



Wood Buffalo Environmental Association

JANUARY 2017 MONTHLY REPORT

CONTINUOUS MONITORING
INTEGRATED MONITORING
February 27, 2017

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



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February 27, 2017

Director, Environmental Monitoring and Evaluation Branch
Alberta Environment and Parks
11th Floor, Oxbridge Place
9820 106 Street
Edmonton, Alberta T5K 2J6

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

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

The continuous ambient air quality monitoring network stations are:

AMS 1 - Fort McKay – Bertha Ganter
AMS 2 - Mildred Lake
AMS 3 - Lower Camp B (meteorology)
AMS 4 - Buffalo Viewpoint
AMS 5 - Mannix
AMS 6 - Patricia McInnes
AMS 7 - Athabasca Valley
AMS 8 - Fort Chipewyan
AMS 9 - Barge Landing
AMS 11 - Lower Camp (air quality)
AMS 13 - Fort McKay South
AMS 14 - Anzac
AMS 15 - CNRL Horizon
AMS 16 - Shell Muskeg River
AMS 17 - Wapasu
AMS 18 - Stony Mountain
AMS 19 - Firebag
AMS 20 - Brion MacKay River
AMS 21 - Conklin
AMS 22 - Janvier
AMS 500 - Cenovus Christina Lake
AMS 502 - ConocoPhillips Surmont

WBEA commissioned a permanent air monitoring station in the community of Janvier on January 1, 2017. This station is equipped with ambient air quality analyzers for SO₂, TRS, THC, CH₄, NMHC, NO, NO₂, NO_x, O₃, and PM_{2.5}. Temperature, wind speed and direction, and relative humidity are also continuously measured.



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

Member	EPEA Approval No.
Athabasca Oil Corporation	289664-00-00
Brion Energy	254465-00-00
Canadian Natural Resources Ltd.	149968-00-01
Cenovus Energy	48522-01-00
Connacher Oil and Gas Ltd.	240008-00-03
ConocoPhillips Canada	48263-01-00
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; 236394-00-00
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 & Parks
Alberta Health Services
Alberta Health & Wellness
Environment Canada

Health Canada
Parks Canada
Pembina Institute for Appropriate Development
Regional Municipality of Wood Buffalo
Saskatchewan Environment

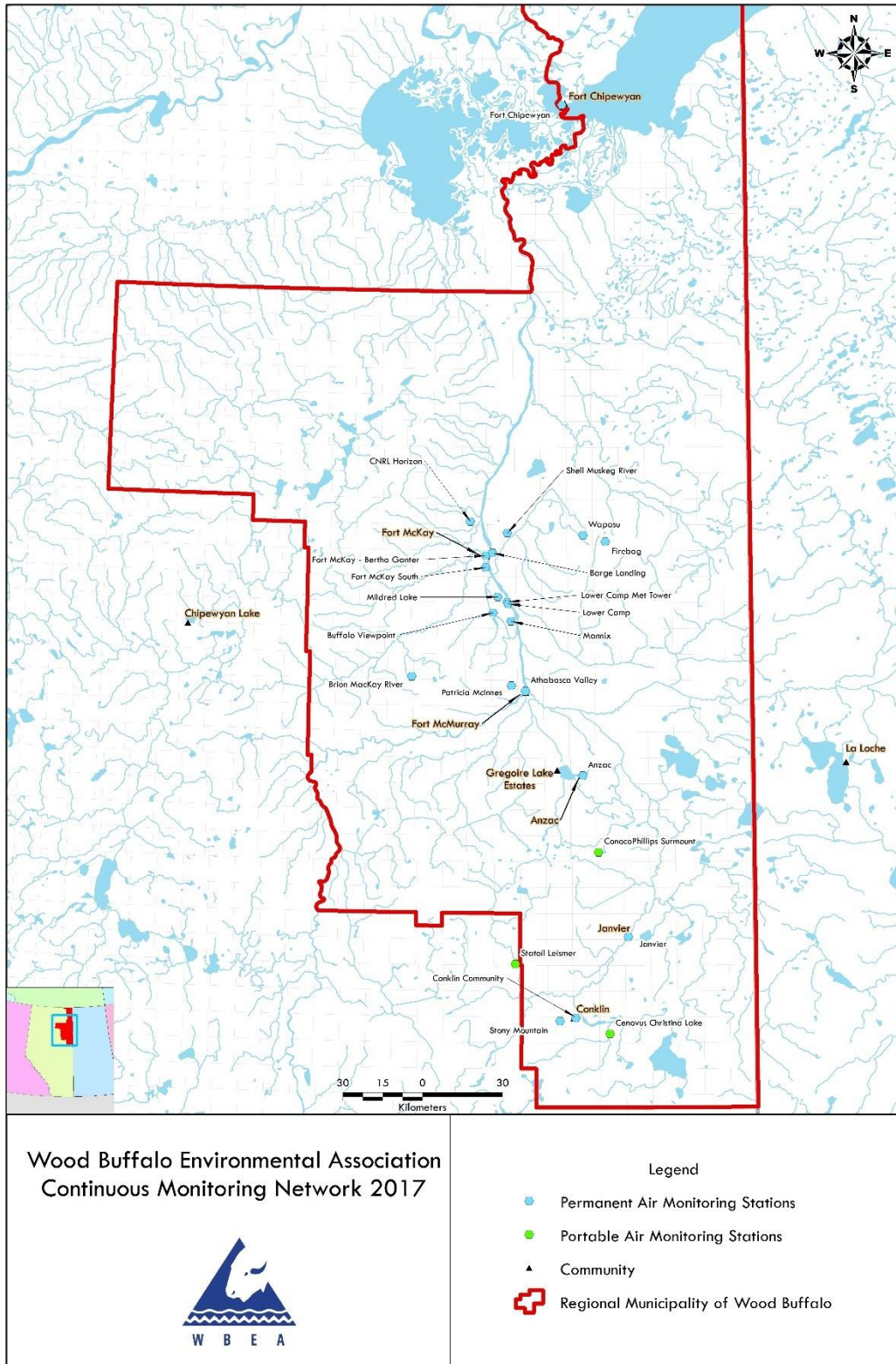


Figure 1: Map of WBEA Air Monitoring Network.

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 CO, NO₂, O₃, and NH₃.

There were 2 SO₂ ambient ground level concentrations in excess of the 1-hour SO₂ air quality objective reported to the Energy and Environmental Response Centre in real time. After data processing to account for analyzer drift with baseline correction, there were 2 concentrations in excess of the 1-hour SO₂ air quality objective.

There were 8 H₂S ambient ground level concentrations in excess of the 1-hour H₂S air quality objective reported to the Energy and Environmental Response Centre in real time. After data processing to account for analyzer drift with baseline correction, there were 6 concentrations in excess of the 1-hour H₂S air quality objective.

There was 1 PM_{2.5} ambient ground level concentration in excess of the 24-hour PM_{2.5} air quality objective reported to the Energy and Environmental Response Centre in real time. After data processing to account for analyzer drift with baseline correction, there was 1 concentration in excess of the 24-hour PM_{2.5} air quality objective.

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

<u>Site</u>	<u>Parameter</u>	<u>Date / Time</u>	<u>Reference</u>	<u>Period</u>	Concentration ppb or ug/m ³		<u>Status</u>
					<u>Reported</u>	<u>Final</u>	
AMS 5 Mannix	H ₂ S	07Jan17, 11:00	319760	1hr	10	10	nae
AMS 5 Mannix	H ₂ S	07Jan17, 12:00	319760	1hr	10	9	nae
AMS 11 Lower Camp	H ₂ S	15Jan17, 15:00	320012	1hr	12	12	exc
AMS 11 Lower Camp	H ₂ S	15Jan17, 16:00	320013	1hr	11	11	exc
AMS 11 Lower Camp	H ₂ S	15Jan17, 17:00	320015	1hr	10	11	exc
AMS 11 Lower Camp	H ₂ S	29Jan17, 16:00	320496	1hr	22	22	exc
AMS 11 Lower Camp	H ₂ S	29Jan17, 17:00	320497	1hr	20	20	exc
AMS 11 Lower Camp	H ₂ S	30Jan17, 03:00	320499	1hr	14	14	exc
AMS 14 Anzac	PM _{2.5}	19Jan17, 24:00	320201	24hr	33	33.6	exc
AMS 15 CNRL Horizon	SO ₂	12Jan17, 17:00	319926	1hr	514	513	exc
AMS 15 CNRL Horizon	SO ₂	12Jan17, 18:00	319930	1hr	178	177	exc

*status legend:

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

1.1 Data Processing and Validation

Concentrations reported in near real-time were raw values. The final values were determined after processing of data for reporting. For all parameters except PM_{2.5}, 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, NO₂ concentrations were re-calculated from baseline-corrected NO_x and NO concentrations. Specifically, the NO concentration was subtracted from the NO_x concentration to determine the NO₂ concentration. In cases where the NO_x and/or NO values exceeded the operating range of the analyzer, values reported for NO₂ were determined as the largest of either the difference between baseline-corrected NO_x and NO values, or the NO₂ value reported by the data acquisition system with baseline correction applied.

1.2 Revisions to AEP Airdata Warehouse

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

2.0 Operational Status

Continuous Monitoring

In January 2017, there was 1 incident resulting in compliance monitoring instruments operating less than 90% of the time:

The 20m elevation wind speed, wind direction, and vertical wind speed sensors at Mannix AMS operated less than 90% of the time in January 2017, which is a violation of the Air Monitoring Directive (1989, as amended), Chapter 6, Clause DQ 4-C. Flat-line periods in the sensors' output signals were attributed to ice build-up on the sonic sensors, and data from these periods were invalidated.

During the data validation process, wind speed, wind direction, and vertical wind speed data at Mannix AMS were invalidated for a total of 150 hours, resulting in a monthly operational time of 80% for the month of January 2017. This incident was reported to Alberta Environment and Parks on February 8, 2017 (AEP Reference #320819).

In January 2017, there were 7 incidents of a monitoring instrument not required for air quality compliance operating less than 90% of the time:

1. The 100m meteorological sensors at Lower Camp Met Tower (AMS 3) had 171 hours of invalid data due to freezing temperatures and ice build-up.
2. The 167m meteorological sensors at Lower Camp Met Tower (AMS 3) had 259 hours of invalid data due to freezing temperatures and ice build-up.
3. The 45m meteorological sensors at Mannix (AMS 5) had 233 hours of invalid data due to freezing temperatures and ice build-up.
4. The 75m meteorological sensors at Mannix (AMS 5) had 246 hours of invalid data due to freezing temperatures and ice build-up.
5. The 90m meteorological sensors at Mannix (AMS 5) had 188 hours of invalid data due to freezing temperatures and ice build-up.
6. The precipitation collector at Fort Chipewyan (AMS 8) had 744 hours of invalid data due to sensor failure discovered during a routine function check. The unit was repaired in-shop and returned to site on February 9, 2017.
7. The precipitation collector at Wapasu (AMS 17) had 429 hours of invalid data due to a data collection issue. A program revision to address the issue was uploaded to the data logger on February 1, 2017.

Intermittent Monitoring

The results for passive and integrated monitoring of PAH, VOC, PM_{2.5} and PM₁₀ 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 (NH₃) 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 NH₃ 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 NH₃ gas is an inherent behavior in the NH₃ analyzer operations resulting from the properties of the NH₃ gas. Data for 1 hour following the daily spans have been reported as invalid for a total of 31 hours this month. Maintenance to reinitiate the daily zero/span check on January 9 interrupted the routine operation of the NH₃ analyzer for 1 hour.

Maintenance and cleaning of the sample manifold on January 5 interrupted the normal operations of all air quality analyzers for 1 hour.

Unstable operation due to negative baseline drift on January 17 affected the normal operation of the PM_{2.5} analyzer for 2 hours. Maintenance on January 17 to verify analyzer zero response affected the routine operation of the PM_{2.5} analyzer for 1 hour.

The daily span of the O₃ analyzer did not meet acceptance criteria ($\pm 10\%$) on January 24. On site investigation and repair attempts required the removal of the analyzer for repairs. A backup analyzer was installed and calibrated and data was invalidated back until the last valid span response on January 23, resulting in 28 hours of invalid data.

Maintenance to reset the data logger on January 24 interrupted the routine operation of the THC analyzer for 1 hour.

Maintenance to confirm calibration points for the O₃ analyzer, based on NO_x GPT reaction, on January 24 interrupted the normal operation of the NO₂ for 1 hour.

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

No operational issues to report this month.

Station 3, Lower Camp B - Meteorology

Flat lines in output signals of the sonic wind sensors at 45, 100, and 167 m elevations resulted in 1, 171, and 259 hours of downtime for each respective sensor.

Station 4, Buffalo Viewpoint

No operational issues to report this month.

Station 5, Mannix

Maintenance to the daily zero/span system on January 9 interrupted the routine operation of the H₂S analyzer for 2 hours.

The as found span of the THC analyzer did not meet calibration acceptance criteria ($\pm 10\%$) on January 11. Consequently, data was invalidated back until the last valid span response, resulting in 52 hours of invalid data.

Maintenance to the daily zero/span system on January 12 interrupted the routine operations of all air quality analyzers for 1 to 4 hours.

Maintenance to replace the calibration gas cylinder on January 13 interrupted the routine operations of the THC and SO₂ analyzers for 1 hour.

Flat lines in output signals of the sonic wind sensors at 20, 45, 75 and 90 m elevations resulted in 150, 233, 246, and 188 hours of downtime for each respective sensor.

Flat lines in output signals of the ambient temperature and relative humidity sensors at 20 m elevation resulted in 27 hours of invalid data this reporting period.

Station 6, Patricia McInnes

The NH₃ 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 NH₃ gas is an inherent behavior in the NH₃ analyzer operations resulting from the properties of the NH₃ gas. Data for 1 to hour following each daily span has been reported as invalid for a total of 31 hours this month.

Multiple instances of unstable operation due to baseline drift affected the normal operation of the THC analyzer for a total of 15 hours. Collection of diagnostic information on January 20 interrupted the normal operation of the THC analyzer for 1 hour. Maintenance to adjust the carrier gas pressure and recalibrate on January 23 interrupted the normal operation of the THC analyzer for 3 hours. Maintenance to replace the zero air generator and confirm analyzer response on January 31 interrupted the routine operation of the THC analyzer for 2 hours.

Maintenance to reinitiate the daily zero/span check on January 18 interrupted the routine operation of the NO₂ analyzer for 3 hours.

Station 7, Athabasca Valley

Maintenance and cleaning of the sample manifold on January 5 interrupted the normal operation of the TRS, O₃, and CO analyzers for 1 hour.

Maintenance to reinitiate the daily zero/span check on January 17 interrupted the routine operation of the NO₂ analyzer for 2 hours.

A power outage at the station on January 19 affected the normal operation of all air quality analyzers for 1 to 2 hours. The PM_{2.5} analyzer required an additional 2 hours to stabilize following the power outage.

Multiple instances of unstable operation due to baseline drift affected the normal operation of the PM_{2.5} analyzer for a total of 5 hours this reporting period.

Station 8, Fort Chipewyan

An internal WBEA audit on January 17 interrupted the normal operation of all air quality analyzers for 2 to 4 hours.

A power spike at the station followed by stabilization time on January 14 interrupted the routine operation of the NO₂ analyzer for 2 hours.

Maintenance to remove built-up frost from the wind speed and wind direction sensors on January 4 interrupted the normal operations of the wind sensors for 1 hour. Flat-lines in the output signal of the wind sensor resulted in 8 hours of invalid data this reporting period.

The precipitation collector was found to be unresponsive on January 5, 2017 and was removed from site for repairs. Data was invalidated back to the last precipitation event on November 28 resulting in 744 hours of invalid data. The analyzer was re-installed on February 9 following in-shop repairs.

Station 9, Barge Landing

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

Station 11, Lower Camp

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

Station 13, Fort McKay South

Maintenance to confirm calibration points for the O₃ analyzer, derived from NO₂ GPT reaction, on January 18 interrupted the normal operation of the NO₂ for 1 hour.

Unstable operation due to baseline drift on January 27 affected the normal operation of the PM_{2.5} analyzer for 6 hours.

Flat-lines in the output signal of the wind sensor resulted in 35 hours of invalid data this reporting period.

Station 14, Anzac

Maintenance to upgrade the calibration system and verify analyzer responses at the station on January 4 interrupted the routine operation of all air quality analyzers for 2 hours.

Unstable operation due to fluctuating station temperature on January 11 interrupted the normal operation of the NO₂ analyzer for 6 hours.

A power outage at the station on January 21 affected the normal operation of all air quality analyzers for 5 to 7 hours.

Flat-lines in the output signal of the wind sensor resulted in 33 hours of invalid data this reporting period.

Station 15, CNRL Horizon

Flat-lines in the output signal of the wind sensor resulted in 9 hours of invalid data this reporting period.

Station 16, Shell Muskeg River

No operational issues to report this month.

Station 17, Wapasu

Precipitation collector data was not collected from January 5 to 23 due to a data collection issue, resulting in 429 hours of invalid data this reporting period. A program revision to address the issue was uploaded to the data logger on February 1, 2017.

Flat-lines in the output signal of the wind sensor resulted in 53 hours of invalid data this reporting period.

Station 18, Stony Mountain

Maintenance and cleaning of the sample manifold on January 10 interrupted the normal operations of all air quality analyzers for 1 hour.

Sample pump failure and maintenance to replace the pump and recalibrate on January 14 interrupted the routine operation of the O₃ analyzer for 39 hours.

Flat-lines in the output signal of the wind sensor resulted in 5 hours of invalid data this reporting period.

Station 19, Firebag

Fluctuating station temperatures on January 23 due to tech activities affected the normal operation of the THC analyzer for 1 hour.

Flat-lines in the output signal of the wind sensor resulted in 65 hours of invalid data this reporting period.

Station 20, Brion MacKay River

Maintenance and cleaning of the sample manifold on January 23 interrupted the normal operations of the H₂S analyzer for 1 hour.

Maintenance to clear built up snow and ice from the precipitation collection bucket on January 23 interrupted the routine operation of the precipitation collector for 2 hours.

Flat-lines in the output signal of the wind sensor resulted in 12 hours of invalid data this reporting period.

Station 21, Conklin Community

Three instances of unstable operation due to baseline drift affected the normal operation of the PM_{2.5} analyzer for 3 hours this reporting period.

Flat-lines in the output signal of the wind sensor resulted in 3 hours of invalid data this reporting period.

Station 22, Janvier

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

Maintenance to the zero/span solenoids on January 12 interrupted the routine operations of the SO₂, TRS, and THC analyzers for 1 hour.

A power outage at the station on January 13 affected the normal operation of all air quality analyzers for 1 hour.

Unstable operation due to baseline drift on January 10 affected the normal operation of the THC analyzer for 4 hours.

Five instances of unstable operation due to baseline drift affected the normal operation of the PM_{2.5} analyzer for 28 hours this reporting period.

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

Station 500, Cenovus Christina Lake

Flat-lines in the output signal of the wind sensor resulted in 7 hours of invalid data this reporting period.

Station 502, ConocoPhillips Surmont

Maintenance to reinitiate the daily zero/span check on January 8 interrupted the routine operations of the SO₂ and NO₂ analyzers for 1 hour.

Maintenance to replace the zero air generator and confirm analyzer zero responses on January 9 interrupted the routine operations of the SO₂ and NO₂ analyzers for 1 hour.

Flat-lines in the output signal of the wind sensor resulted in 35 hours of invalid data this reporting period.

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

Yours sincerely,

Wood Buffalo Environmental Association

Mike Martineau
Data Technician

Sanjay Prasad
Air Quality Scientist



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

JANUARY 2017

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Prepared: Feb 24 2017 11:03

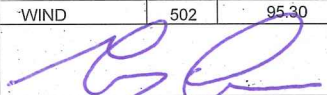
APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
289664-00-00	1	2017					
254465-00-00	CONTINUOUS AMBIENT MONITORING						
149968-00-01							
48522-01-00							
240008-00-03				ONE-HOUR AVERAGE		24-HOUR AVERAGE	
48263-00-00	PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
224816-00-03	SO2(ppm)	1	99.87	0.024	0	0.005	0
189942-00-02	SO2(ppm)	2	100.00	0.047	0	0.012	0
206355-00-00	SO2(ppm)	4	100.00	0.010	0	0.004	0
46586-00-00	SO2(ppm)	5	99.73	0.085	0	0.014	0
216466-00-04	SO2(ppm)	6	100.00	0.026	0	0.007	0
137467-00-00	SO2(ppm)	7	99.87	0.014	0	0.005	0
20809-01-00	SO2(ppm)	8	99.73	0.018	0	0.005	0
241311-00-00	SO2(ppm)	11	100.00	0.125	0	0.020	0
094-02-00	SO2(ppm)	13	100.00	0.018	0	0.003	0
305529-00-00	SO2(ppm)	14	98.92	0.013	0	0.005	0
026-02-00	SO2(ppm)	15	99.87	0.513	2	0.038	0
228044-00-00	SO2(ppm)	16	100.00	0.027	0	0.012	0
73203-01-00	SO2(ppm)	17	100.00	0.031	0	0.010	0
236394-00-00	SO2(ppm)	18	99.87	0.005	0	0.001	0
	SO2(ppm)	19	100.00	0.046	0	0.017	0
	SO2(ppm)	20	100.00	0.021	0	0.008	0
	SO2(ppm)	21	100.00	0.004	0	0.001	0
	SO2(ppm)	22	99.73	0.005	0	0.001	0
	SO2(ppm)	500	100.00	0.013	0	0.003	0
	SO2(ppm)	502	99.73	0.024	0	0.002	0
	H2S(ppm)	2	100.00	0.009	0	0.003	0
	H2S(ppm)	4	100.00	0.003	0	0.001	0
	H2S(ppm)	5	99.19	0.010	0	0.003	0
	H2S(ppm)	11	100.00	0.022	6	0.003	0
	H2S(ppm)	17	100.00	0.001	0	0.000	0
	H2S(ppm)	19	100.00	0.002	0	0.001	0
	H2S(ppm)	20	99.87	0.001	0	0.001	0
	H2S(ppm)	500	100.00	0.001	0	0.000	0
	H2S(ppm)	502	100.00	0.002	0	0.001	0
	TRS(ppm)	1	99.87	0.004	0	0.002	0
	TRS(ppm)	6	100.00	0.002	0	0.001	0
	TRS(ppm)	7	99.73	0.002	0	0.001	0
	TRS(ppm)	9	100.00	0.003	0	0.002	0
	TRS(ppm)	13	100.00	0.003	0	0.001	0
	TRS(ppm)	14	99.06	0.005	0	0.001	0
	TRS(ppm)	15	100.00	0.009	0	0.002	0
	TRS(ppm)	18	99.87	0.001	0	0.000	0
	TRS(ppm)	21	100.00	0.001	0	0.000	0
	TRS(ppm)	22	99.73	0.000	0	0.000	0
	THC(ppm)	1	99.73	5.4	-	3.4	-
	THC(ppm)	2	100.00	5.5	-	3.3	-
	THC(ppm)	4	100.00	6.2	-	3.2	-
	THC(ppm)	5	92.74	6.0	-	2.8	-
	THC(ppm)	6	97.18	2.9	-	2.2	-
	THC(ppm)	7	99.73	3.6	-	2.8	-
	THC(ppm)	9	100.00	5.4	-	3.5	-
	THC(ppm)	11	100.00	4.8	-	3.4	-
	THC(ppm)	13	100.00	6.8	-	4.4	-
	THC(ppm)	14	98.92	2.7	-	2.3	-
	THC(ppm)	15	100.00	8.1	-	3.7	-
	THC(ppm)	16	100.00	4.7	-	3.6	-
	THC(ppm)	17	100.00	4.5	-	2.4	-
	THC(ppm)	18	99.87	2.4	-	2.1	-
	THC(ppm)	19	99.87	2.6	-	2.4	-
	THC(ppm)	20	100.00	4.0	-	2.4	-
	THC(ppm)	21	100.00	2.4	-	2.2	-
	THC(ppm)	22	99.19	2.2	-	2.1	-
	O3(ppm)	1	96.10	0.040	0	0.034	-
	O3(ppm)	6	100.00	0.047	0	0.041	-
	O3(ppm)	7	99.73	0.041	0	0.033	-

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

JANUARY 2017

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APPROVAL NUMBERS	REPORT DATE		CONTINUOUS AMBIENT MONITORING						
	MONTH	YEAR	ONE-HOUR AVERAGE		24-HOUR AVERAGE				
	1	2017	PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
289664-00-00									
254465-00-00									
149968-00-01									
48522-01-00									
240008-00-03									
48263-00-00									
224816-00-03									
189942-00-02									
206355-00-00									
46586-00-00			O3(ppm)	8	99.60	0.042	0	0.039	-
216466-00-04			O3(ppm)	13	100.00	0.039	0	0.032	-
137467-00-00			O3(ppm)	14	98.92	0.049	0	0.043	-
20809-01-00			O3(ppm)	17	100.00	0.039	0	0.033	-
241311-00-02			O3(ppm)	18	94.62	0.049	0	0.046	-
094-02-00			O3(ppm)	21	100.00	0.047	0	0.044	-
305529-00-00			O3(ppm)	22	99.87	0.047	0	0.044	-
026-02-00			NO2(ppm)	1	99.73	0.043	0	0.025	-
228044-00-00			NO2(ppm)	6	99.60	0.046	0	0.018	-
73203-01-00			NO2(ppm)	7	99.46	0.045	0	0.026	-
236394-00-00			NO2(ppm)	8	99.19	0.025	0	0.012	-
			NO2(ppm)	13	99.87	0.036	0	0.022	-
			NO2(ppm)	14	98.12	0.024	0	0.011	-
			NO2(ppm)	15	100.00	0.036	0	0.016	-
			NO2(ppm)	16	100.00	0.052	0	0.029	-
			NO2(ppm)	17	100.00	0.030	0	0.011	-
			NO2(ppm)	18	99.87	0.017	0	0.008	-
			NO2(ppm)	19	100.00	0.027	0	0.014	-
			NO2(ppm)	20	100.00	0.021	0	0.013	-
			NO2(ppm)	21	100.00	0.023	0	0.008	-
			NO2(ppm)	22	99.87	0.014	0	0.007	-
			NO2(ppm)	500	100.00	0.035	0	0.016	-
			NO2(ppm)	502	99.73	0.028	0	0.013	-
			CO(ppm)	7	99.73	0.7	0	0.3	-
			NH3(ppm)	1	95.70	0.000	0	0.000	-
			NH3(ppm)	6	95.70	0.011	0	0.001	-
			PM2.5(ug/m3)	1	99.60	61.6	-	30.3	0
			PM2.5(ug/m3)	6	100.00	57.5	-	16.7	0
			PM2.5(ug/m3)	7	98.92	36.7	-	14.2	0
			PM2.5(ug/m3)	8	100.00	19.5	-	11.4	0
			PM2.5(ug/m3)	13	99.19	33.2	-	20.7	0
			PM2.5(ug/m3)	14	99.06	153.5	-	33.6	1
			PM2.5(ug/m3)	15	100.00	40.2	-	14.6	0
			PM2.5(ug/m3)	16	100.00	65.5	-	23.1	0
			PM2.5(ug/m3)	17	100.00	50.4	-	13.9	0
			PM2.5(ug/m3)	18	100.00	22.3	-	15.4	0
			PM2.5(ug/m3)	21	99.60	29.2	-	15.6	0
			PM2.5(ug/m3)	22	96.24	54.7	-	14.3	0
			WIND	1	100.00	-	-	-	-
			WIND	2	100.00	-	-	-	-
			WIND	4	100.00	-	-	-	-
			WIND	5	79.84	-	-	-	-
			WIND	6	100.00	-	-	-	-
			WIND	7	100.00	-	-	-	-
			WIND	8	98.79	-	-	-	-
			WIND	9	98.92	-	-	-	-
			WIND	11	99.87	-	-	-	-
			WIND	13	95.16	-	-	-	-
			WIND	14	95.56	-	-	-	-
			WIND	15	98.79	-	-	-	-
			WIND	16	100.00	-	-	-	-
			WIND	17	92.88	-	-	-	-
			WIND	18	99.33	-	-	-	-
			WIND	19	91.26	-	-	-	-
			WIND	20	98.39	-	-	-	-
			WIND	21	99.60	-	-	-	-
			WIND	22	99.87	-	-	-	-
			WIND	500	99.06	-	-	-	-
			WIND	502	95.30	-	-	-	-
									
SIGNATURE OF ASSOCIATION REPRESENTATIVE			FOR ALBERTA ENVIRONMENT USE ONLY						



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

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

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

February 27, 2017



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY - BERTHA GANTER (AMS 1)
 JANUARY 2017

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	708	35	36	99.87	24	0	5	0
TRS(ppb) Average	708	35	36	99.87	4	0	2	0
THC(ppm) Average	707	35	37	99.73	5.4	-	3.4	-
NMHC(ppm) Average	707	35	37	99.73	2.057	-	0.518	-
CH4(ppm) Average	707	35	37	99.73	4.2	-	3	-
O3 (ppb) Average	674	41	70	96.10	40	0	34	-
NO2 (ppb) Average	706	36	38	99.73	43	0	25	-
NO (ppb) Average	706	36	38	99.73	92	-	44	-
NOX (ppb) Average	706	36	38	99.73	126	-	63	-
NH3 (ppb) Average	669	43	75	95.70	0	0	0	-
PM2.5 (ug/m3) Average	739	2	5	99.60	61.6	-	30.3	0
Wind Speed 10 m (km/h) Average	744	0	0	100.00	32	-	15	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100.00	7.7	-	2.0	-
Temperature 10 m (C) Average	744	0	0	100.00	7.6	-	3.2	-
Relative Humidity (%) Average	744	0	0	100.00	97	-	94	-
Precipitation (mm) Total	744	0	0	100.00	0.2	-	0.4	-
Leaf Wetness (% of range) Average	744	0	0	100.00	11	-	9	-
Global Solar Radiation (W/m2) Average	744	0	0	100.00	300	-	59	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BERTHA GANTER FORT MCKAY (AMS 1)
 JANUARY 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	1.1	2	-	0	0	0	0	1	3	24
TRS (ppb) Average	708	0.8	1	-	0	0	0	0	1	2	4
THC (ppm) Average	707	2.26	0.4	-	1.9	2	2	2.1	2.4	2.6	5.4
NMHC(ppm) Average	707	0.085	0.172	-	0	0	0	0	0.1	0.2	2.057
CH4(ppm) Average	707	2.17	0.3	-	1.9	2	2	2.1	2.3	2.4	4.2
O3 (ppb) Average	674	18.4	12	-	1	2	6	19	29	34	40
NO2 (ppb) Average	706	12.9	10	-	0	1	3	12	21	27	43
NO (ppb) Average	706	5.7	12	-	0	0	0	1	6	19	92
NOX (ppb) Average	706	18.6	19	-	0	1	4	13	28	41	126
NH3 (ppb) Average	669	0	0	-	0	0	0	0	0	0	0
PM2.5 (ug/m3) Average	739	7.74	7.6	-	0.3	1.5	2.6	5.3	10.2	16.4	61.6
Wind Speed 10 m (km/h) Average	744	7.1	4	-	0	2	4	6	9	12	32
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	-12.9	10.3	-	-37.6	-26.3	-20.6	-13.6	-3.8	0.6	7.7
Temperature 10 m (C) Average	744	-12.34	10.2	-	-36.2	-25.3	-20	-13.4	-2.8	1.5	7.6
Relative Humidity (%) Average	744	78.1	8	-	52	68	73	78	83	91	97
Precipitation (mm) Total	744	-	-	1.46	-	-	-	-	-	-	-
Leaf Wetness (% of range) Average	744	1.4	2	-	0	0	0	1	2	4	11
Global Solar Radiation (W/m2) Average	744	25.9	53	-	0	0	0	0	22	98	300

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
AIR QUALITY ANALYZERS	13 Jan 2017 11:00	13 Jan 2017 11:00	1	Maintenance - manifold cleaning
NMHC, CH4, THC	24 Jan 2017 14:00	24 Jan 2017 14:00	1	Maintenance - Data logger reset
O3	23 Jan 2017 07:00	24 Jan 2017 10:00	28	Analyzer Failure - removed for repairs
NO2, NO, NOX	24 Jan 2017 12:00	24 Jan 2017 12:00	1	Maintenance - confirmed calibration points for Ozone
NH3	01 Jan 2017 05:00	31 Jan 2017 05:00	31	Stabilization after daily span
NH3	09 Jan 2017 11:00	09 Jan 2017 11:00	1	Maintenance - reinitiated daily QA check
PM2.5	17 Jan 2017 13:00	17 Jan 2017 14:00	2	Unstable operation - excessive baseline drift
PM2.5	17 Jan 2017 15:00	17 Jan 2017 15:00	1	Maintenance - verified zero response



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 24 ppb on Jan 24 05:00	Maximum Daily Average: 4.5 ppb on Jan 24		Hours of Data:	708
Minimum Value: 0 ppb on Jan 1 09:00	Minimum Daily Average: 0.0 ppb on Jan 22		Hours of Missing Data:	36
Maximum Diurnal Average: 2.5 ppb at hour 16	Minimum Diurnal Average: 0.6 ppb at hour 2		Hours of Calibration:	35
Monthly Average: 1.1 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 10		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-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.1	1
2-Jan	1	Z	0	0	0	0	0	1	1	1	1	1	2	1	2	2	2	3	3	2	1	2	1	1	1.2	3
3-Jan	1	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0.3	1
4-Jan	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	0	0	1	3	2	2	6	4	4	3	1.3	6
5-Jan	2	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	2
6-Jan	0	0	0	0	0	Z	0	0	0	0	0	1	1	2	5	7	6	2	1	1	1	0	0	0	1.2	7
7-Jan	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
8-Jan	0	Z	0	0	0	0	0	1	2	3	3	4	7	5	7	6	3	2	1	1	0	0	0	0	2.0	7
9-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
10-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	3	11	3	3	2	1	1	1	1	1	1.3	11
11-Jan	4	4	5	5	Z	6	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.4	6
12-Jan	0	0	0	0	0	Z	0	1	4	4	3	2	3	3	3	3	4	1	2	1	1	1	3	1	1.8	4
13-Jan	Z	1	1	1	1	1	1	1	1	1	M	2	4	8	6	7	6	4	2	2	2	2	3	3	2.6	8
14-Jan	3	Z	1	2	7	5	7	10	6	5	4	6	6	3	2	2	2	1	1	1	0	0	0	1	3.3	10
15-Jan	0	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
16-Jan	0	0	0	Z	0	2	1	2	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	3	0.7	3
17-Jan	4	3	2	1	Z	1	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	0.8	4
18-Jan	1	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	1	0	0.6	1
19-Jan	Z	0	0	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.1	0
20-Jan	1	Z	0	0	1	1	2	3	3	1	1	1	1	1	2	3	1	0	0	0	0	1	0	0	1.0	3
21-Jan	0	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
22-Jan	0	0	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
23-Jan	0	0	0	0	Z	0	0	0	1	1	2	10	12	13	14	5	3	3	3	2	2	3	3	3	3.4	14
24-Jan	2	3	5	10	24	Z	5	7	9	4	2	3	4	5	5	6	3	1	1	1	1	1	1	1	4.5	24
25-Jan	Z	1	1	2	2	1	2	1	2	2	2	5	7	8	10	16	11	5	3	4	4	3	2	1	4.1	16
26-Jan	1	Z	1	1	1	1	1	1	1	1	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0.7	2
27-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
28-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	3	4	2	2	2	1	0	0	0	0	0.8	4
29-Jan	0	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
30-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.1	1
31-Jan	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

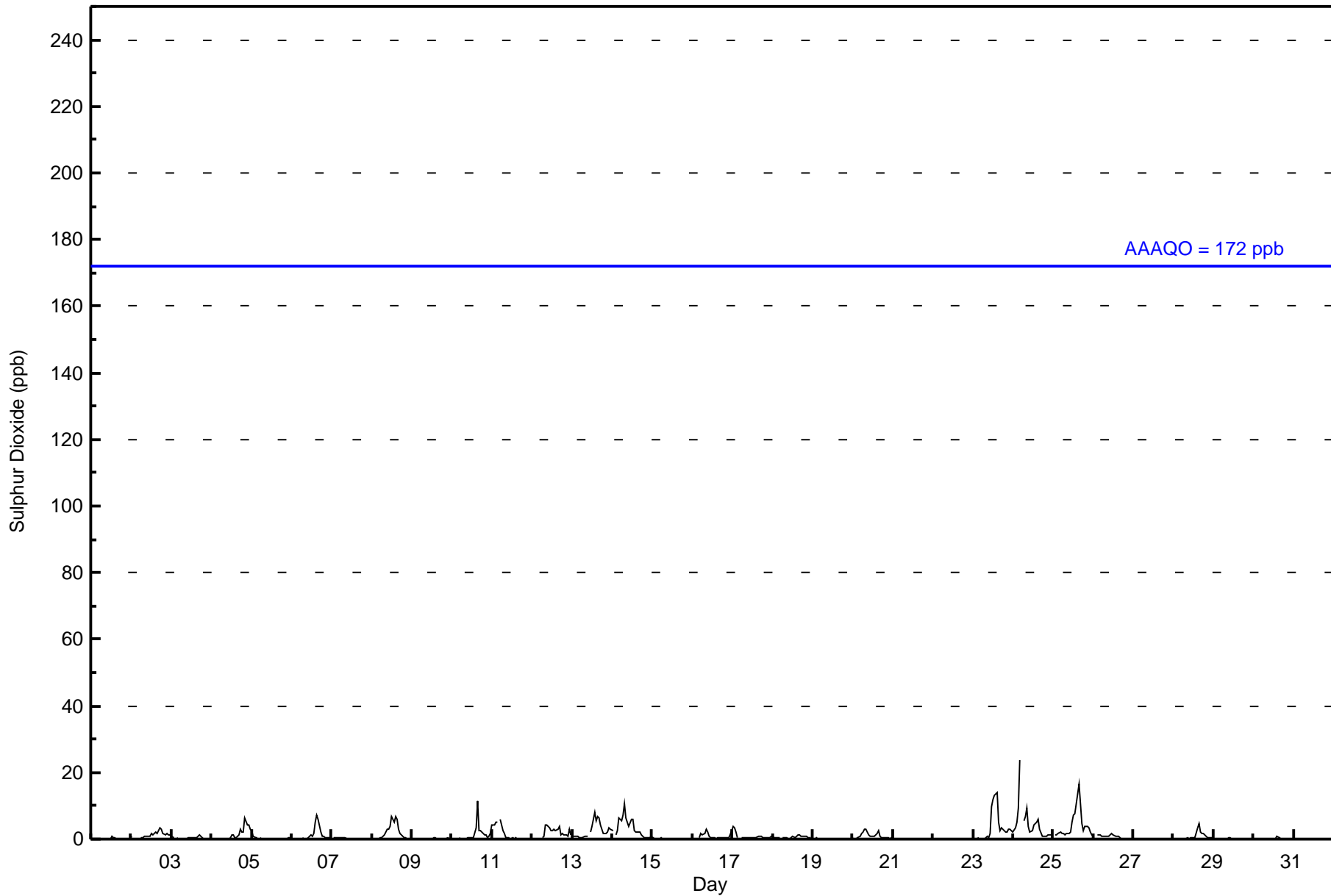
0.8	0.6	0.7	0.9	1.4	0.8	0.8	1.0	1.1	0.9	0.8	1.3	1.7	1.8	2.2	2.5	1.7	1.1	0.8	0.7	0.8	0.7	0.7	0.7	0.7	Diurnal Average
4	4	5	10	24	6	7	10	9	5	4	10	12	13	14	16	11	5	3	4	6	4	4	3	Diurnal Maximum	

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 (SO₂) - ppb
Fort McKay - Bertha Ganter - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay - Bertha Ganter - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	701	99.01	99.01
11 - 20	6	0.85	99.86
21 - 60	1	0.14	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Fort McKay - Bertha Ganter - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	104	6	0	0	2	2	8	89	224	52	39	40	49	30	20	36	701
11 - 20	0	0	0	0	0	0	1	2	3	0	0	0	0	0	0	0	6
21 - 60	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	104	6	0	0	2	2	9	91	228	52	39	40	49	30	20	36	708

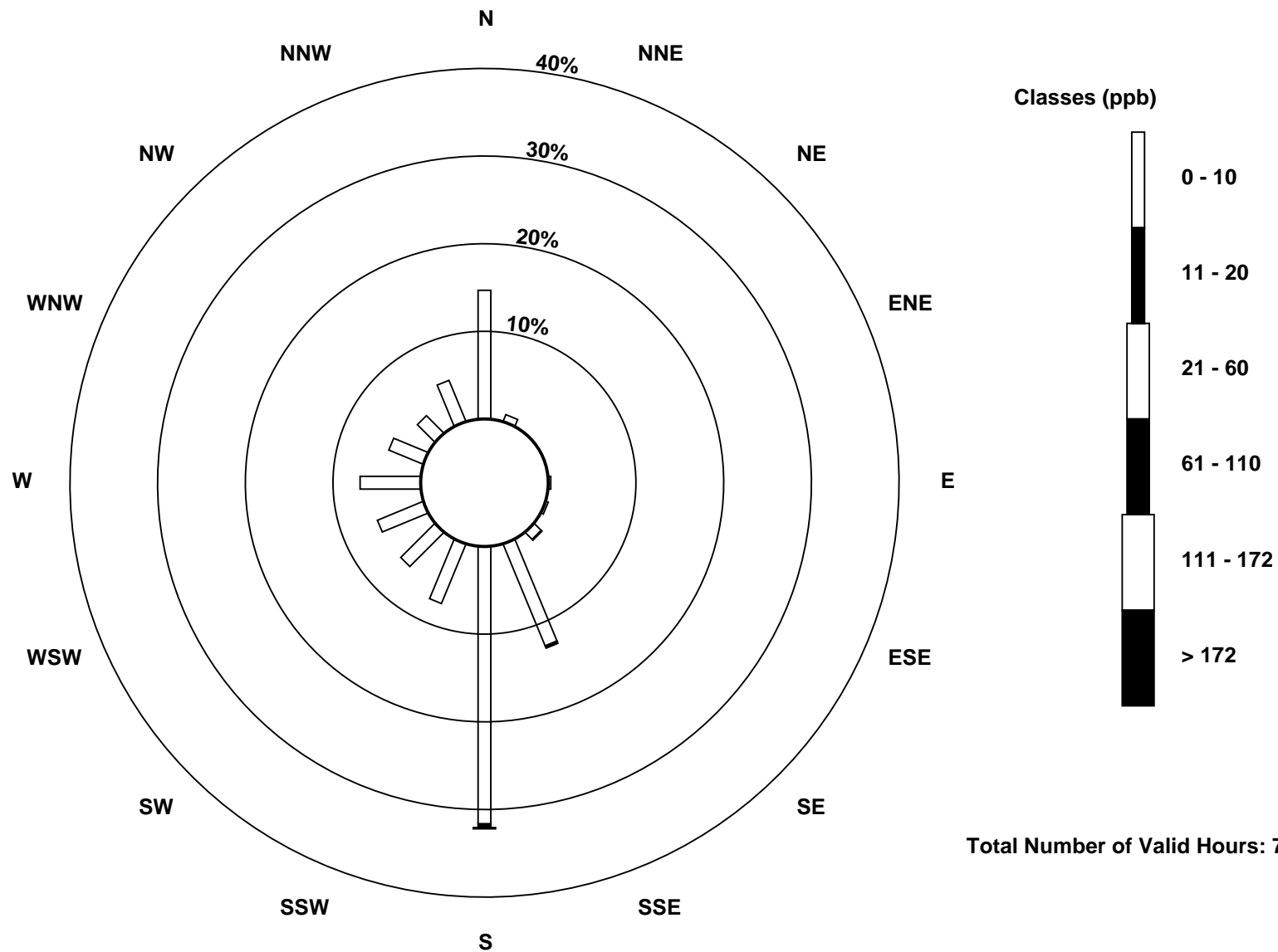
Total Number of Valid Hours: 708

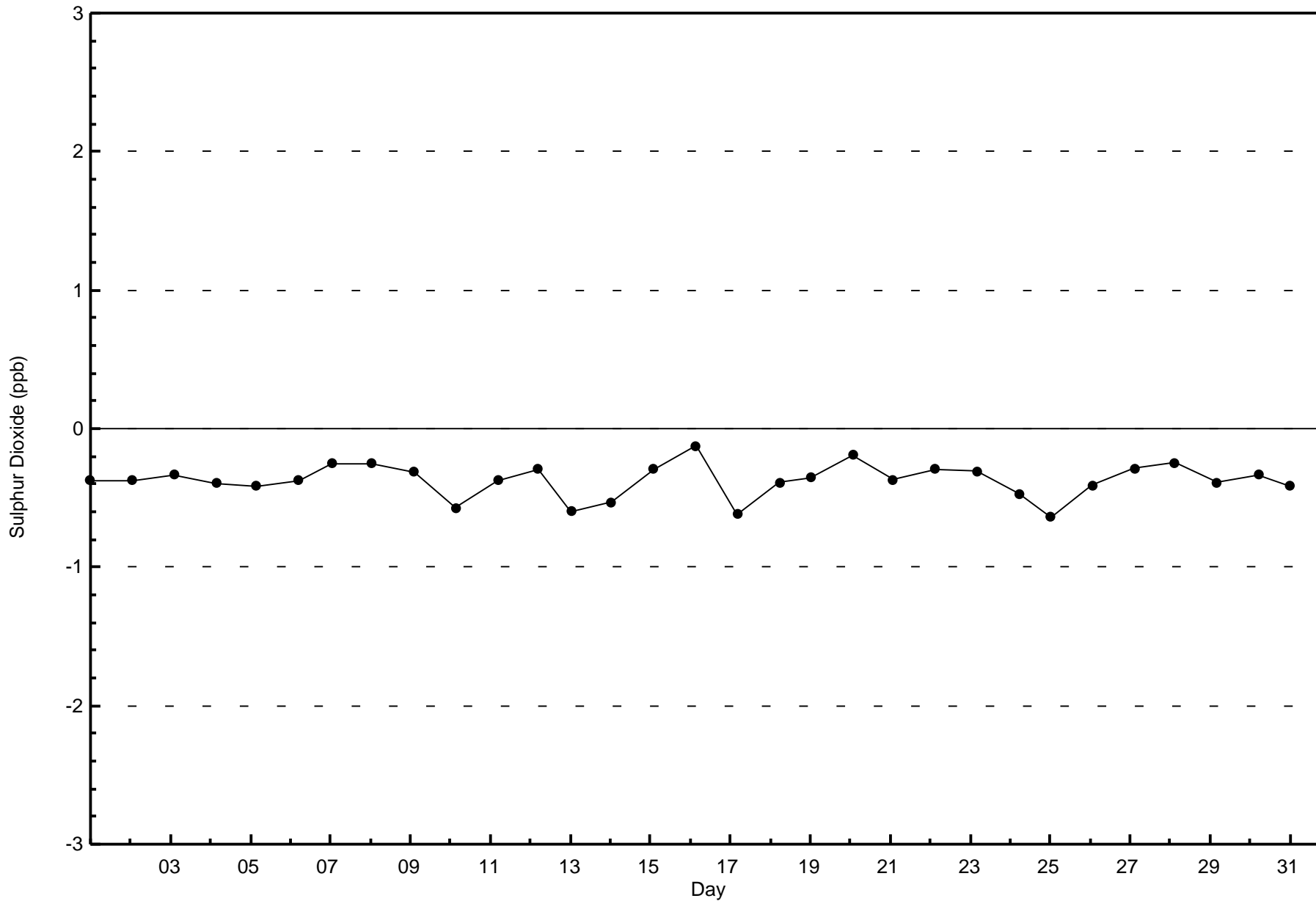
Total Number of Hours: 744

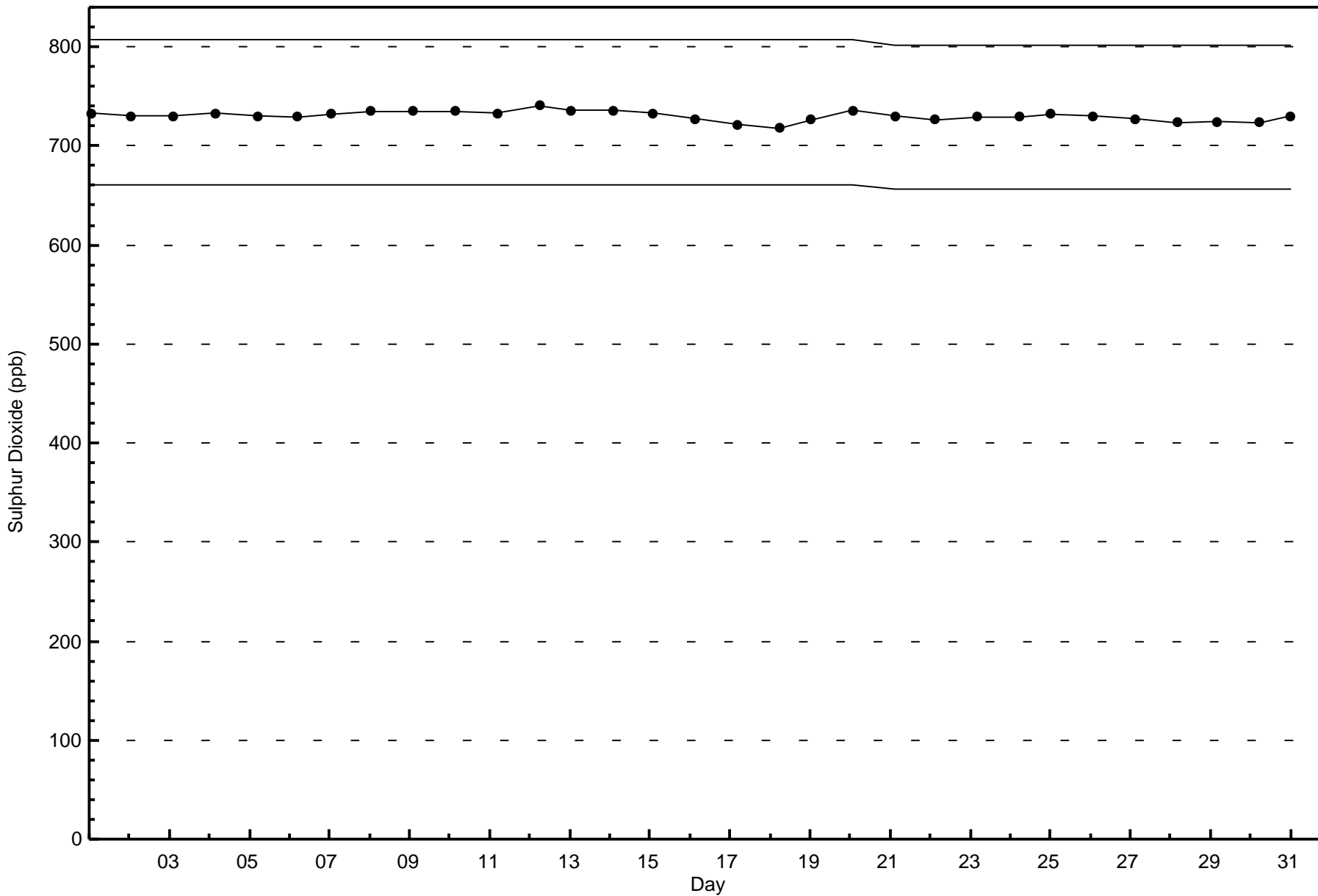


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Sulphur Dioxide (SO₂) - ppb
Fort McKay - Bertha Ganter (AMS 1)









Wood Buffalo Environmental Association

Summary of Hour Averages

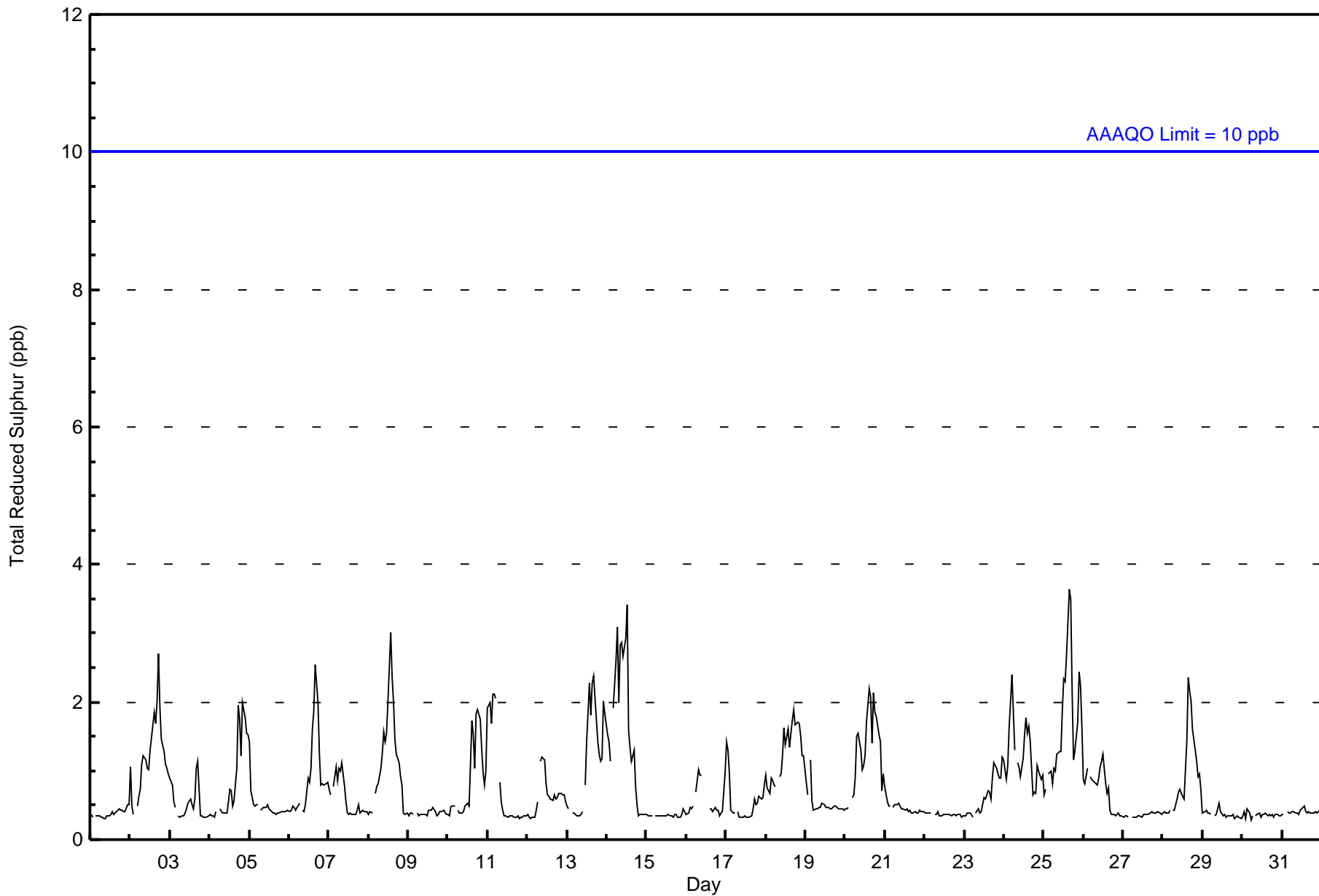
Total Reduced Sulphur (TRS) - ppb
Fort McKay - Bertha Ganter - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4 ppb on Jan 25 16:00 Maximum Daily Average: 1.7 ppb on Jan 25																	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 Jan 30 06:00 Minimum Daily Average: 0.4 ppb on Jan 15 Maximum Diurnal Average: 1.0 ppb at hour 16 Minimum Diurnal Average: 0.6 ppb at hour 3 Monthly Average: 0.8 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P 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-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.4	1	
2-Jan	1	0	0	Z	0	1	1	1	1	1	1	1	1	1	2	2	2	3	2	1	1	1	1	1	1.2	3	
3-Jan	1	1	1	0	Z	0	0	0	0	0	0	1	1	1	0	1	1	1	0	0	0	0	0	0	0.5	1	
4-Jan	0	0	0	0	0	Z	0	0	0	0	0	1	1	1	0	1	1	2	2	1	2	2	2	2	0.9	2	
5-Jan	1	1	1	0	1	1	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1	
6-Jan	0	0	0	0	0	0	1	Z	0	0	1	1	1	1	2	2	3	2	1	1	1	1	1	1	0.9	3	
7-Jan	1	1	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0.6	1	
8-Jan	0	0	0	Z	1	1	1	1	1	2	1	2	2	3	2	2	1	1	1	1	1	0	0	0	1.1	3	
9-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0	
10-Jan	0	0	0	0	0	Z	0	0	0	0	0	1	1	0	2	2	1	2	2	2	1	1	1	1	0.9	2	
11-Jan	2	2	2	2	2	2	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	2	
12-Jan	0	0	0	0	0	0	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1	
13-Jan	0	0	Z	0	0	0	0	0	0	0	M	1	1	2	2	2	2	2	1	1	1	1	2	2	1.2	2	
14-Jan	2	1	1	Z	2	3	3	2	3	3	3	3	3	2	1	1	1	1	1	0	0	0	0	0	1.6	3	
15-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0	
16-Jan	0	0	0	0	0	Z	1	1	1	1	C	C	C	C	0	0	0	0	0	0	0	0	0	1	0.5	1	
17-Jan	1	1	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0.6	1	
18-Jan	1	1	1	1	1	1	1	Z	1	1	1	2	1	2	1	2	2	2	2	2	2	2	1	1	1	1.3	2
19-Jan	1	1	Z	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1	
20-Jan	0	0	0	Z	1	1	1	2	2	1	1	1	1	2	2	2	1	2	2	2	2	2	1	1	1	1.3	2
21-Jan	1	1	0	0	Z	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1	
22-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0	
23-Jan	0	0	0	0	0	0	Z	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1	
24-Jan	1	1	1	2	2	2	1	Z	1	1	1	1	2	2	2	2	2	1	1	1	1	1	1	1	1.2	2	
25-Jan	1	1	Z	1	1	1	1	1	1	1	1	2	2	2	3	4	3	2	1	1	2	2	2	2	1.7	4	
26-Jan	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.7	1	
27-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0	
28-Jan	0	0	0	0	0	Z	0	0	1	1	1	1	1	1	1	2	2	2	2	2	1	1	1	1	0.9	2	
29-Jan	0	0	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
30-Jan	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0	
31-Jan	0	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	
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																											



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	695	98.16	98.16
3 - 4	13	1.84	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
Fort McKay - Bertha Ganter - January 2017

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	105	6	0	0	2	1	9	88	214	53	41	40	47	29	21	39	695
3 - 4	0	0	0	0	0	0	0	1	10	2	0	0	0	0	0	0	13
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
Totals	105	6	0	0	2	1	9	89	224	55	41	40	47	29	21	39	708

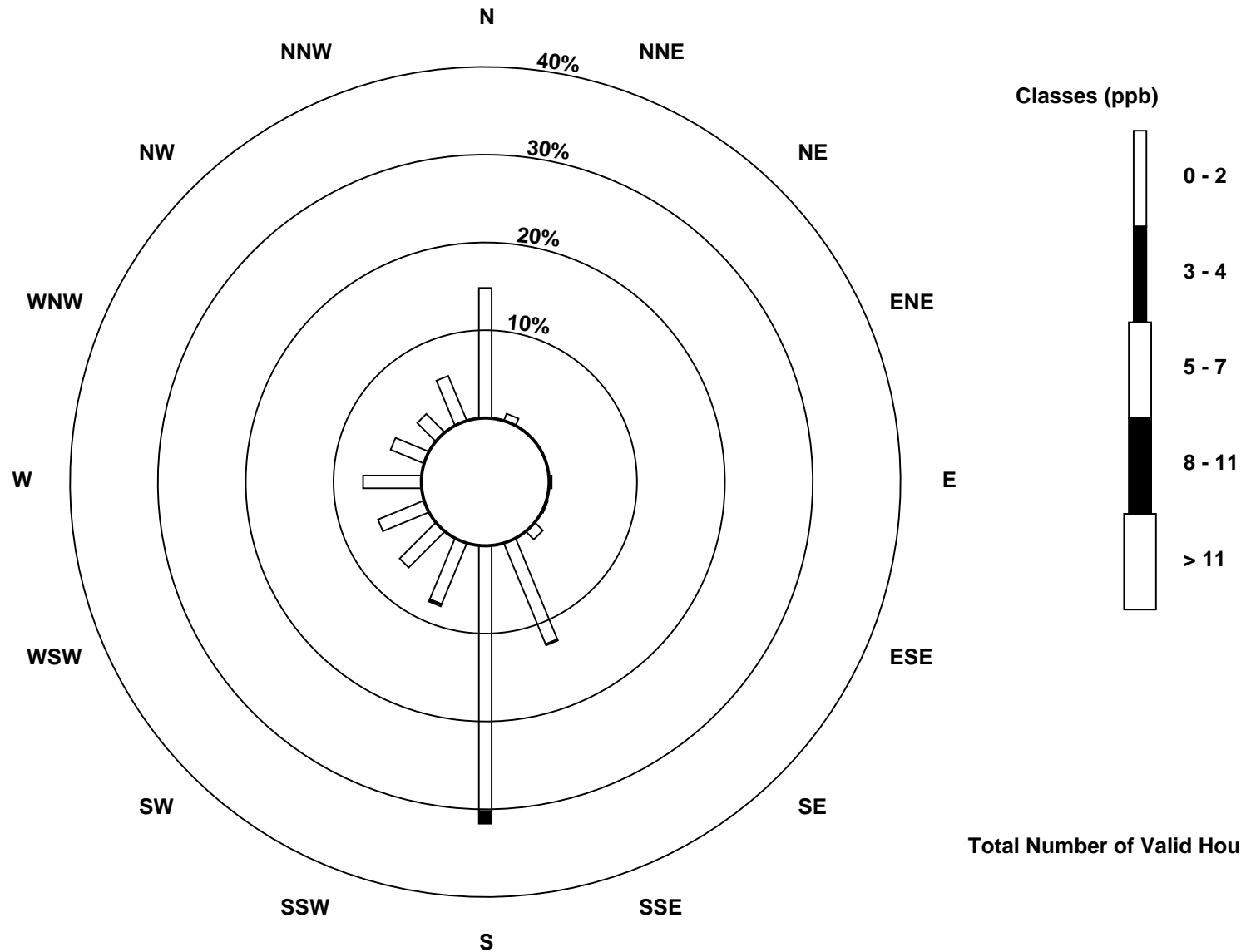
Total Number of Valid Hours: 708

Total Number of Hours: 744

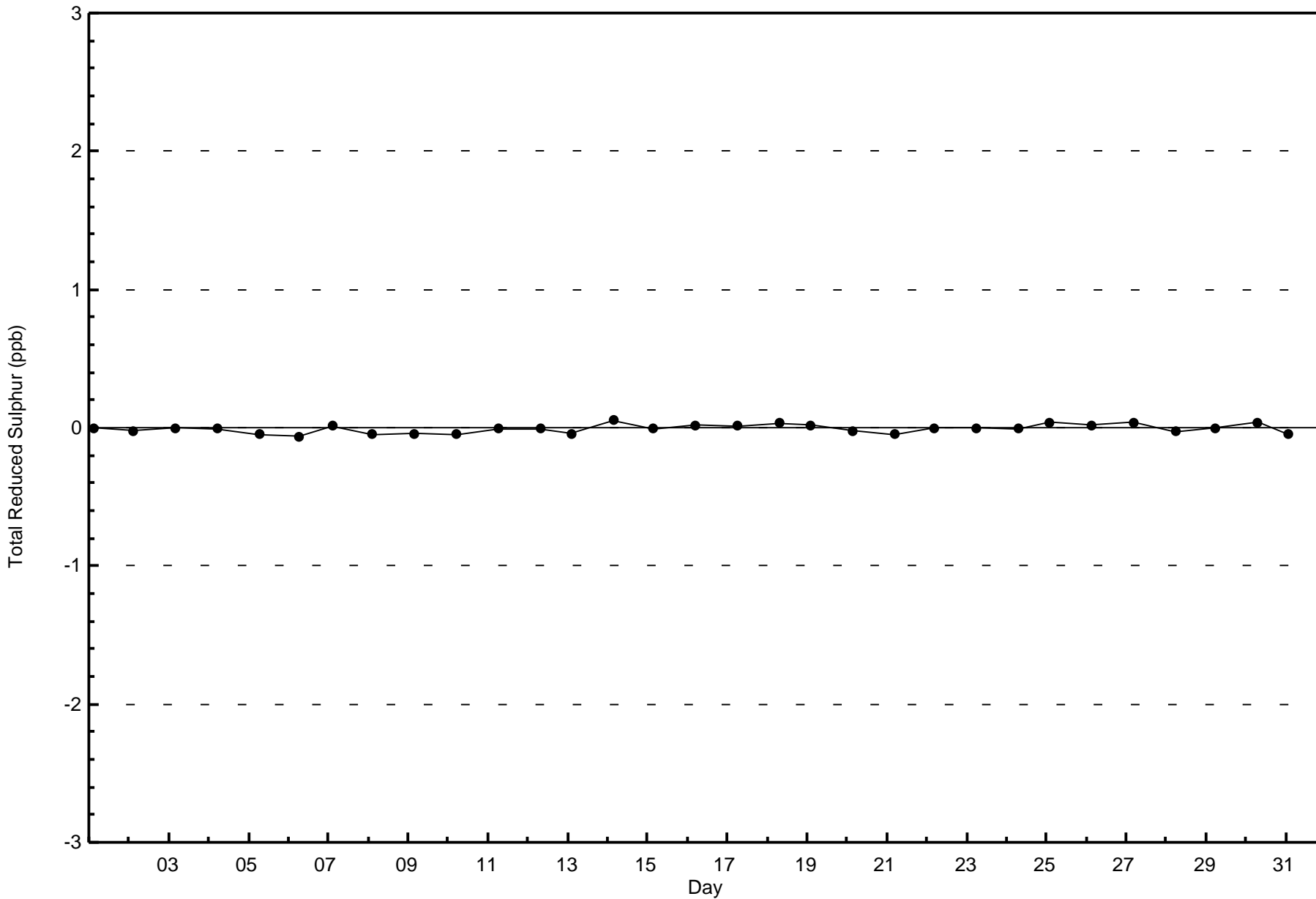


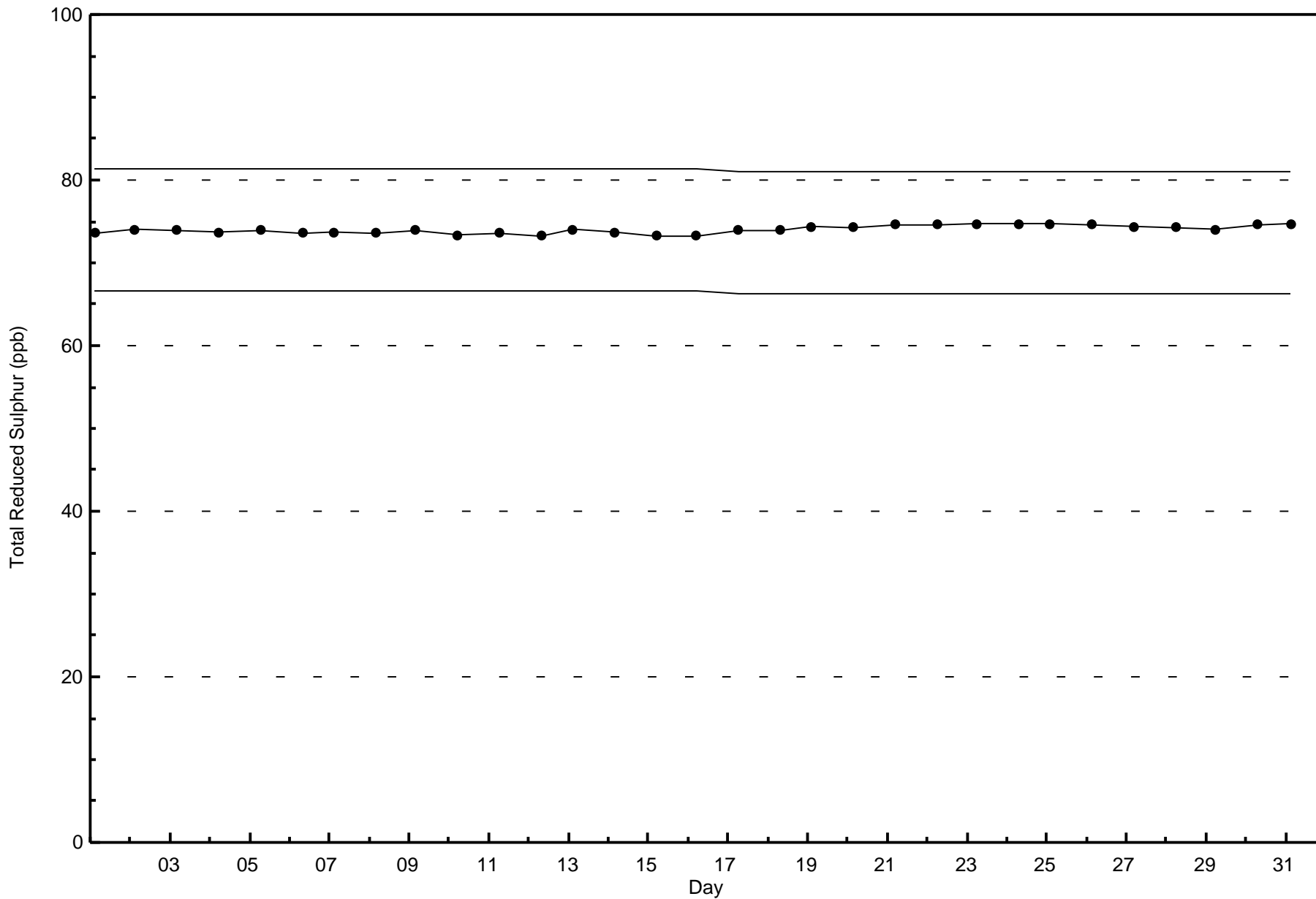
Wood Buffalo Environmental Association
Wind Rose Jan 2017

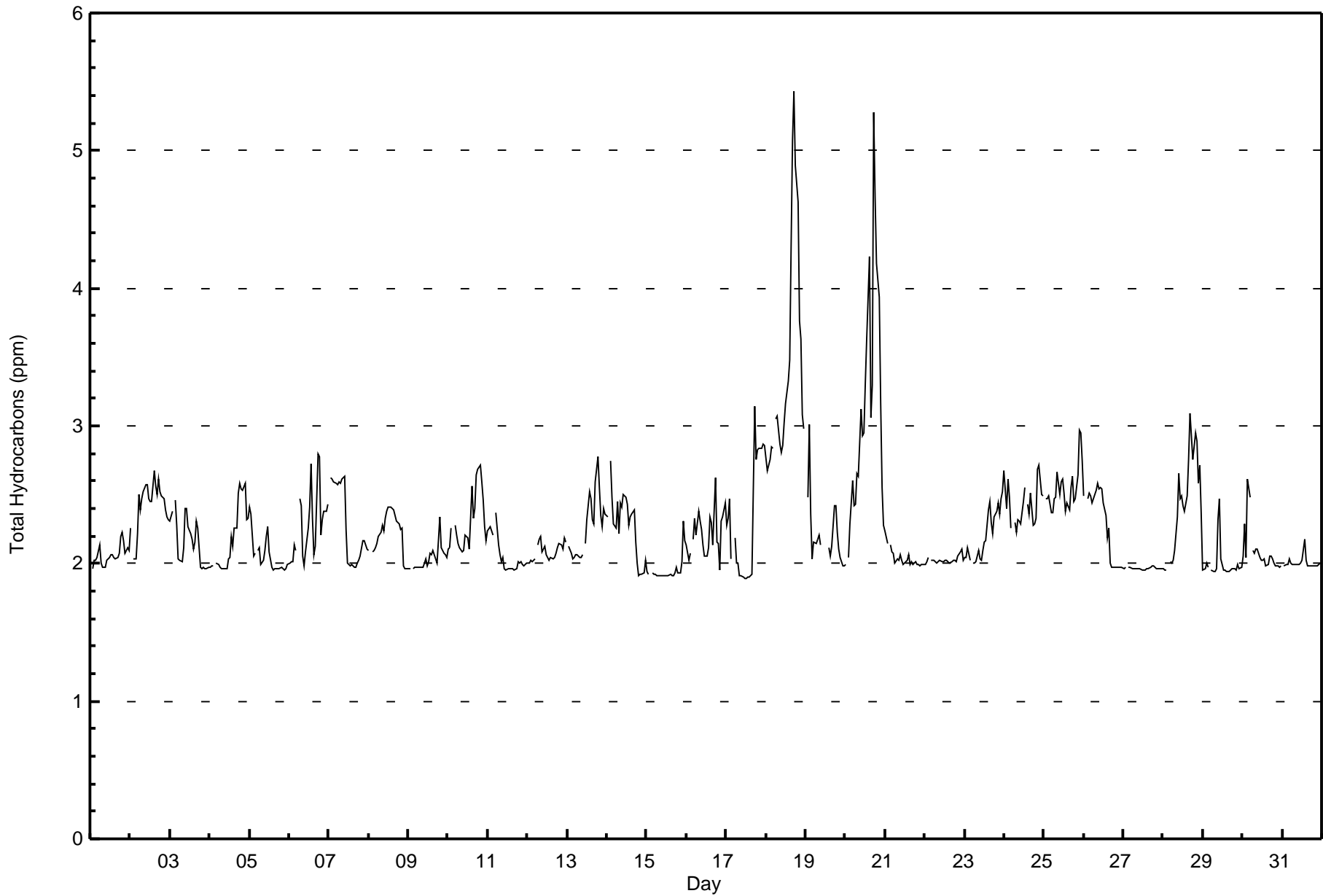
Total Reduced Sulphur (TRS) - ppb
Fort McKay - Bertha Ganter (AMS 1)



Total Number of Valid Hours: 708









Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	293	41.44	41.44
2.1 - 3.0	389	55.02	96.46
3.1 - 10.0	25	3.54	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
Fort McKay - Bertha Ganter - January 2017

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	60	3	0	0	2	1	5	12	32	24	23	34	43	17	13	24	293
2.1 - 3.0	41	3	0	0	0	0	4	75	186	24	15	5	6	13	7	10	389
3.1 - 10.0	3	0	0	0	0	1	0	3	10	4	1	1	0	0	0	2	25
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	104	6	0	0	2	2	9	90	228	52	39	40	49	30	20	36	707

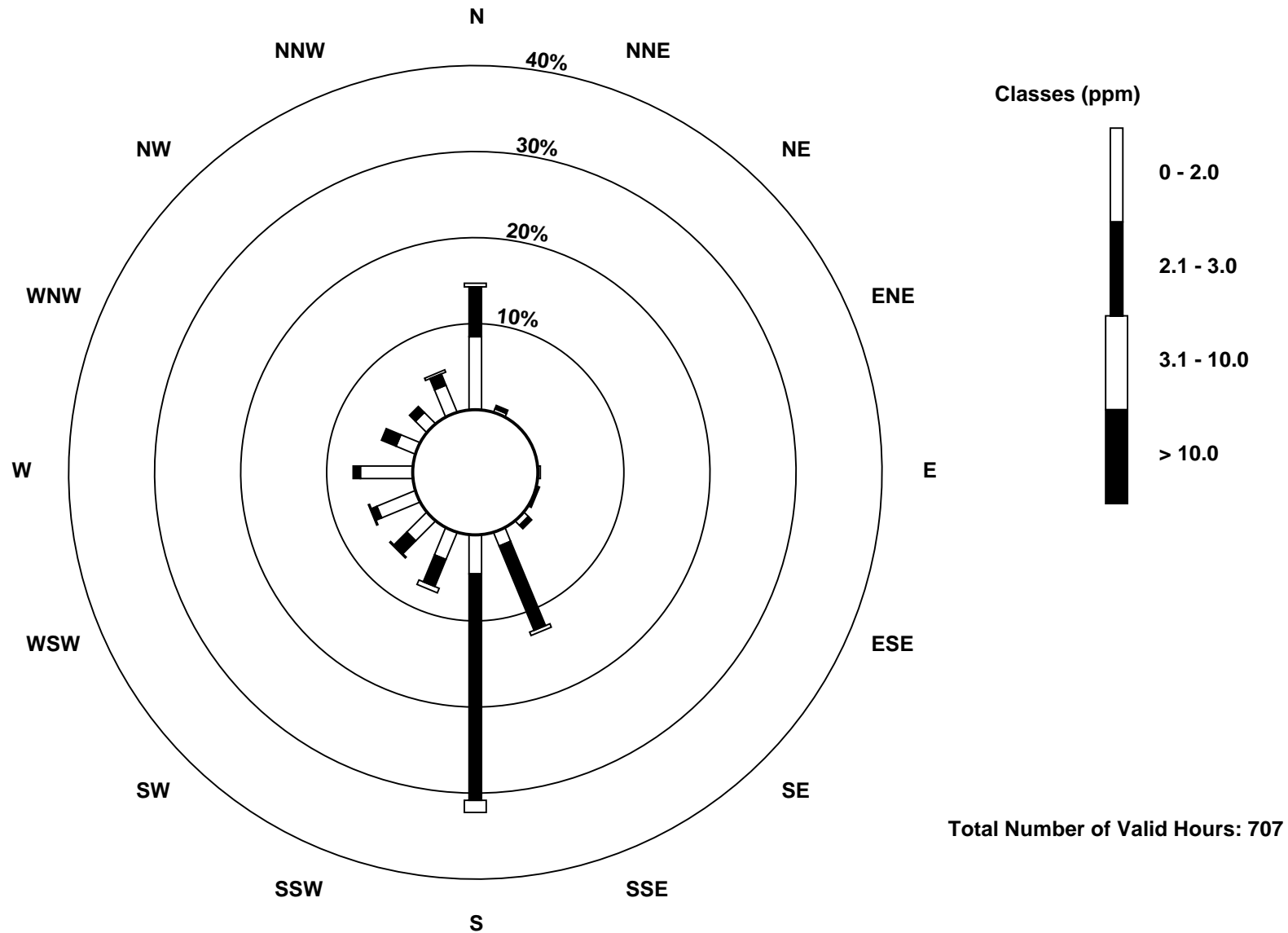
Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

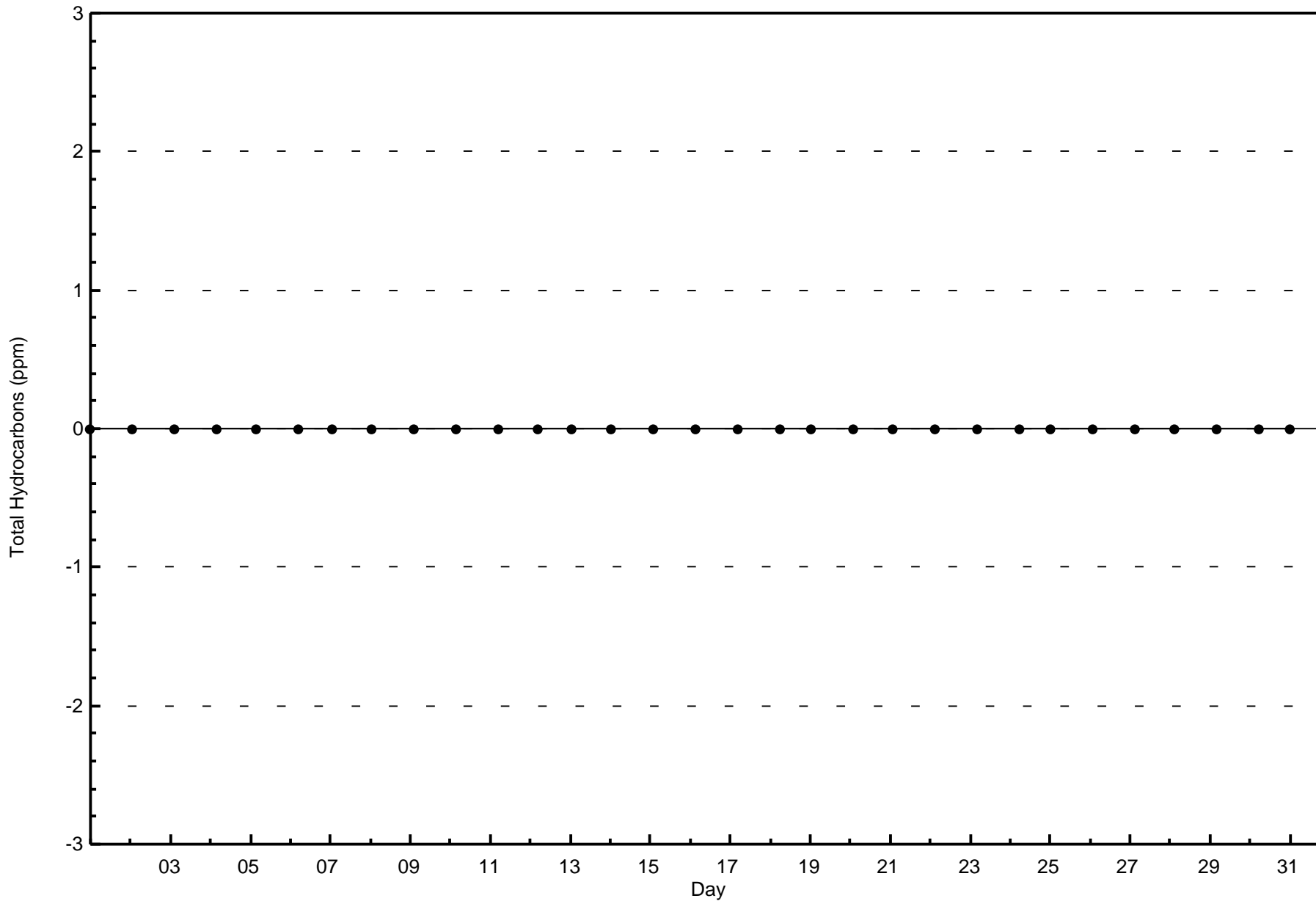
Total Hydrocarbons (THC) - ppm
Fort McKay - Bertha Ganter (AMS 1)

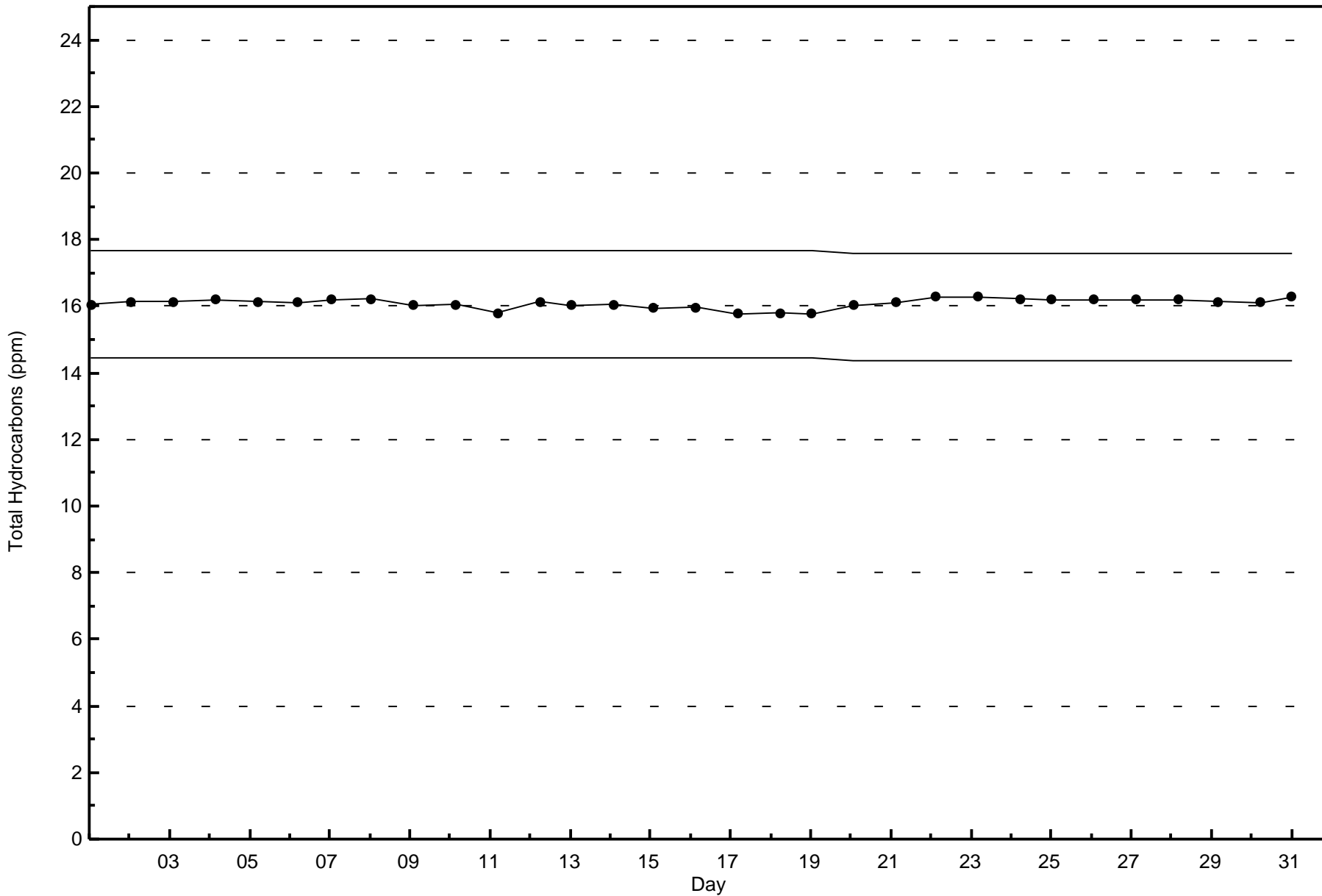




Wood Buffalo Environmental Association
Zero Responses

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







Wood Buffalo Environmental Association
Summary of Hour Averages

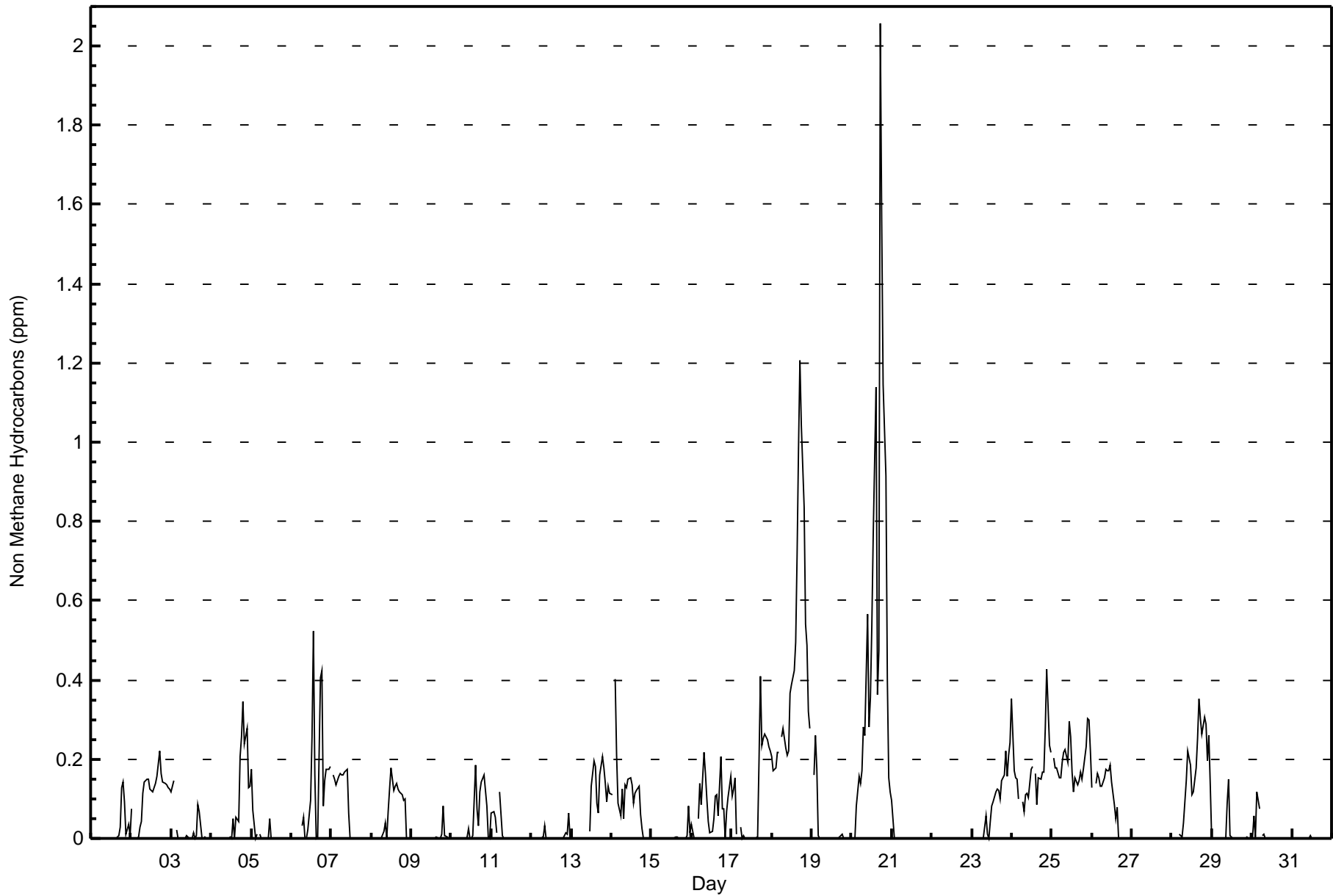
Non Methane Hydrocarbons (NMHC) - ppm
Fort McKay - Bertha Ganter - January 2017

Maximum Value: 2.057 ppm on Jan 20 18:00		Maximum Daily Average: 0.518 ppm on Jan 20		Hours in Service: 744																							
Minimum Value: 0.000 ppm on Jan 1 02:00		Minimum Daily Average: 0.000 ppm on Jan 22		Hours of Data: 707																							
Maximum Diurnal Average: 0.193 ppm at hour 18		Minimum Diurnal Average: 0.038 ppm at hour 6		Hours of Missing Data: 37																							
Monthly Average: 0.085 ppm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.1 P ₉₀ = 0.2 P ₉₉ = 0.9		Hours of Calibration: 35																							
				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-Jan	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	0.007	0.030	0.130	0.142	0.094	0.010	0.036	0.009	0.020	0.142	
2-Jan	0.074	Z	0.000	0.000	0.002	0.027	0.041	0.113	0.143	0.149	0.151	0.125	0.122	0.117	0.139	0.157	0.187	0.221	0.165	0.144	0.140	0.137	0.130	0.124	0.113	0.221	
3-Jan	0.117	0.144	Z	0.023	0.000	0.000	0.000	0.000	0.000	0.008	0.004	0.001	0.001	0.015	0.000	0.009	0.087	0.069	0.000	0.000	0.002	0.000	0.000	0.000	0.021	0.144	
4-Jan	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.048	0.000	0.055	0.044	0.206	0.255	0.344	0.237	0.278	0.129	0.131	0.075	0.344	
5-Jan	0.174	0.071	0.000	0.011	Z	0.012	0.000	0.000	0.000	0.000	0.000	0.051	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.014	0.174		
6-Jan	0.000	0.000	0.000	0.000	0.000	Z	0.033	0.054	0.000	0.000	0.020	0.095	0.257	0.524	0.162	0.000	0.002	0.408	0.423	0.081	0.147	0.173	0.173	0.182	0.119	0.524	
7-Jan	Z	0.160	0.150	0.136	0.158	0.165	0.160	0.160	0.168	0.175	0.063	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	0.065	0.175	
8-Jan	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.018	0.039	0.000	0.066	0.123	0.177	0.121	0.131	0.140	0.124	0.118	0.111	0.098	0.098	0.000	0.000	0.000	0.059	0.177	
9-Jan	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	0.003	0.000	0.000	0.000	0.011	0.083	0.008	0.002	0.000	0.005	0.083	
10-Jan	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.003	0.026	0.000	0.000	0.008	0.184	0.076	0.030	0.118	0.141	0.161	0.122	0.083	0.005	0.000	0.042	0.184	
11-Jan	0.065	0.068	0.055	0.013	Z	0.119	0.006	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	0.014	0.119	
12-Jan	0.000	0.000	0.000	0.000	0.000	Z	0.005	0.003	0.031	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.014	0.011	0.062	0.000	0.006	0.062	
13-Jan	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	M	0.019	0.131	0.197	0.182	0.090	0.064	0.160	0.206	0.176	0.140	0.092	0.130	0.115	0.077	0.206
14-Jan	0.110	Z	0.404	0.210	0.090	0.058	0.126	0.049	0.136	0.129	0.151	0.154	0.135	0.090	0.112	0.121	0.131	0.061	0.025	0.000	0.000	0.000	0.000	0.000	0.100	0.404	
15-Jan	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	0.004	0.002	0.000	0.000	0.000	0.000	0.000	0.007	0.081	0.014	0.005	0.081	
16-Jan	0.036	0.000	0.000	Z	0.049	0.140	0.087	0.216	0.162	0.099	0.044	0.016	0.017	0.050	0.108	0.109	0.056	0.206	0.077	0.076	0.000	0.068	0.103	0.157	0.081	0.216	
17-Jan	0.107	0.123	0.153	0.010	Z	0.029	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.197	0.408	0.234	0.252	0.262	0.249	0.230	0.221	0.108	0.408	
18-Jan	0.207	0.170	0.177	0.216	0.219	Z	0.257	0.278	0.226	0.209	0.221	0.366	0.388	0.424	0.496	0.716	0.982	1.207	1.041	0.838	0.540	0.487	0.320	0.278	0.446	1.207	
19-Jan	Z	0.161	0.259	0.176	0.009	0.000	0.000	0.000	0.000	0.000	0.000	C	C	C	C	0.000	0.000	0.000	0.007	0.011	0.000	0.000	0.000	0.000	0.033	0.259	
20-Jan	0.000	Z	0.000	0.081	0.156	0.139	0.170	0.281	0.258	0.565	0.281	0.355	0.536	0.768	1.140	0.363	0.475	2.057	1.558	1.145	0.915	0.402	0.152	0.117	0.518	2.057	
21-Jan	0.097	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	0.004	0.097	
22-Jan	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
23-Jan	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.057	0.012	0.000	0.041	0.083	0.093	0.118	0.125	0.123	0.098	0.147	0.159	0.219	0.156	0.209	0.242	0.082	0.242	
24-Jan	0.352	0.170	0.153	0.148	0.101	Z	0.094	0.067	0.112	0.113	0.102	0.174	0.180	DF	0.162	0.084	0.153	0.149	0.167	0.168	0.276	0.426	0.237	0.219	0.173	0.426	
25-Jan	Z	0.202	0.179	0.179	0.154	0.154	0.191	0.216	0.224	0.191	0.296	0.167	0.117	0.153	0.134	0.145	0.169	0.151	0.174	0.233	0.301	0.300	0.221	0.196	0.301	0.301	
26-Jan	0.127	Z	0.138	0.164	0.152	0.133	0.131	0.152	0.176	0.172	0.172	0.186	0.142	0.085	0.049	0.078	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.089	0.186	
27-Jan	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
28-Jan	0.000	0.000	0.000	Z	0.011	0.006	0.005	0.038	0.144	0.221	0.201	0.185	0.112	0.117	0.179	0.254	0.352	0.302	0.262	0.307	0.289	0.197	0.259	0.135	0.156	0.352	
29-Jan	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.089	0.149	0.007	0.002	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.149	
30-Jan	0.004	0.058	0.003	0.119	0.074	Z	0.007	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.012	0.119	
31-Jan	Z	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	0.006	0.006
		0.059	0.051	0.064	0.057	0.045	0.038	0.042	0.054	0.061	0.069	0.067	0.072	0.082	0.096	0.107	0.081	0.102	0.193	0.165	0.140	0.121	0.099	0.082	0.070	Diurnal Average	
		0.352	0.202	0.404	0.216	0.219	0.165	0.257	0.281	0.258	0.565	0.296	0.366	0.536	0.768	1.140	0.716	0.982	2.057	1.558	1.145	0.915	0.487	0.320	0.278	Diurnal Maximum	
Z - zerospan		C - Calibration			M - Maintenance			DF - DAS Failure																			



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	374	52.90	52.90
0.006 - 0.05	60	8.49	61.39
0.06 - 0.1	121	17.11	78.50
> 0.1	152	21.50	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	85	5	0	0	2	1	5	22	54	27	27	35	44	24	14	29	374
0.006 - 0.05	6	0	0	0	0	0	1	13	23	7	2	2	2	1	2	1	60
0.06 - 0.1	5	0	0	0	0	0	2	26	71	8	4	2	1	2	0	0	121
> 0.1	8	1	0	0	0	1	1	29	80	10	6	1	2	3	4	6	152
Totals	104	6	0	0	2	2	9	90	228	52	39	40	49	30	20	36	707

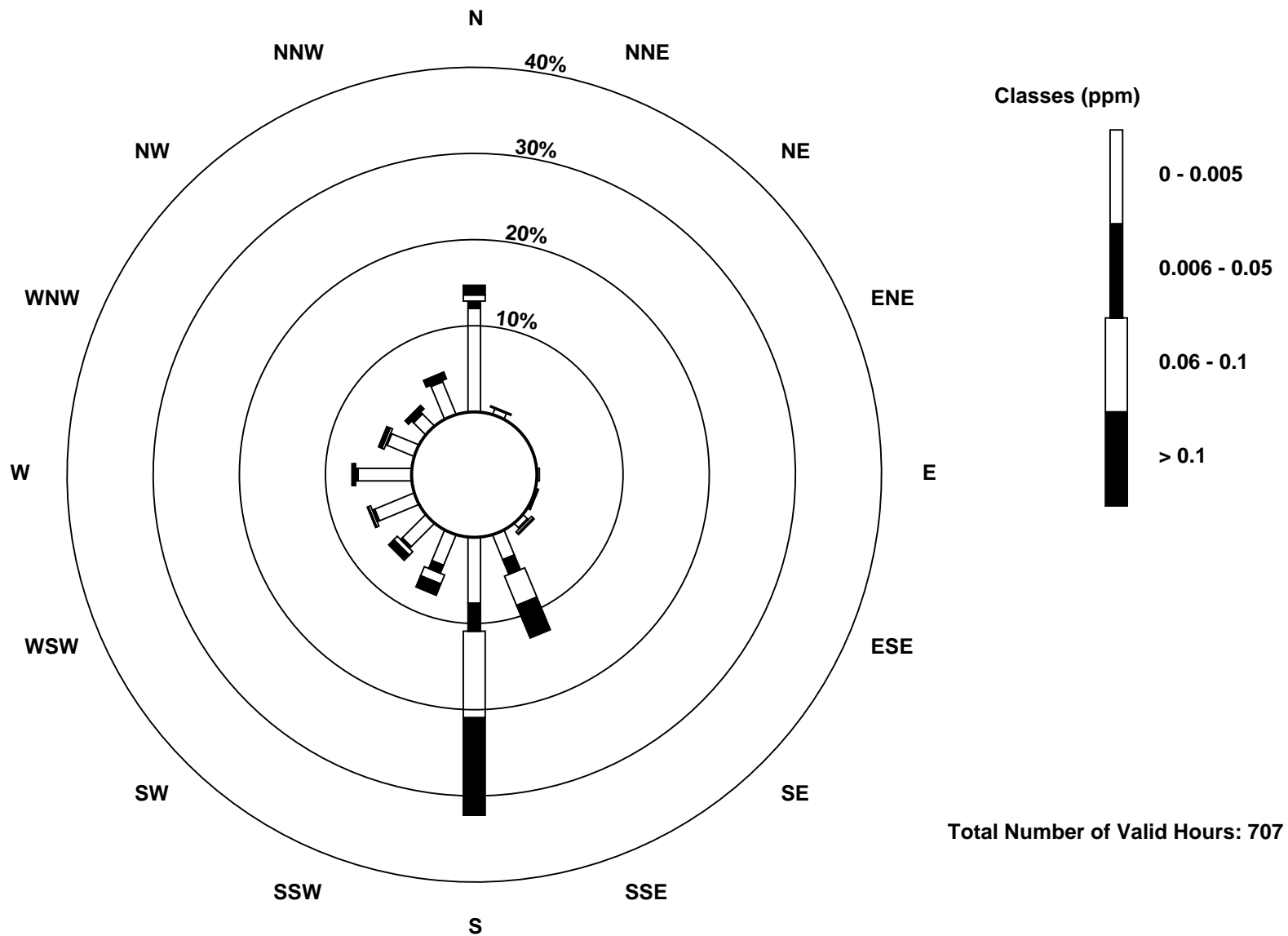
Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

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

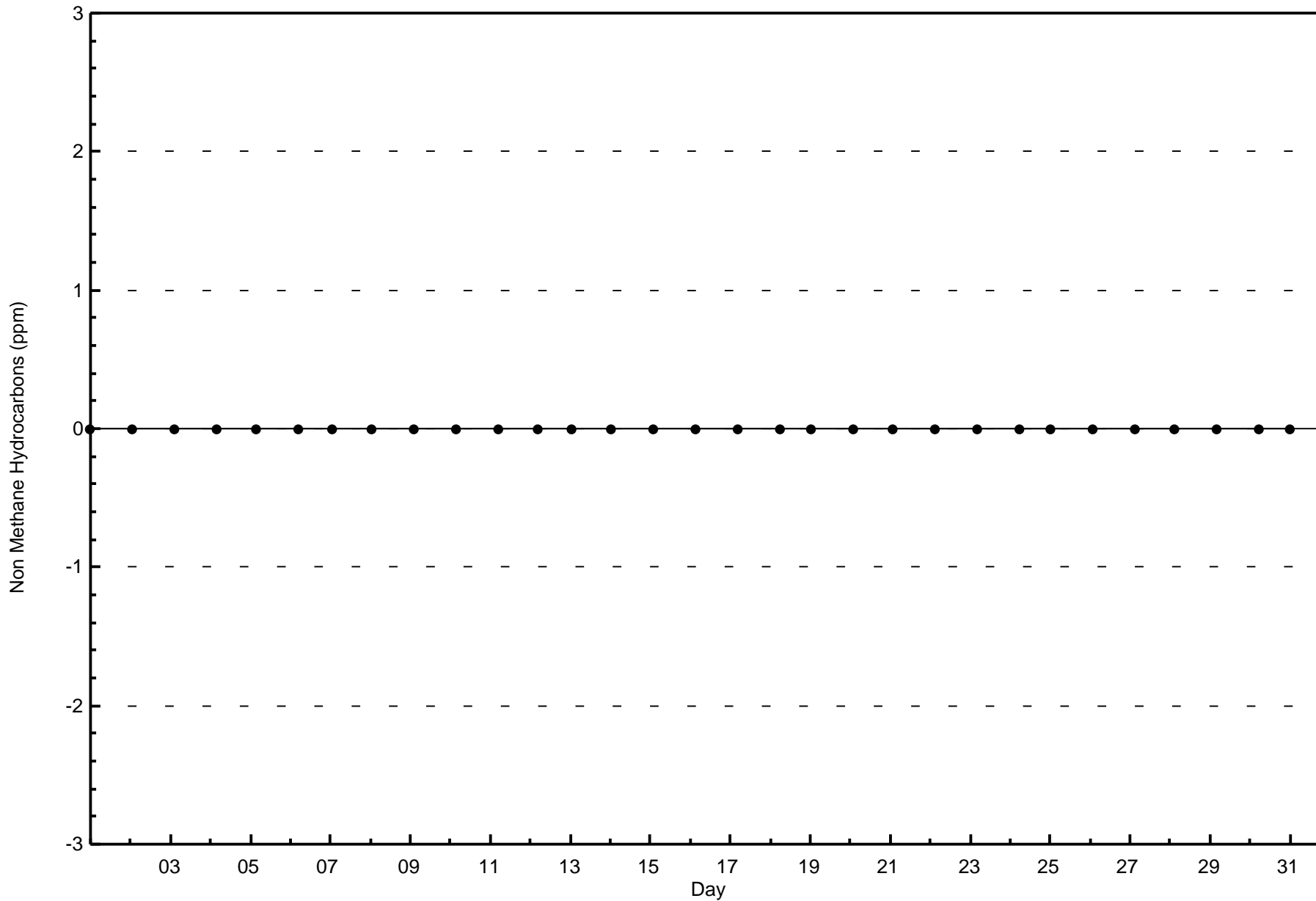


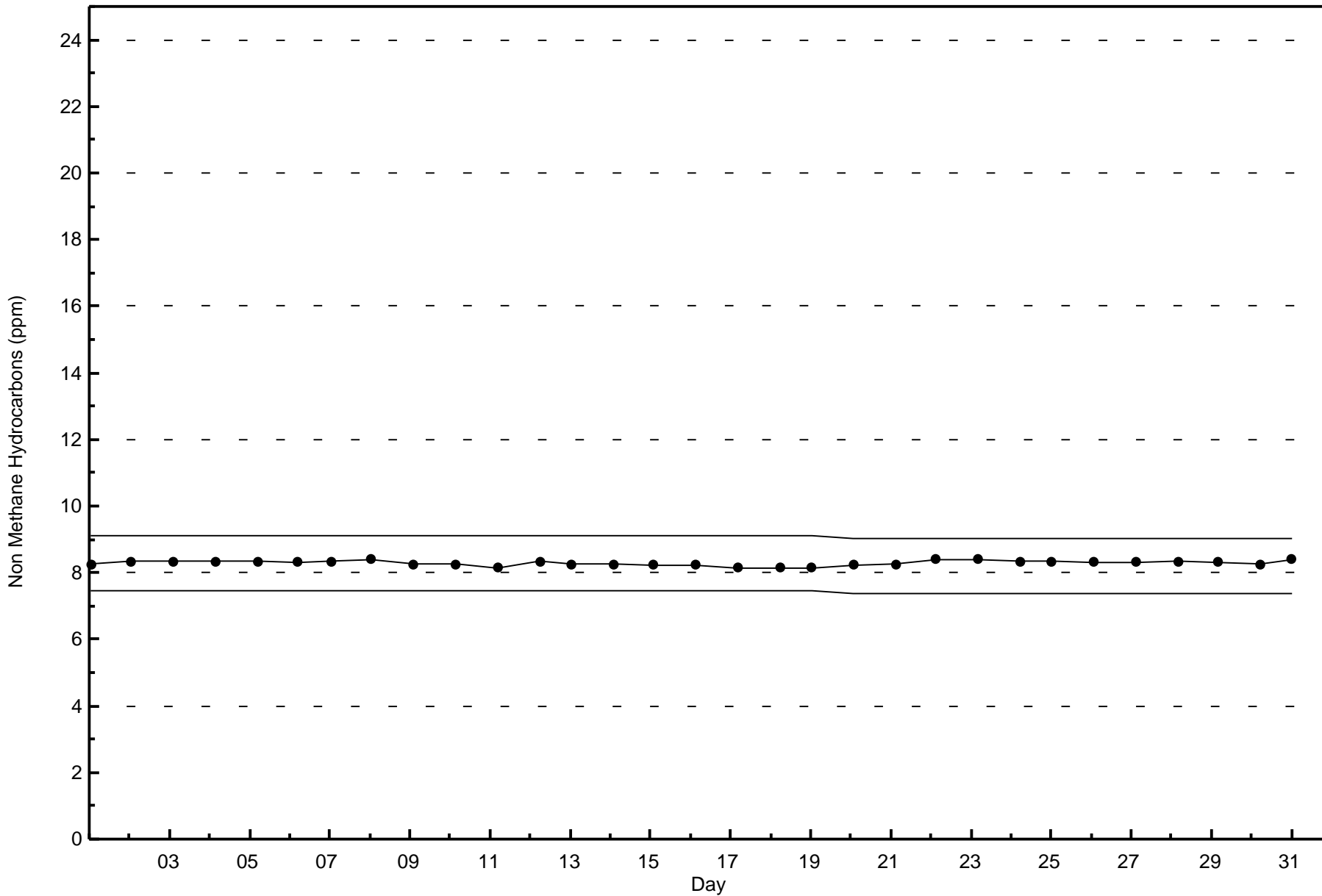
Total Number of Valid Hours: 707

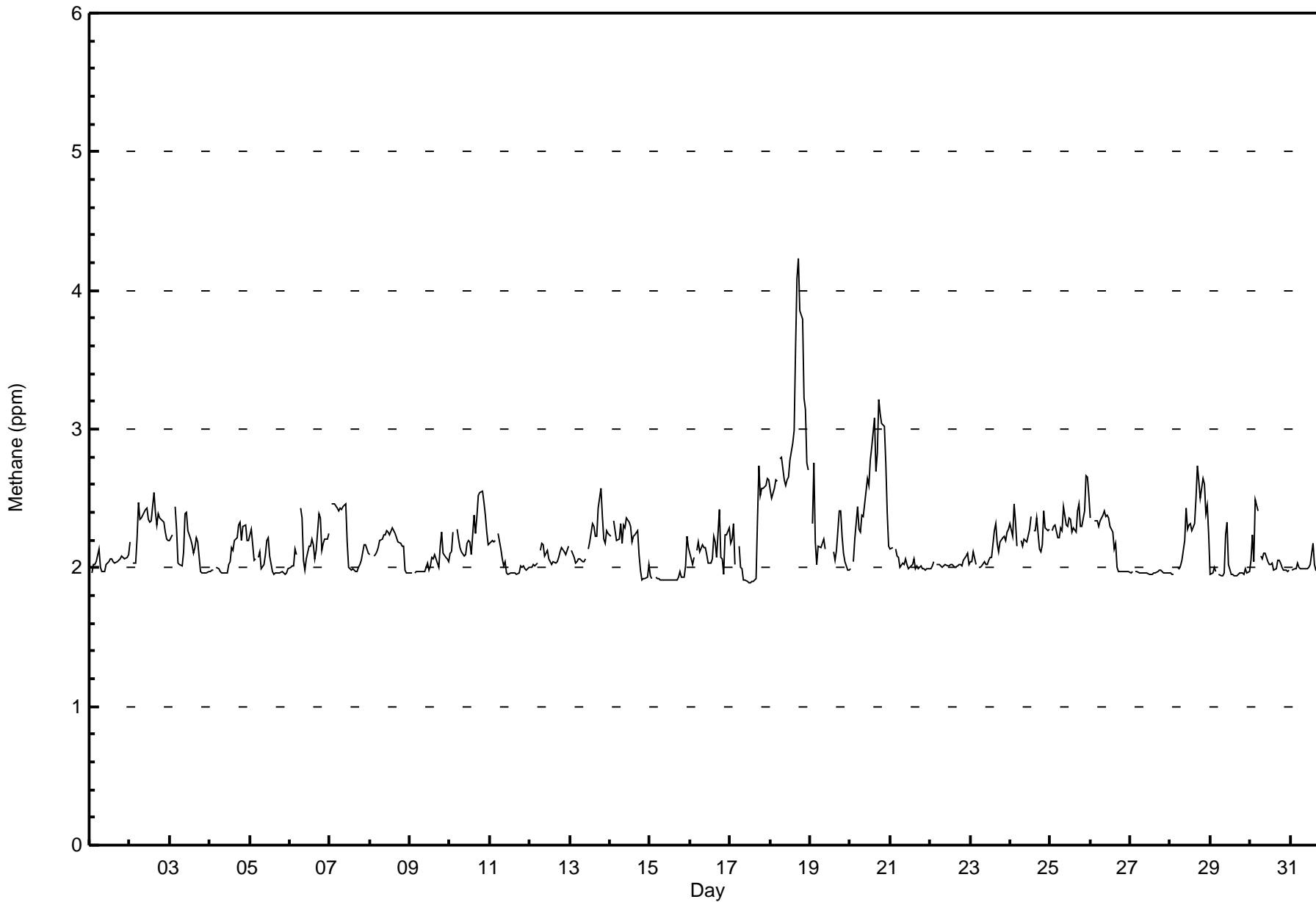


Wood Buffalo Environmental Association
Zero Responses

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









Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Fort McKay - Bertha Ganter - January 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	297	42.01	42.01
2.1 - 3.0	400	56.58	98.59
3.1 - 10.0	10	1.41	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



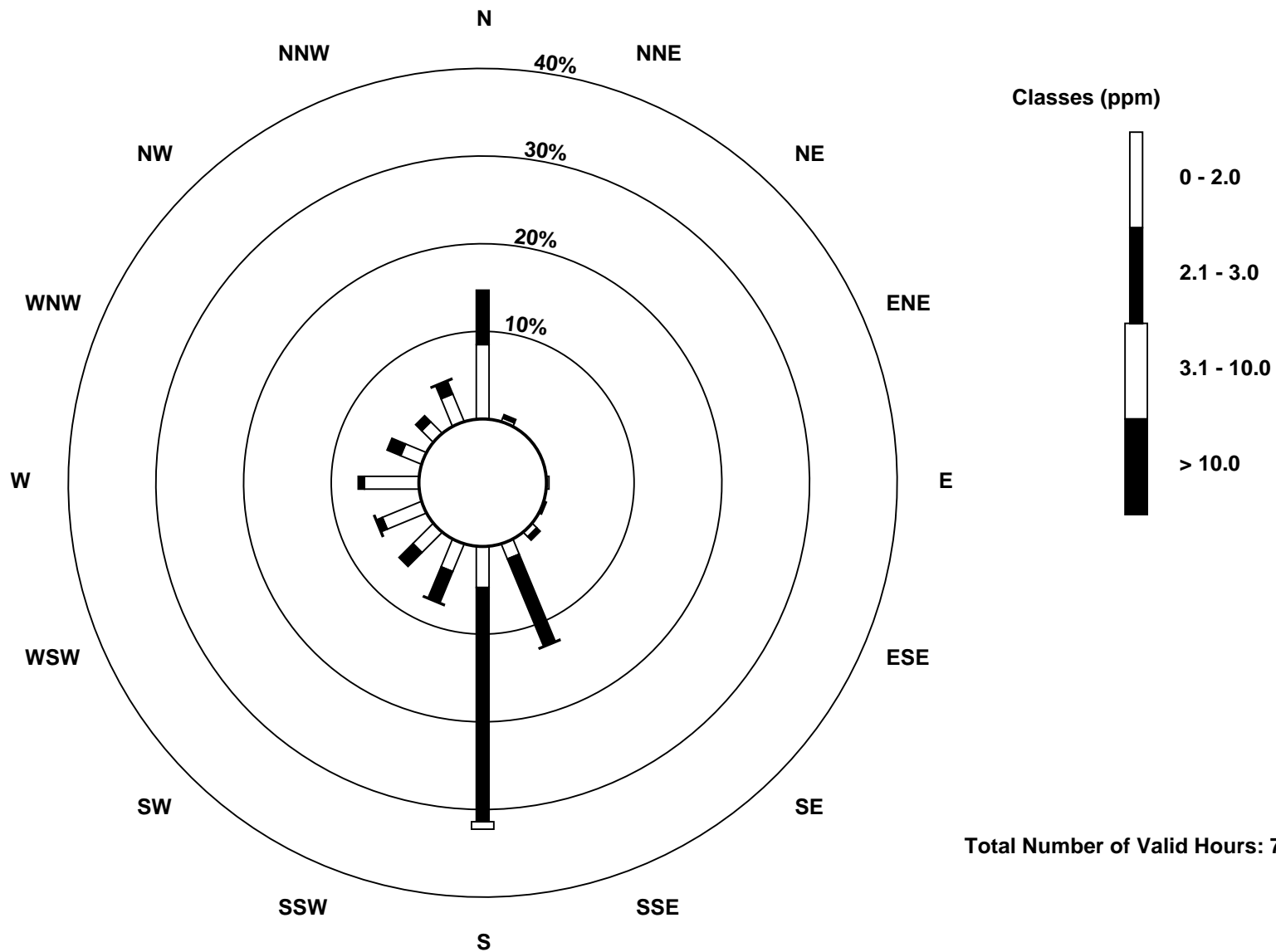
Wood Buffalo Environmental Association
Frequency Distribution

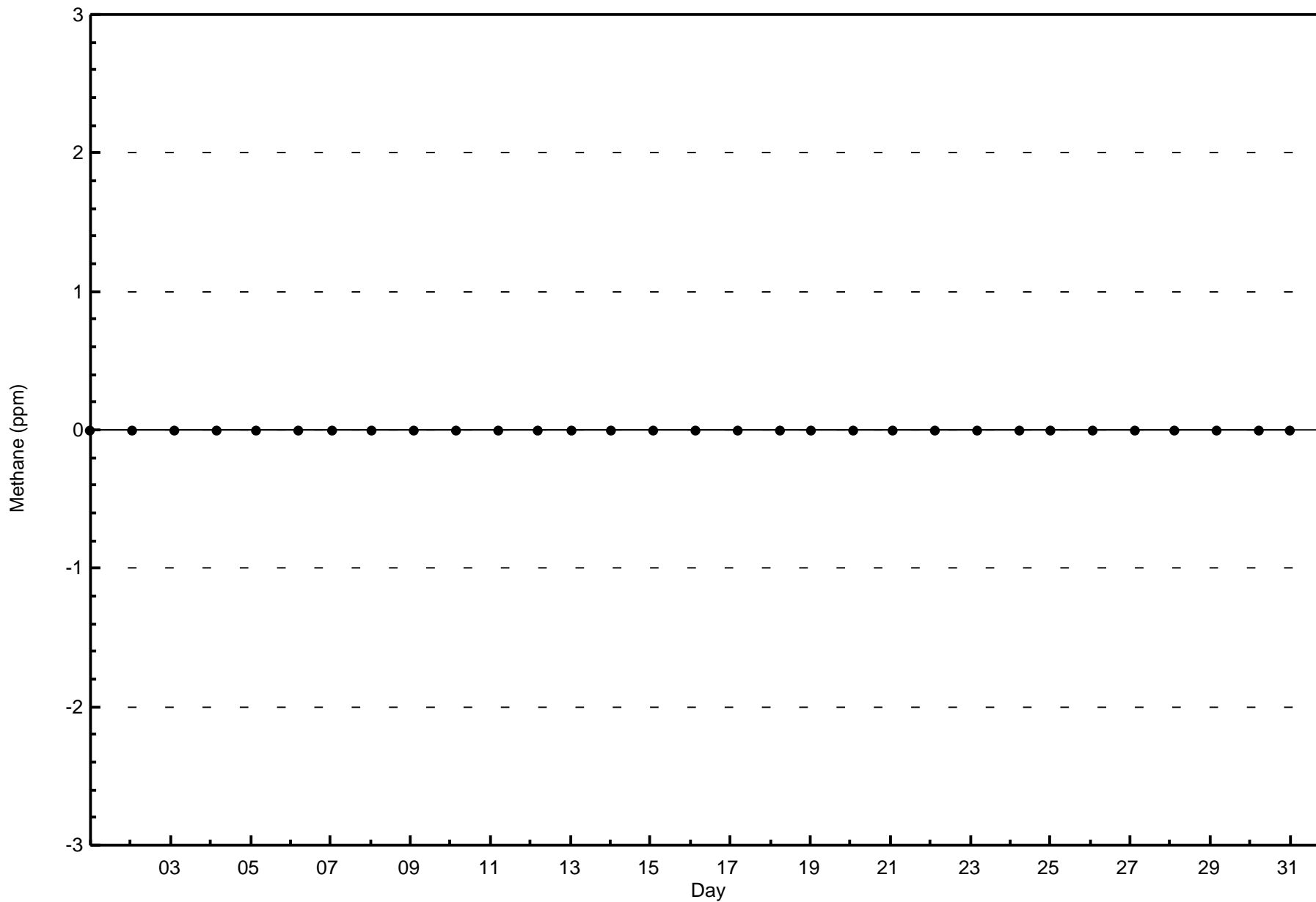
Methane (CH₄) - ppm
Fort McKay - Bertha Ganter - January 2017

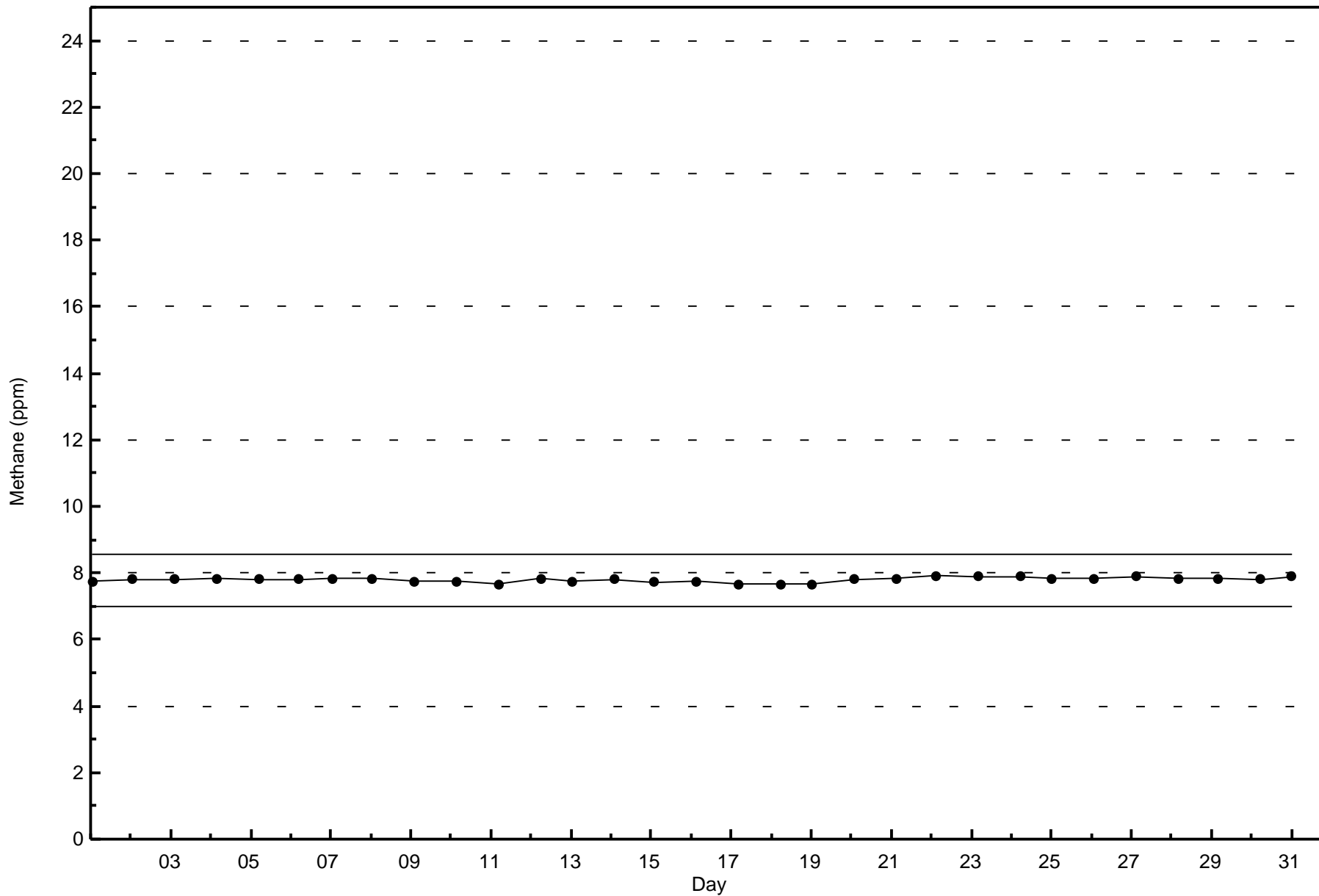
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	60	3	0	0	2	1	5	13	33	24	23	34	44	18	13	24	297
2.1 - 3.0	44	3	0	0	0	1	4	76	189	27	16	5	5	12	7	11	400
3.1 - 10.0	0	0	0	0	0	0	0	1	6	1	0	1	0	0	0	1	10
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	104	6	0	0	2	2	9	90	228	52	39	40	49	30	20	36	707

Total Number of Valid Hours: 707

Total Number of Hours: 744









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

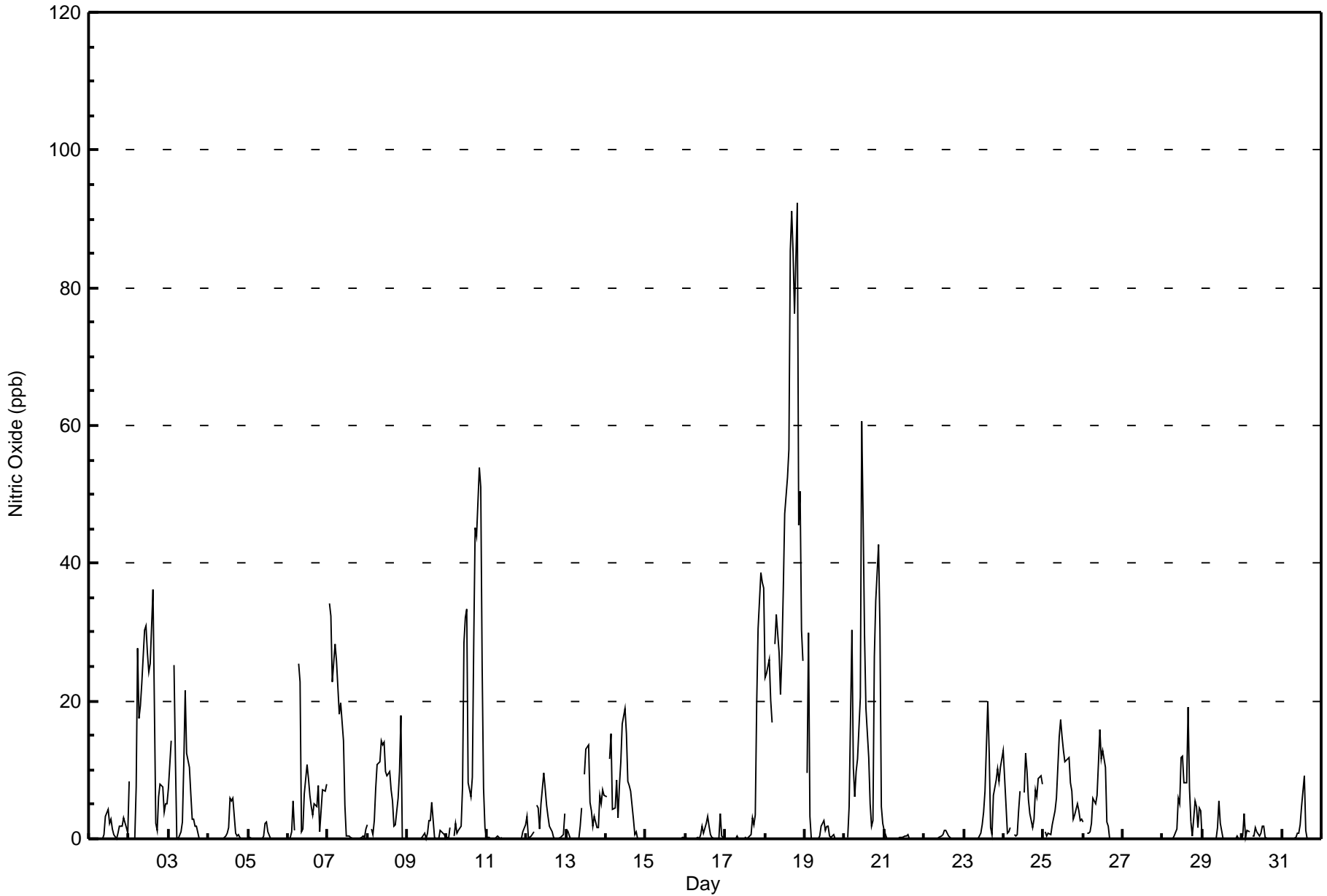
Fort McKay - Bertha Ganter - January 2017

Maximum Value: 92 ppb on Jan 18 20:00																		Maximum Daily Average: 44.4 ppb on Jan 18						Hours in Service: 744																																													
Minimum Value: 0 ppb on Jan 1 02:00																		Minimum Daily Average: 0.0 ppb on Jan 27						Hours of Data: 706																																													
Maximum Diurnal Average: 9.8 ppb at hour 11																		Minimum Diurnal Average: 2.7 ppb at hour 1						Hours of Missing Data: 38																																													
Monthly Average: 5.7 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 6 P ₉₀ = 19 P ₉₉ = 54						Hours of Calibration: 36																																													
																		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-Jan	Z	0	0	0	0	0	0	0	0	1	3	4	2	3	2	1	0	1	2	2	2	3	2	1	1.2	4																																											
2-Jan	8	Z	0	0	7	28	17	19	23	30	31	27	24	25	36	19	2	1	6	8	7	4	5	5	14.6	36																																											
3-Jan	7	14	Z	25	12	0	0	1	2	11	22	12	10	6	3	3	2	2	0	0	0	0	0	0	5.8	25																																											
4-Jan	0	0	0	Z	0	0	0	0	0	0	0	1	2	6	6	6	1	0	1	0	0	0	0	0	1.0	6																																											
5-Jan	0	0	0	0	Z	0	0	0	0	0	2	3	1	0	0	0	0	0	0	0	0	0	0	0	0.3	3																																											
6-Jan	0	0	1	6	1	Z	26	23	1	1	7	11	9	6	5	3	5	5	8	1	4	7	7	8	6.2	26																																											
7-Jan	Z	34	32	23	28	26	22	18	20	14	5	0	0	0	0	0	0	0	0	0	0	0	0	1	9.8	34																																											
8-Jan	2	Z	1	1	3	7	11	11	14	14	14	10	9	10	7	6	2	2	6	10	18	0	0	0	6.8	18																																											
9-Jan	0	0	Z	0	0	0	0	0	0	0	1	0	1	3	3	5	0	0	0	0	1	1	1	0	0.7	5																																											
10-Jan	0	0	2	Z	0	2	1	1	2	8	28	32	33	8	6	9	29	45	44	54	51	25	7	2	16.9	54																																											
11-Jan	0	0	0	0	Z	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	1	2	0.2	2																																											
12-Jan	3	0	0	0	1	Z	5	4	1	5	10	7	5	3	2	1	0	0	0	0	0	0	1	4	2.4	10																																											
13-Jan	Z	1	0	0	0	0	0	0	2	4	M	9	13	14	5	4	2	3	2	2	6	5	7	6	3.9	14																																											
14-Jan	6	Z	12	15	4	5	9	3	8	11	17	19	15	8	8	7	3	1	1	0	0	0	0	0	6.5	19																																											
15-Jan	0	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																																											
16-Jan	0	0	0	Z	0	0	0	0	0	1	2	1	2	3	2	1	0	0	0	0	0	4	1	0	0.7	4																																											
17-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	3	2	3	19	31	39	37	36	7.5	39																																											
18-Jan	23	24	26	20	17	Z	28	33	27	21	27	36	47	52	57	85	91	85	76	92	45	51	30	26	44.4	92																																											
19-Jan	Z	10	30	3	0	0	0	0	0	0	2	3	1	2	2	0	0	1	0	0	0	0	0	0	2.3	30																																											
20-Jan	0	Z	0	5	30	10	6	10	12	20	61	46	30	19	12	5	2	3	26	35	43	31	5	2	17.9	61																																											
21-Jan	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.1	1																																											
22-Jan	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0.2	1																																											
23-Jan	0	0	0	0	Z	0	0	0	0	0	1	2	4	7	20	12	2	1	6	9	10	8	10	12	4.5	20																																											
24-Jan	13	5	1	1	2	Z	1	0	1	4	7	M	7	12	10	6	4	2	3	7	6	9	9	8	5.2	13																																											
25-Jan	Z	1	0	1	1	2	3	4	6	15	17	15	13	11	11	12	8	7	3	3	5	4	3	3	6.4	17																																											
26-Jan	2	Z	1	1	1	2	6	5	6	11	16	12	13	10	2	2	0	0	0	0	0	0	0	0	3.9	16																																											
27-Jan	0	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																																											
28-Jan	0	0	0	Z	0	0	0	0	1	6	5	12	12	8	8	19	7	3	0	5	5	2	4	4	4.5	19																																											
29-Jan	0	0	0	0	Z	0	0	0	0	2	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0.4	6																																											
30-Jan	0	4	0	1	1	Z	0	0	2	1	0	1	2	2	0	0	0	0	0	0	0	0	0	0	0.7	4																																											
31-Jan	Z	0	0	0	0	0	0	0	0	1	1	2	5	9	1	0	0	0	0	0	0	0	0	0	0.8	9																																											
2.7																		3.6						4.1		3.9		4.2		3.2		4.4		4.3		4.1		5.9		9.8		9.2		8.7		7.7		6.9		6.7		5.3		5.2		6.0		8.0		7.6		6.2		4.2		3.9		Diurnal Average	
23																		34						32		25		30		28		28		33		27		30		61		46		47		52		57		85		91		85		76		92		51		51		37		36		Diurnal Maximum	
Z - zerospan		C - Calibration				M - Maintenance																																																															



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	645	91.36	91.36
21 - 40	44	6.23	97.59
41 - 80	13	1.84	99.43
81 - 159	4	0.57	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	101	6	0	0	2	1	6	82	205	44	35	39	48	27	19	30	645
21 - 40	5	0	0	0	0	0	3	5	14	6	3	1	1	3	1	2	44
11 - 80	1	0	0	0	0	1	0	2	7	1	1	0	0	0	0	0	13
81 - 159	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	4
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	107	6	0	0	2	2	9	90	228	52	39	40	49	30	20	32	706

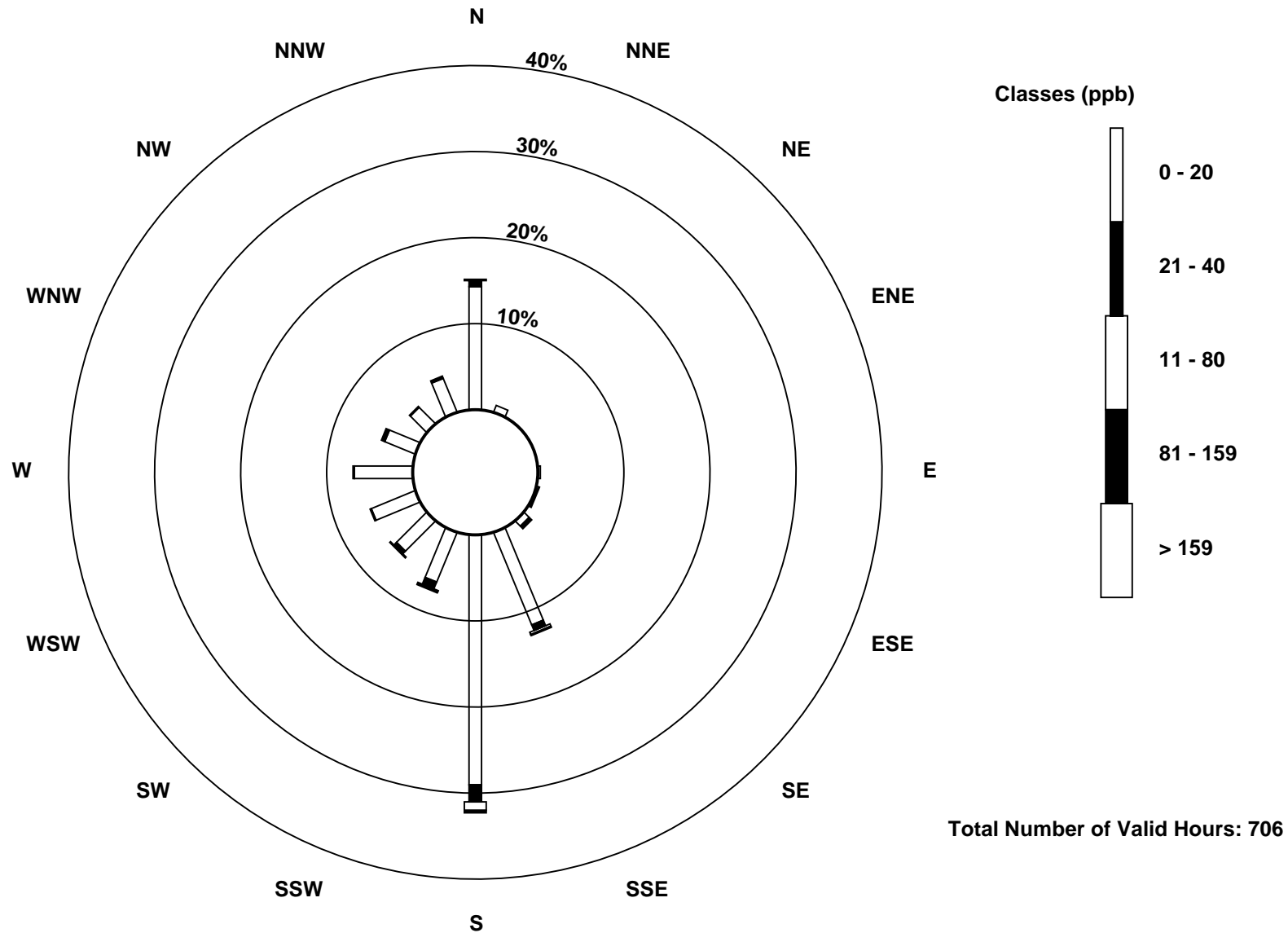
Total Number of Valid Hours: 706

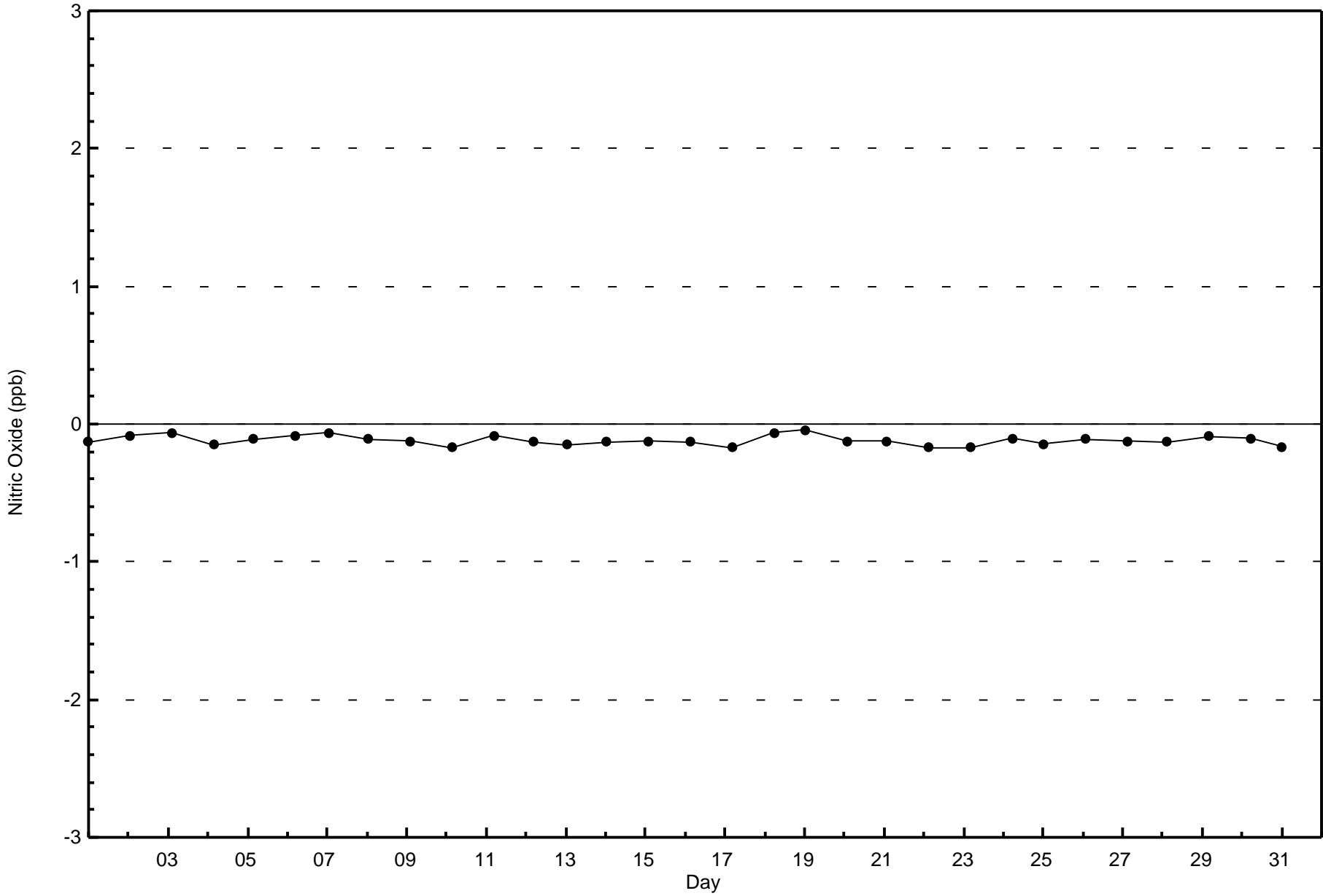
Total Number of Hours: 744

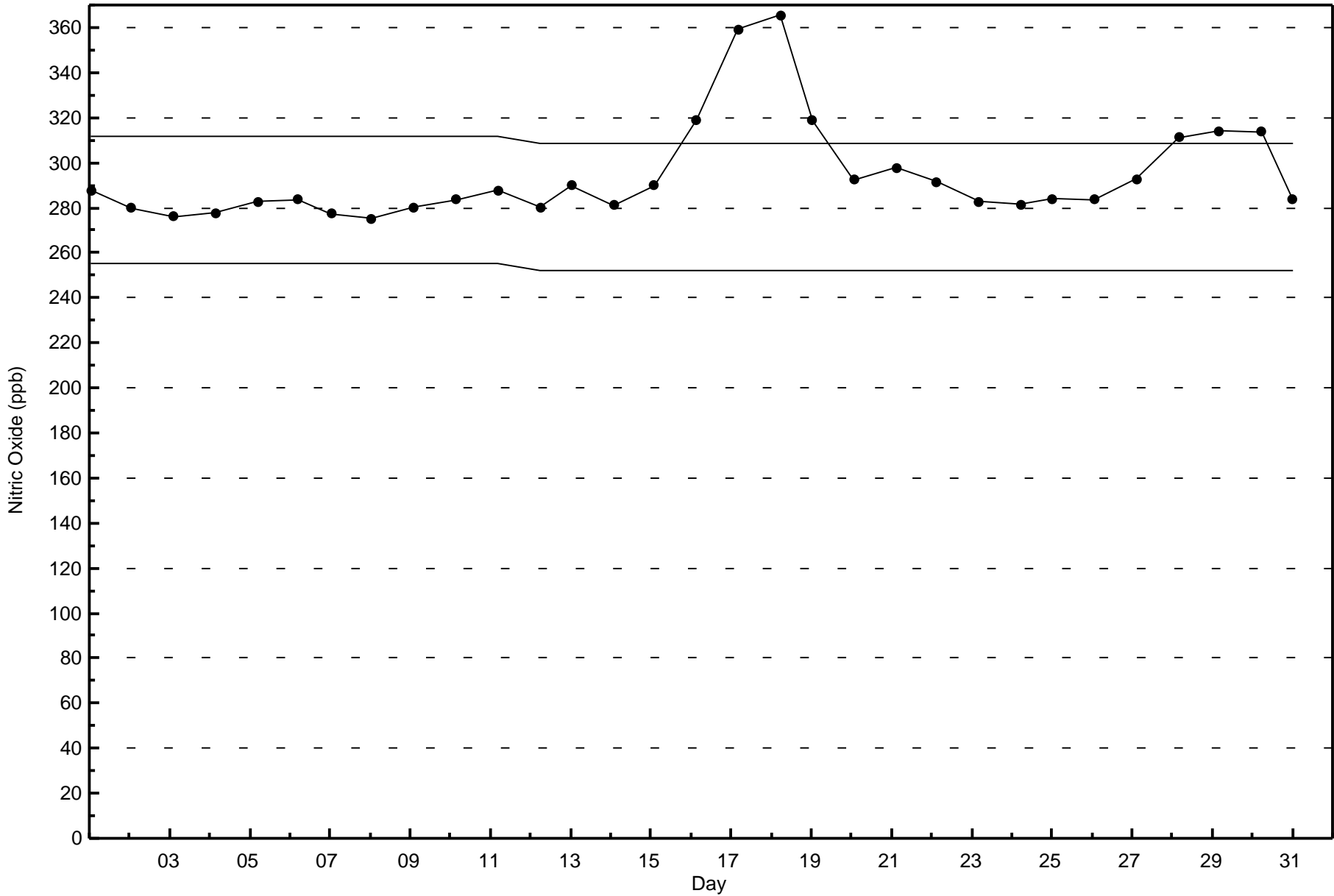


Wood Buffalo Environmental Association
Wind Rose Jan 2017

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









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

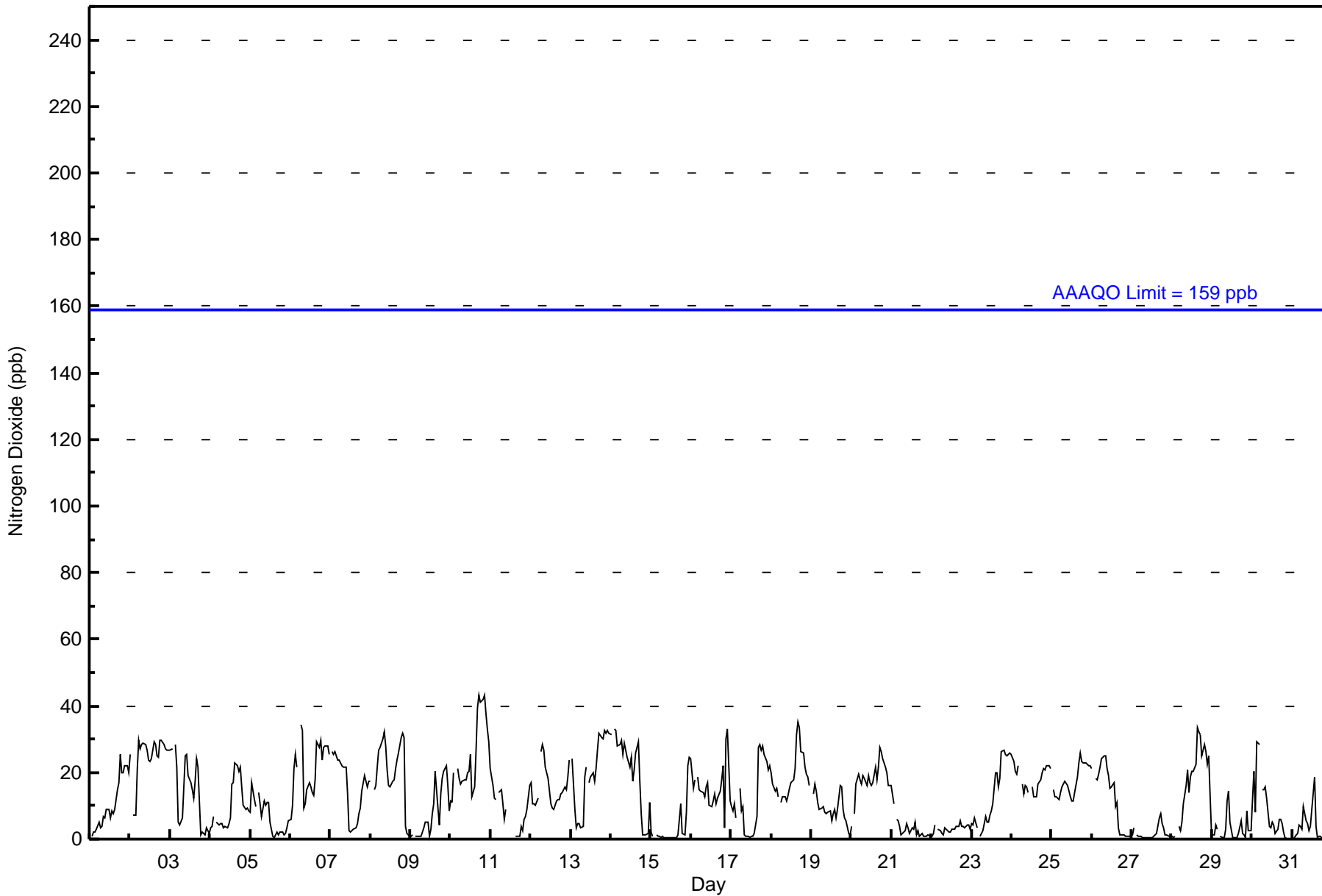
Fort McKay - Bertha Ganter - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 43 ppb on Jan 10 18:00										Maximum Daily Average: 25.2 ppb on Jan 10										Hours of Data: 706						
Minimum Value: 0 ppb on Jan 31 00:00										Minimum Daily Average: 1.8 ppb on Jan 27										Hours of Missing Data: 38						
Maximum Diurnal Average: 16.2 ppb at hour 18										Minimum Diurnal Average: 10.3 ppb at hour 12										Hours of Calibration: 36						
Monthly Average: 12.9 ppb										Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 3 Median = 12 Q ₃ = 21 P ₉₀ = 27 P ₉₉ = 33										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-Jan	Z	1	2	2	3	5	3	4	7	6	9	9	6	8	8	9	15	17	26	20	20	22	22	20	10.6	26
2-Jan	26	Z	7	7	21	30	27	29	29	29	27	24	23	24	29	28	25	24	30	30	29	27	27	27	25.1	30
3-Jan	27	27	Z	28	22	5	4	6	16	25	26	19	17	15	12	17	24	22	1	2	2	1	3	2	14.0	28
4-Jan	3	4	7	Z	5	4	5	5	3	4	3	5	6	17	17	23	22	20	22	16	10	9	9	8	9.9	23
5-Jan	8	17	12	10	Z	14	10	7	12	10	11	11	5	1	1	1	2	1	2	2	1	2	4	5	6.4	17
6-Jan	6	10	21	26	22	Z	35	33	10	11	15	17	16	14	13	18	29	27	30	24	28	28	28	26	21.0	35
7-Jan	Z	26	25	26	24	24	23	22	22	21	14	3	2	3	3	3	5	8	10	15	19	17	16	17	15.1	26
8-Jan	17	Z	15	16	22	27	28	30	32	28	21	16	16	18	18	21	24	26	30	32	30	4	2	1	20.5	32
9-Jan	1	1	Z	1	1	1	1	2	4	5	5	1	3	8	11	20	9	4	13	18	20	22	16	9	7.7	22
10-Jan	11	11	20	Z	21	18	17	17	18	18	20	20	25	13	16	27	39	43	41	42	43	38	33	29	25.2	43
11-Jan	21	16	12	12	Z	14	15	11	6	9	C	C	C	C	C	1	1	1	4	2	6	7	9	16	9.0	21
12-Jan	17	11	11	10	12	Z	26	29	27	22	18	14	11	9	9	12	12	12	13	14	16	15	19	24	15.7	29
13-Jan	Z	24	9	4	5	5	4	4	19	22	M	17	19	20	18	21	27	32	31	30	33	32	33	32	19.8	33
14-Jan	32	Z	33	33	28	29	30	25	29	27	25	22	24	17	21	26	29	18	8	1	1	1	2	11	20.4	33
15-Jan	2	1	Z	1	1	1	1	1	0	0	0	1	1	0	1	1	1	6	11	2	1	8	22	25	3.8	25
16-Jan	24	15	18	Z	19	15	14	14	13	16	17	10	10	11	14	11	12	14	18	22	4	30	33	11	15.8	33
17-Jan	10	9	11	6	Z	15	8	10	1	1	1	1	1	1	2	7	28	28	27	28	25	23	21	22	12.3	28
18-Jan	20	17	14	15	13	Z	11	13	13	12	13	15	17	18	21	31	35	34	26	26	21	19	19	16	19.1	35
19-Jan	Z	14	16	14	11	9	9	10	8	8	8	8	5	8	9	6	9	16	16	9	6	5	2	1	9.0	16
20-Jan	4	Z	8	16	19	18	17	19	18	16	19	17	16	17	22	18	22	28	26	24	22	20	16	16	18.1	28
21-Jan	16	10	Z	6	5	4	1	2	2	5	3	2	3	3	5	1	3	1	2	1	1	1	1	1	3.5	16
22-Jan	1	2	4	Z	3	2	2	1	3	3	2	2	3	3	3	4	4	6	4	4	3	4	4	3	3.1	6
23-Jan	5	4	6	4	Z	1	2	3	7	5	5	7	8	11	20	20	16	18	26	27	26	25	26	26	12.9	27
24-Jan	26	23	20	20	22	Z	17	14	16	16	14	M	16	13	13	13	17	18	20	21	21	22	22	21	18.3	26
25-Jan	Z	15	13	13	12	14	16	17	17	16	14	13	12	11	14	19	23	26	23	23	23	23	22	22	17.3	26
26-Jan	21	Z	18	18	19	22	24	25	25	21	19	15	16	17	10	11	3	1	1	1	1	1	1	1	12.7	25
27-Jan	1	4	Z	1	1	1	1	1	1	1	0	0	1	1	1	2	6	8	5	4	1	1	1	1	1.8	8
28-Jan	1	1	1	Z	4	3	5	11	16	21	14	19	21	20	23	34	32	31	25	29	26	22	25	13	17.2	34
29-Jan	1	1	4	3	Z	1	0	0	3	11	14	5	1	1	1	1	2	5	2	1	1	8	3	3	3.1	14
30-Jan	12	21	8	29	28	Z	15	15	16	12	4	3	5	4	2	3	6	6	5	2	1	0	0	0	8.5	29
31-Jan	Z	0	1	2	4	4	3	10	5	5	2	4	9	19	4	0	1	1	0	0	0	1	1	1	3.3	19
12.5 10.9 12.2 12.4 13.3 10.9 12.0 12.5 12.7 13.0 11.8 10.3 10.5 10.8 11.2 13.1 15.5 16.2 16.0 15.2 14.2 14.2 14.2 13.2																								Diurnal Average		
32 27 33 33 28 30 35 33 32 29 27 24 25 24 29 34 39 43 41 42 43 38 33 32																								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 (NO₂) - ppb
Fort McKay - Bertha Ganter - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	523	74.08	74.08
21 - 40	179	25.35	99.43
41 - 80	4	0.57	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	106	6	0	0	2	2	8	67	111	34	33	36	47	26	18	27	523
21 - 40	1	0	0	0	0	0	1	23	114	17	6	4	2	4	2	5	179
11 - 80	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	4
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
Totals	107	6	0	0	2	2	9	90	228	52	39	40	49	30	20	32	706

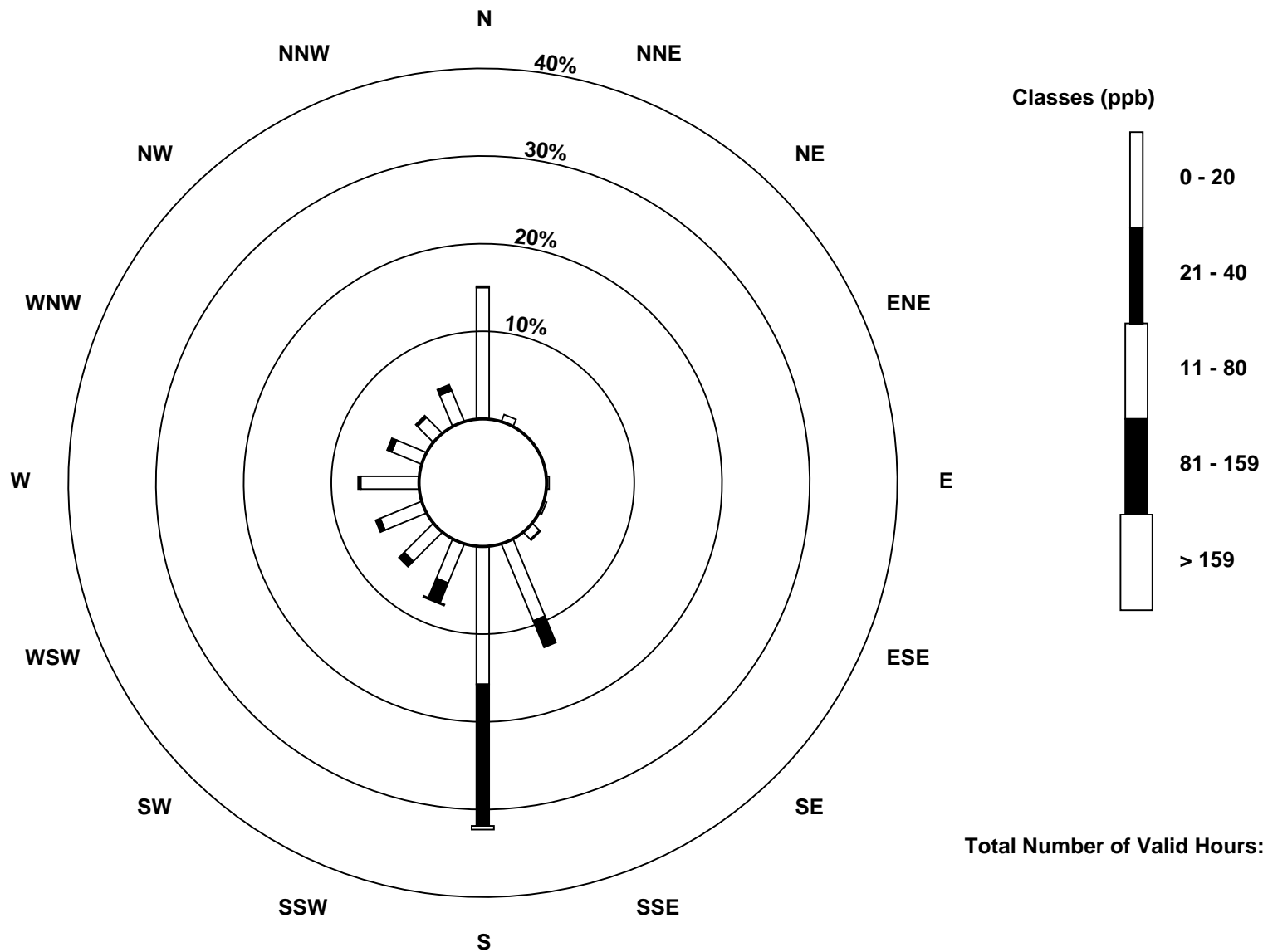
Total Number of Valid Hours: 706

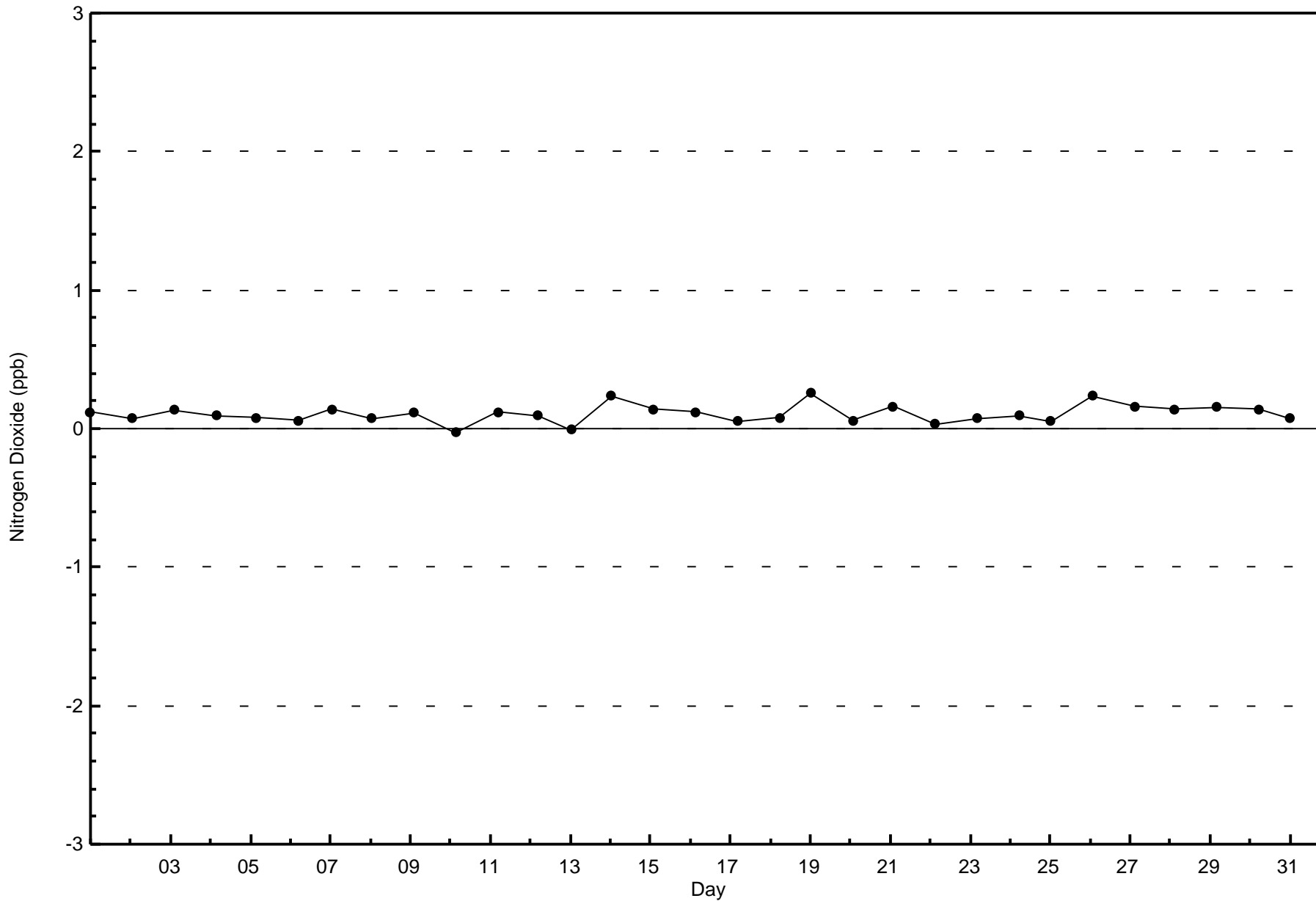
Total Number of Hours: 744

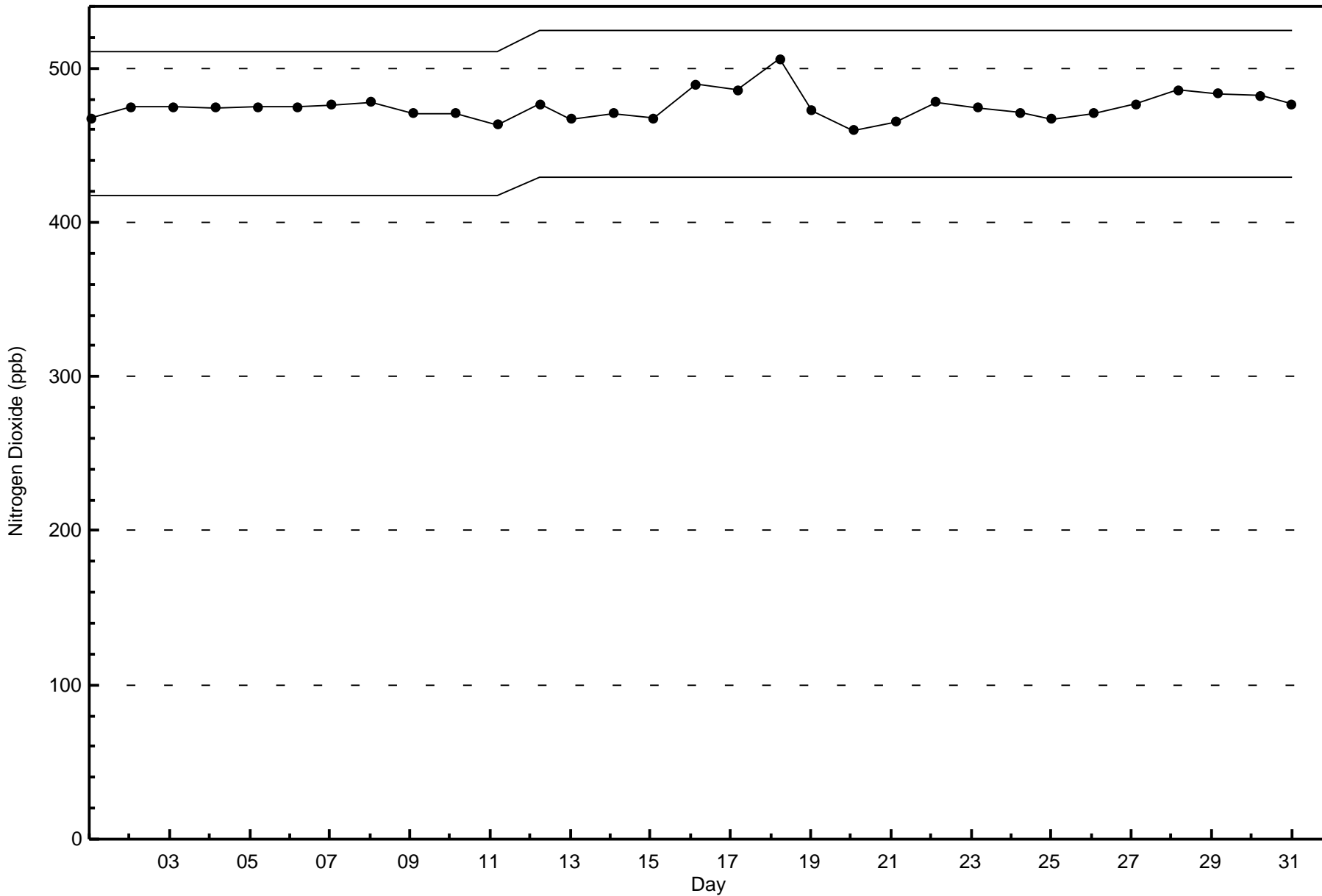


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter (AMS 1)









