.9	29			
10-Oct	0	Z	1	1	2	2	1	0	1	1	0	0	0	0	0	0	0	0	1	1	1	5	4	7	1.2	7			
11-Oct	5	8	Z	3	2	2	1	1	1	1	1	2	1	2	1	1	1	0	0	0	0	0	0	0	1.5	8			
12-Oct	0	0	0	Z	7	5	4	6	7	6	10	5	9	7	3	0	0	0	0	0	0	9	3	0	3.7	10			
13-Oct	0	0	0	1	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	0	0	0	0	0	0	0	0	0	1	3	6	5	4	3	2	2	2	1.4	6			
15-Oct	Z	1	0	2	1	1	1	1	1	3	12	5	4	5	3	4	4	3	4	7	8	7	7	5	3.8	12			
16-Oct	5	Z	3	2	2	2	2	2	5	19	18	18	17	9	8	9	7	5	4	4	5	9	3	3	7.0	19			
17-Oct	6	3	Z	10	6	4	5	8	11	14	15	14	13	12	8	5	1	16	25	19	19	16	14	13	11.1	25			
18-Oct	8	4	3	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2	7	7	1.4	8			
19-Oct	11	7	6	6	Z	11	7	4	6	9	6	4	6	4	1	2	4	8	7	5	4	2	2	8	5.8	11			
20-Oct	3	5	8	1	2	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	4	3	1.4	8			
21-Oct	Z	1	0	0	0	2	7	5	8	13	21	21	14	14	10	12	14	14	15	15	12	6	3	2	9.1	21			
22-Oct	2	Z	6	7	6	3	1	C	C	C	C	C	1	0	0	0	0	0	0	0	0	0	0	0	1.5	7			
23-Oct	0	0	Z	0	1	14	11	7	5	1	1	16	16	17	13	15	11	5	9	9	8	9	7	6	8.0	17			
24-Oct	5	5	6	Z	8	2	3	1	4	6	6	10	11	11	7	6	7	4	3	2	1	6	24	10	6.5	24			
25-Oct	9	6	5	5	Z	3	5	7	6	14	9	4	5	6	6	6	5	4	4	4	5	5	4	4	5.7	14			
26-Oct	3	3	2	1	1	Z	4	9	11	11	7	8	9	7	6	8	5	2	1	3	5	1	0	0	4.6	11			
27-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	3	2	4	2	2	0.8	4			
28-Oct	1	Z	8	6	4	1	1	4	4	7	10	7	13	11	16	19	13	12	9	16	7	2	4	10	8.1	19			
29-Oct	4	2	Z	3	3	4	5	6	7	9	12	9	5	5	6	9	12	12	11	19	45	32	20	7	10.8	45			
30-Oct	1	1	1	Z	1	0	2	5	11	11	16	17	14	15	16	10	6	6	5	4	3	5	2	6	6.8	17			
31-Oct	7	5	4	2	Z	1	1	3	2	4	10	8	6	5	16	7	4	3	2	2	2	2	6	6	4.8	16			
3.9														3.3										3.0				Diurnal Average	
22														19										10				Diurnal Maximum	
3.0														3.0										2.6					
2.9														2.9										2.9					
3.2														5.0										8.0					
9.9														8.3										8.0					
8.3														6.8										6.4					
6.4														6.4										5.5					
5.0														5.0										5.2					
5.2														5.0										5.1					
5.0														5.1										5.0					
5.1														5.0										4.3					
3.8														3.8										4.3					
3.8														3.8										3.8					

Z - zerospan C - Calibration



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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort McKay South - October 2015**





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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort McKay South - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	686	96.89	96.89
21 - 40	20	2.82	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: 708

Total Number of Hours: 744



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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort McKay South - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	79	51	14	1	2	11	22	36	83	60	66	100	38	39	42	41	685
21 - 40	4	2	0	0	0	0	4	4	3	2	0	0	0	0	0	1	20
11 - 80	0	0	0	0	1	0	0	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>	83	53	14	1	3	11	26	40	86	63	66	100	38	39	42	42	707

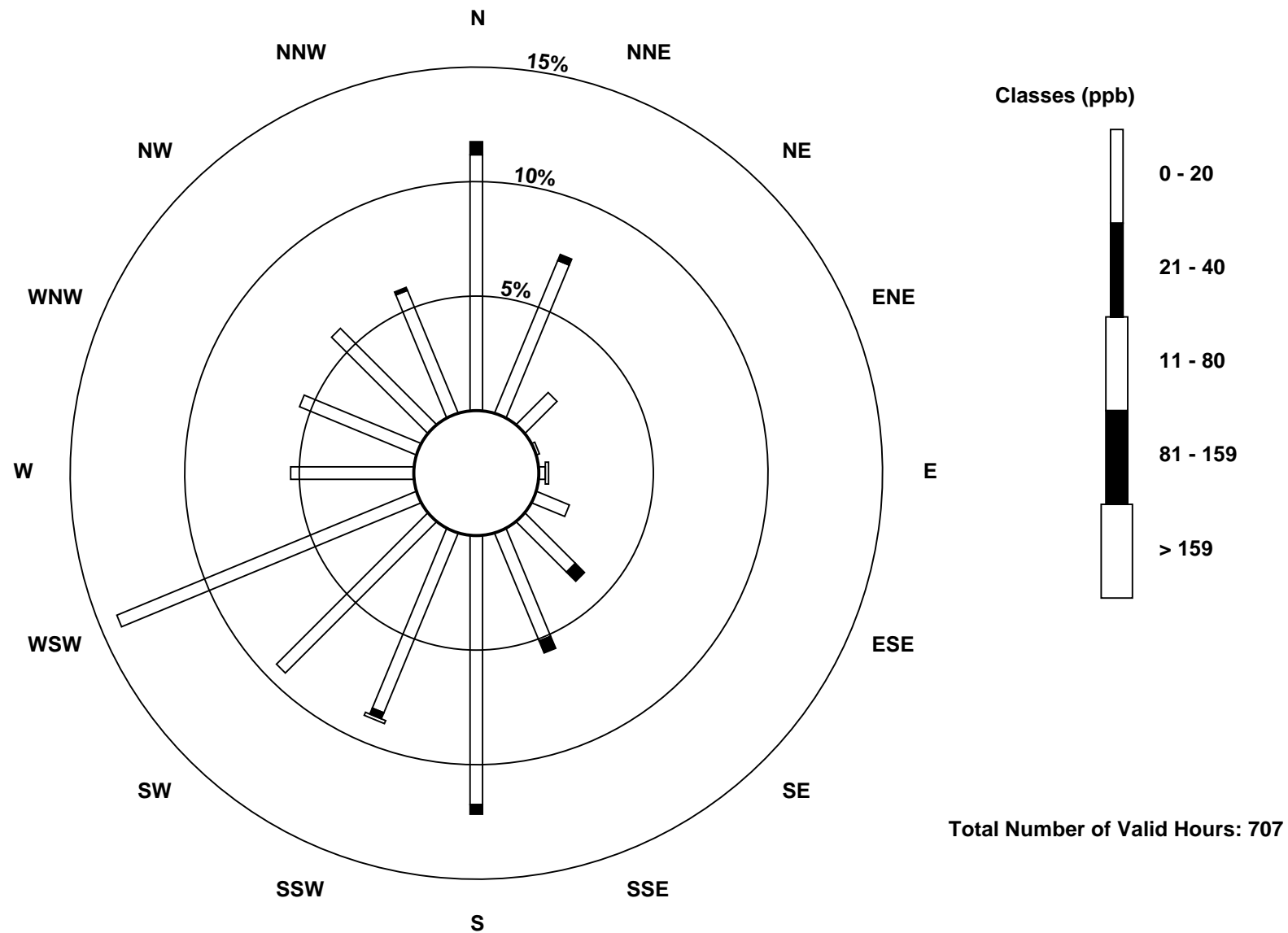
Total Number of Valid Hours: 707

Total Number of Hours: 744

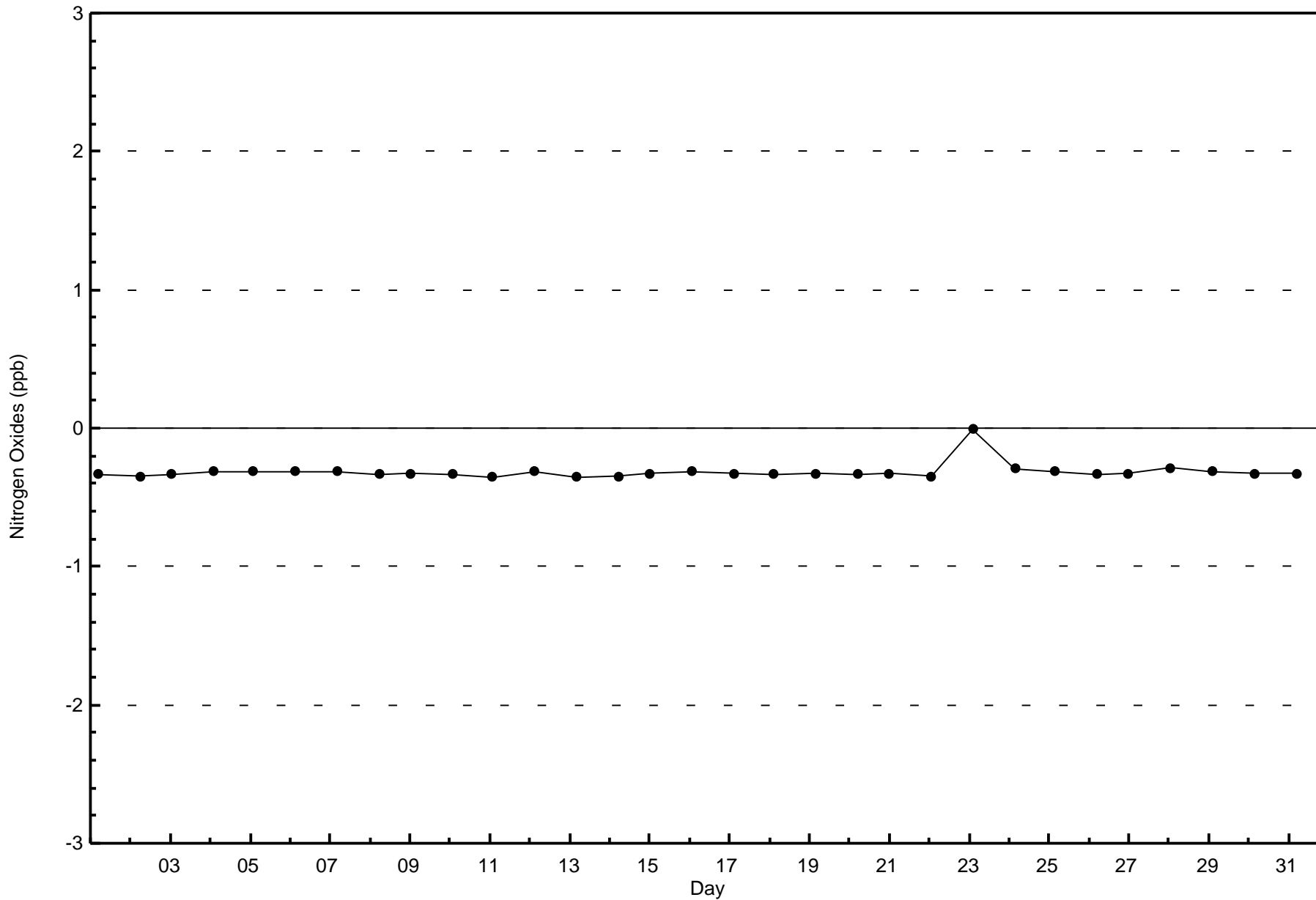


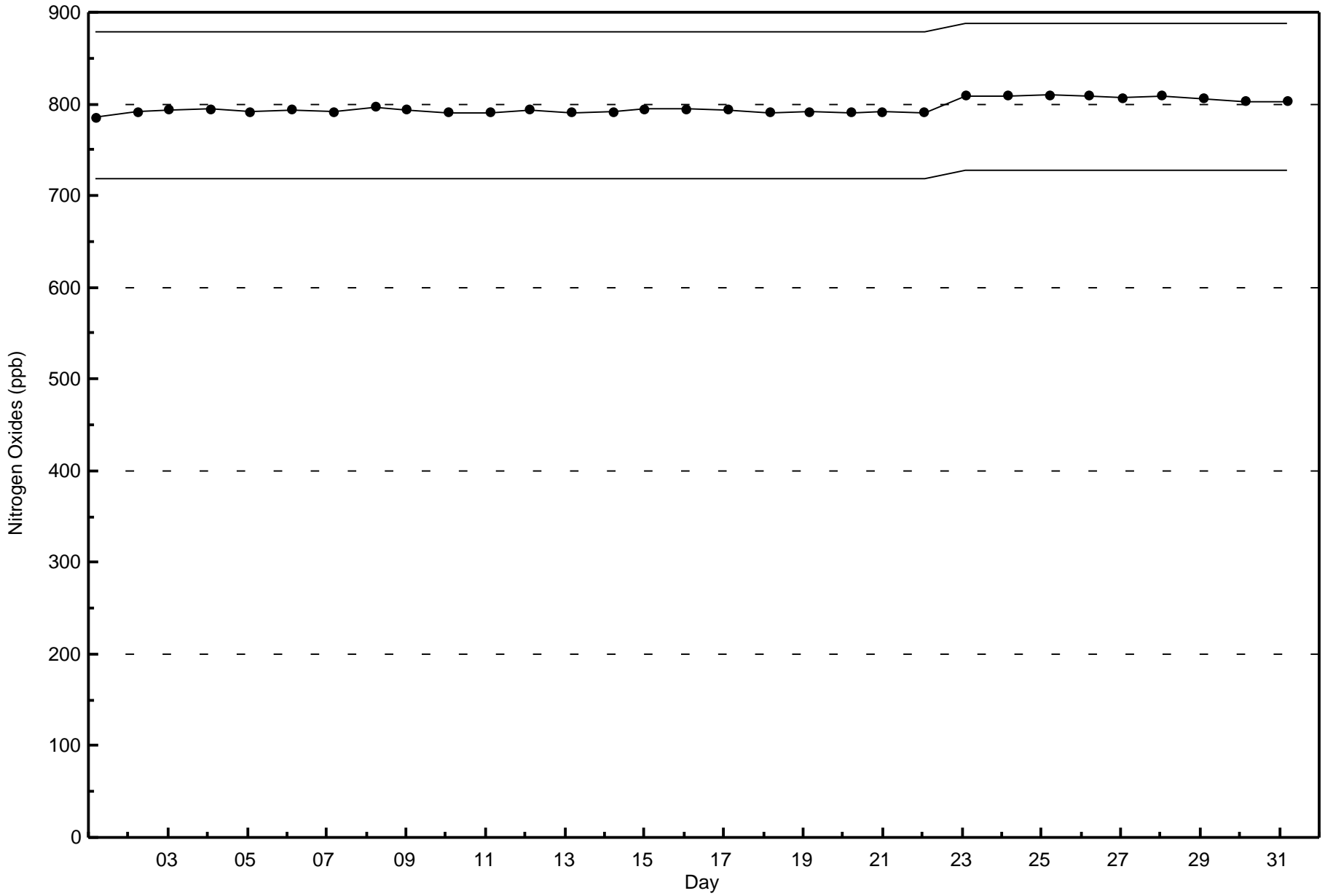
Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort McKay South (AMS 13)











Summary of Hour Averages

Fort McKay South - October 2015

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 22.5 µg/m <sup>3</sup> on Oct 17 04:00 Minimum Value: 0.1 µg/m <sup>3</sup> on Oct 27 14:00 Maximum Diurnal Average: 4.6 µg/m <sup>3</sup> at hour 4 Monthly Average: 3.99 µg/m <sup>3</sup>		Maximum Daily Average: 9.3 µg/m <sup>3</sup> on Oct 4 Minimum Daily Average: 0.3 µg/m <sup>3</sup> on Oct 27 Minimum Diurnal Average: 3.0 µg/m <sup>3</sup> at hour 14 Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.9 Q <sub>1</sub> = 1.9 Median = 3.2 Q <sub>3</sub> = 5.6 P <sub>90</sub> = 7.8 P <sub>99</sub> = 14.1		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	10.8	10.4	9.5	9.7	8.7	8.2	7.5	6.9	5.2	2.2	1.8	2.7	3.6	3.6	4.8	7.0	9.3	8.6	6.8	5.8	5.8	9.0	11.3	12.5	7.2	12.5																							
2-Oct	12.6	12.3	10.8	6.3	4.3	5.9	7.8	8.3	6.7	6.8	7.9	7.8	5.8	5.2	4.6	5.5	6.5	5.4	4.7	3.9	3.4	3.0	2.8	3.4	6.3	12.6																							
3-Oct	3.9	3.8	3.5	3.2	2.8	2.9	2.8	3.6	4.3	4.0	3.6	3.2	2.6	2.4	2.6	3.3	5.4	6.0	5.6	6.1	5.8	5.5	5.3	5.8	4.1	6.1																							
4-Oct	6.2	5.9	5.6	5.6	5.3	5.2	4.8	5.0	6.3	11.3	10.1	12.0	15.6	11.7	8.5	9.8	13.6	13.9	14.5	14.3	12.6	10.9	7.5	6.3	9.3	15.6																							
5-Oct	6.1	9.0	9.5	7.8	6.8	6.5	6.6	6.0	6.1	4.3	2.2	1.5	1.5	0.7	0.1	0.3	0.5	0.6	0.8	0.8	0.7	1.0	0.9	0.9	3.4	9.5																							
6-Oct	0.9	0.8	0.8	0.7	0.7	0.7	0.7	0.7	1.9	2.9	1.9	1.5	2.1	2.0	3.0	1.2	2.2	3.4	3.9	4.5	4.4	4.1	3.8	3.3	2.2	4.5																							
7-Oct	3.3	3.5	3.9	4.3	5.6	6.3	6.1	7.3	9.4	5.3	5.5	4.3	2.9	1.8	0.7	0.9	1.3	1.7	2.8	3.3	3.5	4.6	4.4	4.1	4.0	9.4																							
8-Oct	4.5	4.4	4.2	4.2	3.7	3.4	3.3	2.8	3.1	3.8	9.9	11.2	5.5	6.6	9.1	8.8	13.0	14.5	17.8	14.8	9.1	6.8	5.6	4.9	7.3	17.8																							
9-Oct	4.3	4.3	5.0	5.9	5.3	5.1	4.5	4.3	5.3	4.5	3.9	3.7	3.7	5.7	10.0	10.5	10.6	7.8	7.2	8.0	7.8	8.6	8.4	7.8	6.3	10.6																							
10-Oct	7.5	7.4	7.2	6.9	6.9	6.8	6.0	5.1	4.9	1.4	0.9	0.9	0.7	0.6	0.5	0.6	0.7	0.9	1.3	1.9	2.5	3.7	3.9	3.6	3.5	7.5																							
11-Oct	3.6	4.2	3.7	3.1	3.1	3.3	3.1	2.7	2.2	1.9	1.6	1.5	1.4	1.1	1.1	1.4	1.3	1.3	1.4	1.5	1.6	1.8	2.5	2.3	2.2	4.2																							
12-Oct	1.7	2.0	2.2	2.8	2.9	3.4	3.1	2.8	5.8	5.6	9.8	6.0	5.1	2.1	1.5	0.9	0.9	1.0	1.2	1.3	1.6	2.1	1.5	1.3	2.9	9.8																							
13-Oct	1.3	1.4	1.5	1.8	2.0	2.0	2.1	2.2	2.1	1.7	1.3	1.0	0.5	0.2	0.1	0.4	0.7	1.3	1.6	1.8	1.6	1.6	1.4	1.6	1.4	2.2																							
14-Oct	1.9	2.6	2.9	3.2	3.1	2.9	2.8	2.9	2.5	1.8	1.0	0.8	0.9	1.1	1.9	1.8	2.1	3.0	4.3	4.7	4.4	3.7	3.2	2.9	2.6	4.7																							
15-Oct	2.7	2.5	2.5	2.5	2.3	2.3	2.7	2.5	2.5	2.2	4.1	3.4	2.4	3.1	2.1	2.0	3.0	5.0	9.1	12.7	10.6	9.6	9.3	8.0	4.5	12.7																							
16-Oct	7.1	6.6	5.6	5.5	5.3	4.7	4.6	5.0	5.8	5.9	3.3	3.0	3.2	2.5	2.2	3.0	3.7	4.3	5.0	4.2	4.4	5.8	6.2	6.8	4.7	7.1																							
17-Oct	6.3	4.9	7.0	22.5	13.9	8.2	6.1	6.3	7.4	7.1	11.3	10.2	8.8	10.5	9.3	6.1	3.6	10.4	11.2	9.9	10.4	8.8	8.8	7.6	9.0	22.5																							
18-Oct	7.4	7.1	7.3	6.6	6.0	7.4	7.0	7.2	6.7	4.4	3.1	1.8	1.2	1.0	1.0	0.9	1.2	1.6	2.0	2.7	3.0	2.8	3.2	4.0	4.0	7.4																							
19-Oct	4.0	5.2	5.9	6.4	6.9	7.3	7.2	6.3	6.0	6.3	4.6	4.0	5.1	4.6	4.9	5.0	5.7	6.2	6.4	6.2	6.1	5.9	5.4	5.2	5.7	7.3																							
20-Oct	5.6	6.5	5.8	5.0	5.1	3.0	2.9	3.1	2.8	2.6	2.1	1.8	1.5	1.4	1.4	1.5	1.5	1.8	2.3	2.3	2.4	2.5	2.2	2.0	2.9	6.5																							
21-Oct	2.1	2.1	2.0	2.0	2.1	2.2	5.6	7.6	8.5	13.8	6.0	2.5	1.9	1.9	1.8	2.8	3.7	4.7	4.7	4.0	4.0	4.2	4.1	3.6	4.1	13.8																							
22-Oct	4.5	5.3	5.4	5.8	5.8	5.7	5.9	6.1	6.2	5.4	2.7	2.9	2.4	1.8	1.9	1.9	2.1	3.2	4.1	4.9	4.8	4.6	3.8	3.5	4.2	6.2																							
23-Oct	4.1	5.0	5.3	5.3	5.5	6.7	6.4	6.1	5.7	4.3	2.8	3.4	4.3	4.4	4.1	4.2	3.7	3.4	3.7	3.5	2.8	2.6	2.4	2.3	4.2	6.7																							
24-Oct	2.2	2.1	2.2	2.3	2.4	2.1	2.0	2.1	2.2	2.4	2.4	2.6	2.7	2.7	2.5	4.1	6.2	5.6	5.5	5.2	5.0	4.9	4.1	3.3	3.3	6.2																							
25-Oct	3.2	2.7	2.4	2.4	2.4	2.3	2.4	2.5	2.6	2.8	2.4	2.2	2.1	2.1	2.5	2.9	3.0	3.3	3.5	3.8	3.7	4.2	4.4	4.6	2.9	4.6																							
26-Oct	5.5	7.9	5.6	4.3	5.0	5.6	4.6	4.9	5.8	5.9	5.1	4.3	C	1.9	1.9	2.1	1.5	1.4	1.5	1.8	2.8	1.7	0.8	0.7	3.6	7.9																							
27-Oct	0.6	0.6	0.6	0.6	0.6	0.4	0.2	0.2	0.3	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.3	0.4	0.2	0.2	0.3	0.3	0.4	0.3	0.6																							
28-Oct	0.4	0.4	0.5	0.6	0.6	0.5	0.5	1.2	6.2	3.1	2.8	2.2	5.6	3.9	1.9	1.8	1.5	1.1	1.1	1.4	1.2	1.2	1.3	1.3	1.8	6.2																							
29-Oct	1.6	1.4	1.2	1.2	1.3	1.5	1.6	1.7	2.9	4.1	4.0	2.4	1.5	1.9	2.0	2.2	2.9	3.6	3.0	2.4	2.7	2.3	1.8	1.4	2.2	4.1																							
30-Oct	1.2	1.2	1.1	1.1	1.0	0.8	0.7	0.7	0.8	1.1	1.9	2.9	2.5	2.7	2.6	2.4	2.3	2.1	1.7	1.5	1.3	1.5	1.2	1.5	1.6	2.9																							
31-Oct	1.9	2.0	2.2	2.1	2.1	2.1	2.1	2.3	2.0	2.4	3.2	2.9	2.5	2.3	2.7	2.2	2.1	1.7	1.6	1.5	1.5	1.4	1.3	1.5	2.1	3.2																							
																								4.2	4.4	4.3	4.6	4.2	4.0	4.0	4.1	4.5	4.2	4.0	3.6	3.3	3.0	3.0	3.1	3.7	4.2	4.5	4.5	4.2	4.2	4.0	3.8	Diurnal Average	
																								12.6	12.3	10.8	22.5	13.9	8.2	7.8	8.3	9.4	13.8	11.3	12.0	15.6	11.7	10.0	10.5	13.6	14.5	17.8	14.8	12.6	10.9	11.3	12.5	Diurnal Maximum	
C - Calibration																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m <sup>3</sup>																																																	

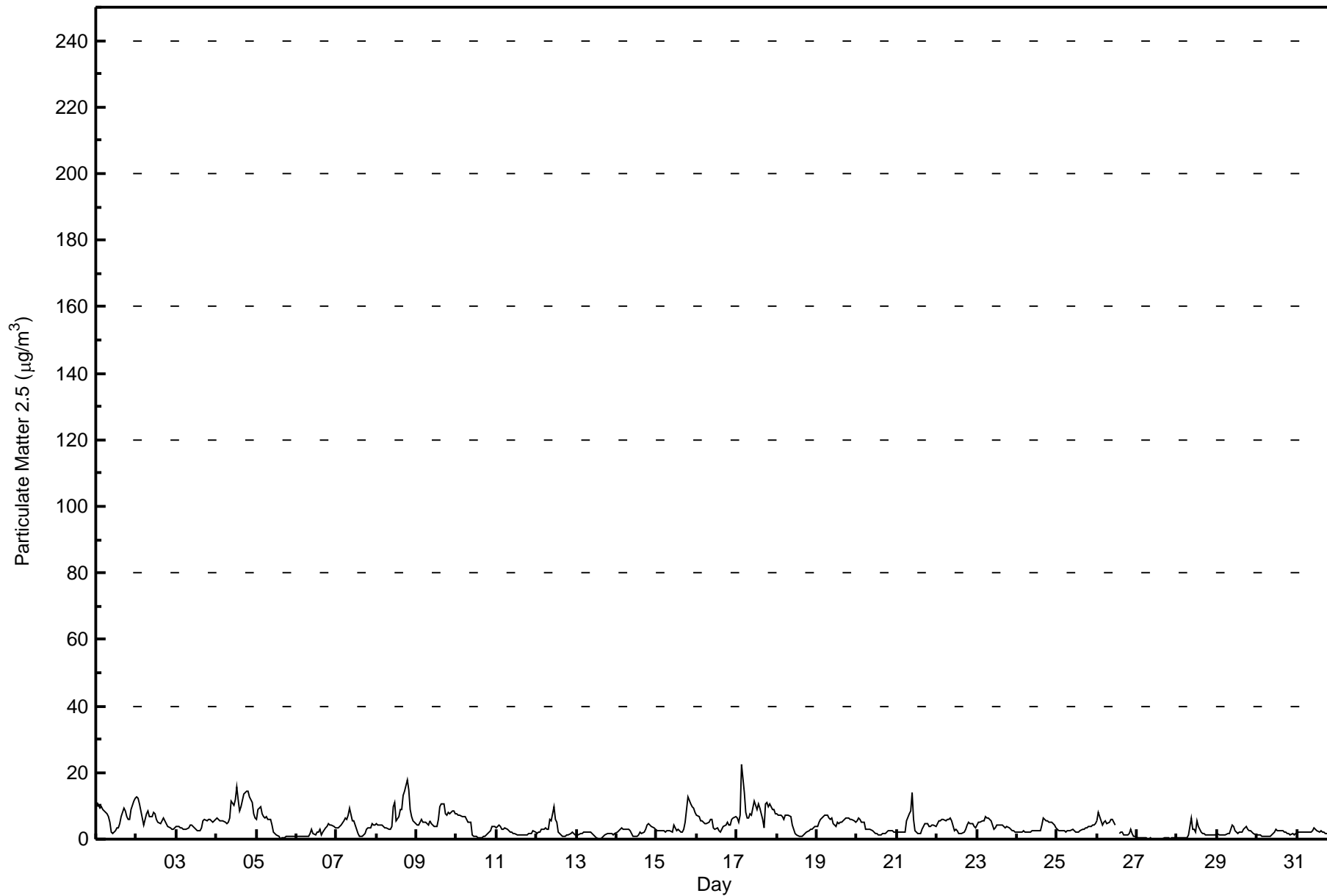


Wood Buffalo Environmental Association

Hourly Averages

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$

Fort McKay South - October 2015





**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 2015**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	472	63.53	63.53
6 - 15	190	25.57	89.10
16 - 25	3	0.40	89.50
26 - 80	0	0.00	89.50
> 81.0	0	0.00	89.50

Total Number of Valid Hours: 743

Total Number of Hours: 744



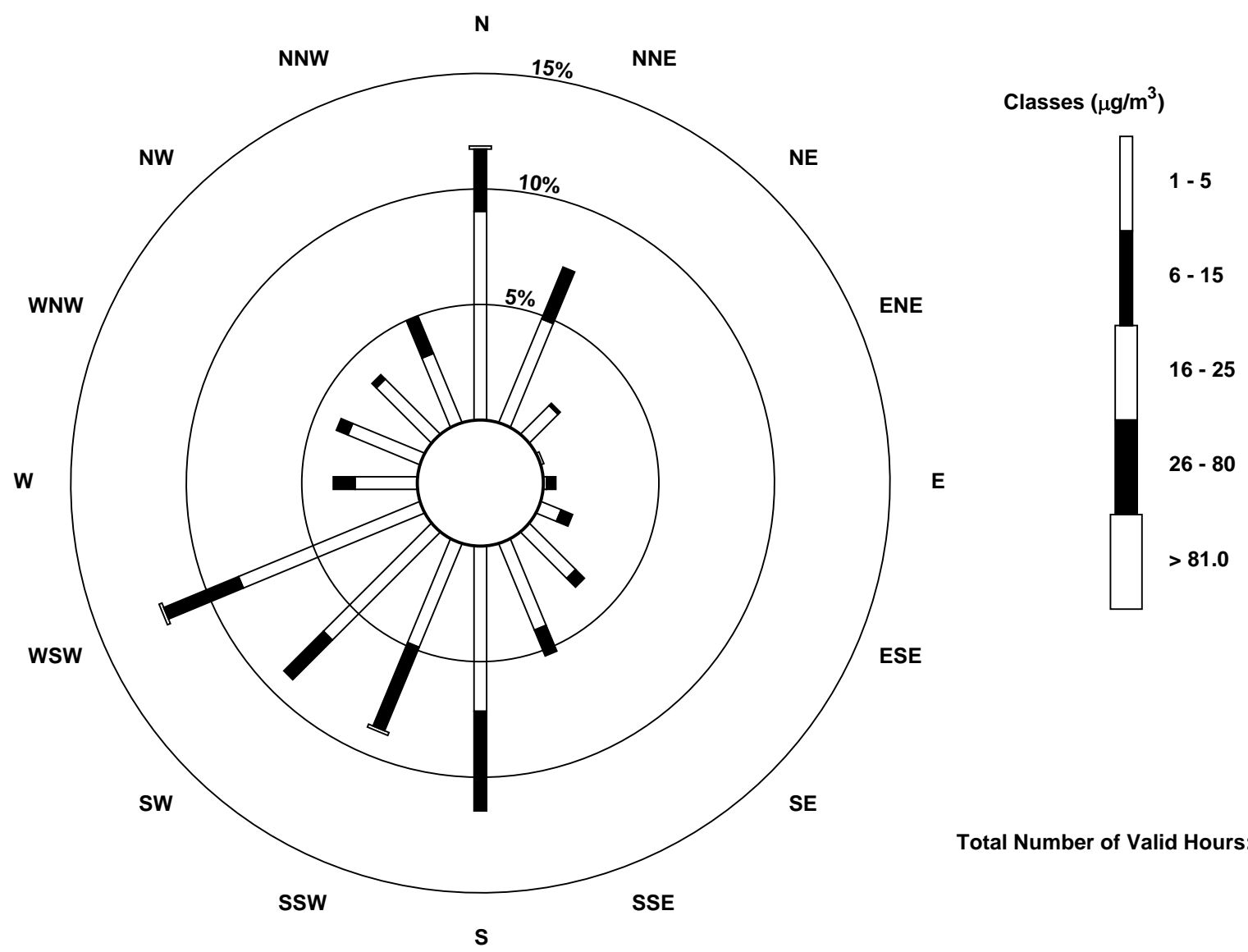
**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**Fort McKay South - October 2015**

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	67	36	13	1	1	7	21	30	53	36	49	63	20	25	25	24	471
6 - 15	20	18	1	0	3	4	4	9	32	29	18	26	7	4	2	13	190
16 - 25	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	3
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>	88	54	14	1	4	11	25	39	85	66	67	90	27	29	27	37	664

Total Number of Valid Hours: 742

Total Number of Hours: 744





**Wood Buffalo Environmental Association**

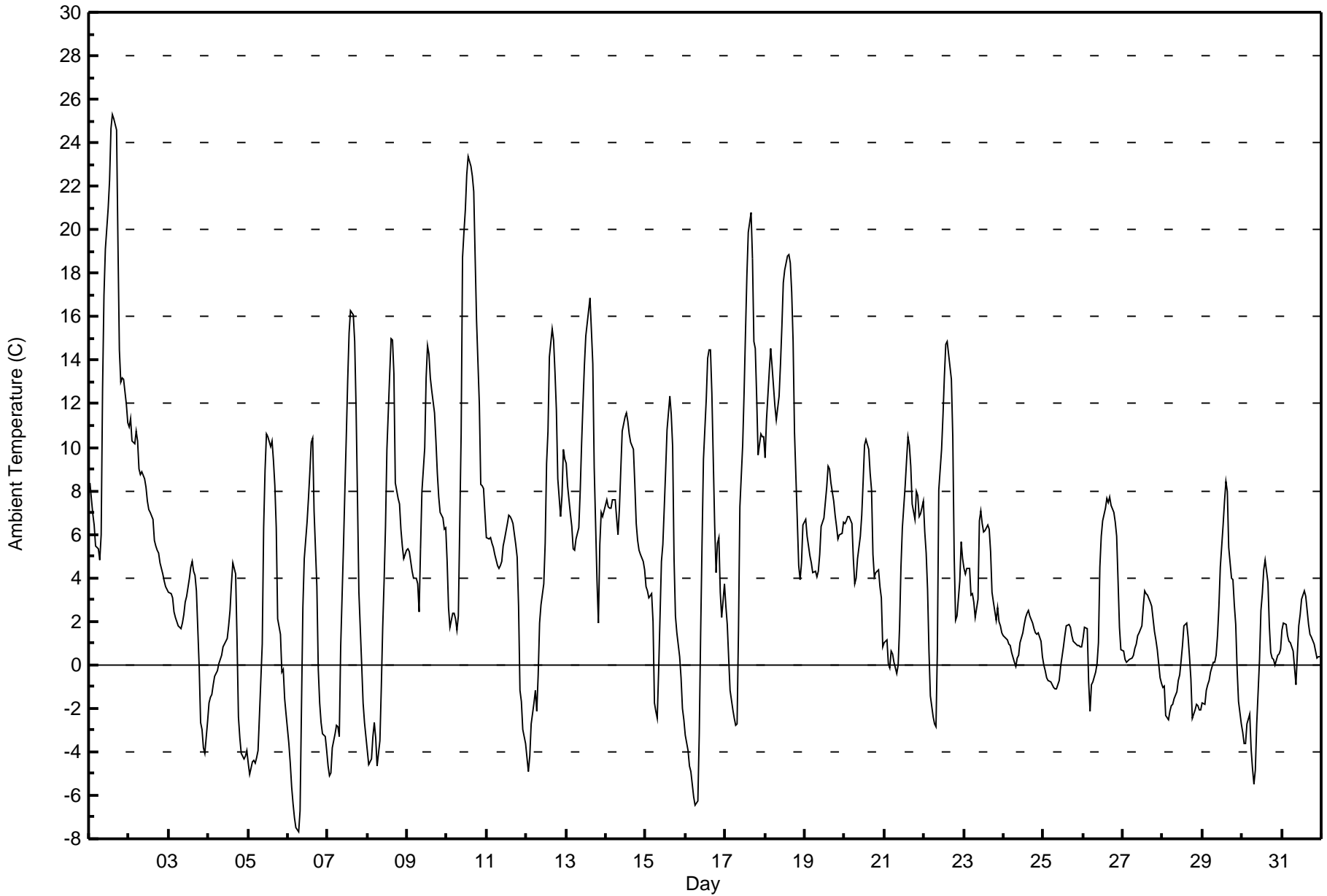
**Summary of Hour Averages**

**Ambient Temperature (AT) - C**

**Fort McKay South - October 2015**

Maximum Value: 25.3 C on Oct 1 15:00		Maximum Daily Average: 14.1 C on Oct 1		Hours in Service: 744																							
Minimum Value: -7.7 C on Oct 6 07:00		Minimum Daily Average: -1.0 C on Oct 28		Hours of Data: 744																							
Maximum Diurnal Average: 10.5 C at hour 15		Minimum Diurnal Average: 0.6 C at hour 7		Hours of Missing Data: 0																							
Monthly Average: 4.52 C		Percentiles: P <sub>1</sub> = -6.1 P <sub>10</sub> = -2.6 Q <sub>1</sub> = 0.4 Median = 3.9 Q <sub>3</sub> = 7.6 P <sub>90</sub> = 12.7 P <sub>99</sub> = 22.2		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	8.4	7.6	7.0	6.4	5.5	5.3	4.8	6.0	12.7	17.0	19.1	21.0	22.3	24.7	25.3	25.1	24.6	19.3	14.5	13.0	13.2	13.2	12.0	11.2	14.1	25.3	
2-Oct	10.9	11.3	10.3	10.1	10.7	10.3	9.0	8.7	8.8	8.5	8.1	7.5	7.2	7.0	6.7	5.7	5.5	5.3	5.1	4.7	4.2	3.9	3.6	3.4	7.4	11.3	
3-Oct	3.3	3.3	3.1	2.4	2.2	2.0	1.8	1.7	1.9	2.3	2.9	3.1	4.0	4.5	4.8	4.3	4.1	3.4	-0.1	-2.6	-3.0	-3.8	-4.1	-2.6	1.6	4.8	
4-Oct	-1.8	-1.5	-1.4	-0.9	-0.5	-0.3	0.0	0.3	0.5	0.8	1.1	1.2	1.8	2.5	3.7	4.7	4.2	1.2	-2.4	-3.4	-4.1	-4.3	-4.2	-4.0	-0.3	4.7	
5-Oct	-4.5	-5.1	-4.4	-4.4	-4.5	-4.3	-3.9	-2.3	1.0	6.3	8.9	10.6	10.5	10.0	10.3	9.4	8.3	6.3	2.1	1.4	-0.3	-0.2	-1.6	-2.3	2.0	10.6	
6-Oct	-3.6	-4.5	-5.6	-6.4	-7.0	-7.5	-7.7	-6.7	-2.0	2.6	4.9	6.6	7.7	8.9	10.2	10.4	7.1	3.6	-0.2	-1.8	-2.6	-3.2	-3.3	-3.9	-0.2	10.4	
7-Oct	-4.6	-5.1	-4.9	-3.8	-3.2	-2.8	-2.9	-3.3	0.9	5.4	8.0	10.5	13.0	15.3	16.3	16.1	14.9	11.7	7.7	3.3	0.0	-1.8	-2.6	-3.3	3.5	16.3	
8-Oct	-4.0	-4.6	-4.3	-3.3	-2.7	-3.4	-4.6	-3.5	-1.0	1.7	3.9	6.4	9.9	13.4	15.0	14.9	13.4	8.4	7.6	7.4	6.2	5.4	4.9	5.3	3.8	15.0	
9-Oct	5.3	5.2	4.7	4.3	4.0	4.0	3.7	2.4	5.3	8.0	10.0	13.2	14.7	14.3	13.2	12.6	11.6	10.3	8.8	7.7	7.0	6.7	6.2	6.3	7.9	14.7	
10-Oct	4.7	2.6	1.7	2.4	2.4	2.1	1.6	2.3	10.6	18.7	19.9	20.9	22.6	23.4	22.9	22.4	21.8	18.7	15.8	11.9	8.3	8.2	8.1	7.0	11.7	23.4	
11-Oct	5.9	5.8	5.8	5.6	5.4	5.1	4.6	4.4	4.6	4.8	5.4	5.8	6.5	6.9	6.8	6.7	6.5	5.5	5.0	2.7	-1.2	-1.7	-3.0	-3.6	4.2	6.9	
12-Oct	-4.3	-4.9	-4.2	-2.7	-1.8	-1.2	-2.1	-0.5	1.9	2.8	3.8	5.6	9.3	10.7	14.2	15.5	15.0	13.4	11.7	8.5	6.8	7.8	9.9	9.5	5.2	15.5	
13-Oct	9.2	8.2	6.9	6.4	5.3	5.2	5.8	6.3	8.0	10.1	12.0	13.8	15.1	16.3	16.9	15.4	13.8	9.1	3.8	1.9	5.5	7.0	6.8	7.1	9.0	16.9	
14-Oct	7.6	7.3	7.2	7.2	7.6	7.6	6.8	5.9	7.2	9.0	10.7	11.4	11.6	11.2	10.6	10.3	9.9	8.3	6.5	5.7	5.3	5.0	4.8	4.4	7.9	11.6	
15-Oct	3.6	3.4	3.1	3.3	2.0	-1.8	-2.1	-2.4	-0.3	4.8	5.5	7.2	9.0	10.8	12.3	11.5	10.1	4.9	2.2	1.5	0.4	-0.6	-2.0	-2.5	3.5	12.3	
16-Oct	-3.3	-3.9	-4.6	-4.9	-5.5	-6.1	-6.5	-6.3	-3.2	1.5	5.6	9.5	12.2	14.1	14.5	14.5	12.5	6.4	4.3	5.6	5.8	3.3	2.1	3.7	3.0	14.5	
17-Oct	2.7	1.8	0.3	-1.2	-2.0	-2.5	-2.8	-2.7	1.5	7.3	10.1	12.5	15.3	17.9	19.9	20.8	18.6	14.9	14.6	12.3	9.6	10.6	10.5	10.5	8.4	20.8	
18-Oct	9.5	11.3	13.5	14.6	13.7	12.8	11.9	11.3	12.4	13.8	15.6	17.6	18.2	18.8	18.8	18.5	17.1	14.8	10.6	6.6	4.6	3.9	4.7	6.5	12.5	18.8	
19-Oct	6.7	5.9	5.4	5.0	4.7	4.3	4.3	4.1	4.3	5.1	6.3	6.8	7.5	8.2	9.1	9.0	8.3	7.5	6.9	6.3	5.8	5.9	6.0	6.6	6.3	9.1	
20-Oct	6.5	6.6	6.8	6.8	6.5	4.9	3.8	4.0	4.9	5.9	6.9	8.4	10.1	10.4	9.9	8.8	8.0	5.1	4.1	4.2	4.4	3.6	3.1	0.8	6.0	10.4	
21-Oct	1.0	1.1	0.0	-0.2	0.7	0.5	0.1	-0.4	0.0	1.7	4.5	6.3	8.2	9.4	10.5	10.1	9.1	7.4	6.7	8.0	7.8	6.8	7.0	7.5	4.7	10.5	
22-Oct	6.1	5.1	3.4	0.6	-1.4	-2.4	-2.7	-2.8	0.7	8.1	9.9	11.4	13.3	14.7	14.9	14.3	13.1	10.5	5.0	2.0	2.2	3.8	5.7	4.9	5.9	14.9	
23-Oct	4.4	4.2	4.4	4.4	3.2	3.2	2.9	2.2	3.0	6.6	7.1	6.5	6.1	6.2	6.4	6.2	5.2	3.3	2.9	2.1	2.6	2.0	1.8	1.5	4.1	7.1	
24-Oct	1.4	1.2	1.1	0.9	0.9	0.6	0.1	-0.1	0.3	0.4	1.0	1.5	1.8	2.2	2.4	2.5	2.3	1.9	1.6	1.5	1.4	1.5	1.1	0.4	1.2	2.5	
25-Oct	0.0	-0.3	-0.6	-0.7	-0.8	-0.9	-1.1	-1.1	-1.1	-0.7	0.0	0.4	0.9	1.4	1.8	1.9	1.7	1.3	1.1	1.0	0.9	0.9	0.8	0.9	0.3	1.9	
26-Oct	1.2	1.7	1.7	-0.8	-2.2	-0.9	-0.8	-0.3	0.1	1.0	4.5	5.9	6.6	7.2	7.7	7.4	7.7	7.4	7.0	6.6	5.9	3.9	1.7	0.7	3.4	7.7	
27-Oct	0.6	0.2	0.1	0.2	0.2	0.3	0.5	0.8	1.0	1.4	1.5	1.8	2.7	3.4	3.2	3.2	2.9	2.7	2.1	1.5	1.1	0.7	-0.6	-0.9	1.3	3.4	
28-Oct	-1.1	-1.0	-2.3	-2.6	-2.1	-1.9	-1.8	-1.5	-1.2	-0.7	-0.5	0.2	0.9	1.8	1.9	1.3	0.4	-0.7	-2.4	-2.1	-1.8	-1.9	-2.0	-2.1	-1.0	1.9	
29-Oct	-1.7	-1.8	-1.2	-0.9	-0.7	-0.3	0.1	0.1	0.4	1.3	2.7	4.5	6.5	7.5	8.4	8.0	5.4	4.0	3.9	2.7	1.9	-0.2	-1.7	-2.7	1.9	8.4	
30-Oct	-3.1	-3.6	-3.6	-2.7	-2.3	-3.9	-4.8	-5.5	-4.8	-2.7	0.2	2.5	3.3	4.3	4.8	3.8	1.8	0.6	0.3	0.3	0.0	0.5	0.5	0.7	-0.6	4.8	
31-Oct	1.6	1.9	1.8	1.3	1.1	1.0	0.8	0.7	-0.9	0.5	1.8	2.3	3.0	3.4	3.1	2.5	1.8	1.4	1.3	1.0	0.6	0.3	0.4	0.4	1.4	3.4	
		2.2	1.9	1.7	1.5	1.3	0.9	0.6	0.7	2.5	4.9	6.5	7.8	9.1	10.0	10.5	10.3	9.2	7.0	5.1	3.9	3.2	2.8	2.5	2.3	Diurnal Average	
		10.9	11.3	13.5	14.6	13.7	12.8	11.9	11.3	12.7	18.7	19.9	21.0	22.6	24.7	25.3	25.1	24.6	19.3	15.8	13.0	13.2	13.2	12.0	11.2	Diurnal Maximum	







**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C  
Fort McKay South - October 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	162	21.77	21.77
0 - 10	453	60.89	82.66
10 - 20	116	15.59	98.25
> 20	13	1.75	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %**

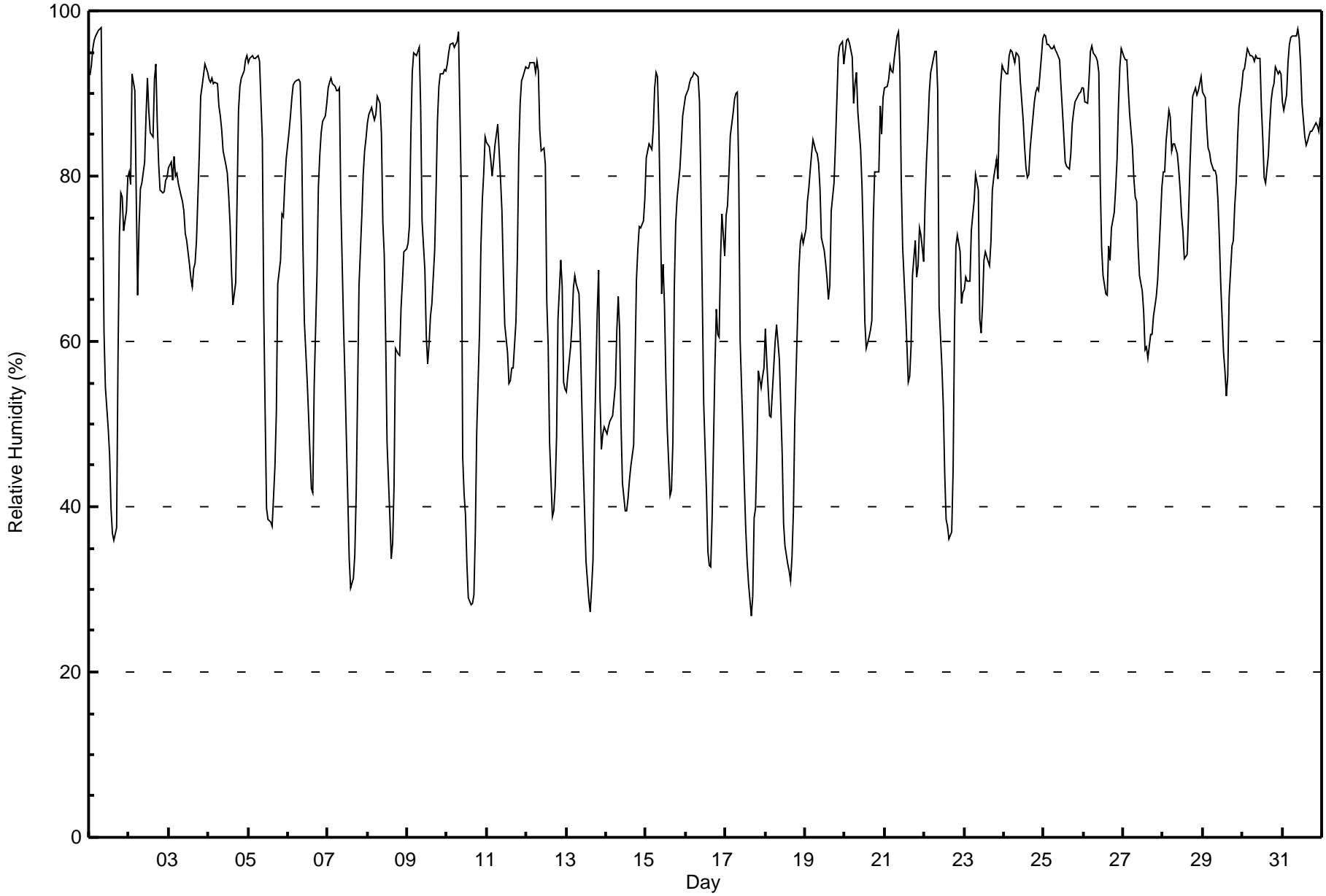
**Fort McKay South - October 2015**

Maximum Value: 98 % on Oct 1 08:00      Maximum Daily Average: 90.8 % on Oct 30																		Hours in Service: 744 Hours of Data: 744																																																							
Minimum Value: 27 % on Oct 17 16:00      Minimum Daily Average: 51.1 % on Oct 13 Maximum Diurnal Average: 87.3 % at hour 8      Minimum Diurnal Average: 53.7 % at hour 15 Monthly Average: 74.6 %      Percentiles: P <sub>1</sub> = 29 P <sub>10</sub> = 46 Q <sub>1</sub> = 63 Median = 80 Q <sub>3</sub> = 90 P <sub>90</sub> = 94 P <sub>99</sub> = 97																		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	92	93	95	96	97	98	98	98	80	61	54	49	46	40	37	36	37	58	73	78	78	73	76	80	71.8	98																																															
2-Oct	81	79	92	90	78	66	74	78	79	82	87	92	88	85	85	92	93	86	81	78	78	78	79	80	82.6	93																																															
3-Oct	81	82	79	82	80	80	79	78	77	76	73	72	69	68	67	69	70	72	83	90	91	92	94	93	79.0	94																																															
4-Oct	92	91	92	91	91	91	89	87	86	83	81	80	78	74	69	64	67	77	88	91	92	93	94	95	84.8	95																																															
5-Oct	94	94	95	94	94	94	95	94	84	64	51	40	38	38	38	41	45	51	67	70	75	75	79	82	70.6	95																																															
6-Oct	85	87	89	91	91	91	92	91	85	71	62	55	51	46	42	42	55	68	79	83	85	87	87	89	75.2	92																																															
7-Oct	91	91	92	91	91	90	90	91	77	62	55	48	41	34	30	31	34	42	54	67	75	80	83	85	67.7	92																																															
8-Oct	86	87	88	87	87	87	90	89	85	74	70	61	48	39	34	36	43	59	58	58	64	67	71	71	68.4	90																																															
9-Oct	72	74	85	93	95	95	95	96	88	75	69	61	57	60	63	65	71	78	87	91	92	92	93	93	80.7	96																																															
10-Oct	94	95	96	96	96	96	96	97	78	46	41	39	33	29	28	28	29	37	49	61	72	77	80	85	65.8	97																																															
11-Oct	84	84	82	80	82	84	86	83	80	76	68	62	59	55	55	57	57	62	70	83	89	91	92	93	75.6	93																																															
12-Oct	93	93	94	94	94	93	94	93	86	83	83	81	65	60	48	39	39	42	49	63	70	67	55	54	72.1	94																																															
13-Oct	54	56	59	62	66	68	67	66	60	53	45	39	33	29	27	30	34	48	63	69	53	47	49	50	51.1	69																																															
14-Oct	49	50	50	51	51	55	61	65	61	50	43	40	39	41	43	45	48	57	67	71	74	74	75	77	55.7	77																																															
15-Oct	82	83	84	83	86	91	93	92	86	66	69	64	56	49	41	42	48	66	74	77	81	84	87	89	73.9	93																																															
16-Oct	90	91	91	92	92	93	92	92	89	79	66	53	42	35	33	33	39	57	64	61	61	70	75	70	69.0	93																																															
17-Oct	75	76	80	85	88	89	90	90	80	60	49	43	37	33	31	27	29	39	40	47	56	54	56	57	58.8	90																																															
18-Oct	61	58	51	51	54	57	60	62	58	52	46	38	35	33	32	31	34	39	50	63	69	72	73	72	52.2	73																																															
19-Oct	74	77	79	81	83	84	83	83	82	78	73	71	69	68	65	67	76	79	84	89	94	96	96	94	80.1	96																																															
20-Oct	95	96	97	96	94	89	91	92	88	83	79	72	62	59	60	61	62	74	81	81	81	88	85	89	81.6	97																																															
21-Oct	91	91	92	93	93	92	94	97	98	93	79	71	64	60	55	56	59	68	72	68	69	74	73	70	78.0	98																																															
22-Oct	77	82	86	90	93	94	95	95	90	64	57	52	44	38	38	36	37	44	62	71	73	71	65	66	67.5	95																																															
23-Oct	66	68	67	67	73	75	77	80	78	63	61	64	70	71	70	69	72	78	80	82	80	87	91	93	74.4	93																																															
24-Oct	93	92	92	94	95	95	94	95	95	94	91	87	83	81	80	80	83	87	89	90	91	90	94	97	90.2	97																																															
25-Oct	97	97	96	96	95	95	96	95	95	94	91	88	85	82	81	81	83	86	88	89	90	90	90	91	90.4	97																																															
26-Oct	91	89	89	92	95	96	95	94	94	92	79	71	68	66	66	72	70	74	76	79	82	88	93	95	83.6	96																																															
27-Oct	94	94	94	91	87	83	80	77	77	72	68	66	64	59	59	58	61	61	63	64	65	68	75	79	73.3	94																																															
28-Oct	81	81	84	88	87	83	84	84	83	81	78	75	73	70	71	75	81	86	90	91	90	90	91	92	82.8	92																																															
29-Oct	90	89	86	83	83	82	81	81	80	77	73	67	59	56	53	56	65	72	72	76	79	84	88	91	76.0	91																																															
30-Oct	93	93	94	95	95	95	94	94	95	94	94	89	85	80	79	82	86	89	91	91	93	92	93	92	90.8	95																																															
31-Oct	89	88	90	94	96	97	97	97	97	98	97	94	89	85	84	84	85	85	85	86	86	86	85	87	90.0	98																																															
83.4																		83.9		85.2		86.2		86.5		86.4		87.1		87.3		82.9		74.1		68.9		64.0		59.0		55.5		53.7		54.3		57.8		65.3		71.9		76.0		78.3		80.0		81.2		82.2		Diurnal Average									
97																		97		97		96		97		98		98		98		98		98		98		98		98		98		97		94		89		85		85		92		93		89		91		91		94		96		96		97		Diurnal Maximum	



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

**Relative Humidity (RH) - %**  
**Fort McKay South - October 2015**





Maximum Speed: 20 km/h on Oct 10 13:00	Maximum Daily Speed Average: 9.1 km/h on Oct 2	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 9 23:00	Minimum Daily Speed Average: 1.3 km/h on Oct 8	Hours of Data: 743
Maximum Diurnal Speed Average: 2.3 km/h at hour 16	Minimum Diurnal Speed Average: 0.9 km/h at hour 24	Hours of Missing Data: 1
Monthly Average Velocity: 1.5 km/h 269.5 deg	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 5 Q <sub>3</sub> = 7 P <sub>90</sub> = 10 P <sub>99</sub> = 14	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	S3	S2	SSW2	SSW2	SSW3	SSW3	SW2	SSW3	S5	S6	S6	SSE7	SE7	SSE7	SE6	ESE6	ESE4	SW2	WSW2	WSW2	NW2	NNW5	NNW4	WNW1	S2.3	SSE7
2-Oct	WSW2	ESE1	N3	NNE4	NNE7	NNE11	NNE10	NNE8	N13	N13	N13	N13	NNE14	N13	N15	N10	NNW8	NNW9	N9	N9	N10	N12	N10	N11	N9.1	N15
3-Oct	N9	N11	N9	N11	N13	N11	N11	NNE12	N11	NNE10	NE10	NNE9	NE8	NNE9	NE7	NNE7	NNE6	WSW1	WSW2	WSW2	WSW2	SW2	SW1	N6.8	N13	
4-Oct	WNW1	SW1	WSW1	W1	SW1	WSW2	WSW3	WSW3	WSW3	SW4	SW5	SSW6	SSW5	SSW6	SSW6	SSW5	S4	S3	WSW2	WSW2	SSW2	SSW3	S4	S3	SW3.0	SSW6
5-Oct	SW2	SW2	SSW3	SW2	SW2	SSW3	SW1	S2	SSW2	W2	W6	WNW11	NW12	NW12	NW13	NNW12	NW7	WNW5	WNW3	W4	W5	W5	W5	W1	WNW4.0	NW13
6-Oct	SW2	S1	SW1	SSW1	SSW2	SW3	SW2	WSW1	S2	SE3	ESE6	ESE7	ESE5	SE4	SE6	SE5	NNE0	WSW2	WSW3	W2	WSW3	WSW2	W2	WSW2	S1.6	ESE7
7-Oct	WSW2	WSW2	WSW1	WNW1	WSW1	S2	SSW1	SSW1	S1	S2	SSE4	SSW4	S4	SSW6	SW6	W9	NW6	NW5	NW5	NW4	W2	WSW1	SW2	WSW3	WSW2.0	W9
8-Oct	WSW2	SW1	SW2	WNW1	SW1	SW2	SW2	SSW1	AF	SSE2	E3	SE3	SE4	SE3	E5	NNE6	N5	NNW5	N6	N7	N7	NNW5	N4	NNW3	N1.3	NNW7
9-Oct	N4	N3	N3	NNW2	NW2	NNW2	WSW1	WSW2	S3	S6	SSW6	S2	ESE2	NE6	NNE7	NNE7	N7	N6	N5	N2	NW2	NW0	SE0	S1	N1.4	NNE7
10-Oct	WSW1	SW2	SSW2	SSW1	SSW1	W2	WSW3	SW4	SSW8	SW13	WSW12	WSW16	WSW20	WSW17	W14	WSW15	WSW11	W4	NW6	WNW2	WNW2	NNE5	NNE8	N7	WSW5.4	WSW20
11-Oct	N8	NNE10	N10	N10	N10	N10	N9	N9	N11	N9	NNW9	NNW11	NNW10	NNW13	NW10	NNW10	NNW8	WNW6	WNW5	W3	WSW3	W3	SW3	S3	NNW6.8	NNW13
12-Oct	SSW1	WSW2	SW1	SSW1	S2	SSE4	S3	S6	S5	S5	S6	S9	S9	SE8	SSW9	WSW12	WSW8	WSW6	SW5	SSW3	SW3	SSW6	SSW7	SW8	SSW4.5	WSW12
13-Oct	SW8	SW9	SW10	SW10	SW7	SW8	SW9	SW8	WSW9	WSW10	WSW12	WSW11	WSW11	WSW11	WSW12	WSW12	WSW9	SW3	SW3	SSW5	SSW7	SW8	SW8	SW8	WSW8.4	WSW12
14-Oct	WSW9	WSW8	WSW7	SW9	WSW10	WSW7	WSW6	WSW6	SW8	WSW12	W12	WNW13	WNW12	NW12	NW10	NW9	NNW9	NNE9	NNE6	NNE6	NNE4	N6	N5	NNW2	WNW5.4	WNW13
15-Oct	W2	W2	SW0	E2	SE0	WSW2	WSW3	SW2	SW2	SSE3	SSW7	SSW6	S4	S5	SSW6	SE4	ESE3	NNE2	N3	NNW3	N3	WNW1	W2	WSW2	SSW1.3	SSW7
16-Oct	WSW2	WSW2	WSW2	WSW2	W1	WSW2	WSW2	WSW1	N1	NNE4	SE2	ESE5	SSE7	SE8	SSE8	SSE7	SE5	SE3	SSE3	SSE5	SSE5	S4	S4	S3	SSE2.6	SSE8
17-Oct	S4	S5	S3	WSW3	SW3	SW1	WSW2	SW2	S4	SSE4	SSE8	SSE8	S8	SSE7	S7	SSW8	SSW9	S7	S7	S5	S5	S5	S5	S5	S4.9	SSW9
18-Oct	SSE2	SSW6	SW7	WSW10	WSW10	WSW11	W11	W12	W12	WSW11	WSW10	W12	WNW13	WNW13	W10	WNW10	W7	WNW6	WNW4	W4	W2	NW2	NNW3	N6	W7.1	WNW13
19-Oct	N6	N5	N7	N8	N6	N5	NNE7	NNE7	NNE6	NNE6	NE5	N7	N5	NE3	NNE3	NNE4	NNE3	N4	N5	NNW2	NNW2	N1	S2	S4	NNE4.1	N8
20-Oct	SSW5	S4	SSW5	SW5	WSW7	W9	WSW3	SSW5	SW7	WSW8	WSW8	WSW8	W10	WNW12	WNW12	WNW12	WNW7	NW3	W2	NW5	NNW6	NNE7	NE4	WSW1	W4.5	WNW12
21-Oct	SSW2	SSW2	SSW2	SSW2	SW1	SW3	WSW2	WSW2	WSW2	S3	SSE4	SSE6	SE6	SE5	SE6	SE6	SSE5	SSE1	SSE4	SSE5	SSE5	S3	S4	S5	SSE3.0	SSE6
22-Oct	SSW3	SW2	WSW2	SSW2	SW2	WSW3	W2	SSW3	SW5	WSW10	WSW12	WSW10	SW13	WSW13	WSW14	WSW13	WSW11	SW6	SW4	SW4	SSW4	SW4	WSW6	WSW5	WSW6.2	WSW14
23-Oct	W6	WNW1	WSW8	SW4	SSE3	SSW5	SSW4	SSW4	ESE1	WNW4	N6	N7	N7	N6	NNE5	N7	NNE5	NW2	N4	N5	N5	N4	N5	N5	NNW2.4	WSW8
24-Oct	N4	N6	N4	N4	NNE4	NNE4	NNE3	NNW1	NNW2	N1	N3	N4	N4	NNE2	N2	WNW2	WNW2	NNW1	SSW0	WSW0	W1	NNW3	N5	NNE5	N2.6	N6
25-Oct	NNE5	NNE5	N5	N4	N4	N5	NNW4	NNW4	N5	N4	NNE4	N3	N2	NNE2	WNW2	NW1	NW1	NW1	NW0	WNW1	NW1	NW1	NW1	SW1	N2.5	NNE5
26-Oct	S5	S7	S3	WSW1	SSW2	E1	N1	N3	N3	NNE2	SE6	SSE7	SE8	SE7	SE5	SSE6	S10	S10	S11	S9	WSW6	WNW7	W6	WSW5	S3.5	S11
27-Oct	W5	NW5	W4	WNW5	WNW6	WNW8	WNW8	WNW8	WNW7	NW10	NW11	NW9	NW10	NW14	NW12	NW11	NW8	NNW10	NNW10	NNW9	NNW5	N3	W1	W1	NW7.1	NW14
28-Oct	NW2	NNE3	NW2	WSW1	WSW2	SW2	SSE1	S1	SSE3	S5	SSW6	SSW7	SSE6	SE7	SE7	SSE7	SSE5	SSE4	SSE3	S5	S5	S7	S6	S7	S3.5	S7
29-Oct	S7	S7	S10	S10	S8	SSE8	SSE8	S8	S8	S8	SSE6	S6	S9	S10	S10	S7	S5	S5	S6	SSW6	SSW6	SSE2	SSW2	WNW1	S6.5	S10
30-Oct	S2	SW3	S3	SW4	SSW3	S3	S1	WSW2	SSW2	SSW1	NW1	SSE2	S1	S0	W0	SW2	SW2	SSW2	WSW1	SSW3	WSW2	WNW2	NNW2	NW3	SW1.4	SW4
31-Oct	NNW4	NNW3	NNW3	W2	WSW1	WNW0	NNW1	N2	SW2	SW1	ESE1	ENE3	NE3	NNE4	NE6	NE6	NE5	NE4	NE5	NE5	NNE7	NNE6	NNE5	NNE5	NNE2.7	NNE7

W1.3	W1.1	WSW1.5	W1.6	W1.6	W1.7	W1.6	W1.5	WSW1.4	WSW1.9	WSW2.0	WSW2.0	WSW1.7	W1.6	W1.9	WNW2.3	WNW1.9	NW1.4	WNW1.3	W1.1	W1.3	WNW1.2	WNW1.0	W0.9	Diurnal Average
WSW9	N11	N10	N11	N13	N11	N11	W12	N13	NNE13	N13	WSW16	WSW20	WSW17	N15	WSW15	WSW11	S10	S11	S9	N10	N12	N10	N11	Diurnal Maximum

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



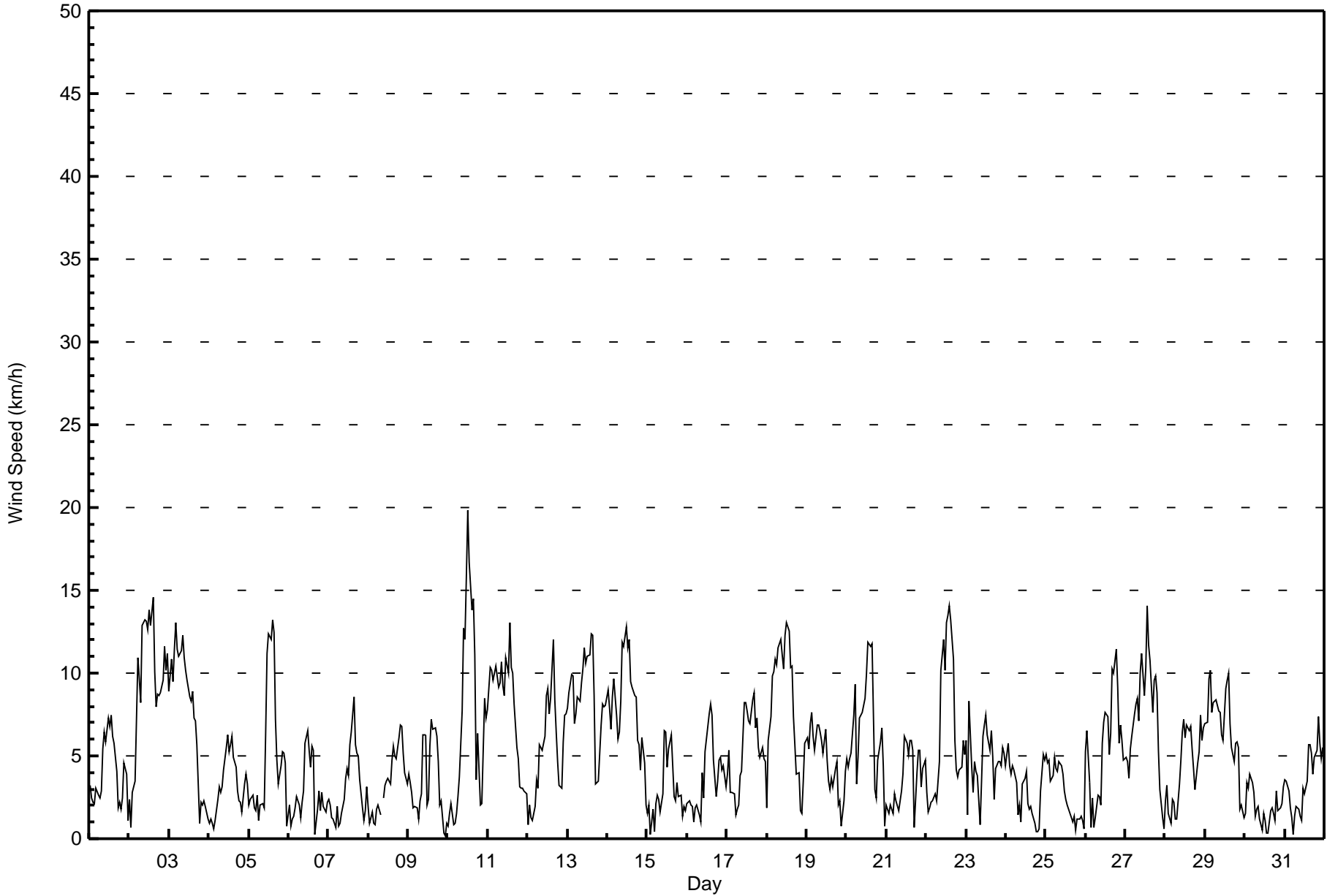
**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Speed (WS) - km/h**  
**Fort McKay South - October 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Oct 10 13:00	Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9
Minimum Value: 0 km/h on Oct 3 23:00	
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> = 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	1	1	1	1	1	1	1	2	2	2	2	3	3	2	2	1	1	1	1	2	1	1	1	3
2-Oct	1	1	1	1	3	4	3	3	4	4	4	4	4	4	5	4	3	3	4	3	3	4	4	4	5
3-Oct	3	4	4	4	5	4	4	4	4	4	3	3	3	3	3	3	2	2	1	1	1	1	0	1	5
4-Oct	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	0	1	1	1	1	2
5-Oct	1	1	1	0	1	1	1	1	1	1	2	3	6	5	6	5	5	3	2	1	1	1	2	2	6
6-Oct	1	1	1	1	1	1	1	1	1	1	2	3	2	2	2	3	1	1	1	1	1	1	1	1	3
7-Oct	1	1	1	1	1	1	1	1	1	2	2	2	2	2	3	3	2	2	2	1	1	1	1	1	3
8-Oct	1	1	1	1	1	1	1	1	AF	1	1	1	2	2	2	1	1	1	2	2	2	1	1	1	2
9-Oct	1	1	1	1	1	1	1	1	1	3	3	2	2	2	2	2	2	2	2	1	1	1	1	1	3
10-Oct	1	1	1	1	1	1	1	1	3	5	6	7	7	6	6	5	5	2	3	1	1	4	3	3	7
11-Oct	2	4	3	3	3	4	3	3	3	3	4	4	4	5	4	4	3	2	2	1	1	2	1	1	5
12-Oct	1	1	1	1	2	1	1	2	3	2	2	3	3	3	4	5	4	2	1	1	1	1	2	2	5
13-Oct	2	3	3	3	2	2	3	4	4	4	4	4	5	4	5	5	5	1	1	1	2	2	2	3	5
14-Oct	3	2	2	3	3	3	2	2	3	4	5	5	5	5	4	4	3	3	2	2	2	2	2	1	5
15-Oct	1	1	1	2	1	1	1	1	1	1	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2
16-Oct	1	1	1	1	1	1	1	1	1	1	2	2	3	3	3	3	2	1	1	1	2	1	1	1	3
17-Oct	1	2	1	1	1	1	1	1	1	2	3	3	3	2	2	3	3	2	2	1	1	2	1	1	3
18-Oct	1	2	2	3	3	4	4	4	5	4	4	6	6	5	5	4	3	2	1	1	1	1	1	2	6
19-Oct	2	2	2	3	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	2	1	3
20-Oct	1	1	2	2	3	4	2	2	3	3	4	4	4	5	5	5	4	1	1	2	2	2	2	1	5
21-Oct	1	1	1	1	1	1	1	2	1	1	2	2	2	2	2	2	2	1	2	2	2	1	1	2	2
22-Oct	1	1	1	1	1	1	1	1	3	4	5	4	5	5	5	5	4	3	1	1	1	1	2	2	5
23-Oct	3	2	2	2	1	1	2	1	1	2	3	3	2	2	2	2	2	1	1	2	2	2	2	2	3
24-Oct	2	2	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2
25-Oct	2	2	2	1	1	2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
26-Oct	3	3	2	1	1	1	1	1	1	1	3	3	3	3	2	3	4	4	5	3	3	3	2	2	5
27-Oct	2	3	2	3	3	3	4	3	3	4	5	4	5	5	5	4	3	4	4	4	4	2	1	1	5
28-Oct	1	2	2	1	1	1	1	1	1	2	2	3	2	2	2	3	2	2	1	2	2	3	2	2	3
29-Oct	2	2	4	4	3	3	3	3	3	2	2	2	3	3	3	2	1	1	2	1	1	1	1	1	4
30-Oct	1	2	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	2	1	0	1	2
31-Oct	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	2	2	2	2	2	2	2
	3	4	4	4	5	4	4	4	5	5	6	7	7	6	6	5	5	4	5	4	3	4	4	5	
	Diurnal Maximum																								

AF - Analyzer Failure





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

**Wind Speed (WS) - km/h**  
**Fort McKay South - October 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	447	60.16	60.16
6 - 11	250	33.65	93.81
12 - 19	45	6.06	99.87
20 - 28	1	0.13	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**  
**Fort McKay South - October 2015**

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	42	27	8	1	4	8	14	23	56	48	54	63	27	21	24	27	447
6 - 11	40	25	6	0	0	3	12	17	32	21	17	32	9	11	12	13	250
12 - 19	7	3	0	0	0	0	0	0	0	0	2	13	5	7	6	2	45
20 - 28	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
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>	89	55	14	1	4	11	26	40	88	69	73	109	41	39	42	42	743

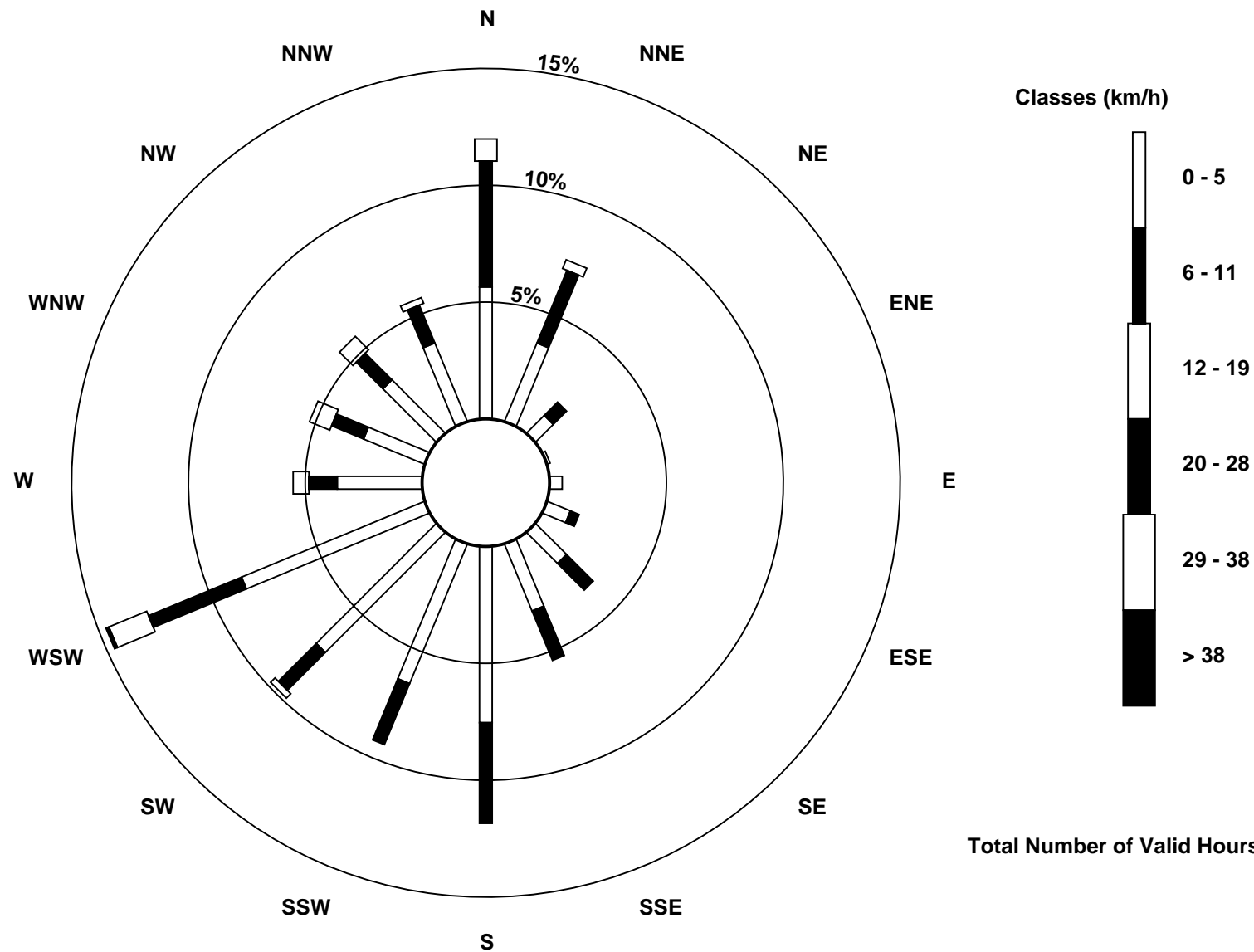
Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Wind Speed (WS) - km/h  
Fort McKay South (AMS 13)





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg**

**Fort McKay South - October 2015**

Direction of Maximum Speed: 242 deg on Oct 10 13:00		Hours in Service:	744
Direction of Maximum Daily Speed Average: 6.1 deg on Oct 2		Hours of Data:	743
Direction of Minimum Speed: 134 deg on Oct 9 23:00		Hours of Missing Data:	1
Direction of Minimum Daily Speed Average: 1.3 deg on Oct 8		Percent Operational Time:	99.9
Monthly Average Direction: 255.1 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	187	191	194	205	197	192	220	192	178	177	178	154	124	154	126	103	122	228	242	246	317	339	344	301	168.8
2-Oct	254	109	350	15	14	21	22	32	10	11	9	8	14	7	8	1	345	346	352	349	2	7	1	1	6.1
3-Oct	360	356	349	354	356	359	2	3	12	11	18	35	30	36	30	35	24	32	253	242	249	245	230	219	8.5
4-Oct	298	219	245	273	234	243	246	244	242	223	224	212	211	202	208	195	189	181	245	244	196	205	190	184	214.3
5-Oct	221	225	202	217	214	192	233	175	198	265	276	294	318	317	322	330	314	319	297	277	266	270	268	266	293.4
6-Oct	233	180	227	197	213	224	229	243	184	141	123	119	120	124	132	142	32	244	245	275	251	258	268	247	171.5
7-Oct	246	243	257	286	257	186	210	209	177	191	164	194	189	196	231	262	324	307	316	312	281	248	220	244	245.3
8-Oct	241	221	227	286	225	227	236	205	AF	163	100	134	131	127	97	19	4	342	351	349	350	348	352	347	5.2
9-Oct	4	352	349	341	306	332	246	249	189	182	195	177	123	36	15	16	11	3	354	349	326	325	134	172	358.7
10-Oct	240	224	208	206	203	273	243	220	200	222	243	241	242	252	260	248	256	265	315	283	293	13	21	9	252.8
11-Oct	9	17	11	5	6	3	2	359	3	2	348	344	334	343	326	345	328	294	295	272	241	261	225	191	346.9
12-Oct	194	242	223	200	174	168	186	174	170	177	170	175	173	146	196	244	257	254	225	205	214	203	212	223	201.0
13-Oct	223	227	236	235	234	230	235	236	253	253	248	241	244	253	245	249	255	222	217	201	210	220	214	230	236.9
14-Oct	247	240	237	232	255	245	242	238	233	252	279	292	303	311	317	310	338	21	24	33	15	1	357	342	288.0
15-Oct	273	264	227	91	134	254	251	234	219	165	210	211	189	182	196	128	106	14	357	343	352	303	261	253	212.3
16-Oct	248	253	247	251	261	246	253	256	8	25	134	121	147	145	147	148	139	134	150	155	168	186	189	182	162.1
17-Oct	184	179	186	238	235	236	248	221	177	156	167	168	177	166	176	212	212	187	187	182	185	180	176	178	185.9
18-Oct	152	208	222	244	250	258	263	261	260	254	249	279	283	290	280	295	272	291	297	273	275	304	347	4	268.5
19-Oct	6	359	357	6	5	4	22	22	22	26	37	2	11	36	13	12	13	3	0	340	332	11	176	176	11.5
20-Oct	193	188	203	223	247	268	240	206	226	240	246	256	280	285	298	295	295	310	281	312	348	28	36	242	268.8
21-Oct	205	203	205	213	218	232	254	255	241	169	161	153	128	125	141	144	149	149	160	158	168	182	172	179	166.9
22-Oct	205	225	244	210	220	238	266	201	219	240	246	237	227	241	252	254	247	230	219	217	213	224	244	250	237.2
23-Oct	261	293	248	233	167	206	196	211	110	296	2	11	9	0	14	10	14	325	352	1	353	349	11	0	338.6
24-Oct	9	1	4	9	15	30	20	340	335	356	353	358	11	17	0	290	301	335	203	254	279	341	3	26	2.1
25-Oct	15	19	359	352	351	359	346	347	2	3	24	358	357	31	287	318	326	318	316	313	316	308	314	235	354.4
26-Oct	171	179	179	243	198	96	351	2	6	15	130	147	142	145	139	159	175	171	173	173	252	284	261	241	175.5
27-Oct	273	304	280	287	289	294	300	303	299	318	323	310	307	317	311	319	324	331	333	337	333	8	263	262	312.7
28-Oct	317	26	324	242	239	236	164	172	151	174	202	192	156	136	144	150	156	154	164	169	177	182	174	176	170.2
29-Oct	179	182	174	170	170	168	167	170	174	169	166	172	191	185	191	186	184	181	189	199	199	155	207	283	179.3
30-Oct	186	219	178	217	205	186	189	258	199	197	323	165	173	171	278	229	217	203	251	213	246	282	341	322	218.9
31-Oct	333	343	341	261	246	283	340	2	234	224	108	67	55	33	43	52	54	55	45	40	28	31	13	25	28.5

259.2 261.3 258.7 264.5 272.2 274.3 281.0 265.7 254.4 248.4 244.9 245.0 251.7 271.5 273.5 282.5 286.0 303.8 293.4 272.2 281.0 297.0 281.8 265.3

Diurnal Average

AF - Analyzer Failure

All monthly, daily, and diurnal averages have been calculated using vector methods



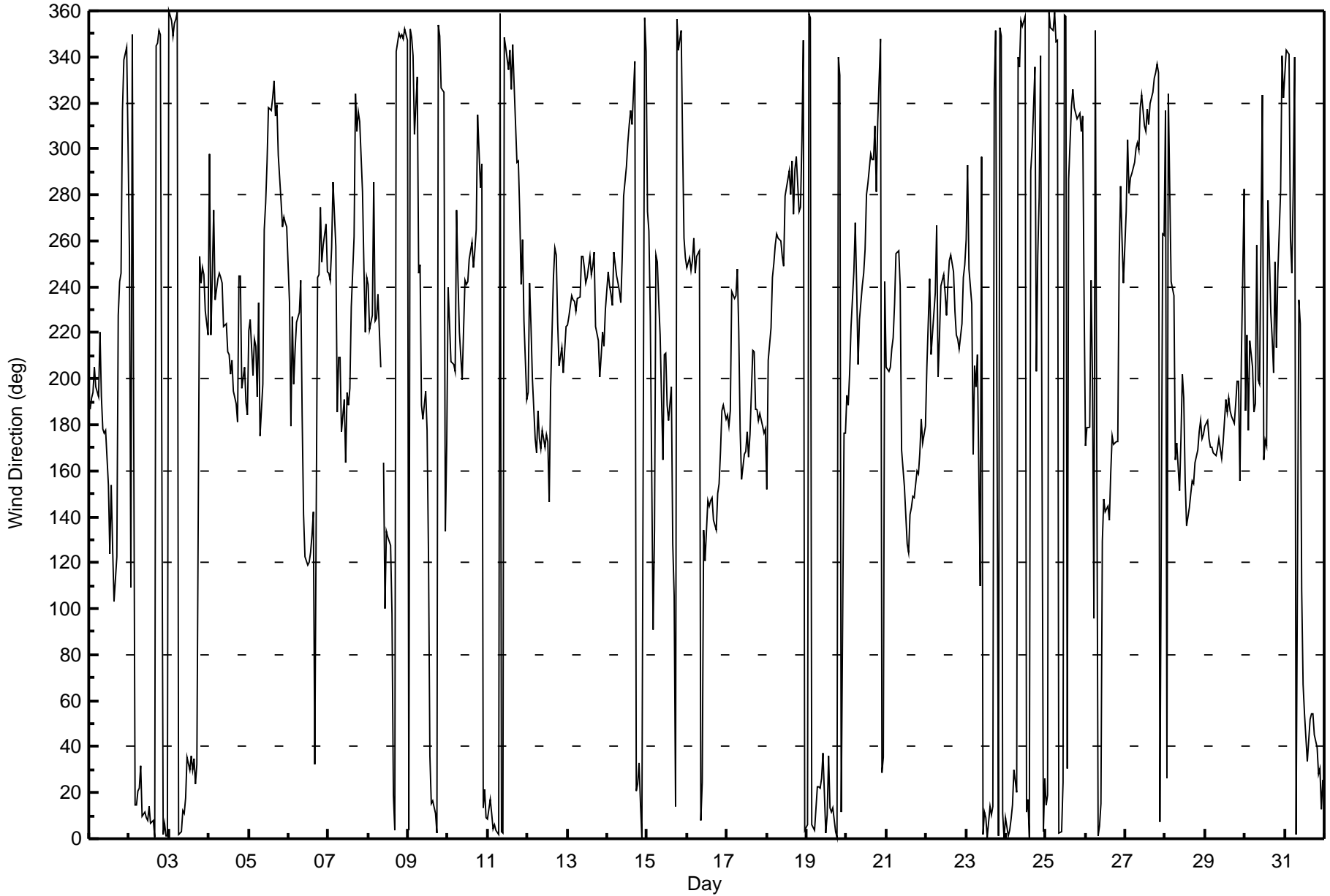
**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Direction (WD) - deg**  
**Fort McKay South - October 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 95 deg on Oct 30 14:00	Hours of Data: 743
Minimum Value: 8 deg on Oct 6 19:00	Hours of Missing Data: 1
Percentiles: P <sub>1</sub> = 12 P <sub>10</sub> = 18 Q <sub>1</sub> = 24 Median = 29 Q <sub>3</sub> = 39 P <sub>90</sub> = 59 P <sub>99</sub> = 90	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	11	27	23	21	18	21	25	50	19	24	34	33	39	39	38	35	35	46	18	29	59	15	21	53	59
2-Oct	54	81	38	23	22	27	25	25	26	25	26	25	26	28	26	26	28	26	26	27	25	25	25	27	81
3-Oct	28	28	26	26	28	26	25	25	24	27	26	31	31	35	29	35	28	28	70	13	12	10	40	62	70
4-Oct	89	76	44	80	36	20	31	33	36	29	29	31	35	40	38	35	31	31	15	16	35	21	14	19	89
5-Oct	37	29	17	27	29	29	58	60	63	85	54	44	42	39	39	39	40	29	18	22	16	23	26	93	93
6-Oct	51	75	44	26	25	20	21	46	24	44	34	39	41	53	43	38	80	32	8	32	15	20	39	10	80
7-Oct	16	34	60	39	57	15	73	60	38	61	57	56	75	36	49	35	30	23	19	35	58	64	45	12	75
8-Oct	40	49	31	69	48	30	16	50	AF	37	33	54	56	61	41	25	20	14	17	20	21	20	18	37	69
9-Oct	21	24	22	31	63	59	44	37	45	26	36	92	79	28	24	24	22	23	23	42	35	86	91	75	92
10-Oct	65	37	38	81	89	51	21	29	19	29	32	26	27	32	34	27	29	37	28	62	68	46	27	25	89
11-Oct	22	24	25	24	24	26	25	25	26	27	30	31	36	32	36	32	33	32	39	18	18	55	27	24	55
12-Oct	68	19	53	49	56	28	36	21	31	30	23	27	30	45	45	28	28	30	19	18	21	13	18	19	68
13-Oct	18	20	17	18	17	16	19	26	34	30	28	31	30	31	30	29	29	21	17	12	16	17	18	22	34
14-Oct	21	18	18	19	24	23	23	18	22	26	38	39	41	40	41	35	31	28	27	29	33	28	26	46	46
15-Oct	31	31	93	67	84	26	17	15	50	47	35	36	62	49	40	39	77	42	19	27	32	34	27	31	93
16-Oct	15	28	13	16	44	23	18	40	41	21	79	37	36	33	32	30	31	40	22	26	24	17	13	13	79
17-Oct	15	16	24	16	18	51	24	28	19	30	28	28	35	30	28	26	23	14	17	13	11	15	14	18	51
18-Oct	53	19	21	22	21	24	26	27	28	29	28	38	37	37	37	36	34	31	22	18	85	68	22	18	85
19-Oct	19	23	23	23	22	24	24	24	25	30	40	32	43	44	63	27	22	20	18	35	48	80	71	36	80
20-Oct	18	16	24	25	25	31	42	21	23	27	34	34	34	40	38	37	38	25	25	22	35	26	28	72	72
21-Oct	35	26	27	50	37	30	32	93	49	39	41	38	44	43	32	28	29	92	53	27	28	27	22	21	93
22-Oct	38	48	42	54	28	29	47	25	29	23	26	28	24	26	29	27	25	28	17	17	17	18	16	29	54
23-Oct	34	79	20	49	32	14	18	19	77	50	42	33	28	27	29	25	24	34	20	18	27	25	24	23	79
24-Oct	27	27	23	25	28	32	34	59	35	74	33	32	30	73	59	44	29	63	90	52	53	22	25	25	90
25-Oct	24	24	27	26	25	25	27	29	26	25	35	48	47	55	47	47	57	23	80	28	26	30	35	70	80
26-Oct	23	25	23	63	29	78	36	20	28	38	43	37	38	35	35	40	27	26	28	27	52	35	28	24	78
27-Oct	34	43	39	33	36	37	37	34	38	36	37	36	36	33	33	32	33	34	31	31	32	35	51	85	85
28-Oct	28	42	61	35	16	33	49	77	27	29	27	30	34	39	36	29	30	26	28	28	27	19	22	22	77
29-Oct	26	20	23	25	27	25	25	27	24	25	24	30	27	24	22	20	13	17	15	15	11	68	32	69	69
30-Oct	35	25	30	41	44	33	65	49	32	73	74	52	75	95	82	55	32	38	65	26	73	50	26	24	95
31-Oct	21	20	28	35	29	60	39	23	46	70	64	37	48	50	33	32	33	29	33	30	26	26	26	24	70
	89	81	93	81	89	78	73	93	77	85	79	92	79	95	82	55	80	92	90	62	85	86	91	93	
	Diurnal Maximum																								

AF - Analyzer Failure





# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	October 22, 2015	Last Calibration	September 2, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	7:23	End Time (MST)	11:58
Gas Cert Reference	S980455A	Station temp.	22 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
ZAG Make/Model	API 701	Serial Number	5613
DACS make/model	Campbell Scientific CR3000	DACS serial No.	1850

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		HVPS voltage	547	547
Analyzer IP address	192.168.1.44		Lamp voltage	1799	1736
Calculated slope	1.001658	1.004741	Box temp	31.5	31.5
Calculated intercept	0.642086	-0.076419	Pressure	26.0	25.9
Analyzer Background	42.1	42.1	Flow	686	676
Analyzer Coefficient	1.026	1.022	Lamp Ratio	61	59

Analyzer make API T100 Analyzer serial # 599

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	70.3	703.0	693.0	1.014
calibrator zero	5000	0.0	0.0	0.3	----
high point	5000	70.3	703.0	699.3	1.005
second point	5000	35.1	351.0	351.0	1.000
third point	5000	17.6	176.0	173.9	1.012
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	70.3	703.0	694.5	1.012
Average Correction Factor					1.006

Corrected As found 693.1 Previous response 701.2 % change 1.2%

**Notes:**

No adjustments or maintenance done, filter changed out

Calibration Performed By: Melissa Lemay



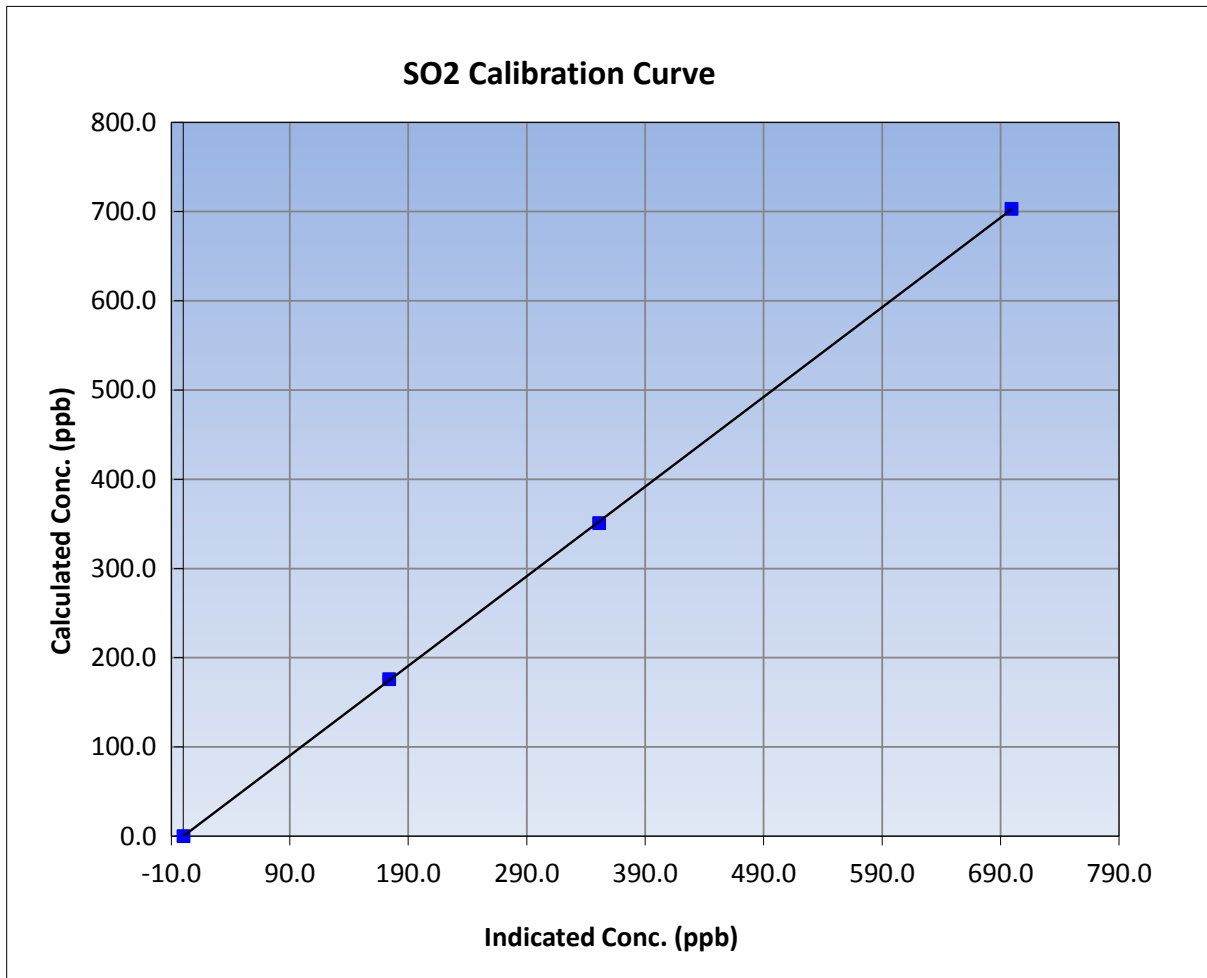
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	October 22, 2015	Previous Calibration	September 2, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	7:23	End Time (MST)	11:58
Analyzer make	API T100	Analyzer serial #	599

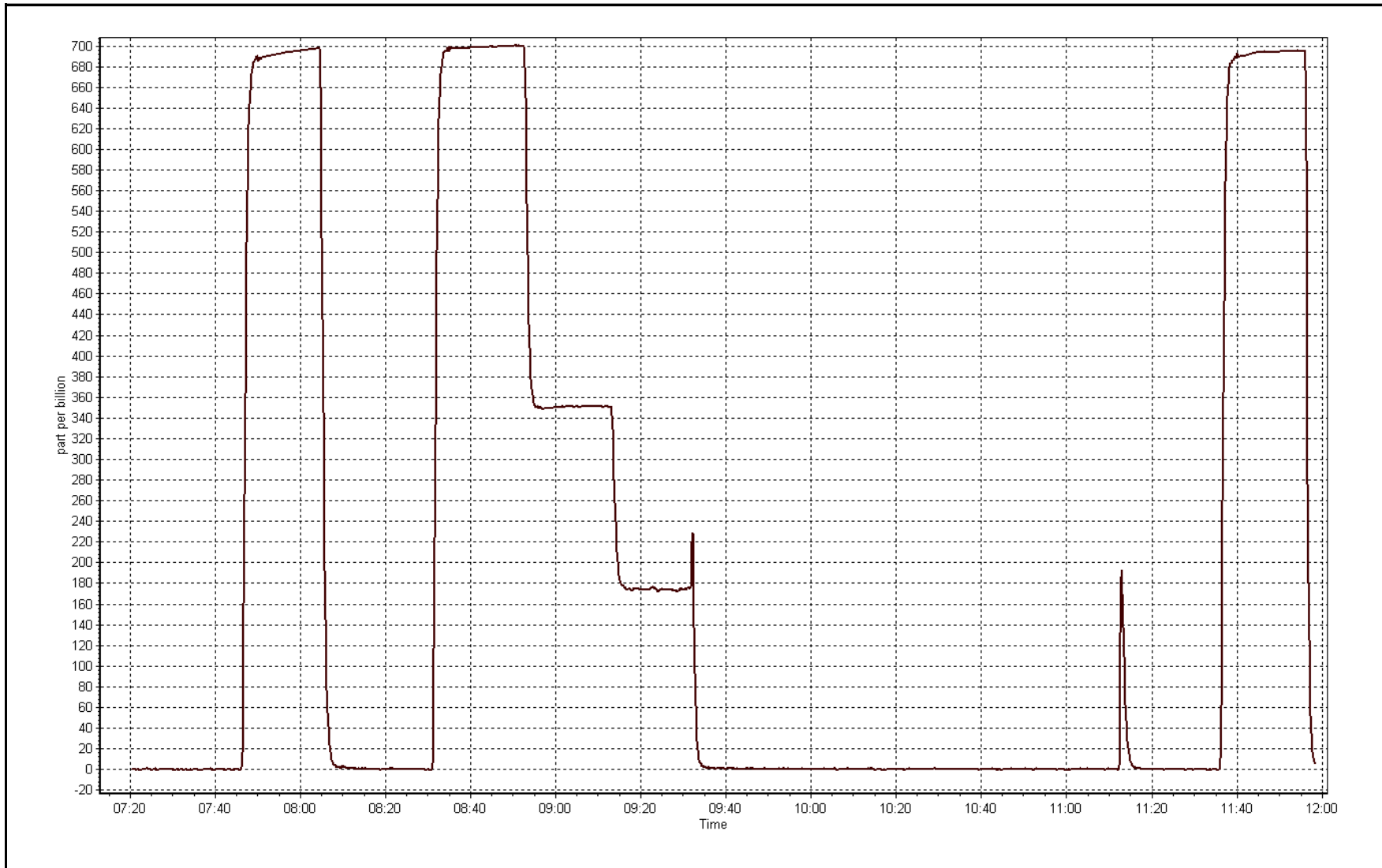
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999983
703.0	699.3	1.0053		
351.0	351.0	1.0000	Slope	1.004741
176.0	173.9	1.0121		
			Intercept	-0.076419



SO2 Calibration Plot

Date: October 22, 2015







# Wood Buffalo Environmental Association TRS Calibration Report

## Station Information

Calibration Date	October 7, 2015	Last Calibration	September 3, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	10:13	End Time (MST)	12:40
Gas Cert Reference	CC178364	Station temp.	22 Deg C
Cal Gas Concentration	5.07 ppm	Cal Gas Exp Date	30/05/2013
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
Dil air Make/Model	API 701	Serial Number	5613
DACS make/model	Campbell Scientific CR3000	DACS serial No.	1850
SO2 gas concentration	51.1 ppm	SO2 gas cert/exp	S980455A 26/Sep/17

## Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-727	-727
Analyzer IP address	192.168.1.44		Lamp voltage	994	999
Calculated slope	0.996086	0.985238	Chamber temp	45	45
Calculated intercept	0.418811	0.265667	Pressure	685.9	693.2
Analyzer Background	2.13	2.13	Flow	0.447	0.453
Analyzer Coefficient	1.038	1.038	Intensity	90	90
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1218153359	
Converter make/model	CDN-101		Converter serial #	456	

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.3	----
as found span	5000	78.9	80.0	80.9	0.989
SO2 scrubber check	5000	17.6	179.9	0.1	----
calibrator zero	5000	0.0	0.0	-0.3	----
high point	5000	78.9	80.0	80.9	0.989
second point	5000	39.4	40.0	40.4	0.989
third point	5000	19.7	20.0	19.9	1.004
as left zero	5000	0.0	0.0	-0.2	----
as left span	5000	78.9	80.0	81.0	0.988
Average Correction Factor					0.994

Corrected As found	81.2	Previous response	79.9	% change	-1.5%
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**Notes:**

no adjustments or maintenance done, filter changed out

Calibration Performed By:

Melissa Lemay



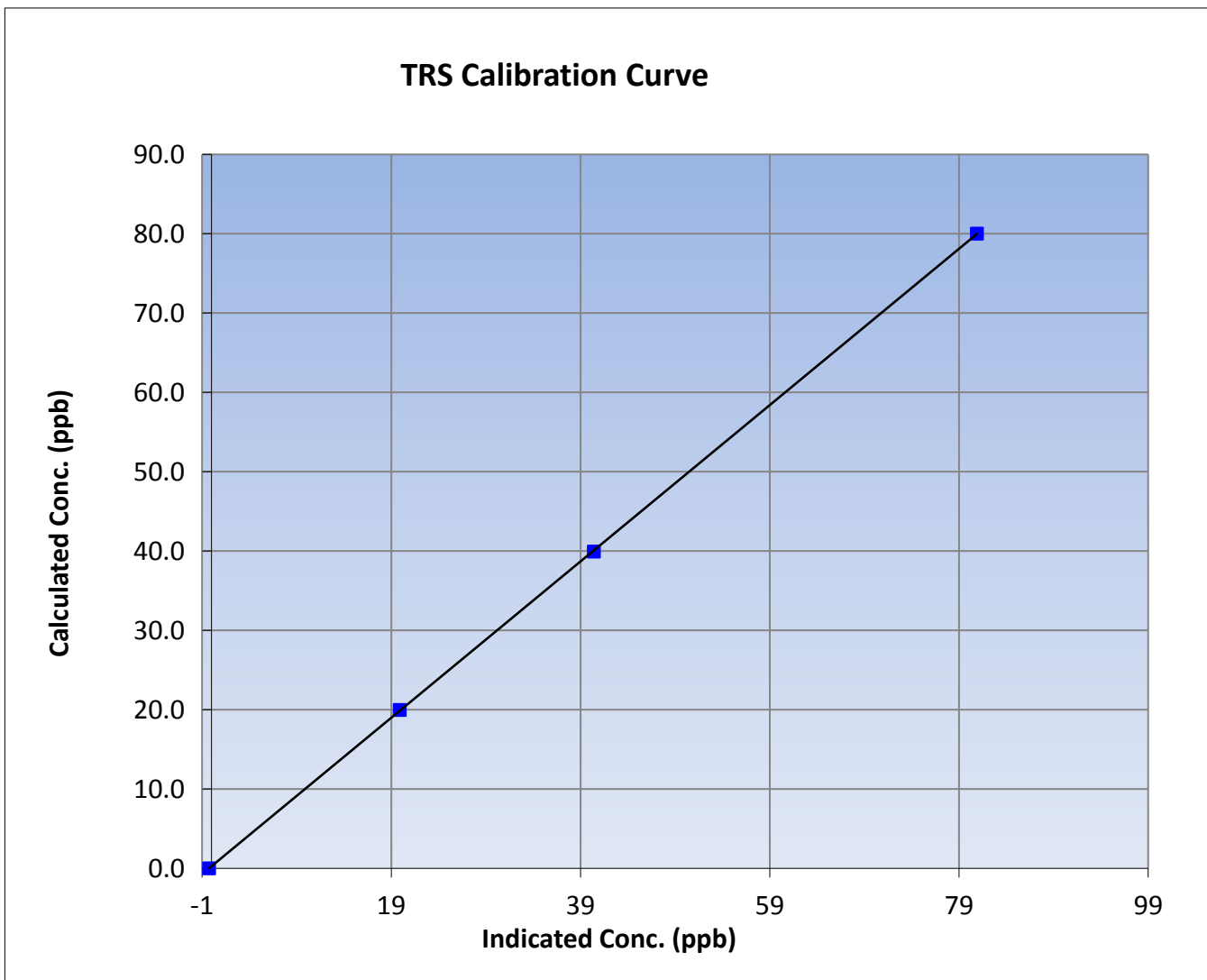
# Wood Buffalo Environmental Association TRS Calibration Report

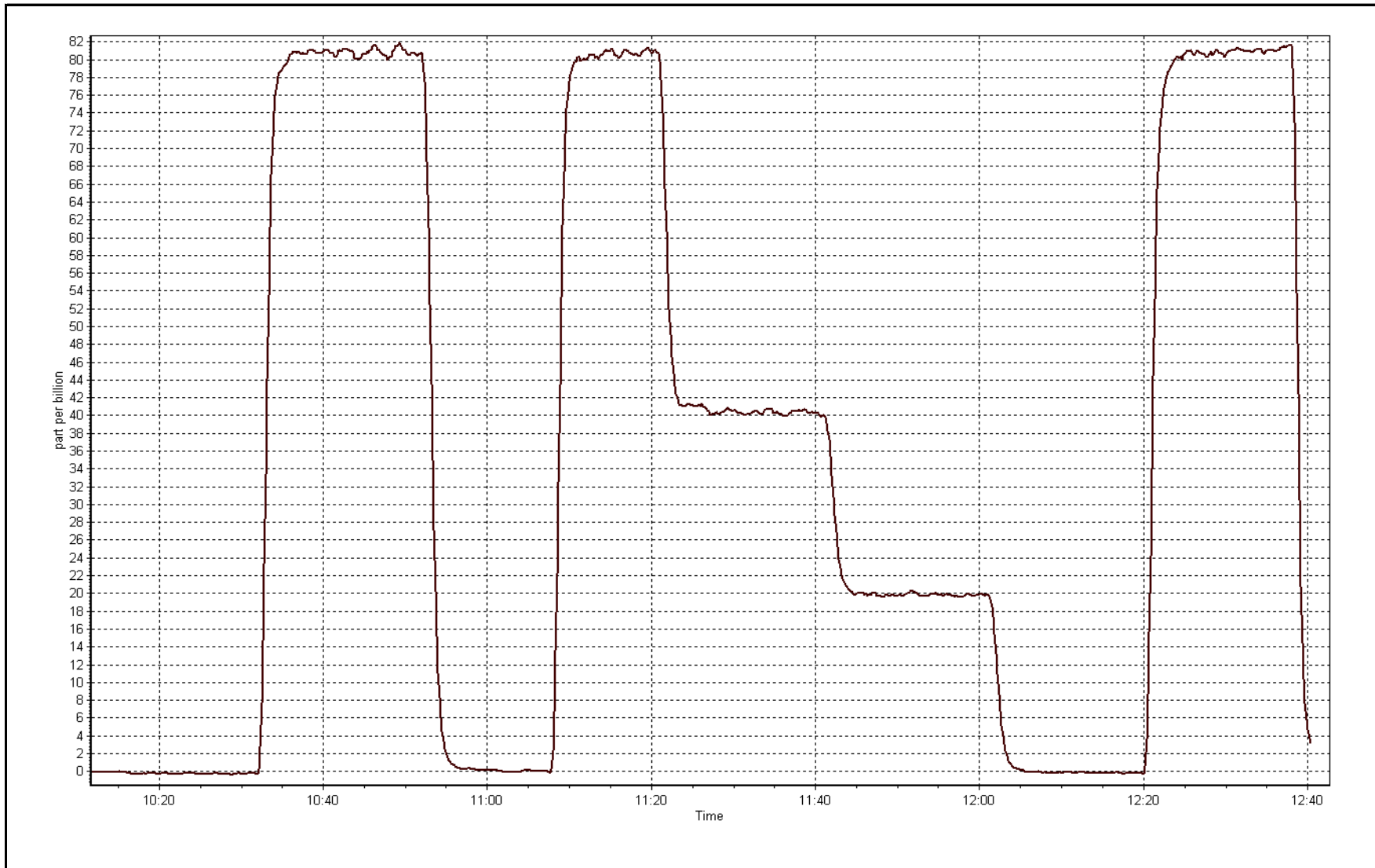
## Station Information

Calibration Date	October 7, 2015	Previous Calibration	September 3, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	10:13	End Time (MST)	12:40
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153359

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999993
80.0	80.9	0.9889		
40.0	40.4	0.9889	Slope	0.985238
20.0	19.9	1.0038		
			Intercept	0.265667







# Wood Buffalo Environmental Association THC Calibration Report

### Station Information

Calibration Date	October-22-15	Last Calibration	September-21-15
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	7:20	End Time (MST)	11:59
Gas Cert Reference	S980455A	Cal Gas Expiry Date	26/09/2017
CH4 Cal Gas Conc.	497 ppm	CH4 Equiv Conc.	1033.3 ppm
C3H8 Cal Gas Conc.	195 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
ZAG make/model	Teledyne API 701	Serial Number	5613
DACS make/model	Campbell Scientific CR3000	Serial Number	1850

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	9.2	9.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.2	34.2
Calculated slope	0.983581	0.999288	Fuel Pressure	23.1	23.1
Calculated intercept	0.098358	0.004012	Analyzer Coeff	2.998	2.970
			Analyzer BKG	1.500	1.330

Analyzer make 51i-LT Analyzer serial # 1505164380

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.15	----
as found span	5000	70.3	14.53	14.50	1.002
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	70.3	14.53	14.53	1.000
second point	5000	35.1	7.25	7.27	0.998
third point	5000	17.6	3.64	3.62	1.005
as left zero	5000	0.0	0.00	0.06	----
as left span	5000	70.3	14.53	14.60	0.995
Average Correction Factor					1.001

Corrected As found 14.65 Previous response 14.67 % change 0.1%

**Notes:**

Zero adjusted, no maintenance done, filter changed out

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association THC Calibration Report

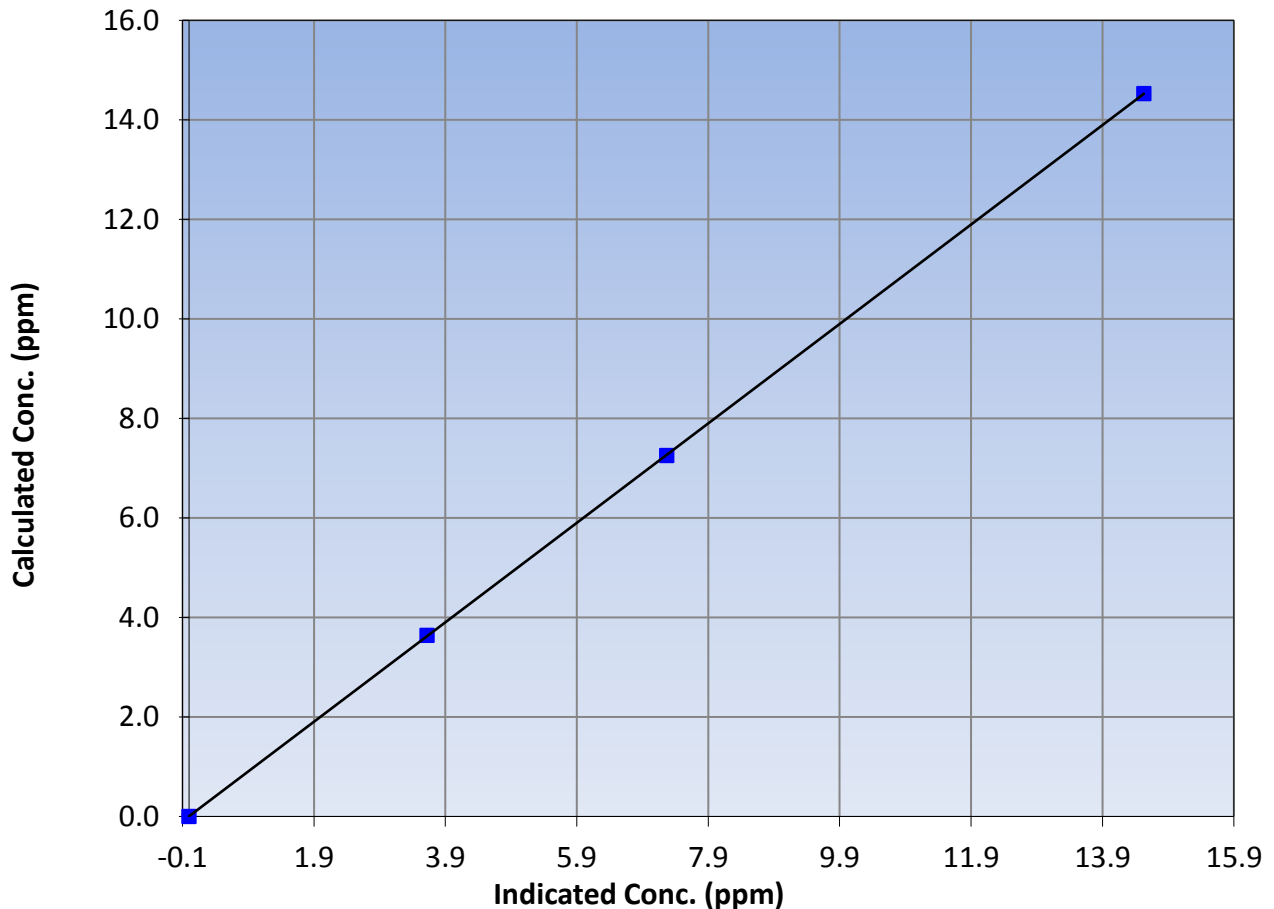
## Station Information

Calibration Date	October 22, 2015	Previous Calibration	September 21, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	7:20	End Time (MST)	11:59
Analyzer make	51i-LT	Analyzer serial #	1505164380

## Calibration Data

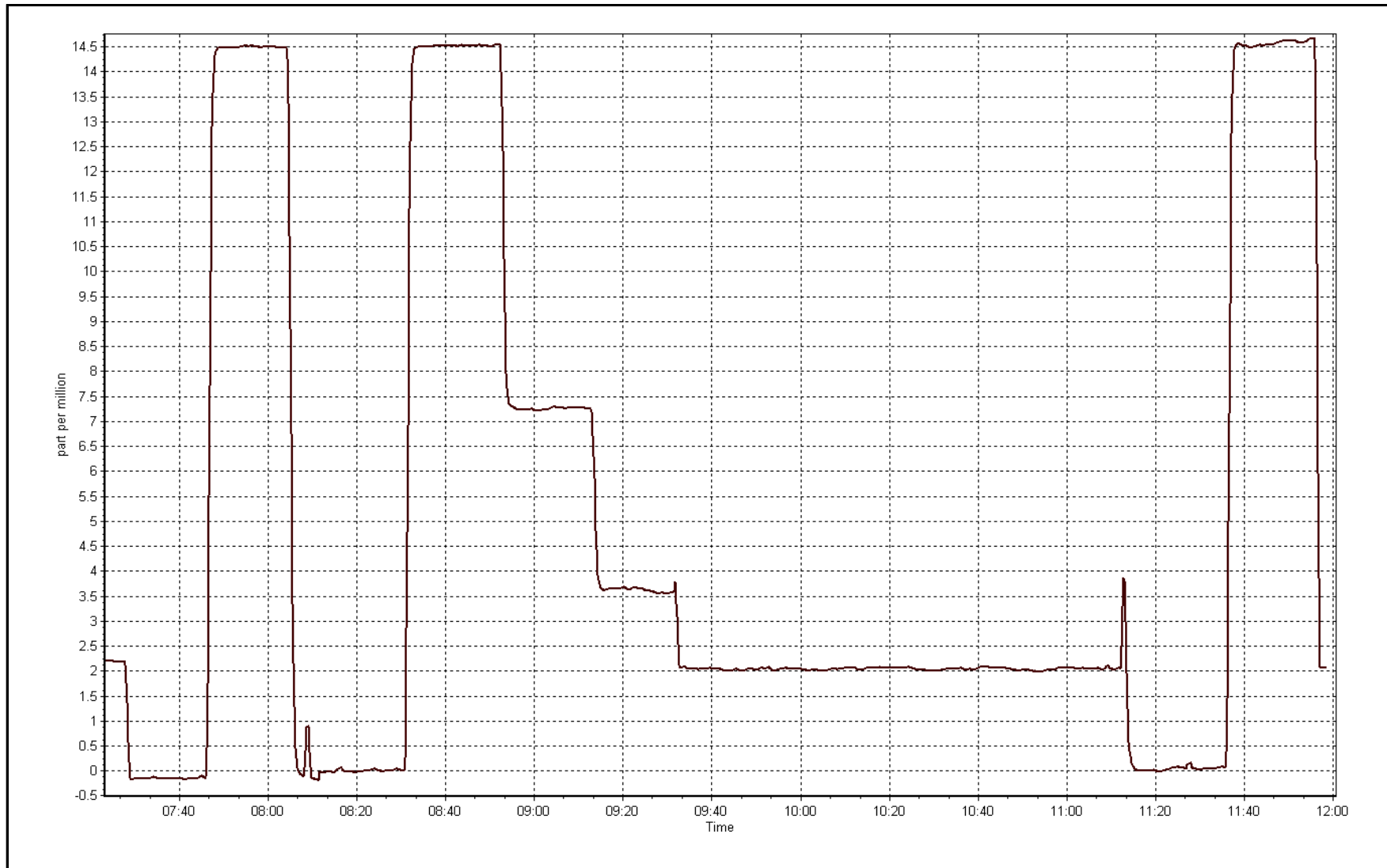
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999996
14.53	14.53	0.9998		
7.25	7.27	0.9977	Slope	0.999288
3.64	3.62	1.0047		
			Intercept	0.004012

**THC Calibration Curve**



THC Calibration Plot

Date: October 22, 2015





# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 26, 2015	Previous Calibration	September 3, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	11:49
NO2 GPT Ref date	September-02-15	Transfer Standard	Sabio 4010
Calibrator Make/Model	Sabio 4010	Station temp.	22 Deg C
ZAG make/model	Teledyne API 701	Serial Number	11041107
DACS make/model	Campbell Scientific CR3000	Serial Number	3410
		Serial Number	1850

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Box temp.	25.1	26.1
Analyzer IP address	192.168.1.79		Lamp temp.	58.0	58.0
Calculated slope	0.992351	0.991317	Pressure	26.3	26.5
Calculated intercept	-0.561569	-0.206921	Flow	745.0	771.0
Analyzer Background	0.2	0.2	Intensity	2740.0	2681.0
Analyzer Coefficient	0.916	0.916			

Analyzer make	API T400	Analyzer serial #	825
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### Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	0.2	----
as found span	5000	0.89	320.8	323.8	0.991
calibrator zero	5000	0.00	0.0	0.2	----
high point	5000	0.89	320.8	323.8	0.991
second point	5000	0.47	190.3	192.2	0.990
third point	5000	0.36	100.3	101.4	0.989
as left zero	5000	0.00	0.0	0.5	----
as left span	5000	0.89	320.8	329.0	0.975
Average Correction Factor					0.990

Corrected As found	323.6	Previous response	323.8	% change	0.1%
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**Notes:**

No adjustments or maintenance done, filter changed out

Calibration Performed By: Melissa Lemay



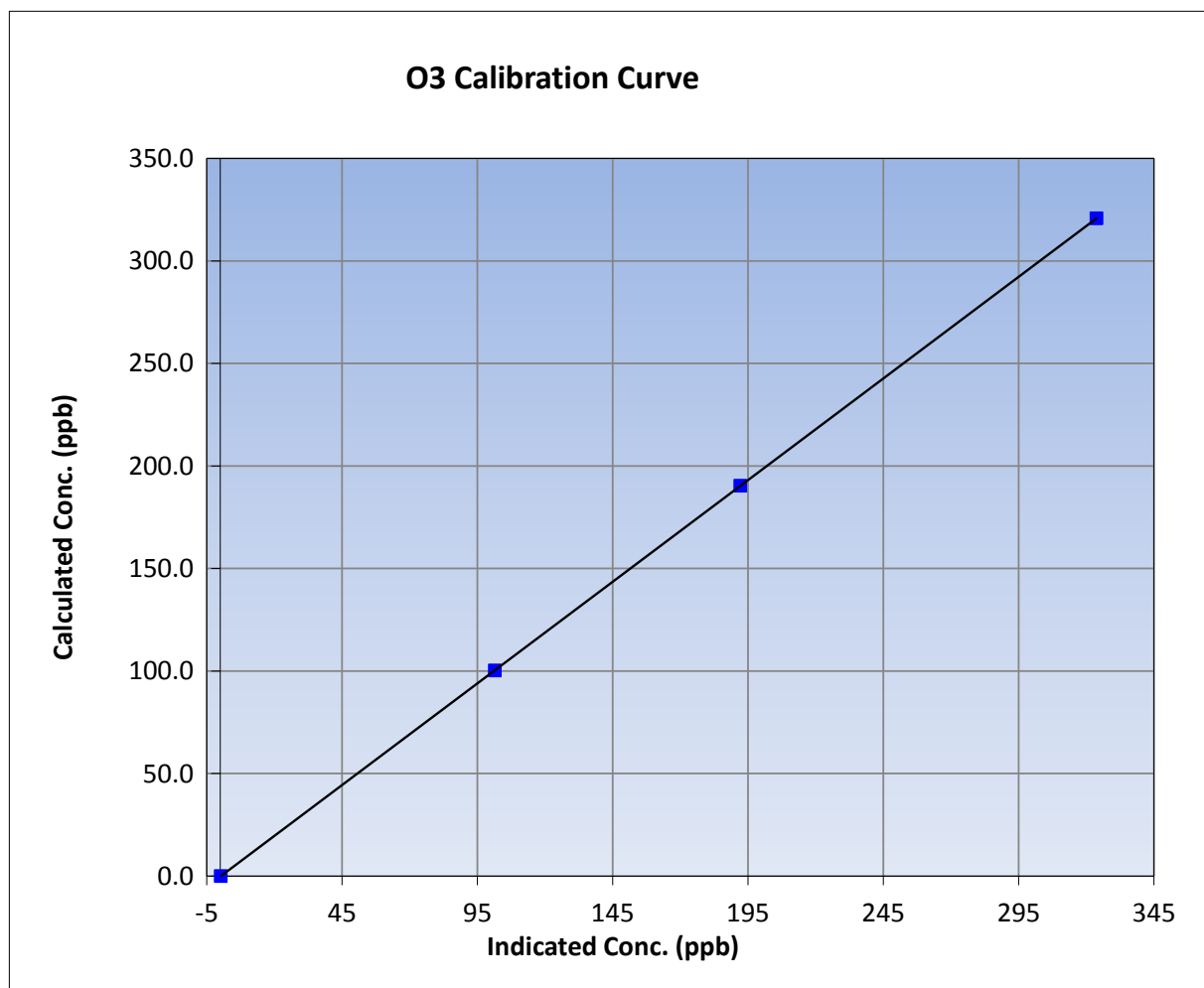
## Wood Buffalo Environmental Association O3 Calibration Report

### Station Information

Calibration Date	October-26-15	Previous Calibration	September 3, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:15	End Time (MST)	11:49
Analyzer make	API T400	Analyzer serial #	825

### Calibration Data

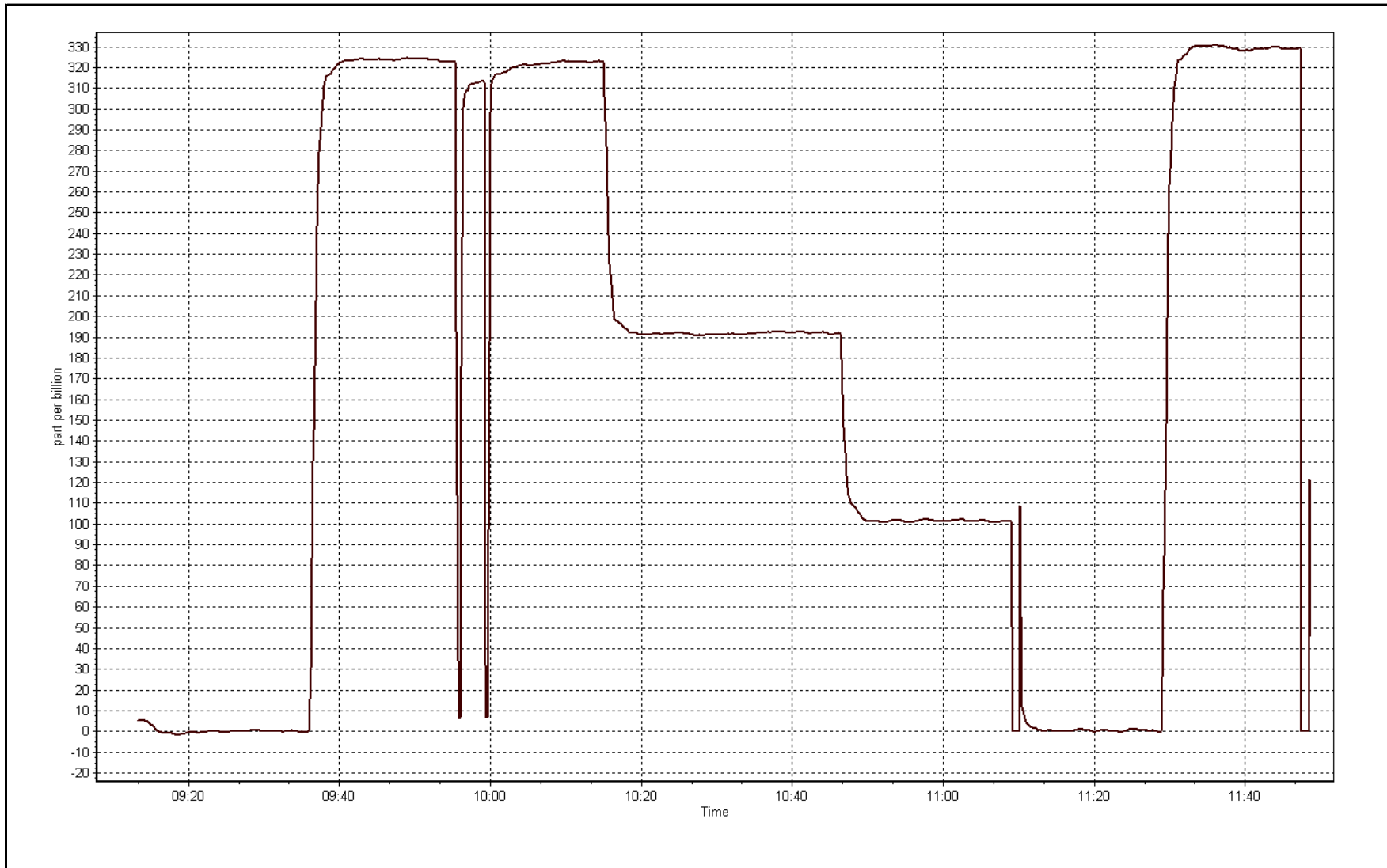
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	1.000000
320.8	323.8	0.9907		
190.3	192.2	0.9901	Slope	0.991317
100.3	101.4	0.9892		
			Intercept	-0.206921





O3 Calibration Plot

Date: October 26, 2015





# Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

## Station Information

Calibration Date	October 22, 2015	Previous Calibration	September 2, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	7:20	End Time (MST)	11:59
NO Cal Gas Conc	56.9 ppm	Gas Cert Reference	S980455A
NOX Cal Gas Conc	56.9 ppm	Cal Gas Expiry Date	26/9/17
Calibrator	Sabio 4010	Serial Number	11041107
Zero air Generator	Teledyne API T701	Serial Number	5613

## DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	1850
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## Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.008016	1.009393	0.994835
	Data Offset	0.688075	0.519647	-0.194905
Current Calibration	Data Slope	0.997878	0.998515	0.996458
	Data Offset	0.006514	-0.076854	-0.268163

## Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1410661329
---------------------	------------	-------------------	------------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.726		0.742	
NOX coefficient	0.998		0.998	
NO2 coefficient	0.999		0.998	
NO bkgrnd	6.4		6.6	
NOX bkgrnd	6.5		6.7	
Chamber Temp	50.1	Deg C	50.4	Deg C
Moly Temp	325.5	Deg C	324.7	Deg C
PMT voltage	-846.2	V	-846.2	V
PMT Temp	-2.9	Deg C	-2.9	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	179.4	mmHg	177.9	mmHg
R Cell Press Nox	179.7	mmHg	178.2	mmHg
NO sample flow	0.886	lpm	0.895	lpm
Nox sample Flow	0.888	lpm	0.896	lpm

**Notes:**

Span adjusted, no maintenance done, filter changed out



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date:

October 22, 2015

Station Number:

AMS 13

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.3	0.0	----	----
as found span	5000	70.2	798.9	798.9	0.0	782.7	781.6	1.1	1.0207	1.0221
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.2	-0.1	----	----
high point	5000	70.2	798.9	798.9	0.0	800.3	799.8	0.5	0.9982	0.9988
second point	5000	35.1	399.4	399.4	0.0	400.9	400.9	-0.1	0.9964	0.9964
third point	5000	17.5	199.2	199.2	0.0	199.4	199.3	0.1	0.9987	0.9992
as left zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.2	0.0	----	----
as left span	5000	70.2	798.9	478.8	320.1	808.8	482.1	326.7	0.9877	0.9932
Average Correction Factor									0.9978	0.9981

Corrected As found

NO<sub>x</sub>= 783.0

NO= 781.9

Percent Change

NO<sub>x</sub>= 1.1%

NO= 1.2%

Previous Response

NO<sub>x</sub>= 791.8

NO= 790.9

### GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

70.20

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			-0.1			N/A	
1st NO2 (300)	----	478.8	320.8	800.8	478.8	322.0	0.9838	1.0000	0.9963	100.4%
2nd NO2 (200)	----	609.3	190.3	800.7	609.3	191.4	0.9839	1.0000	0.9943	100.6%
3rd NO2 (100)	----	699.3	100.3	800.6	699.3	101.3	0.9840	1.0000	0.9901	101.0%
4th NO2 (0)	799.6	----	0.4	800.0	799.6	0.4	0.9848	1.0000	N/A	----
Average Correction Factor							0.9841	1.0000	0.9936	100.6%

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association

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

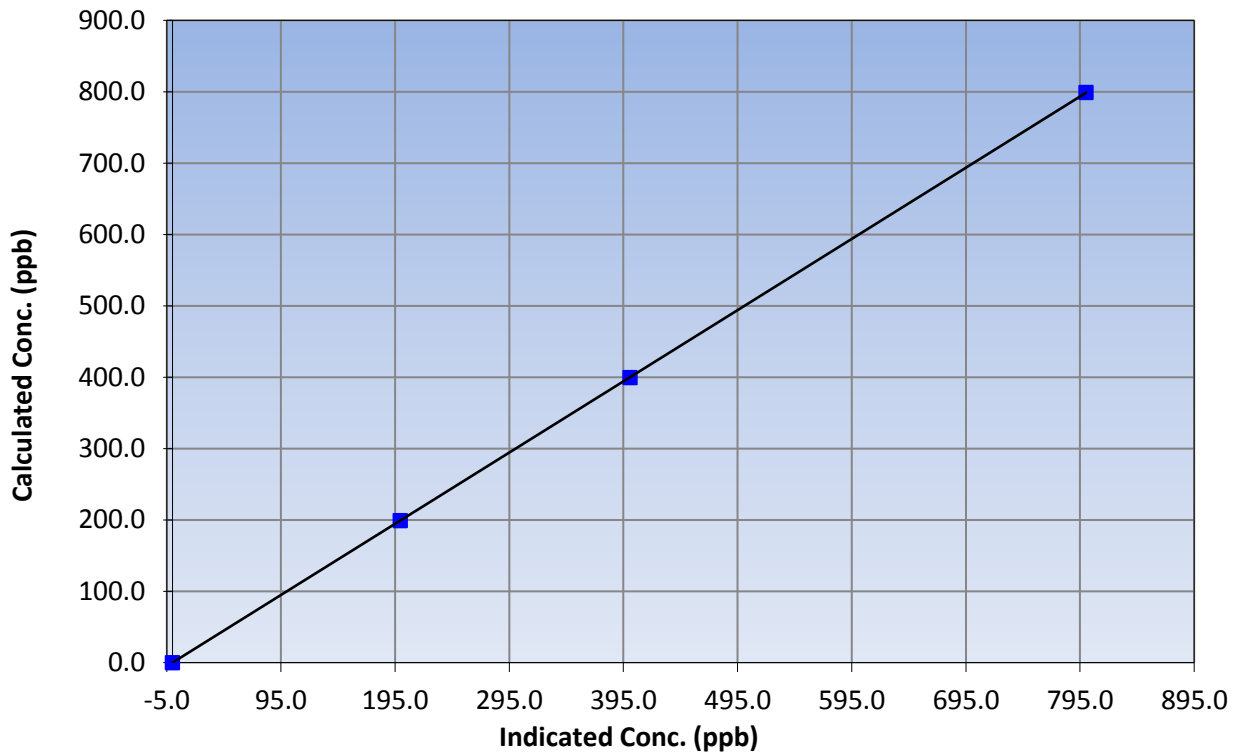
### Station Information

Calibration Date	October 22, 2015	Previous Calibration	September 2, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	7:20	End Time (MST)	11:59
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999999
798.9	800.3	0.9982		
399.4	400.9	0.9964	Slope	0.997878
199.2	199.4	0.9987		
			Intercept	0.006514

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

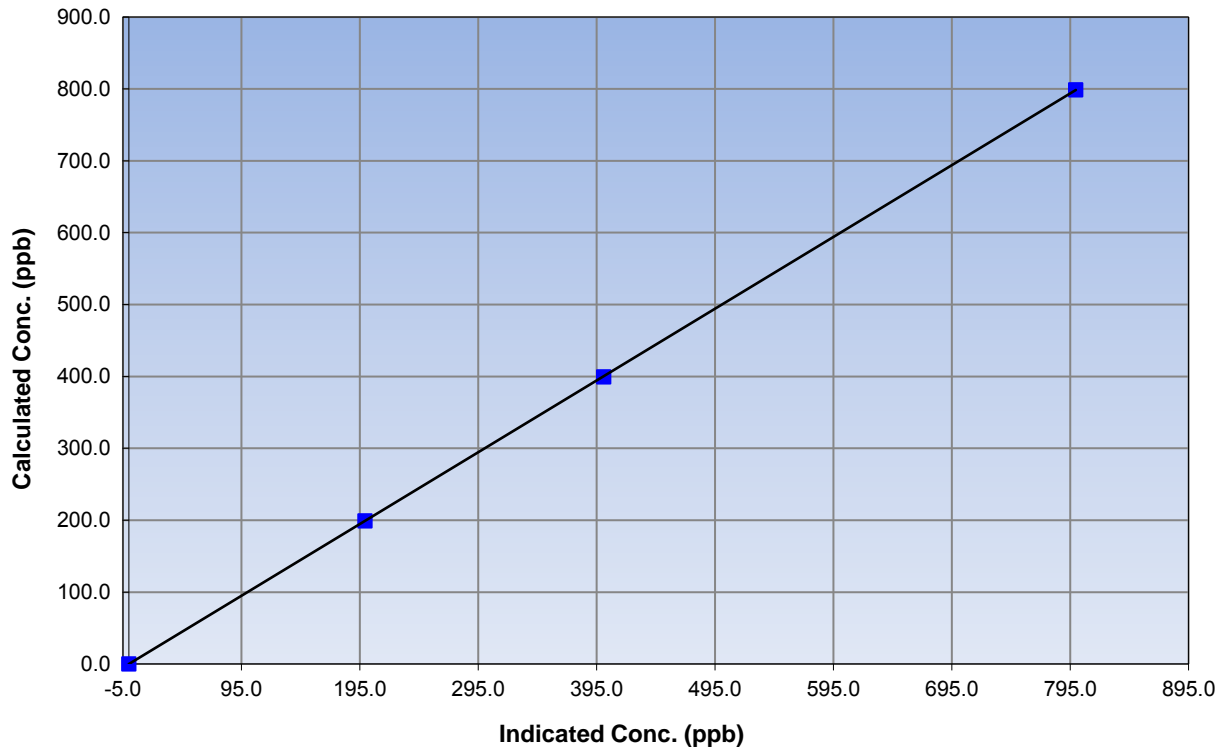
### Station Information

Calibration Date	October 22, 2015	Previous Calibration	September 2, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	7:20	End Time (MST)	11:59
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999998
798.9	799.8	0.9988		
399.4	400.9	0.9964	Slope	0.998515
199.2	199.3	0.9992		
			Intercept	-0.076854

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

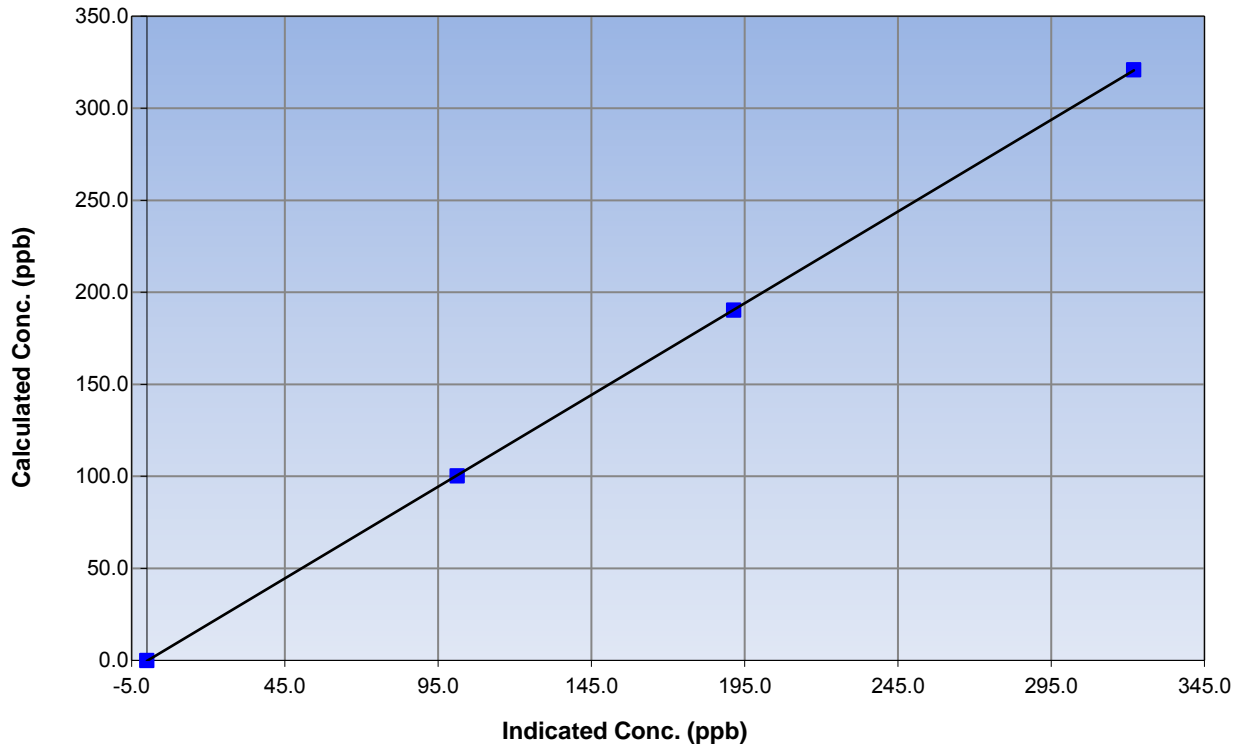
### Station Information

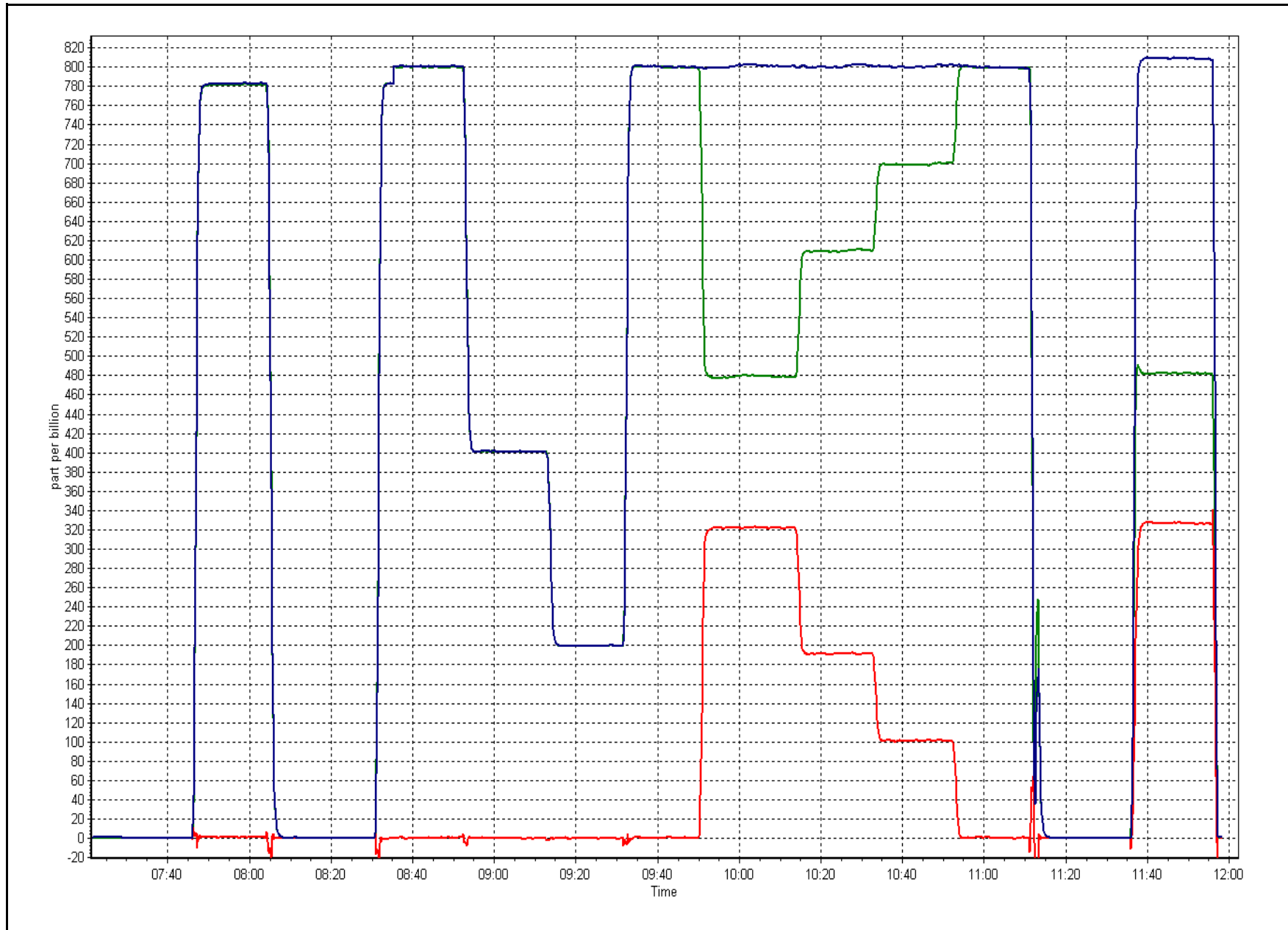
Calibration Date	October 22, 2015	Previous Calibration	September 2, 2015
Station Number	Fort McKay South	Station Number	AMS 13
Start Time (MST)	7:20	End Time (MST)	11:59
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999994
320.8	322.0	0.9963		
190.3	191.4	0.9943	Slope	0.996458
100.3	101.3	0.9901		
			Intercept	-0.268163

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







# Wood Buffalo Environmental Association

## SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	October 26, 2015	Previous Calibration:	September 28, 2015
Station Name:	Fort McKay South	Station Number:	AMS 13
Start Time (MST):	11:48	End Time (MST):	12:25
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1097

SHARP INFORMATION			
Particulate Fraction:		PM2.5	
Make/Model:		Thermo / SHARP 5030	
Serial Number		E-803	
C <sub>14</sub> Source SN:		4066	
Confirmation of Time settings:		Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Parameters Checked:	T1 <input checked="" type="checkbox"/>	T2 <input type="checkbox"/>	T3 <input type="checkbox"/>
	T4 <input type="checkbox"/>	P3 <input type="checkbox"/>	Main Flow <input checked="" type="checkbox"/>
		Beta <input checked="" type="checkbox"/>	Neph <input type="checkbox"/>

CALIBRATION DATA				
Temperature (°C)				
Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	6.0	6.3	0.3	6.0
T2	21.0	na	na	21.0
T3	22.0	na	na	22.0
T4	22.0	na	na	22.0
RH (%)	28.0	na	na	28.0

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	978	979.0	1.0	978

Main Flow (Lph)				
Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1000	0	1000	1000

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	392		391
Neph	3.3		0
C14	4.6		3.1
Indicated Concentration (ug/m3)	1	Yes	0
Offset 1	387.4		389.8
Offset 2	50.7		51

Leak Check (Quarterly)			
Leak Check Date:	September 28, 2015	Previous Leak Check Date:	July 14, 2015
	Measured		Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.74		0.10
*Flow with adaptor (LPM):	16.64		

\*Note - do not attach adaptor without shutting off the pump first

Mass Foil Calibration (Annually)			
Foil Calibration Date:	July 14, 2015	Previous Foil Calibration:	
Zeroed?:	Yes		
Foil Mass:	1337		Mass foil set S/N:
Previous Correction Factor:	6970		
New Correction Factor:	7080		

INSPECTION DATA		
Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

**NOTES:**

nephelometer adjusted, sample head cleaned

Calibration Performed By: Melissa Lemay





## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 14  
ANZAC  
OCTOBER 2015**

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

November 26, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)  
OCTOBER 2015

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	708	35	36	99.87	9	0	2	0
TRS(ppb) Average	706	34	38	99.46	3	0	0	0
THC(ppm) Average	672	33	72	94.76	2.2	-	1.9	-
NMHC(ppm) Average	672	33	72	94.76	0.11	-	0.025	-
CH4(ppm) Average	672	33	72	94.76	2.2	-	1.9	-
NO2(ppb) Average	707	36	37	99.87	14	0	5	-
NO(ppb) Average	707	36	37	99.87	9	-	2	-
NOX(ppb) Average	707	36	37	99.87	20	-	6	-
O3(ppb) Average	709	34	35	99.87	50	0	38	-
PM2.5(ug/m3) Average	720	2	24	97.04	40.3	-	7.5	0
AT 2m(C) Average	744	0	0	100.00	25.2	-	17.5	-
RH(%) Average	744	0	0	100.00	98	-	95	-
Leaf Wetness (% of range) Average	744	0	0	100.00	103	-	19	-
WS(km/h) Average	725	0	19	97.45	21	-	16	-
WD(deg) Average	725	0	19	97.45	-	-	-	-
PC(mm) Total	744	0	0	100.00	1	-	2.8	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)  
OCTOBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	708	0.4	1	-	0	0	0	0	0	1	9
TRS(ppb) Average	706	0.2	0	-	0	0	0	0	0	0	3
THC(ppm) Average	672	1.88	0.1	-	1.8	1.8	1.9	1.9	1.9	1.9	2.2
NMHC (ppm) Average	672	0.002	0.008	-	0	0	0	0	0	0	0.11
CH4(ppm) Average	672	1.88	0	-	1.8	1.8	1.9	1.9	1.9	1.9	2.2
NO2(ppb) Average	707	1.6	2	-	0	0	1	1	2	3	14
NO(ppb) Average	707	0.3	1	-	0	0	0	0	0	1	9
NOX(ppb) Average	707	1.9	2	-	0	0	1	1	2	4	20
O3(ppb) Average	709	26.8	9	-	5	15	20	27	34	39	50
PM2.5(ug/m3) Average	720	2.92	3.3	-	0.1	0.6	0.9	2	3.9	6.1	40.3
Temperature 2 m (C) Average	744	5.53	6.1	-	-6.7	-2	0.8	4.6	9.4	13.9	25.2
Relative Humidity (%) Average	744	71.2	19	-	21	42	57	74	89	94	98
Leaf Wetness (% of range) Average	744	3.3	10	-	0	0	0	0	0	8	103
Wind Speed 20 m (km/h) Average	725	9.1	5	-	1	3	6	9	12	15	21
Wind Direction 20 m (deg) Average	725	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	744	-	-	4.83	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)  
OCTOBER 2015

OPERATIONAL NOTES

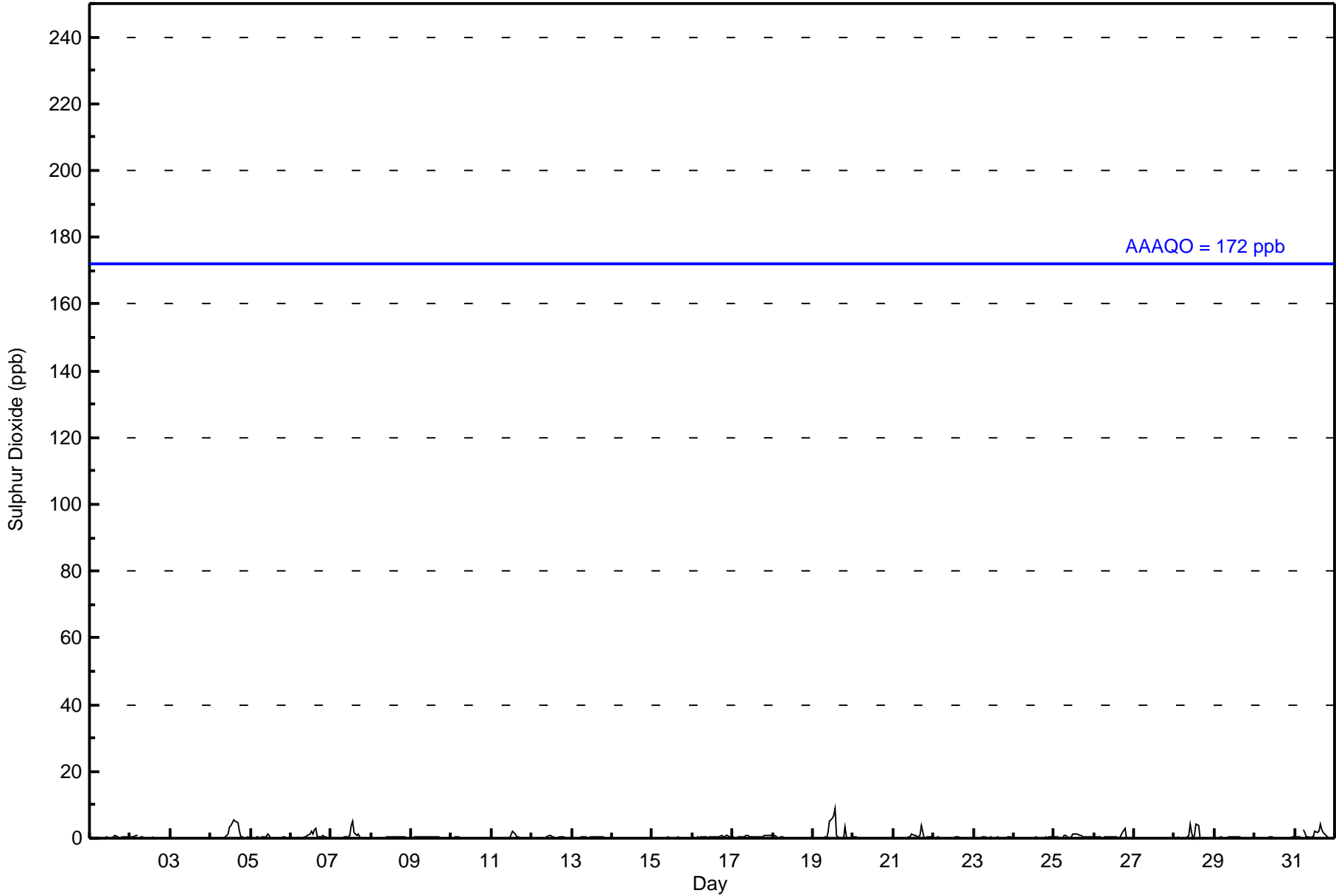
Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, NOX, O3, PM2.5	27 Oct 2015 15:00	27 Oct 2015 15:00	1	DAS restart
TRS	27 Oct 2015 13:00	27 Oct 2015 15:00	3	DAS collection error
TRS	27 Oct 2015 16:00	27 Oct 2015 16:00	1	Maintenance - zero/span check after restart
CH4, NMHC, THC	01 Oct 2015 01:00	01 Oct 2015 07:00	7	Analyzer Failure - fuel supply interrupted
CH4, NMHC, THC	01 Oct 2015 08:00	02 Oct 2015 09:00	26	Zero/span response not confirmed after FID relight
CH4, NMHC, THC	23 Oct 2015 14:00	23 Oct 2015 14:00	1	Maintenance - replaced carrier gas
CH4, NMHC, THC	27 Oct 2015 13:00	27 Oct 2015 15:00	3	DAS collection error
CH4, NMHC, THC	27 Oct 2015 16:00	27 Oct 2015 17:00	2	Maintenance - zero/span check after restart
PM2.5	02 Oct 2015 19:00	02 Oct 2015 23:00	5	Unstable operation - excessive baseline drift
PM2.5	03 Oct 2015 01:00	03 Oct 2015 01:00	1	Unstable operation - excessive baseline drift
PM2.5	09 Oct 2015 14:00	09 Oct 2015 14:00	1	Unstable operation - excessive baseline drift
PM2.5	10 Oct 2015 11:00	10 Oct 2015 18:00	8	Unstable operation - excessive baseline drift
PM2.5	11 Oct 2015 09:00	11 Oct 2015 09:00	1	Unstable operation - excessive baseline drift
PM2.5	13 Oct 2015 16:00	13 Oct 2015 16:00	1	Unstable operation - excessive baseline drift
PM2.5	18 Oct 2015 14:00	18 Oct 2015 17:00	4	Unstable operation - excessive baseline drift
Wind Speed, Wind Direction	03 Oct 2015 07:00	03 Oct 2015 09:00	3	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	04 Oct 2015 00:00	04 Oct 2015 12:00	13	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	31 Oct 2015 22:00	01 Nov 2015 00:00	3	Flat line in sensor output signal -sensor frozen



Summary of Hour Averages

Anzac - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 ppb on Oct 19 14:00 Maximum Daily Average: 1.6 ppb on Oct 19																	Hours in Service: 744 Hours of Data: 708 Hours of Missing Data: 36 Hours of Calibration: 35 Percent Operational Time: 99.9									
Minimum Value: 0 ppb on Oct 2 21:00 Minimum Daily Average: 0.0 ppb on Oct 27 Maximum Diurnal Average: 1.1 ppb at hour 14 Minimum Diurnal Average: 0.2 ppb at hour 23 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> = 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	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1
2-Oct	0	0	0	1	1	Z	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.2	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	0.1	0
4-Oct	0	Z	0	0	0	0	0	0	0	0	0	1	3	4	5	6	5	5	2	0	0	0	0	0	1.5	6
5-Oct	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0.3	1
6-Oct	0	0	0	Z	0	0	0	0	0	1	1	1	2	1	2	3	1	0	1	1	0	0	0	0	0.7	3
7-Oct	0	0	0	0	Z	0	0	0	0	0	0	1	4	5	2	1	1	1	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	1	1	1	0	1	0	0	0	0	0	0.3	1
9-Oct	Z	0	1	1	1	1	0	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	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	2	2	1	0	0	0	0	0	0	0	0	0	0.4	2
12-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	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	0.2	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	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
16-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1	0	0	0.4	1
17-Oct	0	0	Z	0	0	0	0	0	1	1	0	0	1	0	0	1	1	1	1	1	1	1	1	1	0.5	1
18-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
19-Oct	0	0	0	0	Z	0	0	0	0	2	5	6	7	9	1	0	0	0	0	3	1	0	0	0	1.6	9
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	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	4	0	0	0	0	0	0	0.5	4
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	1	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	0	0	0	0.2	0
25-Oct	0	0	0	0	Z	1	1	1	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0.6	1
26-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	2	3	0	0	0	0	0	0.5	3
27-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0.0	0
28-Oct	0	Z	0	0	0	0	0	0	1	4	2	0	1	4	4	0	0	0	0	0	0	0	0	0	0.7	4
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	1	0	Z	3	2	1	0	0	0	1	2	2	2	4	2	2	1	1	0	0	0	0	1.1	4
																								Diurnal Average		
																								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**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Anzac - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	708	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: 708

Total Number of Hours: 744





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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Anzac - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	29	5	6	10	9	20	76	93	43	26	26	27	89	106	71	54	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>	29	5	6	10	9	20	76	93	43	26	26	27	89	106	71	54	690

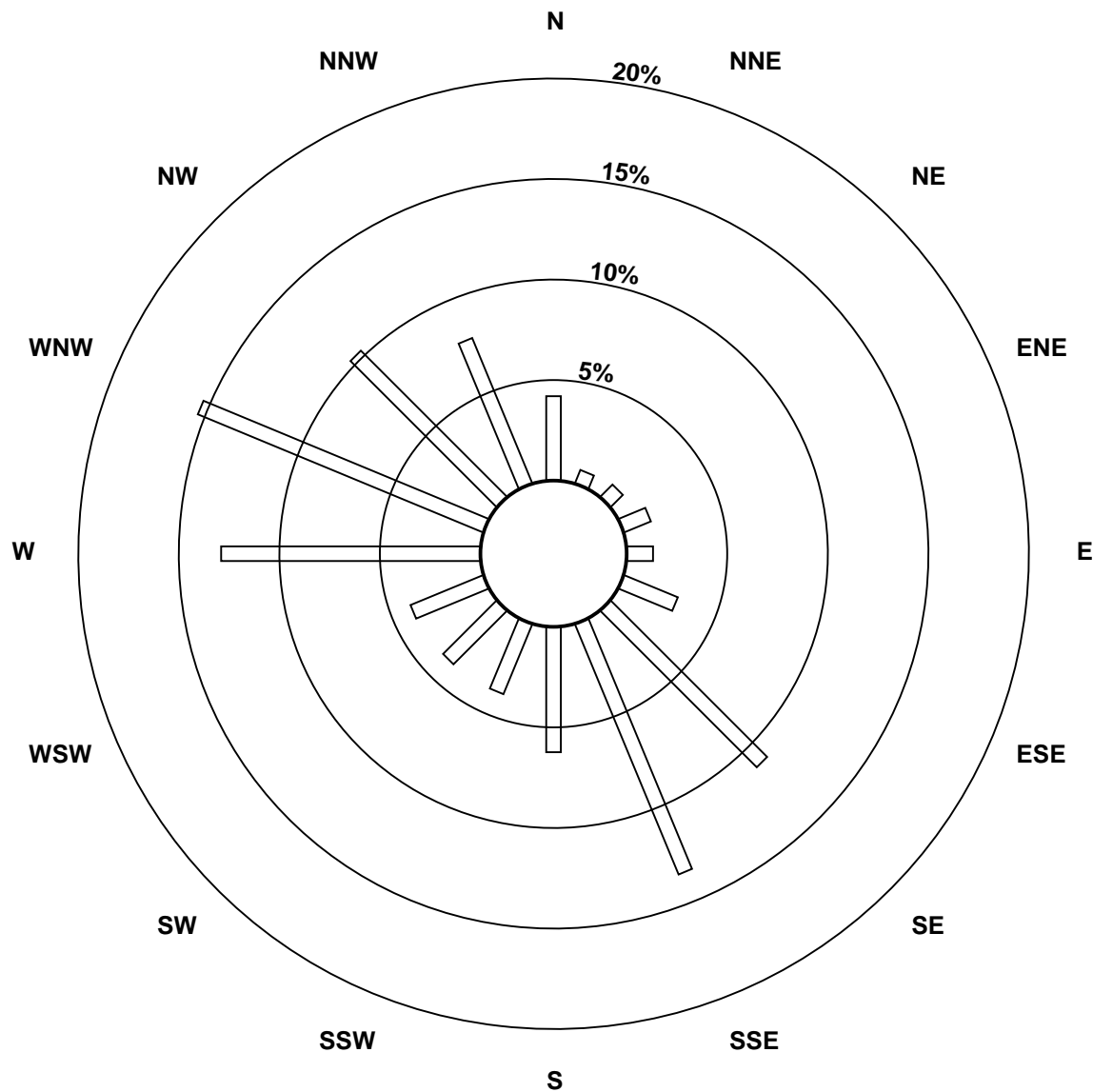
Total Number of Valid Hours: 690

Total Number of Hours: 744

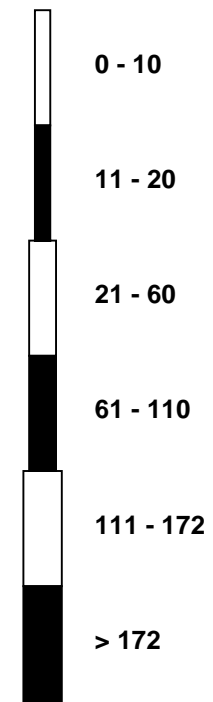


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

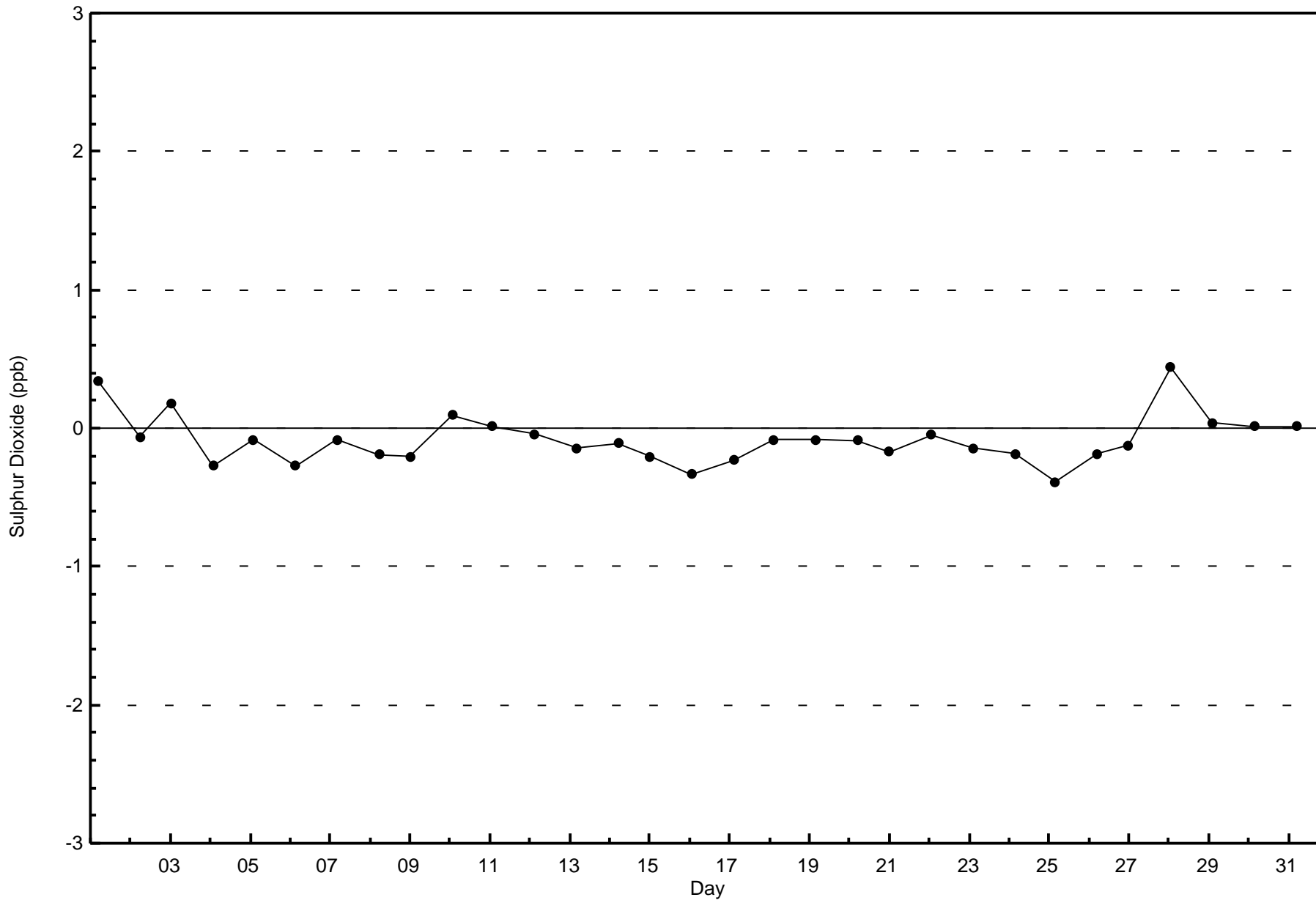
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Anzac (AMS 14)

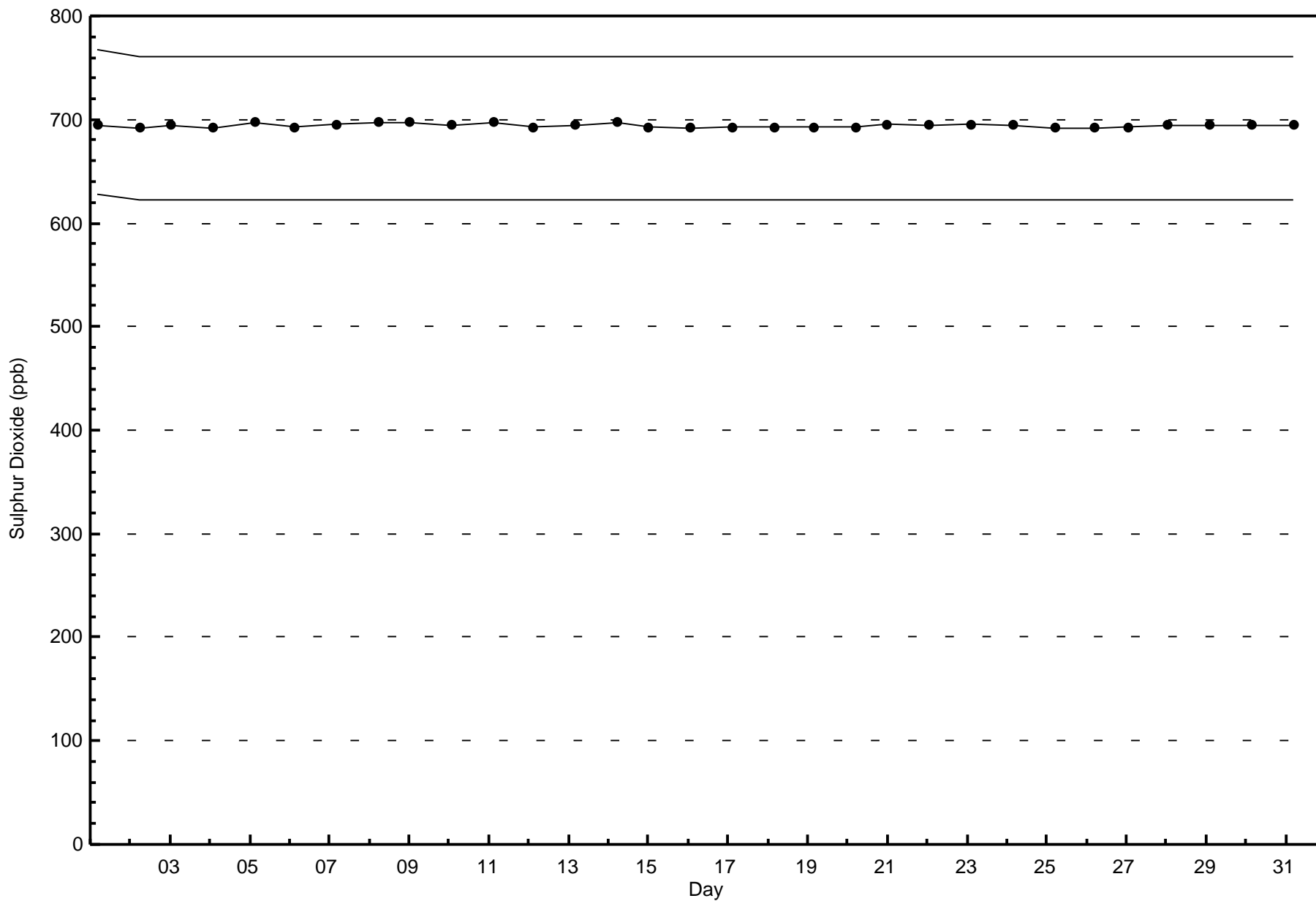


Classes (ppb)



Total Number of Valid Hours: 690



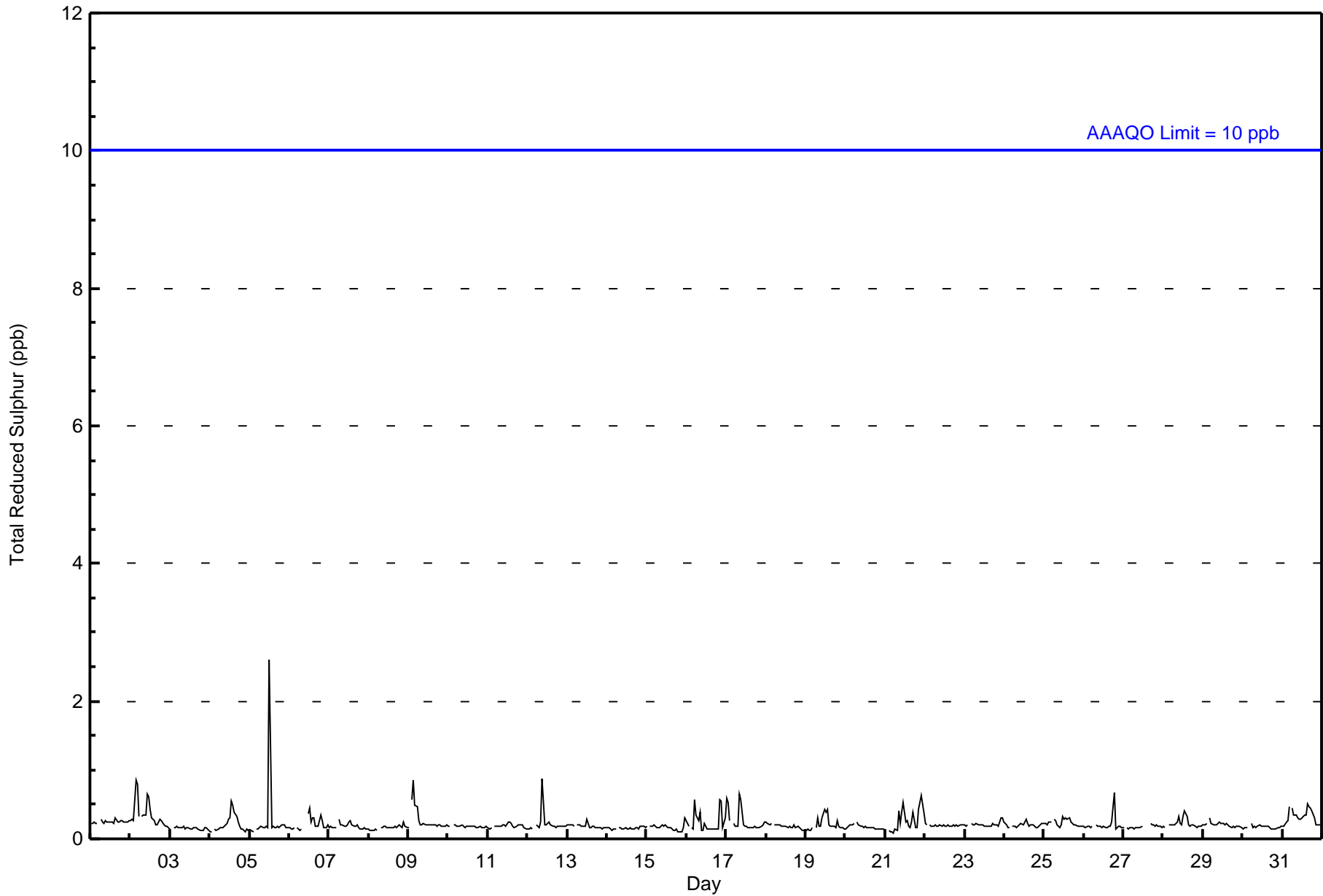




Summary of Hour Averages

Anzac - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3 ppb on Oct 5 13:00 Maximum Daily Average: 0.3 ppb on Oct 2																	Hours in Service: 744 Hours of Data: 706 Hours of Missing Data: 38 Hours of Calibration: 34 Percent Operational Time: 99.5									
Minimum Value: 0 ppb on Oct 21 06:00 Minimum Daily Average: 0.2 ppb on Oct 3 Maximum Diurnal Average: 0.3 ppb at hour 13 Minimum Diurnal Average: 0.2 ppb at hour 20 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																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	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	1	1	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
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	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1
5-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0.3	3
6-Oct	0	0	0	0	Z	0	0	0	C	C	C	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	0.2	0
9-Oct	0	Z	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
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	0.2	0
12-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
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	0.2	0
16-Oct	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.2	1
17-Oct	1	1	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
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	0.2	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	0.2	0
21-Oct	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0.3	1
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	0.2	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	0.2	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	1	0	0	0	0	0	0.2	1
27-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	UO	UO	UO	M	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	0.2	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	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.3	1
																								Diurnal Average	Diurnal Maximum	
																								0.2	0.2	
																								1	1	
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**  
**Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Anzac - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	705	99.86	99.86
3 - 4	1	0.14	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**  
**Anzac - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	29	6	6	11	9	20	74	94	41	28	26	27	87	104	71	54	687
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
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>	29	6	6	11	9	20	74	94	41	28	26	27	87	105	71	54	688

Total Number of Valid Hours: 688

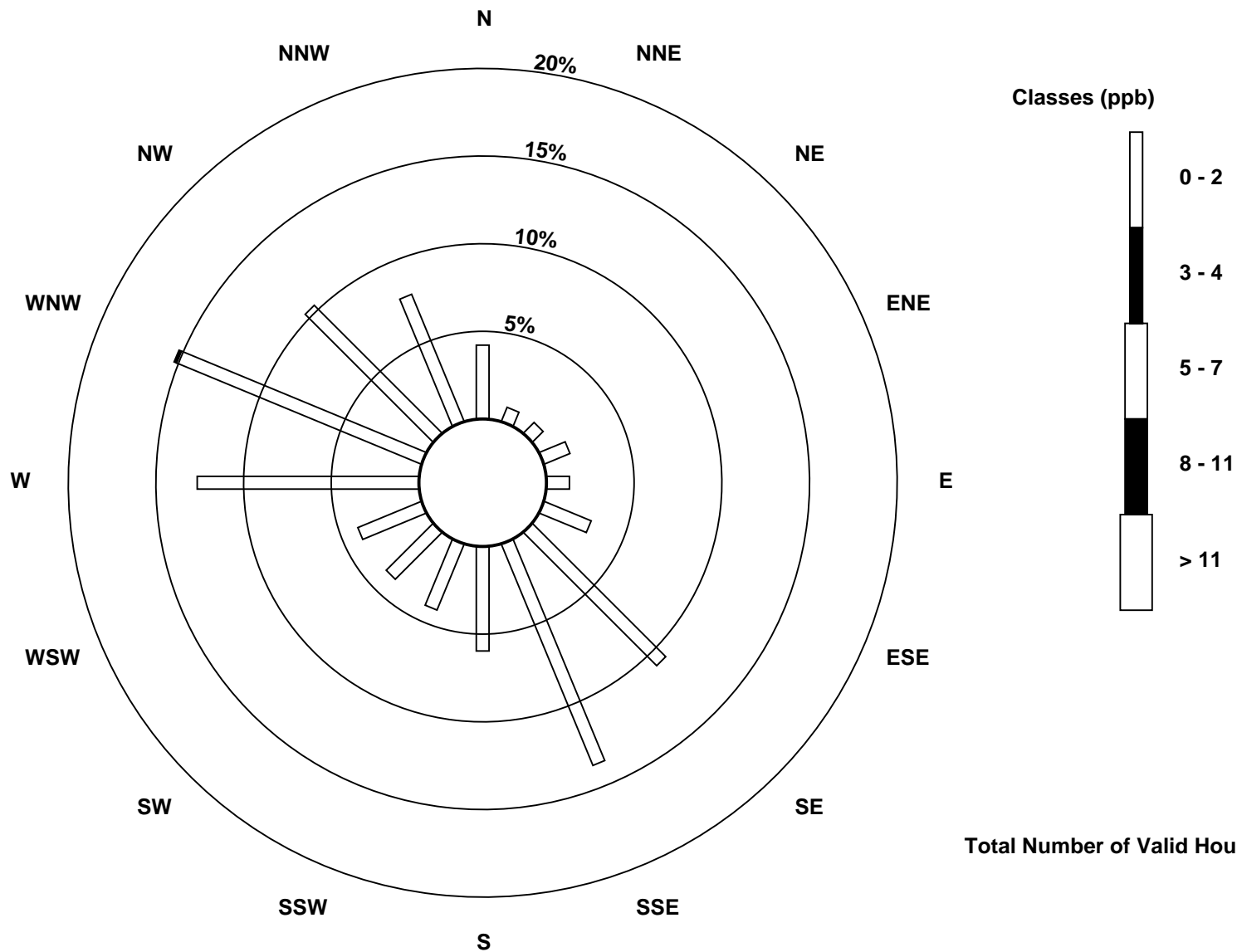
Total Number of Hours: 744



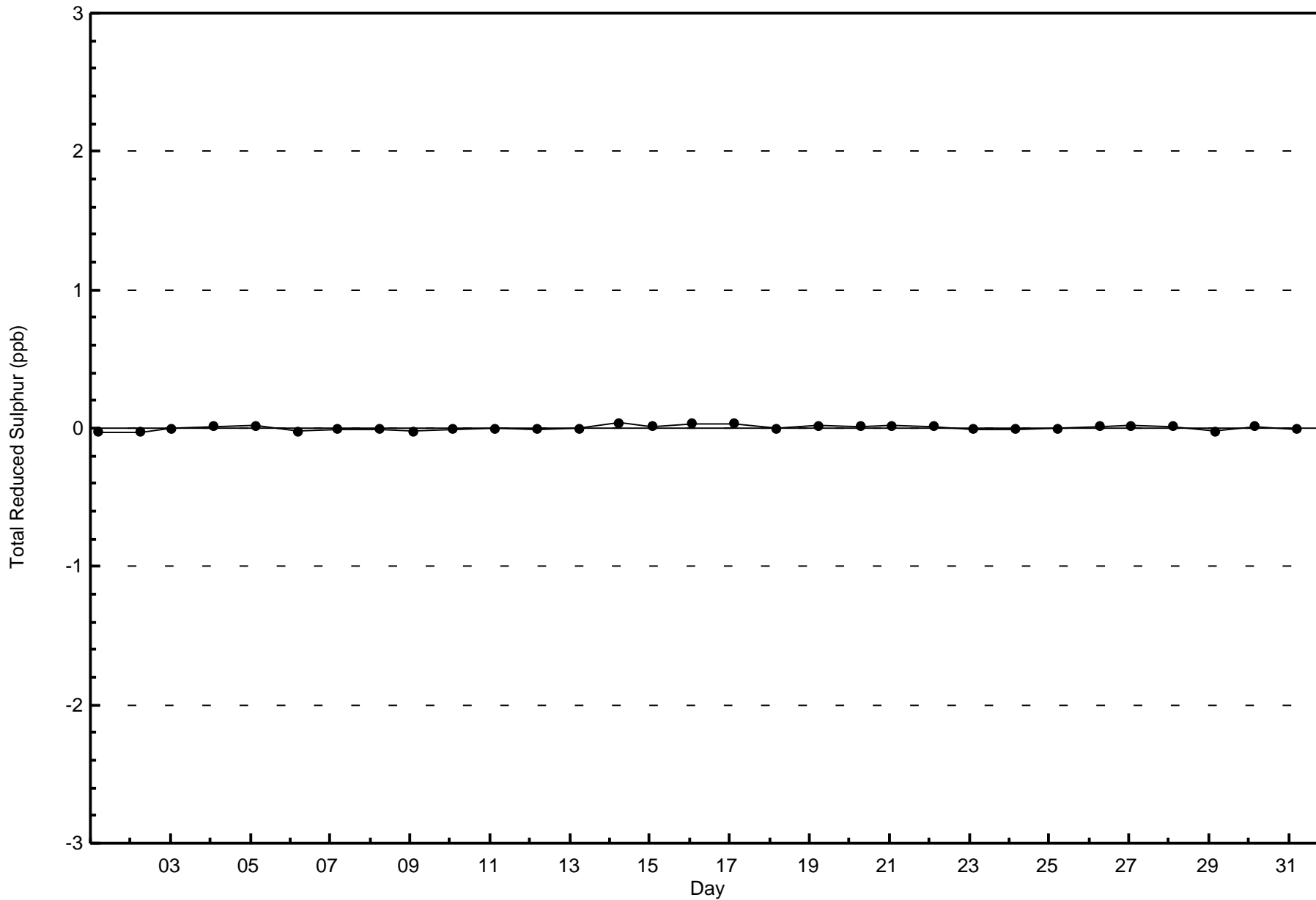


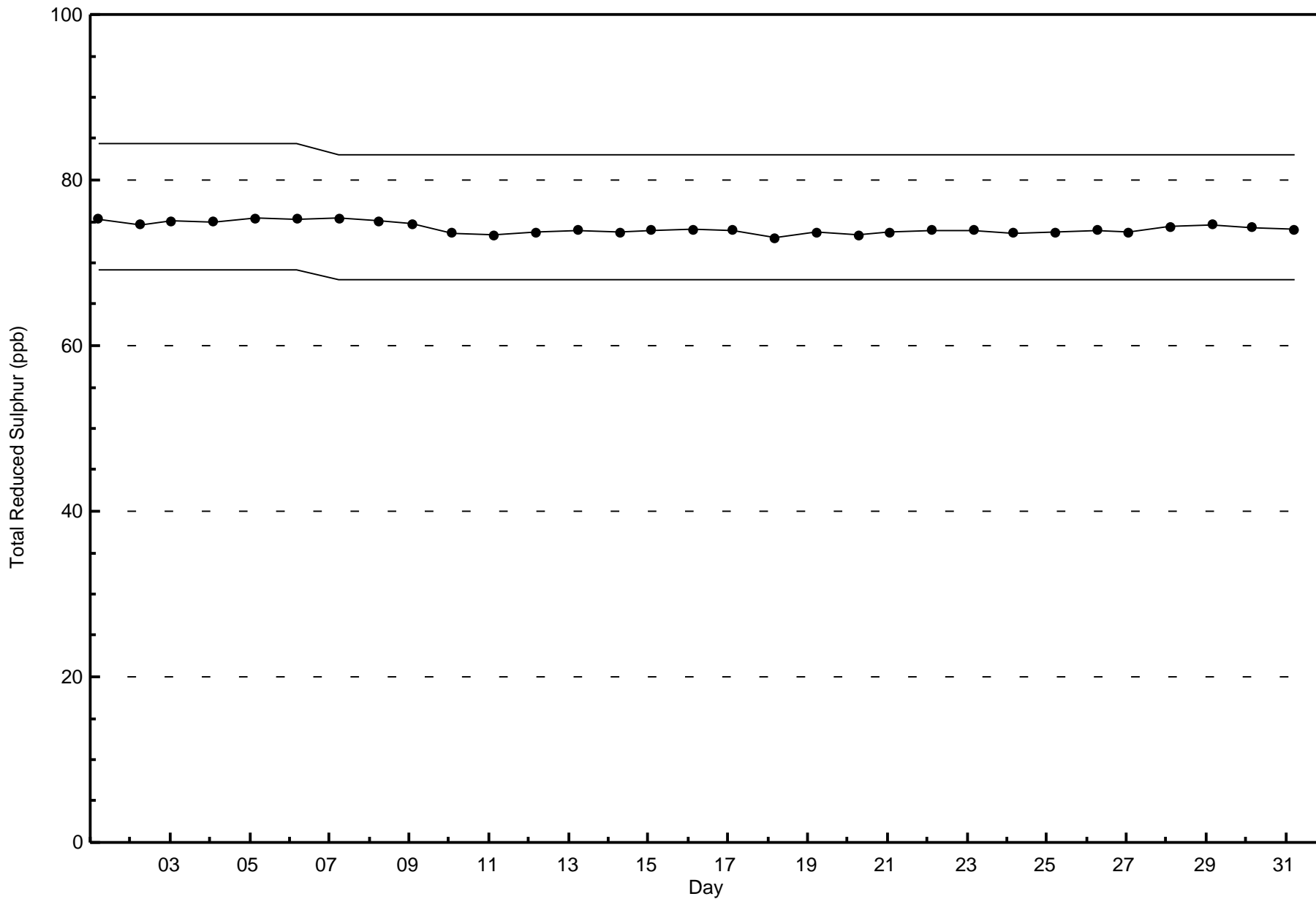
Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Total Reduced Sulphur (TRS) - ppb  
Anzac (AMS 14)



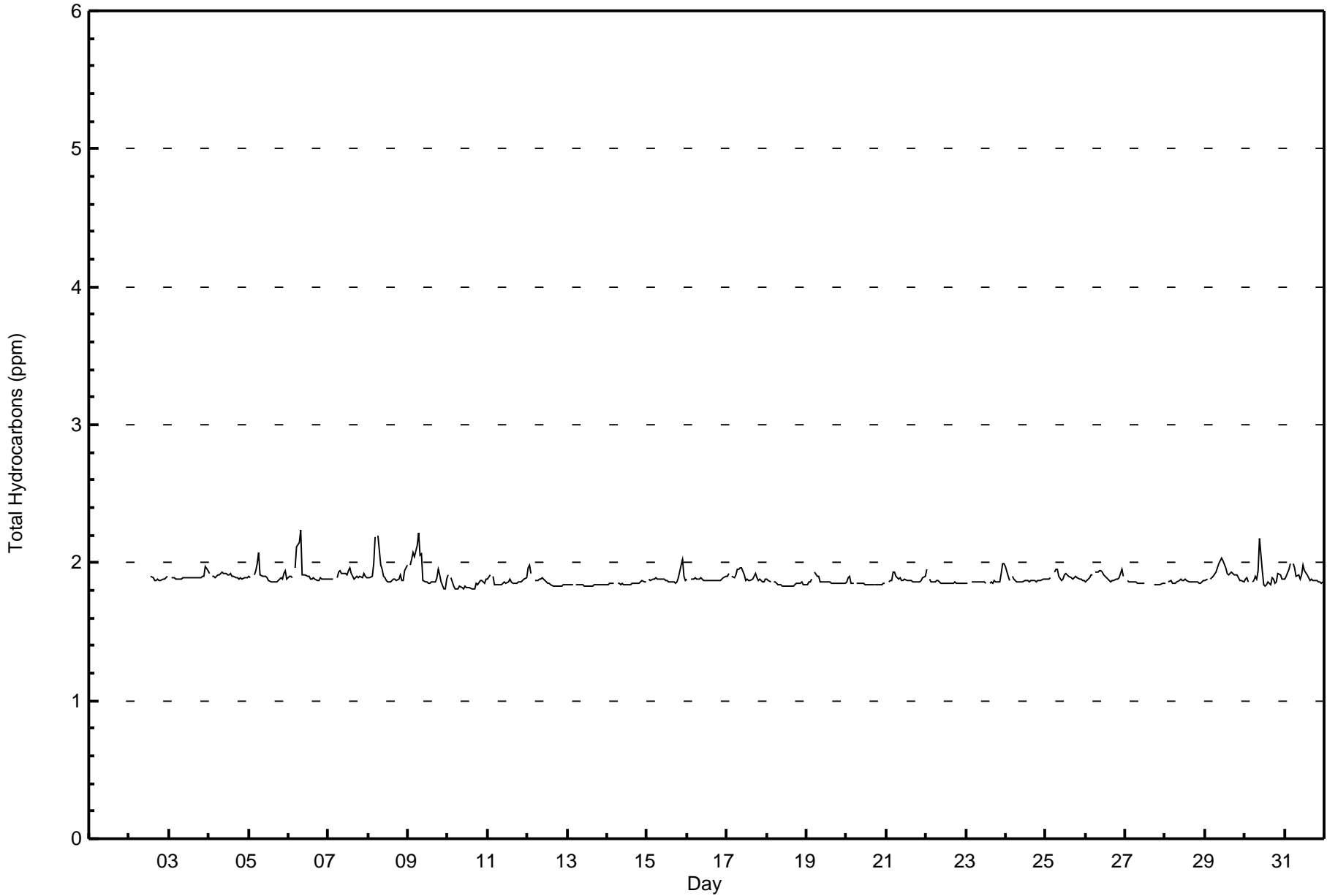
Total Number of Valid Hours: 688







Maximum Value: 2.2 ppm on Oct 6 08:00		Maximum Daily Average: 1.9 ppm on Oct 9		Hours in Service:	744																					
Minimum Value: 1.8 ppm on Oct 9 22:00		Minimum Daily Average: 1.8 ppm on Oct 10		Hours of Data:	672																					
Maximum Diurnal Average: 1.9 ppm at hour 7		Minimum Diurnal Average: 1.9 ppm at hour 16		Hours of Missing Data:	72																					
Monthly Average: 1.88 ppm		Percentiles: P <sub>1</sub> = 1.8 P <sub>10</sub> = 1.8 Q <sub>1</sub> = 1.9 Median = 1.9 Q <sub>3</sub> = 1.9 P <sub>90</sub> = 1.9 P <sub>99</sub> = 2.1		Hours of Calibration:	33																					
				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	AF	AF	AF	AF	AF	AF	AF	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	--
2-Oct	UO	UO	UO	UO	UO	UO	UO	UO	UO	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	--	1.9
3-Oct	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	1.9	2.0	
4-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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
5-Oct	1.9	1.9	Z	1.9	1.9	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	2.1	
6-Oct	1.9	1.9	1.9	Z	2.0	2.1	2.1	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	1.9	1.9	2.2	
7-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	2.0	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	2.0	2.2	Z	2.2	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	1.9	1.9	2.2	
9-Oct	Z	2.0	2.0	2.1	2.0	2.1	2.2	2.1	2.1	1.9	1.9	1.9	1.9	1.8	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.8	1.8	1.9	2.2	
10-Oct	1.9	Z	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.8	1.9	
11-Oct	1.9	1.9	Z	1.9	1.8	1.8	1.8	1.8	1.8	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	2.0	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	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0	
13-Oct	1.8	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	
14-Oct	1.8	1.8	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.8	1.9	
15-Oct	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	1.8	1.9	1.9	2.0	2.0	1.9	2.0	
16-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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
17-Oct	1.9	1.9	Z	1.9	1.9	1.9	1.9	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	
18-Oct	1.9	1.9	1.9	Z	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.9	1.8	1.8	1.9	
19-Oct	1.8	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	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	
20-Oct	1.9	1.9	1.9	1.9	1.8	Z	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	
21-Oct	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	
22-Oct	2.0	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	1.8	1.8	1.9	1.9	1.9	2.0	
23-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	M	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	
24-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	1.9	2.0	
25-Oct	1.9	1.9	1.9	1.9	Z	1.9	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	1.9	2.0	
26-Oct	1.9	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	2.0	1.9	1.9	2.0	
27-Oct	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	AF	AF	AF	M	M	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	
28-Oct	1.9	Z	1.9	1.9	1.9	1.8	1.8	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	1.9	Z	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
30-Oct	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	2.2	1.9	1.8	1.8	1.8	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.2	
31-Oct	1.9	1.9	2.0	2.0	Z	2.0	2.0	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	2.0	
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan      C - Calibration      M - Maintenance      AF - Analyzer Failure      UO - Unstable Operation																										





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

**Total Hydrocarbons (THC) - ppm**  
**Anzac - October 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	660	98.21	98.21
2.1 - 3.0	12	1.79	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 744



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

**Total Hydrocarbons (THC) - ppm**  
**Anzac - October 2015**

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	29	5	5	10	9	18	72	86	33	21	20	26	86	102	66	54	642
2.1 - 3.0	0	0	0	0	0	1	1	3	4	1	0	1	1	0	0	0	12
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	5	5	10	9	19	73	89	37	22	20	27	87	102	66	54	654

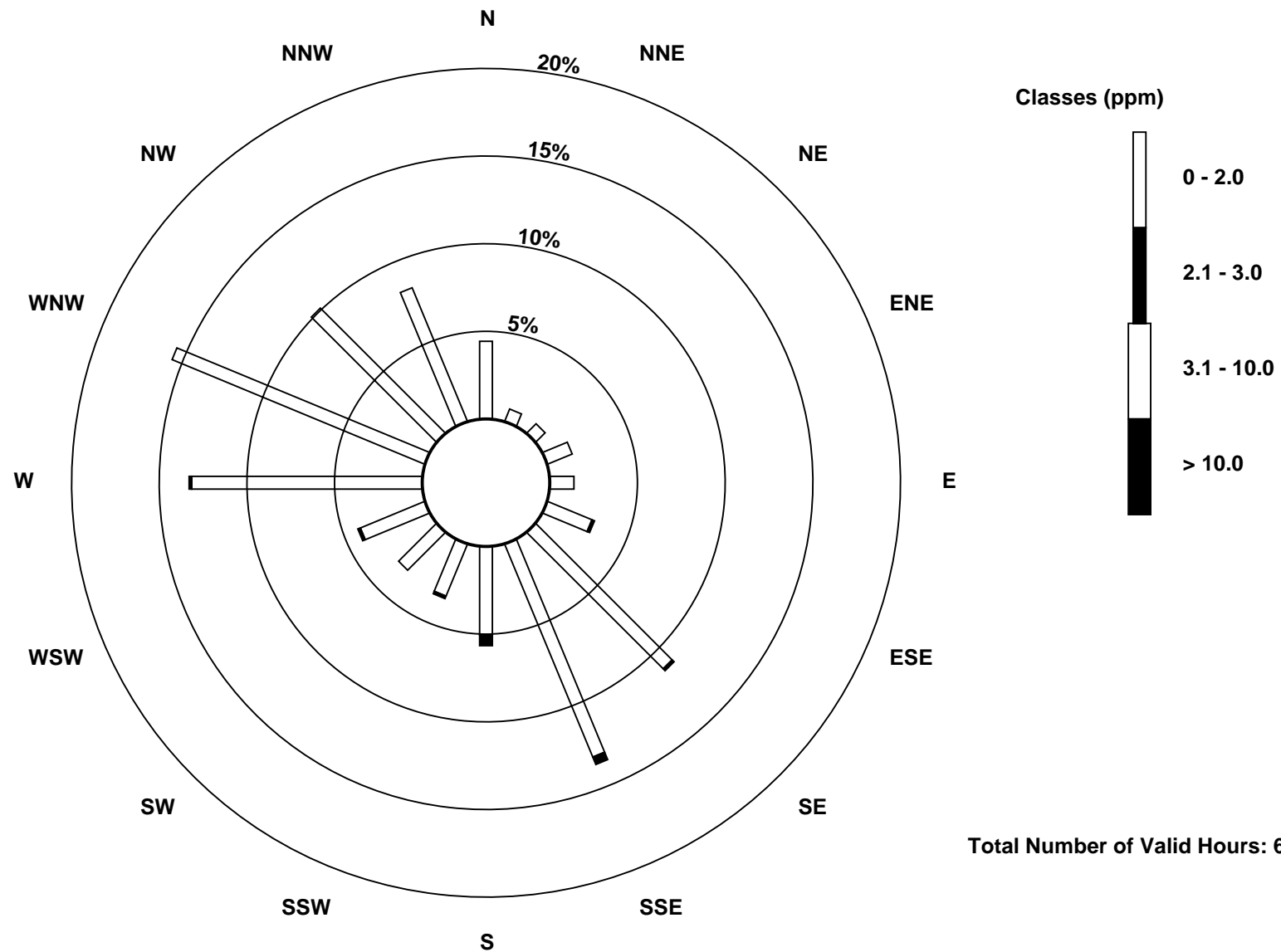
Total Number of Valid Hours: 654

Total Number of Hours: 744

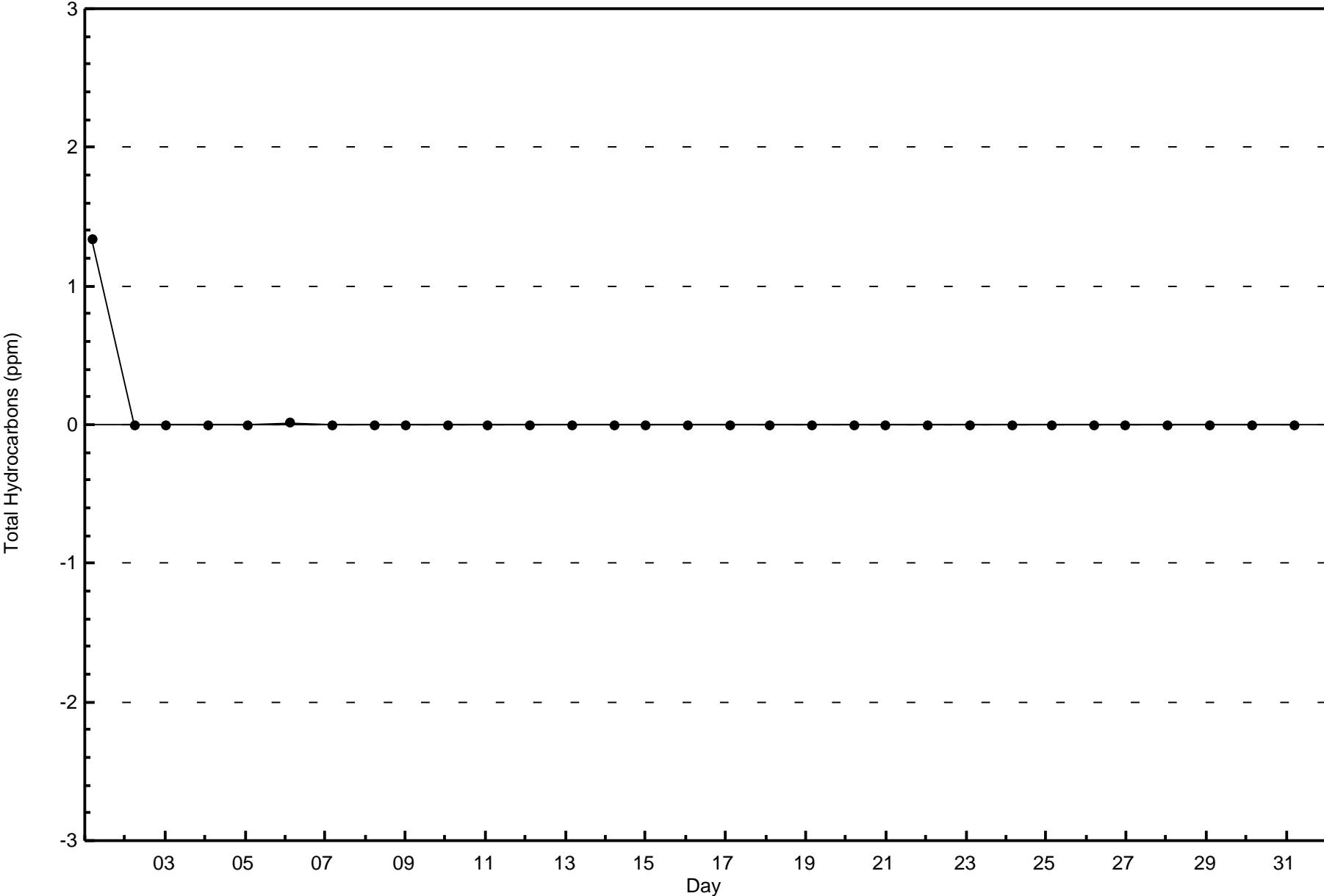


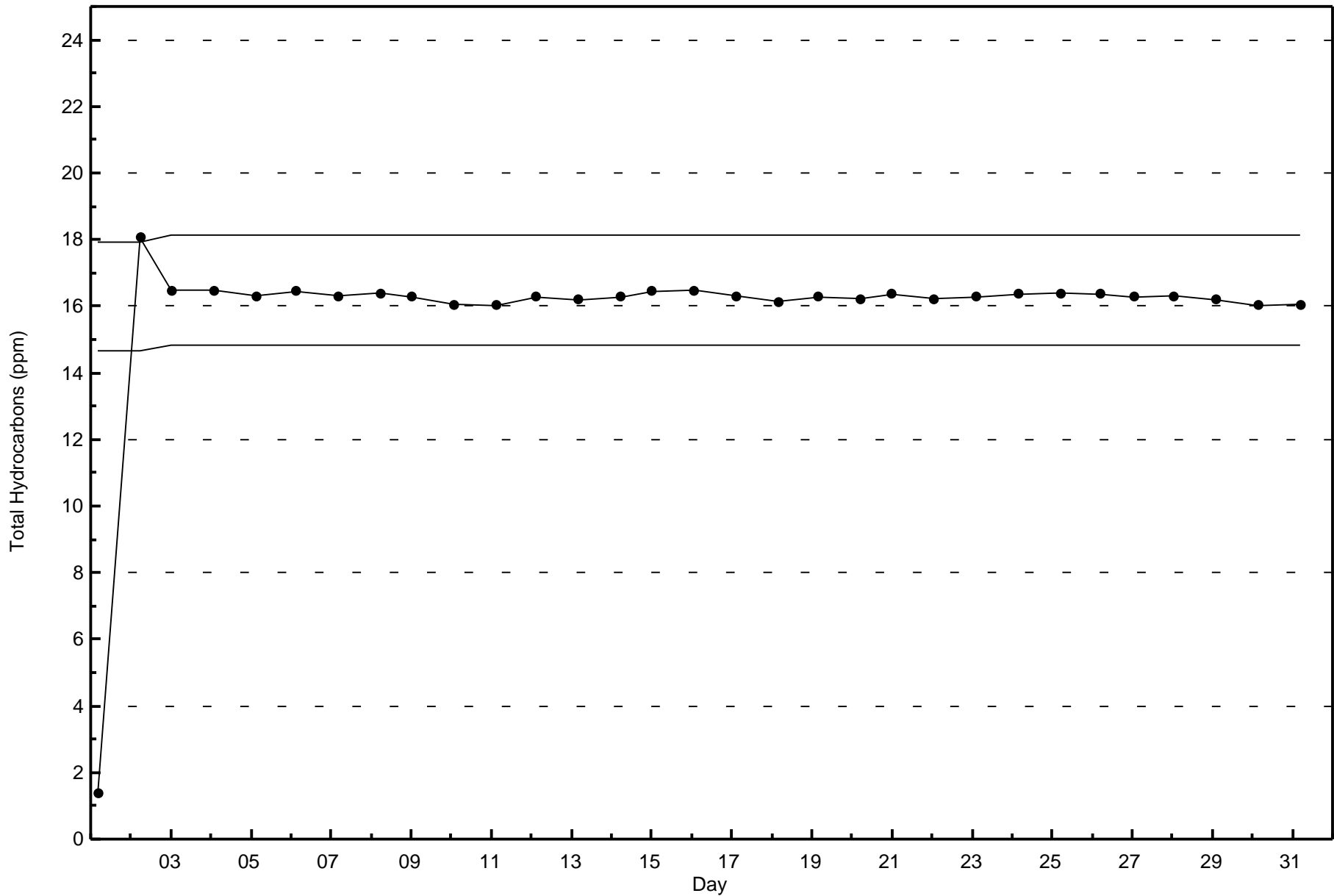
Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Total Hydrocarbons (THC) - ppm  
Anzac (AMS 14)







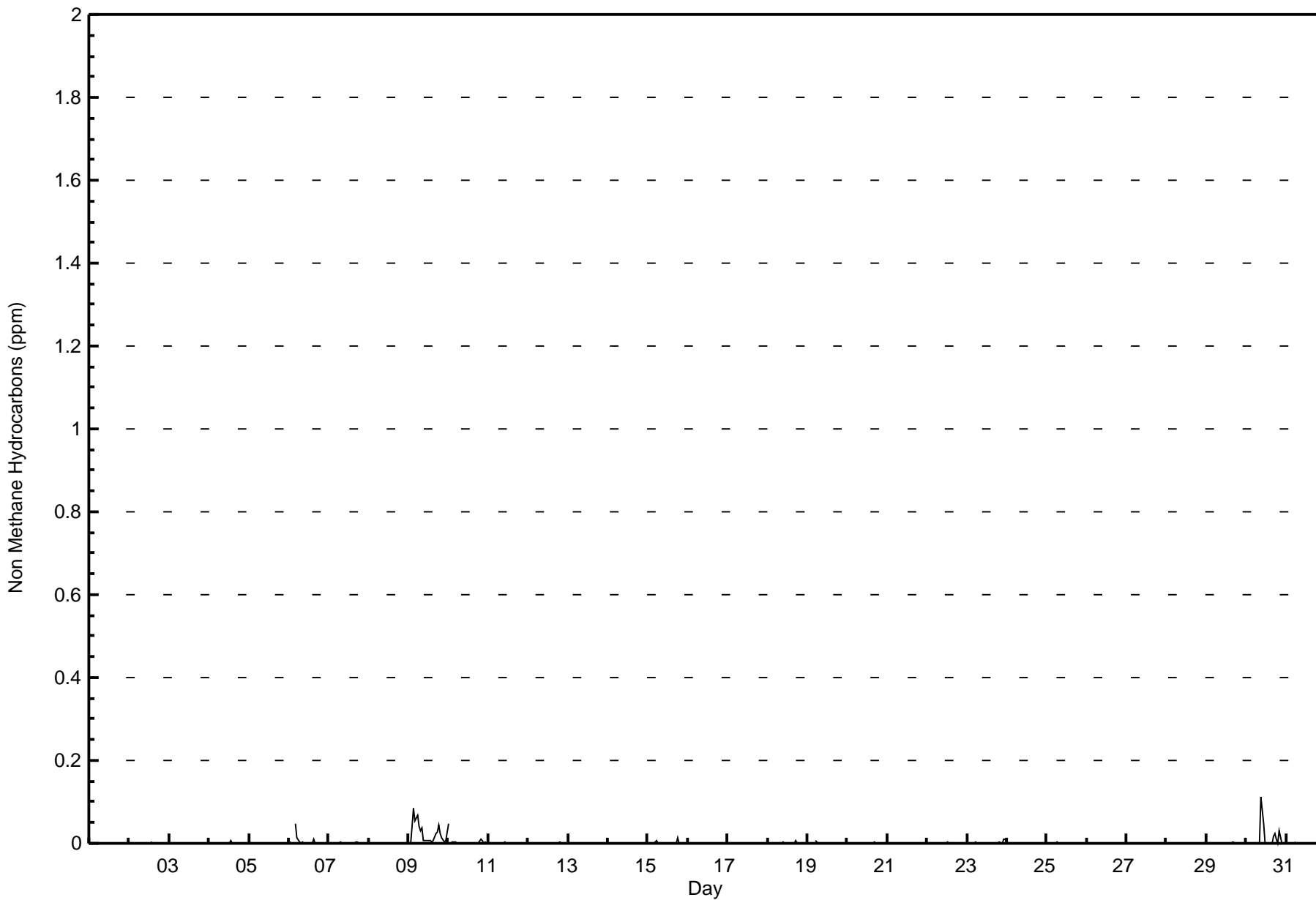




Summary of Hour Averages

Anzac - October 2015

Maximum Value: 0.110 ppm on Oct 30 10:00		Maximum Daily Average: 0.025 ppm on Oct 9		Hours in Service:	744																					
Minimum Value: 0.000 ppm on Oct 2 16:00		Minimum Daily Average: 0.000 ppm on Oct 28		Hours of Data:	672																					
Maximum Diurnal Average: 0.005 ppm at hour 5		Minimum Diurnal Average: 0.000 ppm at hour 2		Hours of Missing Data:	72																					
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:	33																					
				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	AF	AF	AF	AF	AF	AF	AF	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	--
2-Oct	UO	UO	UO	UO	UO	UO	UO	UO	UO	C	C	C	C	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	--	0.003
3-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	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	
4-Oct	0.000	Z	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008	
5-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	
6-Oct	0.003	0.000	0.000	Z	0.049	0.014	0.004	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.049	
7-Oct	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.003	0.000	0.000	0.000	0.000	0.001	0.001	0.004	
8-Oct	0.000	0.000	0.000	0.000	0.000	Z	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	0.000	0.000	0.000	0.000	0.000	0.001	
9-Oct	Z	0.001	0.042	0.084	0.054	0.067	0.042	0.030	0.038	0.008	0.007	0.006	0.007	0.006	0.003	0.006	0.024	0.028	0.044	0.025	0.014	0.003	0.006	0.025	0.084	
10-Oct	0.046	Z	0.003	0.004	0.002	0.001	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	0.010	0.006	0.001	0.003	0.003	0.046	
11-Oct	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	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	
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	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.002	
13-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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
14-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	0.001	0.000	0.000	0.000	0.001	
15-Oct	Z	0.000	0.001	0.000	0.004	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.000	0.000	0.000	0.000	0.001	0.013	
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	0.000	0.000	0.000	0.000	0.000	0.000	
17-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	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	
18-Oct	0.000	0.000	0.000	Z	0.001	0.001	0.000	0.001	0.002	0.003	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.001	0.006	
19-Oct	0.000	0.000	0.000	0.000	Z	0.007	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	0.007	
20-Oct	0.000	0.000	0.000	0.001	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	
21-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	
22-Oct	0.000	Z	0.000	0.002	0.000	0.000	0.000	0.000	0.002	0.000	0.001	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	
23-Oct	0.000	0.000	Z	0.000	0.000	0.003	0.000	0.001	0.000	0.000	0.000	0.000	0.000	M	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.001	0.009	0.001	0.009	
24-Oct	0.002	0.001	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	0.002	
25-Oct	0.000	0.000	0.000	0.000	Z	0.001	0.003	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	
26-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	0.000	0.001	0.000	0.000	0.001	
27-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	AF	AF	AF	M	M	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
28-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	0.000	0.000	0.000	0.000	0.000	0.000	
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	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	
30-Oct	0.000	0.000	0.000	Z	0.001	0.001	0.000	0.000	0.000	0.000	0.110	0.047	0.001	0.000	0.000	0.000	0.000	0.017	0.025	0.011	0.000	0.032	0.000	0.011	0.110	
31-Oct	0.000	0.000	0.000	0.000	Z	0.002	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	
		0.002	0.000	0.002	0.004	0.005	0.004	0.002	0.001	0.002	0.004	0.002	0.000	0.001	0.000	0.001	0.002	0.002	0.002	0.001	0.002	0.000	0.001	Diurnal Average		
		0.046	0.001	0.042	0.084	0.054	0.067	0.042	0.030	0.038	0.110	0.047	0.006	0.007	0.008	0.003	0.010	0.024	0.028	0.044	0.025	0.032	0.003	Diurnal Maximum		
Z - zerospan		C - Calibration					M - Maintenance					AF - Analyzer Failure					UO - Unstable Operation									





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

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Anzac - October 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.005	633	94.20	94.20
0.006 - 0.05	36	5.36	99.55
0.06 - 0.1	3	0.45	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 744



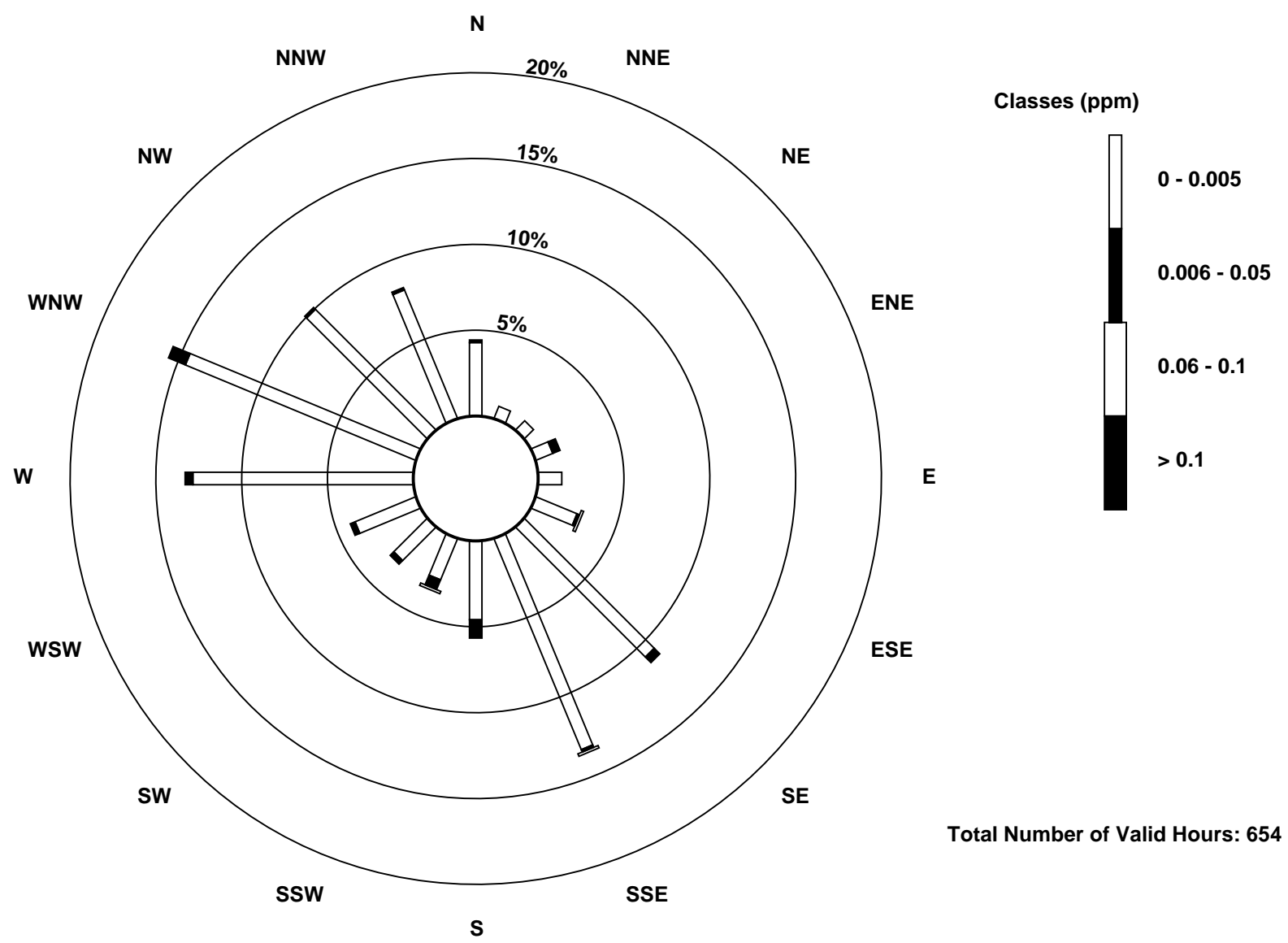
**Wood Buffalo Environmental Association**  
**Frequency Distribution**

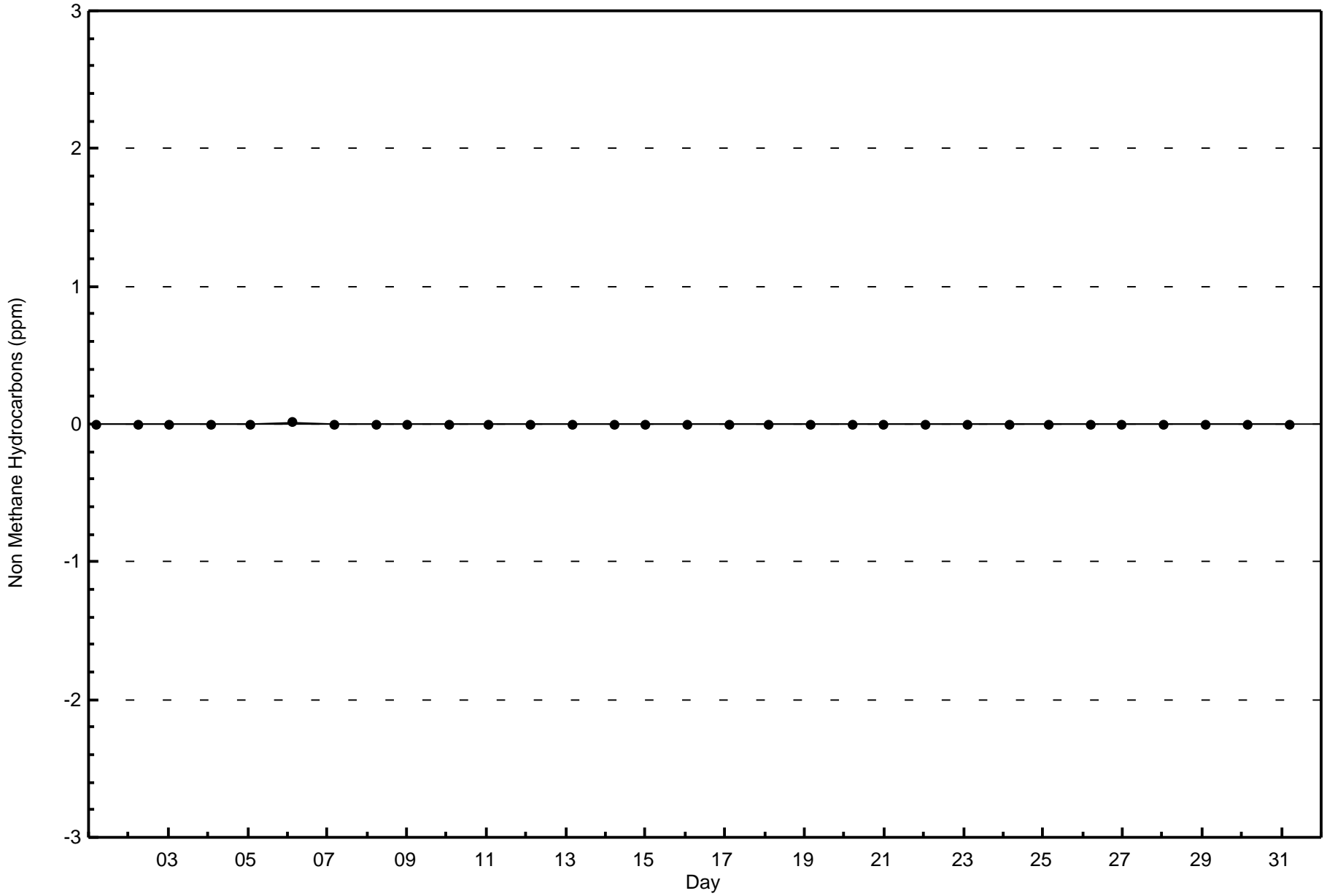
**Non Methane Hydrocarbons (NMHC) - ppm**  
**Anzac - October 2015**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	28	5	5	7	9	17	70	87	30	17	18	25	84	95	65	53	615
0.006 - 0.05	1	0	0	3	0	1	3	1	7	4	2	2	3	7	1	1	36
0.06 - 0.1	0	0	0	0	0	1	0	1	0	1	0	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
<b>Totals</b>	29	5	5	10	9	19	73	89	37	22	20	27	87	102	66	54	654

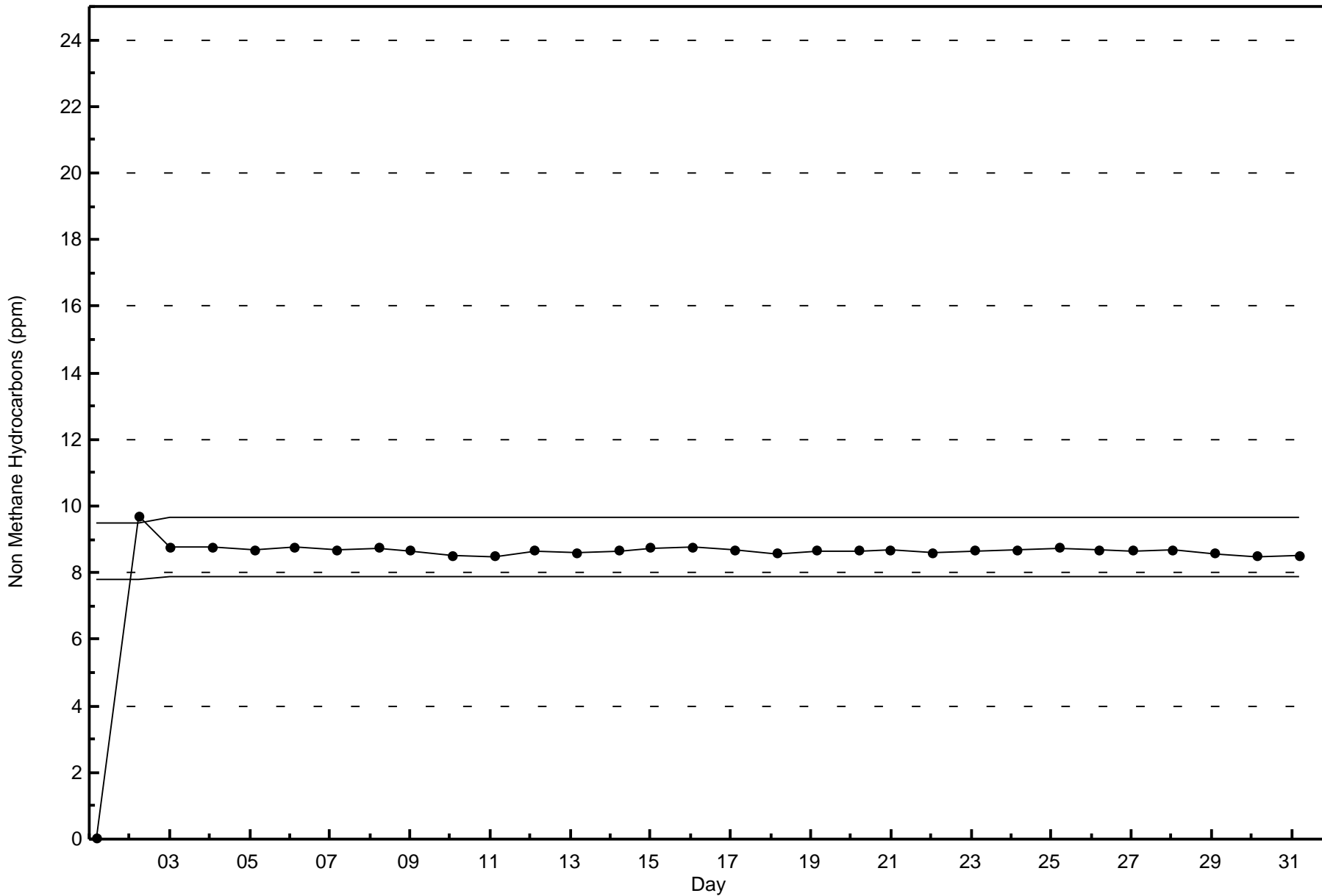
Total Number of Valid Hours: 654

Total Number of Hours: 744











Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH<sub>4</sub>) - ppm

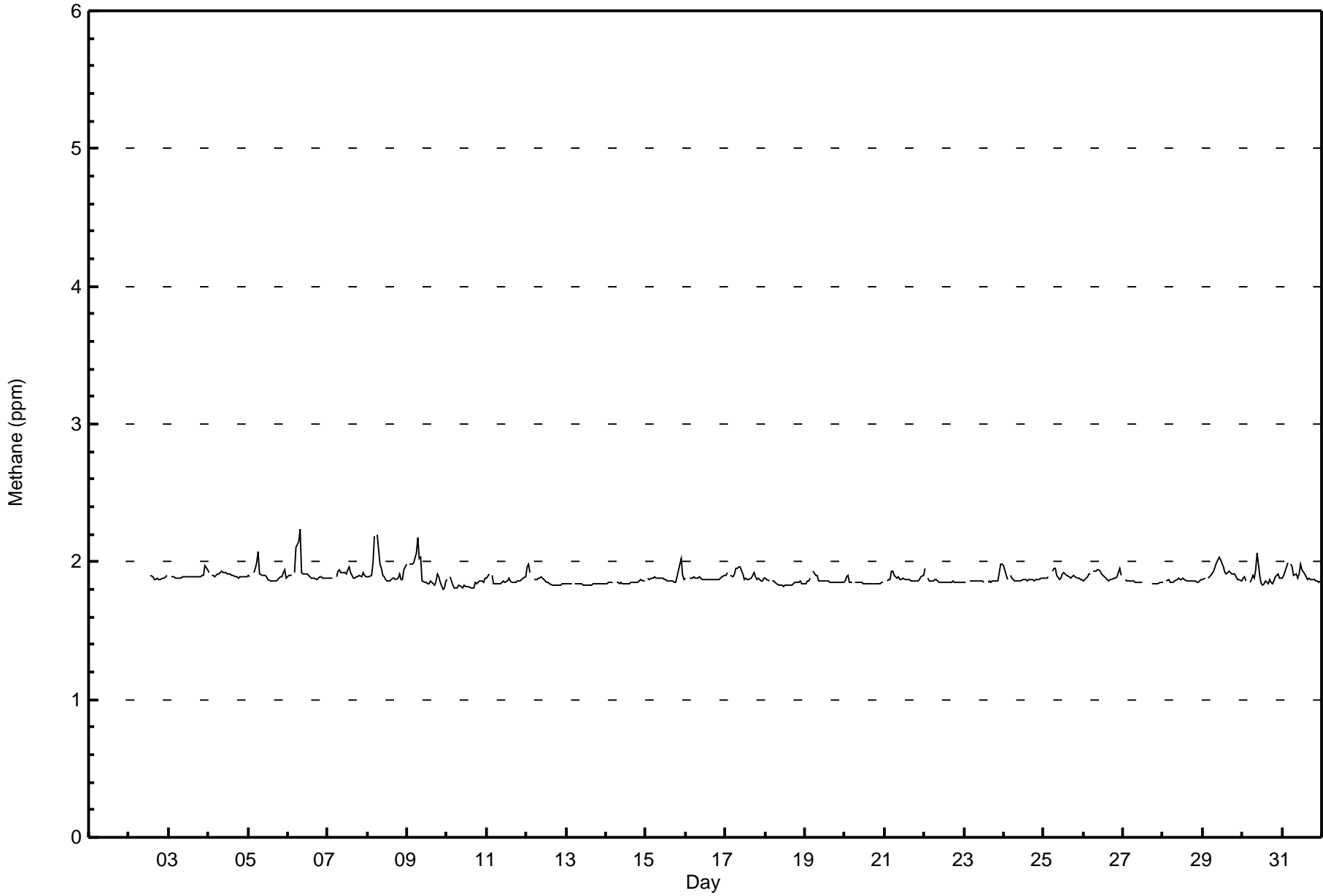
Anzac - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 744												
Maximum Value: 2.2 ppm on Oct 6 08:00														Maximum Daily Average: 1.9 ppm on Oct 6												
Minimum Value: 1.8 ppm on Oct 9 22:00														Minimum Daily Average: 1.8 ppm on Oct 10												
Maximum Diurnal Average: 1.9 ppm at hour 7														Minimum Diurnal Average: 1.9 ppm at hour 16												
Monthly Average: 1.88 ppm														Percentiles: P <sub>1</sub> = 1.8 P <sub>10</sub> = 1.8 Q <sub>1</sub> = 1.9 Median = 1.9 Q <sub>3</sub> = 1.9 P <sub>90</sub> = 1.9 P <sub>99</sub> = 2.1												
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	AF	AF	AF	AF	AF	AF	AF	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	--
2-Oct	UO	UO	UO	UO	UO	UO	UO	UO	UO	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	--	1.9
3-Oct	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	2.0	1.9	1.9	2.0
4-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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
5-Oct	1.9	1.9	Z	1.9	1.9	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	2.1
6-Oct	1.9	1.9	1.9	Z	1.9	2.1	2.1	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	1.9	1.9	1.9	2.2
7-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	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
8-Oct	1.9	1.9	1.9	2.0	2.2	Z	2.2	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	1.9	2.2
9-Oct	Z	2.0	2.0	2.0	2.0	2.1	2.2	2.0	2.0	1.9	1.9	1.9	1.8	1.8	1.9	1.9	1.8	1.9	1.9	1.9	1.8	1.8	1.8	1.9	1.9	2.2
10-Oct	1.9	Z	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.8	1.9	1.9
11-Oct	1.9	1.9	Z	1.9	1.8	1.8	1.8	1.8	1.8	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	2.0	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	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0
13-Oct	1.8	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
14-Oct	1.8	1.8	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9
15-Oct	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	1.8	1.9	1.9	2.0	2.0	1.9	1.9	2.0
16-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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
17-Oct	1.9	1.9	Z	1.9	1.9	1.9	1.9	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
18-Oct	1.9	1.9	1.9	Z	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.9	1.8	1.8	1.8	1.9
19-Oct	1.8	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	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9
20-Oct	1.9	1.9	1.9	1.9	1.8	Z	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9
21-Oct	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
22-Oct	2.0	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	1.8	1.8	1.9	1.9	1.9	2.0
23-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	M	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0
24-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	1.9	1.9	2.0
25-Oct	1.9	1.9	1.9	1.9	Z	1.9	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	1.9	1.9	2.0
26-Oct	1.9	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	2.0	1.9	1.9	2.0
27-Oct	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	AF	AF	AF	M	M	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9
28-Oct	1.9	Z	1.9	1.9	1.9	1.8	1.8	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	1.9	Z	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
30-Oct	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	2.1	1.9	1.8	1.8	1.8	1.9	1.8	1.9	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.1
31-Oct	1.9	1.9	2.0	2.0	Z	2.0	2.0	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	2.0
1.9 1.9																								Diurnal Average		
2.0 2.0 2.0 2.0 2.2 2.1 2.2 2.2 2.0 2.1 2.0 2.0 2.0 2.0 1.9 1.9 1.9 1.9 1.9 1.9 2.0 2.0 2.0 2.0																								Diurnal Maximum		
Z - zerospan			C - Calibration				M - Maintenance				AF - Analyzer Failure				UO - Unstable Operation											



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

**Methane (CH<sub>4</sub>) - ppm**  
**Anzac - October 2015**





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

**Methane (CH<sub>4</sub>) - ppm**  
**Anzac - October 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	663	98.66	98.66
2.1 - 3.0	9	1.34	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 744



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

**Methane (CH<sub>4</sub>) - ppm**  
**Anzac - October 2015**

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	29	5	5	10	9	19	72	86	34	21	20	26	87	102	66	54	645
2.1 - 3.0	0	0	0	0	0	0	1	3	3	1	0	1	0	0	0	0	9
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	5	5	10	9	19	73	89	37	22	20	27	87	102	66	54	654

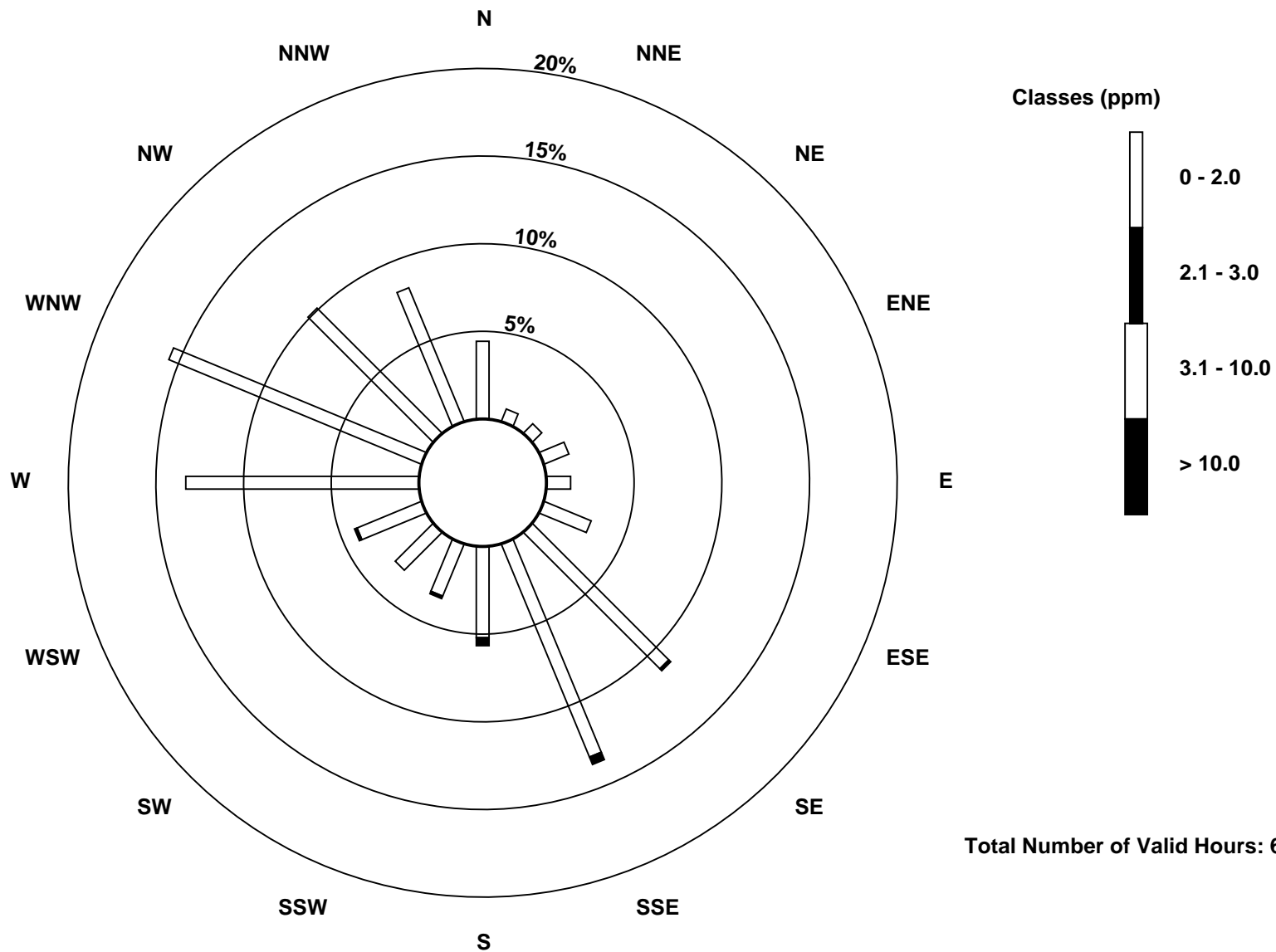
Total Number of Valid Hours: 654

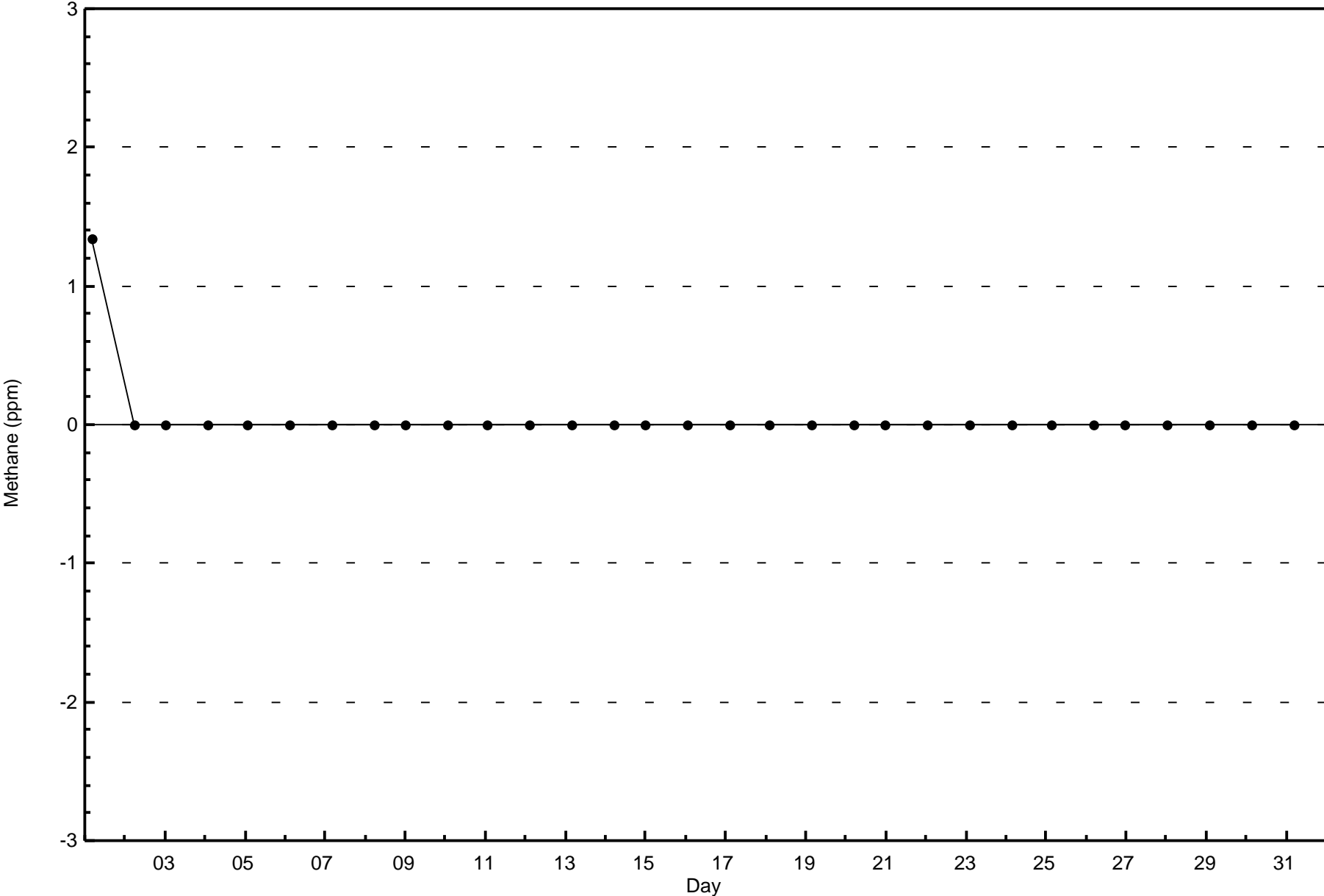
Total Number of Hours: 744

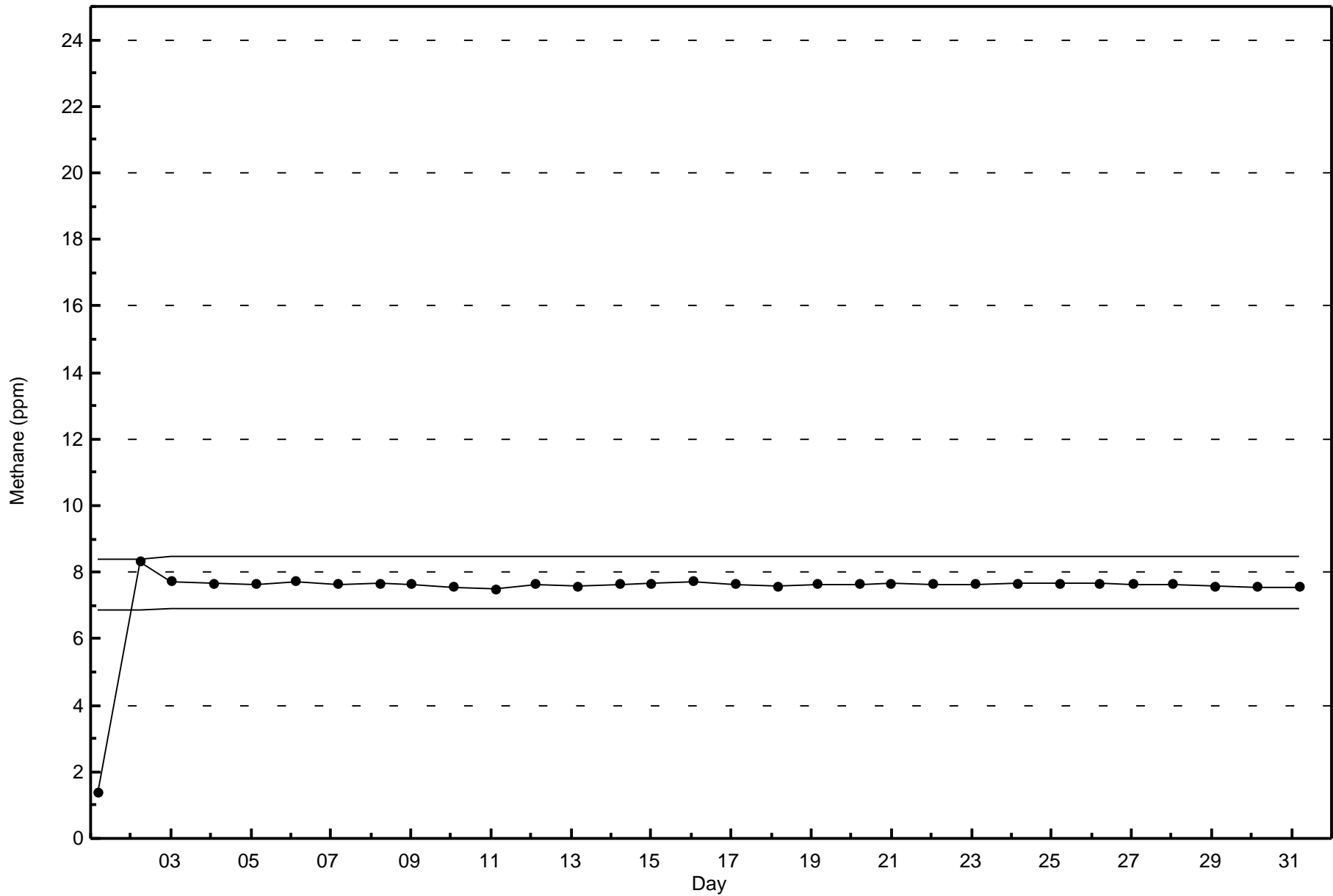


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Methane (CH<sub>4</sub>) - ppm  
Anzac (AMS 14)









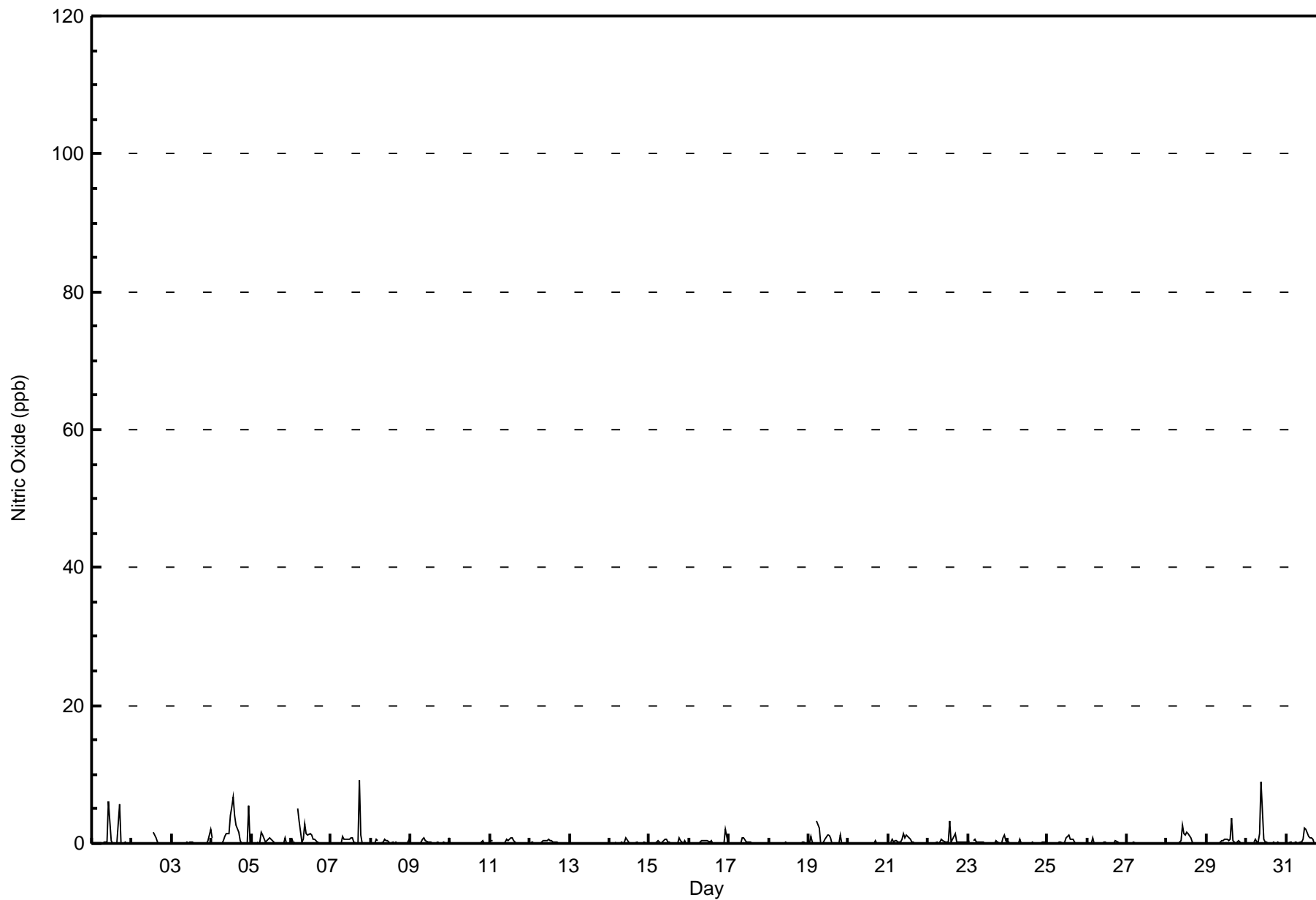


Maximum Value: 9 ppb on Oct 7 18:00		Maximum Daily Average: 1.5 ppb on Oct 4		Hours in Service: 744																																														
Minimum Value: 0 ppb on Oct 1 02:00		Minimum Daily Average: 0.0 ppb on Oct 20		Hours of Data: 707																																														
Maximum Diurnal Average: 0.7 ppb at hour 10		Minimum Diurnal Average: 0.1 ppb at hour 3		Hours of Missing Data: 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> = 1 P <sub>99</sub> = 5		Hours of Calibration: 36																																														
				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	6	0	0	0	0	0	6	0	0	0	0	0	0	0	0.6	6																								
2-Oct	0	0	0	0	0	Z	0	0	C	C	C	C	C	2	1	0	0	0	0	0	0	0	0	0	0.2	2																								
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	2	0.1	2																								
4-Oct	1	Z	0	0	0	0	0	0	1	2	1	4	5	7	4	3	2	0	0	0	0	0	5	0	1.5	7																								
5-Oct	0	0	Z	0	0	0	2	1	0	0	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0.3	2																								
6-Oct	1	0	0	Z	5	3	0	1	3	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.9	5																								
7-Oct	0	0	0	0	Z	0	0	1	1	1	1	1	1	0	0	0	0	9	1	0	0	0	0	0	0.7	9																								
8-Oct	0	0	0	1	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1																								
9-Oct	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	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	0																								
11-Oct	0	0	Z	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0.2	1																								
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	0.2	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	0.0	0																								
14-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	0.1	1																								
15-Oct	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	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	2	0	0.2	2																								
17-Oct	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	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	1	0	0	Z	3	2	0	0	0	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0.5	3																								
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	0.0	0																								
21-Oct	Z	0	1	0	0	0	0	0	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	2																								
22-Oct	0	Z	0	0	0	0	0	0	1	0	0	0	0	3	0	1	1	0	0	0	0	0	0	0	0.4	3																								
23-Oct	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.3	1																								
24-Oct	0	0	0	Z	0	0	0	1	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	Z	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.2	1																								
26-Oct	0	0	0	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																								
27-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0.0	0																								
28-Oct	0	Z	0	0	0	0	0	0	0	3	1	1	2	1	1	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	1	1	0	1	4	0	0	0	0	0	0	0	0	0.4	4																								
30-Oct	0	0	0	Z	0	1	0	0	1	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	9																								
31-Oct	0	0	0	0	Z	0	0	0	0	0	1	2	2	1	1	1	1	0	0	0	0	0	0	0	0.4	2																								
																								0.1	0.1	0.1	0.1	0.3	0.4	0.2	0.2	0.4	0.7	0.6	0.6	0.6	0.7	0.4	0.3	0.4	0.4	0.1	0.1	0.1	0.1	0.1	0.3	0.1	Diurnal Average	
																								1	1	1	1	5	3	2	1	3	9	6	4	5	7	4	4	4	6	9	1	1	1	1	5	2	Diurnal Maximum	
Z - zerospan		C - Calibration				M - Maintenance																																												



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

**Nitric Oxide (NO) - ppb**  
**Anzac - October 2015**





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

**Nitric Oxide (NO) - ppb**  
**Anzac - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	707	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: 707

Total Number of Hours: 744



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

**Nitric Oxide (NO) - ppb**  
**Anzac - October 2015**

<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	29	5	6	10	9	20	75	93	43	26	26	27	89	106	71	54	689
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	5	6	10	9	20	75	93	43	26	26	27	89	106	71	54	689

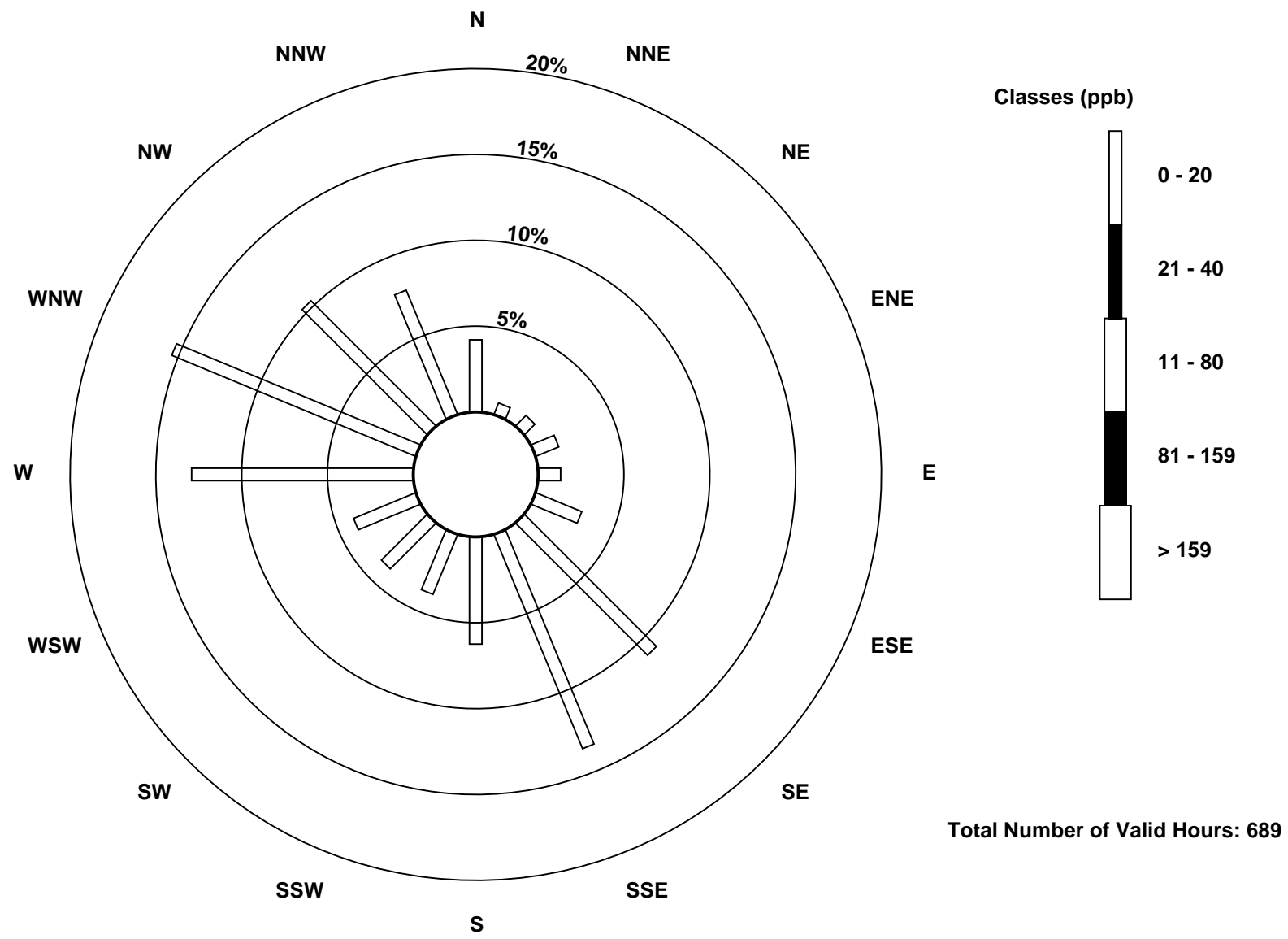
Total Number of Valid Hours: 689

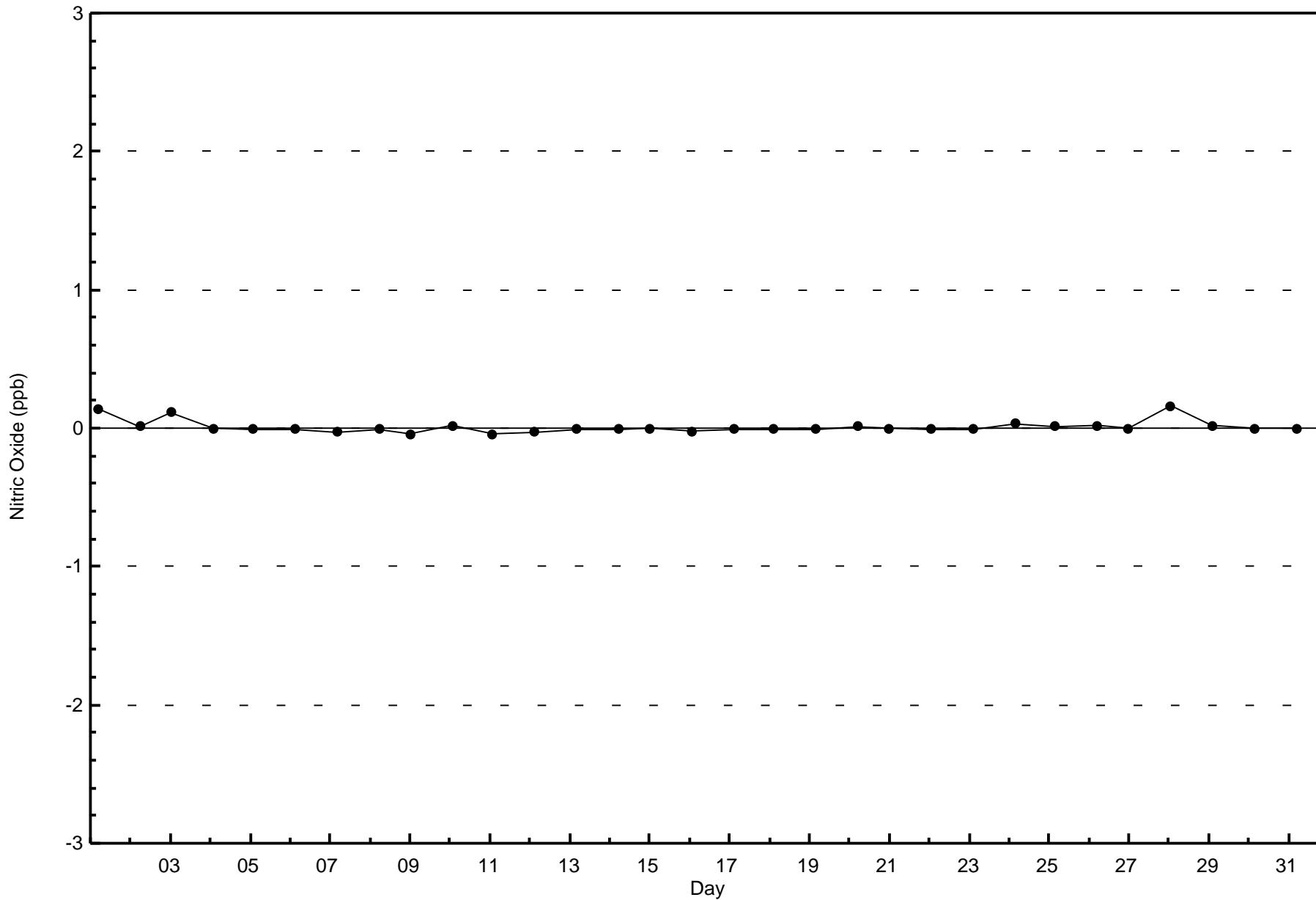
Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Nitric Oxide (NO) - ppb  
Anzac (AMS 14)

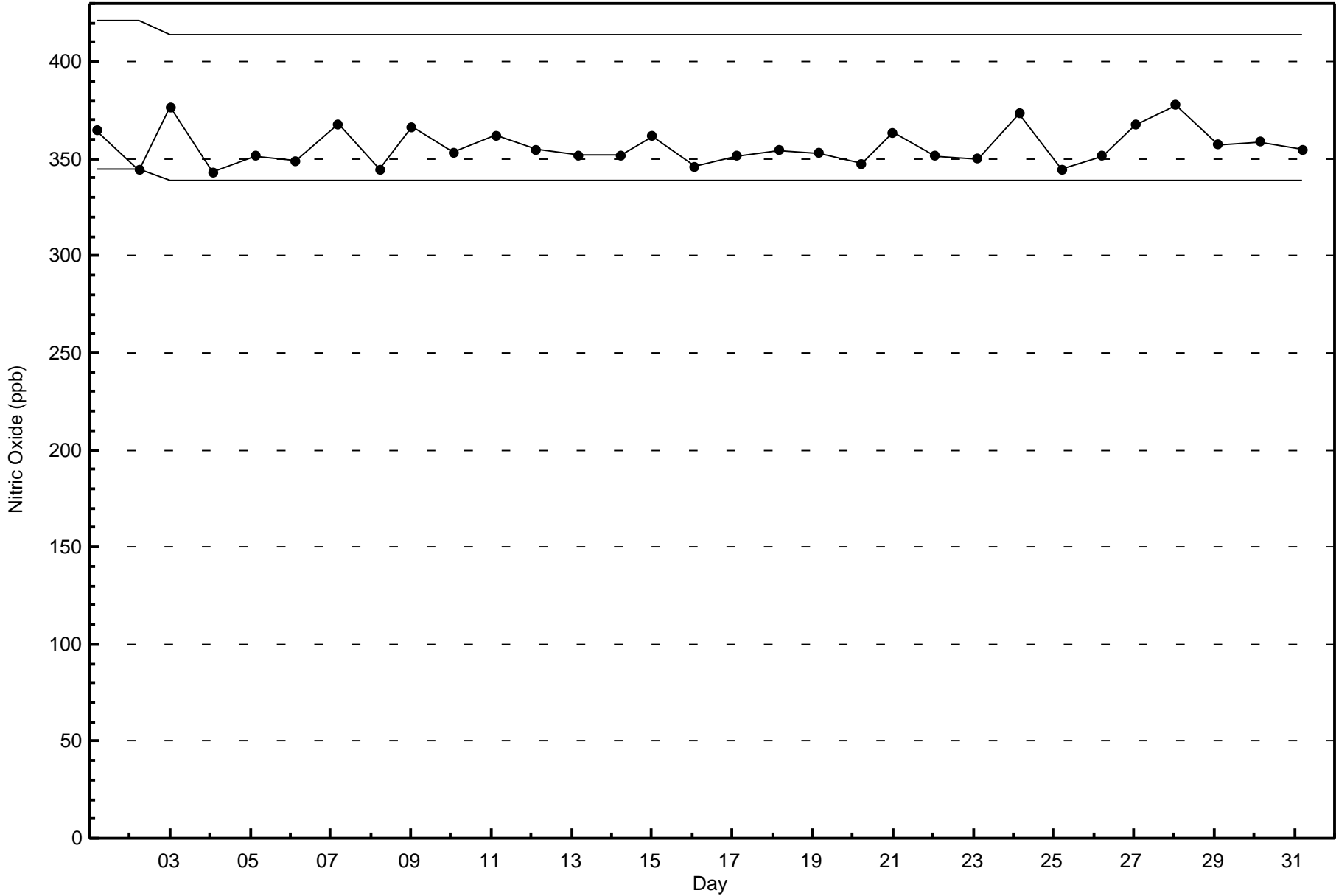






Wood Buffalo Environmental Association  
Span Responses

Nitric Oxide (NO) - ppb  
Anzac - October 2015





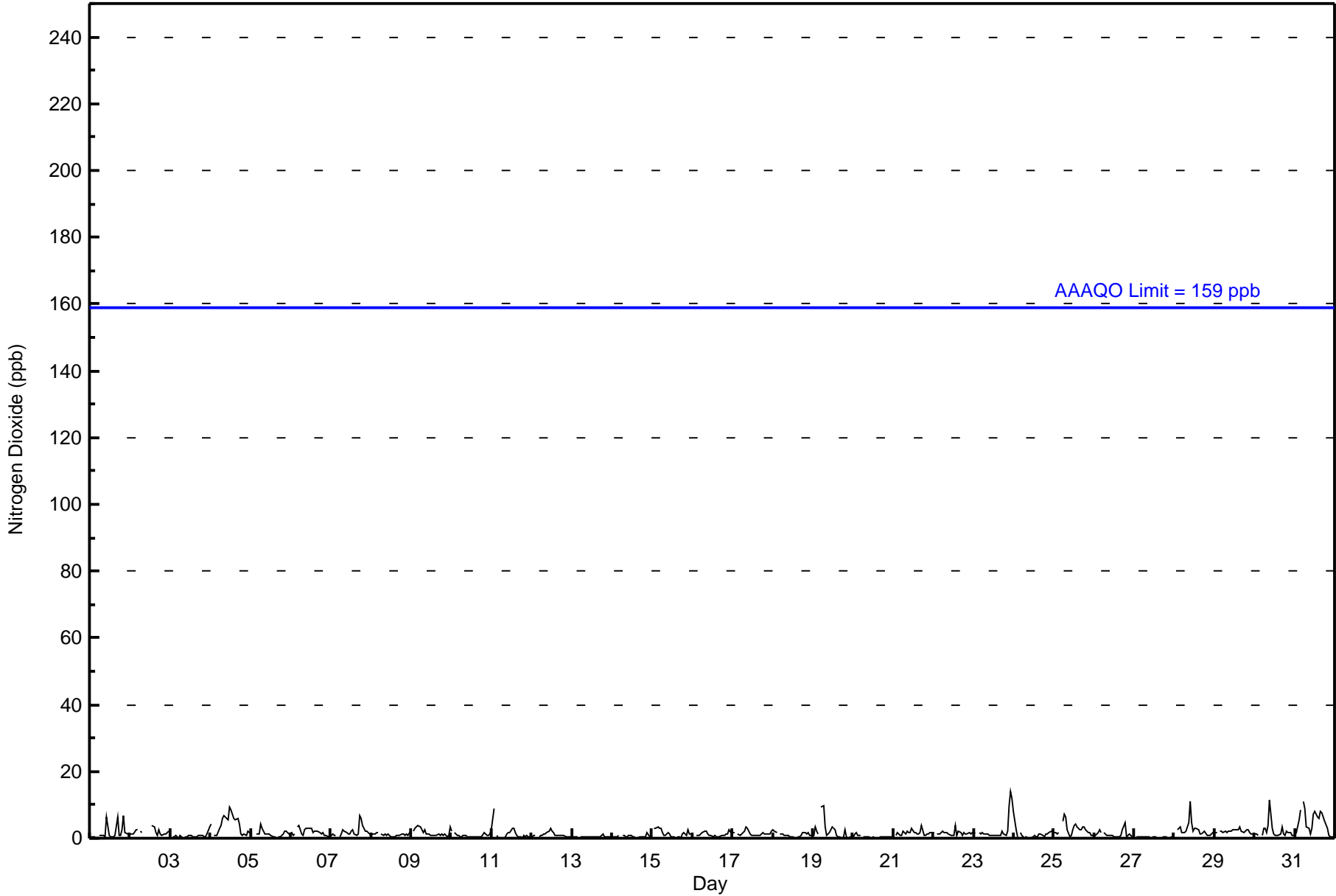
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 14 ppb on Oct 23 23:00      Maximum Daily Average: 4.7 ppb on Oct 31																	Hours in Service: 744 Hours of Data: 707 Hours of Missing Data: 37 Hours of Calibration: 36 Percent Operational Time: 99.9									
Minimum Value: 0 ppb on Oct 3 06:00      Minimum Daily Average: 0.3 ppb on Oct 27 Maximum Diurnal Average: 2.3 ppb at hour 6      Minimum Diurnal Average: 1.3 ppb at hour 21 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> = 10																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	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	7	1	0	0	1	1	6	1	1	3	7	2	1	1	1.6	7
2-Oct	1	1	1	3	3	Z	2	2	C	C	C	C	C	4	3	2	1	3	1	1	1	1	2	2	1.9	4
3-Oct	Z	0	0	1	0	0	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	4	0.7	4	
4-Oct	4	Z	1	1	1	3	4	6	7	6	6	9	8	7	6	5	6	4	1	1	1	1	2	2	4.1	9
5-Oct	1	1	Z	1	1	1	4	3	1	1	1	1	1	0	0	0	0	4	1	1	2	2	1	1.3	4	
6-Oct	2	1	1	Z	3	4	1	1	3	3	3	3	2	2	2	2	2	2	1	2	1	1	1	1.9	4	
7-Oct	1	1	1	1	Z	1	1	2	2	2	1	1	2	3	1	1	1	7	6	4	2	2	1	2.0	7	
8-Oct	1	1	1	2	2	Z	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	2	1.1	2	
9-Oct	Z	2	3	3	4	3	3	2	3	1	1	1	1	1	1	1	1	1	1	1	1	0	1	3	1.7	4
10-Oct	2	Z	2	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	2	1	1	1	0.8	2	
11-Oct	3	9	Z	1	0	0	0	0	0	1	2	2	3	3	2	1	1	0	0	1	1	1	1	1.3	9	
12-Oct	1	1	1	Z	0	1	1	1	1	2	2	3	2	2	1	1	1	1	1	1	0	0	1	1.0	3	
13-Oct	1	1	1	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	0	0	1	0.5	1	
14-Oct	1	0	1	1	1	Z	1	1	1	1	1	1	0	0	0	0	1	1	1	1	2	0	1	0.6	2	
15-Oct	Z	3	3	4	3	3	2	1	1	2	1	1	0	0	0	0	1	0	1	2	1	3	1	1.4	4	
16-Oct	1	Z	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1.1	2	
17-Oct	2	2	Z	1	1	1	2	2	3	3	1	1	1	1	1	1	1	1	2	1	1	1	2	1.5	3	
18-Oct	3	2	2	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	1	2	2	1	2	1	1.0	3	
19-Oct	1	4	2	1	Z	10	10	3	1	1	2	4	3	3	1	0	0	0	0	3	1	0	0	2.1	10	
20-Oct	1	1	2	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.5	2	
21-Oct	Z	1	2	1	1	1	2	1	2	2	2	3	2	2	1	1	2	4	1	1	1	1	2	1.6	4	
22-Oct	2	Z	1	1	1	2	2	2	2	1	1	1	1	4	1	2	2	1	2	1	1	2	1	1.5	4	
23-Oct	1	2	Z	2	1	2	1	1	1	1	1	1	1	1	1	1	2	1	1	2	10	14	12	2.6	14	
24-Oct	8	3	1	Z	2	1	0	1	0	0	0	1	1	1	1	1	1	1	1	1	2	2	2	1.2	8	
25-Oct	2	2	1	2	Z	5	7	7	3	1	1	3	4	4	3	2	2	3	3	3	2	2	1	2.7	7	
26-Oct	1	1	2	3	2	Z	2	1	1	1	1	1	1	1	1	1	3	5	1	1	1	1	1	1.2	5	
27-Oct	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0.3	1	
28-Oct	0	Z	3	4	2	2	2	2	5	11	5	2	3	3	2	1	1	2	2	1	1	1	2	2.4	11	
29-Oct	2	2	Z	2	2	2	2	2	2	2	2	3	3	2	3	3	2	2	2	3	3	2	1	2.1	3	
30-Oct	1	1	1	Z	1	3	3	2	4	12	3	1	1	1	1	1	3	1	1	2	2	2	1	2.1	12	
31-Oct	1	2	6	9	Z	11	9	4	3	1	3	7	8	6	6	8	8	6	5	3	1	1	1	4.7	11	
1.6 1.7 1.5 1.8 1.4 2.3 2.1 1.7 1.8 2.0 1.7 1.7 1.7 1.7 1.4 1.3 1.6 1.6 1.5 1.4 1.3 1.4 1.5 1.6																								Diurnal Average		
8 9 6 9 4 11 10 7 7 12 7 9 8 7 6 8 8 8 7 6 4 7 10 14 12																								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  
Anzac - October 2015





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Anzac - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	707	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: 707

Total Number of Hours: 744



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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Anzac - October 2015**

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	5	6	10	9	20	75	93	43	26	26	27	89	106	71	54	689
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	5	6	10	9	20	75	93	43	26	26	27	89	106	71	54	689

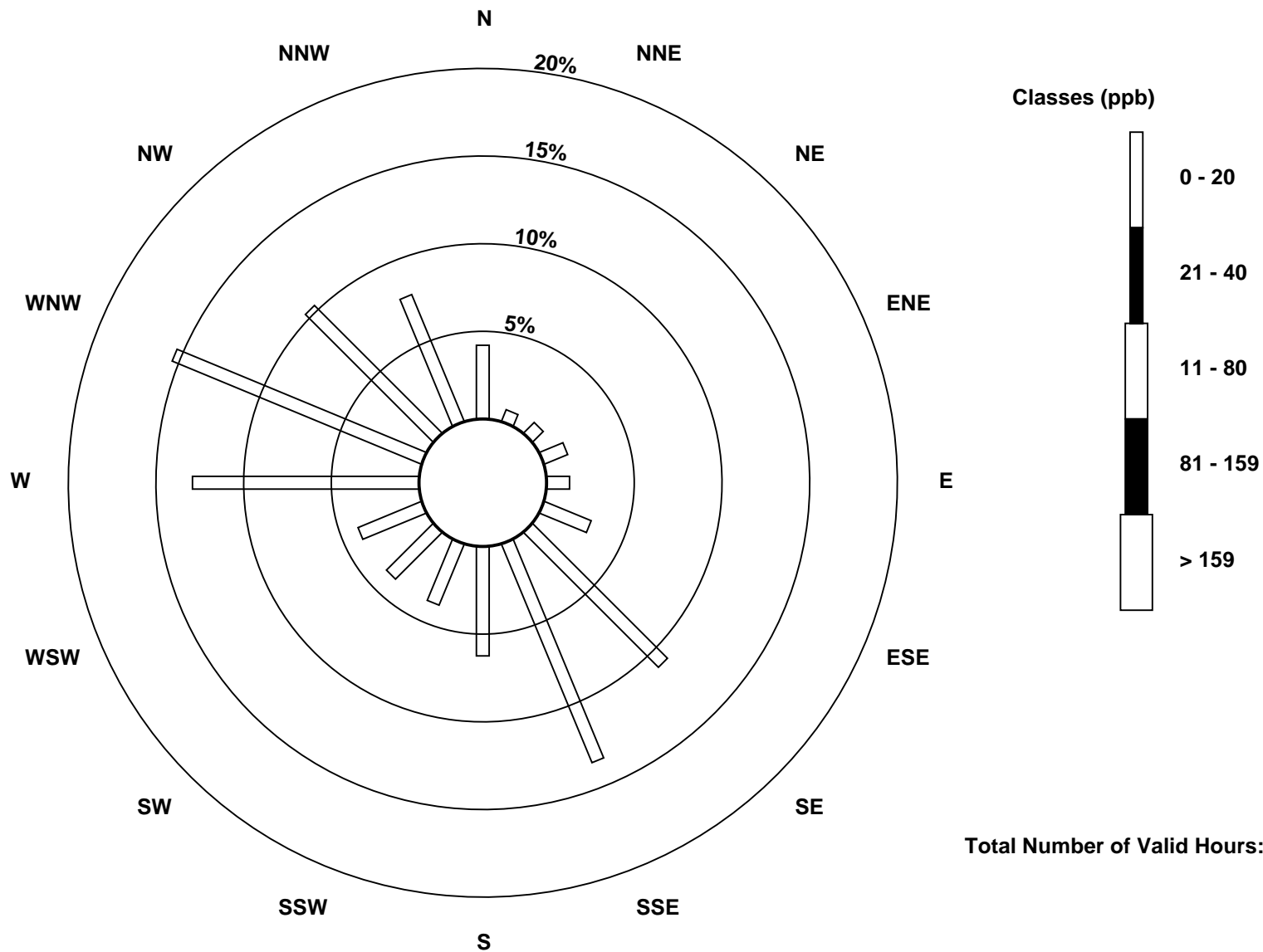
Total Number of Valid Hours: 689

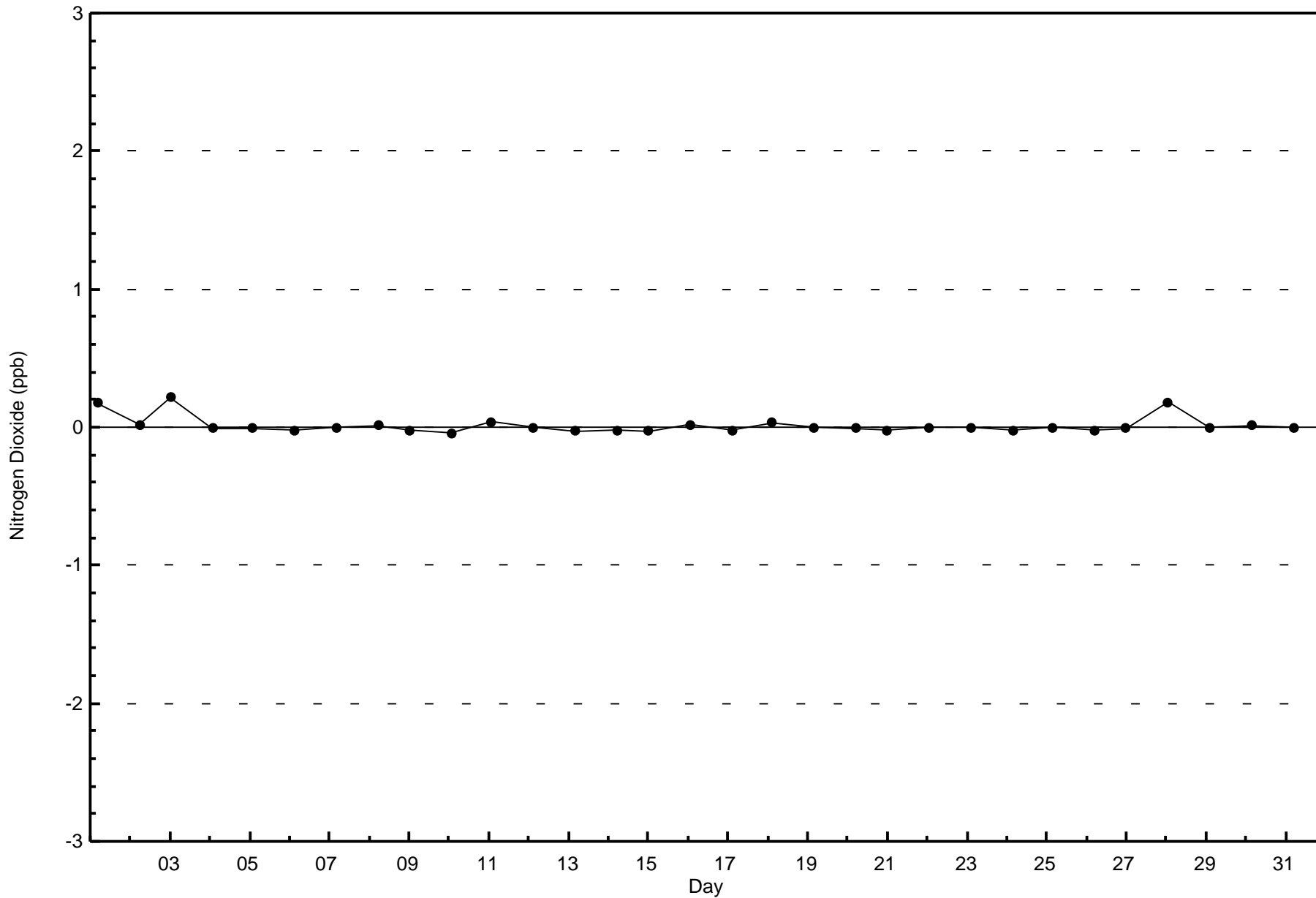
Total Number of Hours: 744

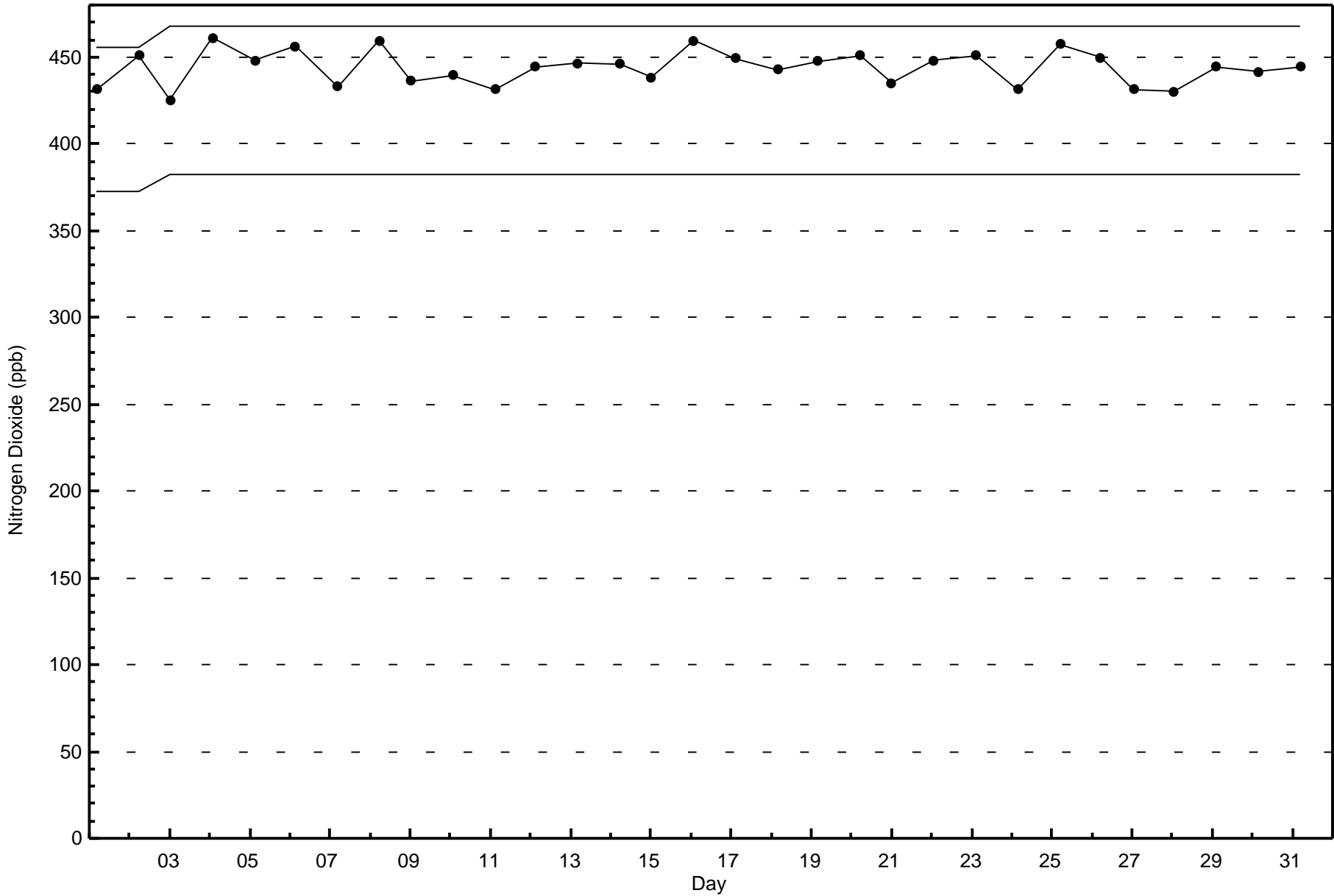


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Anzac (AMS 14)

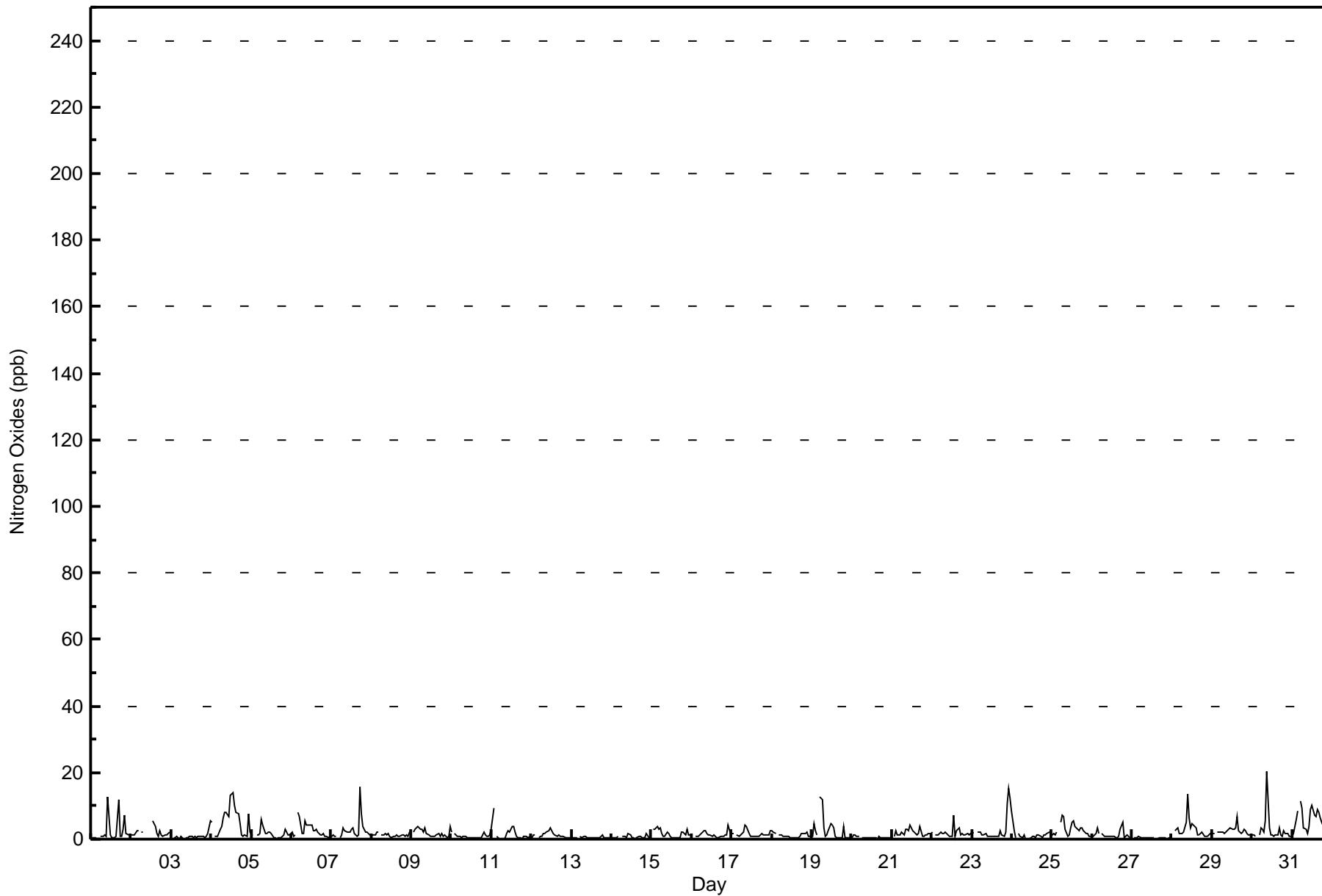








Maximum Value: 20 ppb on Oct 30 10:00		Maximum Daily Average: 5.6 ppb on Oct 4		Hours in Service: 744																																													
Minimum Value: 0 ppb on Oct 11 08:00		Minimum Daily Average: 0.3 ppb on Oct 27		Hours of Data: 707																																													
Maximum Diurnal Average: 2.7 ppb at hour 10		Minimum Diurnal Average: 1.4 ppb at hour 21		Hours of Missing Data: 37																																													
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> = 13		Hours of Calibration: 36																																													
				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	1	1	Z	1	1	1	1	1	13	1	0	0	1	1	12	1	1	3	7	2	1	1	2.2	13																							
2-Oct	1	1	1	3	3	Z	2	2	C	C	C	C	C	5	4	2	1	3	1	1	1	1	2	2	2.1	5																							
3-Oct	Z	0	0	1	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	2	6	0.9	6																							
4-Oct	5	Z	1	1	1	3	4	6	8	8	7	13	14	14	10	8	8	5	1	1	1	1	8	2	5.6	14																							
5-Oct	1	1	Z	1	1	2	6	4	1	2	2	2	2	0	0	0	0	0	1	1	3	2	1	1	1.6	6																							
6-Oct	2	1	1	Z	8	7	2	2	6	4	4	4	4	2	3	3	2	1	1	2	1	1	1	1	2.7	8																							
7-Oct	1	1	1	1	Z	1	1	3	3	2	2	2	3	3	2	1	1	16	7	4	2	2	2	1	2.7	16																							
8-Oct	1	1	1	2	2	Z	1	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	3	1.3	3																							
9-Oct	Z	2	3	3	4	3	3	2	3	2	1	1	1	1	1	2	1	1	1	1	1	0	1	4	1.9	4																							
10-Oct	2	Z	2	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	2	1	1	1	1	0.8	2																							
11-Oct	3	9	Z	1	0	0	0	0	0	2	2	2	4	4	2	1	1	0	0	1	1	1	1	1	1.5	9																							
12-Oct	1	1	1	Z	1	1	1	2	2	2	2	3	2	2	1	1	1	1	1	1	1	0	0	0	1.2	3																							
13-Oct	1	0	0	0	Z	1	1	1	1	0	0	0	1	0	0	0	0	1	1	1	0	0	0	0	0.5	1																							
14-Oct	0	0	0	1	1	Z	1	1	1	1	2	1	0	0	0	0	0	1	1	1	1	2	0	1	0.7	2																							
15-Oct	Z	3	3	4	3	3	2	1	1	2	2	1	1	0	0	0	1	0	2	2	1	3	1	1	1.6	4																							
16-Oct	1	Z	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	4	1	1.3	4																							
17-Oct	2	2	Z	1	1	1	2	2	4	4	2	1	1	1	1	1	1	1	2	1	1	1	1	2	1.6	4																							
18-Oct	3	2	2	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	1	2	2	2	2	1	1	1.1	3																							
19-Oct	1	5	3	1	Z	13	12	3	1	1	2	5	4	4	1	0	0	0	0	4	1	0	0	0	2.7	13																							
20-Oct	1	1	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.5	1																							
21-Oct	Z	1	2	1	1	1	2	1	3	3	3	4	2	2	2	1	2	4	1	1	1	1	2	2	1.9	4																							
22-Oct	2	Z	1	1	1	2	2	2	2	2	1	1	1	7	1	3	3	1	2	1	1	2	1	2	1.9	7																							
23-Oct	1	2	Z	2	2	2	1	1	2	1	1	1	1	1	1	1	1	2	1	1	2	10	15	12	2.9	15																							
24-Oct	8	3	0	Z	1	1	0	1	0	0	0	1	1	1	1	1	1	1	0	1	1	2	2	2	1.3	8																							
25-Oct	1	1	1	2	Z	5	7	7	3	1	1	3	5	5	4	3	2	3	4	3	2	2	1	1	2.9	7																							
26-Oct	1	1	2	4	2	Z	2	1	1	1	1	1	1	1	0	1	3	5	1	1	1	1	1	1	1.3	5																							
27-Oct	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0.3	1																							
28-Oct	0	Z	3	4	2	2	2	2	5	14	6	3	5	4	3	1	1	2	2	1	1	1	1	2	2.9	14																							
29-Oct	2	2	Z	2	2	2	2	2	2	2	3	3	3	3	3	7	3	2	2	3	3	2	1	1	2.5	7																							
30-Oct	1	1	1	Z	1	4	3	2	5	20	3	1	1	1	1	3	1	1	1	2	2	2	1	1	2.6	20																							
31-Oct	1	2	6	9	Z	11	9	4	3	2	4	9	10	7	7	9	8	7	5	3	1	1	1	0	5.1	11																							
																								1.7	1.8	1.5	1.8	1.7	2.6	2.3	1.9	2.2	2.7	2.3	2.3	2.3	2.4	1.7	1.6	2.0	2.0	1.6	1.5	1.4	1.5	1.8	1.8	Diurnal Average	
																								8	9	6	9	8	13	12	7	8	20	13	13	14	14	10	9	12	16	7	4	7	10	15	12	Diurnal Maximum	
Z - zerospan		C - Calibration				M - Maintenance																																											







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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Anzac - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	707	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: 707

Total Number of Hours: 744



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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Anzac - October 2015**

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	5	6	10	9	20	75	93	43	26	26	27	89	106	71	54	689
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	5	6	10	9	20	75	93	43	26	26	27	89	106	71	54	689

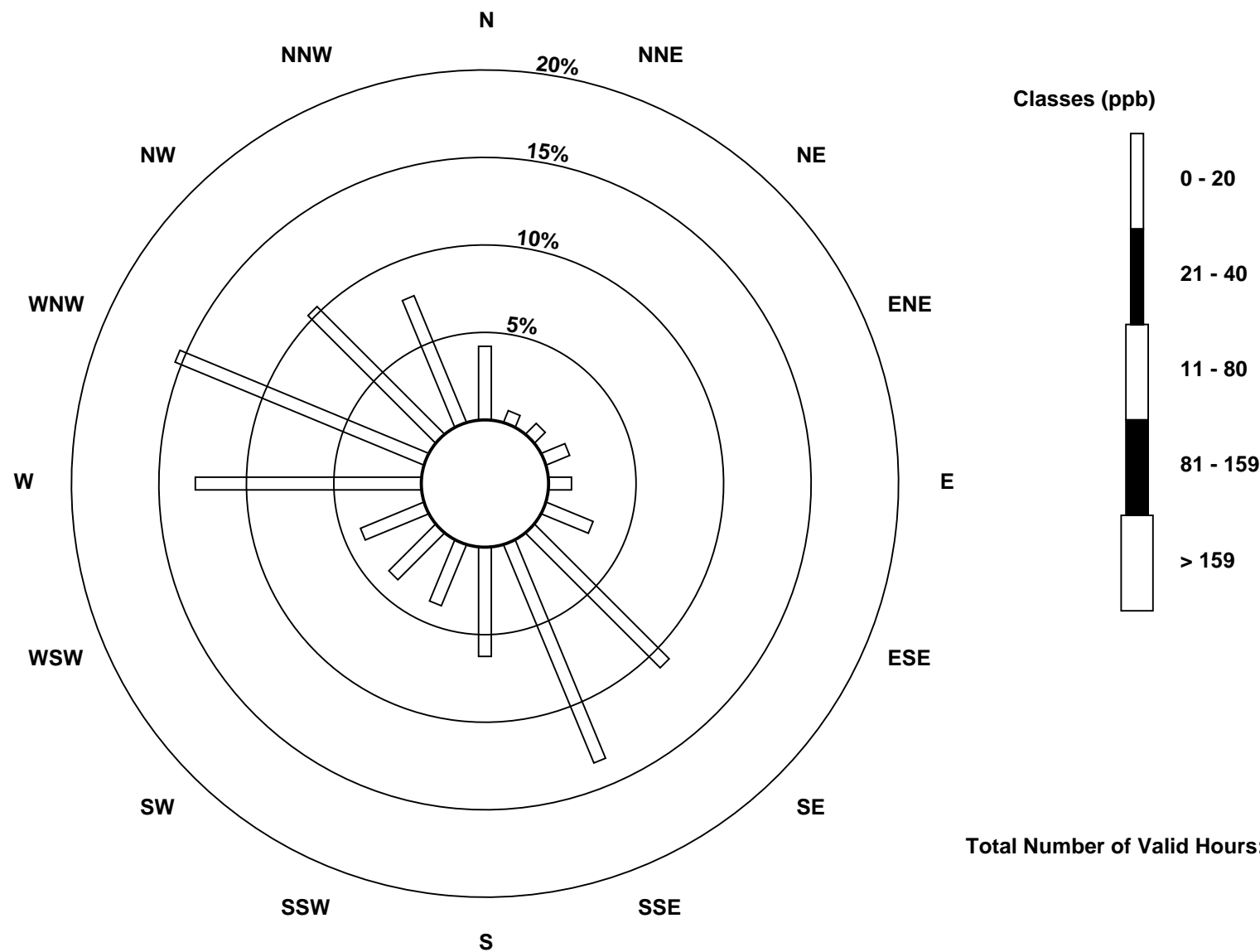
Total Number of Valid Hours: 689

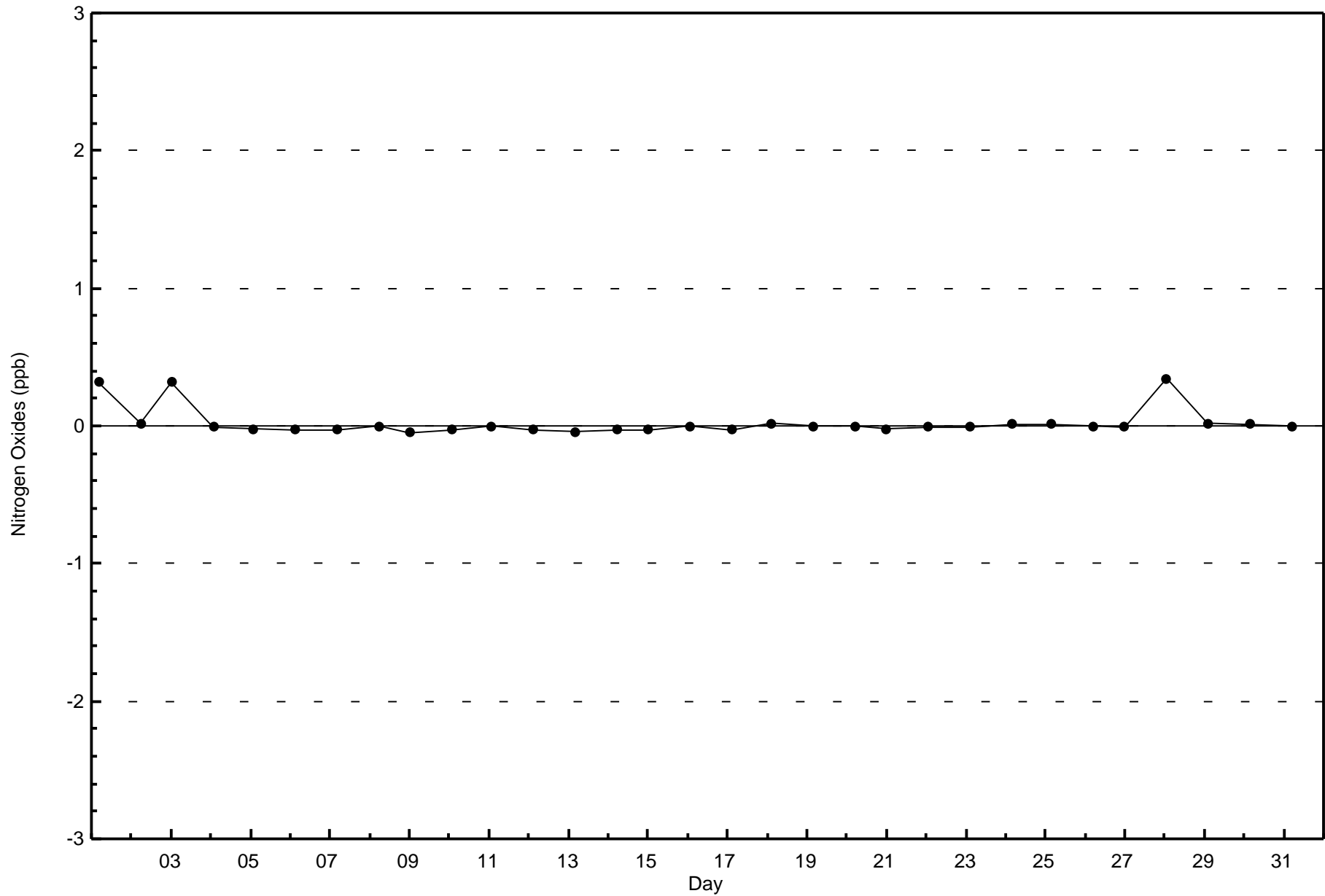
Total Number of Hours: 744

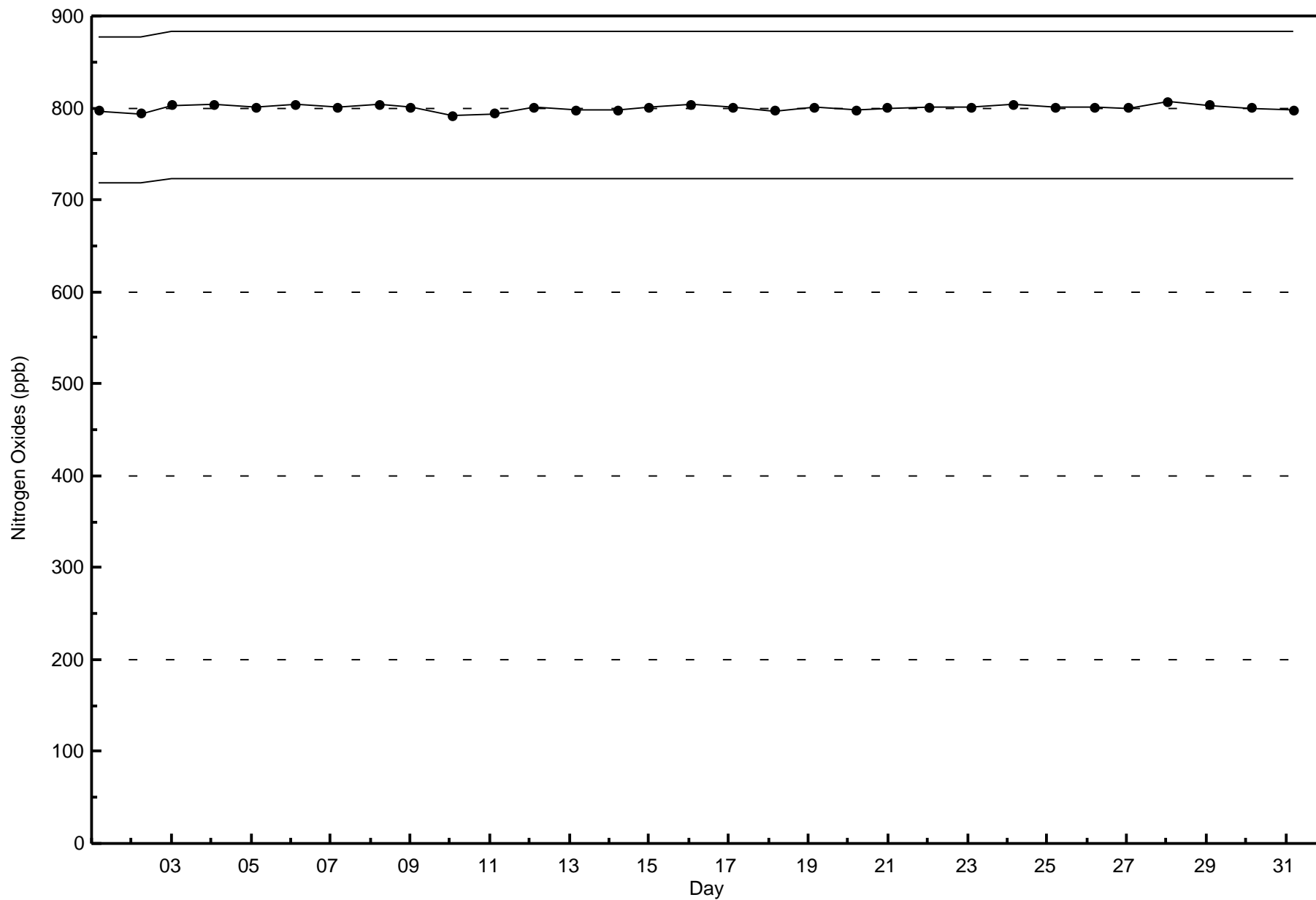


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Anzac (AMS 14)









**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

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

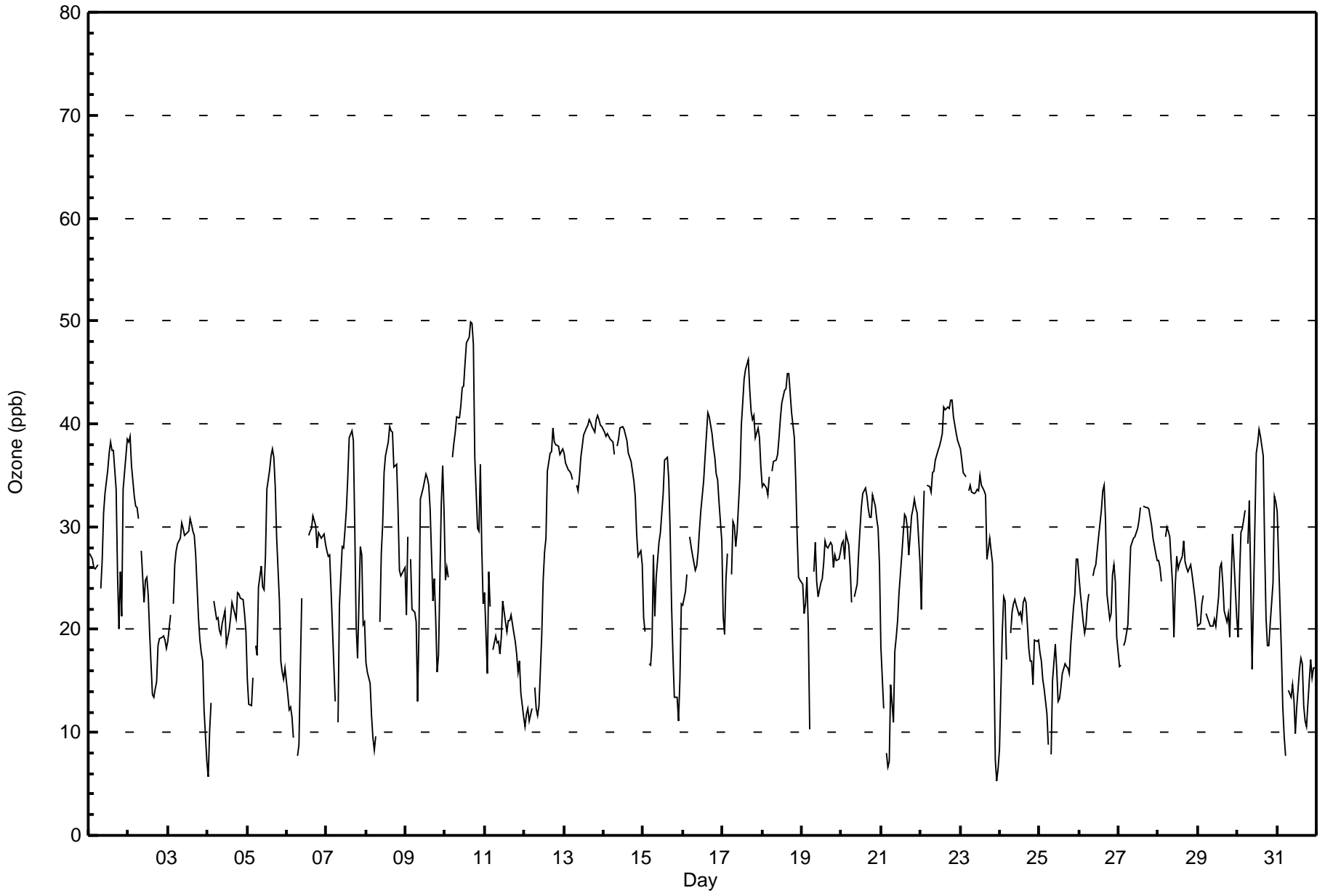
**Anzac - October 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 50 ppb on Oct 10 16:00										Maximum Daily Average: 37.9 ppb on Oct 10										Hours of Data: 709						
Minimum Value: 5 ppb on Oct 23 23:00										Minimum Daily Average: 15.1 ppb on Oct 31										Hours of Missing Data: 35						
Maximum Diurnal Average: 32.6 ppb at hour 16										Minimum Diurnal Average: 22.7 ppb at hour 6										Hours of Calibration: 34						
Monthly Average: 26.8 ppb										Percentiles: P <sub>1</sub> = 8 P <sub>10</sub> = 15 Q <sub>1</sub> = 20 Median = 27 Q <sub>3</sub> = 34 P <sub>90</sub> = 39 P <sub>99</sub> = 46										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	27	27	27	26	26	26	Z	24	27	31	33	36	37	38	37	37	34	25	20	26	21	34	37	38	30.2	38
2-Oct	38	39	36	33	32	32	31	Z	28	23	25	25	23	20	14	13	14	15	18	19	19	19	19	18	24.1	39
3-Oct	19	21	Z	23	26	28	28	29	30	30	29	29	30	31	30	30	29	27	21	19	18	17	12	7	24.5	31
4-Oct	6	10	13	Z	23	21	21	20	21	22	19	19	20	21	23	22	21	24	23	23	23	22	20	20	19.7	24
5-Oct	15	13	13	15	Z	18	18	24	26	24	24	27	34	35	37	38	37	34	29	23	17	16	15	16	23.8	38
6-Oct	14	12	12	12	9	Z	8	9	16	23	C	C	C	29	30	30	31	30	28	29	29	29	29	28	21.9	31
7-Oct	28	27	27	24	17	13	Z	11	22	28	28	30	32	35	39	39	38	30	20	17	28	27	21	21	26.2	39
8-Oct	17	16	15	12	9	8	10	Z	21	27	30	35	37	38	40	39	39	36	36	32	26	25	26	26	26.1	40
9-Oct	21	29	Z	27	22	22	21	13	20	33	34	34	35	35	34	32	23	25	21	16	18	32	36	31	26.6	36
10-Oct	25	26	25	Z	37	38	39	41	41	42	44	44	46	48	48	50	50	48	37	30	30	36	28	23	37.9	50
11-Oct	24	16	26	22	Z	18	19	19	19	18	19	23	21	20	21	21	21	20	19	18	16	17	14	11	19.1	26
12-Oct	11	12	12	11	12	Z	14	12	12	13	20	25	28	29	35	37	37	40	38	38	38	37	37	38	25.4	40
13-Oct	37	36	36	35	35	35	Z	34	33	35	37	38	39	40	40	40	40	39	40	41	40	40	40	40	37.8	41
14-Oct	39	39	39	39	39	38	37	Z	38	38	40	40	39	38	37	36	35	34	33	29	27	28	26	26	36.0	40
15-Oct	21	20	Z	17	17	19	27	21	25	28	29	31	33	37	37	35	29	22	18	13	13	11	15	23	23.6	37
16-Oct	22	24	25	Z	29	28	27	26	26	28	30	32	34	37	39	41	41	39	38	37	35	35	32	29	31.9	41
17-Oct	21	19	25	27	Z	25	31	30	28	30	35	40	42	44	45	46	43	41	40	41	39	40	39	36	35.1	46
18-Oct	34	34	34	33	35	Z	35	36	36	37	39	40	42	43	43	45	45	43	41	39	35	29	25	25	36.9	45
19-Oct	24	22	23	25	20	10	Z	26	28	25	23	25	25	26	29	28	28	28	28	26	27	27	27	27	25.1	29
20-Oct	28	29	27	29	28	26	23	Z	23	24	27	30	32	33	34	33	32	31	31	33	32	31	30	26	29.2	34
21-Oct	18	12	Z	8	7	7	15	11	18	19	21	24	27	29	31	31	30	27	31	32	33	32	31	27	22.6	33
22-Oct	22	29	34	Z	34	34	33	35	35	37	37	38	38	39	42	41	42	41	42	42	41	39	38	38	37.1	42
23-Oct	38	36	35	35	Z	33	34	33	33	33	34	33	35	34	34	33	27	28	29	26	17	7	5	7	28.7	38
24-Oct	8	20	23	23	17	Z	20	22	23	23	22	21	22	21	23	23	18	17	17	15	19	19	19	19	19.8	23
25-Oct	18	17	15	14	12	9	Z	8	15	19	16	13	13	14	16	17	16	16	16	18	22	24	27	27	16.6	27
26-Oct	25	23	21	20	21	23	23	Z	25	26	26	28	29	32	34	34	31	24	21	22	25	26	25	19	25.2	34
27-Oct	16	16	Z	18	19	20	24	28	29	29	29	30	31	32	M	32	32	32	32	31	30	29	27	27	27.0	32
28-Oct	27	26	25	Z	29	30	30	29	24	19	24	27	26	26	27	29	27	26	26	26	25	24	23	22	26.0	30
29-Oct	20	21	22	23	Z	22	21	20	20	20	21	20	23	26	26	25	22	21	21	19	25	29	27	21	22.5	29
30-Oct	19	25	29	30	32	Z	28	32	25	16	30	37	38	39	39	37	28	21	18	18	21	25	33	32	28.4	39
31-Oct	31	27	18	12	10	8	Z	14	13	15	13	10	13	16	17	17	13	11	11	15	17	15	16	16	15.1	31
23.1 23.3 24.5 22.8 22.9 22.7 24.7 23.4 25.2 26.2 28.0 29.4 30.8 31.8 32.6 32.6 30.9 28.9 27.2 26.4 25.9 26.5 25.9 24.6																								Diurnal Average		
39 39 39 39 39 38 39 41 41 42 44 44 46 48 48 50 50 48 42 42 41 40 40 40																								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**  
**Anzac - October 2015**





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

**Ozone (O<sub>3</sub>) - ppb**  
**Anzac - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	180	25.39	25.39
21 - 50	529	74.61	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**  
**Anzac - October 2015**

<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	13	4	2	6	4	5	13	18	17	6	7	8	11	9	16	31	170
21 - 50	16	2	4	5	5	14	58	78	25	24	19	18	78	93	58	24	521
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>	29	6	6	11	9	19	71	96	42	30	26	26	89	102	74	55	691

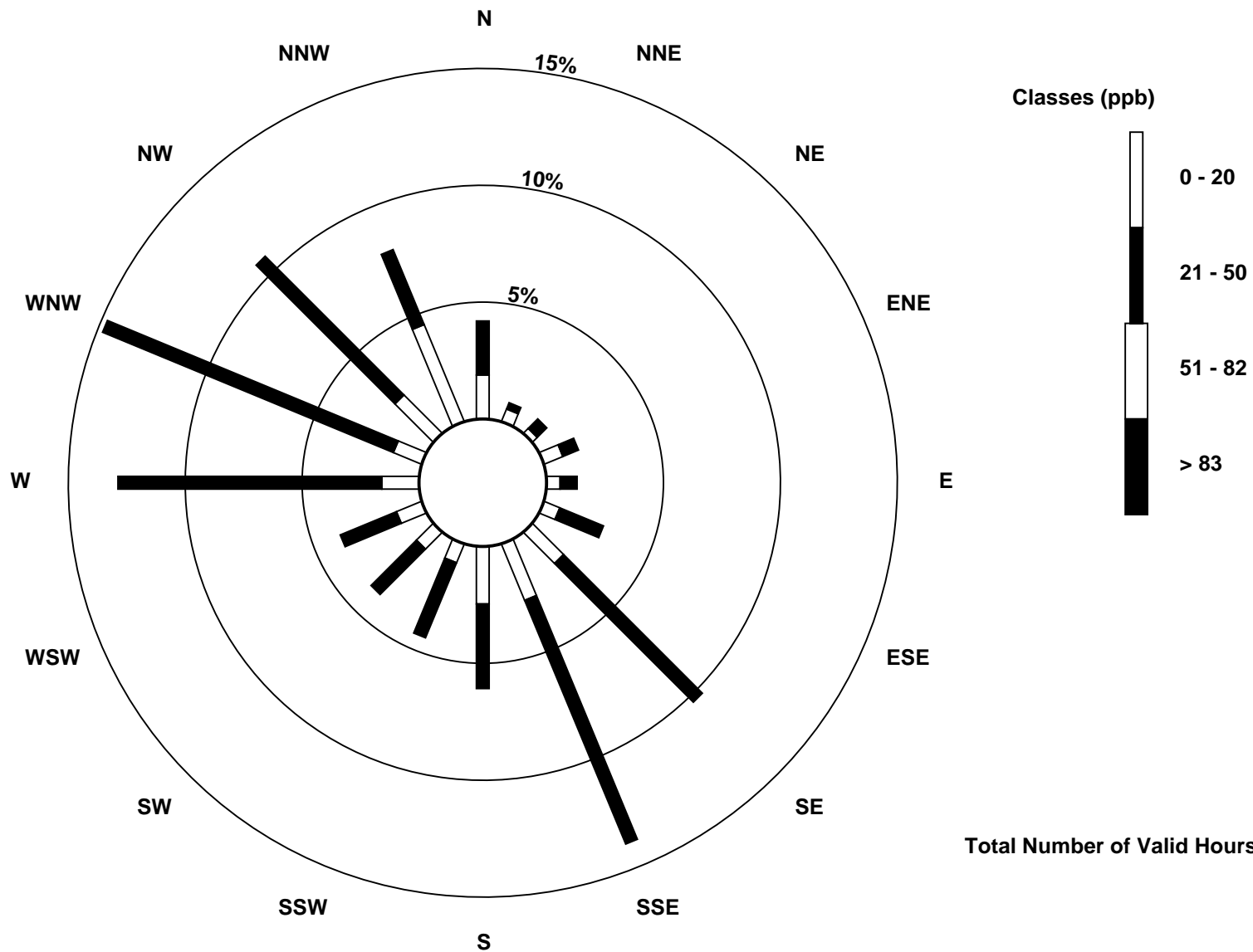
Total Number of Valid Hours: 691

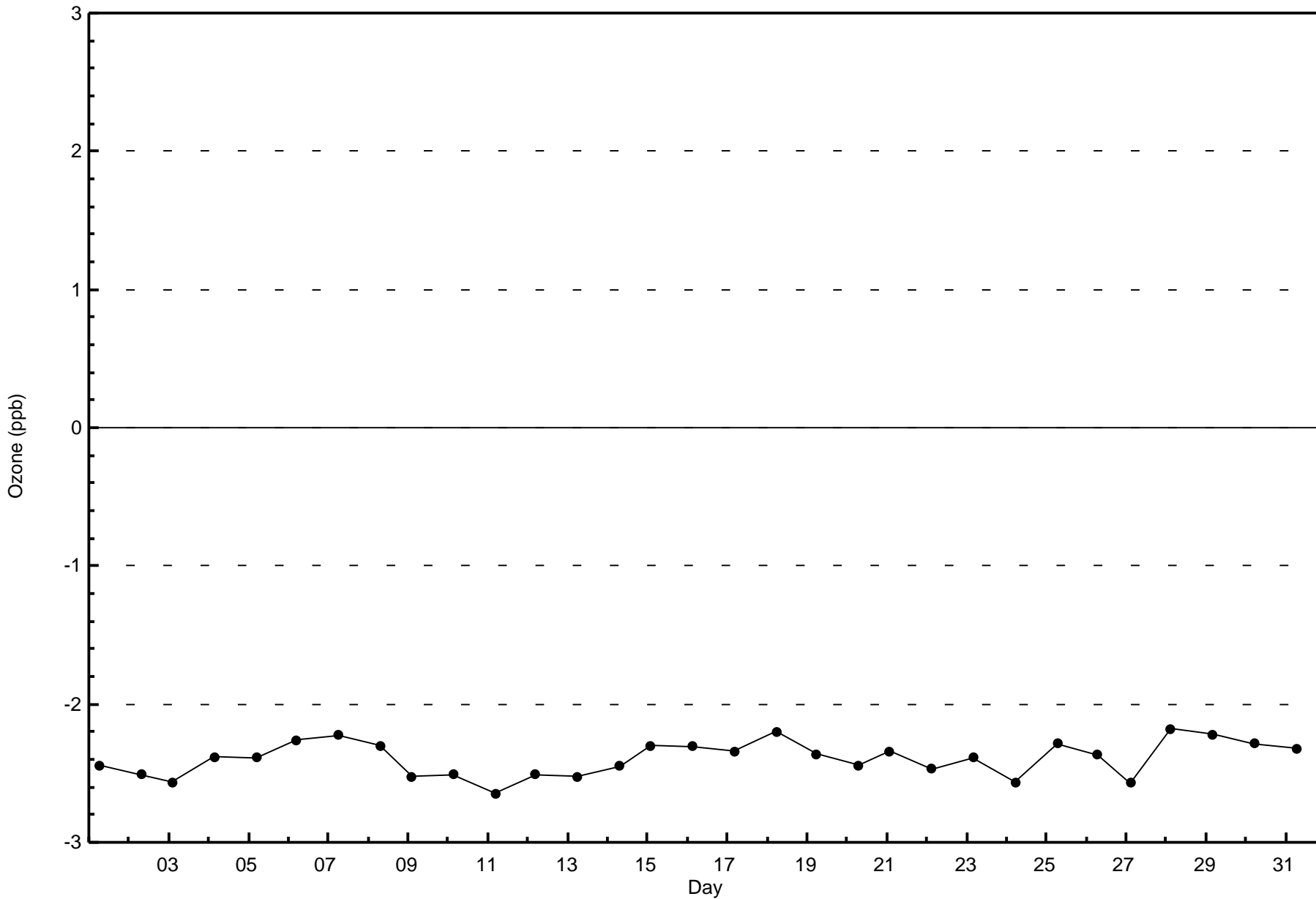
Total Number of Hours: 744

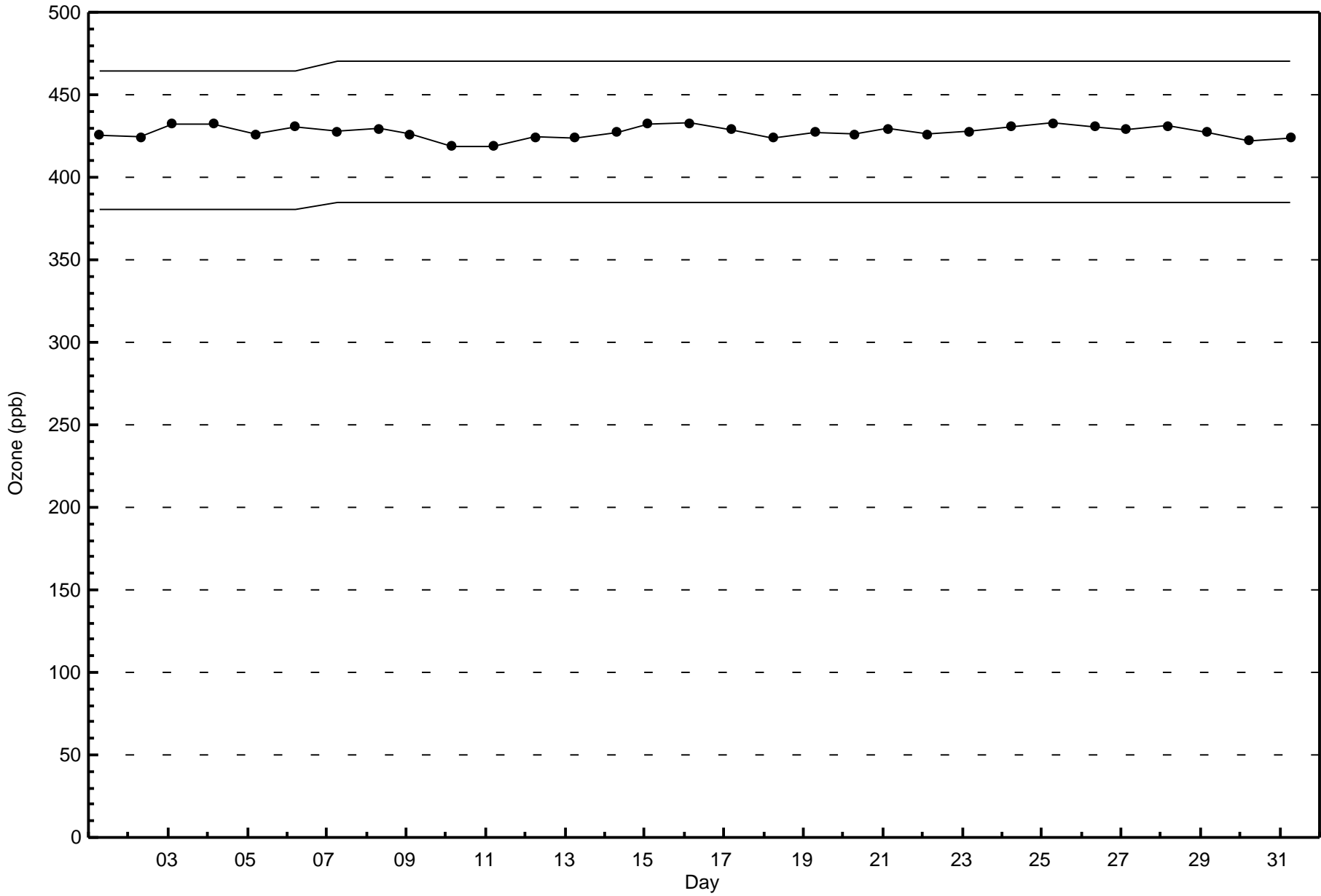


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Ozone (O<sub>3</sub>) - ppb  
Anzac (AMS 14)









Summary of Hour Averages

Anzac - October 2015

Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 744																								
Maximum Value: 40.3 µg/m <sup>3</sup> on Oct 30 11:00		Maximum Daily Average: 7.5 µg/m <sup>3</sup> on Oct 2																								
Minimum Value: 0.1 µg/m <sup>3</sup> on Oct 9 13:00		Hours of Data: 720																								
Maximum Diurnal Average: 4.0 µg/m <sup>3</sup> at hour 11		Hours of Missing Data: 24																								
Monthly Average: 2.92 µg/m <sup>3</sup>		Hours of Calibration: 2																								
Minimum Daily Average: 0.6 µg/m <sup>3</sup> on Oct 15		Percent Operational Time: 97.0																								
Minimum Diurnal Average: 1.8 µg/m <sup>3</sup> at hour 16																										
Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.6 Q <sub>1</sub> = 0.9 Median = 2.0 Q <sub>3</sub> = 3.9 P <sub>90</sub> = 6.1 P <sub>99</sub> = 12.2																										
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	3.9	3.7	4.0	3.6	3.4	3.8	3.6	4.2	4.0	3.1	2.1	2.1	1.5	1.1	1.5	2.4	4.2	5.5	13.5	9.3	11.1	5.9	7.0	7.3	4.7	13.5
2-Oct	7.9	9.6	10.0	11.3	11.8	10.7	11.2	10.9	10.4	10.3	9.8	8.0	5.3	5.1	7.1	2.8	0.3	0.3	UO	UO	UO	UO	UO	0.3	7.5	11.8
3-Oct	UO	0.2	0.2	0.6	0.4	0.4	0.5	0.5	0.6	0.4	0.3	0.7	1.2	1.1	1.4	1.1	0.9	2.0	1.5	1.3	1.3	1.7	2.0	2.3	1.0	2.3
4-Oct	3.5	5.0	3.2	2.8	2.0	6.1	7.6	11.0	12.0	9.9	7.2	6.4	5.5	7.4	3.6	2.4	2.1	1.8	1.6	1.4	1.3	1.1	1.4	1.2	4.5	12.0
5-Oct	2.3	1.3	1.2	3.9	4.1	5.6	6.4	4.3	2.3	1.9	1.8	1.2	39.0	0.3	0.2	0.2	0.4	0.6	0.7	1.2	2.9	15.3	9.0	1.5	4.5	39.0
6-Oct	25.0	12.1	10.6	4.3	4.7	6.8	2.8	7.7	0.8	1.2	C	C	1.4	1.0	1.0	0.8	0.8	0.7	0.8	0.8	0.7	0.6	0.7	0.8	3.9	25.0
7-Oct	0.9	1.0	1.2	1.2	1.0	1.0	1.4	2.8	1.7	1.1	1.2	1.1	1.3	1.2	0.8	0.3	0.7	2.0	4.7	4.8	5.5	4.7	4.7	3.7	2.1	5.5
8-Oct	3.5	3.7	6.2	5.8	5.1	6.1	3.8	3.6	2.1	1.2	1.1	0.9	0.9	0.8	1.1	1.3	1.4	2.6	4.1	5.0	5.4	6.8	7.6	9.3	3.7	9.3
9-Oct	9.7	9.9	10.9	10.0	9.1	8.9	8.5	7.0	6.4	2.4	1.5	0.6	0.1	UO	0.2	0.5	1.1	1.6	3.1	2.3	2.3	1.0	1.0	1.4	4.3	10.9
10-Oct	2.2	2.3	2.4	2.1	1.9	2.1	1.9	1.8	1.6	0.4	UO	UO	UO	UO	UO	UO	UO	UO	0.8	3.4	2.5	2.1	6.6	3.0	--	6.6
11-Oct	4.4	5.1	2.9	5.0	5.9	3.0	0.8	0.3	UO	1.0	1.9	1.2	5.0	4.0	2.2	1.0	0.7	0.3	0.2	0.6	0.5	2.5	1.4	3.6	2.3	5.9
12-Oct	6.8	9.8	2.2	1.2	0.3	0.2	0.2	0.3	0.6	0.8	0.6	1.1	2.0	0.9	0.6	0.6	0.7	0.8	0.9	0.7	0.7	0.8	0.7	0.7	1.4	9.8
13-Oct	0.7	0.7	0.7	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.7	0.8	9.0	0.5	0.5	UO	0.4	0.7	1.5	0.9	0.8	1.0	1.2	1.5	1.2	9.0
14-Oct	1.8	2.0	2.6	2.8	3.1	2.8	2.8	2.1	2.1	1.5	0.9	1.2	0.7	0.5	0.4	0.4	0.4	0.5	0.6	0.8	0.5	0.4	0.4	0.4	1.3	3.1
15-Oct	0.6	0.6	0.7	0.8	1.1	0.7	0.5	0.8	0.7	0.7	0.6	0.5	0.9	0.4	0.3	0.5	0.4	0.2	0.5	1.2	0.8	0.9	0.4	0.6	0.6	1.2
16-Oct	0.6	0.6	0.7	0.7	0.6	0.7	0.9	1.0	1.2	1.1	1.0	1.0	1.0	1.2	1.2	1.5	1.4	1.5	1.3	1.0	1.1	1.3	1.5	1.5	1.1	1.5
17-Oct	1.5	1.5	2.1	2.1	2.0	2.2	2.5	2.6	2.9	2.7	2.1	2.0	1.4	1.1	1.1	1.2	1.0	2.0	2.1	2.2	2.8	3.2	3.7	4.2	2.2	4.2
18-Oct	4.7	4.6	4.5	4.7	4.7	4.7	6.0	8.2	9.4	7.1	4.2	1.8	0.6	UO	UO	UO	UO	1.2	2.5	5.1	3.6	2.5	1.8	1.4	4.2	9.4
19-Oct	1.5	1.4	1.4	2.0	2.6	8.6	3.9	3.3	5.4	5.5	4.7	2.9	2.6	2.4	2.9	2.6	2.8	2.8	3.0	3.1	3.2	3.3	3.7	3.5	3.3	8.6
20-Oct	3.1	3.8	3.7	1.3	1.1	1.4	0.7	0.3	0.8	0.5	0.4	0.4	0.5	0.4	0.5	0.8	0.7	0.6	0.6	0.3	0.5	0.6	1.6	1.6	1.0	3.8
21-Oct	0.9	1.0	1.1	1.2	1.6	1.5	2.7	2.1	2.0	1.9	1.6	1.3	1.3	1.6	2.0	2.0	2.0	2.4	2.6	2.3	2.3	2.6	2.9	2.8	1.9	2.9
22-Oct	3.5	4.3	3.2	3.1	3.6	5.0	5.5	6.9	7.8	5.8	4.4	3.9	2.8	2.6	2.2	2.0	1.9	2.9	3.0	5.1	4.1	3.9	4.4	4.4	4.0	7.8
23-Oct	4.3	4.6	4.2	3.8	3.7	3.8	3.9	4.3	5.1	5.2	4.8	4.6	3.3	3.5	2.9	3.1	4.1	5.6	5.1	4.5	5.9	9.3	7.6	5.8	4.7	9.3
24-Oct	4.5	1.8	0.8	0.7	1.9	1.0	0.7	0.9	1.1	1.5	1.9	2.8	6.0	5.6	3.0	6.4	7.5	3.9	2.9	3.7	3.7	4.4	4.3	4.7	3.2	7.5
25-Oct	4.5	2.8	3.6	5.8	5.3	5.6	6.6	5.7	2.5	0.6	1.5	4.1	3.4	2.8	2.3	1.5	1.7	2.1	2.3	2.6	2.5	2.1	1.9	2.1	3.2	6.6
26-Oct	2.3	2.9	2.9	3.0	3.8	4.3	5.1	4.4	4.5	4.4	3.7	2.2	1.5	1.2	1.2	1.5	1.5	1.8	2.2	2.1	2.4	2.6	2.8	0.7	2.7	5.1
27-Oct	0.5	0.5	1.0	1.5	1.6	1.6	1.1	0.5	0.4	0.5	0.7	0.5	0.4	0.4	M	0.8	0.6	0.6	0.9	1.4	0.9	0.6	0.7	0.7	0.8	1.6
28-Oct	0.5	0.5	2.7	1.6	1.0	1.1	1.1	1.6	2.1	2.6	2.1	1.8	1.9	1.6	1.3	1.2	1.3	1.8	2.8	2.6	2.2	2.3	2.5	2.3	1.8	2.8
29-Oct	2.7	3.3	3.8	4.3	3.9	3.6	3.8	4.4	5.3	5.2	4.6	3.2	2.7	3.3	3.7	3.9	4.1	3.6	3.0	3.8	3.6	1.4	1.4	1.2	3.5	5.3
30-Oct	1.1	0.9	0.7	1.0	1.6	2.4	2.7	2.5	2.5	2.6	40.3	3.7	0.6	0.5	2.5	1.1	1.0	1.0	1.1	1.2	0.8	0.7	0.6	0.6	3.1	40.3
31-Oct	0.6	0.8	1.8	3.5	5.0	5.5	5.5	4.9	6.0	6.1	8.5	12.7	12.4	8.8	6.7	5.7	6.7	6.6	6.3	3.9	2.6	2.7	2.6	2.5	5.4	12.7
																								Diurnal Average		
																								Diurnal Maximum		
3.7 3.3 3.1 3.1 3.2 3.6 3.4 3.6 3.5 2.9 4.0 2.6 3.9 2.2 1.9 1.8 1.8 2.0 2.5 2.6 2.6 3.0 2.9 2.5																										
25.0 12.1 10.9 11.3 11.8 10.7 11.2 11.0 12.0 10.3 40.3 12.7 39.0 8.8 7.1 6.4 7.5 6.6 13.5 9.3 11.1 15.3 9.0 9.3																										
C - Calibration M - Maintenance UO - Unstable Operation																										
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m <sup>3</sup>																										

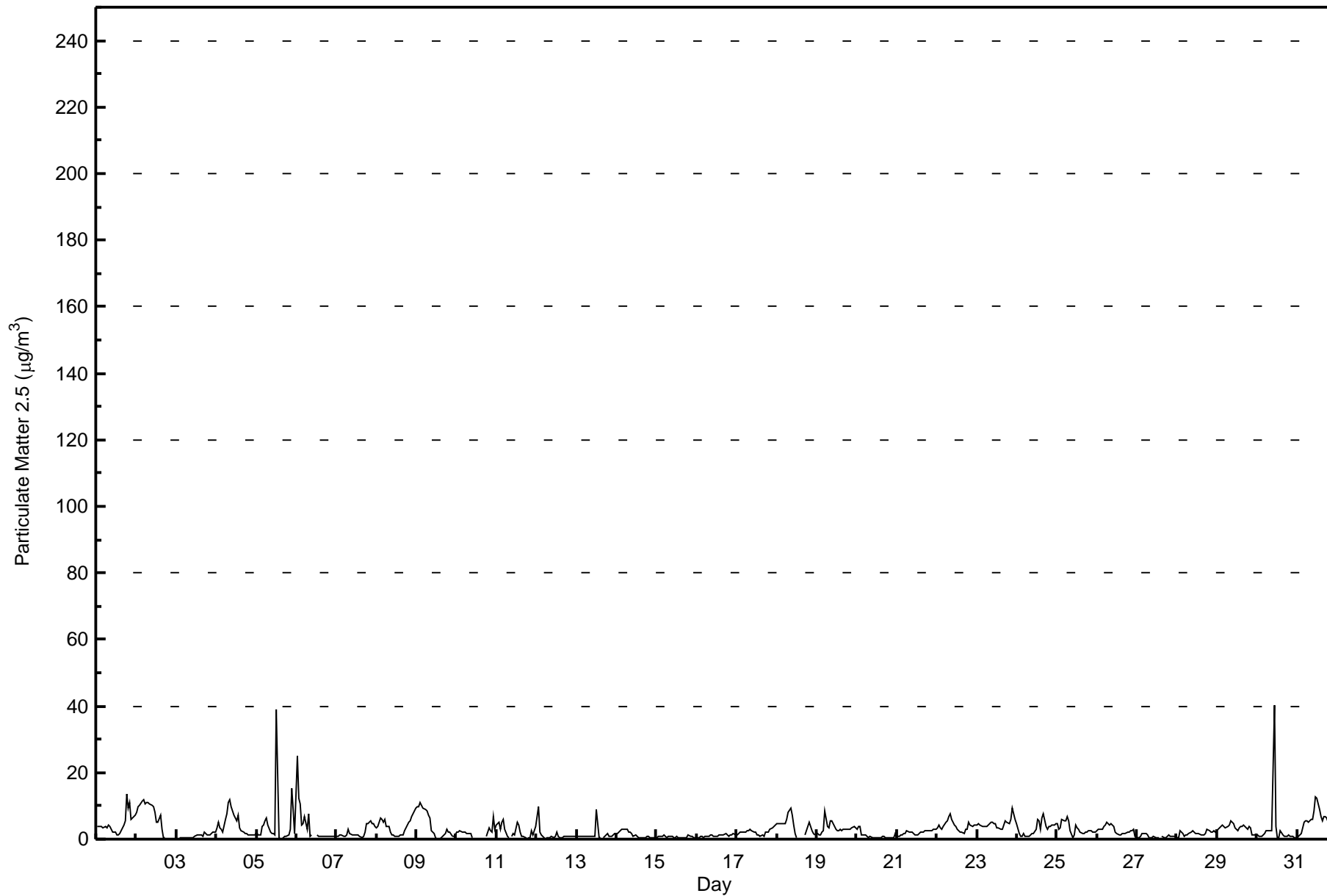


Wood Buffalo Environmental Association

Hourly Averages

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$

Anzac - October 2015





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

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Anzac - October 2015**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	436	60.56	60.56
6 - 15	89	12.36	72.92
16 - 25	1	0.14	73.06
26 - 80	2	0.28	73.33
> 81.0	0	0.00	73.33

Total Number of Valid Hours: 720

Total Number of Hours: 744



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

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Anzac - October 2015**

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	15	4	4	6	5	16	55	71	28	25	23	20	53	55	24	23	427
6 - 15	4	1	1	4	2	1	7	12	12	3	3	4	5	11	3	9	82
16 - 25	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
26 - 80	0	0	0	0	0	0	0	0	0	1	0	0	0	1	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>	19	5	5	10	7	17	62	83	40	29	26	24	59	67	27	32	512

Total Number of Valid Hours: 701

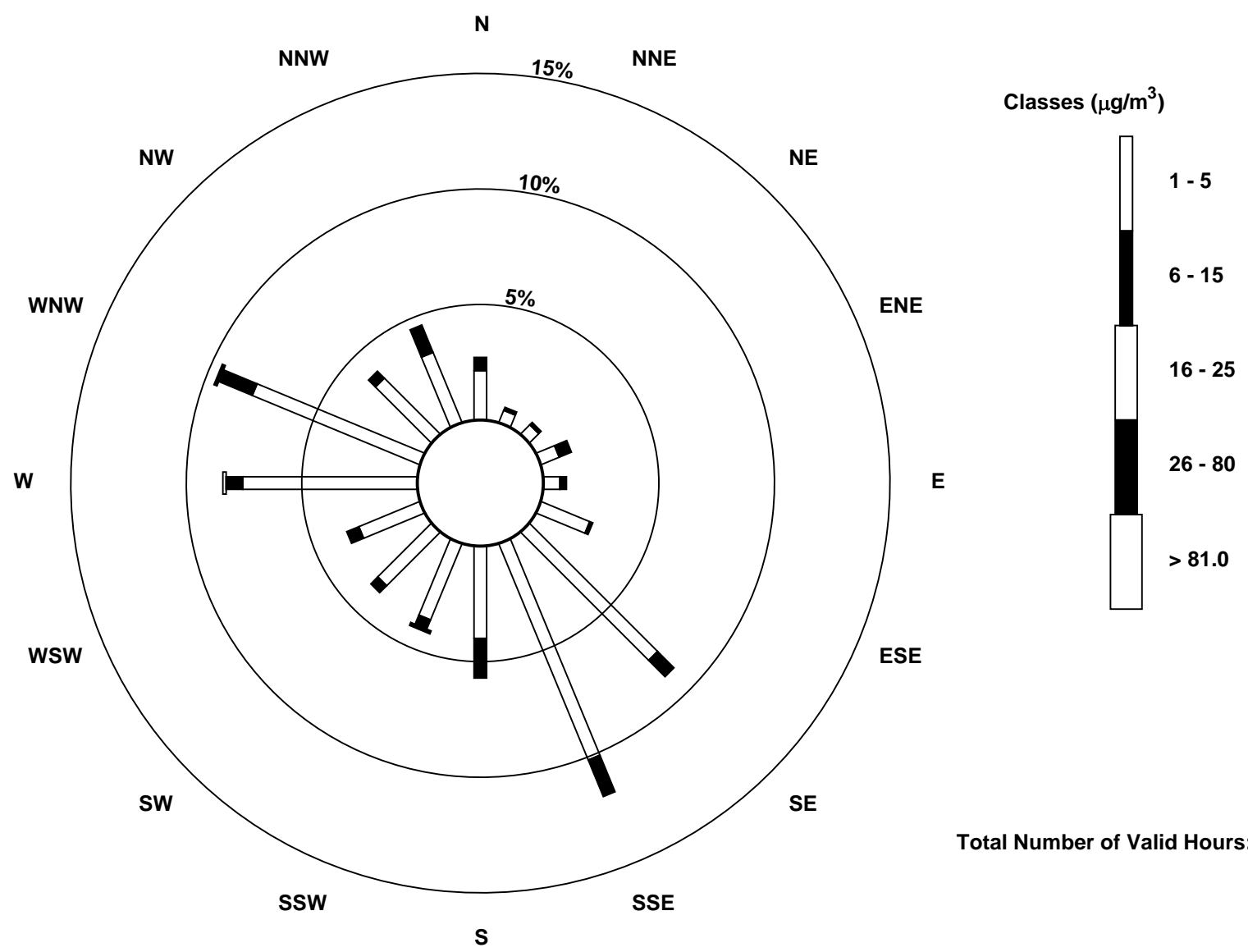
Total Number of Hours: 744





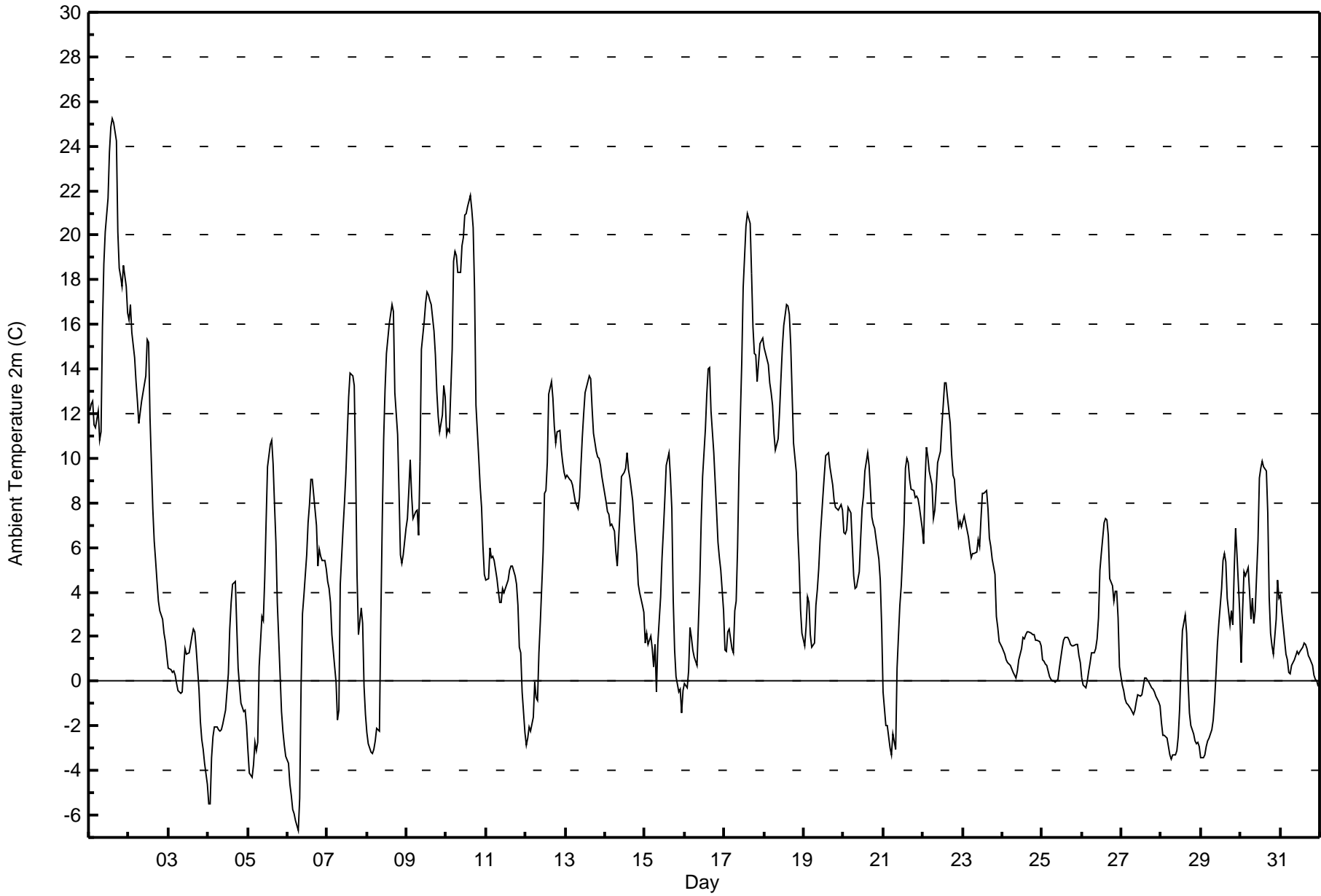
Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Anzac (AMS 14)





Maximum Value: 25.2 C on Oct 1 15:00		Maximum Daily Average: 17.5 C on Oct 1		Hours in Service: 744																																												
Minimum Value: -6.7 C on Oct 6 07:00		Minimum Daily Average: -1.7 C on Oct 28		Hours of Data: 744																																												
Maximum Diurnal Average: 10.1 C at hour 15		Minimum Diurnal Average: 2.7 C at hour 7		Hours of Missing Data: 0																																												
Monthly Average: 5.53 C		Percentiles: P <sub>1</sub> = -5.2 P <sub>10</sub> = -2.0 Q <sub>1</sub> = 0.8 Median = 4.6 Q <sub>3</sub> = 9.4 P <sub>90</sub> = 13.9 P <sub>99</sub> = 21.6		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	12.2	12.4	12.5	11.5	11.4	12.1	10.8	11.2	15.9	18.7	20.2	21.7	23.7	24.9	25.2	25.1	24.3	20.2	18.5	18.1	17.7	18.6	17.7	16.5	17.5	25.2																						
2-Oct	16.2	16.9	15.6	14.5	13.5	12.6	11.6	12.1	12.6	13.3	13.7	15.3	15.2	11.8	7.8	6.3	5.4	4.5	3.6	3.1	2.8	2.2	1.8	1.1	9.7	16.9																						
3-Oct	0.6	0.6	0.4	0.5	0.3	-0.1	-0.4	-0.6	-0.5	0.6	1.5	1.2	1.3	1.7	2.0	2.4	2.2	1.5	-0.3	-1.8	-2.6	-3.1	-3.6	-4.6	0.0	2.4																						
4-Oct	-5.5	-5.5	-3.4	-2.5	-2.1	-2.0	-2.2	-2.3	-2.2	-1.9	-1.3	-0.5	0.3	2.3	3.5	4.3	4.5	2.4	0.6	-0.2	-1.0	-1.4	-1.3	-2.0	-0.8	4.5																						
5-Oct	-3.1	-4.1	-4.3	-3.8	-2.8	-3.1	-2.7	0.6	2.9	2.7	4.6	7.2	9.6	10.6	10.8	9.8	7.9	6.2	3.6	0.3	-1.4	-2.2	-2.8	-3.4	1.8	10.8																						
6-Oct	-3.7	-4.6	-5.1	-5.7	-5.9	-6.3	-6.7	-5.2	-0.1	3.0	3.8	5.7	7.1	7.9	9.1	9.1	8.4	7.0	5.2	5.9	5.6	5.4	5.4	5.0	2.1	9.1																						
7-Oct	4.5	4.1	3.5	2.1	0.7	-0.1	-1.8	-1.3	4.4	6.9	8.0	9.3	11.1	12.7	13.9	13.7	13.3	9.5	4.7	2.1	3.3	2.6	-0.2	-1.5	5.2	13.9																						
8-Oct	-2.3	-2.8	-3.2	-3.3	-3.0	-2.7	-2.1	-2.2	2.9	7.1	10.8	13.1	14.7	16.0	16.5	16.9	16.6	12.9	11.1	8.5	5.7	5.3	5.7	6.9	6.2	16.9																						
9-Oct	7.3	8.5	9.9	8.4	7.3	7.6	7.7	6.6	9.9	14.9	16.1	17.0	17.5	17.3	17.1	16.9	15.7	14.6	13.0	11.9	11.2	11.9	13.3	12.7	12.3	17.5																						
10-Oct	11.1	11.3	11.2	14.9	18.8	19.3	19.1	18.4	18.3	19.6	19.9	20.9	21.0	21.3	21.8	21.1	20.3	17.5	12.4	10.0	8.7	7.8	6.1	4.8	15.6	21.8																						
11-Oct	4.5	4.6	6.0	5.5	5.6	5.4	4.6	4.0	3.5	3.5	4.2	4.0	4.4	4.5	5.0	5.1	5.1	4.7	4.3	3.4	1.5	1.3	-0.5	-2.3	3.8	6.0																						
12-Oct	-2.8	-2.5	-2.1	-2.2	-1.6	0.0	-0.7	-0.9	1.3	2.7	5.8	8.4	8.6	9.8	12.9	13.4	12.7	11.4	10.7	11.2	11.2	10.4	9.8	9.4	5.7	13.4																						
13-Oct	9.1	9.3	9.0	9.0	8.8	8.4	8.0	7.8	8.3	9.6	10.9	12.0	12.9	13.5	13.7	13.5	12.2	11.1	10.3	10.1	10.0	9.7	9.2	8.8	10.2	13.7																						
14-Oct	8.1	7.6	7.5	7.0	7.1	6.7	5.8	5.2	6.4	7.7	9.2	9.4	9.6	10.2	9.5	9.1	8.1	7.2	6.4	5.6	4.4	4.0	3.4	3.1	7.0	10.2																						
15-Oct	1.7	2.1	1.6	2.0	1.4	0.7	1.7	-0.5	1.7	3.8	5.5	6.8	8.2	9.7	10.2	9.2	7.8	3.7	1.4	0.2	-0.4	-0.4	-1.4	-0.4	3.2	10.2																						
16-Oct	-0.1	-0.3	0.5	2.4	2.0	1.4	1.1	0.7	2.6	4.5	7.2	9.2	11.3	12.9	14.0	14.0	12.2	10.3	8.9	7.6	6.2	5.6	5.0	3.2	5.9	14.0																						
17-Oct	1.4	1.3	2.2	2.3	1.5	1.3	3.2	3.6	6.0	9.5	14.3	17.6	19.0	20.4	21.0	20.5	18.3	15.9	14.7	14.6	13.5	15.1	15.2	15.4	11.2	21.0																						
18-Oct	14.9	14.7	14.2	13.4	13.0	12.4	11.1	10.3	10.9	12.0	13.6	15.0	16.0	16.9	16.8	16.5	15.1	12.9	10.7	9.4	6.7	5.3	3.2	2.2	12.0	16.9																						
19-Oct	1.6	2.4	3.8	3.5	2.1	1.5	1.7	3.4	4.1	5.0	6.4	8.3	9.3	10.1	10.2	10.2	9.6	8.8	8.1	7.8	7.7	7.7	7.9	7.7	6.2	10.2																						
20-Oct	6.7	6.6	6.8	7.8	7.5	6.1	4.7	4.2	4.2	4.9	6.4	7.7	8.3	9.5	10.2	9.7	8.6	7.4	7.0	6.9	5.9	5.5	4.5	2.5	6.7	10.2																						
21-Oct	-0.5	-2.0	-2.0	-2.5	-3.0	-3.3	-2.4	-3.0	0.6	2.0	3.4	4.3	7.0	9.5	10.0	9.8	9.0	8.6	8.5	8.3	8.3	8.2	7.8	6.8	3.9	10.0																						
22-Oct	6.2	8.9	10.5	10.1	9.4	8.8	7.3	7.7	8.7	9.8	10.3	11.4	12.4	13.4	13.4	12.8	11.6	10.2	9.2	9.0	8.1	6.9	7.2	6.9	9.6	13.4																						
23-Oct	7.2	7.5	7.1	6.5	6.0	5.6	5.7	5.7	5.8	6.3	6.1	7.3	8.4	8.5	8.6	7.8	6.4	6.0	5.5	4.8	2.9	2.4	1.8	1.6	5.9	8.6																						
24-Oct	1.5	1.2	1.0	0.8	0.8	0.7	0.4	0.3	0.2	0.5	1.0	1.5	2.0	1.9	2.1	2.2	2.2	2.1	2.1	2.1	1.8	1.8	1.8	1.6	1.4	2.2																						
25-Oct	1.0	0.9	0.8	0.7	0.2	0.1	0.0	0.0	-0.1	0.1	0.6	1.0	1.4	1.8	2.0	2.0	1.9	1.7	1.6	1.6	1.7	1.6	1.1	0.8	1.0	2.0																						
26-Oct	0.1	-0.2	-0.3	0.0	0.5	0.8	1.3	1.3	1.5	1.9	2.8	4.9	5.7	7.1	7.3	7.3	6.5	4.6	4.3	3.6	4.1	4.1	2.9	0.7	3.0	7.3																						
27-Oct	-0.2	-0.4	-0.8	-1.0	-1.1	-1.2	-1.3	-1.5	-1.3	-0.9	-0.6	-0.7	-0.6	-0.2	0.2	0.2	0.0	-0.2	-0.3	-0.3	-0.5	-0.7	-0.9	-1.1	-0.7	0.2																						
28-Oct	-1.8	-2.4	-2.4	-2.6	-2.9	-3.3	-3.5	-3.3	-3.3	-3.1	-2.5	-1.2	0.7	2.3	3.0	2.2	0.0	-1.4	-2.0	-2.4	-2.7	-2.8	-2.7	-2.9	-1.7	3.0																						
29-Oct	-3.4	-3.4	-3.3	-2.9	-2.7	-2.5	-2.2	-1.7	-0.8	0.4	1.7	2.6	4.1	5.4	5.7	5.3	3.7	2.5	3.2	2.6	5.0	6.9	5.7	3.0	1.4	6.9																						
30-Oct	0.8	3.2	4.9	4.7	5.1	4.0	2.8	3.7	2.6	3.2	6.3	9.1	9.6	9.9	9.6	9.4	7.6	3.8	2.2	1.6	1.2	2.8	4.5	3.7	4.8	9.9																						
31-Oct	3.8	3.1	1.8	1.2	1.0	0.4	0.3	0.7	1.0	1.2	1.3	1.2	1.3	1.5	1.7	1.7	1.5	1.1	1.0	0.7	0.3	0.1	0.0	-0.3	1.2	3.8																						
																								3.1	3.2	3.4	3.3	3.2	2.9	2.7	2.7	4.1	5.5	6.8	8.1	9.1	9.8	10.1	9.9	9.0	7.4	6.1	5.4	4.7	4.6	4.1	3.4	Diurnal Average
																								16.2	16.9	15.6	14.9	18.8	19.3	19.1	18.4	18.3	19.6	20.2	21.7	23.7	24.9	25.2	25.1	24.3	20.2	18.5	18.1	17.7	18.6	17.7	16.5	Diurnal Maximum





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

**Ambient Temperature 2m (AT 2m) - C**  
**Anzac - October 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	139	18.68	18.68
0 - 10	443	59.54	78.23
10 - 20	145	19.49	97.72
> 20	17	2.28	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

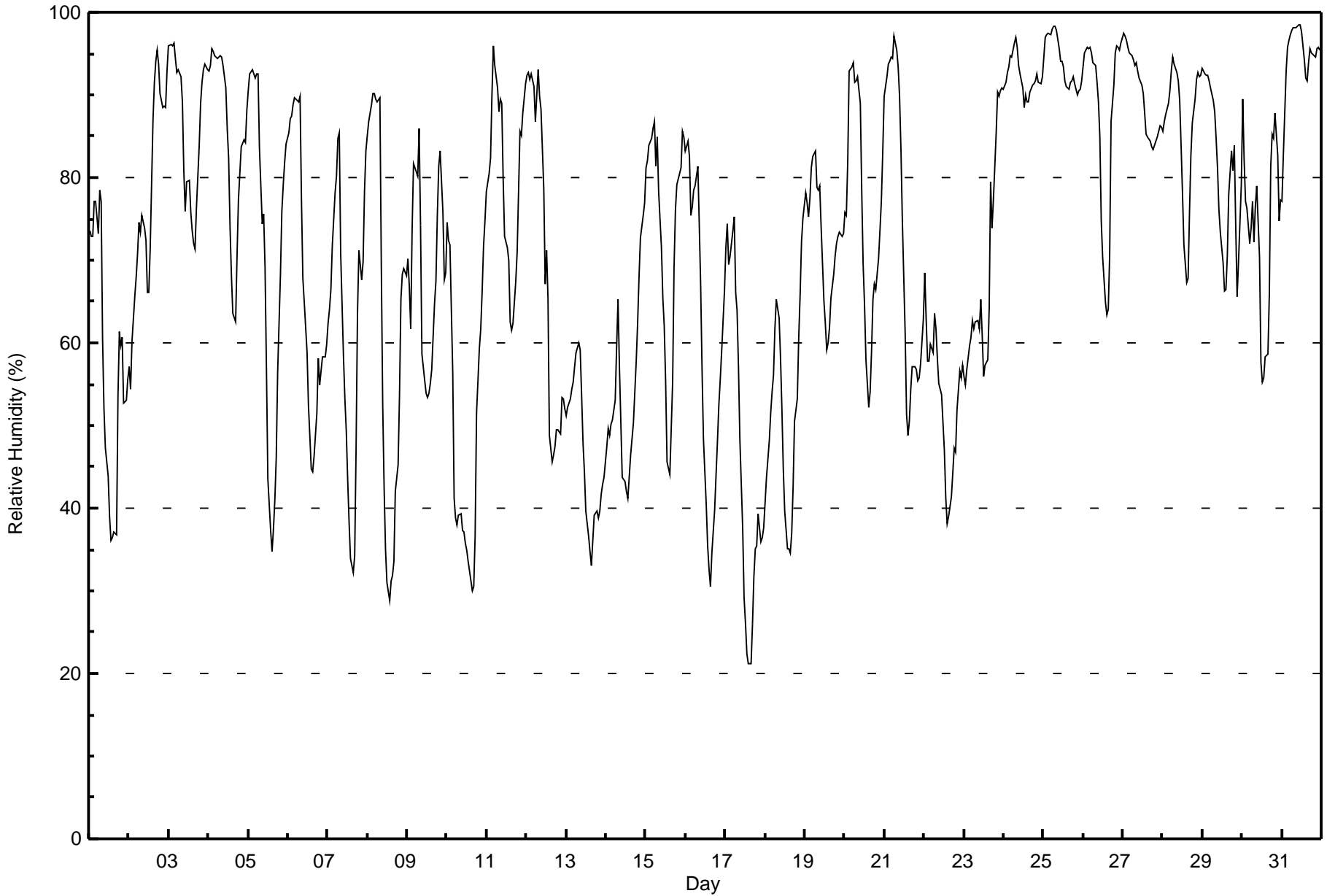


Maximum Value: 98 % on Oct 31 12:00														Maximum Daily Average: 94.5 % on Oct 31														Hours in Service: 744												
Minimum Value: 21 % on Oct 17 16:00														Minimum Daily Average: 46.1 % on Oct 17														Hours of Data: 744												
Maximum Diurnal Average: 81.9 % at hour 7														Minimum Diurnal Average: 54.5 % at hour 15														Hours of Missing Data: 0												
Monthly Average: 71.2 %														Percentiles: P <sub>1</sub> = 30 P <sub>10</sub> = 42 Q <sub>1</sub> = 57 Median = 74 Q <sub>3</sub> = 89 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	74	73	73	77	77	73	79	77	61	52	47	44	39	36	36	37	37	54	61	60	61	53	53	56	57.9	79														
2-Oct	57	54	60	66	68	71	75	73	75	74	72	66	66	71	87	91	94	95	94	90	88	89	88	93	77.5	95														
3-Oct	96	96	96	96	94	93	93	92	89	81	76	79	80	76	74	72	71	76	84	89	91	93	94	93	86.4	96														
4-Oct	93	94	96	95	95	94	95	95	95	94	91	86	82	74	68	64	62	70	77	81	84	85	84	88	85.0	96														
5-Oct	91	92	93	93	92	92	93	84	74	76	69	57	44	37	35	37	41	46	56	68	76	79	82	84	70.5	93														
6-Oct	85	87	88	89	90	89	89	90	77	68	65	59	52	49	45	44	46	51	58	55	57	58	58	60	67.1	90														
7-Oct	62	64	66	72	78	80	85	85	71	58	53	49	43	38	34	32	34	47	64	71	68	70	78	83	62.0	85														
8-Oct	85	87	89	90	90	90	89	90	69	53	43	35	31	29	31	32	34	42	45	54	65	68	69	68	61.5	90														
9-Oct	70	67	62	74	82	81	80	86	74	59	55	54	53	54	55	57	65	68	75	81	83	76	68	68	68.6	86														
10-Oct	75	72	72	56	41	39	38	39	39	37	37	36	35	34	31	30	31	37	52	59	62	66	72	75	48.5	75														
11-Oct	78	80	82	90	96	94	91	88	89	89	80	73	71	70	63	62	62	67	71	78	86	85	88	91	80.2	96														
12-Oct	92	93	92	93	91	87	90	93	90	88	79	67	71	65	49	46	46	47	49	49	49	53	53	52	70.2	93														
13-Oct	51	52	53	54	55	57	59	60	59	54	48	44	40	37	35	33	36	39	40	39	40	42	43	44	46.4	60														
14-Oct	47	50	49	50	51	53	59	65	57	51	44	43	42	41	44	46	50	54	58	62	68	73	75	77	54.6	77														
15-Oct	81	82	84	85	86	87	81	85	78	71	65	62	55	46	44	50	55	69	76	79	81	81	86	85	73.1	87														
16-Oct	83	84	82	75	76	78	79	81	74	67	57	48	40	35	33	31	35	40	44	48	53	56	59	66	59.4	84														
17-Oct	71	74	69	71	74	75	66	64	57	48	38	29	26	22	21	21	26	32	35	35	39	36	37	38	46.1	75														
18-Oct	41	44	48	52	54	56	62	65	63	58	52	45	40	35	35	35	37	42	50	53	60	66	72	75	51.7	75														
19-Oct	78	77	75	78	81	82	83	79	79	79	74	65	62	59	60	62	65	68	71	72	73	73	73	73	72.6	83														
20-Oct	76	75	82	93	93	94	91	92	92	89	78	70	65	58	52	54	59	65	67	66	70	74	77	83	75.7	94														
21-Oct	90	92	94	94	95	94	97	95	93	90	83	75	61	51	49	51	54	57	57	57	55	56	57	63	73.4	97														
22-Oct	69	63	58	58	60	59	64	62	58	55	54	50	47	41	38	39	41	44	47	47	52	57	56	57	53.1	69														
23-Oct	56	55	57	60	61	63	62	62	63	62	65	61	56	57	58	64	79	74	77	85	90	90	90	91	68.3	91														
24-Oct	91	91	93	93	95	95	96	97	96	93	92	91	88	90	89	89	90	91	91	92	93	92	91	92	92.2	97														
25-Oct	95	97	97	97	97	98	98	98	98	96	94	94	93	92	91	91	92	92	92	91	90	90	91	92	94.0	98														
26-Oct	93	95	96	96	96	95	94	94	92	89	85	75	70	65	63	64	70	87	91	95	96	96	95	96	87.0	96														
27-Oct	98	97	97	96	95	95	94	94	94	93	92	91	90	88	85	85	84	84	83	84	84	85	86	86	90.0	98														
28-Oct	86	87	88	89	91	93	95	94	93	92	89	84	78	72	67	68	76	83	87	89	92	93	92	92	86.1	95														
29-Oct	93	92	92	92	92	91	89	88	85	81	76	73	70	66	66	70	78	83	81	84	74	66	70	79	80.5	93														
30-Oct	89	82	77	76	72	74	77	72	76	79	70	58	55	56	58	59	66	81	85	85	88	83	75	77	73.8	89														
31-Oct	77	83	93	96	97	97	98	98	98	98	98	98	98	94	92	92	94	96	95	95	95	96	96	95	94.5	98														
														78.2	78.5	79.1	80.5	81.1	81.3	81.9	81.8	77.7	73.3	68.5	63.3	59.5	56.1	54.5	55.1	58.5	64.0	68.2	70.8	73.0	73.4	74.5	76.6	Diurnal Average		
														98	97	97	97	97	98	98	98	98	98	98	98	98	98	94	92	92	94	96	95	95	96	96	96	96	Diurnal Maximum	



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

**Relative Humidity (RH) - %**  
**Anzac - October 2015**





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

**Relative Humidity (RH) - %**  
**Anzac - October 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	66	8.87	8.87
40 - 60	164	22.04	30.91
60 - 80	215	28.90	59.81
80 - 100	299	40.19	100.00

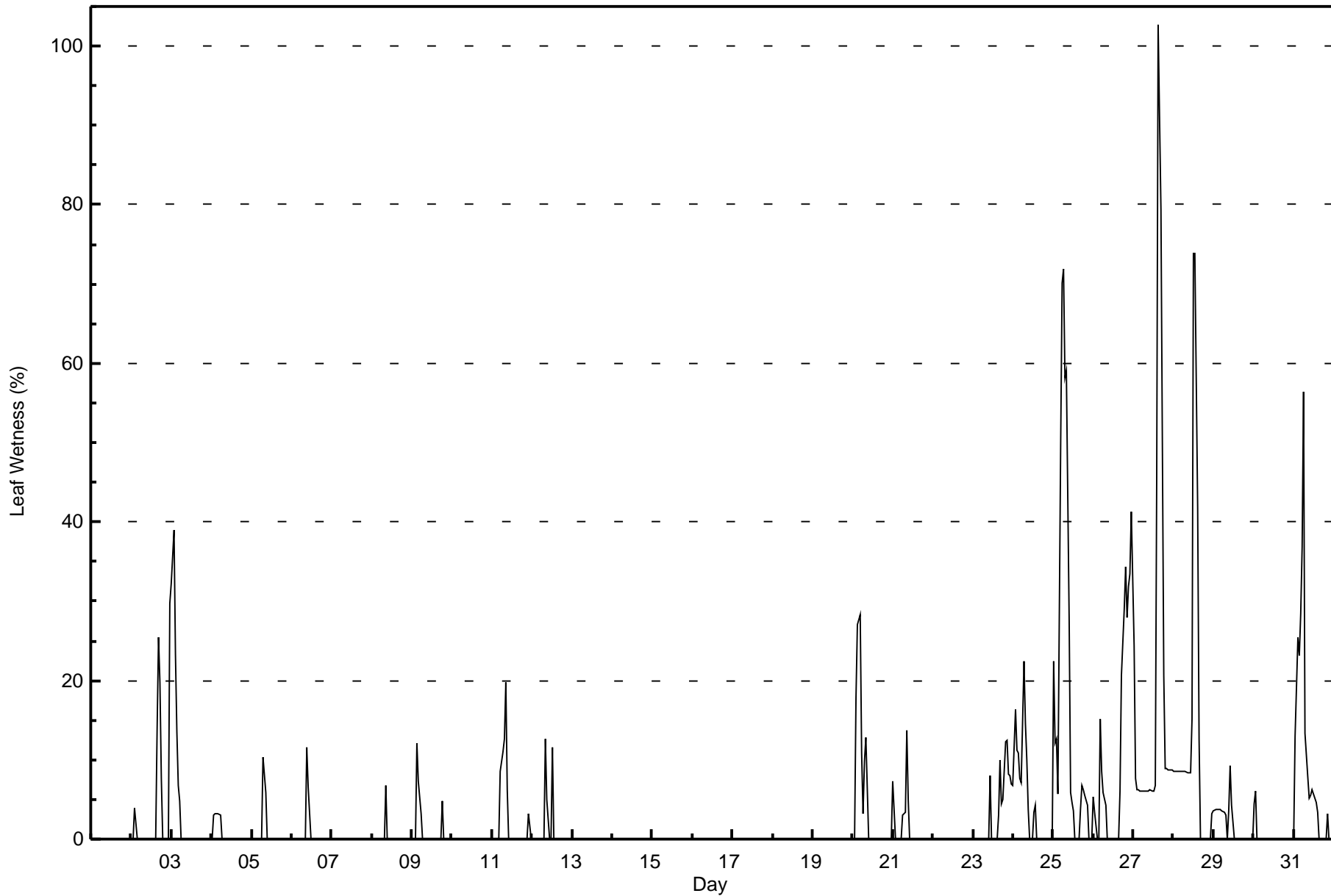
Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Value: 103 % on Oct 27 16:00																	Maximum Daily Average: 18.7 % on Oct 27																	Hours in Service: 744															
Minimum Value: 0 % on Oct 1 01:00																	Minimum Daily Average: 0.0 % on Oct 1																	Hours of Data: 744															
Maximum Diurnal Average: 6.2 % at hour 7																	Minimum Diurnal Average: 1.2 % at hour 12																	Hours of Missing Data: 0															
Monthly Average: 3.3 %																	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> = 8 P <sub>99</sub> = 49																	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																						
2-Oct	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	14	25	20	8	0	0	0	0	0	30	4.2	30																						
3-Oct	32	39	23	14	7	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.0	39																						
4-Oct	0	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	3																						
5-Oct	0	0	0	0	0	0	0	10	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	10																						
6-Oct	0	0	0	0	0	0	0	0	0	12	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	12																						
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																						
8-Oct	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	7																						
9-Oct	0	0	0	12	7	3	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	1.1	12																						
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																						
11-Oct	0	0	0	0	0	8	11	13	20	6	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2.6	20																						
12-Oct	0	0	0	0	0	0	0	0	13	5	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	1.2	13																						
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																						
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																						
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																						
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																						
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																						
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																						
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																						
20-Oct	0	0	18	27	28	11	3	10	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.6	28																						
21-Oct	7	0	0	0	0	0	3	3	14	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.3	14																						
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																						
23-Oct	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	3	10	4	5	12	13	8	8	7	0	3.3	13																						
24-Oct	7	16	11	11	8	7	23	15	10	4	0	0	3	4	0	0	0	0	0	0	0	0	0	0	0	4.9	23																						
25-Oct	22	12	13	6	50	70	72	58	59	27	6	5	4	0	0	0	4	7	6	5	4	0	0	0	0	17.9	72																						
26-Oct	5	3	0	0	15	9	6	4	0	0	0	0	0	0	0	6	21	29	34	28	32	33	41	0	11.1	41																							
27-Oct	24	8	6	6	6	6	6	6	6	6	6	6	6	7	46	103	79	50	21	9	9	9	9	9	18.7	103																							
28-Oct	9	9	9	9	8	8	8	8	8	8	8	15	74	74	42	13	0	0	0	0	0	0	0	3	13.1	74																							
29-Oct	4	4	4	4	4	4	3	3	0	4	9	4	0	0	0	0	0	0	0	0	0	0	0	0	0	1.9	9																						
30-Oct	4	6	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	6																						
31-Oct	0	13	25	23	28	37	56	13	8	5	5	6	6	5	3	0	0	0	0	0	0	3	0	0	0	9.9	56																						
																								3.7	3.6	3.7	3.7	5.3	5.5	6.2	4.7	5.3	2.6	1.6	1.2	3.4	2.9	2.9	4.3	4.0	3.3	2.4	2.0	1.8	1.6	1.7	2.9	Diurnal Average	
																								32	39	25	27	50	70	72	58	59	27	9	15	74	74	46	103	79	50	29	34	28	32	33	41	Diurnal Maximum	







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

**Leaf Wetness (SW) - %**  
**Anzac - October 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	574	77.15	77.15
0.4 - 0.5	0	0.00	77.15
0.6 - 0.7	0	0.00	77.15
0.8 - 1.4	0	0.00	77.15
1.5 - 10	106	14.25	91.40
> 10	63	8.47	99.87

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 21 km/h on Oct 10 12:00	Maximum Daily Speed Average: 15.5 km/h on Oct 13	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 24 18:00	Minimum Daily Speed Average: 1.2 km/h on Oct 24	Hours of Data: 725
Maximum Diurnal Speed Average: 4.4 km/h at hour 14	Minimum Diurnal Speed Average: 1.2 km/h at hour 18	Hours of Missing Data: 19
Monthly Average Velocity: 3.0 km/h 260.4 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 6 Median = 9 Q <sub>3</sub> = 12 P <sub>90</sub> = 15 P <sub>99</sub> = 20	Percent Operational Time: 97.5

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	SW7	SW7	SSW7	SSW6	SSW6	SW8	SW6	SW5	SW7	W5	NW5	W3	WNW3	WNW4	NE1	ESE2	SSW7	S3	WNW1	S5	S5	S7	SSW6	SSE10	SW4.0	SSE10	
2-Oct	S8	S9	SSE8	SE10	SE9	SSE9	SSE10	SSE9	SE6	SSE4	SE7	ENE4	NNW11	NNW16	NNW14	NNW14	NNW14	NNW14	NNW14	NNW17	N17	NNW15	NNW14	NNW11	N3.7	N17	
3-Oct	NNW8	NNW12	NNW11	NNW11	NNW12	NNW11	AF	AF	AF	N13	N11	N11	N11	N11	NNW11	NNW9	NNW8	NNW7	NNW5	N6	N5	NNE3	SW2	AF	NNW8.6	N13	
4-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	S1	ENE6	NE7	ENE5	E5	ESE6	SE8	SSE7	SSE8	SSE10	SSE8	SE7	---	SSE10		
5-Oct	SSE5	S5	SSW6	SW8	SW8	SW7	WSW7	W11	WNW12	WNW11	WNW12	WNW11	WNW16	NW17	NW18	NW17	NNW16	NNW11	N7	N6	NW3	WNW4	WNW5	WNW4	WNW6.9	NW18	
6-Oct	W4	W4	WSW2	SSW1	S2	S3	SSE3	SSE5	SSE7	SSE9	SE8	SE9	SE9	SE9	ESE10	ESE9	SSE9	SE6	SE6	SE8	SSE8	SSE8	SSE10	SSE9	SE5.8	ESE10	
7-Oct	SSE9	SSE10	SSE9	SSE5	SE2	W1	WNW3	W5	WNW6	WNW7	WNW8	WNW9	W9	W8	NW8	NW7	WNW6	W4	WSW5	WSW5	NW7	NW4	WNW5	W3	W3.5	SSE10	
8-Oct	W3	WNW4	W2	SW3	S3	SW3	SE3	SE5	S6	S6	S6	SSE7	S10	SSW10	SSW12	SSW9	S8	SSE7	SE9	SSE8	SSE6	SSE6	S6	S5.2	SSW12		
9-Oct	SSE6	SSE8	SE9	ESE6	SE4	SSE6	S6	S3	W7	WNW11	WNW11	WNW8	WNW9	WNW8	WNW5	NW3	ENE1	ENE4	SSW2	S2	S5	SSE9	SSE11	S8	SSW2.5	SSE11	
10-Oct	SW6	SW9	SSW8	WSW9	W15	W17	W18	W17	W15	W18	W18	W21	W21	W19	W21	W20	W17	W7	SW3	W6	WSW5	NNW4	WNW1	W2	W11.8	W21	
11-Oct	N3	NE4	NNE6	N9	N7	N9	N10	N10	NNW11	NNW14	NNW16	NNW16	NNW15	NNW15	NNW15	NNW13	NW12	NW11	NW11	NNW9	NNW5	W5	WSW4	SSW4	NNW8.9	NNW16	
12-Oct	S4	S6	SSE6	SSE6	SE7	SE10	SE8	SSE5	SE5	SE6	SSE10	SW12	SW16	SW15	WSW14	W15	W13	WNW11	W8	W14	WNW15	WNW13	WNW13	W12	SW6.3	SW16	
13-Oct	W13	W15	W14	W17	W17	W16	W16	W16	WNW14	WNW16	WNW16	W14	WNW13	W15	WNW15	WNW15	WNW16	W12	W11	W15	W19	WNW21	W19	W19	W15.5	WNW21	
14-Oct	WNW18	WNW17	WNW16	W15	W18	WNW18	WNW15	WNW15	WNW19	WNW20	WNW21	WNW19	NW19	NW17	NW16	NW15	NW13	NW10	NW8	NNW6	N6	N6	N5	NNW4	WNW13.3	WNW21	
15-Oct	NW3	W3	WNW5	WNW4	W3	WNW5	W6	NNW5	NNW5	W5	WNW6	W8	WNW7	WNW8	WNW8	NNW6	N2	E2	SE3	SSW4	S5	S5	ESE5	SE7	WNW2.6	WNW8	
16-Oct	SSE7	SSE7	SSE9	SSE10	SSE10	SE11	SE11	SE11	SE12	SSE12	SSE12	SE14	SE14	SSE14	SSE13	SSE14	SSE11	SE10	SE10	SE10	ESE9	SE11	SE9	SE8	SE10.7	SE14	
17-Oct	SE5	S5	SSW7	S6	SE6	SE6	SE10	SE10	ESE8	SE8	S9	S10	S14	SSW14	SSW13	SSW11	S10	SSW7	SSW8	SW12	SW9	WSW17	WSW14	W10	S7.6	WSW17	
18-Oct	WNW11	W13	WNW15	WNW15	WNW15	WNW15	WNW13	WNW12	WNW12	WNW14	WNW15	WNW18	NW19	WNW16	WNW15	WNW10	WNW6	W6	WNW7	NW6	W6	W6	WSW4	WNW11.7	NW19		
19-Oct	WNW3	WNW6	NW2	N4	N1	SSW1	ESE4	ESE8	ESE10	SE10	ESE12	SE12	SE12	SE10	SE11	ESE11	ESE10	ESE12	SE16	SE14	SSE17	SSE15	SSE13	SSE11	SE7.8	SSE17	
20-Oct	SSE12	S7	SW4	WSW10	W9	NW13	WNW15	WNW15	WNW13	WNW13	WNW17	WNW17	WNW15	WNW16	NW16	NW15	NW15	NW12	NW11	NW13	NW10	NW9	NW7	NW6	WNW10.3	WNW17	
21-Oct	NNW4	N3	W2	S2	SSE3	SSE4	S6	SE7	SE10	SE12	SE12	SE11	SE13	SE14	SE11	SSE11	SE10	SE12	SE11	SE9	SE12	SSE11	SSE10	S5	SE7.7	SE14	
22-Oct	SSW5	W6	W7	WNW8	W8	WSW8	WSW9	W10	W10	WNW15	WNW14	W14	WNW13	W15	WSW20	WSW19	W15	W11	W11	W12	WNW10	W7	W9	W10	W10.7	WSW20	
23-Oct	W12	W11	WNW12	W10	W10	WNW10	W11	W11	WNW10	WNW12	WNW11	NW5	NW7	WNW8	WNW11	NW7	NW6	WNW5	WNW6	NW4	NNW4	NNW4	N4	NNW3	WNW7.6	WNW12	
24-Oct	NW2	NE4	NE3	N3	N4	N3	NNE3	ENE4	E5	E4	E2	ESE2	SE1	NE3	NNE2	WSW2	SSW3	NNW1	NNE1	W2	N3	WNW3	WSW5	WNW4	NNE1.2	WSW5	
25-Oct	NNW5	NNW4	NNW4	NNW5	N4	NNW3	N3	NNE3	ENE5	E4	E4	SE3	ESE4	ESE5	ESE6	ESE7	SE8	SSE8	SSE7	SSE8	SSE12	SSE13	SSE14	S12	SE3.2	SSE14	
26-Oct	SSE10	SSE11	SSE10	SSE11	SSE9	SSE12	SSE17	SSE17	SSE16	SSE13	SE14	SE16	SSE16	SSE15	SSE13	SE12	SE13	SSE12	SSE11	S11	W6	NW12	NW15	SSE10.1	SSE17		
27-Oct	NW14	NW15	NW16	NW16	NW15	NW15	NW14	NW15	NW14	NW14	NW14	NW14	NW14	NW14	NW16	NW14	NW14	NW14	NW14	NW14	NW14	NW11	NW10	NW9	NW10	NW13.6	NW16
28-Oct	NW10	NW8	NNW7	NNW7	NNW8	NW4	N3	S3	S4	SSE6	SSE6	SE9	SE9	SE9	SE10	SE11	SSE10	SE12	SSE14	SSE14	SE13	SSE13	SSE11	SSE11	SSE4.7	SSE14	
29-Oct	SSE13	SSE15	SSE15	SE14	SSE13	SSE10	SSE11	SSE8	SSE7	S7	S8	S9	SSW9	SW10	SW10	SW8	SSW7	SSW6	SSW7	SW7	WSW10	W12	W7	WNW4	S7.3	SSE15	
30-Oct	W5	W7	WNW8	W7	W10	W7	W8	W9	SW6	SSW6	SSW4	WSW10	WSW11	W6	WSW4	SW8	WSW6	SSW5	SW5	WSW6	W5	WNW6	WNW8	WNW7	WSW6.2	WSW11	
31-Oct	WNW9	NW11	NW9	NW7	NNW7	NNW8	NNW7	NW7	NW5	NW7	NNW7	NNW5	NNW5	N4	ENE4	E3	S1	ENE3	E3	ENE6	ENE5	AF	AF	AF	NNW4.3	NW11	

WSW3.0	WSW3.4	WSW3.0	W3.2	W3.2	W3.5	WSW3.4	WSW3.1	WSW3.0	W3.5	W3.6	W4.0	W4.0	W4.4	NNW4.4	W3.7	W2.9	W1.2	SW1.6	WSW2.2	WSW1.9	WSW2.8	SW3.0	WSW2.8	Diurnal Average
WNW18	WNW17	WNW16	W17	W18	WNW18	W18	SSE17	WNW19	WNW20	WNW21	W21	W21	W19	W21	W20	W17	NW14	SE16	NNW17	W19	WNW21	W19	W19	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

Anzac - October 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 8 km/h on Oct 10 13:00			Hours of Data:	725
Minimum Value: 0 km/h on Oct 6 06:00			Hours of Missing Data:	19
			Hours of Calibration:	0
			Percent Operational Time:	97.5
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				

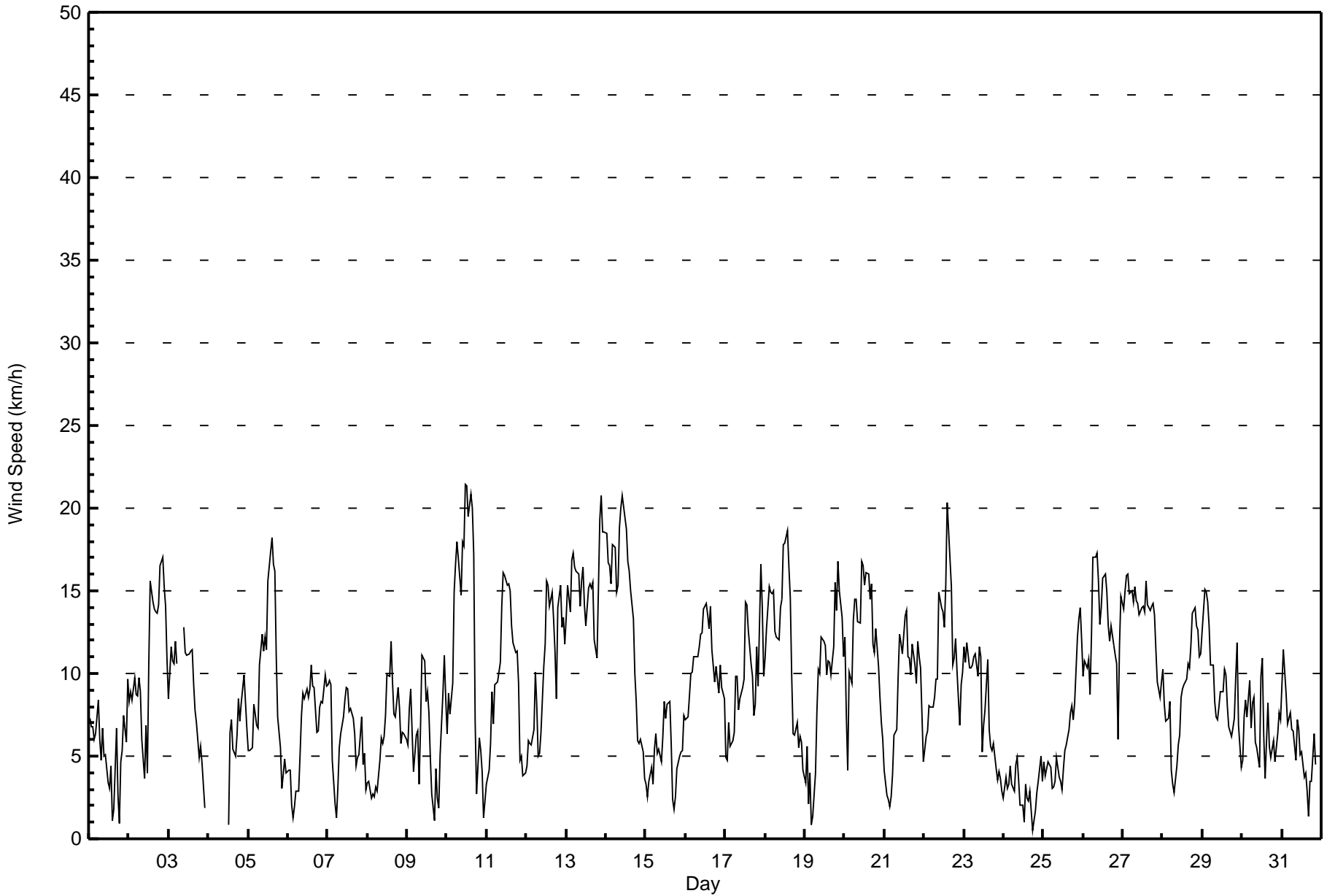
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Oct	2	1	1	1	1	2	1	1	2	2	2	1	2	2	2	3	3	1	1	1	1	2	2	3	3
2-Oct	2	2	2	2	2	2	3	3	2	1	3	2	4	5	5	5	5	5	5	5	5	5	4	3	5
3-Oct	2	4	3	3	4	4	AF	AF	AF	4	4	3	4	4	3	3	2	2	1	1	1	1	1	AF	4
4-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	2	2	2	1	2	2	2	2	2	2	2	2
5-Oct	1	2	1	2	1	1	1	4	5	4	4	4	6	7	7	6	5	4	2	1	1	2	1	1	7
6-Oct	1	1	1	1	0	0	0	1	2	3	3	2	2	3	3	3	3	1	2	2	2	2	2	2	3
7-Oct	2	2	2	2	1	1	1	2	2	3	3	2	3	3	3	3	2	1	1	1	2	1	1	1	3
8-Oct	1	1	1	1	1	1	1	1	2	2	2	3	3	3	4	3	2	1	2	2	2	1	1	2	4
9-Oct	1	2	2	3	2	1	2	1	3	4	4	3	3	3	2	1	1	2	1	1	1	2	3	3	4
10-Oct	2	2	2	4	6	7	7	7	5	6	7	8	8	8	8	8	7	4	1	1	1	3	1	1	8
11-Oct	2	2	2	3	2	3	3	3	3	4	5	5	5	5	5	4	5	4	4	3	2	2	1	1	5
12-Oct	1	1	1	2	2	2	2	2	2	2	3	6	5	4	5	6	5	4	3	6	6	5	5	5	6
13-Oct	5	5	5	7	7	6	6	6	6	6	6	5	5	6	5	6	6	4	4	6	6	8	7	7	8
14-Oct	7	6	6	6	7	6	6	6	8	8	8	8	7	7	5	6	4	4	3	2	1	2	1	1	8
15-Oct	1	1	1	1	1	2	2	1	1	2	2	3	3	3	3	2	2	1	1	1	1	1	2	2	3
16-Oct	1	2	2	2	3	3	3	3	3	3	3	4	4	4	4	4	3	2	2	2	2	2	2	2	4
17-Oct	1	2	2	2	2	1	2	2	2	2	3	3	5	5	5	4	3	3	3	4	6	5	4	4	6
18-Oct	4	5	6	5	5	6	5	4	5	5	5	7	7	7	6	5	4	2	2	2	2	1	1	1	7
19-Oct	1	2	1	2	1	1	2	3	3	3	4	3	3	3	3	4	3	4	4	4	5	3	3	3	5
20-Oct	3	3	2	3	4	6	6	6	5	5	6	6	6	6	6	6	6	4	3	4	4	3	2	2	6
21-Oct	1	1	1	1	1	2	1	2	3	3	3	3	4	4	3	3	3	4	3	3	3	3	2	2	4
22-Oct	1	2	3	3	3	3	2	3	4	5	5	5	5	6	7	7	6	3	4	4	4	3	4	3	7
23-Oct	4	4	5	4	4	4	4	4	3	4	4	2	2	3	4	3	1	1	2	2	1	1	1	1	5
24-Oct	1	1	1	1	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	2	1	2
25-Oct	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	3	4	4	4
26-Oct	3	3	3	3	3	3	4	4	5	4	4	5	5	5	5	5	4	4	3	3	3	4	5	6	6
27-Oct	5	5	6	5	5	5	5	6	5	6	5	5	5	5	5	5	4	5	5	4	4	3	2	3	6
28-Oct	3	3	2	3	2	2	1	1	2	2	2	3	2	3	3	3	2	3	3	3	3	4	3	3	4
29-Oct	3	4	4	4	3	2	3	2	2	2	2	2	3	3	3	2	2	2	2	2	3	4	3	3	4
30-Oct	2	3	3	3	3	2	3	2	2	1	1	5	4	2	2	2	2	1	1	1	1	2	3	2	5
31-Oct	3	4	3	2	2	2	2	2	2	2	2	2	1	1	1	2	1	1	2	2	1	AF	AF	AF	4
Diurnal Maximum																									
7 6 6 7 7 7 7 7 8 8 8 8 8 8 8 8 7 5 5 6 6 8 7 7																									

AF - Analyzer Failure



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

**Wind Speed (WS) - km/h**  
**Anzac - October 2015**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h  
Anzac - October 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	179	24.69	24.69
6 - 11	331	45.66	70.34
12 - 19	207	28.55	98.90
20 - 28	8	1.10	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 725

Total Number of Hours: 744



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

**Wind Speed (WS) - km/h**  
**Anzac - October 2015**

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	16	5	5	9	9	6	9	8	20	9	7	11	17	19	12	17	179
6 - 11	14	1	1	2	0	12	50	62	21	18	17	11	35	38	27	22	331
12 - 19	2	0	0	0	0	2	19	30	2	3	4	4	36	49	37	19	207
20 - 28	0	0	0	0	0	0	0	0	0	0	0	1	4	3	0	0	8
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>	32	6	6	11	9	20	78	100	43	30	28	27	92	109	76	58	725

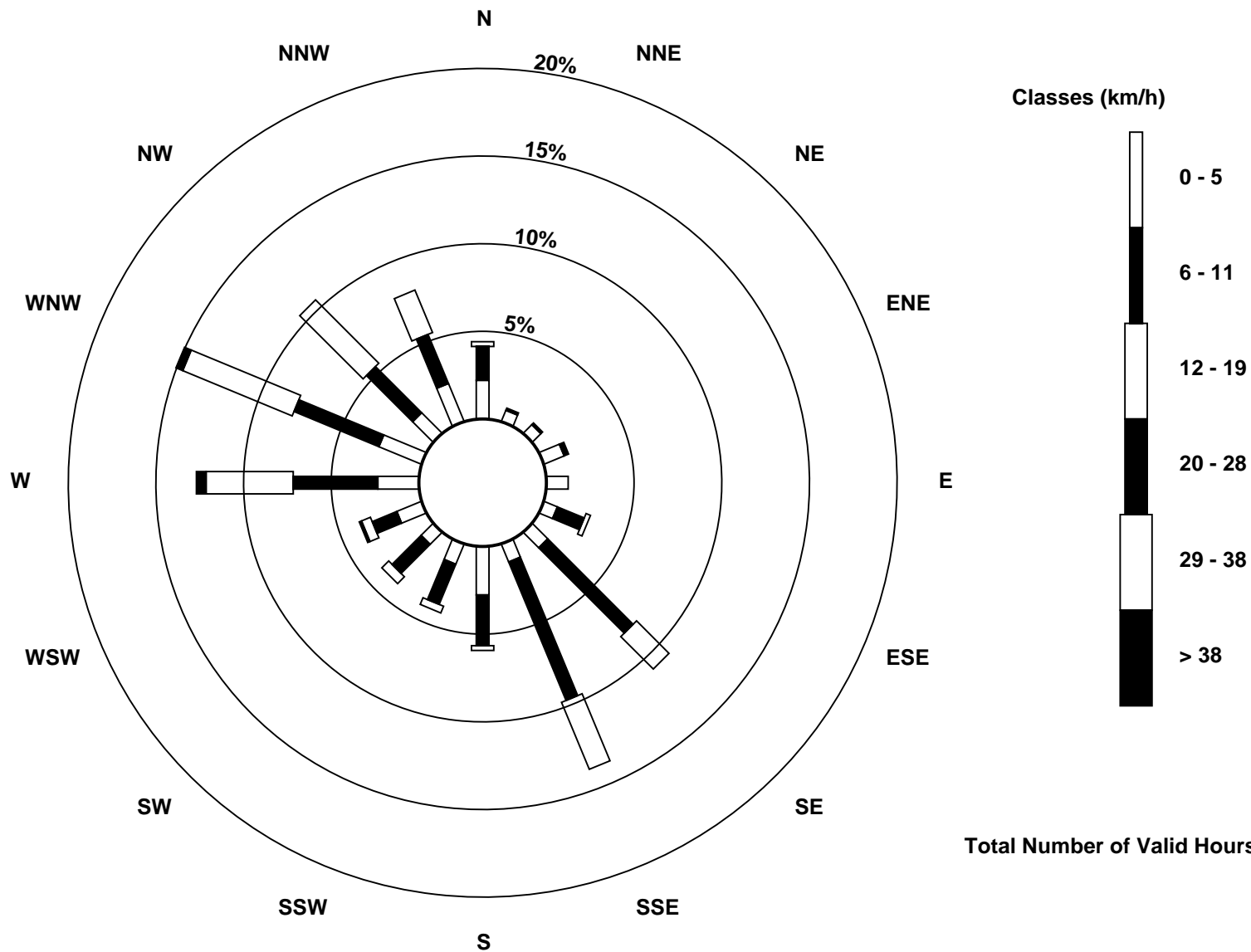
Total Number of Valid Hours: 725

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Wind Speed (WS) - km/h  
Anzac (AMS 14)







# Wood Buffalo Environmental Association

## Summary of Hour Averages

Wind Direction (WD) - deg

Anzac - October 2015

Direction of Maximum Speed: 267 deg on Oct 10 12:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 278.3 deg on Oct 13	Hours of Data: 725
Direction of Minimum Speed: 335 deg on Oct 24 18:00	Hours of Missing Data: 19
Direction of Minimum Daily Speed Average: 1.2 deg on Oct 24	Percent Operational Time: 97.5
Monthly Average Direction: 279.3 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	228	218	206	209	213	233	215	217	235	279	305	278	301	295	50	109	206	174	290	183	169	183	194	166	216.0
2-Oct	175	169	149	135	135	148	148	155	139	164	135	59	340	329	330	333	341	339	343	348	350	347	347	347	355.6
3-Oct	340	338	338	339	348	348	AF	AF	AF	356	360	351	2	360	343	344	343	336	348	352	353	20	224	AF	348.0
4-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	184	61	43	65	88	113	140	164	162	161	151	143	--
5-Oct	160	187	201	226	215	221	244	276	291	299	296	295	296	309	321	325	334	347	358	353	320	290	288	289	297.0
6-Oct	275	275	244	212	183	177	156	160	158	151	133	129	132	142	122	111	154	135	126	133	152	151	154	148	145.6
7-Oct	153	147	150	150	124	270	298	280	299	297	293	285	269	279	315	310	294	274	243	250	317	305	289	275	273.3
8-Oct	281	282	265	218	190	216	144	132	169	171	170	163	169	201	213	195	171	147	146	152	147	156	166	169	175.7
9-Oct	151	151	146	118	125	156	182	171	274	289	291	289	288	288	291	313	68	70	197	170	170	158	165	191	203.1
10-Oct	219	220	212	249	266	271	272	271	260	263	274	267	274	277	266	274	271	274	217	260	253	339	291	259	265.5
11-Oct	1	36	16	7	8	359	355	354	343	335	337	341	336	339	338	330	322	316	323	342	344	278	245	209	338.9
12-Oct	183	173	167	168	145	144	142	152	132	126	168	228	218	223	257	260	270	282	272	281	284	290	282	272	235.9
13-Oct	264	272	268	278	275	277	275	279	288	294	289	281	282	278	284	284	282	274	261	269	281	282	276	276	278.3
14-Oct	286	286	284	278	278	285	296	298	292	299	301	299	308	312	319	312	321	319	313	333	3	6	355	328	301.8
15-Oct	317	264	300	295	279	286	281	332	335	264	296	281	288	288	291	327	357	93	144	196	181	171	109	134	282.5
16-Oct	150	159	156	152	147	136	142	141	140	151	147	144	145	155	153	160	155	141	146	142	122	138	135	136	145.9
17-Oct	135	186	193	177	137	141	143	137	121	129	169	182	181	200	200	197	183	206	208	219	223	238	241	260	190.4
18-Oct	285	281	284	291	287	283	284	288	291	292	296	297	297	307	301	299	302	300	281	291	309	267	259	239	290.9
19-Oct	296	283	322	351	9	212	111	116	117	124	123	142	131	124	127	114	116	116	125	144	148	147	151	158	132.3
20-Oct	167	182	220	252	274	305	295	298	294	294	297	298	299	300	311	312	317	322	320	321	321	310	310	310	298.7
21-Oct	345	352	278	184	168	168	170	141	142	141	139	138	134	137	139	147	138	136	145	131	145	153	148	169	143.3
22-Oct	211	279	281	287	281	258	258	267	276	282	284	279	283	270	255	256	266	262	270	271	288	279	281	280	271.3
23-Oct	279	276	285	279	281	286	279	278	282	295	285	313	323	301	300	304	323	295	289	311	347	339	353	340	293.6
24-Oct	324	36	36	2	6	9	20	76	80	87	99	111	146	35	12	239	199	335	18	259	1	300	238	290	19.4
25-Oct	332	309	344	327	350	345	360	19	60	92	100	135	109	102	105	120	129	151	158	154	162	166	168	171	136.5
26-Oct	147	151	151	157	147	156	158	159	161	157	147	141	143	147	147	155	128	130	149	160	177	269	306	314	154.3
27-Oct	307	309	310	312	311	310	307	305	304	307	309	314	312	311	314	315	315	316	314	317	321	326	324	325	312.4
28-Oct	320	320	332	338	332	315	8	169	177	163	150	140	127	126	134	142	149	146	152	156	144	151	155	151	146.5
29-Oct	152	154	153	143	148	152	159	159	162	170	184	173	210	220	221	216	212	199	195	219	245	269	267	283	185.1
30-Oct	279	270	284	272	265	263	262	271	234	209	212	250	239	266	241	227	238	212	224	240	262	286	289	293	256.1
31-Oct	301	310	313	313	336	335	327	321	319	320	327	337	348	357	60	83	182	76	80	62	58	AF	AF	AF	337.5
250.5 251.6 253.5 264.2 268.9 264.7 251.1 256.1 255.6 270.6 272.8 267.5 268.8 277.6 282.8 276.0 274.0 265.5 222.6 239.4 237.5 238.3 235.2 238.3																									
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

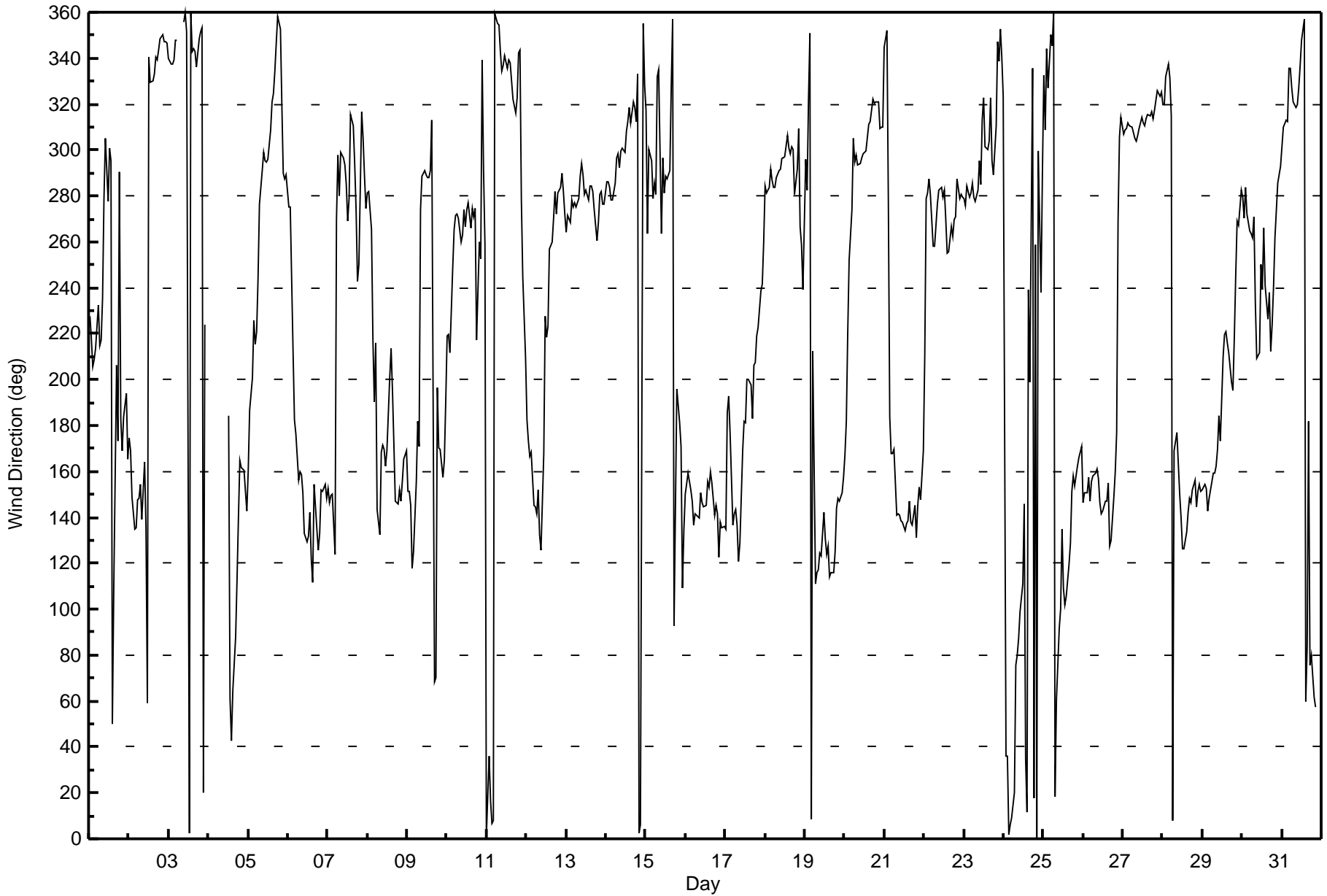
Wind Direction (WD) - deg

Anzac - October 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 103 deg on Oct 1 15:00			Hours of Data:	725
Minimum Value: 7 deg on Oct 15 20:00			Hours of Missing Data:	19
			Hours of Calibration:	0
			Percent Operational Time:	97.5
Percentiles: P <sub>1</sub> = 11 P <sub>10</sub> = 16 Q <sub>1</sub> = 18 Median = 22 O <sub>3</sub> = 28 P <sub>90</sub> = 34 P <sub>99</sub> = 77				

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	16	14	14	13	16	17	18	18	41	36	56	81	54	103	75	26	67	76	18	20	26	21	18	103
2-Oct	19	19	16	16	18	15	16	18	34	52	22	58	32	18	20	17	18	18	17	18	18	18	17	17	58
3-Oct	17	16	16	18	17	16	AF	AF	AF	19	25	19	20	20	19	22	17	17	13	12	11	48	23	AF	48
4-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	86	41	27	32	29	19	16	14	12	17	14	86	
5-Oct	18	22	17	12	10	10	14	24	28	25	27	25	25	23	20	17	18	11	14	41	32	19	27	41	
6-Oct	23	18	40	48	18	17	19	13	15	22	21	23	25	24	24	24	20	17	17	15	17	15	16	48	
7-Oct	15	15	15	23	65	47	21	17	24	26	28	20	27	40	39	29	27	21	9	13	21	28	15	36	65
8-Oct	20	22	21	29	12	29	32	17	14	22	29	32	31	32	20	28	22	15	15	13	12	16	16	18	32
9-Oct	17	15	17	21	59	18	12	21	34	27	25	29	29	30	26	23	50	52	39	49	11	13	15	28	59
10-Oct	22	17	21	34	27	29	31	29	26	30	31	29	30	30	29	30	29	28	27	24	26	21	53	45	53
11-Oct	20	33	22	19	22	20	18	18	17	18	18	18	19	18	19	19	20	21	19	21	29	30	21	14	33
12-Oct	15	14	19	23	20	16	19	31	39	25	20	38	19	21	30	29	29	28	31	30	29	27	30	30	39
13-Oct	28	28	30	31	30	32	28	27	29	29	28	28	31	29	29	30	27	26	24	26	27	27	28	28	32
14-Oct	26	27	26	30	30	27	28	25	28	27	23	27	23	25	20	22	19	18	18	29	15	16	16	20	30
15-Oct	28	46	28	28	28	25	22	17	17	46	43	30	38	31	29	23	43	35	43	7	11	14	32	15	46
16-Oct	16	15	15	18	18	16	18	18	19	19	20	19	21	24	26	21	19	18	18	18	17	17	15	12	26
17-Oct	23	37	23	20	15	16	16	16	21	22	22	33	26	28	29	32	25	27	27	19	31	18	19	25	37
18-Oct	26	27	29	25	26	27	28	26	30	30	27	26	26	23	25	24	22	24	22	20	25	18	11	16	30
19-Oct	31	24	55	14	80	72	39	17	18	21	22	22	24	26	21	23	24	23	17	20	19	17	18	18	80
20-Oct	18	22	43	26	33	25	27	26	29	27	26	26	25	26	25	25	21	18	18	19	18	21	23	19	43
21-Oct	17	20	38	34	22	29	17	19	17	19	20	20	21	20	22	20	20	21	21	19	18	17	17	28	38
22-Oct	30	24	31	30	27	25	18	24	29	26	27	27	30	30	25	25	26	23	28	28	29	28	27	25	31
23-Oct	26	25	28	26	28	25	27	27	27	26	27	33	29	29	26	25	12	20	21	36	27	20	24	35	36
24-Oct	41	22	24	33	28	19	33	19	22	25	72	80	83	29	56	48	32	78	59	64	28	46	22	45	83
25-Oct	44	23	18	18	15	13	19	25	27	32	29	28	24	19	23	18	19	17	18	19	18	18	20	19	44
26-Oct	17	18	20	20	27	17	15	16	19	17	23	22	20	20	21	21	18	20	17	18	50	24	22	50	
27-Oct	21	21	20	19	22	22	22	21	22	22	22	20	22	22	22	20	22	20	19	19	19	16	15	16	22
28-Oct	16	18	16	17	18	45	28	53	39	31	28	24	21	21	25	19	18	17	17	18	19	19	18	19	53
29-Oct	17	16	15	18	17	19	17	19	18	21	22	19	23	20	16	16	15	22	18	18	25	26	26	36	36
30-Oct	29	28	29	29	26	22	21	22	25	17	32	32	23	36	43	17	20	12	15	14	21	20	24	22	43
31-Oct	21	20	21	20	17	15	16	19	26	18	21	19	22	28	23	51	67	34	29	20	19	AF	AF	AF	67
44 46 55 48 80 72 39 53 39 52 72 80 86 54 103 75 67 78 76 64 41 50 53 45																								Diurnal Maximum	

AF - Analyzer Failure



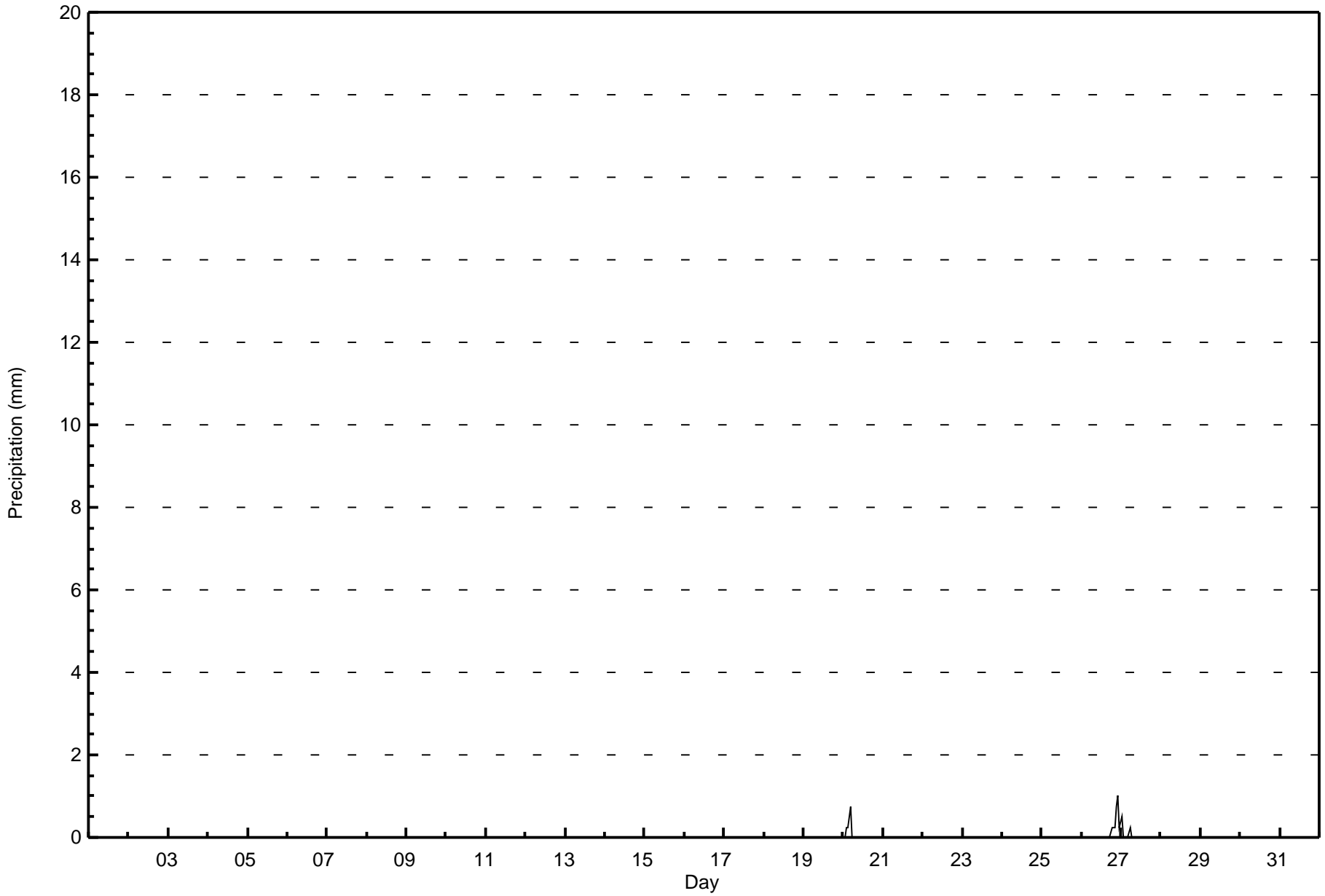


Maximum Value: 1.0 mm on Oct 26 23:00      Maximum Daily Total: 2.8 mm on Oct 26																								Hours in Service: 744 Hours of Data: 744												
Minimum Value: 0.0 mm on Oct 1 01:00      Minimum Daily Total: 0.0 mm on Oct 1 Maximum Diurnal Total: 1.0 mm at hour 23      Minimum Diurnal Total: 0.0 mm at hour 2 Monthly Total: 4.83 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> = 0.3																								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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	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	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	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	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	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	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	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	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	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.3	0.3	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.8
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.3	0.3	0.3	0.8	1.0	0.3	2.8	2.8	1.0	0.3	0.3	0.3	0.3	0.8	1.0	0.3	
27-Oct	0.5	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.5
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	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	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
																								Diurnal Average												
																								Diurnal Maximum												



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

**Precipitation (PC) - mm**  
**Anzac - October 2015**





# Wood Buffalo Environmental Association

## SO2 Calibration Report

### Station Information

Calibration Date	October 2, 2015	Last Calibration	September 24, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	12:44
Gas Cert Reference	SA130026A	Station temp.	22 Deg C
Cal Gas Concentration	47.2 ppm	Cal Gas Exp Date	12/12/2016
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
ZAG Make/Model	API 701	Serial Number	764
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8790

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	524	524
Analyzer IP address	192.168.1.43		Lamp voltage	2722	2712
Calculated slope	1.001711	1.001898	Chamber temp	50.0	50.0
Calculated intercept	-0.305412	-0.713867	Pressure	25.2	25.2
Analyzer Background	19.4	19.4	Flow	656	658
Analyzer Coefficient	1.011	1.011	Intensity	67	67

Analyzer make API T100 Analyzer serial # 723

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	----
as found span	5000	74.9	707.1	706.2	1.001
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	74.9	707.1	706.2	1.001
second point	5000	37.5	354.0	354.0	1.000
third point	5000	18.7	176.5	177.9	0.992
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	74.9	707.1	699.5	1.011
Average Correction Factor					0.998

Corrected As found 706.2 Previous response 706.2 % change 0.0%

Notes:

Filter changed No adjustments or maintenance done.

Calibration Performed By: Melissa Lemay



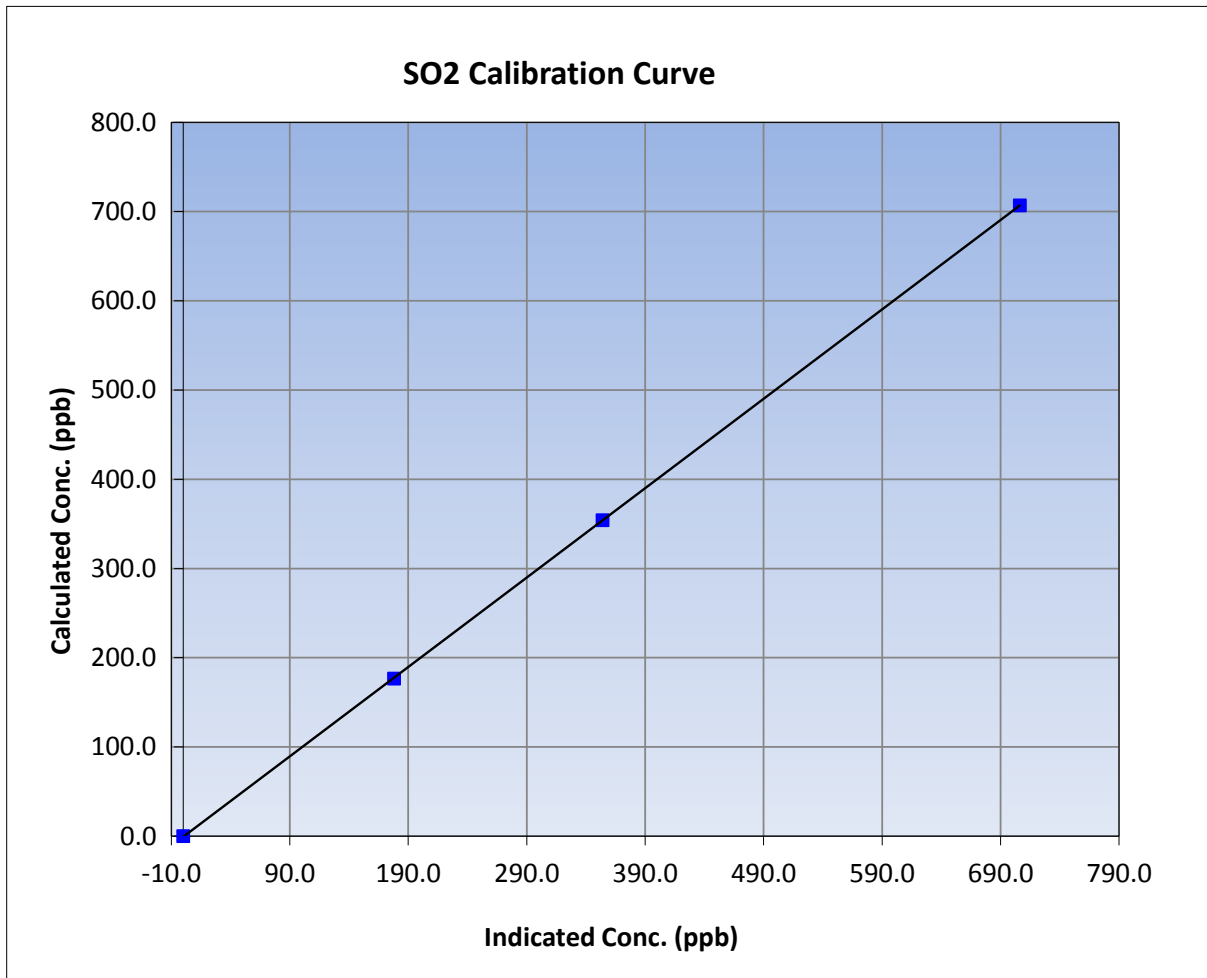
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	October 2, 2015	Previous Calibration	September 24, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:00	End Time (MST)	12:44
Analyzer make	API T100	Analyzer serial #	723

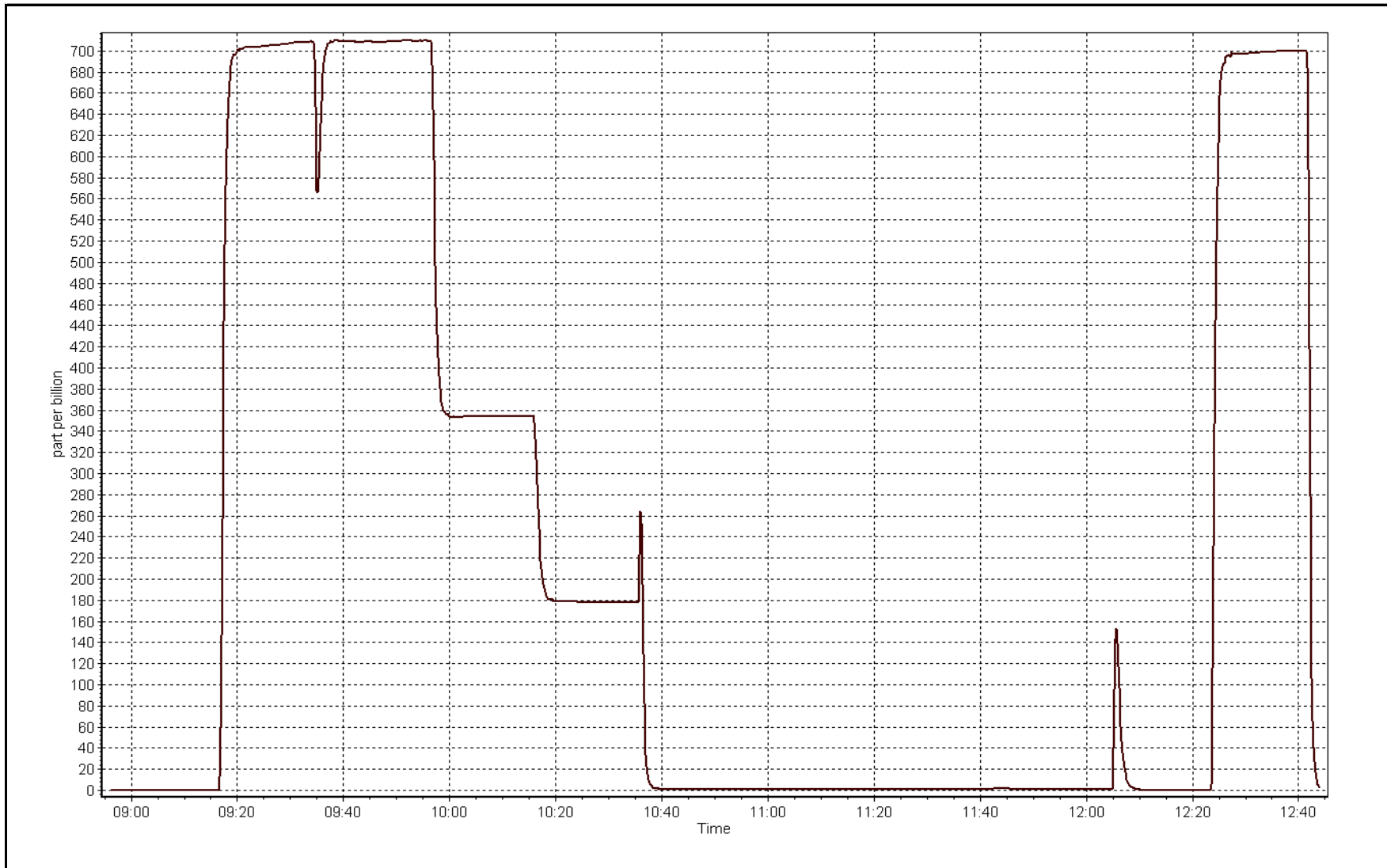
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999994
707.1	706.2	1.0012		
354.0	354.0	1.0000	Slope	1.001898
176.5	177.9	0.9923		
			Intercept	-0.713867



SO2 Calibration Plot

Date: October 2, 2015







# Wood Buffalo Environmental Association TRS Calibration Report

### Station Information

Calibration Date	October 6, 2015	Last Calibration	September 25, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	8:05	End Time (MST)	10:45
Gas Cert Reference	ALM033528	Station temp.	22 Deg C
Cal Gas Concentration	5.05 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
Dil air Make/Model	API 701	Serial Number	4764
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8790
SO2 gas concentration	47.2 ppm	SO2 gas cert/exp	SA130026A 12/Dec/16

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-731	-732
Analyzer IP address	192.168.1.42		Lamp voltage	982	985
Calculated slope	0.998388	1.007400	Chamber temp	45	45
Calculated intercept	-0.131042	-0.134734	Pressure	655.3	683.7
Analyzer Background	1.63	1.62	Flow	0.387	0.400
Analyzer Coefficient	0.976	1.139	Intensity	98	97
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1300156232	
Converter make/model	CDN-101		Converter serial #	510	

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	----
as found span	5000	74.3	75.0	75.9	0.988
SO2 scrubber check	5000	18.7	176.5	0.5	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	74.3	75.0	74.6	1.006
second point	5000	39.6	40.0	39.9	1.003
third point	5000	19.8	20.0	20.1	0.993
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	74.3	75.0	74.7	1.005
Average Correction Factor					1.001

Corrected As found	75.9	Previous response	75.3	% change	-0.8%
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**Notes:**

Inlet filter replaced after as founds. Slightly adjusted span.

Calibration Performed By:

Asad Hidayat



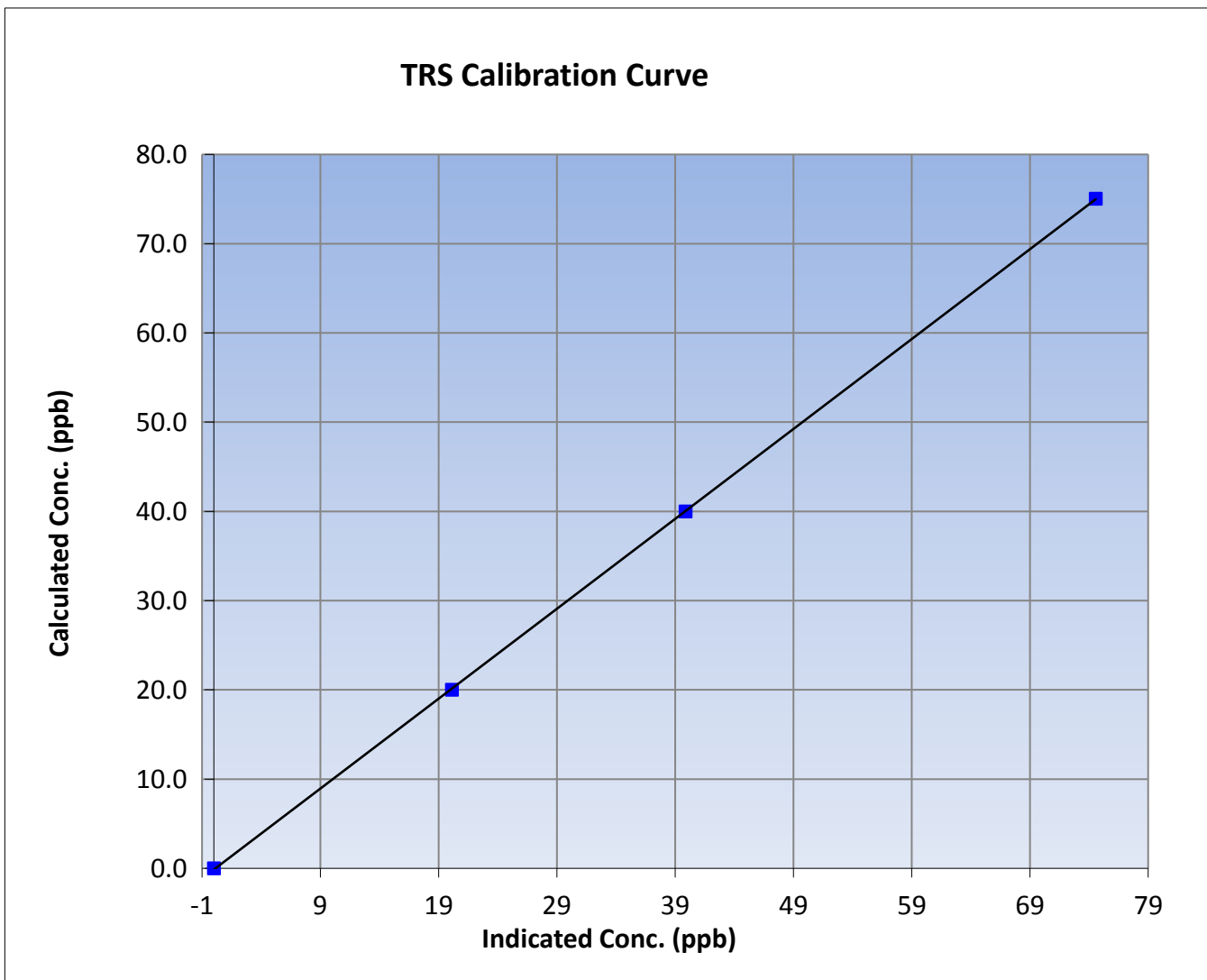
# Wood Buffalo Environmental Association TRS Calibration Report

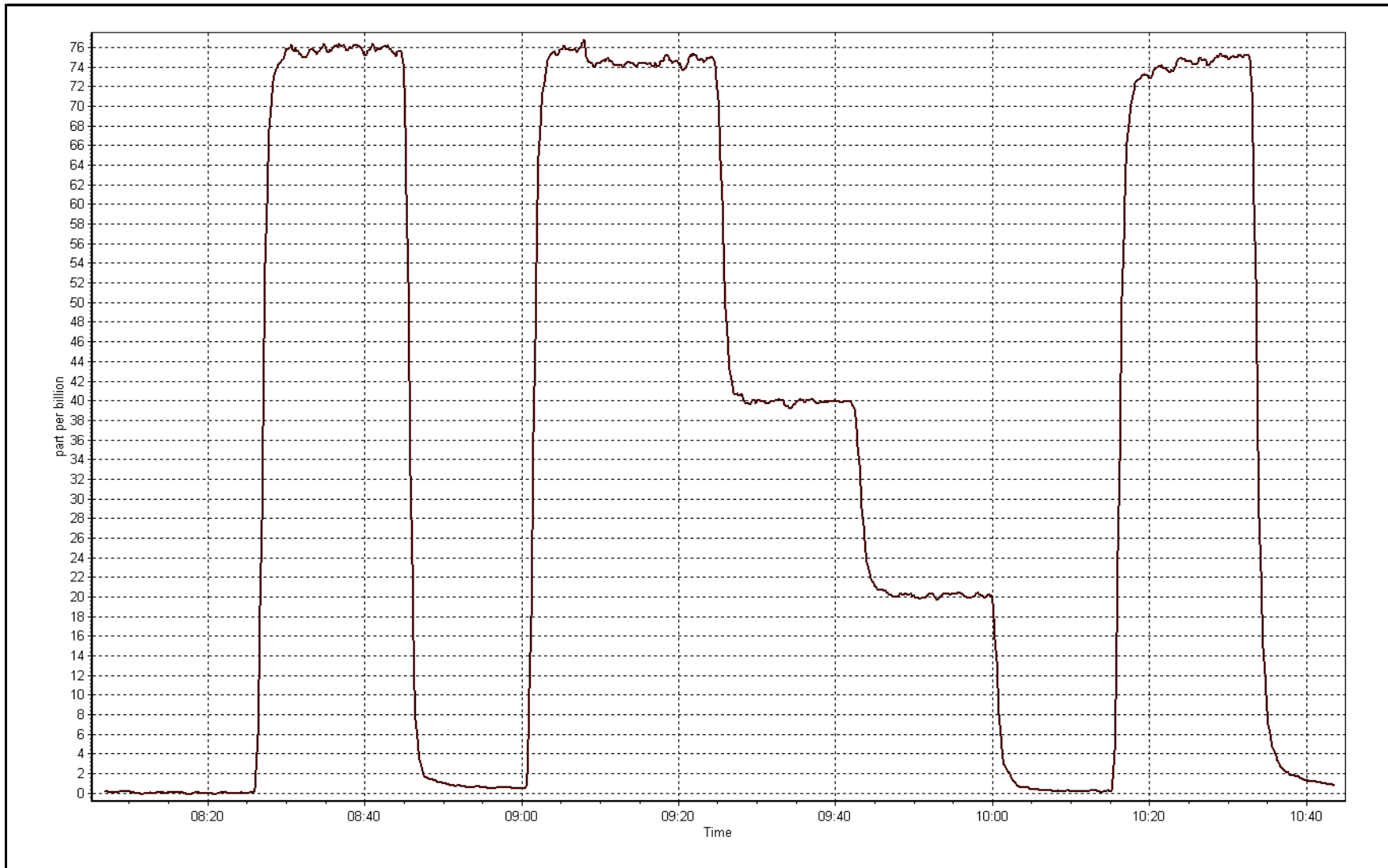
## Station Information

Calibration Date	October 6, 2015	Previous Calibration	September 25, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	8:05	End Time (MST)	10:45
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1300156232

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999984
75.0	74.6	1.0065		
40.0	39.9	1.0029	Slope	1.007400
20.0	20.1	0.9929		
			Intercept	-0.134734







## Wood Buffalo Environmental Association THC / NMHC Calibration Report

### Station Information

Calibration Date	October-02-15	Last Calibration	September-30-15
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	12:44
Gas Cert Reference	SA130026A	Cal Gas Expiry Date	December-12-16
CH4 Cal Gas Conc.	512.0 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211.0 ppm	Station temp.	22 Deg C
Calibrator Model	Sabio 4010	Serial Number	8400311
ZAG make/model	Teledyne API 701	Serial Number	4764
DACS make/model	Campbell Scientific CR3000	Serial Number	8790

### Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	74.9	74.9
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	392.2	392-405
THC Calc slope	0.999505	1.000288	Carrier Pressure	31.8	31.8
THC Calc intercept	0.000000	0.020145	Fuel Pressure	41.4	41.4
NMHC Calc slope	0.999097	1.000923	Air Pressure	32.6	32.6
NMHC Calc intercept	0.000000	0.000033			

Analyzer make Thermo 55i Analyzer serial # 1218153355

### THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	----
as found span	5000	74.9	16.36	18.00	0.909
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	16.36	16.36	1.000
second point	5000	37.5	8.19	8.12	1.009
third point	5000	18.7	4.09	4.07	1.004
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	74.9	16.36	16.31	1.003
Average Correction Factor					1.004

Corrected As found 18.00 Previous response 16.37 % change -9.1%

**Notes:**

Came to find out why the span was 10% out; Pressures are the same to hydrogen change out, flame temp going between 392-405degC; All other diagnostics normal.

Calibration Performed By: Melissa Lemay



## Wood Buffalo Environmental Association THC / NMHC Calibration Report

### NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	74.9	8.69	9.70	0.896
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	8.69	8.69	1.000
second point	5000	37.5	4.35	4.33	1.005
third point	5000	18.7	2.17	2.18	0.995
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	74.9	8.69	8.66	1.004
Average Correction Factor					1.000

Corrected As found      9.70      Previous response      8.70      % change      -10.3%

### CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	74.9	7.67	8.30	0.924
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	7.67	7.67	1.000
second point	5000	37.5	3.84	3.79	1.013
third point	5000	18.7	1.91	1.90	1.008
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	74.9	7.67	7.65	1.003
Average Correction Factor					1.007

Corrected As found      8.30      Previous response      7.67      % change      -7.6%



# Wood Buffalo Environmental Association

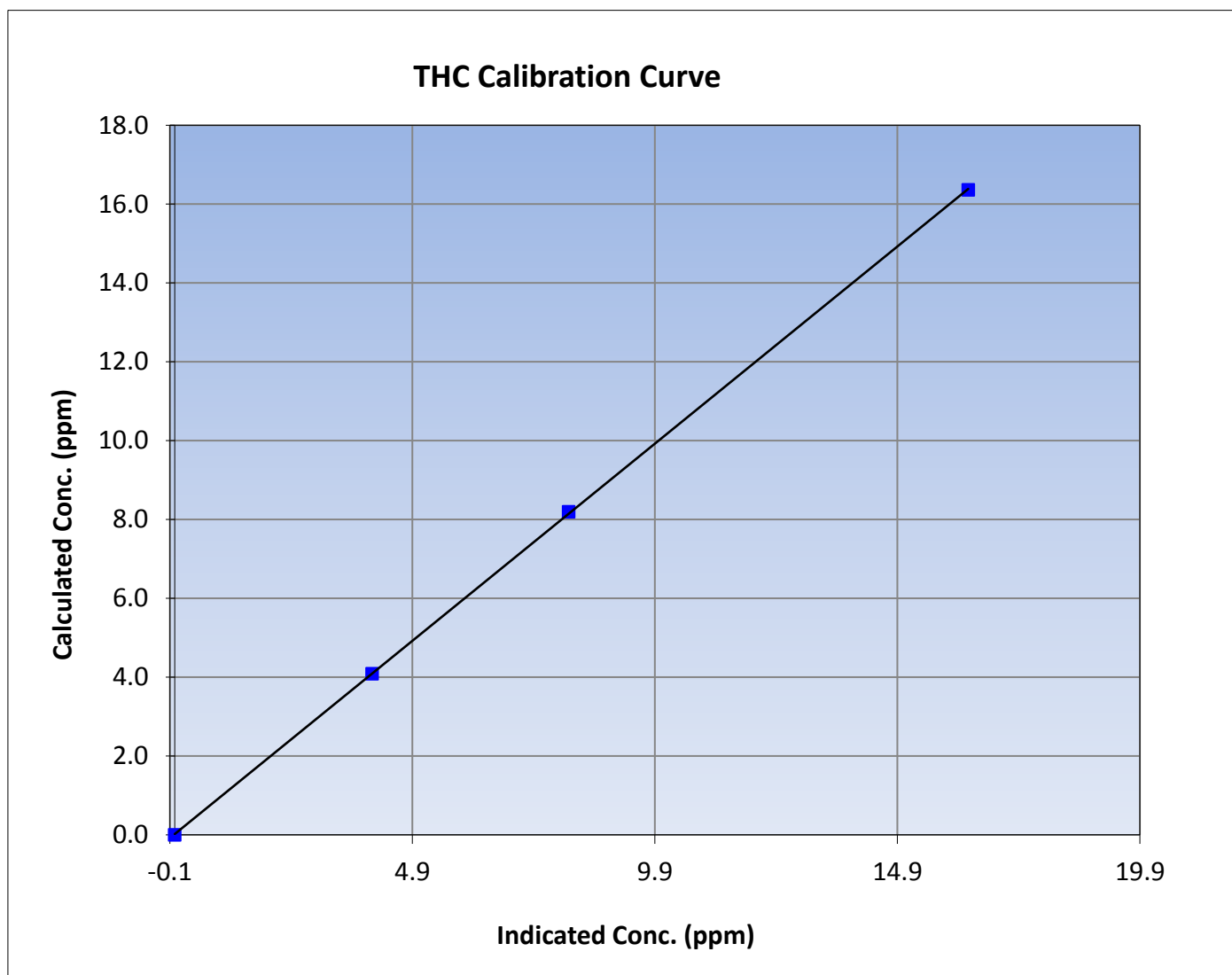
## THC Calibration Summary

### Station Information

Calibration Date	October 2, 2015	Previous Calibration	September 30, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:00	End Time (MST)	12:44
Analyzer make	Thermo 55i	Analyzer serial #	1218153355

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999977
16.36	16.36	1.0001		
8.19	8.12	1.0089	Slope	1.000288
4.09	4.07	1.0037		
			Intercept	0.020145





# Wood Buffalo Environmental Association

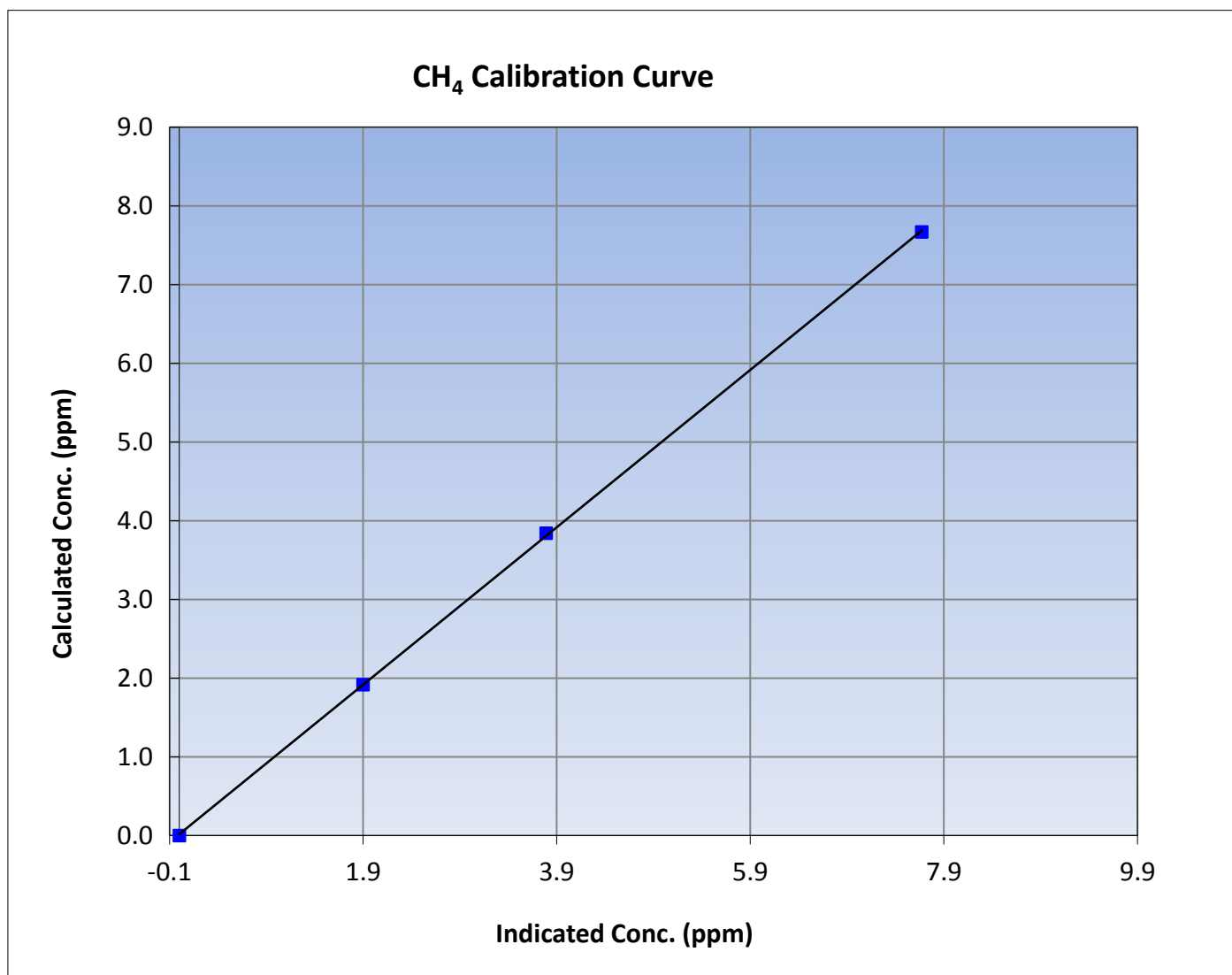
## CH<sub>4</sub> Calibration Summary

### Station Information

Calibration Date	October 2, 2015	Previous Calibration	September 30, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:00	End Time (MST)	12:44
Analyzer make	Thermo 55i	Analyzer serial #	1218153355

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999948
7.67	7.67	1.0000		
3.84	3.79	1.0132	Slope	1.000001
1.91	1.90	1.0078		
			Intercept	0.016157





# Wood Buffalo Environmental Association

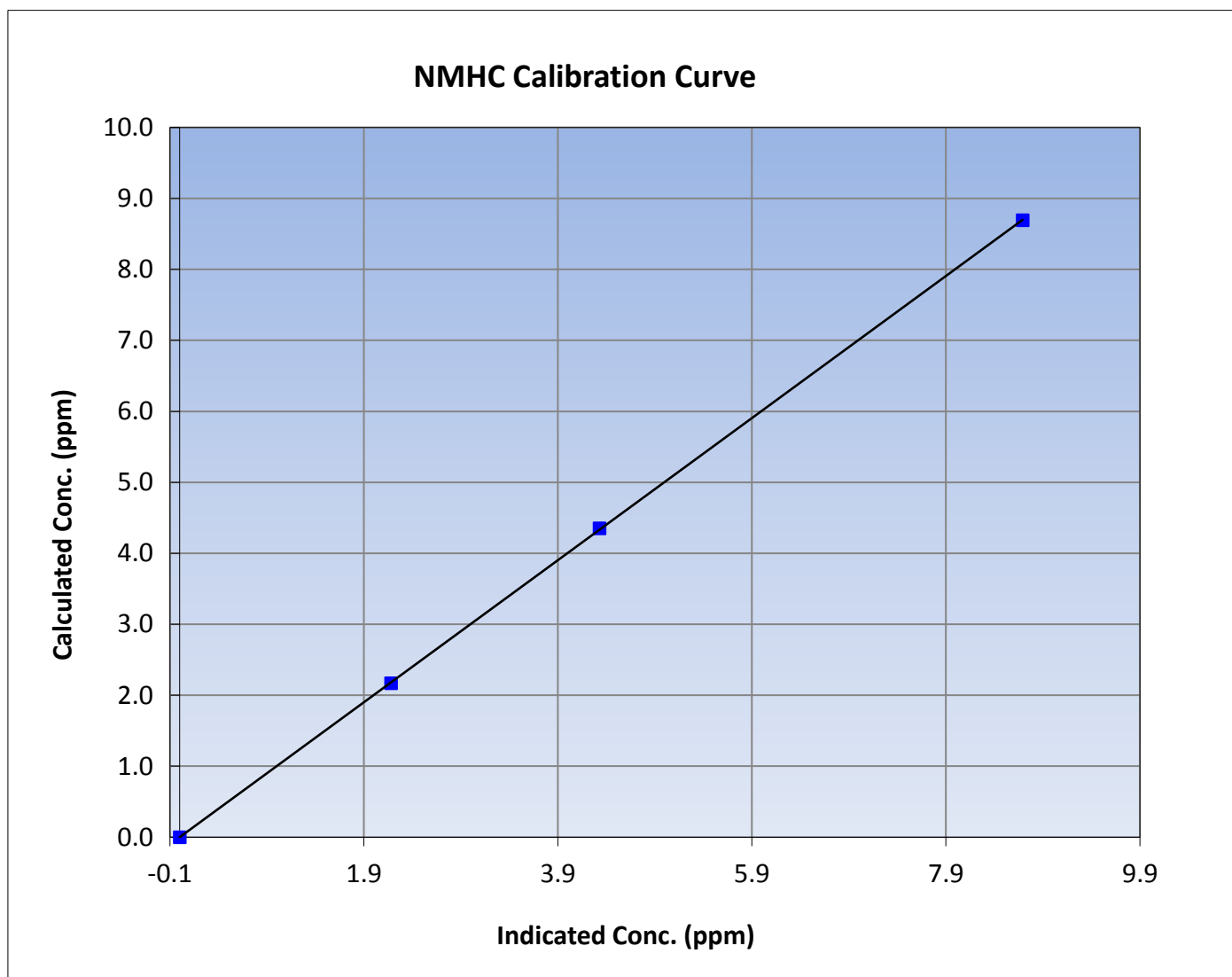
## NMHC Calibration Summary

### Station Information

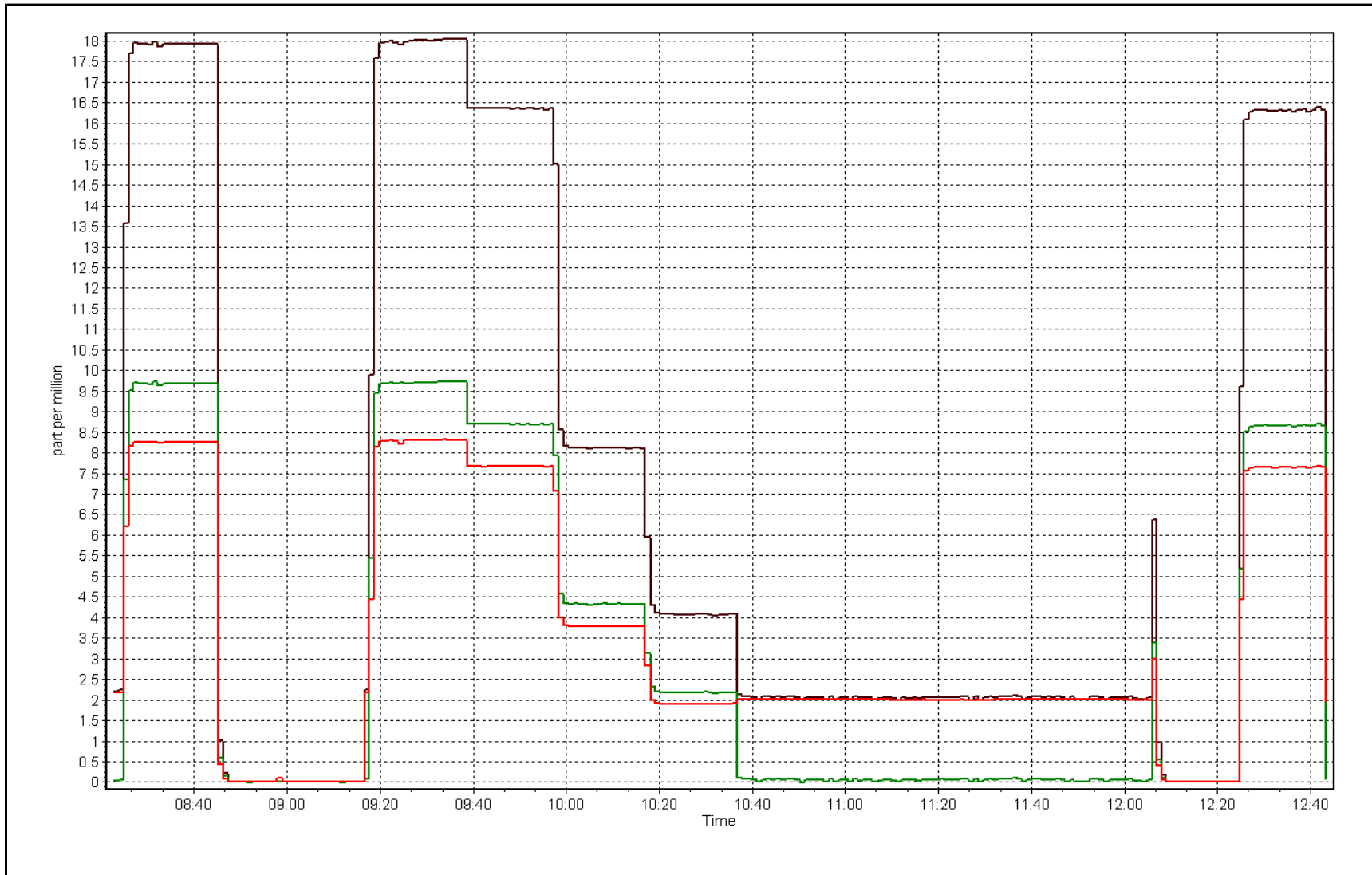
Calibration Date	October 2, 2015	Previous Calibration	September 30, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:00	End Time (MST)	12:44
Analyzer make	Thermo 55i	Analyzer serial #	1218153355

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999988
8.69	8.69	1.0002		
4.35	4.33	1.0051	Slope	1.000923
2.17	2.18	0.9955		
			Intercept	0.000033









# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 6, 2015	Previous Calibration	September 24, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	10:35	End Time (MST)	13:12
NO2 GPT Ref date	Oct-02-2015	Transfer Standard	NO2
		Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
ZAG make/model	Teledyne API 701	Serial Number	4764
DACS make/model	Campbell Scientific CR3000	Serial Number	8790

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	27.3	26.8
Analyzer IP address	192.168.1.48		Lamp temp.	53.8	53.8
Calculated slope	0.994915	1.003309	Pressure	658.9	666.8
Calculated intercept	-0.431671	-0.298815	Flow cell A	0.707	0.713
Analyzer Background	-2.0	-2.0	Flow cell B	0.711	0.715
Analyzer Coefficient	0.980	0.980	Cell A Intensity	124348	123167
			Cell B Intensity	126514	125438

Analyzer make	Thermo 49i	Analyzer serial #	1426262596
---------------	------------	-------------------	------------

### Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	0.2	----
as found span	5000	1.19	426.0	424.6	1.003
calibrator zero	5000	0.00	0.0	-0.4	----
high point	5000	1.19	426.0	424.6	1.003
second point	5000	0.85	292.5	291.6	1.003
third point	5000	0.51	152.2	153.3	0.993
as left zero	5000	0.00	0.0	0.0	----
as left span	5000	1.19	426.0	430.7	0.989
Average Correction Factor					1.000

Corrected As found	424.4	Previous response	428.6	% change	1.0%
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**Notes:**

Sample inlet filter replaced after as founds. No adjustments.

Calibration Performed By: Asad Hidayat



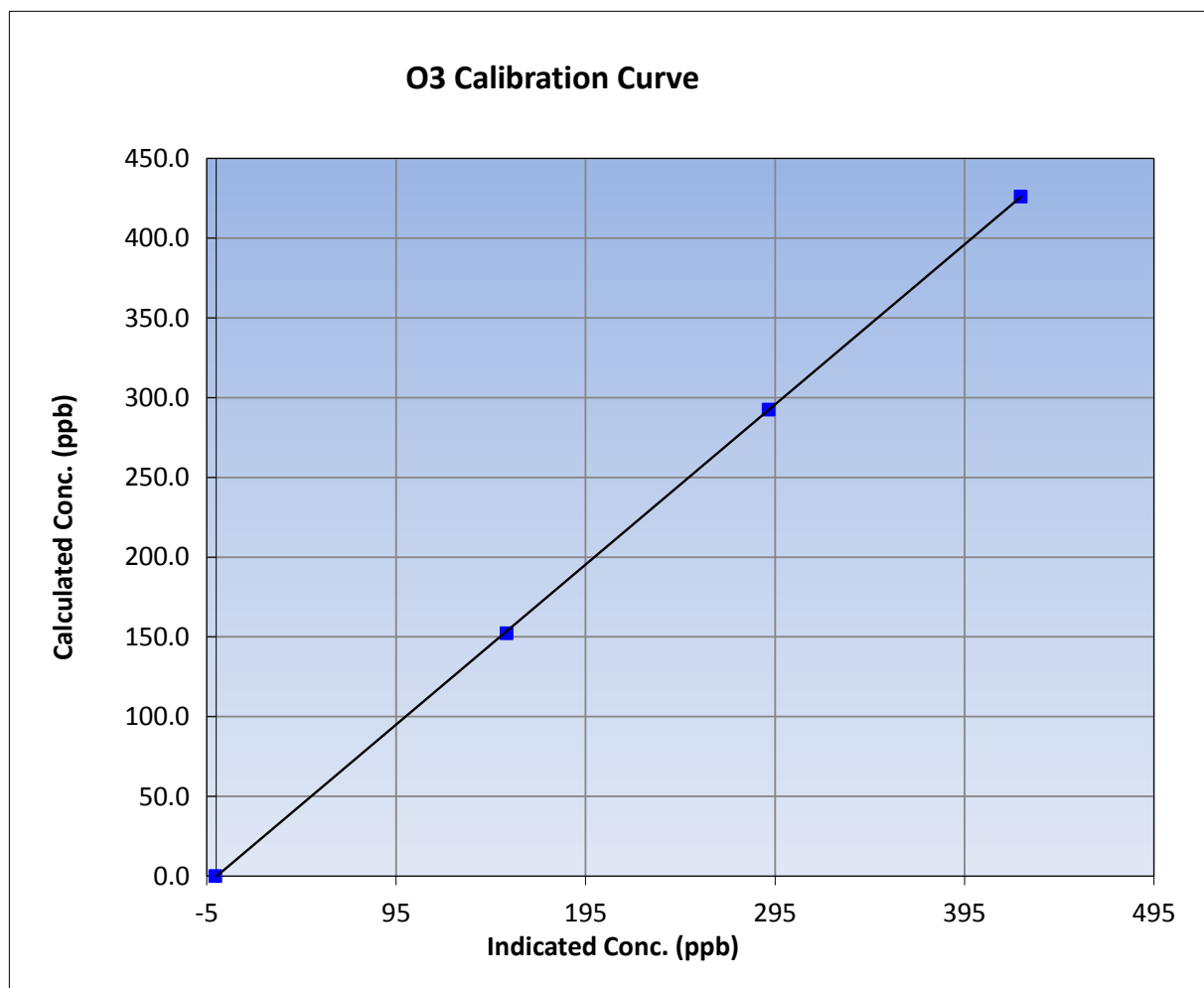
## Wood Buffalo Environmental Association O3 Calibration Report

### Station Information

Calibration Date	October-06-15	Previous Calibration	September 24, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	10:35	End Time (MST)	13:12
Analyzer make	Thermo 49i	Analyzer serial #	1426262596

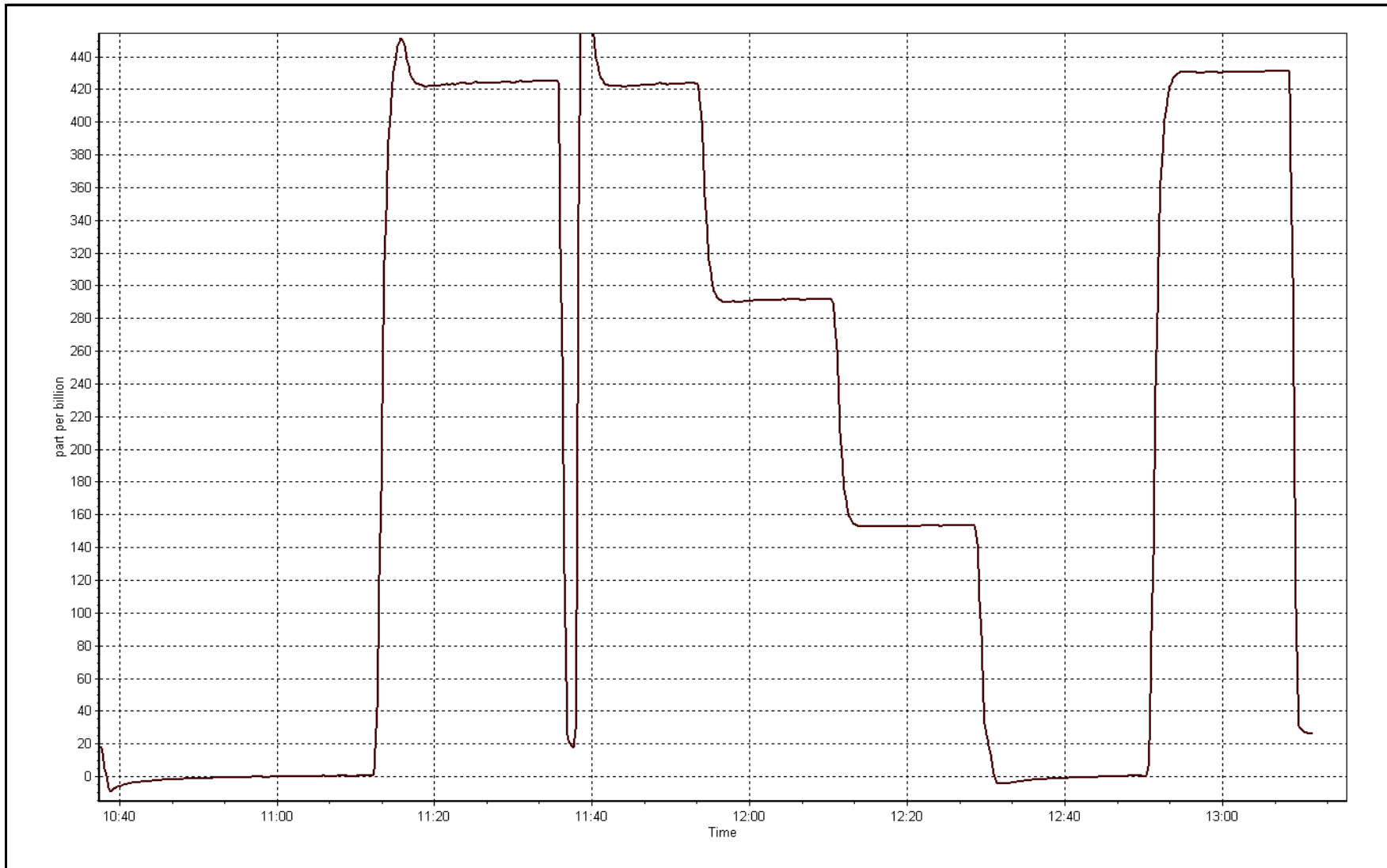
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	0.999977
426.0	424.6	1.0032		
292.5	291.6	1.0032	Slope	1.003309
152.2	153.3	0.9930		
			Intercept	-0.298815



O3 Calibration Plot

Date: October 6, 2015





# Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

## Station Information

Calibration Date	October 2, 2015	Previous Calibration	September 24, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Install		
Start Time (MST)	9:00	End Time (MST)	12:43
NO Cal Gas Conc	53.4 ppm	Gas Cert Reference	SA130026A
NOX Cal Gas Conc	53.4 ppm	Cal Gas Expiry Date	12/12/2016
Calibrator	Sabio 4010	Serial Number	8400311
Zero air Generator	Teledyne API T701	Serial Number	4764

## DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	8790
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## Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.997058	0.998338	0.998959
	Data Offset	-0.196965	-0.185031	-0.604405
Current Calibration	Data Slope	1.001863	1.003014	0.998645
	Data Offset	-0.582586	-0.398468	-0.688703

## Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1426262592
---------------------	------------	-------------------	------------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.43		192.168.1.43	
NO coefficient	0.976		0.976	
NOX coefficient	0.999		0.999	
NO2 coefficient	1.000		1.000	
NO bkgrnd	3.2		3.2	
NOX bkgrnd	3.3		3.3	
Chamber Temp	49.9	Deg C	50.3	Deg C
Moly Temp	321.8	Deg C	321.6	Deg C
PMT voltage	-802.5	V	-802.2	V
PMT Temp	-3	Deg C	-2.8	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	144.8	mmHg	159.1	mmHg
R Cell Press Nox	144.8	mmHg	158.8	mmHg
NO sample flow	0.827	lpm	0.838	lpm
Nox sample Flow	0.827	lpm	0.835	lpm

**Notes:**

Pressure changed from last calibration was 144.8 now 159. Similar to the calibration in August. No maintenance or adjustments done, filter changed out



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date:

October 2, 2015

Station Number:

AMS 14

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.2	0.0	0.1	----	----
as found span	5000	74.9	799.9	799.9	0.0	799.0	798.0	1.1	1.0012	1.0024
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	0.0	0.1	----	----
high point	5000	74.9	799.9	799.9	0.0	799.0	798.0	1.1	1.0012	1.0024
second point	5000	37.5	400.5	400.5	0.0	400.0	399.1	0.9	1.0013	1.0035
third point	5000	18.7	199.7	199.7	0.0	200.7	200.4	0.3	0.9951	0.9966
as left zero	5000	0.0	0.0	0.0	0.0	0.2	0.1	0.1	----	----
as left span	5000	74.9	799.9	372.5	427.4	796.7	378.9	417.8	1.0041	0.9831
Average Correction Factor									0.9992	1.0008

Corrected As found  
Previous Response

NO<sub>x</sub>= 798.8  
NO<sub>x</sub>= 802.5

NO= 798.0  
NO= 801.4

Percent Change

NO<sub>x</sub>= 0.5%

NO= 0.4%

### GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

74.90

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.1			N/A	
1st NO2 (300)	----	372.5	426.0	799.4	372.5	426.9	0.9859	1.0000	0.9979	100.2%
2nd NO2 (200)	----	506.0	292.5	799.7	506.0	293.7	0.9855	1.0000	0.9959	100.4%
3rd NO2 (100)	----	646.3	152.2	800.1	646.3	153.9	0.9850	1.0000	0.9890	101.1%
4th NO2 (0)	798.5	----	1.1	799.6	798.5	1.1	0.9857	1.0000	N/A	----
Average Correction Factor							0.9855	1.0000	0.9943	100.6%

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association

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

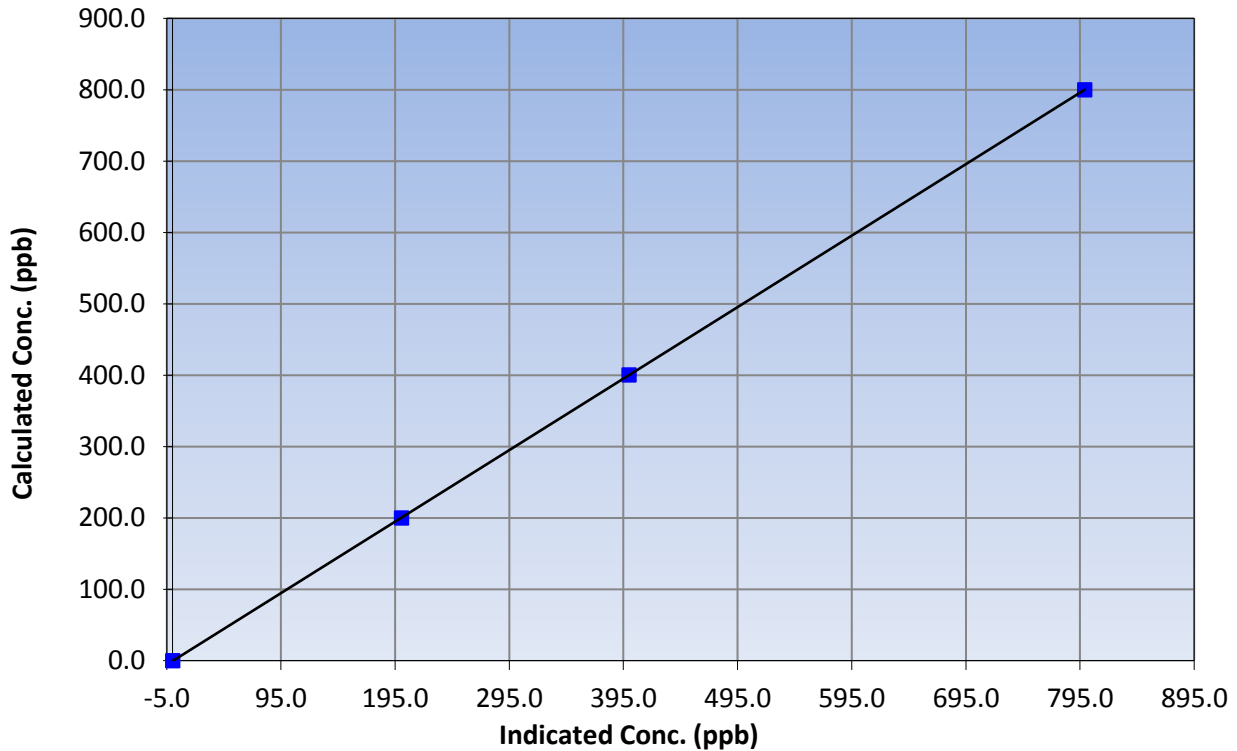
### Station Information

Calibration Date	October 2, 2015	Previous Calibration	September 24, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:00	End Time (MST)	12:43
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999997
799.9	799.0	1.0012		
400.5	400.0	1.0013	Slope	1.001863
199.7	200.7	0.9951		
			Intercept	-0.582586

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

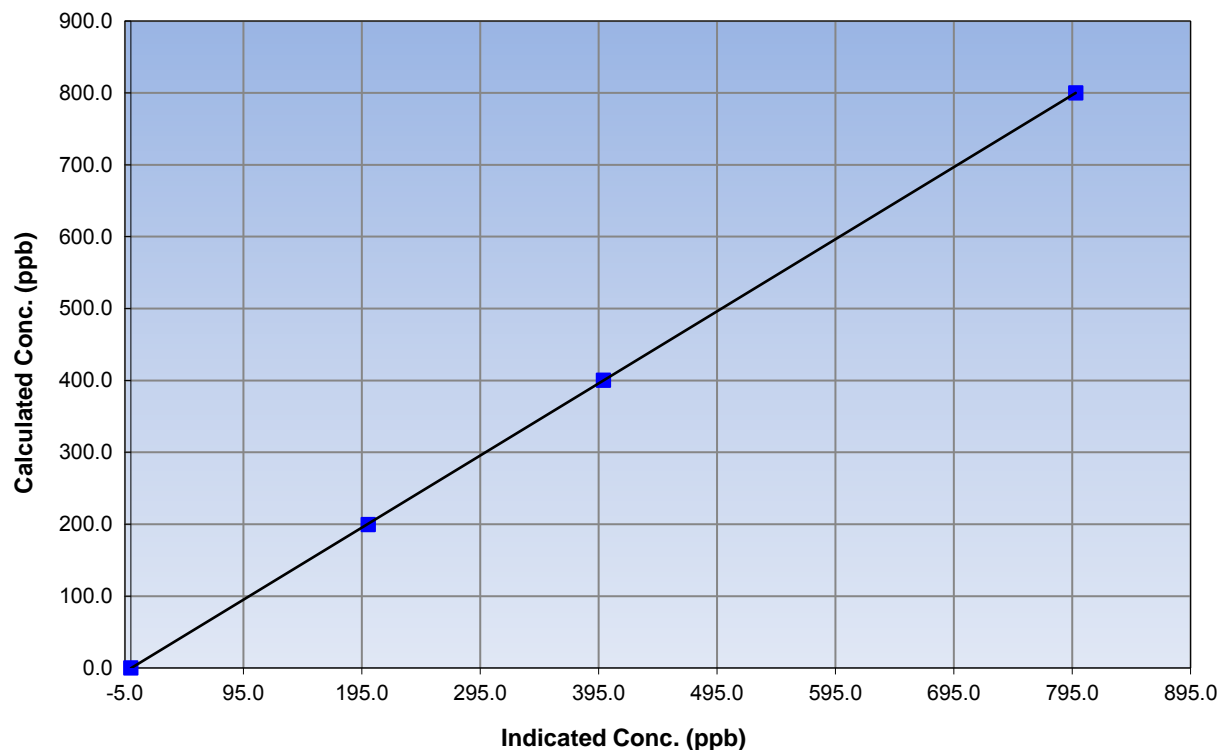
### Station Information

Calibration Date	October 2, 2015	Previous Calibration	September 24, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:00	End Time (MST)	12:43
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999996
799.9	798.0	1.0024		
400.5	399.1	1.0035	Slope	1.003014
199.7	200.4	0.9966		
			Intercept	-0.398468

### NO Calibration Curve







# Wood Buffalo Environmental Association

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

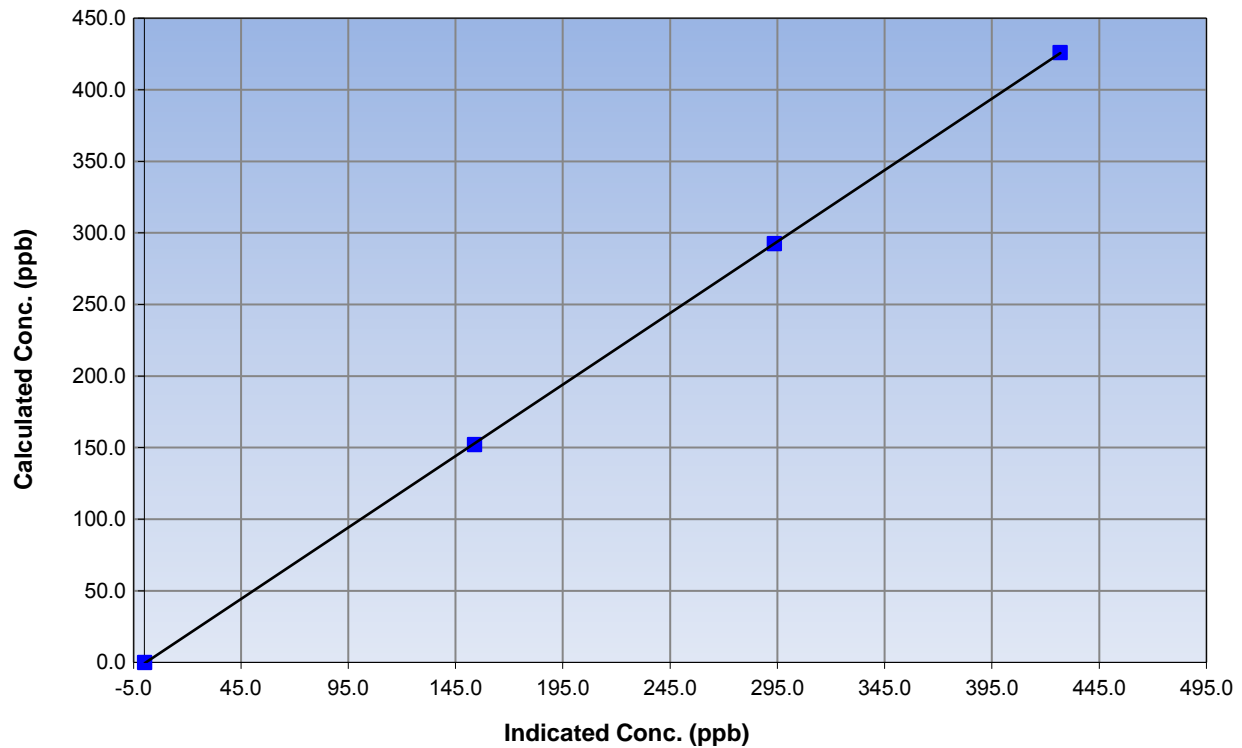
### Station Information

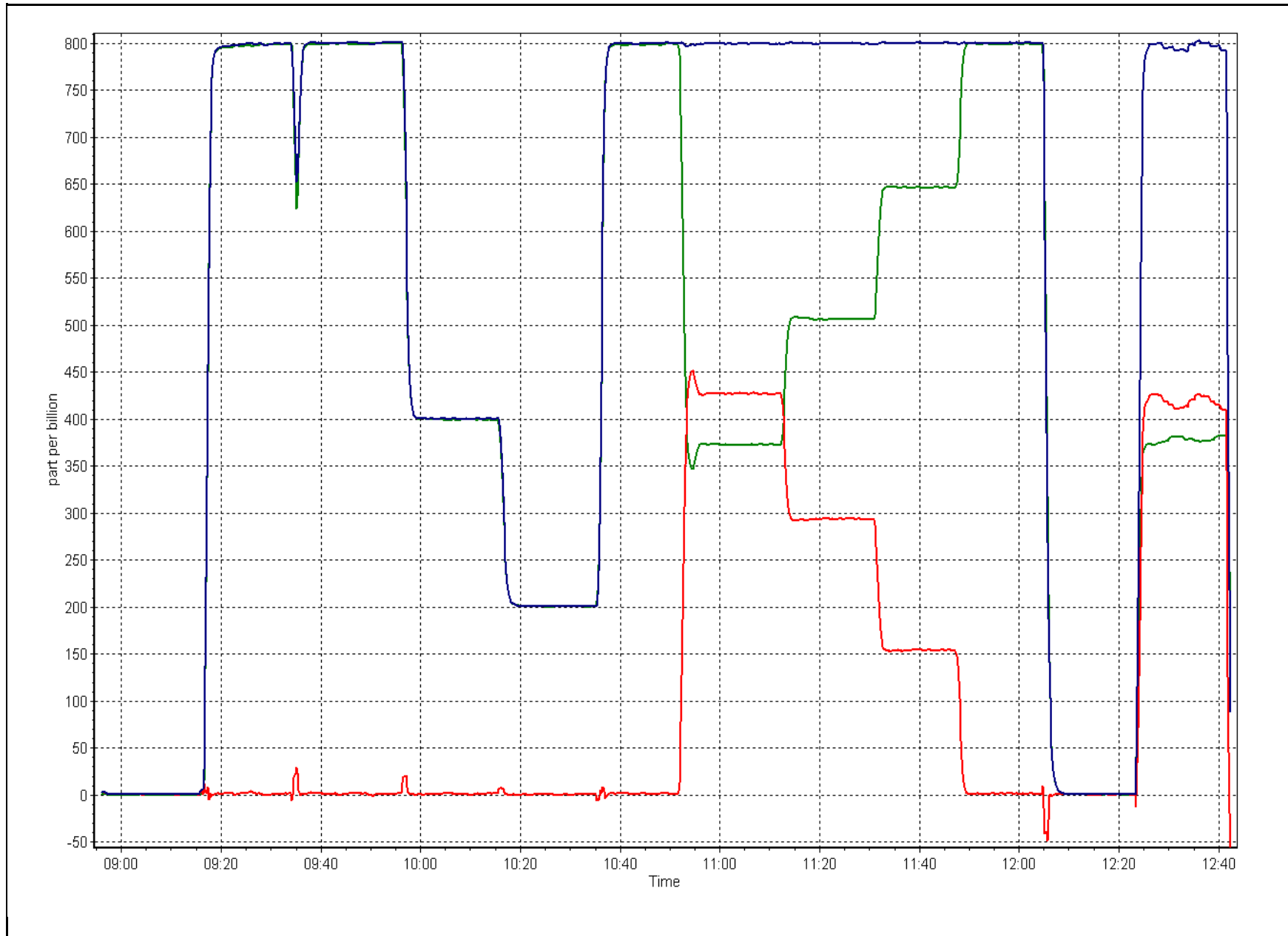
Calibration Date	October 2, 2015	Previous Calibration	September 24, 2015
Station Number	Anzac	Station Number	AMS 14
Start Time (MST)	9:00	End Time (MST)	12:43
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999989
426.0	426.9	0.9979		
292.5	293.7	0.9959	Slope	0.998645
152.2	153.9	0.9890		
			Intercept	-0.688703

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







# Wood Buffalo Environmental Association

## SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	October 6, 2015	Previous Calibration:	September 25, 2015
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	10:45	End Time (MST):	12:07
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1451

SHARP INFORMATION			
Particulate Fraction:	PM2.5		
Make/Model:	Thermo / SHARP 5030		
Serial Number	E1093		
C <sub>14</sub> Source SN:	4933		
Confirmation of Time settings:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Parameters Checked:	T1 <input checked="" type="checkbox"/>	T2 <input type="checkbox"/>	T3 <input type="checkbox"/>
	T4 <input type="checkbox"/>	P3 <input type="checkbox"/>	Main Flow <input checked="" type="checkbox"/>
		Beta <input checked="" type="checkbox"/>	Neph <input type="checkbox"/>

CALIBRATION DATA				
Temperature (°C)				
Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	5.0	4.9	-0.1	5.0
T2	25.0	na	na	25.0
T3	25.0	na	na	25.0
T4	19.0	na	na	19.0
RH (%)	19.0	na	na	19.0

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	960	960.5	0.5	960

Main Flow (Lph)				
Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1012	12	1012	1000

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	191		191
Neph	-0.1		-0.1
C14	12.1		12.1
Indicated Concentration (ug/m3)	-0.1	No	-0.1
Offset 1			
Offset 2			

Leak Check (Quarterly)			
Leak Check Date:	August 18, 2015	Previous Leak Check Date:	
	Measured	Difference LPM (Limit +/- 0.42 LPM)	
Flow without adaptor (LPM):	16.82	0.13	
*Flow with adaptor (LPM):	16.69		
<i>*Note - do not attach adaptor without shutting off the pump first</i>			

Mass Foil Calibration (Annually)			
Foil Calibration Date:	June 17, 2015	Previous Foil Calibration:	
Zeroed?:			
Foil Mass:	1278	Mass foil set S/N:	2520
Previous Correction Factor:	7020		
New Correction Factor:	6936		

INSPECTION DATA		
Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	06/10/2015
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

### NOTES:

No adjustments. Cyclone head cleaned.

Calibration Performed By: Asad Hidayat



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## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 15  
CNRL HORIZON  
OCTOBER 2015**

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

November 26, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)  
OCTOBER 2015

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	708	36	36	100.00	16	0	6	0
TRS (ppb) Average	707	37	37	100.00	1	0	0	0
THC (ppm) Average	708	36	36	100.00	3.7	-	2.5	-
NO2 (ppb) Average	708	36	36	100.00	34	0	11	-
NO (ppb) Average	708	36	36	100.00	45	-	9	-
NOX (ppb) Average	708	36	36	100.00	57	-	18	-
PM2.5 (ug/m3) Average	741	3	3	100.00	27.3	-	8.3	0
Temperature 2 m (C) Average	744	0	0	100.00	24.9	-	16	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	24	-	16	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-
Precipitation (mm) Total	744	0	0	100.00	0.8	-	2.5	-
Relative Humidity (%) Average	744	0	0	100.00	98	-	92	-
Global Solar Radiation (W/m2) Average	744	0	0	100.00	498	-	138	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)  
OCTOBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	0.7	2	-	0	0	0	0	0	2	16
TRS (ppb) Average	707	0.2	0	-	0	0	0	0	0	0	1
THC (ppm) Average	708	2.1	0.2	-	1.8	1.9	2	2.1	2.2	2.3	3.7
NO2 (ppb) Average	708	4.7	5	-	0	0	1	2	6	13	34
NO (ppb) Average	708	1.6	4	-	0	0	0	0	1	4	45
NOX (ppb) Average	708	6.2	9	-	0	0	1	3	8	16	57
PM2.5 (ug/m3) Average	741	4.7	3.5	-	0.1	1.5	2	4	6.2	8.7	27.3
Temperature 2 m (C) Average	744	4.59	5.6	-	-6.2	-1.9	0.6	3.8	7.8	12.8	24.9
Wind Speed 10 m (km/h) Average	744	8.2	4	-	1	3	5	8	11	14	24
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	744	-	-	7.62	-	-	-	-	-	-	-
Relative Humidity (%) Average	744	74.1	19	-	28	44	62	78	90	95	98
Global Solar Radiation (W/m2) Average	744	71.6	119	-	0	0	0	0	105	274	498



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)  
OCTOBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
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No operational issues to report



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 16 ppb on Oct 8 16:00	Maximum Daily Average: 5.6 ppb on Oct 6		Hours of Data:	708
Minimum Value: 0 ppb on Oct 1 01:00	Minimum Daily Average: 0.0 ppb on Oct 20		Hours of Missing Data:	36
Maximum Diurnal Average: 2.0 ppb at hour 17	Minimum Diurnal Average: 0.2 ppb at hour 3		Hours of Calibration:	36
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> = 13		Percent Operational Time:	100.0

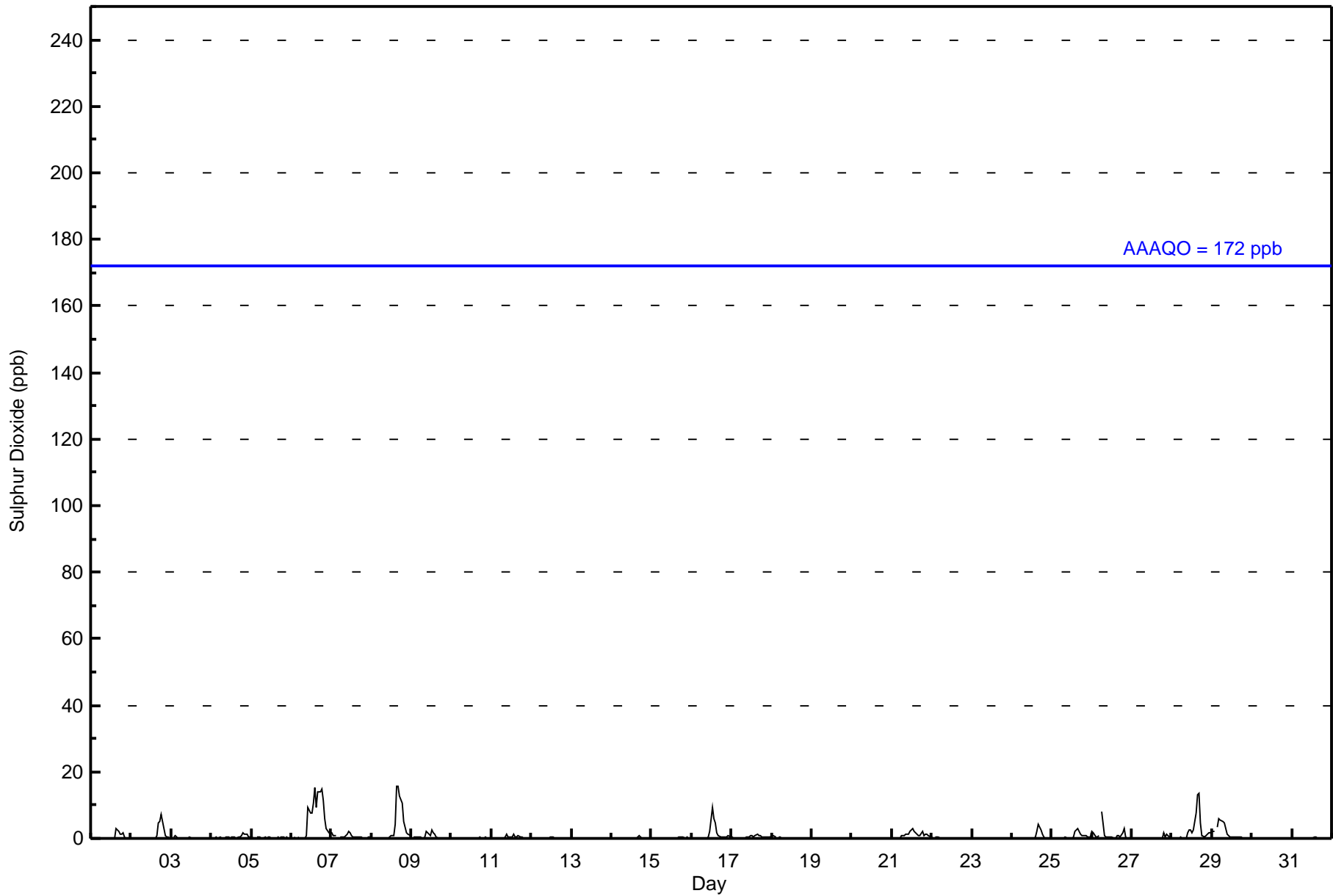
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	3	2	1	1	2	0	0	0	0	0.5	3
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	5	5	7	5	1	0	0	0	1.1	7
3-Oct	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
4-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	1	0	0	0.4	2
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	1	9	8	8	10	15	9	14	14	15	11	6	3	2	2	5.6	15
7-Oct	2	1	1	1	Z	1	0	0	1	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0.7	2
8-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	4	16	16	13	10	5	3	2	1	1	3.2	16
9-Oct	Z	0	0	0	0	0	0	0	0	2	1	1	2	1	1	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	0.1	0
11-Oct	0	0	Z	0	0	0	0	0	0	1	0	0	0	1	0	0	1	1	1	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	0.1	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	C	C	C	C	C	0	1	0	0	0	0	0	0	0	0.1	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	2	9	6	4	2	1	0	0	0	0	1	1	1	1.2	9
17-Oct	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	1	0.4	1
18-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
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	0	0	0	0	0	0	0.0	0
21-Oct	Z	0	0	0	0	0	1	1	1	1	1	2	3	2	2	1	1	1	2	1	1	1	1	1	1.0	3
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	0.0	0
24-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	2	4	2	1	0	0	0	0	0	0.5	4
25-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	2	3	2	1	1	1	1	0	0	0.6	3
26-Oct	2	2	1	0	1	Z	8	1	0	0	0	0	0	0	0	1	1	0	2	3	1	0	0	0	1.0	8
27-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0.2	2
28-Oct	0	Z	0	0	0	0	0	0	0	1	3	3	2	3	8	13	14	5	1	0	1	1	2	1	2.5	14
29-Oct	2	2	Z	3	6	6	5	5	3	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1.6	6
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	1	0	0	0	0	0	0	0	0	0	0	0.1	1
	0.4	0.3	0.2	0.3	0.4	0.4	0.5	0.3	0.3	0.4	0.7	0.7	1.0	1.0	1.4	1.8	2.0	1.5	1.4	1.1	0.6	0.4	0.3	0.3	Diurnal Average	
	2	2	1	3	6	6	8	5	3	2	9	8	9	10	15	16	16	14	15	11	6	3	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  
CNRL Horizon - October 2015





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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**CNRL Horizon - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	698	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: 708

Total Number of Hours: 744



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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**CNRL Horizon - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	81	83	32	10	9	9	14	28	93	115	69	30	27	36	39	23	698
11 - 20	2	2	1	0	0	0	2	3	0	0	0	0	0	0	0	0	10
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>	83	85	33	10	9	9	16	31	93	115	69	30	27	36	39	23	708

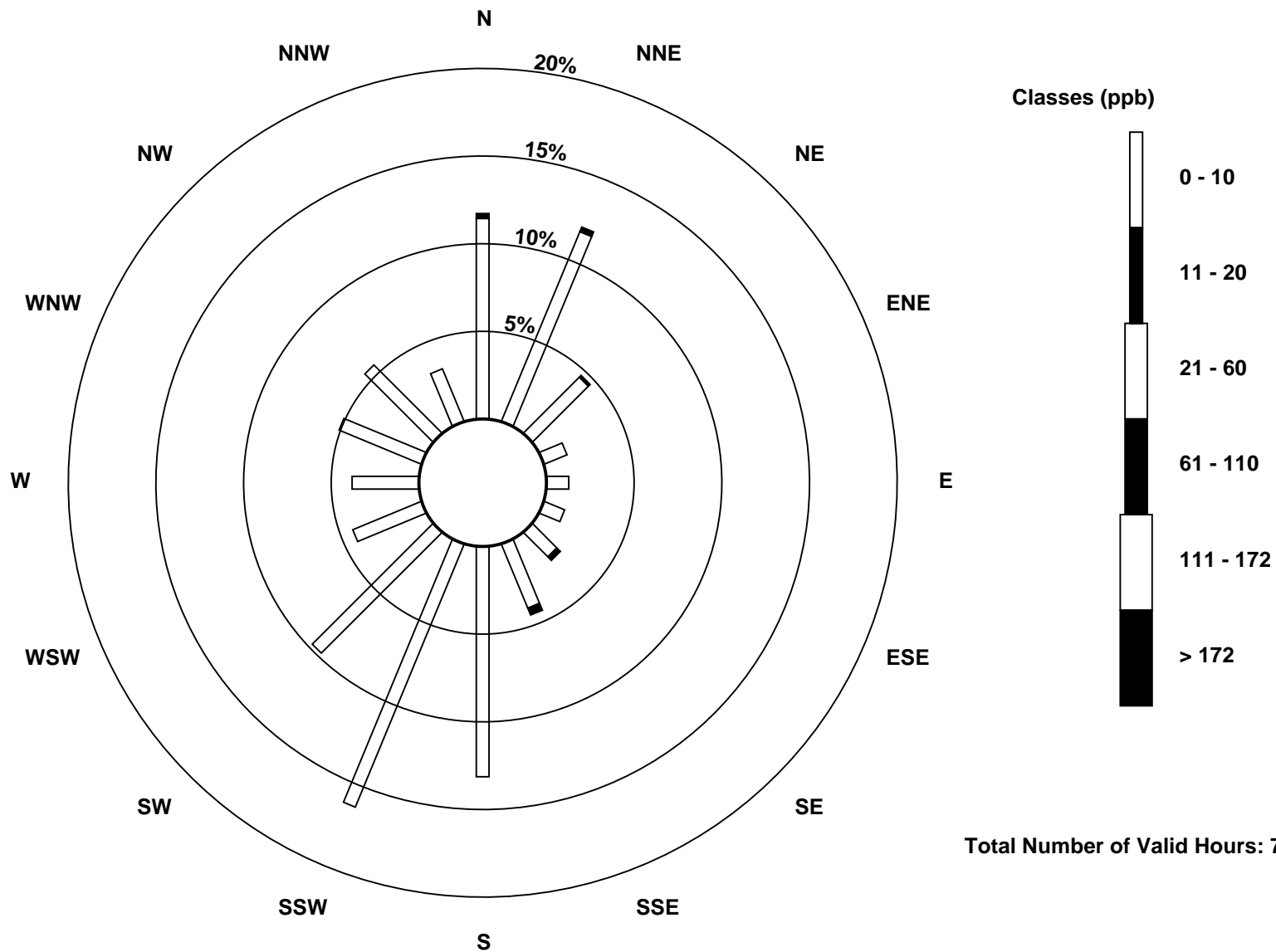
Total Number of Valid Hours: 708

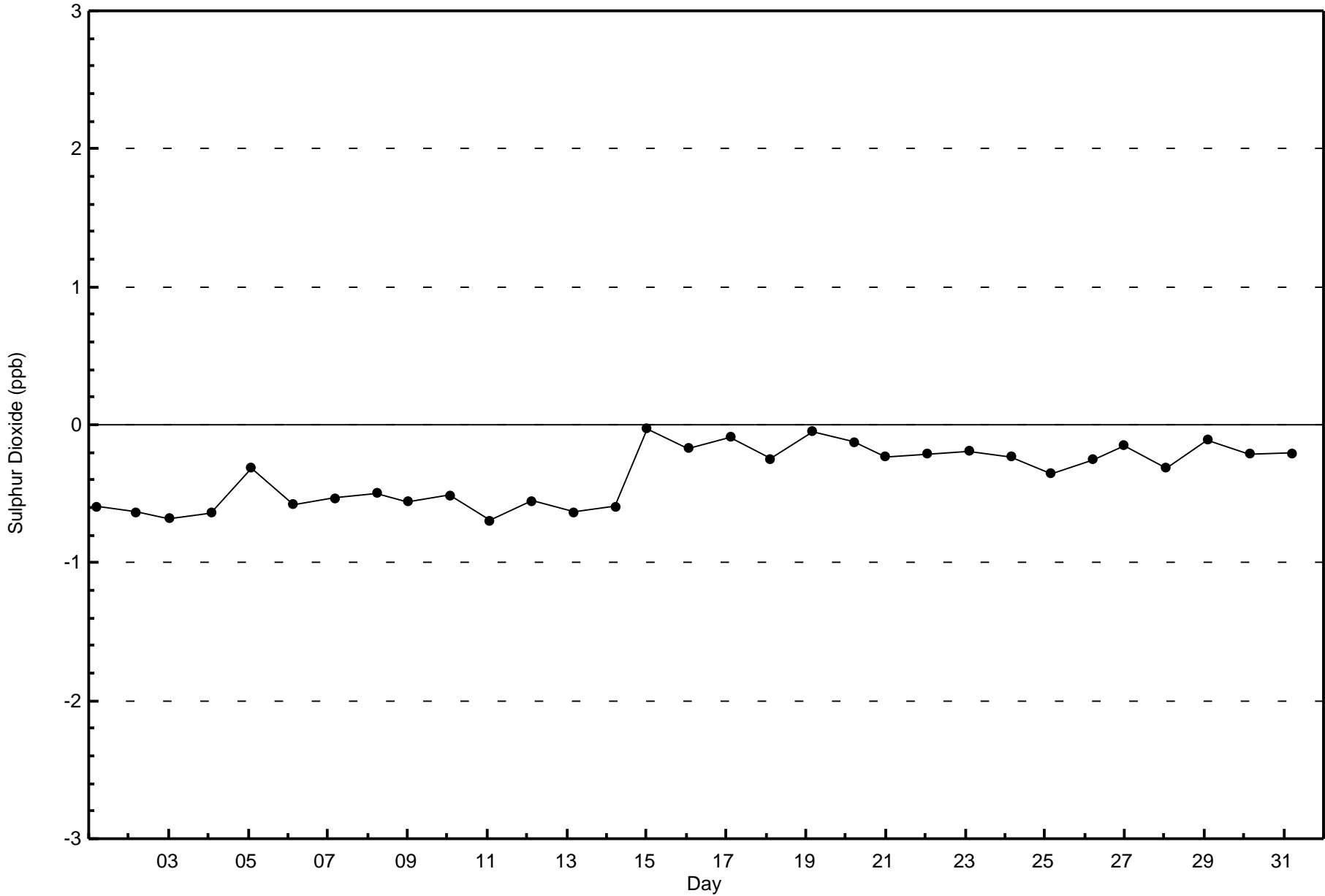
Total Number of Hours: 744

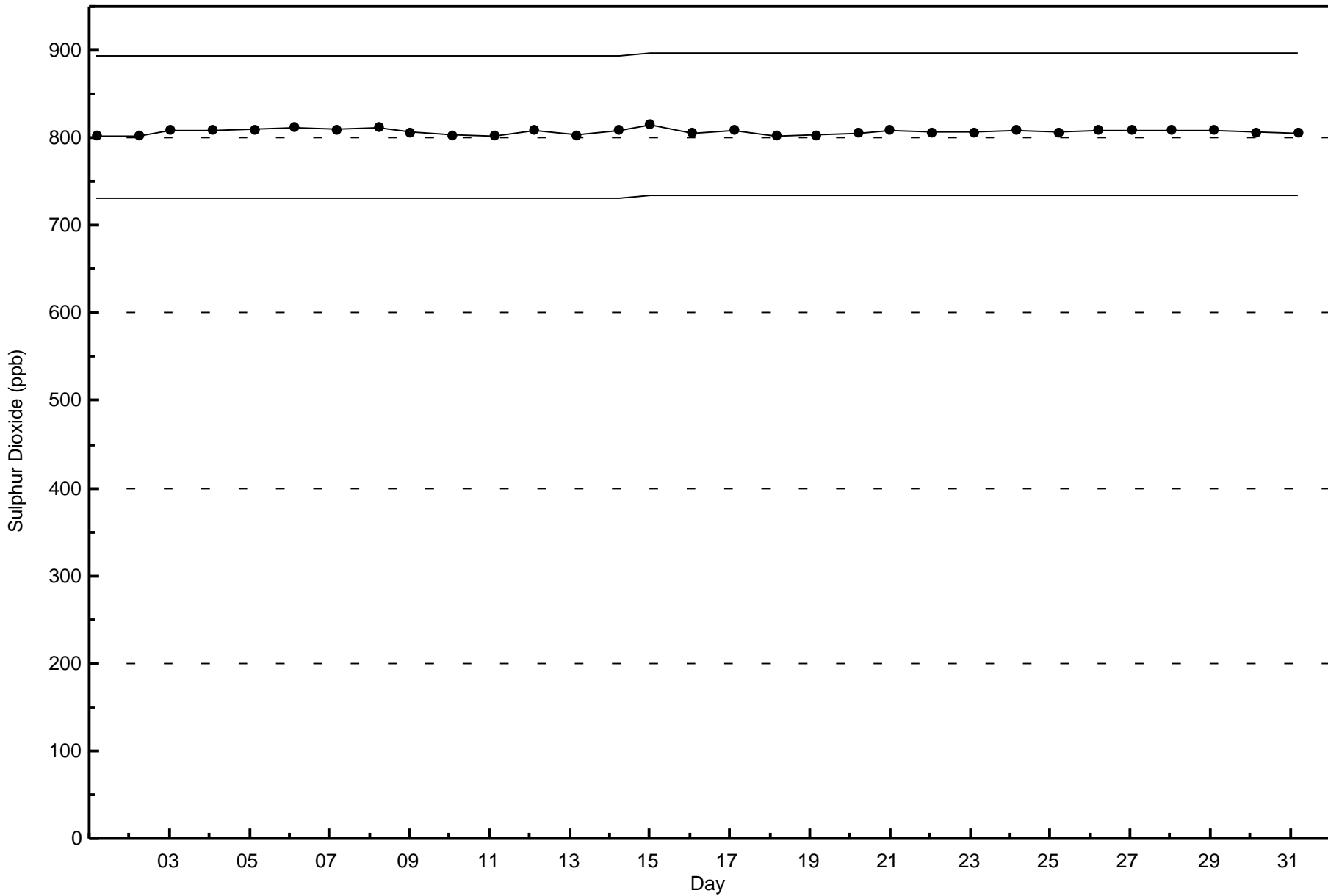


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
CNRL Horizon (AMS 15)











Summary of Hour Averages

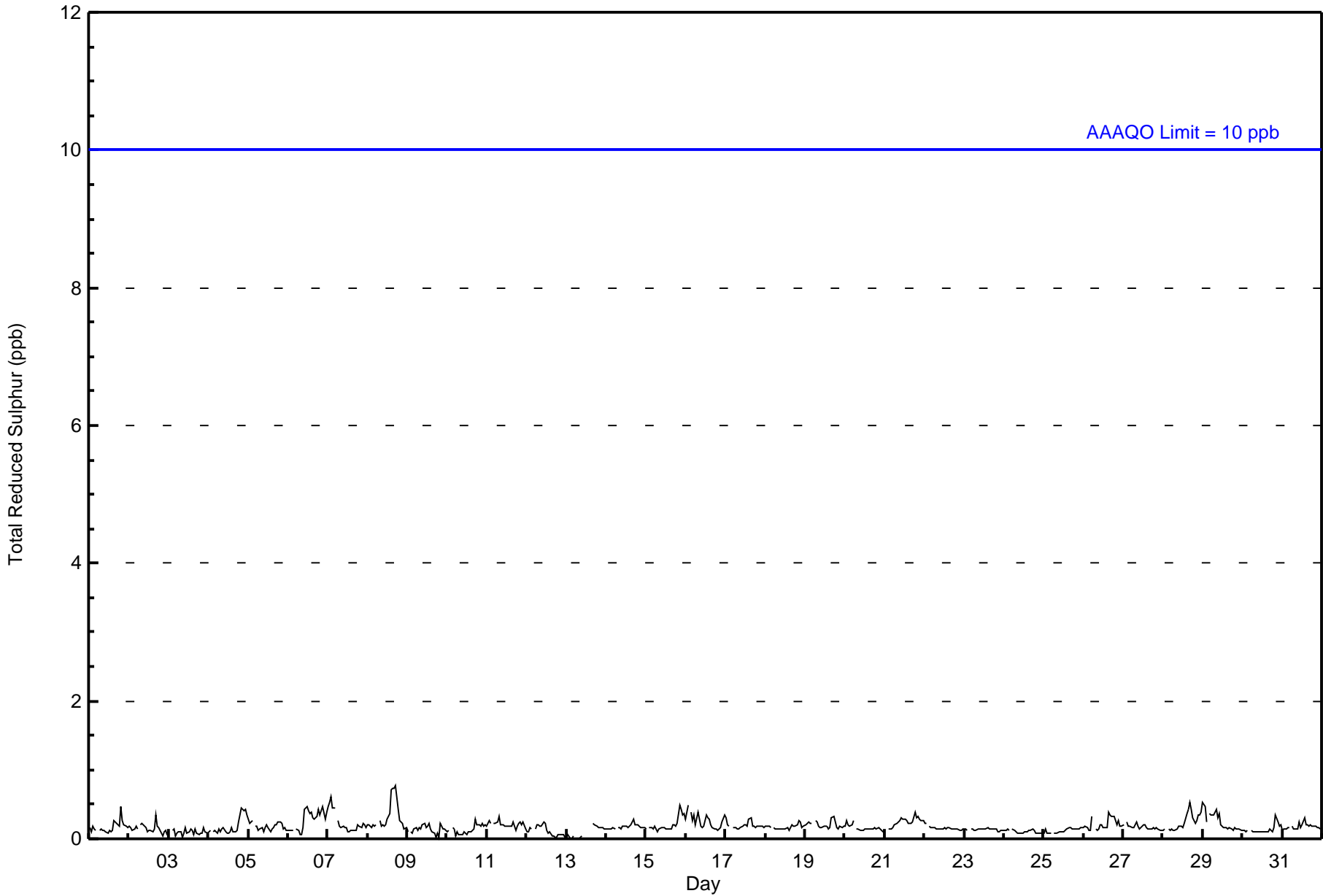
CNRL Horizon - October 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 1 ppb on Oct 8 18:00	Maximum Daily Average: 0.3 ppb on Oct 8		Hours of Data:	707
Minimum Value: 0 ppb on Oct 13 04:00	Minimum Daily Average: 0.1 ppb on Oct 3		Hours of Missing Data:	37
Maximum Diurnal Average: 0.2 ppb at hour 17	Minimum Diurnal Average: 0.2 ppb at hour 10		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	0.2	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	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	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
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	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
8-Oct	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0.3	1
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	0.1	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	0.1	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	0.2	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	0.1	0
13-Oct	0	0	0	0	0	Z	0	0	0	0	C	C	C	C	C	C	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	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	0.2	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	0.3	0
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	0.2	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	0.2	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	0.2	0
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	0.2	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	0.2	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	0.1	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	0.1	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	0.2	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	0.2	0
28-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.2	1
29-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	0.3	1
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

0.2	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	0.2	Diurnal Average
1	1	1	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	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**

**Total Reduced Sulphur (TRS) - ppb**  
**CNRL Horizon - October 2015**

<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**  
**CNRL Horizon - October 2015**

<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	84	84	33	10	9	9	16	29	95	115	65	32	23	42	38	23	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>	84	84	33	10	9	9	16	29	95	115	65	32	23	42	38	23	707

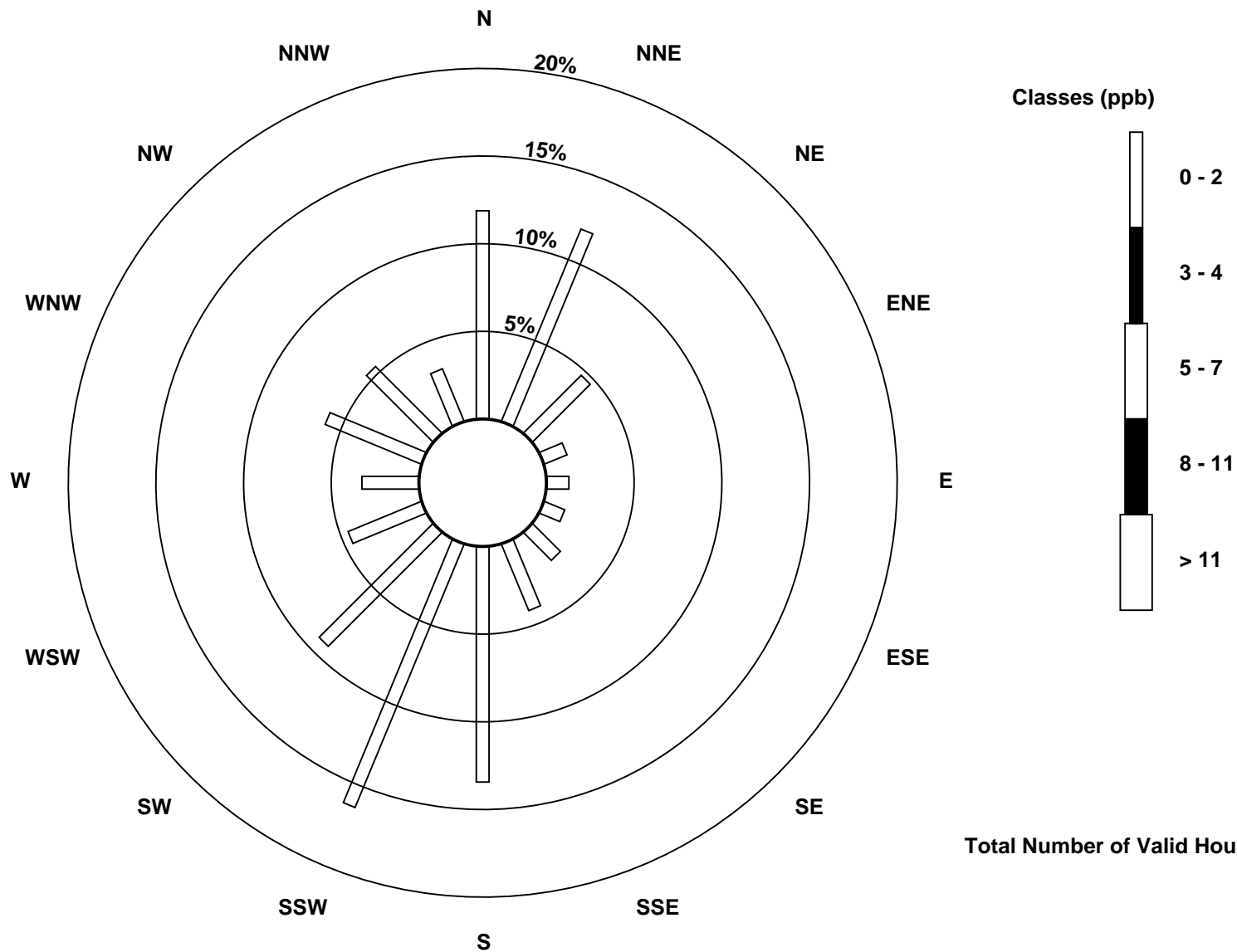
Total Number of Valid Hours: 707

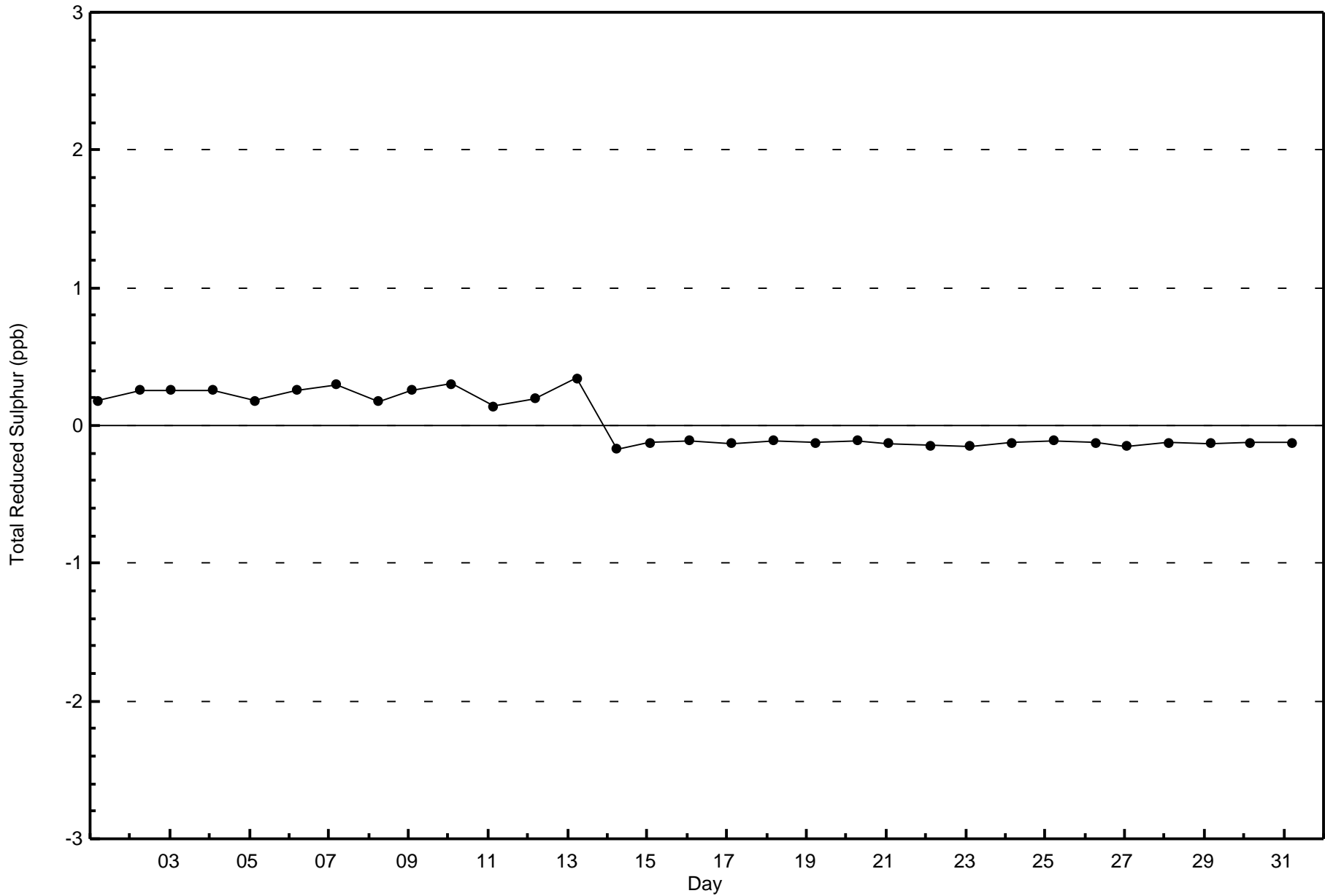
Total Number of Hours: 744

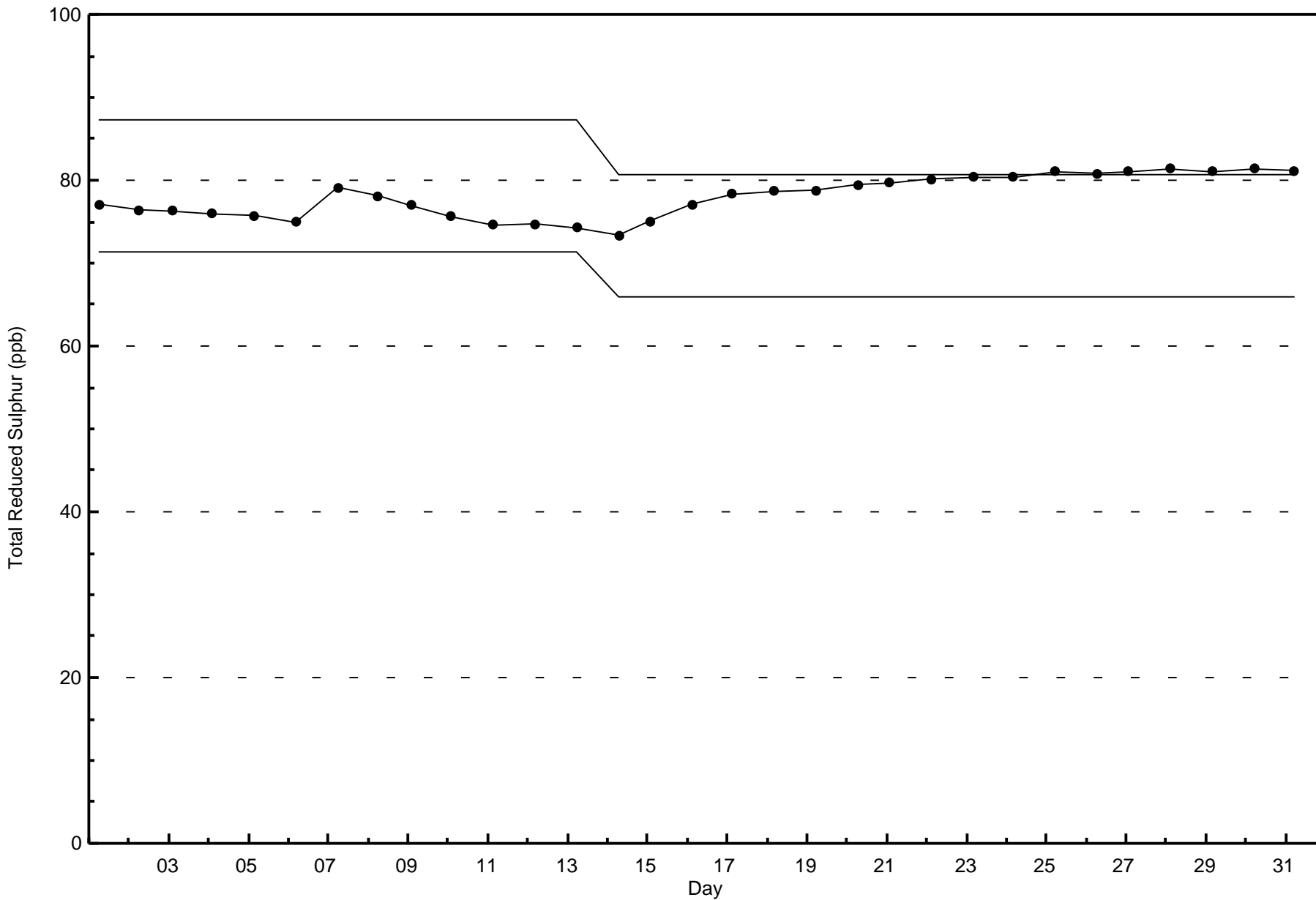


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Total Reduced Sulphur (TRS) - ppb  
CNRL Horizon (AMS 15)



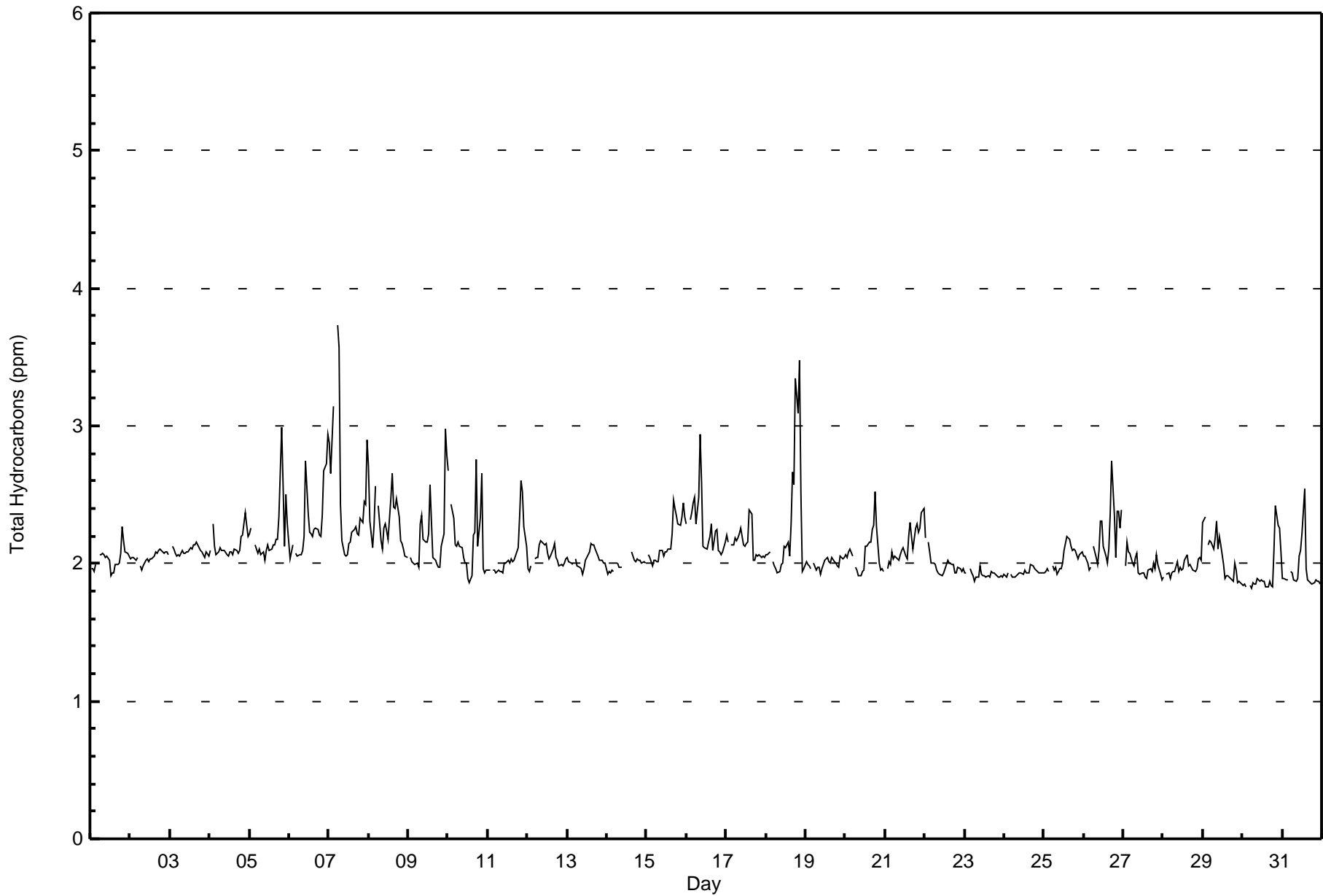






Maximum Value: 3.7 ppm on Oct 7 06:00																				Maximum Daily Average: 2.5 ppm on Oct 7					Hours in Service: 744	
Minimum Value: 1.8 ppm on Oct 30 06:00																				Minimum Daily Average: 1.9 ppm on Oct 23					Hours of Data: 708	
Maximum Diurnal Average: 2.2 ppm at hour 21																				Minimum Diurnal Average: 2.0 ppm at hour 10					Hours of Missing Data: 36	
Monthly Average: 2.10 ppm																				Percentiles: P <sub>1</sub> = 1.8 P <sub>10</sub> = 1.9 Q <sub>1</sub> = 2.0 Median = 2.1 Q <sub>3</sub> = 2.2 P <sub>90</sub> = 2.3 P <sub>99</sub> = 2.9					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	2.0	2.0	1.9	2.0	Z	2.1	2.1	2.1	2.1	2.0	2.1	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.3	2.2	2.1	2.1	2.1	2.0	2.3
2-Oct	2.0	2.0	2.0	2.0	2.0	Z	2.0	1.9	2.0	2.0	2.0	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	2.0	2.1
3-Oct	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	2.2	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.2
4-Oct	2.1	Z	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.4	2.3	2.2	2.1	2.4
5-Oct	2.2	2.3	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	3.0	2.6	2.1	2.5	2.3	2.2	3.0
6-Oct	2.0	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.2	2.7	2.4	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.4	2.7	2.7	2.9	2.3	2.9
7-Oct	2.9	2.6	2.9	3.1	Z	3.7	3.6	2.4	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.3	2.5	2.4	2.9	2.5	3.7
8-Oct	2.7	2.3	2.1	2.3	2.6	Z	2.4	2.2	2.1	2.3	2.3	2.2	2.2	2.5	2.7	2.4	2.4	2.5	2.3	2.2	2.1	2.1	2.1	2.0	2.3	2.7
9-Oct	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.3	2.2	2.2	2.2	2.2	2.6	2.3	2.0	2.0	2.0	2.0	2.0	2.1	2.2	3.0	2.8	2.2	3.0
10-Oct	2.7	Z	2.4	2.3	2.1	2.1	2.2	2.1	2.1	2.0	2.0	2.0	1.9	1.9	1.9	2.2	2.2	2.8	2.1	2.3	2.7	2.0	1.9	2.0	2.2	2.8
11-Oct	2.0	2.0	Z	2.0	2.0	1.9	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.3	2.6	2.5	2.3	2.1	2.1	2.6
12-Oct	2.0	1.9	2.0	Z	2.0	2.0	2.0	2.1	2.2	2.2	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2
13-Oct	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1
14-Oct	1.9	1.9	1.9	2.0	1.9	Z	2.0	2.0	2.0	2.0	2.0	C	C	C	C	C	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
15-Oct	Z	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.5	2.4	2.4	2.3	2.3	2.3	2.4	2.3	2.2	2.5
16-Oct	2.3	Z	2.3	2.4	2.4	2.5	2.3	2.5	2.9	2.6	2.1	2.1	2.1	2.2	2.2	2.3	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.3	2.9
17-Oct	2.2	2.2	Z	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.1	2.1	2.1	2.2	2.4	2.4	2.0	2.0	2.1	2.1	2.1	2.0	2.1	2.0	2.1	2.4
18-Oct	2.1	2.1	2.1	Z	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.1	2.1	2.2	2.1	2.3	2.7	2.6	3.3	3.1	3.5	2.5	1.9	2.0	2.3	3.5
19-Oct	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.1
20-Oct	2.1	2.0	2.1	2.1	2.0	Z	2.0	2.0	1.9	1.9	1.9	2.0	2.1	2.1	2.2	2.2	2.2	2.3	2.5	2.3	2.0	2.0	2.0	1.9	2.1	2.5
21-Oct	Z	2.0	2.0	2.0	2.1	2.0	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.2	2.3	2.2	2.1	2.3	2.3	2.2	2.3	2.4	2.4	2.1	2.4
22-Oct	2.2	Z	2.2	2.1	2.0	2.0	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	1.9	1.9	2.0	1.9	2.0	2.0	2.2
23-Oct	1.9	1.9	Z	2.0	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	2.0
24-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	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0
25-Oct	1.9	1.9	2.0	1.9	Z	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.0	2.2
26-Oct	2.1	2.1	2.0	2.0	2.0	Z	2.1	2.0	2.0	2.1	2.3	2.3	2.1	2.1	2.0	2.1	2.4	2.7	2.3	2.0	2.4	2.4	2.3	2.4	2.2	2.7
27-Oct	Z	2.0	2.2	2.1	2.1	2.0	2.0	2.0	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.0	2.1	2.0	1.9	1.9	2.0	2.2
28-Oct	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.1
29-Oct	2.3	2.3	Z	2.1	2.2	2.2	2.1	2.2	2.3	2.1	2.2	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.8	2.0	2.3
30-Oct	1.8	1.8	1.8	Z	1.8	1.8	1.9	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.9	1.8	1.8	2.1	2.4	2.3	2.3	2.1	1.9	2.4
31-Oct	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	2.1	2.1	2.2	2.5	2.0	1.9	1.9	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.5
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration																										







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

**Total Hydrocarbons (THC) - ppm**  
**CNRL Horizon - October 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	348	49.15	49.15
2.1 - 3.0	354	50.00	99.15
3.1 - 10.0	6	0.85	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**  
**CNRL Horizon - October 2015**

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	46	72	14	4	1	3	8	8	45	49	47	18	7	3	15	8	348
2.1 - 3.0	37	13	19	6	8	6	8	23	48	66	20	12	18	32	23	15	354
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	2	0	2	1	1	0	6
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	83	85	33	10	9	9	16	31	93	115	69	30	27	36	39	23	708

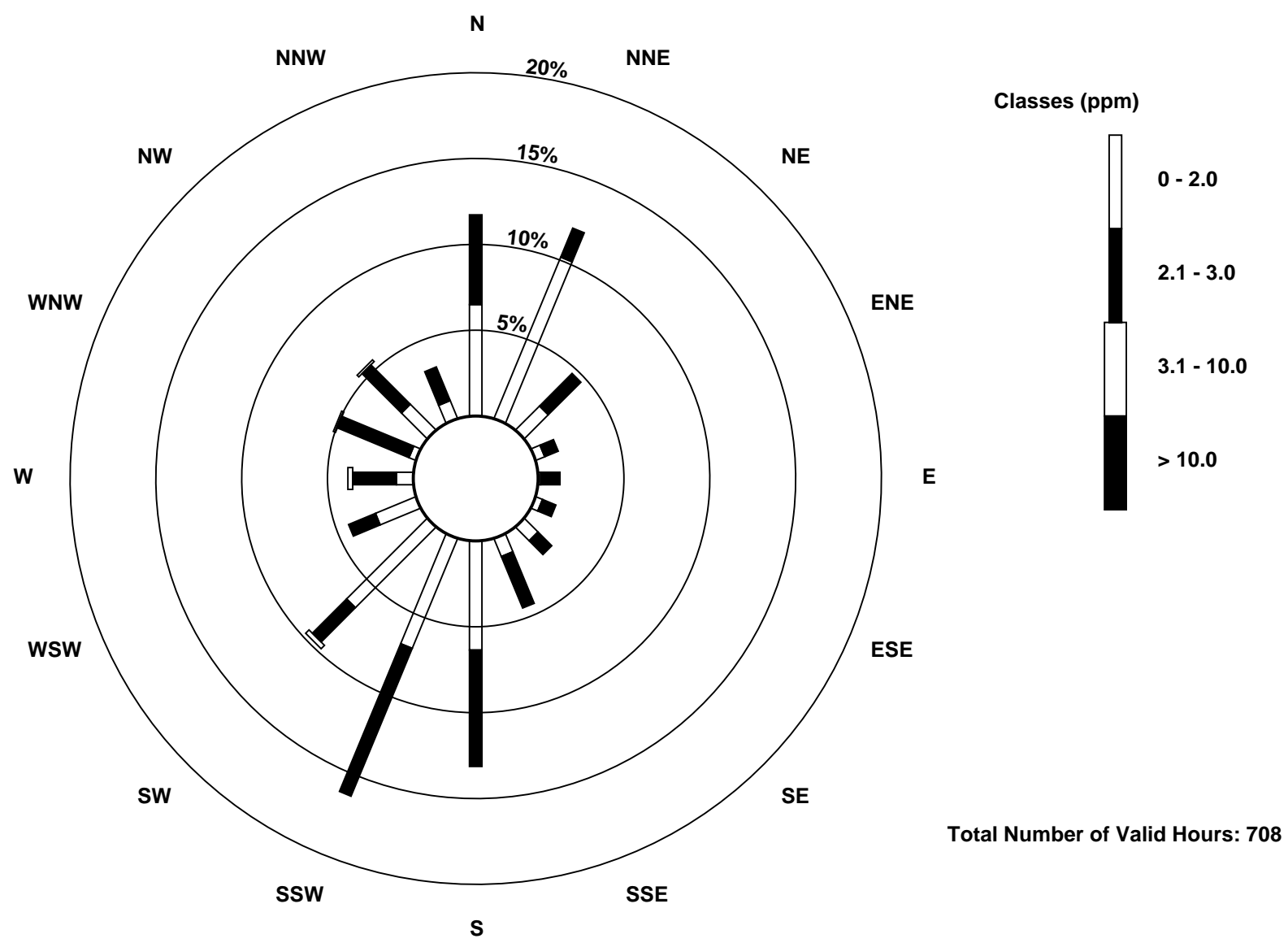
Total Number of Valid Hours: 708

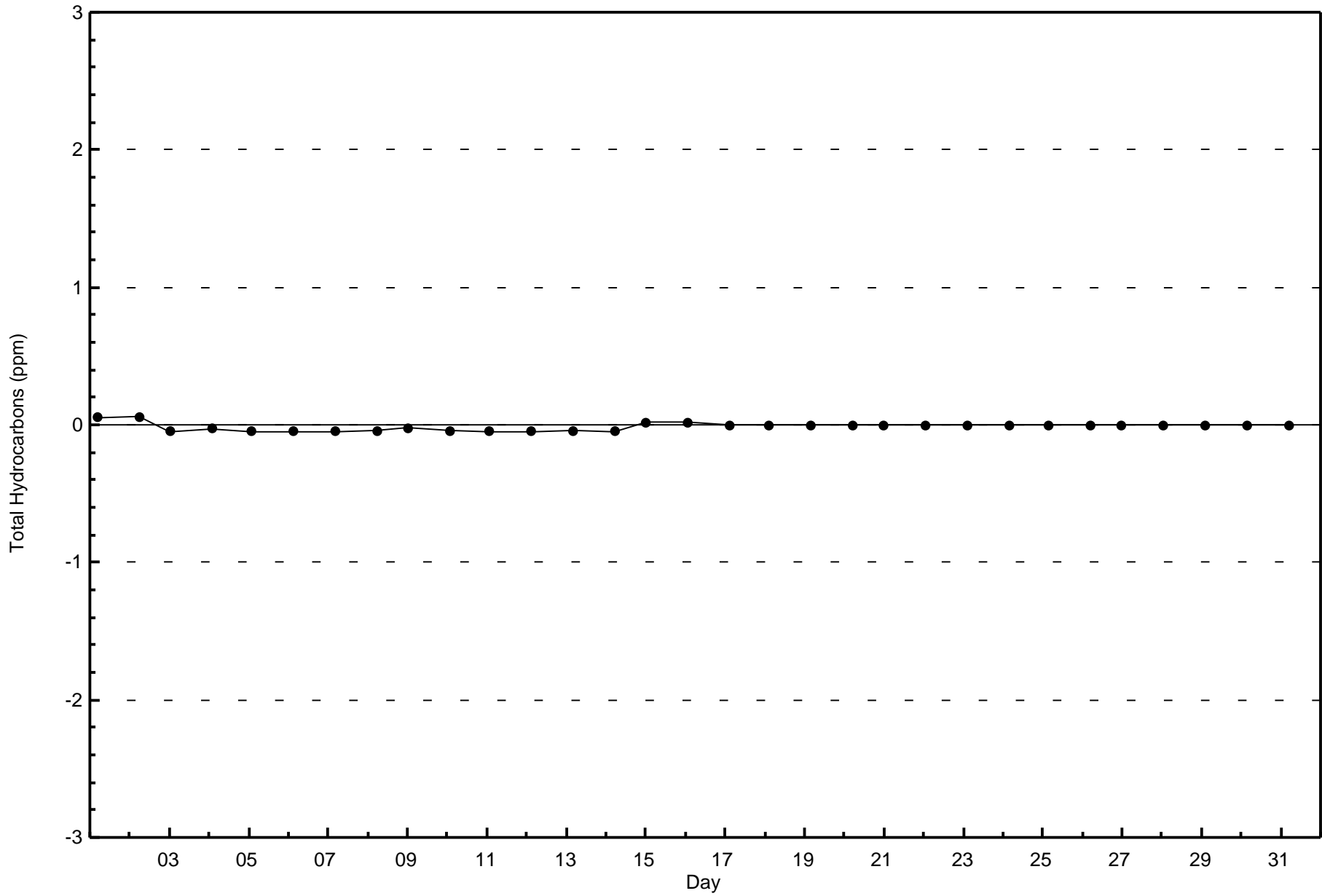
Total Number of Hours: 744

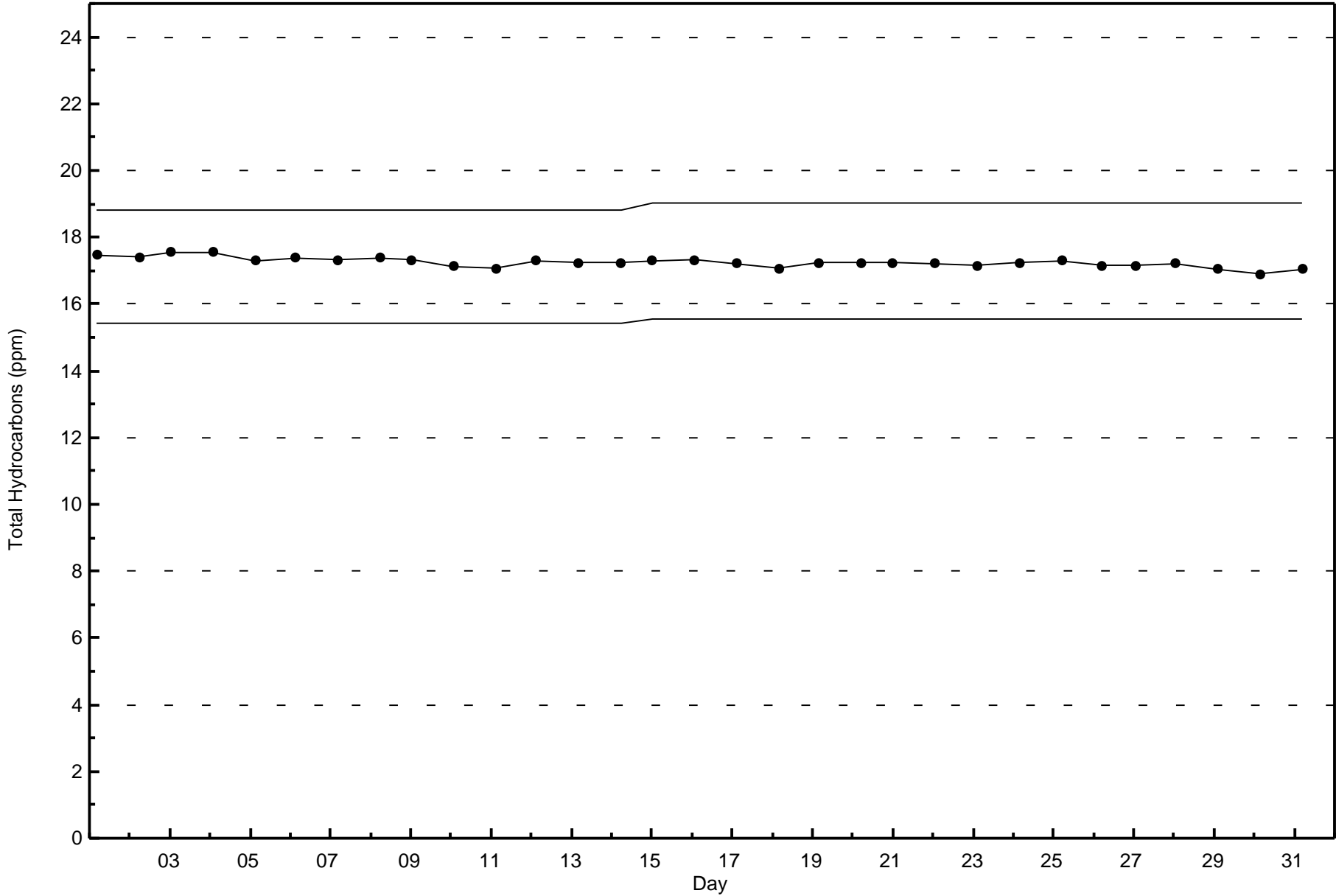


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Total Hydrocarbons (THC) - ppm  
CNRL Horizon (AMS 15)

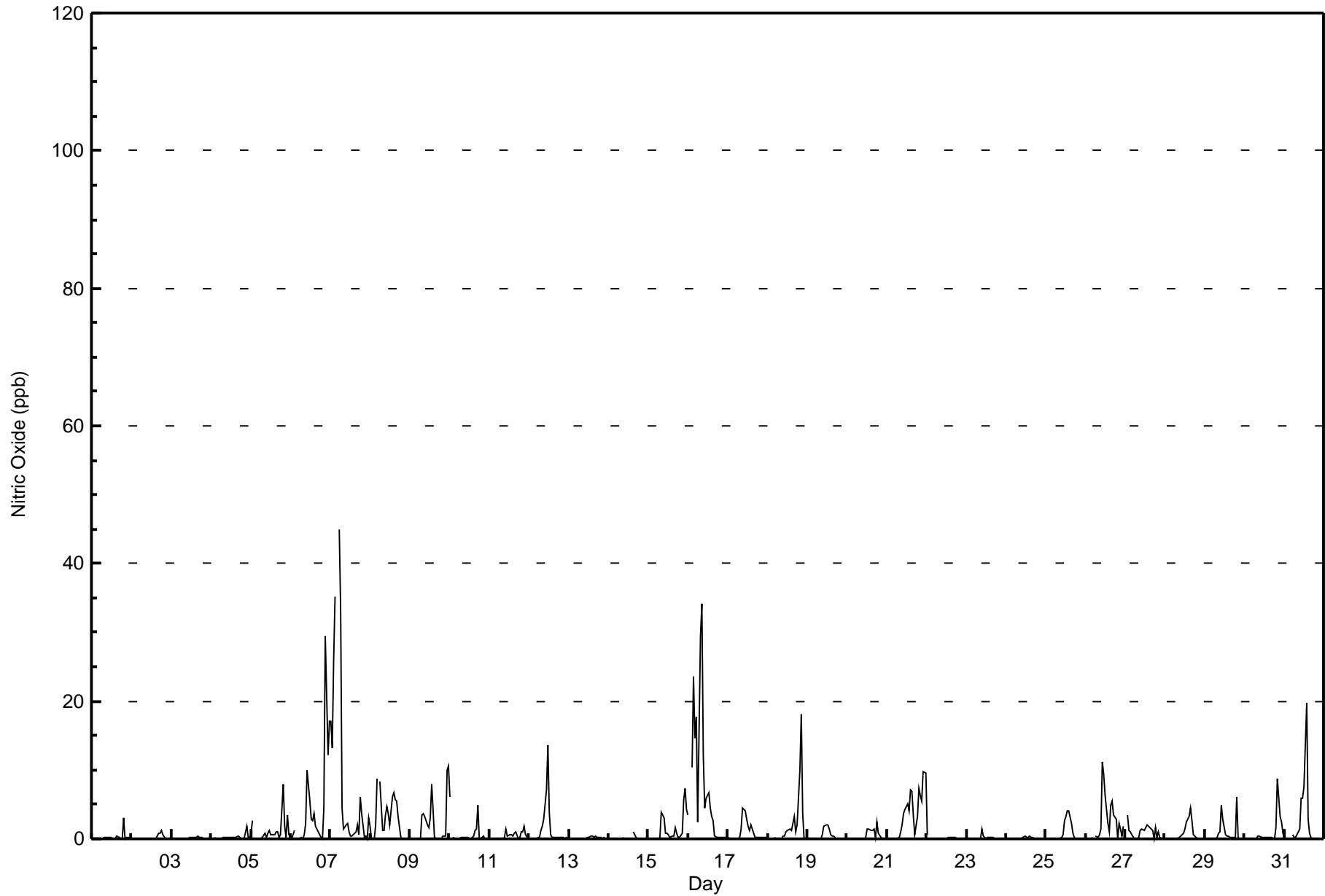








Maximum Value: 45 ppb on Oct 7 06:00																		Maximum Daily Average: 8.7 ppb on Oct 7																		Hours in Service: 744			
Minimum Value: 0 ppb on Oct 1 02:00																		Minimum Daily Average: 0.1 ppb on Oct 24																		Hours of Data: 708			
Maximum Diurnal Average: 2.5 ppb at hour 6																		Minimum Diurnal Average: 0.6 ppb at hour 18																		Hours of Missing Data: 36			
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> = 24																		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	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0.2	3													
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0.2	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	0.1	0													
4-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0.2	2													
5-Oct	1	3	Z	0	0	0	0	0	1	0	1	1	1	1	1	1	1	0	1	8	2	0	3	1	1.1	8													
6-Oct	0	1	1	Z	0	0	0	0	1	2	10	5	3	3	4	2	1	1	0	0	4	29	12	17	4.2	29													
7-Oct	17	13	26	35	Z	45	33	4	1	2	2	1	0	0	1	1	2	1	6	4	0	0	0	3	8.7	45													
8-Oct	2	0	0	2	9	Z	8	1	1	3	5	4	2	6	7	6	5	3	0	0	0	0	0	0	2.8	9													
9-Oct	Z	0	0	0	0	0	0	3	4	3	2	2	3	8	4	0	0	0	0	0	0	0	10	11	2.2	11													
10-Oct	6	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	5	0	0	0	0	0	0	0.7	6													
11-Oct	0	0	Z	0	0	0	0	0	0	0	1	0	1	1	0	1	1	0	0	1	1	2	1	0	0.5	2													
12-Oct	0	0	0	Z	0	0	0	1	2	3	7	14	4	1	0	0	0	0	0	0	0	0	0	0	1.4	14													
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	C	C	C	C	C	1	0	0	0	0	0	0	0	0	0.1	1													
15-Oct	Z	0	0	0	0	0	0	0	4	3	1	1	1	0	0	0	2	1	0	0	1	6	7	4	1.4	7													
16-Oct	3	Z	10	24	15	18	2	30	34	12	4	6	7	4	3	3	0	0	0	0	0	0	0	0	7.7	34													
17-Oct	0	0	Z	0	0	0	0	0	1	4	4	3	2	1	2	1	0	0	0	0	0	0	0	0	0.9	4													
18-Oct	0	0	0	Z	0	0	0	0	0	0	0	1	1	2	1	2	3	1	2	10	18	4	0	0	2.0	18													
19-Oct	0	0	0	0	Z	0	0	0	0	1	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0.4	2													
20-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	0	3	1	0	0	0	0	0.5	3													
21-Oct	Z	0	0	0	0	0	0	0	1	2	4	4	5	4	7	7	3	1	3	7	6	6	10	10	3.5	10													
22-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	0.1	1													
23-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	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	0.1	0													
25-Oct	0	0	0	0	Z	0	0	0	0	0	1	3	3	4	4	2	1	0	0	0	0	0	0	0	0.8	4													
26-Oct	0	0	0	0	0	Z	0	0	1	1	11	9	6	2	1	5	6	3	3	0	2	1	0	2	2.4	11													
27-Oct	Z	4	1	1	1	0	0	0	0	1	1	1	2	2	2	2	1	0	2	0	1	0	0	0	1.0	4													
28-Oct	0	Z	0	0	0	0	0	0	0	0	1	1	1	2	3	5	3	1	0	0	0	0	0	0	0.8	5													
29-Oct	0	0	Z	0	0	0	0	0	1	1	5	3	1	0	0	0	0	0	0	6	0	0	0	0	0.8	6													
30-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	9	3	2	1	0.8	9													
31-Oct	0	0	0	0	Z	1	0	0	1	1	6	6	7	20	3	1	0	0	0	0	0	0	0	0	2.0	20													
1.2																		0.8																		Diurnal Average			
17																		13																		Diurnal Maximum			
1.5																		2.4																					
1.0																		2.5																					
1.5																		1.5																					
1.4																		1.8																					
1.8																		1.5																					
2.3																		2.3																					
1.8																		2.2																					
1.6																		1.4																					
1.4																		1.2																					
0.6																		0.7																					
0.7																		1.4																					
1.5																		1.8																					
1.5																		1.5																					
1.6																		1.6																					
Z - zerospan																								C - Calibration															







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

**Nitric Oxide (NO) - ppb**  
**CNRL Horizon - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	700	98.87	98.87
21 - 40	7	0.99	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: 708

Total Number of Hours: 744



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

**Nitric Oxide (NO) - ppb**  
**CNRL Horizon - October 2015**

<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	82	85	33	10	9	9	16	31	93	115	67	30	25	36	37	22	700
21 - 40	1	0	0	0	0	0	0	0	0	0	1	0	2	0	2	1	7
11 - 80	0	0	0	0	0	0	0	0	0	0	1	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>	<b>83</b>	<b>85</b>	<b>33</b>	<b>10</b>	<b>9</b>	<b>9</b>	<b>16</b>	<b>31</b>	<b>93</b>	<b>115</b>	<b>69</b>	<b>30</b>	<b>27</b>	<b>36</b>	<b>39</b>	<b>23</b>	<b>708</b>

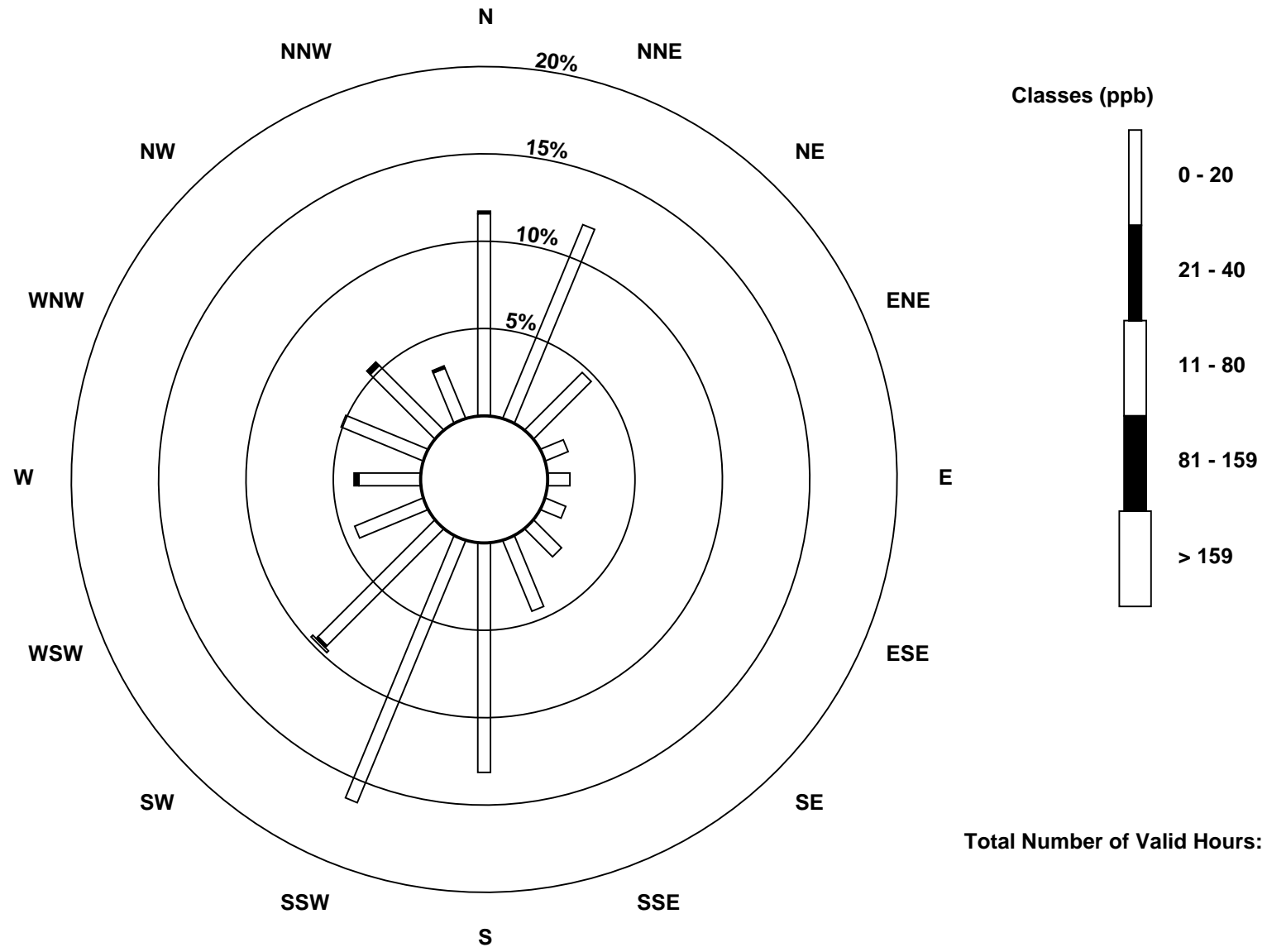
Total Number of Valid Hours: 708

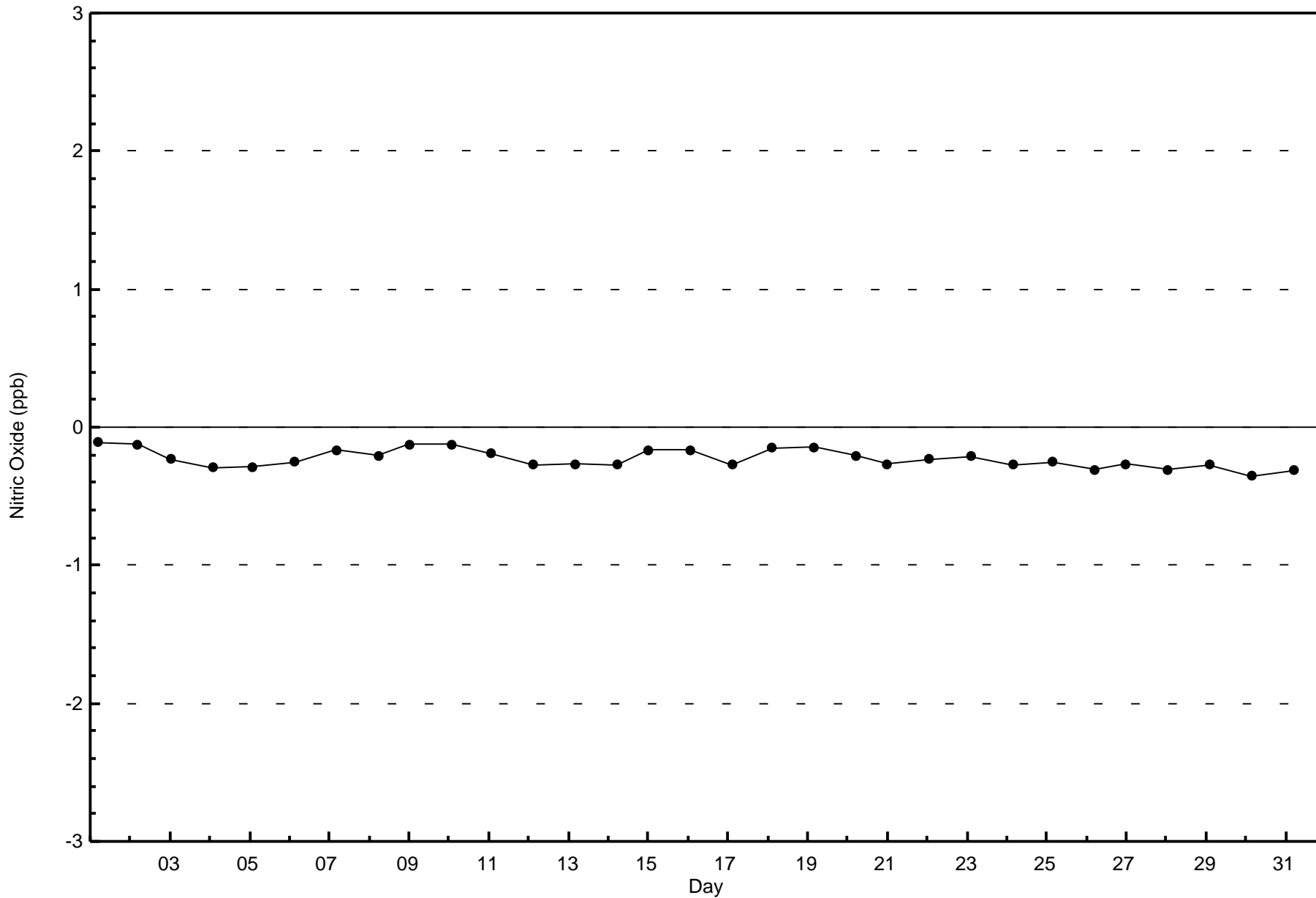
Total Number of Hours: 744

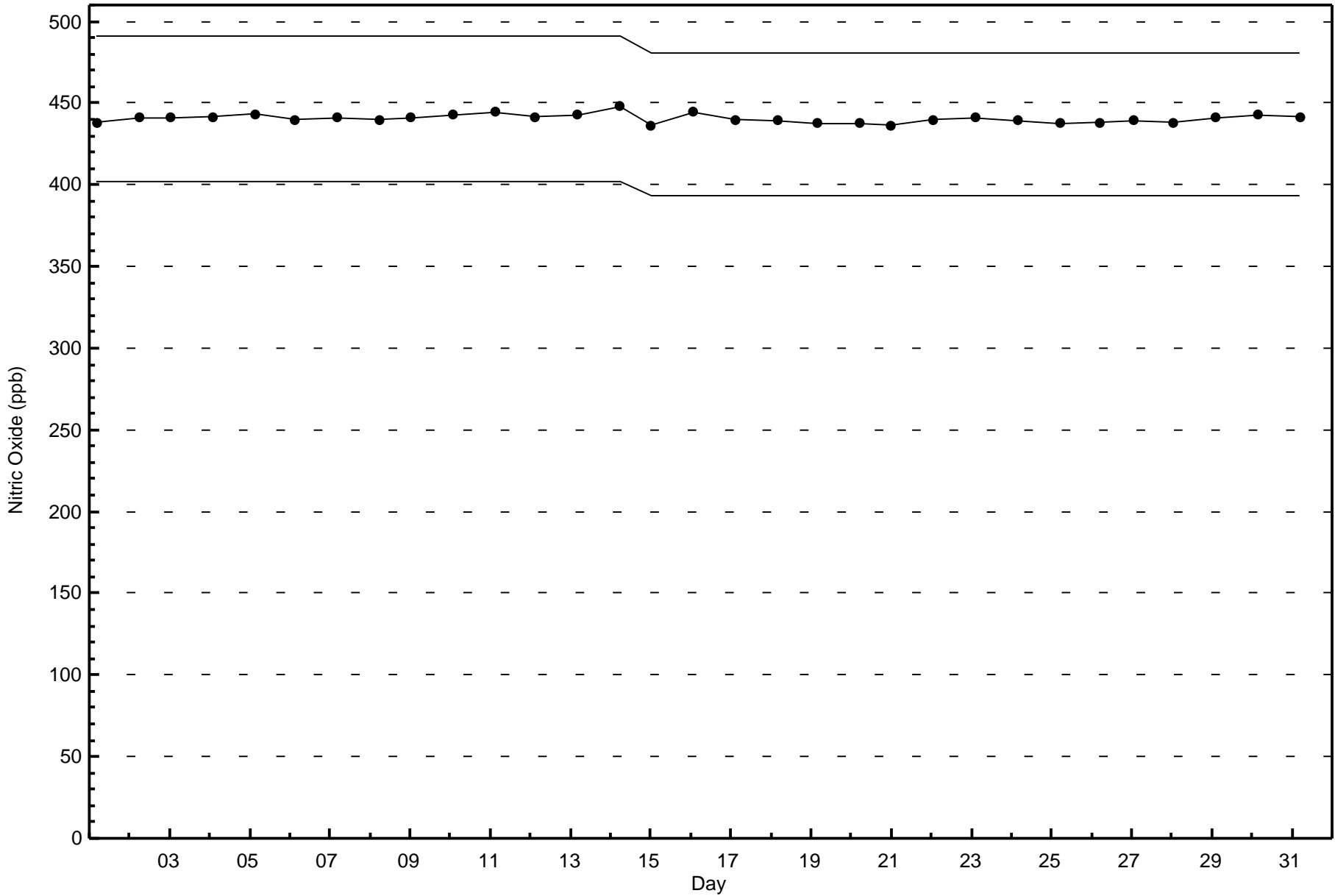


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Nitric Oxide (NO) - ppb  
CNRL Horizon (AMS 15)