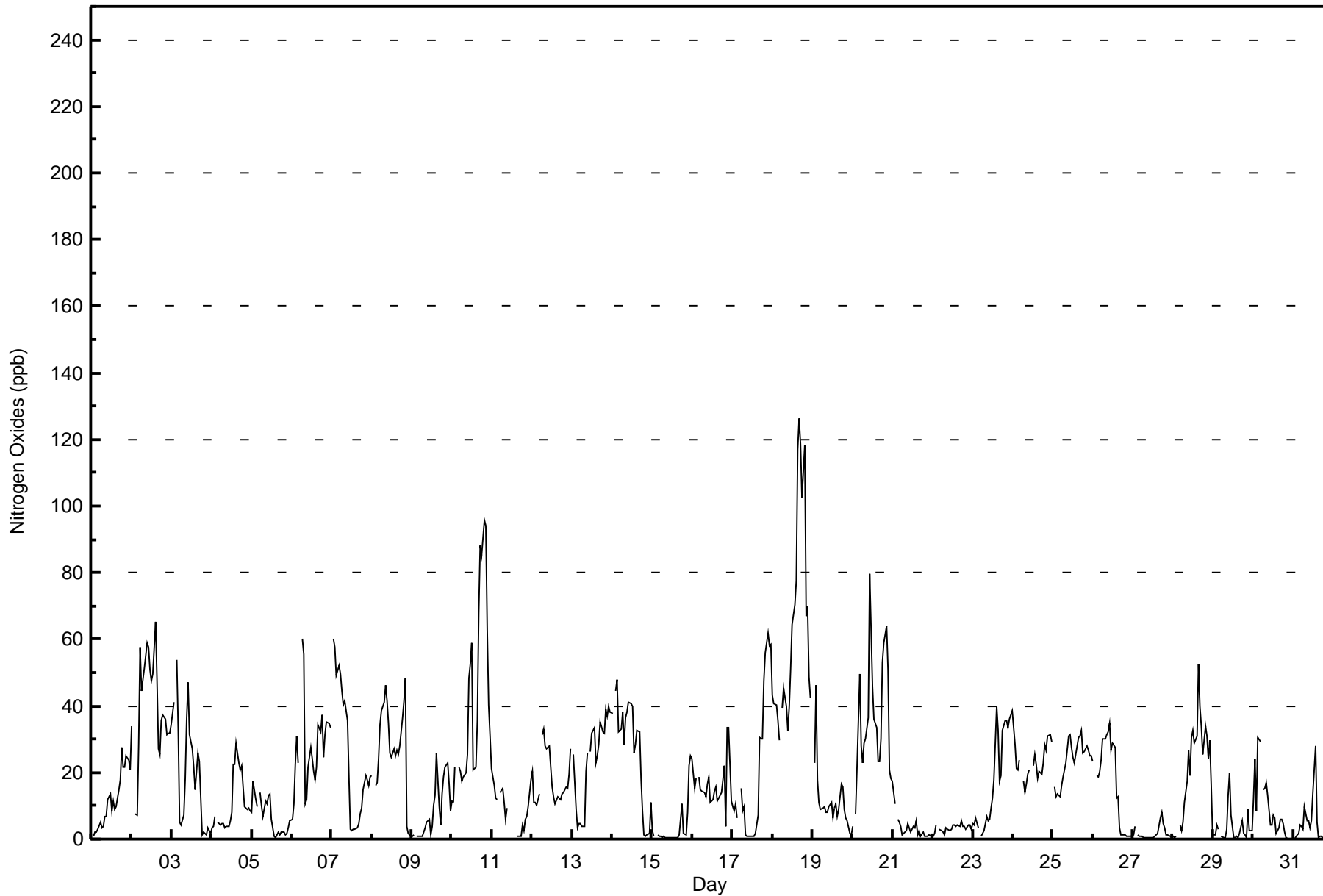
Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb

Fort McKay - Bertha Ganter - January 2017

Maximum Value: 126 ppb on Jan 18 17:00																			Maximum Daily Average: 63.5 ppb on Jan 18						Hours in Service: 744																			
Minimum Value: 0 ppb on Jan 31 00:00																			Minimum Daily Average: 1.8 ppb on Jan 27						Hours of Data: 706																			
Maximum Diurnal Average: 23.1 ppb at hour 20																			Minimum Diurnal Average: 14.1 ppb at hour 6						Hours of Missing Data: 38																			
Monthly Average: 18.6 ppb																			Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 4 Median = 13 Q ₃ = 28 P ₉₀ = 41 P ₉₉ = 93						Hours of Calibration: 36																			
																									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-Jan	Z	1	2	2	3	5	3	4	7	7	12	13	8	11	9	10	15	18	27	22	22	25	24	21	11.8	27																		
2-Jan	34	Z	8	7	28	57	44	48	51	59	58	51	47	50	65	47	27	26	36	37	36	31	32	32	39.6	65																		
3-Jan	34	41	Z	54	34	5	4	7	18	36	47	32	27	22	15	20	26	23	1	2	2	1	3	2	19.8	54																		
4-Jan	3	4	7	Z	5	4	5	5	3	4	5	8	22	29	23	21	22	16	10	9	9	8	8	8	10.8	29																		
5-Jan	8	17	12	10	Z	14	10	7	12	10	13	13	6	1	1	1	2	1	2	2	1	2	4	5	6.7	17																		
6-Jan	6	10	22	31	23	Z	60	56	11	12	21	27	24	20	18	21	34	32	37	25	32	35	35	33	27.2	60																		
7-Jan	Z	60	58	49	52	50	45	40	41	36	18	3	3	3	3	3	4	8	9	15	19	18	16	19	24.9	60																		
8-Jan	19	Z	16	17	24	34	38	41	46	41	35	26	25	27	25	26	26	28	36	42	48	4	2	1	27.3	48																		
9-Jan	1	1	Z	1	1	1	1	2	4	5	6	1	4	10	13	26	10	4	13	18	22	23	16	9	8.3	26																		
10-Jan	11	11	22	Z	22	21	17	19	20	25	48	52	59	21	21	35	68	88	85	96	94	63	40	31	42.2	96																		
11-Jan	21	16	12	12	Z	14	15	11	6	9	C	C	C	C	C	1	1	1	4	2	6	7	10	18	9.2	21																		
12-Jan	20	11	11	10	13	Z	31	33	28	27	28	22	16	13	11	13	12	12	13	14	16	15	19	27	18.1	33																		
13-Jan	Z	25	9	4	5	5	4	4	20	26	M	26	32	33	23	25	28	35	32	32	39	37	40	38	23.7	40																		
14-Jan	38	Z	45	48	32	33	38	28	37	38	41	41	40	26	28	33	32	18	9	1	1	1	2	11	27.0	48																		
15-Jan	2	1	Z	1	1	1	1	1	0	0	0	1	1	0	1	1	1	6	11	2	1	8	22	25	3.8	25																		
16-Jan	24	15	18	Z	19	15	14	14	13	16	19	11	12	15	15	11	12	14	18	22	4	34	34	11	16.5	34																		
17-Jan	10	9	11	6	Z	15	8	10	1	1	1	1	1	1	2	7	30	30	30	47	56	62	58	59	19.8	62																		
18-Jan	43	41	40	35	30	Z	39	45	40	32	40	51	64	70	78	117	126	119	102	118	67	70	49	42	63.5	126																		
19-Jan	Z	23	46	18	11	9	9	10	8	8	10	11	6	9	11	7	9	17	16	9	6	5	2	1	11.3	46																		
20-Jan	4	Z	8	21	50	28	23	29	30	36	80	63	46	36	34	23	23	30	53	59	64	51	21	18	36.0	80																		
21-Jan	17	10	Z	6	5	4	1	2	2	5	4	2	4	3	5	1	3	1	2	1	1	1	1	1	3.6	17																		
22-Jan	1	2	4	Z	3	2	2	1	3	3	3	3	4	4	4	4	4	6	4	4	3	4	4	3	3.3	6																		
23-Jan	5	4	6	3	Z	1	2	3	7	6	6	9	12	18	40	33	17	19	33	35	36	33	36	37	17.4	40																		
24-Jan	38	28	21	21	24	Z	17	14	17	20	21	M	22	25	23	18	20	20	23	28	27	31	31	29	23.5	38																		
25-Jan	Z	16	13	13	13	16	19	21	23	31	31	27	24	23	25	30	31	32	26	26	28	27	25	25	23.7	32																		
26-Jan	23	Z	19	19	20	24	30	30	31	32	35	27	29	27	12	13	3	1	1	1	1	1	1	1	16.6	35																		
27-Jan	1	4	Z	1	1	1	1	0	1	1	0	0	0	1	1	1	6	8	5	4	1	1	1	1	1.8	8																		
28-Jan	1	1	1	Z	4	3	5	11	17	27	19	30	33	29	31	53	40	34	25	34	31	24	30	17	21.6	53																		
29-Jan	1	1	4	3	Z	1	0	0	3	13	20	7	1	1	1	0	2	5	2	1	0	9	3	2	3.5	20																		
30-Jan	12	24	8	30	29	Z	15	15	17	13	4	4	7	6	2	3	6	6	5	2	1	0	0	0	9.2	30																		
31-Jan	Z	0	1	2	4	4	3	10	5	6	3	6	14	28	5	0	1	1	0	0	0	1	1	1	4.1	28																		
																			15.2	14.5	16.3	16.3	17.5	14.1	16.3	16.8	16.9	18.9	21.6	19.5	19.2	18.5	18.1	19.8	20.8	21.4	22.0	23.1	21.7	20.4	18.4	17.1	Diurnal Average	
																			43	60	58	54	52	57	60	56	51	59	80	63	64	70	78	117	126	119	102	118	94	70	58	59	Diurnal Maximum	
Z - zerospan		C - Calibration					M - Maintenance																																					





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort McKay - Bertha Ganter - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	433	61.33	61.33
21 - 40	201	28.47	89.80
41 - 80	63	8.92	98.73
81 - 159	9	1.27	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort McKay - Bertha Ganter - January 2017

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	99	6	0	0	2	1	6	42	71	30	28	36	47	23	17	25	433
21 - 40	4	0	0	0	0	0	0	35	124	15	8	3	1	4	2	5	201
11 - 80	4	0	0	0	0	1	3	12	27	5	3	1	1	3	1	2	63
81 - 159	0	0	0	0	0	0	0	1	6	2	0	0	0	0	0	0	9
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	107	6	0	0	2	2	9	90	228	52	39	40	49	30	20	32	706

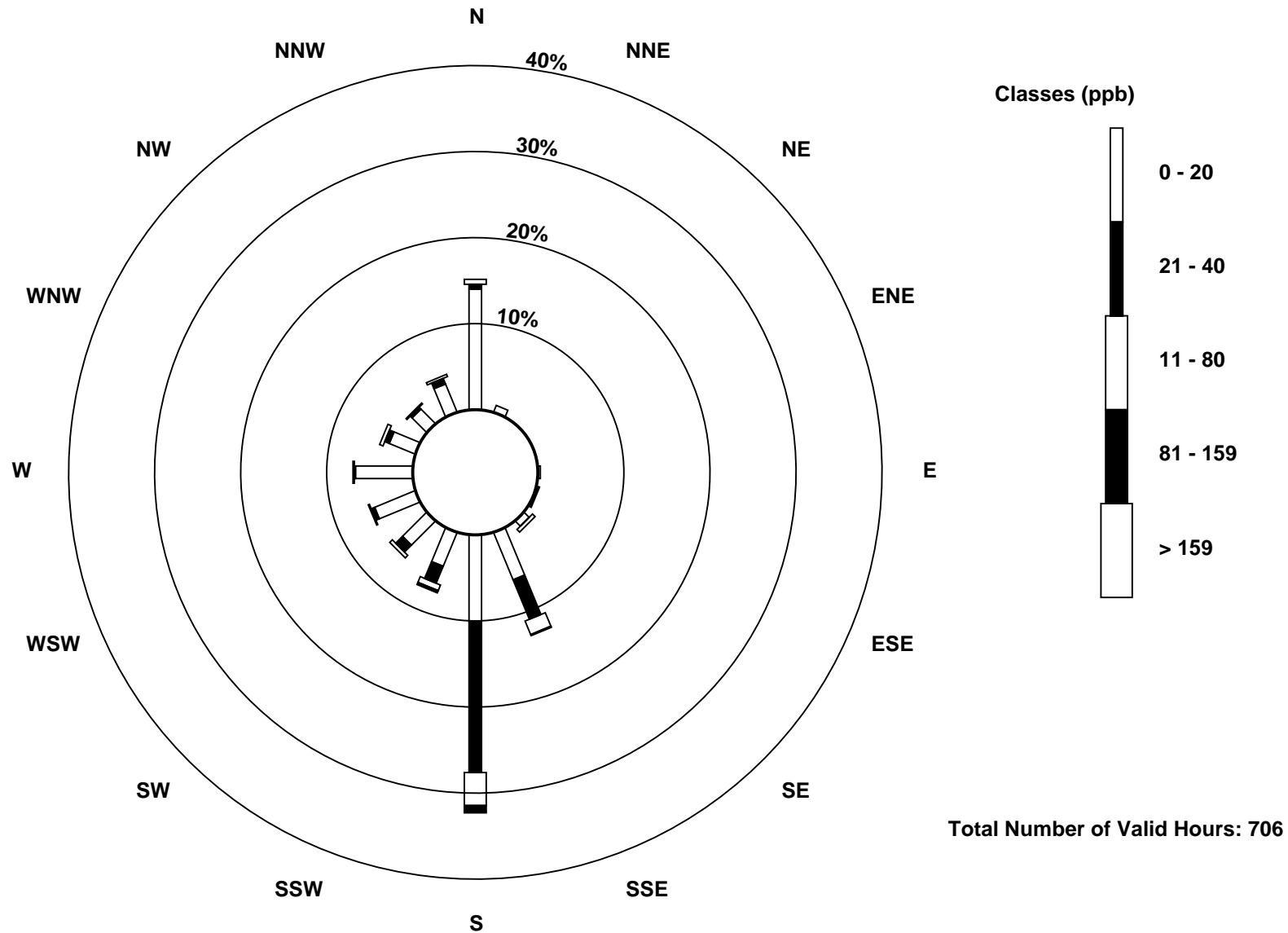
Total Number of Valid Hours: 706

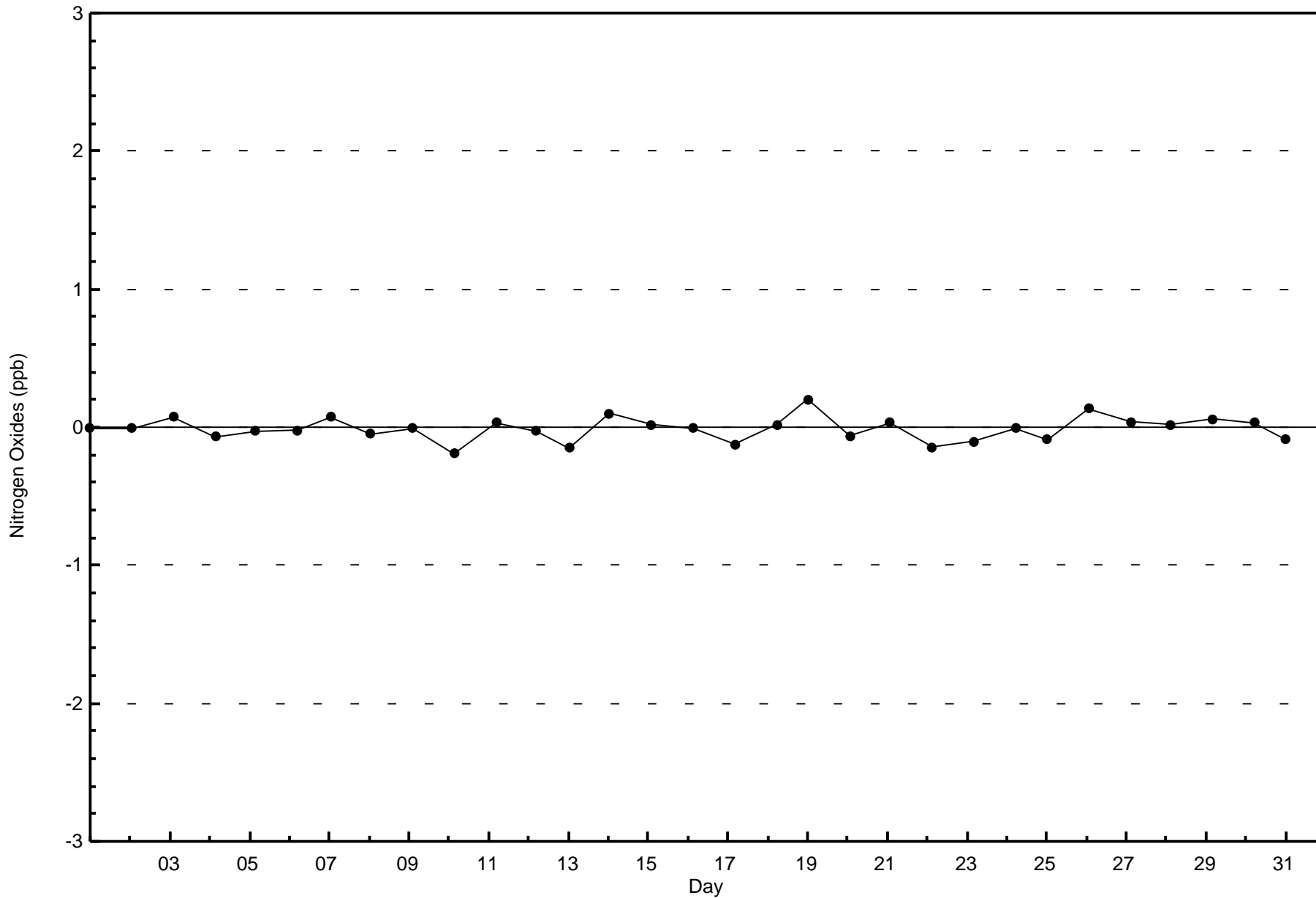
Total Number of Hours: 744

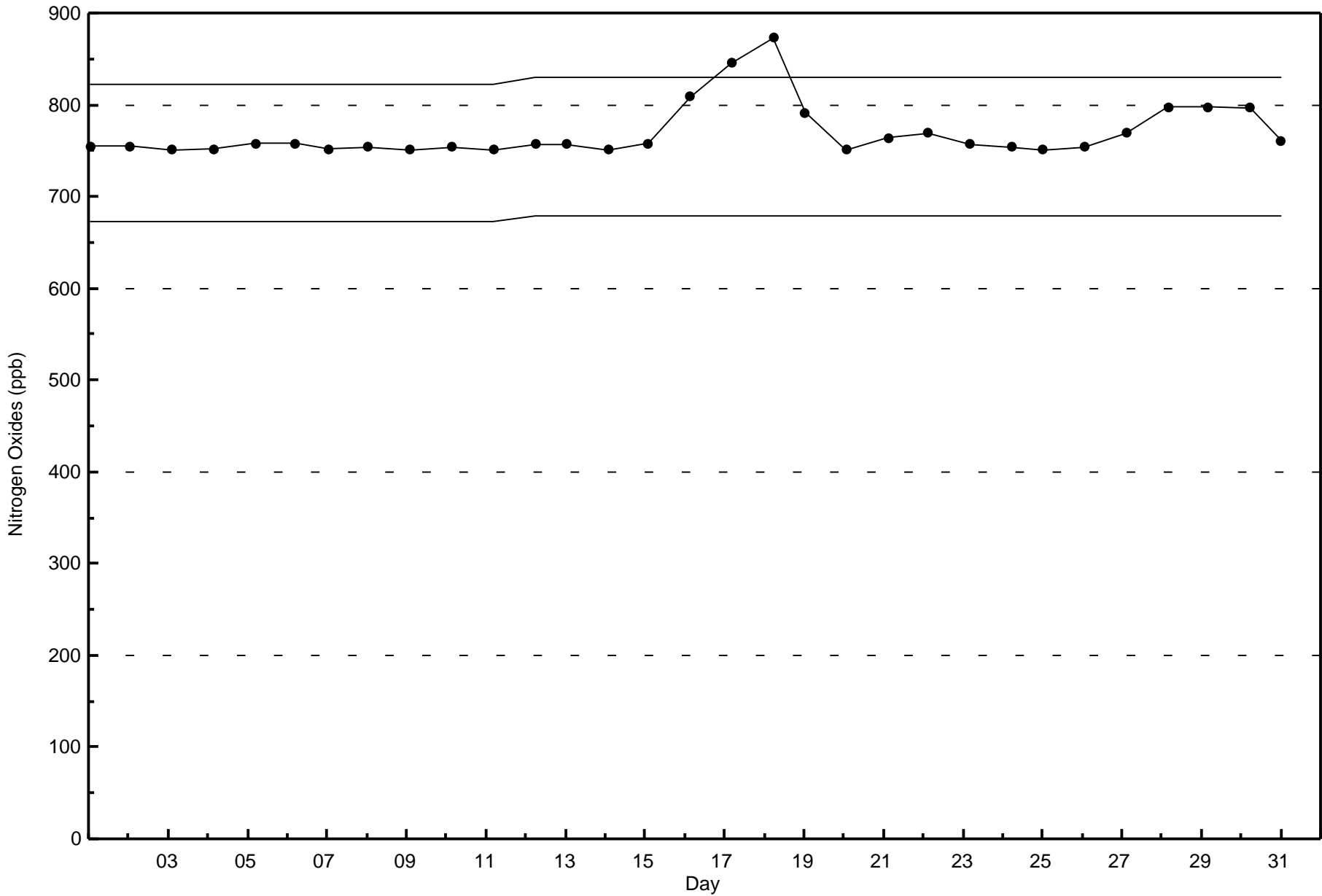


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Nitrogen Oxides (NO_x) - ppb
Fort McKay - Bertha Ganter (AMS 1)









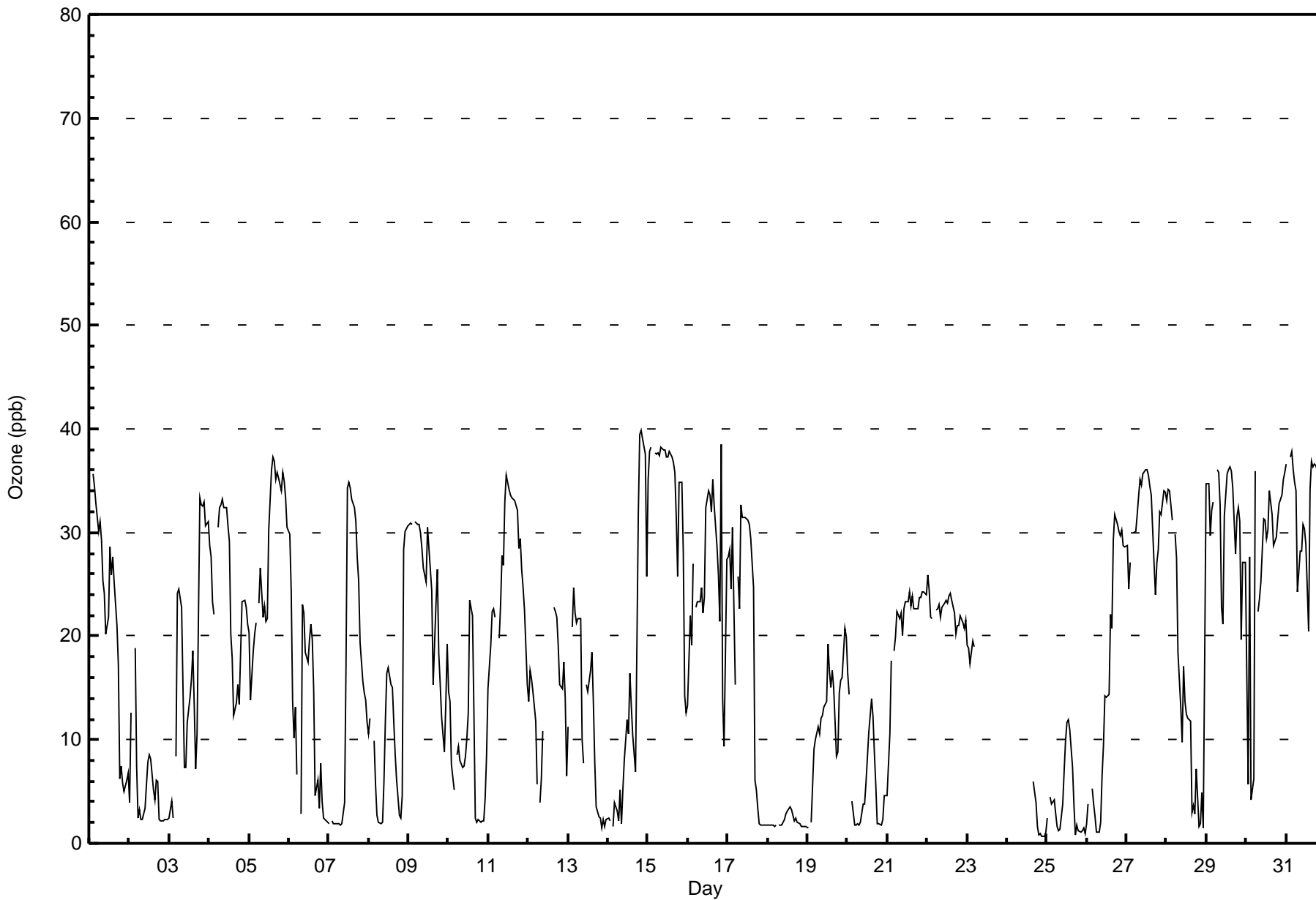
Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Fort McKay - Bertha Ganter - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																	
Maximum Value: 40 ppb on Jan 14 21:00										Maximum Daily Average: 33.9 ppb on Jan 15										Hours of Data: 674							
Minimum Value: 1 ppb on Jan 24 23:00										Minimum Daily Average: 2.1 ppb on Jan 18										Hours of Missing Data: 70							
Maximum Diurnal Average: 23.1 ppb at hour 15										Minimum Diurnal Average: 15.9 ppb at hour 5										Hours of Calibration: 41							
Monthly Average: 18.4 ppb										Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 6 Median = 19 Q ₃ = 29 P ₉₀ = 34 P ₉₉ = 38										Percent Operational Time: 96.1							
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-Jan	38	Z	36	34	33	30	31	29	25	24	20	22	29	26	28	25	21	17	6	7	6	5	6	7	22.0	38	
2-Jan	4	13	Z	19	8	2	3	2	2	3	6	8	9	8	5	4	6	6	2	2	2	2	2	2	5.3	19	
3-Jan	2	4	2	Z	8	24	25	23	15	7	7	12	14	16	19	13	7	11	33	33	33	33	31	31	17.5	33	
4-Jan	29	28	23	22	Z	31	32	33	33	32	32	31	29	20	18	12	14	15	13	18	23	23	23	21	24.2	33	
5-Jan	20	14	19	20	21	Z	23	27	22	23	21	22	30	36	37	37	35	36	35	34	36	35	33	31	28.1	37	
6-Jan	30	24	14	10	13	7	Z	3	23	22	18	17	20	21	20	15	5	6	3	8	4	2	2	2	12.6	30	
7-Jan	2	Z	2	2	2	2	2	2	2	4	17	34	35	34	33	32	31	28	25	19	16	15	14	12	15.9	35	
8-Jan	11	12	Z	10	6	3	2	2	2	6	12	16	17	15	15	12	9	6	3	2	5	28	30	31	11.0	31	
9-Jan	31	31	31	Z	31	31	31	30	28	27	25	30	28	26	24	15	23	26	18	15	12	9	13	19	24.2	31	
10-Jan	15	14	8	5	Z	9	9	8	7	7	8	10	13	23	22	13	2	2	2	2	2	2	4	8	8.6	23	
11-Jan	15	19	22	23	22	Z	20	23	28	27	33	36	34	34	33	33	33	32	29	29	26	25	22	15	26.7	36	
12-Jan	14	17	16	15	12	6	Z	4	6	11	C	C	C	C	C	23	22	22	19	15	15	17	14	7	14.1	23	
13-Jan	11	Z	21	25	22	21	22	22	10	8	M	15	15	17	18	14	8	3	3	2	2	2	2	2	12.0	25	
14-Jan	2	2	Z	2	4	3	2	5	2	5	8	12	11	16	13	10	7	19	32	39	40	39	38	26	14.7	40	
15-Jan	35	38	38	Z	38	38	38	37	38	38	38	37	37	38	37	37	36	31	26	35	35	28	14	13	33.9	38	
16-Jan	13	22	19	27	Z	23	23	23	25	22	24	32	34	34	32	35	33	29	26	21	39	14	9	27	25.5	39	
17-Jan	28	28	24	30	15	Z	26	23	33	31	31	31	31	31	29	25	6	5	3	2	2	2	2	2	19.2	33	
18-Jan	2	2	2	2	2	2	Z	2	2	2	2	3	3	4	3	3	2	2	2	2	2	2	2	2	2	2.1	4
19-Jan	2	Z	2	6	9	10	11	11	12	12	13	14	19	17	15	17	15	8	9	14	16	16	21	20	12.5	21	
20-Jan	16	14	Z	4	2	2	2	2	2	4	4	6	8	11	14	12	9	6	2	2	2	2	5	5	5.8	16	
21-Jan	5	11	18	Z	19	20	22	22	22	20	23	23	23	24	23	24	23	23	23	24	24	24	24	24	24	21.1	24
22-Jan	26	24	22	22	Z	23	23	23	22	23	23	23	23	24	24	23	22	20	21	21	22	21	21	22	22.5	26	
23-Jan	19	19	17	19	19	Z	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	19	
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	C	C	C	C	C	C	C	6	4	2	1	1	1	1	--	6	
25-Jan	2	Z	4	4	4	3	2	1	1	4	7	10	12	12	11	7	4	1	2	1	1	1	1	1	4.2	12	
26-Jan	2	4	Z	5	4	3	1	1	2	6	9	14	14	14	22	21	29	32	31	30	30	30	29	29	15.8	32	
27-Jan	29	25	27	Z	30	30	32	33	35	35	36	36	36	36	34	34	27	24	27	28	32	32	34	34	31.5	36	
28-Jan	33	34	34	31	Z	30	27	19	13	10	17	14	12	12	12	3	4	3	7	2	2	5	2	17	14.9	34	
29-Jan	35	35	30	32	33	Z	36	36	33	23	21	32	36	36	36	36	34	28	32	32	31	20	27	27	31.3	36	
30-Jan	16	6	28	4	6	36	Z	22	24	25	31	31	29	30	34	32	29	29	30	31	33	34	35	36	26.6	36	
31-Jan	37	Z	37	38	36	35	34	24	28	28	31	30	29	21	34	37	36	37	36	36	35	34	33	32	33.0	38	
17.4 18.2 19.8 16.4 15.9 16.8 19.2 16.9 17.2 16.9 19.3 21.5 22.5 22.7 23.1 20.8 17.9 17.0 16.7 17.0 17.5 16.8 16.5 16.8																								Diurnal Average			
38 38 38 38 38 38 38 37 38 38 38 37 37 38 37 37 36 37 36 39 40 39 38 38 36																								Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance AF - Analyzer Failure																											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																											





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Fort McKay - Bertha Ganter - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	350	51.93	51.93
21 - 50	324	48.07	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 674

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Ozone (O₃) - ppb
Fort McKay - Bertha Ganter - January 2017

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	34	1	0	0	1	1	3	46	176	23	16	7	5	14	10	13	350
21 - 50	72	5	0	0	1	1	5	32	36	26	24	33	41	12	10	26	324
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
Totals	106	6	0	0	2	2	8	78	212	49	40	40	46	26	20	39	674

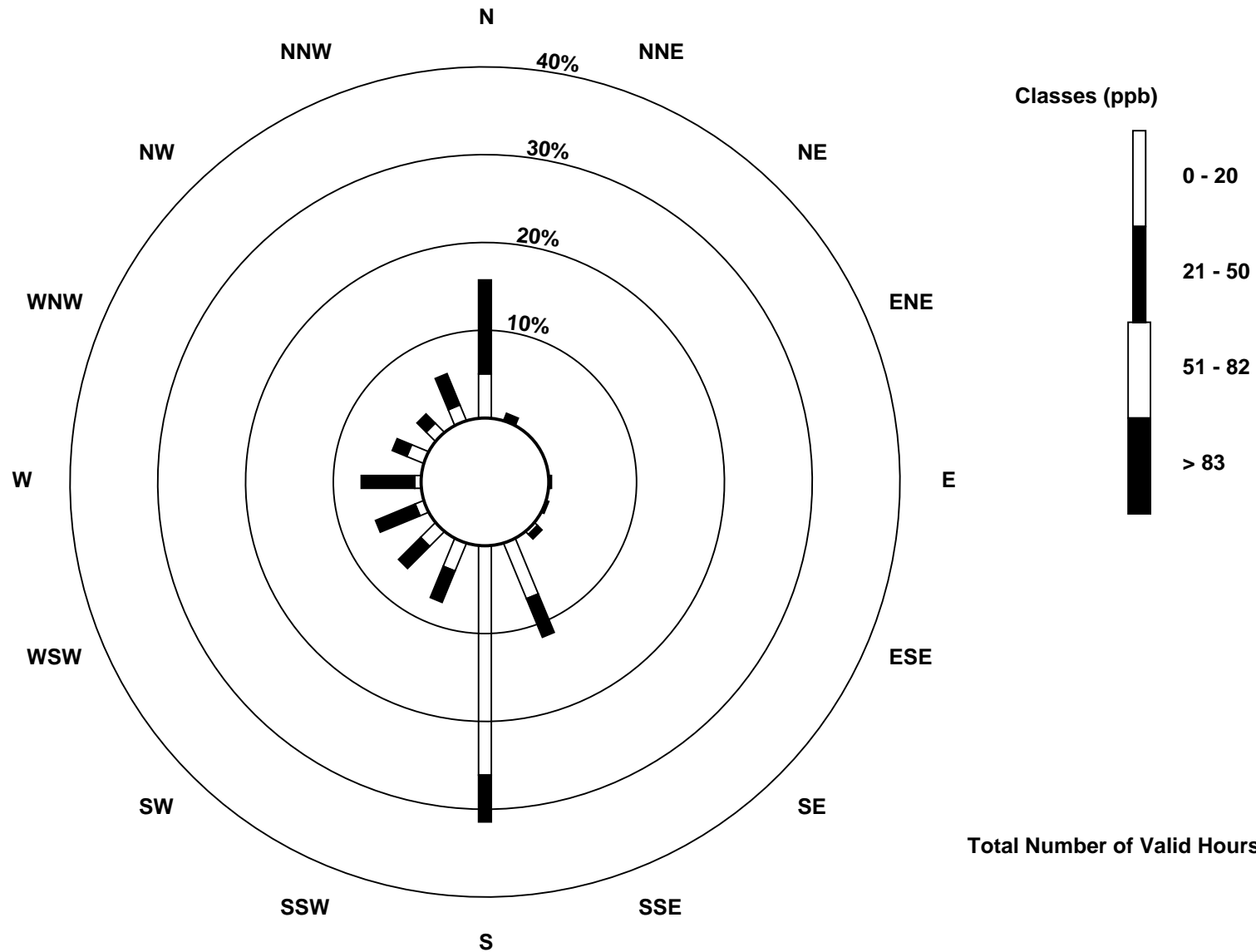
Total Number of Valid Hours: 674

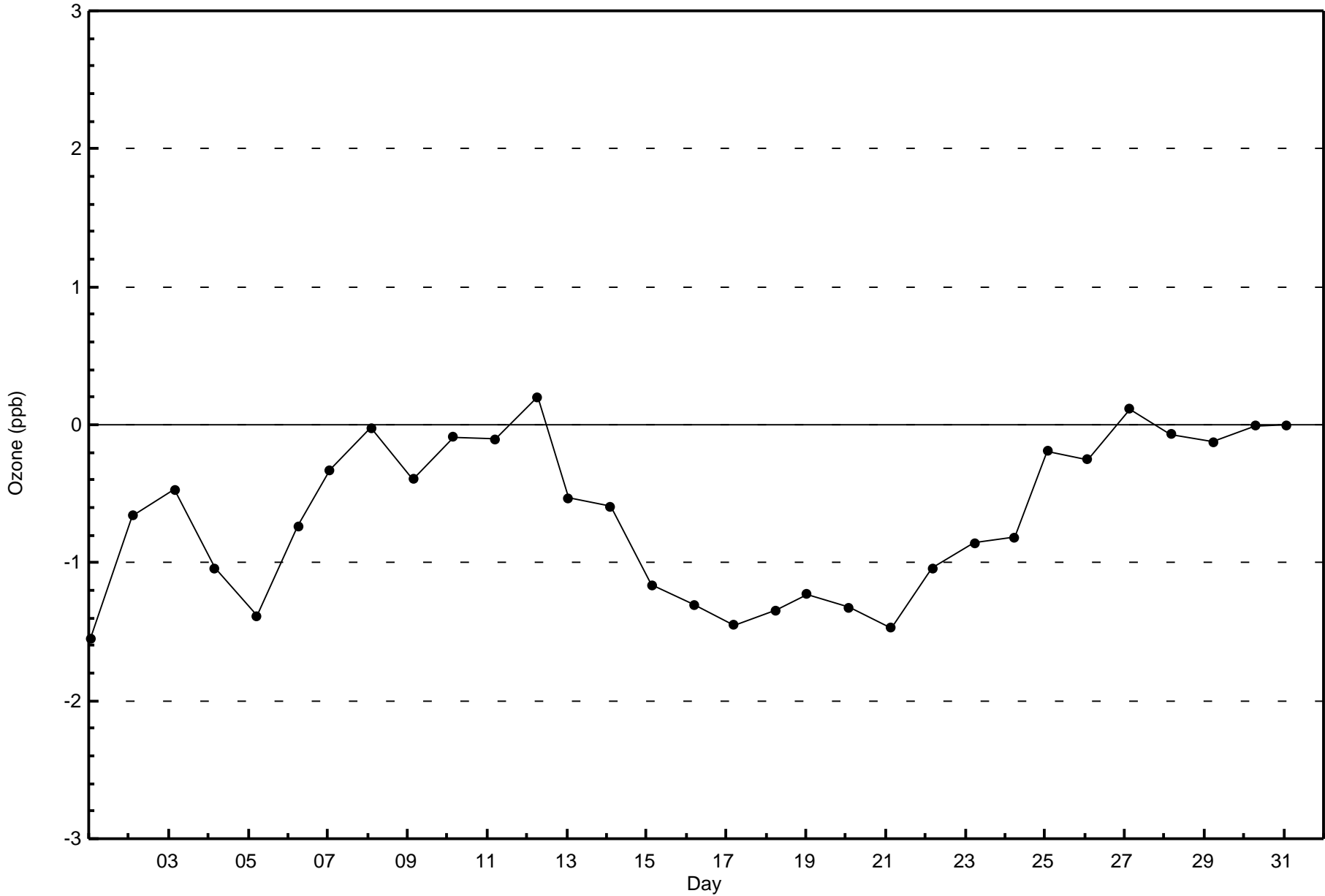
Total Number of Hours: 744

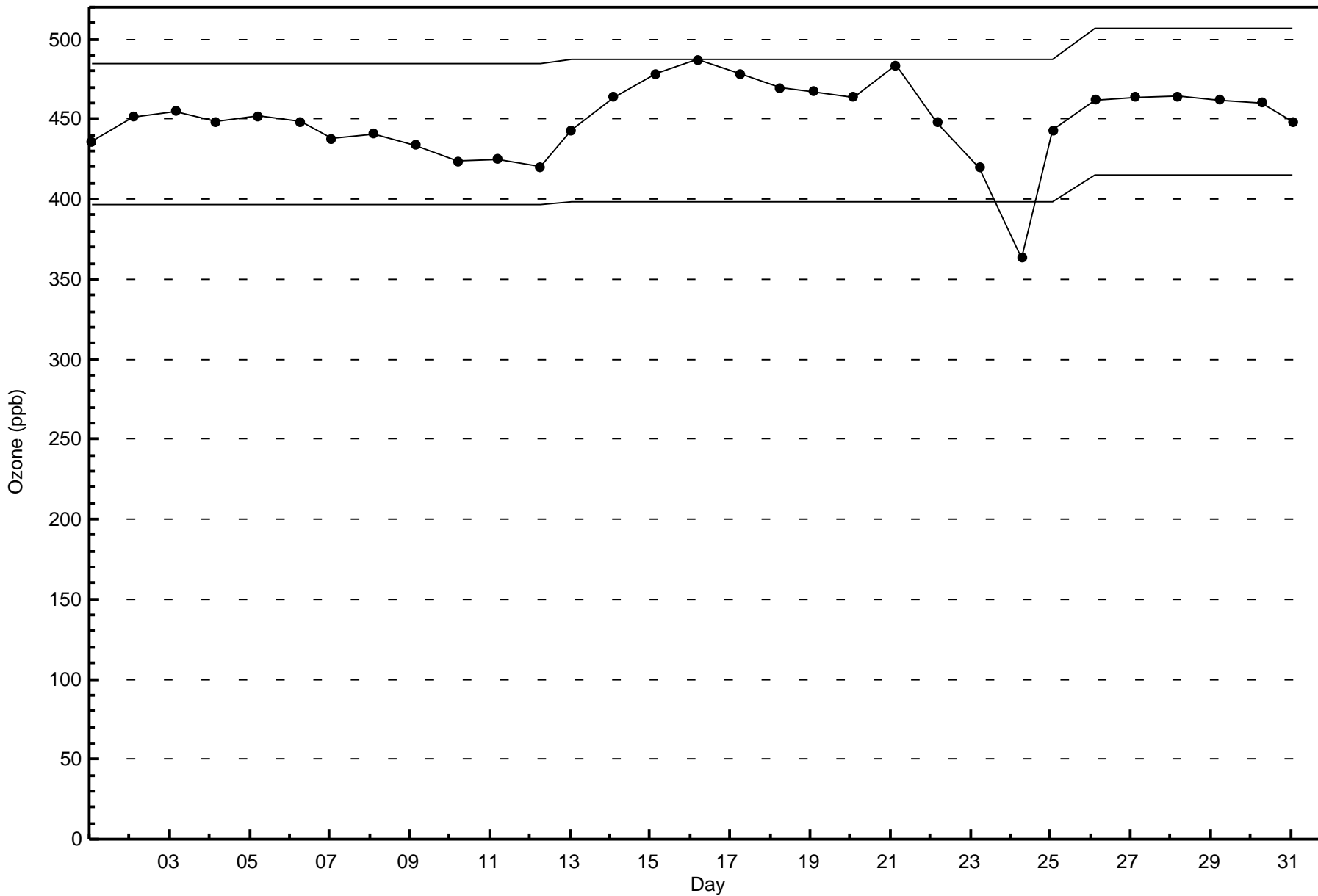


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Ozone (O₃) - ppb
Fort McKay - Bertha Ganter (AMS 1)









Wood Buffalo Environmental Association

Summary of Hour Averages

Particulate Matter 2.5 (PM_{2.5}) - µg/m³

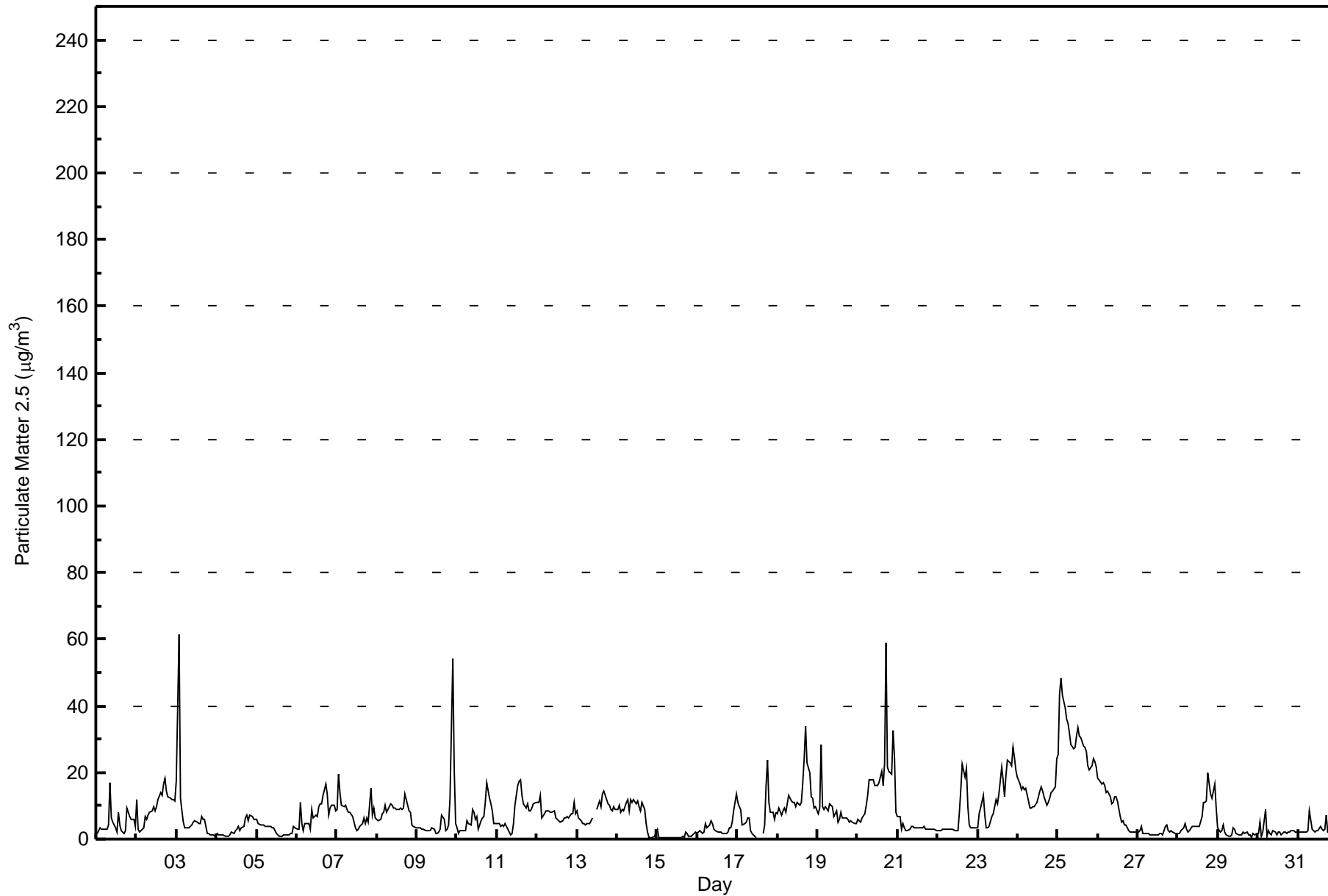
Fort McKay - Bertha Ganter - January 2017

Number of Exceedences (AAAQO):		24-hr: 0		Hours in Service:		744																																										
Maximum Value: 61.6 µg/m ³ on Jan 3 02:00		Maximum Daily Average: 30.3 µg/m ³ on Jan 25		Hours of Data:		739																																										
Minimum Value: 0.3 µg/m ³ on Jan 15 15:00		Minimum Daily Average: 0.8 µg/m ³ on Jan 15		Hours of Missing Data:		5																																										
Maximum Diurnal Average: 11.2 µg/m ³ at hour 18		Minimum Diurnal Average: 6.3 µg/m ³ at hour 7		Hours of Calibration:		2																																										
Monthly Average: 7.74 µg/m ³		Percentiles: P ₁ = 0.3 P ₁₀ = 1.5 Q ₁ = 2.6 Median = 5.3 Q ₃ = 10.2 P ₉₀ = 16.4 P ₉₉ = 36.2		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-Jan	1.7	2.7	3.4	3.1	3.1	3.1	3.0	4.3	17.0	6.4	4.9	3.5	2.2	8.1	4.1	2.4	1.7	2.5	9.5	7.9	6.7	5.9	5.8	3.8	4.9	17.0																						
2-Jan	12.1	3.2	2.0	2.9	3.2	6.6	5.9	7.2	7.9	8.4	9.6	8.6	9.8	11.8	13.8	13.3	16.4	18.0	14.4	12.8	12.1	12.0	11.7	11.6	9.8	18.0																						
3-Jan	17.4	61.6	12.1	8.7	5.3	3.4	3.3	3.2	3.7	4.4	5.0	5.3	5.1	4.6	4.5	7.0	6.1	6.1	1.8	1.8	1.4	1.2	1.1	1.0	7.3	61.6																						
4-Jan	1.5	1.1	1.1	1.1	1.2	0.8	0.8	0.9	1.2	1.9	1.8	2.5	3.0	3.9	2.5	3.2	3.9	6.2	7.1	5.7	7.1	6.8	5.9	6.1	3.2	7.1																						
5-Jan	5.9	4.8	4.4	4.4	4.0	3.7	3.7	3.7	3.9	3.4	3.2	2.6	1.6	0.8	0.7	1.1	1.1	1.1	1.2	1.4	1.5	1.6	3.7	3.3	2.8	5.9																						
6-Jan	3.1	2.8	11.1	4.8	2.7	4.6	4.8	4.8	2.8	8.8	6.3	7.3	6.6	9.8	10.5	10.6	13.0	16.3	13.8	7.4	9.3	10.2	10.1	8.4	7.9	16.3																						
7-Jan	8.8	19.3	14.1	10.3	9.9	10.2	9.0	8.1	7.9	6.7	5.2	3.2	2.6	3.2	3.6	4.8	6.3	4.8	6.2	5.2	15.2	7.2	9.3	6.3	7.8	19.3																						
8-Jan	6.1	5.4	5.8	7.6	8.2	10.2	8.3	9.6	10.5	10.1	9.3	9.4	9.0	9.0	9.3	9.0	9.3	13.4	10.4	8.5	7.9	4.4	3.8	3.4	8.3	13.4																						
9-Jan	3.6	3.4	3.3	3.1	2.8	2.7	2.5	2.7	2.4	3.4	3.1	1.8	1.9	2.0	3.1	7.2	5.8	2.6	3.1	4.2	12.3	54.1	20.9	4.5	6.5	54.1																						
10-Jan	3.3	1.9	2.7	2.4	2.4	2.5	5.6	4.5	4.3	9.0	8.1	5.8	7.0	3.1	5.6	6.4	6.6	11.1	17.1	12.2	10.8	8.3	4.7	4.5	6.2	17.1																						
11-Jan	4.5	4.7	4.0	4.2	3.9	4.7	3.1	2.2	1.5	1.5	4.5	10.0	16.0	17.2	17.9	13.3	10.7	9.4	10.7	8.6	8.6	9.5	10.6	11.2	8.0	17.9																						
12-Jan	11.1	11.1	13.3	6.2	7.8	8.4	8.6	8.4	8.1	8.2	8.4	6.4	6.0	5.4	5.1	5.5	6.4	6.2	6.7	6.5	7.7	7.5	11.0	7.6	7.8	13.3																						
13-Jan	8.4	6.2	5.5	4.5	4.6	4.4	4.5	4.6	5.7	6.6	C	C	9.0	11.6	9.5	13.5	14.3	13.1	10.6	10.2	8.8	8.3	9.9	8.9	8.3	14.3																						
14-Jan	9.1	10.2	8.2	9.0	8.7	11.2	11.8	8.7	11.7	10.8	11.7	10.5	11.5	9.7	8.3	11.1	9.0	4.7	2.1	0.3	0.3	0.3	1.0	2.3	7.6	11.8																						
15-Jan	3.1	0.5	0.4	0.5	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.4	0.3	0.9	0.4	2.2	1.8	0.7	0.7	1.1	1.7	2.1	0.8	3.1																						
16-Jan	1.6	2.7	2.1	1.8	2.2	4.5	3.4	4.3	5.3	4.6	3.0	2.4	2.3	2.3	2.1	1.9	1.9	1.9	2.1	3.2	3.3	5.0	8.7	13.5	3.6	13.5																						
17-Jan	10.8	9.9	8.9	4.2	4.7	5.1	6.2	6.4	2.5	1.7	0.7	0.3	UO	UO	M	1.9	4.1	15.9	23.7	10.9	8.1	8.1	6.0	8.1	7.1	23.7																						
18-Jan	7.6	9.2	7.3	8.6	9.2	8.2	10.8	13.0	11.5	10.9	11.0	9.8	10.8	10.0	10.9	17.1	24.3	34.1	22.9	20.1	12.7	12.5	9.2	9.6	13.0	34.1																						
19-Jan	7.7	9.3	28.4	9.7	8.9	9.5	8.4	10.5	10.0	9.7	6.6	8.6	5.3	5.9	8.0	6.3	6.4	6.5	5.7	5.0	5.3	5.0	4.9	4.8	8.2	28.4																						
20-Jan	5.9	5.3	5.0	6.5	7.7	10.3	13.0	18.0	17.9	17.6	16.2	16.3	15.9	16.7	20.5	16.1	22.9	58.8	21.5	20.2	19.3	32.5	24.8	8.0	17.4	58.8																						
21-Jan	6.7	6.7	3.1	4.7	3.2	2.6	2.7	2.8	3.6	4.0	3.6	3.3	3.5	3.2	3.5	3.5	3.8	3.1	3.0	2.9	2.8	2.8	2.8	2.7	3.5	6.7																						
22-Jan	2.4	2.5	2.6	2.8	3.0	3.0	3.1	2.9	3.1	2.8	2.6	2.5	2.6	8.1	14.7	22.6	18.6	21.3	9.6	4.0	3.4	3.3	3.3	3.2	6.2	22.6																						
23-Jan	3.4	7.5	9.5	13.1	7.1	3.6	3.6	3.9	6.9	7.6	9.6	12.1	10.5	13.8	21.7	18.0	12.6	19.2	23.9	23.0	22.1	27.4	24.6	20.7	13.6	27.4																						
24-Jan	18.6	16.5	14.8	15.7	15.0	15.5	11.5	9.4	9.5	9.6	9.9	11.0	12.5	14.5	15.9	14.4	12.8	10.0	10.9	12.1	13.9	14.4	15.5	24.1	13.7	24.1																						
25-Jan	25.2	43.6	48.5	43.3	39.5	35.9	34.8	31.8	28.5	27.0	27.7	31.1	33.7	30.7	30.6	28.0	27.7	26.4	22.2	20.9	22.2	24.3	23.3	21.4	30.3	48.5																						
26-Jan	18.2	17.9	16.6	17.0	16.0	14.1	14.6	12.6	10.8	10.9	12.8	12.8	11.5	6.9	5.0	5.5	4.3	4.2	2.4	2.3	2.1	2.0	2.0	2.0	9.4	18.2																						
27-Jan	2.1	2.6	4.0	1.7	1.6	1.6	1.5	1.4	1.3	1.4	1.4	1.3	1.5	1.5	1.7	1.4	3.8	4.0	2.4	2.1	2.4	2.2	1.6	1.6	2.0	4.0																						
28-Jan	1.5	1.6	2.6	3.5	4.5	2.8	1.9	2.6	3.7	3.8	4.0	4.0	3.6	4.0	6.7	11.2	10.9	11.6	19.8	13.4	12.1	14.3	16.6	9.1	7.1	19.8																						
29-Jan	3.5	1.9	2.3	4.0	2.2	1.1	0.9	0.9	1.4	3.4	3.1	1.8	1.2	1.3	1.4	2.1	1.5	2.1	1.2	1.2	0.5	1.9	1.4	1.8	1.8	4.0																						
30-Jan	1.8	5.0	1.1	2.2	9.0	0.8	2.5	1.8	1.3	2.4	2.2	1.5	2.2	2.0	1.3	2.3	2.3	1.9	2.1	2.2	2.6	2.6	2.0	2.0	2.4	9.0																						
31-Jan	2.2	2.1	2.1	2.2	2.2	2.3	2.6	8.5	3.2	2.6	2.1	2.4	2.6	3.6	2.8	2.4	3.0	7.2	2.0	1.9	3.0	6.9	9.1	6.1	3.5	9.1																						
																								7.1	9.1	8.1	6.9	6.6	6.4	6.3	6.6	6.8	6.8	6.6	6.6	7.0	7.5	8.2	8.5	8.8	11.2	9.4	7.7	8.0	9.8	8.6	7.2	Diurnal Average
																								25.2	61.6	48.5	43.3	39.5	35.9	34.8	31.8	28.5	27.0	27.7	31.1	33.7	30.7	30.6	28.0	27.7	58.8	23.9	23.0	22.2	54.1	24.8	24.1	Diurnal Maximum
C - Calibration																								M - Maintenance						UO - Unstable Operation																		
Alberta Ambient Air Quality Objectives (AAAQO):																								24-hr						30 µg/m ³																		



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay - Bertha Ganter - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay - Bertha Ganter - January 2017**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	342	46.28	46.28
6 - 15	280	37.89	84.17
16 - 25	61	8.25	92.42
26 - 80	24	3.25	95.67
> 81.0	0	0.00	95.67

Total Number of Valid Hours: 739

Total Number of Hours: 744



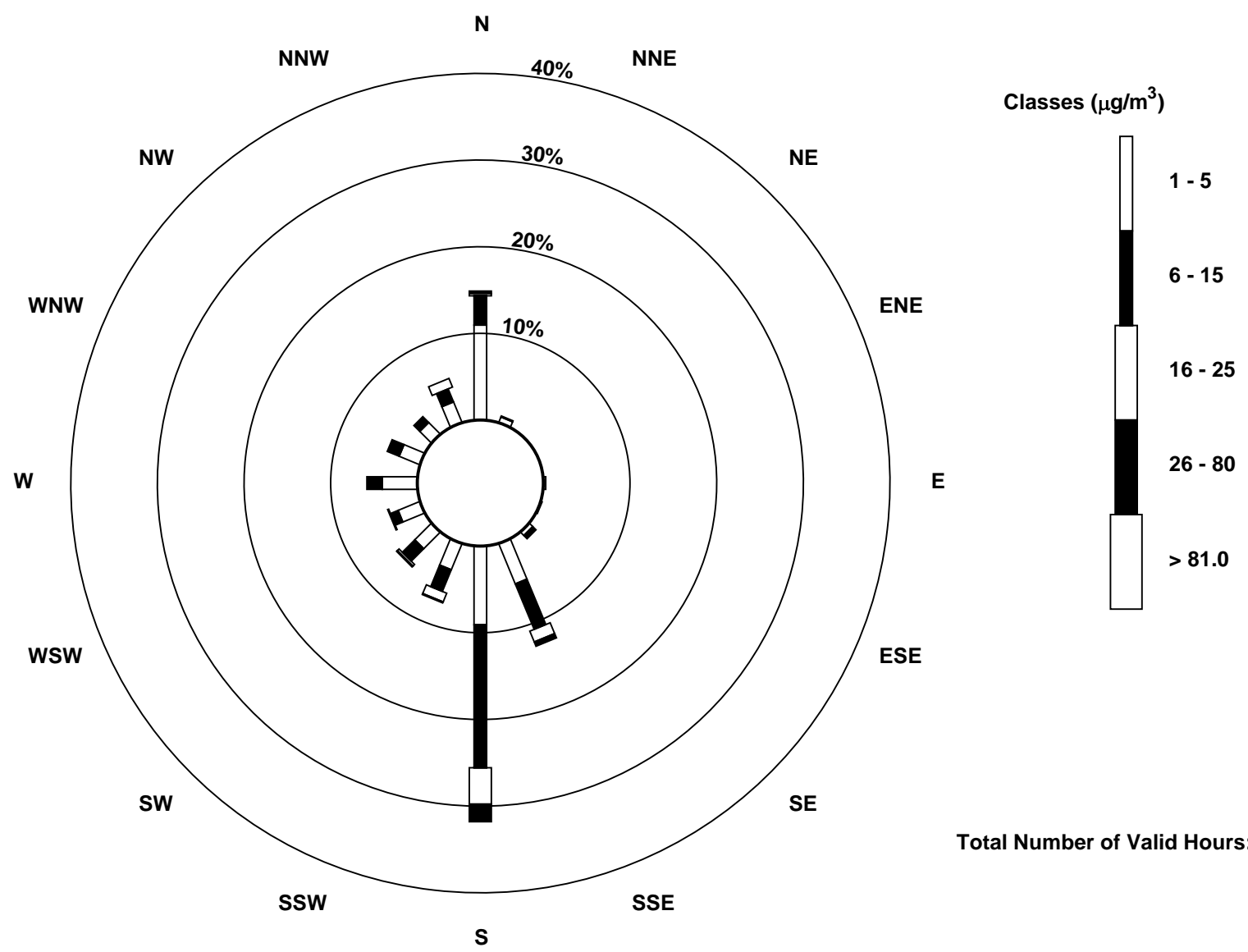
Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay - Bertha Ganter - January 2017

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	81	5	0	0	2	0	4	37	67	24	20	20	30	19	14	19	342
6 - 15	25	1	0	0	0	1	4	42	122	20	15	7	13	11	7	12	280
16 - 25	2	0	0	0	0	0	0	10	31	8	2	0	0	0	0	8	61
26 - 80	2	0	0	0	0	0	0	4	15	1	1	1	0	0	0	0	24
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	110	6	0	0	2	1	8	93	235	53	38	28	43	30	21	39	707

Total Number of Valid Hours: 739

Total Number of Hours: 744



Total Number of Valid Hours: 739

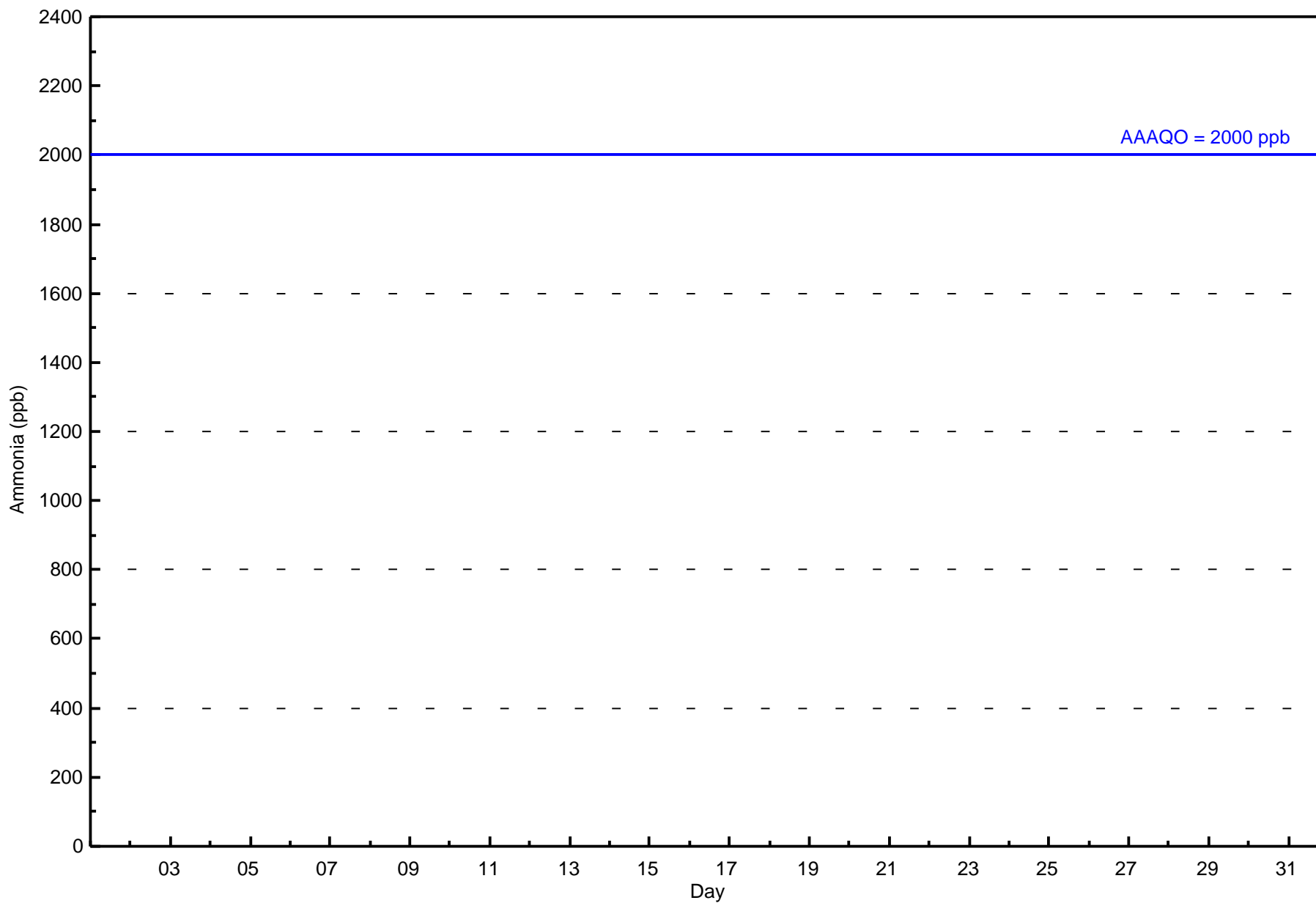


Number of Exceedences (AAAQO): 1-hr: 0										Hours in Service: 744																	
Maximum Value: 0 ppb on Jan 1 01:00										Maximum Daily Average: 0.0 ppb on Jan 1										Hours of Data: 669							
Minimum Value: 0 ppb on Jan 1 01:00										Minimum Daily Average: 0.0 ppb on Jan 1										Hours of Missing Data: 75							
Maximum Diurnal Average: 0.0 ppb at hour 1										Minimum Diurnal Average: 0.0 ppb at hour 1										Hours of Calibration: 43							
Monthly Average: 0.0 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 0										Percent Operational Time: 95.7							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jan	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
2-Jan	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
3-Jan	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
4-Jan	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	0
5-Jan	0	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
6-Jan	0	0	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
7-Jan	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
8-Jan	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
9-Jan	0	0	0	0	0	Z	RE	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
10-Jan	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	0
11-Jan	0	0	0	0	0	0	0	Z	RE	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	--	0
12-Jan	0	0	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
13-Jan	0	0	0	Z	RE	0	0	0	0	C	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	--	0
14-Jan	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
15-Jan	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
16-Jan	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	0
17-Jan	0	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
18-Jan	0	0	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
19-Jan	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
20-Jan	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
21-Jan	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
22-Jan	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	0
23-Jan	0	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
24-Jan	0	0	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
25-Jan	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
26-Jan	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
27-Jan	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
28-Jan	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	0
29-Jan	0	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
30-Jan	0	0	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
31-Jan	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
0.0																								Diurnal Average			
0																								Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance RE - Recovery																											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 2000 ppb																											



Wood Buffalo Environmental Association
Hourly Averages

Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 5	669	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: 669

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter - January 2017

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	97	3	0	0	2	2	8	88	212	52	39	37	47	28	21	33	669
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
Totals	97	3	0	0	2	2	8	88	212	52	39	37	47	28	21	33	669

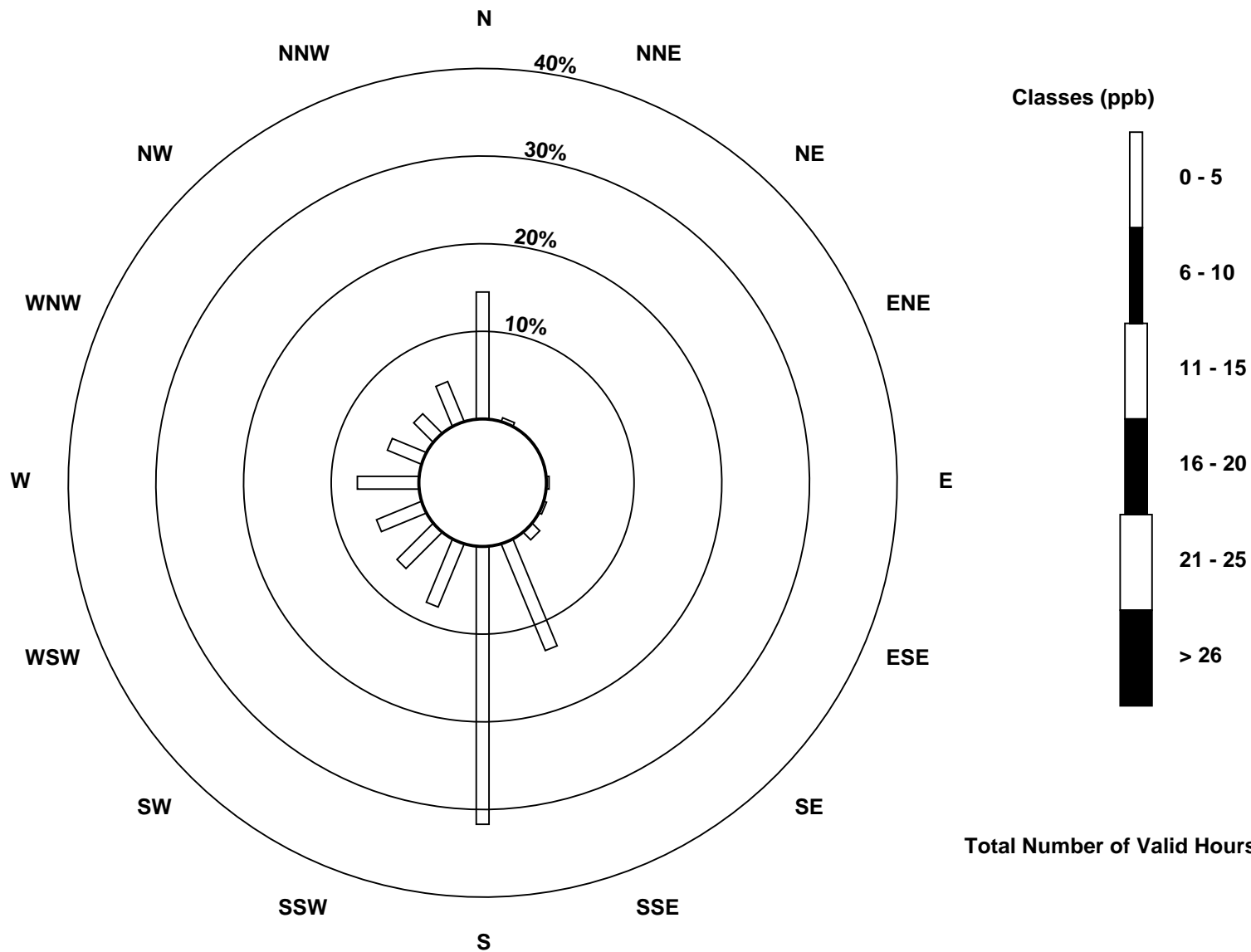
Total Number of Valid Hours: 669

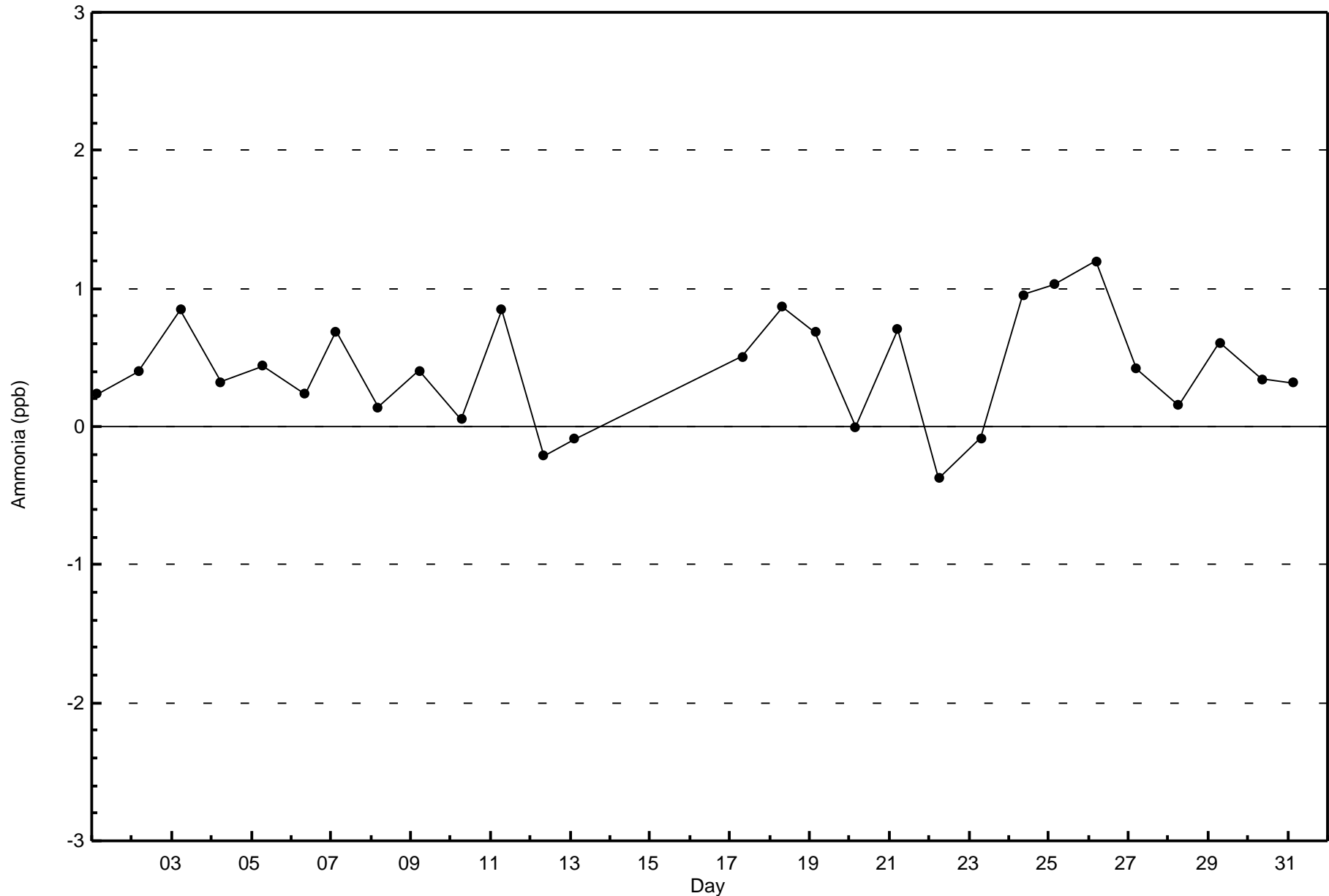
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter (AMS 1)

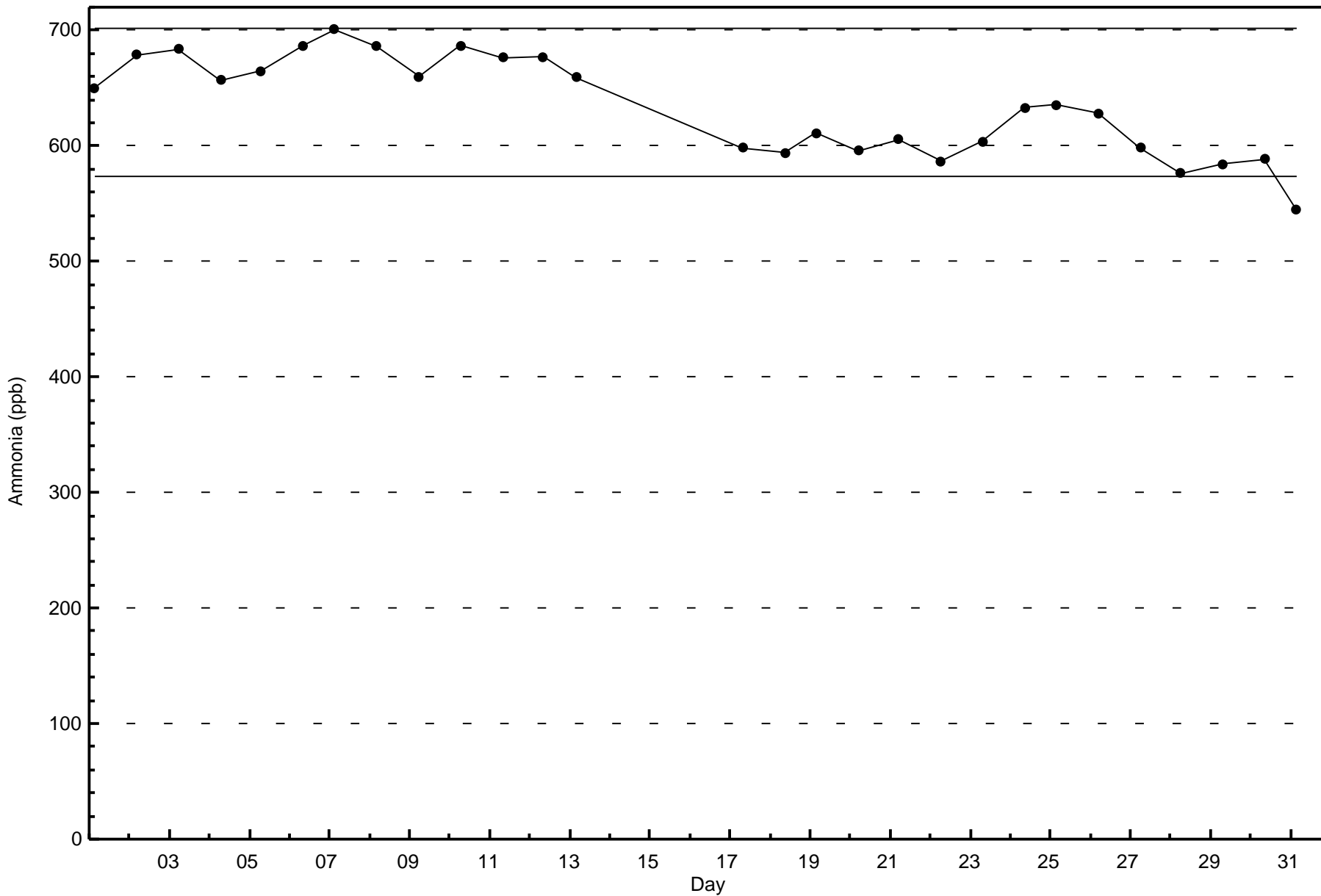






Wood Buffalo Environmental Association
Span Responses

Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter - January 2017





Wood Buffalo Environmental Association
Summary of Hour Averages

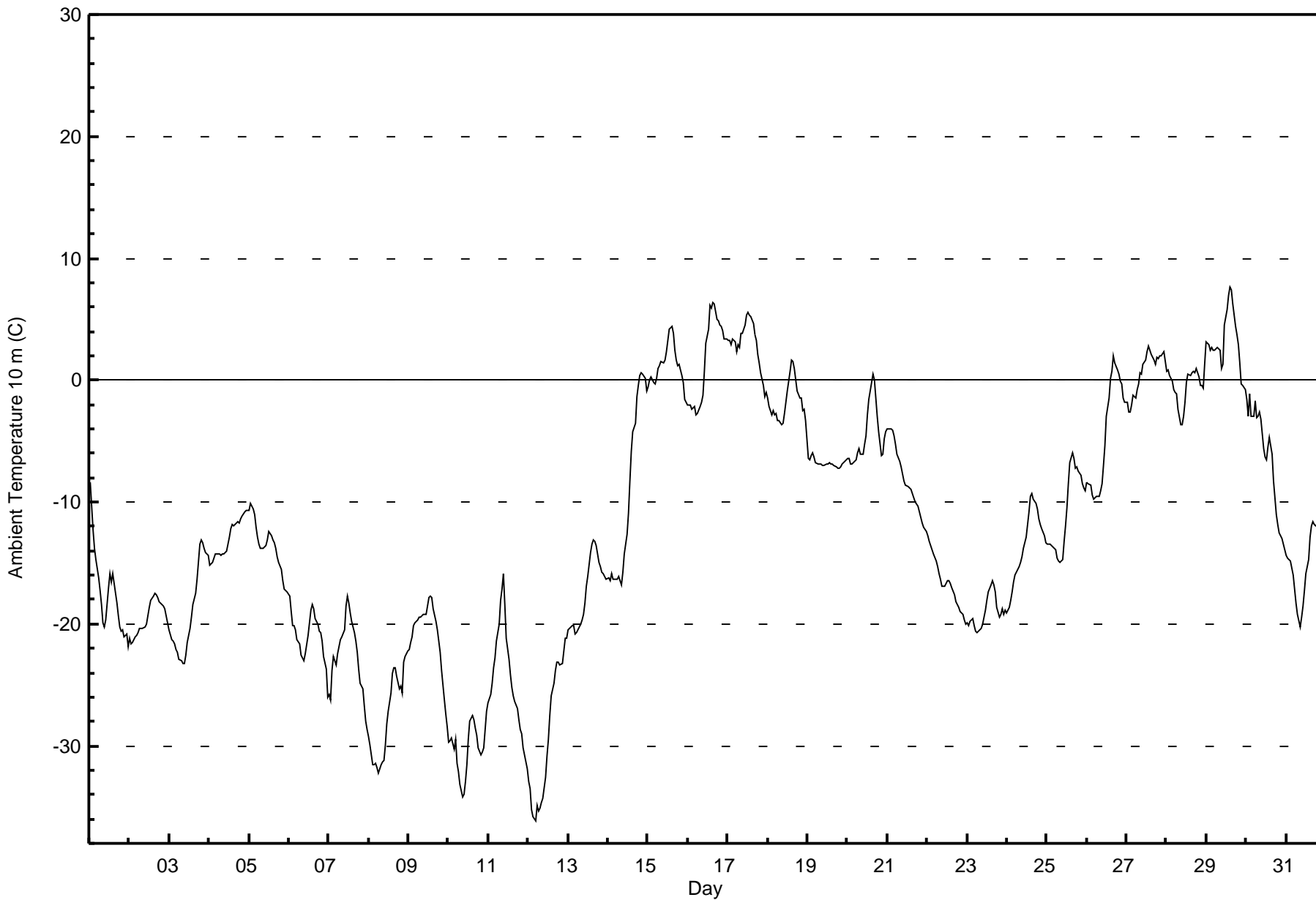
Ambient Temperature 10 m (AT 10m) - C
Fort McKay - Bertha Ganter - January 2017

Maximum Value: 7.6 C on Jan 29 15:00 Minimum Value: -36.2 C on Jan 12 05:00 Maximum Diurnal Average: -10.0 C at hour 16 Monthly Average: -12.34 C		Maximum Daily Average: 3.2 C on Jan 29 Minimum Daily Average: -30.2 C on Jan 10 Minimum Diurnal Average: -13.8 C at hour 9 Percentiles: P ₁ = -34.3 P ₁₀ = -25.3 Q ₁ = -20.0 Median = -13.4 Q ₃ = -2.8 P ₉₀ = 1.5 P ₉₉ = 6.0		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 Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	-8.4	-10.3	-12.3	-13.8	-14.7	-16.2	-17.3	-18.4	-19.9	-20.3	-19.6	-17.1	-15.8	-16.5	-15.8	-16.6	-18.3	-19.3	-20.3	-20.6	-20.5	-21.0	-20.9	-21.9	-17.3	-8.4
2-Jan	-21.2	-21.6	-21.5	-21.1	-20.9	-20.7	-20.4	-20.4	-20.4	-20.3	-20.0	-19.3	-18.6	-18.0	-17.7	-17.5	-17.6	-17.9	-18.1	-18.2	-18.5	-18.8	-19.3	-19.9	-19.5	-17.5
3-Jan	-20.5	-21.3	-21.4	-21.6	-22.1	-22.4	-22.9	-23.0	-23.3	-23.2	-22.6	-21.5	-20.4	-19.4	-18.4	-18.0	-17.5	-16.3	-13.5	-13.1	-13.3	-13.9	-14.1	-14.4	-19.1	-13.1
4-Jan	-15.1	-15.1	-14.9	-14.6	-14.2	-14.3	-14.3	-14.4	-14.3	-14.2	-14.0	-13.5	-12.9	-12.2	-11.9	-11.9	-11.7	-11.6	-11.7	-11.4	-11.1	-10.8	-10.7	-10.7	-13.0	-10.7
5-Jan	-10.7	-10.1	-10.5	-11.0	-12.0	-12.8	-13.4	-13.8	-13.8	-13.7	-13.5	-13.1	-12.4	-12.8	-13.1	-13.3	-13.8	-14.4	-14.9	-15.6	-16.4	-17.1	-17.2	-17.4	-13.6	-10.1
6-Jan	-17.7	-19.0	-20.1	-20.2	-20.5	-21.3	-21.6	-22.5	-22.8	-23.1	-22.4	-20.9	-19.9	-18.9	-18.4	-18.7	-19.6	-20.0	-20.6	-20.8	-21.4	-22.6	-23.7	-26.0	-20.9	-17.7
7-Jan	-25.8	-26.3	-23.8	-22.6	-23.4	-22.5	-21.9	-21.2	-21.0	-20.5	-18.5	-17.7	-18.3	-19.1	-19.7	-20.7	-21.4	-22.4	-23.7	-24.8	-25.3	-26.7	-28.0	-28.7	-22.7	-17.7
8-Jan	-29.3	-30.0	-31.5	-31.5	-31.5	-31.8	-32.2	-31.6	-31.3	-31.2	-29.9	-28.2	-27.2	-25.7	-24.1	-23.6	-23.6	-24.3	-25.3	-25.1	-25.6	-23.1	-22.6	-22.2	-27.6	-22.2
9-Jan	-22.1	-21.5	-21.1	-20.2	-19.9	-19.6	-19.4	-19.4	-19.3	-19.2	-19.3	-18.5	-17.9	-17.7	-17.8	-18.8	-19.8	-20.5	-21.4	-22.3	-23.8	-26.2	-27.4	-28.4	-20.9	-17.7
10-Jan	-29.7	-29.6	-29.4	-30.2	-29.5	-31.4	-32.2	-33.1	-34.2	-34.0	-32.9	-31.5	-29.5	-27.9	-27.6	-27.9	-28.5	-29.1	-30.1	-30.7	-30.5	-30.2	-28.7	-27.2	-30.2	-27.2
11-Jan	-26.4	-25.7	-24.9	-23.6	-22.8	-21.4	-20.1	-18.1	-17.1	-15.9	-18.4	-21.2	-22.9	-24.2	-25.2	-25.9	-26.4	-27.0	-27.9	-28.7	-29.0	-30.2	-30.7	-31.8	-24.4	-15.9
12-Jan	-32.9	-33.5	-35.2	-35.8	-36.2	-34.9	-35.4	-35.2	-34.7	-34.3	-32.6	-30.9	-29.5	-27.5	-25.9	-24.8	-23.8	-23.1	-23.1	-23.4	-23.3	-22.2	-21.2	-21.1	-29.2	-21.1
13-Jan	-20.5	-20.3	-20.2	-20.1	-20.8	-20.7	-20.5	-20.1	-19.6	-19.2	-18.3	-16.9	-16.1	-14.2	-13.4	-13.1	-13.2	-13.6	-15.0	-15.2	-15.8	-15.9	-16.1	-16.3	-17.3	-13.1
14-Jan	-16.2	-16.5	-15.9	-16.4	-16.4	-16.3	-16.1	-16.5	-16.8	-15.7	-14.2	-12.6	-10.9	-8.3	-5.8	-4.3	-3.5	-1.3	-0.5	0.4	0.6	0.5	0.1	-0.8	-9.3	0.6
15-Jan	-0.6	0.0	0.2	-0.2	-0.4	0.1	1.0	1.2	1.5	1.4	1.7	2.3	3.2	4.2	4.5	3.8	2.5	1.6	1.2	1.3	0.4	-0.2	-1.6	-1.8	1.1	4.5
16-Jan	-2.0	-2.1	-2.4	-2.3	-2.1	-2.8	-2.8	-2.2	-1.8	-1.2	0.8	3.1	4.2	6.1	5.9	6.3	6.3	5.0	4.9	4.5	4.4	4.0	3.4	3.4	1.7	6.3
17-Jan	3.3	3.3	3.0	3.4	3.2	2.4	2.9	2.7	3.9	3.9	4.6	5.3	5.5	5.3	5.2	4.7	3.7	3.3	2.1	1.4	0.6	-0.4	-1.4	-1.0	3.0	5.5
18-Jan	-1.5	-2.1	-2.8	-2.5	-2.8	-2.8	-3.3	-3.4	-3.6	-3.5	-2.8	-1.8	-0.9	0.7	1.6	1.5	1.0	0.1	-0.9	-1.5	-1.5	-2.5	-2.4	-3.3	-1.7	1.6
19-Jan	-6.5	-6.6	-6.1	-5.9	-6.3	-6.8	-6.9	-6.9	-6.9	-7.0	-7.0	-6.9	-6.9	-6.8	-6.9	-6.9	-7.0	-7.1	-7.2	-7.2	-7.1	-6.9	-6.7	-6.5	-6.8	-5.9
20-Jan	-6.4	-6.4	-6.9	-6.9	-6.7	-6.6	-6.0	-5.6	-6.1	-6.0	-5.3	-4.6	-2.8	-1.6	-0.2	0.5	0.0	-1.5	-3.0	-4.2	-6.2	-6.0	-4.8	-4.2	-4.5	0.5
21-Jan	-4.0	-4.0	-4.0	-4.2	-4.6	-5.3	-6.0	-6.7	-7.1	-7.7	-8.3	-8.6	-8.7	-8.8	-9.0	-9.3	-9.6	-10.0	-10.4	-10.8	-11.3	-11.8	-12.1	-12.4	-8.1	-4.0
22-Jan	-12.8	-13.2	-13.6	-13.9	-14.3	-14.9	-15.3	-15.9	-16.3	-16.9	-16.9	-16.7	-16.4	-16.4	-16.7	-17.1	-17.6	-18.1	-18.4	-18.6	-18.9	-19.2	-19.7	-20.0	-16.6	-12.8
23-Jan	-19.9	-20.1	-19.8	-19.5	-20.1	-20.6	-20.7	-20.6	-20.3	-20.0	-19.5	-18.9	-18.0	-17.4	-16.8	-16.4	-16.8	-17.4	-18.6	-19.4	-19.2	-18.7	-19.2	-18.9	-19.0	-16.4
24-Jan	-19.1	-18.6	-18.0	-17.3	-16.5	-16.0	-15.5	-15.3	-14.9	-14.5	-13.8	-12.9	-11.9	-10.8	-9.5	-9.2	-9.7	-10.1	-10.6	-11.4	-11.8	-12.2	-12.7	-13.3	-13.6	-9.2
25-Jan	-13.4	-13.4	-13.5	-13.6	-13.7	-13.9	-14.6	-14.8	-15.0	-14.7	-13.2	-12.0	-10.5	-8.5	-6.8	-5.9	-6.4	-7.2	-7.1	-7.5	-7.8	-8.4	-8.8	-9.1	-10.8	-5.9
26-Jan	-8.4	-8.5	-8.6	-9.4	-9.7	-9.7	-9.6	-9.5	-9.1	-8.5	-7.0	-5.4	-3.0	-1.5	0.2	0.7	2.0	1.4	0.9	0.5	-0.1	-0.3	-1.4	-1.8	-4.4	2.0
27-Jan	-1.8	-2.6	-2.6	-2.0	-1.3	-1.4	-0.8	-0.3	0.6	0.5	1.3	1.6	2.4	2.8	2.5	2.1	1.6	1.3	1.9	1.8	2.0	2.0	2.3	1.5	0.6	2.8
28-Jan	0.7	0.8	0.4	-0.1	-0.8	-1.0	-1.1	-2.3	-3.7	-3.7	-3.0	-1.9	-0.2	0.5	0.4	0.6	0.8	0.6	0.9	0.3	-0.4	-0.5	-0.7	1.3	-0.5	1.3
29-Jan	3.2	2.9	2.5	2.7	2.5	2.5	2.7	2.6	2.5	1.0	1.3	4.5	5.8	7.0	7.6	7.5	6.3	4.4	3.8	2.9	1.4	-0.3	-0.4	-0.8	3.2	7.6
30-Jan	-1.6	-3.0	-1.1	-3.0	-2.9	-1.7	-3.0	-3.0	-2.7	-3.2	-5.6	-6.3	-6.6	-5.5	-4.7	-6.1	-8.2	-9.7	-11.0	-11.8	-12.5	-13.0	-13.4	-13.9	-6.4	-1.1
31-Jan	-14.4	-14.6	-14.9	-15.5	-16.0	-17.1	-18.3	-19.2	-20.3	-19.5	-18.5	-17.3	-15.8	-14.7	-12.9	-12.0	-11.7	-11.9	-11.9	-11.8	-11.3	-11.0	-11.1	-10.9	-14.7	-10.9
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	184	24.73	24.73
-20 - 0	443	59.54	84.27
0 - 10	117	15.73	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature 2m (AT 2m) - C

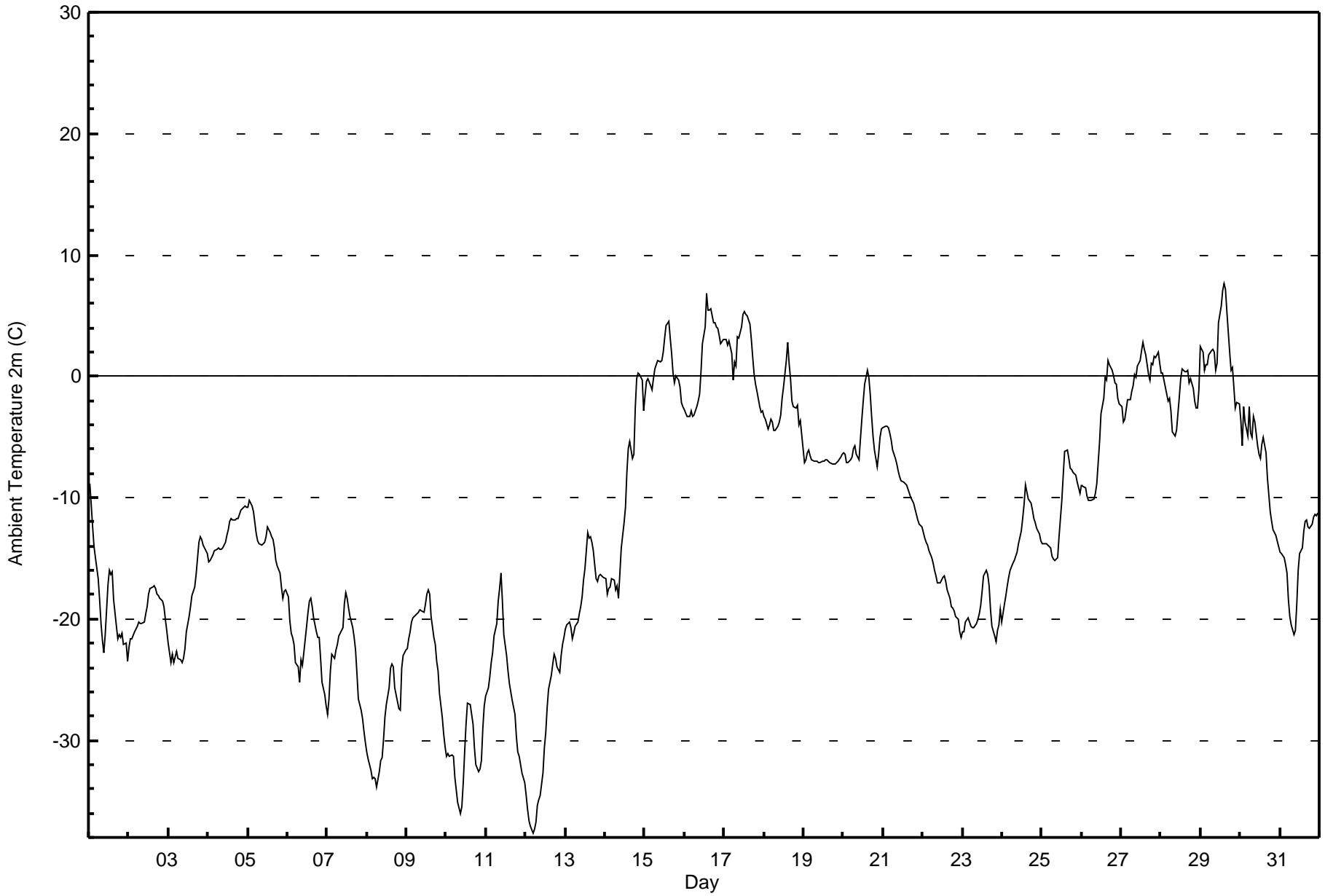
Fort McKay - Bertha Ganter - January 2017

Maximum Value: 7.7 C on Jan 29 15:00		Maximum Daily Average: 2.0 C on Jan 29		Hours in Service: 744																																													
Minimum Value: -37.6 C on Jan 12 05:00		Minimum Daily Average: -31.2 C on Jan 10		Hours of Data: 744																																													
Maximum Diurnal Average: -9.9 C at hour 15		Minimum Diurnal Average: -14.4 C at hour 8		Hours of Missing Data: 0																																													
Monthly Average: -12.90 C		Percentiles: P ₁ = -35.4 P ₁₀ = -26.3 Q ₁ = -20.6 Median = -13.6 Q ₃ = -3.8 P ₉₀ = 0.6 P ₉₉ = 5.4		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-Jan	-8.8	-10.6	-12.5	-14.0	-15.0	-16.6	-18.5	-20.3	-21.8	-22.8	-21.3	-17.2	-16.0	-16.3	-16.2	-18.5	-20.5	-21.6	-21.3	-21.6	-21.2	-22.1	-22.0	-23.5	-18.3	-8.8																							
2-Jan	-22.3	-21.7	-21.6	-21.1	-20.8	-20.6	-20.2	-20.3	-20.4	-20.2	-19.6	-19.0	-17.9	-17.5	-17.4	-17.3	-17.5	-17.9	-18.1	-18.2	-18.6	-19.0	-20.0	-21.0	-19.5	-17.3																							
3-Jan	-21.9	-23.6	-22.9	-23.6	-23.2	-22.7	-23.3	-23.4	-23.6	-23.3	-22.4	-21.1	-19.7	-19.0	-18.1	-17.7	-17.4	-16.4	-13.7	-13.2	-13.4	-13.9	-14.2	-14.6	-19.4	-13.2																							
4-Jan	-15.3	-15.2	-15.0	-14.8	-14.4	-14.3	-14.1	-14.2	-14.2	-14.1	-13.7	-13.1	-12.7	-12.0	-11.7	-11.8	-11.7	-11.7	-11.7	-11.4	-11.1	-10.8	-10.6	-10.8	-12.9	-10.6																							
5-Jan	-10.8	-10.2	-10.7	-11.1	-12.1	-13.0	-13.5	-13.8	-13.9	-13.8	-13.7	-13.2	-12.4	-12.9	-13.2	-13.4	-14.2	-15.1	-15.7	-16.3	-17.4	-18.3	-17.8	-17.6	-13.9	-10.2																							
6-Jan	-18.1	-20.1	-21.2	-21.5	-22.1	-23.6	-23.9	-25.2	-23.4	-23.9	-22.8	-20.6	-19.4	-18.5	-18.3	-19.0	-19.9	-21.0	-21.5	-21.5	-23.3	-25.2	-26.3	-27.2	-22.0	-18.1																							
7-Jan	-27.9	-26.6	-24.3	-22.9	-23.3	-22.5	-22.1	-21.4	-21.2	-20.7	-18.8	-17.8	-18.3	-19.1	-19.8	-20.7	-21.5	-22.6	-24.5	-26.6	-27.5	-28.2	-29.2	-30.2	-23.2	-17.8																							
8-Jan	-31.0	-31.5	-32.5	-33.2	-33.0	-33.1	-33.9	-32.6	-31.7	-31.5	-30.0	-28.1	-27.1	-25.7	-24.1	-23.7	-24.0	-25.6	-26.8	-27.3	-27.5	-24.0	-23.1	-22.6	-28.5	-22.6																							
9-Jan	-22.5	-21.6	-21.1	-20.2	-19.9	-19.7	-19.5	-19.5	-19.2	-19.3	-19.5	-18.7	-17.9	-17.7	-18.0	-19.8	-21.5	-22.1	-23.4	-24.3	-26.1	-28.1	-29.5	-30.5	-21.7	-17.7																							
10-Jan	-31.3	-31.0	-31.3	-31.2	-31.3	-33.0	-34.0	-35.1	-36.1	-35.4	-33.5	-31.0	-28.7	-27.0	-27.1	-27.9	-28.7	-30.6	-32.0	-32.5	-32.4	-31.7	-29.1	-27.2	-31.2	-27.0																							
11-Jan	-26.4	-25.7	-24.8	-23.6	-22.8	-21.4	-20.3	-18.6	-17.4	-16.2	-18.5	-21.3	-23.0	-24.3	-25.3	-26.0	-26.7	-27.8	-29.8	-31.0	-31.3	-32.1	-32.7	-33.5	-25.0	-16.2																							
12-Jan	-34.5	-35.7	-36.6	-37.1	-37.6	-37.3	-36.7	-35.4	-34.9	-34.5	-32.7	-30.7	-29.3	-27.3	-25.8	-24.7	-23.7	-22.9	-23.3	-23.9	-24.4	-23.1	-22.1	-21.5	-29.8	-21.5																							
13-Jan	-20.9	-20.5	-20.3	-20.7	-21.7	-21.2	-20.6	-20.3	-19.5	-19.0	-18.2	-16.8	-15.9	-12.9	-13.3	-13.2	-13.6	-14.3	-16.7	-16.9	-16.4	-16.3	-16.5	-16.6	-17.6	-12.9																							
14-Jan	-16.6	-17.9	-17.5	-17.3	-16.7	-16.8	-17.6	-17.2	-18.3	-16.2	-14.2	-12.1	-10.8	-7.9	-6.0	-5.4	-6.8	-6.4	-2.6	-0.2	0.2	0.2	-0.3	-2.8	-10.3	0.2																							
15-Jan	-1.6	-0.4	-0.2	-0.7	-1.1	-0.2	0.7	0.9	1.3	1.2	1.3	2.0	3.1	4.2	4.5	3.1	1.9	0.3	-0.5	0.1	-0.3	-0.9	-2.2	-2.5	0.6	4.5																							
16-Jan	-2.7	-3.3	-3.3	-3.3	-2.8	-3.3	-3.2	-2.5	-2.1	-1.5	0.4	2.7	4.1	6.8	5.4	5.5	5.6	4.4	4.5	4.1	3.9	3.3	2.7	3.1	1.2	6.8																							
17-Jan	3.1	3.0	2.5	2.9	1.9	-0.3	1.2	0.8	3.3	3.1	4.0	5.1	5.3	5.1	5.0	4.3	3.0	1.6	0.1	-0.6	-1.3	-2.6	-3.0	-2.9	1.9	5.3																							
18-Jan	-3.3	-3.5	-4.4	-4.1	-3.6	-3.8	-4.5	-4.4	-4.1	-3.8	-3.2	-1.9	-0.9	1.3	2.8	1.1	-0.2	-2.0	-2.5	-2.6	-2.4	-4.0	-3.7	-4.8	-2.6	2.8																							
19-Jan	-7.1	-6.9	-6.3	-6.1	-6.5	-6.9	-7.0	-7.0	-7.0	-7.1	-7.1	-7.0	-7.0	-6.9	-6.9	-7.0	-7.1	-7.2	-7.3	-7.3	-7.2	-7.0	-6.7	-6.4	-6.9	-6.1																							
20-Jan	-6.3	-6.4	-7.1	-7.1	-6.9	-6.7	-6.0	-5.7	-6.4	-6.9	-5.1	-3.6	-2.0	-0.7	0.5	-0.1	-1.5	-3.3	-4.9	-6.1	-7.5	-6.4	-5.0	-4.4	-4.8	0.5																							
21-Jan	-4.2	-4.1	-4.1	-4.3	-4.7	-5.3	-6.1	-6.8	-7.2	-7.8	-8.3	-8.6	-8.7	-8.8	-9.0	-9.3	-9.7	-10.0	-10.5	-10.9	-11.4	-11.8	-12.2	-12.5	-8.2	-4.1																							
22-Jan	-12.8	-13.3	-13.7	-14.0	-14.4	-14.9	-15.4	-16.0	-16.4	-17.0	-17.0	-16.8	-16.5	-16.4	-17.0	-17.6	-18.3	-18.9	-19.1	-19.3	-19.8	-20.1	-21.1	-21.5	-17.0	-12.8																							
23-Jan	-21.0	-21.0	-20.2	-19.9	-20.2	-20.6	-20.7	-20.7	-20.4	-20.0	-19.5	-18.9	-17.7	-16.4	-16.0	-16.3	-17.3	-19.3	-20.6	-21.4	-21.9	-21.0	-20.4	-19.3	-19.6	-16.0																							
24-Jan	-20.3	-18.7	-18.1	-17.2	-16.5	-16.0	-15.4	-15.2	-14.9	-14.5	-13.8	-12.8	-11.7	-10.6	-9.0	-9.5	-10.1	-10.4	-11.0	-11.7	-12.1	-12.6	-13.0	-13.6	-13.7	-9.0																							
25-Jan	-13.7	-13.8	-13.8	-13.9	-14.0	-14.1	-14.9	-15.1	-15.2	-14.9	-13.2	-11.8	-10.2	-8.1	-6.2	-6.1	-6.8	-7.6	-7.6	-7.9	-8.1	-8.8	-9.2	-9.6	-11.0	-6.1																							
26-Jan	-8.9	-9.1	-9.2	-9.9	-10.2	-10.2	-10.2	-10.1	-9.6	-8.8	-7.1	-5.4	-3.1	-1.8	-0.1	-0.4	1.3	1.0	0.5	0.1	-0.5	-0.7	-1.9	-2.3	-4.9	1.3																							
27-Jan	-2.5	-3.8	-3.5	-2.7	-1.9	-2.0	-1.3	-0.7	0.1	0.0	0.8	1.3	2.1	2.8	2.2	1.7	0.1	-0.4	1.1	1.0	1.7	1.6	2.0	1.1	0.0	2.8																							
28-Jan	0.3	0.3	-0.3	-1.4	-2.0	-1.8	-2.8	-4.6	-4.9	-4.5	-3.1	-1.7	-0.2	0.6	0.3	0.4	0.5	-0.6	-0.2	-1.0	-2.0	-2.6	-2.6	-1.1	-1.5	0.6																							
29-Jan	2.4	2.0	0.5	0.9	1.0	1.8	2.1	2.2	2.0	0.4	1.1	4.4	5.7	7.0	7.7	7.2	5.4	2.0	0.5	0.7	-0.9	-2.6	-2.2	-2.3	2.0	7.7																							
30-Jan	-3.7	-5.8	-2.5	-3.7	-4.9	-2.5	-4.7	-5.0	-3.3	-3.8	-5.7	-6.4	-6.7	-5.7	-5.0	-6.3	-8.3	-9.8	-11.1	-11.9	-12.7	-13.1	-13.5	-14.0	-7.1	-2.5																							
31-Jan	-14.5	-14.7	-15.0	-15.6	-16.3	-18.5	-19.8	-20.4	-21.3	-20.9	-18.7	-15.9	-14.7	-14.1	-12.8	-12.0	-11.8	-12.4	-12.6	-12.2	-11.7	-11.4	-11.4	-11.3	-15.0	-11.3																							
																								-13.7	-13.9	-13.9	-13.9	-14.1	-14.2	-14.4	-14.4	-14.2	-14.1	-13.3	-12.1	-11.2	-10.3	-9.9	-10.3	-11.0	-11.9	-12.3	-12.6	-13.0	-13.3	-13.4	-13.7	Diurnal Average	
																								3.1	3.0	2.5	2.9	1.9	1.8	2.1	2.2	3.3	3.1	4.0	5.1	5.7	7.0	7.7	7.2	5.6	4.4	4.5	4.1	3.9	3.3	2.7	3.1	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	205	27.55	27.55
-20 - 0	444	59.68	87.23
0 - 10	95	12.77	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

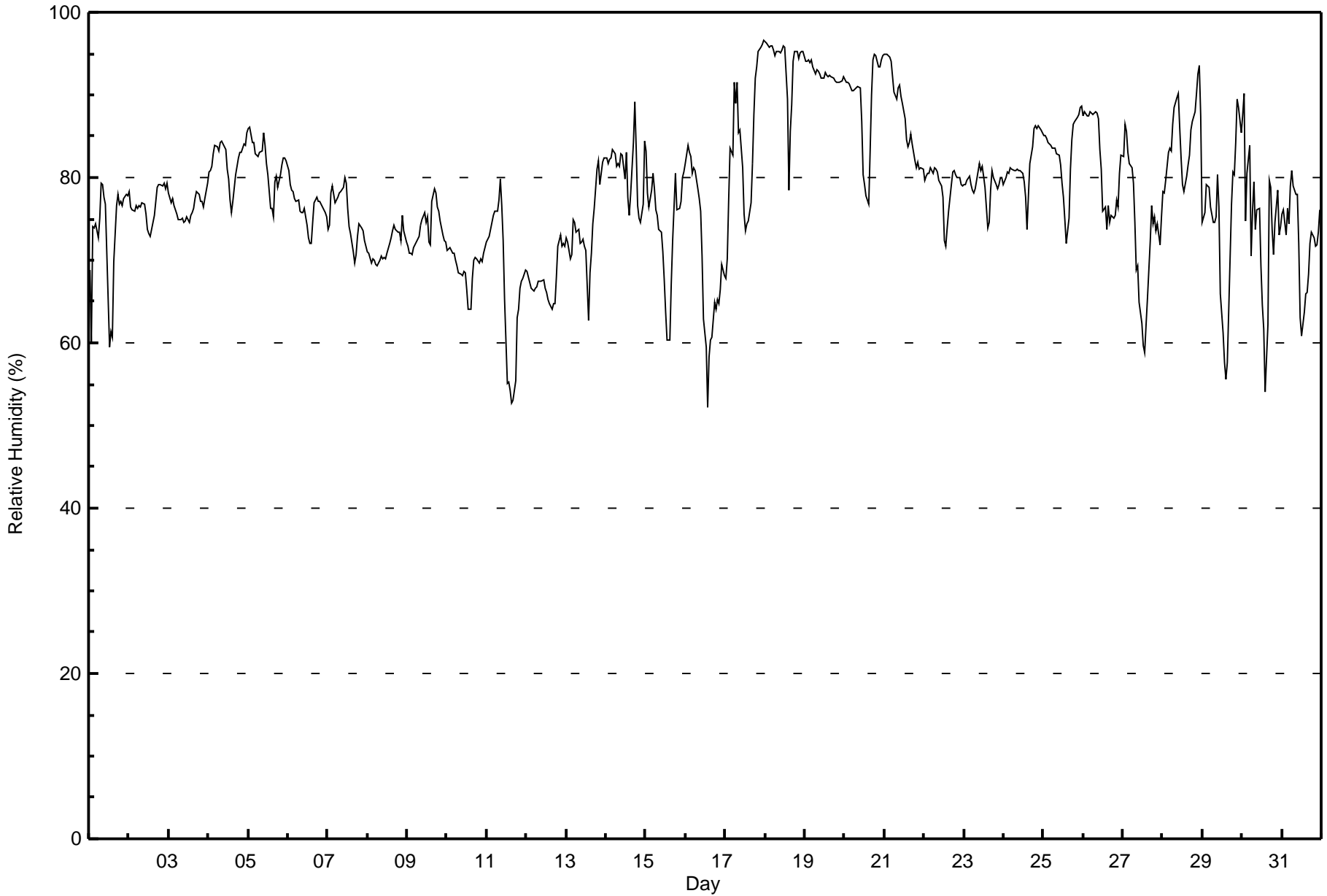
Fort McKay - Bertha Ganter - January 2017

Maximum Value: 97 % on Jan 18 00:00																		Maximum Daily Average: 93.7 % on Jan 18						Hours in Service: 744		Hours of Data: 744																	
Minimum Value: 52 % on Jan 16 14:00																		Minimum Daily Average: 67.3 % on Jan 11						Hours of Missing Data: 0		Hours of Calibration: 0																	
Maximum Diurnal Average: 80.5 % at hour 24																		Minimum Diurnal Average: 70.6 % at hour 15						Percent Operational Time: 100.0																			
Monthly Average: 78.1 %																		Percentiles: P ₁ = 55 P ₁₀ = 68 Q ₁ = 73 Median = 78 Q ₃ = 83 P ₉₀ = 91 P ₉₉ = 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-Jan	69	60	74	74	74	73	75	79	79	78	77	65	59	61	61	70	77	78	77	77	77	77	78	78	72.8	79																	
2-Jan	78	76	76	76	77	76	77	76	77	77	76	74	73	73	75	75	77	79	79	79	79	79	79	79	76.8	79																	
3-Jan	78	77	77	77	76	76	75	75	75	75	75	75	75	76	76	77	78	78	77	77	77	78	79	76.4	79																		
4-Jan	81	81	81	83	84	84	83	84	84	84	83	81	80	77	76	77	80	81	82	83	83	84	84	85	82.0	85																	
5-Jan	86	86	84	84	83	83	83	83	83	85	84	82	80	76	76	75	80	80	79	80	82	82	82	82	81.7	86																	
6-Jan	81	79	79	78	77	77	77	76	76	76	76	74	73	72	72	75	77	78	77	77	77	76	76	75	76.3	81																	
7-Jan	74	74	78	79	77	77	78	78	78	79	80	79	76	74	73	71	70	71	73	74	74	74	72	72	75.2	80																	
8-Jan	71	71	70	70	70	70	69	70	70	70	70	70	71	72	73	73	74	74	73	73	72	75	74	72	71.6	75																	
9-Jan	72	71	71	71	72	72	73	73	74	75	76	75	75	72	72	77	79	78	76	76	75	73	72	72	73.8	79																	
10-Jan	71	71	71	71	71	70	69	68	68	68	69	68	67	64	64	68	70	70	70	70	70	70	71	71	69.2	71																	
11-Jan	72	73	74	75	75	76	76	77	80	77	72	65	55	55	54	53	53	55	63	64	67	67	68	69	67.3	80																	
12-Jan	69	68	67	67	66	67	67	67	67	68	68	67	66	65	65	64	65	65	68	72	73	72	72	72	67.7	73																	
13-Jan	73	72	70	71	75	75	73	74	72	72	73	72	71	63	68	71	74	76	81	82	79	81	82	82	74.2	82																	
14-Jan	82	82	82	82	83	83	81	82	81	83	83	80	83	78	75	78	84	89	83	77	75	75	77	84	81.0	89																	
15-Jan	83	78	76	79	81	79	76	75	74	73	71	68	64	60	60	67	72	76	81	76	76	77	80	81	74.3	83																	
16-Jan	82	84	83	83	81	81	81	79	78	76	71	63	59	52	58	60	61	65	64	65	65	66	70	68	70.6	84																	
17-Jan	68	70	77	84	83	91	89	92	85	86	81	76	74	74	75	77	82	88	92	93	95	96	96	97	84.1	97																	
18-Jan	96	96	96	96	96	95	95	95	95	95	95	96	96	90	79	86	89	94	95	95	94	95	95	95	93.7	96																	
19-Jan	94	94	94	94	94	93	93	93	93	92	92	92	93	92	92	92	92	92	92	92	92	92	92	92	92.6	94																	
20-Jan	92	92	91	91	91	90	91	91	91	91	87	80	79	78	77	83	90	94	95	95	93	93	94	95	89.3	95																	
21-Jan	95	95	95	95	94	92	90	90	91	91	90	89	87	85	84	84	85	84	82	81	82	81	81	81	87.7	95																	
22-Jan	80	80	80	80	81	80	81	81	81	80	79	78	72	72	74	76	79	81	81	80	80	80	79	79	78.9	81																	
23-Jan	79	79	80	80	79	78	78	79	81	82	81	81	80	79	74	75	79	81	80	79	79	79	80	80	79.2	82																	
24-Jan	79	80	81	81	81	81	81	81	81	81	81	80	79	78	74	78	82	84	86	86	86	86	86	85	81.6	86																	
25-Jan	85	85	85	84	84	84	83	84	83	83	81	79	78	75	72	75	81	85	87	87	87	88	89	89	83.0	89																	
26-Jan	87	88	88	88	88	88	88	88	88	87	83	81	76	76	74	77	75	75	75	75	77	77	80	83	81.7	88																	
27-Jan	83	87	86	83	82	81	79	75	69	69	65	62	60	59	62	65	72	77	74	75	74	74	72	75	73.3	87																	
28-Jan	78	78	80	83	84	83	86	88	90	90	86	82	79	78	80	82	83	86	87	88	90	93	94	88	84.8	94																	
29-Jan	75	76	79	79	79	76	75	75	75	80	76	66	61	58	56	58	64	77	81	80	84	89	88	85	74.7	89																	
30-Jan	88	90	75	80	84	70	76	80	74	76	76	69	65	62	54	62	80	79	74	71	75	78	74	74	74.3	90																	
31-Jan	76	76	73	76	74	79	81	79	78	78	72	63	61	64	66	66	68	72	73	73	72	72	73	76	72.6	81																	
																		79.8	79.7	79.8	80.4	80.5	80.1	80.0	80.2	79.7	79.9	78.3	75.3	73.1	71.3	70.6	73.1	76.4	78.8	79.3	79.2	79.3	80.0	80.2	80.5	Diurnal Average	
																		96	96	96	96	96	95	95	95	95	95	95	96	96	92	92	92	92	94	95	95	95	96	96	97	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

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



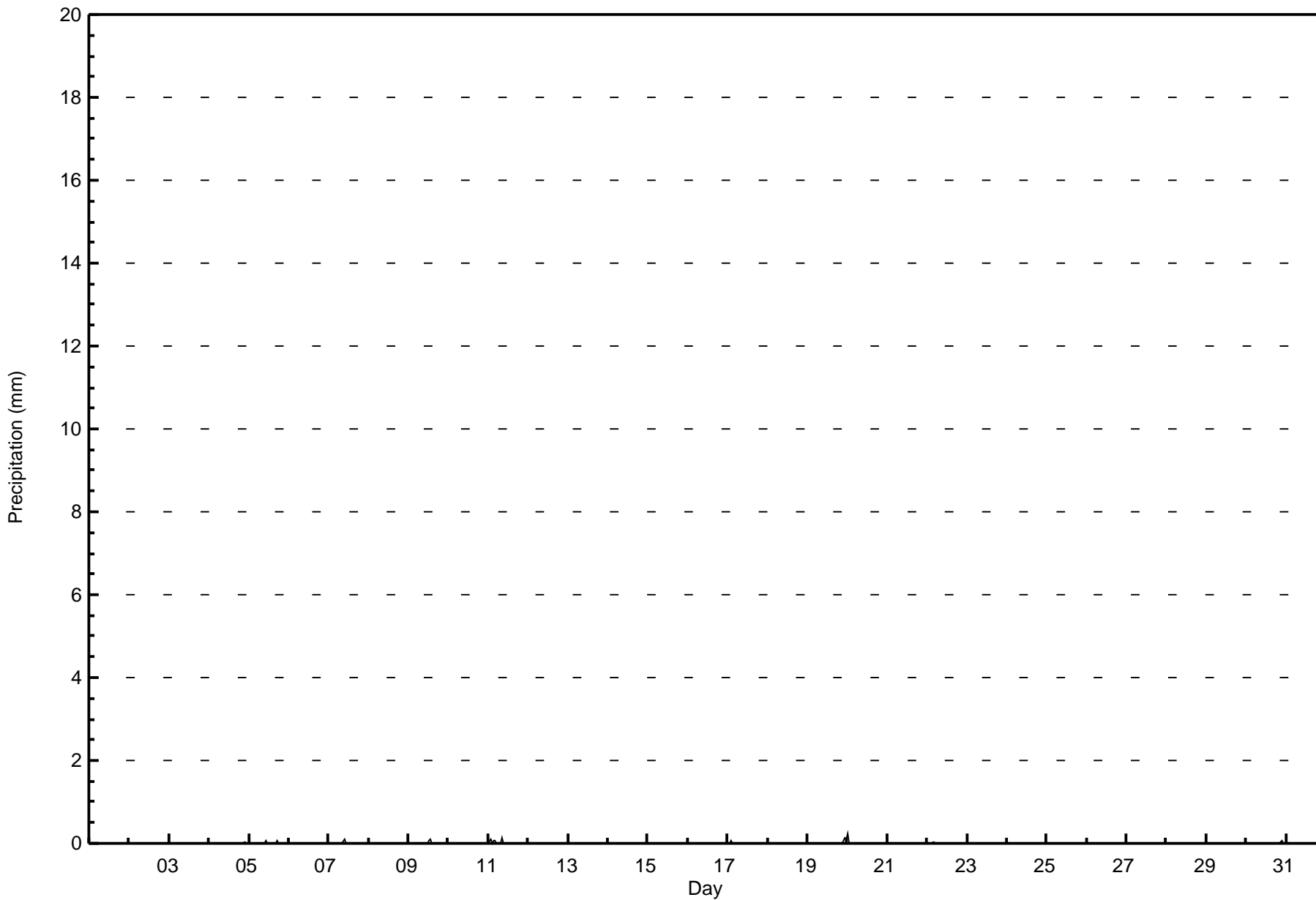


Maximum Value: 0.2 mm on Jan 20 01:00		Maximum Daily Total: 0.4 mm on Jan 11		Hours in Service: 744																								
Minimum Value: 0.0 mm on Jan 1 01:00		Minimum Daily Total: 0.0 mm on Jan 1		Hours of Data: 744																								
Maximum Diurnal Total: 0.2 mm at hour 1		Minimum Diurnal Total: 0.0 mm at hour 6		Hours of Missing Data: 0																								
Monthly Total: 1.46 mm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.1		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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1
5-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
6-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
8-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
10-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
12-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
18-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.2
20-Jan	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
21-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
23-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1
31-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
Fort McKay - Bertha Ganter - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Precipitation (PC) - mm
Fort McKay - Bertha Ganter - January 2017

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	744	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: 744

Total Number of Hours: 744



Summary of Hour Averages

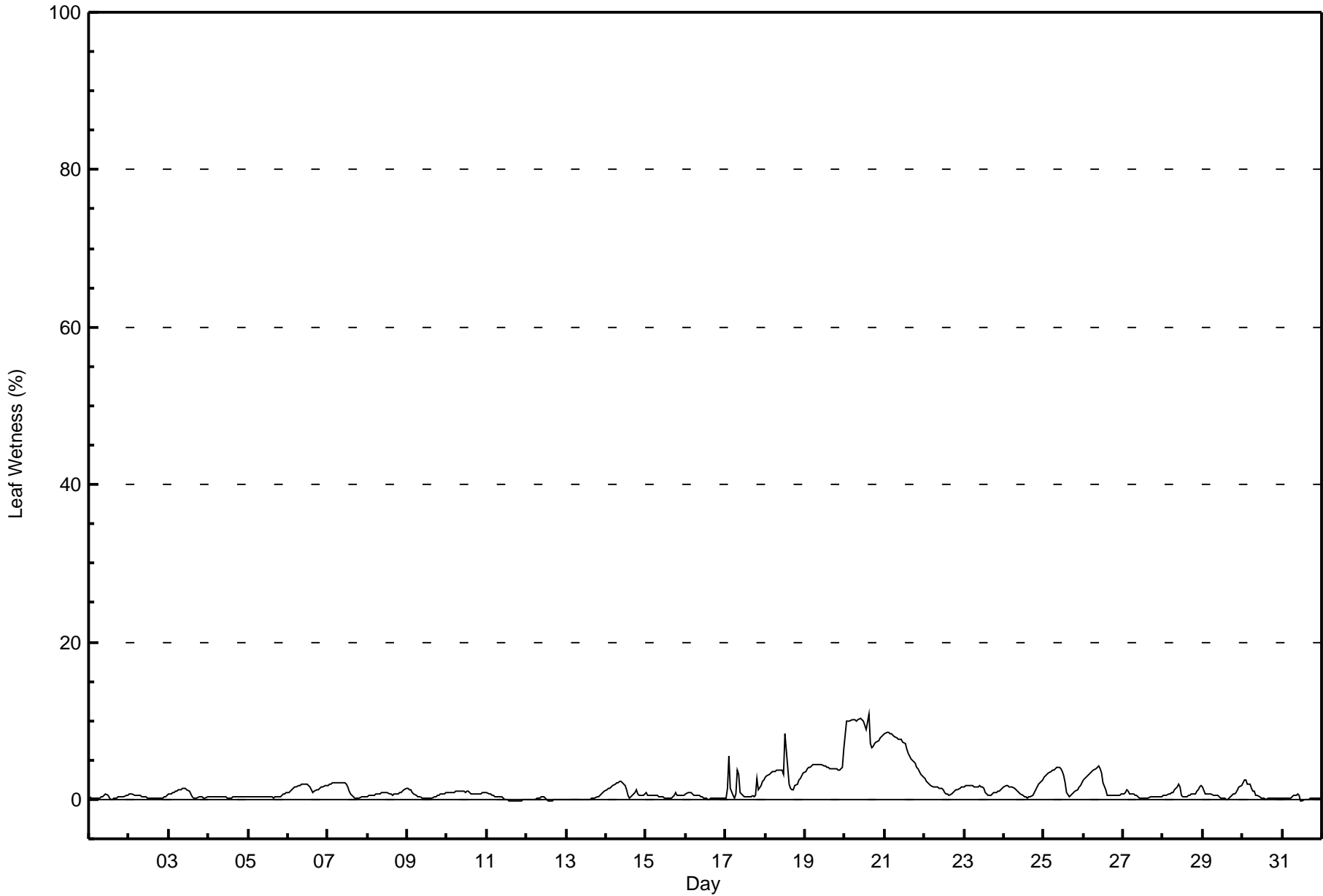
Fort McKay - Bertha Ganter - January 2017

Maximum Value: 11 % on Jan 20 15:00														Maximum Daily Average: 8.9 % on Jan 20														Hours in Service: 744			
Minimum Value: 0 % on Jan 11 18:00														Minimum Daily Average: 0.0 % on Jan 12														Hours of Data: 744			
Maximum Diurnal Average: 1.9 % at hour 3														Minimum Diurnal Average: 0.8 % at hour 16														Hours of Missing Data: 0			
Monthly Average: 1.4 %														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 2 P ₉₀ = 4 P ₉₉ = 10														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-Jan	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1					
2-Jan	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1					
3-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.7	1					
4-Jan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0					
5-Jan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1					
6-Jan	1	1	1	1	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	2	2	2	2	1.5	2					
7-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	0	0	0	0	0	0	0	0	0	1.3	2					
8-Jan	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1					
9-Jan	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.5	1					
10-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1					
11-Jan	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1					
12-Jan	0	0	0	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-Jan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.2	1					
14-Jan	1	1	1	2	2	2	2	2	2	2	2	1	1	0	0	1	1	1	1	0	0	0	1	1	1.2	2					
15-Jan	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0.4	1					
16-Jan	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1					
17-Jan	0	1	5	1	1	0	1	4	3	1	1	0	0	0	0	0	1	0	0	3	1	2	2	3	1.3	5					
18-Jan	3	3	3	3	3	4	4	4	4	4	4	3	8	4	2	1	1	1	2	2	2	3	3	3	3.1	8					
19-Jan	4	4	4	4	4	4	4	4	4	5	5	4	4	4	4	4	4	4	4	4	4	4	4	6	4.2	6					
20-Jan	8	10	10	10	10	10	10	10	10	10	10	10	9	9	11	7	7	7	7	7	8	8	8	8	8.9	11					
21-Jan	8	8	8	8	8	8	8	8	8	8	8	7	7	6	6	5	5	5	5	4	4	3	3	3	6.4	8					
22-Jan	3	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1.4	3					
23-Jan	2	2	2	2	2	2	2	2	2	2	2	1	1	1	0	0	0	1	1	1	1	1	1	1	1.3	2					
24-Jan	2	2	2	2	2	2	1	1	1	1	1	0	0	0	0	0	0	1	1	1	2	2	3	3	1.2	3					
25-Jan	3	3	3	3	4	4	4	4	4	4	4	4	3	2	1	0	0	1	1	1	1	2	2	2	2.5	4					
26-Jan	2	3	3	3	3	4	4	4	4	4	4	3	2	1	0	0	0	1	1	0	1	0	1	1	2.1	4					
27-Jan	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1					
28-Jan	0	1	1	1	1	1	1	1	2	2	2	1	0	0	0	0	1	1	1	1	1	2	2	2	0.9	2					
29-Jan	2	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	1	1	1	1	2	2	0.6	2					
30-Jan	2	2	2	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	2					
31-Jan	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1					
1.6														1.7														Diurnal Average			
8														10														Diurnal Maximum			



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

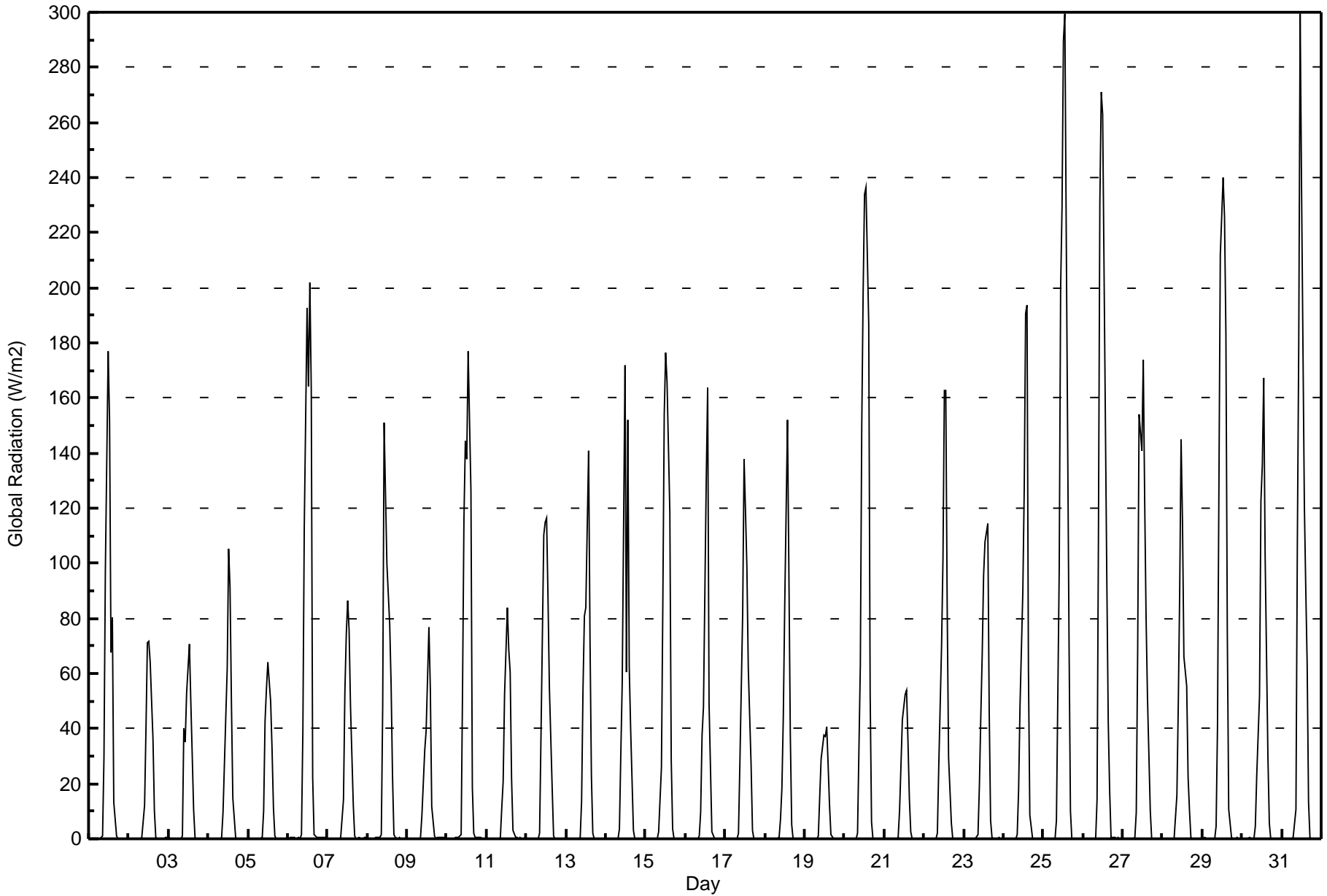
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	192	26.82	26.82
0.4 - 0.5	112	15.64	42.46
0.6 - 0.7	75	10.47	52.93
0.8 - 1.4	120	16.76	69.69
1.5 - 10	202	28.21	97.91
> 10	9	1.26	99.16

Total Number of Valid Hours: 716

Total Number of Hours: 744



Maximum Value: 300 W/m2 on Jan 31 12:00 Maximum Daily Average: 59.3 W/m2 on Jan 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: 0 W/m2 on Jan 1 01:00 Minimum Daily Average: 8.4 W/m2 on Jan 19 Maximum Diurnal Average: 129.9 W/m2 at hour 13 Minimum Diurnal Average: 0.0 W/m2 at hour 4 Monthly Average: 25.9 W/m2 Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 22 P ₉₀ = 98 P ₉₉ = 233																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	0	0	0	0	0	0	0	0	1	29	98	177	151	68	80	13	1	0	0	0	0	0	0	0	25.8	177
2-Jan	0	0	0	0	0	0	0	0	1	12	40	71	72	64	36	10	1	0	0	0	0	0	0	0	12.8	72
3-Jan	1	0	0	0	0	0	0	0	1	40	35	53	71	50	30	11	1	0	0	0	0	0	0	0	12.2	71
4-Jan	0	0	0	0	0	0	0	0	1	10	45	62	105	91	49	15	1	0	0	0	0	0	0	0	15.8	105
5-Jan	0	0	0	0	0	0	0	0	1	10	43	54	64	50	32	11	1	0	0	0	0	0	0	0	11.1	64
6-Jan	0	0	0	0	0	0	0	0	2	39	113	193	164	202	163	23	1	1	0	0	0	0	0	0	37.7	202
7-Jan	0	0	0	0	0	0	0	0	0	14	54	74	87	76	48	12	1	0	0	0	0	0	0	0	15.3	87
8-Jan	0	0	0	0	0	0	0	0	1	48	151	125	100	78	56	23	1	0	0	0	0	0	0	0	24.5	151
9-Jan	0	0	0	0	0	0	0	0	0	9	32	39	58	77	55	11	1	0	0	0	0	0	0	0	11.8	77
10-Jan	0	0	0	0	0	0	0	0	1	54	116	144	138	177	126	19	2	1	1	1	1	0	0	0	32.6	177
11-Jan	0	0	0	0	0	0	0	0	0	11	21	52	84	69	60	22	3	0	0	0	0	0	0	0	13.5	84
12-Jan	0	0	0	0	0	0	0	0	2	37	110	115	116	88	55	18	1	0	0	0	0	0	0	0	22.6	116
13-Jan	0	0	0	0	0	0	0	0	1	14	55	81	84	141	73	23	2	0	0	0	0	0	0	0	19.7	141
14-Jan	0	0	0	0	0	0	0	0	3	31	57	172	61	152	63	40	3	0	0	0	0	0	0	0	24.2	172
15-Jan	0	0	0	0	0	0	0	0	2	26	86	154	176	166	119	29	3	0	0	0	0	0	0	0	31.7	176
16-Jan	0	0	0	0	0	0	0	0	1	10	38	48	131	164	49	26	2	0	0	0	0	0	0	0	19.5	164
17-Jan	0	0	0	0	0	0	0	0	2	28	82	138	119	99	62	27	3	0	0	0	0	0	0	0	23.3	138
18-Jan	0	0	0	0	0	0	0	0	0	7	18	44	84	152	96	38	5	0	0	0	0	0	0	0	18.6	152
19-Jan	0	0	0	0	0	0	0	0	1	15	29	37	37	41	27	12	1	0	0	0	0	0	0	0	8.4	41
20-Jan	0	0	0	0	0	0	0	0	2	63	149	199	234	236	187	53	6	0	0	0	0	0	0	0	47.0	236
21-Jan	0	0	0	0	0	0	0	0	1	10	27	43	52	54	35	15	2	0	0	0	0	0	0	0	10.0	54
22-Jan	0	0	0	0	0	0	0	0	2	26	70	102	163	163	85	29	6	0	0	0	0	0	0	0	26.9	163
23-Jan	0	0	0	0	0	0	0	0	2	19	44	67	96	108	114	46	7	1	0	0	0	0	0	0	21.0	114
24-Jan	0	0	0	0	0	0	0	0	2	18	48	90	127	191	194	63	9	0	0	0	0	0	0	0	30.8	194
25-Jan	0	0	0	0	0	0	0	0	7	98	200	229	290	299	220	72	10	0	0	0	0	0	0	0	59.3	299
26-Jan	0	0	0	0	0	0	0	0	14	110	231	271	263	149	93	42	17	0	0	0	0	0	0	0	49.7	271
27-Jan	0	0	0	0	0	0	0	0	10	68	154	141	174	123	81	51	10	0	0	0	0	0	0	0	33.8	174
28-Jan	0	0	0	0	0	0	0	0	16	49	89	145	115	66	55	23	10	1	0	0	0	0	0	0	23.7	145
29-Jan	0	0	0	0	0	0	0	0	4	41	127	212	240	226	183	75	11	0	0	0	0	0	0	0	46.7	240
30-Jan	0	0	0	0	0	0	0	0	5	23	52	123	136	167	103	30	6	0	0	0	0	0	0	0	26.9	167
31-Jan	0	0	0	0	0	0	0	0	11	107	180	300	236	121	91	63	13	0	0	0	0	0	0	0	46.8	300
																		Diurnal Average								
																		Diurnal Maximum								





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	552	74.19	74.19
21 - 100	119	15.99	90.19
101 - 300	73	9.81	100.00
301 - 600	0	0.00	100.00
601 - 900	0	0.00	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

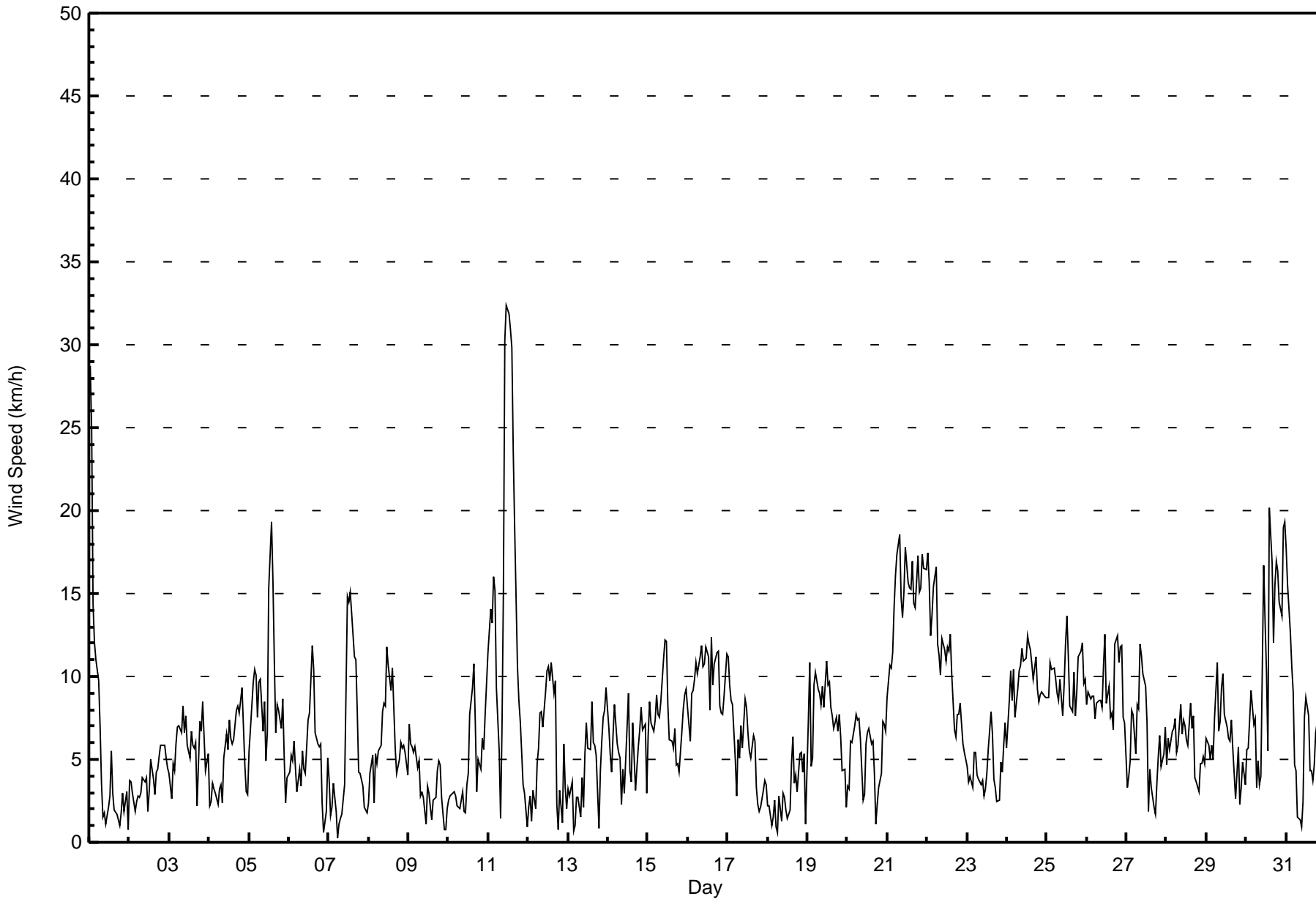


Maximum Speed: 32 km/h on Jan 11 12:00	Maximum Daily Speed Average: 14.9 km/h on Jan 21	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jan 7 06:00	Minimum Daily Speed Average: 1.7 km/h on Jan 18	Hours of Data: 744
Maximum Diurnal Speed Average: 2.3 km/h at hour 9	Minimum Diurnal Speed Average: 0.8 km/h at hour 11	Hours of Missing Data: 0
Monthly Average Velocity: 1.6 km/h 220.2 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 4 Median = 6 O ₃ = 9 P ₉₀ = 12 P ₉₉ = 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-Jan	NW29	NW25	N14	N12	N11	N10	NNW7	W4	SSW2	W2	S1	SW2	WNW3	SSE6	SE3	E2	NW2	WNW1	WSW1	SW2	S3	SSE2	SSW3	NNW1	NNW3.7	NW29
2-Jan	SW4	SSW4	WSW3	S2	SSE2	S3	SSE3	SSE3	S4	S4	SSE4	SSE2	SE3	SSE5	SSE4	S3	S4	S4	S5	S6	S6	S6	S5	S4	S3.6	S6
3-Jan	S4	S3	S5	SSW4	S6	S7	S7	S7	S8	S7	S8	SSE6	SSE5	SSE7	SSE6	SSE6	S6	SSW2	W7	W7	W8	W6	WNW4	WNW5	SSW4.0	W8
4-Jan	WSW2	W2	NW4	NNW3	N3	ESE2	SSE3	SE4	SE2	SSE5	SSE7	SSE6	S7	S6	SSE6	S8	S8	S8	S9	SSE9	SSE5	S3	N3	S3.7	SSE9	
5-Jan	NW5	N7	N10	N10	N10	N8	N10	N10	N7	N8	N5	N7	N15	N19	N16	N11	N7	NNW8	N8	NNW7	NNW9	WNW5	WSW2	SW4	N8.0	N19
6-Jan	S4	S5	S5	S6	S4	S3	SW4	SSW3	SSW5	SW4	S4	S7	SSE8	SSE10	SSE12	S10	S7	SSW6	S6	S6	SSW2	SW1	W2	NNW5	S4.8	SSE12
7-Jan	W4	SSW2	WSW2	WNW4	S2	NW0	WNW1	NW1	WNW2	NNW3	N9	N15	N15	N15	N14	NNE11	N11	N8	N4	NW4	W3	WSW2	SW2	SSW2	N4.4	N15
8-Jan	S2	S4	S5	S2	S5	S5	S5	S6	S8	S8	S8	S12	S11	S9	S11	S8	S6	S4	S5	S6	S6	SW6	SW5	WSW4	S6.1	S12
9-Jan	W7	WSW6	SSW6	SW5	WSW6	WSW4	W5	SW3	S3	S3	NNW1	NW3	NNW3	NNE2	SSW1	S3	W3	WNW4	NW5	WNW5	SSW3	SW1	SSE1	NW2	WSW2.4	W7
10-Jan	NW3	NW3	WNW3	NNW3	WNW3	WNW2	W2	WNW2	WNW3	SW2	S2	SE3	SSE4	SSE8	SSE9	SSE11	S7	SSW3	S5	S4	S6	S6	S8	S10	S3.1	SSE11
11-Jan	S11	SSE14	SSE13	SSE16	SSE15	S9	S6	NNE1	NNW7	NNW15	N30	NNW32	NNW32	NNW31	NNW30	NNW24	NNW19	NW11	WNW9	WNW7	WNW5	W4	W3	WSW1	NW6.9	NNW32
12-Jan	S2	SW3	SSW1	SSW3	SSW2	SSW5	S6	S8	S8	S7	S9	S10	S11	S10	SSE11	SSE9	S10	SSE2	SSW1	NNW3	SW1	S6	SW3	WSW2	S5.0	SSE11
13-Jan	WSW3	SSW3	SW4	SW1	NNE1	N3	N3	SSW1	SSE4	SSE2	S5	S7	S6	SSE6	S9	S6	S6	S5	NNW1	S4	S6	S8	S8	S9	S3.8	S9
14-Jan	S7	S5	S4	S6	S8	SSW6	S5	S5	S2	SSW4	S3	SSE7	S9	S4	S4	S7	SSE3	S5	WSW6	SW7	WSW8	SW7	SW7	S3	SSW5.1	S9
15-Jan	SSW6	WSW8	W7	W7	W7	WSW9	W8	WSW8	WSW9	WSW11	W12	W12	W8	WSW6	SW6	WSW6	SSW7	SSE5	SSE5	WSW4	SSW7	S8	S9	S9	WSW6.3	W12
16-Jan	S8	S6	S9	S9	S10	S11	S10	S11	SSE12	SSE11	SSE11	S12	SSE11	SSE8	SSE12	S9	SSE11	S11	S12	SSW8	SSW8	S8	SSE9	S11	S9.8	SSE12
17-Jan	S11	S9	SSE9	SSE8	SSE5	SSE3	S6	SSW5	SW7	WSW6	WSW9	SW8	WSW7	SW6	SSW5	S6	S6	SSW3	SW2	SSE2	W2	S3	S4	S3	SSW4.7	S11
18-Jan	SW2	S2	SW1	NW2	NNW3	SW1	SSW1	N3	N1	N3	WNW3	SE2	SW1	ESE2	SSE5	SSE6	S4	SSW4	S3	S5	S5	S4	S5	SSW1	S1.7	SSE6
19-Jan	N7	N11	N5	NNE5	N9	N10	N9	N9	NNW8	N9	N8	N11	N9	N10	N8	N8	N7	N8	N7	N8	N6	WNW4	NW4	E2	N7.4	N11
20-Jan	S3	SSE3	S6	S6	S7	S8	S7	SSE7	S6	SSW3	S3	SSE6	S7	SSE7	S6	S6	SSW4	WSW1	NNW2	NNW3	N4	N7	N7	N7	S2.7	S8
21-Jan	N9	N11	N10	N11	N14	N16	N17	N19	N15	N14	N15	N18	N16	N15	N15	N17	N14	N14	N17	N15	N15	N17	N17	N16	N14.9	N19
22-Jan	N17	N16	N12	N14	N15	N17	N12	N11	N10	N12	N12	N11	N12	N12	NNW13	NNW10	NNW7	NNW6	NNW8	NNW8	NNW8	N6	NNW5	NW5	N10.6	N17
23-Jan	NW5	NNW4	NW4	WNW3	WNW5	WNW5	WNW4	WNW4	W3	W4	WNW3	WSW3	S4	SE6	SSE8	SSE7	SSE4	S3	S2	SSW3	S5	S4	S6	S7	SW2.0	SSE8
24-Jan	S6	S9	S10	SSE9	S10	S8	SSE9	SSE10	SSE11	SSE12	SSE11	SSE11	SSE12	SSE12	SSE12	S11	S10	S11	S9	S8	S9	S9	S9	S9	SSE9.8	SSE12
25-Jan	S9	S9	S11	S10	S10	S10	S9	S9	S10	S8	SSE10	SSE12	SSE14	SSE11	S8	S8	S10	S8	S9	S11	S12	S12	S10	S10	S9.9	SSE14
26-Jan	S8	S9	S9	SSE9	S9	S7	S8	S9	S9	S8	S11	S13	S8	SSE9	S8	SSE8	SW7	W12	W12	W11	W12	W12	W8	WSW7	SSW6.7	S13
27-Jan	WSW3	SSE4	SW5	W8	W8	SW5	WSW8	W8	W12	W11	W10	W9	W7	S2	SSW4	SSW3	SW2	S2	SW4	SSW5	SSW6	S5	W5	W7	WSW5.2	W12
28-Jan	WSW5	WSW6	SSW6	SSW7	SSW7	S7	S5	S6	S8	SSE7	S7	SSE7	SSE6	S6	S8	S7	S8	S4	SW4	SSE3	SSE5	S5	S5	SW5	S5.5	S8
29-Jan	SW6	SW6	S5	SSW6	SW5	W7	W11	WSW7	S7	SSE9	SSE10	SSW8	WSW7	WSW6	WSW6	SW7	S6	S3	W4	W6	WNW2	S3	WSW5	SW3	SW4.9	W11
30-Jan	S6	S6	SSW7	S9	SSW7	WSW7	S3	W5	SSW3	N4	N17	N13	N10	NNW6	NW20	NNW17	N12	N15	N17	N16	N15	NNW14	N19	N19	NNW7.0	NW20
31-Jan	NNW18	N16	N13	N11	N9	NW5	W4	SW2	SSW1	WSW1	SSE2	SE8	SE9	SSE8	SSW4	SSW4	SW4	W5	W7	WNW8	WNW7	W6	WNW6	NW7	NW2.9	NNW18

WSW2.0	WSW1.6	SSW1.7	SSW1.5	SSW1.4	SW1.6	SW1.8	SW1.7	SSW2.3	SW1.6	SW0.8	SSW1.1	SSW1.0	S1.2	SSW1.6	S1.8	SSW1.9	SW1.4	W1.8	WSW2.2	WSW2.3	SW2.3	SW2.2	SW1.6	Diurnal Average
NW29	NW25	N14	SSE16	N15	N17	N17	N19	N15	NNW15	N30	NNW32	NNW32	NNW31	NNW30	NNW24	NNW19	N15	N17	N16	N15	N17	N19	N19	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
Fort McKay - Bertha Ganter - January 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	299	40.19	40.19
6 - 11	353	47.45	87.63
12 - 19	83	11.16	98.79
20 - 28	3	0.40	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
Fort McKay - Bertha Ganter - January 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	12	4	0	0	2	2	6	30	78	39	32	19	19	26	16	14	299
6 - 11	48	2	0	0	0	0	3	51	153	17	10	23	25	5	2	14	353
12 - 19	51	0	0	0	0	0	0	13	6	0	0	0	7	0	0	6	83
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	3
29 - 38	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	6
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	112	6	0	0	2	2	9	94	237	56	42	42	51	31	21	39	744

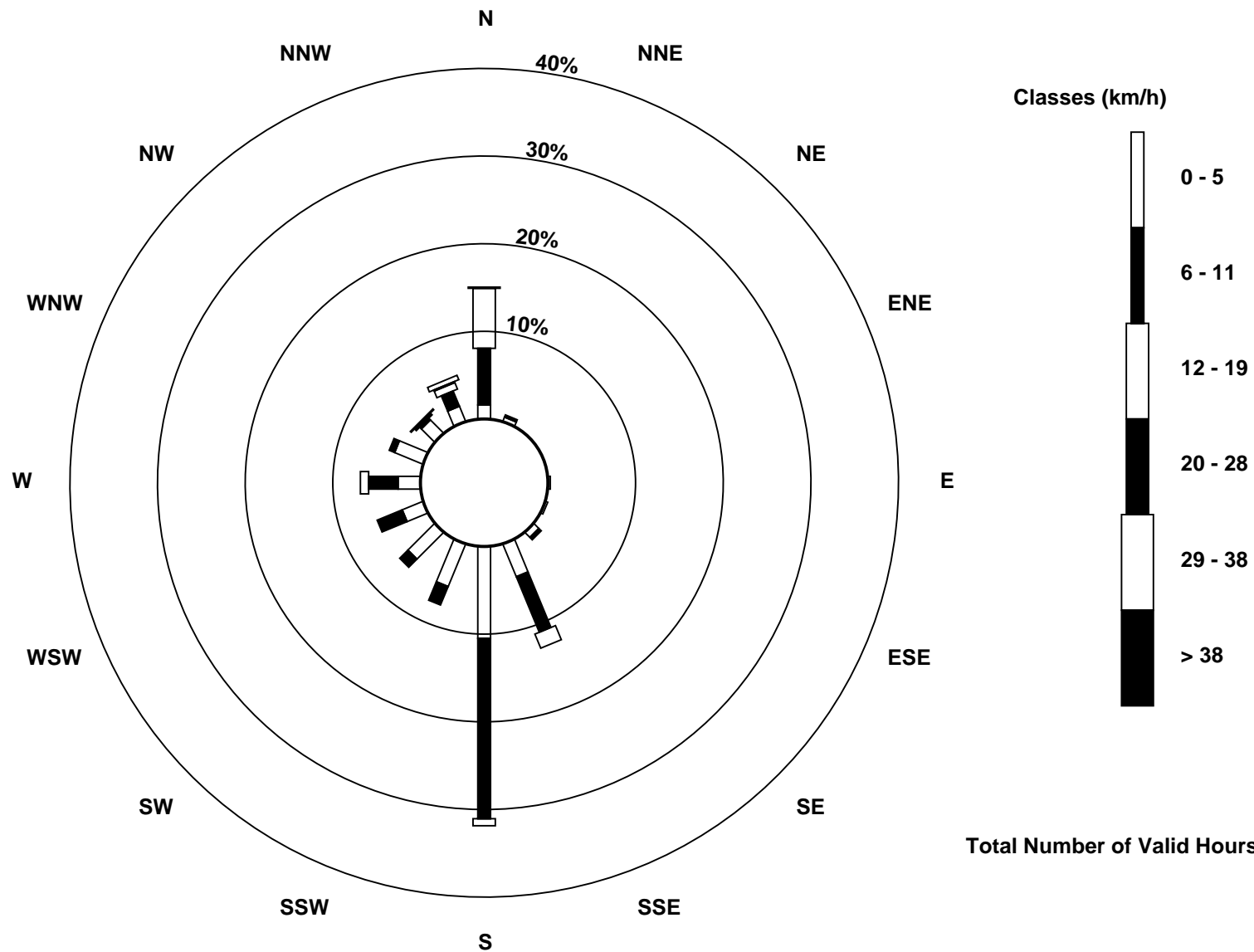
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

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



Total Number of Valid Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Jan 1 01:00 Minimum Value: 0 km/h on Jan 23 00:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 2 P ₉₀ = 3 P ₉₉ = 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-Jan	10	7	4	3	3	2	2	1	1	2	1	1	2	1	1	1	1	1	1	1	1	1	2	2	10
2-Jan	2	2	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
3-Jan	1	1	1	1	1	1	2	1	1	1	1	2	1	1	1	1	1	2	2	3	3	3	2	1	3
4-Jan	1	1	1	2	1	1	1	1	1	1	1	1	2	2	2	1	2	1	1	2	2	2	1	2	2
5-Jan	1	3	3	3	3	2	3	2	2	1	1	3	5	4	4	4	2	2	2	2	1	1	1	2	5
6-Jan	1	1	1	1	1	1	1	2	1	1	1	1	1	2	2	3	1	2	1	1	2	2	1	1	3
7-Jan	1	1	1	1	1	1	1	1	1	1	2	4	4	5	4	3	3	2	2	1	1	1	1	1	5
8-Jan	1	1	2	2	1	1	2	1	1	2	1	2	2	2	3	1	2	2	2	2	2	3	2	2	3
9-Jan	3	2	2	2	2	2	2	1	1	1	1	1	2	2	1	1	1	2	1	2	1	1	1	1	3
10-Jan	2	2	1	2	1	1	1	1	2	1	1	1	1	2	2	2	2	1	1	1	1	1	1	2	2
11-Jan	2	2	2	3	3	2	1	4	2	4	9	9	7	8	7	6	4	2	2	2	2	1	2	1	9
12-Jan	1	1	1	1	1	1	2	2	2	2	2	2	2	3	2	2	4	1	1	1	2	2	1	1	4
13-Jan	2	1	1	1	1	1	1	1	2	1	2	2	1	2	2	2	2	2	1	2	1	2	2	2	2
14-Jan	2	1	1	1	2	1	1	2	1	2	1	3	1	2	1	1	1	1	2	3	4	3	3	1	4
15-Jan	2	4	3	3	2	3	3	3	4	5	4	4	4	3	2	2	2	2	1	2	2	2	1	2	5
16-Jan	2	1	1	1	2	2	2	2	2	2	2	2	2	2	2	3	3	2	3	2	2	2	2	2	3
17-Jan	2	2	2	2	2	3	2	2	3	2	3	3	3	2	2	2	1	1	1	1	1	1	2	1	3
18-Jan	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	2	2	2	2
19-Jan	2	2	2	2	2	2	2	2	3	2	2	2	2	2	2	3	2	2	1	1	1	1	1	1	3
20-Jan	1	1	2	1	2	2	2	2	1	2	1	1	1	1	1	1	1	1	1	2	2	1	2	2	2
21-Jan	2	2	3	3	4	4	4	4	4	3	3	4	4	4	4	4	3	4	4	3	3	4	3	4	4
22-Jan	3	4	3	3	6	5	3	3	3	3	2	2	3	3	2	2	1	1	1	1	1	1	1	0	6
23-Jan	1	1	2	1	1	1	1	1	1	1	1	2	1	1	1	1	2	0	0	1	2	1	1	1	2
24-Jan	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	1	2	1	2
25-Jan	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2
26-Jan	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	3	4	4	4	4	4	3	3	4
27-Jan	2	2	2	3	3	3	3	3	4	4	4	4	3	2	2	1	1	1	2	2	2	1	3	3	4
28-Jan	2	3	2	2	2	2	2	2	2	1	2	1	2	2	2	1	1	1	2	1	2	2	1	2	3
29-Jan	2	2	1	2	2	3	4	3	2	2	2	3	3	3	2	3	2	1	1	2	2	1	2	1	4
30-Jan	2	2	2	2	2	3	1	2	2	6	5	4	3	2	6	5	3	4	4	4	3	4	5	4	6
31-Jan	7	4	3	3	2	1	1	1	1	2	2	2	1	1	2	1	1	1	1	2	2	2	1	2	7
Diurnal Maximum																									



Wood Buffalo Environmental Association
Summary of Hour Averages

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

Direction of Maximum Speed: 348 deg on Jan 11 12:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 359.4 deg on Jan 21	Hours of Data: 744
Direction of Minimum Speed: 315 deg on Jan 7 06:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 1.7 deg on Jan 18	Percent Operational Time: 100.0
Monthly Average Direction: 233.2 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-Jan	323	320	359	4	4	3	348	273	205	265	180	225	283	156	142	88	316	285	243	233	189	168	210	341	331.2
2-Jan	225	195	245	174	152	173	167	166	179	178	157	159	138	155	166	172	176	179	171	178	172	181	176	182	175.4
3-Jan	185	184	177	199	188	182	177	175	177	172	170	157	153	163	162	161	169	208	281	274	270	276	290	296	195.8
4-Jan	240	262	310	336	352	103	153	126	137	166	152	159	169	178	169	168	175	176	173	175	165	165	175	357	169.3
5-Jan	313	356	4	9	7	2	3	5	2	353	2	3	5	357	350	5	357	338	350	341	330	296	257	220	353.5
6-Jan	181	171	178	179	178	191	224	212	200	219	189	171	162	163	165	172	176	192	169	178	197	215	279	341	181.3
7-Jan	281	213	257	286	177	315	288	304	302	348	354	359	8	7	9	14	8	11	356	319	274	256	235	200	351.9
8-Jan	185	178	169	174	174	179	170	178	180	179	173	169	169	176	170	174	177	188	176	189	176	226	224	247	180.2
9-Jan	266	257	210	221	242	252	262	229	184	186	344	309	344	18	212	173	267	301	307	299	210	227	160	321	256.4
10-Jan	311	304	290	330	293	283	268	289	297	233	173	142	153	164	166	167	178	204	180	191	181	179	180	173	188.4
11-Jan	170	166	168	168	168	171	175	25	338	331	357	348	332	328	337	342	334	316	293	291	299	270	260	257	325.6
12-Jan	172	219	212	203	209	197	175	173	174	176	179	169	170	171	168	168	170	150	211	339	229	181	222	251	178.6
13-Jan	245	209	215	236	14	353	351	211	168	162	177	174	171	156	175	179	177	337	179	182	181	176	175	175	180.1
14-Jan	175	178	188	176	185	202	176	178	184	195	172	162	170	178	176	184	155	186	246	236	238	225	214	191	192.0
15-Jan	208	243	264	267	274	258	263	251	245	252	264	276	259	242	235	240	196	162	167	244	200	183	175	174	236.4
16-Jan	180	179	179	175	174	169	171	169	162	159	163	171	160	157	167	171	168	177	187	197	196	188	167	170	172.4
17-Jan	170	169	157	168	155	163	188	210	230	254	249	233	252	216	197	183	174	204	222	162	276	191	183	191	197.3
18-Jan	215	182	220	304	347	224	194	353	356	353	288	142	214	109	152	167	185	192	181	179	177	174	178	193	183.6
19-Jan	355	352	9	24	355	354	349	353	347	350	356	351	357	352	354	352	354	356	354	349	352	300	321	82	352.9
20-Jan	169	150	178	185	174	169	174	168	173	198	171	157	170	168	179	185	198	242	331	344	4	360	2	11	171.9
21-Jan	5	2	360	2	5	0	356	356	3	1	356	358	358	4	3	360	358	359	360	358	358	358	357	356	359.4
22-Jan	356	359	7	4	4	7	8	6	8	359	357	349	3	351	345	336	338	344	342	344	345	349	331	319	355.2
23-Jan	322	329	304	297	291	292	289	288	280	277	289	238	172	139	149	158	168	191	178	196	189	178	177	176	219.0
24-Jan	178	170	172	164	169	173	163	164	164	164	168	165	163	165	162	170	173	173	176	172	171	172	173	172	168.6
25-Jan	173	173	170	171	172	173	174	177	171	172	168	167	166	168	170	175	173	175	171	173	174	174	183	179	172.5
26-Jan	173	175	171	168	173	178	174	177	175	172	169	171	179	167	177	165	230	260	263	269	271	278	266	256	202.0
27-Jan	248	167	227	270	266	225	257	269	274	270	268	268	261	185	200	192	235	188	234	213	203	187	264	263	248.5
28-Jan	243	254	197	200	196	185	176	172	169	167	172	167	168	170	171	169	179	189	215	166	163	174	177	221	183.4
29-Jan	219	214	185	204	227	264	272	246	173	167	164	207	244	249	237	218	190	182	279	275	292	178	253	228	221.8
30-Jan	182	177	196	173	208	238	177	265	192	356	6	6	4	332	324	340	2	7	1	359	354	347	353	352	346.1
31-Jan	345	352	358	358	3	316	279	229	207	241	161	145	146	149	206	213	223	263	280	288	288	277	300	314	312.4

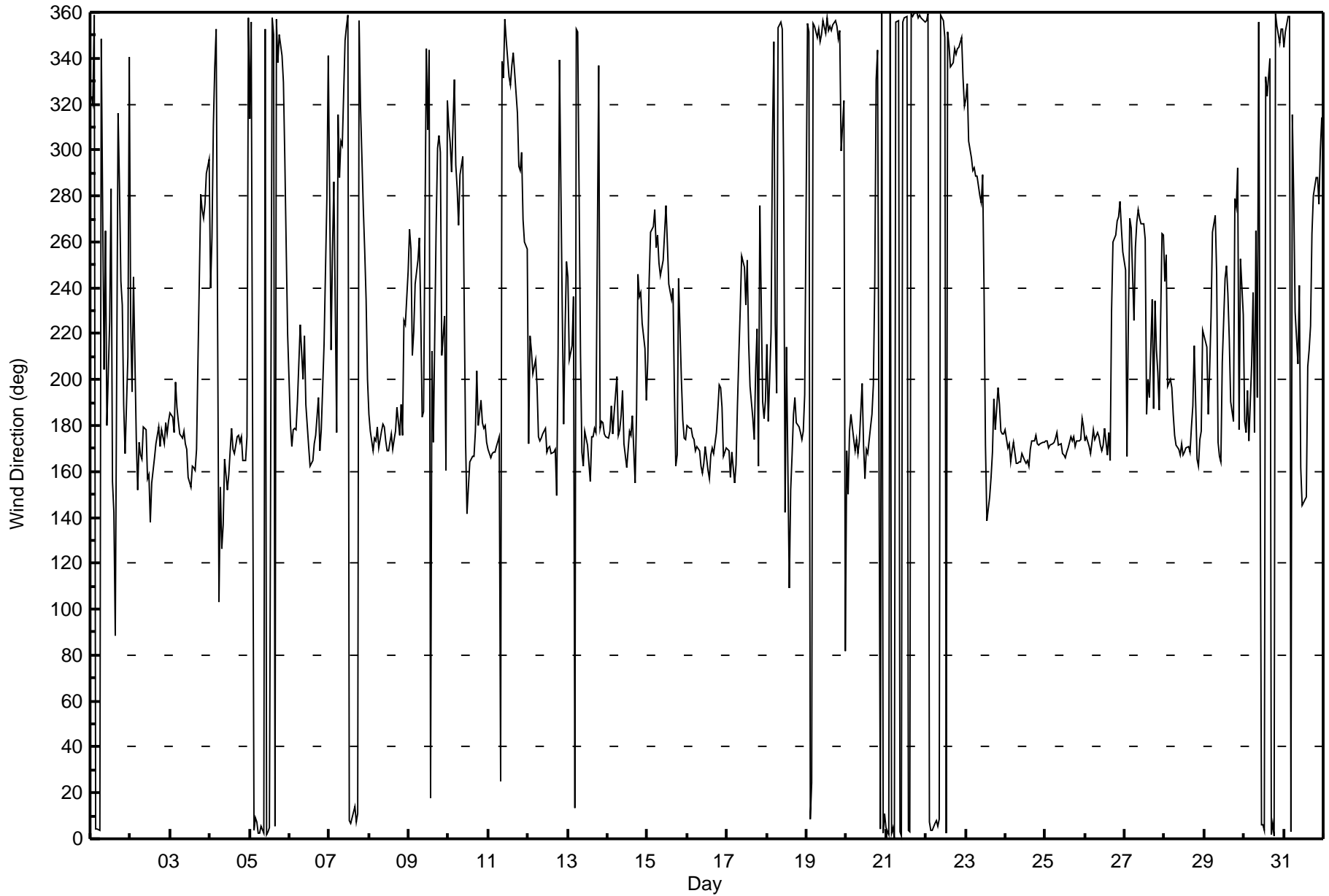
251.4 238.7 203.1 201.9 212.1 225.6 223.0 215.8 198.8 223.9 222.7 204.8 196.6 172.8 193.0 184.1 195.7 232.2 262.2 256.9 237.3 224.5 228.6 234.9
 Diurnal Average

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



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 105 deg on Jan 11 08:00 Minimum Value: 8 deg on Jan 16 02:00 Percentiles: P ₁ = 9 P ₁₀ = 11 Q ₁ = 13 Median = 18 Q ₃ = 38 P ₉₀ = 57 P ₉₉ = 88																	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-Jan	15	10	16	16	14	15	16	24	63	78	79	64	66	11	24	62	58	52	47	46	32	73	62	87	87
2-Jan	28	46	62	77	20	42	40	48	12	12	17	65	16	11	17	21	16	16	12	17	14	14	10	13	77
3-Jan	12	22	12	23	13	12	10	9	10	12	11	19	19	14	12	14	11	60	23	31	30	41	35	13	60
4-Jan	66	45	24	33	24	55	18	12	27	15	14	15	15	26	18	13	11	10	10	11	12	36	20	57	66
5-Jan	16	23	16	16	18	21	16	17	21	11	14	38	18	15	14	18	15	13	12	13	14	15	42	30	42
6-Jan	28	9	18	13	10	19	12	13	14	11	22	11	9	10	10	12	19	13	13	15	88	100	54	22	100
7-Jan	31	54	38	23	41	86	66	54	64	15	14	16	18	18	19	19	15	19	30	19	19	47	46	64	86
8-Jan	59	16	19	83	16	9	20	19	11	13	13	11	12	13	13	12	17	27	17	8	18	38	49	56	83
9-Jan	36	48	28	39	54	64	52	52	37	28	89	34	44	70	53	29	22	39	19	45	41	83	91	65	91
10-Jan	63	32	42	28	23	54	45	70	34	44	50	23	13	13	12	11	15	21	9	15	10	11	14	13	70
11-Jan	12	11	11	12	12	15	22	105	20	16	18	17	14	13	14	13	10	16	11	12	24	29	48	74	105
12-Jan	43	19	57	21	20	12	16	11	12	12	12	14	12	15	13	13	14	62	89	42	73	24	23	57	89
13-Jan	42	44	33	84	78	19	13	68	43	49	38	13	14	16	13	15	11	18	92	20	12	12	11	12	92
14-Jan	14	12	21	18	14	17	24	16	68	33	24	15	14	34	41	12	44	31	50	47	53	53	34	34	68
15-Jan	29	50	42	40	29	44	38	44	50	51	40	30	46	53	43	47	23	22	22	58	27	17	11	12	58
16-Jan	10	8	13	10	13	12	11	12	10	9	10	16	11	14	12	25	19	10	15	17	16	14	9	10	25
17-Jan	11	12	12	12	51	83	17	35	47	49	49	53	58	43	27	22	12	49	51	70	60	54	37	26	83
18-Jan	47	43	74	43	48	79	83	46	80	44	55	80	82	62	24	14	49	25	28	9	27	37	21	88	88
19-Jan	17	17	57	38	14	14	13	14	14	13	14	13	15	14	15	20	14	14	12	13	13	31	21	60	60
20-Jan	25	33	18	15	14	12	13	13	13	57	39	14	11	14	16	11	13	71	72	23	44	11	17	21	72
21-Jan	17	15	16	15	17	16	14	14	15	15	14	14	14	16	16	16	13	13	15	14	15	14	15	14	17
22-Jan	15	15	18	16	17	17	17	16	18	13	15	13	15	15	12	12	10	11	10	9	10	15	12	10	18
23-Jan	14	18	27	28	12	12	19	11	27	34	47	64	31	13	10	13	23	9	19	22	12	22	9	10	64
24-Jan	11	12	12	13	12	12	10	10	11	11	11	11	11	11	10	12	12	12	11	11	10	10	10	9	13
25-Jan	11	12	12	11	11	12	12	13	12	12	13	12	11	13	13	11	11	11	13	11	11	12	11	9	13
26-Jan	17	10	16	13	12	12	10	10	10	11	11	13	15	22	35	25	49	46	43	33	31	23	44	53	53
27-Jan	61	35	39	26	35	51	50	45	29	38	38	36	46	86	42	35	71	68	61	24	31	30	50	40	86
28-Jan	53	53	37	23	26	32	24	23	17	17	12	16	16	17	16	20	11	30	57	71	43	15	17	53	71
29-Jan	31	29	24	18	39	42	29	57	17	16	11	46	51	47	47	32	20	71	23	29	59	50	37	50	71
30-Jan	19	29	37	9	29	38	45	47	66	84	17	18	16	36	22	26	16	17	15	15	15	12	15	15	84
31-Jan	14	15	15	15	15	28	25	48	72	74	78	16	14	12	46	35	33	38	16	14	20	22	26	24	78
66 54 74 84 78 86 83 105 80 84 89 80 82 86 53 62 71 71 92 71 88 100 91 88																									
Diurnal Maximum																									



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	January 19, 2017	Last Calibration	December 12, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	9:55	End Time (MST)	13:40
Gas Cert Reference	EY0000683	Station temp.	21 Deg C
Cal Gas Concentration	49.3 ppm	Cal Gas Exp Date	11/04/2019
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.	9036

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-614	-614
Analyzer IP address	192.168.1.43		Lamp voltage	819	819
Calculated slope	0.996293	0.998726	Chamber temp	45.0	45.1
Calculated intercept	1.347462	1.460949	Pressure	687.8	673.6
Analyzer Background	14.6	15.1	Flow	0.508	0.497
Analyzer Coefficient	0.957	0.948	Intensity	91	91

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	-0.3	----
as found span	5500	83.0	744.0	742.2	1.002
calibrator zero	5500	0.0	0.0	-0.2	----
high point	5500	83.0	744.0	743.7	1.000
second point	5500	46.5	416.8	416.6	1.001
third point	5500	23.3	208.9	205.5	1.016
as left zero	5500	0.0	0.0	-0.3	----
as left span	5500	83.0	744.0	743.4	1.001
Average Correction Factor					1.006

Corrected As found 742.5 Previous response 745.4 % change 0.4%

Notes:

Inlet filter changed after as founds. Span adjusted.