Wood Buffalo Environmental Association

Summary of Hour Averages

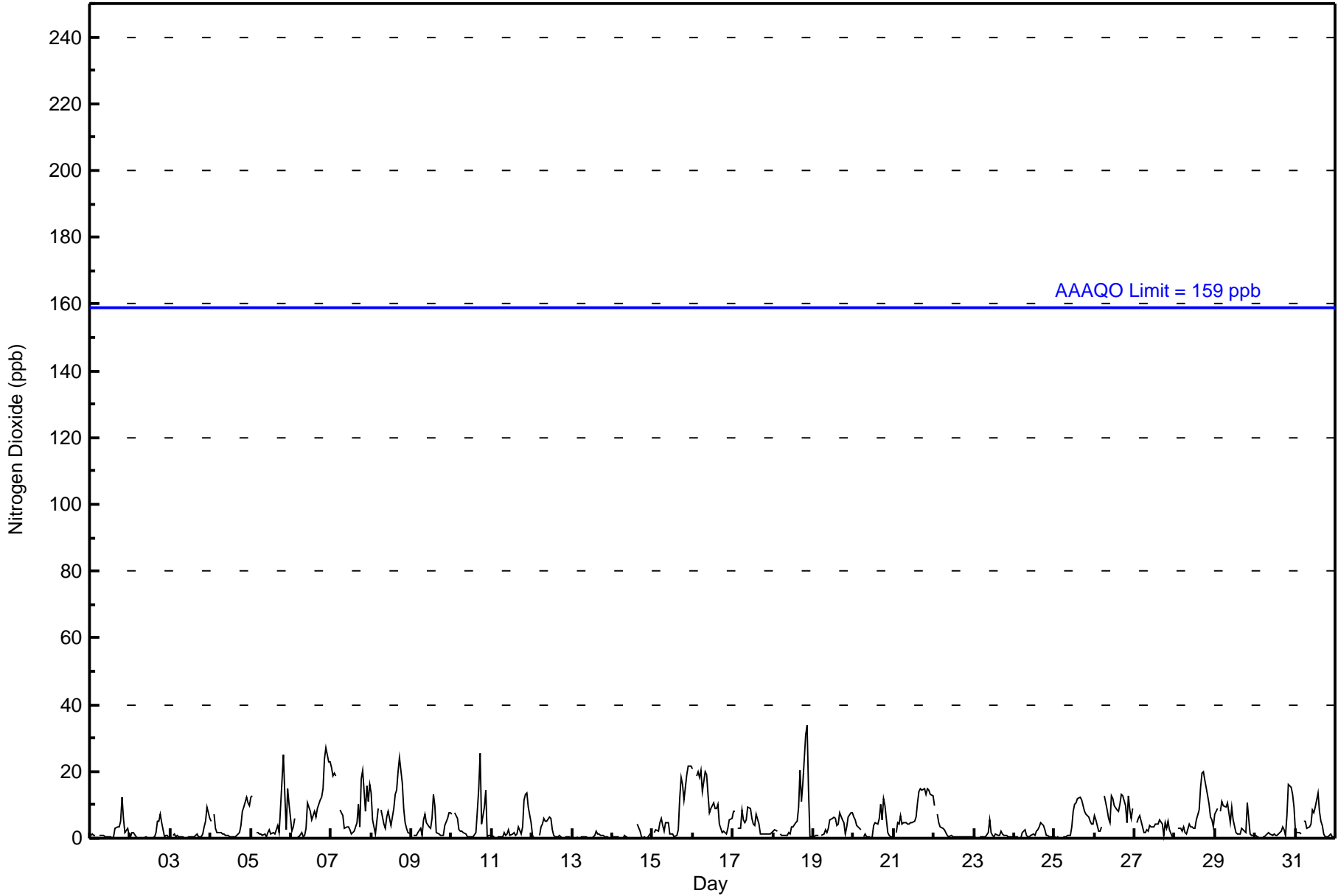
Nitrogen Dioxide (NO<sub>2</sub>) - ppb

CNRL Horizon - October 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 34 ppb on Oct 18 21:00	Maximum Daily Average: 10.6 ppb on Oct 16		Hours of Data:	708
Minimum Value: 0 ppb on Oct 12 20:00	Minimum Daily Average: 0.5 ppb on Oct 13		Hours of Missing Data:	36
Maximum Diurnal Average: 7.6 ppb at hour 21	Minimum Diurnal Average: 2.9 ppb at hour 9		Hours of Calibration:	36
Monthly Average: 4.7 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> = 13 P <sub>99</sub> = 23		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	0	0	0	0	3	3	3	5	12	6	2	3	1	2.0	12																							
2-Oct	0	2	2	1	0	Z	0	0	0	0	0	0	0	0	0	2	5	5	7	5	1	1	1	0	1.4	7																							
3-Oct	Z	1	1	0	1	0	0	1	0	0	0	1	1	1	1	1	1	0	0	1	3	5	9	6	1.5	9																							
4-Oct	5	Z	7	3	2	2	2	1	1	1	1	1	1	0	1	1	1	2	4	8	9	12	11	10	3.7	12																							
5-Oct	12	13	Z	2	2	1	1	1	1	1	2	3	1	2	1	3	4	2	10	25	13	3	15	10	5.5	25																							
6-Oct	2	4	6	Z	0	0	2	0	1	3	11	8	6	7	8	6	9	11	12	15	24	27	23	23	9.0	27																							
7-Oct	21	19	20	19	Z	8	8	7	3	3	4	2	1	2	2	5	10	4	18	21	8	16	11	16	9.8	21																							
8-Oct	13	5	1	5	9	Z	9	4	3	6	8	6	4	9	13	14	20	24	17	9	5	3	2	1	8.3	24																							
9-Oct	Z	1	1	1	2	3	1	5	7	5	3	3	6	13	10	2	1	1	1	1	4	6	8	8	4.0	13																							
10-Oct	7	Z	8	6	3	2	2	2	1	1	1	0	0	0	2	8	15	26	4	10	15	1	1	1	4.9	26																							
11-Oct	1	0	Z	0	1	1	1	2	1	1	3	1	1	2	1	1	3	1	3	11	13	14	9	5	3.3	14																							
12-Oct	1	0	0	Z	1	4	4	6	5	5	6	6	3	1	1	1	1	1	0	0	0	0	0	0	2.0	6																							
13-Oct	0	0	0	0	Z	0	1	1	1	0	0	0	0	1	2	1	1	1	1	0	0	0	0	0	0.5	2																							
14-Oct	0	0	0	0	0	Z	0	1	0	0	C	C	C	C	C	C	4	2	1	0	1	0	0	1	0.8	4																							
15-Oct	Z	2	2	2	5	6	4	2	5	5	1	1	1	1	1	3	12	18	16	11	19	22	22	22	7.9	22																							
16-Oct	21	Z	19	20	18	20	14	20	19	13	8	9	11	9	9	10	4	2	2	2	1	3	5	6	10.6	21																							
17-Oct	8	8	Z	3	3	9	6	5	6	9	9	6	4	4	7	4	1	1	1	1	1	1	1	2	4.4	9																							
18-Oct	2	2	2	Z	1	1	1	1	1	2	1	3	3	5	5	10	20	11	17	31	34	15	1	0	7.3	34																							
19-Oct	1	1	1	1	Z	1	1	3	2	3	5	6	6	6	4	4	8	6	5	1	4	6	8	8	3.8	8																							
20-Oct	6	6	4	4	2	Z	1	1	0	0	0	0	4	5	4	6	10	6	12	10	2	1	1	1	3.7	12																							
21-Oct	Z	2	5	4	7	4	5	5	4	4	5	5	5	6	11	14	15	15	15	13	15	14	13	13	8.6	15																							
22-Oct	10	Z	7	5	3	3	2	2	1	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	1.7	10																							
23-Oct	0	0	Z	0	0	0	1	1	2	6	2	1	0	1	1	1	2	1	1	1	0	0	0	0	1.0	6																							
24-Oct	0	0	0	Z	0	2	3	1	1	0	1	1	1	2	2	3	5	4	3	1	1	1	1	0	1.4	5																							
25-Oct	0	0	0	0	Z	0	0	1	1	1	3	8	10	11	12	12	11	10	8	7	7	5	4	4	5.1	12																							
26-Oct	7	6	2	2	4	Z	13	8	6	5	13	12	10	8	8	10	13	13	10	5	13	9	6	9	8.2	13																							
27-Oct	Z	5	6	7	5	2	2	3	2	4	4	4	4	4	4	6	4	1	5	3	5	3	1	0	3.5	7																							
28-Oct	1	Z	3	3	2	3	2	1	4	3	3	3	3	5	9	15	19	20	18	13	10	6	5	4	6.8	20																							
29-Oct	7	9	Z	8	11	10	9	10	8	5	9	6	2	1	1	1	3	2	2	11	6	1	1	1	5.4	11																							
30-Oct	1	1	1	Z	1	1	1	1	2	1	1	1	1	1	1	2	4	2	1	7	16	15	13	9	3.5	16																							
31-Oct	2	2	2	1	Z	5	5	3	3	4	9	8	9	14	8	5	4	1	0	1	1	1	1	0	3.8	14																							
																								5.0	3.4	3.8	3.8	3.3	3.4	3.1	3.2	2.9	3.0	3.8	3.5	3.3	4.0	4.3	5.1	6.9	6.2	6.3	7.6	7.6	6.2	5.7	5.2	Diurnal Average	
																								21	19	20	20	18	20	14	20	19	13	13	12	11	14	13	15	20	26	18	31	34	27	23	23	Diurnal Maximum	

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





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**CNRL Horizon - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	693	97.88	97.88
21 - 40	15	2.12	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: 708

Total Number of Hours: 744





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

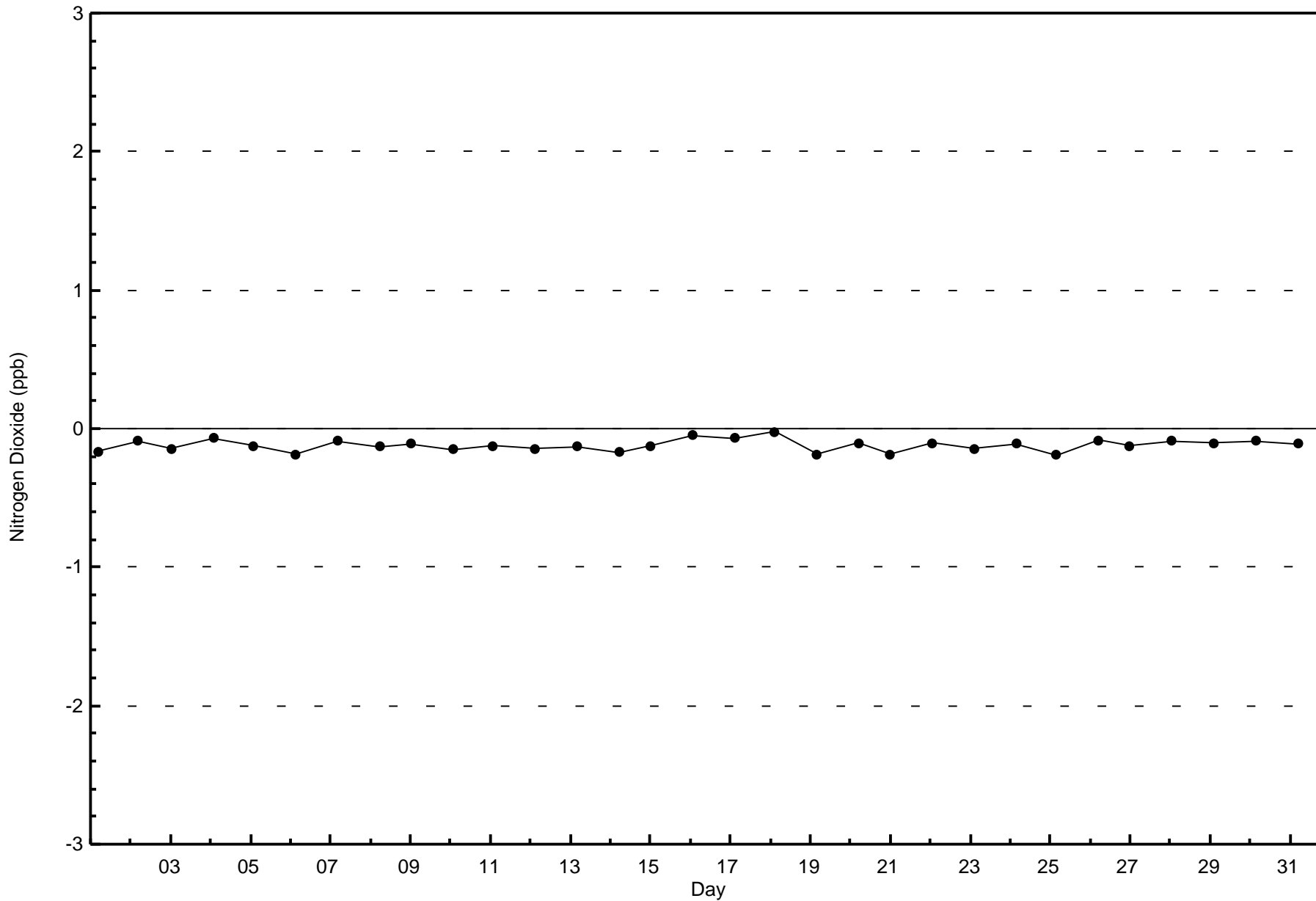
**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**CNRL Horizon - October 2015**

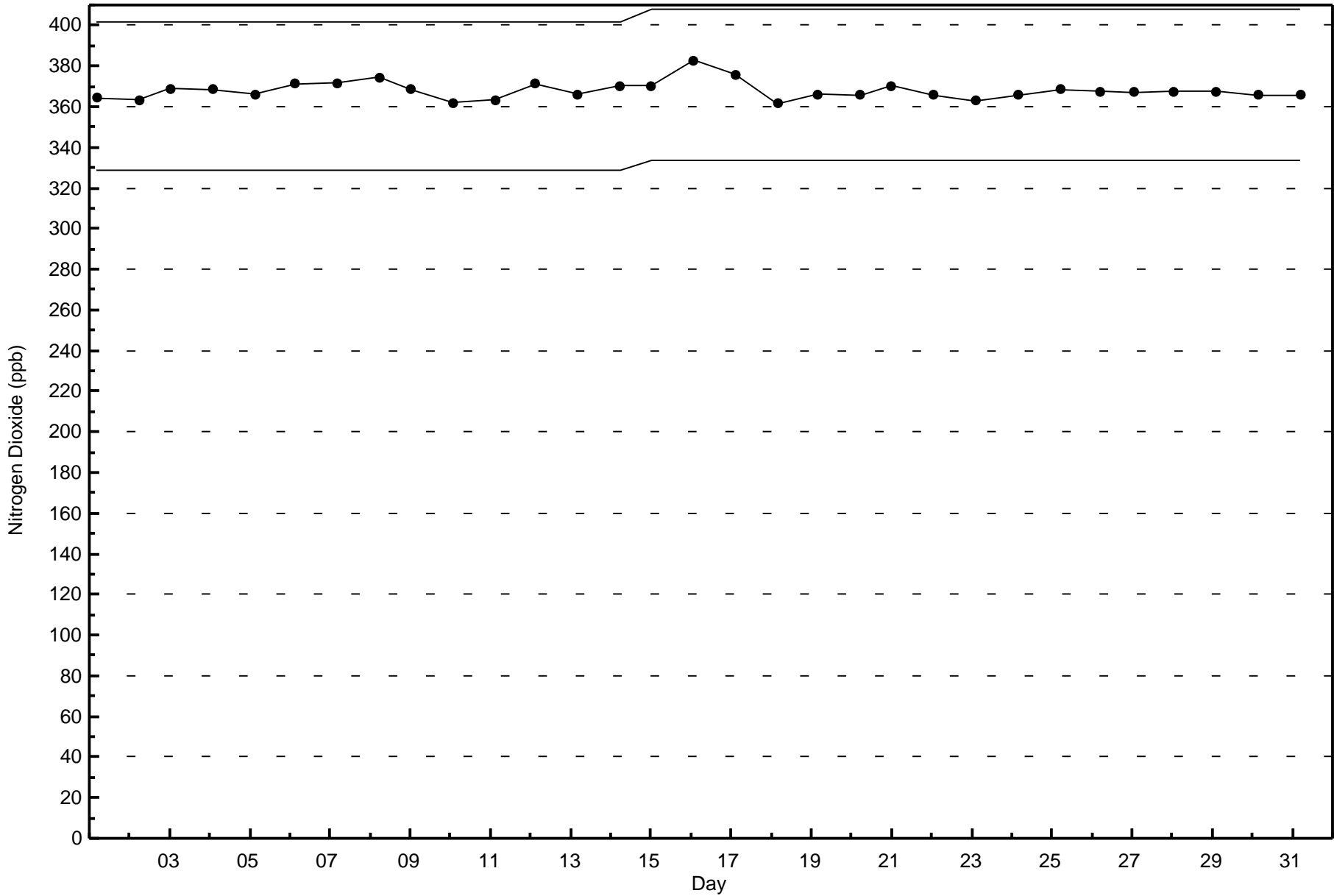
<b>Concentration</b> <b>Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	78	84	33	10	9	9	16	31	93	115	69	30	26	34	36	20	693
21 - 40	5	1	0	0	0	0	0	0	0	0	0	0	1	2	3	3	15
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	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>	83	85	33	10	9	9	16	31	93	115	69	30	27	36	39	23	708

Total Number of Valid Hours: 708

Total Number of Hours: 744

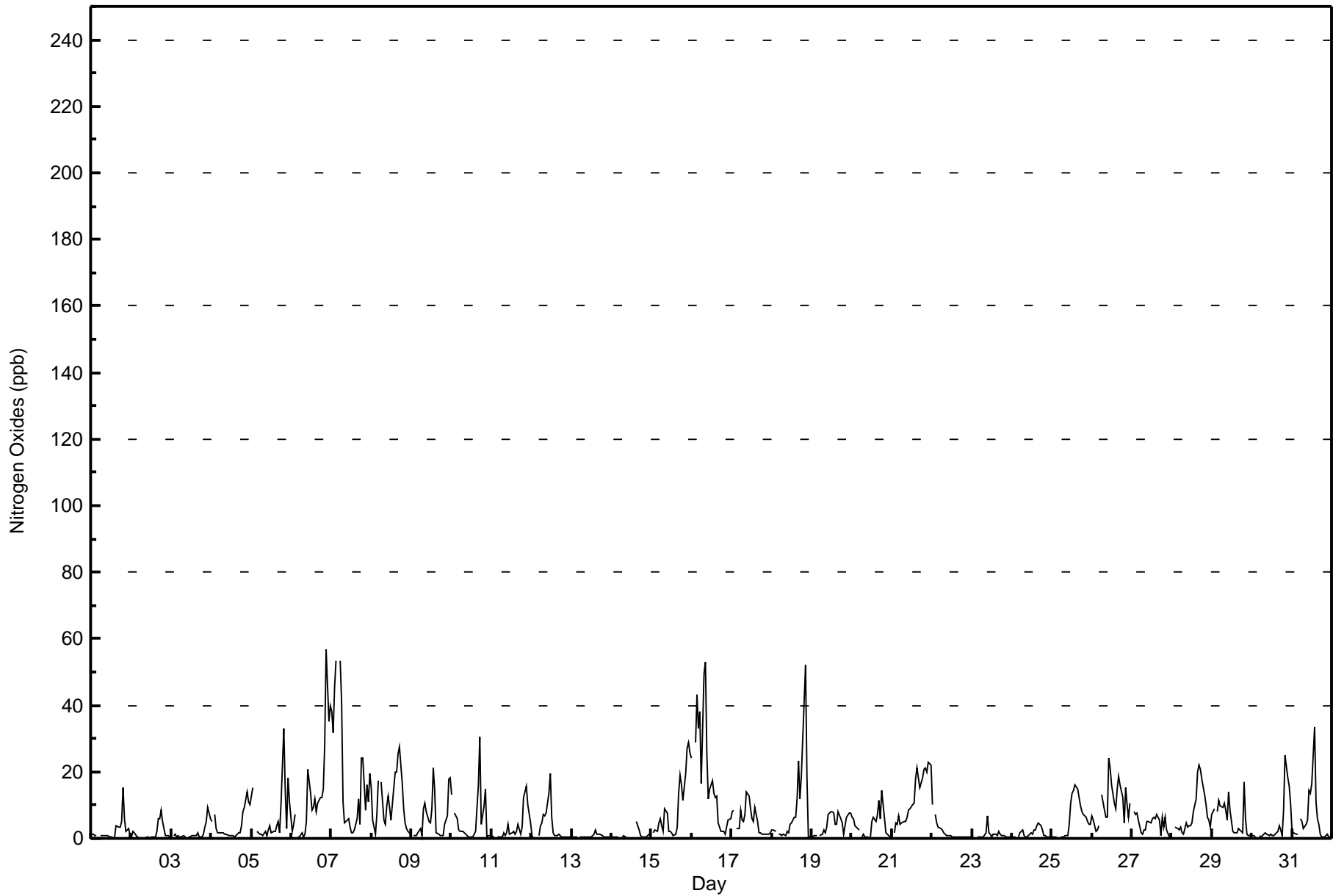








Maximum Value: 57 ppb on Oct 6 22:00																		Maximum Daily Average: 18.5 ppb on Oct 7																		Hours in Service: 744			
Minimum Value: 0 ppb on Oct 3 10:00																		Minimum Daily Average: 0.7 ppb on Oct 13																		Hours of Data: 708			
Maximum Diurnal Average: 9.1 ppb at hour 21																		Minimum Diurnal Average: 4.2 ppb at hour 2																		Hours of Missing Data: 36			
Monthly Average: 6.2 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> = 16 P <sub>99</sub> = 43																		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	1	1	1	1	Z	1	1	1	1	1	1	0	0	0	4	3	3	5	15	6	2	3	1	2.3	15														
2-Oct	0	2	2	1	0	Z	0	0	0	0	0	0	0	1	2	6	6	8	5	1	1	1	0	1.6	8														
3-Oct	Z	1	1	0	1	0	0	1	0	0	0	1	1	1	1	2	0	1	1	3	5	9	6	1.6	9														
4-Oct	5	Z	7	3	2	2	2	2	1	1	1	1	1	1	1	2	2	4	8	9	14	11	10	3.9	14														
5-Oct	13	15	Z	2	2	1	1	1	2	1	2	4	2	2	4	5	2	10	33	15	3	18	11	6.6	33														
6-Oct	2	4	7	Z	0	0	2	0	1	5	21	13	9	9	12	8	10	12	12	15	28	57	35	40	13.2	57													
7-Oct	38	32	46	54	Z	53	41	11	4	6	6	3	2	2	3	6	12	4	24	24	8	16	11	19	18.5	54													
8-Oct	15	5	1	7	17	Z	17	5	4	10	13	9	6	15	20	20	25	28	17	9	5	3	2	1	11.1	28													
9-Oct	Z	1	1	1	2	3	1	9	11	8	5	5	9	21	14	2	1	1	1	1	4	7	18	18	6.2	21													
10-Oct	13	Z	8	6	3	2	2	2	1	1	1	1	0	0	2	9	16	31	4	10	15	1	1	1	5.6	31													
11-Oct	1	0	Z	0	1	1	1	2	1	2	4	1	2	2	1	2	4	1	3	12	14	15	10	5	3.7	15													
12-Oct	1	0	0	Z	1	4	5	7	7	8	14	19	6	2	1	1	1	1	0	0	0	0	0	0	3.4	19													
13-Oct	0	0	0	0	Z	1	1	1	1	0	0	0	0	1	3	1	1	1	1	0	0	0	0	0	0.7	3													
14-Oct	0	0	0	0	0	Z	0	1	0	0	C	C	C	C	C	5	2	1	0	1	0	0	1	1	0.9	5													
15-Oct	Z	2	2	2	4	6	4	2	9	8	2	2	2	1	1	3	13	19	16	11	20	27	29	26	9.3	29													
16-Oct	24	Z	29	43	33	38	16	49	53	25	12	15	17	14	12	13	5	2	2	2	1	3	5	6	18.3	53													
17-Oct	8	8	Z	3	3	9	6	5	7	14	13	9	6	5	9	5	2	1	1	1	1	1	1	2	5.3	14													
18-Oct	2	3	2	Z	1	1	1	1	1	2	2	4	5	6	6	12	24	12	19	41	52	18	0	0	9.4	52													
19-Oct	0	1	1	1	Z	1	1	3	2	4	7	8	8	7	4	4	8	6	5	1	4	6	8	8	4.2	8													
20-Oct	6	6	4	4	2	Z	1	1	1	0	0	0	5	6	5	7	12	6	14	10	2	1	1	1	4.2	14													
21-Oct	Z	2	5	4	7	4	5	5	5	6	9	9	10	11	18	21	18	15	18	21	21	20	23	22	12.1	23													
22-Oct	10	Z	7	5	3	3	2	2	1	1	1	1	1	1	0	0	0	0	1	0	0	0	0	0	1.8	10													
23-Oct	0	0	Z	0	0	0	1	1	2	7	2	1	0	1	1	2	1	1	1	1	0	0	0	0	1.1	7													
24-Oct	0	0	0	Z	0	2	3	1	1	0	1	2	1	3	3	4	5	4	3	1	1	1	0	0	1.5	5													
25-Oct	0	0	0	0	Z	0	0	1	1	1	4	11	13	15	16	15	12	10	8	7	7	5	4	4	5.9	16													
26-Oct	7	6	2	2	4	Z	13	9	6	6	24	21	16	10	9	15	19	16	12	5	15	10	6	11	10.6	24													
27-Oct	Z	8	7	8	6	1	1	3	3	5	5	5	6	6	6	7	5	1	6	3	6	3	0	0	4.5	8													
28-Oct	1	Z	3	3	2	3	2	1	5	4	4	4	5	8	12	20	22	21	18	13	10	6	5	4	7.6	22													
29-Oct	7	9	Z	8	11	10	9	11	9	6	14	8	2	2	2	2	3	2	2	17	6	1	1	1	6.2	17													
30-Oct	1	1	1	Z	1	1	1	1	2	1	1	1	1	1	1	2	4	2	1	9	25	18	16	10	4.4	25													
31-Oct	2	2	1	1	Z	6	5	3	4	6	14	14	17	33	11	6	4	1	0	0	1	1	1	0	5.8	33													
6.2																		4.2																		Diurnal Average			
38																		32																		Diurnal Maximum			
5.4																		4.6																					
6.2																		4.5																					
4.3																		4.7																					
5.9																		4.5																					
4.6																		6.1																					
4.5																		5.8																					
4.7																		5.1																					
4.5																		6.2																					
6.1																		5.9																					
5.8																		6.5																					
5.1																		8.0																					
6.2																		6.9																					
5.9																		7.1																					
6.5																		9.0																					
8.0																		9.1																					
6.9																		8.0																					
7.1																		7.2																					
9.0																		6.8																					
9.1																		35																					
8.0																		40																					
7.2																																							
6.8																																							
Z - zerospan																		C - Calibration																					





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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**CNRL Horizon - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	665	93.93	93.93
21 - 40	33	4.66	98.59
41 - 80	10	1.41	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**CNRL Horizon - October 2015**

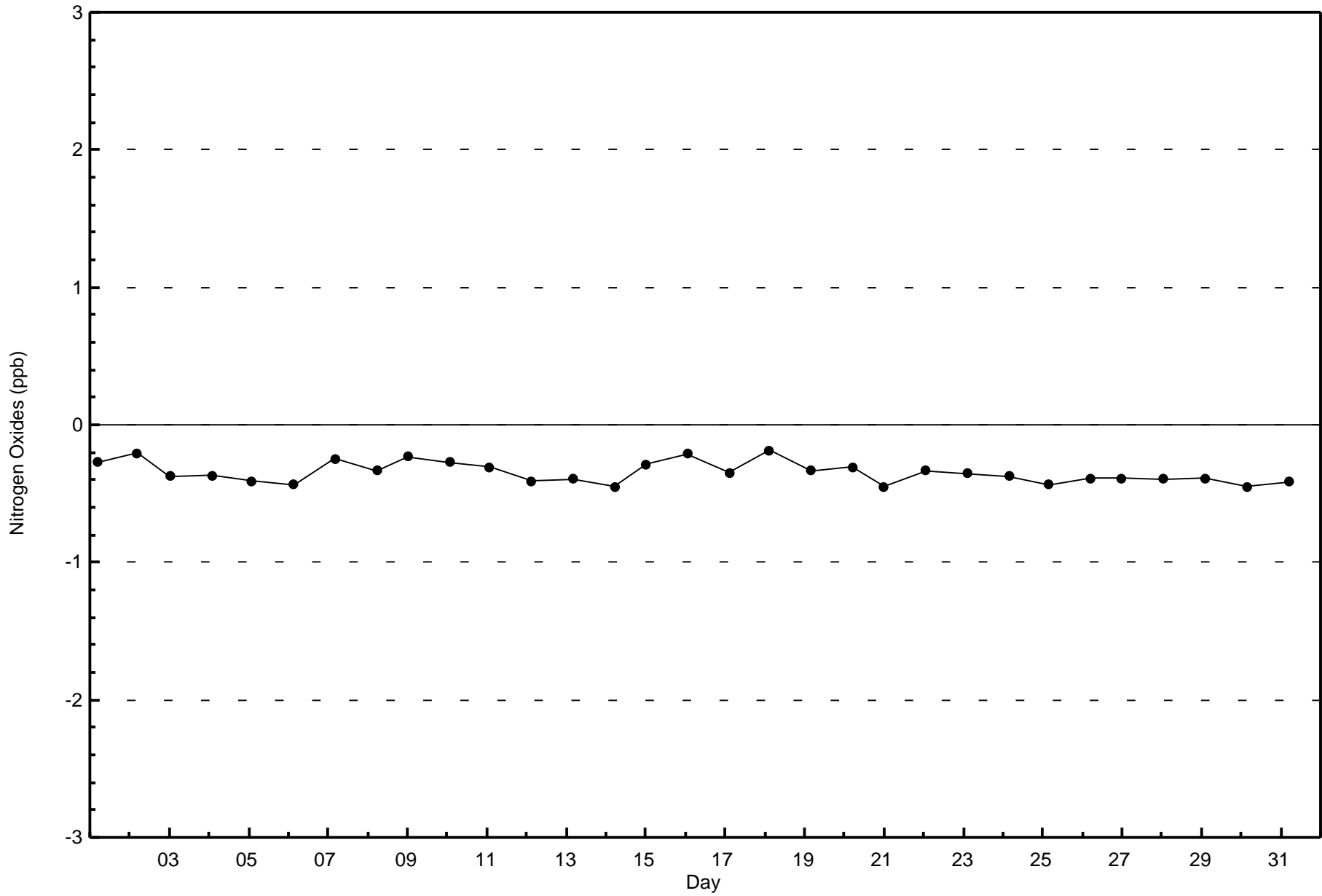
<b>Concentration</b> <b>Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	74	82	29	9	9	9	16	28	92	112	67	30	24	33	34	17	665
21 - 40	8	3	4	1	0	0	0	3	1	3	0	0	0	2	3	5	33
11 - 80	1	0	0	0	0	0	0	0	0	0	2	0	3	1	2	1	10
81 - 159	0	0	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>	83	85	33	10	9	9	16	31	93	115	69	30	27	36	39	23	708

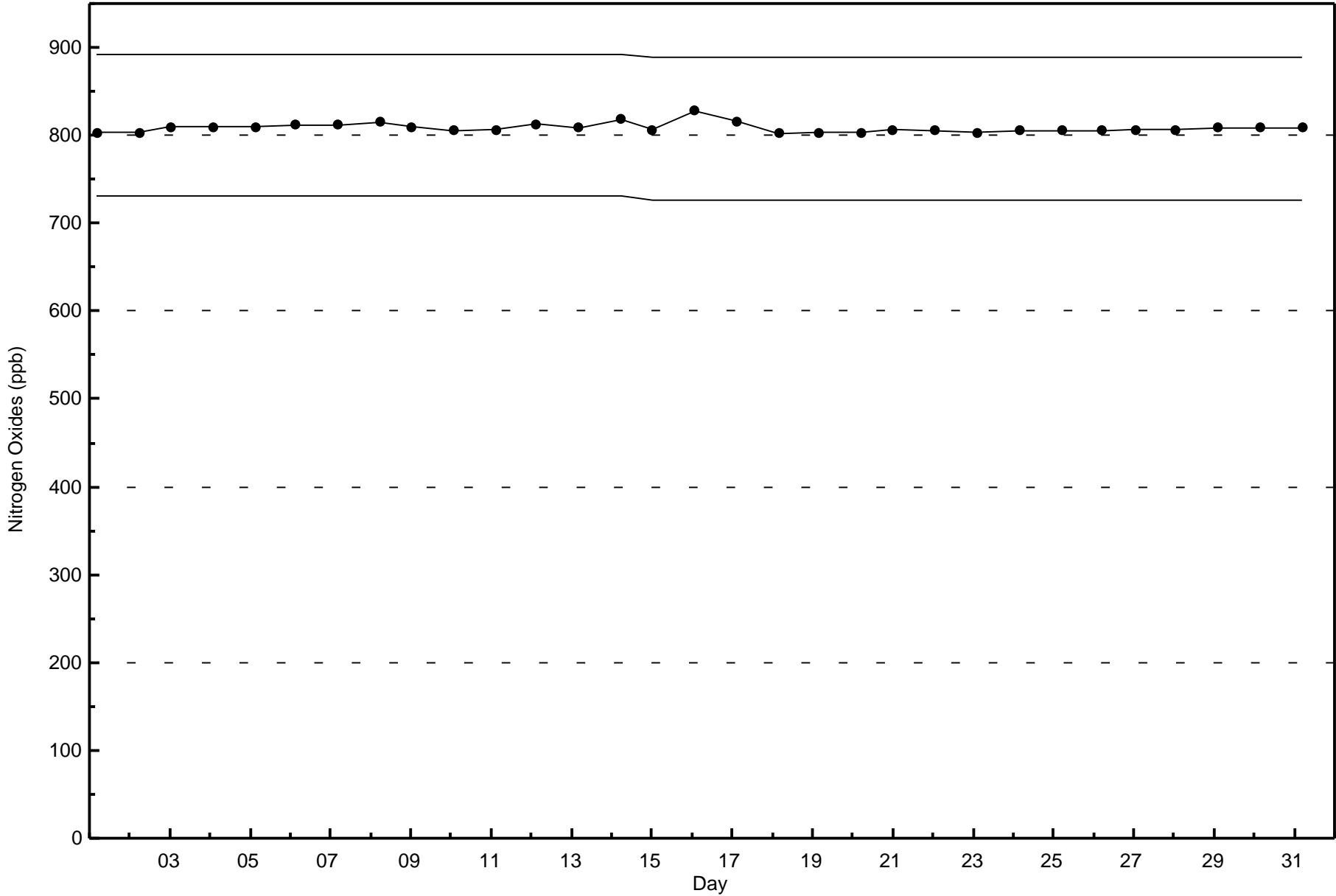
Total Number of Valid Hours: 708

Total Number of Hours: 744











Summary of Hour Averages

CNRL Horizon - October 2015

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 27.3 µg/m <sup>3</sup> on Oct 8 18:00 Maximum Daily Average: 8.3 µg/m <sup>3</sup> on Oct 6		Hours in Service: 744 Hours of Data: 741 Hours of Missing Data: 3 Hours of Calibration: 3 Percent Operational Time: 100.0																																														
Minimum Value: 0.1 µg/m <sup>3</sup> on Oct 2 21:00 Maximum Diurnal Average: 5.9 µg/m <sup>3</sup> at hour 18 Monthly Average: 4.70 µg/m <sup>3</sup>		Minimum Daily Average: 1.3 µg/m <sup>3</sup> on Oct 11 Minimum Diurnal Average: 3.5 µg/m <sup>3</sup> at hour 13 Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 1.5 Q <sub>1</sub> = 2.0 Median = 4.0 Q <sub>3</sub> = 6.2 P <sub>90</sub> = 8.7 P <sub>99</sub> = 17.6																																														
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	5.0	5.0	5.1	5.2	5.3	5.3	5.3	5.4	5.7	6.0	5.6	5.1	5.0	4.7	4.3	8.3	6.7	5.8	8.7	15.7	11.2	8.0	7.6	6.4	6.5	15.7																						
2-Oct	5.1	5.7	5.6	6.0	7.1	6.1	4.1	3.3	4.5	5.3	4.8	3.1	2.4	2.8	2.5	0.2	0.2	0.1	0.3	0.2	0.1	0.1	0.1	0.2	2.9	7.1																						
3-Oct	0.2	0.6	0.8	0.6	1.0	1.0	0.9	1.1	0.8	0.8	0.8	0.9	1.2	1.5	1.7	1.6	2.3	1.8	2.2	2.9	4.5	4.8	5.0	4.2	1.8	5.0																						
4-Oct	3.8	3.9	4.3	4.9	5.0	5.0	5.6	5.4	5.6	5.1	4.2	4.0	3.8	3.7	3.0	3.0	4.5	9.5	17.1	21.5	18.5	17.6	16.9	13.0	7.9	21.5																						
5-Oct	7.6	6.9	7.7	7.3	5.6	3.8	3.3	3.3	3.5	2.2	2.0	3.7	2.3	2.0	2.9	1.9	2.9	2.0	1.9	3.5	3.3	1.8	3.8	2.9	3.7	7.7																						
6-Oct	1.3	1.6	1.8	1.1	1.0	1.1	1.1	1.1	2.6	7.6	15.9	15.4	10.8	10.6	12.7	7.8	9.4	18.1	11.3	12.2	18.2	15.6	9.3	11.9	8.3	18.2																						
7-Oct	12.6	11.5	12.1	14.4	13.7	12.9	9.9	6.5	4.3	4.2	3.8	2.7	2.8	2.8	3.0	3.6	6.2	6.0	10.0	12.0	5.6	8.2	5.5	5.6	7.5	14.4																						
8-Oct	5.0	3.6	2.9	4.3	8.7	11.5	4.2	3.7	3.9	3.6	3.7	4.0	3.3	5.6	11.8	11.3	14.7	27.3	10.4	7.0	4.6	3.4	2.4	1.9	6.8	27.3																						
9-Oct	1.7	1.5	1.5	1.5	1.7	1.9	1.7	2.7	3.5	3.8	4.4	4.8	5.3	7.1	7.1	7.2	8.1	8.1	8.7	8.4	8.9	7.8	7.3	6.7	5.1	8.9																						
10-Oct	6.5	6.8	8.5	7.2	4.0	3.9	3.7	3.5	2.9	2.3	1.7	1.6	1.4	1.4	1.8	2.2	2.3	3.9	2.7	3.4	4.7	4.0	2.8	1.2	3.5	8.5																						
11-Oct	1.0	0.7	0.6	0.6	1.0	1.2	1.2	1.0	1.0	1.1	1.1	1.1	1.2	1.4	1.6	1.8	2.1	2.0	1.6	1.6	2.7	2.3	1.4	1.1	1.3	2.7																						
12-Oct	0.7	0.7	0.8	1.0	1.0	1.5	2.2	2.4	1.7	1.7	2.4	3.1	1.8	1.7	2.1	2.1	2.6	2.7	2.4	2.1	2.2	2.0	2.2	1.4	1.9	3.1																						
13-Oct	1.3	1.4	1.4	1.4	1.5	1.6	1.6	1.6	1.7	1.5	2.4	2.6	2.4	3.1	4.2	6.3	4.0	3.1	4.2	2.8	1.6	1.3	1.2	1.4	2.3	6.3																						
14-Oct	1.8	2.1	2.4	2.6	2.5	1.7	1.8	2.6	1.1	1.3	8.1	5.5	C	C	C	4.8	3.8	2.2	1.8	1.5	1.5	1.5	3.0	3.2	2.7	8.1																						
15-Oct	2.7	2.5	2.4	2.1	2.5	2.3	2.0	1.9	3.8	3.3	1.8	2.1	2.0	1.7	2.5	5.0	12.4	11.4	9.5	6.5	9.3	12.2	11.3	9.9	5.1	12.4																						
16-Oct	8.4	10.5	7.1	8.8	7.8	11.6	6.3	16.5	9.0	6.1	4.2	4.2	4.2	3.7	4.7	6.9	4.1	4.3	3.5	3.2	2.4	3.1	4.8	8.8	6.4	16.5																						
17-Oct	8.2	8.0	6.4	5.4	4.9	6.1	5.4	5.8	5.3	5.0	5.0	4.6	4.4	4.6	6.8	6.5	5.6	6.3	5.9	5.1	5.3	5.2	5.3	5.6	5.7	8.2																						
18-Oct	7.3	8.5	8.8	8.4	7.3	6.1	5.7	5.6	5.1	4.4	4.0	5.7	5.5	5.1	4.0	6.3	6.3	5.2	6.9	7.2	7.2	4.9	2.7	2.6	5.9	8.8																						
19-Oct	3.2	4.2	4.7	5.1	5.2	5.4	5.7	6.4	6.6	5.8	4.9	4.8	4.9	4.8	5.6	6.5	5.8	5.1	5.2	4.8	5.1	5.2	5.6	5.6	5.3	6.6																						
20-Oct	6.9	8.0	7.9	8.7	6.6	1.4	1.2	1.2	1.2	1.3	1.6	1.6	1.7	1.9	2.0	2.1	2.3	2.1	2.5	2.2	1.7	1.5	1.4	1.4	2.9	8.7																						
21-Oct	1.4	1.5	1.7	1.8	2.6	6.9	16.7	17.9	8.7	8.5	8.0	5.7	4.3	3.8	3.2	2.9	3.6	4.5	7.2	7.9	7.1	6.5	6.2	5.8	6.0	17.9																						
22-Oct	5.3	5.8	6.2	5.8	5.7	5.8	5.4	5.2	4.8	4.4	4.9	4.6	4.0	4.0	3.8	3.6	3.5	3.8	3.7	4.2	4.2	3.9	4.5	4.7	4.6	6.2																						
23-Oct	6.0	6.7	6.6	6.3	5.9	5.7	5.5	5.2	5.0	5.9	3.2	2.7	1.9	2.1	2.0	2.1	2.3	2.5	1.9	1.5	1.5	1.5	1.6	1.6	3.6	6.7																						
24-Oct	1.6	1.8	1.8	2.1	2.1	2.0	1.9	2.0	1.9	1.9	1.8	1.9	1.9	2.0	4.1	6.9	8.1	7.1	4.9	1.9	2.0	1.8	1.9	1.5	2.8	8.1																						
25-Oct	1.4	1.4	1.4	1.5	1.7	1.7	1.9	2.2	2.3	2.3	2.5	2.9	2.9	3.2	3.6	4.0	5.5	8.5	10.1	10.0	8.8	7.7	7.2	6.9	4.2	10.1																						
26-Oct	7.6	8.5	6.0	4.1	4.3	7.9	7.5	5.7	5.4	5.2	6.4	5.8	5.2	4.9	4.9	5.6	6.4	7.2	7.8	5.6	4.3	2.7	1.7	1.8	5.5	8.5																						
27-Oct	1.7	1.7	2.1	2.5	2.2	1.5	1.4	1.5	1.6	1.7	1.7	1.8	1.9	1.8	2.0	2.0	2.0	1.6	1.9	1.5	2.0	1.8	1.8	2.0	1.8	2.5																						
28-Oct	2.3	1.8	1.5	1.6	1.6	1.9	1.8	1.8	4.2	12.1	11.4	5.4	3.2	4.3	9.0	9.7	6.9	7.0	4.1	3.3	4.2	10.2	9.5	5.5	5.2	12.1																						
29-Oct	14.1	9.6	3.6	7.2	20.5	15.8	13.1	13.4	7.3	3.9	3.9	3.1	2.6	3.1	4.2	5.0	5.6	5.5	5.8	7.3	7.1	6.2	6.0	6.9	7.5	20.5																						
30-Oct	7.6	7.2	6.8	6.5	5.9	5.3	4.4	4.0	3.4	2.8	3.2	3.1	3.1	2.9	2.8	2.8	4.2	3.5	3.2	4.1	7.0	6.9	6.8	6.9	4.8	7.6																						
31-Oct	5.8	6.2	8.0	7.5	7.5	7.6	8.1	8.4	8.0	7.4	7.3	7.2	6.9	6.7	5.4	5.2	3.7	3.2	2.6	2.9	3.7	4.0	4.1	3.2	5.9	8.4																						
																								4.7	4.7	4.5	4.6	4.9	4.9	4.5	4.8	4.1	4.1	4.4	4.0	3.5	3.6	4.3	4.7	5.1	5.9	5.5	5.6	5.5	5.3	4.9	4.6	Diurnal Average
																								14.1	11.5	12.1	14.4	20.5	15.8	16.7	17.9	9.0	12.1	15.9	15.4	10.8	10.6	12.7	11.3	14.7	27.3	17.1	21.5	18.5	17.6	16.9	13.0	Diurnal Maximum
C - Calibration																																																
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m <sup>3</sup>																																																

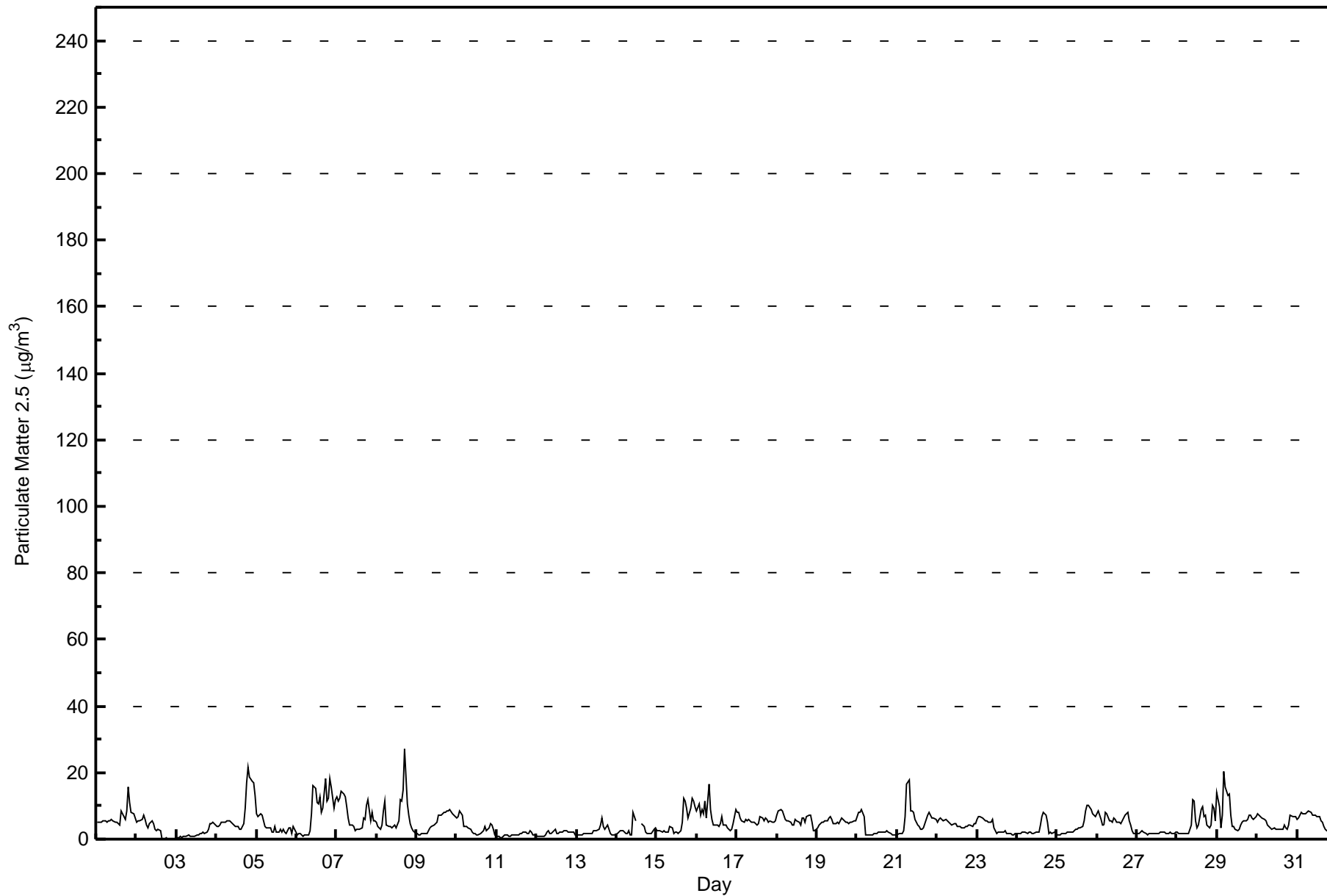


Wood Buffalo Environmental Association

Hourly Averages

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$

CNRL Horizon - October 2015





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

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**CNRL Horizon - October 2015**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	468	63.16	63.16
6 - 15	228	30.77	93.93
16 - 25	15	2.02	95.95
26 - 80	1	0.13	96.09
> 81.0	0	0.00	96.09

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>) -  $\mu\text{g}/\text{m}^3$**   
**CNRL Horizon - October 2015**

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	45	64	23	5	5	8	9	11	67	70	49	28	20	28	27	9	468
6 - 15	26	18	9	6	4	1	7	17	27	50	20	6	6	11	10	10	228
16 - 25	1	0	0	0	0	0	1	4	2	1	2	0	1	0	2	1	15
26 - 80	1	0	0	0	0	0	0	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>	73	82	32	11	9	9	17	32	96	121	71	34	27	39	39	20	712

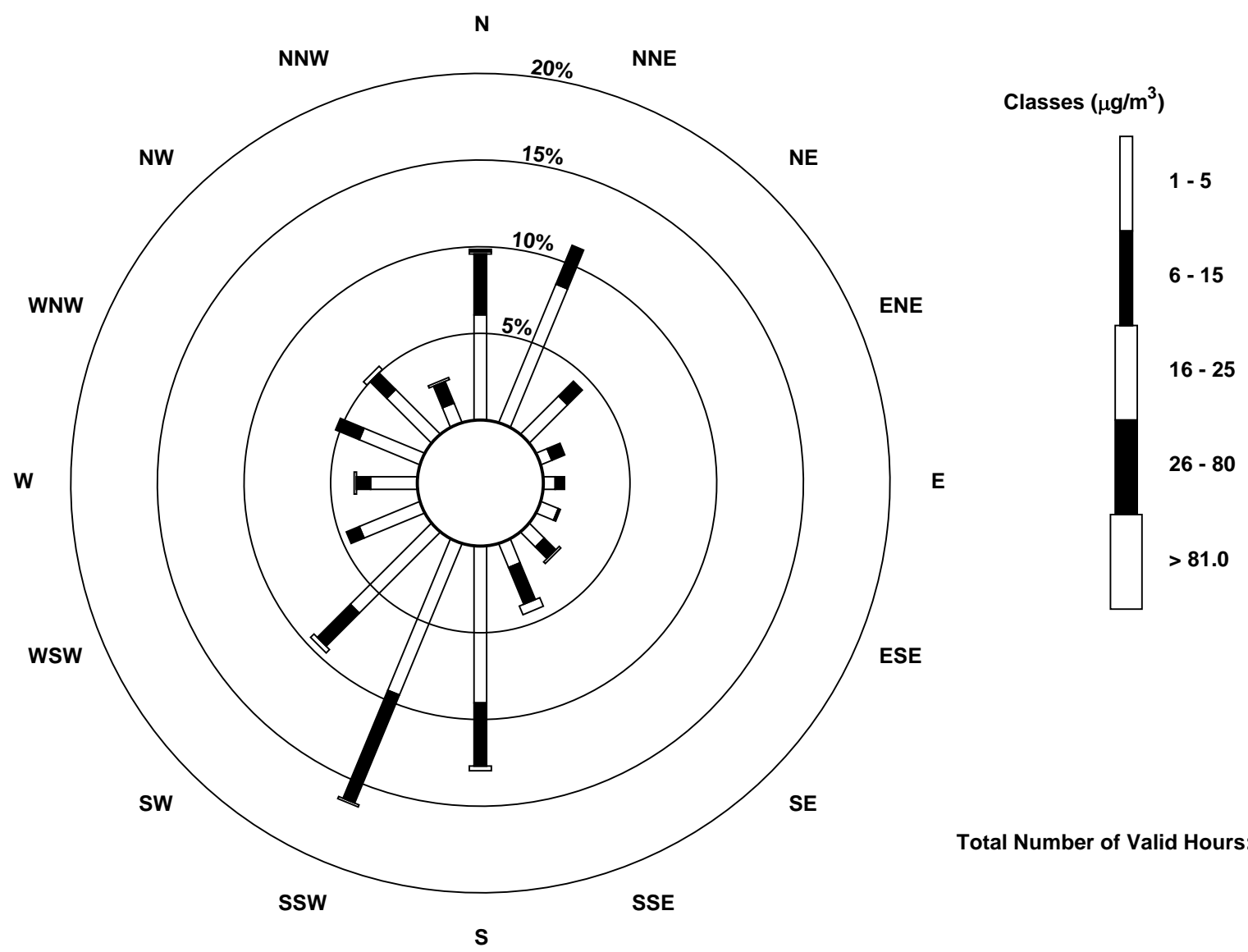
Total Number of Valid Hours: 741

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
CNRL Horizon (AMS 15)







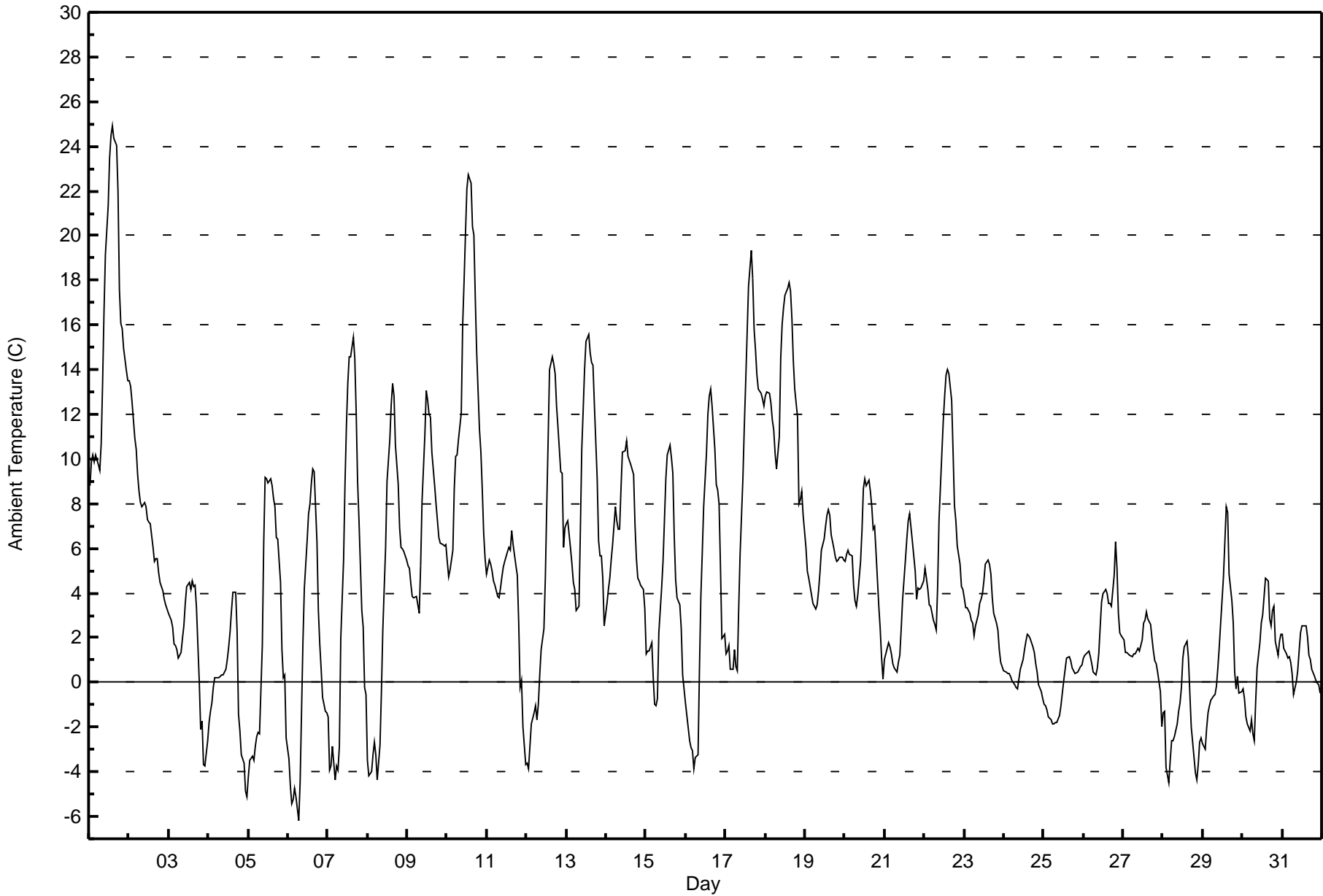
**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Ambient Temperature (AT) - C**

**CNRL Horizon - October 2015**

Maximum Value: 24.9 C on Oct 1 15:00		Maximum Daily Average: 16.0 C on Oct 1		Hours in Service: 744																							
Minimum Value: -6.2 C on Oct 6 07:00		Minimum Daily Average: -1.8 C on Oct 28		Hours of Data: 744																							
Maximum Diurnal Average: 9.4 C at hour 15		Minimum Diurnal Average: 1.4 C at hour 7		Hours of Missing Data: 0																							
Monthly Average: 4.59 C		Percentiles: P <sub>1</sub> = -4.6 P <sub>10</sub> = -1.9 Q <sub>1</sub> = 0.6 Median = 3.8 Q <sub>3</sub> = 7.8 P <sub>90</sub> = 12.8 P <sub>99</sub> = 22.0		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	8.8	9.9	10.2	9.9	10.2	9.8	9.5	10.7	13.4	16.6	19.2	21.4	23.5	24.5	24.9	24.3	24.0	22.0	17.6	16.1	15.8	14.9	13.9	13.5	16.0	24.9	
2-Oct	13.5	13.3	12.6	10.9	10.4	9.3	8.5	8.0	7.9	8.1	7.9	7.3	7.2	7.1	6.0	5.4	5.5	5.6	4.9	4.5	4.1	3.7	3.5	3.3	7.4	13.5	
3-Oct	3.1	2.8	2.5	1.7	1.7	1.5	1.1	1.3	2.0	2.5	3.5	4.3	4.5	4.2	4.5	4.3	4.4	3.3	0.0	-2.1	-1.8	-3.7	-3.7	-2.6	1.6	4.5	
4-Oct	-1.8	-1.3	-0.9	-0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.6	1.0	1.6	2.3	3.2	4.0	4.1	2.3	-1.4	-2.2	-3.2	-3.6	-4.9	-5.1	-0.2	4.1	
5-Oct	-4.3	-3.5	-3.3	-3.5	-2.9	-2.4	-2.2	-2.3	1.7	6.3	9.2	9.1	8.9	9.1	8.8	8.2	7.8	6.5	6.4	4.5	1.5	0.2	0.3	-2.5	2.6	9.2	
6-Oct	-3.4	-4.6	-5.5	-5.2	-4.8	-5.1	-6.2	-4.4	-1.3	1.9	4.2	6.4	7.6	8.0	9.0	9.5	9.4	6.3	3.2	1.7	0.6	-0.7	-1.3	-1.4	1.0	9.5	
7-Oct	-1.5	-3.9	-3.8	-2.9	-4.4	-3.7	-3.9	-2.9	2.0	5.5	8.8	11.4	13.4	14.6	14.5	15.4	14.5	12.0	9.0	7.3	3.2	2.5	-0.2	-0.5	4.4	15.4	
8-Oct	-3.5	-4.2	-4.0	-3.3	-2.6	-3.2	-4.4	-2.8	-0.4	2.4	4.2	6.0	9.0	10.9	12.4	13.4	12.8	10.6	8.9	6.9	6.0	6.0	5.9	5.5	3.9	13.4	
9-Oct	5.2	5.1	4.4	3.8	3.8	3.9	3.4	3.1	5.2	8.1	11.1	13.1	12.6	12.0	11.9	10.3	8.8	8.0	7.3	6.5	6.2	6.2	6.1	6.2	7.2	13.1	
10-Oct	5.4	4.7	5.1	5.9	8.7	10.1	10.2	10.9	12.0	16.0	18.0	20.1	22.1	22.7	22.4	20.4	20.1	17.2	14.7	11.3	10.3	8.6	6.7	5.6	12.9	22.7	
11-Oct	4.8	5.5	5.3	5.0	4.6	4.3	3.9	3.8	4.2	4.7	5.2	5.4	5.9	6.0	5.9	6.8	6.2	5.2	4.8	2.6	-0.2	0.1	-2.0	-3.6	3.9	6.8	
12-Oct	-3.6	-3.9	-2.9	-1.8	-1.4	-1.1	-1.7	-1.0	0.3	1.5	2.4	4.7	7.9	10.9	14.0	14.6	14.2	13.8	12.4	11.4	9.4	9.3	6.0	6.9	5.1	14.6	
13-Oct	7.1	7.2	6.0	5.3	4.5	4.1	3.2	3.4	6.8	10.5	12.2	14.0	15.2	15.6	14.8	14.3	14.2	12.4	9.1	6.4	5.7	5.7	4.6	2.5	8.5	15.6	
14-Oct	3.5	4.2	4.7	5.5	6.2	7.8	7.3	6.9	6.9	8.7	10.3	10.4	10.8	10.1	9.9	9.8	9.3	7.1	5.5	4.7	4.5	4.4	4.2	3.3	6.9	10.8	
15-Oct	1.3	1.4	1.4	1.8	0.2	-1.0	-1.0	-0.7	2.2	4.2	5.4	7.2	9.1	10.2	10.6	10.1	9.3	6.6	4.6	3.8	3.5	2.4	0.3	-0.3	3.9	10.6	
16-Oct	-0.9	-2.0	-2.6	-2.9	-3.0	-3.9	-3.4	-3.3	0.6	3.8	5.8	7.8	10.2	12.0	12.8	13.1	12.4	10.5	8.9	8.6	8.0	5.1	2.0	2.2	4.2	13.1	
17-Oct	1.3	1.4	1.7	0.6	0.6	1.4	0.7	0.5	3.3	5.7	9.1	11.4	13.5	15.6	17.7	19.3	18.1	15.9	14.9	13.8	13.1	12.9	12.7	12.4	9.1	19.3	
18-Oct	12.8	13.0	13.0	12.5	11.7	11.3	10.2	9.6	11.0	14.5	16.0	16.8	17.3	17.7	17.9	17.5	16.3	14.4	13.1	11.9	8.0	8.2	8.5	7.5	12.9	17.9	
19-Oct	6.0	5.0	4.6	4.3	3.9	3.6	3.3	3.5	4.1	4.9	5.9	6.4	7.0	7.5	7.7	7.5	6.6	6.0	5.6	5.4	5.5	5.6	5.6	5.5	5.5	7.7	
20-Oct	5.4	5.7	5.9	5.7	5.6	4.3	3.7	3.4	3.9	5.4	6.8	8.6	9.1	8.8	9.1	8.5	7.9	6.9	7.0	5.9	3.4	2.4	1.1	0.2	5.6	9.1	
21-Oct	1.0	1.5	1.8	1.6	1.3	0.9	0.7	0.4	0.9	1.2	2.4	3.7	5.5	6.4	7.2	7.6	7.0	6.3	5.0	3.7	4.3	4.2	4.2	4.5	3.5	7.6	
22-Oct	5.1	4.7	4.2	3.5	3.4	2.8	2.6	2.3	4.3	7.3	10.2	11.7	12.8	13.8	14.0	13.8	12.6	10.4	7.9	7.2	6.1	5.3	4.3	4.2	7.3	14.0	
23-Oct	3.8	3.4	3.3	3.1	2.8	2.6	2.1	2.6	3.0	3.5	3.7	4.0	4.5	5.3	5.4	5.3	4.8	3.8	3.1	2.7	2.3	1.4	0.9	0.7	3.3	5.4	
24-Oct	0.5	0.5	0.4	0.4	0.3	0.1	-0.1	-0.2	-0.3	0.2	0.6	1.0	1.5	1.8	2.2	2.1	2.0	1.6	1.3	0.8	0.4	-0.1	-0.4	-0.7	0.7	2.2	
25-Oct	-0.9	-1.0	-1.2	-1.5	-1.7	-1.9	-1.8	-1.8	-1.8	-1.5	-1.0	-0.5	0.1	0.6	1.1	1.1	1.0	0.7	0.5	0.4	0.5	0.6	0.7	0.8	-0.4	1.1	
26-Oct	1.1	1.2	1.3	1.4	1.2	0.8	0.5	0.3	0.7	1.3	2.5	3.6	4.0	4.1	4.0	3.5	3.5	3.4	4.8	6.3	5.1	3.1	2.2	2.1	2.6	6.3	
27-Oct	1.9	1.4	1.4	1.3	1.2	1.2	1.3	1.3	1.4	1.5	1.4	1.9	2.6	2.8	3.1	2.9	2.6	2.0	1.4	1.0	0.8	0.5	-0.4	-2.0	1.4	3.1	
28-Oct	-1.3	-1.3	-3.8	-4.5	-3.5	-2.6	-2.6	-2.4	-1.9	-1.3	-0.9	-0.2	1.1	1.6	1.8	1.1	-0.5	-2.0	-2.7	-4.1	-4.3	-3.7	-2.7	-2.5	-1.8	1.8	
29-Oct	-2.7	-3.0	-2.0	-1.4	-1.0	-0.8	-0.6	-0.6	-0.2	0.7	1.6	2.7	4.7	6.3	7.8	7.6	4.9	3.7	2.7	0.4	-0.3	0.3	-0.5	-0.4	1.2	7.8	
30-Oct	-0.3	-0.8	-1.5	-1.9	-2.2	-1.7	-2.3	-2.6	-0.9	0.7	1.8	2.6	3.0	3.8	4.7	4.5	2.8	2.5	3.2	3.4	1.8	1.2	1.8	2.1	1.1	4.7	
31-Oct	2.2	1.5	1.3	1.1	1.1	0.9	0.4	-0.6	0.0	0.5	1.4	2.2	2.5	2.6	2.5	2.0	1.2	1.0	0.6	0.3	0.1	0.0	-0.1	-0.5	1.0	2.6	
		2.2	2.1	1.9	1.8	1.8	1.7	1.4	1.5	2.9	4.7	6.1	7.3	8.3	9.0	9.4	9.3	8.6	7.3	5.9	4.9	3.9	3.3	2.6	2.1	Diurnal Average	
		13.5	13.3	13.0	12.5	11.7	11.3	10.2	10.9	13.4	16.6	19.2	21.4	23.5	24.5	24.9	24.3	24.0	22.0	17.6	16.1	15.8	14.9	13.9	13.5	Diurnal Maximum	





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

**Ambient Temperature (AT) - C**  
**CNRL Horizon - October 2015**

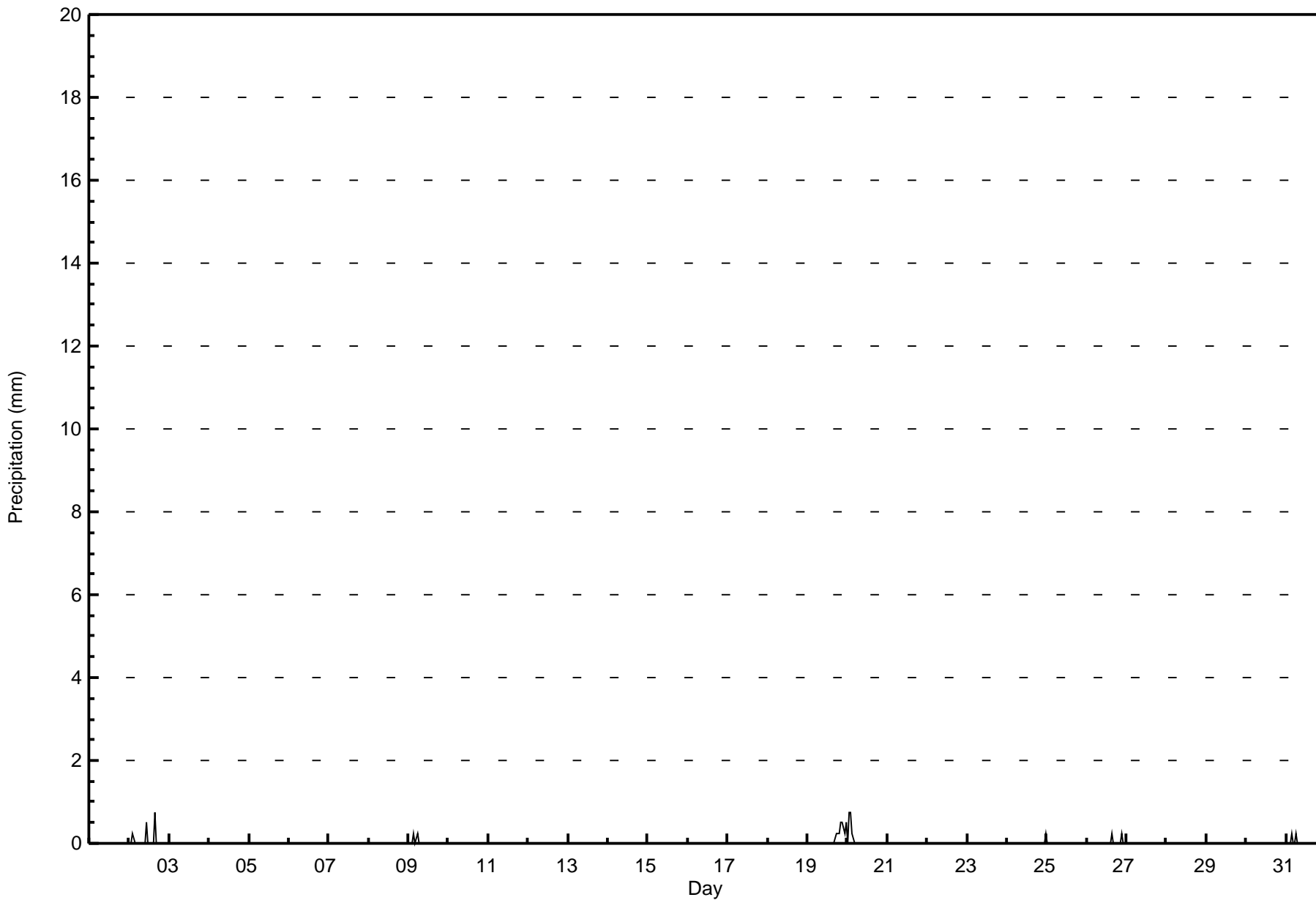
<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	143	19.22	19.22
0 - 10	474	63.71	82.93
10 - 20	114	15.32	98.25
> 20	13	1.75	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

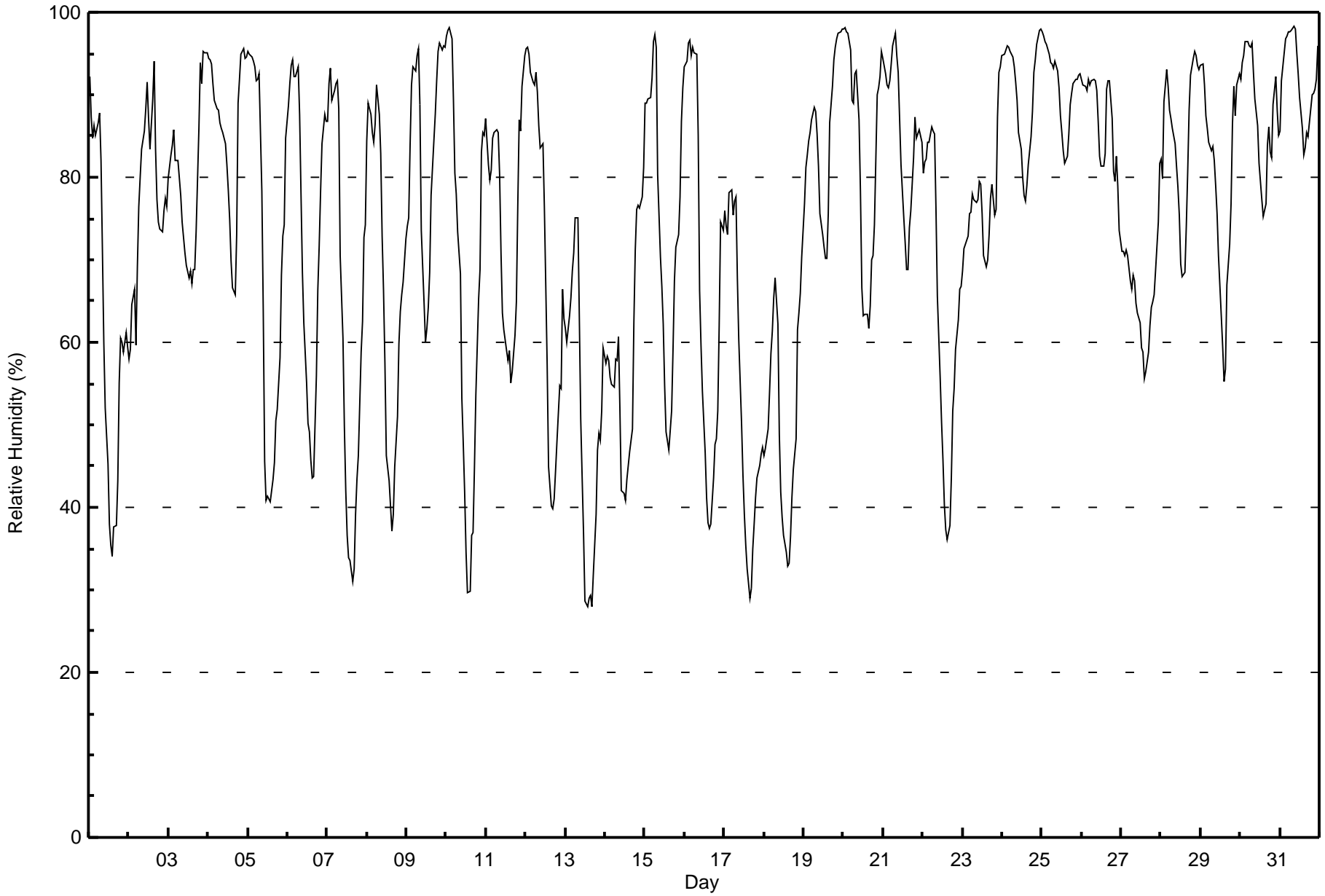


Maximum Value: 0.8 mm on Oct 2 16:00																			Maximum Daily Total: 2.5 mm on Oct 19						Hours in Service: 744				
Minimum Value: 0.0 mm on Oct 1 01:00																			Minimum Daily Total: 0.0 mm on Oct 1						Hours of Data: 744				
Maximum Diurnal Total: 1.0 mm at hour 3																			Minimum Diurnal Total: 0.0 mm at hour 1						Hours of Missing Data: 0				
Monthly Total: 7.62 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		
2-Oct	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.8
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
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
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
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
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
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
9-Oct	0.0	0.0	0.0	0.3	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	0.0	0.5	0.3	
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
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
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
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
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
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	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	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	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.3	0.3	0.3	0.5	0.5	0.3	0.5	0.0	2.5	0.5		
20-Oct	0.0	0.8	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.8	
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
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
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
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	0.3	0.3	0.3	0.3
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	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	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.5	0.3	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
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
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
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
31-Oct	0.0	0.0	0.0	0.3	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	0.5	0.5	0.3	0.3
																			0.0 0.8 1.0 0.8 0.0 0.3 0.3 0.0 0.0 0.0 0.5 0.0 0.0 0.0 0.0 1.0 0.0 0.3 0.3 0.3 0.5 0.8 0.3 0.8						Diurnal Average				
																			0.0 0.8 0.8 0.3 0.0 0.3 0.3 0.0 0.0 0.0 0.5 0.0 0.0 0.0 0.0 0.8 0.0 0.3 0.3 0.3 0.5 0.5 0.3 0.5						Diurnal Maximum				





Maximum Value: 98 % on Oct 31 09:00																		Maximum Daily Average: 91.7 % on Oct 31																		Hours in Service: 744			
Minimum Value: 28 % on Oct 13 14:00																		Minimum Daily Average: 50.1 % on Oct 13																		Hours of Data: 744			
Maximum Diurnal Average: 86.1 % at hour 7																		Minimum Diurnal Average: 56.0 % at hour 15																		Hours of Missing Data: 0			
Monthly Average: 74.1 %																		Percentiles: P <sub>1</sub> = 30 P <sub>10</sub> = 44 Q <sub>1</sub> = 62 Median = 78 Q <sub>3</sub> = 90 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	92	87	85	86	85	87	88	82	71	60	52	45	38	35	34	38	38	43	55	60	60	59	61	59	62.6	92													
2-Oct	58	59	65	66	60	69	76	80	83	86	88	92	87	83	89	94	83	77	75	74	73	76	77	76	77.0	94													
3-Oct	80	83	84	86	82	82	82	78	75	73	71	69	68	69	67	69	69	73	86	94	91	95	95	95	79.8	95													
4-Oct	94	94	94	91	89	88	88	87	86	85	84	82	78	75	70	67	66	73	89	92	95	96	94	95	85.5	96													
5-Oct	95	95	95	94	93	92	92	93	78	64	46	41	41	41	42	43	45	50	52	58	68	73	74	85	68.7	95													
6-Oct	89	91	94	94	92	92	93	88	78	68	62	55	50	49	46	44	44	56	66	72	78	84	88	87	73.3	94													
7-Oct	87	91	93	89	91	91	92	88	70	60	50	42	37	34	33	31	33	39	43	46	59	63	73	74	62.9	93													
8-Oct	84	89	88	85	84	86	91	88	83	73	66	57	46	43	40	37	39	45	51	60	64	66	67	73	66.9	91													
9-Oct	74	75	84	91	93	93	95	96	89	74	65	60	62	64	68	78	84	88	92	95	96	95	96	96	83.5	96													
10-Oct	97	98	98	97	89	81	78	73	68	53	48	42	35	30	30	37	37	45	54	65	69	83	85	85	65.7	98													
11-Oct	87	81	80	81	85	86	86	85	80	71	64	62	59	58	59	55	56	61	65	77	87	86	91	95	74.8	95													
12-Oct	96	96	95	93	91	91	93	90	86	84	84	76	67	57	45	40	40	41	44	48	55	54	66	63	70.6	96													
13-Oct	62	60	63	65	69	71	75	75	63	51	44	37	29	28	29	29	28	32	39	47	49	48	52	59	50.1	75													
14-Oct	58	58	58	56	55	55	58	58	61	52	42	42	41	43	45	47	49	62	71	76	77	76	78	81	58.2	81													
15-Oct	89	89	89	90	92	97	97	96	80	70	67	62	55	49	47	49	52	59	67	71	73	78	87	91	74.9	97													
16-Oct	93	94	96	97	95	96	95	95	85	66	60	54	47	41	38	37	38	44	48	48	52	62	75	74	67.9	97													
17-Oct	76	74	73	78	78	75	77	78	68	60	50	44	39	35	33	29	30	35	38	41	43	45	46	47	54.0	78													
18-Oct	46	47	50	54	59	61	66	68	62	49	42	39	37	35	33	33	36	41	45	48	61	64	66	70	50.5	70													
19-Oct	77	81	83	84	85	87	89	88	85	81	76	73	72	70	70	76	87	91	94	96	97	97	98	98	84.8	98													
20-Oct	98	98	98	98	95	89	89	93	93	87	78	67	63	63	63	62	64	70	71	74	90	91	92	95	82.6	98													
21-Oct	94	92	91	91	92	94	96	97	95	93	87	81	75	72	69	69	74	76	82	87	85	85	86	84	85.3	97													
22-Oct	80	82	82	84	84	86	86	85	76	66	56	50	46	40	37	36	38	44	52	54	59	63	66	67	63.3	86													
23-Oct	69	71	72	73	76	76	78	77	77	80	79	76	71	69	70	73	78	79	75	76	87	93	93	93	76.8	93													
24-Oct	95	95	96	96	96	95	95	93	91	89	85	83	80	78	77	79	81	85	88	93	94	96	98	98	89.9	98													
25-Oct	98	97	96	96	95	94	94	93	94	93	91	88	85	83	82	83	85	89	90	91	92	92	92	93	91.1	98													
26-Oct	92	91	91	90	92	91	92	92	92	91	87	83	81	81	83	91	92	92	87	81	80	83	79	74	86.9	92													
27-Oct	71	71	70	71	70	67	66	68	67	65	64	62	59	59	56	56	59	62	64	65	66	69	75	82	66.1	82													
28-Oct	82	80	89	93	91	88	87	86	84	81	79	75	69	68	68	74	81	88	92	94	95	95	94	93	84.5	95													
29-Oct	93	94	91	87	86	84	83	84	82	79	76	71	63	59	55	57	67	72	77	86	91	88	91	93	79.5	94													
30-Oct	92	94	95	96	96	96	96	96	93	89	86	82	79	77	75	77	84	86	83	82	89	92	88	85	87.9	96													
31-Oct	86	92	95	97	97	98	98	98	98	98	95	92	90	86	83	83	85	85	87	90	90	91	92	96	91.7	98													
83.4																		83.9																		Diurnal Average			
98																		98																		Diurnal Maximum			





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

**Relative Humidity (RH) - %**  
**CNRL Horizon - October 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	46	6.18	6.18
40 - 60	128	17.20	23.39
60 - 80	215	28.90	52.28
80 - 100	355	47.72	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744





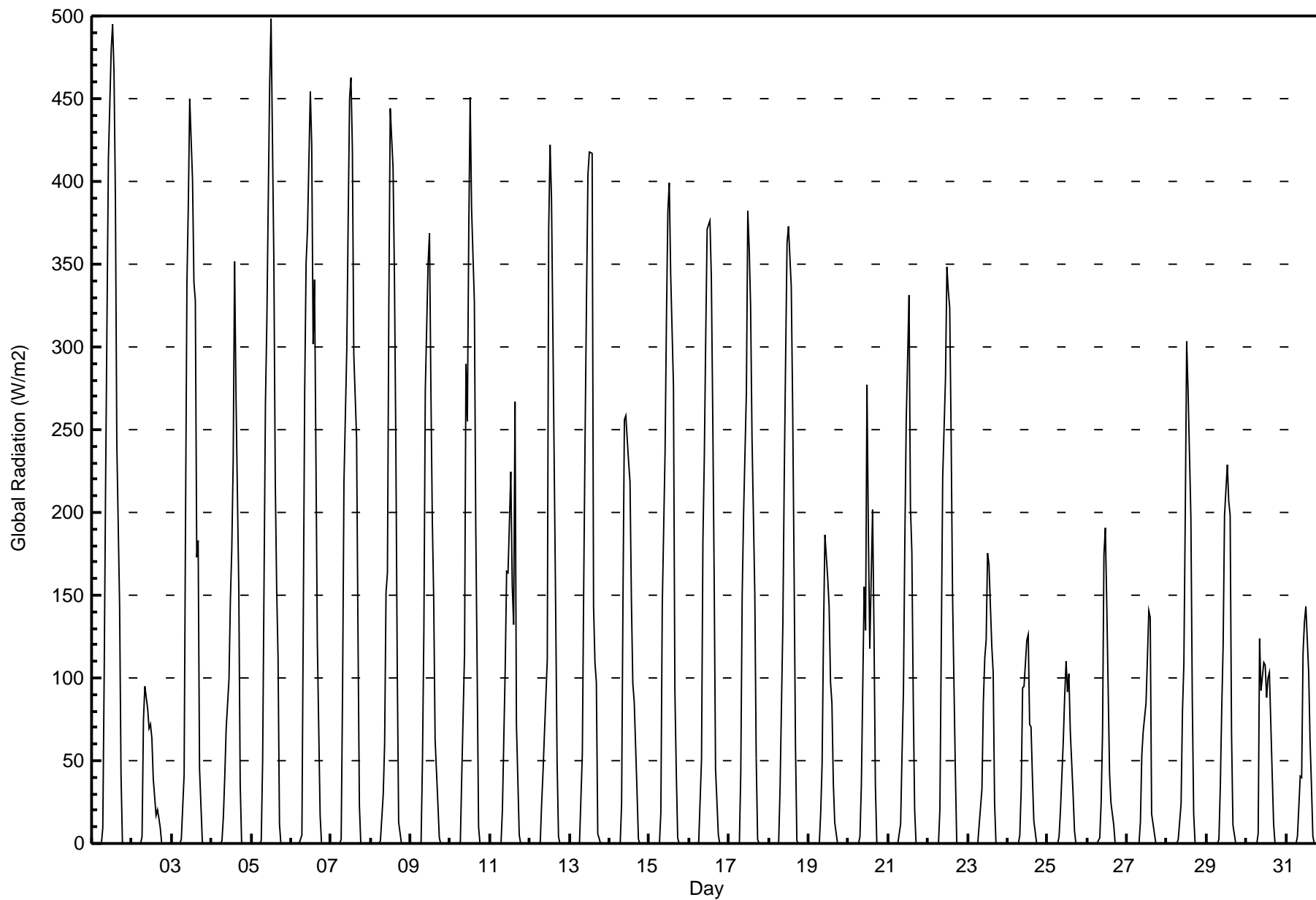
Wood Buffalo Environmental Association

Summary of Hour Averages

Global Radiation (GR) - W/m2

CNRL Horizon - October 2015

Maximum Value: 498 W/m2 on Oct 5 13:00																			Maximum Daily Average: 138.1 W/m2 on Oct 1						Hours in Service: 744	
Minimum Value: 0 W/m2 on Oct 1 01:00																			Minimum Daily Average: 23.4 W/m2 on Oct 2						Hours of Data: 744	
Maximum Diurnal Average: 286.8 W/m2 at hour 13																			Minimum Diurnal Average: 0.0 W/m2 at hour 1						Hours of Missing Data: 0	
Monthly Average: 71.6 W/m2																			Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 105 P <sub>90</sub> = 274 P <sub>99</sub> = 451						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	9	102	217	317	413	480	495	466	389	241	143	41	1	0	0	0	0	0	138.1	495
2-Oct	0	0	0	0	0	0	4	75	95	82	69	72	64	39	17	20	15	9	0	0	0	0	0	0	23.4	95
3-Oct	0	0	0	0	0	0	2	42	194	338	387	450	401	339	328	173	183	45	1	0	0	0	0	0	120.1	450
4-Oct	0	0	0	0	0	0	2	16	40	70	99	148	178	231	351	271	153	36	1	0	0	0	0	0	66.5	351
5-Oct	0	0	0	0	0	0	2	50	266	316	388	458	498	351	219	154	112	12	0	0	0	0	0	0	117.8	498
6-Oct	0	0	0	0	0	0	5	137	275	351	371	455	422	302	340	234	122	17	0	0	0	0	0	0	126.3	455
7-Oct	0	0	0	0	0	0	2	92	219	298	376	450	463	419	296	245	128	23	0	0	0	0	0	0	125.5	463
8-Oct	0	0	0	0	0	0	2	30	60	152	163	325	444	408	342	241	106	13	0	0	0	0	0	0	95.3	444
9-Oct	0	0	0	0	0	0	1	51	130	274	351	368	274	196	147	63	24	4	0	0	0	0	0	0	78.4	368
10-Oct	0	0	0	0	0	0	1	41	115	290	255	369	451	384	327	192	105	10	0	0	0	0	0	0	105.8	451
11-Oct	0	0	0	0	0	0	0	20	64	106	164	164	224	156	132	267	72	5	0	0	0	0	0	0	57.2	267
12-Oct	0	0	0	0	0	0	1	25	44	67	111	371	422	390	309	140	50	5	0	0	0	0	0	0	80.6	422
13-Oct	0	0	0	0	0	0	1	55	158	249	331	405	418	417	143	110	98	6	0	0	0	0	0	0	99.6	418
14-Oct	0	0	0	0	0	0	0	24	150	256	258	231	219	146	97	85	32	2	0	0	0	0	0	0	62.5	258
15-Oct	0	0	0	0	0	0	0	19	143	236	318	383	399	344	277	92	43	4	0	0	0	0	0	0	94.1	399
16-Oct	0	0	0	0	0	0	1	51	183	234	306	372	377	343	259	163	45	5	0	0	0	0	0	0	97.4	377
17-Oct	0	0	0	0	0	0	0	43	150	199	273	383	360	324	246	150	52	2	0	0	0	0	0	0	90.9	383
18-Oct	0	0	0	0	0	0	0	33	132	222	295	362	373	336	263	167	59	2	0	0	0	0	0	0	93.5	373
19-Oct	0	0	0	0	0	0	0	19	48	127	187	160	143	97	85	36	13	0	0	0	0	0	0	0	38.2	187
20-Oct	0	0	0	0	0	0	0	4	36	155	129	277	187	118	202	128	35	1	0	0	0	0	0	0	53.0	277
21-Oct	0	0	0	0	0	0	0	12	54	91	183	256	332	203	177	88	20	0	0	0	0	0	0	0	59.0	332
22-Oct	0	0	0	0	0	0	0	20	121	221	281	348	334	324	248	152	45	1	0	0	0	0	0	0	87.3	348
23-Oct	0	0	0	0	0	0	0	11	33	85	112	123	175	169	119	103	25	0	0	0	0	0	0	0	39.8	175
24-Oct	0	0	0	0	0	0	0	5	33	94	95	123	126	72	71	40	14	0	0	0	0	0	0	0	28.0	126
25-Oct	0	0	0	0	0	0	0	4	20	62	89	110	92	103	68	30	8	0	0	0	0	0	0	0	24.3	110
26-Oct	0	0	0	0	0	0	0	3	25	67	175	191	145	42	25	18	11	0	0	0	0	0	0	0	29.2	191
27-Oct	0	0	0	0	0	0	0	0	13	53	68	85	112	141	136	18	6	0	0	0	0	0	0	0	26.3	141
28-Oct	0	0	0	0	0	0	0	3	24	79	108	200	303	273	198	88	18	0	0	0	0	0	0	0	53.9	303
29-Oct	0	0	0	0	0	0	0	3	35	81	119	198	229	206	198	66	11	0	0	0	0	0	0	0	47.8	229
30-Oct	0	0	0	0	0	0	0	6	123	93	109	108	88	100	103	42	12	0	0	0	0	0	0	0	32.7	123
31-Oct	0	0	0	0	0	0	0	4	41	40	115	134	143	103	62	35	4	0	0	0	0	0	0	0	28.4	143
																			0.0 0.0 0.0 0.0 0.0 0.0 1.1 32.3 104.6 171.1 216.1 276.1 286.8 243.3 199.2 124.2 56.8 7.8 0.1 0.0 0.0 0.0 0.0 0.0						Diurnal Average	
																			0 0 0 0 0 0 9 137 275 351 413 480 498 466 389 271 183 45 1 0 0 0 0 0						Diurnal Maximum	





Maximum Speed: 24 km/h on Oct 5 12:00	Maximum Daily Speed Average: 15.4 km/h on Oct 27	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 28 00:00	Minimum Daily Speed Average: 0.8 km/h on Oct 26	Hours of Data: 744
Maximum Diurnal Speed Average: 4.2 km/h at hour 16	Minimum Diurnal Speed Average: 1.1 km/h at hour 24	Hours of Missing Data: 0
Monthly Average Velocity: 2.1 km/h 266.6 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> = 14 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	S7	S8	S9	S10	S12	SSW10	S11	S9	S10	S7	S9	S8	S10	S12	S10	SE9	SE6	ESE5	E4	N5	N7	N7	N5	NE5	S5.2	S12	
2-Oct	NE4	NE5	NNE7	NNE8	NNE11	NNE15	NNE14	NNE14	NNE16	NNE15	NNE18	NNE15	NNE14	N17	NNE12	N10	N14	NNW17	NNW18	NNW17	N12	NNE10	N11	N13	N12.3	NNW18	
3-Oct	N12	N15	N12	NNE12	N15	N13	N13	N12	NNE12	NNE14	NE11	NE11	NE11	NE11	NE11	NE9	NE7	NE7	ENE5	E5	E5	ENE1	W2	WSW2	NNE8.6	N15	
4-Oct	SSE2	SE3	SW4	SW5	SSW4	SSW6	SSW6	SSW7	SSW9	SSW9	SSW8	SSW8	SSW9	SSW10	S9	S9	S6	SSE5	S6	SW3	NW4	S2	SSW3	SSW5.6	SSW10		
5-Oct	SSW8	SSW8	SSW9	SSW9	S11	SSW11	SSW7	SSW5	SSW6	SSW7	W13	WNW24	WNW22	WNW21	WNW21	NW19	NW17	NW13	WNW9	WNW6	WSW6	WSW5	WNW7	SW4	W7.5	WNW24	
6-Oct	SW6	SW5	SW5	SSW7	SSW8	SSW7	SSW5	S5	SSE4	SSE5	SSE8	SSE7	SSE7	SSE8	SSE9	SSE6	SSE5	SE1	NNE4	N3	NNW2	NW3	NNW4	N4	S3.2	SSE9	
7-Oct	N4	SSW2	NNW4	NW6	W3	SW5	SW4	SSW5	SSW5	S7	S6	S8	S9	SE8	ESE7	WNW14	NW14	NW12	NW10	NW8	WNW4	WNW5	NW5	WNW5	W2.7	WNW14	
8-Oct	SW4	SW6	WSW4	W4	WNW1	SSW2	WSW2	S2	S3	S3	S6	SSE6	SSE5	SE4	E3	NE4	NNE6	N7	N12	N11	N10	N9	N6	N6	N1.4	N12	
9-Oct	NNE6	NNE7	NNE7	N6	N5	N5	W1	SSW5	S8	S11	S10	E5	NE8	NE11	NNE9	N11	NNE10	N8	N6	N5	NW3	SW2	SSW4	S5	NNE2.5	NE11	
10-Oct	S6	S7	S9	SSW9	SW13	SW14	SW14	SW12	SSW12	SW17	SW17	SW21	SW22	WSW21	WSW20	WNW15	WNW11	NW9	WNW8	W6	NW5	NNE12	NNE8	NNE7	WSW8.4	SW22	
11-Oct	NNE9	NNE14	NNE12	NNE10	N11	N12	N10	N13	N12	NNW13	NW15	NW15	NNW16	NNW17	NNW15	NW17	NW14	NW14	NW9	W6	WSW2	WSW6	WSW4	WSW4	NNW9.4	NW17	
12-Oct	SW7	SSW6	S7	SSW6	SSE4	SSW2	SW3	SSW6	SSW7	SSW7	S8	SSW9	SSW11	S12	SW12	WSW13	W14	W10	WSW9	WSW7	S6	S6	SSW3	SW8	SW6.6	W14	
13-Oct	SW9	SW10	SW12	SW12	SW12	SW11	SSW10	S9	SSW8	WSW11	SW15	SW13	W16	W15	W14	W14	W15	WSW9	SSW6	S8	S9	SSW10	S9	S8	SW9.7	W16	
14-Oct	SSW10	SSW9	SW10	SW12	SW10	WSW11	WSW11	WSW11	SW14	WSW13	WNW21	WNW21	WNW20	WNW20	WNW17	NW15	NNW14	NNE11	NNE9	NE10	NNE9	N6	N4	NNW2	WNW7.4	WNW21	
15-Oct	SSW3	SSW2	NNE1	ENE1	ESE4	NNE4	SSW1	WSW2	SW4	SSW7	S8	S9	S7	SSE7	SE8	E8	ENE8	NNE6	NNE6	N6	N5	NNW5	N3	NNE4	ESE1.1	S9	
16-Oct	N3	ENE2	NE3	N4	NNW4	N4	N4	W1	W1	N3	ESE4	SE4	ESE6	ESE6	E6	ENE5	ESE7	ESE7	SE7	SE9	SSE9	SSW4	S2	SSW2	ESE2.2	SSE9	
17-Oct	WSW4	SSW9	SSW7	SSW8	SSW9	S10	SSW8	SSW8	SSW9	SSW8	S11	S12	SSW10	S9	S8	SSW9	SSW10	S11	S12	S10	S10	S11	S10	SSW7	SSW9.0	S12	
18-Oct	SSW12	SSW11	SSW8	SW9	SW11	WSW13	SW11	SW12	SW12	W12	W16	WNW19	WNW22	WNW23	WNW22	WNW18	WNW11	W9	W11	W8	WNW4	NE6	NE8	NNE11	W9.1	WNW23	
19-Oct	NNE11	N10	N6	N9	NNE9	NNE8	NNE7	N8	NNE9	NNE10	NE10	NE8	NE7	NNE6	N7	N6	N6	N7	N6	N6	NNE6	N5	NNE5	NNE3	NNE7.1	NNE11	
20-Oct	NW1	S5	SSW9	SSW10	SW11	WSW11	SW8	S8	SSW10	SW11	WSW11	W11	WNW18	WNW18	WNW21	WNW18	WNW15	WNW8	WNW13	NW11	NNE9	NE6	NE3	SSW2	W6.9	WNW21	
21-Oct	SSW5	S4	S4	SW5	SSW5	SSW6	SW7	SSW4	SSW4	SSW6	SSW4	NW2	NNW5	N4	NE5	NNE4	N4	N5	NW3	NNW2	S1	W3	SSW3	SSW7	SW1.7	SW7	
22-Oct	SSW7	S9	SSW10	SSW11	SW11	SW11	SW12	WSW8	SW10	SW13	SW12	SW14	SW14	WSW16	WSW18	WSW16	WSW12	SW8	SSW8	SSW8	SW5	SSW8	SW10	SW10	SW10.5	WSW18	
23-Oct	SW6	SSW7	SSW8	SSW6	SSW9	SSW8	SSW8	SSW7	SSE3	N6	N8	N8	NNE8	NNE4	NNE7	NNE8	NNE6	N6	NNE7	N8	NNE9	NNE8	NNE8	NNE7	N2.0	NNE9	
24-Oct	NNE8	NNE8	N6	NNE5	NNE7	NNE5	NNE5	N6	NNE6	N5	N5	N5	N2	S3	SSW3	SSW3	SW4	SW4	N2	N5	N8	N8	N8	NNE8	N3.9	NNE8	
25-Oct	NNE7	N8	NNE8	N9	N9	NNE7	N6	N7	NNE6	NNE6	NNE4	NNE2	ENE1	NE1	S2	SSW2	SW3	SW2	SW2	SSW3	WSW3	SW3	S4	S4	N2.3	N9	
26-Oct	S6	SSE7	S7	SSW3	ESE3	SSE9	SSE6	SE3	ENE3	NE5	NE5	NE6	NNE7	N6	NNE7	NNW7	WNW4	NNW4	S7	S10	W10	W13	W10	W11	WSW0.8	W13	
27-Oct	WNW15	NW15	WNW15	WNW18	WNW15	WNW16	WNW19	WNW17	NW16	NW19	NW21	NW19	NW20	NW22	NW21	NW18	NW20	NW19	NW16	NNW16	NW12	NNW7	NNE1	SE1	NW15.4	NW22	
28-Oct	NNE2	NE5	SE2	SW4	SSW4	SSW4	S4	SSW4	S6	SSW7	SSW9	S9	SSE9	SE9	SSE9	SE8	SSE5	SSE5	SSE4	S3	S6	S8	S9	S9	S5.2	SSE9	
29-Oct	SSW8	SSW7	S9	S10	SSE9	SSE9	SSE9	SSE9	S9	S8	SSW7	S9	SSW10	SSW9	SSW12	SSW8	SSE5	S5	SSW4	W3	SSW5	S9	SSW6	SSW10	S7.5	SSW12	
30-Oct	SW10	SW10	SW6	SW7	SSW8	SW10	SSW9	S7	S11	S11	SSW9	S11	S10	S8	S7	S5	SE3	SSW6	SW5	NW4	N2	NNW4	NNW3	NNW6	SSW5.5	S11	
31-Oct	NNE7	NE4	NNE4	WSW3	WSW2	ENE2	NE3	E1	S3	SE2	SE5	E3	ENE6	ENE7	NE8	NE10	NE8	NNE8	NNE9	NNE9	NNE9	NNE9	NNE7	NNE8	NNE8	NE4.5	NE10

WSW1.6	SW1.6	SW2.1	SW2.9	SW2.7	SSW2.9	SW3.0	SW2.7	SSW2.8	SW2.8	WSW3.4	WSW3.2	W3.3	W3.1	NNW3.4	NNW4.2	NW4.0	NW3.5	NW2.8	NW2.5	NNW1.7	NW1.8	NW1.1	WNW1.1	Diurnal Average
WNW15	N15	WNW15	WNW18	WNW15	WNW16	WNW19	WNW17	NNE16	NW19	NW21	WNW24	SW22	WNW23	WNW22	NW19	NW20	NW19	NNW18	NNW17	N12	W13	N11	N13	Diurnal Maximum

All monthly, daily, and diurnal averages have been calculated using vector methods



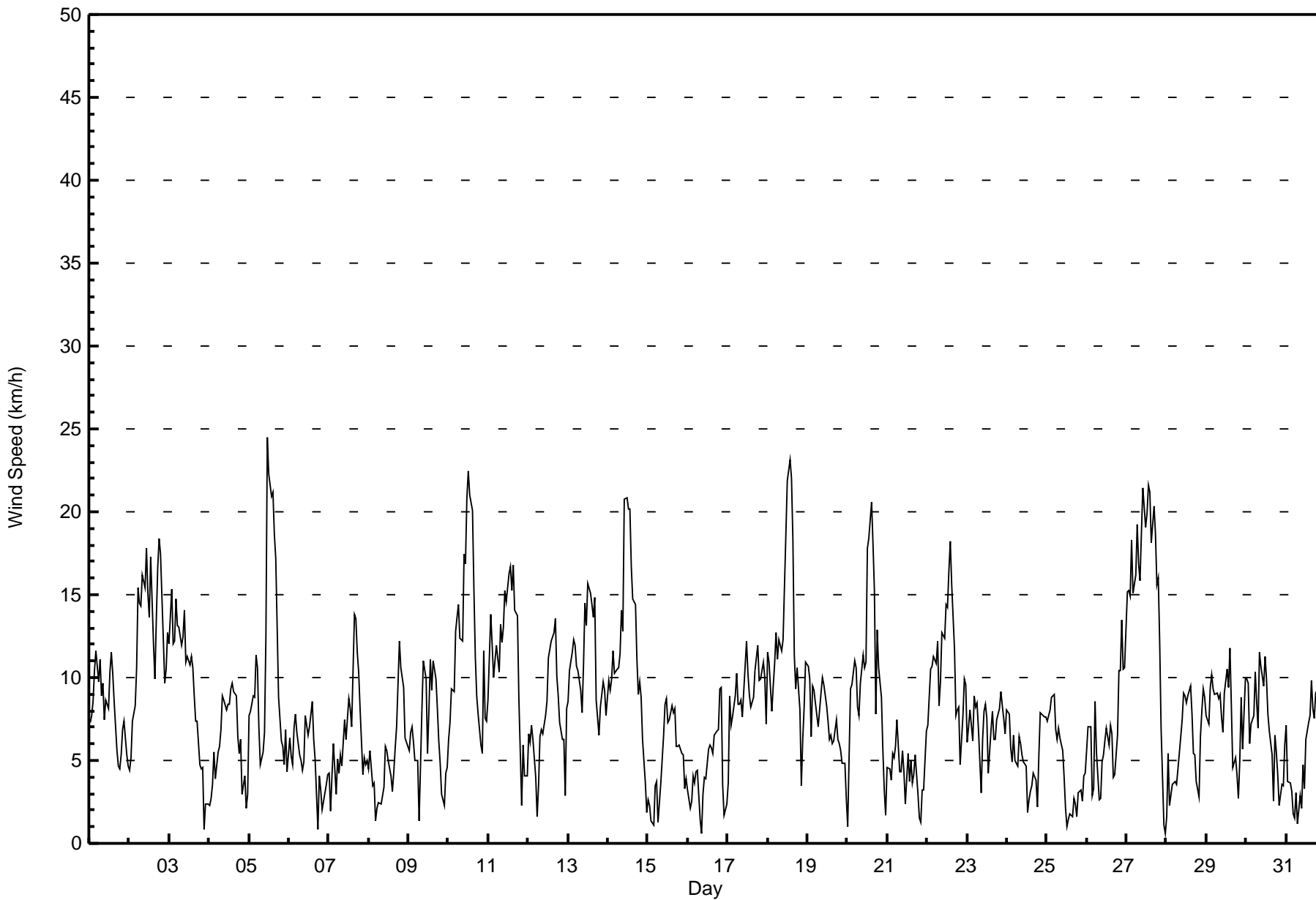
Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

CNRL Horizon - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Oct 10 13:00 Minimum Value: 0 km/h on Oct 16 03:00 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> = 6																		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	1	1	1	2	2	2	2	2	2	2	3	2	4	3	3	3	2	1	1	2	1	2	1	1	4
2-Oct	1	2	2	2	4	4	4	5	4	4	5	4	4	5	4	5	4	5	5	5	4	3	3	3	5
3-Oct	4	4	3	3	4	3	3	3	4	4	3	3	3	3	3	2	2	2	1	1	2	2	1	4	
4-Oct	1	1	1	2	1	2	2	2	3	2	2	3	3	3	3	3	2	1	1	1	1	1	2	3	
5-Oct	1	1	2	2	2	3	2	2	1	2	7	6	6	5	5	5	5	3	3	1	2	2	2	7	
6-Oct	1	2	1	1	1	2	1	1	1	2	2	3	3	3	3	3	1	2	1	1	1	2	1	3	
7-Oct	1	1	2	1	1	1	1	1	1	2	2	3	3	2	2	4	3	2	2	2	2	1	2	4	
8-Oct	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	1	1	3	2	2	2	2	3	
9-Oct	2	2	2	2	1	3	1	2	2	3	4	2	2	3	2	3	2	2	1	1	1	1	1	4	
10-Oct	1	1	2	3	5	4	4	4	4	6	5	7	8	8	7	4	3	5	2	1	3	4	2	8	
11-Oct	2	4	4	3	3	3	2	3	3	5	4	3	4	4	4	5	3	4	3	2	2	1	1	5	
12-Oct	1	1	2	2	1	2	2	2	2	2	2	2	3	3	5	5	5	4	3	3	2	3	2	5	
13-Oct	2	3	3	3	3	2	2	2	2	3	4	4	5	5	4	4	5	3	1	1	2	2	3	5	
14-Oct	1	2	2	3	3	3	3	3	4	5	6	6	5	5	4	4	4	4	2	2	2	2	1	6	
15-Oct	2	2	2	2	1	1	2	1	1	2	2	3	2	3	2	2	2	1	1	1	1	0	1	3	
16-Oct	2	2	0	1	1	1	1	2	1	1	2	2	2	2	2	2	1	1	2	2	3	1	2	3	
17-Oct	2	1	1	1	2	2	1	1	2	2	3	3	3	3	2	3	3	3	3	2	2	2	3	3	
18-Oct	3	3	2	2	2	3	3	3	3	5	6	6	6	6	5	5	4	2	3	3	2	3	2	6	
19-Oct	3	2	2	3	2	2	2	2	2	3	3	2	2	2	2	1	1	2	1	1	1	1	1	3	
20-Oct	2	2	3	3	3	4	2	2	2	3	3	5	4	5	6	5	4	3	5	4	3	2	2	6	
21-Oct	1	1	1	1	1	1	2	2	2	1	2	2	1	2	1	1	1	1	2	1	1	1	1	2	
22-Oct	2	2	2	2	2	3	3	3	3	4	4	5	5	6	6	5	4	2	1	2	3	1	2	6	
23-Oct	2	2	1	1	2	2	2	2	2	2	2	2	1	2	2	2	1	2	2	2	2	3	2	3	
24-Oct	2	2	2	1	2	1	1	2	1	1	1	2	2	2	2	1	1	1	3	1	2	2	2	3	
25-Oct	2	2	2	2	2	2	2	2	2	1	2	2	1	1	1	1	1	1	1	1	1	1	1	2	
26-Oct	2	2	2	2	1	3	2	2	1	1	2	1	2	2	2	2	1	2	5	4	5	4	3	5	
27-Oct	5	5	4	5	4	5	5	5	4	5	5	6	6	5	6	4	5	5	4	4	3	3	2	6	
28-Oct	1	2	2	1	1	1	1	1	2	2	2	2	3	2	2	2	1	1	1	1	1	1	2	3	
29-Oct	2	1	2	2	2	2	2	2	2	2	2	3	3	3	4	4	1	1	2	1	2	1	1	4	
30-Oct	2	2	2	2	3	2	2	2	2	3	2	2	2	2	2	1	2	2	2	1	2	2	1	3	
31-Oct	2	1	1	1	2	2	2	2	2	1	2	2	2	2	2	2	3	2	2	3	2	2	2	3	
																		Diurnal Maximum							





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

**Wind Speed (WS) - km/h**  
**CNRL Horizon - October 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	219	29.44	29.44
6 - 11	383	51.48	80.91
12 - 19	121	16.26	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**  
**CNRL Horizon - October 2015**

<b>Wind Speed</b> <b>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	27	16	13	8	7	4	10	12	20	34	22	13	7	6	9	11	219
6 - 11	43	59	21	3	2	5	7	20	72	86	27	12	10	7	6	3	383
12 - 19	15	15	0	0	0	0	0	0	5	3	21	7	10	17	19	9	121
20 - 28	0	0	0	0	0	0	0	0	0	0	2	2	0	12	5	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>	<b>85</b>	<b>90</b>	<b>34</b>	<b>11</b>	<b>9</b>	<b>9</b>	<b>17</b>	<b>32</b>	<b>97</b>	<b>123</b>	<b>72</b>	<b>34</b>	<b>27</b>	<b>42</b>	<b>39</b>	<b>23</b>	<b>744</b>

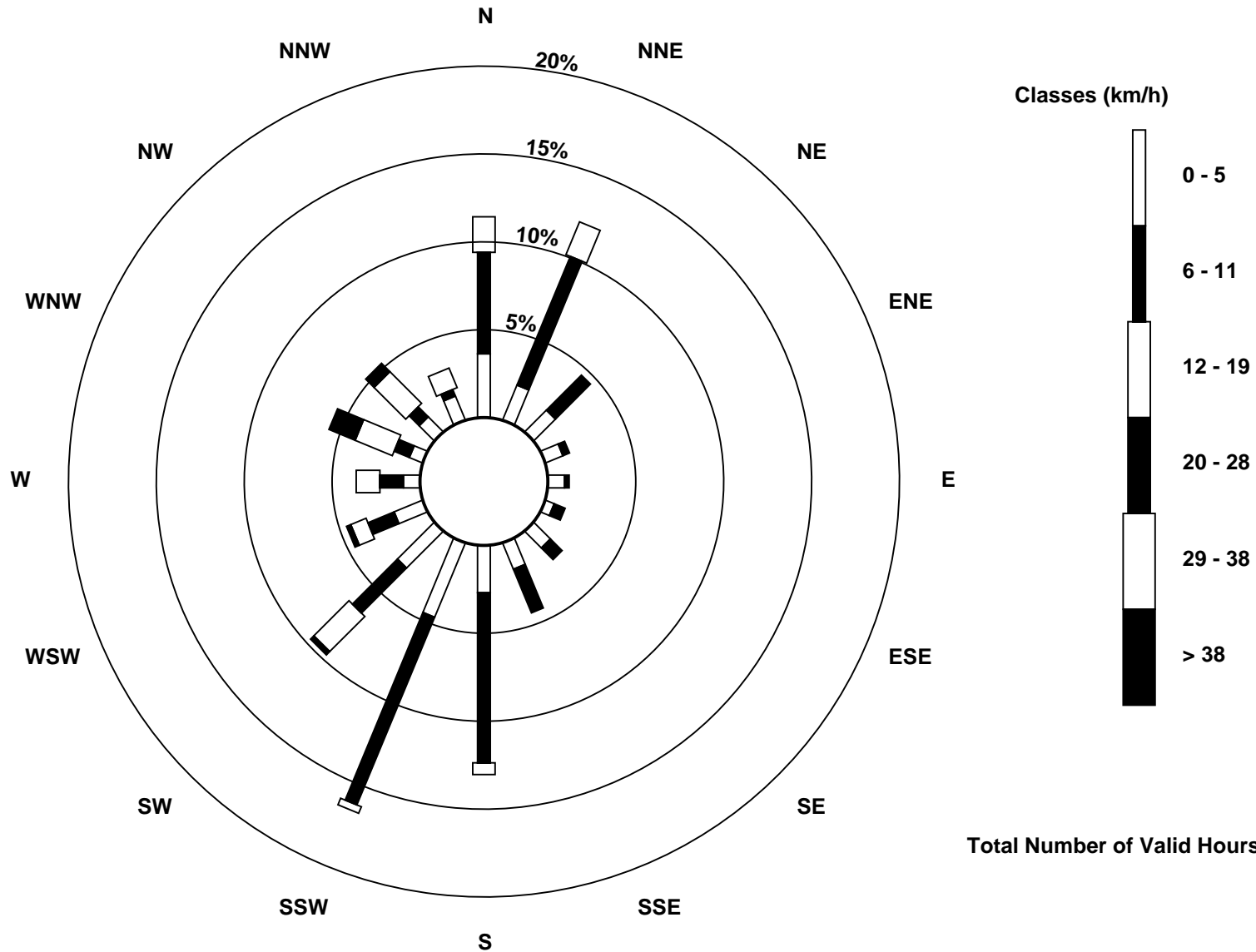
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Wind Speed (WS) - km/h  
CNRL Horizon (AMS 15)







**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg  
CNRL Horizon - October 2015**

Direction of Maximum Speed: 303 deg on Oct 5 12:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 313.1 deg on Oct 27	Hours of Data: 744
Direction of Minimum Speed: 141 deg on Oct 28 00:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.8 deg on Oct 26	Percent Operational Time: 100.0
Monthly Average Direction: 241.4 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	175	186	186	184	187	195	187	184	171	178	179	173	176	185	184	128	131	112	96	358	7	359	2	39	171.9
2-Oct	49	44	28	13	19	26	25	25	23	16	24	22	20	8	13	350	349	337	338	344	2	14	7	6	9.9
3-Oct	8	2	2	13	6	8	6	8	21	31	44	53	49	39	44	50	38	34	59	79	83	67	280	256	25.0
4-Oct	167	143	224	231	209	205	205	208	193	195	201	199	198	193	195	179	179	182	165	186	228	312	173	195	195.9
5-Oct	198	198	199	192	185	197	198	198	197	196	278	303	301	303	303	310	306	311	288	284	253	244	288	217	271.0
6-Oct	225	234	228	203	203	201	193	184	160	164	167	156	156	156	166	164	156	129	26	9	328	324	345	2	182.5
7-Oct	351	213	348	306	259	227	220	202	192	172	174	174	170	136	102	297	307	313	308	314	283	299	310	287	268.8
8-Oct	222	227	257	280	287	211	238	175	169	178	172	158	158	134	87	40	20	351	10	359	356	354	11	10	358.8
9-Oct	17	12	12	9	356	7	259	206	175	178	186	82	50	47	26	9	12	10	11	2	311	231	199	181	26.5
10-Oct	191	189	183	193	216	224	221	222	200	215	225	229	234	242	258	289	291	307	301	265	324	27	31	26	238.8
11-Oct	26	28	22	14	9	1	2	360	2	337	316	324	327	330	331	320	320	325	306	267	244	250	238	244	338.2
12-Oct	222	198	191	193	167	203	227	210	205	195	178	196	196	180	218	253	266	262	245	246	181	184	213	226	214.5
13-Oct	228	222	235	232	233	236	207	189	211	240	232	231	268	272	265	268	264	245	212	184	189	193	188	186	231.7
14-Oct	200	206	217	222	227	250	258	248	232	251	286	288	302	299	299	315	330	21	32	34	24	4	357	336	284.8
15-Oct	195	196	14	67	104	32	210	239	221	197	182	191	186	164	134	98	67	22	21	355	355	345	2	16	120.4
16-Oct	355	61	44	360	340	355	350	281	274	10	121	135	121	111	94	75	121	109	128	137	157	211	190	201	107.1
17-Oct	248	197	207	194	194	190	193	195	201	192	186	191	192	184	184	210	198	190	189	190	187	181	184	195	192.8
18-Oct	194	210	206	220	230	239	231	229	231	260	270	285	289	290	294	300	292	276	275	281	294	34	34	14	268.9
19-Oct	13	4	8	10	16	13	17	11	22	33	50	39	40	32	356	357	351	351	354	3	16	1	12	27	15.0
20-Oct	321	171	193	210	234	246	227	185	201	222	244	263	297	289	296	289	293	294	301	304	26	38	38	213	268.2
21-Oct	194	180	181	216	208	213	218	203	208	199	193	310	339	1	52	25	10	5	321	347	184	268	204	209	223.2
22-Oct	208	184	192	203	214	217	226	238	230	222	229	215	217	240	242	241	238	225	208	205	215	210	225	229	221.9
23-Oct	223	203	212	202	197	212	211	198	167	9	5	5	22	26	17	30	28	3	13	9	13	14	20	18	1.9
24-Oct	14	18	10	18	23	27	17	4	25	7	8	8	359	175	205	210	227	225	354	350	5	10	11	14	8.5
25-Oct	14	8	14	8	10	19	5	2	18	22	30	29	76	47	174	201	229	225	219	202	237	232	183	186	8.4
26-Oct	184	161	172	205	113	147	149	125	57	55	55	45	31	8	19	337	303	327	180	186	269	280	274	277	248.6
27-Oct	303	310	295	297	301	300	302	302	306	320	316	311	313	319	317	322	320	322	325	328	325	345	14	141	313.1
28-Oct	25	50	125	218	211	213	191	193	186	198	197	181	165	146	149	139	150	157	158	186	175	177	172	172	170.9
29-Oct	192	197	183	169	164	161	165	165	174	185	194	190	193	193	200	199	151	178	202	267	210	190	208	211	186.3
30-Oct	220	222	221	222	212	214	193	191	184	190	192	181	187	187	175	173	138	197	219	314	7	345	341	331	202.9
31-Oct	12	36	19	237	253	62	42	95	169	134	130	84	61	65	45	45	50	27	27	30	30	27	16	21	40.0

241.6 216.1 223.5 235.5 231.4 238.4 233.9 226.9 208.2 226.0 237.4 250.9 268.0 276.4 283.6 303.3 308.1 317.4 316.3 317.0 330.2 325.0 318.4 285.4  
Diurnal Average

All monthly, daily, and diurnal averages have been calculated using vector methods

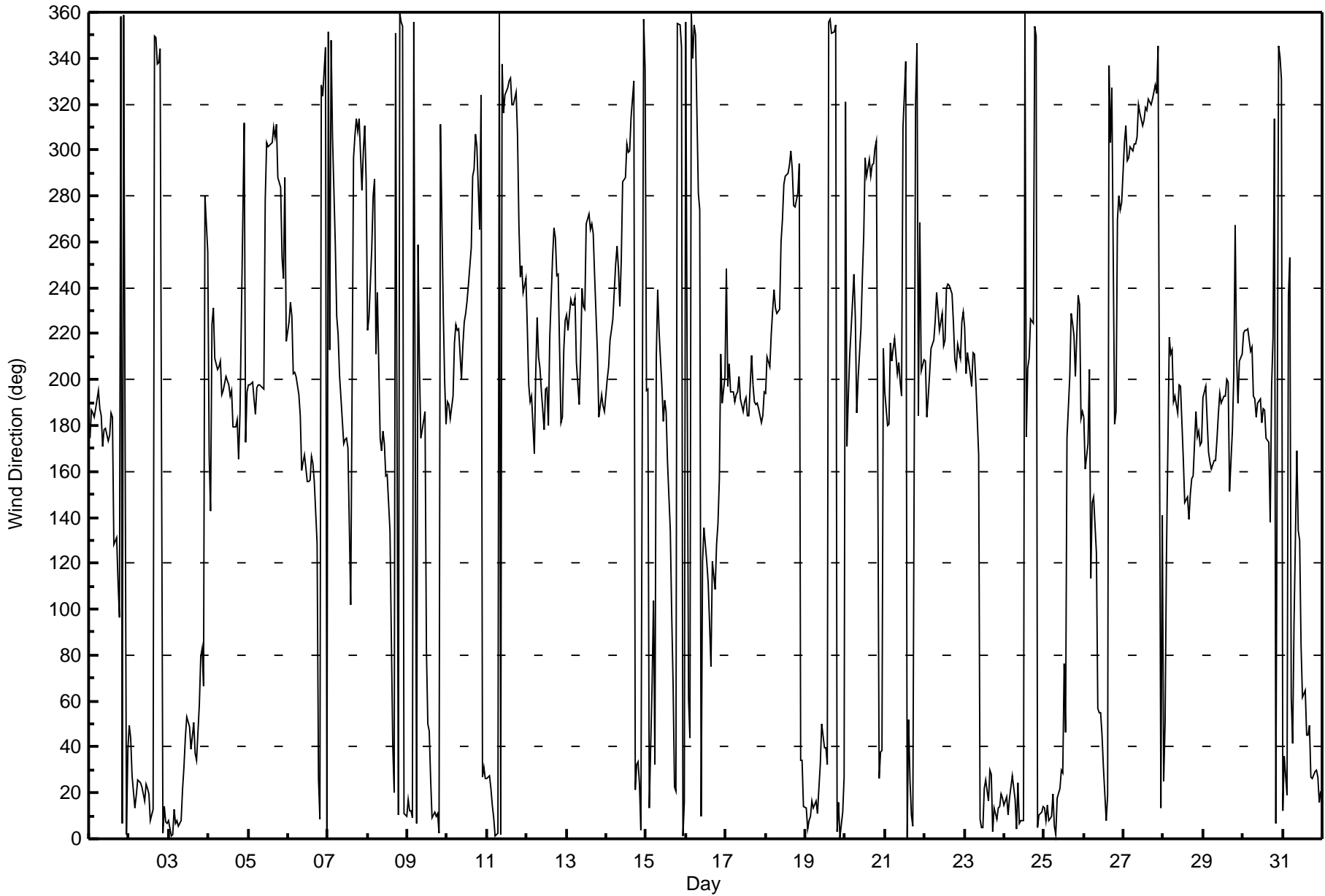


**Wood Buffalo Environmental Association**

**Summary of Hour Standard Deviations**

**Wind Direction (WD) - deg  
CNRL Horizon - October 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 88 deg on Oct 15 04:00 Minimum Value: 7 deg on Oct 15 22:00 Percentiles: P <sub>1</sub> = 9 P <sub>10</sub> = 14 Q <sub>1</sub> = 16 Median = 19 Q <sub>3</sub> = 25 P <sub>90</sub> = 43 P <sub>99</sub> = 79																		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	8	8	9	12	14	14	14	17	16	25	26	27	28	23	24	23	24	13	22	30	16	15	10	16	30
2-Oct	47	45	20	16	18	19	19	19	20	21	20	19	21	20	20	26	20	18	18	21	20	20	20	19	47
3-Oct	20	21	20	18	18	19	20	21	19	18	21	26	26	22	24	21	31	16	19	13	13	80	31	31	80
4-Oct	25	51	16	17	20	20	21	23	24	31	30	30	31	29	35	26	18	13	16	9	45	14	77	32	77
5-Oct	12	14	15	15	14	15	21	22	21	35	38	18	18	18	17	17	21	15	21	14	20	48	20	46	48
6-Oct	22	19	23	10	12	14	16	14	25	28	36	50	37	32	29	31	23	80	10	19	61	46	18	12	80
7-Oct	9	59	41	14	38	15	15	11	20	18	32	29	29	34	41	21	16	13	11	10	43	14	18	42	59
8-Oct	20	11	22	19	50	63	40	28	15	23	21	32	44	61	72	61	23	12	19	18	18	17	17	16	72
9-Oct	19	19	17	17	24	20	64	16	17	19	23	48	20	18	22	19	18	19	17	24	35	43	18	18	64
10-Oct	12	12	12	19	20	20	20	23	21	22	22	22	23	27	28	19	17	15	17	16	41	21	21	17	41
11-Oct	17	17	18	19	19	19	18	19	19	24	16	17	18	19	20	20	23	17	30	18	67	12	34	45	67
12-Oct	13	12	17	19	32	39	15	18	20	27	30	26	22	22	38	28	23	25	20	19	14	51	47	14	51
13-Oct	16	16	17	15	15	17	16	13	27	22	23	25	26	27	23	22	23	19	12	11	14	15	13	12	27
14-Oct	11	11	14	16	17	20	19	18	19	28	21	20	21	16	16	17	19	19	18	16	20	22	24	65	65
15-Oct	41	41	85	88	28	20	77	22	19	27	27	29	39	36	32	22	20	21	23	12	9	7	13	10	88
16-Oct	29	54	50	11	12	20	21	66	71	50	47	54	43	41	32	33	17	10	13	17	17	26	61	71	71
17-Oct	33	11	13	9	11	14	12	12	17	22	20	21	24	26	24	24	23	15	15	14	14	13	15	21	33
18-Oct	18	19	20	16	17	15	17	15	18	24	25	21	20	17	17	16	19	19	15	58	64	30	16	18	64
19-Oct	18	18	18	18	18	17	16	16	18	19	24	22	20	28	19	16	15	15	20	15	25	25	15	51	51
20-Oct	72	27	18	18	23	23	26	15	18	18	21	26	17	18	18	17	17	13	14	17	19	16	23	82	82
21-Oct	12	18	26	14	16	17	16	39	28	27	50	81	33	56	33	21	16	22	35	57	65	30	30	13	81
22-Oct	15	15	15	16	13	17	17	20	21	22	23	21	23	25	23	22	21	14	13	15	19	9	19	15	25
23-Oct	33	16	13	17	15	13	13	17	52	22	22	21	23	39	27	20	16	19	16	18	18	20	18	18	52
24-Oct	17	18	19	18	18	13	24	21	20	21	25	34	77	61	51	39	19	12	77	19	18	17	18	18	77
25-Oct	19	19	19	18	19	18	20	19	18	23	26	61	78	78	60	53	26	24	44	27	29	32	15	16	78
26-Oct	21	16	23	34	30	23	21	24	23	20	24	25	18	22	19	30	31	22	52	25	23	17	20	18	52
27-Oct	18	17	18	18	17	17	16	17	17	16	16	17	17	17	18	17	16	16	16	16	15	26	84	76	84
28-Oct	75	18	38	20	16	22	19	18	18	24	24	23	35	27	24	23	16	21	15	23	9	16	12	15	75
29-Oct	15	14	15	15	14	17	16	14	15	18	20	19	21	21	21	23	11	15	15	53	30	11	11	11	53
30-Oct	10	12	15	12	17	13	15	12	13	16	17	14	15	17	18	15	51	14	16	34	88	23	24	21	88
31-Oct	20	18	35	35	78	46	24	58	54	30	23	49	20	19	20	16	14	18	17	20	19	18	17	17	78
75 59 85 88 78 63 77 66 71 50 50 81 78 78 72 61 51 80 77 58 88 80 84 82																									
Diurnal Maximum																									





# Wood Buffalo Environmental Association

## SO2 Calibration Report

### Station Information

Calibration Date	October 14, 2015	Last Calibration	September 18, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	9:55	End Time (MST)	14:25
Gas Cert Reference	S0002486	Station temp.	21 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26/09/2017
Calibrator Make/Model	Teledyne API T700	Serial Number	1223
ZAG Make/Model	Teledyne API 701	Serial Number	1004
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2580

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-622	-622
Analyzer IP address	192.168.1.43		Lamp voltage	840	845
Calculated slope	0.995017	0.994665	Chamber temp	45.0	45.0
Calculated intercept	1.170751	0.716876	Pressure	701.8	710.6
Analyzer Background	18.8	18.1	Flow	0.426	0.430
Analyzer Coefficient	0.982	0.982	Intensity	91	91

Analyzer make Thermo 43i Analyzer serial # 710321322

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.2	----
as found span	5000	81.5	815.0	820.8	0.993
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	81.5	815.0	818.9	0.995
second point	5000	40.6	406.0	407.4	0.996
third point	5000	20.2	202.0	201.2	1.004
as left zero	5000	0.0	0.0	0.8	----
as left span	5000	81.5	815.0	815.2	1.000
Average Correction Factor					0.999

Corrected As found 821.0 Previous response 817.9 % change -0.4%

Notes:

Inlet filter replaced after as founds. Adjusted zero.

Calibration Performed By: Asad Hidayat



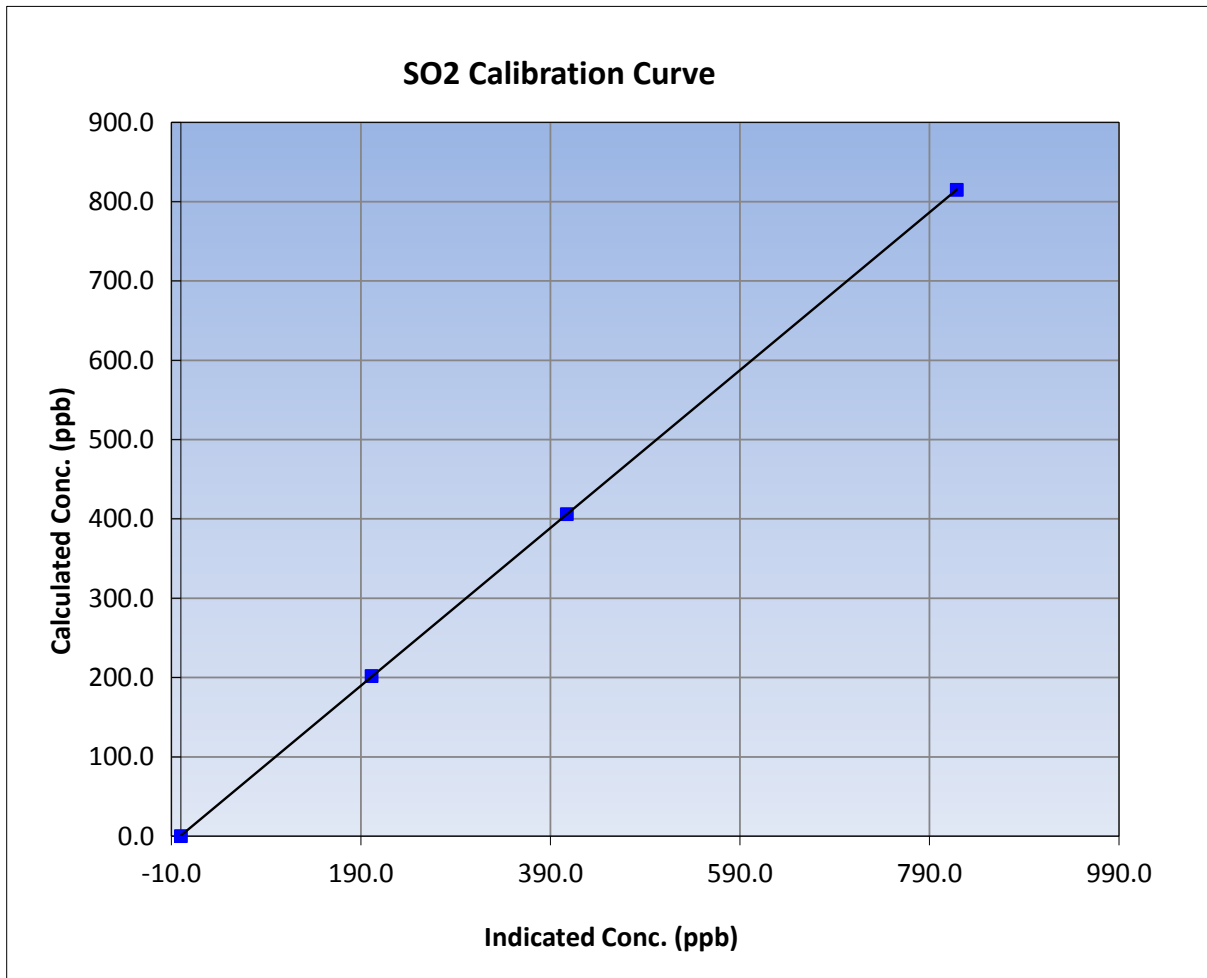
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	October 14, 2015	Previous Calibration	September 18, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:55	End Time (MST)	14:25
Analyzer make	Thermo 43i	Analyzer serial #	710321322

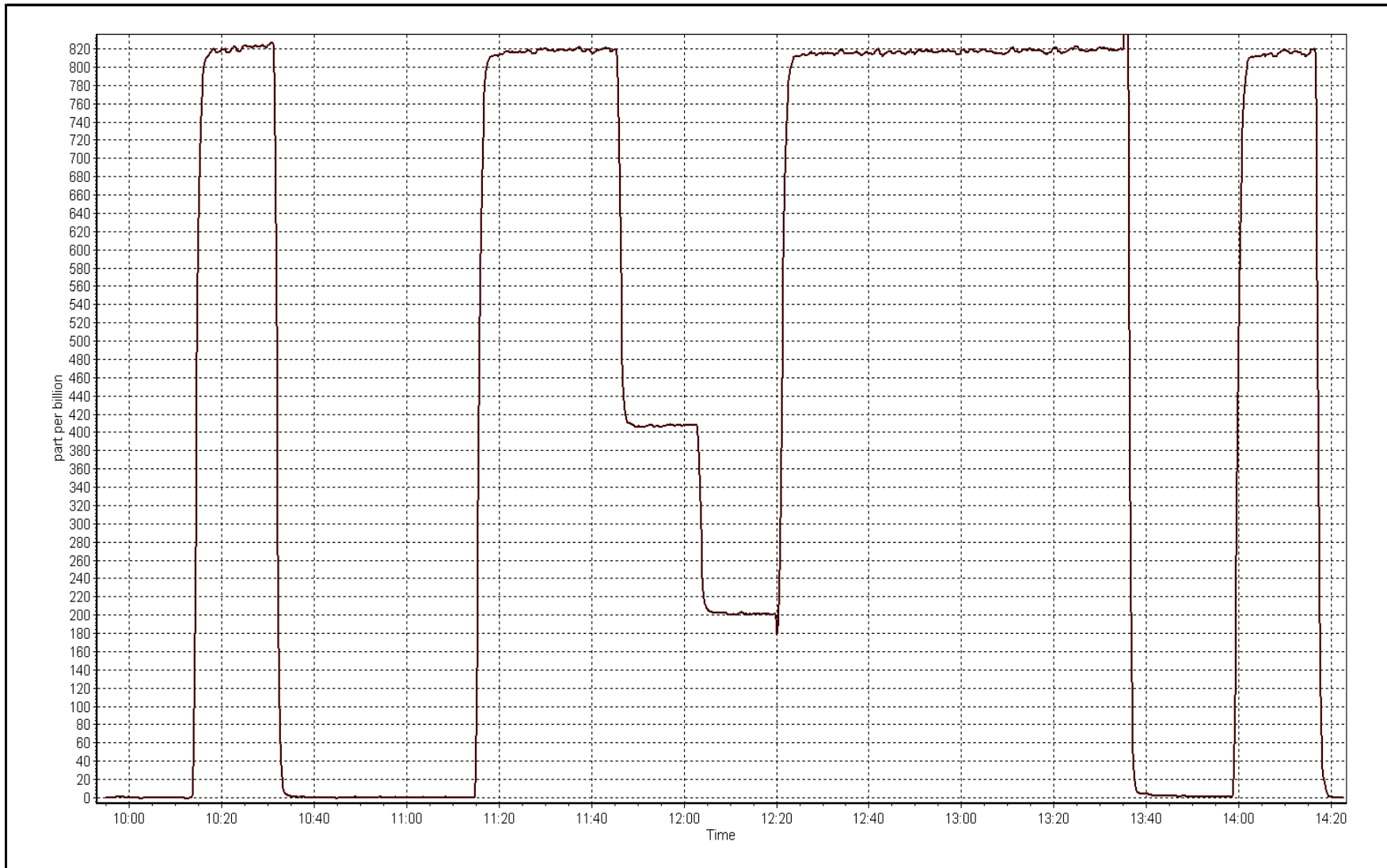
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999994
815.0	818.9	0.9952		
406.0	407.4	0.9965	Slope	0.994665
202.0	201.2	1.0039		
			Intercept	0.716876



SO2 Calibration Plot

Date: October 14, 2015





# Wood Buffalo Environmental Association TRS Calibration Report

## Station Information

Calibration Date	October 13, 2015	Last Calibration	September 14, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Removal		
Start Time (MST)	10:25	End Time (MST)	11:35
Gas Cert Reference	LL82745	Station temp.	22 Deg C
Cal Gas Concentration	9.6 ppm	Cal Gas Exp Date	2/22/16
Calibrator Make/Model	API T700	Serial Number	1223
Dil air Make/Model	API 701	Serial Number	1005
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2580
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S0002486 26/Sep/17

## Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-672	NA
Analyzer IP address	192.168.1.42		Lamp voltage	756	NA
Calculated slope	0.990618	1.077826	Chamber temp	45	NA
Calculated intercept	-0.177008	-0.497799	Pressure	693.9	NA
Analyzer Background	9.5	NA	Flow	0.423	NA
Analyzer Coefficient	0.939	NA	Intensity	93	NA
			Converter temp.	800	NA

Analyzer make/model	Thermo 43i	Analyzer serial #	0710321323
Converter make/model	CDN-101	Converter serial #	363

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.3	----
as found span	5000	41.5	79.7	74.3	1.073
SO2 scrubber check					
calibrator zero	5000	0.0	0.0	0.3	----
high point	5000	41.5	79.7	74.3	1.073
second point	5000	20.6	39.6	37.4	1.058
third point	5000	10.2	19.6	18.7	1.047
as left zero					
as left span					
Average Correction Factor					1.059

Corrected As found	74.0	Previous response	80.6	% change	9.0%
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**Notes:**

Removal cal. No adjustments.

Calibration Performed By: Asad Hidayat



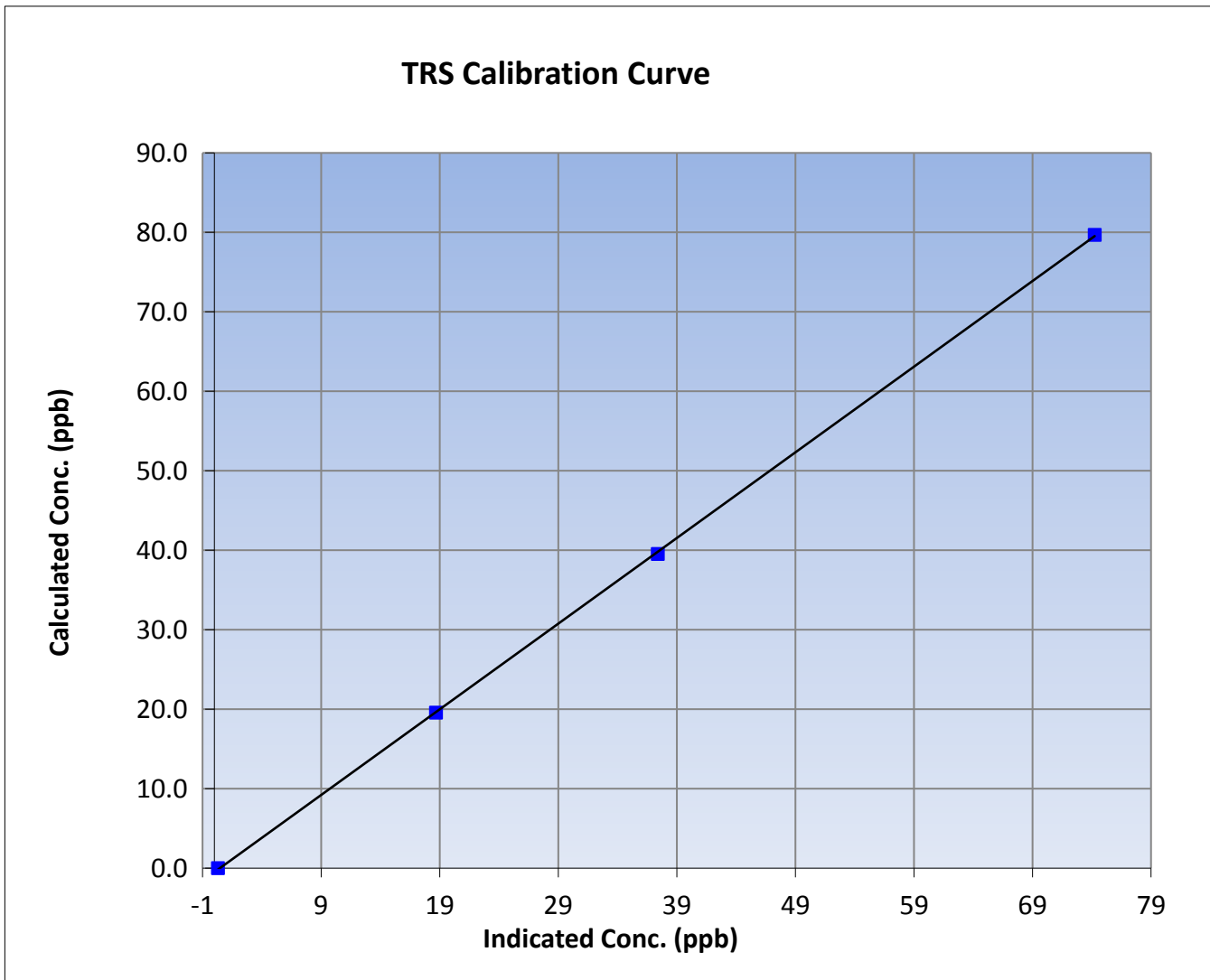
# Wood Buffalo Environmental Association TRS Calibration Report

## Station Information

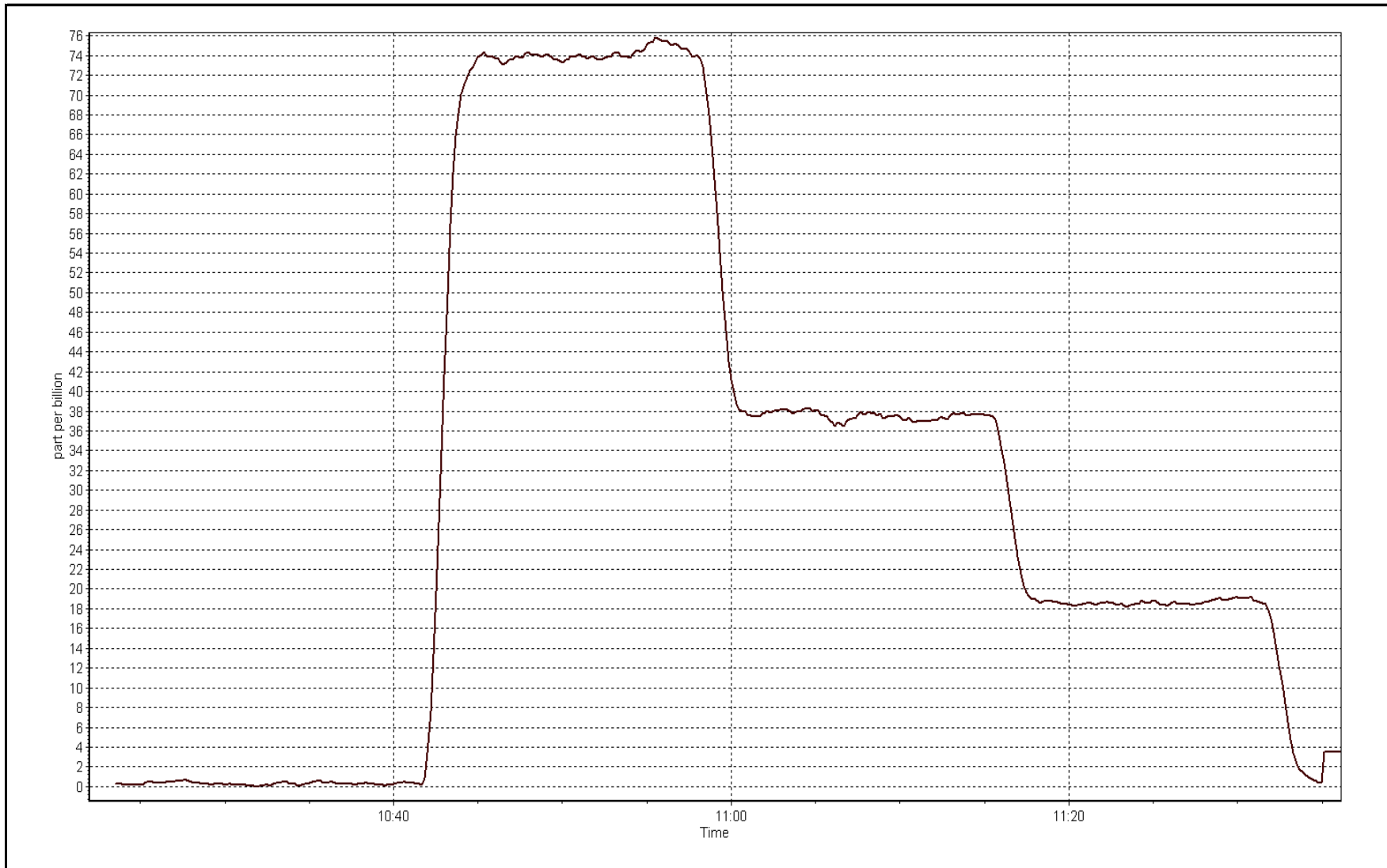
Calibration Date	October 13, 2015	Previous Calibration	September 14, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:25	End Time (MST)	11:35
Analyzer make	Thermo 43i	Analyzer serial #	0710321323

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999963
79.7	74.3	1.0731		
39.6	37.4	1.0575	Slope	1.077826
19.6	18.7	1.0473		
			Intercept	-0.497799









# Wood Buffalo Environmental Association TRS Calibration Report

### Station Information

Calibration Date	October 13, 2015	Last Calibration	NA
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Install		
Start Time (MST)	12:50	End Time (MST)	15:30
Gas Cert Reference	LL82745	Station temp.	22 Deg C
Cal Gas Concentration	9.6 ppm	Cal Gas Exp Date	2/22/16
Calibrator Make/Model	API T700	Serial Number	1223
Dil air Make/Model	API 701	Serial Number	1005
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2580
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S0002486 26/Sep/17

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	NA	-694
Analyzer IP address	192.168.1.44		Lamp voltage	NA	948
Calculated slope	NA	0.989041	Chamber temp	NA	45
Calculated intercept	NA	-0.046372	Pressure	NA	698.4
Analyzer Background	NA	1.38	Flow	NA	0.436
Analyzer Coefficient	NA	1.023	Intensity	NA	91
			Converter temp.	NA	809

Analyzer make/model	Thermo 43i TLE	Analyzer serial #	1150840012
Converter make/model	CDN-101	Converter serial #	363

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
SO2 scrubber check	5000	19.8	198.0	0.3	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	41.5	79.7	80.5	0.990
second point	5000	20.7	39.7	40.5	0.982
third point	5000	10.3	19.8	20.0	0.991
as left zero	5000	0.0	0.0	-0.1	----
as left span	5000	41.5	79.7	80.3	0.992
Average Correction Factor					0.987

Corrected As found      NA      Previous response      NA      % change      NA

**Notes:**

Install cal. Scrubber check done and inlet filter replaced after as founds. Adjusted both zero and span.

Calibration Performed By: \_\_\_\_\_ Asad Hidayat



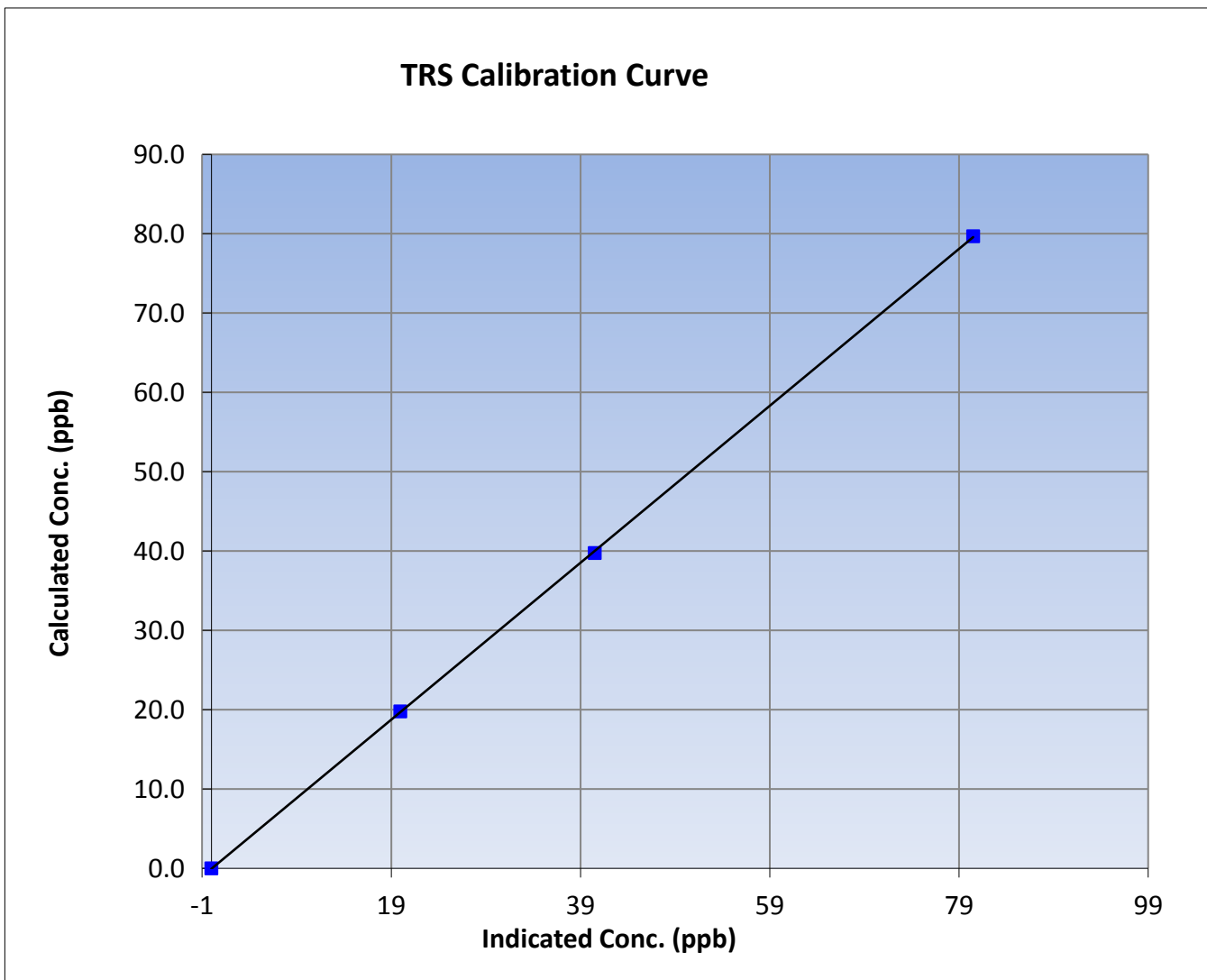
# Wood Buffalo Environmental Association TRS Calibration Report

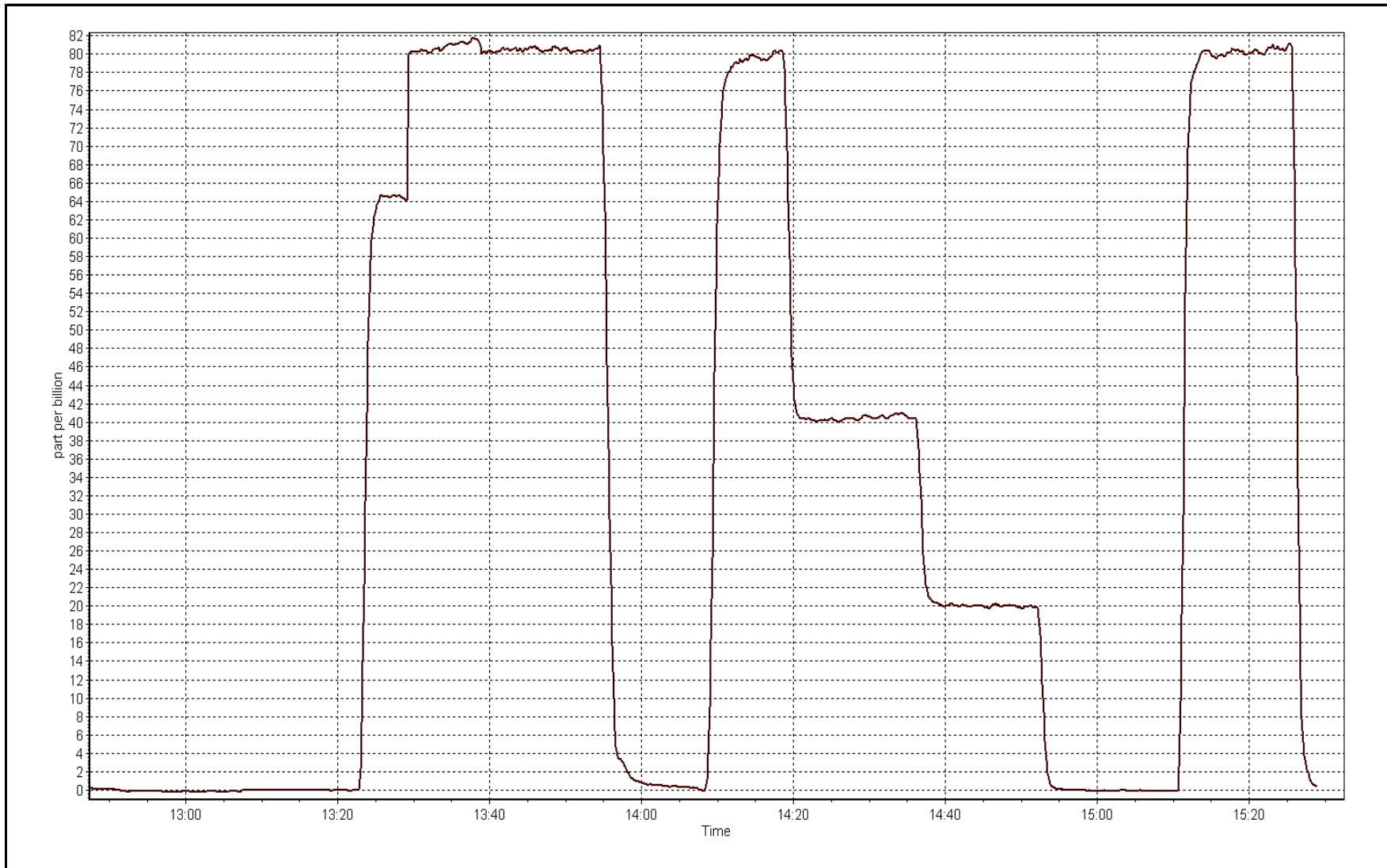
## Station Information

Calibration Date	October 13, 2015	Previous Calibration	NA
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	12:50	End Time (MST)	15:30
Analyzer make	Thermo 43i TLE	Analyzer serial #	1150840012

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999975
79.7	80.5	0.9898		
39.7	40.5	0.9816	Slope	0.989041
19.8	20.0	0.9908		
			Intercept	-0.046372







# Wood Buffalo Environmental Association THC Calibration Report

### Station Information

Calibration Date	October-14-15	Last Calibration	September-18-15
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	9:55	End Time (MST)	14:25
Gas Cert Reference	S0002486	Cal Gas Expiry Date	26-Sep-17
CH4 Cal Gas Conc.	505 ppm	CH4 Equiv Conc.	1046.8 ppm
C3H8 Cal Gas Conc.	197 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Teledyne API T700	Serial Number	1223
ZAG make/model	Teledyne API 701	Serial Number	1004
DACS make/model	Campbell Scientific CR3000	Serial Number	2580

### Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	8.8	8.8
Analyzer IP address	192.168.1.51		Air or Bypass Press	37.1	38.0
Calculated slope	0.998666	1.000136	Fuel Pressure	26.3	26.3
Calculated intercept	0.025040	-0.060897	Analyzer Coeff	3.1	3.0
			Analyzer BKG	0.005	0.000

Analyzer make Thermo 51i-LT Analyzer serial # 1327059295

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.05	----
as found span	5000	81.5	17.06	17.22	0.991
calibrator zero	5000	0.0	0.00	0.07	----
high point	5000	81.5	17.06	17.12	0.997
second point	5000	40.6	8.50	8.57	0.992
third point	5000	20.2	4.23	4.27	0.990
as left zero	5000	0.0	0.00	0.02	----
as left span	5000	81.5	17.06	17.18	0.993
Average Correction Factor					0.993

Corrected As found 17.27 Previous response 17.06 % change -1.2%

**Notes:**

Inlet filter replaced after as founds. Hydrogen cylinder was replaced after as founds. Adjusted zero and span.

Calibration Performed By:

Asad Hidayat



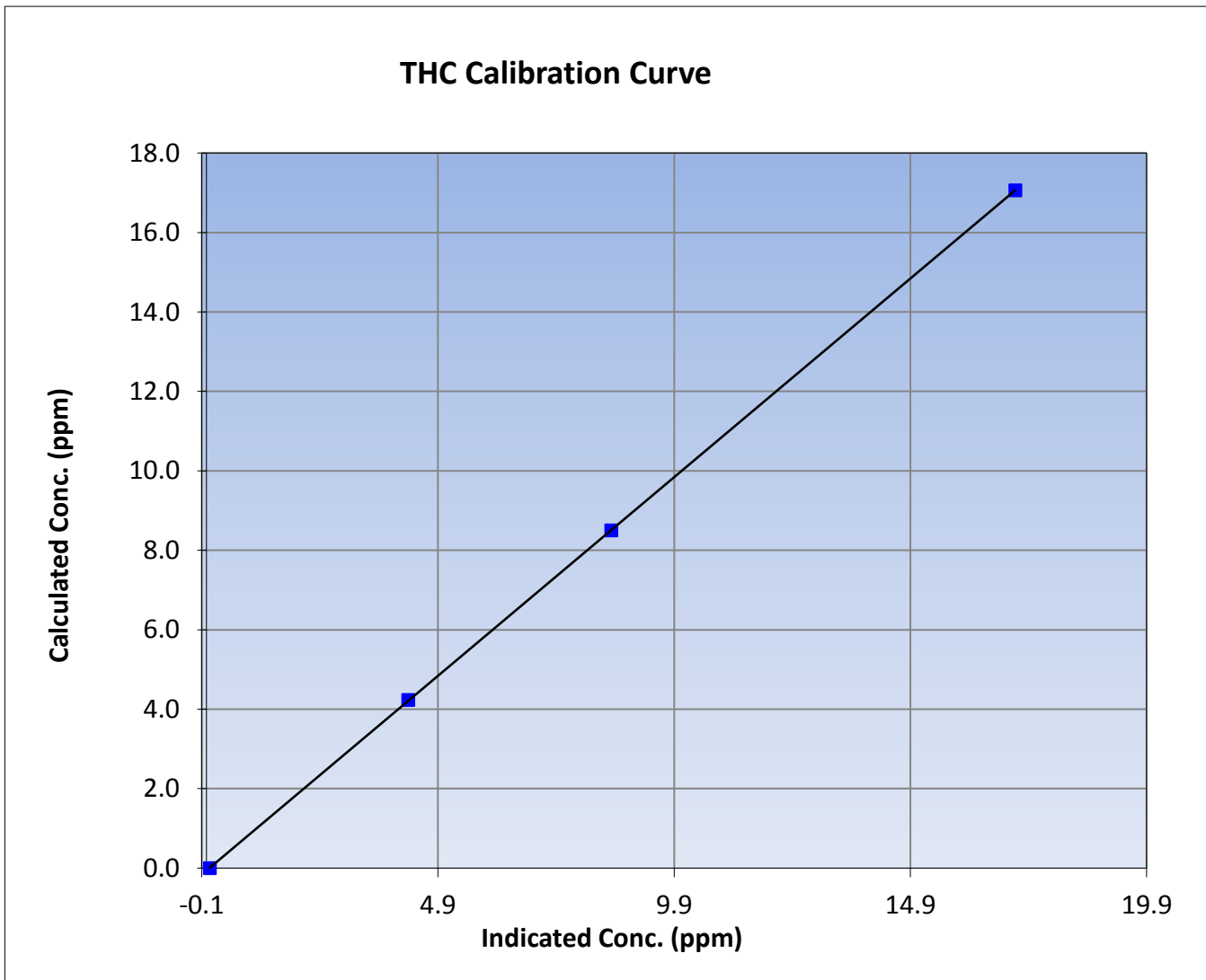
# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	October 14, 2015	Previous Calibration	September 18, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:55	End Time (MST)	14:25
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059295

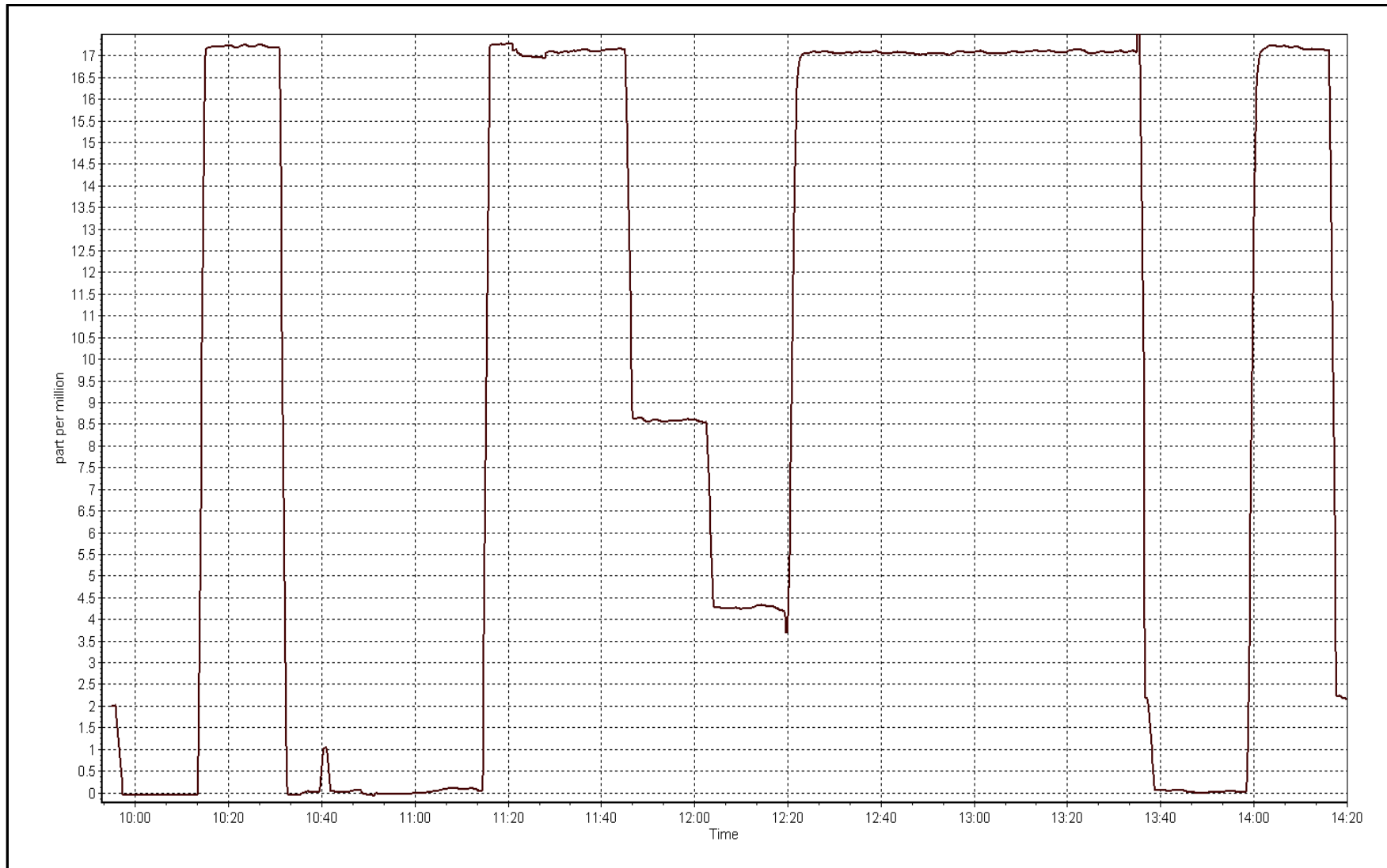
## Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.07	----	Correlation Coefficient	0.999996
17.06	17.12	0.9966		
8.50	8.57	0.9918	Slope	1.000136
4.23	4.27	0.9904		
			Intercept	-0.060897



THC Calibration Plot

Date: October 14, 2015





# Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

## Station Information

Calibration Date	October 14, 2015	Previous Calibration	September 18, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	9:55	End Time (MST)	14:25
NO Cal Gas Conc	48.9 ppm	Gas Cert Reference	S0002486
NOX Cal Gas Conc	48.9 ppm	Cal Gas Expiry Date	26/09/2017
Calibrator	Teledyne API T700	Serial Number	1223
Zero air Generator	Teledyne API T701	Serial Number	1004

## DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2580
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## Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.998924	0.998246	1.006544
	Data Offset	0.495365	0.568917	-2.605182
Current Calibration	Data Slope	0.995672	0.996816	0.993240
	Data Offset	0.359170	0.343638	-0.839307

## Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	710321429
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.767		0.761	
NOX coefficient	0.999		1.001	
NO2 coefficient	1.000		1.000	
NO bkgrnd	9.7		9.6	
NOX bkgrnd	9.9		9.8	
Chamber Temp	50	Deg C	49.8	Deg C
Moly Temp	326.3	Deg C	324.5	Deg C
PMT voltage	-784.4	V	-784	V
PMT Temp	-2.7	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	158.4	mmHg	160	mmHg
R Cell Press Nox	158.7	mmHg	160.2	mmHg
NO sample flow	0.681	lpm	0.688	lpm
Nox sample Flow	0.679	lpm	0.687	lpm

**Notes:**

Inlet filter replaced after as founds. Adjusted span slightly.





# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date:

October 14, 2015

Station Number:

AMS 15

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.1	----	----
as found span	5000	81.5	797.1	797.1	0.0	817.1	816.7	0.3	0.9755	0.9760
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.1	----	----
high point	5000	81.5	797.1	797.1	0.0	800.0	799.1	0.9	0.9963	0.9975
second point	5000	40.6	397.1	397.1	0.0	399.1	398.8	0.3	0.9950	0.9957
third point	5000	20.2	197.6	197.6	0.0	197.4	197.0	0.5	1.0006	1.0030
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.2	-0.1	----	----
as left span	5000	81.5	797.1	442.3	354.8	796.1	438.1	357.8	1.0013	1.0095
Average Correction Factor									0.9973	0.9987

Corrccted As found      NO<sub>x</sub>=      817.3                      NO=      816.8                      Percent Change              NO<sub>x</sub>=      -2.4%                      NO=      -2.3%  
 Previous Response      NO<sub>x</sub>=      797.4                      NO=      797.9

### GPT Calibration Data

Dilution Flow      5000      ccm      Source Gas Flow      81.50      ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			-0.1			N/A	
1st NO2 (300)	----	442.3	353.9	798.6	442.3	356.4	0.9820	1.0000	0.9929	100.7%
2nd NO2 (200)	----	553.6	242.5	798.9	553.6	245.3	0.9817	1.0000	0.9886	101.2%
3rd NO2 (100)	----	669.6	126.5	799.2	669.6	129.6	0.9813	1.0000	0.9762	102.4%
4th NO2 (0)	796.1	----	2.3	798.4	796.1	2.3	0.9824	1.0000	N/A	----
Average Correction Factor							0.9819	1.0000	0.9859	101.4%

Calibration Performed By: Asad Hidayat



# Wood Buffalo Environmental Association

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

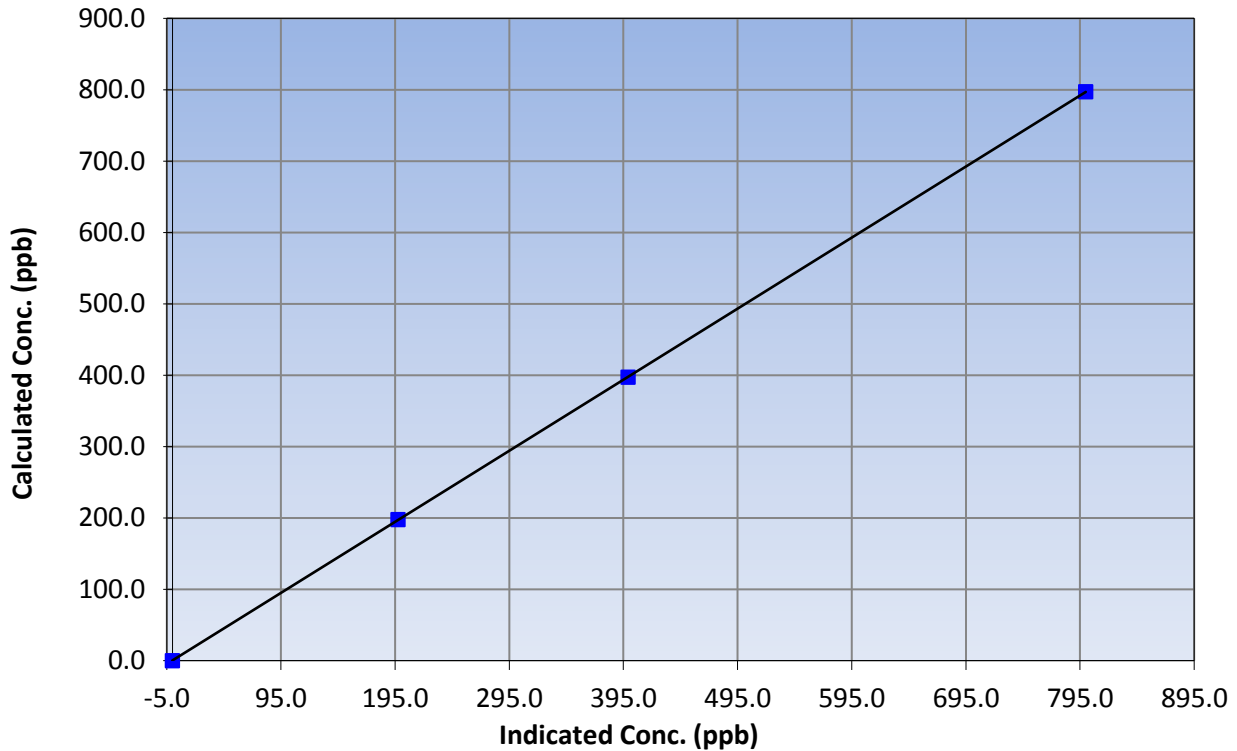
### Station Information

Calibration Date	October 14, 2015	Previous Calibration	September 18, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:55	End Time (MST)	14:25
Analyzer make	Thermo 42i	Analyzer serial #	710321429

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999998
797.1	800.0	0.9963		
397.1	399.1	0.9950	Slope	0.995672
197.6	197.4	1.0006		
			Intercept	0.359170

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

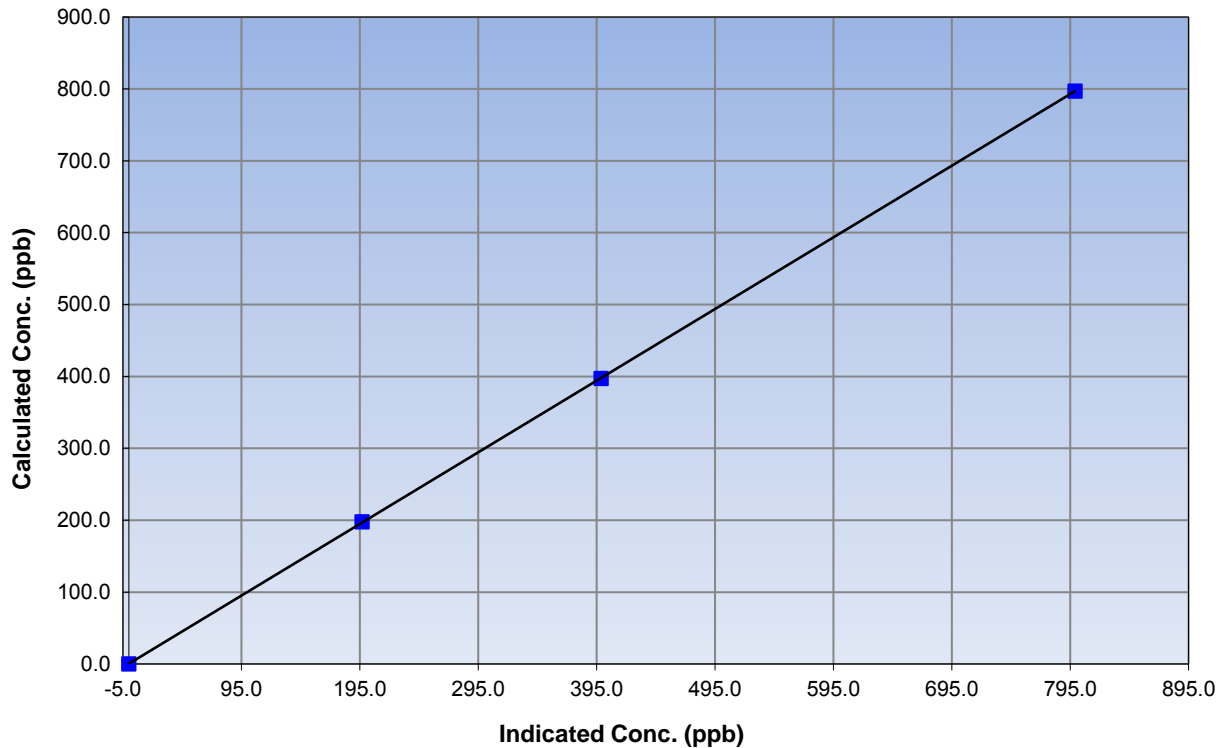
### Station Information

Calibration Date	October 14, 2015	Previous Calibration	September 18, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:55	End Time (MST)	14:25
Analyzer make	Thermo 42i	Analyzer serial #	710321429

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999996
797.1	799.1	0.9975		
397.1	398.8	0.9957	Slope	0.996816
197.6	197.0	1.0030		
			Intercept	0.343638

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

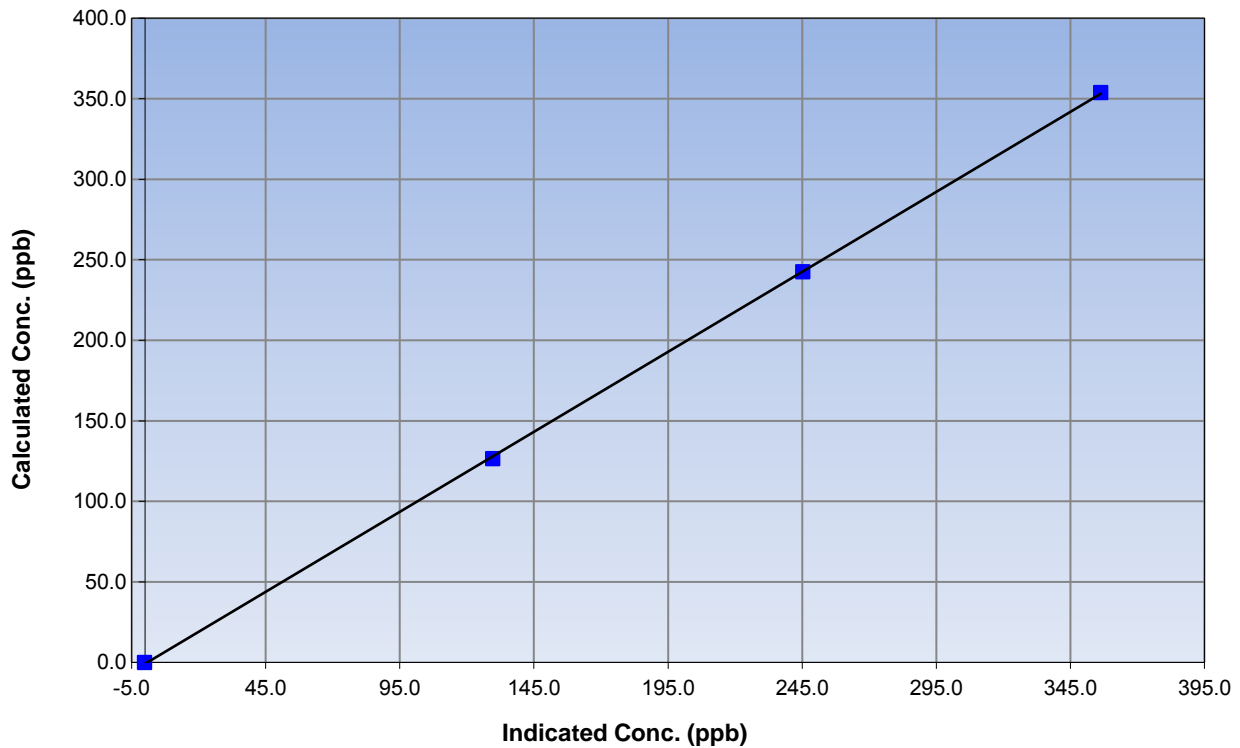
### Station Information

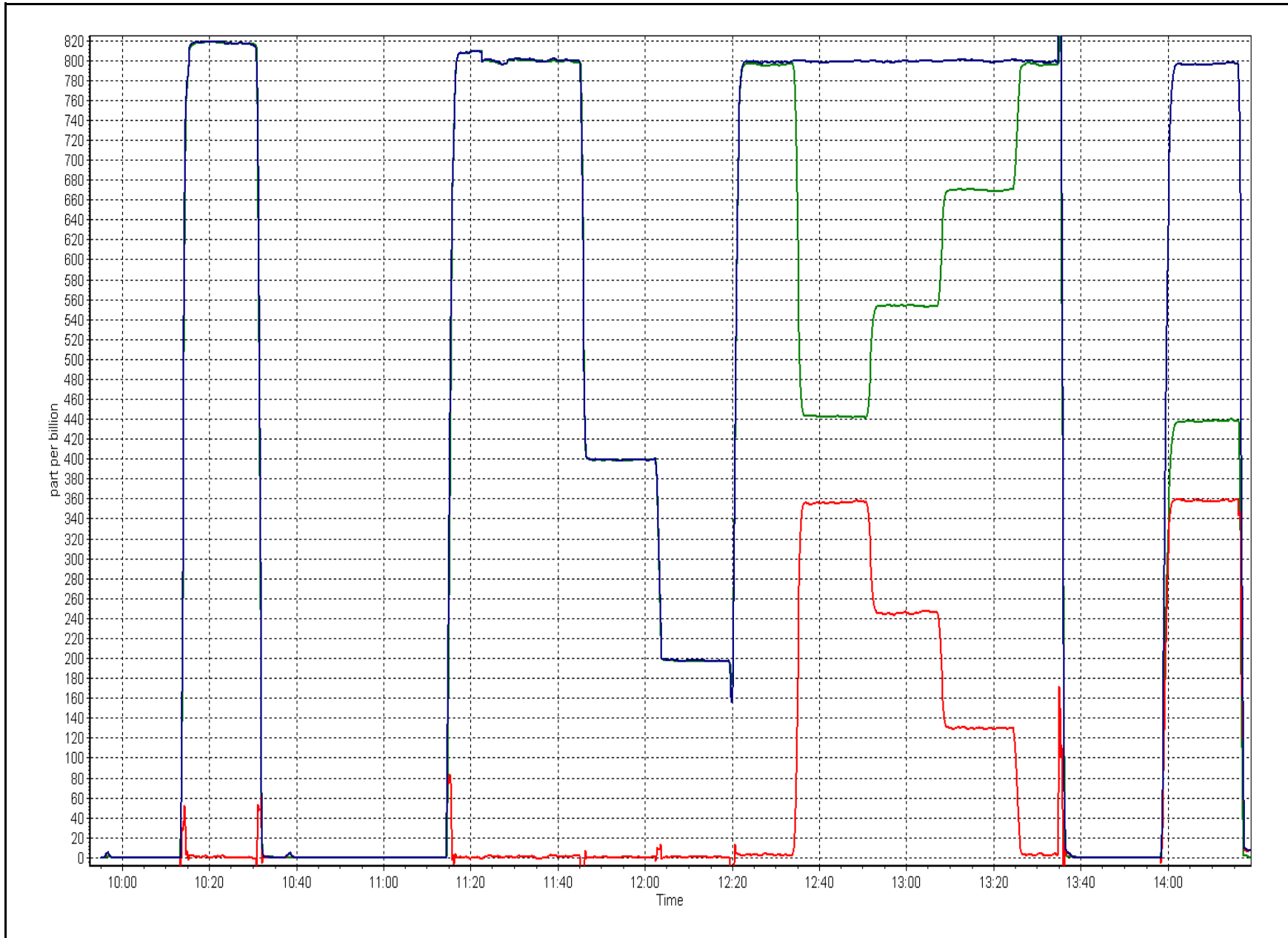
Calibration Date	October 14, 2015	Previous Calibration	September 18, 2015
Station Number	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:55	End Time (MST)	14:25
Analyzer make	Thermo 42i	Analyzer serial #	710321429

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999951
353.9	356.4	0.9929		
242.5	245.3	0.9886	Slope	0.993240
126.5	129.6	0.9762		
			Intercept	-0.839307

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







# Wood Buffalo Environmental Association

## SHARP CALIBRATION

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### STATION INFORMATION

Calibration Date: September 18, 2015 Previous Calibration: September 18, 2015  
 Station Name: CNRL Horizon Station Number: AMS 15  
 Start Time (MST): 12:10 End Time (MST): 14:25  
 Calibrator Make/Model: Delta Cal Calibrator Serial Number: 1451

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### SHARP INFORMATION

Particulate Fraction: PM2.5  
 Make/Model: Thermo / SHARP 5030  
 Serial Number: E-2020  
 C<sub>14</sub> Source SN: 7409  
 Confirmation of Time settings: Yes  No   
 Parameters Checked: T1  T2  T3  T4  P3  Main Flow  Beta  Neph

---

### CALIBRATION DATA

Temperature (°C)				
Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	11.0	11.4	0.4	17.0
T2	24.0	na	na	26.0
T3	24.0	na	na	24.0
T4	23.0	na	na	23.2
RH (%)	22.0	na	na	28.0

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	975	976.0	1.0	964

Main Flow (Lph)				
Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
999	998	-1	1003	1000

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	166		166
Neph	0.4		0
C14	25		7.3
Indicated Concentration (ug/m3)	0.6	Yes	0
Offset 1			166.5
Offset 2			30

---

### Leak Check (Quarterly)

Leak Check Date: August 26, 2015 Previous Leak Check Date: May 14, 2015

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.72	
*Flow with adaptor (LPM):	16.68	0.04

\*Note - do not attach adaptor without shutting off the pump first

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### Mass Foil Calibration (Annually)

Foil Calibration Date: June 22, 2015 Previous Foil Calibration: NA  
 Zeroed?: Yes  
 Foil Mass: 1507 Mass foil set S/N: 2022  
 Previous Correction Factor: 7091  
 New Correction Factor: 7029

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### INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	18/09/2015
Pump	Good	09/06/2014
Filter Tape	Good	09/06/2014
Mass Foil Cal Set	Good	NA
HEPA filter	Good	09/06/2014

### NOTES:

Zero adjusted. Cleaned cyclone head.

Calibration Performed By: Asad Hidayat



## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 16**  
**SHELL MUSKEG RIVER**  
**OCTOBER 2015**

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

November 26, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)  
OCTOBER 2015

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	709	35	35	100.00	20	0	4	0
THC (ppm) Average	709	35	35	100.00	5.4	-	3	-
NO2 (ppb) Average	707	36	37	99.87	38	0	18	-
NO (ppb) Average	707	36	37	99.87	102	-	27	-
NOX (ppb) Average	707	36	37	99.87	141	-	41	-
PM2.5 (ug/m3) Average	737	4	7	99.60	51.8	-	14.7	0
Temperature 2 m (C) Average	744	0	0	100.00	25.2	-	16.1	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	90	-
Barometric Pressure (inHg) Average	744	0	0	100.00	29.4	-	29.4	-
Wind Speed 10 m (km/h) Average	742	0	2	99.73	36	-	19	-
Wind Direction 10 m (deg) Average	742	0	2	99.73	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)  
OCTOBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	709	1	2	-	0	0	0	0	1	2	20
THC (ppm) Average	709	2.32	0.3	-	1.9	2	2.1	2.2	2.5	2.7	5.4
NO2 (ppb) Average	707	7.9	6	-	0	1	3	7	11	16	38
NO (ppb) Average	707	5.7	11	-	0	0	0	2	7	15	102
NOX (ppb) Average	707	13.6	15	-	0	1	3	9	19	30	141
PM2.5 (ug/m3) Average	737	5.86	5.3	-	0.6	2.1	2.9	4.4	7	10.4	51.8
Temperature 2 m (C) Average	744	4.97	5.6	-	-5.5	-1.6	0.9	4.1	8.1	12.6	25.2
Relative Humidity (%) Average	744	74	18	-	28	45	63	78	89	94	99
Barometric Pressure (inHg) Average	744	28.82	0.3	-	28.1	28.4	28.6	28.9	29	29.2	29.4
Wind Speed 10 m (km/h) Average	742	10.6	6	-	0	4	6	9	15	19	36
Wind Direction 10 m (deg) Average	742	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)  
OCTOBER 2015

OPERATIONAL NOTES

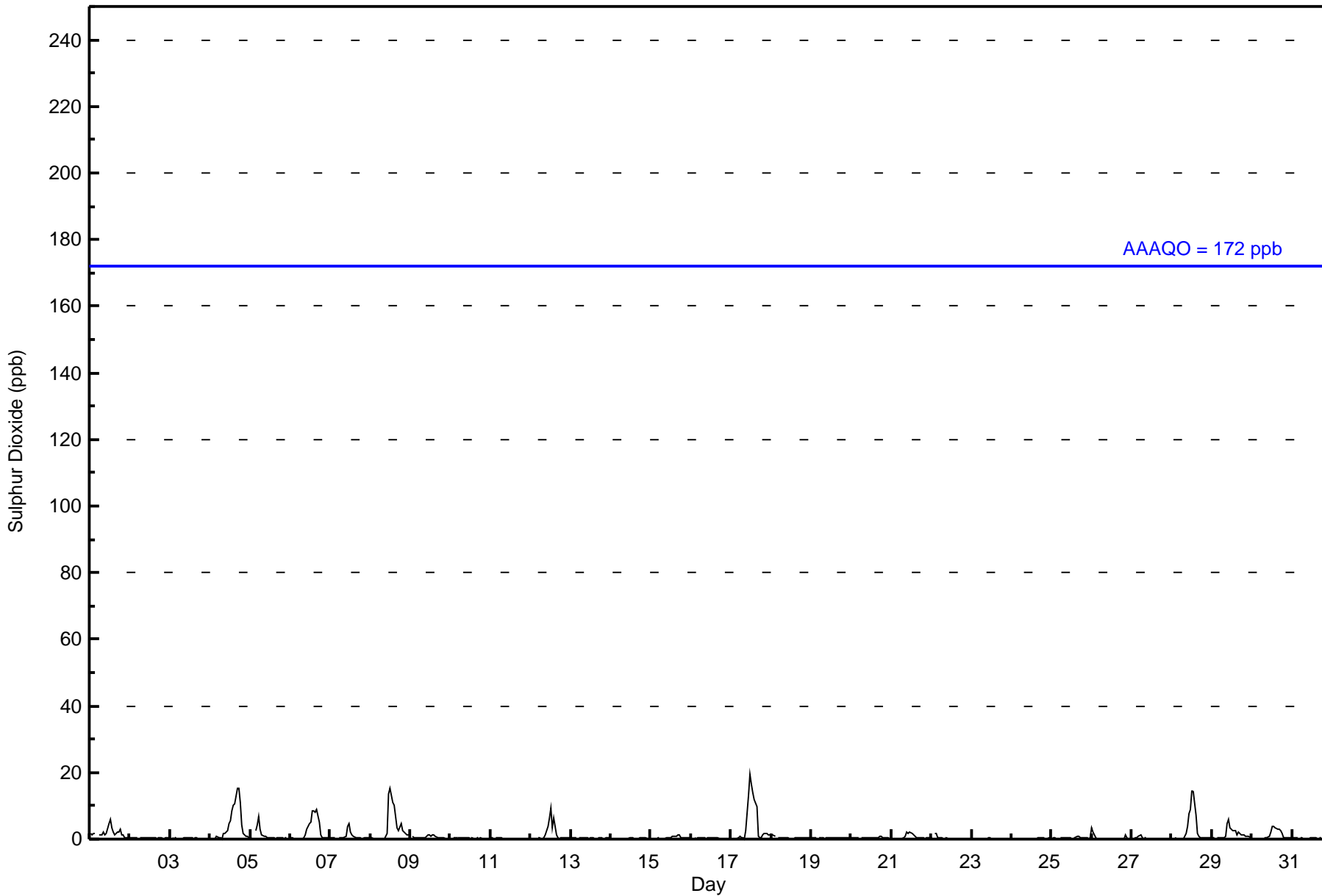
Parameter	Period Start	Period End	Duration (Hours)	Notes
NO2, NO, NOX	26 Oct 2015 13:00	26 Oct 2015 13:00	1	Maintenance - manifold cleaning
PM2.5	28 Oct 2015 11:00	28 Oct 2015 13:00	3	Maintenance - Flow and zero check
Wind Speed, Wind Direction	16 Oct 2015 09:00	16 Oct 2015 09:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	26 Oct 2015 08:00	26 Oct 2015 08:00	1	Flat line in sensor output signal -sensor frozen



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 20 ppb on Oct 17 12:00	Maximum Daily Average: 4.3 ppb on Oct 17		Hours of Data:	709
Minimum Value: 0 ppb on Oct 24 01:00	Minimum Daily Average: 0.1 ppb on Oct 23		Hours of Missing Data:	35
Maximum Diurnal Average: 2.9 ppb at hour 13	Minimum Diurnal Average: 0.3 ppb at hour 24		Hours of Calibration:	35
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> = 14		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	1	2	2	Z	1	1	1	2	1	2	5	6	4	2	1	2	2	3	1	1	1	0	0	1.9	6
2-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	0.3	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	0.2	0
4-Oct	0	Z	0	0	1	1	1	0	2	1	2	5	6	8	10	10	15	15	11	4	2	1	1	0	4.2	15
5-Oct	1	1	Z	2	4	7	3	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1.1	7
6-Oct	0	0	0	Z	0	0	0	0	0	1	3	5	5	9	8	8	9	5	1	1	0	0	0	0	2.5	9
7-Oct	0	0	0	0	Z	0	0	0	0	1	4	5	2	1	1	1	1	0	0	0	0	0	0	0	0.8	5
8-Oct	0	0	0	0	0	Z	0	0	0	1	2	14	15	11	10	7	3	2	5	3	2	2	1	1	3.5	15
9-Oct	Z	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.6	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	1	0	0	0	0	1	4	6	9	3	7	1	0	0	0	0	0	0	0	0	1.6	9
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	0.2	0
15-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	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	0.3	0
17-Oct	0	0	Z	0	0	1	0	0	0	3	13	20	17	14	12	10	1	1	1	1	2	2	1	1	4.3	20
18-Oct	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.4	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	0.3	0
20-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0.4	1
21-Oct	Z	0	0	0	0	0	0	0	1	2	2	2	2	1	1	1	0	0	0	0	0	0	0	0	0.6	2
22-Oct	0	Z	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
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	1	0	0	0	0	0	0.2	1
25-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0.3	1
26-Oct	3	2	0	0	0	Z	0	0	0	C	C	C	C	0	0	0	0	0	0	0	1	0	0	0	0.5	3
27-Oct	Z	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
28-Oct	0	Z	0	0	0	0	0	0	2	4	8	9	15	14	7	2	1	0	0	0	0	0	0	0	2.8	15
29-Oct	0	0	Z	0	0	0	0	1	1	5	6	4	2	3	3	1	2	1	1	1	1	1	1	0	1.6	6
30-Oct	0	0	0	Z	0	0	0	0	0	0	1	2	4	4	3	3	3	2	2	1	0	0	1	1	1.2	4
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
	0.5	0.4	0.4	0.4	0.5	0.6	0.4	0.3	0.4	0.9	1.7	2.7	2.9	2.5	2.3	1.6	1.4	1.2	1.0	0.6	0.5	0.4	0.3	0.3	Diurnal Average	
	3	2	2	2	4	7	3	1	2	5	13	20	17	14	12	10	15	15	11	4	2	2	1	1	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**  
**Shell Muskeg River - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	696	98.17	98.17
11 - 20	13	1.83	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: 709

Total Number of Hours: 744



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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Shell Muskeg River - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	43	46	62	42	12	10	17	40	119	82	47	57	21	22	43	31	694
11 - 20	0	0	0	0	1	0	0	2	7	2	0	0	0	0	1	0	13
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>	43	46	62	42	13	10	17	42	126	84	47	57	21	22	44	31	707

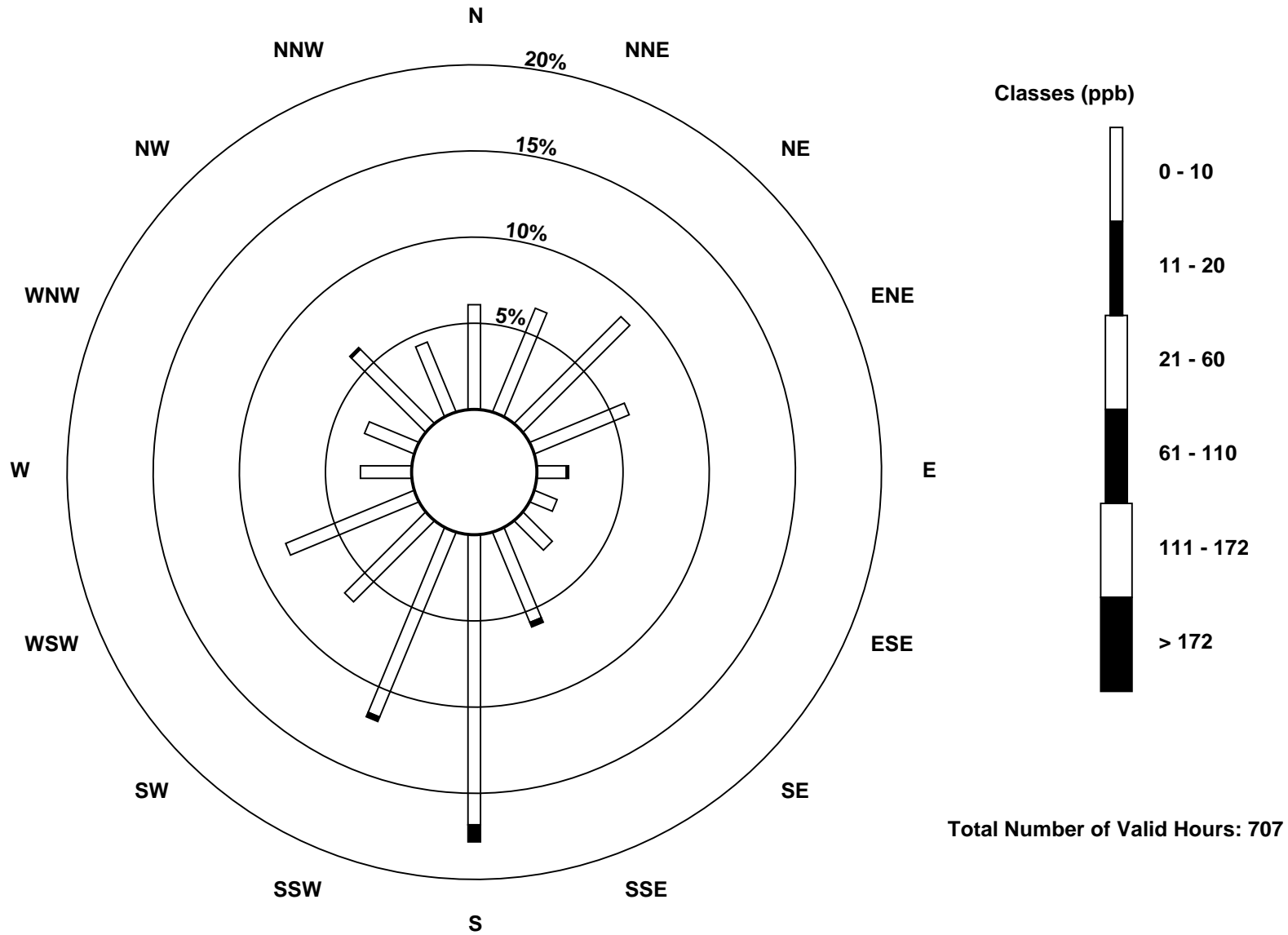
Total Number of Valid Hours: 707

Total Number of Hours: 744

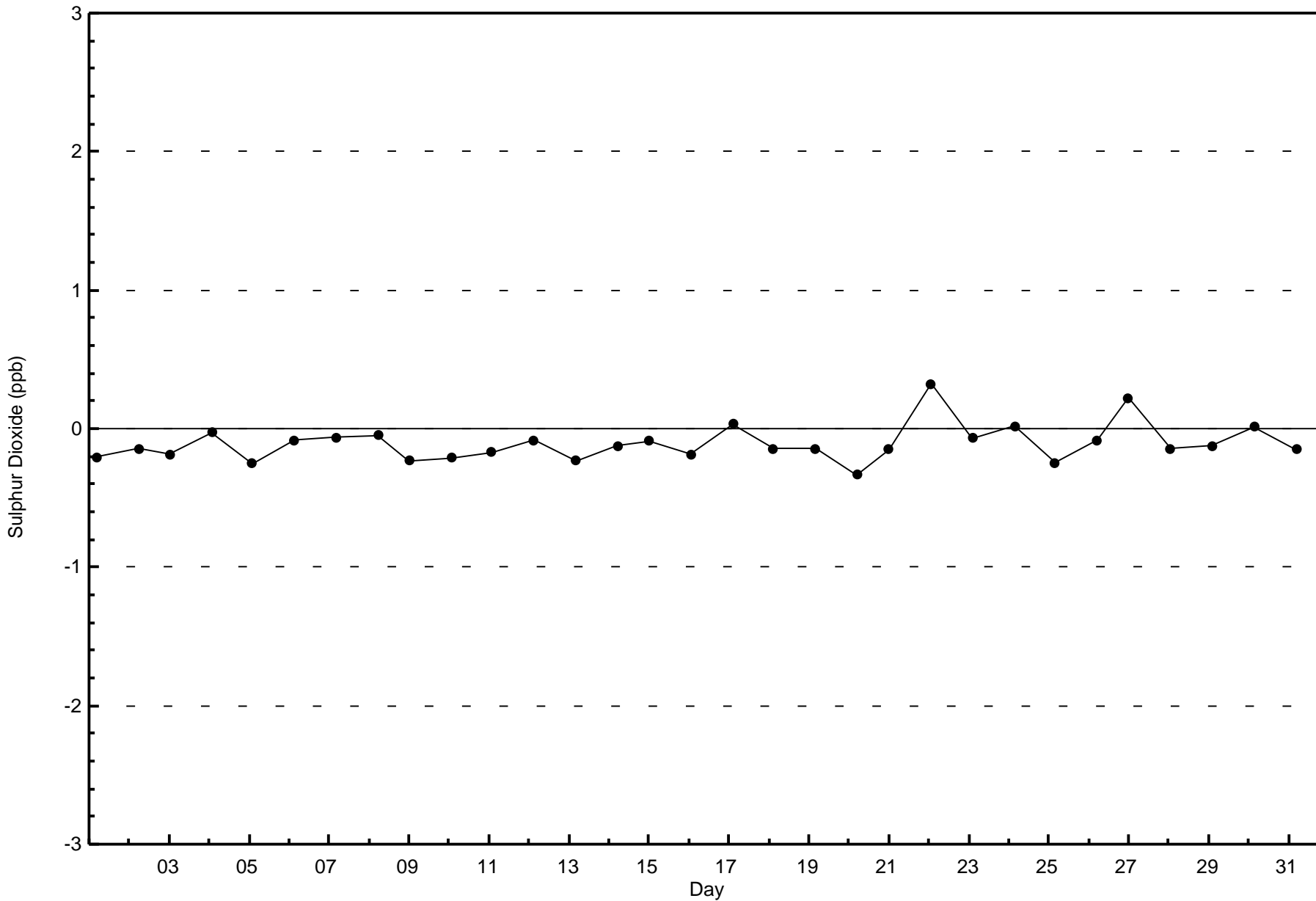


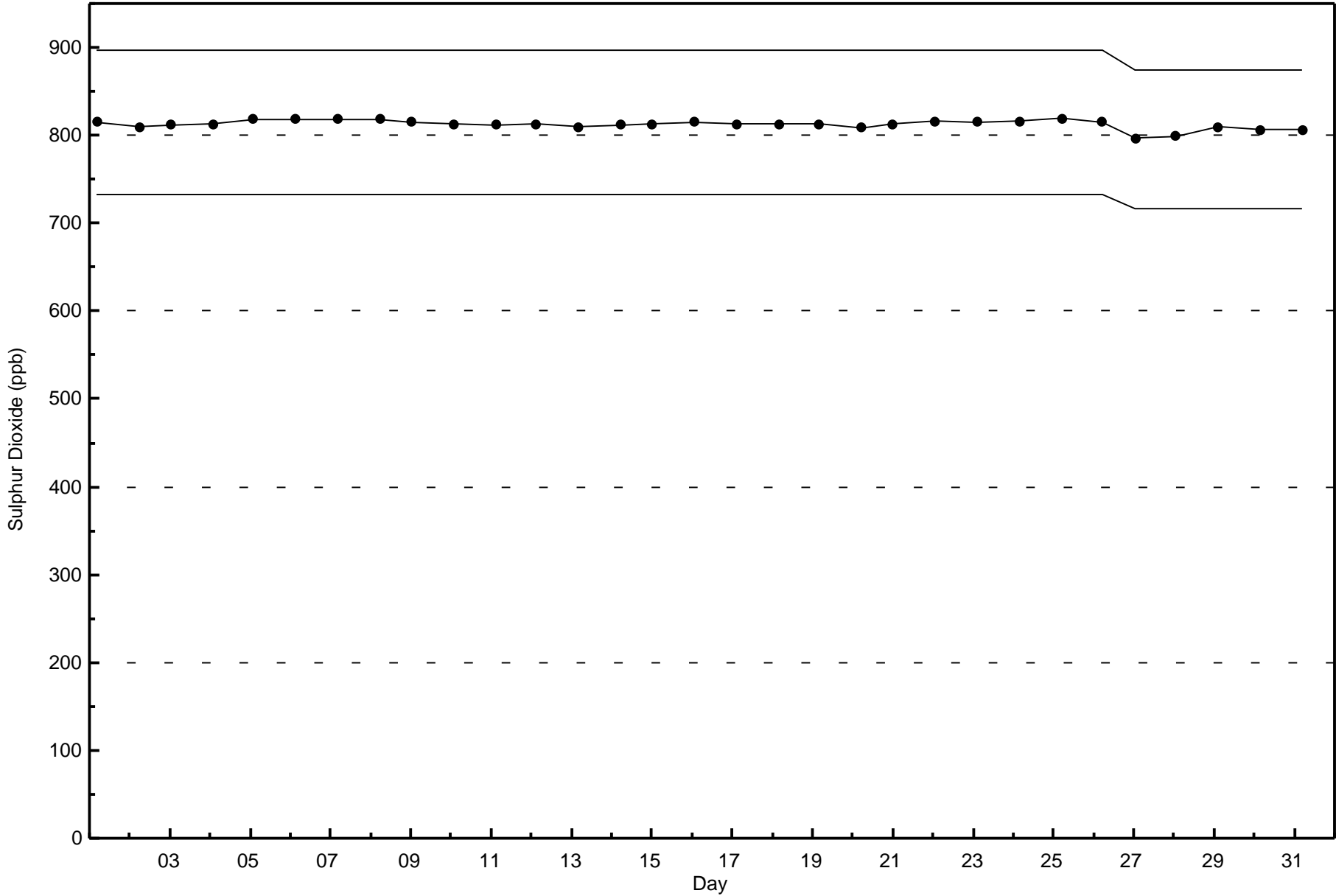
Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Shell Muskeg River (AMS 16)



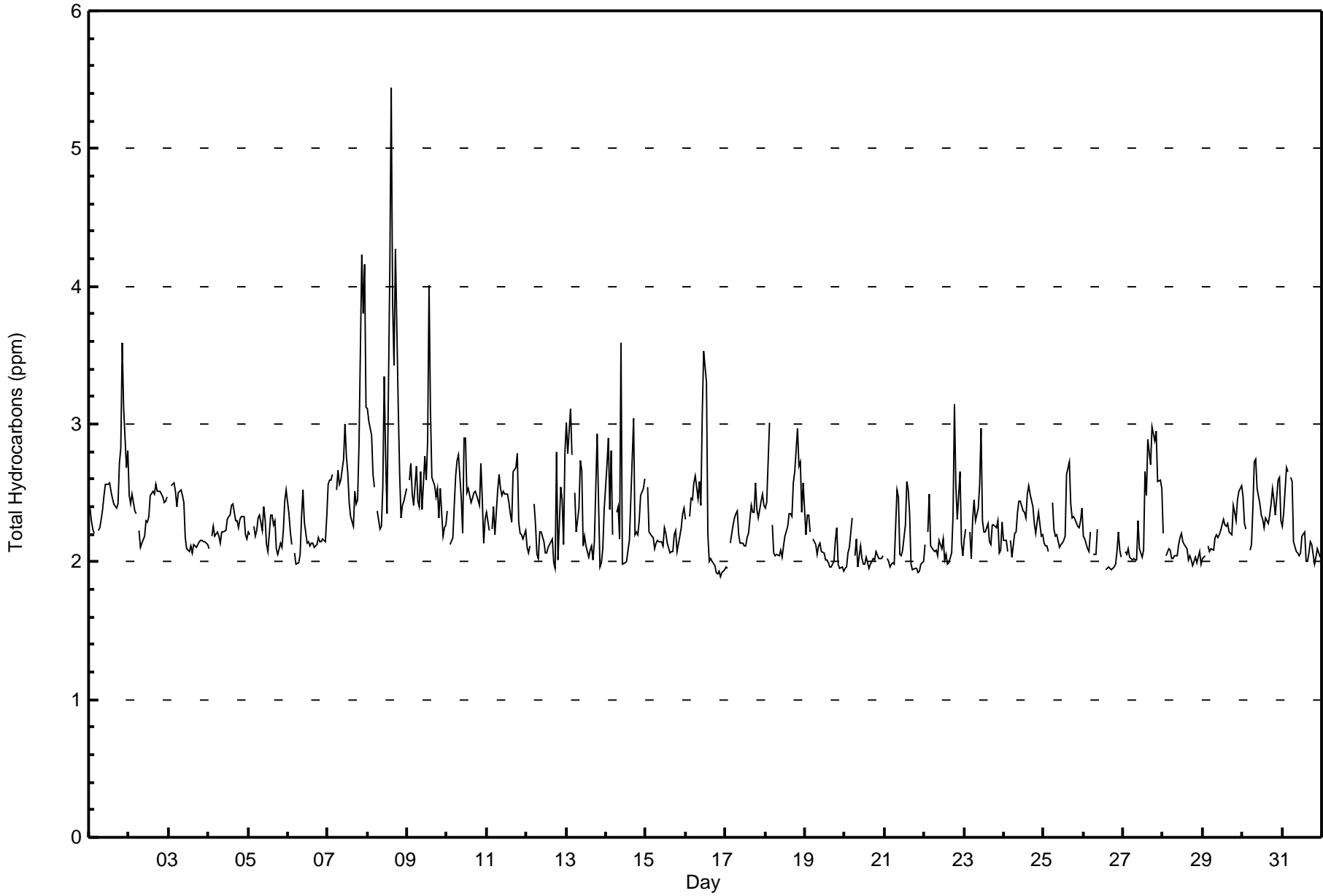








Maximum Value: 5.4 ppm on Oct 8 15:00		Maximum Daily Average: 3.0 ppm on Oct 8		Hours in Service: 744																						
Minimum Value: 1.9 ppm on Oct 16 22:00		Minimum Daily Average: 2.0 ppm on Oct 20		Hours of Data: 709																						
Maximum Diurnal Average: 2.4 ppm at hour 19		Minimum Diurnal Average: 2.2 ppm at hour 5		Hours of Missing Data: 35																						
Monthly Average: 2.32 ppm		Percentiles: P <sub>1</sub> = 1.9 P <sub>10</sub> = 2.0 Q <sub>1</sub> = 2.1 Median = 2.2 Q <sub>3</sub> = 2.5 P <sub>90</sub> = 2.7 P <sub>99</sub> = 3.8		Hours of Calibration: 35																						
				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	2.4	2.3	2.2	2.2	Z	2.2	2.3	2.3	2.4	2.5	2.6	2.6	2.6	2.5	2.5	2.4	2.4	2.4	2.7	2.8	3.6	3.1	2.7	2.8	2.5	3.6
2-Oct	2.5	2.4	2.5	2.4	2.4	Z	2.2	2.1	2.1	2.2	2.3	2.3	2.3	2.5	2.5	2.5	2.6	2.5	2.5	2.5	2.5	2.4	2.4	2.5	2.4	2.6
3-Oct	Z	2.6	2.6	2.6	2.5	2.4	2.5	2.5	2.5	2.4	2.2	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	2.3	2.6
4-Oct	2.1	Z	2.2	2.3	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.2	2.3	2.3	2.2	2.2	2.2	2.3	2.4
5-Oct	2.2	2.2	Z	2.3	2.2	2.2	2.3	2.3	2.2	2.4	2.3	2.1	2.1	2.3	2.3	2.3	2.3	2.1	2.1	2.1	2.2	2.2	2.4	2.5	2.2	2.5
6-Oct	2.3	2.2	2.1	Z	2.1	2.0	2.0	2.1	2.3	2.5	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.1	2.3	2.2	2.5
7-Oct	2.6	2.6	2.6	2.6	Z	2.5	2.7	2.6	2.6	2.7	3.0	2.8	2.6	2.4	2.3	2.3	2.5	2.4	2.5	2.9	4.2	3.8	4.2	3.1	2.8	4.2
8-Oct	3.1	3.0	2.9	2.6	2.5	Z	2.4	2.2	2.3	2.5	3.4	2.8	2.3	4.1	5.4	3.9	3.4	4.3	3.1	2.6	2.3	2.4	2.4	2.5	3.0	5.4
9-Oct	Z	2.6	2.7	2.5	2.4	2.7	2.4	2.4	2.7	2.4	2.8	2.6	2.9	4.0	3.1	2.6	2.6	2.5	2.5	2.3	2.5	2.2	2.2	2.3	2.6	4.0
10-Oct	2.4	Z	2.1	2.2	2.4	2.6	2.7	2.8	2.5	2.2	2.9	2.9	2.5	2.5	2.4	2.5	2.5	2.5	2.5	2.4	2.7	2.4	2.1	2.3	2.5	2.9
11-Oct	2.4	2.2	Z	2.2	2.4	2.2	2.5	2.6	2.5	2.5	2.5	2.5	2.5	2.4	2.3	2.3	2.7	2.7	2.8	2.3	2.2	2.2	2.2	2.2	2.4	2.8
12-Oct	2.1	2.1	2.1	Z	2.4	2.3	2.1	2.0	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.0	2.0	2.8	2.0	2.5	2.4	2.1	2.8	2.2	2.8
13-Oct	3.0	2.8	3.1	2.8	Z	2.5	2.2	2.4	2.7	2.7	2.1	2.2	2.1	2.0	2.1	2.1	2.0	2.1	2.9	2.4	2.0	2.0	2.1	2.4	2.4	3.1
14-Oct	2.7	2.9	2.4	2.8	2.2	Z	2.4	2.4	2.2	3.6	2.0	2.0	2.0	2.1	2.2	2.4	3.0	2.2	2.2	2.2	2.3	2.5	2.5	2.6	2.4	3.6
15-Oct	Z	2.5	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.3	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.2	2.3	2.4	2.2	2.5
16-Oct	2.3	Z	2.3	2.5	2.5	2.6	2.6	2.5	2.6	2.4	3.1	3.5	3.3	2.2	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.3	3.5
17-Oct	2.0	2.0	Z	2.1	2.3	2.3	2.3	2.4	2.2	2.1	2.1	2.1	2.2	2.2	2.4	2.4	2.4	2.4	2.6	2.4	2.3	2.4	2.5	2.4	2.3	2.6
18-Oct	2.4	2.4	3.0	Z	2.3	2.1	2.0	2.1	2.0	2.1	2.0	2.1	2.2	2.3	2.4	2.4	2.3	2.6	2.7	3.0	2.7	2.7	2.4	2.6	2.4	3.0
19-Oct	2.2	2.3	2.3	2.2	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.2	2.0	2.0	2.0	1.9	2.1	2.3
20-Oct	2.0	2.0	2.1	2.1	2.3	Z	2.0	2.2	2.0	2.1	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.3
21-Oct	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.1	2.0	2.1	2.3	2.6	2.5	2.4	2.0	1.9	2.0	2.0	1.9	1.9	2.0	2.0	2.1	2.6
22-Oct	2.1	Z	2.2	2.5	2.1	2.1	2.1	2.1	2.0	2.2	2.1	2.2	2.0	2.1	2.0	2.0	2.1	2.3	3.1	2.5	2.3	2.6	2.1	2.0	2.2	3.1
23-Oct	2.2	2.2	Z	2.2	2.0	2.3	2.4	2.3	2.4	2.6	3.0	2.3	2.2	2.2	2.3	2.1	2.1	2.3	2.3	2.3	2.3	2.1	2.1	2.3	2.3	3.0
24-Oct	2.2	2.2	2.1	Z	2.2	2.0	2.2	2.2	2.4	2.4	2.4	2.4	2.4	2.3	2.5	2.5	2.5	2.4	2.3	2.2	2.3	2.4	2.2	2.2	2.3	2.5
25-Oct	2.1	2.1	2.1	2.1	Z	2.4	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.6	2.7	2.4	2.3	2.3	2.3	2.3	2.2	2.3	2.4	2.3	2.7
26-Oct	2.2	2.2	2.1	2.1	2.2	Z	2.1	2.1	2.2	C	C	C	C	1.9	2.0	2.0	2.0	1.9	2.0	2.0	2.1	2.2	2.1	2.0	2.1	2.2
27-Oct	Z	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.3	2.1	2.0	2.1	2.7	2.5	2.9	2.7	3.0	2.9	2.9	3.0	2.6	2.6	2.5	2.4	3.0
28-Oct	2.2	Z	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.2
29-Oct	2.0	2.0	Z	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.4	2.4	2.3	2.4	2.5	2.6	2.2	2.6
30-Oct	2.5	2.3	2.2	Z	2.1	2.1	2.4	2.7	2.7	2.5	2.4	2.3	2.3	2.2	2.3	2.3	2.3	2.4	2.5	2.4	2.3	2.6	2.6	2.3	2.4	2.7
31-Oct	2.3	2.4	2.7	2.7	Z	2.6	2.6	2.1	2.1	2.1	2.0	2.1	2.2	2.2	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.0	2.2	2.7
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration																										





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

**Total Hydrocarbons (THC) - ppm**  
**Shell Muskeg River - October 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	112	15.80	15.80
2.1 - 3.0	575	81.10	96.90
3.1 - 10.0	22	3.10	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



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

**Total Hydrocarbons (THC) - ppm**  
**Shell Muskeg River - October 2015**

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	6	5	3	3	8	18	25	8	4	8	8	6	9	0	112
2.1 - 3.0	37	41	54	37	10	7	9	23	101	75	42	47	13	16	34	27	573
3.1 - 10.0	6	4	2	0	0	0	0	1	0	1	1	2	0	0	1	4	22
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	43	46	62	42	13	10	17	42	126	84	47	57	21	22	44	31	707

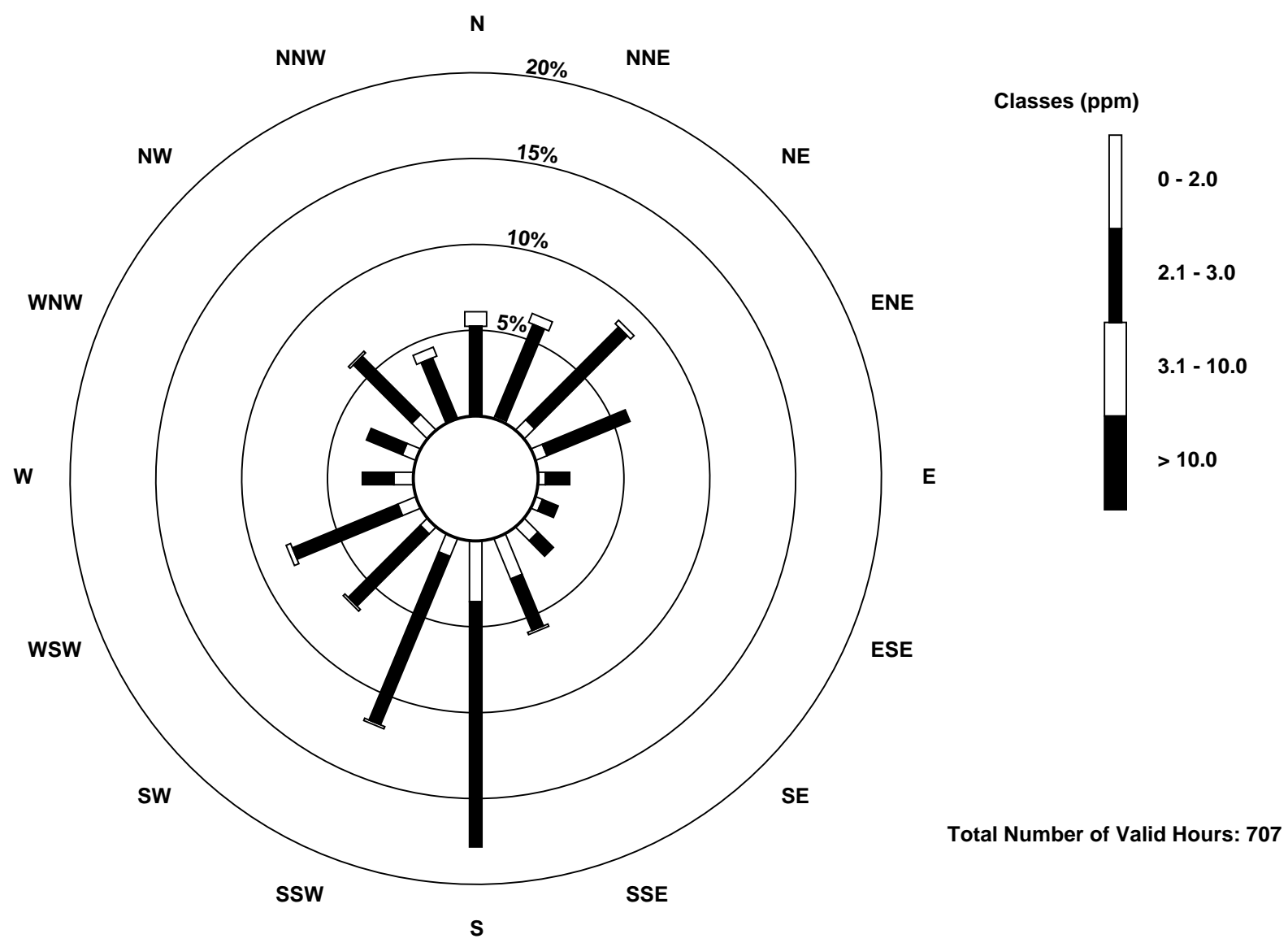
Total Number of Valid Hours: 707

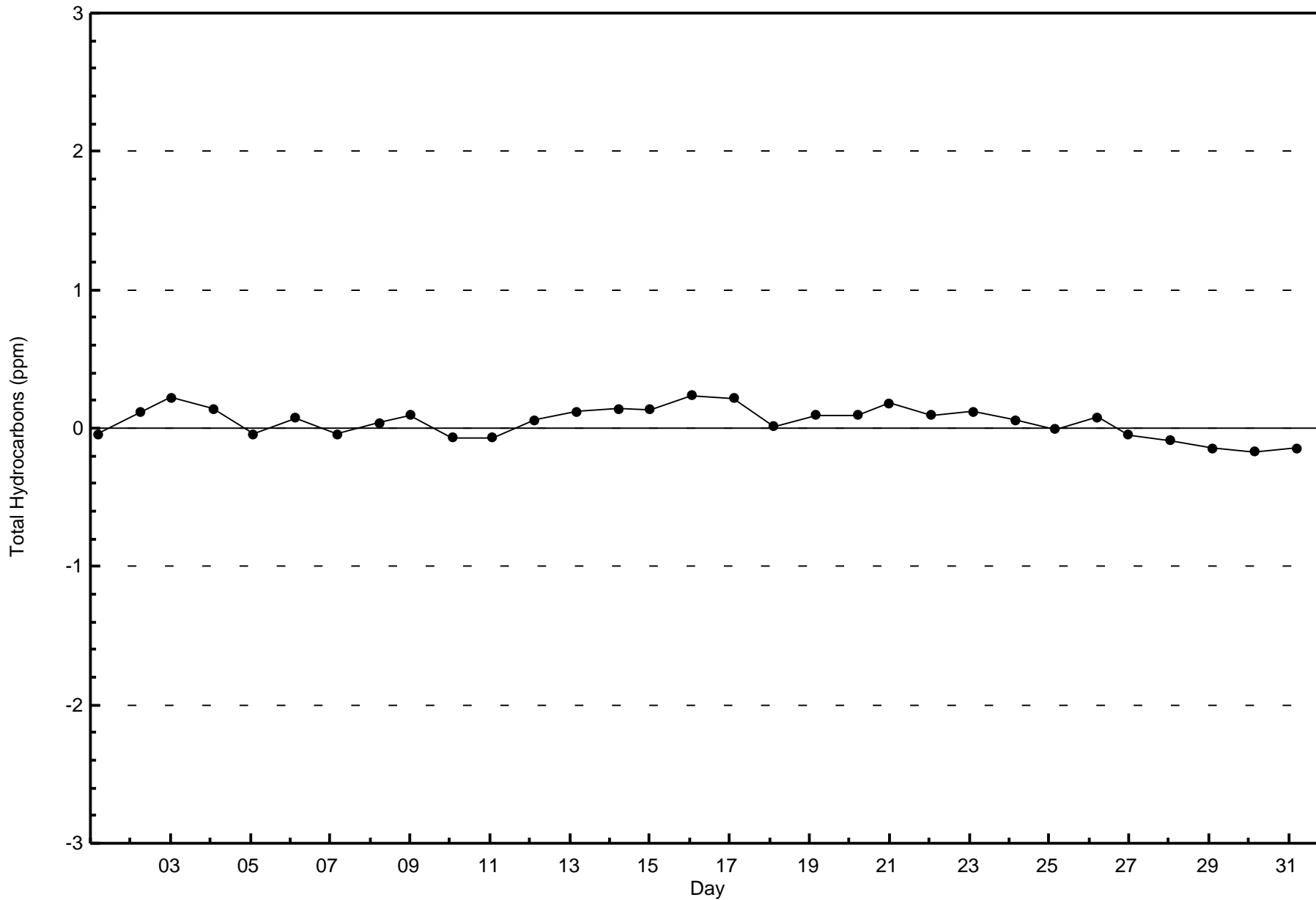
Total Number of Hours: 744



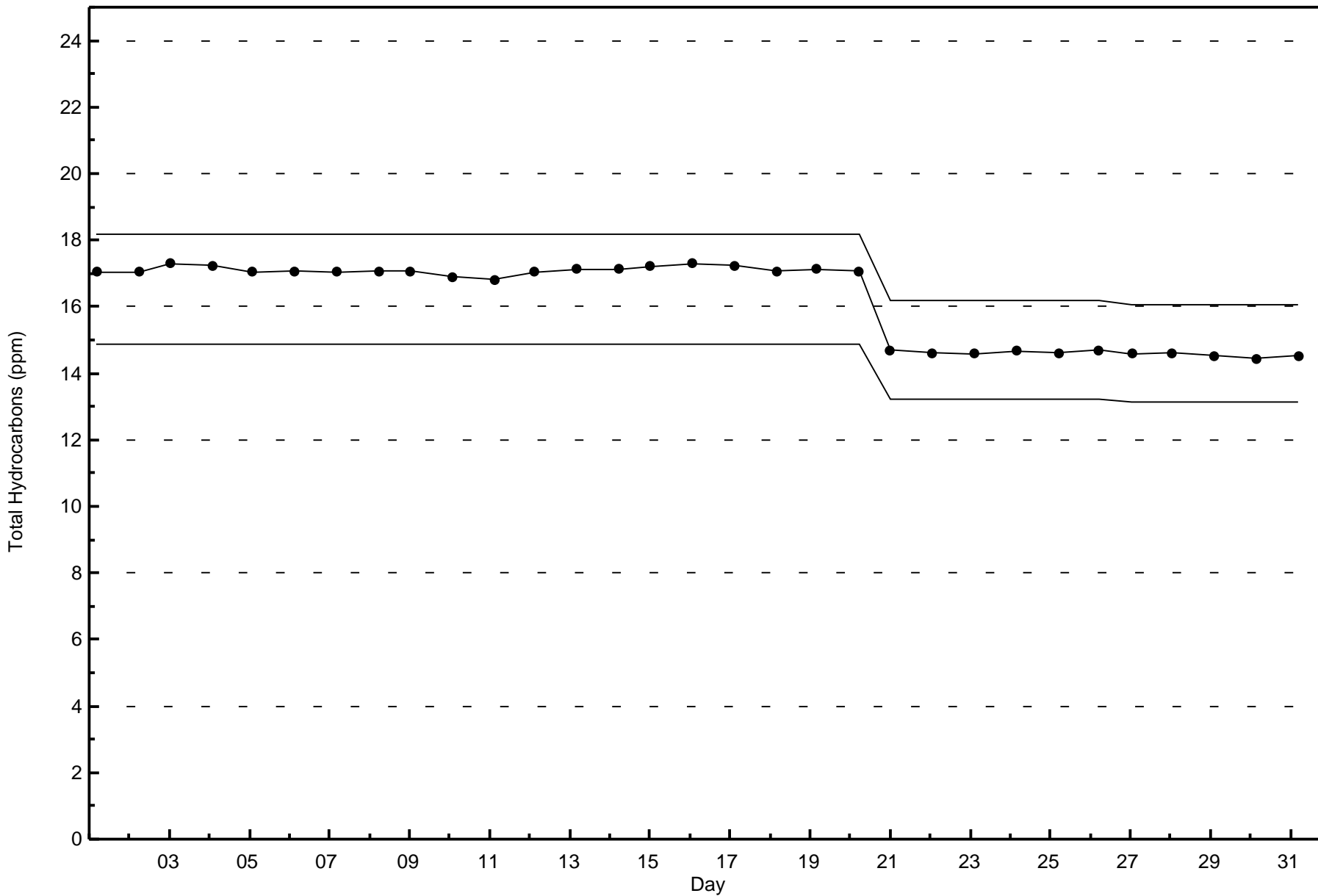
Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Total Hydrocarbons (THC) - ppm  
Shell Muskeg River (AMS 16)











Maximum Value: 102 ppb on Oct 8 15:00																		Maximum Daily Average: 26.8 ppb on Oct 7																		Hours in Service: 744	
Minimum Value: 0 ppb on Oct 26 17:00																		Minimum Daily Average: 0.2 ppb on Oct 13																		Hours of Data: 707	
Maximum Diurnal Average: 8.6 ppb at hour 9																		Minimum Diurnal Average: 2.6 ppb at hour 20																		Hours of Missing Data: 37	
Monthly Average: 5.7 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> = 15 P <sub>99</sub> = 54																		Hours of Calibration: 36	
																																				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	1	2	3	2	2	2	1	0	0	0	0	0	0	25	10	7	5	2.8	25												
2-Oct	0	0	4	1	3	Z	15	8	25	20	20	24	16	16	16	12	11	10	9	12	10	9	8	9	11.2	25											
3-Oct	Z	9	8	9	10	6	8	6	8	11	21	11	6	9	3	4	6	2	0	0	0	1	1	6.1	21												
4-Oct	0	Z	2	1	0	0	0	0	1	1	2	3	3	5	6	5	4	3	3	4	3	7	1	1	2.4	7											
5-Oct	3	13	Z	10	7	1	1	3	7	4	1	1	1	2	2	2	1	0	0	0	0	3	2	2.8	13												
6-Oct	0	0	0	Z	0	0	1	7	22	37	20	4	3	2	3	2	1	0	0	0	0	0	2	4.6	37												
7-Oct	23	28	58	54	Z	48	54	45	39	18	18	11	9	4	1	0	1	1	1	15	62	52	55	21	26.8	62											
8-Oct	21	20	19	13	9	Z	3	2	6	18	14	16	14	55	102	58	34	56	20	9	3	4	2	11	22.1	102											
9-Oct	Z	11	3	3	6	12	6	6	5	9	11	8	13	50	12	5	1	1	6	1	4	2	1	0	7.7	50											
10-Oct	0	Z	0	3	6	7	10	13	6	2	0	0	0	0	0	0	0	0	0	0	1	6	2	13	3.2	13											
11-Oct	18	24	Z	22	14	20	15	15	15	10	9	10	8	3	2	2	4	4	3	1	0	0	0	0	8.7	24											
12-Oct	0	0	0	Z	35	22	6	6	19	11	10	6	5	3	4	1	0	0	0	0	0	0	0	0	5.6	35											
13-Oct	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1											
14-Oct	0	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	5	5	20	14	8	12	7	5	3	3.7	20											
15-Oct	Z	1	1	3	7	0	0	0	4	5	2	5	3	1	1	0	1	3	2	1	4	20	24	18	4.6	24											
16-Oct	13	Z	13	12	32	36	46	46	53	24	40	66	28	3	0	0	0	0	0	0	0	0	0	0	18.0	66											
17-Oct	0	0	Z	0	1	1	9	9	5	5	7	5	3	2	2	1	0	0	0	0	0	0	0	0	2.2	9											
18-Oct	0	0	0	Z	0	0	0	0	1	1	0	0	1	1	1	1	0	0	1	7	10	22	12	9	2.9	22											
19-Oct	8	6	9	9	Z	8	5	2	3	4	3	5	1	0	0	0	0	0	3	4	0	0	0	0	3.0	9											
20-Oct	0	0	0	0	0	Z	1	0	0	0	0	0	1	1	1	1	0	0	1	2	4	11	7	1	1.4	11											
21-Oct	Z	0	0	0	0	0	0	11	13	C	C	C	C	C	20	12	1	0	0	0	0	0	0	0	3.1	20											
22-Oct	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1											
23-Oct	0	0	Z	0	0	0	0	3	3	7	28	13	7	7	9	5	1	8	11	8	11	1	8	2	5.7	28											
24-Oct	0	12	2	Z	1	0	0	0	10	13	7	5	4	2	12	5	2	1	1	2	3	2	0	1	3.7	13											
25-Oct	0	3	8	3	Z	12	9	5	2	1	1	2	2	2	22	19	5	1	0	0	1	1	1	1	4.3	22											
26-Oct	1	0	0	0	0	Z	1	1	8	2	0	0	M	0	2	0	0	0	0	0	0	0	0	0	0.8	8											
27-Oct	Z	1	0	0	0	0	0	1	0	4	1	1	2	4	5	11	3	4	4	3	4	10	9	7	3.3	11											
28-Oct	5	Z	5	0	0	0	0	0	0	1	2	3	6	7	4	1	0	0	0	0	0	0	0	0	1.4	7											
29-Oct	0	0	Z	0	0	0	0	0	1	2	3	2	2	2	2	1	0	0	0	0	0	0	0	0	0.7	3											
30-Oct	0	0	0	Z	0	0	2	8	4	3	3	14	9	7	13	10	6	7	5	1	0	5	10	13	5.2	14											
31-Oct	10	7	36	19	Z	22	24	3	2	3	2	2	6	6	1	0	0	0	0	3	4	10	5	2	7.2	36											
4.1																		5.2																		Diurnal Average	
23																		58																		Diurnal Maximum	
Z - zerospan																		C - Calibration																		M - Maintenance	

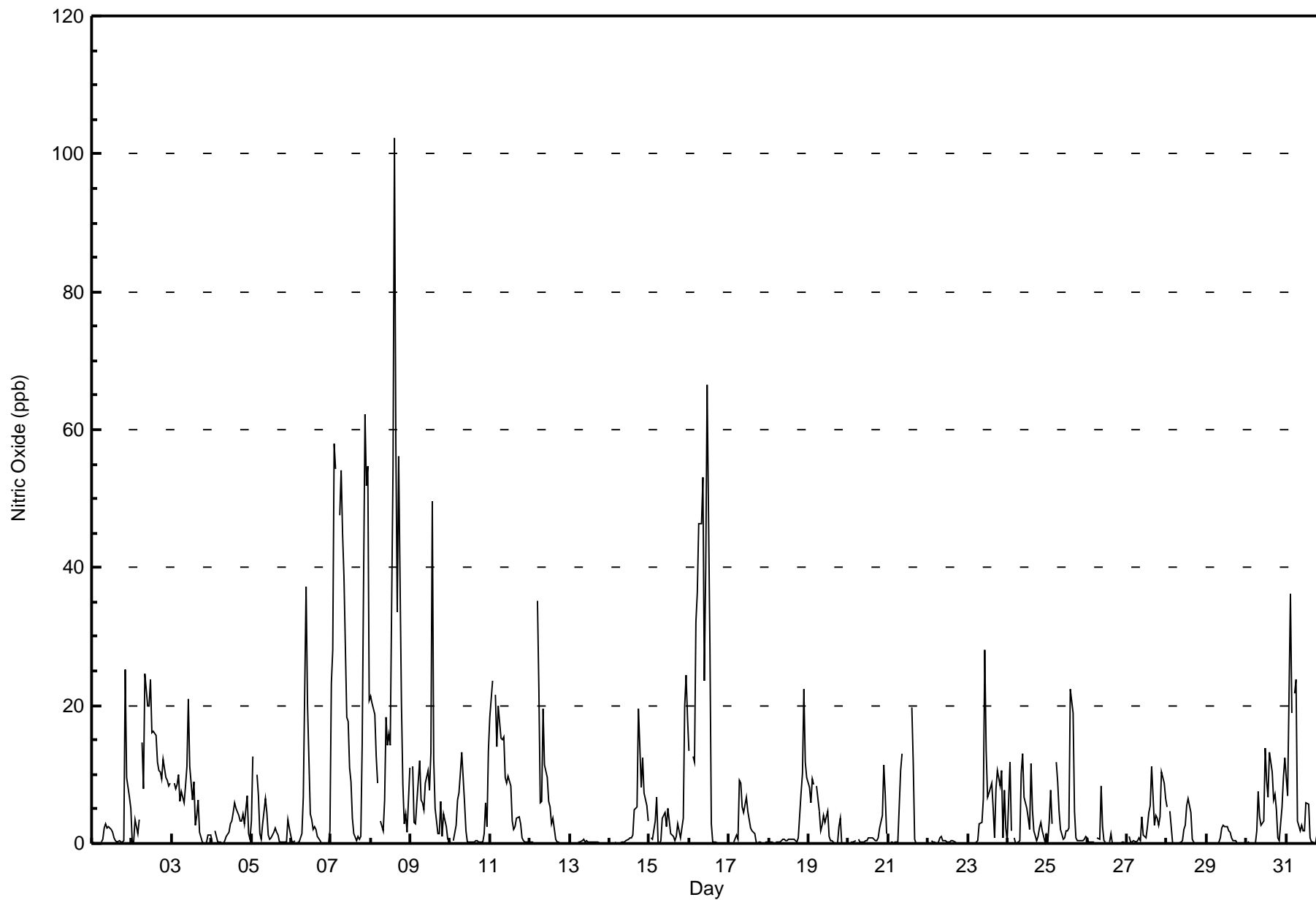


Wood Buffalo Environmental Association

Hourly Averages

Nitric Oxide (NO) - ppb

Shell Muskeg River - October 2015





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

**Nitric Oxide (NO) - ppb**  
**Shell Muskeg River - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	662	93.64	93.64
21 - 40	28	3.96	97.60
41 - 80	16	2.26	99.86
81 - 159	1	0.14	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



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

**Nitric Oxide (NO) - ppb**  
**Shell Muskeg River - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	35	38	58	38	13	11	17	40	119	84	46	56	21	22	40	23	661
21 - 40	3	7	3	4	0	0	0	2	4	0	0	0	0	0	1	4	28
11 - 80	5	1	1	0	0	0	0	1	1	0	1	1	0	0	2	2	15
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	43	46	62	42	13	11	17	43	124	84	47	57	21	22	43	30	705

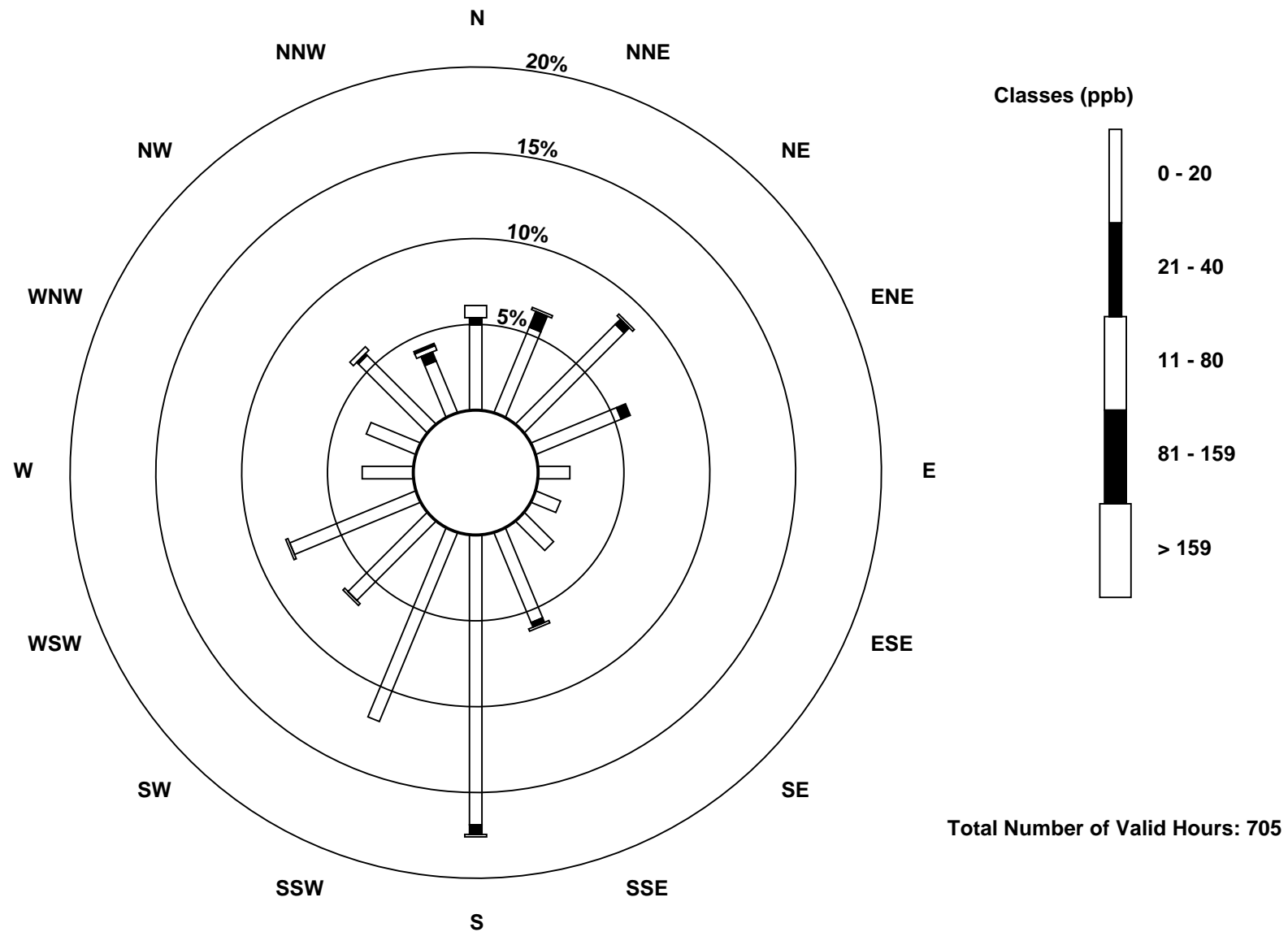
Total Number of Valid Hours: 705

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Nitric Oxide (NO) - ppb  
Shell Muskeg River (AMS 16)



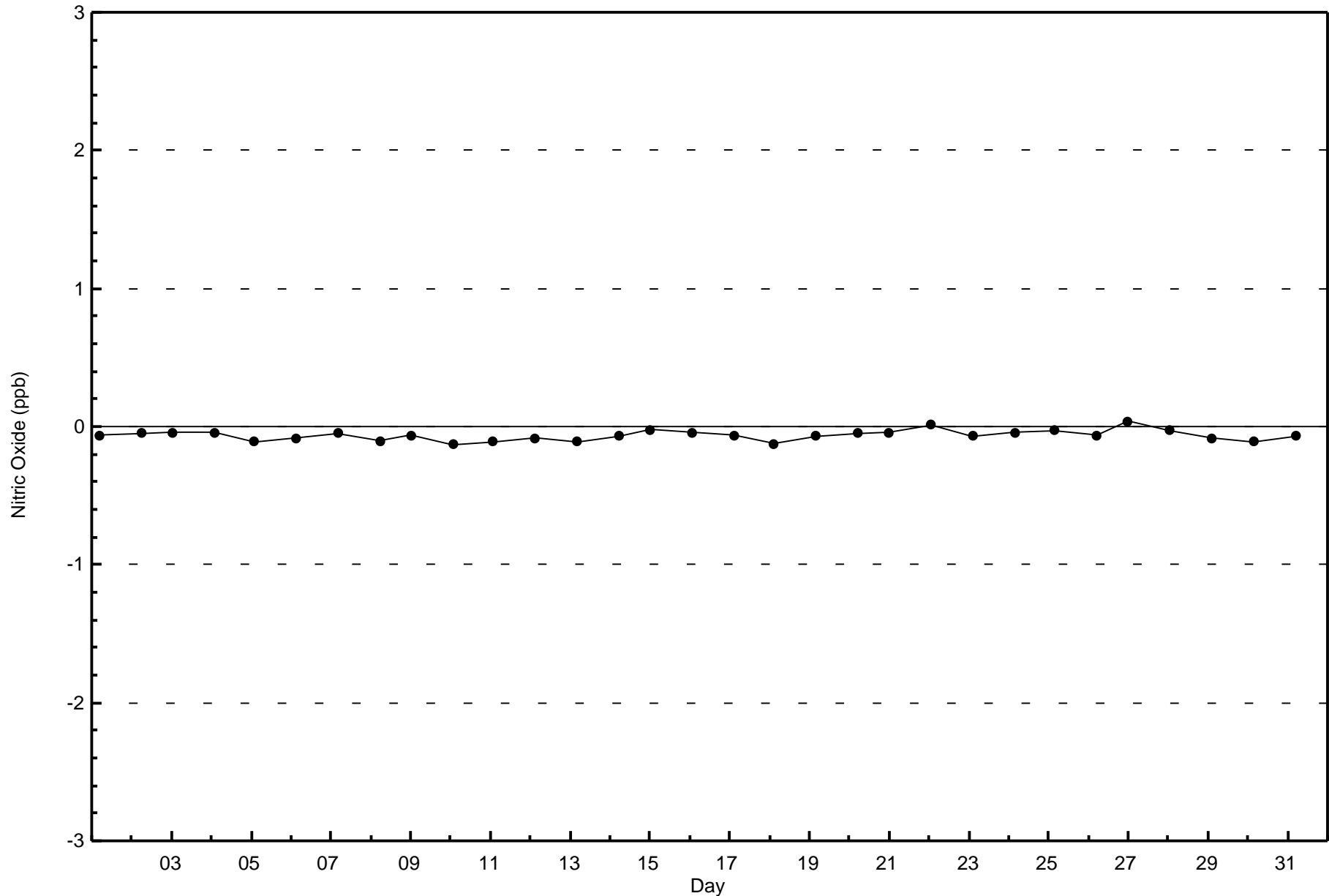


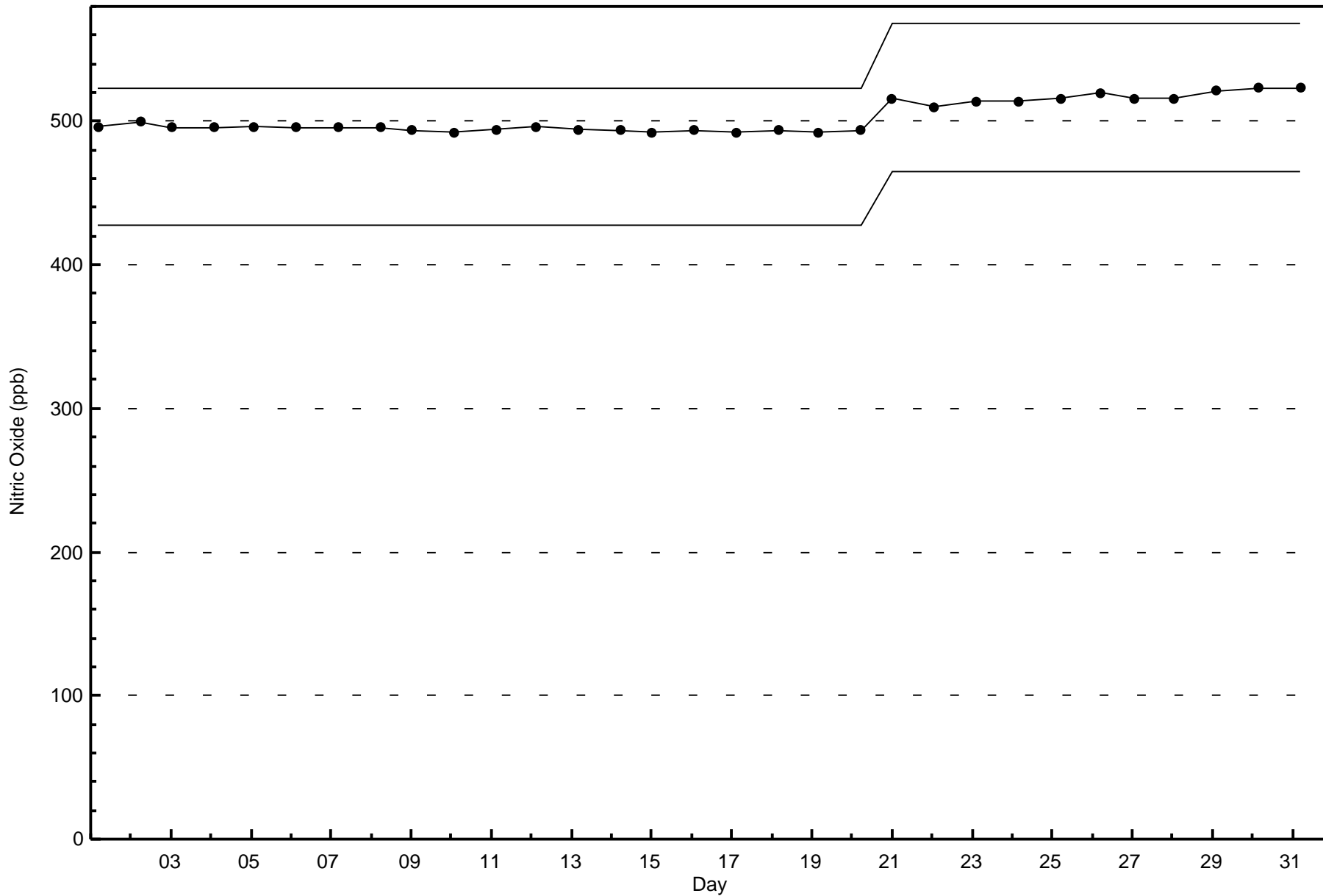
Wood Buffalo Environmental Association

Zero Responses

Nitric Oxide (NO) - ppb

Shell Muskeg River - October 2015







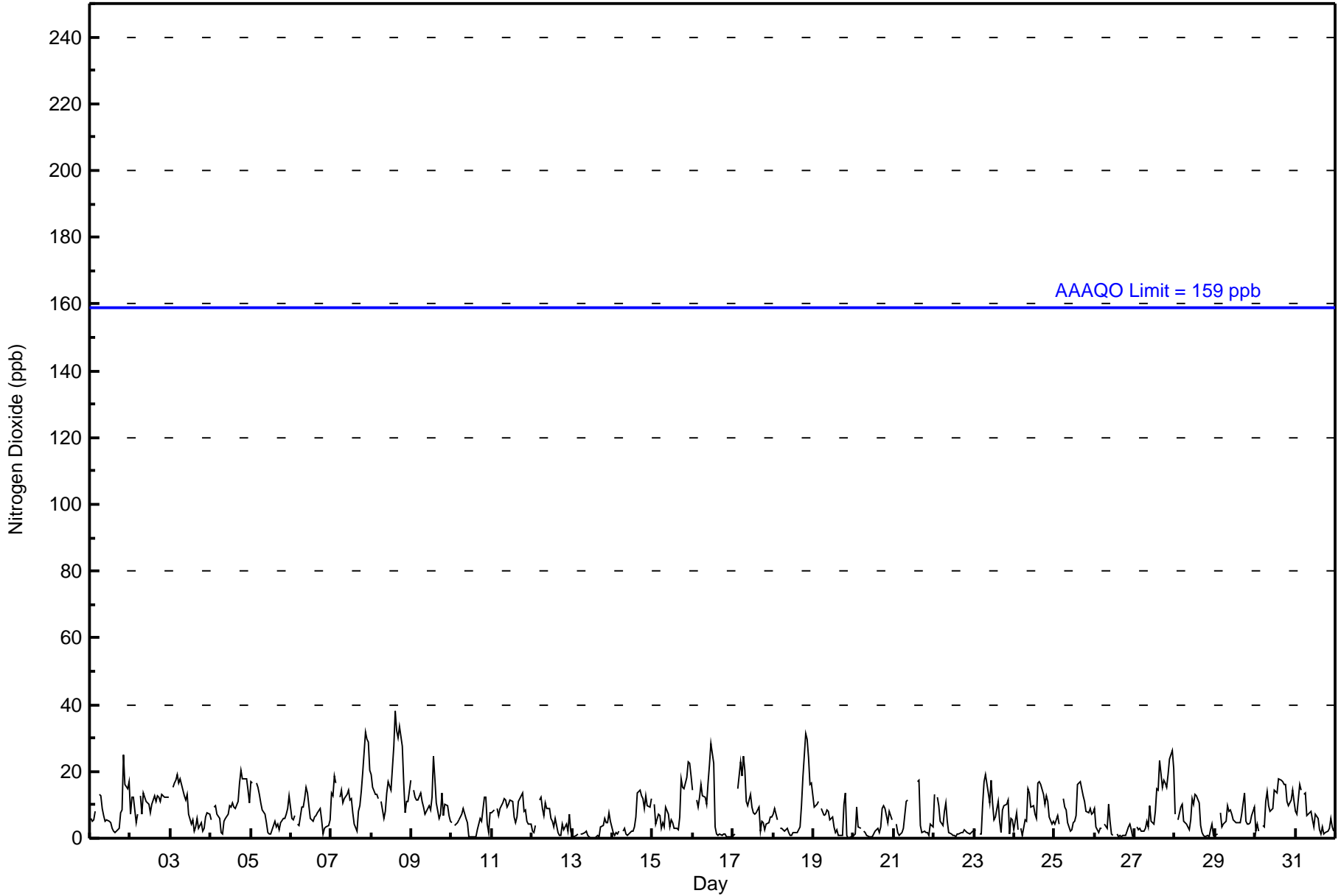


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 38 ppb on Oct 8 15:00	Maximum Daily Average: 17.8 ppb on Oct 8		Hours of Data:	707
Minimum Value: 0 ppb on Oct 19 22:00	Minimum Daily Average: 2.1 ppb on Oct 13		Hours of Missing Data:	37
Maximum Diurnal Average: 9.4 ppb at hour 21	Minimum Diurnal Average: 6.6 ppb at hour 1		Hours of Calibration:	36
Monthly Average: 7.9 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 3 Median = 7 Q <sub>3</sub> = 11 P <sub>90</sub> = 16 P <sub>99</sub> = 29		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	6	5	5	8	Z	13	13	9	7	5	5	5	3	2	2	3	3	8	8	25	16	15	17	8.1	25	
2-Oct	7	12	12	5	7	Z	13	7	14	11	10	10	8	10	13	11	13	12	11	13	12	12	12	12	10.8	14
3-Oct	Z	15	17	17	19	17	18	14	13	12	13	7	4	5	2	4	6	3	5	2	3	6	8	7	9.5	19
4-Oct	5	Z	9	10	7	6	2	1	5	6	7	10	9	10	9	9	11	17	21	18	18	14	11	10.1	21	
5-Oct	17	17	Z	16	15	13	10	8	7	5	2	1	1	4	5	4	4	2	5	6	6	7	9	13	7.7	17
6-Oct	6	5	7	Z	4	4	9	9	12	15	13	6	5	5	7	7	8	9	6	1	3	4	4	5	6.7	15
7-Oct	14	13	19	17	Z	12	14	11	12	13	14	12	12	8	4	2	8	10	14	19	32	30	29	20	14.7	32
8-Oct	19	15	13	13	12	Z	11	6	8	14	17	16	14	28	38	32	30	34	28	17	8	11	11	17	17.8	38
9-Oct	Z	14	12	12	12	14	11	9	7	8	10	9	12	25	18	11	6	7	14	7	10	10	7	5	10.8	25
10-Oct	5	Z	4	5	6	7	7	9	6	5	1	1	1	1	0	2	4	6	5	12	12	4	2	8	4.8	12
11-Oct	8	8	Z	9	7	9	10	12	11	10	10	11	11	6	5	7	11	13	14	8	9	5	4	4	8.7	14
12-Oct	2	2	4	Z	12	12	9	7	10	9	9	6	5	4	6	2	1	1	4	2	4	2	7	2	5.3	12
13-Oct	1	0	1	1	Z	1	1	2	2	1	1	0	0	0	0	1	1	4	4	6	5	5	8	5	2.1	8
14-Oct	2	1	2	1	2	Z	2	3	1	1	1	2	2	3	7	14	14	13	12	9	13	10	9	12	5.8	14
15-Oct	Z	10	4	7	7	3	5	3	9	7	3	6	5	3	3	3	6	18	15	15	18	23	23	19	9.3	23
16-Oct	15	Z	11	9	12	16	13	12	10	17	22	29	22	4	1	1	1	1	1	1	1	0	0	0	8.7	29
17-Oct	1	1	Z	15	23	19	25	20	11	10	13	9	8	7	8	9	2	5	5	3	4	5	7	7	9.3	25
18-Oct	7	9	6	Z	3	3	3	2	3	2	1	1	2	2	2	2	3	10	18	31	30	24	16	17	8.5	31
19-Oct	9	10	10	11	Z	9	7	7	9	8	5	6	3	2	2	1	1	1	10	14	1	0	0	0	5.6	14
20-Oct	1	1	9	3	3	Z	2	2	1	1	1	1	1	2	3	2	4	9	10	9	5	8	7	6	3.8	10
21-Oct	Z	4	2	1	1	2	3	11	12	C	C	C	C	C	17	17	4	2	2	2	2	1	4	4	5.0	17
22-Oct	13	Z	12	10	5	4	8	10	5	2	1	1	1	1	1	1	2	2	2	2	2	1	2	2	3.9	13
23-Oct	2	3	Z	1	1	10	17	19	14	11	17	11	5	6	11	5	2	8	10	10	12	1	6	6	8.2	19
24-Oct	3	8	2	Z	3	1	6	5	15	14	9	10	7	6	17	17	16	13	10	13	11	6	4	5	8.7	17
25-Oct	4	5	7	4	Z	12	9	9	5	2	3	5	5	7	16	17	15	13	11	8	8	9	7	8	8.1	17
26-Oct	9	3	2	3	3	Z	4	3	10	5	1	1	M	1	1	1	0	1	1	2	4	4	3	0	2.8	10
27-Oct	Z	3	3	3	2	2	3	5	3	10	5	4	8	15	15	24	15	17	16	15	19	24	26	21	11.2	26
28-Oct	7	Z	6	9	10	5	5	4	3	5	12	10	13	13	10	4	2	1	1	1	1	3	4	1	5.6	13
29-Oct	1	1	Z	8	4	4	5	10	8	8	7	5	5	5	5	5	7	14	5	4	4	5	7	10	5.9	14
30-Oct	2	4	2	Z	4	4	11	14	10	8	9	15	14	14	18	17	17	16	16	11	10	12	15	11	11.0	18
31-Oct	8	7	16	14	Z	13	14	7	8	8	6	4	7	6	3	1	3	1	2	2	3	6	4	2	6.3	16

6.6	6.9	7.6	8.2	7.4	8.2	8.6	8.1	8.0	7.6	7.6	7.1	6.8	6.8	7.9	7.5	7.1	8.5	9.1	8.8	9.4	8.7	8.8	8.2	Diurnal Average
19	17	19	17	23	19	25	20	15	17	22	29	22	28	38	32	30	34	28	31	32	30	29	21	Diurnal Maximum

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





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Shell Muskeg River - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	681	96.32	96.32
21 - 40	26	3.68	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: 707

Total Number of Hours: 744



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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Shell Muskeg River - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	36	42	62	40	13	11	17	43	122	83	47	57	21	21	41	23	679
21 - 40	7	4	0	2	0	0	0	0	2	1	0	0	0	1	2	7	26
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>	43	46	62	42	13	11	17	43	124	84	47	57	21	22	43	30	705

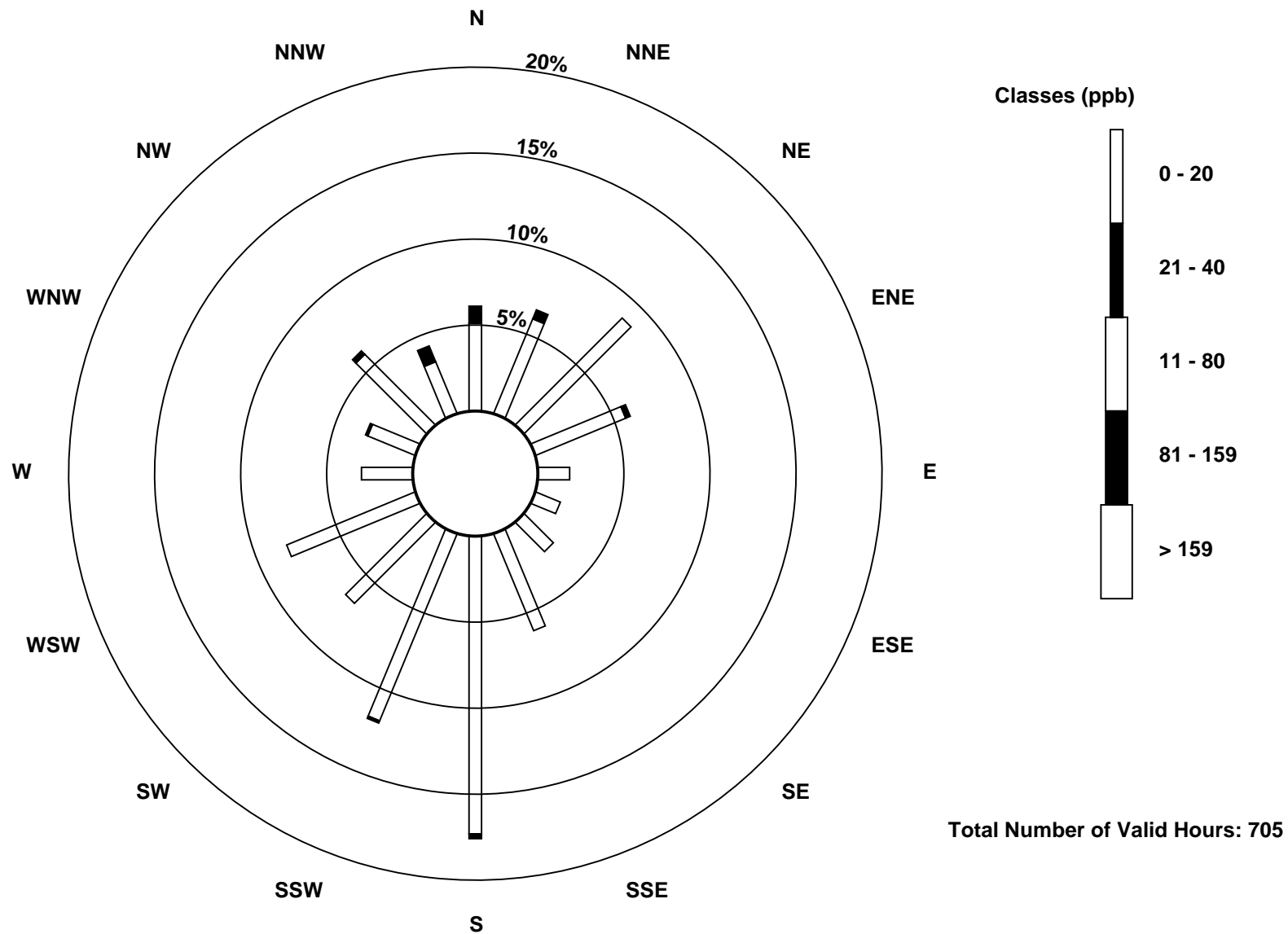
Total Number of Valid Hours: 705

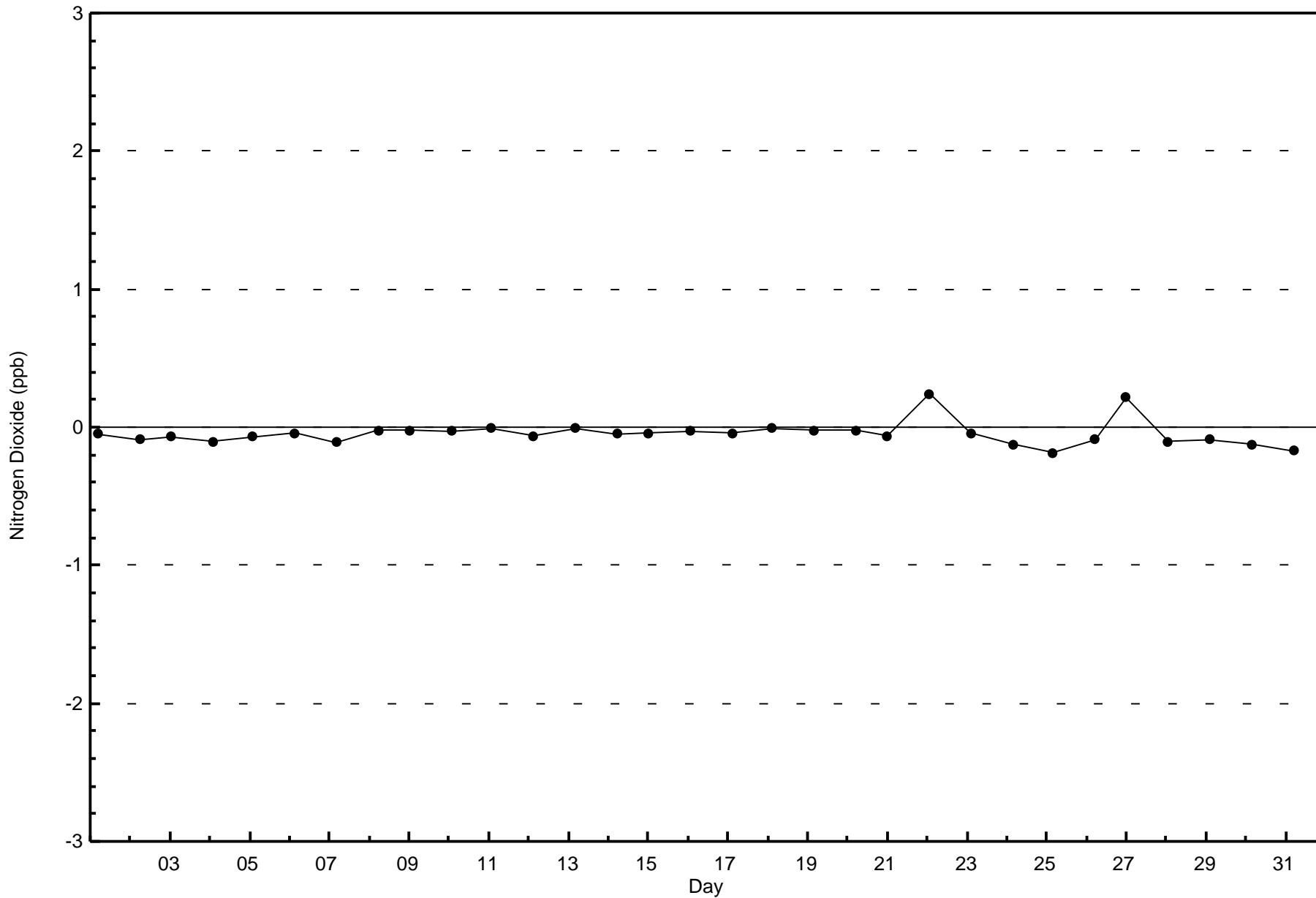
Total Number of Hours: 744

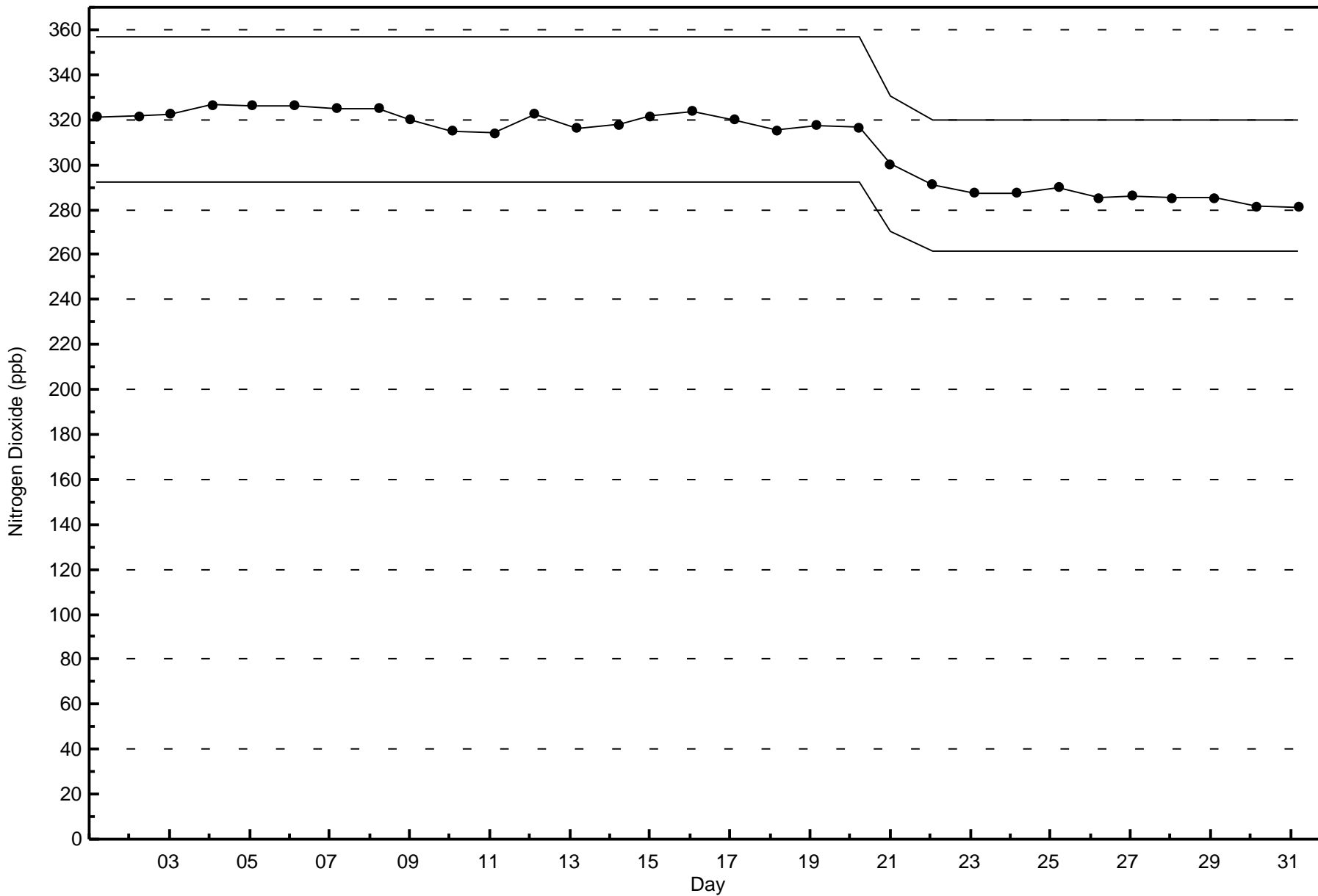


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Shell Muskeg River (AMS 16)



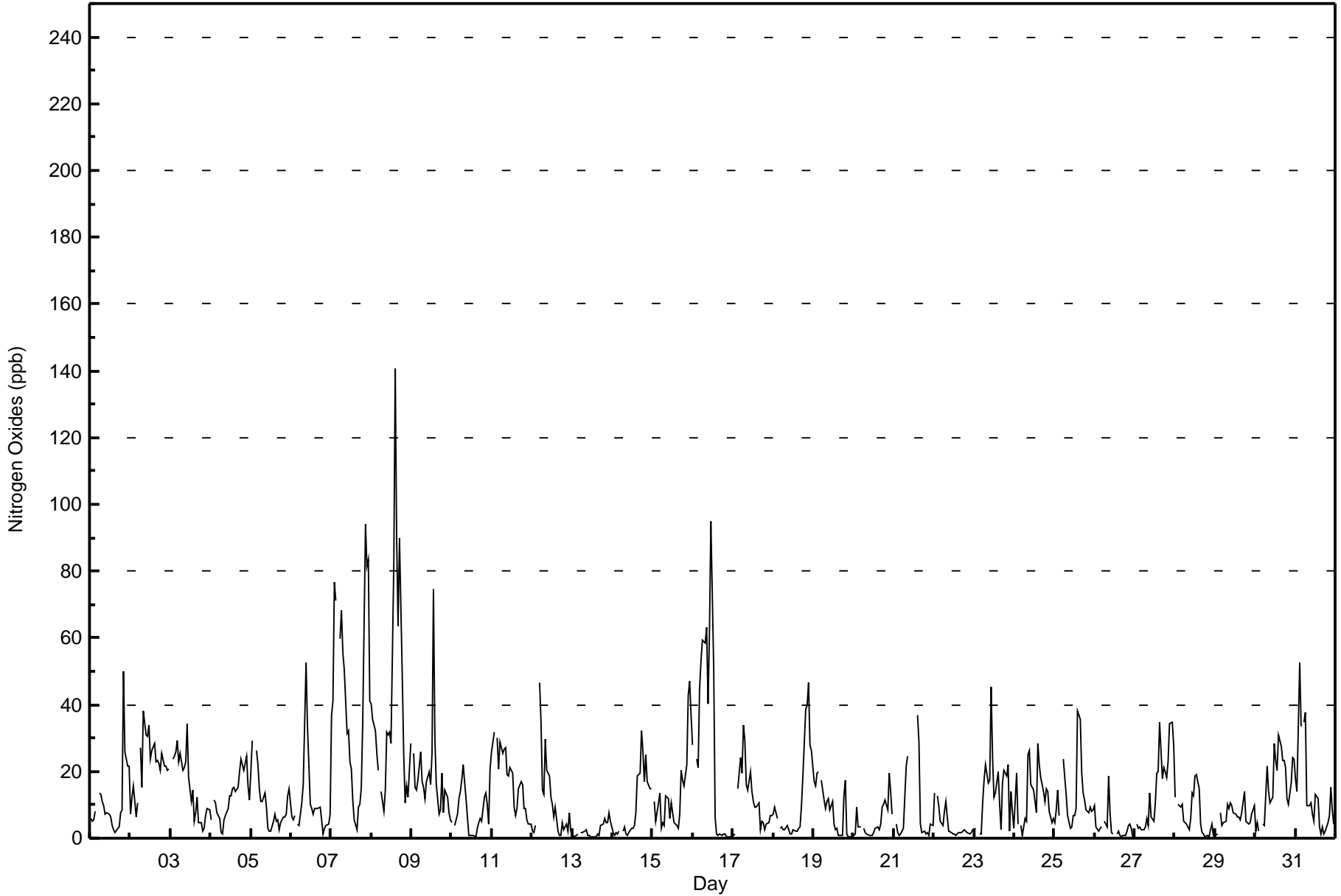






Maximum Value: 141 ppb on Oct 8 15:00																		Maximum Daily Average: 41.5 ppb on Oct 7																		Hours in Service: 744			
Minimum Value: 0 ppb on Oct 26 17:00																		Minimum Daily Average: 2.3 ppb on Oct 13																		Hours of Data: 707			
Maximum Diurnal Average: 16.6 ppb at hour 9																		Minimum Diurnal Average: 10.0 ppb at hour 17																		Hours of Missing Data: 37			
Monthly Average: 13.6 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 3 Median = 9 Q <sub>3</sub> = 19 P <sub>90</sub> = 30 P <sub>99</sub> = 81																		Hours of Calibration: 36			
																																				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	6	5	5	8	Z	13	13	11	10	7	8	7	6	4	2	2	3	3	8	9	50	26	21	22	10.9	50													
2-Oct	7	12	16	6	11	Z	27	15	38	31	30	34	24	26	28	23	23	23	20	25	22	22	21	21	22.0	38													
3-Oct	Z	24	24	26	29	23	26	20	21	23	34	18	11	14	5	8	12	5	5	2	3	7	9	8	15.5	34													
4-Oct	6	Z	11	11	8	6	2	1	6	7	9	13	13	15	15	14	15	20	24	22	21	25	16	11	12.5	25													
5-Oct	20	29	Z	26	22	15	11	11	14	9	3	2	2	5	7	5	5	3	5	6	6	7	13	15	10.5	29													
6-Oct	6	6	7	Z	4	4	11	16	34	52	33	10	9	7	9	9	9	9	6	1	3	4	4	7	11.3	52													
7-Oct	37	41	77	71	Z	60	68	56	50	31	32	23	21	11	6	3	9	10	15	34	94	82	84	41	41.5	94													
8-Oct	40	36	32	26	21	Z	14	8	15	32	31	32	28	82	141	90	63	90	48	25	11	16	12	28	40.0	141													
9-Oct	Z	25	15	14	17	26	17	15	12	17	20	16	25	74	30	16	7	9	20	8	15	12	8	6	18.4	74													
10-Oct	5	Z	4	7	12	14	18	22	12	6	1	1	1	1	1	3	5	6	5	12	14	10	4	21	8.0	22													
11-Oct	26	32	Z	30	21	29	26	27	27	19	19	21	19	10	7	9	15	17	16	9	9	5	4	4	17.4	32													
12-Oct	2	2	4	Z	47	35	14	13	30	20	19	12	10	6	9	2	1	1	5	3	4	2	8	2	10.9	47													
13-Oct	1	1	1	1	Z	1	2	2	3	1	1	0	0	0	0	1	1	4	4	6	5	5	8	5	2.3	8													
14-Oct	2	1	2	1	2	Z	2	3	1	1	2	3	3	4	8	19	20	32	26	17	25	17	15	15	9.5	32													
15-Oct	Z	11	5	11	14	3	5	4	13	12	6	11	8	5	4	3	7	21	17	16	22	43	47	37	14.0	47													
16-Oct	28	Z	24	21	44	53	59	58	63	40	62	95	51	6	1	1	1	1	1	1	0	0	0	0	26.7	95													
17-Oct	1	1	Z	15	24	19	34	29	16	14	20	14	11	9	9	11	3	5	5	3	4	5	7	7	11.5	34													
18-Oct	7	9	6	Z	3	3	3	2	4	2	1	1	2	2	2	3	4	10	19	39	40	47	28	26	11.4	47													
19-Oct	17	16	20	20	Z	18	11	9	11	12	8	11	4	2	3	1	1	1	13	17	1	0	1	0	8.6	20													
20-Oct	1	1	9	3	3	Z	3	2	1	1	1	1	2	3	3	2	4	9	10	11	9	19	14	7	5.3	19													
21-Oct	Z	4	2	1	1	2	3	22	24	C	C	C	C	C	37	29	4	2	2	1	2	1	4	4	8.1	37													
22-Oct	13	Z	13	10	5	4	8	11	6	2	2	1	1	1	1	2	2	2	2	2	2	1	2	2	4.2	13													
23-Oct	2	3	Z	1	1	11	17	22	17	17	45	24	12	13	20	10	3	16	20	19	22	2	14	8	13.9	45													
24-Oct	3	19	4	Z	4	1	6	5	25	26	16	15	11	8	28	22	18	14	11	15	14	8	5	6	12.4	28													
25-Oct	5	9	15	7	Z	24	18	13	7	3	3	7	7	9	38	36	20	14	12	9	8	9	8	9	12.4	38													
26-Oct	10	4	2	3	3	Z	5	3	19	7	2	1	M	1	2	1	0	1	1	2	4	4	3	0	3.6	19													
27-Oct	Z	4	3	3	2	2	3	6	4	13	6	5	10	19	20	35	18	21	20	18	23	34	35	28	14.5	35													
28-Oct	12	Z	10	9	10	5	5	4	3	6	14	13	19	19	15	4	2	1	1	1	0	3	4	1	7.0	19													
29-Oct	1	1	Z	8	4	4	5	10	9	10	10	8	7	7	6	5	8	14	5	5	4	5	7	10	6.6	14													
30-Oct	2	4	2	Z	4	4	13	22	14	11	12	28	23	20	31	28	23	23	21	12	10	17	24	24	16.2	31													
31-Oct	18	14	52	33	Z	35	38	10	10	11	7	5	13	12	3	1	3	1	2	5	7	15	9	4	13.4	52													
																		10.7 12.1 14.0 14.4 12.7 15.9 15.7 14.6 16.6 14.9 15.2 14.4 12.2 13.3 15.9 12.8 10.0 12.5 11.8 11.4 14.6 14.6 14.0 12.2																		Diurnal Average			
																		40 41 77 71 47 60 68 58 63 52 62 95 51 82 141 90 63 90 48 39 94 82 84 41																		Diurnal Maximum			
Z - zerospan			C - Calibration			M - Maintenance																																	







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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Shell Muskeg River - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	552	78.08	78.08
21 - 40	121	17.11	95.19
41 - 80	26	3.68	98.87
81 - 159	8	1.13	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Shell Muskeg River - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	9	20	52	32	12	11	17	34	107	71	37	56	20	19	36	18	551
21 - 40	26	22	7	6	1	0	0	8	13	13	9	0	1	3	5	7	121
11 - 80	4	4	3	4	0	0	0	1	4	0	1	1	0	0	1	2	25
81 - 159	4	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	8
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	43	46	62	42	13	11	17	43	124	84	47	57	21	22	43	30	705

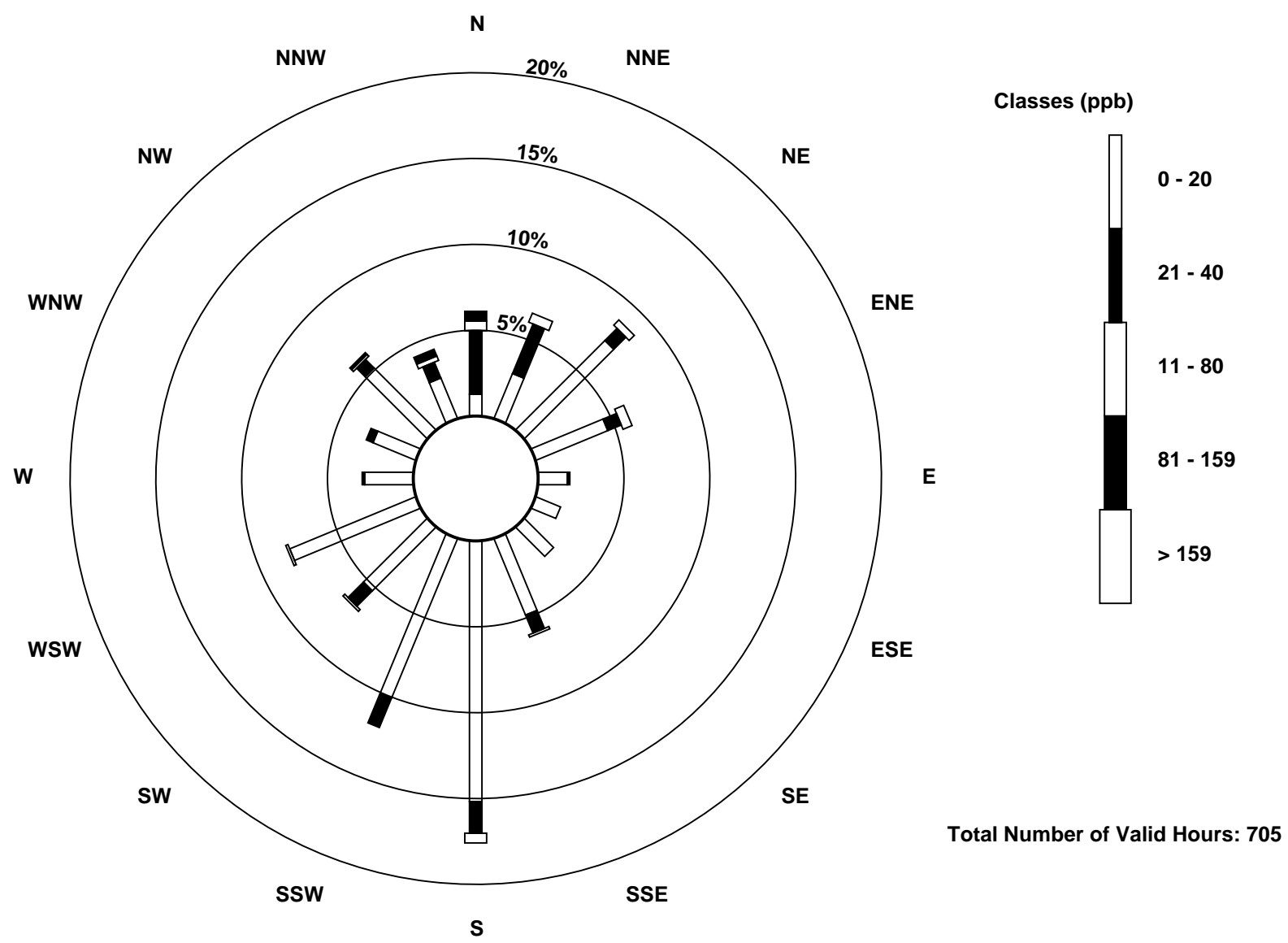
Total Number of Valid Hours: 705

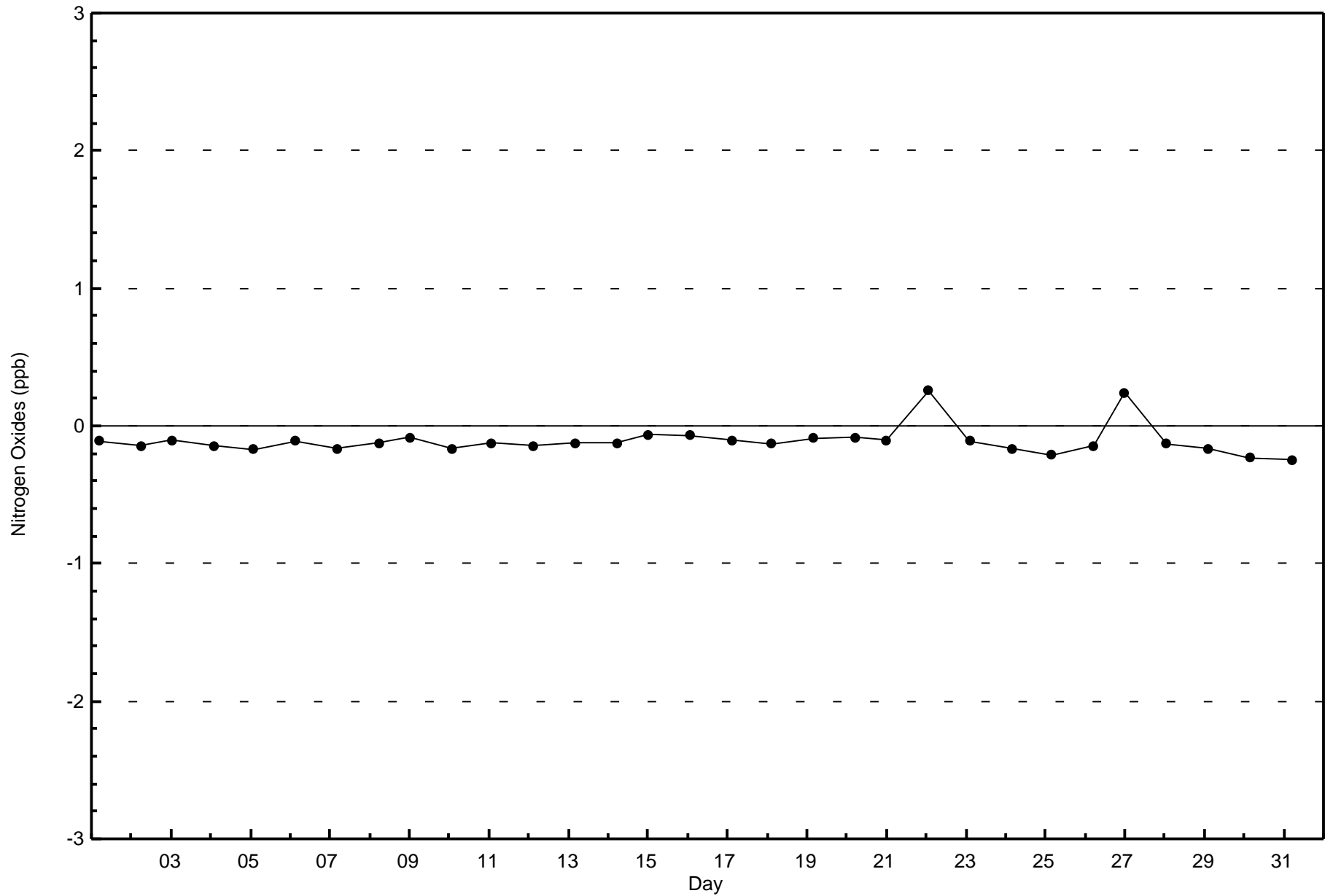
Total Number of Hours: 744

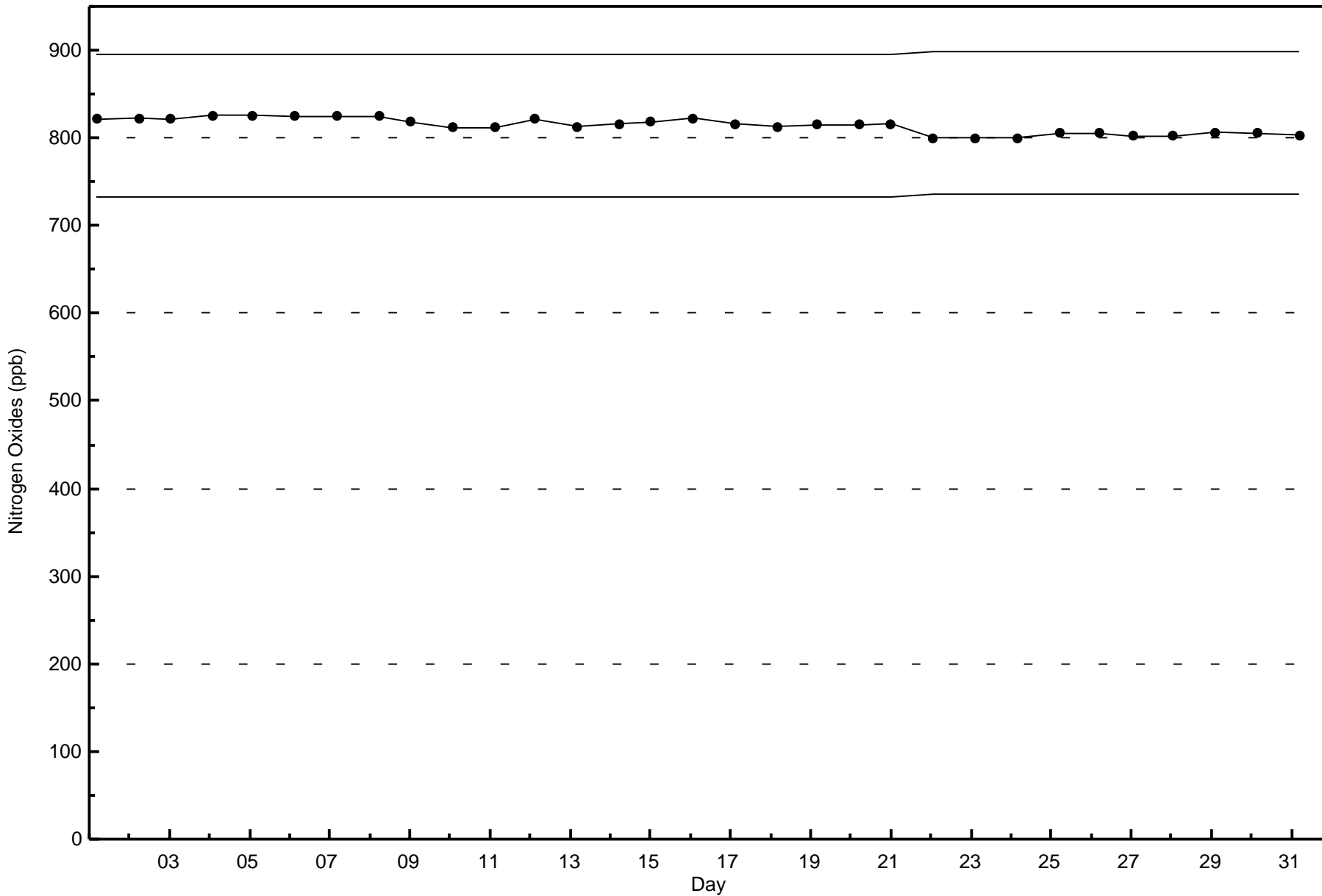


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Shell Muskeg River (AMS 16)









Number of Exceedences (AAAQO):	24-hr: 0	Hours in Service:	744
Maximum Value: 51.8 µg/m <sup>3</sup> on Oct 16 08:00	Maximum Daily Average: 14.7 µg/m <sup>3</sup> on Oct 16	Hours of Data:	737
Minimum Value: 0.6 µg/m <sup>3</sup> on Oct 28 16:00	Minimum Daily Average: 2.5 µg/m <sup>3</sup> on Oct 25	Hours of Missing Data:	7
Maximum Diurnal Average: 8.2 µg/m <sup>3</sup> at hour 20	Minimum Diurnal Average: 4.3 µg/m <sup>3</sup> at hour 11	Hours of Calibration:	4
Monthly Average: 5.86 µg/m <sup>3</sup>	Percentiles: P <sub>1</sub> = 1.0 P <sub>10</sub> = 2.1 Q <sub>1</sub> = 2.9 Median = 4.4 Q <sub>3</sub> = 7.0 P <sub>90</sub> = 10.4 P <sub>99</sub> = 30.6	Percent Operational Time:	99.6

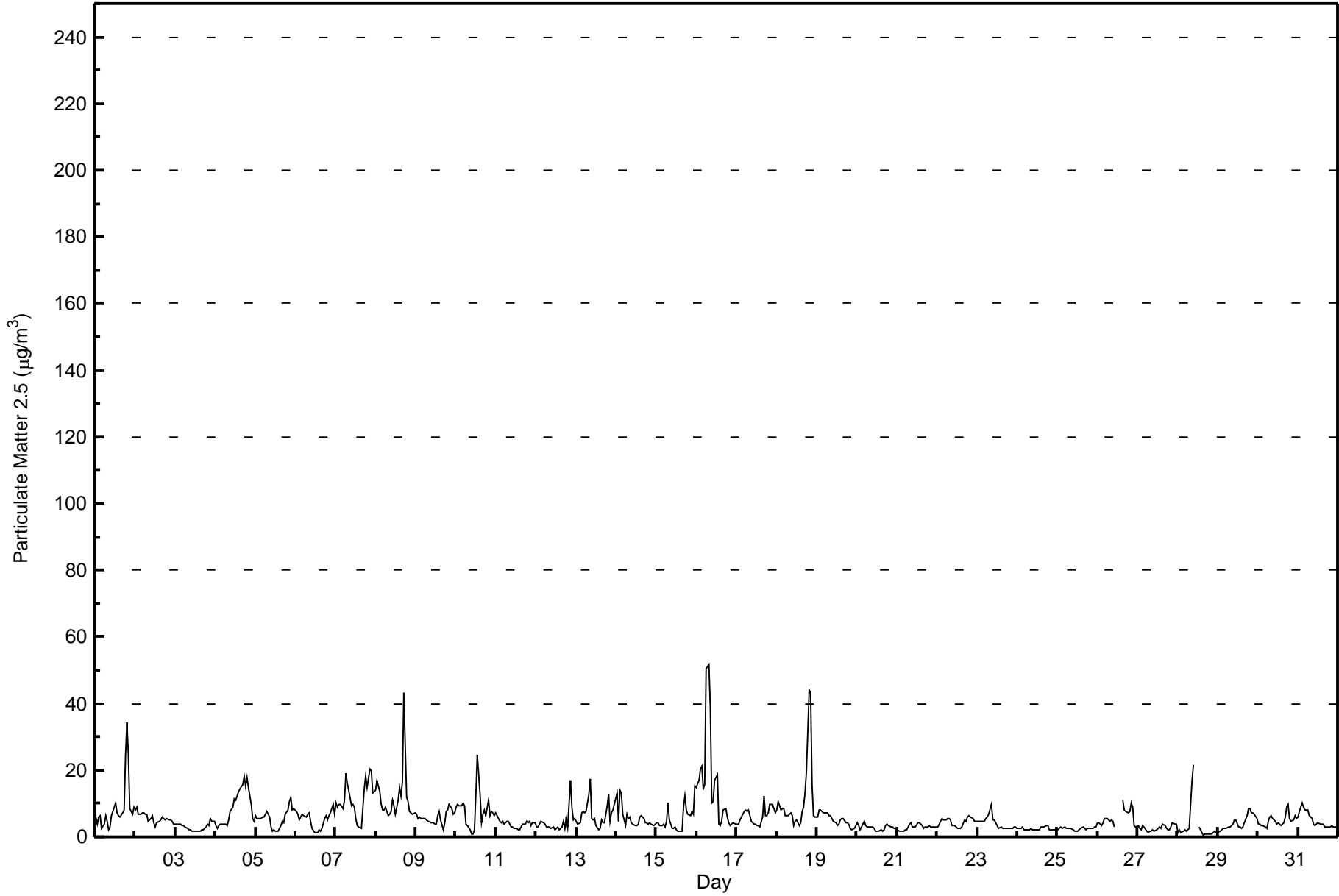
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Oct	5.7	4.0	5.8	6.2	2.4	3.8	6.3	4.6	2.1	3.1	6.4	9.0	10.1	7.1	6.5	6.0	7.2	8.3	24.6	34.2	24.7	8.5	6.7	9.0	8.8	34.2																						
2-Oct	7.8	9.0	7.0	6.8	7.1	7.1	6.7	6.8	4.9	5.4	6.6	4.4	3.0	4.2	4.6	4.9	5.7	5.4	5.1	5.4	5.1	4.9	4.6	3.9	5.7	9.0																						
3-Oct	3.6	3.7	3.8	3.6	3.4	3.2	2.9	2.6	2.2	2.1	1.9	1.7	1.8	1.8	1.8	1.9	2.1	2.2	3.1	3.8	3.6	5.3	4.7	4.5	3.0	5.3																						
4-Oct	3.3	2.7	3.4	3.7	3.7	3.8	3.7	3.2	5.0	7.6	8.9	11.7	10.9	12.4	13.6	14.4	15.8	18.2	15.4	17.8	14.9	9.8	5.4	4.5	8.9	18.2																						
5-Oct	6.2	5.7	5.5	5.5	5.8	5.8	6.7	7.5	5.8	3.0	1.6	2.1	1.5	1.7	2.7	3.3	4.5	4.0	6.8	8.1	10.4	12.0	8.0	8.5	5.5	12.0																						
6-Oct	7.7	6.8	5.1	5.9	6.7	6.5	5.8	6.7	7.2	4.5	2.6	1.4	1.2	1.3	2.3	1.6	2.4	5.4	6.1	5.2	6.2	7.1	9.7	6.7	5.1	9.7																						
7-Oct	10.2	9.0	9.7	9.8	8.4	10.9	19.1	16.1	14.0	9.4	9.6	8.8	5.3	3.5	2.8	2.6	8.4	14.3	18.1	14.7	20.2	19.7	13.2	13.4	11.3	20.2																						
8-Oct	13.9	17.0	13.7	9.6	7.9	8.1	8.7	6.6	6.6	7.8	11.0	9.1	6.8	11.2	15.0	12.1	16.4	43.1	12.0	10.4	7.5	7.1	6.8	7.0	11.5	43.1																						
9-Oct	6.7	5.7	6.1	5.6	5.7	5.6	5.0	4.8	4.7	4.2	4.0	3.6	3.7	6.5	7.7	5.0	2.0	4.2	7.6	8.0	9.8	8.3	6.9	7.4	5.8	9.8																						
10-Oct	8.9	9.5	9.5	9.4	10.4	9.1	3.9	3.3	2.2	0.9	1.0	2.3	12.8	24.5	12.6	4.2	6.9	7.9	6.6	10.9	6.5	7.7	7.1	6.5	7.7	24.5																						
11-Oct	7.0	5.5	4.7	4.3	4.7	4.0	4.6	4.5	3.7	2.9	2.8	2.6	2.7	2.2	2.3	3.1	4.0	3.9	4.6	4.2	4.5	3.4	4.0	4.2	3.9	7.0																						
12-Oct	3.1	3.1	3.8	4.5	4.2	3.7	2.9	2.8	2.8	2.5	2.9	2.0	2.7	3.0	2.2	2.8	4.9	2.3	6.0	3.0	17.1	9.0	5.1	5.4	4.2	17.1																						
13-Oct	4.8	3.8	4.1	7.3	7.6	7.0	7.4	12.5	17.5	5.6	5.3	5.5	3.3	2.3	2.7	5.1	4.1	4.1	9.4	12.6	4.6	7.2	8.0	9.6	6.7	17.5																						
14-Oct	13.1	4.6	14.1	13.1	6.9	3.6	6.6	5.5	5.8	4.1	3.7	3.3	3.4	3.6	6.1	6.3	5.4	4.3	4.2	3.8	4.0	3.8	3.4	3.9	5.7	14.1																						
15-Oct	4.1	4.2	3.6	3.4	4.0	3.0	4.5	10.4	5.0	2.7	2.3	2.8	2.2	1.8	1.6	1.9	8.9	12.2	8.0	6.6	6.5	7.7	6.8	15.4	5.4	15.4																						
16-Oct	14.7	16.8	20.5	21.3	14.5	15.7	50.6	51.8	38.4	10.4	10.5	17.0	18.6	3.8	3.2	4.5	8.0	8.4	5.9	4.3	3.6	3.7	4.2	3.7	14.7	51.8																						
17-Oct	3.6	3.7	5.1	6.1	7.6	7.8	7.8	7.9	6.1	4.5	3.8	3.7	3.5	3.5	2.9	5.8	12.1	6.2	6.5	7.1	9.9	9.8	8.6	7.3	6.3	12.1																						
18-Oct	8.0	10.8	8.1	8.4	8.4	6.5	6.5	6.5	7.2	6.4	3.6	4.8	5.0	3.2	4.2	7.7	8.7	13.0	19.4	44.0	43.1	15.6	6.4	6.0	10.9	44.0																						
19-Oct	6.1	7.9	7.9	7.8	7.4	7.3	7.0	6.5	6.5	5.5	4.8	4.2	3.6	4.0	5.1	5.3	5.3	4.1	4.4	3.9	2.5	2.3	2.7	3.2	5.2	7.9																						
20-Oct	4.1	3.2	1.9	3.1	4.5	3.4	2.9	2.9	2.9	3.1	2.6	1.9	1.7	1.7	2.1	1.9	2.1	3.4	3.7	3.2	3.1	3.1	2.8	2.4	2.8	4.5																						
21-Oct	1.9	1.7	1.7	1.7	1.8	1.9	2.0	3.9	4.4	2.8	2.8	3.1	4.2	4.4	3.8	3.5	2.5	3.0	3.1	3.3	3.1	2.9	2.8	2.8	2.9	4.4																						
22-Oct	3.0	3.8	4.9	5.5	5.2	5.1	5.3	5.6	5.1	3.6	3.6	3.2	2.5	2.4	2.5	3.2	5.1	4.7	5.8	6.3	6.0	5.4	4.8	4.6	4.5	6.3																						
23-Oct	4.7	4.8	4.7	4.9	4.8	5.6	6.1	6.7	9.9	5.2	4.9	4.0	3.3	2.7	3.0	2.5	2.6	2.7	2.4	2.5	2.6	2.7	2.9	3.0	4.1	9.9																						
24-Oct	2.7	2.7	2.6	3.0	2.3	2.2	2.3	2.2	2.5	2.3	2.2	2.3	2.1	2.0	2.9	2.9	2.8	3.4	3.3	2.2	2.2	2.0	2.0	2.3	2.5	3.4																						
25-Oct	2.3	2.7	2.8	2.6	3.1	2.6	2.4	2.7	2.6	2.0	1.8	1.9	1.9	2.0	2.6	2.8	2.5	2.3	2.5	2.4	2.6	2.4	2.8	3.0	2.5	3.1																						
26-Oct	4.1	4.3	3.6	4.3	5.5	5.3	5.5	4.9	5.0	4.8	2.8	C	C	C	C	11.0	8.1	7.7	7.2	7.4	10.0	9.0	3.6	2.9	5.9	11.0																						
27-Oct	3.2	2.7	2.3	3.3	3.0	1.7	1.1	1.6	1.5	2.0	1.8	2.0	2.7	2.9	2.6	3.6	3.5	2.7	2.3	2.1	2.9	4.2	3.9	3.8	2.6	4.2																						
28-Oct	1.3	1.9	1.2	1.7	2.0	1.8	2.1	2.3	16.8	21.5	M	M	M	2.9	1.5	0.6	0.8	0.8	0.8	0.9	1.0	1.2	1.5	1.4	3.1	21.5																						
29-Oct	1.3	1.6	2.0	2.4	2.3	2.6	2.8	3.2	3.6	3.6	5.0	5.0	2.9	2.9	2.7	3.0	4.1	6.3	8.3	8.4	7.1	7.1	6.9	5.6	4.2	8.4																						
30-Oct	3.8	3.8	3.5	3.2	2.9	2.7	4.5	5.8	6.5	5.4	4.8	4.0	4.2	3.7	3.5	4.4	6.1	8.8	9.8	5.3	4.6	5.0	6.5	5.5	4.9	9.8																						
31-Oct	5.8	7.4	10.2	9.0	8.2	8.1	8.1	6.3	5.5	3.8	3.3	3.9	4.4	3.9	3.9	3.7	2.8	2.9	2.8	3.1	3.3	2.9	2.9	3.2	5.0	10.2																						
																								5.7	5.6	5.9	6.0	5.6	5.4	6.8	7.0	6.9	4.9	4.3	4.5	4.5	4.4	4.4	4.6	5.7	7.1	7.3	8.2	8.2	6.5	5.3	5.5	Diurnal Average
																								14.7	17.0	20.5	21.3	14.5	15.7	50.6	51.8	38.4	21.5	11.0	17.0	18.6	24.5	15.0	14.4	16.4	43.1	24.6	44.0	43.1	19.7	13.2	15.4	Diurnal Maximum

C - Calibration M - Maintenance  
 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>) -  $\mu\text{g}/\text{m}^3$   
Shell Muskeg River - October 2015







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

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Shell Muskeg River - October 2015**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	451	61.19	61.19
6 - 15	247	33.51	94.71
16 - 25	25	3.39	98.10
26 - 80	7	0.95	99.05
> 81.0	0	0.00	99.05

Total Number of Valid Hours: 737

Total Number of Hours: 744



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

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Shell Muskeg River - October 2015**

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	37	27	39	27	9	10	9	29	77	45	30	29	21	16	24	21	450
6 - 15	5	21	25	12	4	1	7	8	52	38	15	28	1	5	19	6	247
16 - 25	2	2	0	2	1	0	0	2	5	1	1	4	0	1	0	4	25
26 - 80	2	0	0	1	0	0	0	0	0	0	0	0	0	1	2	0	6
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	46	50	64	42	14	11	16	39	134	84	46	61	22	23	45	31	728

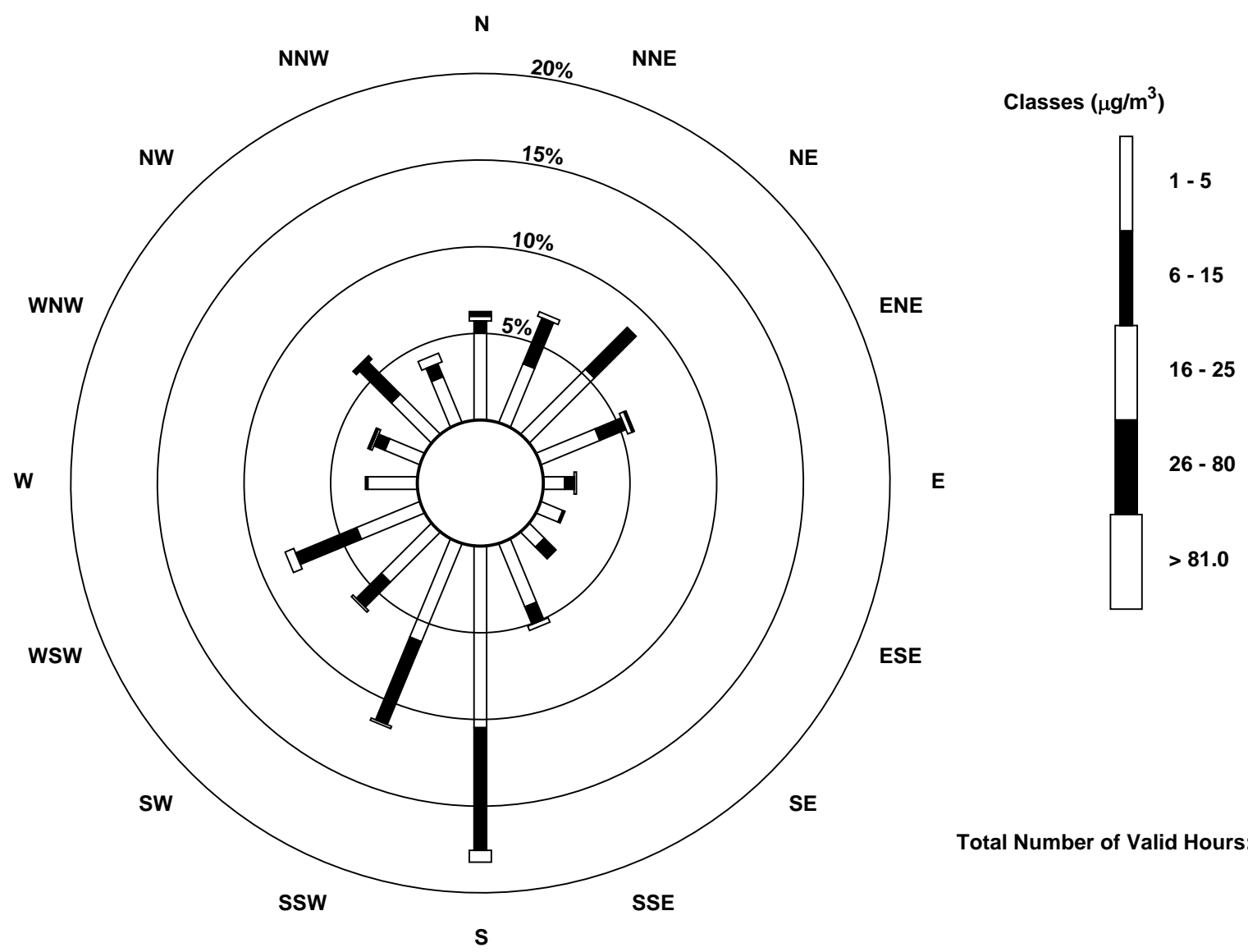
Total Number of Valid Hours: 735

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Shell Muskeg River (AMS 16)





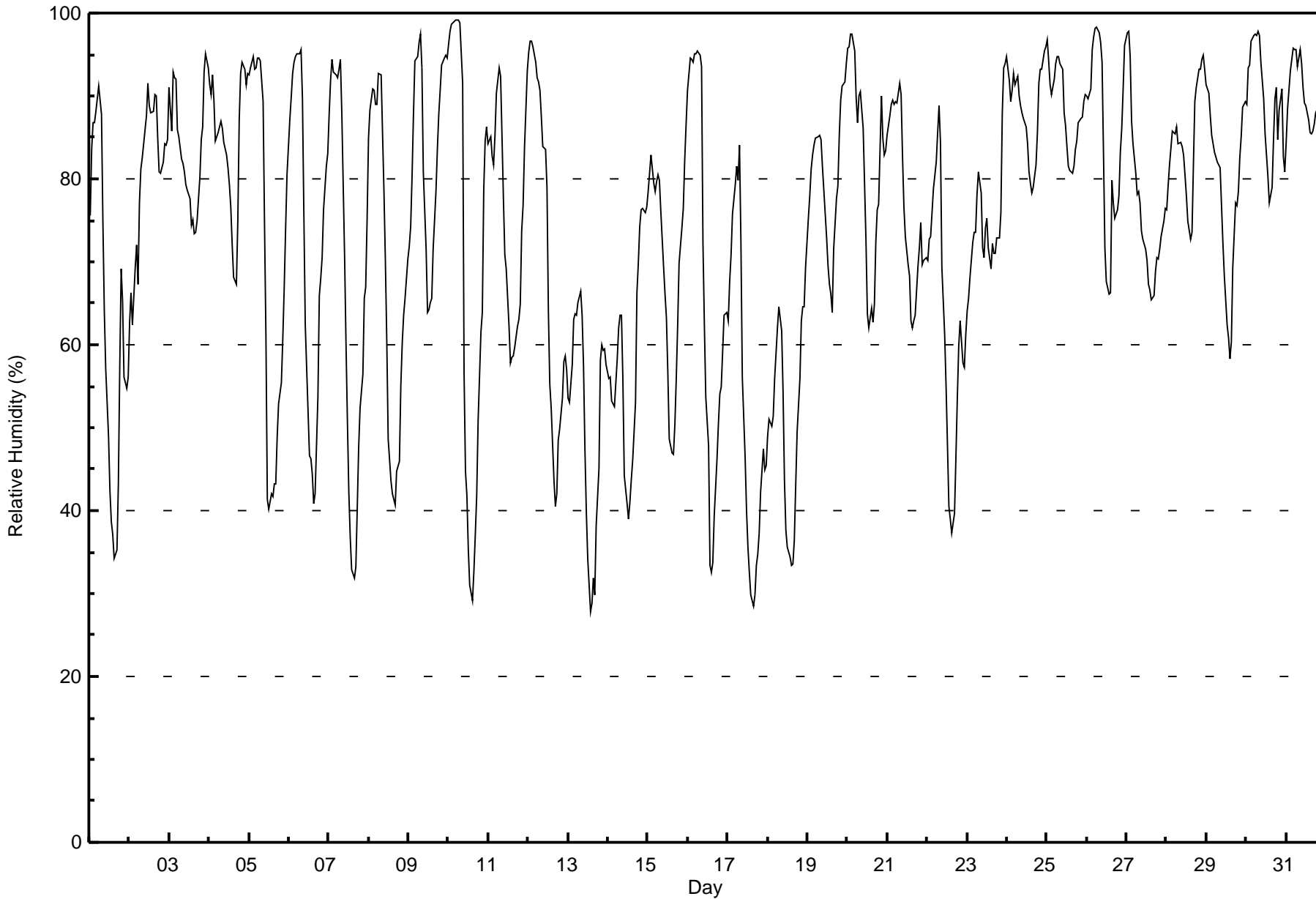
**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %**

**Shell Muskeg River - October 2015**

Maximum Value: 99 % on Oct 10 06:00																		Maximum Daily Average: 90.0 % on Oct 31																		Hours in Service: 744							
Minimum Value: 28 % on Oct 13 14:00																		Minimum Daily Average: 51.0 % on Oct 18																		Hours of Data: 744							
Maximum Diurnal Average: 87.2 % at hour 8																		Minimum Diurnal Average: 56.2 % at hour 15																		Hours of Missing Data: 0							
Monthly Average: 74.0 %																		Percentiles: P <sub>1</sub> = 31 P <sub>10</sub> = 45 Q <sub>1</sub> = 63 Median = 78 Q <sub>3</sub> = 89 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	76	84	87	87	88	91	89	88	75	64	57	49	42	39	37	34	35	43	57	69	65	56	55	56	63.5	91																	
2-Oct	63	66	62	69	72	67	77	81	83	86	88	91	89	88	88	90	90	85	81	81	82	84	84	85	80.5	91																	
3-Oct	91	86	93	92	92	86	85	82	82	81	79	79	78	74	75	73	74	75	80	85	86	93	95	93	83.7	95																	
4-Oct	91	90	93	90	85	86	86	87	86	84	83	81	79	77	72	68	67	75	87	93	94	93	91	93	84.6	94																	
5-Oct	92	93	95	93	93	95	95	94	89	75	61	41	40	42	42	43	43	49	53	55	61	67	74	80	69.4	95																	
6-Oct	87	90	93	94	95	95	95	96	90	76	62	52	47	46	44	41	42	54	66	68	71	76	82	83	72.6	96																	
7-Oct	88	92	94	93	93	92	93	94	88	71	60	51	42	37	33	32	33	40	48	52	57	66	67	75	66.2	94																	
8-Oct	85	88	91	91	89	89	93	92	85	78	70	61	49	44	42	41	41	45	46	55	60	64	66	70	68.1	93																	
9-Oct	72	74	80	88	94	95	96	97	93	81	72	64	64	65	66	71	79	84	88	91	94	95	95	95	83.0	97																	
10-Oct	96	98	99	99	99	99	99	99	92	57	45	42	35	31	29	33	37	42	51	62	64	79	85	86	69.0	99																	
11-Oct	84	85	83	82	85	90	93	92	85	78	71	69	62	58	58	59	60	62	63	65	74	77	84	93	75.5	93																	
12-Oct	95	97	97	96	94	92	92	91	87	84	84	79	64	55	52	44	41	42	48	50	54	58	59	57	71.3	97																	
13-Oct	54	53	58	63	64	63	65	67	64	58	48	40	34	28	29	32	30	38	45	58	60	59	59	58	51.0	67																	
14-Oct	56	56	53	53	53	58	62	63	64	56	44	41	39	41	44	46	53	66	70	74	76	76	76	77	58.2	77																	
15-Oct	79	81	83	80	79	80	80	80	76	69	66	63	57	49	47	47	50	56	62	70	74	76	82	87	69.7	87																	
16-Oct	91	95	94	94	95	95	95	95	94	72	62	54	48	33	33	34	39	46	51	54	55	59	63	64	67.3	95																	
17-Oct	63	68	71	76	79	82	80	84	73	56	47	40	36	33	30	29	30	33	35	37	42	47	45	45	52.4	84																	
18-Oct	49	51	50	51	56	59	62	65	62	54	44	38	36	34	33	34	37	43	49	56	63	65	65	69	51.0	69																	
19-Oct	75	78	81	83	84	85	85	85	85	82	79	73	70	67	66	64	72	78	79	85	90	91	92	94	80.0	94																	
20-Oct	96	96	98	97	96	90	87	90	91	86	79	73	64	62	64	63	65	72	76	77	90	85	83	83	81.7	98																	
21-Oct	85	88	89	90	89	89	89	92	90	83	77	73	70	68	63	62	63	64	69	72	75	70	70	71	77.0	92																	
22-Oct	70	73	73	76	79	82	86	89	84	69	61	55	48	41	39	37	40	46	54	60	63	58	57	61	62.5	89																	
23-Oct	64	66	68	72	74	74	78	81	78	72	70	74	75	72	69	72	71	71	73	73	76	88	93	94	74.9	94																	
24-Oct	95	92	89	91	93	91	92	90	89	88	87	86	84	81	79	78	79	82	86	92	93	93	95	96	88.4	96																	
25-Oct	97	94	91	90	92	94	95	95	94	93	88	86	84	82	81	81	81	84	85	87	87	87	89	90	88.6	97																	
26-Oct	90	90	91	96	97	98	98	98	96	94	83	72	68	66	66	80	77	75	76	78	83	86	91	96	85.2	98																	
27-Oct	98	98	95	87	84	81	78	78	77	74	73	72	70	67	67	65	66	69	71	70	72	73	75	76	76.5	98																	
28-Oct	76	79	82	86	86	85	86	84	84	84	83	81	78	75	73	74	82	89	91	93	93	94	95	93	84.4	95																	
29-Oct	91	90	88	85	84	83	82	82	81	77	72	68	62	61	58	60	69	77	77	78	83	85	89	89	78.1	91																	
30-Oct	89	93	94	97	97	98	97	98	97	94	90	85	83	80	77	79	85	90	91	85	88	91	83	81	89.2	98																	
31-Oct	84	88	93	94	96	96	96	94	96	94	91	89	89	87	86	85	86	87	88	89	88	87	88	90	90.0	96																	
																		81.4	82.9	84.1	84.9	85.6	85.8	86.7	87.2	84.2	76.4	70.1	65.2	60.8	57.5	56.2	56.5	58.6	63.3	67.6	71.4	74.5	76.7	78.3	80.0	Diurnal Average	
																		98	98	99	99	99	99	99	99	97	94	91	91	89	88	88	90	90	90	91	93	94	95	95	96	Diurnal Maximum	





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

**Relative Humidity (RH) - %**  
**Shell Muskeg River - October 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	43	5.78	5.78
40 - 60	121	16.26	22.04
60 - 80	231	31.05	53.09
80 - 100	349	46.91	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

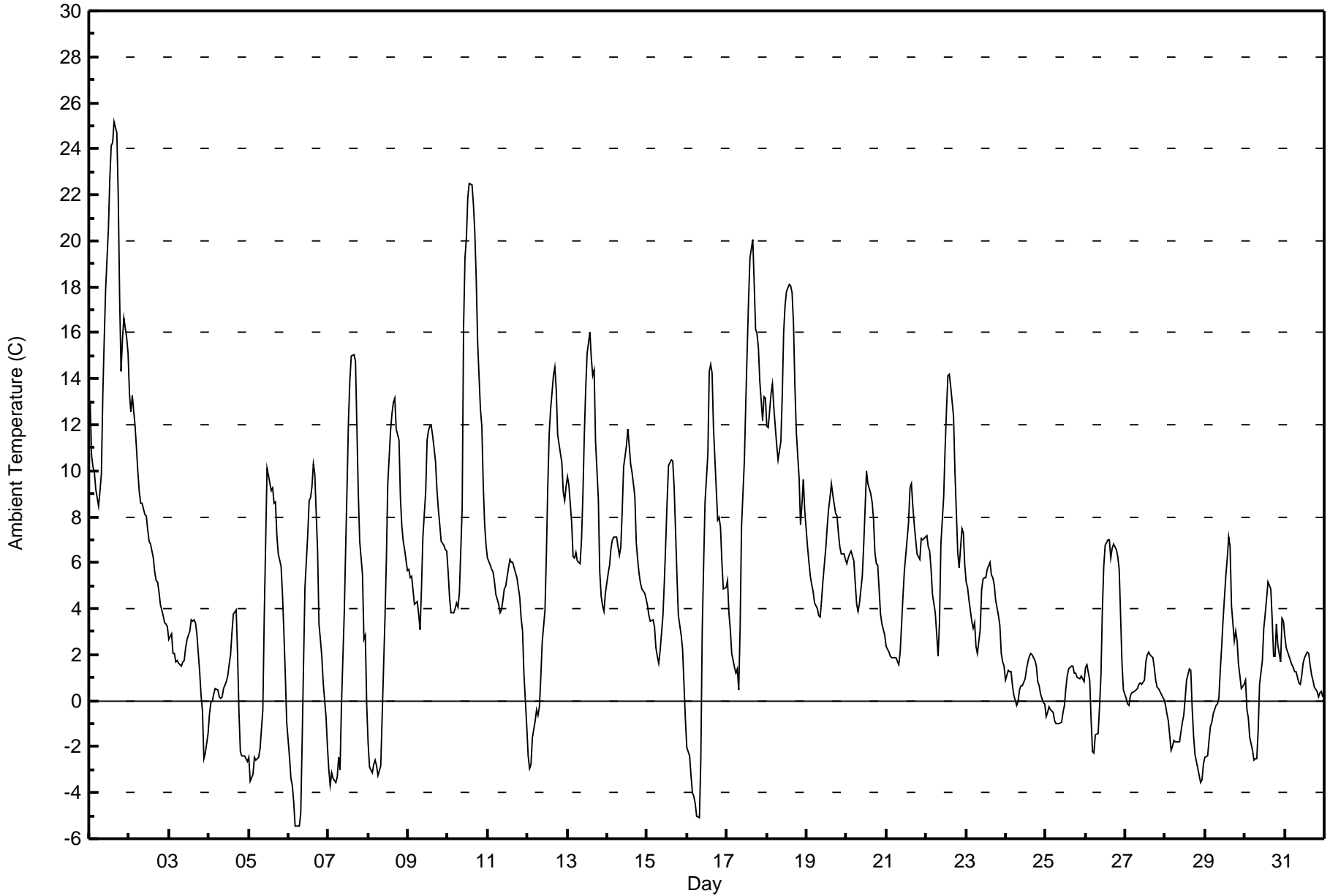
**Ambient Temperature (AT) - C  
Shell Muskeg River - October 2015**

Maximum Value: 25.2 C on Oct 1 16:00		Maximum Daily Average: 16.1 C on Oct 1		Hours in Service: 744																						
Minimum Value: -5.5 C on Oct 6 05:00		Minimum Daily Average: -1.3 C on Oct 28		Hours of Data: 744																						
Maximum Diurnal Average: 9.6 C at hour 15		Minimum Diurnal Average: 1.5 C at hour 8		Hours of Missing Data: 0																						
Monthly Average: 4.97 C		Percentiles: P <sub>1</sub> = -4.4 P <sub>10</sub> = -1.6 Q <sub>1</sub> = 0.9 Median = 4.1 Q <sub>3</sub> = 8.1 P <sub>90</sub> = 12.6 P <sub>99</sub> = 22.4		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	13.0	10.7	10.2	9.9	9.2	8.4	9.1	9.9	13.3	15.7	17.9	20.6	22.7	24.1	24.3	25.2	24.7	21.9	17.5	14.3	15.7	16.6	15.8	15.1	16.1	25.2
2-Oct	13.4	12.6	13.3	12.0	11.0	9.9	9.1	8.6	8.6	8.1	8.1	7.4	6.9	6.8	6.2	5.6	5.2	5.2	4.7	4.2	3.7	3.4	3.3	3.2	7.5	13.4
3-Oct	2.6	2.9	2.1	2.1	1.7	1.8	1.6	1.5	1.7	1.8	2.3	2.7	3.0	3.5	3.5	3.5	3.4	2.9	1.2	0.2	-0.4	-2.5	-2.3	-1.4	1.6	3.5
4-Oct	-0.6	-0.1	0.0	0.3	0.5	0.5	0.2	0.1	0.2	0.5	0.8	1.1	1.5	2.0	3.0	3.8	3.9	2.0	-0.5	-2.2	-2.4	-2.4	-2.5	-2.7	0.3	3.9
5-Oct	-2.5	-3.5	-3.2	-2.5	-2.6	-2.5	-2.5	-2.1	-0.4	3.6	6.9	10.1	9.8	9.1	9.3	8.6	8.6	7.1	6.4	5.8	4.6	3.0	1.1	-0.9	3.0	10.1
6-Oct	-2.5	-3.4	-3.7	-4.4	-5.5	-5.4	-5.4	-4.9	-1.8	1.6	4.9	7.2	8.7	8.8	9.3	10.3	9.8	6.5	3.3	2.7	1.9	0.8	-0.7	-1.9	1.5	10.3
7-Oct	-3.0	-3.7	-3.2	-3.4	-3.6	-3.3	-2.5	-3.0	-0.2	3.8	6.6	9.3	12.2	13.9	15.0	15.0	14.7	11.9	9.0	6.9	5.5	2.6	2.8	-0.2	4.3	15.0
8-Oct	-1.9	-2.9	-3.1	-2.8	-2.6	-2.8	-3.3	-2.8	-0.7	1.5	3.6	6.2	9.4	11.8	12.5	13.0	13.2	11.8	11.4	8.8	7.6	6.9	6.6	5.7	4.5	13.2
9-Oct	5.7	5.4	5.4	4.8	4.2	4.3	3.8	3.1	4.9	7.1	9.1	11.3	11.8	11.9	11.9	11.5	10.4	9.2	8.3	7.7	6.9	6.8	6.6	6.5	7.4	11.9
10-Oct	5.6	4.5	3.8	3.8	4.0	4.3	4.1	4.7	8.4	16.3	19.2	20.1	21.9	22.5	22.5	21.6	20.3	18.4	15.6	12.7	12.0	9.4	7.6	6.8	12.1	22.5
11-Oct	6.2	5.9	5.7	5.6	5.2	4.6	4.2	3.8	3.9	4.3	4.9	5.0	5.8	6.2	6.0	6.0	5.8	5.3	4.9	4.5	3.6	3.0	1.1	-1.1	4.6	6.2
12-Oct	-2.4	-3.0	-2.8	-1.6	-0.9	-0.4	-0.6	-0.3	1.0	2.5	3.9	6.4	9.4	11.6	12.7	14.2	14.5	13.5	11.6	11.1	10.4	9.1	8.7	9.3	5.8	14.5
13-Oct	9.7	9.4	7.7	6.2	6.2	6.4	6.1	6.0	7.0	9.0	11.6	13.6	15.1	16.0	14.9	14.1	14.4	11.3	8.8	5.6	4.6	4.1	3.9	4.7	9.0	16.0
14-Oct	5.6	5.9	6.6	7.0	7.1	7.1	6.7	6.3	6.7	8.3	10.2	11.1	11.8	11.1	10.3	9.9	8.9	6.9	6.1	5.5	5.1	4.9	4.7	4.4	7.4	11.8
15-Oct	4.1	3.7	3.5	3.5	3.2	2.3	1.9	1.6	2.2	3.7	5.2	6.9	8.7	10.2	10.5	10.4	9.3	7.4	5.4	3.7	2.8	2.3	0.7	-0.8	4.7	10.5
16-Oct	-2.0	-2.4	-3.3	-4.0	-4.2	-4.5	-5.0	-5.1	-2.5	3.1	5.9	8.7	10.7	14.3	14.6	14.2	11.9	9.2	7.9	8.0	7.5	6.0	4.8	5.0	4.1	14.6
17-Oct	5.2	3.8	3.1	2.0	1.4	1.2	1.4	0.5	3.2	7.6	10.4	12.9	15.2	17.4	19.3	20.1	18.2	16.2	16.0	15.3	13.9	12.2	13.2	13.2	10.1	20.1
18-Oct	12.0	11.9	13.3	13.8	12.7	12.0	11.2	10.5	11.3	13.3	16.0	17.2	17.8	18.1	18.0	17.8	16.4	13.7	11.7	9.7	7.7	8.5	9.6	8.2	13.0	18.1
19-Oct	6.7	6.0	5.4	5.0	4.7	4.3	4.0	3.7	3.6	4.4	5.2	6.6	7.5	8.3	8.8	9.5	8.9	8.2	8.0	7.3	6.7	6.4	6.4	6.1	6.3	9.5
20-Oct	6.0	6.2	6.4	6.5	6.1	5.1	4.2	3.9	4.3	5.4	6.8	8.3	10.0	9.5	9.0	8.6	7.9	6.4	6.0	5.9	3.7	3.3	3.1	2.8	6.1	10.0
21-Oct	2.3	2.1	1.9	1.9	1.9	1.9	1.9	1.6	2.1	3.3	4.5	5.6	7.0	7.8	9.3	9.4	8.5	7.7	6.4	6.3	6.1	7.0	7.0	7.1	5.0	9.4
22-Oct	7.2	6.7	6.5	5.7	4.6	3.9	2.9	1.9	3.4	6.8	8.9	11.0	12.7	14.2	14.2	13.6	12.4	10.0	8.2	6.4	5.8	7.5	7.3	5.9	7.8	14.2
23-Oct	5.2	4.9	4.4	3.5	3.2	3.4	2.4	2.1	3.1	4.8	5.3	5.4	5.7	6.0	5.5	5.3	5.0	4.4	3.7	3.3	2.0	1.7	1.5	4.0	6.0	
24-Oct	0.9	1.3	1.2	1.3	0.7	0.2	-0.2	0.0	0.4	0.7	1.0	1.4	1.7	1.9	2.1	2.0	1.7	1.5	0.9	0.7	0.3	-0.1	-0.2	0.9	2.1	
25-Oct	-0.7	-0.5	-0.2	-0.4	-0.5	-0.9	-1.0	-1.0	-1.0	-1.0	-0.5	-0.2	0.5	1.1	1.4	1.5	1.5	1.2	1.2	1.0	1.0	1.1	1.0	0.8	0.2	1.5
26-Oct	1.4	1.6	0.9	-0.8	-2.2	-2.3	-1.5	-1.4	-0.3	1.1	3.9	5.8	6.7	7.0	7.0	6.2	6.7	6.8	6.6	6.3	5.7	3.7	1.6	0.5	3.0	7.0
27-Oct	0.1	-0.1	-0.2	0.2	0.3	0.4	0.5	0.5	0.7	0.8	0.7	0.9	1.7	2.0	2.1	2.0	1.9	1.5	0.9	0.6	0.6	0.4	0.1	0.0	0.8	2.1
28-Oct	-0.2	-0.6	-0.9	-2.1	-2.0	-1.8	-1.8	-1.8	-1.8	-1.4	-1.0	-0.6	0.1	0.9	1.4	1.3	-0.3	-1.6	-2.3	-2.9	-3.2	-3.5	-3.5	-2.7	-1.3	1.4
29-Oct	-2.5	-2.4	-1.7	-1.1	-0.9	-0.5	-0.2	-0.1	0.1	1.3	2.3	3.5	5.5	6.2	7.1	6.7	4.1	2.6	3.0	2.6	1.5	1.1	0.5	0.7	1.6	7.1
30-Oct	0.9	-0.4	-0.8	-1.6	-2.2	-2.6	-2.5	-2.5	-1.3	0.7	1.8	3.1	3.8	4.5	5.2	4.9	3.5	1.9	1.9	3.3	2.4	1.7	3.6	3.4	1.4	5.2
31-Oct	2.8	2.3	1.9	1.7	1.5	1.4	1.3	1.3	0.7	0.7	1.0	1.6	1.9	2.1	2.1	1.6	1.1	0.9	0.6	0.4	0.2	0.3	0.4	0.2	1.3	2.8
																								Diurnal Average		
																								Diurnal Maximum		



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

**Ambient Temperature (AT) - C**  
**Shell Muskeg River - October 2015**







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

**Ambient Temperature (AT) - C**  
**Shell Muskeg River - October 2015**

<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	486	65.32	83.06
10 - 20	112	15.05	98.12
> 20	14	1.88	100.00

Total Number of Valid Hours: 744

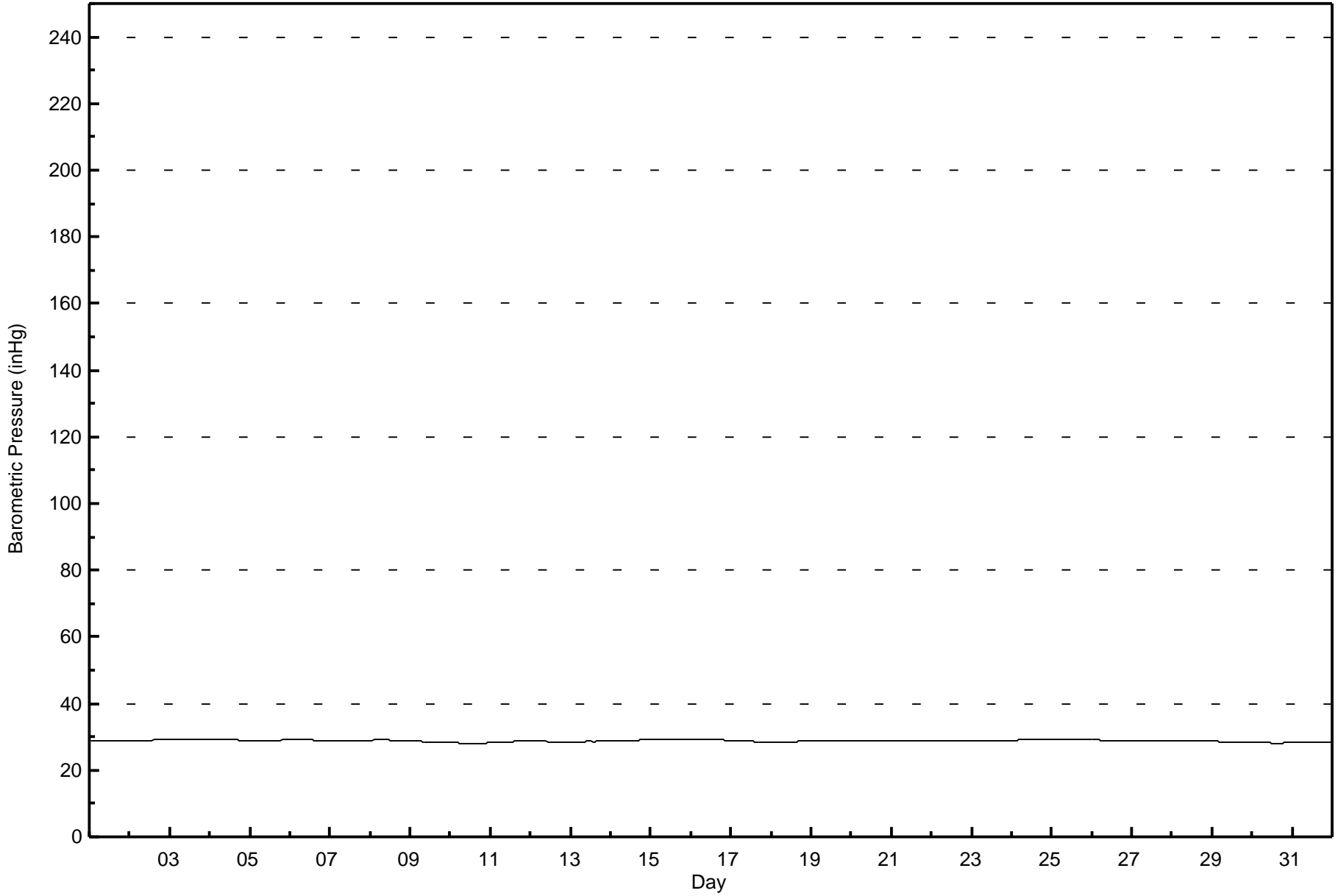
Total Number of Hours: 744





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

**Barometric Pressure (BP) - inHg**  
**Shell Muskeg River - October 2015**





Maximum Speed: 36 km/h on Oct 10 14:00	Maximum Daily Speed Average: 17.9 km/h on Oct 13	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 25 13:00	Minimum Daily Speed Average: 1.4 km/h on Oct 7	Hours of Data: 742
Maximum Diurnal Speed Average: 4.6 km/h at hour 12	Minimum Diurnal Speed Average: 0.6 km/h at hour 3	Hours of Missing Data: 2
Monthly Average Velocity: 1.5 km/h 272.6 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 4 Q <sub>1</sub> = 6 Median = 9 Q <sub>3</sub> = 15 P <sub>90</sub> = 19 P <sub>99</sub> = 25	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	S7	S7	S7	S8	S8	S9	S9	S8	S9	SSW11	SSW9	S10	S10	S9	S6	S8	S7	SE3	E5	ENE6	NNE9	NNE17	NNE16	NE12	SSE4.0	NNE17
2-Oct	ENE4	E6	NE16	NE15	NE17	NNE25	NE23	NE21	NE23	NNE21	NNE21	NNE22	N22	N19	N20	N22	N17	N18	N19	N19	N19	N20	N21	N19	NNE17.8	NNE25
3-Oct	N16	N19	N15	N16	N17	N19	N17	N20	N19	N20	NNE19	NE17	NE18	NE19	NE18	NE19	NE19	ENE13	ENE11	ENE9	ENE9	ESE2	SSE1	SE2	NNE13.1	N20
4-Oct	SSW3	SSE3	SSW4	W6	W6	WSW7	SW9	SSW6	SW10	SSW7	S8	SSW8	SSW10	S9	SSW9	S8	S8	S7	S5	S7	S6	S8	S7	S7	SSW6.3	SW10
5-Oct	SSW6	SSW8	S8	S10	S7	S7	S6	S6	SSW6	SSW6	SW8	NW23	NW25	NW16	NNW15	NW20	NW16	NW13	NW11	NW10	NW12	NW9	NW6	S4	WNW6.2	NW25
6-Oct	SSW5	SSW5	S5	S5	S7	S7	SSW7	S4	SSE4	S5	SSW8	SSW8	SSW8	SSW7	SSE6	S7	S6	SE5	ESE7	ESE5	SSE4	SSW3	NW2	SW1	S4.8	SSW8
7-Oct	ENE2	ENE5	NE2	WSW1	E2	SSE5	SW3	S3	S4	SW7	SSW6	SW9	SSW6	SSW7	SSW7	S8	NW6	NW10	NW10	NW8	N3	NNW6	N8	NE1	WSW1.4	NW10
8-Oct	SSE2	SSW4	S4	S3	SSE4	S5	S6	S5	SSE4	SSW6	SSW6	SSE4	E4	NW4	NNW6	N6	N6	N6	NNE18	NNE16	NNE19	NNE16	NNE10	ENE3	NE2.5	NNE19
9-Oct	NE6	ENE8	NNE7	ENE7	N1	NW1	SSW4	WSW6	SSW5	S10	SSW11	SSW3	N4	NNE8	NE13	NE14	NNE12	NNE12	NNE9	NE5	WNW3	WNW4	WSW2	S2	NNE2.5	NE14
10-Oct	SSW4	S5	S5	S4	SSW4	SW7	S6	SSE2	SSW9	SW12	SW25	SW25	WSW36	WSW36	WSW35	WNW18	NW10	NW8	NW13	NW8	NNW10	NE23	NE16	NNE20	W7.2	WSW36
11-Oct	NNE22	NNE22	NNE22	NNE18	NNE17	NNE20	NNE14	N15	N19	N14	N13	N11	NNW13	NNW15	NNW14	NNW13	NNW13	NNW11	NNW11	NW7	WNW8	W10	W4	S5	N11.5	NNE22
12-Oct	S7	S7	S6	S7	S5	S7	S8	S6	SW6	SSW6	SSW8	S13	SSW16	SSW15	S12	WSW20	W14	W15	WSW12	W13	WSW9	SSW9	SW13	WSW18	SW9.0	WSW20
13-Oct	WSW21	WSW23	SW22	SW20	WSW22	WSW24	WSW25	WSW21	WSW16	WSW19	WSW20	SW19	SW21	W19	W21	W14	W19	WSW14	WSW11	SSW10	SW12	SW17	SW17	WSW16	WSW17.9	WSW25
14-Oct	WSW16	WSW17	WSW18	WSW18	WSW16	WSW13	WSW14	WSW15	WSW19	WSW22	NNW22	NW20	NW19	NW19	NW15	NNW14	N16	NE20	ENE18	NE17	NNE15	NNE12	N13	N8	WNW8.9	WNW22
15-Oct	N5	E1	NE5	NE7	NE11	E3	ESE5	SE4	SE5	SW3	SW9	SW11	SW9	SSW7	S6	SE6	E7	ENE12	ENE13	ENE5	ENE5	ENE1	SW3	ESE2.4	ENE13	
16-Oct	SSW4	WSW4	SSE2	ENE4	NE5	ENE3	NW1	N1	AF	NE4	N4	NNW6	NNW4	SSE12	SSE11	SE12	SE10	SE8	SE11	SSE12	S10	S10	S11	S9	SSE4.3	SSE12
17-Oct	S9	S9	S6	SSW5	S5	SSW6	SSW7	SSW8	S8	SSW8	S13	SSW15	SSW15	S13	S12	SSW10	SW18	SSW12	SSW14	S13	S11	S10	SSW11	SSW11	SSW10.1	SW18
18-Oct	S8	SW13	WSW19	WSW20	WSW20	WSW21	WSW23	WSW25	WSW25	WSW20	W24	W29	WNW26	WNW24	WNW22	WNW21	NW17	WNW11	WNW11	NW7	WNW8	NNE14	NE17	NNE20	W14.0	W29
19-Oct	NE18	NNE15	NNE14	NNE18	NE18	NE17	NE16	NE15	NE11	NE11	NE11	ENE7	E6	ESE5	ENE5	E5	ESE5	E5	ENE7	ESE7	ESE7	SE6	S4	SSE7	NE8.2	NNE18
20-Oct	SSE9	S11	SSW9	SW14	WSW18	W20	WSW16	SW9	SW12	SW17	WSW20	WSW18	W18	WNW22	NW22	WNW26	WNW16	NW9	NW11	NNW9	NE18	NNE20	NE15	ENE8	W8.0	WNW26
21-Oct	S4	S4	S4	SSW5	SSW5	S5	S4	SW3	S3	SE7	S5	S3	NW5	NNW6	WNW3	SW3	SSE8	SSE5	SSE5	SSE6	SSE9	S6	S7	SSW8	S3.8	SSE9
22-Oct	S7	S7	SSW6	SW7	SSW12	S9	S8	SE8	SSE8	SW14	SW21	SW20	SW21	WSW24	WSW28	WSW28	WSW20	WSW15	WSW15	SW12	SW12	WSW15	WSW17	WSW9	SW13.0	WSW28
23-Oct	WSW7	SW11	SSW7	SSW6	SSW7	SSW8	SSW6	S5	S5	W3	N9	NNE10	NE11	NE8	N8	NE14	NE11	NNE16	NNE17	NNE15	NNE14	NE17	NE13	NE8	NNE4.6	NE17
24-Oct	ENE12	NNE16	NE14	NNE10	NE13	ENE13	ENE9	ENE8	N8	NNE5	ENE3	N2	NE6	NNW1	WNW3	SW2	WSW3	WSW4	NE2	ENE6	ENE6	ENE8	NE13	NE17	NE6.2	NE17
25-Oct	ENE13	NE13	NE14	NE15	N10	N9	NE11	NE8	ENE9	ENE7	E6	E3	ENE0	NW1	NW2	W1	S3	SW4	WSW3	SSW2	S1	W2	WSW1	SE3	NE4.1	NE15
26-Oct	S11	SSW9	S5	S2	SSE5	S4	W2	AF	ENE6	ESE5	SE8	SSE10	SE11	SE11	SE5	SE8	S10	S12	S11	S14	SSW11	WNW19	W15	W10	S5.3	WNW19
27-Oct	WNW7	NW11	WNW11	WNW19	WNW17	WNW18	NW18	NW18	NW16	NW18	NW18	NW17	NW15	NNW14	NNW17	NNW15	NNW15	NNW14	NNW15	NNW15	NNW12	NNW10	NNW7	N9	NW13.8	WNW19
28-Oct	NNE16	NNE16	NE15	ESE3	SSW3	SSW4	SSW5	SSW5	S6	SSE8	S8	SSW10	S9	SSE10	SSE9	SSE10	SSE7	SSE9	S7	SSE7	S7	S9	SSE11	SSE14	SSE5.3	NNE16
29-Oct	SSE14	S13	S11	S15	S13	SSE14	S13	S12	S11	S12	S13	S12	S14	S13	S14	S11	SSE8	S9	S9	S8	S8	S8	SSW8	SW11	S11.1	S15
30-Oct	SW12	SSW7	SSW8	S7	S7	SSW8	SSW8	SSW9	SSW10	SSW8	S5	SSE6	S5	SSE6	SSE4	SW4	SW3	SSW5	SSW7	WSW6	W3	ENE6	NE13	NNE15	S4.0	NNE15
31-Oct	NNE17	NNE11	NNW7	NW8	NW8	NNW9	NNW5	NE6	SSE2	SSE3	S4	ESE5	E4	ENE8	ENE11	ENE13	E10	ENE9	ENE13	NE15	NE18	NE16	NE16	NE19	NE7.7	NE19

SSE0.9	SSW0.9	SW0.6	WSW1.5	WSW1.8	WSW2.1	WSW2.5	SW1.9	SW2.4	SW3.4	WSW4.6	WSW4.6	W4.4	W4.1	NNW3.8	NNW3.1	NW2.6	NNW1.7	N2.1	N1.4	NNE1.9	N2.9	NNE2.2	NE1.1	Diurnal Average
NNE22	WSW23	NNE22	WSW20	WSW22	NNE25	WSW25	WSW25	WSW25	WSW22	SW25	W29	WSW36	WSW36	WSW35	WSW28	WSW20	NE20	N19	N19	N19	NE23	N21	NNE20	Diurnal Maximum

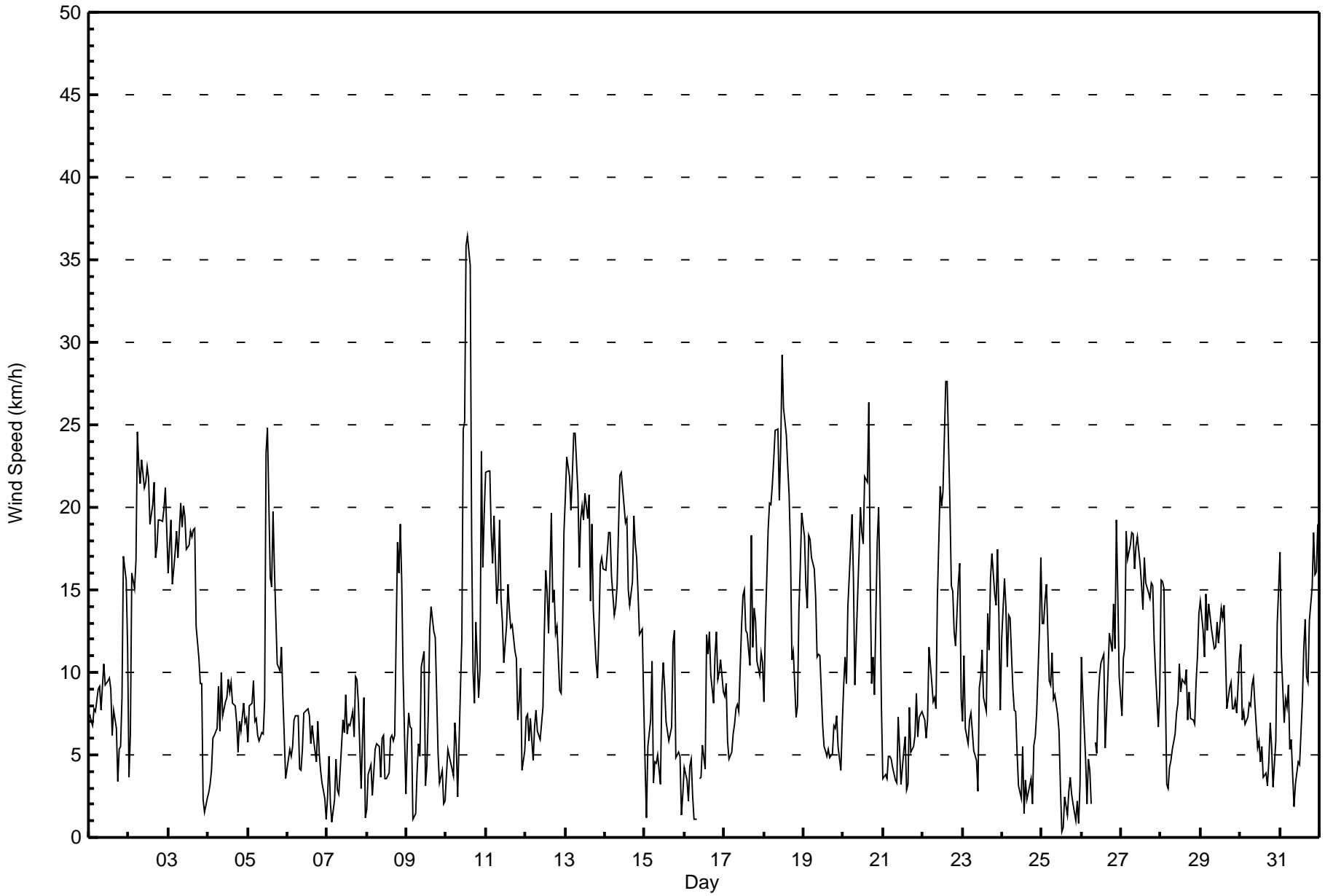
AF - Analyzer Failure  
 All monthly, daily, and diurnal averages have been calculated using vector methods



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

**Wind Speed (WS) - km/h**  
**Shell Muskeg River - October 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Oct 10 14:00 Minimum Value: 1 km/h on Oct 30 16:00 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> = 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	1	1	1	2	2	2	3	2	3	3	3	3	3	3	3	2	2	1	2	4	5	5	4	5	
2-Oct	3	3	3	4	5	5	4	3	5	6	7	7	6	6	7	7	5	5	6	6	6	6	6	6	
3-Oct	5	6	5	5	5	6	6	6	5	6	5	3	3	3	4	3	3	4	2	2	1	2	1	1	
4-Oct	1	1	1	2	2	2	3	3	3	2	3	3	3	3	3	2	2	1	1	1	2	1	2	2	
5-Oct	1	1	2	2	2	2	1	1	2	1	2	8	8	5	6	7	5	5	3	3	3	2	2	2	
6-Oct	1	1	1	1	1	1	1	1	1	2	3	3	2	3	2	2	2	1	1	2	1	1	1	1	
7-Oct	1	1	2	1	1	1	1	2	1	2	2	2	2	2	3	2	3	2	2	3	2	2	2	2	
8-Oct	2	1	1	2	1	1	1	1	1	2	2	2	2	2	2	2	2	2	3	4	3	4	5	3	
9-Oct	2	2	2	2	2	2	1	2	2	3	3	2	1	3	2	2	2	2	2	2	3	1	2	1	
10-Oct	1	1	1	1	1	2	2	2	2	7	5	6	8	9	7	7	3	2	6	2	5	4	4	4	
11-Oct	4	4	5	4	5	4	4	5	6	4	4	3	4	5	5	5	4	4	4	2	1	2	2	2	
12-Oct	1	1	1	2	1	1	2	1	2	2	3	4	5	4	4	6	5	5	2	2	2	2	2	3	
13-Oct	3	3	3	3	3	4	3	3	3	3	3	4	4	5	5	4	5	3	1	1	2	1	2	2	
14-Oct	2	3	3	3	3	2	2	3	4	4	6	5	6	6	5	4	5	4	4	3	4	4	4	3	
15-Oct	2	2	3	4	3	3	2	1	1	2	3	3	2	2	2	2	1	3	3	3	1	1	1	2	
16-Oct	1	2	1	1	1	2	1	1	AF	1	1	2	2	4	4	4	3	2	3	4	3	2	2	2	
17-Oct	2	2	2	1	1	1	1	1	2	2	4	4	5	4	4	3	5	3	4	3	3	2	3	3	
18-Oct	2	3	3	3	3	4	3	4	4	4	6	6	6	6	5	4	4	2	1	1	2	6	4	4	
19-Oct	4	6	3	3	3	3	2	2	2	2	2	2	2	2	2	2	1	1	2	1	2	3	2	2	
20-Oct	2	2	2	5	3	5	2	2	3	4	4	3	6	5	5	6	6	3	2	3	4	3	3	2	
21-Oct	1	1	1	1	1	1	1	2	1	2	2	2	2	2	2	2	3	2	1	1	2	2	2	2	
22-Oct	2	1	2	3	2	2	2	2	2	6	5	5	4	4	5	5	4	2	2	1	1	2	2	3	
23-Oct	3	2	1	2	2	2	2	2	1	2	4	3	2	2	3	3	4	4	3	4	4	2	2	3	
24-Oct	4	3	3	3	4	3	2	3	2	2	2	2	2	2	2	1	2	1	2	1	1	3	3	3	
25-Oct	2	2	3	2	3	3	3	3	2	2	2	2	1	1	1	1	1	1	1	1	2	1	1	1	
26-Oct	5	3	2	1	1	2	2	AF	1	1	3	3	3	4	3	3	3	4	4	4	5	5	4	2	
27-Oct	3	3	4	4	4	4	5	4	4	7	6	5	5	5	6	5	6	5	5	6	5	3	3	3	
28-Oct	4	5	4	3	1	1	1	1	2	2	2	3	3	3	3	3	2	3	1	2	1	2	2	3	
29-Oct	3	3	3	4	3	3	3	3	3	3	4	4	4	4	4	3	2	2	2	1	1	1	1	2	
30-Oct	2	2	2	1	2	3	2	2	3	2	2	2	2	1	2	1	1	1	2	3	2	3	2	2	
31-Oct	4	4	3	2	2	3	2	4	2	1	1	2	1	3	3	3	3	2	3	4	3	3	3	3	
																	Diurnal Maximum								
AF - Analyzer Failure																									





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

**Wind Speed (WS) - km/h**  
**Shell Muskeg River - October 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	165	22.24	22.24
6 - 11	295	39.76	61.99
12 - 19	211	28.44	90.43
20 - 28	67	9.03	99.46
29 - 38	4	0.54	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  
Shell Muskeg River - October 2015**

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	1	7	13	9	8	7	18	37	21	10	7	6	4	7	3	165
6 - 11	12	8	14	21	5	3	11	21	83	56	14	7	4	6	17	13	295
12 - 19	20	29	39	8	0	0	1	5	18	8	15	23	8	6	16	15	211
20 - 28	7	12	4	0	0	0	0	0	0	0	8	21	3	7	5	0	67
29 - 38	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	4
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	46	50	64	42	14	11	19	44	138	85	47	61	22	23	45	31	742

Total Number of Valid Hours: 742

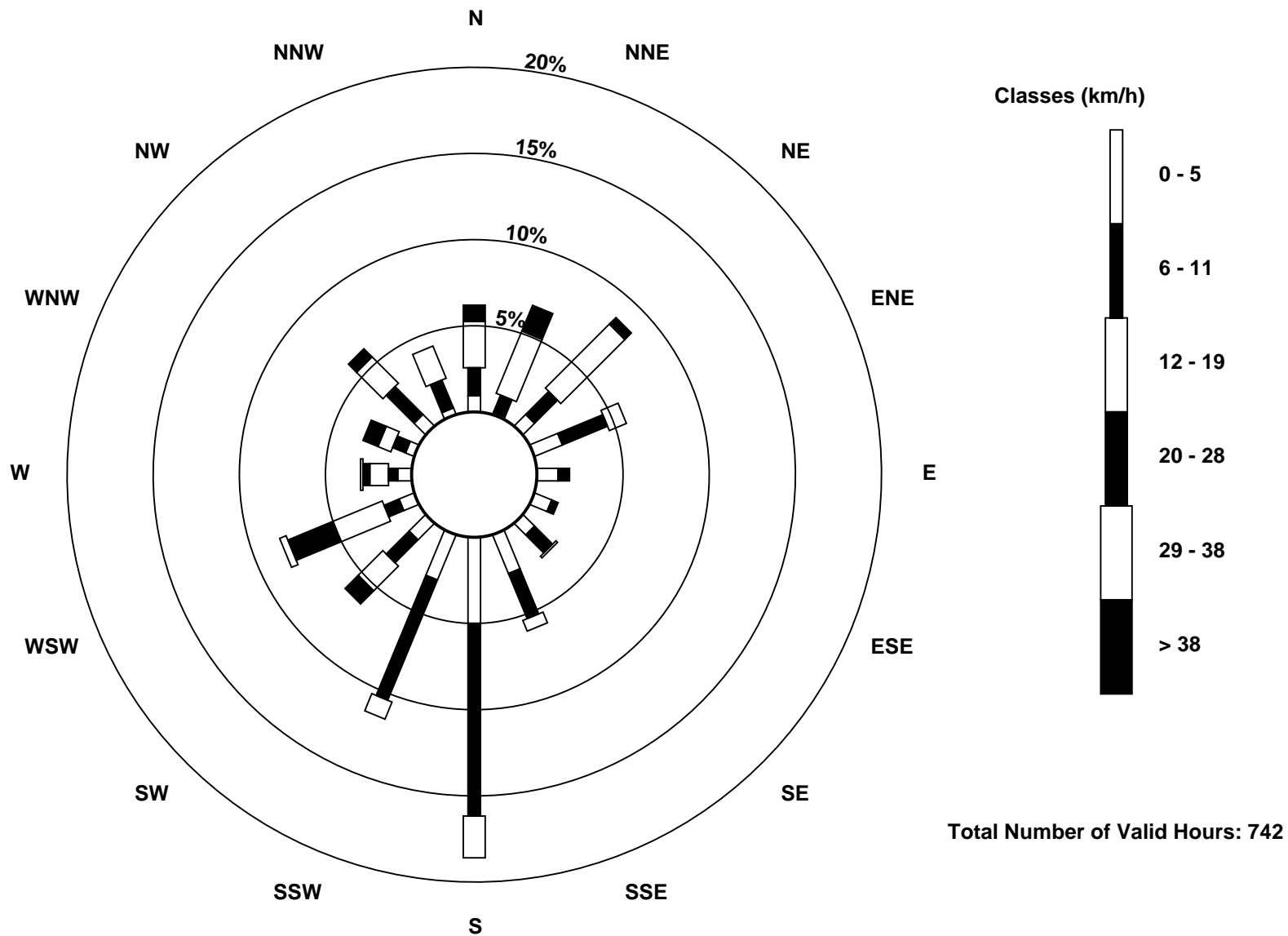
Total Number of Hours: 744





Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Wind Speed (WS) - km/h  
Shell Muskeg River (AMS 16)





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg**

**Shell Muskeg River - October 2015**

Direction of Maximum Speed: 248 deg on Oct 10 14:00															Hours in Service: 744											
Direction of Maximum Daily Speed Average: 242.7 deg on Oct 13															Hours of Data: 742											
Direction of Minimum Speed: 70 deg on Oct 25 13:00															Hours of Missing Data: 2											
Direction of Minimum Daily Speed Average: 1.4 deg on Oct 7															Percent Operational Time: 99.7											
Monthly Average Direction: 235.7 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	185	182	180	183	187	182	187	180	183	199	192	191	186	175	179	180	177	125	96	63	21	25	27	42	163.8
2-Oct	76	79	36	49	39	28	39	42	34	21	16	16	8	6	358	6	2	3	1	357	1	2	1	9	17.0
3-Oct	8	1	360	358	351	352	354	356	3	11	24	40	46	43	45	44	44	57	72	60	68	109	156	143	23.2
4-Oct	211	168	199	264	264	255	233	209	227	193	175	198	208	188	203	186	177	170	185	185	173	179	175	181	199.3
5-Oct	213	199	181	186	187	175	173	186	200	203	225	306	310	326	327	321	318	320	308	306	308	308	311	187	287.5
6-Oct	207	196	184	186	191	187	193	177	162	179	193	193	192	204	161	172	170	134	115	118	153	196	314	218	179.2
7-Oct	77	78	48	256	88	155	214	191	180	216	193	231	194	205	201	176	313	325	326	326	6	330	354	47	253.0
8-Oct	164	204	188	181	163	181	179	184	164	196	195	149	90	322	338	7	10	358	27	16	28	30	33	61	37.2
9-Oct	54	58	24	58	350	319	208	249	194	181	211	205	10	12	34	35	33	30	25	47	301	293	252	187	31.0
10-Oct	197	176	188	170	197	223	191	155	212	218	234	234	245	248	253	282	324	307	318	319	341	35	43	32	260.4
11-Oct	31	32	28	28	20	32	14	358	4	3	356	358	346	334	334	328	342	340	337	304	300	265	263	190	359.8
12-Oct	189	182	180	187	174	170	188	191	216	208	192	186	199	207	179	241	271	269	245	260	239	211	220	239	217.2
13-Oct	237	238	236	236	242	241	246	243	237	237	246	235	234	271	274	261	278	252	237	213	218	229	228	238	242.7
14-Oct	239	237	244	238	251	244	245	246	246	250	289	310	315	315	326	336	9	34	25	39	23	12	11	360	299.4
15-Oct	352	100	56	38	43	83	116	125	128	222	220	225	229	198	179	129	92	71	72	73	68	69	70	223	104.4
16-Oct	213	246	148	72	56	71	326	5	AF	35	357	332	334	168	152	145	137	130	134	148	169	173	178	169	149.7
17-Oct	183	184	184	192	191	202	209	205	190	196	187	193	207	190	188	203	220	194	192	191	185	181	195	209	195.4
18-Oct	190	220	239	243	248	258	258	258	254	251	264	279	292	295	296	299	308	284	303	318	303	14	35	28	277.4
19-Oct	41	24	23	28	43	43	43	48	56	52	48	58	79	119	60	92	115	99	59	110	117	124	183	162	56.2
20-Oct	167	185	193	223	242	264	251	217	215	232	246	243	278	301	307	289	303	313	312	339	45	32	41	60	273.3
21-Oct	174	182	173	203	200	183	186	233	172	136	180	180	318	331	296	234	156	154	158	161	157	181	187	193	181.5
22-Oct	188	191	202	215	209	184	170	143	162	219	236	225	225	245	252	247	245	242	238	231	231	245	250	252	229.4
23-Oct	252	235	212	204	201	203	193	185	184	274	8	28	35	41	6	41	46	29	25	25	24	43	36	41	30.2
24-Oct	58	30	46	16	56	66	78	66	352	21	62	357	44	345	282	232	251	255	52	65	63	75	56	48	46.2
25-Oct	57	51	40	43	7	9	38	45	68	68	83	89	70	317	312	266	180	226	253	208	185	277	253	144	45.5
26-Oct	174	200	191	174	152	178	273	AF	68	107	145	150	138	145	129	127	188	171	170	179	212	293	280	265	181.8
27-Oct	284	310	287	288	298	294	309	312	311	325	318	314	322	333	333	339	331	336	338	336	335	342	330	351	319.2
28-Oct	33	30	47	108	204	198	205	200	177	163	183	196	173	149	150	163	157	153	174	167	172	178	168	168	155.5
29-Oct	168	171	181	173	170	167	169	171	172	180	187	190	184	182	186	179	164	173	181	181	184	190	201	227	179.6
30-Oct	224	193	205	172	178	194	201	200	199	194	181	166	184	164	155	220	224	200	202	248	269	60	35	33	190.4
31-Oct	29	20	343	310	312	338	346	43	150	149	169	121	97	66	68	65	79	75	69	53	43	36	47	44	44.3

152.9 194.6 233.1 242.9 251.7 246.6 238.0 235.6 223.6 226.7 239.2 248.4 262.6 268.9 284.5 292.1 312.2 342.7 1.8 6.1 13.8 7.8 11.4 37.7

Diurnal Average

AF - Analyzer Failure

All monthly, daily, and diurnal averages have been calculated using vector methods



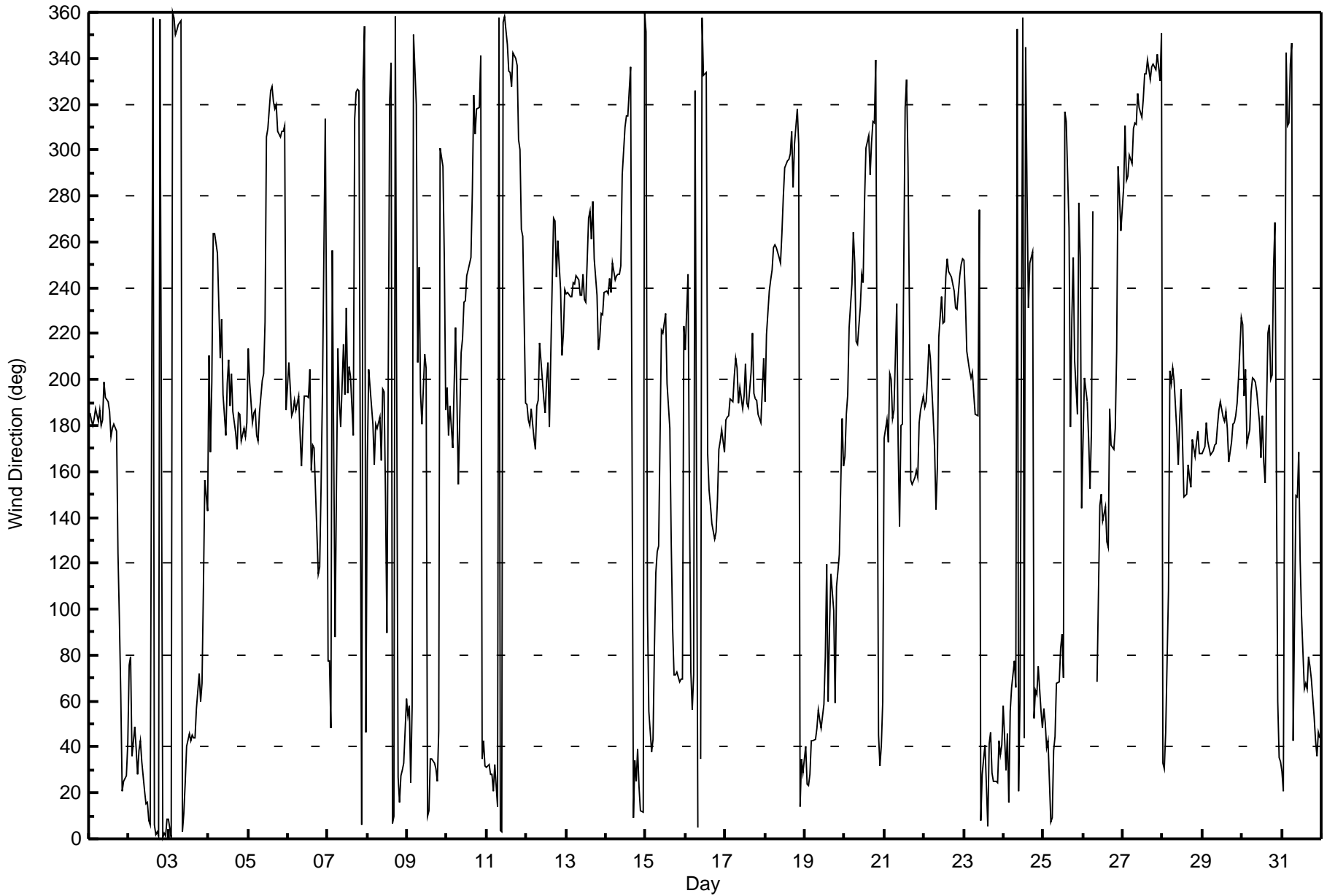
Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Shell Muskeg River - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 102 deg on Oct 25 13:00 Minimum Value: 4 deg on Oct 13 22:00 Percentiles: P <sub>1</sub> = 7 P <sub>10</sub> = 10 Q <sub>1</sub> = 14 Median = 18 Q <sub>3</sub> = 24 P <sub>90</sub> = 44 P <sub>99</sub> = 81																		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	15	15	14	17	16	20	18	15	20	24	30	29	28	29	39	26	19	37	15	16	38	11	11	19	39
2-Oct	52	56	12	16	14	11	11	11	14	18	17	19	19	19	23	18	19	19	19	20	20	19	18	19	56
3-Oct	19	21	19	20	18	19	20	20	19	20	16	14	10	12	12	11	10	20	10	15	13	84	70	63	84
4-Oct	42	44	22	31	22	23	14	23	19	30	23	27	28	28	30	26	23	22	14	17	16	17	15	17	44
5-Oct	10	17	13	16	19	16	15	15	20	30	23	23	19	23	24	22	22	18	15	15	12	16	46	44	46
6-Oct	20	18	16	10	12	12	14	18	20	31	32	37	37	36	50	29	18	22	15	19	18	29	29	78	78
7-Oct	35	13	65	57	45	23	45	51	20	23	36	22	39	36	41	22	60	18	17	21	59	34	22	79	79
8-Oct	71	20	16	70	16	8	9	9	15	21	26	50	66	69	26	28	18	20	10	16	10	11	26	53	71
9-Oct	25	18	24	18	98	89	32	17	44	18	23	71	34	34	8	10	11	10	20	49	68	21	60	50	98
10-Oct	30	20	17	24	42	16	34	66	20	19	10	12	11	12	13	28	21	15	16	11	26	10	13	12	66
11-Oct	11	11	10	14	20	12	19	19	18	18	21	24	23	23	22	24	21	23	24	28	11	9	39	19	39
12-Oct	13	13	15	24	20	21	19	18	17	34	30	21	21	23	20	21	15	14	9	9	22	13	8	8	34
13-Oct	8	9	8	9	8	8	8	8	9	8	10	13	16	21	17	17	18	8	13	10	8	4	4	11	21
14-Oct	8	10	8	8	10	13	8	12	10	14	20	17	21	22	23	21	23	13	14	13	16	21	19	24	24
15-Oct	37	71	62	42	16	73	29	25	26	74	29	24	27	33	32	26	17	10	12	67	12	11	45	77	77
16-Oct	13	45	61	10	10	36	77	80	AF	22	39	28	59	28	23	18	15	13	16	17	21	14	13	12	80
17-Oct	16	14	14	14	17	12	10	14	18	22	20	21	21	21	18	20	15	17	17	18	17	17	19	17	22
18-Oct	17	14	8	7	8	11	10	9	10	9	13	14	16	14	14	13	13	9	10	20	19	25	15	9	25
19-Oct	12	15	15	10	10	10	9	9	11	9	11	34	30	35	24	23	18	16	9	22	16	35	36	18	36
20-Oct	12	15	17	15	13	12	10	20	17	14	9	13	29	14	15	15	17	16	12	39	16	11	14	24	39
21-Oct	42	18	19	21	19	15	20	56	27	24	49	76	66	27	76	56	15	16	18	14	14	18	17	18	76
22-Oct	19	15	22	21	12	21	18	14	17	24	12	13	12	15	13	10	8	7	5	5	6	9	8	51	51
23-Oct	57	14	17	23	15	15	21	21	17	61	33	20	23	24	33	14	17	14	11	13	16	9	13	32	61
24-Oct	19	15	14	20	19	17	15	37	23	44	66	72	33	77	40	33	20	22	86	14	18	27	15	8	86
25-Oct	13	18	17	11	19	23	20	23	21	25	25	46	102	101	52	71	20	17	17	18	87	34	65	42	102
26-Oct	20	20	23	32	17	27	33	AF	7	22	20	19	19	17	29	43	24	17	23	18	34	15	11	11	43
27-Oct	20	14	12	11	13	13	14	13	17	21	20	17	21	24	22	21	22	20	20	23	27	22	34	20	34
28-Oct	20	21	16	68	63	23	18	27	25	16	23	22	23	21	21	16	13	15	14	15	14	17	12	13	68
29-Oct	12	13	15	14	13	13	14	15	14	16	20	19	17	18	17	15	14	12	13	12	11	12	13	10	20
30-Oct	10	23	25	17	16	19	20	12	15	16	22	20	23	16	46	12	46	36	17	57	78	60	14	11	78
31-Oct	13	19	24	13	18	16	33	57	73	30	20	36	31	28	16	15	15	16	13	17	10	13	14	11	73
71 71 65 70 98 89 77 80 73 74 66 76 102 101 76 71 60 37 86 67 87 84 70 79																								Diurnal Maximum	
AF - Analyzer Failure																									





# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	October 26, 2015	Last Calibration	September 24, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	9:38	End Time (MST)	12:40
Gas Cert Reference	LL104193	Station temp.	22 Deg C
Cal Gas Concentration	48.3 ppm	Cal Gas Exp Date	12-Feb-18
Calibrator Make/Model	API T700	Serial Number	493
ZAG Make/Model	API 701	Serial Number	2155
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2632

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-710	-710
Analyzer IP address	192.168.1.43		Lamp voltage	798	802
Calculated slope	0.997446	0.993100	Chamber temp	45.0	44.9
Calculated intercept	1.327575	2.775660	Pressure	711.4	706.3
Analyzer Background	6.1	6.1	Flow	0.447	0.443
Analyzer Coefficient	1.222	1.206	Intensity	91	91

Analyzer make Thermo 43i Analyzer serial # 1118148498

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	83.7	808.5	820.6	0.985
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	83.7	808.5	812.4	0.995
second point	5000	41.7	402.8	402.3	1.001
third point	5000	21.0	202.9	198.3	1.023
as left zero	6000	0.0	0.0	0.2	----
as left span	5000	83.6	807.6	806.5	1.001
Average Correction Factor					1.007

Corrected As found 820.7 Previous response 809.3 % change -1.4%

**Notes:**

Changed inlet filter after as founds. Adjusted span.

Calibration Performed By: Evan Magill



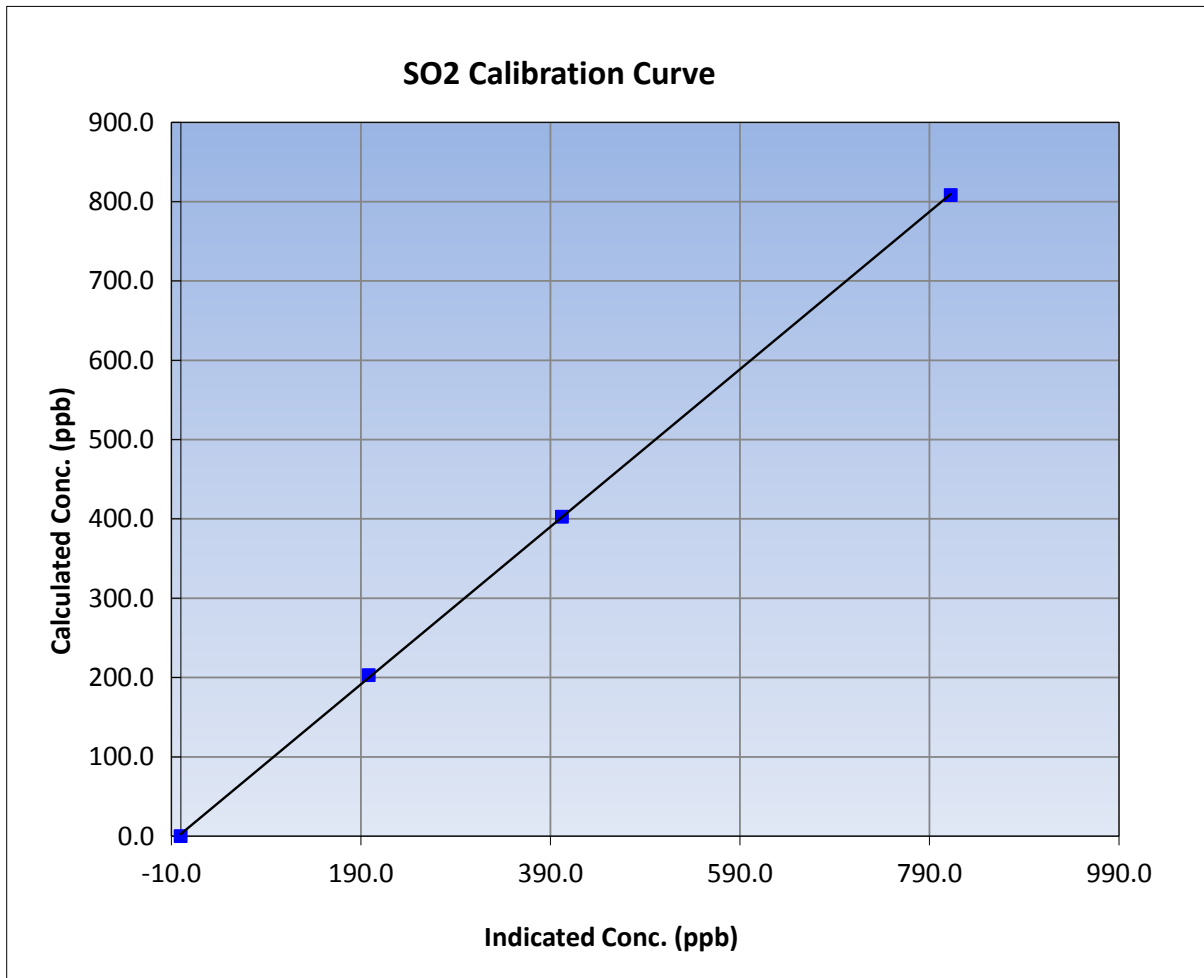
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	October 26, 2015	Previous Calibration	September 24, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:38	End Time (MST)	12:40
Analyzer make	Thermo 43i	Analyzer serial #	1118148498

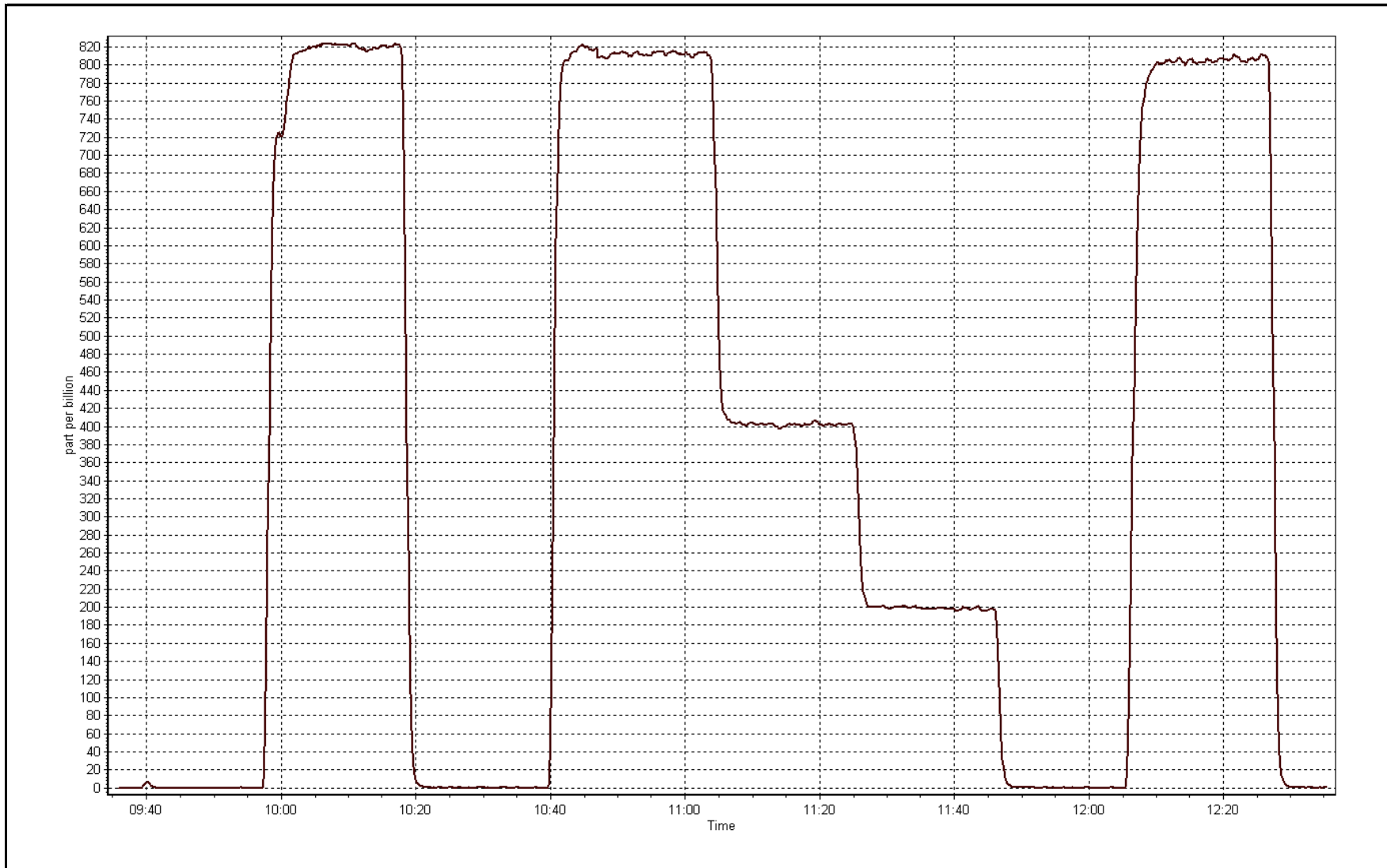
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999948
808.5	812.4	0.9952		
402.8	402.3	1.0013	Slope	0.993100
202.9	198.3	1.0231		
			Intercept	2.775660



SO2 Calibration Plot

Date: October 26, 2015





# Wood Buffalo Environmental Association THC Calibration Report

### Station Information

Calibration Date	October-26-15	Last Calibration	September-24-15
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	9:38	End Time (MST)	12:40
Gas Cert Reference	LL104193	Cal Gas Expiry Date	12-Feb-18
CH4 Cal Gas Conc.	487 ppm	CH4 Equiv Conc.	1017.8 ppm
C3H8 Cal Gas Conc.	193 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	493
ZAG make/model	Teledyne API 701	Serial Number	2155
DACS make/model	Campbell Scientific CR3000	Serial Number	2632

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.2	8.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.8	34.9
Calculated slope	1.002831	0.993473	Fuel Pressure	24.2	24.2
Calculated intercept	0.026550	0.065942	Analyzer Coeff	4.49	4.52
			Analyzer BKG	2.350	2.460

Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458
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### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.04	----
as found span	5000	83.7	17.04	17.10	0.996
calibrator zero	5000	0.0	0.00	-0.01	----
high point	5000	83.7	17.04	17.10	0.996
second point	5000	41.7	8.49	8.48	1.001
third point	5000	21.0	4.27	4.16	1.028
as left zero	6000	0.0	0.00	-0.03	----
as left span	5000	83.6	17.02	16.98	1.002
Average Correction Factor					1.008

Corrected As found	17.06	Previous response	16.96	% change	-0.6%
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**Notes:**

Changed inlet filter after as founds. Adjusted zero.

Calibration Performed By:

Evan Magill





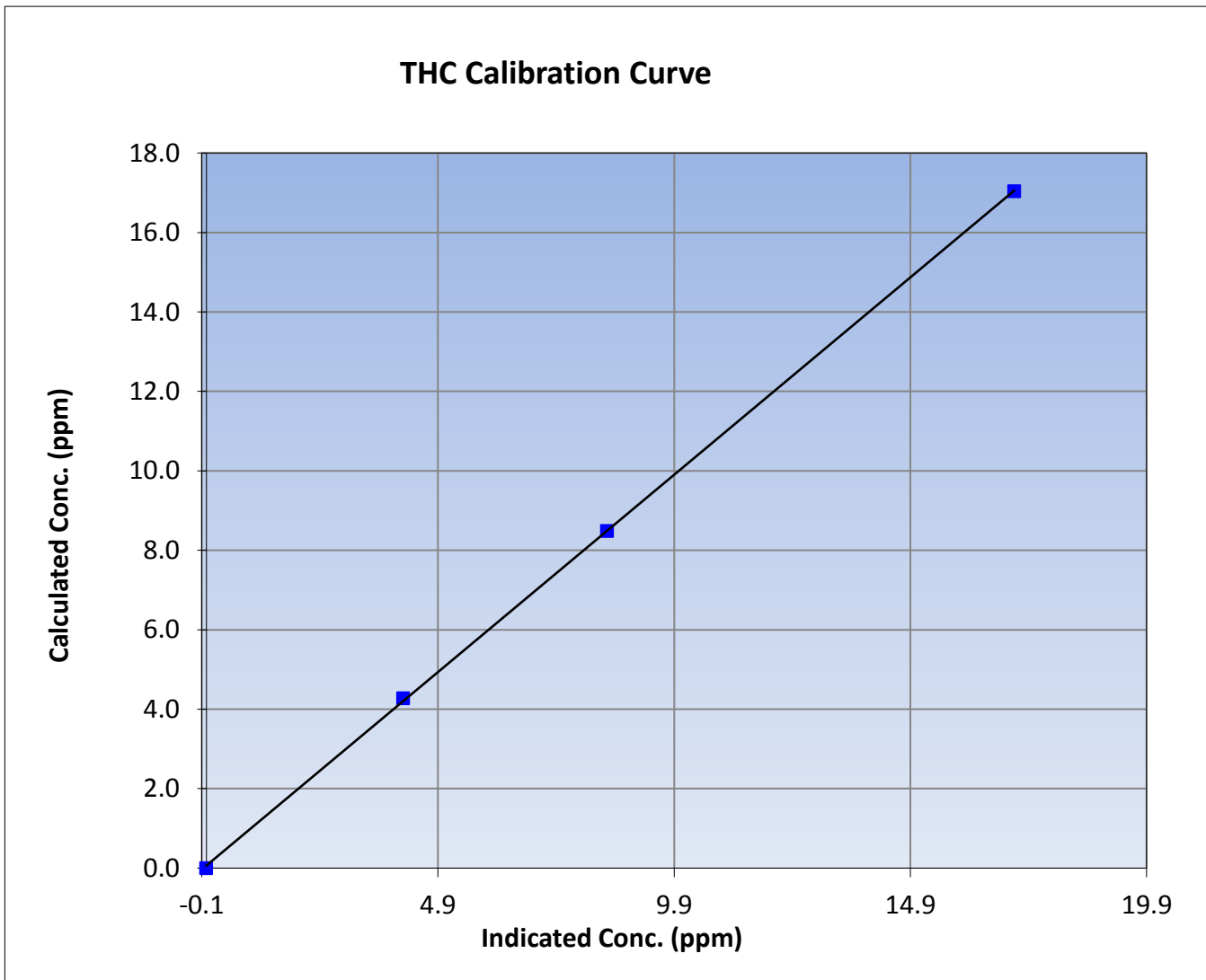
# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	October 26, 2015	Previous Calibration	September 24, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:38	End Time (MST)	12:40
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458

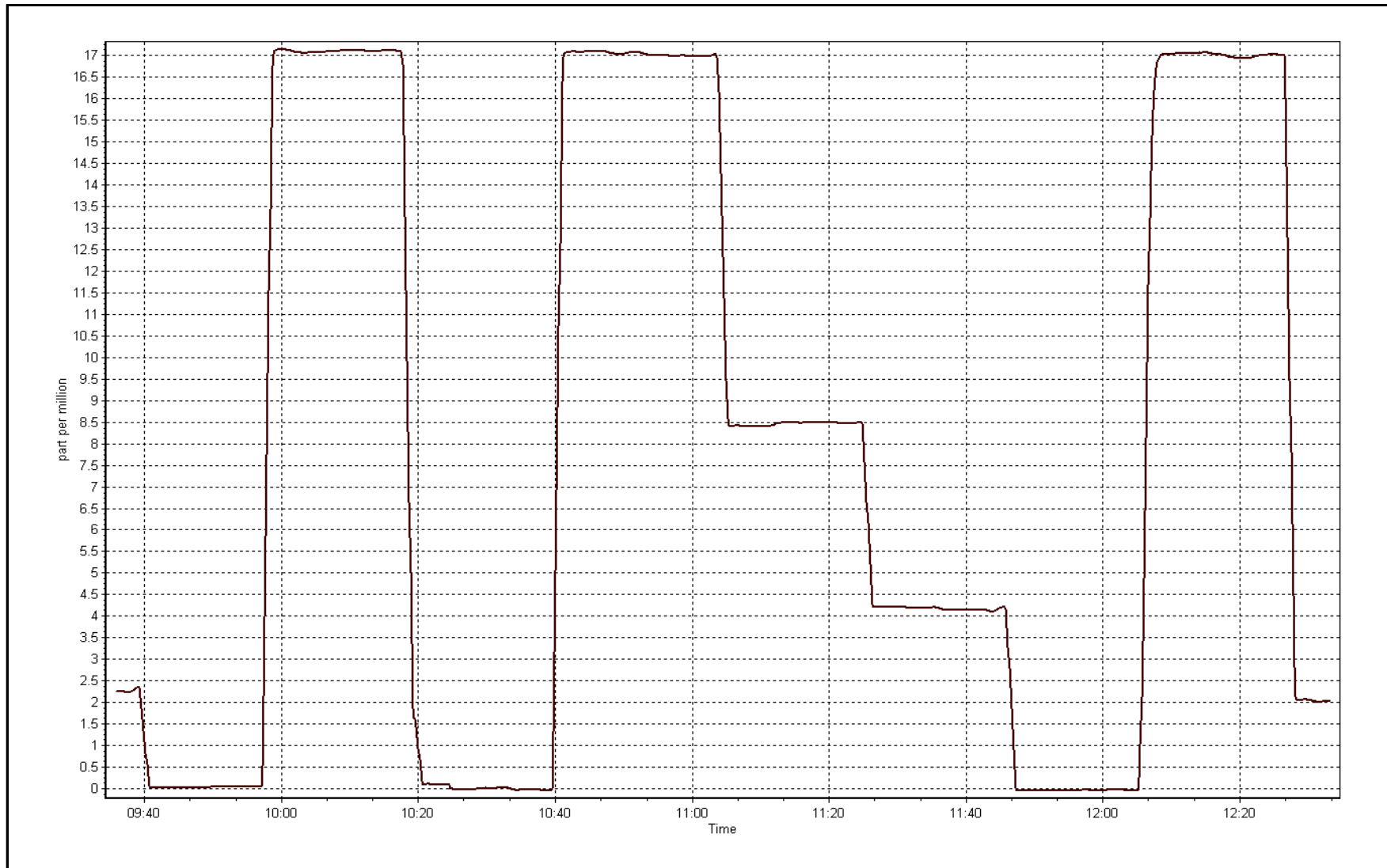
## Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.01	----	Correlation Coefficient	0.999942
17.04	17.10	0.9963		
8.49	8.48	1.0009	Slope	0.993473
4.27	4.16	1.0275		
			Intercept	0.065942



THC Calibration Plot

Date: October 26, 2015





## Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date	October 21, 2015	Previous Calibration	September 24, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	9:20	End Time (MST)	13:35
NO Cal Gas Conc	48 ppm	Gas Cert Reference	LL104193
NOx Cal Gas Conc	48 ppm	Cal Gas Expiry Date	February 12, 2018
Calibrator	API T700	Serial Number	493
Zero air Generator	Teledyne API T701	Serial Number	2155

### DACs Information

DACs make & model	Campbell Scientific CR3000	DACs serial No.	2632
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### Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.999009	0.998610	1.002759
	Data Offset	0.655648	0.997919	0.983547
Current Calibration	Data Slope	0.999939	0.999693	0.998810
	Data Offset	0.473793	1.117846	1.100402

### Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1426262593
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.779		0.767	
NOx coefficient	0.997		0.997	
NO2 coefficient	1.000		1.000	
NO bkgrnd	8.6		8.4	
NOx bkgrnd	8.9		8.7	
Chamber Temp	50.2	Deg C	50.4	Deg C
Moly Temp	323.9	Deg C	325.3	Deg C
PMT voltage	-774	V	-744.4	V
PMT Temp	-3.3	Deg C	-3.1	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	173.7	mmHg	173.1	mmHg
R Cell Press Nox	173.4	mmHg	172.8	mmHg
NO sample flow	0.871	lpm	0.874	lpm
Nox sample Flow	0.874	lpm	0.876	lpm

**Notes:**

Changed inlet filter after as founds. Adjusted span. Used 2nd GPT reference points.



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date:

October 21, 2015

Station Number:

AMS 16

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.1	-0.2	----	----
as found span	5000	83.6	802.6	802.6	0.0	816.2	815.1	1.1	0.9833	0.9846
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.1	-0.2	----	----
high point	5000	83.6	802.6	802.6	0.0	801.9	801.9	0.0	1.0008	1.0008
second point	5000	42.0	403.2	403.2	0.0	403.7	402.7	1.0	0.9989	1.0014
third point	5000	21.1	202.6	202.6	0.0	201.2	199.8	1.4	1.0067	1.0138
as left zero	6000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
as left span	5000	83.6	802.6	514.5	288.1	802.5	506.1	296.4	1.0001	1.0166
Average Correction Factor									1.0021	1.0053

Corrected As found  
Previous Response

NO<sub>x</sub>= 816.5  
NO<sub>x</sub>= 802.7

NO= 815.2  
NO= 802.7

Percent Change

NO<sub>x</sub>= -1.7%

NO= -1.5%

### GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

83.60

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			-0.2			N/A	
1st NO2 (300)	----	514.5	286.7	801.1	514.5	286.6	0.9854	1.0000	1.0004	100.0%
2nd NO2 (200)	----	600.5	200.7	800.1	600.5	199.6	0.9866	1.0000	1.0056	99.4%
3rd NO2 (100)	----	695.5	105.7	798.9	695.5	103.4	0.9880	1.0000	1.0219	97.9%
4th NO2 (0)	801.2	----	-1.0	800.2	801.2	-1.0	0.9865	1.0000	N/A	----
Average Correction Factor							0.9866	1.0000	1.0093	99.1%

Calibration Performed By:

Evan Magill



# Wood Buffalo Environmental Association

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

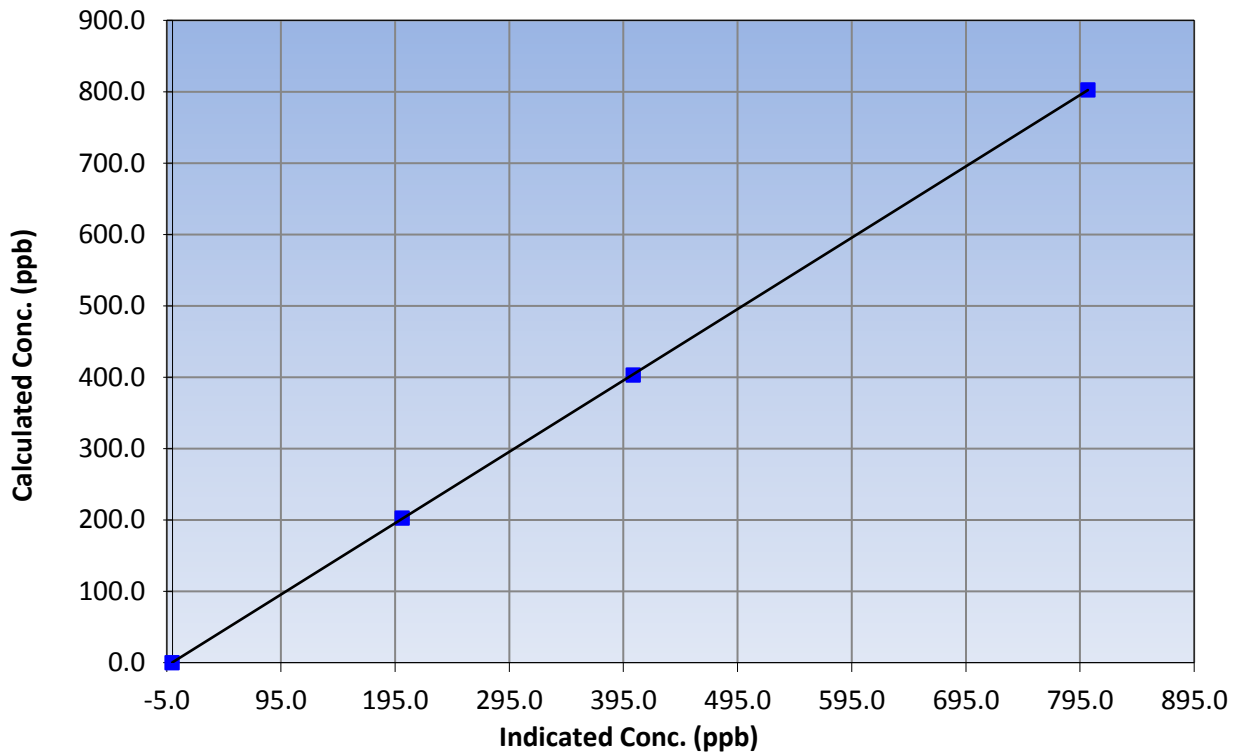
### Station Information

Calibration Date	October 21, 2015	Previous Calibration	September 24, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:20	End Time (MST)	13:35
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999995
802.6	801.9	1.0008		
403.2	403.7	0.9989	Slope	0.999939
202.6	201.2	1.0067		
			Intercept	0.473793

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

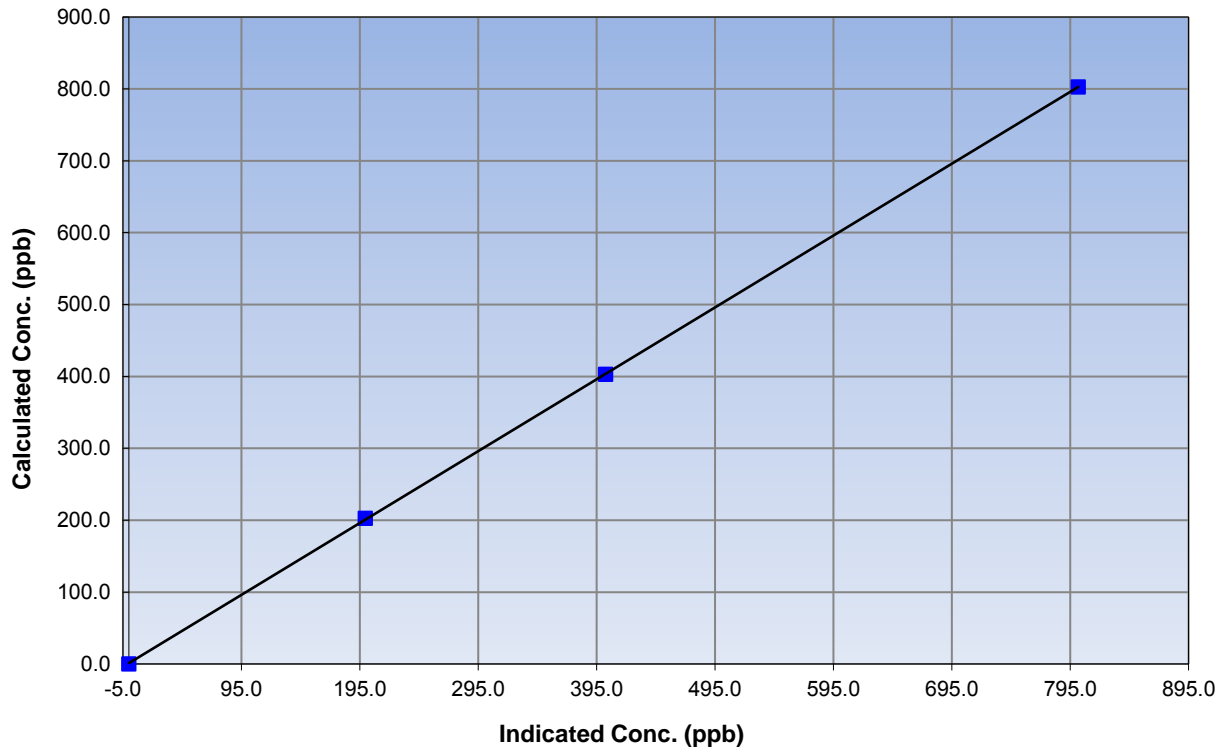
### Station Information

Calibration Date	October 21, 2015	Previous Calibration	September 24, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:20	End Time (MST)	13:35
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999988
802.6	801.9	1.0008		
403.2	402.7	1.0014	Slope	0.999693
202.6	199.8	1.0138		
			Intercept	1.117846

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

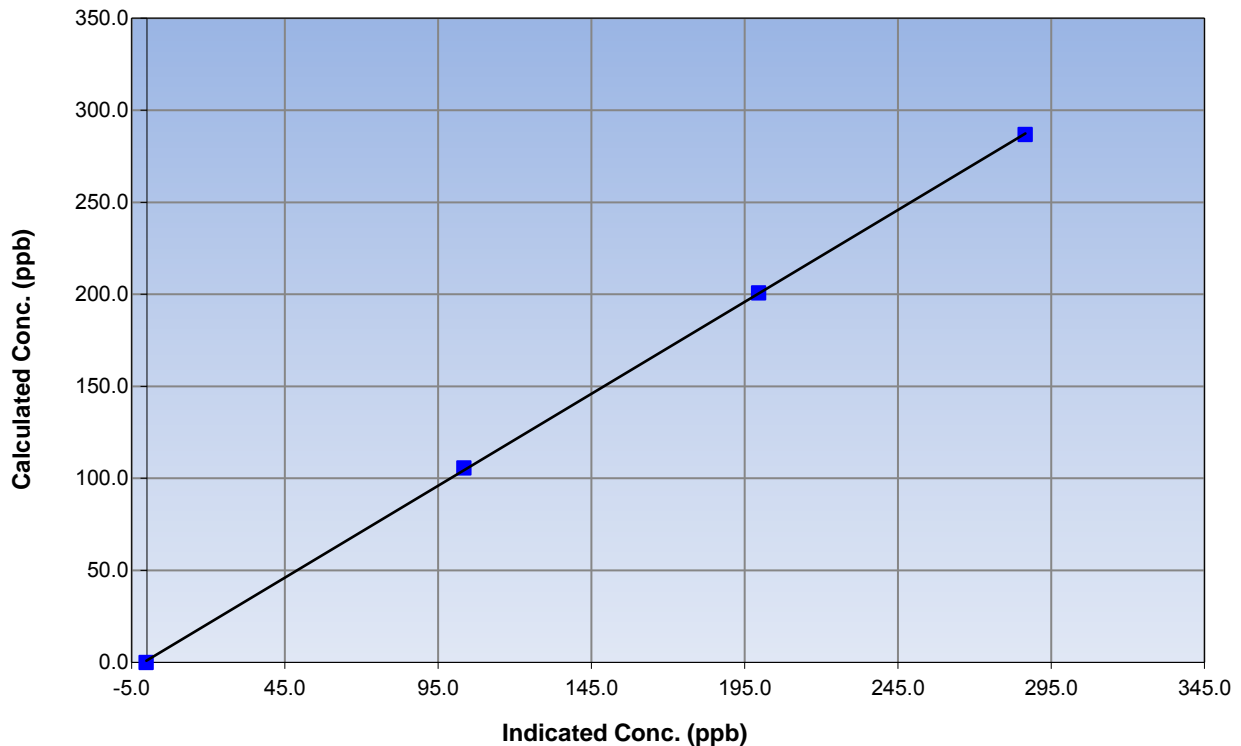
### Station Information

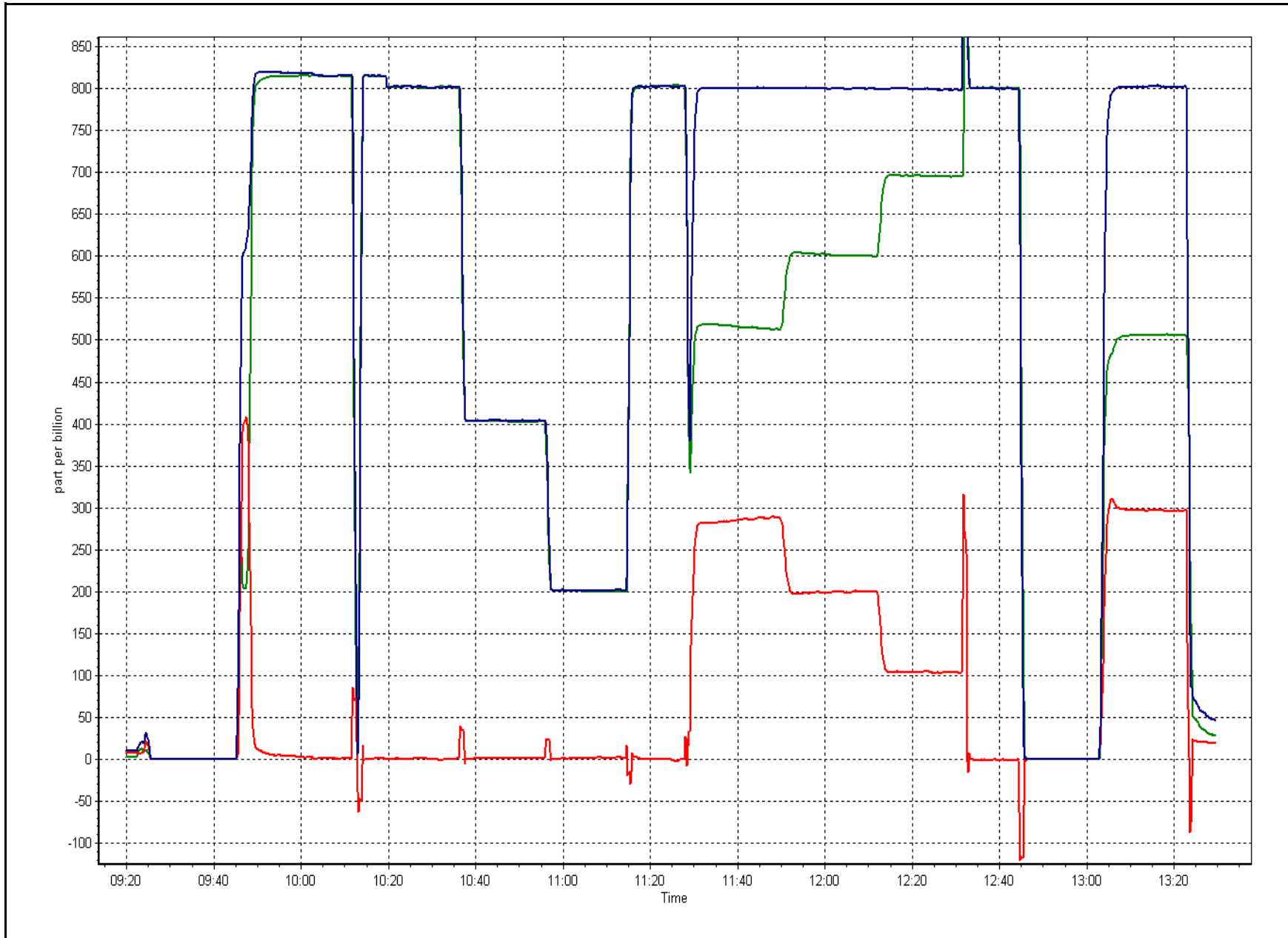
Calibration Date	October 21, 2015	Previous Calibration	September 24, 2015
Station Number	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:20	End Time (MST)	13:35
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999935
286.7	286.6	1.0004		
200.7	199.6	1.0056	Slope	0.998810
105.7	103.4	1.0219		
			Intercept	1.100402

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









Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	October 26, 2015	Previous Calibration:	September 24, 2015
Station Name:	Shell Muskeg River	Station Number:	AMS 16
Start Time (MST):	11:15	End Time (MST):	14:30
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1212

SHARP INFORMATION			
Particulate Fraction:		PM2.5	
Make/Model:		Thermo / SHARP 5030	
Serial Number		E-798	
C <sub>14</sub> Source SN:		4142	
Confirmation of Time settings:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Parameters Checked:	T1 <input checked="" type="checkbox"/>	T2 <input type="checkbox"/>	T3 <input type="checkbox"/>
	T4 <input type="checkbox"/>	P3 <input checked="" type="checkbox"/>	Main Flow <input checked="" type="checkbox"/>
		Beta <input type="checkbox"/>	Neph <input checked="" type="checkbox"/>

CALIBRATION DATA

Temperature (°C)				
Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	9.0	7.7	-1.3	9.0
T2		na	na	
T3		na	na	
T4		na	na	
RH (%)		na	na	

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	976	978.0	2.0	976

Main Flow (Lph)				
Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1001	991	-10	991	1001

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	545		545
Neph	5.9		0
C14	22.8		17
Indicated Concentration (ug/m3)	10.6	yes	-0.1
Offset 1	na		na
Offset 2	na		na

Leak Check (Quarterly)			
Leak Check Date:	August 11, 2015	Previous Leak Check Date:	May 25, 2015

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.67	
*Flow with adaptor (LPM):	16.57	0.10

\*Note - do not attach adaptor without shutting off the pump first

Mass Foil Calibration (Annually)			
Foil Calibration Date:	May 25, 2015	Previous Foil Calibration:	na
Zeroed?:	yes		
Foil Mass:	1337		
Previous Correction Factor:	7029	Mass foil set S/N:	2518
New Correction Factor:	7067		

INSPECTION DATA		
Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

NOTES:

Made a large zero adjustment. Replaced cyclone head with a clean one.

Calibration Performed By:	Evan Magill
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# Wood Buffalo Environmental Association

## SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	October 28, 2015	Previous Calibration:	October 26, 2015
Station Name:	Shell Muskeg River	Station Number:	AMS 16
Start Time (MST):	10:05	End Time (MST):	12:40
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1212

SHARP INFORMATION			
Particulate Fraction:	PM2.5		
Make/Model:	Thermo / SHARP 5030		
Serial Number	E-798		
C <sub>14</sub> Source SN:	4142		
Confirmation of Time settings:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Parameters Checked:	T1 <input type="checkbox"/>	T2 <input type="checkbox"/>	T3 <input type="checkbox"/>
	T4 <input type="checkbox"/>	P3 <input type="checkbox"/>	Main Flow <input checked="" type="checkbox"/>
		Beta <input type="checkbox"/>	Neph <input checked="" type="checkbox"/>

CALIBRATION DATA				
Temperature (°C)				
Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	na	na	#VALUE!	na
T2		na	na	
T3		na	na	
T4		na	na	
RH (%)		na	na	

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	na	na	#VALUE!	na

Main Flow (Lph)				
Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1001	1000	-1	1000	1001

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	544		544
Neph	0		0
C14	-8.2		-8.2
Indicated Concentration (ug/m3)	0	no	0
Offset 1	na		na
Offset 2	na		na

Leak Check (Quarterly)			
Leak Check Date:	October 28, 2015	Previous Leak Check Date:	August 11, 2015
	Measured		Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.67		0.12
*Flow with adaptor (LPM):	16.55		
<i>*Note - do not attach adaptor without shutting off the pump first</i>			

Mass Foil Calibration (Annually)			
Foil Calibration Date:	May 25, 2015	Previous Foil Calibration:	na
Zeroed?:	yes		
Foil Mass:	1337		Mass foil set S/N: 2518
Previous Correction Factor:	7029		
New Correction Factor:	7067		

INSPECTION DATA		
Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

**NOTES:**

Investigating noisy response. Leak check done. Nephelometer zero checked, did not adjust. Manually moved the tape forward, small debris noticed on the tape that was moved forward. Most likely the cause of the noisy response. Did not check the temperature and pressure, as they were completed in the monthly audit two days earlier.

Calibration Performed By: Evan Magill



## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 17  
WAPASU  
OCTOBER 2015**

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

November 26, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)  
OCTOBER 2015

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	708	36	36	100.00	17	0	4	0
H2S (ppb) Average	707	36	37	99.87	1	0	0	0
THC (ppm) Average	708	36	36	100.00	2.8	-	2.4	-
O3 (ppb) Average	708	35	36	99.87	44	0	33	-
NO2 (ppb) Average	708	36	36	100.00	16	0	7	-
NO (ppb) Average	708	36	36	100.00	7	-	2	-
NOX (ppb) Average	708	36	36	100.00	18	-	8	-
PM2.5 (ug/m3) Average	731	2	13	98.52	19.4	-	8.1	0
Temperature 2 m (C) Average	744	0	0	100.00	23.4	-	16.5	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	98	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	22	-	15	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)  
OCTOBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	0.9	2	-	0	0	0	0	1	2	17
H2S (ppb) Average	707	0.2	0	-	0	0	0	0	0	0	1
THC (ppm) Average	708	2.19	0.1	-	2	2.1	2.1	2.2	2.2	2.3	2.8
O3 (ppb) Average	708	21.5	8	-	4	11	16	21	27	31	44
NO2 (ppb) Average	708	2.2	3	-	0	0	0	1	3	6	16
NO (ppb) Average	708	0.3	1	-	0	0	0	0	0	1	7
NOX (ppb) Average	708	2.6	3	-	0	0	1	1	3	7	18
PM2.5 (ug/m3) Average	731	2.71	2.6	-	0	0.3	0.7	2.1	4	6	19.4
Temperature 2 m (C) Average	744	4.36	5.6	-	-5	-1.9	-0.2	3.3	7.8	12.1	23.4
Relative Humidity (%) Average	744	75.5	19	-	28	47	61	81	92	96	99
Wind Speed 10 m (km/h) Average	744	8.7	4	-	0	4	5	8	11	14	22
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)  
OCTOBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S, O3	14 Oct 2015 12:00	14 Oct 2015 12:00	1	Maintenance - cleaned glass manifold
PM2.5	24 Oct 2015 01:00	24 Oct 2015 11:00	11	Analyzer Failure - Filter tape failed to advance



Summary of Hour Averages

Wapasu - October 2015

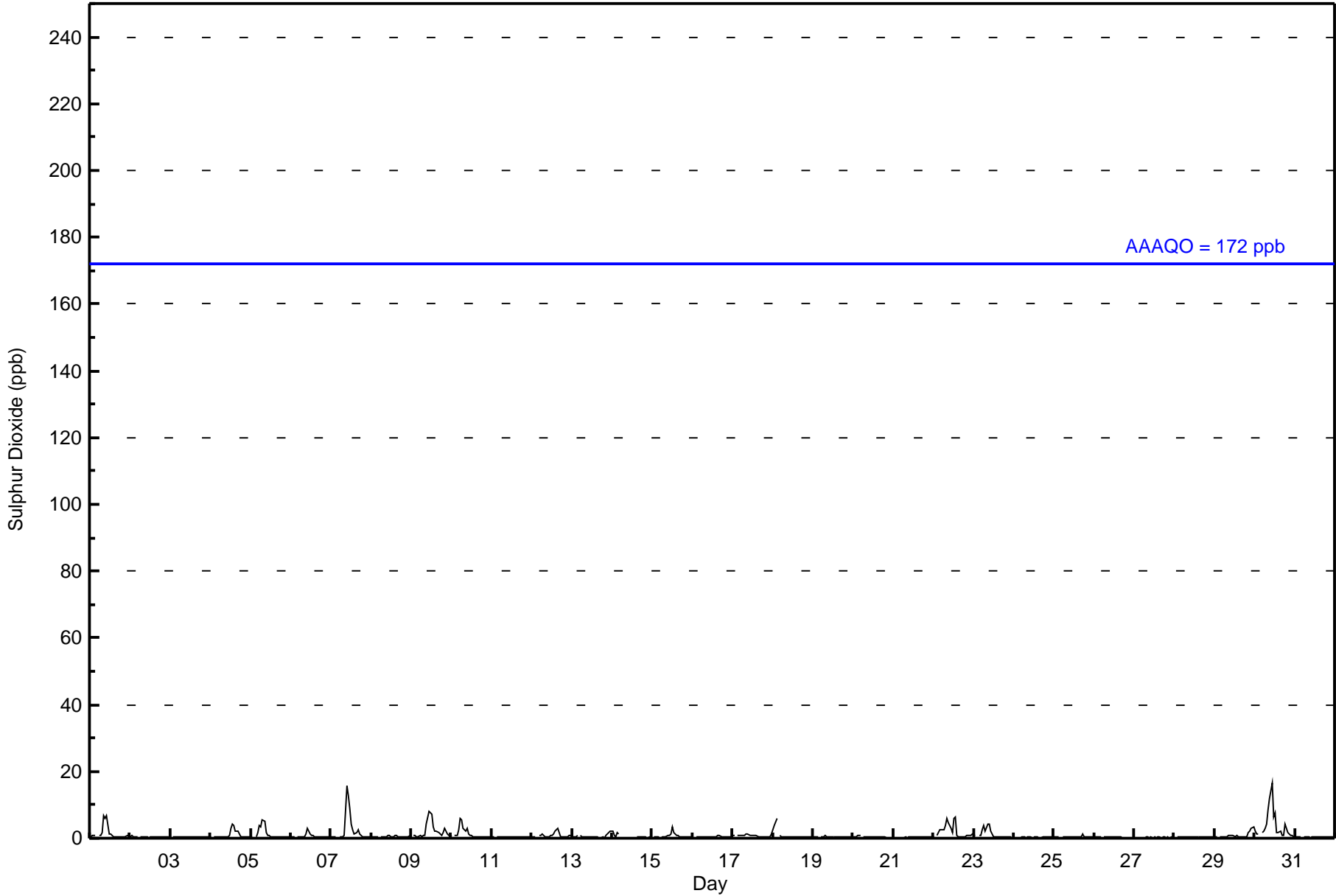
Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 17 ppb on Oct 30 11:00	Maximum Daily Average: 3.7 ppb on Oct 30		Hours of Data:	708
Minimum Value: 0 ppb on Oct 14 08:00	Minimum Daily Average: 0.2 ppb on Oct 27		Hours of Missing Data:	36
Maximum Diurnal Average: 2.1 ppb at hour 11	Minimum Diurnal Average: 0.5 ppb at hour 20		Hours of Calibration:	36
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> = 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	1	1	1	Z	1	1	2	7	6	7	1	1	1	1	0	0	0	0	0	0	1	1	1	1.5	7
2-Oct	1	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	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	0.3	0
4-Oct	0	Z	0	0	0	0	0	0	0	0	0	1	3	4	4	2	2	1	0	0	0	0	0	0	1.0	4
5-Oct	0	0	Z	1	2	4	3	5	5	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1.2	5
6-Oct	0	0	0	Z	0	0	0	0	0	1	3	1	1	1	1	0	0	0	0	0	0	0	0	0	0.6	3
7-Oct	0	0	0	0	Z	0	0	0	1	16	13	9	4	3	1	2	2	1	1	1	0	0	0	0	2.5	16
8-Oct	0	0	0	0	0	Z	0	0	0	0	1	1	1	1	1	1	0	0	1	0	0	0	0	1	0.5	1
9-Oct	Z	1	1	0	1	1	1	1	1	4	8	8	7	4	2	2	2	1	1	2	3	1	1	1	2.2	8
10-Oct	1	Z	1	1	3	6	6	3	2	3	1	1	1	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	0.3	0
12-Oct	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	2	3	2	0	0	0	0	0	1	1	0.8	3
13-Oct	0	0	0	1	Z	1	1	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	2	2	0.6	2
14-Oct	2	1	0	2	1	Z	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0.5	2
15-Oct	Z	0	0	0	0	0	0	0	0	1	1	1	4	2	1	1	0	0	0	0	1	0	0	1	0.7	4
16-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	1	0.4	1
17-Oct	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
18-Oct	2	4	6	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	6
19-Oct	0	0	0	0	Z	0	1	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0.5	1
20-Oct	0	0	0	1	1	Z	0	0	0	0	0	0	1	0	0	0	0	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	0	0	0	0	0	0	0	0	0	0	1	0.3	1
22-Oct	0	Z	1	2	3	3	3	4	6	5	3	2	6	6	1	0	0	0	0	0	1	1	1	1	2.1	6
23-Oct	1	1	Z	1	1	2	4	2	4	4	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1.2	4
24-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.2	1
25-Oct	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0.4	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	0.3	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	0.2	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	0.3	0
29-Oct	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	2	2	3	3	0.9	3
30-Oct	2	1	1	Z	2	2	3	4	8	12	17	6	8	2	2	2	1	1	4	3	2	1	1	1	3.7	17
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

0.6	0.6	0.6	0.6	0.7	1.0	0.9	1.0	1.4	2.0	2.1	1.3	1.5	1.0	0.7	0.7	0.6	0.5	0.5	0.5	0.6	0.5	0.6	0.6	0.6	Diurnal Average
2	4	6	2	3	6	6	5	8	16	17	9	8	6	4	3	2	1	4	3	3	2	3	3	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**  
**Wapasu - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	704	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: 708

Total Number of Hours: 744



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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Wapasu - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	41	41	25	13	9	42	102	92	70	23	60	37	21	25	47	56	704
11 - 20	0	0	0	0	0	0	0	0	2	0	1	1	0	0	0	0	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>	41	41	25	13	9	42	102	92	72	23	61	38	21	25	47	56	708

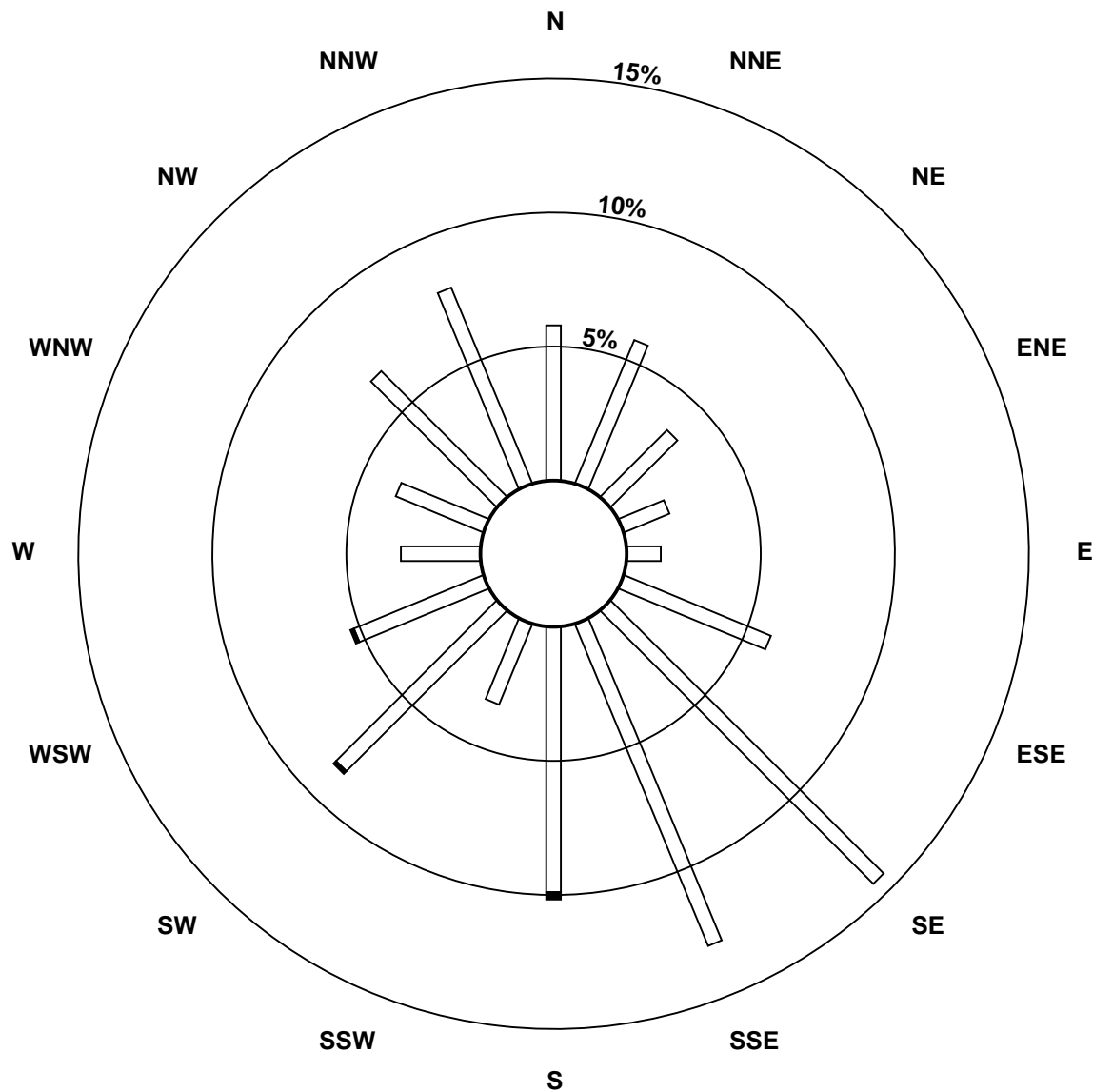
Total Number of Valid Hours: 708

Total Number of Hours: 744

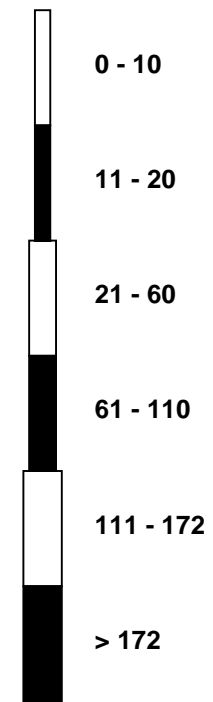


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

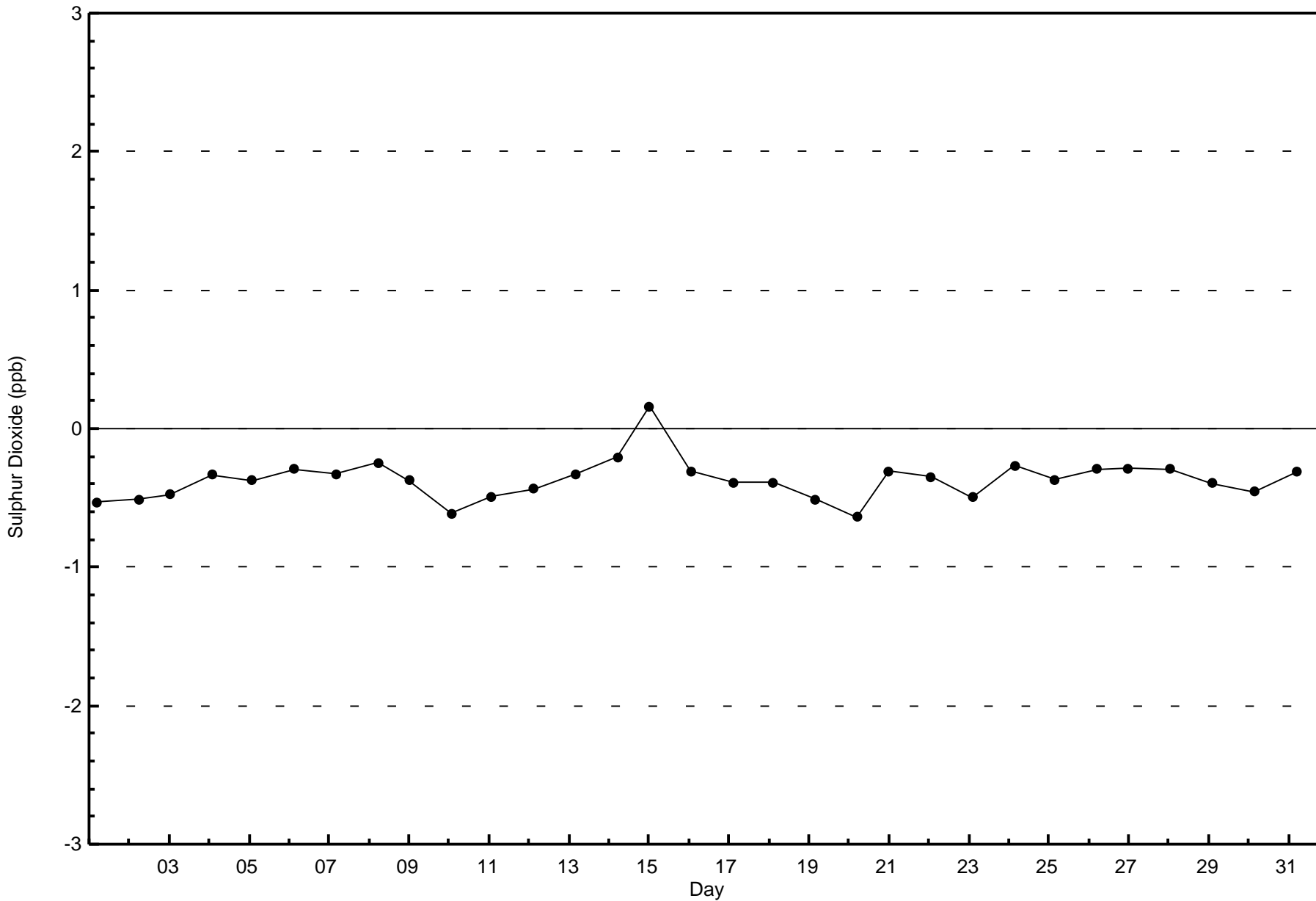
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Wapasu (AMS 17)

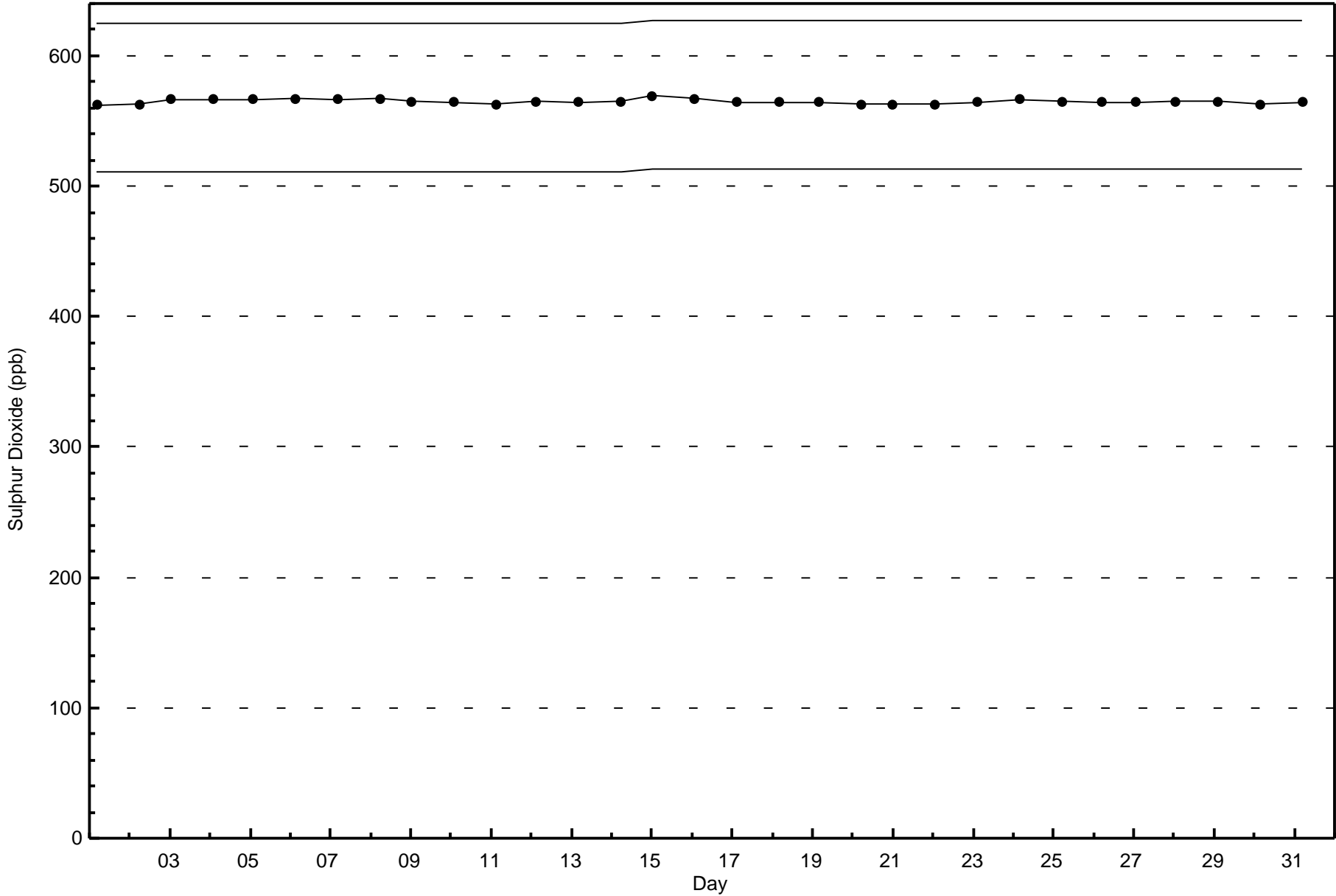


Classes (ppb)

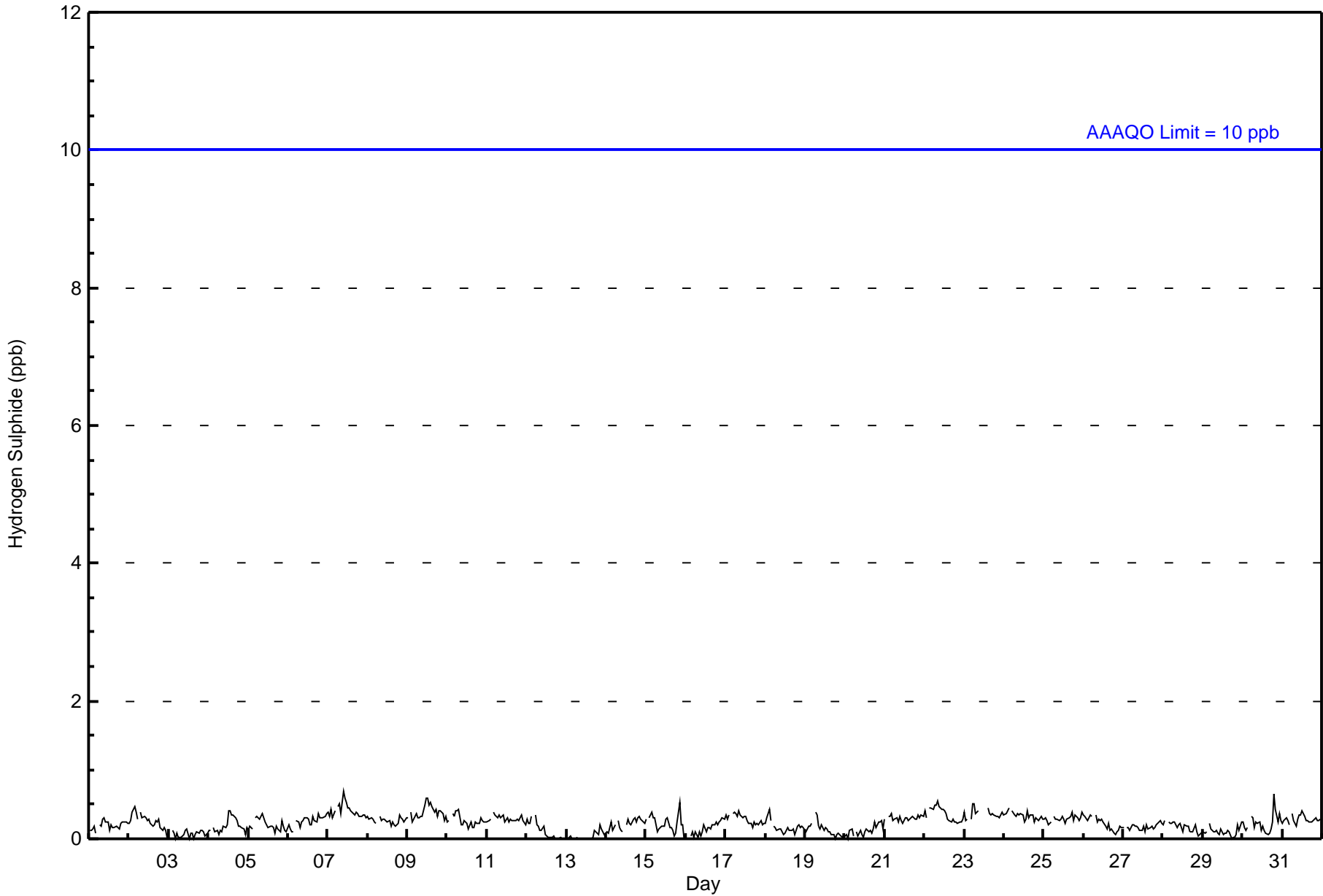


Total Number of Valid Hours: 708













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

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Wapasu - October 2015**

<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**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Wapasu - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	40	42	23	12	9	42	103	93	71	24	58	39	21	26	48	56	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>	40	42	23	12	9	42	103	93	71	24	58	39	21	26	48	56	707

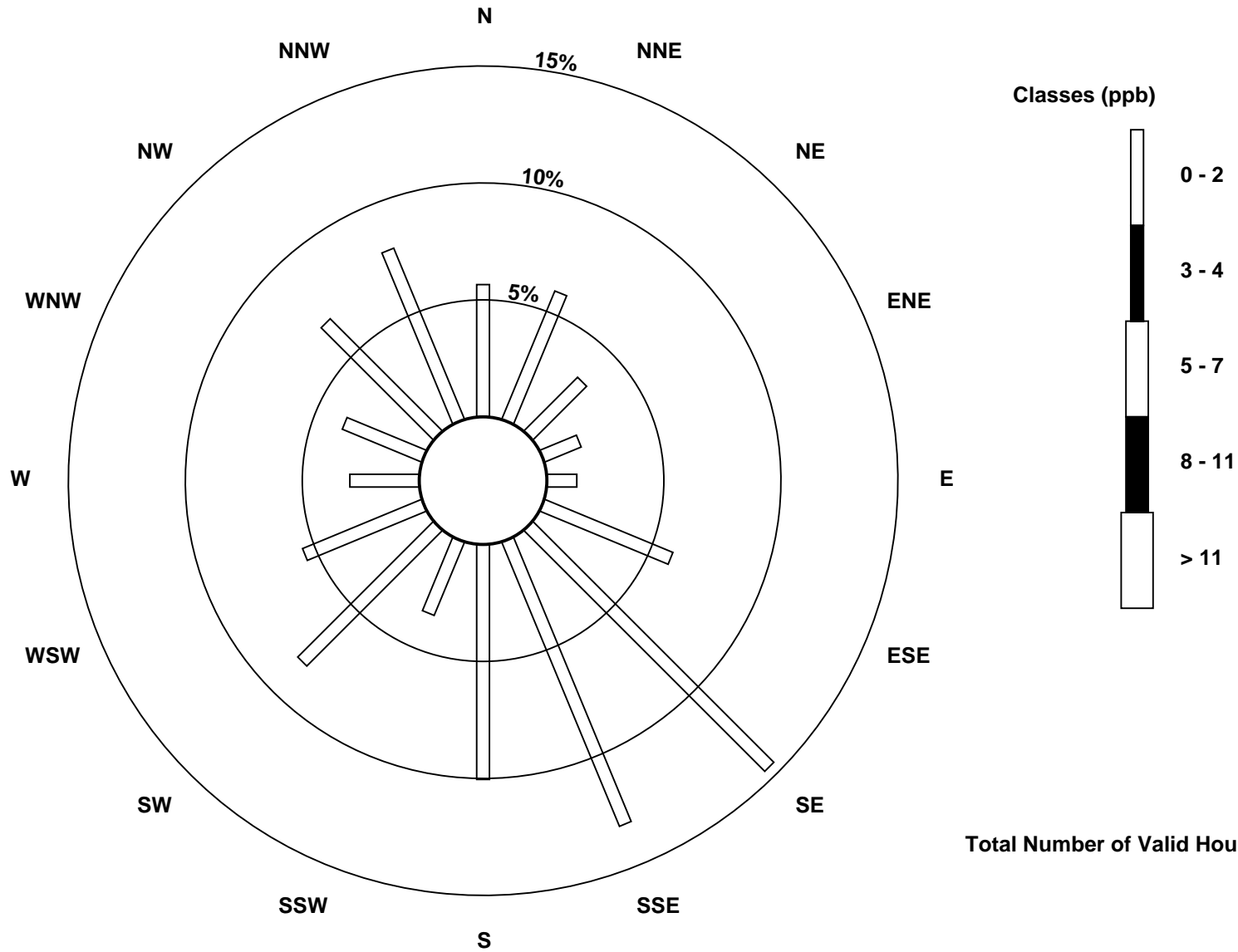
Total Number of Valid Hours: 707

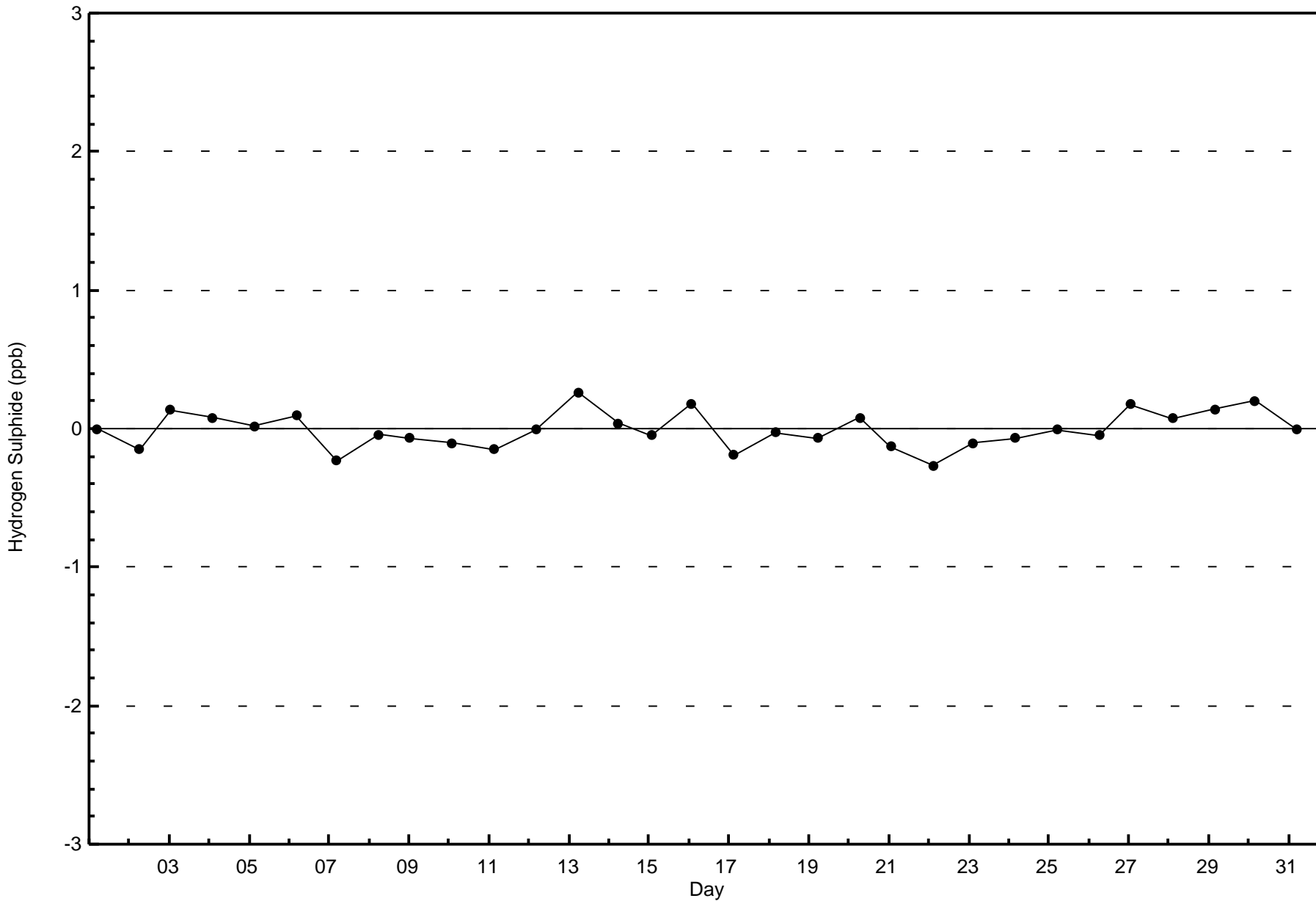
Total Number of Hours: 744

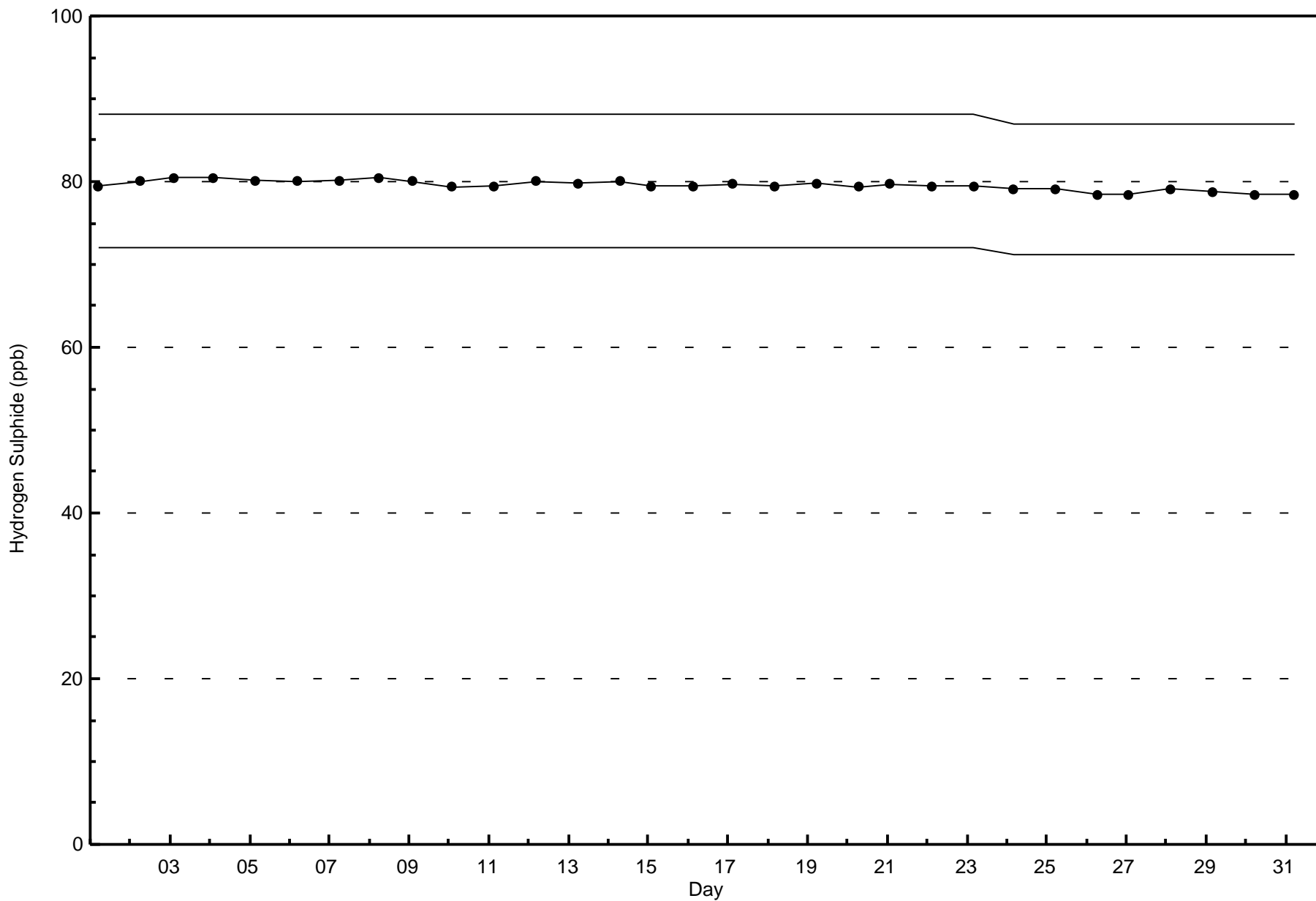


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

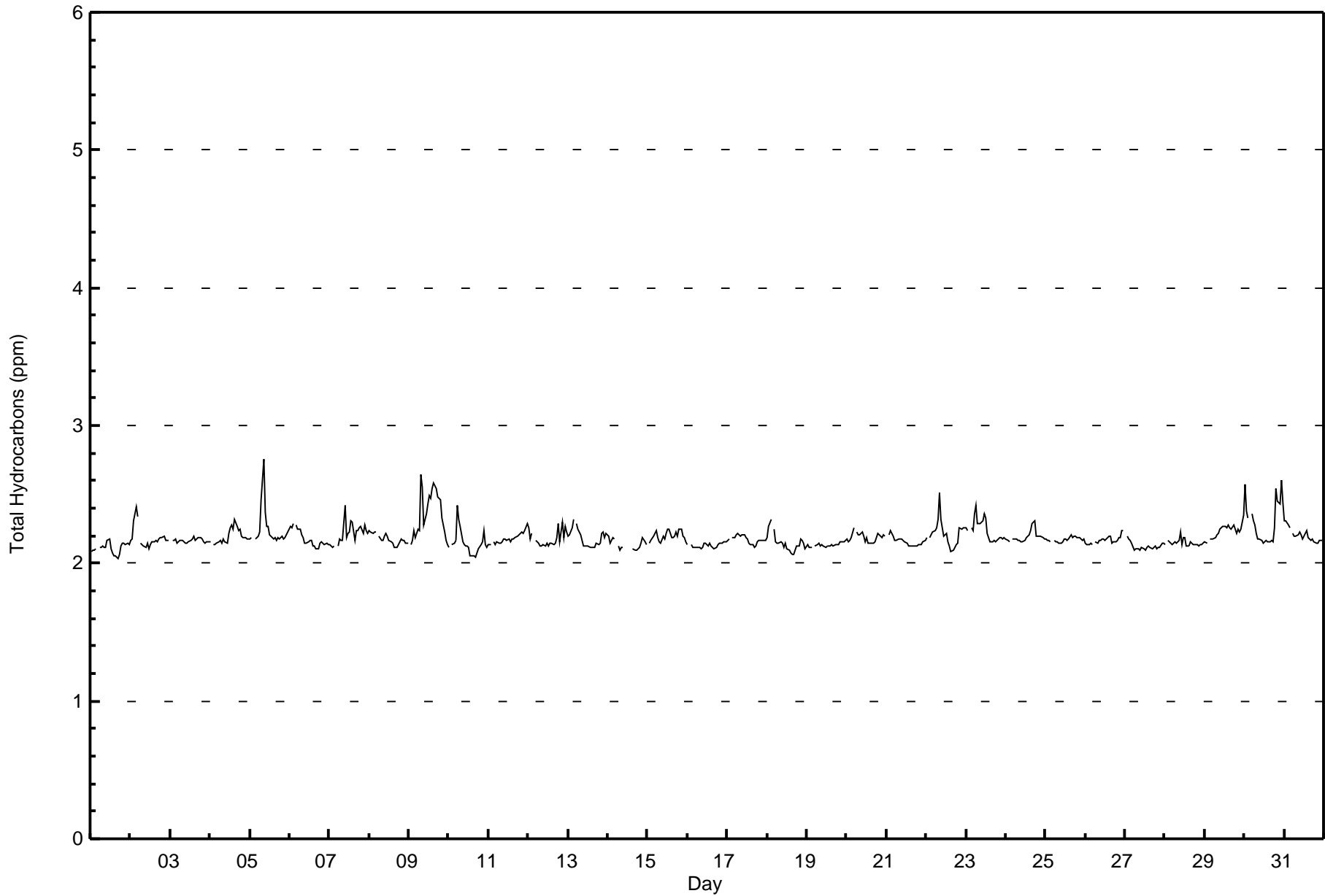
Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Wapasu (AMS 17)













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

**Total Hydrocarbons (THC) - ppm**  
**Wapasu - October 2015**

<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	706	99.72	100.00
3.1 - 10.0	0	0.00	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**  
**Wapasu - October 2015**

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	1	0	0	0	1	0	0	2
2.1 - 3.0	41	41	25	13	9	42	102	92	72	22	61	38	21	24	47	56	706	
3.1 - 10.0	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	0
<b>Totals</b>	41	41	25	13	9	42	102	92	72	23	61	38	21	25	47	56	708	

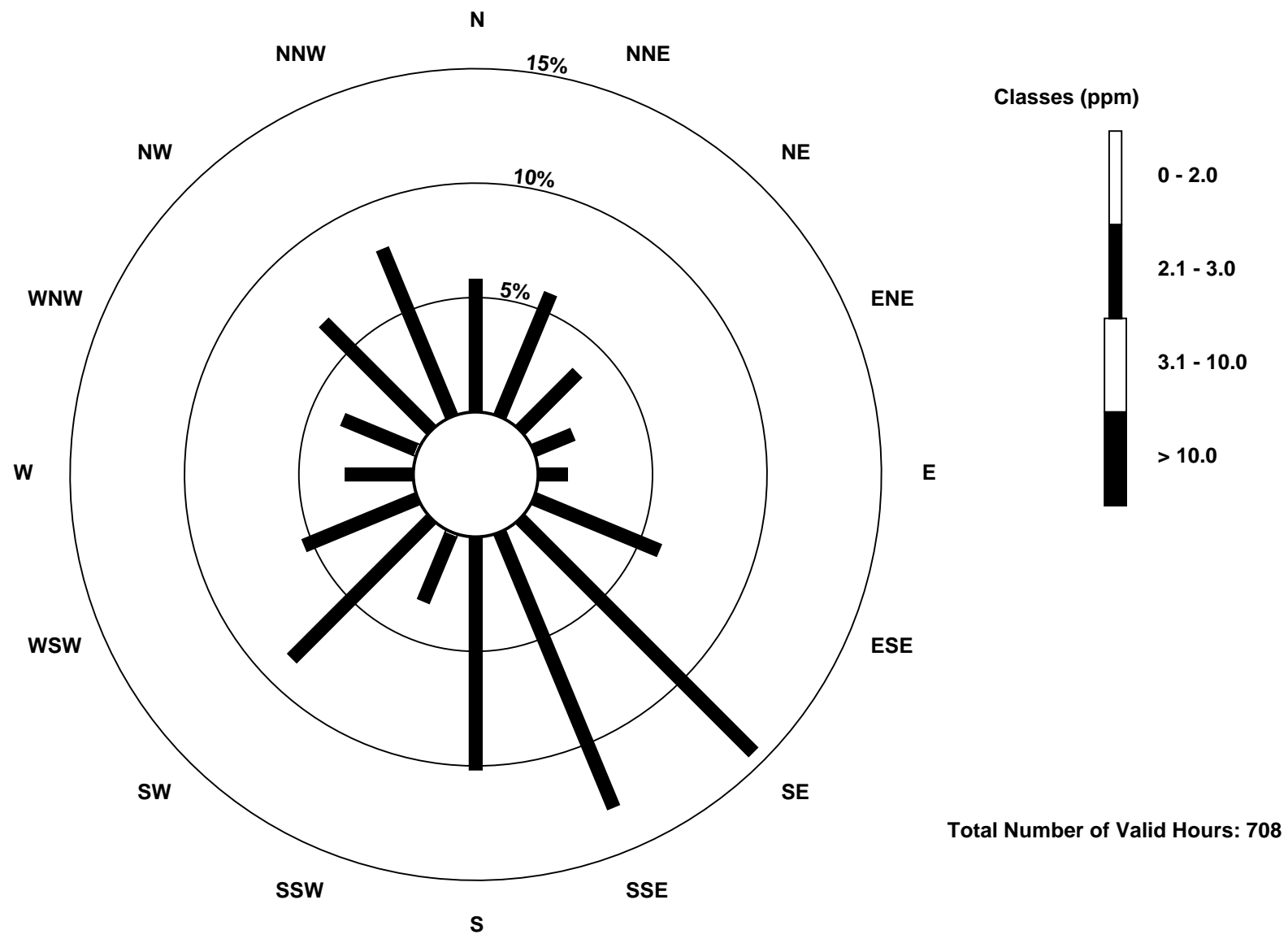
Total Number of Valid Hours: 708

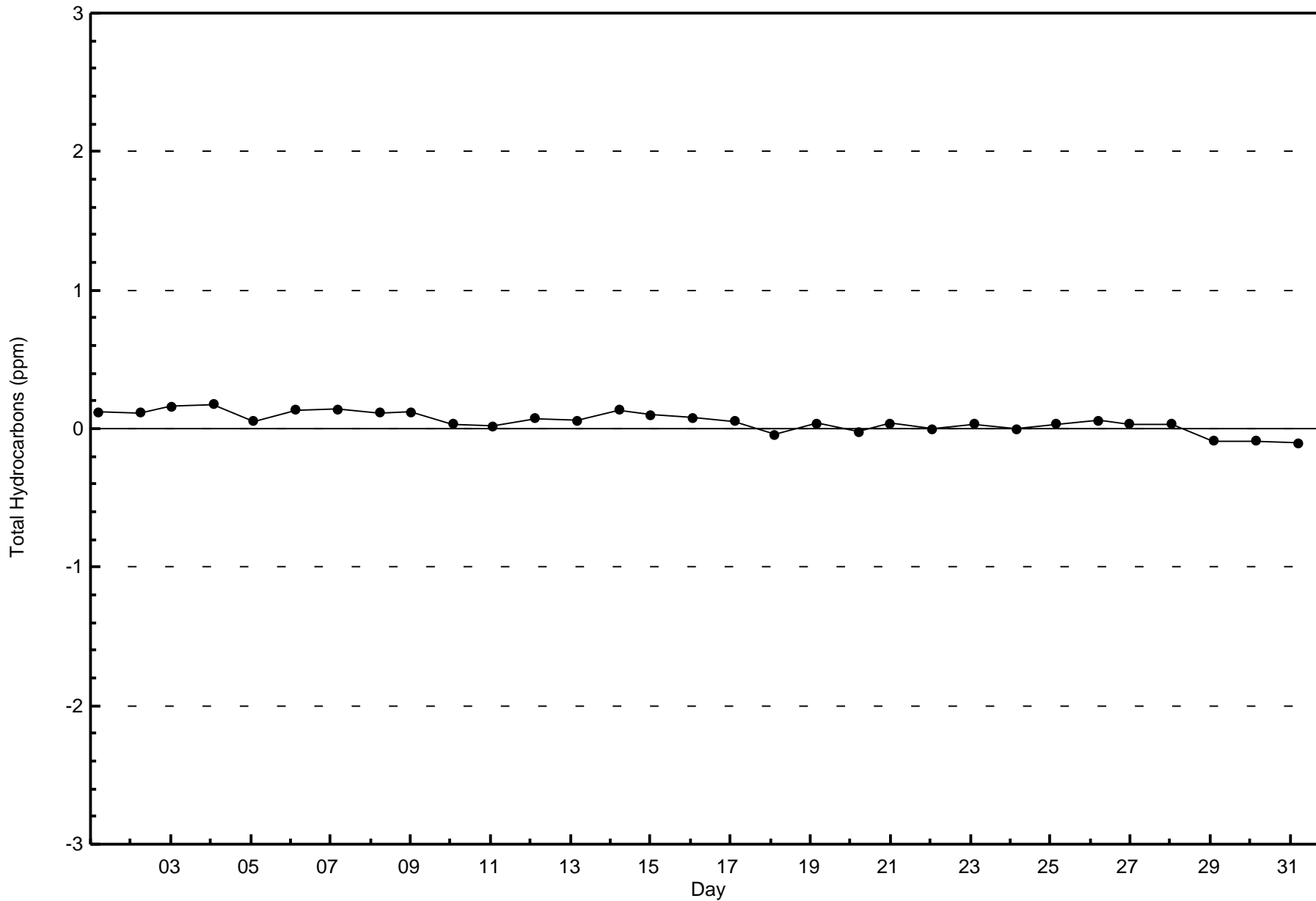
Total Number of Hours: 744

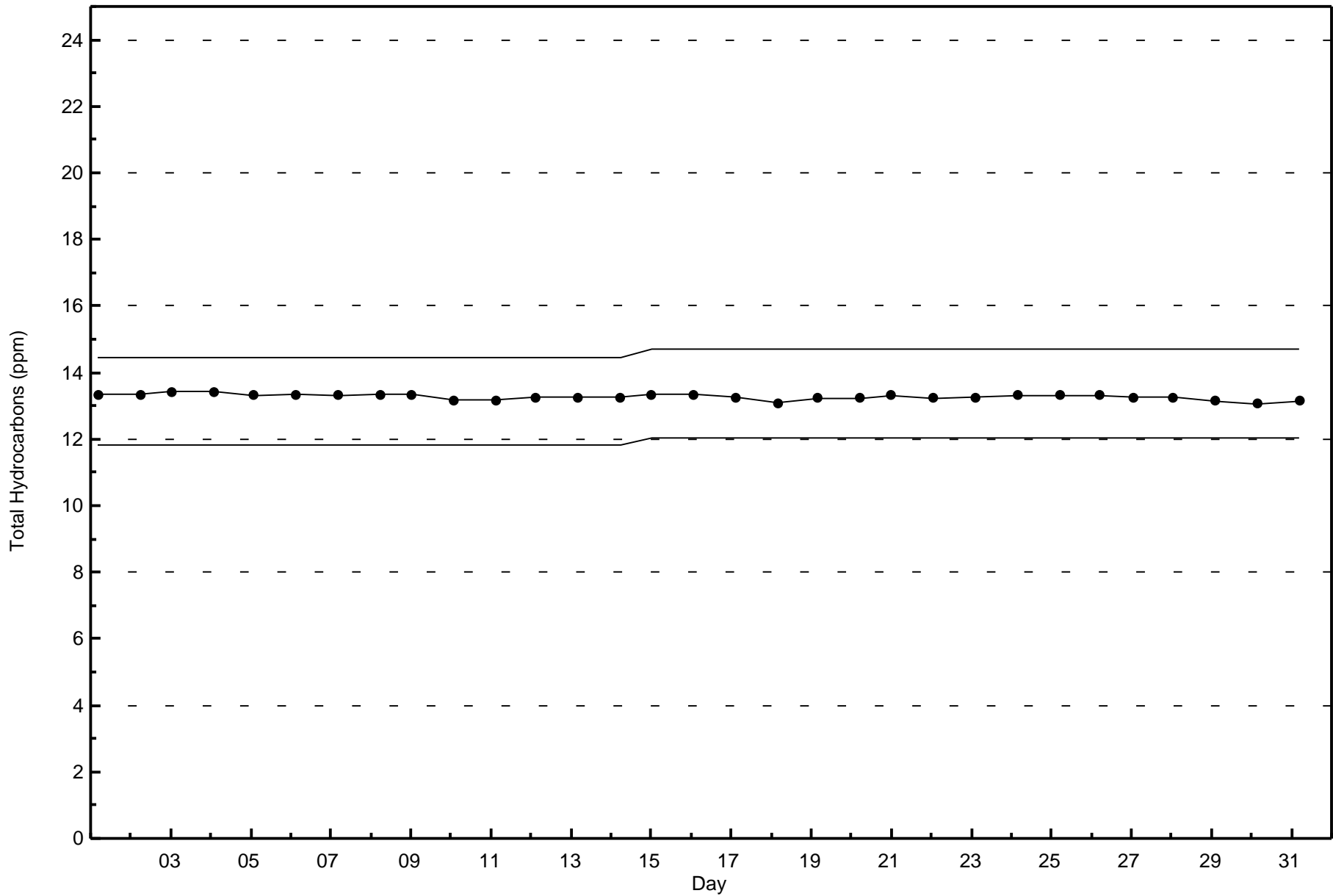


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Total Hydrocarbons (THC) - ppm  
Wapasu (AMS 17)







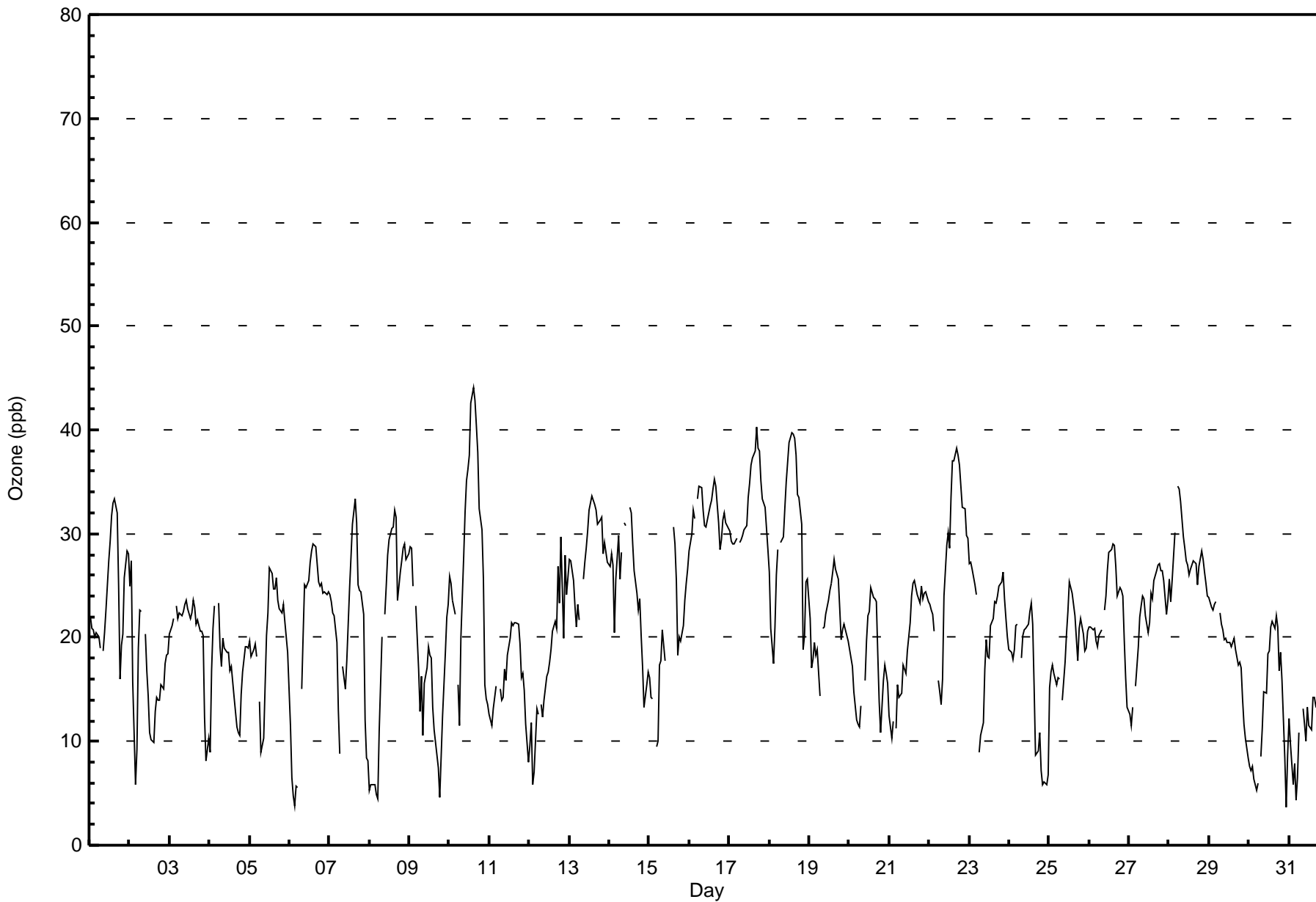


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 44 ppb on Oct 10 15:00	Maximum Daily Average: 32.7 ppb on Oct 17		Hours of Data:	708
Minimum Value: 4 ppb on Oct 30 23:00	Minimum Daily Average: 11.7 ppb on Oct 31		Hours of Missing Data:	36
Maximum Diurnal Average: 26.3 ppb at hour 15	Minimum Diurnal Average: 16.7 ppb at hour 5		Hours of Calibration:	35
Monthly Average: 21.5 ppb	Percentiles: P <sub>1</sub> = 5 P <sub>10</sub> = 11 Q <sub>1</sub> = 16 Median = 21 Q <sub>3</sub> = 27 P <sub>90</sub> = 31 P <sub>99</sub> = 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	22	21	21	20	20	20	19	Z	19	20	23	27	29	32	33	33	32	25	16	19	20	26	28	28	24.1	33
2-Oct	25	27	16	6	9	19	23	23	Z	20	17	14	11	10	10	13	14	14	14	15	15	17	18	18	16.1	27
3-Oct	20	21	22	Z	23	22	22	22	23	23	24	23	22	22	24	23	21	22	21	21	20	12	8	10	20.5	24
4-Oct	9	17	21	23	Z	23	19	17	20	19	19	19	17	17	16	14	11	11	11	14	17	19	19	19	17.0	23
5-Oct	20	18	19	19	18	Z	14	9	10	15	20	22	27	26	25	25	26	24	23	22	23	22	20	19	20.2	27
6-Oct	12	7	5	4	6	6	Z	15	20	25	25	26	27	28	29	29	29	25	25	25	24	24	24	24	20.1	29
7-Oct	24	23	22	22	19	13	9	Z	17	15	18	21	25	28	31	33	31	25	25	24	22	12	8	8	20.8	33
8-Oct	5	6	6	6	5	4	11	20	Z	22	25	28	29	30	31	32	32	24	26	27	29	29	27	28	21.0	32
9-Oct	29	29	25	Z	23	17	13	16	11	16	17	19	18	18	13	11	9	7	5	9	13	19	22	23	16.5	29
10-Oct	26	25	24	22	Z	15	12	20	28	32	35	36	38	43	44	43	40	38	32	30	26	16	14	14	28.3	44
11-Oct	13	12	13	14	15	Z	15	14	14	17	16	18	20	21	21	21	21	21	19	16	17	15	12	8	16.3	21
12-Oct	10	12	6	7	13	13	Z	14	12	14	16	17	18	19	21	22	21	27	23	30	20	28	24	26	17.8	30
13-Oct	27	27	26	23	21	23	22	Z	26	27	29	30	32	34	33	33	32	31	31	32	28	29	28	27	28.3	34
14-Oct	27	28	27	21	26	30	26	28	Z	31	31	M	32	32	29	26	24	23	24	20	17	13	15	17	24.9	32
15-Oct	16	14	14	Z	9	10	17	18	21	18	C	C	C	C	31	29	25	18	20	20	21	24	25	27	19.9	31
16-Oct	28	30	32	32	Z	33	35	34	32	31	31	31	33	33	34	35	35	31	28	29	31	32	31	31	31.9	35
17-Oct	30	29	29	29	30	Z	29	29	30	30	31	33	35	37	37	38	40	38	38	35	33	33	30	29	32.7	40
18-Oct	26	21	18	21	26	28	Z	29	30	32	35	37	39	40	40	39	38	34	34	31	19	20	25	26	29.8	40
19-Oct	22	17	18	19	18	19	14	Z	21	21	22	24	25	25	26	27	27	26	23	20	21	21	20	20	21.6	27
20-Oct	19	18	17	15	12	12	11	13	Z	16	20	22	23	25	24	24	23	19	14	11	16	17	17	16	17.5	25
21-Oct	12	10	12	Z	11	15	14	15	17	17	17	19	21	24	25	25	25	24	23	25	24	24	24	23	19.5	25
22-Oct	23	23	22	21	Z	16	15	14	16	24	29	30	29	34	37	37	38	38	37	35	33	32	30	30	27.8	38
23-Oct	27	27	27	25	24	Z	9	11	12	17	20	18	18	21	22	23	23	24	25	25	26	24	22	20	21.3	27
24-Oct	19	19	18	19	21	21	Z	18	20	21	21	21	23	23	21	15	9	9	11	7	6	6	6	7	15.7	23
25-Oct	15	17	17	17	15	16	16	Z	14	18	20	22	25	25	24	22	20	18	21	22	20	19	19	21	19.3	25
26-Oct	21	21	21	21	20	19	20	21	Z	23	24	26	28	29	29	29	27	24	25	25	24	20	16	13	22.8	29
27-Oct	13	12	13	Z	15	19	22	23	24	24	22	21	21	24	24	25	26	27	27	26	26	26	22	24	22.0	27
28-Oct	26	24	25	30	Z	35	34	33	30	29	27	27	26	27	27	27	27	25	27	28	28	26	25	24	27.7	35
29-Oct	24	23	23	23	23	Z	22	21	21	20	20	20	20	19	20	20	19	17	18	17	14	12	10	8	18.8	24
30-Oct	8	7	8	6	5	6	Z	9	11	15	15	18	19	21	22	21	22	21	17	19	16	8	4	9	13.3	22
31-Oct	12	10	6	8	4	7	11	Z	13	12	10	13	11	11	14	14	13	14	14	15	15	15	14	14	11.7	15

19.7	19.2	18.4	18.2	16.7	17.8	18.2	19.4	19.7	21.4	22.5	23.6	24.7	25.9	26.3	26.2	25.2	23.3	22.4	22.4	21.4	20.6	19.7	19.6	Diurnal Average
30	30	32	32	30	35	35	34	32	32	35	37	39	43	44	43	40	38	38	35	33	33	31	31	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**  
**Wapasu - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	310	43.79	43.79
21 - 50	398	56.21	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**  
**Wapasu - October 2015**

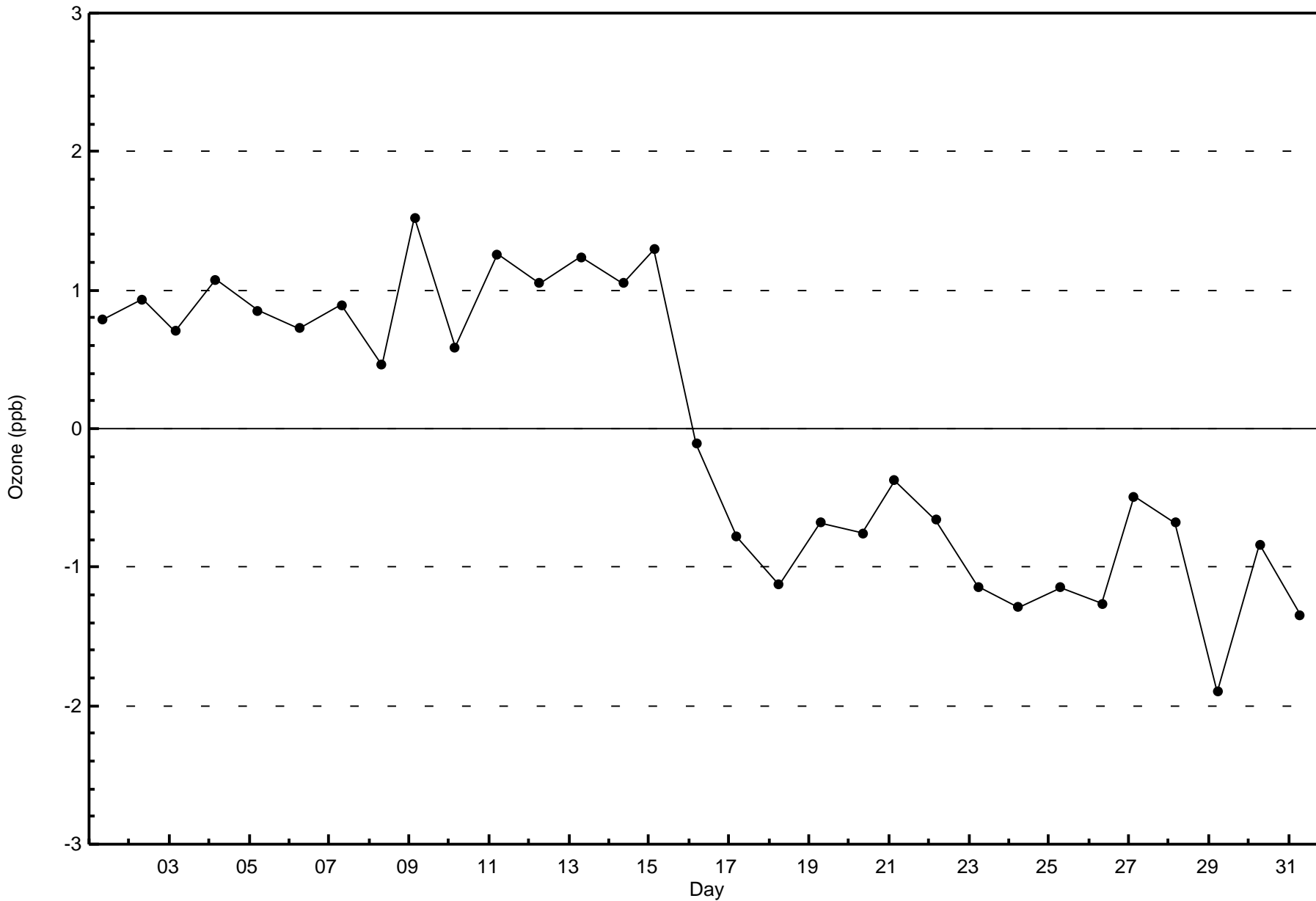
<b>Concentration</b> <b>Ranges (ppb)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	27	31	15	12	8	10	33	40	36	8	12	11	5	9	20	33	310
21 - 50	14	12	8	1	1	31	67	54	34	17	46	26	15	18	31	23	398
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	41	43	23	13	9	41	100	94	70	25	58	37	20	27	51	56	708

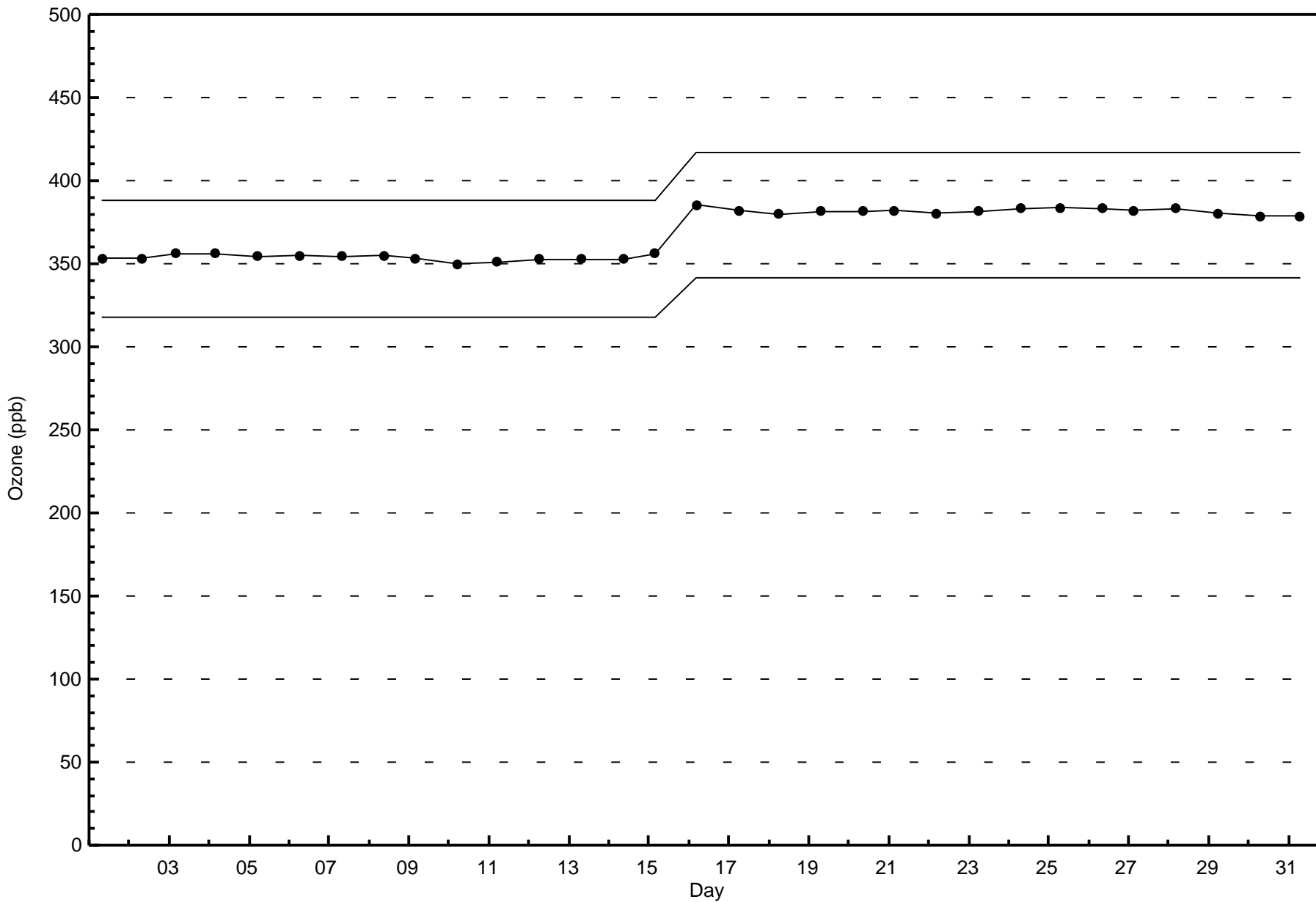
Total Number of Valid Hours: 708

Total Number of Hours: 744









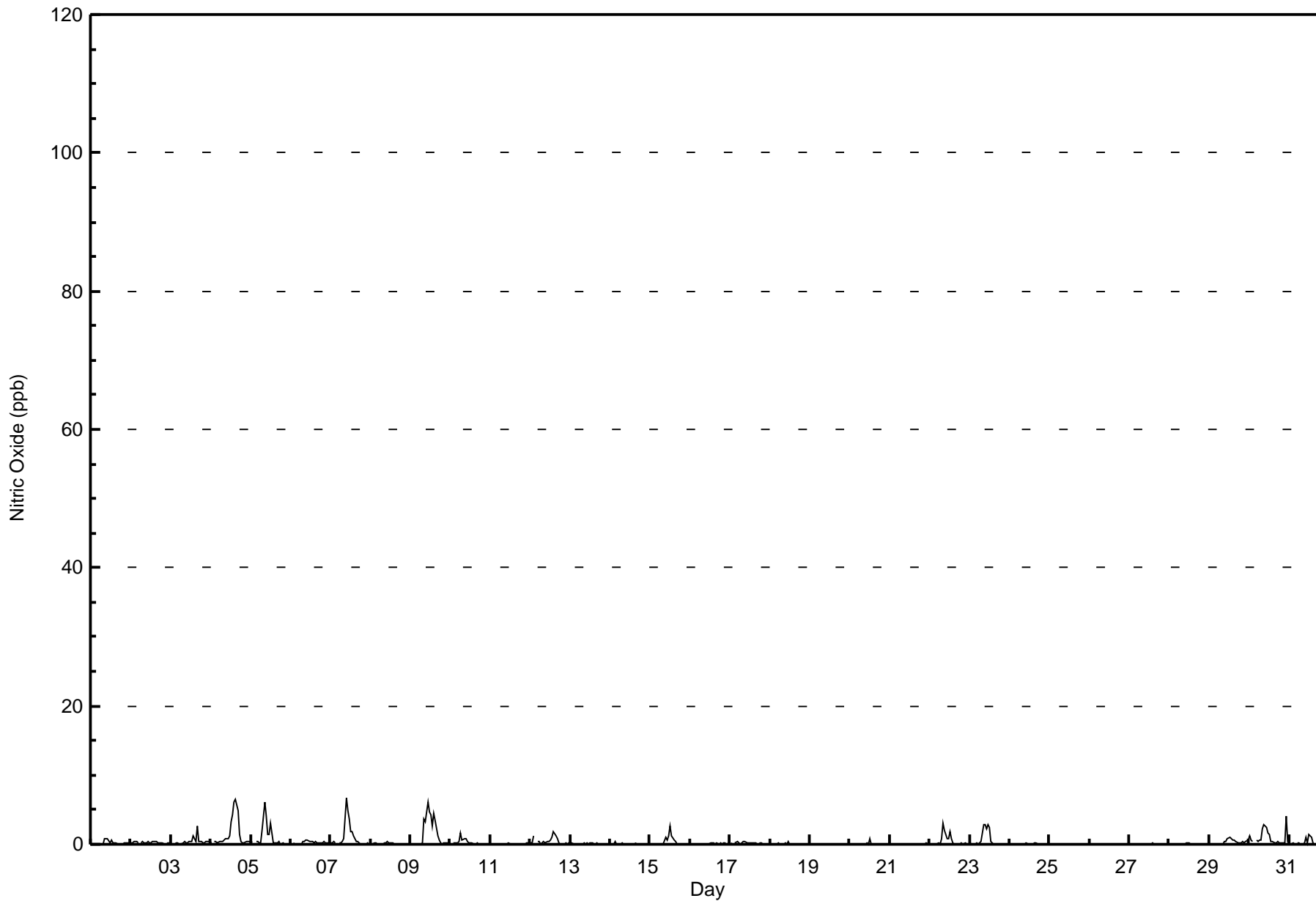


Maximum Value: 7 ppb on Oct 7 10:00      Maximum Daily Average: 1.6 ppb on Oct 9																	Hours in Service: 744 Hours of Data: 708									
Minimum Value: 0 ppb on Oct 1 01:00      Minimum Daily Average: 0.0 ppb on Oct 25 Maximum Diurnal Average: 0.9 ppb at hour 13      Minimum Diurnal Average: 0.1 ppb at hour 21 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> = 5																	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	Z	0	0	0	1	1	1	0	1	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	0.3	0
3-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	3	0	0	0	0	0	0	0	0	0.4	3
4-Oct	0	Z	0	0	0	0	0	0	1	1	1	1	3	4	6	6	5	1	0	0	0	0	0	0	1.5	6
5-Oct	0	0	Z	0	0	0	0	2	6	4	2	1	3	0	0	0	0	0	0	0	0	0	0	0	0.9	6
6-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
7-Oct	0	0	0	0	Z	0	0	1	1	7	5	4	2	2	1	0	0	0	0	0	0	0	0	0	1.1	7
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	4	3	6	5	4	3	4	3	1	1	0	0	0	0	0	0	1.6	6
10-Oct	0	Z	0	0	0	0	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
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	1	Z	0	0	0	0	0	0	0	1	1	2	1	1	0	0	0	0	0	0	0	0	0.5	2
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	C	C	C	C	C	0	0	0	0	0	0	0	0	0.1	0
15-Oct	Z	0	0	0	0	0	0	0	0	1	1	1	3	1	1	0	0	0	0	0	0	0	0	0	0.3	3
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	0.2	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	0.0	0
20-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	1
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	0
22-Oct	0	Z	0	0	0	0	0	1	3	2	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0.5	3
23-Oct	0	0	Z	0	0	0	0	0	3	3	2	3	2	0	0	0	0	0	0	0	0	0	0	0	0.6	3
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	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	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	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	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
29-Oct	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	1	0.3	1
30-Oct	1	1	0	Z	1	1	1	1	2	3	2	2	2	0	0	0	0	0	0	0	0	0	4	0	1.0	4
31-Oct	0	0	0	0	Z	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0.2	1
																								Diurnal Average		
																								Diurnal Maximum		
0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.2 0.8 0.9 0.8 0.7 0.9 0.6 0.6 0.5 0.4 0.1 0.1 0.1 0.1 0.1 0.2 0.1 1 1 1 0 1 1 2 2 6 7 6 5 4 4 6 6 5 1 0 0 0 0 0 4 1																										
Z - zerospan      C - Calibration																										



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

**Nitric Oxide (NO) - ppb**  
**Wapasu - October 2015**





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

**Nitric Oxide (NO) - ppb**  
**Wapasu - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	708	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: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitric Oxide (NO) - ppb  
Wapasu - October 2015**

<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	41	41	25	13	9	42	102	92	72	23	61	38	21	25	47	56	708
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>	41	41	25	13	9	42	102	92	72	23	61	38	21	25	47	56	708

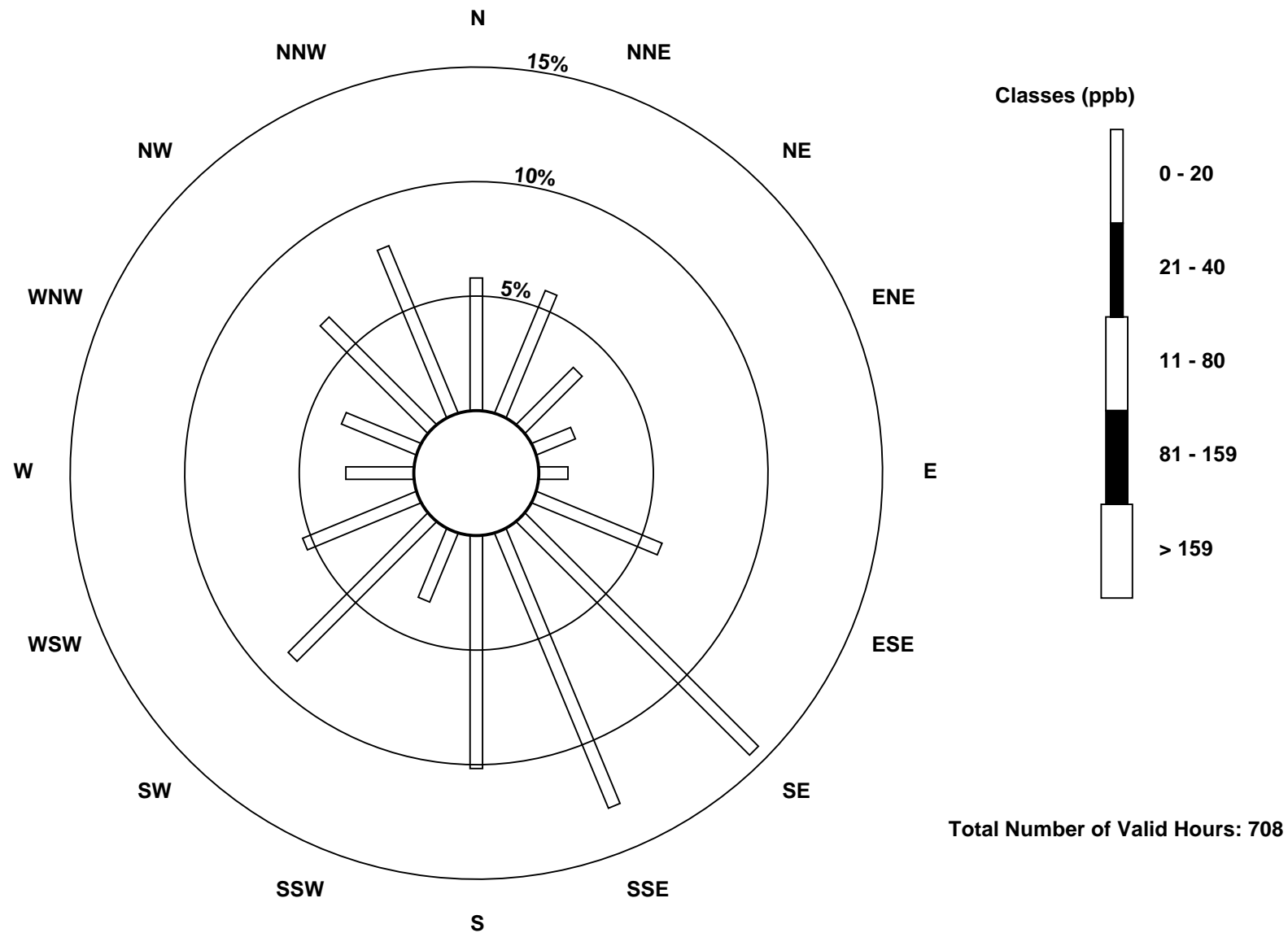
Total Number of Valid Hours: 708

Total Number of Hours: 744

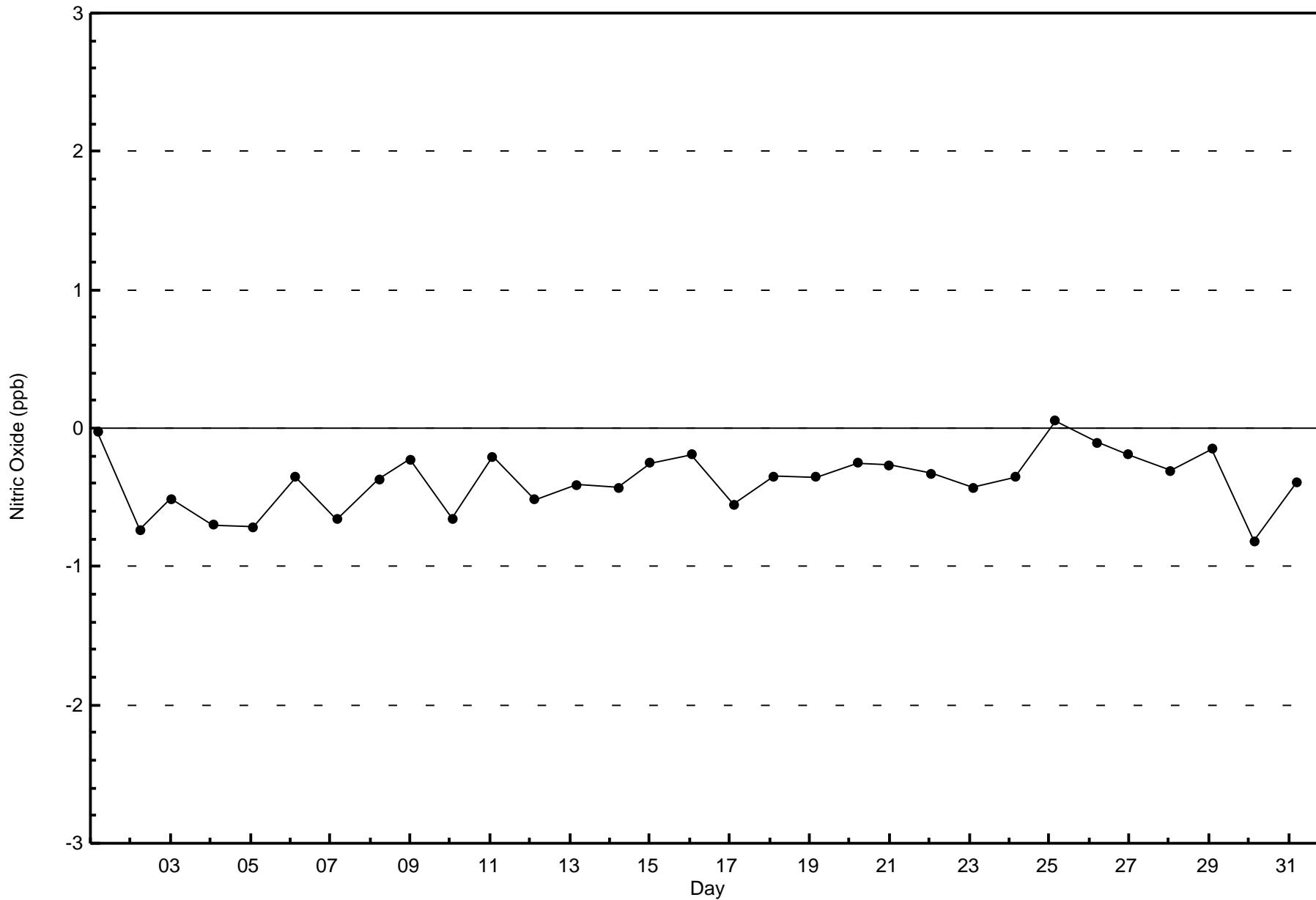


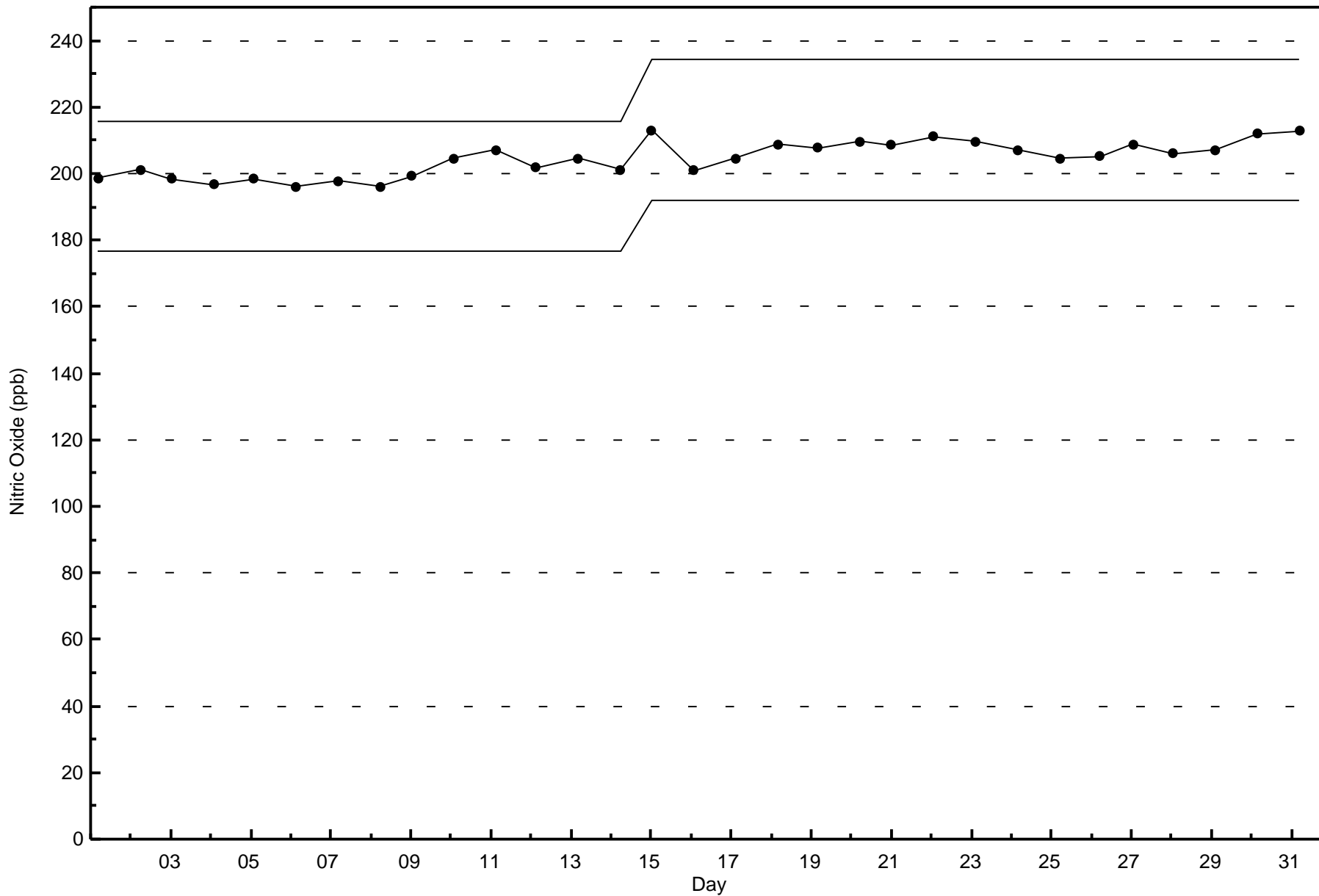
Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Nitric Oxide (NO) - ppb  
Wapasu (AMS 17)







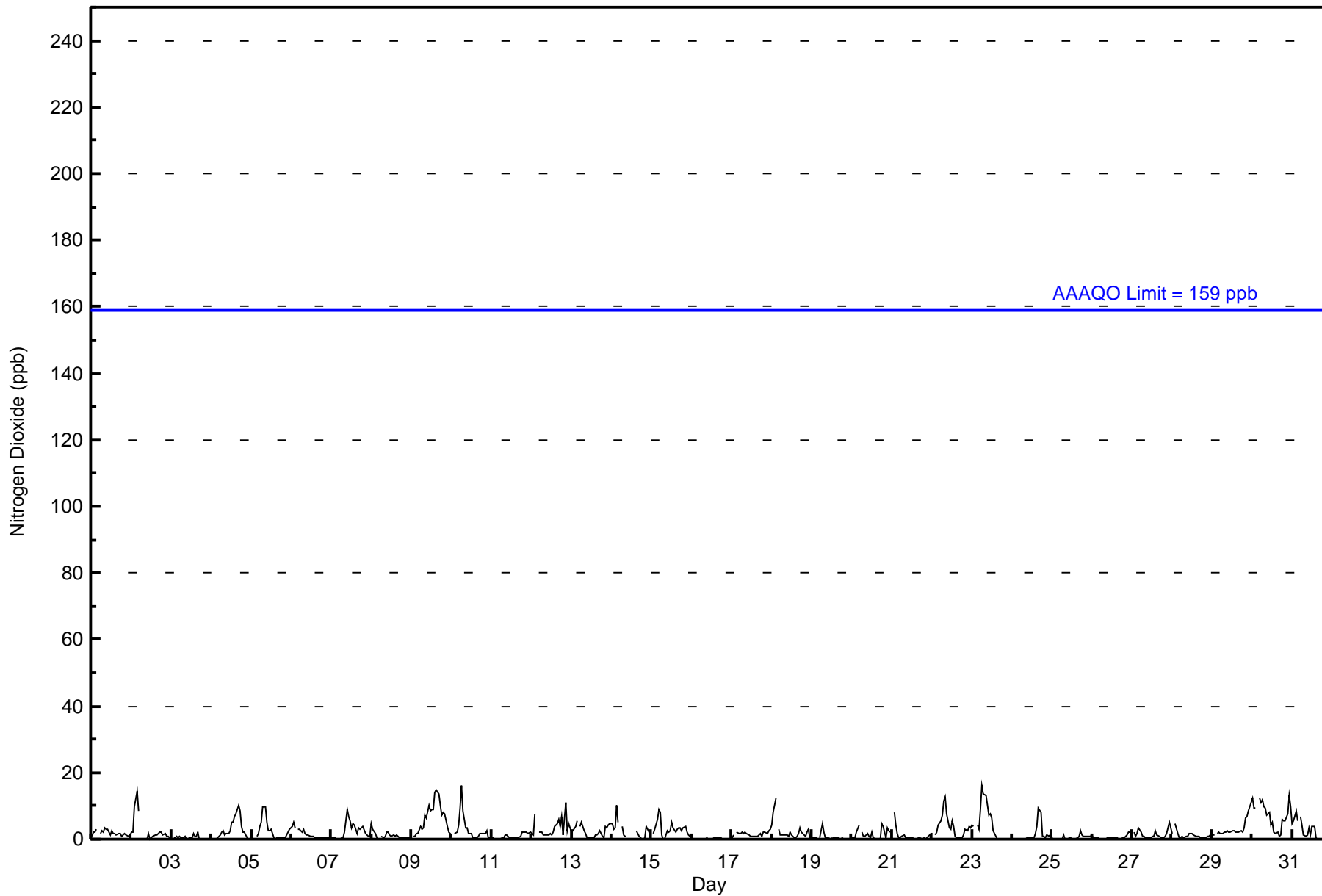




Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 16 ppb on Oct 10 07:00	Maximum Daily Average: 7.2 ppb on Oct 30
Minimum Value: 0 ppb on Oct 3 19:00	Hours of Data: 708
Maximum Diurnal Average: 3.2 ppb at hour 7	Hours of Missing Data: 36
Monthly Average: 2.2 ppb	Hours of Calibration: 36
Minimum Daily Average: 0.2 ppb on Oct 16	Percent Operational Time: 100.0
Minimum Diurnal Average: 1.6 ppb at hour 20	
Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 3 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	2	2	3	Z	2	2	2	4	3	3	1	3	2	2	1	2	2	1	1	2	1	1	1	1.8	4	
2-Oct	2	2	10	14	8	Z	0	0	0	0	2	0	1	1	1	1	2	2	2	1	2	1	1	1	2.4	14	
3-Oct	Z	0	1	1	0	1	1	1	1	0	0	0	1	2	1	1	2	0	0	0	0	0	0	0	0.5	2	
4-Oct	0	Z	0	0	1	1	2	3	1	2	2	3	5	5	7	8	10	8	4	2	2	1	0	0	2.9	10	
5-Oct	0	1	Z	1	2	4	5	10	10	5	2	2	3	1	0	0	0	1	1	1	0	1	2	3	2.3	10	
6-Oct	4	5	4	Z	3	3	2	3	2	1	1	1	1	1	0	1	1	1	1	0	0	1	0	0	1.5	5	
7-Oct	0	0	0	0	Z	0	0	1	2	9	7	6	3	5	4	2	4	3	3	4	2	1	1	1	2.5	9	
8-Oct	5	3	2	1	0	Z	1	1	1	2	2	1	1	1	1	1	1	0	1	1	0	0	0	0	1.1	5	
9-Oct	Z	1	1	2	2	4	3	4	7	6	10	8	9	9	14	15	14	10	7	8	8	4	2	2	6.4	15	
10-Oct	1	Z	2	2	4	9	16	8	3	3	2	2	2	0	0	1	1	2	2	2	2	3	1	0	2.9	16	
11-Oct	0	0	Z	0	0	0	1	0	1	1	1	1	1	0	1	0	1	1	2	2	2	2	2	2	0.9	2	
12-Oct	2	1	8	Z	2	2	2	1	1	1	1	2	1	2	4	5	6	4	7	1	11	2	5	3	3.3	11	
13-Oct	2	2	4	6	Z	4	5	3	2	1	1	0	0	1	1	1	2	3	1	1	4	4	4	5	2.3	6	
14-Oct	5	3	3	10	5	Z	4	1	1	1	C	C	C	C	C	3	1	0	0	1	4	2	1	1	2.5	10	
15-Oct	Z	2	3	6	9	8	1	0	0	3	2	3	5	4	2	3	3	3	3	3	4	2	1	1	3.1	9	
16-Oct	1	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0.2	1	
17-Oct	1	1	Z	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2	1	2	2	2	3	3	1.5	3	
18-Oct	4	8	12	Z	3	1	1	1	1	1	1	2	1	1	0	1	2	4	2	1	1	2	3	1	2.4	12	
19-Oct	1	0	0	0	Z	0	5	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	5	
20-Oct	0	0	1	2	4	Z	2	1	1	2	1	0	2	0	0	0	0	0	0	5	4	1	4	3	2	1.5	5
21-Oct	Z	8	4	2	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1.0	8
22-Oct	2	Z	1	2	4	6	7	12	13	8	3	3	6	4	1	0	1	0	1	1	3	2	4	3	3.7	13	
23-Oct	4	4	Z	4	3	9	16	14	13	10	7	8	6	3	1	0	0	0	0	0	0	0	0	0	4.5	16	
24-Oct	0	0	0	Z	0	0	0	0	0	1	1	0	0	0	2	4	10	8	1	1	1	1	1	2	1.4	10	
25-Oct	0	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	1	2	1	1	1	1	1	1	0.6	2	
26-Oct	1	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	2	2	0.6	2
27-Oct	Z	2	1	2	3	2	1	1	1	0	1	0	1	1	3	1	1	1	1	1	0	1	2	5	3	1.4	5
28-Oct	2	Z	5	2	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1.1	5
29-Oct	1	1	Z	2	2	2	2	2	2	2	2	2	3	3	2	2	2	3	2	3	6	7	8	11	3.1	11	
30-Oct	12	10	10	Z	12	11	12	10	9	7	8	4	5	2	2	2	1	1	6	6	5	8	13	10	7.2	13	
31-Oct	5	6	9	6	Z	7	4	1	1	1	3	1	4	4	1	0	0	0	0	0	0	0	0	0	2.3	9	
	2.1	2.5	3.1	2.7	2.9	3.0	3.2	2.8	2.6	2.4	2.2	1.8	2.2	1.8	1.8	1.8	2.2	2.0	1.8	1.6	2.0	1.9	2.2	2.0	Diurnal Average		
	12	10	12	14	12	11	16	14	13	10	10	8	9	9	14	15	14	10	7	8	11	8	13	11	Diurnal Maximum		

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





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Wapasu - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	708	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: 708

Total Number of Hours: 744



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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Wapasu - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	41	41	25	13	9	42	102	92	72	23	61	38	21	25	47	56	708
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>	41	41	25	13	9	42	102	92	72	23	61	38	21	25	47	56	708

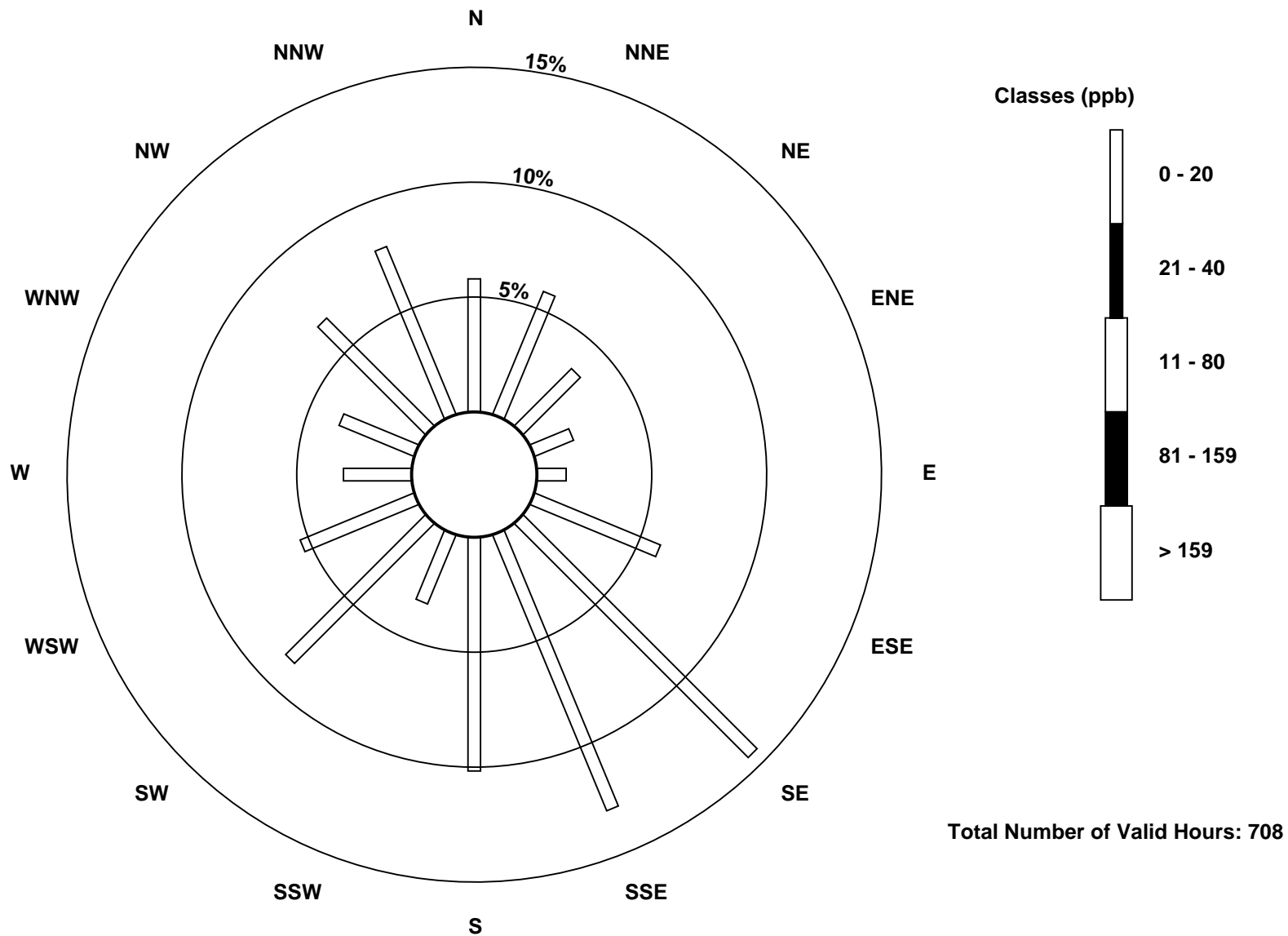
Total Number of Valid Hours: 708

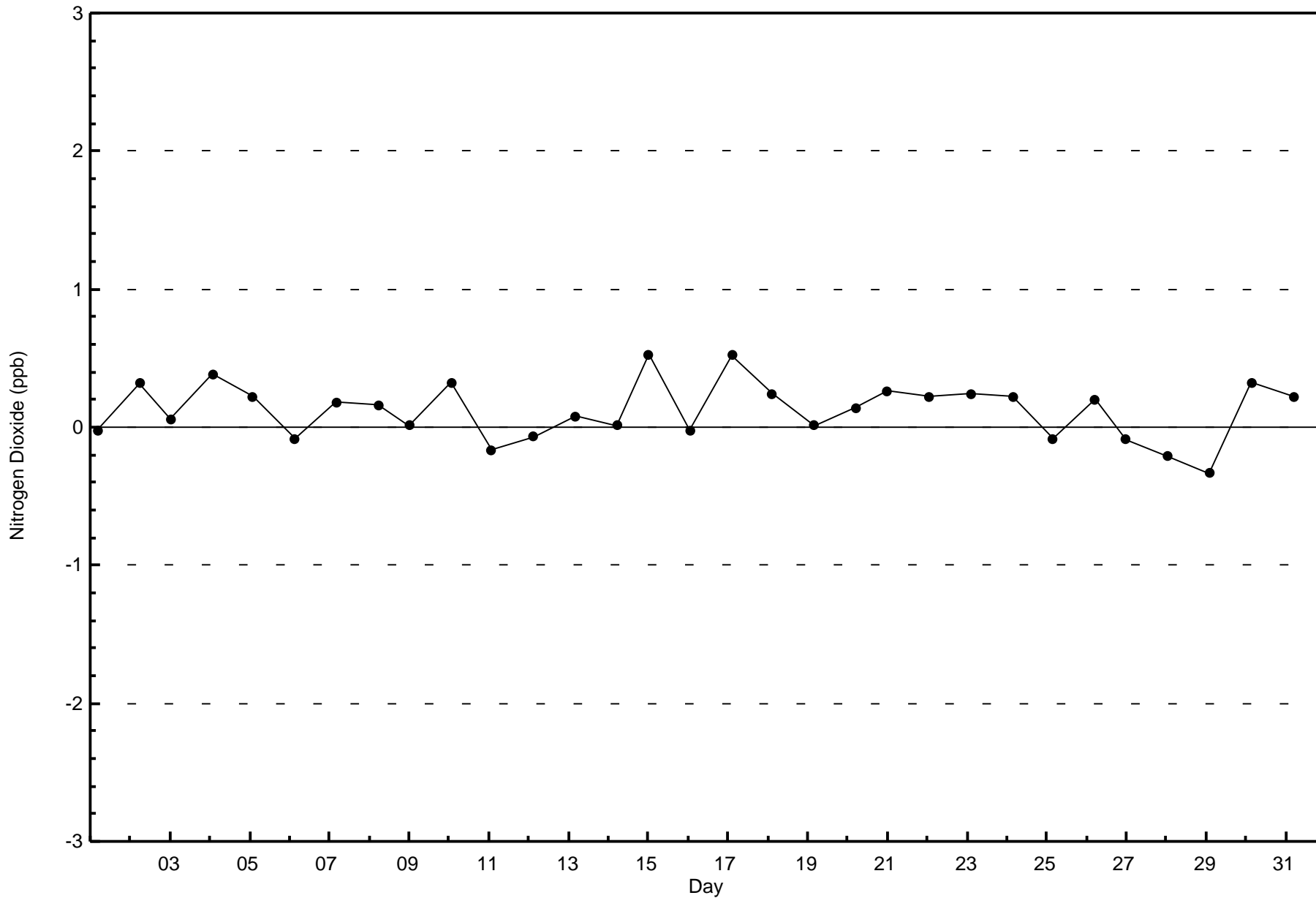
Total Number of Hours: 744



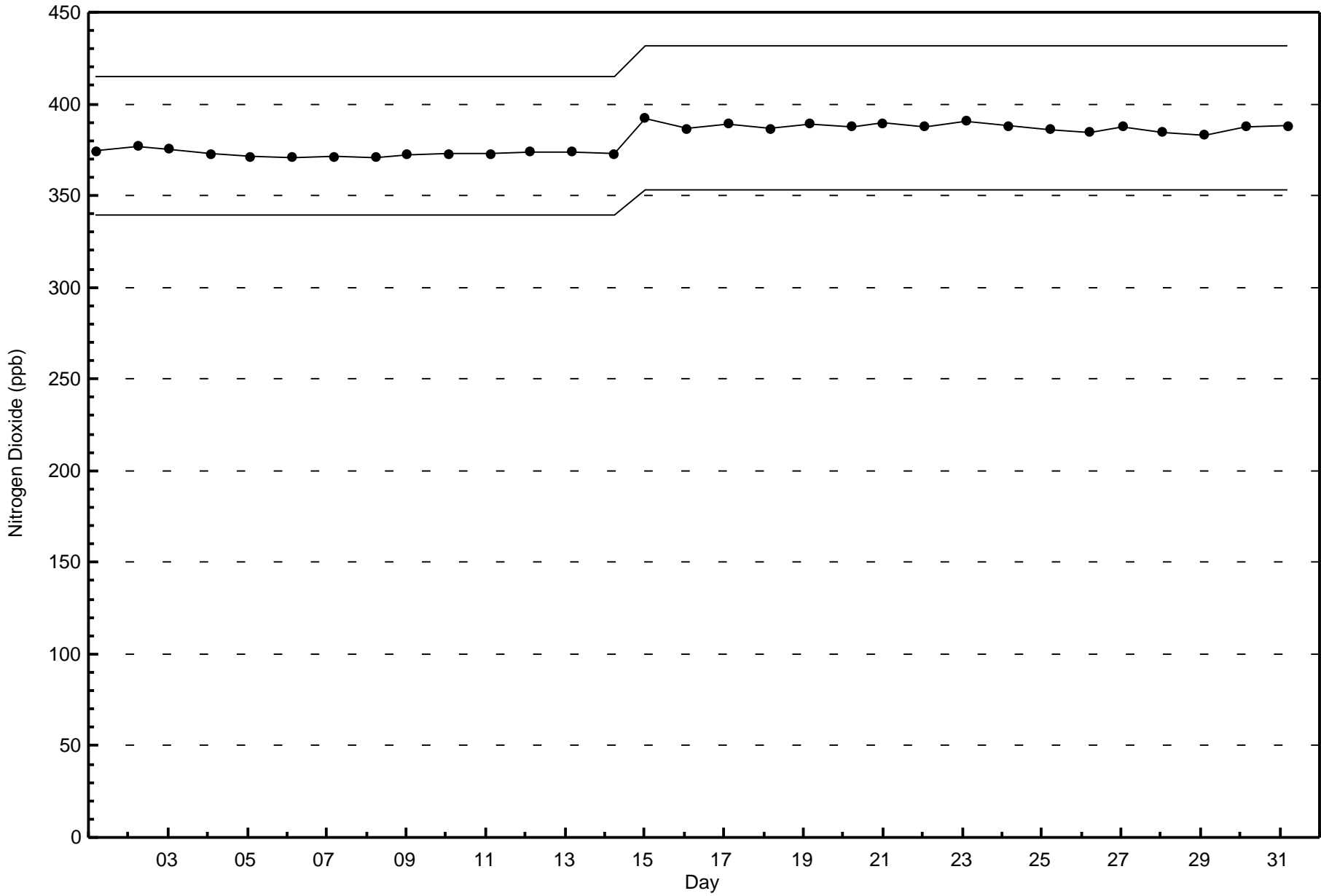
Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Wapasu (AMS 17)



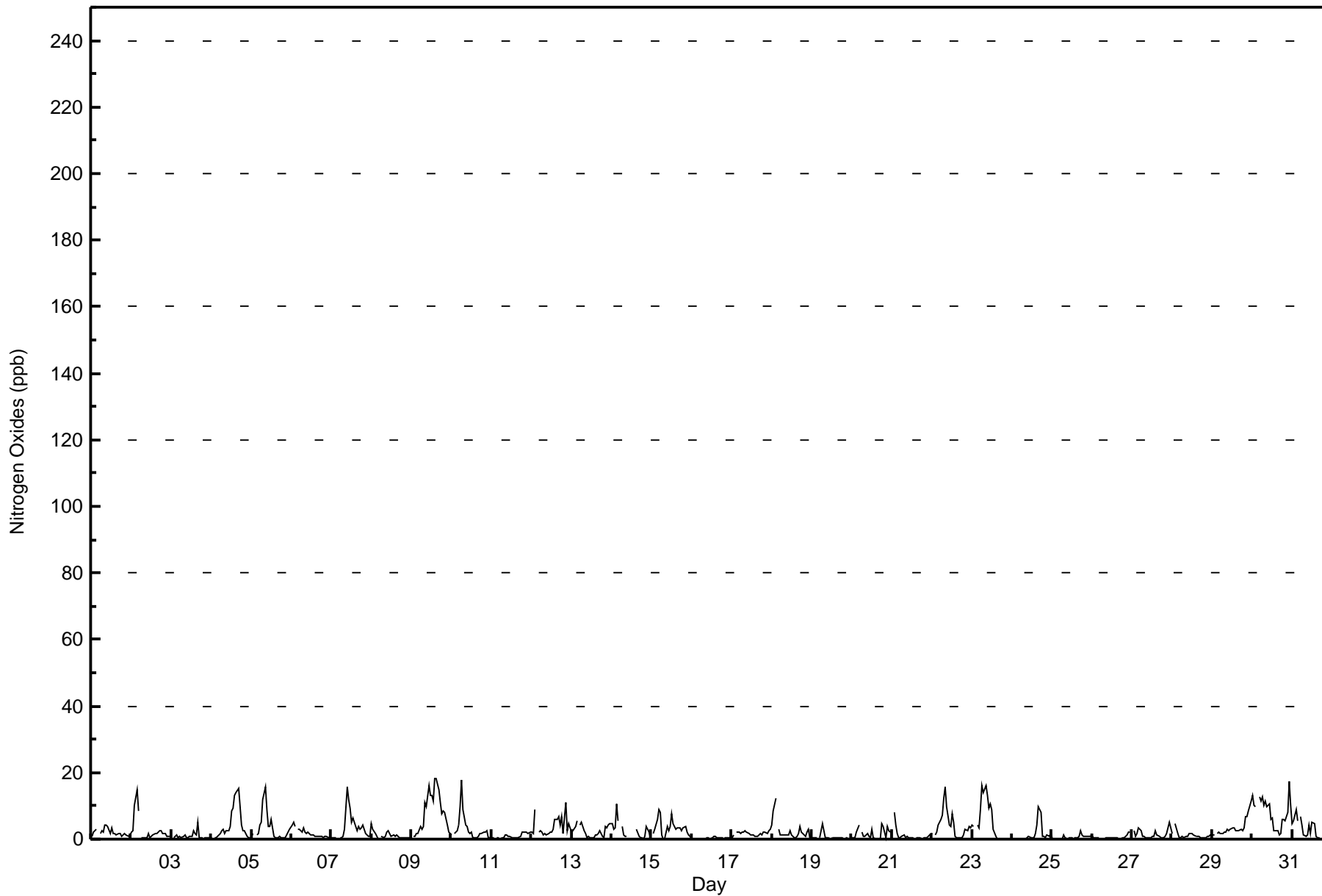








Maximum Value: 18 ppb on Oct 9 15:00																	Maximum Daily Average: 8.2 ppb on Oct 30																	Hours in Service: 744	
Minimum Value: 0 ppb on Oct 20 15:00																	Minimum Daily Average: 0.3 ppb on Oct 16																	Hours of Data: 708	
Maximum Diurnal Average: 3.4 ppb at hour 7																	Minimum Diurnal Average: 1.7 ppb at hour 20																	Hours of Missing Data: 36	
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> = 7 P <sub>99</sub> = 16																	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	1	2	2	3	Z	2	2	2	4	4	4	2	3	2	2	1	2	2	1	1	2	1	1	1	2.0	4									
2-Oct	2	2	10	15	9	Z	1	0	0	0	2	0	1	1	2	2	2	3	3	2	2	1	1	1	2.6	15									
3-Oct	Z	0	1	1	0	1	1	1	1	0	0	1	1	3	2	1	5	0	0	0	0	0	0	0.9	5										
4-Oct	0	Z	0	1	1	2	3	3	2	3	2	4	9	9	13	14	15	10	4	2	3	1	1	0	4.4	15									
5-Oct	0	2	Z	1	2	4	5	12	16	9	4	4	6	1	1	0	0	1	1	1	0	1	2	3	3.3	16									
6-Oct	4	5	4	Z	3	3	2	3	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.8	5									
7-Oct	1	1	1	0	Z	0	0	1	3	16	12	9	5	6	5	2	4	3	3	4	2	1	1	1	3.6	16									
8-Oct	5	3	2	1	0	Z	1	1	1	2	2	2	1	1	1	1	1	0	1	1	0	0	0	0	1.2	5									
9-Oct	Z	1	1	2	2	4	3	4	11	10	16	13	13	11	18	18	15	11	8	8	8	4	2	2	8.0	18									
10-Oct	1	Z	2	2	4	10	18	9	4	4	2	2	2	1	0	1	1	2	2	2	2	3	1	0	3.2	18									
11-Oct	0	0	Z	0	0	0	0	0	1	1	1	1	0	0	1	0	1	1	2	2	2	2	2	2	1.0	2									
12-Oct	2	2	9	Z	2	2	2	1	2	1	2	2	2	3	6	6	7	4	7	2	11	3	5	3	3.7	11									
13-Oct	2	2	4	6	Z	4	5	3	2	1	1	1	1	1	1	1	2	2	1	1	4	3	4	5	2.4	6									
14-Oct	5	3	3	11	5	Z	4	1	1	1	C	C	C	C	C	3	1	0	0	1	4	2	1	2.5	11										
15-Oct	Z	2	3	6	9	8	1	0	0	4	3	4	8	5	3	3	3	3	3	3	4	2	1	1	3.4	9									
16-Oct	1	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	0	0	0	0	0	0	0.3	1									
17-Oct	1	1	Z	2	2	2	2	2	2	2	2	1	1	1	1	1	1	2	1	2	2	2	2	3	1.7	3									
18-Oct	4	8	12	Z	3	1	1	1	1	1	1	3	1	0	0	1	2	4	2	1	1	2	3	1	2.5	12									
19-Oct	1	0	0	0	Z	0	5	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	5									
20-Oct	0	0	1	2	4	Z	2	1	1	2	1	1	3	0	0	0	0	0	0	5	4	1	4	3	2	1.5	5								
21-Oct	Z	8	4	2	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1.0	8								
22-Oct	1	Z	1	2	4	6	7	12	16	10	4	4	7	5	1	1	0	0	1	1	3	3	4	3	4.2	16									
23-Oct	4	4	Z	4	3	9	16	14	16	13	9	10	9	3	1	0	0	0	0	0	0	0	0	0	5.1	16									
24-Oct	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	2	4	10	8	1	1	0	1	1	2	1.4	10									
25-Oct	0	0	0	0	Z	0	0	1	0	0	0	1	0	0	0	0	1	2	1	1	1	1	1	1	0.6	2									
26-Oct	1	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	2	2	0.6	2								
27-Oct	Z	2	1	2	3	2	1	1	1	0	0	0	1	1	3	1	1	1	1	0	1	2	5	3	1.4	5									
28-Oct	2	Z	5	2	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1.2	5								
29-Oct	1	1	Z	2	2	2	2	2	2	3	2	3	3	3	3	3	3	3	3	2	3	7	7	9	12	3.5	12								
30-Oct	13	10	10	Z	13	11	13	10	11	10	11	6	6	3	2	2	1	2	6	6	5	8	17	10	8.2	17									
31-Oct	5	6	9	6	Z	7	4	1	1	1	4	2	5	5	1	0	0	0	0	0	0	0	0	0	2.5	9									
2.2																	2.6																	Diurnal Average	
13																	10																	Diurnal Maximum	
3.3																	3.3																		
2.8																	2.8																		
3.0																	3.0																		
3.2																	3.2																		
3.4																	3.4																		
3.0																	3.0																		
3.3																	3.3																		
3.3																	3.3																		
3.1																	3.1																		
2.6																	2.6																		
3.1																	3.1																		
2.3																	2.3																		
2.4																	2.4																		
2.3																	2.3																		
2.6																	2.6																		
2.1																	2.1																		
1.8																	1.8																		
1.7																	1.7																		
2.0																	2.0																		
1.9																	1.9																		
2.4																	2.4																		
2.1																	2.1																		
Z - zerospan C - Calibration																																			





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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Wapasu - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	708	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: 708

Total Number of Hours: 744



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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Wapasu - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	41	41	25	13	9	42	102	92	72	23	61	38	21	25	47	56	708
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>	41	41	25	13	9	42	102	92	72	23	61	38	21	25	47	56	708

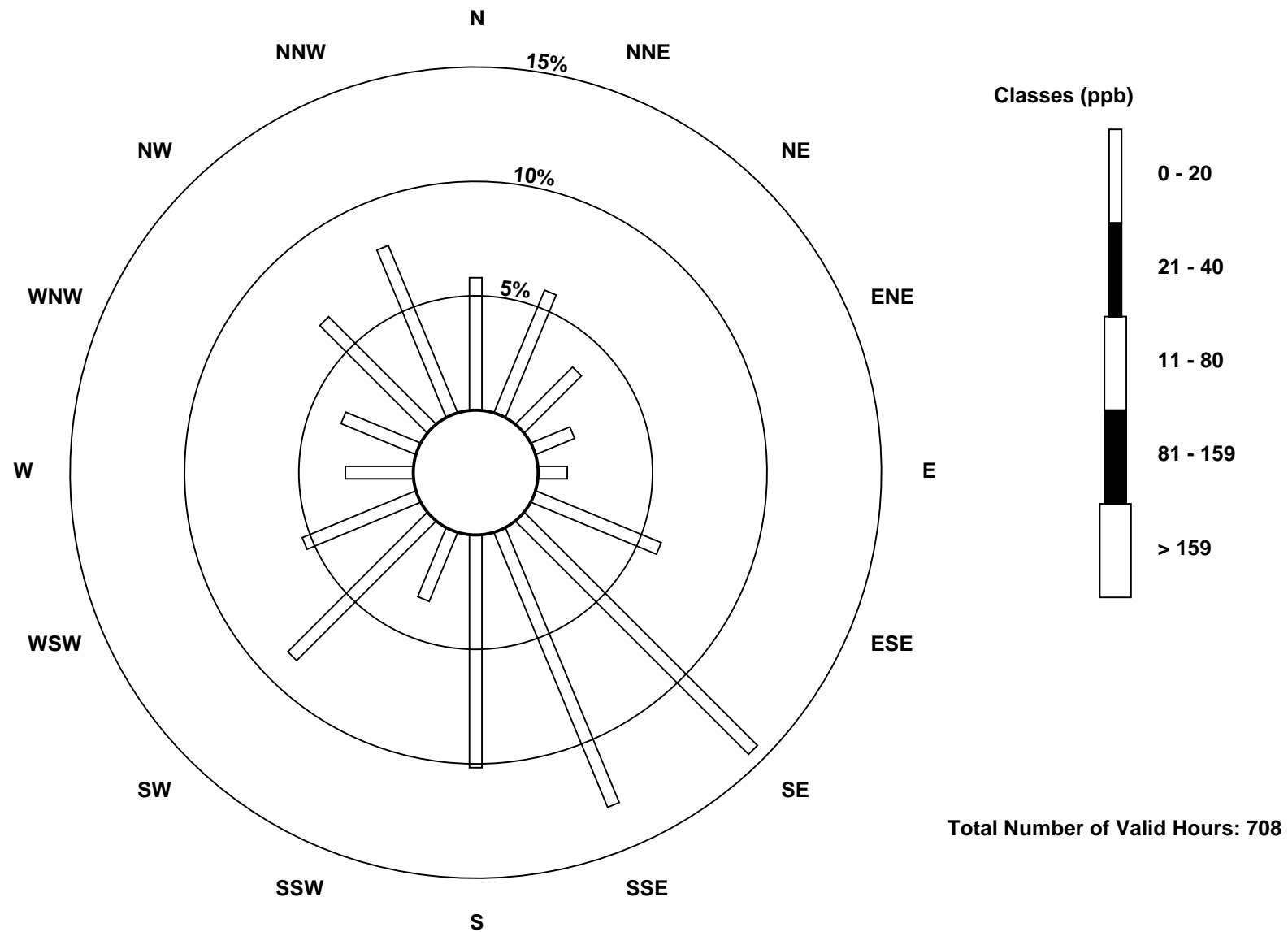
Total Number of Valid Hours: 708

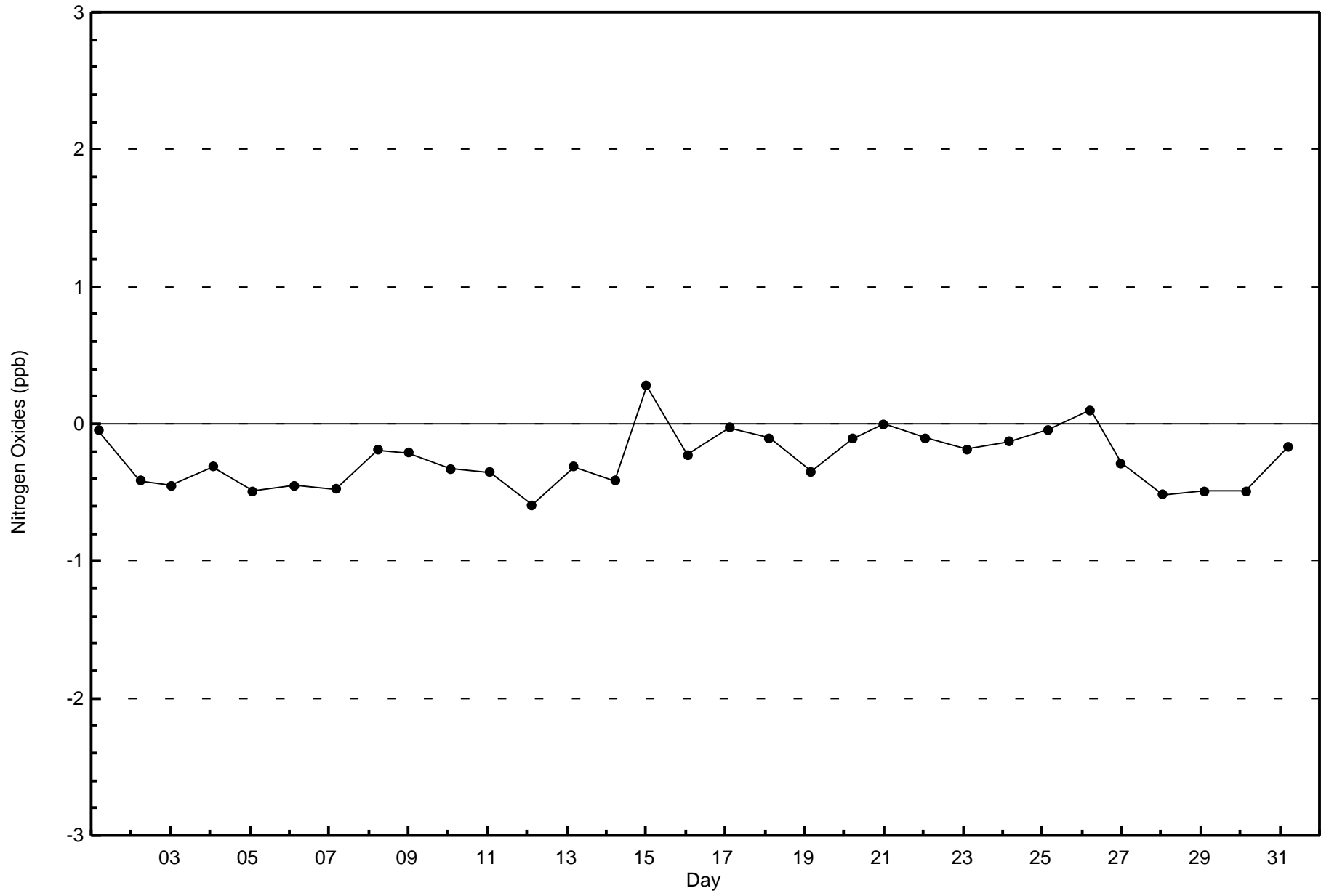
Total Number of Hours: 744

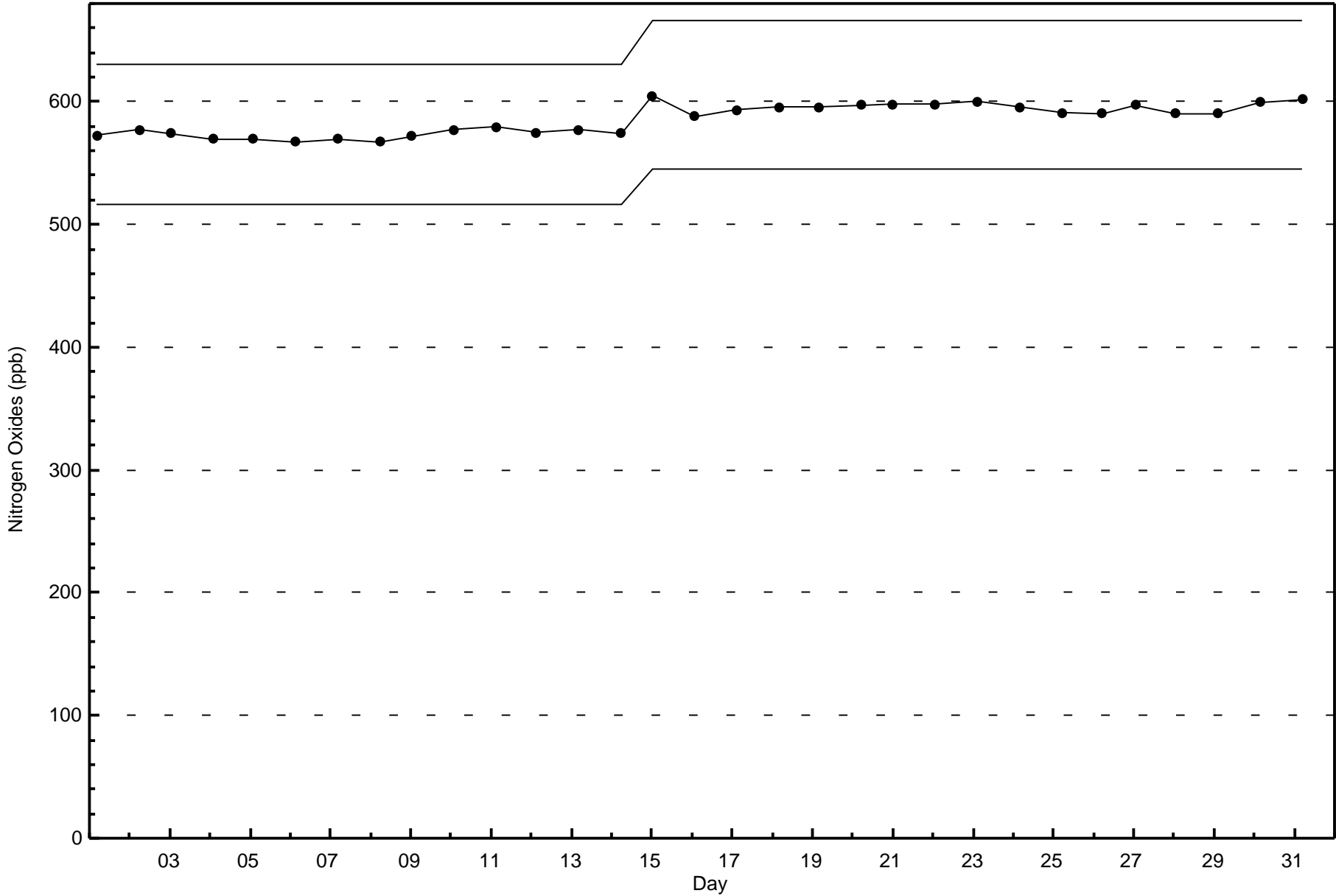


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Wapasu (AMS 17)











Summary of Hour Averages

Wapasu - October 2015

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 19.4 µg/m <sup>3</sup> on Oct 4 13:00 Minimum Value: 0.0 µg/m <sup>3</sup> on Oct 5 19:00 Maximum Diurnal Average: 3.3 µg/m <sup>3</sup> at hour 13 Monthly Average: 2.71 µg/m <sup>3</sup>		Maximum Daily Average: 8.1 µg/m <sup>3</sup> on Oct 9 Minimum Daily Average: 0.4 µg/m <sup>3</sup> on Oct 6 Minimum Diurnal Average: 2.1 µg/m <sup>3</sup> at hour 22 Percentiles: P <sub>1</sub> = 0.0 P <sub>10</sub> = 0.3 Q <sub>1</sub> = 0.7 Median = 2.1 Q <sub>3</sub> = 4.0 P <sub>90</sub> = 6.0 P <sub>99</sub> = 11.6		Hours in Service: 744 Hours of Data: 731 Hours of Missing Data: 13 Hours of Calibration: 2 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	3.6	4.4	4.6	5.2	5.1	4.8	4.9	4.3	5.6	6.8	5.6	4.6	4.3	3.9	3.8	3.8	3.5	4.2	4.6	5.0	4.6	3.9	3.7	3.8	4.5	6.8																							
2-Oct	3.8	4.1	6.4	8.1	8.3	4.5	4.2	4.4	3.7	3.2	6.0	4.8	2.4	1.7	1.2	0.7	0.1	0.2	0.1	0.2	0.3	0.1	0.2	0.2	2.9	8.3																							
3-Oct	0.0	0.1	0.3	0.3	0.2	0.2	0.2	0.2	0.8	1.0	1.1	1.0	0.8	0.9	0.8	0.9	1.2	0.9	0.8	0.8	0.9	0.9	1.1	1.1	0.7	1.2																							
4-Oct	1.3	0.7	0.6	0.6	0.9	1.4	2.9	2.7	2.1	1.8	3.0	9.4	19.4	12.9	8.1	6.3	7.5	6.0	4.6	3.2	1.8	0.6	0.4	0.3	4.1	19.4																							
5-Oct	0.4	0.7	0.9	1.0	1.7	4.5	5.7	10.9	10.0	4.2	1.9	1.5	1.1	0.1	0.3	0.0	0.2	0.3	0.0	0.1	0.2	0.2	0.3	0.3	1.9	10.9																							
6-Oct	0.6	0.7	0.6	0.7	0.7	0.8	0.8	0.6	0.3	0.2	0.6	0.3	0.1	0.0	0.2	0.0	0.1	0.2	0.2	0.3	0.4	0.5	0.7	0.8	0.4	0.8																							
7-Oct	0.8	0.9	1.0	1.2	1.3	1.3	1.2	1.2	1.6	4.0	6.0	14.3	5.9	4.7	4.1	6.0	8.2	5.6	6.5	3.0	2.9	3.3	3.0	3.1	3.8	14.3																							
8-Oct	3.7	3.6	2.9	2.4	2.1	1.8	1.7	1.5	2.0	3.2	3.4	2.6	2.1	2.3	2.8	3.2	3.5	1.9	1.6	1.7	1.9	2.1	2.0	2.5	2.4	3.7																							
9-Oct	4.0	5.4	6.2	8.1	8.6	7.8	7.4	7.6	7.0	7.3	9.7	9.9	10.3	9.6	11.7	11.7	11.0	10.4	9.7	11.9	8.5	5.3	3.7	2.7	8.1	11.9																							
10-Oct	2.2	2.6	2.8	2.9	3.8	5.3	5.8	6.0	5.2	4.5	2.5	2.6	3.3	3.0	6.8	2.2	0.9	1.3	0.8	0.7	0.8	2.3	2.4	2.1	3.0	6.8																							
11-Oct	2.2	2.4	1.0	0.1	0.5	0.6	0.6	0.6	0.7	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.2	0.3	0.3	0.5	0.5	0.7	0.7	0.5	2.4																							
12-Oct	0.7	0.5	1.5	2.8	1.3	1.4	0.6	0.5	0.4	0.6	0.8	0.9	2.0	5.4	2.1	3.2	2.8	1.8	2.9	0.9	2.2	1.7	3.4	3.4	1.8	5.4																							
13-Oct	1.2	1.2	1.4	3.9	4.3	3.8	3.2	2.3	2.1	2.5	0.8	1.2	1.8	2.3	4.7	6.9	2.2	2.0	1.6	2.3	4.7	3.6	4.0	5.1	2.9	6.9																							
14-Oct	4.2	2.7	2.8	2.9	4.2	1.5	1.1	1.0	0.6	0.4	0.9	0.7	0.4	0.4	0.4	1.3	0.8	0.3	0.2	0.0	0.1	0.5	0.3	0.0	1.2	4.2																							
15-Oct	0.0	0.0	0.1	0.4	0.6	0.8	0.1	0.0	0.0	0.2	0.4	4.8	7.8	4.8	2.2	2.1	2.0	1.7	0.9	0.9	0.9	0.6	0.5	0.4	1.3	7.8																							
16-Oct	0.2	0.3	0.1	0.2	0.3	0.4	0.5	0.5	0.7	0.8	0.9	0.8	0.9	1.1	1.8	1.4	1.0	1.0	1.1	1.0	0.9	0.9	1.0	1.1	0.8	1.8																							
17-Oct	1.4	1.6	1.9	2.6	2.9	3.1	3.2	3.5	3.3	3.0	3.9	3.6	3.7	4.1	3.1	3.8	3.7	3.9	2.9	2.7	3.4	3.9	4.3	5.3	3.3	5.3																							
18-Oct	5.8	8.9	12.9	8.6	6.4	5.5	5.3	5.3	4.9	4.0	3.3	4.7	5.2	2.3	1.4	1.6	2.2	3.1	1.6	1.7	1.3	1.3	1.4	1.1	4.2	12.9																							
19-Oct	1.1	1.1	1.3	1.7	2.4	2.8	2.9	3.1	3.1	2.7	2.6	2.2	2.1	2.8	3.1	3.5	3.6	3.6	3.6	3.6	3.0	2.6	2.3	1.9	2.6	3.6																							
20-Oct	2.8	3.3	3.5	4.7	7.6	5.7	1.7	0.3	0.3	0.5	0.7	0.7	0.8	0.5	0.7	0.7	0.6	0.5	1.2	1.3	0.5	0.8	0.8	0.6	1.7	7.6																							
21-Oct	0.8	1.1	1.0	0.6	0.3	0.4	0.6	0.9	0.8	1.4	1.5	1.4	1.3	1.3	1.3	1.7	1.9	2.2	2.7	2.4	2.1	2.1	2.3	2.4	1.4	2.7																							
22-Oct	2.4	2.6	3.0	3.9	5.8	7.7	9.7	9.4	9.0	7.9	7.2	6.6	8.3	7.8	4.1	3.3	2.4	2.1	2.4	2.9	3.7	4.2	5.0	4.8	5.3	9.7																							
23-Oct	4.0	3.5	3.7	4.1	4.7	6.5	7.0	6.2	6.9	8.8	5.7	C	C	2.7	1.3	0.7	0.5	0.4	0.3	0.1	0.2	0.3	0.4	0.2	3.1	8.8																							
24-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.3	0.3	0.4	0.9	1.4	2.7	2.2	0.3	0.3	2.4	1.0	0.9	--	2.7																						
25-Oct	0.2	0.1	0.2	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.6	0.6	0.5	0.4	0.5	0.7	0.9	3.7	4.7	4.2	4.5	3.7	3.6	5.0	1.6	5.0																							
26-Oct	5.2	5.3	4.9	4.8	4.5	3.8	3.5	3.4	4.1	4.7	4.3	3.1	2.5	2.1	2.0	1.9	1.9	2.0	2.1	2.1	2.5	2.8	2.7	0.7	3.2	5.3																							
27-Oct	0.7	0.6	0.3	0.6	1.0	1.1	0.5	0.3	0.3	0.4	0.2	0.3	0.3	0.4	0.5	0.4	0.4	0.4	0.6	0.5	0.6	0.6	0.6	0.6	0.5	1.1																							
28-Oct	0.5	0.9	1.0	0.8	0.8	0.9	1.2	0.9	0.8	0.8	1.0	1.5	1.5	1.0	0.9	0.8	0.9	1.0	1.1	1.1	1.0	1.4	1.8	2.1	1.1	2.1																							
29-Oct	2.5	2.8	3.1	3.7	4.1	4.1	4.2	4.6	5.4	5.6	4.7	4.1	3.6	3.4	3.4	3.6	4.2	5.2	5.0	4.4	4.3	5.1	5.4	6.9	4.3	6.9																							
30-Oct	5.4	6.3	9.9	10.0	7.1	7.3	7.2	4.9	5.6	6.1	6.8	2.6	2.5	1.6	1.6	2.0	1.5	1.5	4.4	5.3	3.6	3.4	4.4	5.2	4.8	10.0																							
31-Oct	5.5	8.4	14.6	9.5	7.8	6.7	4.4	2.8	2.4	2.7	4.3	4.8	5.4	5.1	3.3	2.5	2.3	2.5	3.1	3.0	2.3	2.8	2.7	1.9	4.6	14.6																							
																								2.2	2.6	3.2	3.2	3.3	3.2	3.1	3.0	3.0	3.0	3.0	3.2	3.3	2.9	2.6	2.5	2.4	2.3	2.3	2.2	2.1	2.1	2.1	2.2	Diurnal Average	
																								5.8	8.9	14.6	10.0	8.6	7.8	9.7	10.9	10.0	8.8	9.7	14.3	19.4	12.9	11.7	11.7	11.0	10.4	9.7	11.9	8.5	5.3	5.4	6.9	Diurnal Maximum	
C - Calibration																								AF - Analyzer Failure																									
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m <sup>3</sup>																																																	