Calibration Performed By:

Devin Russell



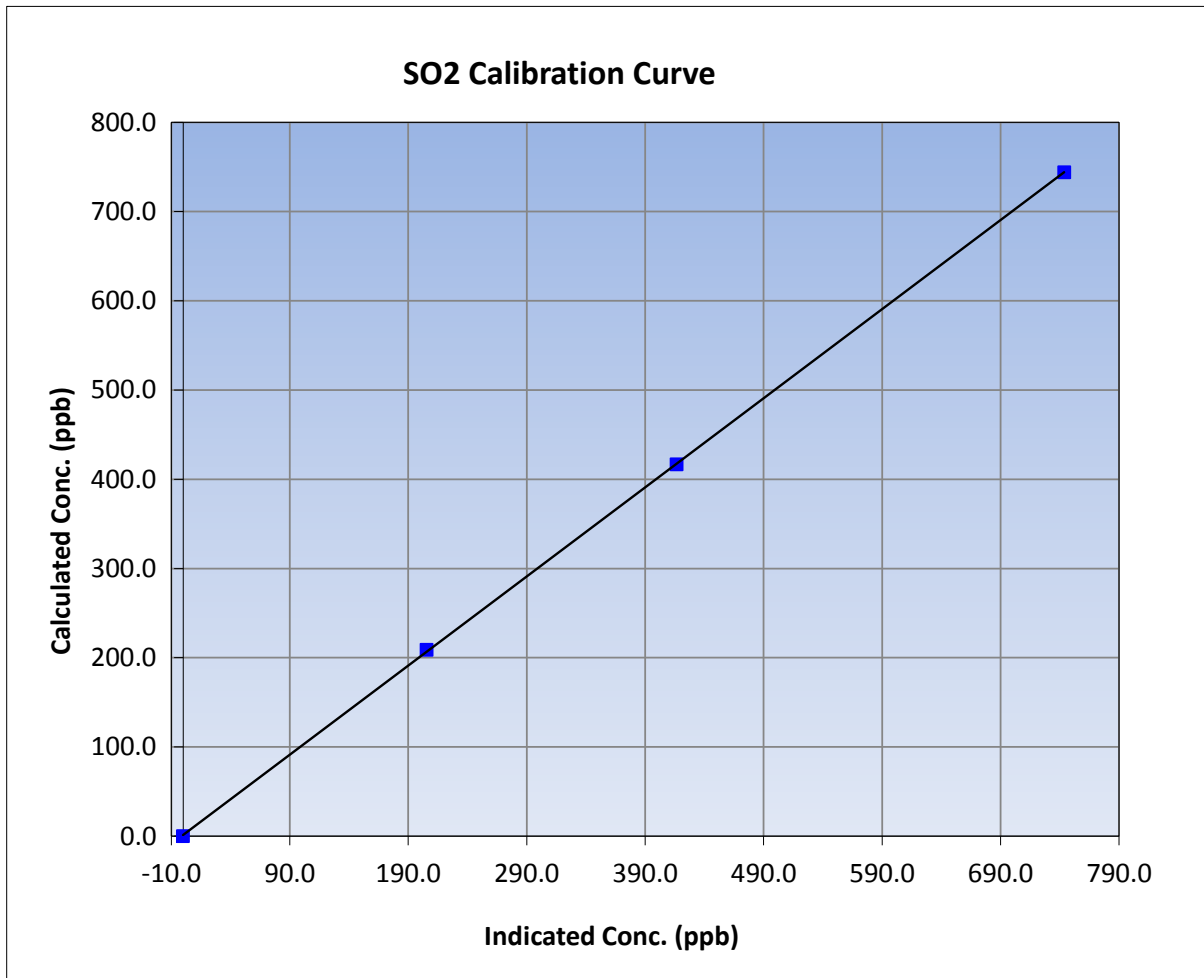
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 19, 2017	Previous Calibration	December 12, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:55	End Time (MST)	13:40
Analyzer make	Thermo 43i	Analyzer serial #	JC1501301448

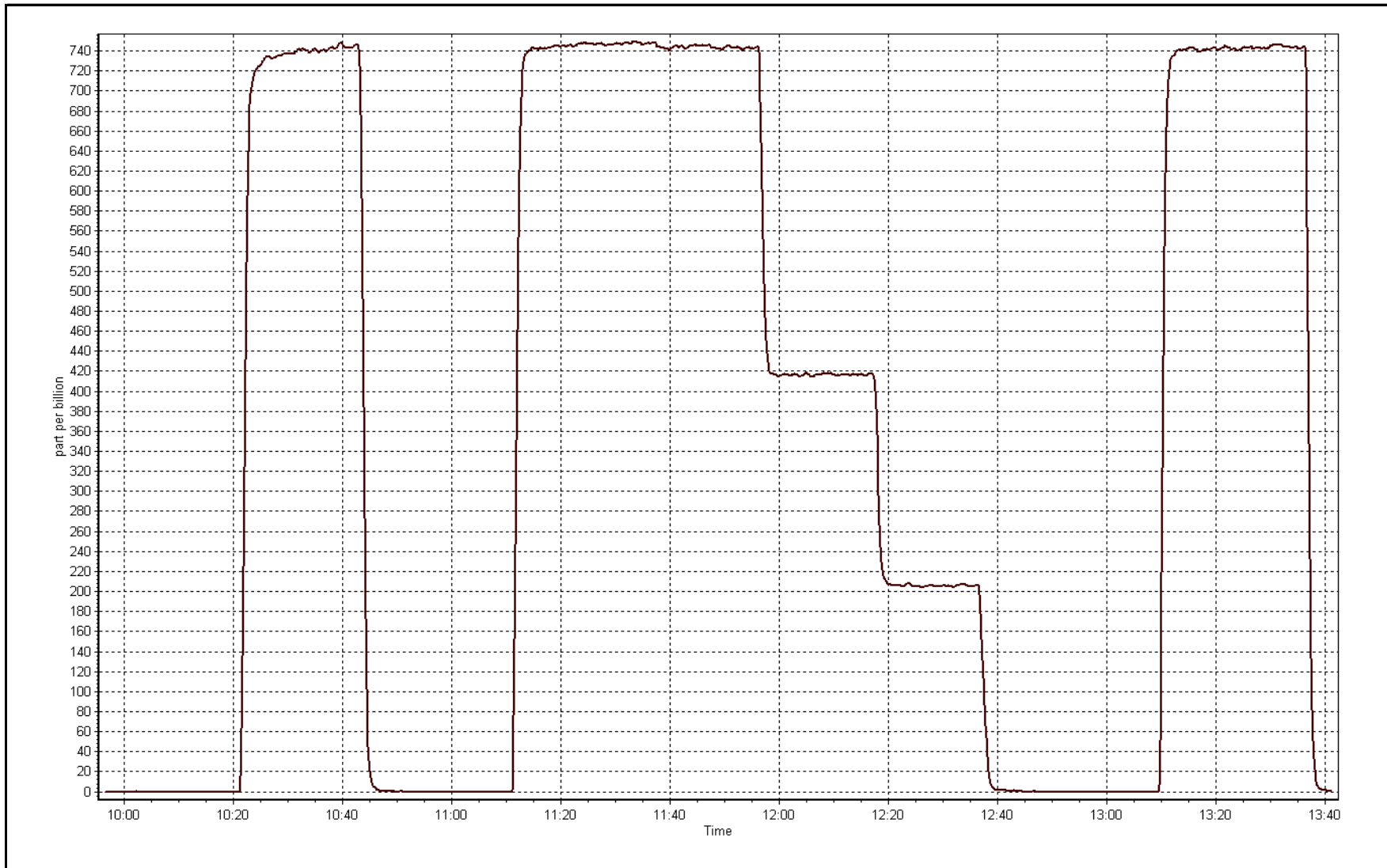
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999978
744.0	743.7	1.0004		
416.8	416.6	1.0006	Slope	0.998726
208.9	205.5	1.0162		
			Intercept	1.460949



SO2 Calibration Plot

Date: January 19, 2017





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	January 16, 2017	Last Calibration	December 10, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	10:25	End Time (MST)	14:00
Gas Cert Reference	ET0005004	Station temp.	21 Deg C
Cal Gas Concentration	4.94 ppm	Cal Gas Exp Date	2/12/2019
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.	9036
SO2 gas concentration	49.7 ppm	SO2 gas cert/exp	LL107945 8/Sep/18

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-859	-860
Analyzer IP address	192.168.1.44		Lamp voltage	1143	1155
Calculated slope	1.007036	1.004735	Chamber temp	45	45
Calculated intercept	-0.049525	-0.107919	Pressure	676.0	656.6
Analyzer Background	1.7	1.76	Flow	0.442	0.430
Analyzer Coefficient	0.925	0.937	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	6000	0.0	0.0	0.0	----
as found span	6000	91.1	75.0	73.9	1.015
SO2 scrubber check	6000	23.2	192.2	0.5	----
calibrator zero	6000	0.0	0.0	0.1	----
high point	6000	91.1	75.0	74.7	1.004
second point	6000	48.6	40.0	40.1	0.998
third point	6000	24.3	20.0	19.9	1.005
as left zero	6000	0.0	0.0	0.1	----
as left span	6000	91.1	75.0	75.1	0.998
Average Correction Factor					1.002

Corrected As found	73.9	Previous response	74.5	% change	0.8%
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Notes:

Inlet filter changed after as founds. Scrubber check completed after as founds. Span adjusted.

Calibration Performed By:

Devin Russell



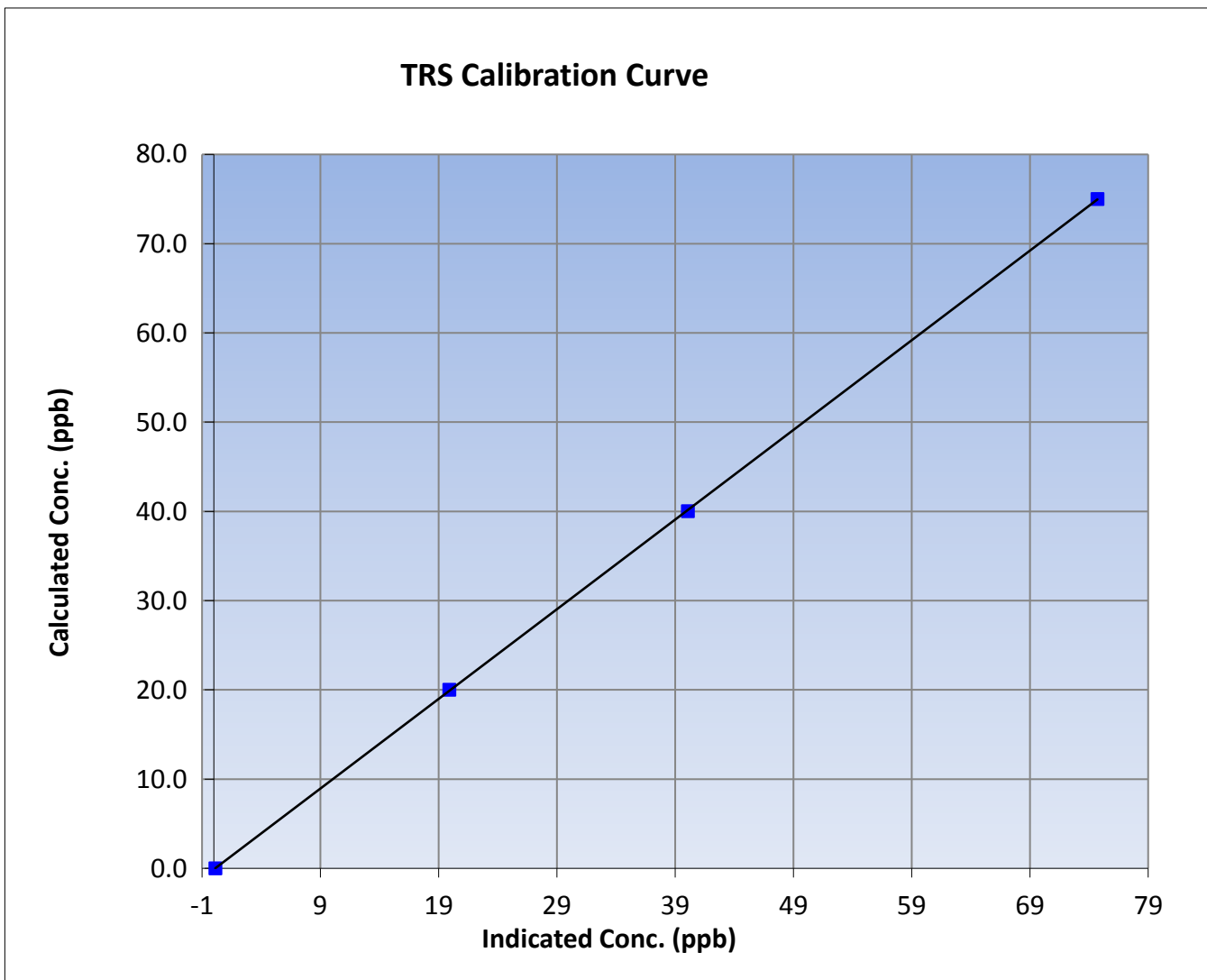
Wood Buffalo Environmental Association TRS Calibration Report

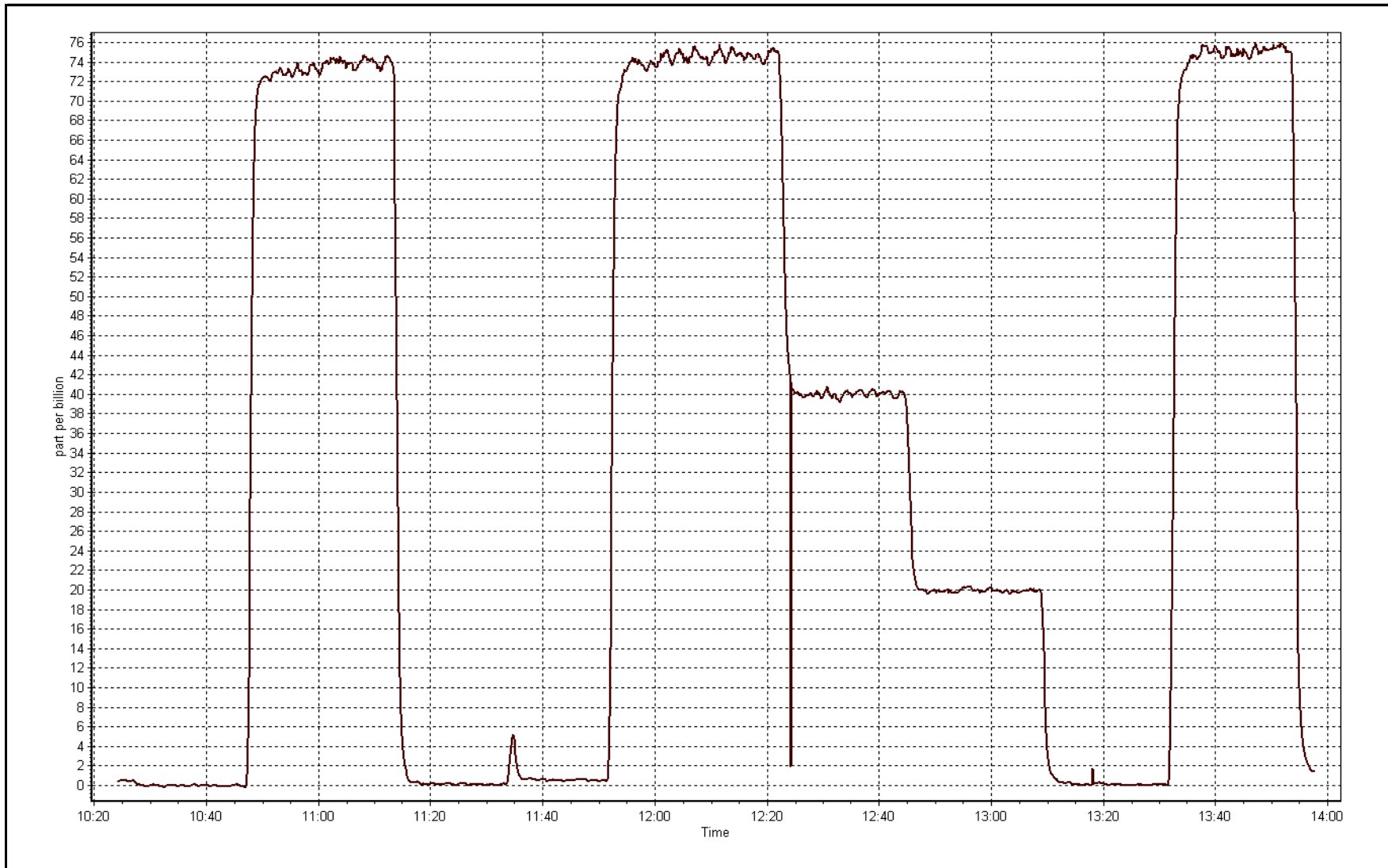
Station Information

Calibration Date	January 16, 2017	Previous Calibration	December 10, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:25	End Time (MST)	14:00
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	0.999988
75.0	74.7	1.0040		
40.0	40.1	0.9984	Slope	1.004735
20.0	19.9	1.0049		
			Intercept	-0.107919







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	January 19, 2017	Last Calibration	December 20, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	9:55	End Time (MST)	13:40
Gas Cert Reference	EY0000683	Cal Gas Expiry Date	November-04-19
CH4 Cal Gas Conc.	515.0 ppm	CH4 Equiv Conc.	1062.3 ppm
C3H8 Cal Gas Conc.	199.0 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	9036

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 100 ppm		Column Temp	75.2	75.0
NMHC Range (ppm)	0 - 50 ppm		Detector Temp	175.1	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	1.006297	1.000799	Carrier Pressure	36.7	36.7
THC Calc intercept	0.000000	0.041954	Fuel Pressure	47.7	47.7
NMHC Calc slope	1.005907	1.000027	Air Pressure	38.9	39.0
NMHC Calc intercept	0.000000	0.010799			

Analyzer make Thermo 55i Analyzer serial # 1152430012

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	83.0	16.03	15.82	1.013
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	83.0	16.03	16.00	1.002
second point	5500	46.5	8.98	8.91	1.008
third point	5500	23.3	4.50	4.41	1.020
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	83.0	16.03	16.01	1.001
Average Correction Factor					1.010

Corrected As found 15.82 Previous response 15.93 % change 0.7%

Notes:

Inlet filter changed after 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	5500	0	0.00	0.00	----
as found span	5500	83	8.26	8.14	1.015
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	83.0	8.26	8.25	1.001
second point	5500	46.5	4.63	4.62	1.001
third point	5500	23.3	2.32	2.29	1.012
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	83.0	8.26	8.24	1.002
Average Correction Factor					1.005

Corrected As found 8.14 Previous response 8.21 % change 0.9%

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	83	7.77	7.67	1.013
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	83.0	7.77	7.76	1.002
second point	5500	46.5	4.35	4.29	1.015
third point	5500	23.3	2.18	2.11	1.034
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	83.0	7.77	7.77	1.000
Average Correction Factor					1.017

Corrected As found 7.67 Previous response 7.72 % change 0.7%



Wood Buffalo Environmental Association

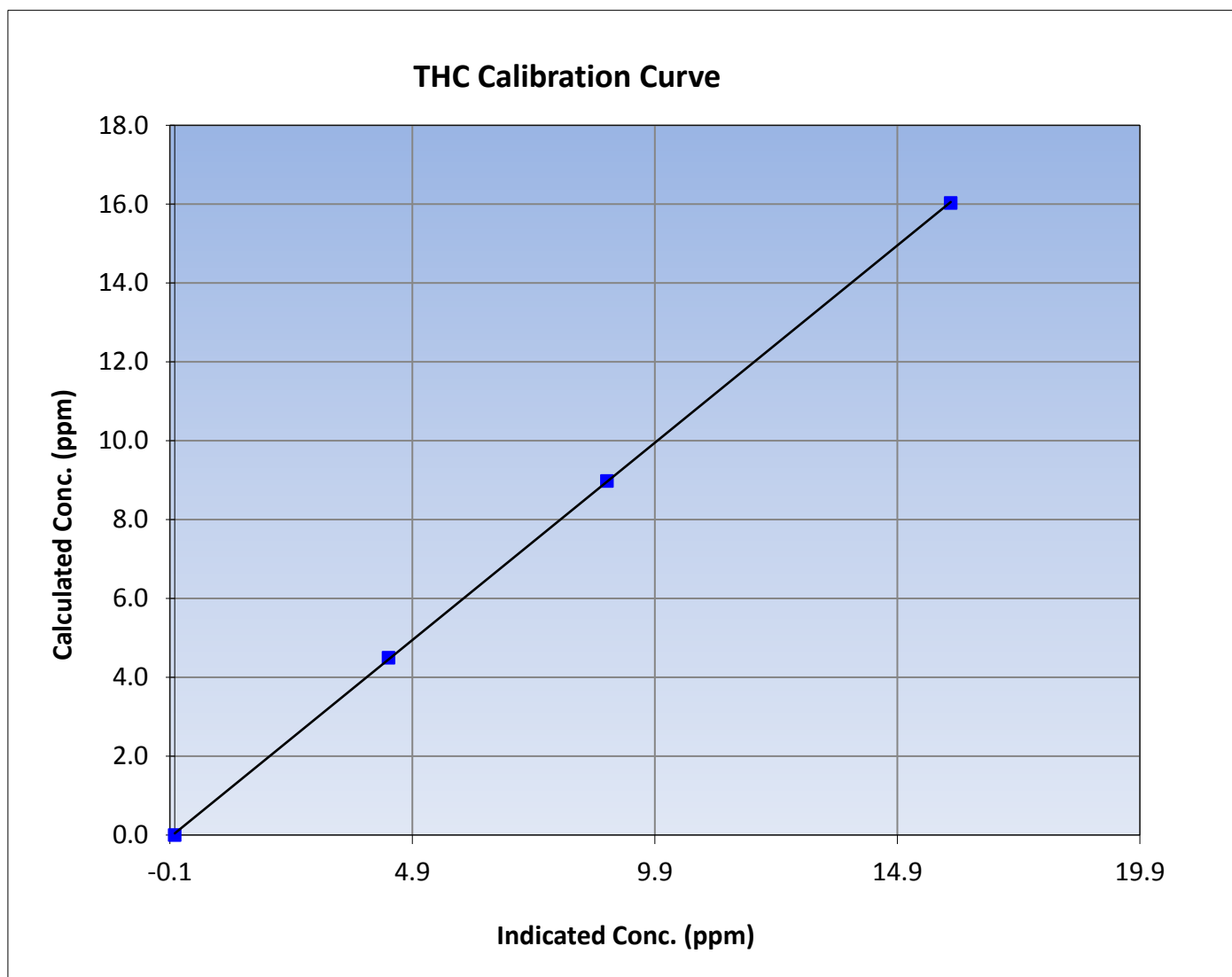
THC Calibration Summary

Station Information

Calibration Date	January 19, 2017	Previous Calibration	December 20, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:55	End Time (MST)	13:40
Analyzer make	Thermo 55i	Analyzer serial #	1152430012
	8:17		

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999966
16.03	16.00	1.0019		
8.98	8.91	1.0080	Slope	1.000799
4.50	4.41	1.0204		
			Intercept	0.041954





Wood Buffalo Environmental Association

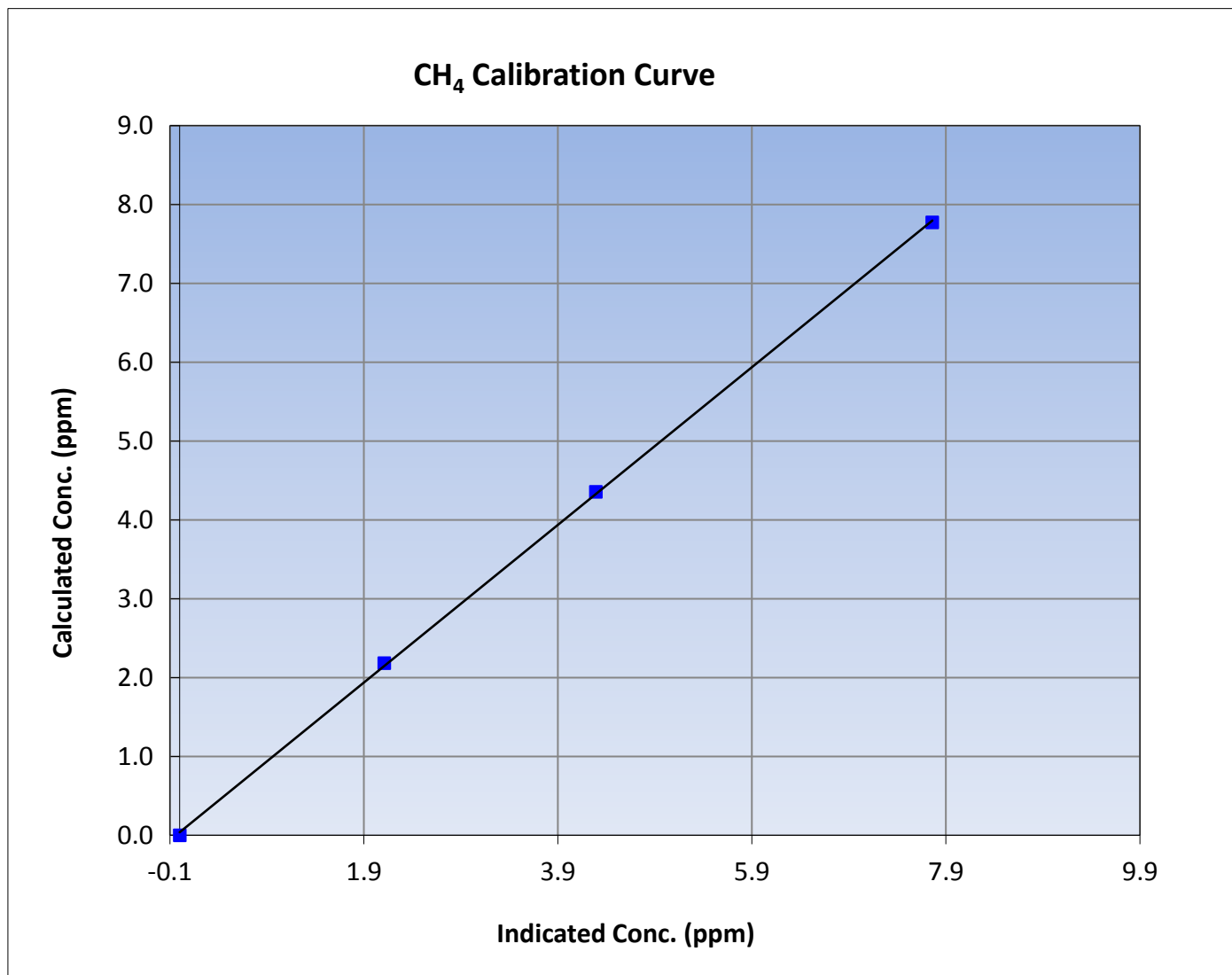
CH₄ Calibration Summary

Station Information

Calibration Date	January 19, 2017	Previous Calibration	December 20, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:55	End Time (MST)	13:40
Analyzer make	Thermo 55i	Analyzer serial #	1152430012
8:17			

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999880
7.77	7.76	1.0015		
4.35	4.29	1.0149	Slope	0.999860
2.18	2.11	1.0340		
			Intercept	0.037406





Wood Buffalo Environmental Association

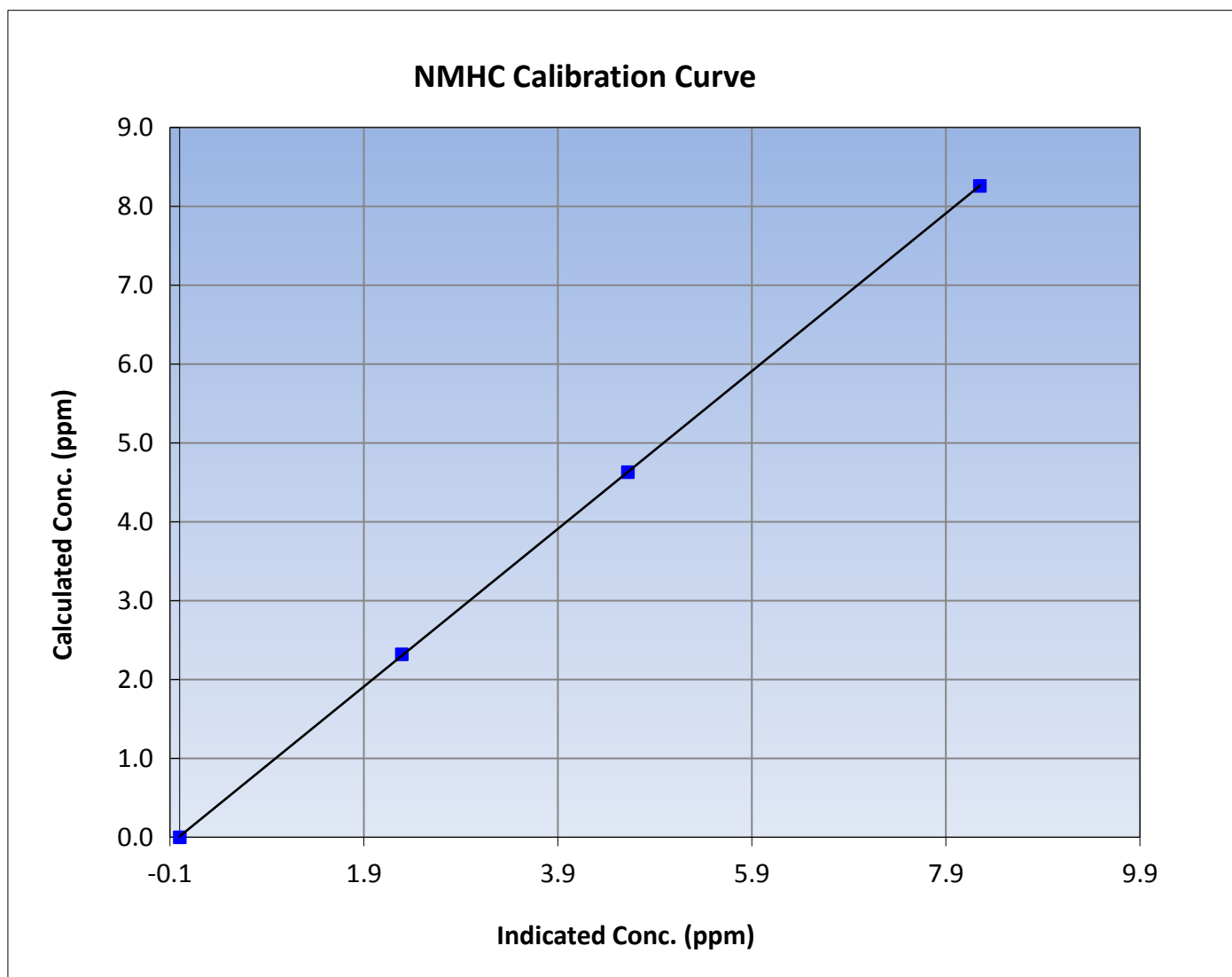
NMHC Calibration Summary

Station Information

Calibration Date	January 19, 2017	Previous Calibration	December 20, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:55	End Time (MST)	13:40
Analyzer make	Thermo 55i	Analyzer serial #	1152430012
	8:17		

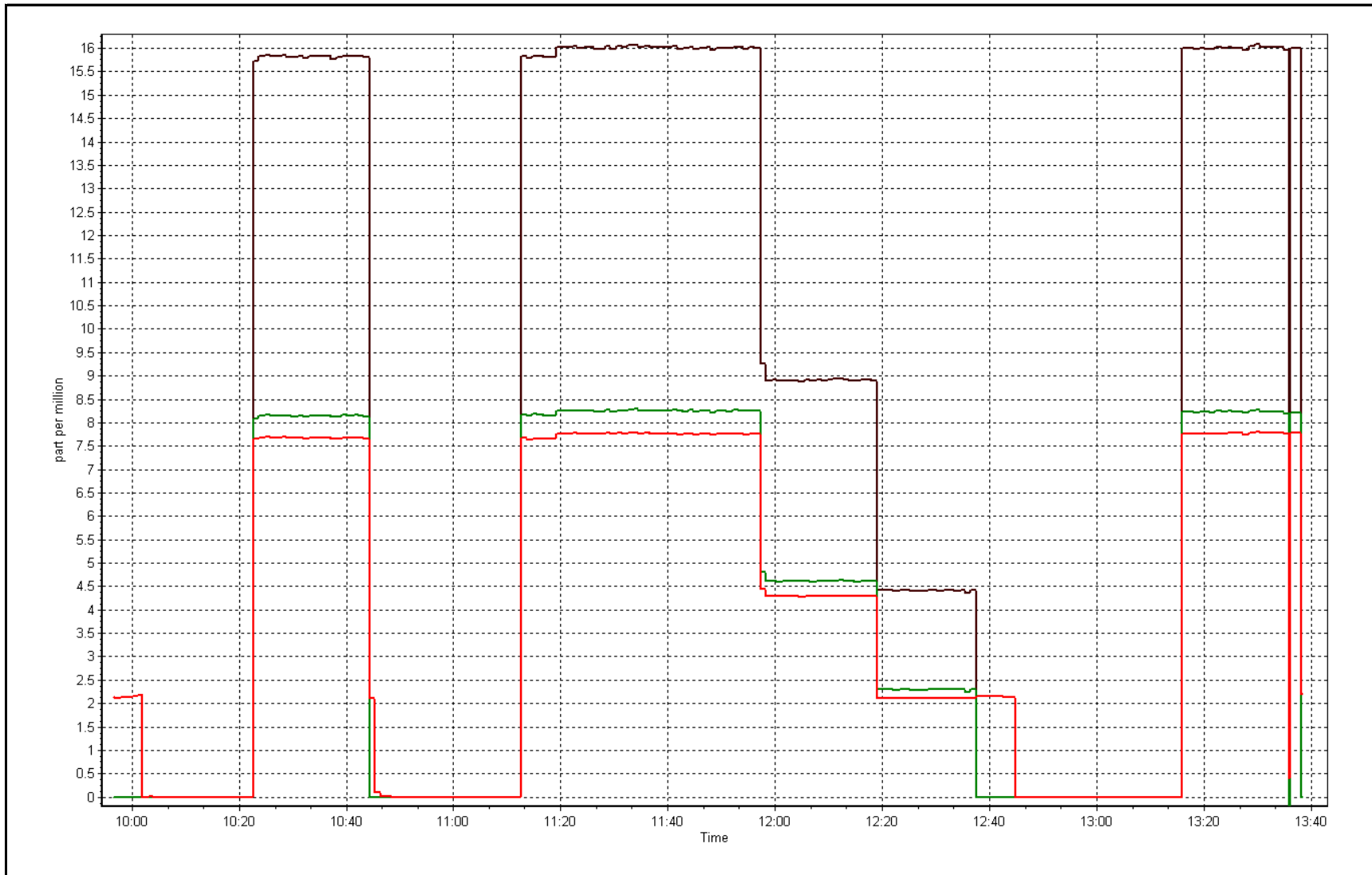
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999988
8.26	8.25	1.0010		
4.63	4.62	1.0015	Slope	1.000027
2.32	2.29	1.0124		
			Intercept	0.010799



THC Calibration Plot

Date: January 19, 2017





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	January 12, 2017	Previous Calibration	December 13, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	10:15	End Time (MST)	14:50
NO2 GPT Ref date	January-11-17	Transfer Standard	N/A
Calibrator Make/Model	Sabio 4010	Station temp.	22 Deg C
ZAG make/model	Teledyne API 701	Serial Number	1730512
DACS make/model	Campbell Scientific CR3000	Serial Number	587
		Serial Number	9036

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	30.7	30.6
Analyzer IP address	192.168.1.49		Lamp temp.	53.7	53.6
Calculated slope	1.004411	1.004543	Pressure	722.5	721.1
Calculated intercept	-1.835749	-1.648707	Flow cell A	0.767	0.765
Analyzer Background	-1.3	-0.1	Flow cell B	0.819	0.818
Analyzer Coefficient	1.076	1.143	Cell A Intensity	68xxx	99xxx
			Cell B Intensity	84xxx	99xxx

Analyzer make Thermo 49i Analyzer serial # 1152220026

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	0.8	----
as found span	5000	0.88	426.8	402.1	1.062
calibrator zero	6000	0.00	0.0	0.0	----
high point	5000	0.88	426.8	425.6	1.003
second point	5000	0.56	253.2	254.1	0.997
third point	5000	0.34	130.4	133.6	0.976
As Left Zero	6000	0.00	0.0	-0.1	----
As Left Span	5000	0.88	426.8	433.3	0.985
Average Correction Factor					0.992

Corrected As found 401.3 Previous response 426.8 % change 6.3%

Notes:

Inlet filter changed after as founds. As found span was 6.2% low. Cell A intensity is low at 66000 Hz, while Cell B intensity is at 82000 Hz. Absorption tubes cleaned. Lamp voltage adjustments completed. Detector calibration completed. Zero and span adjusted.

Calibration Performed By:

Devin Russell



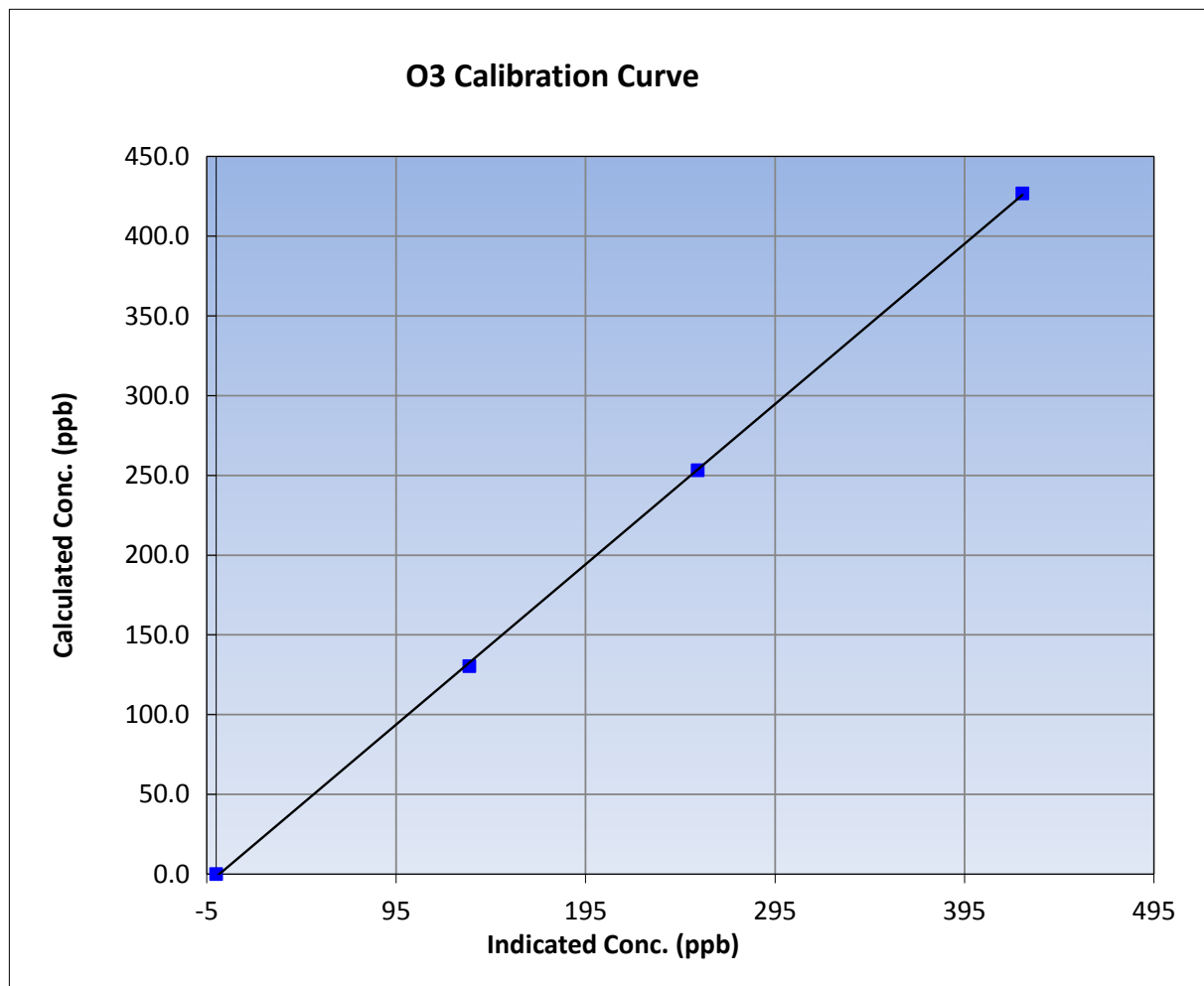
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	January-12-17	Previous Calibration	December-13-16
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	10:15	End Time (MST)	14:50
Analyzer make	Thermo 49i	Analyzer serial #	1152220026

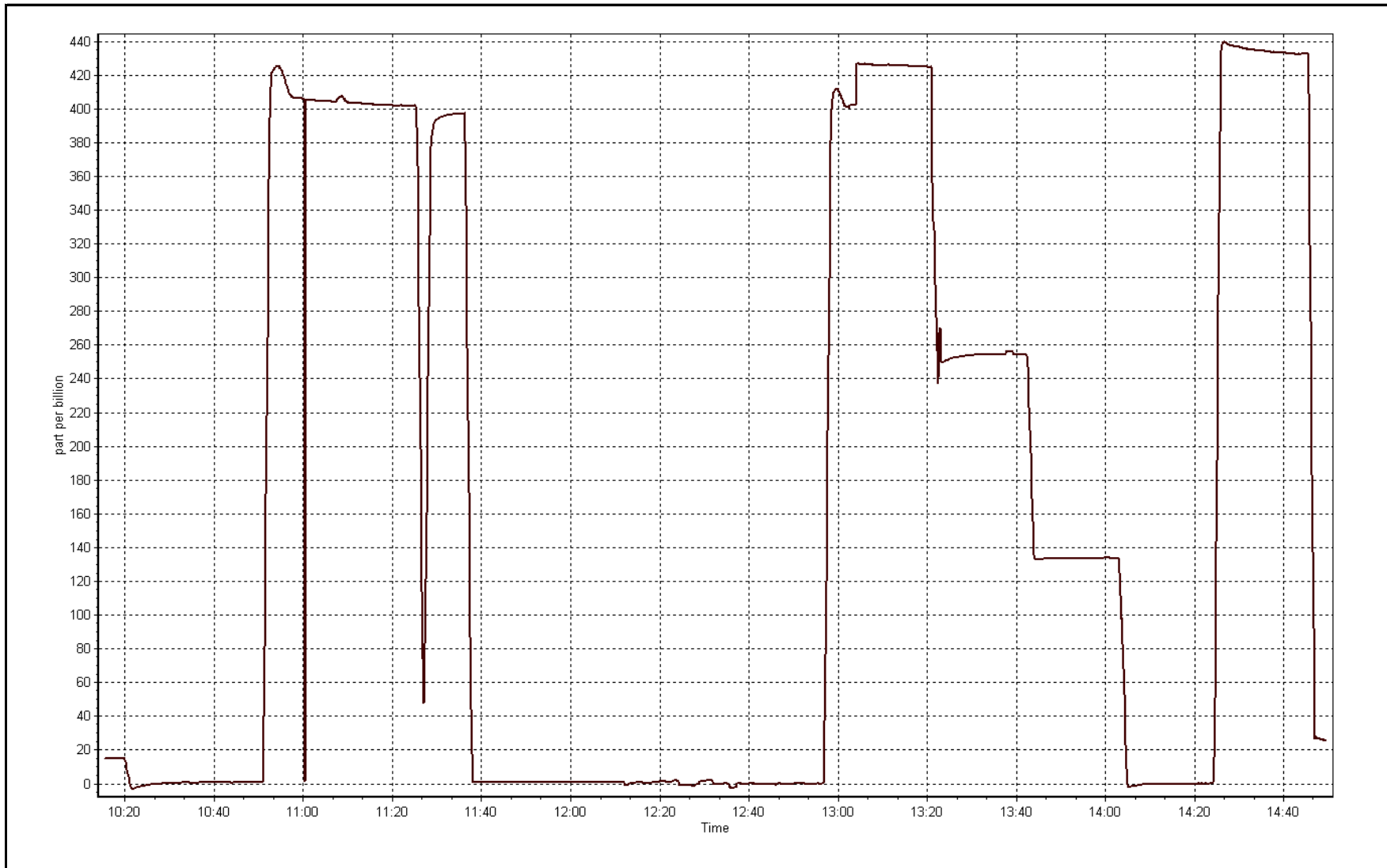
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999918
426.8	425.6	1.0028		
253.2	254.1	0.9966	Slope	1.004543
130.4	133.6	0.9762		
			Intercept	-1.648707



O3 Calibration Plot

Date: January 12, 2017





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	January 24, 2017	Previous Calibration	January 12, 2017
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Removal		
Start Time (MST)	9:55	End Time (MST)	13:40
NO2 GPT Ref date	January-11-17	Transfer Standard	N/A
Calibrator Make/Model	Sabio 4010	Station temp.	22 Deg C
ZAG make/model	Teledyne API 701	Serial Number	1730512
DACS make/model	Campbell Scientific CR3000	Serial Number	587
		Serial Number	9036

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	30.6	NA
Analyzer IP address	192.168.1.49		Lamp temp.	53.6	NA
Calculated slope	1.004543	1.278546	Pressure	721.1	NA
Calculated intercept	-1.648707	-1.443120	Flow cell A	0.765	NA
Analyzer Background	-0.1	NA	Flow cell B	0.818	NA
Analyzer Coefficient	1.143	NA	Cell A Intensity	99xxx	NA
			Cell B Intensity	99xxx	NA

Analyzer make	Thermo 49i	Analyzer serial #	1152220026
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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	-0.2	----
as found span	5000	0.88	426.8	329.2	1.296
calibrator zero	6000	0.00	0.0	-0.3	----
high point	5000	0.88	426.8	334.0	1.278
second point	5000	0.56	253.2	199.8	1.267
third point	5000	0.34	130.4	104.8	1.245
As Left Zero					
As Left Span					
Average Correction Factor					1.263

Corrected As found	329.5	Previous response	426.5	% change	29.5%
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Notes:

As founds completed. Span was 30% low. The lamp was replaced but did not resolve issue. Analyzer removed.

Calibration Performed By:

Devin Russell



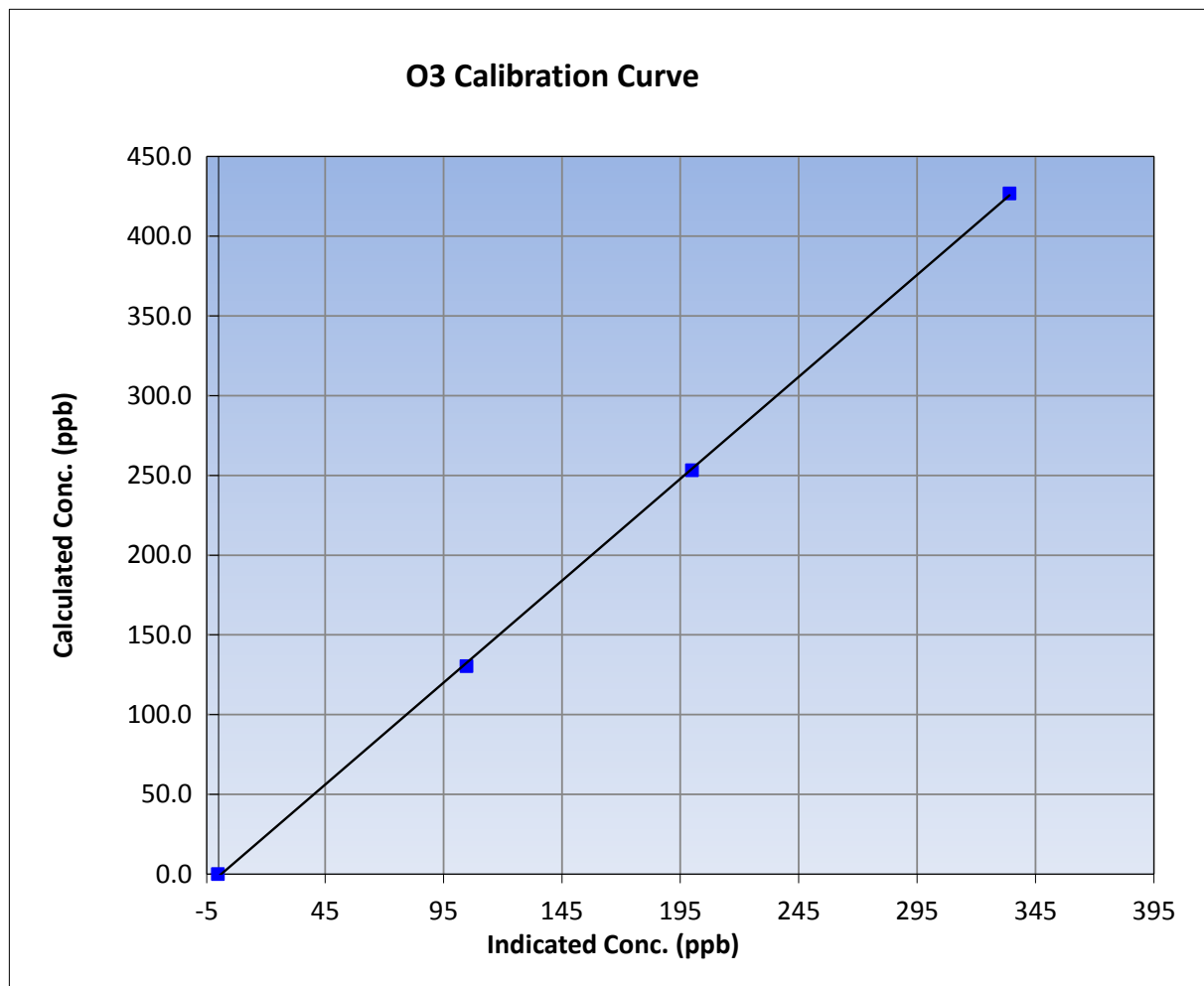
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	January-24-17	Previous Calibration	January-12-17
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:55	End Time (MST)	13:40
Analyzer make	Thermo 49i	Analyzer serial #	1152220026

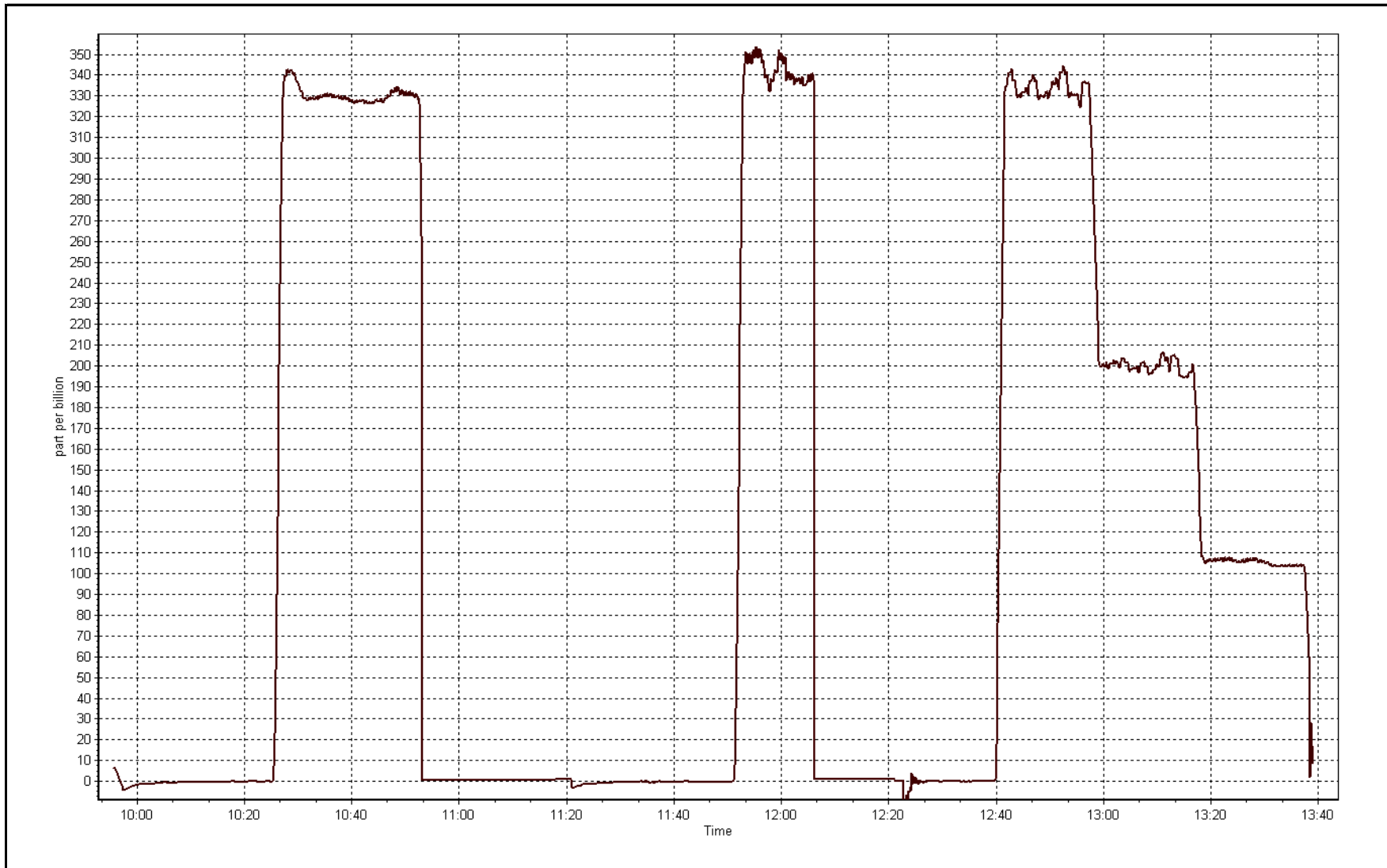
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999903
426.8	334.0	1.2777		
253.2	199.8	1.2670	Slope	1.278546
130.4	104.8	1.2449		
			Intercept	-1.443120



O3 Calibration Plot

Date: January 24, 2017





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	January 24, 2017	Previous Calibration	NA
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Install		
Start Time (MST)	13:50	End Time (MST)	15:50
NO2 GPT Ref date	January-11-17	Transfer Standard	N/A
Calibrator Make/Model	Sabio 4010	Station temp.	22 Deg C
ZAG make/model	Teledyne API 701	Serial Number	1730512
DACS make/model	Campbell Scientific CR3000	Serial Number	587
		Serial Number	9036

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	NA	26.7
Analyzer IP address	192.168.1.79		Lamp temp.	NA	58.0
Calculated slope	1.004543	0.998458	Pressure	NA	26.7
Calculated intercept	-1.648707	-0.696127	Flow cell A	NA	753.0
Analyzer Background	NA	-0.1	Flow cell B	NA	756.0
Analyzer Coefficient	NA	1.143	O3 Measure	NA	4184.7
			O3 Reference	NA	4195.6

Analyzer make	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					
as found span					
calibrator zero	6000	0.00	0.0	-0.1	----
high point	5000	0.88	426.8	427.4	0.999
second point	5000	0.56	253.2	255.3	0.992
third point	5000	0.34	130.4	131.9	0.989
As Left Zero	6000	0.00	0.0	-0.1	----
As Left Span	5000	0.88	426.8	442.6	0.964
Average Correction Factor					0.993

Corrected As found	NA	Previous response	NA	% change	NA
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Notes:

Installation calibration. Span adjusted.

Calibration Performed By: Devin Russell



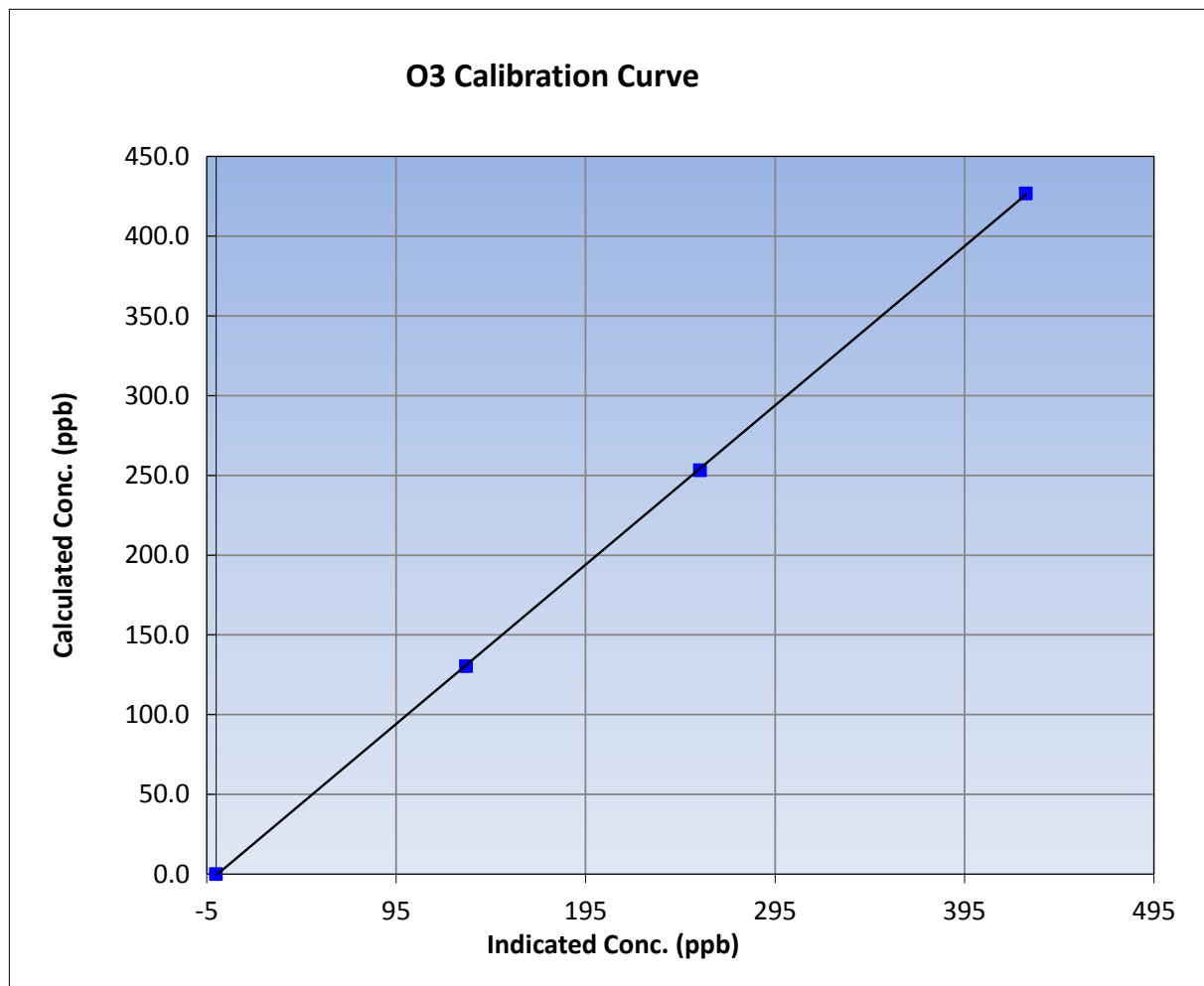
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	January-24-17	Previous Calibration	NA
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	13:50	End Time (MST)	15:50
Analyzer make	API T400	Analyzer serial #	1107

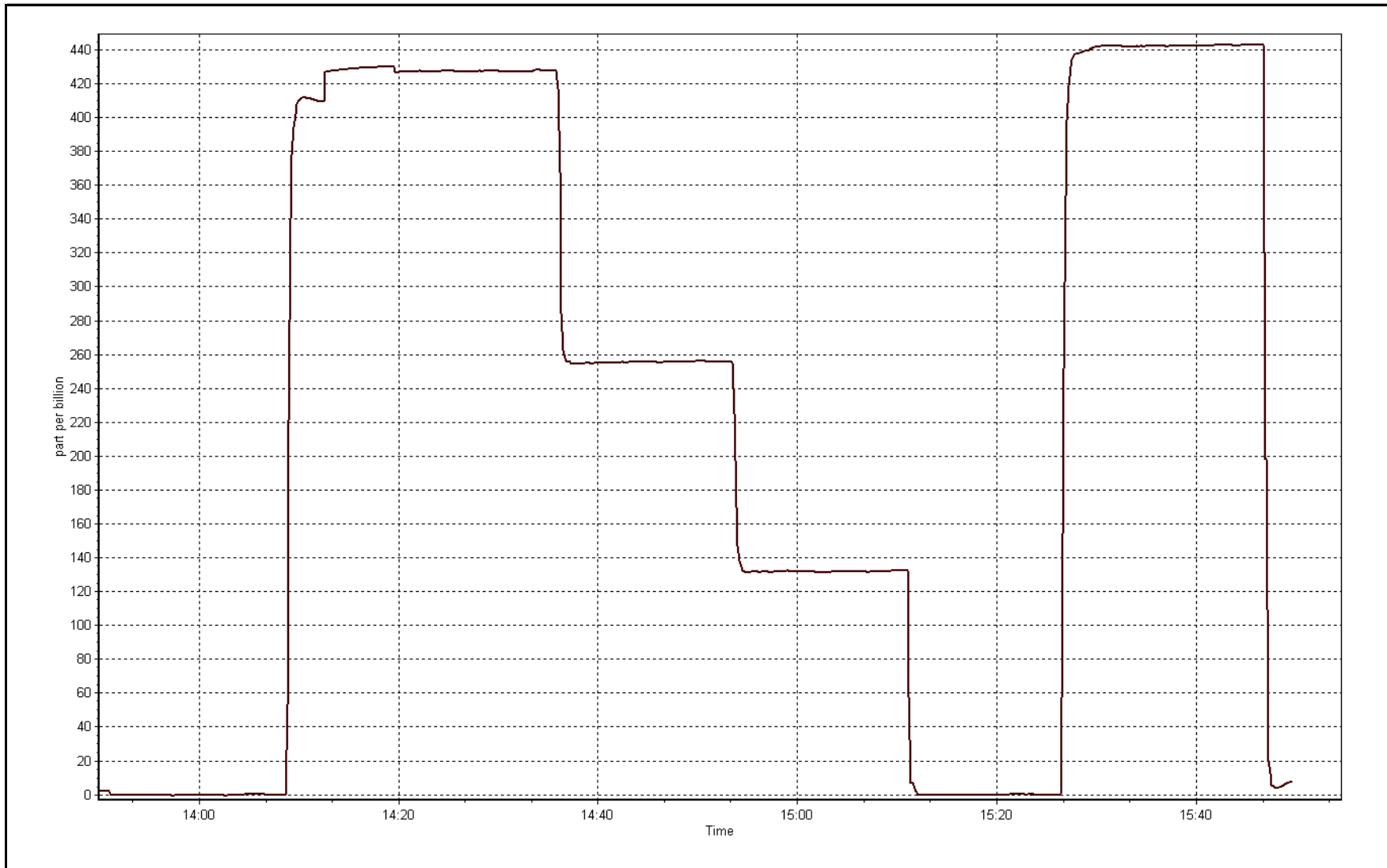
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999973
426.8	427.4	0.9987		
253.2	255.3	0.9917	Slope	0.998458
130.4	131.9	0.9888		
			Intercept	-0.696127



O3 Calibration Plot

Date: January 24, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 11, 2017	Previous Calibration	December 12, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	9:46	End Time (MST)	14:30
NO Cal Gas Conc	49.7 ppm	Gas Cert Reference	EY0000683
NOX Cal Gas Conc	49.7 ppm	Cal Gas Expiry Date	11/04/2019
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.	9036
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.994666	0.999695	0.999116
	Data Offset	1.268723	1.437863	-0.806909
Current Calibration	Data Slope	0.997452	0.997533	1.005521
	Data Offset	1.231387	1.512568	-0.135650

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153357
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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	1.157		1.166	
NOX coefficient	1.005		0.999	
NO2 coefficient	1.000		1.000	
NO bkgrnd	5.9		5.9	
NOX bkgrnd	6.0		6.1	
Chamber Temp	50.5	Deg C	50.4	Deg C
Moly Temp	325.3	Deg C	323.9	Deg C
PMT voltage	-791.4	V	-791.1	V
PMT Temp	-3	Deg C	-2.9	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	172	mmHg	170.8	mmHg
R Cell Press Nox	172	mmHg	170.8	mmHg
NO sample flow	0.592	lpm	0.589	lpm
Nox sample Flow	0.592	lpm	0.589	lpm

Notes:

Inlet filter changed after as founds. Span adjusted.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: January 11, 2017 Station Number: AMS 1

Calibration Data

Set Point	Routine	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	0.1	-0.1	0.1	----	----
as found span	5500	83.0	750.0	750.0	0.0	749.3	744.9	4.4	1.0010	1.0069
calibrator zero	5500	0.0	0.0	0.0	0.0	0.2	-0.1	0.2	----	----
high point	5500	83.0	750.0	750.0	0.0	751.0	750.7	0.3	0.9987	0.9991
second point	5500	46.4	419.3	419.3	0.0	419.8	419.3	0.5	0.9987	0.9999
third point	5500	23.3	210.5	210.5	0.0	207.5	207.2	0.3	1.0147	1.0161
as left zero	5500	0.0	0.0	0.0	0.0	0.2	-0.1	0.3	----	----
as left span	5500	83.0	750.0	323.9	426.1	748.0	309.5	438.5	1.0027	1.0464
Average Correction Factor									1.0041	1.0050

Corrected As found NO_x= 749.2 NO= 744.9 Percent Change NO_x= 0.5% NO= 0.5%
 Previous Response NO_x= 752.8 NO= 748.8

GPT Calibration Data

Dilution Flow (total) 5500 ccm Source Gas Flow 83.00 ccm NOx ref calc conc = 750.0 ppb NO ref calc conc = 750.0 ppb

O3 Setpoint (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
1st NO ref point		0.0	750.3	750.7	0.2	0.9996	0.9992	----	----
1st NO2 (300)	323.9	426.8	748.4	323.9	424.5	1.0021	----	1.0053	99.5%
2nd NO2 (200)	497.5	253.2	749.6	497.5	252.1	1.0006	----	1.0044	99.6%
3rd NO2 (100)	620.2	130.4	749.9	620.2	129.6	1.0002	----	1.0060	99.4%
2nd NO ref point	----	0.0	750.5	750.3	0.1	0.9994	0.9996	----	----
Average Correction Factor						1.0006		1.0052	99.5%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

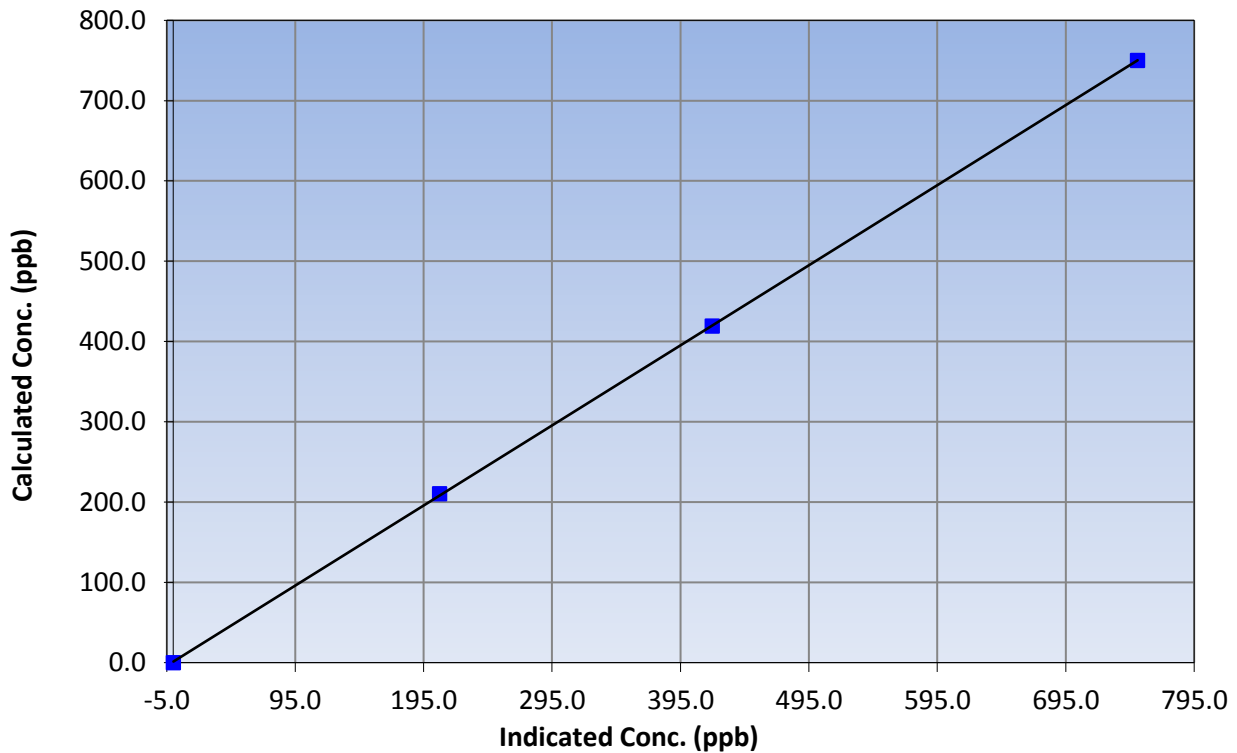
Station Information

Calibration Date	January 11, 2017	Previous Calibration	December 12, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:46	End Time (MST)	14:30
Analyzer make	Routine	Analyzer serial #	1218153357

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999974
750.0	751.0	0.9987		
419.3	419.8	0.9987	Slope	0.997452
210.5	207.5	1.0147		
			Intercept	1.231387

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

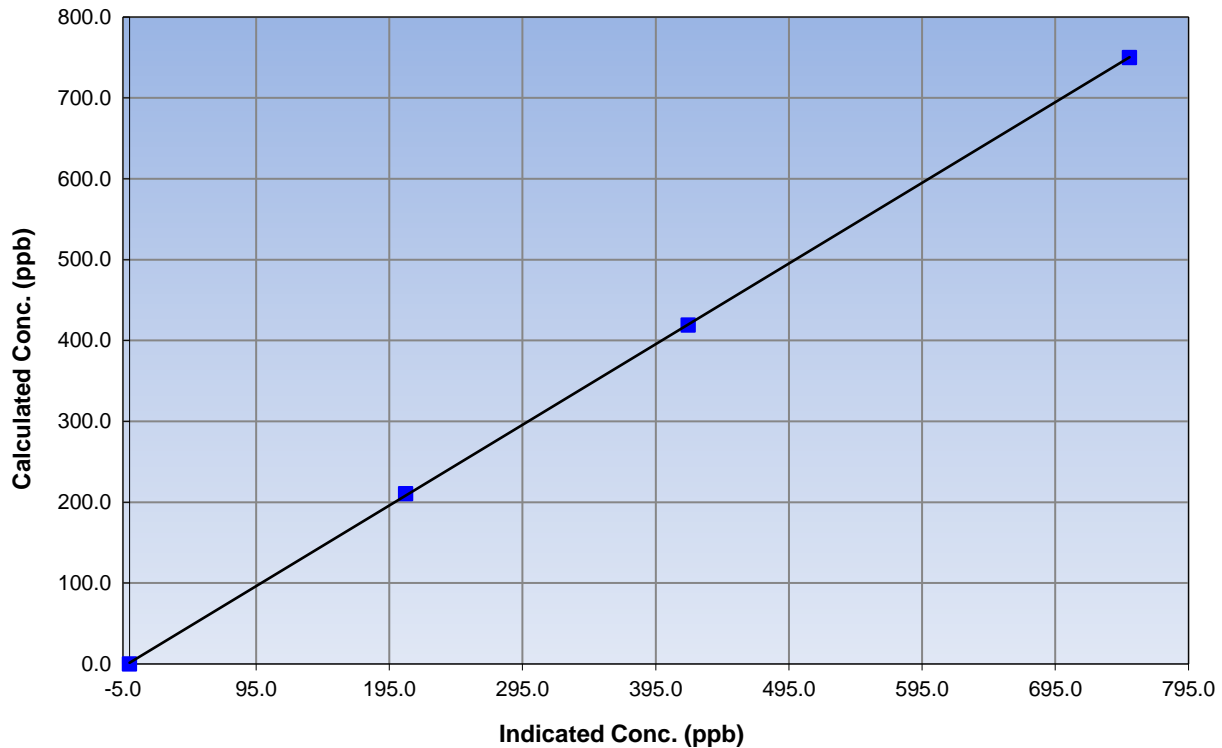
Station Information

Calibration Date	January 11, 2017	Previous Calibration	December 12, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:46	End Time (MST)	14:30
Analyzer make	Routine	Analyzer serial #	1218153357

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999974
750.0	750.7	0.9991		
419.3	419.3	0.9999	Slope	0.997533
210.5	207.2	1.0161		
			Intercept	1.512568

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

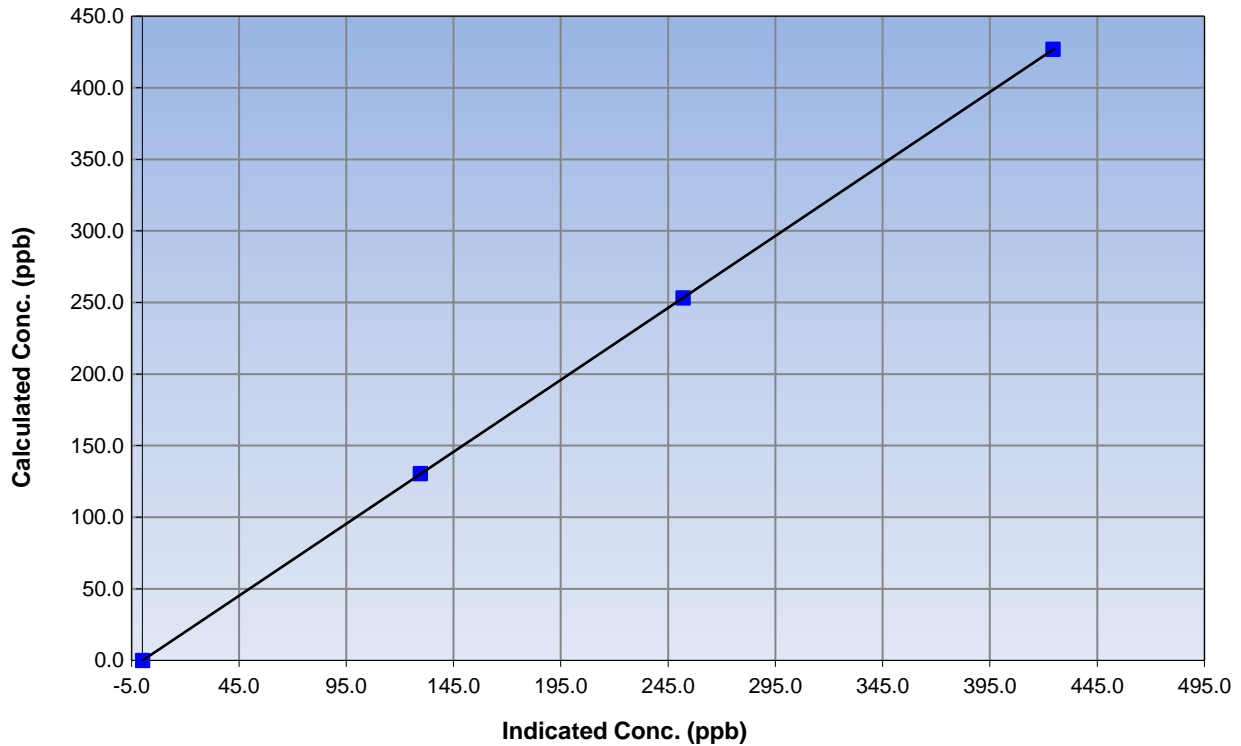
Station Information

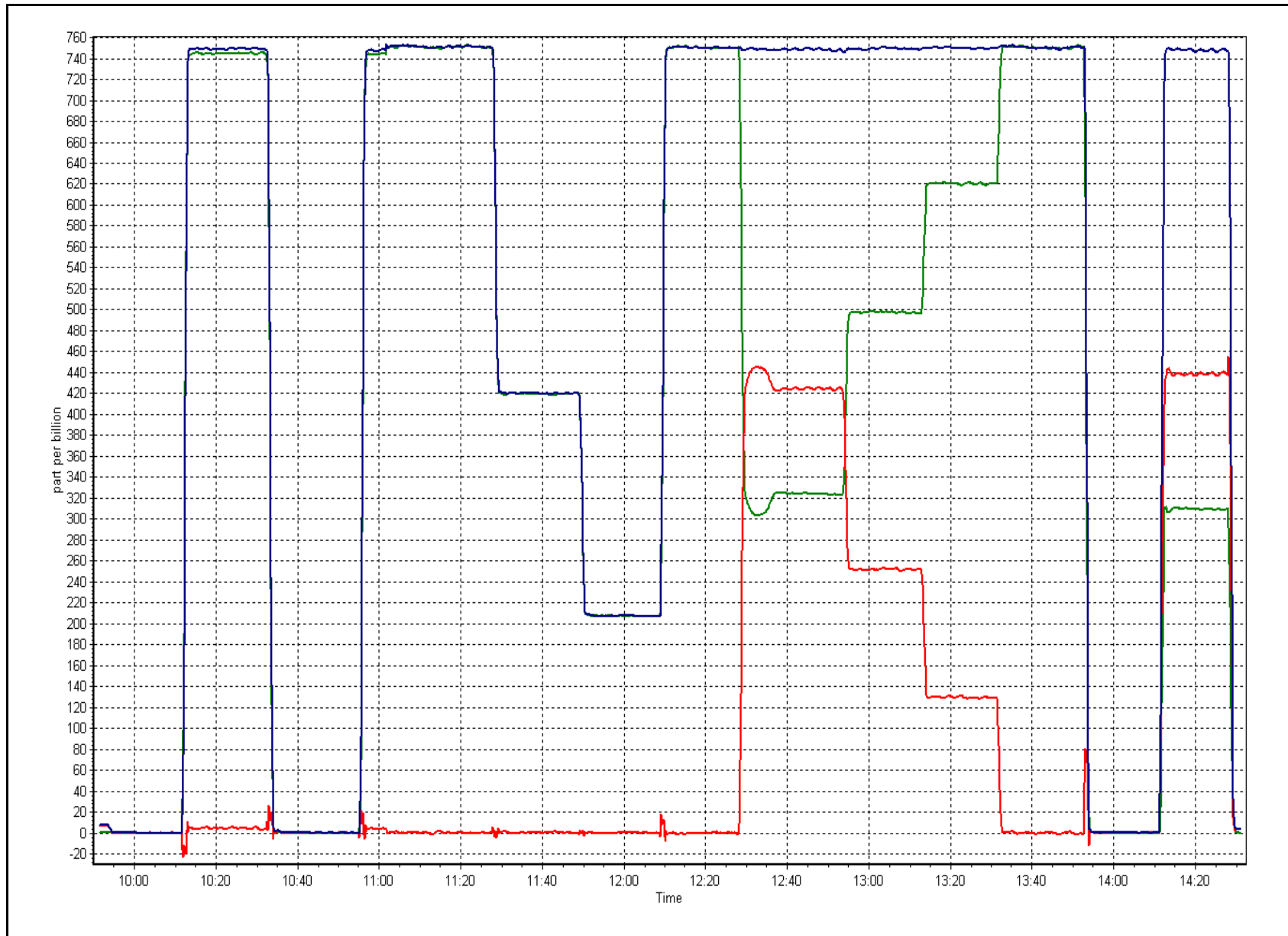
Calibration Date	January 11, 2017	Previous Calibration	December 12, 2016
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:46	End Time (MST)	14:30
Analyzer make	Routine	Analyzer serial #	1218153357

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999999
426.8	424.5	1.0053		
253.2	252.1	1.0044	Slope	1.005521
130.4	129.6	1.0060		
			Intercept	-0.135650

NO₂ Calibration Curve







Wood Buffalo Environmental Association

N_t-NO_x-NH₃ Calibration Report

Station Information

Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
NOX Calibration Date	January 11, 2017	NOX Previous Cal Date	December 12, 2016
NH3 Calibration Date	January 13, 2017	NH3 Previous Cal Date	December 13, 2016
Reason:	Routine		
Start Time (MST)	9:46	End Time (MST)	14:30
Calibrator	Sabio 4010	Station Temperature	21.0 Deg C
NH3 Cal Gas Conc	95.5 ppm	Serial Number	14300410
NOx Cal Gas Conc	49.7 ppm	NH3 Expiry Date / SN	24/May/2017 LL23123
NO Cal Gas Conc	49.7 ppm	NO Expiry Date / SN	4/Nov/2019 EY0000683

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9036
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Parameter		NH3	Nt	NOx	NO	NO2
Cal Stats As Found	Data Slope	1.001636	0.989520	0.997722	0.997105	1.010174
	Data Offset	-10.2522	-11.001861	0.803858	0.994442	1.769413
Cal Stats After	Data Slope	0.998045	0.986249	0.997516	0.998053	1.004704
	Data Offset	-5.93	-6.58	-0.025151	1.505763	-1.620263
IP address			192.168.1.77			

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	0.0		0.0	
NOx BKG	0.0		0.0	
Nt BKG	0.0		0.0	
NO coefficient	1.127		1.104	
NO2 coefficient	1.000		1.000	
NOx coefficient	1.268		1.254	
NH3 coefficient	0.859		0.871	
Nt coefficient	1.271		1.251	
NH3 conv temp	825	DegC	825	Deg C
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	314.6	Deg C	314.9	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O3 flow	85.0	ccm	84.0	ccm
R Cell Press	5.8	mmHg	6.2	mmHg
PMT Voltage	645.0	v	645.0	v
Sample Flow 1 NO	553.0	ccm	548.0	ccm
Sample Flow 2 Nox	524.0	ccm	521.0	ccm
Sample Flow 3 Nt	514.0	ccm	510.0	ccm

Notes:

Inlet filter changed after as founds. Span adjusted. Second High NO point used as GPT reference. NH3 span adjusted.



Wood Buffalo Environmental Association

NH₃ Calibration Report

Station Information

Calibration Date:

January 13, 2017

Station Number:

AMS 1

NH₃ Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated Nt conc (ppb)	Calculated NOx conc (ppb)	Calculated NH ₃ conc (ppb)	Indicated Nt conc (ppb)	Indicated NOx conc (ppb)	Indicated NH ₃ conc (ppb)	Nt Correction factor	NH ₃ Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	-1.6	-1.6	0.0	----	----
as found NO	5500	83.0	750.0	750.0	----	745.3	752.2	-6.9	1.006	----
calibrator zero	5500	0.0	0.0	0.0	0.0	1.1	0.9	0.3	----	----
high NO point	5500	83.0	750.0	750.0	----	748.1	752.0	-3.9	1.003	----
NO/O ₃ point	5500	81.4	735.6	735.6	----	755.8	755.9	-0.1	0.973	----
as found NH ₃	5000	94.2	1799.2	NA	1799.2	1839.0	22.2	1816.7	0.978	0.990
first NH ₃	5000	94.2	1799.2	NA	1799.2	1825.0	21.8	1803.2	0.986	0.998
second NH ₃	5000	52.4	1000.8	NA	1000.8	1031.2	14.0	1017.1	0.971	0.984
third NH ₃	5000	26.2	500.4	NA	500.4	516.0	5.8	510.2	0.970	0.981
Average Correction Factor									0.9879	0.9876

Nt Corrected As Found Nt = 746.9 ppb
 NOx Corrected As Found NOx = 753.8 ppb
 NH₃ Previous Converter Efficiency = 85.9 %

Previous Response Nt = 769.0 ppb
 Previous Response NOx = 750.9 ppb
 NH₃ Current Converter Efficiency = 87.1 %

Nt percent change 3.0%
 NOx percent change -0.4%
 NH₃ percent change 1.2%



Wood Buffalo Environmental Association

NO_x(NH₃) Calibration Report

Station Information

Calibration Date: January 11, 2017 Station Number: AMS 1

NO_x / NO / Nt Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated Nt conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated Nt conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	0.2	0.0	1.1	----	----
as found span	5500	83.0	750.0	750.0	750.0	771.8	775.7	776.6	0.9718	0.9669
calibrator zero	5500	0.0	0.0	0.0	0.0	0.9	0.4	1.1	----	----
high point	5500	83.0	750.0	750.0	750.0	752.0	751.1	748.1	0.9974	0.9986
second point	5500	46.4	419.3	419.3	419.3	421.0	417.6	419.0	0.9959	1.0040
third point	5500	23.3	210.5	210.5	210.5	209.6	207.5	210.1	1.0048	1.0148
Average Correction Factor									0.9993	1.0058

	<u>Nt</u>	<u>NOX</u>	<u>NO</u>	<u>NO2</u>
Corrected As found	775.4	771.6	775.7	----
Previous Response	769.0	750.9	751.2	----
Percent Change	-0.8%	-2.7%	-3.2%	0.5%

GPT Calibration Data

Dilution Flow (total) 5500 ccm Source Gas Flow 83.0 ccm NO_x ref calc conc = 750.0 ppb NO ref calc conc = 750.0 ppb

O3 Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
1st NO ref point	----	0.0	755.9	752.2	3.8	0.9922	0.9972	----	----
1st NO ₂ (300)	322.6	429.6	751.5	322.6	429.0	0.9980	----	1.0015	99.9%
2nd NO ₂ (200)	496.5	255.6	751.9	496.5	255.4	0.9975	----	1.0009	99.9%
3rd NO ₂ (100)	621.3	130.9	755.2	621.3	133.9	0.9932	----	0.9775	102.3%
2nd NO ref point	----	0.0	755.9	752.2	3.8	0.9922	0.9972	----	----
Average Correction Factor						0.9952	0.9972	0.9933	100.7%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NH3 Calibration Summary

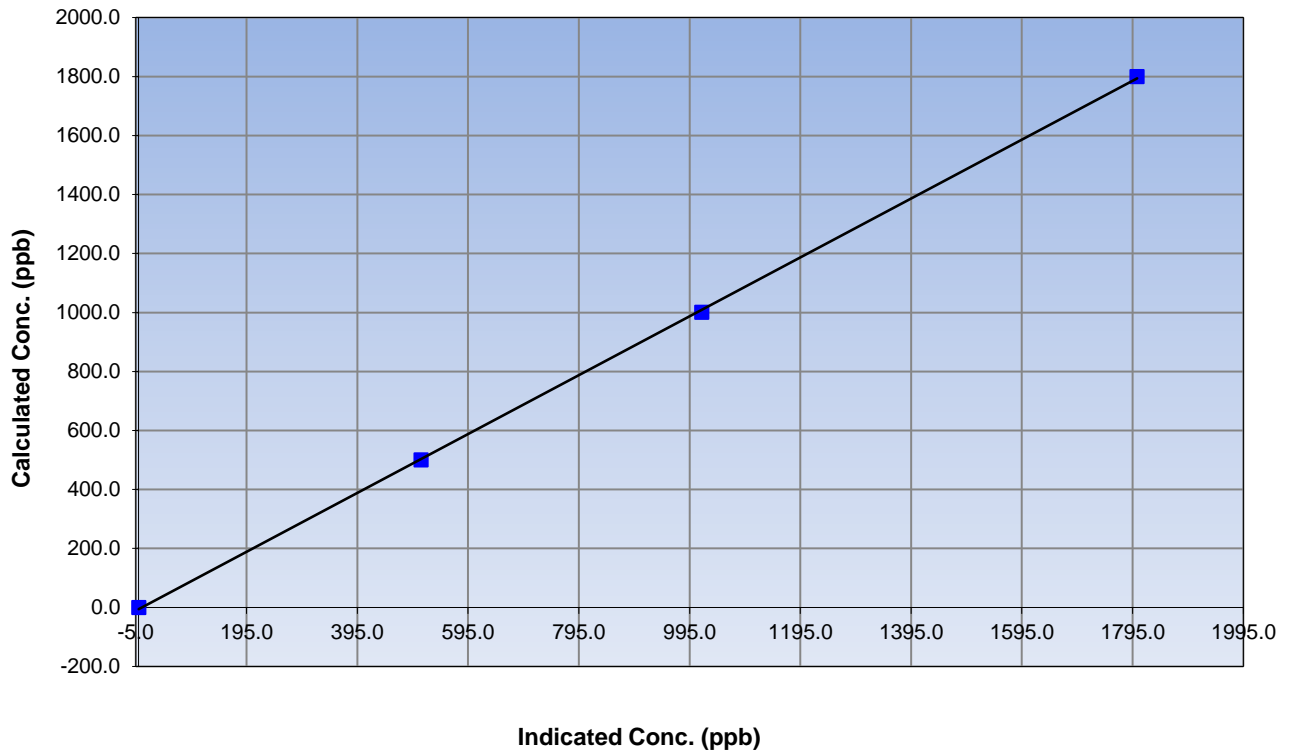
Station Information

Calibration Date	January 13, 2017	Previous Calibration	December 12, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:46	End Time (MST)	14:30
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	0.3	----	Correlation Coefficient	0.999920
1799.2	1803.2	0.9978		
1000.8	1017.1	0.9840	Slope	0.998045
500.4	510.2	0.9809	Intercept	-5.929731

NH3 Calibration Curve





Wood Buffalo Environmental Association

Nt Calibration Summary

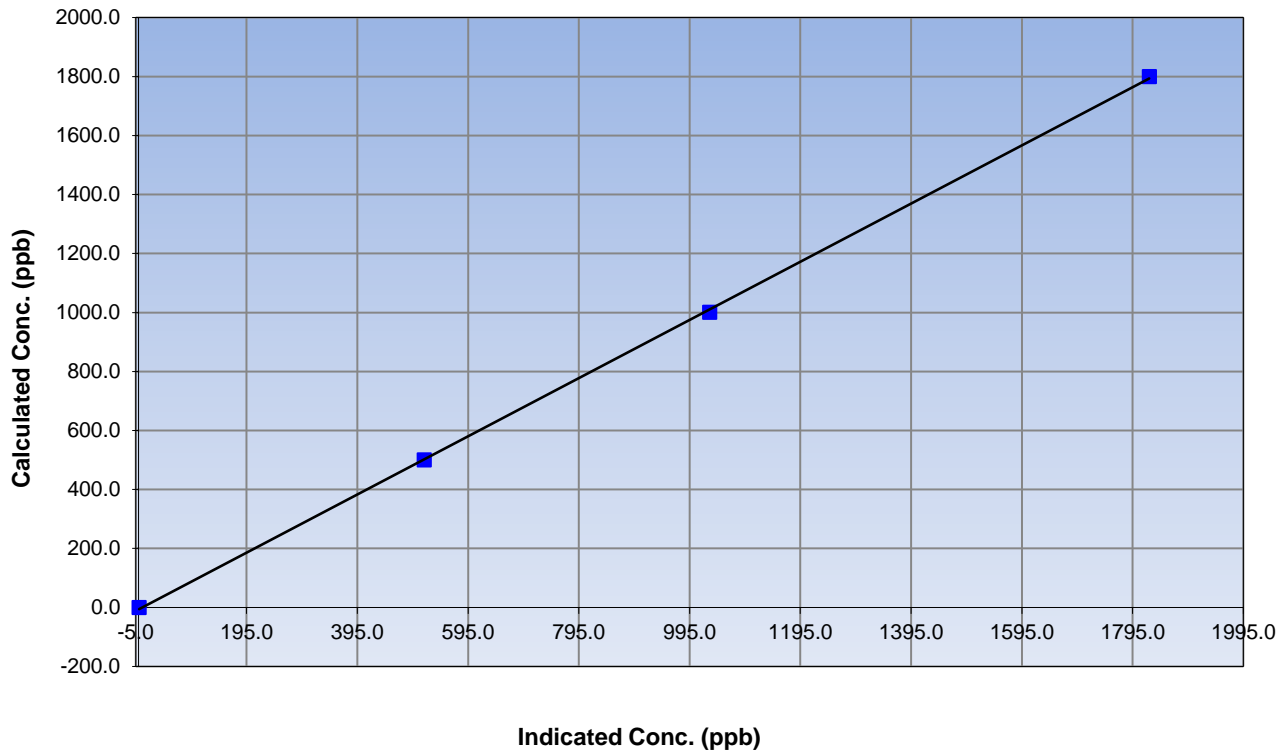
Station Information

Calibration Date	January 13, 2017	Previous Calibration	December 12, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:46	End Time (MST)	14:30
Analyzer make	API T201	Analyzer serial #	152

Nt (NH₃) Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	1.1	----	Correlation Coefficient	0.999909
1799.2	1825.0	0.9859		
1000.8	1031.2	0.9706	Slope	0.986249
500.4	516.0	0.9698		
			Intercept	-6.581500

Nt Calibration Curve





Wood Buffalo Environmental Association

NOx Calibration Summary

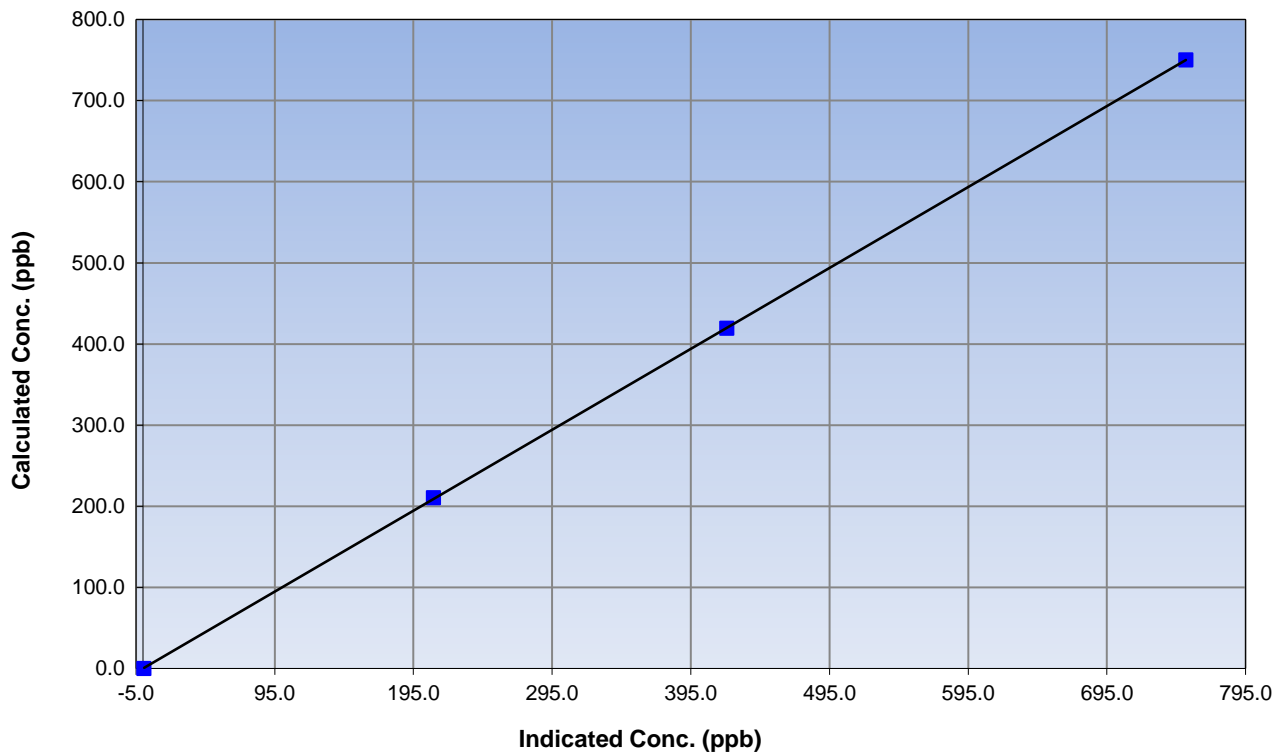
Station Information

Calibration Date	January 11, 2017	Previous Calibration	December 12, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:46	End Time (MST)	14:30
Analyzer make	API T201	Analyzer serial #	152

NO_x Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.9	----	Correlation Coefficient	0.999989
750.0	752.0	0.9974		
419.3	421.0	0.9959	Slope	0.997516
210.5	209.6	1.0048		
			Intercept	-0.025151

NOx Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

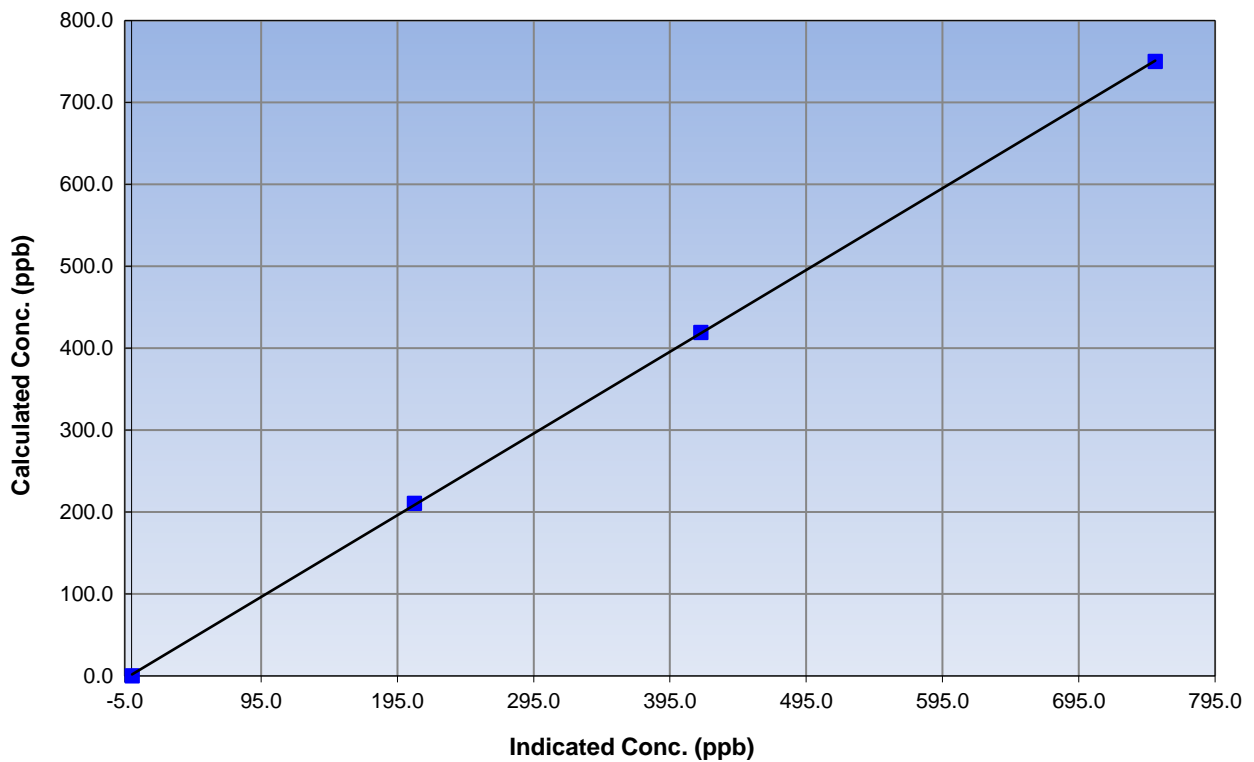
Station Information

Calibration Date	January 11, 2017	Previous Calibration	December 12, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:46	End Time (MST)	14:30
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	0.4	----	Correlation Coefficient	0.999969
750.0	751.1	0.9986		
419.3	417.6	1.0040	Slope	0.998053
210.5	207.5	1.0148		
			Intercept	1.505763

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

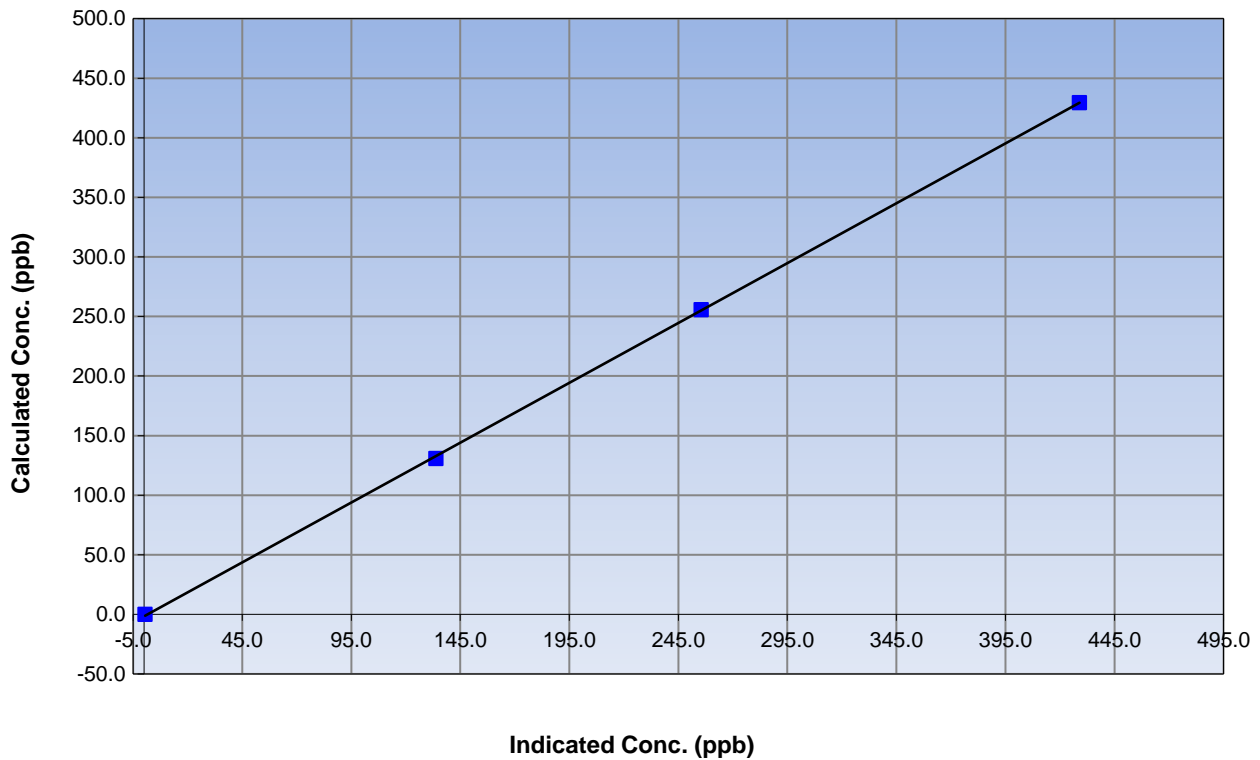
Station Information

Calibration Date	January 11, 2017	Previous Calibration	December 12, 2016
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:46	End Time (MST)	14:30
Analyzer make	API T201	Analyzer serial #	152

Calibration Information

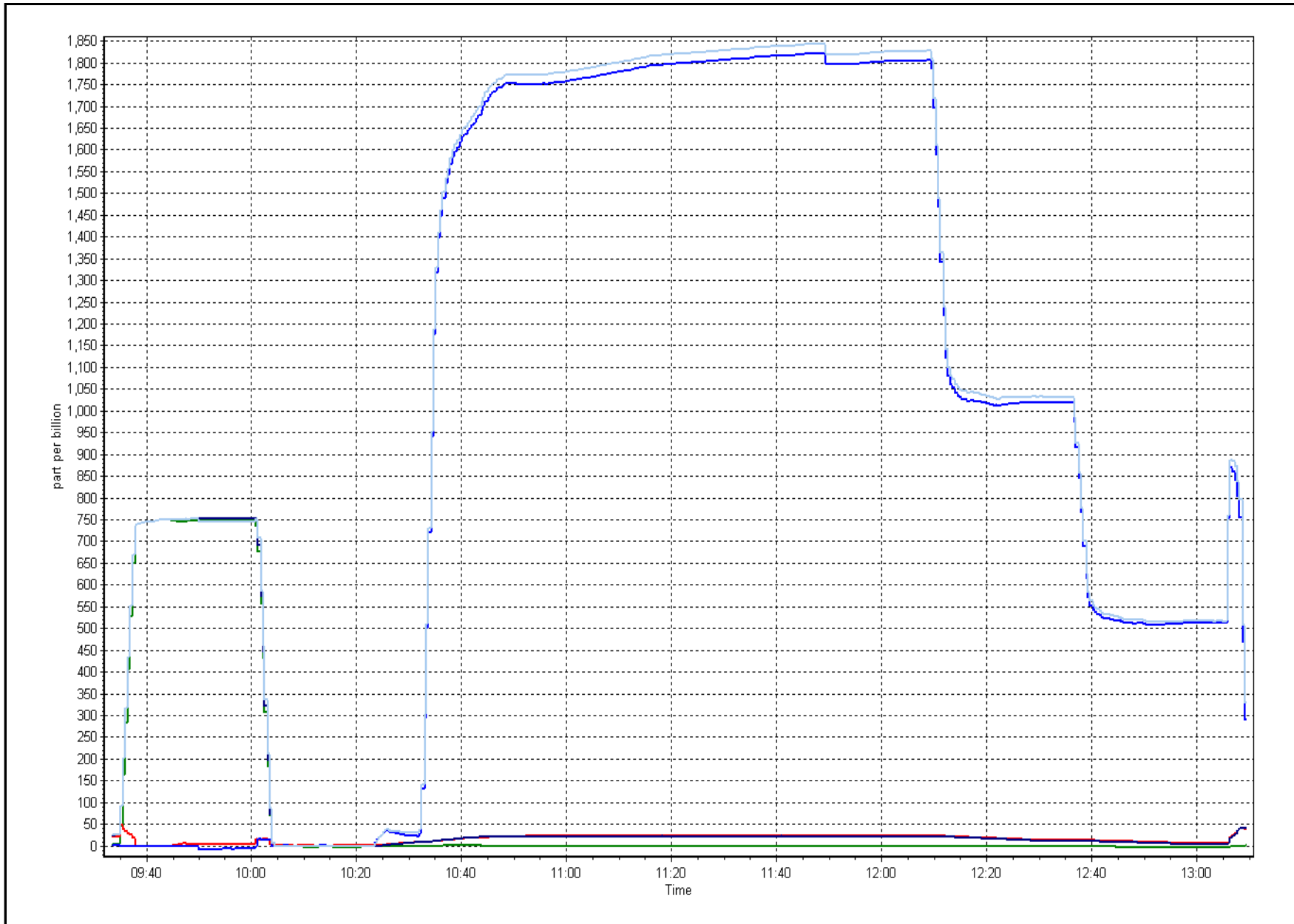
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	----	Correlation Coefficient	0.999942
429.6	429.0	1.0015		
255.6	255.4	1.0009	Slope	1.004704
130.9	133.9	0.9775		
			Intercept	-1.620263

NO₂ Calibration Curve



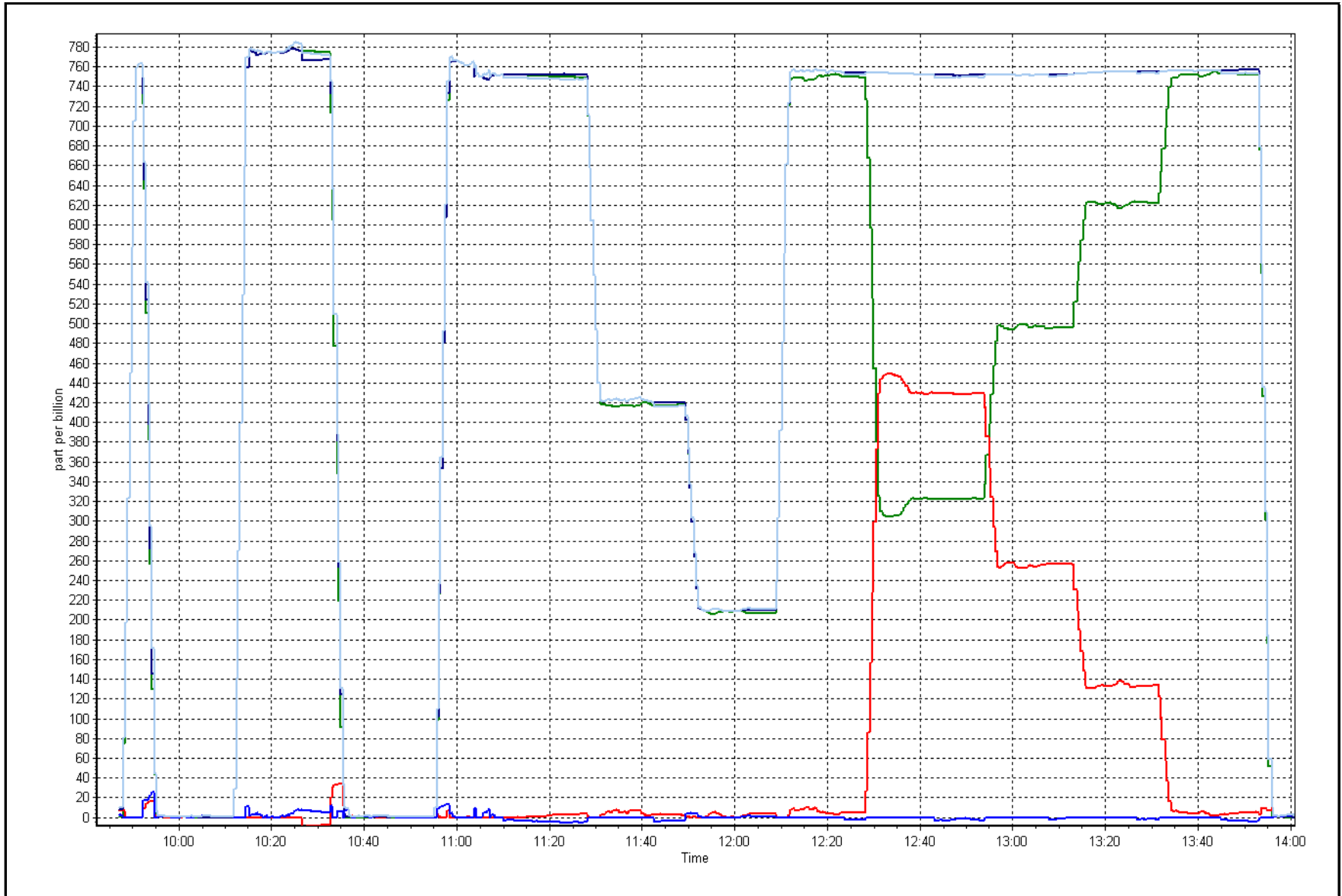
NH₃ Calibration Plot

Date: 13-Jan-2017



NOx Calibration Plot

Date: 11-Jan-2017





Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-08-2016

Station Information

Station Name:	Bertha Ganter - Fort McKay	Station number:	AMS 1
Calibration Date:	January 13, 2017	Last Cal Date:	December 14, 2016
Start time (MST):	10:00	End time (MST):	11:33
Sharp Model:	Thermo 5030 SHARP	S/N:	E-1486
Particulate Fraction:	PM2.5	C14 Source S/N:	5691
Flow Standard Model:	Delta-Cal	S/N:	1451
Temp/RH standard:	Delta-Cal	S/N:	1451

Monthly Calibration Test

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<u>Tolerance</u>
T1 (°C)	-17	-17.7	-17	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	983	979.11	983	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	1014	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	0.1	-----	0.1	<input type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified <input checked="" type="checkbox"/>				
Cyclone cleaning :	PM10 Cyclone <input checked="" type="checkbox"/>		PM2.5 Cyclone <input checked="" type="checkbox"/>		
Filter Tape Installed:	<input type="checkbox"/>				

Quarterly Calibration Test

Leak Test:	Date of check:	<u>January 13, 2017</u>	Last Cal Date:	<u>June 8, 2016</u>	<u>Tolerance</u>
	Flow w/o adaptor:	<u>16.9</u>	Flow w/ adaptor:	<u>16.55</u>	0.4 LPM

Annual Calibration Test

Foil Calibration	Foil Mass:	_____	S/N:	_____
	Date of check:	_____	Last Cal Date:	<u>November 17, 2016</u>
	New Correction Factor:	_____	Previous Correction Factor:	_____

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<u>Tolerance</u>
T2 (°C)	-----	-----	-----	<input type="checkbox"/>	+/- 2 °C
T3 (°C)	-----	-----	-----	<input type="checkbox"/>	+/- 2 °C
T4 (°C)	-----	-----	-----	<input type="checkbox"/>	+/- 2 °C
RH (%)	-----	-----	-----	<input type="checkbox"/>	+/- 10%

Notes: Cyclone head cleaned.No adjustments to T1, RH or P3 or nephelometer

Calibration by: Devin Russell/Aswin Sasi Kumar



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 2
MILDRED LAKE
JANUARY 2017**

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

February 27, 2017



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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	710	34	34	100.00	47	0	12	0
H2S (ppb) Average	709	35	35	100.00	9	0	3	0
THC (ppm) Average	710	34	34	100.00	5.5	-	3.3	-
Temperature (C) Average	744	0	0	100.00	6.8	-	3	-
Relative Humidity (%) Average	744	0	0	100.00	98	-	95	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	35	-	14	-
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)
 JANUARY 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	710	3.2	6	-	0	0	0	1	3	10	47
H2S (ppb) Average	709	0.8	1	-	0	0	0	0	1	2	9
THC (ppm) Average	710	2.58	0.5	-	2.1	2.2	2.2	2.4	2.8	3.2	5.5
Temperature 2 m (C) Average	744	-12.27	10.1	-	-35.7	-25.2	-19.8	-13.5	-3	1.7	6.8
Relative Humidity (%) Average	744	81.2	8	-	53	71	76	82	87	93	98
Wind Speed 10 m (km/h) Average	744	7.9	4	-	0	3	5	7	10	13	35
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
<hr/>				
No operational issues to report				



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Mildred Lake - January 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 47 ppb on Jan 15 10:00	Maximum Daily Average: 11.5 ppb on Jan 15		Hours of Data:	710
Minimum Value: 0 ppb on Jan 1 03:00	Minimum Daily Average: 0.1 ppb on Jan 3		Hours of Missing Data:	34
Maximum Diurnal Average: 4.9 ppb at hour 10	Minimum Diurnal Average: 1.1 ppb at hour 22		Hours of Calibration:	34
Monthly Average: 3.2 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 3 P ₉₀ = 10 P ₉₉ = 28		Percent Operational Time:	100.0

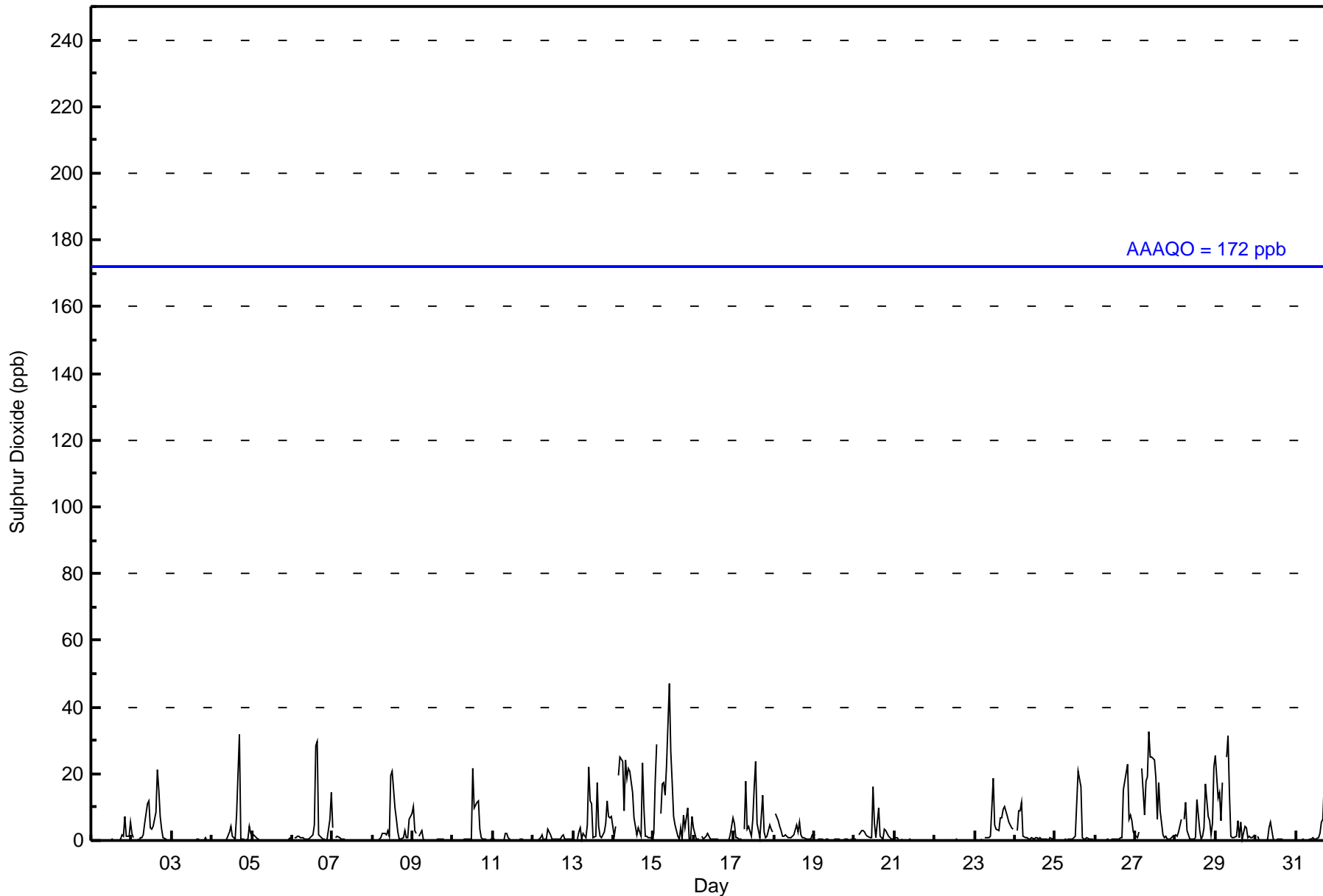
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	1	7	1	1	6	0.9	7
2-Jan	2	1	Z	1	0	1	1	2	5	11	12	4	3	4	8	21	15	7	4	1	0	0	0	0	4.5	21
3-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.1	1
4-Jan	0	0	0	0	Z	0	0	0	0	0	2	4	1	1	0	8	32	1	0	0	0	1	4	2	2.5	32
5-Jan	1	2	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	2
6-Jan	Z	1	1	1	1	1	1	0	0	0	0	1	2	5	28	30	2	1	0	0	0	0	6	15	4.3	30
7-Jan	4	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	4
8-Jan	0	0	Z	0	0	1	2	2	1	3	1	20	21	10	6	3	1	1	1	3	1	1	6	8	4.0	21
9-Jan	10	3	2	Z	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	10
10-Jan	0	0	0	0	Z	0	0	0	0	1	0	1	21	10	12	12	3	1	0	0	0	0	0	0	2.7	21
11-Jan	1	0	0	0	0	Z	0	2	2	1	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0.4	2
12-Jan	Z	0	0	0	1	2	0	0	1	3	2	0	0	0	0	0	0	1	2	0	0	0	0	0	0.7	3
13-Jan	0	Z	0	3	4	1	2	1	4	22	12	11	1	1	17	4	1	1	3	5	12	7	7	7	5.5	22
14-Jan	1	4	Z	19	25	24	9	24	19	22	21	15	7	4	2	4	1	23	10	1	1	1	1	1	10.3	25
15-Jan	2	18	29	Z	8	17	17	14	22	47	27	18	7	5	1	1	4	0	8	4	10	0	7	7	11.5	47
16-Jan	4	0	1	0	Z	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	2	7	1.0	7
17-Jan	5	1	1	1	1	Z	3	18	4	4	1	6	16	24	5	1	7	13	3	1	1	5	4	2	5.5	24
18-Jan	Z	8	6	4	3	1	1	2	1	1	1	1	2	5	2	6	1	1	1	0	1	1	0	2	2.2	8
19-Jan	2	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
20-Jan	0	0	Z	2	3	3	2	2	1	1	1	16	5	1	10	1	1	1	4	3	1	1	1	1	2.6	16
21-Jan	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
22-Jan	0	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
23-Jan	0	0	0	0	0	Z	1	1	1	1	10	19	5	3	7	7	9	10	7	5	5	4	3	3	4.4	19
24-Jan	Z	3	9	9	11	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	0	0	0	1.9	11
25-Jan	0	Z	0	0	0	0	0	0	1	0	0	1	1	11	21	16	1	1	0	1	0	0	0	0	2.4	21
26-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	15	20	23	6	8	6	2	2	3.7	23
27-Jan	1	1	3	Z	22	8	18	19	33	25	25	24	19	6	17	9	2	1	1	1	1	0	1	1	10.3	33
28-Jan	2	1	3	6	Z	6	12	3	0	0	0	0	1	12	3	1	1	4	17	7	6	2	5	22	5.0	22
29-Jan	26	13	14	6	17	Z	25	32	14	1	1	1	1	6	1	5	0	4	4	1	1	1	1	2	7.7	32
30-Jan	Z	1	0	0	0	0	0	0	4	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	5
31-Jan	0	Z	0	0	0	0	0	0	0	0	1	0	0	1	2	5	6	17	1	0	0	0	0	0	1.6	17
2.4 2.3 2.8 2.1 3.8 2.7 3.1 4.1 3.8 4.9 3.9 4.7 3.7 3.7 4.8 4.6 2.9 3.3 2.9 2.0 1.8 1.1 1.6 2.9																								Diurnal Average		
26 18 29 19 25 24 25 32 33 47 27 24 21 24 28 30 32 23 20 23 12 8 7 22																								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 (SO₂) - ppb
Mildred Lake - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Mildred Lake - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	640	90.14	90.14
11 - 20	41	5.77	95.92
21 - 60	29	4.08	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 (SO₂) - ppb
Mildred Lake - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	65	99	7	7	6	8	16	51	125	75	54	44	22	23	18	20	640
11 - 20	0	0	0	0	0	3	4	11	2	1	1	2	14	3	0	0	41
21 - 60	0	0	0	0	0	1	2	10	0	0	0	2	13	1	0	0	29
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
Totals	65	99	7	7	6	12	22	72	127	76	55	48	49	27	18	20	710

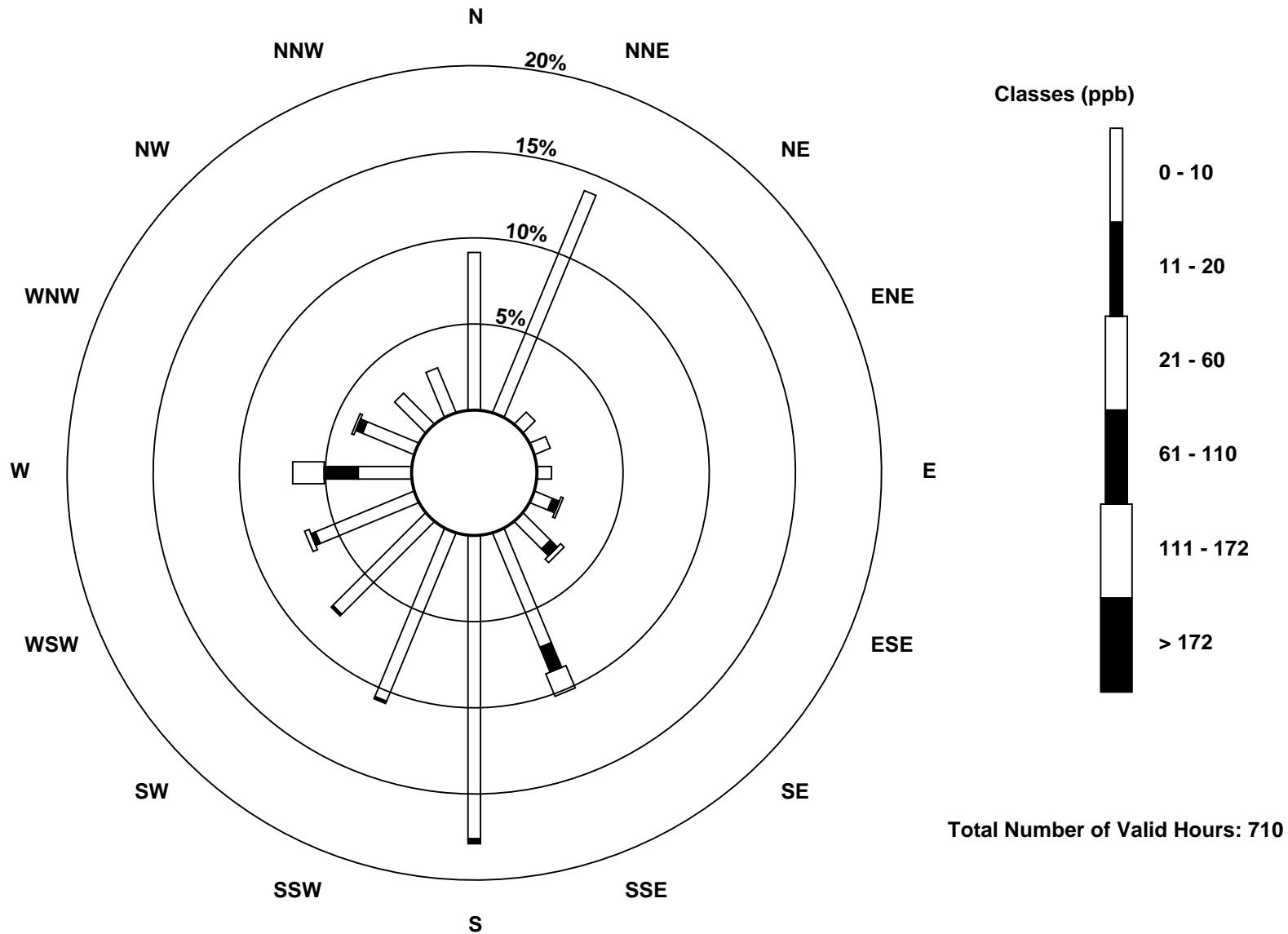
Total Number of Valid Hours: 710

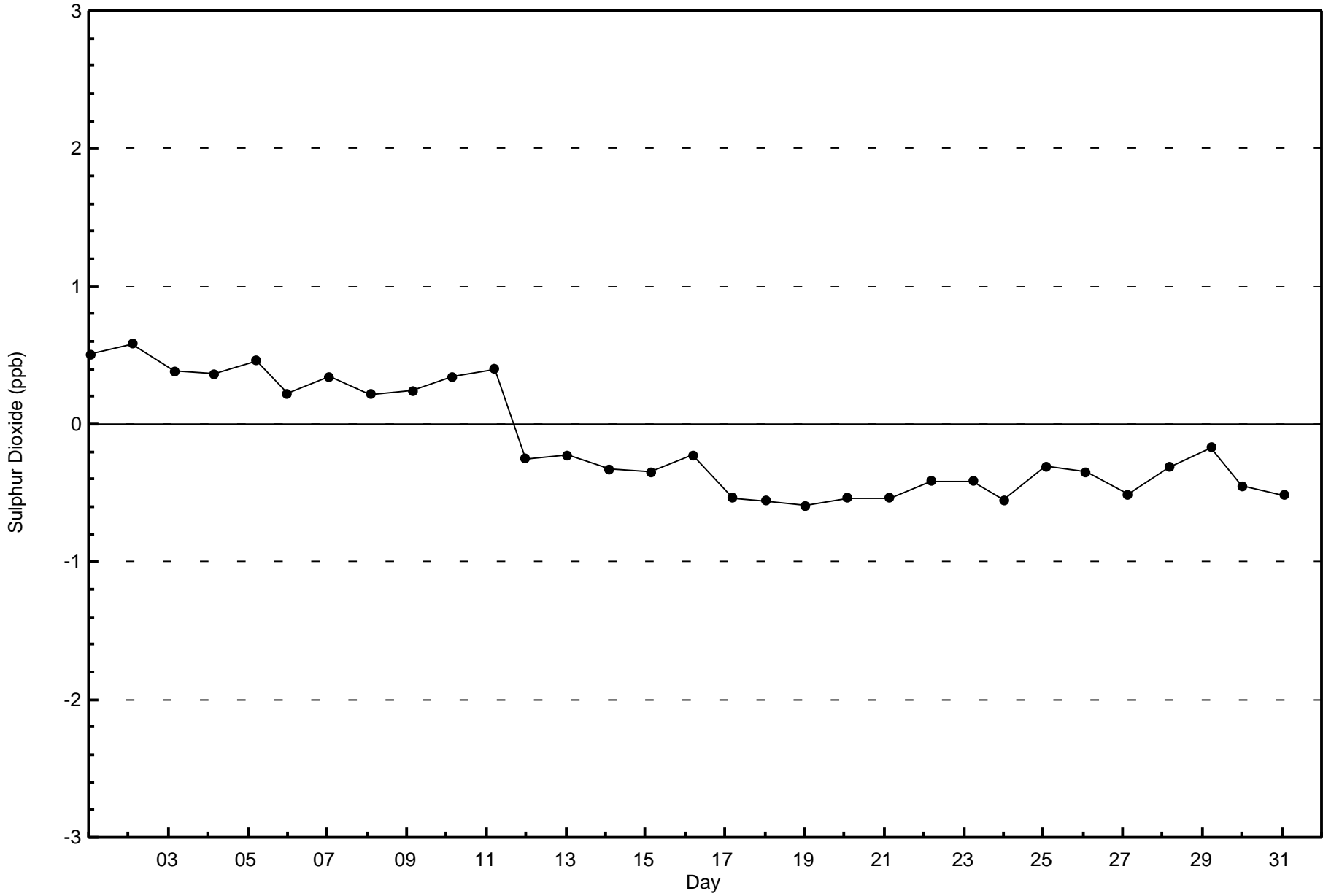
Total Number of Hours: 744

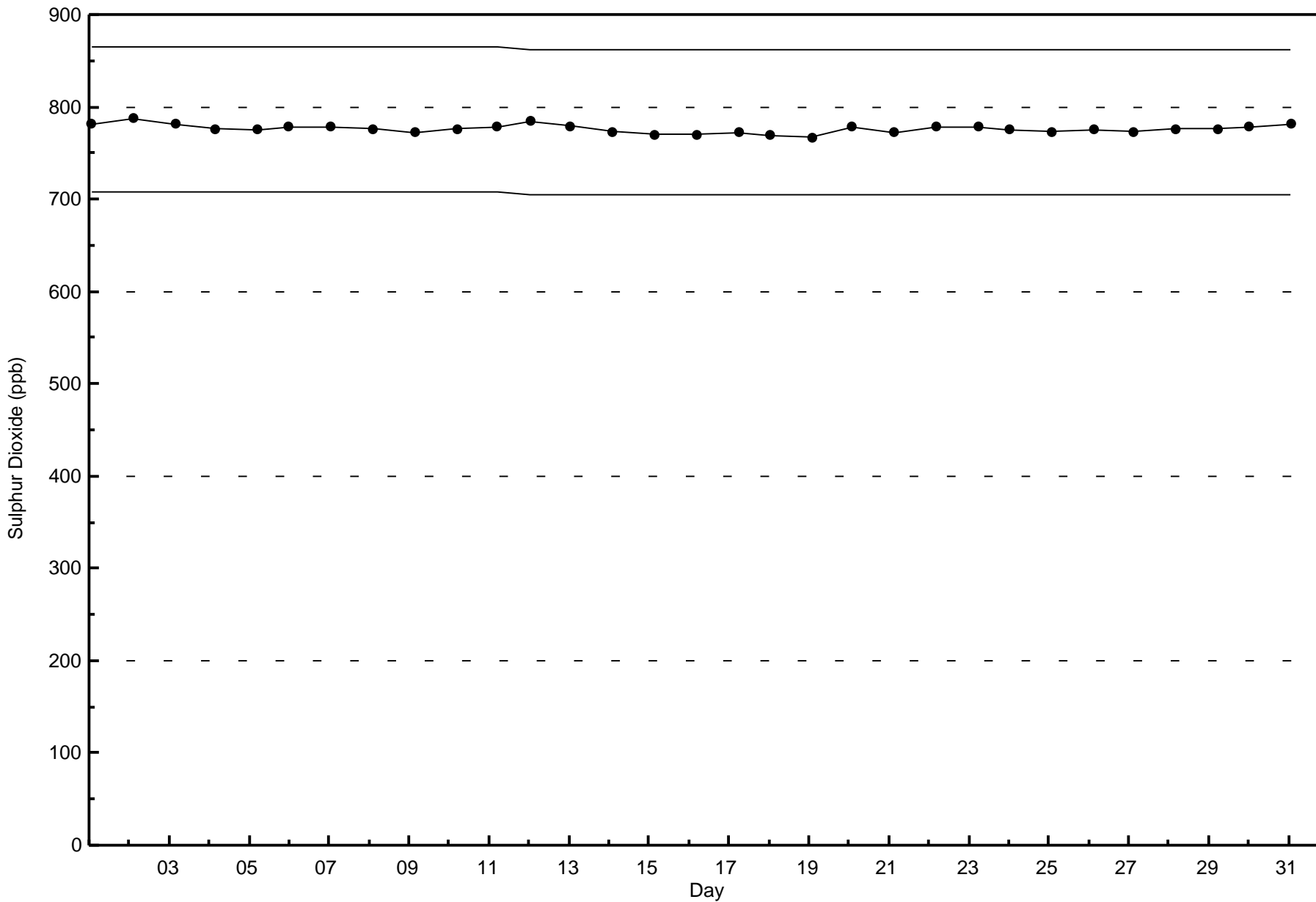


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Sulphur Dioxide (SO₂) - ppb
Mildred Lake (AMS 2)









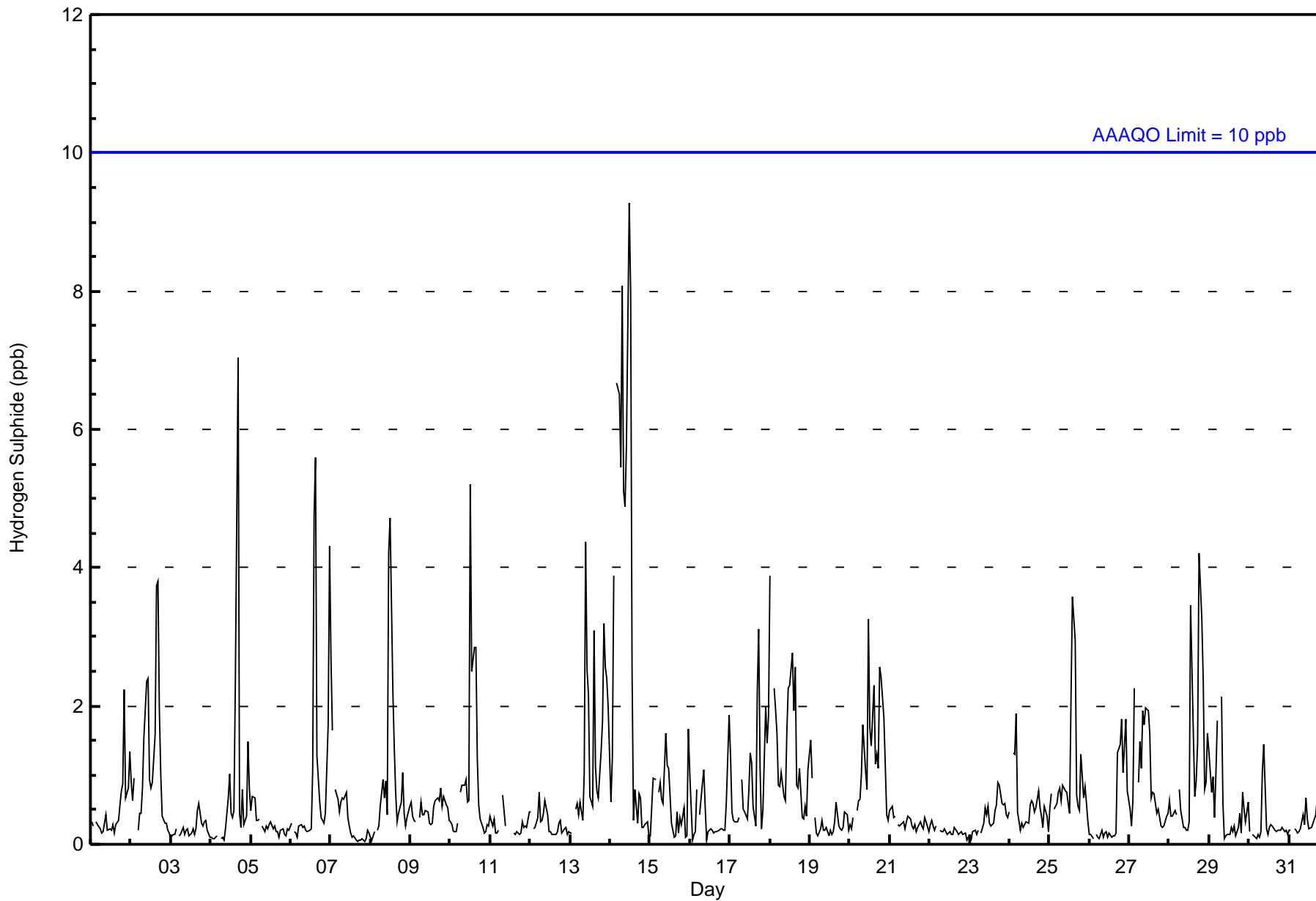
Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H₂S) - ppb

Mildred Lake - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 744																																			
Maximum Value: 9 ppb on Jan 14 12:00														Maximum Daily Average: 3.1 ppb on Jan 14																																			
Minimum Value: 0 ppb on Jan 7 17:00														Minimum Daily Average: 0.2 ppb on Jan 22																																			
Maximum Diurnal Average: 1.1 ppb at hour 12														Minimum Diurnal Average: 0.4 ppb at hour 2																																			
Monthly Average: 0.8 ppb														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 5																																			
														Hours of Data: 709																																			
														Hours of Missing Data: 35																																			
														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-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	1	1	1	0.5	2																							
2-Jan	1	1	1	Z	0	0	0	1	2	2	2	1	1	1	2	4	4	2	1	0	0	0	0	0	1.2	4																							
3-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.2	1																							
4-Jan	0	0	0	0	0	Z	0	0	0	0	1	1	0	0	0	2	7	0	0	1	0	0	1	1	0.8	7																							
5-Jan	0	1	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
6-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	5	6	1	1	0	0	0	0	2	4	1.0	6																							
7-Jan	3	2	Z	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3																							
8-Jan	0	0	0	Z	0	0	1	1	1	1	0	4	5	2	1	1	0	0	1	1	0	0	0	1	0.9	5																							
9-Jan	1	0	0	0	Z	0	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0.5	1																							
10-Jan	0	0	0	0	0	Z	1	1	1	1	1	1	5	2	3	3	1	1	0	0	0	0	0	0	1.0	5																							
11-Jan	0	0	0	0	0	0	Z	1	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.3	1																							
12-Jan	0	Z	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
13-Jan	0	0	Z	1	1	0	1	0	1	4	3	2	1	1	3	1	1	1	1	2	3	3	2	2	1.4	4																							
14-Jan	1	1	4	Z	7	7	5	8	5	6	9	8	3	0	1	0	1	0	1	0	0	0	0	0	3.1	9																							
15-Jan	0	1	1	1	Z	1	1	1	1	2	1	1	1	0	0	0	0	0	0	0	1	0	0	2	0.6	2																							
16-Jan	1	0	0	0	1	Z	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0.4	2																							
17-Jan	1	0	0	0	0	0	Z	1	1	0	0	1	1	1	1	0	2	3	1	0	0	2	1	2	1.0	3																							
18-Jan	4	Z	2	2	2	1	1	1	1	1	2	2	2	3	2	3	1	1	1	0	0	1	0	1	1.4	4																							
19-Jan	2	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.3	2																							
20-Jan	0	0	0	Z	0	1	1	1	2	1	1	3	2	1	2	1	1	1	3	2	2	1	0	0	1.2	3																							
21-Jan	0	1	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																							
22-Jan	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																							
23-Jan	0	0	0	0	0	0	Z	0	0	1	0	1	0	0	0	0	1	1	1	1	1	1	0	0	0.4	1																							
24-Jan	0	Z	1	1	2	0	0	0	0	0	0	0	1	1	1	0	1	1	1	0	0	1	0	0	0.6	2																							
25-Jan	1	1	Z	1	1	1	1	1	1	1	1	1	0	2	4	3	1	1	0	1	1	1	1	0	1.0	4																							
26-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1	1	2	1	0.5	2																							
27-Jan	1	0	1	2	Z	1	1	1	2	2	2	2	2	1	1	1	0	1	0	0	0	0	0	0	0.9	2																							
28-Jan	1	0	0	0	0	Z	1	0	0	0	0	0	0	3	2	1	1	1	4	3	2	1	1	2	1.1	4																							
29-Jan	1	1	1	0	1	2	Z	2	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0.6	2																							
30-Jan	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
31-Jan	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	1	0.3	1																							
																								0.7	0.4	0.6	0.5	0.7	0.7	0.7	0.8	0.7	0.9	0.8	1.1	1.1	0.9	0.9	1.0	0.9	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.8	Diurnal Average
																								4	2	4	2	7	7	5	8	5	5	6	9	8	3	5	6	7	3	4	3	3	3	3	2	4	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 (H₂S) - ppb
Mildred Lake - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	670	94.50	94.50
3 - 4	25	3.53	98.03
5 - 7	11	1.55	99.58
8 - 11	3	0.42	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



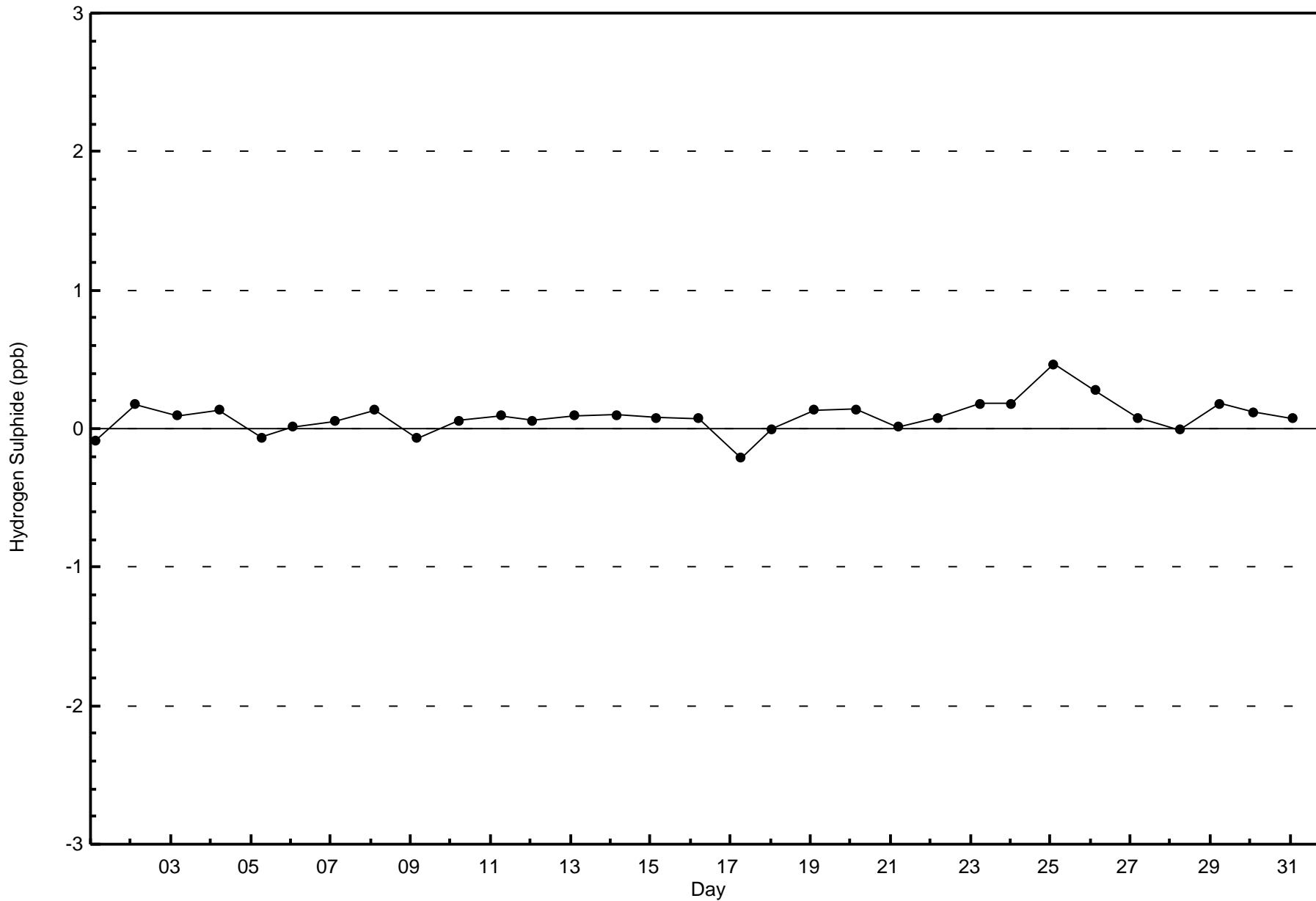
**Wood Buffalo Environmental Association
Frequency Distribution**

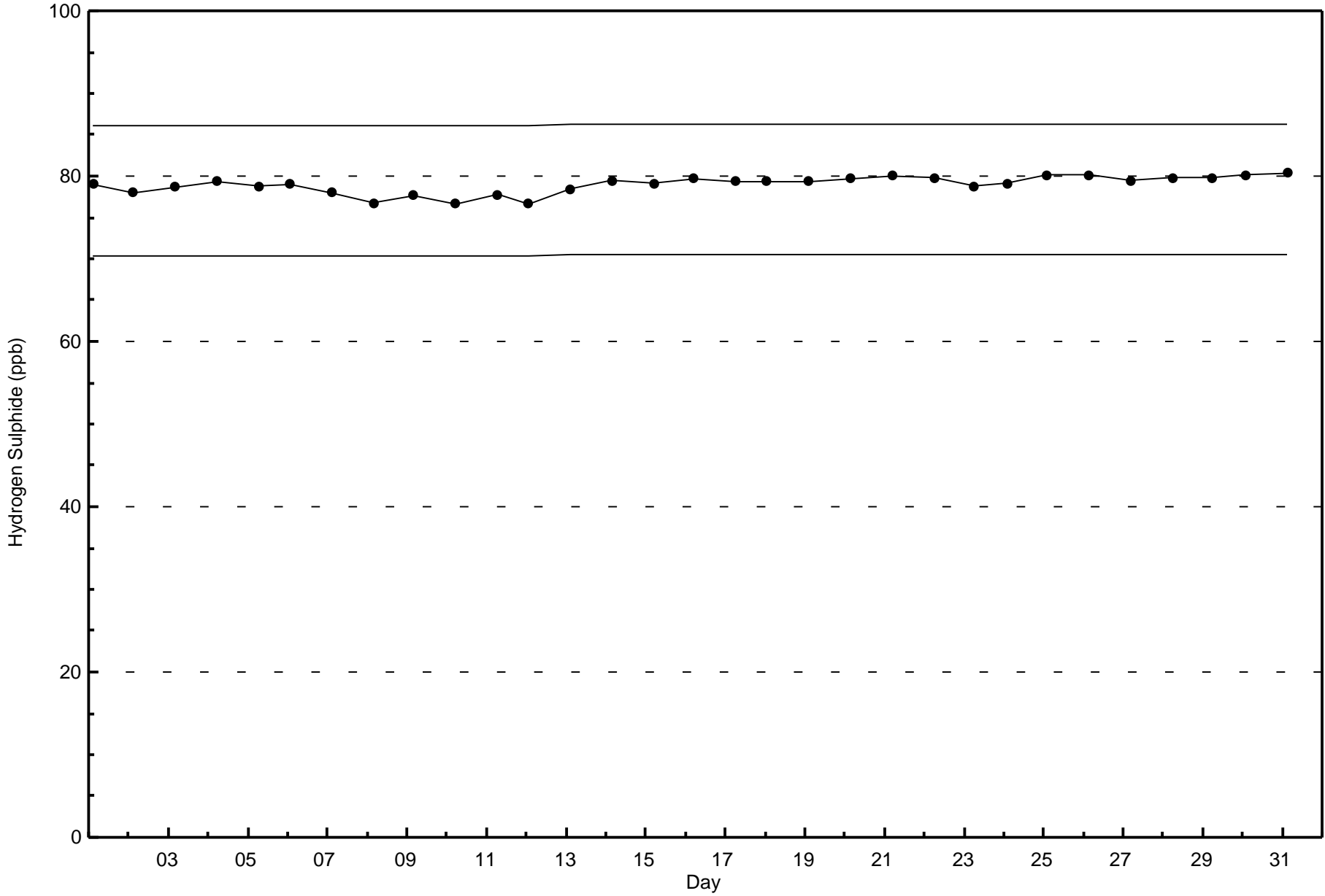
**Hydrogen Sulphide (H₂S) - ppb
Mildred Lake - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	63	98	8	6	6	6	14	51	129	75	53	47	50	24	18	22	670
3 - 4	0	0	0	0	0	4	5	11	2	0	1	0	0	2	0	0	25
5 - 7	0	0	0	0	0	1	2	8	0	0	0	0	0	0	0	0	11
8 - 11	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	3
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	63	98	8	6	6	12	21	71	132	75	54	47	50	26	18	22	709

Total Number of Valid Hours: 709

Total Number of Hours: 744







Wood Buffalo Environmental Association
Summary of Hour Averages

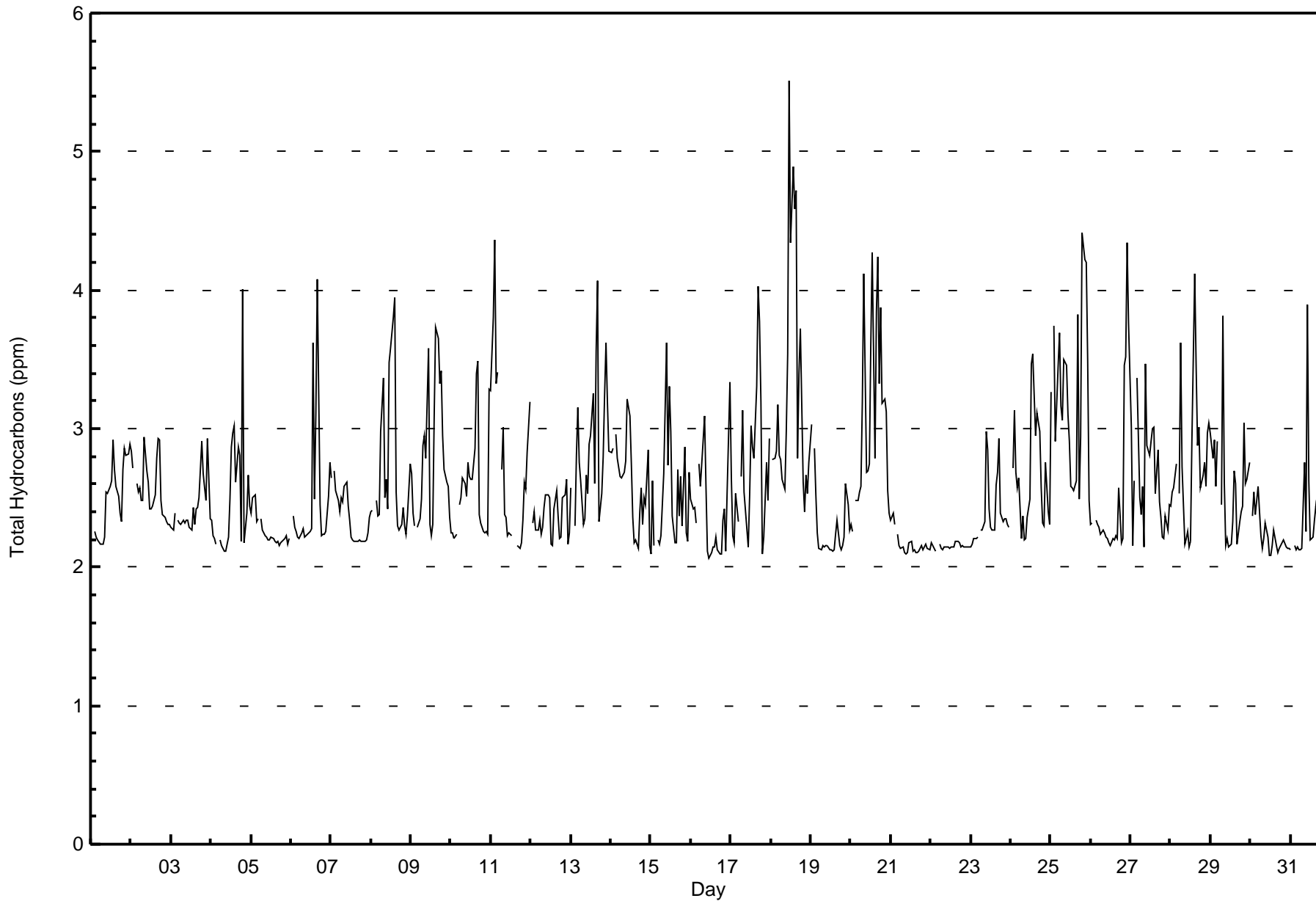
Total Hydrocarbons (THC) - ppm
Mildred Lake - January 2017

Maximum Value: 5.5 ppm on Jan 18 12:00		Maximum Daily Average: 3.3 ppm on Jan 18		Hours in Service: 744																						
Minimum Value: 2.1 ppm on Jan 16 12:00		Minimum Daily Average: 2.2 ppm on Jan 22		Hours of Data: 710																						
Maximum Diurnal Average: 2.8 ppm at hour 17		Minimum Diurnal Average: 2.4 ppm at hour 6		Hours of Missing Data: 34																						
Monthly Average: 2.58 ppm		Percentiles: P ₁ = 2.1 P ₁₀ = 2.2 Q ₁ = 2.2 Median = 2.4 Q ₃ = 2.8 P ₉₀ = 3.2 P ₉₉ = 4.3		Hours of Calibration: 34																						
				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-Jan	2.6	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.5	2.5	2.6	2.6	2.9	2.7	2.6	2.5	2.4	2.3	2.7	2.9	2.8	2.8	2.9	2.5	2.9
2-Jan	2.8	2.7	Z	2.6	2.5	2.6	2.5	2.5	2.9	2.7	2.6	2.4	2.4	2.4	2.5	2.8	2.9	2.9	2.5	2.4	2.4	2.3	2.3	2.3	2.6	2.9
3-Jan	2.3	2.3	2.4	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.4	2.4	2.5	2.9	2.7	2.6	2.5	2.9	2.4	2.4	2.9	
4-Jan	2.3	2.2	2.2	2.2	Z	2.2	2.2	2.1	2.1	2.1	2.2	2.5	2.9	3.0	3.0	2.6	2.9	2.8	2.2	4.0	2.2	2.4	2.7	2.4	2.5	4.0
5-Jan	2.4	2.5	2.5	2.3	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	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5
6-Jan	Z	2.4	2.3	2.3	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.3	3.6	2.5	3.1	4.1	2.5	2.2	2.2	2.2	2.3	2.5	2.8	2.5	4.1
7-Jan	2.6	Z	2.7	2.5	2.5	2.4	2.5	2.5	2.6	2.6	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.4	2.7
8-Jan	2.4	2.4	Z	2.5	2.4	2.4	3.0	3.4	2.5	2.6	2.4	3.5	3.6	3.8	3.9	2.5	2.3	2.3	2.3	2.4	2.3	2.2	2.4	2.7	2.7	3.9
9-Jan	2.7	2.4	2.3	Z	2.3	2.3	2.5	2.9	3.0	2.8	3.6	2.3	2.2	2.3	3.1	3.7	3.7	3.3	3.4	2.9	2.7	2.6	2.6	2.4	2.8	3.7
10-Jan	2.2	2.2	2.2	2.2	Z	2.5	2.5	2.6	2.6	2.5	2.8	2.7	2.6	2.6	2.9	3.4	3.5	2.4	2.3	2.3	2.2	2.3	2.2	3.3	2.6	3.5
11-Jan	3.3	3.8	4.4	3.3	3.4	Z	2.7	3.0	2.4	2.4	2.2	2.2	2.2	C	C	C	2.2	2.1	2.2	2.3	2.6	2.6	2.8	3.2	2.8	4.4
12-Jan	Z	2.3	2.4	2.3	2.3	2.3	2.2	2.3	2.4	2.5	2.5	2.5	2.2	2.2	2.4	2.6	2.4	2.2	2.2	2.5	2.5	2.6	2.2	2.2	2.4	2.6
13-Jan	2.6	Z	2.3	2.8	3.1	2.8	2.6	2.3	2.4	2.7	2.5	2.9	2.9	3.3	2.6	3.6	4.1	2.3	2.5	2.8	3.2	3.6	3.2	2.8	2.9	4.1
14-Jan	2.8	2.9	Z	3.0	2.8	2.7	2.6	2.7	2.7	2.8	3.2	3.1	2.7	2.4	2.2	2.2	2.1	2.4	2.6	2.3	2.5	2.4	2.8	2.2	2.6	3.2
15-Jan	2.1	2.6	2.2	Z	2.2	2.2	2.2	2.5	2.7	3.6	2.7	3.3	3.0	2.4	2.2	2.2	2.7	2.4	2.7	2.3	2.9	2.2	2.2	2.7	2.5	3.6
16-Jan	2.5	2.4	2.4	2.3	Z	2.7	2.6	2.9	3.1	2.6	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.1	2.1	2.3	2.4	2.1	2.5	3.3	2.4	3.3
17-Jan	2.6	2.2	2.2	2.5	2.3	Z	2.7	3.1	2.5	2.4	2.1	2.5	3.0	2.9	2.8	3.3	4.0	3.8	3.2	2.1	2.2	2.8	2.5	2.9	2.7	4.0
18-Jan	Z	2.8	2.8	2.8	3.2	2.8	2.8	2.6	2.6	3.0	3.5	5.5	4.3	4.9	4.6	4.7	2.8	3.4	3.7	2.6	2.4	2.7	2.5	2.8	3.3	5.5
19-Jan	3.0	Z	2.9	2.5	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.3	2.2	2.1	2.2	2.2	2.6	2.5	2.3	2.3	3.0
20-Jan	2.3	2.3	Z	2.5	2.5	2.5	2.6	3.2	4.1	2.7	2.7	2.7	3.6	4.3	2.8	3.8	4.2	3.3	3.9	3.2	3.2	3.1	2.6	2.4	3.1	4.3
21-Jan	2.3	2.4	2.3	Z	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.1	2.1	2.2	2.4
22-Jan	2.2	2.2	2.1	2.1	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.2	2.2
23-Jan	2.1	2.2	2.2	2.2	2.2	Z	2.3	2.3	2.3	3.0	2.8	2.4	2.3	2.3	2.3	2.6	2.7	2.9	2.4	2.3	2.3	2.4	2.3	2.3	2.4	3.0
24-Jan	Z	2.7	3.1	2.7	2.6	2.6	2.2	2.4	2.2	2.2	2.4	2.5	3.5	3.5	3.2	3.0	3.1	3.0	2.6	2.3	2.3	2.8	2.4	2.3	2.7	3.5
25-Jan	3.3	Z	3.7	2.9	3.4	3.7	3.2	3.1	3.5	3.5	3.1	2.9	2.6	2.6	2.6	2.6	3.8	2.5	2.9	4.4	4.2	4.2	3.5	2.5	3.2	4.4
26-Jan	2.3	2.3	Z	2.3	2.3	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.6	2.2	2.2	3.5	3.5	4.3	3.8	2.5	4.3
27-Jan	3.0	2.2	2.6	Z	3.4	2.5	2.4	2.6	2.1	3.5	2.9	2.8	2.9	3.0	3.0	2.5	2.8	2.5	2.4	2.2	2.2	2.4	2.3	2.5	2.6	3.5
28-Jan	2.4	2.5	2.6	2.7	Z	2.5	3.6	2.7	2.2	2.2	2.3	2.1	2.2	2.9	4.1	3.5	2.9	3.0	2.6	2.7	2.8	2.6	3.0	3.0	2.7	4.1
29-Jan	3.0	2.8	2.9	2.6	2.9	Z	2.4	3.8	2.6	2.2	2.2	2.1	2.2	2.3	2.7	2.6	2.2	2.3	2.4	2.4	3.0	2.6	2.6	2.8	2.6	3.8
30-Jan	Z	2.4	2.5	2.4	2.6	2.4	2.2	2.1	2.2	2.3	2.2	2.1	2.1	2.2	2.3	2.2	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.6
31-Jan	2.1	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.8	2.3	3.9	2.6	2.2	2.2	2.3	2.4	2.3	2.2	2.7	3.1	2.9	2.9	2.2	2.2	2.4	3.9
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration																										



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Mildred Lake - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Mildred Lake - January 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	617	86.90	86.90
3.1 - 10.0	93	13.10	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Mildred Lake - January 2017

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	64	99	5	7	5	11	20	44	93	74	53	47	38	26	13	18	617
3.1 - 10.0	1	0	2	0	1	1	2	28	34	2	2	1	11	1	5	2	93
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	65	99	7	7	6	12	22	72	127	76	55	48	49	27	18	20	710

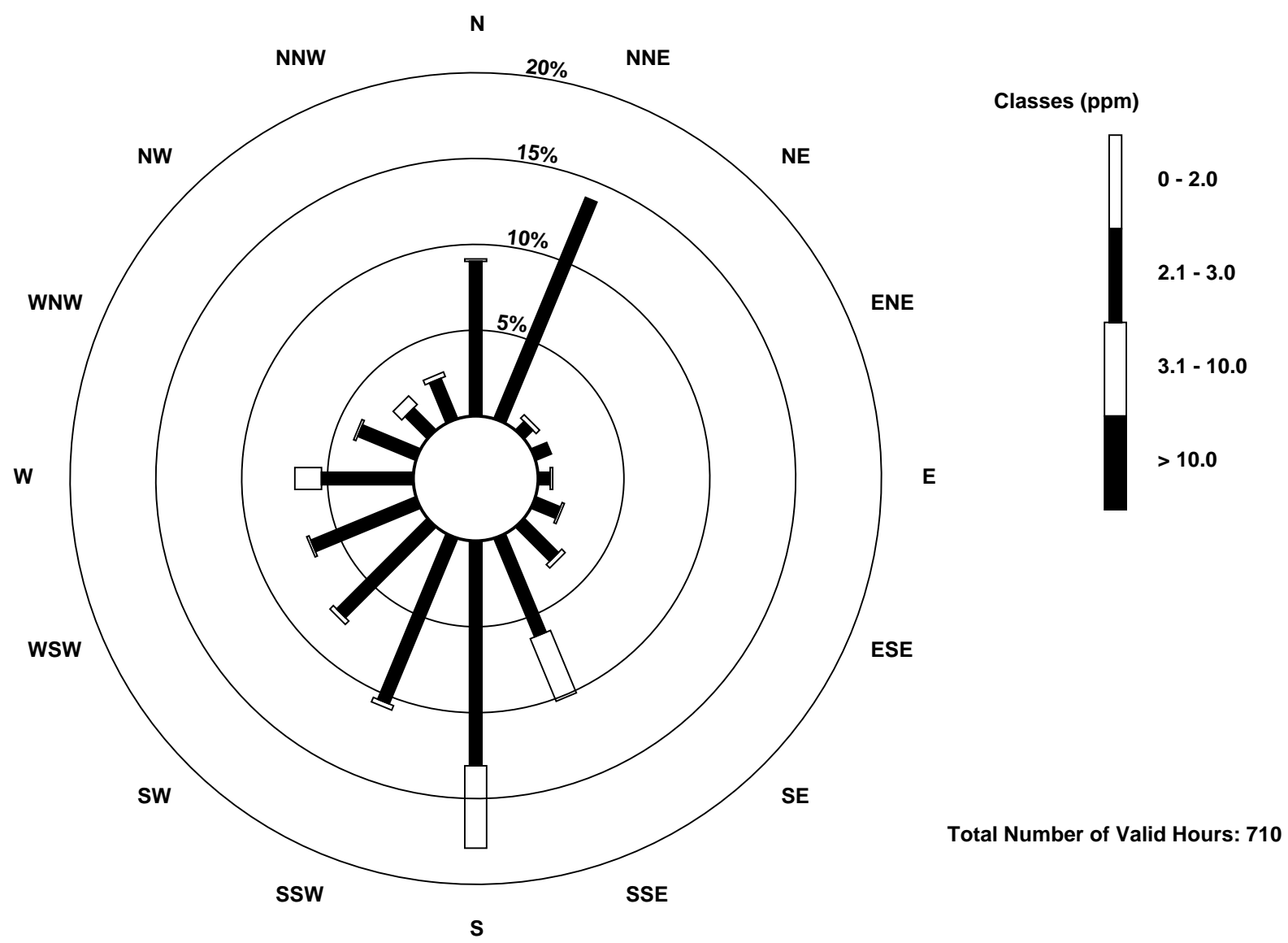
Total Number of Valid Hours: 710

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

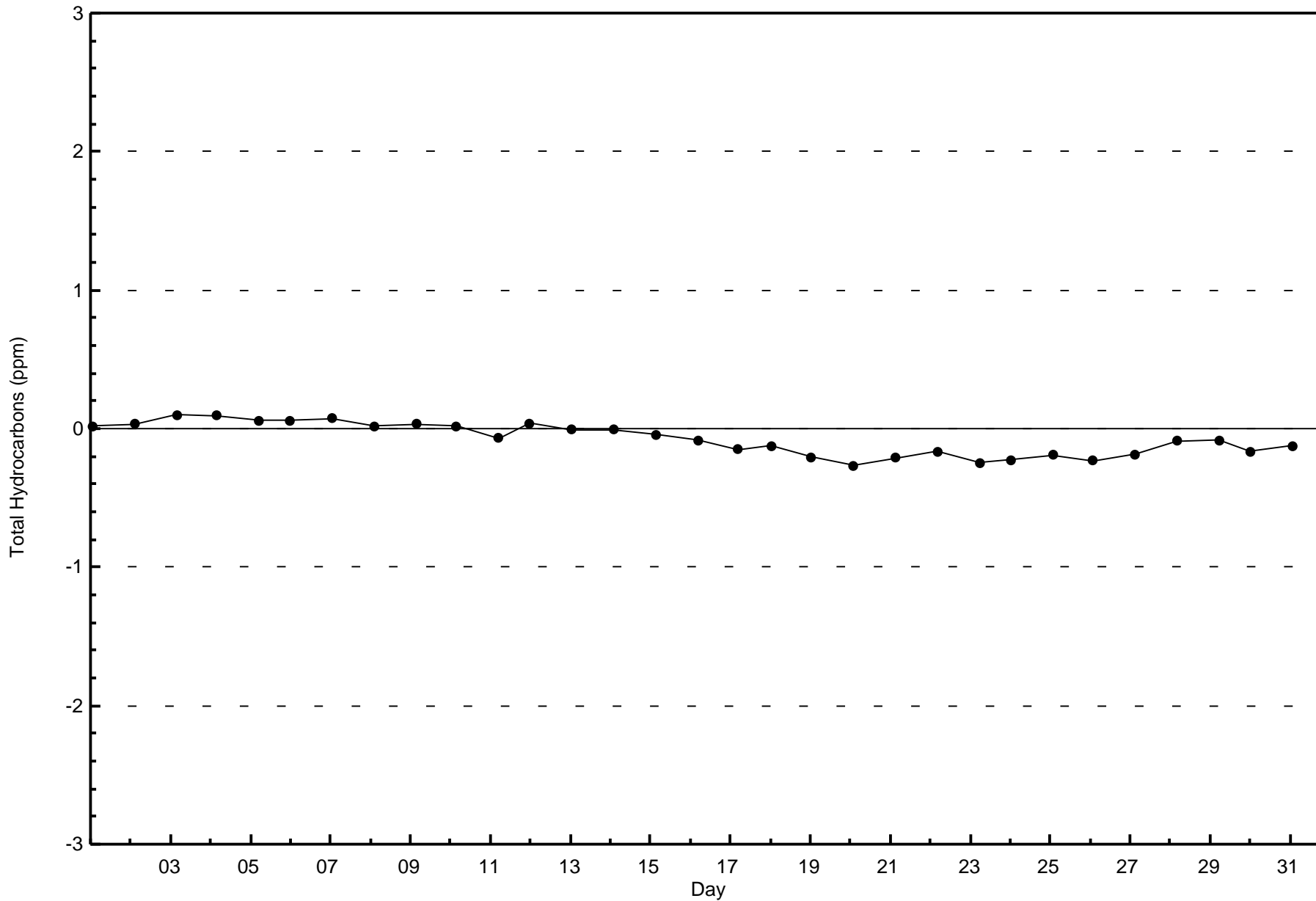
Total Hydrocarbons (THC) - ppm
Mildred Lake (AMS 2)

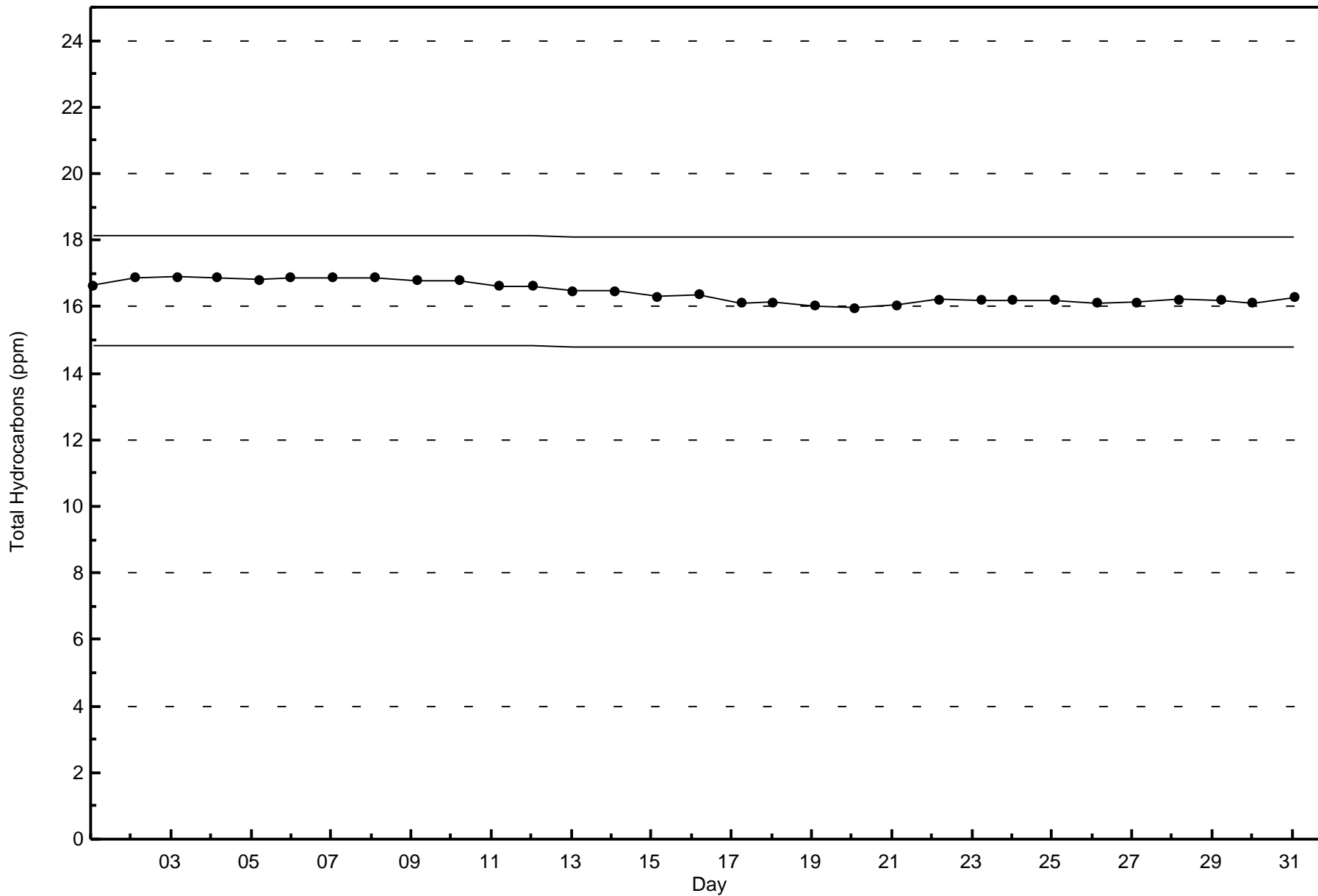




Wood Buffalo Environmental Association
Zero Responses

Total Hydrocarbons (THC) - ppm
Mildred Lake - January 2017







Wood Buffalo Environmental Association
Summary of Hour Averages

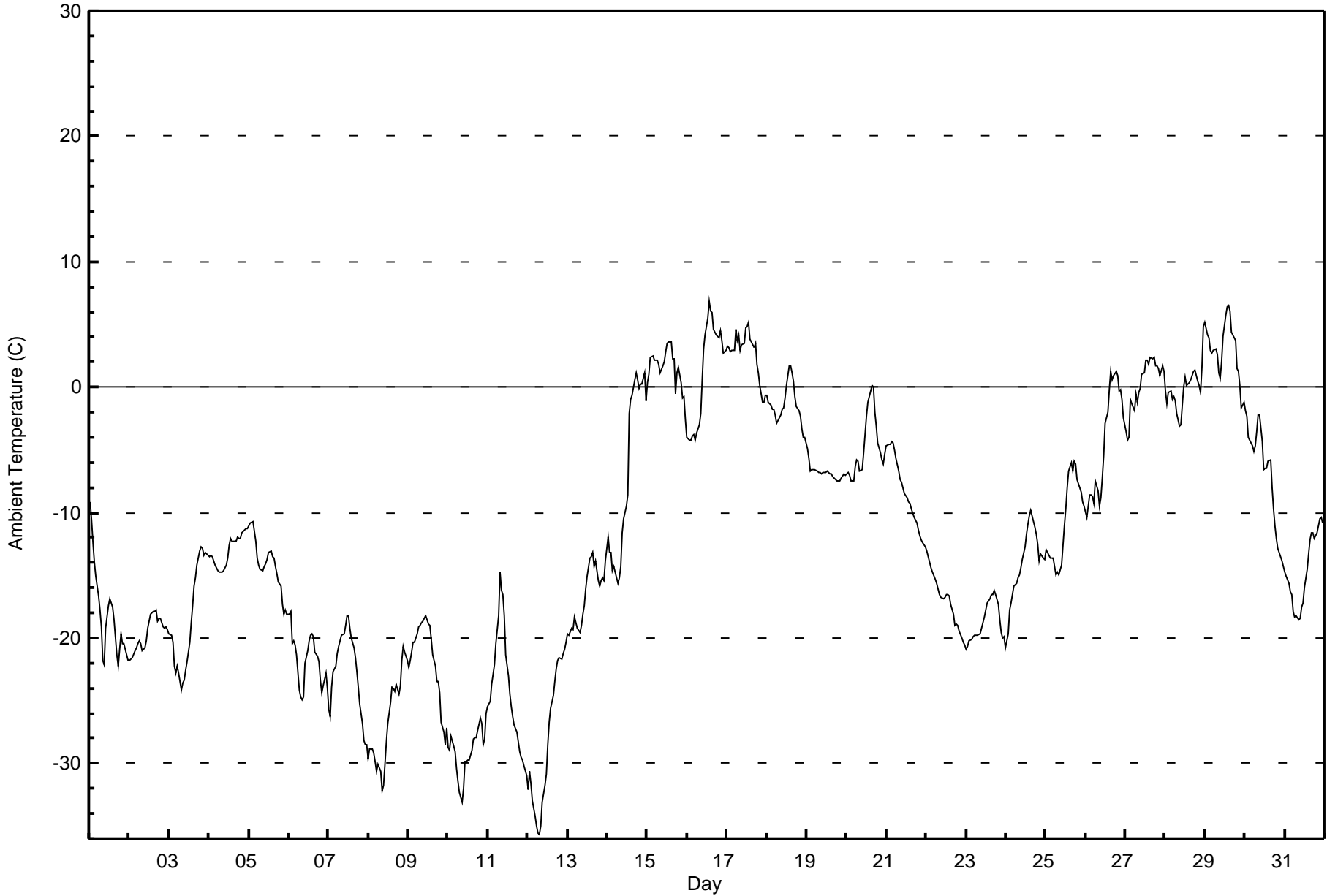
Ambient Temperature (AT) - C
Mildred Lake - January 2017

Maximum Value: 6.8 C on Jan 16 14:00 Maximum Daily Average: 3.0 C on Jan 29		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Minimum Value: -35.7 C on Jan 12 08:00 Minimum Daily Average: -29.1 C on Jan 10 Maximum Diurnal Average: -10.3 C at hour 16 Minimum Diurnal Average: -13.8 C at hour 9 Monthly Average: -12.27 C Percentiles: P ₁ = -33.0 P ₁₀ = -25.2 Q ₁ = -19.8 Median = -13.5 Q ₃ = -3.0 P ₉₀ = 1.7 P ₉₉ = 5.5																										
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-Jan	-9.2	-10.6	-12.4	-13.9	-15.0	-16.6	-17.8	-19.1	-21.8	-22.1	-19.3	-17.4	-16.9	-17.2	-17.6	-18.5	-21.4	-22.3	-20.9	-19.6	-20.5	-20.4	-21.3	-21.8	-18.1	-9.2
2-Jan	-21.7	-21.7	-21.5	-21.0	-20.8	-20.5	-20.2	-20.5	-21.0	-20.8	-20.2	-19.2	-18.7	-18.1	-17.8	-17.8	-18.7	-18.5	-18.5	-19.1	-19.3	-19.2	-19.4	-19.7	-19.7	-17.8
3-Jan	-19.6	-19.8	-20.3	-22.3	-22.8	-22.3	-22.8	-24.1	-23.6	-23.4	-22.6	-21.9	-20.3	-18.8	-17.4	-15.9	-15.1	-14.2	-13.1	-12.8	-12.8	-13.4	-13.2	-13.5	-18.6	-12.8
4-Jan	-13.6	-13.4	-13.5	-13.9	-14.2	-14.6	-14.7	-14.7	-14.7	-14.2	-13.6	-12.6	-12.0	-12.2	-12.3	-12.3	-12.0	-12.1	-12.0	-11.6	-11.4	-11.3	-11.3	-13.0	-13.0	-11.3
5-Jan	-11.1	-10.8	-10.8	-11.5	-12.2	-13.6	-14.2	-14.5	-14.6	-14.4	-14.1	-13.7	-13.2	-13.1	-13.5	-13.7	-14.3	-14.9	-15.5	-15.9	-17.3	-18.1	-17.8	-18.1	-14.2	-10.8
6-Jan	-18.1	-17.8	-20.5	-20.3	-20.5	-21.4	-24.2	-24.6	-24.9	-24.7	-22.1	-21.0	-20.2	-19.8	-19.7	-19.9	-21.1	-21.5	-21.9	-23.4	-24.3	-23.8	-22.9	-24.1	-21.8	-17.8
7-Jan	-25.8	-26.3	-23.9	-22.7	-22.2	-21.3	-20.7	-20.2	-19.8	-19.7	-19.0	-18.3	-18.3	-19.2	-20.0	-20.7	-21.6	-22.7	-24.0	-25.2	-26.8	-28.2	-28.5	-28.5	-22.6	-18.3
8-Jan	-29.6	-28.8	-28.9	-29.2	-29.9	-30.6	-30.1	-30.6	-32.2	-31.7	-30.1	-28.3	-26.8	-25.2	-23.9	-24.1	-24.2	-23.7	-24.5	-23.8	-21.8	-20.7	-21.1	-21.8	-26.7	-20.7
9-Jan	-22.3	-21.8	-21.1	-20.3	-20.3	-19.7	-19.1	-19.0	-18.8	-18.6	-18.3	-18.6	-18.9	-19.0	-20.1	-21.4	-22.2	-23.5	-23.5	-24.4	-26.7	-27.5	-28.5	-27.1	-21.7	-18.3
10-Jan	-28.7	-28.9	-27.8	-28.6	-29.0	-30.4	-31.5	-32.3	-33.1	-32.0	-29.8	-29.9	-29.8	-29.8	-28.9	-28.0	-27.9	-28.0	-27.3	-26.4	-26.8	-28.5	-28.1	-26.0	-29.1	-26.0
11-Jan	-25.5	-25.0	-23.7	-22.9	-22.1	-20.4	-18.2	-14.7	-16.2	-16.5	-18.2	-21.3	-23.0	-24.4	-25.5	-26.3	-27.0	-27.4	-28.3	-29.0	-29.5	-29.8	-30.2	-31.0	-24.0	-14.7
12-Jan	-32.1	-30.6	-31.6	-32.9	-34.2	-35.0	-35.6	-35.7	-35.0	-33.1	-31.7	-30.8	-28.6	-26.7	-25.6	-24.6	-23.5	-22.4	-21.8	-21.6	-21.6	-21.2	-20.9	-20.4	-28.2	-20.4
13-Jan	-19.7	-19.8	-19.3	-19.3	-18.4	-18.7	-19.2	-19.6	-19.0	-18.1	-17.4	-16.1	-15.1	-13.6	-13.5	-13.2	-14.3	-13.9	-15.4	-15.9	-15.4	-15.1	-15.4	-13.8	-16.6	-13.2
14-Jan	-11.9	-13.2	-13.2	-14.6	-14.3	-15.2	-15.7	-15.2	-14.3	-11.7	-10.5	-9.5	-8.6	-2.1	-1.0	-0.6	0.6	1.1	0.6	-0.1	0.2	0.2	1.2	-1.1	-7.0	1.2
15-Jan	0.4	1.0	2.4	2.5	2.2	2.2	2.2	1.8	1.2	1.7	2.0	2.8	3.4	3.5	3.6	2.2	2.3	-0.6	1.2	1.6	0.4	-0.9	-0.8	-2.6	1.5	3.6
16-Jan	-4.1	-4.3	-4.2	-3.9	-3.8	-4.3	-3.7	-3.0	-2.1	0.6	3.1	4.1	5.5	6.8	6.1	6.0	4.6	4.2	4.0	4.0	4.5	3.7	2.7	2.9	1.2	6.8
17-Jan	3.3	3.2	2.8	2.9	2.9	4.6	3.7	4.2	2.9	3.4	3.5	4.7	4.8	5.1	3.9	3.4	3.1	3.5	1.8	1.2	0.1	-1.2	-1.2	-0.6	2.8	5.1
18-Jan	-0.7	-1.2	-1.4	-1.7	-1.8	-2.2	-2.9	-2.6	-2.2	-1.8	-1.7	-0.8	0.1	1.7	1.7	1.2	0.4	-0.7	-1.5	-1.9	-2.3	-3.4	-4.0	-4.0	-1.4	1.7
19-Jan	-5.0	-5.7	-6.6	-6.6	-6.6	-6.6	-6.7	-6.8	-6.8	-6.9	-6.8	-6.8	-6.7	-6.8	-7.0	-7.0	-7.1	-7.3	-7.5	-7.5	-7.5	-7.3	-6.9	-7.0	-6.8	-5.0
20-Jan	-7.0	-6.8	-7.1	-7.4	-7.5	-6.4	-5.8	-5.9	-6.7	-6.6	-5.3	-3.8	-2.4	-1.2	-0.3	0.1	0.0	-2.0	-3.1	-4.5	-5.3	-5.8	-6.2	-5.3	-4.7	0.1
21-Jan	-4.7	-4.6	-4.6	-4.4	-4.4	-5.1	-5.7	-6.7	-7.3	-7.6	-8.0	-8.5	-8.8	-9.1	-9.3	-9.7	-10.0	-10.4	-10.8	-11.4	-11.8	-12.1	-12.4	-12.7	-8.3	-4.4
22-Jan	-13.1	-13.5	-14.0	-14.4	-14.8	-15.3	-15.7	-16.1	-16.5	-16.8	-16.8	-16.7	-16.5	-16.5	-16.7	-17.3	-18.1	-18.9	-18.9	-19.0	-19.4	-20.0	-20.3	-20.5	-16.9	-13.1
23-Jan	-20.9	-20.6	-20.3	-20.1	-19.9	-19.8	-19.7	-19.8	-19.7	-19.3	-18.8	-18.4	-17.8	-17.3	-16.9	-16.5	-16.5	-16.2	-16.6	-17.3	-18.6	-19.5	-20.0	-19.9	-18.8	-16.2
24-Jan	-20.8	-19.7	-17.8	-17.3	-16.5	-15.9	-15.7	-15.2	-14.9	-14.4	-13.7	-12.7	-11.7	-10.9	-10.3	-9.9	-10.3	-11.1	-11.7	-12.5	-13.9	-13.3	-13.6	-13.8	-14.1	-9.9
25-Jan	-12.9	-13.2	-13.4	-13.6	-13.6	-14.3	-14.9	-14.7	-14.9	-14.1	-12.6	-11.1	-9.8	-8.1	-6.7	-6.1	-6.7	-5.9	-6.2	-7.4	-8.0	-8.4	-9.2	-9.5	-10.6	-5.9
26-Jan	-10.0	-10.4	-8.6	-8.6	-8.7	-9.3	-7.5	-8.2	-9.5	-8.9	-7.2	-5.5	-2.8	-2.0	-0.2	1.3	0.6	0.9	1.3	0.9	-0.4	-0.2	-0.9	-2.5	-4.4	1.3
27-Jan	-3.6	-4.2	-4.0	-1.0	-1.3	-1.8	-0.5	-1.2	-0.4	-0.1	1.1	1.2	2.1	2.1	1.8	2.4	2.3	2.4	1.7	1.7	1.5	0.9	1.7	1.3	0.2	2.4
28-Jan	-0.3	-1.3	-0.4	-0.3	-1.0	-0.8	-1.1	-2.1	-3.1	-3.0	-1.4	0.1	0.8	0.1	0.4	0.5	0.9	1.2	1.3	0.5	0.2	-0.4	1.6	4.8	-0.1	4.8
29-Jan	5.1	4.2	3.9	2.9	2.7	3.0	3.0	2.6	1.2	0.7	2.0	4.1	5.7	6.4	6.5	6.1	4.3	3.9	3.7	1.4	1.3	0.2	-1.7	-1.2	3.0	6.5
30-Jan	-1.9	-2.3	-4.0	-4.2	-4.6	-5.1	-4.6	-3.6	-2.3	-2.2	-4.4	-6.6	-6.5	-6.4	-5.9	-5.8	-8.1	-9.7	-11.0	-12.1	-12.9	-13.6	-13.8	-14.4	-6.9	-1.9
31-Jan	-14.8	-15.1	-15.6	-16.3	-16.6	-17.9	-18.4	-18.2	-18.5	-18.4	-17.6	-17.2	-16.0	-14.5	-13.3	-12.2	-11.6	-11.6	-12.1	-11.6	-11.1	-10.5	-10.3	-10.8	-14.6	-10.3
	-12.9	-13.0	-12.9	-13.1	-13.2	-13.4	-13.5	-13.6	-13.8	-13.4	-12.6	-12.0	-11.2	-10.5	-10.3	-10.3	-10.7	-11.0	-11.3	-11.7	-12.2	-12.5	-12.7	-12.7	Diurnal Average	
	5.1	4.2	3.9	2.9	2.9	4.6	3.7	4.2	2.9	3.4	3.5	4.7	5.7	6.8	6.5	6.1	4.6	4.2	4.0	4.0	4.5	3.7	2.7	4.8	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Mildred Lake - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	181	24.33	24.33
-20 - 0	442	59.41	83.74
0 - 10	121	16.26	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

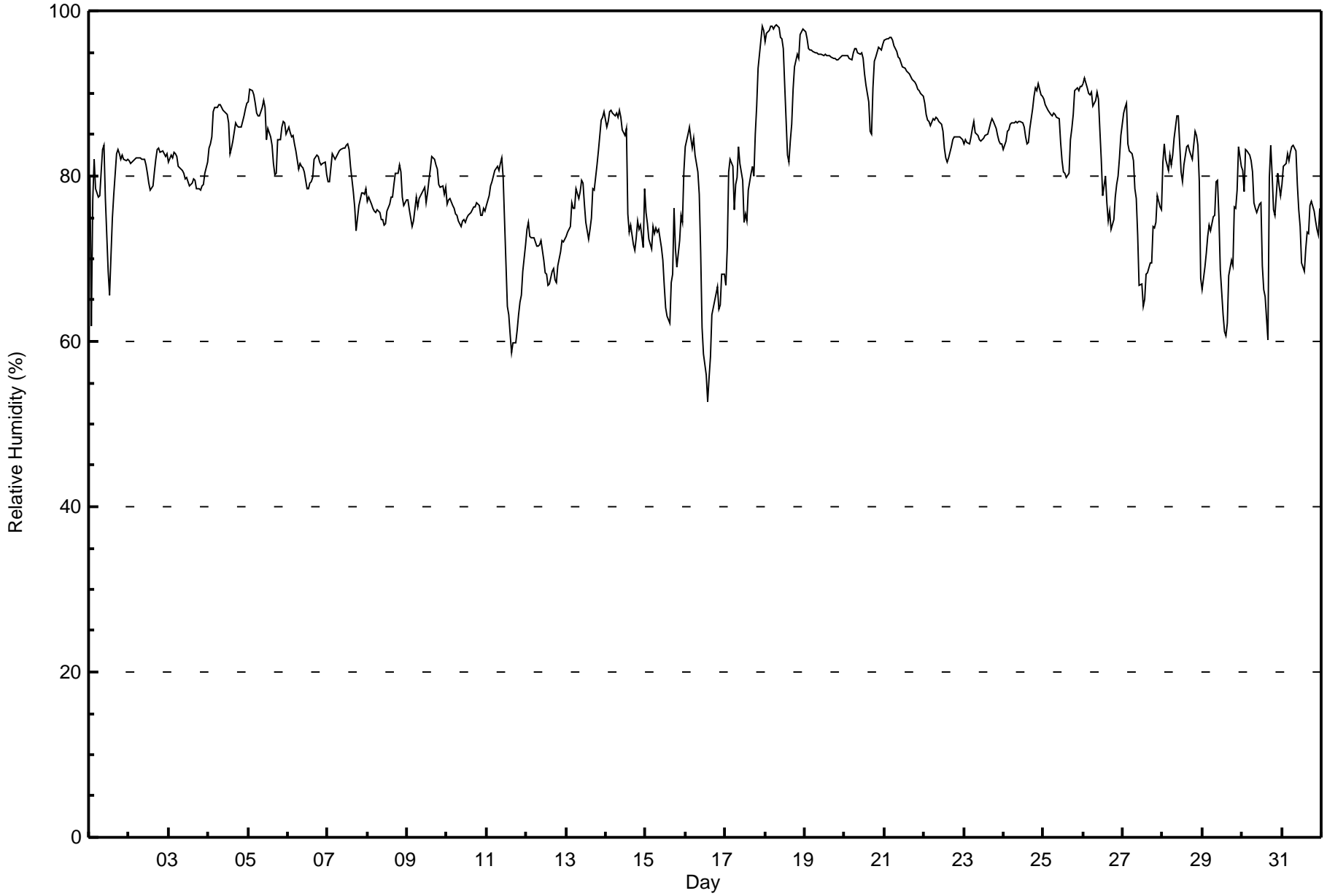
Mildred Lake - January 2017

Maximum Value: 98 % on Jan 18 08:00																		Maximum Daily Average: 94.9 % on Jan 19																		Hours in Service: 744																															
Minimum Value: 53 % on Jan 16 14:00																		Minimum Daily Average: 70.3 % on Jan 16																		Hours of Data: 744																															
Maximum Diurnal Average: 83.7 % at hour 4																		Minimum Diurnal Average: 76.5 % at hour 14																		Hours of Missing Data: 0																															
Monthly Average: 81.2 %																		Percentiles: P ₁ = 60 P ₁₀ = 71 Q ₁ = 76 Median = 82 Q ₃ = 87 P ₉₀ = 93 P ₉₉ = 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-Jan	80	62	77	82	78	78	78	80	83	84	77	68	66	70	75	78	83	83	83	82	83	82	82	82	78.1	84																																									
2-Jan	82	82	82	82	82	82	82	82	82	82	81	80	79	78	79	80	82	83	83	83	83	83	82	83	81.7	83																																									
3-Jan	82	83	82	83	83	82	81	81	81	80	80	80	79	79	79	80	79	78	78	78	79	79	80	82	80.3	83																																									
4-Jan	83	84	85	88	88	88	89	89	88	88	88	87	86	83	83	84	86	86	86	86	87	88	89	89	86.5	89																																									
5-Jan	89	90	90	90	89	88	87	87	88	89	88	84	86	85	84	82	80	80	84	84	86	87	87	85	86.3	90																																									
6-Jan	86	85	85	85	84	83	81	82	81	81	80	79	78	79	79	80	82	83	82	82	81	82	82	80	81.7	86																																									
7-Jan	79	79	81	83	82	82	83	83	83	83	83	84	84	83	81	78	76	73	75	76	78	78	78	78	80.2	84																																									
8-Jan	77	77	77	76	76	76	76	76	75	75	74	74	76	77	77	78	79	80	80	81	81	77	76	77	77.0	81																																									
9-Jan	77	76	75	74	75	77	76	77	78	78	79	77	78	80	81	82	82	81	81	79	79	79	78	79	78.2	82																																									
10-Jan	77	77	77	76	76	75	75	75	74	75	75	74	75	75	76	76	76	76	77	77	75	75	76	76	75.7	77																																									
11-Jan	77	78	79	79	80	81	81	81	82	82	80	75	64	63	61	59	60	60	61	63	65	66	68	72	71.4	82																																									
12-Jan	74	74	73	72	73	72	72	72	72	72	70	68	68	67	67	68	69	67	67	69	71	72	72	72	70.6	74																																									
13-Jan	73	73	74	77	76	76	79	77	78	79	79	77	74	72	74	75	78	78	81	83	85	87	87	88	78.4	88																																									
14-Jan	86	87	88	88	88	87	88	87	88	87	86	85	86	75	73	74	72	71	72	75	74	74	71	79	80.8	88																																									
15-Jan	76	74	72	71	74	73	74	73	74	71	70	67	64	63	62	67	68	76	71	69	72	75	74	80	71.3	80																																									
16-Jan	84	85	86	85	83	85	82	81	78	71	62	58	56	53	56	58	63	65	66	67	64	64	68	68	70.3	86																																									
17-Jan	67	71	81	82	81	76	79	80	84	82	80	74	75	75	78	80	81	80	85	89	93	96	98	98	81.9	98																																									
18-Jan	96	97	98	98	98	98	98	98	98	97	97	95	91	82	82	84	86	91	93	95	94	97	97	98	94.1	98																																									
19-Jan	97	97	95	95	95	95	95	95	95	95	95	95	95	95	95	95	94	94	94	94	94	94	95	95	94.9	97																																									
20-Jan	95	95	95	94	94	95	95	95	95	95	95	94	92	91	89	85	85	91	94	94	96	95	95	96	93.4	96																																									
21-Jan	96	97	97	97	97	96	96	95	94	94	94	93	93	93	93	92	92	92	91	91	91	90	90	90	93.5	97																																									
22-Jan	89	87	87	87	86	87	87	87	87	87	86	85	83	82	82	82	84	84	85	85	85	85	84	84	85.3	89																																									
23-Jan	84	84	84	84	85	86	87	85	85	84	84	84	85	85	85	86	86	87	87	86	85	84	84	84	85.0	87																																									
24-Jan	83	84	85	86	86	86	87	87	87	87	86	86	85	84	84	86	88	90	91	90	91	90	90	90	86.8	91																																									
25-Jan	89	89	88	88	88	87	88	88	87	87	84	82	81	80	80	80	84	86	87	90	91	90	91	91	86.5	91																																									
26-Jan	91	92	91	90	90	90	88	89	90	89	86	82	78	80	77	75	76	74	75	77	79	80	82	85	83.5	92																																									
27-Jan	88	88	89	84	83	83	82	79	77	73	67	67	64	65	68	68	69	69	74	74	74	78	76	76	75.6	89																																									
28-Jan	82	84	82	81	83	81	83	85	87	87	84	81	79	81	84	84	83	83	82	85	85	84	79	68	82.3	87																																									
29-Jan	66	69	71	73	74	73	75	75	79	80	75	69	63	61	61	62	68	70	69	76	76	78	84	81	72.0	84																																									
30-Jan	81	78	83	83	82	82	80	77	76	76	77	77	69	66	65	60	80	84	80	76	75	80	79	78	76.9	84																																									
31-Jan	79	81	82	83	82	83	84	84	83	79	76	74	70	69	71	73	73	76	77	76	74	74	73	76	77.1	84																																									
																		82.7		82.6		83.5		83.7		83.6		83.4		83.4		83.2		83.5		82.8		81.2		79.3		77.5		76.5		76.8		77.1		78.9		79.7		80.4		81.1		81.4		82.1		82.2		82.5		Diurnal Average	
																		97		97		98		98		98		98		98		98		97		97		95		95		95		95		95		95		94		94		94		95		96		97		98		98		Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Mildred Lake - January 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Mildred Lake - January 2017

Maximum Speed: 35 km/h on Jan 1 02:00	Maximum Daily Speed Average: 11.7 km/h on Jan 21	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jan 1 14:00	Minimum Daily Speed Average: 0.7 km/h on Jan 23	Hours of Data: 744
Maximum Diurnal Speed Average: 2.4 km/h at hour 20	Minimum Diurnal Speed Average: 0.7 km/h at hour 15	Hours of Missing Data: 0
Monthly Average Velocity: 1.6 km/h 257.1 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 7 Q ₃ = 10 P ₉₀ = 13 P ₉₉ = 20	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jan	NNW21	NNW35	N16	NNE10	NNE14	NNE12	NNE9	N6	W2	WSW3	NNW7	NW8	NW6	N0	SE3	NNE2	ENE1	ESE3	ESE5	ESE2	SSW3	S5	S3	SW5	N4.9	NNW35	
2-Jan	E3	SW3	SSW4	SW1	SSE3	S4	S2	SSE3	SE3	S2	S4	S3	S4	S3	S3	SSE5	ESE3	SSE4	S4	S5	S6	S5	S4	S5	S3.3	S6	
3-Jan	SSW3	SSE4	S7	SSW6	SSW6	SSW7	SSW10	SSW6	SSW5	SSW7	SSW10	S7	SSW5	SSW5	SSW3	W4	WNW7	WNW11	WNW11	WNW12	WNW15	WNW13	NW9	NNW7	WSW4.7	WNW15	
4-Jan	NNW5	N5	NNE4	NNE7	NE7	ENE7	NE6	E4	SE3	SE3	SE5	SE7	S9	S7	S5	S6	SSE7	SSW8	S7	S10	S11	SSE5	E3	ENE4	SE2.9	S11	
5-Jan	N4	N8	NNE10	NNE11	NNE11	NNE12	NNE10	NNE10	NNE7	NNE7	NNE9	NNE11	NNE10	NNE14	NNE13	NNE11	NNE10	NNE7	N7	N6	NNE7	N6	N5	NNW3	NNE8.6	NNE14	
6-Jan	SW4	SW5	SSW6	W3	SW3	S4	SSW5	SSW5	SSW4	SSW6	SSW4	S7	S8	SSE10	SSE8	SSE7	S6	SSW6	S8	SSW8	S2	SE4	SSE4	WNW1	S4.8	SSE10	
7-Jan	WNW1	N5	NNE4	NNE4	NNE6	NE4	N5	N5	N5	N7	N9	NNE10	N16	NNE16	NNE15	NNE12	NNE12	NNE11	NNE9	NNE5	N4	N4	NW3	SW5	NNE6.7	NNE16	
8-Jan	SW4	SW4	SW6	SW4	SSW5	S4	S9	S7	S6	S6	S7	SSE8	SSE9	SSE8	S7	SSW7	SSW6	S5	SSE4	SSW5	WSW10	WSW12	WSW13	WSW9	SSW5.8	WSW13	
9-Jan	WSW9	W8	WSW9	WSW11	WSW10	W7	WNW9	WNW5	W6	WNW6	NW3	NNW12	NNW9	NNW8	NW4	W2	W3	WNW2	NNW7	N5	NNE1	SSW2	N1	N5	WNW4.6	NNW12	
10-Jan	NNE3	NNE6	NE7	NNE7	NNE7	N3	N5	NNW4	NNE3	WSW0	SSW4	SSW3	SE3	SE5	SE5	SSE7	S7	SW5	SW4	WSW8	WSW7	SSW7	S7	S9	S0.9	S9	
11-Jan	SSE10	SSE12	SSE13	SSE15	S10	S9	WSW3	WNW10	NNE12	N12	N28	N29	N31	N28	NNW29	N23	N17	NNW13	NNW10	NNW7	NNW8	NW8	NW5	NW4	N8.1	N31	
12-Jan	S4	SSW5	S4	SSW4	SSE5	S4	SW6	SSW7	SSW5	SSE9	S10	SSW12	S10	S12	S12	S10	S13	S16	S14	S10	S8	S10	S8	S8	S8.3	S16	
13-Jan	S8	S10	SSE2	SSE2	NW5	N2	NE4	ENE4	SSE5	ESE5	ESE5	SSE7	S8	SSE9	SSE7	SSE7	S5	S6	SE5	SSE5	SSE7	SSE7	SSE7	SSE9	SSE4.6	S10	
14-Jan	S11	SSE8	SSE8	SE6	SSE10	SE7	ESE7	SSE5	SSE6	SSE8	SSE7	ESE4	S5	SW9	SSW6	SW8	SW10	WSW10	WSW10	WSW10	WSW13	WSW15	WSW15	WSW11	SW6	SSW6.0	WSW15
15-Jan	WSW12	W16	W18	W19	WNW16	W18	W14	W14	WSW17	W16	W20	W15	W10	WSW4	SW7	S4	WSW10	S9	WSW11	WSW13	SW9	SSW9	SW7	S6	WSW11.0	W20	
16-Jan	SSW7	SSW5	S4	SSW6	S6	SSE8	SSW9	SSE9	SSE10	SW9	SW11	SW15	SW13	SW8	SSW5	WSW6	SW8	SW9	SW13	SW9	SW9	SSW10	SSE7	SSE9	SSW7.8	SW15	
17-Jan	SSE8	S7	SSW8	SW9	SW7	WSW10	WSW6	WSW10	WSW7	WSW10	WSW8	WSW11	W12	W10	SSW5	SSE4	SSE5	SSE8	SSW7	SSW1	ESE4	SSE5	SSW6	SE7	SW5.4	W12	
18-Jan	SE7	SE4	SE5	SE4	NE4	E3	ESE2	ENE3	NE4	N7	NNW8	E2	SSE2	S2	S4	S5	S4	S6	SSW5	S6	S5	S5	SSW3	SSE3	SSE2.2	NNW8	
19-Jan	ENE1	N11	NNE11	N8	N11	NNE12	N11	NNE10	N9	N11	NNE9	NNE10	NNE9	N9	N8	N7	N6	NNE7	NNE7	N7	N6	NW5	N5	ESE3	N7.8	NNE12	
20-Jan	SE2	E2	S6	SSW6	SSW7	S6	S7	S6	S6	S5	S3	SSE5	S8	S8	SSE8	S8	S8	S5	SE5	SE2	NE6	N13	NNE13	NNE11	SSE2.9	NNE13	
21-Jan	NNE13	NNE11	NNE12	NNE10	NNE11	NNE14	NNE13	NNE15	NNE13	NNE12	NNE12	N11	NNE12	NNE13	NNE12	NNE12	NNE11	NNE11	NNE10	NNE11	NNE11	N11	NNE11	NNE10	NNE11.7	NNE15	
22-Jan	N13	N13	NNE11	NNE12	NNE14	NNE11	NNE11	NNE10	NNE9	NNE9	NNE9	N9	N11	N11	N10	N7	N6	N6	N6	N6	NNE4	NNE5	NNE5	NNE5	NNE8.7	NNE14	
23-Jan	NNE4	NNE4	NNE3	NNE3	N4	N5	N5	N3	NNW3	NW4	WNW3	WSW3	WSW3	SW3	S3	SSE4	S4	S5	S4	S4	SSW4	SSW4	S4	SSW3	WSW0.7	N5	
24-Jan	S4	S4	SSE4	SSE4	SSE5	S6	S5	S5	S5	S5	S5	S5	S5	S7	SSE7	SSE9	SSE10	S8	S8	S7	SSW5	S5	S4	S6	S6	S5.6	SSE10
25-Jan	S7	S7	S8	S8	S8	S7	S7	S7	S7	S7	S7	S8	SSE10	SSE11	SSE11	SSE11	SSE10	S8	S11	S10	SSE9	SSE9	SSE9	S8	S9	S8.5	SSE11
26-Jan	S9	SSW10	SW10	SW8	SW8	SW9	SW11	SW11	SSW10	SSW10	SSW11	S10	SSW10	S10	SW7	SW7	SW5	W16	W24	W18	W13	W13	W7	SW7	SW8.9	W24	
27-Jan	SSW4	SW7	SW5	W13	W11	W8	WNW16	W12	WNW16	W15	W21	W16	W15	WSW12	W8	WNW9	NW8	NW9	WSW5	WSW8	WSW7	SW5	WNW6	W7	W9.4	W21	
28-Jan	SW6	ENE2	SSW8	WSW9	SW7	SW9	SW6	WSW7	WSW8	SSW7	SW8	SW8	SSW4	SE7	S9	S7	S6	SSE8	SE6	ESE3	SSW3	SSE4	WSW6	W15	SSW5.1	W15	
29-Jan	W13	W12	W12	WSW10	W10	W16	W19	W13	SSW7	SW10	SW10	SSW8	SSW5	WNW12	WNW9	W8	WSW10	W9	W8	WSW5	W5	WNW4	SW6	WSW6	WSW8.6	W19	
30-Jan	WSW6	WSW6	SW7	SSW5	SW7	SSW7	WSW9	W11	WNW10	WNW11	NNE15	NNE15	NNE12	N12	NNW9	NNW20	NNE14	NNE15	NNE17	N17	N16	N15	N19	N20	N7.8	NNW20	
31-Jan	N19	NNE13	NNE13	NNE11	NNE9	NNE5	N6	SW1	W3	SW4	W2	SSW4	SSW4	WSW2	W1	NW8	WNW10	WNW11	WNW10	NW9	NW11	NW12	NNW12	NNW11	NNW5.8	N19	

WSW1.6	WNW1.6	WSW1.2	W1.4	WNW1.1	W1.2	W2.2	W2.1	WSW1.7	WSW2.3	W1.8	W1.3	W1.5	WSW1.0	SSW0.7	WSW0.8	SW1.4	SW2.0	WSW2.3	W2.4	WSW2.4	WSW2.1	W1.6	WSW1.3	Diurnal Average
NNW21	NNW35	W18	W19	WNW16	W18	W19	NNE15	WSW17	W16	N28	N29	N31	N28	NNW29	N23	N17	W16	W24	W18	NNE16	N15	N19	N20	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

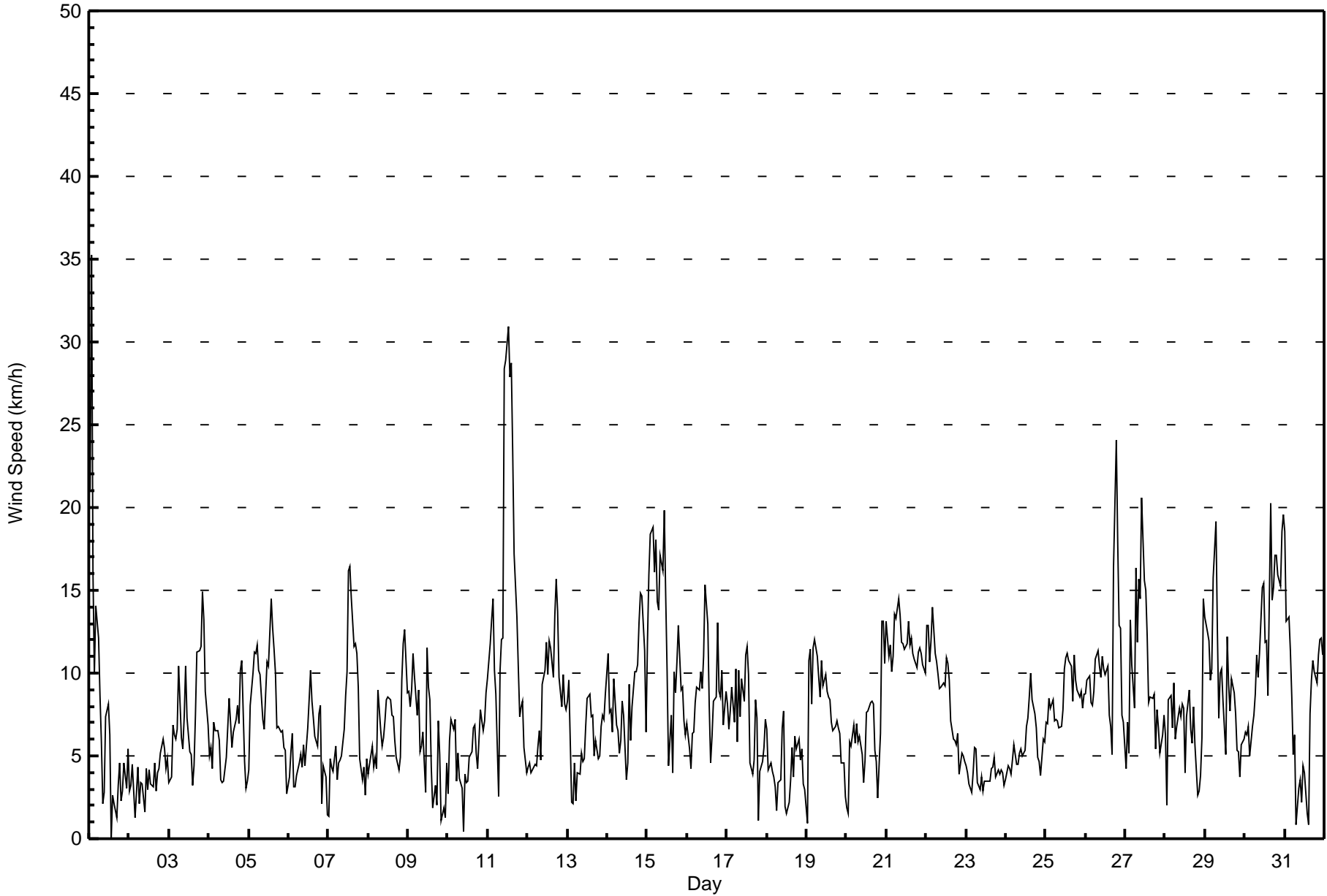
Wind Speed (WS) - km/h
Mildred Lake - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on Jan 11 11:00 Minimum Value: 0 km/h on Jan 23 20:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 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-Jan	8	7	4	3	3	3	3	1	1	2	2	3	2	1	1	2	2	1	1	1	2	3	2	2	8
2-Jan	2	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	2
3-Jan	1	1	2	2	2	2	2	2	2	2	2	2	1	1	3	3	3	3	3	4	4	2	1	4	
4-Jan	1	1	1	2	2	1	2	1	1	1	1	2	2	3	1	1	2	2	2	2	2	1	1	3	
5-Jan	1	2	2	3	2	3	3	3	2	2	3	3	3	4	3	3	3	2	2	1	1	1	2	4	
6-Jan	2	2	2	2	2	1	1	1	1	1	1	1	2	2	2	1	1	1	1	2	1	2	2	2	
7-Jan	2	1	2	1	1	1	1	1	1	1	2	3	4	4	4	5	4	3	3	1	2	1	1	5	
8-Jan	1	1	1	2	2	2	2	2	2	1	2	2	1	1	2	2	2	2	2	2	3	3	4	4	
9-Jan	3	3	3	3	3	3	3	2	1	2	3	2	2	2	1	1	1	2	1	1	1	1	2	3	
10-Jan	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	2	2	
11-Jan	2	2	2	2	2	2	2	5	3	2	11	8	7	8	6	7	4	3	2	1	2	1	1	11	
12-Jan	1	1	1	1	1	2	2	1	2	3	2	2	2	2	3	2	4	3	3	3	2	3	2	4	
13-Jan	2	2	3	2	2	2	1	1	2	1	1	2	2	2	2	2	2	2	1	1	2	1	2	3	
14-Jan	2	2	1	1	2	1	2	2	2	2	2	1	3	2	2	3	5	4	4	4	4	4	2	5	
15-Jan	4	6	5	6	5	5	5	5	5	5	6	5	4	4	2	2	4	1	4	5	3	2	2	6	
16-Jan	2	1	1	1	2	1	2	1	2	3	4	5	4	3	2	3	2	4	2	3	2	2	2	5	
17-Jan	3	3	2	2	2	3	3	4	3	3	3	3	3	4	2	2	1	2	2	1	1	1	1	4	
18-Jan	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	2	2	2	1	1	2	1	2	2	
19-Jan	2	5	4	3	3	3	2	2	2	3	2	2	2	2	2	2	2	2	2	1	2	1	1	5	
20-Jan	1	1	2	2	2	2	1	1	1	1	2	1	2	2	2	2	2	2	1	2	2	4	3	4	
21-Jan	3	3	3	3	3	4	3	3	3	3	3	3	3	4	3	3	3	3	3	3	3	2	3	4	
22-Jan	3	3	2	3	4	3	3	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	4	
23-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	
24-Jan	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	
25-Jan	2	2	2	2	2	1	1	1	1	1	2	2	2	2	1	2	2	2	2	1	1	1	1	2	
26-Jan	1	2	2	2	2	2	3	2	2	2	2	3	2	2	2	2	2	7	6	5	4	4	3	7	
27-Jan	2	2	3	5	5	4	6	5	5	5	7	4	5	4	4	3	3	3	2	2	2	2	5	7	
28-Jan	3	1	2	2	2	3	2	3	3	2	2	3	2	2	2	1	2	2	2	2	1	3	6	6	
29-Jan	5	5	4	3	4	7	6	4	2	3	3	2	2	5	2	3	3	3	3	2	2	3	2	7	
30-Jan	2	2	2	1	2	1	3	3	3	3	5	4	3	3	3	5	4	4	4	4	4	4	5	5	
31-Jan	4	4	3	3	3	1	1	1	1	1	1	1	1	1	2	2	3	3	3	3	3	3	3	4	
Diurnal Maximum																									



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	248	33.33	33.33
6 - 11	379	50.94	84.27
12 - 19	104	13.98	98.25
20 - 28	9	1.21	99.46
29 - 38	4	0.54	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 - January 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	21	17	4	6	6	11	16	25	50	38	18	9	9	6	8	4	248
6 - 11	31	52	4	1	0	1	7	45	79	39	38	33	15	14	9	11	379
12 - 19	12	35	0	0	0	0	0	3	5	1	3	9	25	7	1	3	104
20 - 28	4	0	0	0	0	0	0	0	0	0	0	0	3	0	0	2	9
29 - 38	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	70	104	8	7	6	12	23	73	134	78	59	51	52	27	18	22	744

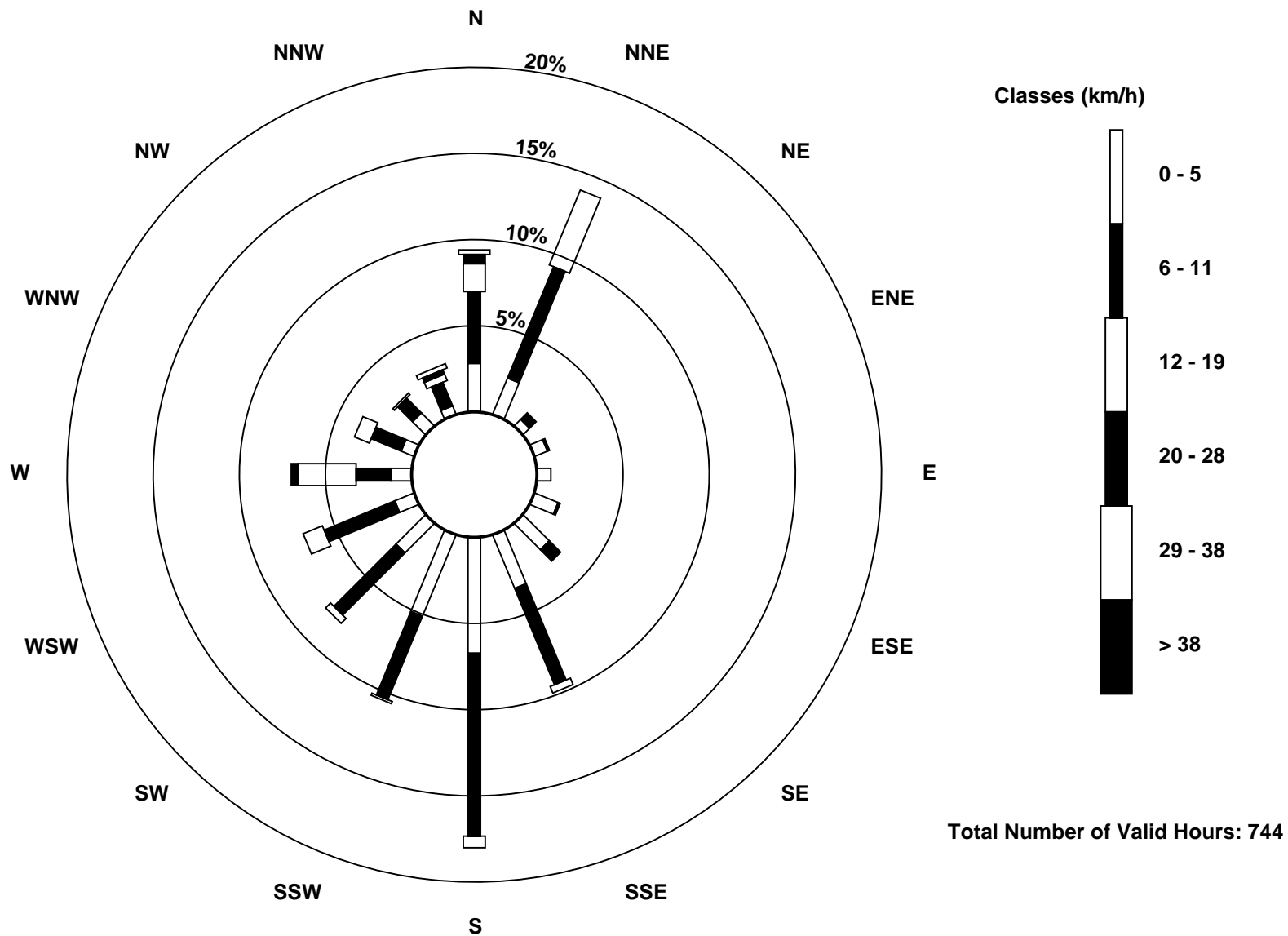
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

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





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Mildred Lake - January 2017

Direction of Maximum Speed: 346 deg on Jan 1 02:00 Direction of Maximum Daily Speed Average: 18.9 deg on Jan 21	Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0
Direction of Minimum Speed: 354 deg on Jan 1 14:00 Direction of Minimum Daily Speed Average: 0.7 deg on Jan 23	Percent Operational Time: 100.0
Monthly Average Direction: 227.6 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-Jan	328	346	8	23	13	20	23	9	278	254	328	326	325	354	131	21	63	123	111	114	195	187	172	233	354.4
2-Jan	97	227	211	227	161	181	189	154	132	180	188	185	179	184	172	159	110	160	186	179	183	174	187	187	176.0
3-Jan	199	164	183	203	203	204	205	200	209	202	202	187	196	201	205	263	283	298	300	295	301	298	325	336	247.6
4-Jan	340	9	21	23	34	57	51	96	129	131	140	145	171	181	175	183	167	193	186	173	179	147	101	62	140.9
5-Jan	9	353	15	28	17	18	25	21	31	25	20	17	17	17	21	21	18	23	358	354	13	9	7	346	16.5
6-Jan	224	222	209	263	223	191	212	210	201	207	192	185	180	165	149	165	174	205	191	206	177	141	148	289	190.2
7-Jan	290	9	16	28	14	41	360	358	355	7	11	12	9	16	22	20	26	26	31	14	360	9	322	214	14.0
8-Jan	216	229	216	228	192	174	176	188	190	187	189	158	156	167	177	211	208	191	167	206	239	251	257	251	203.6
9-Jan	255	264	238	245	257	272	292	290	281	289	311	336	333	334	313	273	265	299	342	358	29	192	5	359	292.4
10-Jan	17	17	34	21	16	357	355	343	16	239	202	209	139	131	140	153	186	220	227	258	243	204	179	172	189.0
11-Jan	163	166	165	164	174	180	250	301	21	3	11	9	354	355	347	357	356	346	337	334	329	323	316	309	352.8
12-Jan	190	207	190	193	153	179	215	193	192	161	178	193	181	190	176	181	170	169	171	179	183	182	183	183	181.0
13-Jan	184	189	159	161	316	6	54	65	157	112	103	158	184	164	155	161	175	183	131	149	152	165	161	164	158.6
14-Jan	169	158	158	142	151	134	119	148	159	156	150	120	177	236	212	214	229	255	250	243	244	243	250	224	201.4
15-Jan	249	268	280	280	289	280	279	263	257	266	273	271	263	244	231	184	240	187	245	249	229	200	219	187	258.1
16-Jan	205	206	191	198	177	167	199	168	165	214	232	226	225	221	201	246	216	226	217	231	222	194	168	150	205.1
17-Jan	168	178	203	216	220	240	241	254	245	253	249	253	270	268	213	152	153	161	211	198	116	160	196	137	218.9
18-Jan	134	144	129	136	54	98	120	69	48	6	345	85	158	187	183	174	184	171	193	176	184	184	192	156	147.8
19-Jan	78	8	14	10	8	18	10	15	3	8	20	18	12	11	5	9	11	15	14	7	10	323	353	105	10.9
20-Jan	146	96	187	203	204	191	184	175	178	191	183	160	178	174	166	176	178	179	143	139	34	9	17	31	163.6
21-Jan	23	20	24	26	27	20	16	17	23	20	19	10	15	17	18	24	21	18	14	17	19	9	18	16	18.9
22-Jan	11	9	16	23	22	28	21	20	22	18	12	9	5	3	7	353	354	360	0	3	13	26	23	22	13.3
23-Jan	13	19	14	13	7	6	0	360	330	312	285	254	238	229	188	167	176	186	181	188	199	202	183	193	246.7
24-Jan	187	186	168	152	164	189	190	176	184	189	175	179	173	168	168	166	172	176	180	193	191	173	185	184	177.2
25-Jan	178	181	170	180	177	182	184	182	183	185	178	165	168	165	161	158	170	175	178	166	166	168	178	179	173.1
26-Jan	191	207	215	220	216	216	228	227	211	201	196	191	203	182	217	233	215	271	281	281	264	273	263	231	232.6
27-Jan	196	217	217	281	269	264	284	271	289	271	279	273	269	255	264	296	306	306	247	254	248	224	297	277	271.1
28-Jan	223	77	211	252	216	236	228	241	238	210	218	232	206	144	171	181	179	153	144	107	202	162	255	272	212.0
29-Jan	270	262	268	241	265	271	277	268	208	224	221	208	203	293	299	269	246	260	272	247	273	285	231	253	258.6
30-Jan	253	240	222	198	226	202	247	264	293	287	23	32	13	7	329	347	16	22	13	9	11	3	2	2	349.9
31-Jan	4	16	14	12	19	24	7	225	277	223	281	209	196	248	273	310	298	288	300	323	309	319	339	347	334.9

243.9 290.3 239.4 259.1 287.5 260.8 280.0 265.2 250.4 249.2 277.8 265.7 261.1 255.8 210.9 240.8 228.9 233.7 255.1 261.0 256.2 249.0 269.6 243.3
 Diurnal Average

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

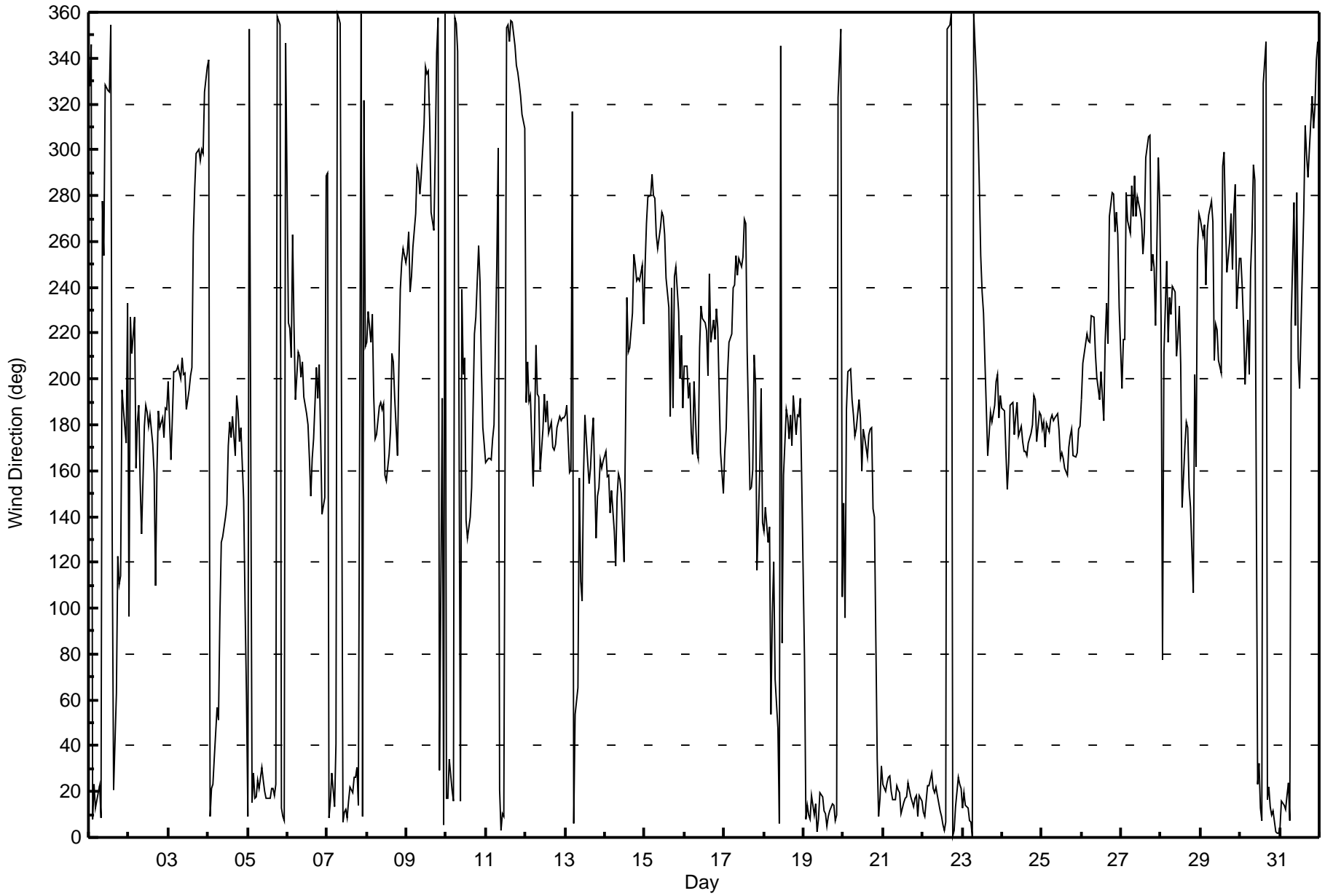
Wind Direction (WD) - deg
Mildred Lake - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 96 deg on Jan 1 14:00 Minimum Value: 7 deg on Jan 24 01:00 Percentiles: P ₁ = 9 P ₁₀ = 12 Q ₁ = 15 Median = 18 Q ₃ = 25 P ₉₀ = 41 P ₉₉ = 86																		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-Jan	25	12	15	17	18	15	16	22	60	51	11	16	17	96	42	43	76	14	21	54	74	63	26	37	96
2-Jan	60	27	40	91	46	23	26	22	17	64	16	24	17	20	18	18	16	25	18	12	15	32	28	16	91
3-Jan	40	43	28	11	26	16	10	16	23	20	12	17	24	25	36	41	23	16	15	17	15	15	19	15	43
4-Jan	20	17	23	17	22	20	18	25	30	20	18	17	18	15	35	25	12	15	16	12	13	32	25	20	35
5-Jan	22	11	16	19	17	17	15	17	20	21	16	16	18	18	21	18	18	20	12	12	12	15	13	40	40
6-Jan	43	23	22	46	40	23	20	28	23	19	23	15	13	10	16	19	12	13	11	10	77	22	53	67	77
7-Jan	74	13	20	28	17	28	14	12	12	12	14	17	15	18	18	19	18	17	17	15	10	10	38	12	74
8-Jan	15	13	14	28	27	19	9	23	16	13	16	12	13	12	18	13	17	15	32	31	21	21	21	24	32
9-Jan	23	25	27	23	23	27	16	20	17	19	76	10	9	8	14	49	18	66	8	22	86	43	87	19	87
10-Jan	59	29	15	16	14	28	10	41	37	76	19	20	28	15	19	16	14	18	31	22	23	23	13	12	76
11-Jan	12	10	9	10	14	16	74	35	22	16	17	17	15	16	12	15	12	11	13	12	9	9	12	77	77
12-Jan	17	15	19	18	21	19	12	16	21	14	16	13	15	13	16	16	13	13	12	16	15	18	18	17	21
13-Jan	18	10	67	74	68	54	32	21	25	28	17	25	15	14	15	14	17	38	14	16	13	11	16	17	74
14-Jan	11	15	14	16	10	16	16	30	29	17	14	30	39	20	28	21	29	36	27	24	21	19	21	25	39
15-Jan	23	20	19	19	19	18	23	26	21	22	20	20	26	76	23	55	31	20	33	25	33	12	17	24	76
16-Jan	20	30	32	21	24	19	13	17	14	34	24	22	21	35	44	37	20	27	15	26	17	14	30	14	44
17-Jan	15	44	20	17	19	22	42	25	33	21	24	25	20	23	44	48	22	16	23	86	33	28	16	10	86
18-Jan	17	29	18	18	32	36	64	24	31	15	15	79	87	65	43	47	30	11	9	13	18	23	66	35	87
19-Jan	84	49	19	15	16	15	16	16	15	15	16	17	15	16	14	17	18	18	16	15	16	29	20	45	84
20-Jan	55	62	15	25	15	18	15	15	13	14	28	27	14	17	17	13	13	18	19	54	22	14	15	17	62
21-Jan	16	18	18	16	18	18	16	16	17	18	17	16	17	16	17	17	18	17	16	16	15	16	17	16	18
22-Jan	15	15	16	17	18	18	18	16	17	16	18	18	14	14	16	17	13	13	13	12	17	16	16	15	18
23-Jan	15	15	19	16	13	12	12	19	18	18	25	25	29	26	28	14	16	15	13	9	11	12	11	12	29
24-Jan	7	11	17	23	20	16	13	16	14	13	15	17	13	10	10	11	11	12	14	13	14	17	9	9	23
25-Jan	16	18	13	14	14	13	11	13	12	13	15	11	11	13	12	13	10	11	13	9	11	11	10	12	18
26-Jan	9	14	20	20	16	16	18	14	14	16	12	18	17	18	24	29	45	24	17	19	23	23	32	29	45
27-Jan	62	16	63	23	31	41	22	31	23	21	19	19	23	24	35	29	23	19	24	20	22	49	84	52	84
28-Jan	37	87	22	20	22	23	28	25	27	18	16	26	42	21	15	25	18	13	65	65	66	32	36	24	87
29-Jan	27	23	25	24	28	22	19	23	39	19	20	23	37	24	19	30	22	28	29	24	31	85	38	17	85
30-Jan	21	23	24	22	15	19	26	20	18	19	32	19	21	18	19	12	18	16	14	15	16	15	15	15	32
31-Jan	17	17	16	14	18	16	11	78	32	19	71	22	28	83	90	21	21	21	16	25	16	16	16	12	90
84 87 67 91 68 54 74 78 60 76 76 79 87 96 90 55 76 66 65 86 86 85 87 77																									
Diurnal Maximum																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Mildred Lake - January 2017





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	January 11, 2017	Last Calibration	December 7, 2016
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	As Found		
Start Time (MST)	13:01	End Time (MST)	15:40
Gas Cert Reference	LL107930	Station temp.	22 Deg C
Cal Gas Concentration	51.2 ppm	Cal Gas Exp Date	2/19/2018
Calibrator Make/Model	API T700	Serial Number	1185
ZAG Make/Model	API 701	Serial Number	4767
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8790

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-653	-653
Analyzer IP address	192.168.1.43		Lamp voltage	810	809
Calculated slope	1.002813	0.997720	Chamber temp	45.1	45.3
Calculated intercept	1.271164	1.780685	Pressure	690.2	694.1
Analyzer Background	20.5	21.4	Flow	0.491	0.494
Analyzer Coefficient	0.977	0.977	Intensity	91	91

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	0.4	----
as found span	5000	76.4	782.3	783.6	0.998
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	76.4	782.3	783.6	0.998
second point	5000	38.3	392.2	389.4	1.007
third point	5000	19.2	196.6	194.1	1.013
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	76.4	782.3	783.6	0.998
Average Correction Factor					1.006

Corrected As found 783.2 Previous response 778.9 % change -0.6%

Notes:

Changed inlet filter after as founds. Adjusted the zero.

Calibration Performed By: Jayne Marcoux



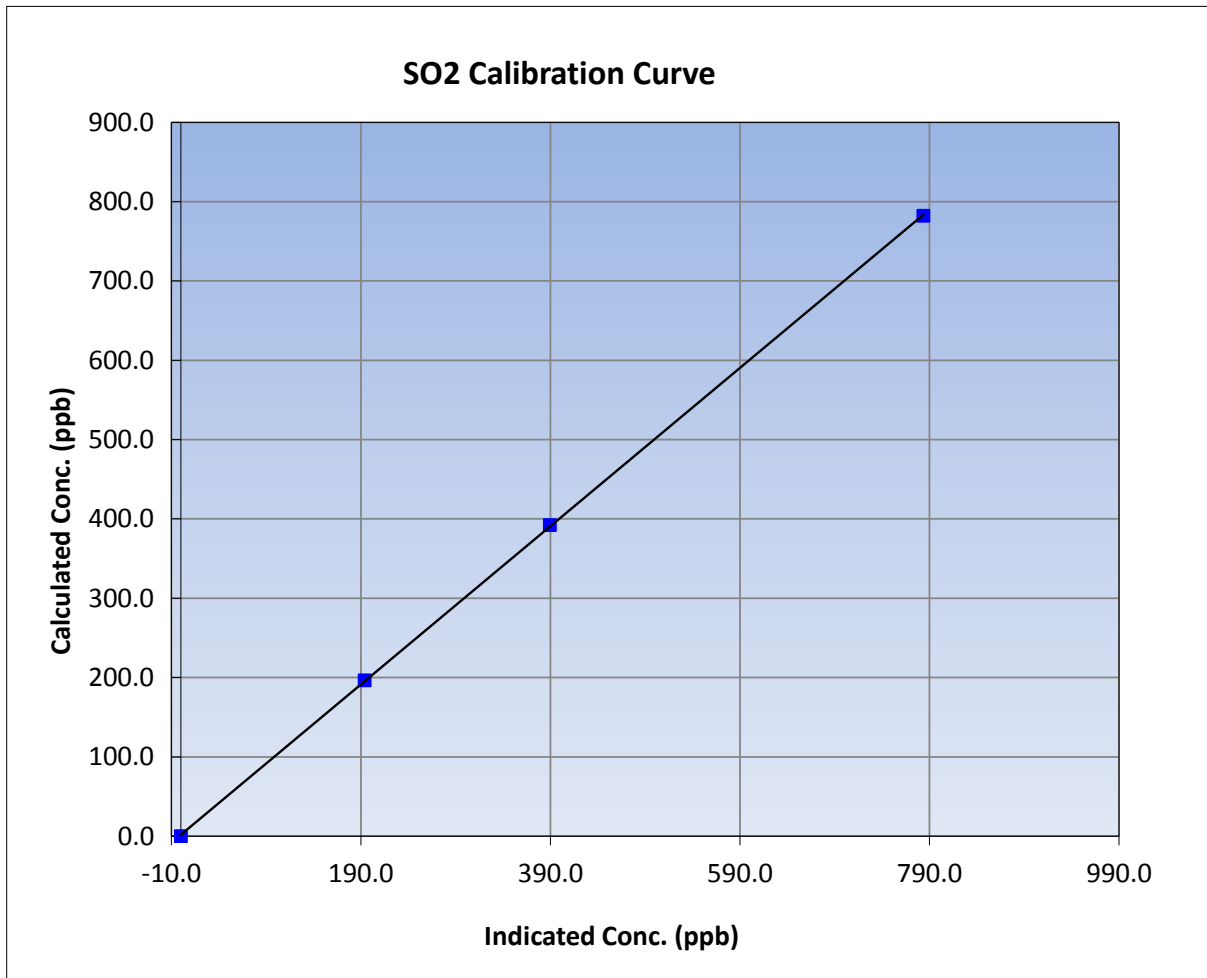
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 11, 2017	Previous Calibration	December 7, 2016
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	13:01	End Time (MST)	15:40
Analyzer make	TEI 43i	Analyzer serial #	JC1404901075

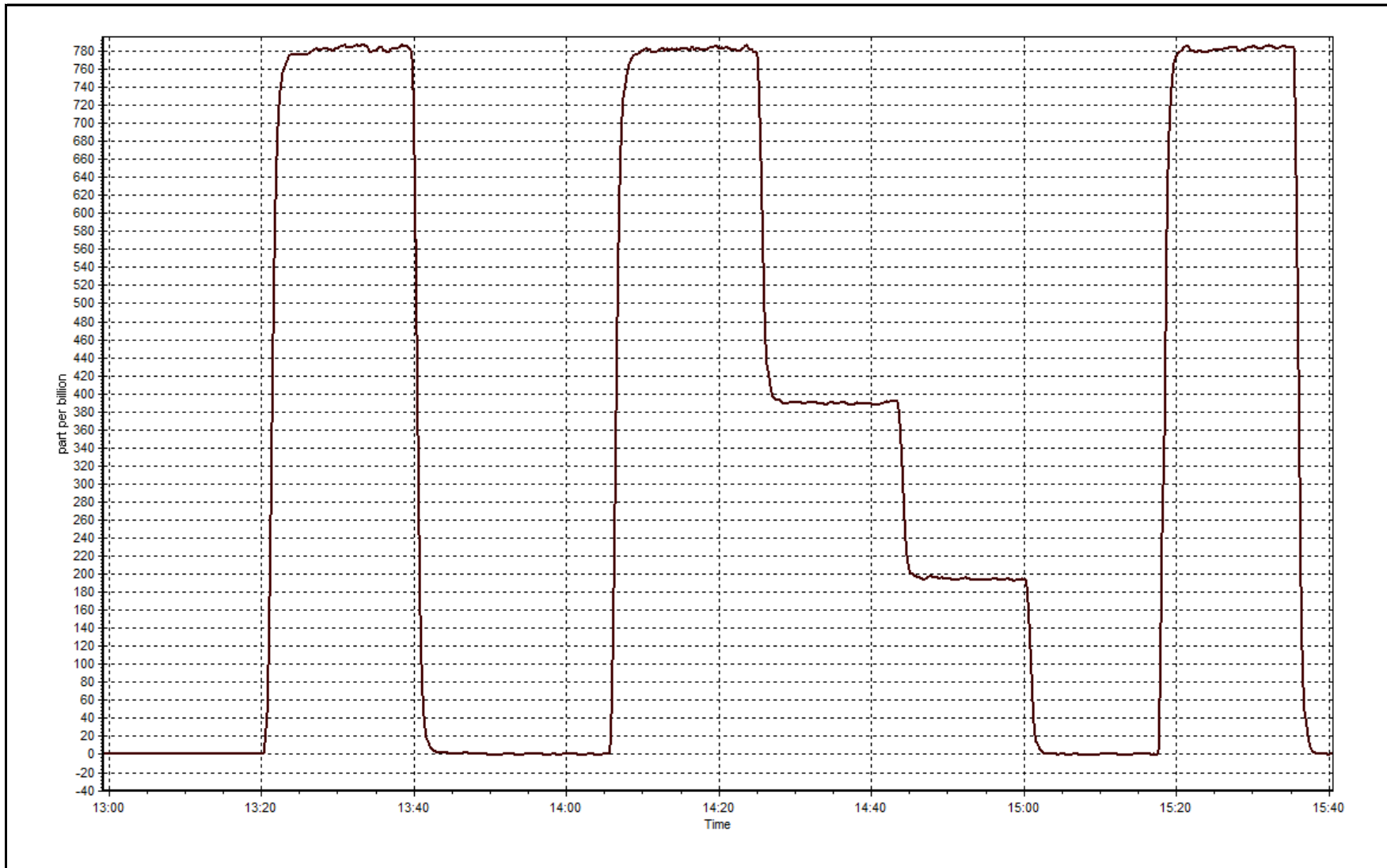
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999970
782.3	783.6	0.9984		
392.2	389.4	1.0072	Slope	0.997720
196.6	194.1	1.0129		
			Intercept	1.780685



SO2 Calibration Plot

Date: January 11, 2017





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	January 11, 2017	Last Calibration	December 6, 2016
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	10:19	End Time (MST)	13:08
Gas Cert Reference	ALM028262	Station temp.	22 Deg C
Cal Gas Concentration	5.04 ppm	Cal Gas Exp Date	September 9, 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	8790
SO2 gas concentration	51.2 ppm	SO2 gas cert/exp	LL107930 19-Feb-18

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	600	-601
Analyzer IP address	192.168.1.42		Lamp voltage	790	786
Calculated slope	1.016995	0.996136	Chamber temp	45	45
Calculated intercept	-0.262929	0.239303	Pressure	541.0	558.8
Analyzer Background	16.8	16.8	Flow	1.000	1.033
Analyzer Coefficient	0.967	0.967	Intensity	88	88
			Converter temp.	325	324

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	5000	0.0	0.0	0.0	----
as found span	5000	80.1	80.7	79.3	1.019
SO2 scrubber check	5000	19.2	196.6	2.2	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	80.1	80.7	81.0	0.997
second point	5000	40.1	40.4	40.1	1.008
third point	5000	20.1	20.3	19.9	1.019
as left zero	5000	0.0	0.0	0.4	----
as left span	5000	80.1	80.7	80.8	0.999
Average Correction Factor					1.008

Corrected As found	79.2	Previous response	79.7	% change	0.5%
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Notes:

Changed inlet filter after as founds. Completed scrubber check. Adjusted the span.

Calibration Performed By: Jayme Marcoux



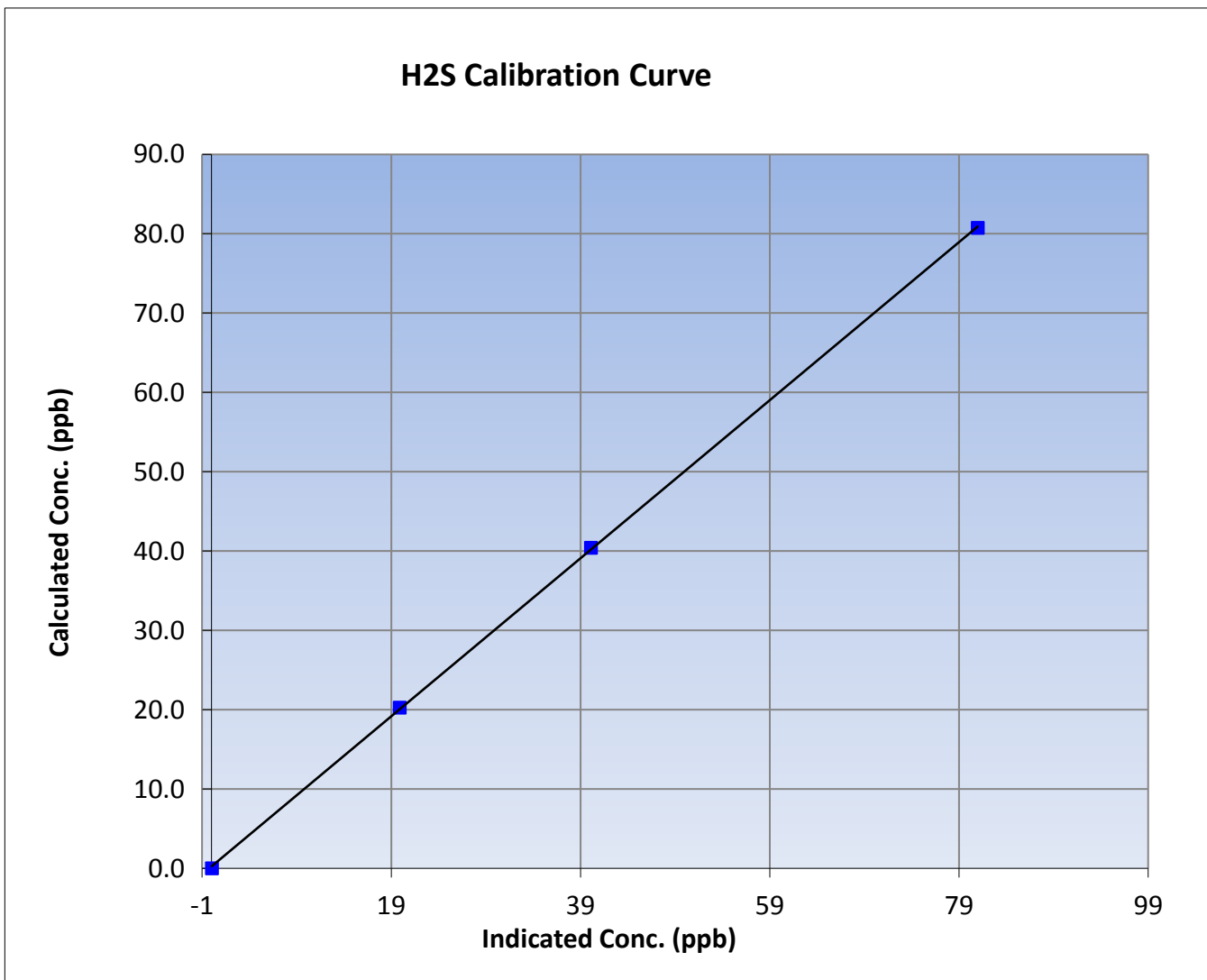
Wood Buffalo Environmental Association H2S Calibration Report

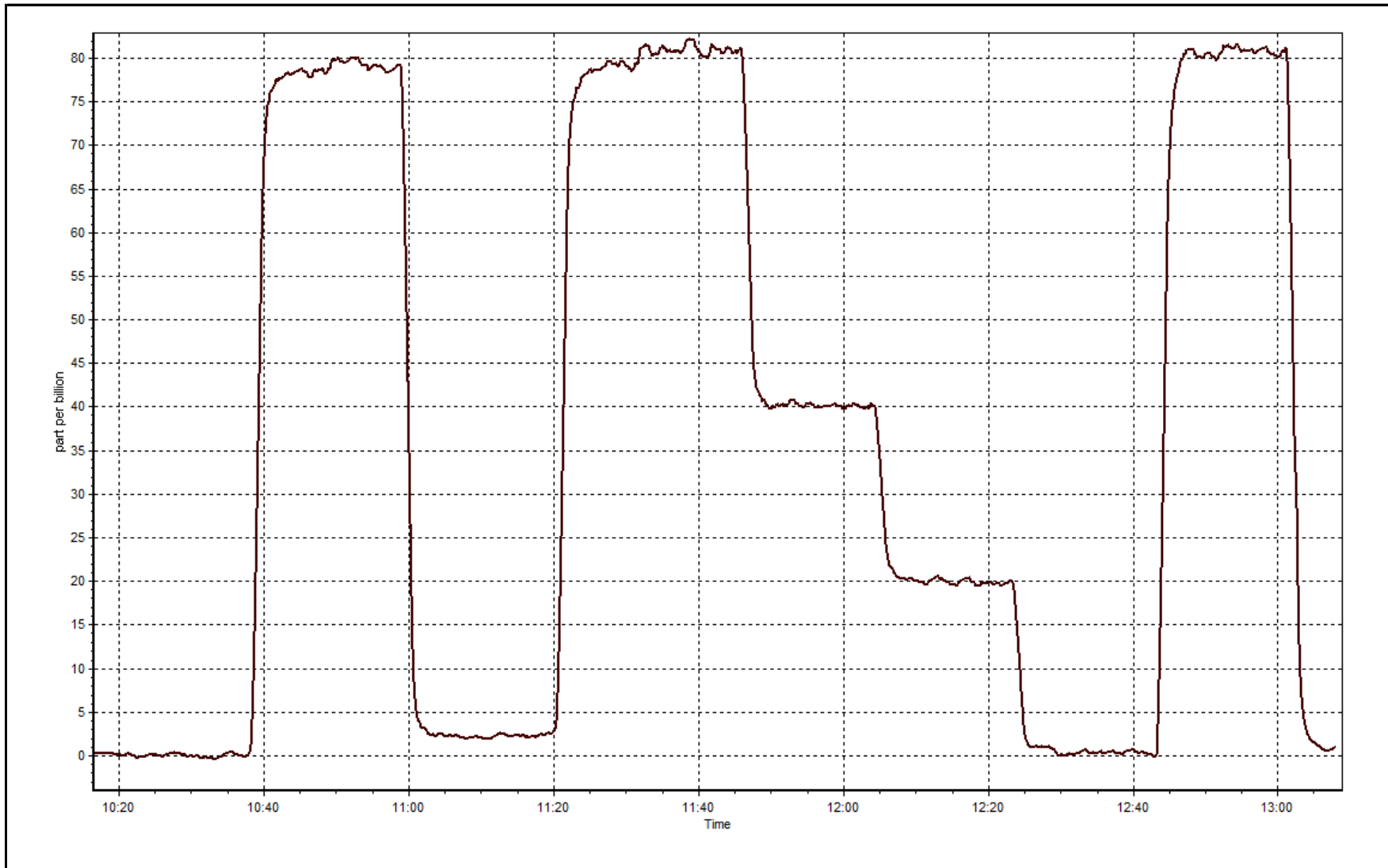
Station Information

Calibration Date	January 11, 2017	Previous Calibration	December 6, 2016
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	10:19	End Time (MST)	13:08
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	0.0	----	Correlation Coefficient	0.999943
80.7	81.0	0.9970		
40.4	40.1	1.0077	Slope	0.996136
20.3	19.9	1.0192		
			Intercept	0.239303







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	January 11, 2017	Last Calibration	December 8, 2016
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	<input type="checkbox"/> Other: <input checked="" type="checkbox"/> Maintenance		
Start Time (MST)	13:01	End Time (MST)	15:37
Gas Cert Reference	LL107930	Cal Gas Expiry Date	2/9/2018
CH4 Cal Gas Conc.	509 ppm	CH4 Equiv Conc.	1081.0 ppm
C3H8 Cal Gas Conc.	208 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	1185
ZAG make/model	Teledyne API 701	Serial Number	4767
DACS make/model	Campbell Scientific CR3000	Serial Number	8790

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	40.1	40.1
Calculated slope	1.000061	0.999490	Fuel Pressure	25.8	25.8
Calculated intercept	-0.030650	-0.009010	Analyzer Coeff	5.092	5.006
			Analyzer BKG	2.23	2.19

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	0.00	----
as found span	5000	76.4	16.52	16.78	0.984
calibrator zero	5000	0.0	0.00	0.01	----
high point	5000	76.4	16.52	16.54	0.999
second point	5000	38.3	8.28	8.28	1.000
third point	5000	19.2	4.15	4.17	0.995
as left zero	5000	0.0	0.00	0.02	----
as left span	5000	76.4	16.52	16.47	1.003
Average Correction Factor					0.998

Corrected As found: 16.78 Previous response: 16.55 % change: -1.4%

Notes:

Changed out inlet filter after as founds. Adjusted the span.

Calibration Performed By:

Jayne Marcoux



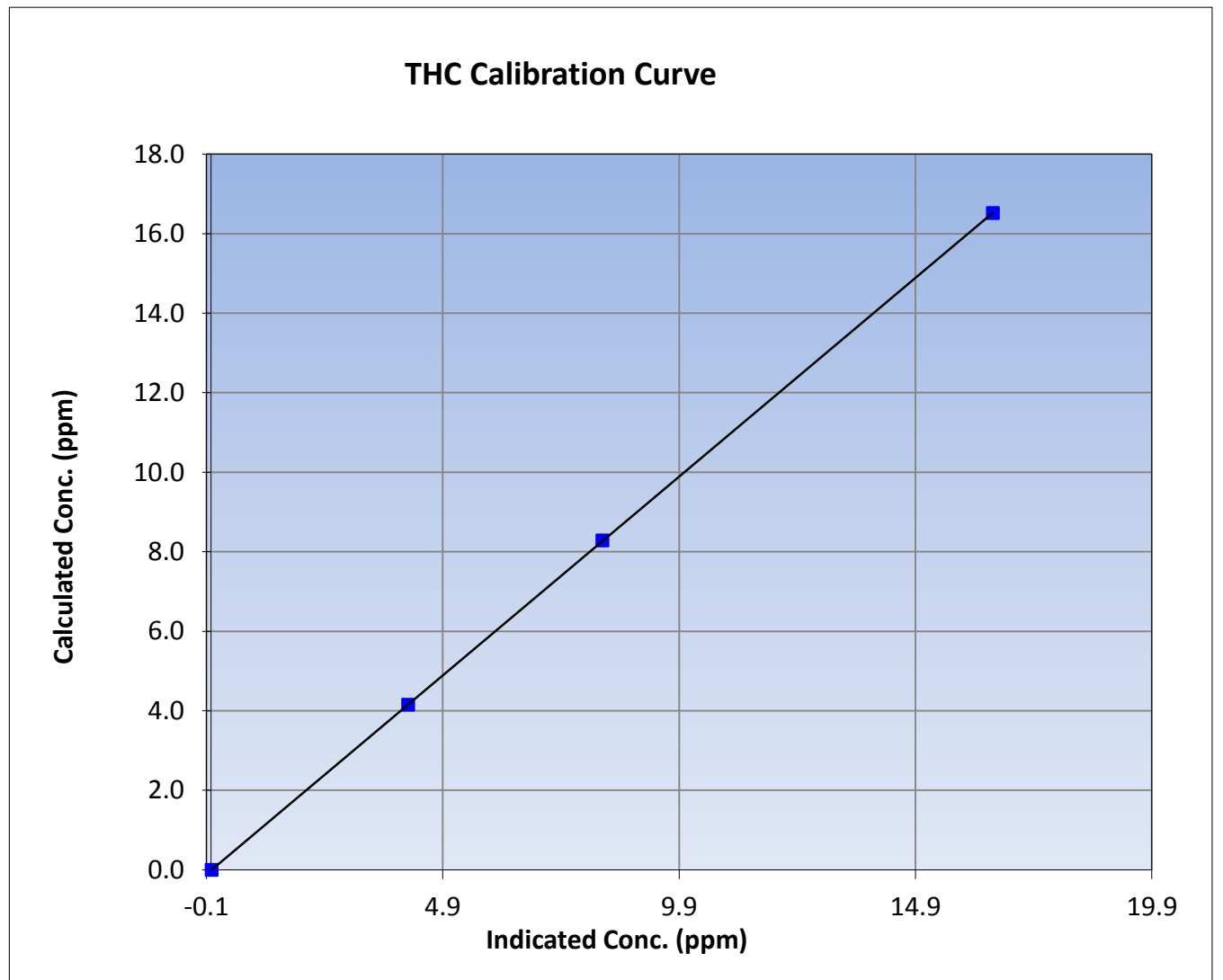
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	January 11, 2017	Previous Calibration	December 8, 2016
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	13:01	End Time (MST)	15:37
Analyzer make	Thermo 51i-LT	Analyzer serial #	1300156231

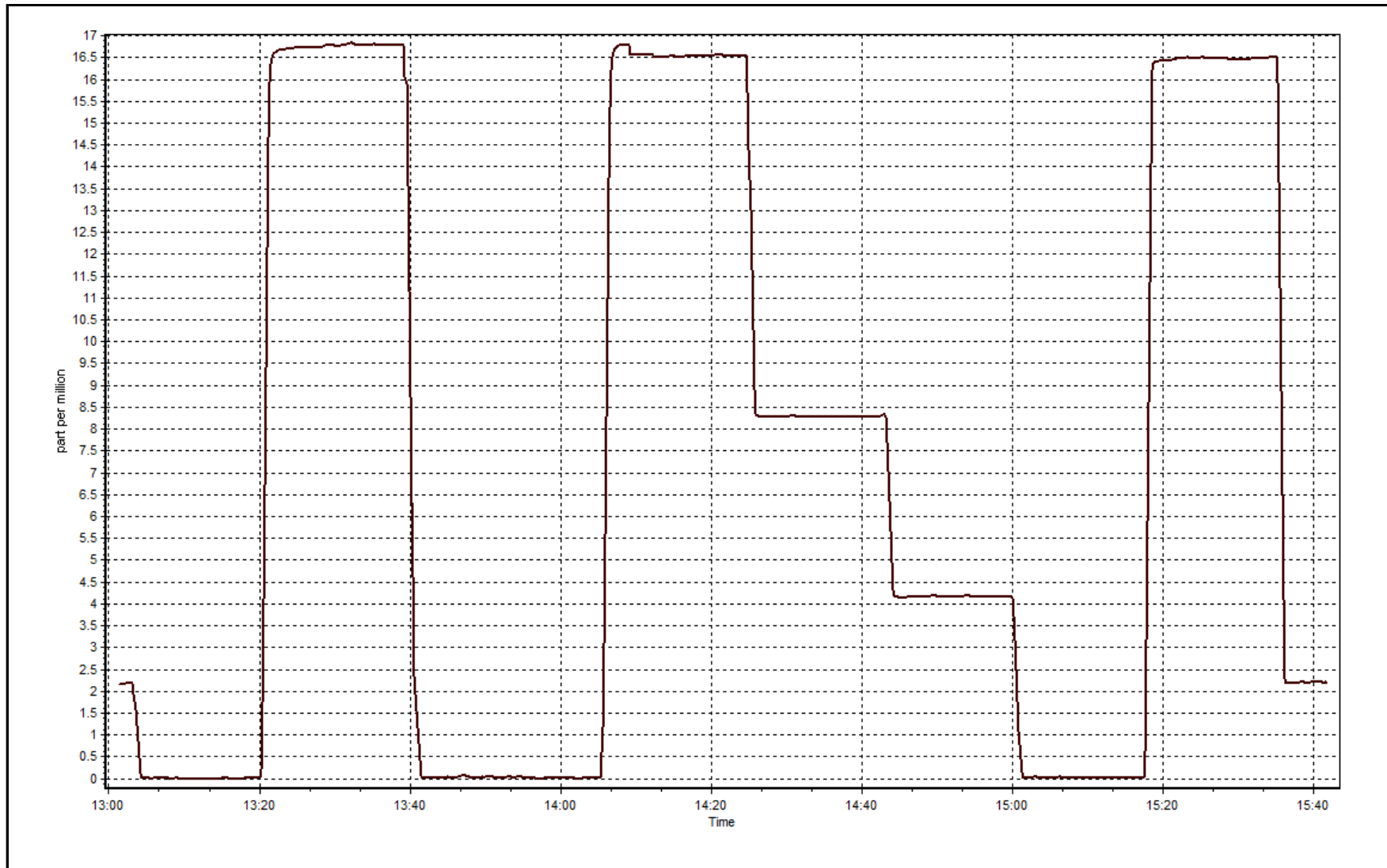
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	----	Correlation Coefficient	0.999998
16.52	16.54	0.9987		
8.28	8.28	1.0001	Slope	0.999490
4.15	4.17	0.9955		
			Intercept	-0.009010



THC Calibration Plot

Date: January 11, 2017





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 3
LOWER CAMP METEOROLOGY
JANUARY 2017**

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

February 27, 2017



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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
Temperature 20 m (C) Average	744	0	0	100.00	8	-	3.4	-
Temperature 45 m (C) Average	744	0	0	100.00	8.1	-	3.9	-
Temperature 100 m (C) Average	744	0	0	100.00	8.4	-	4.9	-
Temperature 167 m (C) Average	744	0	0	100.00	8.6	-	5.1	-
Relative Humidity 20 m (%) Average	744	0	0	100.00	97	-	93.0	-
Relative Humidity 45 m (%) Average	744	0	0	100.00	97	-	93.0	-
Relative Humidity 100 m (%) Average	744	0	0	100.00	95	-	93.0	-
Relative Humidity 167 m (%) Average	744	0	0	100.00	94	-	92.0	-
Wind Speed 20 m (km/h) Average	744	0	0	100.00	26	-	14.0	-
Wind Speed 45 m (km/h) Average	743	0	1	99.87	35	-	18.0	-
Wind Speed 100 m (km/h) Average	573	0	171	77.02	51	-	24.0	-
Wind Speed 167 m (km/h) Average	485	0	259	65.19	58	-	33.0	-
Wind Direction 20 m (deg) Average	744	0	0	100.00	-	-	-	-
Wind Direction 45 m (deg) Average	743	0	1	99.87	-	-	-	-
Wind Direction 100 m (deg) Average	573	0	171	77.02	-	-	-	-
Wind Direction 167 m (deg) Average	485	0	259	65.19	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	744	0	0	100.00	0.7	-	0.2	-
Vertical Wind Speed 45 m (km/h) Average	743	0	1	99.87	2.1	-	0.9	-
Vertical Wind Speed 100 m (km/h) Average	573	0	171	77.02	3.6	-	0.8	-
Vertical Wind Speed 167 m (km/h) Average	485	0	259	65.19	5	-	1.9	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
Temperature 20 m (C) Average	744	-12.62	10.4	-	-35.7	-26.4	-20.1	-13.6	-3.1	1.7	8
Temperature 45 m (C) Average	744	-12.29	10.3	-	-34.6	-26	-19.9	-13.6	-2.7	1.9	8.1
Temperature 100 m (C) Average	744	-11.3	10.2	-	-33.1	-24.1	-19.3	-12.7	-1.1	2.5	8.4
Temperature 167 m (C) Average	744	-10.93	10.3	-	-32.1	-23.5	-19	-12.4	-0.4	3.1	8.6
Relative Humidity 20 m (%) Average	744	79.1	8	-	49	71	74	80	84	89	97
Relative Humidity 45 m (%) Average	744	77.7	8	-	48	68	73	78	83	87	97
Relative Humidity 100 m (%) Average	744	77.6	9	-	47	66	72	79	84	89	95
Relative Humidity 167 m (%) Average	744	76.6	9	-	47	65	71	78	83	87	94
Wind Speed 20 m (km/h) Average	744	7.9	5	-	0	2	4	7	11	14	26
Wind Speed 45 m (km/h) Average	743	10.6	6	-	0	3	6	10	15	19	35
Wind Speed 100 m (km/h) Average	573	14	9	-	1	5	8	12	18	26	51
Wind Speed 167 m (km/h) Average	485	19	11	-	1	6	10	17	25	34	58
Wind Direction 20 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-
Wind Direction 100 m (deg) Average	573	-	-	-	-	-	-	-	-	-	-
Wind Direction 167 m (deg) Average	485	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	744	-0.02	0.2	-	-1.2	-0.3	-0.1	0	0.1	0.2	0.7
Vertical Wind Speed 45 m (km/h) Average	743	0.23	0.6	-	-1.6	-0.4	-0.2	0.1	0.6	1	2.1
Vertical Wind Speed 100 m (km/h) Average	573	0.27	0.5	-	-1.3	-0.2	0	0.1	0.5	0.9	3.6
Vertical Wind Speed 167 m (km/h) Average	485	0.75	0.9	-	-1.5	-0.1	0.2	0.6	1	1.9	5

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed. Wind Direction, Vertical Wind Speed 45 m	21 Jan 2017 13:00	21 Jan 2017 13:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 100 m	07 Jan 2017 05:00	07 Jan 2017 09:00	5	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 100 m	07 Jan 2017 12:00	07 Jan 2017 17:00	6	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 100 m	19 Jan 2017 10:00	20 Jan 2017 13:00	28	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 100 m	20 Jan 2017 23:00	26 Jan 2017 10:00	132	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	05 Jan 2017 10:00	05 Jan 2017 12:00	3	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	06 Jan 2017 11:00	06 Jan 2017 12:00	2	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	07 Jan 2017 04:00	11 Jan 2017 09:00	102	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	11 Jan 2017 11:00	11 Jan 2017 13:00	3	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	19 Jan 2017 05:00	19 Jan 2017 05:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	19 Jan 2017 07:00	20 Jan 2017 12:00	30	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	20 Jan 2017 23:00	25 Jan 2017 18:00	116	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	26 Jan 2017 03:00	26 Jan 2017 04:00	2	Flat line in sensor output signal - Sensor frozen



Wood Buffalo Environmental Association
Summary of Hour Averages

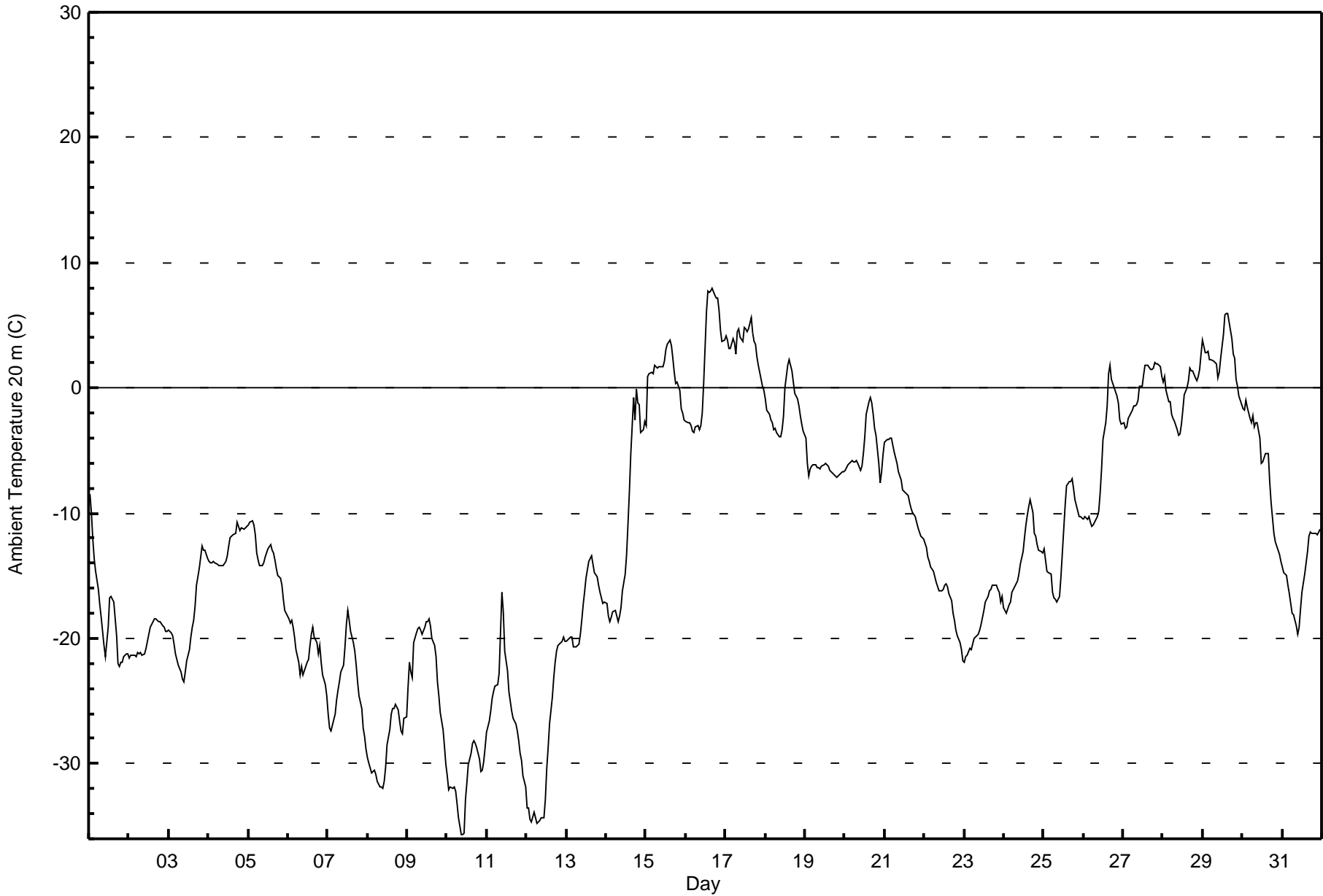
Ambient Temperature 20 m (AT20m) - C
Lower Camp Met Tower - January 2017

Maximum Value: 8.0 C on Jan 16 17:00 Maximum Daily Average: 3.4 C on Jan 17		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Minimum Value: -35.7 C on Jan 10 10:00 Maximum Diurnal Average: -10.3 C at hour 16 Monthly Average: -12.62 C		Minimum Daily Average: -31.3 C on Jan 10 Minimum Diurnal Average: -14.2 C at hour 8 Percentiles: P ₁ = -34.5 P ₁₀ = -26.4 Q ₁ = -20.1 Median = -13.6 Q ₃ = -3.1 P ₉₀ = 1.7 P ₉₉ = 7.1																								
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-Jan	-8.5	-9.9	-12.1	-13.6	-14.6	-16.1	-17.3	-18.3	-19.4	-20.5	-21.5	-19.1	-16.7	-16.6	-16.8	-17.1	-19.8	-22.0	-22.2	-21.9	-21.9	-21.4	-21.2	-21.3	-17.9	-8.5
2-Jan	-21.6	-21.4	-21.4	-21.4	-21.4	-21.1	-21.2	-21.1	-21.4	-21.2	-20.8	-20.3	-19.7	-19.1	-18.7	-18.4	-18.4	-18.6	-18.6	-18.7	-19.0	-19.1	-19.4	-19.4	-20.1	-18.4
3-Jan	-19.3	-19.6	-19.8	-20.4	-21.2	-21.7	-22.1	-22.7	-23.2	-23.5	-22.7	-21.8	-20.9	-19.9	-19.1	-18.6	-17.5	-15.8	-14.5	-13.6	-12.6	-13.0	-12.9	-13.6	-18.7	-12.6
4-Jan	-13.9	-14.0	-14.0	-13.9	-13.9	-14.1	-14.2	-14.2	-14.2	-14.2	-13.9	-13.4	-12.6	-12.0	-11.9	-11.7	-11.6	-10.8	-11.1	-11.4	-11.2	-11.3	-11.1	-11.1	-12.7	-10.8
5-Jan	-11.0	-10.7	-10.6	-10.9	-11.7	-13.1	-13.8	-14.2	-14.2	-13.9	-13.5	-13.2	-12.8	-12.5	-12.9	-13.2	-13.8	-14.4	-14.9	-15.1	-15.7	-16.9	-17.7	-18.0	-13.7	-10.6
6-Jan	-18.4	-18.8	-18.6	-19.2	-19.8	-20.9	-21.9	-22.9	-22.3	-22.9	-22.6	-21.9	-21.6	-20.6	-19.7	-19.2	-19.9	-20.4	-21.2	-20.5	-21.9	-23.0	-23.7	-24.6	-21.1	-18.4
7-Jan	-26.1	-27.2	-27.4	-27.0	-26.0	-24.9	-24.2	-23.5	-22.7	-22.1	-20.7	-18.9	-17.7	-18.5	-19.4	-20.3	-21.0	-22.1	-23.5	-24.6	-25.6	-27.1	-27.8	-28.9	-23.6	-17.7
8-Jan	-29.5	-30.0	-30.7	-30.6	-30.5	-30.9	-31.4	-31.8	-31.9	-31.9	-31.4	-30.3	-28.5	-27.2	-26.0	-25.6	-25.6	-25.2	-25.7	-26.6	-27.4	-27.6	-26.4	-26.2	-28.7	-25.2
9-Jan	-23.9	-21.9	-22.7	-23.1	-20.3	-19.5	-19.2	-19.1	-19.3	-19.6	-19.1	-18.6	-18.6	-18.5	-19.0	-20.0	-20.6	-21.5	-23.5	-24.6	-25.9	-27.3	-28.7	-30.1	-21.9	-18.5
10-Jan	-31.0	-32.1	-31.8	-32.0	-31.9	-32.2	-33.3	-34.4	-35.6	-35.7	-35.6	-32.8	-31.6	-30.0	-29.1	-28.4	-28.1	-28.4	-28.8	-29.6	-30.6	-30.5	-29.8	-28.7	-31.3	-28.1
11-Jan	-27.5	-26.6	-25.8	-24.8	-24.2	-23.9	-23.7	-22.8	-19.5	-16.3	-17.9	-21.0	-22.6	-24.3	-25.0	-25.8	-26.4	-26.8	-27.4	-28.1	-29.1	-29.8	-31.0	-31.8	-25.1	-16.3
12-Jan	-33.6	-33.5	-34.5	-34.7	-33.9	-34.3	-34.8	-34.7	-34.5	-34.3	-34.3	-32.9	-30.4	-28.7	-26.8	-24.7	-23.1	-21.9	-21.0	-20.5	-20.3	-20.3	-19.9	-20.3	-28.7	-19.9
13-Jan	-20.2	-20.1	-19.9	-19.9	-20.7	-20.7	-20.7	-20.4	-19.7	-18.5	-17.3	-16.3	-15.2	-13.8	-13.6	-13.4	-14.1	-14.7	-15.1	-15.7	-16.3	-16.8	-17.2	-17.1	-17.4	-13.4
14-Jan	-17.2	-18.2	-18.7	-18.3	-17.8	-17.8	-18.2	-18.6	-18.2	-17.5	-16.2	-14.9	-13.3	-10.8	-8.2	-5.2	-0.8	-2.6	-0.1	-1.2	-1.4	-3.5	-3.3	-2.7	-11.0	-0.1
15-Jan	-3.0	0.9	1.1	1.2	1.2	1.8	1.7	1.6	1.7	1.7	1.7	2.2	3.0	3.5	3.8	3.4	2.3	1.3	0.3	0.4	-0.2	-1.7	-2.0	-2.6	1.1	3.8
16-Jan	-2.7	-2.8	-2.8	-3.0	-3.5	-3.6	-3.1	-3.0	-3.3	-2.9	-2.0	0.3	6.1	7.7	7.7	7.8	8.0	7.3	7.1	7.2	6.2	4.6	3.8	3.9	1.9	8.0
17-Jan	4.1	3.8	3.1	3.2	3.9	3.7	2.7	4.5	4.8	4.1	3.7	4.8	4.7	4.5	4.8	5.6	4.4	3.7	3.5	2.5	1.8	0.7	0.2	-0.2	3.4	5.6
18-Jan	-0.9	-1.7	-2.1	-2.5	-2.8	-3.4	-3.3	-3.6	-3.9	-3.9	-3.4	-2.2	0.0	1.8	2.3	1.8	1.4	0.4	-0.5	-0.8	-1.4	-2.2	-2.9	-3.5	-1.5	2.3
19-Jan	-4.0	-6.1	-7.0	-6.5	-6.2	-6.2	-6.1	-6.4	-6.4	-6.4	-6.2	-6.1	-6.1	-6.1	-6.3	-6.6	-6.7	-6.9	-7.1	-7.1	-7.1	-6.9	-6.7	-6.7	-6.4	-4.0
20-Jan	-6.5	-6.3	-6.1	-6.0	-5.8	-5.9	-5.9	-5.8	-6.0	-6.5	-6.2	-5.2	-3.9	-2.1	-1.1	-0.7	-1.2	-2.1	-3.3	-3.8	-6.0	-7.6	-6.7	-5.3	-4.8	-0.7
21-Jan	-4.4	-4.1	-4.1	-4.0	-4.0	-4.5	-5.1	-6.0	-6.7	-7.0	-7.4	-8.1	-8.4	-8.5	-8.6	-9.1	-9.6	-10.0	-10.3	-10.8	-11.2	-11.5	-11.8	-12.1	-7.8	-4.0
22-Jan	-12.4	-12.8	-13.5	-13.8	-14.2	-14.7	-15.1	-15.6	-15.8	-16.2	-16.2	-16.1	-15.8	-15.7	-15.9	-16.4	-17.0	-18.0	-18.6	-19.3	-19.8	-20.3	-20.9	-21.7	-16.5	-12.4
23-Jan	-21.9	-21.4	-21.4	-20.8	-20.9	-20.5	-20.0	-19.9	-19.6	-19.3	-18.9	-18.3	-17.8	-17.1	-16.7	-16.2	-16.1	-15.8	-15.7	-15.8	-16.1	-16.3	-17.1	-16.6	-18.3	-15.7
24-Jan	-17.5	-18.0	-17.6	-17.3	-17.1	-16.3	-15.9	-15.6	-15.4	-14.9	-14.0	-13.1	-12.0	-11.0	-10.1	-9.5	-9.0	-10.0	-11.6	-11.9	-12.6	-12.9	-13.1	-13.1	-13.7	-9.0
25-Jan	-12.9	-13.8	-14.7	-14.7	-14.8	-16.3	-16.8	-16.8	-17.0	-16.7	-15.1	-13.2	-11.2	-9.4	-7.8	-7.5	-7.5	-7.3	-8.0	-8.9	-9.8	-10.2	-10.3	-10.4	-12.1	-7.3
26-Jan	-10.5	-10.3	-10.5	-10.3	-10.7	-11.0	-11.0	-10.5	-10.2	-9.9	-8.4	-6.5	-4.2	-2.8	-1.4	1.2	1.8	0.7	0.1	-0.3	-0.6	-1.2	-2.6	-2.9	-5.5	1.8
27-Jan	-2.8	-3.2	-3.1	-2.5	-2.3	-1.7	-1.5	-1.4	-1.3	-1.0	0.1	0.1	1.1	1.9	1.8	1.8	1.4	1.5	1.6	2.0	1.9	1.9	1.7	0.9	0.0	2.0
28-Jan	0.5	0.9	-0.2	-1.2	-1.1	-2.1	-2.4	-2.7	-3.3	-3.8	-3.6	-2.9	-1.8	-0.5	0.0	0.6	1.5	1.4	1.4	0.8	0.6	1.0	1.4	2.7	-0.5	2.7
29-Jan	3.8	2.9	2.8	2.9	2.3	2.2	2.1	2.0	2.0	0.8	1.2	2.4	4.3	5.8	5.9	5.9	5.3	4.0	2.7	2.3	0.7	0.2	-0.7	-1.3	2.6	5.9
30-Jan	-1.7	-1.8	-0.9	-1.5	-2.5	-2.7	-2.2	-3.1	-2.8	-2.7	-4.0	-6.0	-5.9	-5.6	-5.3	-5.3	-7.5	-9.1	-10.4	-11.6	-12.3	-13.0	-13.3	-13.9	-6.1	-0.9
31-Jan	-14.3	-14.7	-15.0	-15.7	-16.4	-17.2	-18.0	-18.2	-19.0	-19.6	-19.1	-17.6	-16.3	-14.8	-13.9	-13.0	-11.8	-11.5	-11.6	-11.6	-11.6	-11.8	-11.6	-11.3	-14.8	-11.3
	-13.2	-13.3	-13.5	-13.6	-13.6	-13.9	-14.1	-14.2	-14.2	-14.1	-13.7	-12.9	-11.8	-11.0	-10.6	-10.3	-10.3	-10.8	-11.2	-11.6	-12.1	-12.7	-13.0	-13.2	Diurnal Average	
	4.1	3.8	3.1	3.2	3.9	3.7	2.7	4.5	4.8	4.1	3.7	4.8	6.1	7.7	7.7	7.8	8.0	7.3	7.1	7.2	6.2	4.6	3.8	3.9	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	189	25.40	25.40
-20 - 0	443	59.54	84.95
0 - 10	112	15.05	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

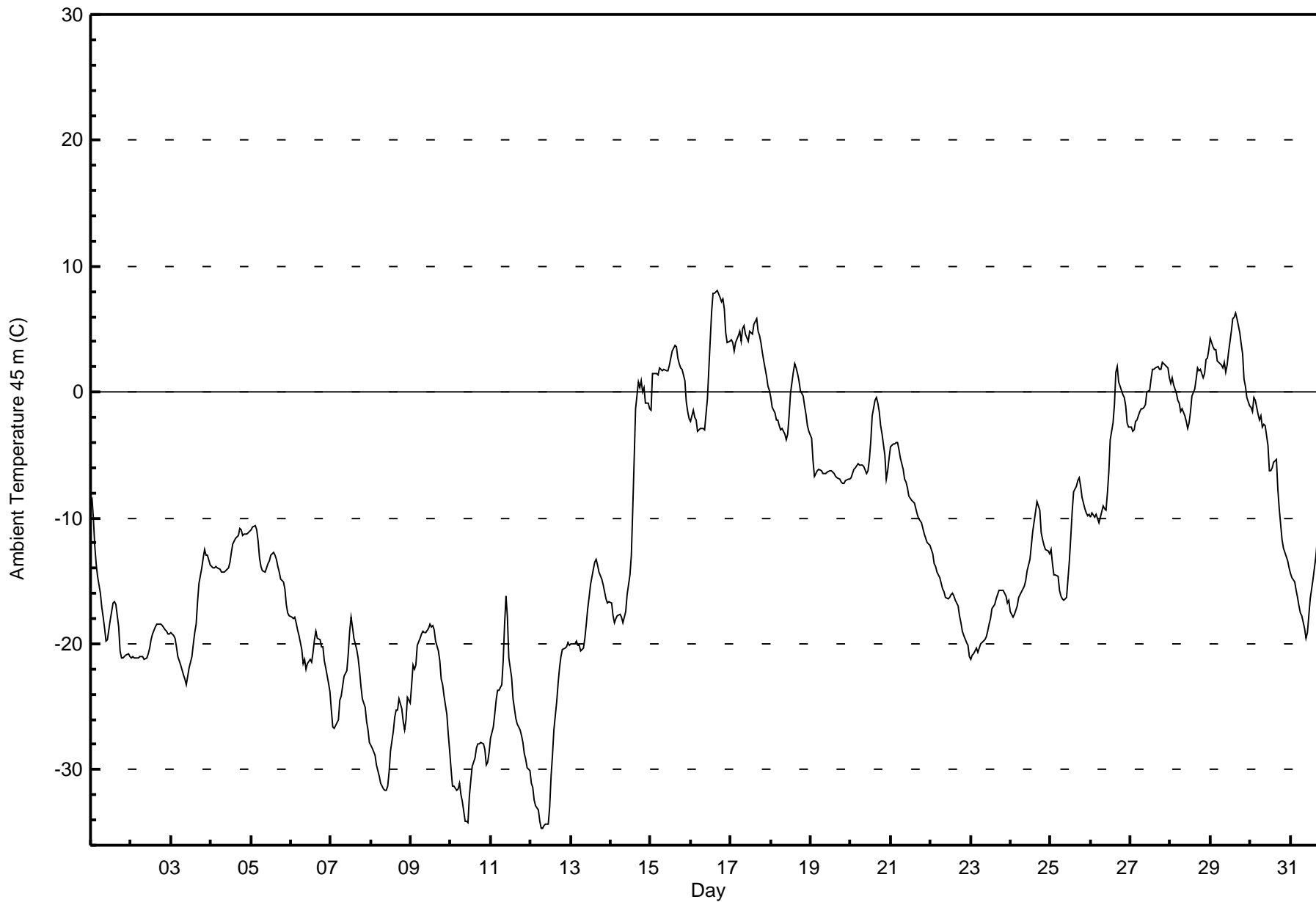
Ambient Temperature 45 m (AT45m) - C
Lower Camp Met Tower - January 2017

Maximum Value: 8.1 C on Jan 16 17:00		Maximum Daily Average: 3.9 C on Jan 17		Hours in Service: 744																																												
Minimum Value: -34.6 C on Jan 12 07:00		Minimum Daily Average: -30.5 C on Jan 10		Hours of Data: 744																																												
Maximum Diurnal Average: -10.0 C at hour 16		Minimum Diurnal Average: -13.8 C at hour 9		Hours of Missing Data: 0																																												
Monthly Average: -12.29 C		Percentiles: P ₁ = -34.1 P ₁₀ = -26.0 Q ₁ = -19.9 Median = -13.6 Q ₃ = -2.7 P ₉₀ = 1.9 P ₉₉ = 7.1		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-Jan	-8.4	-10.0	-12.1	-13.6	-14.6	-16.0	-17.1	-17.9	-18.7	-19.7	-19.7	-18.1	-17.5	-16.7	-16.6	-16.8	-18.6	-20.6	-21.1	-21.1	-21.1	-20.9	-20.8	-21.0	-17.4	-8.4																						
2-Jan	-21.1	-21.1	-21.1	-21.1	-21.1	-21.0	-21.0	-21.0	-21.3	-21.2	-20.8	-20.3	-19.7	-19.2	-18.7	-18.4	-18.4	-18.4	-18.5	-18.5	-18.9	-19.0	-19.3	-19.2	-19.9	-18.4																						
3-Jan	-19.1	-19.4	-19.5	-20.3	-21.0	-21.3	-21.7	-22.5	-22.8	-23.2	-22.6	-21.9	-21.0	-20.0	-19.2	-18.4	-16.6	-15.2	-14.0	-13.1	-12.6	-13.0	-13.0	-13.7	-18.5	-12.6																						
4-Jan	-13.9	-14.0	-13.9	-13.8	-13.9	-14.1	-14.3	-14.3	-14.3	-14.2	-14.0	-13.5	-12.7	-12.1	-11.9	-11.6	-11.4	-10.8	-11.0	-11.3	-11.3	-11.2	-11.1	-12.7	-10.8																							
5-Jan	-11.0	-10.7	-10.6	-11.0	-11.8	-13.2	-13.8	-14.2	-14.3	-14.0	-13.7	-13.4	-13.0	-12.7	-13.0	-13.3	-13.8	-14.4	-14.8	-15.1	-15.7	-16.8	-17.5	-17.8	-13.7	-10.6																						
6-Jan	-17.9	-18.0	-17.9	-18.3	-18.9	-19.3	-20.5	-21.5	-21.2	-22.0	-21.6	-21.3	-21.4	-20.6	-19.6	-19.0	-19.5	-19.6	-20.2	-20.2	-21.3	-21.9	-23.2	-23.9	-20.4	-17.9																						
7-Jan	-25.3	-26.6	-26.7	-26.5	-26.0	-24.4	-24.1	-23.3	-22.6	-22.1	-20.7	-19.0	-17.9	-18.7	-19.5	-20.4	-21.1	-22.2	-23.4	-24.3	-25.0	-26.2	-26.8	-27.8	-23.4	-17.9																						
8-Jan	-28.0	-28.3	-28.8	-29.7	-30.0	-30.5	-31.1	-31.5	-31.6	-31.7	-31.3	-30.2	-28.5	-27.0	-25.8	-25.3	-25.3	-24.4	-25.1	-26.2	-26.8	-26.0	-24.2	-24.7	-28.0	-24.2																						
9-Jan	-23.2	-21.6	-22.0	-21.7	-20.1	-19.5	-19.2	-19.0	-19.1	-19.1	-18.8	-18.5	-18.6	-18.5	-18.8	-19.7	-20.5	-21.3	-22.8	-23.3	-24.2	-25.6	-27.2	-28.6	-21.3	-18.5																						
10-Jan	-30.0	-31.3	-31.3	-31.6	-31.5	-31.1	-32.0	-32.6	-34.1	-34.1	-34.3	-32.1	-30.9	-29.7	-29.1	-28.3	-28.0	-28.0	-27.8	-28.0	-28.4	-29.6	-29.4	-28.6	-30.5	-27.8																						
11-Jan	-27.5	-26.6	-25.6	-24.5	-23.7	-23.7	-23.2	-21.4	-18.4	-16.2	-17.9	-21.2	-22.7	-24.4	-25.1	-25.9	-26.4	-26.8	-27.3	-27.9	-28.7	-29.2	-29.8	-30.1	-24.8	-16.2																						
12-Jan	-31.1	-31.4	-32.4	-32.8	-33.2	-34.1	-34.6	-34.6	-34.4	-34.3	-34.4	-32.9	-30.5	-28.8	-26.8	-24.6	-23.1	-21.9	-21.0	-20.5	-20.3	-20.2	-19.9	-20.2	-28.3	-19.9																						
13-Jan	-20.0	-20.0	-20.0	-19.7	-20.1	-20.1	-20.5	-20.3	-19.6	-18.5	-17.2	-16.3	-15.3	-14.0	-13.6	-13.3	-13.7	-14.3	-14.8	-15.3	-15.9	-16.4	-16.8	-16.6	-17.2	-13.3																						
14-Jan	-16.7	-17.7	-18.3	-17.9	-17.7	-17.7	-17.8	-18.3	-17.9	-17.5	-16.1	-14.5	-12.9	-9.3	-5.4	-1.3	0.8	0.3	0.9	0.0	0.4	-0.9	-0.9	-1.3	-9.9	0.9																						
15-Jan	-1.4	1.4	1.5	1.5	1.4	1.9	1.8	1.7	1.8	1.7	1.7	2.1	2.7	3.3	3.7	3.6	2.7	2.2	1.9	1.8	0.9	-0.7	-1.5	-2.1	1.5	3.7																						
16-Jan	-2.3	-1.5	-2.0	-2.2	-3.1	-3.0	-2.9	-2.8	-2.9	-1.8	-0.5	1.9	6.4	7.8	7.8	8.0	8.1	7.6	7.2	7.3	6.6	4.7	4.0	4.0	2.3	8.1																						
17-Jan	4.2	3.9	3.3	3.9	4.5	4.8	4.0	5.1	5.3	4.6	4.0	4.9	4.7	4.6	5.4	5.9	4.8	4.4	3.9	3.2	2.5	1.3	0.5	0.1	3.9	5.9																						
18-Jan	-0.4	-1.2	-1.7	-2.2	-2.2	-2.7	-3.0	-2.8	-3.4	-3.8	-3.3	-1.9	-0.1	1.6	2.3	1.9	1.5	0.9	0.1	-0.3	-1.1	-1.8	-2.6	-3.1	-1.2	2.3																						
19-Jan	-3.7	-5.5	-6.7	-6.5	-6.2	-6.2	-6.2	-6.4	-6.4	-6.5	-6.3	-6.3	-6.2	-6.3	-6.5	-6.7	-6.8	-6.9	-7.1	-7.2	-7.2	-7.1	-6.9	-6.9	-6.4	-3.7																						
20-Jan	-6.8	-6.5	-6.1	-6.0	-5.7	-5.8	-5.8	-5.8	-5.9	-6.5	-6.2	-5.3	-3.9	-1.9	-0.7	-0.4	-0.9	-1.6	-2.7	-3.3	-5.0	-7.0	-6.3	-5.2	-4.6	-0.4																						
21-Jan	-4.4	-4.2	-4.1	-4.0	-4.0	-4.6	-5.2	-6.1	-6.9	-7.1	-7.5	-8.3	-8.6	-8.7	-8.8	-9.2	-9.7	-10.0	-10.4	-10.9	-11.3	-11.6	-11.9	-12.2	-7.9	-4.0																						
22-Jan	-12.5	-12.9	-13.6	-13.9	-14.3	-14.8	-15.2	-15.7	-15.9	-16.3	-16.4	-16.3	-16.1	-16.0	-16.1	-16.6	-16.9	-17.8	-18.3	-19.0	-19.3	-19.9	-20.1	-21.0	-16.5	-12.5																						
23-Jan	-21.2	-20.9	-20.8	-20.4	-20.7	-20.4	-20.0	-19.9	-19.7	-19.4	-19.0	-18.4	-18.0	-17.3	-16.9	-16.4	-16.1	-15.8	-15.7	-15.7	-16.0	-16.2	-16.8	-16.5	-18.3	-15.7																						
24-Jan	-17.5	-17.9	-17.6	-17.3	-17.0	-16.3	-15.8	-15.7	-15.4	-14.9	-14.1	-13.3	-12.2	-11.1	-10.3	-9.5	-8.7	-9.4	-11.2	-11.7	-12.2	-12.5	-12.7	-12.9	-13.6	-8.7																						
25-Jan	-12.5	-13.6	-14.5	-14.5	-14.6	-15.8	-16.3	-16.4	-16.5	-16.3	-14.9	-13.4	-11.5	-9.4	-8.0	-7.5	-7.1	-6.8	-7.5	-8.3	-9.3	-9.6	-9.8	-9.7	-11.8	-6.8																						
26-Jan	-9.9	-9.7	-10.0	-9.7	-10.1	-10.3	-9.9	-9.1	-9.3	-9.4	-8.1	-6.4	-3.8	-2.4	-1.0	1.6	2.0	0.8	0.2	-0.2	-0.5	-1.1	-2.4	-2.8	-5.1	2.0																						
27-Jan	-2.7	-3.1	-3.0	-2.3	-2.2	-1.5	-1.3	-1.3	-1.3	-0.9	0.1	0.1	1.1	1.8	1.8	1.9	2.0	1.8	1.9	2.4	2.2	2.1	1.9	1.1	0.1	2.4																						
28-Jan	0.7	1.2	0.6	-0.1	-0.7	-0.9	-1.5	-1.3	-1.9	-2.3	-2.9	-2.5	-1.5	-0.3	0.2	1.0	2.0	1.7	1.8	1.1	1.5	2.6	2.7	3.3	0.2	3.3																						
29-Jan	4.2	3.6	3.4	3.3	2.5	2.4	2.2	2.0	2.3	1.6	2.2	3.1	4.8	5.8	5.9	6.3	5.9	4.7	3.8	3.1	1.1	0.5	-0.5	-1.1	3.0	6.3																						
30-Jan	-1.3	-1.5	-0.4	-0.7	-1.8	-2.2	-1.9	-2.7	-2.6	-2.7	-4.2	-6.2	-6.2	-6.0	-5.6	-5.4	-7.7	-9.2	-10.5	-11.7	-12.4	-13.0	-13.4	-14.0	-6.0	-0.4																						
31-Jan	-14.4	-14.7	-15.0	-15.7	-16.3	-17.0	-17.6	-17.7	-18.8	-19.5	-19.2	-17.8	-16.4	-14.9	-14.0	-13.1	-11.8	-11.5	-11.4	-11.4	-11.4	-11.5	-11.2	-11.0	-14.7	-11.0																						
																								-12.7	-12.9	-13.1	-13.2	-13.4	-13.5	-13.7	-13.8	-13.8	-13.8	-13.5	-12.8	-11.9	-11.0	-10.4	-10.0	-10.1	-10.4	-10.8	-11.2	-11.6	-12.2	-12.5	-12.7	Diurnal Average
																								4.2	3.9	3.4	3.9	4.5	4.8	4.0	5.1	5.3	4.6	4.0	4.9	6.4	7.8	7.8	8.0	8.1	7.6	7.2	7.3	6.6	4.7	4.0	4.0	Diurnal Maximum



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	182	24.46	24.46
-20 - 0	442	59.41	83.87
0 - 10	120	16.13	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

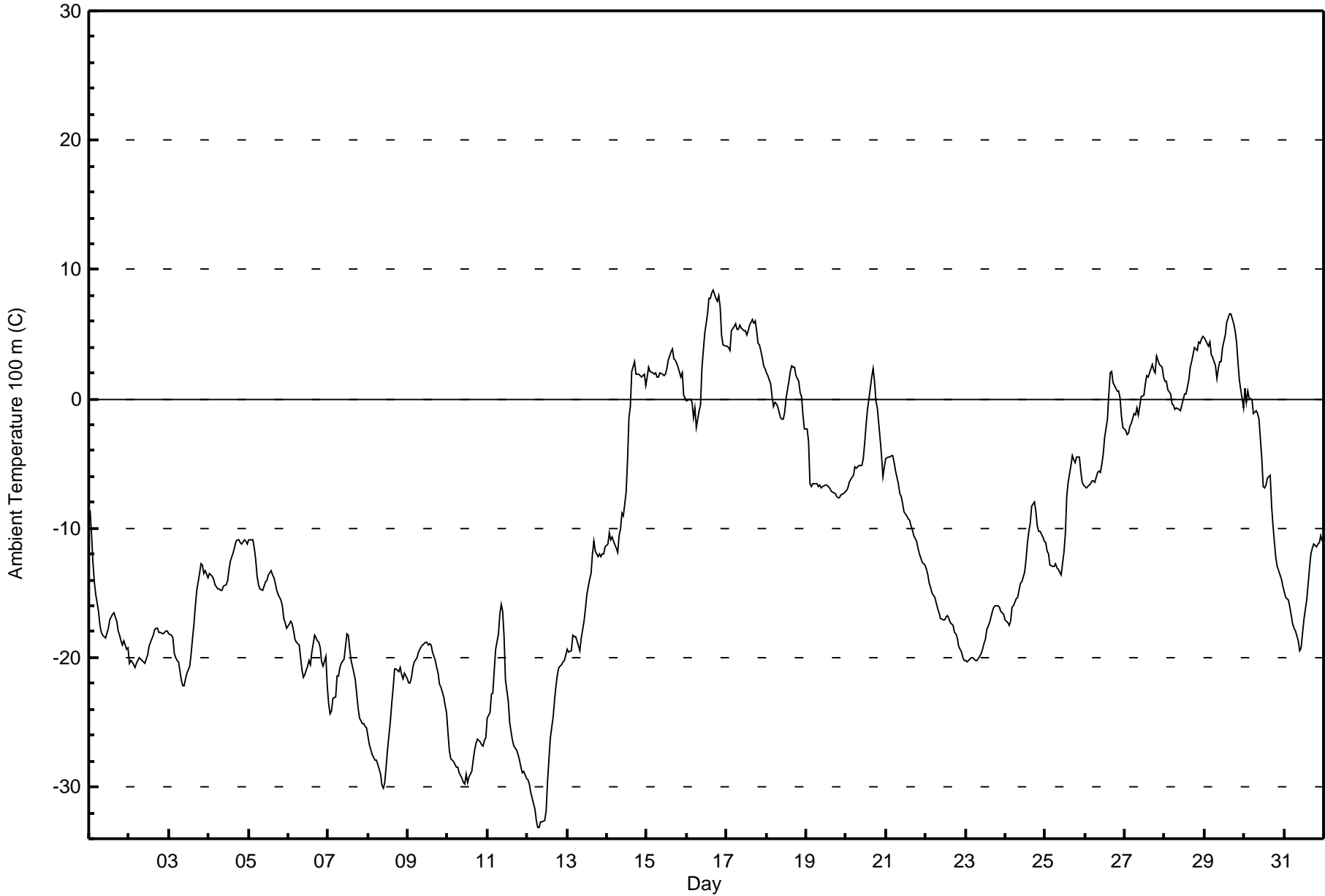


Maximum Value: 8.4 C on Jan 16 17:00		Maximum Daily Average: 4.9 C on Jan 17		Hours in Service: 744																						
Minimum Value: -33.1 C on Jan 12 08:00		Minimum Daily Average: -27.9 C on Jan 10		Hours of Data: 744																						
Maximum Diurnal Average: -9.4 C at hour 17		Minimum Diurnal Average: -12.6 C at hour 9		Hours of Missing Data: 0																						
Monthly Average: -11.30 C		Percentiles: P ₁ = -31.8 P ₁₀ = -24.1 Q ₁ = -19.3 Median = -12.7 Q ₃ = -1.1 P ₉₀ = 2.5 P ₉₉ = 7.3		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-Jan	-8.6	-10.5	-12.7	-14.1	-15.2	-16.4	-17.5	-18.1	-18.3	-18.3	-18.5	-17.7	-17.1	-16.9	-16.7	-16.5	-17.2	-18.0	-18.3	-18.7	-19.0	-18.7	-19.3	-19.3	-16.7	-8.6
2-Jan	-20.5	-20.2	-20.3	-20.8	-20.5	-20.2	-20.0	-20.1	-20.2	-20.4	-20.1	-19.8	-19.2	-18.9	-18.3	-17.9	-17.7	-17.8	-18.0	-18.1	-18.2	-18.1	-17.9	-18.0	-19.2	-17.7
3-Jan	-18.1	-18.3	-18.5	-19.7	-20.0	-20.2	-20.4	-21.7	-22.1	-22.1	-21.7	-21.2	-20.6	-19.6	-18.5	-17.4	-16.0	-14.8	-13.5	-12.7	-12.9	-13.5	-13.3	-13.8	-17.9	-12.7
4-Jan	-13.5	-13.6	-13.8	-14.0	-14.4	-14.7	-14.7	-14.8	-14.8	-14.5	-14.4	-14.1	-13.1	-12.5	-12.2	-11.8	-11.0	-10.9	-10.9	-11.2	-11.3	-10.9	-11.0	-11.2	-12.9	-10.9
5-Jan	-10.9	-10.9	-10.9	-11.5	-12.4	-13.8	-14.3	-14.7	-14.8	-14.4	-14.2	-14.1	-13.6	-13.3	-13.6	-13.8	-14.3	-14.7	-15.1	-15.5	-16.0	-16.9	-17.3	-17.7	-14.1	-10.9
6-Jan	-17.4	-17.2	-17.4	-18.0	-18.6	-18.8	-19.1	-20.0	-21.0	-21.5	-21.3	-20.6	-20.2	-20.5	-19.6	-18.9	-18.3	-18.8	-18.8	-19.3	-20.3	-20.6	-19.9	-22.2	-19.5	-17.2
7-Jan	-23.6	-24.3	-24.1	-23.2	-23.0	-21.4	-21.5	-20.7	-20.4	-20.1	-19.1	-18.1	-18.3	-19.4	-20.2	-21.2	-21.7	-22.8	-23.9	-24.7	-25.1	-25.1	-25.3	-25.5	-22.2	-18.1
8-Jan	-26.0	-26.8	-27.5	-27.8	-27.9	-27.9	-28.2	-29.0	-29.9	-30.1	-29.7	-28.4	-27.1	-24.9	-23.5	-22.2	-20.8	-20.8	-21.1	-20.7	-21.3	-21.6	-21.2	-21.6	-25.3	-20.7
9-Jan	-22.0	-22.0	-21.5	-20.8	-20.3	-20.1	-19.6	-19.3	-19.2	-19.1	-18.8	-18.8	-19.0	-18.9	-19.0	-19.6	-20.3	-20.8	-21.2	-22.1	-22.3	-23.0	-23.7	-24.2	-20.6	-18.8
10-Jan	-25.7	-27.2	-27.8	-28.1	-28.3	-28.4	-28.5	-29.0	-29.4	-29.6	-29.8	-29.1	-29.6	-29.2	-28.8	-28.0	-27.2	-26.7	-26.3	-26.5	-26.8	-26.8	-26.4	-26.2	-27.9	-25.7
11-Jan	-24.7	-24.2	-22.8	-22.7	-21.0	-19.4	-18.2	-16.7	-15.9	-16.4	-18.3	-21.8	-23.3	-25.0	-25.8	-26.4	-26.9	-27.1	-27.5	-27.9	-28.5	-28.9	-28.8	-29.4	-23.6	-15.9
12-Jan	-29.5	-29.8	-30.5	-30.8	-31.7	-32.6	-33.1	-33.1	-32.7	-32.7	-32.6	-31.8	-29.5	-27.8	-26.2	-24.5	-23.2	-22.2	-21.3	-20.7	-20.5	-20.4	-20.3	-19.8	-27.4	-19.8
13-Jan	-19.4	-19.6	-19.5	-18.3	-18.4	-18.3	-18.7	-19.5	-18.4	-17.8	-17.2	-16.2	-15.2	-13.9	-13.5	-12.0	-11.0	-11.8	-12.2	-12.0	-12.2	-12.0	-11.9	-11.5	-15.4	-11.0
14-Jan	-11.2	-10.3	-10.8	-10.7	-11.0	-11.5	-11.9	-10.6	-10.0	-8.8	-9.0	-7.2	-4.8	-1.5	-0.6	2.1	2.8	1.9	2.0	1.9	1.8	1.7	2.0	1.0	-4.7	2.8
15-Jan	1.7	2.4	2.1	2.0	1.9	2.0	1.7	1.7	2.0	1.9	1.8	1.9	2.3	3.0	3.6	3.8	3.1	3.0	2.8	2.5	1.7	2.0	0.3	0.0	2.1	3.8
16-Jan	-0.2	-0.1	-0.1	-0.3	-1.4	-0.7	-2.2	-0.9	-0.5	2.4	3.8	5.0	6.6	7.8	7.8	8.2	8.4	7.8	7.5	8.0	7.1	4.9	4.2	4.0	3.6	8.4
17-Jan	4.1	3.9	3.8	5.2	5.6	5.8	5.3	5.4	5.7	5.5	5.3	5.3	4.9	5.2	5.7	6.2	5.8	6.0	5.2	4.3	4.2	3.3	2.6	2.3	4.9	6.2
18-Jan	2.0	1.8	1.1	0.2	-0.6	-0.3	-0.4	-0.6	-1.4	-1.6	-1.5	-1.1	0.1	1.4	2.1	2.6	2.4	2.5	1.8	1.4	0.5	0.2	-1.2	-2.3	0.4	2.6
19-Jan	-2.3	-3.3	-6.5	-6.8	-6.6	-6.5	-6.5	-6.7	-6.7	-6.9	-6.7	-6.7	-6.7	-6.7	-6.9	-7.1	-7.2	-7.3	-7.5	-7.6	-7.6	-7.5	-7.3	-7.2	-6.6	-2.3
20-Jan	-7.1	-6.8	-6.5	-6.3	-5.9	-5.2	-5.4	-5.2	-5.2	-5.1	-4.6	-3.5	-2.0	-0.8	0.8	1.6	2.3	1.4	-0.2	-0.7	-3.1	-4.4	-6.0	-5.2	-3.5	2.3
21-Jan	-4.6	-4.5	-4.5	-4.3	-4.4	-5.0	-5.5	-6.6	-7.3	-7.6	-8.0	-8.7	-9.1	-9.2	-9.4	-9.8	-10.2	-10.6	-11.0	-11.6	-12.0	-12.3	-12.6	-12.8	-8.4	-4.3
22-Jan	-13.2	-13.6	-14.3	-14.5	-15.0	-15.4	-15.8	-16.2	-16.5	-16.9	-17.0	-17.0	-16.9	-16.8	-17.0	-17.2	-17.5	-18.0	-18.2	-18.4	-19.2	-19.6	-20.0	-20.2	-16.9	-13.2
23-Jan	-20.2	-20.4	-20.2	-20.0	-20.0	-20.1	-20.2	-20.2	-19.9	-19.7	-19.3	-19.0	-18.6	-17.8	-17.3	-16.9	-16.4	-16.1	-16.0	-16.0	-16.1	-16.5	-16.5	-16.7	-18.3	-16.0
24-Jan	-17.1	-17.3	-17.5	-17.2	-16.1	-15.9	-15.5	-15.3	-14.8	-14.3	-14.2	-13.4	-12.5	-11.1	-10.2	-9.5	-8.3	-7.9	-8.7	-9.8	-10.3	-10.3	-10.6	-11.1	-12.9	-7.9
25-Jan	-11.1	-11.8	-12.0	-12.8	-12.9	-13.0	-12.7	-13.1	-13.2	-13.6	-12.7	-11.9	-10.4	-7.5	-6.4	-5.1	-4.4	-4.7	-5.0	-4.5	-4.5	-5.6	-6.4	-6.6	-9.2	-4.4
26-Jan	-6.7	-6.9	-6.7	-6.6	-6.4	-6.3	-6.4	-5.7	-5.5	-5.6	-5.0	-4.3	-2.9	-1.6	0.4	2.0	2.1	1.2	0.8	0.6	0.6	0.1	-1.3	-2.3	-3.0	2.1
27-Jan	-2.5	-2.8	-2.6	-2.1	-1.9	-1.1	-1.3	-0.7	-1.2	-0.6	0.2	0.3	1.1	1.8	1.7	2.1	2.7	2.3	2.0	3.3	3.0	2.7	2.5	1.7	0.4	3.3
28-Jan	1.3	1.4	0.8	0.4	-0.4	-0.5	-0.8	-0.7	-0.8	-0.9	-0.5	0.0	0.4	0.4	1.5	2.4	2.9	3.4	4.0	3.8	4.4	4.3	4.6	4.9	1.5	4.9
29-Jan	4.8	4.3	4.1	4.4	3.4	3.2	2.5	1.6	2.4	2.8	2.9	4.0	5.0	6.0	6.3	6.5	6.6	5.8	5.3	4.4	2.9	1.5	0.7	-0.7	3.8	6.6
30-Jan	0.8	-0.2	0.6	0.0	-0.1	-1.1	-1.1	-0.9	-1.1	-1.5	-4.6	-6.8	-6.9	-6.7	-6.2	-5.9	-8.3	-9.8	-11.1	-12.3	-12.9	-13.6	-14.0	-14.5	-5.8	0.8
31-Jan	-14.9	-15.3	-15.6	-16.2	-16.8	-17.4	-17.7	-18.0	-18.7	-19.4	-19.2	-18.1	-17.1	-15.5	-14.4	-13.1	-11.9	-11.6	-11.3	-11.5	-11.3	-11.1	-10.5	-11.0	-14.9	-10.5
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	162	21.77	21.77
-20 - 0	428	57.53	79.30
0 - 10	154	20.70	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