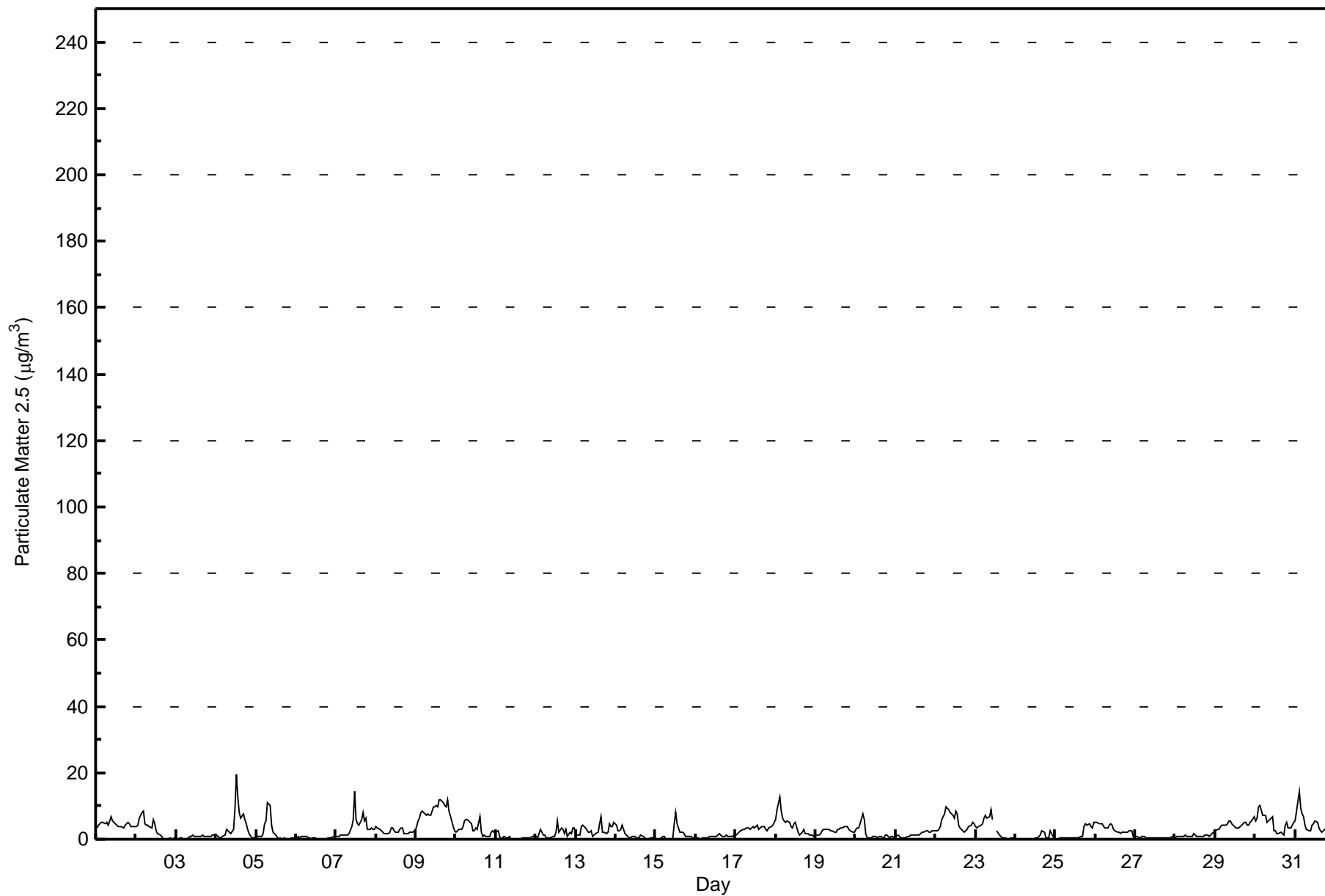


Wood Buffalo Environmental Association

Hourly Averages

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$

Wapasu - October 2015





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

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Wapasu - October 2015**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	390	53.35	53.35
6 - 15	87	11.90	65.25
16 - 25	1	0.14	65.39
26 - 80	0	0.00	65.39
> 81.0	0	0.00	65.39

Total Number of Valid Hours: 731

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 2015**

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	16	15	12	7	5	28	66	76	42	16	42	23	13	9	4	16	390
6 - 15	3	3	2	1	0	2	4	8	21	6	16	10	3	1	4	3	87
16 - 25	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
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>	19	18	14	8	5	30	70	84	63	22	59	33	16	10	8	19	478

Total Number of Valid Hours: 731

Total Number of Hours: 744





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Ambient Temperature (AT) - C**

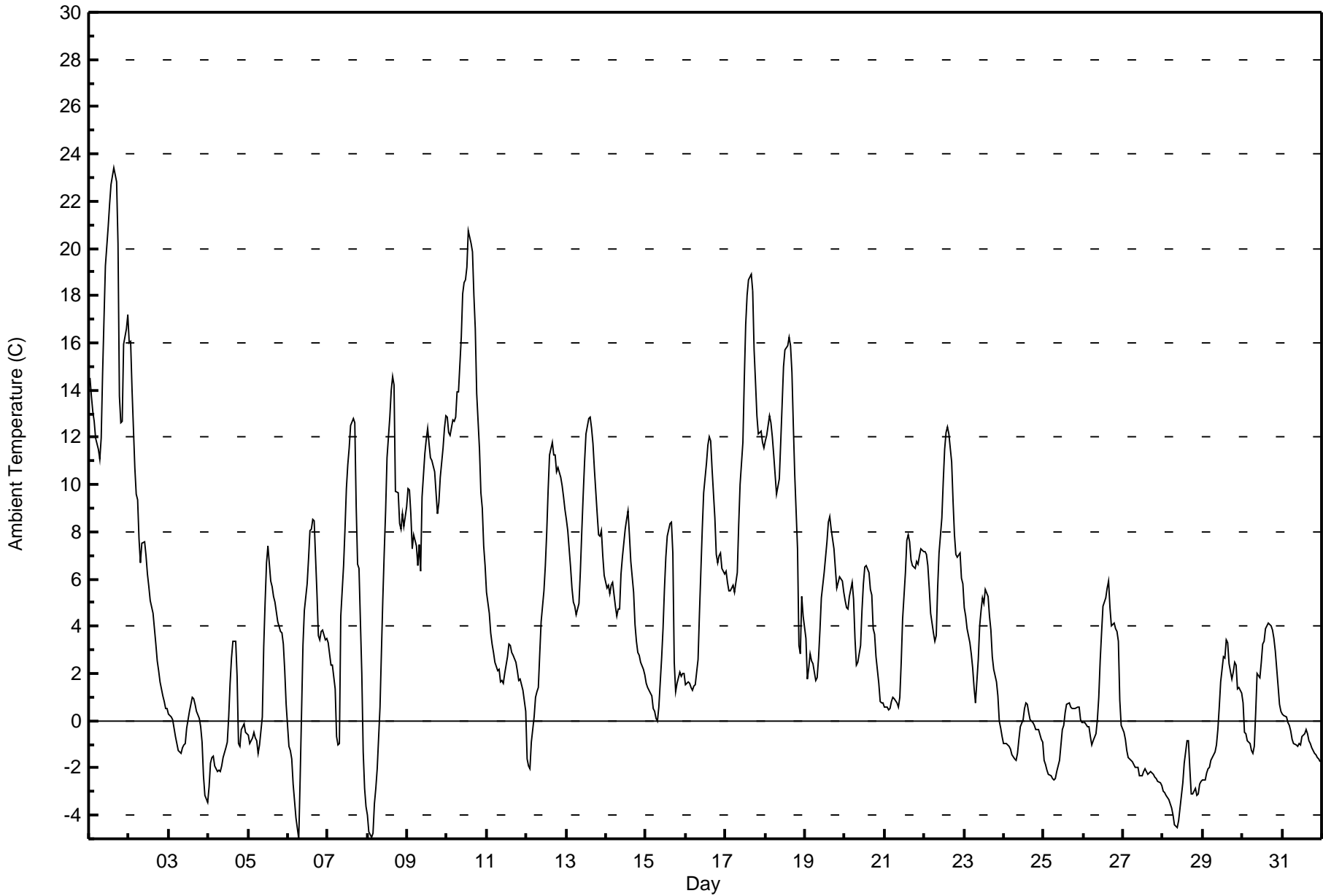
**Wapasu - October 2015**

Maximum Value: 23.4 C on Oct 1 16:00		Maximum Daily Average: 16.5 C on Oct 1		Hours in Service: 744																							
Minimum Value: -5.0 C on Oct 6 07:00		Minimum Daily Average: -3.0 C on Oct 28		Hours of Data: 744																							
Maximum Diurnal Average: 7.9 C at hour 15		Minimum Diurnal Average: 1.7 C at hour 7		Hours of Missing Data: 0																							
Monthly Average: 4.36 C		Percentiles: P <sub>1</sub> = -4.1 P <sub>10</sub> = -1.9 Q <sub>1</sub> = -0.2 Median = 3.3 Q <sub>3</sub> = 7.8 P <sub>90</sub> = 12.1 P <sub>99</sub> = 20.5		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	14.5	13.7	13.1	12.7	12.0	11.5	11.1	12.0	14.7	17.0	19.2	20.9	21.9	22.7	23.0	23.4	22.8	20.2	13.8	12.6	12.7	16.0	16.6	17.2	16.5	23.4	
2-Oct	16.0	16.1	14.1	10.7	9.6	9.3	7.7	6.7	7.5	7.6	7.0	6.2	5.7	5.1	4.6	3.9	3.3	2.5	2.1	1.6	1.1	0.8	0.5	0.5	6.3	16.1	
3-Oct	0.3	0.1	0.0	-0.3	-0.7	-1.0	-1.3	-1.4	-1.2	-1.0	-1.0	-0.3	0.4	0.7	1.0	0.9	0.7	0.4	0.1	-0.3	-0.9	-2.3	-3.2	-3.4	-0.6	1.0	
4-Oct	-2.8	-1.8	-1.5	-1.5	-1.9	-2.1	-2.1	-2.1	-1.9	-1.6	-1.1	-0.9	0.2	1.6	2.7	3.4	3.4	1.9	-1.0	-1.1	-0.4	-0.1	-0.5	-0.6	-0.5	3.4	
5-Oct	-0.6	-1.0	-0.7	-0.5	-0.7	-0.8	-1.4	-1.0	0.2	3.1	5.0	6.7	7.4	5.9	5.7	5.3	5.0	4.6	4.2	3.8	3.7	3.2	2.1	0.7	2.5	7.4	
6-Oct	-1.1	-1.3	-1.6	-2.7	-3.4	-4.1	-5.0	-2.5	0.3	3.2	4.7	5.8	6.9	8.1	8.1	8.5	8.4	5.4	3.6	3.4	3.8	3.8	3.4	3.5	2.5	8.5	
7-Oct	3.3	2.9	2.3	2.3	1.3	-0.7	-1.0	-1.0	4.4	6.5	8.1	9.8	10.8	11.6	12.5	12.8	12.6	9.1	6.6	6.4	2.0	-1.3	-2.8	-3.7	4.8	12.8	
8-Oct	-4.0	-4.7	-4.9	-4.7	-3.5	-2.9	-2.1	0.6	2.9	5.1	7.1	8.9	11.1	12.9	14.0	14.6	14.2	9.7	9.7	8.4	8.1	8.8	8.2	9.1	5.3	14.6	
9-Oct	9.8	9.8	8.7	7.3	7.9	7.4	6.6	7.5	6.3	9.4	11.3	11.9	12.4	11.7	11.1	11.0	10.5	9.6	8.7	9.3	10.3	11.6	12.4	12.9	9.8	12.9	
10-Oct	12.9	12.2	12.1	12.7	12.7	12.8	13.9	13.9	16.3	18.1	18.6	18.7	19.2	20.7	20.2	19.9	18.0	16.6	13.9	11.5	9.6	9.0	7.4	6.6	14.5	20.7	
11-Oct	5.4	4.5	3.7	3.2	2.9	2.5	2.1	2.1	1.7	1.7	1.6	2.0	2.7	3.3	3.2	2.9	2.7	2.5	2.1	1.7	1.8	1.5	1.3	0.4	2.5	5.4	
12-Oct	-1.6	-1.9	-2.0	-0.9	0.2	1.0	1.2	1.4	2.8	4.2	5.5	6.6	8.0	9.8	11.2	11.8	11.3	11.3	10.5	10.7	10.3	9.9	9.5	9.0	5.8	11.8	
13-Oct	8.5	8.0	6.5	5.6	5.0	4.9	4.5	4.9	6.3	8.0	9.5	10.9	12.2	12.8	12.8	12.4	11.8	10.7	8.7	7.9	7.8	8.1	7.0	6.1	8.4	12.8	
14-Oct	5.6	5.8	5.4	5.7	5.9	4.8	4.4	4.7	4.7	6.2	6.9	8.1	8.5	8.9	7.9	6.8	5.5	4.1	3.4	2.9	2.7	2.5	2.2	1.9	5.2	8.9	
15-Oct	1.6	1.4	1.3	1.0	0.5	0.4	0.1	0.0	0.6	2.7	3.9	5.6	6.9	7.8	8.3	8.4	7.1	2.5	1.2	1.6	2.0	1.9	2.0	2.0	3.0	8.4	
16-Oct	1.5	1.7	1.6	1.4	1.3	1.4	1.5	2.6	4.6	6.3	8.1	9.6	10.9	11.7	12.0	11.9	10.6	8.6	7.0	6.7	7.0	7.1	6.4	6.2	6.2	12.0	
17-Oct	6.3	5.9	5.5	5.5	5.7	5.5	5.9	6.2	8.3	10.0	11.8	14.4	16.8	18.0	18.7	18.9	18.2	15.7	14.3	12.9	12.1	12.3	11.8	11.5	11.3	18.9	
18-Oct	11.8	12.1	12.9	12.6	12.0	11.2	10.4	9.6	10.2	11.8	13.4	15.0	15.7	15.9	16.3	15.9	14.7	12.5	10.5	7.3	3.2	2.9	5.3	4.5	11.2	16.3	
19-Oct	3.5	1.8	2.3	2.9	2.5	2.4	1.7	1.8	2.7	3.8	5.2	6.3	6.9	7.6	8.4	8.7	8.1	7.3	6.5	5.6	5.8	6.1	5.9	5.4	5.0	8.7	
20-Oct	5.1	4.8	4.7	5.2	5.9	5.2	3.5	2.4	2.5	3.2	4.6	5.8	6.5	6.6	6.3	5.6	5.3	3.9	3.6	2.7	1.6	0.8	0.7	0.7	4.1	6.6	
21-Oct	0.6	0.5	0.4	0.5	0.8	1.0	0.9	0.8	0.6	1.0	2.5	4.3	6.3	7.7	7.9	7.6	6.8	6.6	6.5	6.8	6.6	7.0	7.3	7.2	4.1	7.9	
22-Oct	7.2	7.0	6.6	5.6	4.5	3.7	3.4	3.6	5.6	7.1	8.6	10.1	11.5	12.2	12.5	12.2	11.0	9.3	7.9	7.1	6.9	7.1	6.1	5.8	7.6	12.5	
23-Oct	4.8	4.4	3.9	3.3	2.8	2.3	1.4	0.8	2.6	4.0	4.7	5.2	5.0	5.6	5.2	4.4	3.8	2.7	2.2	1.6	1.1	0.0	-0.3	-0.7	3.0	5.6	
24-Oct	-1.0	-1.0	-1.1	-1.1	-1.2	-1.5	-1.6	-1.6	-1.4	-0.8	-0.3	0.1	0.5	0.8	0.7	0.4	0.1	-0.1	-0.2	-0.4	-0.4	-0.4	-0.8	-0.9	-0.5	0.8	
25-Oct	-1.7	-1.9	-2.1	-2.2	-2.4	-2.5	-2.5	-2.4	-2.1	-1.7	-1.0	-0.3	-0.2	0.3	0.7	0.8	0.6	0.5	0.5	0.5	0.6	0.6	0.0	-0.1	-0.7	0.8	
26-Oct	-0.1	-0.1	-0.2	-0.3	-0.7	-1.0	-0.9	-0.6	0.0	1.0	2.5	3.7	4.9	5.2	5.6	5.9	4.8	4.0	4.1	3.9	3.8	3.4	0.9	-0.2	2.1	5.9	
27-Oct	-0.5	-0.8	-1.3	-1.6	-1.6	-1.7	-1.9	-2.0	-2.0	-2.0	-2.3	-2.3	-2.2	-2.0	-2.2	-2.3	-2.2	-2.2	-2.3	-2.4	-2.5	-2.5	-2.6	-2.8	-2.0	-0.5	
28-Oct	-3.0	-3.1	-3.1	-3.3	-3.5	-3.7	-4.0	-4.4	-4.5	-4.2	-3.7	-3.2	-2.7	-1.8	-0.8	-0.9	-2.0	-3.1	-3.1	-2.9	-3.1	-3.1	-2.7	-2.5	-3.0	-0.8	
29-Oct	-2.5	-2.5	-2.2	-2.0	-2.0	-1.7	-1.4	-1.3	-1.0	-0.4	0.6	1.7	2.7	2.7	3.4	3.3	2.4	1.7	2.1	2.5	2.4	1.3	1.4	1.2	0.5	3.4	
30-Oct	0.7	-0.5	-0.6	-0.8	-1.0	-1.3	-1.4	-1.1	0.4	2.0	1.8	2.5	3.2	3.4	3.9	4.1	4.1	4.0	3.8	3.5	3.0	1.5	0.7	0.4	1.5	4.1	
31-Oct	0.3	0.2	0.1	-0.1	-0.2	-0.5	-0.8	-1.0	-1.0	-1.1	-1.0	-1.0	-0.7	-0.5	-0.4	-0.6	-0.8	-1.0	-1.2	-1.4	-1.4	-1.6	-1.6	-1.7	-0.8	0.3	
		3.3	3.0	2.7	2.5	2.3	2.0	1.7	1.9	2.9	4.2	5.2	6.2	7.1	7.6	7.9	7.8	7.2	5.9	4.8	4.3	3.9	3.7	3.4	3.1	Diurnal Average	
		16.0	16.1	14.1	12.7	12.7	12.8	13.9	13.9	16.3	18.1	19.2	20.9	21.9	22.7	23.0	23.4	22.8	20.2	14.3	12.9	12.7	16.0	16.6	17.2	Diurnal Maximum	



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

**Ambient Temperature (AT) - C**  
**Wapasu - October 2015**





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

**Ambient Temperature (AT) - C**  
**Wapasu - October 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	196	26.34	26.34
0 - 10	422	56.72	83.06
10 - 20	117	15.73	98.79
> 20	9	1.21	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



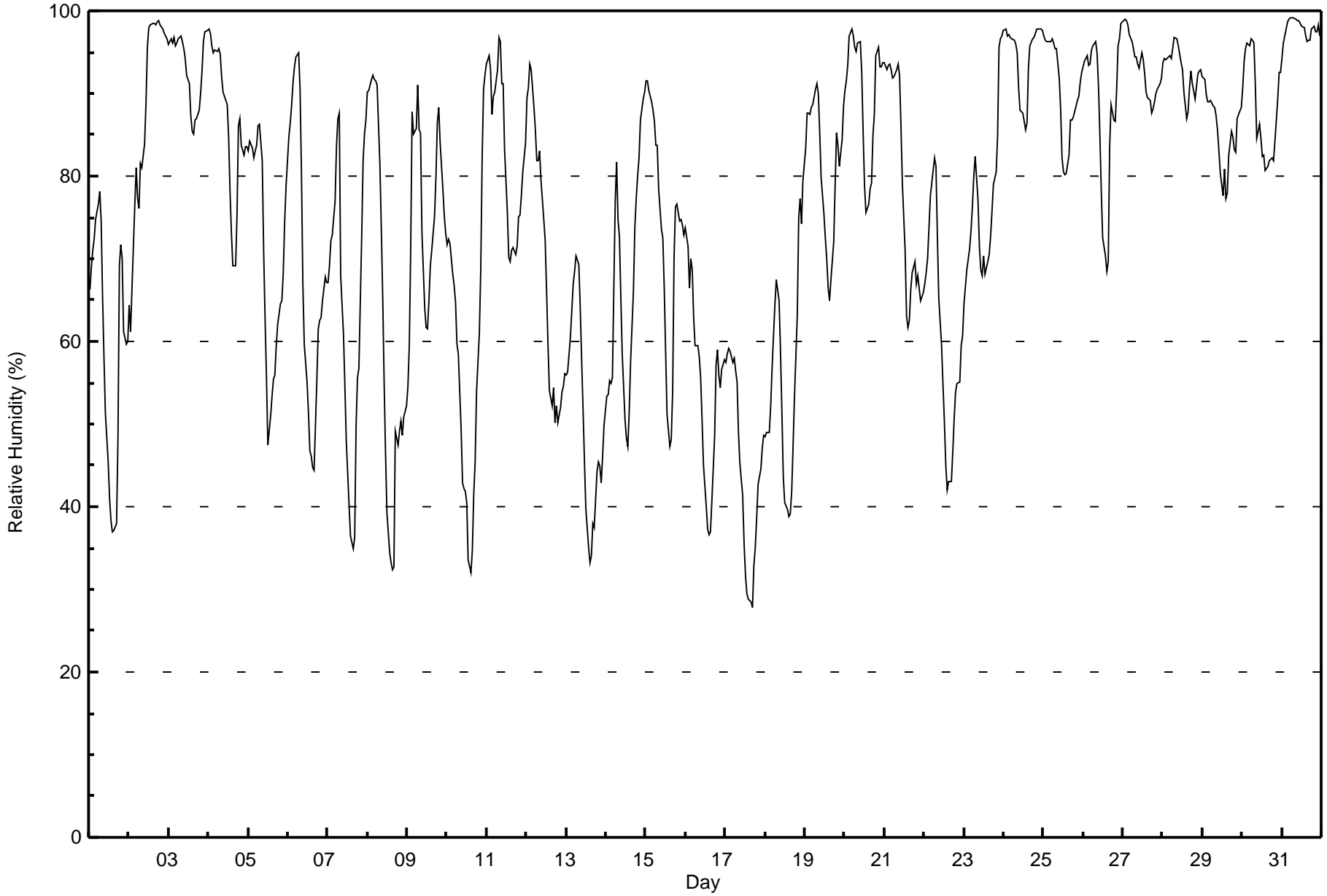


Maximum Value: 99 % on Oct 31 07:00																	Maximum Daily Average: 97.8 % on Oct 31																	Hours in Service: 744									
Minimum Value: 28 % on Oct 17 17:00																	Minimum Daily Average: 44.5 % on Oct 17																	Hours of Data: 744									
Maximum Diurnal Average: 85.5 % at hour 7																	Minimum Diurnal Average: 61.6 % at hour 15																	Hours of Missing Data: 0									
Monthly Average: 75.5 %																	Percentiles: P <sub>1</sub> = 33 P <sub>10</sub> = 47 Q <sub>1</sub> = 61 Median = 81 Q <sub>3</sub> = 92 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	66	69	71	72	75	77	78	75	65	58	51	45	41	38	37	37	38	48	69	72	70	61	60	60	59.8	78																	
2-Oct	64	61	66	76	81	77	76	81	81	84	89	96	98	98	98	98	98	99	99	98	98	97	97	97	87.9	99																	
3-Oct	96	97	96	97	96	96	97	97	96	95	94	92	91	87	85	85	87	87	88	90	93	96	97	98	93.1	98																	
4-Oct	98	97	96	95	95	95	95	95	92	90	89	89	85	78	73	69	69	75	86	87	84	83	84	84	86.8	98																	
5-Oct	83	84	83	82	83	84	86	86	82	71	63	56	47	51	53	55	56	60	62	65	65	68	74	79	70.0	86																	
6-Oct	85	86	89	91	93	94	95	91	80	67	60	55	51	47	46	45	44	55	62	63	63	65	68	67	69.3	95																	
7-Oct	67	69	72	73	77	84	87	88	68	61	55	48	44	40	37	35	36	50	56	57	73	82	85	87	63.7	88																	
8-Oct	90	90	92	92	92	91	91	81	74	65	55	47	39	34	33	32	33	49	47	49	50	49	51	52	61.7	92																	
9-Oct	55	60	71	88	85	86	91	86	85	73	64	62	61	65	69	71	75	80	86	88	84	78	75	73	75.5	91																	
10-Oct	72	72	72	68	67	65	60	58	49	43	42	42	40	34	32	35	42	45	54	61	69	82	90	92	57.7	92																	
11-Oct	94	95	93	87	90	90	93	97	96	91	91	83	76	70	70	71	71	71	72	75	75	78	81	84	83.0	97																	
12-Oct	90	91	94	93	88	86	82	82	83	79	75	72	66	60	54	52	54	50	52	50	52	54	55	56	69.6	94																	
13-Oct	56	56	60	64	67	68	70	69	64	58	52	46	40	35	33	34	38	37	44	45	45	43	46	50	50.9	70																	
14-Oct	53	54	55	55	56	77	82	75	73	65	58	51	48	47	52	58	66	74	77	80	82	87	89	90	66.8	90																	
15-Oct	91	92	90	89	88	87	84	84	79	74	72	66	59	51	47	48	54	70	76	77	75	75	74	73	73.9	92																	
16-Oct	74	72	66	70	69	63	59	60	58	56	51	45	40	37	37	37	41	49	57	59	56	54	57	58	55.1	74																	
17-Oct	57	59	59	59	57	58	56	55	49	45	41	36	32	30	29	28	28	33	35	39	43	45	47	49	44.5	59																	
18-Oct	48	49	49	52	57	61	64	67	65	59	52	44	40	40	39	39	42	48	53	63	75	77	74	80	55.7	80																	
19-Oct	83	88	88	88	88	89	90	91	90	85	80	75	73	70	67	65	67	72	79	85	84	81	84	89	81.3	91																	
20-Oct	90	91	93	97	98	97	96	95	96	96	93	85	79	76	77	78	79	85	87	95	96	93	93	94	90.0	98																	
21-Oct	94	93	93	94	93	92	92	93	94	92	86	79	71	63	62	63	66	68	70	67	68	66	65	66	78.7	94																	
22-Oct	67	68	70	74	78	81	82	81	73	65	60	55	50	45	42	43	43	47	51	54	55	55	59	61	60.7	82																	
23-Oct	65	67	69	71	73	76	80	82	77	71	69	68	70	68	70	71	73	76	79	80	85	96	97	97	76.2	97																	
24-Oct	98	98	97	97	97	96	96	96	95	91	88	88	87	86	86	93	96	97	97	97	98	98	98	98	94.4	98																	
25-Oct	97	96	96	96	96	97	96	95	95	92	88	82	80	80	80	83	87	87	87	88	89	90	91	93	90.1	97																	
26-Oct	93	94	95	93	93	95	96	96	95	91	85	78	73	70	68	70	84	89	87	87	90	96	97	98	88.0	98																	
27-Oct	99	99	99	98	97	96	95	94	94	94	93	95	94	92	90	90	89	88	88	89	90	91	91	92	93.2	99																	
28-Oct	94	94	94	94	95	94	95	97	97	96	95	94	93	90	87	88	91	93	91	89	91	92	93	93	92.9	97																	
29-Oct	92	92	90	89	89	89	88	88	87	86	83	80	78	81	77	78	83	85	85	83	83	87	87	88	85.4	92																	
30-Oct	91	94	96	96	96	97	96	96	91	85	86	85	82	83	81	81	82	82	82	82	84	89	93	93	88.4	97																	
31-Oct	94	96	98	99	99	99	99	99	99	99	99	98	98	98	97	96	96	96	98	98	97	97	98	97	97.8	99																	
																	80.5	81.3	82.3	83.5	84.1	85.1	85.5	84.9	81.4	76.7	72.8	68.9	65.4	62.7	61.6	62.2	64.8	69.1	72.8	74.6	76.1	77.6	79.1	80.1	Diurnal Average		
																	99	99	99	99	99	99	99	99	99	99	99	98	98	98	98	98	98	98	99	99	98	98	98	98	98	Diurnal Maximum	



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

**Relative Humidity (RH) - %**  
**Wapasu - October 2015**





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

**Relative Humidity (RH) - %**  
**Wapasu - October 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	36	4.84	4.84
40 - 60	142	19.09	23.92
60 - 80	186	25.00	48.92
80 - 100	380	51.08	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

Wapasu - October 2015

Maximum Speed: 22 km/h on Oct 10 14:00	Maximum Daily Speed Average: 13.5 km/h on Oct 26	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 7 05:00	Minimum Daily Speed Average: 0.6 km/h on Oct 15	Hours of Data: 744
Maximum Diurnal Speed Average: 4.8 km/h at hour 11	Minimum Diurnal Speed Average: 0.9 km/h at hour 18	Hours of Missing Data: 0
Monthly Average Velocity: 2.3 km/h 182.5 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 4 Q <sub>1</sub> = 5 Median = 8 Q <sub>3</sub> = 11 P <sub>90</sub> = 14 P <sub>99</sub> = 19	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	S7	SSE8	SSE8	SSE9	SSE8	SSE9	SSE10	SSE9	S8	S9	S9	SSW9	SSW9	SW9	WSW8	SW6	SSW4	SE1	ESE4	ESE5	ESE4	ESE6	SE9	S6	S6.1	SSE10
2-Oct	S6	SSE8	NE1	NE4	NNE4	N7	NE9	NE9	NNE11	N9	N10	N11	NNW12	NNW12	NNW13	NNW15	NNW15	NNW15	NNW16	NNW14	NNW12	NNW15	NNW14	NNW11	N8.7	NNW16
3-Oct	NNW11	NNW12	NNW12	NNW11	N12	NNW11	NNW10	N10	N9	N9	N9	NNW9	NNW9	NNW10	NNW9	NNW8	NNW7	N6	N4	N5	NNE5	NE3	NE3	ENE3	N7.8	NNW12
4-Oct	N2	NNE1	NE3	NNW3	ESE4	NE2	ESE2	SSE5	SSE5	S6	S7	SW7	SW7	WSW8	SW8	SSW7	SW6	S4	SE5	SE7	SSE10	SSE12	SE13	SE12	SSE4.1	SE13
5-Oct	SSE12	SSE8	SSE8	SSE9	SSE8	SE7	S5	S4	S5	WSW5	W8	W12	NW19	NW16	NW12	NW13	NW11	NW9	NW7	WNNW6	NW8	NNW7	N7	N4	W3.7	WNNW19
6-Oct	NNW3	N3	SE2	SE4	SE6	SE6	SE5	SE6	SE8	SSE8	S8	S6	S5	SSW6	S7	SSE8	SSE7	SE5	ESE8	ESE8	SE9	SE10	SE9	SE9	SE5.6	SE10
7-Oct	SE9	ESE8	SE8	SE7	ESE0	ENE2	SE4	SE5	S3	SW4	WSW5	WSW6	W8	W8	W6	WSW7	SW6	WSW3	NW6	N5	NE4	E3	E3	ENE4	S1.2	ESE9
8-Oct	E3	E4	ESE3	ESE3	SE4	SE4	SE6	SE6	SE7	SSE7	S8	S8	S8	SSW8	SSW8	SSW7	S5	ESE4	ESE7	ESE7	ESE9	SE11	SE8	SE9	SSE5.4	SE11
9-Oct	SE8	SE9	S2	ESE5	SE8	SW4	SE4	SSW3	WSW5	S8	SW10	WSW8	WNNW6	NW7	N6	NNE4	NE3	ENE2	ESE1	SE6	SSE8	SE11	SSE11	SSE12	SSE3.1	SSE12
10-Oct	SSE11	SSE10	S9	S10	S9	S8	SSW10	SW11	SW15	SW17	SW18	SW16	SW18	WSW22	WSW21	W13	WNNW7	WSW5	WNNW5	E1	NNW4	NNW8	NNE9	NNE8	SW7.1	WSW22
11-Oct	NNE10	NNE9	NNE10	NNE7	NNE9	NNE9	N8	NNW10	NNW14	NNW13	NW15	NW14	NW15	NW17	NW15	NW14	NW10	NW9	NW6	NW2	N3	WNNW1	S1	SSE3	NNW8.1	NW17
12-Oct	SE5	SE6	SE7	SSE8	SSE12	SSE13	SE12	SE14	SSE13	SSE12	SSE10	SSE14	S13	SSW13	SW13	SSW11	SW9	WSW8	WSW7	WSW11	WSW8	SW8	SW10	SW10	S8.0	SE14
13-Oct	SW9	SW10	SW9	SSW9	SSW9	SW12	SW9	SW12	SW13	WSW13	WSW13	WSW14	SW15	WSW17	W12	W13	WSW11	WSW8	WSW7	SW7	SW10	SW11	SW9	SW10	SW10.6	WSW17
14-Oct	SW10	SW10	SW7	SSW8	SW9	WSW7	SW8	WSW11	WSW11	WSW12	W12	WNNW13	WNNW13	NW14	NW12	NNW11	NNW10	N10	NNW9	N8	NNW6	NW7	NW8	NW7	WNNW6.5	NW14
15-Oct	NW7	NW6	NW8	NNW7	NW5	NNW4	NE3	ENE4	ESE5	S4	SW9	WSW9	WSW6	W7	W5	NW3	NNE3	E5	E5	E6	ESE7	ESE7	ESE8	ESE7	N0.6	SW9
16-Oct	ESE7	ESE9	SE10	ESE11	SE11	SE12	SE13	SE14	SE14	SE16	SE17	SE16	SSE14	SE14	SE15	SE14	SE13	ESE12	ESE15	SE16	SE15	SE15	SE13	SE13	SE13.1	SE17
17-Oct	SSE11	SSE12	SSE11	SSE10	SSE10	SSE10	SSE11	SSE11	SSE12	SSE11	SSE12	S14	S14	S14	S14	S12	S10	S9	S9	SSE8	SSE9	S10	S9	S7	SSE10.6	S14
18-Oct	S7	S7	SW11	SW10	SW11	WSW11	SW11	SW9	SW9	WSW14	WSW15	W17	W18	W18	WNNW15	WNNW12	W9	WNNW6	WNNW5	WNNW4	SE2	N4	NNE5	NE5	WSW7.5	W18
19-Oct	NE5	NE2	NE5	ENE4	ENE7	ENE8	E5	ESE7	ESE11	ESE9	ESE11	ESE12	ESE9	ESE10	ESE10	SE12	SE11	ESE14	ESE16	ESE16	SE18	SE19	SE18	SE19	ESE10.0	SE19
20-Oct	SE18	SSE14	SSE11	S8	SW11	WSW13	WSW12	WSW11	SW11	SW14	WSW14	W13	W12	WNNW12	WNNW11	WNNW11	NW10	WNNW5	NW7	NNW8	N9	NNW9	N4	NNW4	W5.5	SE18
21-Oct	NW4	N4	NE3	ENE3	W1	N1	N1	SE4	SE7	SE8	SE9	SSE9	SE9	SE10	SE13	SE14	SE15	SE17	SE18	SE19	SE18	SE16	SSE14	SSE13	SE8.5	SE19
22-Oct	SSE9	SSE9	SSE7	SSE7	SSE6	SSE7	S8	S7	S7	SW12	SW13	SW12	SSW14	SW17	WSW17	WSW14	WSW12	SW9	SW8	SW8	SW9	SW9	SW7	SW7	SSW8.5	SW17
23-Oct	SSW5	SW7	SSW4	SSW5	SSE5	S6	S5	S5	SSW5	SW6	W6	NW5	N6	NNW5	N5	NNE5	NNE4	NE5	NNE5	NNE6	NNE5	NNE5	NNE6	NNE6	NNW0.6	SW7
24-Oct	NE5	NNE5	NNE5	NNE5	NNE6	NNE5	NE4	NNE3	NE4	ENE1	NW2	NNE1	NNW4	NW3	W3	NNW4	NNW3	NNE2	N1	ENE2	NE1	NNW1	NE3	N3	NNE2.6	NNE6
25-Oct	NNE5	NNE5	NE5	NE5	NNE4	NNE5	NE6	NE4	N3	ENE3	E3	SSE2	SSE4	SSE5	S4	SSW4	S4	SSE4	S5	S6	SSE6	SSE7	S6	SSE10	SE2.1	SSE10
26-Oct	SSE12	SSE11	SE10	SE10	SE11	SE14	SE16	SE16	SE17	SE18	SE19	SE19	SE22	SE20	SE19	SE17	SE19	SE19	SE17	SE18	SSE11	SSW8	W11	W7	SE13.5	SE22
27-Oct	WNNW10	WNNW10	WNNW10	W8	WNNW10	WNNW10	WNNW11	WNNW10	WNNW10	NW12	NW12	WNNW8	NW10	NW13	NW14	NW13	NW12	NW15	NW16	NW15	NW13	NW10	NNW10	NNW10	NW10.9	NW16
28-Oct	NNW10	NNW9	NNW7	N6	N4	N2	N2	SE4	SSW6	S7	S7	S8	S7	SSE9	SE9	SE10	SE11	SE13	SE15	SE13	SE16	SE15	SSE14	SSE16	SE5.7	SSE16
29-Oct	SE16	SSE16	SSE16	SSE15	SSE14	SSE13	SSE14	SSE14	SSE14	S12	S12	S10	S10	S9	S11	S11	S9	SSE7	SSE8	SSE6	SSE6	SSE7	S6	S5	SSE10.6	SSE16
30-Oct	S5	SE5	SSE6	SSE6	SSE6	S7	SSE6	S7	S7	S8	S8	SSE8	SSE8	SSE7	SSE7	SSE7	SSE6	SSE6	SSW5	WSW5	W4	N2	N4	N6	S4.6	S8
31-Oct	N8	NNW9	NW8	NW9	NNW8	NW10	NNW9	NNW6	N6	NW6	NW6	NW6	NNW6	N5	NNE6	N5	NNE4	NNE5	NNE5	NNE7	NE6	NNE6	NNE4	NE5	N5.7	NW10

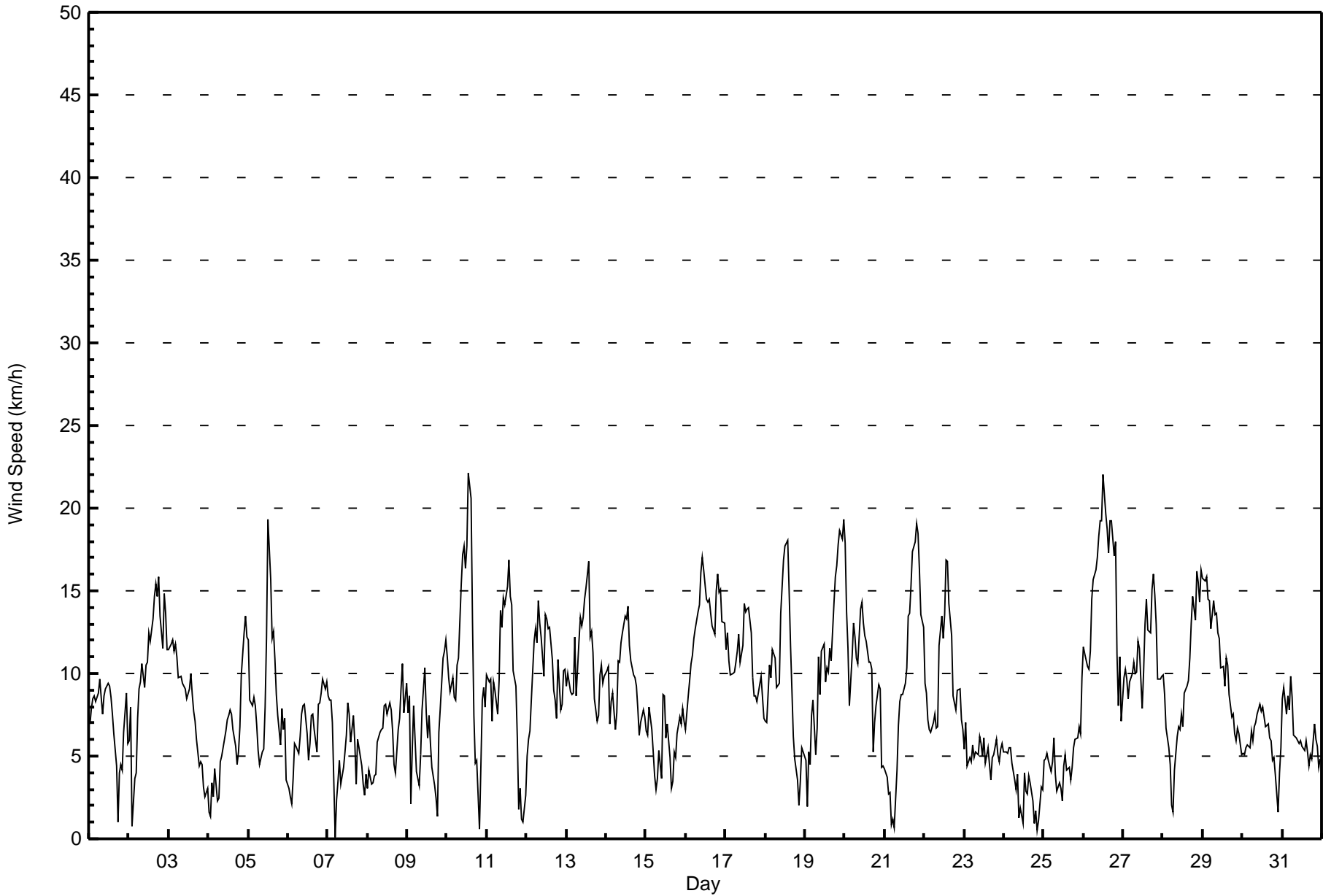
SSE2.7 SSE2.6 SSE2.3 SSE2.5 SSE2.5	S2.1 SSE2.8 SSE3.5	S3.8 SSW4.4 SSW4.8	SW4.8	SW4.1	WSW4.3	WSW3.4	WSW2.5	SW1.6	SSE0.9	SE1.3	SE2.3	SE2.6	SE2.7	SE2.6	SE2.8	Diurnal Average		
SE18 SSE16 SSE16 SSE15 SSE14	SE14	SE16	SE16	SE17	SE18	SE19	SE19	SE22	WSW22	WSW21	SE17	SE19	SE19	SE18	SE19	SE18	SE19	Diurnal Maximum

All monthly, daily, and diurnal averages have been calculated using vector methods



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

**Wind Speed (WS) - km/h**  
**Wapasu - October 2015**





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

**Wind Speed (WS) - km/h**  
**Wapasu - October 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	188	25.27	25.27
6 - 11	376	50.54	75.81
12 - 19	176	23.66	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  
Wapasu - October 2015**

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	22	30	21	12	8	13	15	8	16	9	2	6	3	6	7	10	188
6 - 11	19	15	4	2	1	24	37	65	49	14	45	19	9	16	23	34	376
12 - 19	1	0	0	0	0	7	52	27	7	2	15	13	10	6	21	15	176
20 - 28	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	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>	42	45	25	14	9	44	106	100	72	25	62	40	22	28	51	59	744

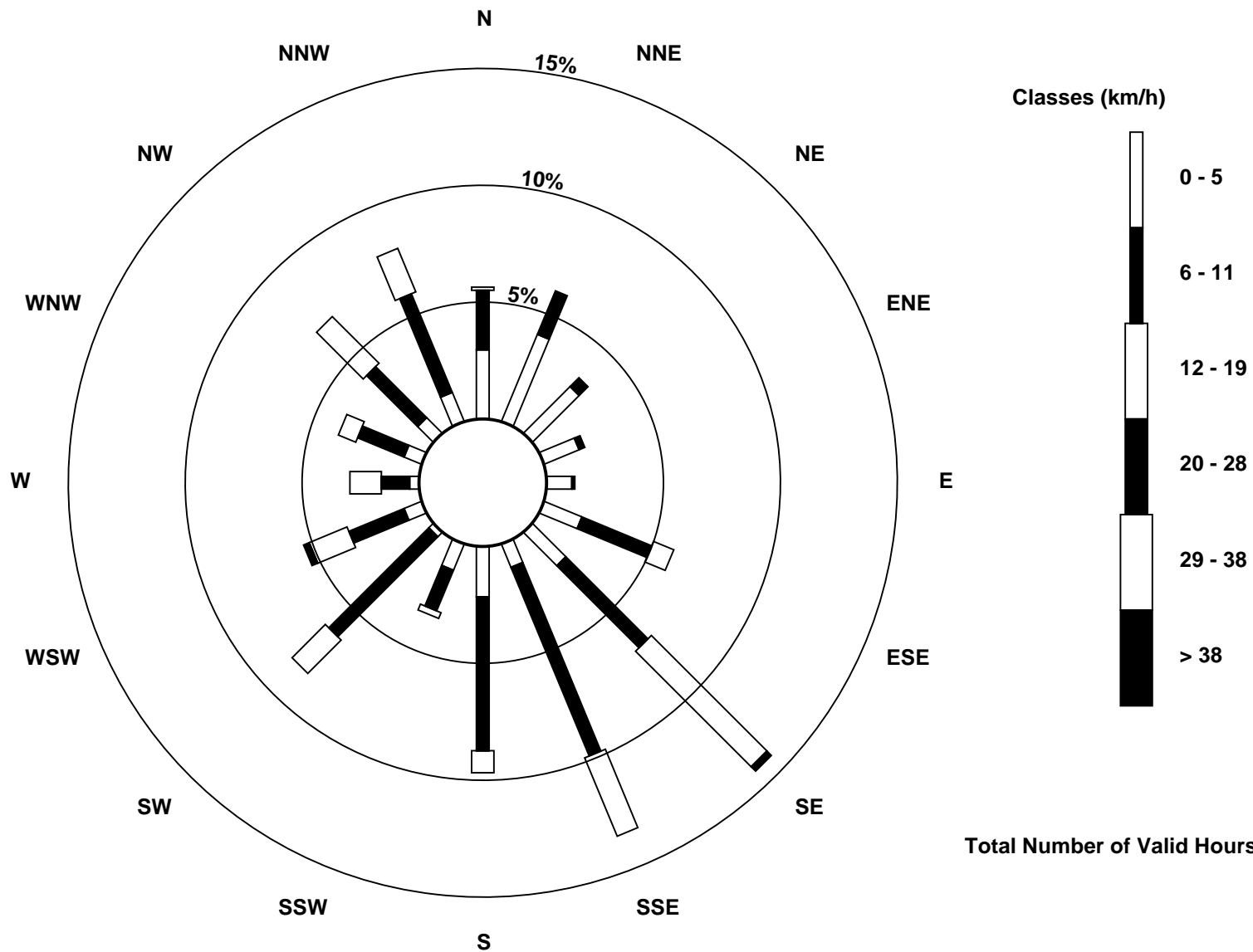
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Wind Speed (WS) - km/h  
Wapasu (AMS 17)







Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Wapasu - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Oct 10 14:00 Minimum Value: 0 km/h on Oct 6 07:00 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> = 6																		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	2	2	2	2	2	2	3	2	3	3	3	3	3	3	2	2	1	1	1	1	2	2	3	3	
2-Oct	3	3	2	1	2	3	3	3	4	3	4	4	5	5	5	6	5	4	5	6	4	5	5	4	
3-Oct	4	4	5	4	4	4	4	4	3	3	3	3	3	3	3	3	2	2	2	1	1	1	1	1	
4-Oct	2	1	1	1	1	1	1	1	2	2	2	2	2	2	3	2	2	1	1	2	3	3	3	3	
5-Oct	3	3	2	2	2	2	2	1	2	2	2	5	6	5	4	4	3	2	2	1	2	2	3	1	
6-Oct	1	1	1	1	1	0	0	2	2	2	3	2	2	3	3	2	2	1	1	1	2	2	1	2	
7-Oct	2	1	2	2	1	1	1	1	1	1	2	2	3	3	2	3	2	1	2	2	1	1	1	1	
8-Oct	1	1	1	0	1	1	1	1	1	2	3	3	3	3	3	2	2	1	1	1	2	2	3	2	
9-Oct	2	2	2	3	3	2	2	2	2	3	3	2	2	2	2	1	1	1	1	2	2	3	3	3	
10-Oct	4	3	3	3	3	3	4	4	5	6	6	5	7	8	7	6	3	1	3	2	3	3	3	3	
11-Oct	3	3	4	3	3	3	3	3	5	4	4	4	5	5	5	4	3	3	2	1	2	1	1	1	
12-Oct	1	1	2	2	4	3	3	4	4	4	3	5	5	5	5	4	3	2	2	4	3	2	3	3	
13-Oct	3	3	3	3	3	3	2	4	4	4	4	4	5	6	4	5	4	3	2	2	3	3	3	3	
14-Oct	3	3	3	3	3	3	3	3	3	4	4	5	4	5	4	4	4	4	3	3	2	2	2	2	
15-Oct	2	1	2	2	1	1	1	1	1	2	3	3	3	2	2	2	1	1	1	1	1	2	2	2	
16-Oct	1	2	2	2	3	3	3	3	4	5	5	5	5	5	4	4	4	3	3	4	4	4	3	3	
17-Oct	3	4	3	3	3	3	3	3	4	4	4	5	5	5	5	4	3	2	2	2	3	3	3	2	
18-Oct	2	2	3	3	3	3	3	3	3	4	5	5	6	6	5	4	3	2	2	1	1	2	1	2	
19-Oct	1	1	1	1	2	2	2	3	4	3	4	4	3	4	3	3	3	4	4	4	5	5	5	5	
20-Oct	5	5	4	3	4	4	4	3	3	4	4	4	4	4	3	3	3	1	2	3	4	4	2	1	
21-Oct	1	1	1	1	1	1	1	1	2	2	2	3	3	3	4	4	4	5	5	5	5	5	4	4	
22-Oct	3	3	2	2	1	1	2	2	2	4	4	4	5	6	6	4	4	3	2	2	3	3	2	2	
23-Oct	2	2	1	1	1	1	1	1	2	2	2	2	2	2	2	2	1	1	2	2	2	1	2	2	
24-Oct	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	
25-Oct	2	2	2	2	2	2	2	1	1	1	1	1	2	2	2	2	1	1	2	2	2	2	3	3	
26-Oct	4	4	3	3	3	4	4	4	4	5	5	5	6	5	5	5	5	5	4	5	5	4	4	4	
27-Oct	3	3	3	3	3	3	3	3	2	5	3	2	2	4	4	3	4	4	5	4	4	4	4	4	
28-Oct	3	4	2	2	2	1	1	2	2	2	2	3	2	3	3	3	3	4	3	4	5	4	5	5	
29-Oct	5	5	5	5	5	5	4	4	4	4	4	4	4	3	4	3	3	2	2	2	1	1	2	1	
30-Oct	2	2	1	1	1	2	1	2	2	2	3	2	2	2	2	2	2	2	1	1	1	1	1	2	
31-Oct	3	3	2	2	2	3	3	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	1	1	
																		Diurnal Maximum							



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg**

**Wapasu - October 2015**

Direction of Maximum Speed: 247 deg on Oct 10 14:00															Hours in Service: 744	
Direction of Maximum Daily Speed Average: 138.9 deg on Oct 26															Hours of Data: 744	
Direction of Minimum Speed: 123 deg on Oct 7 05:00															Hours of Missing Data: 0	
Direction of Minimum Daily Speed Average: 0.6 deg on Oct 15															Percent Operational Time: 100.0	
Monthly Average Direction: 245.5 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	176	158	157	154	157	160	159	162	170	175	185	196	210	221	239	232	195	125	111	108	112	121	135	169	170.5
2-Oct	170	158	40	34	16	11	39	36	28	355	352	359	345	341	331	342	328	330	332	343	340	336	344	347	349.5
3-Oct	348	345	343	345	349	338	347	349	357	356	1	342	337	337	343	348	338	352	357	2	16	56	50	73	350.2
4-Oct	11	33	44	341	103	56	117	149	159	171	173	218	234	241	235	212	216	169	139	145	149	148	144	146	167.6
5-Oct	147	152	156	163	166	168	170	184	191	250	261	266	304	317	315	317	309	315	306	301	305	329	351	350	279.7
6-Oct	339	352	144	132	137	137	145	144	138	149	169	175	182	198	178	161	163	129	121	123	129	132	126	125	144.5
7-Oct	124	123	127	131	123	66	130	137	171	217	239	248	270	270	270	252	226	258	318	7	48	79	100	62	190.3
8-Oct	89	81	109	113	124	130	145	140	144	166	190	180	182	201	197	194	171	113	117	117	122	128	136	139	147.8
9-Oct	139	124	178	123	133	234	137	199	238	182	224	244	293	312	351	18	41	60	111	135	147	144	148	151	161.2
10-Oct	160	162	170	177	176	189	212	214	225	233	235	230	228	247	249	271	299	258	297	98	338	347	33	26	229.9
11-Oct	24	26	20	23	27	15	354	347	333	329	323	318	323	319	317	321	317	320	325	320	358	292	174	149	338.9
12-Oct	139	134	144	151	150	147	146	146	152	155	166	162	180	198	219	212	227	256	239	254	253	231	222	224	184.7
13-Oct	224	225	215	212	212	223	217	226	229	241	240	242	232	249	275	262	243	252	244	228	221	223	219	218	233.6
14-Oct	216	223	215	207	231	246	219	237	241	255	266	284	298	311	324	338	348	351	348	349	343	323	310	311	284.0
15-Oct	314	321	322	332	325	344	40	78	106	184	231	237	238	278	281	309	17	81	90	97	105	105	105	109	7.9
16-Oct	111	114	124	123	125	125	133	136	136	138	140	138	147	145	137	140	135	123	122	128	133	137	142	142	133.5
17-Oct	148	153	157	154	154	152	159	160	164	167	168	175	178	185	176	175	190	177	177	166	164	176	173	169	167.5
18-Oct	175	185	219	222	235	239	234	233	234	240	246	266	280	277	290	283	280	283	288	289	128	353	33	36	256.0
19-Oct	46	47	36	60	71	73	91	111	108	104	115	118	117	123	119	133	127	122	117	121	124	124	130	136	114.7
20-Oct	141	151	157	186	230	251	256	246	228	231	242	259	277	299	302	302	304	302	314	348	350	343	351	345	260.3
21-Oct	311	354	43	61	265	5	11	139	129	142	145	148	138	141	133	134	132	132	135	138	143	145	149	153	137.5
22-Oct	164	161	166	167	162	160	169	177	187	214	228	218	212	223	244	249	248	235	225	223	229	229	220	234	212.8
23-Oct	212	217	199	196	163	174	180	174	192	229	279	309	355	345	357	31	13	38	15	30	15	27	23	20	331.9
24-Oct	34	19	29	19	15	18	39	33	43	63	305	30	340	312	262	335	340	15	11	77	55	335	40	4	12.8
25-Oct	27	28	35	37	19	23	46	40	4	60	95	161	162	147	183	196	177	164	171	169	163	167	176	160	126.5
26-Oct	149	148	140	133	134	137	132	132	134	135	129	131	130	131	131	138	133	131	139	144	163	202	276	281	138.9
27-Oct	293	292	288	281	287	286	293	289	295	305	317	301	315	320	326	318	325	320	321	320	324	324	332	329	310.2
28-Oct	334	339	330	2	8	0	353	136	193	184	176	173	174	149	145	141	137	131	131	141	143	144	150	147	144.0
29-Oct	145	148	147	153	154	159	151	157	160	169	174	179	187	178	178	181	169	157	164	165	167	154	178	178	162.5
30-Oct	186	144	166	163	157	169	147	169	169	169	180	159	167	162	165	164	168	167	195	242	260	0	7	359	169.4
31-Oct	1	336	326	320	330	326	331	348	357	326	322	318	348	357	12	11	25	30	31	32	39	26	14	35	352.6

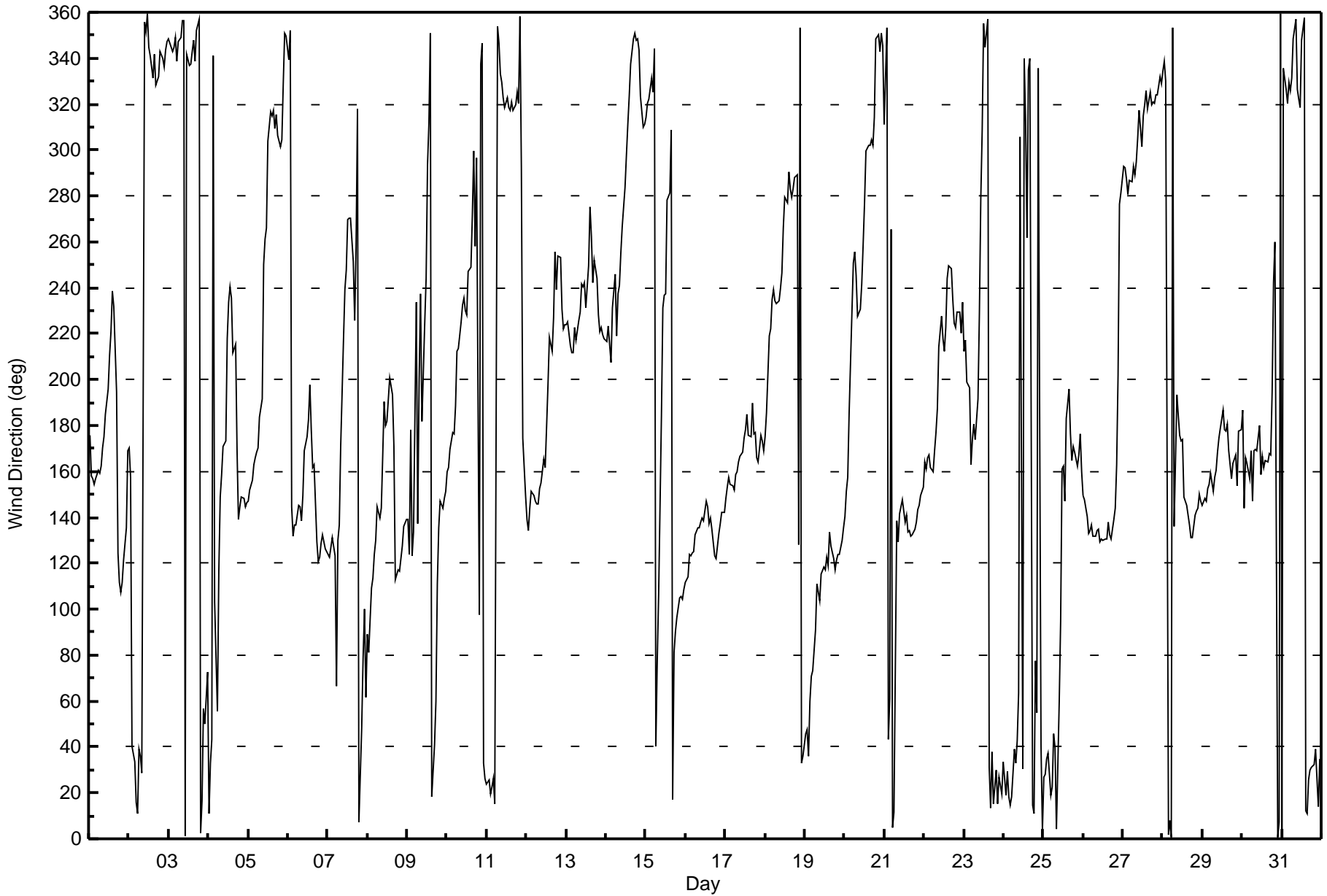
148.3 148.7 153.3 153.7 157.6 171.4 161.6 166.8 176.0 196.8 212.1 217.2 233.8 246.4 248.8 243.2 227.7 147.1 135.7 130.7 137.7 142.2 139.3 141.2  
Diurnal Average

All monthly, daily, and diurnal averages have been calculated using vector methods



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

**Wind Direction (WD) - deg**  
**Wapasu - October 2015**





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Wapasu - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 93 deg on Oct 7 05:00 Minimum Value: 5 deg on Oct 6 05:00 Percentiles: P <sub>1</sub> = 10 P <sub>10</sub> = 19 Q <sub>1</sub> = 22 Median = 27 Q <sub>3</sub> = 34 P <sub>90</sub> = 40 P <sub>99</sub> = 79																			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	31	24	23	22	21	25	24	28	31	32	33	38	36	35	36	40	35	63	15	8	14	11	18	38	63
2-Oct	34	26	88	33	35	42	28	28	34	38	39	38	37	36	31	35	29	26	30	36	32	30	37	34	88
3-Oct	37	35	33	35	35	32	35	35	36	38	38	35	33	32	35	34	33	34	37	33	29	20	26	34	38
4-Oct	56	71	30	56	19	60	39	33	35	40	33	32	33	32	35	36	35	23	15	17	23	23	20	21	71
5-Oct	21	31	26	26	28	28	25	30	33	37	32	30	26	23	24	24	20	20	21	23	21	34	32	31	37
6-Oct	25	79	21	15	5	6	6	15	21	28	38	45	62	60	39	32	28	20	14	14	14	15	12	13	79
7-Oct	15	14	15	15	93	42	16	7	46	38	38	35	34	40	41	33	27	26	21	27	10	15	21	22	93
8-Oct	35	8	22	24	22	17	12	14	18	30	34	34	37	35	43	39	29	13	14	14	14	16	22	21	43
9-Oct	23	17	67	14	40	39	41	53	47	37	28	34	33	24	38	34	26	16	67	24	20	19	22	24	67
10-Oct	30	27	33	32	32	33	31	31	24	24	25	25	28	26	27	38	25	27	32	92	76	33	30	28	92
11-Oct	31	32	32	37	31	34	38	37	29	28	23	23	26	23	24	22	22	22	25	65	42	71	65	37	71
12-Oct	10	14	17	26	24	22	22	22	25	28	31	31	39	35	33	34	26	24	22	26	29	25	23	26	39
13-Oct	25	26	29	33	34	26	29	26	23	23	25	24	27	30	28	25	25	26	23	21	26	25	31	26	34
14-Oct	29	27	30	34	32	44	28	19	22	26	27	25	26	27	34	35	36	36	36	34	32	25	23	23	44
15-Oct	20	21	22	31	26	41	46	30	22	61	26	34	53	43	50	61	36	14	21	16	15	13	16	15	61
16-Oct	14	16	16	15	16	16	17	18	20	20	22	24	27	27	22	23	17	17	17	18	19	19	20	20	27
17-Oct	24	25	28	24	25	24	26	27	28	31	31	33	36	36	34	33	32	28	30	25	25	31	30	29	36
18-Oct	32	33	29	27	23	21	21	23	24	22	29	26	28	27	27	26	25	27	27	31	46	62	19	27	62
19-Oct	23	66	29	20	21	24	37	27	26	29	25	25	25	22	22	23	21	20	19	18	18	19	19	19	66
20-Oct	20	28	27	36	25	25	26	24	24	24	23	25	27	24	25	22	20	21	23	37	38	39	40	38	40
21-Oct	27	41	42	63	79	80	84	26	25	26	29	30	28	24	21	20	20	19	19	20	21	22	24	24	84
22-Oct	34	28	30	25	17	19	22	32	34	31	27	31	34	27	27	24	23	23	21	22	23	23	25	27	34
23-Oct	25	23	32	28	21	21	25	22	34	28	39	38	41	44	36	32	30	26	34	28	37	33	42	34	44
24-Oct	29	37	33	33	37	36	23	32	30	68	62	91	37	53	51	35	28	44	70	23	74	48	27	38	91
25-Oct	34	30	28	28	35	34	21	25	43	37	36	55	41	35	43	40	34	23	26	29	27	29	32	29	55
26-Oct	23	23	20	19	19	19	18	19	18	19	19	19	19	20	20	21	18	18	21	22	38	43	27	23	43
27-Oct	24	23	25	26	25	26	23	24	23	22	21	21	20	21	24	21	23	24	23	22	26	29	27	29	29
28-Oct	32	35	30	36	43	63	81	50	35	38	36	37	34	26	25	21	18	16	17	20	20	22	24	23	81
29-Oct	24	25	23	28	27	32	24	27	30	31	31	35	36	34	31	31	30	24	25	22	22	15	30	26	36
30-Oct	28	18	19	26	19	22	16	25	28	28	35	25	27	26	33	23	26	26	36	19	31	61	27	28	61
31-Oct	32	28	25	21	27	24	25	40	35	31	28	22	35	42	36	37	33	32	31	29	27	30	34	33	42
Diurnal Maximum																									



# Wood Buffalo Environmental Association

## SO2 Calibration Report

### Station Information

Calibration Date	October 14, 2015	Last Calibration	September 18, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	14:45
Gas Cert Reference	SA130010A	Station temp.	22 Deg C
Cal Gas Concentration	47.8 ppm	Cal Gas Exp Date	12/12/2016
Calibrator Make/Model	API T700	Serial Number	493
ZAG Make/Model	API 701	Serial Number	4427
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6894

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-702	-702
Analyzer IP address	192.168.1.43		Lamp voltage	861	864
Calculated slope	0.993613	0.992073	Chamber temp	44.9	44.9
Calculated intercept	1.470468	0.905252	Pressure	692.8	687.4
Analyzer Background	8.9	9.0	Flow	0.455	0.451
Analyzer Coefficient	0.853	0.853	Intensity	82	82

Analyzer make Thermo 43i Analyzer serial # 1218153459

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.3	----
as found span	5000	60.4	577.4	573.9	1.006
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	60.4	577.4	581.5	0.993
second point	5000	30.2	288.7	289.8	0.996
third point	5000	15.2	145.3	144.7	1.004
as left zero	5000	0.0	0.0	-0.1	----
as left span	5000	60.4	577.4	579.5	0.996
Average Correction Factor					0.998

Corrected As found 574.2 Previous response 579.7 % change 0.9%

**Notes:**

Filter changed after as founds. No adjustments made.

Calibration Performed By: Devin Russell



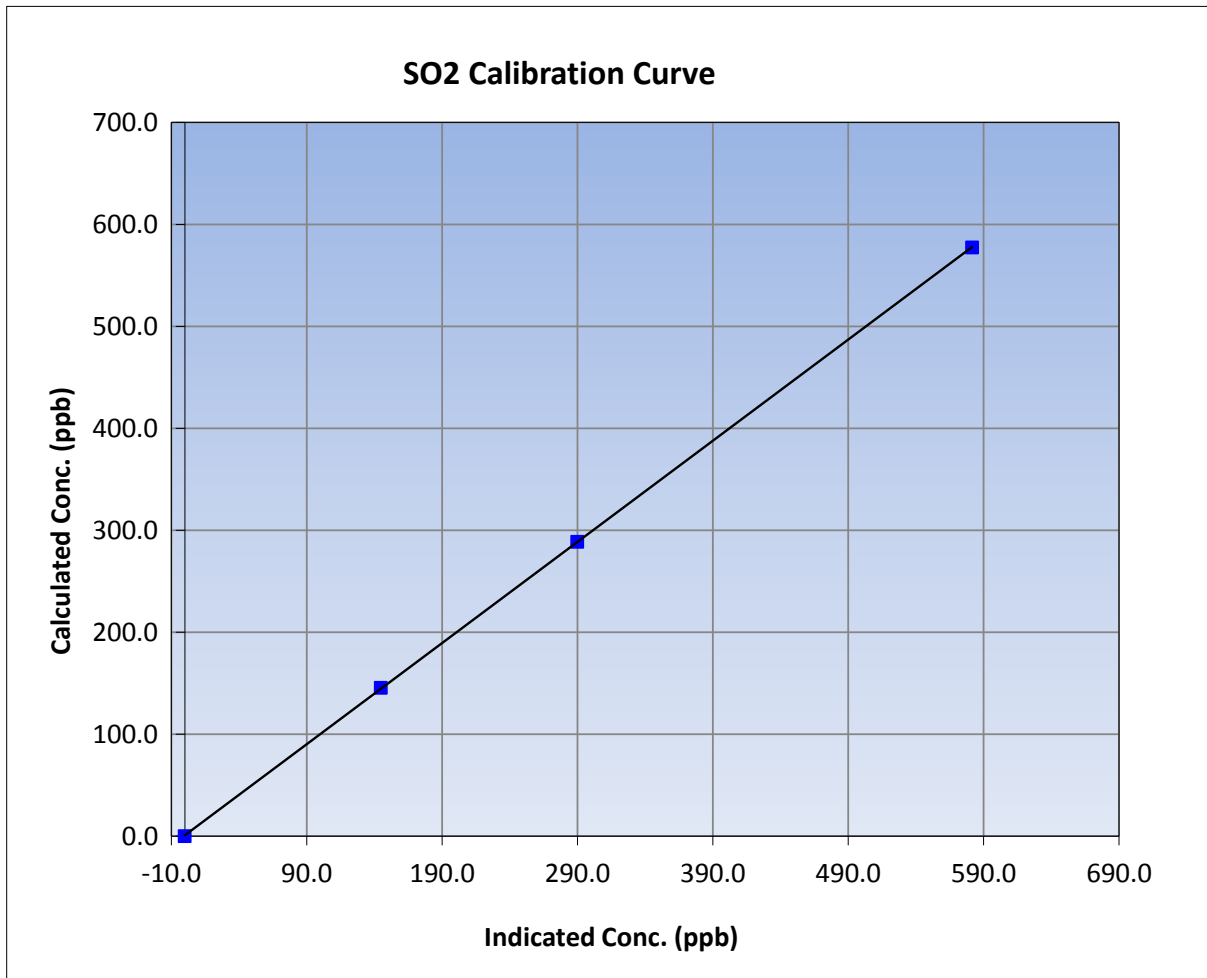
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	October 14, 2015	Previous Calibration	September 18, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	10:00	End Time (MST)	14:45
Analyzer make	Thermo 43i	Analyzer serial #	1218153459

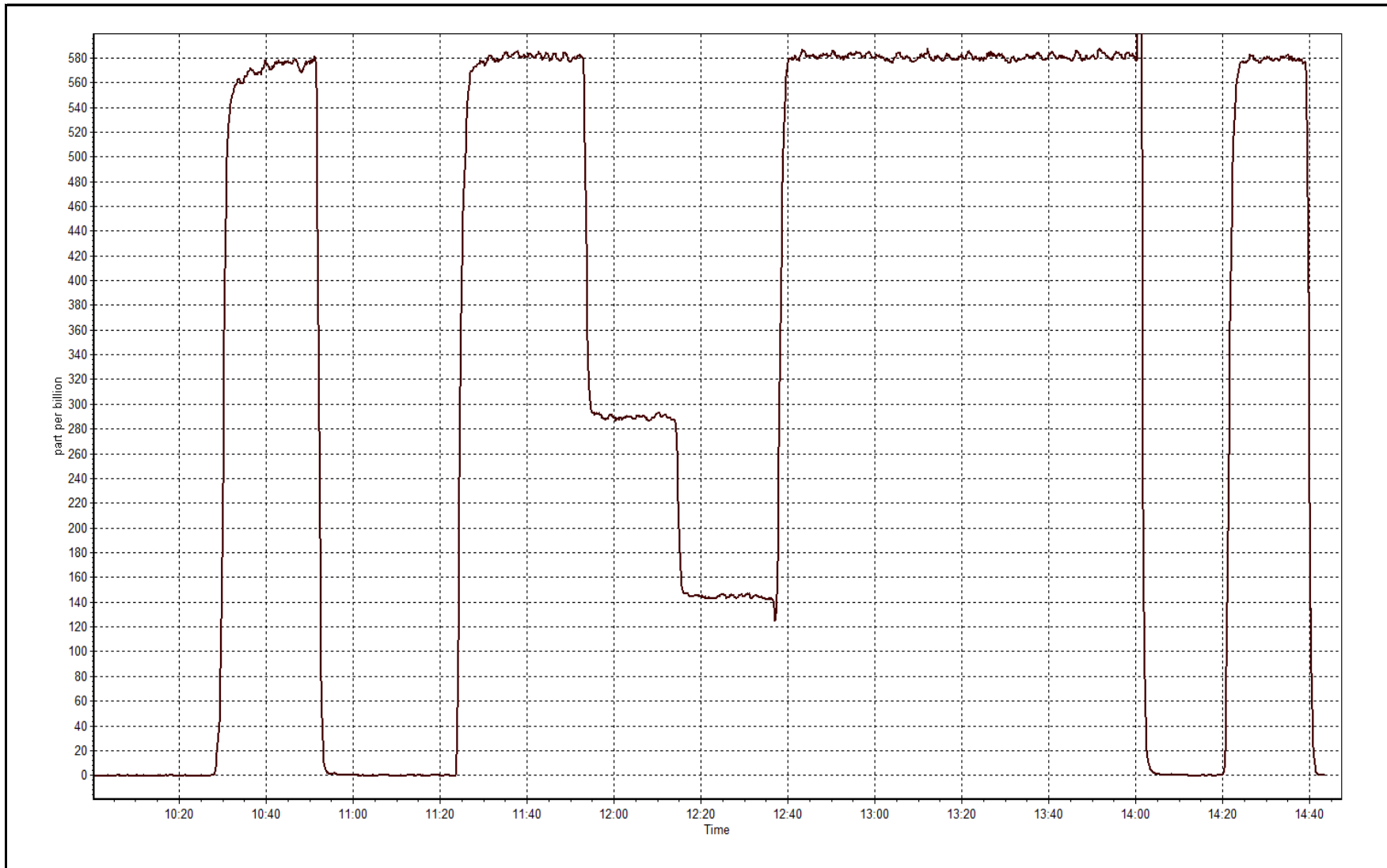
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999991
577.4	581.5	0.9930		
288.7	289.8	0.9961	Slope	0.992073
145.3	144.7	1.0043		
			Intercept	0.905252



SO2 Calibration Plot

Date: October 14, 2015





# Wood Buffalo Environmental Association H2S Calibration Report

## Station Information

Calibration Date	October 23, 2015	Last Calibration	September 18, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	9:30	End Time (MST)	13:25
Gas Cert Reference	CC107167	Station temp.	21 Deg C
Cal Gas Concentration	5.1 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	API T700	Serial Number	997
ZAG air Make/Model	API 701	Serial Number	4227
DACS make/model	Campbell Scientific CR3000	Serial Number	6894
SO2 gas concentration	47.8 ppm	SO2 gas cert/exp	SA130010A 12-Dec-16

## Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-651	-651
Analyzer IP address	192.168.1.45		Lamp voltage	794	799
Calculated slope	0.988418	1.002700	Chamber temp	45	45
Calculated intercept	-0.026334	-0.215420	Pressure	551.3	552.2
Analyzer Background	14.7	14.3	Flow	0.931	0.945
Analyzer Coefficient	1.191	1.222	Intensity	113	113
			Converter temp.	342	340

Analyzer make/model	Thermo 450i	Analyzer serial #	1218153583
Converter make/model		Converter serial #	

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	----
as found span	5000	78.4	80.0	80.2	0.997
SO2 scrubber check	5000	20.9	199.8	1.7	----
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	78.4	80.0	80.0	1.000
second point	5000	39.3	40.1	40.1	0.999
third point	5000	19.7	20.1	20.3	0.988
as left zero	5000	0.0	0.0	0.6	----
as left span	5000	78.5	80.1	79.5	1.007
Average Correction Factor					0.996

Corrected As found	80.3	Previous response	80.9	% change	0.8%
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**Notes:**

Sample inlet filter replaced and scrubber check done after as founds. Updated firmware version to 02.02.00.289 after as founds. Zero dropped a bit after updating the fireware. Adjusted both zero and span.

Calibration Performed By: Asad Hidayat





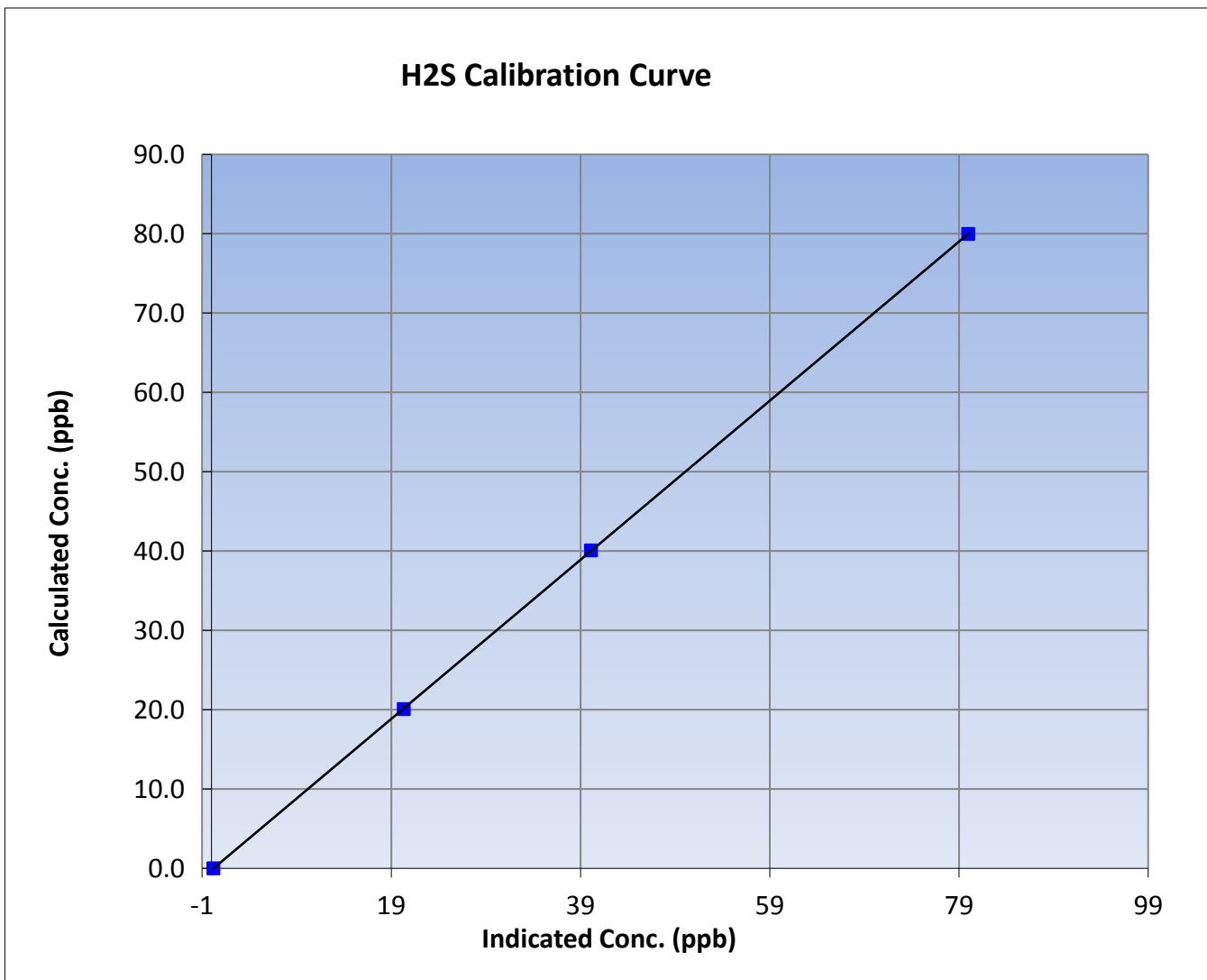
# Wood Buffalo Environmental Association H2S Calibration Report

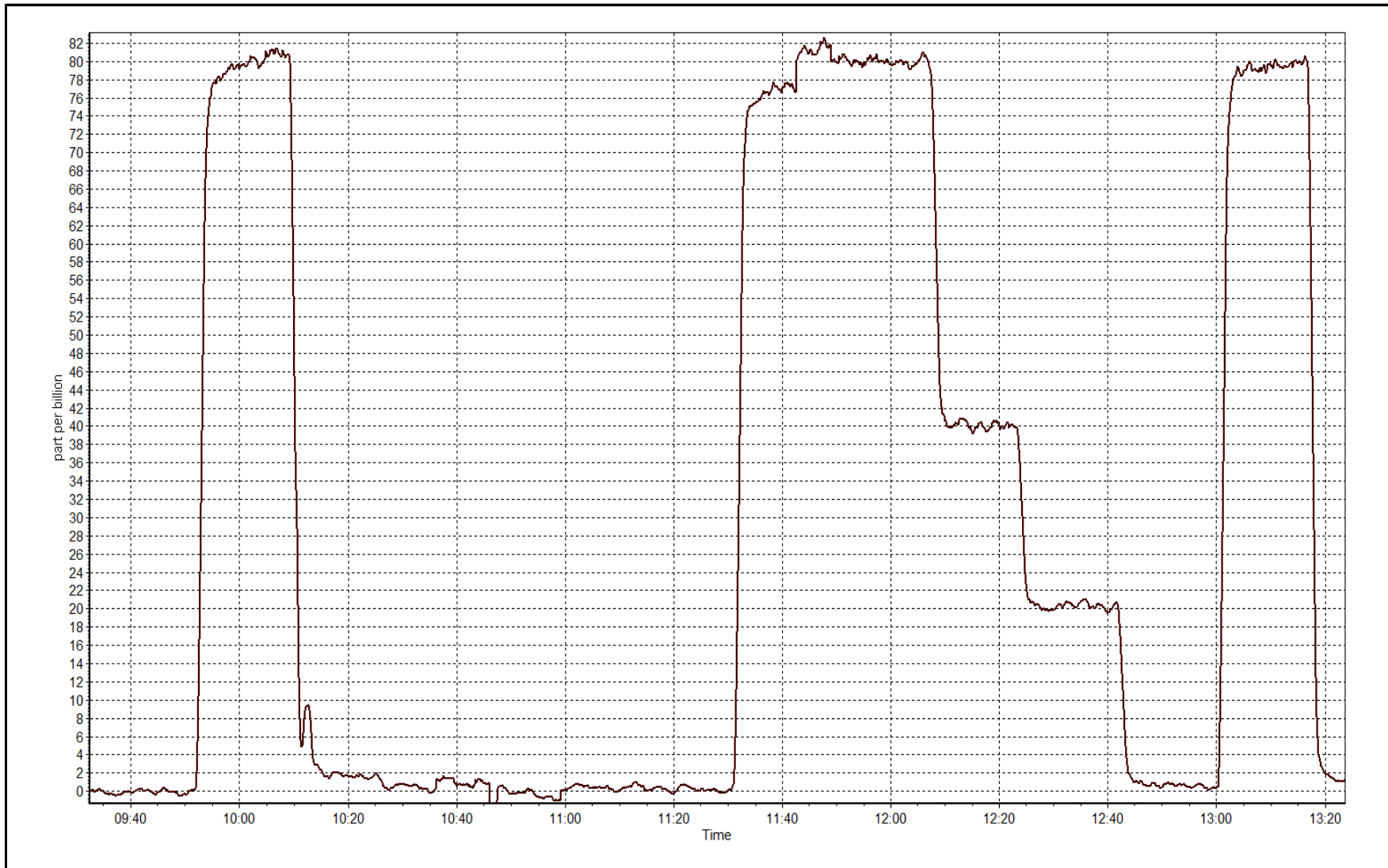
## Station Information

Calibration Date	October 23, 2015	Previous Calibration	September 18, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	9:30	End Time (MST)	13:25
Analyzer make	Thermo 450i	Analyzer serial #	1218153583

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999996
80.0	80.0	0.9997		
40.1	40.1	0.9994	Slope	1.002700
20.1	20.3	0.9884		
			Intercept	-0.215420







# Wood Buffalo Environmental Association THC Calibration Report

### Station Information

Calibration Date	October-14-15	Last Calibration	September-18-15
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	14:45
Gas Cert Reference	SA130010A	Cal Gas Expiry Date	12/12/2016
CH4 Cal Gas Conc.	512 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	493
ZAG make/model	Teledyne API 701	Serial Number	4427
DACS make/model	Campbell Scientific CR3000	Serial Number	6894

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.5	8.5
Analyzer IP address	192.168.1.51		Air or Bypass Press	40.1	39.0
Calculated slope	1.001602	0.997010	Fuel Pressure	24.8	24.8
Calculated intercept	-0.011255	-0.027088	Analyzer Coeff	4.3	4.3
			Analyzer BKG	2.650	2.730

Analyzer make Thermo 51i-LT      Analyzer serial # 1218153352

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.07	----
as found span	5000	60.4	13.19	13.31	0.991
calibrator zero	5000	0.0	0.00	0.01	----
high point	5000	60.4	13.19	13.25	0.996
second point	5000	30.2	6.60	6.66	0.991
third point	5000	15.2	3.32	3.37	0.985
as left zero	5000	0.0	0.00	0.03	----
as left span	5000	60.4	13.19	13.19	1.000
Average Correction Factor					0.991

Corrected As found    13.24      Previous response    13.18      % change    -0.4%

**Notes:**

Filter changed after as founds. Zero and span adjusted.

Calibration Performed By:

Devin Russell



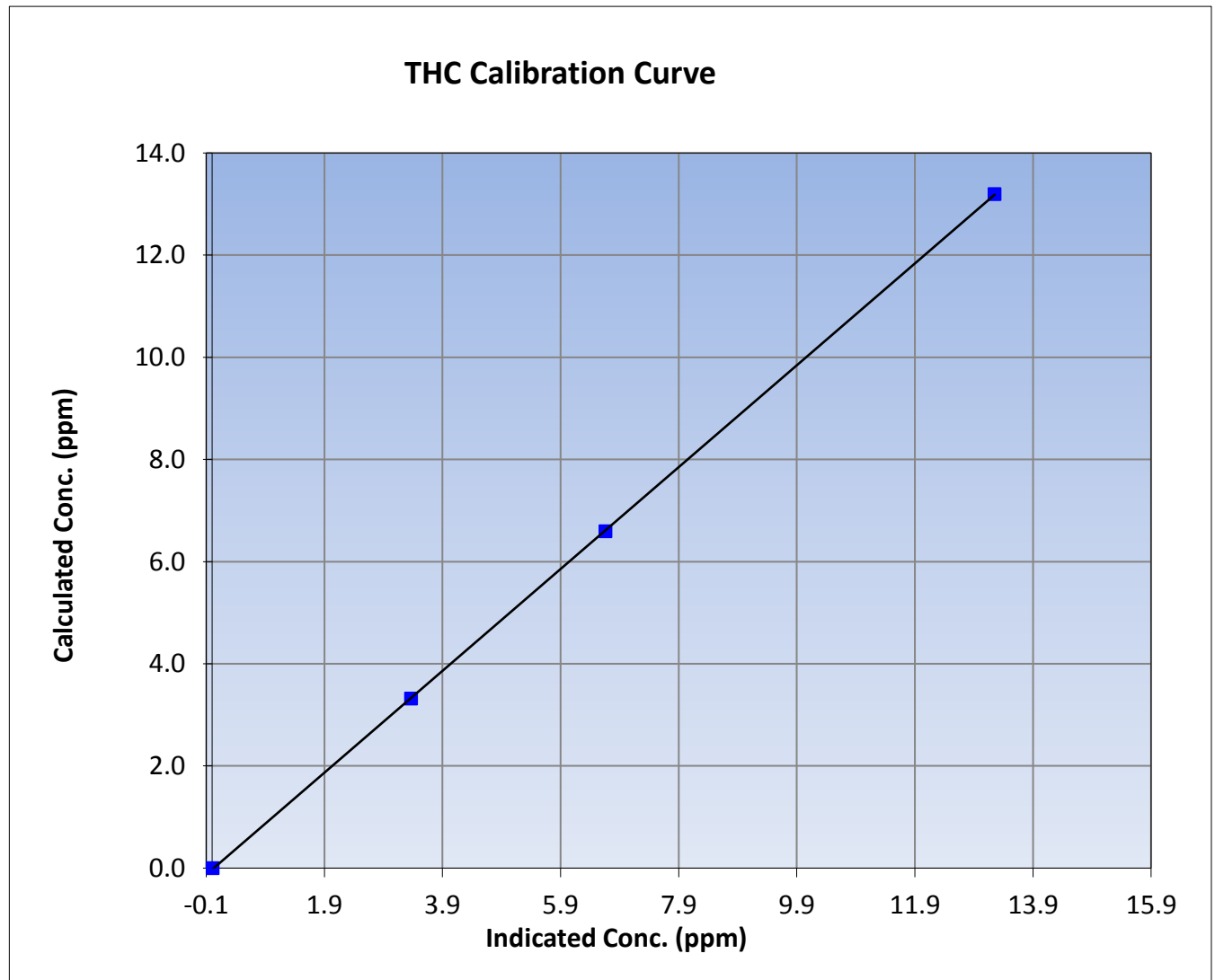
# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	October 14, 2015	Previous Calibration	September 18, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	10:00	End Time (MST)	14:45
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153352

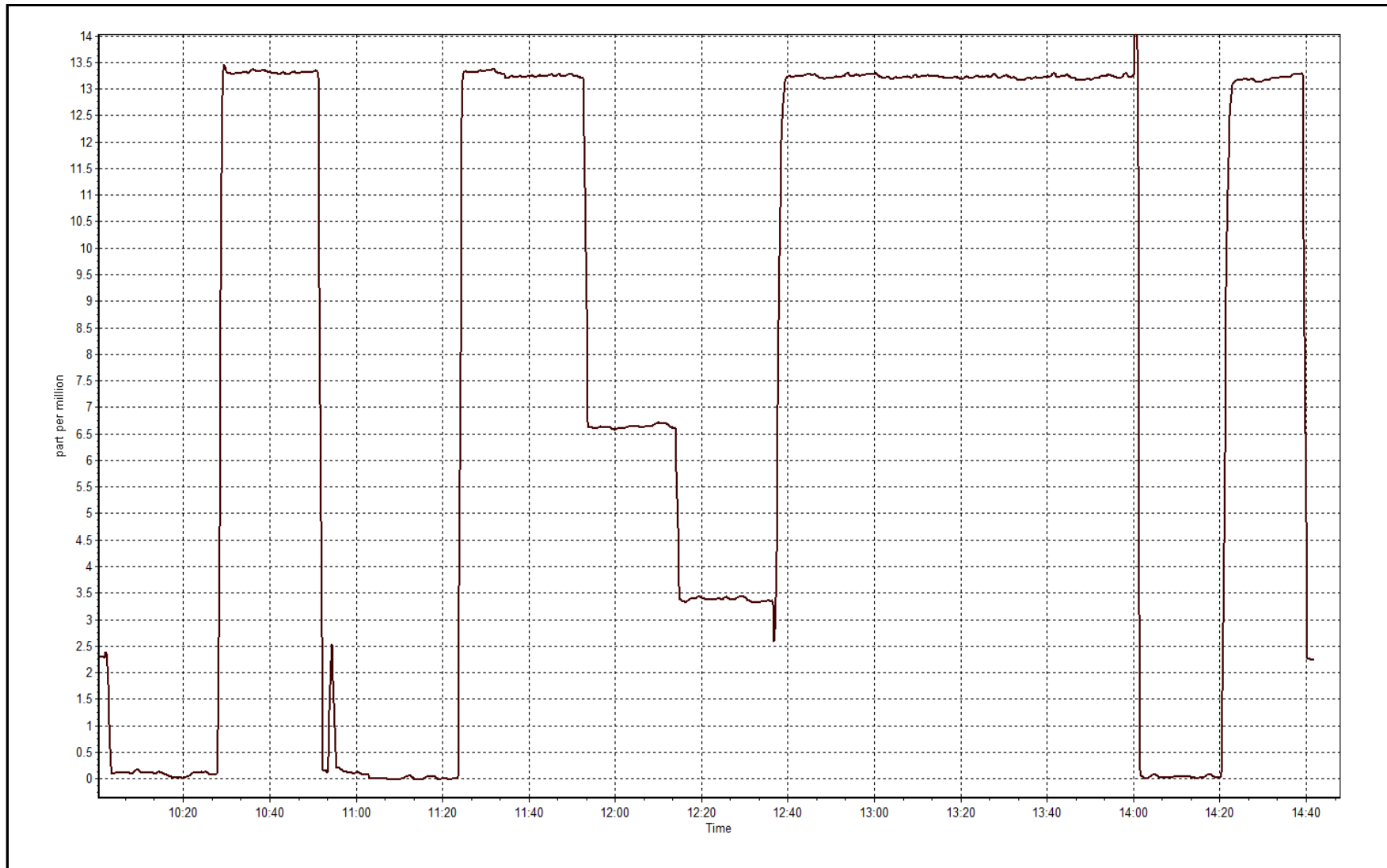
## Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	----	Correlation Coefficient	0.999991
13.19	13.25	0.9958		
6.60	6.66	0.9906	Slope	0.997010
3.32	3.37	0.9853		
			Intercept	-0.027088



THC Calibration Plot

Date: October 14, 2015





# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 15, 2015	Previous Calibration	September 10, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	13:00
NO2 GPT Ref date	October-14-15	Transfer Standard	23
		Station temp.	23 Deg C
Calibrator Make/Model	Teledyne API 700	Serial Number	997
ZAG make/model	Teledyne API 701	Serial Number	4427
DACS make/model	Campbell Scientific CR3000	Serial Number	6894

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	27.0	28.3
Analyzer IP address	192.168.1.49		Lamp temp.	58.0	58.0
Calculated slope	0.994970	1.000358	Pressure	26.0	26.0
Calculated intercept	-0.106231	-0.324740	Flow cell A	737.000	748.000
Analyzer Background	4.9	6.6	Flow cell B	722.000	726.000
Analyzer Coefficient	0.913	0.991	Cell A Intensity		
			Cell B Intensity		

Analyzer make	Teledyne API T400	Analyzer serial #	824
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### Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	193.1/800	0.0	1.1	----
as found span	5000	713.6/1082.0	385.5	355.7	1.084
calibrator zero	5000	193.1/800	0.0	0.3	----
high point	5000	713.6/1082.0	385.5	385.6	1.000
second point	5000	496.5/973.6	259.8	260.3	0.998
third point	5000	260.3/849.3	133.6	133.8	0.999
as left zero	5000	193.1/800	0.0	0.5	----
as left span	5000	713.9/1083.6	385.5	386.0	0.999
Average Correction Factor					0.999

Corrected As found	354.6	Previous response	387.6	% change	9.3%
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**Notes:**

Filter changed after as founds. As found span was around 8% low. High point last calibration was adjusted 5% down. MFC calibration was completed after September Nox calibration. Nox high point adjusted 4% up during yesterdays calibration. Zero

Calibration Performed By:

Devin Russell



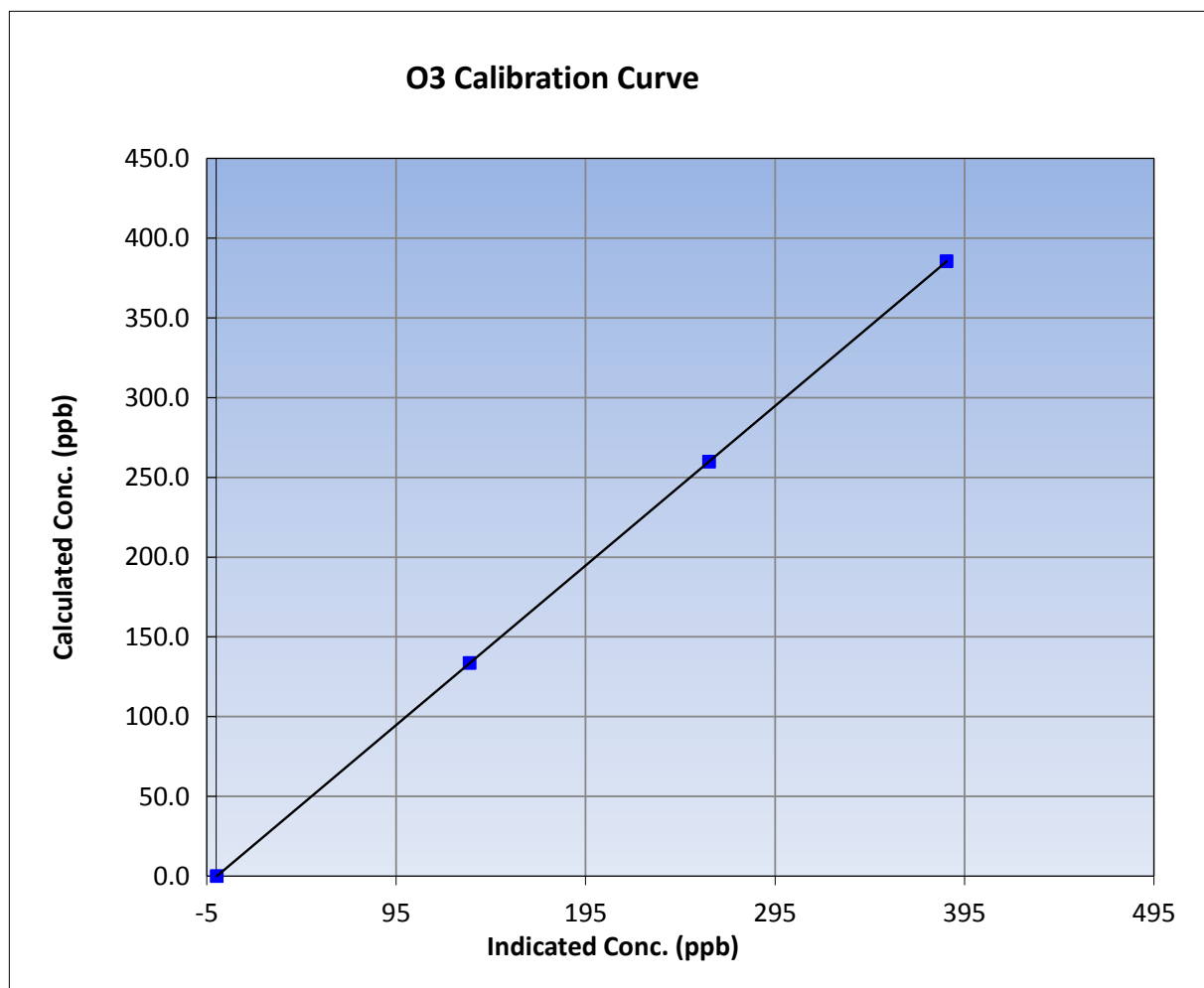
## Wood Buffalo Environmental Association O3 Calibration Report

### Station Information

Calibration Date	October-15-15	Previous Calibration	September 10, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	10:00	End Time (MST)	13:00
Analyzer make	Teledyne API T400	Analyzer serial #	824

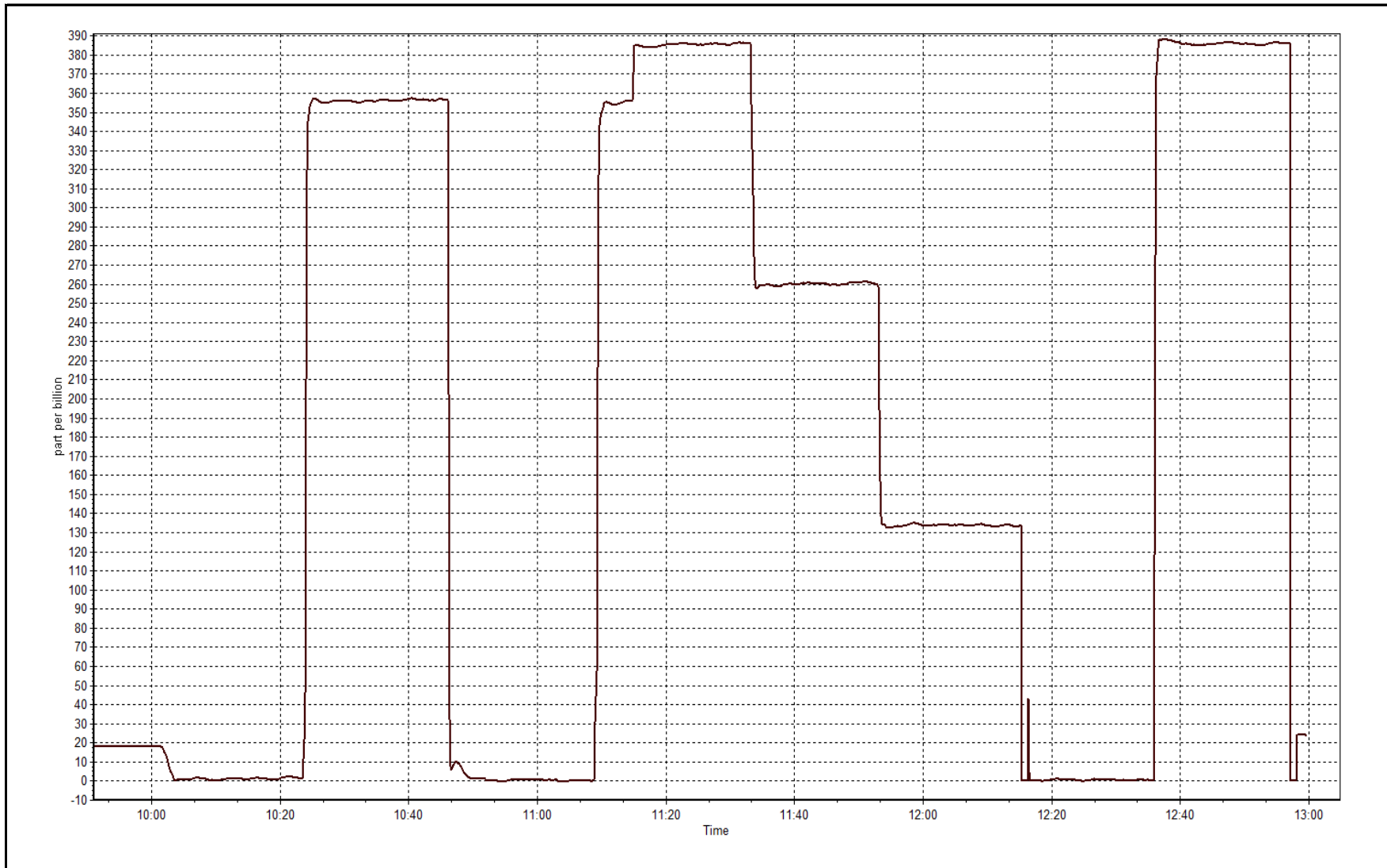
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999999
385.5	385.6	0.9998		
259.8	260.3	0.9983	Slope	1.000358
133.6	133.8	0.9988		
			Intercept	-0.324740



O3 Calibration Plot

Date: October 15, 2015







# Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

## Station Information

Calibration Date	October 14, 2015	Previous Calibration	September 9, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	14:45
NO Cal Gas Conc	49.7 ppm	Gas Cert Reference	SA130010A
NOx Cal Gas Conc	49.7 ppm	Cal Gas Expiry Date	12/1216
Calibrator	API T700	Serial Number	997
Zero air Generator	Teledyne API T701	Serial Number	4427

## DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	6894
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## Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.997652	0.995700	1.000398
	Data Offset	0.892136	1.287719	0.374388
Current Calibration	Data Slope	0.997261	0.996999	1.001777
	Data Offset	2.710259	2.661461	0.500424

## Analyzer Information

Analyzer make/model	API T200	Analyzer serial #	833
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.913		0.952	
NOx coefficient	0.911		0.950	
NO2 coefficient	1.000		1.000	
NO bkgrnd	0.6		0.6	
NOx bkgrnd	1.1		1.1	
Chamber Temp	50	Deg C	50	Deg C
Moly Temp	316.4	Deg C	314.5	Deg C
PMT voltage	781	V	781	V
PMT Temp	7	Deg C	7	Deg C
O3 flow	71	ccm	71	ccm
R Cell press NO	4.5	mmHg	4.6	mmHg
R Cell Press Nox	4.5	mmHg	4.6	mmHg
NO sample flow	0.444	lpm	0.443	lpm
Nox sample Flow	0.444	lpm	0.443	lpm

**Notes:**

As found span was around 4% out. Calibrator MFC was calibrated on September 10. Filter changed after as founds. Span adjusted.



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date: October 14, 2015 Station Number: AMS 17

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.1	-0.1	----	----
as found span	5000	60.4	600.4	600.4	0.0	577.7	576.6	1.1	1.0392	1.0413
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.2	-0.2	----	----
high point	5000	60.4	600.4	600.4	0.0	600.5	600.7	-0.2	0.9999	0.9994
second point	5000	30.2	300.2	300.2	0.0	297.1	297.1	0.0	1.0104	1.0103
third point	5000	15.2	151.1	151.1	0.0	146.5	146.5	0.0	1.0315	1.0314
as left zero	5000	0.0	0.0	0.0	0.0	0.0	-0.2	0.2	----	----
as left span	5000	60.4	600.4	212.6	387.8	594.2	210.6	383.6	1.0104	1.0094
Average Correction Factor									1.0139	1.0137

Corrected As found NO<sub>x</sub>= 578.0 NO= 576.7 Percent Change NO<sub>x</sub>= 4.0% NO= 4.3%  
 Previous Response NO<sub>x</sub>= 600.9 NO= 601.7

### GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 60.40 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			-0.2			N/A	
1st NO2 (300)	----	212.6	385.5	597.1	212.6	384.5	0.9936	1.0000	1.0026	99.7%
2nd NO2 (200)	----	338.3	259.8	597.1	338.3	258.8	0.9936	1.0000	1.0038	99.6%
3rd NO2 (100)	----	464.4	133.6	596.9	464.4	132.4	0.9938	1.0000	1.0094	99.1%
4th NO2 (0)	598.0	----	0.0	598.1	598.0	0.0	0.9919	1.0000	N/A	----
Average Correction Factor							0.9932	1.0000	1.0053	99.5%

Calibration Performed By: Devin Russell



# Wood Buffalo Environmental Association

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

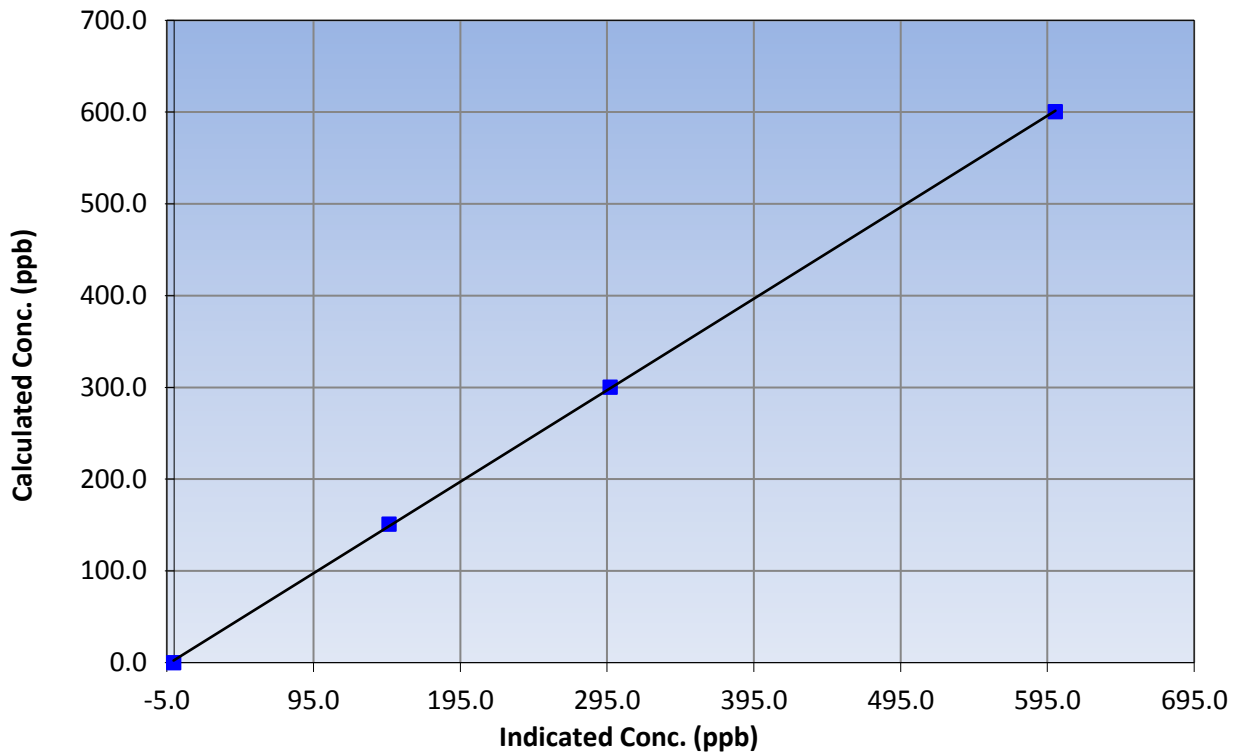
### Station Information

Calibration Date	October 14, 2015	Previous Calibration	September 9, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	10:00	End Time (MST)	14:45
Analyzer make	API T200	Analyzer serial #	833

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	0.999931
600.4	600.5	0.9999		
300.2	297.1	1.0104	Slope	0.997261
151.1	146.5	1.0315		
			Intercept	2.710259

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

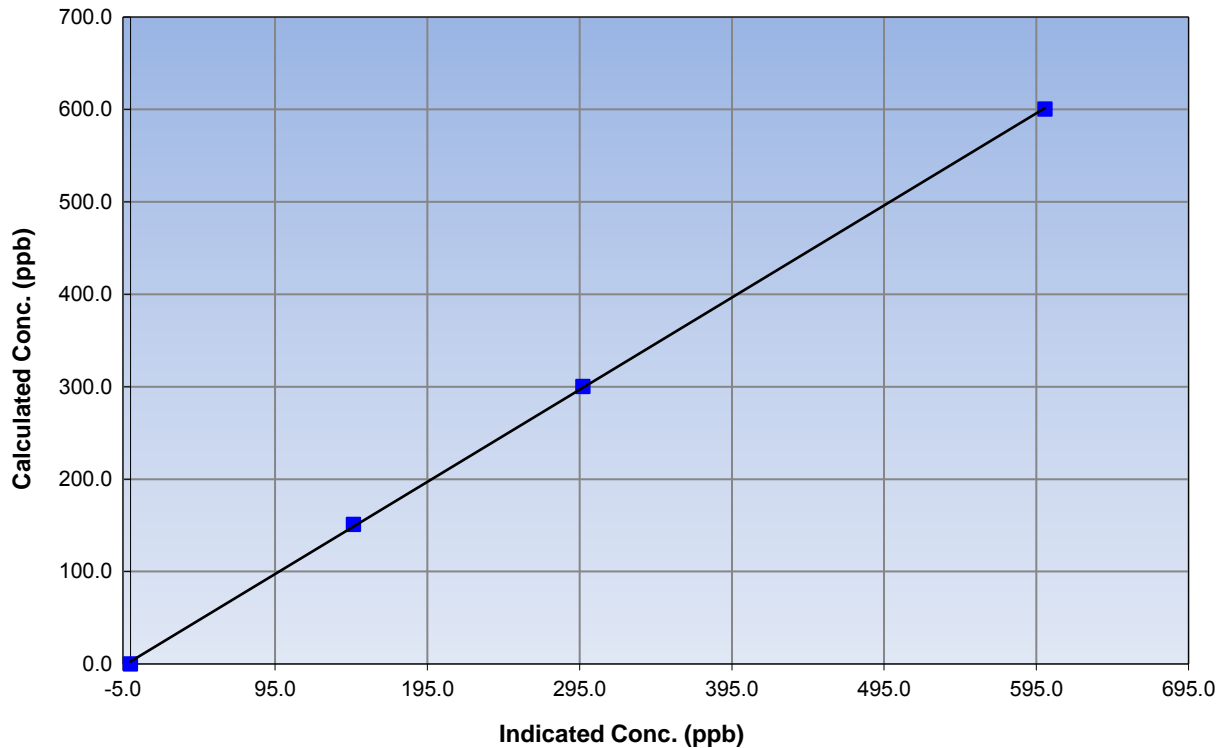
### Station Information

Calibration Date	October 14, 2015	Previous Calibration	September 9, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	10:00	End Time (MST)	14:45
Analyzer make	API T200	Analyzer serial #	833

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999925
600.4	600.7	0.9994		
300.2	297.1	1.0103	Slope	0.996999
151.1	146.5	1.0314		
			Intercept	2.661461

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

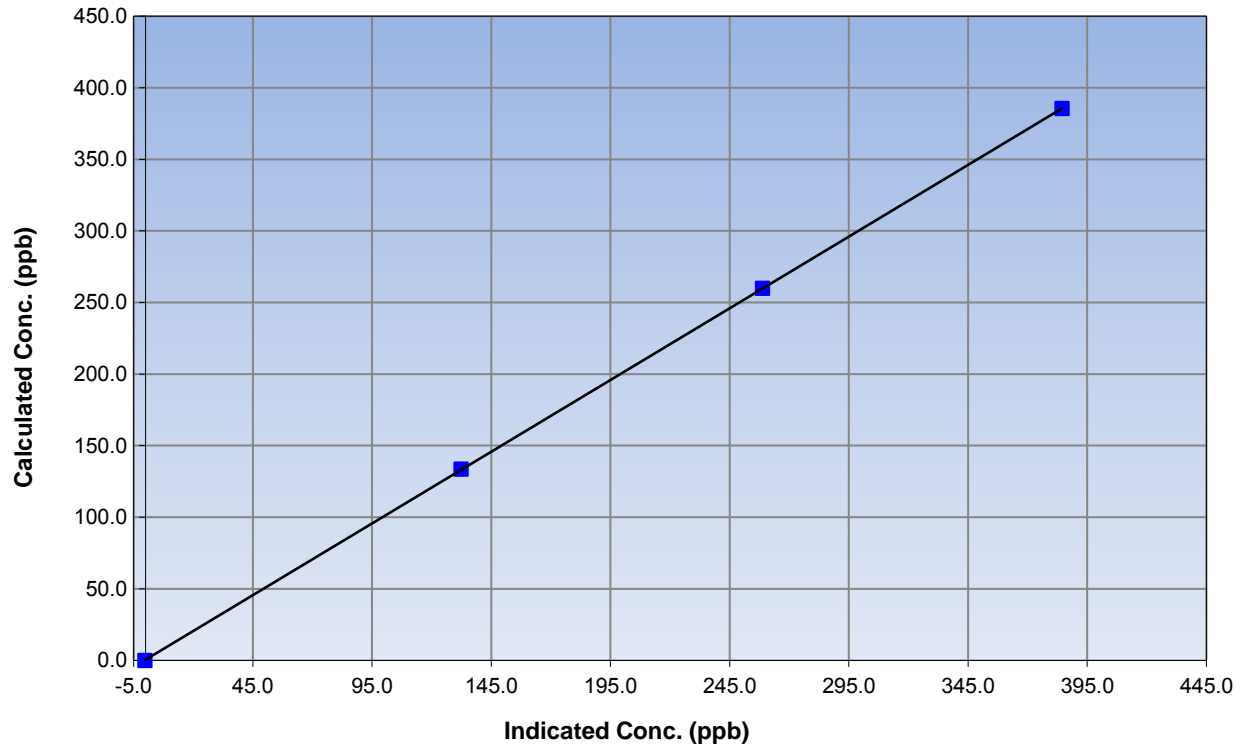
### Station Information

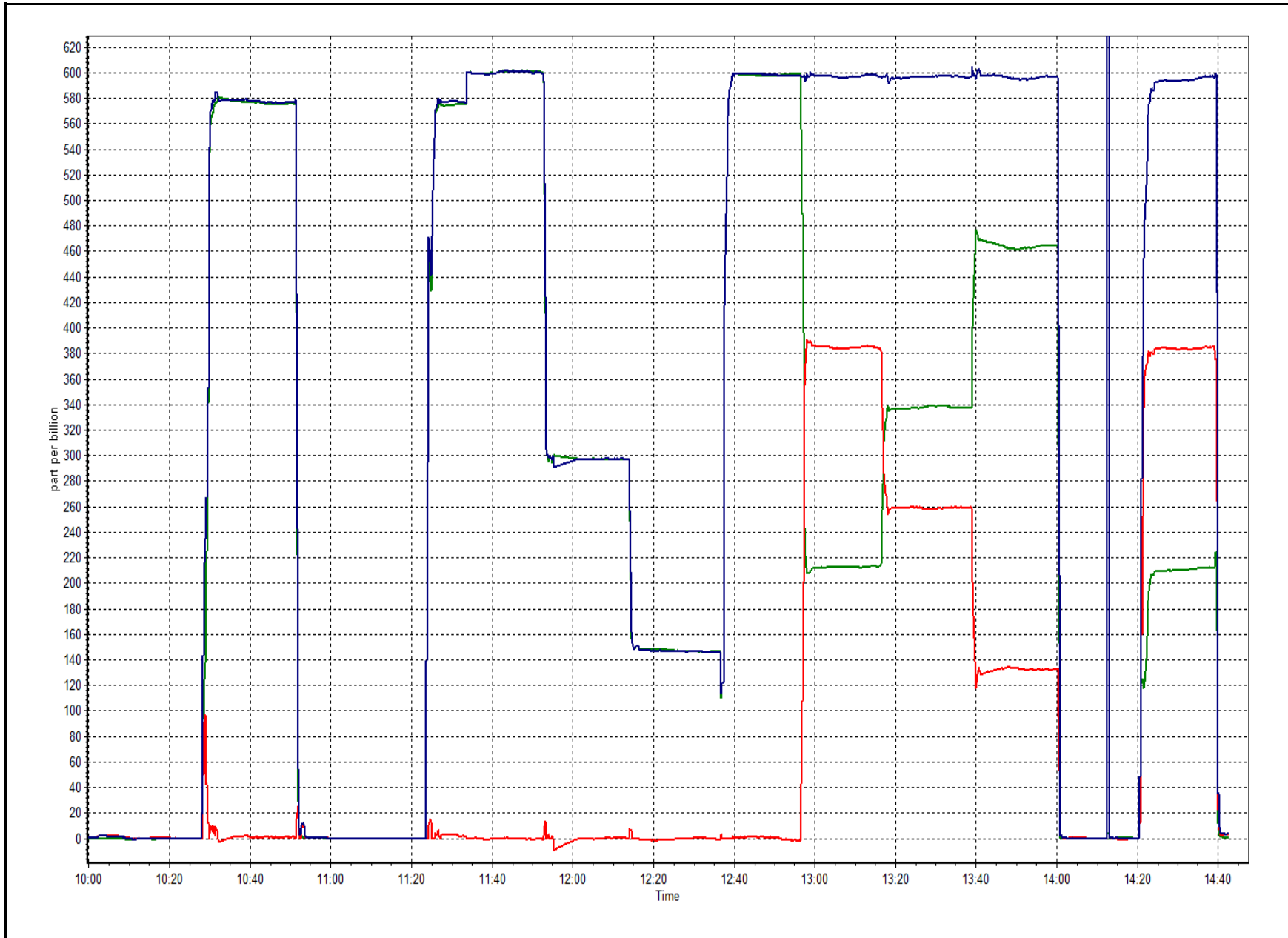
Calibration Date	October 14, 2015	Previous Calibration	September 9, 2015
Station Number	Wapasu	Station Number	AMS 17
Start Time (MST)	10:00	End Time (MST)	14:45
Analyzer make	API T200	Analyzer serial #	833

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999995
385.5	384.5	1.0026		
259.8	258.8	1.0038	Slope	1.001777
133.6	132.4	1.0094		
			Intercept	0.500424

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







# Wood Buffalo Environmental Association

## SHARP CALIBRATION

STATION INFORMATION			
Calibration Date:	October 23, 2015	Previous Calibration:	September 18, 2015
Station Name:	Wapasu	Station Number:	AMS 17
Start Time (MST):	11:14	End Time (MST):	13:00
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1451

SHARP INFORMATION			
Particulate Fraction:	PM2.5		
Make/Model:	Thermo / SHARP 5030		
Serial Number	E-1107		
C <sub>14</sub> Source SN:	2518		
Confirmation of Time settings:	Yes <input type="checkbox"/>	No <input type="checkbox"/>	
Parameters Checked:	T1 <input checked="" type="checkbox"/>	T2 <input type="checkbox"/>	T3 <input type="checkbox"/>
	T4 <input type="checkbox"/>	P3 <input checked="" type="checkbox"/>	Main Flow <input checked="" type="checkbox"/>
		Beta <input type="checkbox"/>	Neph <input checked="" type="checkbox"/>

CALIBRATION DATA				
Temperature (°C)				
Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	4.0	5.2	1.2	5.0
T2	20.0	na	na	
T3	21.0	na	na	
T4	21.0	na	na	
RH (%)	22.0	na	na	

Pressure (Hpa)				
Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	951	952.5	1.5	943

Main Flow (Lph)				
Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	984	16	1002	999

Nephelometer Calibration			
Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	198		198
Neph	-0.2		-0.2
C14	27		26.8
Indicated Concentration (ug/m3)	-0.2	no	-0.2
Offset 1			
Offset 2			

Leak Check (Quarterly)			
Leak Check Date:		Previous Leak Check Date:	June 10, 2015
	Measured	Difference LPM (Limit +/- 0.42 LPM)	
Flow without adaptor (LPM):		0.00	
*Flow with adaptor (LPM):			
<i>*Note - do not attach adaptor without shutting off the pump first</i>			

Mass Foil Calibration (Annually)	
Foil Calibration Date:	Previous Foil Calibration:
Zeroed?:	
Foil Mass:	Mass foil set S/N:
Previous Correction Factor:	
New Correction Factor:	

INSPECTION DATA		
Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	23/10/2015
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

**NOTES:**

Cyclone head cleaned. Main flow and T1 were both adjusted.

Calibration Performed By: Asad Hidayat



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## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 18  
CONKLIN LOOKOUT  
OCTOBER 2015**

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

November 26, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN LOOKOUT (AMS 18)  
OCTOBER 2015

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	709	35	35	100.00	2	0	1	0
TRS(ppb) Average	710	34	34	100.00	1	0	0	0
THC(ppm) Average	709	35	35	100.00	2.2	-	2.1	-
NMHC(ppm) Average	709	35	35	100.00	0.058	-	0.022	-
CH4(ppm) Average	709	35	35	100.00	2.2	-	2.1	-
O3 (ppb) Average	709	34	35	99.87	49	0	41	-
NO2 (ppb) Average	709	35	35	100.00	6	0	3	-
NO (ppb) Average	709	35	35	100.00	2	-	0	-
NOX (ppb) Average	709	35	35	100.00	5	-	3	-
PM2.5 (ug/m3) Average	736	2	8	99.19	9.2	-	4.7	0
Wind Speed 10 m (km/h) Average	738	0	6	99.19	21	-	16	-
Wind Direction 10 m (deg) Average	738	0	6	99.19	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100.00	24.1	-	16.6	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	94.0	-
Leaf Wetness (% of range) Average	744	0	0	100.00	93	-	32.0	-
Global Solar Radiation (W/m2) Average	744	0	0	100.00	607	-	162.0	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN LOOKOUT (AMS 18)  
OCTOBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	709	0.2	0	-	0	0	0	0	0	1	2
TRS (ppb) Average	710	0.3	0	-	0	0	0	0	0	0	1
THC (ppm) Average	709	1.94	0.1	-	1.9	1.9	1.9	1.9	2	2.1	2.2
NMHC(ppm) Average	709	0.003	0.008	-	0	0	0	0	0	0	0.058
CH4(ppm) Average	709	1.94	0.1	-	1.9	1.9	1.9	1.9	2	2	2.2
O3 (ppb) Average	709	32.4	8	-	13	21	27	34	38	42	49
NO2 (ppb) Average	709	1.2	1	-	0	0	1	1	2	3	6
NO (ppb) Average	709	0.1	0	-	0	0	0	0	0	0	2
NOX (ppb) Average	709	1.3	1	-	0	0	1	1	2	3	5
PM2.5 (ug/m3) Average	736	2.52	1.8	-	0.3	0.7	1.1	2	3.5	5.2	9.2
Wind Speed 10 m (km/h) Average	738	9.9	4	-	0	4	7	10	13	16	21
Wind Direction 10 m (deg) Average	738	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	5.9	5.8	-	-6.4	-1	1.3	5.3	9.9	13.4	24.1
Relative Humidity (%) Average	744	67.4	20	-	27	40	52	66	86	95	99
Surface Wetness (% of range) Average	744	5.7	15	-	0	0	0	0	0	18	93
Global Solar Radiation (W/m2) Average	744	91.7	152	-	0	0	0	0	124	369	607

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN LOOKOUT (AMS 18)  
OCTOBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
O3	01 Oct 2015 09:00	01 Oct 2015 09:00	1	Maintenance - manifold cleaning
PM2.5	05 Oct 2015 15:00	05 Oct 2015 17:00	3	Unstable operation - excessive baseline drift
PM2.5	15 Oct 2015 15:00	15 Oct 2015 17:00	3	Unstable operation - excessive baseline drift
Wind Speed, Wind Direction	03 Oct 2015 04:00	03 Oct 2015 09:00	6	Flat line in sensor output signal -sensor frozen

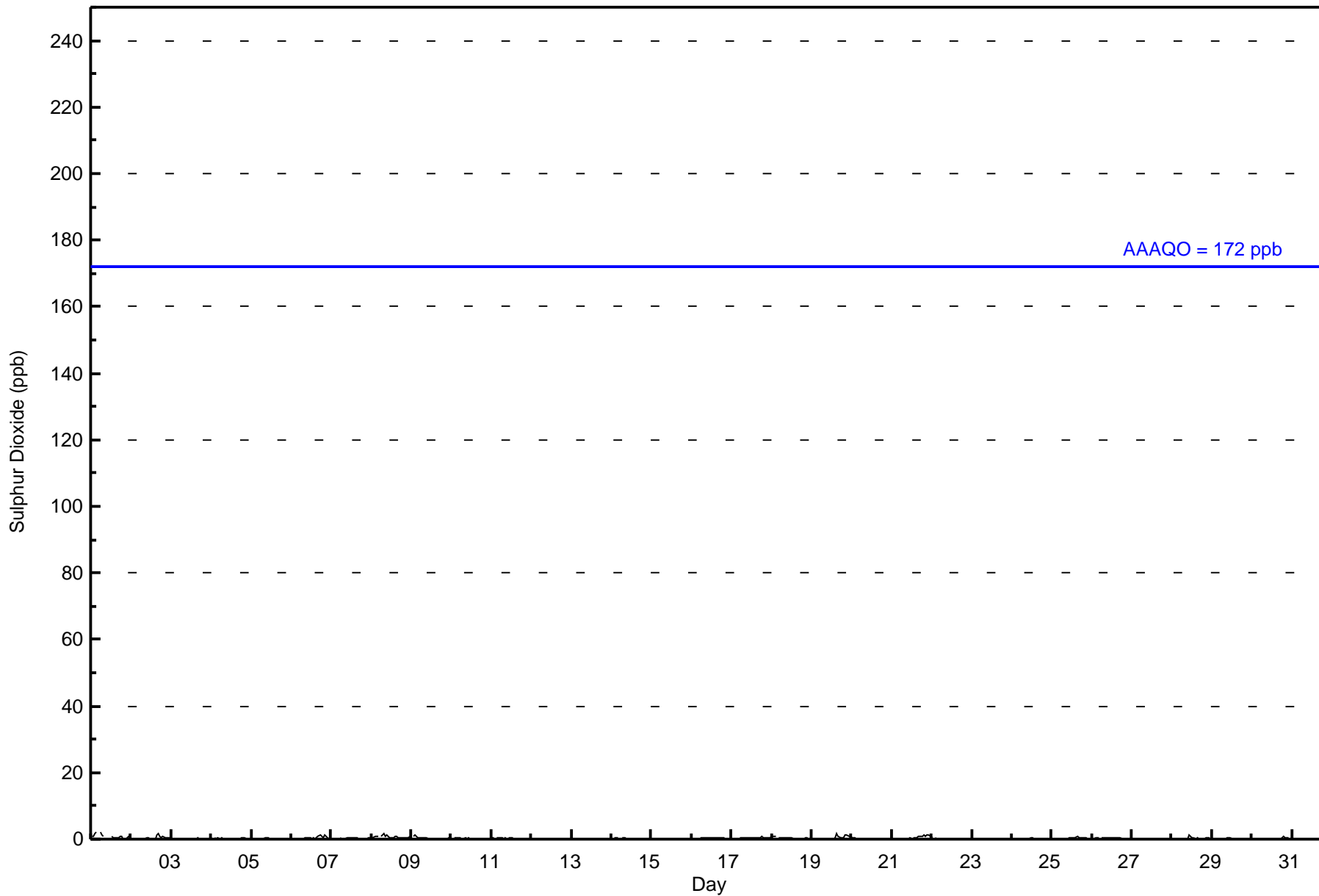


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 2 ppb on Oct 1 06:00	Maximum Daily Average: 0.8 ppb on Oct 1		Hours of Data:	709
Minimum Value: 0 ppb on Oct 2 13:00	Minimum Daily Average: 0.0 ppb on Oct 15		Hours of Missing Data:	35
Maximum Diurnal Average: 0.3 ppb at hour 3	Minimum Diurnal Average: 0.2 ppb at hour 9		Hours of Calibration:	35
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:	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	2	2	Z	2	1	1	C	C	C	C	1	0	0	0	0	1	1	0	0	0	1	0	0.8	2
2-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	2	1	1	1	0	0	0	0	0.4	2
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	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	1	1	1	1	1	1	0	0	0.3	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	0.2	0
8-Oct	0	0	1	1	1	Z	1	2	1	1	1	0	0	1	1	1	1	1	0	0	0	0	1	1	0.7	2
9-Oct	Z	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
10-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
11-Oct	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.2	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	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	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
16-Oct	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.3	1
17-Oct	0	0	Z	0	0	0	0	0	0	1	0	0	0	1	1	0	1	1	1	1	0	0	0	1	0.4	1
18-Oct	1	1	1	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	2	1	0	0	1	1	1	1	1	0.4	2
20-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	0.2	1
21-Oct	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0.5	1
22-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	0.1	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	0.1	0
25-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	1	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	0.3	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	0
28-Oct	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	1	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.1	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	1	0	0.1	1

0.2	0.2	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	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	Diurnal Average	
1	1	2	2	1	2	1	2	1	2	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	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**  
**Conklin Lookout - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	709	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: 709

Total Number of Hours: 744





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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Conklin Lookout - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	28	6	6	7	8	11	32	55	55	108	57	37	82	98	80	33	703
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	6	6	7	8	11	32	55	55	108	57	37	82	98	80	33	703

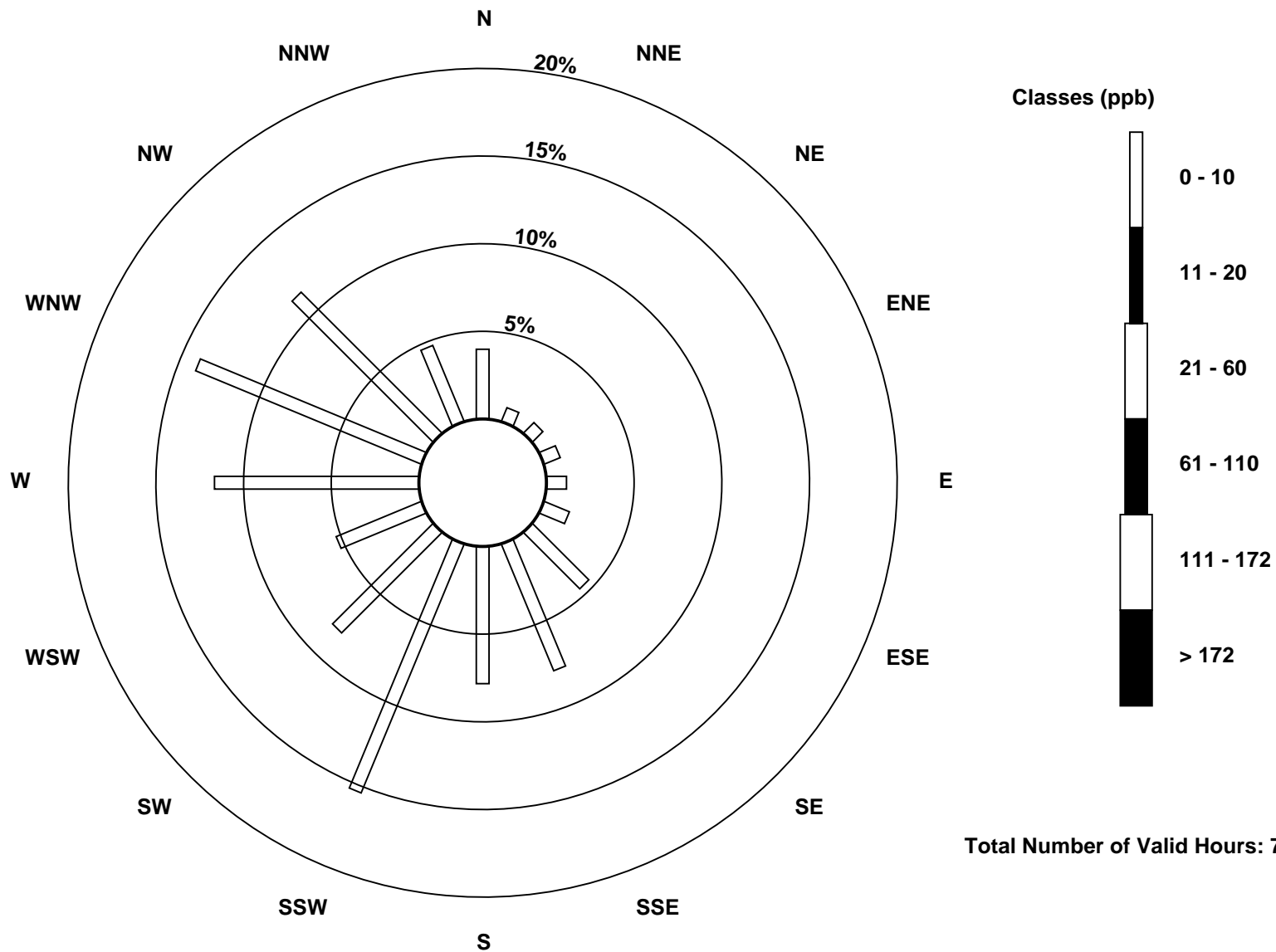
Total Number of Valid Hours: 703

Total Number of Hours: 744

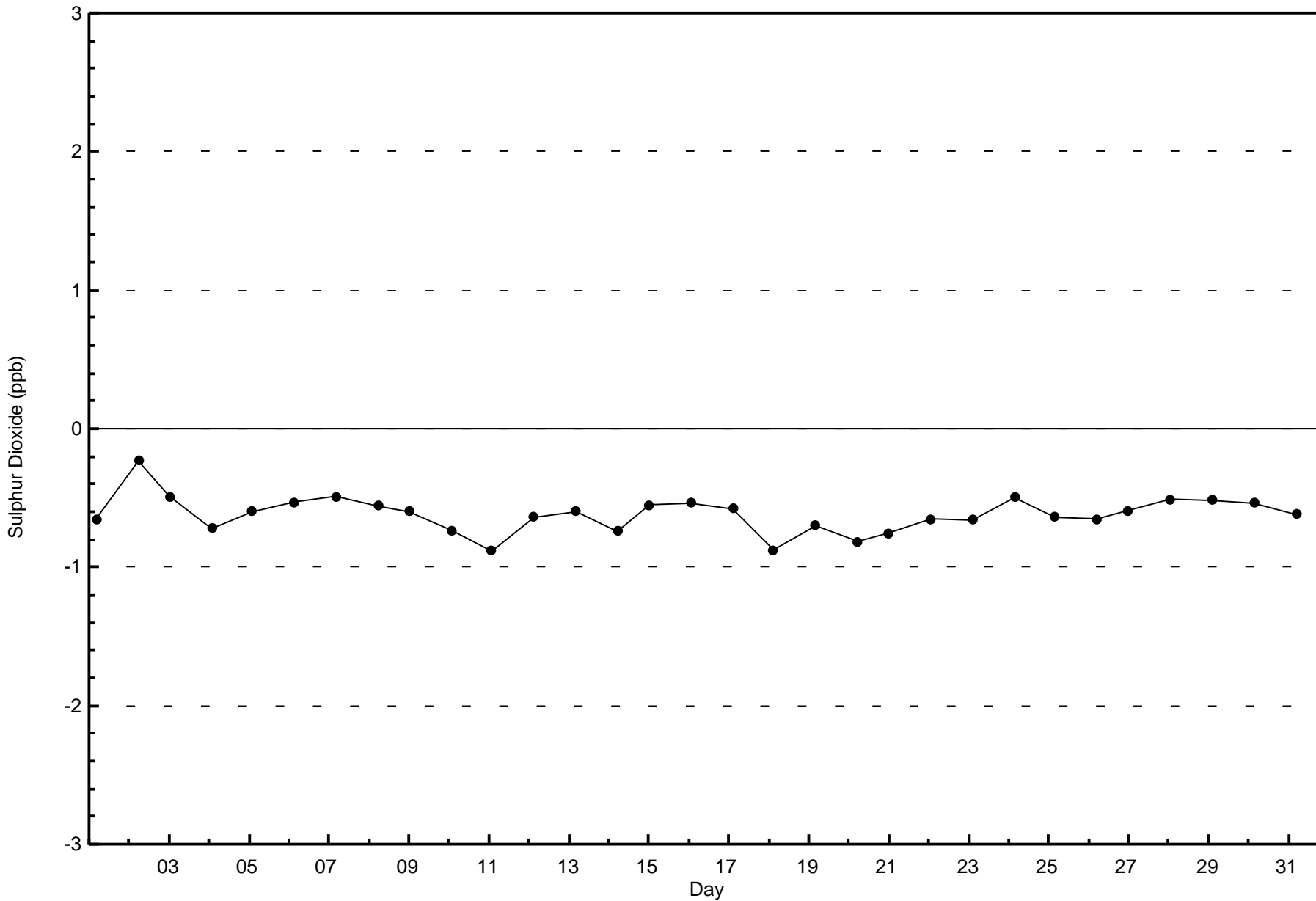


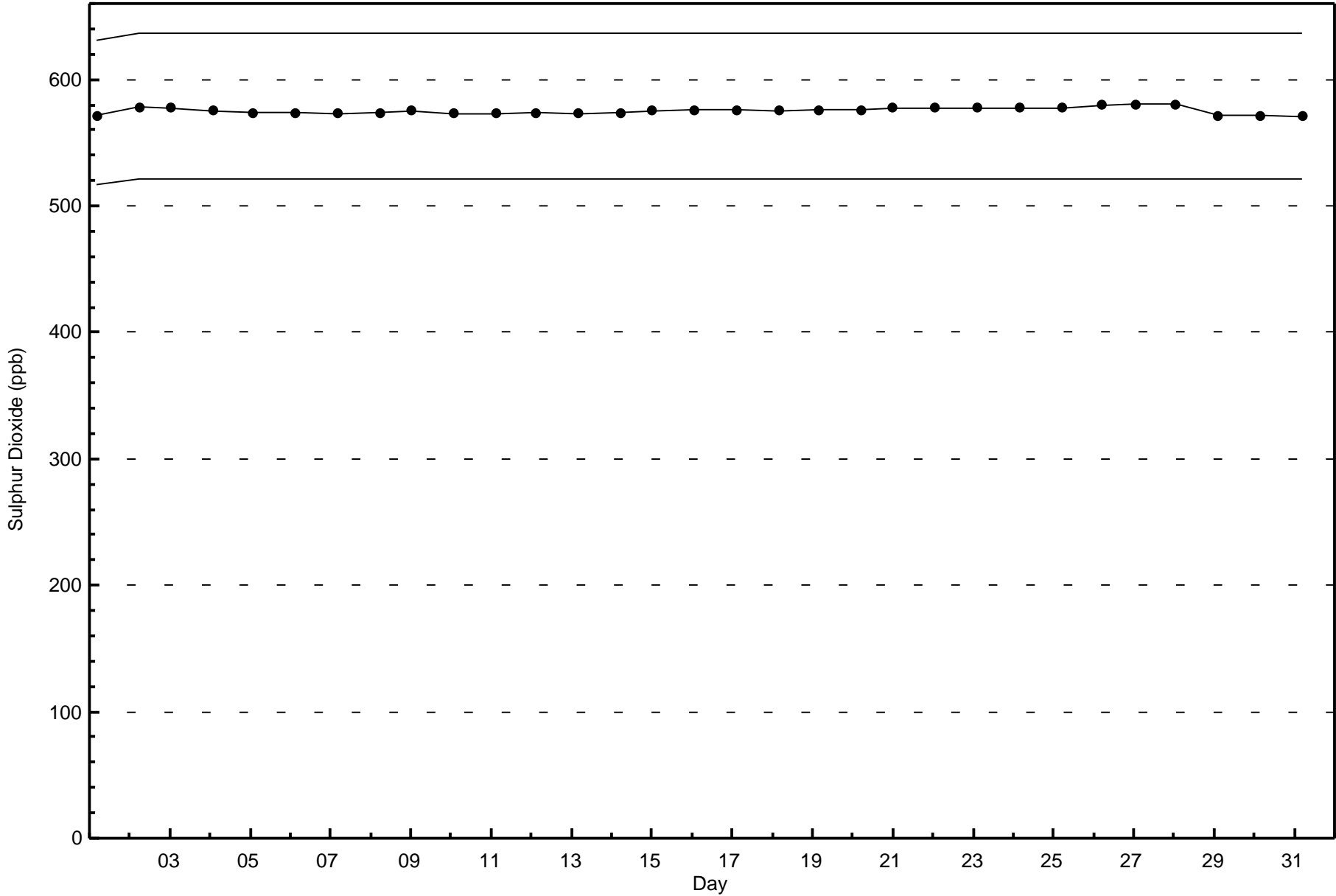
Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Conklin Lookout (AMS 18)



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 2 09:00	Maximum Daily Average: 0.4 ppb on Oct 2		Hours of Data:	710
Minimum Value: 0 ppb on Oct 5 01:00	Minimum Daily Average: 0.2 ppb on Oct 4		Hours of Missing Data:	34
Maximum Diurnal Average: 0.3 ppb at hour 8	Minimum Diurnal Average: 0.2 ppb at hour 2		Hours of Calibration:	34
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:	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	0.3	0
2-Oct	0	0	0	0	0	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
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	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
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	0.2	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	0.3	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	0.2	0
8-Oct	0	0	0	0	0	0	Z	0	C	C	C	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	0.3	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	0.3	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	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	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	0.3	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	0.3	0
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	0.3	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	0.3	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	0.3	0
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	0.2	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	0.3	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	0.3	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	0.3	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	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
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	0.3	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	0.3	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	0.2	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

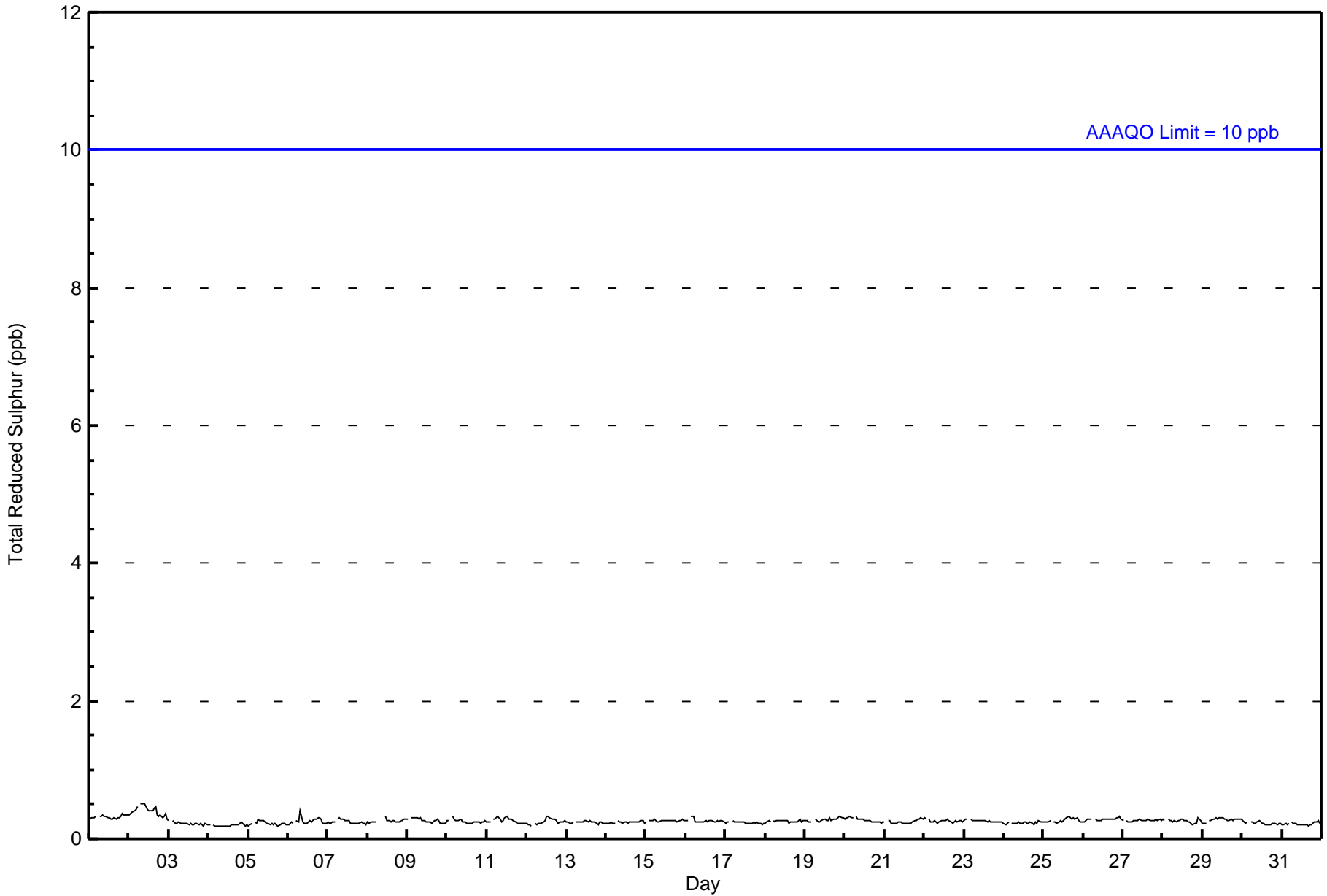
0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.2	Diurnal Average
0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Diurnal Maximum

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**  
**Conklin Lookout - October 2015**





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

**Total Reduced Sulphur (TRS) - ppb**  
**Conklin Lookout - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	710	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: 710

Total Number of Hours: 744



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

**Total Reduced Sulphur (TRS) - ppb**  
**Conklin Lookout - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	29	6	6	7	8	11	32	54	52	113	57	36	85	96	79	33	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>	29	6	6	7	8	11	32	54	52	113	57	36	85	96	79	33	704

Total Number of Valid Hours: 704

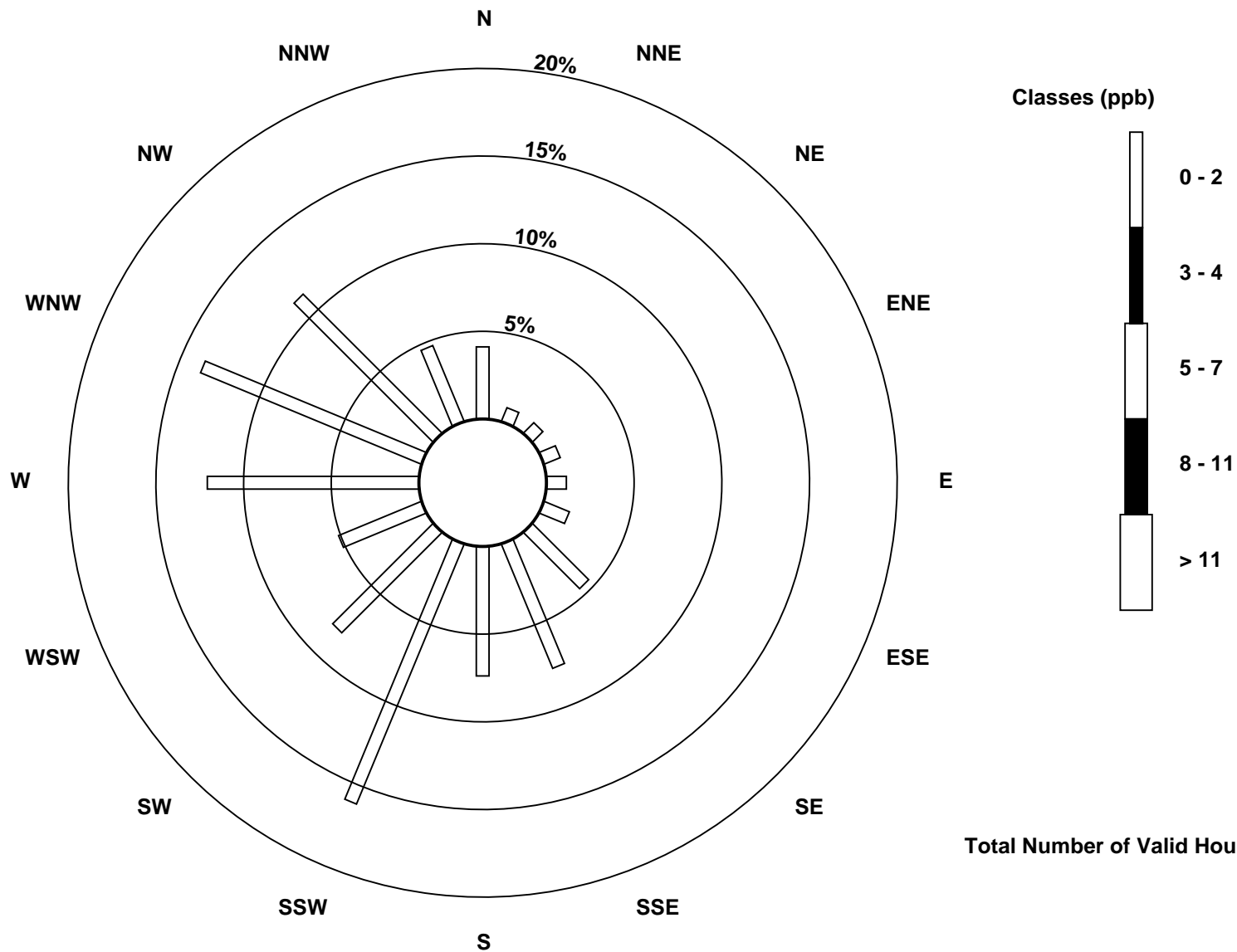
Total Number of Hours: 744





Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Total Reduced Sulphur (TRS) - ppb  
Conklin Lookout (AMS 18)

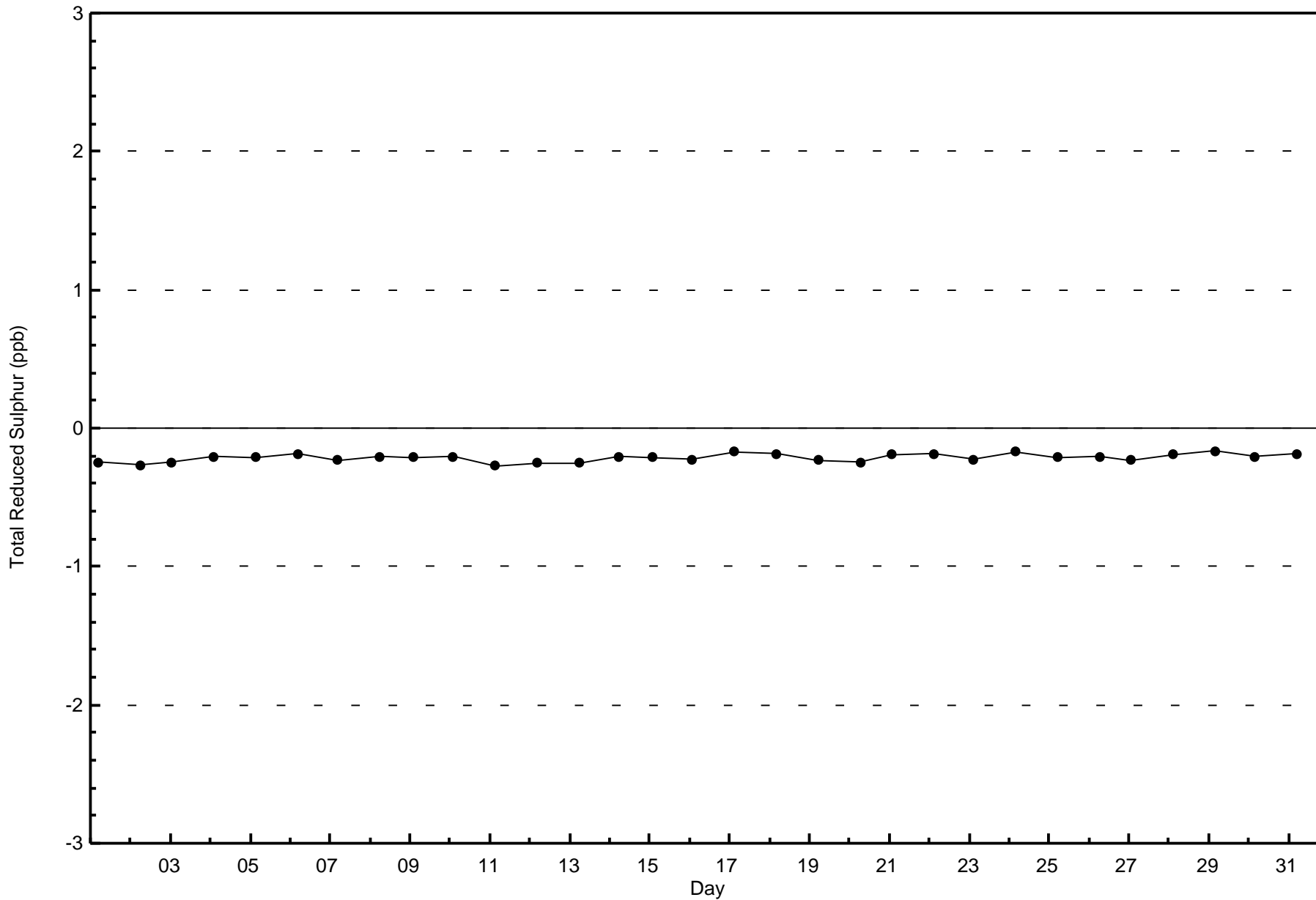


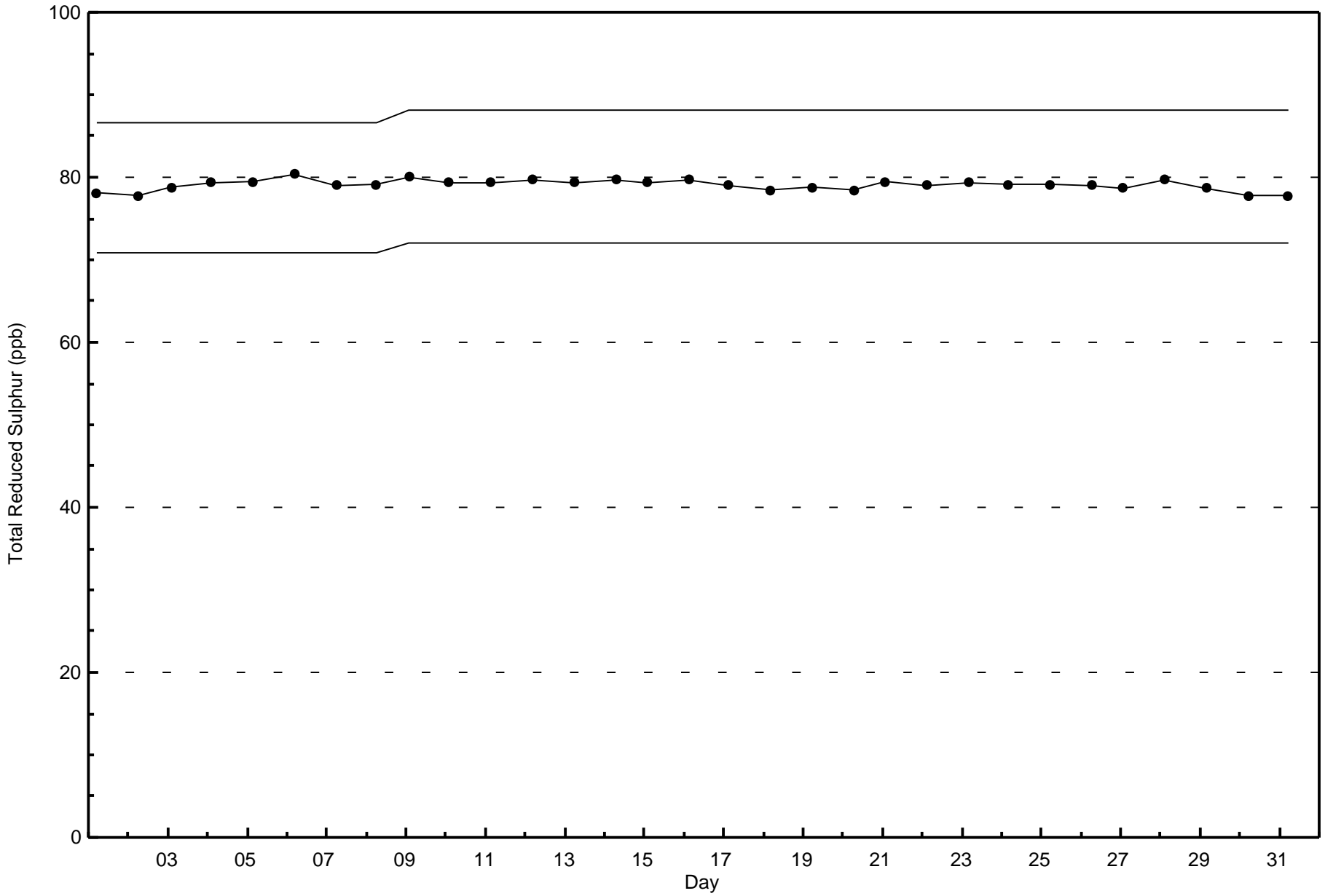
Total Number of Valid Hours: 704



Wood Buffalo Environmental Association  
Zero Responses

Total Reduced Sulphur (TRS) - ppb  
Conklin Lookout - October 2015







Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

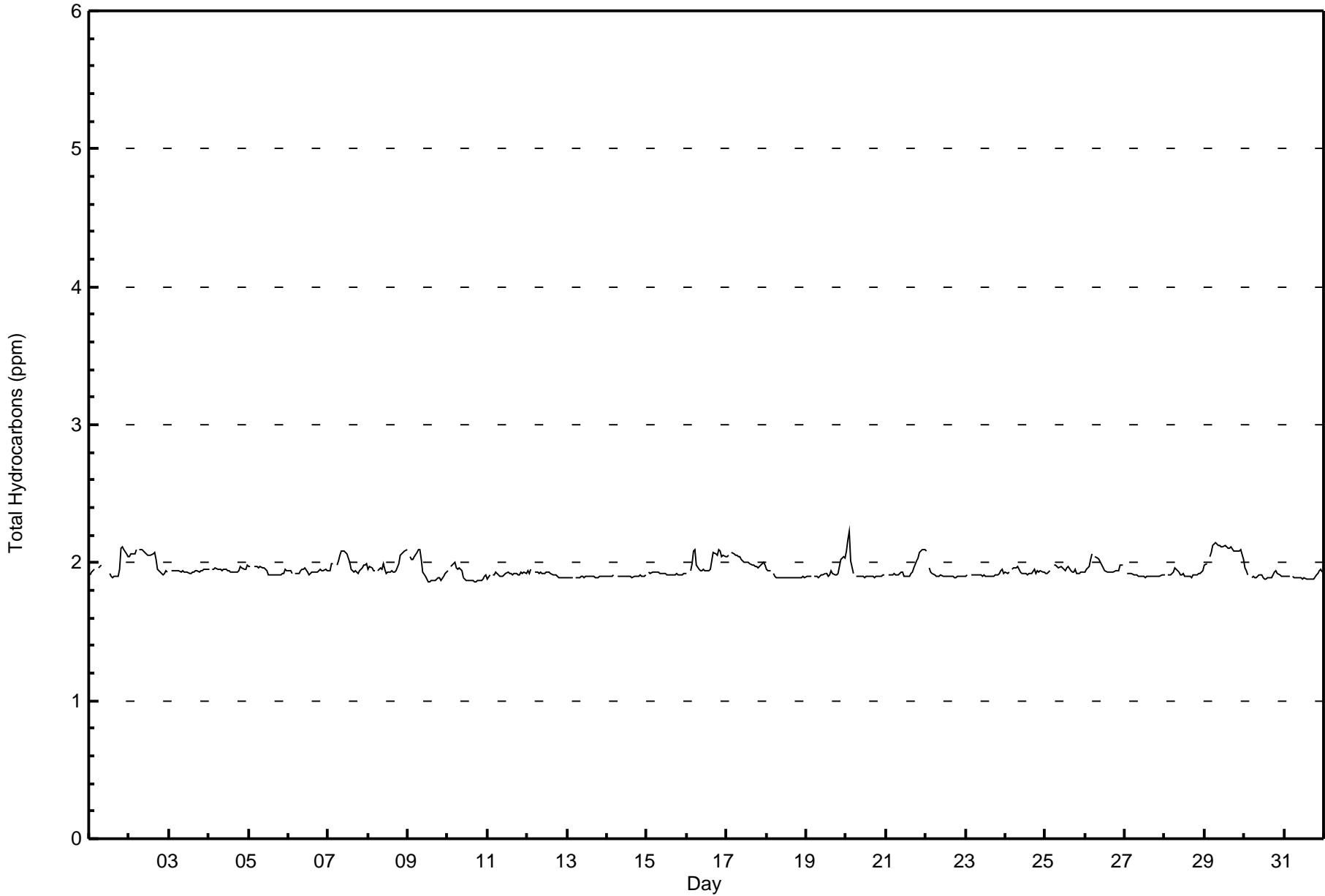
Conklin Lookout - October 2015

Maximum Value: 2.2 ppm on Oct 20 03:00		Maximum Daily Average: 2.1 ppm on Oct 29		Hours in Service: 744																						
Minimum Value: 1.9 ppm on Oct 9 13:00		Minimum Daily Average: 1.9 ppm on Oct 13		Hours of Data: 709																						
Maximum Diurnal Average: 2.0 ppm at hour 5		Minimum Diurnal Average: 1.9 ppm at hour 18		Hours of Missing Data: 35																						
Monthly Average: 1.94 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> = 2.1		Hours of Calibration: 35																						
				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	1.9	1.9	1.9	2.0	Z	2.0	2.0	2.0	C	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.1
2-Oct	2.0	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	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
3-Oct	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	2.0	2.0	2.0	1.9
4-Oct	2.0	Z	2.0	1.9	2.0	2.0	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	2.0	2.0	1.9	2.0	2.0	2.0	1.9
5-Oct	2.0	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	2.0	1.9	1.9	2.0
6-Oct	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	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
7-Oct	1.9	1.9	2.0	2.0	Z	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0
8-Oct	2.0	2.0	2.0	1.9	1.9	Z	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.1	2.1	2.1	2.1	2.0
9-Oct	Z	2.0	2.0	2.0	2.0	2.1	2.1	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
10-Oct	1.9	Z	2.0	2.0	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
11-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
12-Oct	1.9	1.9	2.0	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
13-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
14-Oct	1.9	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
15-Oct	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
16-Oct	1.9	Z	1.9	2.0	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0
17-Oct	2.0	2.1	Z	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
18-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	1.9	1.9	1.9
19-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	2.0	2.0	2.0	2.0	1.9	2.0
20-Oct	2.1	2.2	2.2	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.2
21-Oct	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	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.1
22-Oct	2.1	Z	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	1.9	1.9	1.9
23-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
24-Oct	1.9	1.9	1.9	Z	1.9	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	1.9	2.0
25-Oct	1.9	1.9	1.9	1.9	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	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
26-Oct	1.9	2.0	2.0	2.0	2.1	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	2.0	2.0	2.0	2.0	2.1
27-Oct	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
28-Oct	1.9	Z	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	1.9	2.0
29-Oct	2.0	2.0	Z	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	2.1	2.1	2.1	2.1	2.1	2.1
30-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	1.9	1.9	2.0
31-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	2.0	1.9	1.9	2.0
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan      C - Calibration																										



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

**Total Hydrocarbons (THC) - ppm**  
**Conklin Lookout - October 2015**





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

**Total Hydrocarbons (THC) - ppm**  
**Conklin Lookout - October 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	638	89.99	89.99
2.1 - 3.0	71	10.01	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



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

**Total Hydrocarbons (THC) - ppm**  
**Conklin Lookout - October 2015**

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	28	6	6	7	8	10	31	51	39	77	48	34	82	97	77	31	632
2.1 - 3.0	0	0	0	0	0	1	1	4	16	31	9	3	0	1	3	2	71
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>	28	6	6	7	8	11	32	55	55	108	57	37	82	98	80	33	703

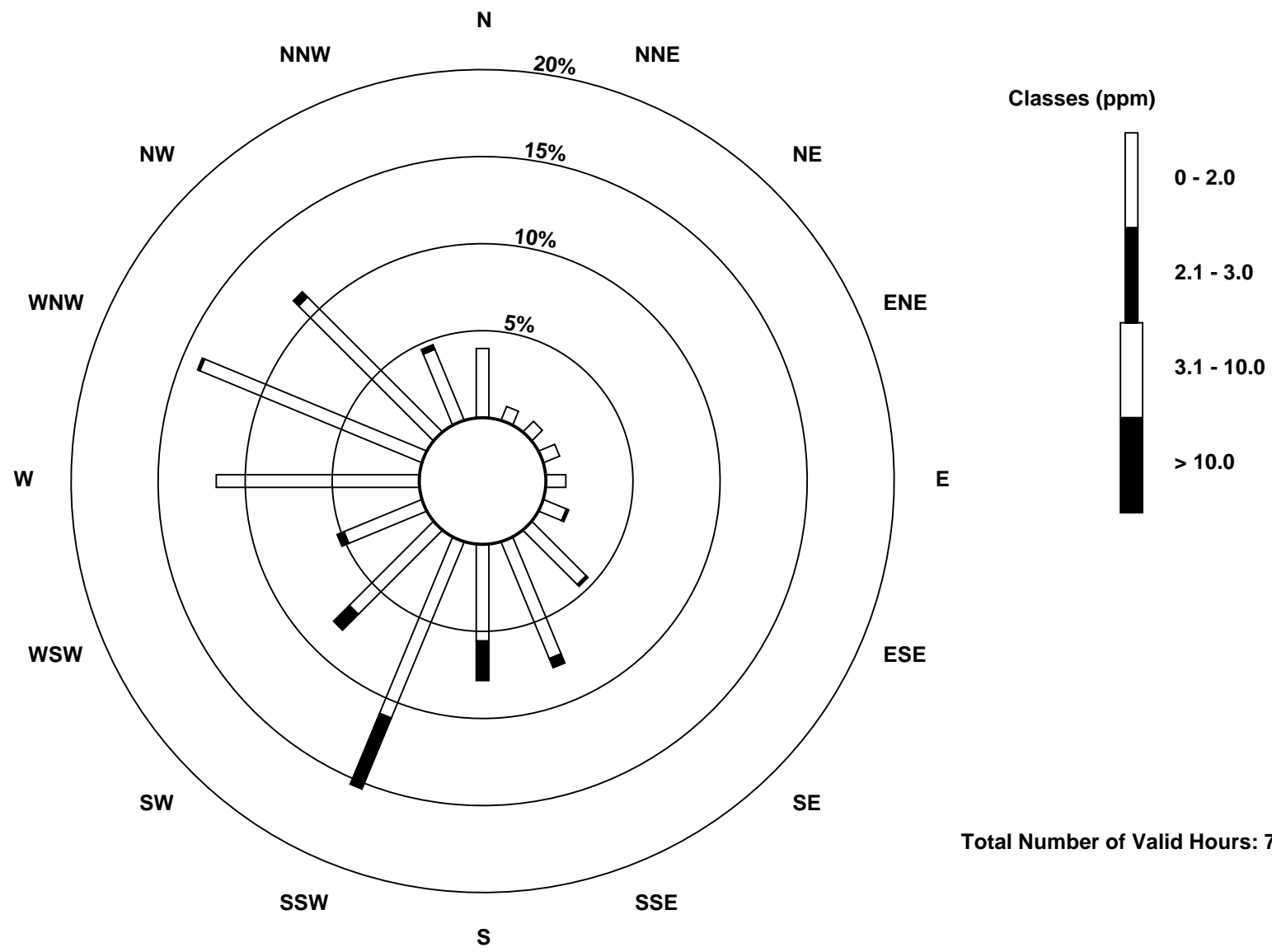
Total Number of Valid Hours: 703

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Total Hydrocarbons (THC) - ppm  
Conklin Lookout (AMS 18)

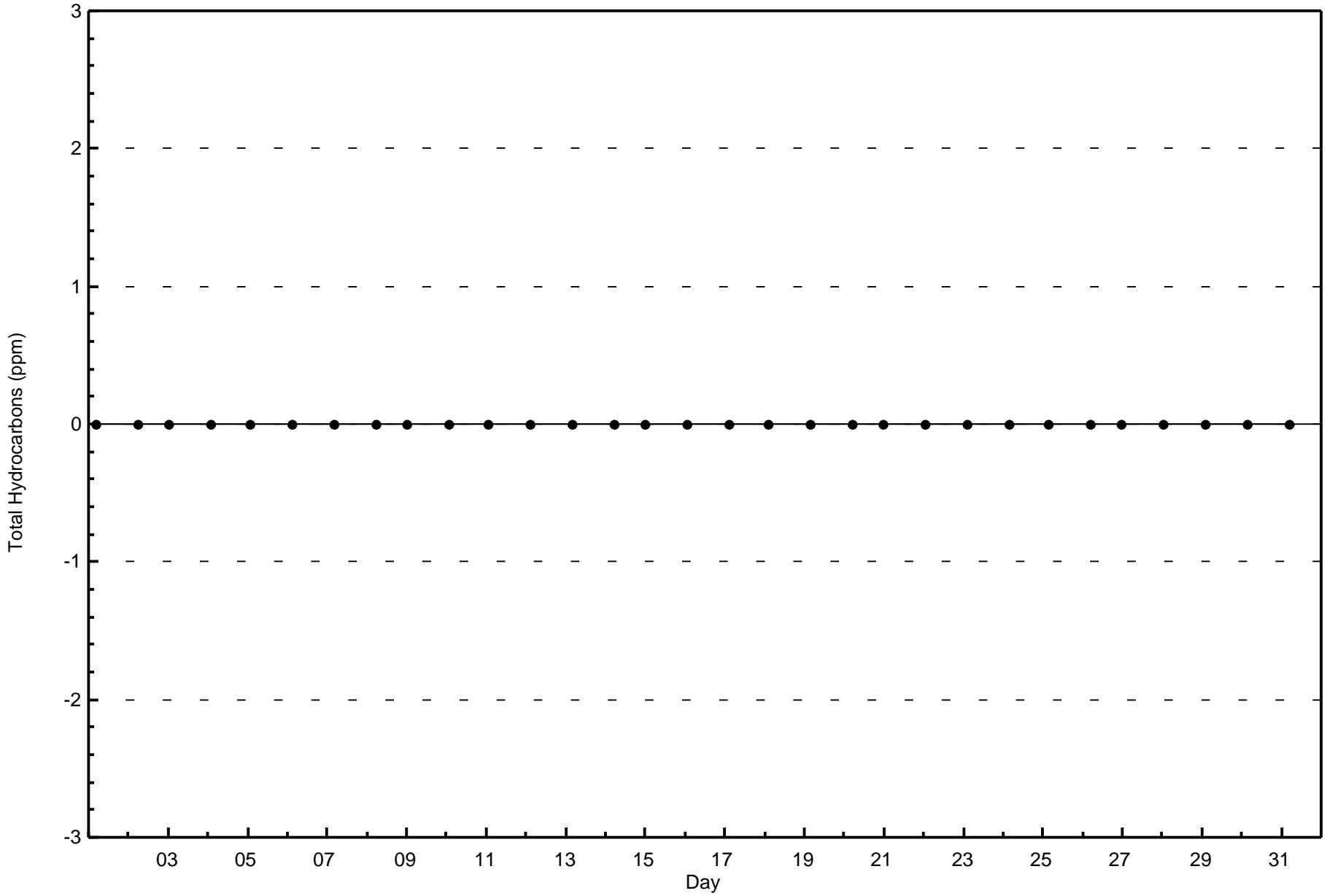


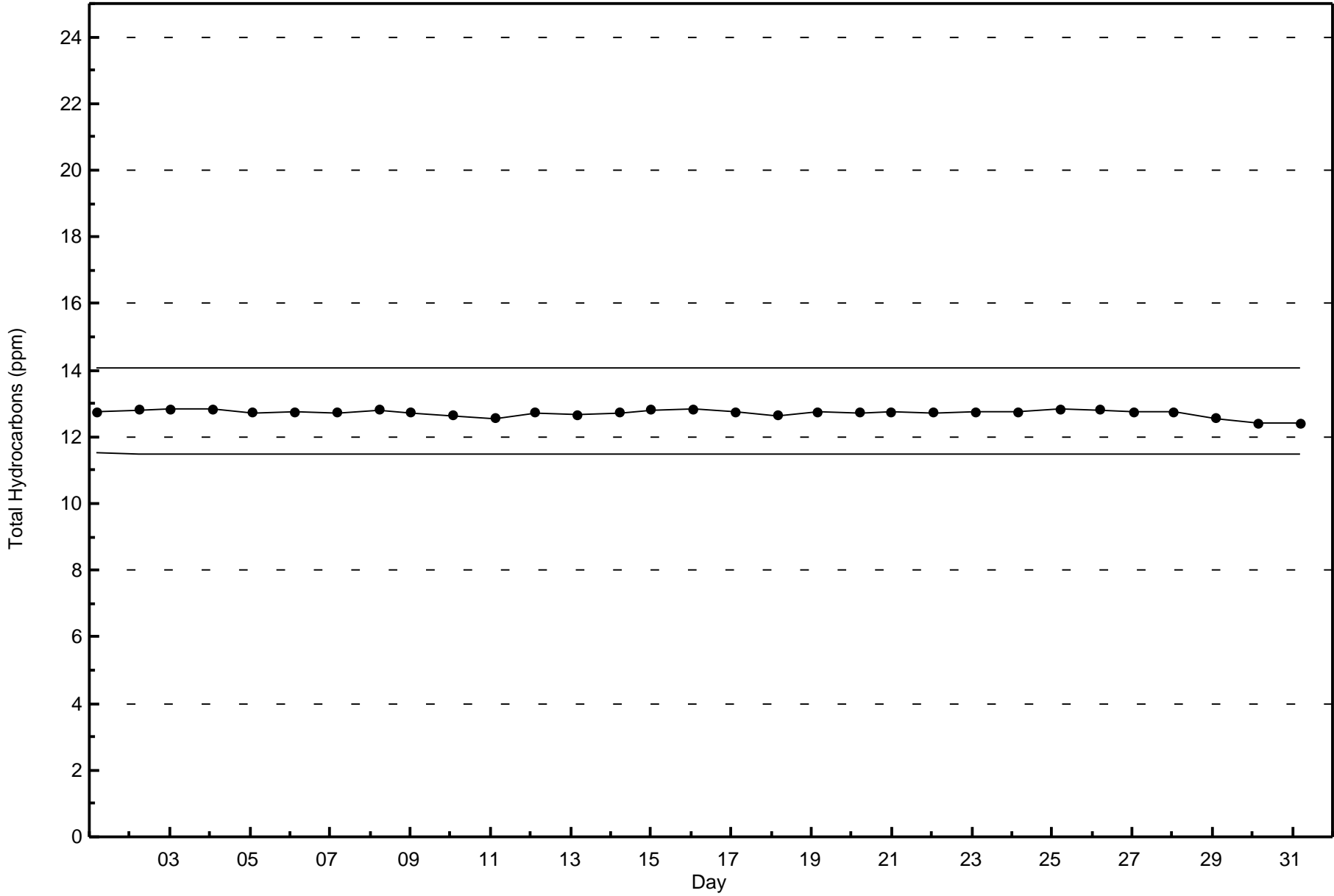




Wood Buffalo Environmental Association  
Zero Responses

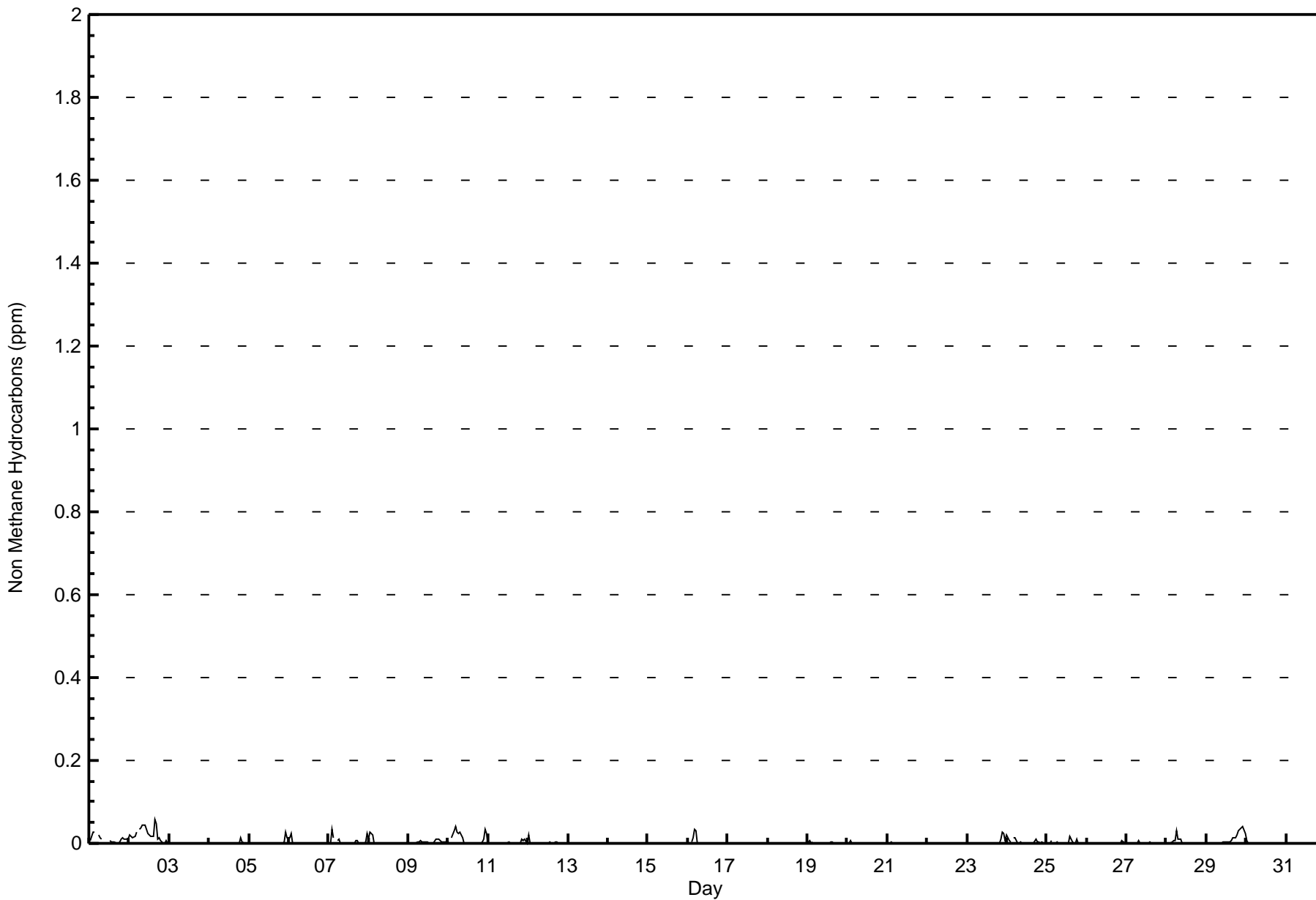
Total Hydrocarbons (THC) - ppm  
Conklin Lookout - October 2015







Maximum Value: 0.058 ppm on Oct 2 16:00      Maximum Daily Average: 0.022 ppm on Oct 2																								Hours in Service:	744	
Minimum Value: 0.000 ppm on Oct 2 21:00      Minimum Daily Average: 0.000 ppm on Oct 14																								Hours of Data:	709	
Maximum Diurnal Average: 0.006 ppm at hour 23      Minimum Diurnal Average: 0.001 ppm at hour 14																								Hours of Missing Data:	35	
Monthly Average: 0.003 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:	35	
																								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	0.007	0.016	0.026	0.026	Z	0.021	0.014	0.009	C	C	C	C	0.007	0.004	0.003	0.002	0.001	0.001	0.004	0.011	0.012	0.009	0.010	0.011	0.010	0.026
2-Oct	0.020	0.016	0.013	0.016	0.028	Z	0.033	0.037	0.043	0.042	0.035	0.023	0.021	0.017	0.018	0.058	0.048	0.011	0.013	0.006	0.000	0.000	0.007	0.000	0.022	0.058
3-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
4-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	0.014	0.003	0.000	0.000	0.000	0.000	0.001	0.014
5-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	0.001	0.000	0.004	0.026	0.013	0.002	0.026
6-Oct	0.014	0.022	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	0.001	0.001	0.000	0.000	0.000	0.000	0.002	0.022
7-Oct	0.000	0.000	0.035	0.013	Z	0.006	0.009	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.006	0.000	0.000	0.000	0.000	0.004	0.024	0.005	0.035
8-Oct	0.011	0.027	0.019	0.001	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	0.001	0.000	0.001	0.003	0.003	0.027
9-Oct	Z	0.002	0.001	0.001	0.002	0.003	0.005	0.007	0.005	0.003	0.003	0.002	0.000	0.000	0.000	0.001	0.010	0.010	0.011	0.007	0.003	0.004	0.003	0.008	0.004	0.011
10-Oct	0.005	Z	0.015	0.030	0.040	0.028	0.023	0.026	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.011	0.033	0.024	0.011	0.040	
11-Oct	0.000	0.001	Z	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.001	0.000	0.002	0.012	0.005	0.011	0.000	0.002	0.012
12-Oct	0.019	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.002	0.001	0.000	0.003	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.019
13-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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
14-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	0.000	0.000	0.000	0.000	0.000	0.000
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	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.002
16-Oct	0.000	Z	0.003	0.013	0.034	0.029	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	0.000	0.001	0.001	0.004	0.034
17-Oct	0.001	0.000	Z	0.001	0.001	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	0.000	0.000	0.000	0.000	0.000	0.000	0.001
18-Oct	0.000	0.000	0.000	Z	0.001	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	0.000	0.000	0.000	0.000	0.000	0.000	0.001
19-Oct	0.002	0.007	0.000	0.002	Z	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.007
20-Oct	0.001	0.001	0.007	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	0.007
21-Oct	Z	0.000	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	0.000	0.001	0.000	0.000	0.001	0.000	0.005
22-Oct	0.001	Z	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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
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	0.002	0.000	0.002	0.009	0.028	0.023	0.008	0.003	0.028
24-Oct	0.021	0.005	0.003	Z	0.012	0.013	0.000	0.001	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.012	0.003	0.000	0.005	0.001	0.000	0.004	0.021
25-Oct	0.000	0.001	0.001	0.007	Z	0.002	0.004	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.017	0.003	0.001	0.001	0.010	0.000	0.000	0.000	0.000	0.000	0.002	0.017
26-Oct	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.002	0.001	0.000	0.007	0.003	0.003	0.001	0.007
27-Oct	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006
28-Oct	0.000	Z	0.000	0.002	0.006	0.007	0.029	0.012	0.009	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	0.029
29-Oct	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.003	0.005	0.004	0.004	0.007	0.012	0.014	0.019	0.029	0.033	0.039	0.041	0.025	0.010	0.041
30-Oct	0.007	0.001	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	0.001	0.000	0.000	0.000	0.000	0.000	0.007
31-Oct	0.000	0.000	0.001	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	0.008	0.017	0.006	0.001	0.017
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan      C - Calibration																										





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

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Conklin Lookout - October 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.005	608	85.75	85.75
0.006 - 0.05	100	14.10	99.86
0.06 - 0.1	1	0.14	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



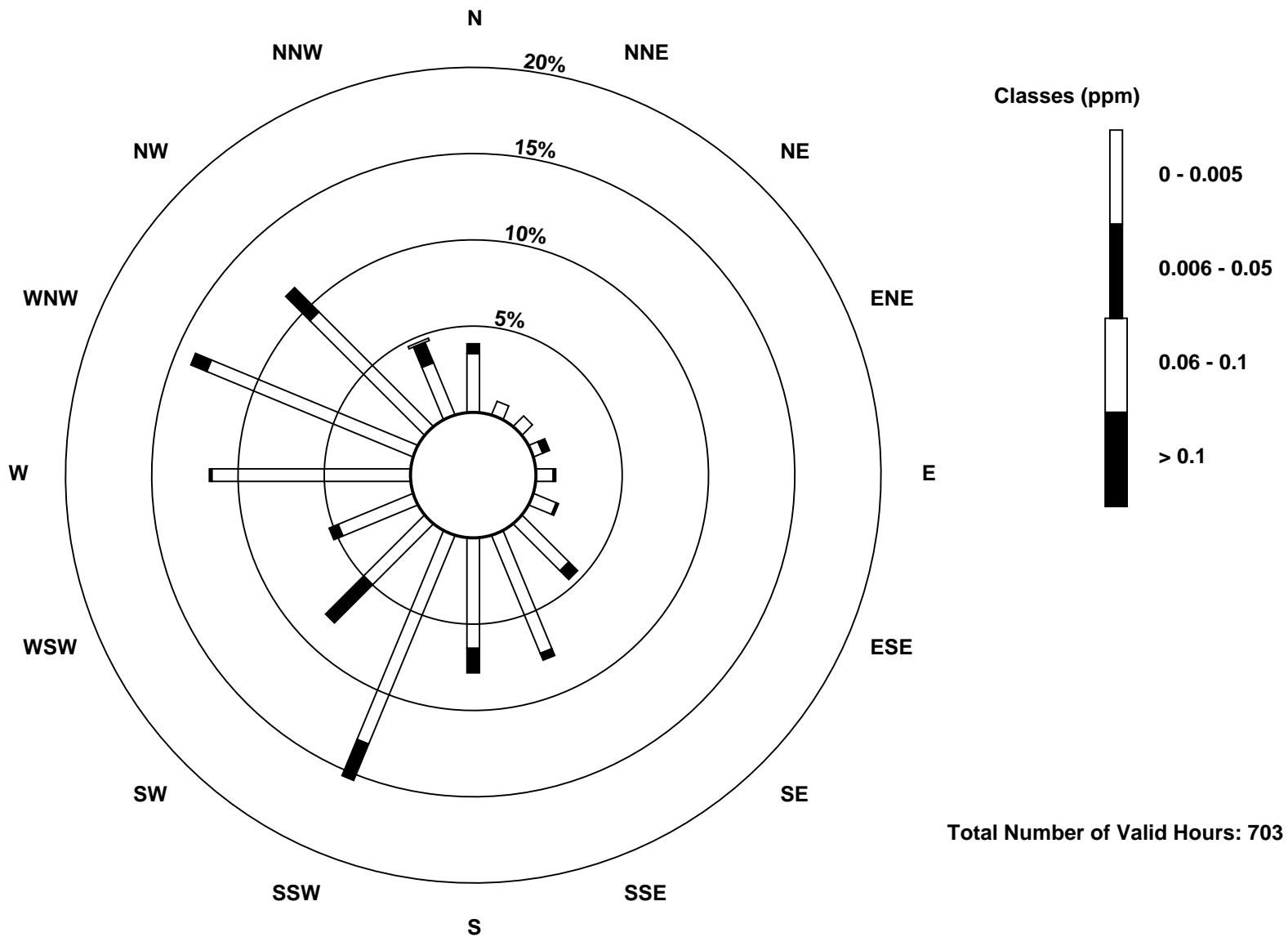
**Wood Buffalo Environmental Association**  
**Frequency Distribution**

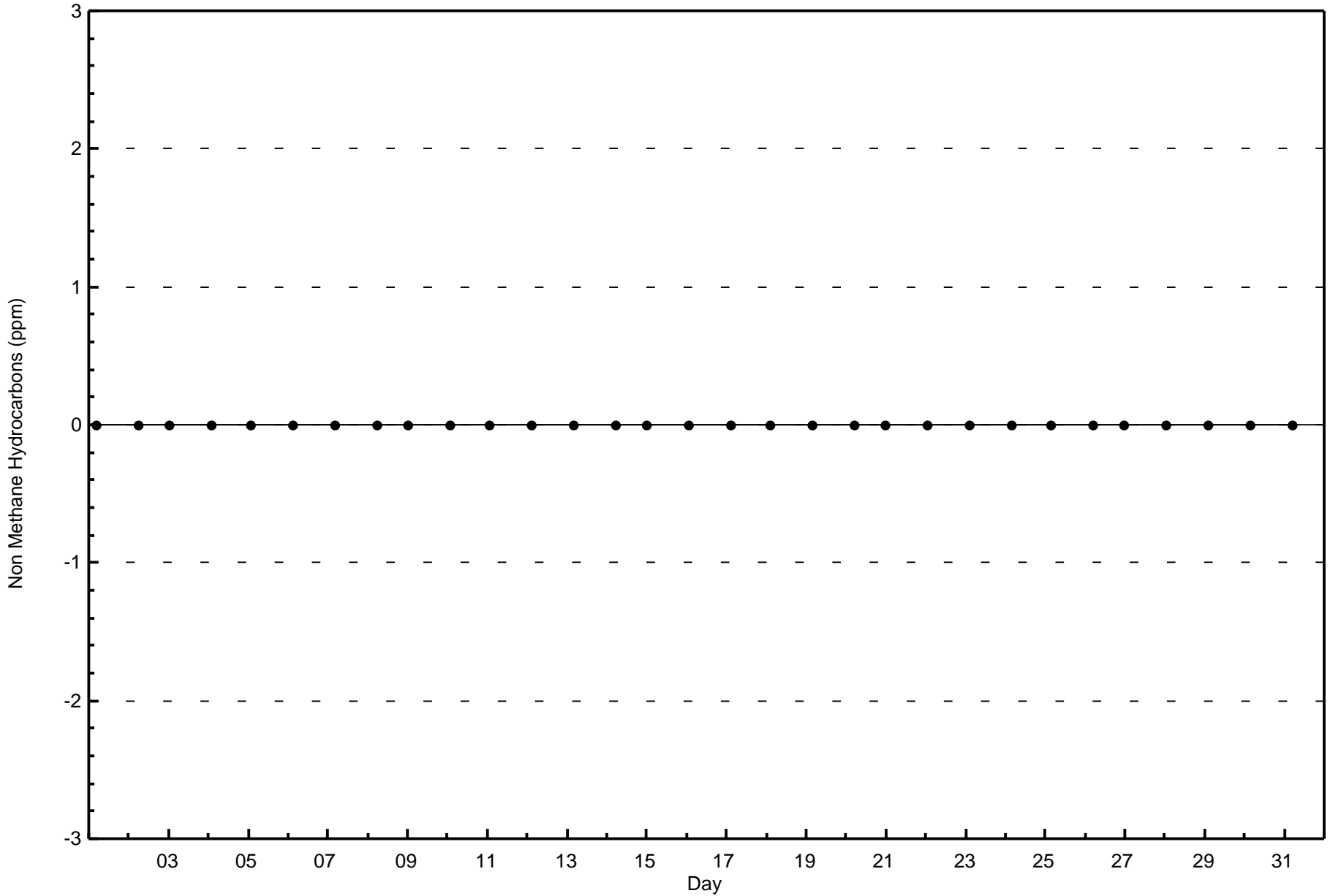
**Non Methane Hydrocarbons (NMHC) - ppm**  
**Conklin Lookout - October 2015**

<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	24	6	6	4	7	10	27	52	45	92	35	33	81	91	66	23	602
0.006 - 0.05	4	0	0	3	1	1	5	3	10	16	22	4	1	7	14	9	100
0.06 - 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	28	6	6	7	8	11	32	55	55	108	57	37	82	98	80	33	703

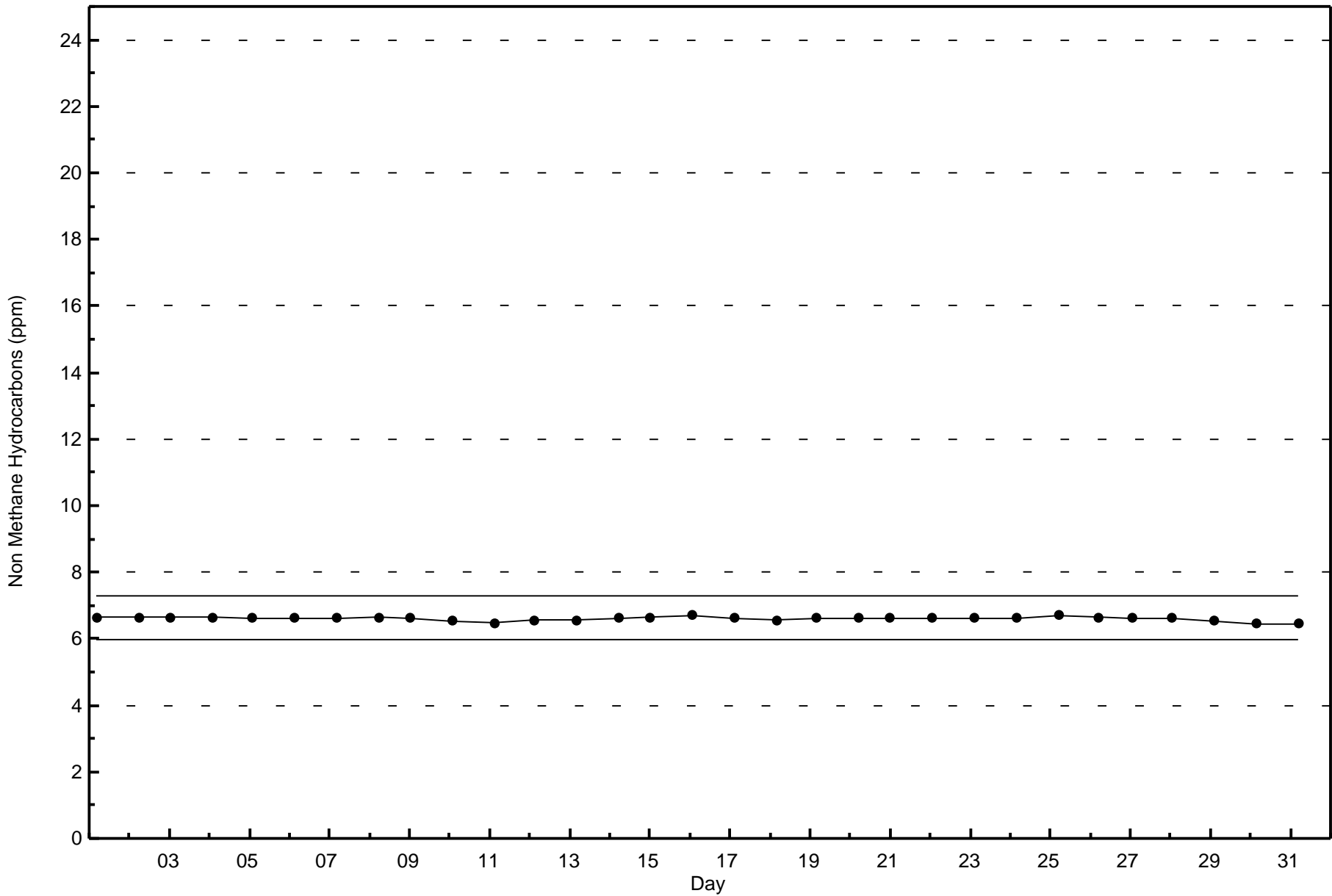
Total Number of Valid Hours: 703

Total Number of Hours: 744



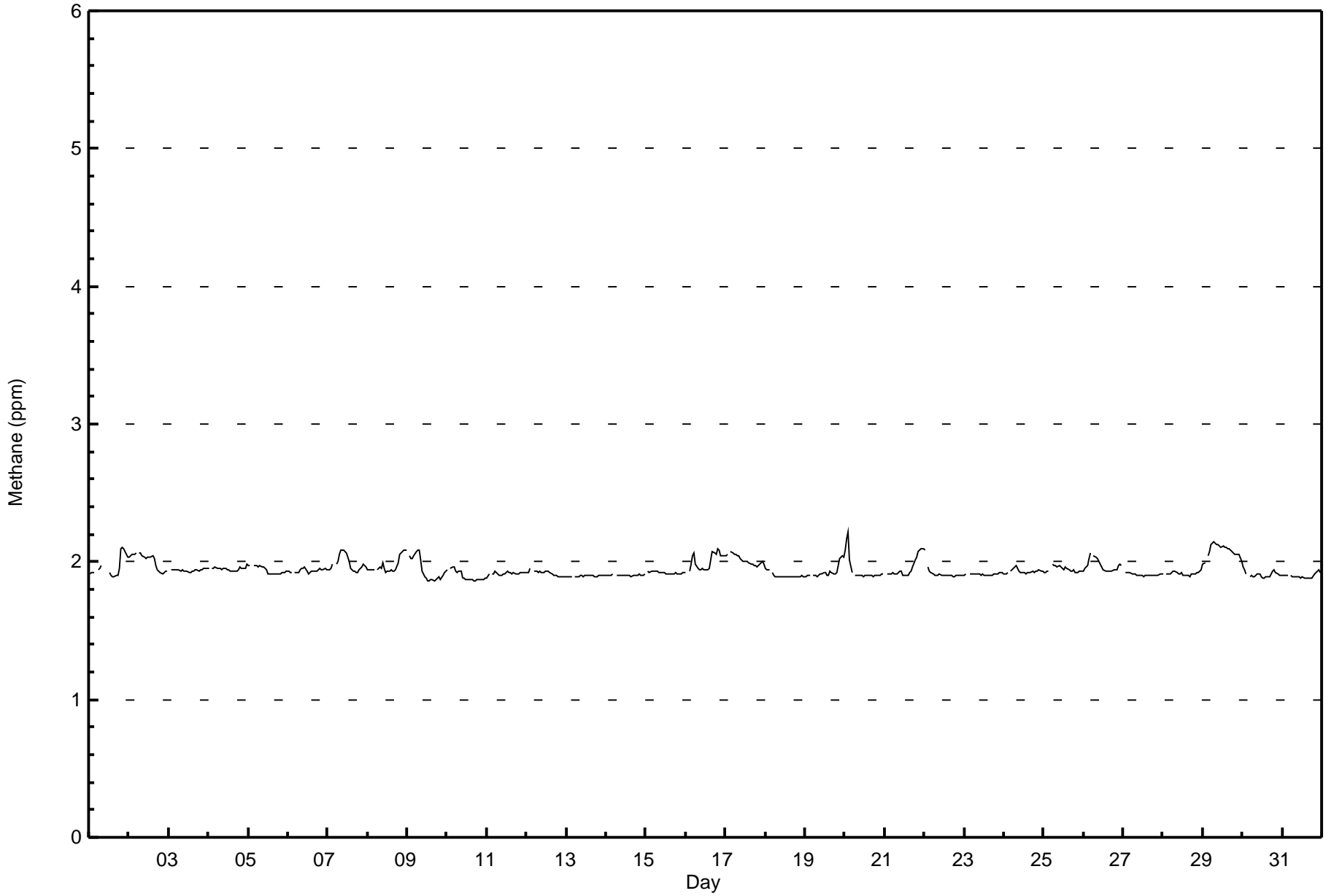








Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 2.2 ppm on Oct 20 03:00 Maximum Daily Average: 2.1 ppm on Oct 29																	Hours in Service: 744 Hours of Data: 709 Hours of Missing Data: 35 Hours of Calibration: 35 Percent Operational Time: 100.0										
Minimum Value: 1.9 ppm on Oct 9 14:00 Minimum Daily Average: 1.9 ppm on Oct 10 Maximum Diurnal Average: 2.0 ppm at hour 5 Minimum Diurnal Average: 1.9 ppm at hour 18 Monthly Average: 1.94 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> = 2.0 P <sub>99</sub> = 2.1																											
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	1.9	1.9	1.9	1.9	Z	1.9	2.0	2.0	C	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.1	2.1	2.1	2.0	2.0	2.1	
2-Oct	2.0	2.0	2.0	2.1	2.1	Z	2.1	2.1	2.0	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	2.0	2.1
3-Oct	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	2.0	2.0	2.0	1.9	2.0
4-Oct	2.0	Z	2.0	1.9	2.0	2.0	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	2.0	2.0	1.9	2.0	2.0	2.0	1.9	2.0
5-Oct	2.0	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	1.9	Z	1.9	1.9	1.9	1.9	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
7-Oct	1.9	1.9	2.0	2.0	Z	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1
8-Oct	1.9	1.9	1.9	1.9	1.9	Z	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.1
9-Oct	Z	2.0	2.0	2.0	2.0	2.1	2.1	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	2.1
10-Oct	1.9	Z	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	1.9	1.9	1.9	1.9	1.9	1.9	2.0
11-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	1.9
12-Oct	1.9	1.9	2.0	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	2.0
13-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
14-Oct	1.9	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
15-Oct	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	1.9
16-Oct	1.9	Z	1.9	2.0	2.0	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1
17-Oct	2.0	2.1	Z	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
18-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	1.9	1.9	1.9	2.0
19-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	2.0	2.0	2.0	2.0	2.0	1.9	2.0
20-Oct	2.1	2.2	2.2	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.2
21-Oct	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	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.1
22-Oct	2.1	Z	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	1.9	1.9	1.9	2.1
23-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	1.9
24-Oct	1.9	1.9	1.9	Z	1.9	1.9	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	1.9	1.9	2.0
25-Oct	1.9	1.9	1.9	1.9	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	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
26-Oct	1.9	2.0	2.0	2.0	2.1	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	2.0	2.0	2.0	2.0	2.0	2.1
27-Oct	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	1.9
28-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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
29-Oct	2.0	2.0	Z	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	2.1	2.1	2.1	2.1	2.1	2.1	2.1
30-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	1.9	1.9	1.9	2.0
31-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
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration																											





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

**Methane (CH<sub>4</sub>) - ppm**  
**Conklin Lookout - October 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	649	91.54	91.54
2.1 - 3.0	60	8.46	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



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

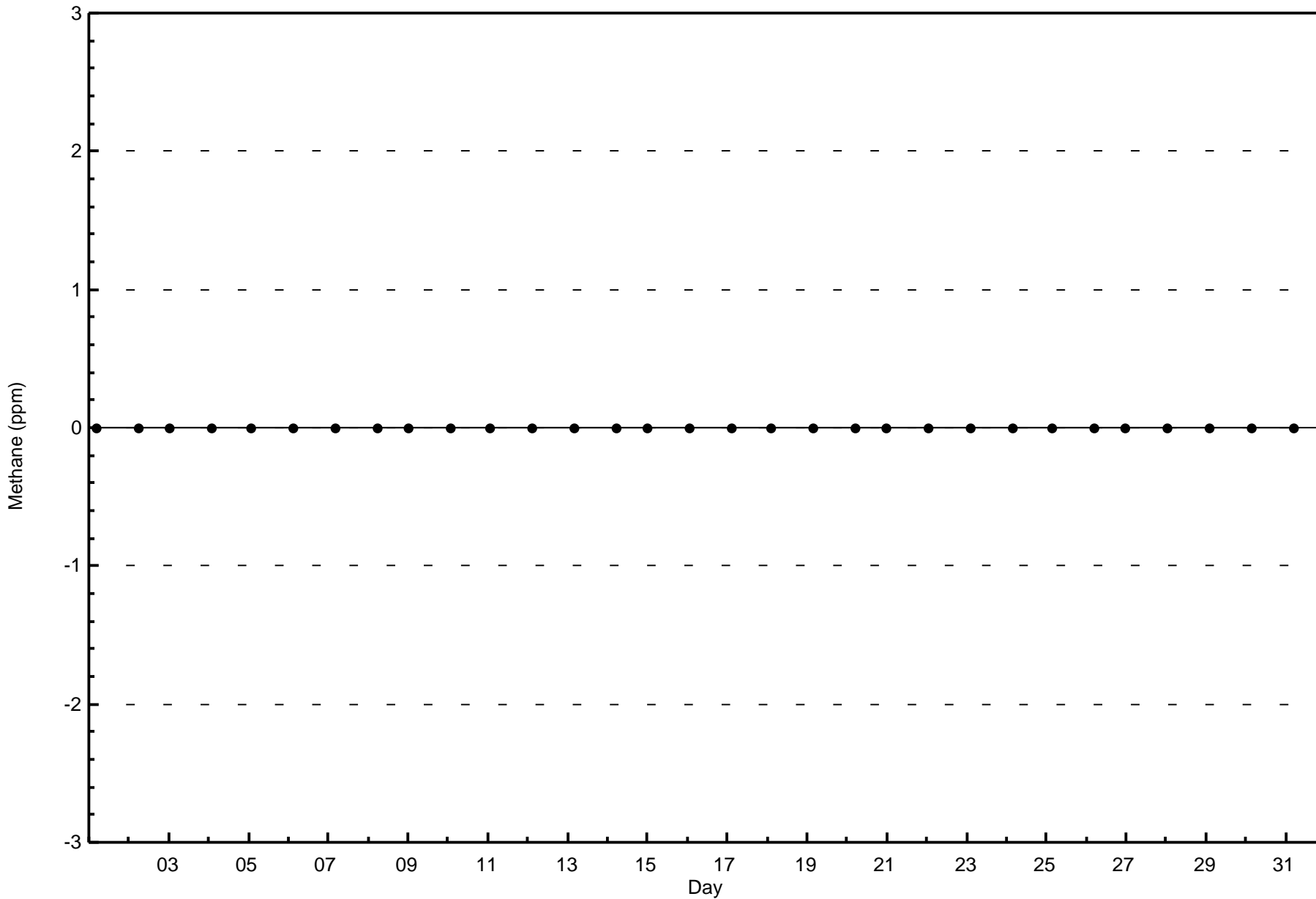
**Methane (CH<sub>4</sub>) - ppm**  
**Conklin Lookout - October 2015**

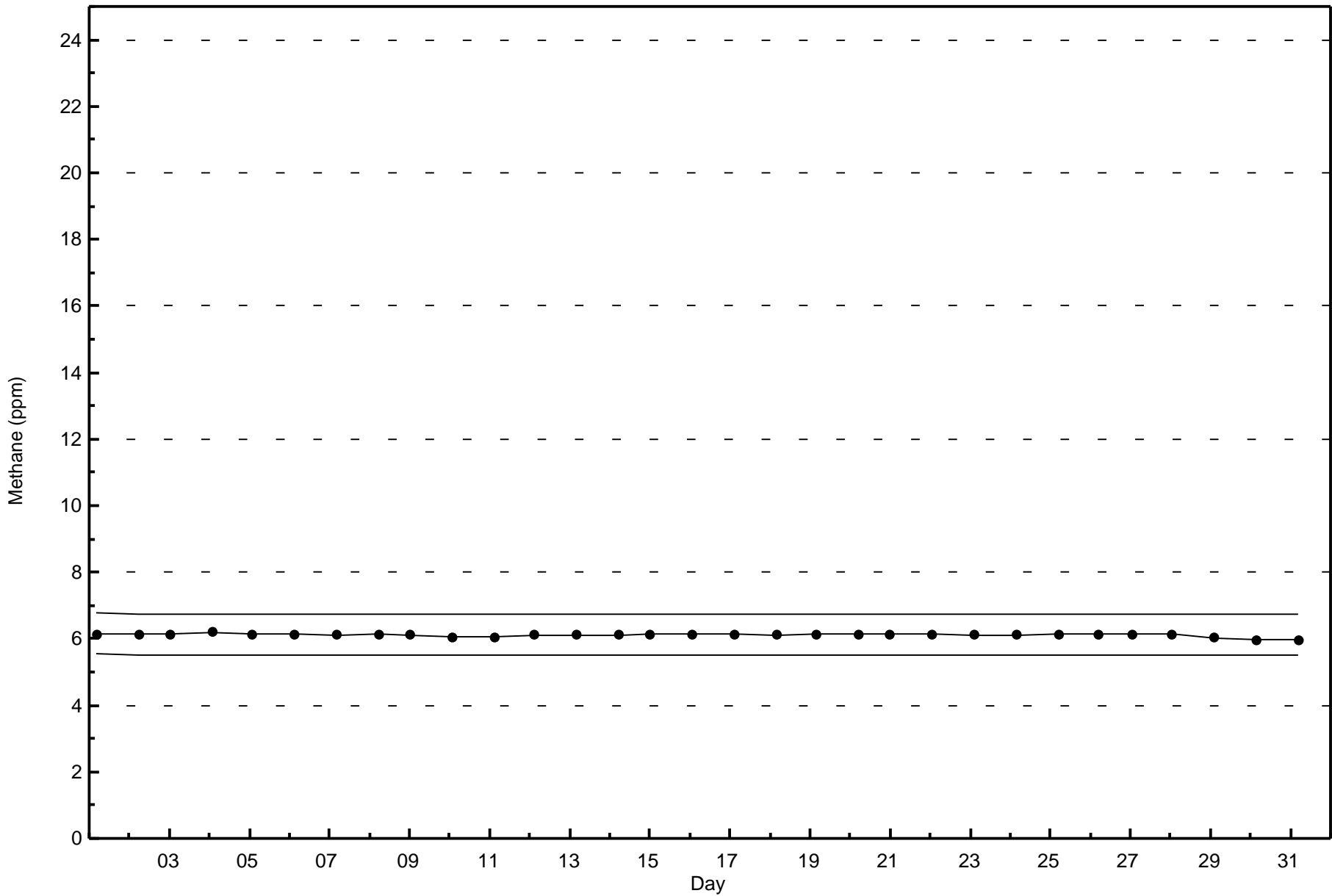
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	28	6	6	7	8	11	31	51	45	80	48	34	82	97	77	32	643
2.1 - 3.0	0	0	0	0	0	0	1	4	10	28	9	3	0	1	3	1	60
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	28	6	6	7	8	11	32	55	55	108	57	37	82	98	80	33	703

Total Number of Valid Hours: 703

Total Number of Hours: 744











Maximum Value: 2 ppb on Oct 3 16:00																	Maximum Daily Average: 0.3 ppb on Oct 3																	Hours in Service: 744	
Minimum Value: 0 ppb on Oct 1 01:00																	Minimum Daily Average: 0.0 ppb on Oct 27																	Hours of Data: 709	
Maximum Diurnal Average: 0.3 ppb at hour 11																	Minimum Diurnal Average: 0.0 ppb at hour 1																	Hours of Missing Data: 35	
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: 35	
																																		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	C	C	C	C	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	1	1	0	0	0	0	0	0	0	0.2	1									
3-Oct	Z	0	0	0	0	0	0	0	0	0	0	1	2	2	1	2	0	0	0	0	0	0	0	0	0.3	2									
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	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.2	1									
6-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	0.1	1									
7-Oct	0	0	0	0	Z	0	0	0	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0.2	1									
8-Oct	0	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1									
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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0									
11-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	0.1	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	0.1	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	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	0.0	0									
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	0.0	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	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									
19-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	0.1	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	0.0	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	0.1	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	0.0	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	0.0	0									
24-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.1	1									
25-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	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	0.1	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	0									
28-Oct	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.2	1									
29-Oct	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.2	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	0.0	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									
																								Diurnal Average											
																								Diurnal Maximum											
Z - zerospan      C - Calibration																																			

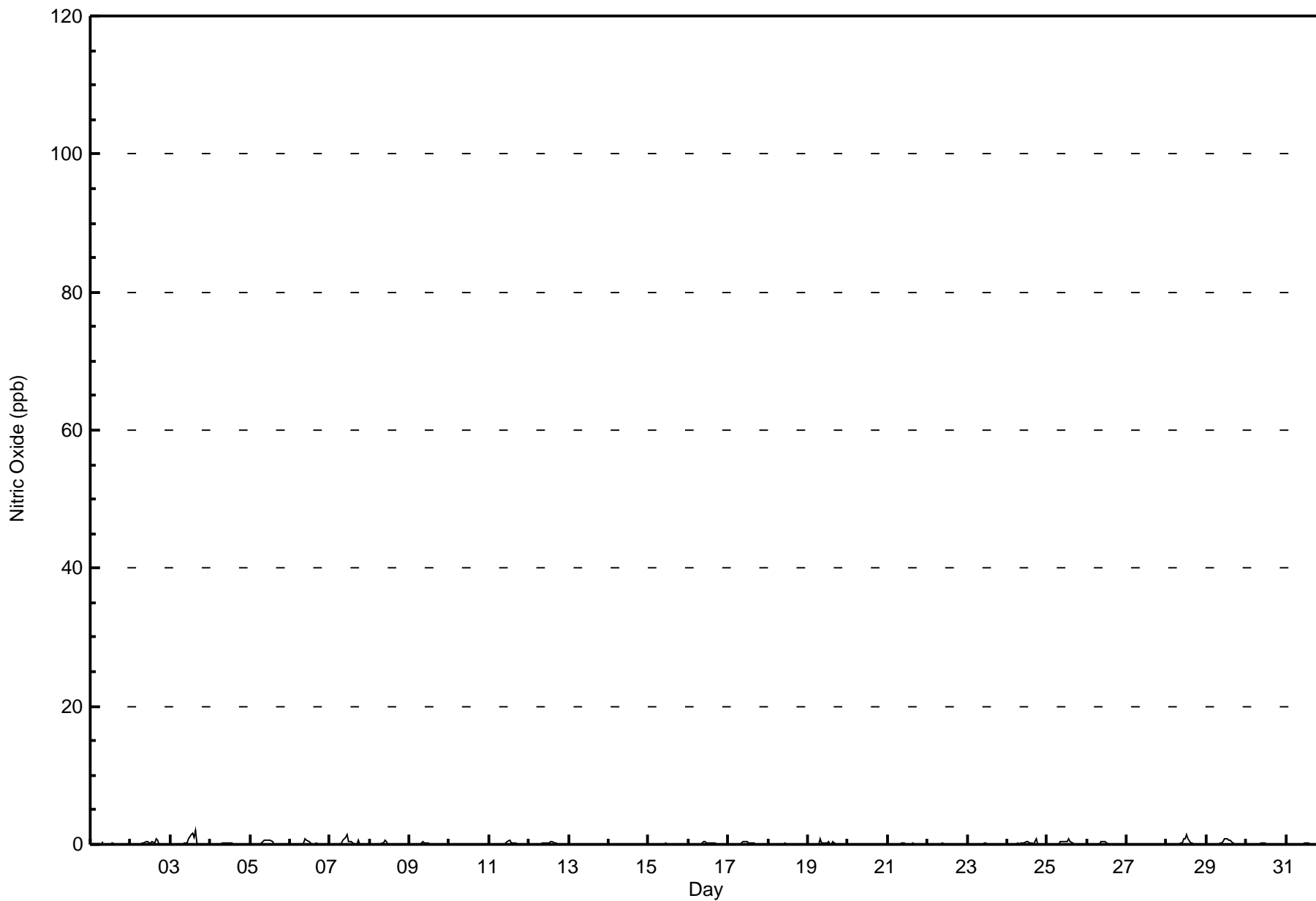


Wood Buffalo Environmental Association

Hourly Averages

Nitric Oxide (NO) - ppb

Conklin Lookout - October 2015





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

**Nitric Oxide (NO) - ppb**  
**Conklin Lookout - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	709	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: 709

Total Number of Hours: 744



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

**Nitric Oxide (NO) - ppb**  
**Conklin Lookout - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	28	6	6	7	8	11	32	55	55	108	57	37	82	98	80	33	703
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>	28	6	6	7	8	11	32	55	55	108	57	37	82	98	80	33	703

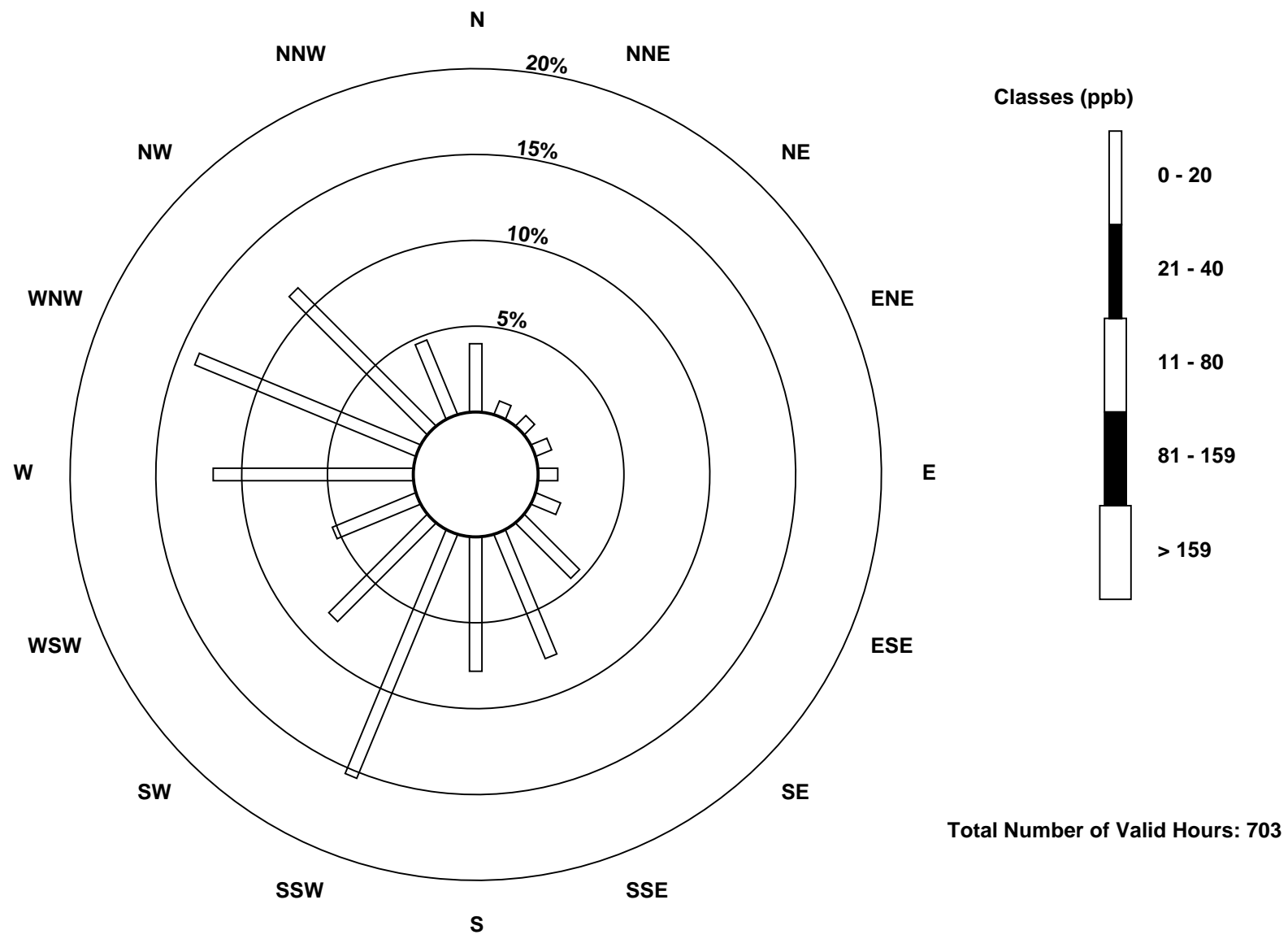
Total Number of Valid Hours: 703

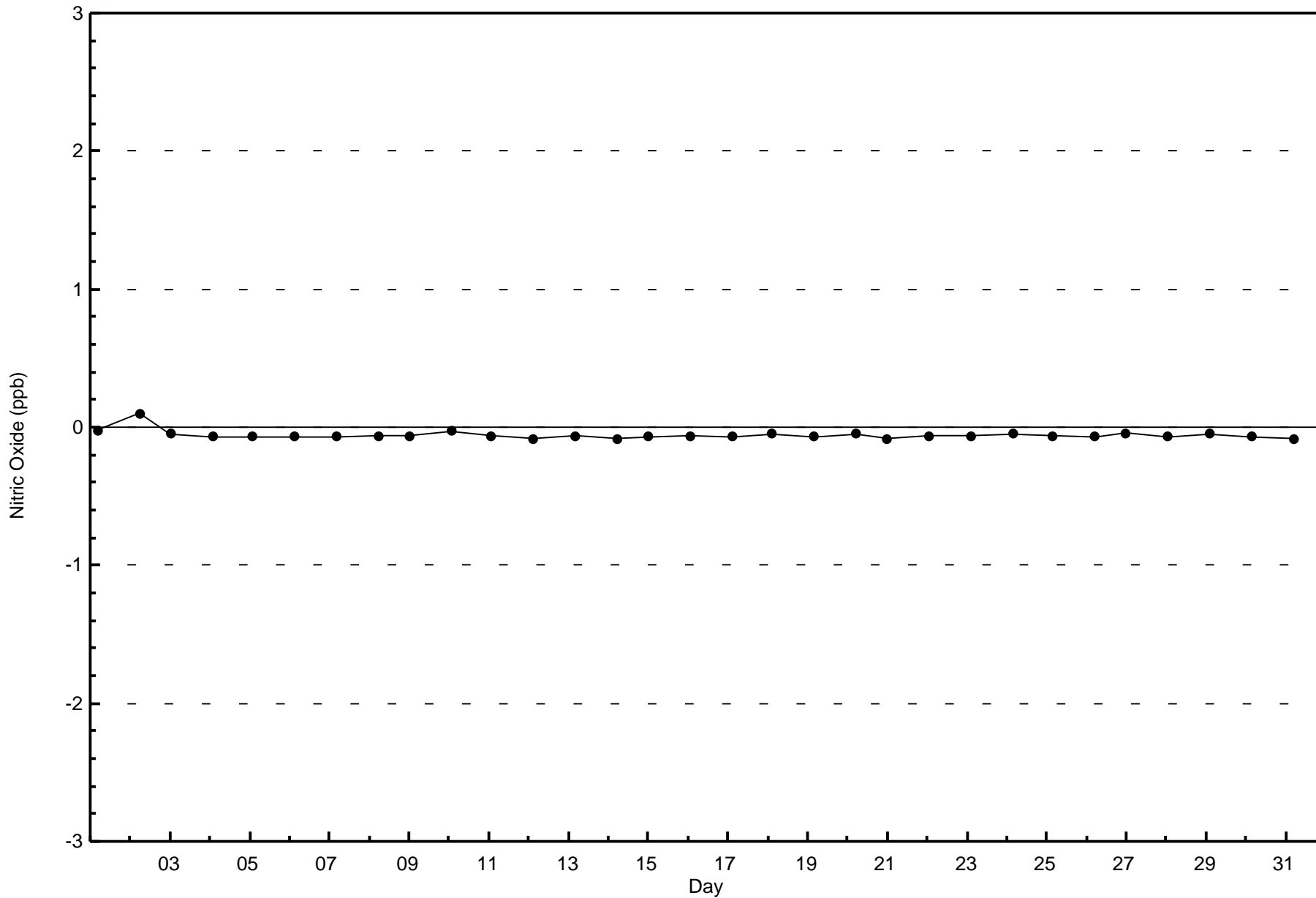
Total Number of Hours: 744

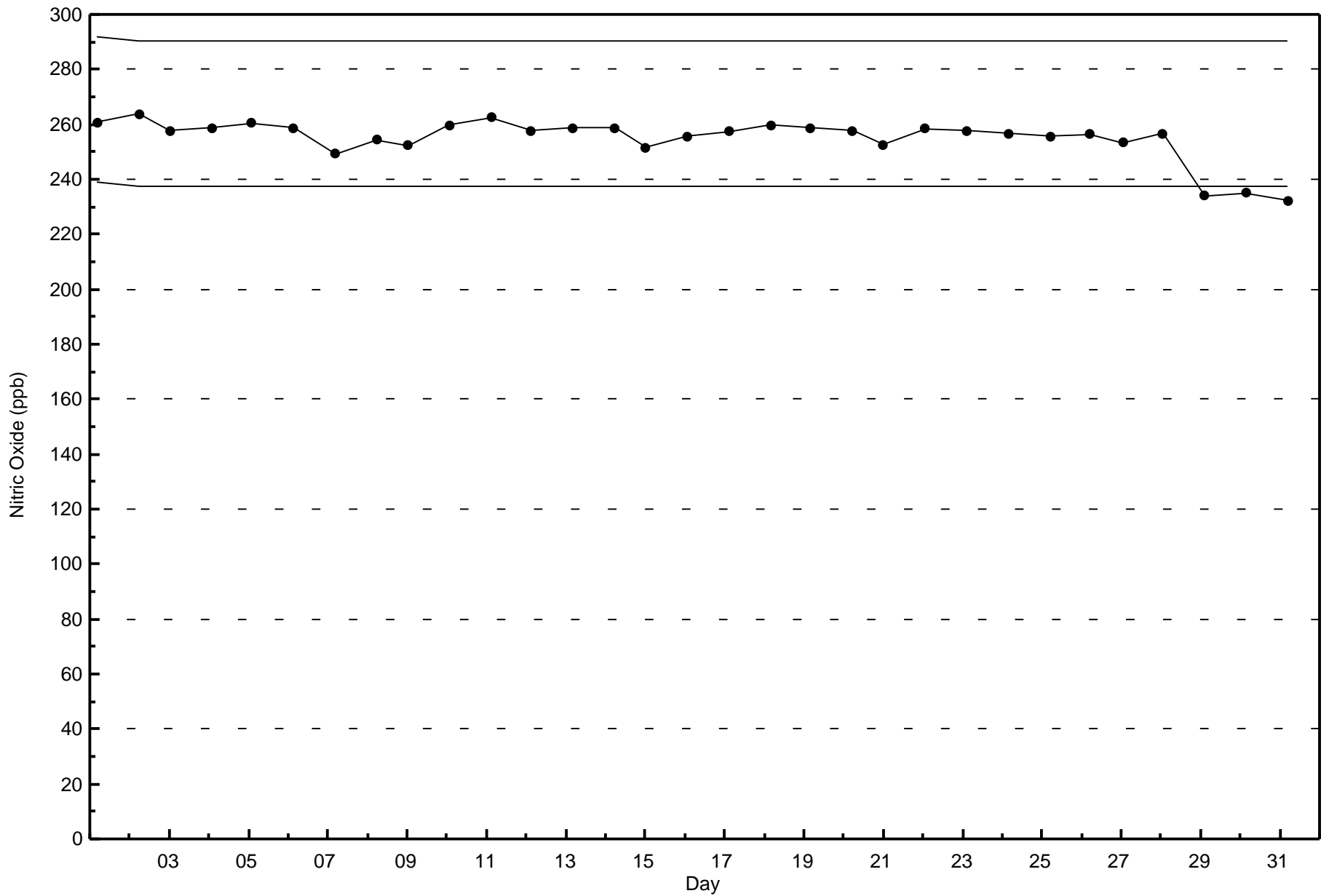


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Nitric Oxide (NO) - ppb  
Conklin Lookout (AMS 18)









Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 6 ppb on Oct 28 22:00	Maximum Daily Average: 2.7 ppb on Oct 29
Minimum Value: 0 ppb on Oct 5 16:00	Hours of Data: 709
Maximum Diurnal Average: 1.5 ppb at hour 23	Hours of Missing Data: 35
Monthly Average: 1.2 ppb	Hours of Calibration: 35
Minimum Daily Average: 0.2 ppb on Oct 27	Percent Operational Time: 100.0
Minimum Diurnal Average: 0.8 ppb at hour 15	
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> = 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	2	3	5	5	Z	5	4	4	C	C	C	C	1	1	1	1	1	1	1	2	2	2	2	2	2.2	5
2-Oct	2	2	2	2	2	Z	2	2	2	2	1	1	1	1	1	3	4	3	3	2	1	2	3	2	1.9	4
3-Oct	Z	1	1	1	1	1	1	1	1	1	0	1	2	3	2	3	2	2	2	1	1	2	2	2	1.3	3
4-Oct	1	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	4	2	2	2	1.0	4
5-Oct	1	1	Z	1	1	1	1	2	2	1	1	1	1	1	0	0	0	0	1	0	1	0	0	1	0.8	2
6-Oct	1	1	1	Z	0	1	1	1	1	2	2	1	1	1	1	2	3	3	3	3	3	2	1	1	1.3	3
7-Oct	1	1	1	2	Z	2	2	2	3	3	3	2	2	2	1	1	1	1	1	1	1	1	2	2	1.4	3
8-Oct	1	1	1	1	1	Z	2	3	2	2	1	1	1	1	1	1	1	1	2	3	3	2	3	3	1.6	3
9-Oct	Z	3	3	2	2	3	3	3	2	1	1	1	0	0	1	1	1	3	1	1	1	2	2	2	1.6	3
10-Oct	3	Z	3	3	3	2	2	2	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1.1	3
11-Oct	1	2	Z	2	2	1	1	1	1	0	1	2	2	1	0	0	0	0	0	0	0	0	1	0	0.8	2
12-Oct	1	0	0	Z	0	1	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.6	1
13-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0.3	1
14-Oct	1	1	1	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
15-Oct	Z	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0	1	0.4	1
16-Oct	1	Z	1	1	3	3	2	2	1	2	1	1	1	1	1	1	2	2	2	2	2	2	2	2	1.6	3
17-Oct	2	2	Z	2	2	2	2	2	2	1	1	1	1	1	2	1	1	1	2	2	2	2	2	2	1.5	2
18-Oct	2	3	3	Z	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	0.8	3
19-Oct	1	1	1	1	Z	1	0	1	1	1	1	1	1	0	1	4	2	1	1	2	3	4	3	2	1.4	4
20-Oct	2	3	4	2	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.7	4
21-Oct	Z	1	1	1	1	1	1	1	1	1	1	1	0	1	1	2	2	2	3	4	3	3	3	3	1.4	4
22-Oct	3	Z	2	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.8	3
23-Oct	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
24-Oct	1	1	1	Z	1	1	2	3	2	2	1	1	1	1	1	2	2	3	2	2	1	2	1	1	1.4	3
25-Oct	1	1	1	1	Z	3	2	1	1	1	1	1	1	4	3	3	2	2	2	2	1	1	2	2	1.6	4
26-Oct	1	2	2	3	2	Z	2	2	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.5	3
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	1	1	1	1	1	2	1	1	2	2	2	2	1	1	1	1	1	2	4	6	4	2	1.6	6
29-Oct	2	1	Z	1	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	4	4	5	4	2.7	5
30-Oct	3	2	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	1	2	3	2	2	1	1	1	1.3	3
31-Oct	1	1	1	1	Z	1	0	0	0	0	0	1	1	1	1	1	1	1	1	2	2	2	3	2	1.0	3
	1.2	1.3	1.4	1.4	1.2	1.3	1.2	1.3	1.2	1.0	1.0	0.9	0.9	0.9	0.8	1.0	1.0	1.2	1.2	1.4	1.4	1.5	1.5	1.3		Diurnal Average
	3	3	5	5	3	5	4	4	3	3	3	3	3	3	4	3	4	4	3	3	4	4	6	5	4	Diurnal Maximum

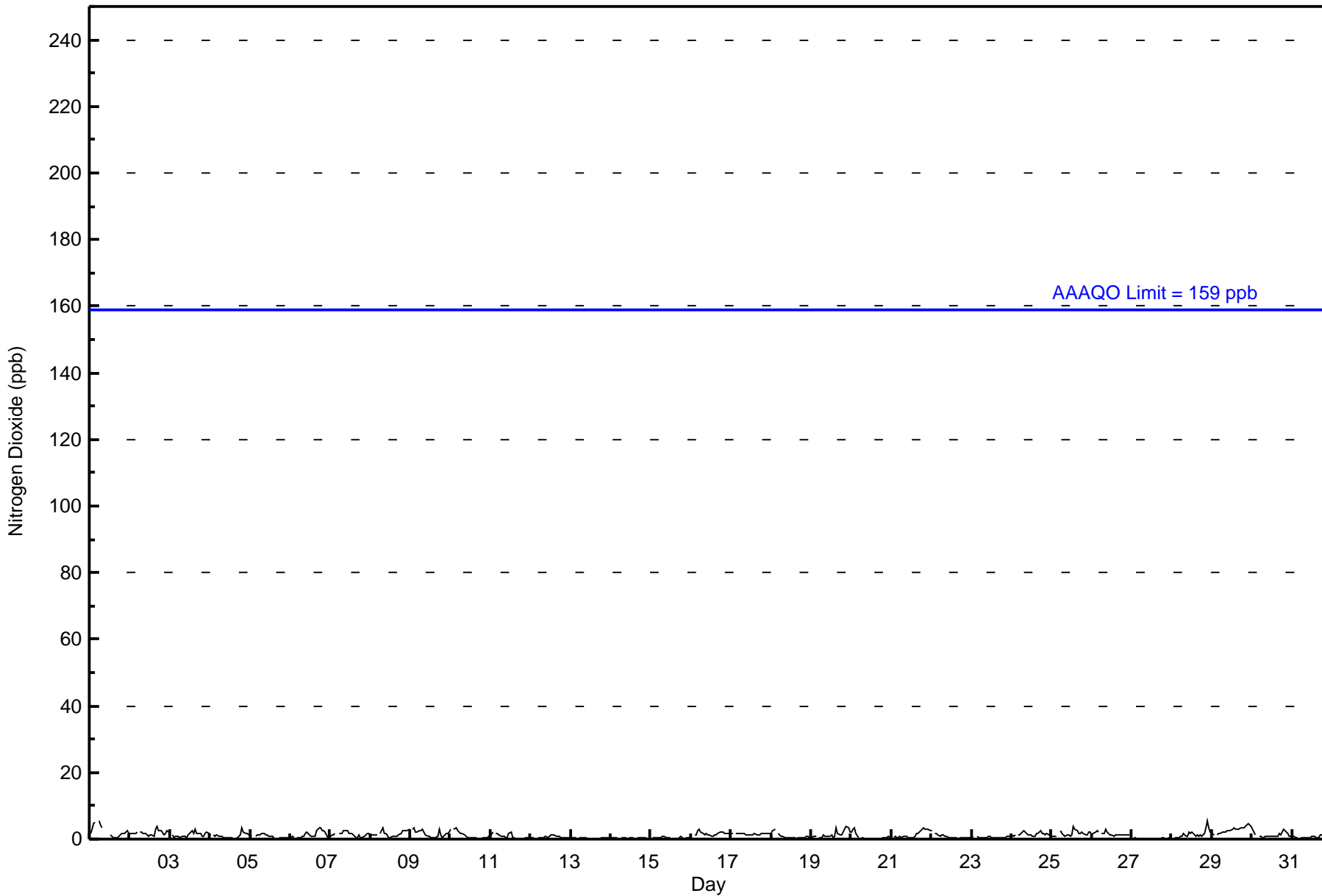
Z - zerospan C - Calibration  
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb





Wood Buffalo Environmental Association  
Hourly Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Conklin Lookout - October 2015





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Conklin Lookout - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	709	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: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Conklin Lookout - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	28	6	6	7	8	11	32	55	55	108	57	37	82	98	80	33	703
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>	28	6	6	7	8	11	32	55	55	108	57	37	82	98	80	33	703

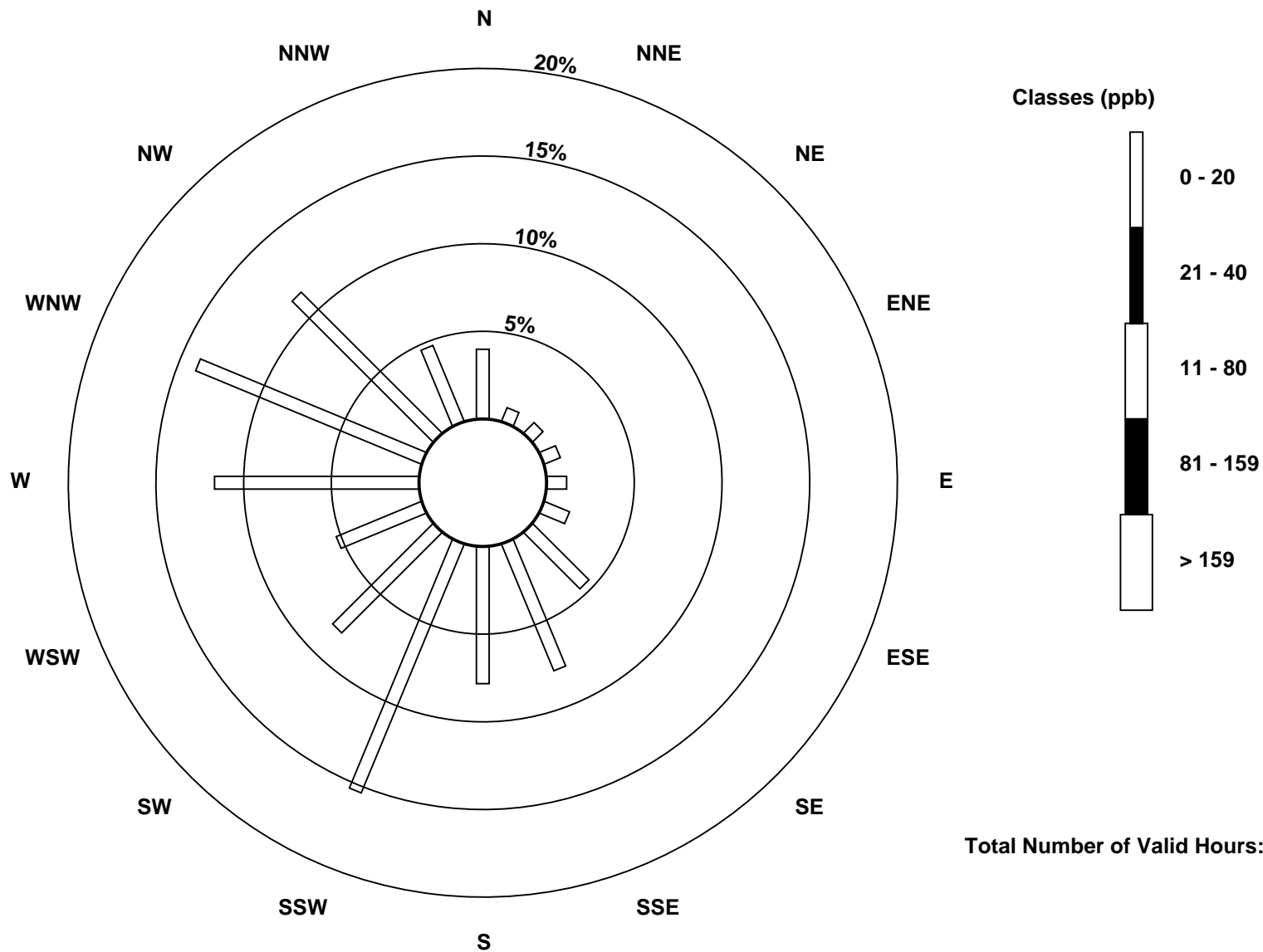
Total Number of Valid Hours: 703

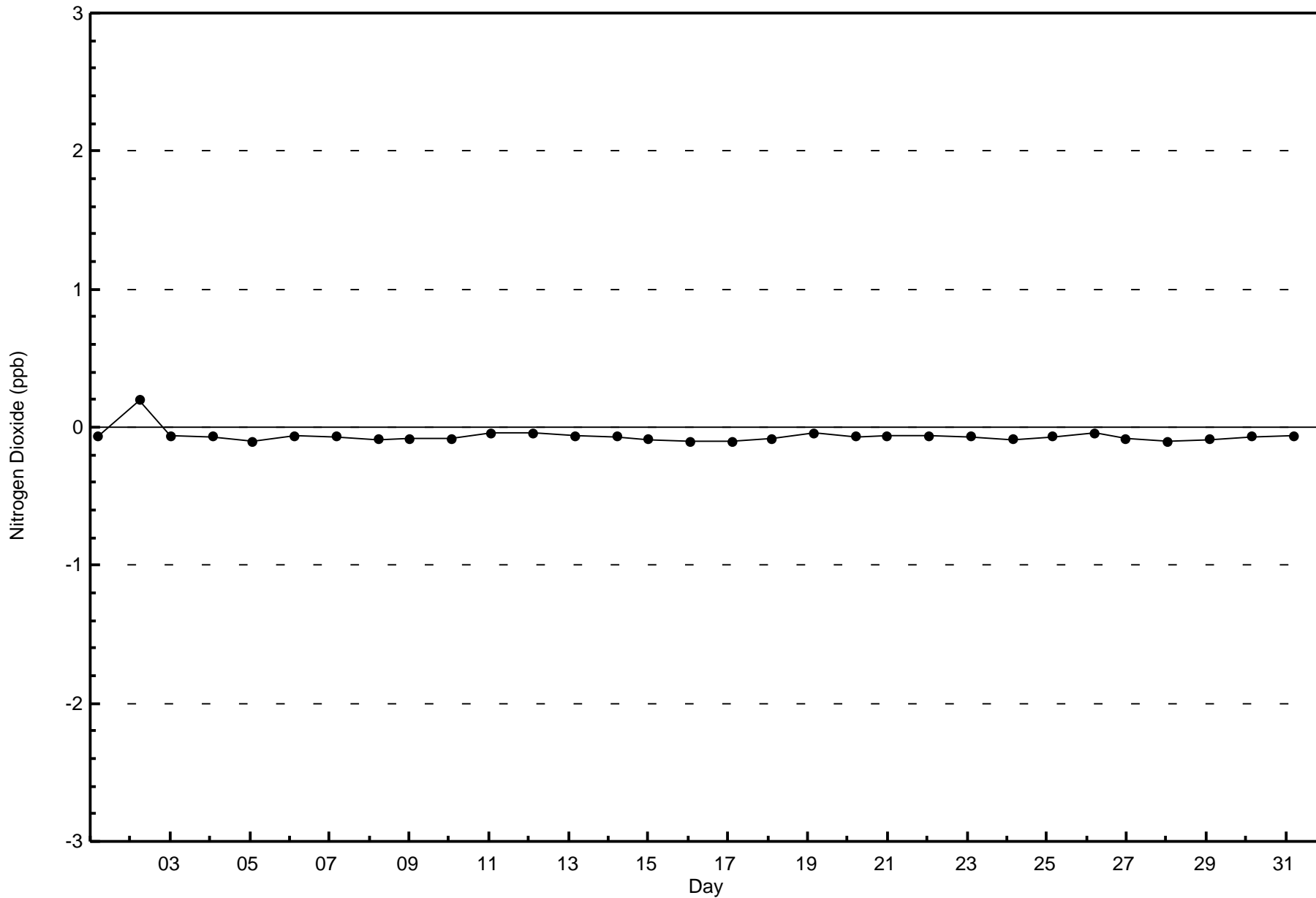
Total Number of Hours: 744

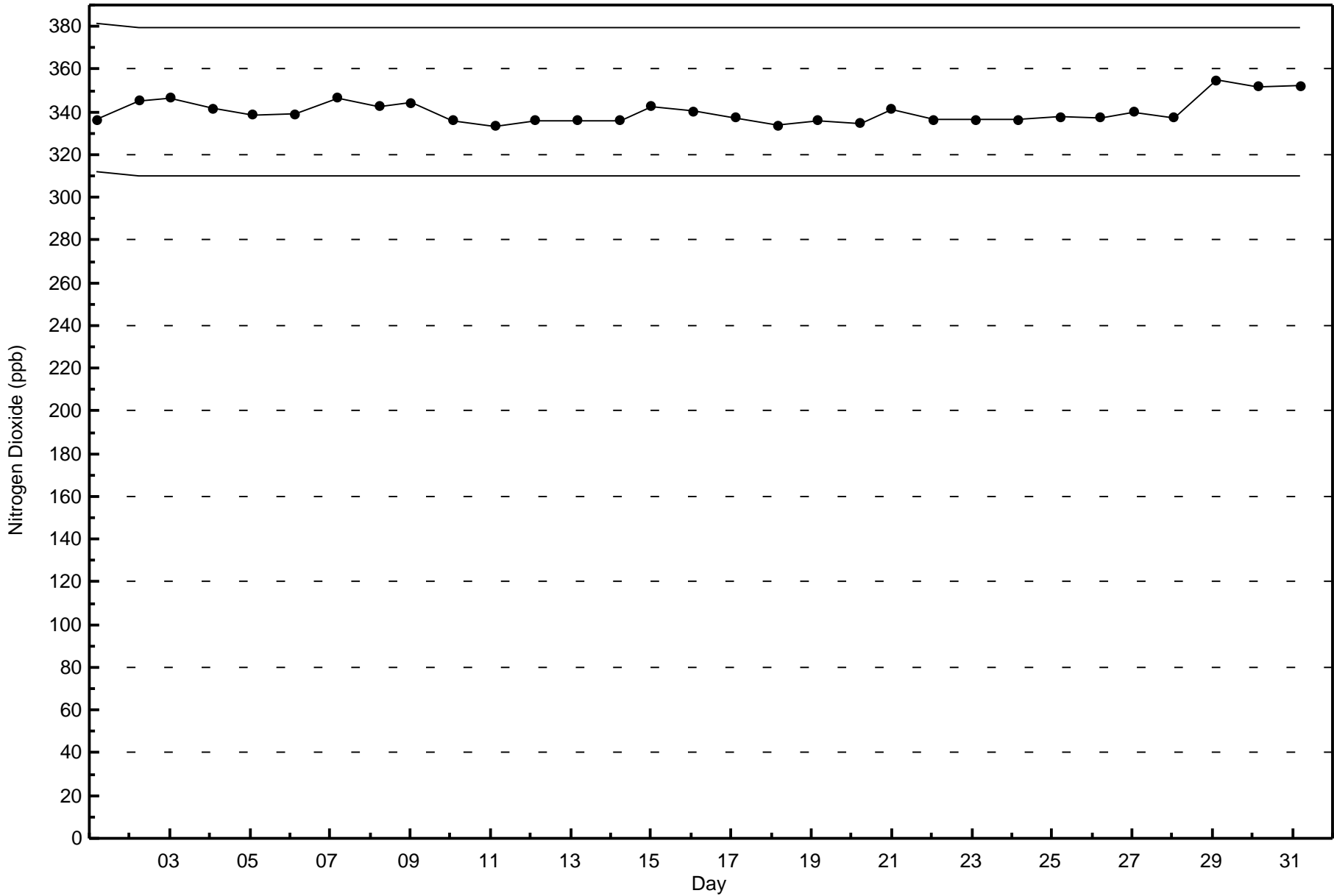


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Conklin Lookout (AMS 18)

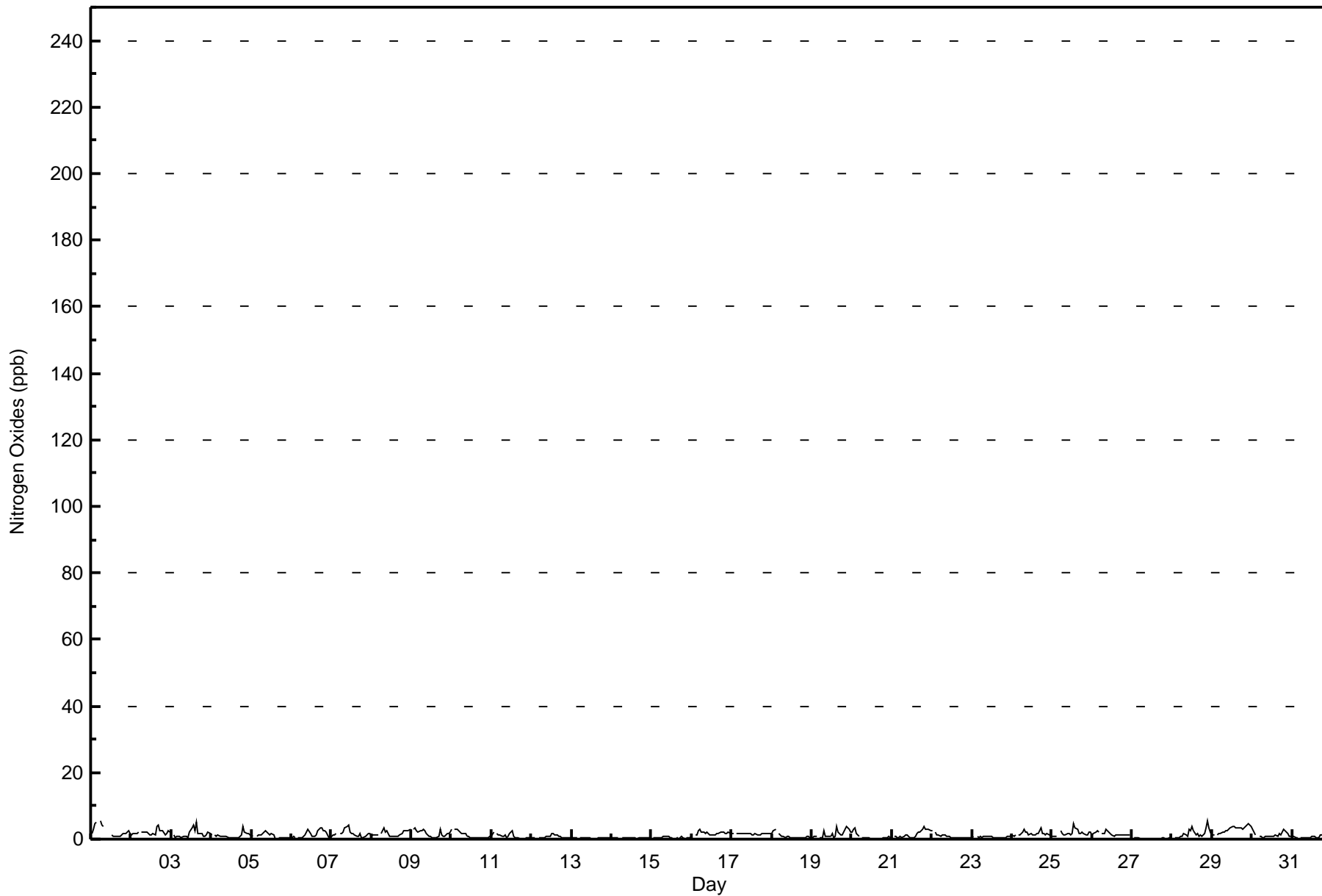








Maximum Value: 5 ppb on Oct 28 22:00																	Maximum Daily Average: 2.9 ppb on Oct 29																	Hours in Service: 744			
Minimum Value: 0 ppb on Oct 11 20:00																	Minimum Daily Average: 0.2 ppb on Oct 27																	Hours of Data: 709			
Maximum Diurnal Average: 1.5 ppb at hour 23																	Minimum Diurnal Average: 1.0 ppb at hour 15																	Hours of Missing Data: 35			
Monthly Average: 1.3 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> = 3 P <sub>99</sub> = 4																	Hours of Calibration: 35			
																																		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	5	5	Z	5	4	4	C	C	C	C	1	1	1	1	1	1	1	2	2	2	2	2	2.3	5											
2-Oct	1	2	2	2	2	Z	2	2	2	2	2	1	1	2	1	4	4	3	3	2	1	2	2	2	2.0	4											
3-Oct	Z	1	1	1	1	1	0	1	1	1	1	2	4	4	3	5	2	2	2	1	1	1	2	2	1.6	5											
4-Oct	1	Z	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	1	1	4	2	2	2	1.1	4											
5-Oct	1	1	Z	1	1	1	1	2	2	2	2	1	2	1	0	0	0	0	1	0	1	0	0	1	0.9	2											
6-Oct	0	1	1	Z	0	0	0	1	1	2	3	2	1	1	1	1	3	3	3	3	2	2	1	1	1.4	3											
7-Oct	1	1	1	2	Z	2	2	2	3	4	4	2	2	2	1	1	1	2	1	1	1	1	2	2	1.7	4											
8-Oct	1	1	1	1	1	Z	2	3	2	2	2	1	1	1	1	1	1	1	2	3	3	2	3	3	1.7	3											
9-Oct	Z	3	3	2	2	3	3	3	3	2	1	1	0	0	0	1	1	3	1	1	1	2	2	2	1.7	3											
10-Oct	3	Z	3	3	3	2	2	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1.1	3											
11-Oct	1	2	Z	2	1	1	1	1	1	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0.8	2											
12-Oct	1	0	0	Z	0	0	0	0	0	1	1	1	2	2	1	1	1	1	0	0	0	0	0	0	0.7	2											
13-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.3	1											
14-Oct	1	1	1	1	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1											
15-Oct	Z	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0.5	1											
16-Oct	1	Z	1	1	3	3	2	2	2	2	2	1	1	1	1	2	2	2	2	2	2	2	2	2	1.8	3											
17-Oct	2	2	Z	2	2	2	2	2	2	2	2	2	1	1	2	1	1	1	2	2	2	2	2	2	1.6	2											
18-Oct	2	3	3	Z	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	0.8	3											
19-Oct	1	1	1	1	Z	1	0	2	1	1	1	1	2	0	1	4	2	1	1	2	3	4	3	2	1.5	4											
20-Oct	2	3	4	2	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.7	4											
21-Oct	Z	1	1	1	1	1	1	1	1	1	1	1	0	1	1	2	2	2	3	4	3	3	3	3	1.5	4											
22-Oct	3	Z	2	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.8	3											
23-Oct	1	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											
24-Oct	1	1	1	Z	1	1	2	3	2	2	1	2	1	1	1	2	2	3	2	2	1	2	1	1	1.6	3											
25-Oct	1	1	1	1	Z	3	2	1	1	2	2	1	2	5	3	3	2	2	2	2	1	1	2	2	1.8	5											
26-Oct	1	2	2	3	2	Z	2	2	3	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1.6	3											
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	1	1	1	1	1	2	1	1	3	2	4	2	1	2	1	1	1	2	4	5	4	2	1.8	5											
29-Oct	1	1	Z	1	2	2	2	2	2	3	3	3	4	4	4	3	3	3	3	3	4	4	5	4	2.9	5											
30-Oct	3	2	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	2	2	1	1	1.3	3											
31-Oct	1	1	1	1	Z	1	0	0	0	0	0	1	1	1	1	0	1	1	1	2	2	2	3	2	1.0	3											
																	1.2 1.3 1.4 1.4 1.2 1.3 1.2 1.4 1.3 1.3 1.3 1.1 1.2 1.2 1.0 1.2 1.1 1.3 1.2 1.4 1.4 1.5 1.5 1.3																	Diurnal Average			
																	3 3 5 5 3 5 4 4 3 4 4 3 4 5 4 5 4 3 3 4 4 5 5 4																	Diurnal Maximum			
Z - zerospan		C - Calibration																																			







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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Conklin Lookout - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	709	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: 709

Total Number of Hours: 744



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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Conklin Lookout - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	28	6	6	7	8	11	32	55	55	108	57	37	82	98	80	33	703
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>	28	6	6	7	8	11	32	55	55	108	57	37	82	98	80	33	703

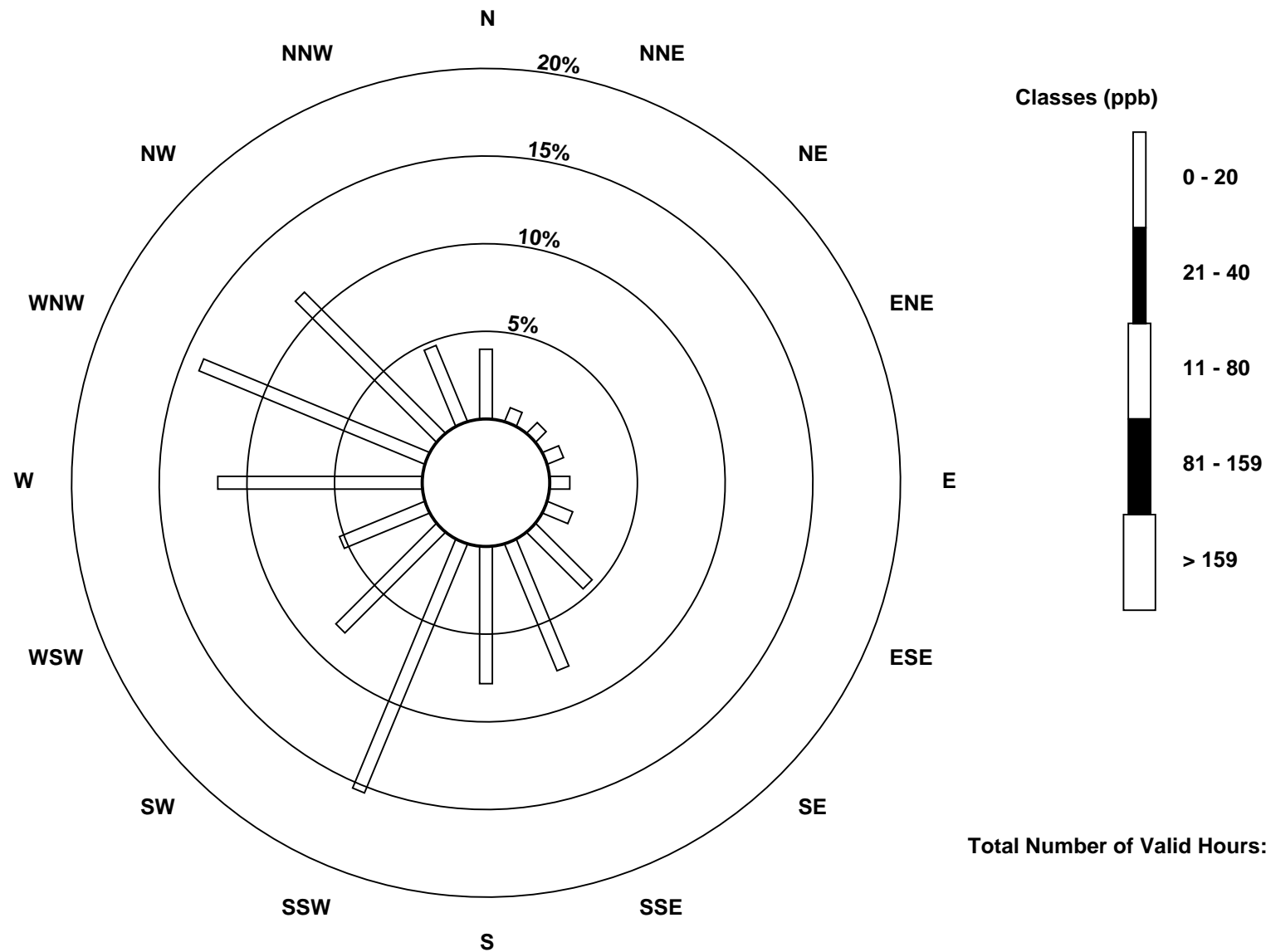
Total Number of Valid Hours: 703

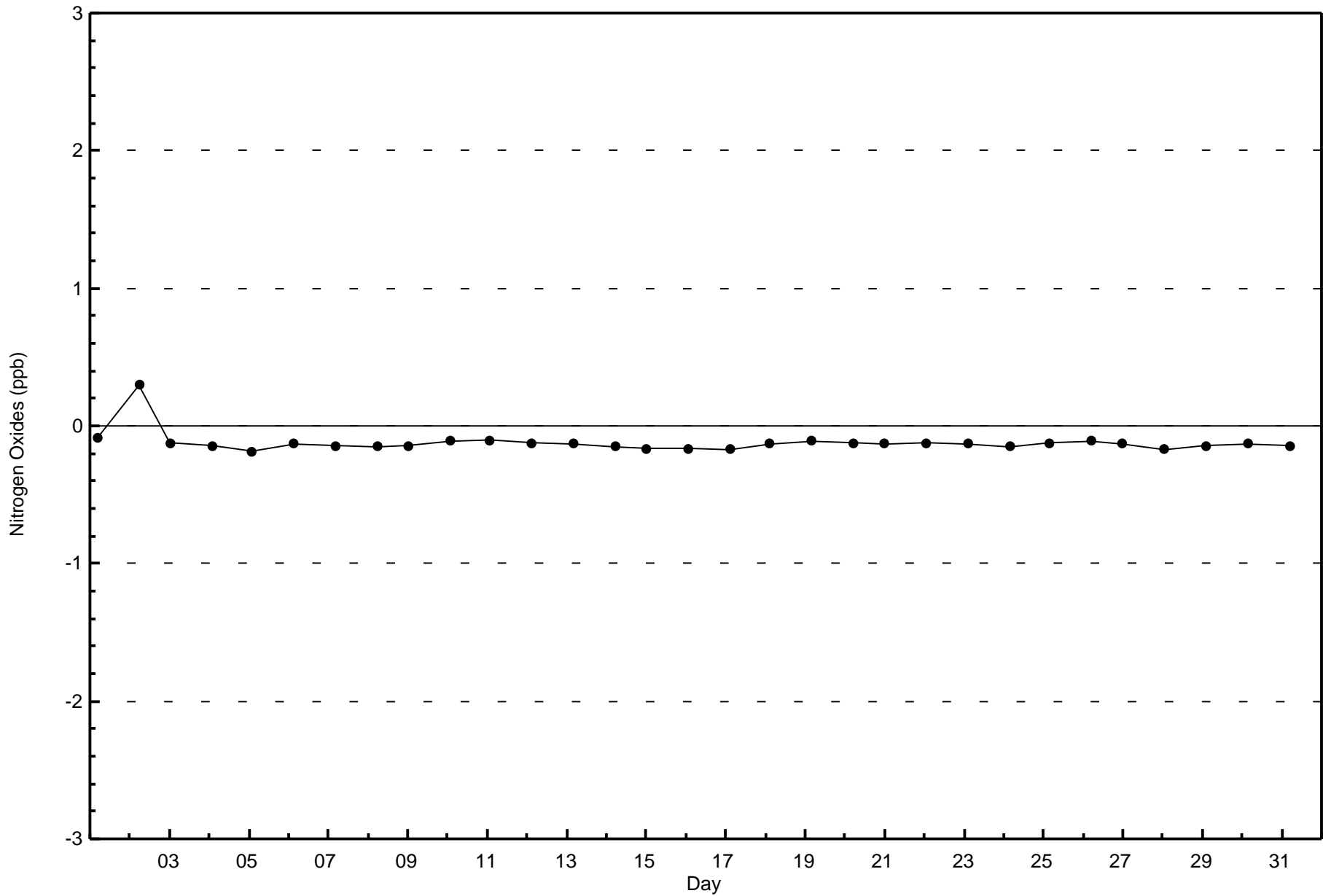
Total Number of Hours: 744

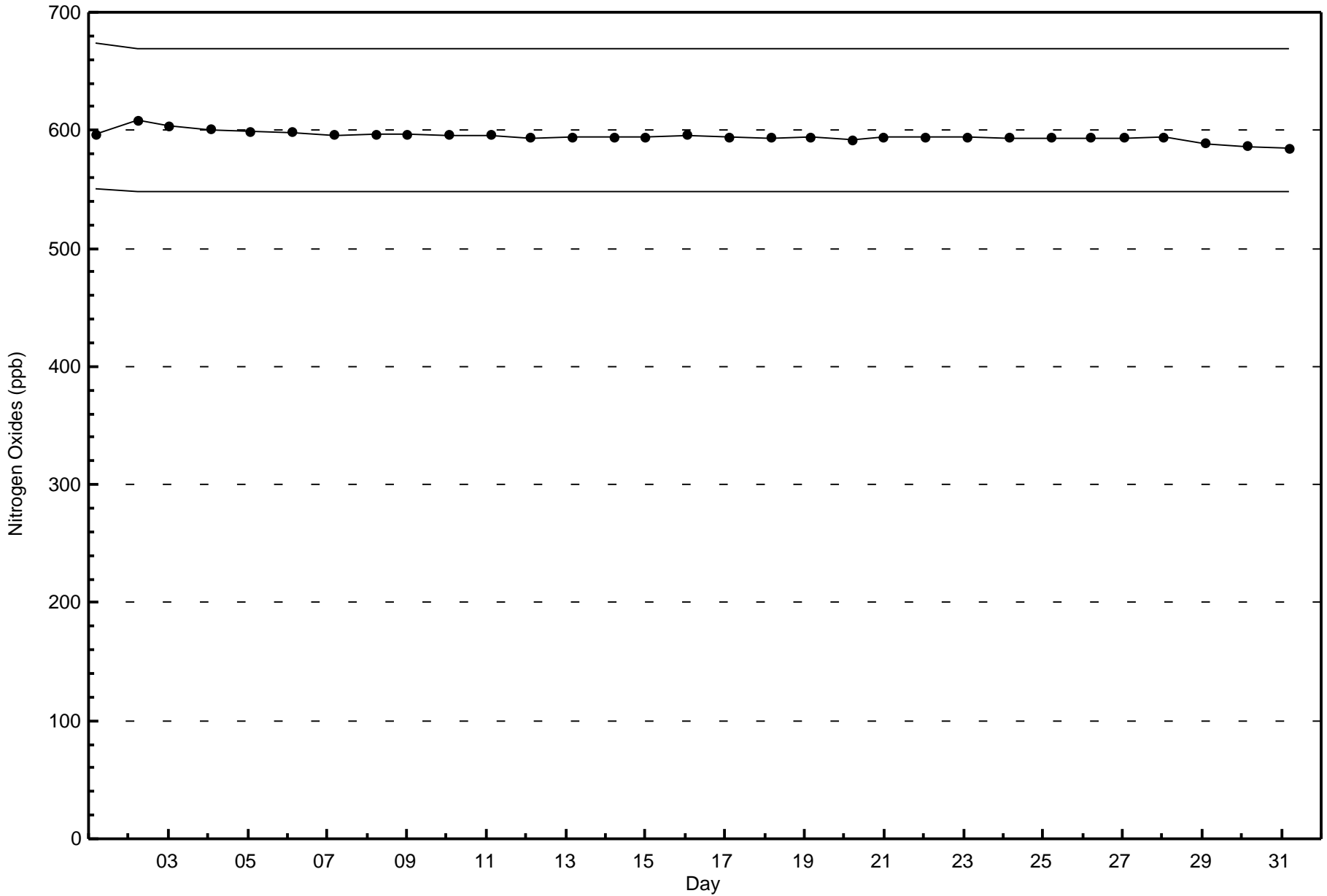


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Conklin Lookout (AMS 18)









Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 49 ppb on Oct 10 15:00	Maximum Daily Average: 40.7 ppb on Oct 18		Hours of Data:	709
Minimum Value: 13 ppb on Oct 12 04:00	Minimum Daily Average: 20.7 ppb on Oct 29		Hours of Missing Data:	35
Maximum Diurnal Average: 36.7 ppb at hour 15	Minimum Diurnal Average: 28.4 ppb at hour 9		Hours of Calibration:	34
Monthly Average: 32.4 ppb	Percentiles: P <sub>1</sub> = 14 P <sub>10</sub> = 21 Q <sub>1</sub> = 27 Median = 34 Q <sub>3</sub> = 38 P <sub>90</sub> = 42 P <sub>99</sub> = 47		Percent Operational Time:	99.9

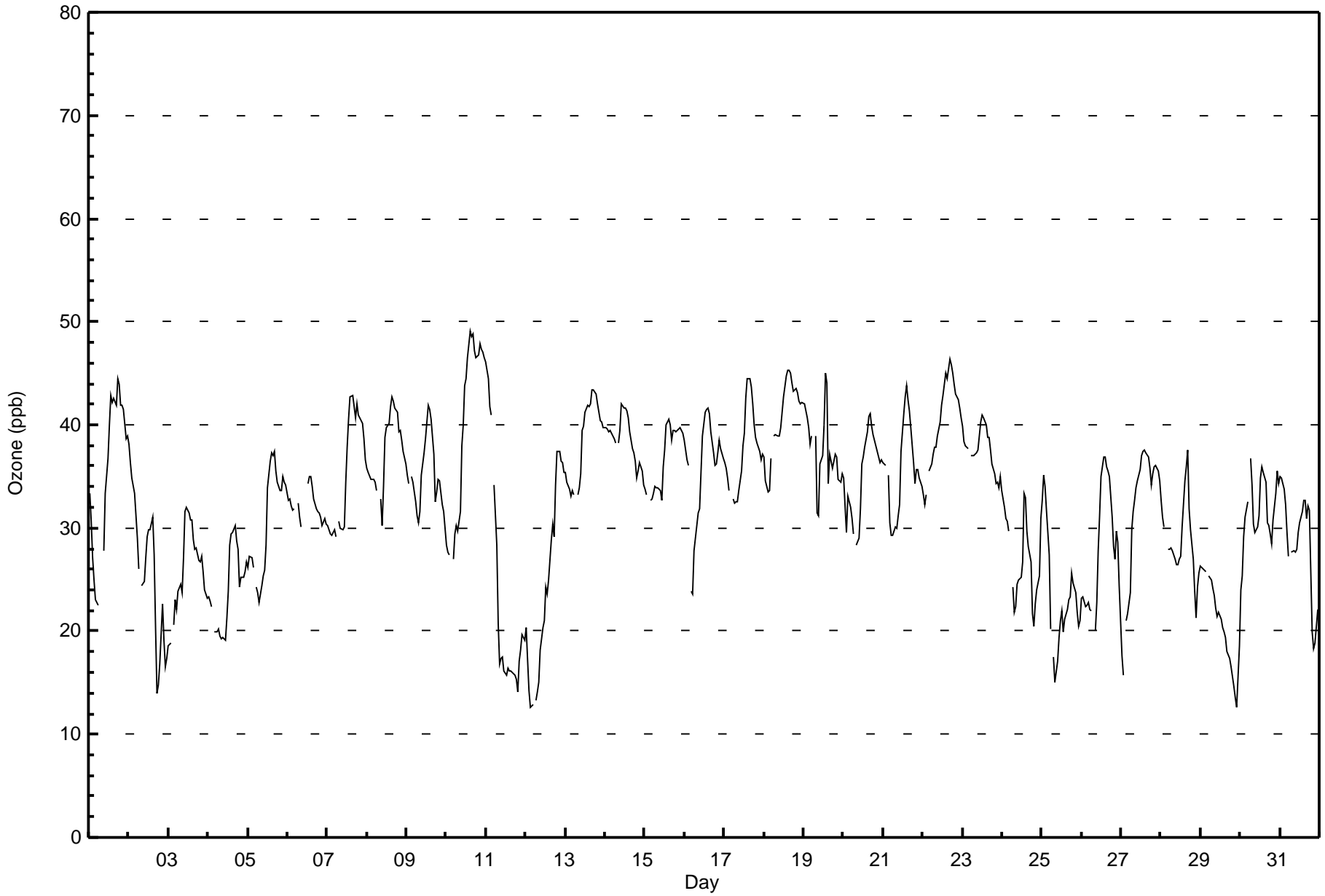
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	33	31	27	25	23	22	Z	25	M	28	33	37	40	43	42	43	42	44	44	42	42	41	39	39	35.7	44																							
2-Oct	38	36	35	33	31	29	26	Z	24	25	27	29	30	30	31	27	20	14	15	17	23	19	17	17	25.8	38																							
3-Oct	19	19	Z	21	23	22	24	24	24	27	32	32	32	31	31	29	28	28	27	27	27	26	24	23	26.0	32																							
4-Oct	23	23	22	Z	20	20	20	19	19	19	21	24	28	29	30	30	29	28	24	25	25	26	27	27	24.0	30																							
5-Oct	26	27	27	26	Z	24	24	23	24	25	26	28	34	36	37	37	37	36	34	34	34	35	34	34	30.6	37																							
6-Oct	33	33	32	32	32	Z	32	31	30	C	C	C	34	35	35	34	33	32	32	32	31	30	31	30	32.2	35																							
7-Oct	30	30	29	29	30	29	Z	31	30	30	30	34	38	41	43	43	42	41	42	41	40	40	39	37	35.6	43																							
8-Oct	36	35	35	35	35	34	34	Z	33	30	34	39	40	40	42	43	42	42	41	39	39	39	37	36	37.4	43																							
9-Oct	35	34	Z	35	34	33	31	30	32	35	37	39	40	42	42	41	37	32	34	35	35	32	32	30	35.1	42																							
10-Oct	28	28	27	Z	27	29	30	30	32	38	40	44	45	46	49	49	49	47	47	47	48	47	47	46	40.0	49																							
11-Oct	46	44	42	41	Z	34	28	21	17	17	18	16	16	16	16	16	16	15	14	17	18	20	19	22.8	46																								
12-Oct	20	17	14	13	13	Z	13	14	15	18	20	21	24	24	25	29	30	29	34	37	37	36	36	35	24.2	37																							
13-Oct	35	34	34	33	34	33	Z	33	34	35	40	40	41	42	42	43	43	43	42	41	40	40	40	40	38.5	43																							
14-Oct	40	40	39	39	39	39	38	Z	38	39	42	42	42	41	41	39	38	37	36	35	36	36	34	34	38.5	42																							
15-Oct	34	33	Z	33	33	33	34	34	34	34	33	36	38	40	40	39	39	39	39	39	40	40	39	39	36.6	40																							
16-Oct	38	37	36	Z	24	24	28	30	31	32	35	39	41	42	42	41	39	37	36	36	37	38	38	37	35.6	42																							
17-Oct	36	36	35	34	Z	33	32	33	33	34	36	38	39	43	44	45	44	42	40	39	38	37	37	37	37.5	45																							
18-Oct	37	35	34	34	37	Z	39	39	39	39	40	41	43	45	45	45	45	44	43	44	43	42	42	42	40.7	45																							
19-Oct	42	41	41	40	38	39	Z	39	31	31	36	37	40	45	44	34	37	36	37	37	37	35	34	35	37.7	45																							
20-Oct	35	32	30	33	32	31	29	Z	28	29	32	36	37	38	39	41	41	40	39	38	37	37	36	37	35.1	41																							
21-Oct	36	36	Z	35	31	29	29	30	30	31	32	37	41	43	44	42	41	40	36	34	36	36	35	34	35.6	44																							
22-Oct	33	32	33	Z	36	36	37	38	38	39	40	42	43	44	45	44	46	46	45	44	43	42	42	41	40.4	46																							
23-Oct	40	38	38	38	Z	37	37	37	37	38	39	40	41	41	40	39	39	38	36	35	34	34	34	35	37.6	41																							
24-Oct	34	32	31	31	30	Z	24	22	22	25	25	27	33	33	30	28	27	22	20	23	24	25	31	27.1	34																								
25-Oct	33	35	34	32	27	20	Z	17	15	17	19	21	22	20	21	22	23	23	26	25	24	22	20	21	23.5	35																							
26-Oct	23	23	22	23	23	22	22	Z	20	23	28	31	35	37	37	36	36	35	31	28	27	30	29	24	28.0	37																							
27-Oct	18	16	Z	21	22	24	30	32	33	34	35	36	37	37	37	37	37	36	34	35	36	36	36	35	31.8	37																							
28-Oct	33	31	30	Z	28	28	28	28	27	26	26	27	27	30	35	36	38	32	30	27	24	21	24	26	28.8	38																							
29-Oct	26	26	26	26	Z	25	25	24	23	22	21	22	21	20	20	19	18	17	17	16	15	14	13	19	20.7	26																							
30-Oct	24	25	29	31	33	Z	37	34	30	30	30	31	35	36	35	34	30	30	29	28	31	33	36	34	31.6	37																							
31-Oct	35	35	34	32	30	27	Z	28	28	28	28	30	31	32	33	33	31	32	32	20	18	19	20	22	28.5	35																							
																								32.3	31.5	31.4	30.9	29.3	29.2	29.3	28.7	28.4	29.3	31.1	33.0	34.7	36.1	36.7	36.1	35.5	34.3	33.7	32.6	32.8	32.5	32.2	32.2	Diurnal Average	
																								46	44	42	41	39	39	39	39	39	39	42	44	45	46	49	49	49	47	47	47	48	47	47	46	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 Lookout - October 2015**