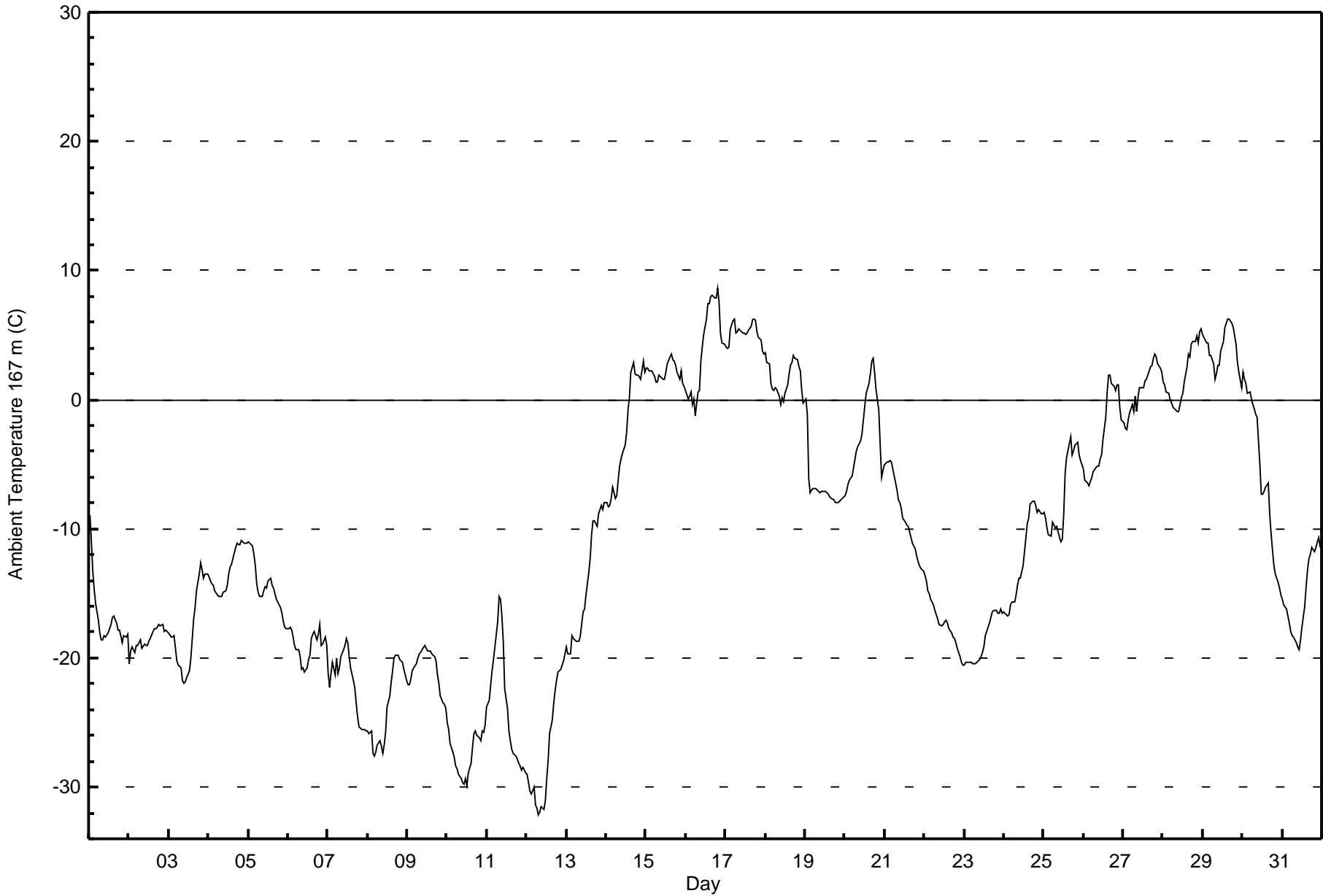


Maximum Value: 8.6 C on Jan 16 20:00		Maximum Daily Average: 5.1 C on Jan 17		Hours in Service: 744																																												
Minimum Value: -32.1 C on Jan 12 08:00		Minimum Daily Average: -27.4 C on Jan 10		Hours of Data: 744																																												
Maximum Diurnal Average: -9.3 C at hour 17		Minimum Diurnal Average: -12.1 C at hour 7		Hours of Missing Data: 0																																												
Monthly Average: -10.93 C		Percentiles: P ₁ = -30.6 P ₁₀ = -23.5 Q ₁ = -19.0 Median = -12.4 Q ₃ = -0.4 P ₉₀ = 3.1 P ₉₉ = 7.3		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-Jan	-8.9	-11.0	-13.3	-14.7	-15.8	-17.0	-18.1	-18.6	-18.6	-18.3	-18.4	-18.0	-17.7	-17.4	-16.9	-16.8	-17.3	-17.8	-17.9	-18.3	-18.8	-18.2	-18.4	-18.1	-16.8	-8.9																						
2-Jan	-20.5	-19.4	-19.2	-19.6	-19.0	-19.0	-18.9	-18.6	-19.3	-18.9	-19.1	-19.0	-18.8	-18.5	-17.9	-17.7	-17.8	-17.6	-17.4	-17.5	-17.4	-17.9	-17.8	-18.0	-18.5	-17.4																						
3-Jan	-18.1	-18.3	-18.4	-18.3	-19.2	-20.2	-20.6	-20.8	-21.8	-22.0	-21.9	-21.5	-21.0	-20.0	-18.4	-16.9	-16.1	-14.8	-13.5	-12.6	-13.2	-13.8	-13.5	-13.5	-17.9	-12.6																						
4-Jan	-13.7	-14.1	-14.2	-14.4	-14.9	-15.1	-15.2	-15.3	-15.2	-14.9	-14.8	-14.4	-13.5	-13.0	-12.7	-12.3	-11.4	-11.1	-11.2	-11.2	-10.9	-11.1	-11.1	-11.1	-13.2	-10.9																						
5-Jan	-11.0	-11.1	-11.3	-12.0	-12.9	-14.3	-14.9	-15.2	-15.2	-14.8	-14.5	-14.5	-14.0	-13.9	-14.3	-14.6	-15.0	-15.4	-15.7	-16.1	-16.5	-17.2	-17.6	-17.8	-14.6	-11.0																						
6-Jan	-17.7	-17.6	-17.9	-18.3	-19.0	-19.3	-19.4	-19.9	-20.9	-20.8	-21.1	-20.7	-20.1	-19.7	-18.4	-18.2	-18.0	-18.6	-18.2	-17.5	-19.1	-18.9	-18.4	-19.1	-19.0	-17.5																						
7-Jan	-21.2	-22.3	-21.2	-20.3	-21.4	-20.0	-21.2	-20.8	-19.9	-19.4	-19.0	-18.5	-18.8	-19.9	-20.8	-21.7	-22.3	-23.5	-24.6	-25.3	-25.5	-25.5	-25.5	-25.7	-21.8	-18.5																						
8-Jan	-25.6	-25.8	-25.6	-27.4	-27.6	-27.2	-26.7	-26.4	-26.9	-27.4	-26.7	-25.7	-23.8	-22.9	-21.8	-21.0	-20.0	-19.8	-19.8	-20.1	-20.2	-20.3	-20.9	-21.7	-23.8	-19.8																						
9-Jan	-22.1	-22.1	-21.6	-20.9	-20.8	-20.5	-20.0	-19.6	-19.6	-19.4	-19.1	-19.3	-19.4	-19.4	-19.5	-19.7	-19.9	-20.2	-21.3	-22.0	-22.9	-23.4	-23.6	-23.9	-20.8	-19.1																						
10-Jan	-25.0	-25.5	-26.6	-27.3	-27.7	-28.3	-28.6	-29.0	-29.3	-29.6	-29.8	-29.3	-29.9	-28.9	-28.1	-27.0	-25.8	-25.7	-26.0	-26.2	-26.4	-25.6	-25.8	-25.2	-27.4	-25.0																						
11-Jan	-23.8	-23.3	-22.0	-20.9	-20.1	-19.2	-17.2	-15.2	-15.5	-16.7	-18.8	-22.3	-23.9	-25.6	-26.4	-27.1	-27.4	-27.6	-27.9	-28.1	-28.3	-28.7	-28.5	-28.9	-23.5	-15.2																						
12-Jan	-29.0	-29.7	-30.3	-30.5	-30.0	-31.4	-31.6	-32.1	-31.9	-31.5	-31.7	-31.0	-29.3	-27.9	-25.9	-24.7	-23.5	-22.5	-21.7	-21.1	-20.9	-20.5	-20.3	-19.6	-27.0	-19.6																						
13-Jan	-19.1	-19.7	-19.7	-18.3	-18.4	-18.6	-18.8	-18.7	-18.2	-17.3	-16.5	-16.2	-15.1	-13.3	-12.3	-10.5	-9.4	-9.4	-9.8	-8.9	-8.5	-8.1	-8.6	-8.0	-14.2	-8.0																						
14-Jan	-8.0	-8.3	-8.2	-7.6	-6.8	-7.6	-7.4	-6.2	-5.2	-4.6	-4.2	-3.5	-2.6	-0.8	0.1	2.2	2.9	2.0	2.0	2.0	1.8	1.5	2.9	2.1	-2.6	2.9																						
15-Jan	2.4	2.4	2.2	2.2	2.0	1.8	1.4	1.4	1.9	1.7	1.5	1.6	2.1	2.7	3.3	3.5	3.1	3.0	2.7	2.2	1.6	2.2	1.3	1.0	2.1	3.5																						
16-Jan	0.7	0.1	0.3	0.6	-0.4	0.0	-1.3	0.6	0.7	3.0	4.1	5.1	6.2	7.4	7.4	8.0	8.1	7.9	7.9	8.6	7.6	5.1	4.4	4.2	4.0	8.6																						
17-Jan	4.1	4.0	4.1	5.5	6.1	6.2	5.2	5.3	5.5	5.4	5.2	5.2	5.0	5.1	5.3	5.7	6.2	6.2	6.1	5.3	4.8	4.6	3.8	3.5	5.1	6.2																						
18-Jan	3.6	2.9	2.8	1.3	0.8	0.7	0.9	0.9	0.3	-0.4	0.1	-0.2	0.5	1.1	2.0	2.7	2.9	3.4	3.2	3.1	2.5	2.2	0.7	-0.2	1.6	3.6																						
19-Jan	0.0	-1.1	-6.1	-7.2	-6.9	-6.9	-6.9	-7.0	-7.1	-7.2	-7.1	-7.1	-7.1	-7.2	-7.3	-7.5	-7.6	-7.8	-8.0	-8.0	-8.0	-7.9	-7.6	-7.6	-6.7	0.0																						
20-Jan	-7.4	-7.1	-6.6	-6.2	-5.9	-5.3	-4.6	-3.9	-3.6	-3.2	-2.6	-1.6	-0.5	0.5	1.2	2.0	3.0	3.2	2.2	0.8	-0.8	-3.5	-6.0	-5.4	-2.6	3.2																						
21-Jan	-5.0	-4.9	-4.8	-4.7	-4.8	-5.4	-5.9	-7.0	-7.7	-8.0	-8.5	-9.1	-9.5	-9.7	-9.8	-10.3	-10.6	-11.1	-11.5	-12.1	-12.5	-12.8	-13.1	-13.3	-8.8	-4.7																						
22-Jan	-13.6	-14.1	-14.8	-15.0	-15.5	-15.9	-16.3	-16.7	-17.0	-17.4	-17.5	-17.4	-17.2	-17.1	-17.3	-17.7	-18.0	-18.4	-18.5	-18.8	-19.2	-19.8	-20.4	-20.6	-17.3	-13.6																						
23-Jan	-20.5	-20.4	-20.4	-20.3	-20.3	-20.4	-20.5	-20.5	-20.3	-20.1	-19.9	-19.5	-19.1	-18.2	-17.6	-17.3	-16.8	-16.4	-16.3	-16.4	-16.5	-16.5	-16.2	-16.5	-18.6	-16.2																						
24-Jan	-16.4	-16.7	-16.7	-16.7	-15.9	-15.7	-15.6	-15.2	-14.4	-13.9	-13.8	-12.8	-11.8	-10.7	-9.6	-9.2	-8.0	-7.9	-7.9	-8.2	-8.8	-8.5	-8.9	-8.8	-12.2	-7.9																						
25-Jan	-8.7	-9.2	-9.9	-10.5	-10.5	-9.5	-9.7	-9.9	-9.8	-10.7	-11.1	-10.7	-8.9	-5.7	-4.5	-3.4	-2.8	-4.3	-4.0	-3.5	-3.3	-4.3	-4.7	-5.0	-7.3	-2.8																						
26-Jan	-5.4	-6.2	-6.5	-6.6	-6.3	-6.0	-5.6	-5.3	-5.2	-5.1	-4.6	-4.3	-3.1	-1.4	0.6	1.9	1.9	1.3	1.0	0.7	1.2	1.1	-0.6	-1.6	-2.7	1.9																						
27-Jan	-1.8	-2.2	-2.3	-1.6	-1.1	-0.3	-0.9	0.3	-1.0	0.2	0.9	0.9	1.0	1.5	1.5	1.9	2.5	2.7	3.2	3.5	3.3	2.8	2.5	2.1	0.8	3.5																						
28-Jan	1.4	1.1	0.6	0.4	-0.1	-0.3	-0.6	-0.7	-0.9	-0.9	-0.3	0.2	0.5	1.4	2.5	3.6	3.3	4.3	4.5	4.5	4.9	4.4	5.3	5.5	1.9	5.5																						
29-Jan	5.1	4.7	4.4	4.3	3.5	3.4	2.8	1.5	2.0	2.7	2.7	3.7	4.6	5.6	5.9	6.2	6.2	6.0	5.5	5.0	4.3	2.9	2.1	0.9	4.0	6.2																						
30-Jan	2.1	1.6	1.2	0.5	0.6	0.1	-0.4	-0.7	-1.2	-1.4	-5.0	-7.4	-7.3	-7.1	-6.7	-6.5	-8.8	-10.4	-11.7	-12.9	-13.6	-14.2	-14.6	-15.1	-5.8	2.1																						
31-Jan	-15.5	-15.9	-16.2	-16.7	-17.3	-18.0	-18.3	-18.4	-18.8	-19.2	-19.3	-18.6	-17.7	-16.0	-14.4	-13.1	-12.3	-12.0	-11.4	-11.7	-11.5	-11.0	-10.7	-11.4	-15.2	-10.7																						
																								-10.9	-11.3	-11.6	-11.7	-11.8	-11.9	-12.1	-12.0	-12.1	-11.9	-12.0	-11.8	-11.3	-10.6	-10.0	-9.5	-9.3	-9.4	-9.5	-9.7	-10.0	-10.4	-10.6	-10.9	Diurnal Average
																								5.1	4.7	4.4	5.5	6.1	6.2	5.2	5.3	5.5	5.4	5.2	5.2	6.2	7.4	7.4	8.0	8.1	7.9	7.9	8.6	7.6	5.1	5.3	5.5	Diurnal Maximum



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	142	19.09	19.09
-20 - 0	422	56.72	75.81
0 - 10	180	24.19	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity 20m (RH20m) - %

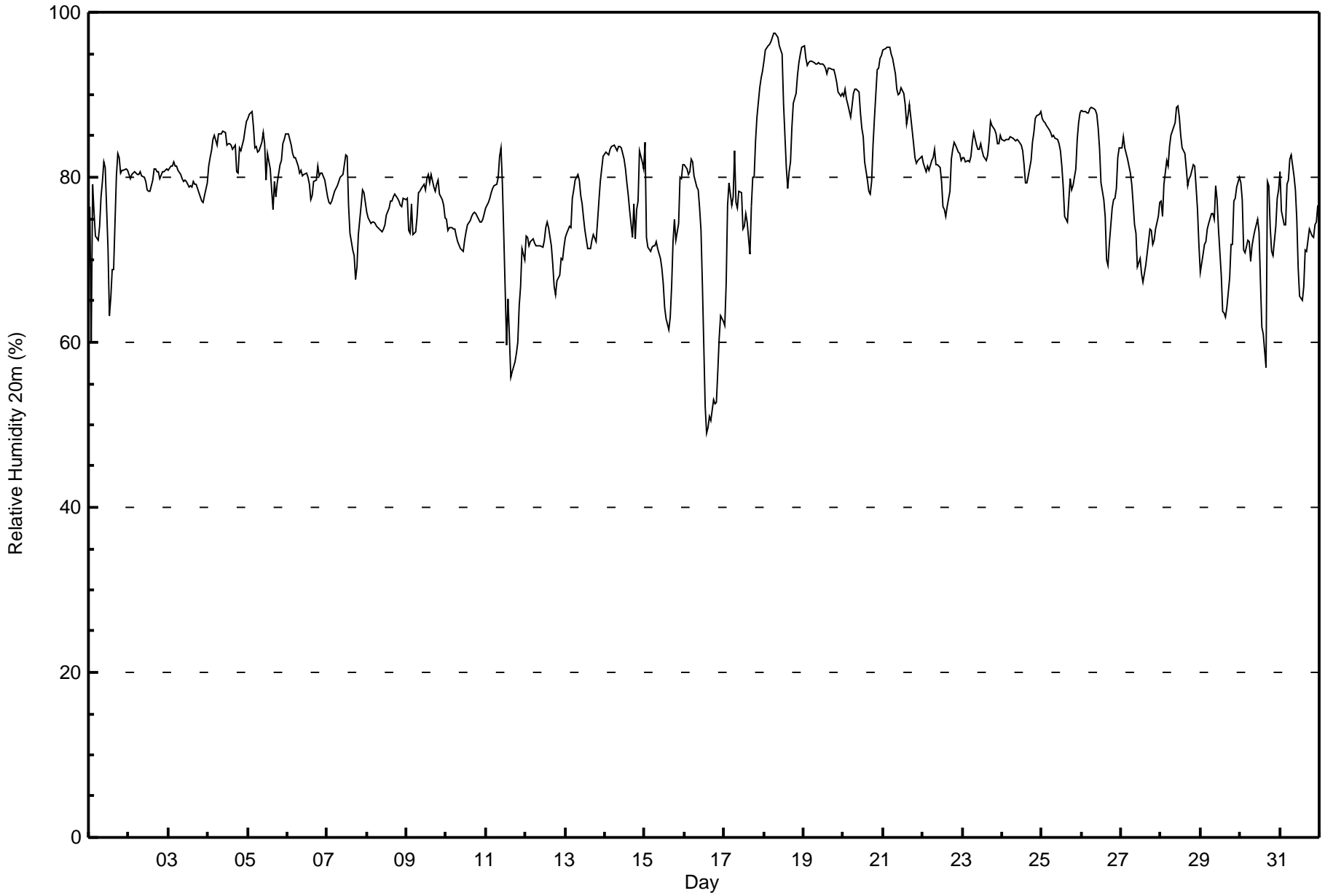
Lower Camp Met Tower - January 2017

Maximum Value: 97 % on Jan 18 08:00 Maximum Daily Average: 93.1 % on Jan 19																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0									
Minimum Value: 49 % on Jan 16 14:00 Minimum Daily Average: 66.5 % on Jan 16 Maximum Diurnal Average: 81.5 % at hour 7 Minimum Diurnal Average: 74.0 % at hour 16 Monthly Average: 79.1 % Percentiles: P ₁ = 53 P ₁₀ = 71 Q ₁ = 74 Median = 80 Q ₃ = 84 P ₉₀ = 89 P ₉₉ = 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-Jan	77	60	79	76	73	72	74	78	79	82	81	71	63	65	69	69	80	83	82	81	81	81	81	81	75.7	83	
2-Jan	80	80	80	81	81	80	80	81	80	80	79	78	78	78	80	81	81	81	81	81	80	81	81	81	81	80.2	81
3-Jan	81	81	81	82	81	81	81	80	80	79	80	80	79	79	79	79	79	79	78	78	77	77	78	79	79.5	82	
4-Jan	81	82	83	85	85	84	85	85	85	86	86	84	84	84	84	83	84	81	81	84	83	85	86	87	84.0	87	
5-Jan	87	88	88	86	84	84	83	83	84	85	84	80	83	81	78	76	80	78	79	81	82	84	85	85	82.8	88	
6-Jan	85	85	84	83	82	82	81	80	81	80	80	81	80	79	77	78	79	80	81	80	81	81	80	79	80.8	85	
7-Jan	78	77	77	77	78	79	79	79	80	80	82	83	83	77	73	71	70	68	69	73	77	78	78	77	76.8	83	
8-Jan	76	75	74	75	75	74	74	74	74	73	74	74	75	76	77	77	78	78	78	77	77	76	77	77	75.7	78	
9-Jan	77	74	73	77	73	73	75	78	78	79	79	78	80	80	79	80	79	78	79	80	78	77	77	75	77.4	80	
10-Jan	75	74	74	74	74	74	73	72	71	71	71	72	73	74	75	75	76	76	76	75	75	75	75	76	73.9	76	
11-Jan	76	77	77	78	79	79	79	80	83	84	79	73	60	65	61	56	57	58	59	60	64	67	71	70	70.4	84	
12-Jan	73	73	72	72	73	72	72	72	72	72	72	72	74	75	74	72	70	67	66	67	68	70	70	71	71.2	75	
13-Jan	73	73	74	74	77	78	80	80	80	78	77	75	74	71	71	71	72	73	72	75	77	80	81	82	75.8	82	
14-Jan	83	83	83	83	84	84	84	83	84	84	84	82	81	79	78	76	73	77	73	76	77	83	82	81	80.6	84	
15-Jan	84	73	72	71	72	72	72	72	71	70	69	67	64	63	61	63	67	72	75	72	74	80	80	81	71.6	84	
16-Jan	82	81	80	81	82	82	80	79	78	76	74	67	52	49	50	51	51	53	52	53	57	61	63	62	66.5	82	
17-Jan	62	67	77	79	77	78	83	77	76	78	78	74	74	76	75	71	76	80	80	84	87	91	92	93	78.5	93	
18-Jan	94	95	96	96	96	97	97	97	97	96	95	95	89	81	79	81	82	86	89	90	92	94	95	96	91.9	97	
19-Jan	96	94	94	94	94	94	94	94	94	94	94	94	94	93	93	93	93	93	93	92	92	90	90	90	93.1	96	
20-Jan	90	91	90	89	87	89	90	91	91	90	88	86	85	82	80	78	78	80	84	87	93	93	94	95	87.4	95	
21-Jan	96	96	96	96	96	95	94	93	91	90	90	91	90	89	86	87	89	87	84	82	82	82	82	82	89.4	96	
22-Jan	82	81	81	81	81	82	82	83	81	82	81	80	76	76	75	77	78	82	83	84	84	83	83	82	80.9	84	
23-Jan	82	82	82	82	82	83	84	86	84	83	83	84	83	83	82	83	84	87	86	86	85	84	84	85	83.7	87	
24-Jan	85	84	85	85	85	85	85	85	84	85	84	84	83	82	79	79	80	82	84	85	87	87	88	88	84.1	88	
25-Jan	87	87	87	86	86	85	85	85	85	85	84	83	81	79	75	75	77	80	78	79	81	85	87	88	82.9	88	
26-Jan	88	88	88	88	88	88	88	88	88	88	86	83	79	77	75	70	69	72	76	77	77	79	82	84	82.0	88	
27-Jan	83	85	84	83	82	81	79	77	74	73	69	70	68	67	68	69	72	74	74	72	72	74	75	77	75.1	85	
28-Jan	77	75	79	82	81	84	85	86	87	88	89	87	85	83	83	81	79	80	80	81	81	79	76	72	81.7	89	
29-Jan	69	71	72	72	74	74	76	76	75	79	77	74	68	64	64	63	64	68	72	72	77	77	79	80	72.3	80	
30-Jan	79	77	71	71	72	72	70	72	73	74	75	73	67	62	61	57	80	79	74	71	71	74	77	78	72.1	80	
31-Jan	81	76	74	74	79	80	82	83	80	79	75	69	66	65	67	71	71	72	74	73	73	74	75	77	74.5	83	
																		81.2 80.1 80.8 81.0 81.0 81.2 81.5 81.5 81.3 81.4 80.6 78.9 76.5 75.3 74.4 74.0 75.7 76.8 77.2 77.7 78.8 80.0 80.7 81.0						Diurnal Average			
																		96 96 96 96 96 97 97 97 97 96 95 95 94 93 93 93 93 93 93 92 93 94 95 96						Diurnal Maximum			



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	15	2.02	2.02
60 - 80	380	51.08	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

Relative Humidity 45m (RH45m) - %

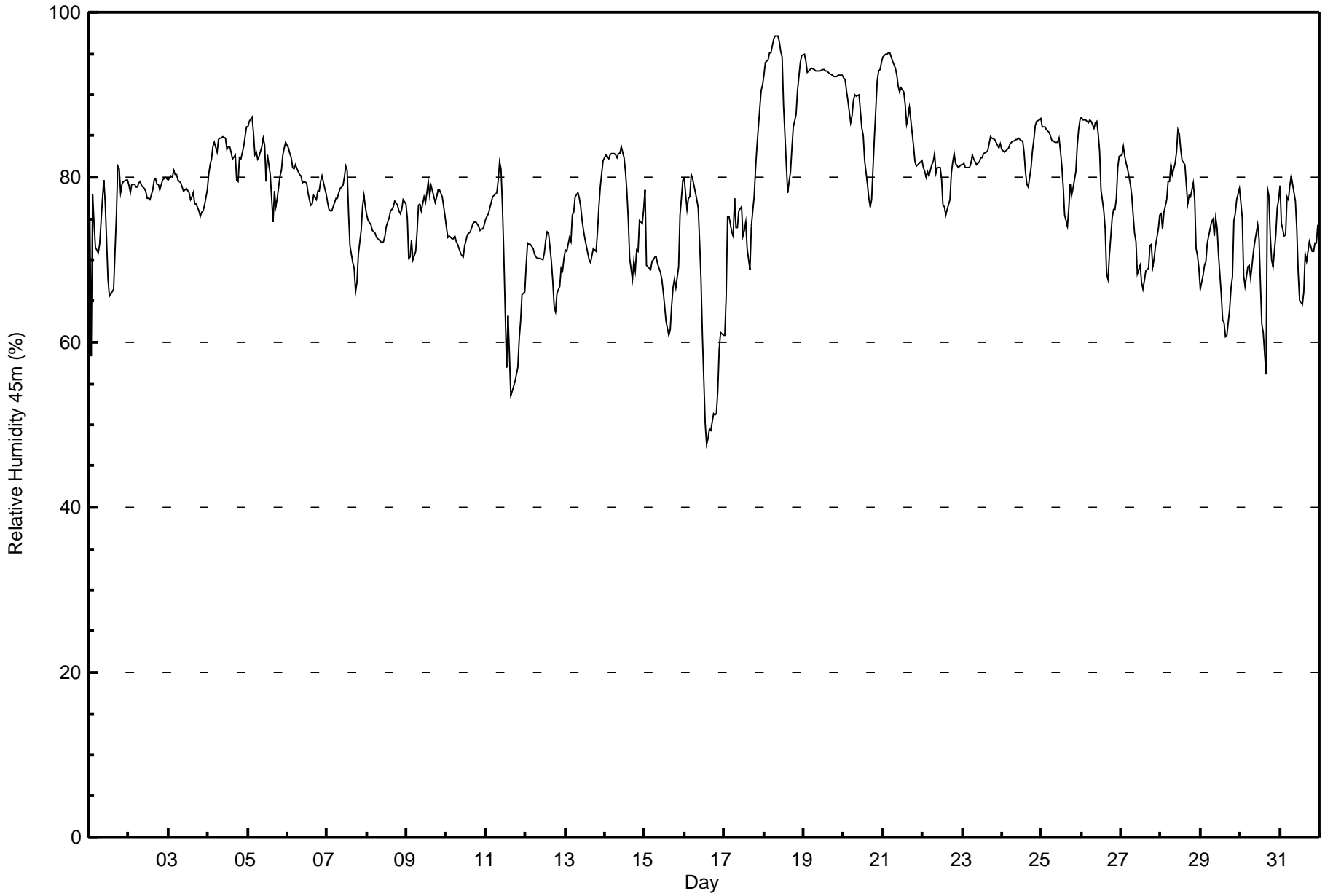
Lower Camp Met Tower - January 2017

Maximum Value: 97 % on Jan 18 09:00																			Maximum Daily Average: 92.9 % on Jan 19						Hours in Service: 744	
Minimum Value: 48 % on Jan 16 14:00																			Minimum Daily Average: 64.1 % on Jan 16						Hours of Data: 744	
Maximum Diurnal Average: 80.2 % at hour 8																			Minimum Diurnal Average: 72.6 % at hour 16						Hours of Missing Data: 0	
Monthly Average: 77.7 %																			Percentiles: P ₁ = 51 P ₁₀ = 68 Q ₁ = 73 Median = 78 Q ₃ = 83 P ₉₀ = 87 P ₉₉ = 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-Jan	75	58	78	74	71	71	72	75	77	80	77	68	66	66	66	66	75	81	81	78	79	80	80	80	73.9	81
2-Jan	79	78	79	79	79	79	79	80	79	79	78	78	77	77	78	80	80	79	79	78	80	80	80	80	78.9	80
3-Jan	80	80	80	81	80	80	80	79	79	78	78	79	78	77	78	78	77	77	76	75	76	76	77	78	78.2	81
4-Jan	80	81	82	84	84	83	85	85	85	85	83	84	84	83	82	83	80	79	82	82	84	85	86	83.2	86	
5-Jan	86	87	87	85	83	83	82	83	84	85	84	79	83	80	77	75	78	76	77	80	81	83	84	84	82.0	87
6-Jan	84	83	82	81	81	82	81	80	80	79	80	79	78	77	77	77	78	77	78	78	80	80	79	78	79.5	84
7-Jan	77	76	76	76	77	78	78	78	79	79	80	81	81	76	72	70	69	66	67	71	74	77	78	76	75.4	81
8-Jan	75	75	74	74	73	73	73	72	72	72	72	73	74	75	76	76	76	77	77	76	76	76	77	77	74.7	77
9-Jan	75	70	70	72	70	71	73	77	77	76	78	77	78	79	78	79	78	77	78	78	78	78	77	75	75.8	79
10-Jan	74	73	73	73	73	73	72	72	71	71	70	72	72	73	73	74	74	75	75	74	74	74	74	74	73.0	75
11-Jan	75	76	76	77	78	78	78	80	82	81	77	71	57	63	59	54	54	55	56	57	60	62	66	66	68.2	82
12-Jan	69	72	72	72	71	71	70	70	70	70	70	71	72	73	73	70	67	64	64	66	67	69	69	70	69.7	73
13-Jan	71	71	73	72	75	76	78	78	77	76	75	74	73	71	70	70	71	71	71	73	76	79	81	82	74.3	82
14-Jan	83	82	82	83	83	83	83	82	83	83	84	82	81	78	75	70	68	70	69	71	71	75	74	76	77.9	84
15-Jan	79	69	69	69	70	70	70	70	70	69	68	66	64	63	61	61	64	67	68	67	69	75	77	80	68.9	80
16-Jan	80	76	77	78	80	80	79	77	76	72	68	61	50	48	48	50	49	51	51	51	54	59	61	61	64.1	80
17-Jan	61	66	75	75	73	73	78	74	74	76	77	73	74	75	71	69	74	76	78	81	84	88	90	91	76.0	91
18-Jan	92	94	94	95	95	96	97	97	97	96	95	95	89	81	78	79	81	83	86	88	90	92	94	95	90.9	97
19-Jan	95	94	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	92	92	92	92	92	92	92	92.9	95
20-Jan	92	92	90	89	87	87	89	90	90	90	88	86	85	82	79	77	76	77	81	85	92	93	93	94	86.9	94
21-Jan	95	95	95	95	95	95	94	93	92	91	90	91	90	89	86	87	88	87	84	82	81	82	82	82	89.2	95
22-Jan	81	81	80	81	80	81	82	83	81	81	80	77	76	75	76	77	80	82	83	82	81	81	82	82	80.2	83
23-Jan	81	82	81	81	81	82	83	82	82	82	82	82	82	83	83	83	84	85	85	85	84	84	84	84	82.8	85
24-Jan	83	83	83	83	84	84	84	84	85	85	85	84	84	83	81	79	79	81	83	85	86	87	87	87	83.7	87
25-Jan	86	86	86	86	85	85	84	84	84	84	85	83	81	79	75	74	76	79	78	79	81	84	86	87	82.4	87
26-Jan	87	87	87	87	87	87	87	86	87	87	85	83	78	76	74	68	68	71	75	76	76	78	81	83	80.8	87
27-Jan	83	84	82	82	81	79	78	75	73	72	68	69	67	66	68	69	69	72	72	69	70	72	74	75	73.7	84
28-Jan	76	74	76	77	79	79	82	80	82	83	86	85	83	82	82	79	77	78	78	79	77	71	71	69	78.5	86
29-Jan	66	68	69	70	72	73	75	75	73	75	74	71	66	63	62	61	61	64	67	68	75	76	77	79	69.9	79
30-Jan	77	75	68	67	69	69	68	69	71	72	74	73	67	62	61	56	79	78	73	70	69	73	76	77	70.6	79
31-Jan	79	74	73	73	78	77	79	80	78	77	74	69	65	65	66	71	70	71	72	71	71	72	72	74	72.9	80
	79.9	78.8	79.5	79.5	79.6	79.7	80.1	80.2	80.0	80.0	79.3	77.7	75.8	74.7	73.5	72.6	74.0	74.8	75.2	75.8	77.0	78.4	79.3	79.8	Diurnal Average	
	95	95	95	95	95	96	97	97	97	96	95	95	93	93	93	93	93	92	92	92	92	93	94	95	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	19	2.55	2.55
60 - 80	442	59.41	61.96
80 - 100	283	38.04	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) - %

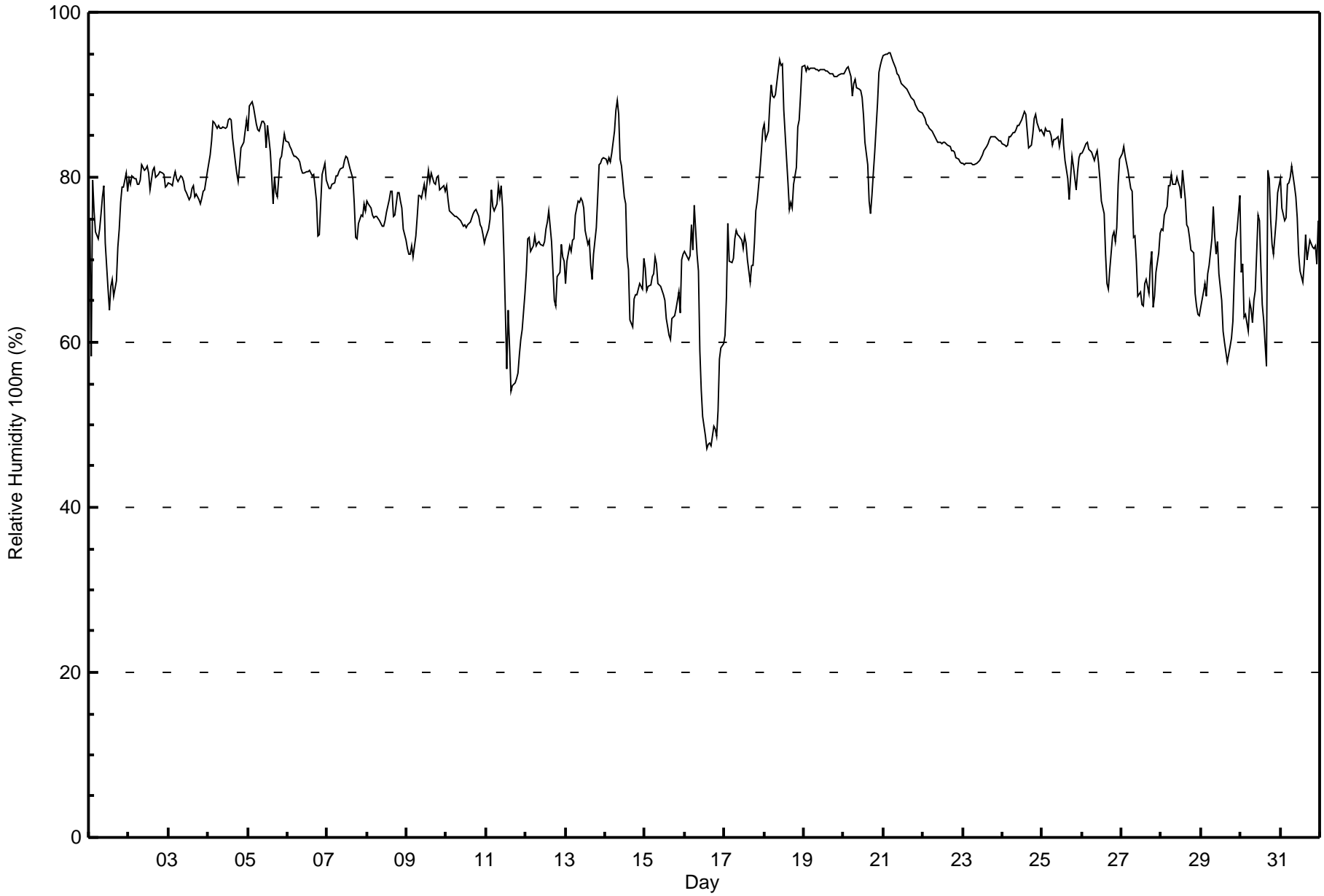
Lower Camp Met Tower - January 2017

Maximum Value: 95 % on Jan 21 04:00 Maximum Daily Average: 92.8 % on Jan 19																	Hours in Service: 744 Hours of Data: 744																								
Minimum Value: 47 % on Jan 16 14:00 Minimum Daily Average: 59.3 % on Jan 16 Maximum Diurnal Average: 80.2 % at hour 8 Minimum Diurnal Average: 73.6 % at hour 16 Monthly Average: 77.6 % Percentiles: P ₁ = 50 P ₁₀ = 66 Q ₁ = 72 Median = 79 Q ₃ = 84 P ₉₀ = 89 P ₉₉ = 94																	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-Jan	75	58	80	76	73	72	74	76	78	79	72	66	64	67	68	66	68	71	74	77	79	79	81	78	72.9	81															
2-Jan	80	79	80	80	80	79	79	80	81	81	81	81	80	79	81	81	80	80	80	81	81	80	79	79	80.1	81															
3-Jan	79	79	79	80	81	80	80	80	80	79	78	78	77	78	79	79	78	78	77	77	77	78	79	81	78.8	81															
4-Jan	82	83	84	87	87	86	86	86	86	86	86	86	87	87	87	85	82	80	79	81	84	84	86	87	84.7	87															
5-Jan	86	89	89	89	87	86	86	86	86	87	87	86	84	86	83	80	77	80	78	78	82	83	84	85	84	84.2	89														
6-Jan	84	84	83	83	83	83	82	82	81	80	80	81	81	81	81	80	80	77	73	73	77	80	82	80	80.4	84															
7-Jan	79	79	79	79	79	80	80	81	81	81	82	83	82	82	81	80	77	73	73	74	75	75	77	76	78.7	83															
8-Jan	77	77	76	75	75	75	75	75	74	74	74	75	76	77	78	78	75	76	78	78	77	76	74	72	75.8	78															
9-Jan	71	71	71	72	70	73	75	78	78	77	79	78	79	81	79	81	79	79	80	80	79	79	79	78	76.9	81															
10-Jan	79	77	76	76	75	75	75	75	75	74	74	74	74	74	75	75	76	76	76	75	74	74	73	72	75.0	79															
11-Jan	73	74	75	79	76	76	77	79	78	79	76	70	57	64	59	54	55	55	56	56	59	60	61	66	67.2	79															
12-Jan	69	73	73	71	72	73	72	72	72	72	72	72	74	75	76	72	69	65	64	68	69	72	70	70	71.0	76															
13-Jan	67	70	72	71	72	73	75	77	77	77	77	76	73	72	72	69	68	71	74	78	82	82	82	82	74.6	82															
14-Jan	82	82	82	82	83	86	88	89	88	82	81	78	77	70	69	63	62	65	66	66	66	67	66	70	75.4	89															
15-Jan	69	66	67	67	68	68	70	69	67	67	66	66	65	63	61	60	62	63	63	64	66	64	70	71	66.0	71															
16-Jan	71	70	70	70	74	71	77	71	69	59	54	51	49	47	48	48	48	50	50	49	52	58	59	60	59.3	77															
17-Jan	61	65	74	70	70	70	72	74	73	73	72	71	73	72	70	67	69	69	72	76	77	81	83	86	72.6	86															
18-Jan	86	84	86	89	91	90	90	90	93	94	94	94	88	82	79	76	77	76	79	81	86	87	90	93	86.5	94															
19-Jan	94	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	92	92	92	92	92	92	93	92.8	94															
20-Jan	93	93	93	93	92	90	91	92	91	91	91	90	88	84	81	77	76	78	81	83	89	93	94	94	88.2	94															
21-Jan	95	95	95	95	95	95	94	93	93	92	92	91	91	91	91	90	90	90	89	89	88	88	88	88	91.6	95															
22-Jan	87	87	86	86	86	86	85	85	85	84	84	84	84	84	84	84	84	83	83	83	82	82	82	82	84.3	87															
23-Jan	82	82	82	82	82	82	82	82	82	82	82	82	83	83	84	84	85	85	85	85	85	85	84	84	83.0	85															
24-Jan	84	84	84	84	85	85	85	85	86	86	87	88	88	88	86	84	84	85	85	87	88	87	86	86	85.7	88															
25-Jan	85	85	86	86	86	85	84	85	85	85	84	85	87	84	82	80	77	80	83	81	79	81	82	83	83.2	87															
26-Jan	83	83	84	84	83	83	83	82	83	83	82	80	77	76	71	67	66	69	73	73	72	74	79	82	78.0	84															
27-Jan	83	84	83	82	81	79	78	73	73	70	66	66	65	64	67	68	66	69	71	64	66	69	71	73	72.0	84															
28-Jan	74	74	75	76	79	79	80	79	79	80	79	79	77	81	77	74	74	73	71	71	66	64	63	63	74.6	81															
29-Jan	64	66	67	66	68	69	72	76	73	71	72	68	65	61	60	59	58	60	60	63	68	72	74	78	67.1	78															
30-Jan	69	69	63	63	61	65	64	62	65	66	75	75	69	65	63	57	81	80	75	72	71	75	78	79	69.3	81															
31-Jan	80	76	75	75	79	79	80	81	79	78	75	71	69	67	69	73	70	71	72	72	71	72	69	75	74.1	81															
																	78.8	78.4	79.4	79.4	79.6	79.5	80.2	80.2	80.1	79.5	79.0	77.9	76.7	76.0	75.2	73.6	73.7	74.1	74.6	75.2	76.1	77.2	78.0	78.9	Diurnal Average
																	95	95	95	95	95	95	94	93	93	94	94	94	93	93	93	93	93	92	92	92	92	93	94	94	Diurnal Maximum



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	29	3.90	3.90
60 - 80	401	53.90	57.80
80 - 100	314	42.20	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) - %

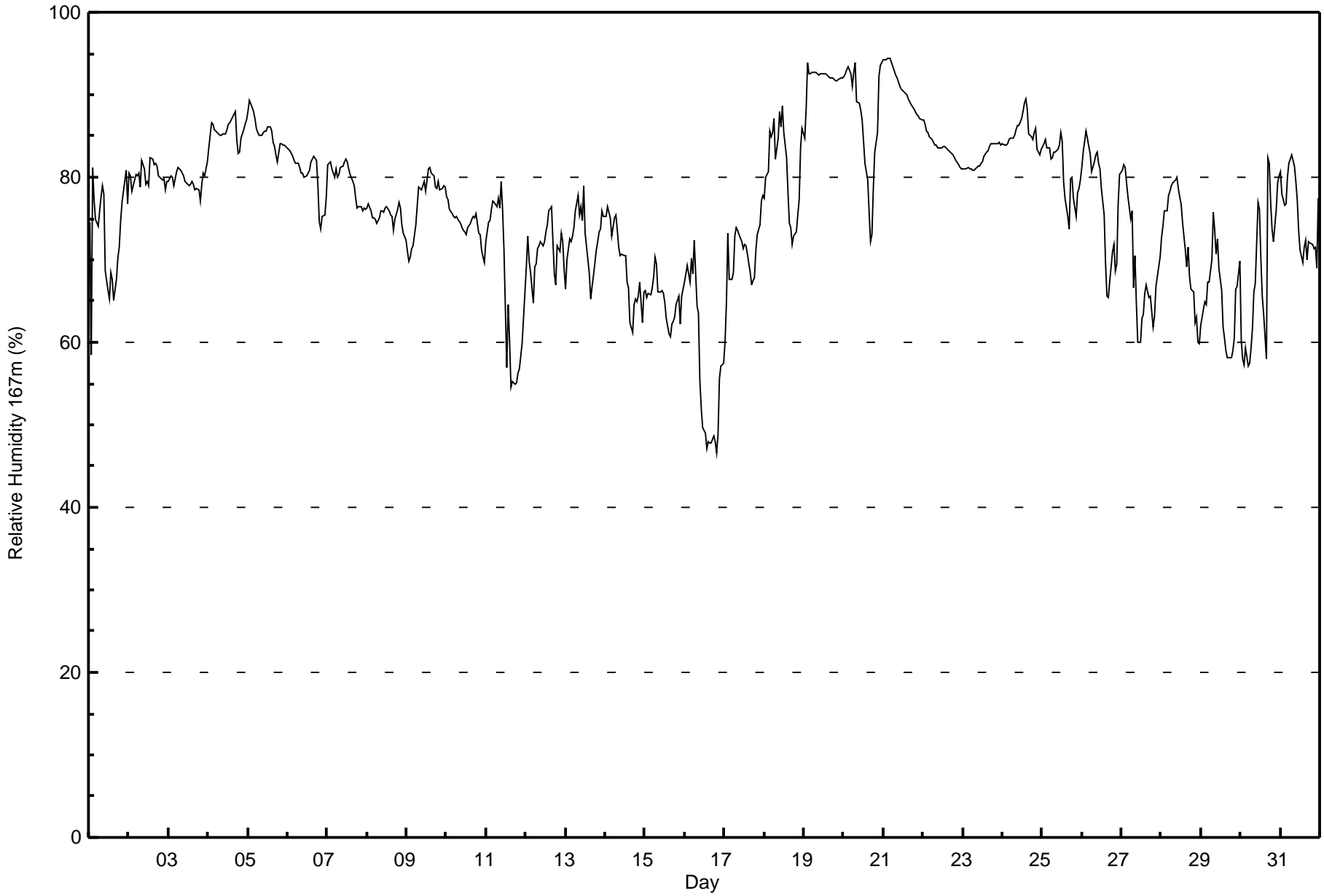
Lower Camp Met Tower - January 2017

Maximum Value: 94 % on Jan 21 04:00														Maximum Daily Average: 91.9 % on Jan 19														Hours in Service: 744	
Minimum Value: 47 % on Jan 16 20:00														Minimum Daily Average: 57.1 % on Jan 16														Hours of Data: 744	
Maximum Diurnal Average: 79.2 % at hour 7														Minimum Diurnal Average: 73.5 % at hour 16														Hours of Missing Data: 0	
Monthly Average: 76.6 %														Percentiles: P ₁ = 49 P ₁₀ = 65 Q ₁ = 71 Median = 78 Q ₃ = 83 P ₉₀ = 87 P ₉₉ = 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-Jan	75	58	81	77	75	74	76	78	79	78	69	66	65	69	68	65	68	70	72	75	77	78	81	77	72.9	81			
2-Jan	81	80	78	80	80	80	80	79	82	81	79	79	79	82	82	82	82	81	80	80	80	80	78	79	80.2	82			
3-Jan	79	80	80	79	80	81	81	81	80	80	80	79	79	79	79	79	78	79	78	77	79	81	80	82	79.6	82			
4-Jan	84	85	87	86	86	85	85	85	85	85	85	86	86	87	87	87	88	85	83	83	85	86	87	87	85.6	88			
5-Jan	88	89	89	88	87	86	85	85	85	85	86	86	86	86	86	84	84	83	82	84	84	84	84	84	85.4	89			
6-Jan	83	83	83	83	82	82	82	81	81	80	80	80	81	81	82	82	83	82	79	75	74	75	75	78	80.2	83			
7-Jan	81	82	82	81	80	81	80	80	81	81	82	82	82	81	80	80	79	78	76	76	76	76	76	76	79.6	82			
8-Jan	76	77	76	75	75	75	74	75	76	76	76	76	76	75	75	74	75	76	77	76	74	73	72	75.3	77				
9-Jan	71	70	70	71	72	74	77	79	79	79	80	78	80	81	81	81	80	79	79	80	79	79	79	79	77.2	81			
10-Jan	78	77	76	76	75	75	75	75	74	74	74	73	73	74	74	75	75	75	76	73	73	71	70	70	74.2	78			
11-Jan	72	75	75	76	77	77	76	77	76	79	76	71	57	65	60	55	55	55	55	56	57	58	60	66	67.0	79			
12-Jan	69	73	70	68	65	69	69	71	72	72	72	72	73	74	76	76	72	68	67	72	71	73	72	69	71.1	76			
13-Jan	67	70	73	72	73	74	76	78	75	76	75	79	73	70	68	65	67	68	71	72	73	74	76	75	72.5	79			
14-Jan	75	76	76	75	73	75	75	73	71	71	71	71	70	67	67	62	61	65	65	65	66	67	62	66	69.4	76			
15-Jan	66	65	66	66	67	68	70	70	66	66	66	66	65	63	61	61	62	63	63	65	66	62	66	66	65.2	70			
16-Jan	67	69	68	67	70	68	72	64	64	55	52	50	49	47	48	48	48	49	48	47	49	56	57	57	57.1	72			
17-Jan	60	65	73	68	68	69	73	74	74	73	72	71	72	72	71	69	67	67	68	71	73	74	77	78	70.7	78			
18-Jan	77	80	81	86	85	85	87	82	85	88	86	89	86	82	78	74	74	72	73	73	75	77	84	86	81.1	89			
19-Jan	85	88	94	93	93	93	93	93	93	92	93	93	93	92	92	92	92	92	92	92	92	92	92	92	91.9	94			
20-Jan	92	92	93	93	93	91	93	94	89	89	88	87	84	82	80	76	72	73	79	83	85	92	94	94	87.0	94			
21-Jan	94	94	94	94	94	94	93	92	92	92	91	91	90	90	90	90	89	89	88	88	88	87	87	87	90.8	94			
22-Jan	87	87	86	85	85	85	84	84	84	84	84	84	84	84	83	83	83	83	83	82	82	82	81	81	83.7	87			
23-Jan	81	81	81	81	81	81	81	81	81	81	81	82	82	83	83	83	84	84	84	84	84	84	84	84	82.4	84			
24-Jan	84	84	84	84	85	85	85	85	86	86	86	87	88	89	90	88	85	85	85	85	86	83	83	83	85.5	90			
25-Jan	84	84	85	84	83	82	82	83	83	83	84	85	84	79	78	75	74	80	80	78	75	78	79	80	80.9	85			
26-Jan	81	83	86	85	84	83	81	82	83	83	82	81	79	75	69	66	65	67	71	72	69	69	77	80	77.2	86			
27-Jan	81	82	81	79	78	75	76	67	70	65	60	60	63	63	66	67	65	66	64	62	63	67	69	70	69.1	82			
28-Jan	73	74	76	76	78	78	79	79	80	80	79	78	77	75	71	69	71	68	66	66	62	63	60	60	72.4	80			
29-Jan	62	64	65	65	67	67	70	76	74	71	73	69	66	62	60	59	58	58	58	59	60	66	67	70	65.3	76			
30-Jan	60	58	57	59	57	57	59	62	66	67	77	76	70	66	63	58	82	82	77	74	72	76	79	80	68.2	82			
31-Jan	81	78	77	77	80	82	82	83	81	80	77	74	71	70	72	72	70	72	72	72	71	71	69	77	75.4	83			
														77.2 77.6 78.7 78.3 78.3 78.4 79.2 79.0 78.9 78.5 77.8 77.4 76.2 75.6 74.9 73.5 73.8 73.9 73.8 74.1 74.3 75.4 76.1 77.0														Diurnal Average	
														94 94 94 94 94 94 93 94 93 92 93 93 93 92 92 92 92 92 92 92 92 92 94 94														Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	40	5.38	5.38
60 - 80	405	54.44	59.81
80 - 100	299	40.19	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 20 m (WS20m) - km/h

Lower Camp Met Tower - January 2017

Maximum Speed: 26 km/h on Jan 27 11:00	Maximum Daily Speed Average: 11.4 km/h on Jan 16	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jan 7 04:00	Minimum Daily Speed Average: 0.6 km/h on Jan 23	Hours of Data: 744
Maximum Diurnal Speed Average: 3.1 km/h at hour 22	Minimum Diurnal Speed Average: 1.7 km/h at hour 13	Hours of Missing Data: 0
Monthly Average Velocity: 2.3 km/h 162.2 deg	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 4 Median = 7 O ₃ = 11 P ₉₀ = 14 P ₉₉ = 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-Jan	NW17	NNW19	N13	N11	N10	N9	NNW5	NW4	W4	SW1	WSW2	WNW2	NW1	SW1	S2	W2	SW1	SE0	S1	NNW1	S1	SE5	SSE3	SSE4	NNW2.9	NNW19	
2-Jan	WNW2	SSE3	SSE4	S0	SE4	SSE7	SSE3	SSE5	SSE5	SSE4	SSE6	SSE5	SSE4	SSE5	SSE5	SSE6	SSE4	SSE5	SSE3	SSE9	SSE9	SE8	SE10	SE12	SSE5.2	SE12	
3-Jan	SE9	SE8	SSE8	SE4	SW2	S3	SSE8	SSE8	SSE6	SSE9	SSE10	SE8	SE6	SSE8	SE7	SE9	SE8	SE2	N4	N3	NW6	NW7	NNW4	N4	SE4.2	SSE10	
4-Jan	NNW2	N2	NW2	NNW2	NE4	NNE4	NNE2	NE1	SSW1	ESE1	SE3	SE6	SE7	SSE9	SSE7	SSE7	SSE9	S11	SSE12	SSE9	SE7	SE4	NNW1	SSE3.5	SSE12		
5-Jan	NW3	NNW4	N6	N8	NNE8	NNE9	N7	N7	N5	N5	N6	N7	N8	N12	NNE9	NNE8	N6	N5	N4	N3	N5	NNW4	NNW4	NW2	N5.8	N12	
6-Jan	WSW0	W1	S3	SW2	SSW3	SSE5	SW3	SSE4	SSE8	SSE9	SSE10	SE12	SSE12	SSE7	SSE7	SSE8	SSE6	SW2	SSE7	SE9	ESE2	S3	SSE10	NNE0	SSE5.1	SSE12	
7-Jan	NNW1	NW1	NW1	WNW0	NW1	ESE0	NNW0	NW1	NW2	NW2	NNW2	N4	N13	N14	NNE11	NNE12	N10	N10	N6	NW5	NNW2	NNW2	WNW1	SE1	N4.0	N14	
8-Jan	SSW1	SSW1	SSE3	SSE7	SSE12	SSE12	SSE13	SSE9	SSE11	SSE12	SSE10	SSE11	SSE9	SSE10	SSE13	SSE14	SE15	SSE13	SSE15	SSE14	SSE14	SE13	SSE7	SSE9	SSE10.3	SSE15	
9-Jan	SW6	WSW11	SSE8	SE10	WSW9	WSW10	W6	SW3	S4	SE6	SSE4	SE1	NE0	SW1	WNW3	W4	WNW3	WNW4	NW2	NW2	SW0	NW0	NW2	NNW2	SW2.3	WSW11	
10-Jan	NW1	NNW3	NW4	WNW3	NW2	WNW2	NNW4	NW2	NNW2	NNW1	SSE1	SSE4	SSE6	SSE7	SE7	SE5	SSE6	SSE5	SSE8	SSE8	SE13	SE13	SSE15	SSE14	SSE3.7	SSE15	
11-Jan	SE15	SSE15	SSE18	SSE20	SSE18	SE17	SE17	SE13	NNW6	NNW9	N20	N23	N23	N18	NNW18	NNW18	NNW13	NNW9	NNW6	NNW5	N3	NW1	WNW1	NW2	NE2.9	N23	
12-Jan	ENE1	SSW1	ENE0	SSE2	SSE7	SSE11	SSE12	SSE11	SSE12	SE7	SE5	SSE5	SE4	SE6	SE5	SSE8	SSE10	SE11	SE11	SSE9	SSE9	SSE12	SSE9	SSE9	SSE7.3	SSE12	
13-Jan	SSE13	SSE9	SE7	SSE8	SSE7	ESE2	NNW2	S1	SSE3	SSE6	SSE7	SSE9	SSE9	SSE8	SE7	SSE11	SSE11	SE9	SSE9	SSE13	SSE12	SSE13	SSE14	SSE14	SSE8.1	SSE14	
14-Jan	SSE15	SSE16	SSE18	SSE18	SE14	SSE12	SSE11	SSE12	SSE12	SSE15	SSE16	SSE16	SSE15	SSE16	SE9	SSE9	SSE3	SSE7	W8	W4	WSW5	SE9	SE12	SE10	SSE10.8	SSE18	
15-Jan	SSE7	W17	W13	W12	W11	W14	WSW10	W13	W17	W15	W18	W14	W5	SW5	SSW4	SSW3	S3	SSE7	SE8	SSE4	SSE6	SE14	SSE13	SSE12	SW6.3	W18	
16-Jan	SSE13	SSE15	SSE15	SSE18	SE14	SE17	SE11	SE14	SSE13	SE21	SE22	SSE17	SSW11	S8	S9	SSW8	SSW11	SW8	SSW11	SW10	SSE6	SE10	SSE12	SSE13	SSE11.4	SE22	
17-Jan	SE10	SE10	SE11	SE9	SE8	SE5	SSW0	SW5	WSW12	W15	W12	W7	W6	W7	SW8	SSE4	SE6	SSE7	SE6	ESE3	SSE3	SSE10	SSE9	SSE10	S4.2	W15	
18-Jan	SSE10	SSE6	SSE5	SSE3	WNW2	N3	WSW0	NW2	NW2	NNW3	WNW3	E2	SSW2	S1	S2	SSE4	SSE2	SE5	SSE5	SE8	SSE4	SSE8	SSE4	SSE2	SSE2.4	SSE10	
19-Jan	WSW1	N6	N6	NNW5	NNW7	N8	NNW6	NNW6	NW8	NNW7	N7	N9	N8	N7	NNW6	NNW7	N6	NNW5	NNW6	NNW5	NNW5	NW6	N4	ESE1	NNW5.6	N9	
20-Jan	SSE1	ENE1	SSE5	SSE6	SSE8	SSE8	SSE11	SE7	SE7	SE5	SSE7	SSE8	SSE13	SSE9	SSE11	SSE8	SSE10	SSE8	SSE4	SSE3	N4	NNW5	NNW5	NNW4	SSE5.1	SSE13	
21-Jan	N8	N8	N10	NNE8	N9	N11	N11	N14	N11	N9	N11	N12	N11	NNE11	N11	N12	N11	NNE9	N11	N14	N11	N10	N11	N11	N10.6	N14	
22-Jan	N11	N11	N12	N11	N14	N12	N10	N9	NNE7	N9	N9	N7	N7	N8	N8	NNW7	N6	NNW5	NNW4	N5	N3	NW3	N4	NNW4	N7.7	N14	
23-Jan	N2	NW2	NNW3	NNW3	NNW2	NNW3	N3	NNW4	NNW2	N3	N4	WNW5	W5	WSW5	SSE5	SSE5	SSE5	SSE5	SSE7	SSE7	SE5	SE1	SSE3	SSE4	SSE6	SSE0.6	SSE7
24-Jan	SE7	SSE8	SSE7	SSE8	SSE8	SSE7	SSE8	SSE7	SE7	SE8	SE7	SSE9	SSE6	SSE10	SSE10	SSE9	S12	SSE16	SE11	SE7	SSE6	SSE10	SSE12	SE5	SSE8.5	SSE16	
25-Jan	SSE8	SE7	ESE6	SE9	SE10	SSE11	SSE14	SE11	SSE13	SSE12	SSE11	SE9	SSE8	SSE13	SSE6	SSE7	SSE11	SSE12	SSE11	SSE12	SSE16	SSE13	SSE12	SSE17	SSE11.0	SSE17	
26-Jan	SSE18	SSE16	SE14	SE12	SSE15	SSE14	SE15	SE17	SE18	SE16	SE17	SSE13	SSE14	SSE13	SSE11	SW5	W12	W14	W17	W17	W21	W14	W4	SW3	S7.9	W21	
27-Jan	SSW2	S2	SSW4	W10	W9	W8	W8	W12	W13	W22	W26	W22	W18	W13	W7	S2	S2	W2	E1	WSW9	WSW7	SW4	WSW6	WNW4	W8.3	W26	
28-Jan	SW3	SW8	S6	SSE8	SSE7	SSE9	SSE10	SSE12	SE10	SE10	SE13	SE13	SSE10	SSE9	SSE9	SSE10	SE9	SSE12	SSE11	SSE12	SSE9	SSE8	SW4	WSW7	SSE8.3	SE13	
29-Jan	SSW4	S6	SW5	W12	W14	W17	W13	SW8	S5	SSE8	SSE14	SE11	SSW5	W8	WSW6	SW8	WSW12	W9	W10	W7	NW3	NW4	NW3	N2	WSW5.5	W17	
30-Jan	W6	SW2	WSW13	WSW9	SW5	WSW8	W20	W20	W19	W19	N10	NNE9	NNE8	N6	NW7	NNW12	NNE9	N13	N13	N12	N12	N13	N14	N13	NW7.0	W20	
31-Jan	N12	NNE11	N13	N8	N5	N3	NNW2	S1	WNW4	W1	W4	WSW5	S1	WSW2	SE2	E1	WNW5	W14	WNW7	N4	N4	N4	N6	N5	NNW3.4	W14	

SSE2.4 SSE1.8 SSE2.4 SSE2.7 SSE2.1 SSE2.2 S2.3 S2.6 S2.6 S2.7 SSE2.4 SSE2.2 SSE1.7 SSE2.0 SSE2.2 SSE2.1 SSE2.4 S2.3 S2.2 S2.3 SSE1.7 SSE3.1 SSE3.0 SSE2.8	Diurnal Average
SSE18 NNW19 SSE18 SSE20 SSE18 SE17 W20 W20 W19 W22 W26 N23 N23 N18 NNW18 NNW18 SE15 SSE16 W17 W17 W21 W14 SSE15 SSE17	Diurnal Maximum

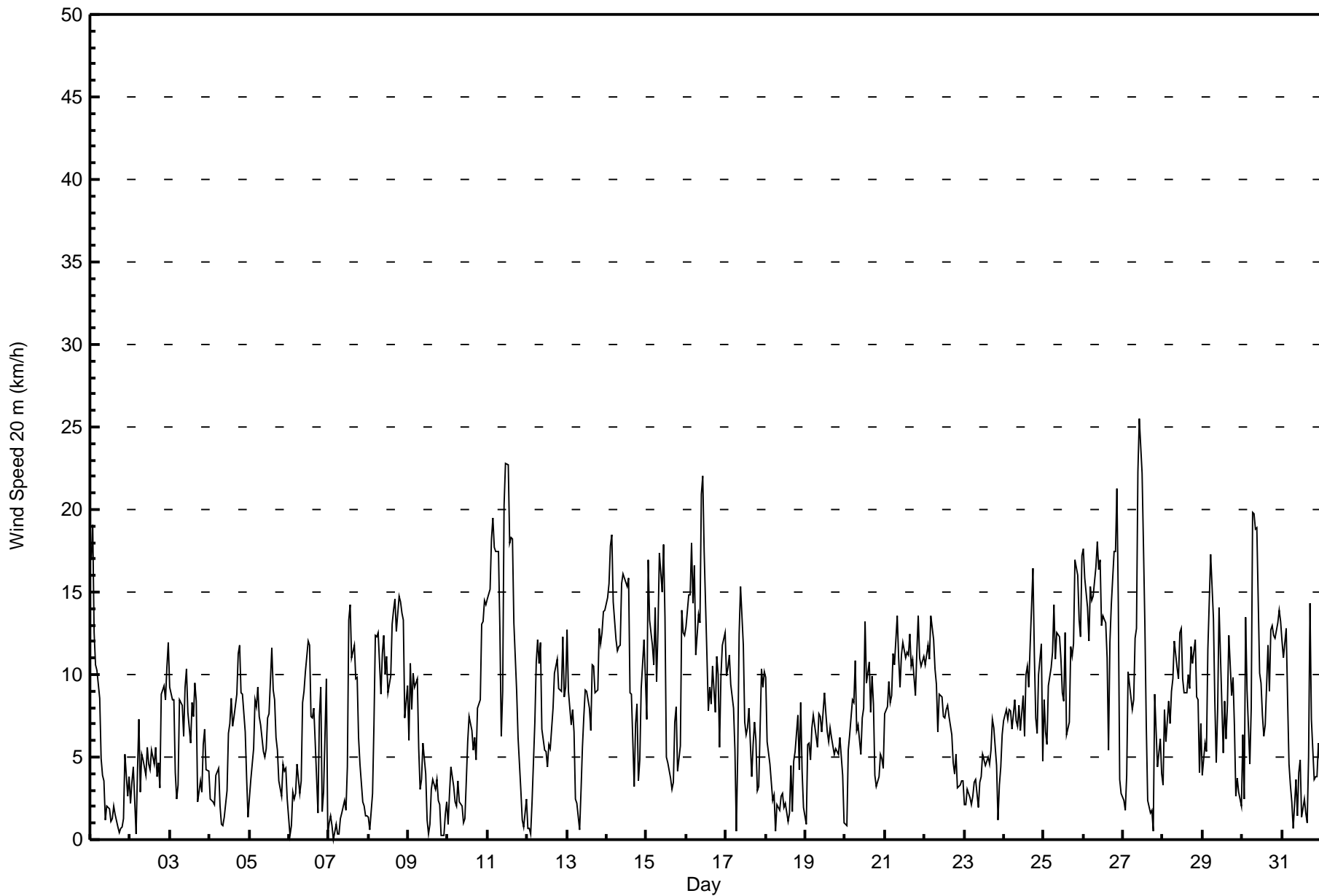
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on Jan 11 11:00 Minimum Value: 1 km/h on Jan 12 02:00 Percentiles: P ₁ = 1 P ₁₀ = 1 O ₁ = 2 Median = 3 O ₃ = 4 P ₉₀ = 4 P ₉₉ = 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-Jan	7	9	4	4	4	4	2	1	2	1	2	1	1	1	1	1	1	1	1	1	2	3	2	3	9
2-Jan	2	1	2	1	2	2	2	1	2	1	2	2	2	2	1	1	2	2	2	2	2	2	2	3	3
3-Jan	1	2	2	3	1	2	2	1	2	2	3	2	2	2	3	2	3	2	2	1	4	4	2	2	4
4-Jan	1	1	1	1	2	2	1	1	1	1	1	2	3	2	2	1	2	3	3	2	2	3	2	1	3
5-Jan	1	1	2	3	3	4	3	2	2	3	2	3	4	4	4	4	2	2	1	1	2	2	1	1	4
6-Jan	1	1	1	2	2	1	2	2	3	1	2	2	2	2	2	2	2	1	4	3	2	2	2	1	4
7-Jan	1	1	1	1	1	1	1	1	1	1	1	4	5	5	5	5	4	4	3	1	2	1	1	1	5
8-Jan	1	1	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	2	3	3	3	4	4	4
9-Jan	4	4	3	4	5	4	2	1	2	2	2	1	1	1	1	2	2	1	2	1	1	1	1	1	5
10-Jan	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	2	2	2	1	2	2	2	4	4	4
11-Jan	4	4	5	4	4	4	3	5	3	3	11	8	8	7	7	6	5	3	3	2	1	1	1	1	11
12-Jan	1	1	1	2	2	3	4	4	4	2	2	2	2	2	2	3	4	5	4	3	3	3	2	4	5
13-Jan	4	3	2	2	2	3	1	1	2	3	2	2	2	4	2	3	3	4	2	3	3	3	3	3	4
14-Jan	3	4	3	4	3	4	3	4	4	5	4	3	4	4	3	3	2	2	4	3	2	3	3	3	5
15-Jan	3	5	5	4	4	6	3	4	6	6	6	6	3	2	2	2	2	3	3	3	5	4	2	2	6
16-Jan	4	4	2	2	3	3	3	3	3	4	3	6	5	4	4	4	4	3	4	4	3	3	3	3	6
17-Jan	3	3	2	3	3	3	2	3	2	3	3	3	3	2	2	3	3	3	3	3	2	2	2	3	3
18-Jan	2	2	3	2	1	2	1	1	2	1	1	2	2	1	1	2	2	2	2	2	2	2	2	2	3
19-Jan	1	5	3	3	3	3	2	2	2	3	3	3	3	2	2	3	2	2	2	2	2	2	2	1	5
20-Jan	1	1	3	4	5	3	3	3	2	2	2	2	3	2	3	2	3	2	2	1	2	2	2	2	5
21-Jan	3	3	3	3	3	4	4	4	4	4	4	4	4	5	4	4	4	4	4	4	4	4	4	4	5
22-Jan	4	4	5	4	5	4	3	3	3	3	3	3	3	3	3	3	2	1	1	2	1	1	1	1	5
23-Jan	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	1	1	1	2	3	3	3
24-Jan	3	2	3	3	3	3	3	2	2	3	2	3	3	3	4	5	4	3	4	3	1	2	3	3	5
25-Jan	4	4	3	2	2	2	3	3	3	4	2	4	4	4	4	4	4	3	2	3	4	5	4	2	5
26-Jan	2	4	3	2	2	2	3	4	3	3	3	4	4	3	3	2	3	4	5	5	7	7	3	2	7
27-Jan	1	2	2	4	4	3	5	5	5	8	8	8	6	8	5	1	2	2	2	3	3	3	3	3	8
28-Jan	2	3	3	2	3	3	3	4	3	4	2	2	2	2	3	3	2	4	4	2	3	4	2	4	4
29-Jan	2	3	3	4	4	6	6	3	2	2	3	4	3	3	2	2	3	3	3	3	2	3	2	2	6
30-Jan	4	3	4	3	2	5	5	5	4	6	6	5	4	3	3	5	4	5	5	5	4	5	6	5	6
31-Jan	5	5	5	4	3	2	1	1	2	1	2	2	1	1	1	1	3	4	4	2	2	1	2	2	5
Diurnal Maximum																									





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	267	35.89	35.89
6 - 11	308	41.40	77.28
12 - 19	157	21.10	98.39
20 - 28	12	1.61	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

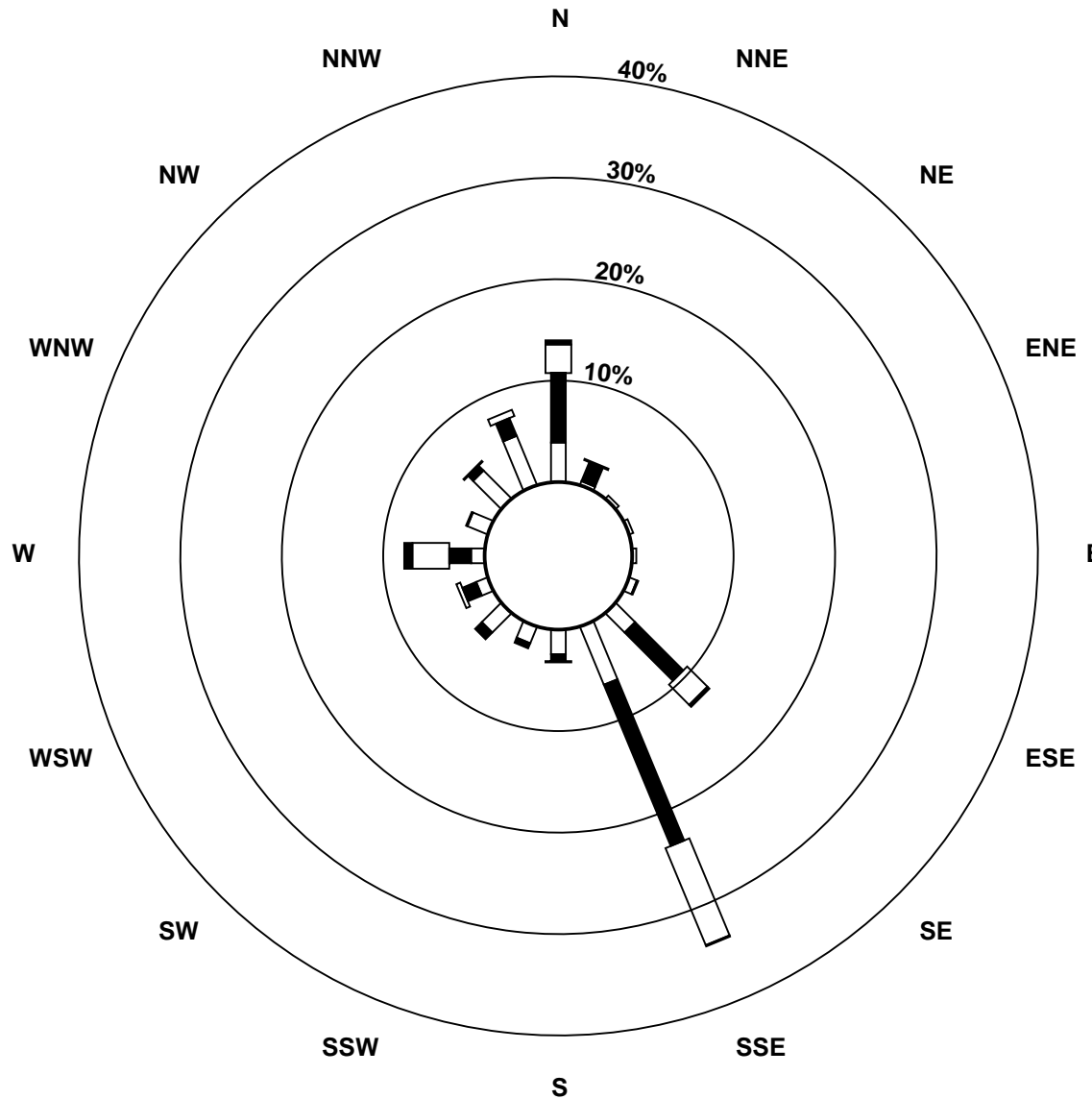
Total Number of Valid Hours: 744

Total Number of Hours: 744

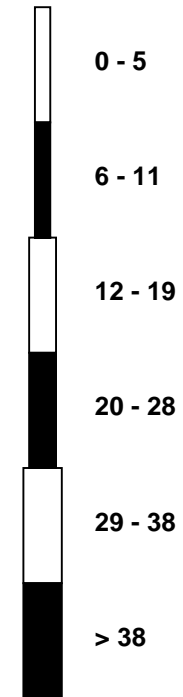


Wood Buffalo Environmental Association
Wind Rose Jan 2017

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



Classes (km/h)



Total Number of Valid Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 45 m (WS45m) - km/h

Lower Camp Met Tower - January 2017

Maximum Speed: 35 km/h on Jan 27 11:00	Maximum Daily Speed Average: 15.3 km/h on Jan 25	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jan 27 19:00	Minimum Daily Speed Average: 0.3 km/h on Jan 23	Hours of Data: 743
Maximum Diurnal Speed Average: 3.4 km/h at hour 22	Minimum Diurnal Speed Average: 1.8 km/h at hour 21	Hours of Missing Data: 1
Monthly Average Velocity: 2.5 km/h 153.8 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 6 Median = 10 Q ₃ = 15 P ₉₀ = 19 P ₉₉ = 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-Jan	NW22	NNW27	N18	N15	NNW15	NNW12	NNW7	NNW6	W5	SW3	WSW4	WNW5	NNW2	SW1	SE3	SW0	SW1	NW1	SSE2	SSE2	SSE2	SE8	SSE5	SE6	NNW4.1	NNW27	
2-Jan	NW1	SSE4	SE6	SE1	SE5	SE9	SE4	SE7	SE5	SE5	SE7	SE5	SE5	SE6	SE5	SE7	SE6	SE7	SSE4	SE11	SE12	SE10	SE13	SE15	SE6.6	SE15	
3-Jan	SE10	SE10	SE11	SE7	SSE3	SE6	SE12	SE9	SE8	SE12	SE14	SE10	SE7	SE9	SE9	SE11	SE7	WSW1	NNW5	NNW5	WNW8	WNW9	NNW6	NNW6	SE4.8	SE14	
4-Jan	NNW3	N4	NNW4	NNW4	NNE7	NNE7	NNE4	NNE1	S1	ESE3	SE4	SE8	SSE9	SSE10	SE8	SE8	SSE11	SSE12	SSE14	SE11	SE11	SE9	SE5	NNW2	SE4.2	SSE14	
5-Jan	NW4	NNW5	N9	N13	N12	NNE14	N11	N10	N8	N7	NNW8	N11	N11	N17	NNE14	NNE13	N9	N9	N6	N4	N7	NNW6	NNW7	NW4	N8.9	N17	
6-Jan	SW1	SW4	SSW6	SSW4	S5	SSE6	S3	S5	SSE8	SSE8	SE11	SE12	SE14	SE10	SE10	SE10	SE8	S2	SE10	SE11	ESE4	SSE4	SE12	SSE1	SSE6.5	SE14	
7-Jan	WNW2	NW3	NNW1	NNE1	WNW1	WSW1	NNW1	NW2	NW3	NW4	NNW4	N8	N19	N20	NNE17	N17	N14	N14	N10	NW7	NW4	NNW3	WSW2	SW1	N6.0	N20	
8-Jan	S2	SW2	SSE4	SE10	SE15	SE15	SE15	SE11	SE14	SE14	SE13	SE14	SE12	SE11	SE15	SE18	SE18	SE16	SE16	SE17	SE16	SE13	S6	SSW7	SE11.9	SE18	
9-Jan	WSW12	WSW17	SSE8	SSE8	WSW16	WSW16	WSW9	SW5	SSW4	SSE4	S3	WNW1	N2	W1	WNW5	W5	W5	WNW5	WNW4	WNW3	W1	WNW1	WNW2	NNW3	WSW4.4	WSW17	
10-Jan	NNW1	NNW5	NNW6	NW4	NNW3	NW3	NW4	NW3	NW4	NW2	SE4	SSE7	SE8	SE9	SE9	SE8	SE8	SE7	SSE8	SSE7	SE13	SE14	SE20	SE20	SE4.3	SE20	
11-Jan	SE21	SE22	SE25	SE26	SE23	SE23	SE19	SE14	NNW10	NNW13	N29	N34	NNW32	N26	NNW25	NNW26	NNW19	NNW12	NW9	NW8	NNW5	NNW2	W1	NNW4	NNE4.9	N34	
12-Jan	WNW0	SSE4	SE4	SE8	SE10	SE14	SE15	SE13	SE14	SE8	SE6	SE7	SE6	SE7	SE7	SSE10	SE14	SE14	SE15	SE12	SSE11	SSE16	SSE10	SSE12	SE9.9	SSE16	
13-Jan	SE16	SE12	SE9	SE10	SE9	SE4	NNW3	NNW0	SE5	SE8	SE10	SE12	SE11	SE10	SE10	SE14	SE15	SE12	SE10	SE16	SE15	SE17	SE17	SE17	SE10.6	SE17	
14-Jan	SE17	SE19	SE22	SE21	SE18	SE16	SE15	SE16	SE15	SE23	SE23	SE23	SE21	SE19	SE18	SE11	SSE10	SSW5	SE6	W14	W9	W10	SE11	SE12	SE13	SE13.1	SE23
15-Jan	SE8	WSW24	WSW20	WSW18	WSW15	WSW16	WSW13	WSW19	WSW24	W22	W25	W19	WSW7	SW6	SSW5	SW4	SSW4	SSE8	SE9	SE5	SSE5	SE16	SE16	SE16	SW9.5	W25	
16-Jan	SE16	SE18	SE18	SE21	SE16	SE19	SE14	SE17	SE16	SE23	SE23	SSE19	SSW15	S9	S11	SSW12	SSW16	SSW11	SSW16	SSW14	S7	ESE12	SE14	SE16	SSE13.6	SE23	
17-Jan	ESE12	SE13	SE13	SE10	SE8	SE7	E2	SW8	WSW18	WSW22	WSW18	WSW11	W9	WSW10	SW11	SSE6	SE9	SE10	SE8	ESE6	SE6	SE13	SE11	SE12	S5.6	WSW22	
18-Jan	SE11	SE8	SE7	SSE6	WNW2	N3	WNW1	NW3	NNW2	NNW5	NW4	E2	S3	SSE1	SSE2	SE6	SE3	SE7	SE9	SE10	SE6	SE10	SE5	SE3	SE3.3	SE11	
19-Jan	SSE1	NNW8	NNW8	NNW7	NNW9	NNW11	NNW9	NNW7	NW9	NNW10	NNW9	N12	N10	NNW9	NNW8	NNW9	NNW9	NNW7	NNW7	NNW7	NNW7	NNW7	NNW8	N6	ENE2	NNW7.6	N12
20-Jan	SE1	ENE1	SSE7	SSE7	SSE9	SE10	SE14	SE10	SE9	SE7	SE9	SSE10	SE16	SE10	SE12	SE8	SE12	SE10	SE7	SSE5	N4	NNW9	NNW8	NNW7	SE6.1	SE16	
21-Jan	N11	N12	N13	N13	N13	N16	N14	N19	N16	N14	N15	N16	AF	NNE15	N14	N17	N15	N16	N13	N16	N19	N16	N15	N15	N14.9	N19	
22-Jan	N15	N16	N18	N17	N20	N17	N15	N14	N10	N12	N12	N10	N10	NNW11	N11	NNW10	N9	NNW8	NNW7	N8	N6	NNW6	NNW6	NNW7	N11.2	N20	
23-Jan	N5	NNW5	NNW5	NW5	NNW4	NNW5	NNW5	NNW5	NNW2	N4	N4	W6	W6	WSW5	SE5	SE5	SE7	SE9	SE8	SE6	SSE2	SSE4	SE7	SE8	SE0.3	SE9	
24-Jan	SE10	SE11	SE10	SE10	SE11	SE9	SE10	SE9	SE9	SE11	SE8	SE11	SE10	SE14	SE16	SE14	SSE14	SSE19	SE15	SE10	SE8	SE13	SE13	SE7	SE11.2	SSE19	
25-Jan	SE15	SE12	SE10	SE12	SE13	SE12	SE16	SE9	SE3	SE15	SE15	SE13	SE11	SE13	SE19	SE11	SE14	SE18	SE14	SE15	SE22	SE23	SE21	SE18	SE20	SE15.3	SE23
26-Jan	SE21	SE19	SE17	SE14	SE18	SE18	SE18	SE19	SE21	SE20	SE21	SE17	SE15	SE16	SSE11	WSW9	WSW17	WSW20	W24	W24	W29	W21	W7	SW6	S9.6	W29	
27-Jan	SW3	SW3	SSW5	WSW15	W13	WSW11	WSW12	WSW17	W17	W30	W35	W31	W26	W18	W10	SSW3	SSW3	W4	W0	WSW15	WSW12	SW8	WSW10	W8	WSW12.6	W35	
28-Jan	SW6	SW12	SSW7	S6	SSE5	SSE7	S8	SSE10	SSE9	SE9	SE14	SE14	SE12	SE12	SE13	SE13	SE11	SE16	SE17	SE14	SE11	SSE8	WSW9	WSW12	SSE8.8	SE17	
29-Jan	SW6	SSW7	SW9	WSW18	W21	W25	W20	SW10	S5	S7	SSE13	SE11	SSW7	WSW12	WSW11	SW13	SW17	WSW14	WSW17	WSW13	W6	WNW5	W5	NW3	WSW9.4	W25	
30-Jan	WSW12	SW5	SW20	SW14	SW9	SW14	WSW28	WSW28	W26	WSW26	N15	NNE15	N10	N9	NW8	NNW16	NNE14	N18	N19	N18	N18	NNW18	NNW20	NNW19	NW9.6	WSW28	
31-Jan	N17	N17	N20	N13	N8	NNW6	NNW4	WSW1	W6	WSW3	WSW6	WSW5	SSW2	WSW3	SE1	ENE1	W8	WSW20	W11	NNW6	NNW6	N7	NNW10	NNW8	NW5.3	WSW20	

SSE2.6	SSE1.9	SE2.7	SSE2.9	SSE2.0	SSE2.3	SSE2.4	S2.7	S2.6	S2.9	SSE2.3	SE2.1	SE2.2	SE2.2	SE2.6	SE2.5	SSE2.8	SSE2.6	SSE2.6	SSE2.6	SSE1.8	SE3.4	SE3.2	SE3.0	Diurnal Average	
NW22	NNW27	SE25	SE26	SE23	W25	WSW28	WSW28	W26	W30	W35	N34	NNW32	N26	NNW25	NNW26	NNW19	WSW20	W24	W24	W29	SE21	SE20	SE20	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

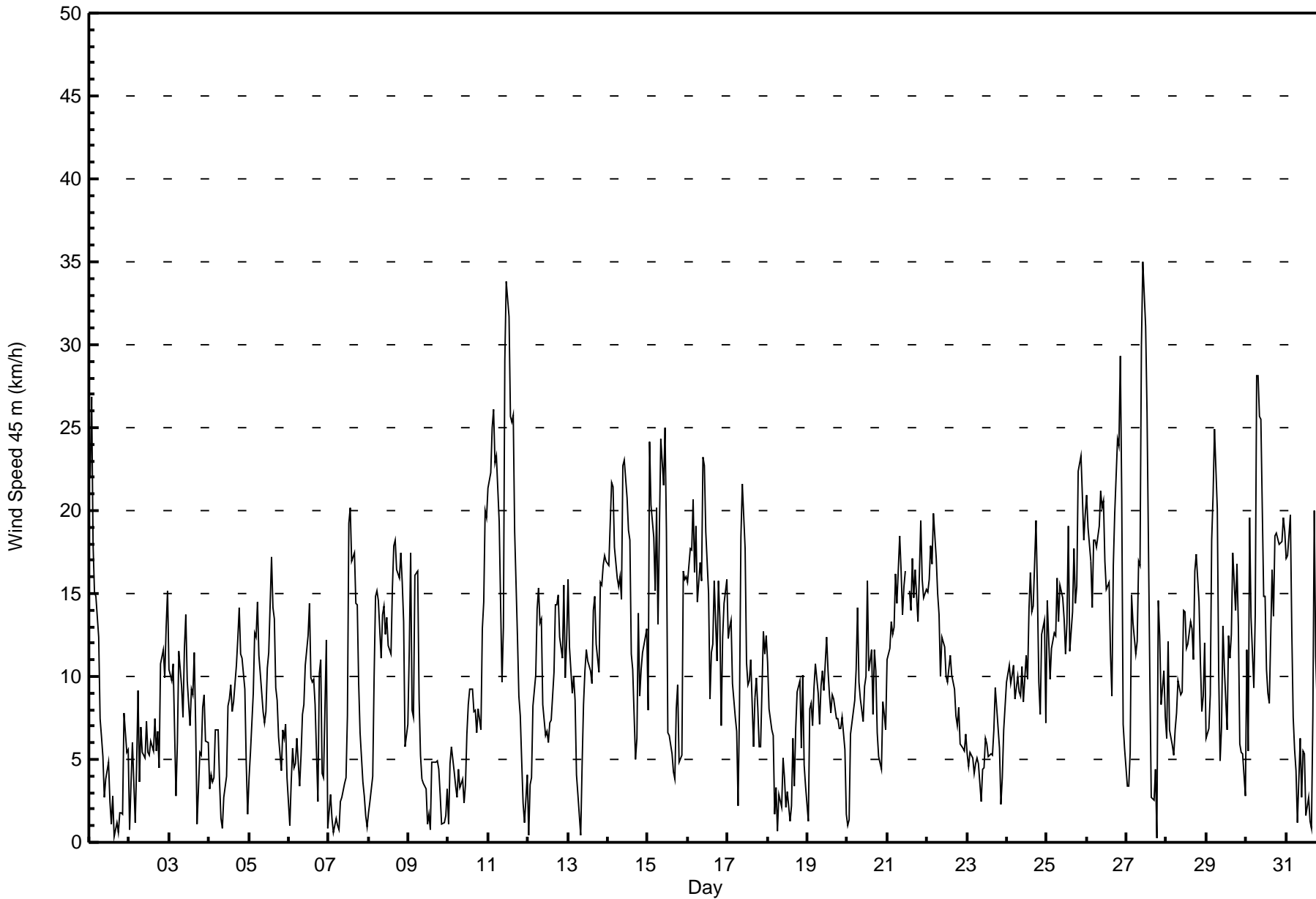
Wind Speed 45 m (WS45m) - km/h
Lower Camp Met Tower - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 14 km/h on Jan 11 11:00 Minimum Value: 0 km/h on Jan 1 18:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 8																		Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jan	7	10	5	4	4	4	3	1	2	2	1	2	1	1	1	0	1	0	1	1	2	4	3	2	10
2-Jan	2	2	2	1	3	2	2	2	2	1	1	1	2	1	1	1	2	2	1	2	2	2	3	2	3
3-Jan	1	2	1	3	2	2	1	2	2	2	2	3	2	2	2	2	2	2	2	1	5	4	2	5	
4-Jan	1	1	1	1	2	2	2	1	1	1	1	2	3	3	2	1	2	3	3	2	2	3	2	3	
5-Jan	1	2	3	4	4	4	3	3	2	3	2	4	4	5	5	4	2	2	2	1	2	2	2	5	
6-Jan	1	2	2	2	2	2	2	2	2	2	1	1	2	2	1	2	1	1	4	3	3	3	2	4	
7-Jan	2	1	1	1	1	1	1	1	1	1	1	6	5	6	5	5	4	4	4	1	2	1	1	6	
8-Jan	1	1	2	1	2	2	2	3	2	3	2	2	2	2	3	2	2	3	2	3	3	2	3	3	
9-Jan	6	4	3	4	6	4	3	2	2	2	2	1	1	1	2	3	3	2	2	1	1	1	1	6	
10-Jan	1	2	1	2	2	1	1	1	1	1	3	1	2	1	1	1	2	1	2	2	3	1	3	3	
11-Jan	4	3	4	3	2	3	2	5	5	4	14	10	9	7	8	7	6	3	3	2	2	1	2	14	
12-Jan	1	1	1	2	2	2	3	4	3	3	2	2	2	2	2	3	6	5	5	4	3	3	2	6	
13-Jan	3	2	2	2	1	3	1	1	2	3	2	2	2	4	3	4	3	5	2	2	2	2	2	5	
14-Jan	2	3	2	3	3	4	3	4	3	4	3	3	4	5	2	3	4	3	5	4	3	4	3	5	
15-Jan	4	4	6	4	5	6	4	3	5	6	5	7	3	3	2	2	2	2	3	3	5	4	2	7	
16-Jan	4	3	2	2	3	4	2	2	3	3	4	6	7	4	5	5	4	4	4	4	3	3	2	7	
17-Jan	3	3	2	3	3	3	3	5	2	2	2	4	4	3	2	2	2	2	4	3	3	2	2	5	
18-Jan	3	2	3	1	1	2	1	1	1	1	2	2	2	1	2	2	3	3	2	3	3	2	3	3	
19-Jan	1	8	4	3	3	3	3	2	2	3	3	3	3	2	2	3	2	2	2	2	2	2	2	8	
20-Jan	1	1	3	4	5	3	3	3	2	2	2	2	2	2	2	2	3	2	1	1	3	3	2	5	
21-Jan	3	3	3	4	4	4	4	4	5	5	4	5	AF	5	4	5	4	5	5	5	4	5	4	5	
22-Jan	4	4	5	5	6	4	4	4	4	3	3	3	3	3	3	3	3	2	1	1	1	1	1	6	
23-Jan	2	1	1	1	1	1	1	2	1	1	1	2	2	2	1	1	1	2	1	1	2	2	3	3	
24-Jan	2	2	3	3	3	3	3	2	2	2	2	3	4	3	4	5	4	3	5	3	2	2	3	5	
25-Jan	5	5	4	3	2	2	2	2	2	4	2	4	5	4	5	4	4	3	2	3	2	3	3	5	
26-Jan	2	4	3	2	2	2	3	4	3	1	1	3	3	3	4	4	3	4	5	5	6	8	4	8	
27-Jan	2	3	3	4	5	4	6	5	5	7	7	7	6	9	6	1	3	2	2	3	2	4	5	9	
28-Jan	4	3	4	2	2	3	3	4	4	3	2	2	2	2	3	3	2	4	3	2	3	4	3	4	
29-Jan	4	3	3	4	4	5	6	3	3	2	4	3	3	3	2	2	4	3	3	3	3	4	4	6	
30-Jan	5	5	4	4	4	6	3	4	4	5	6	5	4	3	3	6	4	5	5	5	5	6	7	7	
31-Jan	6	6	6	5	4	2	2	1	4	2	2	2	2	2	1	1	3	3	5	3	2	2	2	6	
Diurnal Maximum																									
AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Hourly Averages

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





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	174	23.42	23.42
6 - 11	275	37.01	60.43
12 - 19	233	31.36	91.79
20 - 28	54	7.27	99.06
29 - 38	7	0.94	100.00
> 38	0	0.00	100.00

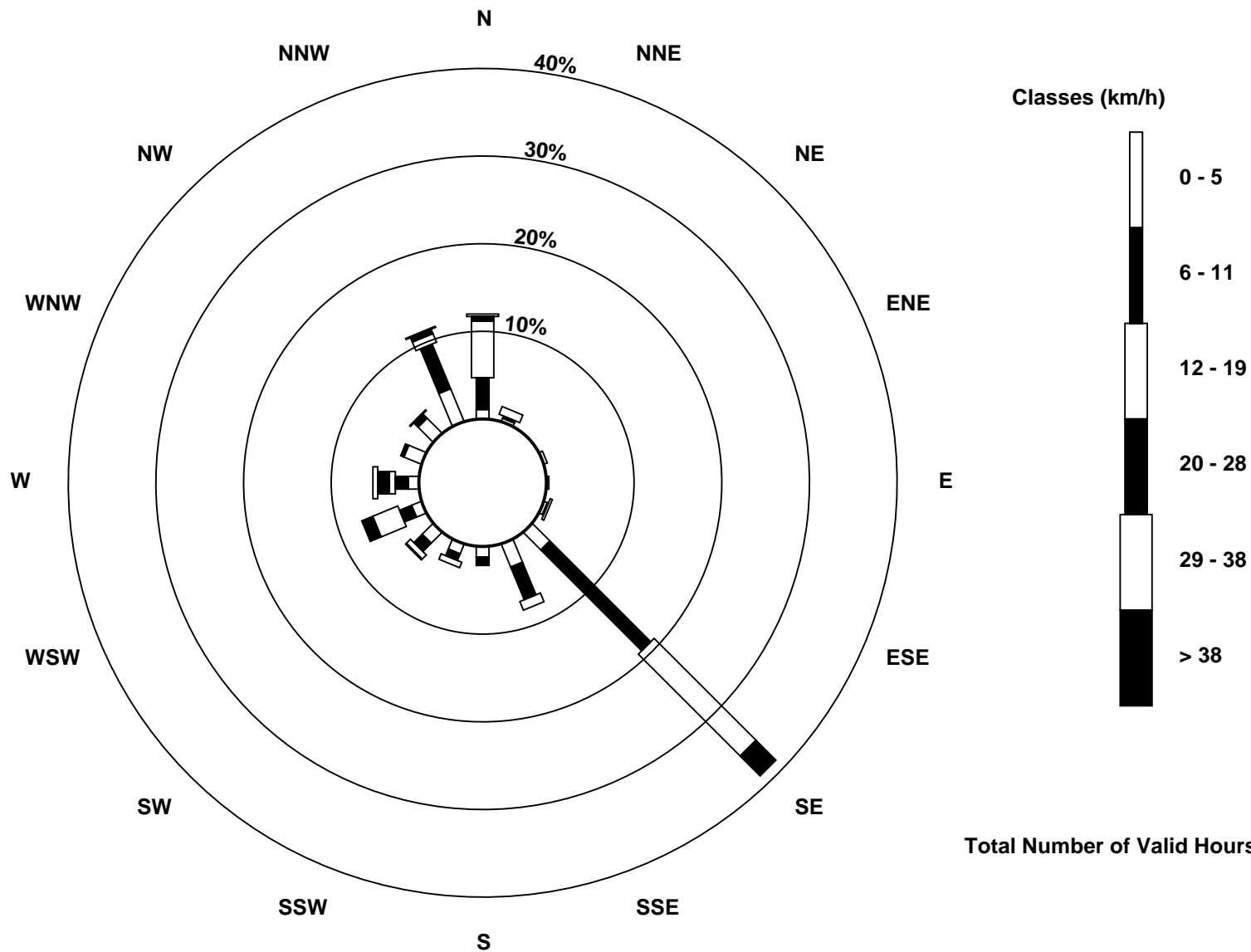
Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

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





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 100 m (WS100m) - km/h

Lower Camp Met Tower - January 2017

Maximum Speed: 51 km/h on Jan 27 11:00	Maximum Daily Speed Average: 24.2 km/h on Jan 27	Hours in Service: 744
Minimum Speed Value: 1 km/h on Jan 13 08:00	Minimum Daily Speed Average: 1.3 km/h on Jan 10	Hours of Data: 573
Maximum Diurnal Speed Average: 8.2 km/h at hour 10	Minimum Diurnal Speed Average: 3.7 km/h at hour 14	Hours of Missing Data: 171
Monthly Average Velocity: 5.6 km/h 236.3 deg	Percentiles: P ₁ = 1 P ₁₀ = 5 Q ₁ = 8 Median = 12 Q ₃ = 18 P ₉₀ = 26 P ₉₉ = 44	Percent Operational Time: 77.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jan	NW32	NNW40	N24	N22	N21	N19	N11	NNW10	NW7	WSW10	NW10	NW11	NW10	WNW3	SSE1	NNW4	ENE4	E4	SE10	SE8	S4	SE8	SE11	SSW5	NNW6.9	NNW40	
2-Jan	ENE5	SSE5	SSW3	WSW4	SW4	SSE5	WSW2	SE5	SE8	S3	SSE5	SE4	SSE2	SE4	SSE3	SSE4	SSE4	SSE5	SSE4	SSE6	SSE7	S5	SSW5	S6	SSE3.8	SE8	
3-Jan	SSW6	SSW6	S8	SSE7	S4	S6	S7	S5	S6	S8	S8	S6	SSW3	SSW4	SSW4	SSW6	SW11	W11	WNW15	WNW13	W18	WNW15	NW10	NW5	SW5.0	W18	
4-Jan	NW7	NNW8	N8	N10	NNE10	NE9	NE6	NE3	SE2	SE5	SE7	SE11	SSE10	SSE8	SSE6	SSE8	SSE12	S17	S12	SSE11	SSE13	SSE8	SE2	E4	SE3.7	S17	
5-Jan	NNE4	NNW10	N15	N18	N17	NNE19	N15	N14	N11	N12	N12	N16	N17	N24	NNE20	NNE18	N13	N13	N12	N7	N9	NNW11	NNW13	NW6	N13.2	N24	
6-Jan	WSW8	SW11	SW14	SW12	SW9	SSW7	SW10	SW12	SW11	SW9	SSW6	S6	SSE9	SE12	SE15	SE14	SSE11	S5	SSE11	S11	SSE4	SE7	SSE13	S2	S7.9	SE15	
7-Jan	WNW4	N6	N8	NNE5	AF	AF	AF	AF	AF	NNW14	N13	AF	AF	AF	AF	AF	AF	N19	N14	NNW9	NNW8	NNW8	NNW3	SW5	----	N19	
8-Jan	SSW3	SW3	SW6	S5	S7	S9	SSE10	SSE9	SSE12	SSE11	SSE10	SSE14	SE11	SSE10	SSE14	S10	S9	S11	S6	SSW7	SW11	WSW12	WSW24	WSW26	S8.2	WSW26	
9-Jan	WSW26	WSW23	SW15	SW14	WSW21	WSW20	WSW13	WSW11	WSW10	WSW10	WSW8	NW7	NNW6	NW6	WNW7	WNW7	W10	WNW8	NW6	N6	N3	W2	W3	WNW6	W8.8	WSW26	
10-Jan	NE3	N7	NNE10	N11	N10	NNW7	NNW9	NW6	NNW6	NE6	NNE1	S1	SE4	SE12	SE15	SE14	SSE8	SW6	SW11	WSW13	SW10	S7	S12	SSE15	SSE1.3	SSE15	
11-Jan	SSE16	SSE18	SSE21	SSE29	S18	S12	SSW9	WSW8	N21	NNW21	N41	N47	NNW44	N36	NNW35	NNW37	NNW28	NNW21	NW16	NW16	NW12	NW9	WNW9	W9	NNW10.9	N47	
12-Jan	SW9	S4	S4	S6	SSE9	SSE14	SSE14	SSE15	SSE18	SSE15	SSE10	S10	SSE12	SSE11	SSE18	SSE18	SE27	SE25	SE26	SE22	SSE18	SSE22	SSE10	SSE16	SSE14.1	SE27	
13-Jan	SSE17	S10	SSE5	WSW5	WSW6	WSW7	WSW1	ENE1	SSE8	SE13	SE13	SE14	SSE9	SSE10	SE14	SSE15	SSE13	SSE13	SSE7	SSE12	SSE13	SSE15	SSE14	S18	SSE9.7	SSE18	
14-Jan	S16	SSE20	SSE19	SSE21	SSE24	SSE21	SE20	SSE20	SSE22	SSE24	SSE22	SE13	SE8	SW16	SW7	SW14	WSW20	WSW9	WSW27	WSW22	WSW20	SSW7	SW15	SSW8	S13.3	WSW27	
15-Jan	WSW15	WSW38	WSW32	WSW29	W29	W32	WSW19	WSW26	WSW37	WSW35	WSW39	W31	WSW16	WSW14	WSW13	WSW13	SSW8	SW6	SW9	SW8	SSW11	SSE10	S12	WSW19.3	WSW39		
16-Jan	S12	SSW10	S10	S10	SSE15	SSE17	SSE17	SSE14	SSE17	S14	SSW17	SSW23	SW25	SSW12	SSW18	SW24	SW31	SSW24	SSW33	SW32	SSW16	SSE11	SSE17	SSE20	SSW16.6	SSW33	
17-Jan	SE13	SSE14	S10	SSW16	SW14	SW10	W2	WSW17	WSW26	WSW30	WSW27	WSW23	W22	WSW21	WSW17	SSW10	SSE11	SSE11	S12	S6	SE9	SSE9	S7	SSE12	SW10.9	WSW30	
18-Jan	SE17	SE16	SE16	SSE8	E2	E1	SE3	E4	NE2	NNW9	NW10	NNW1	SE5	SSE3	SSE6	SSE7	SSE7	SSE10	S8	S9	SSE10	SSE11	SSE8	SE9	SSE5.6	SE17	
19-Jan	SE2	N10	N15	N12	NNW14	N15	NNW14	NNW11	NNW12	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	N15	
20-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	SSE13	SE16	SSE14	SSE15	SSE11	SSE10	S6	E4	N14	AF	AF	----	SE16
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----
26-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	SSW9	S11	S10	S8	SW12	WSW20	WSW24	WSW33	WSW39	W40	W46	W37	WSW22	WSW19	----	W46	
27-Jan	WSW16	WSW15	WSW17	W27	W27	WSW24	W24	WSW33	W27	WSW45	WSW51	WSW44	WSW38	WSW29	WSW20	WSW9	W12	W12	WSW10	WSW24	WSW21	WSW18	WSW21	WSW21	WSW24.2	WSW51	
28-Jan	WSW18	WSW18	SW15	WSW16	WSW12	SW15	WSW14	SW16	SW14	SW12	SW10	SSW7	SSE7	SE17	SSE16	SSE13	S11	SSE19	SSE16	SSE8	SW7	WSW10	WSW26	WSW29	SW11.0	WSW29	
29-Jan	WSW18	WSW20	WSW23	WSW30	WSW36	WSW41	W36	WSW17	SW10	WSW16	SSW10	SSW7	SW12	W21	W17	WSW17	SW25	WSW23	W25	WSW22	WSW21	WSW18	WSW21	WSW15	WSW20.5	WSW41	
30-Jan	WSW25	WSW21	WSW26	WSW21	WSW20	WSW23	WSW35	W38	W34	W35	N20	NNE20	N14	N12	NW12	NNW23	NNE19	N24	N26	N26	N27	N27	N28	NNW27	NW14.6	WSW38	
31-Jan	N26	N25	N28	N20	N13	N8	N6	N3	W10	W8	W10	SW4	SW5	WSW5	W3	W8	W16	WSW27	WNW22	NW13	NW14	NW13	NW18	NNW16	NW9.6	N28	

SW6.1WSW5.7WSW4.7WSW5.7WSW6.2WSW6.4WSW5.9WSW7.1WSW7.0WSW8.2WSW5.9WSW4.3WSW4.1	SW3.7SSW4.3	SW4.9SSW6.6	SW5.6	SW6.2WSW6.8WSW6.2WSW4.7WSW5.9	SW6.0	Diurnal Average																		
NNW32	NNW40	WSW32	WSW30	WSW36	WSW41	WSW36	WSW38	WSW37	WSW45	WSW51	N47	NNW44	N36	NNW35	NNW37	SW31	WSW33	WSW39	W40	W46	W37	N28	WSW29	Diurnal Maximum

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



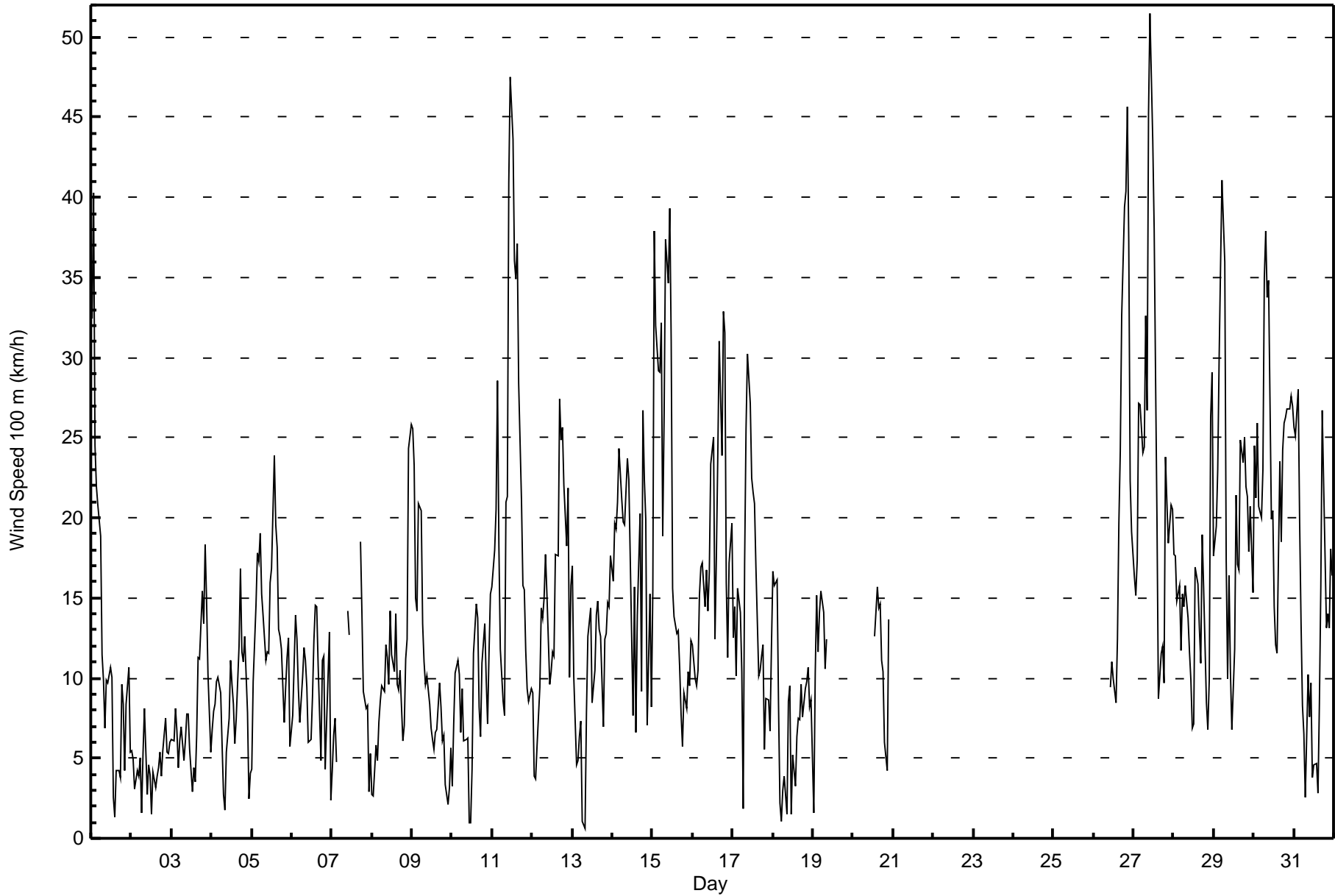
Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 15 km/h on Jan 11 11:00	Hours of Data: 573
Minimum Value: 1 km/h on Jan 5 01:00	Hours of Missing Data: 171
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 8	Hours of Calibration: 0
	Percent Operational Time: 77.0

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-Jan	8	12	4	4	4	4	4	2	2	2	2	1	1	2	1	1	1	1	2	4	1	2	3	2	12
2-Jan	2	2	1	2	2	2	1	3	3	1	1	1	1	1	1	1	1	2	1	2	2	2	2	3	
3-Jan	2	2	2	4	1	2	2	2	1	2	2	1	1	1	3	3	3	4	3	6	6	2	1	6	
4-Jan	2	1	2	2	2	1	2	1	1	1	1	2	2	3	2	2	3	3	2	3	3	1	1	3	
5-Jan	1	2	2	3	3	3	3	2	2	3	2	4	4	3	4	3	2	2	2	1	3	3	2	4	
6-Jan	3	2	1	2	2	2	2	4	5	3	2	2	3	2	1	2	2	2	3	3	2	1	3	5	
7-Jan	1	2	2	2	AF	AF	AF	AF	AF	2	2	AF	AF	AF	AF	AF	AF	3	4	1	3	2	2	4	
8-Jan	2	1	1	2	2	2	3	2	3	4	2	4	2	2	2	2	3	4	2	2	2	3	3	4	
9-Jan	3	3	5	4	3	3	2	2	1	1	2	2	2	1	2	4	2	2	1	2	2	2	2	5	
10-Jan	2	4	1	2	2	1	1	2	2	1	1	1	2	3	1	1	3	2	2	1	3	2	3	4	
11-Jan	4	3	6	2	4	3	2	4	7	4	15	8	8	6	7	6	5	3	4	3	3	2	2	15	
12-Jan	1	2	2	2	3	4	4	3	3	3	3	3	2	2	3	3	5	4	4	4	4	3	4	5	
13-Jan	4	3	2	2	2	1	2	1	2	4	3	2	2	4	2	3	3	2	2	2	2	3	3	4	
14-Jan	3	3	4	2	2	2	2	2	3	4	2	6	3	5	5	9	6	5	5	3	5	3	4	9	
15-Jan	8	3	6	4	6	8	3	4	3	4	3	7	5	3	3	2	2	2	3	5	3	4	3	8	
16-Jan	4	3	3	3	4	5	4	4	4	4	6	7	10	5	8	5	4	7	7	5	8	3	4	10	
17-Jan	4	5	3	5	6	4	3	5	2	2	2	3	4	2	2	3	2	2	3	3	2	2	3	6	
18-Jan	3	3	3	3	2	1	1	2	1	2	2	3	3	2	3	3	3	4	2	2	3	3	2	4	
19-Jan	2	7	4	3	3	2	2	2	3	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	7	
20-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	2	2	3	4	2	2	1	6	6	
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
26-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	2	3	2	4	3	3	6	2	2	4	8	3	8	
27-Jan	3	4	5	4	5	5	9	5	6	5	3	4	3	8	7	2	6	4	4	2	1	3	5	9	
28-Jan	3	2	4	4	4	4	4	2	3	5	3	3	3	2	3	4	3	4	5	2	4	6	4	6	
29-Jan	5	5	4	3	3	4	5	5	4	5	4	4	4	2	3	2	3	2	3	2	2	6	5	6	
30-Jan	3	4	3	1	2	2	5	1	3	2	6	5	4	3	4	6	4	4	4	4	5	5	6	6	
31-Jan	5	6	5	5	5	2	2	2	4	2	3	2	2	3	2	3	3	3	4	4	4	3	3	6	
Diurnal Maximum																									
8 12 6 5 6 8 9 5 7 5 15 8 10 8 8 9 6 7 7 5 8 8 6 5																									

AF - Analyzer Failure





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	78	13.61	13.61
6 - 11	196	34.21	47.82
12 - 19	167	29.14	76.96
20 - 28	90	15.71	92.67
29 - 38	30	5.24	97.91
> 38	12	2.09	100.00

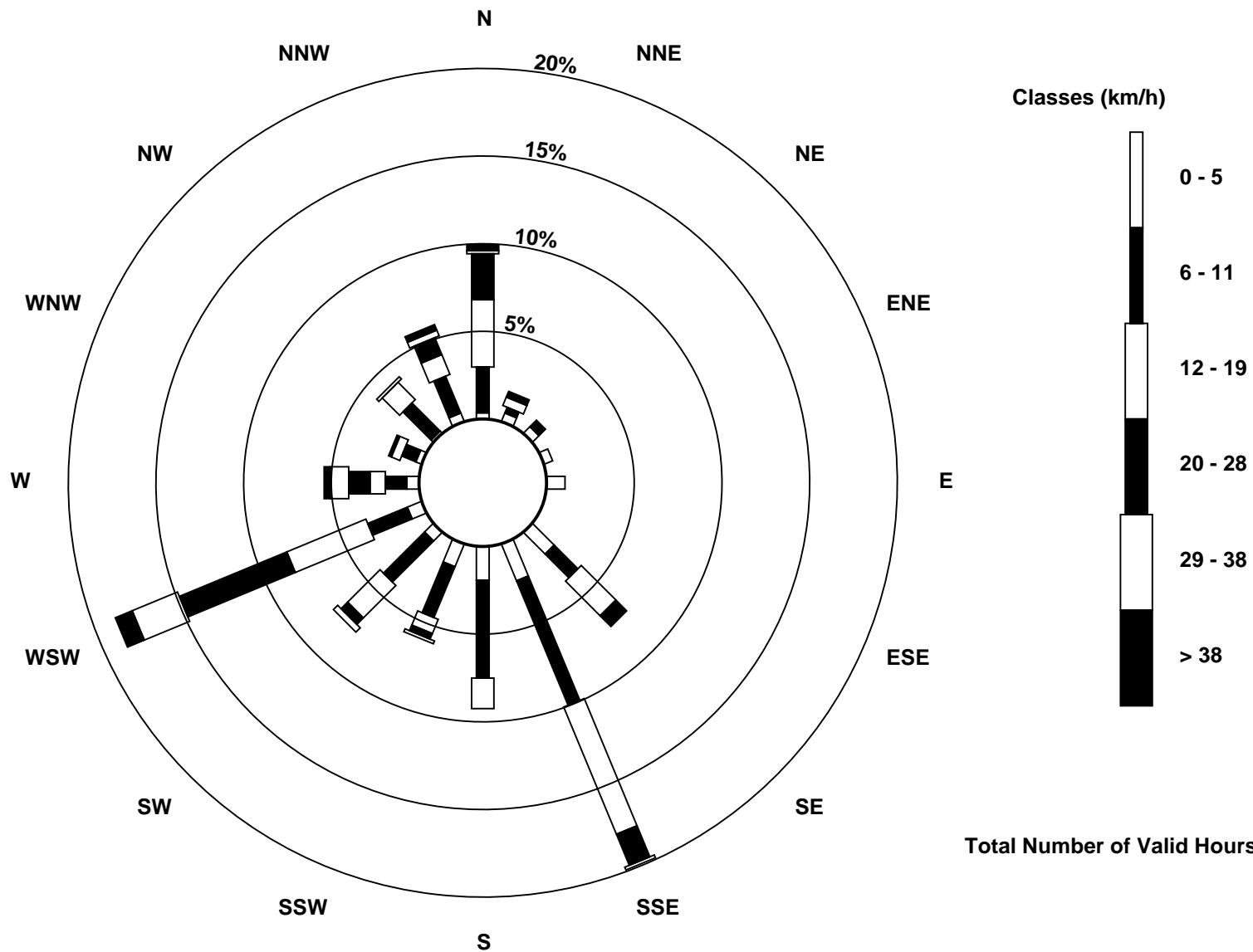
Total Number of Valid Hours: 573

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

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





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed 167 m (WS167m) - km/h

Lower Camp Met Tower - January 2017

Maximum Speed: 58 km/h on Jan 27 11:00	Maximum Daily Speed Average: 33.2 km/h on Jan 27	Hours in Service: 744
Minimum Speed Value: 1 km/h on Jan 18 06:00	Minimum Daily Speed Average: 1.5 km/h on Jan 4	Hours of Data: 485
Maximum Diurnal Speed Average: 15.2 km/h at hour 10	Minimum Diurnal Speed Average: 8.4 km/h at hour 14	Hours of Missing Data: 259
Monthly Average Velocity: 11.4 km/h 249.9 deg	Percentiles: P ₁ = 3 P ₁₀ = 6 Q ₁ = 10 Median = 17 Q ₃ = 25 P ₉₀ = 34 P ₉₉ = 61	Percent Operational Time: 65.2

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-Jan	NW42	NNW48	N27	N25	N23	N22	N13	N13	NNW9	W12	NNW18	NNW15	NW12	NW4	NW5	NNW9	NNE4	E4	ESE9	E9	SE5	SSE8	SSE8	SW8	NNW10.1	NNW48	
2-Jan	ENE5	ESE2	SW2	WSW8	WNW5	SW4	WNW6	NW5	SSW3	SW3	SW5	SW4	SSW3	S4	SSE5	S6	SSW6	SSW9	SSW8	SW10	SW9	SW13	SW12	SW11	SW4.8	SW13	
3-Jan	SW13	SW10	SSW9	SSW9	SW11	SW10	SW12	SW11	SW11	SW10	SW13	SW10	SW9	SW9	WSW11	WSW18	WSW19	W21	WNW24	WNW23	W24	WNW19	NW14	NNW11	WSW11.6	WNW24	
4-Jan	N10	N9	NNE11	NNE12	NNE11	NE10	NE7	ENE4	E3	E5	SE5	SSE9	S8	S8	SSW6	S6	S13	SSW13	SSW12	SSW10	SSW10	SSW8	WSW3	NNE4	SSE1.5	SSW13	
5-Jan	N10	NNW13	N16	NNE17	NNE18	NNE19	NNE15	NNE15	NNE13	AF	AF	AF	NNE16	N23	NNE20	NNE20	NNE14	N14	NNE14	N8	N10	N10	N9	NW7	N14.0	N23	
6-Jan	WSW10	WSW13	SW15	WSW16	SW11	SW10	SW13	SW17	WSW20	WSW18	AF	AF	SSW9	SSE7	SSE5	SSE8	SSE10	SSW9	SSW14	SSW16	SSW13	SSW8	SSW6	SW4	SW10.3	WSW20	
7-Jan	WNW4	N10	NE18	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	NE18	
8-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
9-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
10-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
11-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	N25	AF	AF	AF	N40	NNW39	NNW43	NNW34	NNW27	NNW21	NNW19	NNW18	NW15	NW13	WNW10	----	NNW43	
12-Jan	W4	SW3	SW4	SSW8	SSW9	S12	S15	SSE19	S23	SSE19	SSE14	S17	S17	S15	SSE19	SSE20	SSE32	SE30	SE30	SSE25	SSE20	SSE22	S16	S17	SSE16.2	SSE32	
13-Jan	S14	SSW11	SW5	WSW13	WSW15	W9	W4	SSW2	S8	SSE10	S5	SSE11	S7	S8	S13	S12	SSW15	SSW17	SSW15	SSW16	SSW17	SSW15	SSW17	SSW21	SSW10.4	SSW21	
14-Jan	S26	S20	S17	SSW15	SSW16	SSW16	SSW13	S15	S19	SSW17	SSW23	SW22	SW14	SW26	WSW19	WSW22	WSW31	WSW21	WSW38	WSW36	WSW32	SW17	WSW29	SW24	WSW19.9	WSW38	
15-Jan	WSW30	W50	W43	W40	W41	W40	W26	WSW36	WSW49	WSW45	W48	W39	W25	WSW21	WSW20	WSW20	WSW21	SW16	WSW16	WSW19	WSW19	SW18	SW17	SW18	WSW29.1	W50	
16-Jan	SW24	SW21	SW21	SSW23	SSW23	SSW21	SSW17	SSW22	SSW21	SW27	SW29	SW34	SW29	SW19	SW24	SW29	SW37	SW38	SW46	SW43	SW31	SSW17	S16	S20	SW25.8	SW46	
17-Jan	S13	S15	SSW18	SW31	SW28	WSW21	WSW12	W30	W36	W40	WSW38	WSW34	W33	W30	WSW24	SW14	SSW12	SSW9	SSW25	SW21	SW8	SSW12	SW17	S10	WSW20.0	W40	
18-Jan	S12	SSE15	SSE14	SSE9	ESE5	SSE1	SSE5	SE14	SE10	E2	NW3	W4	SSE9	S6	S9	S11	S12	S17	S16	S19	S14	S16	S17	S12	SSE9.7	S19	
19-Jan	SW5	N10	NNE17	N14	AF	NNE17	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	NNE17	
20-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	SSE11	SSE12	SSE15	SSE15	SSE18	SSE14	SSE14	SSE11	SSE4	NNE15	AF	AF	----	SSE18
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
26-Jan	SW17	SW16	AF	AF	SW17	SW16	WSW25	SW25	SW22	SW20	SW20	SW17	SW16	SW16	WSW24	WSW31	WSW34	WSW45	W51	W49	W51	W45	W31	W31	WSW26.8	W51	
27-Jan	W26	W26	WSW27	W38	W39	W36	W37	W43	W33	W54	W58	W51	W45	W35	W30	W17	W21	W22	W22	W28	W24	WSW26	W29	W31	W33.2	W58	
28-Jan	W24	WSW22	WSW25	WSW28	WSW25	WSW28	WSW26	WSW21	WSW24	WSW22	SW18	SW16	SW5	S7	S12	SSW15	SSW17	S20	SSW13	SW8	WSW18	W23	W38	W42	WSW18.8	W42	
29-Jan	WSW31	WSW34	WSW37	W40	W45	W52	W47	WSW30	WSW17	WSW24	SW21	SW15	WSW18	W26	W20	WSW22	WSW31	WSW36	W32	W29	W29	W24	W28	W29	W29.1	W52	
30-Jan	WNW29	W25	WSW26	WSW24	W20	W25	W35	W33	WNW32	WNW32	N22	NNE22	N16	N13	NW14	NNW28	NNE20	N26	N27	N28	N30	N32	N32	N31	NW18.5	W35	
31-Jan	N28	N28	N30	N22	NNE17	NNE10	NNE8	N4	W7	WNW4	WNW7	SW4	WSW10	WSW9	WSW12	W17	W21	W30	WNW29	WNW21	WNW23	NW22	NNW24	NNW19	NW12.2	N30	

WSW10.9	W10.3	W8.8	W12.4	W12.7	W11.5	W12	W12	W13	W15	W14	W13	W10	W10	W11	W11	W13	W13	W13	W12	W10	W10	W11	W11	Diurnal Average
NW42	W50	W43	W40	W45	W52	W47	W43	WSW49	W54	W58	W51	WSW45	N40	NNW39	NNW43	SW37	WSW45	W51	W49	W51	W45	W38	W42	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

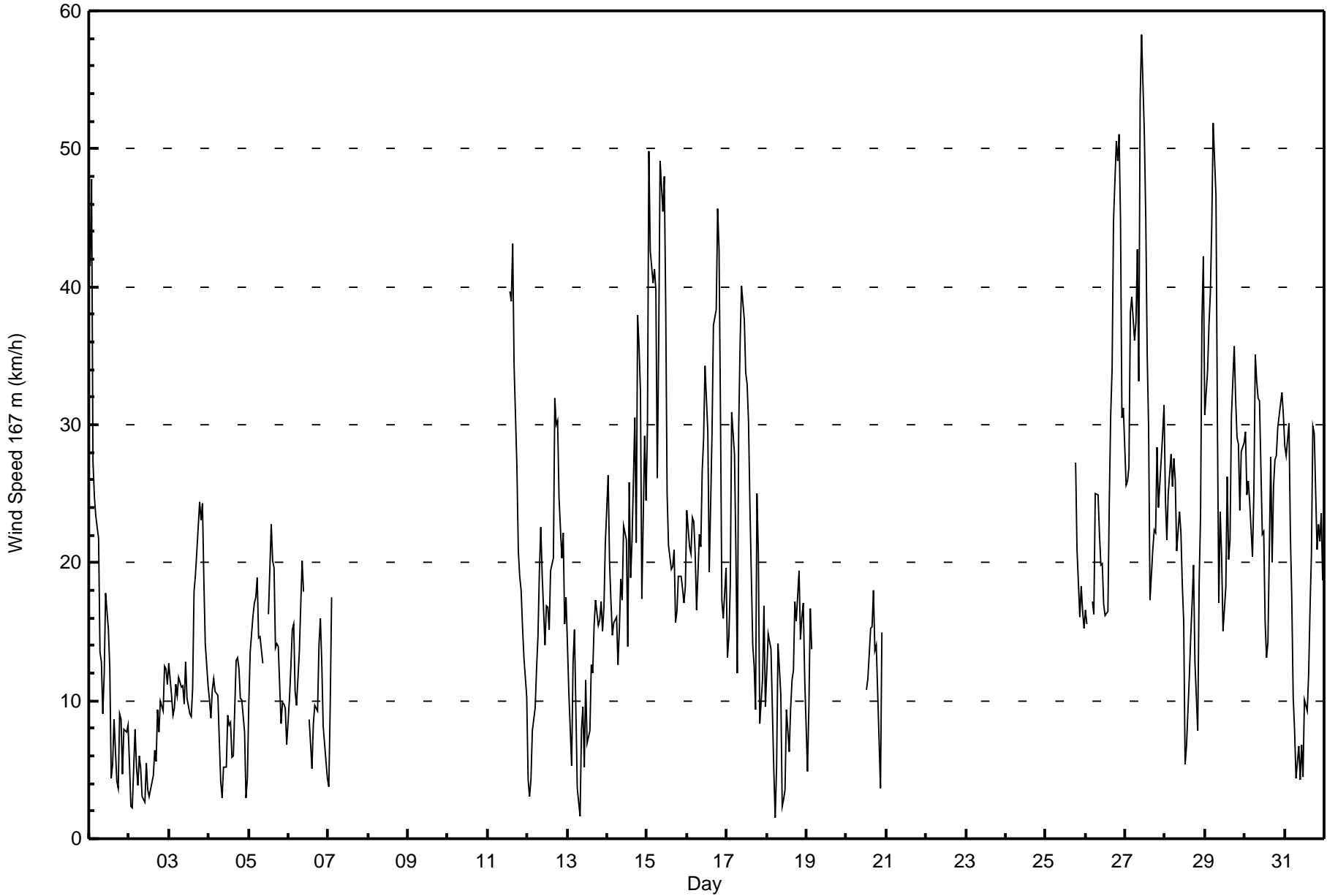
Wind Speed 167 m (WS167m) - km/h
Lower Camp Met Tower - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 13 km/h on Jan 1 02:00	Hours of Data: 485
Minimum Value: 1 km/h on Jan 1 16:00	Hours of Missing Data: 259
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 8	Hours of Calibration: 0
	Percent Operational Time: 65.2

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-Jan	9	13	4	4	5	3	4	2	3	4	3	2	2	2	3	1	2	1	1	3	1	2	1	3	13
2-Jan	2	2	1	2	2	1	1	2	1	1	1	1	1	1	1	1	2	2	1	1	1	2	1	1	2
3-Jan	1	3	3	2	1	2	2	2	2	2	2	1	2	2	2	3	1	3	4	3	4	6	3	2	6
4-Jan	2	1	3	2	2	1	2	1	2	3	1	3	2	2	1	2	2	2	2	2	2	3	2	1	3
5-Jan	2	2	2	3	2	3	3	2	2	AF	AF	AF	4	3	4	3	2	2	2	2	3	3	2	1	4
6-Jan	2	1	2	2	1	1	3	2	2	3	AF	AF	2	1	1	1	2	3	3	2	3	2	1	1	3
7-Jan	1	4	2	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	4
8-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
9-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
10-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
11-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	4	AF	AF	AF	6	6	6	4	3	4	2	2	1	2	1	6
12-Jan	2	1	1	1	1	2	2	3	3	3	2	2	3	2	4	4	5	5	3	5	5	3	4	2	5
13-Jan	2	2	2	2	3	1	2	1	2	2	2	3	2	1	2	2	2	3	3	3	2	2	2	2	3
14-Jan	2	4	2	2	2	2	2	3	4	3	4	5	3	3	5	9	5	5	3	3	5	6	3	4	9
15-Jan	8	3	5	2	4	6	3	4	3	4	2	6	4	2	3	2	3	3	5	7	6	3	3	3	8
16-Jan	5	3	4	2	4	3	3	4	3	4	4	6	10	6	8	4	3	4	3	4	5	4	3	3	10
17-Jan	4	4	5	4	3	4	6	3	2	1	2	3	2	1	2	4	3	2	6	8	3	3	4	2	8
18-Jan	2	2	2	2	3	1	3	1	2	2	3	3	5	3	3	2	3	3	2	1	3	3	5	4	5
19-Jan	3	7	4	3	AF	2	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	7
20-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	2	2	3	3	2	2	2	3	4	AF	AF	4
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	3	3	3	2	3	3	3
26-Jan	3	3	AF	AF	3	3	3	2	2	1	1	3	3	2	4	2	2	5	2	2	4	6	2	4	6
27-Jan	3	2	3	3	2	3	10	4	8	6	2	3	2	5	5	2	6	5	2	2	2	4	2	2	10
28-Jan	4	2	3	4	3	3	4	3	2	3	2	4	2	2	2	3	2	2	4	2	7	7	2	3	7
29-Jan	4	4	2	3	3	4	3	5	6	4	3	6	4	2	2	2	5	1	3	1	1	3	4	3	6
30-Jan	2	2	2	3	2	2	2	2	2	3	6	6	3	3	5	6	4	5	4	5	5	5	5	5	6
31-Jan	5	7	4	5	4	2	2	2	2	2	2	2	2	3	3	2	2	2	3	5	4	6	3	2	7
	9	13	5	5	5	6	10	5	8	6	6	6	10	6	8	9	6	5	6	8	7	7	5	5	

Diurnal Maximum

AF - Analyzer Failure





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	46	9.48	9.48
6 - 11	90	18.56	28.04
12 - 19	149	30.72	58.76
20 - 28	107	22.06	80.82
29 - 38	60	12.37	93.20
> 38	33	6.80	100.00

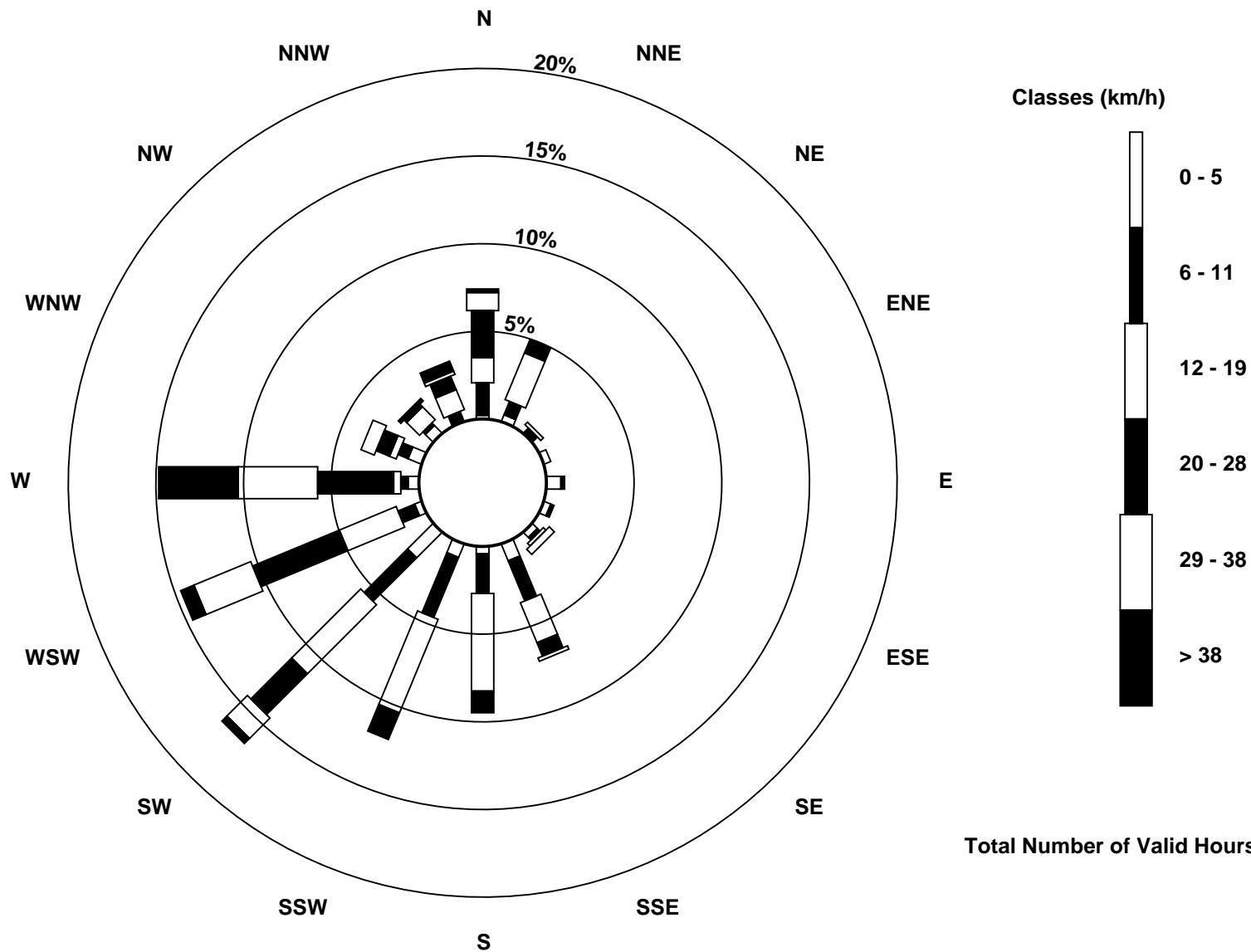
Total Number of Valid Hours: 485

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

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





Wood Buffalo Environmental Association
Summary of Hour Averages

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

Direction of Maximum Speed: 272 deg on Jan 27 11:00																						Hours in Service: 744			
Direction of Maximum Daily Speed Average: 159.2 deg on Jan 16																						Hours of Data: 744			
Direction of Minimum Speed: 290 deg on Jan 7 04:00											Direction of Minimum Daily Speed Average: 0.6 deg on Jan 23											Hours of Missing Data: 0			
Monthly Average Direction: 239.8 deg																						Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jan	315	344	1	360	353	352	340	322	266	217	243	300	312	214	190	259	234	139	177	331	169	143	160	149	335.6
2-Jan	283	168	152	170	144	156	151	150	155	151	156	156	152	159	156	149	149	148	166	148	148	144	146	146	151.7
3-Jan	143	144	148	141	216	173	153	150	150	152	148	142	139	148	145	143	137	125	351	358	313	309	342	354	145.8
4-Jan	342	355	326	346	36	32	24	42	192	118	144	141	158	160	153	151	158	170	160	154	153	138	142	337	147.3
5-Jan	323	334	4	11	16	20	9	1	360	354	349	2	11	7	24	33	8	4	0	357	0	332	348	306	4.7
6-Jan	245	275	189	231	203	161	235	163	159	152	148	146	151	147	156	158	151	233	149	145	114	180	155	21	157.7
7-Jan	348	317	305	290	311	103	341	312	316	308	327	360	2	359	17	12	5	5	3	326	344	335	300	138	357.8
8-Jan	203	199	153	147	151	152	154	153	156	156	154	156	153	151	150	149	146	150	153	153	149	146	154	162	152.3
9-Jan	229	248	158	140	248	254	265	227	174	145	158	146	39	231	284	274	287	302	311	310	236	319	321	348	231.2
10-Jan	325	338	304	295	310	296	338	319	333	331	164	163	157	152	138	141	150	164	158	152	144	146	147	151	153.2
11-Jan	146	149	150	152	150	143	145	140	329	339	1	7	352	0	347	343	343	331	328	334	359	321	283	324	35.0
12-Jan	59	195	78	164	148	150	151	151	151	145	139	149	132	132	145	160	150	135	142	159	164	162	164	160	150.6
13-Jan	153	147	144	151	148	121	335	170	149	152	155	155	153	150	145	149	150	143	148	154	158	157	152	147	150.6
14-Jan	149	154	153	152	145	150	152	150	147	147	150	152	155	150	146	158	153	148	265	272	258	145	141	139	152.8
15-Jan	153	263	261	259	269	269	247	260	269	271	273	277	261	214	194	198	172	151	145	159	157	144	147	154	235.3
16-Jan	151	151	149	150	143	143	136	142	151	144	143	152	202	175	189	205	212	216	211	224	158	125	148	148	159.2
17-Jan	131	135	137	133	130	134	196	224	258	263	268	268	275	263	233	160	142	155	130	105	157	150	147	154	179.4
18-Jan	152	151	151	160	303	352	258	324	309	337	299	95	202	173	175	159	153	144	153	146	153	152	149	163	156.0
19-Jan	242	351	349	344	339	353	338	334	324	340	351	357	358	349	340	342	350	344	341	331	339	306	356	103	342.8
20-Jan	153	57	166	160	156	148	153	142	140	141	147	162	154	153	154	151	153	156	159	164	351	343	346	344	150.7
21-Jan	359	358	0	14	9	4	1	2	7	10	4	356	0	12	1	0	357	9	12	1	358	0	357	1	2.8
22-Jan	360	360	10	10	4	1	1	4	16	1	357	354	358	350	358	344	354	348	346	358	349	325	352	347	358.8
23-Jan	349	315	328	331	344	339	356	343	348	6	1	282	269	252	151	149	148	151	151	142	137	160	147	152	168.4
24-Jan	146	151	148	147	158	156	150	147	143	143	142	147	153	154	151	156	172	158	144	144	151	154	149	139	151.1
25-Jan	147	130	122	144	145	147	149	145	149	152	144	147	153	151	150	155	156	153	151	151	151	154	159	153	149.6
26-Jan	152	152	146	144	147	148	146	144	144	146	145	148	148	151	156	227	266	271	276	271	271	275	275	216	176.0
27-Jan	196	188	196	265	276	265	265	265	266	271	272	272	272	275	267	169	181	275	100	255	254	234	257	298	264.9
28-Jan	222	222	184	152	153	155	161	156	146	141	142	143	149	150	147	150	145	154	150	153	153	153	217	250	157.2
29-Jan	208	181	222	260	270	274	274	222	171	160	152	145	192	263	255	234	239	263	262	261	312	322	322	359	240.0
30-Jan	277	219	244	241	229	239	261	265	270	268	8	21	12	2	319	345	18	7	1	5	5	353	353	350	317.0
31-Jan	2	13	5	358	3	352	333	180	282	274	268	245	180	246	124	96	286	266	285	2	5	357	350	351	332.0
154.7	163.7	154.6	157.7	161.8	164.1	177.0	176.5	187.9	181.5	162.5	152.7	158.3	154.6	151.4	149.0	162.0	170.1	171.7	170.5	164.9	153.2	147.6	147.3		
Diurnal Average																									
All monthly, daily, and diurnal averages have been calculated using vector methods																									



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

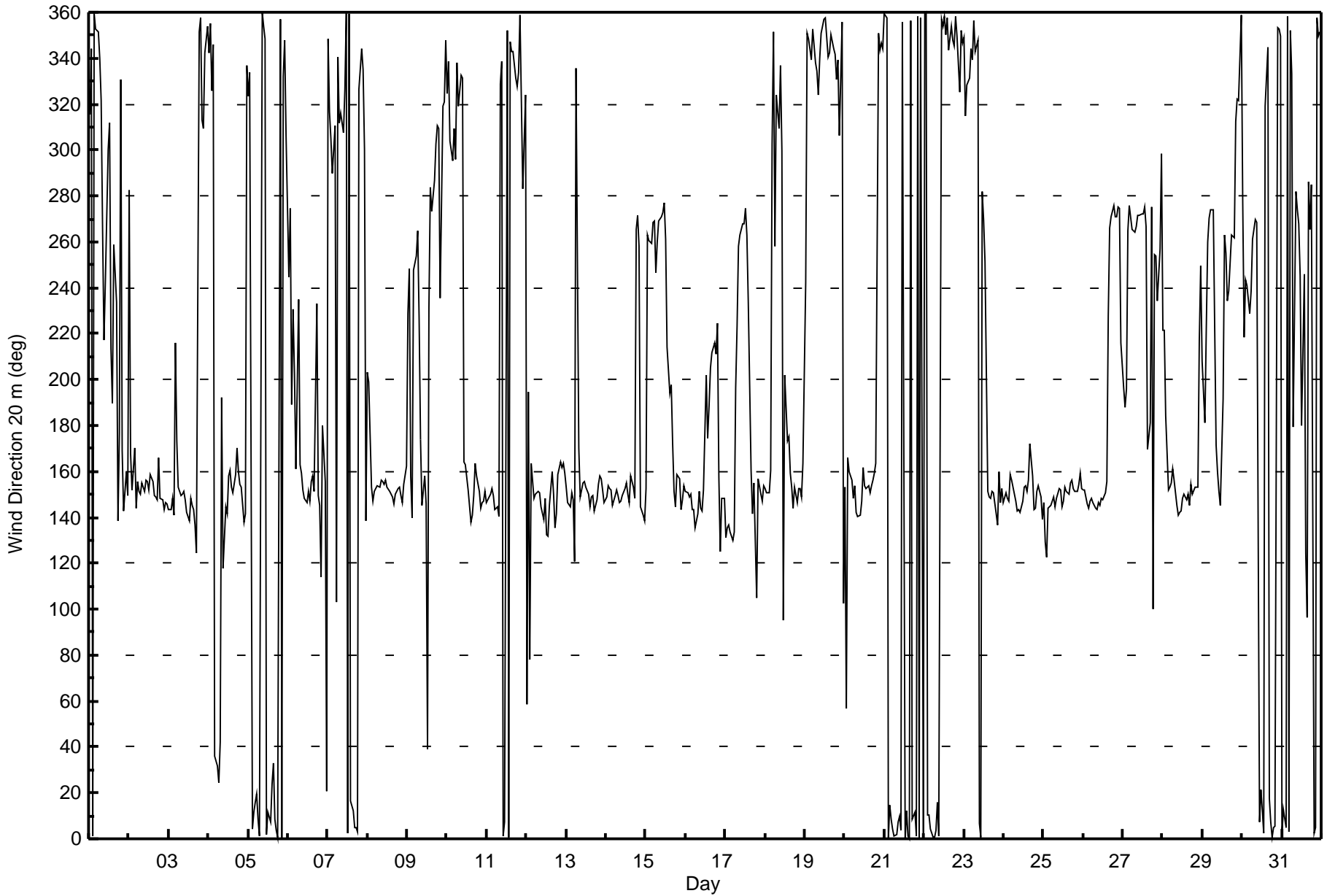
Wind Direction 20 m (WD20m) - deg
Lower Camp Met Tower - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 103 deg on Jan 7 07:00 Minimum Value: 5 deg on Jan 16 04:00 Percentiles: P ₁ = 6 P ₁₀ = 9 Q ₁ = 12 Median = 19 Q ₃ = 31 P ₉₀ = 60 P ₉₉ = 94																	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-Jan	27	21	19	20	19	17	18	25	36	72	50	64	69	52	43	29	90	87	86	84	81	58	58	59	90
2-Jan	62	23	23	102	35	9	19	11	10	9	12	16	14	11	12	11	19	41	30	8	9	8	8	7	102
3-Jan	6	6	7	29	34	18	8	6	9	8	11	15	18	10	11	13	16	79	31	35	45	44	29	18	79
4-Jan	35	22	29	24	25	22	52	68	62	43	25	16	22	12	9	8	7	9	10	9	15	19	16	70	70
5-Jan	20	22	21	21	23	22	22	18	22	28	20	23	25	20	26	24	21	16	25	33	21	21	22	36	36
6-Jan	94	73	24	53	34	13	62	44	23	9	8	6	7	12	10	10	12	62	16	7	81	54	9	90	94
7-Jan	75	49	58	99	69	95	103	63	47	34	41	51	18	18	24	23	20	21	22	21	68	49	63	31	103
8-Jan	45	80	52	14	7	8	8	11	8	8	10	10	13	9	9	9	7	9	5	8	8	8	36	19	80
9-Jan	50	20	31	16	45	21	24	36	31	13	30	74	97	60	38	41	41	28	70	60	98	97	47	27	98
10-Jan	73	26	15	52	47	52	17	30	25	78	41	22	13	8	11	12	11	15	8	11	7	7	11	12	78
11-Jan	14	13	12	9	9	11	7	19	36	17	19	20	17	22	19	16	16	14	16	17	20	48	87	56	87
12-Jan	86	53	90	48	9	11	10	13	10	13	17	16	26	14	16	11	23	22	19	19	14	10	10	14	90
13-Jan	11	13	15	12	15	63	27	69	23	20	11	11	14	18	10	9	16	8	8	9	10	8	9	9	69
14-Jan	6	9	8	7	9	11	12	14	13	14	13	10	8	12	13	18	51	22	36	74	46	16	13	11	74
15-Jan	25	12	16	16	16	18	17	15	17	19	18	22	42	31	30	46	34	13	29	68	56	8	9	7	68
16-Jan	10	8	7	5	9	7	12	10	11	6	7	17	28	34	22	23	11	19	12	18	46	15	11	11	46
17-Jan	19	18	9	21	23	42	94	36	10	9	14	29	29	19	13	32	35	8	48	64	59	6	11	9	94
18-Jan	8	14	55	22	68	63	88	60	70	26	39	83	67	82	55	26	79	24	11	9	26	8	24	55	88
19-Jan	78	60	20	27	23	18	19	20	14	19	18	20	20	20	19	19	20	19	24	20	23	26	22	76	78
20-Jan	67	91	30	38	26	18	11	19	10	32	16	11	9	10	9	10	9	9	16	43	28	18	17	19	91
21-Jan	20	18	17	21	21	18	18	17	20	20	18	17	19	21	17	17	17	21	22	18	16	19	18	18	22
22-Jan	19	18	21	21	18	17	18	20	22	18	19	18	26	20	20	22	18	15	17	13	21	24	26	18	26
23-Jan	55	24	29	20	28	25	22	24	34	22	25	28	28	33	16	16	13	13	10	14	64	37	36	19	64
24-Jan	15	13	20	18	24	23	11	13	13	14	15	15	31	16	17	21	14	11	12	17	7	7	7	33	33
25-Jan	23	49	31	11	9	7	7	9	8	9	10	19	26	17	39	30	17	14	9	8	11	15	16	5	49
26-Jan	6	8	8	6	6	6	10	9	7	7	7	15	10	8	10	34	12	15	15	14	15	23	61	71	71
27-Jan	55	71	41	21	23	23	37	20	23	16	15	17	20	33	40	64	76	82	90	15	22	39	45	61	90
28-Jan	61	14	38	16	20	14	17	14	13	21	8	9	8	12	17	13	10	13	15	7	17	23	43	25	61
29-Jan	40	26	30	13	16	18	26	20	33	19	9	19	44	18	15	15	10	15	13	22	69	53	66	83	83
30-Jan	40	83	9	15	31	26	11	12	12	13	42	26	29	25	20	23	22	19	19	21	20	16	18	18	83
31-Jan	19	22	22	22	30	24	40	84	58	73	36	24	74	69	40	64	35	14	30	35	26	20	20	20	84
94 91 90 102 69 95 103 84 70 78 50 83 97 82 55 64 90 87 90 84 98 97 87 90																									
Diurnal Maximum																									



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Summary of Hour Averages

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

Direction of Maximum Speed: 262 deg on Jan 27 11:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 138.4 deg on Jan 25	Hours of Data: 743
Direction of Minimum Speed: 266 deg on Jan 27 19:00	Hours of Missing Data: 1
Direction of Minimum Daily Speed Average: 0.3 deg on Jan 23	Percent Operational Time: 99.9
Monthly Average Direction: 271.9 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-Jan	308	338	357	354	347	346	336	327	262	224	252	294	345	232	142	214	235	324	157	148	158	134	148	141	333.1
2-Jan	325	162	143	131	132	141	130	140	137	138	143	141	135	142	137	135	134	132	147	137	137	133	135	136	137.7
3-Jan	133	132	138	133	156	146	140	137	135	139	139	134	128	137	133	133	141	239	327	338	293	295	339	346	136.1
4-Jan	330	349	334	341	33	29	25	27	172	114	132	133	148	152	145	142	150	164	152	144	143	133	132	348	133.1
5-Jan	324	332	358	7	10	15	5	358	357	352	345	359	8	2	17	24	6	2	1	354	350	327	338	316	0.6
6-Jan	226	231	201	210	191	160	181	177	162	150	137	134	138	135	139	146	136	178	136	135	112	157	143	165	149.8
7-Jan	296	311	346	17	301	245	327	306	312	310	328	350	359	356	14	8	0	2	358	325	323	332	257	215	351.6
8-Jan	187	233	162	140	138	139	139	139	141	141	141	141	139	137	136	137	135	139	138	140	135	131	188	194	141.3
9-Jan	242	241	165	152	241	244	253	235	199	168	190	287	356	271	282	278	273	286	283	293	268	303	300	337	243.6
10-Jan	334	342	330	309	327	319	315	315	324	309	142	151	146	138	127	133	138	145	153	165	140	129	136	140	139.0
11-Jan	138	140	141	142	142	136	133	125	342	333	356	3	345	356	342	336	337	327	322	326	343	341	268	284	24.3
12-Jan	289	151	140	146	136	138	139	141	141	134	129	140	126	128	139	150	138	126	132	142	150	147	153	148	140.0
13-Jan	146	141	136	140	140	139	346	342	144	138	141	146	143	140	134	139	139	133	133	140	142	142	138	134	139.1
14-Jan	134	139	139	139	135	138	138	137	135	138	137	139	144	141	139	160	195	139	259	259	260	138	140	129	144.7
15-Jan	146	253	249	248	258	258	240	249	258	259	262	265	258	218	205	224	193	150	141	166	164	134	136	145	231.8
16-Jan	142	142	137	140	133	132	126	132	137	136	136	153	200	175	184	196	203	204	202	213	169	120	137	138	153.2
17-Jan	122	128	128	143	136	137	96	229	247	253	256	256	269	255	231	165	136	143	135	114	141	137	134	139	178.7
18-Jan	137	136	135	149	302	352	293	312	344	342	314	92	182	158	162	145	134	136	142	136	138	139	135	135	137.4
19-Jan	161	347	339	342	337	348	334	331	321	336	346	352	356	344	334	338	344	339	337	328	337	295	350	69	339.2
20-Jan	135	57	162	158	157	142	143	134	130	131	135	148	141	137	141	135	140	141	141	147	353	339	338	345	137.4
21-Jan	355	352	357	10	3	0	357	358	5	4	10	357	AF	21	359	354	351	4	8	357	355	357	353	355	360.0
22-Jan	354	356	5	6	1	357	356	0	10	357	353	349	354	345	352	339	350	343	338	351	360	338	337	344	354.4
23-Jan	350	339	338	326	334	337	347	337	340	357	351	272	261	244	139	139	138	141	142	136	148	154	145	143	124.7
24-Jan	138	140	137	136	144	141	139	137	135	137	134	138	140	143	140	143	166	152	136	133	134	139	135	132	140.4
25-Jan	140	133	129	132	133	132	135	133	135	138	140	135	137	142	141	139	142	142	140	141	142	141	143	139	138.4
26-Jan	140	142	136	134	134	137	135	137	136	136	136	139	142	141	151	238	254	258	265	260	260	262	260	227	173.6
27-Jan	218	218	212	258	266	258	258	256	260	260	262	261	260	264	262	200	212	266	266	244	242	235	249	270	255.8
28-Jan	234	222	203	169	160	162	171	163	149	142	134	130	133	137	138	141	135	142	138	140	142	152	239	246	155.4
29-Jan	223	204	233	250	259	262	260	218	180	171	147	139	205	255	246	225	228	245	249	245	271	290	280	304	238.2
30-Jan	257	226	232	227	230	234	250	255	259	258	2	15	7	357	311	339	13	2	356	1	2	346	346	343	308.1
31-Jan	358	8	359	354	2	344	331	249	262	256	258	239	197	250	124	72	270	256	276	345	348	353	344	339	326.1

148.0 161.5 144.5 152.8 154.7 157.8 167.1 176.0 188.2 183.0 152.4 136.6 145.4 131.0 135.0 134.3 154.3 160.4 166.5 166.1 162.6 139.4 140.4 139.8
 Diurnal Average

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 100 deg on Jan 27 19:00	Hours of Data: 743
Minimum Value: 3 deg on Jan 26 00:00	Hours of Missing Data: 1
Percentiles: P ₁ = 3 P ₁₀ = 5 Q ₁ = 8 Median = 14 Q ₃ = 22 P ₉₀ = 45 P ₉₉ = 91	Hours of Calibration: 0
	Percent Operational Time: 99.9

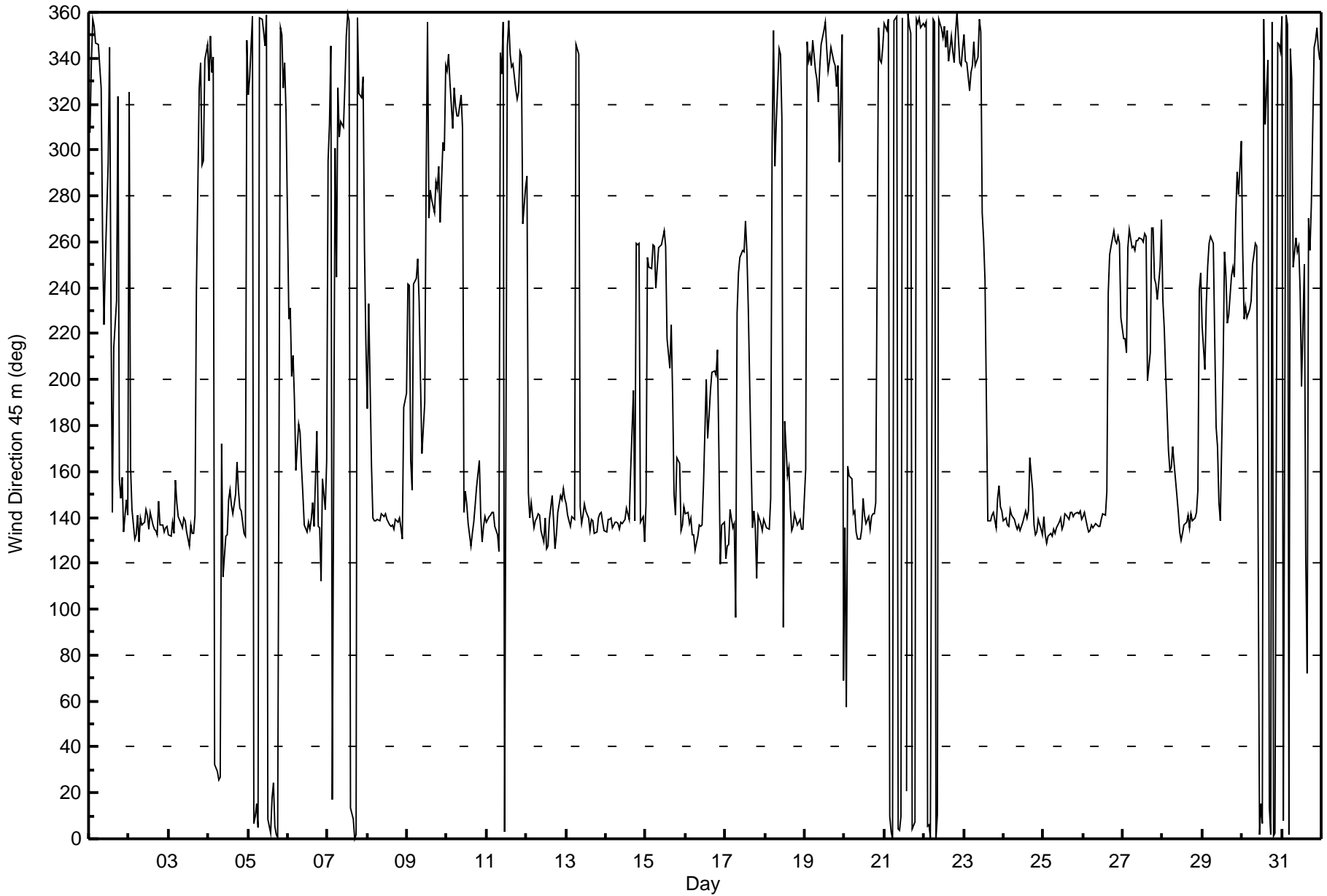
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jan	27	19	14	15	14	14	13	15	27	38	19	22	24	80	18	79	51	58	41	41	52	29	23	43	80
2-Jan	94	37	12	91	41	7	16	7	9	8	7	11	10	8	8	7	13	9	11	5	6	6	5	3	94
3-Jan	5	4	5	11	28	11	4	4	5	5	5	10	13	6	8	8	22	90	25	20	36	31	20	14	90
4-Jan	25	13	18	14	16	16	41	49	83	25	16	12	16	10	8	10	7	8	9	7	12	12	11	52	83
5-Jan	12	18	16	15	18	16	14	12	16	22	15	18	16	14	19	16	15	12	19	26	16	15	17	28	28
6-Jan	95	25	14	21	31	9	37	24	28	19	7	4	3	8	6	9	6	47	8	7	67	64	6	89	95
7-Jan	61	15	38	89	55	78	99	24	27	18	21	23	14	14	17	16	14	17	18	15	43	37	35	61	99
8-Jan	36	38	41	8	4	4	4	6	5	5	5	6	7	6	5	3	4	7	4	5	6	6	45	29	45
9-Jan	28	9	30	26	33	8	14	22	29	25	38	74	63	77	18	23	26	22	18	30	80	68	64	30	80
10-Jan	63	24	16	22	37	27	15	15	16	26	53	10	7	7	5	7	7	10	14	16	12	5	4	6	63
11-Jan	7	6	5	4	4	5	3	12	29	14	16	14	14	19	16	13	13	11	12	11	16	27	87	18	87
12-Jan	95	24	14	5	5	6	6	8	8	11	14	13	20	11	12	10	17	14	14	16	11	8	9	8	95
13-Jan	8	9	10	9	12	43	26	91	15	12	6	6	6	9	12	6	4	9	6	5	4	5	5	4	91
14-Jan	4	4	3	4	5	7	7	7	8	6	5	4	4	8	12	29	50	47	16	13	16	20	17	7	50
15-Jan	45	7	8	8	12	12	13	9	10	11	11	16	35	28	32	43	32	12	20	67	65	7	5	4	67
16-Jan	10	5	5	3	6	5	8	6	8	4	10	20	24	33	21	15	11	15	12	14	34	12	10	8	34
17-Jan	16	15	7	23	31	26	84	26	6	4	8	18	18	15	8	28	12	6	53	45	42	6	8	6	84
18-Jan	6	11	41	11	74	47	79	32	48	16	36	85	60	72	52	16	51	19	5	8	18	5	22	24	85
19-Jan	62	87	15	17	19	13	16	17	12	14	14	13	17	16	14	15	13	14	14	16	18	21	14	59	87
20-Jan	70	86	22	33	23	15	7	11	7	11	10	8	5	6	6	10	7	4	7	11	73	11	13	13	86
21-Jan	14	14	14	15	16	13	14	12	15	15	15	13	AF	14	16	12	13	15	16	15	13	14	14	14	16
22-Jan	15	14	16	15	13	14	14	15	16	13	14	15	20	17	16	19	14	11	12	8	15	16	16	13	20
23-Jan	13	13	17	9	13	15	14	17	28	16	21	22	19	30	13	13	8	7	6	8	56	32	14	14	56
24-Jan	9	8	13	14	14	15	8	9	10	9	12	11	19	9	9	13	10	10	8	11	7	4	5	14	19
25-Jan	13	22	19	9	7	5	4	6	4	7	6	15	17	9	23	15	9	8	6	3	3	5	8	3	23
26-Jan	4	6	6	4	3	4	5	6	5	3	3	10	8	5	15	29	7	11	9	9	8	14	36	40	40
27-Jan	56	61	36	13	17	18	28	13	18	10	9	9	10	23	28	38	63	49	100	7	7	22	31	40	100
28-Jan	46	12	33	27	30	23	23	19	22	18	7	7	6	8	8	8	7	7	6	5	11	34	26	12	46
29-Jan	24	30	22	7	9	10	16	19	33	25	13	17	36	13	8	7	8	8	6	12	47	51	54	75	75
30-Jan	22	57	5	11	20	12	6	6	7	8	41	18	24	21	19	21	17	15	14	15	16	14	14	14	57
31-Jan	16	15	17	17	24	15	27	58	58	63	30	21	81	69	56	73	22	8	22	26	21	12	13	13	81
	95	87	41	91	74	78	99	91	83	63	53	85	81	80	56	79	63	90	100	67	80	68	87	89	
	Diurnal Maximum																								

AF - Analyzer Failure



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Summary of Hour Averages

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

Direction of Maximum Speed: 258 deg on Jan 27 11:00																				Hours in Service: 744						
Direction of Maximum Daily Speed Average: 255.5 deg on Jan 27																				Hours of Data: 573						
Direction of Minimum Speed: 75 deg on Jan 13 08:00										Direction of Minimum Daily Speed Average: 1.3 deg on Jan 10										Hours of Missing Data: 171						
Monthly Average Direction: 237.6 deg																				Percent Operational Time: 77.0						
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-Jan	309	338	0	359	355	356	353	348	312	249	312	314	321	303	154	343	75	95	125	137	171	145	146	202	340.6	
2-Jan	65	158	207	255	214	163	240	145	146	172	161	145	157	133	152	162	149	168	165	166	167	179	193	173	164.6	
3-Jan	192	193	180	166	179	176	186	182	175	169	188	183	196	192	194	211	236	264	291	293	273	283	323	316	233.2	
4-Jan	326	336	359	5	33	34	42	54	134	124	130	135	156	162	167	154	163	181	174	166	155	165	146	83	136.8	
5-Jan	24	334	359	8	11	15	8	5	9	8	360	5	7	4	18	23	11	5	8	358	359	347	345	324	5.1	
6-Jan	237	233	226	230	223	197	215	218	214	215	193	184	162	139	137	145	157	187	166	173	167	131	150	173	186.0	
7-Jan	298	352	353	14	AF	AF	AF	AF	AF	347	351	AF	AF	AF	AF	AF	AF	6	8	348	348	347	335	235	--	
8-Jan	198	222	223	190	174	173	164	162	156	155	157	147	146	156	155	177	190	183	181	205	223	238	249	250	189.5	
9-Jan	251	244	228	235	244	243	253	250	243	241	253	308	332	324	295	284	274	282	326	356	6	273	274	294	260.2	
10-Jan	42	355	29	4	0	337	335	322	341	36	16	170	124	130	139	146	163	216	227	241	218	190	172	162	167.4	
11-Jan	165	165	165	158	171	181	212	244	360	345	357	3	345	356	344	337	340	333	325	322	320	309	298	259	338.6	
12-Jan	234	171	169	176	150	152	162	160	160	151	160	171	162	165	150	153	144	137	140	145	147	149	163	160	153.9	
13-Jan	165	171	157	240	238	245	243	75	156	144	140	146	156	151	143	156	168	161	167	156	154	158	166	169	161.6	
14-Jan	170	159	158	154	156	148	143	153	156	158	151	163	161	221	217	222	238	249	253	243	242	205	225	202	184.8	
15-Jan	237	256	255	255	263	260	249	250	252	255	258	261	258	240	239	243	241	194	226	232	233	210	165	169	248.0	
16-Jan	183	196	185	190	167	166	149	164	162	191	201	213	217	208	208	215	216	210	213	219	209	157	152	149	194.1	
17-Jan	143	148	171	209	218	224	266	249	251	254	248	247	259	255	240	201	162	159	184	187	145	164	171	147	218.5	
18-Jan	144	144	138	149	95	98	133	90	40	343	325	344	145	161	154	164	163	166	177	171	154	153	153	141	148.7	
19-Jan	136	359	349	353	348	358	348	348	340	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
20-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	156	146	148	150	149	149	170	79	358	AF	AF	--
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
26-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	194	179	185	180	234	246	249	251	258	259	261	263	254	248	--	
27-Jan	250	245	242	261	261	258	260	257	264	257	258	256	254	257	258	252	264	271	250	246	245	243	255	256	255.5	
28-Jan	248	238	236	241	241	236	237	228	227	224	215	211	152	140	158	167	169	153	149	156	221	245	256	255	215.6	
29-Jan	245	242	252	252	255	258	259	238	225	237	211	207	236	263	259	243	235	248	260	254	251	255	250	252	249.2	
30-Jan	255	241	241	238	244	243	255	259	270	267	3	20	9	356	314	340	15	5	1	3	3	349	349	346	308.5	
31-Jan	360	8	1	0	10	3	358	349	260	260	263	228	236	251	262	260	261	258	285	309	306	317	326	337	318.0	
235.3 245.9 244.0 245.6 246.3 242.3 245.1 237.7 238.4 242.3 251.6 243.5 245.2 221.3 204.0 214.3 213.3 223.3 235.5 237.0 240.6 240.6 237.8 226.8																										
Diurnal Average																										
AF - Analyzer Failure																										
All monthly, daily, and diurnal averages have been calculated using vector methods																										



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 99 deg on Jan 17 07:00	Hours of Data: 573
Minimum Value: 2 deg on Jan 27 12:00	Hours of Missing Data: 171
Percentiles: P ₁ = 3 P ₁₀ = 5 Q ₁ = 7 Median = 11 Q ₃ = 16 P ₉₀ = 28 P ₉₉ = 78	Hours of Calibration: 0
	Percent Operational Time: 77.0

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-Jan	25	15	8	9	10	9	11	13	30	12	10	9	5	70	79	20	20	27	5	11	25	24	15	31	79	
2-Jan	27	41	25	31	22	14	42	18	13	29	12	19	30	13	12	10	14	16	15	14	13	15	18	16	42	
3-Jan	16	20	23	12	16	11	16	15	14	10	13	17	29	18	19	26	13	19	14	10	14	23	12	12	29	
4-Jan	17	9	13	8	12	11	20	27	39	11	6	5	17	10	13	22	12	5	10	9	15	21	33	22	39	
5-Jan	25	12	11	8	10	8	8	7	10	15	9	10	8	7	12	10	10	6	11	18	13	6	8	31	31	
6-Jan	13	5	5	6	11	15	11	13	20	16	19	15	10	4	4	6	5	33	10	13	38	12	9	47	47	
7-Jan	19	20	15	22	AF	AF	AF	AF	AF	9	11	AF	AF	AF	AF	AF	AF	11	11	11	12	9	45	10	45	
8-Jan	39	31	11	25	11	9	8	10	8	11	11	6	7	7	6	12	15	9	11	14	12	9	6	3	39	
9-Jan	4	5	14	13	5	5	6	7	12	10	12	22	9	8	10	17	10	13	15	15	24	78	38	30	78	
10-Jan	42	31	15	11	12	6	5	11	25	11	86	72	13	3	3	5	11	19	9	5	12	15	10	6	86	
11-Jan	8	8	7	3	9	12	16	29	31	12	11	8	10	15	12	8	8	6	7	5	6	7	18	12	31	
12-Jan	10	29	17	12	12	11	6	6	6	8	11	12	11	8	6	7	6	6	5	7	7	4	11	8	29	
13-Jan	7	12	21	18	19	8	94	66	11	8	6	6	7	10	7	7	7	13	8	7	6	5	7	9	94	
14-Jan	7	5	4	4	3	4	4	5	4	3	5	10	24	14	45	25	7	38	5	5	7	31	14	19	45	
15-Jan	22	4	5	4	6	7	8	4	4	4	5	8	18	11	12	10	13	19	56	43	31	21	12	9	56	
16-Jan	22	18	18	20	11	8	10	12	10	14	18	11	14	26	15	6	5	8	6	5	16	18	10	9	26	
17-Jan	16	15	21	10	19	24	99	8	4	3	5	7	7	4	7	22	12	11	12	39	16	16	14	9	99	
18-Jan	7	6	4	13	80	73	22	47	66	9	12	71	40	34	27	10	21	15	12	11	10	8	13	7	80	
19-Jan	84	50	6	8	11	8	9	11	8	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	84	
20-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	6	5	5	6	10	9	26	50	22	AF	AF	50
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
26-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	15	14	14	16	23	6	5	6	2	2	3	5	5	7	23	
27-Jan	8	9	14	5	8	8	14	5	10	3	2	2	3	8	10	8	18	14	27	3	4	5	10	7	27	
28-Jan	9	9	12	10	15	11	13	7	10	19	11	28	15	6	8	11	12	7	8	10	42	44	4	4	44	
29-Jan	10	11	8	2	2	3	7	14	14	7	17	43	11	4	5	9	3	6	4	4	3	13	10	18	43	
30-Jan	5	6	4	3	7	4	6	3	5	3	40	11	19	16	16	16	14	9	8	8	9	9	8	9	40	
31-Jan	9	8	10	9	14	13	14	53	11	13	17	36	38	36	34	17	9	4	13	15	11	11	14	5	53	
	84	50	25	31	80	73	99	66	66	29	86	72	40	70	79	26	21	38	56	43	50	78	45	47		

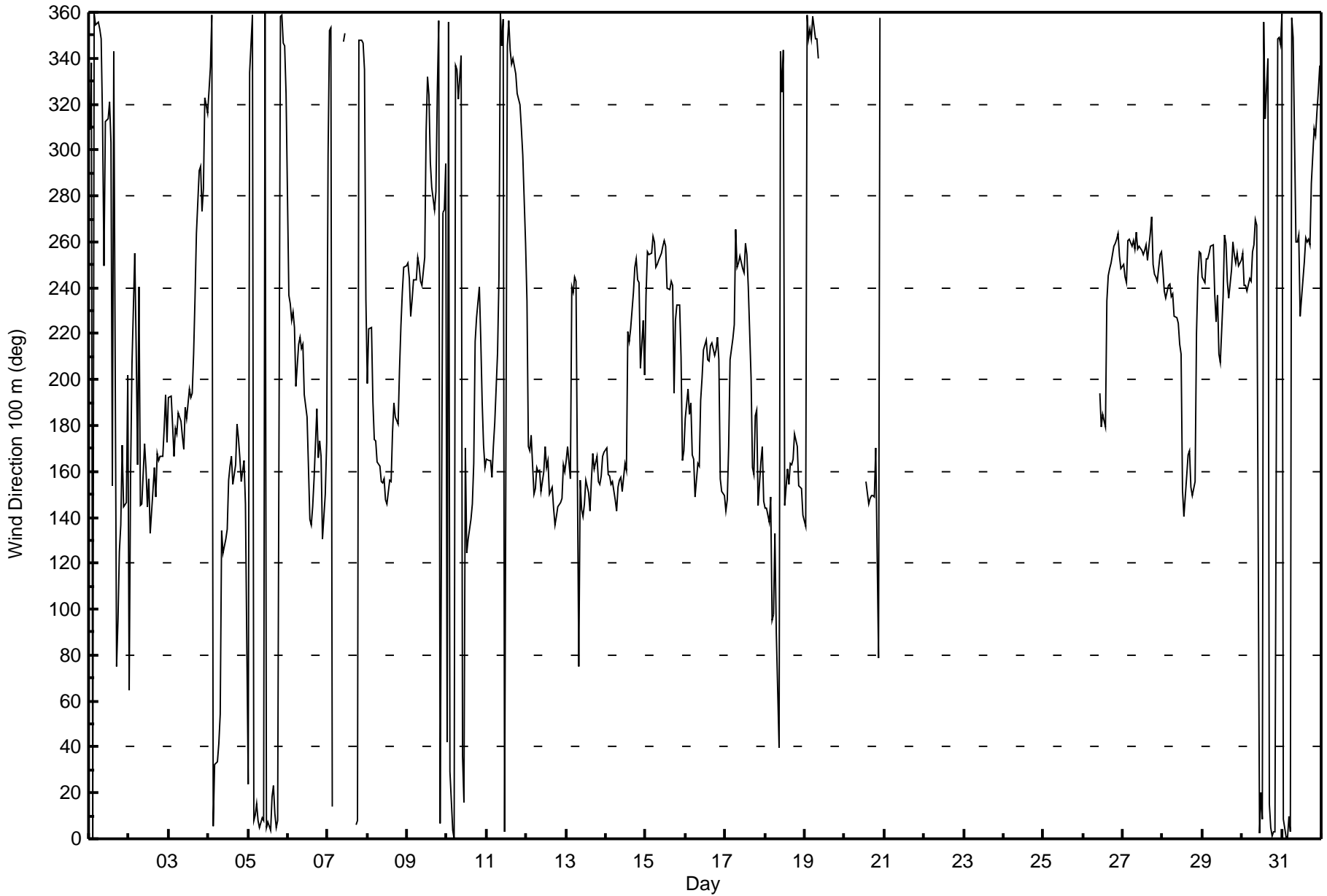
Diurnal Maximum

AF - Analyzer Failure



Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 5.1 km/h on Jan 11 12:00 Minimum Value: 0.1 km/h on Jan 7 02:00 Percentiles: P ₁ = 0.1 P ₁₀ = 0.3 Q ₁ = 0.6 Median = 1.1 Q ₃ = 1.6 P ₉₀ = 2.4 P ₉₉ = 3.5																								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-Jan	3.2	4.3	2.7	2.4	2.2	1.7	1.0	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.1	0.2	0.1	0.1	0.2	0.2	0.5	0.4	0.5	4.3	
2-Jan	0.4	0.4	0.4	0.3	0.5	0.7	0.3	0.5	0.5	0.3	0.8	0.8	0.7	0.7	0.6	0.7	0.6	0.5	0.3	0.7	0.9	0.8	1.2	1.2	1.2
3-Jan	0.4	0.6	0.7	0.6	0.3	0.4	0.8	0.5	0.5	0.9	1.3	1.3	1.0	1.1	1.1	1.2	1.3	0.8	0.8	0.6	2.0	1.8	1.0	0.8	2.0
4-Jan	0.4	0.4	0.4	0.4	1.1	1.0	0.6	0.4	0.2	0.3	0.6	1.3	1.2	1.0	0.7	0.5	0.8	1.2	1.2	1.1	1.4	1.2	0.5	0.2	1.4
5-Jan	0.3	0.6	1.2	1.9	1.9	2.2	1.8	1.4	1.3	1.3	1.3	1.8	2.0	2.6	2.4	2.1	1.4	1.0	0.7	0.6	0.8	0.7	0.6	0.3	2.6
6-Jan	0.3	0.3	0.5	0.5	0.4	0.3	0.4	0.7	1.2	0.8	0.9	1.0	1.3	1.1	0.9	0.7	0.4	0.3	0.5	0.7	0.4	0.2	0.5	0.3	1.3
7-Jan	0.2	0.1	0.1	0.2	0.4	0.4	0.4	0.3	0.3	0.4	0.4	1.4	2.9	2.9	2.9	2.7	2.2	2.2	1.5	0.5	0.5	0.1	0.1	0.2	2.9
8-Jan	0.2	0.2	0.4	0.5	1.1	1.2	1.3	1.0	1.3	1.2	1.3	1.4	1.4	1.3	1.6	1.5	1.4	1.3	1.1	1.3	1.3	1.3	1.5	1.7	1.7
9-Jan	1.7	1.9	1.4	1.5	2.1	2.0	1.2	0.7	0.7	0.8	0.8	0.5	0.3	0.2	0.4	0.5	0.8	0.4	0.3	0.2	0.1	0.2	0.1	0.2	2.1
10-Jan	0.2	0.3	0.4	0.3	0.3	0.1	0.2	0.1	0.1	0.1	0.2	0.3	0.5	0.6	0.7	0.7	0.6	0.4	0.6	1.1	1.1	1.2	1.9	2.1	2.1
11-Jan	2.6	2.5	2.5	2.3	2.2	2.4	1.6	1.6	1.2	1.6	4.4	5.1	4.6	4.1	3.7	3.8	2.7	1.6	1.0	0.7	0.4	0.1	0.2	0.4	5.1
12-Jan	0.2	0.1	0.1	0.2	0.7	1.3	1.5	1.3	1.3	1.1	1.0	1.0	1.1	1.0	1.0	1.2	2.4	2.3	2.3	1.9	1.2	1.5	0.9	1.3	2.4
13-Jan	1.4	1.4	1.0	0.8	0.8	0.6	0.2	0.1	0.4	1.0	1.0	1.1	1.3	1.3	1.2	1.2	1.1	1.0	0.6	1.2	1.4	1.7	1.5	1.5	1.7
14-Jan	1.3	1.7	1.9	1.9	1.7	1.7	1.6	1.7	1.7	2.6	2.5	2.1	1.7	2.0	1.3	0.9	0.9	0.9	1.1	0.7	0.6	1.1	1.2	0.7	2.6
15-Jan	0.9	2.2	2.1	1.9	1.8	2.5	1.3	2.0	3.0	2.8	3.2	2.7	1.5	1.0	0.8	0.6	0.6	0.5	1.2	1.6	1.0	1.2	1.1	1.0	3.2
16-Jan	1.0	1.4	1.1	1.2	1.4	1.4	1.4	1.4	1.3	1.7	1.8	2.4	1.8	1.3	1.5	1.5	1.8	1.6	2.0	1.8	1.1	1.6	1.1	1.6	2.4
17-Jan	1.5	1.5	1.2	1.2	1.0	1.0	0.5	0.7	1.4	1.8	1.7	1.6	1.6	1.2	0.5	0.5	0.7	0.4	1.1	0.9	0.4	0.6	0.8	1.0	1.8
18-Jan	0.9	0.7	0.6	0.6	0.3	0.4	0.1	0.2	0.3	0.5	0.4	0.4	0.7	0.4	0.4	0.6	0.4	0.5	0.5	0.6	0.4	0.7	0.5	0.3	0.9
19-Jan	0.2	1.2	1.1	1.1	1.5	1.6	1.4	1.1	1.2	1.6	1.4	1.9	1.7	1.5	1.3	1.4	1.3	1.2	1.2	1.1	1.1	1.1	0.8	0.5	1.9
20-Jan	0.5	0.4	0.7	0.8	1.1	1.0	1.4	1.2	0.7	0.8	0.9	1.1	1.5	1.1	1.2	1.0	0.8	0.8	0.4	0.3	0.5	0.8	0.8	0.9	1.5
21-Jan	1.6	1.8	2.1	2.1	2.1	2.4	2.2	2.7	2.7	2.1	2.3	2.5	2.3	2.7	2.3	2.5	2.2	2.7	2.3	2.5	2.7	2.3	2.2	2.4	2.7
22-Jan	2.4	2.5	2.8	2.7	3.0	2.6	2.3	2.1	1.6	1.8	1.8	1.6	1.7	1.8	1.7	1.5	1.3	0.8	0.5	0.7	0.4	0.3	0.5	0.4	3.0
23-Jan	0.4	0.2	0.3	0.2	0.3	0.5	0.8	0.8	0.6	0.9	1.0	1.2	1.2	1.0	0.9	0.9	0.8	1.2	0.9	0.4	0.5	0.9	0.6	1.0	1.2
24-Jan	1.1	1.2	1.4	1.5	1.5	1.2	1.1	1.2	1.0	1.5	1.3	1.6	2.0	2.0	2.2	1.9	1.5	1.6	1.6	0.9	0.6	0.9	1.1	0.7	2.2
25-Jan	2.0	2.3	1.6	1.3	1.2	1.2	1.4	1.3	1.5	1.6	1.3	1.8	2.4	2.5	2.2	2.2	2.0	1.6	1.3	1.8	2.2	2.2	2.1	1.4	2.5
26-Jan	1.4	1.4	1.2	0.7	1.1	1.1	1.4	1.7	1.5	1.3	1.6	1.7	1.6	1.4	1.4	1.0	1.6	2.3	2.9	2.7	3.4	2.7	1.3	1.1	3.4
27-Jan	0.9	1.0	1.1	1.8	2.1	1.4	2.1	2.3	2.4	3.6	4.3	3.7	3.3	2.7	1.8	0.5	0.5	0.6	0.6	1.3	1.2	0.8	1.3	1.6	4.3
28-Jan	1.1	1.0	1.0	1.2	1.0	1.3	1.4	1.3	1.2	1.5	1.0	1.4	1.0	1.2	1.5	1.2	0.7	1.6	1.6	0.9	1.1	1.3	0.9	1.3	1.6
29-Jan	1.0	1.6	1.4	1.7	2.4	3.2	2.9	1.7	0.9	1.1	1.4	1.3	0.9	1.3	1.0	1.0	1.2	1.0	1.2	1.1	1.1	1.5	1.4	1.3	3.2
30-Jan	1.6	1.0	1.6	0.9	1.0	1.2	2.5	2.7	2.5	2.8	2.9	2.6	1.9	1.7	1.3	2.6	2.2	2.8	2.8	3.1	3.0	2.8	2.9	2.9	3.1
31-Jan	2.7	2.9	3.0	2.0	1.2	0.7	0.3	0.2	0.9	0.4	1.1	1.0	0.9	1.0	0.6	0.5	1.1	2.0	1.5	0.9	0.8	0.6	0.9	0.8	3.0
	3.2	4.3	3.0	2.7	3.0	3.2	2.9	2.7	3.0	3.6	4.4	5.1	4.6	4.1	3.7	3.8	2.7	2.8	2.9	3.1	3.4	2.8	2.9	2.9	
	Diurnal Maximum																								



Maximum Value: 2.1 km/h on Jan 16 02:00																				Maximum Daily Average: 0.9 km/h on Jan 14					Hours in Service: 744				
Minimum Value: -1.6 km/h on Jan 27 11:00																				Minimum Daily Average: -0.3 km/h on Jan 27					Hours of Data: 743				
Maximum Diurnal Average: 0.3 km/h at hour 22																				Minimum Diurnal Average: 0.2 km/h at hour 9					Hours of Missing Data: 1				
Monthly Average: 0.23 km/h																				Percentiles: P ₁ = -1.0 P ₁₀ = -0.4 Q ₁ = -0.2 Median = 0.1 Q ₃ = 0.6 P ₉₀ = 1.0 P ₉₉ = 1.6					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-Jan	-1.2	-0.6	-0.6	-0.5	-0.4	-0.3	-0.2	-0.3	-0.2	0.0	0.0	-0.2	0.0	0.1	0.3	0.1	0.0	0.0	0.1	0.1	0.1	0.7	0.4	0.4	-0.1	0.7			
2-Jan	-0.1	0.1	0.5	0.1	0.6	0.8	0.3	0.6	0.4	0.5	0.5	0.5	0.3	0.4	0.5	0.5	0.4	0.7	0.3	0.6	0.6	0.4	1.0	0.7	0.5	1.0			
3-Jan	0.9	0.7	0.9	0.4	0.2	0.4	1.1	0.9	0.7	1.0	1.2	0.7	0.5	0.7	0.7	1.0	0.7	-0.1	-0.4	-0.2	0.0	-0.4	-0.1	-0.2	0.5	1.2			
4-Jan	0.0	0.0	-0.1	-0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.2	0.3	0.5	0.3	0.6	0.6	0.9	0.7	0.9	0.7	0.5	0.5	0.4	0.0	0.3	0.9			
5-Jan	-0.2	-0.1	-0.1	-0.1	0.0	-0.1	-0.2	-0.2	-0.2	-0.1	-0.3	0.0	-0.1	-0.2	0.0	0.1	0.0	-0.1	-0.1	0.0	0.0	-0.2	-0.2	-0.1	-0.1	0.1			
6-Jan	0.1	0.0	-0.1	-0.1	0.1	0.3	0.1	0.2	0.4	0.7	1.1	0.8	0.9	0.4	0.6	0.6	0.8	0.0	0.7	0.5	0.4	0.3	0.8	0.1	0.4	1.1			
7-Jan	0.0	0.0	0.0	0.1	0.0	0.1	0.0	-0.1	-0.1	-0.1	-0.1	-0.2	-0.4	-0.6	-0.3	-0.4	-0.2	-0.3	-0.2	-0.3	-0.2	0.0	0.0	0.1	-0.1	0.1			
8-Jan	0.1	0.0	0.3	0.9	1.3	1.3	1.0	0.8	0.9	0.9	0.8	0.8	0.8	0.7	0.7	1.2	1.3	1.7	1.4	1.6	1.5	1.2	0.1	-0.1	0.9	1.7			
9-Jan	0.1	0.5	0.6	0.7	0.4	0.2	0.0	0.1	-0.1	0.2	-0.1	0.0	0.0	0.1	-0.2	-0.3	-0.1	-0.4	-0.2	0.0	0.0	0.1	0.0	0.0	0.1	0.7			
10-Jan	0.1	-0.1	-0.3	-0.2	-0.2	0.0	-0.1	-0.1	0.0	0.0	0.3	0.4	0.8	0.6	0.4	0.4	0.5	0.4	0.6	0.3	1.2	1.6	1.6	1.1	0.4	1.6			
11-Jan	1.1	1.0	1.0	0.9	1.5	1.6	1.5	1.6	-0.4	-0.5	-0.9	-0.6	-1.1	-0.5	-0.7	-0.8	-0.5	-0.4	-0.5	-0.2	-0.2	0.0	0.0	-0.2	0.1	1.6			
12-Jan	0.1	0.2	0.3	0.5	0.9	0.8	0.9	0.7	1.0	0.2	0.5	0.2	0.2	0.2	0.3	0.3	0.8	0.6	0.9	0.8	0.3	0.7	0.7	0.8	0.5	1.0			
13-Jan	0.9	0.7	0.5	1.1	0.6	0.4	-0.1	0.0	0.3	0.3	0.4	0.5	0.5	0.4	0.3	0.6	1.3	1.2	0.8	1.0	0.9	1.2	1.1	1.2	0.7	1.3			
14-Jan	1.0	1.1	1.4	1.6	1.3	1.1	1.1	1.4	1.2	1.0	1.3	1.3	1.6	0.5	0.7	0.2	0.5	-0.4	-0.3	-0.4	0.8	1.1	1.3	0.9	1.6				
15-Jan	0.7	-0.7	-0.2	-0.3	-0.7	-0.6	-0.4	-0.3	-0.9	-0.6	-1.0	-0.8	0.1	0.1	0.0	0.0	0.6	0.6	0.7	0.3	1.3	1.0	1.3	0.0	1.3				
16-Jan	1.1	2.1	1.6	1.8	0.4	0.8	0.3	0.7	0.7	1.6	1.5	1.6	0.0	0.4	0.1	0.0	-0.4	0.1	-0.1	-0.2	0.3	-0.2	0.6	0.6	0.6	2.1			
17-Jan	0.1	0.2	0.8	0.7	0.6	0.5	0.1	-0.2	-0.4	-0.8	-0.5	-0.3	-0.2	-0.4	0.0	0.2	0.6	0.9	0.4	0.6	0.4	1.0	0.9	1.0	0.3	1.0			
18-Jan	0.6	0.7	0.4	0.4	0.0	-0.1	0.0	-0.1	0.0	-0.2	-0.2	0.1	0.0	0.0	0.2	0.4	0.2	0.4	0.9	1.0	0.5	0.8	0.4	0.3	0.3	1.0			
19-Jan	0.1	-0.3	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.4	-0.3	-0.2	-0.4	-0.3	-0.2	-0.2	-0.2	-0.3	0.0	-0.1	-0.2	-0.2	-0.5	-0.1	0.0	-0.2	0.1			
20-Jan	0.1	0.0	0.3	0.3	0.4	0.7	0.5	0.2	0.3	0.5	0.7	0.7	0.6	0.6	0.4	0.3	0.7	0.9	0.7	0.4	-0.1	-0.3	-0.2	-0.1	0.4	0.9			
21-Jan	-0.1	-0.3	-0.2	-0.3	0.0	-0.3	-0.3	-0.5	-0.2	-0.5	-0.4	-0.7	AF	1.6	1.0	-0.5	-0.3	-0.2	0.1	-0.4	-0.4	-0.3	-0.4	-0.3	-0.2	1.6			
22-Jan	-0.2	-0.3	-0.3	-0.3	-0.4	-0.4	-0.4	-0.2	0.2	-0.3	-0.4	-0.3	-0.2	-0.3	-0.3	-0.4	-0.2	-0.1	-0.2	-0.2	-0.2	-0.3	-0.3	-0.3	-0.3	0.2			
23-Jan	-0.1	-0.1	-0.3	-0.4	-0.2	-0.1	-0.1	-0.1	0.0	0.0	-0.3	-0.1	-0.2	-0.1	0.1	0.3	0.2	0.4	0.2	0.3	0.2	0.1	0.5	0.0	0.0	0.5			
24-Jan	0.5	0.5	0.2	0.1	-0.3	0.0	0.2	0.0	0.3	0.6	0.1	0.3	0.1	0.2	0.4	0.2	1.4	1.4	0.5	0.6	0.7	1.1	0.8	0.6	0.4	1.4			
25-Jan	-0.1	-0.7	-0.3	0.3	0.2	0.9	1.0	0.7	0.9	0.6	0.8	0.2	-0.1	0.7	0.3	-0.1	0.5	0.3	0.9	1.2	1.2	0.1	-0.7	1.0	0.4	1.2			
26-Jan	0.8	1.1	1.2	1.2	1.6	1.4	1.8	1.8	1.8	1.8	1.4	1.3	1.1	1.2	1.2	0.1	-0.7	-0.9	-1.4	-0.9	-1.2	-0.6	0.1	0.1	0.6	1.8			
27-Jan	0.0	0.0	0.0	-0.4	-0.6	-0.3	-0.5	-0.6	-0.9	-1.2	-1.6	-0.9	-0.6	-0.5	-0.2	0.0	0.2	-0.1	0.1	0.2	0.3	0.4	0.0	0.2	-0.3	0.4			
28-Jan	0.1	0.0	0.1	0.4	0.3	0.4	0.3	0.5	0.5	0.8	1.4	1.3	0.7	0.5	0.5	0.6	0.6	0.5	0.7	1.1	0.8	0.8	0.0	-0.3	0.5	1.4			
29-Jan	-0.2	0.0	-0.3	-0.3	-0.8	-1.2	-0.4	-0.3	0.1	0.5	1.1	0.9	0.3	-0.3	0.0	0.3	0.1	-0.2	-0.1	0.1	-0.1	-0.4	-0.1	0.1	0.0	1.1			
30-Jan	0.1	0.2	0.4	0.2	-0.2	0.2	-0.7	-1.0	-0.9	-1.0	-0.2	0.2	-0.1	0.0	-0.5	-0.6	0.2	-0.5	-0.4	-0.1	-0.1	-0.4	-0.6	-0.5	-0.3	0.4			
31-Jan	-0.2	0.0	-0.5	-0.2	0.0	-0.1	-0.2	0.0	-0.1	0.0	-0.4	-0.1	-0.1	0.0	0.1	0.1	-0.2	-0.5	-0.2	-0.1	-0.2	-0.1	-0.2	-0.1	-0.1	0.1			
																								Diurnal Average			Diurnal Maximum		
																								0.2			1.1		
																								0.2			2.1		
																								0.2			1.6		
																								0.3			1.8		
																								0.2			1.6		
																								0.3			1.6		
																								0.2			1.8		
																								0.2			1.8		
																								0.2			1.8		
																								0.2			1.8		
																								0.2			1.5		
																								0.2			1.6		
																								0.2			1.3		
																								0.2			1.6		
																								0.2			1.2		
																								0.2			1.2		
																								0.3			1.4		
																								0.2			1.7		
																								0.2			1.4		
																								0.3			1.6		
																								0.2			1.5		
																								0.3			1.6		
																								0.3			1.6		
																								0.3			1.3		

AF - Analyzer Failure



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 5.1 km/h on Jan 11 12:00 Minimum Value: 0.1 km/h on Jan 10 10:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 0.6 Median = 1.1 Q ₃ = 1.6 P ₉₀ = 2.4 P ₉₉ = 4.1																								Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jan	3.6	4.9	2.7	2.4	2.4	2.0	1.3	0.7	0.4	0.4	0.3	0.4	0.4	0.3	0.3	0.1	0.1	0.1	0.2	0.2	0.3	0.6	0.5	0.6	4.9
2-Jan	0.4	0.4	0.5	0.4	0.6	0.5	0.3	0.3	0.5	0.3	0.6	0.8	0.5	0.6	0.4	0.5	0.5	0.4	0.3	0.5	0.7	0.9	0.8	0.7	0.9
3-Jan	0.4	0.6	0.6	0.7	0.4	0.4	0.6	0.5	0.5	0.6	0.9	1.0	0.8	0.8	0.8	0.9	1.4	1.1	1.1	0.8	2.3	2.3	1.1	0.8	2.3
4-Jan	0.5	0.4	0.5	0.5	1.1	1.0	0.7	0.4	0.2	0.3	0.5	1.2	1.2	1.1	0.6	0.5	0.6	1.3	1.1	1.0	1.3	1.1	0.4	0.2	1.3
5-Jan	0.4	0.6	1.3	2.0	2.0	2.1	1.8	1.5	1.3	1.3	1.4	1.9	2.1	2.7	2.4	2.2	1.5	1.0	0.8	0.8	0.8	0.9	0.7	0.3	2.7
6-Jan	0.3	0.4	0.7	0.9	0.5	0.5	0.6	1.0	1.4	1.1	0.8	0.8	0.6	0.9	0.7	0.6	0.4	0.4	0.7	1.0	0.6	0.4	0.5	0.3	1.4
7-Jan	0.2	0.2	0.1	0.2	0.4	0.3	0.3	0.3	0.4	0.4	0.5	1.4	2.9	2.9	2.9	2.7	2.2	2.2	1.6	0.7	0.7	0.1	0.2	0.2	2.9
8-Jan	0.2	0.2	0.4	0.5	0.7	0.7	0.8	0.8	1.0	0.9	0.9	1.1	1.1	0.9	1.0	0.8	0.8	0.9	0.6	0.8	0.9	1.0	1.7	2.0	2.0
9-Jan	1.9	1.8	1.8	1.6	1.8	1.7	1.3	0.8	0.8	0.8	0.9	0.6	0.4	0.3	0.5	0.6	1.0	0.6	0.3	0.3	0.2	0.2	0.2	0.2	1.9
10-Jan	0.2	0.3	0.5	0.4	0.4	0.2	0.2	0.1	0.2	0.1	0.3	0.4	0.5	0.4	0.4	0.6	0.6	0.5	0.7	1.2	1.2	0.6	1.0	1.5	1.5
11-Jan	1.9	1.8	1.6	1.4	1.3	1.6	0.9	1.4	1.6	2.0	4.5	5.1	5.1	4.2	4.2	4.4	3.2	1.9	1.2	1.0	0.4	0.3	0.3	0.4	5.1
12-Jan	0.3	0.3	0.2	0.3	0.6	1.0	1.3	1.2	1.2	1.1	1.0	0.9	1.1	1.0	1.2	1.3	2.5	2.2	2.3	2.1	1.3	1.4	1.0	1.1	2.5
13-Jan	1.2	1.1	0.9	0.7	0.8	0.7	0.3	0.2	0.5	1.0	0.8	0.8	0.9	1.1	1.1	1.0	0.7	0.9	0.7	1.0	1.0	1.3	1.1	1.0	1.3
14-Jan	0.8	1.2	1.1	1.5	1.6	1.5	1.3	1.2	1.5	1.9	1.8	1.3	1.2	1.5	1.3	1.1	1.3	1.1	1.3	0.8	0.7	1.3	1.5	0.8	1.9
15-Jan	1.2	2.1	1.9	1.9	2.1	2.5	1.4	1.8	3.1	2.9	3.5	2.9	1.8	1.1	1.0	0.8	0.8	0.7	1.5	2.0	1.4	1.1	0.8	0.8	3.5
16-Jan	0.9	1.2	0.8	0.8	1.2	1.1	1.2	1.1	1.0	1.3	1.7	2.6	2.3	1.5	1.8	1.5	1.9	1.8	2.3	2.2	1.5	1.6	1.2	1.4	2.6
17-Jan	1.6	1.5	1.1	1.5	1.4	1.4	0.7	0.7	1.0	1.2	1.4	1.8	2.0	1.4	0.5	0.7	0.7	0.4	1.3	1.1	0.5	0.6	0.7	0.7	2.0
18-Jan	0.6	0.5	0.6	0.6	0.4	0.3	0.2	0.2	0.2	0.6	0.5	0.4	0.6	0.5	0.4	0.6	0.5	0.6	0.4	0.7	0.5	0.6	0.6	0.4	0.7
19-Jan	0.3	0.9	1.2	1.2	1.7	1.7	1.6	1.2	1.4	1.8	1.4	1.8	1.7	1.6	1.4	1.5	1.3	1.2	1.3	1.2	1.2	1.1	0.8	0.5	1.8
20-Jan	0.5	0.4	0.7	1.0	1.2	0.9	1.2	1.2	0.7	0.8	0.7	0.9	1.0	0.8	0.8	0.8	0.6	0.7	0.4	0.3	0.5	1.0	1.1	1.1	1.2
21-Jan	1.8	1.8	2.0	2.1	2.2	2.4	2.2	2.6	2.6	2.3	2.6	2.2	AF	2.7	2.6	2.4	2.2	2.7	2.5	2.6	2.6	2.4	2.3	2.4	2.7
22-Jan	2.4	2.4	2.7	2.6	3.0	2.5	2.1	2.1	1.7	1.8	1.9	1.7	1.8	1.8	1.6	1.3	1.0	0.7	0.5	0.5	0.4	0.6	0.5	0.5	3.0
23-Jan	0.4	0.2	0.3	0.3	0.3	0.5	0.7	0.9	0.6	0.8	0.8	1.2	1.1	1.0	0.8	0.8	0.7	0.9	0.7	0.4	0.6	1.2	0.7	1.1	1.2
24-Jan	1.1	1.1	1.2	1.4	1.4	1.3	0.9	0.9	0.9	1.3	1.1	1.3	2.0	1.7	1.9	1.8	1.6	1.3	1.3	1.0	0.6	0.6	0.9	0.9	2.0
25-Jan	2.1	2.5	1.9	1.3	1.3	1.0	1.0	1.3	1.0	1.2	1.2	1.9	2.4	2.2	2.4	2.2	1.6	1.4	1.1	0.8	1.3	1.6	1.6	0.8	2.5
26-Jan	1.0	1.2	1.0	0.6	0.7	0.8	1.3	1.7	1.4	0.7	0.8	1.3	1.4	1.1	1.5	1.3	1.5	2.4	3.0	3.0	3.4	3.1	1.5	1.4	3.4
27-Jan	1.2	1.2	1.4	2.1	2.4	1.7	2.8	2.6	2.8	3.6	4.1	3.6	3.5	2.8	2.3	0.6	0.7	0.7	0.8	1.1	1.0	0.8	1.4	2.0	4.1
28-Jan	1.4	1.0	1.3	1.3	1.2	1.5	1.6	1.4	1.6	1.7	0.9	1.0	0.5	0.8	1.2	1.1	0.8	1.3	1.1	0.6	1.3	1.5	1.1	1.8	1.8
29-Jan	1.3	1.8	1.8	1.5	2.4	3.3	3.3	2.1	1.2	1.2	1.3	1.3	0.7	1.1	0.6	1.0	1.2	0.8	0.9	1.0	1.5	1.7	1.8	1.7	3.3
30-Jan	1.8	1.4	1.2	0.7	1.2	1.0	1.9	2.3	2.2	2.5	3.0	2.8	2.0	1.7	1.5	3.0	2.2	2.8	2.9	3.2	3.1	2.9	3.0	3.2	3.2
31-Jan	2.8	3.0	3.0	2.0	1.4	0.8	0.4	0.2	1.0	0.6	1.2	0.9	0.9	1.1	0.7	0.5	1.4	1.8	1.9	1.1	1.0	0.7	0.9	1.0	3.0
Diurnal Maximum																									
AF - Analyzer Failure																									



Maximum Value: 3.6 km/h on Jan 28 00:00																				Maximum Daily Average: 0.8 km/h on Jan 27					Hours in Service: 744		
Minimum Value: -1.3 km/h on Jan 11 16:00																				Minimum Daily Average: -0.2 km/h on Jan 11					Hours of Data: 573		
Maximum Diurnal Average: 0.5 km/h at hour 24																				Minimum Diurnal Average: 0.1 km/h at hour 9					Hours of Missing Data: 171		
Monthly Average: 0.27 km/h																				Percentiles: P ₁ = -0.6 P ₁₀ = -0.2 Q ₁ = 0.0 Median = 0.1 Q ₃ = 0.5 P ₉₀ = 0.9 P ₉₉ = 2.1					Hours of Calibration: 0		
																									Percent Operational Time: 77.0		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jan	-1.0	-0.9	-0.3	-0.1	-0.4	-0.3	-0.1	-0.3	0.0	0.0	-0.4	-0.3	-0.3	0.0	0.1	0.0	0.1	0.1	0.4	0.5	0.0	0.3	0.6	0.1	-0.1	0.6	
2-Jan	0.2	0.3	0.1	-0.1	0.0	0.2	0.0	0.3	0.7	0.1	0.2	0.4	0.1	0.3	0.3	0.0	0.3	0.2	0.1	0.1	0.1	-0.3	-0.1	0.0	0.1	0.7	
3-Jan	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	-0.1	0.1	0.0	0.0	0.0	0.1	0.1	-0.2	-0.2	-0.6	-0.6	1.5	0.3	0.1	0.0	0.0	0.0	1.5	
4-Jan	-0.1	-0.2	-0.1	-0.1	0.1	0.1	0.2	0.0	0.0	0.1	0.3	0.6	0.5	0.2	0.1	0.3	0.5	-0.5	0.0	0.8	0.9	0.3	0.2	0.1	0.2	0.9	
5-Jan	0.0	-0.1	0.3	0.2	0.7	0.2	0.2	0.1	0.0	0.1	0.2	0.3	0.0	0.3	0.7	0.0	0.1	0.1	0.2	0.2	0.2	-0.1	-0.3	0.0	0.2	0.7	
6-Jan	0.2	0.2	0.1	-0.2	0.2	-0.1	0.1	0.2	-0.6	0.2	-0.1	-0.1	0.3	0.2	0.9	0.7	0.6	0.0	0.3	-0.1	0.0	0.4	0.9	0.2	0.2	0.9	
7-Jan	-0.1	0.0	0.0	0.0	AF	AF	AF	AF	AF	-0.5	-0.3	AF	AF	AF	AF	AF	AF	0.1	-0.2	-0.1	-0.1	0.0	0.1	0.1	--	0.1	
8-Jan	0.0	0.1	0.2	0.2	0.0	0.1	0.2	0.3	0.5	0.3	0.5	0.8	1.0	0.5	0.5	0.1	-0.1	0.2	0.0	-0.1	0.1	0.0	0.6	1.2	0.3	1.2	
9-Jan	1.9	1.5	0.8	0.5	1.2	1.1	1.0	0.8	-0.1	-0.1	-0.1	-0.2	0.1	0.0	-0.2	-0.1	0.3	-0.6	-0.1	0.0	0.0	0.0	0.0	0.0	0.3	1.9	
10-Jan	0.0	0.0	-0.1	0.0	0.0	0.0	-0.1	-0.1	0.0	-0.1	0.0	0.1	0.2	0.3	0.9	0.9	0.1	-0.1	0.0	0.3	-0.2	-0.2	0.2	0.6	0.1	0.9	
11-Jan	0.6	0.3	0.4	0.7	0.2	0.0	-0.2	-0.3	-0.2	-0.3	0.2	-0.1	-0.5	0.2	-0.3	-1.3	-0.6	-0.6	-0.4	-0.4	-0.2	-0.3	-0.2	-0.4	-0.2	0.7	
12-Jan	0.0	0.1	0.1	0.0	0.7	0.4	0.5	0.3	0.7	-0.1	0.0	-0.3	0.0	-0.4	0.2	-0.1	2.6	2.1	2.1	2.4	1.4	1.7	0.8	1.1	0.7	2.6	
13-Jan	0.8	0.3	0.1	-0.1	0.0	0.1	0.1	0.1	0.3	0.5	0.4	0.8	0.3	0.3	0.4	0.5	0.5	0.8	0.1	0.5	0.6	0.7	0.1	0.2	0.4	0.8	
14-Jan	0.3	0.3	0.0	0.8	0.5	1.4	1.6	1.8	1.1	0.8	1.3	0.5	0.6	0.2	0.0	0.3	0.7	-0.2	0.3	0.1	-0.3	-0.3	0.0	-0.1	0.5	1.8	
15-Jan	0.1	0.3	0.5	0.3	0.0	0.2	-0.3	0.3	0.9	0.8	0.7	0.5	0.0	0.7	0.5	0.5	0.0	0.0	-0.3	-0.3	-0.2	0.0	0.2	0.3	0.2	0.9	
16-Jan	0.1	0.0	-0.1	-0.2	-0.2	-0.4	0.1	-0.5	-0.3	-0.3	-0.1	1.9	1.0	0.4	0.1	0.8	0.6	0.9	1.2	1.6	0.2	-0.2	0.3	0.1	0.3	1.9	
17-Jan	-0.4	-0.2	-0.1	0.5	0.3	0.2	0.1	-0.4	0.0	0.2	0.6	0.8	0.4	0.0	0.3	0.0	0.5	0.4	0.1	0.0	0.6	0.2	0.1	0.9	0.2	0.9	
18-Jan	0.9	1.2	1.0	0.4	0.1	0.1	0.2	0.2	0.0	-0.1	-0.2	-0.1	0.1	0.1	0.3	0.2	0.2	0.2	0.0	0.2	0.4	0.6	0.2	0.6	0.3	1.2	
19-Jan	0.0	-0.1	0.0	0.2	0.2	0.4	0.4	0.3	0.0	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	0.4	
20-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.5	0.8	0.3	0.8	0.7	0.9	0.2	0.1	0.0	AF	AF	--	0.9
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
26-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.0	0.2	-0.1	0.2	0.9	0.4	-0.2	-0.1	0.0	0.2	0.6	1.5	2.5	1.8	--	2.5	
27-Jan	1.0	0.7	1.4	0.6	0.4	0.1	-0.3	0.6	-0.8	0.5	0.5	1.3	1.7	1.1	0.5	0.1	0.2	0.1	0.1	1.4	1.7	1.7	1.4	3.6	0.8	3.6	
28-Jan	2.0	0.6	0.3	1.0	0.5	0.8	0.7	0.1	-0.6	0.2	-0.2	0.1	0.2	0.8	1.1	0.1	-0.4	0.6	0.8	0.4	0.1	0.0	0.5	0.2	0.4	2.0	
29-Jan	0.0	0.4	-0.2	1.0	0.4	1.1	1.8	0.1	-0.3	1.1	-0.1	0.0	0.4	0.0	0.3	0.9	1.3	0.4	0.5	1.1	1.6	-0.2	2.5	1.4	0.6	2.5	
30-Jan	1.8	2.0	1.2	1.2	0.9	1.2	0.0	0.2	-0.2	0.2	0.6	1.0	0.0	0.1	-0.5	-0.6	0.4	0.1	0.0	0.3	0.7	-0.1	-0.5	-0.4	0.4	2.0	
31-Jan	0.3	0.0	-0.5	0.1	0.5	0.2	-0.2	0.0	1.0	-0.1	-0.4	0.0	-0.1	0.3	0.1	0.2	0.4	0.4	0.3	-0.2	-0.8	-0.6	-0.3	-0.2	0.0	1.0	
																								Diurnal Average			
																								Diurnal Maximum			
																								0.4 0.3 0.2 0.3 0.3 0.3 0.3 0.2 0.1 0.2 0.1 0.4 0.2 0.3 0.3 0.2 0.4 0.2 0.2 0.3 0.4 0.2 0.4 0.5			
																								2.0 2.0 1.4 1.2 1.2 1.4 1.8 1.8 1.1 1.1 1.3 1.9 1.7 1.1 1.1 0.9 2.6 2.1 2.1 2.4 1.7 1.7 2.5 3.6			
AF - Analyzer Failure																											



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 5.0 km/h on Jan 1 02:00	Hours of Data: 573
Minimum Value: 0.2 km/h on Jan 5 01:00	Hours of Missing Data: 171
Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 0.7 Median = 1.1 Q ₃ = 1.6 P ₉₀ = 2.2 P ₉₉ = 3.9	Hours of Calibration: 0
	Percent Operational Time: 77.0

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-Jan	3.5	5.0	2.5	2.6	2.4	2.2	1.4	1.0	0.5	0.8	0.6	0.8	0.7	0.5	0.6	0.2	0.2	0.2	0.3	0.4	0.4	0.7	0.6	0.6	5.0	
2-Jan	0.6	0.5	0.5	0.7	0.5	0.6	0.3	0.5	0.8	0.4	0.5	0.4	0.2	0.3	0.3	0.4	0.4	0.5	0.6	0.7	0.8	0.8	0.7	0.8	0.8	
3-Jan	0.7	0.9	0.8	0.8	0.5	0.7	0.8	0.6	0.8	0.9	0.9	0.7	0.6	0.6	0.5	1.4	2.0	1.7	1.9	1.6	2.8	2.8	1.1	0.8	2.8	
4-Jan	1.1	0.4	0.7	0.7	1.2	0.9	0.7	0.6	0.3	0.4	0.3	0.9	1.1	1.1	0.7	0.7	0.9	1.0	1.2	1.3	1.3	1.1	0.4	0.2	1.3	
5-Jan	0.2	0.7	1.1	2.0	1.7	1.8	1.7	1.0	1.4	1.6	1.4	1.8	2.0	2.2	2.8	2.3	1.3	0.9	1.0	1.1	1.0	0.5	0.7	0.3	2.8	
6-Jan	0.8	0.7	0.5	1.2	0.8	0.7	1.1	1.6	1.9	1.4	1.1	0.9	0.7	0.6	0.8	0.6	0.8	0.8	1.1	1.3	0.9	0.4	0.7	0.5	1.9	
7-Jan	0.4	0.4	0.3	0.4	AF	AF	AF	AF	AF	0.8	1.0	AF	AF	AF	AF	AF	AF	2.3	1.8	1.2	1.1	0.2	0.2	0.4	2.3	
8-Jan	0.4	0.3	0.6	1.0	0.8	0.8	0.8	0.9	0.9	0.8	1.0	0.8	0.7	0.7	0.8	0.9	0.9	0.9	0.6	0.6	0.7	1.5	1.9	1.5	1.9	
9-Jan	1.8	1.5	2.4	2.3	1.5	1.5	1.1	0.9	0.6	0.7	0.7	1.0	0.5	0.5	0.5	0.7	1.6	0.9	0.5	0.5	0.2	0.3	0.2	0.3	2.4	
10-Jan	0.2	0.4	0.6	0.8	0.8	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.7	0.9	0.8	0.8	0.7	1.0	1.4	1.1	1.4	1.2	1.4	
11-Jan	1.5	1.3	1.1	1.0	1.3	1.3	0.9	1.6	2.2	1.5	4.1	4.5	5.0	3.7	3.9	4.2	3.1	1.7	1.0	0.8	0.7	0.6	0.6	0.9	5.0	
12-Jan	0.6	0.4	0.4	0.5	0.8	0.9	1.2	1.1	1.3	1.2	0.9	1.1	1.2	1.0	1.7	1.8	2.3	2.1	2.1	2.3	1.8	1.4	1.3	1.4	2.3	
13-Jan	1.4	1.1	0.7	0.7	1.1	0.5	0.2	0.2	0.6	0.8	0.8	0.8	0.6	0.7	0.9	0.9	1.1	1.2	0.7	0.8	0.8	1.0	1.0	1.2	1.4	
14-Jan	1.1	1.1	0.9	1.2	1.1	1.4	0.9	1.2	1.9	1.1	1.3	1.3	0.9	1.3	1.5	1.0	1.6	1.9	1.3	1.4	1.1	2.0	2.0	1.4	2.0	
15-Jan	1.5	1.8	1.7	1.8	1.7	1.5	1.5	1.4	2.0	2.1	2.0	2.4	2.6	1.7	1.0	1.1	1.4	1.0	2.1	3.2	2.0	1.4	1.2	1.3	3.2	
16-Jan	1.4	1.5	1.4	1.4	1.6	1.5	1.6	1.6	1.3	1.6	2.3	3.2	3.0	2.0	2.1	2.2	2.1	2.8	3.1	2.6	1.9	1.8	1.7	2.0	3.2	
17-Jan	2.0	1.8	1.5	2.0	1.9	1.7	1.6	1.5	1.3	0.9	0.9	1.8	1.9	1.0	0.8	1.0	1.1	0.8	1.6	1.6	0.7	0.9	0.9	0.7	2.0	
18-Jan	0.8	0.7	0.7	0.6	0.3	0.2	0.4	0.5	0.3	0.4	0.5	0.5	0.7	0.6	0.7	0.8	0.8	1.0	0.8	0.9	0.9	0.8	0.9	0.7	1.0	
19-Jan	0.4	0.5	0.8	1.0	1.3	1.2	1.4	1.1	0.9	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	1.4	
20-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.9	0.8	0.9	0.9	0.9	0.8	0.5	0.8	0.7	AF	AF	0.9
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
26-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	1.2	1.3	1.5	1.3	1.8	1.8	1.9	2.0	1.2	1.3	1.1	1.7	1.5	1.9	2.0	
27-Jan	1.8	1.7	2.3	2.0	2.2	2.2	3.0	2.1	3.3	1.8	1.7	1.4	1.7	2.5	2.0	0.9	1.2	1.3	1.4	0.8	0.8	1.1	1.6	1.7	3.3	
28-Jan	1.7	1.1	2.1	1.9	1.8	2.2	2.0	1.2	1.9	1.8	1.1	0.9	0.7	0.7	1.2	1.3	1.3	1.4	1.2	0.9	1.8	2.0	1.1	1.5	2.2	
29-Jan	2.1	3.1	2.4	1.0	1.0	1.4	1.8	3.0	1.8	1.6	1.7	1.6	1.1	1.0	0.6	1.0	1.1	0.8	0.7	0.8	1.0	2.2	2.6	2.6	3.1	
30-Jan	1.3	1.9	0.9	1.0	1.2	1.2	1.0	0.7	1.0	1.1	3.2	3.3	1.7	1.5	1.5	3.0	2.4	2.6	2.7	2.9	3.0	3.0	3.0	3.1	3.3	
31-Jan	2.7	2.8	2.2	1.5	1.4	1.2	0.5	0.4	1.2	1.0	1.2	0.7	1.1	0.9	0.7	1.1	1.5	1.0	1.9	1.7	1.8	1.1	1.4	0.8	2.8	
	3.5	5.0	2.5	2.6	2.4	2.2	3.0	3.0	3.3	2.1	4.1	4.5	5.0	3.7	3.9	4.2	3.1	2.8	3.1	3.2	3.0	3.0	3.0	3.1		
	Diurnal Maximum																									

AF - Analyzer Failure



Maximum Value: 5.0 km/h on Jan 16 18:00 Maximum Daily Average: 1.9 km/h on Jan 16																								Hours in Service: 744 Hours of Data: 485			
Minimum Value: -1.5 km/h on Jan 26 00:00 Minimum Daily Average: 0.0 km/h on Jan 1 Maximum Diurnal Average: 1.1 km/h at hour 19 Minimum Diurnal Average: 0.4 km/h at hour 9 Monthly Average: 0.75 km/h Percentiles: P ₁ = -0.7 P ₁₀ = -0.1 Q ₁ = 0.2 Median = 0.6 Q ₃ = 1.0 P ₉₀ = 1.9 P ₉₉ = 4.1																								Hours of Missing Data: 259 Hours of Calibration: 0 Percent Operational Time: 65.2			
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-Jan	-0.9	-0.7	-0.4	-0.2	-0.4	-0.1	-0.1	-0.2	0.1	0.2	-0.4	-0.3	-0.4	0.0	-0.1	0.0	0.1	0.3	0.5	0.4	0.3	0.4	0.5	0.6	0.0	0.6	
2-Jan	0.4	0.2	0.2	0.3	0.0	0.2	0.0	0.0	0.3	0.2	0.4	0.3	0.2	0.2	0.3	0.1	0.4	0.9	0.7	0.7	0.5	0.2	0.5	0.8	0.3	0.9	
3-Jan	0.7	0.7	0.6	0.8	0.7	0.6	0.9	0.7	0.6	0.6	1.0	0.6	0.3	0.5	0.2	1.0	0.4	0.3	-0.1	-0.4	3.8	1.7	-0.2	-0.2	0.7	3.8	
4-Jan	0.0	0.0	0.0	0.3	0.4	0.4	0.2	0.1	0.3	1.5	0.5	0.9	0.6	-0.1	0.3	0.1	0.3	1.0	0.9	0.9	1.1	0.5	0.2	0.1	0.4	1.5	
5-Jan	0.1	0.0	0.4	0.4	0.7	0.3	0.2	0.2	0.1	AF	AF	AF	0.6	0.3	0.7	0.1	0.3	0.1	0.5	0.4	0.4	0.1	-0.1	0.1	0.3	0.7	
6-Jan	0.5	0.6	0.5	0.3	0.6	0.5	0.8	1.0	0.2	1.5	AF	AF	0.7	0.6	0.5	0.7	0.7	0.3	0.6	0.9	0.6	0.5	0.5	0.4	0.6	1.5	
7-Jan	0.2	0.1	-0.1	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	0.2	
8-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
9-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
10-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
11-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	-0.2	AF	AF	AF	0.4	-0.5	-1.3	-0.4	-0.5	-0.3	-0.4	-0.2	-0.4	-0.2	-0.2	--	0.4	
12-Jan	0.1	0.2	0.3	0.7	0.9	0.3	0.8	0.6	0.8	0.3	0.4	0.2	0.2	-0.3	0.3	0.5	3.2	2.8	2.5	2.9	2.0	1.8	0.9	0.8	1.0	3.2	
13-Jan	0.5	1.0	0.2	0.2	0.4	0.2	0.1	0.2	0.4	0.4	0.2	0.7	0.3	0.3	0.1	0.4	1.6	2.0	1.2	1.3	1.4	1.5	1.1	1.6	0.7	2.0	
14-Jan	1.1	-0.1	0.4	0.6	0.6	1.0	0.7	0.4	0.1	1.1	1.0	1.2	0.7	1.5	0.8	0.9	1.8	0.6	1.0	1.3	0.8	0.1	1.5	1.4	0.9	1.8	
15-Jan	1.0	1.2	1.1	0.7	0.5	0.6	-0.1	0.8	2.2	2.3	1.9	1.5	0.6	1.5	1.0	1.2	0.8	1.1	0.2	-0.5	0.8	1.3	1.3	1.5	1.0	2.3	
16-Jan	1.8	1.0	1.1	1.1	1.2	0.9	0.6	0.6	0.8	1.7	2.3	4.8	2.2	1.8	1.7	2.4	2.5	5.0	4.7	3.8	2.8	0.9	0.3	-0.4	1.9	5.0	
17-Jan	-0.1	0.0	1.0	3.2	1.9	1.4	0.1	0.2	0.5	0.7	1.3	1.6	1.7	0.7	0.8	0.8	1.2	0.4	3.1	0.9	0.7	0.8	0.7	0.5	1.0	3.2	
18-Jan	0.4	0.8	0.8	0.5	0.4	0.1	0.3	0.9	0.7	0.2	0.1	0.1	0.6	0.5	0.4	0.2	0.4	0.1	0.1	0.2	0.0	0.4	0.2	0.4	0.4	0.9	
19-Jan	0.3	0.1	0.2	0.2	AF	0.5	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	0.5	
20-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.1	0.5	0.8	0.7	0.5	0.6	1.0	0.4	0.2	0.3	AF	AF	1.0	
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	4.0	4.2	1.4	1.3	0.4	-1.5	--	4.2
26-Jan	-1.0	-1.2	AF	AF	0.8	0.8	1.4	1.2	1.0	1.0	1.2	1.3	1.1	1.1	1.8	0.6	0.1	1.1	1.4	0.9	0.6	1.9	3.4	3.5	1.1	3.5	
27-Jan	2.1	1.7	2.6	1.8	0.9	0.8	0.4	1.2	-0.4	1.5	1.5	2.8	3.6	2.9	1.8	0.5	0.6	0.8	1.0	1.9	1.6	2.4	2.2	4.9	1.7	4.9	
28-Jan	2.7	1.0	1.3	2.3	2.0	2.7	2.0	0.8	0.2	1.1	0.8	0.7	0.3	0.2	0.6	1.0	0.8	0.1	0.8	0.4	0.3	0.0	0.8	1.0	1.0	2.7	
29-Jan	0.5	1.5	1.0	1.9	1.7	2.6	3.2	1.3	0.4	2.0	0.8	0.7	0.5	0.3	0.5	1.2	1.9	1.0	0.5	1.0	1.7	0.1	3.1	3.1	1.4	3.2	
30-Jan	1.1	2.0	1.2	1.5	0.9	1.1	-0.1	0.2	-0.4	-0.1	0.9	1.0	-0.1	0.2	-0.3	-0.4	0.6	0.2	0.1	0.6	0.7	-0.1	-0.3	-0.3	0.4	2.0	
31-Jan	0.5	-0.1	-0.7	0.2	0.8	0.1	-0.1	0.0	0.9	0.1	-0.1	0.2	0.3	0.9	0.3	0.8	1.1	0.5	0.7	-0.1	-0.6	-0.5	-0.3	-0.1	0.2	1.1	
																								Diurnal Average			
																								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 - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 4.5 km/h on Jan 1 02:00	Hours of Data: 485
Minimum Value: 0.2 km/h on Jan 1 16:00	Hours of Missing Data: 259
Percentiles: P ₁ = 0.2 P ₁₀ = 0.5 Q ₁ = 0.7 Median = 1.1 Q ₃ = 1.5 P ₉₀ = 2.2 P ₉₉ = 3.5	Hours of Calibration: 0
	Percent Operational Time: 65.2

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-Jan	3.3	4.5	2.5	2.7	2.7	2.3	1.8	1.3	0.4	0.8	0.6	1.0	0.9	0.6	0.8	0.2	0.3	0.3	0.5	0.5	0.4	0.6	0.5	0.8	4.5	
2-Jan	1.0	0.5	0.4	0.9	0.5	0.5	0.4	0.2	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.6	0.6	0.6	0.6	1.0	0.7	0.9	1.0	
3-Jan	0.6	0.9	0.8	0.8	0.7	1.0	1.1	0.8	1.0	1.2	1.0	0.8	0.8	0.8	0.6	1.0	0.9	1.7	1.6	1.6	2.8	3.2	1.3	1.0	3.2	
4-Jan	1.2	0.6	1.0	0.9	1.1	0.8	0.7	0.6	0.7	2.0	0.5	1.1	0.9	0.7	0.6	0.8	0.6	0.8	1.0	1.1	1.2	1.0	0.4	0.3	2.0	
5-Jan	0.4	0.7	1.3	2.0	1.7	1.7	1.7	1.2	1.7	AF	AF	AF	2.5	2.2	2.6	2.0	1.3	0.9	1.4	1.3	1.2	0.7	0.9	0.4	2.6	
6-Jan	1.0	0.9	0.5	0.8	0.5	0.6	0.7	1.1	1.0	1.0	AF	AF	0.7	0.6	0.6	0.7	0.5	0.9	0.8	0.8	0.9	0.5	0.4	0.4	1.1	
7-Jan	0.6	0.4	0.4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.6	
8-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
9-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
10-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
11-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	1.7	AF	AF	AF	3.5	3.5	3.2	2.5	1.4	1.1	0.7	0.8	0.5	0.7	0.5	3.5	
12-Jan	0.4	0.3	0.3	0.5	0.6	0.7	1.1	1.0	0.9	1.2	0.7	0.9	0.8	0.8	1.5	2.1	2.7	2.2	2.1	2.6	2.1	1.5	1.1	0.9	2.7	
13-Jan	0.8	1.1	0.9	1.3	0.9	0.6	0.4	0.3	0.5	0.9	0.5	1.1	0.5	0.6	0.7	0.8	1.0	1.0	0.9	0.8	0.9	0.7	0.8	1.0	1.3	
14-Jan	1.0	1.2	0.9	1.1	1.1	1.1	0.8	0.9	1.3	1.0	1.1	1.1	1.0	1.2	1.2	1.2	1.4	2.3	1.2	1.4	1.3	2.8	1.3	1.7	2.8	
15-Jan	1.6	1.7	1.4	1.1	1.2	1.1	1.2	1.3	1.6	1.7	1.6	2.1	2.3	1.1	1.0	1.1	1.3	1.4	2.9	3.9	2.3	1.9	1.4	1.2	3.9	
16-Jan	1.4	1.6	1.7	1.5	1.4	1.4	1.2	1.4	1.2	2.2	2.7	3.3	3.5	2.6	2.6	2.5	1.9	2.4	2.1	2.1	1.5	1.6	1.1	1.3	3.5	
17-Jan	1.5	1.4	1.4	2.3	1.7	1.7	2.2	1.2	1.2	0.9	0.9	1.6	1.1	0.7	0.7	1.1	1.0	0.8	2.0	2.1	0.7	1.0	1.1	0.7	2.3	
18-Jan	0.8	0.6	0.7	0.6	0.5	0.2	0.8	0.3	0.8	0.7	0.6	0.7	0.8	0.8	0.7	0.7	0.8	0.7	0.6	0.7	0.6	0.7	0.8	0.7	0.8	
19-Jan	0.7	0.5	0.8	0.9	AF	1.6	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	1.6	
20-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.9	1.1	1.1	1.1	0.9	0.9	0.8	0.5	0.5	0.7	AF	AF	1.1	
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	1.2	1.5	1.1	1.1	1.6	1.3	1.6
26-Jan	1.4	1.4	AF	AF	1.4	1.3	1.3	1.0	0.9	0.8	0.9	1.2	1.4	1.0	1.3	1.2	1.7	1.6	1.1	0.9	0.6	1.5	0.9	1.4	1.7	
27-Jan	1.3	1.5	1.6	1.5	1.6	1.6	2.0	1.4	2.0	1.4	1.2	1.6	1.1	1.8	1.4	1.1	1.7	1.3	1.2	0.7	0.8	1.0	1.4	1.5	2.0	
28-Jan	1.7	1.3	1.5	1.3	1.3	1.4	1.6	0.9	1.2	1.4	0.7	0.7	0.6	0.6	0.7	0.9	1.0	0.9	1.0	1.2	2.5	2.2	0.6	0.8	2.5	
29-Jan	1.2	1.7	1.1	1.0	1.2	1.4	1.3	2.3	2.1	1.6	1.7	1.9	1.4	1.1	0.7	0.9	0.8	0.6	0.6	0.7	0.9	1.6	2.2	1.7	2.3	
30-Jan	1.4	1.6	0.9	0.8	1.2	1.0	0.7	0.9	1.1	1.3	3.7	3.3	1.8	1.7	1.4	2.7	2.3	2.8	2.9	3.1	3.1	2.6	2.8	2.7	3.7	
31-Jan	3.0	2.9	2.0	1.6	1.4	1.4	0.7	0.4	0.7	0.7	0.9	0.6	1.1	0.9	0.8	1.0	1.2	1.0	1.8	1.7	1.8	1.4	1.7	0.8	3.0	
	3.3	4.5	2.5	2.7	2.7	2.3	2.2	2.3	2.1	2.2	3.7	3.3	3.5	3.5	3.5	3.2	2.7	2.8	2.9	3.9	3.1	3.2	2.8	2.7		

Diurnal Maximum

AF - Analyzer Failure



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 4
BUFFALO VIEWPOINT
JANUARY 2017**

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

February 27, 2017



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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	710	34	34	100.00	10	0	4	0
H2S (ppb) Average	709	35	35	100.00	3	0	1	0
THC (ppm) Average	710	34	34	100.00	6.2	-	3.2	-
Temperature (C) Average	744	0	0	100.00	7.8	-	3.6	-
Relative Humidity (%) Average	744	0	0	100.00	97	-	94	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	49	-	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 - BUFFALO VIEWPOINT (AMS 4)
 JANUARY 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	710	0.5	1	-	0	0	0	0	0	1	10
H2S (ppb) Average	709	0.3	0	-	0	0	0	0	0	1	3
THC (ppm) Average	710	2.37	0.3	-	2.1	2.2	2.2	2.3	2.4	2.5	6.2
Temperature 2 m (C) Average	744	-12.26	10.6	-	-37.8	-25.8	-20.1	-13.6	-2.4	2.3	7.8
Relative Humidity (%) Average	744	79.3	9	-	48	68	73	80	85	92	97
Wind Speed 10 m (km/h) Average	744	10.2	6	-	1	4	6	9	13	18	49
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BUFFALO VIEWPOINT (AMS 4)
JANUARY 2016

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
<hr/>				
No operational issues to report				



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

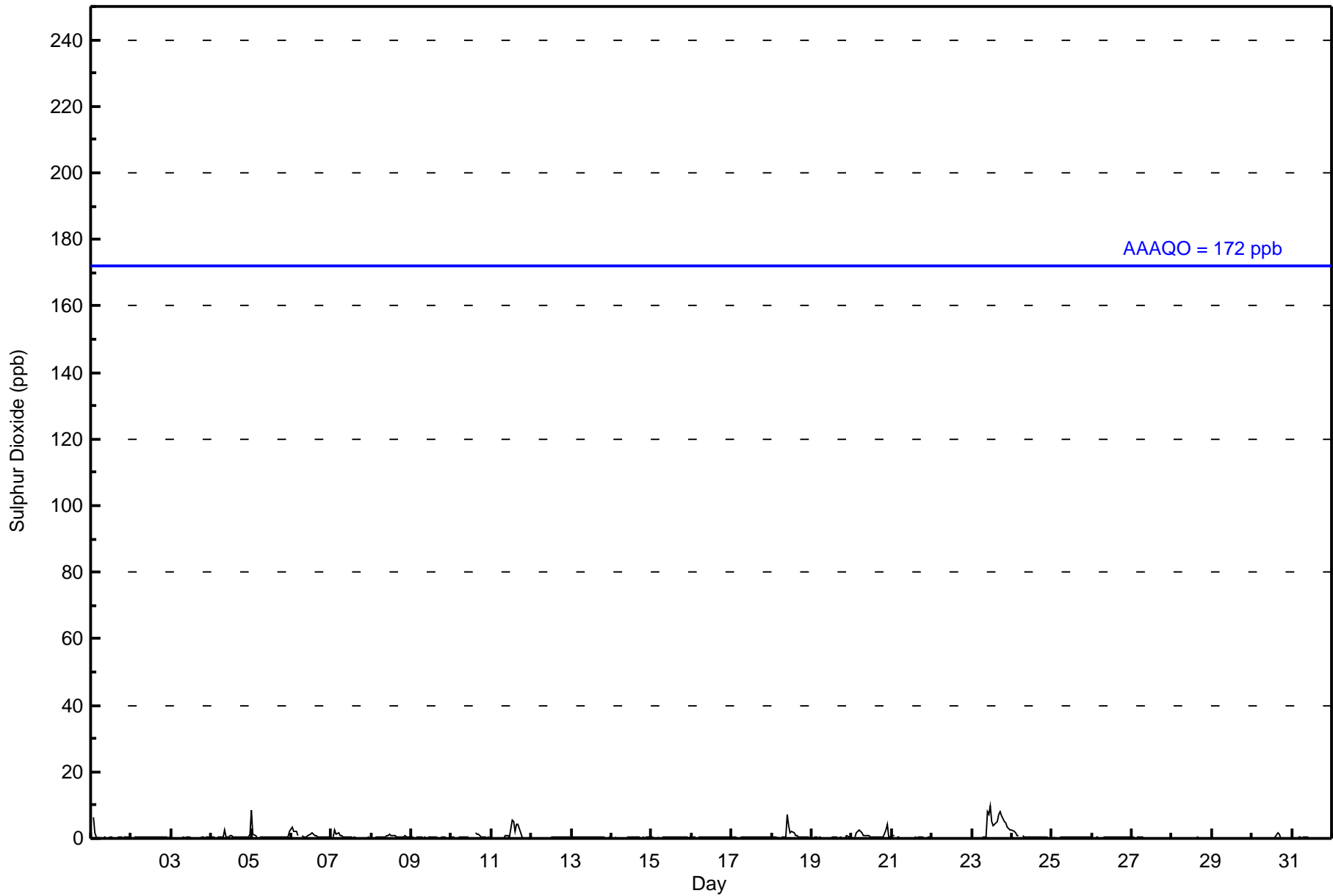
Buffalo Viewpoint - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 ppb on Jan 23 12:00 Maximum Daily Average: 3.7 ppb on Jan 23																	Hours in Service: 744 Hours of Data: 710									
Minimum Value: 0 ppb on Jan 12 10:00 Minimum Daily Average: 0.1 ppb on Jan 22 Maximum Diurnal Average: 0.8 ppb at hour 1 Minimum Diurnal Average: 0.3 ppb at hour 8 Monthly Average: 0.5 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 7																	Hours of Missing Data: 34 Hours of Calibration: 34 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-Jan	Z	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.6	6
2-Jan	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-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-Jan	0	0	0	Z	0	0	0	0	3	1	0	1	1	1	0	0	0	0	0	0	0	0	0	1	0.5	3
5-Jan	9	1	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0.9	9
6-Jan	3	2	2	2	1	Z	1	1	1	1	1	1	2	1	1	1	1	0	0	0	0	0	0	0	1.0	3
7-Jan	Z	1	3	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3
8-Jan	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	1	0	0	0	0.5	1
9-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
10-Jan	0	0	0	Z	0	0	0	0	0	0	0	C	C	C	2	1	1	1	1	0	0	0	0	0	0.5	2
11-Jan	0	0	0	0	Z	0	0	0	1	1	1	1	5	5	2	4	4	2	0	0	0	0	0	0	1.2	5
12-Jan	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
13-Jan	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
14-Jan	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
15-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
16-Jan	0	0	0	Z	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
17-Jan	0	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
18-Jan	0	0	0	0	0	Z	0	0	0	7	4	2	2	2	1	1	1	0	0	0	0	0	0	0	1.0	7
19-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	1
20-Jan	0	Z	0	2	3	2	2	1	1	1	1	1	0	1	0	0	0	0	0	0	2	4	1	0	1.0	4
21-Jan	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
22-Jan	0	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
23-Jan	0	0	0	0	Z	0	0	0	0	8	7	10	5	4	5	5	7	8	7	5	5	3	3	2	3.7	10
24-Jan	3	2	2	1	1	Z	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.7	3
25-Jan	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
26-Jan	0	Z	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
27-Jan	0	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
28-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
29-Jan	0	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
30-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0.2	2
31-Jan	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
																								Diurnal Average		
																								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 (SO₂) - ppb
Buffalo Viewpoint - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Buffalo Viewpoint - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
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 (SO₂) - ppb
Buffalo Viewpoint - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	122	24	3	2	1	1	99	171	34	28	37	95	43	14	17	19	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
Totals	122	24	3	2	1	1	99	171	34	28	37	95	43	14	17	19	710

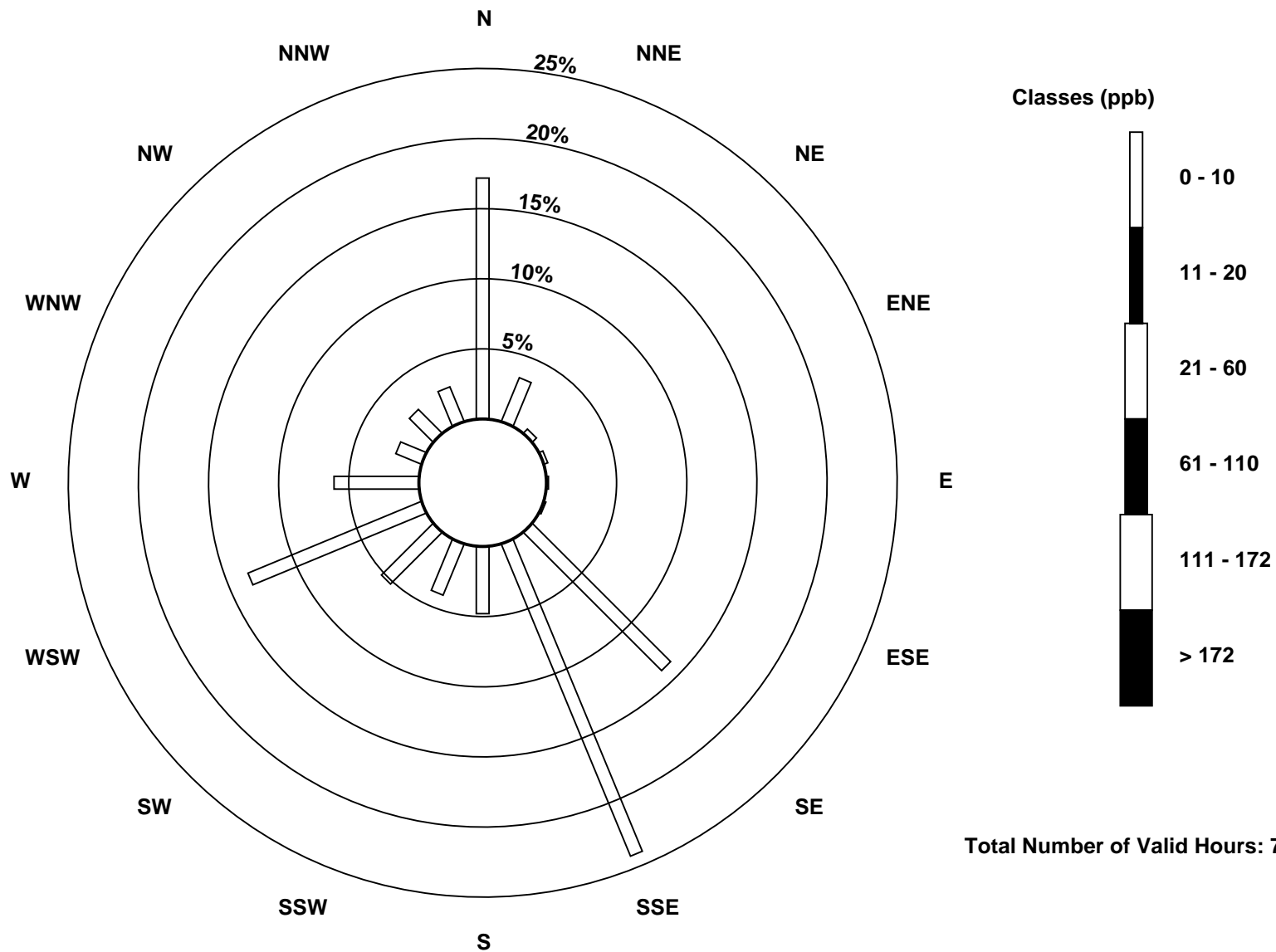
Total Number of Valid Hours: 710

Total Number of Hours: 744

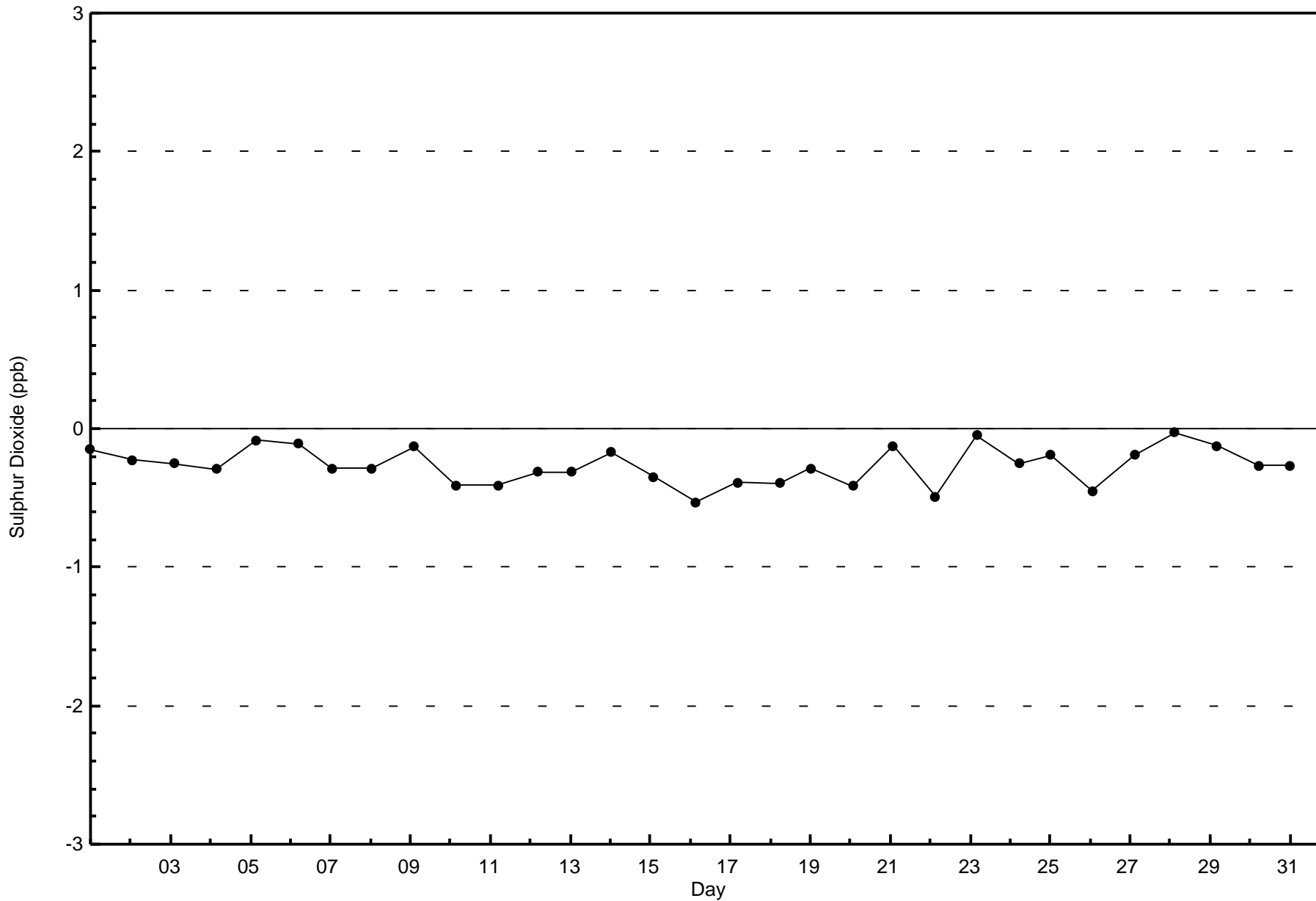


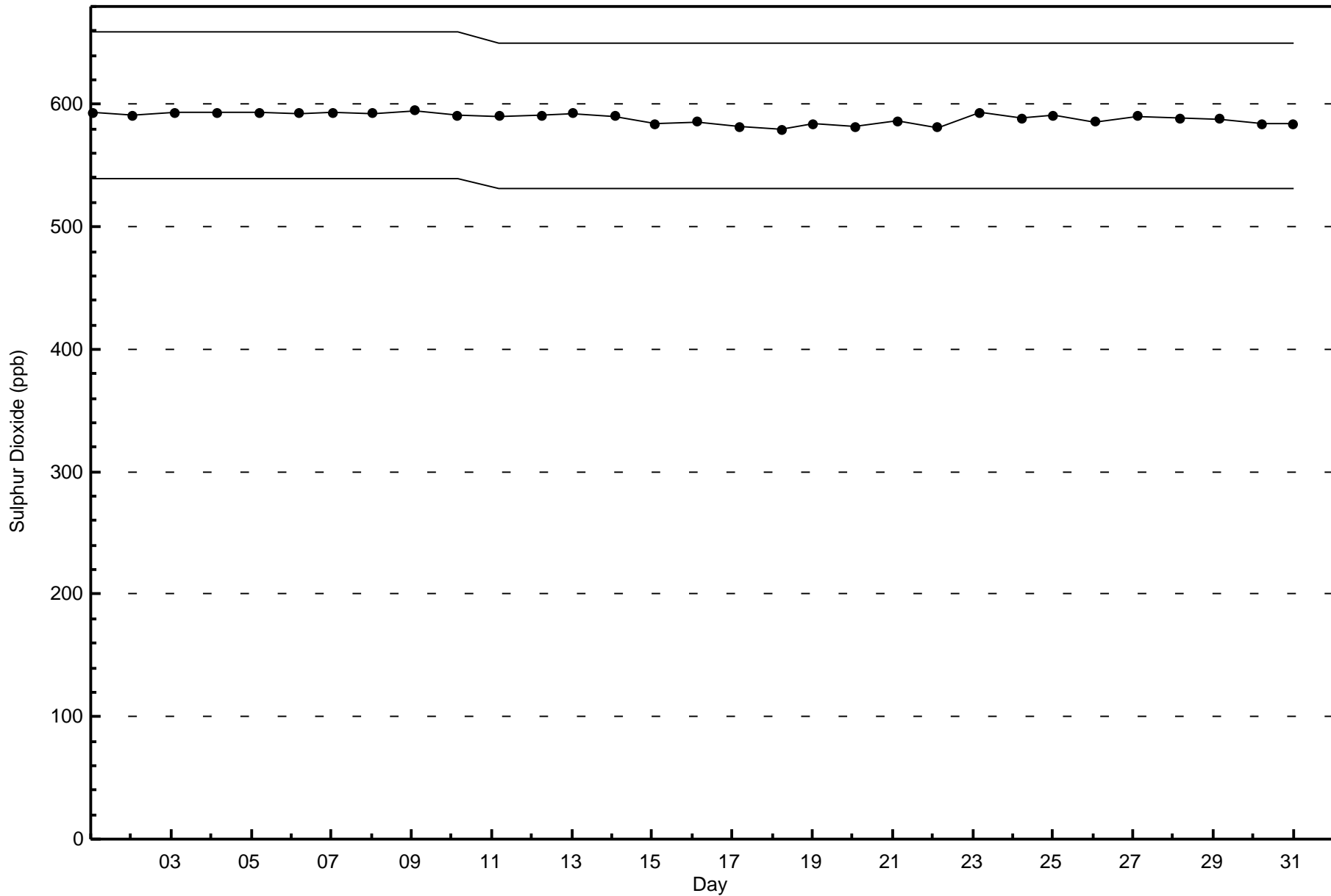
Wood Buffalo Environmental Association
Wind Rose Jan 2017

Sulphur Dioxide (SO₂) - ppb
Buffalo Viewpoint (AMS 4)



Total Number of Valid Hours: 710







Wood Buffalo Environmental Association
Summary of Hour Averages

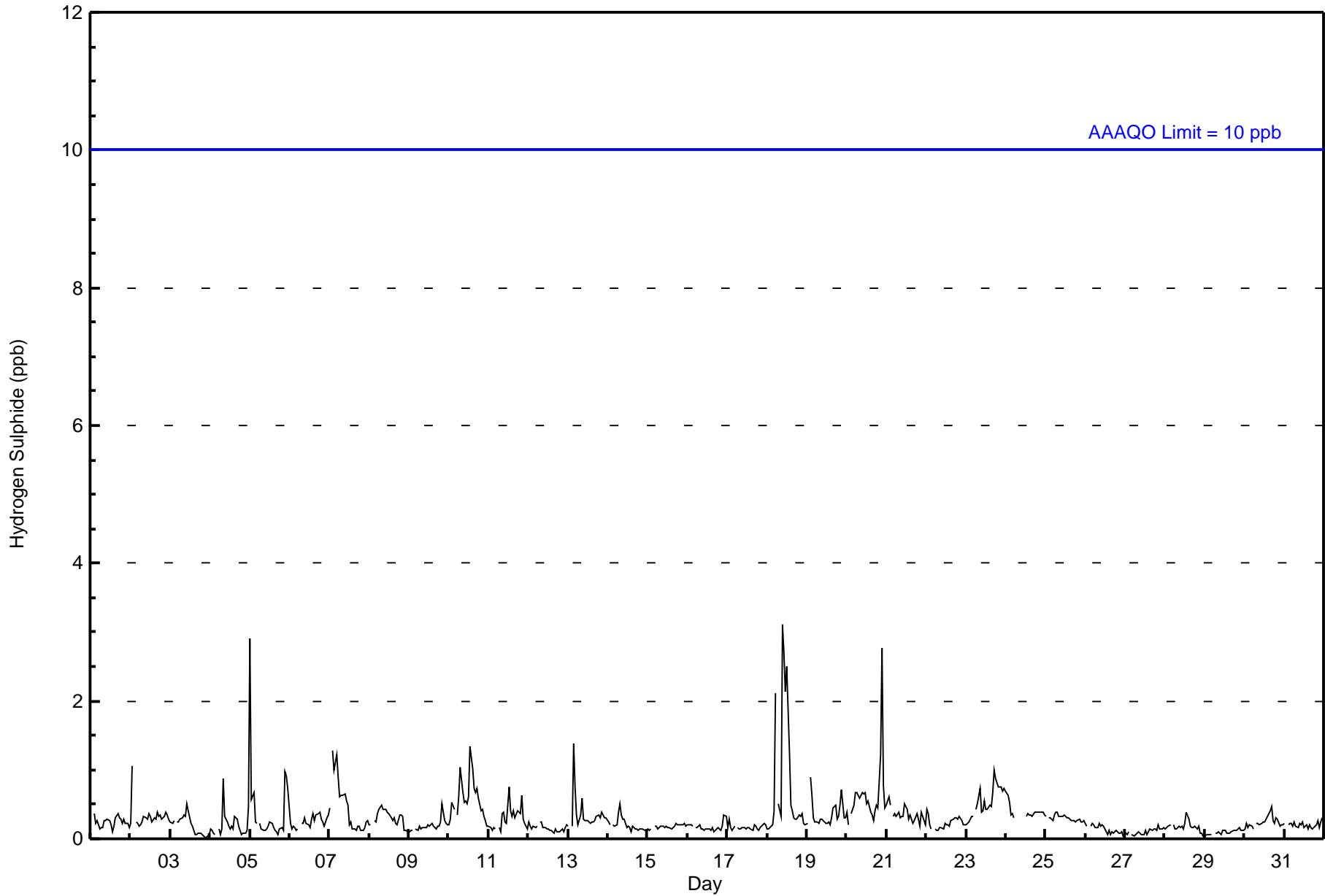
Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3 ppb on Jan 18 10:00 Maximum Daily Average: 0.8 ppb on Jan 18																	Hours in Service: 744 Hours of Data: 709 Hours of Missing Data: 35 Hours of Calibration: 35 Percent Operational Time: 100.0									
Minimum Value: 0 ppb on Jan 3 22:00 Minimum Daily Average: 0.1 ppb on Jan 29 Maximum Diurnal Average: 0.4 ppb at hour 10 Minimum Diurnal Average: 0.2 ppb at hour 20 Monthly Average: 0.3 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P 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-Jan	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
2-Jan	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
3-Jan	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
4-Jan	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
5-Jan	3	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	3
6-Jan	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
7-Jan	0	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
8-Jan	0	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
9-Jan	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
10-Jan	0	0	1	0	Z	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.6	1
11-Jan	0	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0.3	1
12-Jan	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
13-Jan	0	Z	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
14-Jan	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
15-Jan	0	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
16-Jan	0	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
17-Jan	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
18-Jan	0	0	0	0	0	2	Z	1	0	3	3	2	3	1	0	0	0	0	0	0	0	0	0	0	0.8	3
19-Jan	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.4	1
20-Jan	0	0	Z	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	3	1	0	0.6	3
21-Jan	0	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
22-Jan	0	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
23-Jan	0	0	0	0	0	Z	0	1	1	0	0	1	0	0	0	0	1	1	1	1	1	1	1	1	0.5	1
24-Jan	1	1	1	0	0	0	Z	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
25-Jan	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
26-Jan	0	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
27-Jan	0	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
28-Jan	0	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
29-Jan	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
30-Jan	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
31-Jan	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
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	704	99.29	99.29
3 - 4	5	0.71	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 (H₂S) - ppb
Buffalo Viewpoint - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	120	23	3	2	1	2	100	169	33	29	36	96	42	15	17	16	704
3 - 4	1	2	0	0	0	0	0	0	1	0	0	0	0	0	1	0	5
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
Totals	121	25	3	2	1	2	100	169	34	29	36	96	42	15	18	16	709

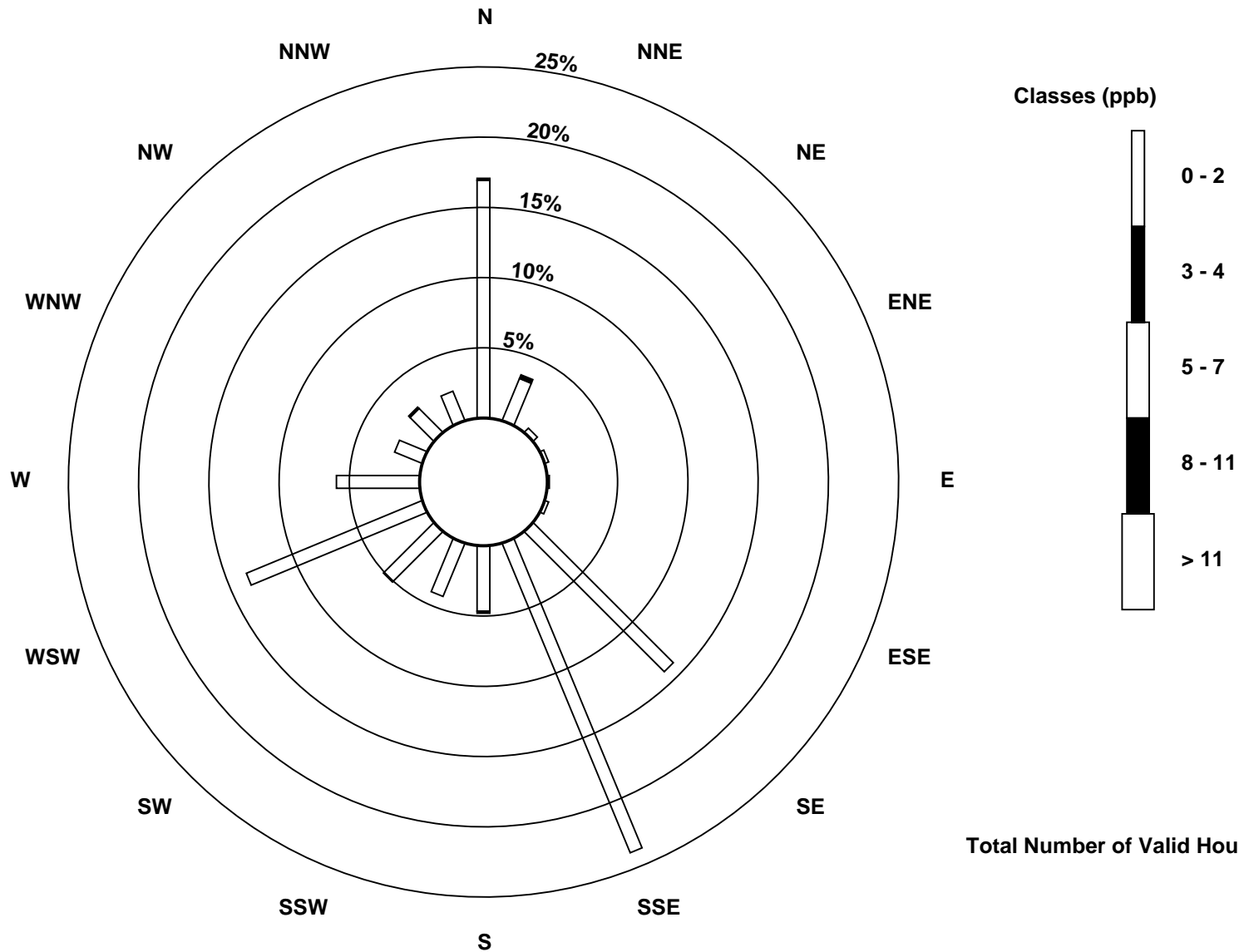
Total Number of Valid Hours: 709

Total Number of Hours: 744

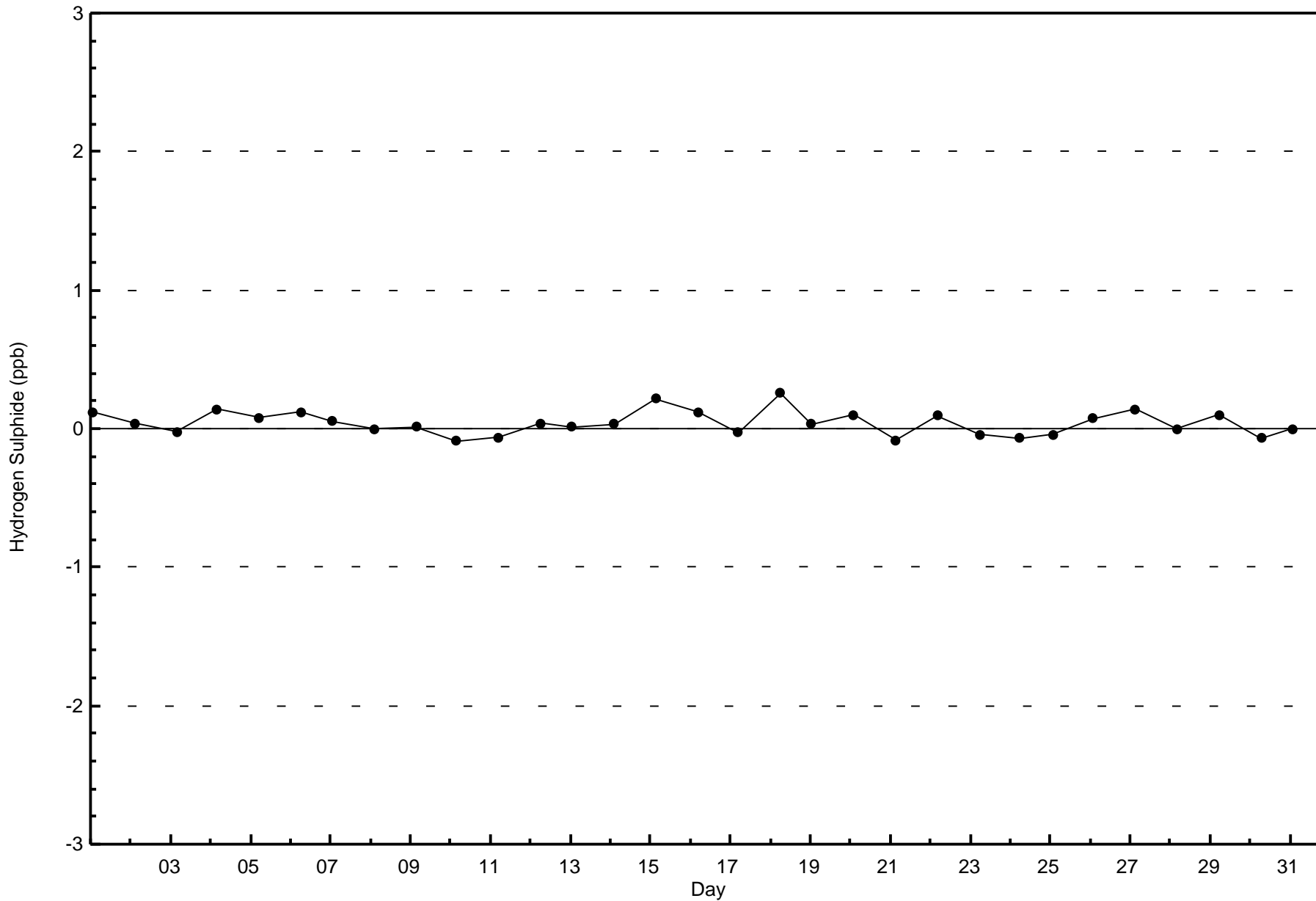


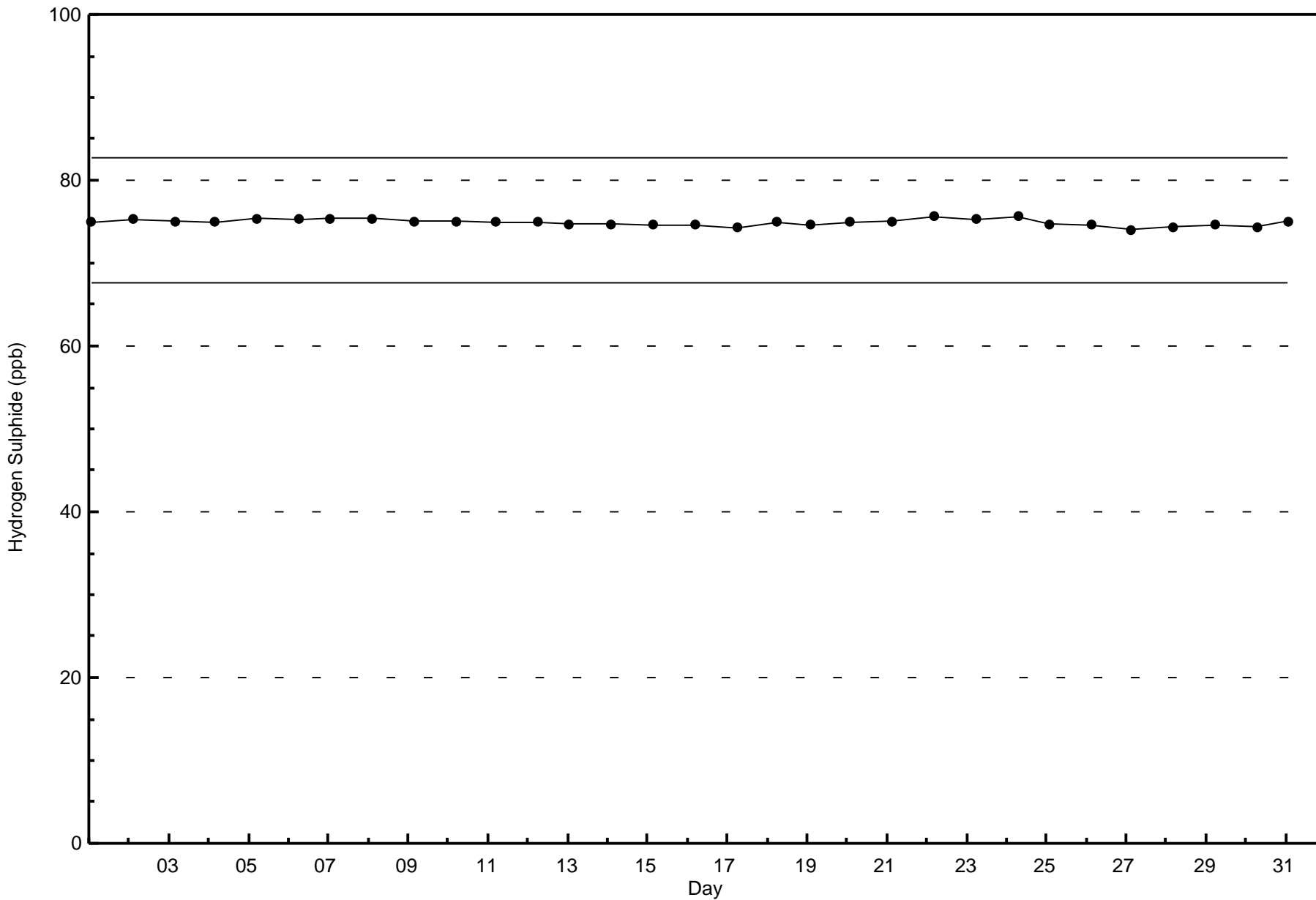
Wood Buffalo Environmental Association
Wind Rose Jan 2017

Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint (AMS 4)



Total Number of Valid Hours: 709

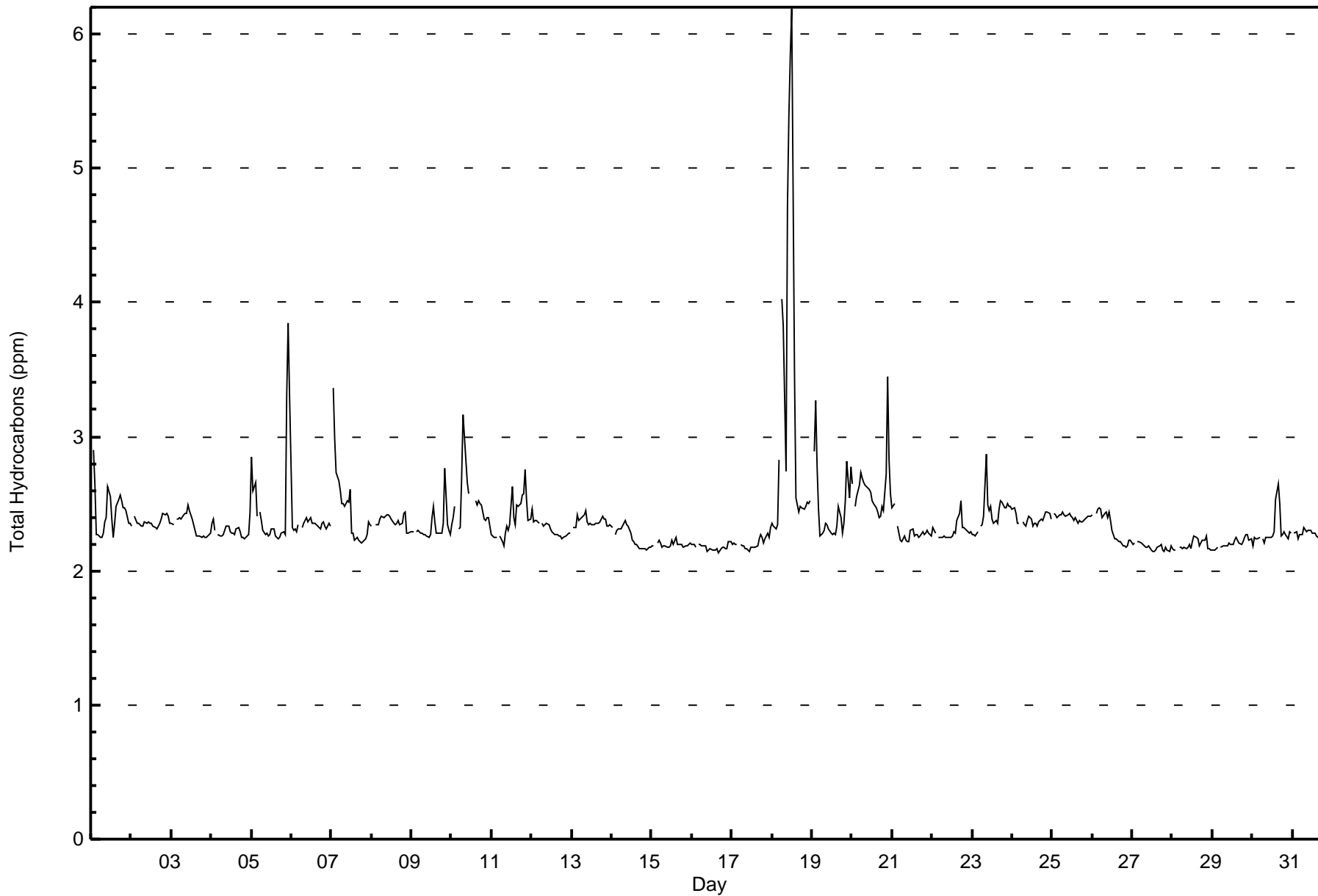






Wood Buffalo Environmental Association
Hourly Averages

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





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	696	98.03	98.03
3.1 - 10.0	14	1.97	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

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

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	121	22	3	2	1	1	98	169	32	28	36	95	43	13	14	18	696
3.1 - 10.0	1	2	0	0	0	0	1	2	2	0	1	0	0	1	3	1	14
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	122	24	3	2	1	1	99	171	34	28	37	95	43	14	17	19	710

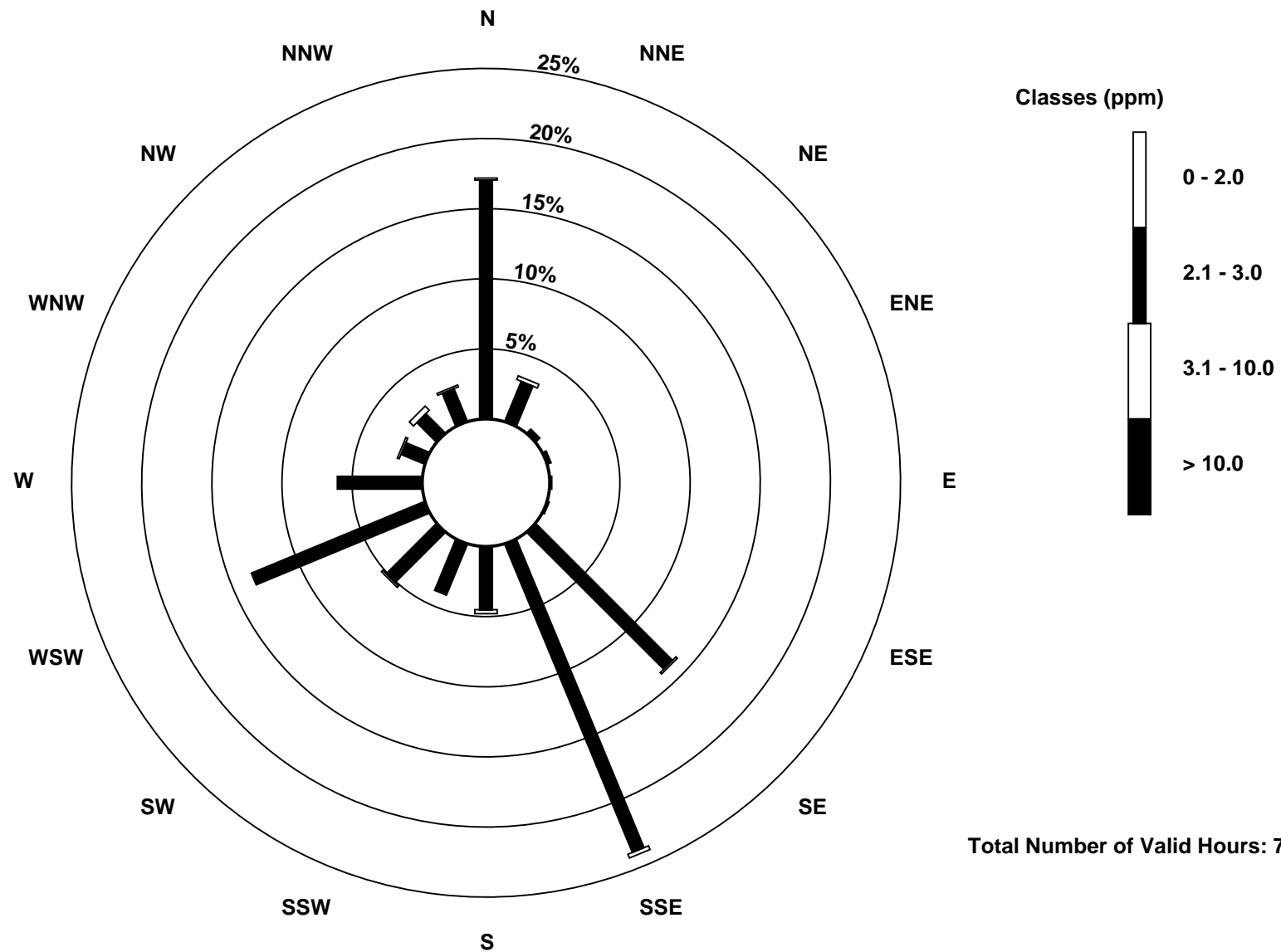
Total Number of Valid Hours: 710

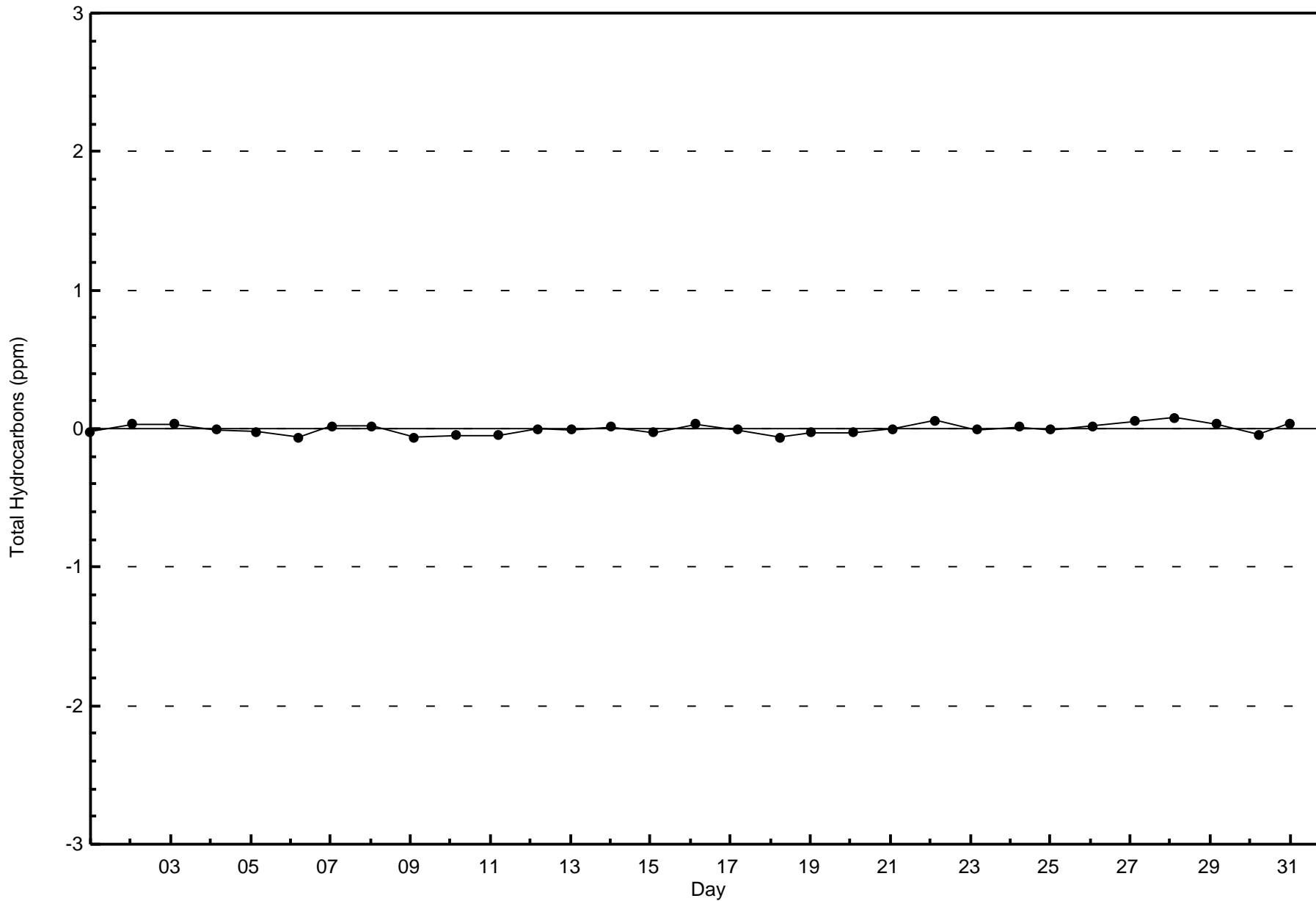
Total Number of Hours: 744

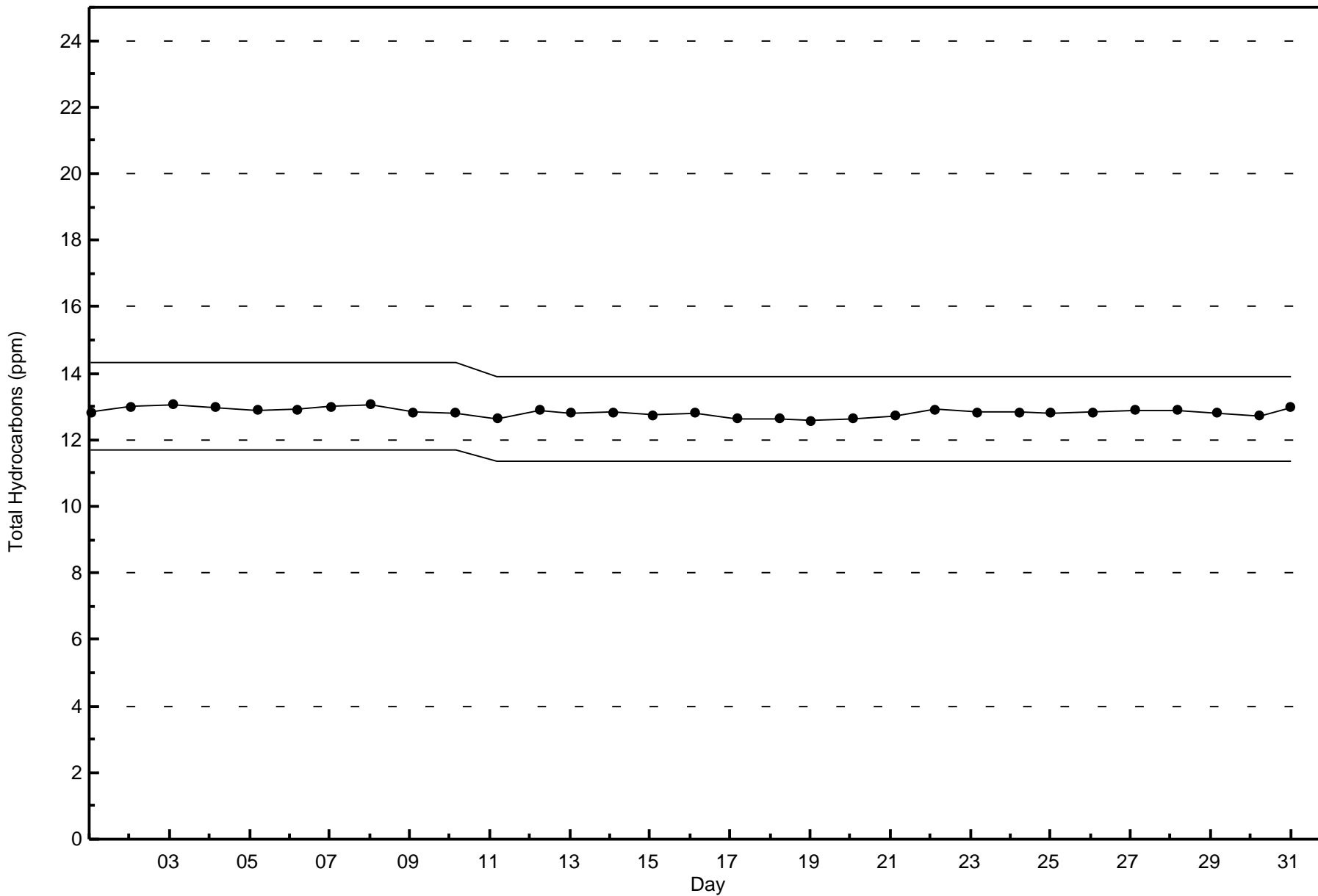


Wood Buffalo Environmental Association
Wind Rose Jan 2017

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





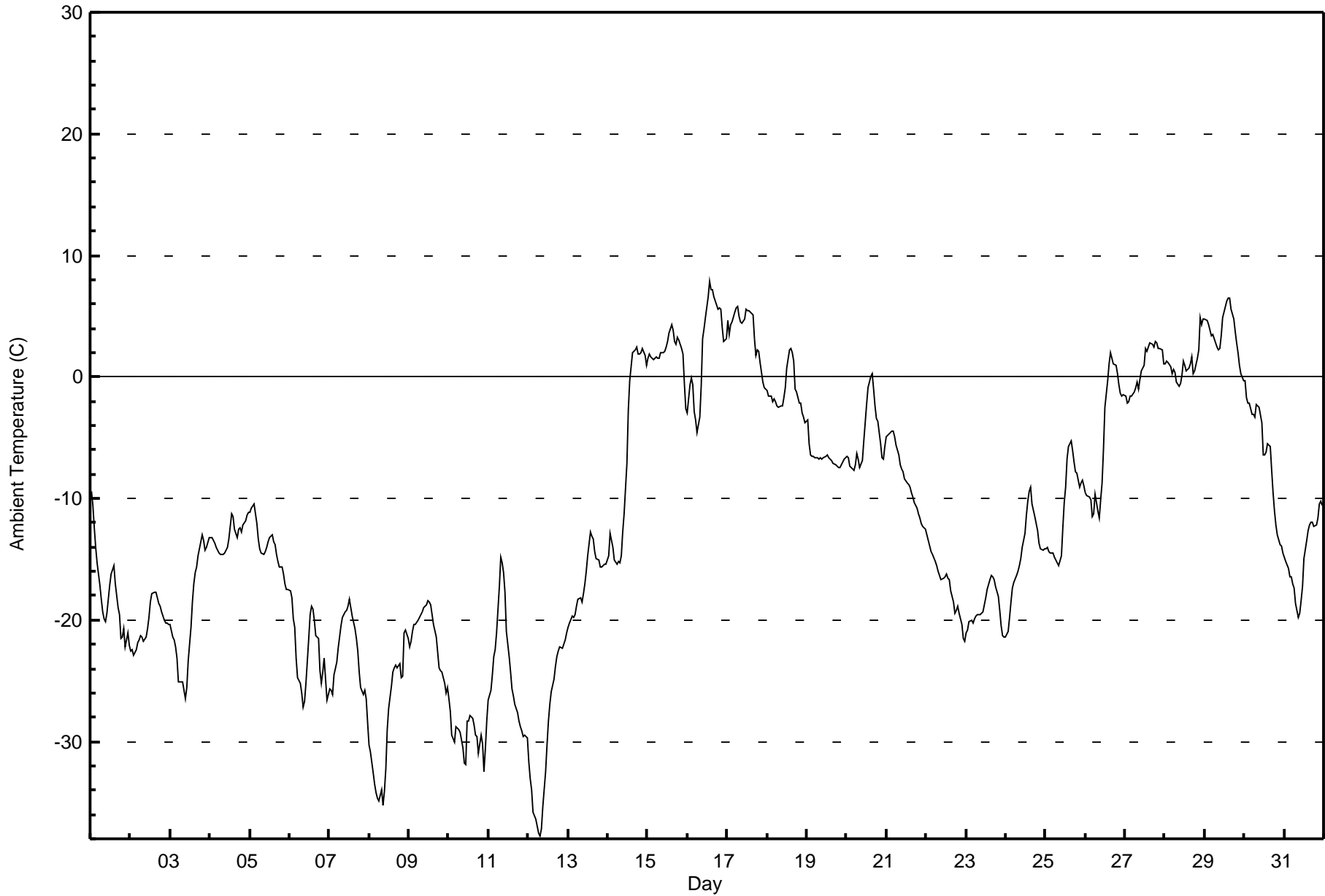




Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature (AT) - C
Buffalo Viewpoint - January 2017

Maximum Value: 7.8 C on Jan 16 14:00 Maximum Daily Average: 3.6 C on Jan 17		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Minimum Value: -37.8 C on Jan 12 08:00 Maximum Diurnal Average: -9.8 C at hour 15 Monthly Average: -12.26 C		Minimum Daily Average: -29.4 C on Jan 10 Minimum Diurnal Average: -14.0 C at hour 9 Percentiles: P ₁ = -35.2 P ₁₀ = -25.8 Q ₁ = -20.1 Median = -13.6 Q ₃ = -2.4 P ₉₀ = 2.3 P ₉₉ = 6.5																								
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-Jan	-9.4	-10.6	-12.4	-14.0	-15.3	-17.1	-18.3	-19.3	-19.9	-20.1	-19.4	-17.1	-16.2	-15.9	-15.5	-17.0	-19.0	-19.5	-21.5	-21.4	-20.8	-22.2	-21.1	-22.1	-17.7	-9.4
2-Jan	-22.6	-22.4	-22.8	-22.4	-21.9	-21.6	-21.3	-21.4	-21.8	-21.4	-20.7	-19.8	-18.5	-17.8	-17.7	-17.7	-18.1	-18.6	-18.8	-19.4	-20.0	-20.2	-20.3	-20.4	-20.3	-17.7
3-Jan	-20.4	-21.4	-21.6	-22.2	-23.1	-25.1	-25.0	-25.0	-25.8	-26.5	-25.6	-23.3	-20.6	-18.5	-17.0	-16.0	-15.6	-14.7	-13.6	-13.0	-13.5	-14.2	-14.0	-13.2	-19.6	-13.0
4-Jan	-13.2	-13.2	-13.5	-13.7	-14.0	-14.5	-14.6	-14.6	-14.6	-14.4	-14.0	-13.4	-12.3	-11.2	-11.5	-12.5	-13.2	-12.5	-12.4	-12.8	-12.2	-11.9	-11.4	-11.2	-13.0	-11.2
5-Jan	-11.2	-10.8	-10.4	-11.3	-12.1	-13.4	-14.2	-14.5	-14.6	-14.4	-14.0	-13.6	-13.2	-13.0	-13.6	-13.8	-14.6	-15.2	-15.6	-15.7	-16.3	-17.1	-17.5	-17.5	-14.1	-10.4
6-Jan	-17.6	-18.2	-19.9	-20.5	-23.2	-24.7	-25.2	-26.0	-27.2	-26.7	-25.2	-21.6	-19.6	-18.9	-19.1	-20.0	-21.2	-21.5	-24.2	-25.2	-24.3	-23.1	-26.6	-26.2	-22.7	-17.6
7-Jan	-25.7	-25.8	-26.2	-24.5	-23.5	-22.3	-21.4	-20.5	-19.8	-19.3	-19.2	-18.9	-18.3	-19.0	-19.7	-20.7	-21.6	-22.6	-24.2	-25.6	-26.1	-25.8	-26.5	-28.5	-22.7	-18.3
8-Jan	-30.3	-30.8	-32.6	-33.6	-34.2	-34.6	-34.9	-33.9	-35.2	-34.1	-32.2	-29.0	-27.3	-25.4	-24.3	-23.9	-23.7	-23.9	-23.6	-24.8	-24.7	-21.1	-20.9	-21.5	-28.4	-20.9
9-Jan	-22.2	-21.8	-21.0	-20.4	-20.4	-20.0	-19.8	-19.6	-19.3	-19.0	-18.8	-18.4	-18.5	-18.7	-19.6	-20.3	-21.3	-22.6	-24.0	-24.2	-24.3	-25.1	-26.0	-25.5	-21.3	-18.4
10-Jan	-26.5	-27.5	-29.5	-30.0	-28.8	-28.9	-29.0	-29.2	-30.5	-31.8	-31.9	-28.3	-28.4	-27.9	-28.1	-28.7	-29.5	-29.6	-31.0	-29.5	-30.2	-32.4	-30.7	-28.3	-29.4	-26.5
11-Jan	-26.6	-25.8	-24.5	-23.1	-22.4	-21.1	-17.3	-14.8	-15.3	-16.1	-17.8	-20.9	-23.0	-24.3	-25.6	-26.2	-26.9	-27.6	-28.3	-28.7	-29.2	-29.6	-29.5	-29.7	-23.9	-14.8
12-Jan	-31.6	-33.0	-33.9	-35.9	-36.4	-36.9	-37.5	-37.8	-37.1	-35.4	-32.5	-30.3	-28.3	-26.9	-25.9	-24.8	-23.8	-23.1	-22.5	-22.2	-22.3	-22.0	-21.7	-21.1	-29.3	-21.1
13-Jan	-20.6	-20.3	-19.7	-19.8	-19.5	-18.9	-18.3	-18.1	-18.5	-17.8	-17.1	-16.0	-14.7	-12.8	-13.1	-13.3	-14.4	-15.0	-15.1	-15.7	-15.7	-15.6	-15.5	-15.4	-16.7	-12.8
14-Jan	-14.7	-12.9	-13.5	-14.0	-15.0	-15.5	-15.2	-15.3	-14.8	-12.7	-11.3	-7.1	-2.7	-0.4	0.9	2.0	2.2	2.4	1.9	1.9	2.0	2.3	1.8	1.0	-6.1	2.4
15-Jan	1.5	1.9	1.7	1.4	1.5	1.7	1.5	1.6	2.0	2.0	2.1	2.5	2.9	3.6	4.3	3.8	2.9	2.6	3.3	3.1	2.3	1.8	-0.5	-2.6	2.0	4.3
16-Jan	-2.9	-0.7	-0.1	-0.6	-2.8	-3.5	-4.5	-3.3	-0.7	3.2	4.0	4.8	6.6	7.8	7.2	7.2	6.5	5.9	5.5	5.7	5.6	4.1	2.9	3.1	2.5	7.8
17-Jan	4.7	3.5	4.3	4.5	5.3	5.7	5.8	5.0	4.5	4.4	4.8	5.6	5.5	5.4	5.4	5.1	3.2	1.7	2.2	2.1	1.2	-0.4	-0.9	-1.0	3.6	5.8
18-Jan	-1.1	-1.5	-1.6	-2.0	-1.8	-2.0	-2.3	-2.5	-2.4	-2.3	-1.7	-0.9	0.7	2.2	2.4	1.9	1.3	-1.0	-1.3	-2.1	-2.2	-3.0	-3.3	-3.8	-1.3	2.4
19-Jan	-3.6	-5.5	-6.4	-6.6	-6.5	-6.6	-6.7	-6.8	-6.7	-6.7	-6.7	-6.5	-6.5	-6.6	-6.8	-6.9	-7.1	-7.2	-7.4	-7.4	-7.4	-7.2	-6.8	-6.7	-6.6	-3.6
20-Jan	-6.6	-6.7	-7.3	-7.5	-7.7	-7.2	-6.3	-6.8	-7.4	-6.9	-5.3	-3.8	-2.3	-0.9	0.0	0.2	-1.0	-2.4	-3.4	-3.6	-5.5	-6.6	-6.8	-5.8	-4.9	0.2
21-Jan	-4.9	-4.7	-4.6	-4.5	-4.4	-4.9	-5.7	-6.5	-7.3	-7.5	-7.8	-8.3	-8.7	-8.9	-9.1	-9.5	-9.9	-10.4	-10.8	-11.2	-11.6	-12.1	-12.3	-12.6	-8.3	-4.4
22-Jan	-13.0	-13.4	-13.9	-14.4	-14.7	-15.1	-15.6	-16.0	-16.4	-16.6	-16.6	-16.4	-16.2	-16.6	-16.7	-17.6	-18.5	-19.4	-19.2	-18.9	-19.4	-20.4	-21.5	-21.7	-17.0	-13.0
23-Jan	-21.1	-20.8	-20.1	-20.1	-20.2	-19.9	-19.7	-19.6	-19.6	-19.4	-19.3	-18.8	-18.2	-17.4	-16.7	-16.3	-16.4	-16.7	-17.3	-18.1	-19.2	-20.5	-21.3	-21.4	-19.1	-16.3
24-Jan	-21.4	-21.0	-19.8	-18.6	-17.4	-16.9	-16.4	-16.0	-15.6	-14.9	-14.0	-12.8	-11.4	-10.2	-9.4	-9.1	-10.4	-11.5	-12.0	-12.7	-13.7	-14.1	-14.3	-14.2	-14.5	-9.1
25-Jan	-14.1	-14.0	-14.4	-14.5	-14.5	-14.8	-15.1	-15.3	-15.5	-14.7	-12.4	-10.3	-9.1	-6.8	-5.7	-5.3	-6.1	-7.0	-7.9	-8.0	-9.1	-8.7	-8.5	-9.0	-10.9	-5.3
26-Jan	-9.5	-9.8	-9.9	-10.1	-11.5	-11.3	-9.6	-11.1	-11.6	-10.1	-8.7	-6.0	-2.4	-0.3	1.0	2.0	1.6	1.0	0.9	0.3	-0.6	-1.4	-1.6	-1.5	-5.0	2.0
27-Jan	-1.6	-2.2	-2.0	-1.5	-1.6	-1.2	-0.9	-0.4	-1.0	-0.3	0.5	0.9	2.4	2.2	2.4	2.8	2.7	2.4	2.9	2.8	2.4	2.3	2.2	1.1	0.7	2.9
28-Jan	1.1	1.2	1.2	0.8	0.3	0.6	0.3	-0.5	-0.8	-0.5	0.2	1.3	1.0	0.5	0.8	1.0	1.7	0.3	0.5	1.6	2.2	4.8	4.3	4.8	1.2	4.8
29-Jan	4.8	4.6	4.3	3.8	3.4	3.5	2.8	2.5	2.3	2.3	3.4	4.9	5.8	6.2	6.5	6.5	5.6	4.8	3.7	2.9	2.0	1.0	0.2	-0.4	3.6	6.5
30-Jan	-0.3	-1.7	-2.1	-2.1	-3.1	-3.1	-3.3	-2.3	-2.4	-2.5	-3.7	-6.4	-6.4	-6.2	-5.5	-5.8	-7.7	-9.5	-11.0	-12.2	-12.9	-13.8	-13.9	-14.5	-6.4	-0.3
31-Jan	-14.9	-15.2	-15.7	-16.5	-16.4	-17.1	-17.4	-18.6	-19.8	-19.4	-18.4	-17.2	-15.0	-13.4	-12.7	-12.1	-11.9	-12.0	-12.4	-12.2	-11.6	-10.5	-10.2	-10.6	-14.6	-10.2
	-12.8	-12.9	-13.2	-13.3	-13.6	-13.8	-13.7	-13.8	-14.0	-13.5	-12.9	-11.8	-10.7	-10.0	-9.8	-9.8	-10.5	-11.0	-11.5	-11.7	-12.1	-12.3	-12.6	-12.8	Diurnal Average	
	4.8	4.6	4.3	4.5	5.3	5.7	5.8	5.0	4.5	4.4	4.8	5.6	6.6	7.8	7.2	7.2	6.5	5.9	5.5	5.7	5.6	4.8	4.3	4.8	Diurnal Maximum	





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	191	25.67	25.67
-20 - 0	414	55.65	81.32
0 - 10	139	18.68	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



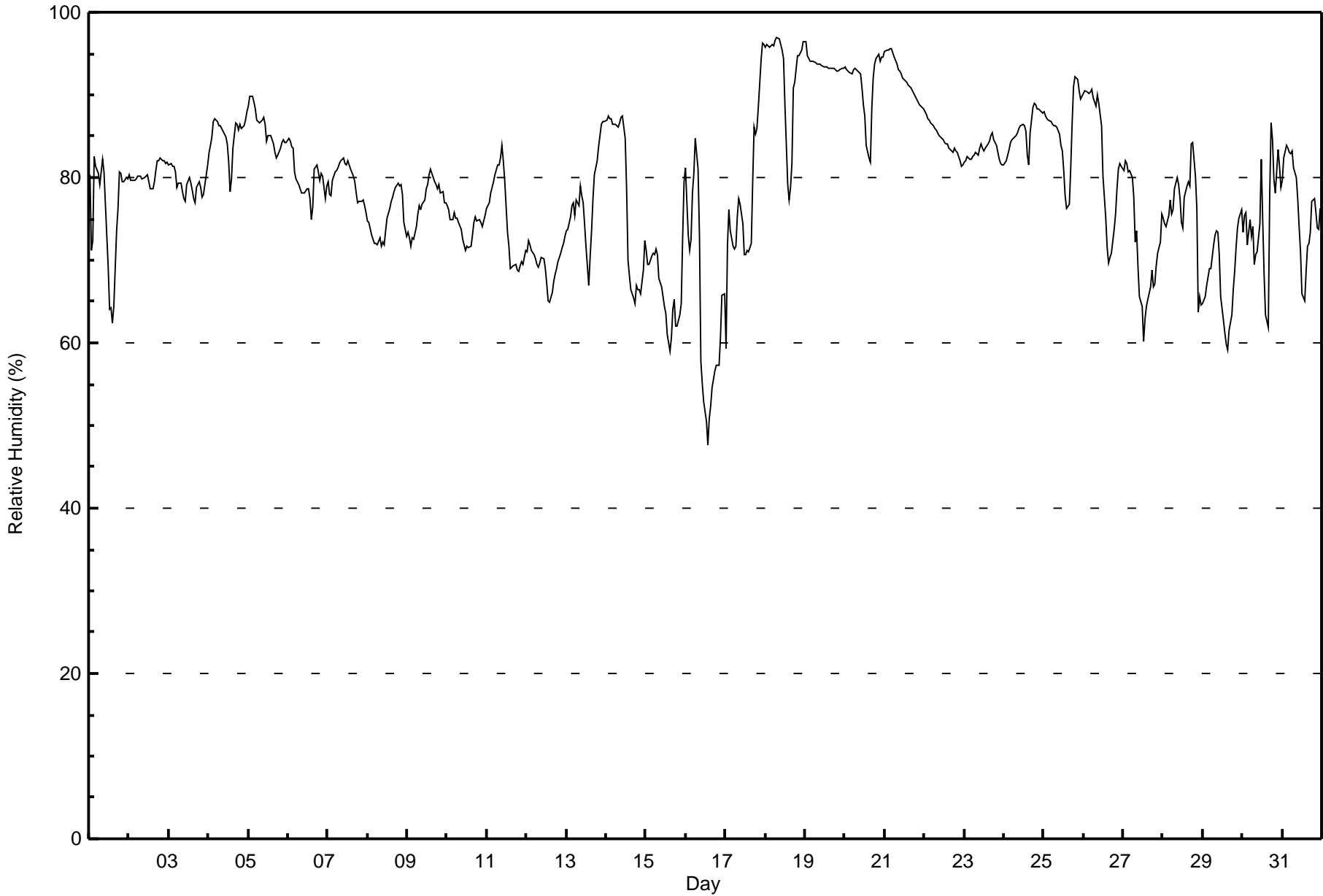
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Buffalo Viewpoint - January 2017

Maximum Value: 97 % on Jan 18 08:00																		Maximum Daily Average: 93.7 % on Jan 19																		Hours in Service: 744																																																																																	
Minimum Value: 48 % on Jan 16 14:00																		Minimum Daily Average: 64.1 % on Jan 16																		Hours of Data: 744																																																																																	
Maximum Diurnal Average: 81.5 % at hour 7																		Minimum Diurnal Average: 74.2 % at hour 15																		Hours of Missing Data: 0																																																																																	
Monthly Average: 79.3 %																		Percentiles: P ₁ = 57 P ₁₀ = 68 Q ₁ = 73 Median = 80 Q ₃ = 85 P ₉₀ = 92 P ₉₉ = 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-Jan	80	71	72	83	81	81	79	81	82	81	77	69	64	64	62	64	74	76	81	80	80	80	80	80	75.9	83																																																																																											
2-Jan	80	80	80	80	80	80	80	80	80	80	80	80	80	79	79	79	79	81	82	82	82	82	82	82	80.5	82																																																																																											
3-Jan	81	82	81	81	81	79	79	79	78	77	77	79	80	79	78	77	77	79	80	79	78	78	79	82	79.2	82																																																																																											
4-Jan	83	84	85	87	87	87	86	86	86	86	85	84	82	78	80	84	87	87	86	86	86	86	87	88	85.1	88																																																																																											
5-Jan	89	90	90	89	88	87	87	87	87	87	86	84	85	85	85	84	83	82	83	84	84	85	84	84	85.8	90																																																																																											
6-Jan	85	84	84	83	81	80	79	79	78	78	78	79	79	77	75	76	81	81	81	80	81	80	77	79	79.8	85																																																																																											
7-Jan	80	78	78	80	81	81	81	82	82	82	82	82	82	82	81	80	79	78	77	77	77	77	76	79.6	82																																																																																												
8-Jan	75	75	73	72	72	72	72	73	72	72	72	74	75	76	77	78	78	79	79	79	79	78	75	73	74.9	79																																																																																											
9-Jan	73	73	72	73	73	74	76	77	76	77	77	79	79	80	81	80	80	79	79	79	78	78	77	77	76.9	81																																																																																											
10-Jan	77	76	75	75	76	75	75	75	74	72	72	71	72	72	72	73	75	75	75	75	74	75	75	75	74.1	77																																																																																											
11-Jan	76	77	78	79	79	80	82	82	82	84	82	80	73	72	69	69	69	70	69	69	69	70	70	71	75.0	84																																																																																											
12-Jan	71	72	72	71	71	70	70	69	70	70	70	69	67	65	65	66	67	68	69	70	71	71	72	73	69.6	73																																																																																											
13-Jan	74	74	75	77	77	75	77	77	79	78	77	74	72	67	70	74	77	80	82	84	85	86	87	87	77.7	87																																																																																											
14-Jan	87	87	87	87	86	86	86	86	87	87	87	85	79	70	68	66	65	65	67	66	66	66	69	72	77.5	87																																																																																											
15-Jan	71	70	70	71	71	71	71	71	68	67	66	64	63	61	59	61	64	65	62	62	63	65	73	79	66.9	79																																																																																											
16-Jan	81	73	71	72	78	81	85	81	73	58	55	53	51	48	51	52	55	57	57	57	57	61	66	66	64.1	85																																																																																											
17-Jan	59	72	76	74	72	71	72	75	77	77	74	71	71	71	71	72	80	86	85	86	88	94	96	96	77.8	96																																																																																											
18-Jan	96	96	96	96	96	96	97	97	97	96	95	94	89	79	77	79	82	91	91	95	95	95	95	96	92.4	97																																																																																											
19-Jan	96	95	94	94	94	94	94	94	94	94	94	93	93	93	93	93	93	93	93	93	93	93	93	93	93.7	96																																																																																											
20-Jan	93	93	93	93	93	93	93	93	93	93	91	89	87	84	82	82	88	92	94	94	95	94	95	95	91.3	95																																																																																											
21-Jan	95	95	95	96	96	95	95	94	93	93	93	92	92	91	91	91	91	90	90	89	89	89	89	88	92.2	96																																																																																											
22-Jan	88	88	87	87	87	86	86	86	85	85	85	85	84	84	84	84	83	83	83	83	82	81	81	81	84.6	88																																																																																											
23-Jan	82	82	82	82	82	83	83	83	83	83	84	84	83	84	84	84	85	85	85	84	83	82	82	81	83.1	85																																																																																											
24-Jan	82	82	83	83	84	85	85	85	85	86	86	86	86	83	82	85	89	89	89	88	88	88	88	88	85.5	89																																																																																											
25-Jan	88	87	87	87	87	86	86	86	86	85	84	83	81	78	76	77	81	87	91	92	92	91	90	90	85.8	92																																																																																											
26-Jan	90	91	90	90	90	91	90	89	90	89	88	86	80	75	72	70	70	71	74	76	79	81	82	81	82.6	91																																																																																											
27-Jan	81	82	82	81	81	80	78	72	73	69	66	64	60	63	64	65	67	69	67	67	69	71	72	76	71.6	82																																																																																											
28-Jan	75	74	74	75	77	76	76	79	80	79	77	75	74	78	79	79	79	84	84	80	76	64	66	65	76.1	84																																																																																											
29-Jan	65	66	67	68	69	69	72	73	74	73	71	66	63	61	60	59	61	63	67	69	71	74	75	76	67.9	76																																																																																											
30-Jan	73	75	76	72	75	73	74	69	71	71	74	82	75	68	63	62	78	87	85	80	78	83	81	79	75.2	87																																																																																											
31-Jan	80	82	84	84	83	83	83	81	80	78	74	71	66	65	69	72	72	73	77	77	76	74	74	76	76.4	84																																																																																											
																		Diurnal Average				Diurnal Maximum																																																																																															
80.9																		80.8				80.9				81.3				81.5				81.3				81.5				81.2				81.1				80.2				79.3				78.3				76.3				74.7				74.2				74.7				77.0				78.9				79.4				79.5				79.6				79.8				80.2				80.8											
96																		96				96				96				96				97				97				97				97				96				95				94				93				93				93				93				93				93				93				94				95				95				95				95				96				96			





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Buffalo Viewpoint - January 2017

Maximum Speed: 49 km/h on Jan 11 12:00	Maximum Daily Speed Average: 18.8 km/h on Jan 27	Hours in Service: 744
Minimum Speed Value: 1 km/h on Jan 18 12:00	Minimum Daily Speed Average: 0.5 km/h on Jan 23	Hours of Data: 744
Maximum Diurnal Speed Average: 3.2 km/h at hour 22	Minimum Diurnal Speed Average: 1.1 km/h at hour 5	Hours of Missing Data: 0
Monthly Average Velocity: 2.1 km/h 249.9 deg	Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 6 Median = 9 Q ₃ = 13 P ₉₀ = 18 P ₉₉ = 27	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jan	NNW21	NNW43	NNW26	N20	N23	NNE18	NNE16	NNW5	SSW6	WSW8	NW8	NW8	WNW7	W7	NW7	NNW7	NNW3	SE1	SE7	S3	SSE4	S8	SE4	S7	NNW6.6	NNW43	
2-Jan	SSE1	SSE3	SSE6	SSW3	S4	SE6	SSE5	SE7	SSE6	SE5	SE6	SE4	SSE3	SE4	SE4	SE5	SE5	SSE5	SSE5	SSE6	SSE8	SSE8	SSE6	SSE8	SSE5.1	SSE8	
3-Jan	S8	SE7	SSE7	SE6	SSE6	SSE6	SSE8	SSE7	SE6	SE6	S7	SSE6	SSW4	SW4	WSW6	WSW10	WSW11	W12	WNW13	WNW13	W16	W15	W13	WNW9	SW4.6	W16	
4-Jan	NNW5	NNE10	NNE8	NNE11	NNE10	NE7	ENE3	E2	SE3	SSE4	SSE6	SSE7	SSE7	SSE6	WSW5	SE6	SSE5	SSE7	SSE8	SE7	SSE7	SSE7	SSE3	NNE5	ESE2.4	NNE11	
5-Jan	N5	NNW10	N15	N17	N17	N17	N13	N13	NNE12	NNE9	N10	N11	N14	N19	N19	NNE14	N16	NNE11	NNE13	N10	N7	NW6	NW2	SW3	N11.4	N19	
6-Jan	SW6	SSW5	S8	S6	S7	SSE7	S7	S7	S7	SSE7	SE6	SSE5	SSE5	SE4	SE6	SE9	SE7	S7	SSE9	SSE8	SSE6	SSE5	SSE8	S8	SSE6.2	SSE9	
7-Jan	WNW3	NNW4	N3	NE5	NNE6	NNE2	N2	N4	N5	N9	N11	N12	N20	N24	N20	N18	NNE15	NNE17	NNE15	N7	N4	W2	SSW5	S5	N8.0	N24	
8-Jan	SSE7	SE6	SSE7	SSE8	SE9	SE10	SSE7	SSE8	SSE10	SE9	SSE8	SE8	SE8	SE7	SE8	SE8	SE7	SSE8	SE9	SSE8	S8	SW11	WSW19	WSW15	SSE6.9	WSW19	
9-Jan	WSW14	WSW14	SW9	SW9	WSW11	WSW11	WSW9	W8	WSW6	WSW7	W9	WNW9	NW12	NW9	W6	W7	W7	W8	W7	WNW5	WNW2	WSW5	SW4	W4	W7.3	WSW14	
10-Jan	W6	NW5	NNE10	N6	NNW6	NNW2	NNW6	WNW3	WNW3	SW1	SSE4	S2	SE4	SE7	SE8	SE9	SE8	SSE7	SSE7	SSW7	SSE7	SE10	SE10	SSE8	SSE2.4	SE10	
11-Jan	SSE8	SE9	SE8	SSE8	SSE8	SSE8	WSW9	W16	N12	N18	N40	N49	NNW44	NNW39	NNW37	NNW30	NNW24	NNW16	NW14	NW12	NW12	WNW9	W5	SSW3	NNW12.6	N49	
12-Jan	S5	SSE7	SSE7	SSE8	SE9	SSE10	SSE10	SSE11	SSE10	SSE11	SSE10	SSE12	SSE12	SSE13	SSE11	S7	SSE12	SSE10	SSE8	SSE8	SSE7	SSE9	SSE7	SSE6	SSE9.0	SSE13	
13-Jan	SSE6	S7	SE2	SE7	SE4	SW4	WNW3	SW2	SSE5	SE7	SE7	SE7	SSE6	SSE7	SE9	SE9	SE10	SE12	SE12	SSE11	SSE10	SE10	SSE13	SE14	SSE7.3	SE14	
14-Jan	SSE14	SSE11	SSE9	SSE10	SE12	SE12	SE11	SE11	SE11	SE12	SE12	SE9	SE6	SSW9	SW7	SSW6	SW13	WSW20	WSW20	WSW17	WSW17	SW16	SSW10	SSW9	S8.2	WSW20	
15-Jan	SW8	WSW18	WSW17	WSW15	W15	WSW19	WSW15	WSW17	WSW20	WSW21	WSW24	W16	W15	WSW20	WSW9	WSW13	WSW12	SSW9	WSW14	WSW11	WSW8	SSW11	S9	SE11	WSW13.2	WSW24	
16-Jan	SSE9	SW13	SSW10	S10	SSE11	SE11	SE11	SE12	SSE10	SW18	SSW16	SSW15	SW16	SW21	SSW17	SSW12	SSW12	SSW13	SSW13	SSW12	S11	SSE9	SE10	SE11	S11.3	SW21	
17-Jan	S10	SSE8	SSW9	S11	SSW12	SW10	WSW15	WSW11	SW9	WSW11	SW14	WSW15	WSW18	WSW18	SW11	S7	SE10	SE9	SSE9	SSE9	SE9	SSE9	SE10	SE10	SSW8.3	WSW18	
18-Jan	SE10	SE9	SE9	SE7	NE5	ESE3	SSE2	SSE2	SE3	NNE6	NW5	S1	S4	SE5	SSE5	SE5	SSE4	SSE7	SSE7	SSE8	SSE7	SSE9	SSE10	SSE7	SSE4.6	SE10	
19-Jan	SSE3	N8	N13	N10	N13	N12	N13	N11	NNW9	N13	N11	N11	N10	N10	N9	N9	N8	N7	N9	N8	N8	NW4	NW5	NE1	N8.6	N13	
20-Jan	SSE2	SSE2	SSE5	S6	SSE6	SSE5	SSE6	SSE5	SSE4	SSE5	SE4	SE5	SE5	SE5	SE7	SE8	SSE8	SE10	SSE10	SE8	ENE6	NNE12	N17	N13	SE3.6	N17	
21-Jan	N17	N15	N14	N13	N13	N16	N16	N17	N17	N15	N14	N15	N15	N14	N14	N13	N12	N13	N14	N12	N13	N16	N12	N14	N14.4	N17	
22-Jan	N16	N15	N14	N16	N15	NNE16	N13	N13	N12	N11	N12	N12	N11	N11	N11	N9	N9	N8	N9	N10	N7	N7	N6	N7	N11.1	NNE16	
23-Jan	N6	N4	N4	NNE3	NNE3	N3	N4	N3	WNW3	W4	W4	WSW3	WSW3	SW3	S2	SSE3	SSE4	SSE4	SSE4	SSE4	SSE5	S5	SSE5	SSE5	SSE5	S0.5	N6
24-Jan	SSE6	SSE6	SSE6	SSE6	SSE6	SSE5	SSE5	SSE5	SSE4	SSE5	SSE5	SSE5	SSE5	SSE5	SSE7	SE6	SSE5	SSE6	SSE7	SE6	SSE6	SSE8	SSE8	SSE7	SSE5.8	SSE8	
25-Jan	SSE6	SSE7	SSE7	SSE7	SSE7	S7	S7	SSE7	SSE7	SSE6	SSE5	SSE6	SE6	SE7	SE6	SSE6	SSE9	SE11	SE9	SE7	SSE8	SSE8	SSE8	SSE8	SSE7.0	SE11	
26-Jan	SSE8	SSE7	SE6	SE6	SE8	SSE8	SSW6	SSE8	SSE9	SSE7	SSE7	SSE7	SSW6	SW8	S4	SW12	SW14	WSW22	WSW26	WSW24	W16	W14	W15	W19	SW7.5	WSW26	
27-Jan	WSW21	WSW17	WSW18	WSW24	W19	WSW17	WSW26	WSW24	WSW27	WSW26	WSW28	WSW23	WSW22	WSW17	WSW22	WSW22	W20	W13	WSW10	WSW10	SW9	WSW13	WSW18	W11	WSW18.8	WSW28	
28-Jan	WSW9	WSW15	WSW18	WSW17	W18	WSW21	WSW22	WSW9	SW10	SW8	SW8	SW9	SSE5	SE7	SE6	SE8	SSE9	SE11	SE9	ESE5	WSW7	W18	W17	WSW21	SW8.5	WSW22	
29-Jan	WSW17	WSW20	WSW22	WSW19	WSW26	WSW29	WSW29	WSW22	SW9	SW5	SW13	SW13	W10	WSW13	W9	WSW9	SW10	WSW12	WSW8	WSW9	WSW10	W10	WSW10	WSW9	WSW14.1	WSW29	
30-Jan	WSW11	SSW8	SSW10	SSW9	S8	SW10	SW9	WSW19	W17	WSW19	N14	NNE18	N15	N12	NW12	NNW23	N24	N22	N26	N28	N26	N22	N29	N31	NNW10.5	N31	
31-Jan	N31	N21	N19	N16	N15	NNE9	N5	WSW5	WSW6	SW5	W6	WSW6	W7	W8	W11	W10	W10	W14	W12	WNW10	W12	NW16	NW15	N19	NNW8.4	N31	

WSW2.7	W2.2	W1.8	WSW1.1	W1.1	SW1.6	WSW3.0	WSW3.1	SW2.8	SW2.7	W2.2	WNW1.9	WNW2.9	W2.9	W2.3	W1.7	SW1.5	SW2.2	SW2.2	SW2.2	SW2.2	SW2.3	SW3.2	SW2.6	SW1.7	Diurnal Average	
N31	NNW43	NNW26	WSW24	WSW26	WSW29	WSW29	WSW24	WSW27	WSW26	N40	N49	NNW44	NNW39	NNW37	NNW30	NNW24	N22	N26	N28	N26	N22	N29	N31	Diurnal Maximum		

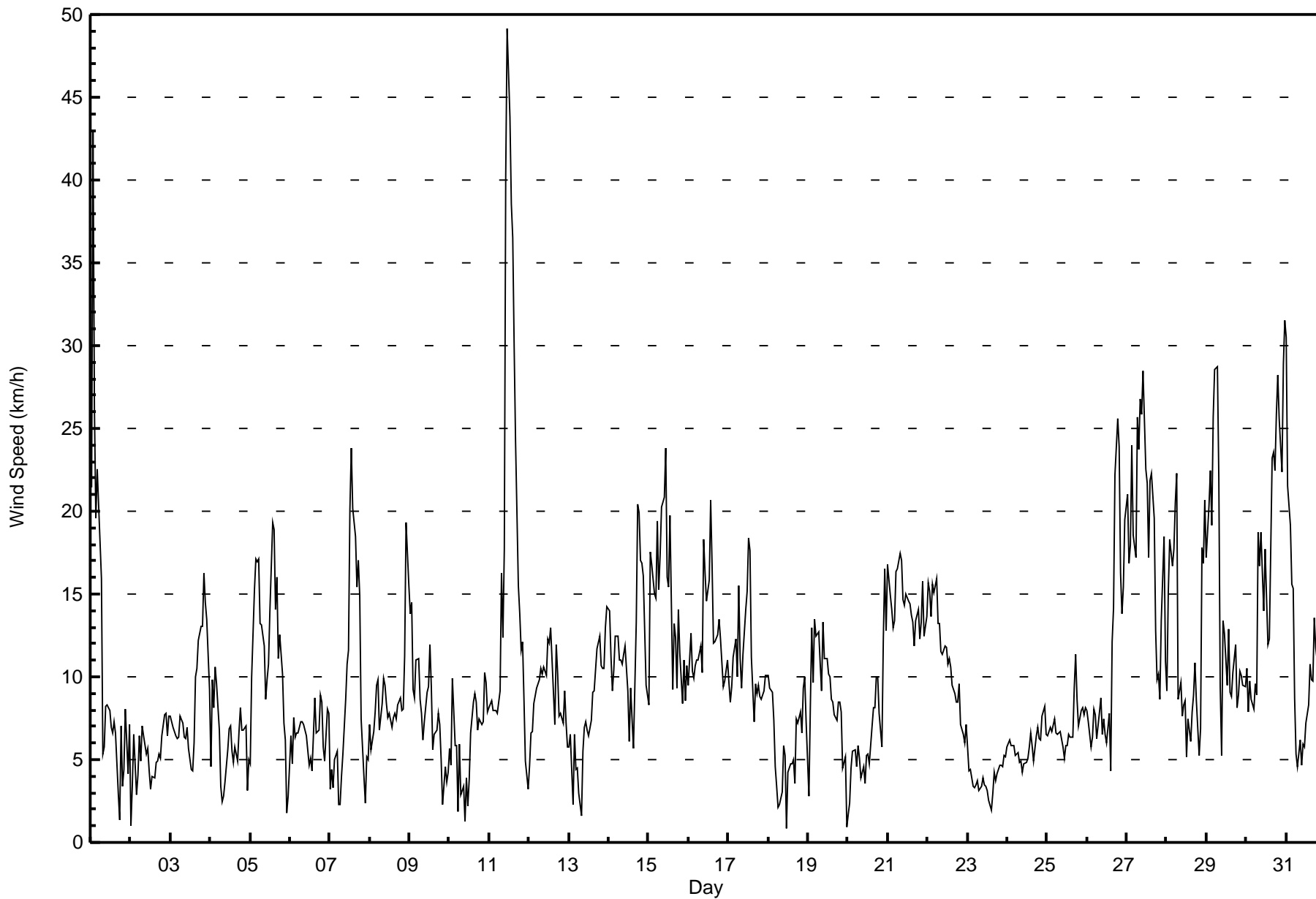
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 13 km/h on Jan 11 11:00 Minimum Value: 0 km/h on Jan 6 06:00 Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 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-Jan	6	8	7	4	4	3	4	2	2	2	2	2	2	2	2	2	2	1	1	2	2	1	1	2	8
2-Jan	2	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
3-Jan	1	1	1	1	1	2	1	1	1	1	1	1	1	2	3	2	3	3	3	4	3	3	2	4	
4-Jan	2	2	2	2	3	2	1	1	2	1	2	2	2	2	2	1	1	1	1	2	1	2	1	3	
5-Jan	1	3	3	3	3	3	3	2	3	2	2	3	3	6	4	4	3	2	2	2	2	1	1	3	
6-Jan	2	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	3	1	1	3	
7-Jan	1	2	2	1	1	1	1	1	1	2	1	2	3	4	4	5	3	4	3	2	2	1	1	2	
8-Jan	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	1	1	1	1	2	1	3	4	4	
9-Jan	4	3	2	2	3	3	2	2	1	2	2	2	2	2	1	1	2	2	2	1	2	1	1	2	
10-Jan	2	1	2	2	2	2	2	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	1	2	
11-Jan	2	2	2	2	2	2	3	4	5	4	13	10	9	7	7	6	5	4	3	2	3	2	2	13	
12-Jan	1	1	1	1	1	1	1	1	2	2	3	3	3	4	3	2	3	3	2	2	1	2	2	4	
13-Jan	2	2	2	2	1	3	2	2	1	2	2	2	2	2	2	1	2	1	1	1	1	1	2	3	
14-Jan	2	2	1	2	2	2	2	2	2	2	2	2	5	4	4	3	5	4	4	4	4	3	3	5	
15-Jan	3	4	5	3	3	5	4	4	5	6	5	5	4	4	4	3	4	3	4	4	3	3	2	6	
16-Jan	1	2	2	2	2	2	2	2	3	4	4	4	6	6	5	3	3	3	3	3	2	2	2	6	
17-Jan	3	2	3	2	4	3	4	2	3	3	3	3	3	3	3	2	2	2	1	2	1	1	1	4	
18-Jan	2	1	2	1	2	1	1	1	1	2	2	2	2	2	2	1	2	1	1	1	1	1	1	2	
19-Jan	2	5	3	2	3	3	2	2	2	2	2	2	2	2	2	2	2	1	2	1	2	1	1	5	
20-Jan	1	1	1	1	1	1	1	1	1	1	1	2	1	1	2	1	1	1	1	2	3	3	3	3	
21-Jan	3	2	2	2	3	3	3	3	3	2	2	2	3	3	2	3	2	2	2	2	2	3	2	3	
22-Jan	2	2	2	3	3	3	3	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	3	
23-Jan	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	
24-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	2	
25-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	3	1	1	1	1	3	
26-Jan	1	1	1	1	1	1	2	1	1	2	1	1	1	2	3	3	4	5	5	5	4	3	3	6	
27-Jan	4	4	6	4	4	4	5	5	7	5	5	5	4	5	4	4	4	3	2	3	2	4	4	7	
28-Jan	3	4	4	4	5	5	5	3	2	3	2	2	1	2	1	2	1	1	2	2	4	4	4	5	
29-Jan	4	4	4	4	5	5	5	5	5	4	3	4	3	3	2	2	2	3	1	2	2	2	2	5	
30-Jan	2	2	2	3	1	3	5	3	5	3	6	4	4	3	7	5	6	5	4	4	4	4	5	7	
31-Jan	5	4	4	2	3	3	2	2	1	1	2	2	2	3	3	3	3	3	3	2	3	3	3	5	
Diurnal Maximum																									





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	140	18.82	18.82
6 - 11	377	50.67	69.49
12 - 19	170	22.85	92.34
20 - 28	45	6.05	98.39
29 - 38	7	0.94	99.33
> 38	5	0.67	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 - January 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	12	5	2	1	1	2	20	46	10	5	9	5	5	7	5	5	140
6 - 11	36	10	1	1	0	0	75	131	26	15	19	29	18	6	5	5	377
12 - 19	62	11	0	0	0	0	7	6	0	9	10	36	19	2	7	1	170
20 - 28	12	0	0	0	0	0	0	0	0	0	0	1	27	1	0	1	45
29 - 38	3	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	7
> 38	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5
Totals	127	26	3	2	1	2	102	183	36	29	39	99	43	15	18	19	744

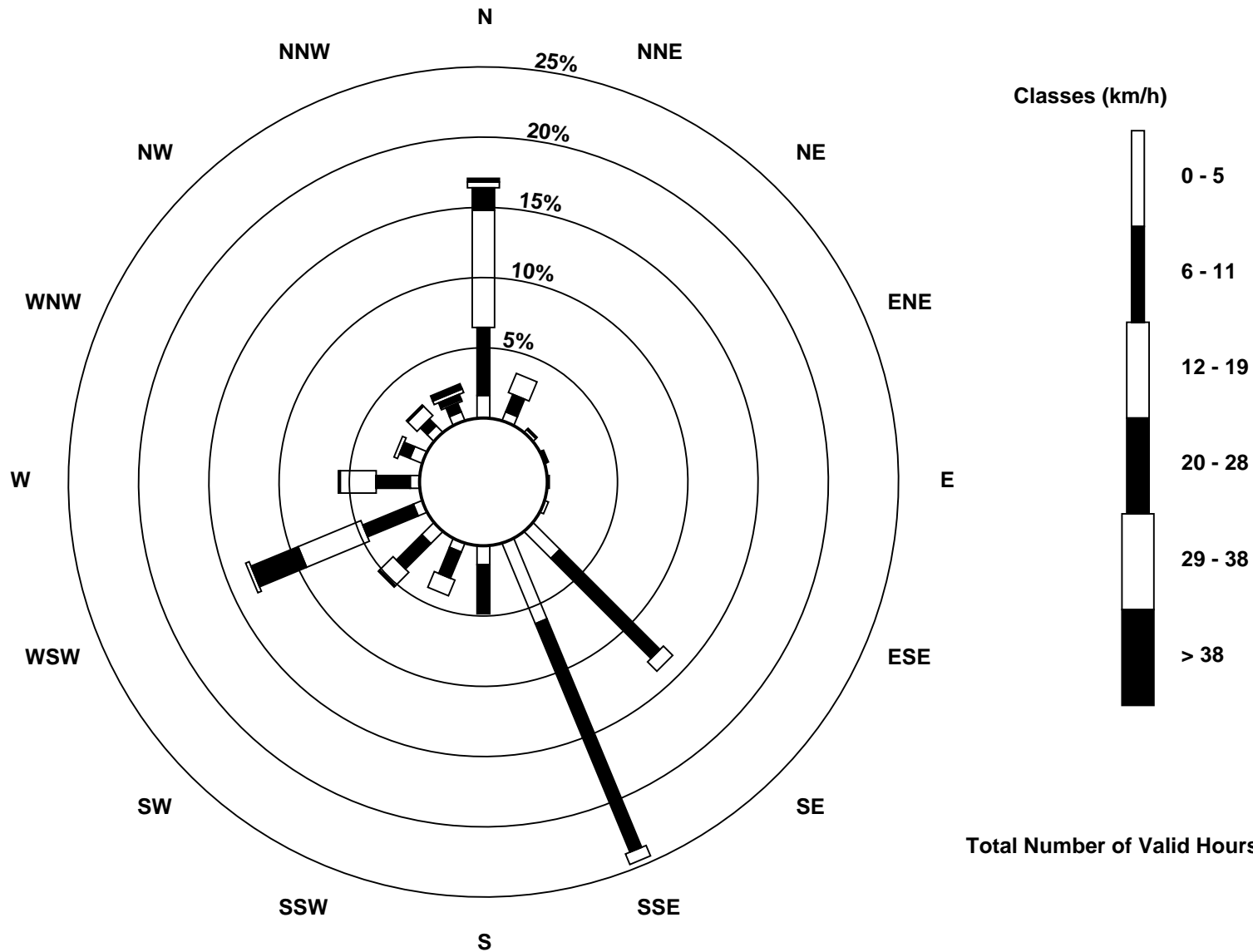
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

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 - January 2017

Direction of Maximum Speed: 355 deg on Jan 11 12:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 254.7 deg on Jan 27	Hours of Data: 744
Direction of Minimum Speed: 174 deg on Jan 18 12:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.5 deg on Jan 23	Percent Operational Time: 100.0
Monthly Average Direction: 227.1 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-Jan	305	339	343	5	4	15	19	339	210	250	304	310	287	278	306	338	337	127	146	182	147	176	130	186	335.4
2-Jan	168	150	150	195	173	146	150	143	157	144	146	141	163	141	135	144	142	148	158	150	150	152	149	149	150.0
3-Jan	182	137	151	143	162	155	154	154	145	146	170	159	201	225	239	252	251	278	290	286	263	281	281	296	230.0
4-Jan	328	21	24	13	19	44	64	82	139	164	149	149	151	167	243	140	151	162	154	141	162	151	156	19	112.1
5-Jan	10	344	358	8	3	0	7	4	13	17	1	356	359	5	5	16	1	13	14	9	350	310	324	231	2.7
6-Jan	225	195	189	180	171	155	191	188	179	152	146	155	159	139	137	135	144	189	153	160	166	160	148	173	165.8
7-Jan	298	339	11	44	20	22	353	352	357	3	358	353	359	359	7	10	19	14	17	2	10	259	207	185	4.3
8-Jan	155	145	160	155	143	138	154	152	154	144	155	143	138	143	142	144	143	160	140	149	179	234	251	248	165.1
9-Jan	258	258	227	236	250	246	257	263	242	257	262	293	314	313	277	281	281	271	276	297	301	238	235	267	265.8
10-Jan	277	316	24	1	336	335	334	287	290	214	154	179	143	136	137	138	141	157	162	202	157	143	139	151	148.8
11-Jan	150	141	146	147	151	150	246	275	350	357	3	355	339	337	329	338	341	330	318	322	319	301	270	207	336.7
12-Jan	191	156	155	154	146	159	162	153	150	148	165	162	168	163	164	173	155	149	153	163	160	168	158	155	158.9
13-Jan	164	177	133	141	136	224	290	226	153	137	135	137	159	148	141	145	141	144	139	150	147	146	148	142	148.1
14-Jan	147	152	154	147	141	139	131	136	140	144	142	127	126	208	234	199	231	248	247	237	238	229	201	197	185.5
15-Jan	234	254	254	255	267	255	247	241	249	255	254	271	273	253	249	250	247	210	246	254	242	205	171	129	247.5
16-Jan	168	218	200	185	163	141	135	140	167	214	205	198	214	218	210	200	192	194	199	194	184	165	141	141	187.6
17-Jan	169	149	195	184	213	216	237	249	226	242	226	237	254	252	236	187	137	143	166	157	146	151	144	140	203.0
18-Jan	144	141	144	138	34	103	155	160	128	27	323	174	191	138	148	141	153	156	160	155	166	154	163	161	146.8
19-Jan	168	5	349	352	351	360	350	356	346	354	3	359	355	359	3	1	358	359	356	356	356	305	322	35	354.6
20-Jan	163	159	163	176	150	156	161	154	164	165	138	136	145	145	136	146	150	141	150	143	73	20	4	5	129.0
21-Jan	8	2	5	9	8	6	4	2	8	7	2	355	357	4	1	4	9	4	357	4	4	355	360	1	3.1
22-Jan	356	358	358	5	10	12	8	5	8	8	2	1	354	353	353	356	356	359	358	356	2	6	3	2	1.6
23-Jan	359	9	11	14	22	356	0	360	289	273	263	252	242	223	179	147	155	155	161	164	179	165	149	164	190.1
24-Jan	167	162	158	155	151	160	159	160	161	162	162	161	160	158	153	145	151	158	158	171	164	159	159	154	158.8
25-Jan	153	156	155	159	165	171	173	162	162	162	158	147	142	144	141	150	158	146	141	145	149	158	162	160	154.8
26-Jan	158	149	144	139	141	147	193	156	153	152	154	167	195	234	172	235	234	246	250	252	272	278	269	262	223.2
27-Jan	258	257	258	258	263	257	258	255	256	252	252	251	248	257	254	257	261	271	242	237	234	237	254	267	254.7
28-Jan	252	247	251	258	260	252	254	245	236	229	217	224	149	134	137	146	149	137	129	116	248	259	264	256	235.0
29-Jan	250	252	253	249	251	253	253	249	230	227	223	234	262	257	265	243	223	240	247	257	251	259	251	258	248.7
30-Jan	250	212	207	208	186	224	229	251	259	256	350	17	7	2	313	332	355	10	7	4	5	3	358	356	337.4
31-Jan	353	1	2	10	10	14	6	250	252	225	270	256	273	265	262	270	263	259	278	282	279	309	316	357	317.1