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

**Ozone (O<sub>3</sub>) - ppb**  
**Conklin Lookout - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	68	9.59	9.59
21 - 50	641	90.41	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**  
**Conklin Lookout - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	11	0	0	4	1	2	3	2	2	15	9	0	1	4	5	9	68
21 - 50	18	5	7	3	7	9	25	53	52	97	50	36	83	92	72	26	635
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>	29	5	7	7	8	11	28	55	54	112	59	36	84	96	77	35	703

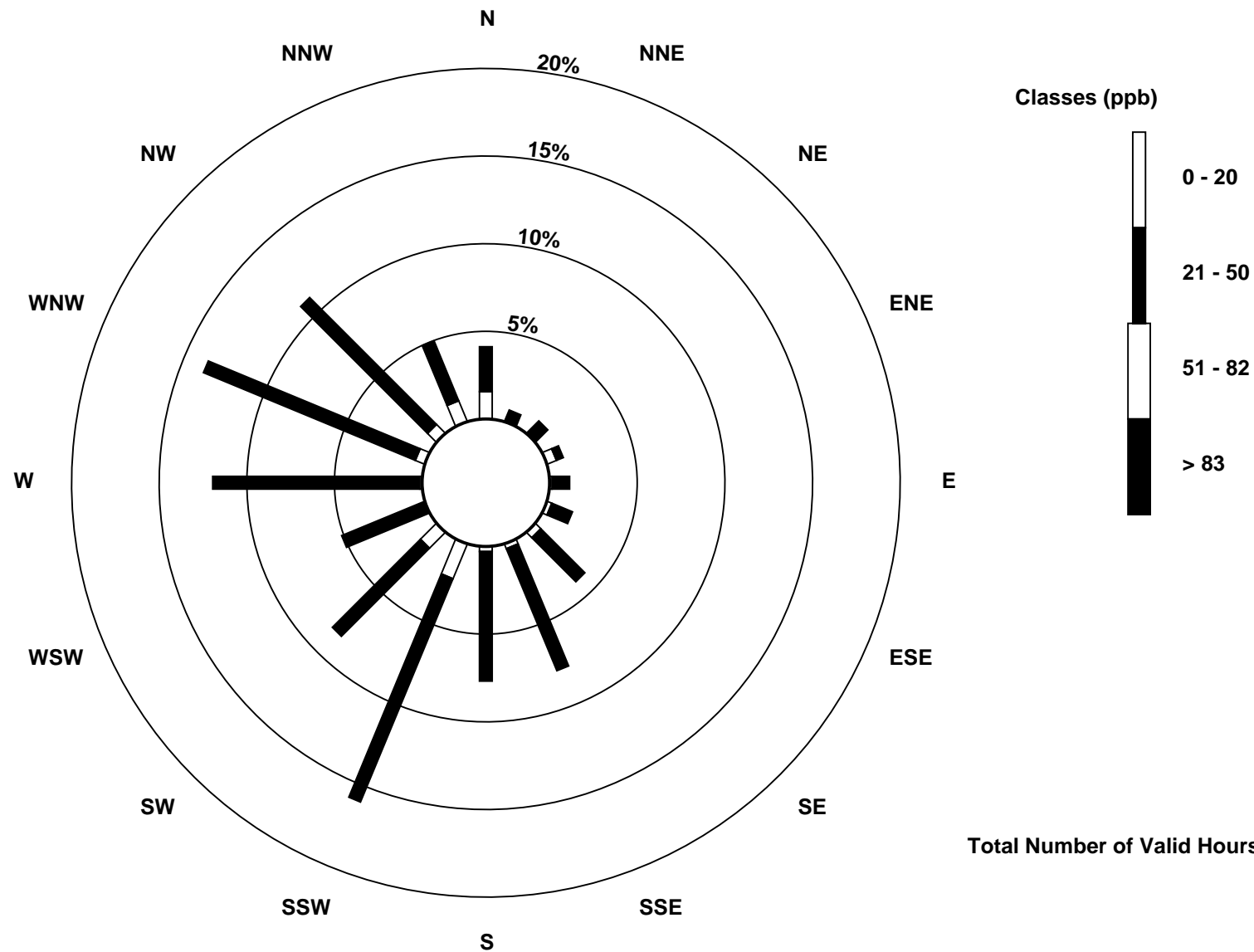
Total Number of Valid Hours: 703

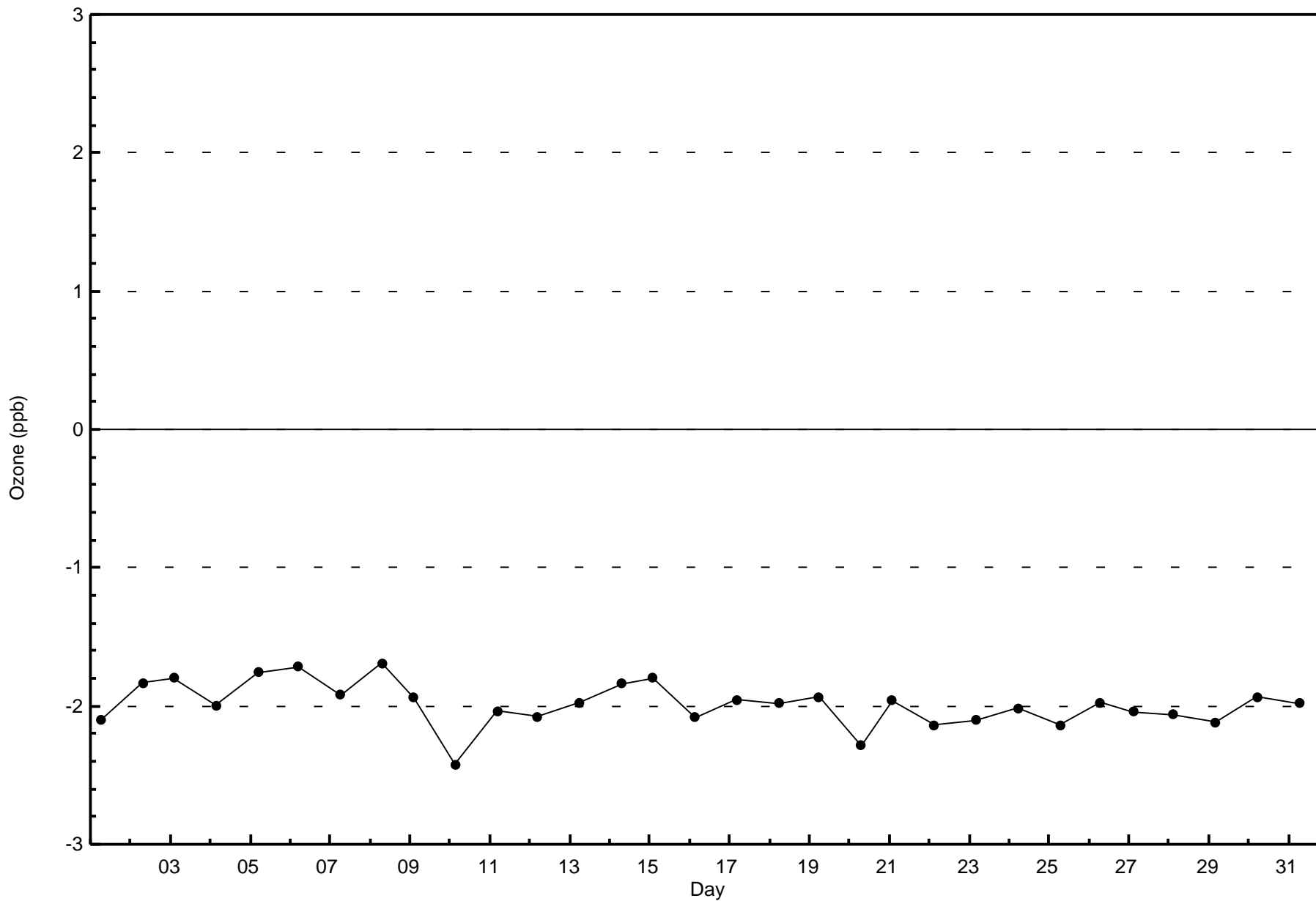
Total Number of Hours: 744

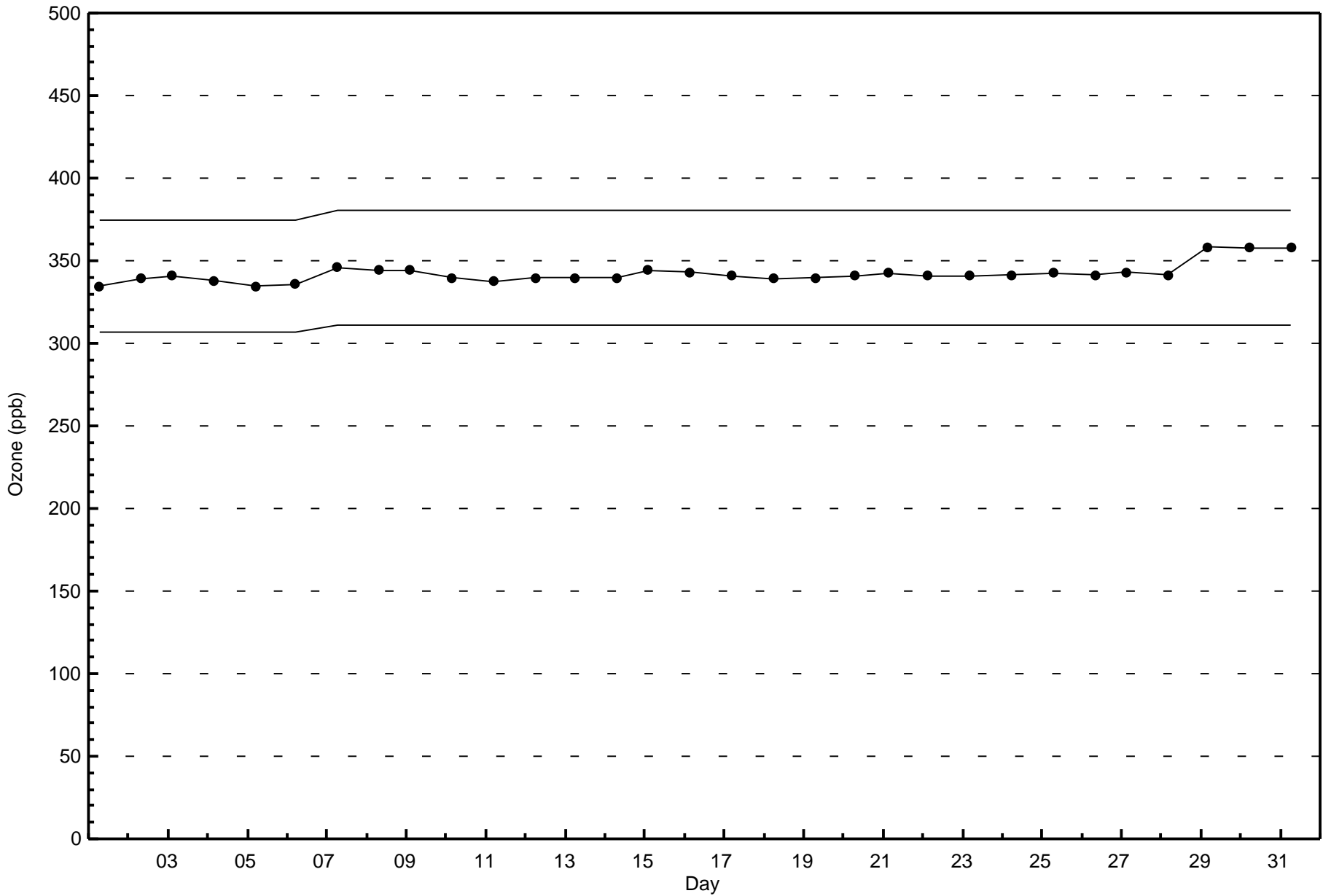


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Ozone (O<sub>3</sub>) - ppb  
Conklin Lookout (AMS 18)









Summary of Hour Averages

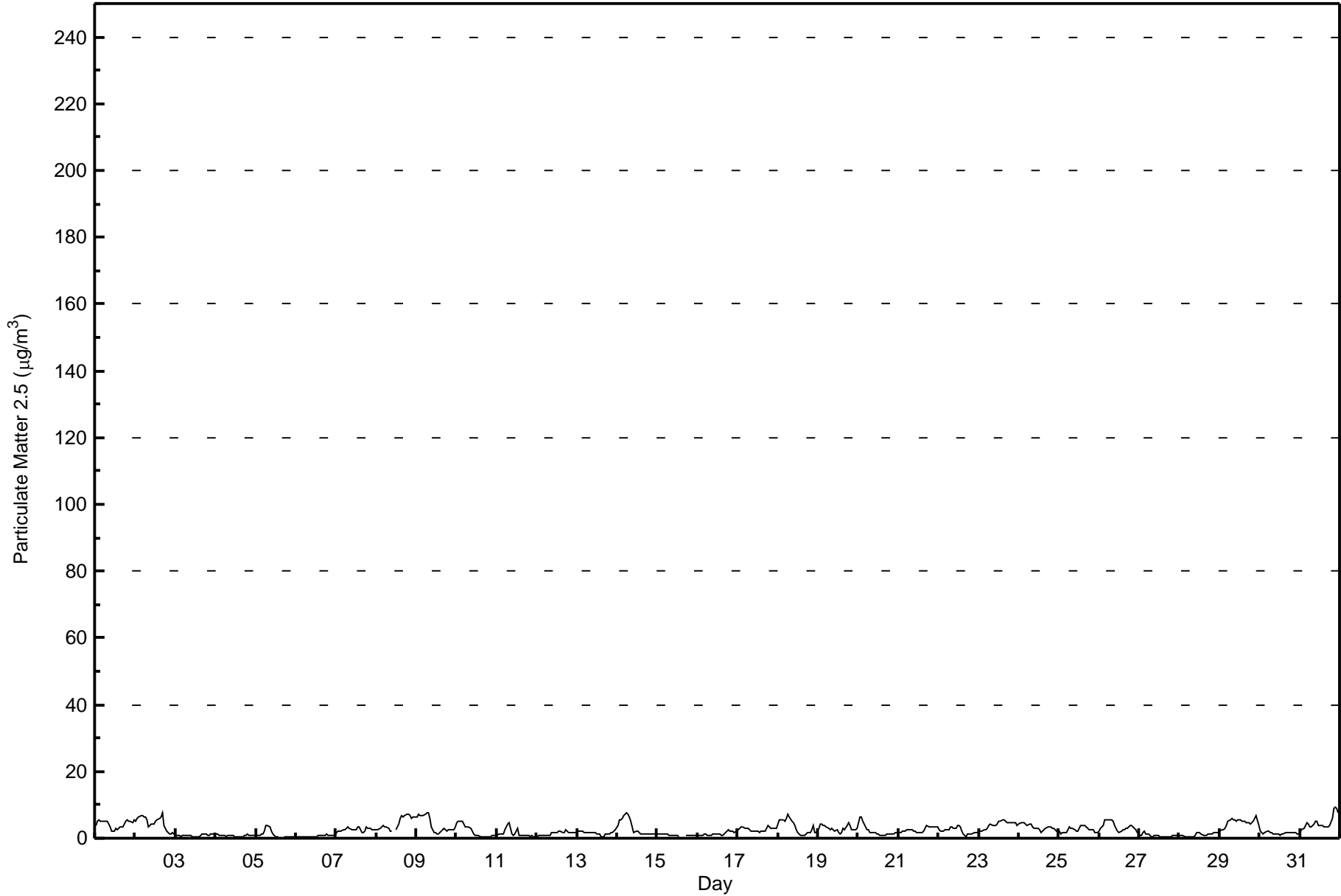
Conklin Lookout - October 2015

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 9.2 µg/m <sup>3</sup> on Oct 31 22:00 Maximum Daily Average: 4.7 µg/m <sup>3</sup> on Oct 29		Hours in Service: 744 Hours of Data: 736 Hours of Missing Data: 8 Hours of Calibration: 2 Percent Operational Time: 99.2																																														
Minimum Value: 0.3 µg/m <sup>3</sup> on Oct 5 14:00 Maximum Diurnal Average: 3.2 µg/m <sup>3</sup> at hour 7 Monthly Average: 2.52 µg/m <sup>3</sup>		Minimum Daily Average: 0.7 µg/m <sup>3</sup> on Oct 6 Minimum Diurnal Average: 2.0 µg/m <sup>3</sup> at hour 14 Percentiles: P <sub>1</sub> = 0.4 P <sub>10</sub> = 0.7 Q <sub>1</sub> = 1.1 Median = 2.0 Q <sub>3</sub> = 3.5 P <sub>90</sub> = 5.2 P <sub>99</sub> = 7.6																																														
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	3.8	5.0	5.4	5.2	5.3	5.0	5.2	5.1	4.4	3.3	2.1	2.2	2.8	2.7	3.2	3.3	3.4	4.2	5.0	5.6	5.1	4.9	4.7	5.4	4.3	5.6																						
2-Oct	5.3	6.1	6.5	6.6	6.8	6.3	6.4	5.7	3.2	4.0	4.4	4.4	5.1	5.7	6.1	6.3	7.6	3.9	3.2	2.2	1.2	1.4	1.7	1.1	4.6	7.6																						
3-Oct	1.0	0.7	0.7	0.6	0.7	0.7	0.8	0.8	0.8	0.7	0.4	0.4	0.5	0.5	0.5	0.7	1.3	1.3	1.2	1.0	0.9	1.2	1.3	1.3	0.8	1.3																						
4-Oct	1.2	1.1	0.7	0.7	0.9	0.8	0.6	0.8	0.7	0.7	0.8	0.6	0.5	0.4	0.5	0.5	0.5	0.8	0.9	1.4	1.1	0.9	0.8	0.8	0.8	1.4																						
5-Oct	0.9	0.9	1.0	1.1	1.4	2.2	3.6	3.9	3.5	2.1	1.4	1.0	0.5	0.3	UO	UO	UO	0.3	0.3	0.3	0.3	0.4	0.4	0.4	1.2	3.9																						
6-Oct	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.6	0.8	0.8	0.8	0.8	0.9	1.1	1.0	0.8	0.8	0.9	1.0	0.7	1.1																						
7-Oct	1.5	2.2	2.3	2.3	2.4	2.6	2.8	3.3	3.1	2.5	2.6	2.7	2.4	3.5	3.5	1.8	1.5	2.3	3.6	2.8	2.8	2.7	2.7	2.7	2.6	3.6																						
8-Oct	2.6	2.6	3.1	3.6	3.9	3.4	3.5	2.9	2.3	2.3	C	C	2.4	4.1	6.0	6.6	6.2	6.6	7.1	7.4	6.6	6.0	6.1	6.4	4.6	7.4																						
9-Oct	6.3	7.1	6.9	6.6	6.8	7.3	7.7	7.6	5.7	3.3	1.8	1.7	1.3	1.4	1.7	2.0	3.1	2.4	1.9	2.4	2.5	2.6	2.7	3.3	4.0	7.7																						
10-Oct	4.6	5.2	5.1	5.0	4.4	3.5	3.4	3.5	3.1	2.3	1.3	1.0	1.0	0.8	0.5	0.5	0.4	0.5	0.5	0.5	0.4	0.7	1.0	1.1	2.1	5.2																						
11-Oct	0.9	1.1	1.2	1.3	1.3	2.6	4.1	4.5	3.1	1.4	1.1	1.4	2.8	1.1	0.9	0.8	0.8	0.9	0.8	0.7	0.6	0.6	0.6	0.6	1.5	4.5																						
12-Oct	0.6	0.7	0.6	0.7	0.7	0.9	0.8	0.8	1.1	1.5	1.7	1.9	1.9	2.1	2.1	1.8	1.8	2.5	2.1	1.8	1.8	1.9	1.9	1.9	1.5	2.5																						
13-Oct	1.9	1.9	2.0	1.9	1.8	1.8	1.8	1.8	1.7	1.7	1.6	1.6	1.3	1.2	0.4	0.3	0.4	1.5	1.3	1.4	1.5	1.9	2.0	2.5	1.6	2.5																						
14-Oct	4.0	5.4	5.7	6.0	6.6	7.5	7.1	6.3	5.0	3.3	1.6	2.2	2.2	1.8	1.3	1.1	1.1	1.3	1.2	1.3	1.3	1.3	1.3	1.2	3.2	7.5																						
15-Oct	1.1	1.1	1.3	1.2	1.2	1.3	1.2	1.0	1.0	1.0	1.0	0.8	0.7	0.4	UO	UO	UO	0.7	0.8	0.7	0.7	0.8	0.8	0.8	0.9	1.3																						
16-Oct	0.8	0.8	0.8	1.1	1.3	1.4	1.0	1.0	1.0	1.2	1.1	1.4	1.5	1.3	0.8	1.0	1.3	2.1	2.5	2.3	2.1	2.0	1.8	2.0	1.4	2.5																						
17-Oct	2.3	3.1	3.4	3.2	3.1	3.2	2.8	2.6	2.3	2.1	2.0	2.3	2.1	1.9	2.0	2.0	2.2	2.8	3.7	3.5	2.9	2.8	3.0	3.0	2.7	3.7																						
18-Oct	4.1	5.5	5.4	5.3	5.2	6.0	7.0	6.2	5.2	4.6	3.8	2.3	1.7	1.0	0.8	0.7	1.0	1.2	1.9	1.6	2.4	3.7	1.7	1.8	3.3	7.0																						
19-Oct	2.9	4.2	4.1	3.8	3.8	3.3	3.0	2.7	2.8	2.6	2.1	2.4	1.8	1.3	1.6	3.0	2.7	3.8	4.6	3.6	2.6	2.7	2.6	2.9	3.0	4.6																						
20-Oct	4.8	6.2	6.3	5.3	3.6	2.8	2.4	1.9	1.7	1.7	1.6	1.3	1.2	1.0	0.9	0.8	0.9	1.1	1.2	1.3	1.4	1.5	1.5	1.5	2.2	6.3																						
21-Oct	1.6	1.7	1.9	1.9	2.2	2.6	2.6	2.4	2.6	2.0	1.9	1.8	1.7	1.6	1.5	2.2	3.2	4.0	3.6	3.4	3.4	3.3	3.6	3.5	2.5	4.0																						
22-Oct	2.7	2.3	2.1	2.1	2.4	2.5	2.6	3.4	3.4	2.8	2.9	4.0	3.9	3.3	2.1	1.4	0.6	1.1	1.1	1.3	1.5	1.5	1.6	1.8	2.3	4.0																						
23-Oct	1.9	2.0	2.3	2.5	2.7	3.0	3.7	4.3	4.0	3.7	3.9	4.1	4.9	4.9	5.4	5.5	5.0	4.7	4.7	4.6	4.5	4.7	4.5	3.9	4.0	5.5																						
24-Oct	4.3	4.9	4.8	4.5	4.2	3.8	4.1	4.4	3.6	2.9	2.8	2.8	2.4	1.8	2.1	2.7	3.1	3.3	3.3	3.2	2.9	2.8	2.2	2.3	3.3	4.9																						
25-Oct	1.9	1.5	1.6	1.7	1.9	2.5	3.2	2.9	2.8	2.4	2.0	2.1	2.9	4.0	3.9	3.6	3.3	2.9	2.7	2.6	2.4	1.8	1.5	1.9	2.5	4.0																						
26-Oct	2.1	2.9	3.9	5.3	5.7	5.6	5.7	5.7	5.3	3.9	2.8	2.0	1.9	2.1	2.4	2.6	2.8	3.0	3.7	3.7	3.6	2.8	2.5	1.8	3.5	5.7																						
27-Oct	1.0	0.9	1.6	1.9	1.5	1.4	0.7	0.5	0.5	0.7	0.7	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.8	0.8	1.9																						
28-Oct	0.7	0.7	0.6	0.6	0.6	0.5	0.5	0.6	0.5	0.9	1.5	1.9	1.6	1.2	0.9	0.8	0.9	1.1	1.3	1.5	1.6	1.6	1.6	1.8	1.1	1.9																						
29-Oct	2.0	2.6	2.7	3.0	3.8	4.9	5.4	5.7	5.5	5.3	5.1	5.7	5.5	5.1	5.1	5.2	4.7	4.5	4.3	4.6	5.1	6.0	6.6	3.9	4.7	6.6																						
30-Oct	2.2	1.7	1.5	1.5	1.9	2.0	1.9	1.6	1.3	1.2	1.2	1.2	1.0	1.2	1.4	1.5	1.8	1.9	1.8	1.9	1.8	1.6	1.4	1.4	1.6	2.2																						
31-Oct	1.7	2.6	3.1	3.6	4.7	4.2	3.5	3.4	4.2	5.2	4.9	3.8	3.8	3.7	3.4	3.3	3.2	3.5	3.9	6.1	8.7	9.2	9.1	7.8	4.6	9.2																						
																								2.4	2.7	2.9	2.9	3.0	3.1	3.2	3.2	2.8	2.4	2.1	2.1	2.1	2.0	2.1	2.2	2.3	2.3	2.4	2.5	2.4	2.5	2.4	2.3	Diurnal Average
																								6.3	7.1	6.9	6.6	6.8	7.5	7.7	7.6	5.7	5.3	5.1	5.7	5.5	5.7	6.1	6.6	7.6	6.6	7.1	7.4	8.7	9.2	9.1	7.8	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>) -  $\mu\text{g}/\text{m}^3$   
Conklin Lookout - October 2015





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

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Conklin Lookout - October 2015**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	520	70.65	70.65
6 - 15	56	7.61	78.26
16 - 25	0	0.00	78.26
26 - 80	0	0.00	78.26
> 81.0	0	0.00	78.26

Total Number of Valid Hours: 736

Total Number of Hours: 744



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

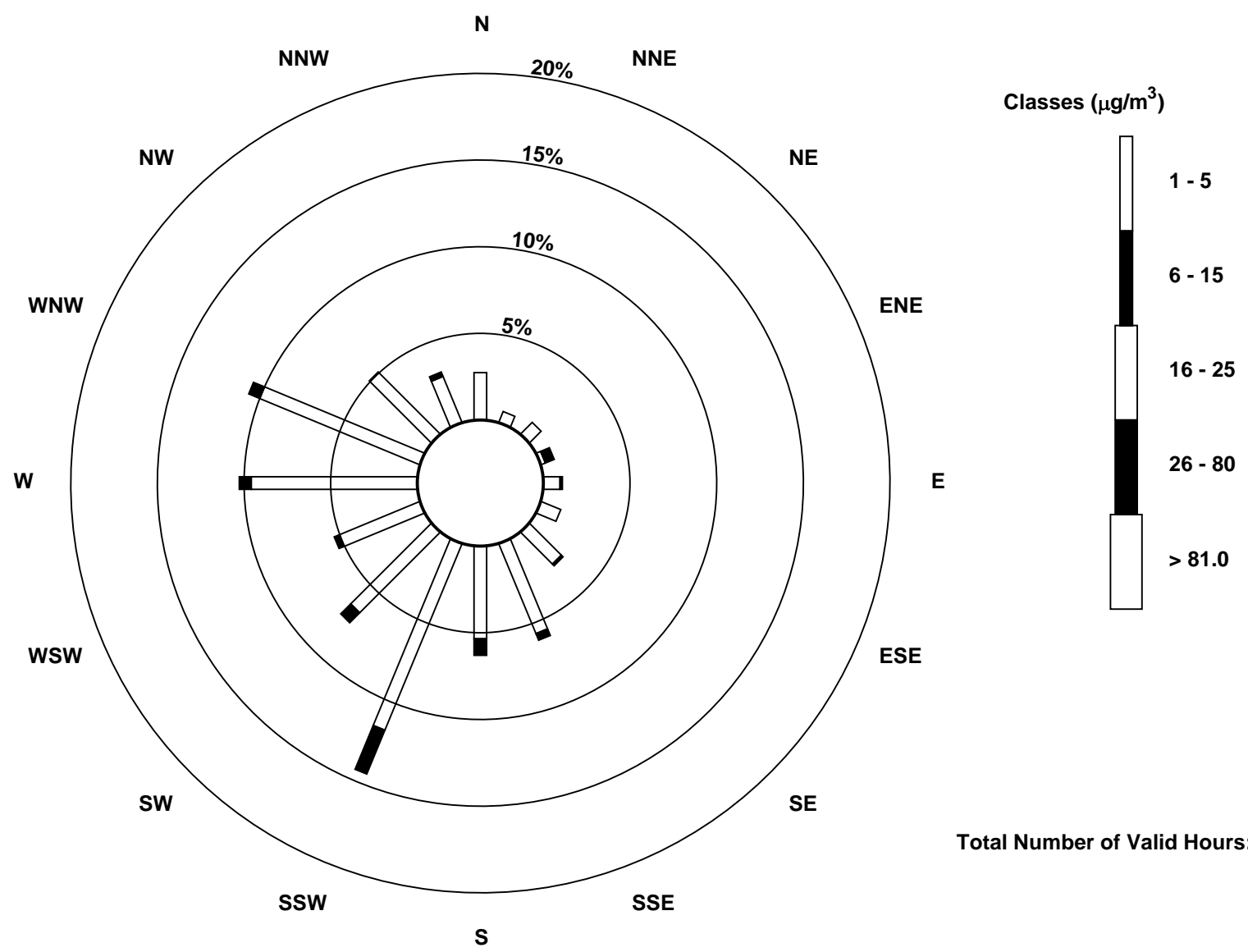
**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Conklin Lookout - October 2015**

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	20	5	7	2	7	9	19	41	39	85	48	37	70	73	37	21	520
6 - 15	0	0	0	4	1	0	1	3	7	20	6	2	5	5	0	2	56
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>	20	5	7	6	8	9	20	44	46	105	54	39	75	78	37	23	576

Total Number of Valid Hours: 730

Total Number of Hours: 744





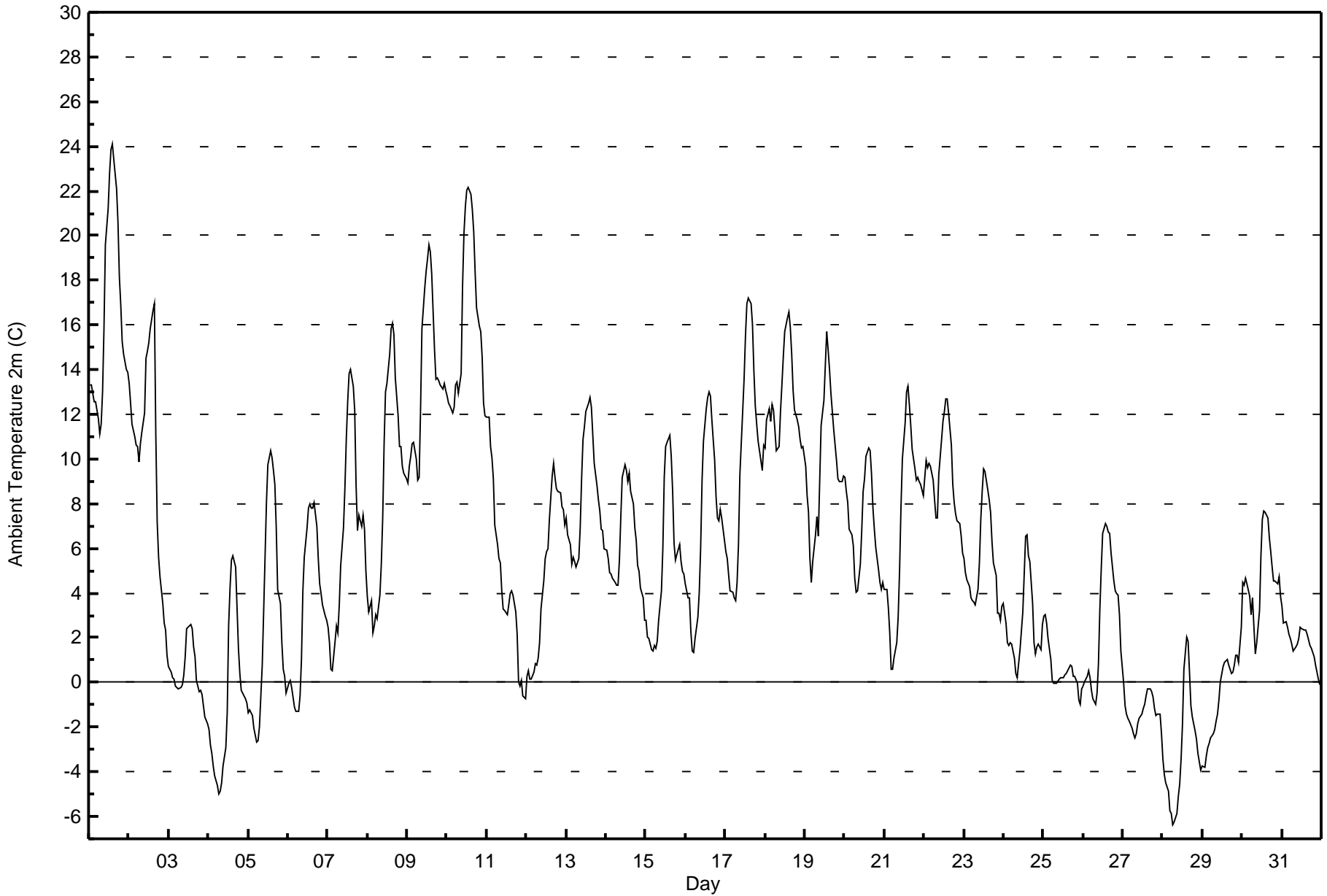


Maximum Value: 24.1 C on Oct 1 15:00		Maximum Daily Average: 16.6 C on Oct 1		Hours in Service: 744																																												
Minimum Value: -6.4 C on Oct 28 07:00		Minimum Daily Average: -3.1 C on Oct 28		Hours of Data: 744																																												
Maximum Diurnal Average: 10.2 C at hour 15		Minimum Diurnal Average: 3.0 C at hour 7		Hours of Missing Data: 0																																												
Monthly Average: 5.90 C		Percentiles: P <sub>1</sub> = -4.9 P <sub>10</sub> = -1.0 Q <sub>1</sub> = 1.3 Median = 5.3 Q <sub>3</sub> = 9.9 P <sub>90</sub> = 13.4 P <sub>99</sub> = 21.9		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	13.3	13.3	12.9	12.6	12.6	11.8	11.1	11.6	13.0	15.8	19.6	21.2	22.8	23.8	24.1	23.4	22.1	20.6	18.1	16.9	15.3	14.7	14.0	13.9	16.6	24.1																						
2-Oct	13.4	12.5	11.6	11.0	10.6	10.6	9.9	10.7	11.2	12.1	14.5	14.8	15.2	15.8	16.7	17.0	11.1	7.2	5.6	4.7	3.5	2.7	2.3	1.2	10.3	17.0																						
3-Oct	0.7	0.5	0.2	0.1	-0.1	-0.2	-0.3	-0.2	-0.1	0.3	1.1	2.4	2.6	2.6	2.4	1.6	1.1	0.1	-0.4	-0.3	-0.5	-1.0	-1.5	-1.9	0.4	2.6																						
4-Oct	-2.1	-2.8	-3.2	-3.7	-4.2	-4.6	-5.0	-4.9	-4.5	-3.8	-2.9	-1.4	2.5	4.3	5.5	5.7	5.2	3.3	1.5	0.4	-0.3	-0.6	-0.7	-0.9	-0.7	5.7																						
5-Oct	-1.4	-1.2	-1.5	-2.0	-2.4	-2.7	-2.6	-2.0	0.8	3.2	5.6	8.1	9.7	10.3	10.0	9.5	8.9	6.9	4.2	3.6	1.8	0.6	0.3	-0.5	2.8	10.3																						
6-Oct	-0.1	0.1	-0.3	-0.7	-1.1	-1.3	-1.3	-0.6	1.0	4.1	5.6	6.9	7.8	8.0	7.8	7.8	8.0	7.0	5.5	4.4	4.0	3.5	3.0	2.8	3.4	8.0																						
7-Oct	2.5	1.8	0.6	0.5	1.8	2.5	2.2	3.5	5.2	6.9	8.7	10.9	12.6	13.8	14.0	13.3	12.2	8.8	6.8	7.5	7.0	7.5	6.9	5.0	6.8	14.0																						
8-Oct	3.9	3.2	3.7	2.2	2.5	3.1	2.9	3.9	5.3	7.3	10.7	13.0	13.4	14.7	15.9	16.0	15.6	13.6	12.0	10.6	10.6	9.7	9.3	9.1	8.8	16.0																						
9-Oct	8.9	9.7	10.1	10.7	10.8	10.0	9.1	9.2	12.1	15.8	17.7	18.4	19.0	19.6	19.3	18.3	14.9	13.6	13.6	13.5	13.3	13.1	13.4	13.0	13.6	19.6																						
10-Oct	12.8	12.5	12.4	12.0	12.3	13.3	13.4	13.0	13.8	17.7	20.1	21.3	22.0	22.2	21.8	21.2	20.1	18.4	16.8	15.9	15.7	14.6	12.5	11.9	16.2	22.2																						
11-Oct	11.9	11.9	10.5	10.0	9.1	7.1	6.1	5.6	5.4	4.1	3.3	3.2	3.0	3.5	4.0	4.1	3.9	3.2	2.2	0.0	-0.1	0.1	-0.6	-0.7	4.6	11.9																						
12-Oct	0.3	0.5	0.1	0.1	0.5	0.8	0.8	1.1	1.8	3.3	4.5	5.6	5.9	6.0	7.3	9.3	9.8	9.2	8.7	8.6	8.5	7.9	7.7	7.1	4.8	9.8																						
13-Oct	7.4	6.6	6.1	5.3	5.6	5.4	5.2	5.5	6.9	9.1	10.9	11.4	12.2	12.5	12.7	12.3	11.1	9.8	8.8	8.1	7.7	6.9	6.8	6.0	8.3	12.7																						
14-Oct	5.9	5.5	4.9	4.8	4.6	4.5	4.3	4.3	5.5	7.4	9.2	9.7	9.5	9.0	9.4	8.6	8.0	6.9	6.4	5.2	5.0	4.2	3.8	2.8	6.2	9.7																						
15-Oct	2.8	2.0	2.0	1.4	1.4	1.6	1.5	1.9	2.8	4.1	6.0	9.2	10.5	10.7	11.1	10.1	8.6	6.2	5.5	5.8	6.1	5.4	5.0	4.9	5.3	11.1																						
16-Oct	4.4	3.8	3.8	2.3	1.4	1.3	2.0	2.9	4.0	6.1	9.1	10.8	12.3	12.7	13.0	12.8	11.8	9.9	8.3	7.3	7.3	7.7	7.4	6.4	7.0	13.0																						
17-Oct	5.8	5.5	4.8	4.1	4.0	3.8	3.6	4.5	6.1	9.3	12.1	13.6	15.5	16.9	17.2	17.0	16.0	14.0	12.4	11.5	10.8	10.0	9.5	10.6	10.0	17.2																						
18-Oct	10.5	11.7	12.2	11.7	12.4	12.2	11.3	10.3	10.5	12.1	13.3	14.6	15.7	16.3	16.6	15.9	14.7	13.0	12.2	11.8	11.4	10.9	10.5	10.6	12.6	16.6																						
19-Oct	9.7	8.4	7.6	5.6	4.5	5.4	6.6	7.5	6.6	9.1	11.5	12.6	14.2	15.7	14.9	14.0	13.0	11.3	10.6	9.9	9.1	9.0	9.0	9.2	9.8	15.7																						
20-Oct	9.2	8.5	8.1	6.9	6.6	6.1	4.6	4.0	4.1	5.3	6.8	8.5	9.1	10.1	10.5	10.4	9.3	7.8	6.9	6.0	5.0	4.5	4.1	4.5	7.0	10.5																						
21-Oct	4.2	4.2	3.4	2.2	0.6	0.6	1.1	1.8	2.9	5.0	7.8	10.0	11.6	13.0	13.3	12.4	11.5	10.5	9.6	9.0	9.2	9.0	8.8	8.4	7.1	13.3																						
22-Oct	9.2	9.9	9.6	9.8	9.7	9.0	8.2	7.4	7.4	9.3	10.9	11.7	12.1	12.7	12.7	12.1	10.6	8.9	8.0	7.5	7.2	7.1	6.6	5.8	9.3	12.7																						
23-Oct	5.5	4.9	4.6	4.3	3.8	3.6	3.6	3.5	4.2	5.3	7.3	8.6	9.5	9.4	8.6	8.2	7.6	6.3	5.4	4.8	3.1	3.1	2.8	3.4	5.5	9.5																						
24-Oct	3.5	2.6	1.8	1.7	1.8	1.7	1.1	0.4	0.2	0.8	1.5	3.2	4.8	6.6	6.6	5.7	5.4	3.5	1.8	1.3	1.6	1.7	1.5	2.6	2.6	6.6																						
25-Oct	3.0	3.0	2.7	2.0	1.0	0.1	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.3	0.4	0.7	0.8	0.7	0.3	0.3	0.0	-0.8	-1.0	-0.3	0.6	3.0																						
26-Oct	-0.2	0.0	0.3	0.5	0.2	-0.3	-0.7	-1.0	-0.5	0.8	3.3	5.1	6.7	7.1	7.0	6.7	6.7	5.8	4.5	4.1	4.0	3.9	3.0	1.4	2.9	7.1																						
27-Oct	0.0	-1.0	-1.4	-1.6	-1.8	-2.0	-2.3	-2.5	-2.3	-1.9	-1.6	-1.4	-1.2	-1.0	-0.6	-0.3	-0.3	-0.4	-0.7	-1.2	-1.5	-1.4	-1.4	-2.3	-1.3	0.0																						
28-Oct	-3.4	-4.1	-4.5	-4.8	-5.8	-5.9	-6.4	-6.2	-5.9	-5.1	-4.6	-3.5	-1.9	0.6	2.0	1.9	0.5	-1.1	-1.5	-2.2	-2.5	-3.2	-3.5	-3.9	-3.1	2.0																						
29-Oct	-3.7	-3.8	-3.3	-2.9	-2.7	-2.5	-2.3	-2.1	-1.8	-1.4	-0.8	0.0	0.7	0.9	1.0	1.0	0.8	0.4	0.4	0.8	1.2	1.2	0.9	2.5	-0.7	2.5																						
30-Oct	4.5	4.3	4.7	4.4	3.9	3.0	3.8	2.5	1.3	1.8	3.3	5.6	7.3	7.7	7.6	7.3	6.5	5.9	5.2	4.5	4.5	4.4	4.7	3.9	4.7	7.7																						
31-Oct	3.4	2.7	2.7	2.5	2.2	1.9	1.7	1.4	1.6	1.7	2.0	2.5	2.4	2.3	2.3	2.1	1.9	1.7	1.5	1.1	0.7	0.5	0.1	-0.1	1.8	3.4																						
																								4.7	4.4	4.1	3.6	3.4	3.2	3.0	3.1	3.8	5.4	7.0	8.3	9.3	9.9	10.2	9.9	8.9	7.5	6.5	5.9	5.4	5.1	4.7	4.4	Diurnal Average
																								13.4	13.3	12.9	12.6	12.6	13.3	13.4	13.0	13.8	17.7	20.1	21.3	22.8	23.8	24.1	23.4	22.1	20.6	18.1	16.9	15.7	14.7	14.0	13.9	Diurnal Maximum



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

**Ambient Temperature 2m (AT 2m) - C**  
**Conklin Lookout - October 2015**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C  
Conklin Lookout - October 2015**

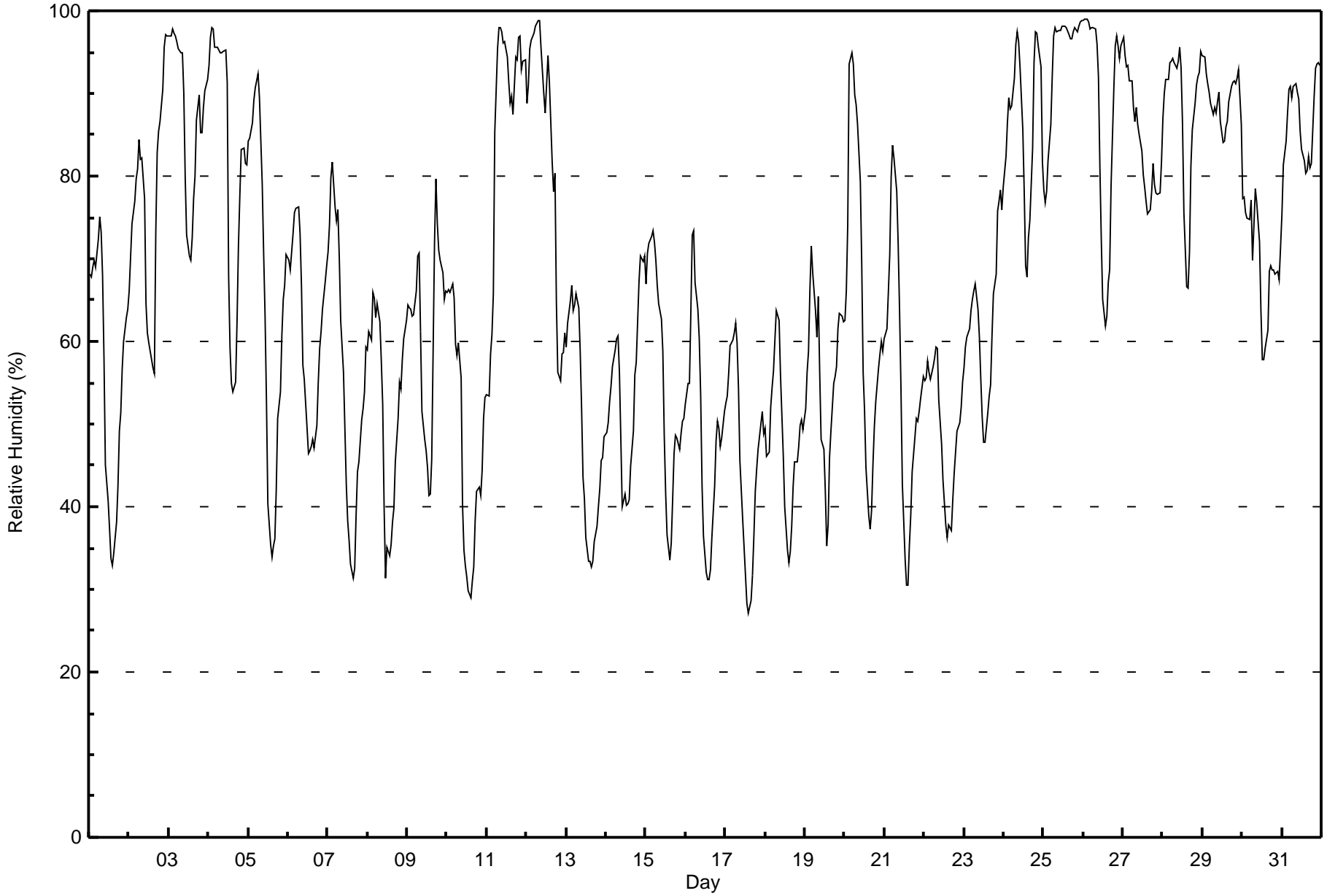
<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	115	15.46	15.46
0 - 10	444	59.68	75.13
10 - 20	171	22.98	98.12
> 20	14	1.88	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

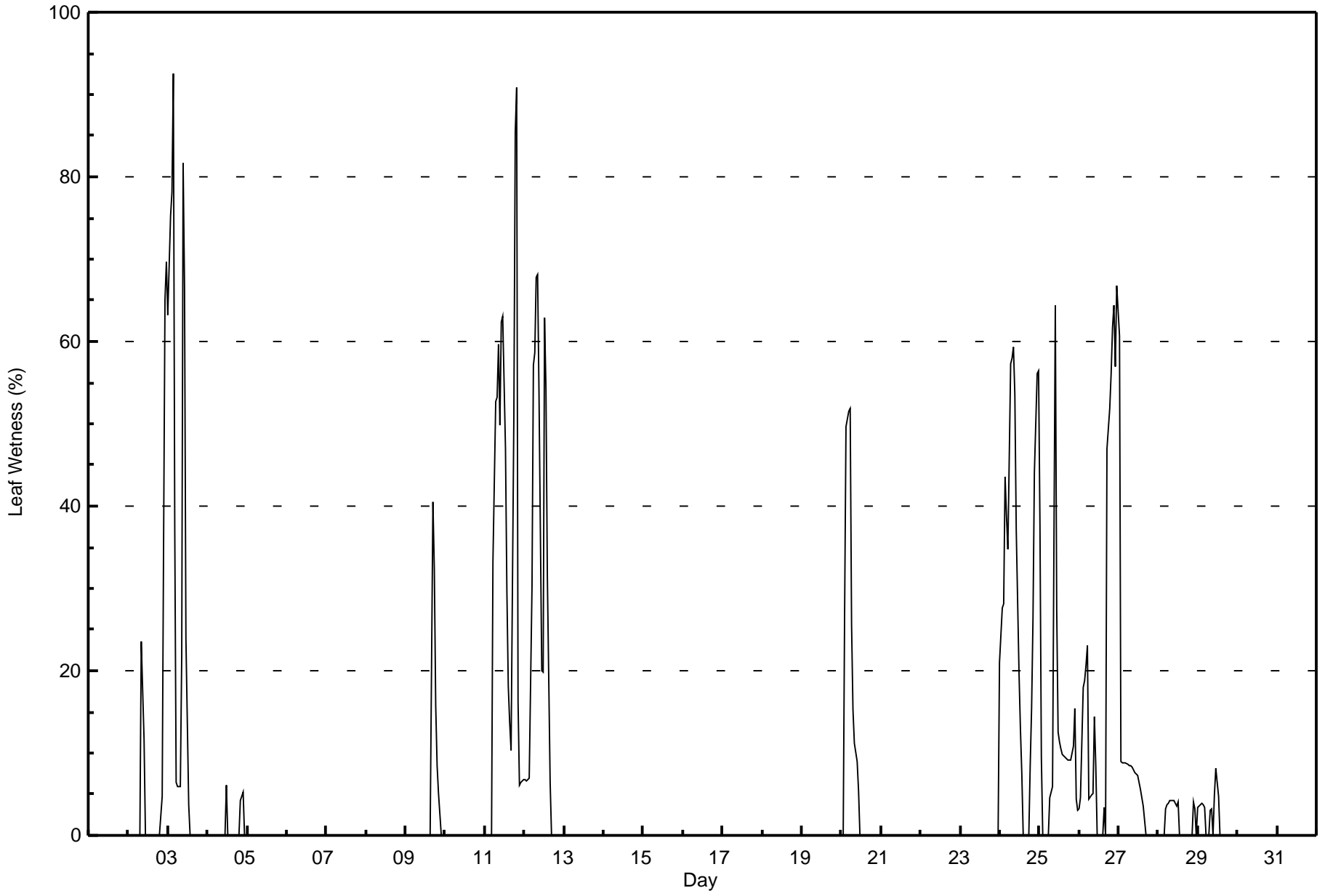


Maximum Value: 99 % on Oct 26 02:00																	Maximum Daily Average: 93.8 % on Oct 25																	Hours in Service: 744								
Minimum Value: 27 % on Oct 17 15:00																	Minimum Daily Average: 46.1 % on Oct 17																	Hours of Data: 744								
Maximum Diurnal Average: 78.8 % at hour 7																	Minimum Diurnal Average: 51.9 % at hour 15																	Hours of Missing Data: 0								
Monthly Average: 67.4 %																	Percentiles: P <sub>1</sub> = 31 P <sub>10</sub> = 40 Q <sub>1</sub> = 52 Median = 66 Q <sub>3</sub> = 86 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	68	68	69	70	69	72	75	73	68	58	45	41	37	34	33	34	38	43	49	51	57	60	63	64	55.8	75																
2-Oct	66	70	74	77	80	81	84	82	82	77	65	61	60	59	57	56	73	83	85	87	91	96	97	97	76.6	97																
3-Oct	97	97	98	97	97	96	95	95	95	90	80	73	70	70	73	77	80	87	90	85	85	88	90	92	87.4	98																
4-Oct	93	97	98	98	96	96	95	95	95	95	91	68	59	55	54	55	62	71	78	83	83	82	81	82.3	98																	
5-Oct	84	85	86	89	91	92	92	90	79	71	63	53	40	35	34	35	36	42	51	54	61	65	67	71	65.2	92																
6-Oct	70	69	71	73	76	76	76	73	67	57	55	50	46	47	47	48	47	50	55	59	61	64	67	69	61.4	76																
7-Oct	71	74	80	82	76	75	76	70	63	56	50	43	38	36	33	31	33	39	44	45	51	52	54	59	55.4	82																
8-Oct	59	61	60	66	65	63	65	62	58	52	40	31	35	34	35	38	40	45	51	55	54	58	60	63	52.2	66																
9-Oct	64	64	64	63	63	66	70	71	61	52	48	47	45	41	42	46	72	80	74	71	70	68	65	66	61.4	80																
10-Oct	66	66	66	67	65	60	58	60	56	40	35	33	32	30	29	31	33	38	42	42	41	44	51	53	47.4	67																
11-Oct	54	53	58	61	66	85	96	98	98	97	96	96	94	91	89	90	88	94	94	97	97	93	94	94	86.4	98																
12-Oct	89	91	95	96	97	98	99	99	99	96	90	88	91	95	91	82	78	80	65	56	55	58	59	61	83.7	99																
13-Oct	59	62	65	67	64	64	66	64	59	52	44	41	36	33	33	33	36	38	40	42	46	46	49	49	48.8	67																
14-Oct	49	50	53	55	57	59	60	61	56	48	40	41	40	41	45	49	56	57	62	67	70	70	70	70	54.1	70																
15-Oct	67	71	72	73	73	72	70	67	65	63	59	49	42	37	34	36	41	46	49	48	47	49	50	51	55.3	73																
16-Oct	52	55	55	64	73	73	67	64	60	54	43	36	32	31	31	32	36	43	48	50	49	47	48	51	49.8	73																
17-Oct	53	53	56	60	60	61	62	60	54	46	38	35	32	28	27	29	32	36	42	45	47	50	52	49	46.1	62																
18-Oct	50	46	47	52	54	56	60	64	63	56	51	46	40	35	33	35	38	42	45	45	47	50	50	49	48.1	64																
19-Oct	52	56	59	66	71	68	64	60	65	56	48	47	42	35	38	46	49	55	56	57	62	63	63	62	55.9	71																
20-Oct	63	66	74	94	95	94	90	89	86	79	69	56	52	45	39	37	40	45	50	53	57	58	60	59	64.5	95																
21-Oct	60	61	66	71	80	84	82	78	72	64	54	43	34	31	30	35	39	44	48	51	50	51	53	56	55.8	84																
22-Oct	55	56	58	56	55	57	58	59	59	53	48	43	41	38	36	38	37	41	44	47	49	50	52	55	49.4	59																
23-Oct	57	59	61	62	64	65	66	67	64	61	55	51	48	48	51	53	55	61	66	68	76	77	78	76	62.0	78																
24-Oct	79	82	87	89	88	89	92	96	97	96	93	86	78	69	68	73	75	83	94	97	97	96	93	82	86.6	97																
25-Oct	78	77	78	82	86	92	97	98	97	98	98	98	98	98	98	97	97	97	97	98	98	98	99	99	93.8	99																
26-Oct	99	99	99	99	98	98	98	98	96	92	81	73	65	62	63	67	69	79	91	96	97	96	94	96	87.6	99																
27-Oct	97	95	93	93	91	92	88	87	88	86	85	83	80	79	77	75	76	78	82	79	78	78	78	82	84.2	97																
28-Oct	87	90	92	92	94	94	94	94	93	94	96	93	86	76	67	66	71	81	86	89	91	92	93	95	87.7	96																
29-Oct	95	94	92	91	90	89	87	88	88	89	90	87	84	84	86	87	89	91	91	92	91	92	93	86	89.4	95																
30-Oct	77	77	76	75	75	77	70	74	78	77	72	64	58	58	59	61	69	69	69	69	68	68	67	71	69.9	78																
31-Oct	75	81	84	88	90	91	89	91	91	90	89	85	83	82	80	81	82	81	82	90	93	94	94	93	86.7	94																
																	70.5	71.8	73.7	76.3	77.4	78.5	78.8	78.2	75.9	70.8	65.0	60.1	55.7	52.9	51.9	53.2	56.4	61.5	64.7	66.3	68.1	69.5	70.4	71.0	Diurnal Average	
																	99	99	99	99	98	98	99	99	99	98	98	98	98	98	98	97	97	97	97	97	98	98	99	99	Diurnal Maximum	





Maximum Value: 93 % on Oct 3 04:00																	Maximum Daily Average: 31.5 % on Oct 11																	Hours in Service: 744								
Minimum Value: 0 % on Oct 1 01:00																	Minimum Daily Average: 0.0 % on Oct 1																	Hours of Data: 744								
Maximum Diurnal Average: 11.3 % at hour 10																	Minimum Diurnal Average: 1.2 % at hour 16																	Hours of Missing Data: 0								
Monthly Average: 5.7 %																	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> = 18 P <sub>99</sub> = 64																	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																
2-Oct	0	0	0	0	0	0	0	0	24	12	0	0	0	0	0	0	0	0	0	0	5	36	65	70	8.8	70																
3-Oct	63	75	78	93	37	6	6	6	22	82	67	24	4	0	0	0	0	0	0	0	0	0	0	0	23.4	93																
4-Oct	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	4	5	0	0	0.6	6																
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																
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																
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																
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	0	0	0	0	0	41	32	16	8	5	0	0	0	4.3	41																
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																
11-Oct	0	0	0	0	0	33	53	53	60	50	62	63	47	30	18	14	10	51	85	91	16	6	6	7	31.5	91																
12-Oct	7	7	7	7	30	57	59	68	68	54	20	20	63	54	32	6	0	0	0	0	0	0	0	0	23.2	68																
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	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																
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																
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																
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																
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																
20-Oct	0	0	27	50	52	52	26	15	11	9	5	0	0	0	0	0	0	0	0	0	0	0	0	0	10.3	52																
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																
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	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	21	28	28	44	39	35	57	58	59	54	37	20	13	7	0	0	0	0	8	15	26	44	56	56	29.4	59																
25-Oct	38	10	0	0	0	0	5	5	6	64	27	13	11	10	10	10	9	9	9	9	11	15	4	3	11.6	64																
26-Oct	3	5	18	19	21	23	4	5	5	14	8	0	0	0	3	0	47	52	56	62	64	57	67	22.2	67																	
27-Oct	61	9	9	9	9	9	9	8	8	8	8	7	6	6	5	4	0	0	0	0	0	0	0	0	7.2	61																
28-Oct	0	0	0	0	3	4	4	4	4	4	4	4	4	0	0	0	0	0	0	0	4	3	0	0	1.8	4																
29-Oct	3	4	4	4	3	0	0	3	3	0	5	8	5	0	0	0	0	0	0	0	0	0	0	0	1.7	8																
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																
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																
																	6.3	4.4	5.5	7.2	6.3	7.1	7.2	7.3	8.7	11.3	7.9	5.3	4.9	3.5	2.1	1.2	1.9	4.5	5.5	5.8	4.2	5.6	6.2	6.5	Diurnal Average	
																	63	75	78	93	52	57	59	68	68	82	67	63	63	54	32	14	41	51	85	91	62	64	65	70	Diurnal Maximum	







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

**Leaf Wetness (LW) - %**  
**Conklin Lookout - October 2015**

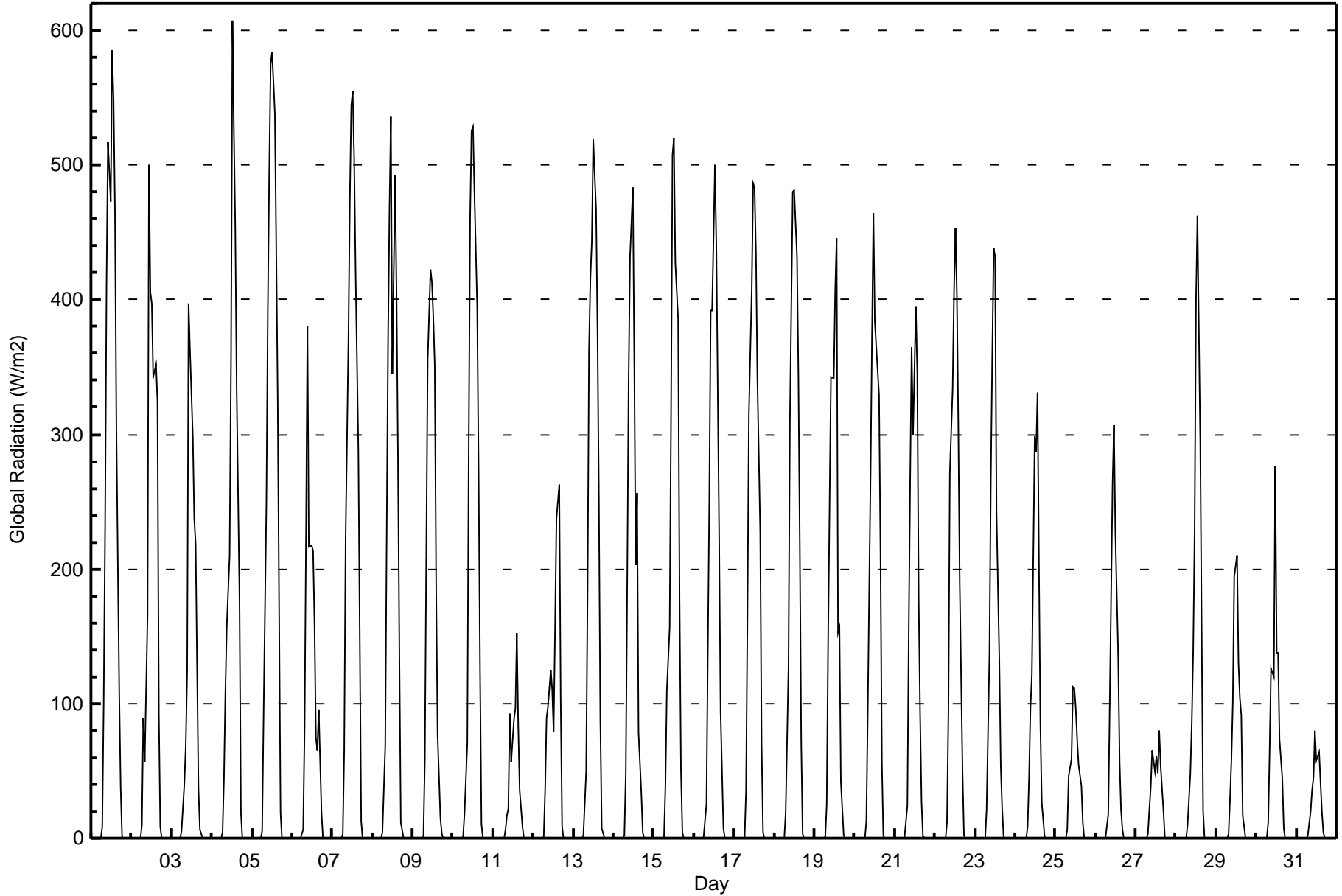
<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	577	77.55	77.55
0.4 - 0.5	0	0.00	77.55
0.6 - 0.7	0	0.00	77.55
0.8 - 1.4	0	0.00	77.55
1.5 - 10	77	10.35	87.90
> 10	90	12.10	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Value: 607 W/m2 on Oct 4 13:00																			Maximum Daily Average: 161.6 W/m2 on Oct 5						Hours in Service: 744	
Minimum Value: 0 W/m2 on Oct 1 01:00																			Minimum Daily Average: 15.3 W/m2 on Oct 31						Hours of Data: 744	
Maximum Diurnal Average: 357.1 W/m2 at hour 13																			Minimum Diurnal Average: 0.0 W/m2 at hour 6						Hours of Missing Data: 0	
Monthly Average: 91.7 W/m2																			Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 124 P <sub>90</sub> = 369 P <sub>99</sub> = 541						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	8	101	230	410	517	472	585	548	465	302	107	38	1	0	0	0	0	0	157.7	585
2-Oct	0	0	0	0	0	0	9	90	57	165	500	405	397	343	352	325	91	9	0	0	0	0	0	0	114.2	500
3-Oct	0	0	0	0	0	0	5	40	68	125	398	362	298	238	218	127	37	7	0	0	0	0	0	0	80.1	398
4-Oct	0	0	0	0	0	0	4	44	108	158	210	356	607	527	453	332	177	19	0	0	0	0	0	0	124.9	607
5-Oct	0	0	0	0	0	0	6	90	249	392	496	575	584	538	434	326	168	18	0	0	0	0	0	0	161.6	584
6-Oct	0	0	0	0	0	0	7	82	224	380	217	218	213	160	74	65	95	18	0	0	0	0	0	0	73.0	380
7-Oct	0	0	0	0	0	0	4	65	223	371	475	544	555	507	423	288	150	12	0	0	0	0	0	0	150.8	555
8-Oct	0	0	0	0	0	0	4	69	223	370	468	536	344	493	403	282	135	12	0	0	0	0	0	0	139.1	536
9-Oct	0	0	0	0	0	0	2	59	210	355	422	413	386	351	187	76	14	3	0	0	0	0	0	0	103.3	422
10-Oct	0	0	0	0	0	0	1	18	70	288	462	526	529	481	394	272	125	11	0	0	0	0	0	0	132.3	529
11-Oct	0	0	0	0	0	0	0	6	17	22	92	57	88	97	153	85	36	9	0	0	0	0	0	0	27.5	153
12-Oct	0	0	0	0	0	0	1	36	90	98	125	111	79	154	238	263	103	8	0	0	0	0	0	0	54.4	263
13-Oct	0	0	0	0	0	0	2	49	185	362	416	443	519	468	377	250	88	7	0	0	0	0	0	0	132.0	519
14-Oct	0	0	0	0	0	0	2	48	189	340	432	483	353	203	256	79	33	4	0	0	0	0	0	0	100.9	483
15-Oct	0	0	0	0	0	0	1	38	109	157	317	508	520	428	386	178	51	4	0	0	0	0	0	0	112.4	520
16-Oct	0	0	0	0	0	0	1	25	141	250	392	392	500	439	332	222	94	8	0	0	0	0	0	0	116.5	500
17-Oct	0	0	0	0	0	0	1	36	167	315	407	486	483	434	341	228	69	4	0	0	0	0	0	0	123.8	486
18-Oct	0	0	0	0	0	0	0	19	127	311	397	480	482	432	343	217	71	4	0	0	0	0	0	0	120.1	482
19-Oct	0	0	0	0	0	0	1	26	147	247	343	341	407	445	152	156	42	2	0	0	0	0	0	0	96.2	445
20-Oct	0	0	0	0	0	0	0	12	93	270	373	465	383	366	329	212	55	2	0	0	0	0	0	0	106.7	465
21-Oct	0	0	0	0	0	0	1	24	157	268	365	299	395	345	177	91	27	1	0	0	0	0	0	0	89.6	395
22-Oct	0	0	0	0	0	0	0	11	94	271	334	408	453	403	308	190	48	2	0	0	0	0	0	0	105.1	453
23-Oct	0	0	0	0	0	0	0	21	137	268	360	439	432	241	132	53	22	1	0	0	0	0	0	0	87.8	439
24-Oct	0	0	0	0	0	0	0	9	45	97	122	298	287	331	203	84	27	1	0	0	0	0	0	0	62.7	331
25-Oct	0	0	0	0	0	0	0	6	47	58	112	111	97	74	55	39	12	0	0	0	0	0	0	0	25.5	112
26-Oct	0	0	0	0	0	0	0	17	98	180	262	306	227	135	57	21	6	0	0	0	0	0	0	0	54.6	306
27-Oct	0	0	0	0	0	0	0	3	21	38	65	49	60	48	80	54	20	0	0	0	0	0	0	0	18.3	80
28-Oct	0	0	0	0	0	0	0	10	48	86	140	227	399	463	294	155	20	0	0	0	0	0	0	0	76.8	463
29-Oct	0	0	0	0	0	0	0	3	28	58	100	194	210	130	104	91	17	0	0	0	0	0	0	0	39.0	210
30-Oct	0	0	0	0	0	0	0	11	65	126	120	276	138	137	73	44	7	0	0	0	0	0	0	0	41.6	276
31-Oct	0	0	0	0	0	0	0	2	20	35	45	80	57	64	41	19	4	0	0	0	0	0	0	0	15.3	80
																			0.0 0.0 0.0 0.0 0.0 0.0 1.9 34.5 119.0 221.6 305.9 350.3 357.1 323.3 252.8 165.3 62.9 6.7 0.1 0.0 0.0 0.0 0.0 0.0						Diurnal Average	
																			0 0 0 0 0 0 9 101 249 410 517 575 607 548 465 332 177 38 1 0 0 0 0 0						Diurnal Maximum	





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

**Global Radiation (GR) - W/m2**  
**Conklin Lookout - October 2015**

<b>Concentration Ranges (W/m2)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	457	61.42	61.42
21 - 100	89	11.96	73.39
101 - 300	92	12.37	85.75
301 - 600	105	14.11	99.87
601 - 900	1	0.13	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

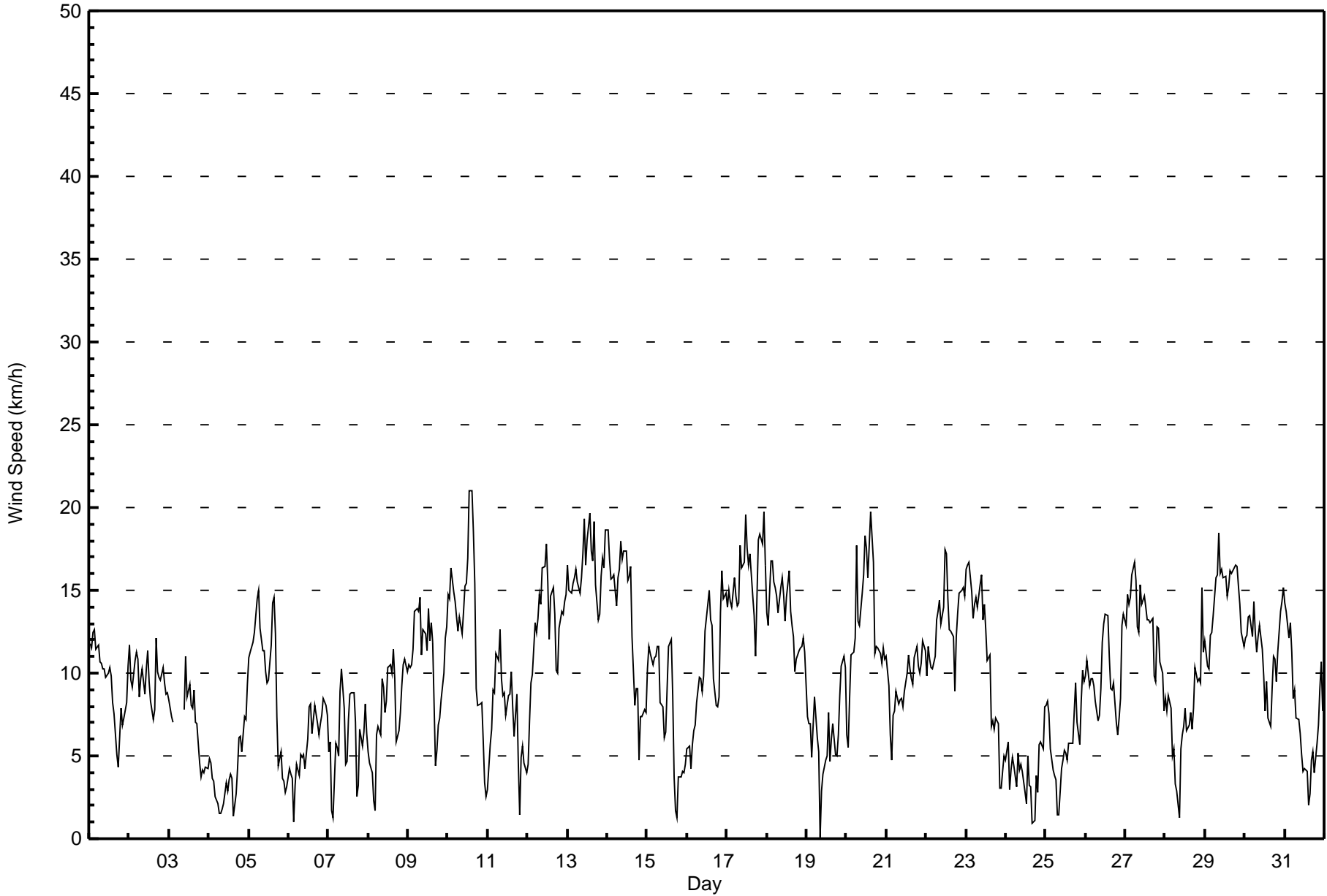


Maximum Speed: 21 km/h on Oct 10 14:00	Maximum Daily Speed Average: 15.8 km/h on Oct 13	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 19 09:00	Minimum Daily Speed Average: 1.1 km/h on Oct 4	Hours of Data: 738
Maximum Diurnal Speed Average: 7.0 km/h at hour 6	Minimum Diurnal Speed Average: 2.8 km/h at hour 18	Hours of Missing Data: 6
Monthly Average Velocity: 5.5 km/h 247.1 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 4 Q <sub>1</sub> = 7 Median = 10 Q <sub>3</sub> = 13 P <sub>90</sub> = 16 P <sub>99</sub> = 19	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	SW12	SW12	SW12	SW13	SW11	SW12	SW11	SSW11	SSW10	SSW10	SSW10	SSW10	SSW10	SSW10	SSW8	SSW8	SSW5	SSW4	SSW6	SSW8	SSW7	SSW7	S8	SSW10	SSW9.3	SW13		
2-Oct	SSW12	SSW10	S9	SSW11	SSW11	SSW11	S9	S10	S10	S9	S10	SSW11	SSW9	S8	S7	NNW8	NNW12	NNW10	N10	N10	N10	N9	N9	N9	SSW3.0	NNW12		
3-Oct	N8	N7	N7	AF	AF	AF	AF	AF	AF	N8	NNE11	N9	N9	N8	N8	N9	N7	N7	NNW5	NNW4	NNW4	NNW4	N4	N4	N6.7	NNE11		
4-Oct	N5	N5	NNW4	NW3	N3	WNW2	W2	SW2	SSW2	SE2	SSE3	SW3	WNW4	WNW4	NW4	WNW1	ENE3	ESE4	ESE6	SSE6	S5	SSW7	SSW7	SSW9	SW1.1	SSW9		
5-Oct	SW11	SW11	SW12	SW12	SSW13	SW14	SW15	SW13	SW11	NNW11	NW10	NNW9	NNW10	SW12	NW14	NW15	NW12	NW7	NW4	NNW5	NNW4	NW3	NNW3	NW3	W6.8	SW15		
6-Oct	NW4	NW4	NW4	NNW1	S3	S5	SSE4	SE5	SE5	SE5	SE4	SSE6	S8	S8	S6	SE7	SE8	SE7	SE6	SE7	SE7	SSE9	SSE8	SSE7	SSE4.5	SSE9		
7-Oct	SSE5	SE6	N2	NW1	SSW6	WSW6	W5	WNW9	NW10	NW8	NNW4	NW5	NW7	NW9	NW9	NW9	NW7	NNW3	WNW3	W7	W6	W6	WNW8	NW6	WNW4.6	NW10		
8-Oct	NNW5	NNW5	N4	NNW2	S2	SSW6	SSW7	SSW6	SSW10	S9	S8	S8	SSW10	SSW10	S10	SSW11	SSW10	S6	SSW6	S8	SSW9	SSW10	SSW11	SSW10	SSW6.4	SSW11		
9-Oct	SSW11	SSW10	SSW11	SSW11	SSW14	SW14	SW14	SW15	SW11	W13	W12	WSW11	WSW14	WSW12	SW13	WSW12	SW4	SE5	SSE7	SSE7	S8	SSW10	SSW12	SSW13	SW9.5	SW15		
10-Oct	SW15	SW15	SW16	SW15	SW14	SW13	SW13	SW13	SW12	WSW14	W15	W15	W17	W21	W21	W19	W15	W9	W8	WNW8	WNW8	WNW6	NW3	NNW3	WSW11.5	W21		
11-Oct	SE3	NNE6	NE7	NE9	NNE9	NNE11	N11	NNE13	N10	NNW9	N9	NNW7	N9	NNW9	NW10	NNW8	NNW6	NW9	NNW5	NW1	WNW5	WNW6	WNW5	SW4	N5.9	NNE13		
12-Oct	SW5	SSW7	SSW9	SSW10	SSW13	SSW12	SSW13	SSW15	SSW14	SSW16	SSW16	SSW18	SW16	SSW12	SSW15	SW15	SW14	WSW10	WSW10	W13	WSW14	WSW14	WSW14	WSW15	SW12.0	SSW18		
13-Oct	WSW16	WSW15	WSW15	SW15	WSW16	WSW16	WSW15	WSW15	W16	W17	WNW19	WNW16	W18	WNW20	WNW17	WNW17	WNW19	W15	W13	W14	W16	W17	W16	W19	W15.8	WNW20		
14-Oct	W19	W17	W16	W16	W16	W14	WNW16	WNW16	WNW18	WNW17	WNW17	WNW17	WNW16	WNW16	WNW16	NW12	NNW8	NW9	NNW5	NW7	WNW7	WNW8	WNW8	WNW12.7	W19			
15-Oct	WNW10	WNW12	WNW11	WNW11	WNW11	W12	W12	W8	W8	WNW6	WNW6	WNW9	WNW12	WNW12	NW9	NW4	WNW2	NNW1	SSW4	S4	S4	SSE4	SSE4	W6.5	WNW12			
16-Oct	SSE5	S6	SSE4	SE6	ESE7	SE7	SSE8	SSE10	SSE10	SSE9	SE10	SSE13	SSE14	SSE15	SSE13	S13	SSE10	SSE8	SSE8	S9	S14	SSW16	SSW15	SSW15	SSE9.5	SSW16		
17-Oct	SSW14	SSW15	SSW14	SSW14	SSW16	SSW15	SSW14	SSW18	SSW16	SSW17	SSW20	SSW18	SSW17	SSW17	SSW15	S13	S11	SSW15	SSW18	SSW18	SSW18	SSW18	SSW18	SSW18	SSW15.7	SSW20		
18-Oct	SW14	W13	W17	W17	WNW15	WNW15	WNW15	WNW14	WNW15	WNW16	WNW15	NW13	NW15	WNW16	NW14	WNW13	WNW12	W10	W11	W11	W12	W12	W12	WNW11	WNW13.1	WNW17		
19-Oct	WNW7	WNW7	W7	WSW5	SW7	SW9	WSW6	W5	ESE0	SSE3	SE4	SSE5	SSE5	SSW8	SSW5	NE6	ENE7	E5	SE5	SSE6	S9	S10	SSW11	SSW10	SSW3.4	SSW11		
20-Oct	SW6	WSW6	WSW8	W11	W11	W12	WNW18	WNW13	WNW13	WNW15	WNW16	WNW18	WNW18	WNW16	WNW20	WNW18	WNW17	WNW11	W12	W12	WNW11	W11	W11	WNW11	WNW12.7	WNW20		
21-Oct	W11	WNW9	WNW6	WSW5	SW7	SW8	SW9	SSW8	SSW8	SSW8	S8	SSE9	SSE10	SSE11	S10	SSE10	SSE9	SSE11	SSE12	S10	S10	S11	SSW12	SSW11	SSW7.6	SSW12		
22-Oct	WSW10	WNW12	WNW11	WNW10	W10	W11	W13	W14	W14	W13	WNW14	WNW17	W14	W13	W13	W12	WSW9	W12	W14	W15	W15	W15	W15	W12.8	WNW17			
23-Oct	W16	W17	W17	W15	W13	W14	W15	W14	W15	W16	WNW13	W14	WNW13	WNW11	WNW11	NW7	WNW7	WNW7	WNW7	WNW7	WNW7	NW3	WNW3	NW4	WNW5	W10.7	W17	
24-Oct	WNW5	NW6	WSW3	NW4	NW5	NW4	N3	NE5	E4	E5	SE4	SSW3	W2	NNW5	NNE3	NE3	SE1	E1	NE4	SSE3	SW6	SW6	WSW5	WSW8	WNW1.1	WSW8		
25-Oct	W8	WNW8	WNW8	NW5	NNW4	NNW4	NW4	ENE1	S1	ESE4	ESE5	ESE5	ESE5	SE5	SE6	ESE6	ESE6	ESE8	SE9	SE7	SE6	SE8	S10	SSE10	SSE2.4	S10		
26-Oct	SSE10	SSE11	SSE9	SSE10	SSE10	SSE9	SSE8	SE7	SE7	SSE9	SSE12	SE13	SSE14	SSE13	SE11	SE9	SSE9	S9	S7	SSW6	SSW7	WSW8	WNW13	NW14	SSE7.3	SSE14		
27-Oct	NW13	NW15	NW14	NW15	NW16	NW17	NW16	NW13	NW12	NW15	NW14	NW15	NW14	NW13	NW13	NW13	NW13	NW10	NW9	NW13	NW13	NW11	NW10	NW8	NW13.1	NW17		
28-Oct	WNW9	NW8	NW9	NW8	NW5	NW5	NNW3	NNW3	S1	SSW5	S6	S7	S8	SSE7	SSE7	SE8	SSE7	SSE8	SSE10	S10	S10	S9	S15	S11	SSW3.8	S15		
29-Oct	S12	S10	S10	S12	S12	S13	SSW16	SSW16	SSW19	SSW16	SSW16	SSW16	SSW16	SSW16	SSW16	SSW15	SSW15	SSW16	SSW16	SSW16	SW17	SW16	SW15	SW14	SW12	SW12	SSW14.1	SSW19
30-Oct	WSW12	WSW12	WSW13	WSW13	WSW12	WSW14	WSW12	SW11	SW12	SW13	SW11	SSW10	SSW8	SSW9	SSW7	SSW7	SW9	SW11	SW11	WSW10	W11	W14	W14	W15	WSW10.4	W15		
31-Oct	WNW14	WNW14	WNW12	WNW13	WNW11	NW8	NW9	NW7	NW7	NW6	NW5	NNW4	NNW4	N4	NE2	S3	E5	E5	E4	ENE6	E7	ENE9	ENE11	ENE8	NNW3.6	WNW14		

WSW6.7WSW6.3WSW6.3WSW6.4WSW6.6WSW7.0WSW6.8WSW6.2WSW6.4WSW5.7WSW4.9WSW5.4WSW5.5WSW5.6WSW5.6	Diurnal Average
W19 W17WNW17 W17 W16 NW17WNW18WNW16 SSW19 W17WNW19 SSW20 W18 W21 W21 W19WNW19 SSW16 SW17 SSW18 SSW18 SSW18 SW20 W19	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 Lookout - October 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	140	18.97	18.97
6 - 11	325	44.04	63.01
12 - 19	267	36.18	99.19
20 - 28	6	0.81	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 738

Total Number of Hours: 744



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

**Wind Speed (WS) - km/h**  
**Conklin Lookout - October 2015**

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	1	4	2	7	6	12	11	9	7	5	4	4	11	24	24	140
6 - 11	21	4	3	5	1	5	19	37	40	60	18	13	20	38	31	10	325
12 - 19	0	1	0	0	0	0	1	8	8	50	37	22	60	51	28	1	267
20 - 28	0	0	0	0	0	0	0	0	0	1	1	0	2	2	0	0	6
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	6	7	7	8	11	32	56	57	118	61	39	86	102	83	35	738

Total Number of Valid Hours: 738

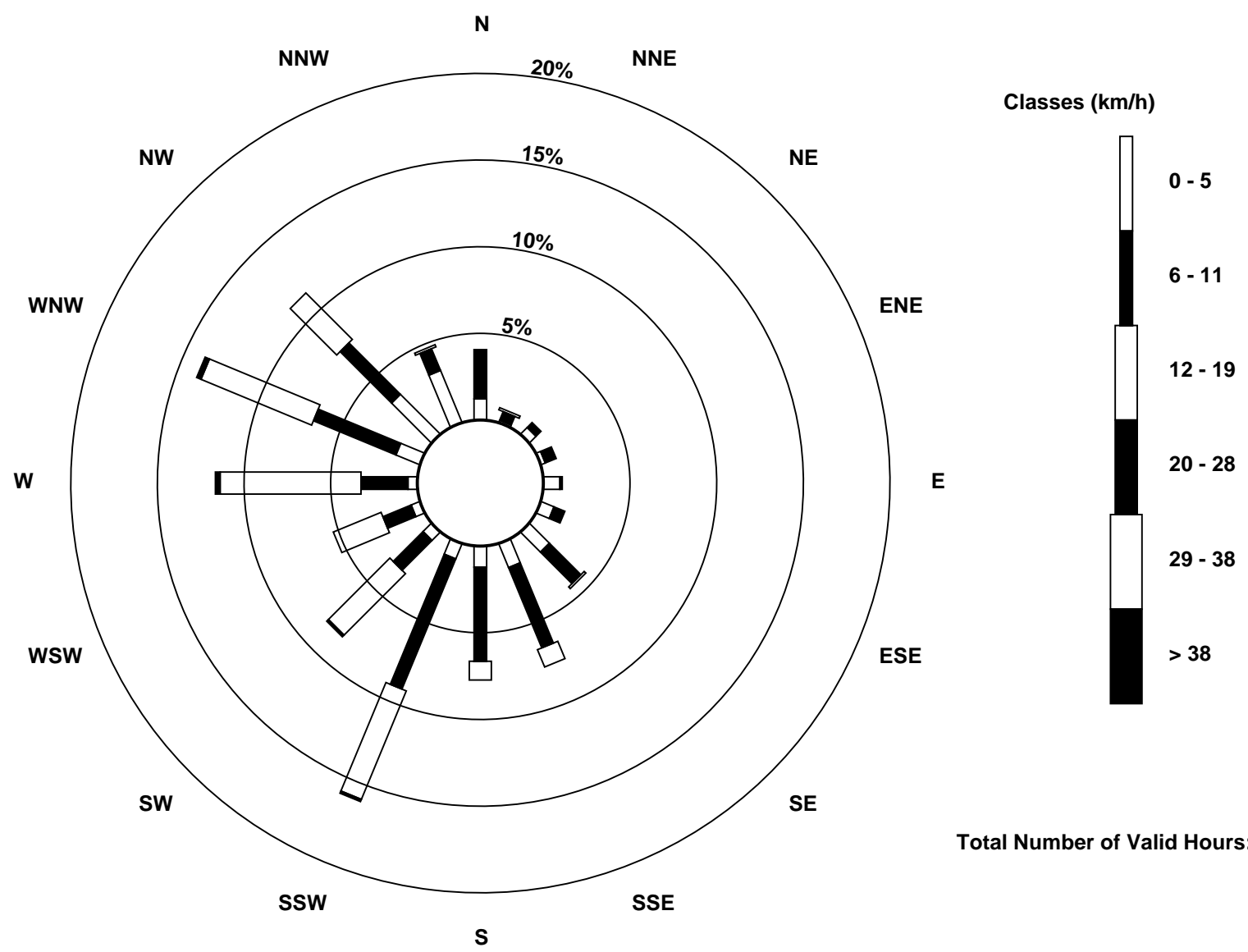
Total Number of Hours: 744





Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Wind Speed (WS) - km/h  
Conklin Lookout (AMS 18)





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h  
Conklin Lookout - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Oct 14 12:00 Minimum Value: 0 km/h on Oct 5 23:00 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> = 6																		Hours in Service: 744 Hours of Data: 738 Hours of Missing Data: 6 Hours of Calibration: 0 Percent Operational Time: 99.2							
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	3	3	3	3	3	3	3	2	3	3	3	3	4	3	3	3	2	1	2	2	1	2	2	3	4
2-Oct	3	2	2	3	3	3	2	3	3	3	4	4	3	3	2	3	5	4	4	4	4	4	4	3	5
3-Oct	3	3	3	AF	AF	AF	AF	AF	AF	3	4	3	4	3	4	3	3	3	2	1	1	1	1	1	4
4-Oct	2	2	1	2	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	2	1	2	1	2	2
5-Oct	3	3	3	3	3	3	4	3	3	4	3	3	4	5	5	5	5	3	1	2	1	1	0	1	5
6-Oct	1	1	1	1	1	1	1	1	1	1	1	3	3	3	2	3	2	2	1	1	2	2	2	2	3
7-Oct	1	1	1	1	2	2	1	2	3	2	1	2	3	3	3	3	3	1	1	2	1	1	2	1	3
8-Oct	1	1	1	0	2	1	1	1	2	3	2	3	3	3	4	4	3	2	1	2	2	2	2	2	4
9-Oct	2	2	2	2	3	3	3	4	3	4	4	4	4	4	4	4	3	1	1	1	2	2	3	3	4
10-Oct	4	3	4	4	3	3	3	3	3	4	5	6	6	7	7	6	5	3	2	2	2	2	1	1	7
11-Oct	1	1	2	2	3	3	3	5	3	3	3	3	4	4	4	3	2	3	2	1	2	2	1	1	5
12-Oct	2	1	3	2	3	3	3	3	3	4	4	5	4	3	4	4	4	3	3	4	4	4	4	5	5
13-Oct	5	5	4	4	5	5	5	4	5	5	7	6	6	7	6	6	6	5	4	4	5	5	5	5	7
14-Oct	6	5	5	5	5	4	5	5	6	6	6	8	6	6	6	5	3	3	3	2	3	2	2	3	8
15-Oct	3	3	3	3	3	3	3	3	2	2	2	3	4	4	4	4	2	1	1	1	1	0	0	1	4
16-Oct	1	1	1	1	1	2	2	2	2	2	3	5	5	5	4	4	3	2	2	3	3	4	3	3	5
17-Oct	3	4	3	3	4	3	3	4	4	5	5	7	6	5	5	4	4	3	4	5	4	4	5	5	7
18-Oct	4	4	5	5	5	5	5	4	5	6	5	5	5	5	5	5	4	3	3	3	3	3	3	3	6
19-Oct	3	2	2	1	2	2	1	2	1	1	2	2	2	3	3	2	2	2	1	2	2	3	3	2	3
20-Oct	3	2	3	3	3	4	6	4	4	5	6	6	6	5	7	6	6	3	3	3	3	3	3	3	7
21-Oct	3	3	2	2	1	1	2	2	2	2	2	3	3	3	3	3	2	3	3	3	3	2	3	3	3
22-Oct	3	3	3	3	3	3	4	4	4	4	5	6	6	4	5	4	4	3	4	4	4	4	4	4	6
23-Oct	5	5	5	4	4	4	5	4	5	5	4	5	4	4	4	3	2	2	2	2	1	1	1	1	5
24-Oct	1	2	1	1	1	1	1	2	1	2	2	2	1	2	2	2	2	2	1	1	1	1	2	2	2
25-Oct	2	2	2	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	2	2	3	3	3	3
26-Oct	3	3	2	3	2	2	2	1	2	2	3	4	4	4	3	3	3	3	2	2	2	3	4	4	4
27-Oct	4	5	5	5	5	6	6	5	4	5	5	5	4	5	5	4	5	4	4	4	4	3	3	3	6
28-Oct	2	2	2	2	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	3	3	4	3	4
29-Oct	3	2	3	3	4	4	4	5	5	5	4	4	4	4	4	4	4	4	4	4	3	3	2	3	5
30-Oct	4	4	4	4	3	4	4	2	3	3	3	2	2	3	2	2	2	3	2	2	3	4	4	4	4
31-Oct	4	4	4	4	4	3	3	2	2	2	2	2	2	2	2	1	2	2	1	2	2	3	4	2	4
Diurnal Maximum																									
AF - Analyzer Failure																									



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

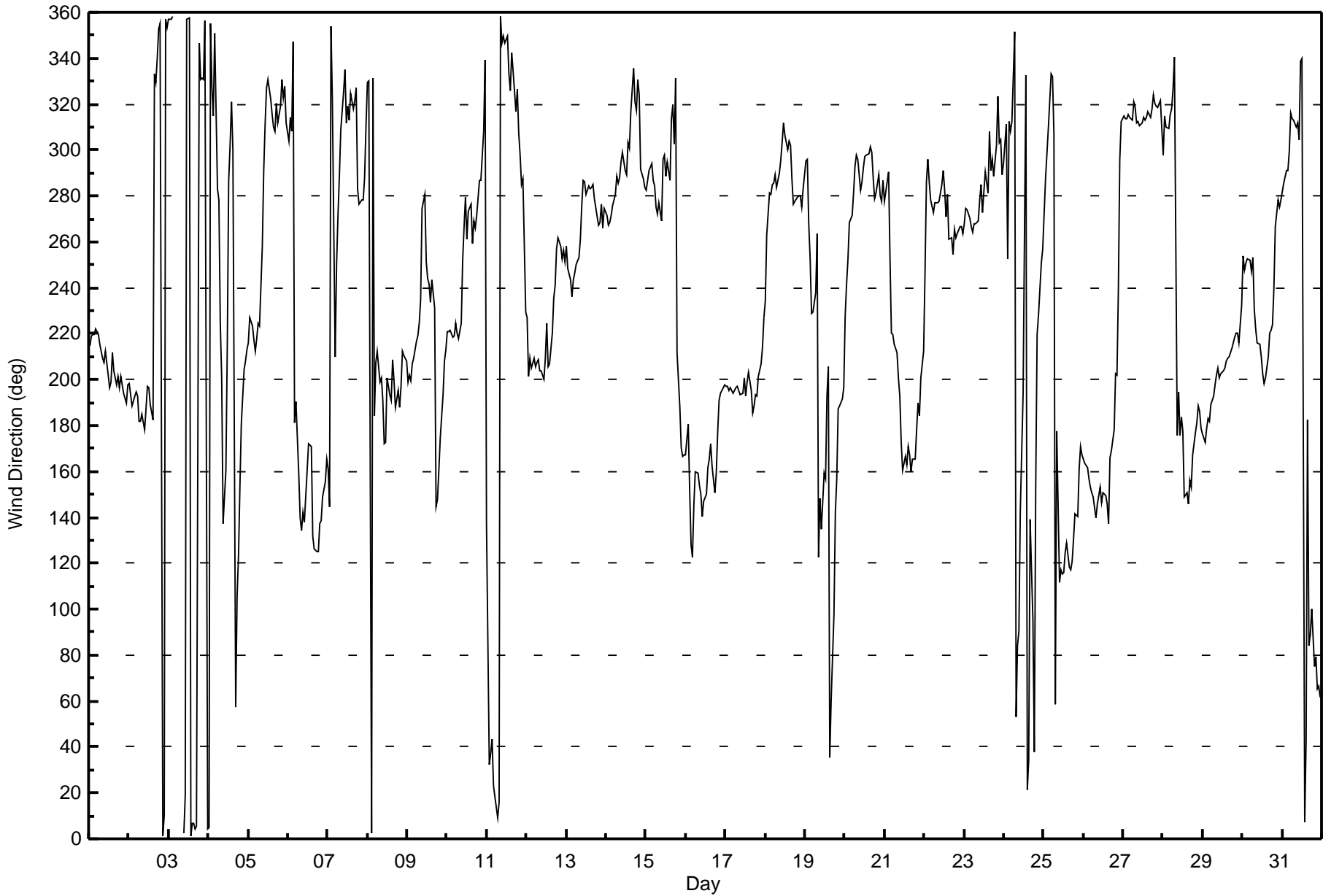
**Wind Direction (WD) - deg  
Conklin Lookout - October 2015**

Direction of Maximum Speed: 273 deg on Oct 10 14:00		Hours in Service:	744
Direction of Maximum Daily Speed Average: 268.1 deg on Oct 13		Hours of Data:	738
Direction of Minimum Speed: 123 deg on Oct 19 09:00		Hours of Missing Data:	6
Direction of Minimum Daily Speed Average: 1.1 deg on Oct 4		Percent Operational Time:	99.2
Monthly Average Direction: 263.4 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	215	219	220	220	222	220	215	212	210	208	212	202	196	199	212	204	197	201	197	201	198	194	190	198	208.4
2-Oct	198	194	189	193	195	193	182	182	185	178	187	197	197	189	183	333	330	340	353	355	1	10	357	353	213.2
3-Oct	357	357	358	AF	AF	AF	AF	AF	AF	2	19	357	358	1	7	7	4	5	347	331	331	331	356	4	359.4
4-Oct	5	355	328	315	351	283	278	225	201	137	161	215	287	302	321	300	57	106	123	153	181	204	208	213	219.7
5-Oct	216	227	223	218	212	218	224	223	258	291	311	327	331	322	316	310	308	320	123	319	331	323	327	312	272.2
6-Oct	304	314	308	347	181	191	159	140	134	142	138	161	172	171	171	132	126	125	125	137	138	149	156	165	151.7
7-Oct	161	145	354	321	210	250	272	289	309	325	335	312	319	313	325	318	322	327	283	276	278	278	288	311	298.0
8-Oct	330	330	2	331	184	207	212	199	201	191	172	173	201	193	191	209	199	188	195	188	197	212	211	208	201.6
9-Oct	199	202	199	207	209	216	219	224	235	275	281	252	244	241	234	244	231	145	148	161	174	194	208	213	220.1
10-Oct	221	221	221	218	219	225	220	218	225	252	267	280	261	273	276	259	269	266	272	287	287	298	308	339	251.0
11-Oct	137	32	38	44	23	18	9	16	358	346	349	347	349	333	326	342	334	316	327	307	298	285	287	229	351.3
12-Oct	227	201	209	205	209	205	207	209	204	204	200	209	225	206	207	221	236	241	257	262	258	253	256	251	222.8
13-Oct	258	248	243	236	243	247	250	253	261	276	287	286	281	285	283	284	285	279	271	267	268	277	266	275	268.1
14-Oct	272	267	269	271	276	281	289	286	288	295	299	291	289	303	301	317	336	321	317	331	324	292	288	284	291.1
15-Oct	283	287	291	294	287	284	275	272	277	269	296	298	288	295	287	313	320	302	331	212	188	170	166	167	281.2
16-Oct	167	181	152	128	122	145	160	159	154	150	140	147	150	162	165	172	162	151	159	177	191	194	195	198	165.3
17-Oct	197	197	195	196	194	195	197	197	195	194	194	201	193	199	203	196	186	189	194	193	201	207	214	227	198.4
18-Oct	234	263	281	281	285	285	289	284	290	295	303	312	306	300	304	302	288	277	278	280	280	280	275	283	286.4
19-Oct	295	296	268	252	229	229	238	264	123	149	135	159	157	193	205	35	61	98	142	157	188	188	192	197	201.2
20-Oct	227	242	252	268	271	281	293	298	296	282	286	293	297	298	298	302	299	288	279	281	289	280	277	287	286.5
21-Oct	278	286	290	253	220	220	215	212	201	193	173	160	167	163	171	167	160	166	165	178	190	184	201	213	194.2
22-Oct	247	286	296	286	278	273	277	277	277	278	285	291	283	271	280	261	262	255	265	262	264	267	267	263	273.4
23-Oct	268	275	274	270	266	264	268	268	269	278	285	273	282	290	282	308	291	296	288	302	323	303	304	289	278.3
24-Oct	294	311	252	312	308	313	352	53	84	90	143	194	264	333	21	34	139	95	38	153	219	228	251	257	296.2
25-Oct	272	287	298	309	333	332	307	59	177	111	117	115	116	125	129	118	117	121	131	141	141	161	171	167	146.5
26-Oct	165	164	162	157	153	151	149	140	146	149	153	146	151	150	146	137	166	169	178	203	202	239	296	312	164.3
27-Oct	315	314	313	315	314	313	321	318	312	312	310	312	314	313	314	317	314	318	324	320	319	318	322	309	315.4
28-Oct	298	315	310	309	316	318	327	341	176	195	176	184	178	149	151	146	156	153	167	177	181	188	186	179	192.2
29-Oct	176	173	179	183	182	189	193	197	202	205	201	203	204	205	208	209	210	213	216	219	220	220	216	233	203.4
30-Oct	254	248	251	253	252	247	253	231	222	216	216	210	203	199	200	210	220	222	224	240	267	278	275	278	239.8
31-Oct	282	285	291	291	299	316	314	313	310	312	305	339	340	7	43	183	84	89	100	75	79	65	66	61	330.3

247.8 254.8 255.9 250.1 243.2 244.6 248.2 243.5 243.0 250.0 251.1 247.5 249.0 252.3 255.5 260.9 259.5 240.0 231.8 233.2 237.9 238.2 240.6 245.2  
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  
Conklin Lookout - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 100 deg on Oct 19 09:00	Hours of Data: 738
Minimum Value: 10 deg on Oct 28 07:00	Hours of Missing Data: 6
Percentiles: P <sub>1</sub> = 11 P <sub>10</sub> = 16 Q <sub>1</sub> = 18 Median = 21 Q <sub>3</sub> = 26 P <sub>90</sub> = 33 P <sub>99</sub> = 75	Hours of Calibration: 0
	Percent Operational Time: 99.2

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	19	20	19	21	21	20	19	18	20	24	27	32	33	31	43	38	25	16	20	17	14	17	19	18	43
2-Oct	18	19	19	18	18	19	23	24	25	26	32	26	30	34	37	42	26	30	30	31	29	27	31	30	42
3-Oct	30	30	30	AF	AF	AF	AF	AF	AF	31	30	34	33	35	38	30	33	31	28	29	26	25	25	28	38
4-Oct	28	30	38	44	31	52	48	68	72	70	45	80	73	76	65	97	52	16	16	20	16	15	18	97	
5-Oct	19	19	19	18	18	17	17	18	27	25	27	32	37	32	29	26	26	21	18	23	19	11	11	10	37
6-Oct	14	10	13	65	34	11	24	13	16	30	34	35	29	29	27	22	21	17	15	15	16	16	14	16	65
7-Oct	18	12	65	44	19	29	25	17	19	22	43	51	37	34	35	28	28	23	12	14	11	14	18	17	65
8-Oct	15	22	19	27	89	12	10	14	18	23	32	33	27	31	35	25	26	18	14	15	16	15	16	15	89
9-Oct	16	16	15	18	18	18	16	17	25	22	28	30	26	28	25	25	40	16	15	15	18	17	18	17	40
10-Oct	17	16	16	17	17	18	17	17	18	25	27	24	28	25	25	27	24	22	22	18	17	18	14	36	36
11-Oct	43	23	33	19	25	19	20	22	24	26	27	30	29	30	28	33	32	25	28	27	17	18	17	36	43
12-Oct	32	15	17	19	16	17	18	18	17	17	18	21	20	20	20	21	21	20	21	23	22	23	24	23	32
13-Oct	23	22	22	20	21	21	22	24	24	23	25	25	27	23	26	25	24	23	21	22	23	21	21	20	27
14-Oct	20	21	21	21	20	20	21	21	22	25	25	26	27	26	24	29	31	26	22	30	29	20	23	21	31
15-Oct	20	20	21	21	22	21	20	20	21	22	35	45	34	30	29	27	31	23	21	45	14	10	10	13	45
16-Oct	14	17	25	16	15	20	16	17	18	20	25	24	26	25	27	25	24	16	16	17	16	17	16	16	27
17-Oct	16	17	15	16	17	16	16	18	18	19	21	21	23	24	21	21	20	20	17	17	17	17	18	19	24
18-Oct	20	23	21	20	22	21	22	22	22	23	25	27	27	24	26	27	23	21	20	19	18	21	22	23	27
19-Oct	22	22	27	35	29	15	19	38	100	45	63	48	54	47	62	25	16	21	25	17	18	18	17	18	100
20-Oct	38	23	22	22	24	23	22	22	22	22	26	26	24	24	24	25	23	20	20	20	19	20	20	19	38
21-Oct	18	19	18	33	13	12	13	15	15	21	24	27	28	24	24	21	17	17	18	19	18	17	18	18	33
22-Oct	27	20	18	21	22	21	20	21	20	22	23	25	25	26	25	27	25	22	22	22	21	21	22	22	27
23-Oct	23	20	20	21	22	23	22	23	23	21	24	24	26	30	23	26	22	18	17	20	14	14	14	16	30
24-Oct	18	17	36	23	16	17	20	19	31	34	43	65	77	48	58	57	88	62	21	51	13	16	31	18	88
25-Oct	18	17	20	17	15	16	28	79	44	26	26	31	33	31	26	25	21	21	19	17	15	22	19	18	79
26-Oct	20	20	19	19	15	15	13	15	16	18	21	21	23	21	21	21	26	22	22	19	20	24	25	20	26
27-Oct	22	24	23	22	23	24	24	24	23	22	21	22	23	23	23	23	23	24	27	20	23	21	22	22	27
28-Oct	20	17	17	17	13	13	10	12	75	24	23	24	25	29	31	22	18	15	17	18	19	19	18	18	75
29-Oct	18	17	18	20	21	20	20	18	19	23	18	18	19	19	19	18	18	18	18	18	17	16	15	19	23
30-Oct	24	22	23	21	22	20	22	20	17	16	18	20	24	21	17	22	19	17	16	18	23	19	20	19	24
31-Oct	19	19	21	21	24	23	22	21	23	23	28	41	38	40	76	55	24	18	22	23	19	16	17	20	76
	43	30	65	65	89	52	48	79	100	70	63	80	77	76	76	97	88	62	30	51	29	27	31	36	

Diurnal Maximum

AF - Analyzer Failure



# Wood Buffalo Environmental Association

## SO2 Calibration Report

### Station Information

Calibration Date	October 1, 2015	Last Calibration	September 9, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	8:00	End Time (MST)	11:38
Gas Cert Reference	EY0000368	Station temp.	22 Deg C
Cal Gas Concentration	49 ppm	Cal Gas Exp Date	10/06/2016
Calibrator Make/Model	API T700	Serial Number	1222
ZAG Make/Model	API 701	Serial Number	5610
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9035

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-601	-602
Analyzer IP address	192.168.1.43		Lamp voltage	885	885
Calculated slope	1.001414	0.994299	Chamber temp	45.0	44.9
Calculated intercept	-1.304051	-0.904979	Pressure	659.6	660.7
Analyzer Background	23.1	23.1	Flow	0.429	0.431
Analyzer Coefficient	0.928	0.928	Intensity	86	86

Analyzer make Thermo 43i Analyzer serial # JC1501301453

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.6	----
as found span	5000	58.6	574.3	577.8	0.994
calibrator zero	5000	0.0	0.0	-0.6	----
high point	5000	58.6	574.3	577.8	0.994
second point	5000	29.3	287.1	290.2	0.989
third point	5000	14.6	143.1	146.5	0.977
as left zero	5000	0.0	0.0	-0.6	----
as left span	5000	58.6	574.3	579.8	0.990
Average Correction Factor					0.987

Corrected As found 578.4 Previous response 574.8 % change -0.6%

**Notes:**

No maintenance or adjustments done, filter changed out

Calibration Performed By: Melissa Lemay



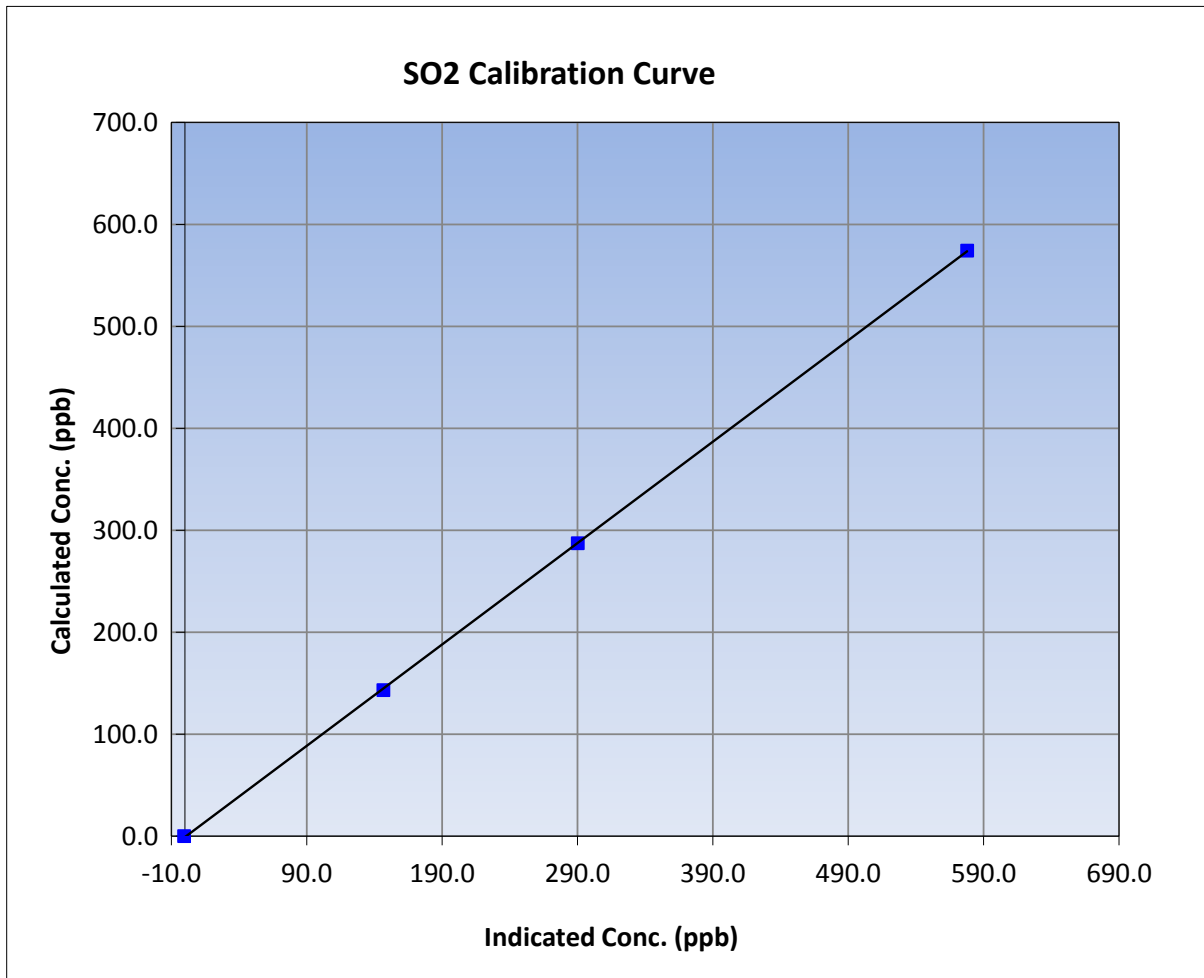
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	October 1, 2015	Previous Calibration	September 9, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	8:00	End Time (MST)	11:38
Analyzer make	Thermo 43i	Analyzer serial #	JC1501301453

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.6	----	Correlation Coefficient	0.999968
574.3	577.8	0.9939		
287.1	290.2	0.9895	Slope	0.994299
143.1	146.5	0.9767		
			Intercept	-0.904979









# Wood Buffalo Environmental Association TRS Calibration Report

## Station Information

Calibration Date	October 8, 2015	Last Calibration	September 10, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	8:10	End Time (MST)	10:32
Gas Cert Reference	CC233389	Station temp.	22 Deg C
Cal Gas Concentration	4.88 ppm	Cal Gas Exp Date	06/10/2014
Calibrator Make/Model	API 700	Serial Number	1222
Dil air Make/Model	API 701	Serial Number	5610
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9035
SO2 gas concentration	49 ppm	SO2 gas cert/exp	EY0000368 10/Jun/15

## Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-699	-699
Analyzer IP address	192.168.1.44		Lamp voltage	1007	1013
Calculated slope	1.000518	1.001230	Chamber temp	45	45
Calculated intercept	-0.079167	-0.186744	Pressure	639.0	640.2
Analyzer Background	1.63	1.63	Flow	0.411	0.413
Analyzer Coefficient	0.976	0.976	Intensity	89	92
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1336160090	
Converter make/model	CDN-101		Converter serial #	522	

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.2	----
as found span	5000	82.0	80.0	79.9	1.002
SO2 scrubber check	5000	19.5	191.1	0.7	----
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	82.0	80.0	79.9	1.002
second point	5000	41.0	40.0	40.4	0.990
third point	5000	20.5	20.0	20.5	0.976
as left zero	5000	0.0	0.0	-0.1	----
as left span	5000	82.0	80.0	81.0	0.988
Average Correction Factor					0.989

Corrected As found	80.1	Previous response	80.1	% change	0.0%
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**Notes:**

no maintenance or adjustments done, filter changed out

Calibration Performed By:

Melissa Lemay



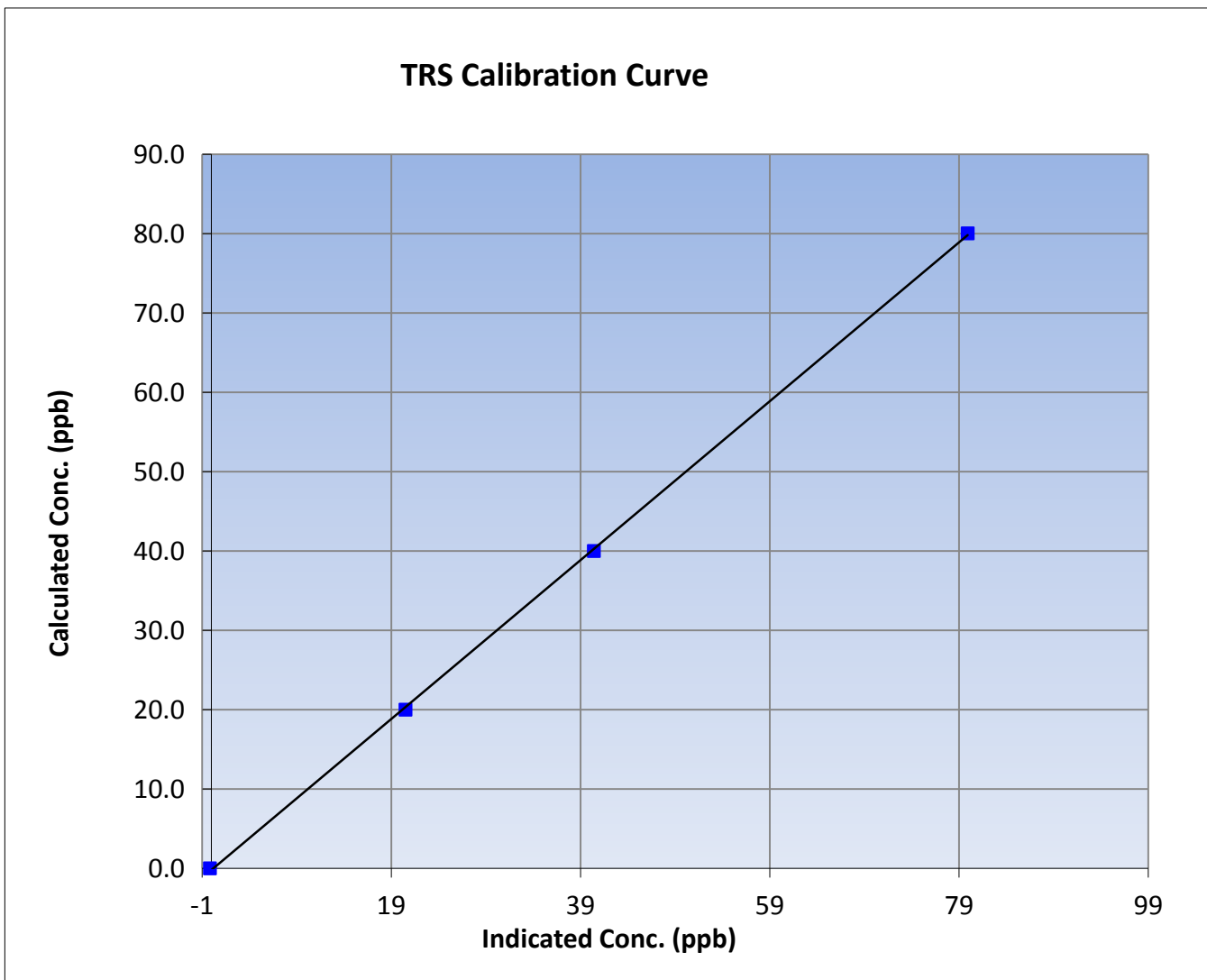
# Wood Buffalo Environmental Association TRS Calibration Report

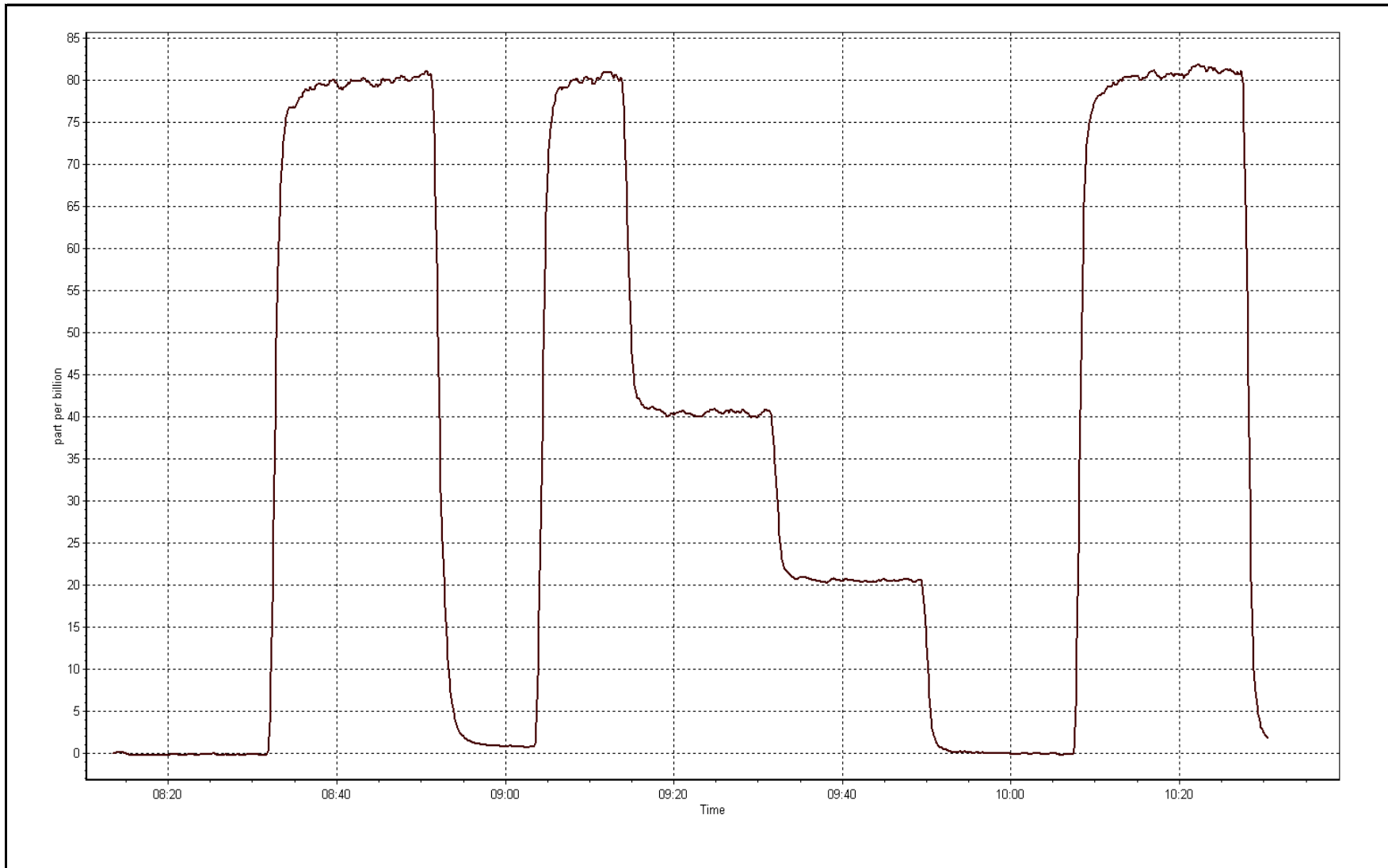
## Station Information

Calibration Date	October 8, 2015	Previous Calibration	September 10, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	8:10	End Time (MST)	10:32
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1336160090

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999900
80.0	79.9	1.0015		
40.0	40.4	0.9905	Slope	1.001230
20.0	20.5	0.9760		
			Intercept	-0.186744







## Wood Buffalo Environmental Association THC / NMHC Calibration Report

### Station Information

Calibration Date	October 1, 2015	Last Calibration	September 9, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	8:00	End Time (MST)	11:37
Gas Cert Reference	EY0000368	Cal Gas Expiry Date	June 10, 2016
CH4 Cal Gas Conc.	518.0 ppm	CH4 Equiv Conc.	1076.3 ppm
C3H8 Cal Gas Conc.	203.0 ppm	Station temp.	22 Deg C
Calibrator Model	API T700	Serial Number	1222
ZAG make/model	Teledyne API 701	Serial Number	5610
DACS make/model	Campbell Scientific CR3000	Serial Number	9035

### Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.3	75.4
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	1.002327	0.999774	Carrier Pressure	31.7	31.7
THC Calc intercept	-0.042121	-0.067954	Fuel Pressure	42.2	42.2
NMHC Calc slope	1.002658	0.995137	Air Pressure	32.5	32.5
NMHC Calc intercept	-0.024117	-0.029841			

Analyzer make Thermo 55i Analyzer serial # 1218153354

### THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.02	----
as found span	5000	58.6	12.61	12.66	0.996
calibrator zero	5000	0.0	0.00	0.02	----
high point	5000	58.6	12.61	12.66	0.996
second point	5000	29.3	6.31	6.40	0.985
third point	5000	14.6	3.14	3.26	0.964
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	58.6	12.61	12.81	0.985
Average Correction Factor					0.982

Corrected As found 12.64 Previous response 12.63 % change -0.1%

**Notes:**

No maintenance or adjustments done, filter changed out

Calibration Performed By: Melissa Lemay



## Wood Buffalo Environmental Association THC / NMHC Calibration Report

### NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	58.6	6.54	6.59	0.993
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	58.6	6.54	6.59	0.993
second point	5000	29.3	3.27	3.33	0.982
third point	5000	14.6	1.63	1.70	0.959
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	58.6	6.54	6.63	0.987
Average Correction Factor					0.978

Corrected As found      6.59      Previous response      6.55      % change      -0.6%

### CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.02	----
as found span	5000	58.6	6.07	6.07	1.000
calibrator zero	5000	0.0	0.00	0.02	----
high point	5000	58.6	6.07	6.07	1.000
second point	5000	29.3	3.04	3.07	0.989
third point	5000	14.6	1.51	1.56	0.970
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	58.6	6.07	6.18	0.982
Average Correction Factor					0.986

Corrected As found      6.05      Previous response      6.08      % change      0.4%



# Wood Buffalo Environmental Association

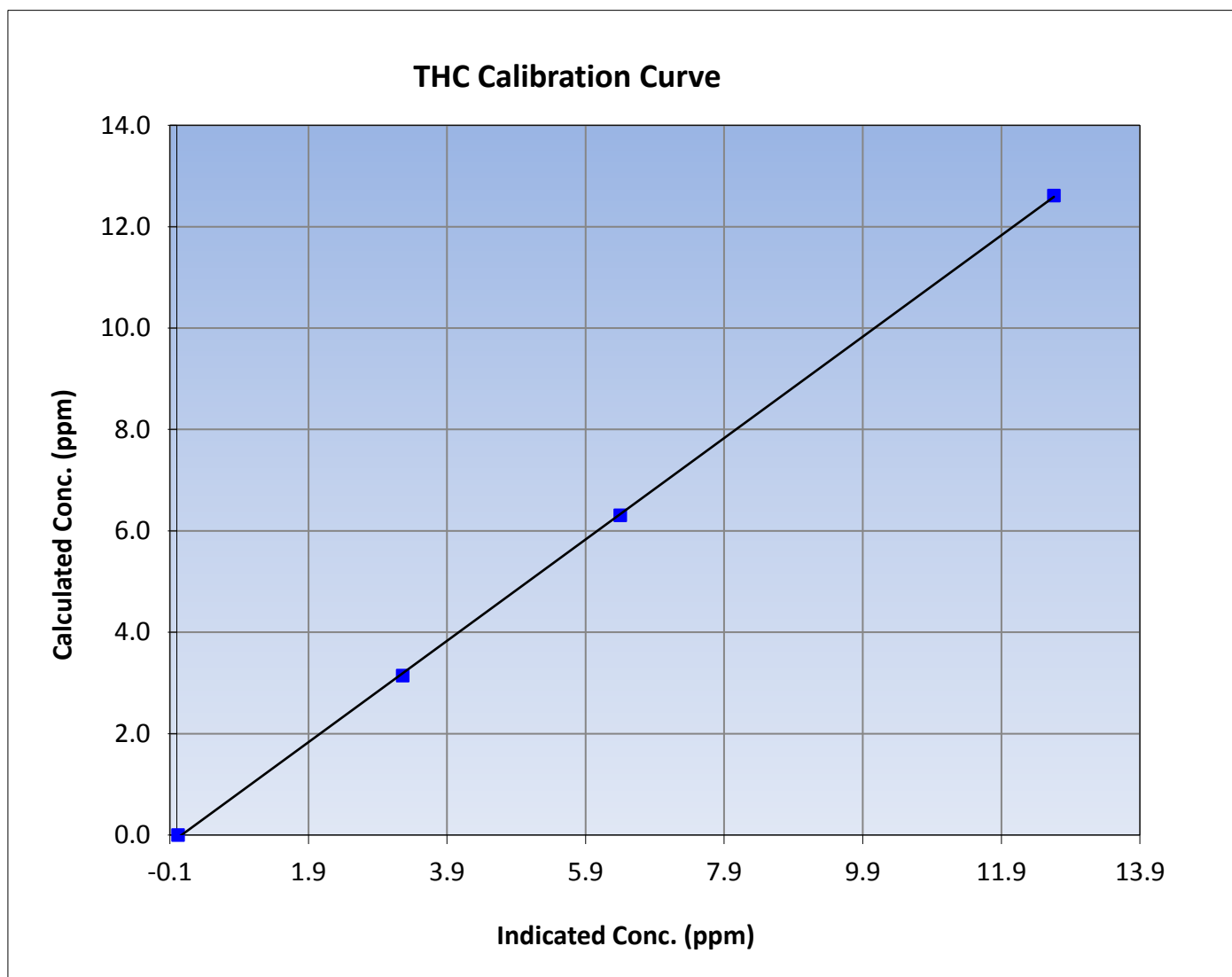
## THC Calibration Summary

### Station Information

Calibration Date	October 1, 2015	Previous Calibration	September 9, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	8:00	End Time (MST)	11:37
Analyzer make	Thermo 55i	Analyzer serial #	1218153354

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.02	----	Correlation Coefficient	0.999933
12.61	12.66	0.9963		
6.31	6.40	0.9854	Slope	0.999774
3.14	3.26	0.9640		
			Intercept	-0.067954





# Wood Buffalo Environmental Association

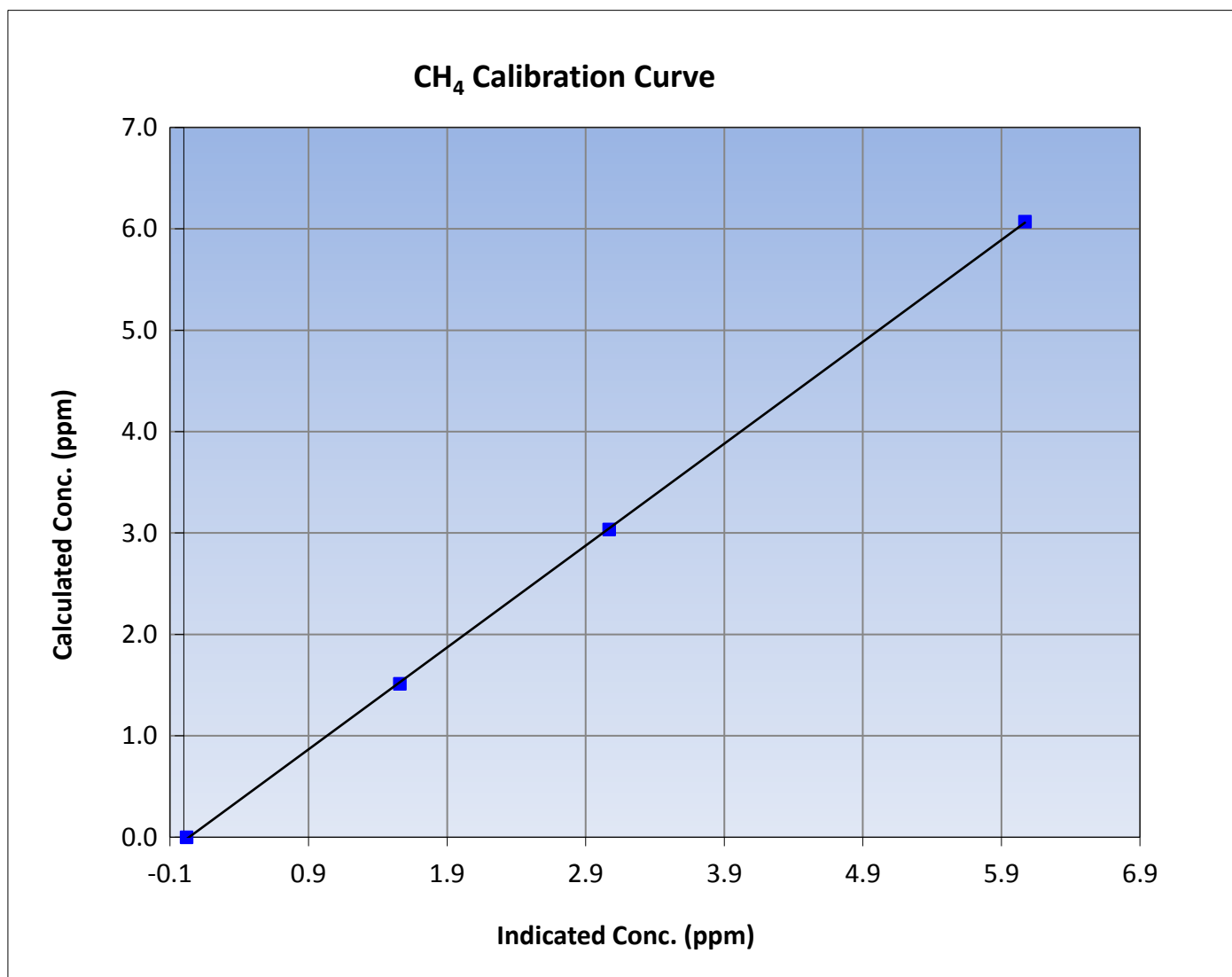
## CH<sub>4</sub> Calibration Summary

### Station Information

Calibration Date	October 1, 2015	Previous Calibration	September 9, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	8:00	End Time (MST)	11:37
Analyzer make	Thermo 55i	Analyzer serial #	1218153354

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.02	----	Correlation Coefficient	0.999959
6.07	6.07	1.0002		
3.04	3.07	0.9888	Slope	1.004812
1.51	1.56	0.9696		
			Intercept	-0.038147





# Wood Buffalo Environmental Association

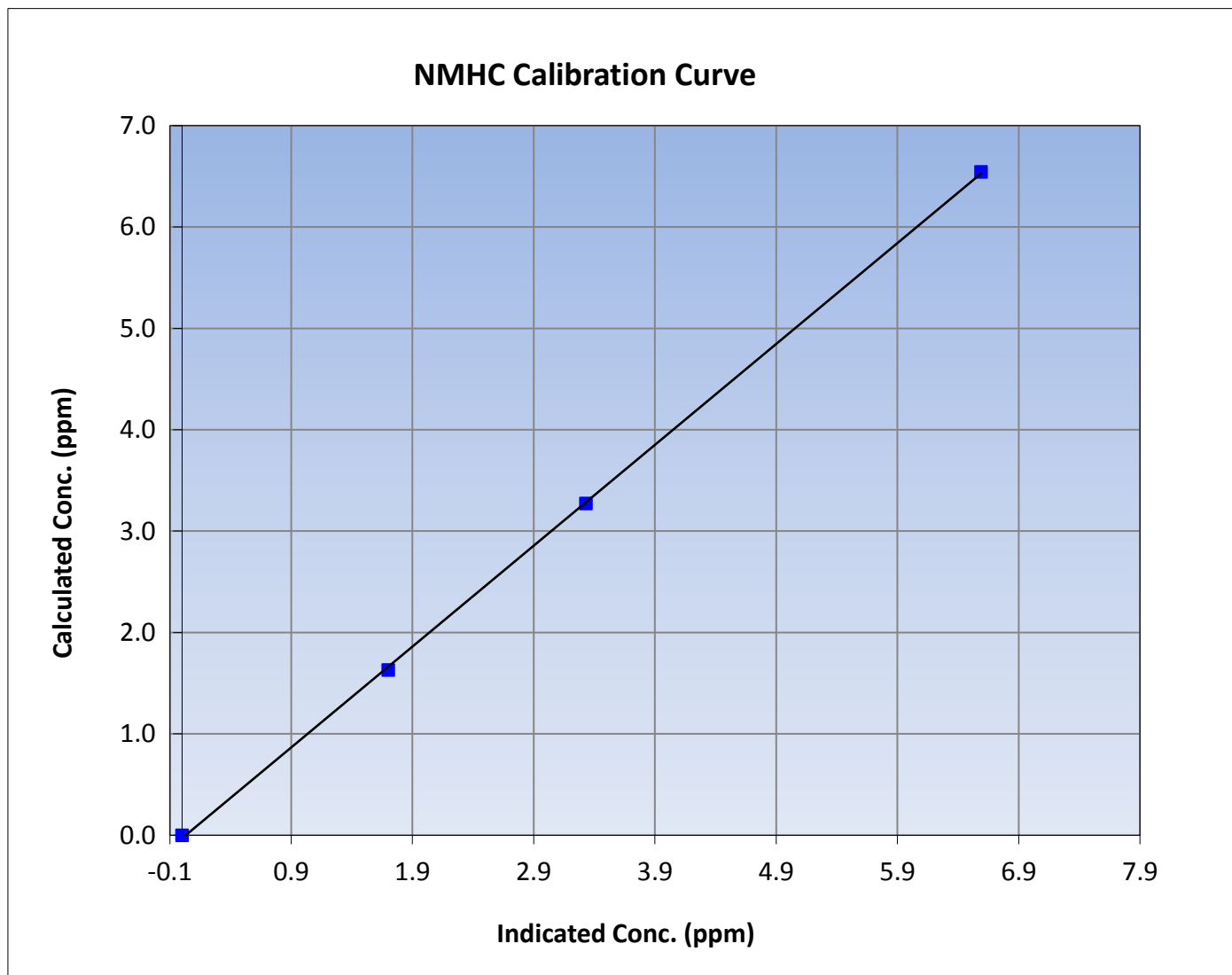
## NMHC Calibration Summary

### Station Information

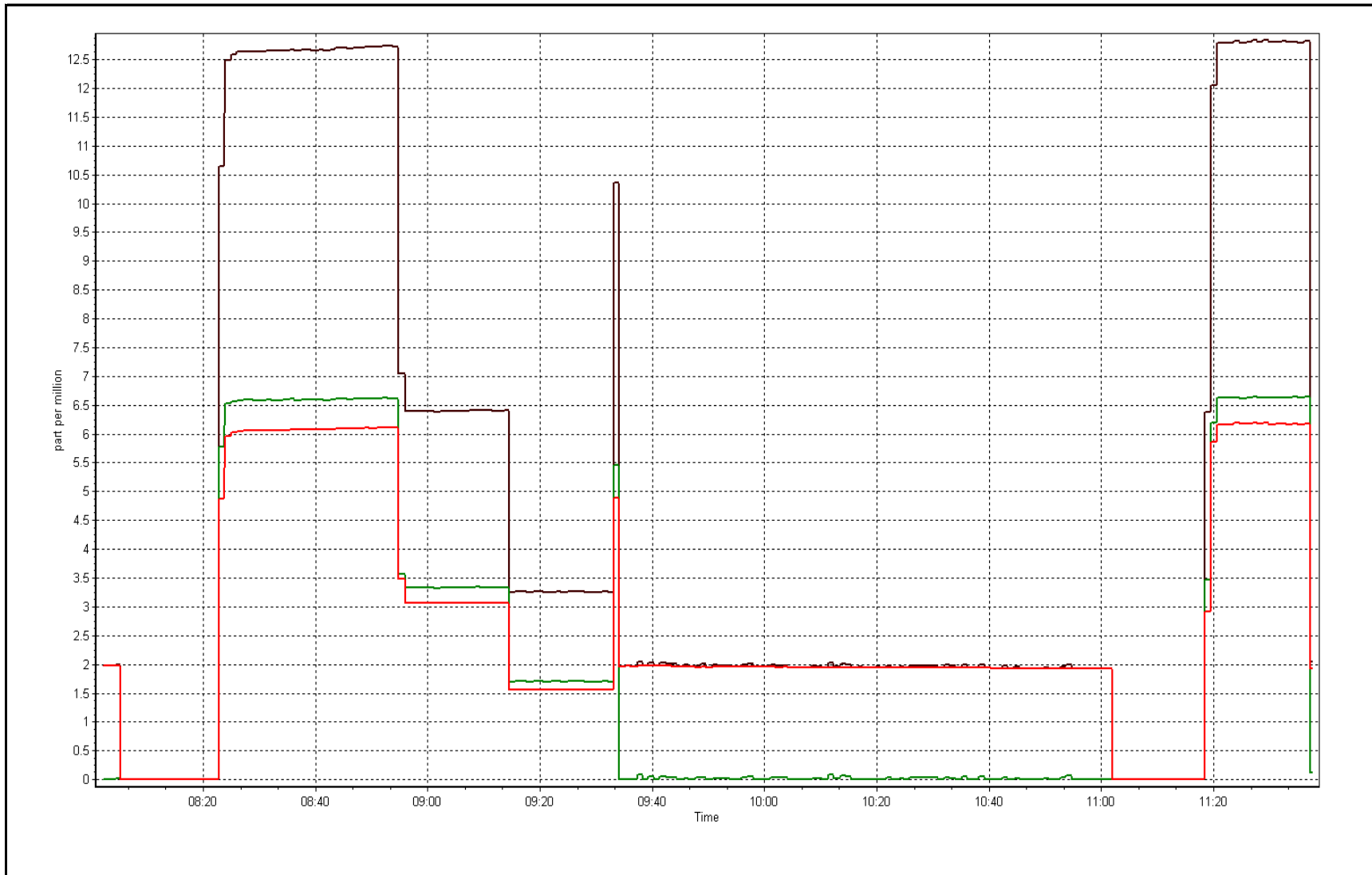
Calibration Date	October 1, 2015	Previous Calibration	September 9, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	8:00	End Time (MST)	11:37
Analyzer make	Thermo 55i	Analyzer serial #	1218153354

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999903
6.54	6.59	0.9928		
3.27	3.33	0.9824	Slope	0.995137
1.63	1.70	0.9589		
			Intercept	-0.029841









# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	October 6, 2015	Previous Calibration	September 10, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	11:35
NO2 GPT Ref date	October-01-15	Transfer Standard	GPT
		Station temp.	22 Deg C
Calibrator Make/Model	Teledyne API 700	Serial Number	1222
ZAG make/model	Teledyne API 701	Serial Number	5610
DACS make/model	Campbell Scientific CR3000	Serial Number	9305

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	26.8	26.7
Analyzer IP address	192.168.1.48		Lamp temp.	53.3	53.2
Calculated slope	1.008085	1.000241	Pressure	614.0	615.8
Calculated intercept	0.039818	-1.179931	Flow cell A	0.693	0.695
Analyzer Background	-1.6	-1.6	Flow cell B	0.691	0.692
Analyzer Coefficient	1.001	1.016	Cell A Intensity	92730	88012
			Cell B Intensity	84737	79668

Analyzer make	Thermo 49i	Analyzer serial #	1501663733
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### Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	-0.7	----
as found span	5000	757.00	346.6	336.2	1.031
calibrator zero	5000	0.00	0.0	-0.7	----
high point	5000	757.00	346.6	346.3	1.001
second point	5000	520.00	233.7	235.6	0.992
third point	5000	270.00	118.6	122.2	0.971
as left zero	5000	0.00	0.0	0.9	----
as left span	5000	757.00	346.6	350.9	0.988
Average Correction Factor					0.988

Corrected As found	336.9	Previous response	343.8	% change	2.1%
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**Notes:**

Filter changed out, span adjusted, no maintenance done

Calibration Performed By: Melissa Lemay



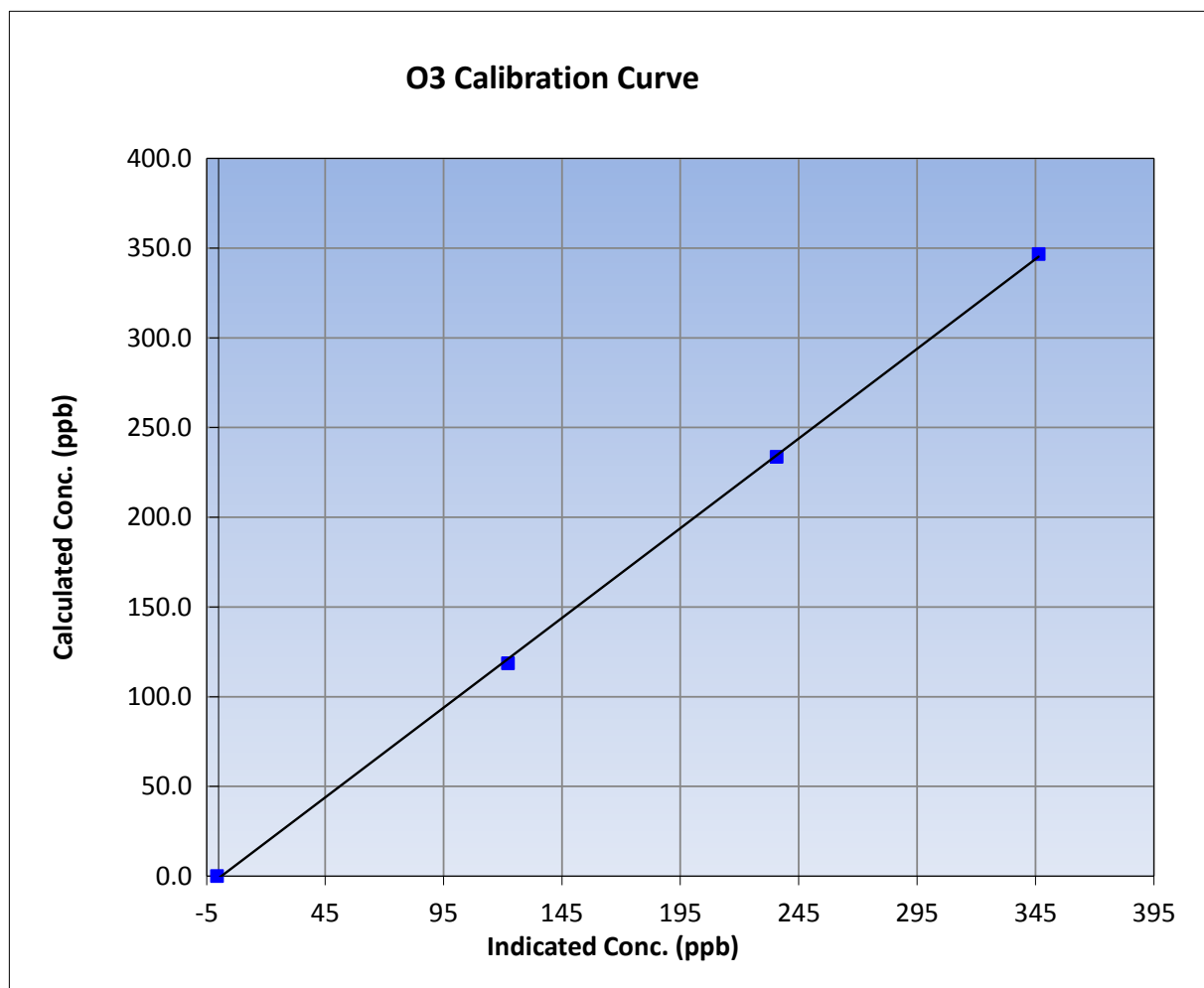
## Wood Buffalo Environmental Association O3 Calibration Report

### Station Information

Calibration Date	October-06-15	Previous Calibration	September 10, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	9:15	End Time (MST)	11:35
Analyzer make	Thermo 49i	Analyzer serial #	1501663733

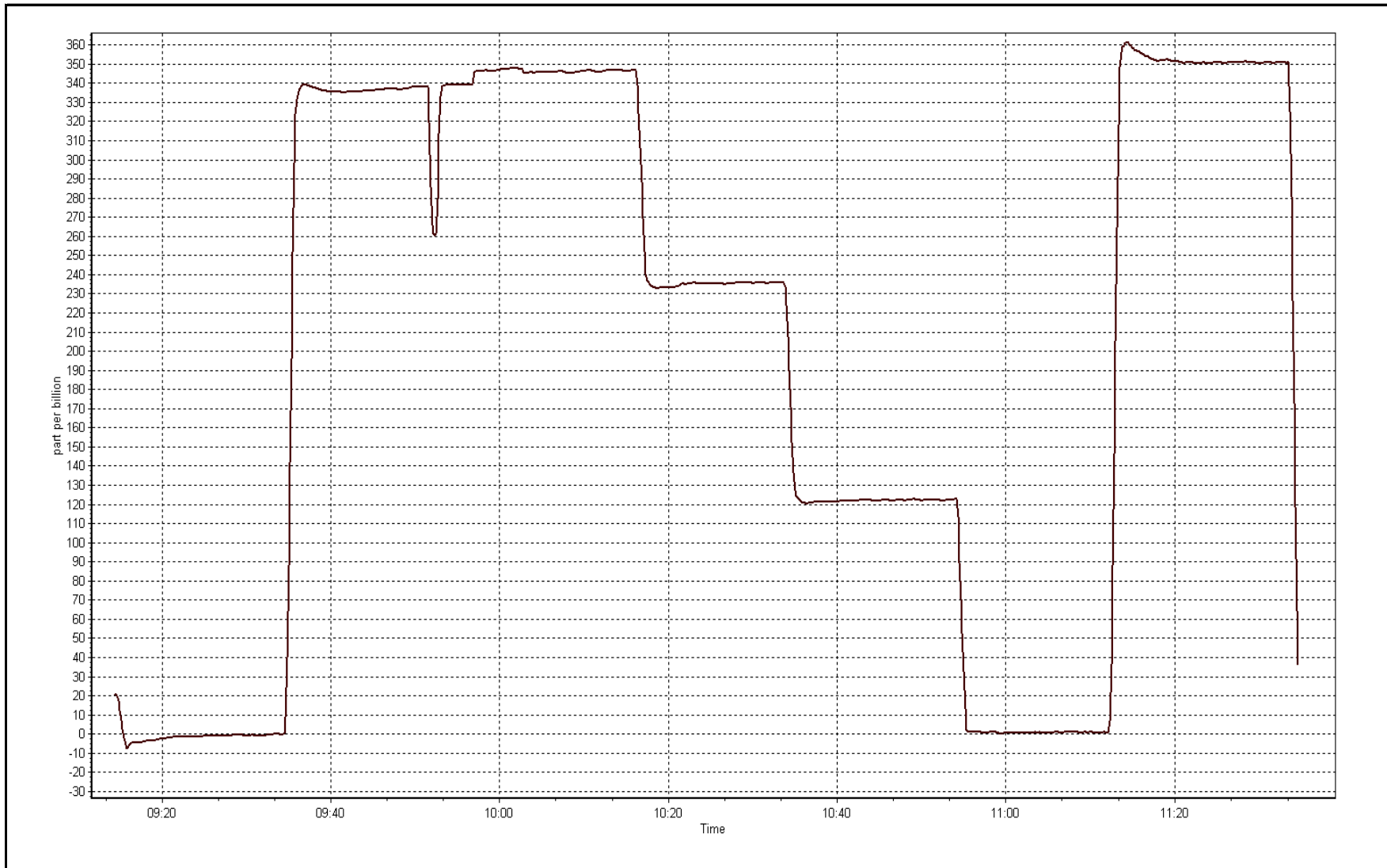
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.7	----	Correlation Coefficient	0.999822
346.6	346.3	1.0009		
233.7	235.6	0.9919	Slope	1.000241
118.6	122.2	0.9705		
			Intercept	-1.179931



O3 Calibration Plot

Date: October 6, 2015





# Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

## Station Information

Calibration Date	October 1, 2015	Previous Calibration	September 9, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	7:10	End Time (MST)	11:40
NO Cal Gas Conc	51.2 ppm	Gas Cert Reference	EY0000368
NOX Cal Gas Conc	51.2 ppm	Cal Gas Expiry Date	10/06/2016
Calibrator	API T700	Serial Number	1222
Zero air Generator	Teledyne API T701	Serial Number	5610

## DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9035
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## Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.991157	0.988180	0.999200
	Data Offset	-2.345485	-1.970193	0.064725
Current Calibration	Data Slope	1.004967	1.003335	0.993329
	Data Offset	-2.941345	-2.645904	-1.258143

## Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1336160088
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.764		0.764	
NOX coefficient	0.995		0.995	
NO2 coefficient	0.999		0.999	
NO bkgrnd	1.6		1.6	
NOX bkgrnd	1.7		1.7	
Chamber Temp	50	Deg C	50.5	Deg C
Moly Temp	326.3	Deg C	322.1	Deg C
PMT voltage	-842.5	V	-842.5	V
PMT Temp	-2.7	Deg C	-2.8	Deg C
O3 flow	151.2	ccm	OK	ccm
R Cell press NO	151.2	mmHg	152.4	mmHg
R Cell Press Nox	164.7	mmHg	152.4	mmHg
NO sample flow	0.989	lpm	0.981	lpm
Nox sample Flow	0.983	lpm	0.983	lpm

**Notes:**

No maintenance or adjustments done, filter changed out



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date:

October 1, 2015

Station Number:

AMS 18

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	----	----
as found span	5000	58.6	600.1	600.1	0.0	598.4	599.2	-0.7	1.0028	1.0014
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	----	----
high point	5000	58.6	600.1	600.1	0.0	598.4	599.2	-0.7	1.0028	1.0014
second point	5000	29.3	300.0	300.0	0.0	303.2	303.4	-0.2	0.9896	0.9889
third point	5000	14.6	149.5	149.5	0.0	154.6	154.1	0.6	0.9670	0.9702
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	----	----
as left span	5000	58.6	600.1	260.7	339.4	611.7	255.6	356.1	0.9810	1.0200
Average Correction Factor									0.9865	0.9868

Corrected As found

NO<sub>x</sub>= 598.5

NO= 599.2

Percent Change

NO<sub>x</sub>= 1.6%

NO= 1.7%

Previous Response

NO<sub>x</sub>= 607.8

NO= 609.2

### GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

58.60

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO2 (300)	----	260.7	346.6	609.7	260.7	349.0	0.9728	1.0000	0.9931	100.7%
2nd NO2 (200)	----	373.6	233.7	611.0	373.6	237.5	0.9707	1.0000	0.9840	101.6%
3rd NO2 (100)	----	488.7	118.6	611.0	488.7	122.2	0.9707	1.0000	0.9705	103.0%
4th NO2 (0)	607.3	----	-2.0	605.3	607.3	-1.9	0.9799	1.0000	N/A	----
Average Correction Factor							0.9735	1.0000	0.9826	101.8%

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association

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

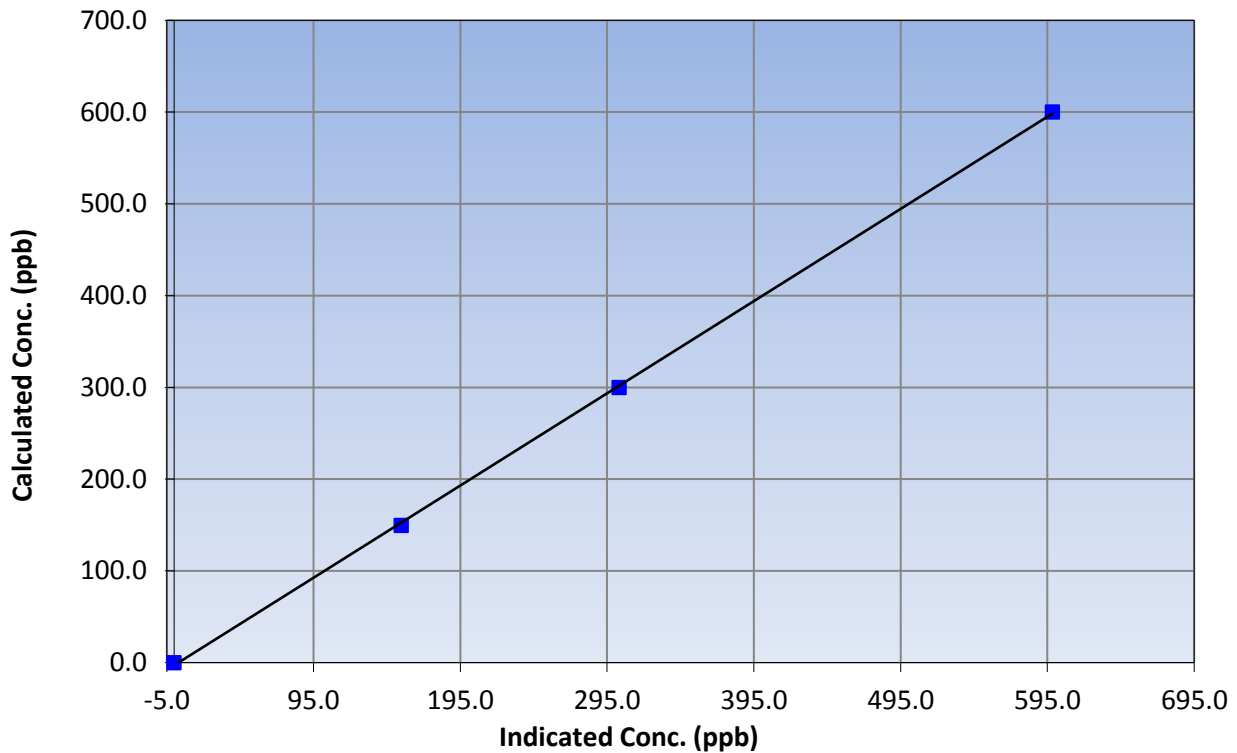
### Station Information

Calibration Date	October 1, 2015	Previous Calibration	September 9, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	7:10	End Time (MST)	11:40
Analyzer make	Thermo 42i	Analyzer serial #	1336160088

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999882
600.1	598.4	1.0028		
300.0	303.2	0.9896	Slope	1.004967
149.5	154.6	0.9670		
			Intercept	-2.941345

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

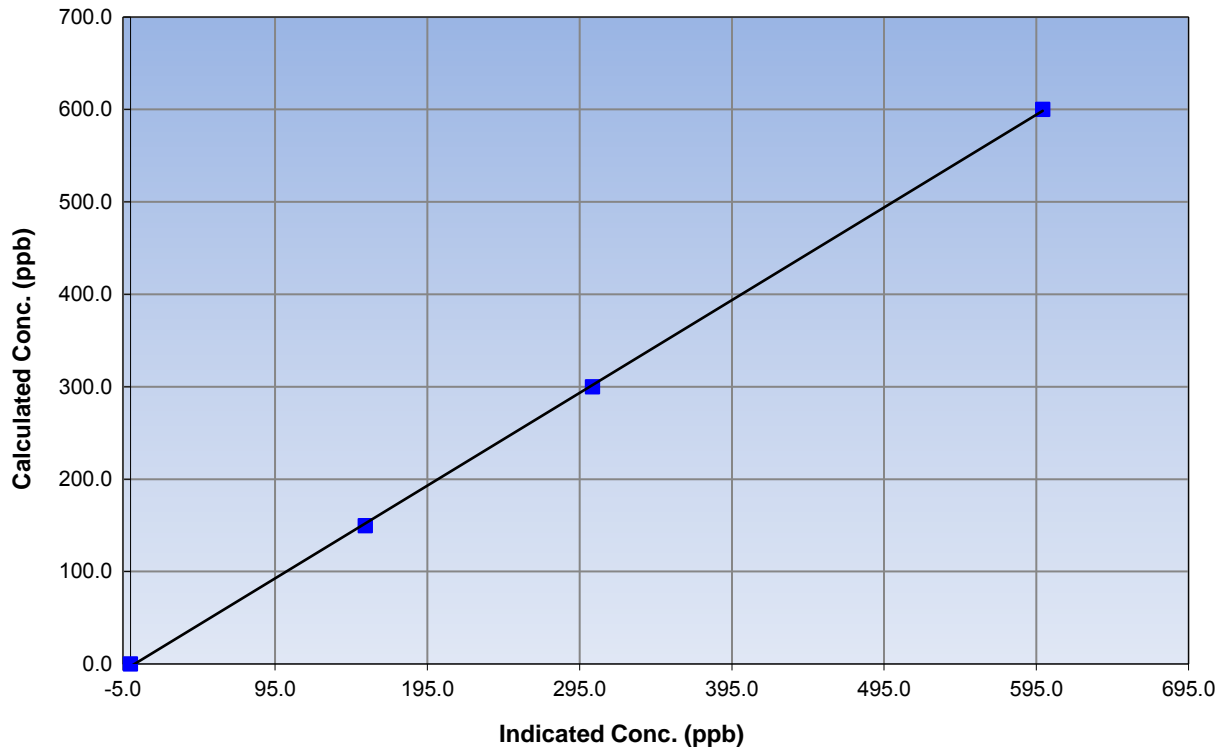
### Station Information

Calibration Date	October 1, 2015	Previous Calibration	September 9, 2015
Station Name	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	7:10	End Time (MST)	11:40
Analyzer make	Thermo 42i	Analyzer serial #	1336160088

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999906
600.1	599.2	1.0014		
300.0	303.4	0.9889	Slope	1.003335
149.5	154.1	0.9702		
			Intercept	-2.645904

### NO Calibration Curve







# Wood Buffalo Environmental Association

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

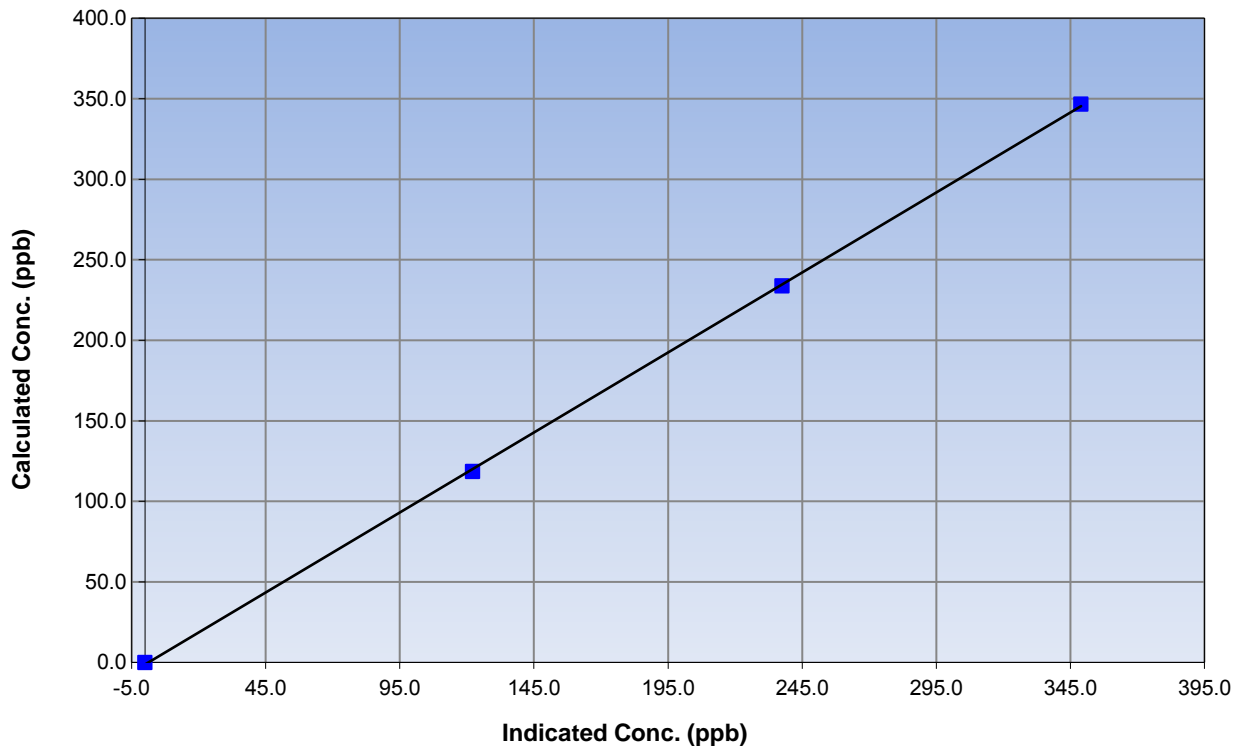
### Station Information

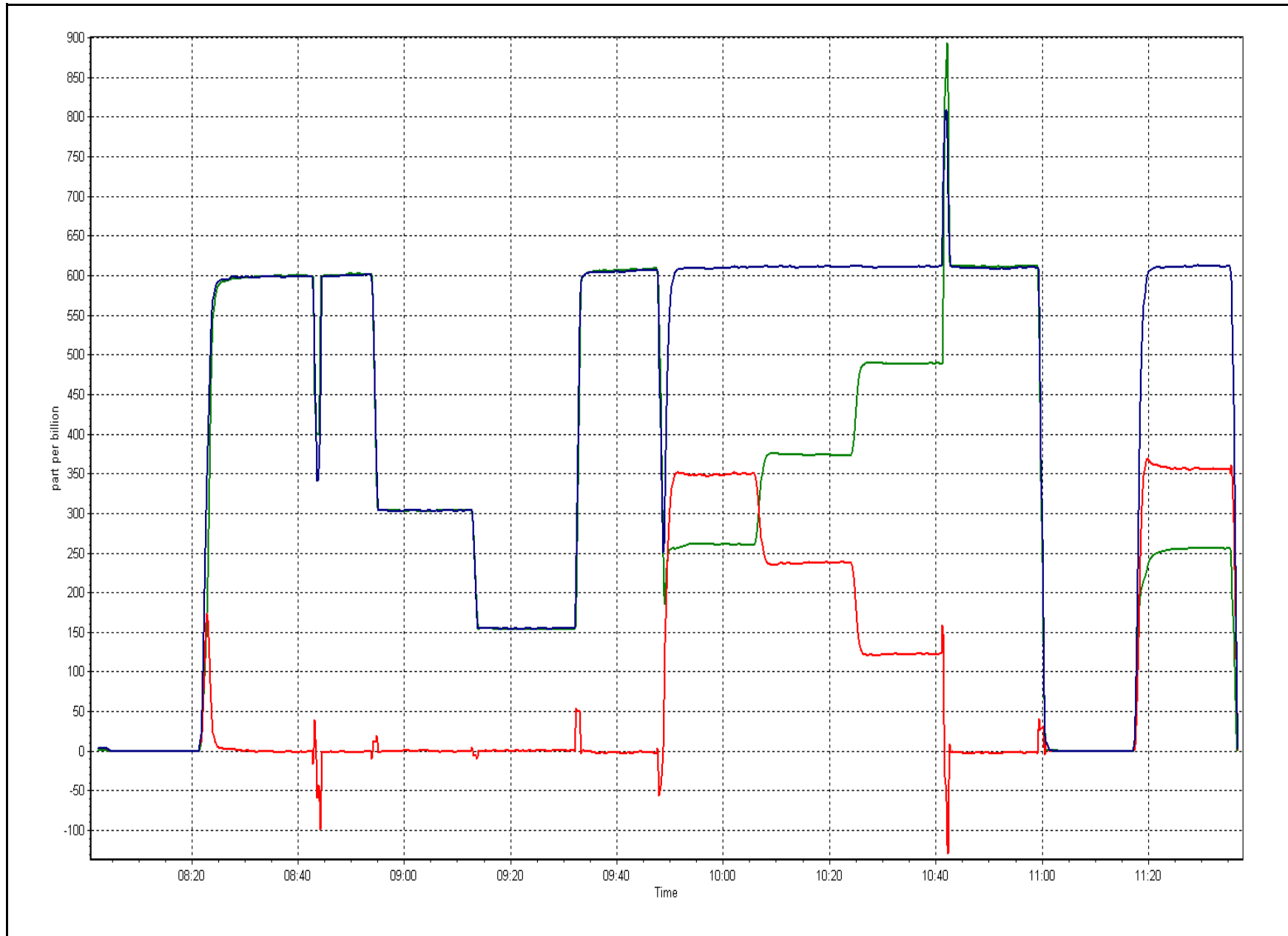
Calibration Date	October 1, 2015	Previous Calibration	September 9, 2015
Station Number	Conklin Lookout	Station Number	AMS 18
Start Time (MST)	7:10	End Time (MST)	11:40
Analyzer make	Thermo 42i	Analyzer serial #	1336160088

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999905
346.6	349.0	0.9931		
233.7	237.5	0.9840	Slope	0.993329
118.6	122.2	0.9705		
			Intercept	-1.258143

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







Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date: October 8, 2015 Previous Calibration: September 29, 2015  
 Station Name: Conklin Lookout Station Number: AMS 18  
 Start Time (MST): 10:33 End Time (MST): 11:16  
 Calibrator Make/Model: Delta Cal Calibrator Serial Number: 1097

SHARP INFORMATION

Particulate Fraction: PM2.5  
 Make/Model: Thermo / SHARP 5030  
 Serial Number: E-781  
 C<sub>14</sub> Source SN:  
 Confirmation of Time settings: Yes  No   
 Parameters Checked: T1  T2  T3  T4  P3  Main Flow  Beta  Neph

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	12.0	10.9	-1.1	12.0
T2	22.0	na	na	21.0
T3	29.0	na	na	28.0
T4	22.0	na	na	21.0
RH (%)	22.0	na	na	27.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	942	937.0	-5.0	942

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1000	0	1000	1000

Nephelometer Calibration

Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	290		290
Neph	0		0
C14	5.2		5.2
Indicated Concentration (ug/m3)	0	No	0

Offset 1  
Offset 2

Leak Check (Quarterly)

Leak Check Date: September 29, 2015 Previous Leak Check Date: June 30, 2015

	Measured	Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.72	
*Flow with adaptor (LPM):	16.52	0.20

\*Note - do not attach adaptor without shutting off the pump first

Mass Foil Calibration (Annually)

Foil Calibration Date: June 30, 2015 Previous Foil Calibration:  
 Zeroed?: Yes  
 Foil Mass: 1337 Mass foil set S/N: 12111  
 Previous Correction Factor: 6983  
 New Correction Factor: 7050

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

NOTES:

No adjustments made, sample head cleaned

Calibration Performed By: Melissa Lemay



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## WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 19**  
**SUNCOR FIREBAG**  
**OCTOBER 2015**

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

November 26, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)  
 OCTOBER 2015  
 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	100.00	19	0	4	0
H2S (ppb) Average	708	35	36	99.87	2	0	0	0
THC (ppm) Average	708	36	36	100.00	2.7	-	2.3	-
NO2 (ppb) Average	708	36	36	100.00	18	0	8	-
NO (ppb) Average	708	36	36	100.00	22	-	4	-
NOX (ppb) Average	708	36	36	100.00	38	-	11	-
Temperature 2 m (C) Average	744	0	0	100.00	22.5	-	16.7	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	98	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	35	-	21	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)  
OCTOBER 2015

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	1	-	0	0	0	0	1	2	19
H2S (ppb) Average	708	0.2	0	-	0	0	0	0	0	0	2
THC (ppm) Average	708	2.15	0.1	-	2	2.1	2.1	2.1	2.2	2.2	2.7
NO2 (ppb) Average	708	2.5	3	-	0	0	1	1	3	7	18
NO (ppb) Average	708	0.7	2	-	0	0	0	0	1	2	22
NOX (ppb) Average	708	3.2	4	-	0	0	1	2	4	8	38
Temperature 2 m (C) Average	744	3.97	5.5	-	-4.8	-2.1	-0.4	2.9	6.9	11.8	22.5
Relative Humidity (%) Average	744	76.5	18	-	30	48	64	81	94	97	99
Wind Speed 10 m (km/h) Average	744	14.5	6	-	1	6	10	14	19	23	35
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)  
OCTOBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S	06 Oct 2015 10:00	06 Oct 2015 10:00	1	Maintenance - manifold cleaning



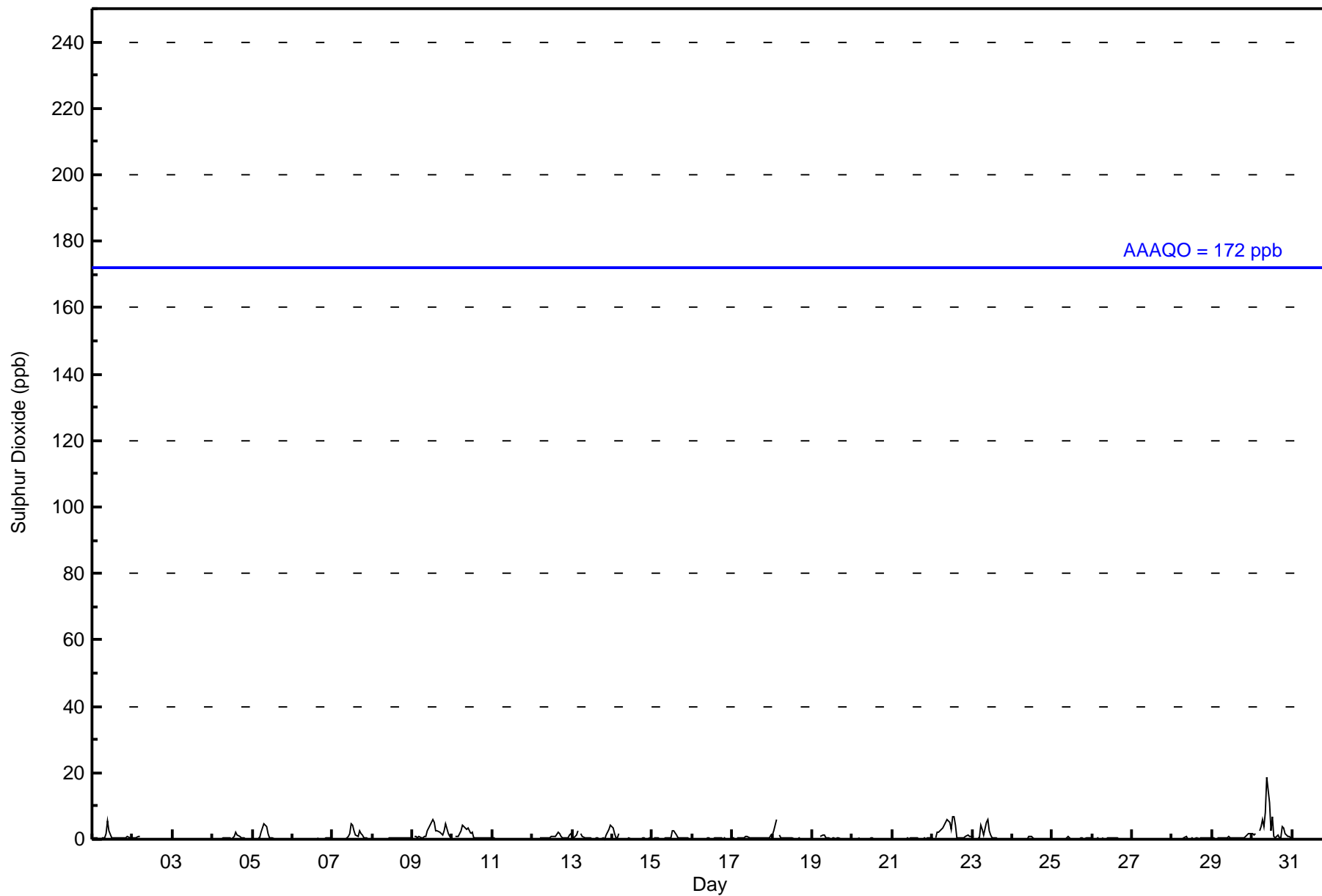
Summary of Hour Averages

Firebag - October 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 19 ppb on Oct 30 10:00	Maximum Daily Average: 3.6 ppb on Oct 30		Hours of Data:	707
Minimum Value: 0 ppb on Oct 24 18:00	Minimum Daily Average: 0.1 ppb on Oct 27		Hours of Missing Data:	37
Maximum Diurnal Average: 1.7 ppb at hour 10	Minimum Diurnal Average: 0.3 ppb at hour 18		Hours of Calibration:	37
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		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	2	5	3	0	0	0	0	0	0	0	0	0	0	1	1	1	0.7	5
2-Oct	1	0	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	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	0.1	0
4-Oct	0	Z	0	0	0	0	1	1	1	0	0	0	1	2	1	1	0	0	0	0	0	0	0	0	0.4	2
5-Oct	0	0	Z	0	0	2	3	5	4	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.8	5
6-Oct	0	0	0	Z	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	--	0
7-Oct	0	0	0	0	Z	0	0	0	0	1	2	5	4	3	1	1	3	2	1	0	0	0	0	0	1.0	5
8-Oct	0	0	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0.3	1
9-Oct	Z	1	1	1	1	1	1	1	1	3	4	5	6	5	2	2	2	2	1	3	5	2	1	0	2.1	6
10-Oct	0	Z	1	1	2	3	4	4	3	4	2	2	2	0	0	0	0	0	0	0	0	0	0	0	1.3	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	1	1	1	1	2	2	1	1	0	1	0	1	2	0.7	2
13-Oct	1	0	1	2	Z	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	4	0.9	4
14-Oct	4	2	1	1	2	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	4
15-Oct	Z	0	0	0	0	0	0	0	0	1	1	0	2	2	1	1	0	0	0	1	0	0	0	0	0.5	2
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	1	0	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0	1	1	0.5	1
18-Oct	1	3	6	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	6
19-Oct	0	0	0	0	Z	1	1	1	0	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	Z	0	0	0	0	0	0	0	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	0.2	0
22-Oct	0	Z	1	2	2	3	3	4	5	6	5	3	7	7	4	1	0	0	0	0	1	1	1	1	2.5	7
23-Oct	1	1	Z	1	1	4	3	1	5	6	2	1	1	0	0	0	0	0	0	0	0	0	0	0	1.2	6
24-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	0.1	1
25-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	0.2	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	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
28-Oct	0	Z	0	0	0	0	0	1	1	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	1	1	1	1	0	0	0	0	0	0	0	1	1	2	2	0.6	2
30-Oct	2	1	2	Z	2	4	6	4	8	19	11	3	7	1	0	1	0	0	4	3	2	1	1	0	3.6	19
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
	0.5	0.4	0.5	0.4	0.6	0.9	0.9	0.8	1.1	1.7	1.2	0.9	1.2	0.8	0.6	0.4	0.4	0.3	0.4	0.4	0.5	0.4	0.4	0.5	Diurnal Average	
	4	3	6	2	2	4	6	5	8	19	11	5	7	7	4	2	3	2	4	4	3	5	2	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**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Firebag - October 2015**

<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**  
**Firebag - October 2015**

<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	71	44	27	6	6	12	31	65	85	69	56	60	52	30	39	52	705
11 - 20	0	0	0	0	0	0	0	0	0	0	2	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>	71	44	27	6	6	12	31	65	85	69	58	60	52	30	39	52	707

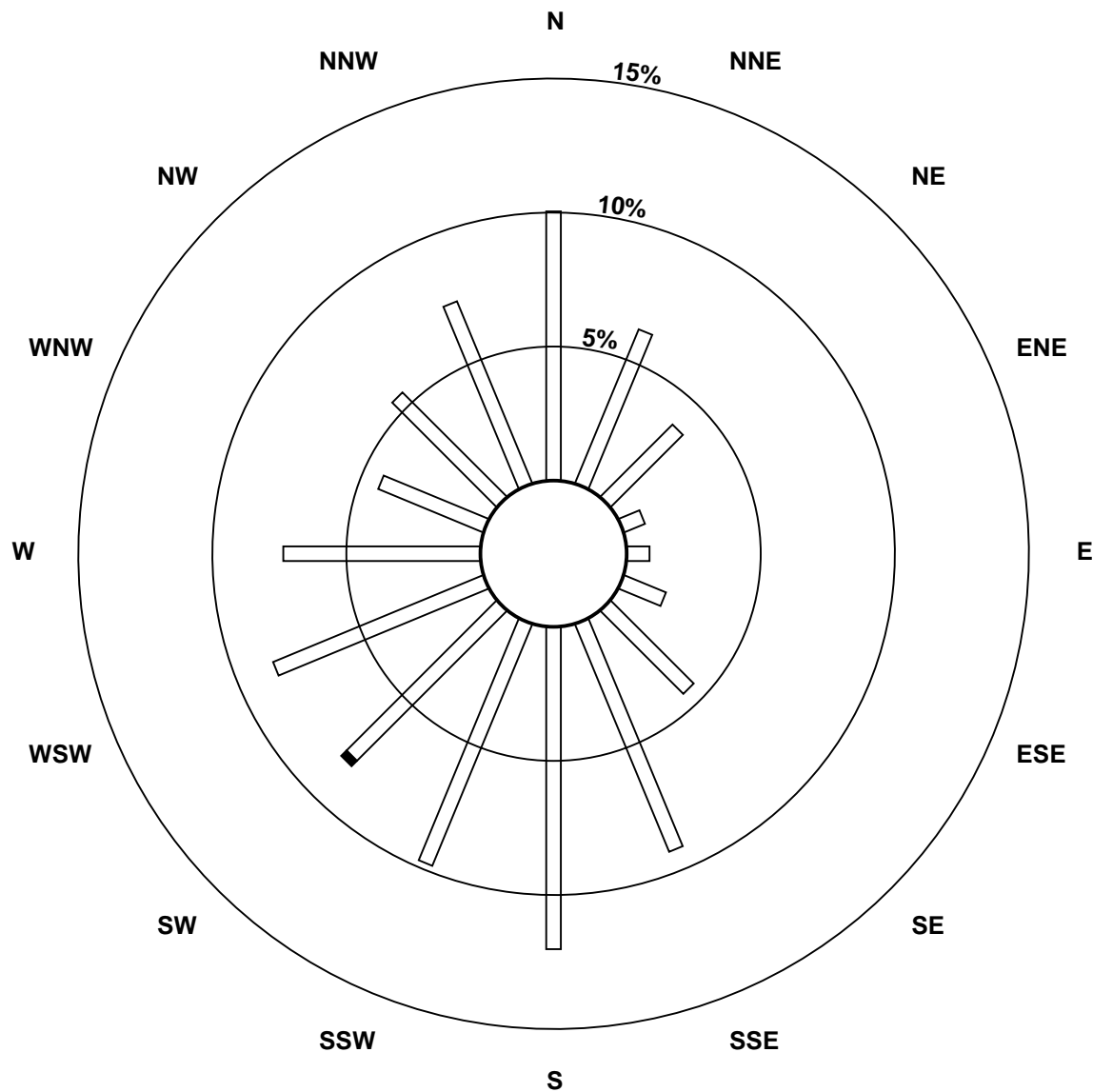
Total Number of Valid Hours: 707

Total Number of Hours: 744

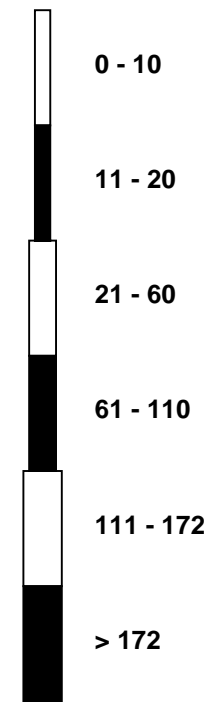


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

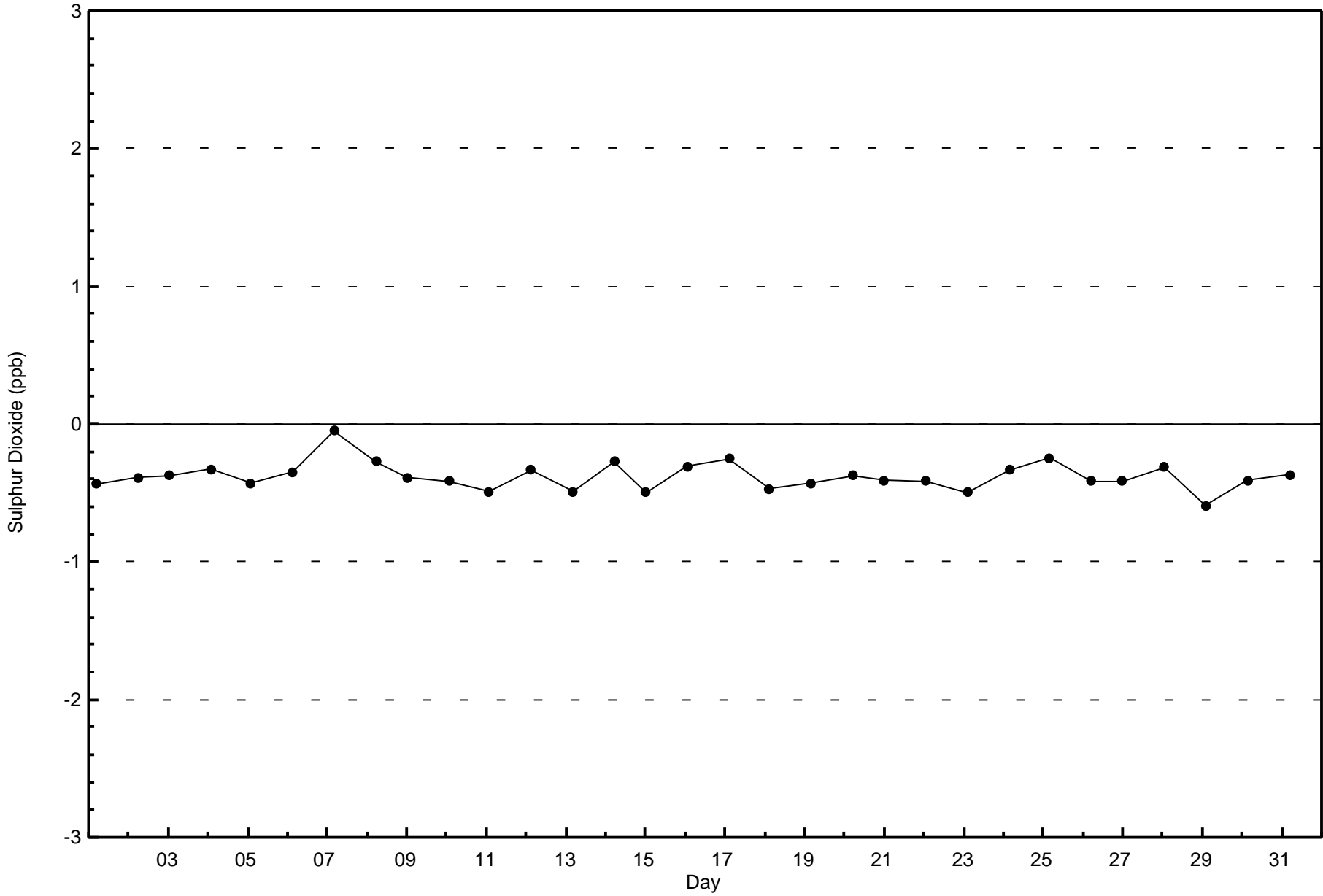
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Firebag (AMS 19)

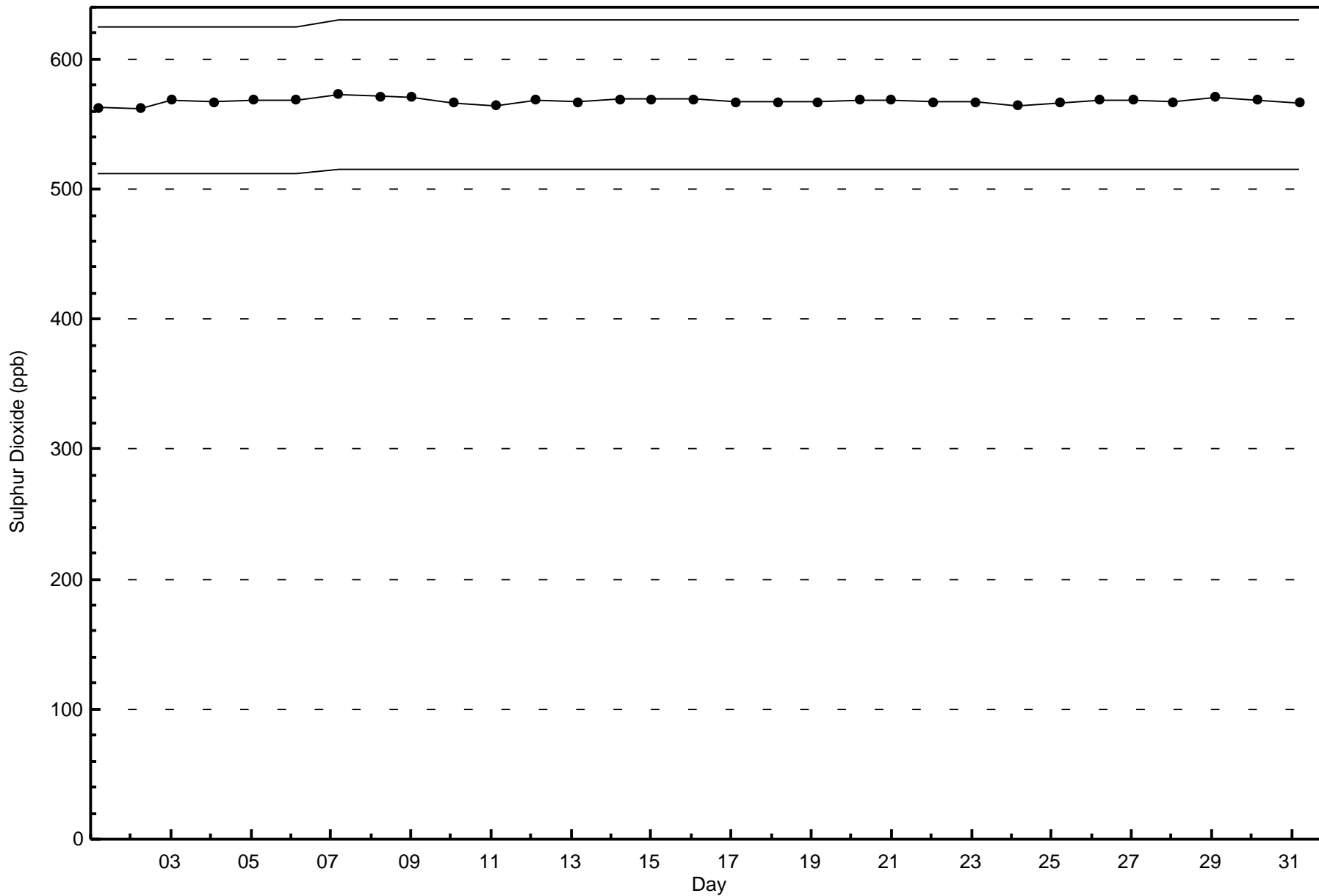


Classes (ppb)



Total Number of Valid Hours: 707





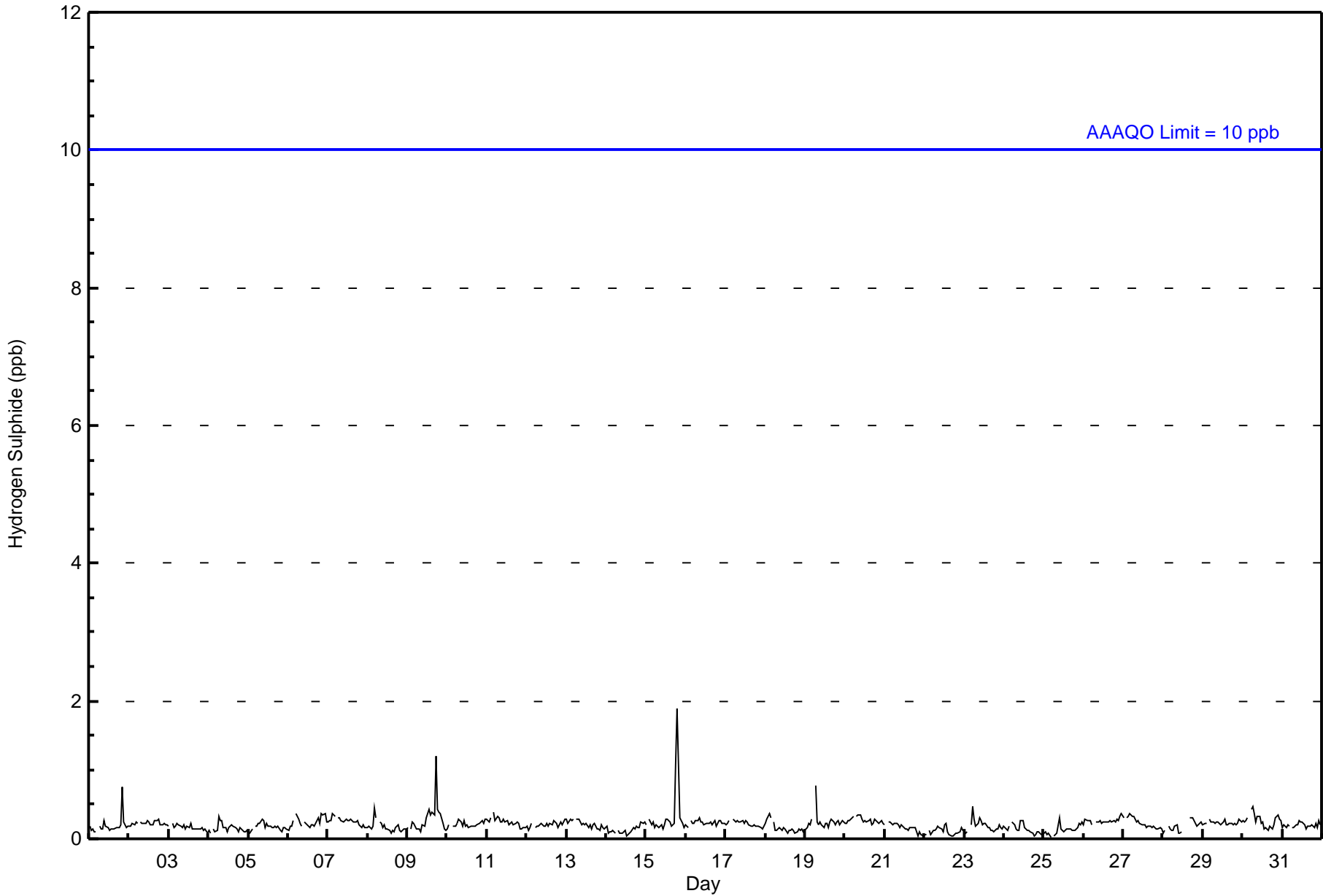




Summary of Hour Averages

Firebag - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 2 ppb on Oct 15 20:00										Maximum Daily Average: 0.3 ppb on Oct 15										Hours of Data: 708						
Minimum Value: 0 ppb on Oct 25 05:00										Minimum Daily Average: 0.1 ppb on Oct 22										Hours of Missing Data: 36						
Maximum Diurnal Average: 0.2 ppb at hour 7										Minimum Diurnal Average: 0.2 ppb at hour 2										Hours of Calibration: 35						
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: 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	1	0	0	0	0.2	1
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	0.2	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	0.2	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	0.2	0
6-Oct	0	0	0	0	Z	0	0	0	0	M	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	0.3	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	0.2	0
9-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	0.3	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	0.2	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	0.2	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	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	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0.3	2
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	0.2	0
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	0.2	0
19-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	0.2	1
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	0.3	0
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	0.2	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	0.1	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	0.2	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	0.1	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	0.1	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	0.3	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	0	C	C	C	C	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	0.3	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	0.2	0
0.2																								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**  
**Cumulative Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Firebag - October 2015**

<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



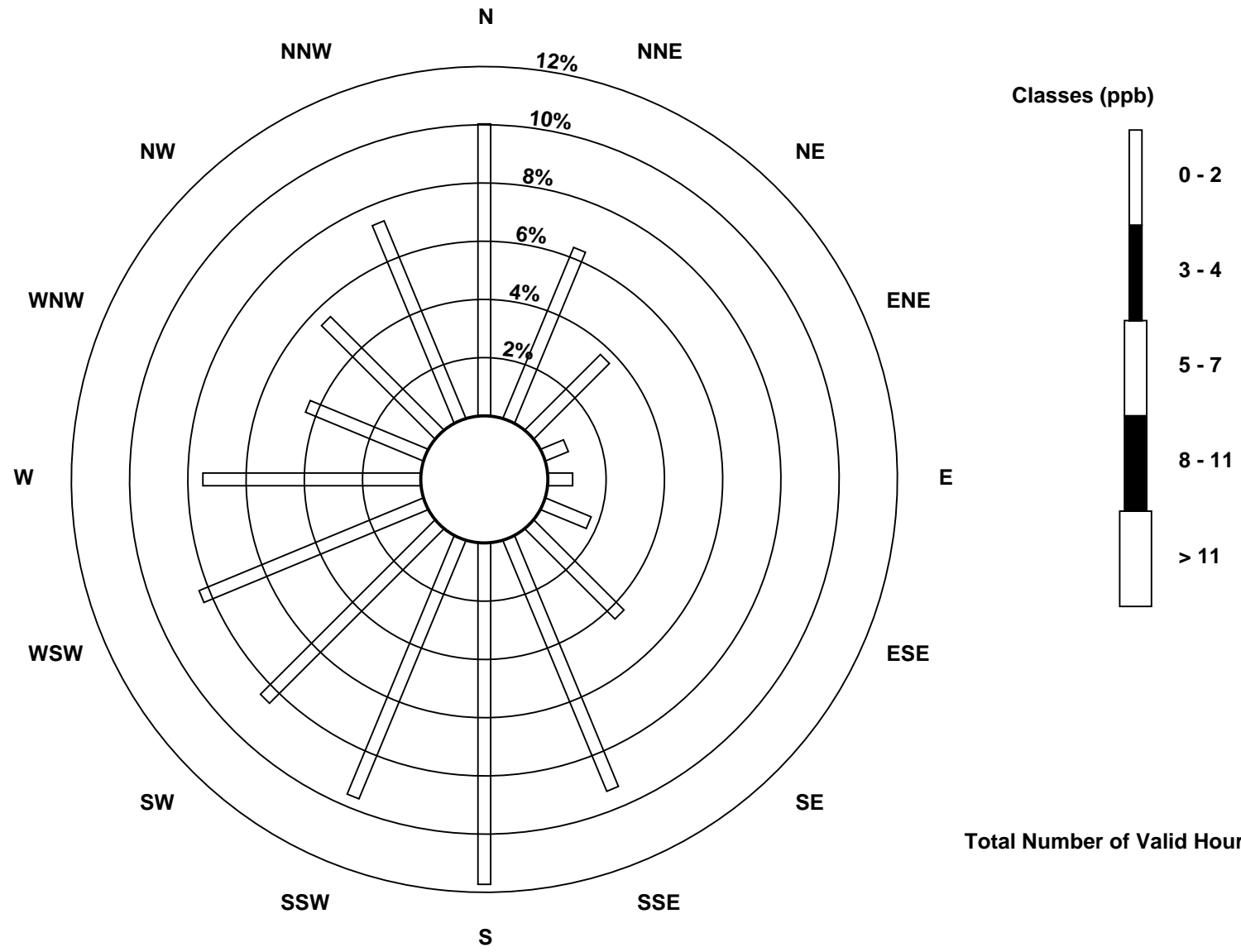
**Wood Buffalo Environmental Association**  
**Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Firebag - October 2015**

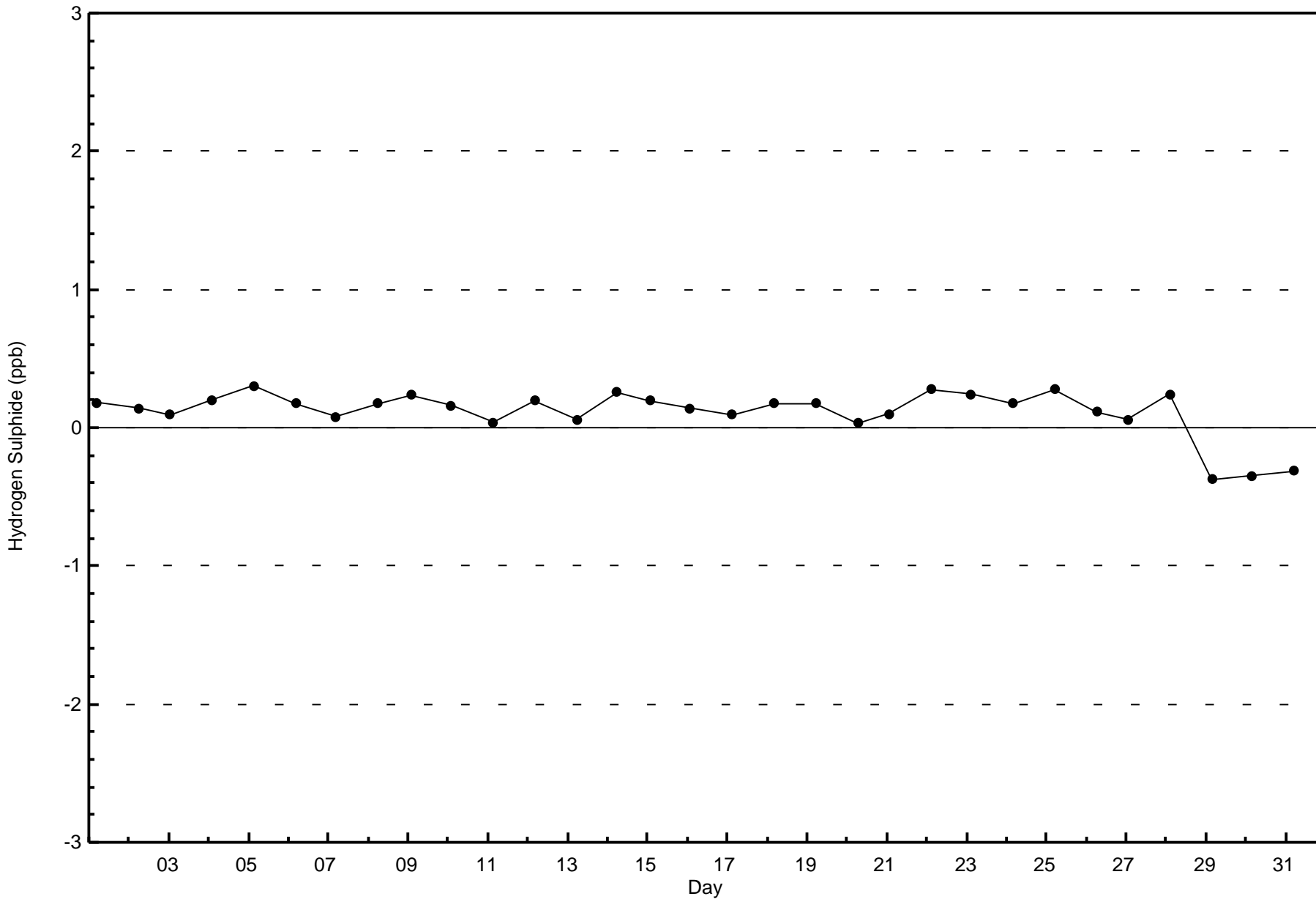
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	71	45	26	6	6	12	31	66	83	68	60	59	53	31	39	52	708
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	71	45	26	6	6	12	31	66	83	68	60	59	53	31	39	52	708

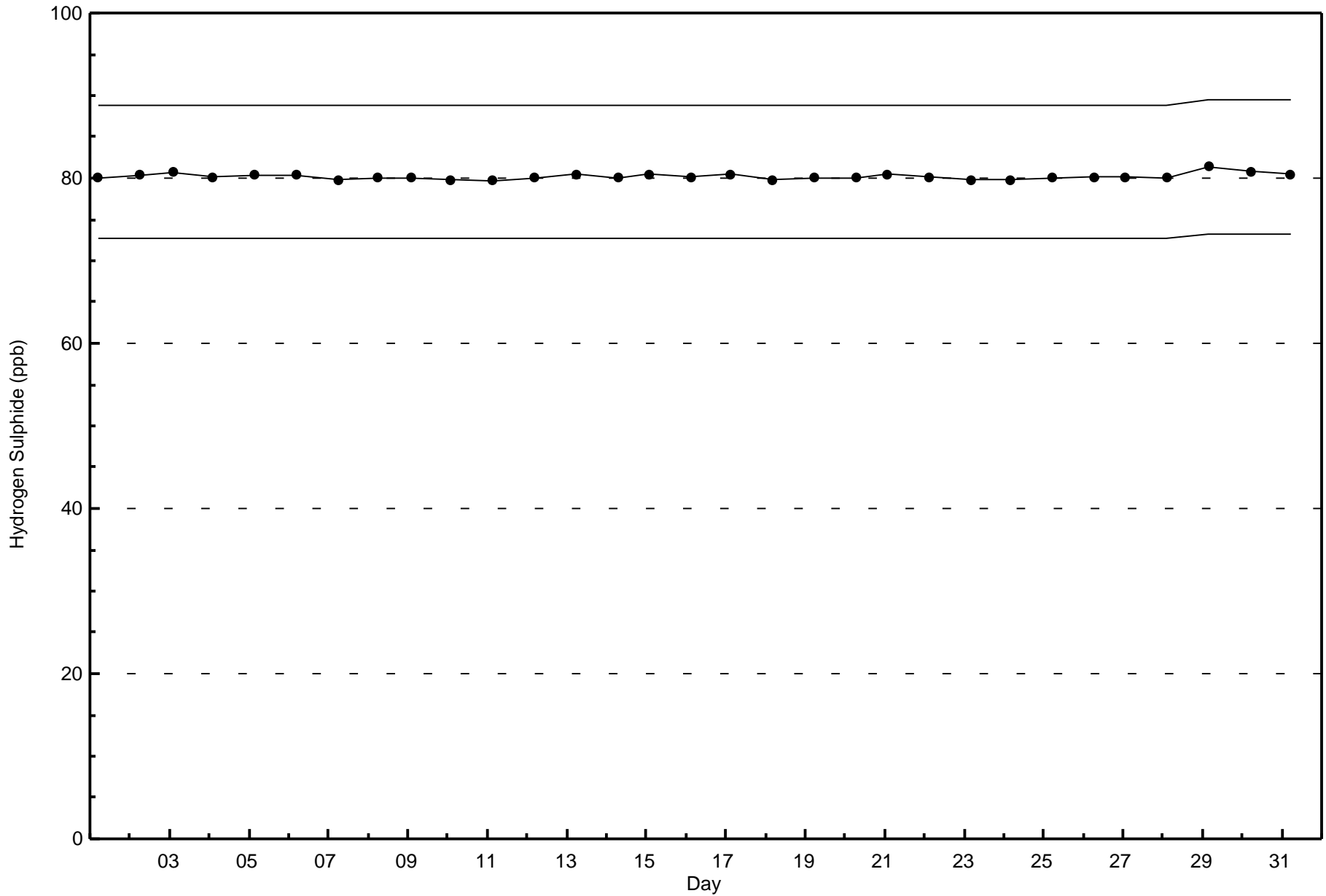
Total Number of Valid Hours: 708

Total Number of Hours: 744



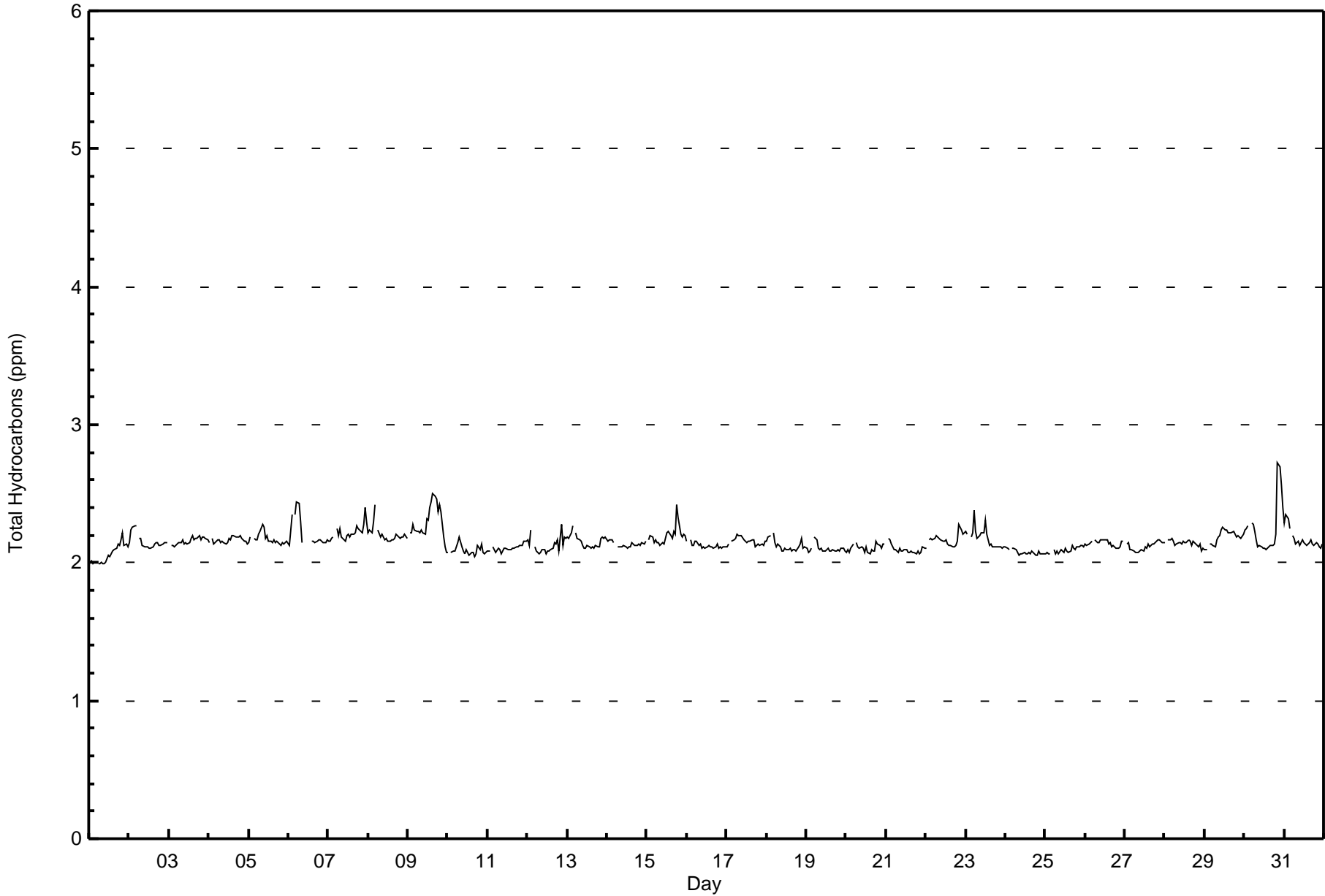
Total Number of Valid Hours: 708













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

**Total Hydrocarbons (THC) - ppm**  
**Firebag - October 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	12	1.69	1.69
2.1 - 3.0	696	98.31	100.00
3.1 - 10.0	0	0.00	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**  
**Firebag - October 2015**

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	10	0	1	0	0	1	0	12
2.1 - 3.0	71	44	27	6	6	12	31	65	85	60	58	59	52	30	38	52	696	
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>	71	44	27	6	6	12	31	65	85	70	58	60	52	30	39	52	708	

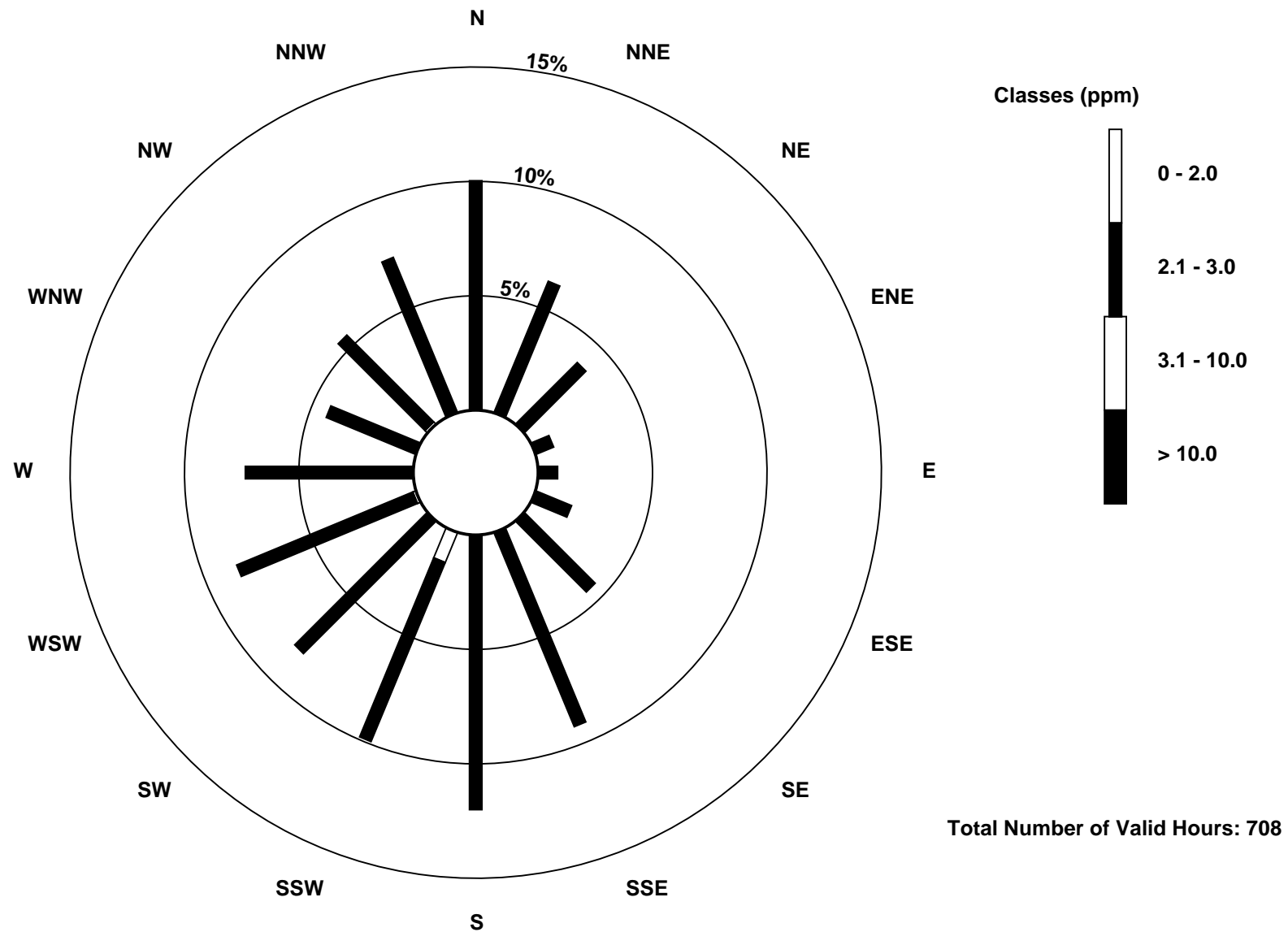
Total Number of Valid Hours: 708

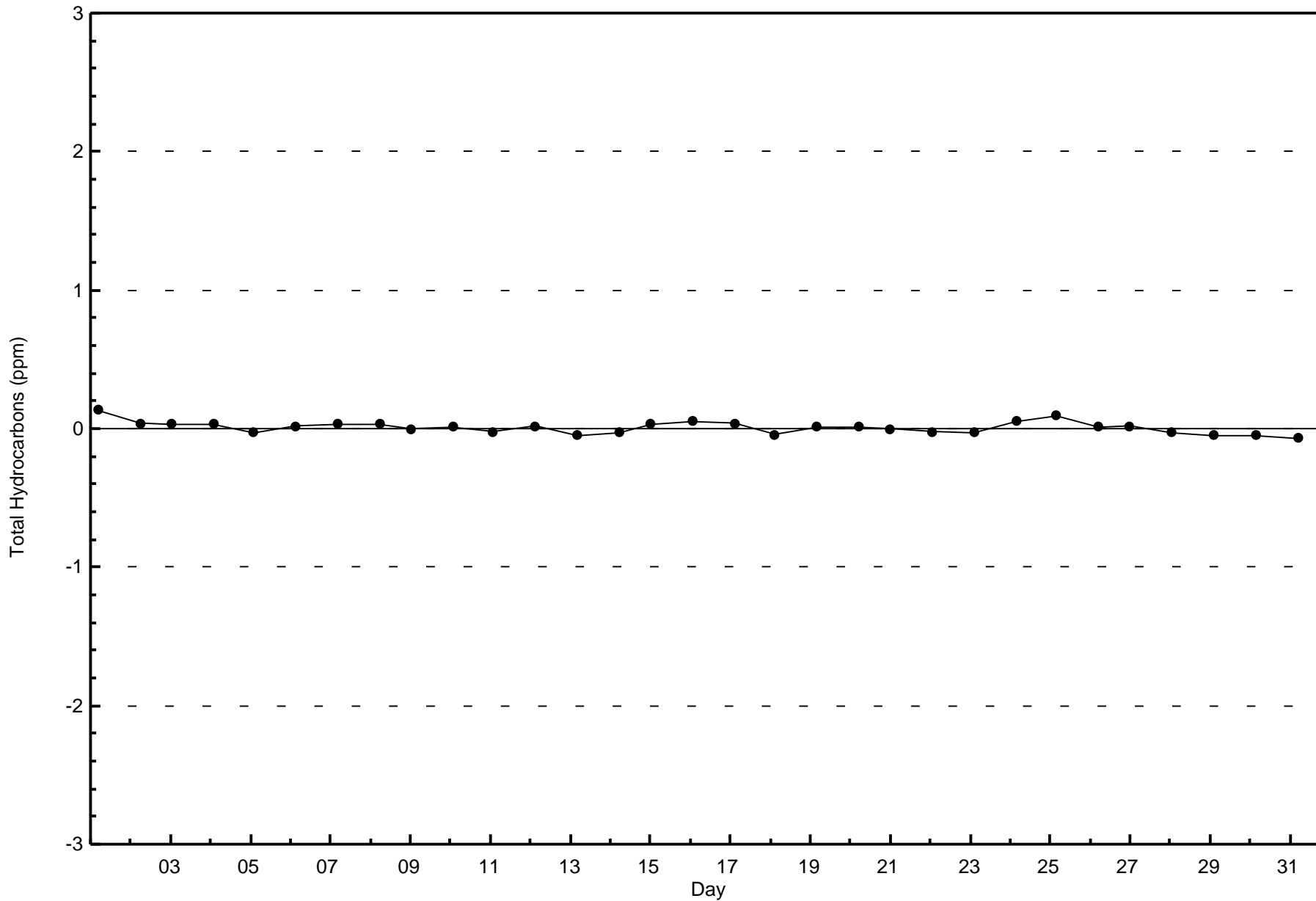
Total Number of Hours: 744

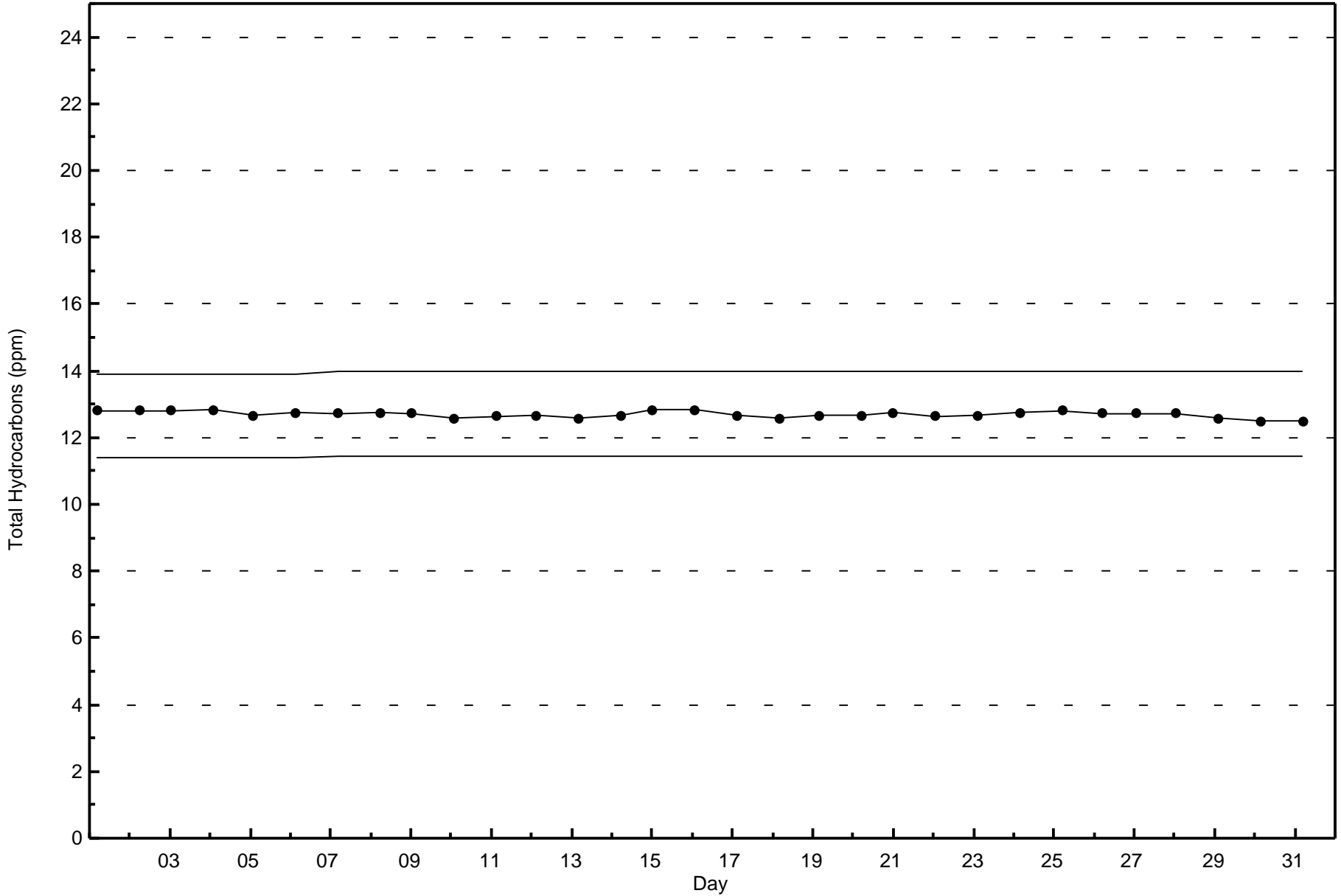


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Total Hydrocarbons (THC) - ppm  
Firebag (AMS 19)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxide (NO) - ppb

Firebag - October 2015

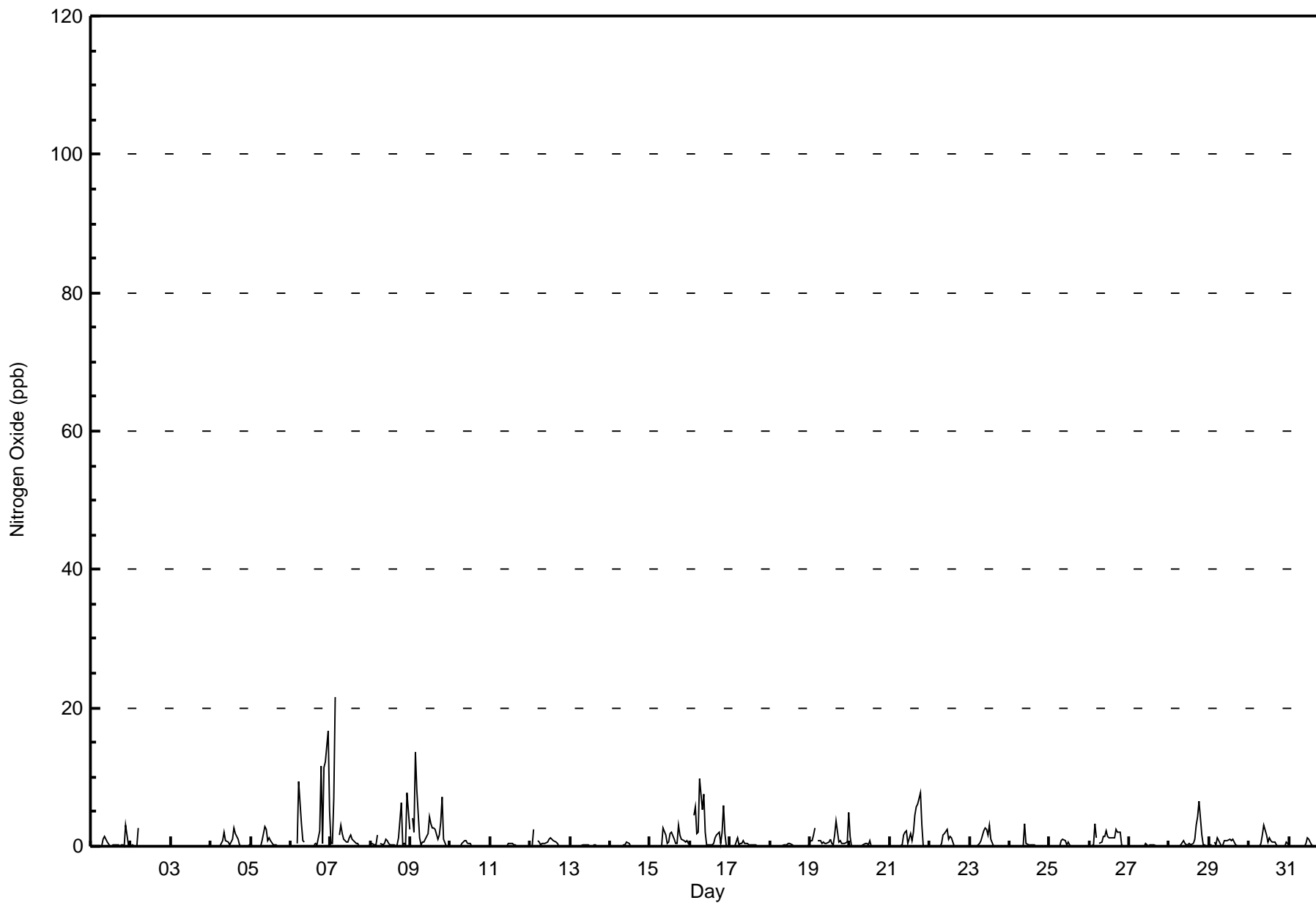
Maximum Value: 22 ppb on Oct 7 04:00																	Maximum Daily Average: 4.1 ppb on Oct 6																	Hours in Service: 744	
Minimum Value: 0 ppb on Oct 28 01:00																	Minimum Daily Average: 0.0 ppb on Oct 3																	Hours of Data: 708	
Maximum Diurnal Average: 1.9 ppb at hour 4																	Minimum Diurnal Average: 0.2 ppb at hour 1																	Hours of Missing Data: 36	
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: 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	Z	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	3	0	1	0.4	3									
2-Oct	0	0	0	0	3	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	3									
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									
4-Oct	0	Z	0	0	0	0	0	1	2	1	1	0	1	1	3	2	1	0	0	0	0	0	0	0	0.6	3									
5-Oct	0	0	Z	0	0	0	0	1	3	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.5	3									
6-Oct	0	0	0	Z	0	9	3	1	1	C	C	C	C	C	0	0	0	2	12	0	11	12	17	5	4.1	17									
7-Oct	0	0	7	22	Z	2	3	2	1	1	1	1	2	1	1	0	0	0	0	0	0	0	0	0	1.9	22									
8-Oct	0	0	0	0	2	Z	0	0	0	1	1	0	0	0	0	0	0	1	6	0	0	0	8	2	1.1	8									
9-Oct	Z	4	2	14	8	1	0	1	1	1	2	4	3	3	3	3	1	2	3	7	1	0	0	0	2.7	14									
10-Oct	0	Z	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									
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	2	Z	1	1	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.5	2									
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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1									
15-Oct	Z	0	0	0	0	0	0	0	3	2	0	1	2	2	1	0	0	3	2	1	1	1	1	1	0.9	3									
16-Oct	0	Z	5	6	2	2	10	5	7	2	0	0	0	0	0	1	2	2	0	2	6	2	0	0	2.4	10									
17-Oct	0	0	Z	0	1	0	0	0	1	0	0	0	0	0	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	0.1	0									
19-Oct	1	1	2	3	Z	1	1	0	1	0	0	1	1	0	0	2	4	1	1	0	0	0	1	5	1.1	5									
20-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	0.2	1									
21-Oct	Z	0	0	0	0	0	0	0	2	2	2	0	2	1	2	4	6	6	8	3	0	0	0	0	1.7	8									
22-Oct	0	Z	0	0	0	0	0	0	2	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0.5	2									
23-Oct	0	0	Z	0	0	0	0	1	2	3	2	2	3	1	0	0	0	0	0	0	0	0	0	0	0.6	3									
24-Oct	0	0	0	Z	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	3									
25-Oct	0	0	0	0	Z	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1									
26-Oct	0	0	0	3	1	Z	0	1	1	1	2	1	1	1	1	1	2	2	2	0	0	0	0	0	1.0	3									
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	0.1	0									
28-Oct	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	1	3	4	6	2	0	0	0	0	0.9	6									
29-Oct	0	0	Z	1	0	1	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.4	1									
30-Oct	0	0	0	Z	0	0	0	0	2	3	2	1	1	1	1	1	0	0	0	0	0	0	1	0	0.5	3									
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	0.1	1									
																	Diurnal Average		Diurnal Maximum																
																	0.2		1																
																	0.3		4																
																	0.7		7																
																	1.9		22																
																	0.7		8																
																	0.7		9																
																	0.7		10																
																	0.6		5																
																	1.1		7																
																	1.0		3																
																	0.8		2																
																	0.7		4																
																	0.8		3																
																	0.6		3																
																	0.5		3																
																	0.6		4																
																	0.7		6																
																	0.8		6																
																	1.3		12																
																	0.5		7																
																	0.7		11																
																	0.6		12																
																	0.9		17																
																	0.5		5																

Z - zerospan C - Calibration



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

**Nitrogen Oxide (NO) - ppb**  
**Firebag - October 2015**







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

**Nitrogen Oxide (NO) - ppb**  
**Firebag - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	707	99.86	99.86
21 - 40	1	0.14	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: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Oxide (NO) - ppb  
Firebag - October 2015**

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	44	27	6	6	12	31	64	85	70	58	60	52	30	39	52	707
21 - 40	0	0	0	0	0	0	0	1	0	0	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	44	27	6	6	12	31	65	85	70	58	60	52	30	39	52	708

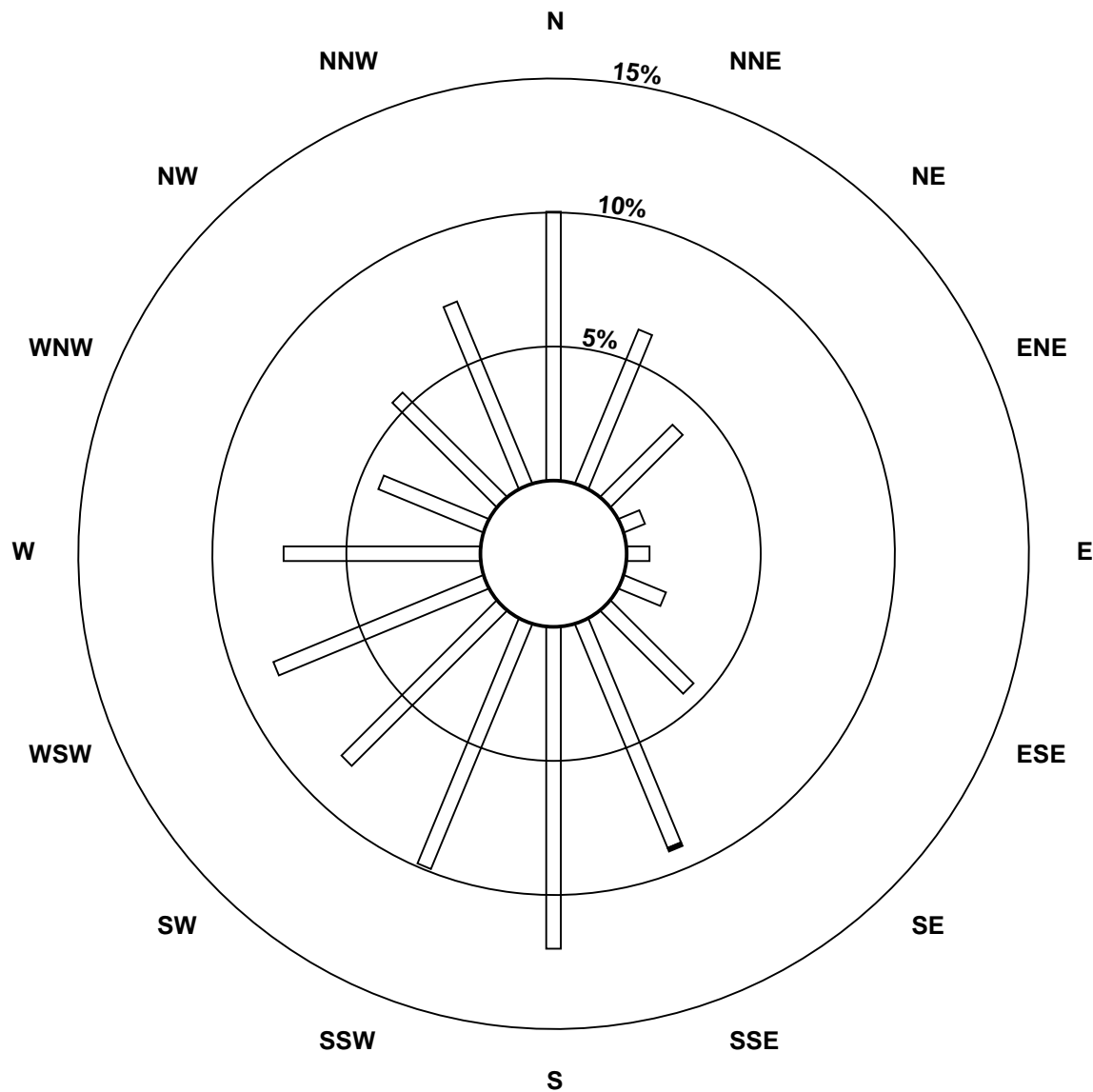
Total Number of Valid Hours: 708

Total Number of Hours: 744

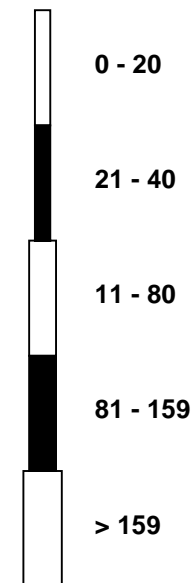


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

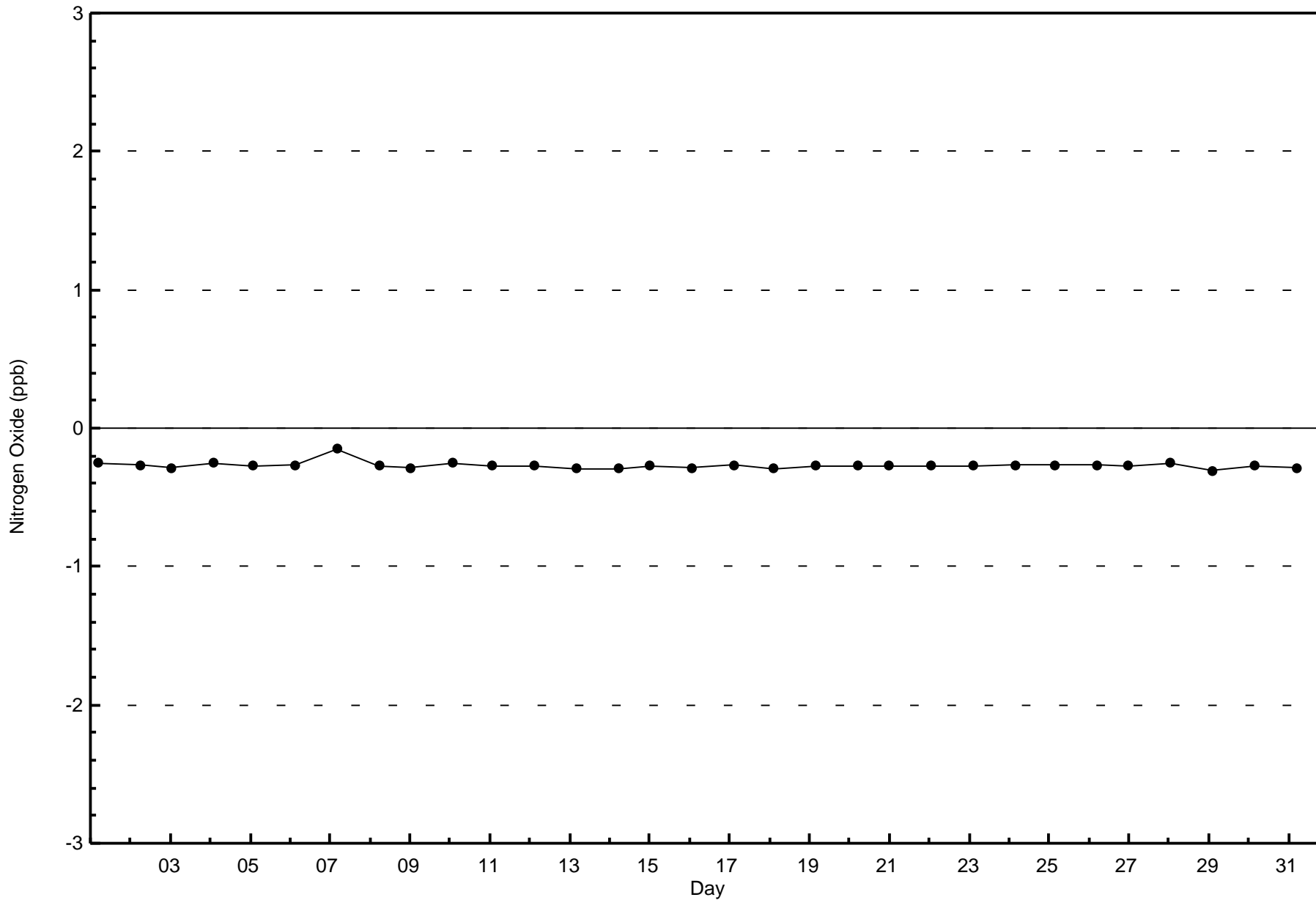
Nitrogen Oxide (NO) - ppb  
Firebag (AMS 19)

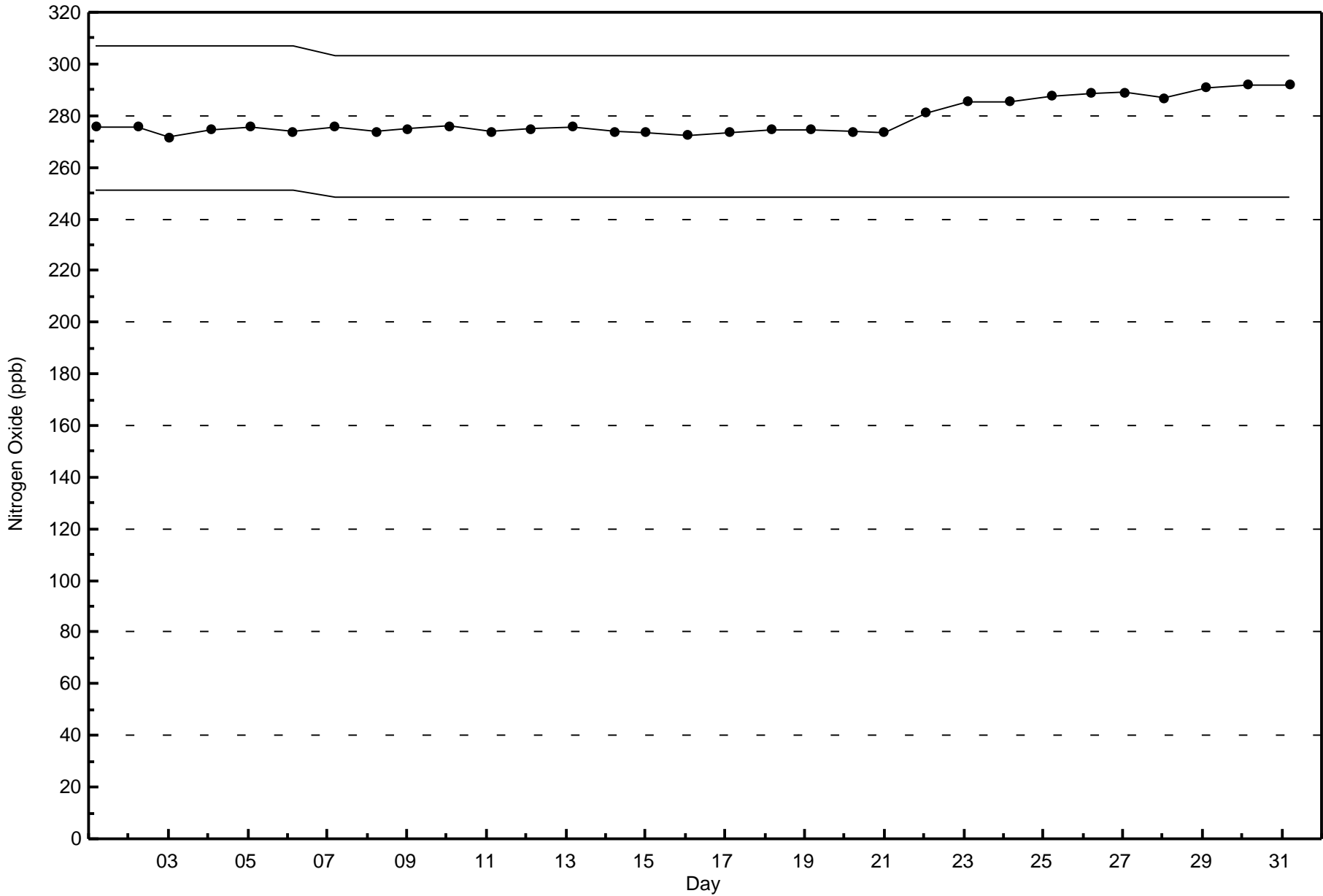


Classes (ppb)



Total Number of Valid Hours: 708







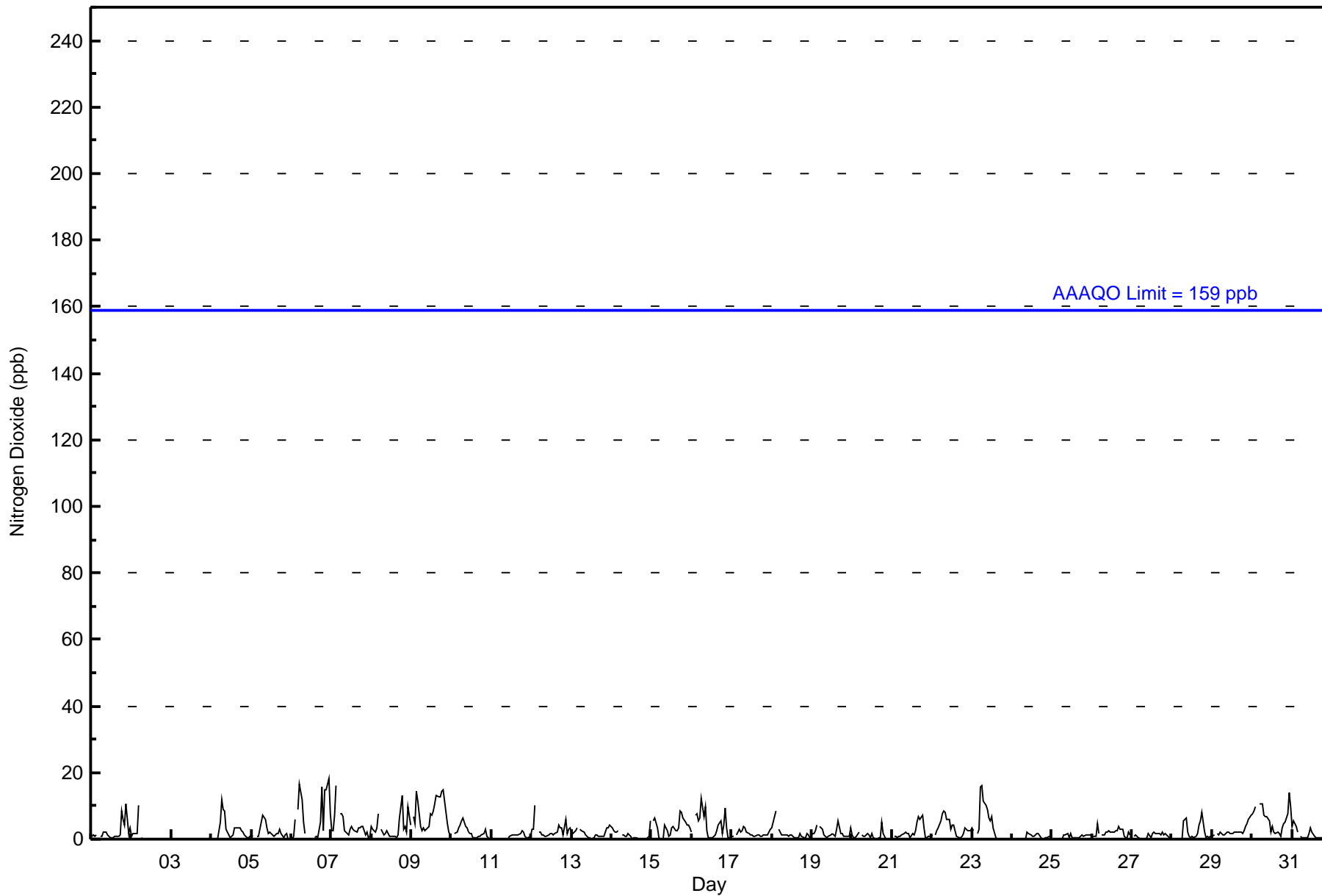
Summary of Hour Averages

Firebag - October 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 18 ppb on Oct 6 23:00	Maximum Daily Average: 7.7 ppb on Oct 9		Hours of Data:	708
Minimum Value: 0 ppb on Oct 2 13:00	Minimum Daily Average: 0.1 ppb on Oct 3		Hours of Missing Data:	36
Maximum Diurnal Average: 3.7 ppb at hour 6	Minimum Diurnal Average: 1.5 ppb at hour 15		Hours of Calibration:	36
Monthly Average: 2.5 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> = 7 P <sub>99</sub> = 14		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	2	2	2	1	0	0	1	1	1	1	1	9	6	4	11	2	4	2.3	11
2-Oct	1	2	2	2	10	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	10
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	0	0	0	5	12	9	9	3	1	1	1	1	4	3	4	3	3	2	1	1	0	1	2.7	12
5-Oct	1	1	Z	1	1	3	5	7	6	4	2	2	2	1	1	2	2	3	2	0	1	2	0	0	2.1	7
6-Oct	0	1	6	Z	9	17	12	5	2	C	C	C	C	C	0	1	1	5	16	3	15	15	18	8	7.3	18
7-Oct	3	2	7	16	Z	8	8	7	2	2	1	3	4	3	3	2	3	4	4	4	1	2	1	1	3.9	16
8-Oct	4	3	2	4	8	Z	3	1	2	2	2	1	1	1	1	1	1	7	13	3	4	2	10	4	3.4	13
9-Oct	Z	7	5	15	12	4	3	3	3	3	4	8	7	9	10	13	13	13	15	15	12	5	2	1	7.7	15
10-Oct	1	Z	2	2	3	4	6	7	4	3	2	2	2	1	0	1	1	1	1	2	3	1	0	0	2.1	7
11-Oct	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2	3	2	1	0	1	1	0.8	3
12-Oct	3	3	10	Z	2	2	1	1	1	1	1	2	2	1	2	2	4	3	4	1	6	2	3	4	2.7	10
13-Oct	2	2	3	4	Z	3	2	2	1	1	1	0	0	0	1	1	1	1	1	1	2	4	3	4	1.7	4
14-Oct	4	3	2	2	3	Z	1	1	1	1	2	1	0	1	1	0	0	0	0	0	0	1	6	6	1.2	6
15-Oct	Z	6	7	4	0	0	0	0	4	2	1	1	3	4	3	2	4	9	8	7	5	4	4	4	3.5	9
16-Oct	2	Z	7	8	6	6	12	7	10	2	1	0	1	1	1	3	4	6	2	4	10	4	1	1	4.2	12
17-Oct	1	1	Z	1	3	2	2	4	3	2	2	1	1	1	1	1	1	1	1	1	1	1	2	3	1.6	4
18-Oct	4	5	8	Z	3	2	1	1	1	1	1	1	1	1	0	0	1	2	1	0	0	2	1	0	1.7	8
19-Oct	2	2	3	4	Z	4	3	1	1	1	1	1	2	1	1	3	5	2	2	1	1	1	1	4	1.9	5
20-Oct	1	0	0	1	2	Z	1	1	1	2	1	1	2	0	0	0	0	0	5	2	0	0	0	0	0.9	5
21-Oct	Z	1	1	0	1	1	1	2	2	2	2	1	2	1	3	5	7	6	7	3	1	1	1	1	2.1	7
22-Oct	1	Z	1	3	3	6	8	9	8	6	6	3	4	4	2	1	1	1	1	2	3	3	2	3	3.4	9
23-Oct	4	3	Z	2	3	16	16	11	10	9	6	5	7	4	1	0	0	0	0	0	0	0	0	0	4.2	16
24-Oct	0	0	0	Z	0	0	0	0	0	2	2	1	1	1	1	2	2	0	0	0	1	1	0	0	0.7	2
25-Oct	0	0	0	0	Z	0	0	1	1	2	1	2	1	0	0	1	1	1	1	1	1	1	1	1	0.8	2
26-Oct	1	1	1	5	2	Z	1	1	2	2	3	2	2	2	3	3	4	3	3	1	1	1	2	1	2.0	5
27-Oct	Z	1	1	1	0	0	0	0	0	0	2	1	2	2	2	2	2	1	2	1	2	1	0	0	1.0	2
28-Oct	0	Z	0	0	0	0	0	6	6	2	1	1	1	1	1	2	4	5	8	2	1	1	0	1	1.9	8
29-Oct	1	1	Z	2	1	2	1	1	2	2	2	2	2	2	2	2	2	2	2	2	4	5	6	7	2.4	7
30-Oct	8	8	10	Z	11	11	11	7	7	7	5	2	4	2	2	2	2	1	3	5	5	8	14	10	6.2	14
31-Oct	4	5	4	2	Z	1	1	0	0	0	2	3	2	1	0	0	0	0	0	0	0	0	0	0	1.2	5
	1.8	2.2	3.2	3.0	3.3	3.7	3.6	3.2	3.0	2.2	1.8	1.7	1.9	1.6	1.5	1.8	2.3	2.6	3.7	2.3	2.7	2.4	2.5	2.2	Diurnal Average	
	8	8	10	16	12	17	16	11	10	9	6	8	7	9	10	13	13	13	16	15	15	15	18	10	Diurnal Maximum	

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





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Firebag - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	708	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: 708

Total Number of Hours: 744





**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Firebag - October 2015**

<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	71	44	27	6	6	12	31	65	85	70	58	60	52	30	39	52	708
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>	71	44	27	6	6	12	31	65	85	70	58	60	52	30	39	52	708

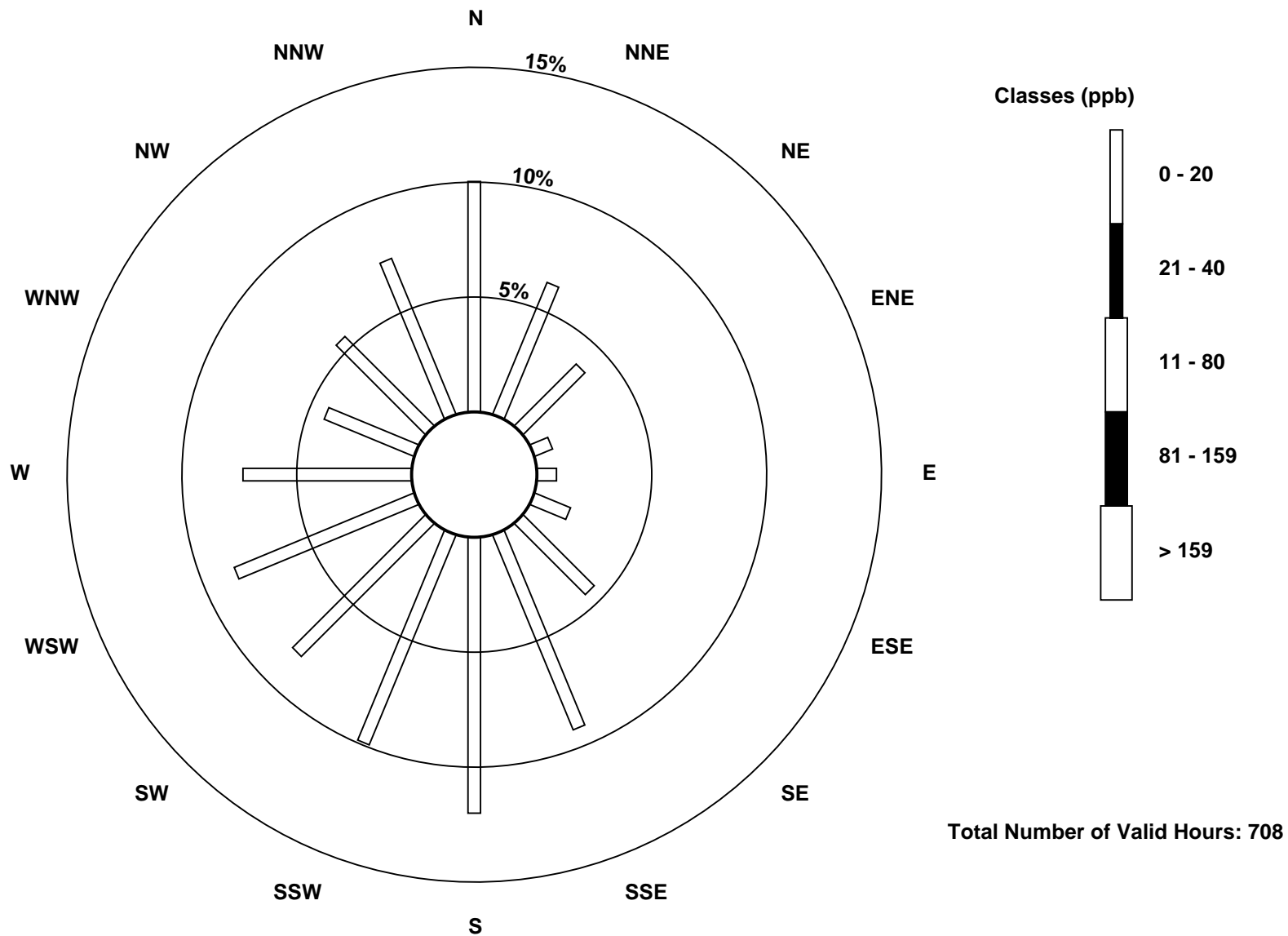
Total Number of Valid Hours: 708

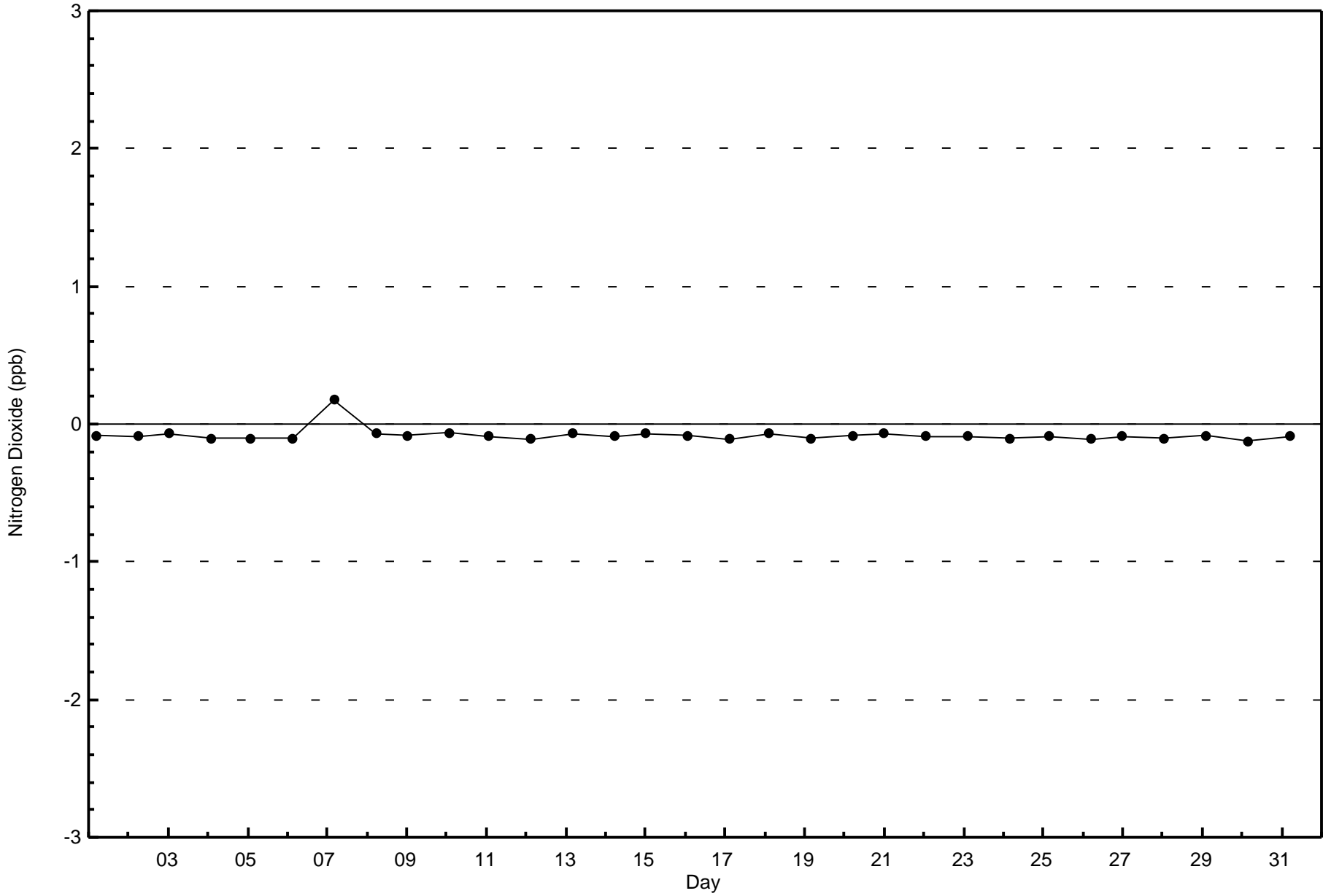
Total Number of Hours: 744

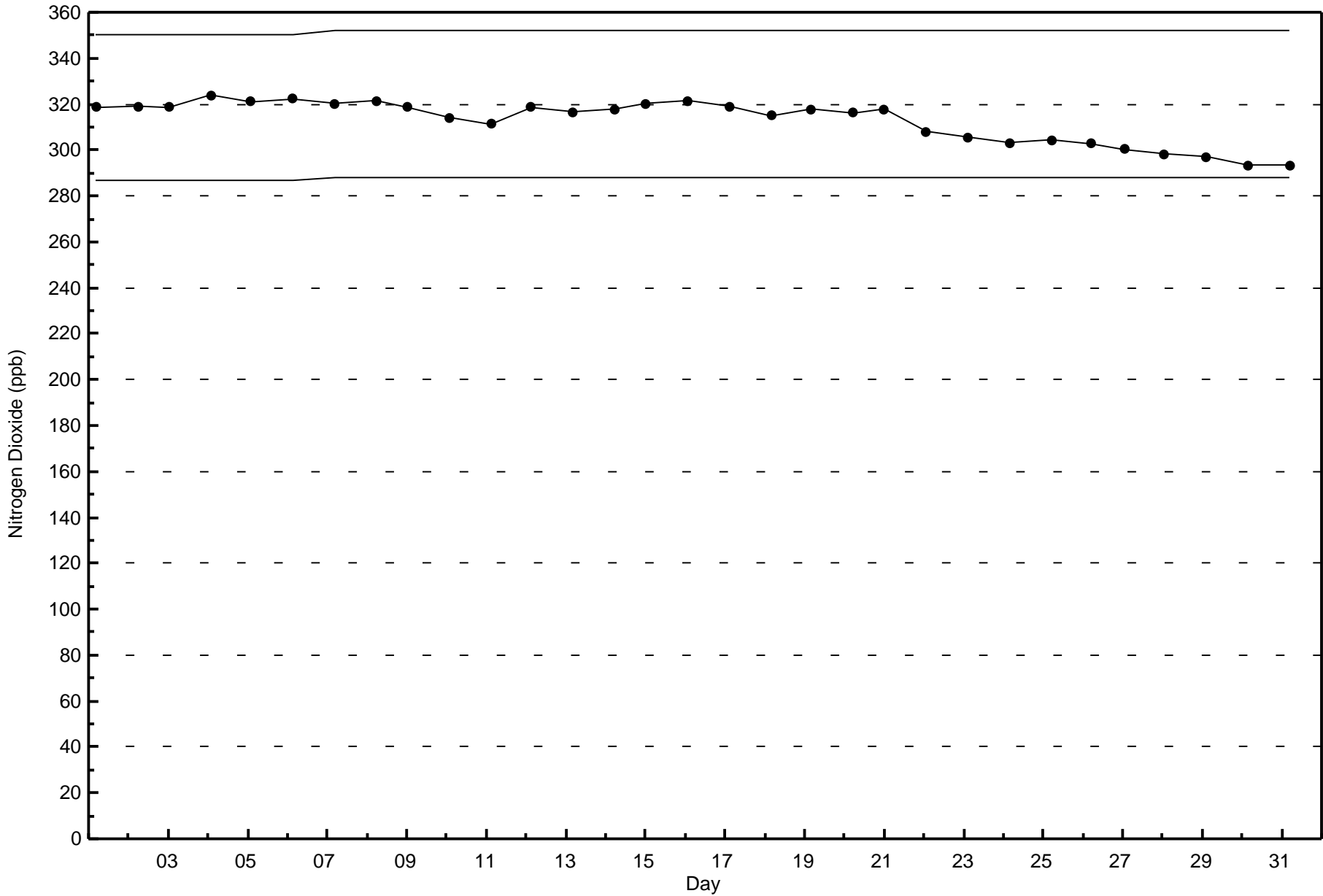


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Firebag (AMS 19)

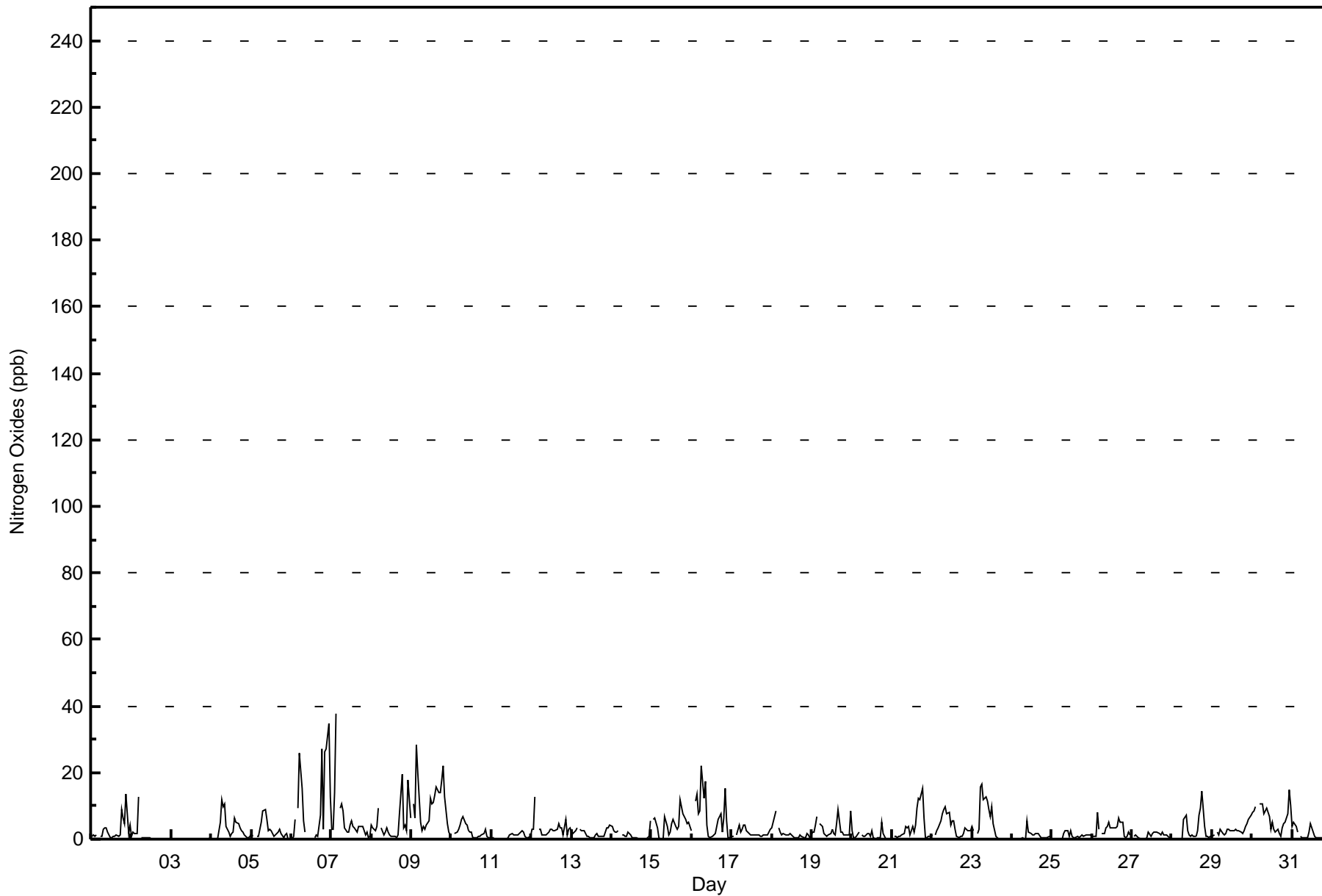








Maximum Value: 38 ppb on Oct 7 04:00																	Maximum Daily Average: 11.4 ppb on Oct 6										Hours in Service: 744															
Minimum Value: 0 ppb on Oct 3 00:00																	Minimum Daily Average: 0.1 ppb on Oct 3										Hours of Data: 708															
Maximum Diurnal Average: 5.0 ppb at hour 19																	Minimum Diurnal Average: 2.0 ppb at hour 1										Hours of Missing Data: 36															
Monthly Average: 3.2 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> = 8 P <sub>99</sub> = 25										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	1	1	1	1	Z	1	1	3	3	3	2	0	0	1	1	1	1	1	9	6	5	14	2	4	2.7	14																
2-Oct	1	2	2	2	13	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	13																
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	0	0	0	5	12	10	11	4	2	1	1	2	6	5	5	4	3	2	1	0	0	1	3.3	12																
5-Oct	2	1	Z	1	1	3	5	8	9	6	2	3	3	1	1	2	2	3	2	0	1	2	0	0	2.5	9																
6-Oct	0	1	6	Z	9	26	15	6	2	C	C	C	C	C	1	1	1	7	27	3	26	27	35	13	11.4	35																
7-Oct	3	3	14	38	Z	9	11	8	3	2	2	4	5	4	3	2	4	4	4	4	1	2	1	1	5.8	38																
8-Oct	4	3	2	4	9	Z	3	1	2	3	2	1	1	1	1	1	1	8	20	3	4	2	18	7	4.5	20																
9-Oct	Z	11	7	28	20	5	3	4	3	4	5	12	11	11	13	16	14	14	18	22	13	5	2	1	10.4	28																
10-Oct	1	Z	2	2	3	4	6	7	5	4	3	2	2	1	0	0	1	1	1	2	3	1	0	0	2.3	7																
11-Oct	0	0	Z	0	0	0	0	0	0	0	0	1	2	1	1	1	1	2	3	2	1	0	1	1	0.8	3																
12-Oct	3	3	13	Z	3	3	1	1	1	1	2	3	3	2	2	3	5	3	4	1	6	1	3	3	3.1	13																
13-Oct	2	2	2	4	Z	3	3	3	2	1	1	0	0	1	1	1	1	1	1	2	4	3	4	4	1.8	4																
14-Oct	4	3	2	2	3	Z	1	1	1	1	2	1	0	1	1	0	0	0	0	0	0	1	6	6	1.3	6																
15-Oct	Z	6	6	4	0	0	0	0	7	4	1	2	5	6	4	3	4	12	10	7	6	5	5	4	4.4	12																
16-Oct	3	Z	12	13	7	8	22	12	17	4	1	1	1	1	2	4	6	8	2	6	15	5	1	1	6.6	22																
17-Oct	1	1	Z	1	4	2	3	4	4	3	2	1	1	1	1	1	1	1	1	1	1	1	2	3	1.9	4																
18-Oct	3	5	9	Z	3	2	1	1	1	1	1	2	1	1	0	0	1	1	1	0	0	2	1	0	1.8	9																
19-Oct	2	2	4	7	Z	5	4	2	1	1	1	2	3	2	1	5	9	2	2	1	1	1	1	8	2.9	9																
20-Oct	3	0	0	1	2	Z	1	1	1	2	2	1	3	0	0	0	0	0	5	2	0	0	0	0	1.1	5																
21-Oct	Z	1	1	0	1	1	1	2	4	4	4	1	4	2	4	9	12	12	15	6	1	1	1	1	3.8	15																
22-Oct	1	Z	1	3	3	6	7	9	10	8	8	4	6	5	3	1	1	1	1	2	3	3	2	3	3.9	10																
23-Oct	4	3	Z	2	3	16	16	12	13	11	9	7	10	5	1	0	0	0	0	0	0	0	0	0	4.8	16																
24-Oct	0	0	0	Z	0	0	0	0	0	6	2	2	1	1	2	2	2	0	0	0	0	1	0	0	0.9	6																
25-Oct	0	0	0	0	Z	0	0	2	2	3	1	2	1	0	0	1	1	1	1	1	1	1	1	1	0.9	3																
26-Oct	1	1	1	8	3	Z	2	2	3	4	5	4	4	4	4	4	7	5	5	1	0	1	2	1	3.0	8																
27-Oct	Z	1	1	1	0	0	0	0	0	0	2	1	2	2	2	2	2	1	2	1	1	1	0	0	1.1	2																
28-Oct	0	Z	0	0	0	0	0	6	7	3	1	1	1	1	1	3	7	9	15	4	1	1	0	1	2.7	15																
29-Oct	1	1	Z	2	1	3	2	1	2	3	3	3	3	3	3	3	2	2	2	2	4	5	6	7	2.8	7																
30-Oct	8	8	10	Z	11	11	11	8	8	10	7	3	5	3	2	3	2	1	3	5	5	7	15	10	6.7	15																
31-Oct	4	5	4	2	Z	1	1	0	0	1	2	5	3	1	0	0	0	0	0	0	0	0	0	0	1.4	5																
																	2.0	2.5	3.9	4.8	4.0	4.4	4.3	3.7	4.0	3.2	2.5	2.3	2.7	2.1	2.0	2.4	2.9	3.4	5.0	2.8	3.4	3.0	3.4	2.7	Diurnal Average	
																	8	11	14	38	20	26	22	12	17	11	9	12	11	11	13	16	14	14	27	22	26	27	35	13	Diurnal Maximum	
Z - zerospan		C - Calibration																																								





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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Firebag - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	699	98.73	98.73
21 - 40	9	1.27	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: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association  
Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Firebag - October 2015**

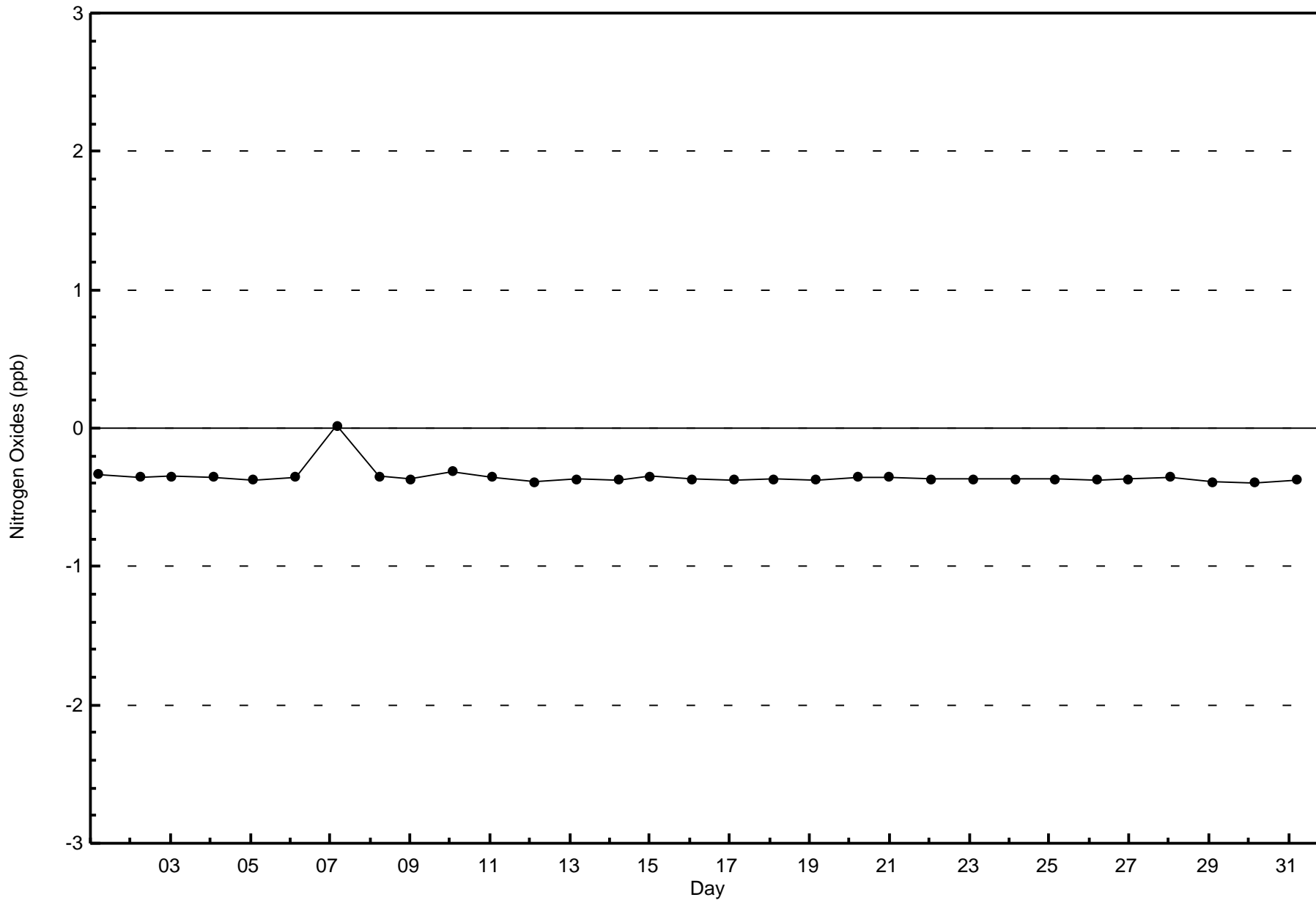
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	71	44	27	6	6	12	31	57	84	70	58	60	52	30	39	52	699
21 - 40	0	0	0	0	0	0	0	8	1	0	0	0	0	0	0	0	9
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	71	44	27	6	6	12	31	65	85	70	58	60	52	30	39	52	708