247.5 277.2 263.3 241.9 271.2 235.9 251.1 240.4 225.0 235.7 259.2 289.4 290.4 280.5 275.1 269.2 235.9 221.3 226.7 235.8 235.2 235.1 235.6 231.1
 Diurnal Average

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

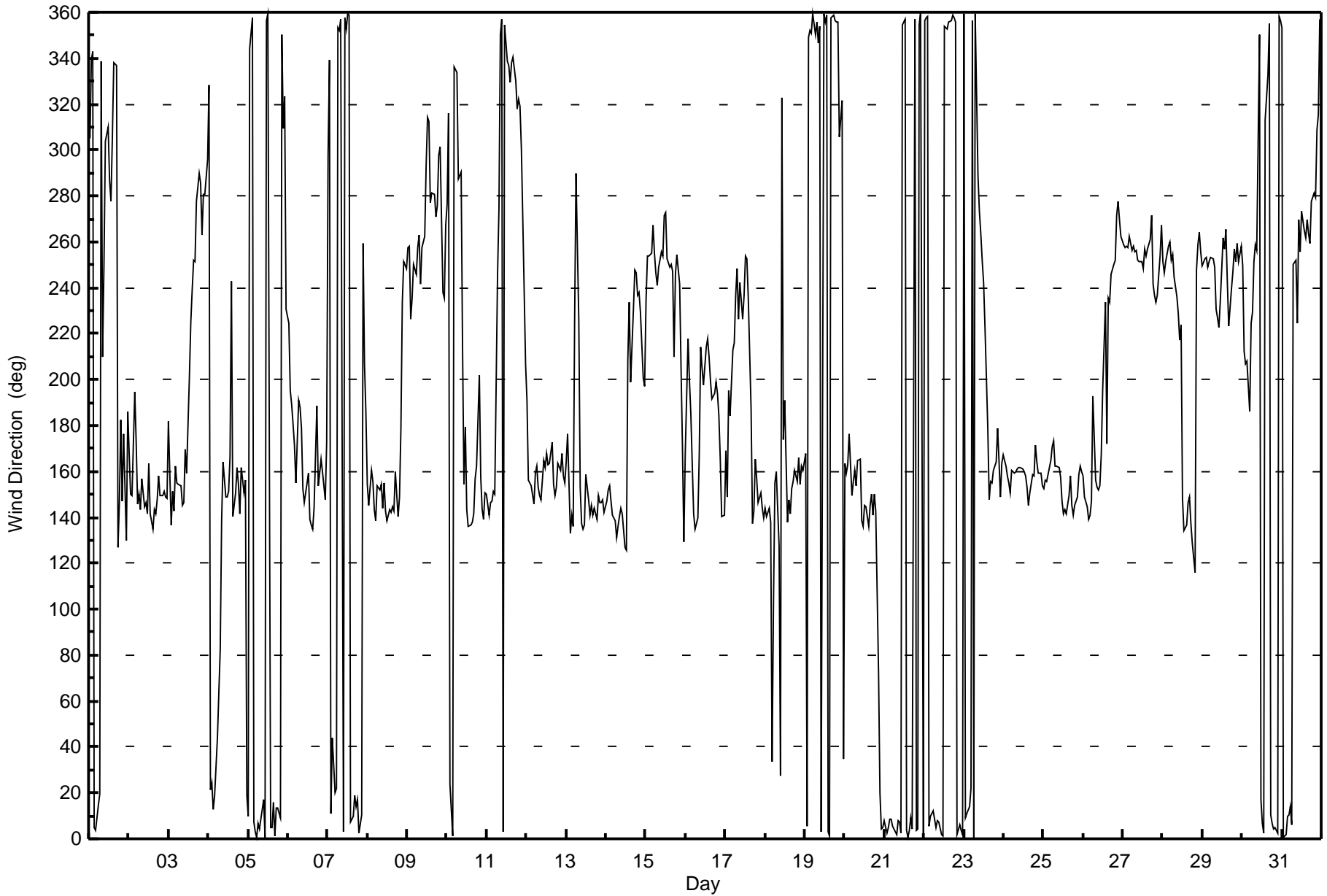
Wind Direction (WD) - deg
Buffalo Viewpoint - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 104 deg on Jan 2 01:00 Minimum Value: 5 deg on Jan 6 11:00 Percentiles: P ₁ = 6 P ₁₀ = 10 Q ₁ = 13 Median = 16 Q ₃ = 19 P ₉₀ = 29 P ₉₉ = 68																								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-Jan	27	14	21	19	21	13	13	30	20	28	11	16	17	16	24	21	63	64	18	49	48	11	34	19	64
2-Jan	104	50	23	60	50	9	14	7	12	14	11	15	18	21	16	14	13	12	15	12	8	9	10	16	104
3-Jan	15	9	13	9	14	6	10	7	9	12	13	15	28	27	22	15	13	20	14	15	16	18	15	17	28
4-Jan	38	17	23	19	20	18	27	34	22	23	19	19	21	24	25	35	14	15	12	11	14	13	49	17	49
5-Jan	29	23	18	16	16	17	15	15	16	17	21	19	21	18	19	17	16	17	13	13	14	17	44	52	52
6-Jan	15	22	8	12	8	8	20	13	8	16	5	13	17	15	13	8	28	18	6	7	25	16	9	10	28
7-Jan	65	24	48	14	12	40	40	14	13	12	13	13	16	17	16	16	14	14	13	13	18	51	12	25	65
8-Jan	21	10	7	9	7	7	16	9	9	13	14	15	10	12	12	9	7	13	6	14	30	14	12	14	30
9-Jan	18	14	16	17	15	17	16	17	18	19	15	15	12	14	16	17	15	11	14	20	70	24	25	19	70
10-Jan	18	37	11	19	12	75	17	31	20	58	21	24	23	15	10	8	7	20	16	28	27	12	9	12	75
11-Jan	14	13	16	19	14	21	37	18	39	16	20	21	16	17	14	14	15	16	12	15	11	14	22	54	54
12-Jan	36	15	11	7	10	7	6	6	10	14	19	18	18	19	19	21	20	20	19	19	16	15	19	19	36
13-Jan	23	16	47	33	39	42	84	71	16	15	14	16	21	21	11	10	10	8	5	7	6	7	9	9	84
14-Jan	10	12	11	12	8	9	10	9	10	17	8	19	39	29	50	46	14	16	13	14	14	13	21	13	50
15-Jan	29	14	15	12	18	17	17	15	15	16	16	21	24	12	26	16	18	22	20	25	29	18	18	9	29
16-Jan	25	12	14	20	13	12	11	16	31	15	17	19	21	17	17	18	17	17	15	13	15	19	14	14	31
17-Jan	22	25	19	17	18	19	19	16	20	16	14	16	12	11	16	35	12	12	8	15	14	9	9	8	35
18-Jan	8	11	11	12	34	50	49	49	42	23	33	82	47	31	31	14	36	20	9	12	13	14	10	18	82
19-Jan	57	37	14	14	15	15	15	15	14	16	16	15	15	15	16	17	15	16	16	15	17	26	18	69	69
20-Jan	50	28	20	18	14	28	17	16	18	11	22	21	19	19	14	12	13	8	8	5	52	21	13	14	52
21-Jan	14	17	15	14	17	16	16	17	17	16	17	17	17	17	17	17	17	17	17	17	16	17	15	16	17
22-Jan	17	17	17	17	15	14	15	16	14	15	16	16	17	15	16	14	16	13	14	14	13	12	10	11	17
23-Jan	13	14	14	16	14	23	18	29	21	21	24	21	22	22	45	22	18	16	10	8	10	9	10	10	45
24-Jan	8	7	8	13	13	13	12	12	12	16	15	17	17	16	18	18	14	14	12	14	12	8	7	9	18
25-Jan	10	11	13	11	13	13	13	11	10	15	16	18	16	15	15	17	15	9	11	10	10	11	12	11	18
26-Jan	10	11	27	15	14	16	31	15	10	19	8	15	29	25	49	18	16	13	11	13	17	17	15	16	49
27-Jan	12	13	14	12	14	13	13	15	13	11	11	12	14	18	12	12	14	16	20	15	14	15	13	15	20
28-Jan	22	17	14	16	16	15	13	20	17	23	13	15	26	14	20	24	14	10	13	36	43	15	15	12	43
29-Jan	13	12	11	12	11	11	11	12	33	85	15	25	23	14	18	19	10	17	24	19	15	15	15	15	85
30-Jan	17	32	27	27	21	21	47	11	13	11	58	17	15	14	25	17	21	15	16	16	16	16	18	19	58
31-Jan	18	16	16	13	14	15	18	36	13	20	27	30	26	28	19	19	18	14	16	16	19	12	12	18	36
	104	50	48	60	50	75	84	71	42	85	58	82	47	31	50	46	63	64	24	49	70	51	49	69	
Diurnal Maximum																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Buffalo Viewpoint - January 2017





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 10, 2017	Last Calibration	December 15, 2016
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	11:21	End Time (MST)	13:49
Gas Cert Reference	LL107929	Station temp.	21 Deg C
Cal Gas Concentration	49.7 ppm	Cal Gas Exp Date	08-Spet-2018
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	-593	-593
Analyzer IP address	192.168.1.43		Lamp voltage	841	841
Calculated slope	1.000155	1.003000	Chamber temp	45.2	45.2
Calculated intercept	0.723869	0.705896	Pressure	694.9	694.9
Analyzer Background	11.6	11.6	Flow	0.495	0.495
Analyzer Coefficient	0.819	0.819	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	-0.1	----
as found span	5000	60.4	600.4	595.7	1.008
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	60.4	600.4	597.8	1.004
second point	5000	30.2	300.2	299.4	1.003
third point	5000	15.1	150.1	147.6	1.017
as left zero	5000	0.0	0.0	-0.2	----
as left span	5000	60.4	600.4	597.6	1.005
Average Correction Factor					1.008

Corrected As found 595.8 Previous response 599.6 % change 0.6%

Notes:

No maintenance or adjustments done, filter changed out

Calibration Performed By: Melissa Lemay



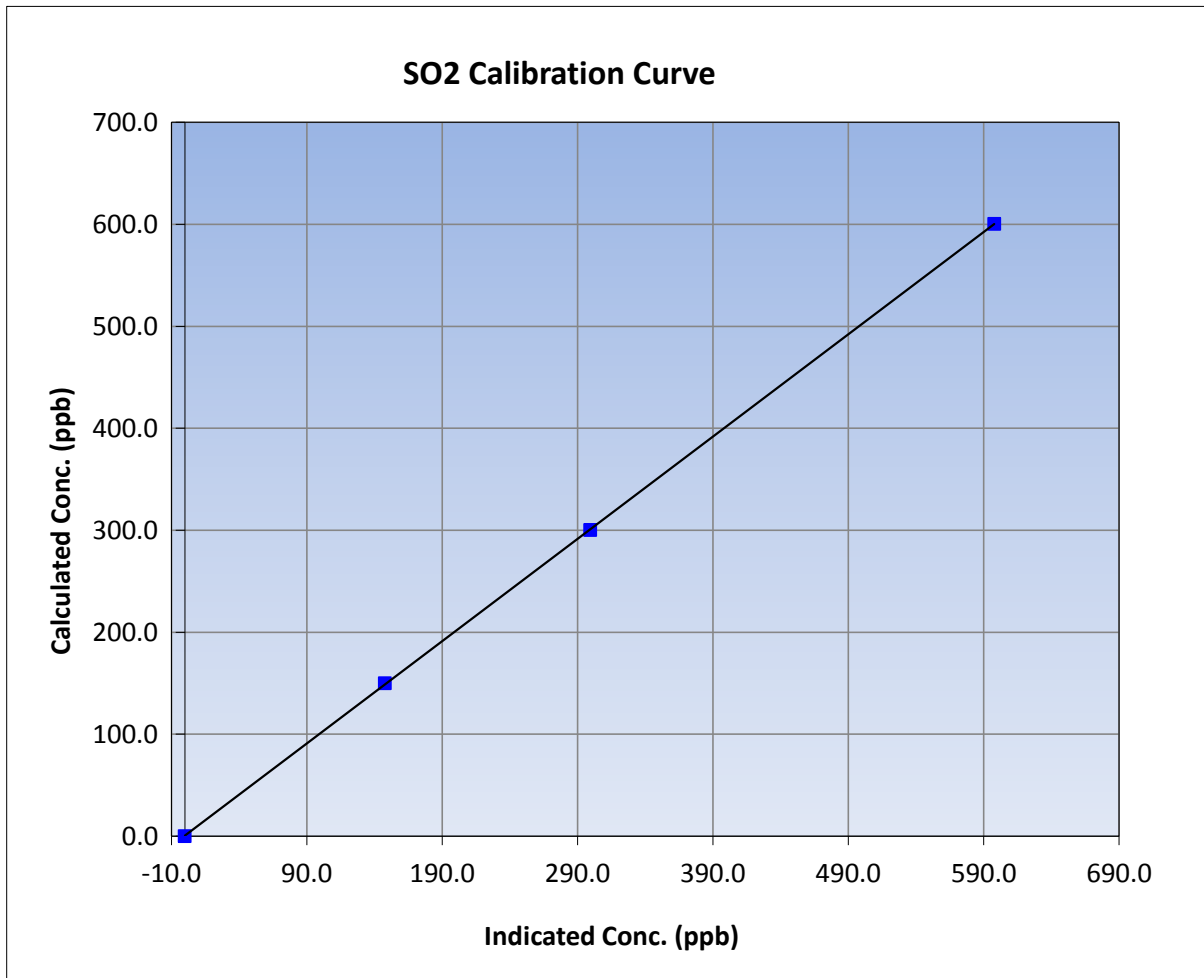
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 10, 2017	Previous Calibration	December 15, 2016
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	11:21	End Time (MST)	13:49
Analyzer make	TEI 43i	Analyzer serial #	JC1327300932

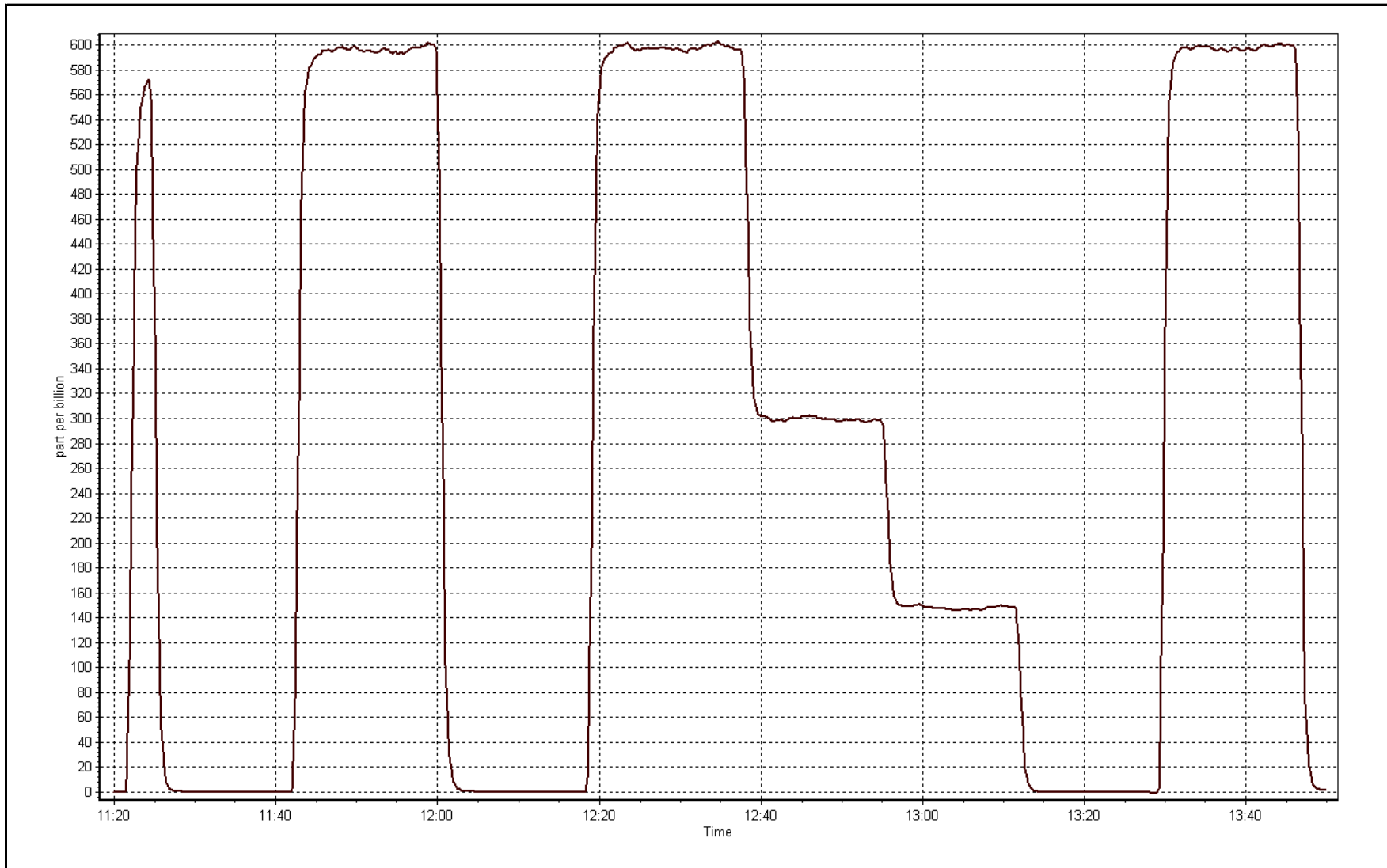
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999986
600.4	597.8	1.0043		
300.2	299.4	1.0026	Slope	1.003000
150.1	147.6	1.0169		
			Intercept	0.705896



SO2 Calibration Plot

Date: January 10, 2017





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	January 24, 2017	Last Calibration	December 15, 2016
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	8:30	End Time (MST)	9:10
Gas Cert Reference	LL101590	Station temp.	22 Deg C
Cal Gas Concentration	9.75 ppm	Cal Gas Exp Date	2/22/2016
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	49.7 ppm	SO2 gas cert/exp	08/09/2018 Praxair

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-617	-617
Analyzer IP address	192.168.1.42		Lamp voltage	881	881
Calculated slope	0.989218	0.998833	Chamber temp	45	45
Calculated intercept	0.125818	-0.099883	Pressure	547.2	547.2
Analyzer Background	14.7	14.7	Flow	1.043	1.043
Analyzer Coefficient	0.871	0.871	Intensity	94	94
			Converter temp.	330	330
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	75.1	0.998
SO2 scrubber check					
calibrator zero	6000	0.0	0.0	0.1	----
high point	6000	46.1	74.9	75.1	0.998
second point					
third point					
as left zero					
as left span					
Average Correction Factor					0.998

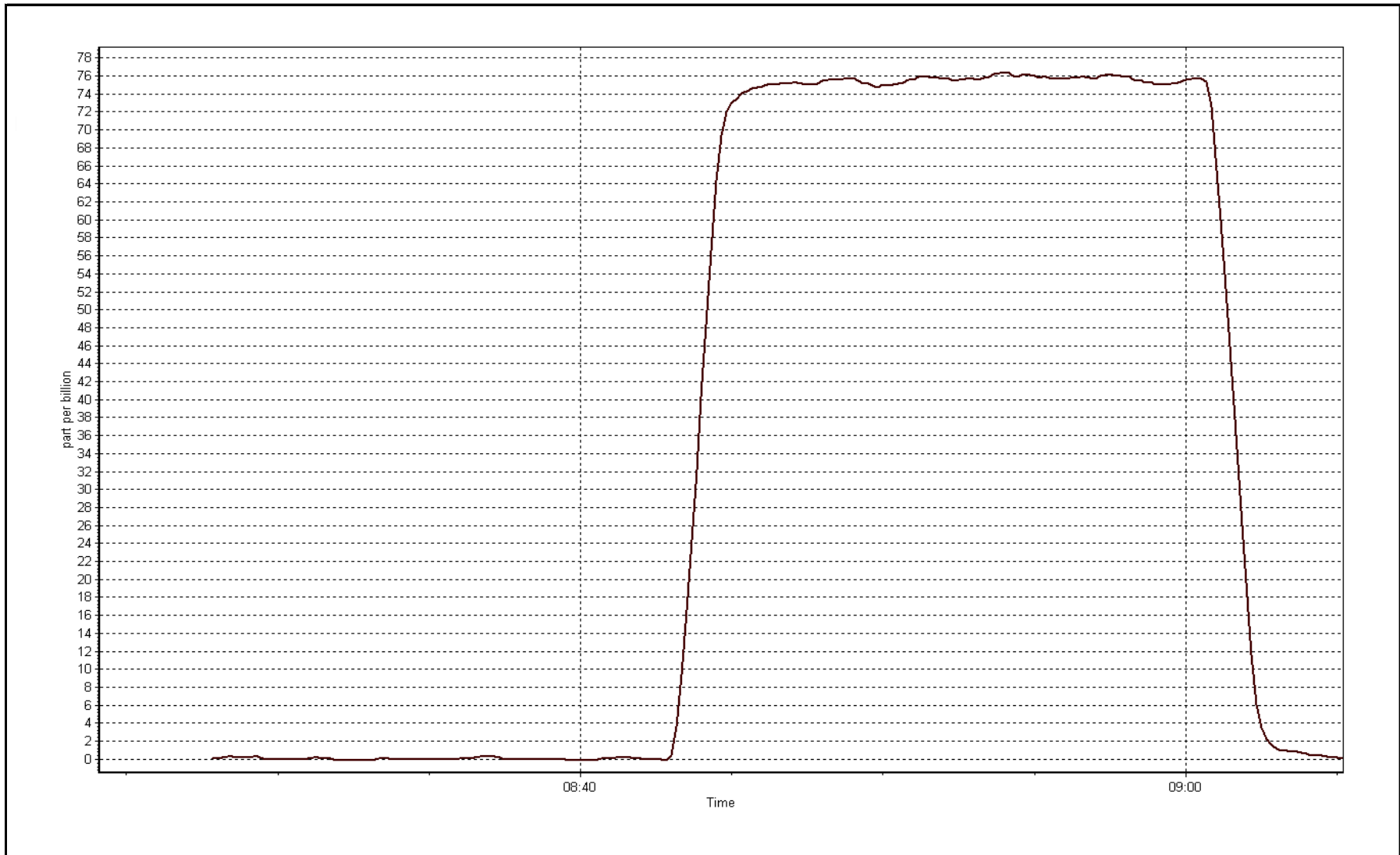
Corrected As found	75.0	Previous response	75.6	% change	0.8%
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Notes:

As Found for Calibration Gas change out

Calibration Performed By:

Melissa Lemay





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	January 24, 2017	Last Calibration	December 15, 2016
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	<input checked="" type="checkbox"/> Routine	<input type="checkbox"/> Calibration Gas	<input type="checkbox"/> Change out
Start Time (MST)	8:30	End Time (MST)	9:10
Gas Cert Reference	LL55546	Station temp.	22 Deg C
Cal Gas Concentration	5.11 ppm	Cal Gas Exp Date	December 2, 2019
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	49.7 ppm	SO2 gas cert/exp	08/09/2018 Praxair

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-617	-617
Analyzer IP address	192.168.1.42		Lamp voltage	881	881
Calculated slope	0.998833	0.996398	Chamber temp	45	45
Calculated intercept	-0.099883	-0.074582	Pressure	547.2	547.2
Analyzer Background	14.7	13.7	Flow	1.043	1.043
Analyzer Coefficient	0.871	0.806	Intensity	94	94
			Converter temp.	330	330
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	88.1	75.0	81.2	0.924
SO2 scrubber check	5000	15.1	150.1	1.5	----
calibrator zero	6000	0.0	0.0	0.1	----
high point	6000	88.1	75.0	75.4	0.995
second point	6000	49.2	41.9	42.1	0.995
third point	6000	29.3	25.0	25.1	0.994
as left zero	6000	0.0	0.0	0.1	----
as left span	6000	88.1	75.0	75.4	0.995
Average Correction Factor					0.995

Corrected As found 81.1 Previous response 75.2 % change -7.3%

Notes:

Calibration Gas change out, As found zero done after scrubber, scrubber done after as found span, filter changed out, span adjusted

Calibration Performed By:

Melissa Lemay



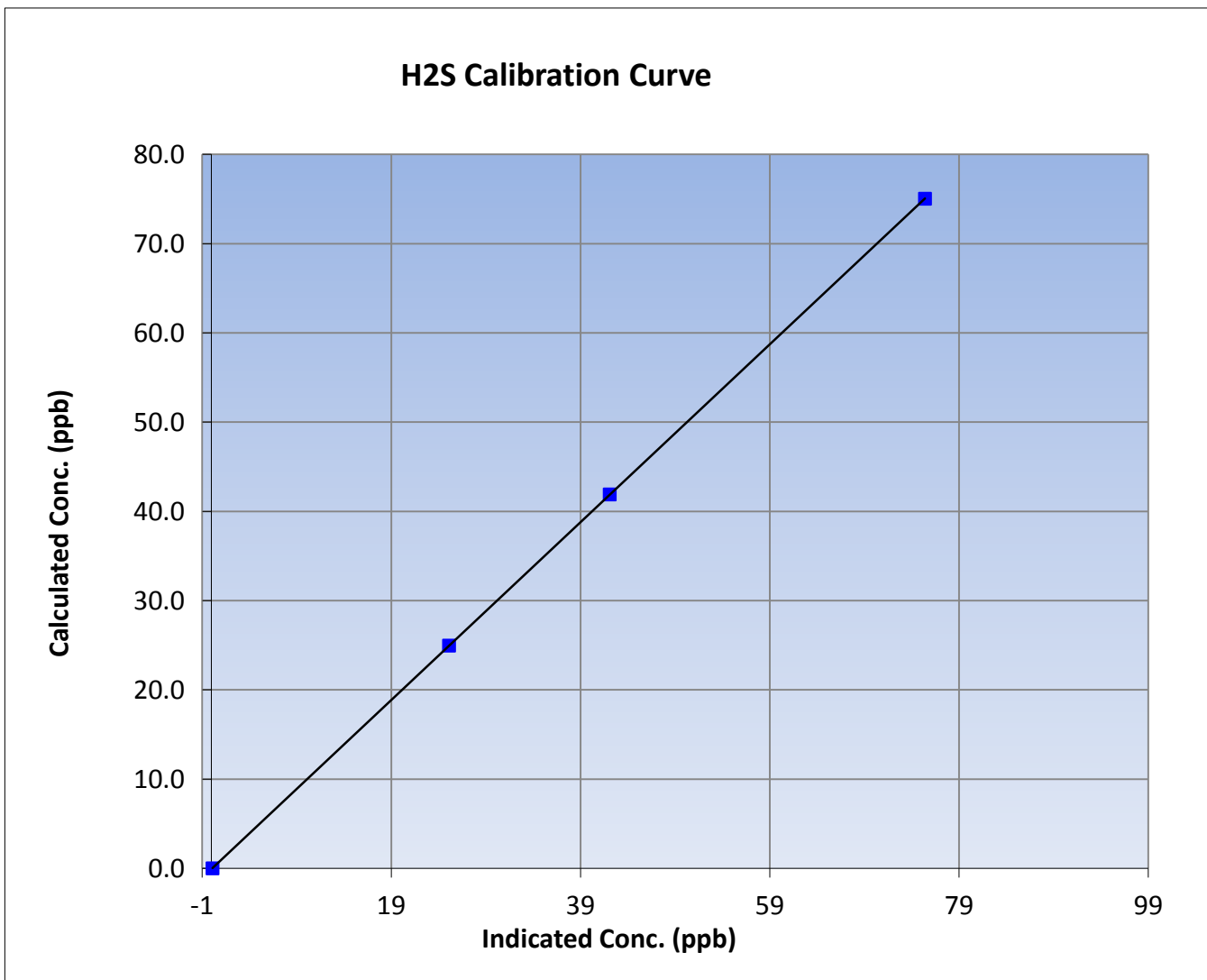
Wood Buffalo Environmental Association H2S Calibration Report

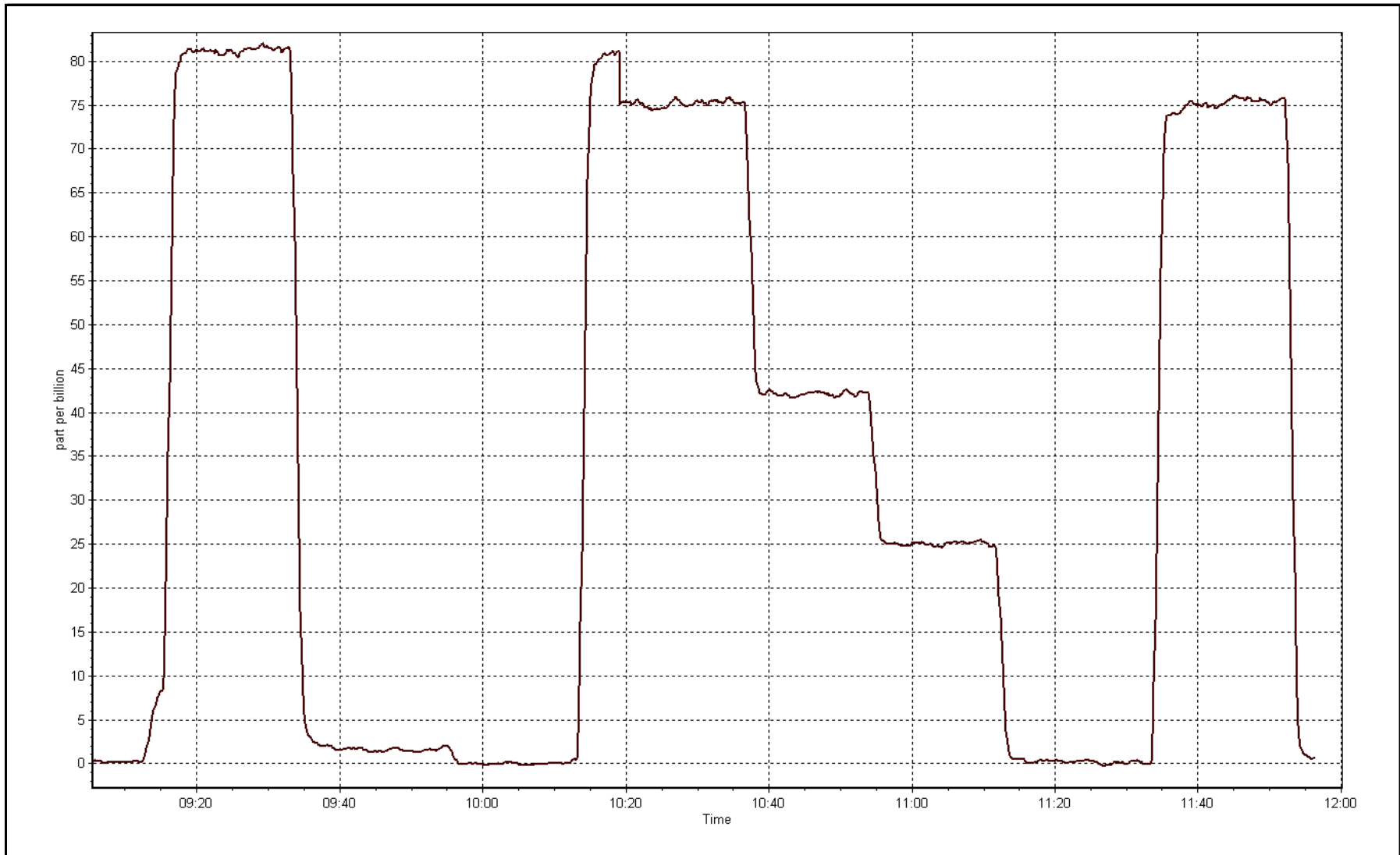
Station Information

Calibration Date	January 24, 2017	Previous Calibration	December 15, 2016
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	8:30	End Time (MST)	9:10
Analyzer make	Routine	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	0.999999
75.0	75.4	0.9951		
41.9	42.1	0.9953	Slope	0.996398
25.0	25.1	0.9942		
			Intercept	-0.074582







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	January 10, 2017	Last Calibration	December 15, 2016
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	11:21	End Time (MST)	13:49
Gas Cert Reference	LL107929	Cal Gas Expiry Date	September 8, 2018
CH4 Cal Gas Conc.	514 ppm	CH4 Equiv Conc.	1061.3 ppm
C3H8 Cal Gas Conc.	199 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	0.992977	1.003690	Fuel Pressure	19.9	19.9
Calculated intercept	-0.021475	-0.021994	Analyzer Coeff	4.275	4.253
			Analyzer BKG	0.840	0.750

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	60.4	12.82	12.71	1.009
calibrator zero	5000	0.0	0.00	0.01	----
high point	5000	60.4	12.82	12.78	1.003
second point	5000	30.2	6.41	6.44	0.995
third point	5000	15.1	3.20	3.21	0.998
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	60.4	12.82	12.82	1.000
Average Correction Factor					0.999

Corrected As found	12.79	Previous response	12.93	% change	1.1%
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Notes:

zero adjusted, no maintenance done, filter changed out

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association THC Calibration Report

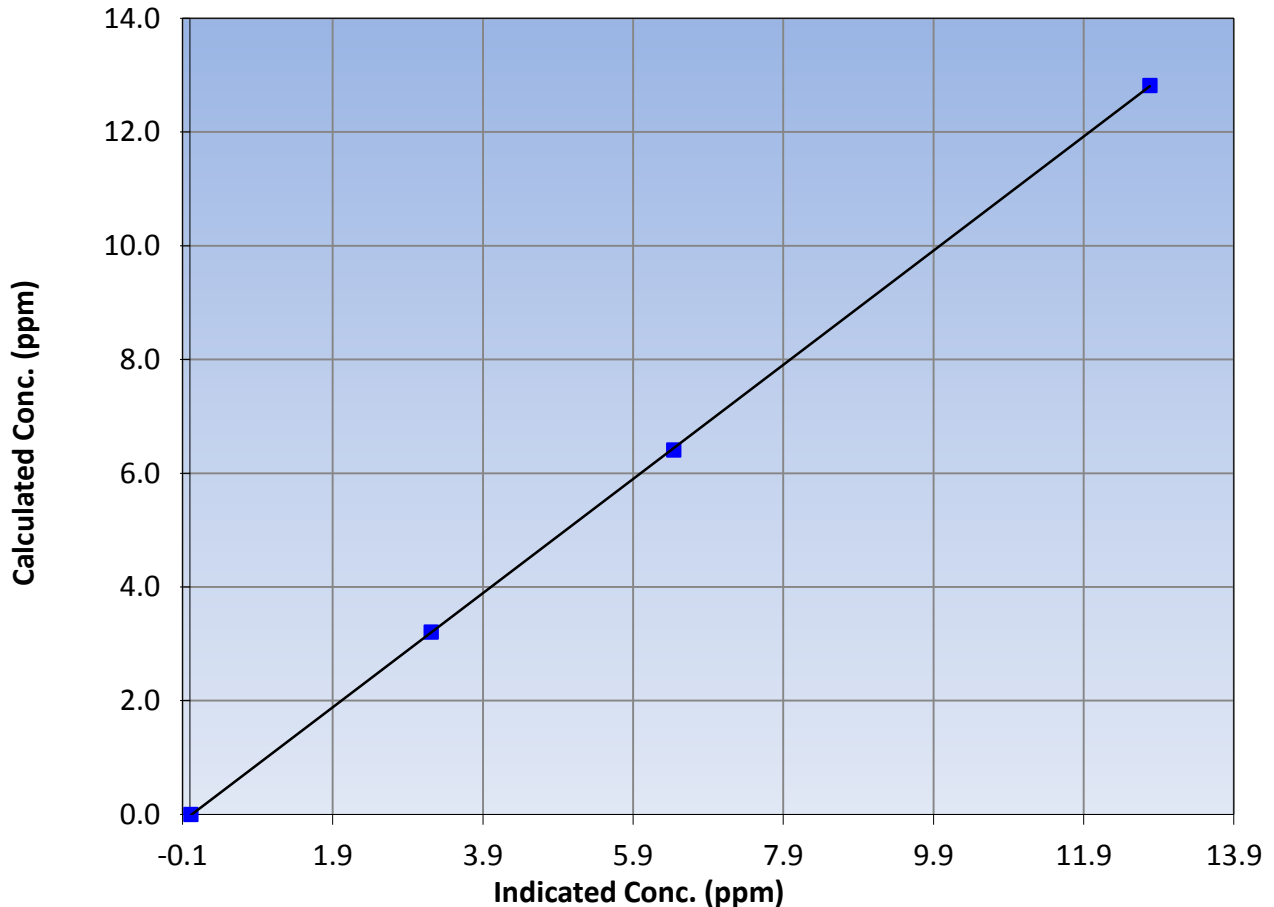
Station Information

Calibration Date	January 10, 2017	Previous Calibration	December 15, 2016
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	11:21	End Time (MST)	13:49
Analyzer make	TEI 51i-LT	Analyzer serial #	1201650671

Calibration Data

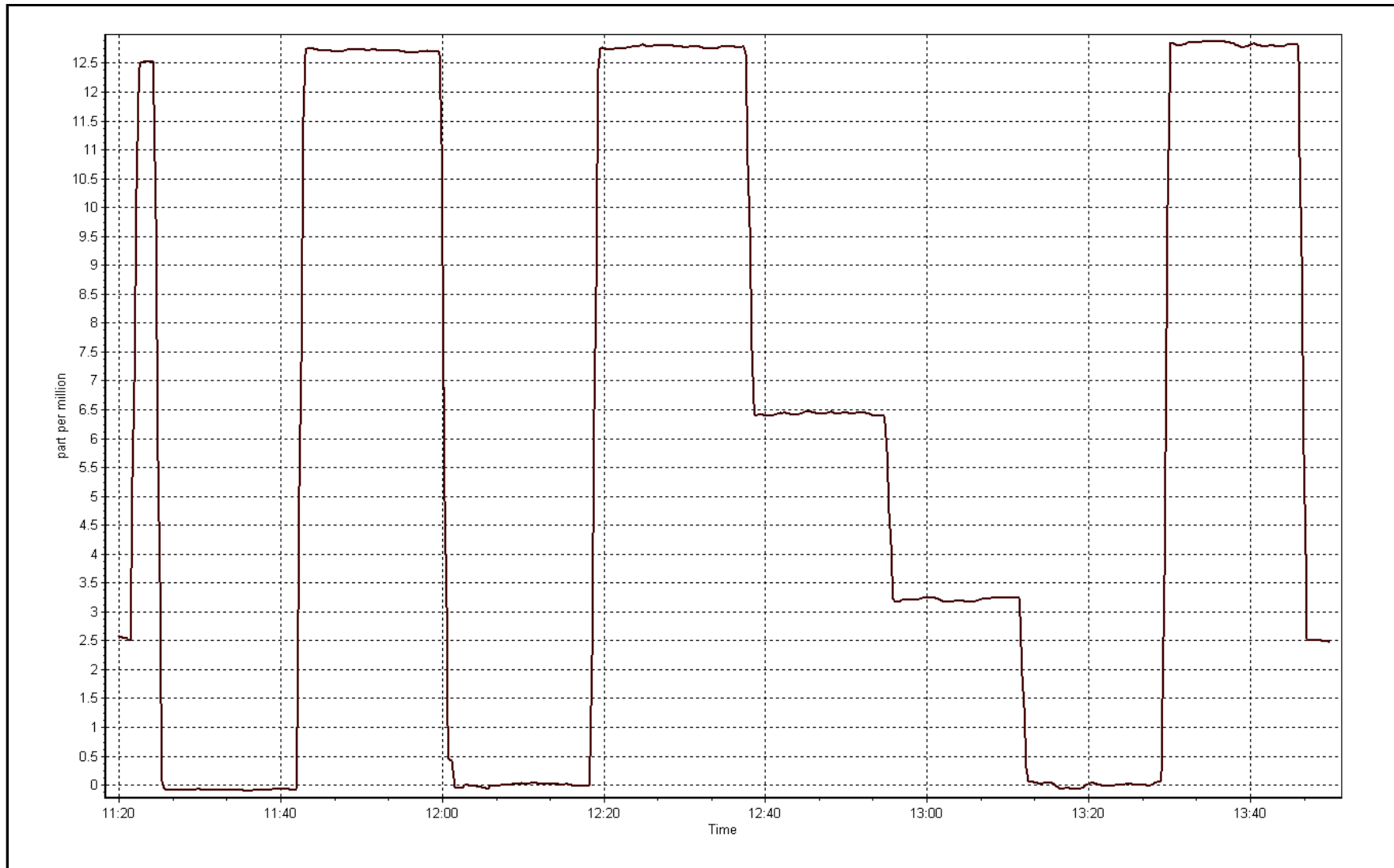
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	----	Correlation Coefficient	0.999984
12.82	12.78	1.0031		
6.41	6.44	0.9953	Slope	1.003690
3.20	3.21	0.9984		
			Intercept	-0.021994

THC Calibration Curve



THC Calibration Plot

Date: January 10, 2017





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

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

**AMS 5
MANNIX
JANUARY 2017**

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

February 27, 2017



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)
 JANUARY 2017

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	707	35	37	99.73	85	0	14	0
H2S (ppb) Average	701	37	43	99.19	10	0	3	0
THC (ppm) Average	657	33	87	92.74	6	-	2.8	-
Temperature 2 m (C) Average	744	0	0	100.00	7	-	3.1	-
Temperature 20 m (C) Average	716	0	28	96.24	8	-	4.5	-
Temperature 45 m (C) Average	744	0	0	100.00	8.1	-	5	-
Temperature 75 m (C) Average	744	0	0	100.00	8.1	-	5.3	-
Temperature 90 m (C) Average	744	0	0	100.00	8.1	-	5.3	-
Relative Humidity 2 m (%) Average	744	0	0	100.00	95	-	93	-
Relative Humidity 20 m (%) Average	717	0	27	96.37	95	-	92	-
Relative Humidity 45 m (%) Average	744	0	0	100.00	95	-	92	-
Relative Humidity 75 m (%) Average	744	0	0	100.00	95	-	91	-
Relative Humidity 90 m (%) Average	744	0	0	100.00	94	-	91	-
Wind Speed 20 m (km/h) Average	594	0	150	79.84	33	-	18	-
Wind Speed 45 m (km/h) Average	511	0	233	68.68	42	-	22	-
Wind Speed 75 m (km/h) Average	498	0	246	66.94	49	-	27	-
Wind Speed 90 m (km/h) Average	556	0	188	74.73	53	-	29	-
Wind Direction 20 m (deg) Average	594	0	150	79.84	-	-	-	-
Wind Direction 45 m (deg) Average	511	0	233	68.68	-	-	-	-
Wind Direction 75 m (deg) Average	498	0	246	66.94	-	-	-	-
Wind Direction 90 m (deg) Average	556	0	188	74.73	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	594	0	150	79.84	1.2	-	0.4	-
Vertical Wind Speed 45 m (km/h) Average	511	0	233	68.68	2.1	-	1	-
Vertical Wind Speed 75 m (km/h) Average	498	0	246	66.94	1.4	-	0.4	-
Vertical Wind Speed 90 m (km/h) Average	556	0	188	74.73	3.8	-	1	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)
JANUARY 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	707	2.5	7	-	0	0	0	0	1	6	85
H2S (ppb) Average	701	0.6	1	-	0	0	0	0	1	1	10
THC (ppm) Average	657	2.23	0.3	-	2	2	2.1	2.2	2.3	2.4	6
Temperature 2 m (C) Average	744	-12.44	10	-	-34.5	-25.4	-20.1	-13.5	-3.5	1.4	7
Temperature 20 m (C) Average	716	-10.95	9.8	-	-30.2	-22.4	-19.2	-12.8	-1.1	2.5	8
Temperature 45 m (C) Average	744	-11.33	10.4	-	-33.9	-24.1	-19.5	-12.8	-0.7	2.8	8.1
Temperature 75 m (C) Average	744	-11.01	10.3	-	-32.6	-23.8	-19.2	-12.8	0.1	3	8.1
Temperature 90 m (C) Average	744	-10.9	10.3	-	-32	-23.6	-19	-12.5	0.3	3.2	8.1
Relative Humidity 2 m (%) Average	744	80	8	-	51	70	75	80	85	92	95
Relative Humidity 20 m (%) Average	717	77.9	9	-	46	65	73	79	85	88	95
Relative Humidity 45 m (%) Average	744	77	9	-	45	64	71	78	84	88	95
Relative Humidity 75 m (%) Average	744	76.5	9	-	45	64	70	78	83	88	95
Relative Humidity 90 m (%) Average	744	76.4	9	-	46	64	70	78	83	87	94
Wind Speed 20 m (km/h) Average	594	10.6	5	-	0	4	7	10	14	18	33
Wind Speed 45 m (km/h) Average	511	15.7	7	-	1	6	10	15	21	25	42
Wind Speed 75 m (km/h) Average	498	18.4	9	-	1	7	12	19	25	29	49
Wind Speed 90 m (km/h) Average	556	19	9	-	1	7	12	18	26	31	53
Wind Direction 20 m (deg) Average	594	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	511	-	-	-	-	-	-	-	-	-	-
Wind Direction 75 m (deg) Average	498	-	-	-	-	-	-	-	-	-	-
Wind Direction 90 m (deg) Average	556	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	594	0.02	0.4	-	-1	-0.5	-0.3	0	0.3	0.5	1.2
Vertical Wind Speed 45 m (km/h) Average	511	0.11	0.7	-	-2.3	-0.7	-0.4	0	0.6	1.1	2.1
Vertical Wind Speed 75 m (km/h) Average	498	0.15	0.3	-	-1.2	-0.2	0	0.1	0.3	0.6	1.4
Vertical Wind Speed 90 m (km/h) Average	556	0.15	0.6	-	-2.4	-0.3	-0.1	0.1	0.3	0.7	3.8

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)
JANUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, THC	12 Jan 2017 11:00	12 Jan 2017 11:00	1	Maintenance on daily zero and span system
SO2, THC	13 Jan 2017 09:00	13 Jan 2017 09:00	1	Maintenance - replaced calibration cylinder
H2S	09 Jan 2017 12:00	09 Jan 2017 13:00	2	Maintenance on daily zero and span system
H2S	12 Jan 2017 12:00	12 Jan 2017 15:00	4	Maintenance on daily zero and span system
THC	09 Jan 2017 05:00	11 Jan 2017 08:00	52	Analyzer Failure - as founds did not meet criteria
Temperature, Relative Humidity 20 m	08 Jan 2017 04:00	08 Jan 2017 15:00	12	Flat line in sensor output signal - Sensor frozen
Temperature, Relative Humidity 20 m	11 Jan 2017 23:00	12 Jan 2017 13:00	15	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 20 m	08 Jan 2017 04:00	08 Jan 2017 15:00	12	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 20 m	12 Jan 2017 00:00	12 Jan 2017 13:00	14	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 20 m	19 Jan 2017 20:00	20 Jan 2017 07:00	12	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 20 m	21 Jan 2017 00:00	25 Jan 2017 15:00	112	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 45 m	07 Jan 2017 05:00	11 Jan 2017 07:00	99	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 45 m	11 Jan 2017 09:00	11 Jan 2017 09:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 45 m	19 Jan 2017 14:00	20 Jan 2017 08:00	19	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 45 m	21 Jan 2017 00:00	25 Jan 2017 17:00	114	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 75 m	05 Jan 2017 09:00	05 Jan 2017 11:00	3	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 75 m	06 Jan 2017 10:00	06 Jan 2017 12:00	3	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 75 m	07 Jan 2017 04:00	11 Jan 2017 09:00	102	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 75 m	19 Jan 2017 08:00	20 Jan 2017 05:00	22	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 75 m	20 Jan 2017 23:00	25 Jan 2017 18:00	116	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 90 m	07 Jan 2017 04:00	09 Jan 2017 04:00	49	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 90 m	09 Jan 2017 11:00	09 Jan 2017 12:00	2	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 90 m	09 Jan 2017 14:00	09 Jan 2017 17:00	4	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 90 m	09 Jan 2017 20:00	10 Jan 2017 14:00	19	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction, Vertical Wind Speed 90 m	20 Jan 2017 23:00	25 Jan 2017 16:00	114	Flat line in sensor output signal - Sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Mannix - January 2017

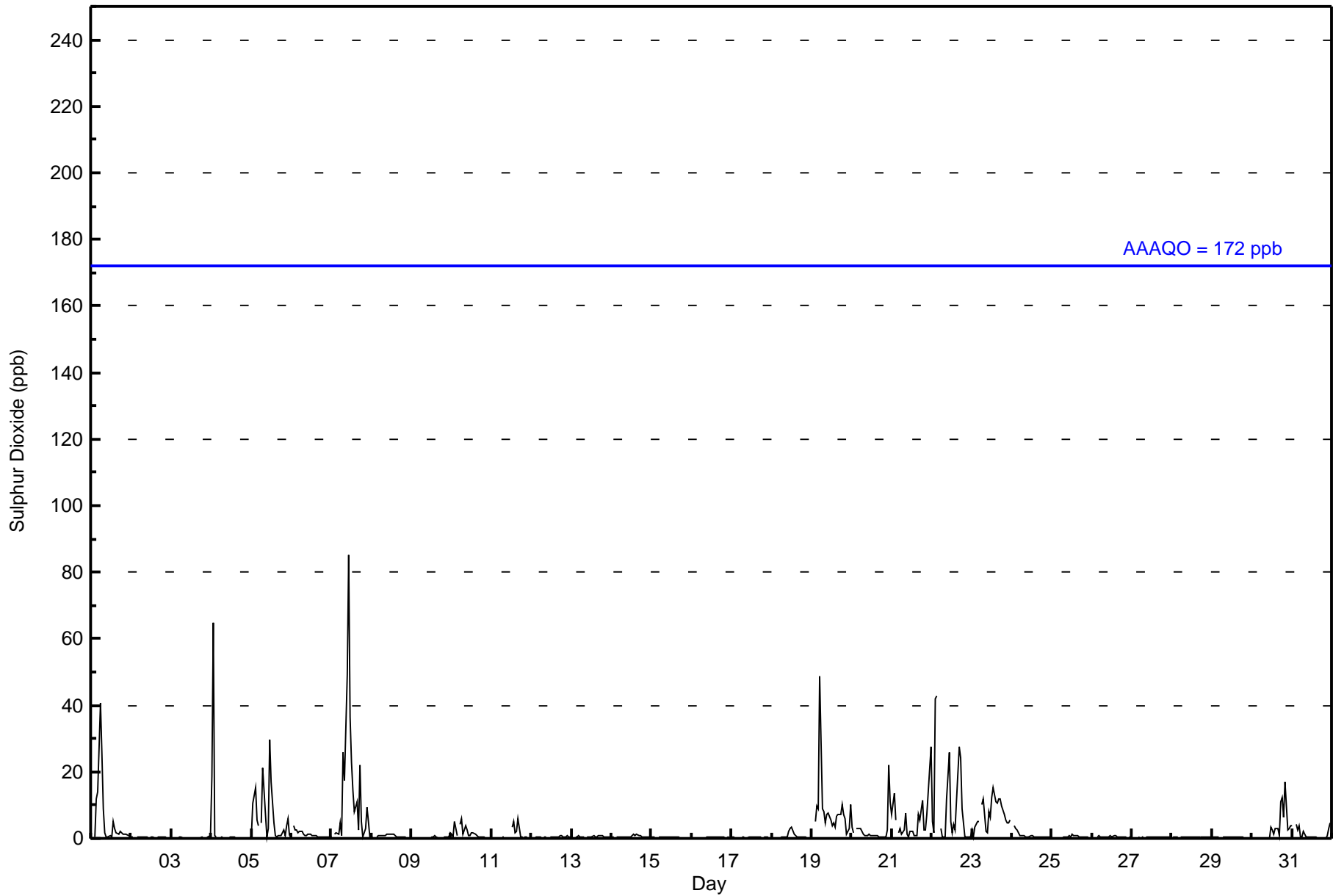
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0		Hours in Service: 744	
Maximum Value: 85 ppb on Jan 7 11:00		Maximum Daily Average: 14.3 ppb on Jan 7	
Minimum Value: 0 ppb on Jan 16 01:00		Hours of Data: 707	
Maximum Diurnal Average: 5.0 ppb at hour 11		Hours of Missing Data: 37	
Monthly Average: 2.5 ppb		Hours of Calibration: 35	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 6 P ₉₉ = 40		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-Jan	0	Z	1	12	14	41	25	9	2	0	0	1	1	5	3	2	1	2	2	1	1	1	1	1	5.5	41
2-Jan	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
3-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
4-Jan	19	65	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.8	65
5-Jan	1	11	15	5	4	Z	5	21	7	0	3	30	17	5	1	0	1	1	1	3	1	4	6	1	6.1	30
6-Jan	Z	4	3	3	2	2	2	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	0	1.2	4
7-Jan	0	Z	1	2	1	5	1	26	17	49	85	37	23	14	8	11	2	22	5	0	3	9	5	1	14.3	85
8-Jan	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	0	0	0	0.7	1
9-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2	0.3	2
10-Jan	1	0	5	1	Z	4	6	1	4	2	1	1	2	2	1	1	1	0	0	0	0	0	0	0	1.5	6
11-Jan	0	0	0	0	0	Z	0	1	C	C	C	C	3	5	2	2	6	0	0	0	0	0	0	0	1.1	6
12-Jan	Z	0	0	0	0	0	0	0	0	0	M	0	0	0	0	0	0	1	1	1	1	1	1	1	0.4	1
13-Jan	1	Z	1	0	1	1	1	1	M	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0.5	1
14-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0.5	1
15-Jan	0	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
16-Jan	0	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
17-Jan	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
18-Jan	Z	0	0	0	0	0	0	0	0	0	2	3	3	1	1	1	1	0	0	0	0	0	0	0	0.7	3
19-Jan	0	Z	5	10	9	49	9	8	5	7	7	5	4	5	4	7	7	7	10	7	6	1	3	10	8.1	49
20-Jan	3	2	Z	3	3	3	2	1	1	1	1	1	1	1	1	1	1	1	0	0	1	3	22	11	2.7	22
21-Jan	7	13	5	Z	2	3	1	3	7	1	1	2	2	1	1	1	7	5	11	3	2	7	14	28	5.6	28
22-Jan	5	2	42	43	Z	3	0	0	0	12	26	5	2	4	2	11	28	24	9	5	0	0	0	1	9.8	43
23-Jan	2	0	3	5	5	Z	10	12	2	2	8	6	12	15	11	11	12	12	10	7	5	5	5	6	7.2	15
24-Jan	Z	4	3	2	2	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.9	4
25-Jan	0	Z	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
26-Jan	0	0	Z	0	1	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.4	1
27-Jan	0	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
28-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.4	1
29-Jan	0	0	0	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
30-Jan	Z	0	0	0	0	0	0	0	0	0	0	3	3	1	3	3	1	11	12	6	17	3	3	4	3.1	17
31-Jan	4	Z	4	3	4	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	5	1.3	5
1.8 4.2 3.5 3.5 1.9 4.4 2.2 3.0 1.8 2.8 5.0 3.4 2.7 2.2 1.5 1.9 2.4 3.0 2.2 1.3 1.4 1.3 2.2 2.3																								Diurnal Average		
19 65 42 43 14 49 25 26 17 49 85 37 23 15 11 11 28 24 12 7 17 9 22 28																								Diurnal Maximum		
Z - zerspan 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 (SO₂) - ppb
Mannix - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Mannix - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	663	93.78	93.78
11 - 20	25	3.54	97.31
21 - 60	17	2.40	99.72
61 - 110	2	0.28	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 (SO₂) - ppb
Mannix - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	16	25	4	1	1	8	33	171	34	29	38	74	43	18	16	29	540
11 - 20	7	2	0	0	0	0	0	0	0	0	0	0	0	0	1	2	12
21 - 60	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
61 - 110	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
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
Totals	35	28	4	1	1	8	33	171	34	29	38	74	43	18	17	31	565

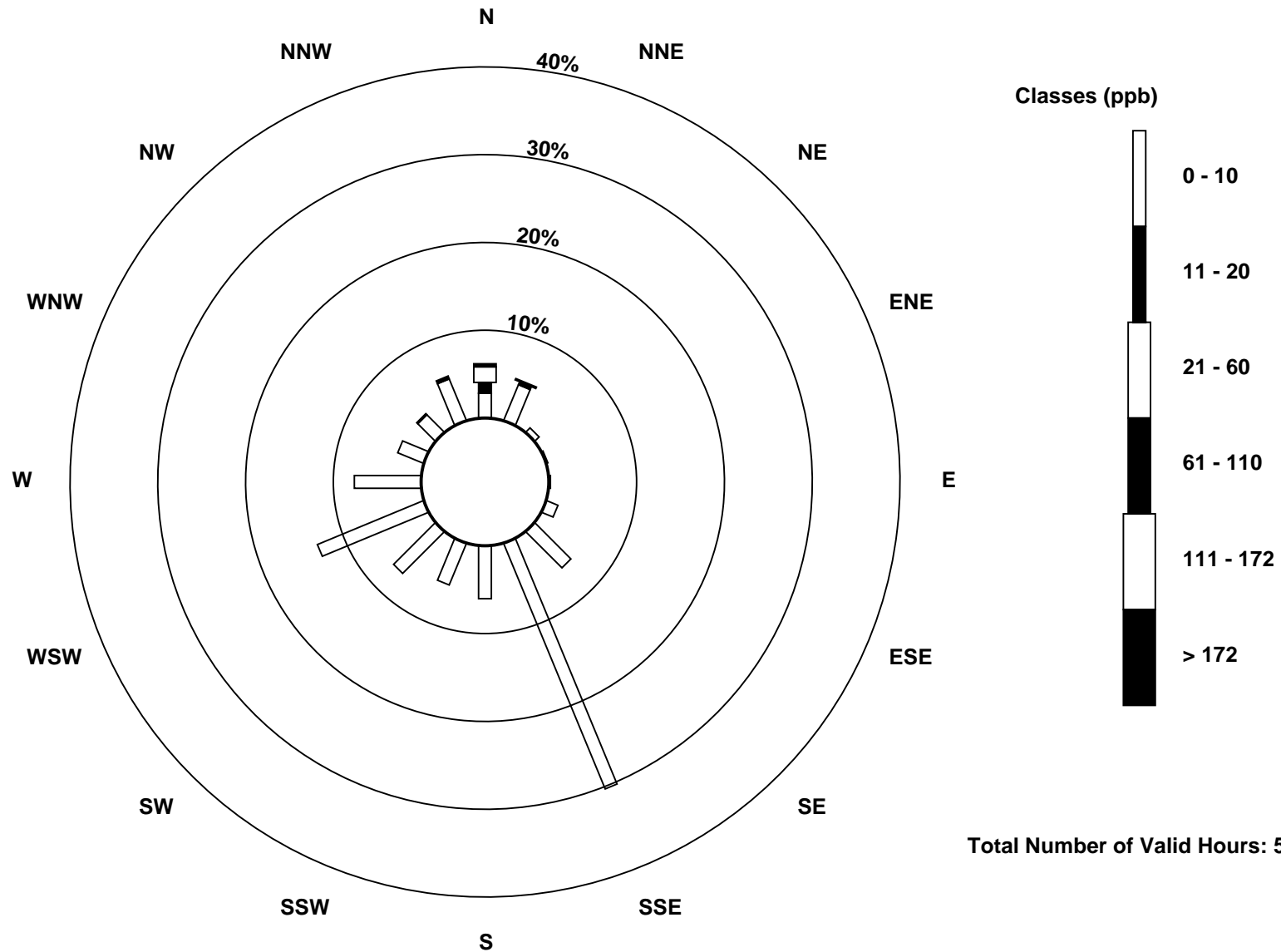
Total Number of Valid Hours: 565

Total Number of Hours: 744

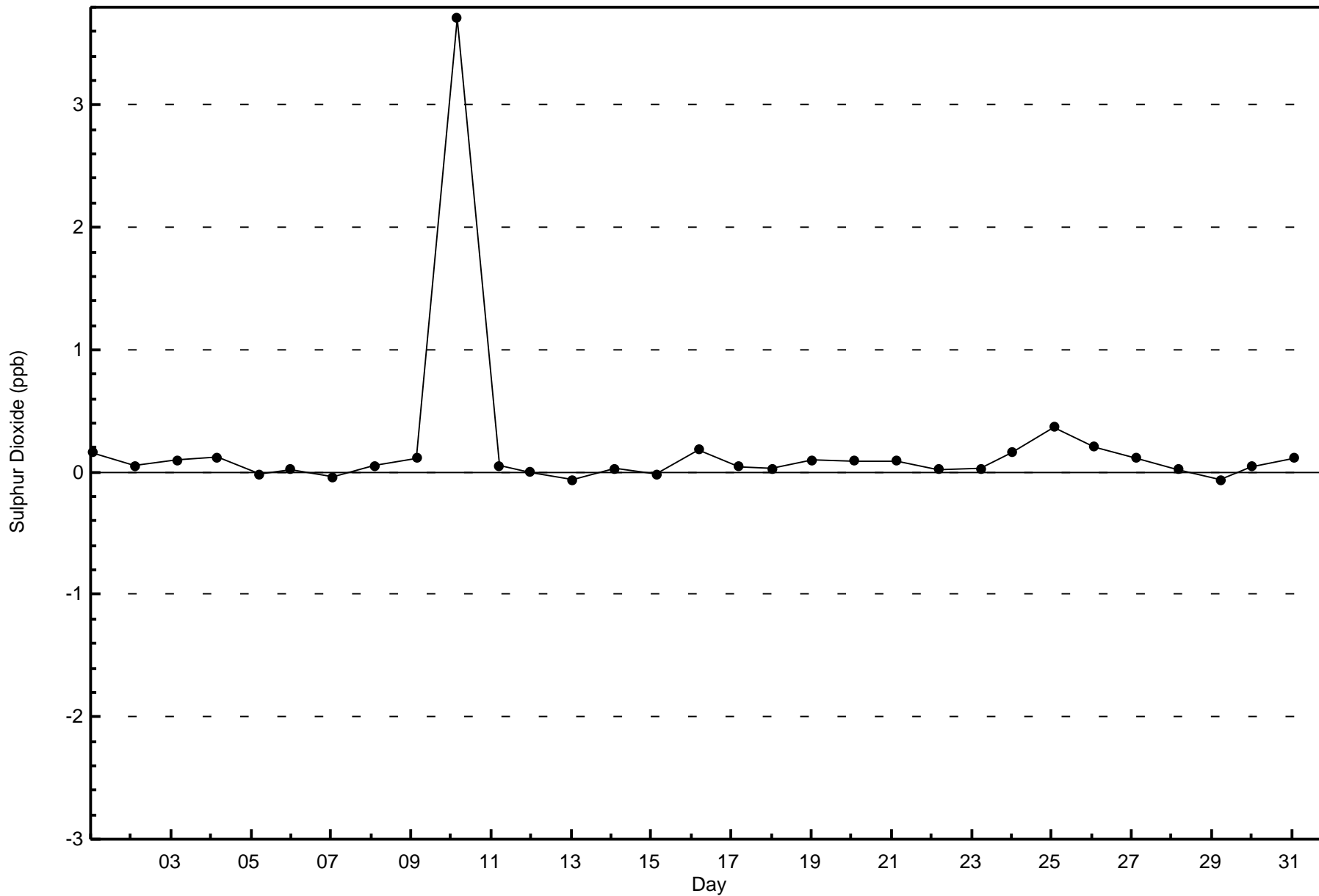


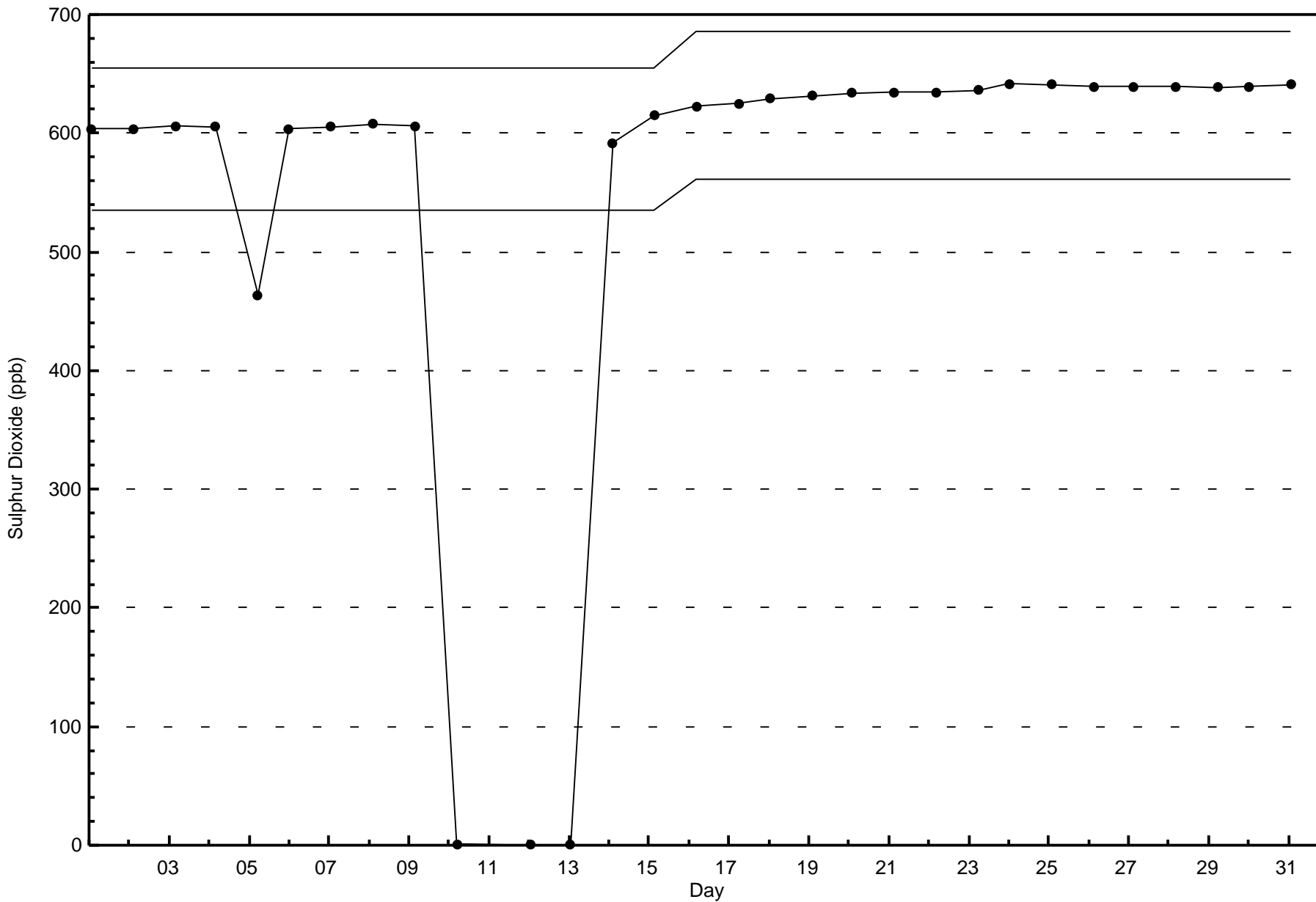
Wood Buffalo Environmental Association
Wind Rose Jan 2017

Sulphur Dioxide (SO₂) - ppb
Mannix (AMS 5)



Total Number of Valid Hours: 565





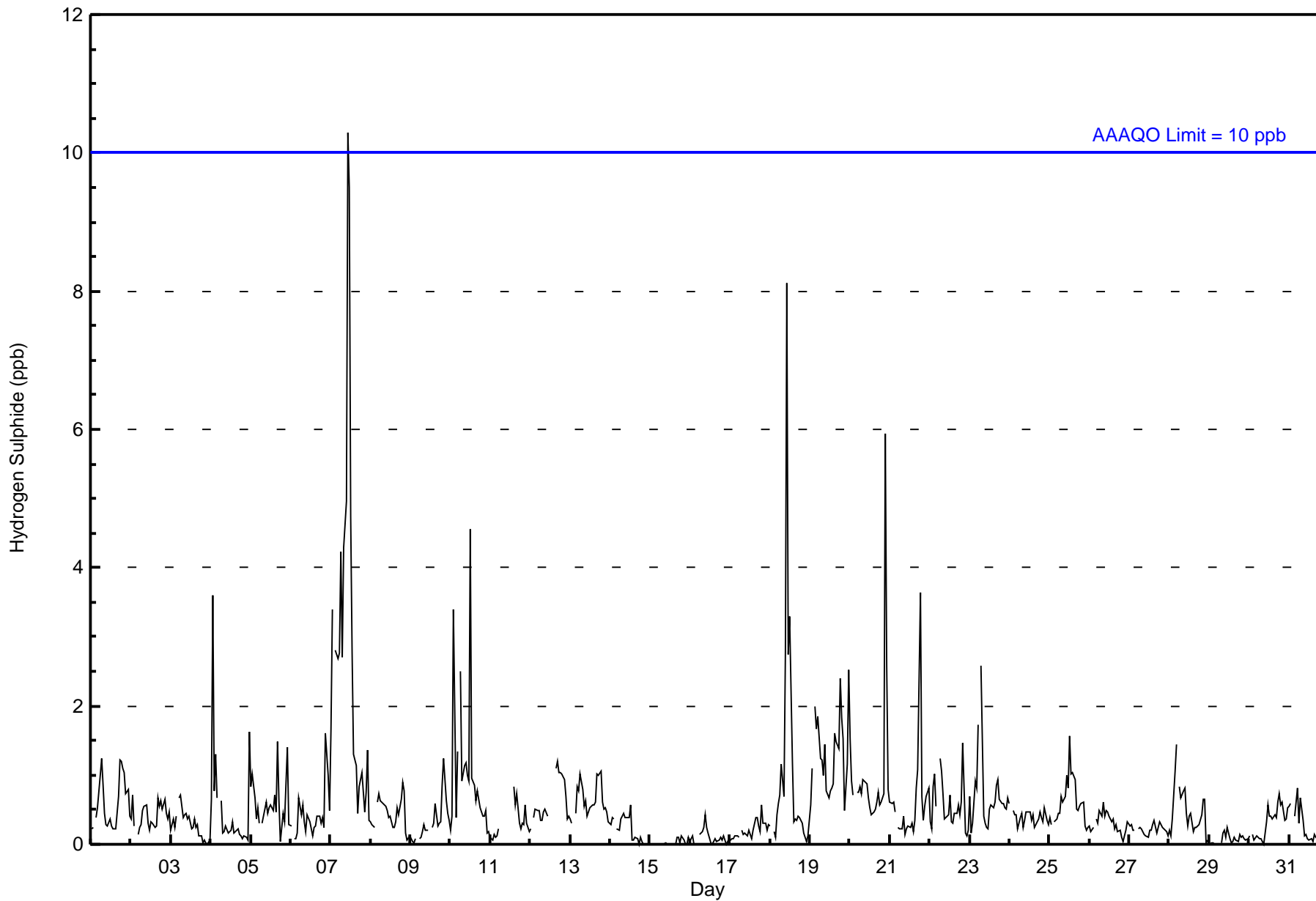


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 10 ppb on Jan 7 11:00	Maximum Daily Average: 2.8 ppb on Jan 7		Hours of Data:	701
Minimum Value: 0 ppb on Jan 3 23:00	Minimum Daily Average: 0.0 ppb on Jan 15		Hours of Missing Data:	43
Maximum Diurnal Average: 1.0 ppb at hour 11	Minimum Diurnal Average: 0.4 ppb at hour 15		Hours of Calibration:	37
Monthly Average: 0.6 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 4		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-Jan	0	0	Z	0	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0.6	1
2-Jan	0	1	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0.4	1
3-Jan	0	0	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
4-Jan	1	4	1	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.5	4
5-Jan	1	1	1	0	1	0	Z	0	1	1	0	1	1	0	1	0	1	1	0	0	0	1	1	0	0.6	1
6-Jan	0	Z	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0.4	2
7-Jan	2	3	Z	3	3	3	4	3	4	5	10	9	5	3	1	1	0	1	1	1	1	0	1	1	2.8	10
8-Jan	0	0	0	Z	1	1	1	1	1	1	0	0	0	0	0	0	1	0	1	1	1	0	0	0	0.4	1
9-Jan	0	0	0	0	Z	0	0	0	0	0	0	M	M	0	0	1	0	0	0	1	1	1	0	0	0.3	1
10-Jan	0	0	3	0	1	Z	3	1	1	1	1	1	5	1	1	1	1	1	1	1	0	0	0	0	1.0	5
11-Jan	0	0	0	0	0	0	Z	4	C	C	C	C	C	C	1	1	1	0	0	0	0	1	0	0	--	4
12-Jan	0	Z	0	1	0	0	0	0	0	1	0	M	M	M	M	1	1	1	1	1	1	1	0	0	0.6	1
13-Jan	0	0	Z	0	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0.6	1
14-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1
15-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
16-Jan	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
17-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.2	1
18-Jan	0	Z	0	0	0	1	1	1	1	3	8	3	3	1	0	0	0	0	0	0	0	0	0	0	1.1	8
19-Jan	1	1	Z	2	2	2	1	1	1	1	1	1	1	1	1	2	1	1	2	2	2	0	1	3	1.3	3
20-Jan	2	1	1	Z	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	6	3	1	1.0	6
21-Jan	1	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	4	1	0	1	1	1	0.6	4
22-Jan	0	0	1	1	1	Z	1	1	1	0	0	0	1	0	0	0	0	1	0	1	1	0	0	0	0.6	1
23-Jan	1	0	0	1	1	2	Z	3	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0.7	3
24-Jan	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.4	1
25-Jan	0	0	Z	0	0	0	0	1	1	1	1	1	2	1	1	1	1	0	1	1	1	0	0	0	0.6	2
26-Jan	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
27-Jan	0	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
28-Jan	0	0	0	1	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.5	1
29-Jan	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
30-Jan	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1	0	0	1	0.3	1
31-Jan	1	1	Z	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1

0.4	0.6	0.4	0.5	0.6	0.6	0.8	0.7	0.6	0.7	1.0	0.8	0.8	0.5	0.4	0.4	0.5	0.5	0.6	0.5	0.5	0.6	0.4	0.4	Diurnal Average		
2	4	3	3	3	3	4	4	4	4	5	10	9	5	3	1	2	1	1	4	2	2	6	3	3	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 (H₂S) - ppb
Mannix - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	675	96.29	96.29
3 - 4	19	2.71	99.00
5 - 7	4	0.57	99.57
8 - 11	3	0.43	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 701

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Mannix - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	25	24	4	1	0	7	33	170	34	29	38	73	41	15	15	29	538
3 - 4	4	4	2	0	1	0	1	0	0	0	0	2	0	0	1	1	16
5 - 7	3	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4
8 - 11	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	34	28	6	1	1	8	34	170	34	29	38	75	41	16	16	30	561

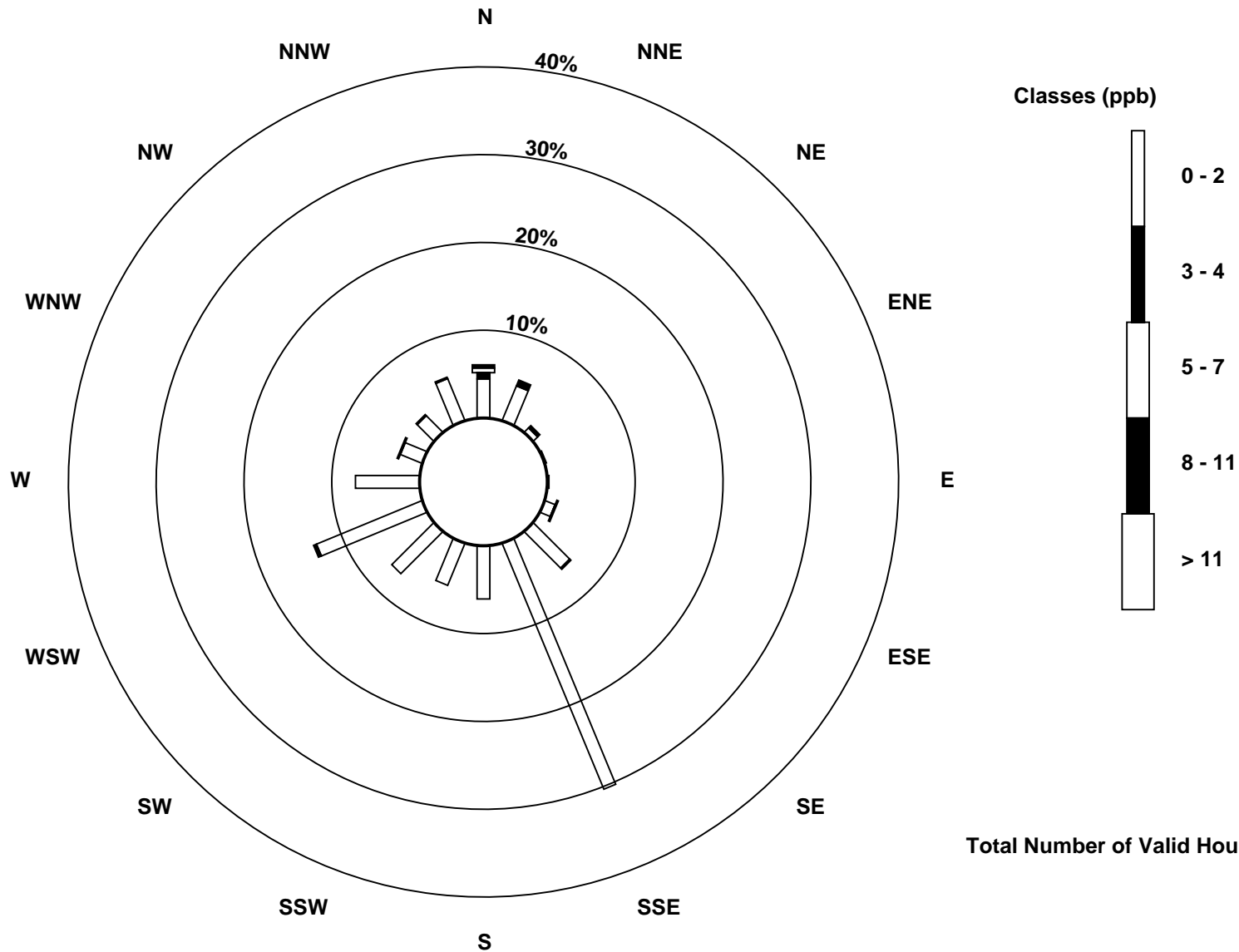
Total Number of Valid Hours: 561

Total Number of Hours: 744

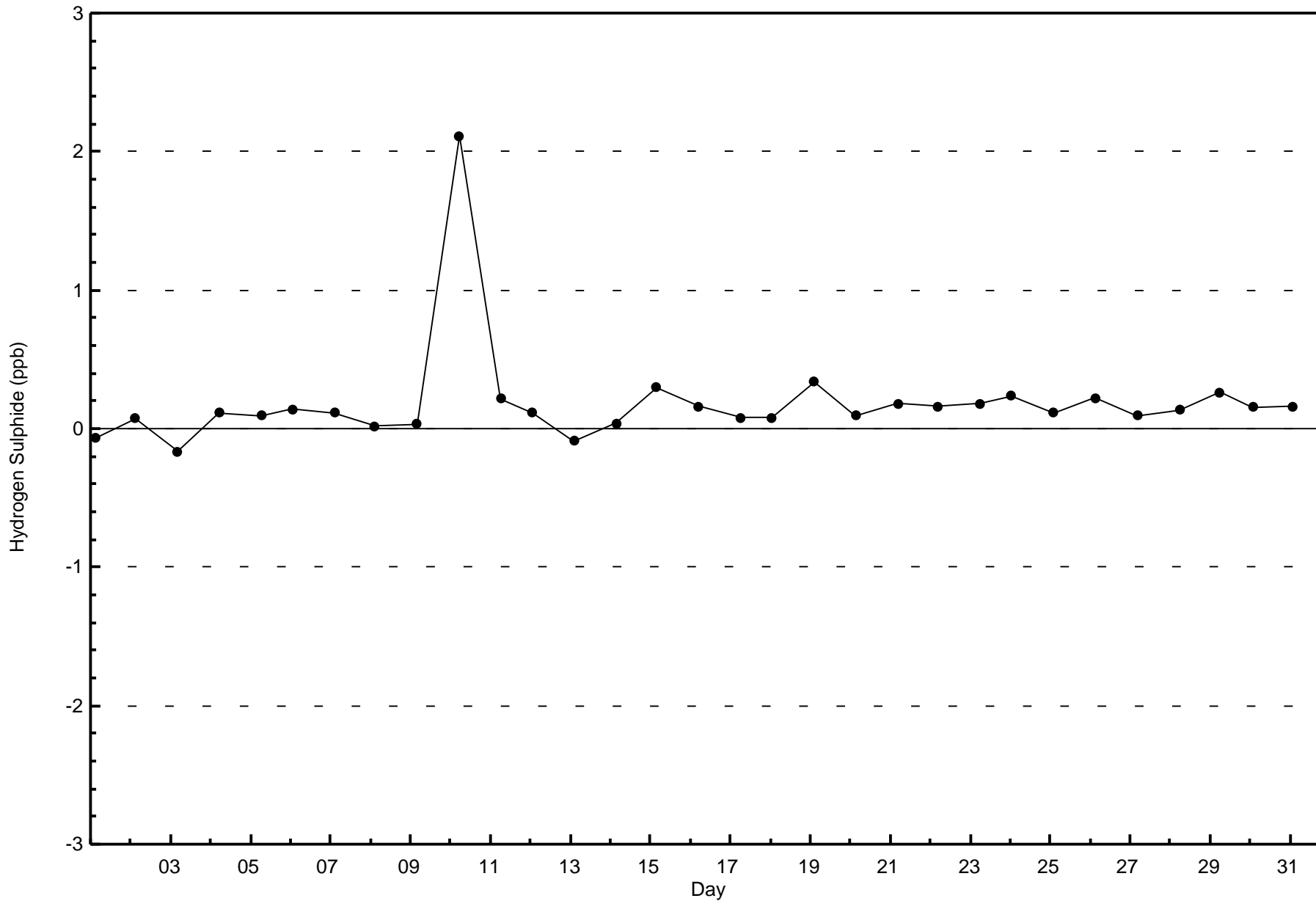


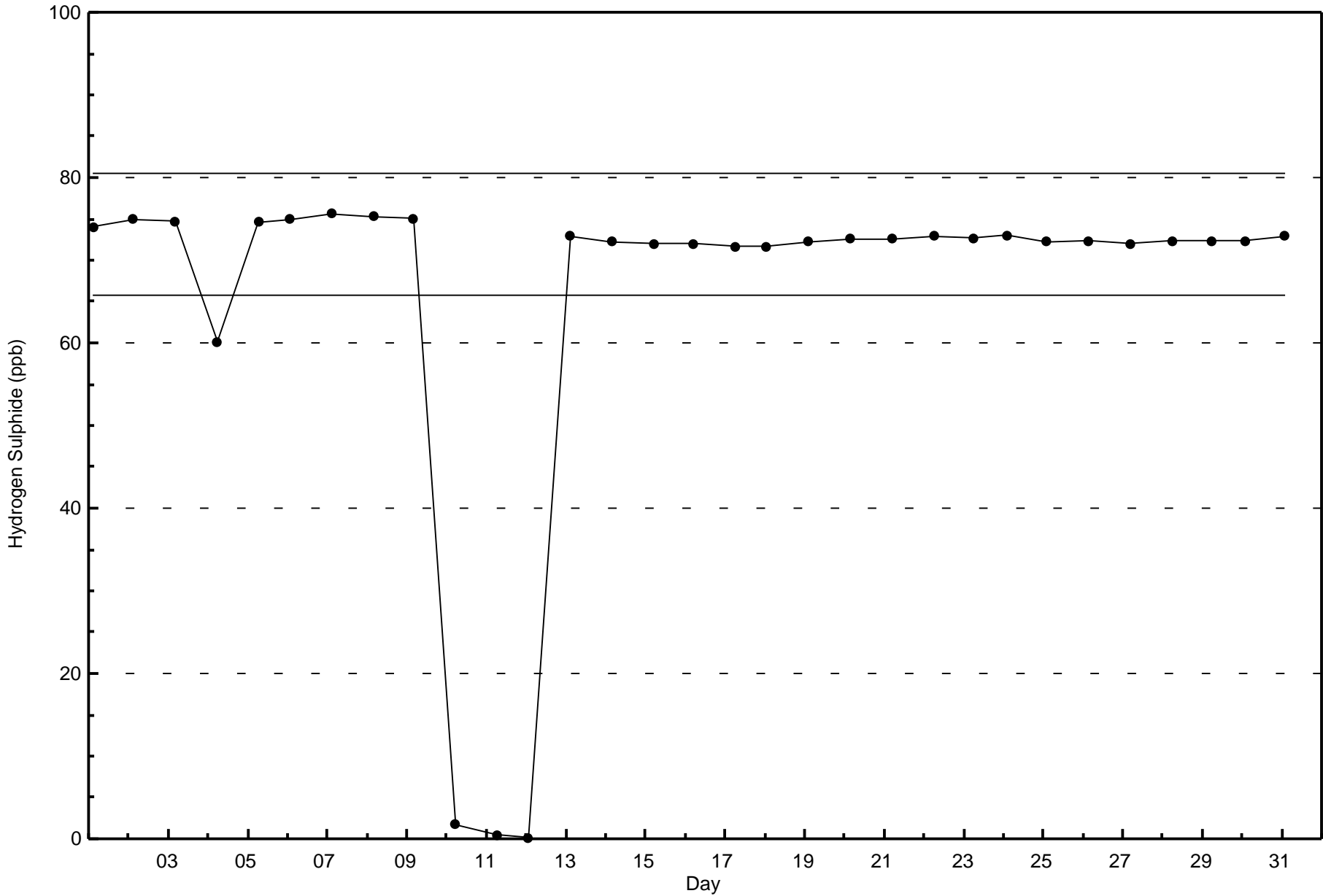
Wood Buffalo Environmental Association
Wind Rose Jan 2017

Hydrogen Sulphide (H₂S) - ppb
Mannix (AMS 5)



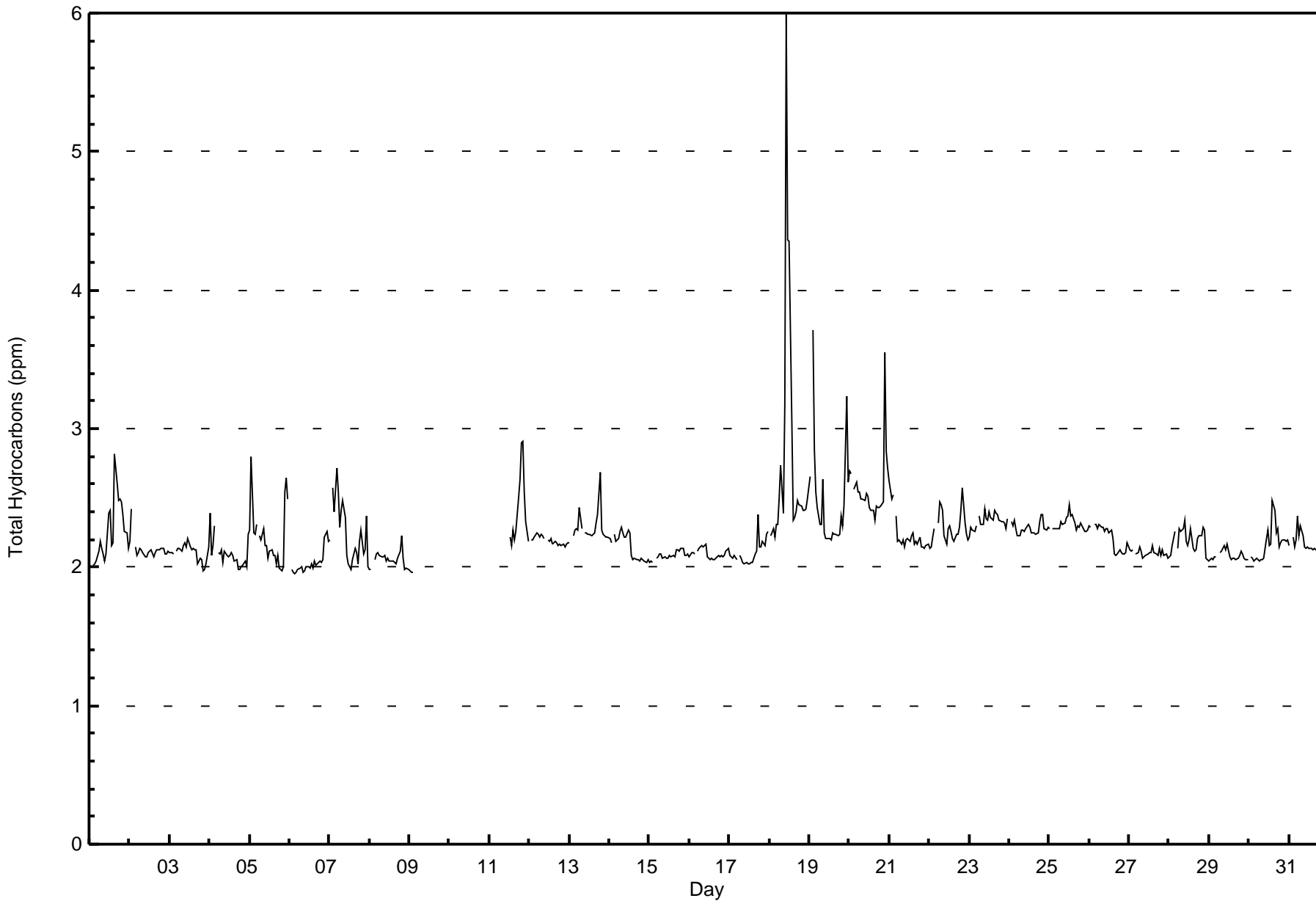
Total Number of Valid Hours: 561







Maximum Value: 6.0 ppm on Jan 18 11:00																				Maximum Daily Average: 2.8 ppm on Jan 18					Hours in Service: 744	
Minimum Value: 2.0 ppm on Jan 6 04:00																				Minimum Daily Average: 2.0 ppm on Jan 6					Hours of Data: 657	
Maximum Diurnal Average: 2.3 ppm at hour 11																				Minimum Diurnal Average: 2.2 ppm at hour 15					Hours of Missing Data: 87	
Monthly Average: 2.23 ppm																				Percentiles: P ₁ = 2.0 P ₁₀ = 2.0 Q ₁ = 2.1 Median = 2.2 Q ₃ = 2.3 P ₉₀ = 2.4 P ₉₉ = 3.2					Hours of Calibration: 33	
																									Percent Operational Time: 92.7	
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-Jan	2.1	Z	2.0	2.0	2.0	2.1	2.2	2.1	2.1	2.0	2.1	2.4	2.4	2.2	2.2	2.8	2.6	2.5	2.5	2.5	2.4	2.3	2.2	2.1	2.3	2.8
2-Jan	2.2	2.4	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	2.4
3-Jan	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.2
4-Jan	2.4	2.1	2.2	2.3	Z	2.1	2.1	2.1	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	2.0	2.2	2.1	2.4	
5-Jan	2.3	2.8	2.3	2.2	2.3	Z	2.2	2.2	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.5	2.6	2.5	2.2	2.8
6-Jan	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	2.3	2.2	2.0	2.3
7-Jan	2.2	Z	2.6	2.4	2.7	2.5	2.3	2.4	2.5	2.4	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.2	2.3	2.1	2.1	2.4	2.0	2.2	2.7
8-Jan	2.0	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.1	2.0	2.0	2.0	2.1	2.2
9-Jan	2.0	2.0	2.0	Z	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2.0
10-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
11-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	C	C	C	C	2.2	2.2	2.3	2.2	2.3	2.5	2.6	2.9	2.9	2.5	2.3	2.2	--
12-Jan	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	M	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2
13-Jan	2.2	Z	2.2	2.3	2.3	2.3	2.4	2.3	M	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.7	2.3	2.2	2.2	2.2	2.2	2.3	2.7
14-Jan	2.2	2.2	Z	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.0	2.0	2.1	2.1	2.3
15-Jan	2.0	2.0	2.0	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
16-Jan	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.2	2.1	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
17-Jan	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.4	2.1	2.1	2.2	2.2	2.2	2.3	2.1	2.4
18-Jan	Z	2.2	2.3	2.2	2.3	2.3	2.5	2.7	2.4	3.2	6.0	4.4	4.4	3.0	2.3	2.4	2.4	2.5	2.5	2.4	2.4	2.4	2.4	2.5	2.8	6.0
19-Jan	2.7	Z	3.7	2.8	2.5	2.4	2.3	2.3	2.6	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.3	2.4	3.2	2.6	3.7	
20-Jan	2.7	2.7	Z	2.6	2.6	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.3	2.4	2.4	2.4	2.4	2.5	3.6	2.8	2.7	3.6	
21-Jan	2.6	2.5	2.5	Z	2.4	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.6	
22-Jan	2.1	2.1	2.2	2.3	Z	2.3	2.5	2.4	2.4	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.4	2.6	2.3	2.2	2.2	2.6	
23-Jan	2.2	2.3	2.3	2.3	2.3	Z	2.4	2.3	2.3	2.4	2.3	2.3	2.4	2.4	2.3	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.4	
24-Jan	Z	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.4	2.4	2.3	2.3	2.3	2.4	
25-Jan	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	
26-Jan	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3
27-Jan	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	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
28-Jan	2.1	2.1	2.2	2.3	Z	2.1	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.1	2.0	2.2	2.3
29-Jan	2.0	2.1	2.1	2.1	2.1	Z	2.1	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	2.1	2.1	2.1	2.1	2.2
30-Jan	Z	2.1	2.1	2.0	2.1	2.1	2.0	2.1	2.1	2.1	2.2	2.3	2.2	2.2	2.5	2.4	2.3	2.3	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.5
31-Jan	2.2	Z	2.2	2.1	2.2	2.4	2.2	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.6	2.2	2.2	2.6
2.2																								Diurnal Average		
2.7																								Diurnal Maximum		
Z - zerospan			C - Calibration				M - Maintenance				AF - Analyzer Failure															





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Mannix - January 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	77	11.72	11.72
2.1 - 3.0	573	87.21	98.93
3.1 - 10.0	7	1.07	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 657

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Mannix - January 2017

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	8	0	1	0	0	0	3	16	3	7	15	13	5	0	0	2	73
2.1 - 3.0	24	27	3	1	0	6	29	143	30	19	19	54	31	8	13	29	436
3.1 - 10.0	1	0	0	0	1	0	1	0	0	0	0	1	0	1	1	0	6
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	33	27	4	1	1	6	33	159	33	26	34	68	36	9	14	31	515

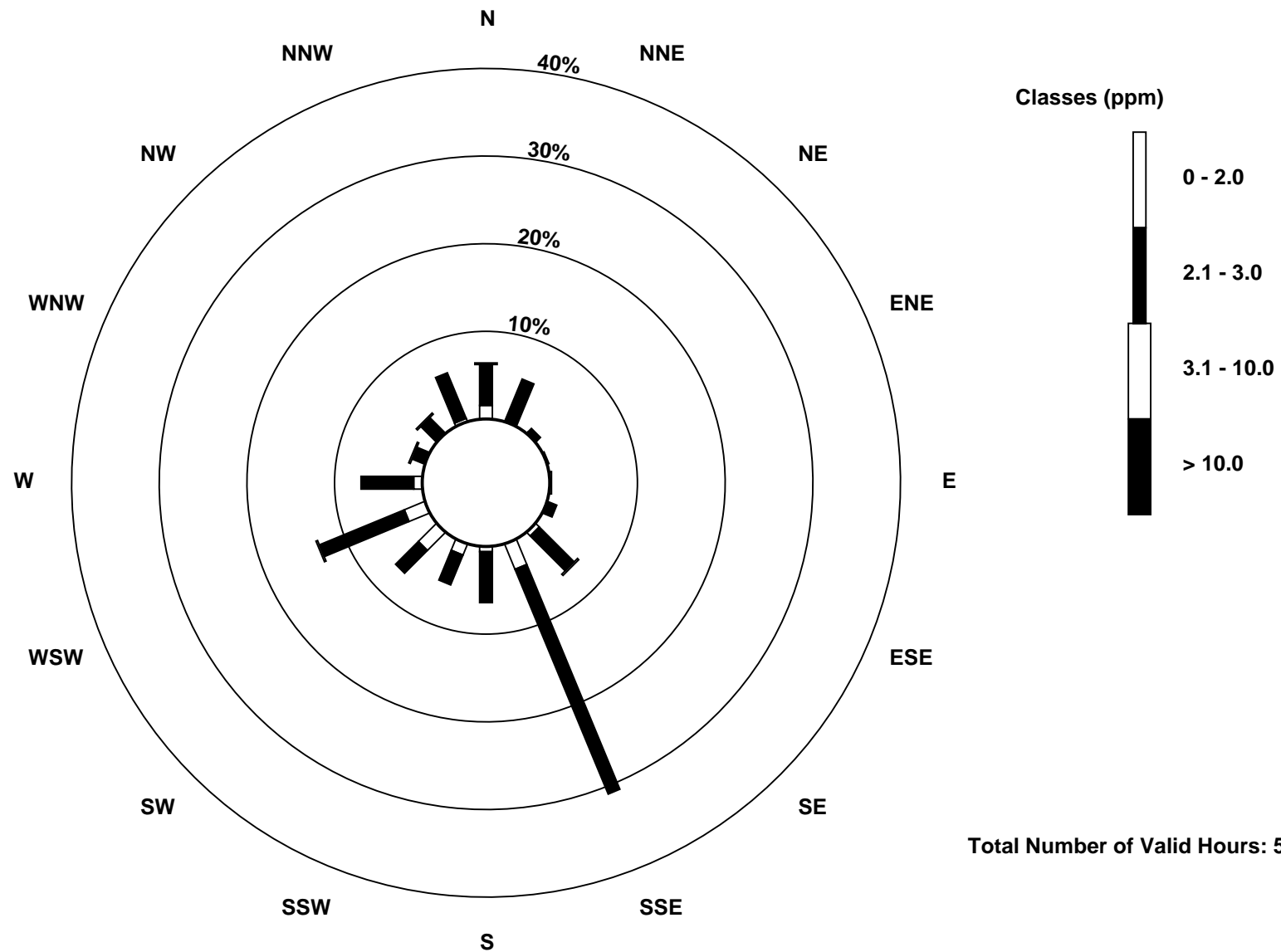
Total Number of Valid Hours: 515

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

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



Total Number of Valid Hours: 515

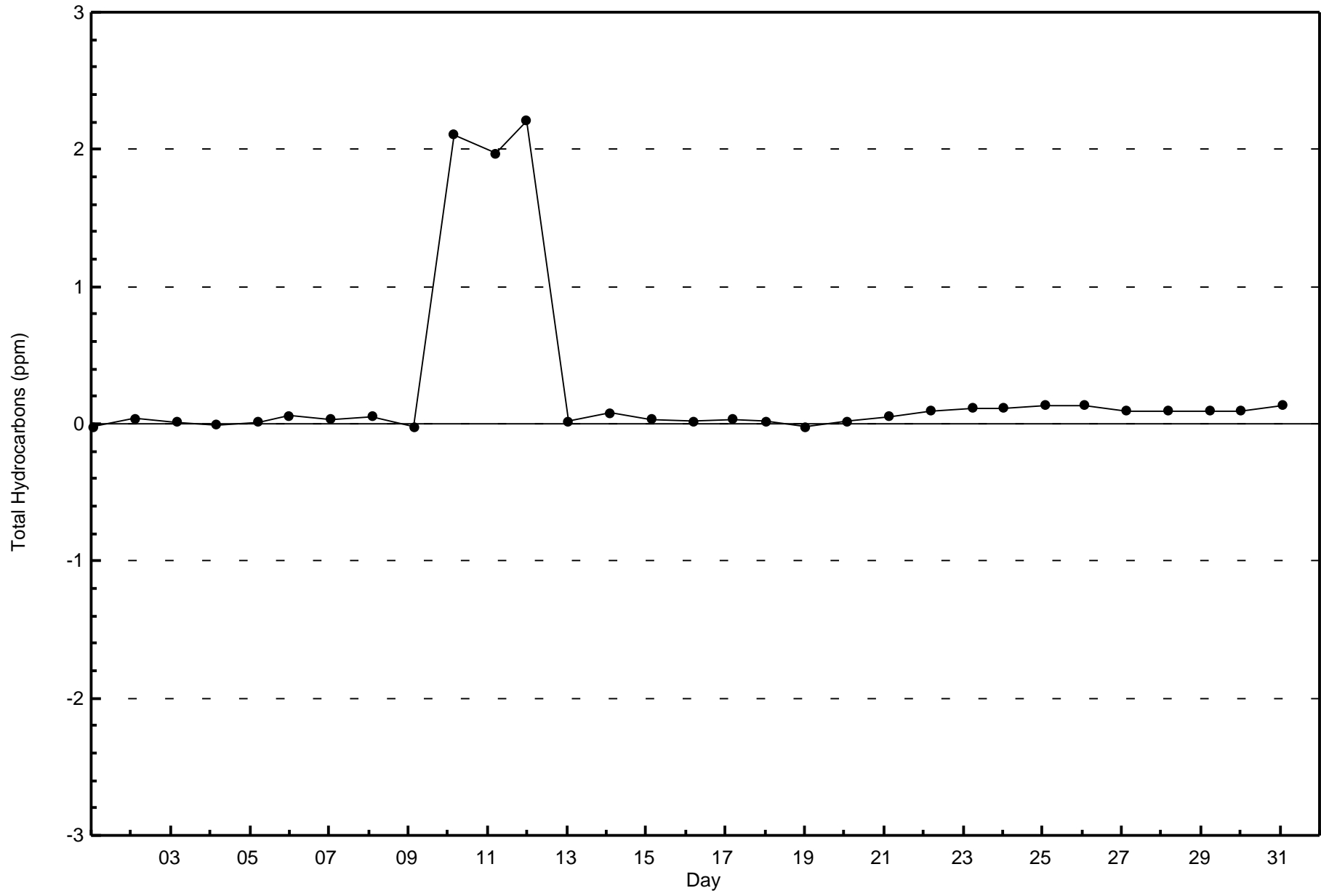


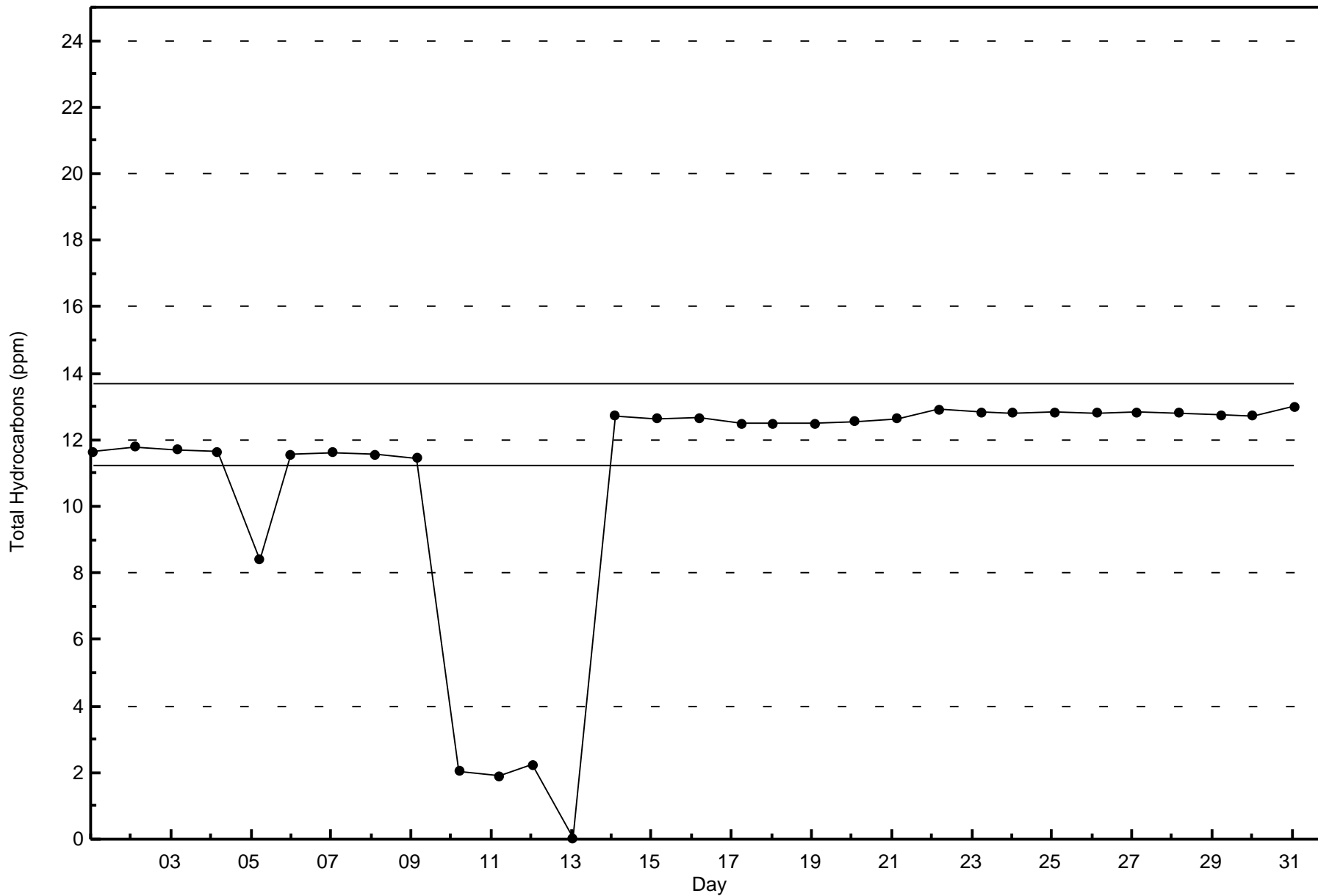
Wood Buffalo Environmental Association

Zero Responses

Total Hydrocarbons (THC) - ppm

Mannix - January 2017





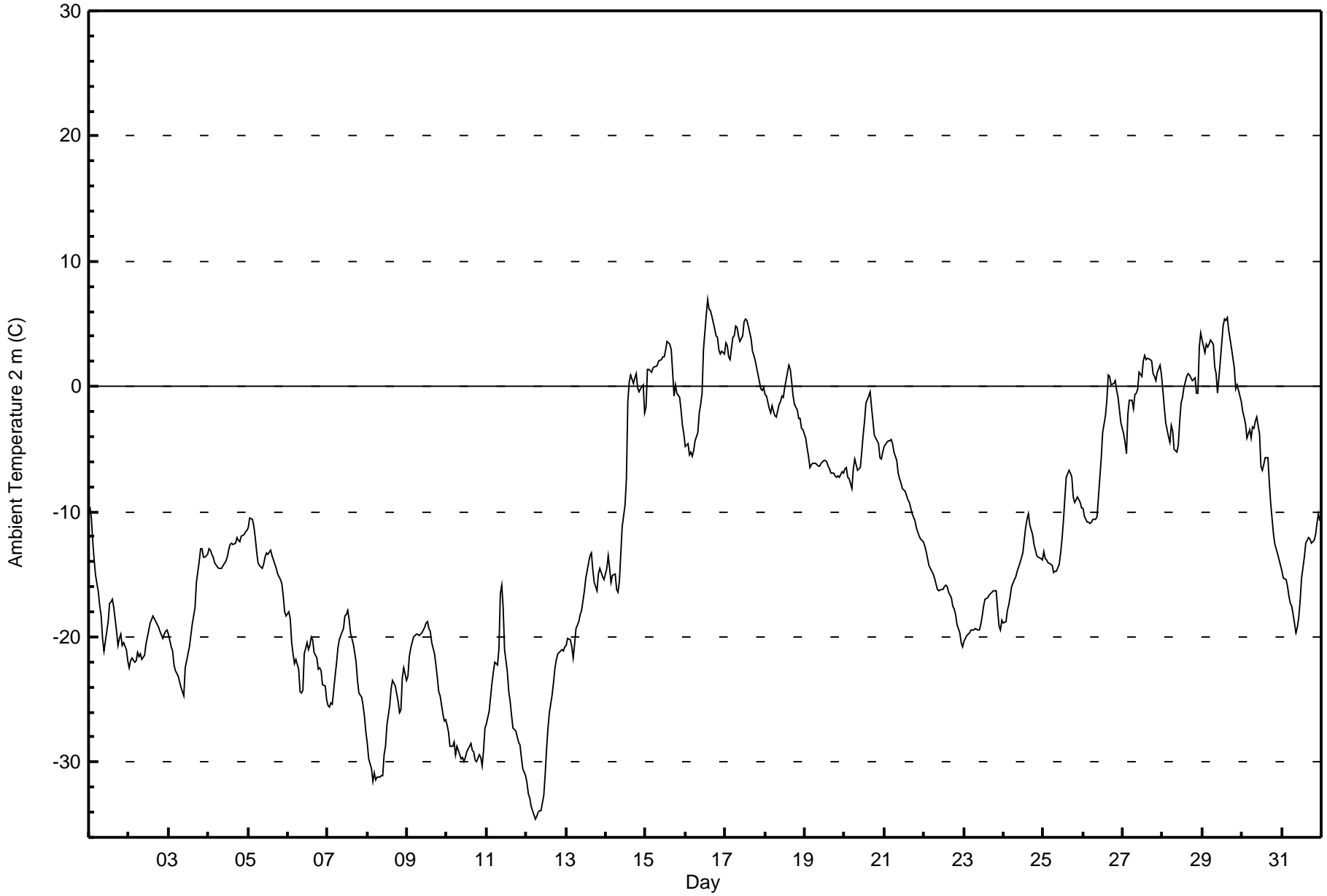


Maximum Value: 7.0 C on Jan 16 14:00 Maximum Daily Average: 3.1 C on Jan 17		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Minimum Value: -34.5 C on Jan 12 06:00 Maximum Diurnal Average: -10.3 C at hour 16 Monthly Average: -12.44 C		Minimum Daily Average: -29.0 C on Jan 10 Minimum Diurnal Average: -13.8 C at hour 8 Percentiles: P ₁ = -32.9 P ₁₀ = -25.4 Q ₁ = -20.1 Median = -13.5 Q ₃ = -3.5 P ₉₀ = 1.4 P ₉₉ = 5.3																								
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-Jan	-9.6	-10.5	-12.4	-13.9	-15.1	-16.5	-17.5	-18.4	-20.1	-21.1	-20.3	-18.7	-17.4	-17.2	-16.9	-17.7	-19.6	-20.6	-20.1	-19.8	-20.7	-20.4	-21.1	-21.9	-17.8	-9.6
2-Jan	-22.4	-21.9	-21.7	-22.1	-21.9	-21.2	-21.5	-21.3	-21.8	-21.4	-20.5	-20.0	-19.4	-18.9	-18.3	-18.5	-18.8	-19.0	-19.3	-19.6	-20.1	-19.8	-19.6	-19.5	-20.4	-18.3
3-Jan	-19.8	-20.8	-21.1	-22.3	-22.7	-22.9	-23.1	-24.0	-24.4	-24.7	-22.5	-21.8	-20.7	-19.9	-19.0	-18.3	-17.6	-15.6	-13.9	-13.0	-13.0	-13.6	-13.7	-13.4	-19.2	-13.0
4-Jan	-13.0	-13.1	-13.4	-13.7	-14.1	-14.4	-14.5	-14.6	-14.6	-14.3	-14.0	-13.6	-13.1	-12.6	-12.5	-12.6	-12.5	-12.0	-12.3	-12.4	-12.0	-11.9	-11.6	-11.5	-13.1	-11.5
5-Jan	-11.3	-10.5	-10.6	-11.1	-12.1	-13.1	-14.0	-14.4	-14.5	-14.2	-13.6	-13.3	-13.4	-13.0	-13.5	-13.8	-14.2	-14.6	-15.0	-15.4	-15.7	-16.7	-18.0	-18.3	-13.9	-10.5
6-Jan	-18.0	-18.5	-20.5	-21.4	-22.2	-21.8	-22.5	-24.4	-24.5	-24.3	-21.4	-20.5	-21.0	-20.7	-20.0	-20.2	-21.3	-21.6	-22.5	-22.5	-22.7	-23.8	-23.9	-25.0	-21.9	-18.0
7-Jan	-25.5	-25.6	-25.2	-25.4	-23.1	-22.2	-20.9	-20.2	-19.9	-19.3	-18.4	-18.2	-17.9	-18.5	-19.6	-20.6	-21.3	-22.0	-23.5	-24.5	-24.8	-25.5	-26.3	-27.7	-22.3	-17.9
8-Jan	-28.5	-29.7	-30.6	-31.5	-30.9	-31.4	-31.2	-31.2	-31.1	-31.1	-29.4	-28.8	-27.1	-25.5	-24.1	-23.5	-23.7	-23.9	-25.1	-26.0	-25.8	-23.3	-22.5	-23.5	-27.5	-22.5
9-Jan	-23.1	-21.6	-20.9	-20.4	-20.1	-19.8	-19.7	-19.9	-19.8	-19.6	-19.3	-18.9	-18.8	-19.3	-19.6	-20.4	-21.4	-22.2	-23.3	-24.3	-24.7	-26.2	-26.7	-26.6	-21.5	-18.8
10-Jan	-27.0	-27.6	-28.7	-28.7	-28.4	-29.4	-28.7	-29.0	-29.7	-29.6	-29.9	-29.6	-29.1	-28.9	-28.5	-29.0	-29.2	-29.9	-30.0	-29.4	-29.6	-30.3	-29.1	-27.2	-29.0	-27.0
11-Jan	-26.9	-25.9	-24.8	-23.7	-22.8	-22.0	-22.3	-20.9	-16.5	-15.9	-17.6	-21.0	-22.8	-24.4	-25.2	-26.3	-27.2	-27.5	-28.0	-28.4	-28.7	-29.6	-30.5	-31.1	-24.6	-15.9
12-Jan	-31.6	-32.5	-32.9	-33.5	-34.2	-34.5	-34.3	-34.0	-33.9	-33.9	-32.6	-30.9	-28.9	-27.3	-26.0	-24.6	-23.6	-22.5	-21.8	-21.4	-21.1	-21.0	-21.1	-20.7	-28.3	-20.7
13-Jan	-20.7	-20.1	-20.2	-20.8	-21.7	-20.6	-19.3	-18.8	-18.2	-17.9	-17.2	-16.3	-15.3	-14.1	-13.5	-13.3	-14.6	-15.7	-16.3	-15.0	-14.5	-14.9	-15.2	-15.5	-17.1	-13.3
14-Jan	-14.6	-13.5	-14.5	-15.7	-15.1	-14.9	-16.2	-16.5	-15.6	-13.3	-11.1	-9.5	-7.4	-1.2	0.3	0.9	0.2	0.6	1.0	-0.1	-0.4	-0.2	0.2	-2.1	-7.4	1.0
15-Jan	-1.7	1.3	1.4	1.2	1.5	1.6	1.6	1.7	2.1	2.2	2.4	2.4	2.9	3.6	3.4	2.9	1.2	-0.8	0.2	-0.5	-0.8	-1.9	-3.1	-3.8	0.9	3.6
16-Jan	-4.8	-4.5	-5.5	-5.2	-5.6	-5.1	-4.3	-3.6	-2.1	-1.5	-0.5	3.0	5.8	7.0	6.2	6.0	5.6	4.6	4.1	3.9	3.0	2.6	2.9	2.6	0.6	7.0
17-Jan	3.5	3.2	2.3	2.1	3.9	4.0	4.8	4.7	4.0	3.6	4.1	5.1	5.4	5.3	4.8	3.9	2.8	2.4	2.0	1.5	0.9	-0.2	-0.3	-0.1	3.1	5.4
18-Jan	-0.7	-0.8	-1.7	-2.1	-1.5	-2.0	-2.3	-2.5	-1.4	-1.2	-0.8	-0.8	-0.1	1.1	1.6	1.4	0.3	-0.7	-1.4	-1.9	-2.5	-2.6	-3.4	-3.4	-1.2	1.6
19-Jan	-4.1	-4.9	-5.5	-6.4	-6.3	-6.1	-6.2	-6.3	-6.4	-6.4	-6.1	-5.9	-5.9	-6.0	-6.3	-6.6	-6.9	-6.9	-7.1	-7.2	-7.2	-7.2	-6.8	-7.0	-6.3	-4.1
20-Jan	-6.6	-6.5	-7.2	-7.4	-8.1	-6.6	-5.9	-6.3	-6.7	-6.5	-5.2	-3.9	-2.7	-1.4	-0.8	-0.4	-1.7	-2.8	-3.9	-4.1	-4.5	-5.6	-5.9	-5.2	-4.8	-0.4
21-Jan	-4.8	-4.5	-4.4	-4.3	-4.2	-4.5	-5.2	-5.9	-6.9	-7.3	-7.6	-8.1	-8.4	-8.7	-9.0	-9.3	-9.8	-10.2	-10.7	-11.3	-11.6	-12.0	-12.2	-12.4	-8.0	-4.2
22-Jan	-12.8	-13.1	-13.8	-14.2	-14.6	-15.0	-15.4	-15.7	-16.2	-16.3	-16.2	-16.2	-16.0	-15.9	-16.0	-16.5	-16.9	-17.6	-17.8	-18.2	-19.0	-19.7	-20.4	-20.7	-16.4	-12.8
23-Jan	-20.3	-20.1	-19.8	-19.7	-19.5	-19.5	-19.5	-19.4	-19.5	-19.4	-18.9	-18.3	-17.6	-17.0	-16.8	-16.7	-16.5	-16.4	-16.3	-16.4	-17.7	-19.1	-19.4	-18.7	-18.4	-16.3
24-Jan	-18.9	-18.8	-17.9	-17.4	-16.8	-16.0	-15.4	-15.2	-14.8	-14.4	-14.0	-13.3	-12.2	-11.3	-10.6	-10.2	-11.0	-11.8	-12.7	-13.0	-13.5	-13.6	-13.7	-13.8	-14.2	-10.2
25-Jan	-13.1	-13.7	-13.9	-14.1	-14.2	-14.3	-14.9	-14.8	-14.8	-14.2	-13.3	-12.2	-10.7	-8.9	-7.3	-6.7	-6.9	-7.3	-8.8	-9.2	-8.8	-9.1	-9.3	-9.8	-11.3	-6.7
26-Jan	-9.7	-10.4	-10.8	-10.8	-11.0	-10.8	-10.6	-10.6	-10.4	-8.8	-7.3	-5.7	-3.7	-2.4	-1.1	0.9	0.8	0.1	0.3	0.4	-0.3	-0.9	-1.9	-2.9	-5.3	0.9
27-Jan	-3.7	-4.5	-5.4	-2.2	-1.1	-1.1	-1.8	-0.6	-0.6	-0.2	1.1	0.8	2.1	2.5	2.2	2.3	2.2	2.0	1.1	0.8	0.4	1.1	1.7	0.9	0.0	2.5
28-Jan	-0.3	-1.7	-2.9	-4.0	-4.4	-3.1	-3.6	-5.0	-5.3	-4.7	-2.7	-1.3	-0.8	-0.1	0.9	1.1	0.9	0.7	0.4	0.7	-0.6	-0.6	3.1	4.2	-1.2	4.2
29-Jan	3.7	2.7	3.4	3.1	3.4	3.7	3.4	1.6	1.1	-0.6	0.7	2.1	4.9	5.4	5.3	5.5	4.5	3.1	2.3	1.4	-0.2	0.2	-0.3	-1.2	2.5	5.5
30-Jan	-1.9	-2.5	-3.0	-4.1	-3.5	-4.1	-3.2	-3.4	-2.8	-2.5	-3.8	-6.4	-6.7	-6.3	-5.7	-5.7	-7.7	-9.4	-10.6	-11.8	-12.6	-13.4	-13.8	-14.3	-6.6	-1.9
31-Jan	-14.7	-15.3	-15.4	-16.0	-16.8	-17.4	-17.5	-18.2	-19.7	-19.3	-18.5	-17.0	-15.3	-13.7	-12.5	-12.2	-12.1	-12.2	-12.5	-12.3	-11.8	-11.0	-10.2	-10.7	-14.7	-10.2
	-13.0	-13.1	-13.5	-13.7	-13.6	-13.6	-13.6	-13.8	-13.7	-13.5	-12.7	-12.2	-11.3	-10.6	-10.3	-10.3	-10.8	-11.3	-11.7	-11.9	-12.3	-12.6	-12.6	-12.9	Diurnal Average	
	3.7	3.2	3.4	3.1	3.9	4.0	4.8	4.7	4.0	3.6	4.1	5.1	5.8	7.0	6.2	6.0	5.6	4.6	4.1	3.9	3.0	2.6	3.1	4.2	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 2 m (AT2m) - C
Mannix - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 2 m (AT2m) - C
Mannix - January 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	190	25.54	25.54
-20 - 0	446	59.95	85.48
0 - 10	108	14.52	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

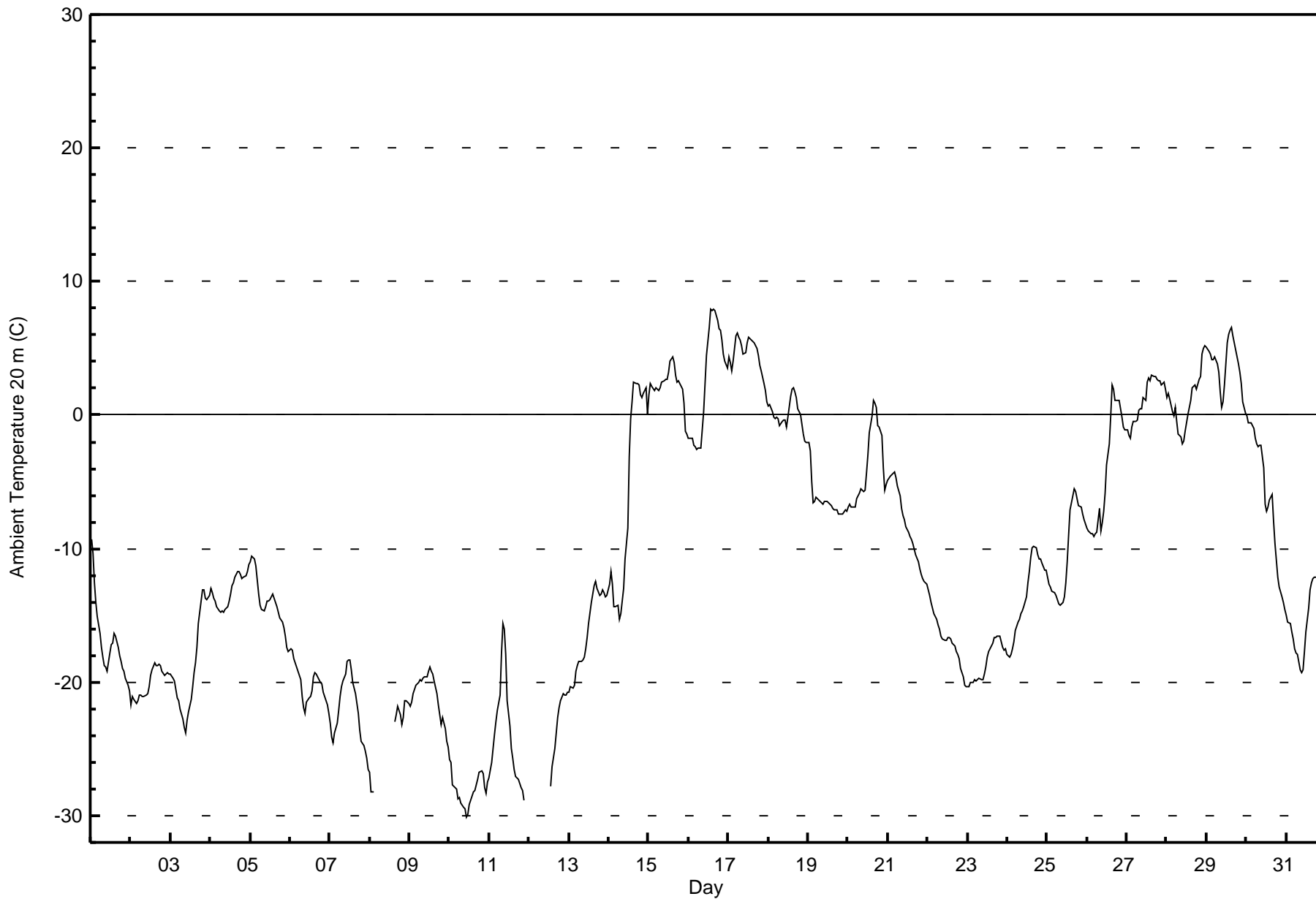


Maximum Value: 8.0 C on Jan 16 14:00 Maximum Daily Average: 4.5 C on Jan 17		Hours in Service: 744 Hours of Data: 717 Hours of Missing Data: 27 Hours of Calibration: 0 Percent Operational Time: 96.4																									
Minimum Value: -30.2 C on Jan 10 11:00 Maximum Diurnal Average: -9.7 C at hour 15 Monthly Average: -10.98 C		Minimum Daily Average: -28.1 C on Jan 10 Minimum Diurnal Average: -11.8 C at hour 3 Percentiles: P ₁ = -28.8 P ₁₀ = -22.4 Q ₁ = -19.2 Median = -12.9 Q ₃ = -1.1 P ₉₀ = 2.5 P ₉₉ = 6.5																									
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-Jan	-9.3	-10.4	-12.5	-14.0	-15.1	-16.4	-17.4	-18.1	-18.8	-18.9	-19.2	-17.8	-17.2	-17.1	-16.3	-16.5	-17.4	-18.0	-18.5	-19.0	-19.2	-19.7	-20.3	-20.7	-17.0	-9.3	
2-Jan	-21.7	-21.0	-21.3	-21.6	-21.4	-21.0	-21.0	-21.0	-21.1	-21.0	-20.9	-20.4	-19.5	-19.1	-18.6	-18.7	-18.8	-18.7	-18.8	-19.2	-19.5	-19.4	-19.2	-19.3	-20.1	-18.6	
3-Jan	-19.4	-19.7	-19.9	-20.5	-21.1	-21.4	-22.1	-22.8	-23.4	-23.8	-22.9	-22.2	-21.2	-20.3	-19.3	-18.6	-17.4	-15.6	-13.9	-13.0	-13.1	-13.7	-13.8	-13.5	-18.9	-13.0	
4-Jan	-13.0	-13.3	-13.7	-13.9	-14.4	-14.6	-14.7	-14.7	-14.7	-14.5	-14.3	-14.0	-13.4	-12.8	-12.5	-12.1	-11.7	-11.7	-12.0	-12.2	-12.1	-12.0	-11.7	-11.2	-13.1	-11.2	
5-Jan	-10.9	-10.6	-10.7	-11.3	-12.3	-13.4	-14.3	-14.6	-14.6	-14.4	-13.9	-13.9	-13.8	-13.4	-13.8	-14.0	-14.4	-14.7	-15.1	-15.6	-16.0	-16.6	-17.4	-17.7	-14.1	-10.6	
6-Jan	-17.5	-17.6	-18.2	-18.6	-18.9	-19.2	-19.8	-21.1	-22.0	-22.4	-21.4	-21.2	-21.0	-20.6	-19.6	-19.3	-19.4	-19.8	-20.0	-20.1	-20.7	-21.1	-21.7	-22.4	-20.1	-17.5	
7-Jan	-23.1	-24.1	-24.5	-23.8	-23.1	-22.1	-21.0	-20.3	-19.9	-19.4	-18.5	-18.3	-18.4	-19.1	-20.0	-20.9	-21.6	-22.3	-23.6	-24.5	-24.8	-25.1	-25.7	-26.6	-22.1	-18.3	
8-Jan	-26.7	-28.2	-28.2	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	-23.0	-22.4	-21.8	-22.4	-23.2	-22.7	-21.3	-21.4	-21.6	--	-21.3	
9-Jan	-21.8	-21.5	-20.9	-20.5	-20.2	-20.0	-19.8	-19.9	-19.8	-19.6	-19.6	-19.1	-18.9	-19.2	-19.4	-19.9	-20.9	-21.7	-22.4	-23.1	-22.7	-23.5	-24.4	-24.9	-21.0	-18.9	
10-Jan	-25.8	-26.1	-27.7	-27.9	-28.0	-28.7	-28.7	-29.1	-29.3	-29.5	-30.2	-29.9	-29.1	-28.8	-28.2	-28.1	-27.7	-27.3	-26.7	-26.7	-26.9	-28.0	-28.3	-27.5	-28.1	-25.8	
11-Jan	-27.1	-26.0	-25.0	-23.9	-23.0	-22.2	-20.9	-17.8	-15.6	-16.0	-17.9	-21.4	-23.3	-24.9	-25.7	-26.5	-27.1	-27.3	-27.6	-28.0	-28.1	-28.9	AF	AF	-23.8	-15.6	
12-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	-27.8	-26.3	-24.9	-23.8	-22.6	-22.0	-21.4	-20.9	-20.9	-21.0	-20.7	--	-20.7	
13-Jan	-20.7	-20.3	-20.4	-20.2	-19.2	-18.8	-18.4	-18.4	-18.4	-18.1	-17.5	-16.6	-15.6	-14.0	-13.4	-12.8	-12.4	-13.0	-13.5	-13.4	-13.1	-13.3	-13.6	-13.5	-16.2	-12.4	
14-Jan	-12.7	-11.7	-12.7	-14.3	-14.3	-14.3	-15.3	-14.9	-13.9	-13.0	-10.8	-8.5	-3.1	-0.3	1.0	2.5	2.3	2.4	2.2	1.5	1.3	1.6	2.0	0.1	-5.9	2.5	
15-Jan	1.5	2.4	2.2	1.9	2.0	2.0	1.8	2.0	2.5	2.5	2.7	2.7	3.2	4.1	4.3	3.9	3.0	2.5	2.6	2.3	1.9	0.9	-1.2	-1.4	2.2	4.3	
16-Jan	-1.7	-1.7	-1.7	-2.3	-2.4	-2.5	-2.4	-2.4	-1.1	0.2	2.4	4.5	6.6	8.0	7.8	7.9	7.8	7.1	6.5	6.4	5.6	4.6	4.1	3.5	2.7	8.0	
17-Jan	4.4	3.9	3.3	4.1	6.0	6.2	5.8	5.6	5.2	4.6	4.6	5.4	5.8	5.7	5.6	5.5	5.2	5.0	4.4	3.7	3.3	2.3	1.8	1.0	4.5	6.2	
18-Jan	0.7	0.8	0.2	-0.2	-0.2	-0.1	-0.2	-0.8	-0.5	-0.4	-0.3	-0.9	-0.2	1.4	1.9	2.1	1.7	1.3	0.5	0.1	-0.7	-1.4	-2.0	-2.1	0.0	2.1	
19-Jan	-2.0	-2.6	-4.9	-6.6	-6.4	-6.2	-6.3	-6.4	-6.5	-6.7	-6.5	-6.4	-6.5	-6.6	-6.8	-7.0	-7.1	-7.1	-7.4	-7.4	-7.4	-7.4	-7.1	-7.2	-6.4	-2.0	
20-Jan	-6.9	-6.7	-6.9	-6.9	-6.9	-6.2	-6.0	-5.8	-5.5	-5.7	-5.6	-4.4	-3.0	-1.4	-0.1	1.1	0.9	0.6	-0.8	-0.9	-1.5	-4.0	-5.7	-5.2	-3.9	1.1	
21-Jan	-4.8	-4.6	-4.5	-4.4	-4.3	-4.7	-5.3	-6.0	-7.0	-7.5	-7.9	-8.4	-8.8	-9.1	-9.3	-9.6	-10.0	-10.5	-11.0	-11.5	-11.9	-12.3	-12.5	-12.7	-8.3	-4.3	
22-Jan	-13.1	-13.5	-14.1	-14.5	-14.8	-15.3	-15.7	-16.0	-16.6	-16.7	-16.8	-16.8	-16.7	-16.6	-16.7	-17.1	-17.3	-17.7	-17.9	-18.2	-18.9	-19.6	-20.2	-20.3	-16.7	-13.1	
23-Jan	-20.3	-20.3	-20.0	-20.0	-19.8	-19.9	-19.8	-19.7	-19.8	-19.8	-19.4	-18.9	-18.2	-17.7	-17.3	-17.0	-16.7	-16.6	-16.5	-16.5	-17.0	-17.4	-17.6	-17.5	-18.5	-16.5	
24-Jan	-17.9	-18.2	-17.9	-17.5	-16.9	-16.1	-15.5	-15.3	-14.9	-14.6	-14.3	-13.6	-12.6	-11.7	-10.7	-10.0	-9.8	-9.9	-10.4	-10.8	-10.8	-11.1	-11.6	-11.6	-13.5	-9.8	
25-Jan	-12.1	-12.7	-12.9	-13.2	-13.3	-13.5	-13.9	-14.2	-14.2	-14.0	-13.6	-12.6	-11.0	-8.9	-7.1	-6.1	-5.5	-5.7	-6.3	-6.8	-6.9	-7.4	-7.8	-8.1	-10.3	-5.5	
26-Jan	-8.4	-8.7	-8.8	-8.9	-9.1	-8.9	-8.7	-6.9	-8.7	-8.1	-7.2	-5.8	-3.7	-2.1	-0.1	2.2	1.9	1.1	1.1	1.1	0.5	-0.2	-0.9	-1.1	-4.1	2.2	
27-Jan	-1.1	-1.5	-1.7	-0.9	-0.5	-0.5	-0.3	0.4	0.5	0.4	1.4	1.1	2.5	2.8	2.6	2.9	2.9	2.8	2.7	2.5	2.5	2.2	2.5	1.9	1.2	2.9	
28-Jan	1.3	1.6	1.2	0.3	0.0	0.6	-0.4	-1.4	-1.7	-2.2	-1.9	-1.2	-0.6	0.0	1.1	2.0	2.2	2.3	1.9	2.6	2.9	4.5	5.0	5.2	1.1	5.2	
29-Jan	5.1	4.8	4.5	4.1	4.1	4.3	3.8	3.2	1.8	0.6	1.0	2.3	5.4	6.0	6.3	6.6	5.9	4.8	4.4	3.8	3.2	2.4	1.0	0.2	3.7	6.6	
30-Jan	0.0	-0.6	-0.6	-0.6	-1.0	-1.8	-2.1	-2.4	-2.2	-2.3	-4.0	-6.7	-7.2	-6.9	-6.4	-6.0	-8.0	-9.6	-10.8	-12.1	-12.9	-13.6	-14.0	-14.6	-6.1	0.0	
31-Jan	-15.0	-15.5	-15.7	-16.2	-16.8	-17.5	-17.8	-17.9	-19.1	-19.3	-19.1	-17.7	-16.2	-14.4	-13.1	-12.5	-12.2	-12.1	-12.2	-12.2	-11.8	-10.8	-10.1	-10.8	-14.8	-10.1	
	-11.3	-11.4	-11.8	-11.5	-11.4	-11.5	-11.6	-11.6	-11.7	-11.7	-11.4	-11.1	-10.2	-10.2	-9.7	-9.8	-9.9	-10.1	-10.4	-10.7	-10.9	-11.3	-11.1	-11.3	Diurnal Average		
	5.1	4.8	4.5	4.1	6.0	6.2	5.8	5.6	5.2	4.6	4.6	5.4	6.6	8.0	7.8	7.9	7.8	7.1	6.5	6.4	5.6	4.6	5.0	5.2	Diurnal Maximum		
AF - Analyzer Failure																											



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 20 m (AT20m) - C
Mannix - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 20 m (AT20m) - C
Mannix - January 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	143	19.94	19.94
-20 - 0	427	59.55	79.50
0 - 10	147	20.50	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 717

Total Number of Hours: 744



Summary of Hour Averages

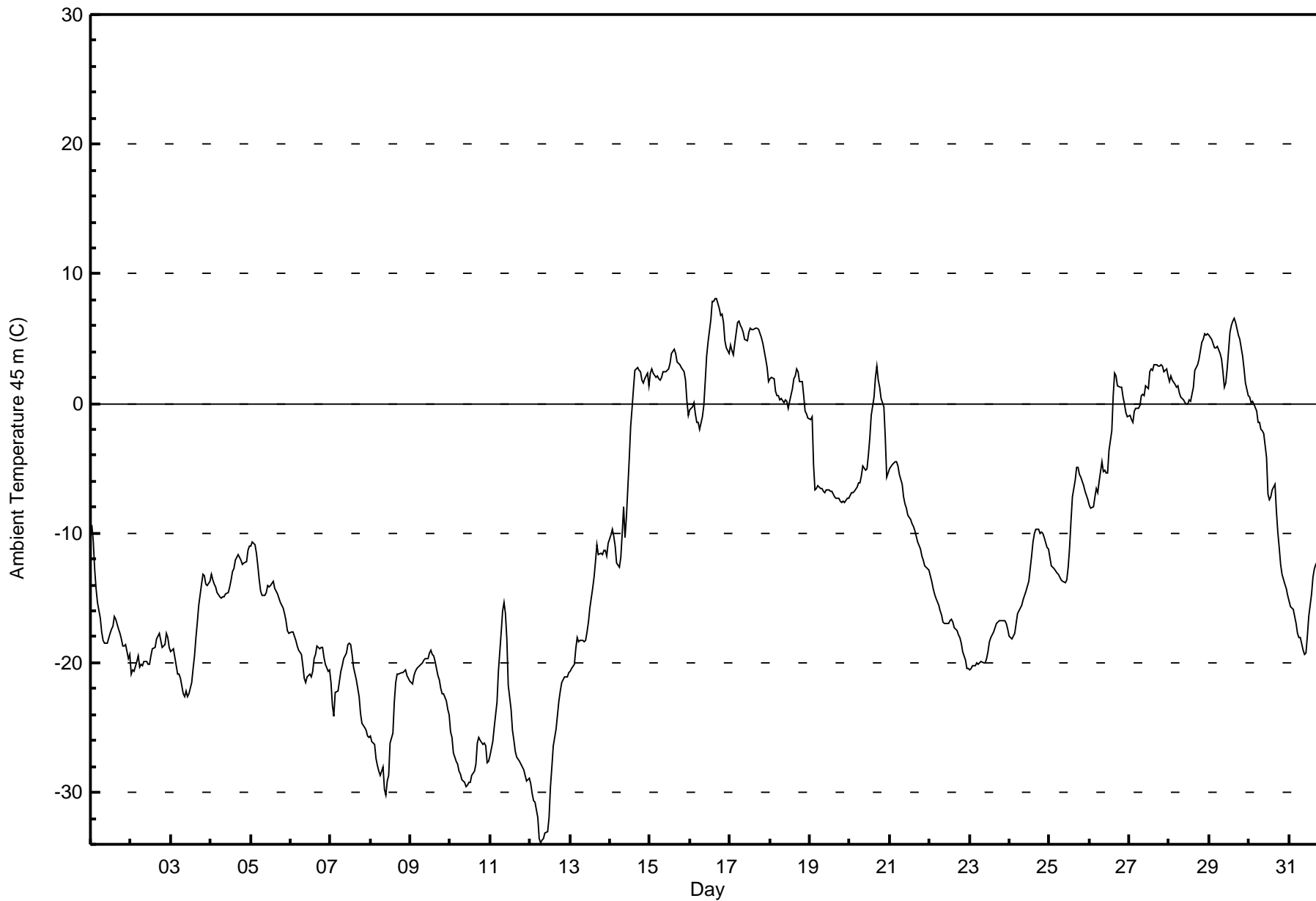
Mannix - January 2017

Maximum Value: 8.1 C on Jan 16 16:00		Maximum Daily Average: 5.0 C on Jan 17		Hours in Service: 744																						
Minimum Value: -33.9 C on Jan 12 07:00		Minimum Daily Average: -27.9 C on Jan 12		Hours of Data: 744																						
Maximum Diurnal Average: -9.6 C at hour 17		Minimum Diurnal Average: -12.6 C at hour 10		Hours of Missing Data: 0																						
Monthly Average: -11.33 C		Percentiles: P ₁ = -32.0 P ₁₀ = -24.1 Q ₁ = -19.5 Median = -12.8 Q ₃ = -0.7 P ₉₀ = 2.8 P ₉₉ = 6.6		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-Jan	-9.4	-10.6	-12.8	-14.2	-15.3	-16.6	-17.6	-18.2	-18.5	-18.5	-18.5	-17.7	-17.4	-17.2	-16.5	-16.7	-17.3	-17.8	-18.2	-18.7	-18.7	-18.6	-19.7	-19.3	-16.8	-9.4
2-Jan	-20.9	-20.6	-20.7	-19.9	-19.5	-20.3	-20.1	-20.3	-19.9	-19.9	-20.2	-20.1	-19.4	-18.9	-18.8	-18.1	-18.0	-17.7	-18.3	-18.9	-18.7	-17.7	-18.1	-18.8	-19.3	-17.7
3-Jan	-19.1	-18.9	-19.6	-20.2	-20.8	-20.8	-21.2	-22.4	-22.6	-22.1	-22.6	-22.4	-21.5	-20.5	-19.5	-18.1	-16.9	-15.6	-14.0	-13.2	-13.3	-13.9	-14.0	-13.7	-18.6	-13.2
4-Jan	-13.2	-13.6	-13.9	-14.2	-14.6	-14.9	-15.0	-14.9	-14.9	-14.7	-14.6	-14.1	-13.6	-13.0	-12.7	-12.1	-11.6	-11.9	-12.1	-12.4	-12.4	-12.2	-11.4	-11.0	-13.3	-11.0
5-Jan	-11.0	-10.6	-10.9	-11.5	-12.5	-13.6	-14.5	-14.8	-14.8	-14.6	-14.1	-14.1	-14.0	-13.7	-14.2	-14.5	-14.7	-15.0	-15.4	-15.8	-16.2	-16.7	-17.5	-17.7	-14.3	-10.6
6-Jan	-17.6	-17.6	-17.9	-18.3	-18.7	-19.0	-19.3	-20.3	-21.3	-21.5	-21.1	-20.9	-21.1	-20.7	-19.7	-19.3	-18.7	-18.9	-18.8	-18.8	-19.6	-20.2	-20.6	-20.5	-19.6	-17.6
7-Jan	-21.6	-23.2	-24.2	-22.3	-22.2	-21.5	-20.7	-20.2	-19.7	-19.3	-18.6	-18.5	-18.6	-19.3	-20.3	-21.3	-22.0	-22.6	-23.9	-24.7	-25.0	-25.2	-25.7	-25.8	-21.9	-18.5
8-Jan	-25.7	-26.0	-26.3	-27.4	-27.9	-28.3	-28.7	-28.0	-29.8	-30.2	-29.2	-28.6	-26.2	-25.4	-23.0	-21.6	-20.9	-20.8	-20.7	-20.8	-20.7	-20.6	-21.0	-21.4	-25.0	-20.6
9-Jan	-21.6	-21.7	-21.0	-20.6	-20.4	-20.2	-20.1	-20.0	-19.8	-19.7	-19.7	-19.2	-19.1	-19.4	-19.5	-19.9	-20.9	-21.3	-22.0	-22.4	-22.4	-22.9	-23.6	-24.1	-20.9	-19.1
10-Jan	-25.3	-25.7	-26.9	-27.6	-27.8	-28.4	-28.6	-29.0	-29.2	-29.6	-29.4	-29.2	-29.3	-28.7	-28.4	-27.8	-26.2	-25.8	-26.0	-26.3	-26.2	-26.4	-27.7	-27.6	-27.6	-25.3
11-Jan	-27.2	-26.1	-25.0	-24.1	-23.0	-20.7	-17.6	-16.0	-15.3	-16.2	-18.2	-21.7	-23.6	-25.2	-26.0	-26.8	-27.3	-27.5	-27.8	-28.0	-28.2	-28.6	-29.1	-28.9	-24.1	-15.3
12-Jan	-29.3	-30.1	-30.7	-30.7	-31.9	-33.5	-33.9	-33.7	-33.5	-33.1	-33.0	-31.9	-29.6	-28.1	-26.4	-25.1	-24.0	-22.9	-22.2	-21.5	-21.1	-21.1	-21.1	-20.8	-27.9	-20.8
13-Jan	-20.7	-20.4	-20.2	-19.0	-18.1	-18.4	-18.3	-18.3	-18.4	-18.3	-17.6	-16.8	-15.8	-14.2	-13.4	-12.2	-10.9	-11.6	-11.5	-11.7	-11.3	-11.4	-11.8	-10.8	-15.5	-10.8
14-Jan	-10.1	-9.7	-10.2	-11.0	-12.3	-12.7	-11.8	-10.0	-8.0	-10.3	-8.8	-4.3	-1.8	-0.3	1.1	2.6	2.7	2.5	2.4	1.8	1.6	1.9	2.4	1.3	-4.2	2.7
15-Jan	2.4	2.6	2.3	2.1	2.1	1.9	1.8	2.0	2.4	2.5	2.6	2.7	3.1	3.8	4.2	3.9	3.2	3.1	3.0	2.7	2.4	1.8	0.2	-0.9	2.4	4.2
16-Jan	-0.5	-0.3	0.1	-0.8	-1.5	-1.5	-2.0	-1.0	-0.2	1.7	3.6	4.7	6.5	7.9	7.9	8.1	8.1	7.3	6.8	6.9	6.2	4.8	4.2	3.8	3.4	8.1
17-Jan	4.5	4.1	3.7	4.6	6.2	6.3	6.0	5.8	5.5	4.9	4.8	5.4	5.8	5.7	5.7	5.8	5.8	5.7	5.4	5.0	4.6	3.4	2.8	1.7	5.0	6.3
18-Jan	1.9	2.1	1.9	0.9	0.6	0.6	0.3	0.4	0.0	0.2	0.2	-0.3	0.2	1.2	1.9	2.1	2.7	2.4	1.6	1.7	0.6	-0.6	-0.8	-1.1	0.9	2.7
19-Jan	-1.2	-1.0	-4.8	-6.7	-6.6	-6.3	-6.5	-6.6	-6.7	-6.9	-6.7	-6.6	-6.7	-6.8	-7.0	-7.2	-7.3	-7.3	-7.6	-7.6	-7.6	-7.6	-7.3	-7.3	-6.4	-1.0
20-Jan	-7.1	-6.9	-6.9	-6.8	-6.4	-6.1	-6.1	-5.6	-4.8	-5.2	-5.0	-4.0	-2.6	-0.9	0.5	2.0	2.8	1.8	1.2	0.4	-0.3	-2.7	-5.7	-5.4	-3.3	2.8
21-Jan	-5.0	-4.7	-4.6	-4.5	-4.5	-4.9	-5.5	-6.2	-7.2	-7.7	-8.1	-8.6	-9.0	-9.3	-9.5	-9.8	-10.2	-10.7	-11.2	-11.7	-12.1	-12.5	-12.7	-12.9	-8.5	-4.5
22-Jan	-13.3	-13.7	-14.3	-14.7	-15.1	-15.5	-15.9	-16.3	-16.8	-17.0	-17.0	-17.0	-16.7	-16.7	-16.9	-17.3	-17.5	-17.9	-18.1	-18.4	-19.1	-19.8	-20.4	-20.4	-16.9	-13.3
23-Jan	-20.5	-20.5	-20.2	-20.2	-20.0	-20.1	-20.1	-19.9	-20.0	-20.0	-19.7	-19.1	-18.4	-18.1	-17.6	-17.2	-16.9	-16.8	-16.8	-16.7	-16.8	-16.8	-17.0	-17.4	-18.6	-16.7
24-Jan	-17.9	-18.2	-18.0	-17.7	-17.0	-16.3	-15.7	-15.5	-15.1	-14.8	-14.5	-13.7	-12.7	-11.8	-10.7	-10.0	-9.7	-9.7	-10.0	-10.0	-10.0	-10.4	-11.1	-11.2	-13.4	-9.7
25-Jan	-11.9	-12.5	-12.6	-12.8	-13.0	-13.1	-13.4	-13.7	-13.7	-13.8	-13.6	-12.7	-11.1	-9.1	-7.2	-5.9	-5.0	-5.0	-5.5	-5.7	-6.3	-6.8	-7.1	-7.4	-10.0	-5.0
26-Jan	-7.8	-8.0	-7.9	-7.3	-6.5	-6.9	-6.0	-4.5	-5.2	-5.2	-5.3	-5.3	-3.7	-2.1	0.6	2.3	2.1	1.3	1.3	1.2	0.5	0.0	-0.6	-1.0	-3.1	2.3
27-Jan	-0.9	-1.3	-1.5	-0.6	-0.4	-0.3	-0.2	0.6	0.7	0.6	1.3	1.1	2.5	2.7	2.5	2.9	3.0	2.9	2.9	3.0	2.9	2.5	2.7	2.2	1.3	3.0
28-Jan	1.7	2.1	1.8	1.5	1.3	1.4	0.9	0.5	0.3	0.0	0.0	0.0	0.3	0.2	1.2	2.5	2.8	2.9	3.4	4.7	5.0	5.4	5.3	5.4	2.1	5.4
29-Jan	5.3	5.0	4.6	4.3	4.2	4.4	3.8	3.4	2.5	1.3	1.5	2.7	5.5	6.0	6.3	6.5	6.2	5.2	5.0	4.2	3.6	2.7	1.5	0.7	4.0	6.5
30-Jan	0.5	0.1	0.1	0.0	-0.6	-1.5	-1.5	-2.0	-2.1	-2.3	-4.2	-7.0	-7.4	-7.2	-6.7	-6.2	-8.2	-9.9	-11.1	-12.4	-13.1	-13.9	-14.3	-14.8	-6.1	0.5
31-Jan	-15.2	-15.7	-15.9	-16.5	-17.0	-17.7	-18.0	-18.1	-19.0	-19.4	-19.3	-17.9	-16.4	-14.7	-13.4	-12.8	-12.4	-12.2	-12.1	-12.2	-11.9	-10.9	-10.3	-11.0	-15.0	-10.3
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 45 m (AT45m) - C
Mannix - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 45 m (AT45m) - C
Mannix - January 2017**

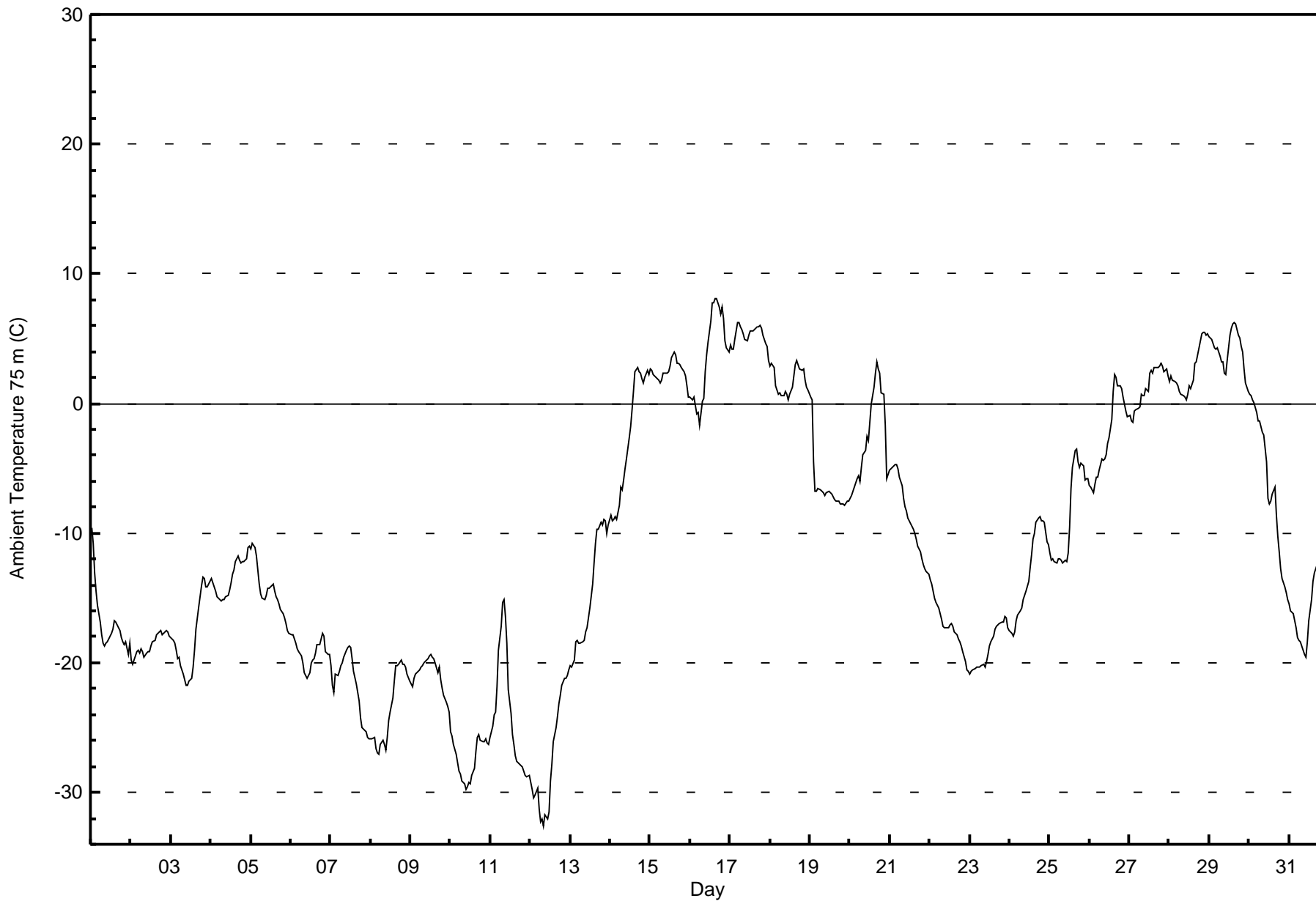
Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	168	22.58	22.58
-20 - 0	404	54.30	76.88
0 - 10	172	23.12	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Value: 8.1 C on Jan 16 17:00		Maximum Daily Average: 5.3 C on Jan 17		Hours in Service: 744																						
Minimum Value: -32.6 C on Jan 12 09:00		Minimum Daily Average: -27.4 C on Jan 10		Hours of Data: 744																						
Maximum Diurnal Average: -9.5 C at hour 17		Minimum Diurnal Average: -12.0 C at hour 9		Hours of Missing Data: 0																						
Monthly Average: -11.01 C		Percentiles: P ₁ = -30.5 P ₁₀ = -23.8 Q ₁ = -19.2 Median = -12.8 Q ₃ = 0.1 P ₉₀ = 3.0 P ₉₉ = 6.4		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-Jan	-9.6	-10.8	-13.1	-14.5	-15.6	-16.9	-17.9	-18.5	-18.7	-18.5	-18.4	-18.0	-17.7	-17.4	-16.7	-16.9	-17.3	-17.5	-18.1	-18.4	-18.6	-18.4	-19.3	-18.5	-16.9	-9.6
2-Jan	-19.7	-20.1	-19.8	-19.2	-19.0	-19.3	-19.0	-19.1	-19.6	-19.3	-19.2	-19.2	-18.7	-18.4	-18.3	-17.8	-17.7	-17.6	-17.5	-17.8	-17.6	-17.6	-17.6	-18.0	-18.6	-17.5
3-Jan	-18.1	-18.3	-18.5	-19.0	-19.7	-19.6	-20.2	-20.8	-21.3	-21.8	-21.7	-21.4	-21.2	-20.4	-19.0	-17.4	-16.6	-15.6	-14.1	-13.4	-13.5	-14.1	-14.2	-13.7	-18.1	-13.4
4-Jan	-13.5	-13.9	-14.2	-14.5	-14.9	-15.1	-15.2	-15.1	-14.9	-14.8	-14.3	-13.8	-13.1	-12.9	-12.2	-11.7	-12.1	-12.3	-12.3	-12.2	-12.0	-11.1	-11.0	-11.0	-13.4	-11.0
5-Jan	-11.2	-10.7	-11.1	-11.8	-12.8	-13.9	-14.7	-15.0	-15.1	-14.8	-14.3	-14.2	-13.9	-14.5	-14.9	-15.2	-15.5	-15.9	-16.2	-16.5	-17.0	-17.5	-17.8	-14.5	-10.7	
6-Jan	-17.8	-17.8	-18.1	-18.4	-18.9	-19.2	-19.5	-20.0	-20.7	-21.0	-21.2	-20.7	-20.0	-19.8	-19.7	-19.2	-18.6	-18.6	-18.2	-17.8	-17.9	-19.1	-19.4	-19.3	-19.2	-17.8
7-Jan	-20.2	-21.8	-22.3	-20.8	-21.0	-20.7	-20.2	-20.0	-19.6	-19.0	-18.8	-18.7	-18.9	-19.6	-20.6	-21.6	-22.3	-22.9	-24.3	-25.0	-25.2	-25.3	-25.7	-25.9	-21.7	-18.7
8-Jan	-25.9	-25.8	-25.8	-26.6	-27.0	-27.1	-26.3	-26.0	-26.3	-26.7	-25.8	-24.5	-23.8	-22.7	-21.4	-20.2	-20.2	-20.1	-19.8	-20.1	-20.1	-20.4	-20.9	-21.4	-23.5	-19.8
9-Jan	-21.7	-21.8	-21.2	-20.8	-20.7	-20.5	-20.3	-20.2	-20.0	-19.9	-19.7	-19.4	-19.3	-19.6	-19.7	-20.0	-20.8	-20.4	-21.3	-21.9	-22.5	-23.0	-23.3	-23.8	-20.9	-19.3
10-Jan	-25.3	-25.7	-26.3	-27.0	-27.8	-28.3	-28.6	-29.1	-29.4	-29.8	-29.6	-29.3	-29.3	-28.7	-28.2	-26.8	-25.8	-25.5	-25.9	-26.1	-26.1	-25.9	-26.2	-26.3	-27.4	-25.3
11-Jan	-25.7	-24.9	-24.0	-23.8	-21.9	-19.0	-17.1	-15.3	-15.2	-16.4	-18.5	-22.1	-24.0	-25.6	-26.3	-27.1	-27.6	-27.8	-27.9	-28.1	-28.3	-28.7	-28.8	-28.7	-23.9	-15.2
12-Jan	-29.2	-29.7	-30.4	-30.2	-29.7	-31.3	-32.2	-32.0	-32.6	-31.8	-32.1	-31.5	-29.1	-27.8	-26.1	-25.0	-24.1	-23.2	-22.5	-21.7	-21.2	-21.2	-21.0	-20.6	-27.4	-20.6
13-Jan	-20.3	-20.3	-19.8	-18.3	-18.2	-18.5	-18.4	-18.4	-18.2	-17.6	-17.3	-16.6	-15.8	-13.9	-12.3	-10.8	-9.7	-9.7	-9.2	-9.3	-9.0	-9.1	-10.0	-9.3	-14.6	-9.0
14-Jan	-8.6	-9.0	-8.9	-8.8	-8.9	-7.8	-6.5	-6.7	-5.9	-5.1	-4.2	-2.7	-1.8	-0.5	1.0	2.5	2.8	2.5	2.3	1.9	1.6	2.1	2.6	2.3	-2.7	2.8
15-Jan	2.7	2.6	2.2	2.0	1.9	1.7	1.6	1.8	2.3	2.3	2.4	2.5	2.9	3.6	3.9	3.7	3.2	3.1	3.0	2.8	2.5	2.1	1.3	0.5	2.4	3.9
16-Jan	0.5	0.2	0.4	-0.1	-0.8	-0.7	-1.7	0.1	0.4	2.4	3.8	4.8	6.3	7.7	7.7	8.1	8.1	7.5	6.9	7.4	6.5	4.9	4.3	4.0	3.7	8.1
17-Jan	4.6	4.2	4.1	5.0	6.3	6.3	6.0	5.7	5.4	5.0	4.8	5.3	5.6	5.6	5.6	5.8	6.0	5.9	6.0	5.8	5.3	4.6	4.4	3.3	5.3	6.3
18-Jan	2.9	3.0	2.8	1.4	1.0	0.7	0.8	0.7	0.6	0.9	0.7	0.3	0.8	1.3	2.2	3.0	3.4	3.0	2.7	2.6	2.7	1.8	1.2	1.1	1.7	3.4
19-Jan	0.5	0.3	-4.5	-6.8	-6.7	-6.5	-6.7	-6.7	-6.9	-7.1	-6.9	-6.8	-6.9	-7.0	-7.2	-7.4	-7.5	-7.5	-7.7	-7.8	-7.7	-7.9	-7.5	-7.5	-6.4	0.5
20-Jan	-7.3	-7.1	-6.8	-6.5	-5.8	-5.6	-6.0	-4.9	-3.9	-3.7	-2.6	-2.8	-1.4	-0.1	1.2	2.3	3.2	2.7	2.3	0.8	0.7	-1.7	-5.8	-5.5	-2.7	3.2
21-Jan	-5.2	-4.9	-4.9	-4.7	-4.7	-5.0	-5.7	-6.4	-7.3	-7.9	-8.3	-8.8	-9.2	-9.5	-9.7	-10.1	-10.5	-11.0	-11.5	-12.0	-12.4	-12.7	-12.9	-13.2	-8.7	-4.7
22-Jan	-13.6	-14.0	-14.5	-15.0	-15.4	-15.8	-16.2	-16.6	-17.1	-17.3	-17.3	-17.3	-17.0	-16.9	-17.1	-17.6	-17.8	-18.1	-18.4	-18.7	-19.2	-19.9	-20.5	-20.7	-17.2	-13.6
23-Jan	-20.8	-20.7	-20.5	-20.5	-20.4	-20.4	-20.3	-20.2	-20.2	-20.3	-20.0	-19.3	-18.7	-18.4	-17.9	-17.4	-17.2	-17.1	-17.0	-16.9	-16.8	-16.5	-16.6	-17.3	-18.8	-16.5
24-Jan	-17.5	-17.7	-17.9	-17.6	-16.8	-16.4	-16.0	-15.7	-15.2	-14.8	-14.5	-13.7	-12.7	-11.7	-10.5	-10.0	-9.2	-8.9	-8.7	-9.0	-9.1	-9.2	-10.6	-10.9	-13.1	-8.7
25-Jan	-11.6	-12.1	-12.0	-12.2	-12.3	-12.0	-12.0	-12.1	-12.3	-12.1	-12.2	-11.5	-9.6	-6.6	-5.0	-3.6	-3.5	-4.5	-5.0	-4.6	-4.9	-5.9	-5.8	-5.8	-8.7	-3.5
26-Jan	-6.3	-6.5	-6.9	-6.2	-5.7	-5.7	-5.2	-4.3	-4.4	-4.2	-3.9	-3.1	-2.6	-1.2	1.0	2.2	2.0	1.4	1.3	1.2	0.5	0.0	-0.6	-1.0	-2.4	2.2
27-Jan	-1.0	-1.3	-1.5	-0.6	-0.4	-0.3	0.7	0.6	0.6	1.1	0.9	2.3	2.5	2.3	2.7	2.8	2.8	2.9	3.1	2.8	2.4	2.6	2.1	1.2	3.1	3.1
28-Jan	1.7	2.1	1.8	1.7	1.5	1.4	0.9	0.7	0.6	0.4	0.3	0.7	1.4	1.1	1.8	3.1	3.3	3.7	4.3	5.4	5.4	5.5	5.2	5.4	2.5	5.5
29-Jan	5.2	4.9	4.6	4.2	4.2	4.3	3.7	3.2	3.2	2.3	2.2	3.4	5.3	5.8	6.1	6.3	6.1	5.3	5.1	4.4	3.9	2.7	1.6	1.0	4.1	6.3
30-Jan	0.7	0.6	0.3	0.0	-0.7	-1.4	-1.4	-1.8	-2.2	-2.4	-4.5	-7.3	-7.8	-7.5	-7.0	-6.5	-8.6	-10.2	-11.4	-12.7	-13.5	-14.2	-14.6	-15.2	-6.2	0.7
31-Jan	-15.5	-16.0	-16.3	-16.7	-17.2	-18.0	-18.3	-18.3	-19.0	-19.3	-19.6	-18.4	-16.8	-15.1	-13.7	-13.1	-12.7	-12.4	-12.2	-12.3	-12.1	-11.0	-10.5	-11.3	-15.2	-10.5
																								Diurnal Average		
																								Diurnal Maximum		