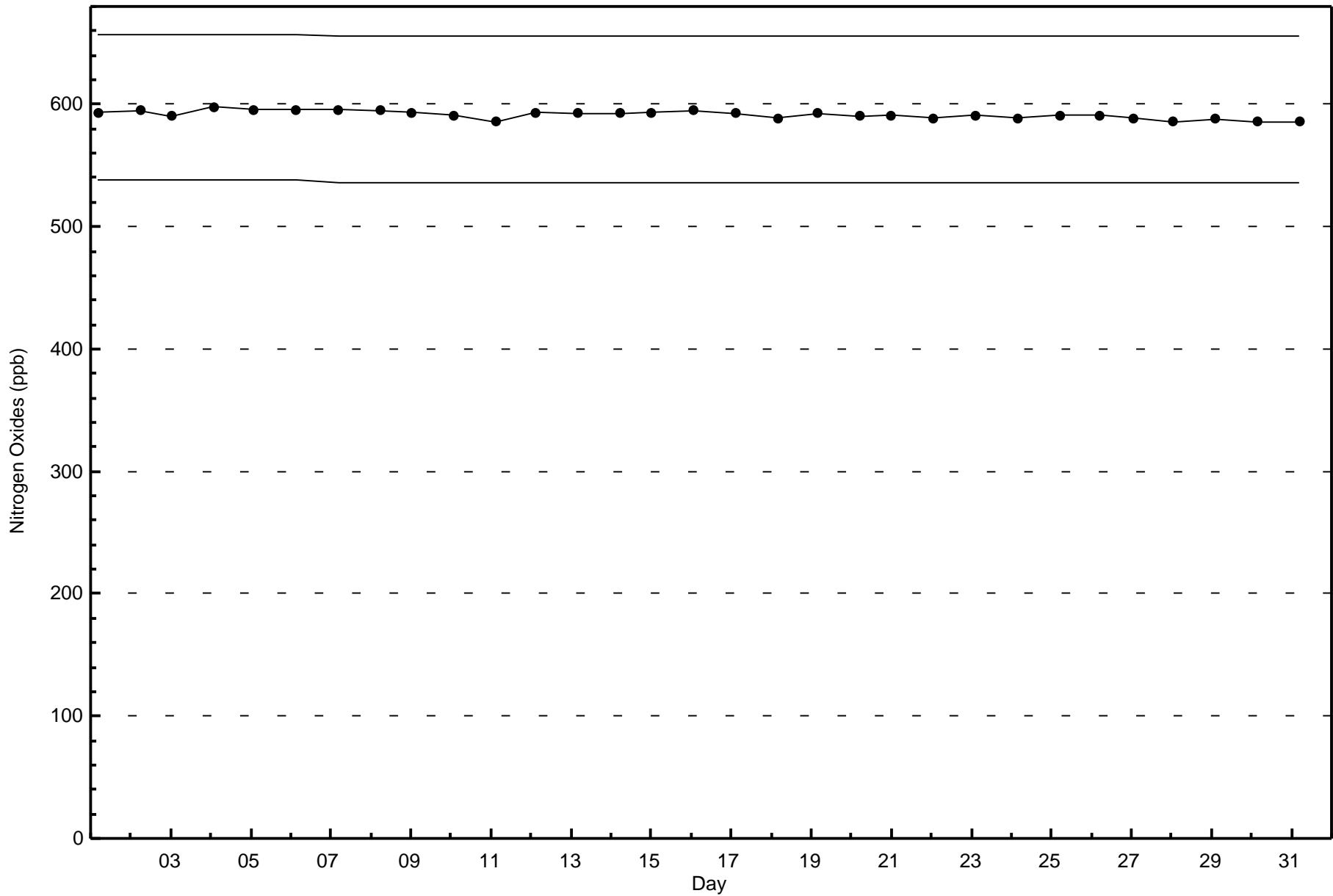
Total Number of Valid Hours: 708

Total Number of Hours: 744











**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Ambient Temperature (AT) - C**

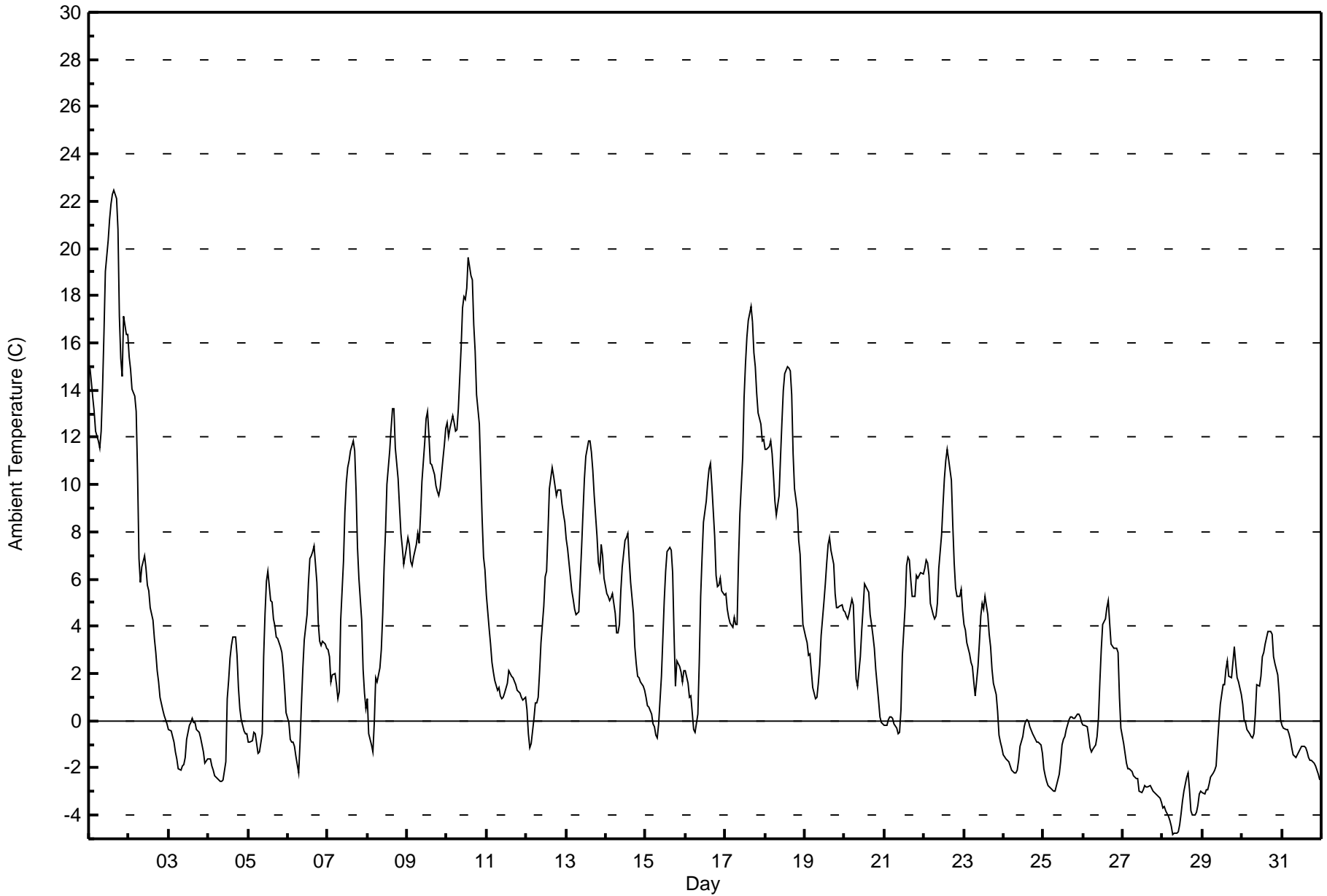
**Firebag - October 2015**

Maximum Value: 22.5 C on Oct 1 16:00		Maximum Daily Average: 16.7 C on Oct 1		Hours in Service: 744																																												
Minimum Value: -4.8 C on Oct 28 07:00		Minimum Daily Average: -3.8 C on Oct 28		Hours of Data: 744																																												
Maximum Diurnal Average: 6.9 C at hour 15		Minimum Diurnal Average: 1.5 C at hour 7		Hours of Missing Data: 0																																												
Monthly Average: 3.97 C		Percentiles: P <sub>1</sub> = -4.1 P <sub>10</sub> = -2.1 Q <sub>1</sub> = -0.4 Median = 2.9 Q <sub>3</sub> = 6.9 P <sub>90</sub> = 11.8 P <sub>99</sub> = 19.9		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	14.9	14.3	13.7	13.1	12.2	11.9	11.5	12.3	14.1	16.4	19.0	20.3	21.2	21.8	22.3	22.5	22.1	20.8	17.1	15.3	14.6	17.1	16.3	16.4	16.7	22.5																						
2-Oct	15.4	14.8	14.0	13.8	13.1	10.4	6.9	5.9	6.5	7.0	6.5	5.7	5.5	4.8	4.3	3.5	2.9	2.1	1.7	1.0	0.5	0.2	0.0	-0.2	6.1	15.4																						
3-Oct	-0.4	-0.5	-0.7	-0.9	-1.3	-1.6	-2.1	-2.1	-1.9	-1.9	-1.6	-0.8	-0.2	-0.1	0.1	-0.1	-0.1	-0.4	-0.5	-0.8	-1.0	-1.3	-1.8	-1.6	-1.0	0.1																						
4-Oct	-1.6	-1.6	-1.9	-2.1	-2.3	-2.5	-2.5	-2.6	-2.6	-2.5	-1.8	0.9	1.7	2.7	3.2	3.5	3.5	2.8	1.4	0.5	0.1	-0.4	-0.6	-0.5	-0.2	3.5																						
5-Oct	-0.9	-0.9	-0.9	-0.5	-0.5	-1.0	-1.4	-1.3	-0.6	2.7	4.5	5.9	6.3	5.1	5.1	4.3	4.0	3.5	3.5	3.1	2.9	2.3	1.4	0.3	2.0	6.3																						
6-Oct	-0.1	-0.8	-0.9	-0.9	-1.1	-1.5	-2.2	-0.9	0.8	2.3	3.4	4.5	5.9	6.9	7.0	7.2	7.4	5.9	4.1	3.4	3.2	3.4	3.2	3.1	2.6	7.4																						
7-Oct	3.0	2.7	1.7	1.9	2.0	1.5	0.9	1.2	4.2	6.8	8.8	10.1	10.7	11.0	11.4	11.8	11.5	9.7	7.3	6.1	4.2	2.2	1.1	0.5	5.5	11.8																						
8-Oct	0.9	-0.5	-1.0	-1.3	-0.1	1.8	1.7	2.3	3.0	4.5	6.5	8.0	10.0	11.4	12.4	13.2	13.2	11.6	10.3	9.0	8.0	7.3	6.6	7.3	6.1	13.2																						
9-Oct	7.8	7.4	6.7	6.6	6.9	7.5	7.9	7.5	8.7	10.1	11.8	12.8	13.1	12.1	10.9	10.8	10.4	10.0	9.7	9.5	9.8	11.1	11.7	12.4	9.7	13.1																						
10-Oct	12.6	12.0	12.4	12.9	12.6	12.2	12.3	13.2	15.8	17.5	17.9	17.8	18.3	19.6	18.8	18.6	16.8	15.6	13.8	12.6	10.6	8.6	6.9	6.4	14.0	19.6																						
11-Oct	5.3	3.9	3.2	2.4	2.1	1.7	1.3	1.4	1.1	0.9	1.0	1.2	1.6	2.1	2.0	1.9	1.8	1.5	1.3	1.2	1.2	1.0	0.9	1.0	1.8	5.3																						
12-Oct	0.5	-0.6	-1.1	-1.0	0.1	0.8	0.7	1.0	2.1	3.3	4.9	6.1	6.3	8.0	9.8	10.7	10.3	10.0	9.5	9.8	9.8	9.2	8.8	8.4	5.3	10.7																						
13-Oct	7.7	7.3	6.1	5.5	5.1	4.7	4.5	4.6	6.0	7.3	8.8	10.3	11.2	11.8	11.9	11.4	10.6	9.6	7.8	6.7	6.4	7.4	7.0	6.0	7.7	11.9																						
14-Oct	5.4	5.2	5.1	5.2	5.4	4.6	3.7	3.7	4.1	5.5	6.5	7.6	7.8	7.9	6.8	5.9	4.6	3.1	2.4	1.9	1.8	1.7	1.5	1.3	4.5	7.9																						
15-Oct	1.0	0.6	0.6	0.3	-0.2	-0.3	-0.6	-0.7	-0.2	1.9	3.5	5.1	6.3	7.1	7.4	7.2	6.3	3.7	1.5	2.6	2.3	2.1	1.7	2.1	2.5	7.4																						
16-Oct	2.1	1.6	1.0	1.1	0.3	-0.4	-0.5	0.3	2.5	5.3	6.9	8.4	9.3	10.1	10.6	10.9	9.9	7.8	6.2	5.7	5.7	6.0	5.5	5.3	5.1	10.9																						
17-Oct	5.4	4.7	4.4	4.1	4.0	4.4	4.0	4.1	6.7	8.8	11.1	13.7	15.1	16.3	16.9	17.5	16.9	15.6	15.0	13.8	13.0	12.5	11.8	11.9	10.5	17.5																						
18-Oct	11.5	11.5	11.6	11.8	11.3	10.3	9.3	8.7	9.5	11.1	12.6	14.0	14.7	15.0	14.9	14.8	13.8	11.3	9.8	9.0	7.6	7.0	5.5	4.1	10.9	15.0																						
19-Oct	3.5	3.3	2.8	2.8	2.1	1.4	0.9	1.0	1.6	2.3	3.6	5.0	5.8	6.7	7.5	7.7	7.2	6.6	5.4	4.8	4.8	4.8	4.9	4.7	4.2	7.7																						
20-Oct	4.6	4.4	4.3	4.5	5.2	4.9	3.2	1.8	1.5	2.7	3.8	4.8	5.8	5.7	5.5	4.5	4.1	3.6	3.1	2.2	0.9	0.2	-0.1	-0.1	3.4	5.8																						
21-Oct	-0.2	-0.2	0.0	0.2	0.2	0.1	-0.2	-0.3	-0.6	-0.5	0.5	2.8	4.8	6.6	6.9	6.8	6.0	5.3	5.2	6.2	6.1	6.1	6.3	6.2	3.1	6.9																						
22-Oct	6.4	6.8	6.7	6.2	5.0	4.5	4.3	4.4	5.0	6.4	7.9	9.1	10.3	11.0	11.5	11.1	10.2	8.3	6.7	5.6	5.3	5.3	5.5	4.7	7.0	11.5																						
23-Oct	4.1	3.8	3.3	2.8	2.5	2.3	1.6	1.1	2.3	3.3	4.4	5.0	4.7	5.3	4.5	3.6	3.2	2.2	1.6	1.1	0.4	-0.6	-0.9	-1.2	2.5	5.3																						
24-Oct	-1.5	-1.6	-1.7	-1.7	-1.9	-2.1	-2.2	-2.2	-2.1	-1.7	-1.1	-0.7	-0.2	0.0	0.1	0.0	-0.3	-0.6	-0.7	-0.8	-0.9	-0.9	-1.1	-1.4	-1.1	0.1																						
25-Oct	-2.0	-2.3	-2.6	-2.8	-2.9	-3.0	-3.0	-3.0	-2.7	-2.3	-1.8	-1.0	-0.8	-0.7	-0.4	0.0	0.2	0.1	0.1	0.1	0.3	0.3	0.2	-0.1	-1.2	0.3																						
26-Oct	-0.2	-0.2	-0.3	-0.7	-1.2	-1.3	-1.2	-1.0	-0.7	0.1	1.6	3.0	4.1	4.3	4.8	5.1	4.1	3.2	3.0	3.1	3.0	2.9	1.0	-0.3	1.5	5.1																						
27-Oct	-1.0	-1.4	-1.8	-2.0	-2.0	-2.2	-2.3	-2.4	-2.4	-2.4	-3.0	-3.0	-2.9	-2.8	-2.8	-2.8	-2.7	-2.9	-3.0	-3.1	-3.1	-3.2	-3.3	-3.5	-2.6	-1.0																						
28-Oct	-3.7	-3.6	-3.8	-4.0	-4.2	-4.5	-4.8	-4.7	-4.8	-4.7	-4.4	-3.9	-3.4	-3.0	-2.4	-2.2	-2.9	-3.8	-4.0	-4.0	-3.9	-3.6	-3.1	-3.0	-3.8	-2.2																						
29-Oct	-3.0	-3.1	-3.0	-2.9	-2.7	-2.4	-2.2	-2.1	-1.9	-1.0	-0.1	0.7	1.5	1.5	2.2	2.6	1.9	1.8	2.5	3.1	2.4	1.8	1.6	1.1	0.0	3.1																						
30-Oct	0.7	0.1	0.0	-0.4	-0.5	-0.7	-0.7	-0.6	0.3	1.5	1.5	1.9	2.7	2.9	3.2	3.8	3.8	3.8	3.7	2.7	2.4	1.9	1.2	0.1	1.5	3.8																						
31-Oct	-0.2	-0.3	-0.4	-0.4	-0.6	-0.8	-1.1	-1.4	-1.6	-1.4	-1.3	-1.2	-1.1	-1.1	-1.1	-1.3	-1.5	-1.7	-1.6	-1.8	-1.9	-2.1	-2.3	-2.5	-1.3	-0.2																						
																								3.2	2.8	2.5	2.4	2.2	2.0	1.5	1.6	2.4	3.5	4.6	5.6	6.3	6.8	6.9	6.9	6.4	5.5	4.6	4.2	3.8	3.6	3.2	2.9	Diurnal Average
																								15.4	14.8	14.0	13.8	13.1	12.2	12.3	13.2	15.8	17.5	19.0	20.3	21.2	21.8	22.3	22.5	22.1	20.8	17.1	15.3	14.6	17.1	16.3	16.4	Diurnal Maximum



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

**Ambient Temperature (AT) - C**  
**Firebag - October 2015**





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

**Ambient Temperature (AT) - C**  
**Firebag - October 2015**

<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	29.30	29.30
0 - 10	407	54.70	84.01
10 - 20	112	15.05	99.06
> 20	7	0.94	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

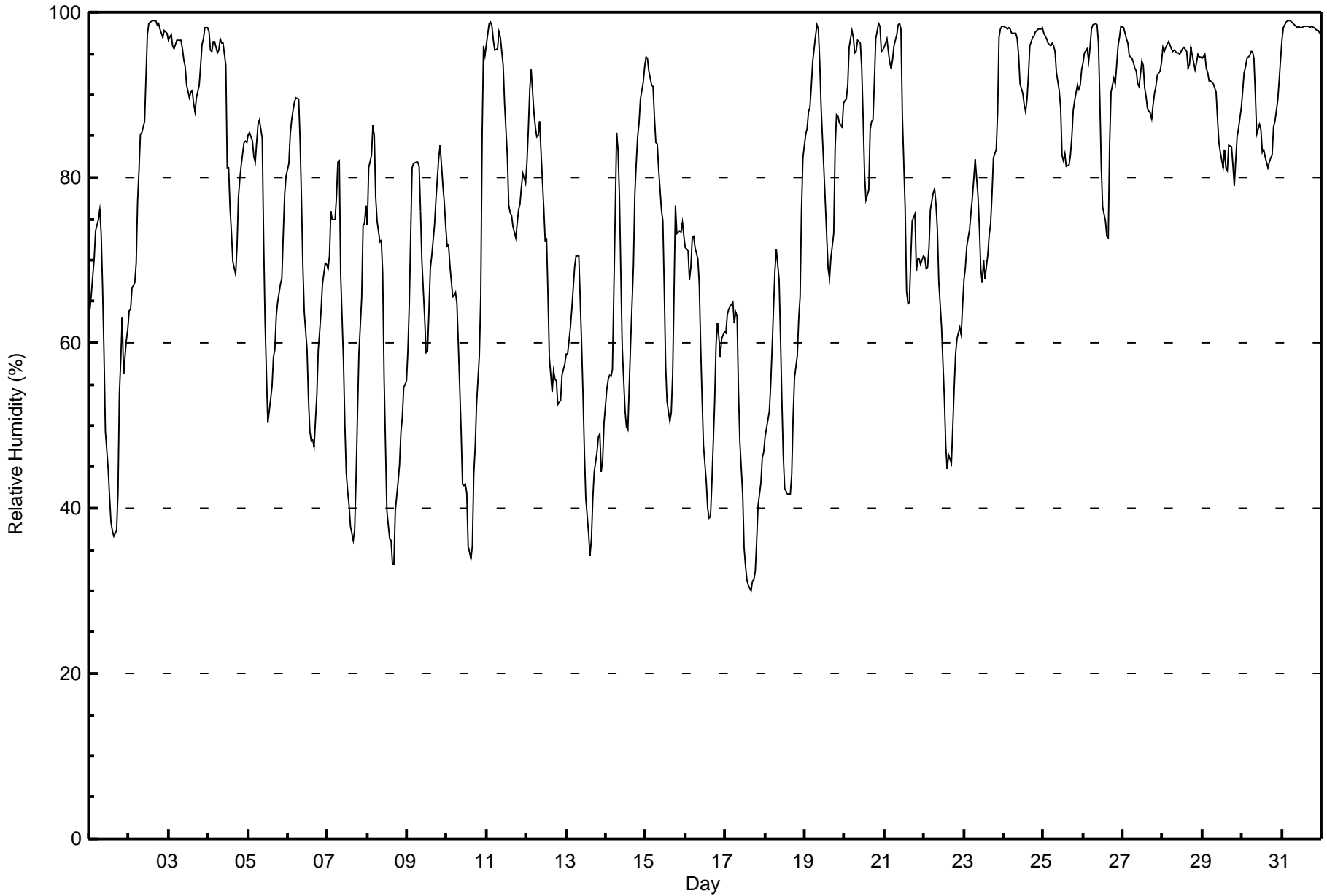


Maximum Value: 99 % on Oct 31 05:00																	Maximum Daily Average: 98.2 % on Oct 31																	Hours in Service: 744								
Minimum Value: 30 % on Oct 17 16:00																	Minimum Daily Average: 46.6 % on Oct 17																	Hours of Data: 744								
Maximum Diurnal Average: 86.0 % at hour 7																	Minimum Diurnal Average: 64.0 % at hour 15																	Hours of Missing Data: 0								
Monthly Average: 76.5 %																	Percentiles: P <sub>1</sub> = 33 P <sub>10</sub> = 48 Q <sub>1</sub> = 64 Median = 81 Q <sub>3</sub> = 94 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	64	66	68	70	74	75	76	73	67	59	49	45	41	38	37	37	37	42	54	58	63	56	60	62	57.2	76																
2-Oct	64	64	67	67	70	77	81	85	85	87	92	97	99	99	99	99	99	98	99	98	97	98	98	97	88.2	99																
3-Oct	97	97	96	96	96	97	97	97	96	94	93	91	90	90	91	89	88	90	91	94	96	97	98	98	94.0	98																
4-Oct	98	95	95	96	96	95	96	97	96	96	93	81	81	76	73	70	68	72	78	80	81	84	84	84	86.2	98																
5-Oct	85	85	84	82	82	84	86	87	85	72	63	56	50	53	55	58	59	63	65	67	68	73	78	80	71.8	87																
6-Oct	82	85	87	88	89	90	89	85	77	69	64	59	53	49	48	48	47	54	59	61	64	67	70	69	69.0	90																
7-Oct	69	70	76	75	75	78	82	82	68	58	50	44	42	40	38	36	37	44	51	59	65	74	74	77	61.1	82																
8-Oct	74	81	83	86	85	78	75	72	72	68	56	48	40	36	36	33	33	40	43	45	49	51	55	55	58.1	86																
9-Oct	59	65	73	81	82	82	82	81	76	70	63	59	59	64	69	70	74	77	80	82	84	79	77	74	73.4	84																
10-Oct	72	72	69	66	66	66	65	60	49	43	43	43	42	35	34	35	44	47	53	58	66	85	96	95	58.5	96																
11-Oct	96	99	99	98	97	96	96	98	97	95	94	89	83	77	76	75	74	73	74	76	77	79	81	79	86.5	99																
12-Oct	82	86	91	93	88	86	85	85	87	83	76	72	73	66	58	54	57	56	55	53	53	56	57	58	71.2	93																
13-Oct	59	59	62	64	67	69	71	70	65	60	54	47	41	37	34	36	41	44	47	49	49	44	46	50	52.7	71																
14-Oct	54	56	56	56	57	76	85	83	78	68	60	52	50	50	55	60	69	78	82	85	87	90	92	93	69.6	93																
15-Oct	95	94	93	91	91	87	84	84	81	76	75	67	57	53	51	52	56	66	77	73	74	73	75	73	74.9	95																
16-Oct	72	71	68	69	73	73	71	70	67	60	53	48	43	40	39	39	43	53	60	62	61	58	61	61	59.0	73																
17-Oct	61	63	64	64	65	62	64	63	54	48	42	35	33	31	31	30	31	31	32	36	40	43	46	47	46.6	65																
18-Oct	49	50	52	55	59	64	69	71	68	61	53	46	42	42	42	44	51	56	59	63	66	76	82	82	56.7	82																
19-Oct	85	86	88	88	91	94	97	98	98	94	88	81	77	73	69	68	70	73	83	88	87	87	86	89	85.0	98																
20-Oct	89	89	91	96	98	97	95	95	97	96	93	87	80	77	79	86	87	87	92	97	99	98	95	95	91.5	99																
21-Oct	96	97	95	94	93	94	96	97	98	99	98	88	76	66	65	65	70	75	76	69	70	70	70	70	82.8	99																
22-Oct	70	69	69	71	76	78	79	77	74	67	62	57	53	47	45	46	45	50	55	59	60	62	61	65	62.4	79																
23-Oct	68	69	72	74	76	78	80	82	78	74	69	67	70	68	71	73	74	78	82	83	88	97	98	98	77.8	98																
24-Oct	98	98	98	98	98	98	97	97	97	95	91	90	89	88	89	92	96	97	97	98	98	98	98	98	98	95.6	98															
25-Oct	98	97	97	96	96	96	96	95	93	91	88	83	82	83	81	81	83	85	88	89	91	91	91	93	90.2	98																
26-Oct	94	95	96	94	96	98	98	99	99	96	89	81	76	75	73	73	84	90	92	91	94	96	97	98	90.6	99																
27-Oct	98	97	97	96	95	94	94	93	93	91	91	94	93	91	90	88	88	87	89	90	91	92	93	94	92.5	98																
28-Oct	96	95	96	96	96	96	95	95	95	95	95	95	96	96	95	93	94	96	95	93	94	95	95	95	95.0	96																
29-Oct	94	95	93	93	92	92	91	91	90	87	84	83	81	83	81	81	84	84	81	79	82	85	86	89	86.7	95																
30-Oct	90	93	93	94	95	95	95	94	90	85	86	86	83	83	83	81	82	82	83	86	87	89	92	94	88.5	95																
31-Oct	97	98	99	99	99	99	99	99	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	97	98.2	99																
																	80.8	81.9	82.8	83.5	84.2	85.2	86.0	85.7	82.8	78.6	74.4	70.0	66.9	64.7	64.0	64.2	66.4	69.7	73.1	74.7	76.6	78.4	80.0	81.0	Diurnal Average	
																	98	99	99	99	99	99	99	99	99	99	98	98	99	99	99	99	99	99	98	99	98	99	98	98	Diurnal Maximum	



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

**Relative Humidity (RH) - %**  
**Firebag - October 2015**







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

**Relative Humidity (RH) - %**  
**Firebag - October 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	31	4.17	4.17
40 - 60	129	17.34	21.51
60 - 80	203	27.28	48.79
80 - 100	381	51.21	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

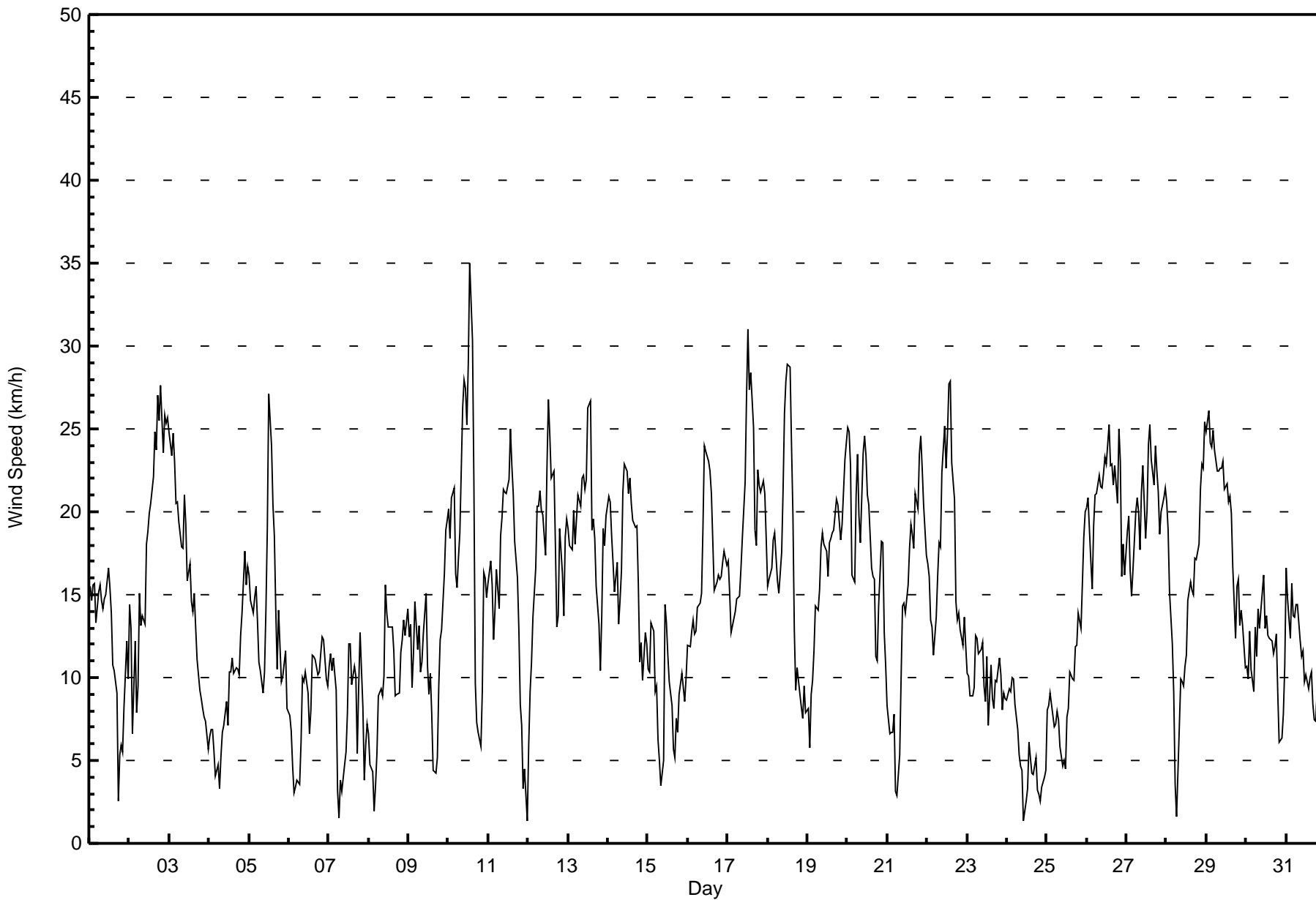


Maximum Speed: 35 km/h on Oct 10 14:00	Maximum Daily Speed Average: 19.9 km/h on Oct 27	Hours in Service: 744
Minimum Speed Value: 1 km/h on Oct 24 11:00	Minimum Daily Speed Average: 1.8 km/h on Oct 7	Hours of Data: 744
Maximum Diurnal Speed Average: 8.8 km/h at hour 12	Minimum Diurnal Speed Average: 1.8 km/h at hour 20	Hours of Missing Data: 0
Monthly Average Velocity: 4.4 km/h 235.7 deg	Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 6 Q <sub>1</sub> = 10 Median = 14 Q <sub>3</sub> = 19 P <sub>90</sub> = 23 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	SSW16	SSW15	SSW16	SSW16	SSW13	SSW15	SSW16	SSW15	SSW14	SSW15	SSW15	SW17WSW15	SW14WSW11	SW10	SW9	W3	SE5	ESE6	ESE6	SSE8	S12	S10	SSW10.7	SW17		
2-Oct	S14	S13	S7	S12	SSE8	NNE10	NE15	NE13	NNE14	N13	N18	NNE19	N20	N21	N22	N25	N24	N27	N26	N28	N24	N26	N25	N26	N13.6	N28
3-Oct	N25	N23	N25	N23	N21	N21	N19	N18	N18	N21	N19	N16	N17	N15	N14	N15	N13	N11	N9	N9	N8	NNE8	NE7	NE6	N15.6	N25
4-Oct	NNE6	NNE7	NNE7	NNE6	NNE4	NNW5	W3	SW5	SSW7	SSW7	SSW9	SW7	W10WSW10	W11WSW10WSW11	SSW10	SSW10	S13	S14	S18	S16	S17	SW5.4	S18			
5-Oct	S16	S15	S14	SSW15	SW16	SW13WSW11	WSW10	WSW9WNW10WNW14WNW19	NW27	NNW24	NNW20	NNW19	NNW14	NNW11	NW14	NW10	NW10	NW11	N11	N12	NNW8	WNW8.3	NW27			
6-Oct	NW8	NNW7	NW5	WNW3	SSW3	S4	S4	S6	S10	SSE10	S10	SSW9	SW7	SW8	SW11	S11	S11	S10	SSE10	SE11	SSE12	SSE12	SSE10	SE10	S6.2	SSE12
7-Oct	SE11	SE11	SE10	SSE11	SSE9	S3	E1	SSE4	SW3	W5	W6	WNW8WNW12WNW12	NW10	W11WSW10	WSW5	NW9	NNE13	NNE8	NE4	N6	N7	W1.8	NNE13			
8-Oct	NNE7	NE5	E4	ESE2	SSE3	SSE5	S9	S9	S9	SSW10	SW16	SW14	SSW13	SSW13	SSW13	SSW12	S9	SSE9	SE9	SE11	SE12	SE13	SSE13	SSE14	S7.5	SW16
9-Oct	SSE12	SE13	SSE9	SSE11	SSE15	S12	S13	S10	SW11	SW13WSW15	W11	WNW9	NW10	N8	N4	NE4	ESE5	SE9	SSE12	S13	S16	S19	S20	S7.2	S20	
10-Oct	SSW20	SSW18	SSW21	SW21	SW16	SW15WSW17	WSW19WSW26	W28WSW27	WSW25WSW29	W35	W30	W22	NW10	W7	NW7	N6	NNW9	NNE16	NNE16	NE15	WSW13.1	W35				
11-Oct	NNE16	NNE17	NNE16	NNE12	NNE14	NNE17	N14	N19	N20	NNW21	NNW21	NNW21	NNW22	NNW25	NNW23	NNW21	NNW18	NNW16	NNW13	NNW8	N7	NNW3	W4	WNW1	N14.0	NNW25
12-Oct	SSW6	S9	S11	S14	S17	S20	S20	S21	S20	S20	SSW17	SSW23	SSW27	SW25	SW22WSW22	SW18	W13	W14	W19	W16	W14WSW18WSW20	SW14.5	SSW27			
13-Oct	WSW19WSW18WSW18WSW20WSW18WSW20WSW21WSW20	W22	W22	W21	W22WSW26	W27WNW19	W20	W18	W16	W13	W10WSW14WSW19WSW18WSW20	W18.8	W27													
14-Oct	WSW21WSW21WSW19	SW17WSW15	W17WSW13WSW15	W16	W21WNW23WNW22	NW21	NNW22	NNW21	N19	N19	N19	N16	N11	N12	NNW10	NNW13	NW12	WNW12.7	WNW23							
15-Oct	NW10	NW10	NW13	NNW15	NNW9	N10	NNE6	NNE5	SE3	SSW5WSW14	W13WNW11WNW10	NNW8	NW6	N5	ENE8	E7	ESE9	SE10	SE9	ESE9	SE10	NNW2.6	WSW14			
16-Oct	SE12	SE12	SSE13	SSE13	SE13	SSE13	SSE14	SSE15	SSE15	SSE19	S24	S24	S23	S22	S21	SSE18	SSE15	SE16	SE16	SE16	SSE16	SSE17	S18	S17	SSE16.4	S24
17-Oct	S17	S15	S13	S13	S14	S15	S15	S15	S16	S18	SSW22	SSW27	SSW31	SSW27	SSW28	SSW25	SSW19	SSW18	SW23	SW22	SW21	SW22	SW21	SW18	SSW19.2	SSW31
18-Oct	SW16	SW16WSW17WSW18WSW19	W17	W16WSW15	W18	W21	W26WNW28WNW29WNW29	NW24	NW20WNW13	WNW9WNW11	WNW9	WNW8	NNW8	NNE10	NE8	W14.1	WNW29									
19-Oct	ENE8	NE6	ENE9	E10	E12	E14	ESE14	ESE15	ESE18	ESE19	ESE18	SE18	SE16	SE18	SE18	SSE19	SSE19	SE21	SE20	SE19	SE18	SE19	SE23	SSE24	SE15.3	SSE24
20-Oct	SSE25	S25	S23	SSW16WSW16	W21	W24	W20WSW18WSW24	W25	W23WNW21	NW20	NW17	NW16	NW16	NW11	NW11	N14	N18	N18	N13	N11	W11.0	SSE25				
21-Oct	NNW8	NNW7	N7	NNW7	NW8	NW3	W3	S5	S10	SSE14	SSE14	SSE14	SSE16	SSE18	SSE19	SSE19	SSE18	SSE21	SSE20	SSE24	S25	S23	S20	S17	SSE10.6	S25
22-Oct	SSW17	SSW16	SSW13	SSW13	SW11	SW14	SW16	SW18	SW18WSW22WSW25WSW23WSW25WSW28WSW28	W23	W21	W15WSW14WSW14WSW13WSW12	W14	W12	WSW16.5	WSW28										
23-Oct	W10	W10	WSW9	WSW9	SW9	SW13	SW12	SW11WSW12WSW12WNW10	WNW9	N11	NNW7	N11	NNE9	NNE8	NE10	NNE10	NE11	NNE10	NNE8	NNE9	NNE9	NW3.7	SW13			
24-Oct	NE9	NNE9	NE9	NNE10	NNE10	NNE8	NNE7	NE5	NNE5	ENE4	S1	SW3	W3	W6	WSW5	NW4	NNW4	NE5	NE3	NE3	NE3	N3	NNE4	NNE4	NNE3.8	NNE10
25-Oct	NE8	NE8	NE9	NE8	NE7	NE7	NE8	ENE7	ENE6	E5	ESE5	SSW5	SW8	SSW8	S10	SSW10	SSW10	SSW12	SSW12	SSW14	S13	S16	S19	S20	SSE4.4	S20
26-Oct	S20	S21	SSE17	SSE15	SSE19	SSE21	SSE21	SSE22	SSE22	SSE21	SSE22	SSE23	SSE23	SSE25	SSE23	SSE23	SSE22	SSE23	SSE21	SSE25	S23	SSW16WNW18	NW16	SSE18.1	SSE25	
27-Oct	NW19	NW20	NW16WNW15WNW17WNW20	NW21	NW20	NW18	NW21	NW23	NW18	NW20	NNW24	NNW25	NNW23	NNW22	NNW24	NNW22	NNW21	NNW19	NNW20	NNW21	NNW21	NW19.9	NNW25			
28-Oct	N21	N19	N15	N12	N9	NW4	NE2	SW4	SSW10	SSW10	SSW10	SSW11	SSW11	S15	S16	SSE15	SSE15	SSE17	SSE17	SSE18	S21	S23	S23	S25	S7.1	S25
29-Oct	S25	S26	S24	S24	S25	S24	S22	S22	S23	SSW23	SSW23	SSW21	SW22	SSW21	SSW21	SW20	SSW17	SSW12	SW15	SW16	SW13	SW14	SW13	SW11	SSW18.8	S26
30-Oct	SW11	SW10	SW13	SW11	SW9	SW13	SW11	SW14	SW13	SW14	SW16	SSW13	SSW14	SSW13	SSW12	SSW12	SSW11	SSW12	SW13	W9	W6	WNW6	NNW8	N11	SW9.6	SW16
31-Oct	N17	NNW15	NNW12	NNW16	NNW14	NNW14	NNW14	N14	N12	NNW11	NW12	NNW10	N10	N9	NNE10	NNE10	NNE8	NNE7	NNE7	NNE11	NE8	NNE7	NNE6	NNE8	N10.2	N17

SSW3.6SSW3.5	SW3.5	SW4.2	SW4.4	SW4.4	SW4.4	SW4.6	SW5.4	SW6.1	SW7.3	WSW8.6	WSW8.8	WSW8.6	W8.3	W6.4	W5.4	WSW3.8	WSW1.9	SW1.8	SSW1.8	SSW2.4	SSW2.6	SW2.6	SSW2.5	Diurnal Average
SSE25	S26	N25	S24	S25	S24	W24	S22	WSW26	W28	WSW27	WNW28	SSW31	W35	W30	SSW25	N24	N27	N26	N28	S25	N26	N25	N26	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**  
**Firebag - October 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	58	7.80	7.80
6 - 11	214	28.76	36.56
12 - 19	290	38.98	75.54
20 - 28	176	23.66	99.19
29 - 38	6	0.81	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  
Firebag - October 2015**

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	6	9	1	3	3	2	3	5	3	4	2	6	2	4	3	58
6 - 11	20	31	16	5	2	4	11	11	15	19	16	10	11	13	14	16	214
12 - 19	30	11	3	0	2	5	16	36	37	37	31	30	17	9	12	14	290
20 - 28	21	0	0	0	0	0	3	20	33	14	10	20	18	5	11	21	176
29 - 38	0	0	0	0	0	0	0	0	0	1	0	1	2	2	0	0	6
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	73	48	28	6	7	12	32	70	90	74	61	63	54	31	41	54	744

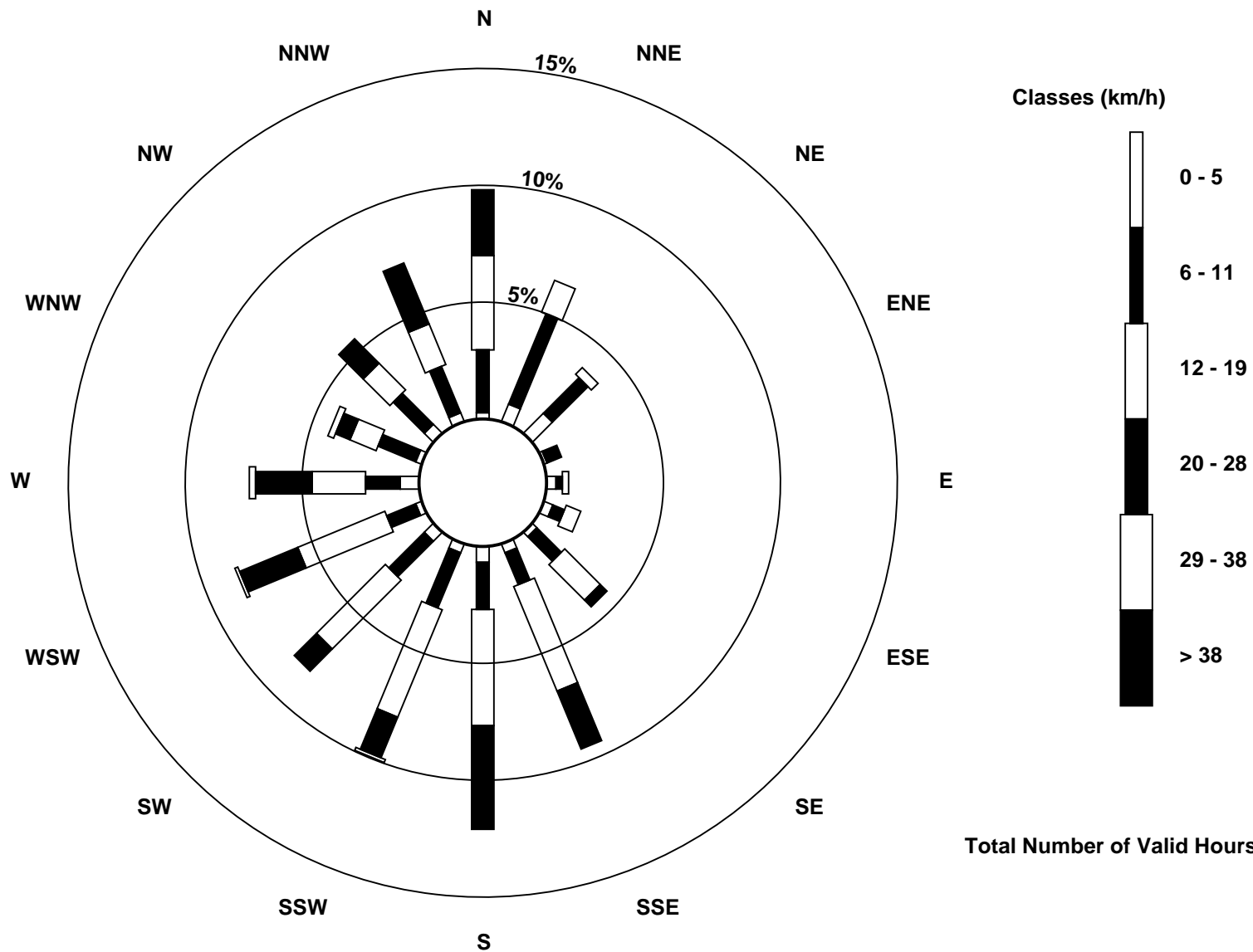
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Wind Speed (WS) - km/h  
Firebag (AMS 19)





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Firebag - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Oct 10 14:00 Minimum Value: 1 km/h on Oct 24 19:00 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> = 4 P <sub>99</sub> = 6																	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	2	2	2	1	2	2	2	2	2	3	3	3	3	3	3	2	3	2	2	3	1	2	2	3
2-Oct	4	2	2	2	3	5	3	3	3	4	3	4	4	5	4	5	5	6	6	6	5	5	5	6	6
3-Oct	6	5	4	7	5	4	4	3	4	4	4	3	3	3	3	3	3	2	2	2	2	2	1	1	7
4-Oct	2	2	2	2	1	1	1	2	1	2	2	3	2	3	2	2	1	1	1	2	3	3	3	3	3
5-Oct	2	2	2	2	2	2	2	2	2	3	3	5	7	5	4	4	3	2	4	2	2	2	3	1	7
6-Oct	1	1	1	1	1	1	1	2	1	2	3	3	4	4	3	3	3	2	2	2	2	2	2	1	4
7-Oct	2	2	2	1	2	2	1	1	2	1	2	3	3	3	3	3	2	2	3	2	1	1	2	2	3
8-Oct	1	1	1	1	1	2	1	1	1	2	3	3	3	3	3	3	2	1	1	2	2	2	2	2	3
9-Oct	2	2	3	3	2	2	3	1	2	2	3	3	2	2	2	1	1	2	2	2	2	3	2	3	3
10-Oct	2	2	3	4	3	2	3	3	5	6	6	6	6	8	7	8	2	1	2	3	4	3	3	3	8
11-Oct	3	4	3	2	3	3	3	4	5	4	5	4	5	6	5	4	4	3	2	2	2	1	1	2	6
12-Oct	1	1	1	2	3	3	3	3	4	3	4	4	4	5	5	4	4	4	3	2	4	3	2	3	5
13-Oct	3	3	2	3	3	4	3	3	4	4	4	4	5	6	5	7	4	3	2	2	4	3	3	4	7
14-Oct	3	3	3	2	4	5	2	3	3	4	5	5	5	5	4	4	4	4	3	2	2	2	2	3	5
15-Oct	2	2	3	3	2	2	2	1	1	2	3	3	3	3	3	2	2	1	2	1	1	2	1	2	3
16-Oct	2	2	2	2	2	2	2	3	3	3	4	4	4	3	3	3	4	3	3	3	3	3	2	2	4
17-Oct	2	2	2	2	2	2	2	2	3	3	3	4	5	5	5	4	3	3	3	3	3	3	3	3	5
18-Oct	2	2	3	3	3	3	2	2	4	4	6	6	6	7	6	5	4	1	1	1	1	1	1	1	7
19-Oct	1	1	2	2	2	2	3	3	3	3	3	4	3	3	4	4	4	4	4	3	3	4	4	4	4
20-Oct	4	4	3	3	3	4	6	4	4	5	5	5	5	4	3	4	3	2	2	3	4	3	3	2	6
21-Oct	2	2	1	2	2	2	2	2	3	2	2	2	3	3	3	3	4	4	4	5	4	4	3	2	5
22-Oct	2	2	2	2	2	2	2	2	3	4	4	4	4	5	5	6	4	3	2	2	2	3	3	3	6
23-Oct	2	1	1	1	1	2	2	1	2	2	2	3	3	2	2	2	2	3	2	2	2	2	2	2	3
24-Oct	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
25-Oct	1	1	2	2	1	1	1	2	1	1	1	2	2	3	2	2	2	2	1	2	2	2	3	4	4
26-Oct	3	4	3	2	3	3	4	4	3	4	4	4	5	5	4	4	4	4	4	5	4	4	5	3	5
27-Oct	4	4	4	8	8	4	4	4	4	6	6	4	4	5	6	4	4	5	5	5	4	4	4	4	8
28-Oct	4	4	3	2	2	2	1	2	2	2	2	2	2	2	3	2	3	3	3	3	3	3	3	4	4
29-Oct	4	4	4	3	4	3	3	3	4	3	4	4	3	3	3	3	2	2	3	2	2	2	2	1	4
30-Oct	1	2	2	2	2	2	1	2	2	2	3	1	2	2	1	2	1	1	2	1	1	1	1	2	3
31-Oct	4	4	3	3	2	3	3	3	2	2	2	2	2	2	2	2	2	1	1	2	2	2	2	2	4
																	6 5 4 8 8 5 6 4 5 6 6 6 7 8 7 8 5 6 6 6 5 5 5 6								
Diurnal Maximum																									



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg**

**Firebag - October 2015**

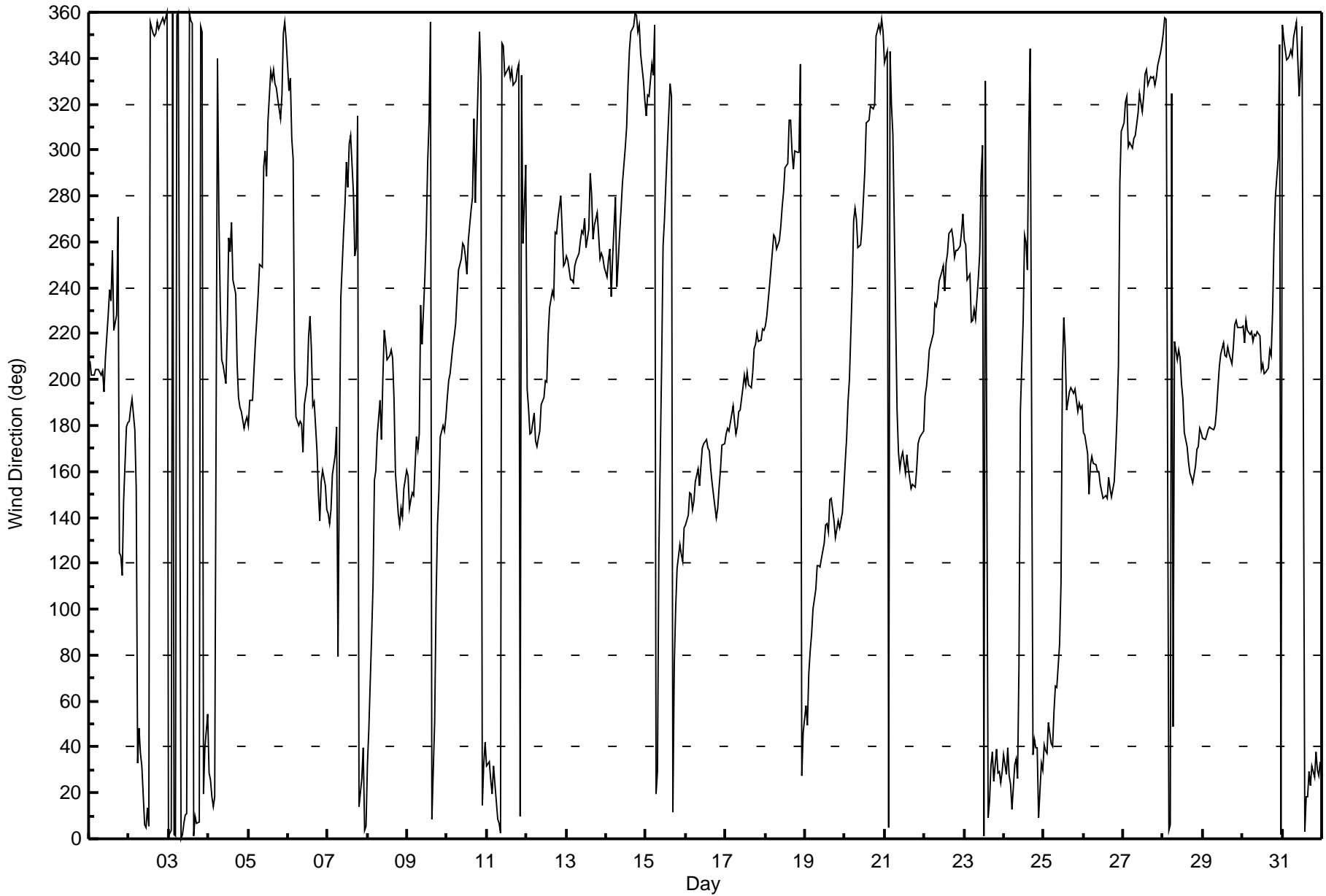
Direction of Maximum Speed: 260 deg on Oct 10 14:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 323.5 deg on Oct 27	Hours of Data: 744
Direction of Minimum Speed: 186 deg on Oct 24 11:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 1.8 deg on Oct 7	Percent Operational Time: 100.0
Monthly Average Direction: 257.6 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	208	202	202	202	205	205	203	202	204	195	209	228	239	234	256	222	228	271	124	123	115	147	179	181	205.3
2-Oct	182	187	191	178	153	33	48	38	32	6	5	13	6	356	351	350	351	356	353	355	357	355	358	360	2.8
3-Oct	1	4	359	2	1	359	360	0	2	7	11	11	359	356	355	2	10	7	7	354	351	19	40	54	3.7
4-Oct	28	25	18	14	18	340	271	232	209	206	198	223	262	256	268	243	238	207	192	188	186	179	182	183	214.4
5-Oct	180	191	191	204	216	226	237	250	249	293	299	289	313	334	331	335	329	327	322	314	324	351	356	348	292.5
6-Oct	326	331	305	296	205	184	180	182	180	168	189	198	219	227	214	188	190	169	151	139	156	160	153	143	181.8
7-Oct	141	137	143	159	167	179	80	166	236	264	277	295	284	303	306	281	254	257	315	14	26	40	4	5	278.5
8-Oct	32	48	89	110	156	161	176	191	174	200	222	216	209	211	213	210	191	159	142	137	144	140	152	161	176.9
9-Oct	158	144	148	151	150	175	169	176	233	216	244	265	295	312	356	8	51	104	136	151	175	180	177	184	180.0
10-Oct	192	199	203	215	219	224	237	248	252	259	258	253	246	260	274	279	314	277	306	352	331	15	32	42	254.0
11-Oct	32	33	26	20	32	24	9	7	3	347	345	332	335	336	331	335	328	330	335	338	9	332	259	293	352.5
12-Oct	196	187	176	177	186	173	171	174	178	189	192	200	199	219	231	239	236	264	264	271	280	265	250	251	214.1
13-Oct	254	252	243	243	242	249	252	255	260	265	263	270	257	265	290	281	261	267	273	263	252	255	253	249	259.0
14-Oct	245	252	257	236	253	280	240	252	264	274	285	301	310	329	343	352	354	359	358	352	355	342	330	322	300.2
15-Oct	315	324	324	337	333	355	20	29	125	207	258	270	286	301	329	324	11	76	100	118	128	124	121	135	333.3
16-Oct	137	141	151	150	144	147	156	161	154	162	170	172	174	170	169	161	155	145	140	144	153	161	171	172	158.7
17-Oct	176	179	178	181	189	182	176	179	186	187	196	202	198	203	198	196	203	213	215	220	217	217	222	222	199.4
18-Oct	223	228	241	248	256	263	262	257	261	267	275	282	292	294	313	313	299	291	300	299	299	337	28	47	278.8
19-Oct	58	50	72	82	89	100	109	119	119	119	122	129	137	137	134	148	149	139	131	135	139	136	142	153	126.9
20-Oct	164	174	190	200	240	269	275	270	258	258	267	279	291	312	313	319	319	318	319	349	355	351	357	351	280.5
21-Oct	338	343	5	343	319	307	268	187	169	161	166	168	159	167	161	157	153	154	153	161	172	175	176	178	166.4
22-Oct	193	197	204	213	215	221	233	232	236	243	247	250	239	251	255	264	266	261	253	257	256	258	264	272	242.5
23-Oct	260	259	243	246	225	226	230	226	244	255	289	302	1	330	9	16	32	38	25	39	29	29	25	29	309.8
24-Oct	37	28	40	27	24	13	32	35	26	76	186	226	263	260	248	307	344	37	43	39	40	9	33	30	20.7
25-Oct	41	39	37	51	42	40	55	66	66	85	111	204	227	213	186	195	196	195	194	196	186	190	188	189	167.9
26-Oct	177	176	168	150	163	166	163	163	160	160	154	151	148	149	148	157	153	149	156	168	184	207	286	308	164.6
27-Oct	312	321	324	302	303	301	305	306	311	316	325	316	323	333	335	328	332	331	332	328	331	337	343	346	323.5
28-Oct	351	358	357	3	6	325	49	217	209	213	209	198	192	177	171	164	159	157	155	162	169	171	179	177	175.1
29-Oct	174	174	175	178	179	179	178	180	186	197	205	211	216	210	210	214	211	207	214	224	226	223	222	223	197.3
30-Oct	224	216	226	221	220	221	216	220	219	221	219	204	207	202	203	205	213	211	229	259	279	297	346	2	223.0
31-Oct	354	348	339	340	341	344	341	349	356	339	324	336	354	3	18	18	29	23	32	27	38	30	27	33	358.0

208.2 208.6 214.3 214.3 216.9 230.9 222.8 221.1 223.8 233.9 243.8 247.5 254.4 262.0 268.1 264.6 257.7 238.0 229.4 209.7 209.2 207.4 217.5 209.7  
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

Firebag - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 90 deg on Oct 24 11:00 Minimum Value: 5 deg on Oct 1 04:00 Percentiles: P <sub>1</sub> = 7 P <sub>10</sub> = 8 Q <sub>1</sub> = 9 Median = 11 Q <sub>3</sub> = 15 P <sub>90</sub> = 21 P <sub>99</sub> = 57																		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	9	7	6	5	7	6	7	7	8	11	13	14	17	21	21	20	16	51	14	10	20	12	10	15	51
2-Oct	10	11	11	8	15	51	10	11	12	17	15	15	14	14	12	15	15	15	14	14	15	14	15	16	51
3-Oct	15	15	15	16	15	15	15	15	15	13	14	14	15	16	14	14	12	15	14	12	13	15	14	17	17
4-Oct	20	20	22	26	29	15	57	37	25	24	25	40	19	21	20	20	14	9	11	8	8	8	8	8	57
5-Oct	8	10	6	9	9	9	11	9	9	19	18	16	16	12	14	12	11	11	12	11	11	19	12	13	19
6-Oct	9	13	20	31	28	12	14	10	9	15	22	27	50	61	22	23	13	10	10	11	10	9	9	10	61
7-Oct	10	10	11	8	10	76	59	14	40	32	41	30	19	20	29	24	12	17	19	10	8	16	12	9	76
8-Oct	15	9	19	39	19	9	7	9	7	11	10	14	17	20	17	19	18	7	16	11	9	10	11	8	39
9-Oct	9	10	14	9	10	9	9	7	21	17	15	19	25	19	17	25	19	18	13	9	10	11	8	9	25
10-Oct	8	7	7	9	9	8	9	8	10	11	13	12	12	13	12	31	15	10	25	36	25	10	12	13	36
11-Oct	13	11	12	11	11	11	13	14	13	13	13	12	11	12	12	11	11	10	11	14	17	40	23	68	68
12-Oct	10	13	8	14	10	9	8	8	8	9	13	11	11	12	17	12	11	11	9	13	13	11	8	9	17
13-Oct	8	9	8	8	10	12	9	9	10	10	12	13	12	13	14	12	13	9	8	10	8	9	9	10	14
14-Oct	8	8	9	10	22	23	8	10	11	11	13	17	16	19	13	13	15	13	13	12	14	15	13	15	23
15-Oct	12	11	11	11	11	14	15	21	30	34	15	21	26	28	38	38	26	17	12	16	8	8	10	10	38
16-Oct	10	10	11	12	10	9	9	10	10	11	9	11	11	10	11	12	14	10	10	10	10	9	8	8	14
17-Oct	8	8	8	7	7	9	8	7	7	7	9	9	9	9	9	8	11	8	9	8	8	8	8	11	11
18-Oct	9	10	8	9	10	9	9	9	11	11	14	14	13	13	17	14	11	7	7	8	6	29	12	11	29
19-Oct	14	21	11	11	11	9	15	10	10	10	13	13	14	12	13	13	11	11	11	11	11	12	10	10	21
20-Oct	11	9	9	11	18	11	10	11	11	10	11	11	14	12	12	11	11	10	10	18	14	12	13	12	18
21-Oct	12	13	14	15	24	47	61	48	20	11	13	12	12	11	12	10	10	10	10	10	9	9	8	9	61
22-Oct	9	7	7	8	8	8	8	8	9	10	10	12	12	11	13	12	10	9	6	8	7	14	9	17	17
23-Oct	10	11	8	10	9	7	8	7	11	10	19	21	20	31	13	11	11	12	10	11	12	11	12	13	31
24-Oct	15	13	10	12	11	11	19	23	25	25	90	32	44	23	28	22	19	24	16	25	17	25	16	90	
25-Oct	9	10	10	9	13	11	11	14	14	25	25	33	25	27	14	13	10	9	7	8	9	7	8	9	33
26-Oct	9	8	9	10	9	9	9	10	9	10	11	12	11	11	11	11	10	10	11	10	11	17	20	11	20
27-Oct	12	15	18	11	10	11	11	10	11	13	12	11	11	12	11	11	11	11	12	12	12	11	12	11	18
28-Oct	13	14	13	14	18	49	89	53	15	18	18	15	14	11	11	9	10	9	9	10	8	8	8	8	89
29-Oct	8	8	9	9	9	9	9	8	10	8	9	9	9	9	9	8	9	9	10	8	8	7	7	7	10
30-Oct	7	8	7	9	9	7	8	7	8	8	8	8	8	7	7	9	9	8	14	11	13	17	10	12	17
31-Oct	11	13	11	10	10	11	10	10	11	13	13	15	15	16	16	13	12	12	20	13	12	18	23	14	23
Diurnal Maximum																									
20 21 22 39 29 76 89 53 40 34 90 40 50 61 38 38 26 51 25 36 25 40 25 68																									



# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	October 6, 2015	Last Calibration	September 11, 2015
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	13:35
Gas Cert Reference	SA130123A	Station temp.	22 Deg C
Cal Gas Concentration	49.3 ppm	Cal Gas Exp Date	12/12/2016
Calibrator Make/Model	API T700	Serial Number	996
ZAG Make/Model	API 701	Serial Number	4891
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9037

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-606	-605
Analyzer IP address	192.168.1.43		Lamp voltage	787	792
Calculated slope	0.998337	0.992920	Chamber temp	45.0	45.0
Calculated intercept	-0.434052	-0.517010	Pressure	679.8	695.6
Analyzer Background	8.0	7.9	Flow	0.445	0.454
Analyzer Coefficient	0.960	0.960	Intensity	90	90

Analyzer make Thermo 43i Analyzer serial # 1410661308

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.4	----
as found span	5000	58.3	574.8	576.2	0.998
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	58.3	574.8	578.9	0.993
second point	5000	29.2	287.9	291.6	0.987
third point	5000	14.7	144.9	146.6	0.989
as left zero	5000	0.0	0.0	-0.1	----
as left span	5000	58.3	574.8	575.8	0.998
Average Correction Factor					0.990

Corrected As found 576.5 Previous response 576.2 % change -0.1%

**Notes:**

Sample inlet filter changed after as founds. No adjustments made.

Calibration Performed By:

Devin Russell



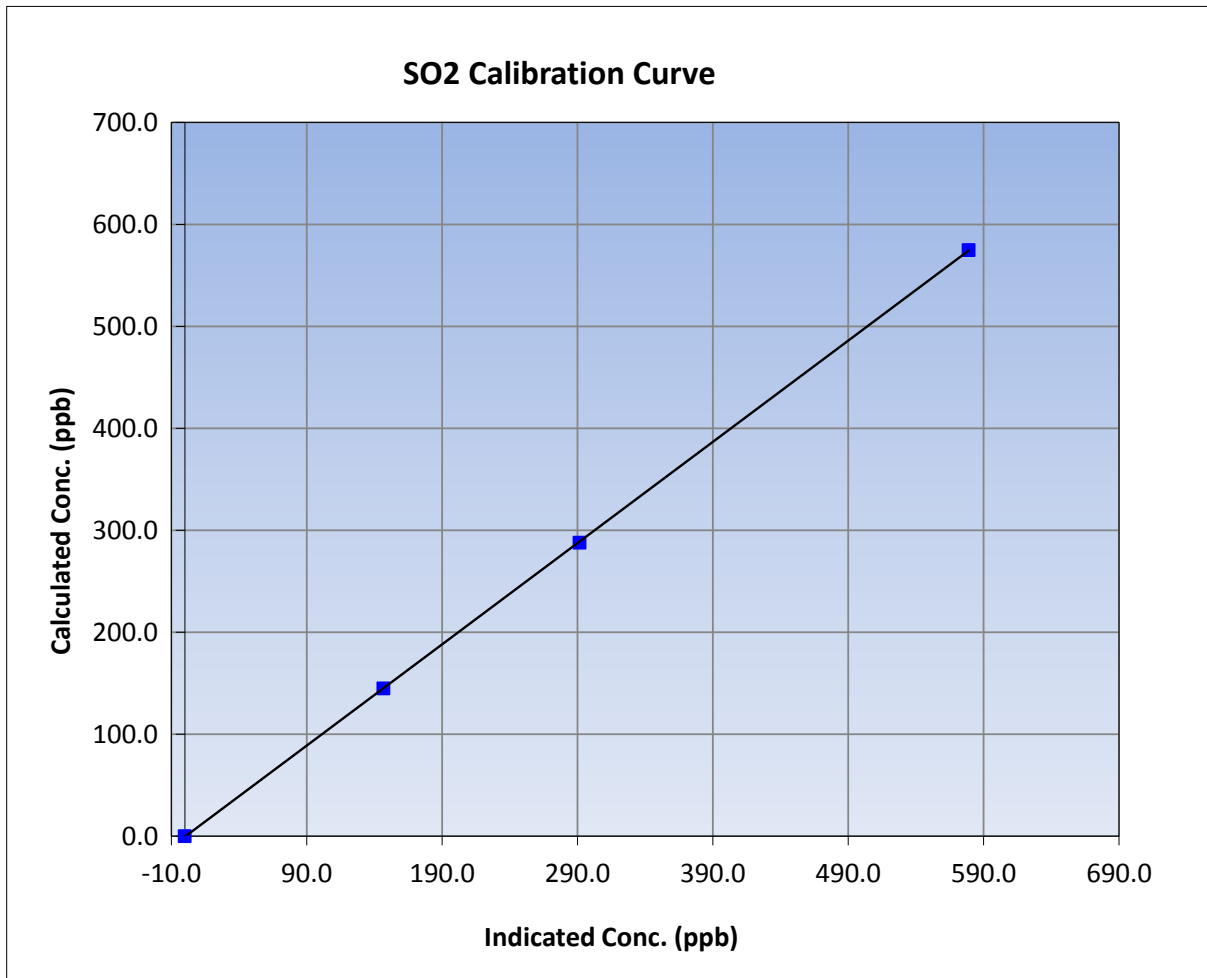
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	October 6, 2015	Previous Calibration	September 11, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:00	End Time (MST)	13:35
Analyzer make	Thermo 43i	Analyzer serial #	1410661308

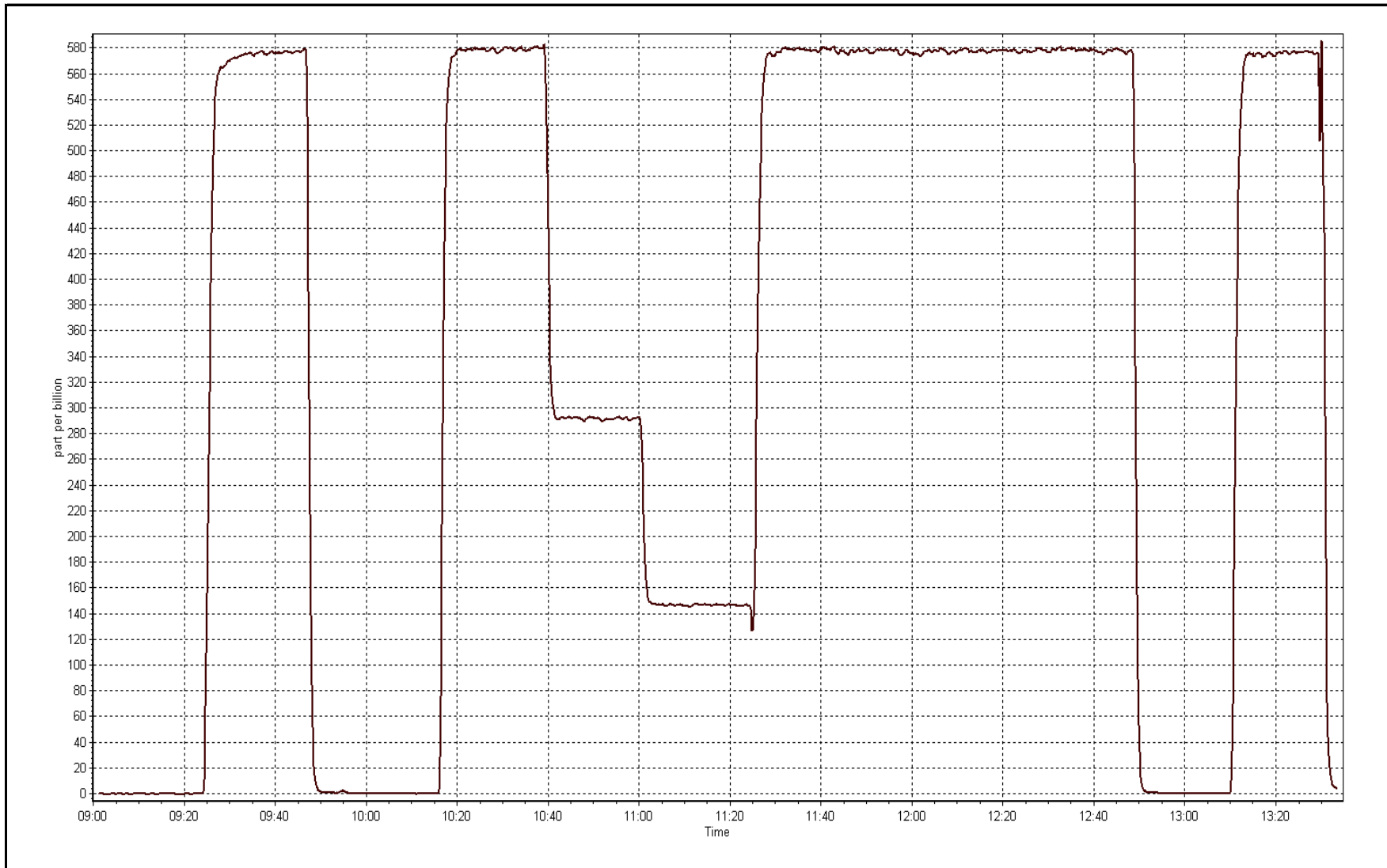
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999990
574.8	578.9	0.9930		
287.9	291.6	0.9875	Slope	0.992920
144.9	146.6	0.9887		
			Intercept	-0.517010



SO2 Calibration Plot

Date: October 6, 2015





# Wood Buffalo Environmental Association H2S Calibration Report

W B E A

### Station Information

Calibration Date	October 28, 2015	Last Calibration	September 8, 2015	
Station Name	Firebag	Station Number	AMS 19	
Reason:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Routine</td> </tr> </table>			Routine
Routine				
Start Time (MST)	12:05	End Time (MST)	15:15	
Gas Cert Reference	ALM066720	Station temp.	22 Deg C	
Cal Gas Concentration	4.85 ppm	Cal Gas Exp Date	10/06/2014	
Calibrator Make/Model	API T700	Serial Number	996	
ZAG air Make/Model	API 701	Serial Number	4891	
DACS make/model	Campbell Scientific CR3000	Serial Number	9037	
SO2 gas concentration	49.3 ppm	SO2 gas cert/exp	SA130123A December-12-16	

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-574	-574
Analyzer IP address	192.168.1.45		Lamp voltage	922	933
Calculated slope	0.998275	0.985409	Chamber temp	45	45
Calculated intercept	-0.303998	0.237453	Pressure	543.4	534.0
Analyzer Background	12	12.8	Flow	0.963	0.950
Analyzer Coefficient	1.073	1.131	Intensity	85	85
			Converter temp.	335	335

Analyzer make/model	Thermo 450i	Analyzer serial #	815129098
Converter make/model	NA	Converter serial #	NA

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.2	----
as found span	5000	83.4	80.9	80.5	1.005
SO2 scrubber check	5000	15.2	149.9	1.4	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	83.4	80.9	81.9	0.988
second point	5000	41.8	40.5	40.9	0.991
third point	5000	21.0	20.4	20.3	1.005
as left zero	5000	0.0	0.0	-0.1	----
as left span	5000	83.4	80.9	82.0	0.986
Average Correction Factor					0.995

Corrected As found	80.3	Previous response	81.3	% change	1.3%
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**Notes:**

Inlet filter replaced and scrubber check done after as founds. Updated firmware to version 02.02.00.289 after scrubber check. Also, sent new program into the datalogger in order to get accurate number on RTMC. Adjusted span.

Calibration Performed By: Asad Hidayat



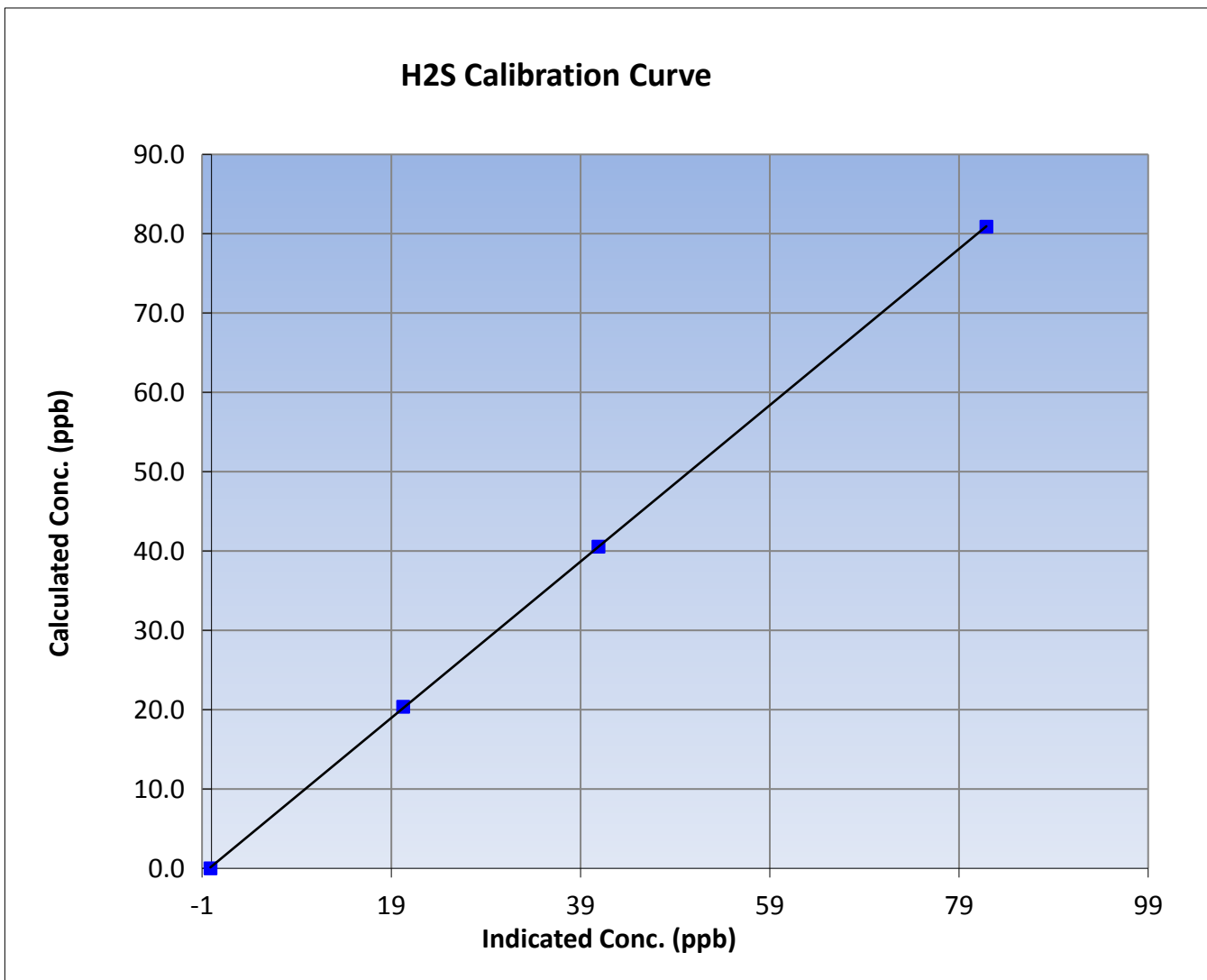
# Wood Buffalo Environmental Association H2S Calibration Report

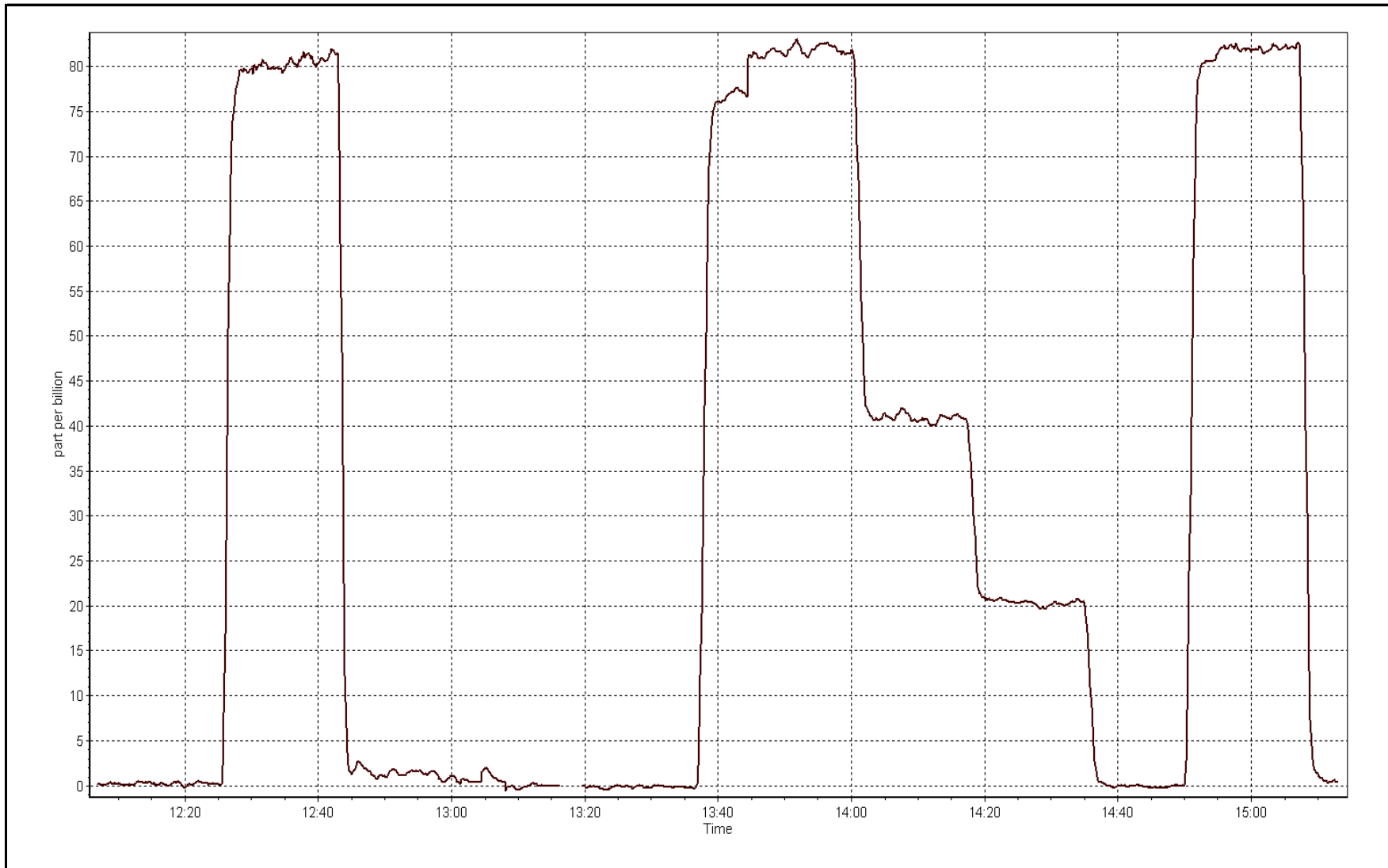
## Station Information

Calibration Date	October 28, 2015	Previous Calibration	September 8, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	12:05	End Time (MST)	15:15
Analyzer make	Thermo 450i	Analyzer serial #	815129098

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999987
80.9	81.9	0.9878		
40.5	40.9	0.9913	Slope	0.985409
20.4	20.3	1.0054		
			Intercept	0.237453









# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	October-06-15	Last Calibration	September-11-15
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	13:35
Gas Cert Reference	SA130123A	Cal Gas Expiry Date	12/12/2016
CH4 Cal Gas Conc.	512 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	996
ZAG make/model	Teledyne API 701	Serial Number	4891
DACS make/model	Campbell Scientific CR3000	Serial Number	9037

## Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	8.6	8.6
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.9	34.9
Calculated slope	1.003953	1.005856	Fuel Pressure	23.0	23.0
Calculated intercept	-0.070859	-0.089114	Analyzer Coeff	3.5	3.5
			Analyzer BKG	4.800	4.800

Analyzer make	Thermo 51i-LT	Analyzer serial #	1336160089
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## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.01	----
as found span	5000	58.3	12.74	12.76	0.998
calibrator zero	5000	0.0	0.00	0.06	----
high point	5000	58.3	12.74	12.72	1.001
second point	5000	29.2	6.38	6.49	0.983
third point	5000	14.7	3.21	3.28	0.979
as left zero	5000	0.0	0.00	0.06	----
as left span	5000	58.3	12.74	12.77	0.997
Average Correction Factor					0.988

Corrected As found	12.75	Previous response	12.76	% change	0.0%
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**Notes:**

H2 cylinder changed after as founds. Sample inlet filter changed after as founds. No adjustments made.

Calibration Performed By:

\_\_\_\_\_  
Devin Russell



# Wood Buffalo Environmental Association THC Calibration Report

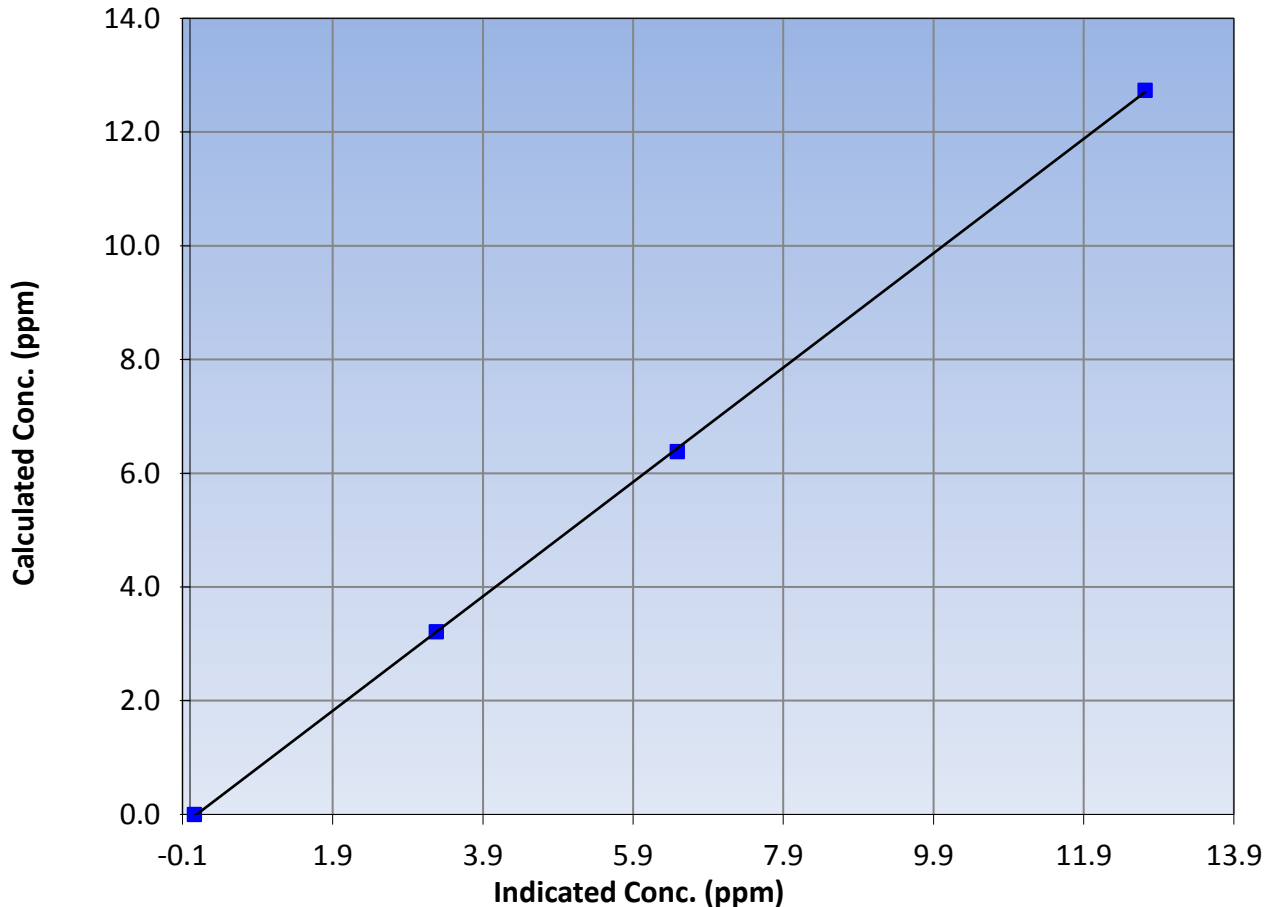
## Station Information

Calibration Date	October 6, 2015	Previous Calibration	September 11, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:00	End Time (MST)	13:35
Analyzer make	Thermo 51i-LT	Analyzer serial #	1336160089

## Calibration Data

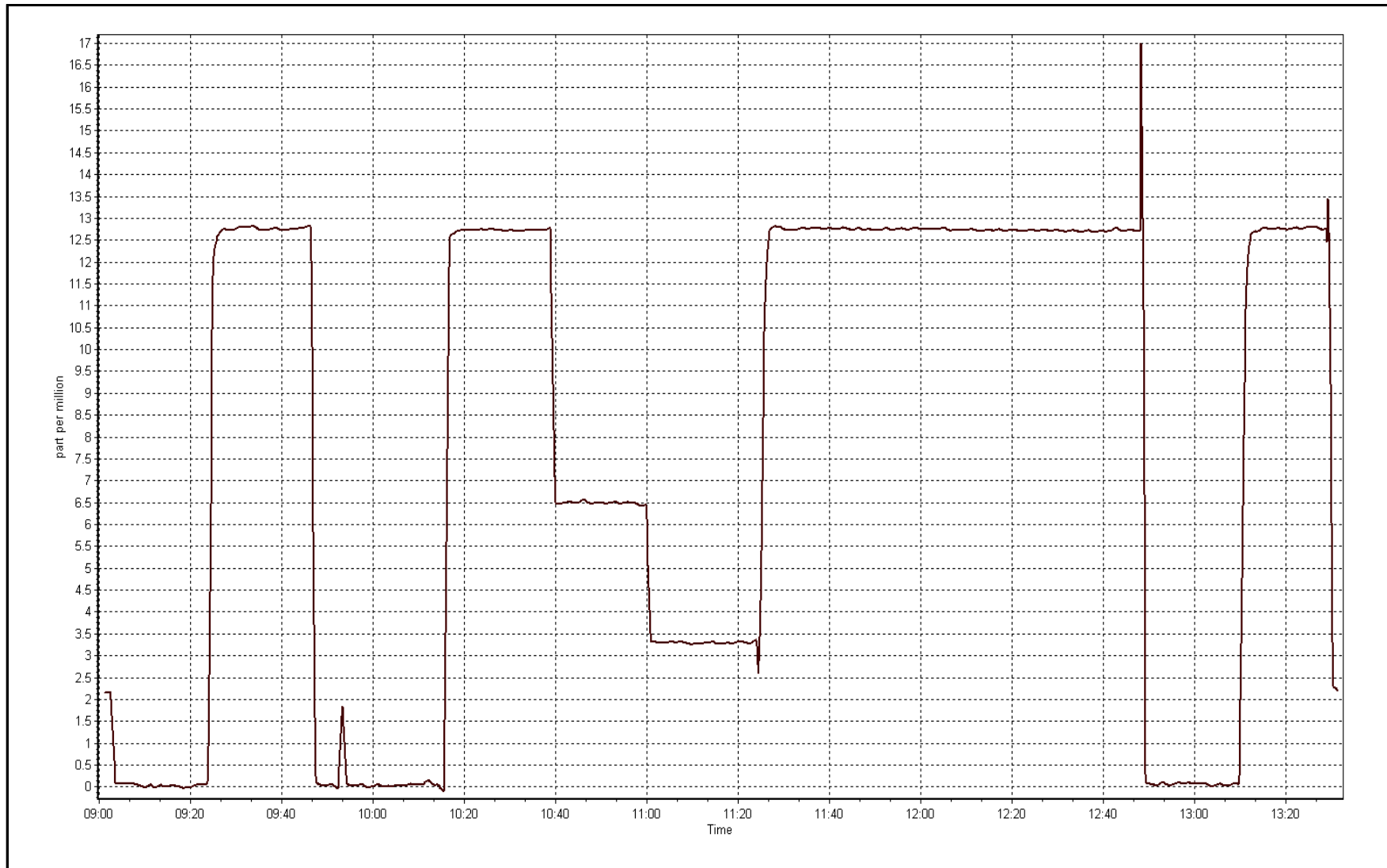
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.06	----	Correlation Coefficient	0.999939
12.74	12.72	1.0012		
6.38	6.49	0.9829	Slope	1.005856
3.21	3.28	0.9790		
			Intercept	-0.089114

**THC Calibration Curve**



THC Calibration Plot

Date: October 6, 2015





## Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date	October 6, 2015	Previous Calibration	September 11, 2015
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	13:35
NO Cal Gas Conc	51.5 ppm	Gas Cert Reference	SA130123A
NOX Cal Gas Conc	51.5 ppm	Cal Gas Expiry Date	12/12/2016
Calibrator	API T700	Serial Number	996
Zero air Generator	Teledyne API T701	Serial Number	4891

### DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9037
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### Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.002017	1.000952	0.999775
	Data Offset	-0.999247	-0.768575	0.208272
Current Calibration	Data Slope	0.997006	0.995570	0.999317
	Data Offset	-0.779806	-0.618714	0.147398

### Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1410661309
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.869		0.869	
NOX coefficient	0.998		0.998	
NO2 coefficient	1.000		1.000	
NO bkgrnd	3.9		3.9	
NOX bkgrnd	4.0		4.0	
Chamber Temp	50.7	Deg C	50.4	Deg C
Moly Temp	325.5	Deg C	327.4	Deg C
PMT voltage	-780	V	-780.3	V
PMT Temp	-3.1	Deg C	-3.1	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	159.3	mmHg	162.7	mmHg
R Cell Press Nox	158.9	mmHg	162.7	mmHg
NO sample flow	0.633	lpm	0.647	lpm
Nox sample Flow	0.633	lpm	0.647	lpm

**Notes:**

Sample inlet filter changed after as founds. No adjustments made.



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date:

October 6, 2015

Station Number:

AMS 19

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.3	-0.1	----	----
as found span	5000	58.3	600.5	600.5	0.0	602.2	602.0	0.2	0.9972	0.9975
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.2	-0.1	----	----
high point	5000	58.3	600.5	600.5	0.0	602.2	603.0	-0.9	0.9972	0.9958
second point	5000	29.2	300.8	300.8	0.0	304.0	304.2	-0.2	0.9892	0.9887
third point	5000	14.7	151.4	151.4	0.0	153.0	152.8	0.2	0.9893	0.9908
as left zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.2	-0.1	----	----
as left span	5000	58.3	600.5	282.2	318.3	598.1	278.9	319.2	1.0041	1.0119
Average Correction Factor									0.9919	0.9918

Corrccted As found    NO<sub>x</sub>=    602.5                      NO=    602.3                      Percent Change            NO<sub>x</sub>=    -0.4%                      NO=    -0.3%  
 Previous Response    NO<sub>x</sub>=    600.3                      NO=    600.7

### GPT Calibration Data

Dilution Flow                      5000                      ccm                      Source Gas Flow                      58.30                      ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			-0.1			N/A	
1st NO2 (300)	----	282.2	318.8	601.0	282.2	318.8	0.9877	1.0000	0.9998	100.0%
2nd NO2 (200)	----	386.3	214.7	601.0	386.3	214.7	0.9876	1.0000	0.9997	100.0%
3rd NO2 (100)	----	490.5	110.4	600.8	490.5	110.2	0.9880	1.0000	1.0016	99.8%
4th NO2 (0)	600.9	----	0.1	601.1	600.9	0.1	0.9875	1.0000	N/A	----
Average Correction Factor							0.9877	1.0000	1.0004	100.0%

Calibration Performed By: Devin Russell



# Wood Buffalo Environmental Association

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

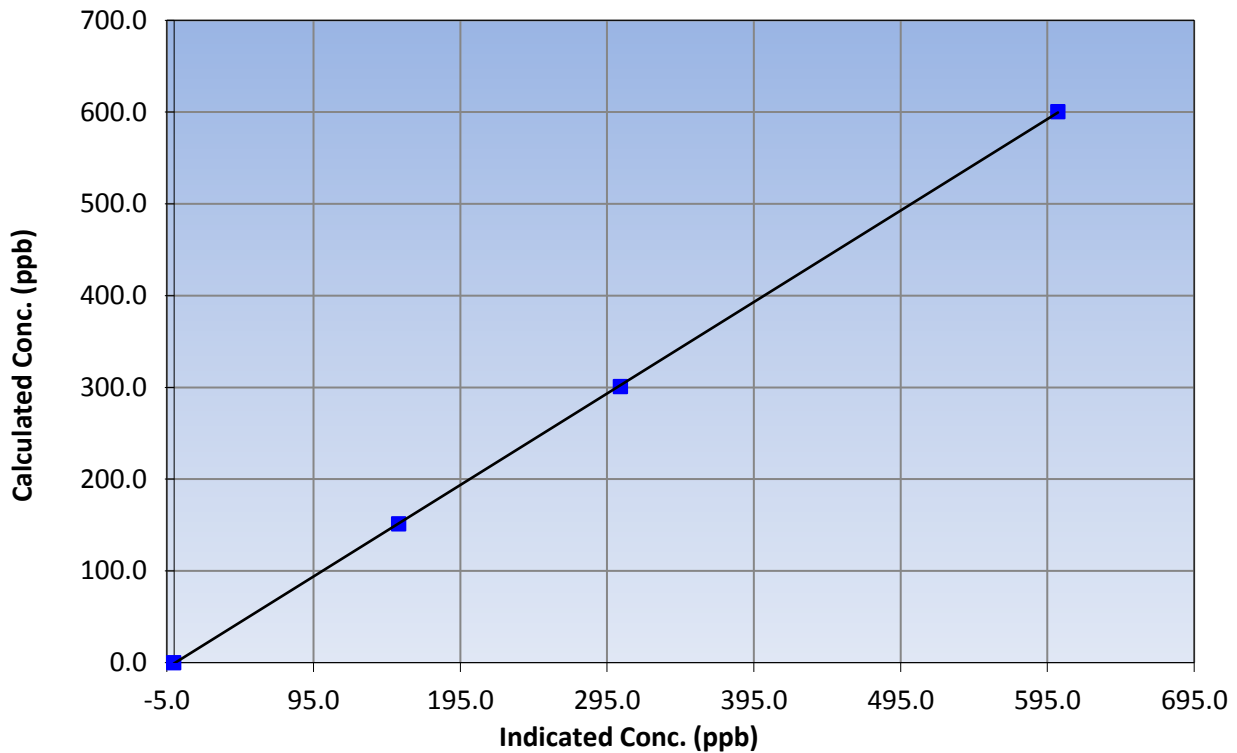
### Station Information

Calibration Date	October 6, 2015	Previous Calibration	September 11, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:00	End Time (MST)	13:35
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999976
600.5	602.2	0.9972		
300.8	304.0	0.9892	Slope	0.997006
151.4	153.0	0.9893		
			Intercept	-0.779806

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

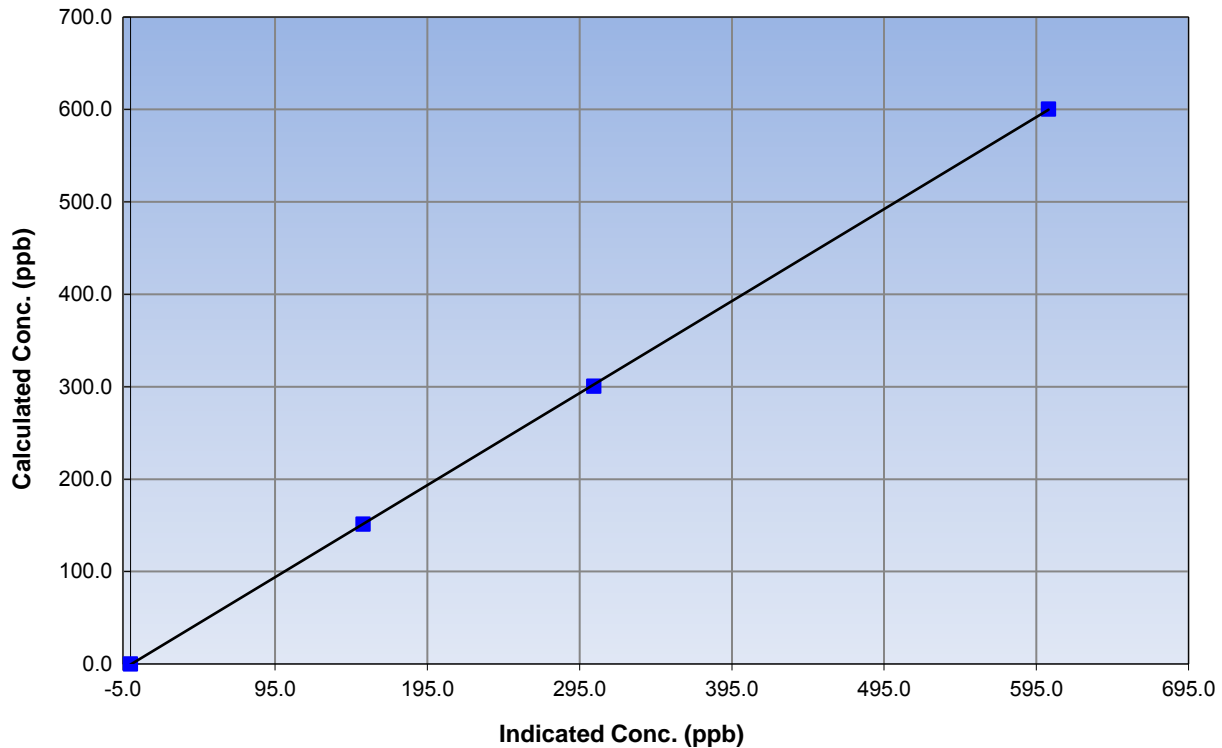
### Station Information

Calibration Date	October 6, 2015	Previous Calibration	September 11, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:00	End Time (MST)	13:35
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999983
600.5	603.0	0.9958		
300.8	304.2	0.9887	Slope	0.995570
151.4	152.8	0.9908		
			Intercept	-0.618714

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

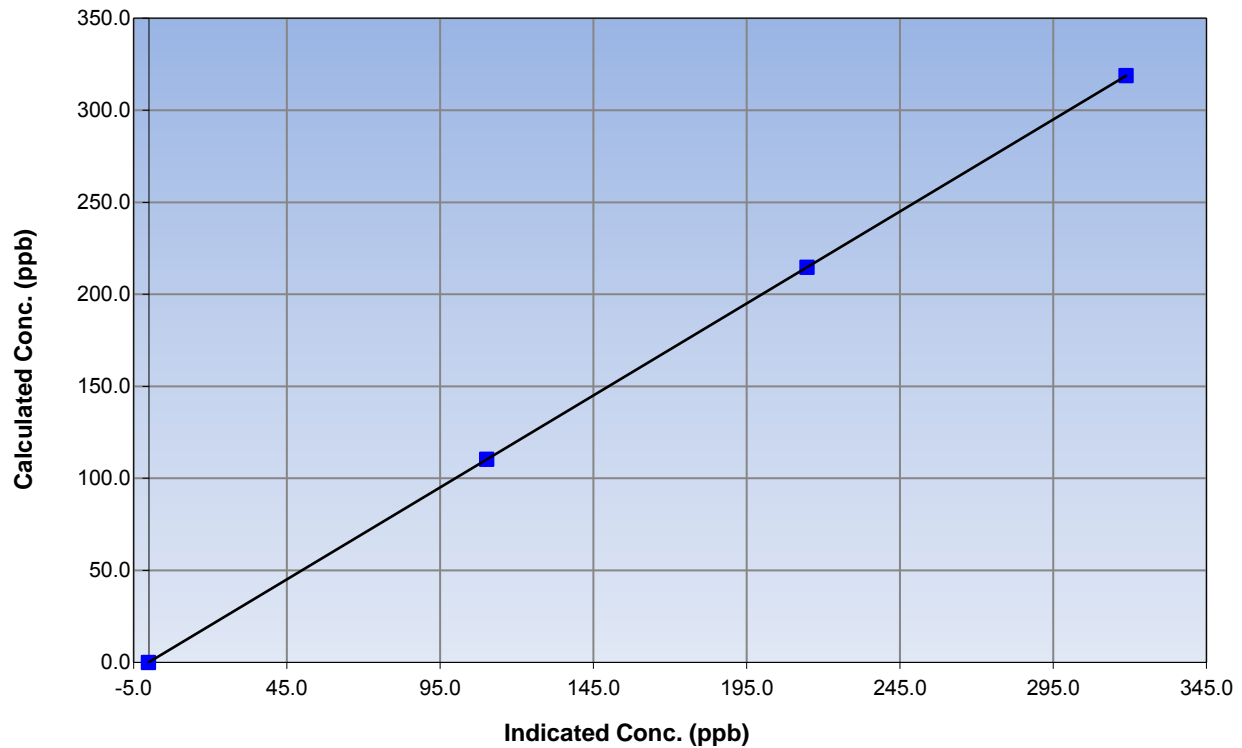
### Station Information

Calibration Date	October 6, 2015	Previous Calibration	September 11, 2015
Station Number	Firebag	Station Number	AMS 19
Start Time (MST)	9:00	End Time (MST)	13:35
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

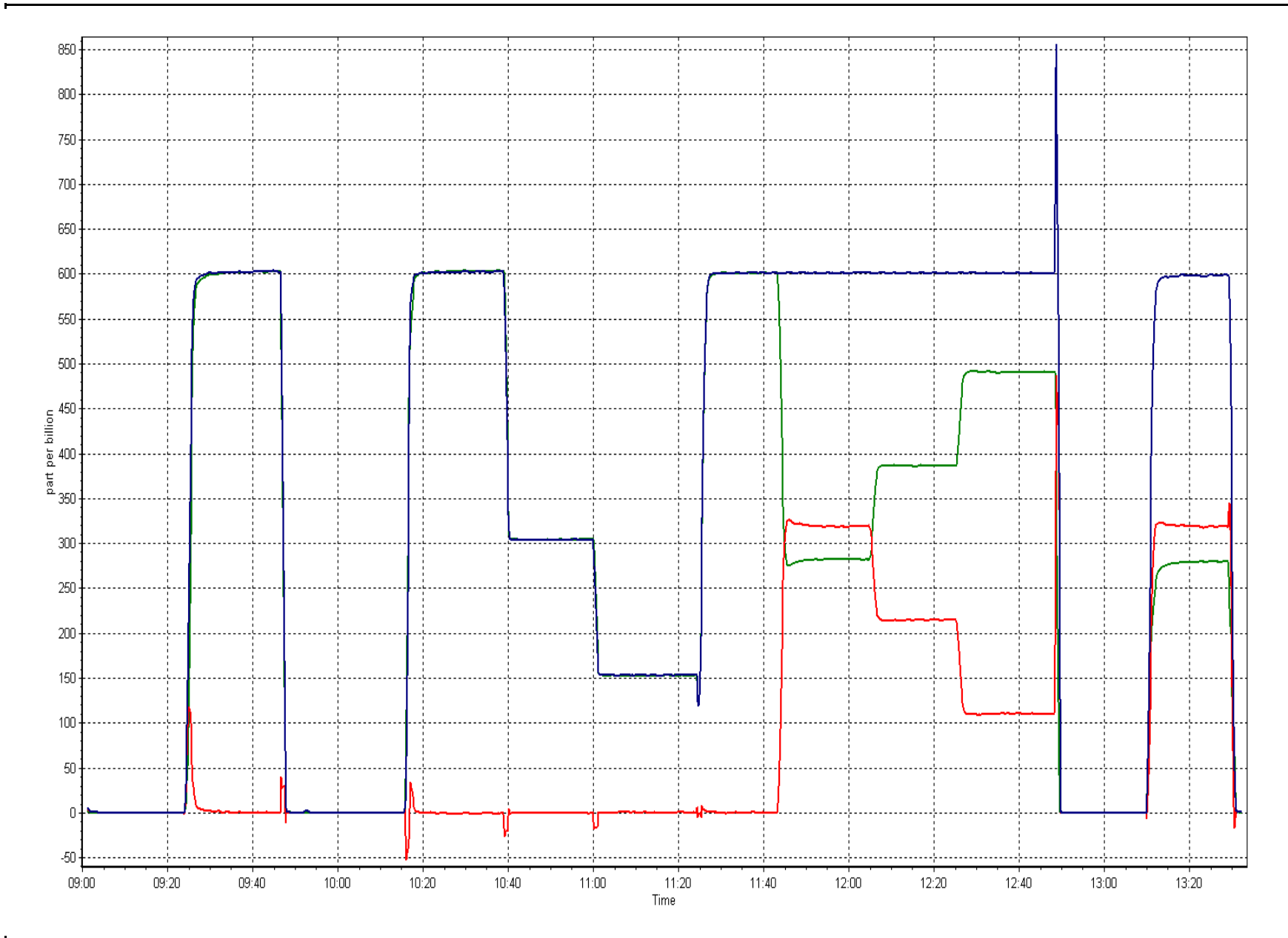
### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	1.000000
318.8	318.8	0.9998		
214.7	214.7	0.9997	Slope	0.999317
110.4	110.2	1.0016		
			Intercept	0.147398

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









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## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

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

**AMS 501  
STATOIL  
LEISMER  
OCTOBER 2015**

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

November 26, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STATOIL LEISMER (AMS 501)  
OCTOBER 2015

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	684	36	60	96.77	10	0	6	0
H2S (ppb) Average	663	42	81	94.76	1	0	0	0
NO2 (ppb) Average	708	36	36	100	12	0	7	-
NO (ppb) Average	708	36	36	100	17	-	9	-
NOX (ppb) Average	708	36	36	100	24	-	16	-
Temperature 2 m (C) Average	744	0	0	100	24.1	-	16.2	-
Relative Humidity (%) Average	744	0	0	100	99	-	97	-
Wind Speed 10 m (km/h) Average	740	0	4	99.46	32	-	24	-
Wind Direction 10 m (deg) Average	740	0	4	99.46	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STATOIL LEISMER (AMS 501)  
OCTOBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	684	0.8	1	-	0	0	0	0	1	1	10
H2S (ppb) Average	663	0.3	0	-	0	0	0	0	0	0	1
NO2 (ppb) Average	708	1.9	2	-	0	1	1	1	2	4	12
NO (ppb) Average	708	0.8	2	-	0	0	0	0	0	2	17
NOX (ppb) Average	708	2.7	4	-	0	1	1	2	3	5	24
Temperature 2 m (C) Average	744	5.11	5.8	-	-7.6	-1.6	0.6	4.2	9	12.5	24.1
Relative Humidity (%) Average	744	70.1	19	-	27	41	55	72	87	94	99
Wind Speed 10 m (km/h) Average	740	10.5	7	-	0	3	5	9	14	22	32
Wind Direction 10 m (deg) Average	740	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STATOIL LEISMER (AMS 501)  
OCTOBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	02 Oct 2015 07:00	02 Oct 2015 07:00	1	Unstable Operation - negative baseline
SO2	04 Oct 2015 03:00	04 Oct 2015 03:00	1	Unstable Operation - negative baseline
SO2	05 Oct 2015 04:00	05 Oct 2015 04:00	1	Unstable Operation - negative baseline
SO2	06 Oct 2015 05:00	06 Oct 2015 05:00	1	Unstable Operation - negative baseline
SO2	07 Oct 2015 06:00	07 Oct 2015 06:00	1	Unstable Operation - negative baseline
SO2	08 Oct 2015 07:00	08 Oct 2015 07:00	1	Unstable Operation - negative baseline
SO2	09 Oct 2015 02:00	09 Oct 2015 02:00	1	Unstable Operation - negative baseline
SO2	10 Oct 2015 03:00	10 Oct 2015 03:00	1	Unstable Operation - negative baseline
SO2	10 Oct 2015 13:00	10 Oct 2015 13:00	1	Unstable Operation - negative baseline
SO2	12 Oct 2015 05:00	12 Oct 2015 05:00	1	Unstable Operation - negative baseline
SO2	13 Oct 2015 06:00	13 Oct 2015 06:00	1	Unstable Operation - negative baseline
SO2	14 Oct 2015 07:00	14 Oct 2015 07:00	1	Unstable Operation - negative baseline
SO2	15 Oct 2015 02:00	15 Oct 2015 02:00	1	Unstable Operation - negative baseline
SO2	16 Oct 2015 03:00	16 Oct 2015 03:00	1	Unstable Operation - negative baseline
SO2	17 Oct 2015 04:00	17 Oct 2015 04:00	1	Unstable Operation - negative baseline
SO2	19 Oct 2015 06:00	19 Oct 2015 06:00	1	Unstable Operation - negative baseline
SO2	20 Oct 2015 07:00	20 Oct 2015 07:00	1	Unstable Operation - negative baseline
SO2	21 Oct 2015 02:00	21 Oct 2015 02:00	1	Unstable Operation - negative baseline
SO2	22 Oct 2015 15:00	22 Oct 2015 15:00	1	Unstable Operation - negative baseline
SO2	23 Oct 2015 04:00	23 Oct 2015 04:00	1	Unstable Operation - negative baseline
SO2	24 Oct 2015 05:00	24 Oct 2015 05:00	1	Unstable Operation - negative baseline
SO2	26 Oct 2015 07:00	26 Oct 2015 07:00	1	Unstable Operation - negative baseline
SO2	29 Oct 2015 04:00	29 Oct 2015 04:00	1	Unstable Operation - negative baseline
SO2	30 Oct 2015 05:00	30 Oct 2015 05:00	1	Unstable Operation - negative baseline
H2S	04 Oct 2015 23:00	04 Oct 2015 23:00	1	Intermittent unstable operation - excessive baseline drift
H2S	05 Oct 2015 07:00	05 Oct 2015 08:00	2	Intermittent unstable operation - excessive baseline drift
H2S	06 Oct 2015 17:00	06 Oct 2015 18:00	2	Intermittent unstable operation - excessive baseline drift
H2S	07 Oct 2015 14:00	07 Oct 2015 14:00	1	Intermittent unstable operation - excessive baseline drift
H2S	07 Oct 2015 18:00	07 Oct 2015 21:00	4	Intermittent unstable operation - excessive baseline drift
H2S	08 Oct 2015 06:00	08 Oct 2015 06:00	1	Intermittent unstable operation - excessive baseline drift
H2S	08 Oct 2015 14:00	08 Oct 2015 15:00	2	Intermittent unstable operation - excessive baseline drift
H2S	08 Oct 2015 18:00	08 Oct 2015 19:00	2	Intermittent unstable operation - excessive baseline drift
H2S	09 Oct 2015 00:00	09 Oct 2015 00:00	1	Intermittent unstable operation - excessive baseline drift
H2S	09 Oct 2015 04:00	09 Oct 2015 04:00	1	Intermittent unstable operation - excessive baseline drift
H2S	09 Oct 2015 06:00	09 Oct 2015 07:00	2	Intermittent unstable operation - excessive baseline drift
H2S	09 Oct 2015 15:00	09 Oct 2015 16:00	2	Intermittent unstable operation - excessive baseline drift
H2S	09 Oct 2015 19:00	09 Oct 2015 19:00	1	Intermittent unstable operation - excessive baseline drift
H2S	10 Oct 2015 02:00	10 Oct 2015 02:00	1	Intermittent unstable operation - excessive baseline drift

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STATOIL LEISMER (AMS 501)  
OCTOBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S	10 Oct 2015 19:00	10 Oct 2015 22:00	4	Intermittent unstable operation - excessive baseline drift
H2S	13 Oct 2015 02:00	13 Oct 2015 02:00	1	Intermittent unstable operation - excessive baseline drift
H2S	13 Oct 2015 08:00	13 Oct 2015 09:00	2	Intermittent unstable operation - excessive baseline drift
H2S	13 Oct 2015 11:00	13 Oct 2015 11:00	1	Intermittent unstable operation - excessive baseline drift
H2S	13 Oct 2015 14:00	13 Oct 2015 14:00	1	Intermittent unstable operation - excessive baseline drift
H2S	13 Oct 2015 16:00	13 Oct 2015 16:00	1	Intermittent unstable operation - excessive baseline drift
H2S	13 Oct 2015 18:00	13 Oct 2015 19:00	2	Intermittent unstable operation - excessive baseline drift
H2S	15 Oct 2015 18:00	15 Oct 2015 18:00	1	Intermittent unstable operation - excessive baseline drift
H2S	18 Oct 2015 12:00	18 Oct 2015 12:00	1	Intermittent unstable operation - excessive baseline drift
H2S	20 Oct 2015 08:00	20 Oct 2015 08:00	1	Intermittent unstable operation - excessive baseline drift
H2S	21 Oct 2015 17:00	21 Oct 2015 17:00	1	Intermittent unstable operation - excessive baseline drift
Wind Speed, Wind Direction	06 Oct 2015 05:00	06 Oct 2015 05:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	26 Oct 2015 07:00	26 Oct 2015 09:00	3	Flat line in sensor output signal -sensor frozen





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 10 ppb on Oct 27 17:00	Maximum Daily Average: 6.4 ppb on Oct 27
Minimum Value: 0 ppb on Oct 22 23:00	Hours of Data: 684
Maximum Diurnal Average: 1.4 ppb at hour 15	Hours of Missing Data: 60
Monthly Average: 0.8 ppb	Hours of Calibration: 36
Minimum Daily Average: 0.2 ppb on Oct 12	Percent Operational Time: 96.8
Minimum Diurnal Average: 0.3 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> = 1 P <sub>90</sub> = 1 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	1	1	1	1	Z	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	0	0	0	1	0.8	2
2-Oct	0	0	0	0	0	Z	UO	0	0	1	1	1	1	4	5	3	1	1	1	1	1	1	1	1	1.2	5
3-Oct	Z	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	0	0	1	1	0	0	0.8	1
4-Oct	0	Z	UO	0	0	0	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
5-Oct	0	0	Z	UO	0	0	0	0	0	2	2	2	4	4	7	4	1	0	0	0	0	0	0	0	1.4	7
6-Oct	0	0	0	Z	UO	0	0	0	6	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.6	6
7-Oct	1	0	0	0	Z	UO	0	0	0	0	1	1	2	4	2	1	0	0	0	0	0	0	0	0	0.7	4
8-Oct	0	0	0	0	0	Z	UO	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.5	1
9-Oct	Z	UO	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
10-Oct	0	Z	UO	0	0	0	0	0	0	0	0	0	UO	0	0	0	0	1	0	0	0	0	0	0	0.4	1
11-Oct	0	1	Z	1	0	0	1	0	0	0	1	1	0	0	1	0	3	4	1	0	0	0	0	0	0.7	4
12-Oct	0	0	0	Z	UO	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	UO	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	UO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
15-Oct	Z	UO	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0.2	1
16-Oct	0	Z	UO	0	0	1	1	1	1	1	1	1	0	1	1	0	0	0	1	0	0	0	0	0	0.5	1
17-Oct	0	0	Z	UO	0	0	1	1	0	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	0.5	1
18-Oct	1	1	1	Z	0	0	0	0	0	2	4	2	4	2	5	3	1	0	0	0	0	0	0	0	1.2	5
19-Oct	0	0	0	0	Z	UO	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0.3	1
20-Oct	1	0	0	0	0	Z	UO	1	0	0	0	2	2	3	2	3	2	1	0	1	0	0	0	0	1.0	3
21-Oct	Z	UO	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	0.4	1
22-Oct	1	Z	2	0	0	0	0	0	0	0	0	0	0	0	UO	0	0	0	0	0	0	0	0	0	0.3	2
23-Oct	0	0	Z	UO	0	0	0	0	0	0	0	1	2	0	0	3	1	1	2	0	0	0	0	0	0.6	3
24-Oct	0	0	0	Z	UO	0	0	0	0	0	0	1	1	1	1	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	0	0.3	0
26-Oct	0	0	0	0	0	Z	UO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5	0.6	5
27-Oct	Z	8	7	8	6	8	8	6	10	9	7	8	6	8	7	7	10	4	1	3	5	8	2	0	6.4	10
28-Oct	2	Z	0	0	1	0	0	0	0	0	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0.5	2
29-Oct	0	0	Z	UO	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	--	0
30-Oct	0	0	0	Z	UO	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0.4	1
31-Oct	0	0	0	2	Z	4	3	1	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0.7	4

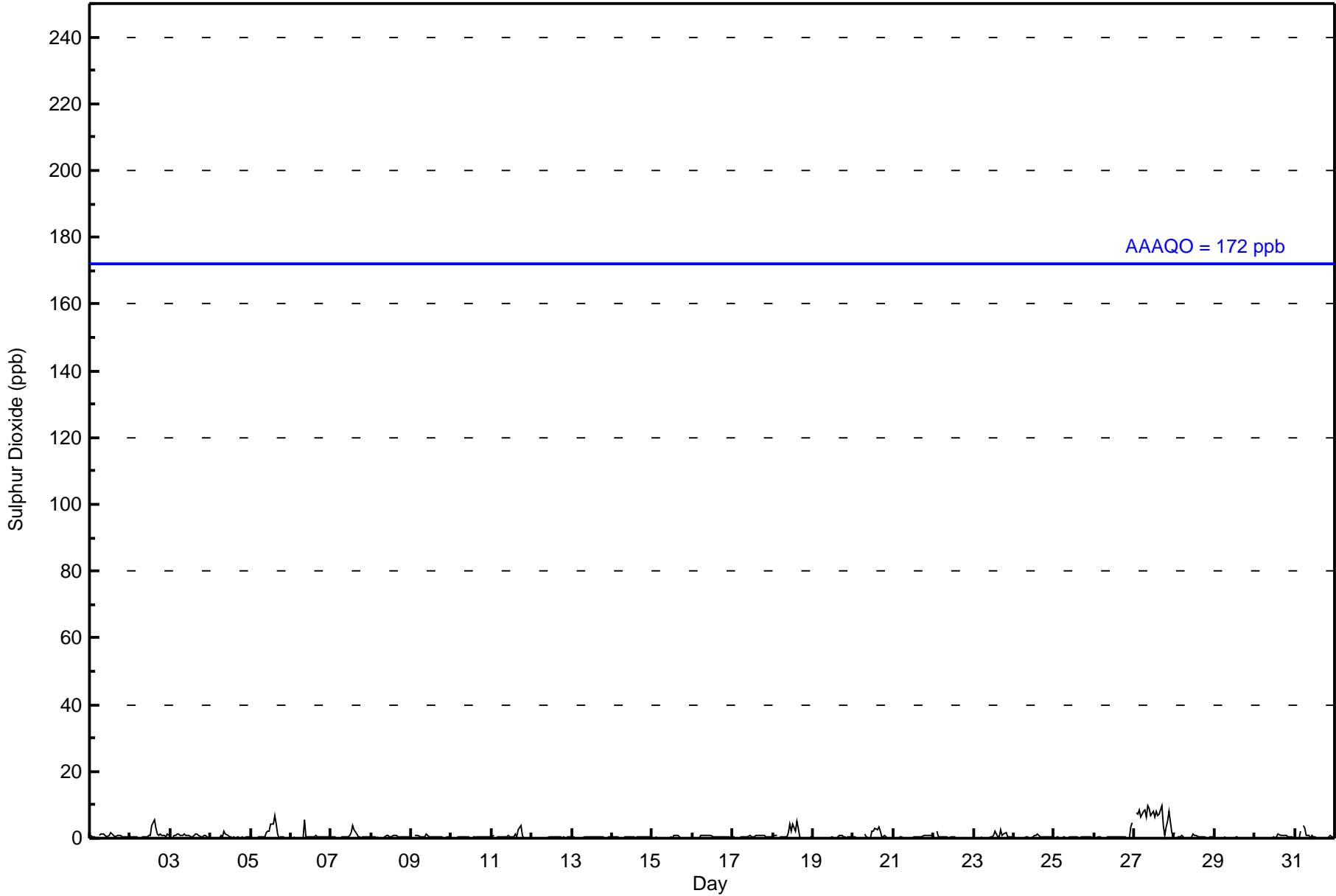
0.3	0.6	0.7	0.8	0.7	0.8	0.8	0.6	0.9	0.8	0.8	0.9	1.0	1.2	1.4	1.1	1.0	0.7	0.4	0.5	0.5	0.6	0.5	0.4	Diurnal Average	
2	8	7	8	6	8	8	6	10	9	7	8	6	8	7	7	10	4	1	3	5	8	3	5	Diurnal Maximum	

Z - zerospan                      C - Calibration                      UO - Unstable Operation  
 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  
Statoil - Leismer - October 2015





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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Statoil - Leismer - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	684	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: 684

Total Number of Hours: 744



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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Statoil - Leismer - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	55	18	5	7	16	28	65	70	58	56	13	14	56	112	61	48	682
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>	55	18	5	7	16	28	65	70	58	56	13	14	56	112	61	48	682

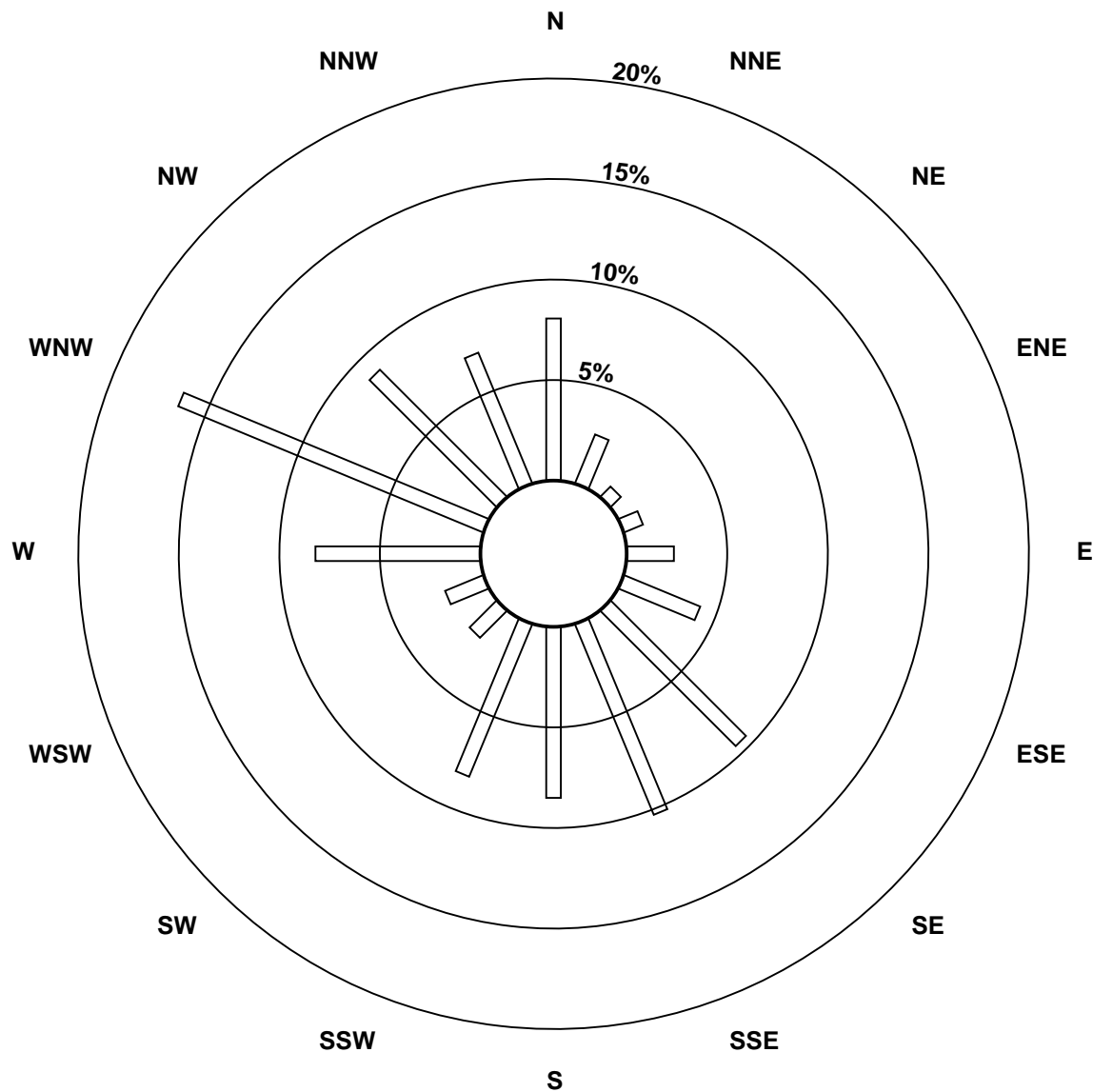
Total Number of Valid Hours: 682

Total Number of Hours: 744

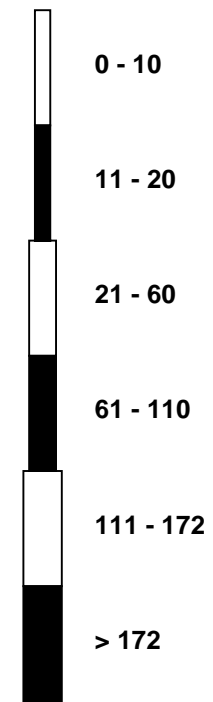


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

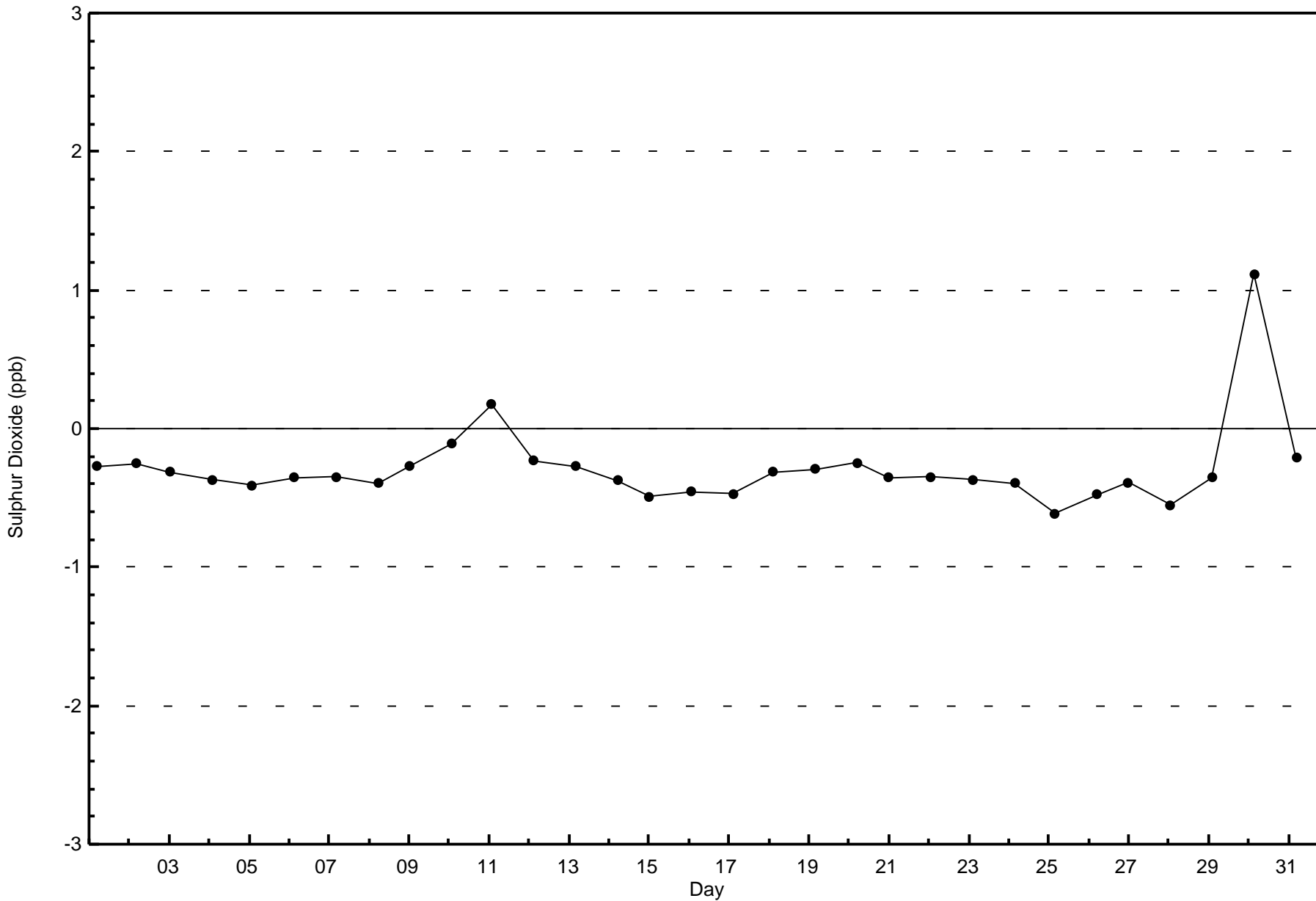
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Statoil - Leismer (AMS501)

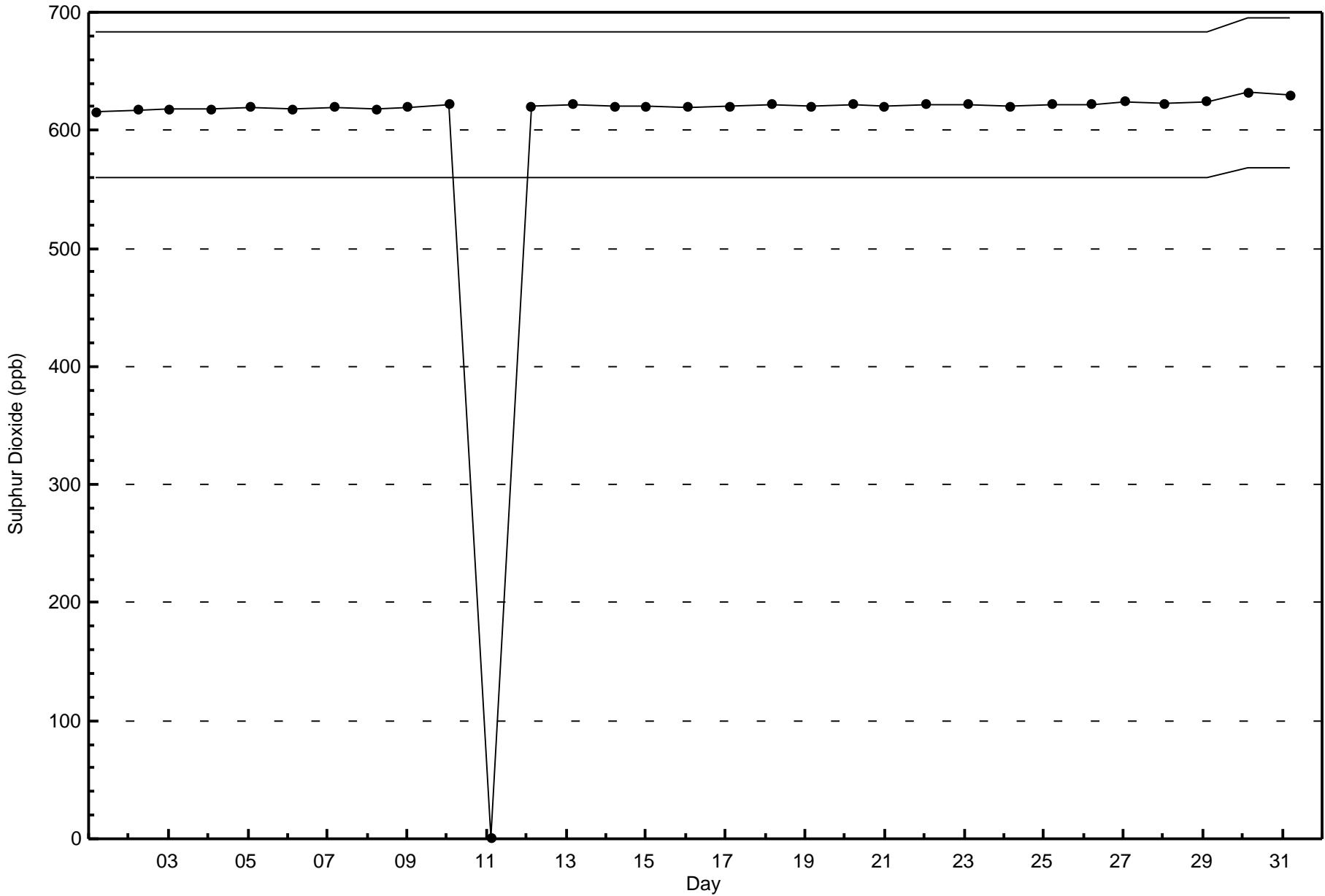


Classes (ppb)



Total Number of Valid Hours: 682







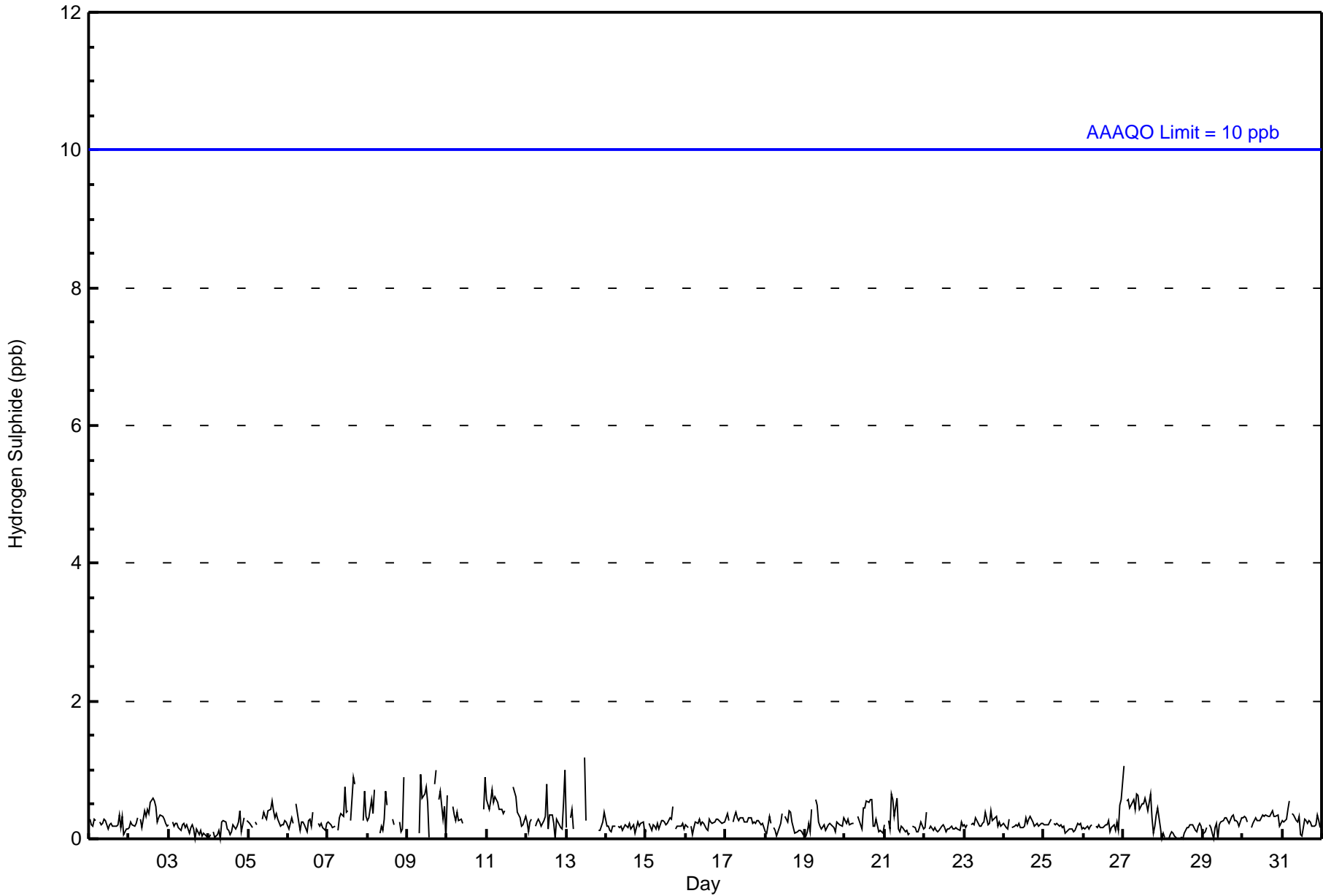
Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 1 ppb on Oct 9 03:00	Maximum Daily Average: 0.5 ppb on Oct 27		Hours of Data:	663
Minimum Value: 0 ppb on Oct 3 17:00	Minimum Daily Average: 0.1 ppb on Oct 28		Hours of Missing Data:	81
Maximum Diurnal Average: 0.3 ppb at hour 17	Minimum Diurnal Average: 0.2 ppb at hour 2		Hours of Calibration:	42
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:	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	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	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1	
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	0	0	0	0	0	0	0	UO	0	0.2	0	
5-Oct	0	0	0	Z	0	0	UO	UO	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1	
6-Oct	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	UO	UO	0	0	0	0	0	0	0	0.2	1	
7-Oct	0	0	0	0	0	Z	0	0	0	0	1	0	0	UO	0	1	1	UO	UO	UO	UO	UO	UO	0	1	0	0.4	1
8-Oct	0	0	1	0	1	UO	Z	0	0	0	0	1	0	UO	UO	0	0	UO	UO	UO	0	0	0	1	UO	--	1	
9-Oct	0	Z	1	UO	0	UO	UO	0	1	1	1	1	0	UO	UO	UO	1	1	UO	UO	1	1	0	0	0	--	1	
10-Oct	1	UO	Z	0	0	0	0	0	0	0	C	C	C	C	C	C	C	C	UO	UO	UO	UO	0	1	--	1		
11-Oct	1	0	1	1	1	1	1	0	0	0	0	C	C	C	C	1	1	0	0	0	0	0	0	0	0	0.5	1	
12-Oct	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0.3	1	
13-Oct	0	UO	0	0	0	Z	0	UO	UO	0	UO	1	0	UO	0	UO	1	UO	UO	0	0	0	0	0	0	--	1	
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	0.2	0	
15-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	UO	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	0.2	0	
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	0.3	0	
18-Oct	0	0	0	0	Z	0	0	0	0	0	0	UO	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
19-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	0.2	1	
20-Oct	0	0	0	0	0	0	Z	UO	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0.3	1	
21-Oct	0	Z	0	0	1	1	0	1	0	0	0	0	0	0	0	0	UO	0	0	0	0	0	0	0	0	0.2	1	
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	0.2	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	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	1	0.2	1	
27-Oct	1	Z	1	1	0	1	1	0	1	1	0	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0.5	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	0.2	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	0.3	0	
31-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	0.3	1	

0.2	0.2	0.3	0.2	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.2	Diurnal Average	
1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	Diurnal Maximum	

Z - zerospan                      C - Calibration                      UO - Unstable Operation  
 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**  
**Statoil - Leismer - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	663	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: 663

Total Number of Hours: 744



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

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Statoil - Leismer - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	55	16	6	8	16	27	64	72	54	59	14	11	47	110	62	40	661
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>	55	16	6	8	16	27	64	72	54	59	14	11	47	110	62	40	661

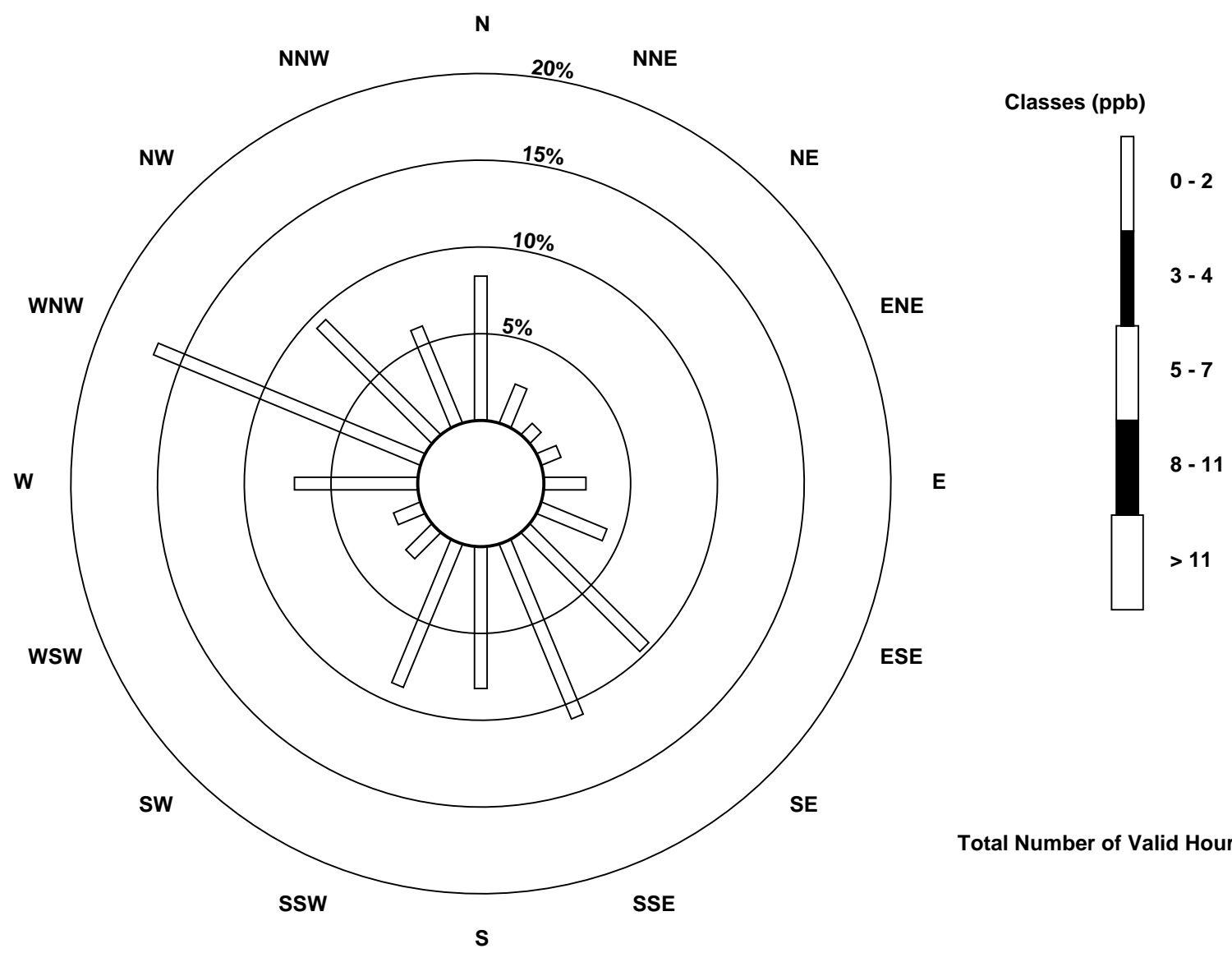
Total Number of Valid Hours: 661

Total Number of Hours: 744

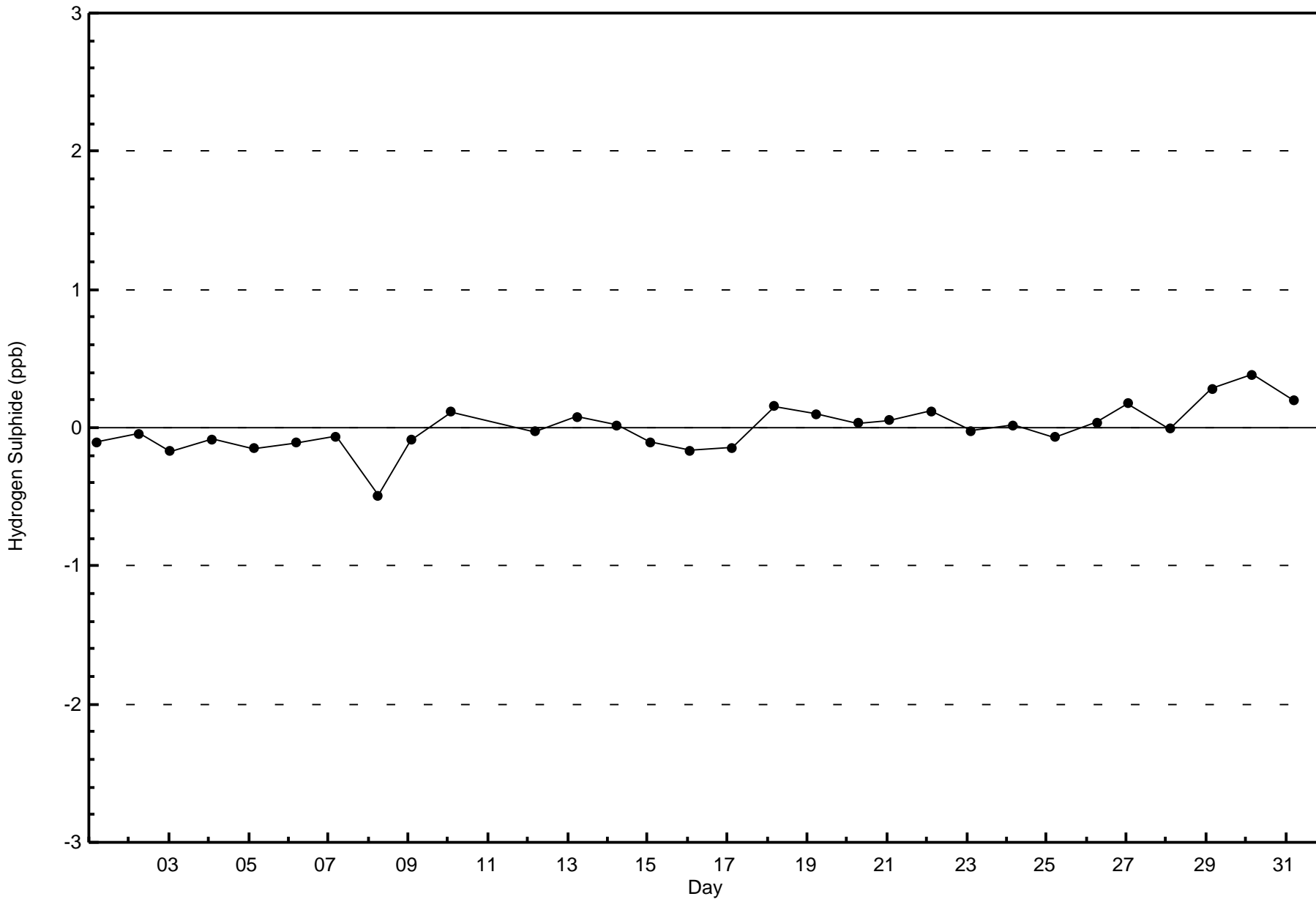


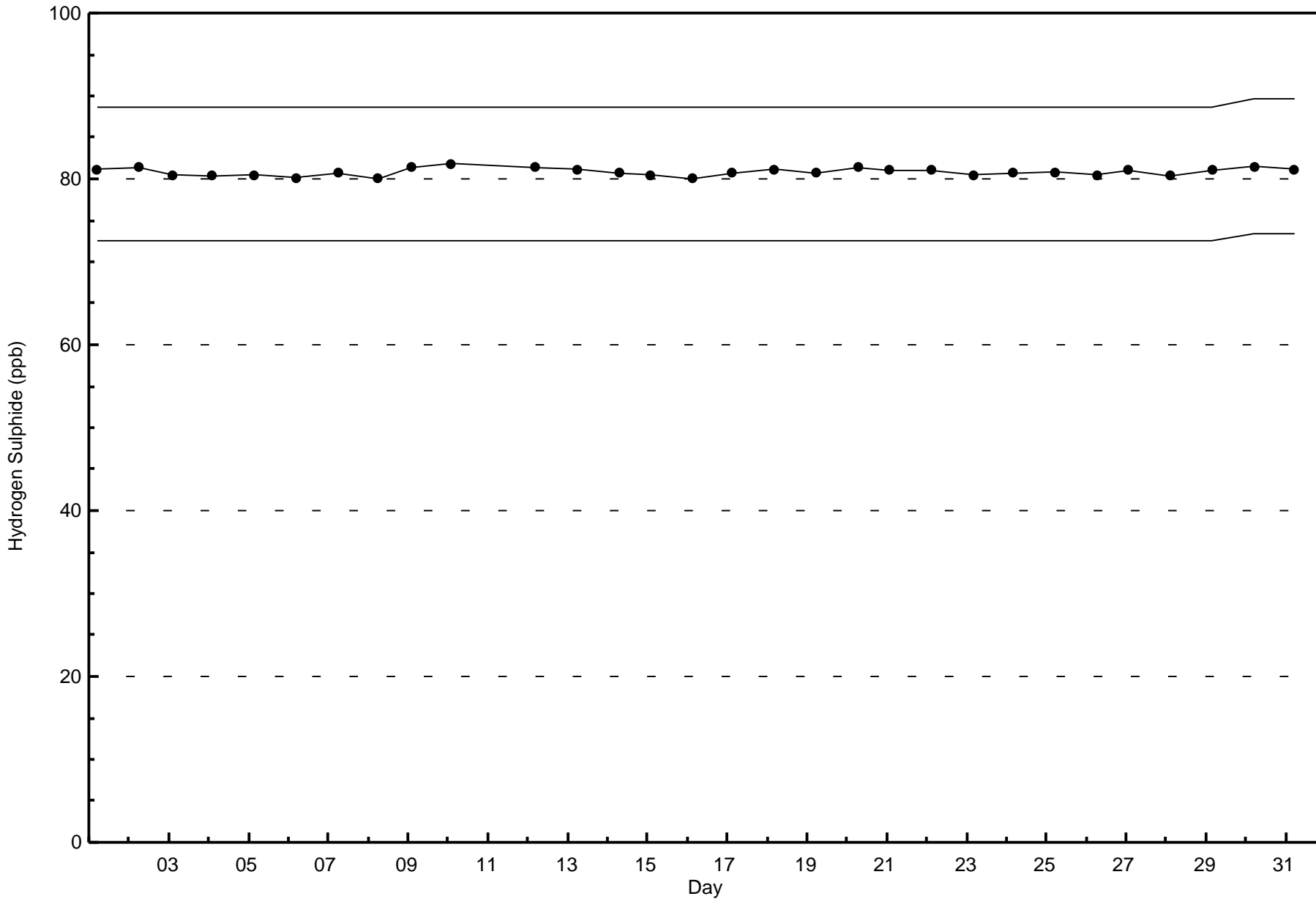
Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Statoil - Leismer (AMS501)



Total Number of Valid Hours: 661





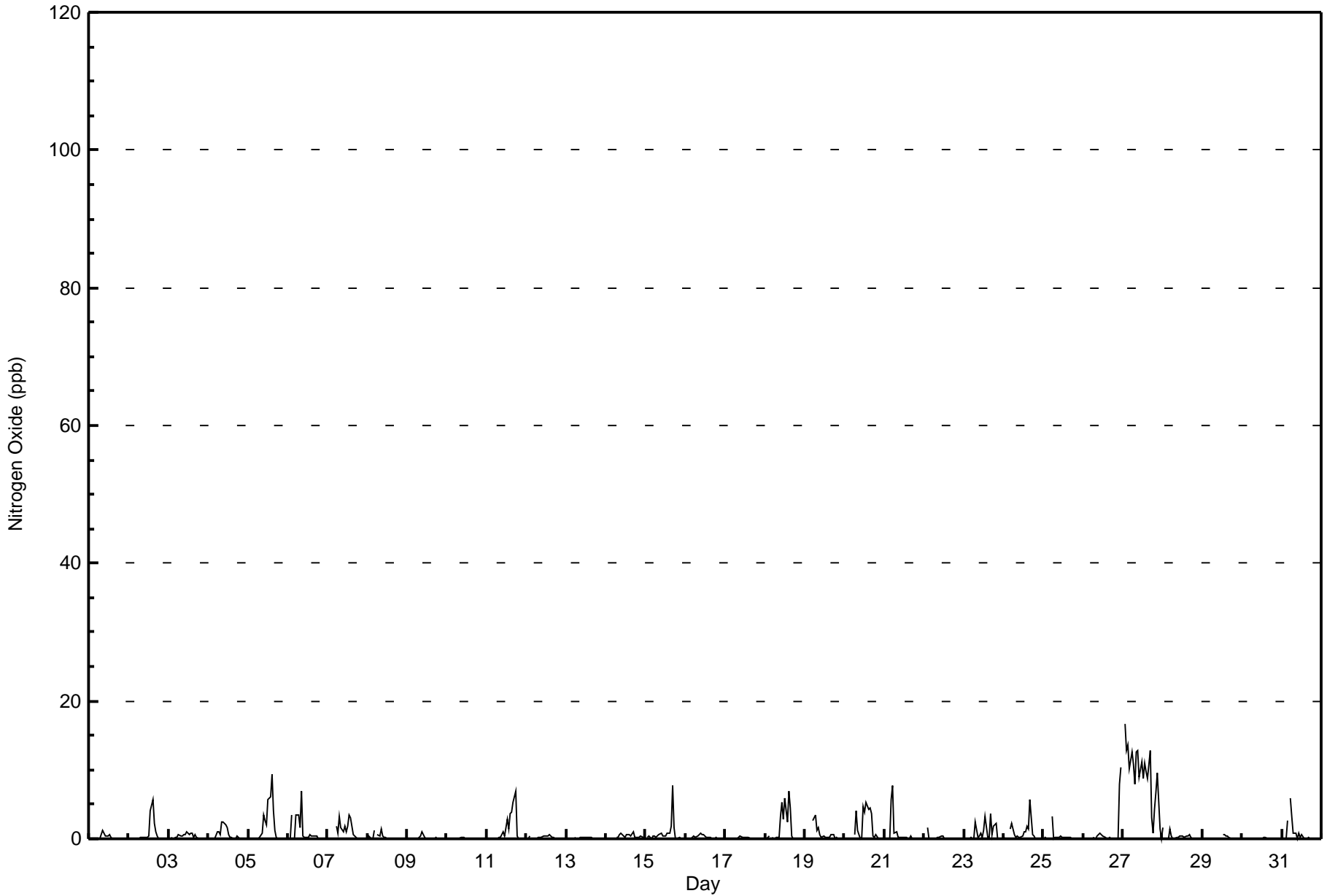


Maximum Value: 17 ppb on Oct 27 02:00																		Maximum Daily Average: 9.0 ppb on Oct 27																		Hours in Service: 744			
Minimum Value: 0 ppb on Oct 1 01:00																		Minimum Daily Average: 0.0 ppb on Oct 10																		Hours of Data: 708			
Maximum Diurnal Average: 1.6 ppb at hour 15																		Minimum Diurnal Average: 0.1 ppb at hour 1																		Hours of Missing Data: 36			
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> = 12																		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	Z	0	0	1	1	1	0	0	1	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	4	6	2	1	0	0	0	0	0	0	0	0.7	6													
3-Oct	Z	0	0	0	0	0	1	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0.3	1														
4-Oct	0	Z	0	0	0	1	1	1	2	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0.6	2													
5-Oct	0	0	Z	0	0	0	0	0	1	3	3	2	6	6	9	4	1	0	0	0	0	0	0	1.6	9														
6-Oct	0	0	3	Z	0	3	4	2	7	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1.0	7														
7-Oct	0	0	0	0	Z	2	1	3	2	1	2	1	2	3	3	1	0	0	0	0	0	0	0	0.9	3														
8-Oct	0	0	0	0	1	Z	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1														
9-Oct	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	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														
11-Oct	0	0	Z	0	0	0	0	0	0	1	1	0	3	1	4	4	5	7	0	0	0	0	0	1.2	7														
12-Oct	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2	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	0.1	0														
14-Oct	0	0	0	0	0	Z	0	0	1	1	1	0	1	1	1	0	1	0	0	0	0	0	0	0.3	1														
15-Oct	Z	0	0	0	0	0	0	0	1	1	0	0	0	1	1	2	8	2	0	0	0	0	0	0.8	8														
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	0.2	1														
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	0.1	0														
18-Oct	0	0	0	Z	0	0	0	0	0	3	5	3	6	2	7	5	0	0	0	0	0	0	0	1.4	7														
19-Oct	0	0	0	0	Z	3	3	1	2	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0.5	3														
20-Oct	0	0	0	0	0	Z	1	4	1	0	0	5	4	5	4	4	4	0	0	1	0	0	0	1.5	5														
21-Oct	Z	0	0	0	6	8	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	8														
22-Oct	0	Z	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2														
23-Oct	0	0	Z	0	0	0	0	3	0	0	1	0	1	3	0	0	4	1	2	2	0	0	0	0.8	4														
24-Oct	0	0	0	Z	2	2	1	0	0	0	0	1	1	2	1	6	1	0	0	0	0	0	0	0.8	6														
25-Oct	0	0	0	0	Z	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	3														
26-Oct	0	0	0	0	0	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	8	10	1.0	10													
27-Oct	Z	17	13	14	10	13	11	8	13	13	9	11	9	11	10	9	13	3	1	4	7	10	1	9.0	17														
28-Oct	2	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.3	2														
29-Oct	0	0	Z	0	0	0	0	C	C	C	C	C	1	1	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	0	0	0	0	0	0	0.0	0														
31-Oct	0	0	0	3	Z	6	3	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0.7	6														
0.1 0.7 0.8 0.7 0.9 1.6 0.9 0.9 1.2 1.1 1.0 1.1 1.2 1.4 1.6 1.1 1.5 0.5 0.2 0.3 0.3 0.3 0.3 0.4																								Diurnal Average															
2 17 13 14 10 13 11 8 13 13 9 11 9 11 10 9 13 7 2 4 7 10 8 10																								Diurnal Maximum															
Z - zerospan C - Calibration																																							



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

**Nitrogen Oxide (NO) - ppb**  
**Statoil - Leismer - October 2015**







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

**Nitrogen Oxide (NO) - ppb**  
**Statoil - Leismer - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	708	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: 708

Total Number of Hours: 744



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

**Nitrogen Oxide (NO) - ppb**  
**Statoil - Leismer - October 2015**

<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	56	18	5	7	17	28	67	72	62	57	13	14	59	118	61	50	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>	56	18	5	7	17	28	67	72	62	57	13	14	59	118	61	50	704

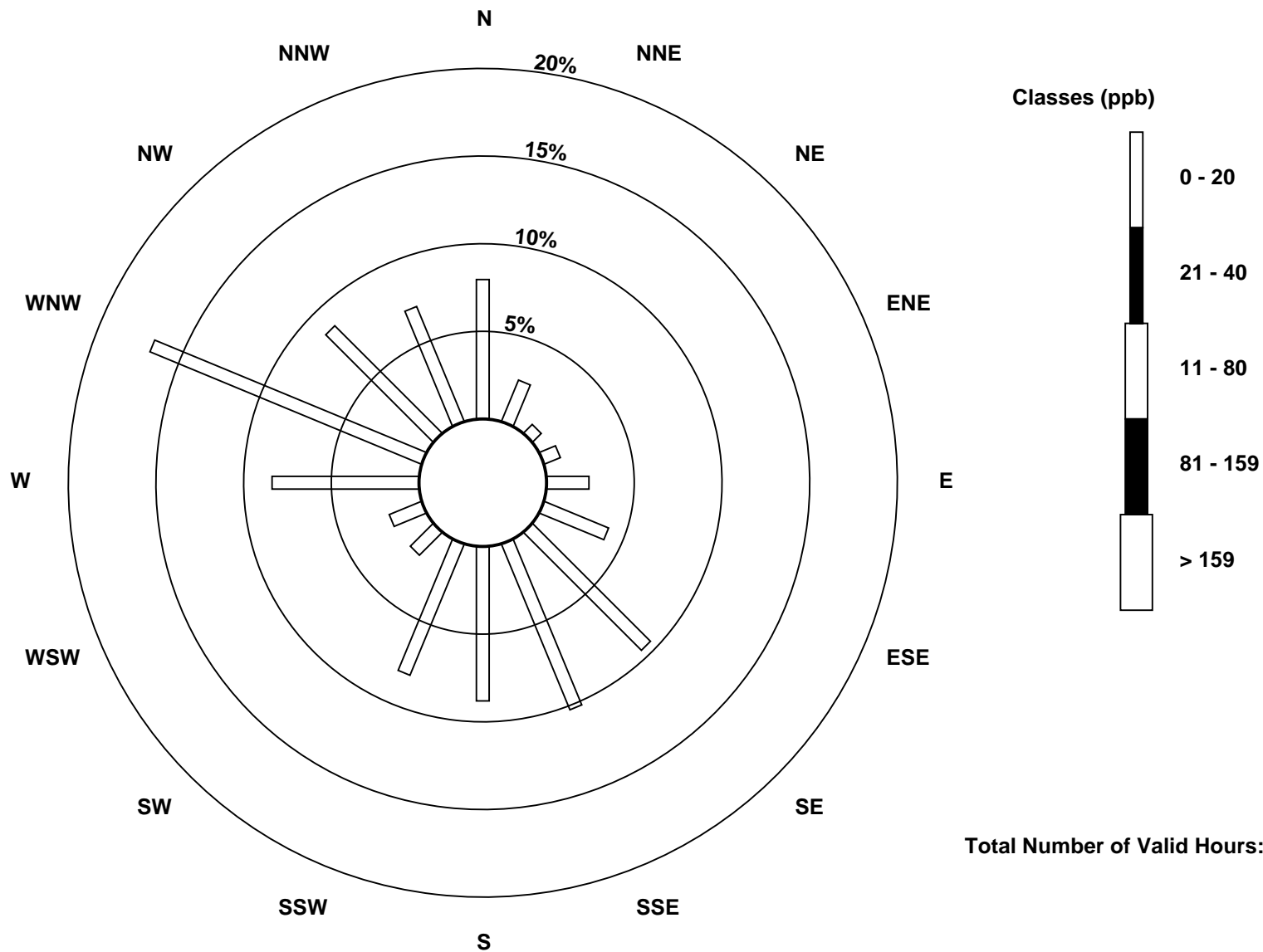
Total Number of Valid Hours: 704

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

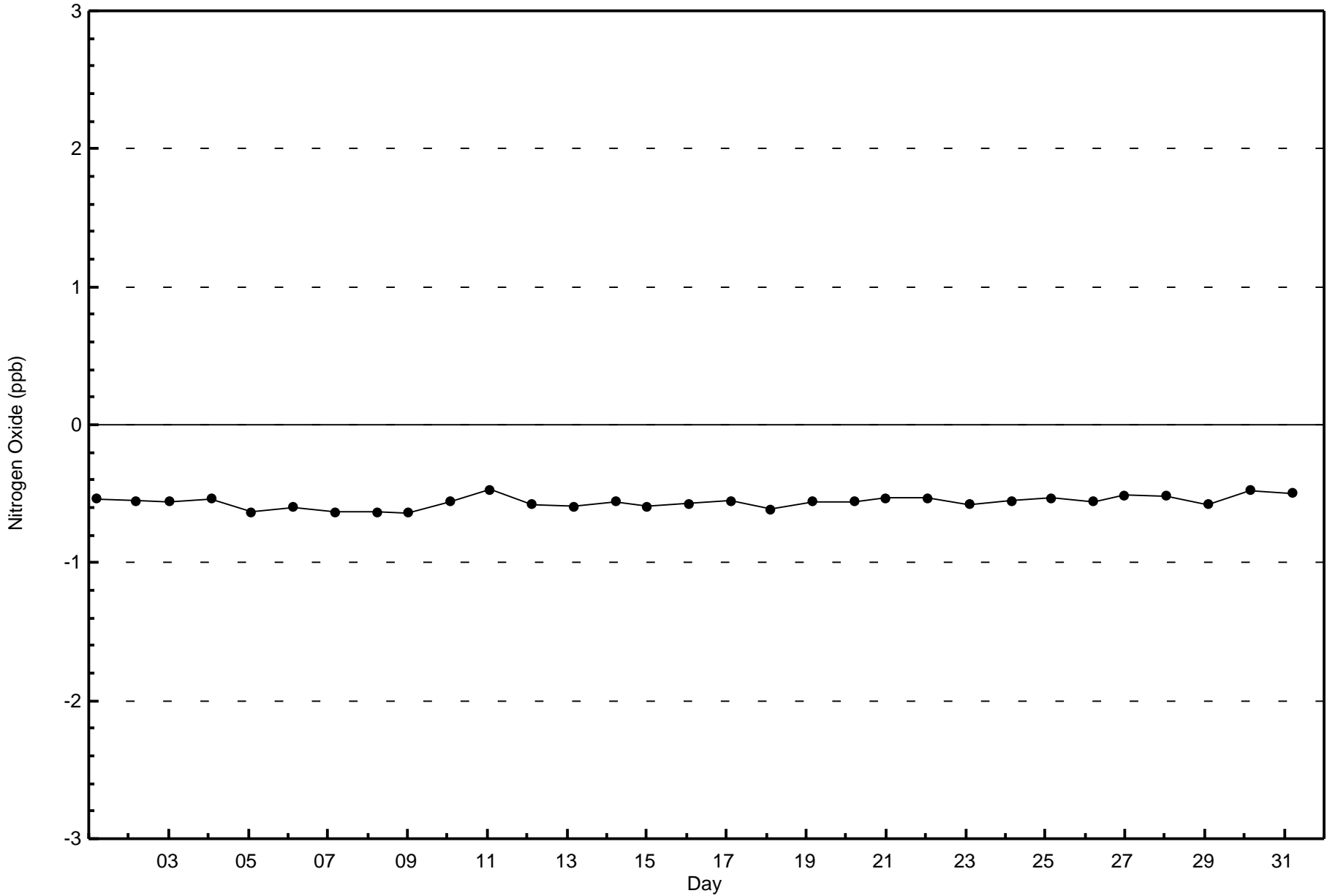
Nitrogen Oxide (NO) - ppb  
Statoil - Leismer (AMS501)

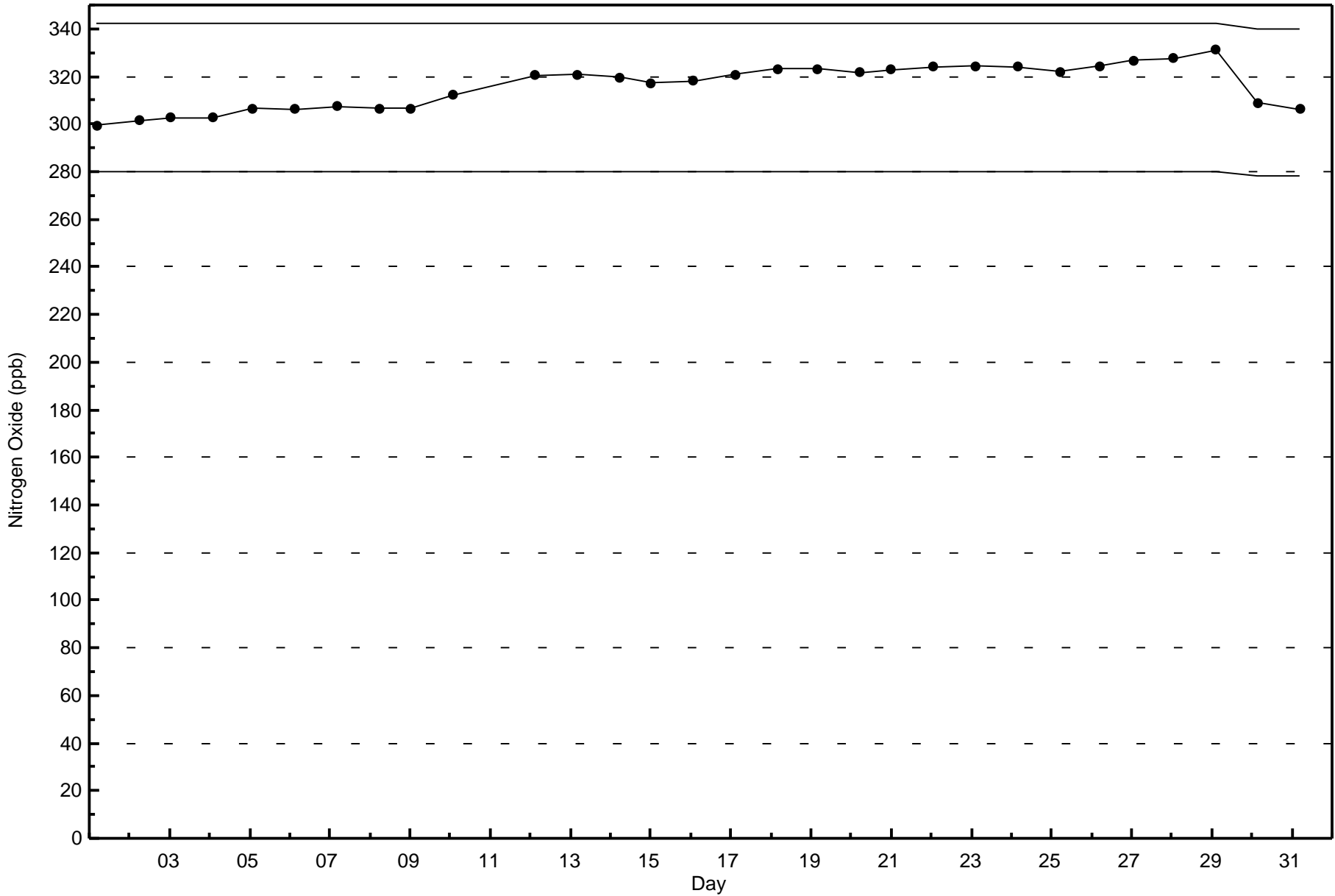




Wood Buffalo Environmental Association  
Zero Responses

Nitrogen Oxide (NO) - ppb  
Statoil - Leismer - October 2015







Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 12 ppb on Oct 27 17:00	Maximum Daily Average: 7.2 ppb on Oct 27		Hours of Data:	708
Minimum Value: 0 ppb on Oct 6 09:00	Minimum Daily Average: 0.5 ppb on Oct 13		Hours of Missing Data:	36
Maximum Diurnal Average: 2.9 ppb at hour 6	Minimum Diurnal Average: 1.3 ppb at hour 19		Hours of Calibration:	36
Monthly Average: 1.9 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> = 4 P <sub>99</sub> = 8		Percent Operational Time:	100.0

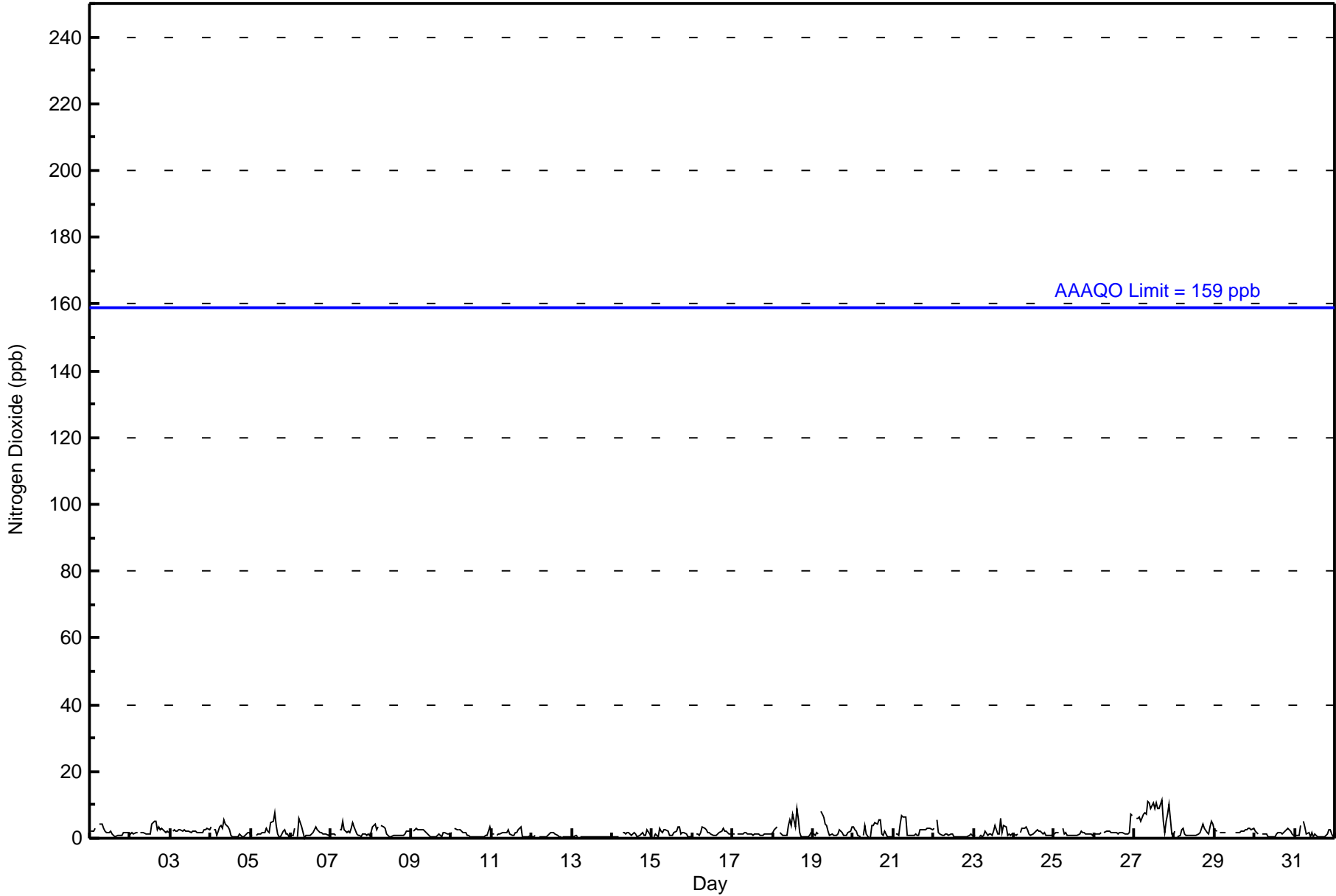
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Oct	2	2	2	3	Z	4	4	4	3	2	2	2	2	1	1	1	1	1	1	1	2	2	2	2	1.9	4
2-Oct	1	2	1	2	2	Z	2	2	2	1	1	1	1	4	5	5	3	3	3	3	2	2	2	2	2.2	5
3-Oct	Z	2	3	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	3	3	3	2	2.2	3
4-Oct	3	Z	3	2	1	3	4	3	6	4	3	2	1	1	1	0	0	1	1	1	1	1	2	2	2.0	6
5-Oct	1	1	Z	1	1	1	1	2	2	3	2	2	5	5	8	4	1	0	0	2	2	1	1	1	2.1	8
6-Oct	1	1	3	Z	1	6	3	2	0	1	1	1	1	2	3	3	2	2	2	1	1	1	1	1	1.7	6
7-Oct	1	1	1	1	Z	3	3	5	3	2	2	2	3	5	3	1	1	1	0	1	1	1	1	1	1.9	5
8-Oct	2	3	4	3	3	Z	4	3	3	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1.8	4
9-Oct	Z	2	3	3	3	3	3	3	2	2	1	1	0	0	1	0	1	1	1	2	2	1	1	1	1.5	3
10-Oct	2	Z	3	3	3	3	2	2	2	1	1	1	1	1	0	0	0	0	0	1	1	1	2	3	1.4	3
11-Oct	1	1	Z	1	1	1	2	2	2	2	3	1	1	1	2	2	3	4	1	0	0	1	1	1	1.3	4
12-Oct	0	0	1	Z	1	1	0	1	1	1	1	2	2	2	1	1	1	0	0	0	0	0	0	0	0.7	2
13-Oct	1	1	1	1	Z	0	0	1	1	0	1	1	0	1	1	1	0	0	0	0	0	0	1	1	0.5	1
14-Oct	1	1	1	1	1	Z	2	2	1	2	2	1	1	2	1	1	1	1	2	1	1	3	1	1	1.2	3
15-Oct	Z	1	1	1	3	2	2	3	2	2	1	1	1	2	2	3	4	1	2	2	1	1	0	1	1.6	4
16-Oct	1	Z	1	1	1	2	3	3	3	2	2	1	1	1	1	1	2	2	3	2	2	2	1	1	1.7	3
17-Oct	1	1	Z	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	2
18-Oct	2	3	3	Z	2	1	1	1	1	4	6	4	7	4	9	6	2	1	0	1	0	1	1	2	2.6	9
19-Oct	1	1	2	1	Z	8	6	4	4	2	1	1	1	1	1	3	2	1	1	1	2	2	3	3	2.1	8
20-Oct	4	3	2	1	1	Z	1	4	1	0	0	4	4	5	4	5	6	1	1	2	0	0	0	1	2.1	6
21-Oct	Z	1	1	1	4	7	7	7	1	1	1	1	1	1	1	1	3	2	3	3	3	3	3	3	2.4	7
22-Oct	3	Z	5	2	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1.1	5
23-Oct	1	1	Z	1	1	1	1	2	1	1	1	1	2	4	1	1	6	2	4	3	1	1	1	1	1.7	6
24-Oct	1	1	1	Z	2	3	3	3	3	1	1	1	2	2	3	2	2	1	2	1	1	1	1	1	1.7	3
25-Oct	1	2	2	2	Z	3	1	2	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1.3	3
26-Oct	1	1	1	1	2	Z	2	2	2	2	2	2	2	2	1	2	2	2	1	1	1	2	7	7	2.0	7
27-Oct	Z	6	6	6	5	7	8	7	11	11	9	11	9	11	9	9	12	5	2	5	7	10	1	1	7.2	12
28-Oct	2	Z	1	1	3	3	1	1	1	1	1	1	1	1	1	2	3	4	3	2	1	4	5	4	1.9	5
29-Oct	3	2	Z	2	2	2	2	C	C	C	C	C	C	2	2	2	2	2	3	3	3	3	3	3	2.2	3
30-Oct	2	2	1	Z	1	1	1	1	1	1	1	1	1	1	2	2	1	2	2	2	3	2	1	1	1.4	3
31-Oct	1	1	1	4	Z	5	3	1	2	1	2	1	1	1	1	1	1	1	0	1	2	3	1	1	1.4	5
	1.5	1.6	2.1	1.7	1.8	2.9	2.5	2.5	2.1	1.8	1.7	1.7	1.8	2.1	2.2	2.0	2.1	1.6	1.3	1.5	1.6	1.8	1.7	1.6	Diurnal Average	
	4	6	6	6	5	8	8	7	11	11	9	11	9	11	9	9	12	5	4	5	7	10	7	7	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  
Statoil - Leismer - October 2015





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Statoil - Leismer - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	708	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: 708

Total Number of Hours: 744





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Statoil - Leismer - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	56	18	5	7	17	28	67	72	62	57	13	14	59	118	61	50	704
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>	56	18	5	7	17	28	67	72	62	57	13	14	59	118	61	50	704

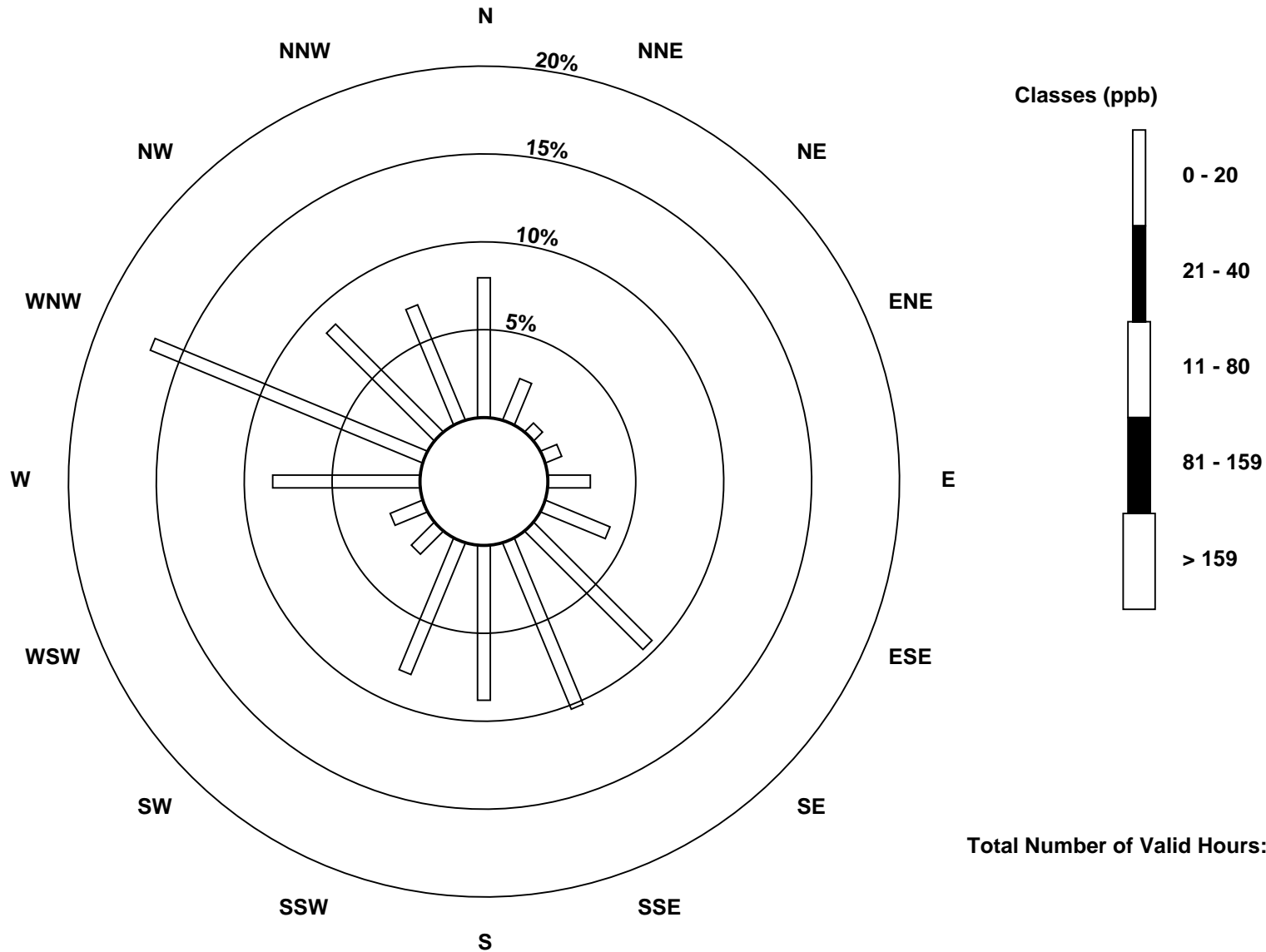
Total Number of Valid Hours: 704

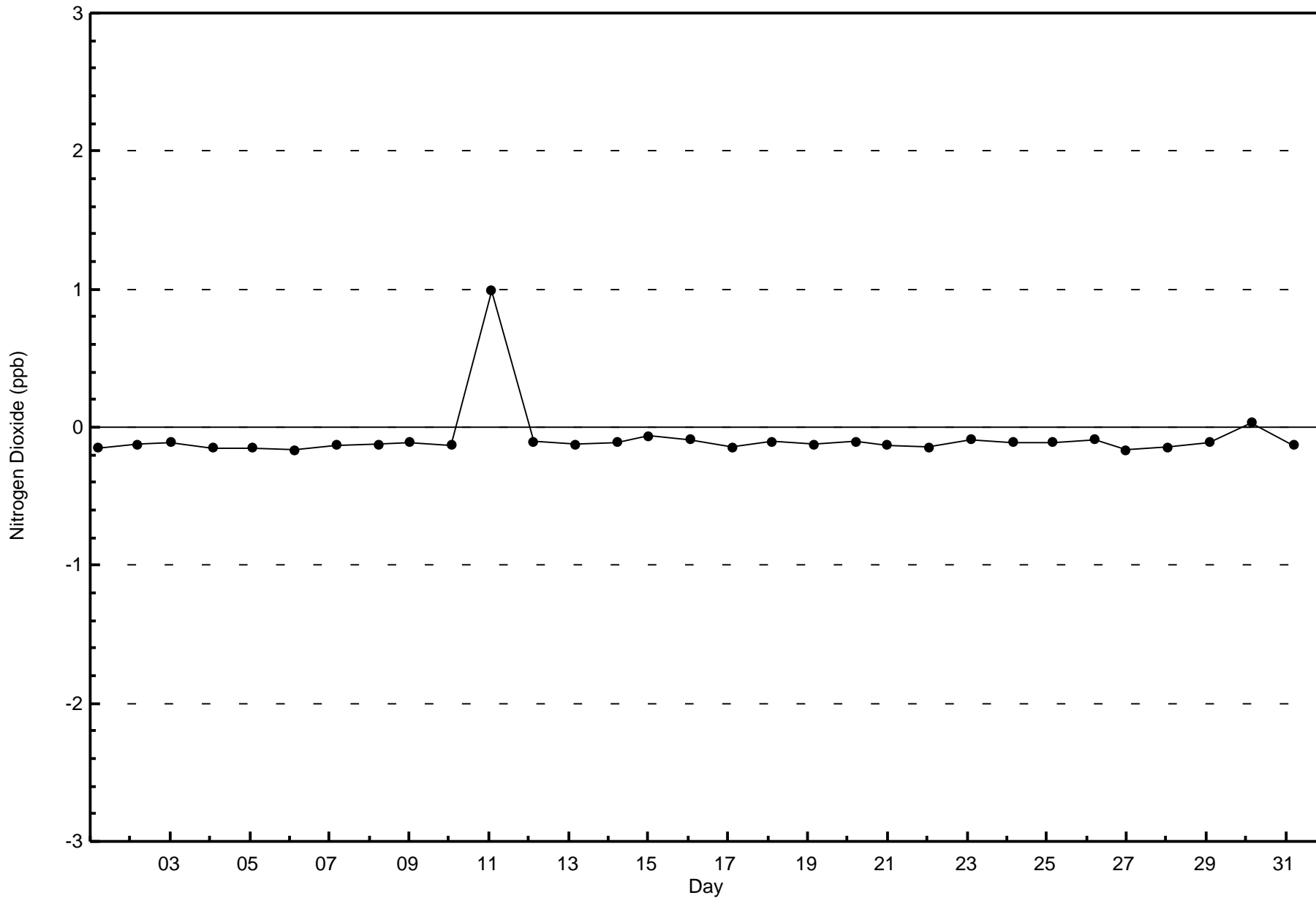
Total Number of Hours: 744

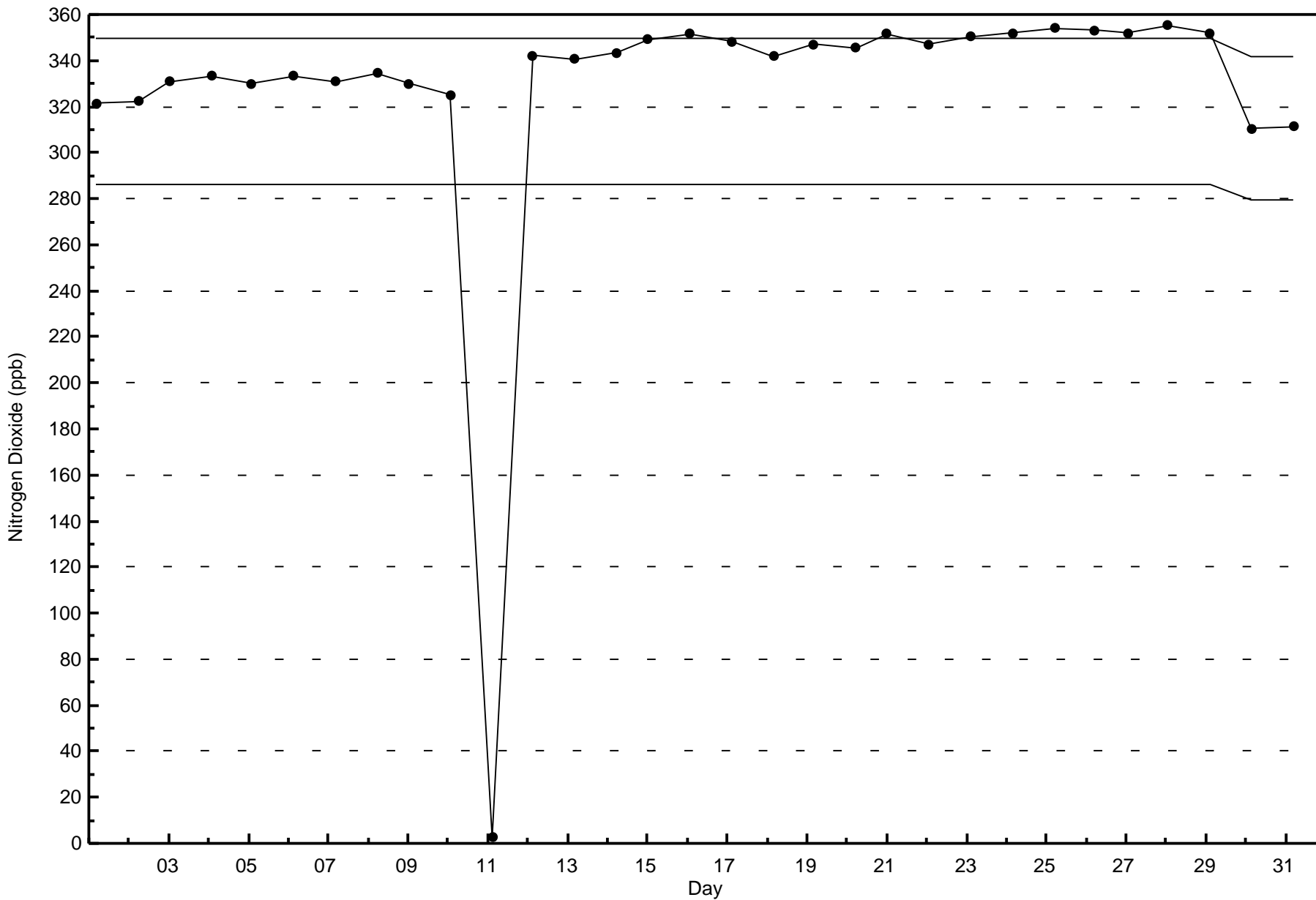


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Statoil - Leismer (AMS501)







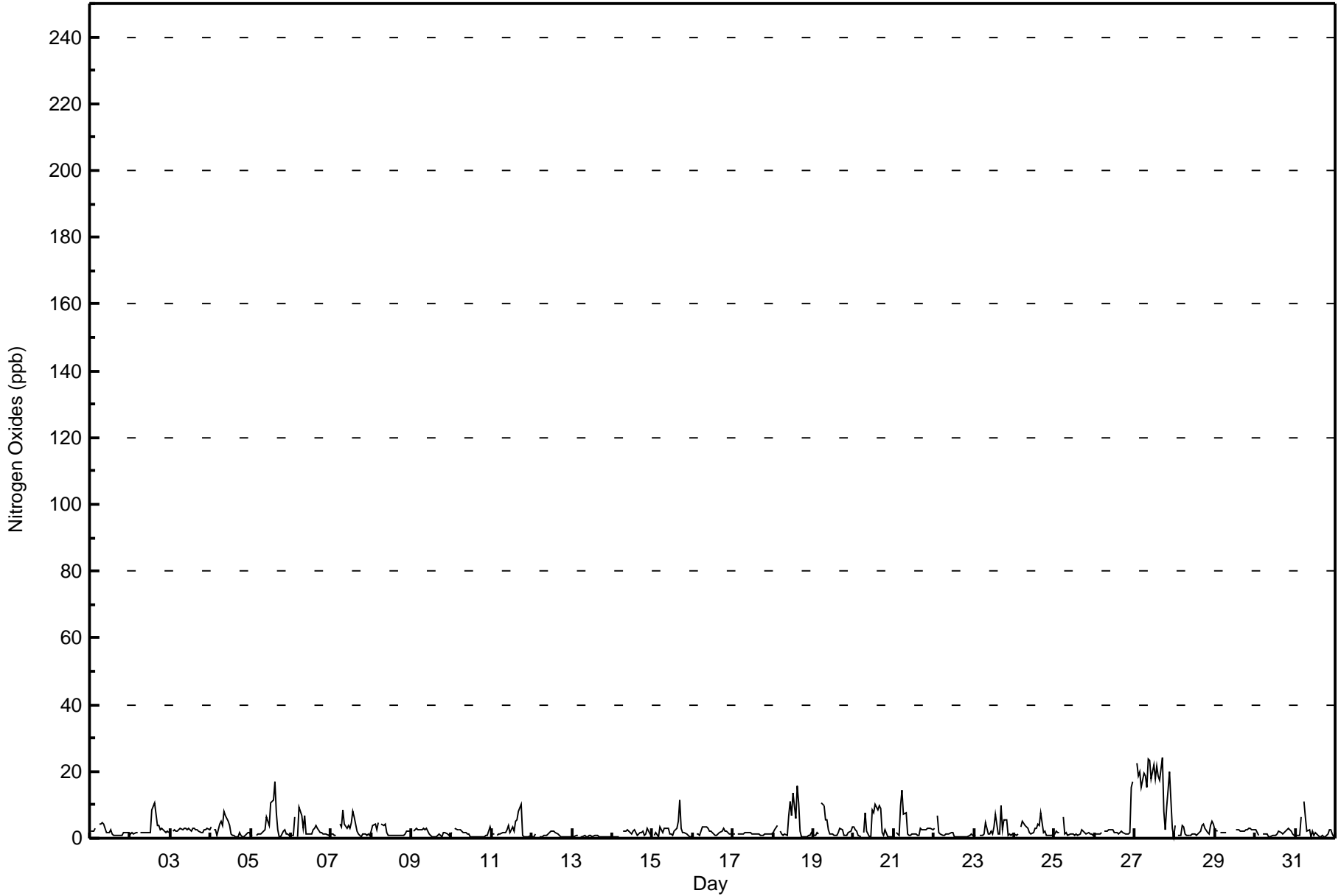


Maximum Value: 24 ppb on Oct 27 17:00		Maximum Daily Average: 16.2 ppb on Oct 27		Hours in Service: 744																																												
Minimum Value: 0 ppb on Oct 10 18:00		Minimum Daily Average: 0.6 ppb on Oct 13		Hours of Data: 708																																												
Maximum Diurnal Average: 4.5 ppb at hour 6		Minimum Diurnal Average: 1.5 ppb at hour 19		Hours of Missing Data: 36																																												
Monthly Average: 2.7 ppb		Percentiles: P <sub>1</sub> = 0 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> = 19		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	2	2	2	3	Z	4	4	5	4	3	2	2	3	1	1	1	1	1	1	1	2	2	2	2	2.1	5																						
2-Oct	1	2	1	1	2	Z	2	2	2	2	2	2	2	8	11	7	4	4	3	3	2	2	2	2	2.9	11																						
3-Oct	Z	2	3	2	2	2	3	3	3	3	3	2	3	3	2	2	2	2	2	2	2	3	3	2	2.5	3																						
4-Oct	3	Z	3	2	1	4	5	4	8	7	5	4	1	1	1	0	0	2	1	0	1	1	2	2	2.6	8																						
5-Oct	1	1	Z	1	1	1	1	2	3	6	5	4	10	11	17	8	3	0	0	2	2	1	1	1	3.6	17																						
6-Oct	1	1	6	Z	1	9	7	3	7	1	1	1	1	2	3	4	3	2	2	1	1	1	1	1	2.7	9																						
7-Oct	1	1	1	1	Z	4	3	8	4	3	4	3	5	8	6	2	1	1	0	1	1	1	1	1	2.8	8																						
8-Oct	2	4	4	3	4	Z	4	4	4	2	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2.1	4																						
9-Oct	Z	2	3	3	3	3	3	3	3	3	1	1	0	0	0	0	1	1	1	1	2	1	1	1	1.6	3																						
10-Oct	2	Z	3	3	3	3	2	2	2	1	1	1	1	0	0	0	0	0	0	1	1	1	2	3	1.4	3																						
11-Oct	1	1	Z	1	1	1	2	2	2	2	4	2	4	2	5	5	8	10	1	0	0	1	1	1	2.5	10																						
12-Oct	0	0	1	Z	1	1	0	1	1	1	2	2	2	2	2	1	1	0	0	0	1	0	0	1	0.9	2																						
13-Oct	1	1	1	1	Z	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	0.6	1																						
14-Oct	0	1	1	1	1	Z	2	2	2	3	2	1	2	2	2	1	2	2	2	1	1	3	1	1	1.5	3																						
15-Oct	Z	1	2	1	3	2	2	3	3	3	1	1	1	2	3	5	11	3	2	2	1	1	1	1	2.4	11																						
16-Oct	1	Z	1	1	1	2	4	3	3	3	2	2	1	1	1	1	2	2	3	2	2	2	1	1	1.9	4																						
17-Oct	1	1	Z	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.3	2																						
18-Oct	2	3	4	Z	2	1	1	1	1	7	11	7	13	6	16	11	2	1	0	0	0	1	1	2	4.0	16																						
19-Oct	1	1	2	1	Z	11	10	5	5	3	1	1	1	1	1	2	3	2	1	1	1	2	2	3	2.6	11																						
20-Oct	3	3	2	1	1	Z	2	8	2	0	1	9	7	10	9	10	9	2	1	3	0	0	0	1	3.6	10																						
21-Oct	Z	2	1	1	10	14	7	8	1	1	1	1	1	1	1	3	2	3	3	3	3	3	3	3	3.2	14																						
22-Oct	3	Z	7	2	1	1	1	1	1	1	2	2	1	1	0	0	0	0	0	0	1	1	1	1	1.3	7																						
23-Oct	1	1	Z	1	1	1	1	4	1	1	2	1	3	7	1	1	10	3	6	6	1	1	1	1	2.4	10																						
24-Oct	1	1	1	Z	3	5	4	3	3	2	1	2	3	3	4	4	8	2	2	1	1	1	1	1	2.5	8																						
25-Oct	1	2	2	2	Z	6	1	2	1	1	1	1	1	1	1	2	2	2	2	1	2	1	1	1	1.6	6																						
26-Oct	1	1	1	1	2	Z	2	2	2	3	3	2	2	2	2	2	2	2	1	1	1	2	15	17	3.0	17																						
27-Oct	Z	22	19	20	15	20	18	15	24	23	18	22	18	22	19	17	24	8	2	9	14	20	3	1	16.2	24																						
28-Oct	4	Z	1	1	4	3	1	1	1	1	1	1	1	1	2	2	4	4	3	2	1	4	5	4	2.2	5																						
29-Oct	3	2	Z	1	2	2	2	C	C	C	C	C	3	2	2	2	2	2	3	3	3	3	3	3	2.3	3																						
30-Oct	2	2	1	Z	1	1	1	1	1	1	1	1	1	1	2	2	1	2	2	2	3	2	1	1	1.5	3																						
31-Oct	1	1	1	7	Z	11	6	2	2	1	2	1	2	1	0	1	1	1	0	1	2	3	1	1	2.1	11																						
																								1.6	2.3	2.8	2.3	2.6	4.5	3.4	3.4	3.3	3.0	2.8	2.7	3.0	3.5	3.8	3.2	3.6	2.1	1.5	1.7	1.8	2.1	2.0	2.0	Diurnal Average
																								4	22	19	20	15	20	18	15	24	23	18	22	18	22	19	17	24	10	6	9	14	20	15	17	Diurnal Maximum
Z - zerospan																								C - Calibration																								



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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Statoil - Leismer - October 2015**





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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Statoil - Leismer - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	702	99.15	99.15
21 - 40	6	0.85	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: 708

Total Number of Hours: 744



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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Statoil - Leismer - October 2015**

<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	56	18	5	7	17	28	67	72	62	57	13	14	59	118	55	50	698
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	6
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>	56	18	5	7	17	28	67	72	62	57	13	14	59	118	61	50	704

Total Number of Valid Hours: 704

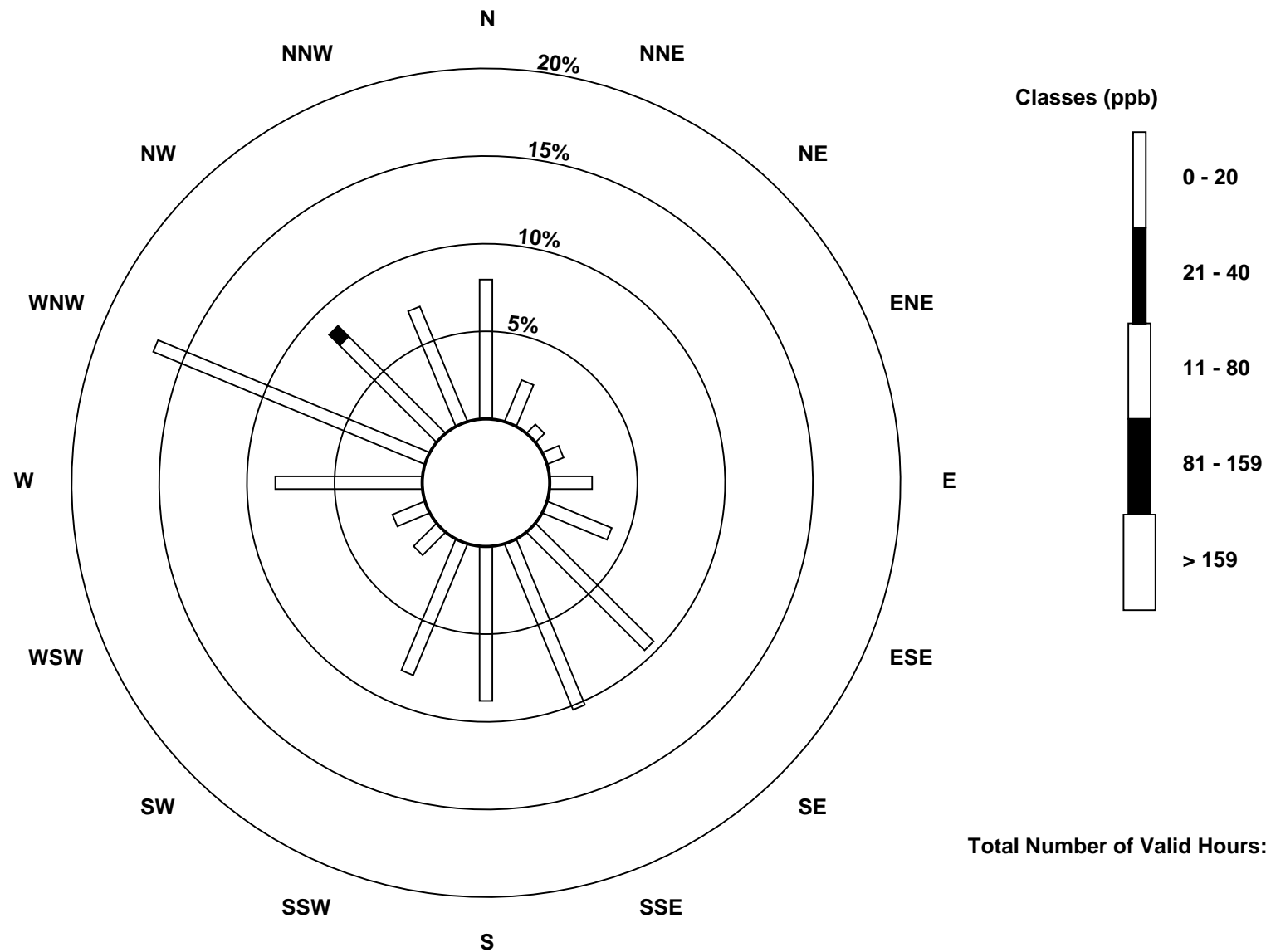
Total Number of Hours: 744



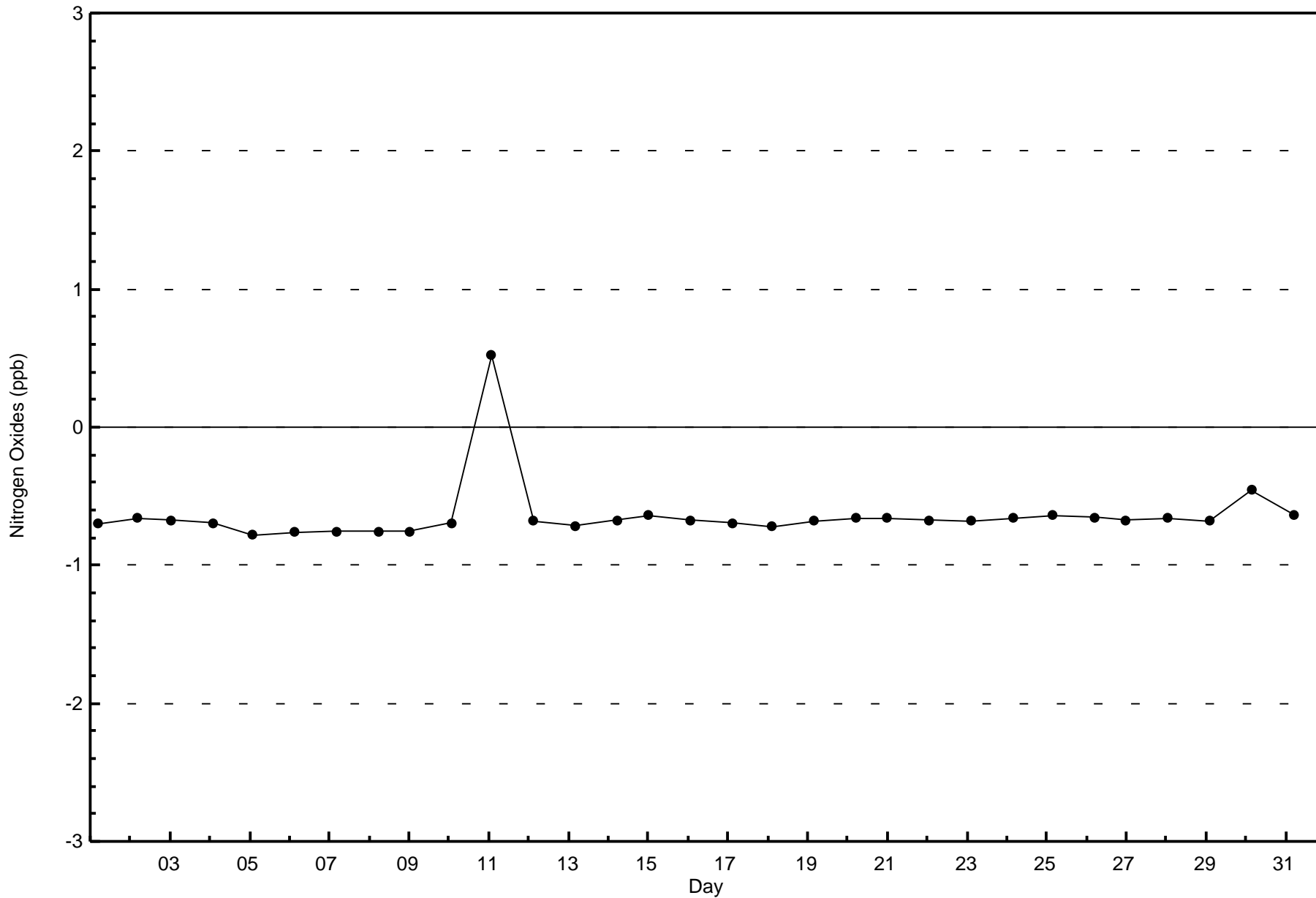


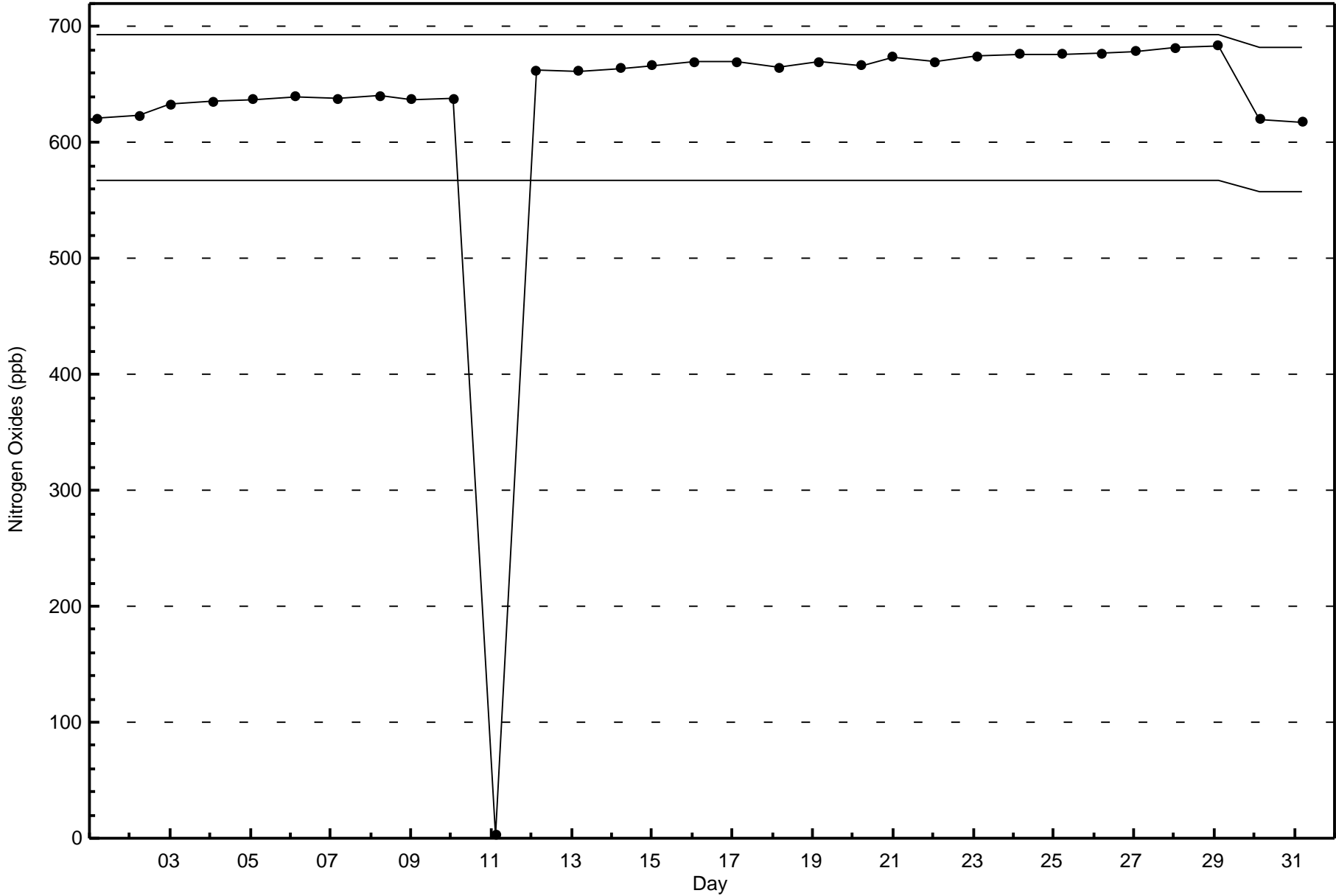
Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Statoil - Leismer (AMS501)



Total Number of Valid Hours: 704







**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Ambient Temperature (AT) - C**

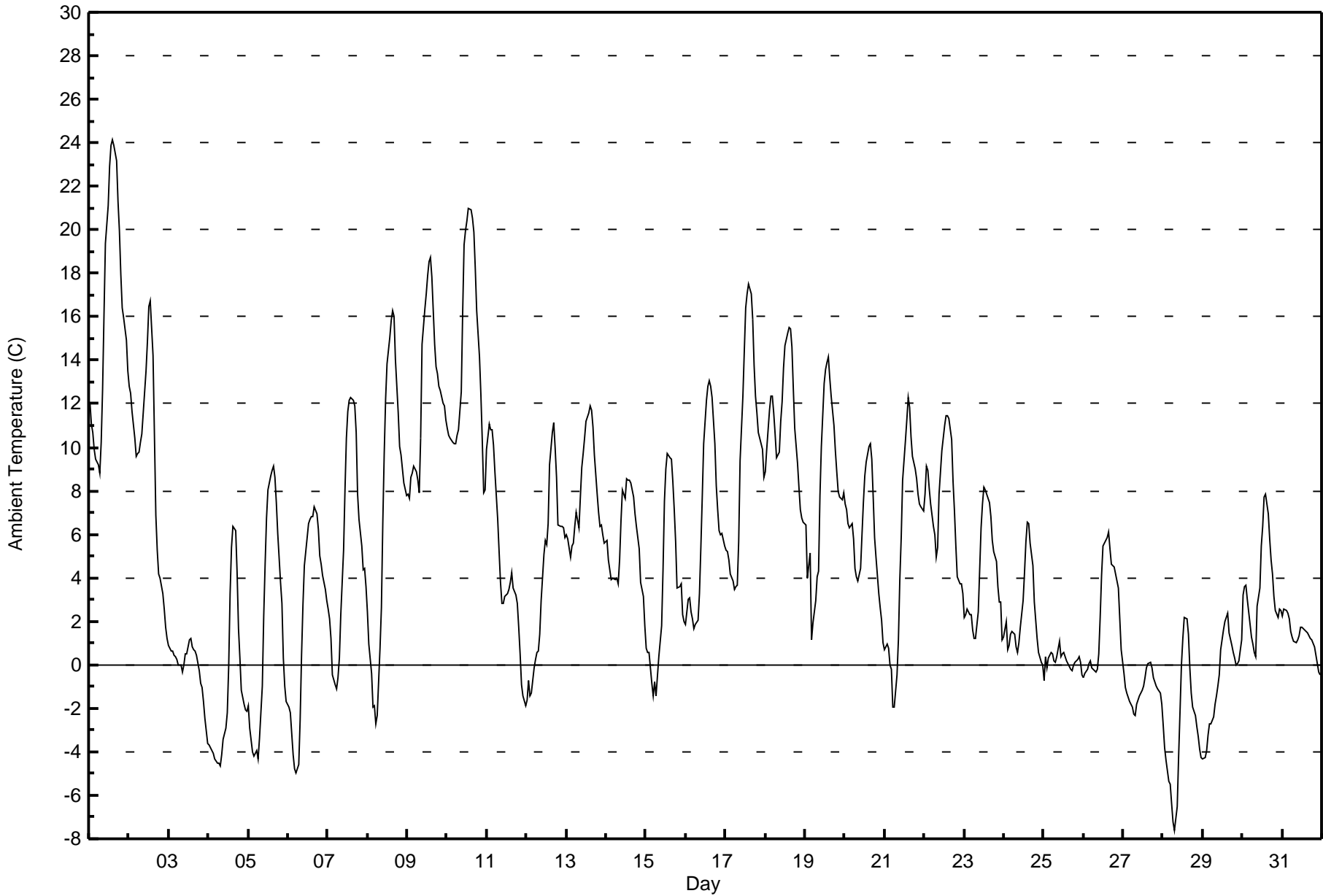
**Statoil - Leismer - October 2015**

Maximum Value: 24.1 C on Oct 1 15:00		Maximum Daily Average: 16.2 C on Oct 1		Hours in Service: 744																																												
Minimum Value: -7.6 C on Oct 28 08:00		Minimum Daily Average: -2.9 C on Oct 28		Hours of Data: 744																																												
Maximum Diurnal Average: 9.6 C at hour 15		Minimum Diurnal Average: 1.9 C at hour 7		Hours of Missing Data: 0																																												
Monthly Average: 5.11 C		Percentiles: P <sub>1</sub> = -4.8 P <sub>10</sub> = -1.6 Q <sub>1</sub> = 0.6 Median = 4.2 Q <sub>3</sub> = 9.0 P <sub>90</sub> = 12.5 P <sub>99</sub> = 20.9		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	12.0	11.0	10.7	9.9	9.5	9.2	8.8	10.2	12.7	16.1	19.4	21.1	22.9	23.9	24.1	23.9	23.2	21.3	20.0	18.0	16.4	15.9	14.9	13.5	16.2	24.1																						
2-Oct	12.8	12.5	11.7	10.4	9.6	9.7	9.8	10.2	10.6	12.6	13.5	14.9	16.5	16.7	14.2	10.6	6.9	5.3	4.2	3.9	3.3	2.6	1.7	1.2	9.4	16.7																						
3-Oct	0.9	0.6	0.6	0.4	0.4	0.3	0.0	0.0	-0.3	0.0	0.5	0.5	1.1	1.2	0.8	0.7	0.6	0.4	-0.3	-0.9	-1.0	-1.7	-2.4	-3.6	0.0	1.2																						
4-Oct	-3.7	-3.8	-3.9	-4.1	-4.3	-4.5	-4.5	-4.6	-4.1	-3.4	-2.9	-2.2	-0.1	3.3	5.4	6.4	6.2	4.2	1.7	0.3	-1.2	-1.8	-2.1	-2.2	-1.1	6.4																						
5-Oct	-1.9	-2.9	-4.0	-4.2	-4.1	-4.0	-4.3	-3.3	-1.0	2.2	4.6	6.8	8.0	8.7	8.9	9.1	8.6	7.5	6.0	3.8	2.8	0.3	-1.0	-1.7	1.9	9.1																						
6-Oct	-1.9	-2.2	-3.2	-4.2	-4.8	-5.0	-4.6	-2.5	0.5	2.8	4.5	5.8	6.5	6.7	6.8	6.8	7.2	7.0	6.2	5.0	4.7	4.1	3.4	2.9	2.2	7.2																						
7-Oct	2.6	2.1	1.2	-0.5	-0.9	-1.1	-0.6	0.3	2.3	5.3	8.0	10.4	11.7	12.1	12.3	12.2	11.9	10.7	7.9	6.7	5.5	4.3	4.4	3.6	5.5	12.3																						
8-Oct	2.4	1.0	-0.4	-1.9	-1.9	-2.7	-2.3	0.8	2.6	6.6	9.7	12.2	13.8	15.1	15.9	16.3	16.0	14.0	11.6	10.1	9.6	9.0	8.4	7.8	7.2	16.3																						
9-Oct	7.9	7.7	8.6	8.8	9.2	8.9	8.5	7.9	10.4	14.7	16.4	17.0	17.9	18.5	18.7	17.8	14.7	13.7	13.4	12.8	12.6	12.0	11.9	11.3	12.6	18.7																						
10-Oct	10.9	10.5	10.4	10.2	10.2	10.1	10.5	10.8	12.5	16.2	19.3	20.0	20.4	21.0	20.9	20.6	19.9	18.2	16.3	14.2	12.4	10.3	7.9	8.0	14.2	21.0																						
11-Oct	9.9	11.1	10.8	10.8	10.1	8.9	6.7	5.2	3.8	2.8	2.9	3.1	3.3	3.5	3.8	4.3	3.5	3.2	2.8	1.7	0.5	-0.9	-1.4	-1.9	4.5	11.1																						
12-Oct	-1.6	-0.7	-1.4	-1.3	-0.1	0.3	0.6	0.7	1.4	3.0	5.1	5.7	5.5	6.5	9.2	10.7	11.1	10.0	8.6	6.4	6.4	6.4	6.3	5.8	4.3	11.1																						
13-Oct	6.0	5.8	4.9	5.4	5.6	6.4	7.0	6.3	7.7	9.0	9.7	10.4	11.2	11.6	11.9	11.7	11.0	9.6	7.8	7.0	6.4	6.4	6.0	5.6	7.9	11.9																						
14-Oct	5.7	4.8	4.4	3.9	4.0	3.9	4.0	3.7	4.8	6.6	8.0	7.6	8.6	8.5	8.5	8.3	7.7	6.9	6.4	5.8	5.3	3.8	3.1	1.8	5.7	8.6																						
15-Oct	0.7	0.6	0.6	-0.9	-1.4	-0.8	-1.5	-0.5	0.4	1.8	4.3	7.5	9.0	9.7	9.5	9.5	8.4	7.1	5.6	3.6	3.6	3.7	2.3	2.0	3.5	9.7																						
16-Oct	1.9	3.0	3.1	2.4	2.1	1.7	1.8	2.1	3.3	5.4	7.7	10.1	12.2	12.8	13.0	12.8	12.3	10.2	8.2	7.1	6.2	6.0	6.0	5.4	6.5	13.0																						
17-Oct	5.3	5.2	4.8	4.1	3.8	3.5	3.6	3.7	5.7	9.4	12.3	14.4	16.4	17.1	17.5	17.1	15.9	13.8	12.4	11.6	10.7	10.1	9.9	8.6	9.9	17.5																						
18-Oct	8.9	9.9	11.7	12.3	12.4	11.6	10.6	9.5	9.8	11.2	12.1	13.6	14.7	15.3	15.5	15.5	14.6	12.7	10.9	9.3	8.1	7.2	6.8	6.5	11.3	15.5																						
19-Oct	6.4	4.0	4.5	5.1	1.2	1.9	3.0	4.1	4.3	7.8	10.1	13.0	13.6	13.9	14.1	13.2	12.3	11.0	9.9	8.8	8.0	7.7	7.6	7.9	8.1	14.1																						
20-Oct	7.4	7.1	6.5	6.3	6.5	5.8	4.4	4.1	3.9	4.5	6.0	7.5	8.7	9.3	10.0	10.1	9.5	7.7	5.8	4.9	3.2	2.7	2.0	1.0	6.0	10.1																						
21-Oct	0.7	0.9	0.8	0.0	-0.2	-1.9	-1.9	-0.4	1.2	3.9	5.9	8.5	10.3	11.3	12.3	11.9	10.5	9.6	9.0	8.5	7.9	7.4	7.3	7.1	5.4	12.3																						
22-Oct	7.9	9.1	9.0	8.1	7.4	6.4	6.0	5.0	5.4	7.9	9.9	10.4	11.0	11.4	11.5	11.3	10.3	8.4	7.1	5.5	4.1	3.7	3.7	3.3	7.6	11.5																						
23-Oct	2.2	2.3	2.6	2.3	2.3	1.6	1.2	1.2	2.5	4.4	6.3	7.4	8.2	8.0	7.6	7.5	6.8	5.7	5.2	4.7	3.6	2.9	2.9	1.2	4.2	8.2																						
24-Oct	1.3	2.0	0.7	0.9	1.4	1.6	1.4	0.8	0.6	1.0	1.7	3.0	4.3	5.7	6.5	6.5	5.6	4.6	2.9	2.0	1.2	0.6	0.1	0.0	2.3	6.5																						
25-Oct	-0.7	0.4	-0.1	0.3	0.6	0.5	0.2	0.1	0.4	1.1	0.3	0.5	0.6	0.4	0.2	-0.1	-0.2	-0.3	0.0	0.1	0.3	0.4	0.1	-0.5	0.2	1.1																						
26-Oct	-0.6	-0.4	-0.2	0.1	0.1	-0.1	-0.2	-0.3	-0.2	0.5	2.2	4.1	5.4	5.7	5.9	6.1	5.3	4.6	4.5	4.1	3.8	3.6	2.1	0.7	2.4	6.1																						
27-Oct	-0.4	-1.1	-1.3	-1.5	-1.7	-2.0	-2.2	-2.4	-1.8	-1.6	-1.4	-1.2	-1.0	-0.6	-0.2	0.0	0.1	-0.1	-0.6	-0.8	-0.9	-1.1	-1.3	-1.8	-1.1	0.1																						
28-Oct	-2.8	-3.8	-4.4	-5.4	-5.5	-6.4	-7.2	-7.6	-6.5	-4.2	-2.1	0.0	1.2	2.2	2.1	1.4	-0.1	-1.3	-2.0	-2.3	-2.9	-3.3	-3.9	-4.3	-2.9	2.2																						
29-Oct	-4.3	-4.3	-3.9	-3.2	-2.7	-2.7	-2.4	-1.8	-1.5	-1.0	-0.5	0.7	1.6	2.0	2.2	2.4	1.5	0.9	0.6	0.3	0.0	0.1	0.2	1.2	-0.6	2.4																						
30-Oct	3.2	3.6	3.6	3.0	1.9	1.3	0.9	0.6	0.4	2.7	3.6	5.5	6.4	7.7	7.8	7.0	5.8	4.8	4.2	3.1	2.5	2.2	2.6	2.5	3.6	7.8																						
31-Oct	2.2	2.6	2.5	2.4	2.1	1.6	1.3	1.1	1.0	1.2	1.4	1.7	1.7	1.6	1.5	1.4	1.3	1.2	1.2	0.8	0.4	0.1	-0.3	-0.5	1.3	2.6																						
																								3.3	3.2	2.9	2.6	2.3	2.1	1.9	2.1	3.0	4.8	6.4	7.7	8.8	9.4	9.6	9.4	8.7	7.5	6.4	5.4	4.6	4.0	3.5	3.0	Diurnal Average
																								12.8	12.5	11.7	12.3	12.4	11.6	10.6	10.8	12.7	16.2	19.4	21.1	22.9	23.9	24.1	23.9	23.2	21.3	20.0	18.0	16.4	15.9	14.9	13.5	Diurnal Maximum



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

**Ambient Temperature (AT) - C**  
**Statoil - Leismer - October 2015**





**Wood Buffalo Environmental Association  
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C  
Statoil - Leismer - October 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	139	18.68	18.68
0 - 10	451	60.62	79.30
10 - 20	143	19.22	98.52
> 20	11	1.48	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

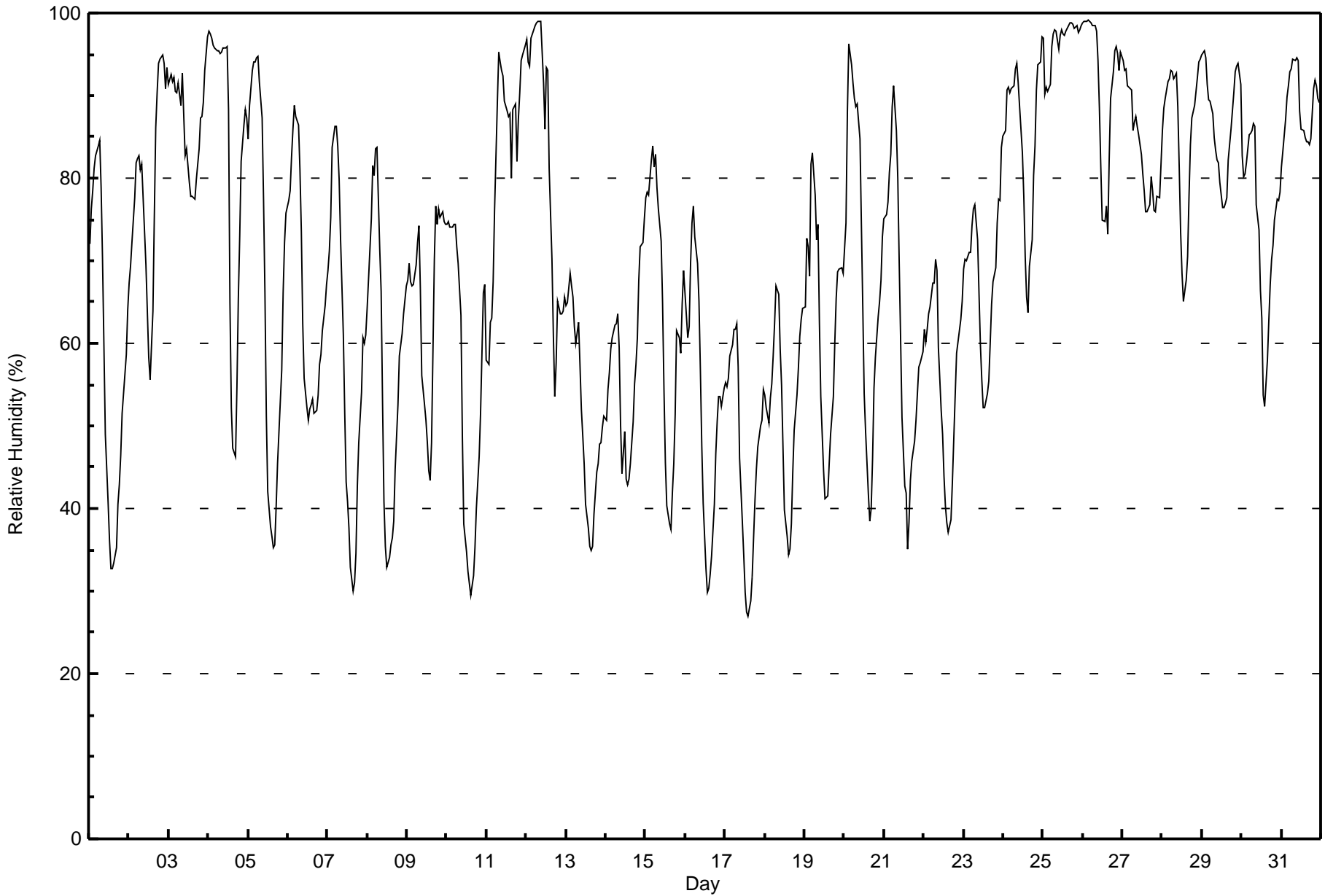


**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %  
Statoil - Leismer - October 2015**

Maximum Value: 99 % on Oct 26 04:00      Maximum Daily Average: 96.6 % on Oct 25																		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 17 15:00      Minimum Daily Average: 46.5 % on Oct 17 Maximum Diurnal Average: 83.0 % at hour 7      Minimum Diurnal Average: 53.0 % at hour 15 Monthly Average: 70.1 %      Percentiles: P <sub>1</sub> = 30 P <sub>10</sub> = 41 Q <sub>1</sub> = 55 Median = 72 Q <sub>3</sub> = 87 P <sub>90</sub> = 94 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	72	76	78	81	83	84	85	79	70	60	49	41	36	33	33	33	35	41	43	46	52	54	59	64	57.7	85
2-Oct	67	69	72	78	82	82	83	81	82	74	69	64	58	56	64	75	86	90	94	94	95	94	91	93	78.9	95
3-Oct	91	93	92	92	91	90	92	89	93	88	83	84	79	78	78	78	77	80	84	87	88	89	93	97	86.8	97
4-Oct	98	97	97	96	96	95	95	95	95	96	96	96	88	65	52	47	46	55	65	73	82	87	88	87	82.9	98
5-Oct	85	89	93	94	94	95	95	92	87	77	66	51	42	38	37	35	36	40	45	53	57	66	72	76	67.3	95
6-Oct	77	79	83	86	89	88	86	81	74	62	56	52	51	52	53	53	52	52	54	58	59	61	65	67	66.1	89
7-Oct	69	71	75	84	86	86	84	80	73	61	52	43	41	38	33	30	31	35	43	48	54	61	60	61	58.2	86
8-Oct	64	68	75	81	80	84	84	71	66	53	41	35	33	34	36	36	39	45	53	59	60	61	64	67	57.8	84
9-Oct	68	70	67	67	67	70	72	74	67	56	53	51	48	45	43	48	70	77	74	76	75	76	75	74	65.1	77
10-Oct	74	75	74	74	74	74	72	70	63	49	38	36	35	32	30	31	32	35	40	46	52	59	66	67	54.1	75
11-Oct	58	57	62	63	67	76	89	95	94	93	92	89	88	87	88	80	88	89	82	87	90	94	95	96	83.4	96
12-Oct	97	94	94	97	98	99	99	99	99	99	99	92	86	93	93	81	70	61	54	58	65	64	64	66	82.6	99
13-Oct	65	65	68	67	66	62	60	62	57	52	49	45	41	38	35	35	35	39	44	45	48	48	50	51	51.2	68
14-Oct	51	54	56	59	61	62	62	64	60	50	44	49	44	43	44	45	51	55	58	61	68	72	72	75	56.6	75
15-Oct	78	78	78	82	84	81	83	79	76	72	65	54	46	40	38	37	42	45	51	62	61	59	65	69	63.6	84
16-Oct	66	61	62	70	75	77	73	70	65	57	48	41	33	30	30	32	34	40	47	51	54	53	52	55	53.0	77
17-Oct	55	55	56	59	60	62	62	62	57	46	38	34	30	27	27	29	32	36	41	45	47	50	51	54	46.5	62
18-Oct	54	52	50	53	55	59	62	67	66	59	55	48	40	37	34	35	38	44	50	54	57	61	63	64	52.4	67
19-Oct	64	73	72	68	82	83	78	73	74	63	54	45	41	41	41	45	49	54	60	65	69	69	69	68	62.5	83
20-Oct	71	75	88	96	94	92	90	89	89	85	74	64	54	49	42	38	40	46	55	58	63	65	68	73	69.1	96
21-Oct	75	76	77	81	83	89	91	86	80	70	61	51	43	42	35	38	43	46	48	51	54	57	58	59	62.2	91
22-Oct	62	60	62	64	64	67	67	70	69	59	52	49	44	40	38	37	39	43	48	54	59	61	63	65	55.7	70
23-Oct	69	70	70	71	71	74	76	77	73	66	60	56	52	52	54	55	60	65	68	69	75	77	77	84	67.5	84
24-Oct	85	86	91	91	90	91	91	93	94	92	89	83	78	70	66	64	69	73	80	84	91	94	94	97	84.8	97
25-Oct	97	90	91	90	91	96	98	98	98	96	97	98	97	97	98	99	99	99	99	98	98	98	98	98	96.6	99
26-Oct	99	99	99	99	99	99	99	99	98	94	88	81	75	75	77	73	82	90	93	95	96	95	93	95	91.3	99
27-Oct	94	93	93	91	91	91	86	87	87	86	85	83	81	79	76	76	77	80	78	76	76	78	78	82	83.5	94
28-Oct	86	88	90	92	92	93	93	92	93	89	81	73	68	65	68	71	78	84	87	89	91	92	94	94	85.1	94
29-Oct	95	95	95	91	89	89	88	85	83	82	82	80	76	76	77	78	82	86	88	90	93	94	94	91	86.7	95
30-Oct	83	80	81	82	85	85	86	87	86	77	74	66	63	54	52	58	63	67	70	72	75	78	77	78	74.1	87
31-Oct	81	83	87	90	91	93	93	94	94	95	94	88	86	86	85	84	84	84	85	91	92	91	90	89	88.8	95
																		75.8 76.5 78.3 80.3 81.6 82.8 83.0 81.9 79.4 72.8 67.0 61.8 57.5 54.6 53.0 53.2 56.5 60.3 64.0 67.8 70.7 72.8 74.1 76.1						Diurnal Average		
																		99 99 99 99 99 99 99 99 99 99 97 98 97 97 98 99 99 99 99 99 98 98 98 98						Diurnal Maximum		







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

**Relative Humidity (RH) - %**  
**Statoil - Leismer - October 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	60	8.06	8.06
40 - 60	176	23.66	31.72
60 - 80	233	31.32	63.04
80 - 100	275	36.96	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

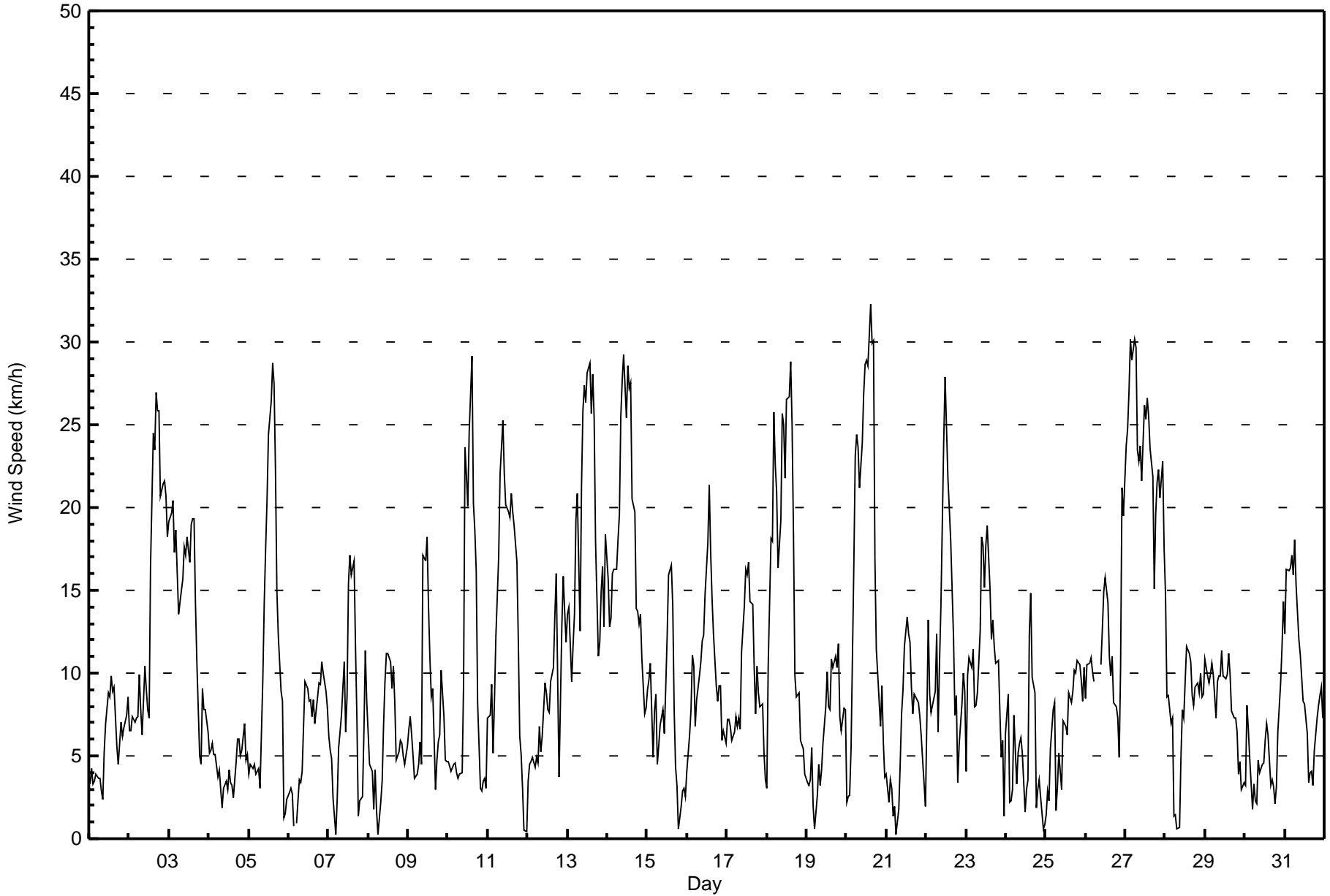


Maximum Speed: 32 km/h on Oct 20 15:00	Maximum Daily Speed Average: 23.8 km/h on Oct 27	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 8 07:00	Minimum Daily Speed Average: 1.1 km/h on Oct 4	Hours of Data: 740
Maximum Diurnal Speed Average: 8.1 km/h at hour 15	Minimum Diurnal Speed Average: 0.5 km/h at hour 20	Hours of Missing Data: 4
Monthly Average Velocity: 4.1 km/h 292.0 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> = 22 P <sub>99</sub> = 29	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	SSW3	SSE4	S3	S4	SSW4	S4	SSW4	SSW3	SSW2	S5	SSW7	SSW9	SSW9	SSW10	SSW9	S9	SSW6	S5	SSE6	SSE7	S6	S7	SSE7	SSE9	S5.6	SSW10
2-Oct	SSE7	SE7	SE7	SSE7	SE7	SE7	SSE10	SSE8	SSE6	S10	SSW9	SSW8	S7	NW16	NNW24	NNW23	N27	N26	N26	N21	N21	N22	N21	N18	N6.1	N27
3-Oct	N19	N20	N20	N17	N19	N16	N14	N15	N16	N18	N17	N18	N17	N19	N19	N19	NNE14	NNE11	NNE5	N4	N9	NNE8	NNE8	NNE6	N14.3	N20
4-Oct	N5	NNW5	NNW6	N5	N5	NNE4	N4	NNW3	S2	SSE3	SSE3	SSE3	SSW4	WSW3	SSW3	SSW2	S5	SSE6	SE6	SE5	ESE5	SE7	SE5	SSE5	SE1.1	SE7
5-Oct	S4	S4	SSE4	SSE5	S4	SSW4	SSW4	WSW3	NNW10	NW14	NNW18	NNW20	NW24	NW26	NW29	NW27	NW22	NNW15	NNW12	N9	N8	NW1	NNE2	N2	NW8.8	NW29
6-Oct	NNW3	N3	N3	NE1	AF	E1	E4	ESE3	ESE4	SE7	SSE10	SSE9	SE8	SE8	ESE7	ESE8	ESE7	ESE9	ESE9	ESE9	ESE11	ESE10	ESE9	ESE8	ESE5.7	ESE11
7-Oct	E6	E5	ESE5	E2	SE0	N2	NNW5	NNW6	NNW7	NNW11	N6	NW9	NW15	NW17	NW16	NNW17	N12	NNW7	W1	NNW2	NW3	N6	N11	NNW8	NNW6.3	NW17
8-Oct	N6	NNE4	N4	NW2	N4	NNE2	SE0	SE2	S3	S7	SSE9	SSE11	S11	S11	SSW9	S10	SSW8	S5	SSE5	SE6	SE6	SSE5	SSE5	SE6	SSE3.8	SSE11
9-Oct	SE7	SE7	SSE6	SSE5	SSW4	S4	SSW5	SSW6	W4	NNW17	NNW17	W18	W14	W11	WSW9	WSW9	WSW3	SE5	SE6	SSE6	SSE10	SE7	S5	SSW5	SW4.2	W18
10-Oct	SSW5	S4	S4	S4	SSW5	S4	S4	S4	SW4	W9	NNW24	W22	W20	W25	W29	W20	W19	W16	W8	NNW3	NNW3	NNE3	NNE4	N3	W8.2	W29
11-Oct	NE7	ENE7	ENE9	ENE5	NE8	NNE12	NNE17	N22	N24	N25	N22	N20	NNW20	NNW19	NNW21	NNW20	NW19	NW17	NNW12	NNW6	WNW5	W3	NW1	SSW0	N11.7	N25
12-Oct	SE3	SE4	SSE5	SSE5	S4	S5	S5	SSW7	S5	S6	SSW9	SW9	SW8	S8	SW10	SW10	W14	NNW16	W10	WSW4	NNW13	NNW16	W14	W12	WSW5.7	NNW16
13-Oct	W14	W14	W10	W12	W14	NNW19	NNW21	W13	W21	NNW26	NNW27	NNW26	NNW28	NNW29	W26	NNW28	W25	W18	W11	NNW12	NNW15	NNW16	NNW13	NNW18	NNW18.9	NNW29
14-Oct	W16	W13	W13	NNW16	NNW16	NNW16	NNW18	NNW20	NNW26	NNW28	NNW29	NNW25	NNW29	NW27	NW28	NW21	NNW20	NNW14	NW14	NNW13	NNW14	NNW11	NNW8	W8	NNW17.6	NNW29
15-Oct	WNW9	WNW10	WNW11	W5	WNW8	WNW9	W5	WNW6	WNW7	WNW8	WNW6	WNW9	NNW12	NNW16	NNW17	NW14	NNW8	NNE4	NE3	WSW1	SE2	ESE3	E3	SE3	WNW5.9	NNW17
16-Oct	ESE4	ESE6	E8	E11	E10	SE7	ESE8	ESE10	ESE11	SE12	SE12	SSE15	SSE18	SSE21	SSE17	S15	S12	SSE9	SE8	SE9	SSE9	SSE6	S7	SSW6	SE9.4	SSE21
17-Oct	SSW7	SSW7	SSW7	S6	S6	S7	S7	S7	S7	S11	SSW14	SSW16	SSW16	SSW17	SSW14	S14	S10	S8	S10	SSW9	SSW8	SSW8	SW5	SSW4	SSW9.3	SSW17
18-Oct	WSW3	NNW11	NNW18	NNW18	NNW26	NNW23	NNW21	NNW16	NNW19	NNW26	NNW25	NNW22	NW27	NNW27	NW29	NW25	NNW18	W10	W9	WNW9	W6	WNW6	WNW5	NW4	NNW16.4	NW29
19-Oct	N3	N3	NW4	NNE6	NW2	W1	NW3	N4	ENE3	SSE4	SE6	SSE8	SSE10	SSE8	SE8	ESE11	ESE10	ESE11	ESE10	E12	ESE7	SE7	SSE8	SW8	ESE3.9	E12
20-Oct	S2	S3	WSW3	W5	NNW17	NNW23	NNW24	NNW24	NNW21	NNW24	NNW27	NNW29	NW29	NW29	NNW32	NW30	NNW30	NNW17	NNW11	NNW10	W7	WNW9	W6	W4	NNW16.8	NNW32
21-Oct	W4	WNW2	NW4	W3	NNE1	E2	NNW0	ESE2	SE4	SSE8	SSE9	SSE12	SSE13	SE12	SE12	SE9	SE8	SE9	SSE8	SSE8	SSE7	SSE6	S5	SW2	SSE5.1	SSE13
22-Oct	WNW7	NNW13	WNW9	W8	WNW8	WNW9	NNW12	W6	NNW11	NNW14	NNW24	NNW28	NNW25	W22	W20	W18	W12	W7	W9	WSW3	WNW6	WNW8	NNW10	WNW9	NNW12.3	NNW28
23-Oct	W4	NNW10	NNW11	NNW10	NNW11	WNW8	WNW8	WNW9	W13	NNW18	NNW18	NNW15	NNW18	NNW19	NNW15	NNW12	NW13	NNW12	NW11	NNW11	N8	NNW5	NNW6	NNW1	NNW10.5	NNW19
24-Oct	NW6	N9	SSE2	NW2	NNW3	N7	NE3	SE5	SE6	SE6	SSE5	SSE2	WSW3	NNW4	NW12	NW15	NNW10	NNW9	NNE2	SSE3	SSE4	E3	S1	NNW1	NNW1.8	NW15
25-Oct	WSW1	WNW3	WSW2	N5	NNW8	NNW8	W2	NE3	NNE5	SE3	ESE7	SE7	SSE7	SSE6	SSE9	SE8	SE9	ESE10	SE10	SE11	SE10	SE10	SE8	SSE10	SE4.0	SE11
26-Oct	SE8	SSE10	SE11	SE11	SE10	SE9	AF	AF	AF	SE11	SE13	SE15	SE16	SE14	SE11	SE10	SE11	SSE8	SSW8	SSW7	SW5	W10	NW21	NW19	SSE6.1	NW21
27-Oct	NW24	NW25	NW27	NW30	NW29	NW30	NW30	NW24	NW23	NW24	NW22	NW26	NW25	NW27	NW26	NW24	NW22	NW15	NNW20	NW22	NW22	NW21	NNW23	NNW18	NW23.8	NW30
28-Oct	NW15	NNW9	NNW9	NW7	NW7	NNW1	E1	SE1	W1	SSE5	SSE8	SSE7	S9	SSE12	SE11	SE11	ESE9	SE8	SE9	SE9	SSE9	SSE10	SSE9	SSE9	SSE3.5	NW15
29-Oct	SSE11	SSE10	SSE9	S10	S11	S10	SSW7	SSW10	SSW10	SW10	SSW11	SSW10	SSW10	SSW10	SSW11	SSW10	SSW8	SSW7	SW7	SW6	SSW4	SSW5	S3	SSW3	SSW8.0	SSW11
30-Oct	WSW3	W8	W7	W5	SSW2	W3	W2	S2	S5	S4	SSW5	S5	S6	SSW7	SW6	S3	SSW4	SSW3	SW2	W3	WNW6	NNW9	NNW12	NNW14	WSW3.9	NNW14
31-Oct	WNW12	NNW16	NNW16	NNW16	NW17	NW16	NNW18	NNW15	NNW12	NNW11	NW10	NNW8	NNW8	N6	SE3	SE4	E4	ENE3	E5	E7	E8	ENE9	ENE9	ENE7	NNW5.8	NNW18

WNW2.6	NNW2.9	NNW3.0	NNW3.1	NNW4.2	NNW4.2	NNW4.6	NNW3.8	NNW4.9	NNW5.6	NNW6.3	W6.5	W7.2	NNW7.9	NNW8.1	NNW6.7	NNW5.5	NNW3.0	NNW1.4	NW0.5	NNW1.1	NNW1.7	NW2.2	NNW2.3	Diurnal Average
NW24	NW25	NW27	NW30	NW29	NW30	NW30	NNW24	NNW26	NNW28	NNW29	NNW29	NNW29	NNW29	NNW32	NNW30	NNW30	N26	N26	NW22	NW22	N22	NNW23	NW19	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**  
**Statoil - Leismer - October 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	207	27.97	27.97
6 - 11	298	40.27	68.24
12 - 19	133	17.97	86.22
20 - 28	86	11.62	97.84
29 - 38	16	2.16	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 740

Total Number of Hours: 744



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

**Wind Speed (WS) - km/h**  
**Statoil - Leismer - October 2015**

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	16	11	4	3	10	7	16	21	33	24	5	12	17	6	9	13	207
6 - 11	11	5	2	5	6	22	47	47	27	34	9	2	18	39	6	18	298
12 - 19	16	3	0	0	1	0	7	7	3	5	0	0	17	44	17	13	133
20 - 28	14	0	0	0	0	0	0	1	0	0	0	0	9	27	26	9	86
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	1	8	7	0	16
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	57	19	6	8	17	29	70	76	63	63	14	14	62	124	65	53	740

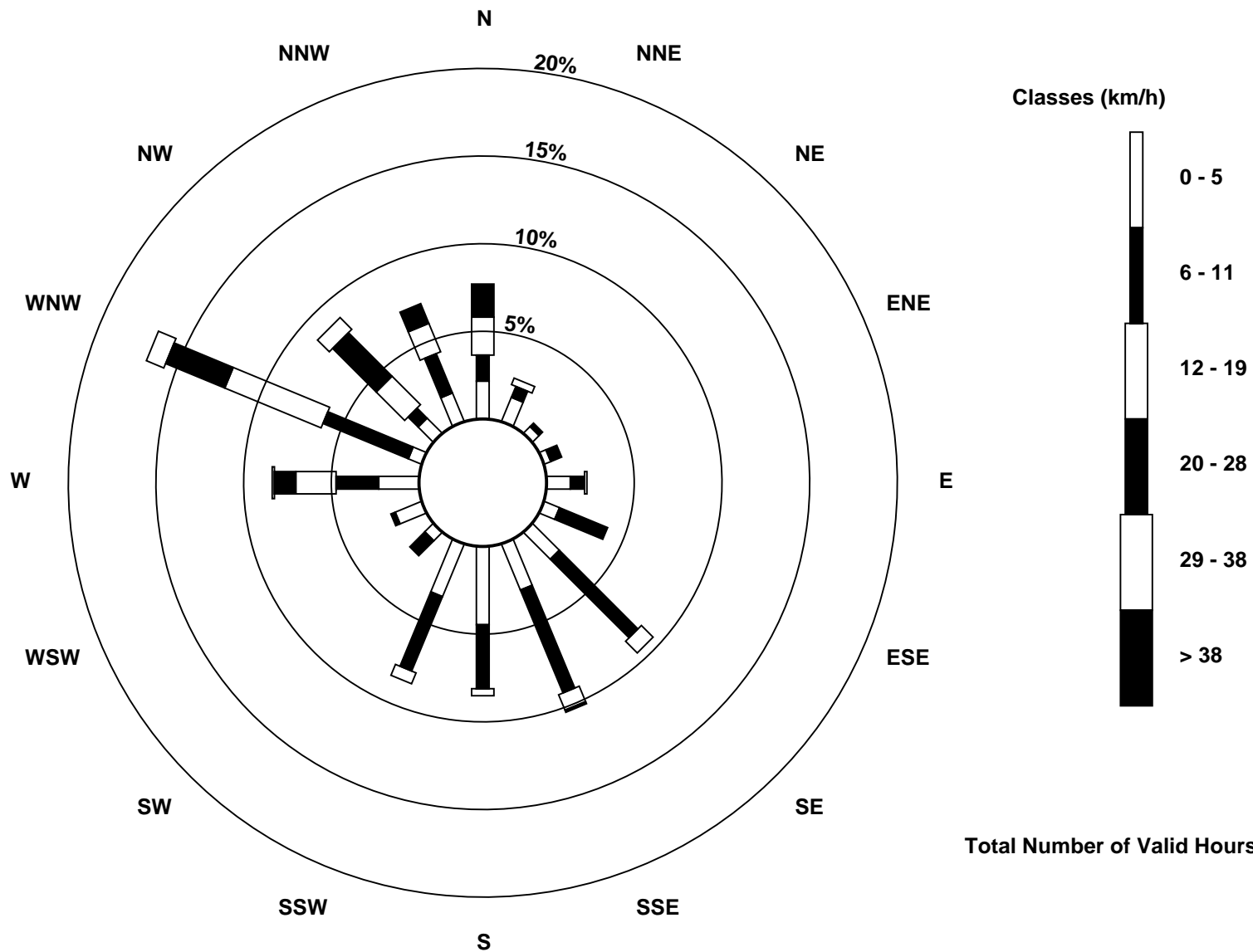
Total Number of Valid Hours: 740

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Wind Speed (WS) - km/h  
Statoil - Leismer (AMS501)





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Statoil - Leismer - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Oct 2 14:00 Minimum Value: 0 km/h on Oct 15 22:00 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: 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	1	1	1	1	1	1	1	1	2	2	2	3	3	3	3	2	1	1	2	2	1	2	1	3
2-Oct	1	1	2	1	2	1	1	1	2	3	2	2	2	9	4	4	5	5	6	5	5	5	5	4	9
3-Oct	4	4	4	4	5	4	3	4	3	3	3	4	4	4	4	3	3	2	3	2	1	1	1	2	5
4-Oct	2	2	2	2	2	1	1	2	1	1	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2
5-Oct	1	1	1	1	1	1	1	1	4	3	3	5	5	5	6	5	5	3	2	1	1	2	1	1	6
6-Oct	1	1	1	1	AF	1	1	1	2	1	2	2	2	2	1	2	1	2	2	2	2	2	2	2	2
7-Oct	2	1	1	1	1	1	1	2	2	2	2	3	4	4	4	4	3	3	1	1	1	4	2	1	4
8-Oct	1	2	1	1	1	1	1	1	1	2	3	3	3	3	3	3	2	1	1	1	1	1	1	1	3
9-Oct	1	1	1	2	1	1	1	1	2	4	5	5	5	4	3	5	3	1	1	2	1	1	1	1	5
10-Oct	1	1	1	1	1	1	1	1	1	5	6	6	6	7	8	7	6	4	4	2	3	1	2	1	8
11-Oct	2	3	3	2	3	3	3	4	4	4	4	5	4	4	4	4	3	3	3	1	2	1	1	1	5
12-Oct	1	1	1	2	1	1	1	2	1	1	3	3	2	2	3	3	6	3	3	3	2	3	3	3	6
13-Oct	3	3	3	3	4	4	5	4	6	6	6	6	6	7	7	7	6	2	2	3	3	3	4	7	
14-Oct	4	4	3	3	4	4	4	4	5	6	6	9	7	6	6	4	4	2	2	3	3	2	3	1	9
15-Oct	2	1	2	2	1	3	1	1	1	2	2	2	5	4	4	4	3	1	2	1	1	0	1	2	5
16-Oct	1	1	2	2	3	2	2	2	2	3	3	3	4	5	4	4	3	2	2	1	1	2	2	1	5
17-Oct	2	1	1	1	1	1	1	2	2	3	4	4	4	5	4	5	3	2	2	2	2	2	2	2	5
18-Oct	1	2	4	4	5	5	4	3	5	5	6	4	5	6	6	5	6	2	2	1	2	2	1	1	6
19-Oct	2	2	1	1	1	1	1	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	5	5
20-Oct	1	1	1	3	5	6	5	5	4	4	6	6	6	6	7	8	7	5	2	2	2	2	2	2	8
21-Oct	1	1	1	1	1	1	1	1	1	2	2	3	3	3	3	2	2	2	2	1	1	1	1	1	3
22-Oct	5	2	2	1	1	1	3	2	3	5	6	5	5	5	6	5	5	3	3	1	2	2	2	2	6
23-Oct	2	2	2	2	2	2	2	2	5	3	4	3	4	3	3	3	3	2	2	3	1	2	2	2	5
24-Oct	3	3	2	1	2	1	2	1	1	1	2	2	2	3	4	4	2	2	2	1	0	1	1	1	4
25-Oct	1	1	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2	2	3	3	3	2	2	2	3
26-Oct	2	2	2	2	2	2	AF	AF	AF	4	3	3	4	4	3	2	4	2	3	3	2	7	4	4	7
27-Oct	6	5	6	7	6	6	7	5	5	5	4	5	5	6	5	5	5	3	3	4	4	4	4	3	7
28-Oct	3	4	2	1	2	2	1	1	1	1	2	2	3	3	2	2	2	2	2	1	1	1	1	1	4
29-Oct	2	2	1	2	2	2	2	2	3	3	3	3	3	3	3	3	2	2	2	2	1	1	1	1	3
30-Oct	2	3	3	2	1	2	2	1	1	1	1	1	2	2	2	2	1	1	1	1	2	1	2	2	3
31-Oct	3	3	3	4	3	4	3	3	2	2	2	2	2	2	2	2	2	1	2	2	2	3	3	3	4
Diurnal Maximum																									
AF - Analyzer Failure																									



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg  
Statoil - Leismer - October 2015**

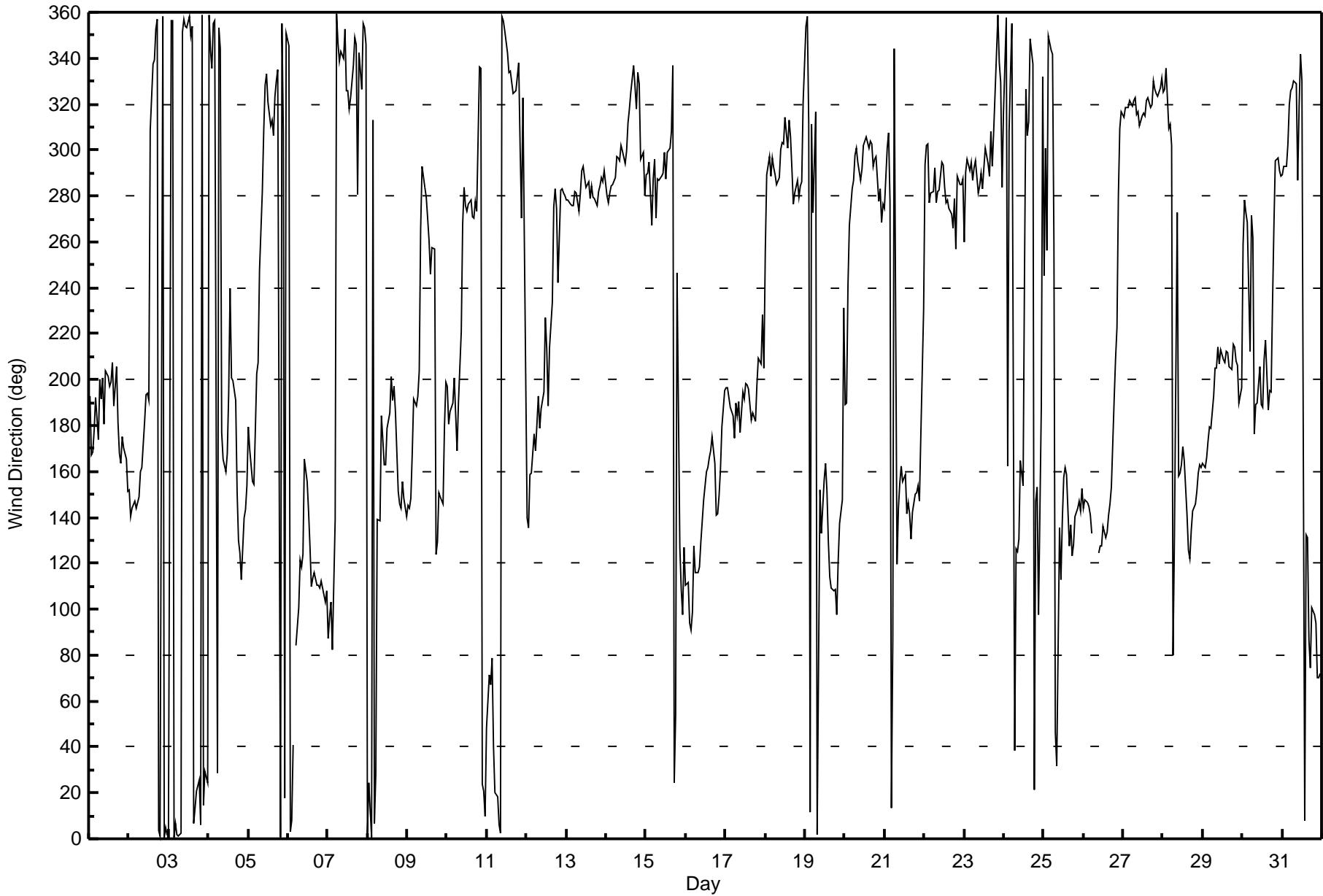
Direction of Maximum Speed: 301 deg on Oct 20 15:00		Hours in Service: 744
Direction of Maximum Daily Speed Average: 320.1 deg on Oct 27		Hours of Data: 740
Direction of Minimum Speed: 139 deg on Oct 8 07:00	Direction of Minimum Daily Speed Average: 1.1 deg on Oct 4	Hours of Missing Data: 4
Monthly Average Direction: 280.4 deg		Percent Operational Time: 99.5

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	193	167	169	178	192	174	200	192	201	181	204	201	197	199	208	189	206	181	168	164	175	170	166	151	184.7
2-Oct	152	140	144	147	144	146	149	160	162	182	194	194	191	309	337	339	353	357	3	1	358	0	5	2	358.4
3-Oct	1	356	356	1	7	2	1	2	351	357	354	353	358	350	354	7	14	21	26	6	359	15	29	24	1.5
4-Oct	359	343	336	355	356	29	354	344	177	165	160	168	194	240	201	199	191	151	130	124	113	140	144	154	135.6
5-Oct	179	170	155	154	178	202	207	248	282	308	328	333	321	311	313	306	324	330	335	1	355	307	18	351	315.9
6-Oct	345	3	8	41	AF	84	101	121	118	124	165	156	143	128	110	113	116	111	111	109	113	109	103	108	116.6
7-Oct	87	97	103	82	139	359	347	339	343	340	352	326	326	318	323	337	349	346	281	342	326	355	353	346	343.2
8-Oct	2	25	0	313	7	28	139	139	184	174	163	163	179	185	202	191	197	186	151	146	144	156	148	140	168.3
9-Oct	145	144	148	168	192	189	193	204	266	293	283	279	270	260	246	258	257	124	130	151	149	146	179	199	226.0
10-Oct	197	181	186	190	201	185	169	191	221	268	284	276	273	276	278	271	271	277	273	336	335	24	20	10	269.3
11-Oct	48	72	67	78	40	20	19	6	2	358	356	352	343	334	334	330	325	326	332	338	302	270	323	201	353.8
12-Oct	139	135	159	160	176	169	181	193	179	187	195	227	214	189	214	234	275	283	275	243	282	283	281	280	237.2
13-Oct	278	278	277	276	276	282	282	273	281	291	293	288	284	286	279	284	280	279	276	282	285	288	286	291	283.2
14-Oct	280	277	281	284	285	288	297	296	295	302	300	294	300	312	318	325	337	328	318	334	329	296	299	280	303.1
15-Oct	289	290	295	268	287	296	271	288	287	289	290	299	287	299	301	308	337	24	53	246	127	109	98	127	298.0
16-Oct	111	112	94	91	99	127	116	116	119	129	138	148	160	162	166	169	175	164	141	142	149	161	179	195	143.3
17-Oct	197	196	192	188	184	175	190	184	191	177	195	192	199	197	196	183	186	183	182	198	209	207	228	205	192.3
18-Oct	256	289	297	288	297	292	289	285	288	300	303	303	315	301	313	306	292	276	281	287	280	285	286	321	296.9
19-Oct	354	358	311	12	311	273	317	2	76	152	133	156	164	152	130	114	109	108	109	97	121	138	148	231	121.9
20-Oct	189	190	241	267	283	287	297	301	294	287	292	302	304	306	301	304	303	293	296	297	277	283	268	277	294.9
21-Oct	275	301	308	278	13	87	344	120	144	155	162	156	158	142	146	142	131	142	150	151	153	147	176	231	153.0
22-Oct	294	302	303	277	282	282	292	277	282	283	295	294	284	277	278	274	272	266	279	257	289	285	285	287	284.5
23-Oct	260	290	296	291	295	287	292	295	281	285	290	283	292	301	294	288	308	293	308	342	359	338	330	284	297.1
24-Oct	317	357	163	308	333	355	39	126	125	130	165	154	246	327	306	312	348	337	21	147	153	97	189	332	339.8
25-Oct	245	301	256	350	344	342	260	47	32	136	113	139	157	161	159	128	137	123	128	140	144	147	143	152	134.0
26-Oct	144	147	146	145	141	133	AF	AF	AF	124	128	128	136	131	133	141	146	153	192	209	223	280	310	317	150.1
27-Oct	314	319	318	319	322	319	322	323	316	317	311	315	316	315	322	323	318	320	330	326	324	323	327	331	320.1
28-Oct	325	327	336	309	311	302	80	131	273	158	159	163	171	165	141	126	122	134	143	146	151	159	163	162	154.4
29-Oct	164	162	166	173	180	179	193	205	205	214	207	213	208	207	212	212	205	204	215	214	208	206	190	196	196.8
30-Oct	258	278	273	268	212	272	262	176	189	190	206	189	188	208	217	187	196	195	233	267	295	296	291	289	249.2
31-Oct	289	293	293	303	320	326	327	330	329	287	319	342	330	8	132	131	86	74	100	98	94	70	70	72	332.4

295.2 299.9 298.4 292.6 300.1 300.1 302.1 301.7 294.4 286.3 281.8 279.8 276.5 282.7 289.2 293.0 302.6 303.1 300.9 323.1 301.2 288.9 306.8 294.4  
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  
Statoil - Leismer - October 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																			Hours in Service: 744							
Maximum Value: 97 deg on Oct 24 12:00																			Hours of Data: 740							
Minimum Value: 5 deg on Oct 8 00:00																			Hours of Missing Data: 4							
Percentiles: P <sub>1</sub> = 7 P <sub>10</sub> = 10 Q <sub>1</sub> = 13 Median = 16 Q <sub>3</sub> = 23 P <sub>90</sub> = 43 P <sub>99</sub> = 86																			Hours of Calibration: 0							
Percentiles: P <sub>1</sub> = 7 P <sub>10</sub> = 10 Q <sub>1</sub> = 13 Median = 16 Q <sub>3</sub> = 23 P <sub>90</sub> = 43 P <sub>99</sub> = 86																			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	20	12	24	18	24	14	42	38	75	29	31	24	30	28	31	27	30	13	11	11	11	9	10	9	75	
2-Oct	8	11	12	10	8	10	10	14	14	18	21	21	34	21	19	13	17	16	16	16	15	16	16	15	34	
3-Oct	15	14	15	15	16	15	15	16	13	13	15	13	18	20	15	17	17	16	19	34	13	12	11	24	34	
4-Oct	27	31	24	28	42	30	27	60	75	50	52	58	64	72	72	82	40	17	12	18	14	10	9	15	82	
5-Oct	13	10	14	19	12	17	10	39	15	20	15	18	15	16	14	17	15	10	10	9	9	75	41	40	75	
6-Oct	30	32	12	57	AF	60	17	17	24	19	17	16	19	17	13	14	13	11	12	12	13	15	17	60		
7-Oct	18	17	11	20	85	20	8	12	14	14	20	28	23	19	21	18	16	12	81	49	31	14	8	5	85	
8-Oct	12	50	35	63	12	69	91	52	30	22	22	19	23	23	29	21	17	12	15	7	10	13	11	10	91	
9-Oct	9	8	8	19	32	20	14	19	30	15	16	16	23	27	32	31	70	13	14	9	7	8	21	13	70	
10-Oct	14	15	13	17	17	17	20	22	34	28	15	18	21	19	17	20	21	13	22	92	59	23	33	52	92	
11-Oct	17	21	21	47	21	16	14	16	15	15	16	14	14	11	15	12	12	11	12	11	33	56	75	92	92	
12-Oct	19	15	30	21	16	18	21	17	14	15	17	24	20	18	23	27	25	11	26	67	11	10	12	13	67	
13-Oct	14	13	20	16	18	12	12	16	13	14	13	15	13	15	17	13	13	12	13	10	10	9	11	11	20	
14-Oct	12	15	12	11	10	11	10	10	11	12	14	18	16	13	14	11	14	11	10	13	13	10	19	10	19	
15-Oct	8	11	11	27	10	13	30	16	13	15	22	23	21	19	16	20	14	21	11	58	62	15	16	52	71	
16-Oct	14	11	17	15	15	20	14	14	14	18	18	17	17	14	14	15	15	13	11	9	7	18	16	14	20	
17-Oct	11	12	12	12	13	11	13	14	15	15	19	17	19	20	17	17	15	11	12	13	13	14	33	41	41	
18-Oct	51	11	10	11	11	11	10	10	12	14	13	15	14	14	14	14	13	13	12	7	17	24	16	43	51	
19-Oct	44	81	36	14	54	83	53	28	50	38	25	24	20	26	33	14	15	14	17	15	20	15	11	40	83	
20-Oct	36	21	47	37	13	11	11	12	11	12	12	14	15	14	14	14	11	11	14	19	13	9	23	47	47	
21-Oct	30	52	29	32	58	42	89	62	14	14	13	14	15	17	14	15	15	13	10	8	9	7	18	66	89	
22-Oct	63	14	21	11	10	10	9	30	13	18	13	13	15	17	18	17	26	29	14	41	23	16	12	13	63	
23-Oct	42	12	10	11	11	14	11	11	13	11	13	17	16	15	11	15	18	13	21	16	10	29	33	87	87	
24-Oct	34	26	58	52	36	8	47	19	24	23	39	97	71	67	23	25	11	21	77	29	14	48	83	77	97	
25-Oct	60	40	56	41	20	17	92	18	25	79	22	25	32	29	17	20	21	18	17	16	14	14	14	12	92	
26-Oct	15	13	12	12	14	15	AF	AF	AF	15	18	17	16	16	17	14	20	22	15	21	24	30	15	14	30	
27-Oct	13	12	13	12	11	11	11	11	13	13	14	14	13	13	13	11	12	18	11	11	10	10	9	10	18	
28-Oct	10	36	12	28	25	85	69	92	77	24	18	20	20	14	18	16	14	15	12	10	8	7	7	9	92	
29-Oct	8	10	9	11	13	13	15	16	17	18	16	18	18	17	16	16	14	13	16	16	19	18	14	24	24	
30-Oct	45	19	33	40	52	65	65	36	19	32	20	24	19	21	20	22	12	17	40	41	12	8	9	9	65	
31-Oct	9	10	9	15	14	10	11	11	16	12	18	26	21	28	63	48	31	35	23	22	23	21	25	24	63	
																			63 81 58 63 85 85 92 92 77 79 52 97 71 72 72 82 70 35 81 92 62 75 83 92							
																			Diurnal Maximum							
AF - Analyzer Failure																										



# Wood Buffalo Environmental Association

## SO2 Calibration Report

### Station Information

Calibration Date	September 25, 2015	Last Calibration	
Station Name	Statoil - Leismer	Station Number	AMS 501
Reason:	Install		
Start Time (MST)	7:30	End Time (MST)	9:30
Gas Cert Reference	S990374A	Station temp.	22 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26-Sep-17
Calibrator Make/Model	Sabio 4010	Serial Number	11581008
ZAG Make/Model	API 701	Serial Number	4522
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2579

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	549	548
Analyzer IP address	192.168.1.72		Lamp voltage	2692	2700
Calculated slope		0.994431	Chamber temp	50.0	49.9
Calculated intercept		1.520898	Pressure	25.0	25.1
Analyzer Background	16.7	18.2	Flow	0.580	0.568
Analyzer Coefficient	1.042	1.052	Intensity	67	67

Analyzer make API T100 Analyzer serial # 721

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	63.1	631.0	633.7	0.996
second point	5000	31.6	316.0	315.6	1.001
third point	5000	15.8	158.0	155.8	1.014
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	63.1	631.0	621.0	1.016
Average Correction Factor					1.004

Corrected As found      NA      Previous response      NA      % change      NA

**Notes:**

Install cal at a new site. Adjusted zero and span.

Calibration Performed By: Asad Hidayat



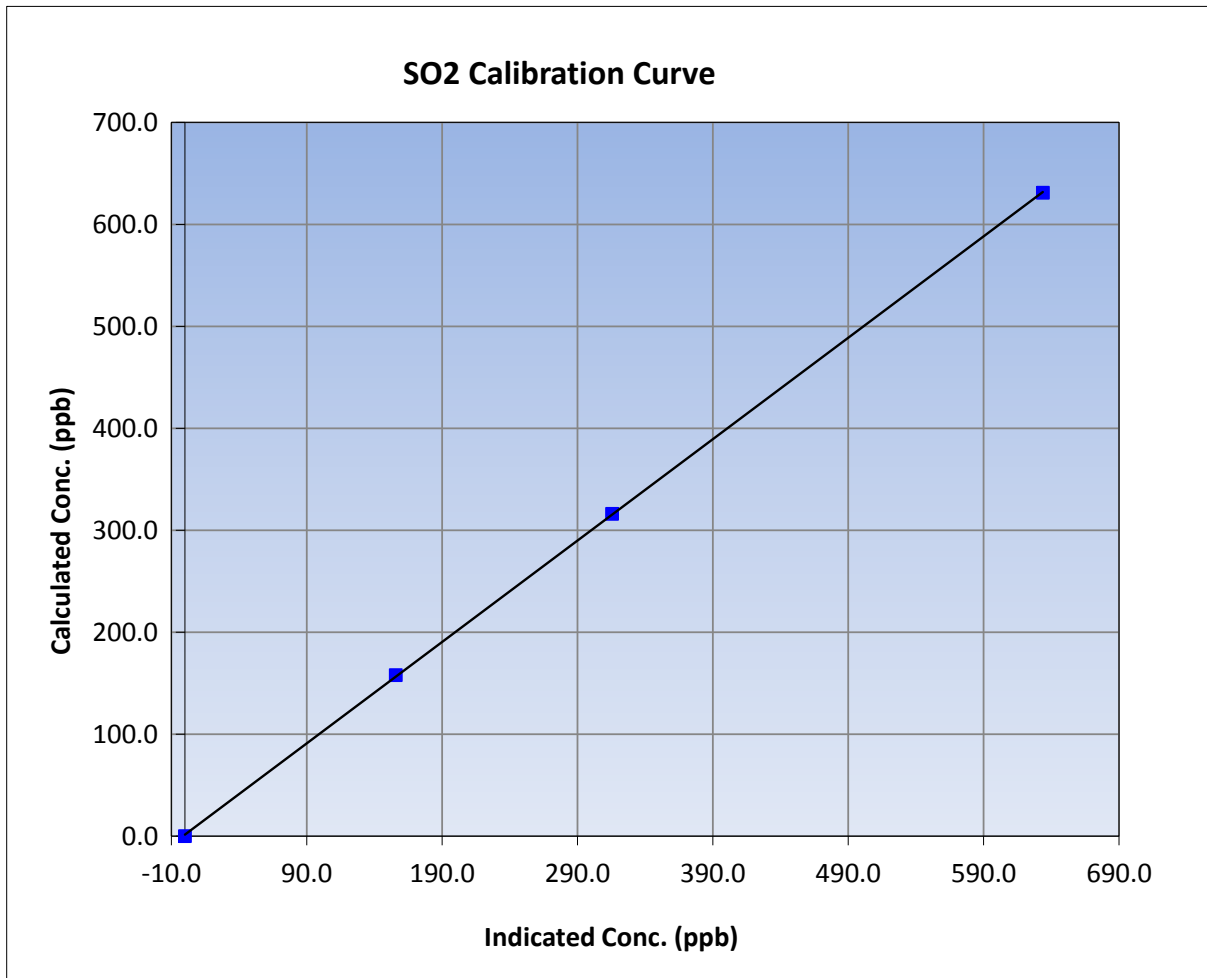
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	September 25, 2015	Previous Calibration	
Station Name	Statoil - Leismer	Station Number	AMS 501
Start Time (MST)	7:30	End Time (MST)	9:30
Analyzer make	API T100	Analyzer serial #	721

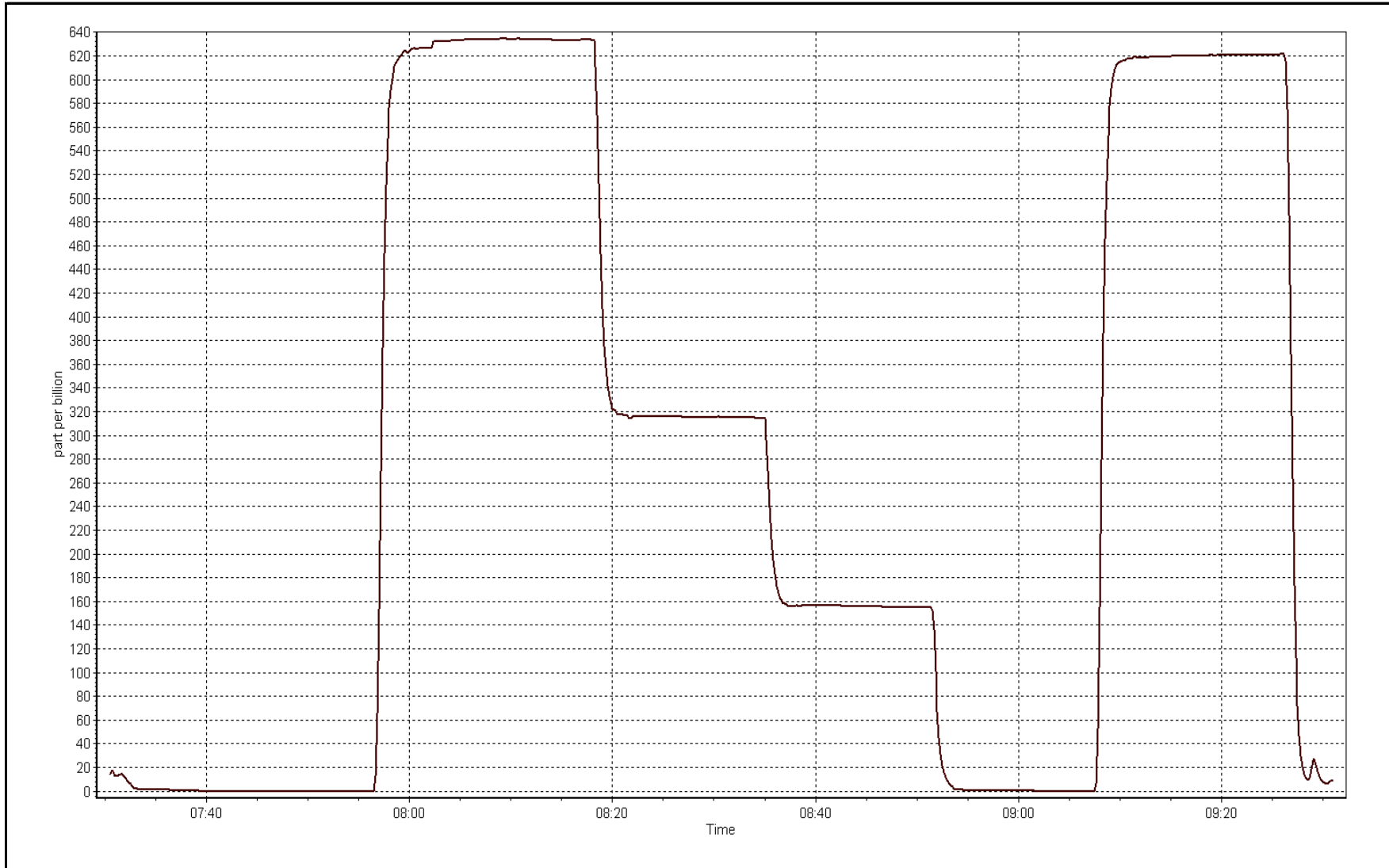
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999974
631.0	633.7	0.9957		
316.0	315.6	1.0014	Slope	0.994431
158.0	155.8	1.0141		
			Intercept	1.520898



SO2 Calibration Plot

Date: September 25, 2015





# Wood Buffalo Environmental Association

## SO2 Calibration Report

### Station Information

Calibration Date	October 29, 2015	Last Calibration	September 25, 2015
Station Name	Statoil - Leismer	Station Number	AMS 501
Reason:	Routine		
Start Time (MST)	7:20	End Time (MST)	11:06
Gas Cert Reference	S990374A	Station temp.	22 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26-Sep-17
Calibrator Make/Model	Sabio 4010	Serial Number	11581008
ZAG Make/Model	API 701	Serial Number	4522
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2579

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	548	549
Analyzer IP address	192.168.1.72		Lamp voltage	2700	2705
Calculated slope	0.994431	0.982763	Chamber temp	49.9	50.1
Calculated intercept	1.520898	1.852623	Pressure	25.1	25.3
Analyzer Background	18.2	18.2	Flow	0.568	0.454
Analyzer Coefficient	1.052	1.052	Intensity	67	67

Analyzer make API T100 Analyzer serial # 721

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.5	----
as found span	5000	63.1	631.0	638.3	0.989
calibrator zero	5000	0.0	0.0	-0.5	----
high point	5000	63.1	631.0	640.8	0.985
second point	5000	31.6	316.0	319.2	0.990
third point	5000	15.8	158.0	157.3	1.004
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	63.1	631.0	632.0	0.998
Average Correction Factor					0.993

Corrected As found 638.8 Previous response 633.0 % change -0.9%

**Notes:**

no adjustments or maintenance done, filter changed out

Calibration Performed By: Melissa Lemay



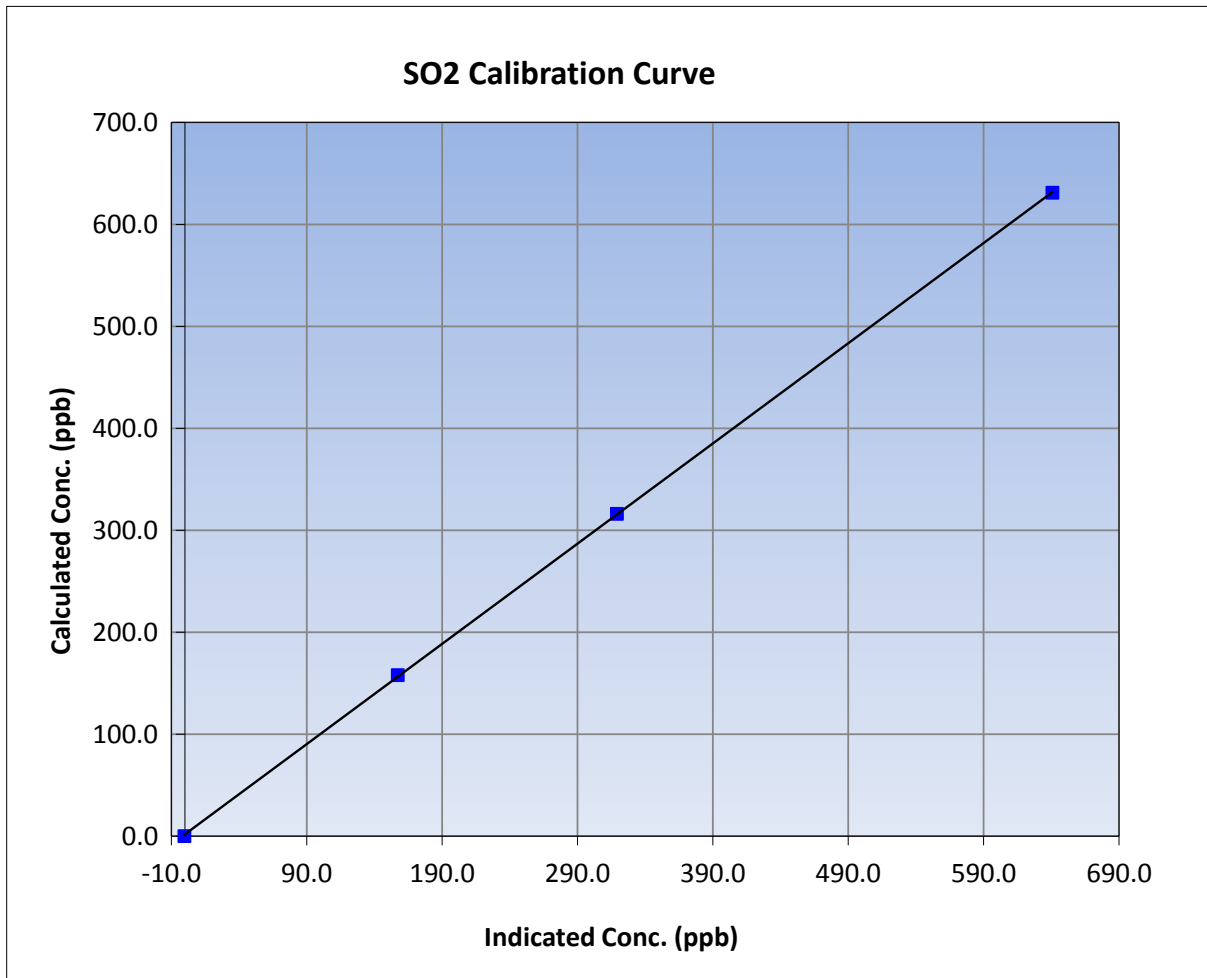
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	October 29, 2015	Previous Calibration	September 25, 2015
Station Name	Statoil - Leismer	Station Number	AMS 501
Start Time (MST)	7:20	End Time (MST)	11:06
Analyzer make	API T100	Analyzer serial #	721

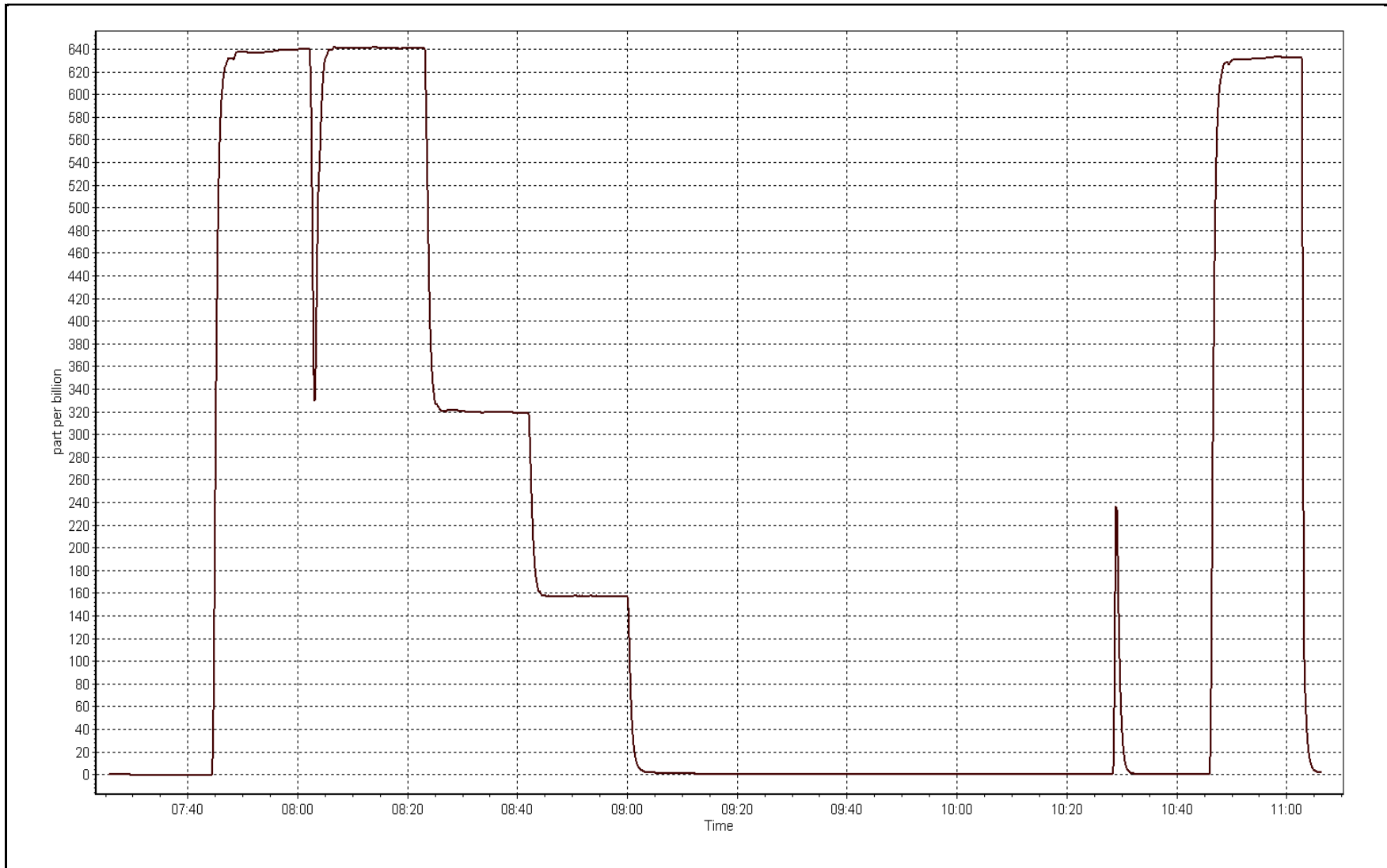
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.5	----	Correlation Coefficient	0.999977
631.0	640.8	0.9847		
316.0	319.2	0.9900	Slope	0.982763
158.0	157.3	1.0045		
			Intercept	1.852623



SO2 Calibration Plot

Date: October 29, 2015







# Wood Buffalo Environmental Association H2S Calibration Report

### Station Information

Calibration Date	September 24, 2015	Last Calibration	
Station Name	Statoil	Station Number	AMS 501
Reason:	Install		
Start Time (MST)	8:00	End Time (MST)	10:57
Gas Cert Reference	ALM066183	Station temp.	21 Deg C
Cal Gas Concentration	5.09 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11581008
ZAG air Make/Model	API 701	Serial Number	4522
DACS make/model	Campbell Scientific CR3000	Serial Number	2579
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S990374A 26-Sep-17

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage		
Analyzer IP address	192.168.1.75		Lamp voltage		
Calculated slope	0.999829		Chamber temp		
Calculated intercept	0.069924		Pressure		
Analyzer Background	19.4		Flow		
Analyzer Coefficient	1.007		Intensity		
			Converter temp.		

Analyzer make/model	API T101	Analyzer serial #	157
Converter make/model	na	Converter serial #	na

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
SO2 scrubber check	5000	15.8	158.0	3.7	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	78.6	80.0	79.9	1.001
second point	5000	39.3	40.0	40.1	0.998
third point	5000	24.6	25.0	24.9	1.008
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	78.6	80.0	78.1	1.025
Average Correction Factor					1.002

Corrected As found	NA	Previous response	NA	% change	NA
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**Notes:**

Install cal at a new site. Inlet filter replaced before calibrator zero point. Adjusted both zero and span.

Calibration Performed By: Asad Hidayat



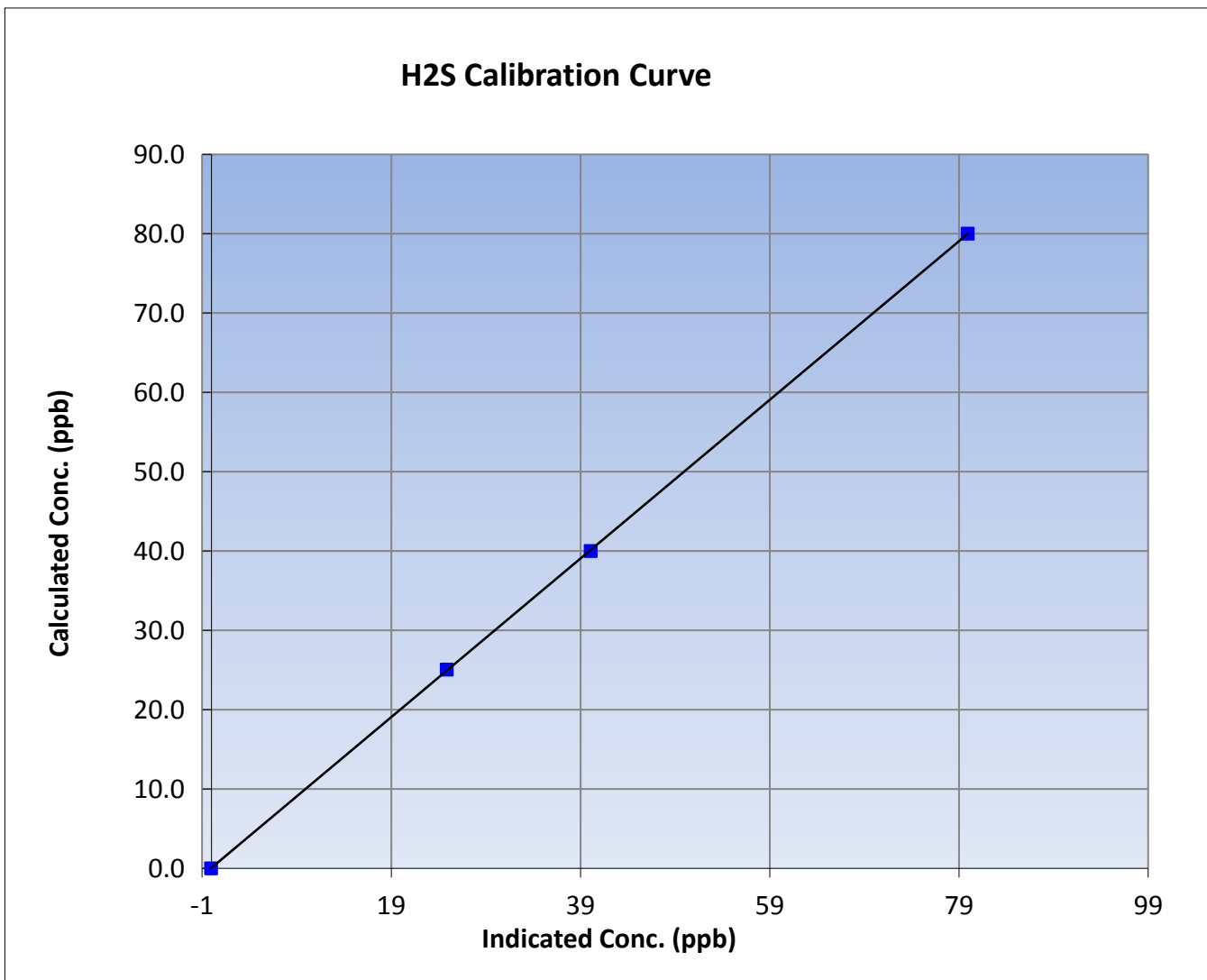
# Wood Buffalo Environmental Association H2S Calibration Report

## Station Information

Calibration Date	September 24, 2015	Previous Calibration	
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	8:00	End Time (MST)	10:57
Analyzer make	API T101	Analyzer serial #	157

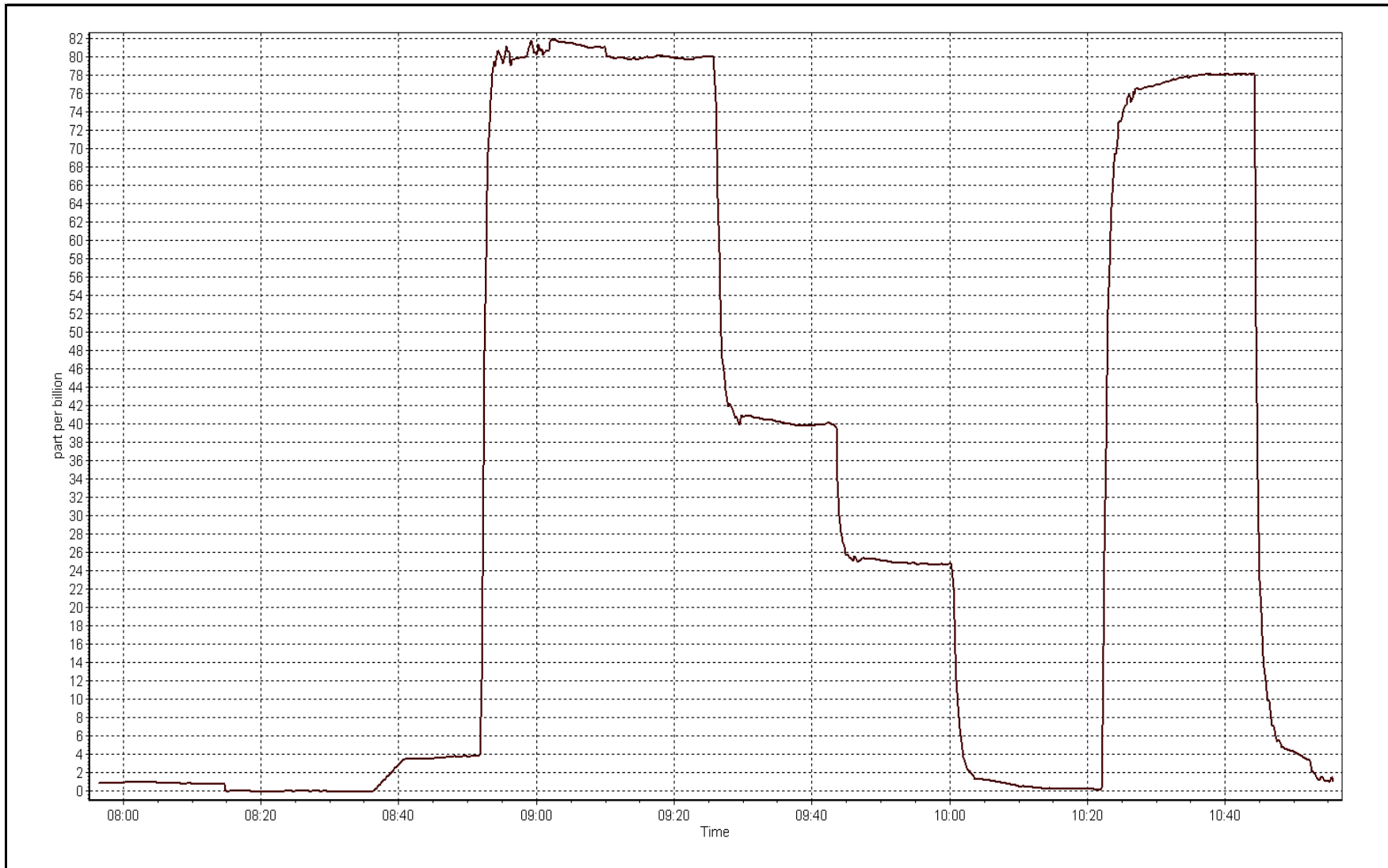
## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999989
80.0	79.9	1.0011		
40.0	40.1	0.9982	Slope	0.999829
25.0	24.9	1.0078		
			Intercept	0.069924



H2S Calibration Plot

Date: September 24, 2015





# Wood Buffalo Environmental Association H2S Calibration Report

### Station Information

Calibration Date	October 10, 2015	Last Calibration	September 24, 2015
Station Name	Statoil	Station Number	AMS 501
Reason:	Removal		
Start Time (MST)	10:00	End Time (MST)	13:20
Gas Cert Reference	ALM066183	Station temp.	21 Deg C
Cal Gas Concentration	5.09 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11581008
ZAG air Make/Model	API 701	Serial Number	4522
DACS make/model	Campbell Scientific CR3000	Serial Number	2579
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S990374A 26-Sep-17

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	512	512
Analyzer IP address	192.168.1.75		Lamp voltage	1712	1683
Calculated slope	0.999829	0.984517	Chamber temp	50	50
Calculated intercept	0.069924	-1.221700	Pressure	23.0	22.2
Analyzer Background	19.4	19.4	Flow	0.555	0.538
Analyzer Coefficient	1.007	1.007	Intensity	42	42
			Converter temp.	316	316

Analyzer make/model	API T101	Analyzer serial #	157
Converter make/model	na	Converter serial #	na

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.3	----
as found span	5000	78.6	80.0	82.0	0.976
SO2 scrubber check					
calibrator zero	5000	0.0	0.0	3.0	----
high point	5000	78.6	80.0	83.5	0.958
second point	5000	39.3	40.0	40.7	0.983
third point	5000	24.6	25.0	25.1	0.997
as left zero					
as left span					
Average Correction Factor					0.979

Corrected As found	81.7	Previous response	80.0	% change	-2.1%
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**Notes:**

Removal cal. Analyzer was showing suspected baseline for past few days. Could not resolve the issue, will be brought back to the shop for bench testing.

Calibration Performed By: Asad Hidayat



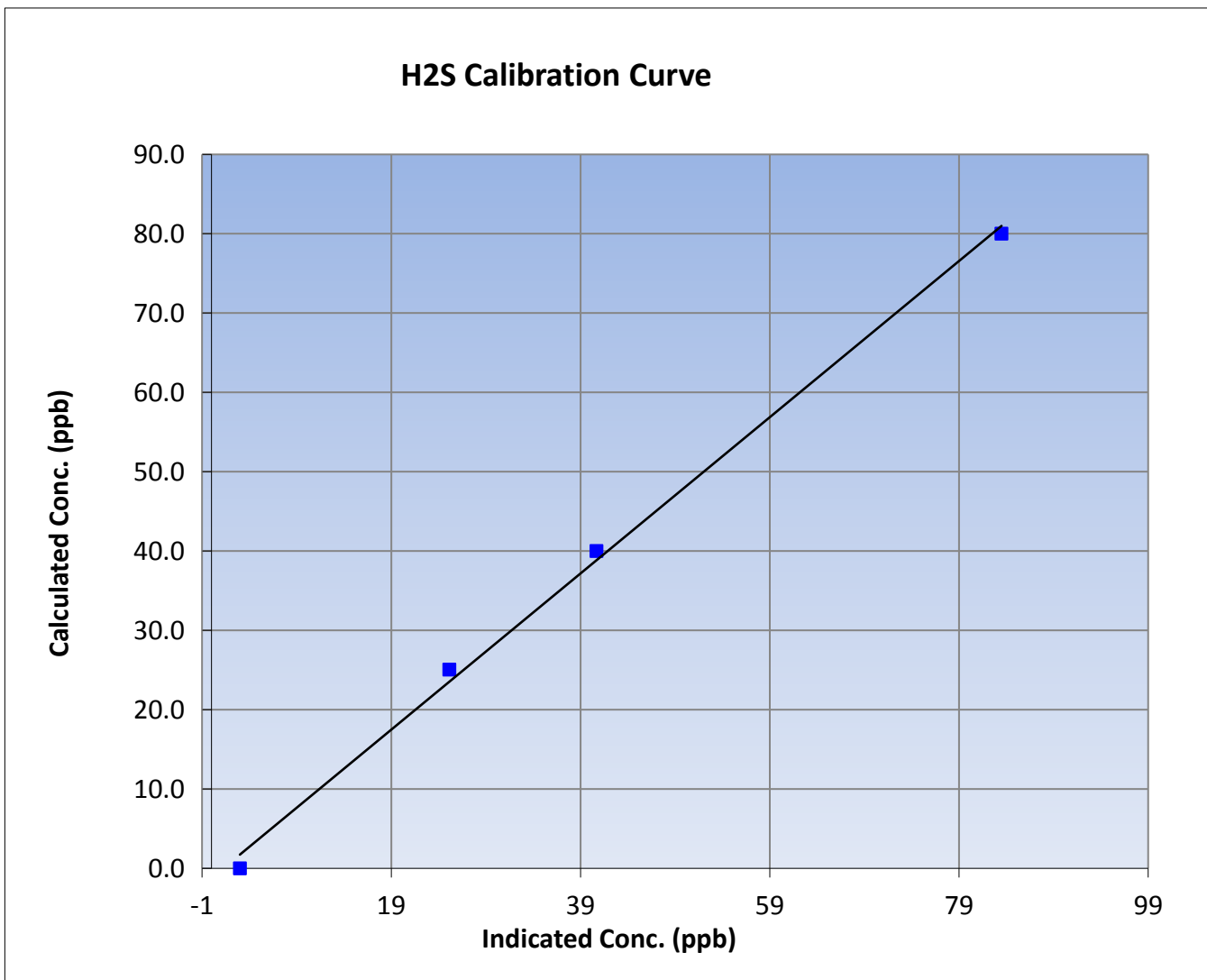
# Wood Buffalo Environmental Association H2S Calibration Report

## Station Information

Calibration Date	October 10, 2015	Previous Calibration	September 24, 2015
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	10:00	End Time (MST)	13:20
Analyzer make	API T101	Analyzer serial #	157

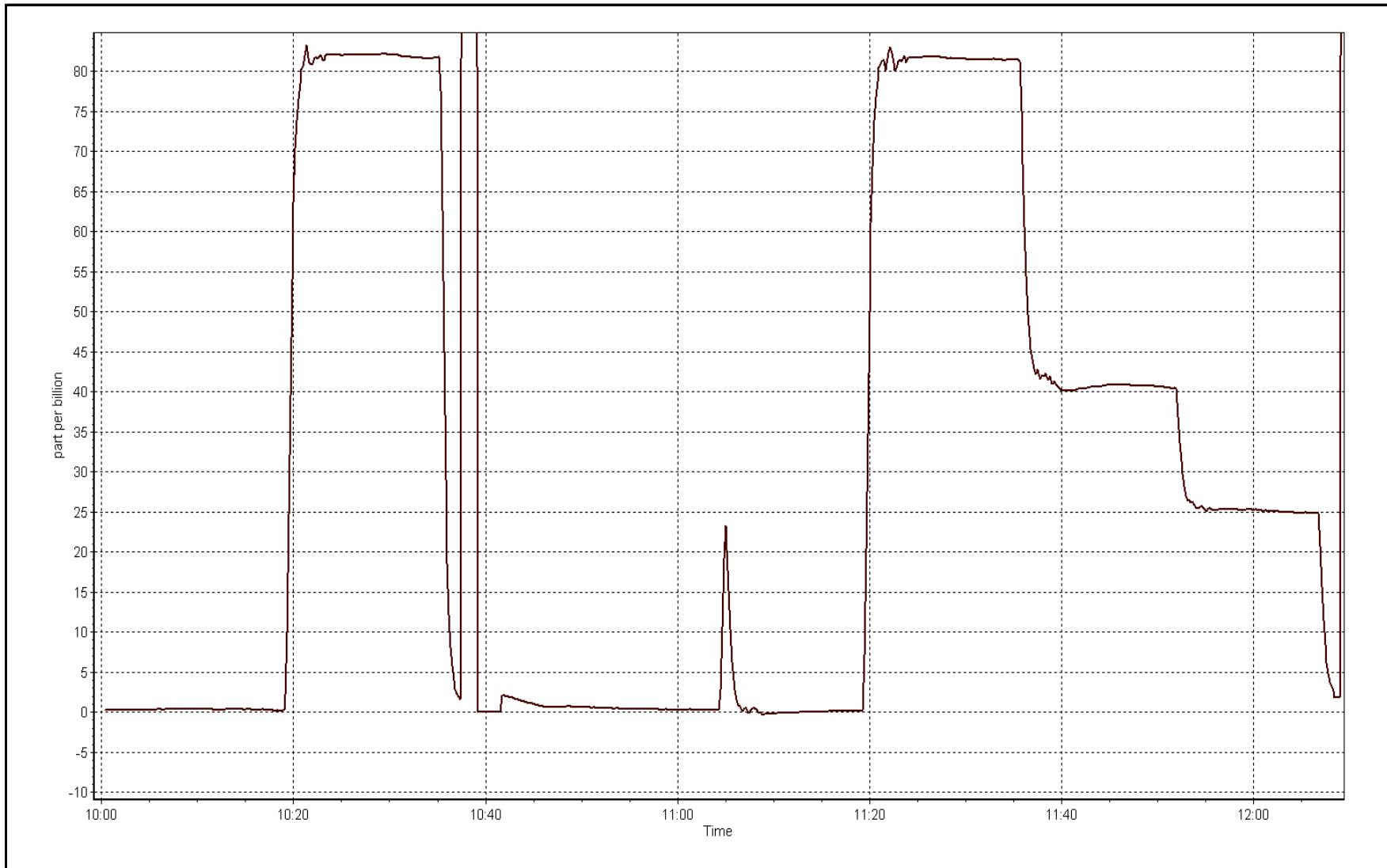
## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	3.0	----	Correlation Coefficient	0.997729
80.0	83.5	0.9583		
40.0	40.7	0.9835	Slope	0.984517
25.0	25.1	0.9965		
			Intercept	-1.221700



H2S Calibration Plot

Date: October 10, 2015





# Wood Buffalo Environmental Association H2S Calibration Report

### Station Information

Calibration Date	October 11, 2015	Last Calibration	September 24, 2015
Station Name	Statoil	Station Number	AMS 501
Reason:	Routine		
Start Time (MST)	12:30	End Time (MST)	15:45
Gas Cert Reference	ALM066183	Station temp.	21 Deg C
Cal Gas Concentration	5.09 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11581008
ZAG air Make/Model	API 701	Serial Number	4522
DACS make/model	Campbell Scientific CR3000	Serial Number	2579
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S990374A 26-Sep-17

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	512	512
Analyzer IP address	192.168.1.75		Lamp voltage	1712	1676
Calculated slope	0.999829	0.997378	Chamber temp	50	50
Calculated intercept	0.069924	0.061414	Pressure	23.0	22.6
Analyzer Background	19.4	19.4	Flow	0.555	0.542
Analyzer Coefficient	1.007	1.007	Intensity	42	41
			Converter temp.	316	317

Analyzer make/model	API T101	Analyzer serial #	157
Converter make/model	na	Converter serial #	na

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	----
as found span	5000	78.6	80.0	81.8	0.978
SO2 scrubber check	5000	15.8	158.0	4.0	----
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	78.6	80.0	80.3	0.997
second point	5000	39.3	40.0	40.0	1.000
third point	5000	24.6	25.0	24.8	1.010
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	78.6	80.0	77.7	1.030
Average Correction Factor					1.002

Corrected As found	81.7	Previous response	80.0	% change	-2.1%
--------------------	------	-------------------	------	----------	-------

**Notes:**

Inlet filter replaced and scrubber check done after as founds. No adjustments were performed, however second high point was closer to calculated gas input value.

Calibration Performed By: Asad Hidayat



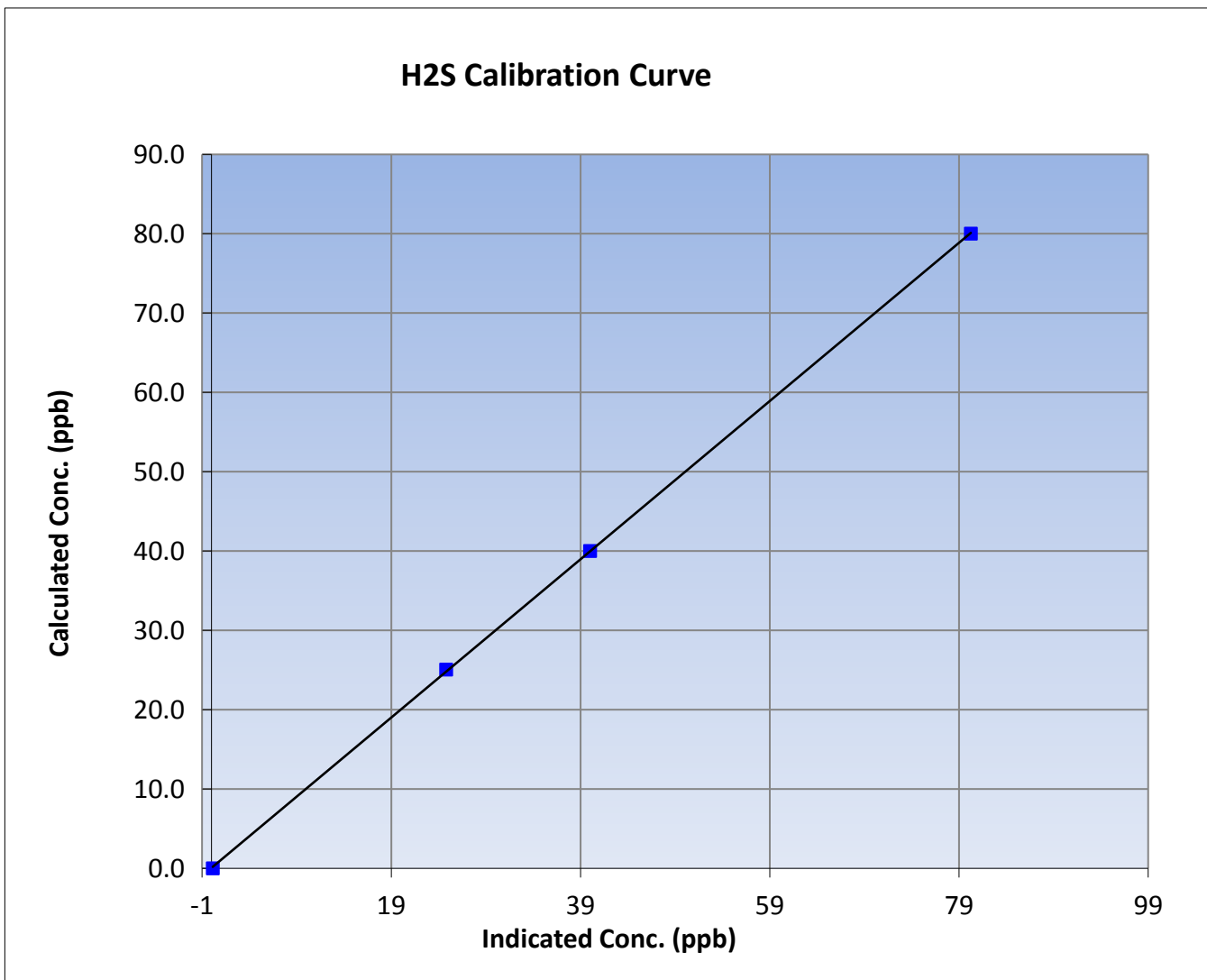
# Wood Buffalo Environmental Association H2S Calibration Report

## Station Information

Calibration Date	October 11, 2015	Previous Calibration	September 24, 2015
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	12:30	End Time (MST)	15:45
Analyzer make	API T101	Analyzer serial #	157

## Calibration Data

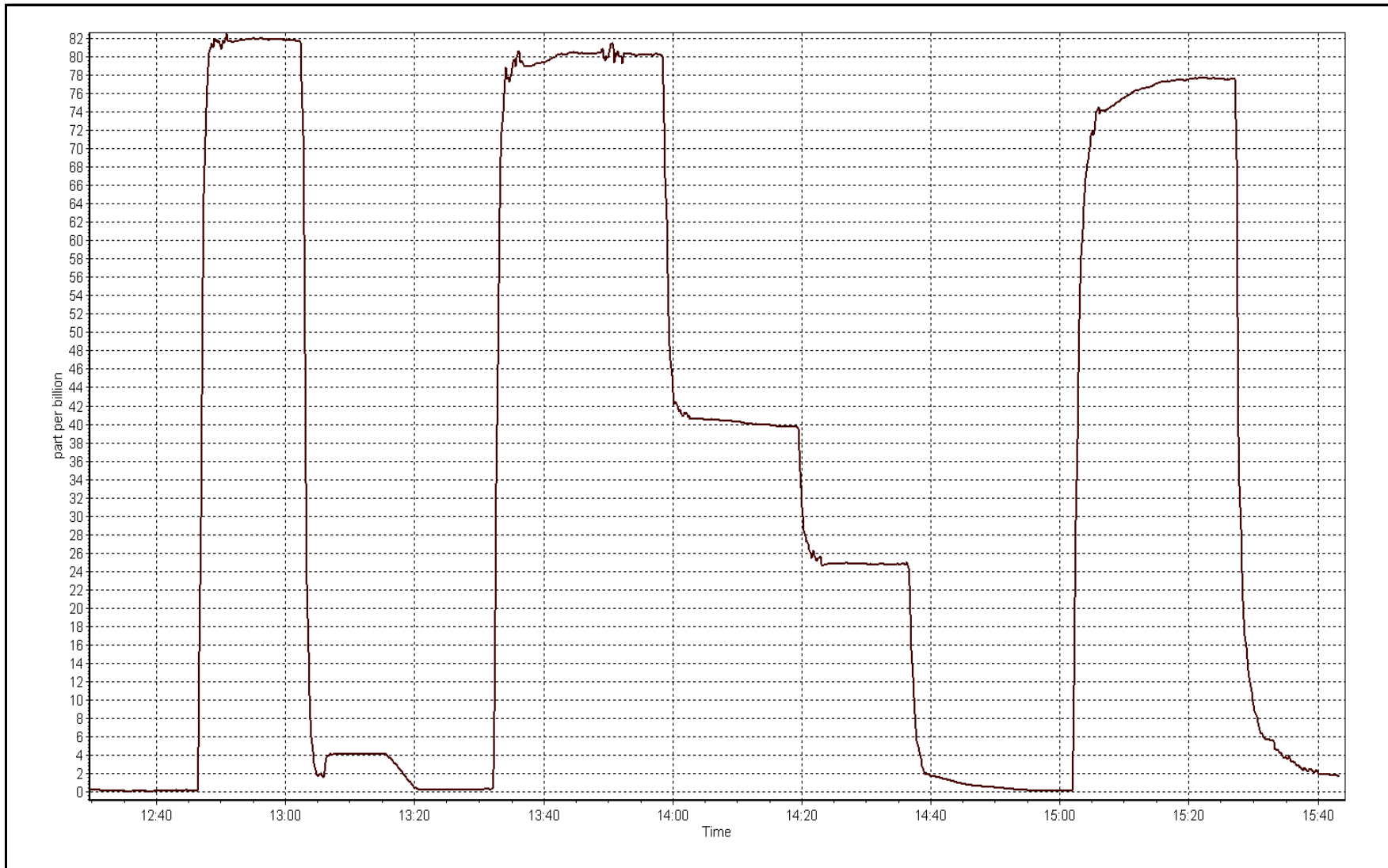
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999968
80.0	80.3	0.9969		
40.0	40.0	0.9999	Slope	0.997378
25.0	24.8	1.0098		
			Intercept	0.061414





H2S Calibration Plot

Date: October 11, 2015





## Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date	September 23, 2015	Previous Calibration	AMS 501
Station Name	Statoil	Station Number	AMS 501
Reason:	Install		
Start Time (MST)	10:35	End Time (MST)	15:15
NO Cal Gas Conc	47.5 ppm	Gas Cert Reference	S990374A
NOx Cal Gas Conc	47.5 ppm	Cal Gas Expiry Date	26-Sep-17
Calibrator	Sabio 4010	Serial Number	11581008
Zero air Generator	Teledyne API T701	Serial Number	4522

### DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2579
-------------------	----------------------------	-----------------	------

### Calibration Statistics

Parameter	NOx	NO	NO2
As Found (last calibration results)			
Current Calibration	Data Slope	0.999855	0.996927
	Data Offset	0.900393	1.160326
			1.004762
			-0.048722

### Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1118148498
---------------------	------------	-------------------	------------

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	1.006		0.974	
NOx coefficient	1.000		0.996	
NO2 coefficient	1.000		1.000	
NO bkgrnd	5.0		4.9	
NOx bkgrnd	5.1		5.1	
Chamber Temp	49.8	Deg C	50.2	Deg C
Moly Temp	322.6	Deg C	324.2	Deg C
PMT voltage	-756.7	V	-756.3	V
PMT Temp	-3	Deg C	-3.1	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	209	mmHg	196.4	mmHg
R Cell Press Nox	208	mmHg	196.4	mmHg
NO sample flow	0.677	lpm	0.697	lpm
Nox sample Flow	0.679	lpm	0.696	lpm

**Notes:**

Install cal at a new site. Sample inlet filter replaced before calibrator zero point. Adjusted span.



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date: September 23, 2015 Station Number: AMS 501

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero										
as found span										
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.5	-0.5	0.0	----	----
high point	5000	63.1	599.5	599.5	0.0	598.8	600.4	-1.7	1.0011	0.9984
second point	5000	31.6	300.2	300.2	0.0	299.3	299.8	-0.5	1.0030	1.0014
third point	5000	15.8	150.1	150.1	0.0	148.7	148.6	0.1	1.0096	1.0102
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1	----	----
as left span	5000	63.1	599.5	301.5	297.9	611.1	298.9	312.2	0.9809	1.0087
Average Correction Factor									1.0046	1.0033

Corrected As found NO<sub>x</sub>= NA NO= NA Percent Change NO<sub>x</sub>= N/A NO= N/A  
 Previous Response NO<sub>x</sub>= NA NO= NA

### GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 63.10 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO2 (300)	----	301.5	306.8	606.8	301.5	305.3	0.9756	1.0000	1.0049	99.5%
2nd NO2 (200)	----	416.9	191.4	607.6	416.9	190.7	0.9743	1.0000	1.0038	99.6%
3rd NO2 (100)	----	495.9	112.4	607.9	495.9	111.9	0.9738	1.0000	1.0044	99.6%
4th NO2 (0)	608.3	----	-0.7	607.6	608.3	-0.9	0.9743	1.0000	N/A	----
Average Correction Factor							0.9745	1.0000	1.0043	99.6%

Calibration Performed By: Asad Hidayat



# Wood Buffalo Environmental Association

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

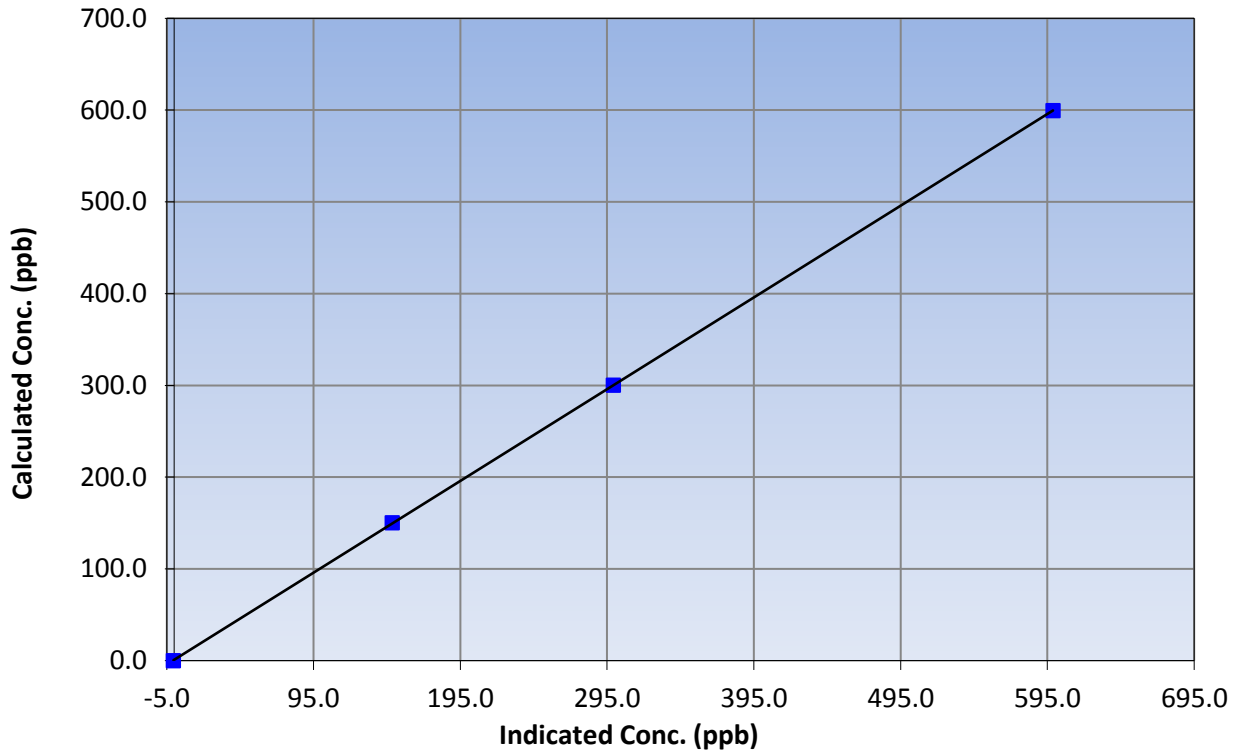
### Station Information

Calibration Date	September 23, 2015	Previous Calibration	
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	10:35	End Time (MST)	15:15
Analyzer make	Thermo 42i	Analyzer serial #	1118148498

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.5	----	Correlation Coefficient	0.999997
599.5	598.8	1.0011		
300.2	299.3	1.0030	Slope	0.999855
150.1	148.7	1.0096		
			Intercept	0.900393

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

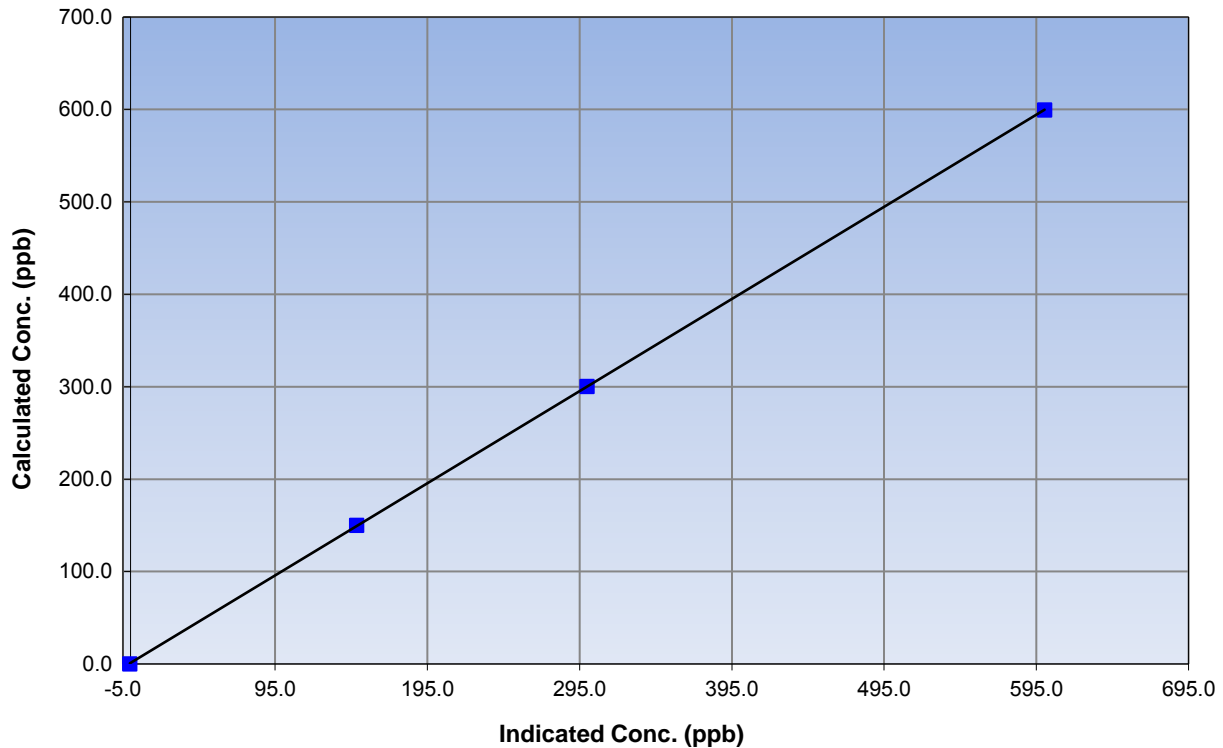
### Station Information

Calibration Date	September 23, 2015	Previous Calibration	
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	10:35	End Time (MST)	15:15
Analyzer make	Thermo 42i	Analyzer serial #	1118148498

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.5	N/A	Correlation Coefficient	0.999994
599.5	600.4	0.9984		
300.2	299.8	1.0014	Slope	0.996927
150.1	148.6	1.0102		
			Intercept	1.160326

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

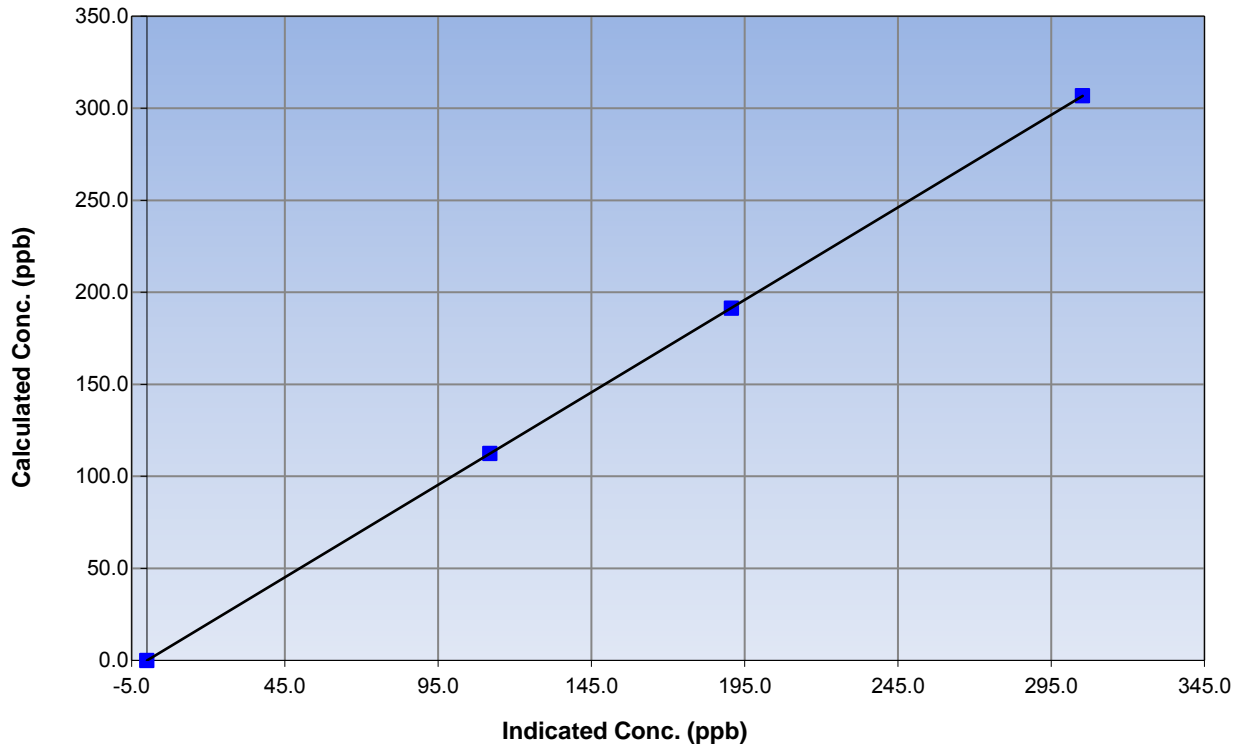
### Station Information

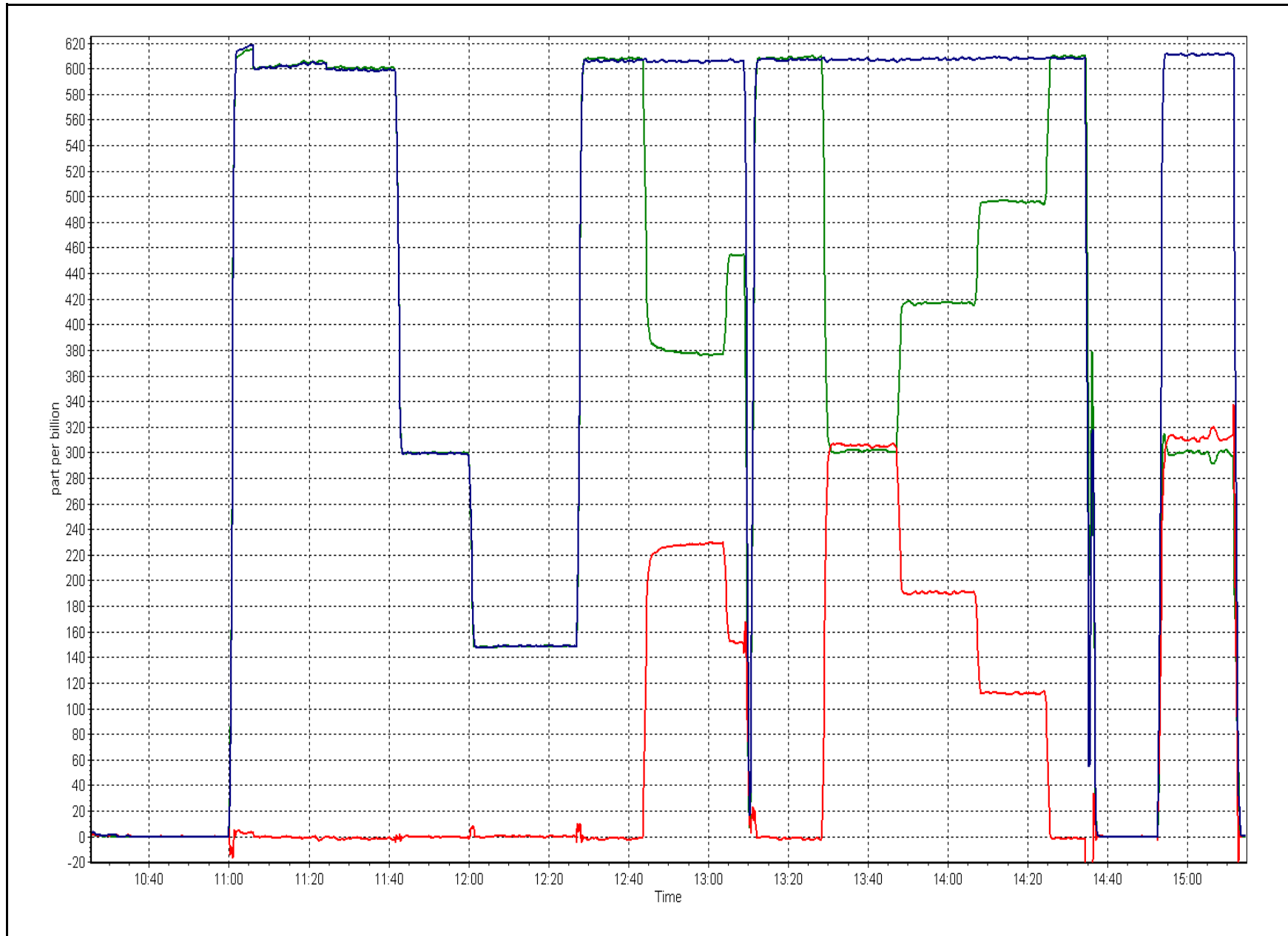
Calibration Date	September 23, 2015	Previous Calibration	
Station Number	Statoil	Station Number	AMS 501
Start Time (MST)	10:35	End Time (MST)	15:15
Analyzer make	Thermo 42i	Analyzer serial #	1118148498

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999999
306.8	305.3	1.0049		
191.4	190.7	1.0038	Slope	1.004762
112.4	111.9	1.0044		
			Intercept	-0.048722

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







## Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date	October 29, 2015	Previous Calibration	September 23, 2015
Station Name	Statoil	Station Number	AMS 501
Reason:	Routine		
Start Time (MST)	7:20	End Time (MST)	11:05
NO Cal Gas Conc	47.5 ppm	Gas Cert Reference	S990374A
NOx Cal Gas Conc	47.5 ppm	Cal Gas Expiry Date	26-Sep-17
Calibrator	Sabio 4010	Serial Number	11581008
Zero air Generator	Teledyne API T701	Serial Number	4522

### DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2579
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### Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.999855	0.996927	1.004762
	Data Offset	0.900393	1.160326	-0.048722
Current Calibration	Data Slope	0.997211	0.997517	1.017686
	Data Offset	1.310325	1.357355	0.116361

### Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1118148498
---------------------	------------	-------------------	------------

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.974		0.870	
NOx coefficient	0.996		0.998	
NO2 coefficient	1.000		1.000	
NO bkgnd	4.9		4.5	
NOx bkgnd	5.1		4.7	
Chamber Temp	50.2	Deg C	49.8	Deg C
Moly Temp	324.2	Deg C	327.1	Deg C
PMT voltage	-756.3	V	-756.3	V
PMT Temp	-3.1	Deg C	-2.8	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	196.4	mmHg	181.3	mmHg
R Cell Press Nox	196.4	mmHg	181.3	mmHg
NO sample flow	0.697	lpm	0.704	lpm
Nox sample Flow	0.696	lpm	0.704	lpm

**Notes:**

Stability is good, pressure dropped from 196 last months cal to 181mmHg this months cal, all other diagonstics similar to last month, pump changed out last month (pressure may have been stabilizing).





# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date: October 29, 2015 Station Number: AMS 501

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.7	-0.6	-0.1	----	----
as found span	5000	63.1	599.5	599.5	0.0	674.6	675.1	-0.5	0.8886	0.8879
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.7	-0.6	-0.1	----	----
high point	5000	63.1	599.5	599.5	0.0	600.0	599.8	0.1	0.9991	0.9994
second point	5000	31.6	300.2	300.2	0.0	299.8	299.7	0.1	1.0013	1.0017
third point	5000	15.8	150.1	150.1	0.0	148.3	148.0	0.3	1.0121	1.0142
as left zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.3	-0.1	----	----
as left span	5000	63.1	599.5	296.7	302.8	618.0	306.8	311.2	0.9700	0.9671
Average Correction Factor									1.0042	1.0051

Corrected As found NO<sub>x</sub>= 675.3 NO= 675.7 Percent Change NO<sub>x</sub>= -11.3% NO= -11.2%  
 Previous Response NO<sub>x</sub>= 598.6 NO= 600.1

### GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 63.10 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			-0.1			N/A	
1st NO2 (300)	----	296.7	315.6	606.7	296.7	310.0	0.9757	1.0000	1.0181	98.2%
2nd NO2 (200)	----	415.3	197.0	608.8	415.3	193.5	0.9724	1.0000	1.0181	98.2%
3rd NO2 (100)	----	495.8	116.5	610.2	495.8	114.3	0.9701	1.0000	1.0192	98.1%
4th NO2 (0)	612.3	----	-1.2	611.1	612.3	-1.2	0.9687	1.0000	N/A	----
Average Correction Factor							0.9717	1.0000	1.0185	98.2%

Calibration Performed By: Melissa Lemay



# Wood Buffalo Environmental Association

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

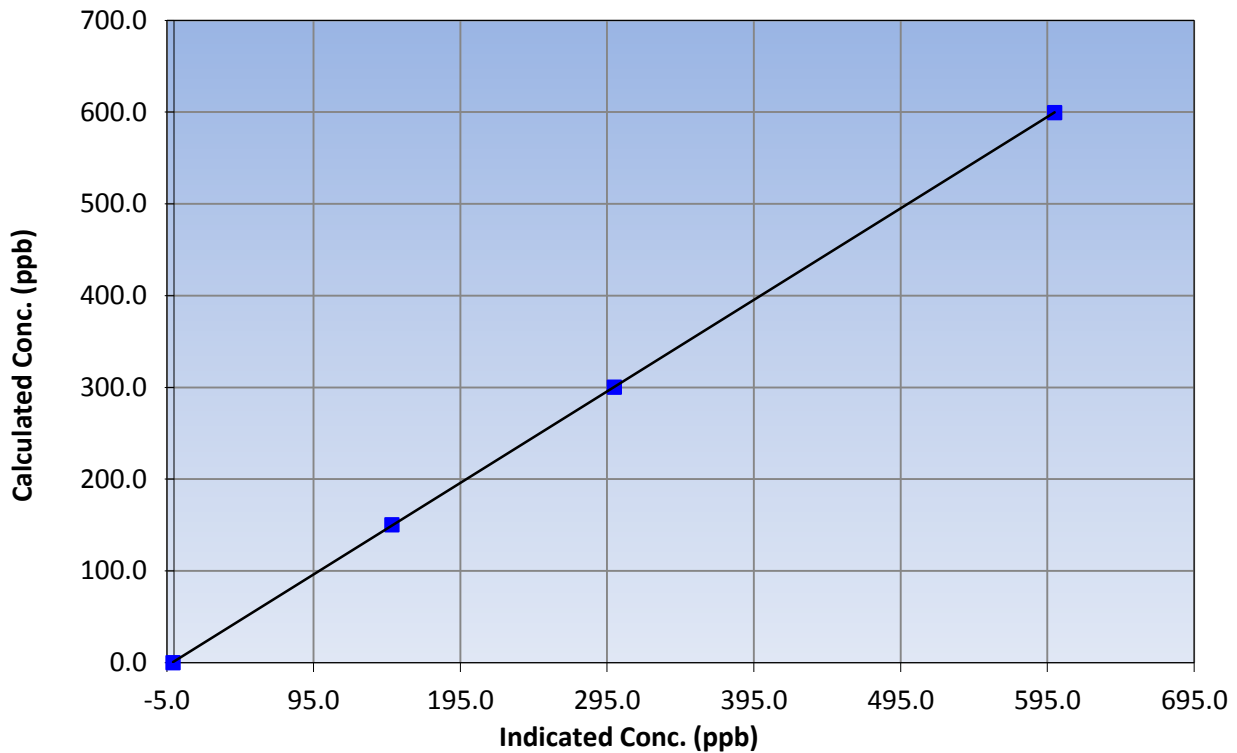
### Station Information

Calibration Date	October 29, 2015	Previous Calibration	September 23, 2015
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	7:20	End Time (MST)	11:05
Analyzer make	Thermo 42i	Analyzer serial #	1118148498

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.7	----	Correlation Coefficient	0.999994
599.5	600.0	0.9991		
300.2	299.8	1.0013	Slope	0.997211
150.1	148.3	1.0121		
			Intercept	1.310325

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

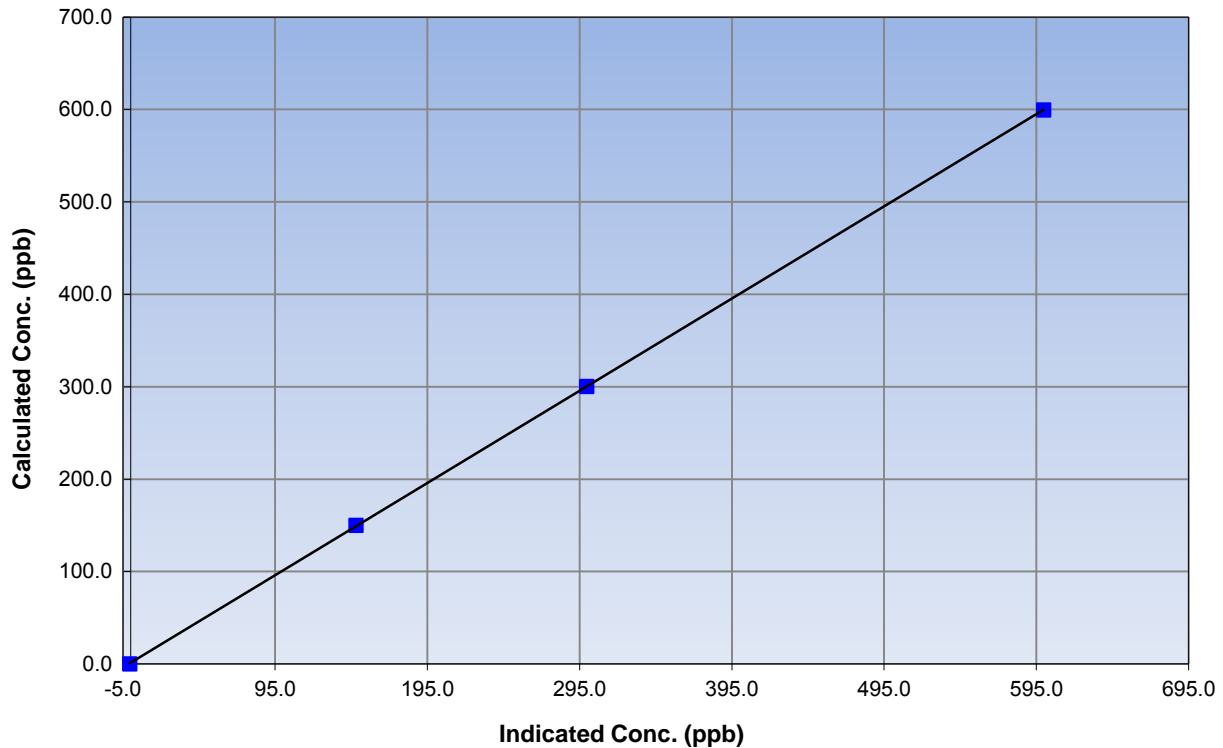
### Station Information

Calibration Date	October 29, 2015	Previous Calibration	September 23, 2015
Station Name	Statoil	Station Number	AMS 501
Start Time (MST)	7:20	End Time (MST)	11:05
Analyzer make	Thermo 42i	Analyzer serial #	1118148498

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.6	N/A	Correlation Coefficient	0.999990
599.5	599.8	0.9994		
300.2	299.7	1.0017	Slope	0.997517
150.1	148.0	1.0142		
			Intercept	1.357355

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

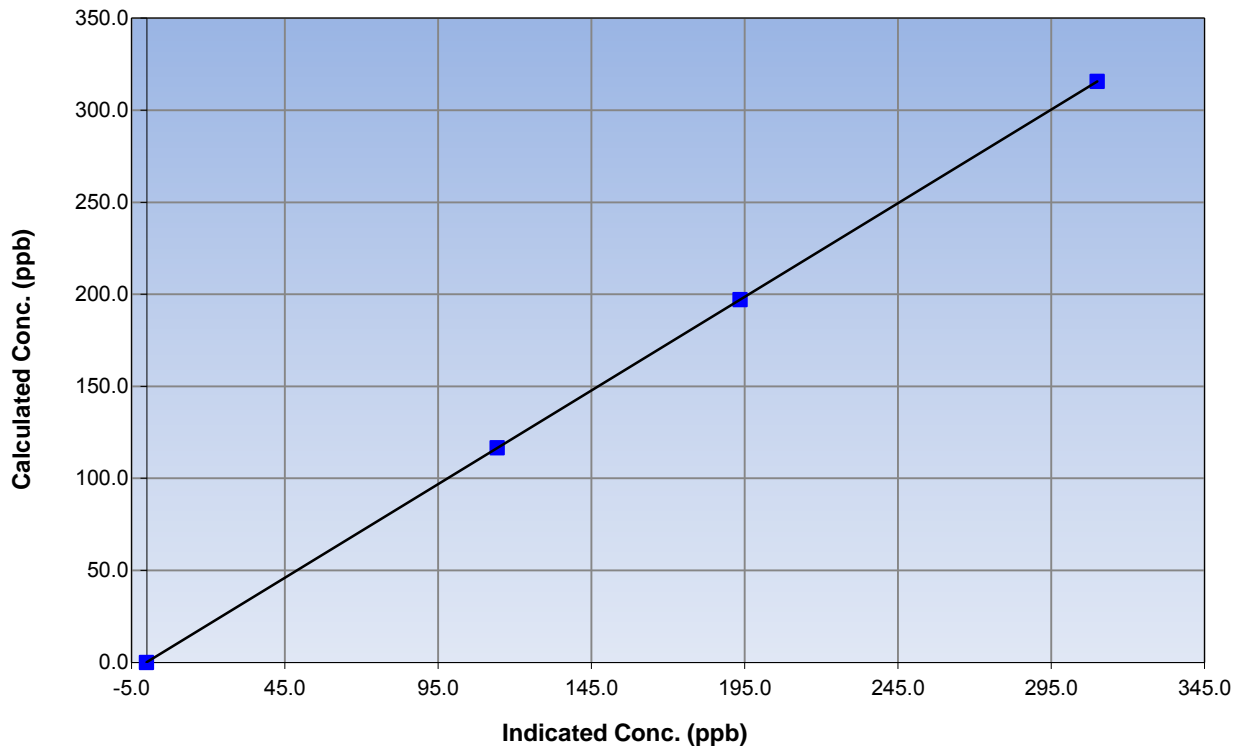
### Station Information

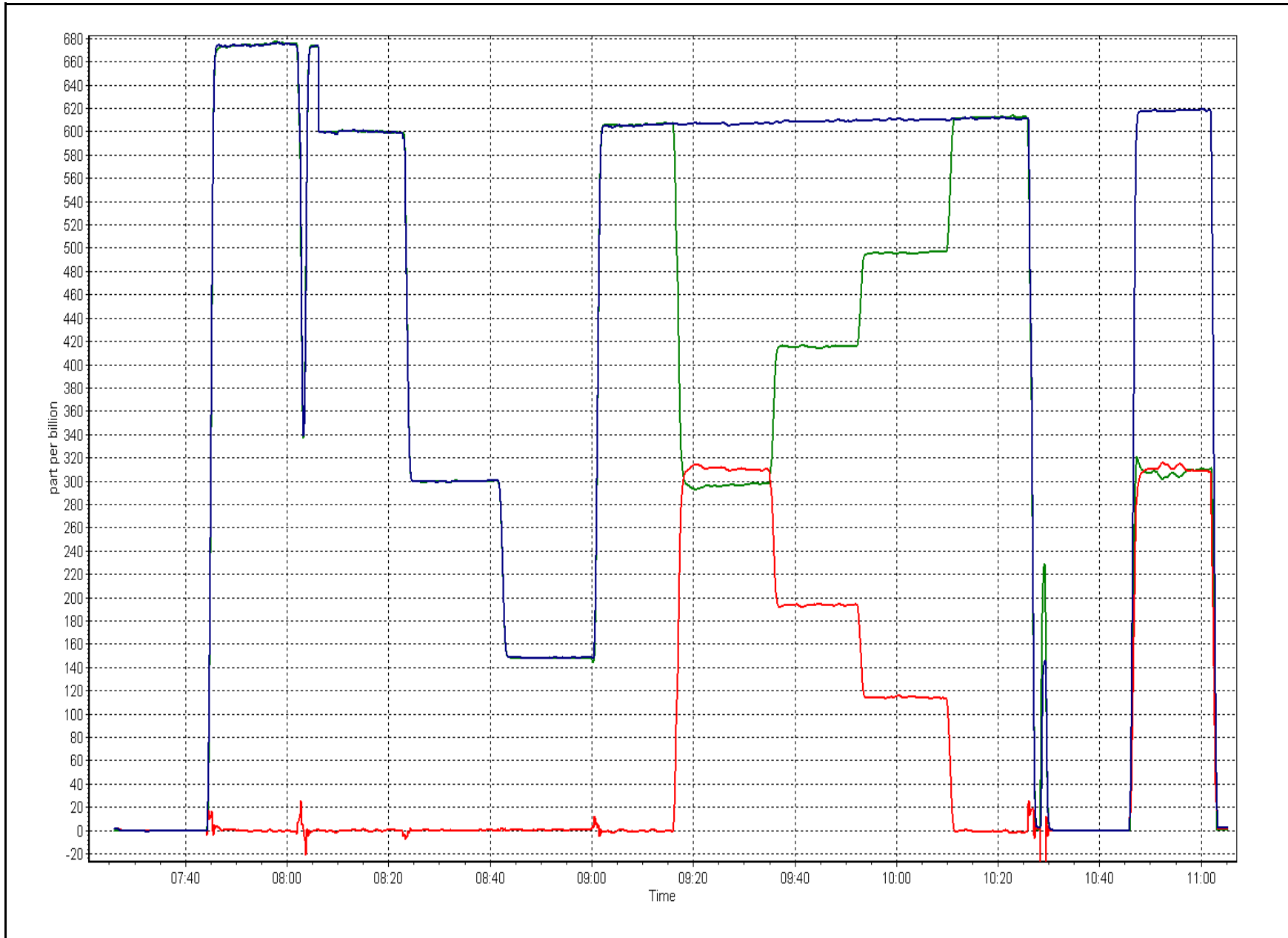
Calibration Date	October 29, 2015	Previous Calibration	September 23, 2015
Station Number	Statoil	Station Number	AMS 501
Start Time (MST)	7:20	End Time (MST)	11:05
Analyzer make	Thermo 42i	Analyzer serial #	1118148498

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	1.000000
315.6	310.0	1.0181		
197.0	193.5	1.0181	Slope	1.017686
116.5	114.3	1.0192		
			Intercept	0.116361

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







# Wood Buffalo Environmental Association

## WS/WD Calibration Report

### Station Information

Calibration Date	September-22-15	Previous Calibration	n/a
Station Name	Statoil	Station Number	AMS 501
Reason:	<input type="radio"/> Routine <input checked="" type="radio"/> Installation <input type="radio"/> Removal		
Start Time (MST)	10:20	End Time (MST)	13:30
Barometric Press	n/a	Station Temp	22 Deg C
WS Calibrator	MetOne 053	Serial Number	P15103

### WIND SPEED

Sensor make/model	Met One 010C-1	Sensor serial #	P22395
DACS make	Campbel Scientific CR3000	DACS serial No.	2579
DACS voltage range	5000	DACS channel #	na
	<u>Before</u>		<u>After</u>
Calculated slope	1.002122327	Calculated slope	0.998909
Calculated intercept	-0.019981501	Calculated intercept	0.030357

### Wind Speed Calibration Data

Shaft RPM	Actual Speed (K/hr)	Indicated Speed (K/hr)	Correction factor
0	0.0	0.0	n/a
200	20.2	20.1	1.0026
400	39.4	39.4	0.9990
600	58.6	58.5	1.0003
800	77.8	77.8	0.9989
Average Correction Factor			1.0002

### WIND DIRECTION

Sensor make/model	Met One 020C-1	Sensor serial #	R14656
DACS make	Campbel Scientific CR3000	DACS serial No.	2579
DACS voltage range	5000	DACS channel #	na
	<u>Before</u>		<u>After</u>
Calculated slope	N/A	Calculated slope	0.275298
Calculated intercept	N/A	Calculated intercept	109.997442
As Found Declination (west of North)	na	As Left Declination (west of North)	14.000000

### Wind Direction Calibration Data

Physical Direction (Degrees)	Indicated Direction (Degrees)	Correction factor
0	362.0	n/a
90	90.8	0.9912
180	179.3	1.0039
270	270.4	0.9985
357	358.0	0.9972
Average Correction Factor		0.9977

Notes:

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Calibration Performed By: Evan Magill/Asad Hidayat/ Melissa Lemay



## **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 502  
CONOCOPHILLIPS  
SURMONT  
OCTOBER 2015**

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

November 26, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)  
OCTOBER 2015

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	708	36	36	100.00	12	0	4	0
H2S (ppb) Average	709	34	35	99.87	1	0	1	0
NO2 (ppb) Average	708	36	36	100.00	15	0	6	-
NO (ppb) Average	708	36	36	100.00	17	-	8	-
NOX (ppb) Average	708	36	36	100.00	25	-	11	-
Temperature 2 m (C) Average	744	0	0	100.00	23.5	-	18.6	-
Relative Humidity (%) Average	744	0	0	100.00	100	-	98	-
Wind Speed 10 m (km/h) Average	720	2	24	97.04	36	-	26	-
Wind Direction 10 m (deg) Average	720	2	24	97.04	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)  
 OCTOBER 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	0.9	1	-	0	0	0	0	1	2	12
H2S (ppb) Average	709	0.2	0	-	0	0	0	0	0	0	1
NO2 (ppb) Average	708	2.1	2	-	0	0	1	2	3	4	15
NO (ppb) Average	708	1.2	2	-	0	0	0	0	1	4	17
NOX (ppb) Average	708	3.3	4	-	0	1	1	2	4	8	25
Temperature 2 m (C) Average	744	5.97	5.8	-	-4.4	-0.6	1	5.3	9.3	14.3	23.5
Relative Humidity (%) Average	744	69	19	-	25	43	54	68	87	96	100
Wind Speed 10 m (km/h) Average	720	15.3	8	-	0	7	10	14	21	27	36
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)  
OCTOBER 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S	17 Oct 2015 08:00	17 Oct 2015 08:00	1	Unstable operation - excessive baseline drift
Wind Speed, Wind Direction	25 Oct 2015 03:00	25 Oct 2015 05:00	3	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	25 Oct 2015 08:00	25 Oct 2015 10:00	3	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	26 Oct 2015 02:00	26 Oct 2015 04:00	3	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	27 Oct 2015 01:00	27 Oct 2015 11:00	11	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	31 Oct 2015 22:00	31 Oct 2015 23:00	2	Flat line in sensor output signal -sensor frozen

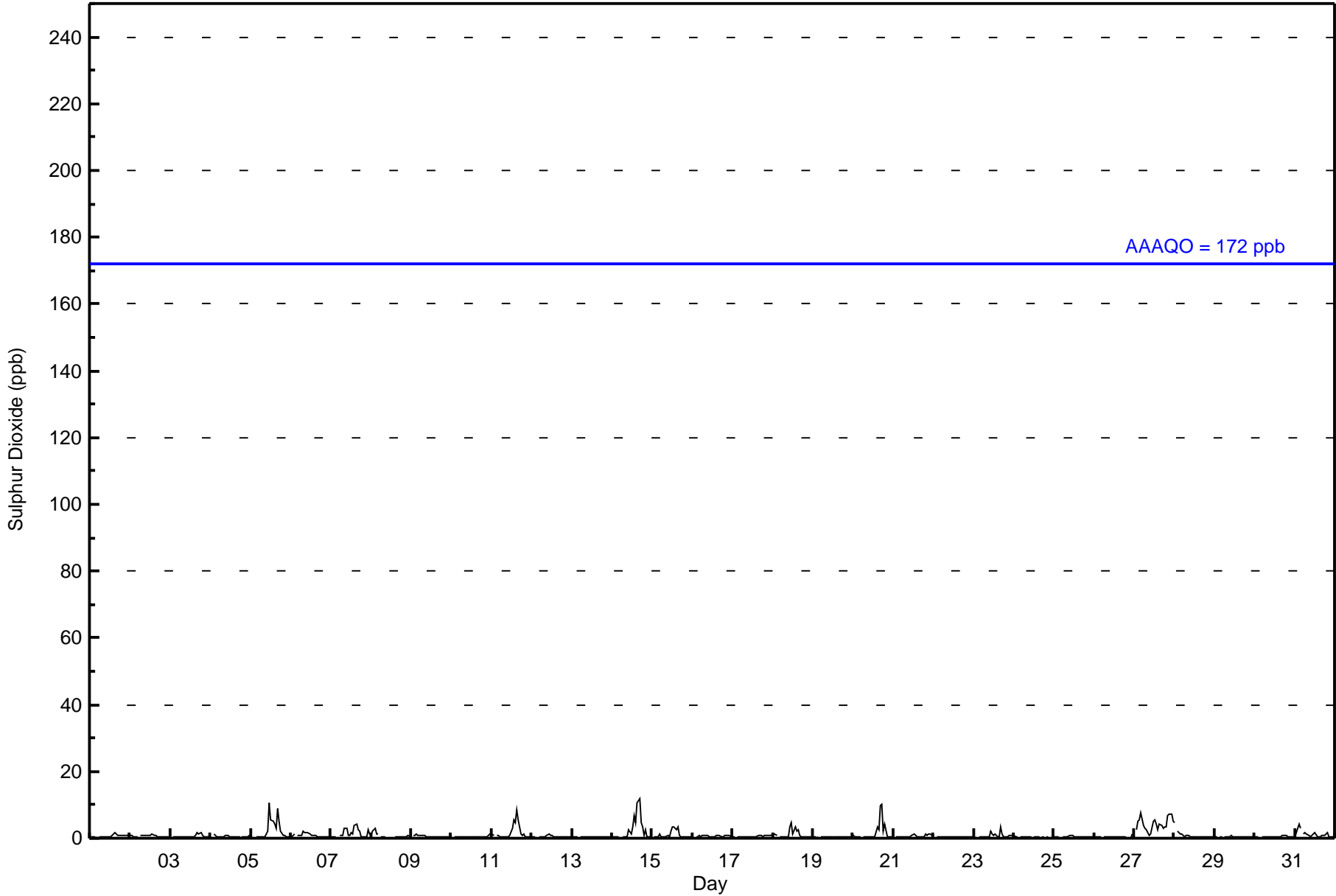


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 12 ppb on Oct 14 17:00	Maximum Daily Average: 4.2 ppb on Oct 27		Hours of Data:	708
Minimum Value: 0 ppb on Oct 26 22:00	Minimum Daily Average: 0.3 ppb on Oct 24		Hours of Missing Data:	36
Maximum Diurnal Average: 1.9 ppb at hour 17	Minimum Diurnal Average: 0.6 ppb at hour 7		Hours of Calibration:	36
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> = 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	1	1	2	1	1	1	1	1	1	1	1	0.7	2
2-Oct	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.6	1
3-Oct	Z	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	2	1	2	1	0	0	1	1	0.6	2
4-Oct	1	Z	1	1	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	1
5-Oct	1	0	Z	0	0	0	0	1	1	1	2	11	5	5	4	3	9	5	2	1	1	1	1	0	2.3	11
6-Oct	0	1	1	Z	1	1	1	2	2	2	2	1	1	1	1	1	1	1	0	0	0	0	0	1	0.8	2
7-Oct	1	0	0	0	Z	1	1	1	3	3	1	1	2	1	4	4	2	2	1	0	1	1	3	1	1.4	4
8-Oct	1	2	3	1	1	Z	1	0	0	C	C	C	C	C	0	1	0	0	0	0	0	0	1	1	0.8	3
9-Oct	Z	1	1	1	1	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0.5	1
10-Oct	1	Z	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.5	1
11-Oct	1	1	Z	1	1	1	1	1	0	0	0	1	3	5	5	8	5	1	1	1	1	0	0	0	1.7	8
12-Oct	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0.5	1
13-Oct	0	0	0	1	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0.4	1
14-Oct	0	0	0	0	0	Z	0	0	0	0	3	1	3	7	5	11	12	5	4	1	3	0	0	0	2.5	12
15-Oct	Z	0	0	0	1	0	0	0	1	1	0	2	3	3	3	3	1	0	0	0	0	0	0	0	1.0	3
16-Oct	0	Z	0	0	1	1	1	1	1	1	1	0	0	0	1	1	1	0	0	1	1	1	1	1	0.7	1
17-Oct	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0.5	1
18-Oct	1	1	1	Z	1	1	0	0	0	0	3	5	1	3	2	2	1	0	0	0	0	0	0	0	1.1	5
19-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	0.3	1
20-Oct	1	1	0	0	0	Z	0	0	0	0	0	0	0	1	3	3	10	10	2	4	1	0	0	0	1.7	10
21-Oct	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	1	1	0.6	1
22-Oct	1	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.5	1
23-Oct	0	0	Z	1	0	0	0	0	0	0	2	1	1	1	0	1	3	1	0	1	0	1	1	1	0.8	3
24-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	0.3	1
25-Oct	0	0	0	0	Z	0	0	0	1	1	1	1	1	0	0	1	0	0	0	0	0	1	0	0	0.5	1
26-Oct	0	0	0	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1
27-Oct	Z	2	5	6	8	4	3	2	2	1	1	5	6	4	2	4	4	3	3	3	7	7	7	5	4.2	8
28-Oct	5	Z	2	1	1	1	0	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.8	5
29-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	0.4	1
30-Oct	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0.5	1
31-Oct	0	2	4	3	Z	1	2	1	1	1	1	1	2	1	0	0	1	1	1	2	0	0	0	0	1.1	4

0.7	0.6	1.0	0.8	0.9	0.6	0.6	0.6	0.6	0.6	0.7	0.9	1.3	1.2	1.4	1.3	1.6	1.9	1.3	0.8	0.8	0.7	0.7	0.8	0.7	Diurnal Average
5	2	5	6	8	4	3	2	3	3	3	3	11	6	7	5	11	12	10	4	4	7	7	7	5	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**  
**ConocoPhillips - Surmont - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	705	99.58	99.58
11 - 20	3	0.42	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: 708

Total Number of Hours: 744



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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**ConocoPhillips - Surmont - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	12	6	7	3	12	25	54	46	69	46	44	78	115	86	34	46	683
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	3	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>	12	6	7	3	12	25	54	46	69	46	44	78	115	89	34	46	686

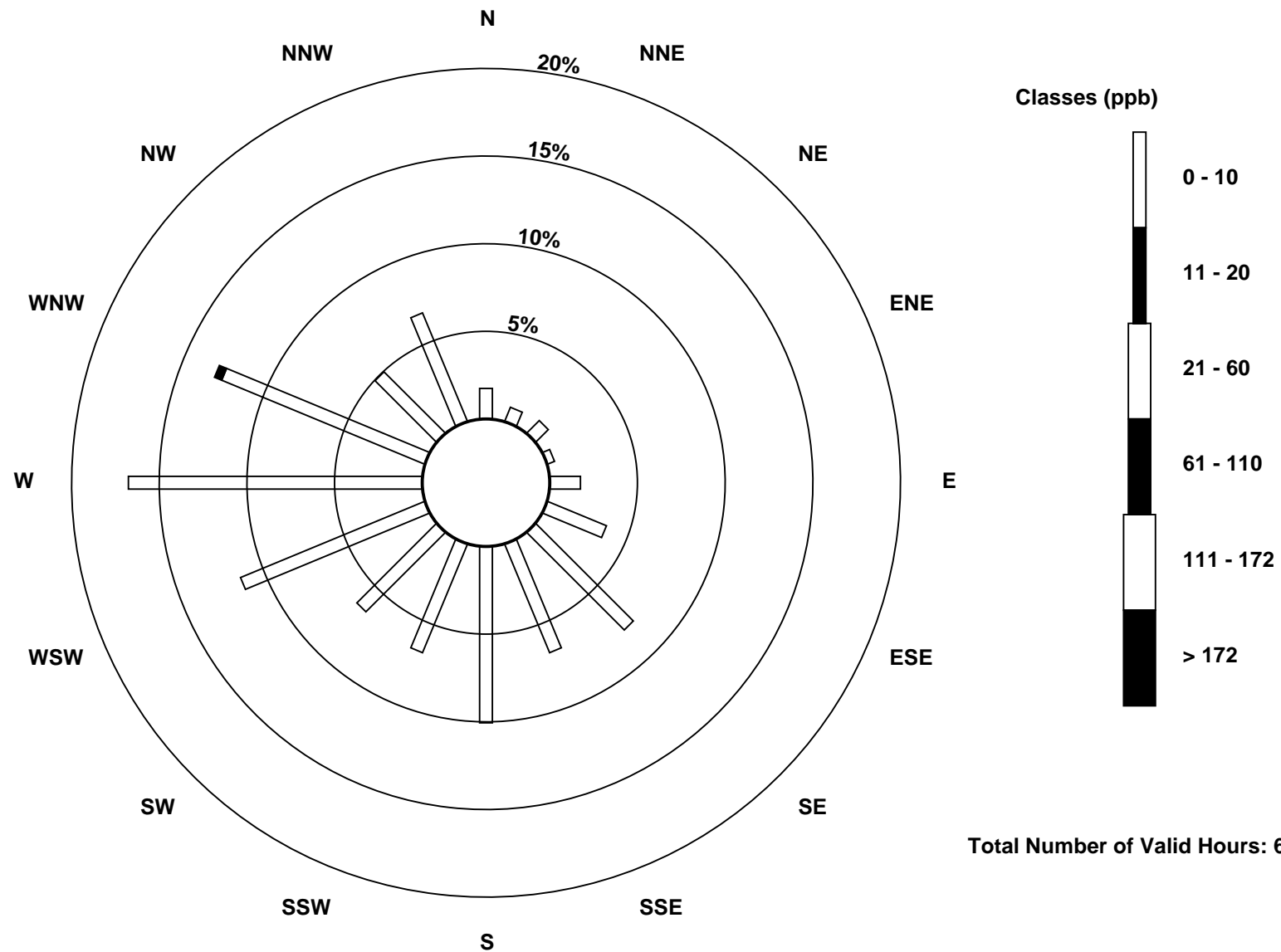
Total Number of Valid Hours: 686

Total Number of Hours: 744



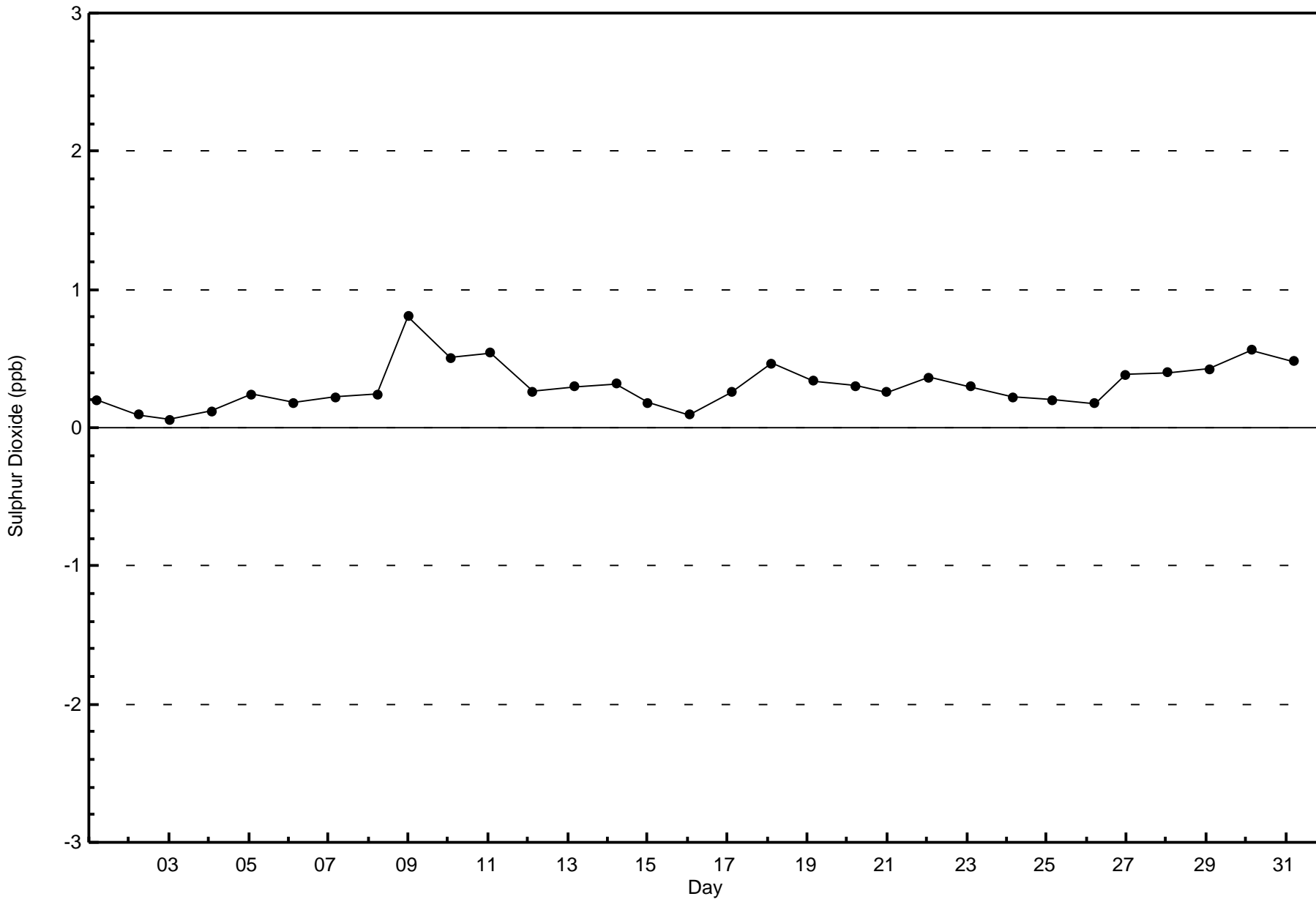
Wood Buffalo Environmental Association  
Wind Rose Oct 2015

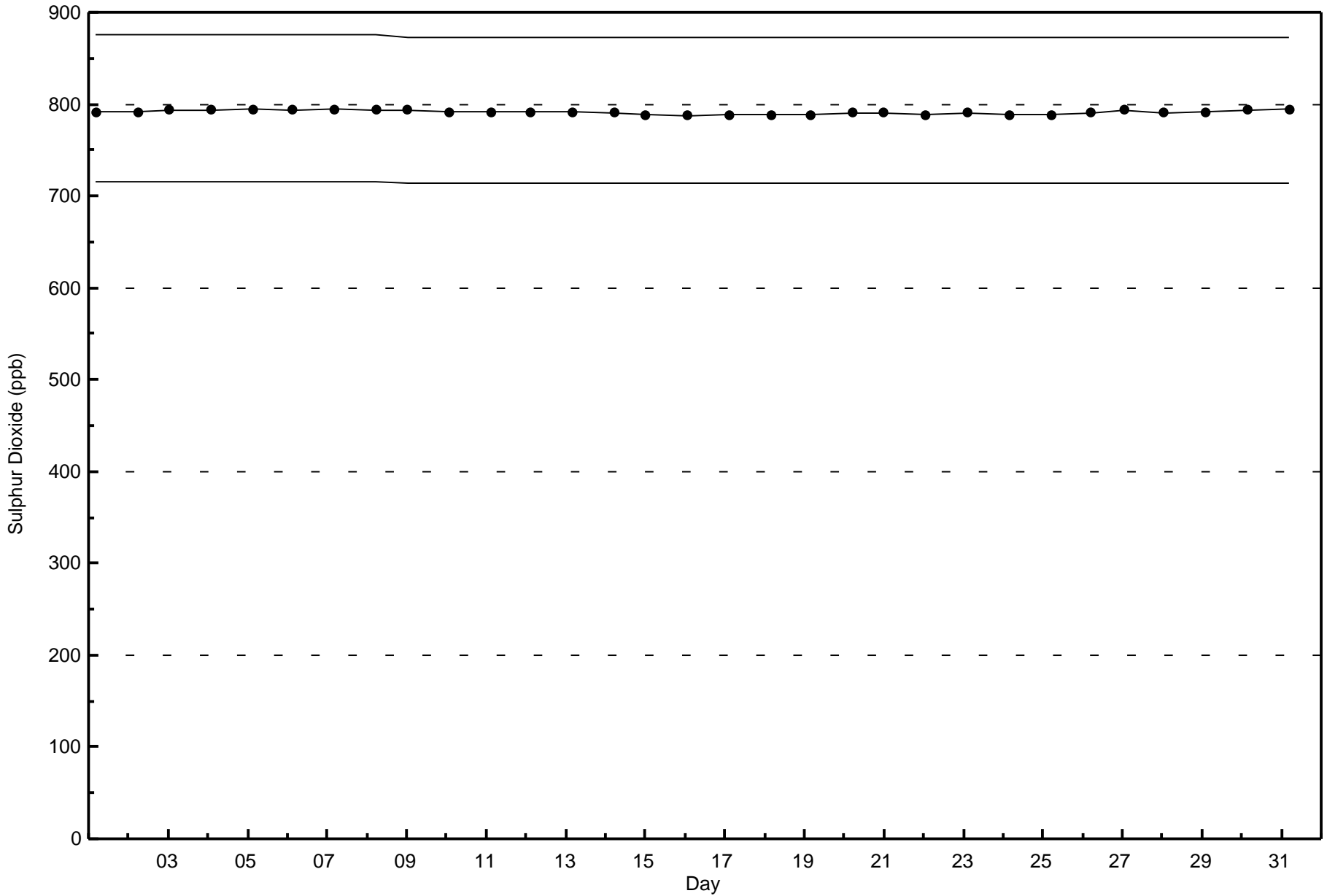
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
ConocoPhillips - Surmont (AMS502)



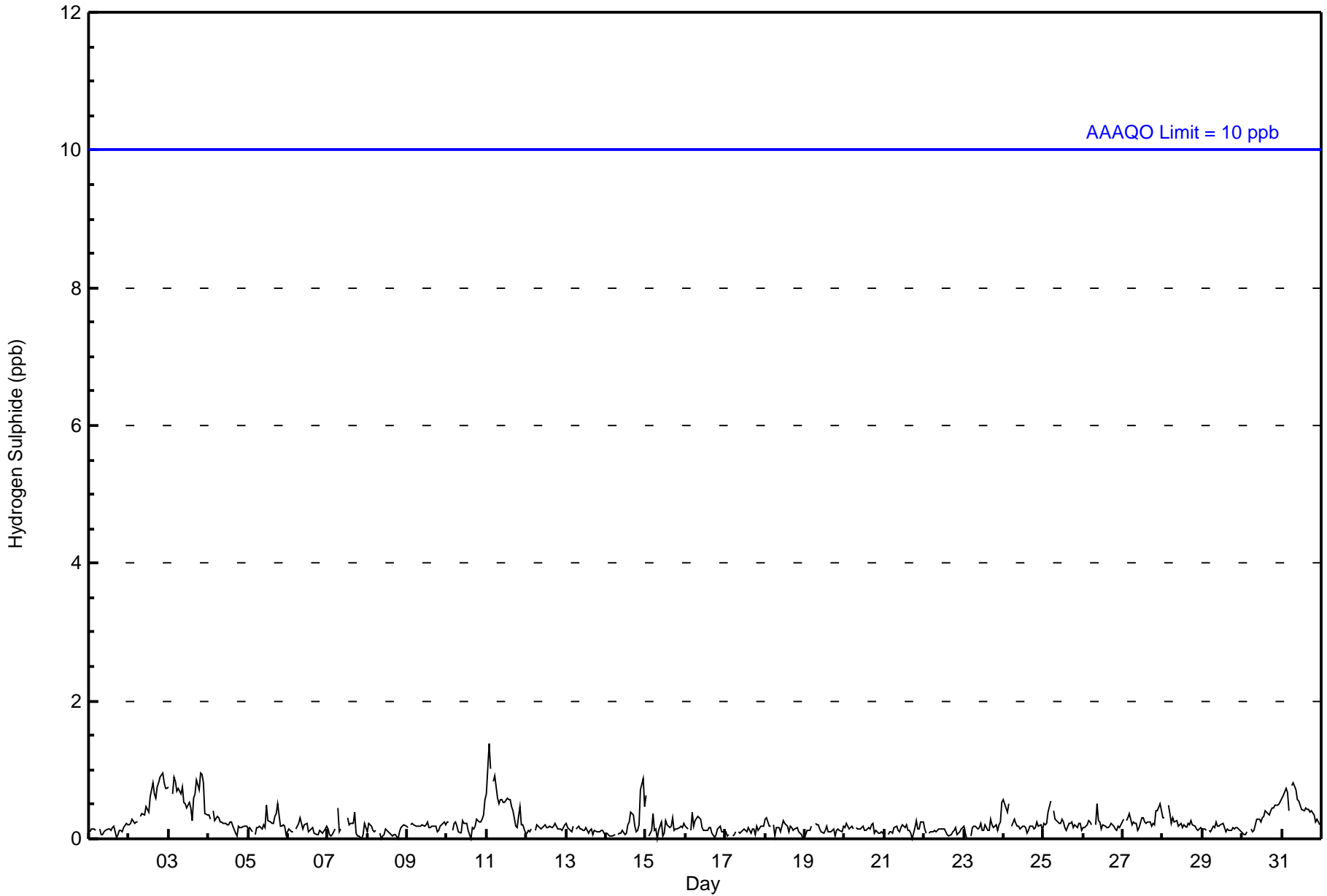
Total Number of Valid Hours: 686













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

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**ConocoPhillips - Surmont - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	709	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: 709

Total Number of Hours: 744



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

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**ConocoPhillips - Surmont - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	9	6	7	3	12	25	54	47	69	51	43	77	115	91	33	46	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>	9	6	7	3	12	25	54	47	69	51	43	77	115	91	33	46	688

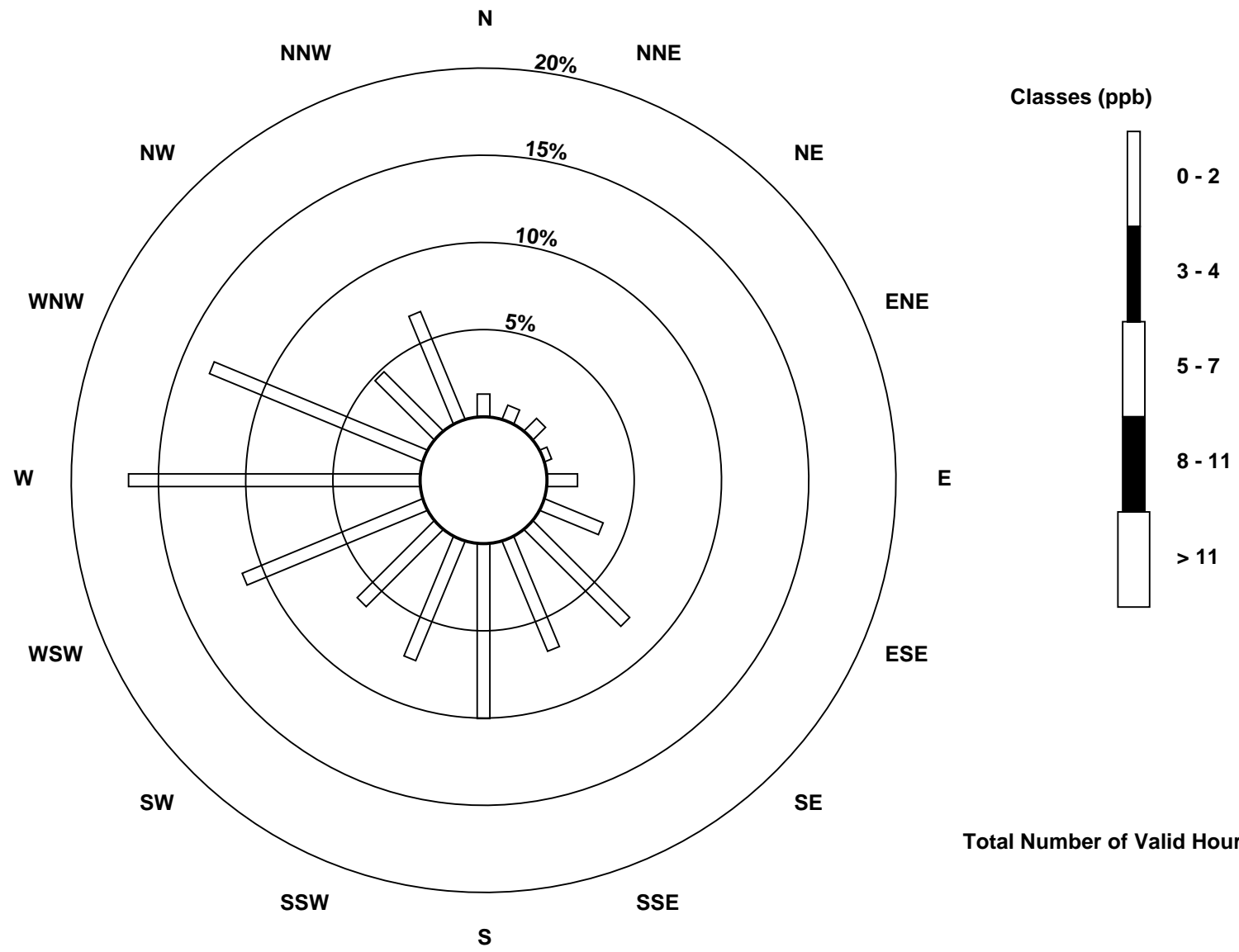
Total Number of Valid Hours: 688

Total Number of Hours: 744

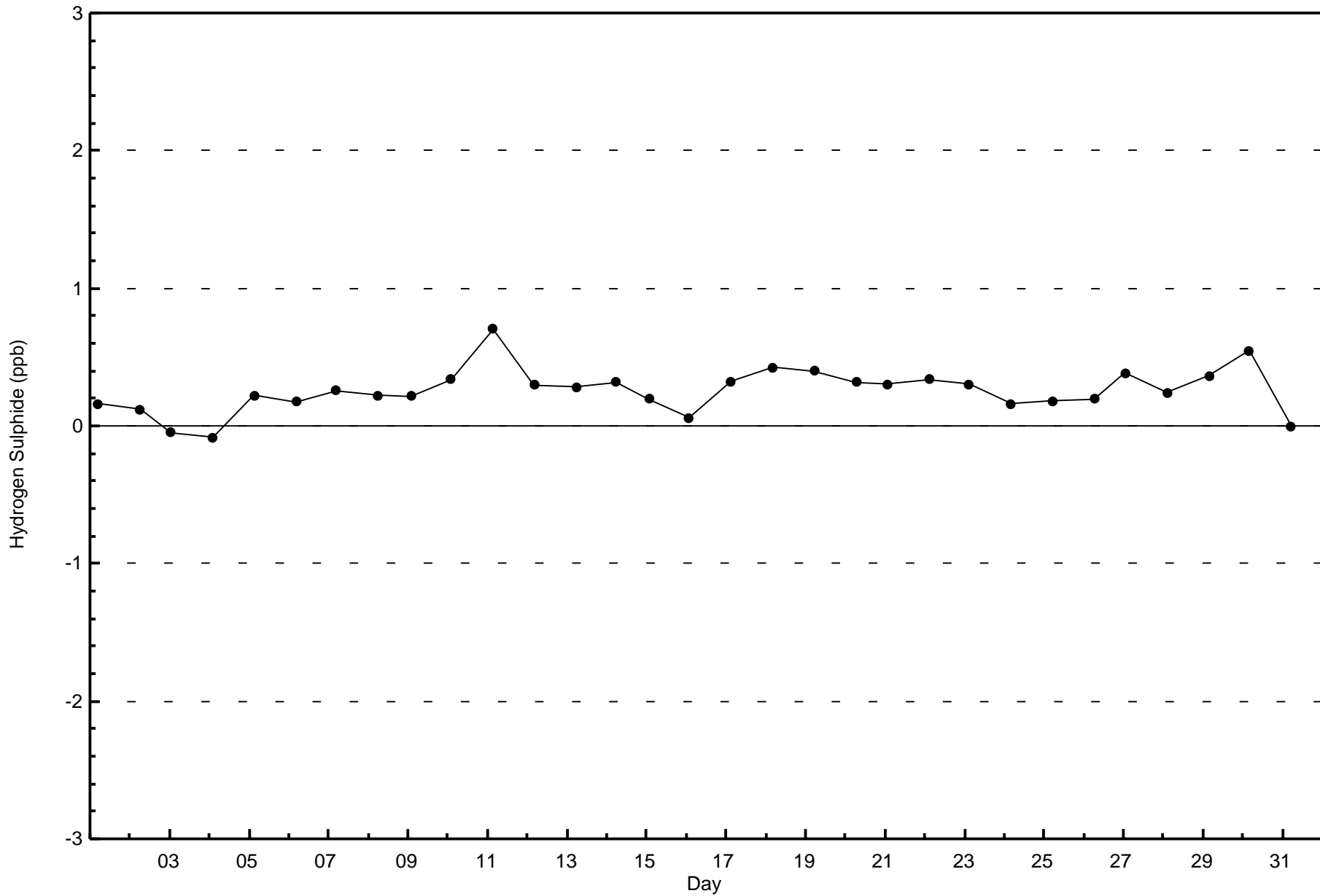


Wood Buffalo Environmental Association  
Wind Rose Oct 2015

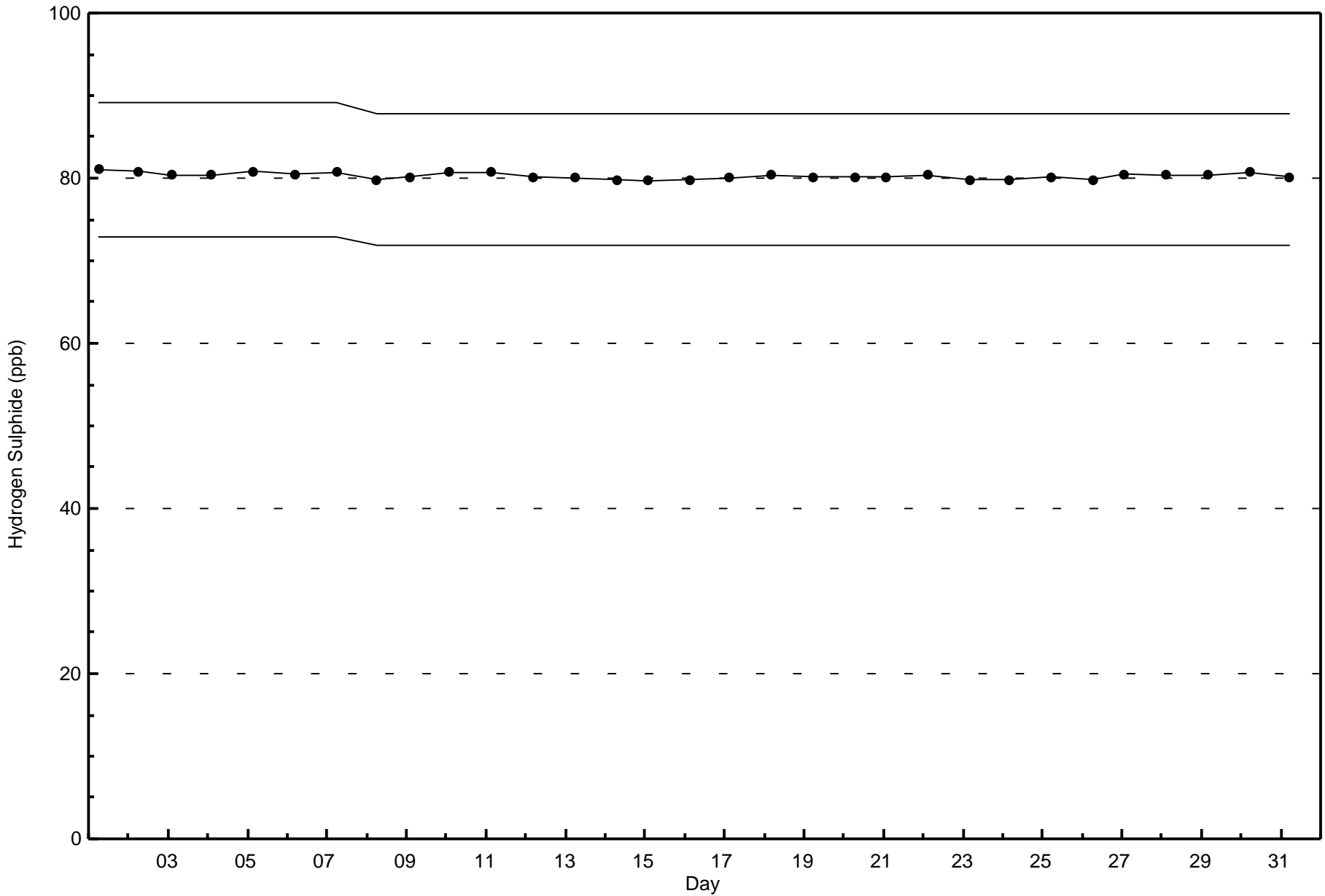
Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
ConocoPhillips - Surmont (AMS502)



Total Number of Valid Hours: 688

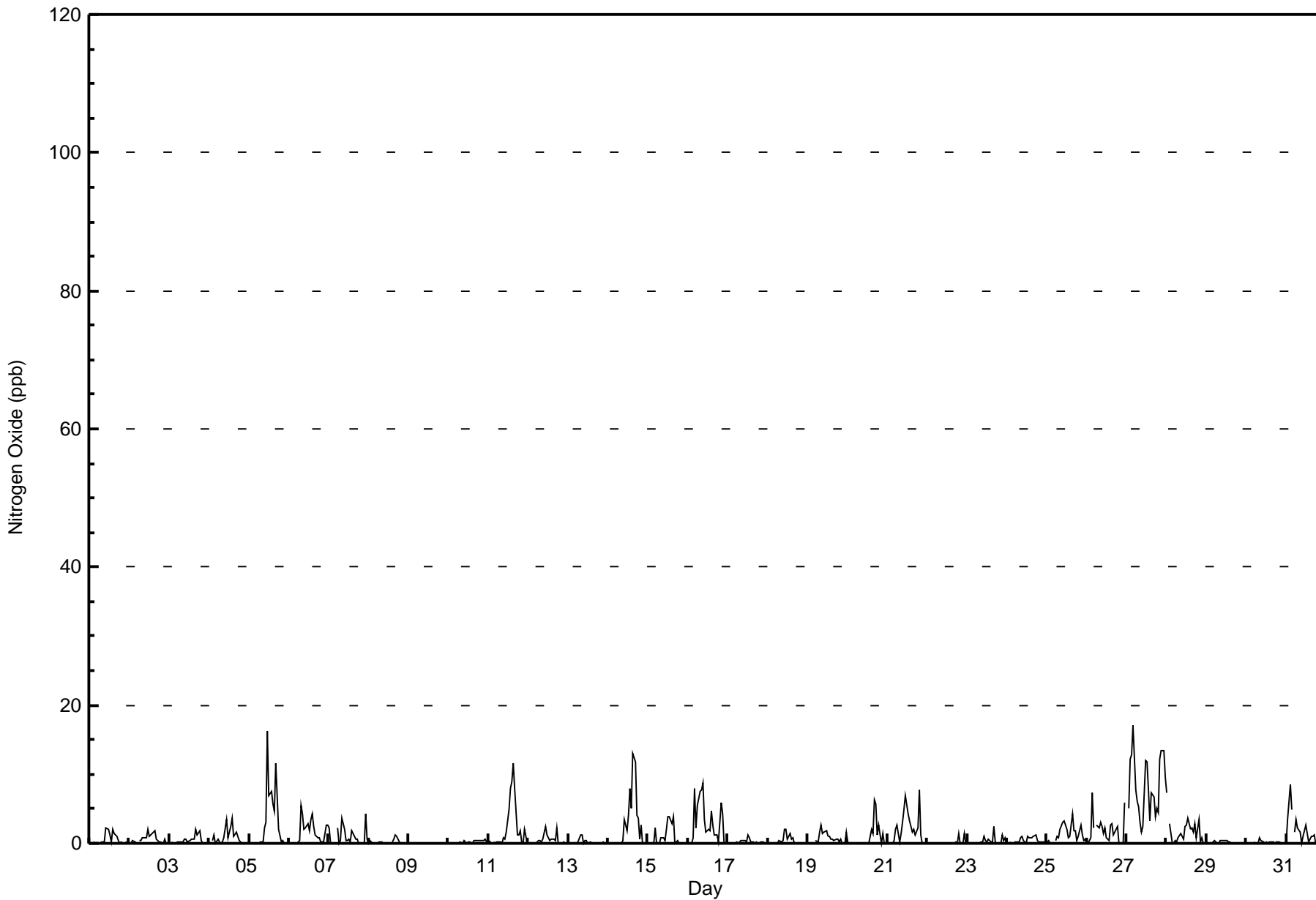








Maximum Value: 17 ppb on Oct 27 05:00																	Maximum Daily Average: 8.0 ppb on Oct 27																	Hours in Service: 744			
Minimum Value: 0 ppb on Oct 1 01:00																	Minimum Daily Average: 0.0 ppb on Oct 9																	Hours of Data: 708			
Maximum Diurnal Average: 2.2 ppb at hour 16																	Minimum Diurnal Average: 0.4 ppb at hour 2																	Hours of Missing Data: 36			
Monthly Average: 1.2 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> = 12																	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	Z	0	0	0	0	0	2	2	1	0	2	1	1	0	0	0	0	0	0	0	0.5	2											
2-Oct	0	0	0	0	0	Z	0	0	1	1	1	2	1	1	2	2	1	0	0	0	0	1	0	0	0.6	2											
3-Oct	Z	0	0	0	0	0	0	0	0	1	1	0	1	1	1	1	2	1	2	0	0	0	0	0	0.5	2											
4-Oct	0	Z	0	1	0	1	0	0	0	1	3	1	2	2	4	1	2	1	0	0	0	0	0	0	0.9	4											
5-Oct	0	0	Z	0	0	0	0	0	0	2	3	16	7	7	6	5	12	7	2	0	0	0	0	0	3.0	16											
6-Oct	0	0	0	Z	0	0	0	6	4	2	2	3	2	3	4	2	1	1	1	0	0	0	3	3	1.6	6											
7-Oct	2	0	0	0	Z	2	0	0	4	2	0	0	1	0	2	1	1	1	0	0	0	0	4	1	0.9	4											
8-Oct	0	1	0	0	0	Z	0	0	0	C	C	C	C	C	0	1	1	1	0	0	0	0	0	0	0.2	1											
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	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	1	0	0.2	1											
11-Oct	0	0	Z	0	0	0	0	0	0	1	1	2	5	8	9	12	8	1	1	2	0	0	2	0	2.3	12											
12-Oct	0	0	0	Z	0	0	0	1	0	1	2	1	1	0	1	1	0	2	0	0	0	0	0	0	0.5	2											
13-Oct	0	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1											
14-Oct	0	0	0	0	0	Z	0	0	0	0	4	2	4	8	5	13	12	4	4	1	3	0	0	0	2.6	13											
15-Oct	Z	0	0	0	2	0	0	0	1	1	0	2	4	4	3	4	0	0	0	0	0	0	0	0	0.9	4											
16-Oct	0	Z	0	1	8	2	6	7	8	9	4	2	2	2	5	3	1	1	0	3	6	4	0	0	3.2	9											
17-Oct	0	0	Z	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	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0.4	2											
19-Oct	0	0	0	0	Z	0	0	2	3	1	2	2	1	1	1	1	0	1	1	0	1	0	0	2	0.7	3											
20-Oct	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	2	1	6	6	1	3	0	1	0	0	0.9	6											
21-Oct	Z	0	0	0	0	2	3	0	2	3	5	7	4	3	2	2	2	1	2	8	1	0	0	0	2.1	8											
22-Oct	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0.2	2											
23-Oct	0	0	Z	0	0	0	0	0	0	0	1	0	0	1	0	0	2	0	0	0	0	1	0	1	0.4	2											
24-Oct	0	0	0	Z	0	0	0	0	1	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0.4	1											
25-Oct	0	0	0	0	Z	0	1	1	2	3	3	3	2	1	1	4	2	2	0	1	3	1	0	1	1.4	4											
26-Oct	0	0	1	7	2	Z	3	2	3	2	1	2	1	0	3	3	1	2	2	0	0	0	0	6	1.8	7											
27-Oct	Z	5	12	13	17	8	6	5	3	2	2	12	12	8	3	7	7	4	5	5	12	13	13	10	8.0	17											
28-Oct	7	Z	3	0	0	0	0	1	1	1	1	2	3	4	2	2	2	3	1	4	0	1	0	0	1.6	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	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1											
31-Oct	0	3	9	5	Z	2	4	2	2	0	1	2	3	0	1	1	1	1	0	0	0	0	0	0	1.5	9											
																								Diurnal Average													
																								Diurnal Maximum													
0.4 0.4 1.0 1.1 1.2 0.7 0.8 1.0 1.2 1.2 1.4 2.2 1.9 2.0 1.9 2.2 2.2 1.4 0.8 0.9 0.9 0.8 0.8 0.7																																					
7 5 12 13 17 8 6 7 8 9 5 16 12 8 9 13 12 7 5 8 12 13 13 10																																					
Z - zerospan C - Calibration																																					





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

**Nitrogen Oxide (NO) - ppb**  
**ConocoPhillips - Surmont - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	708	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: 708

Total Number of Hours: 744



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

**Nitrogen Oxide (NO) - ppb**  
**ConocoPhillips - Surmont - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	12	6	7	3	12	25	54	46	69	46	44	78	115	89	34	46	686
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>	12	6	7	3	12	25	54	46	69	46	44	78	115	89	34	46	686

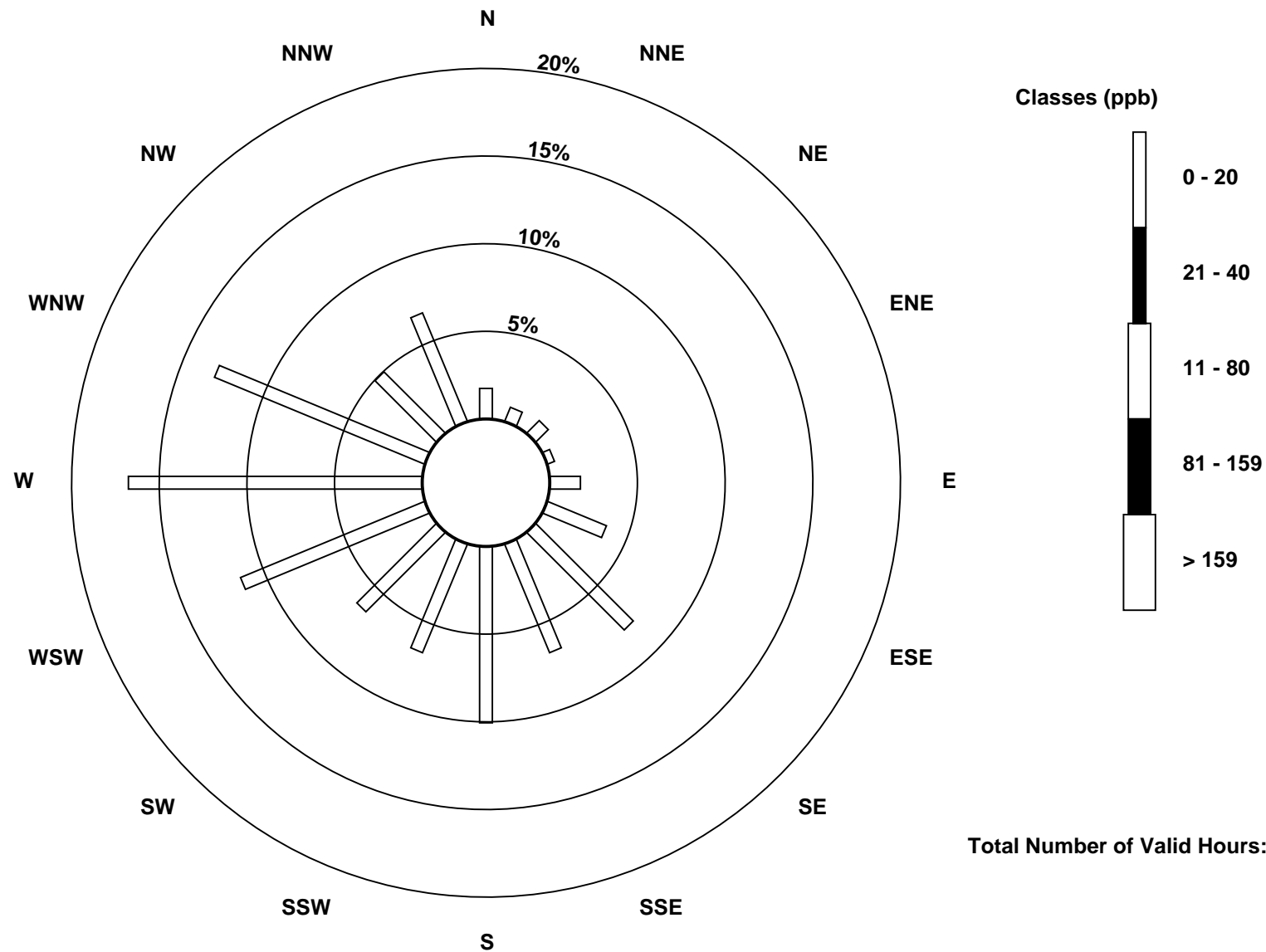
Total Number of Valid Hours: 686

Total Number of Hours: 744



Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Nitrogen Oxide (NO) - ppb  
ConocoPhillips - Surmont (AMS502)



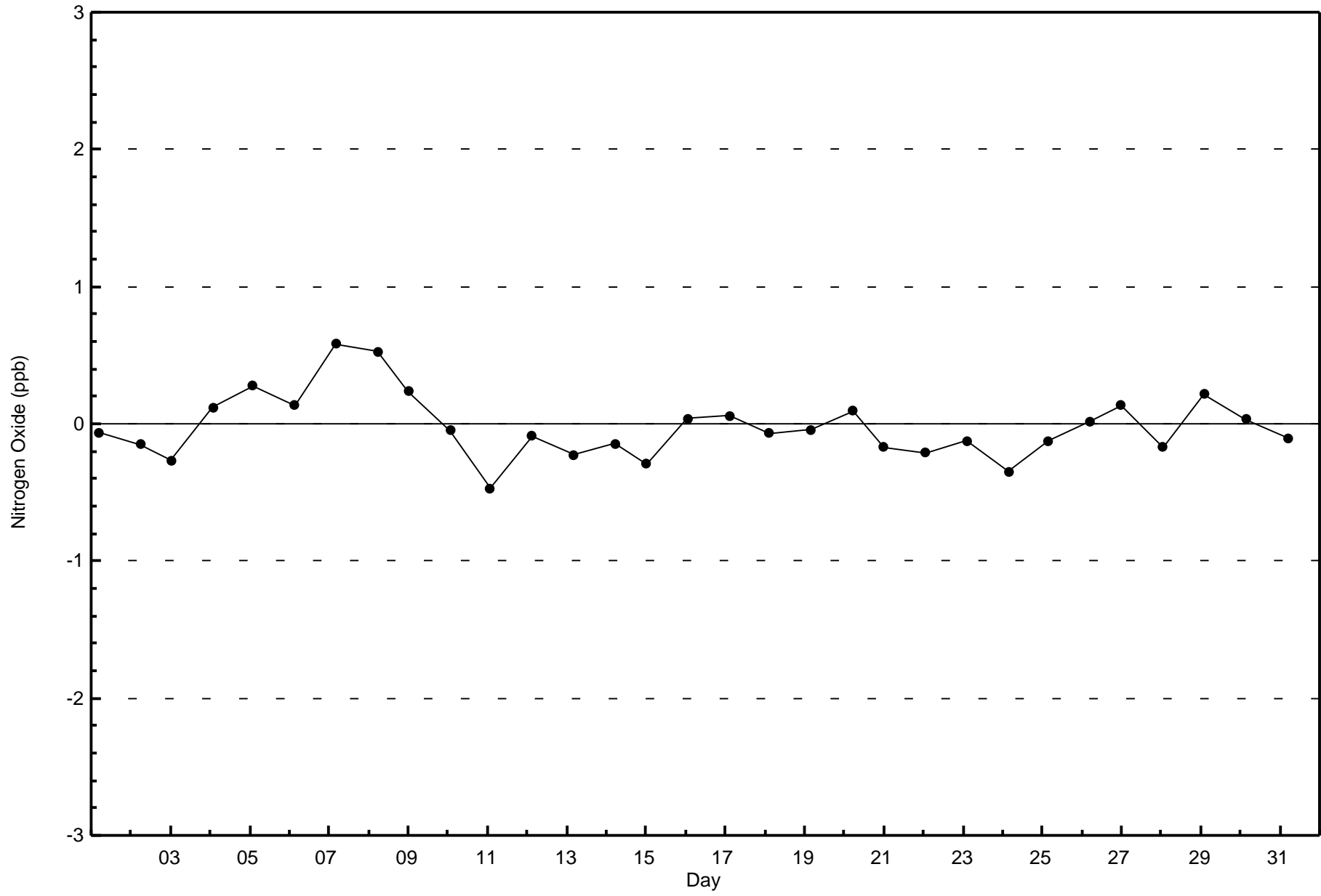


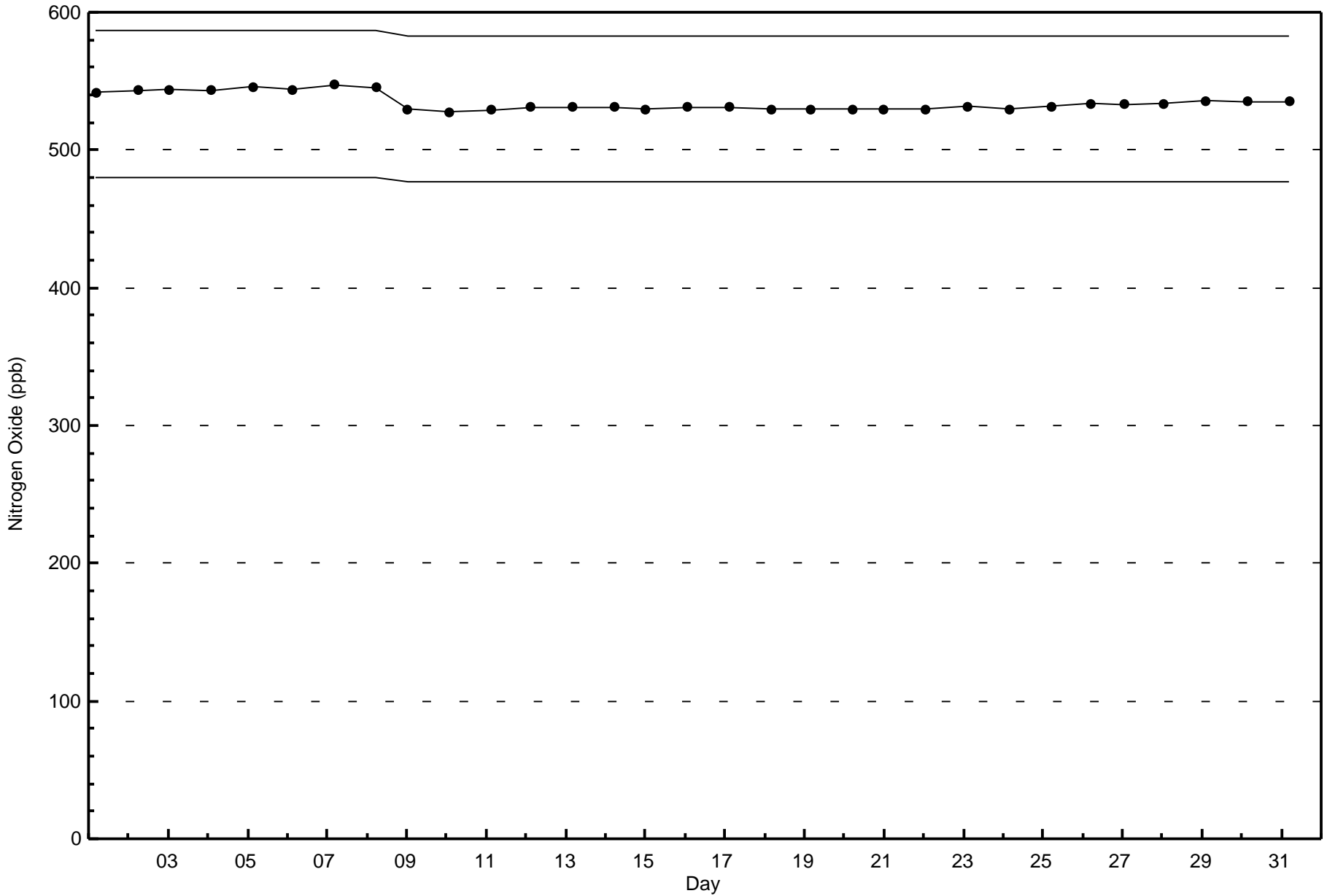
Wood Buffalo Environmental Association

Zero Responses

Nitrogen Oxide (NO) - ppb

ConocoPhillips - Surmont - October 2015









Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 15 ppb on Oct 24 00:00	Maximum Daily Average: 5.7 ppb on Oct 16		Hours of Data:	708
Minimum Value: 0 ppb on Oct 9 11:00	Minimum Daily Average: 0.5 ppb on Oct 13		Hours of Missing Data:	36
Maximum Diurnal Average: 2.7 ppb at hour 17	Minimum Diurnal Average: 1.7 ppb at hour 22		Hours of Calibration:	36
Monthly Average: 2.1 ppb	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> = 4 P <sub>99</sub> = 12		Percent Operational Time:	100.0

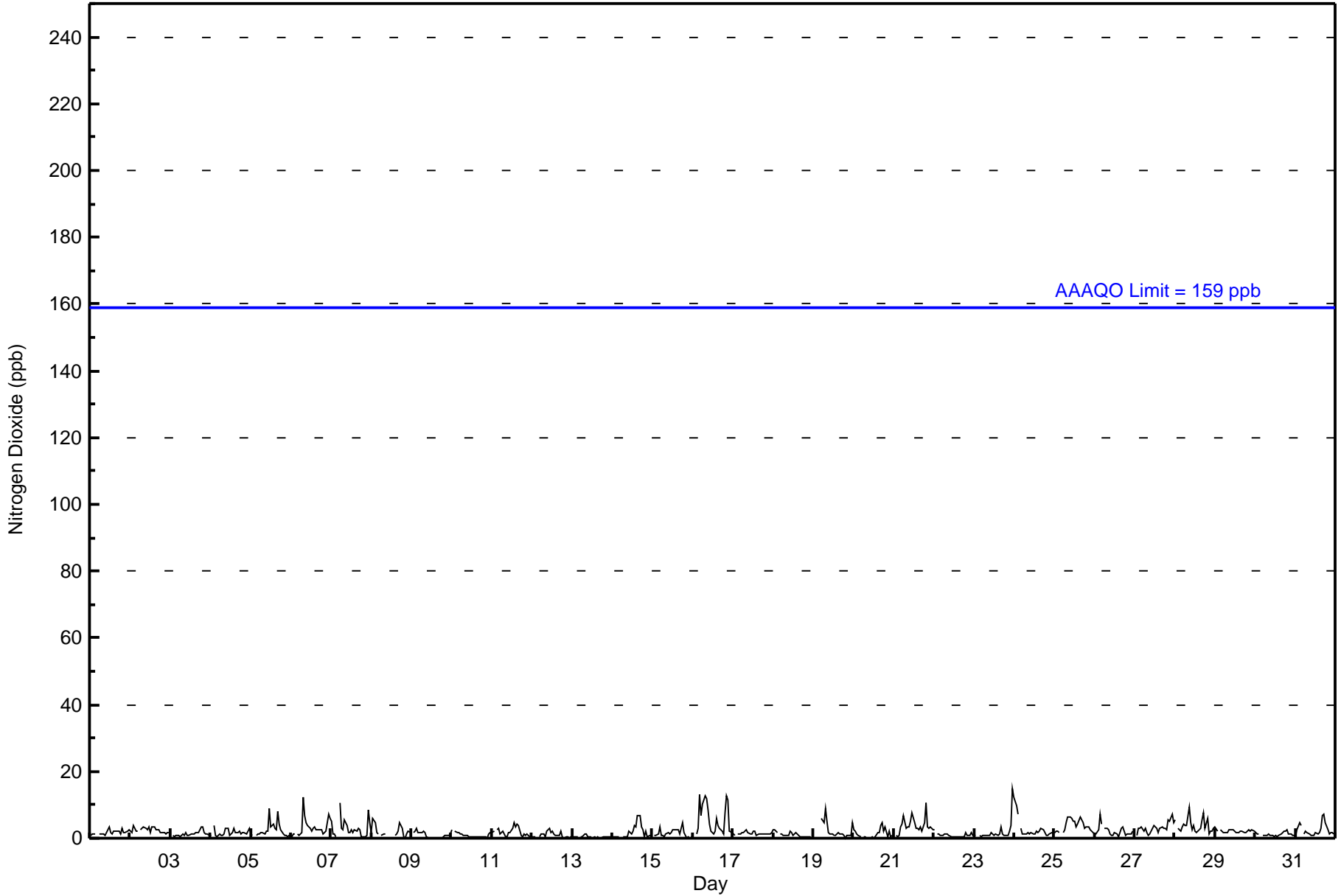
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Oct	1	1	1	1	Z	1	1	1	1	1	2	3	2	1	2	2	2	2	1	3	2	2	2	3	1.7	3																							
2-Oct	2	2	4	2	2	Z	3	3	3	3	3	3	2	3	4	3	3	3	2	2	2	1	2	2	2.4	4																							
3-Oct	Z	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	2	2	4	4	2	1	1	1	1.4	4																							
4-Oct	1	Z	4	1	0	1	1	1	1	3	3	1	1	2	3	2	2	2	1	2	2	1	2	3	1.7	4																							
5-Oct	1	1	Z	1	1	1	2	2	1	2	2	9	3	4	3	3	8	4	3	1	1	1	1	1	2.4	9																							
6-Oct	0	1	1	Z	1	1	2	12	7	5	4	3	2	3	4	3	3	3	2	1	2	2	7	6	3.2	12																							
7-Oct	5	1	1	1	Z	11	3	3	6	4	2	2	3	2	3	2	3	3	1	1	1	1	9	5	2.9	11																							
8-Oct	2	6	5	2	1	Z	1	1	1	C	C	C	C	C	1	1	2	5	3	1	0	1	2	2	2.0	6																							
9-Oct	Z	2	2	3	2	2	2	2	2	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	3																							
10-Oct	3	Z	2	2	2	1	1	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	1	2	0.9	3																							
11-Oct	2	2	Z	2	3	1	2	1	0	0	2	2	3	5	4	4	4	1	1	1	1	1	1	0	1.8	5																							
12-Oct	0	0	0	Z	1	1	1	1	1	2	3	2	2	1	1	1	1	2	0	0	1	0	0	0	1.0	3																							
13-Oct	1	1	0	0	Z	0	0	1	1	0	1	1	0	0	0	0	0	0	1	1	1	0	0	0	0.5	1																							
14-Oct	0	0	0	0	0	Z	1	0	0	0	2	1	2	4	3	7	7	3	3	1	2	1	1	1	1.8	7																							
15-Oct	Z	1	1	1	3	1	1	0	1	2	1	2	3	3	3	2	1	3	5	2	0	0	0	0	1.6	5																							
16-Oct	1	Z	1	3	13	7	10	13	12	8	4	2	1	2	6	4	3	2	1	8	13	11	2	2	5.7	13																							
17-Oct	1	1	Z	1	1	2	2	2	2	2	1	1	2	2	1	1	1	1	1	1	1	1	2	2	1.4	2																							
18-Oct	3	3	2	Z	1	1	1	1	1	1	2	2	1	2	1	1	1	1	1	0	0	1	0	0	1.1	3																							
19-Oct	0	0	0	0	Z	6	5	9	5	2	1	1	1	1	1	2	1	1	1	0	1	1	1	5	1.9	9																							
20-Oct	3	2	1	1	1	Z	1	0	0	0	0	0	0	0	2	2	4	5	2	3	1	2	0	1	1.3	5																							
21-Oct	Z	1	1	1	4	4	7	3	4	3	5	8	5	3	3	3	4	2	5	11	4	3	3	3	3.8	11																							
22-Oct	3	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	2	1	1	2	1	1.0	3																							
23-Oct	1	1	Z	1	1	1	1	1	1	1	2	1	1	1	1	1	3	1	1	1	1	2	4	15	1.8	15																							
24-Oct	12	10	7	Z	3	1	1	1	2	1	2	1	1	2	2	3	3	3	2	1	1	1	2	2	2.7	12																							
25-Oct	2	2	2	2	Z	2	3	5	6	6	6	5	5	3	4	6	5	5	3	3	3	3	2	2	3.7	6																							
26-Oct	1	1	3	7	4	Z	3	3	3	1	1	1	2	1	0	2	3	4	1	1	1	1	1	2	2.0	7																							
27-Oct	Z	1	3	3	3	2	3	2	1	1	2	4	4	3	2	3	3	3	3	3	5	5	7	5	3.1	7																							
28-Oct	5	Z	3	2	4	4	4	4	9	5	3	4	2	2	3	3	5	8	3	6	1	2	2	3	3.7	9																							
29-Oct	3	2	Z	2	2	2	2	2	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2.2	3																							
30-Oct	2	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	3	1	1	1	1	1.1	3																							
31-Oct	1	3	5	4	Z	1	2	2	1	1	1	1	2	1	2	3	7	7	5	3	1	2	2	1	2.4	7																							
																								2.1	1.8	2.0	1.8	2.2	2.2	2.1	2.6	2.6	2.1	2.0	2.2	1.8	1.9	2.0	2.2	2.7	2.5	1.9	2.1	1.8	1.7	2.0	2.3	Diurnal Average	
																								12	10	7	7	13	11	10	13	12	8	6	9	5	5	6	7	8	8	8	5	11	13	11	9	15	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  
ConocoPhillips - Surmont - October 2015





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**ConocoPhillips - Surmont - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	708	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: 708

Total Number of Hours: 744



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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**ConocoPhillips - Surmont - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	12	6	7	3	12	25	54	46	69	46	44	78	115	89	34	46	686
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>	12	6	7	3	12	25	54	46	69	46	44	78	115	89	34	46	686

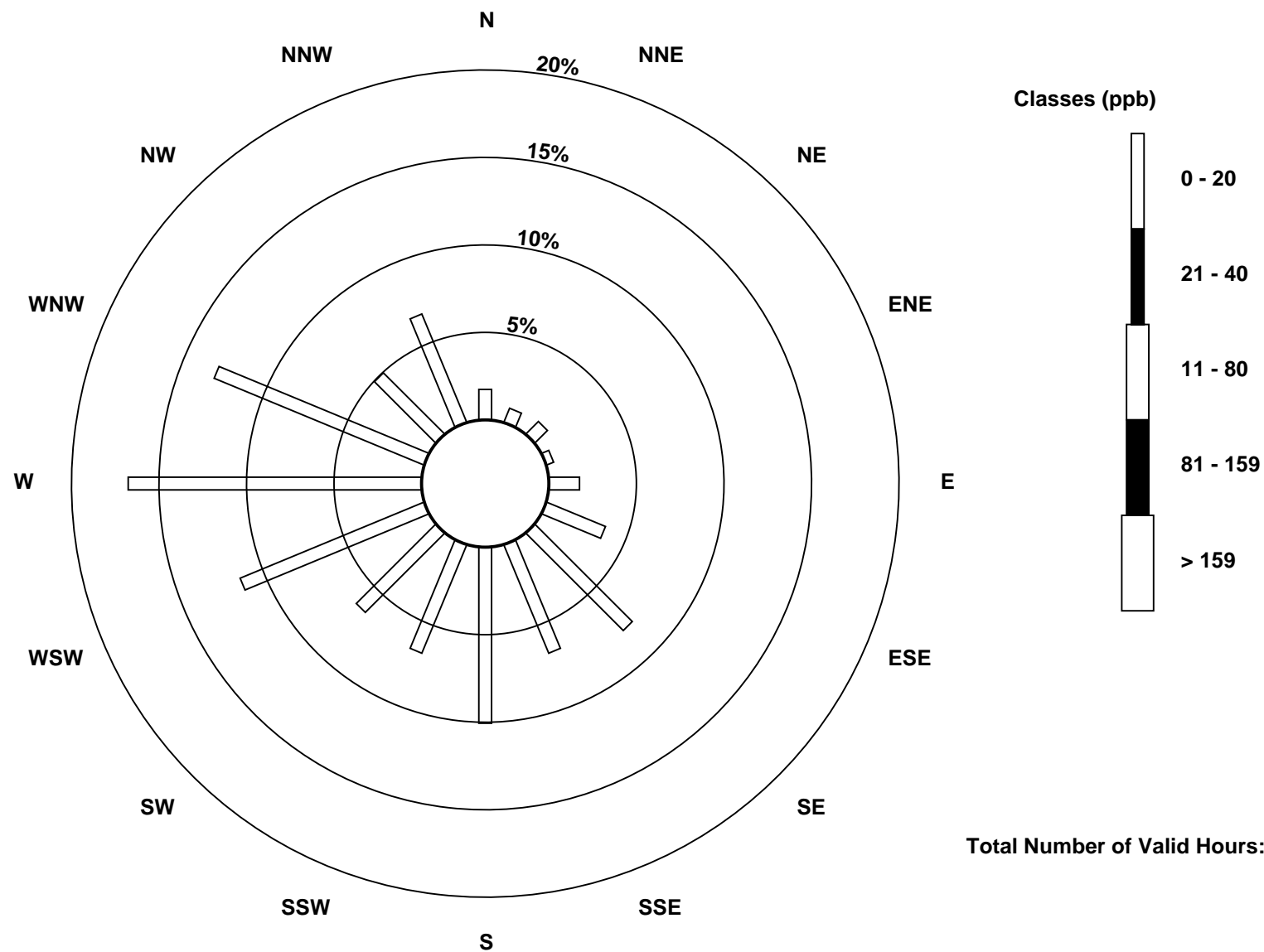
Total Number of Valid Hours: 686

Total Number of Hours: 744

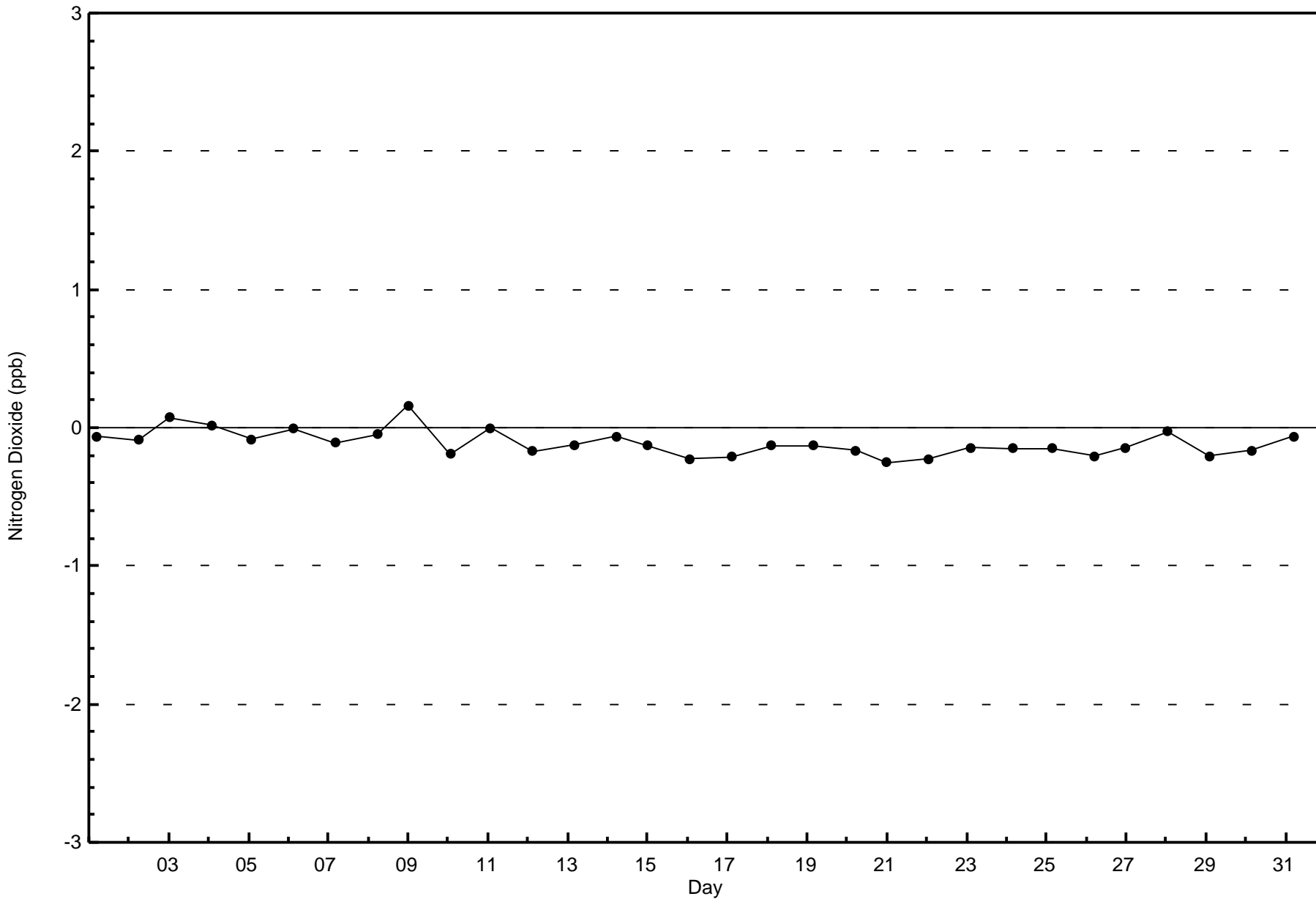


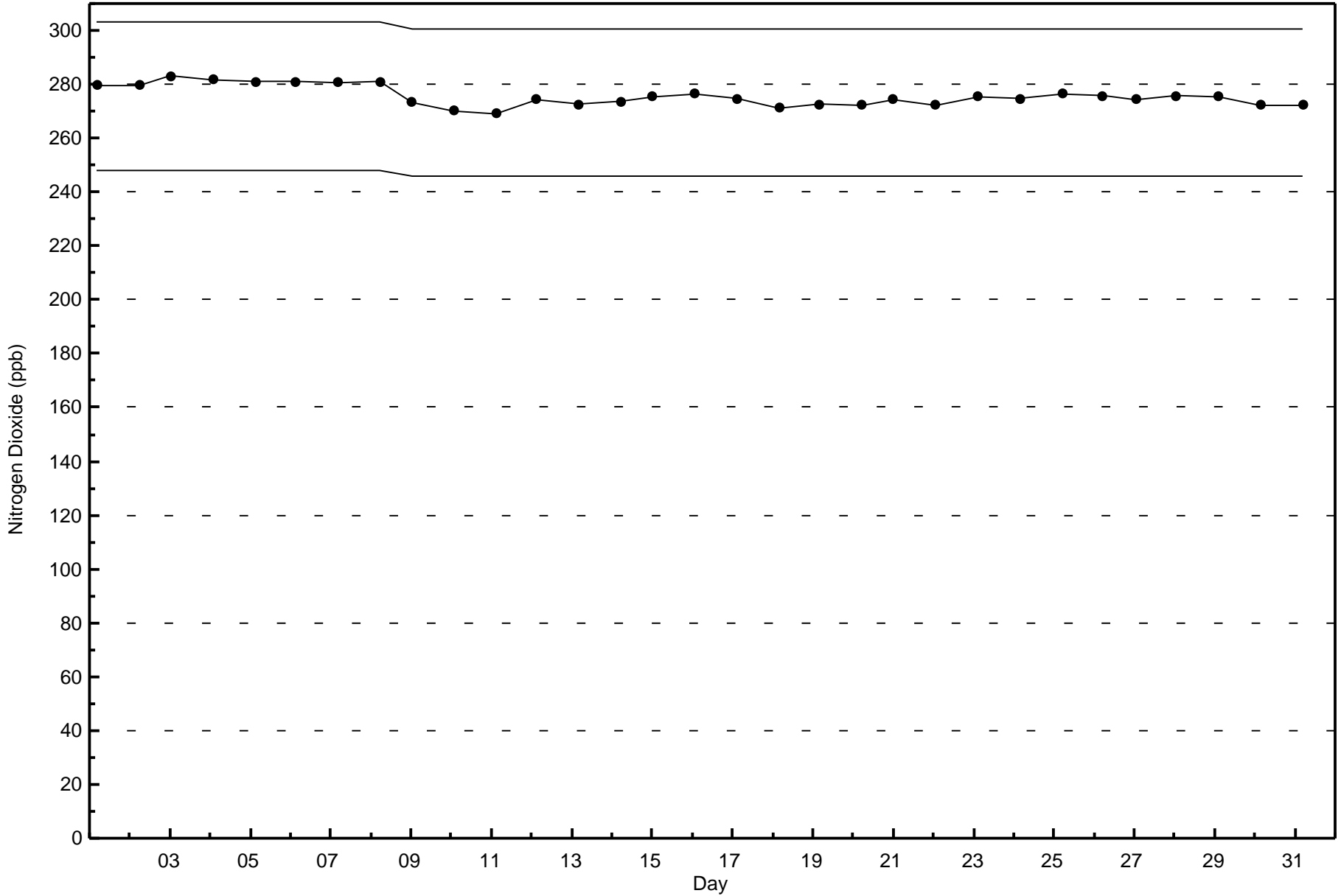
Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
ConocoPhillips - Surmont (AMS502)



Total Number of Valid Hours: 686







Maximum Value: 25 ppb on Oct 5 12:00																	Maximum Daily Average: 11.1 ppb on Oct 27																	Hours in Service: 744	
Minimum Value: 0 ppb on Oct 9 12:00																	Minimum Daily Average: 0.6 ppb on Oct 13																	Hours of Data: 708	
Maximum Diurnal Average: 4.9 ppb at hour 17																	Minimum Diurnal Average: 2.1 ppb at hour 2																	Hours of Missing Data: 36	
Monthly Average: 3.3 ppb																	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 4 P <sub>90</sub> = 8 P <sub>99</sub> = 20																	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	1	1	1	1	Z	1	1	1	2	1	4	5	3	2	4	4	3	3	1	3	2	2	2	3	2.3	5									
2-Oct	2	2	4	2	2	Z	3	3	4	4	3	5	3	4	5	4	3	3	2	2	2	2	2	2	3.0	5									
3-Oct	Z	1	1	1	1	1	1	1	1	2	1	1	2	2	2	2	4	3	5	4	2	1	1	1	1.8	5									
4-Oct	1	Z	4	2	0	2	1	1	2	4	6	2	3	4	6	3	3	3	2	2	2	1	2	3	2.6	6									
5-Oct	1	1	Z	1	1	1	2	2	2	5	5	25	10	11	9	7	20	11	5	2	1	1	1	1	5.4	25									
6-Oct	0	1	1	Z	1	1	2	18	11	7	6	6	4	6	8	5	4	3	3	1	2	2	10	9	4.9	18									
7-Oct	7	2	1	1	Z	13	3	3	9	6	2	2	3	2	4	3	3	3	1	1	1	1	13	5	3.9	13									
8-Oct	2	6	5	2	1	Z	1	1	1	C	C	C	C	C	1	2	3	6	3	1	0	1	2	2	2.2	6									
9-Oct	Z	2	2	3	2	2	2	2	2	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1.0	3									
10-Oct	3	Z	2	2	2	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	2	2	1.1	3									
11-Oct	2	2	Z	3	3	2	2	1	0	1	2	4	8	13	13	16	12	2	2	3	1	1	3	0	4.1	16									
12-Oct	0	0	0	Z	1	1	2	2	1	3	5	3	3	2	1	1	1	4	0	0	1	1	0	0	1.5	5									
13-Oct	1	0	0	0	Z	0	1	2	2	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0.6	2									
14-Oct	0	0	0	0	1	Z	0	0	0	1	6	3	6	12	8	20	19	7	6	1	5	1	1	1	4.3	20									
15-Oct	Z	1	1	1	5	1	1	0	2	2	2	4	6	7	6	6	1	3	5	2	0	0	0	0	2.5	7									
16-Oct	1	Z	1	4	21	9	16	20	20	17	8	4	3	4	11	6	4	3	2	11	19	16	2	2	8.8	21									
17-Oct	1	1	Z	1	1	2	2	2	3	2	2	1	3	3	1	2	1	1	1	1	1	1	1	1	1.6	3									
18-Oct	3	3	2	Z	1	1	1	1	1	1	4	4	1	3	2	2	1	0	1	0	0	0	0	0	1.4	4									
19-Oct	0	0	0	0	Z	6	5	10	8	3	3	3	2	2	2	2	1	2	1	1	1	1	1	6	2.7	10									
20-Oct	3	2	1	1	0	Z	1	0	0	0	0	0	0	0	4	3	10	10	3	6	0	3	0	1	2.2	10									
21-Oct	Z	1	0	1	4	6	9	3	5	7	10	14	9	6	5	4	6	3	7	19	5	3	3	3	5.8	19									
22-Oct	3	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	3	1	1	3	1	1.1	3									
23-Oct	1	1	Z	1	1	1	1	1	1	1	3	2	1	2	1	1	6	2	1	1	1	3	4	16	2.2	16									
24-Oct	12	10	8	Z	3	1	1	1	2	2	2	1	2	3	3	4	4	2	1	1	1	2	2	2	3.1	12									
25-Oct	2	2	2	2	Z	2	4	5	8	9	9	8	7	4	5	10	7	6	3	4	6	4	2	3	5.1	10									
26-Oct	1	1	3	15	6	Z	6	5	5	4	2	3	2	2	3	5	4	5	3	1	1	1	1	8	3.9	15									
27-Oct	Z	6	15	16	20	10	9	7	4	3	5	16	15	11	5	10	10	7	8	7	18	18	21	14	11.1	21									
28-Oct	13	Z	6	2	4	4	4	5	11	6	3	6	5	5	4	5	7	10	4	9	1	3	2	3	5.3	13									
29-Oct	3	2	Z	2	2	2	2	2	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2.3	3									
30-Oct	2	1	1	Z	1	1	1	1	2	1	1	1	1	1	1	1	2	2	2	3	1	1	1	1	1.3	3									
31-Oct	1	6	13	9	Z	3	6	4	3	1	2	3	4	1	2	4	8	8	5	3	1	2	1	1	3.9	13									
2.5																	2.1																	Diurnal Average	
13																	10																	Diurnal Maximum	
3.0																	2.8																		
3.5																	3.0																		
2.9																	3.6																		
3.8																	3.3																		
3.4																	4.4																		
3.7																	3.9																		
3.9																	3.9																		
4.4																	4.9																		
3.9																	2.7																		
3.0																	2.6																		
2.5																	2.9																		
2.9																	3.0																		
3.0																	19																		
16																	18																		
21																	16																		
Z - zerspan																	C - Calibration																		



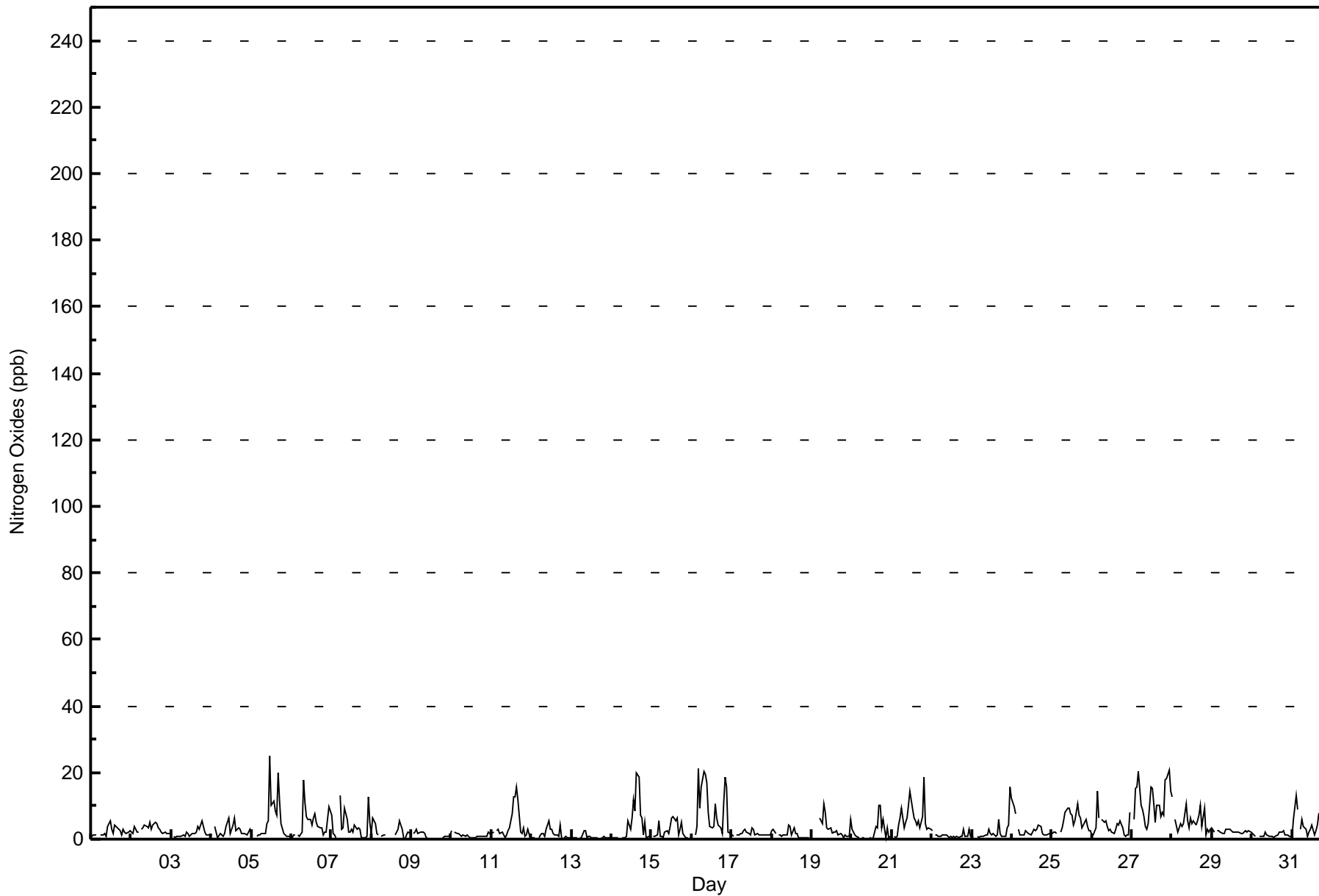


Wood Buffalo Environmental Association

Hourly Averages

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

ConocoPhillips - Surmont - October 2015





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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**ConocoPhillips - Surmont - October 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	705	99.58	99.58
21 - 40	3	0.42	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: 708

Total Number of Hours: 744



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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**ConocoPhillips - Surmont - October 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	12	6	7	3	12	25	54	45	69	46	44	78	115	87	34	46	683
21 - 40	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	3
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>	12	6	7	3	12	25	54	46	69	46	44	78	115	89	34	46	686

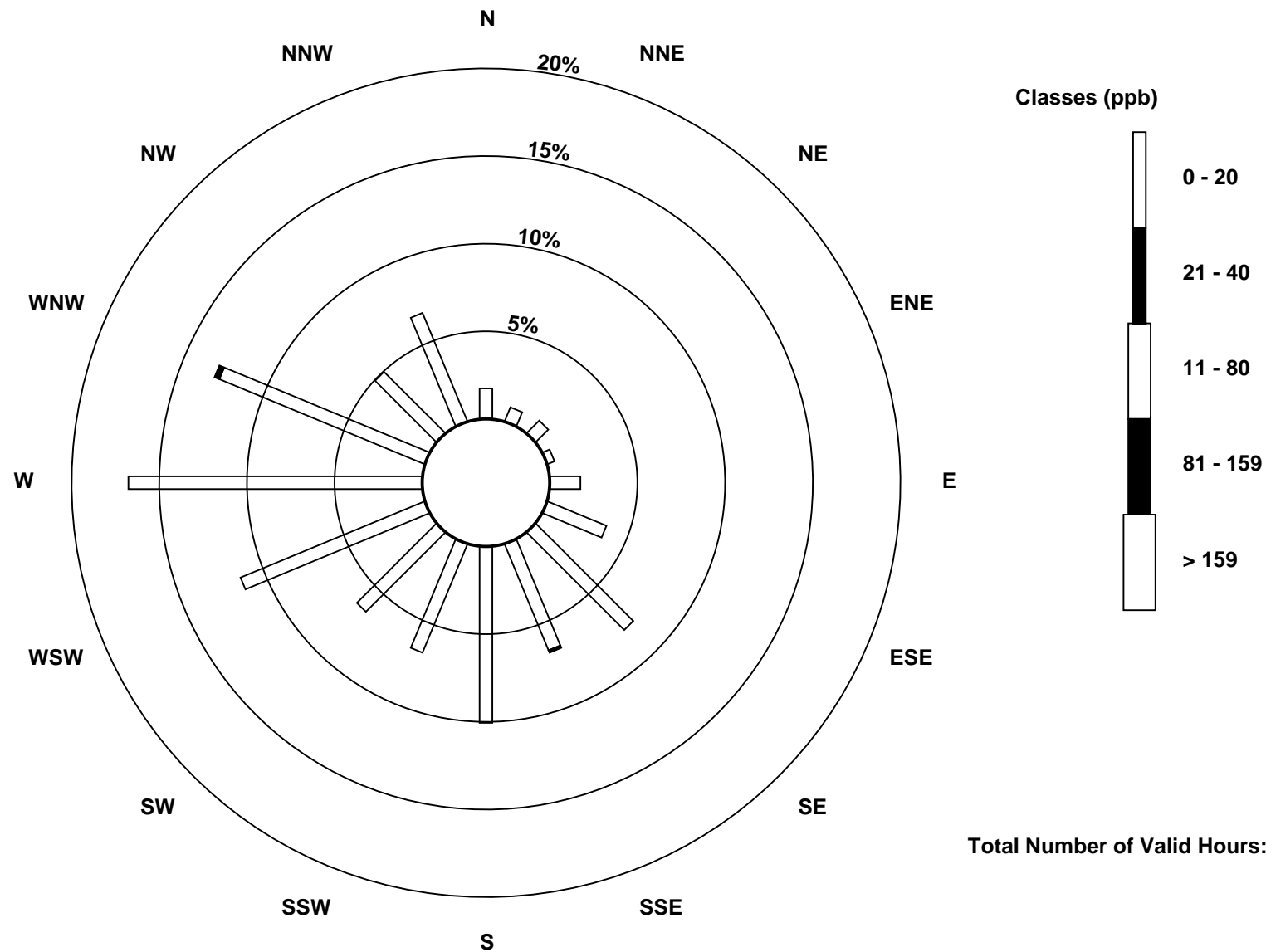
Total Number of Valid Hours: 686

Total Number of Hours: 744

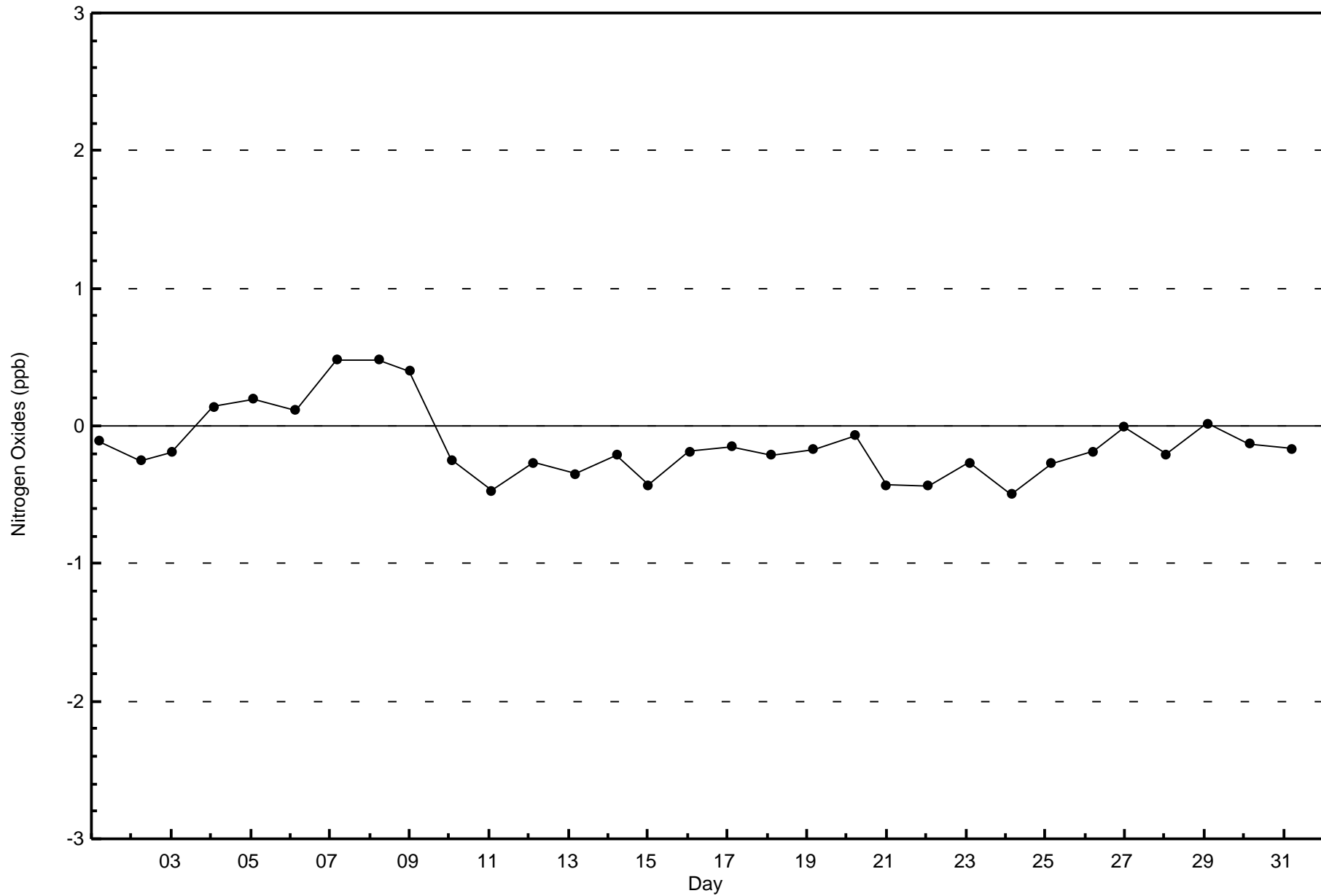


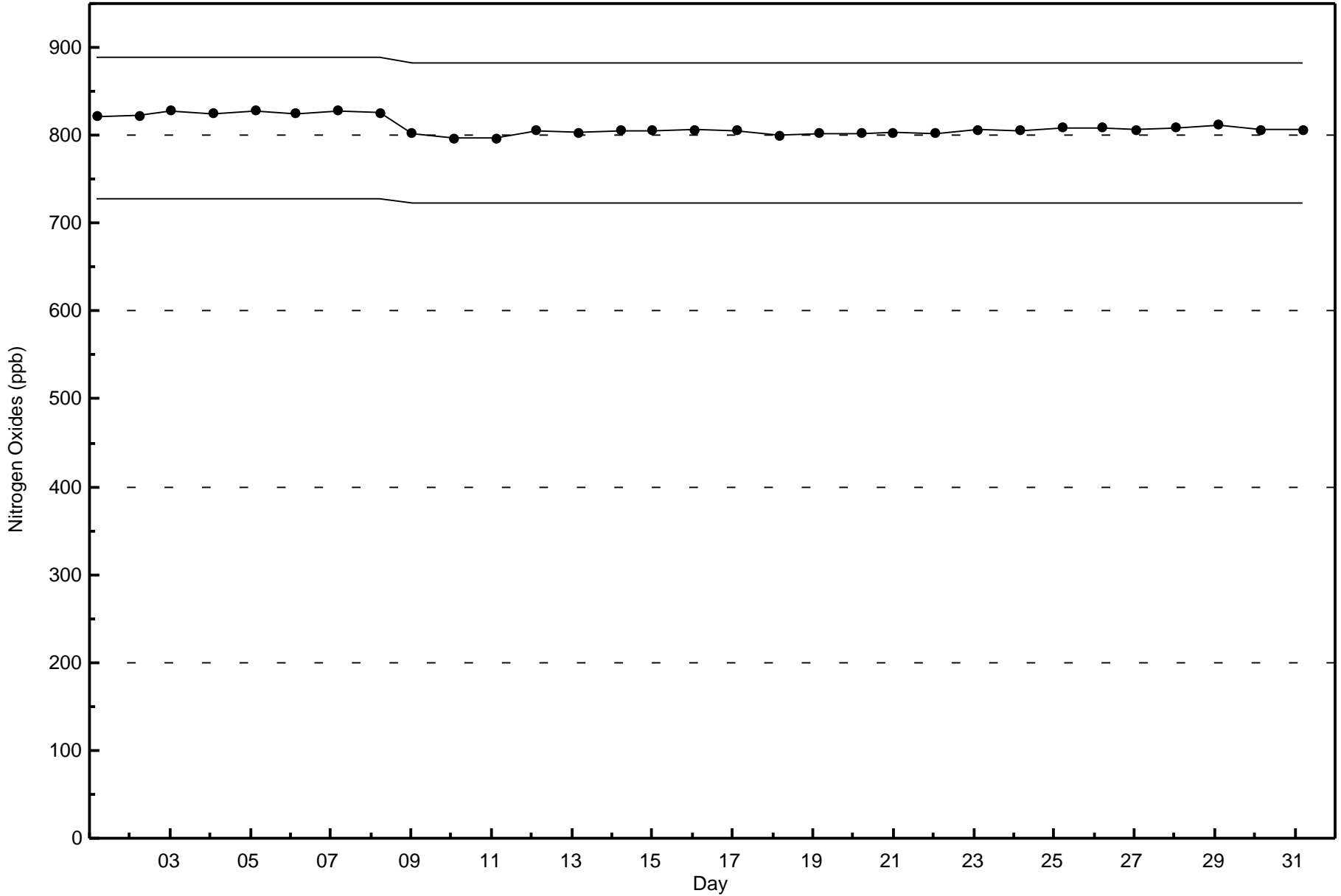
Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
ConocoPhillips - Surmont (AMS502)



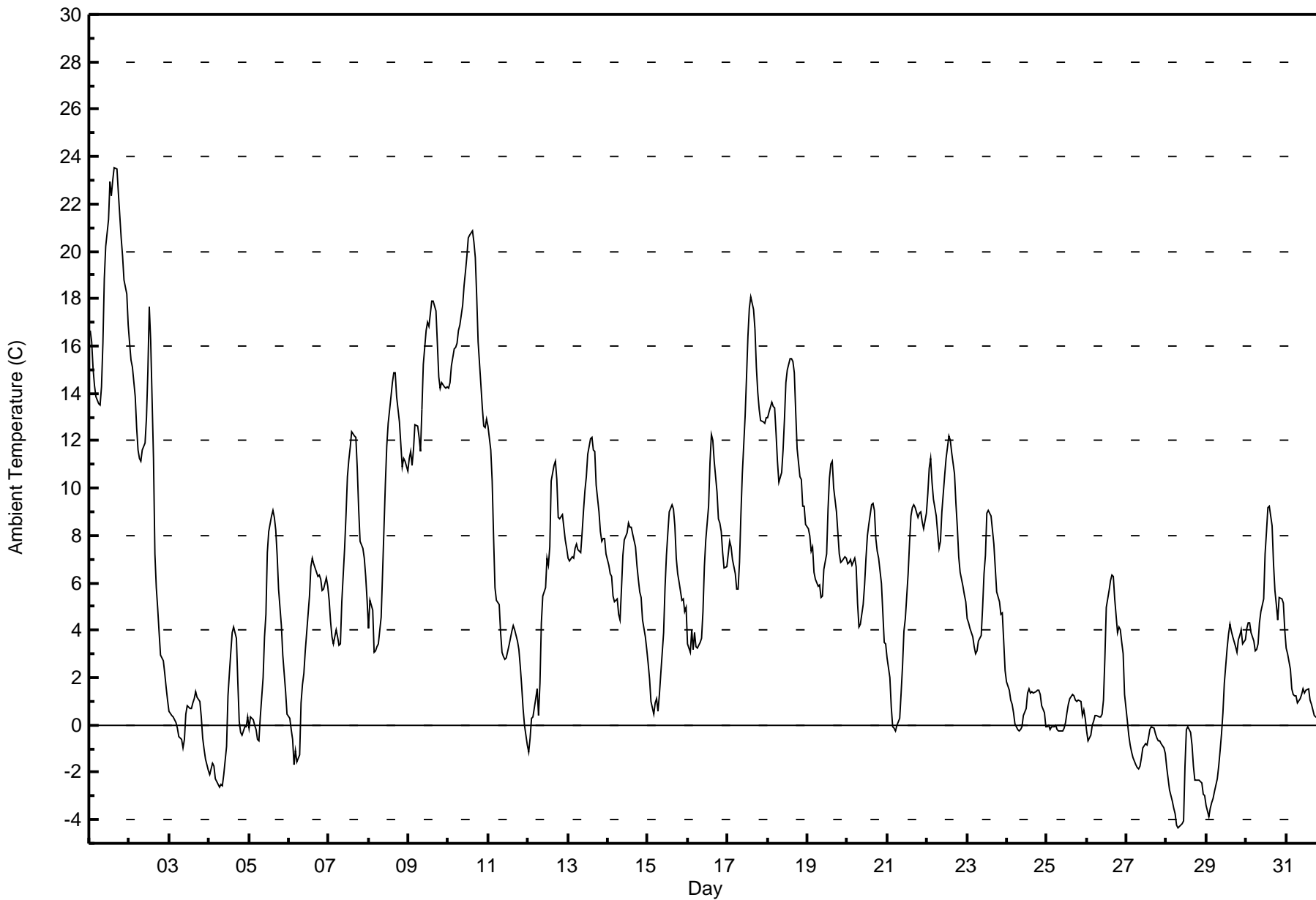
Total Number of Valid Hours: 686







Maximum Value: 23.5 C on Oct 1 16:00		Maximum Daily Average: 18.6 C on Oct 1		Hours in Service: 744																																												
Minimum Value: -4.4 C on Oct 28 08:00		Minimum Daily Average: -2.5 C on Oct 28		Hours of Data: 744																																												
Maximum Diurnal Average: 9.1 C at hour 15		Minimum Diurnal Average: 3.6 C at hour 7		Hours of Missing Data: 0																																												
Monthly Average: 5.97 C		Percentiles: P <sub>1</sub> = -3.5 P <sub>10</sub> = -0.6 Q <sub>1</sub> = 1.0 Median = 5.3 Q <sub>3</sub> = 9.3 P <sub>90</sub> = 14.3 P <sub>99</sub> = 20.7		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	16.6	16.2	15.0	14.4	13.9	13.5	13.5	14.3	16.1	18.8	20.2	21.4	22.9	22.3	23.0	23.5	23.5	22.5	21.5	20.6	19.8	18.8	18.2	16.9	18.6	23.5																						
2-Oct	16.1	15.4	15.1	13.9	12.6	11.6	11.3	11.1	11.6	11.9	13.0	14.9	17.7	16.2	11.3	7.2	5.8	4.9	3.9	3.0	2.7	2.2	1.6	1.0	9.8	17.7																						
3-Oct	0.6	0.4	0.3	0.2	0.1	-0.2	-0.5	-0.6	-1.0	-0.6	0.4	0.8	0.7	0.7	0.9	1.1	1.4	1.2	1.0	0.3	-0.6	-1.0	-1.4	-1.9	0.1	1.4																						
4-Oct	-2.1	-1.9	-1.6	-1.7	-2.3	-2.5	-2.7	-2.5	-2.6	-2.1	-0.9	1.2	2.2	3.0	3.9	4.1	3.7	1.8	0.2	-0.3	-0.4	0.0	-0.1	0.3	-0.1	4.1																						
5-Oct	-0.1	0.4	0.2	0.0	-0.2	-0.6	-0.6	0.3	2.0	3.7	4.7	7.3	8.2	8.8	9.0	8.7	8.2	7.1	5.8	4.2	2.9	2.2	1.4	0.4	3.5	9.0																						
6-Oct	0.3	-0.2	-0.6	-1.7	-1.1	-1.6	-1.2	1.0	1.7	2.2	3.1	4.7	5.5	6.7	7.1	6.8	6.6	6.3	6.3	6.1	5.7	5.7	6.2	5.9	3.4	7.1																						
7-Oct	5.3	4.4	3.7	3.4	4.0	3.7	3.4	3.4	5.2	7.5	8.9	10.5	11.2	11.7	12.4	12.2	12.1	10.9	9.1	7.8	7.5	7.1	6.3	5.2	7.4	12.4																						
8-Oct	4.1	5.2	4.8	3.1	3.2	3.3	3.4	4.5	6.4	8.3	10.2	11.8	12.7	13.9	14.4	14.9	14.9	13.9	12.8	11.9	10.9	11.2	11.1	10.7	9.2	14.9																						
9-Oct	11.2	11.5	10.9	11.6	12.7	12.6	12.1	11.6	13.3	15.2	16.7	17.0	16.8	17.4	17.9	17.9	17.5	16.1	14.7	14.2	14.5	14.3	14.2	14.3	14.4	17.9																						
10-Oct	14.2	14.4	15.2	15.9	15.9	16.1	16.7	16.9	17.7	18.5	19.2	19.8	20.6	20.7	20.9	20.4	19.7	18.1	16.2	14.3	13.4	12.6	12.6	12.9	16.8	20.9																						
11-Oct	12.6	11.6	10.3	8.0	5.8	5.2	5.1	3.9	3.1	2.9	2.8	2.8	3.3	3.6	4.0	4.2	4.0	3.6	3.2	2.5	1.7	0.7	0.0	-0.9	4.3	12.6																						
12-Oct	-1.1	-0.5	0.3	0.4	1.1	1.5	0.4	1.8	4.3	5.5	5.8	7.0	6.8	7.5	10.3	11.0	11.1	10.3	8.8	8.7	8.9	8.3	7.8	7.5	5.6	11.1																						
13-Oct	7.0	6.9	7.1	7.0	7.4	7.6	7.4	7.3	8.1	9.1	9.9	10.5	11.4	12.1	12.1	11.6	11.5	10.1	9.0	8.1	7.8	7.9	7.9	7.2	8.8	12.1																						
14-Oct	6.7	6.4	6.3	5.4	5.2	5.3	4.7	4.4	5.7	7.2	7.8	8.1	8.5	8.3	8.4	8.0	7.5	6.7	6.1	5.6	5.4	4.4	3.7	3.2	6.2	8.5																						
15-Oct	2.6	1.9	1.0	0.5	1.0	1.1	0.6	1.3	2.2	3.9	5.8	7.1	8.1	9.0	9.3	9.1	8.4	7.0	6.4	6.0	5.3	5.3	4.8	5.0	4.7	9.3																						
16-Oct	3.4	3.1	4.0	3.2	3.9	3.3	3.2	3.5	3.7	4.8	6.7	7.8	9.2	11.1	12.2	12.0	11.2	9.8	8.7	8.5	8.2	7.3	6.6	6.7	6.8	12.2																						
17-Oct	7.2	7.8	7.5	7.0	6.4	5.7	5.8	6.9	8.9	10.6	13.0	14.7	16.4	17.6	18.1	17.5	16.7	15.1	14.1	13.3	12.9	12.8	12.7	13.0	11.7	18.1																						
18-Oct	13.0	13.2	13.6	13.4	13.4	12.3	11.2	10.2	10.6	11.6	12.9	14.5	15.0	15.5	15.5	15.3	14.9	13.2	11.7	10.5	10.4	9.2	9.3	8.5	12.5	15.5																						
19-Oct	8.3	8.0	7.3	7.5	6.5	6.2	5.9	5.9	5.4	5.4	6.6	7.2	9.1	10.4	11.0	11.1	10.0	9.0	8.1	7.2	6.9	6.9	7.1	7.1	7.7	11.1																						
20-Oct	6.8	6.8	7.0	6.8	7.1	6.7	5.1	4.2	4.3	5.1	5.9	7.0	8.0	8.5	9.3	9.4	9.0	7.9	7.3	7.1	6.0	4.7	3.5	3.4	6.5	9.4																						
21-Oct	2.8	2.0	0.8	-0.1	-0.1	-0.2	0.0	0.3	1.4	2.5	3.9	4.5	6.4	7.7	8.8	9.2	9.3	9.2	8.8	8.9	9.0	8.6	8.3	8.9	5.0	9.3																						
22-Oct	9.7	10.8	11.3	10.2	9.5	8.8	8.1	7.4	7.7	9.0	10.5	11.2	11.7	12.2	12.0	11.5	10.6	9.4	8.3	7.1	6.4	5.9	5.5	5.2	9.2	12.2																						
23-Oct	4.5	4.3	4.1	3.7	3.3	3.0	3.1	3.6	3.8	5.0	6.4	7.2	9.0	9.1	8.8	8.2	7.7	6.6	5.6	5.2	4.7	4.7	3.6	2.3	5.3	9.1																						
24-Oct	1.8	1.5	1.0	0.9	0.5	0.0	-0.2	-0.2	-0.2	-0.1	0.4	0.7	1.3	1.5	1.3	1.4	1.4	1.4	1.5	1.5	1.3	0.8	0.5	0.0	0.8	1.8																						
25-Oct	-0.1	0.0	-0.2	-0.1	-0.1	0.0	-0.2	-0.3	-0.2	-0.2	-0.1	0.1	0.5	0.9	1.1	1.3	1.2	1.1	1.0	1.1	1.0	0.4	0.6	0.3	0.4	1.3																						
26-Oct	-0.3	-0.7	-0.4	0.0	0.2	0.4	0.4	0.3	0.4	0.5	1.0	2.8	5.0	5.7	6.1	6.4	6.3	5.3	3.9	4.1	4.0	3.5	3.0	1.3	2.5	6.4																						
27-Oct	0.2	-0.4	-0.9	-1.1	-1.4	-1.7	-1.8	-1.9	-1.7	-1.4	-0.9	-0.8	-0.8	-0.5	-0.2	-0.1	-0.2	-0.4	-0.6	-0.6	-0.6	-0.8	-0.9	-1.2	-0.9	0.2																						
28-Oct	-1.8	-2.3	-2.7	-3.2	-3.5	-3.8	-4.2	-4.4	-4.3	-4.2	-4.1	-1.7	-0.2	-0.1	-0.3	-0.8	-1.7	-2.3	-2.3	-2.3	-2.4	-2.4	-2.9	-3.0	-2.5	-0.1																						
29-Oct	-3.4	-3.9	-3.5	-3.3	-3.1	-2.8	-2.3	-1.8	-1.1	-0.4	0.5	1.8	3.2	3.9	4.2	4.0	3.7	3.3	3.1	3.6	3.8	4.0	3.4	3.6	0.9	4.2																						
30-Oct	4.1	4.3	4.3	3.9	3.5	3.1	3.2	3.4	4.3	4.8	5.3	7.2	8.1	9.2	9.3	8.4	6.8	5.7	5.1	4.4	5.4	5.3	5.1	4.0	5.3	9.3																						
31-Oct	3.2	3.0	2.4	1.5	1.3	1.2	1.2	0.9	1.1	1.3	1.6	1.3	1.5	1.5	1.0	0.9	0.6	0.4	0.3	0.3	0.0	-0.4	-0.6	-0.9	1.0	3.2																						
																								4.9	4.8	4.6	4.2	4.1	3.8	3.6	3.8	4.4	5.4	6.4	7.4	8.4	8.9	9.1	8.9	8.5	7.6	6.8	6.2	5.9	5.5	5.1	4.7	Diurnal Average
																								16.6	16.2	15.2	15.9	15.9	16.1	16.7	16.9	17.7	18.8	20.2	21.4	22.9	22.3	23.0	23.5	23.5	22.5	21.5	20.6	19.8	18.8	18.2	16.9	Diurnal Maximum







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

**Ambient Temperature (AT) - C**  
**ConocoPhillips - Surmont - October 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	122	16.40	16.40
0 - 10	447	60.08	76.48
10 - 20	161	21.64	98.12
> 20	14	1.88	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



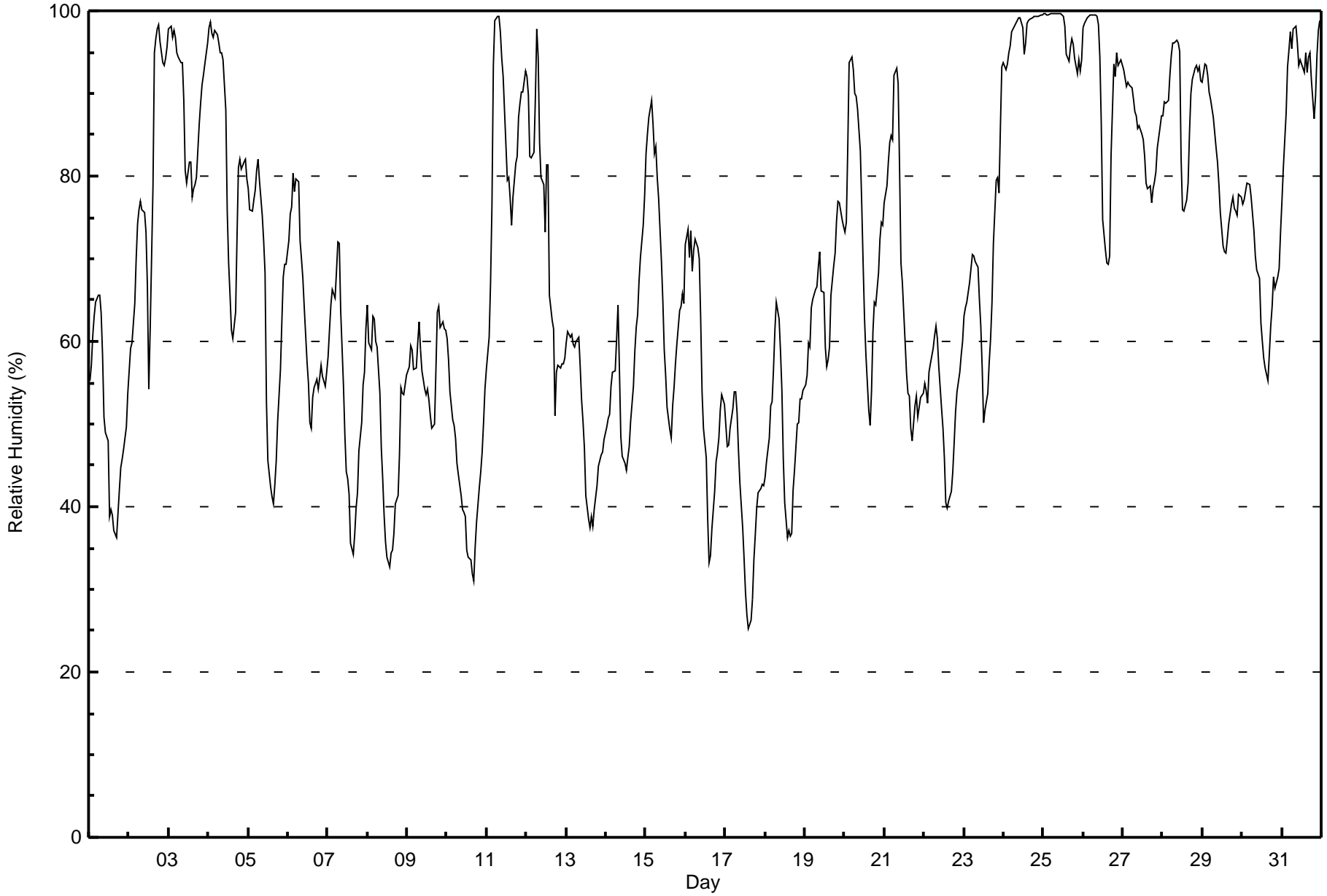
**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %**

**ConocoPhillips - Surmont - October 2015**

Maximum Value: 100 % on Oct 25 08:00																	Maximum Daily Average: 97.6 % on Oct 24										Hours in Service: 744															
Minimum Value: 25 % on Oct 17 15:00																	Minimum Daily Average: 40.9 % on Oct 17										Hours of Data: 744															
Maximum Diurnal Average: 78.7 % at hour 7																	Minimum Diurnal Average: 57.2 % at hour 15										Hours of Missing Data: 0															
Monthly Average: 69.0 %																	Percentiles: P <sub>1</sub> = 33 P <sub>10</sub> = 43 Q <sub>1</sub> = 54 Median = 68 Q <sub>3</sub> = 87 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	55	57	61	63	65	66	66	63	58	51	49	48	39	40	39	37	36	39	42	45	46	47	50	54	50.6	66																
2-Oct	56	59	60	65	70	74	76	77	76	76	73	67	54	62	79	95	97	98	98	96	94	93	94	96	78.5	98																
3-Oct	98	98	97	98	97	95	94	94	94	89	81	79	82	82	77	78	79	80	86	89	91	92	94	96	89.1	98																
4-Oct	98	99	97	97	98	97	96	95	95	94	88	76	69	66	61	60	64	73	81	82	81	82	82	80	83.7	99																
5-Oct	78	76	76	77	78	81	82	80	75	72	68	53	46	42	41	40	43	46	50	57	62	68	69	69	63.7	82																
6-Oct	72	75	76	80	78	80	79	72	70	68	64	58	55	50	50	53	54	55	54	56	57	56	55	56	63.5	80																
7-Oct	58	61	64	66	65	68	72	72	64	55	49	44	43	42	36	34	37	40	42	47	50	55	56	62	53.4	72																
8-Oct	64	60	59	63	63	60	59	54	47	43	39	36	34	33	34	35	37	40	41	46	54	54	54	56	48.6	64																
9-Oct	56	57	60	59	57	57	60	62	59	56	54	54	54	53	51	50	50	57	64	64	62	62	62	61	57.5	64																
10-Oct	60	58	54	50	50	48	45	44	41	40	39	39	35	34	34	32	31	35	38	42	44	47	50	54	43.5	60																
11-Oct	57	61	67	76	93	99	99	99	98	94	92	88	79	80	77	74	77	81	82	87	89	90	90	93	84.3	99																
12-Oct	92	90	82	82	83	90	98	94	84	80	79	73	81	81	66	62	62	51	56	57	57	57	57	58	73.9	98																
13-Oct	60	61	61	61	60	59	60	60	57	53	50	47	41	38	37	39	38	40	43	45	46	46	47	48	49.9	61																
14-Oct	50	51	51	55	56	56	60	64	57	48	46	45	44	46	47	50	55	59	62	63	67	70	74	78	56.5	78																
15-Oct	83	85	87	89	86	83	84	80	77	70	65	59	56	52	49	48	52	54	57	60	64	64	66	65	68.1	89																
16-Oct	72	74	70	73	69	71	72	71	70	63	54	50	46	39	33	34	37	42	46	47	48	52	54	52	55.7	74																
17-Oct	50	47	47	49	52	54	54	51	47	43	38	34	30	27	25	26	29	33	37	40	42	42	43	42	40.9	54																
18-Oct	43	45	48	52	53	57	61	65	63	59	54	46	41	36	37	36	37	42	44	50	50	53	53	54	49.2	65																
19-Oct	55	56	60	59	64	65	66	67	69	71	66	66	59	57	58	59	66	69	71	75	77	77	75	74	65.8	77																
20-Oct	73	74	83	94	94	93	90	90	88	83	77	69	63	58	52	50	54	61	65	64	68	72	74	74	73.5	94																
21-Oct	77	79	82	84	85	84	92	93	91	81	70	67	60	56	54	53	49	48	52	53	51	52	53	54	67.5	93																
22-Oct	55	54	52	56	57	59	61	62	60	57	52	50	46	41	40	41	42	44	48	52	54	56	58	60	52.3	62																
23-Oct	63	64	65	67	69	70	70	70	69	65	62	57	50	52	54	57	60	65	72	80	80	78	86	93	67.4	93																
24-Oct	94	93	94	95	96	97	98	98	99	99	99	98	95	96	99	99	99	99	99	99	99	99	100	100	97.6	100																
25-Oct	100	100	100	100	100	100	100	100	100	100	100	100	100	99	98	95	94	96	97	96	94	92	94	93	94	97.4	100															
26-Oct	98	98	99	99	99	100	100	100	99	98	94	86	75	71	70	69	70	83	94	92	95	93	94	94	90.4	100																
27-Oct	93	92	91	91	91	91	89	88	87	86	86	86	85	84	82	79	79	79	77	79	79	81	83	86	87	85.2	93															
28-Oct	87	89	89	89	92	95	96	96	96	96	95	82	76	76	77	79	85	90	92	93	93	93	93	91	89.2	96																
29-Oct	91	94	93	92	90	89	87	85	83	82	79	76	72	71	71	72	74	77	77	76	76	75	78	77	80.8	94																
30-Oct	77	77	78	79	79	77	76	73	70	69	68	62	60	58	57	55	58	62	64	68	66	68	69	73	68.5	79																
31-Oct	77	81	88	93	95	97	96	98	98	96	93	94	94	92	95	93	94	95	92	87	90	95	98	99	92.9	99																
																	72.3	73.1	73.9	76.0	76.9	77.8	78.7	78.0	75.6	72.1	68.5	64.0	60.1	58.4	57.2	57.6	59.4	62.3	65.3	67.3	68.6	69.9	71.1	72.4	Diurnal Average	
																	100	100	100	100	100	100	100	100	100	100	100	100	100	99	98	99	99	99	99	99	99	99	100	100	Diurnal Maximum	





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

**Relative Humidity (RH) - %**  
**ConocoPhillips - Surmont - October 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	51	6.85	6.85
40 - 60	235	31.59	38.44
60 - 80	222	29.84	68.28
80 - 100	236	31.72	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

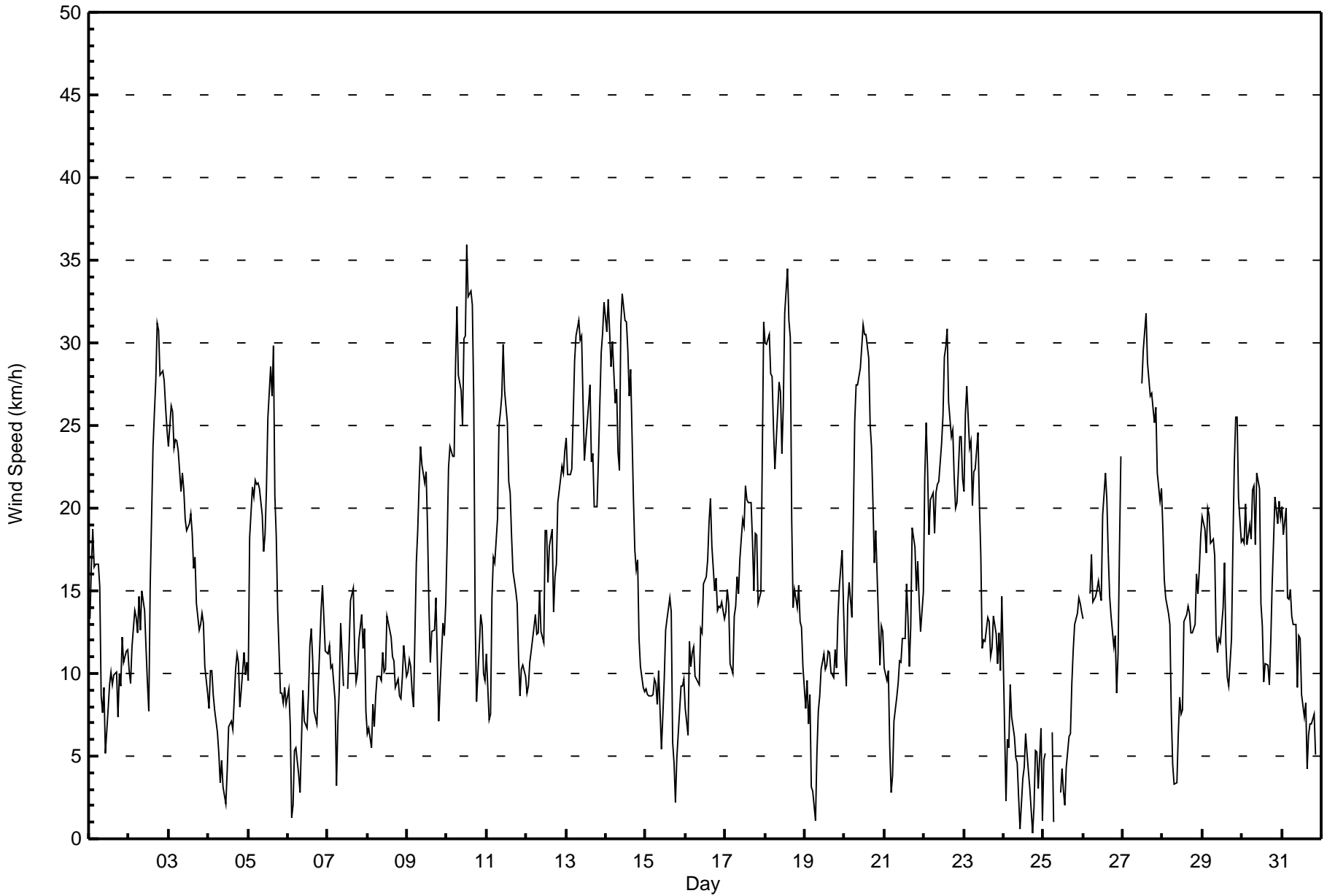


Maximum Speed: 36 km/h on Oct 10 13:00	Maximum Daily Speed Average: 25.7 km/h on Oct 13	Hours in Service: 744
Minimum Speed Value: 0 km/h on Oct 24 18:00	Minimum Daily Speed Average: 1.5 km/h on Oct 4	Hours of Data: 720
Maximum Diurnal Speed Average: 11.2 km/h at hour 2	Minimum Diurnal Speed Average: 5.8 km/h at hour 18	Hours of Missing Data: 24
Monthly Average Velocity: 8.6 km/h 254.5 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 7 Q <sub>1</sub> = 10 Median = 14 Q <sub>3</sub> = 21 P <sub>90</sub> = 27 P <sub>99</sub> = 32	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	SW13	SW16	SW19	SW16	SW17	SW17	SW15	SW9	SW8	SSW9	SE5	SE8	S9	S10	SE9	SE10	SSE10	SSE7	S10	SSE9	SSE12	S11	S11	SSE11	SSW9.7	SW19	
2-Oct	S10	S9	SSE12	SSE14	S13	S12	SSE15	SSE13	SSE15	SSE14	SSE12	SE10	SSW8	WNW15	NW24	NW26	NW28	NW31	NW31	NW28	NW28	NW28	NW26	NW25	WNW6.9	NW31	
3-Oct	NW24	NW26	NW26	NW24	NNW24	NW24	NW23	NNW21	NNW22	NNW21	NNW19	NNW19	NNW19	NNW20	NNW18	NW16	NW17	NW14	NW13	NW13	NNW14	NNW13	NNW10	NNW9	NNW18.6	NW26	
4-Oct	NNW8	WNW10	NNW10	NW9	NNW8	NW6	WNW5	NW3	NNE5	NNE3	E2	ENE4	E7	ESE7	ESE7	E7	ESE10	ESE11	ESE11	SSE8	S9	S11	S10	S11	ESE1.5	S11	
5-Oct	SSW10	SW18	SW21	SW22	SW21	SW21	WSW21	W20	W17	W18	WNW21	W25	W29	W27	W30	WNW21	NW18	NW14	WNW9	W9	W8	W9	WSW8	W16.1	W30		
6-Oct	WSW9	WSW7	S1	SE2	SW5	SW6	S4	SE3	SE6	SSE9	SSE7	SSE7	SE9	ESE12	SE13	ESE11	E8	ESE7	ESE9	ESE12	ESE14	SE15	SE11	SSE11	SE6.4	SE15	
7-Oct	SSE11	S12	S10	SSW11	SSW8	NNW3	WNW7	W9	WNW13	NW9	C	C	NNE9	N12	NNW14	NNW15	NNW11	W9	W10	WSW12	W14	WNW11	WNW13	WNW8	WNW5.9	NNW15	
8-Oct	WNW6	WNW7	W5	SW8	SSW7	SW9	SW10	SSW10	SSW10	SSW11	S10	S10	SSE13	SSW13	S12	S11	S11	SSE9	SSE10	SSW9	SSW8	SSW10	SSW12	SSW10	SSW8.4	SSE13	
9-Oct	SSW10	S11	SSW10	SSW9	SSW8	SW17	WSW19	WSW21	WSW24	W23	W22	W22	W19	W14	WSW11	WSW13	WSW13	WSW15	WSW11	SW7	SSW9	S13	SSW12	SW14	WSW12.9	WSW24	
10-Oct	SW18	WSW22	WSW24	WSW23	WSW23	WSW29	WSW32	WSW28	WSW27	WSW25	W30	WSW30	W36	W33	WSW33	WSW32	W27	W13	SW8	SW12	WSW14	WSW13	WNW10	NNW10	WSW22.2	W36	
11-Oct	NNW11	NNW7	NNW8	NNW15	NNW17	NNW17	NNW19	NNW25	NNW26	NNW27	NNW30	NNW27	NNW25	NNW22	NNW21	NW18	NW16	WNW15	WNW14	NW11	WNW9	W10	W11	SW10	NW15.6	NNW30	
12-Oct	SW9	SW9	SSW11	SSW11	S13	S14	S12	SSW12	SW15	SSW13	SSE12	SW19	SW19	SSW16	SW18	SW19	WSW14	W16	WSW17	WSW20	WSW22	WSW23	W22	W24	SW13.9	W24	
13-Oct	WSW24	WSW22	WSW22	WSW22	W26	W29	W30	W31	W30	W30	W27	W23	W24	W26	W27	W23	W23	W20	W20	WSW23	W26	W29	W31	W32	W25.7	W32	
14-Oct	W31	W33	W31	W29	W30	W26	W27	W23	W22	WNW31	WNW33	WNW31	WNW31	WNW30	WNW27	WNW28	WNW21	WNW17	WNW16	WNW17	NW12	NNW10	NNW9	NNW9	WNW22.8	WNW33	
15-Oct	NNW9	W9	WSW9	WNW9	NNW9	WNW10	WNW9	W8	WNW10	NNW5	W7	WNW10	WNW13	WNW13	WNW15	WNW14	NW6	WSW5	ESE2	SSW5	SSW8	SSW9	SW9	SSW10	W6.9	WNW15	
16-Oct	SE8	SSE6	SE12	SE10	SSE11	SE12	SSE10	SSE10	SSE9	S13	S12	SE15	SE16	SE17	SSE19	SE21	SE18	SE15	SE16	SSE14	SSE14	SSE14	S14	SSW13	SSE12.7	SE21	
17-Oct	SSW14	SSW15	SSW14	S11	S10	S13	S14	SSW16	S15	S17	S19	S19	S21	S21	S20	S20	S18	S15	S19	S18	SSW14	SSW15	SW23	WSW31	SSW16.3	WSW31	
18-Oct	WSW30	W30	W31	W28	W28	W25	W22	W24	W28	WNW27	WNW23	WNW26	WNW32	WNW35	WNW31	WNW30	WNW19	W14	W15	W14	W15	W13	W13	WSW10	W23.1	WNW35	
19-Oct	W8	WSW10	SW7	SW9	NW3	N3	ESE1	ESE5	ESE8	ESE9	ESE10	ESE11	ESE10	ESE10	E11	E11	E10	E10	ESE11	ESE10	SE13	SE15	SE17	SSE14	SE6.6	SE17	
20-Oct	S11	SSW9	WSW14	WSW15	W13	W19	W25	WNW27	WNW27	W28	W30	W31	WNW30	WNW31	WNW29	WNW25	WNW24	WNW20	WNW17	WNW19	W13	W10	W13	W13	W19.4	W31	
21-Oct	W10	W10	WSW10	WSW6	ESE3	SSE4	SSE7	SSW9	S9	SSE11	SE11	SSE12	SSE12	SE15	SE13	SE10	SE13	SE19	SE18	S15	S17	SSW14	S13	SW15	S8.8	SE19	
22-Oct	WSW22	W25	W22	W18	W21	W21	W18	W21	W21	W22	W24	W26	W29	WSW30	WSW31	WSW26	WSW24	WSW25	W22	W20	W20	WSW24	WSW24	WSW22	W23.0	WSW31	
23-Oct	WSW21	WSW26	WSW27	WSW24	WSW24	W20	WSW22	WSW22	WSW25	W20	WNW17	W12	W12	WNW12	W13	WNW13	WNW11	WNW12	W13	W12	W11	WNW12	NNW10	NNW15	W15.8	WSW27	
24-Oct	NNW11	NNW2	N6	NNW5	N9	N7	N6	N5	NNE5	E3	WNW1	S4	S4	ESE6	E5	NE4	NE3	NNE0	SSE2	SW5	SSW5	WSW3	W7	NNW1	N1.7	NNW11	
25-Oct	WNW5	WNW5	AF	AF	AF	N6	N1	AF	AF	AF	E3	E3	ESE4	ENE3	SW2	SSE4	SSE6	SE6	SE9	SE11	SE13	SSE14	S15	S14	S14	SSE5.0	S15
26-Oct	S13	AF	AF	AF	SSE15	SE17	SE14	SE15	SE15	SE16	SE15	SE14	SE20	SE22	SE21	SE17	SE15	SE13	SE12	S12	SSW9	SW11	WNW17	WNW23	SSE11.1	WNW23	
27-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	WNW28	WNW30	WNW31	WNW32	WNW29	WNW27	WNW27	WNW26	WNW25	WNW26	WNW22	WNW20	WNW21	----	WNW32
28-Oct	WNW19	WNW16	NW15	NNW14	NNW13	N8	N4	SSW3	SSE3	SSW6	SSW9	SSE8	SSE8	SE13	SE14	SE14	SE14	SE12	SSE12	SSE13	S16	S15	S16	S18	S4.4	WNW19	
29-Oct	S19	S19	S17	S20	S20	S18	S18	S17	S12	S11	S12	SSW12	SSW14	SSW17	SSW12	SSW10	S9	SSW12	SW18	WSW23	WSW26	WSW26	WSW21	WSW18	SSW14.7	WSW26	
30-Oct	WSW18	W18	W20	W18	WSW19	WSW18	W21	W21	WSW18	WSW22	WSW21	WSW14	WSW13	SW9	SSW11	SW10	SW9	SW12	WSW15	WSW18	W21	W19	W20	W19	WSW16.4	WSW22	
31-Oct	W20	WNW18	WNW20	WNW15	WNW14	WNW15	NW13	WNW13	WNW13	W9	WNW12	WNW12	WNW9	N7	NE8	NNE4	NE6	NE7	NE7	ENE8	E5	AF	AF	NE2	NW7.7	W20	

WSW9.1	WSW11.2	WSW10.9	WSW9.9	WSW9.0	WSW8.9	WSW9.0	WSW10.2	WSW9.7	WSW9.2	W8.5	W8.3	W9.0	W8.6	W7.8	W7.7	W6.1	W5.8	WSW5.8	WSW7.4	WSW8.4	WSW8.9	WSW9.2	WSW9.1	WSW9.1	Diurnal Average
W31	W33	W31	W29	W30	W29	WSW32	W31	W30	WNW31	WNW33	WNW31	W36	WNW35	WSW33	WSW32	NW28	NW31	NW31	NW28	NW28	W29	W31	W32	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**  
**ConocoPhillips - Surmont - October 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	55	7.64	7.64
6 - 11	210	29.17	36.81
12 - 19	247	34.31	71.11
20 - 28	157	21.81	92.92
29 - 38	51	7.08	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 744



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

**Wind Speed (WS) - km/h**  
**ConocoPhillips - Surmont - October 2015**

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	5	3	2	5	5	3	4	4	3	3	2	1	4	2	5	55
6 - 11	7	1	4	1	7	17	14	22	23	30	18	10	18	16	6	16	210
12 - 19	1	0	0	0	0	3	35	22	40	19	20	20	28	32	12	15	247
20 - 28	0	0	0	0	0	0	4	0	6	0	6	39	52	24	14	12	157
29 - 38	0	0	0	0	0	0	0	0	0	0	0	9	23	16	2	1	51
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	12	6	7	3	12	25	56	48	73	52	47	80	122	92	36	49	720

Total Number of Valid Hours: 720

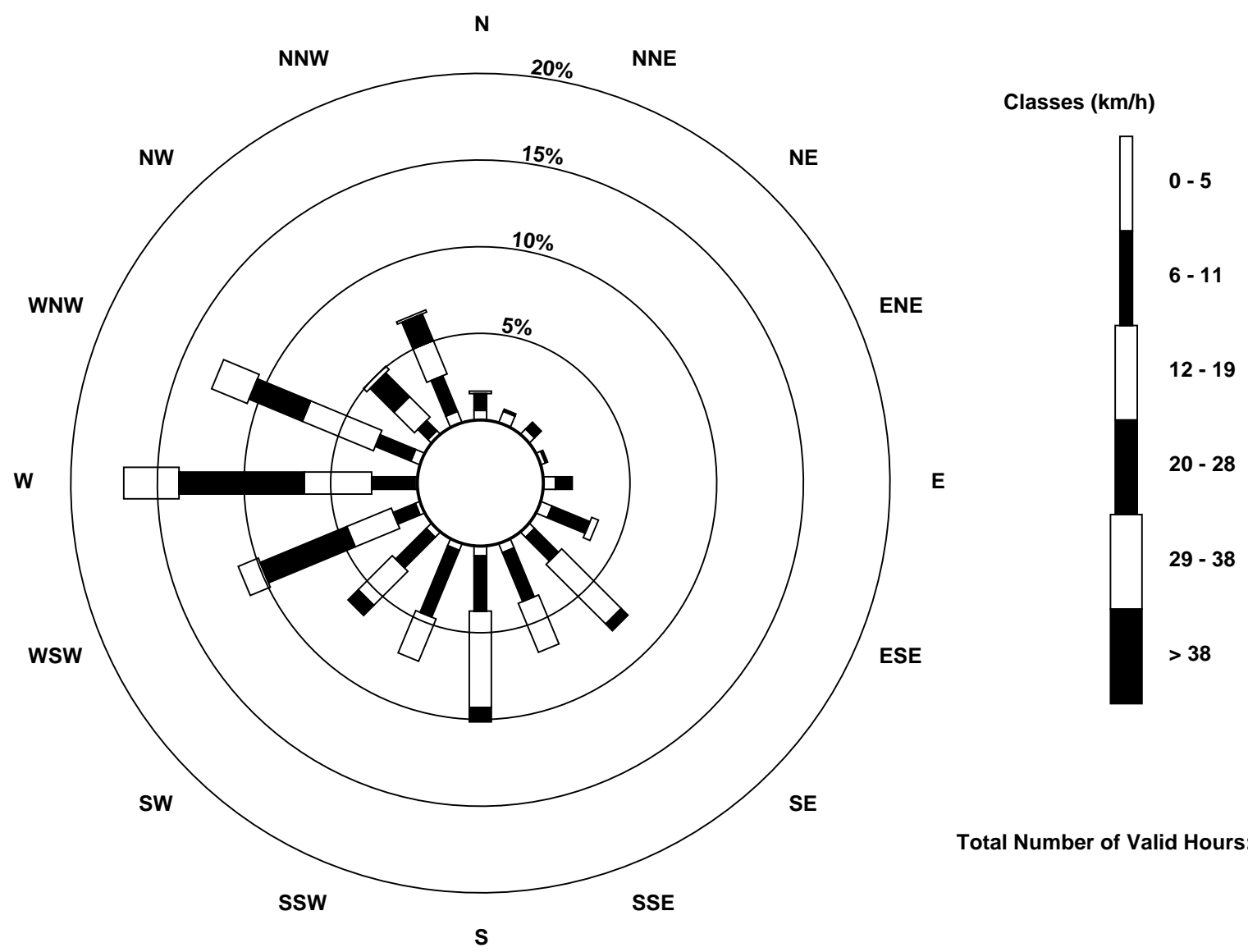
Total Number of Hours: 744





Wood Buffalo Environmental Association  
Wind Rose Oct 2015

Wind Speed (WS) - km/h  
ConocoPhillips - Surmont (AMS502)





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

ConocoPhillips - Surmont - October 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 10 km/h on Oct 27 12:00			Hours of Data:	720
Minimum Value: 1 km/h on Oct 24 20:00			Hours of Missing Data:	24
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> = 5 P <sub>99</sub> = 7			Hours of Calibration:	2
			Percent Operational Time:	97.0

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	2	2	2	3	2	2	3	3	2	3	3	3	3	3	3	3	2	3	3	3	3	3
2-Oct	3	2	3	3	3	3	3	3	3	3	4	3	3	6	5	5	5	6	6	6	6	6	5	5	6
3-Oct	5	5	5	5	5	5	5	4	4	4	4	4	4	4	4	3	3	3	2	2	2	2	2	2	5
4-Oct	2	2	2	2	2	1	2	3	2	1	3	2	3	2	2	2	2	2	2	2	3	2	3	2	3
5-Oct	2	6	3	4	3	3	4	4	3	3	3	6	6	5	6	6	5	4	3	3	1	1	1	1	6
6-Oct	2	2	1	1	2	1	2	1	2	3	2	2	2	3	4	2	2	1	1	2	2	3	2	2	4
7-Oct	2	2	2	2	2	2	2	2	2	2	C	C	3	4	4	4	3	2	1	1	2	2	2	1	4
8-Oct	1	1	1	1	2	2	1	1	2	3	3	3	4	4	3	4	3	3	2	2	1	2	2	2	4
9-Oct	2	3	2	2	2	5	3	3	4	5	5	6	4	3	3	3	4	3	2	1	2	3	3	4	6
10-Oct	3	4	4	3	4	5	5	5	5	5	7	7	7	7	7	7	7	4	1	2	1	1	2	3	7
11-Oct	1	2	5	3	4	3	5	5	5	5	5	5	5	6	5	4	3	3	2	2	2	1	1	1	6
12-Oct	1	1	2	3	3	3	3	3	3	3	3	7	5	4	5	5	3	3	2	3	4	3	3	3	7
13-Oct	4	4	3	4	4	5	5	6	6	6	7	5	5	6	5	5	5	4	4	4	5	5	5	5	7
14-Oct	5	5	5	5	5	4	5	5	6	7	7	6	7	6	5	6	5	3	3	2	3	2	2	2	7
15-Oct	2	1	2	2	2	2	2	2	2	2	3	4	4	3	4	3	3	3	1	1	2	2	1	1	4
16-Oct	3	3	2	2	3	3	2	2	2	3	3	3	3	4	5	5	3	3	3	3	4	3	3	3	5
17-Oct	3	4	3	4	3	3	3	3	3	4	5	5	7	5	5	5	5	3	4	4	4	4	7	5	7
18-Oct	5	5	5	5	5	5	5	5	6	5	5	6	6	8	6	6	7	2	2	2	2	3	2	1	8
19-Oct	1	1	3	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	5	5
20-Oct	3	2	3	2	3	8	5	6	5	6	6	6	6	7	7	7	5	3	3	5	2	2	2	2	8
21-Oct	2	1	1	2	2	2	2	2	3	3	3	3	3	3	3	2	2	3	4	3	3	3	3	5	5
22-Oct	4	5	4	3	4	4	5	4	5	4	6	7	8	6	6	5	4	4	4	3	3	4	4	4	8
23-Oct	3	4	4	4	4	4	4	3	4	5	4	5	3	3	2	3	3	3	3	4	2	2	2	2	5
24-Oct	2	3	2	3	1	1	1	1	1	2	1	1	2	2	1	2	1	1	1	1	1	3	1	2	3
25-Oct	4	4	AF	AF	AF	2	1	AF	AF	AF	2	1	1	2	2	2	3	2	2	3	4	4	4	4	4
26-Oct	3	AF	AF	AF	3	3	3	3	3	3	3	3	4	4	4	3	4	3	3	4	2	4	4	6	6
27-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	10	6	6	6	6	5	6	5	5	5	4	4	10
28-Oct	3	2	3	3	3	3	2	1	2	2	2	2	2	3	2	3	3	3	4	3	3	3	4	4	4
29-Oct	4	4	4	4	4	4	4	4	3	3	3	3	3	4	3	3	2	3	5	4	4	4	4	3	5
30-Oct	3	3	3	4	4	4	4	4	4	4	4	4	3	3	3	2	2	2	2	3	3	3	3	3	4
31-Oct	3	4	4	3	2	3	3	3	2	2	2	2	2	2	2	3	3	2	1	2	2	AF	AF	2	4
	5	6	5	5	5	8	5	6	6	7	7	10	8	8	7	7	7	6	6	6	6	6	7	6	

Diurnal Maximum

C - Calibration AF - Analyzer Failure



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

ConocoPhillips - Surmont - October 2015

Direction of Maximum Speed: 261 deg on Oct 10 13:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 266.0 deg on Oct 13	Hours of Data: 720
Direction of Minimum Speed: 13 deg on Oct 24 18:00	Hours of Missing Data: 24
Direction of Minimum Daily Speed Average: 1.5 deg on Oct 4	Percent Operational Time: 97.0
Monthly Average Direction: 260.7 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	218	222	227	225	228	225	227	217	214	204	131	125	185	186	146	144	168	159	170	159	167	184	172	167	194.3	
2-Oct	180	180	161	163	169	171	166	168	161	160	167	141	198	295	323	313	319	321	319	323	324	324	323	323	295.3	
3-Oct	325	322	322	326	329	326	326	329	327	327	331	331	327	330	342	326	316	320	311	324	329	333	342	346	327.2	
4-Oct	333	289	330	317	337	319	283	307	18	12	100	71	95	102	105	99	106	112	119	156	178	173	173	180	117.0	
5-Oct	205	225	226	226	226	229	231	242	260	279	278	301	278	277	275	291	308	311	290	271	270	265	251	262.6		
6-Oct	256	256	172	138	226	216	185	141	140	166	161	149	127	123	125	111	99	103	115	117	123	127	141	154	139.9	
7-Oct	163	172	183	193	210	334	287	279	284	322	C	C	18	350	340	342	334	281	262	249	266	283	300	297	284.5	
8-Oct	285	286	266	235	213	216	214	209	199	192	183	177	157	192	187	176	177	158	168	202	206	200	199	206	197.3	
9-Oct	203	191	193	203	203	235	245	247	253	264	266	263	261	259	256	254	248	253	245	224	197	184	192	223	238.9	
10-Oct	235	237	240	241	238	246	253	258	254	252	270	258	261	264	254	258	261	267	226	232	244	247	298	328	254.0	
11-Oct	333	335	348	339	342	340	345	340	338	335	335	335	333	328	327	316	309	287	289	308	302	273	260	234	324.8	
12-Oct	220	217	199	200	186	180	187	204	214	200	168	220	233	212	227	234	244	262	252	253	254	257	259	259	228.6	
13-Oct	257	256	255	255	261	263	264	266	270	279	281	280	272	268	268	266	263	260	257	260	268	270	267	266.0		
14-Oct	266	265	263	261	262	269	272	275	277	283	290	286	291	295	293	298	302	297	295	288	306	342	333	342	283.6	
15-Oct	335	276	248	293	306	289	292	267	295	335	263	286	300	293	287	294	308	257	113	194	206	207	214	210	276.5	
16-Oct	128	156	143	139	163	143	148	155	156	173	171	137	137	136	149	144	139	137	139	155	162	166	187	195	151.6	
17-Oct	193	202	201	182	175	176	189	195	184	184	188	188	184	186	190	188	189	188	184	189	198	204	232	249	195.3	
18-Oct	254	264	269	279	279	276	275	268	268	282	290	287	283	287	285	288	284	272	263	261	264	261	266	253	275.2	
19-Oct	260	242	224	232	311	353	108	109	110	119	120	118	111	106	88	88	90	100	109	120	130	136	139	151	125.4	
20-Oct	182	209	238	248	260	280	281	285	285	279	280	277	284	283	290	294	300	300	294	295	281	274	269	277	279.5	
21-Oct	274	269	247	254	112	163	165	192	171	151	145	150	159	138	136	126	132	139	143	174	183	192	185	219	169.1	
22-Oct	249	271	274	277	279	273	279	267	264	267	277	270	266	257	258	247	251	256	266	265	261	258	258	258	263.8	
23-Oct	254	253	253	256	257	260	256	255	255	262	290	276	272	282	274	285	297	288	271	281	273	293	339	341	269.8	
24-Oct	344	339	11	327	356	2	359	4	25	96	292	173	189	112	93	42	34	13	149	224	200	258	264	342	358.4	
25-Oct	294	302	AF	AF	AF	354	3	AF	AF	AF	94	108	67	232	168	153	139	127	129	144	165	177	181	182	157.6	
26-Oct	184	AF	AF	AF	147	139	135	134	135	138	134	137	138	143	143	139	140	145	137	190	204	225	284	296	153.4	
27-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	300	298	296	294	295	296	293	294	294	300	301	303	300	--
28-Oct	303	303	322	342	348	358	10	212	164	192	198	151	161	137	133	134	137	143	163	158	184	184	182	176	174.7	
29-Oct	179	181	182	175	174	176	185	189	184	184	185	194	209	213	200	197	188	213	230	241	246	251	247	240	205.4	
30-Oct	249	259	263	262	252	257	261	260	254	245	244	247	258	223	200	217	225	234	238	245	259	267	271	268	251.7	
31-Oct	268	292	299	303	290	291	310	299	298	277	290	290	298	354	38	21	47	47	53	67	85	AF	AF	48	308.3	

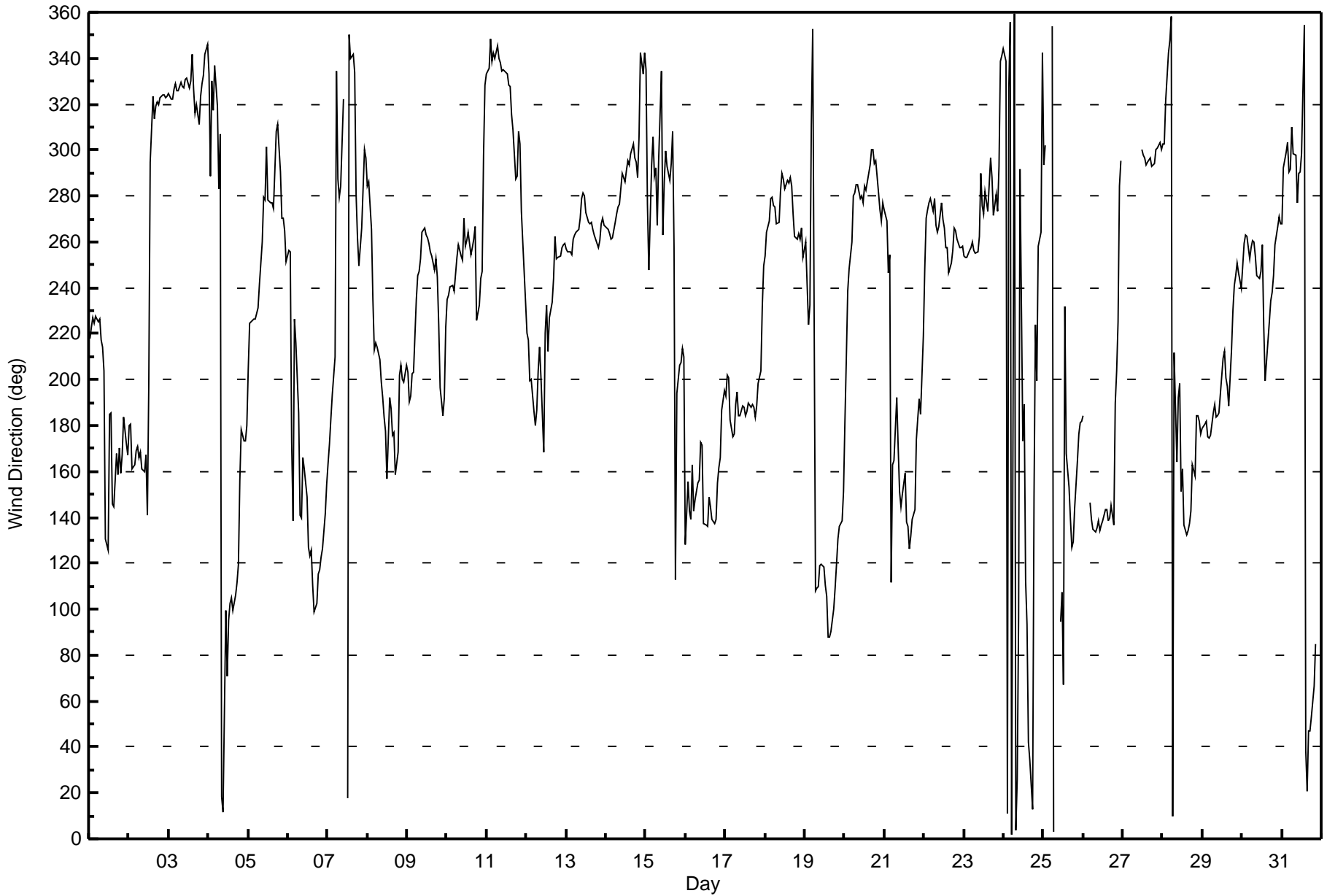
250.0 252.7 251.4 253.3 252.7 254.9 255.3 254.7 256.5 255.7 260.2 261.5 261.4 261.1 262.2 264.5 265.4 259.4 245.1 243.9 242.6 244.5 250.5 252.7

Diurnal Average

C - Calibration

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

ConocoPhillips - Surmont - October 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 99 deg on Oct 4 11:00			Hours of Data:	720
Minimum Value: 5 deg on Oct 7 19:00			Hours of Missing Data:	24
Percentiles: P <sub>1</sub> = 7 P <sub>10</sub> = 9 Q <sub>1</sub> = 10 Median = 13 Q <sub>3</sub> = 18 P <sub>90</sub> = 28 P <sub>99</sub> = 74			Hours of Calibration:	2
			Percent Operational Time:	97.0

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	12	9	9	8	9	10	17	20	22	55	32	32	23	34	32	22	27	15	21	17	19	19	16	55	
2-Oct	17	16	14	13	14	15	14	16	13	12	20	31	42	40	11	14	12	10	11	10	11	11	11	11	42	
3-Oct	10	10	11	10	12	10	10	12	12	14	16	16	14	15	16	14	15	15	17	13	10	10	15	22	22	
4-Oct	34	23	17	33	29	37	40	70	31	40	99	56	39	37	39	34	14	11	10	27	17	15	16	16	99	
5-Oct	16	12	7	8	8	9	9	10	11	11	11	17	17	13	13	13	16	16	15	21	11	8	10	10	21	
6-Oct	12	18	86	74	18	11	36	38	23	22	27	29	24	17	19	12	11	10	10	9	10	10	15	17	86	
7-Oct	17	14	14	12	17	61	25	13	9	24	C	C	32	20	25	18	26	15	5	8	13	8	12	12	61	
8-Oct	10	20	25	7	16	14	8	11	15	18	21	23	25	24	21	21	22	23	22	12	15	14	13	10	25	
9-Oct	10	14	14	16	13	15	8	8	9	10	14	13	13	13	15	12	13	11	8	14	12	14	15	17	17	
10-Oct	10	9	9	8	10	9	9	9	11	13	13	12	13	13	13	13	11	12	10	9	9	6	20	18	20	
11-Oct	7	26	54	12	13	12	15	14	12	11	12	11	13	14	15	20	19	14	9	22	26	8	9	8	54	
12-Oct	7	11	17	16	16	13	14	21	14	15	22	28	14	15	16	16	16	10	8	8	9	8	8	8	28	
13-Oct	8	8	8	9	9	9	9	9	10	12	13	14	15	14	12	11	11	10	10	9	9	10	9	8	15	
14-Oct	8	8	9	8	9	8	9	10	12	11	13	12	13	12	13	11	14	11	10	9	17	12	22	22	22	
15-Oct	18	16	10	15	20	23	21	13	22	41	36	34	31	23	17	18	36	65	47	21	17	12	10	8	65	
16-Oct	23	38	9	13	19	16	16	16	16	16	22	12	13	15	17	13	11	10	11	18	15	18	14	13	38	
17-Oct	14	15	15	20	16	13	15	14	16	15	15	16	17	17	17	15	15	14	14	15	17	17	15	9	20	
18-Oct	8	9	9	10	11	10	10	10	10	11	12	14	13	12	12	11	12	8	7	8	8	18	7	11	18	
19-Oct	13	13	73	13	58	59	76	20	18	17	16	15	18	20	15	13	13	12	10	12	12	10	9	17	76	
20-Oct	18	14	10	9	10	17	10	10	10	10	10	11	11	12	13	11	13	9	9	10	9	12	8	10	18	
21-Oct	10	11	9	51	75	36	20	16	21	22	16	19	25	13	13	11	10	10	12	16	14	13	14	22	75	
22-Oct	10	8	9	9	9	10	12	11	11	12	13	13	13	12	12	11	10	9	10	9	8	8	8	8	13	
23-Oct	8	8	8	9	9	11	9	8	9	18	13	25	19	17	12	13	20	14	18	13	14	17	27	9	27	
24-Oct	12	95	49	44	15	13	13	14	27	39	94	52	30	25	24	26	28	79	61	19	16	47	19	78	95	
25-Oct	35	41	AF	AF	AF	14	10	AF	AF	AF	29	22	44	53	34	26	24	11	11	22	22	18	19	15	53	
26-Oct	15	AF	AF	AF	AF	14	10	11	11	13	12	13	14	13	11	11	12	13	17	19	17	19	16	13	11	19
27-Oct	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	11	11	11	9	10	10	11	11	10	10	11	12	10	12
28-Oct	11	13	20	14	16	34	52	34	51	30	23	20	26	14	12	12	12	14	24	20	14	16	14	14	52	
29-Oct	13	14	14	12	12	15	15	14	16	16	17	17	17	15	18	22	17	14	15	9	9	8	8	9	22	
30-Oct	9	9	8	10	9	9	10	10	10	9	8	11	16	28	18	15	12	9	8	8	8	8	8	8	28	
31-Oct	9	12	10	13	10	9	15	13	18	12	10	15	28	37	17	57	52	15	12	16	18	AF	AF	16	57	
Diurnal Maximum																										
35 95 86 74 75 61 76 70 51 41 99 56 44 53 39 57 52 79 61 27 26 47 27 78																										

C - Calibration AF - Analyzer Failure



# Wood Buffalo Environmental Association

## SO2 Calibration Report

### Station Information

Calibration Date	October 8, 2015	Last Calibration	September 9, 2015
Station Name	ConocoPhillips - Surmont	Station Number	AMS 102
Reason:	Routine		
Start Time (MST)	9:10	End Time (MST)	13:16
Gas Cert Reference	LL104215	Station temp.	21 Deg C
Cal Gas Concentration	48.3 ppm	Cal Gas Exp Date	12-Feb-18
Calibrator Make/Model	API T700	Serial Number	622
ZAG Make/Model	API 701	Serial Number	4865
DACS make/model	Campbell Scientific CR3000	DACS serial No.	7882

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage		518
Analyzer IP address	192.168.1.43		Lamp voltage	2314	2254
Calculated slope	1.003413	1.000207	Chamber temp	50.0	49.8
Calculated intercept	-1.033109	0.078626	Pressure	22.0	21.7
Analyzer Background	19.3	19.3	Flow	0.551	0.539
Analyzer Coefficient	1.015	1.010	Intensity	57	56
Analyzer make	API T100		Analyzer serial #	598	

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.3	----
as found span	5000	83.2	803.7	806.6	0.996
calibrator zero	5000	0.0	0.0	0.3	----
high point	5000	83.2	803.7	803.8	1.000
second point	5000	41.6	401.9	401.1	1.002
third point	5000	20.8	200.9	200.7	1.001
as left zero	5000	0.0	0.0	0.7	----
as left span	6000	99.9	804.2	795.1	1.011
Average Correction Factor					1.001

Corrected As found      806.3      Previous response      802.0      % change      -0.5%

**Notes:**

Inlet filter replaced after as founds. Slightly adjustd span.

Calibration Performed By:

Asad Hidayat



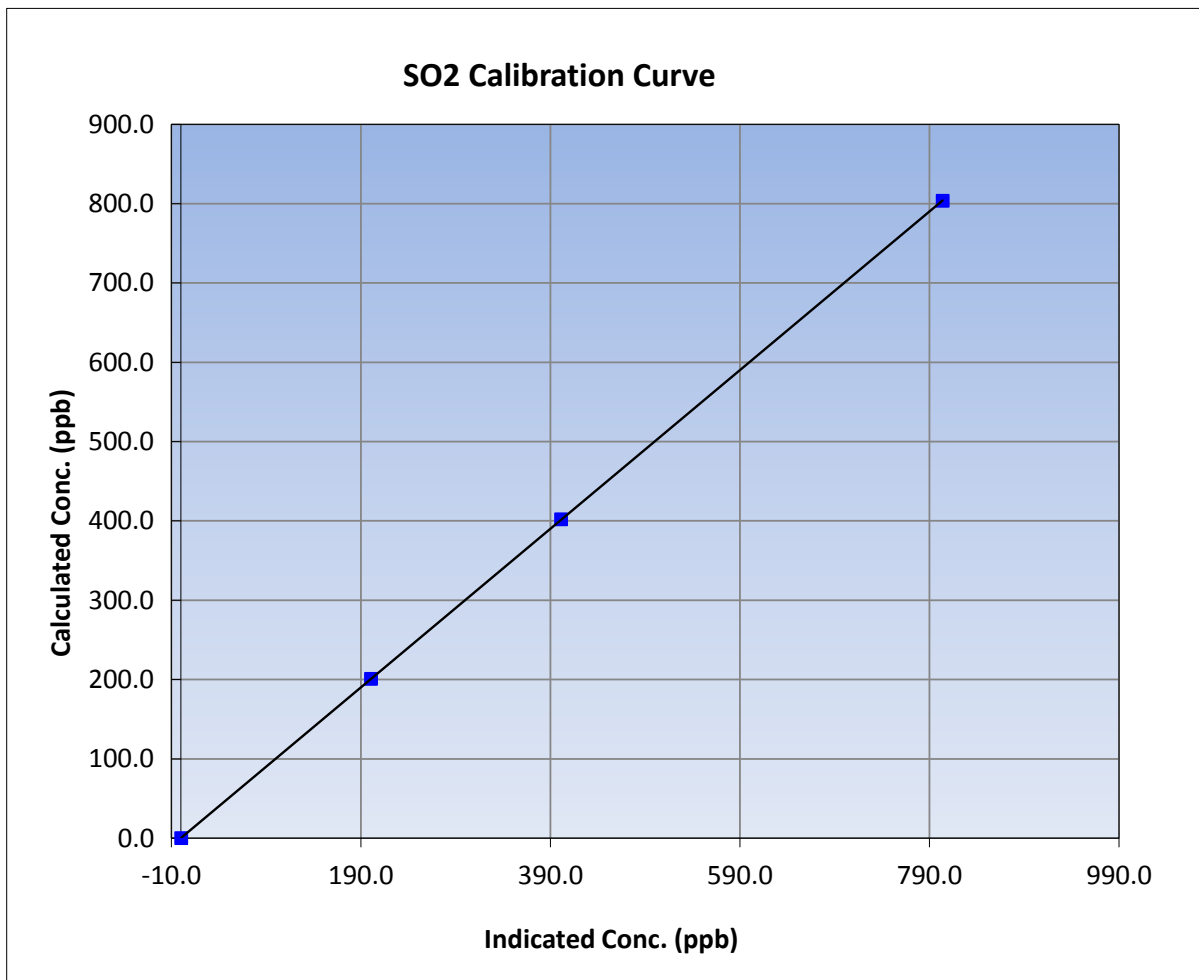
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	October 8, 2015	Previous Calibration	September 9, 2015
Station Name	ConocoPhillips - Surmont	Station Number	AMS 102
Start Time (MST)	9:10	End Time (MST)	13:16
Analyzer make	API T100	Analyzer serial #	598

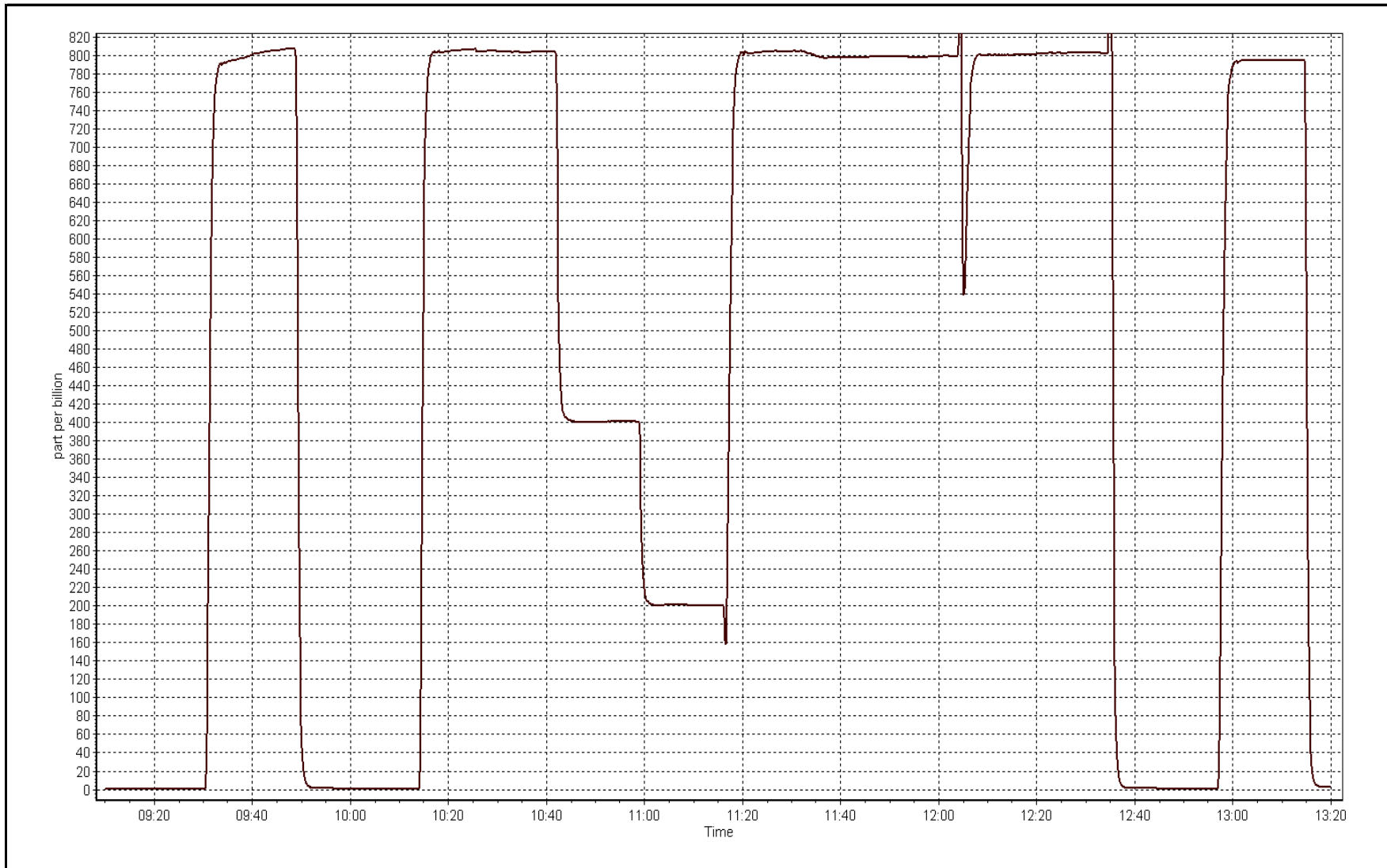
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999998
803.7	803.8	0.9999		
401.9	401.1	1.0019	Slope	1.000207
200.9	200.7	1.0011		
			Intercept	0.078626



SO2 Calibration Plot

Date: October 8, 2015







# Wood Buffalo Environmental Association H2S Calibration Report

### Station Information

Calibration Date	October 7, 2015	Last Calibration	September 11, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	8:55	End Time (MST)	11:48
Gas Cert Reference	LL34303	Station temp.	21 Deg C
Cal Gas Concentration	10.4 ppm	Cal Gas Exp Date	21/12/2012
Calibrator Make/Model	API T700	Serial Number	622
ZAG air Make/Model	API 701	Serial Number	4865
DACS make/model	Campbell Scientific CR3000	Serial Number	7882
SO2 gas concentration	51.1 ppm	SO2 gas cert/exp	LL110503 April-1-2016

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	80	513
Analyzer IP address	192.168.1.75		Lamp voltage	2218	2172
Calculated slope	0.992310	1.004300	Chamber temp	50	50
Calculated intercept	-0.166537	-0.226105	Pressure	22.8	22.7
Analyzer Background	20.6	20.6	Flow	0.565	0.564
Analyzer Coefficient	0.930	0.92	Intensity	49	48
			Converter temp.	315	316

Analyzer make/model	API T101	Analyzer serial #	197
Converter make/model	N/A	Converter serial #	N/A

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.2	----
as found span	5000	38.5	80.1	81.0	0.989
SO2 scrubber check	5000	20.7	211.6	3.7	----
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	38.5	80.1	80.0	1.001
second point	5000	19.3	40.1	40.1	1.000
third point	5000	12.1	25.2	25.3	0.994
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	38.5	80.1	79.6	1.006
Average Correction Factor					0.998

Corrected As found	80.8	Previous response	80.9	% change	0.1%
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**Notes:**

Inlet filter replaced and scrubber check done after as founds. Slightly adjusted span.

Calibration Performed By: Asad Hidayat



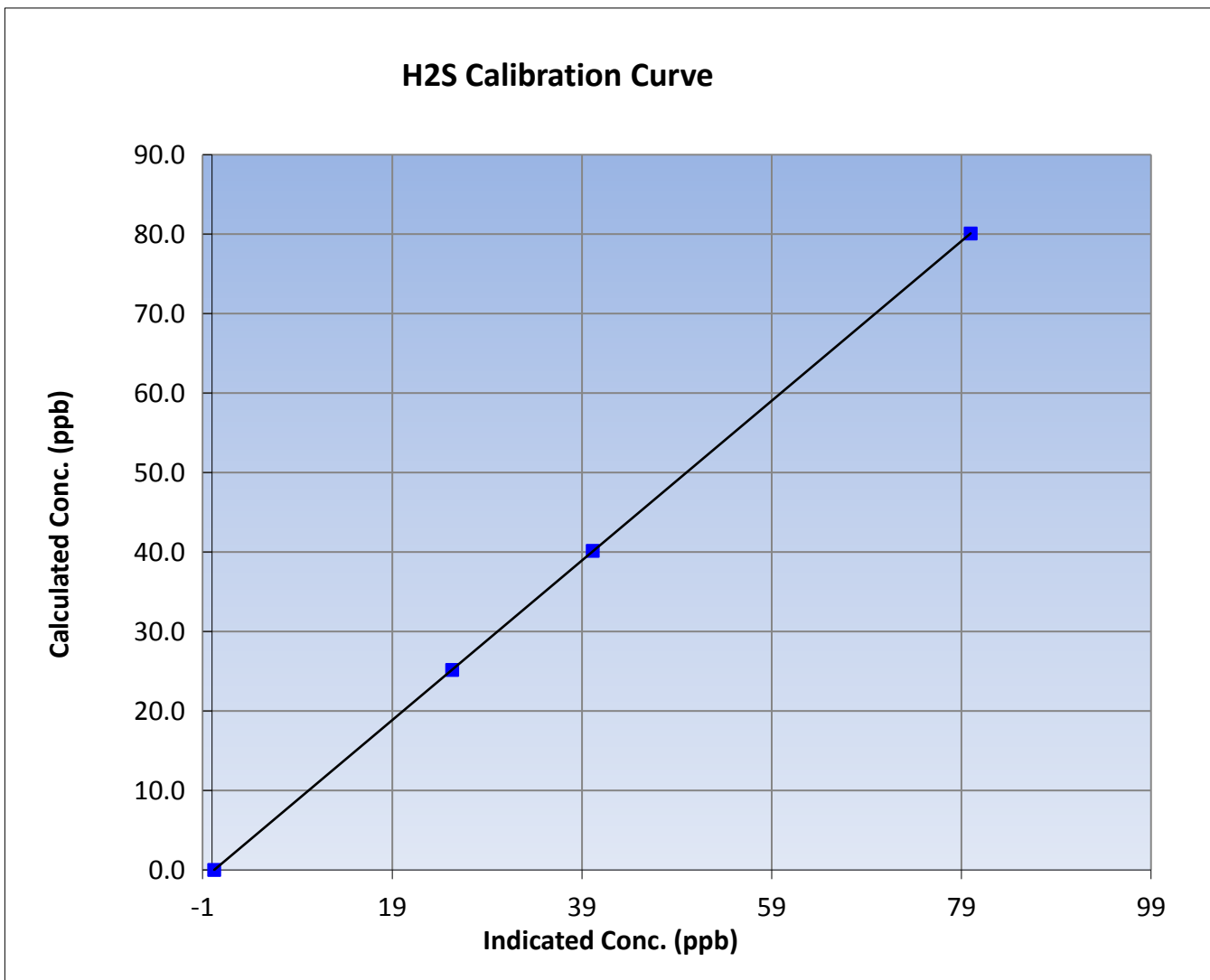
# Wood Buffalo Environmental Association H2S Calibration Report

## Station Information

Calibration Date	October 7, 2015	Previous Calibration	September 11, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	8:55	End Time (MST)	11:48
Analyzer make	API T101	Analyzer serial #	197

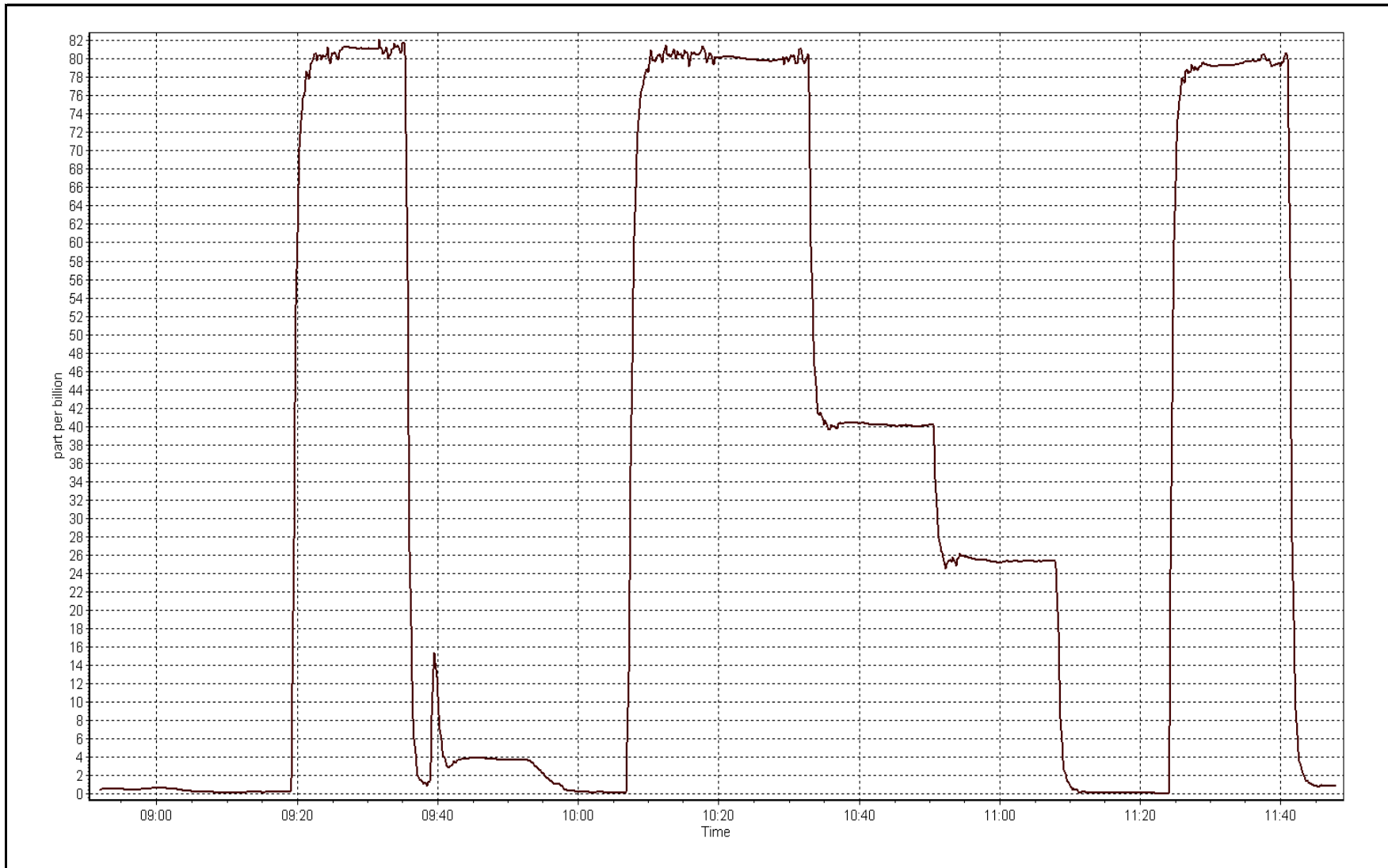
## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999999
80.1	80.0	1.0013		
40.1	40.1	1.0001	Slope	1.004300
25.2	25.3	0.9940		
			Intercept	-0.226105



H2S Calibration Plot

Date: October 7, 2015





# Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

## Station Information

Calibration Date	October 8, 2015	Previous Calibration	September 9, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	9:10	End Time (MST)	13:20
NO Cal Gas Conc	48.1 ppm	Gas Cert Reference	LL104215
NOx Cal Gas Conc	48.1 ppm	Cal Gas Expiry Date	12-Feb-18
Calibrator	API T700	Serial Number	622
Zero air Generator	Teledyne API T701	Serial Number	4865

## DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	7882
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## Calibration Statistics

Parameter	NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.997950	0.996803
	Data Offset	0.291575	0.576786
Current Calibration	Data Slope	1.001508	1.001604
	Data Offset	0.391433	0.598293

## Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153356
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Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	0.988		0.958	
NOX coefficient	0.999		1.001	
NO2 coefficient	1.000		1.000	
NO bkgrnd	4.0		4.4	
NOX bkgrnd	4.1		4.7	
Chamber Temp	50.4	Deg C	50.1	Deg C
Moly Temp	322.6	Deg C	322.4	Deg C
PMT voltage	-866.5	V	-866.9	V
PMT Temp	-3.1	Deg C	-3.1	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	162.1	mmHg	160.3	mmHg
R Cell Press Nox	162.4	mmHg	160.6	mmHg
NO sample flow	0.664	lpm	0.653	lpm
Nox sample Flow	0.660	lpm	0.651	lpm

**Notes:**

Inlet filter replaced after as founds. Adjusted both zero and span.



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date:

October 8, 2015

Station Number:

AMS 502

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.8	0.6	0.2	----	----
as found span	5000	83.2	800.4	800.4	0.0	823.4	822.4	1.0	0.9721	0.9732
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	0.1	0.1	----	----
high point	5000	83.2	800.4	800.4	0.0	799.1	798.9	0.2	1.0016	1.0019
second point	5000	41.6	400.2	400.2	0.0	398.9	398.5	0.4	1.0033	1.0043
third point	5000	20.8	200.1	200.1	0.0	198.9	198.5	0.3	1.0063	1.0079
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.2	-0.2	----	----
as left span	6000	99.9	800.9	525.9	275.0	802.7	529.7	273.0	0.9977	0.9927
Average Correction Factor									1.0037	1.0047

Corrected As found

NO<sub>x</sub>= 822.6

NO= 821.8

Percent Change

NO<sub>x</sub>= -2.5%

NO= -2.4%

Previous Response

NO<sub>x</sub>= 801.7

NO= 802.4

### GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

83.20

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.1			N/A	
1st NO2 (300)	----	525.9	271.5	799.2	525.9	273.3	0.9851	1.0000	0.9934	100.7%
2nd NO2 (200)	----	609.6	187.7	799.1	609.6	189.5	0.9852	1.0000	0.9909	100.9%
3rd NO2 (100)	----	697.2	100.2	798.0	697.2	100.8	0.9866	1.0000	0.9938	100.6%
4th NO2 (0)	797.4	----	2.4	799.8	797.4	2.4	0.9844	1.0000	N/A	----
Average Correction Factor							0.9853	1.0000	0.9927	100.7%

Calibration Performed By:

Asad Hidayat



# Wood Buffalo Environmental Association

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

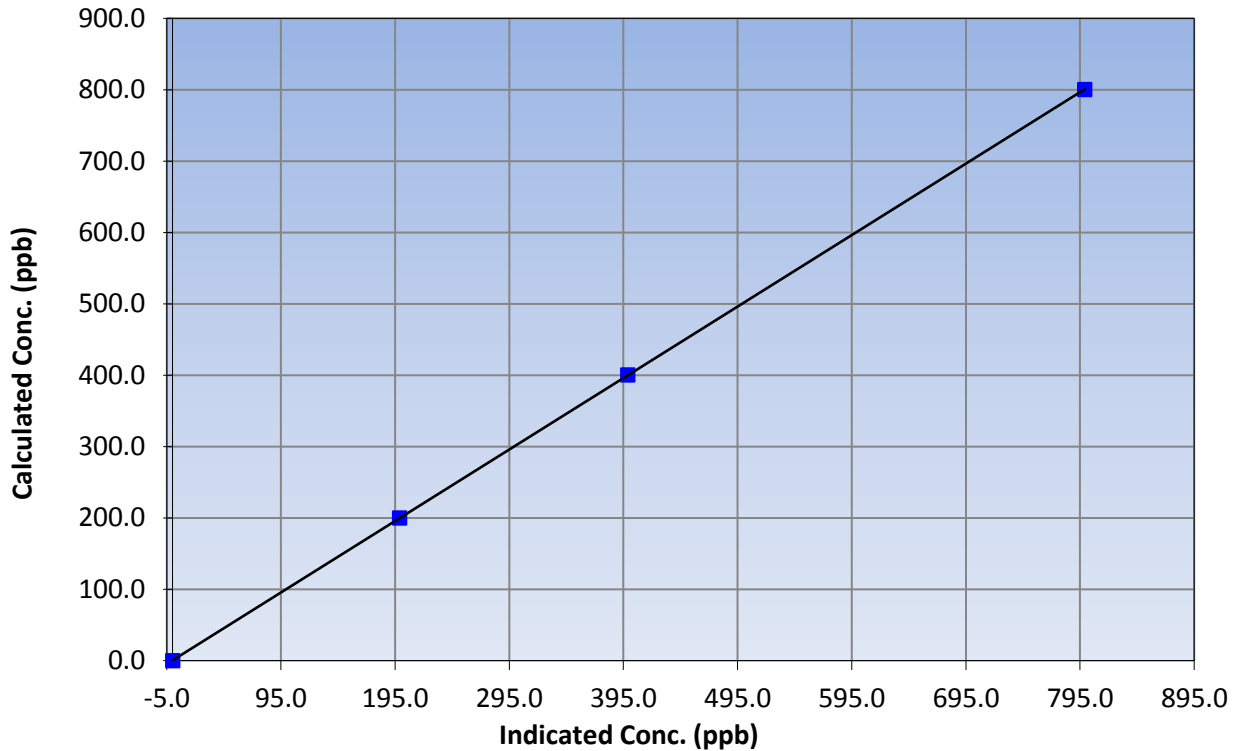
### Station Information

Calibration Date	October 8, 2015	Previous Calibration	September 9, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	9:10	End Time (MST)	13:20
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999998
800.4	799.1	1.0016		
400.2	398.9	1.0033	Slope	1.001508
200.1	198.9	1.0063		
			Intercept	0.391433

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

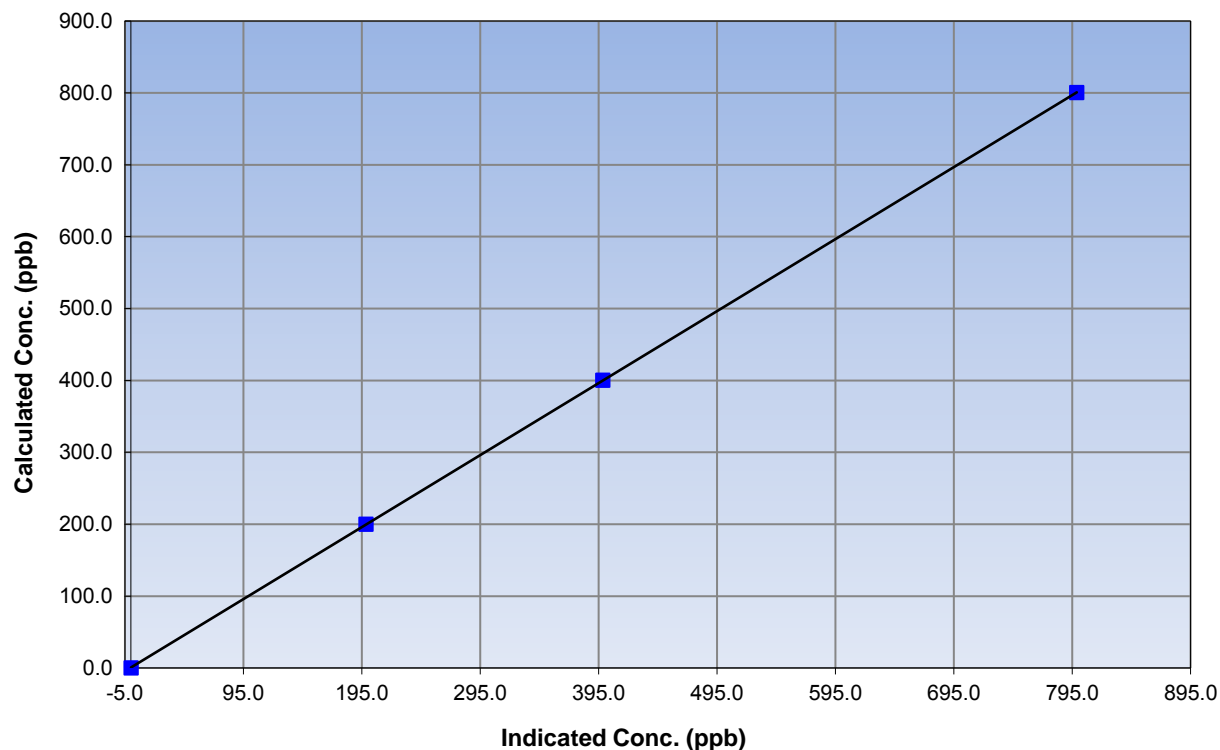
### Station Information

Calibration Date	October 8, 2015	Previous Calibration	September 9, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	9:10	End Time (MST)	13:20
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999996
800.4	798.9	1.0019		
400.2	398.5	1.0043	Slope	1.001604
200.1	198.5	1.0079		
			Intercept	0.598293

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

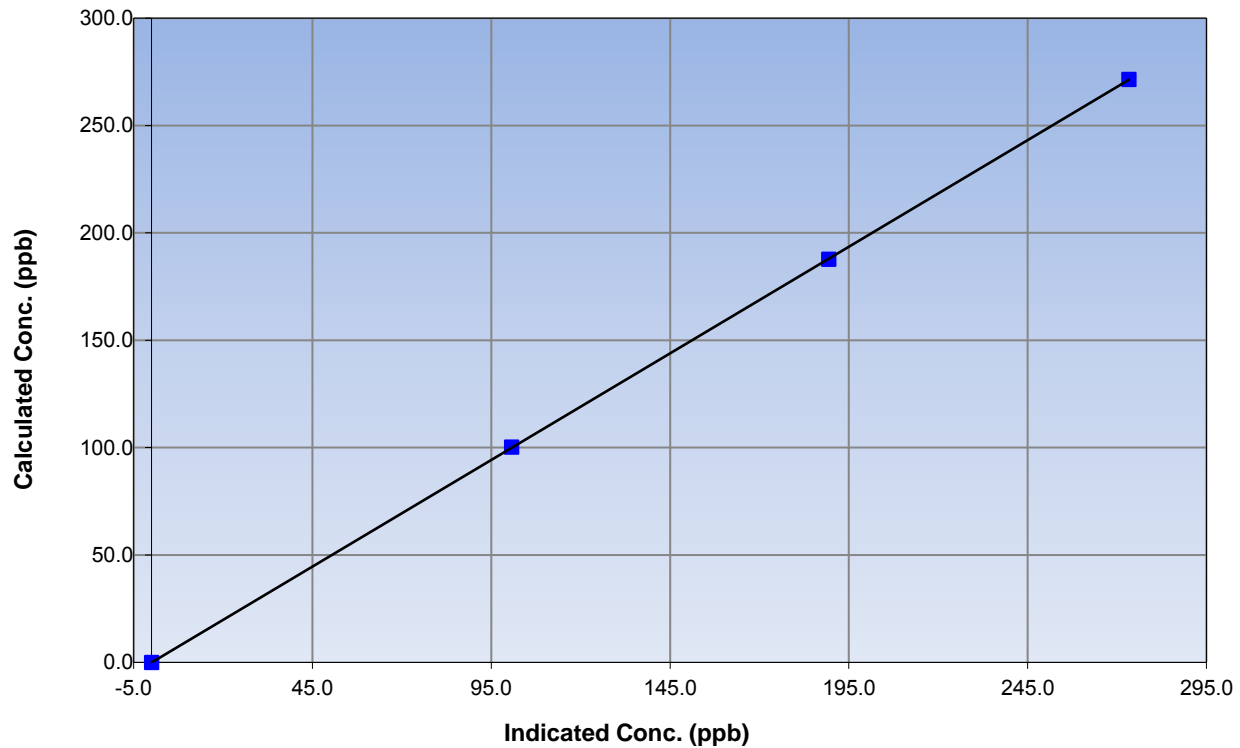
### Station Information

Calibration Date	October 8, 2015	Previous Calibration	September 9, 2015
Station Number	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	9:10	End Time (MST)	13:20
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999996
271.5	273.3	0.9934		
187.7	189.5	0.9909	Slope	0.992977
100.2	100.8	0.9938		
			Intercept	-0.065370

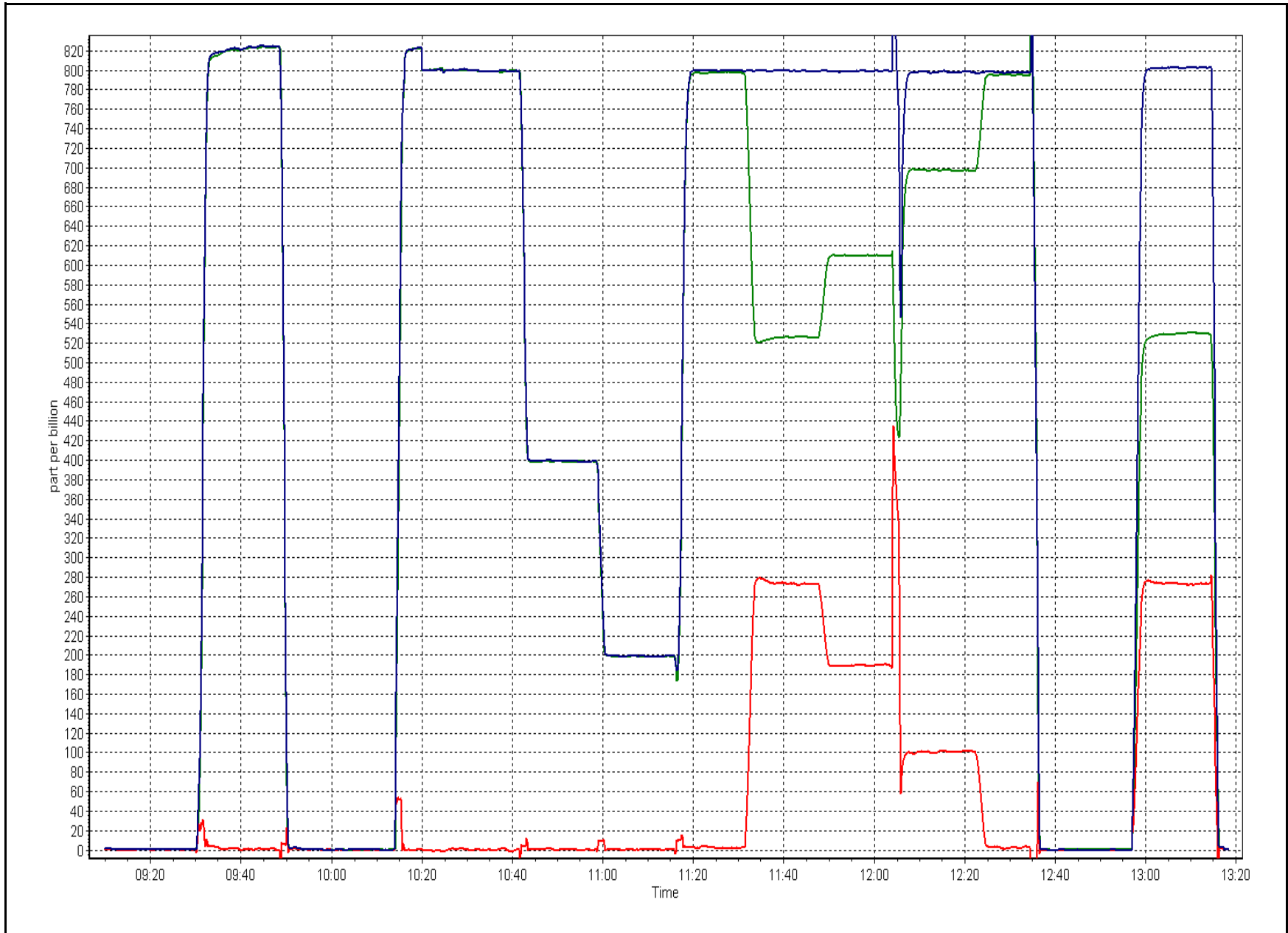
### NO<sub>2</sub> Calibration Curve





NOX Calibration Plot

Date: October 8, 2015





# Wood Buffalo Environmental Association

## WS/WD Calibration Report

### Station Information

Calibration Date	October-07-15	Previous Calibration	
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Routine	Removal	
Start Time (MST)	10:20	End Time (MST)	12:00
Barometric Press	n/a	Station Temp	22 Deg C
WS Calibrator	MetOne 053	Serial Number	J6774

### WIND SPEED

Sensor make/model	Met One 010C-1	Sensor serial #	G3212
DACS make	Campbel Scientific CR3000	DACS serial No.	7882
DACS voltage range	5000	DACS channel #	NA
<u>Before</u>		<u>After</u>	
Calculated slope	0.972124297	Calculated slope	0.998843
Calculated intercept	0.105967314	Calculated intercept	-0.025014

### Wind Speed Calibration Data

Shaft RPM	Actual Speed (K/hr)	Indicated Speed (K/hr)	Correction factor
0	0.0	0.0	n/a
200	20.2	20.3	0.9957
400	39.4	39.4	0.9990
600	58.6	58.7	0.9977
800	77.8	77.8	0.9989
Average Correction Factor			0.9978

### WIND DIRECTION

Sensor make/model	Met One 020C-1	Sensor serial #	G3835
DACS make	Campbel Scientific CR3000	DACS serial No.	7882
DACS voltage range	5000	DACS channel #	NA
<u>Before</u>		<u>After</u>	
Calculated slope	1.009996077	Calculated slope	1.002645
Calculated intercept	-0.809497686	Calculated intercept	-1.489217
As Found Declination (west of North)	0	As Left Declination (west of North)	14

### Wind Direction Calibration Data

Physical Direction (Degrees)	Indicated Direction (Degrees)	Correction factor
0	0.3	n/a
90	92.1	0.9771
180	181.9	0.9896
270	271.4	0.9948
357	356.4	1.0017
Average Correction Factor		0.9908

**Notes:**

Adjusted northing as it was not aligned properly.

Calibration Performed By: Asad Hidayat