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 75 m (AT75m) - C
Mannix - January 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	152	20.43	20.43
-20 - 0	405	54.44	74.87
0 - 10	187	25.13	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

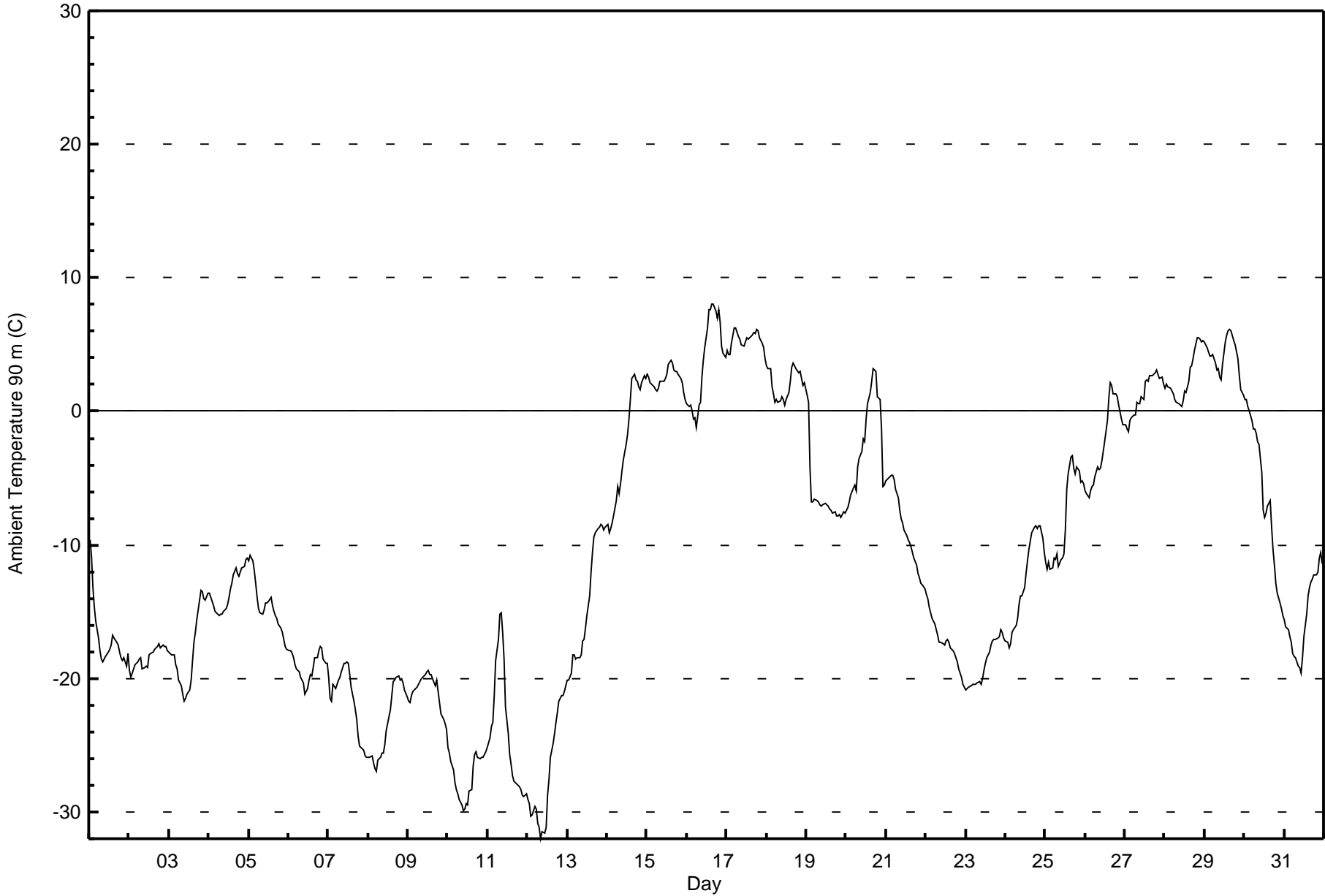
Total Number of Hours: 744



Summary of Hour Averages

Mannix - January 2017

Maximum Value: 8.1 C on Jan 16 17:00		Maximum Daily Average: 5.3 C on Jan 17		Hours in Service: 744																						
Minimum Value: -32.0 C on Jan 12 09:00		Minimum Daily Average: -27.3 C on Jan 10		Hours of Data: 744																						
Maximum Diurnal Average: -9.5 C at hour 17		Minimum Diurnal Average: -11.9 C at hour 7		Hours of Missing Data: 0																						
Monthly Average: -10.90 C		Percentiles: P ₁ = -30.3 P ₁₀ = -23.6 Q ₁ = -19.0 Median = -12.5 Q ₃ = 0.3 P ₉₀ = 3.2 P ₉₉ = 6.5		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-Jan	-9.6	-10.9	-13.1	-14.6	-15.7	-17.0	-18.0	-18.6	-18.8	-18.5	-18.4	-18.0	-17.8	-17.5	-16.8	-16.9	-17.3	-17.4	-18.0	-18.4	-18.6	-18.4	-19.1	-18.2	-16.9	-9.6
2-Jan	-19.4	-19.9	-19.6	-19.0	-18.9	-18.8	-18.5	-18.4	-19.3	-19.1	-19.1	-19.2	-18.3	-18.2	-18.0	-17.8	-17.7	-17.6	-17.4	-17.7	-17.5	-17.6	-17.6	-18.0	-18.4	-17.4
3-Jan	-18.0	-18.2	-18.3	-18.2	-19.0	-19.3	-20.2	-20.6	-21.1	-21.7	-21.5	-21.2	-20.8	-20.1	-18.7	-17.3	-16.6	-15.6	-14.1	-13.4	-13.6	-14.1	-14.1	-13.6	-17.9	-13.4
4-Jan	-13.6	-14.0	-14.3	-14.6	-15.0	-15.2	-15.3	-15.2	-15.0	-14.8	-14.4	-14.4	-13.9	-13.3	-12.9	-12.2	-11.8	-12.1	-12.3	-12.1	-11.7	-11.6	-11.1	-11.0	-13.4	-11.0
5-Jan	-11.2	-10.8	-11.2	-11.9	-12.9	-14.0	-14.8	-15.0	-15.2	-14.9	-14.3	-14.3	-14.2	-14.0	-14.5	-15.0	-15.3	-15.5	-15.9	-16.3	-16.6	-17.1	-17.6	-17.8	-14.6	-10.8
6-Jan	-17.9	-17.9	-18.2	-18.5	-19.0	-19.2	-19.5	-19.9	-20.2	-20.3	-21.1	-20.8	-20.2	-19.7	-19.9	-19.2	-18.4	-18.5	-18.0	-17.6	-17.7	-18.6	-18.9	-18.9	-19.1	-17.6
7-Jan	-20.0	-21.5	-21.8	-20.5	-20.8	-20.4	-20.1	-19.9	-19.5	-18.9	-18.9	-18.8	-18.9	-19.7	-20.7	-21.7	-22.3	-23.0	-24.4	-25.1	-25.2	-25.4	-25.8	-25.9	-21.6	-18.8
8-Jan	-25.9	-25.9	-25.7	-26.3	-26.7	-27.0	-26.1	-25.9	-25.6	-25.6	-25.0	-23.9	-23.3	-22.3	-21.3	-20.2	-20.2	-19.9	-19.8	-20.1	-20.1	-20.3	-20.9	-21.4	-23.3	-19.8
9-Jan	-21.7	-21.8	-21.2	-20.9	-20.8	-20.6	-20.4	-20.2	-20.0	-19.9	-19.7	-19.5	-19.4	-19.7	-19.7	-20.0	-20.5	-20.2	-21.0	-21.8	-22.6	-23.0	-23.4	-23.8	-20.9	-19.4
10-Jan	-25.2	-25.6	-26.2	-26.9	-27.8	-28.3	-28.6	-29.1	-29.4	-29.9	-29.8	-29.3	-29.4	-28.5	-28.3	-26.5	-25.7	-25.5	-25.9	-26.0	-26.0	-25.9	-25.7	-25.5	-27.3	-25.2
11-Jan	-25.1	-24.4	-23.6	-23.3	-21.3	-18.7	-17.1	-15.2	-15.1	-16.5	-18.5	-22.2	-24.1	-25.7	-26.5	-27.3	-27.7	-27.9	-28.0	-28.1	-28.4	-28.7	-28.8	-28.7	-23.8	-15.1
12-Jan	-29.0	-29.4	-30.3	-30.3	-29.6	-29.8	-30.9	-31.2	-32.0	-31.5	-31.5	-31.1	-28.7	-27.6	-25.9	-24.8	-24.1	-23.3	-22.5	-21.7	-21.3	-21.3	-21.0	-20.5	-27.1	-20.5
13-Jan	-20.1	-20.2	-19.6	-18.2	-18.3	-18.5	-18.5	-18.4	-18.2	-17.2	-17.0	-16.2	-15.3	-13.8	-12.0	-10.6	-9.5	-9.1	-8.8	-8.7	-8.5	-8.5	-8.9	-8.6	-14.3	-8.5
14-Jan	-8.5	-9.1	-8.7	-8.3	-7.9	-6.7	-5.7	-6.1	-5.5	-4.5	-3.6	-2.5	-1.8	-0.6	0.9	2.4	2.7	2.4	2.3	1.8	1.6	2.1	2.7	2.5	-2.4	2.7
15-Jan	2.7	2.5	2.2	2.0	1.9	1.7	1.5	1.8	2.3	2.2	2.3	2.4	2.8	3.5	3.8	3.6	3.1	3.0	3.0	2.7	2.4	2.1	1.4	0.9	2.4	3.8
16-Jan	0.6	0.4	0.5	0.0	-0.6	-0.4	-1.2	0.5	0.6	2.6	3.8	4.8	6.2	7.6	7.6	8.0	8.1	7.5	7.0	7.6	6.6	4.9	4.4	4.0	3.8	8.1
17-Jan	4.6	4.2	4.2	5.1	6.3	6.2	5.9	5.6	5.4	5.0	4.8	5.2	5.5	5.5	5.5	5.7	5.9	5.9	6.2	6.0	5.5	5.1	4.8	3.9	5.3	6.3
18-Jan	3.5	3.2	3.2	1.9	1.3	0.7	0.9	0.7	0.8	1.1	0.9	0.4	0.9	1.4	2.3	3.3	3.6	3.4	3.2	2.9	3.0	2.4	2.0	2.1	2.0	3.6
19-Jan	1.2	0.7	-4.2	-6.8	-6.8	-6.6	-6.7	-6.8	-7.0	-7.1	-7.0	-6.9	-7.0	-7.1	-7.3	-7.5	-7.6	-7.5	-7.8	-7.8	-7.8	-7.9	-7.6	-7.6	-6.4	1.2
20-Jan	-7.4	-7.2	-6.8	-6.2	-5.7	-5.5	-5.9	-4.1	-3.6	-3.0	-2.1	-2.3	-0.6	0.6	1.4	2.2	3.2	3.1	3.0	1.2	0.9	-1.3	-5.6	-5.5	-2.4	3.2
21-Jan	-5.2	-5.0	-4.9	-4.8	-4.7	-5.1	-5.8	-6.4	-7.4	-8.0	-8.4	-8.9	-9.3	-9.6	-9.8	-10.1	-10.6	-11.0	-11.5	-12.1	-12.5	-12.8	-13.0	-13.3	-8.8	-4.7
22-Jan	-13.7	-14.1	-14.6	-15.1	-15.5	-15.9	-16.4	-16.7	-17.2	-17.3	-17.4	-17.5	-17.2	-17.1	-17.3	-17.7	-17.9	-18.2	-18.4	-18.7	-19.2	-19.9	-20.4	-20.6	-17.3	-13.7
23-Jan	-20.9	-20.7	-20.6	-20.6	-20.5	-20.5	-20.4	-20.3	-20.2	-20.4	-20.0	-19.4	-18.8	-18.5	-18.0	-17.5	-17.2	-17.1	-16.9	-16.8	-16.4	-16.5	-17.0	-17.0	-18.8	-16.4
24-Jan	-17.2	-17.3	-17.7	-17.4	-16.6	-16.3	-16.0	-15.5	-14.4	-13.8	-13.8	-13.2	-12.1	-11.2	-10.3	-9.8	-9.0	-8.7	-8.6	-8.7	-8.5	-8.6	-9.5	-10.5	-12.7	-8.5
25-Jan	-11.3	-11.9	-11.2	-11.8	-11.8	-11.0	-11.1	-10.7	-11.6	-11.1	-11.0	-10.7	-8.8	-5.8	-4.7	-3.5	-3.3	-4.2	-4.7	-4.1	-4.5	-5.3	-5.2	-5.4	-8.1	-3.3
26-Jan	-5.9	-6.1	-6.5	-6.0	-5.6	-5.5	-4.9	-4.2	-4.3	-4.2	-3.8	-3.0	-2.3	-0.7	1.0	2.2	1.9	1.3	1.3	1.1	0.4	0.0	-0.6	-1.0	-2.3	2.2
27-Jan	-1.0	-1.4	-1.5	-0.7	-0.5	-0.3	-0.3	0.7	0.6	0.6	1.1	0.9	2.2	2.4	2.3	2.7	2.7	2.7	2.9	3.1	2.8	2.4	2.6	2.0	1.2	3.1
28-Jan	1.7	2.1	1.8	1.7	1.5	1.3	0.9	0.6	0.6	0.5	0.4	0.8	1.6	1.4	2.2	3.3	3.4	3.9	4.6	5.5	5.5	5.5	5.2	5.3	2.6	5.5
29-Jan	5.2	4.8	4.5	4.2	4.1	4.3	3.6	3.1	3.2	2.6	2.4	3.5	5.2	5.7	6.0	6.2	6.0	5.3	5.0	4.5	4.0	2.7	1.7	1.2	4.1	6.2
30-Jan	0.9	0.9	0.3	0.0	-0.7	-1.3	-1.4	-1.7	-2.2	-2.5	-4.6	-7.4	-7.9	-7.6	-7.1	-6.6	-8.7	-10.4	-11.5	-12.8	-13.6	-14.3	-14.7	-15.3	-6.3	0.9
31-Jan	-15.6	-16.1	-16.4	-16.9	-17.3	-18.1	-18.4	-18.4	-19.0	-19.2	-19.6	-18.5	-16.8	-15.2	-13.8	-13.2	-12.8	-12.5	-12.3	-12.3	-12.1	-11.0	-10.6	-11.4	-15.3	-10.6
																								Diurnal Average		
																								Diurnal Maximum		





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 90 m (AT90m) - C
Mannix - January 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	150	20.16	20.16
-20 - 0	405	54.44	74.60
0 - 10	189	25.40	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

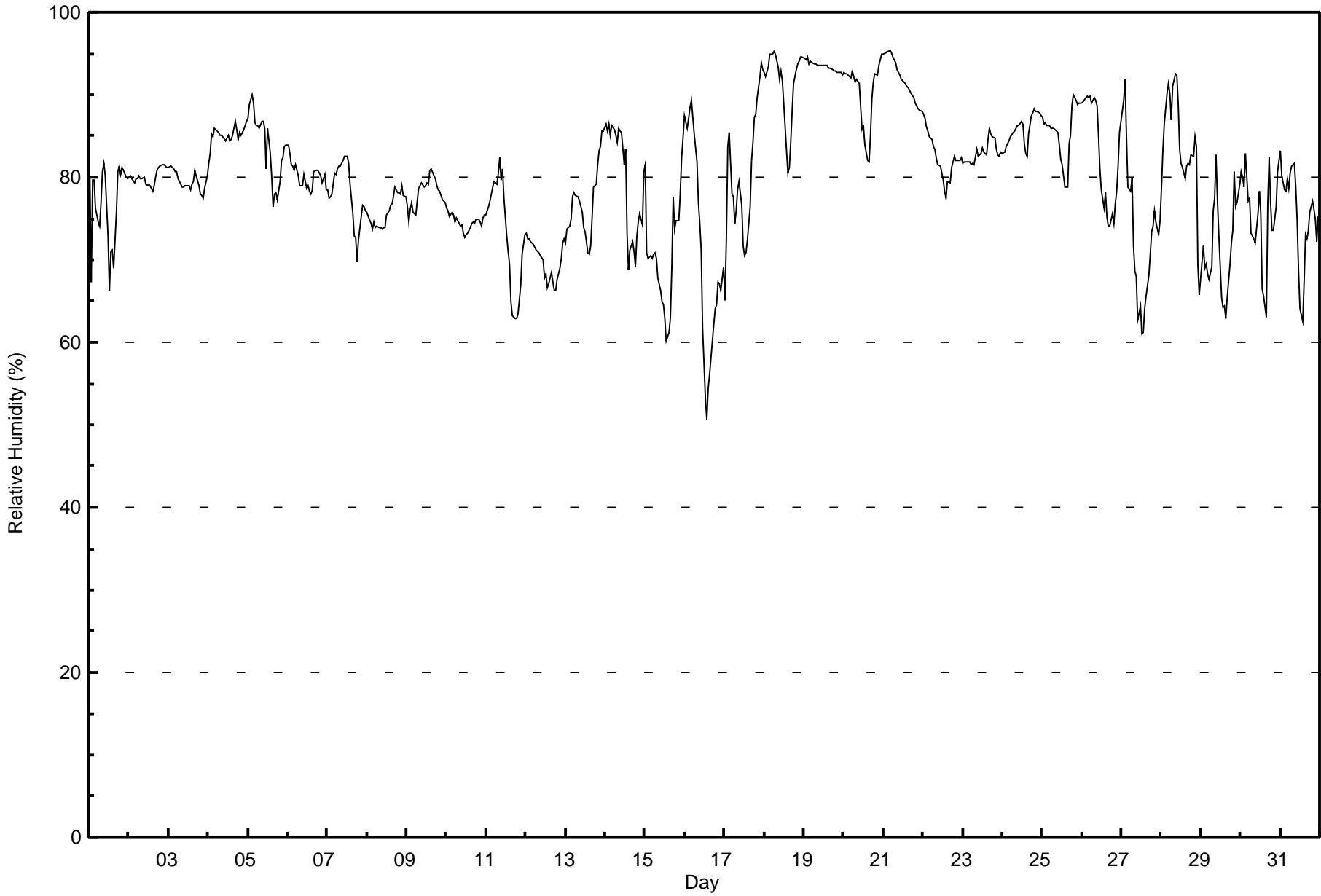
Mannix - January 2017

Maximum Value: 95 % on Jan 21 05:00														Maximum Daily Average: 93.4 % on Jan 19														Hours in Service: 744	
Minimum Value: 51 % on Jan 16 14:00														Minimum Daily Average: 69.9 % on Jan 12														Hours of Data: 744	
Maximum Diurnal Average: 82.7 % at hour 4														Minimum Diurnal Average: 75.3 % at hour 15														Hours of Missing Data: 0	
Monthly Average: 80.0 %														Percentiles: P ₁ = 61 P ₁₀ = 70 Q ₁ = 75 Median = 80 Q ₃ = 85 P ₉₀ = 92 P ₉₉ = 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-Jan	80	67	80	80	76	75	74	77	81	82	80	73	66	71	71	69	76	81	81	80	81	81	80	80	76.7	82			
2-Jan	80	80	80	79	80	80	80	80	80	80	79	79	79	79	78	79	80	81	81	81	82	82	81	81	80.1	82			
3-Jan	81	81	81	81	81	81	80	79	79	79	79	79	79	79	80	81	80	79	78	78	78	79	80	79.5	81				
4-Jan	82	83	85	85	86	86	85	85	85	85	84	85	85	84	85	85	87	86	85	85	85	86	86	87	85.1	87			
5-Jan	87	89	90	89	87	86	86	86	87	87	86	81	86	83	80	76	78	78	77	80	82	82	84	84	83.8	90			
6-Jan	84	83	82	81	81	82	80	79	79	79	80	79	79	78	78	78	81	81	81	81	80	79	80	79	80.1	84			
7-Jan	78	78	78	78	80	80	81	81	81	82	83	83	83	82	79	76	73	73	70	72	75	77	76	76	78.1	83			
8-Jan	76	75	74	74	75	74	74	74	74	74	74	74	75	76	77	77	78	79	78	78	78	79	78	78	75.9	79			
9-Jan	76	75	76	77	76	75	77	79	79	79	79	79	79	79	81	81	80	80	79	79	78	77	77	77	78.1	81			
10-Jan	76	76	75	76	75	75	75	75	74	74	73	73	73	73	74	74	75	74	75	75	75	74	75	75	74.6	76			
11-Jan	75	76	77	78	79	79	79	80	82	80	81	78	73	71	70	65	63	63	63	63	65	67	71	73	73.0	82			
12-Jan	73	73	72	72	72	72	71	71	71	71	70	68	68	67	67	68	67	66	66	68	69	70	72	73	69.9	73			
13-Jan	72	74	74	75	78	78	78	78	77	76	76	74	73	71	71	72	75	79	79	82	83	84	86	86	77.0	86			
14-Jan	86	86	87	85	86	86	85	84	86	86	85	82	83	73	69	71	72	71	69	73	75	76	74	81	79.6	87			
15-Jan	82	71	70	71	70	71	71	70	68	66	65	65	63	60	61	63	69	78	74	75	75	78	82	85	70.9	85			
16-Jan	88	86	87	88	89	87	85	82	77	74	71	62	53	51	54	56	58	62	64	65	67	67	66	69	71.2	89			
17-Jan	65	73	84	86	78	78	74	76	78	79	77	72	70	71	72	76	82	84	87	88	90	92	94	93	80.0	94			
18-Jan	93	92	93	95	95	95	95	95	93	92	93	92	89	83	81	81	84	88	91	93	94	94	94	95	91.3	95			
19-Jan	94	94	95	94	94	94	94	94	94	94	94	94	94	94	93	93	93	93	93	93	93	93	93	92	93.4	95			
20-Jan	93	93	93	92	92	93	92	92	92	91	89	86	86	84	82	82	85	90	92	93	92	94	94	95	90.2	95			
21-Jan	95	95	95	95	95	95	95	94	93	93	92	92	92	91	91	91	90	90	90	89	89	88	88	88	91.9	95			
22-Jan	88	87	86	86	85	85	84	83	82	81	81	81	80	78	78	79	79	81	82	83	82	82	82	82	82.4	88			
23-Jan	82	82	82	82	82	82	82	82	83	83	83	83	84	83	83	85	86	85	85	85	83	83	83	83	83.0	86			
24-Jan	83	83	84	84	84	85	85	86	86	86	86	87	86	84	83	83	85	88	88	88	88	88	88	88	85.6	88			
25-Jan	87	86	87	86	86	86	86	86	86	85	84	82	82	80	79	79	84	85	89	90	89	89	89	89	85.5	90			
26-Jan	89	89	90	90	90	90	89	90	89	89	85	81	78	76	78	75	74	74	76	74	77	78	81	85	82.8	90			
27-Jan	88	89	92	85	79	78	80	72	69	68	63	64	61	61	64	66	68	71	73	74	76	75	73	75	73.5	92			
28-Jan	79	83	87	90	91	90	87	91	92	92	89	83	82	81	80	81	82	82	83	83	85	84	69	66	83.8	92			
29-Jan	68	72	69	70	68	68	69	76	77	83	77	73	65	64	64	63	65	69	72	74	81	76	77	79	71.7	83			
30-Jan	81	80	79	83	77	78	73	73	73	72	76	78	76	66	66	63	77	82	77	73	73	76	81	82	75.6	83			
31-Jan	83	80	78	78	80	79	81	81	82	79	75	69	64	63	67	73	72	74	76	77	76	75	72	75	75.4	83			
	82.1	81.6	82.6	82.7	82.2	81.9	81.5	81.6	81.6	81.3	80.3	78.3	77.0	75.4	75.3	75.5	77.4	78.9	79.2	79.7	80.5	80.7	80.9	81.6	Diurnal Average				
	95	95	95	95	95	95	95	95	95	94	94	94	94	94	94	93	93	93	93	93	94	94	94	95	Diurnal Maximum				



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Mannix - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Relative Humidity (RH) - %
Mannix - January 2017**

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	5	0.67	0.67
60 - 80	360	48.39	49.06
80 - 100	379	50.94	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) - %

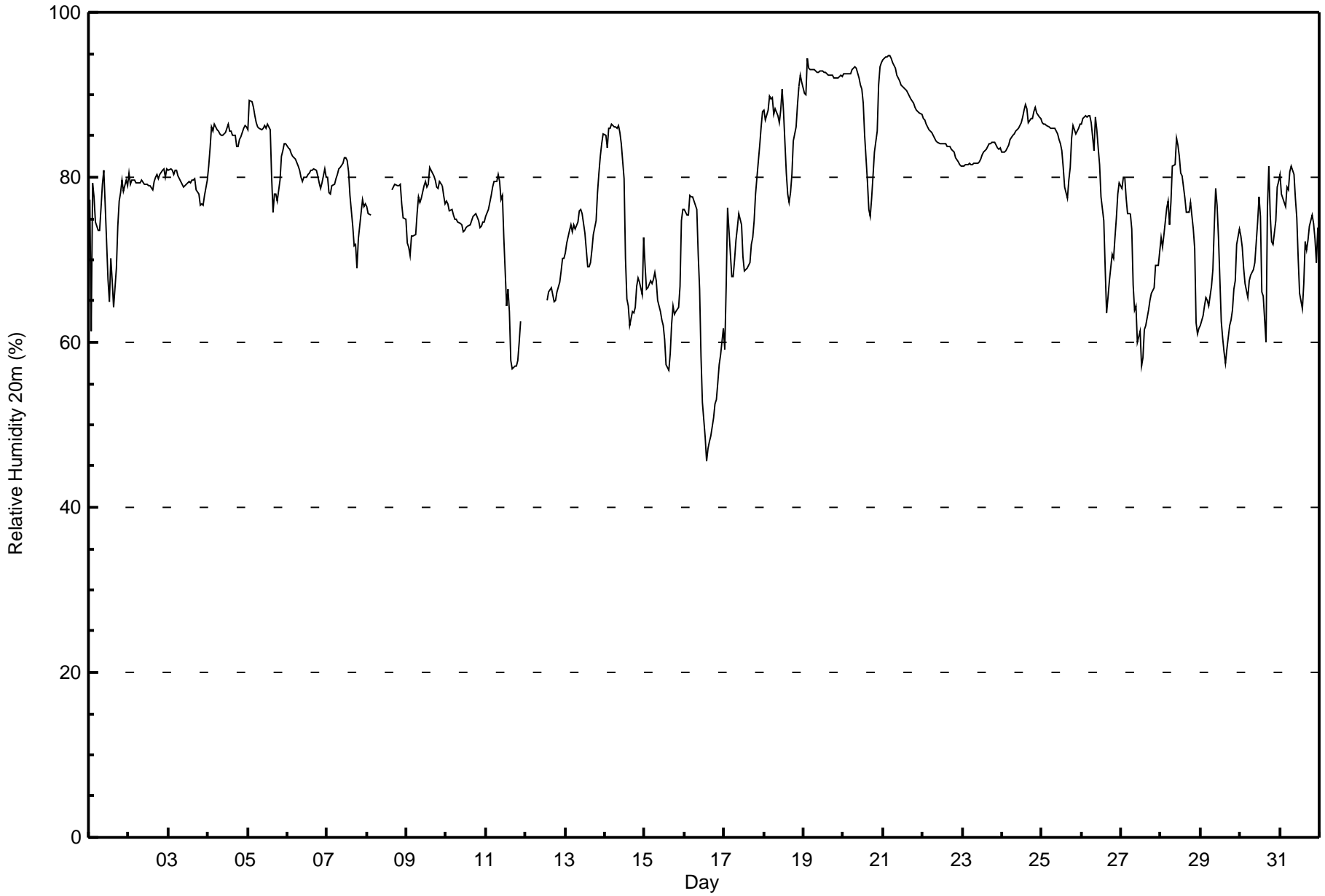
Mannix - January 2017

Maximum Value: 95 % on Jan 21 05:00																			Maximum Daily Average: 92.4 % on Jan 19						Hours in Service: 744	
Minimum Value: 46 % on Jan 16 14:00																			Minimum Daily Average: 62.0 % on Jan 16						Hours of Data: 717	
Maximum Diurnal Average: 80.6 % at hour 4																			Minimum Diurnal Average: 73.1 % at hour 16						Hours of Missing Data: 27	
Monthly Average: 77.9 %																			Percentiles: P ₁ = 53 P ₁₀ = 65 Q ₁ = 73 Median = 79 Q ₃ = 85 P ₉₀ = 88 P ₉₉ = 94						Hours of Calibration: 0	
																			Percent Operational Time: 96.4							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	77	61	79	78	75	74	74	76	79	81	77	68	65	70	68	64	69	74	77	78	80	78	80	79	74.2	81
2-Jan	81	79	80	80	79	79	79	79	80	79	79	79	79	79	79	79	80	80	80	80	81	81	80	81	79.7	81
3-Jan	81	81	81	80	81	81	80	80	79	79	79	79	79	79	80	80	80	78	78	77	77	78	80	79.3	81	
4-Jan	81	84	86	86	86	86	86	85	85	85	85	86	86	86	86	85	85	84	84	85	85	86	86	86	85.2	86
5-Jan	86	89	89	88	88	87	86	86	86	86	86	86	86	86	80	76	78	78	77	80	83	83	84	84	84.1	89
6-Jan	84	83	83	83	82	82	81	81	80	80	80	80	80	80	81	81	81	81	80	79	79	79	81	80	80.9	84
7-Jan	80	78	78	79	79	80	80	81	81	82	82	82	82	81	78	74	72	72	69	72	76	77	76	77	77.9	82
8-Jan	76	76	75	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	78	79	79	79	79	79	77	75	75	--	79
9-Jan	72	71	71	73	73	73	76	78	77	77	79	80	79	79	81	81	80	80	79	79	79	79	78	77	77.0	81
10-Jan	77	77	76	76	76	75	75	75	74	74	73	73	74	74	74	75	75	75	76	75	74	74	75	75	74.9	77
11-Jan	75	76	77	78	79	79	80	80	80	77	78	73	64	67	64	58	57	57	57	58	60	63	AF	AF	69.8	80
12-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	65	66	67	66	65	65	66	67	69	70	70	--	70
13-Jan	71	72	74	74	73	74	74	75	76	76	76	74	73	69	69	70	71	73	75	78	81	83	84	85	75.0	85
14-Jan	85	84	86	86	86	86	86	86	86	85	84	80	70	65	64	62	64	64	64	67	68	67	66	73	75.6	86
15-Jan	69	66	67	67	67	68	68	68	65	64	63	62	60	57	57	59	62	64	63	64	64	67	75	76	65.1	76
16-Jan	76	76	75	78	78	78	77	76	71	66	58	53	48	46	47	48	49	51	53	53	55	57	58	62	62.0	78
17-Jan	59	67	76	74	68	68	70	72	74	76	74	70	69	69	69	70	72	73	75	78	80	84	86	88	73.3	88
18-Jan	88	87	88	90	90	90	88	88	87	87	88	91	88	81	78	77	78	80	84	86	89	91	92	91	86.5	92
19-Jan	90	90	94	93	93	93	93	93	93	93	93	93	93	93	93	92	92	92	92	92	92	92	92	92	92.4	94
20-Jan	92	93	92	93	93	93	93	93	93	92	91	91	89	85	79	76	75	77	80	83	86	91	93	94	88.3	94
21-Jan	94	95	95	95	95	94	94	93	92	92	92	91	91	91	90	90	90	89	89	89	88	88	88	88	91.3	95
22-Jan	87	87	86	86	86	85	85	85	84	84	84	84	84	84	84	84	84	83	83	83	82	82	81	81	84.2	87
23-Jan	81	81	81	81	82	82	82	82	82	82	82	82	83	83	83	84	84	84	84	84	84	83	83	83	82.6	84
24-Jan	83	83	83	84	84	85	85	85	86	86	86	87	87	88	88	87	87	87	87	88	88	88	87	87	86.1	89
25-Jan	87	86	86	86	86	86	86	86	86	85	85	84	83	81	79	77	80	81	85	86	85	86	86	86	84.4	87
26-Jan	86	87	88	87	88	87	87	83	87	86	84	81	78	75	69	64	65	67	71	70	73	75	78	79	79.0	88
27-Jan	79	80	80	77	76	76	74	67	64	64	60	61	57	58	62	62	64	65	66	66	67	69	69	71	68.1	80
28-Jan	73	71	73	76	77	74	77	81	82	85	84	83	80	80	77	76	76	76	77	74	71	62	61	62	75.4	85
29-Jan	62	63	64	65	65	64	67	69	74	79	77	73	63	60	59	57	59	62	63	64	66	67	72	74	66.2	79
30-Jan	73	72	69	67	65	67	68	69	69	70	75	78	75	66	66	60	76	81	75	72	72	75	79	79	71.6	81
31-Jan	80	78	77	76	79	78	81	81	80	77	75	70	66	64	67	72	71	72	74	75	74	73	70	74	74.4	81
																			79.6 79.1 80.4 80.6 80.2 80.2 80.4 80.4 80.4 80.4 80.3 79.6 78.4 76.3 74.7 73.9 73.1 74.2 75.1 75.5 76.1 76.9 77.5 78.8 79.7						Diurnal Average	
																			94 95 95 95 95 94 94 94 93 93 93 93 93 93 93 92 92 92 92 92 92 92 93 94						Diurnal Maximum	
AF - Analyzer Failure																										



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity 20m (RH20m) - %
Mannix - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity 20m (RH20m) - %
Mannix - January 2017

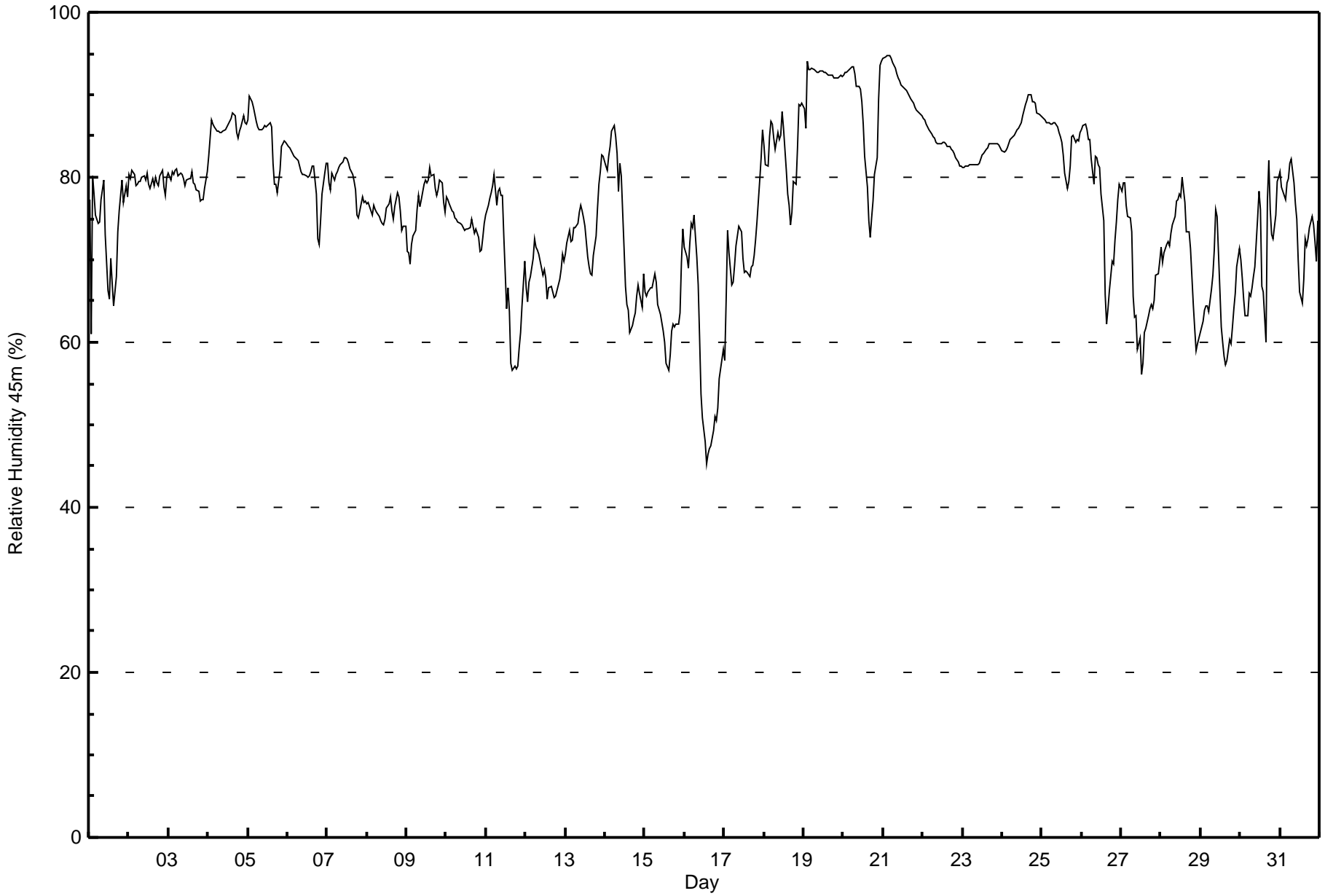
Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	28	3.91	3.91
60 - 80	372	51.88	55.79
80 - 100	317	44.21	100.00

Total Number of Valid Hours: 717

Total Number of Hours: 744



Maximum Value: 95 % on Jan 21 05:00														Maximum Daily Average: 92.2 % on Jan 19														Hours in Service: 744	
Minimum Value: 45 % on Jan 16 14:00														Minimum Daily Average: 59.1 % on Jan 16														Hours of Data: 744	
Maximum Diurnal Average: 79.4 % at hour 6														Minimum Diurnal Average: 73.2 % at hour 16														Hours of Missing Data: 0	
Monthly Average: 77.0 %														Percentiles: P ₁ = 51 P ₁₀ = 64 Q ₁ = 71 Median = 78 Q ₃ = 84 P ₉₀ = 88 P ₉₉ = 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-Jan	77	61	80	78	75	74	75	77	79	80	73	66	65	70	67	64	68	73	76	78	80	77	79	78	73.8	80			
2-Jan	80	80	81	80	79	79	79	79	80	80	80	80	79	79	80	79	80	79	79	80	81	79	78	80	79.6	81			
3-Jan	81	80	81	80	81	81	80	80	80	80	79	80	80	80	81	79	79	78	78	77	77	79	81	79.6	81				
4-Jan	83	85	87	86	86	86	86	85	85	86	86	86	86	87	87	88	87	85	85	86	86	87	86	86	86.0	88			
5-Jan	87	90	89	88	88	87	86	86	86	86	86	86	86	87	86	82	79	79	78	81	84	84	84	84	85.0	90			
6-Jan	84	84	83	83	83	82	82	81	81	80	80	80	80	80	81	81	81	78	72	72	75	78	80	82	80.2	84			
7-Jan	82	79	78	80	80	80	81	81	82	82	82	82	82	82	81	80	80	78	75	75	77	78	77	77	79.7	82			
8-Jan	77	77	76	75	77	76	76	75	75	74	74	75	76	77	78	76	75	77	78	78	76	73	74	74	75.8	78			
9-Jan	71	71	69	72	73	74	76	78	76	77	79	80	79	80	81	80	80	79	78	78	80	79	77	76	76.8	81			
10-Jan	78	77	77	76	76	75	75	75	74	74	74	74	74	74	74	75	74	73	74	73	71	71	73	74	74.3	78			
11-Jan	75	77	77	78	79	80	77	78	79	78	78	73	64	67	64	57	57	57	57	57	59	61	64	70	69.3	80			
12-Jan	67	65	67	68	70	73	72	71	71	70	68	69	68	65	67	67	66	65	66	66	68	69	71	70	68.2	73			
13-Jan	71	72	73	72	72	74	74	74	76	77	76	75	74	70	69	68	68	70	73	76	79	81	83	83	74.2	83			
14-Jan	81	81	83	84	86	86	85	83	78	82	80	71	67	65	64	61	62	63	64	66	67	66	64	68	73.2	86			
15-Jan	66	66	66	67	67	68	68	67	65	63	62	61	60	57	57	59	61	62	62	62	62	64	70	74	64.0	74			
16-Jan	72	70	69	72	74	74	75	70	67	61	54	51	48	45	46	47	47	49	51	50	52	56	57	59	59.1	75			
17-Jan	58	65	74	71	67	67	69	72	73	74	73	70	68	69	68	68	69	69	71	72	75	80	82	86	71.3	86			
18-Jan	84	82	81	85	87	87	85	83	85	85	85	88	86	81	78	77	74	76	80	79	84	89	89	89	83.2	89			
19-Jan	88	86	94	93	93	93	93	93	93	93	93	93	93	93	93	92	92	92	92	92	92	92	92	92	92.2	94			
20-Jan	92	93	93	93	93	93	93	93	91	91	91	89	87	83	79	75	73	75	77	80	82	89	94	94	87.2	94			
21-Jan	94	95	95	95	95	94	94	93	92	92	92	91	91	91	90	90	90	89	89	89	88	88	88	88	91.4	95			
22-Jan	87	87	86	86	86	85	85	85	84	84	84	84	84	84	84	84	84	83	83	83	82	82	81	81	84.2	87			
23-Jan	81	81	81	81	82	82	82	82	82	82	82	82	83	83	83	84	84	84	84	84	84	84	84	84	82.6	84			
24-Jan	83	83	83	83	84	85	85	85	85	86	86	87	87	88	89	89	90	90	89	89	89	88	88	87	86.6	90			
25-Jan	87	87	87	87	87	86	86	87	87	86	85	85	84	83	80	79	79	81	85	85	84	85	84	85	84.7	87			
26-Jan	86	86	86	86	85	85	82	79	83	82	82	81	78	75	66	62	64	66	70	70	72	75	77	79	77.3	86			
27-Jan	78	79	79	77	75	75	73	66	63	63	59	60	56	57	61	62	63	64	64	64	65	68	68	70	67.2	79			
28-Jan	72	70	71	72	72	72	73	74	75	77	77	78	78	80	77	73	73	73	71	65	62	59	60	60	71.5	80			
29-Jan	61	63	64	64	64	64	67	68	71	76	75	71	62	60	58	57	58	60	60	62	64	66	69	71	64.8	76			
30-Jan	70	68	65	63	63	66	66	67	68	69	75	78	76	67	66	60	77	82	76	73	72	75	80	80	71.0	82			
31-Jan	81	79	78	77	79	80	82	82	79	77	75	70	66	65	68	73	72	73	74	75	74	72	70	75	74.8	82			
														78.5 77.9 79.2 79.2 79.2 79.4 79.4 79.1 78.9 78.9 78.3 77.3 75.7 74.9 74.3 73.2 73.8 74.4 74.5 74.8 75.6 76.5 77.5 78.6														Diurnal Average	
														94 95 95 95 95 94 94 93 93 93 93 93 93 93 93 92 92 92 92 92 92 92 94 94														Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity 45m (RH45m) - %
Mannix - January 2017

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	36	4.84	4.84
60 - 80	397	53.36	58.20
80 - 100	311	41.80	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

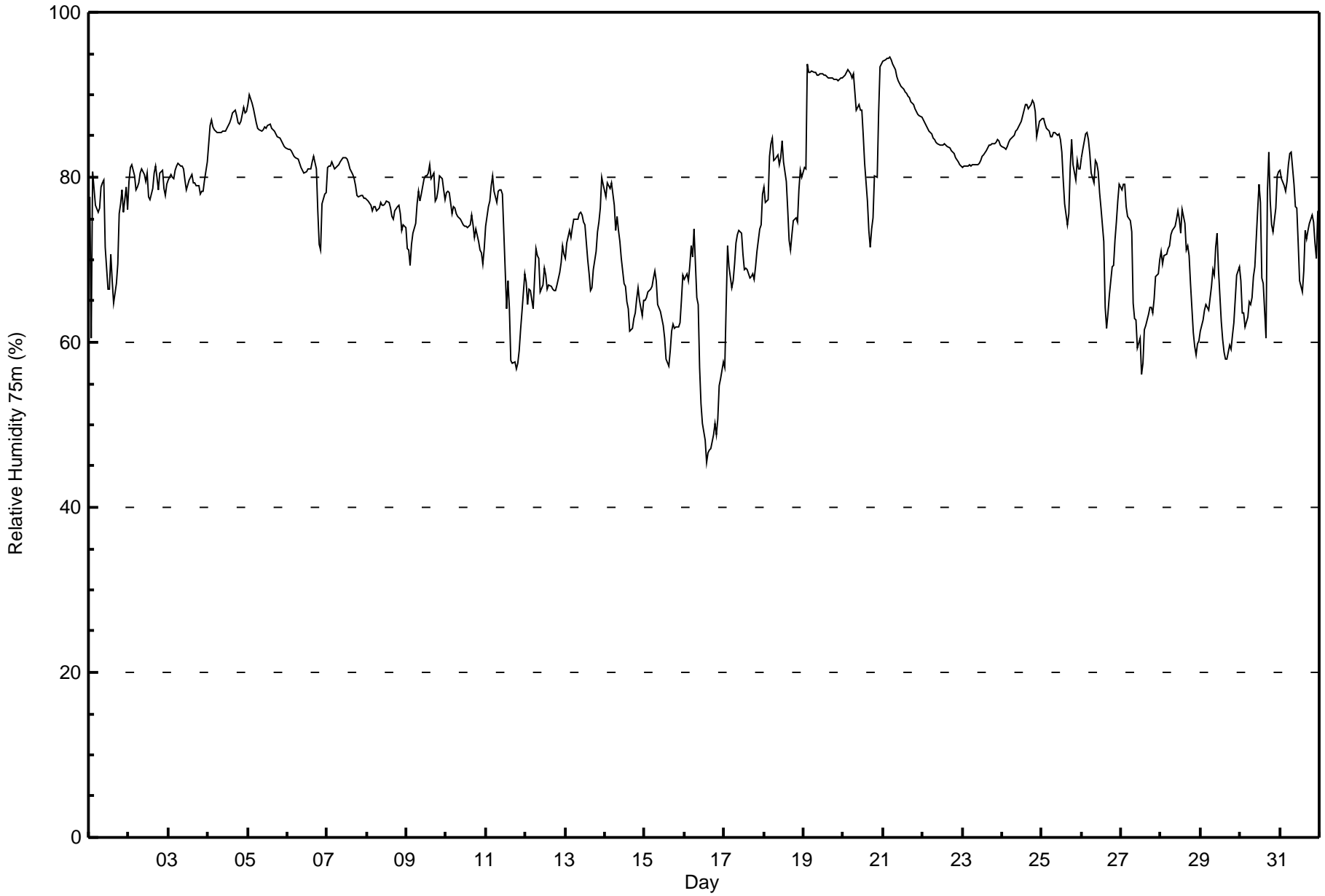


Maximum Value: 95 % on Jan 21 05:00														Maximum Daily Average: 91.4 % on Jan 19														Hours in Service: 744	
Minimum Value: 45 % on Jan 16 14:00														Minimum Daily Average: 57.4 % on Jan 16														Hours of Data: 744	
Maximum Diurnal Average: 79.0 % at hour 7														Minimum Diurnal Average: 73.0 % at hour 16														Hours of Missing Data: 0	
Monthly Average: 76.5 %														Percentiles: P ₁ = 50 P ₁₀ = 64 Q ₁ = 70 Median = 78 Q ₃ = 83 P ₉₀ = 88 P ₉₉ = 93														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-Jan	78	61	81	79	77	76	76	79	79	80	71	67	66	71	67	65	67	69	76	77	79	76	79	76	73.7	81			
2-Jan	79	81	82	80	79	79	79	81	81	80	79	81	78	77	79	80	81	80	78	81	81	79	78	79	79.7	82			
3-Jan	80	80	80	80	81	81	82	81	81	81	80	78	80	80	80	79	79	79	79	78	78	78	80	82	79.9	82			
4-Jan	84	86	87	86	86	86	85	85	85	86	86	86	86	87	87	88	88	87	87	86	87	88	88	88	86.5	88			
5-Jan	89	90	89	88	87	87	86	86	86	86	86	86	86	86	86	86	86	85	85	85	84	84	84	84	86.1	90			
6-Jan	83	83	83	83	83	82	82	82	81	81	81	81	81	81	81	82	83	81	76	72	71	77	78	78	80.2	83			
7-Jan	81	81	81	82	81	81	81	82	82	82	82	82	82	82	81	80	80	79	78	78	78	78	77	77	80.4	82			
8-Jan	77	77	77	76	76	76	76	76	77	77	77	77	77	77	76	75	75	76	76	77	76	73	74	74	76.1	77			
9-Jan	71	71	69	72	73	74	77	78	77	78	80	80	80	80	81	80	81	77	77	79	80	80	78	77	77.2	81			
10-Jan	78	78	78	76	76	76	76	75	75	75	74	74	74	74	74	75	74	73	74	72	71	71	70	71	74.4	78			
11-Jan	74	76	77	79	80	78	77	78	78	79	78	73	64	67	64	58	57	58	57	58	59	62	64	68	69.3	80			
12-Jan	67	65	66	66	64	68	71	71	70	66	67	69	68	66	67	67	67	66	66	67	68	70	72	71	67.7	72			
13-Jan	70	72	74	73	74	75	75	75	76	76	75	75	74	70	68	66	67	69	71	73	75	76	80	79	73.2	80			
14-Jan	78	79	79	79	79	77	74	75	74	72	70	67	67	65	64	61	62	63	64	65	67	65	63	65	69.7	79			
15-Jan	65	65	66	67	67	68	69	67	65	64	63	62	60	58	57	59	61	62	62	62	62	62	65	68	63.6	69			
16-Jan	68	68	67	69	72	70	74	65	65	57	52	50	48	45	47	47	47	49	50	49	51	55	56	58	57.4	74			
17-Jan	57	65	72	69	67	67	69	72	73	74	73	71	69	69	69	68	68	68	68	69	71	74	74	78	69.7	78			
18-Jan	79	77	77	83	84	85	82	82	83	82	82	84	82	80	76	72	71	73	75	75	75	79	81	80	79.1	85			
19-Jan	81	81	94	93	93	93	93	93	92	92	92	93	92	92	92	92	92	92	92	92	92	92	92	92	91.4	94			
20-Jan	92	92	93	93	93	92	93	90	88	89	88	88	85	82	77	74	72	74	75	80	80	88	93	94	86.0	94			
21-Jan	94	94	94	94	95	94	94	93	92	92	91	91	91	90	90	90	90	89	89	88	88	88	88	87	91.1	95			
22-Jan	87	87	86	86	86	85	85	85	84	84	84	84	84	84	84	84	84	83	83	83	82	82	81	81	84.0	87			
23-Jan	81	81	81	81	82	81	82	82	82	82	82	83	83	83	84	84	84	84	84	84	84	85	84	84	82.6	85			
24-Jan	84	84	83	84	84	85	85	85	86	86	87	87	88	89	89	88	89	89	89	89	88	85	87	87	86.4	89			
25-Jan	87	87	86	86	86	85	85	85	85	85	85	85	83	80	77	74	76	81	85	82	80	82	81	81	82.8	87			
26-Jan	82	83	85	85	84	83	81	79	82	82	81	78	76	72	64	62	64	66	69	69	72	75	77	79	76.3	85			
27-Jan	78	79	79	76	75	75	73	65	63	63	59	61	56	58	61	62	63	64	64	63	65	68	68	70	67.1	79			
28-Jan	71	69	70	71	71	72	73	74	74	75	76	75	73	76	74	71	72	70	67	61	59	59	60	60	69.8	76			
29-Jan	61	63	64	65	64	64	67	69	68	72	73	69	63	60	59	58	58	60	59	61	62	65	68	69	64.2	73			
30-Jan	68	64	64	62	63	65	65	65	68	69	76	79	77	68	67	60	78	83	77	74	73	76	80	81	70.9	83			
31-Jan	81	80	79	78	79	81	83	83	79	76	76	72	68	66	69	74	73	73	74	75	75	72	70	76	75.5	83			
																												Diurnal Average	
																												Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity 75m (RH75m) - %
Mannix - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity 75m (RH75m) - %
Mannix - January 2017

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	36	4.84	4.84
60 - 80	411	55.24	60.08
80 - 100	297	39.92	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

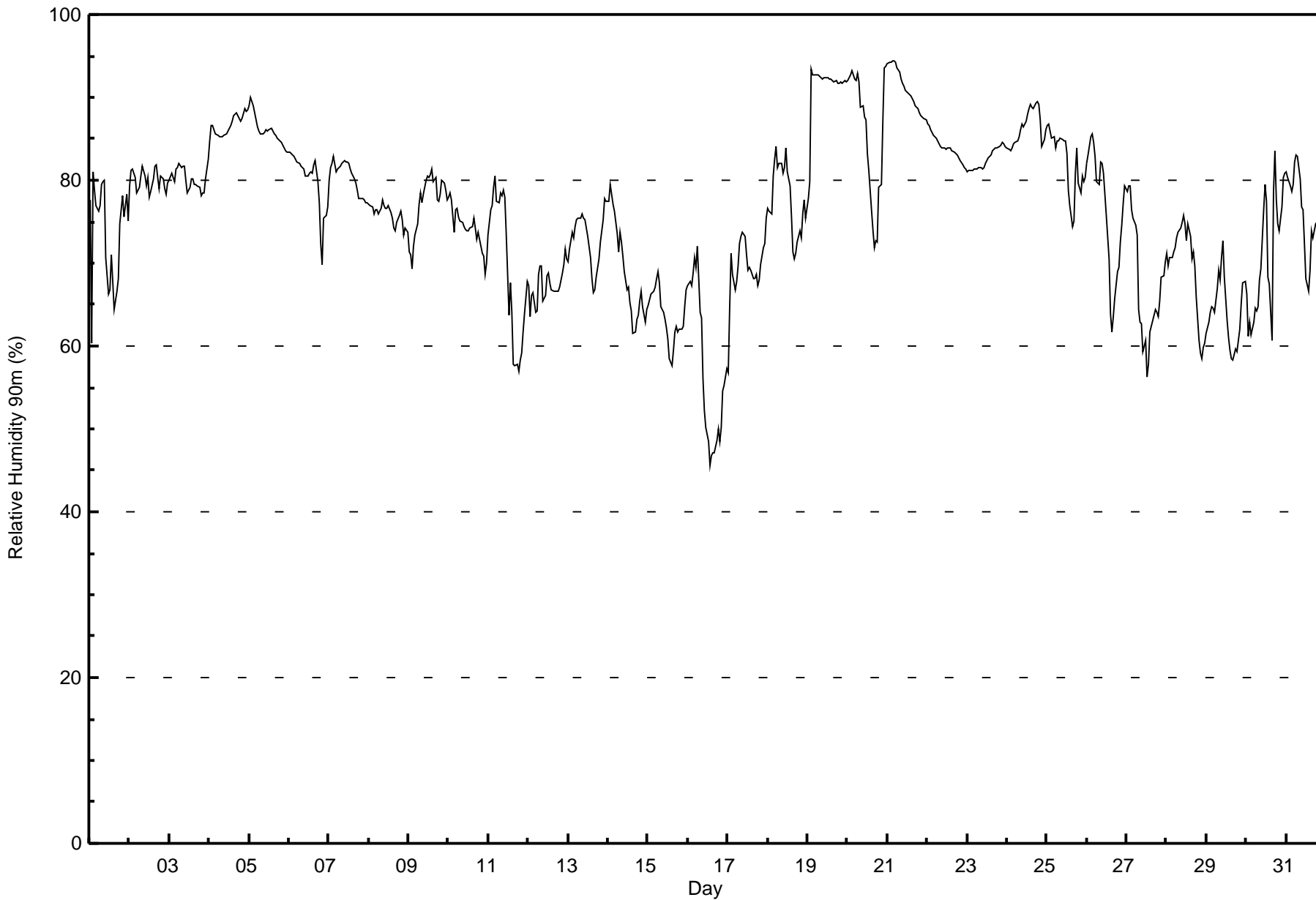


Maximum Value: 94 % on Jan 21 05:00														Maximum Daily Average: 91.2 % on Jan 19														Hours in Service: 744	
Minimum Value: 46 % on Jan 16 14:00														Minimum Daily Average: 57.0 % on Jan 16														Hours of Data: 744	
Maximum Diurnal Average: 78.8 % at hour 7														Minimum Diurnal Average: 73.0 % at hour 16														Hours of Missing Data: 0	
Monthly Average: 76.4 %														Percentiles: P ₁ = 50 P ₁₀ = 64 Q ₁ = 70 Median = 78 Q ₃ = 83 P ₉₀ = 87 P ₉₉ = 93														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-Jan	78	60	81	79	77	76	77	80	80	80	71	66	67	71	68	64	67	68	75	76	78	76	78	75	73.7	81			
2-Jan	79	81	81	80	78	79	79	81	82	81	79	80	78	79	80	82	82	80	79	80	80	79	78	80	79.9	82			
3-Jan	80	81	80	80	81	82	82	82	82	82	80	78	79	80	80	79	80	79	79	78	79	79	80	83	80.2	83			
4-Jan	85	87	87	86	86	85	85	85	85	86	86	86	86	87	87	88	88	88	87	87	87	89	88	89	86.6	89			
5-Jan	89	90	89	88	87	86	86	86	86	86	86	86	86	86	86	86	85	85	85	85	84	84	84	83	86.0	90			
6-Jan	83	83	83	83	82	82	82	82	82	81	80	81	81	81	81	82	82	80	77	72	70	75	76	77	80.0	83			
7-Jan	80	82	82	83	81	81	82	82	82	82	82	82	82	81	81	80	80	79	78	78	78	78	77	77	80.4	83			
8-Jan	77	77	77	76	76	76	76	77	78	77	77	77	77	76	76	74	74	75	76	76	75	73	74	74	75.8	78			
9-Jan	71	71	69	72	73	75	77	79	77	78	80	80	80	81	81	80	80	78	77	78	80	80	79	78	77.3	81			
10-Jan	78	78	78	74	76	77	76	75	75	74	74	74	74	74	74	75	74	73	74	72	71	71	69	70	74.2	78			
11-Jan	73	76	77	79	80	78	77	78	78	79	78	74	64	68	64	58	58	58	57	58	59	62	64	68	69.4	80			
12-Jan	67	64	66	66	64	64	69	70	70	65	66	68	69	68	67	67	67	67	67	67	69	70	72	71	67.4	72			
13-Jan	70	72	74	73	74	75	75	75	76	75	75	74	73	71	68	66	67	68	71	73	74	75	78	77	73.0	78			
14-Jan	77	80	78	77	76	74	71	74	73	71	69	67	67	65	64	62	62	63	64	65	67	65	63	64	69.0	80			
15-Jan	65	66	66	67	67	68	69	68	65	64	63	62	61	59	58	59	62	62	62	62	62	62	65	67	63.8	69			
16-Jan	67	68	67	69	71	69	72	64	63	56	52	50	48	46	47	47	47	49	50	48	50	55	55	57	57.0	72			
17-Jan	57	65	71	69	67	68	70	72	73	74	73	71	69	69	69	68	68	69	67	68	70	72	72	75	69.4	75			
18-Jan	77	76	76	81	83	84	82	82	82	81	82	84	81	79	76	71	70	71	73	74	73	76	78	75	77.7	84			
19-Jan	78	80	93	93	93	93	93	93	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	91.2	93			
20-Jan	92	92	93	93	92	92	93	92	89	89	88	87	83	81	76	74	72	73	73	79	79	87	93	94	85.7	94			
21-Jan	94	94	94	94	94	94	94	93	92	92	91	91	91	90	90	90	89	89	89	88	88	88	87	87	91.0	94			
22-Jan	87	87	86	86	85	85	85	84	84	84	84	84	84	84	84	84	83	83	83	83	82	82	81	81	83.9	87			
23-Jan	81	81	81	81	81	81	81	81	81	81	82	82	82	83	83	83	84	84	84	84	84	85	84	84	82.5	85			
24-Jan	84	84	84	84	84	85	85	85	86	87	87	87	88	89	89	89	89	89	89	89	87	84	85	86	86.4	89			
25-Jan	87	87	86	85	85	84	85	85	85	85	85	85	83	79	77	74	75	81	84	80	79	81	80	80	82.3	87			
26-Jan	82	83	85	86	85	83	80	79	82	82	81	78	76	71	64	62	64	66	69	70	73	75	77	79	76.2	86			
27-Jan	79	79	79	77	75	75	73	64	63	63	59	61	56	58	62	62	64	64	64	64	65	68	68	70	67.2	79			
28-Jan	71	70	71	71	71	72	73	74	74	75	76	75	73	75	73	71	71	70	66	61	59	59	60	60	69.5	76			
29-Jan	62	63	64	65	65	64	67	69	68	71	73	68	63	61	59	58	58	60	59	61	62	65	68	68	64.2	73			
30-Jan	66	61	63	61	63	65	64	65	68	69	76	79	77	68	68	61	79	84	78	75	74	77	80	81	70.9	84			
31-Jan	81	80	79	79	79	82	83	83	80	77	76	72	68	67	69	74	73	74	75	75	75	72	70	76	75.9	83			
																												Diurnal Average	
77.3														77.3														78.8	
94														94														94	
																												Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity 90m (RH90m) - %
Mannix - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity 90m (RH90m) - %
Mannix - January 2017

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	36	4.84	4.84
60 - 80	411	55.24	60.08
80 - 100	297	39.92	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 33 km/h on Jan 11 12:00	Maximum Daily Speed Average: 13.6 km/h on Jan 15	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jan 2 01:00	Minimum Daily Speed Average: 2.1 km/h on Jan 10	Hours of Data: 594
Maximum Diurnal Speed Average: 5.3 km/h at hour 22	Minimum Diurnal Speed Average: 1.7 km/h at hour 12	Hours of Missing Data: 150
Monthly Average Velocity: 3.4 km/h 223.1 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 7 Median = 10 Q ₃ = 14 P ₉₀ = 18 P ₉₉ = 27	Percent Operational Time: 79.8

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-Jan	WNW24	NNW29	NNW18	N19	N17	N17	NNE17	N8	W8	WSW8	W12	NW11	WNW11	WNW5	NW4	NW4	ESE1	SE2	ESE4	SSE1	S2	SSE6	ESE4	S8	NW5.9	NNW29	
2-Jan	WNW0	SSE3	SSW6	SW6	WSW3	S5	SSW4	SSE5	SSE6	SSE4	S4	SSE5	S3	S3	SSE4	SSE4	SSE5	SSE7	SSE5	SSE6	SSE9	S10	SSE8	SSE9	S4.8	S10	
3-Jan	SSE7	SSE10	SSE10	SSE10	S5	SSE6	SSE9	SSE10	SSE9	SSE9	SSE10	SSE7	S4	SSE4	SSE4	S5	SW5	WSW12	W17	W19	W19	W19	W16	WNW8	SSW5.4	W19	
4-Jan	NNW6	N9	NNE10	NNE9	NNE10	NNE8	NE4	ENE1	SSE3	SSE5	SSE5	SSE8	SSE9	SSE9	SSE7	SSE7	SSE10	SSE11	SSE10	SSE12	SSE10	SSE7	SE2	NE2	SE3.5	SSE12	
5-Jan	NNE1	NW6	N11	N15	NNE13	N12	N14	N13	NNE13	NNE11	NNE13	N16	NNE19	NNE16	NNE17	NNE19	NE13	NNE9	N10	NNW7	N7	NNW6	NW6	W5	N10.6	NNE19	
6-Jan	SW7	SSW6	SSW8	SW9	SSW6	S6	SW6	SW9	SW8	SSW7	SSE5	SSE6	SSE7	SSE9	SE4	SE5	SSE7	SSW6	SSE9	S10	S6	ESE3	SE4	SSW5	S5.7	S10	
7-Jan	W5	NE3	N2	NNE3	NNE5	NNE6	NE6	N5	N5	N10	N14	N18	N16	N15	N19	NNE17	NNE20	N16	NNE17	NNE13	NNE11	NNW6	W4	SW8	N9.1	NNE20	
8-Jan	SW6	WSW7	WSW7	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	SSE11	SSE11	SSE9	SSE8	SSE8	S8	SW14	WSW13	SW7	----	SW14	
9-Jan	WSW12	WSW10	SW8	SW9	WSW9	WSW12	WSW8	WSW7	SW7	SW5	SSW3	W6	WNW10	WNW8	W7	W9	W9	W9	W9	W10	WNW7	WNW4	W7	WNW6	WNW8	W7.4	WSW12
10-Jan	WNW4	NW4	NNE8	N9	NNW6	WNW4	NW5	WNW6	NW4	N5	WSW3	SW3	ESE3	ESE5	SSE8	SSE9	SSE7	SSW5	SSW7	SW9	S8	SSE11	SSE12	SSE14	S2.1	SSE14	
11-Jan	SSE13	SSE14	SSE16	SSE17	SSE15	SSE11	SSE7	WSW4	NNW14	N19	N30	N33	NNW30	NNW27	NNW27	NNW26	NNW20	NW17	NW14	NW14	NW12	WNW12	W11	AF	NNW8.4	N33	
12-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	SSE16	SSE13	SSE11	SE16	SE16	SE14	SE14	SE12	SSE13	SSE9	SSE10	----	SE16	
13-Jan	SSE11	SSE9	SSE5	ESE2	SE2	SSE3	NNE1	SSE5	SSE10	SSE11	SSE8	SSE8	SSE7	SSE9	SSE10	SSE9	SSE7	SSE8	SE8	SSE11	SSE12	SSE14	SSE12	SSE13	SSE8.1	SSE14	
14-Jan	SSE15	SSE16	SSE16	SSE13	SSE13	SE10	SE10	SE10	SSE14	SSE13	SSE11	SSE10	SSW10	SW15	WSW12	SW10	SW14	WSW13	SW14	SW11	SW11	SW13	SSW13	S9	S9.7	SSE16	
15-Jan	SW14	W22	W24	WSW21	W26	W27	WSW17	WSW18	WSW22	WSW20	WSW23	WSW19	WSW13	SW10	SW9	SW12	SSW6	S9	SW9	SSW7	S10	S12	S12	SSE9	WSW13.6	W27	
16-Jan	S10	SSE11	S12	SSE13	S12	SSE15	SSE13	SSE14	SSE15	SSE10	S10	SSW15	SSW19	SSW17	SSW18	SSW15	SSW17	SSW18	SSW17	SSW14	S11	S12	S12	SSE14	S13.1	SSW19	
17-Jan	S13	S15	S11	S12	SSW15	SW12	SW17	WSW14	WSW14	WSW15	SW12	SW14	WSW16	WSW12	SSW6	SSE8	SSE9	SSE9	S11	SSE7	SSE8	SSE10	SSE8	SSE9	SSW9.2	SW17	
18-Jan	SE10	SE8	SSE10	SSE9	SE1	ESE1	SE4	SE4	SE5	E2	WNW4	WSW3	SE3	SSE3	SSE5	SSE5	SSE6	SSE8	SSE7	SSE8	SSE9	SE10	SSE10	SSE7	SSE5.3	SE10	
19-Jan	SE4	NE2	NW8	NNW8	NNW10	N8	NNW10	NNW6	NW9	NNW10	N8	NNW9	NNW10	NNW9	NNW8	NNW8	NNW7	NNW6	NNW7	AF	AF	AF	AF	AF	NNW7.1	NNW10	
20-Jan	AF	AF	AF	AF	AF	AF	AF	SSE11	SSE13	SSE13	SSE11	SE9	SSE13	SSE13	SE9	SSE11	SE8	SSE8	SSE10	SSE9	SE5	N11	N13	AF	----	SSE13	
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	SSE13	SSE18	SSE15	SSE12	SSE13	SSE14	SSE16	SSE19	SSE17	----	SSE19	
26-Jan	SSE17	SSE13	SSE11	SSE10	SSE10	SSE11	SSE11	S10	SSE12	SSE11	SSE10	SSE8	SSE8	SE7	SSW7	WSW11	WSW15	WSW16	WSW18	WSW22	W25	W24	WSW16	SSE4	SSW8.6	W25	
27-Jan	SW6	WSW5	SW6	WSW14	W23	W19	SW9	W17	WSW15	WSW22	WSW26	WSW21	WSW21	WSW18	WSW8	WSW5	WSW11	W16	WSW7	WSW9	WSW10	WSW10	WSW13	WSW16	WSW13.4	WSW26	
28-Jan	SW7	SSW6	SSW4	SE2	SE2	SW9	SSE2	SSE6	SSE4	SSE6	SSE7	SSE7	SE6	SE6	SSE12	S10	SSE9	SE9	SSE8	SSE8	SE5	WSW6	W17	WSW20	S5.2	WSW20	
29-Jan	WSW13	SW11	WSW12	WSW17	WSW18	W24	WSW15	S7	SSE7	SSE7	SSE8	SE7	W10	W18	W13	SW10	SW14	WSW11	WSW13	W10	W8	W17	WSW15	WSW13	WSW10.7	W24	
30-Jan	WSW13	WSW13	SW14	SW11	WSW13	WSW11	WSW19	W19	W17	WSW16	NNW14	NNE18	NNE9	N10	NW9	NW17	N18	N18	N20	N21	N19	NNW19	NNW20	NNW20	NW9.8	N21	
31-Jan	NNW19	N19	N17	NNW13	N13	NNE10	NNE5	WNW1	WSW7	WSW7	WSW7	WSW2	WSW5	W4	W12	W13	WSW10	W12	W15	W14	W13	WNW16	NW15	NNW14	NW8.1	N19	

SW5.0 SW3.3SSW3.0 SW2.6WSW3.3WSW3.5 SW2.7 SW3.7SSW4.1 SW3.4WSW2.5 W1.7 W3.0WSW2.7 SW2.6 SW2.7SSW3.3SSW3.7 SW3.8 SW4.0SSW4.0 SW5.3 SW4.7SSW4.7	Diurnal Average
WNW24 NNW29 W24 WSW21 W26 W27 WSW19 W19 WSW22 WSW22 N30 N33 NNW30 NNW27 NNW27 NNW26 NNW20 SSW18 N20 WSW22 W25 W24 NNW20 NNW20	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed 20 m (WS20m) - km/h

Mannix - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 14 km/h on Jan 11 11:00	Hours of Data: 594
Minimum Value: 1 km/h on Jan 5 00:00	Hours of Missing Data: 150
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 8	Hours of Calibration: 0
	Percent Operational Time: 79.8

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-Jan	5	8	5	6	5	5	5	5	1	2	2	3	3	2	2	2	1	1	1	2	1	2	2	2	8
2-Jan	3	2	2	1	2	1	1	1	3	2	1	1	1	2	1	1	1	1	1	2	1	1	1	2	3
3-Jan	1	2	2	2	2	1	1	1	1	1	2	2	2	1	2	2	2	3	3	3	2	2	3	4	4
4-Jan	3	3	4	2	3	2	2	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	1	1	4
5-Jan	1	3	3	5	4	4	4	4	3	3	4	5	5	5	5	5	4	3	3	2	2	1	1	5	
6-Jan	2	1	2	1	1	1	2	1	1	2	1	1	1	2	1	2	1	1	1	2	3	2	1	3	
7-Jan	3	2	2	2	2	2	2	2	1	4	4	5	6	5	6	6	5	5	4	3	2	2	1	6	
8-Jan	1	1	1	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	1	2	2	2	1	3	2	3	3
9-Jan	3	3	2	2	2	2	2	1	1	2	1	2	2	3	1	1	1	1	3	5	1	2	2	5	5
10-Jan	2	1	3	2	3	1	2	2	1	2	1	1	2	1	2	1	1	1	1	1	1	2	3	4	4
11-Jan	3	3	3	3	3	2	2	4	7	6	14	10	8	8	7	7	6	4	3	3	2	2	2	AF	14
12-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	3	3	2	4	4	3	3	2	2	2	3	4
13-Jan	2	2	2	1	1	1	1	2	2	3	3	2	2	2	3	2	2	3	2	2	1	2	4	2	4
14-Jan	3	3	2	2	3	3	3	3	3	3	3	3	3	4	4	4	3	5	3	3	3	4	4	2	5
15-Jan	3	4	4	4	5	6	4	4	4	5	5	5	4	3	3	3	3	2	3	3	4	3	3	2	6
16-Jan	2	2	2	2	2	3	3	2	3	3	5	5	6	6	6	4	5	5	4	4	3	3	3	2	6
17-Jan	3	4	3	3	4	3	4	3	3	3	3	3	4	3	2	2	1	2	2	3	3	2	2	2	4
18-Jan	2	2	2	3	1	1	2	2	3	2	3	4	2	1	3	3	2	2	1	2	2	3	3	2	4
19-Jan	4	2	3	2	3	3	3	2	3	3	3	3	3	3	2	3	3	2	2	AF	AF	AF	AF	AF	4
20-Jan	AF	AF	AF	AF	AF	AF	AF	2	2	2	2	2	3	3	2	2	2	2	1	3	2	2	4	AF	4
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	3	4	1	2	2	2	2	2	4
26-Jan	2	2	2	2	1	2	1	2	2	3	2	2	2	2	2	3	3	3	4	4	3	3	4	2	4
27-Jan	3	2	2	5	4	5	4	5	4	4	5	3	4	5	5	3	4	3	3	2	2	2	3	3	5
28-Jan	3	2	2	1	2	4	3	3	2	2	2	2	2	2	2	2	2	3	2	2	2	3	4	4	4
29-Jan	4	3	3	3	4	5	10	2	3	3	2	4	4	3	3	3	3	2	2	1	2	3	2	2	10
30-Jan	2	2	3	2	2	2	3	3	3	3	6	5	4	4	2	6	6	5	7	7	6	6	6	6	7
31-Jan	6	6	5	4	3	3	2	1	2	1	3	2	2	2	3	2	3	3	2	3	2	4	3	3	6
	6	8	5	6	5	6	10	5	7	6	14	10	8	8	7	7	6	5	7	7	6	6	6	6	

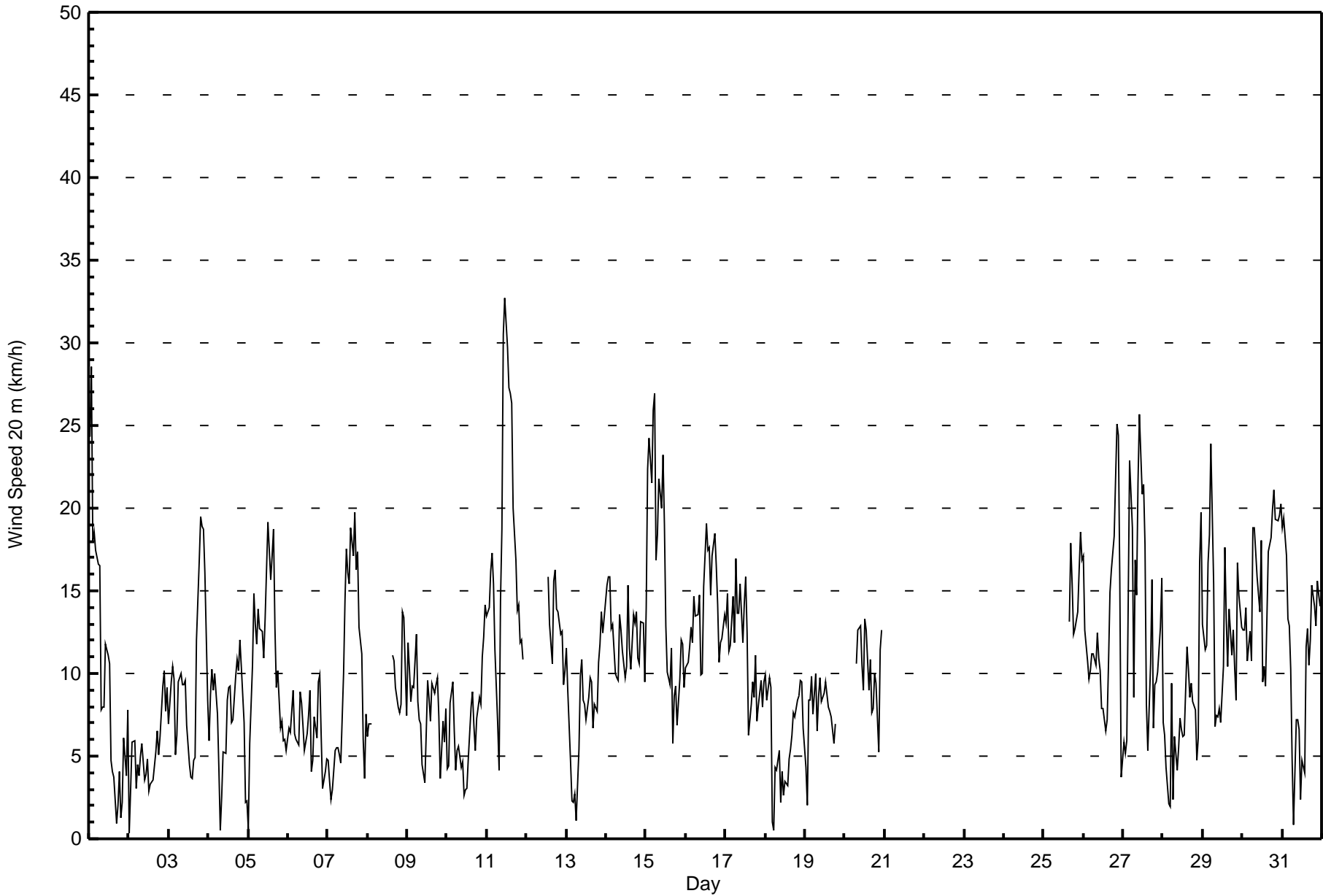
Diurnal Maximum

AF - Analyzer Failure



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed 20 m (WS20m) - km/h
Mannix - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed 20 m (WS20m) - km/h
Mannix - January 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	103	17.34	17.34
6 - 11	268	45.12	62.46
12 - 19	191	32.15	94.61
20 - 28	28	4.71	99.33
29 - 38	4	0.67	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 594

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Wind Speed 20 m (WS20m) - km/h
Mannix - January 2017

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	3	5	4	1	1	8	16	24	8	6	2	8	4	7	5	1	103
6 - 11	11	11	1	0	0	0	14	108	18	13	26	22	12	8	6	18	268
12 - 19	22	12	1	0	0	0	5	45	9	11	13	38	20	2	6	7	191
20 - 28	2	1	0	0	0	0	0	0	0	0	0	10	8	1	0	6	28
29 - 38	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	40	29	6	1	1	8	35	177	35	30	41	78	44	18	17	34	594

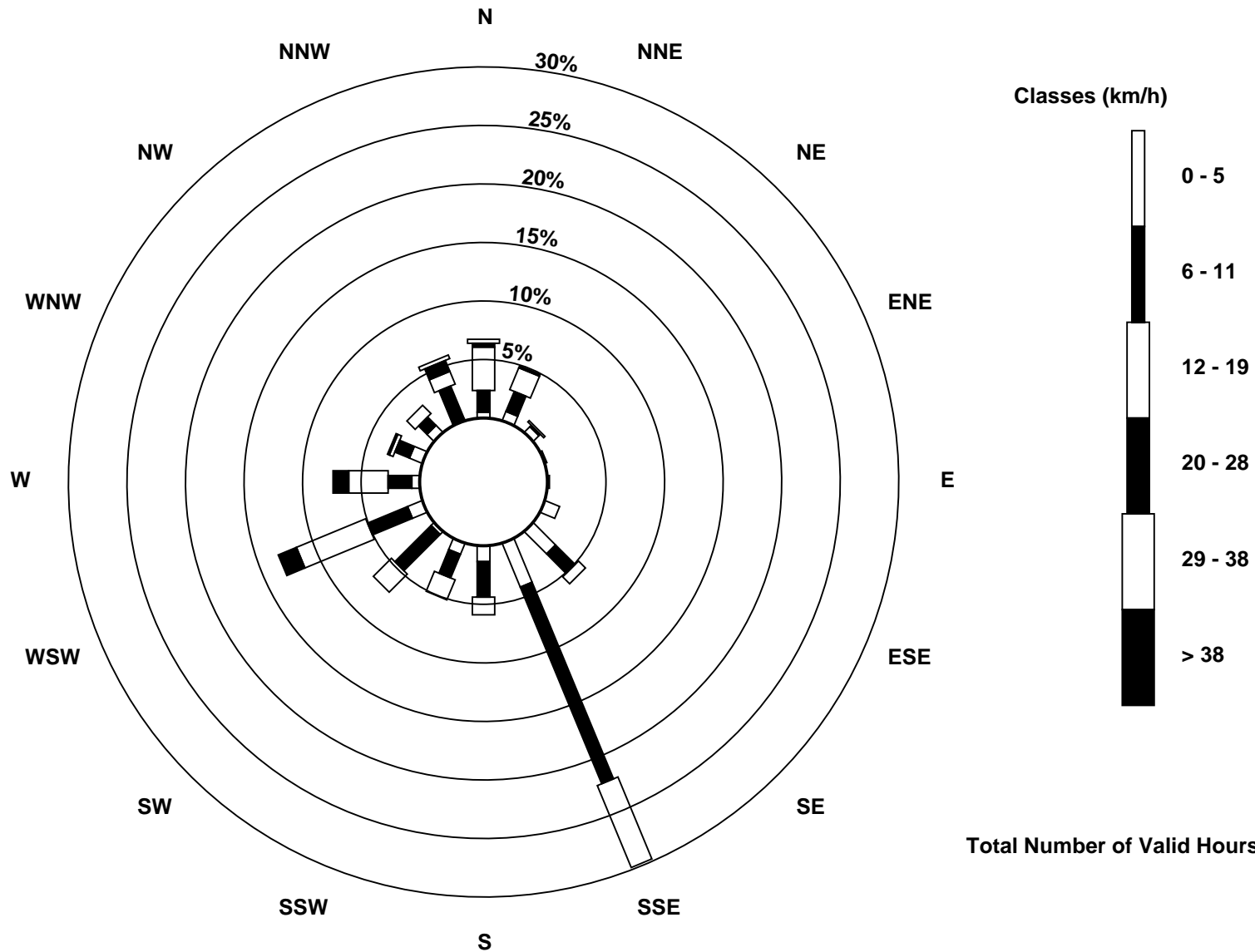
Total Number of Valid Hours: 594

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

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





Maximum Speed: 42 km/h on Jan 11 12:00	Maximum Daily Speed Average: 21.6 km/h on Jan 16	Hours in Service: 744
Minimum Speed Value: 1 km/h on Jan 1 17:00	Minimum Daily Speed Average: 4.1 km/h on Jan 4	Hours of Data: 511
Maximum Diurnal Speed Average: 8.8 km/h at hour 9	Minimum Diurnal Speed Average: 3.4 km/h at hour 12	Hours of Missing Data: 233
Monthly Average Velocity: 6.5 km/h 212.5 deg	Percentiles: P ₁ = 2 P ₁₀ = 6 Q ₁ = 10 Median = 15 Q ₃ = 21 P ₉₀ = 25 P ₉₉ = 34	Percent Operational Time: 68.7

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-Jan	WNW30	NW37	NNW25	N25	N23	N22	N21	N12	WNW9	WSW12	WNW16	NW15	WNW13	W7	NW7	NW6	E1	ESE3	ESE5	ESE3	SE4	SE10	SE7	S8	NW8.3	NW37	
2-Jan	SW3	SE3	SSW7	WSW8	WNW8	SW4	WSW7	S4	SSE7	SSE4	SSE6	S5	SSW2	S4	SSE4	S8	SSE11	SSE13	SSE9	S10	SSE12	S13	S11	SSE14	S6.4	SSE14	
3-Jan	S11	SSE13	SSE15	SSE16	SSE11	SSE10	SSE13	SSE15	SSE12	SSE10	SSE12	SSE8	S5	S3	S4	SSW8	WSW10	WSW17	W21	W24	W21	W21	W19	WNW12	SSW7.7	W24	
4-Jan	NNW9	N12	N13	NNE11	NNE13	NNE8	NNE5	NE1	SSE3	SE5	SSE7	SE9	SE10	SE10	SE8	SE7	SSE15	SSE17	SSE14	SSE16	SSE13	SE9	S2	NNE3	ESE4.1	SSE17	
5-Jan	N1	NW9	N14	N19	N17	N16	N18	N17	N16	NNE14	N17	N22	N24	N21	NNE21	NNE24	NNE16	N12	N14	NNW9	N9	NW8	NW8	WNW6	N14.0	N24	
6-Jan	SW9	SW9	SSW12	SW12	SSW9	S6	SW6	SW10	SW15	SW13	S9	SSE7	SSE9	SE9	SE5	SE7	SE13	S12	SSE19	SSE20	S15	SSE6	ESE8	SSE8	S8.7	SSE20	
7-Jan	SW6	N7	N5	NNE11	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	NNE11	
8-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
9-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
10-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
11-Jan	AF	AF	AF	AF	AF	AF	AF	W15	AF	N25	NNW33	NNW42	NNW38	NNW36	NW34	NW35	NNW27	NW22	NW19	NW20	NW17	WNW14	W15	W14	----	NNW42	
12-Jan	WSW9	SW7	S7	SSE11	SSE15	SSE19	SSE19	SSE24	SSE21	SE19	SSE19	SSE19	SSE21	SSE21	SE17	SSE14	SE20	SE20	SE17	SE18	SE17	SE17	SSE12	SSE14	SSE15.6	SSE24	
13-Jan	SSE16	SSE13	SSE4	SW2	SW5	SW4	WNW3	SSE4	SSE13	SE14	SE10	SE10	SSE8	SE11	SE14	SSE16	SSE17	SSE17	SSE17	SSE21	SSE21	SSE23	SSE22	SSE24	SSE12.3	SSE24	
14-Jan	SSE27	SSE27	SSE26	SSE27	SSE25	SSE22	SSE23	SE26	SSE30	SSE25	SSE24	S17	SSW16	SW21	SW17	SW16	SW22	WSW19	SW19	SW18	SW18	SW22	SSW22	SSW19	S18.0	SSE30	
15-Jan	SW23	WSW28	WSW29	WSW29	WSW31	WSW31	WSW21	WSW24	WSW28	WSW25	WSW28	WSW23	WSW17	SW14	SW13	SW16	SW10	S14	SW17	SW13	S12	S20	S21	SSE15	SW18.9	WSW31	
16-Jan	S19	S15	S20	S18	S21	SSE21	SSE19	SSE20	SSE22	S19	S20	SSW24	SSW27	SSW26	SSW27	SSW22	SSW27	SSW30	SSW28	SSW25	S21	S21	S21	SSE20	S21.6	SSW30	
17-Jan	S23	S25	S21	S21	SSW23	SW18	SW24	WSW19	WSW20	WSW24	SW20	SW20	WSW22	WSW18	SW11	SSE11	SSE15	SSE15	S22	S14	SSE13	SSE18	SSE14	SSE18	SSW15.4	S25	
18-Jan	SE19	SE15	SE13	SE14	SE4	SSE3	SE10	SE10	SE12	ESE7	W2	W4	SE5	SSE5	SSE8	SSE11	SSE12	SSE13	SSE14	SSE16	SSE16	SE17	SE18	SSE15	SSE10.3	SE19	
19-Jan	SSE8	NE4	NNW11	NNW11	NNW13	N11	NNW13	NNW8	NW10	NNW12	N11	NNW11	NNW10	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	NNW13	
20-Jan	AF	AF	AF	AF	AF	AF	AF	AF	SSE21	SSE20	SE17	SE13	SE18	SE17	SE14	SE17	SE15	SE13	SE15	SSE13	SSE10	N13	N19	AF	----	SSE21	
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	SSE23	SSE20	SSE21	SSE22	SSE25	SSE26	SSE23	----	SSE26
26-Jan	SSE24	SSE19	SSE17	SSE14	SSE14	S16	SSW12	SSW12	S15	S13	SSE15	SSE12	SSE12	SE8	SSW10	WSW16	WSW22	WSW23	WSW27	WSW28	WSW29	WSW29	WSW22	SSW5	SSW13.0	WSW29	
27-Jan	WSW11	WSW10	WSW11	WSW21	WSW28	WSW25	WSW14	WSW22	WSW20	WSW28	WSW32	WSW26	WSW26	WSW24	WSW13	WSW9	WSW15	W19	WSW12	WSW17	WSW16	WSW17	WSW20	WSW22	WSW19.0	WSW32	
28-Jan	WSW13	SW11	SW9	SW7	SW6	SW15	SW6	SSW6	SSW9	SW6	SSW8	S11	SE10	SE10	SSE17	S18	SSE14	SSE17	SSE16	S13	SSW6	WSW13	WSW22	WSW26	SSW9.2	WSW26	
29-Jan	WSW19	SW17	WSW18	WSW23	WSW24	WSW29	WSW20	S9	SSE10	S14	S12	SSE10	WSW13	WSW21	WSW16	SW14	SW21	WSW18	WSW19	WSW16	WSW14	WSW22	WSW22	WSW20	WSW15.6	WSW29	
30-Jan	WSW20	WSW20	SW20	SW15	WSW17	WSW16	WSW27	WSW25	WSW22	WSW22	NNW17	N24	N12	N13	WNW11	NW23	N23	N24	N27	NNW28	N26	NNW26	NNW26	NNW27	NW13.8	NNW28	
31-Jan	NNW25	N26	N22	NNW19	NNW18	NNE13	N6	WNW2	WSW11	WSW10	WSW8	SW3	WSW6	WSW5	W13	WSW15	WSW13	WSW16	W20	W19	W16	WNW23	NW21	NNW19	WNW10.7	N26	

SSW8.4	SW5.2	SW5.1	SW5.0	WSW6.2	SW6.0	SW5.4	SSW6.5	SSW8.8	SSW7.2	SSW5.6	SW3.4	SW5.0	SW5.0	SW5.2	SW5.7	SSW7.2	SSW8.4	SSW8.6	SSW8.5	SSW7.8	SW8.4	SW7.5	SSW7.4	Diurnal Average
WNW30	NW37	WSW29	WSW29	WSW31	WSW31	WSW27	SE26	SSE30	WSW28	NNW33	NNW42	NNW38	NNW36	NW34	NW35	SSW27	SSW30	SSW28	WSW28	WSW29	WSW29	NNW26	NNW27	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

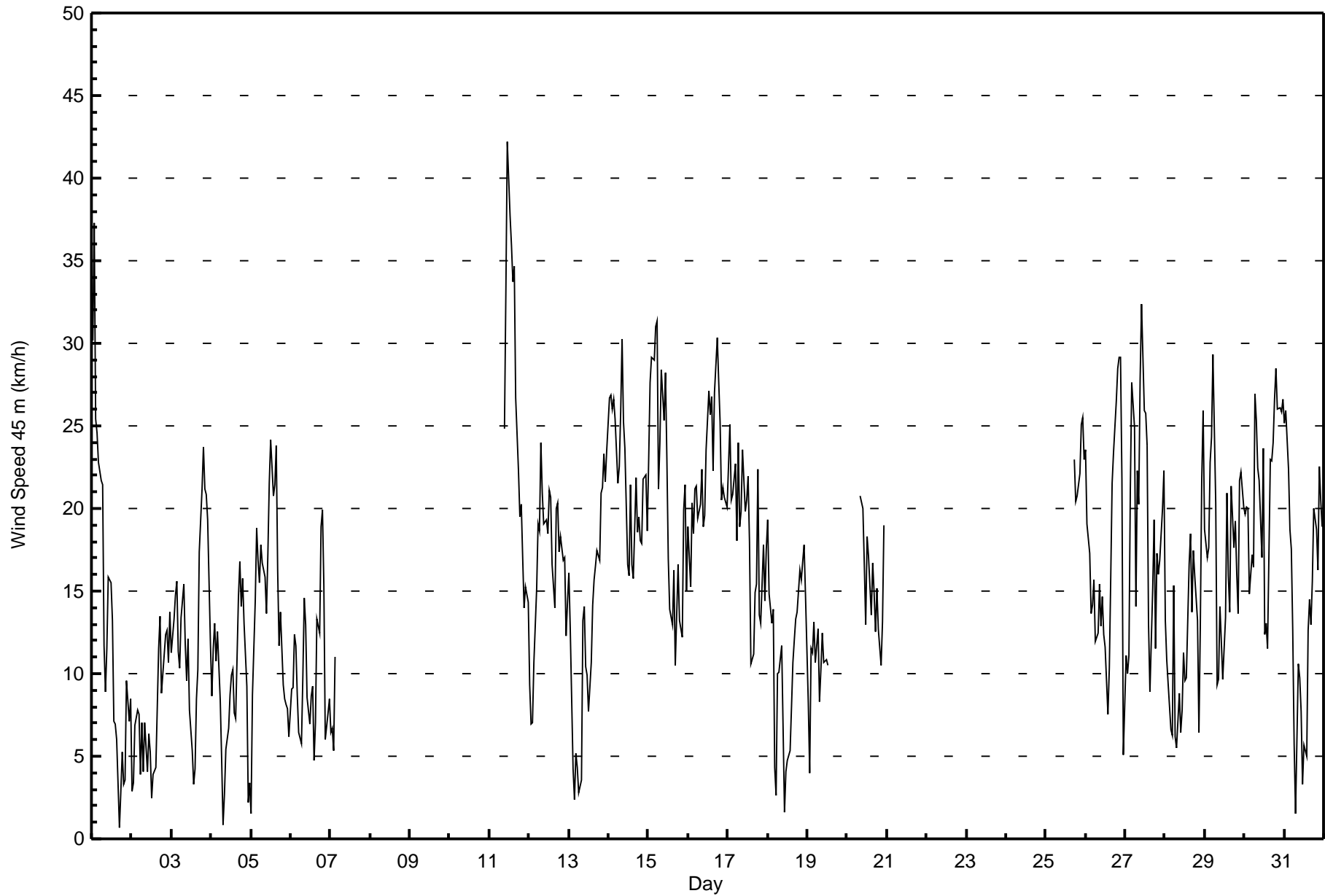
Wind Speed 45 m (WS45m) - km/h

Mannix - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 11 km/h on Jan 29 07:00	Hours of Data: 511
Minimum Value: 1 km/h on Jan 4 08:00	Hours of Missing Data: 233
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 8	Hours of Calibration: 0
	Percent Operational Time: 68.7

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-Jan	5	9	4	5	5	5	5	6	2	2	2	2	3	1	2	2	1	2	1	3	2	2	3	3	9	
2-Jan	4	2	1	1	2	1	1	2	2	1	2	1	1	1	1	1	1	1	2	1	1	1	1	2	4	
3-Jan	1	2	1	2	2	2	2	1	2	1	2	1	2	1	1	3	2	3	3	2	2	2	2	5	5	
4-Jan	2	3	4	2	2	2	2	1	1	1	1	2	2	2	2	2	3	2	1	1	2	2	2	1	4	
5-Jan	1	3	3	5	3	3	5	4	3	4	5	5	5	6	5	5	4	3	3	2	2	2	1	1	6	
6-Jan	2	1	1	2	1	1	1	2	1	2	2	1	2	2	1	3	2	2	1	2	6	2	1	2	6	
7-Jan	2	2	1	3	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	3	
8-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
9-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
10-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
11-Jan	AF	AF	AF	AF	AF	AF	AF	5	AF	6	11	7	8	7	7	7	6	3	3	3	2	3	1	1	11	
12-Jan	1	1	2	2	2	3	2	2	3	2	2	3	2	3	2	2	4	4	3	3	3	2	2	2	4	
13-Jan	3	2	2	2	2	2	1	2	2	3	3	3	2	3	4	4	2	2	2	1	1	1	2	1	4	
14-Jan	3	2	3	2	2	3	3	4	2	3	3	4	4	3	5	6	4	6	4	3	3	3	4	2	6	
15-Jan	2	4	4	4	5	6	4	5	4	5	5	5	4	3	3	3	4	2	4	4	4	2	3	2	6	
16-Jan	2	2	2	2	1	4	3	3	3	3	4	5	6	6	6	5	4	4	4	4	2	3	2	2	6	
17-Jan	3	3	3	4	4	3	4	3	3	3	3	3	4	3	2	2	1	3	2	5	3	2	3	2	5	
18-Jan	2	3	2	3	2	1	3	3	2	3	3	5	2	2	2	3	3	1	1	1	2	4	2	3	5	
19-Jan	8	4	3	2	3	4	3	2	3	3	4	2	2	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	8	
20-Jan	AF	AF	AF	AF	AF	AF	AF	AF	2	3	2	3	3	3	3	2	2	2	2	3	3	5	4	AF	5	
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	4	2	2	2	2	1	1	4
26-Jan	2	2	2	1	2	2	2	1	2	2	3	2	3	2	3	3	2	3	4	4	3	3	3	2	4	
27-Jan	3	3	4	4	3	5	5	4	4	4	5	3	4	4	6	3	4	3	3	2	1	2	3	3	6	
28-Jan	4	3	2	3	3	3	5	3	2	2	2	2	1	3	2	3	2	4	2	1	2	4	5	4	5	
29-Jan	4	3	4	3	4	5	11	3	3	3	4	3	4	4	3	4	3	3	2	2	2	3	1	2	11	
30-Jan	1	2	4	3	2	2	4	4	3	3	6	5	4	4	2	7	6	6	7	7	6	5	5	6	7	
31-Jan	6	6	5	5	3	3	2	1	3	1	3	2	2	2	3	2	2	2	2	4	2	4	3	3	6	
Diurnal Maximum																										

AF - Analyzer Failure





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed 45 m (WS45m) - km/h
Mannix - January 2017

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	43	8.41	8.41
6 - 11	112	21.92	30.33
12 - 19	195	38.16	68.49
20 - 28	143	27.98	96.48
29 - 38	17	3.33	99.80
> 38	1	0.20	100.00

Total Number of Valid Hours: 511

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed 45 m (WS45m) - km/h
Mannix - January 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	2	2	2	0	1	3	6	7	7	2	6	1	1	3	0	0	43
6 - 11	5	3	0	0	0	2	15	25	10	8	13	13	1	5	4	8	112
12 - 19	17	4	0	0	0	0	25	58	16	6	18	29	8	4	3	7	195
20 - 28	14	3	0	0	0	0	3	33	12	11	9	41	5	1	4	7	143
29 - 38	0	0	0	0	0	0	0	1	0	1	0	8	0	1	3	3	17
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Totals	38	12	2	0	1	5	49	124	45	28	46	92	15	14	14	26	511

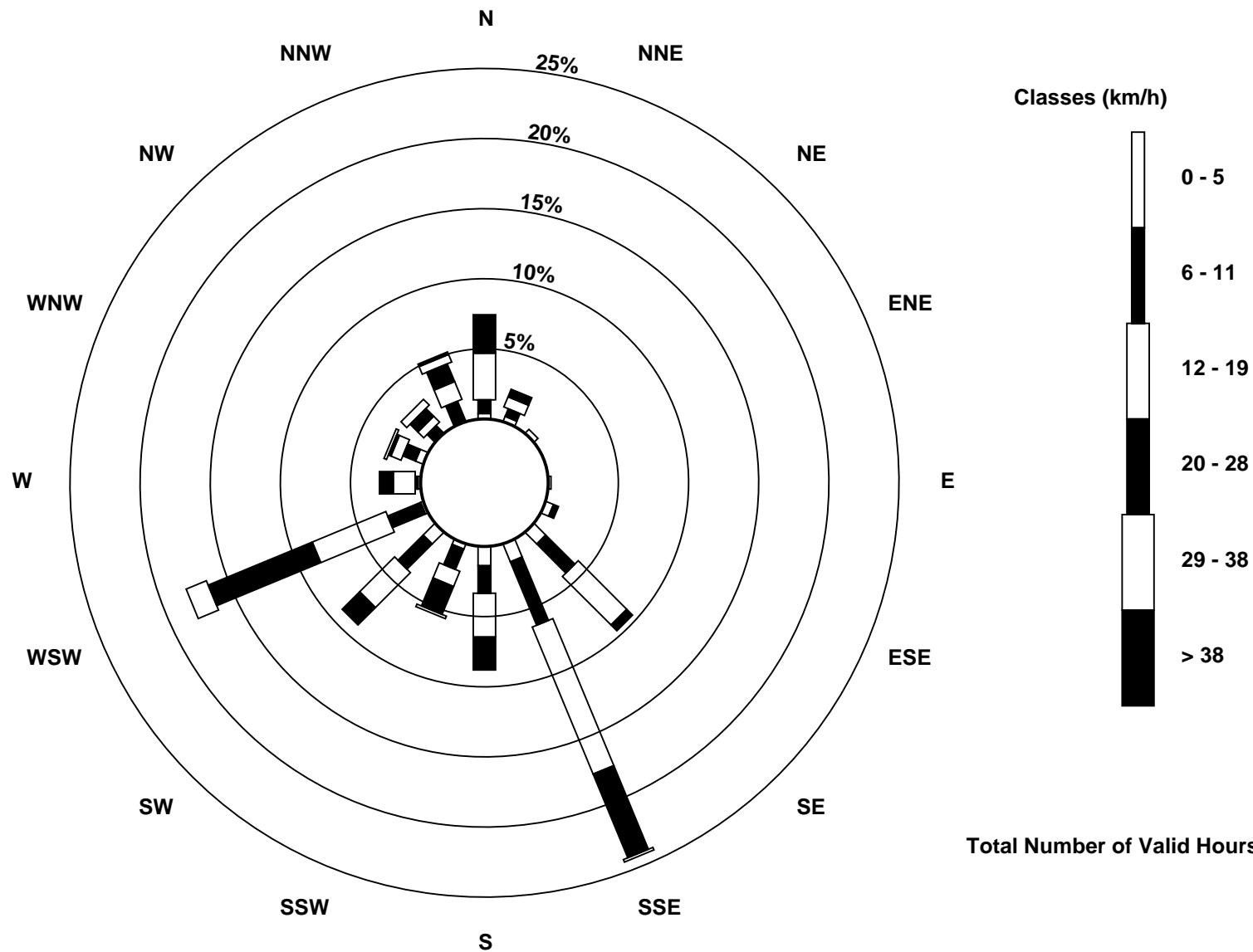
Total Number of Valid Hours: 511

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

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



Total Number of Valid Hours: 511



Maximum Speed: 49 km/h on Jan 11 12:00	Maximum Daily Speed Average: 26.7 km/h on Jan 16	Hours in Service: 744
Minimum Speed Value: 1 km/h on Jan 4 08:00	Minimum Daily Speed Average: 4.1 km/h on Jan 4	Hours of Data: 498
Maximum Diurnal Speed Average: 12.4 km/h at hour 9	Minimum Diurnal Speed Average: 5.5 km/h at hour 12	Hours of Missing Data: 246
Monthly Average Velocity: 8.6 km/h 221.9 deg	Percentiles: P ₁ = 2 P ₁₀ = 7 Q ₁ = 12 Median = 19 Q ₃ = 25 P ₉₀ = 29 P ₉₉ = 40	Percent Operational Time: 66.9

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-Jan	WNW34	NW43	NNW29	N28	N26	N25	N25	N15	WNW9	WSW13	WNW19	NW19	NW14	W8	NW9	NNW8	N2	NE2	ESE3	E4	E4	SE9	SE8	SSW7	NNW10.4	NW43	
2-Jan	W5	SE2	SSW4	WSW7	WNW9	W7	W9	WNW3	SSE3	WSW2	SSW2	SSW4	SW3	SSE4	S6	SSE11	SSE12	SSE15	S11	SSW8	SSW9	SSW12	SSW11	S9	SSW5.2	SSE15	
3-Jan	SSW10	S7	SSE12	SSE14	S12	SSW8	S10	S12	SSW7	SSW8	S10	SSW6	SW5	WSW8	WSW13	WSW15	W21	W25	W27	W23	W23	W22	WNW14	WSW10.0	W27		
4-Jan	N10	N13	NNE15	NNE13	NNE15	NNE10	NNE5	NE1	SSE2	SE4	SSE7	SE9	SE11	SE12	SE8	SE5	SSE17	S21	SSE17	SSE18	SSE16	SSE11	W3	N6	SE4.1	S21	
5-Jan	N5	NNW11	N16	N22	N20	N17	N20	N20	AF	AF	AF	N23	N27	N24	NNE24	NNE27	NNE19	N13	N15	NNW10	N10	NNW8	NW8	WNW6	N15.9	N27	
6-Jan	SW10	SW10	SSW12	SW11	SW9	S7	SW6	SW9	SW18	AF	AF	AF	SE10	SE10	SE6	SE10	SE16	SSE17	SSE22	S22	S22	S12	SSE6	S5	S10.1	S22	
7-Jan	WSW4	NNW6	N14	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	N14	
8-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
9-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
10-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
11-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	N27	NNW32	N49	NNW42	NNW40	NW39	NNW40	NNW31	NW26	NW25	NW24	NW21	NW16	WNW16	WNW13	----	N49
12-Jan	W10	W6	S6	S10	SSE12	SSE21	SSE23	SSE29	SSE29	SE25	SE24	SE23	SSE27	SSE25	SE22	SE20	SE26	SE24	SE21	SE23	SE21	SE22	SE16	SSE18	SSE18.7	SSE29	
13-Jan	SSE22	S15	SSW6	WSW8	WSW7	WSW6	WNW5	SW2	SSE13	SSE13	SE11	SSE13	SSE9	SE14	SSE14	S15	S23	S23	S20	S20	S19	S23	S29	S33	S14.0	S33	
14-Jan	S35	SSE31	SSE32	SSE27	SSE28	S25	S21	SSE27	SSE29	S23	S23	SSW23	SW20	SW25	SW20	SW19	SW27	WSW23	WSW24	SW23	SW28	SW28	SW28	SSW26	SSW22.4	S35	
15-Jan	SW29	WSW32	WSW33	WSW34	WSW35	WSW35	WSW25	WSW29	WSW33	WSW32	WSW26	WSW20	SW16	SW15	SW15	SW19	SW14	SSW16	SW21	SW18	SSW14	SSW21	SSW21	S17	WSW23.0	WSW35	
16-Jan	SSW23	SSW20	SSW25	SSW21	S26	S24	SSE23	S26	S29	SSW26	SSW26	SSW28	SSW31	SSW30	SSW31	SSW27	SSW32	SSW37	SSW34	SSW33	SSW26	S26	S26	S26	SSW26.7	SSW37	
17-Jan	S29	S31	SSW26	SSW27	SSW28	SW22	SW29	WSW23	WSW24	WSW29	SW26	SW25	WSW26	WSW22	SW13	S13	SSE14	SSE15	S27	SSW20	SSW13	S21	SSW16	SSE17	SSW19.7	S31	
18-Jan	SSE20	SE20	SE17	SE14	ESE5	SE4	SE15	SE10	SE14	ESE7	SE3	SW3	SE6	SSE9	SSE13	SSE19	SSE17	SSE19	SSE19	SSE19	SSE19	SE22	SSE26	SSE23	SSE13.8	SSE26	
19-Jan	SSE8	NNE7	NNW13	NNW14	NNW16	N13	NNW15	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	NNW16	
20-Jan	AF	AF	AF	AF	AF	SSE17	SSE18	SSE21	SSE25	SSE20	SSE12	SE17	SE21	SE19	SE17	SE19	SE19	SE15	SE18	SE14	SE14	N10	AF	AF	----	SSE25	
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
26-Jan	S22	S20	S17	SSW9	SSW10	SSW15	SW15	SW13	SSW14	SSW11	SSW11	SSW14	SSW14	S9	SW14	WSW19	WSW25	WSW29	WSW33	WSW34	WSW33	W34	WSW27	WSW10	SW16.8	W34	
27-Jan	WSW16	WSW14	WSW16	WSW26	WSW32	WSW30	WSW19	WSW27	WSW24	WSW33	WSW37	WSW30	WSW28	WSW27	WSW17	WSW11	WSW18	W23	WSW16	WSW23	WSW20	WSW22	WSW24	WSW26	WSW23.2	WSW37	
28-Jan	WSW19	SW14	SW13	WSW12	WSW12	WSW19	WSW10	SW6	SW12	WSW12	SW11	SSW12	S7	SE12	SSE20	S23	S19	SSE24	S20	SSW15	WSW11	WSW18	W26	WSW31	SW12.7	WSW31	
29-Jan	WSW23	WSW20	WSW23	WSW27	WSW30	WSW34	WSW25	SSW10	S9	SSW16	SSW17	S12	WSW15	WSW23	W17	SW15	SW24	WSW23	WSW23	WSW22	WSW19	W26	WSW26	WSW25	WSW19.8	WSW34	
30-Jan	WSW25	WSW25	WSW24	WSW19	WSW20	WSW22	WSW31	WSW32	W26	WSW26	NNW19	NNE27	N15	N15	NW12	NW26	N26	N27	N30	N32	N30	NNW30	NNW30	NNW30	NW16.3	N32	
31-Jan	NNW29	N30	N26	NNW22	N21	NNE15	N6	WNW1	W12	W10	WSW9	SW4	WSW6	WSW6	W13	W15	WSW15	WSW19	W24	W23	W19	WNW27	NW24	NNW22	NW12.3	N30	

SW10.6	SW7.0	SW6.6	WSW7.6	WSW8.4	SW8.2	SW7.4	SW8.6	SW12.4	SW11.1	SW8.8	SW5.5	SW6.5	SW6.1	SW6.4	SW7.0	SSW9.6	SSW10.6	SSW11.1	SSW10.8	SSW9.7	SSW10.8	SSW11.2	SSW9.7	Diurnal Average
S35	NNW43	WSW33	WSW34	WSW35	WSW35	WSW31	WSW32	WSW33	WSW33	WSW37	N49	NNW42	NNW40	NNW39	NNW40	SSW32	SSW37	SSW34	WSW34	WSW33	W34	NNW30	S33	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

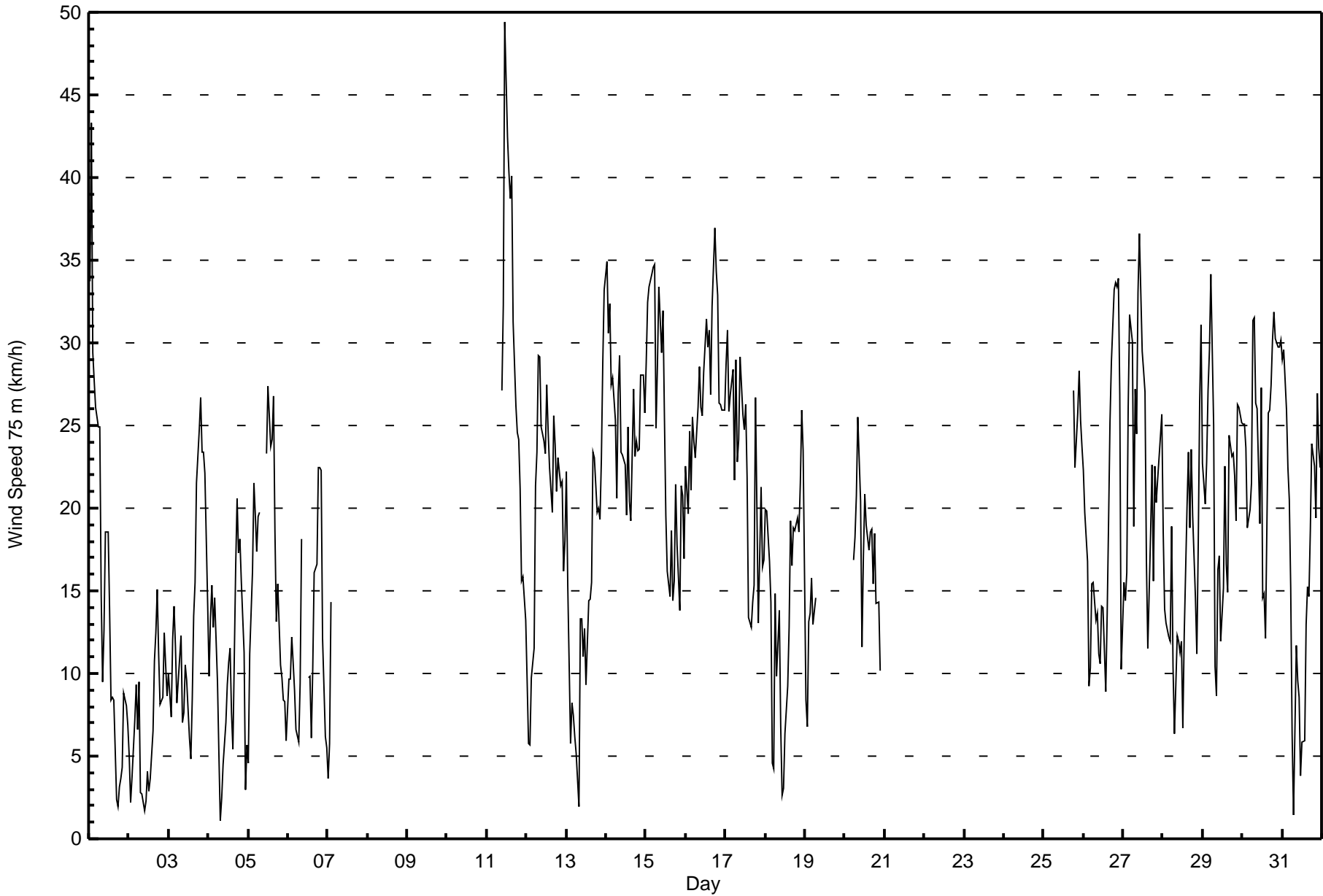
Wind Speed 75 m (WS75m) - km/h
Mannix - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 12 km/h on Jan 29 07:00	Hours of Data: 498
Minimum Value: 1 km/h on Jan 4 20:00	Hours of Missing Data: 246
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 8	Hours of Calibration: 0
	Percent Operational Time: 66.9

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-Jan	5	9	4	5	5	4	5	6	2	2	2	2	3	1	2	2	2	1	1	2	2	2	2	2	9	
2-Jan	4	2	1	2	2	3	1	2	1	1	2	1	1	1	1	1	1	1	1	2	1	1	2	2	4	
3-Jan	2	2	2	2	2	1	2	2	2	1	3	1	2	3	2	3	2	2	3	2	2	2	2	5	5	
4-Jan	2	4	4	2	3	2	2	1	1	1	1	2	2	1	2	2	5	1	1	1	2	3	2	2	5	
5-Jan	3	3	3	6	3	4	5	4	AF	AF	AF	6	4	5	5	4	3	3	3	2	2	2	2	6		
6-Jan	2	1	1	1	1	1	1	4	1	AF	AF	AF	1	2	2	4	2	2	2	1	3	2	2	4		
7-Jan	1	3	2	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	3		
8-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--		
9-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--		
10-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--		
11-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	5	7	8	8	7	7	7	6	3	3	2	2	2	1	1	8	
12-Jan	1	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2	4	5	4	4	2	2	2	3	5	
13-Jan	3	2	2	2	2	1	1	2	4	2	3	2	2	3	3	3	1	2	3	2	1	2	3	1	4	
14-Jan	1	2	2	2	1	2	3	3	2	2	2	3	3	3	5	6	4	6	4	3	3	4	4	3	6	
15-Jan	2	4	4	4	5	5	4	5	4	4	5	4	4	3	3	3	5	3	4	4	3	2	3	2	5	
16-Jan	3	3	2	2	2	3	3	3	3	3	4	5	6	6	7	5	4	3	3	4	2	3	2	2	7	
17-Jan	3	3	3	3	4	3	4	4	3	3	4	3	3	3	3	2	2	3	1	5	2	2	4	2	5	
18-Jan	4	2	3	4	3	3	4	4	5	3	4	3	2	2	3	2	4	2	1	1	1	5	3	3	5	
19-Jan	9	2	3	2	3	4	3	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	9		
20-Jan	AF	AF	AF	AF	AF	2	2	2	2	5	4	3	2	2	5	2	2	3	3	3	3	7	AF	AF	7	
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	1	1	1	2	2	2
26-Jan	1	2	2	2	2	2	2	1	2	1	3	2	2	3	3	4	2	3	4	4	4	3	3	4	4	
27-Jan	3	3	5	4	4	5	5	5	5	5	4	3	3	4	6	3	4	3	4	2	2	2	3	3	6	
28-Jan	5	3	3	2	3	4	7	3	2	3	4	2	2	5	2	3	3	3	1	2	3	5	5	4	7	
29-Jan	5	4	4	3	5	5	12	4	4	3	3	3	4	4	4	4	3	3	2	1	2	3	2	2	12	
30-Jan	1	2	4	3	2	2	4	5	3	4	6	5	4	4	3	7	6	6	7	6	6	6	5	5	7	
31-Jan	6	7	5	5	4	3	3	1	3	2	3	1	3	2	4	2	2	3	2	4	2	4	3	3	7	
	9	9	5	6	5	5	12	6	5	5	7	8	8	7	7	7	6	6	7	6	6	7	5	5		

Diurnal Maximum

AF - Analyzer Failure





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed 75 m (WS75m) - km/h
Mannix - January 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	33	6.63	6.63
6 - 11	91	18.27	24.90
12 - 19	141	28.31	53.21
20 - 28	170	34.14	87.35
29 - 38	57	11.45	98.80
> 38	6	1.20	100.00

Total Number of Valid Hours: 498

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed 75 m (WS75m) - km/h
Mannix - January 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	2	1	2	0	2	2	5	3	1	3	5	2	2	3	0	0	33
6 - 11	5	2	0	0	0	1	12	7	13	15	8	12	6	4	1	5	91
12 - 19	9	6	0	0	0	0	17	29	11	14	15	22	5	4	4	5	141
20 - 28	16	3	0	0	0	0	14	18	30	18	12	39	11	1	6	2	170
29 - 38	4	0	0	0	0	0	0	5	6	7	2	24	1	1	0	7	57
> 38	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	6
Totals	37	12	2	0	2	3	48	62	61	57	42	99	25	13	13	22	498

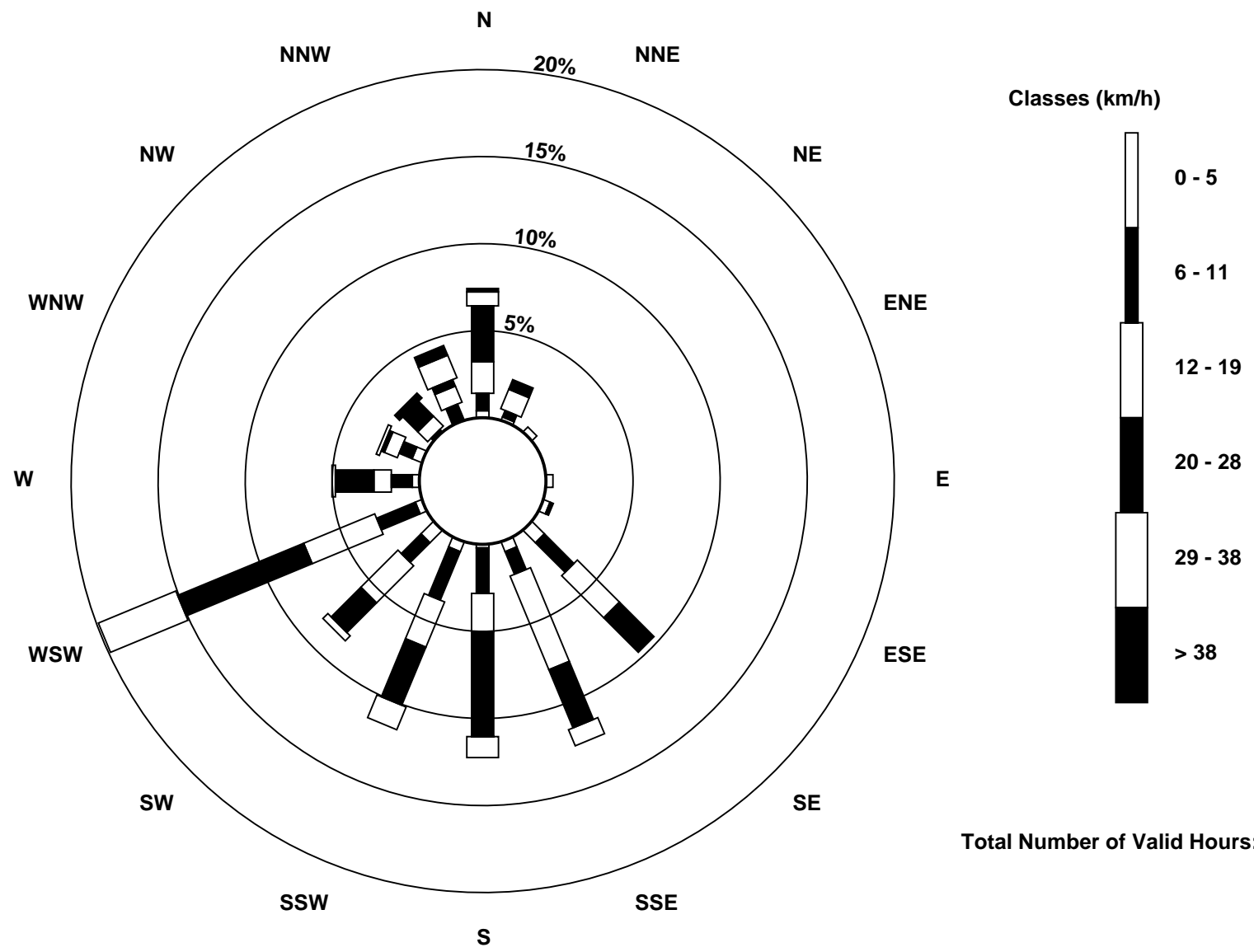
Total Number of Valid Hours: 498

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

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



Total Number of Valid Hours: 498



Maximum Speed: 53 km/h on Jan 11 12:00	Maximum Daily Speed Average: 28.4 km/h on Jan 16	Hours in Service: 744
Minimum Speed Value: 1 km/h on Jan 4 08:00	Minimum Daily Speed Average: 3.3 km/h on Jan 4	Hours of Data: 556
Maximum Diurnal Speed Average: 12.1 km/h at hour 23	Minimum Diurnal Speed Average: 5.8 km/h at hour 12	Hours of Missing Data: 188
Monthly Average Velocity: 9.3 km/h 234.0 deg	Percentiles: P ₁ = 2 P ₁₀ = 7 Q ₁ = 12 Median = 18 Q ₃ = 26 P ₉₀ = 31 P ₉₉ = 42	Percent Operational Time: 74.7

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-Jan	WNNW37	NNW47	NNW31	N29	N28	N26	N26	N16	NW10	WSW14	NW21	NW21	NW15	WNNW9	WNNW10	NNW10	N4	NNE2	ESE5	E6	E5	SSE9	SE9	SW7	NNW11.5	NNW47	
2-Jan	W6	E2	SSW3	WSW6	WNNW10	W6	WNNW9	NW6	SSE1	W4	WSW4	SSW4	SSW2	SSE4	SSE7	SSE11	S12	S14	S11	SSW8	SSW9	SSW12	SW11	S7	SSW4.9	S14	
3-Jan	SW11	SSW7	S10	S11	SSW9	SW9	SSW10	SSW12	SW7	SW8	SSW10	SSW10	WSW9	WSW8	WSW12	WSW16	WSW17	W24	W27	WNNW29	W26	W26	WNNW25	NW15	WSW12.0	WNNW29	
4-Jan	N10	N14	NNE16	NNE13	NNE15	NNE10	NNE5	NE1	SSE3	SE5	SSE7	SSE10	SSE11	SSE12	SSE7	SSE5	S17	S21	S17	S16	S15	S11	W5	NNW7	SE3.3	S21	
5-Jan	NNE6	NNW13	N17	N22	N20	N18	N20	N22	N23	N19	N21	N27	N27	N23	NNE25	NNE27	NNE19	NNE14	N16	N11	N10	NNW8	NW8	WNNW6	N17.1	NNE27	
6-Jan	WSW10	SW10	SW12	WSW11	SW10	SSW7	SW6	SW11	SW17	WSW16	SW12	S6	SE9	SE9	SE9	SSE12	SSE16	S17	S21	S21	S22	S14	S6	SW4	SSW9.9	S22	
7-Jan	W4	NNW7	N17	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	N17	
8-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
9-Jan	AF	AF	AF	AF	WSW15	WSW16	WSW15	W14	W12	W12	AF	AF	WNNW15	AF	AF	AF	AF	WNNW15	NW17	AF	AF	AF	AF	AF	----	WNNW17	
10-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	SSE11	SSW13	SSW20	SW22	SW22	WSW22	SW19	SSW18	S18	S19	----	SW22
11-Jan	S22	S23	S26	SSE29	S22	SSW18	WSW18	W24	NNW27	N32	N49	N53	NNW47	NNW42	NNW42	NNW43	NNW34	NNW29	NW27	NW25	NW23	NW17	WNNW16	WNNW13	NW16.8	N53	
12-Jan	WNNW9	WNNW4	SSW5	S9	S10	S17	S20	SSE27	SSE29	SSE26	SE25	SE25	SSE28	SSE25	SE24	SE22	SE28	SE27	SE3	SE25	SE3	SE23	SE18	SSE20	SSE19.0	SSE29	
13-Jan	SSE23	S15	SW8	WSW11	WSW9	WSW7	W7	WSW3	SSE12	SSE10	SSE10	SSE11	SSE10	SSE15	SSE13	S14	S23	S25	SSW20	SSW17	SSW17	S19	SW8	S34	S13.5	S34	
14-Jan	S35	S30	S31	S24	S26	SSW24	SSW20	S23	S25	SSW23	SSW24	SW25	SW21	SW27	WSW22	SW21	SW29	WSW25	WSW26	WSW26	SW26	SW31	SW31	SW28	SSW23.5	S35	
15-Jan	WSW31	WSW35	WSW36	WSW37	W37	WSW37	WSW27	WSW31	WSW36	WSW31	WSW34	WSW27	WSW21	SW17	WSW15	WSW20	SW16	SW17	SW24	SW20	SW15	SSW22	SSW21	SSW17	WSW25.1	W37	
16-Jan	SW24	SSW22	SSW26	SSW23	SSW27	S24	S23	SSW28	S30	SSW29	SSW28	SSW30	SSW33	SSW31	SSW32	SW28	SSW34	SSW39	SSW37	SW36	SSW29	S28	S27	S27	SSW28.4	SSW39	
17-Jan	S30	S32	SSW28	SSW29	SW30	SW23	SW31	WSW25	WSW26	WSW32	SW29	WSW27	WSW28	WSW23	SW15	S13	S14	SSE14	SSW27	SW23	SSW14	SSW21	SSW18	S14	SSW21.5	S32	
18-Jan	SSE17	SSE20	SSE18	SE15	ESE7	SE6	SE17	ESE11	ESE13	ESE10	ESE4	SSW4	SSE8	SSE11	SSE15	SSE21	SSE19	SSE21	SSE19	SSE21	SSE18	SSE22	SSE23	S20	SSE14.4	SSE23	
19-Jan	S9	N7	N13	N15	NNW17	N14	NNW17	N12	NNW12	NNW16	N13	NNW14	NNW14	NNW14	NNW12	NNW12	NNW11	NNW9	NNW11	NNW10	NNW8	W11	NW7	NW3	NNW10.6	NNW17	
20-Jan	WSW3	SSW2	SSW6	S11	SSW12	SSE13	SSE17	S14	SSE22	S15	S8	SE16	SE18	SE16	SE19	SE19	SSE20	SE16	SE20	SE16	SE14	NNE9	AF	AF	SSE12.4	SSE22	
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	----	----	
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	S32	S31	S29	S20	S24	S26	S22	S20	----	S32
26-Jan	S19	SSW19	SSW17	SW10	SW11	SW18	WSW19	SW14	SW15	SW12	SSW11	SSW14	SSW15	SW11	SW16	WSW21	WSW27	WSW31	WSW36	WSW36	W36	W37	W30	WSW13	WSW19.1	W37	
27-Jan	WSW17	W17	WSW19	WSW29	W35	WSW33	WSW21	W30	WSW27	WSW36	WSW39	WSW32	WSW30	WSW28	WSW19	WSW13	WSW20	W25	WSW18	WSW25	WSW22	WSW24	WSW26	W28	WSW25.5	WSW39	
28-Jan	WSW21	SW15	WSW15	WSW15	WSW15	WSW21	WSW13	WSW8	WSW14	WSW15	WSW14	SW13	SSW7	SSE11	SSE18	S24	S21	S25	SSW21	SW16	WSW14	WSW21	W29	WSW34	SW14.8	WSW34	
29-Jan	WSW25	WSW22	WSW25	WSW29	WSW32	WSW37	WSW28	SW12	SSW9	SSW17	SSW19	SSW14	W16	W23	W17	SW16	SW26	WSW26	WSW25	WSW25	WSW22	W29	W28	W28	WSW21.9	WSW37	
30-Jan	W28	W27	WSW26	WSW21	WSW22	WSW24	WSW34	WSW35	W29	WSW28	NNW20	NNE29	N15	N16	NW13	NW28	N27	N29	N32	N34	N32	NNW32	NNW32	NNW33	NW18.2	WSW35	
31-Jan	NNW31	N31	N28	NNW24	N22	NNE16	N7	WNNW2	W11	W8	W9	SW4	WSW6	WSW7	W13	W16	WSW16	WSW20	W27	W25	W22	WNNW30	NW26	NNW24	NW13.4	NNW31	

SW11.4	WSW8.0	WSW7.7	WSW8.7	WSW10.7	WSW10.2	WSW9.6	WSW9.5	WSW9.3	WSW10.2	WSW8.0	WSW5.8	WSW6.9	SW6.4	SW6.7	SW7.5	WSW10.1	SW10.9	SW11.5	SW11.8	SW10.7	SW12.0	SW12.1	SW10.5	Diurnal Average	
WNNW37	NNW47	WSW36	WSW37	W37	WSW37	WSW34	WSW35	WSW36	WSW36	N49	N53	NNW47	NNW42	NNW42	NNW43	NNW34	SSW39	SSW37	WSW36	W36	W37	NNW32	S34	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	Hours in Service:	744
Maximum Value: 16 km/h on Jan 11 11:00			Hours of Data:	556
Minimum Value: 1 km/h on Jan 2 17:00			Hours of Missing Data:	188
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 8			Hours of Calibration:	0
			Percent Operational Time:	74.7

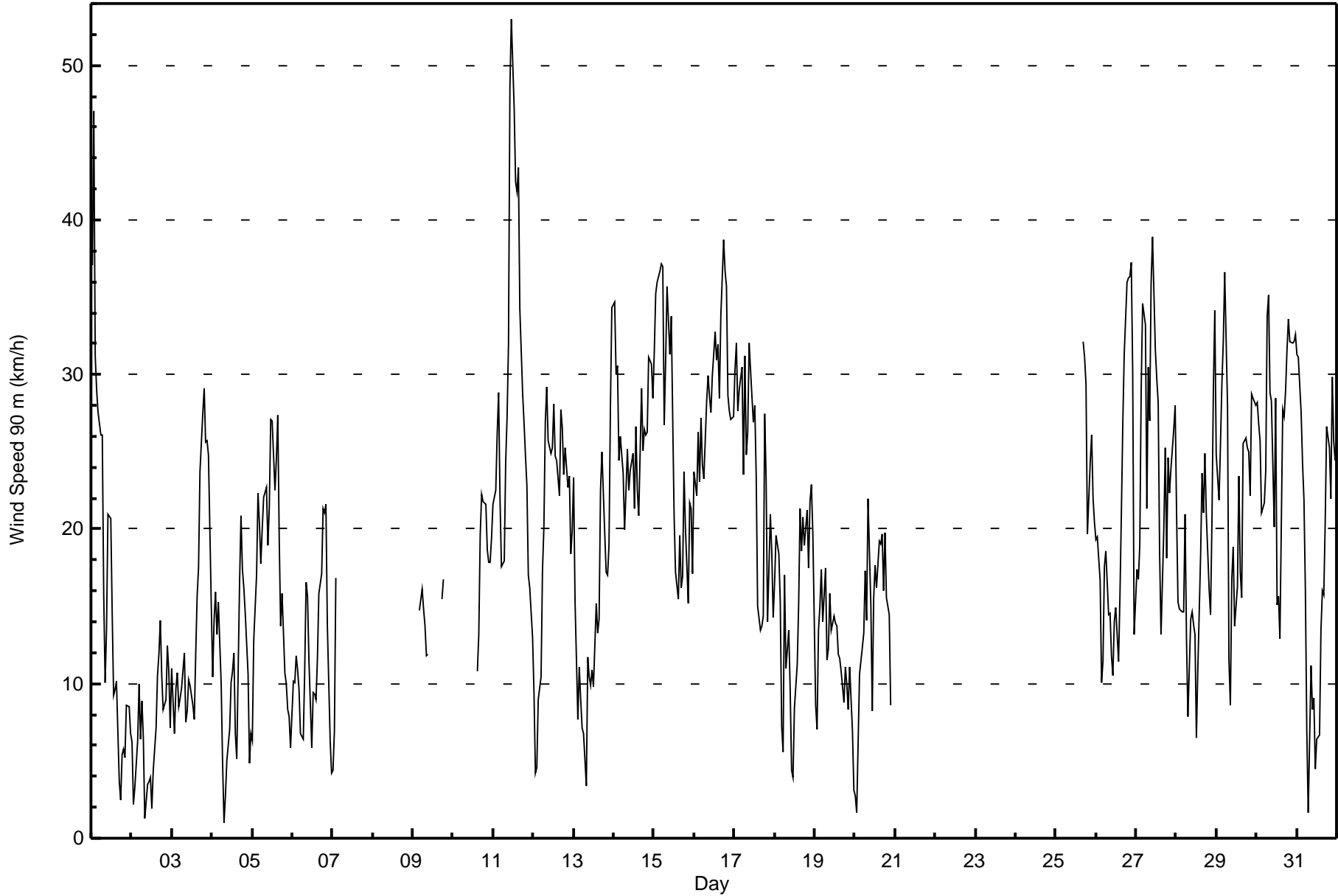
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jan	5	10	3	5	6	5	5	6	2	2	2	3	3	1	2	3	2	1	1	2	2	2	2	3	10
2-Jan	3	1	1	2	2	2	2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	3
3-Jan	2	1	2	2	2	2	2	2	2	2	2	1	2	3	2	3	2	2	2	1	2	2	2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

AF - Analyzer Failure



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed 90 m (WS90m) - km/h
Mannix - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed 90 m (WS90m) - km/h
Mannix - January 2017

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	30	5.40	5.40
6 - 11	107	19.24	24.64
12 - 19	158	28.42	53.06
20 - 28	173	31.12	84.17
29 - 38	79	14.21	98.38
> 38	9	1.62	100.00

Total Number of Valid Hours: 556

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed 90 m (WS90m) - km/h
Mannix - January 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	1	2	1	0	2	2	1	4	0	6	2	3	3	2	1	0	30
6 - 11	4	3	0	0	0	4	5	15	11	13	14	11	7	6	4	10	107
12 - 19	14	6	0	0	0	1	10	17	20	18	18	28	7	5	4	10	158
20 - 28	14	3	0	0	0	0	11	14	29	20	14	41	15	1	7	4	173
29 - 38	7	1	0	0	0	0	0	2	10	10	4	26	9	3	0	7	79
> 38	2	0	0	0	0	0	0	0	0	1	0	1	0	0	0	5	9
Totals	42	15	1	0	2	7	27	52	70	68	52	110	41	17	16	36	556

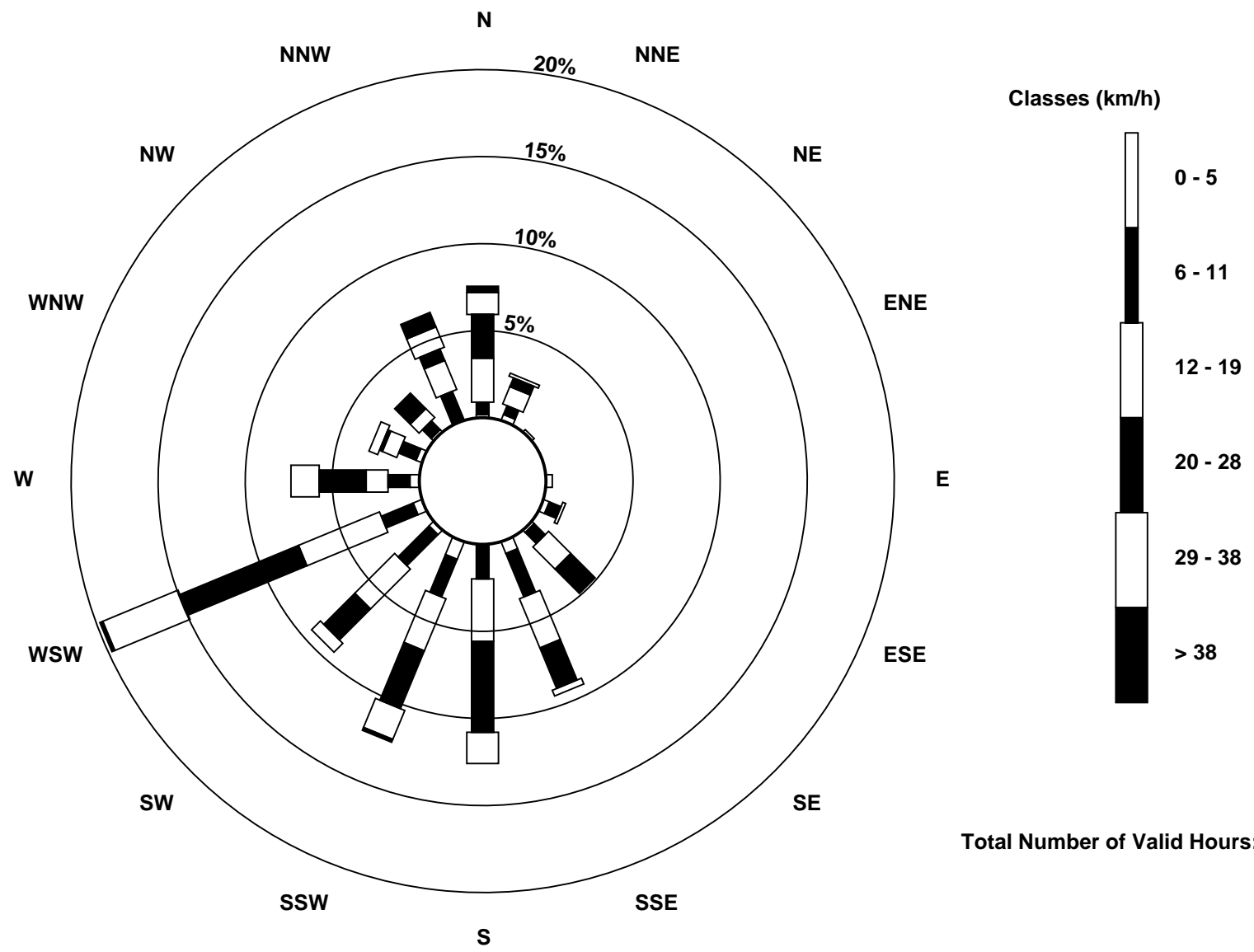
Total Number of Valid Hours: 556

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Wind Speed 90 m (WS90m) - km/h
Mannix (AMS 5)



Total Number of Valid Hours: 556



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 20 m (WD20m) - deg

Mannix - January 2017

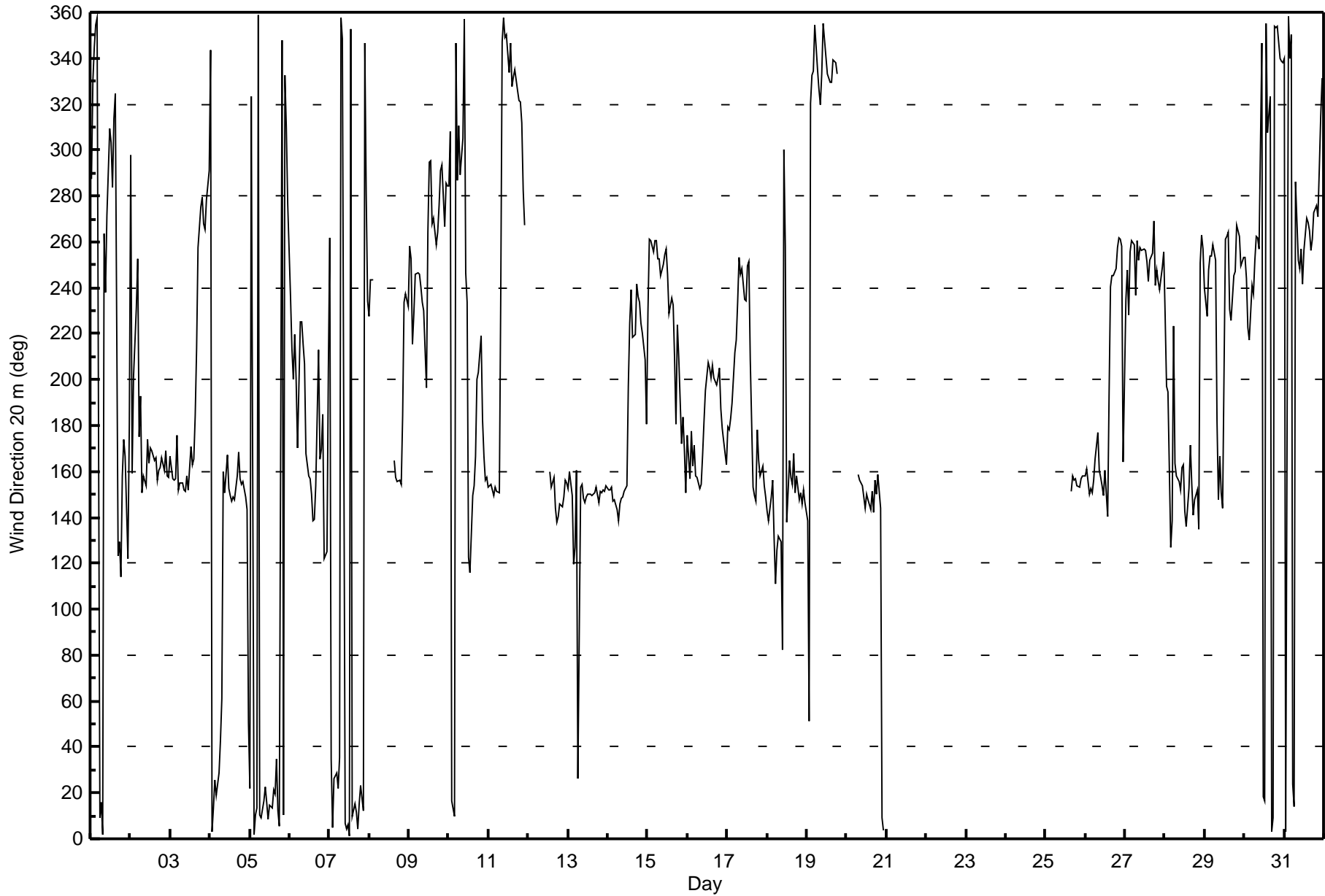
Direction of Maximum Speed: 350 deg on Jan 11 12:00																						Hours in Service: 744				
Direction of Maximum Daily Speed Average: 240.7 deg on Jan 15																						Hours of Data: 594				
Direction of Minimum Speed: 298 deg on Jan 2 01:00											Direction of Minimum Daily Speed Average: 2.1 deg on Jan 10											Hours of Missing Data: 150				
Monthly Average Direction: 229.2 deg																						Percent Operational Time: 79.8				
Day	Hourly Period Ending At (MST)																								Daily Average	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	287	330	345	355	357	9	16	2	263	238	272	309	303	284	313	325	123	129	114	158	174	167	122	181	325.9	
2-Jan	298	159	201	231	252	175	193	151	158	154	174	163	170	169	165	166	157	161	162	166	160	169	158	157	169.6	
3-Jan	166	157	156	157	176	152	155	155	152	151	158	152	171	163	165	184	214	257	275	280	268	266	278	291	212.4	
4-Jan	344	3	13	26	19	29	43	61	160	151	167	152	149	147	149	148	158	168	157	154	155	149	144	51	127.2	
5-Jan	22	324	2	10	14	359	11	9	16	23	16	8	15	13	22	19	35	12	5	348	10	332	310	277	8.9	
6-Jan	236	213	200	220	200	171	225	225	216	207	168	158	157	150	138	139	154	213	166	170	185	122	125	204	185.3	
7-Jan	261	35	5	26	28	22	35	358	349	7	4	6	1	353	10	15	12	4	16	23	12	346	281	234	5.7	
8-Jan	228	244	243	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	165	157	155	156	154	185	234	237	232	--	
9-Jan	258	252	215	229	246	246	246	240	234	230	196	264	295	295	268	271	259	264	276	291	293	267	286	285	259.6	
10-Jan	284	308	17	10	346	287	311	289	305	357	247	234	122	116	150	154	166	200	203	219	182	166	156	157	189.4	
11-Jan	153	154	152	149	153	151	151	238	347	358	349	350	334	347	328	332	335	326	322	321	312	283	267	AF	333.1	
12-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	160	153	157	144	138	141	146	144	149	156	155	--
13-Jan	152	160	150	119	127	161	26	153	154	148	147	149	150	150	149	150	151	153	146	151	151	152	151	154	150.5	
14-Jan	152	152	153	147	147	143	139	146	148	149	151	154	197	224	239	218	220	242	236	234	225	221	209	181	184.0	
15-Jan	229	261	260	256	261	260	253	252	245	250	255	257	246	229	236	232	209	181	224	209	172	184	170	150	240.7	
16-Jan	176	157	177	163	172	158	157	153	154	167	182	195	208	205	201	207	201	198	200	205	187	178	173	163	182.9	
17-Jan	180	178	183	190	212	217	234	253	246	248	235	234	249	252	209	153	150	147	178	165	158	162	154	149	204.6	
18-Jan	143	138	149	156	131	111	126	132	129	82	300	258	138	165	157	154	168	151	158	147	151	146	152	147	149.0	
19-Jan	138	51	321	333	335	355	335	327	320	333	355	340	333	331	329	330	339	338	333	AF	AF	AF	AF	AF	335.7	
20-Jan	AF	AF	AF	AF	AF	AF	AF	159	156	154	149	144	150	148	143	151	142	156	150	159	144	9	4	AF	--	
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	151	158	156	157	154	153	157	158	158	--
26-Jan	158	161	150	153	151	156	165	177	160	158	154	150	161	140	193	241	245	245	248	257	261	261	258	164	204.2	
27-Jan	235	248	228	256	261	259	236	261	252	258	256	257	256	252	243	252	255	269	241	248	243	239	249	256	253.4	
28-Jan	228	197	195	127	139	223	164	158	156	152	162	163	143	136	153	172	155	141	148	152	135	251	263	257	182.5	
29-Jan	240	228	248	254	254	259	252	182	148	167	151	144	261	263	264	230	226	245	247	267	265	262	249	253	243.7	
30-Jan	253	244	223	217	241	237	252	263	262	257	347	18	17	355	307	324	3	9	354	353	354	340	339	338	314.9	
31-Jan	340	3	358	340	350	24	14	286	252	249	257	242	256	270	268	265	256	261	272	276	271	292	315	332	304.7	
215.0	218.4	212.9	224.2	251.8	237.8	233.9	221.1	213.2	218.4	244.8	264.6	259.5	237.9	233.6	214.9	194.6	212.0	219.6	220.3	210.7	224.7	226.2	206.7			
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 20 m (WD20m) - deg
Mannix - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 99 deg on Jan 2 01:00 Minimum Value: 4 deg on Jan 3 10:00 Percentiles: P ₁ = 5 P ₁₀ = 7 Q ₁ = 9 Median = 12 Q ₃ = 19 P ₉₀ = 32 P ₉₉ = 83																		Hours in Service: 744 Hours of Data: 594 Hours of Missing Data: 150 Hours of Calibration: 0 Percent Operational Time: 79.8								
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-Jan	19	11	13	14	15	12	12	41	20	9	15	13	11	15	22	28	69	18	14	81	60	22	32	28	81	
2-Jan	99	48	13	21	50	21	34	12	33	20	20	13	23	25	21	9	7	7	11	12	8	10	10	9	99	
3-Jan	11	6	6	8	12	8	6	6	5	4	7	9	23	25	25	21	20	11	8	6	6	5	10	29	29	
4-Jan	25	16	13	12	14	18	30	91	20	15	18	8	8	9	7	11	9	10	6	8	11	45	14	91		
5-Jan	91	27	14	14	14	15	12	12	13	13	14	13	11	12	14	12	11	17	15	15	20	13	12	19	91	
6-Jan	12	19	8	9	13	19	21	5	8	17	13	7	6	7	24	22	8	27	7	7	49	47	11	44	49	
7-Jan	43	29	49	66	14	21	29	17	15	11	12	12	15	17	14	14	11	12	10	12	10	23	28	6	66	
8-Jan	14	7	6	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	6	9	14	11	12	28	9	7	20	28	
9-Jan	10	16	13	17	11	12	12	12	16	16	17	22	12	14	12	10	6	7	8	25	36	9	25	55	55	
10-Jan	45	33	19	12	36	15	12	24	18	46	25	26	44	16	11	5	11	16	10	7	10	8	7	8	46	
11-Jan	8	8	7	8	7	7	22	59	40	22	15	14	14	14	13	12	13	11	11	10	9	13	10	AF	59	
12-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	7	7	8	9	9	9	10	9	8	7	8	10	
13-Jan	10	12	15	36	35	33	84	17	7	9	13	8	8	11	10	9	12	13	9	5	6	6	9	7	84	
14-Jan	8	5	6	7	9	10	10	11	8	8	9	11	21	13	13	10	11	17	11	12	12	13	17	10	21	
15-Jan	17	7	7	8	8	9	12	11	9	10	11	10	22	17	12	13	43	22	20	25	22	14	14	9	43	
16-Jan	12	13	7	12	12	7	7	7	7	19	25	18	14	16	14	14	13	12	11	10	12	11	11	9	25	
17-Jan	12	12	14	11	12	13	14	10	8	8	14	11	11	12	31	12	6	13	10	22	18	10	16	11	31	
18-Jan	7	8	11	16	92	82	14	41	20	75	27	86	52	35	33	31	36	19	13	8	12	13	11	14	92	
19-Jan	60	64	15	23	18	21	13	17	14	14	19	16	13	15	15	16	17	18	15	AF	AF	AF	AF	AF	64	
20-Jan	AF	AF	AF	AF	AF	AF	AF	9	7	7	7	9	7	7	10	8	8	11	5	10	42	9	15	AF	42	
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	6	5	5	5	5	6	7	5	5	5	7
26-Jan	5	5	6	8	5	6	6	13	7	17	6	14	18	17	35	10	8	9	10	9	5	6	13	38	38	
27-Jan	27	21	23	11	7	9	26	10	12	9	8	7	8	10	65	45	16	6	19	9	6	11	11	9	65	
28-Jan	36	26	30	49	67	25	65	26	32	23	25	24	12	16	10	18	10	9	12	13	21	41	8	9	67	
29-Jan	16	13	14	9	11	10	55	32	31	20	25	36	20	10	10	17	8	16	9	7	11	6	8	7	55	
30-Jan	7	7	10	12	5	8	8	6	9	9	56	14	25	22	16	18	22	13	14	14	16	12	12	12	56	
31-Jan	15	15	21	14	22	11	18	70	11	14	27	58	32	31	10	8	9	9	8	9	8	9	19	11	70	
99 64 49 66 92 82 84 91 40 75 56 86 52 35 65 45 69 27 20 81 60 47 45 55																								Diurnal Maximum		
AF - Analyzer Failure																										





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 45 m (WD45m) - deg

Mannix - January 2017

Direction of Maximum Speed: 346 deg on Jan 11 12:00		Hours in Service:	744
Direction of Maximum Daily Speed Average: 185.4 deg on Jan 16		Hours of Data:	511
Direction of Minimum Speed: 91 deg on Jan 1 17:00		Hours of Missing Data:	233
Direction of Minimum Daily Speed Average: 4.1 deg on Jan 4		Percent Operational Time:	68.7
Monthly Average Direction: 224.9 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-Jan	284	324	340	349	351	2	8	358	289	239	287	311	301	280	304	321	91	113	115	106	125	146	129	177	325.5	
2-Jan	218	136	202	248	284	222	240	173	160	149	167	175	210	179	168	173	162	164	168	172	168	186	179	155	179.8	
3-Jan	171	155	150	151	166	157	155	153	158	162	157	153	174	171	185	212	238	255	273	275	263	261	275	286	208.8	
4-Jan	344	2	10	19	14	21	29	37	153	137	160	142	142	140	138	142	158	166	156	151	154	146	170	12	123.1	
5-Jan	357	326	356	5	8	355	4	3	8	14	9	2	7	7	14	13	25	8	1	343	4	325	313	284	2.4	
6-Jan	234	216	203	222	213	179	218	222	225	223	188	154	155	138	130	139	144	180	162	163	174	166	122	156	181.8	
7-Jan	223	11	359	20	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
8-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
9-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
10-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
11-Jan	AF	AF	AF	AF	AF	AF	AF	262	AF	352	336	346	328	341	322	326	328	321	317	316	311	292	272	272	--	
12-Jan	258	232	169	167	152	150	150	150	150	142	149	155	156	154	143	147	137	131	133	137	138	140	149	151	149.2	
13-Jan	149	161	162	234	222	218	293	162	151	144	143	144	150	144	146	151	160	159	160	154	156	158	160	164	157.1	
14-Jan	159	155	157	152	149	148	148	144	152	150	152	186	211	219	233	223	220	238	234	230	223	220	207	193	181.9	
15-Jan	230	254	254	251	255	254	248	246	241	245	249	251	243	225	232	230	218	191	225	224	187	186	174	156	234.7	
16-Jan	185	180	191	176	177	162	156	166	162	182	190	193	203	202	196	204	196	192	196	202	188	177	173	166	185.4	
17-Jan	177	176	184	190	210	217	231	249	242	240	231	232	246	246	217	164	149	148	175	187	167	165	162	147	200.9	
18-Jan	141	136	127	146	129	150	130	134	127	121	267	281	130	166	161	157	156	161	164	156	147	142	146	151	146.3	
19-Jan	148	49	327	332	333	351	334	330	321	335	354	341	333	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
20-Jan	AF	AF	AF	AF	AF	AF	AF	AF	150	149	144	134	142	140	130	143	136	144	136	156	162	1	358	AF	--	
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	159	161	157	153	155	157	157	--
26-Jan	156	164	157	161	165	173	200	202	178	174	161	154	163	146	208	239	239	239	242	250	256	258	255	211	207.6	
27-Jan	245	253	239	252	255	253	244	256	249	251	249	250	250	246	243	249	252	264	246	246	242	240	246	253	249.6	
28-Jan	242	216	223	236	236	229	228	194	208	224	199	177	146	133	148	174	164	148	162	176	201	254	258	252	201.8	
29-Jan	238	230	245	249	248	252	247	191	155	169	170	158	256	257	258	227	223	237	244	256	256	257	248	252	238.6	
30-Jan	252	244	228	232	241	240	249	255	256	251	341	11	8	349	303	319	356	3	349	348	349	335	335	332	307.7	
31-Jan	337	358	352	336	345	14	5	291	254	252	250	228	247	258	261	258	252	255	268	270	268	289	311	328	301.2	

211.7 217.7 218.8 228.3 236.7 225.0 221.5 211.3 195.8 205.3 213.6 223.3 229.6 216.4 216.4 216.8 195.8 196.6 205.4 211.1 204.5 215.3 218.7 205.0

Diurnal Average

AF - Analyzer Failure

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

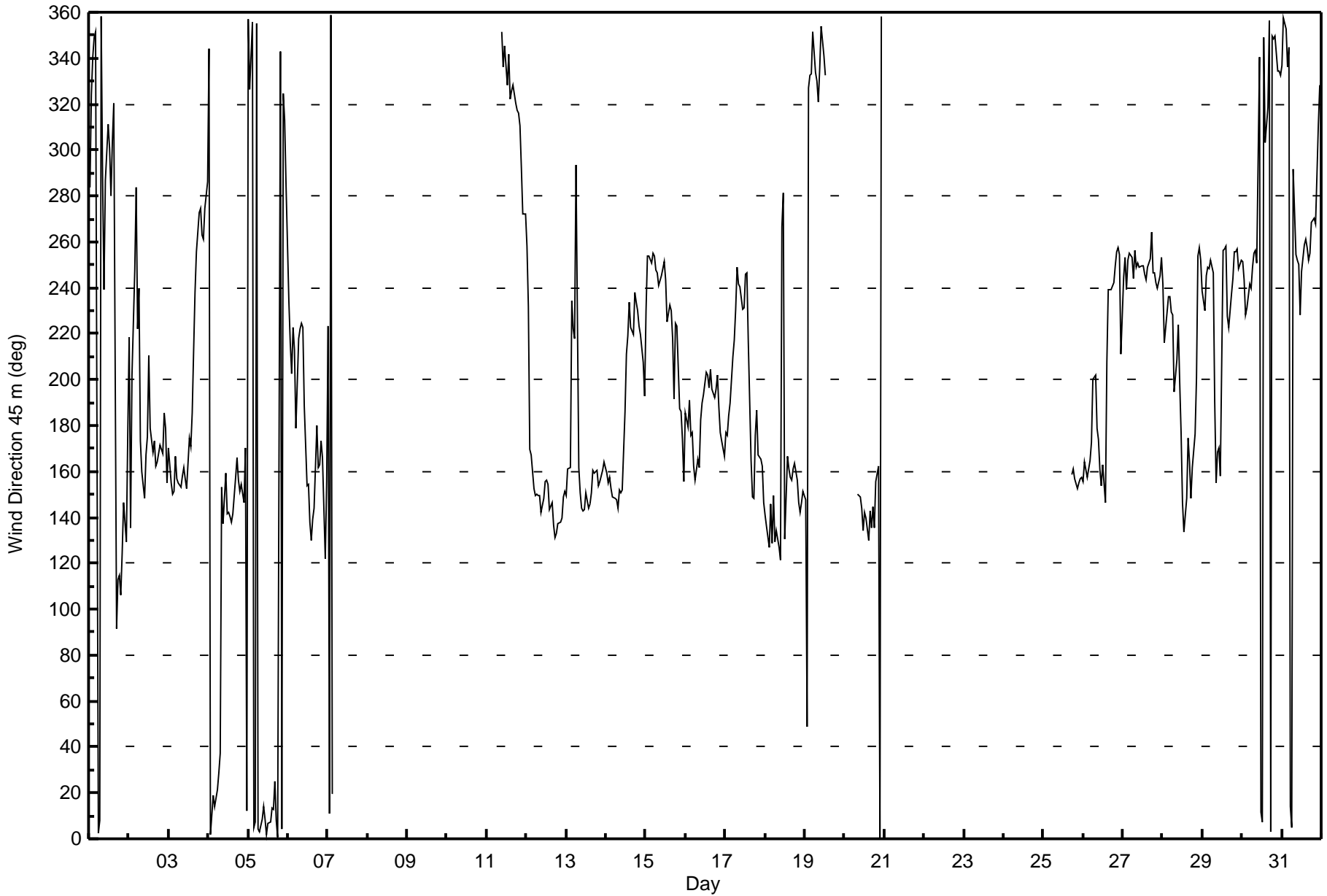
Wind Direction 45 m (WD45m) - deg
Mannix - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 93 deg on Jan 2 01:00 Minimum Value: 2 deg on Jan 26 00:00 Percentiles: P ₁ = 3 P ₁₀ = 4 Q ₁ = 6 Median = 9 Q ₃ = 14 P ₉₀ = 24 P ₉₉ = 72														Hours in Service: 744 Hours of Data: 511 Hours of Missing Data: 233 Hours of Calibration: 0 Percent Operational Time: 68.7													
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-Jan	20	9	9	11	12	10	9	31	15	8	16	9	10	12	17	16	66	21	10	65	29	8	16	30	66		
2-Jan	93	44	12	15	14	43	17	40	9	14	12	15	21	23	11	6	4	3	9	7	8	9	15	5	93		
3-Jan	9	4	3	4	5	9	6	4	7	7	6	12	16	32	26	21	9	7	6	5	6	5	9	24	32		
4-Jan	13	12	9	8	11	12	19	70	16	14	13	7	6	7	8	6	9	5	7	4	8	9	83	28	83		
5-Jan	65	18	10	11	10	12	9	9	10	11	10	8	8	9	10	10	9	13	11	11	18	10	10	18	65		
6-Jan	10	16	6	8	11	24	22	14	3	8	8	17	11	7	17	16	4	19	4	3	11	26	16	16	26		
7-Jan	36	14	20	22	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	36		
8-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--		
9-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--		
10-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--		
11-Jan	AF	AF	AF	AF	AF	AF	AF	7	AF	19	15	10	12	11	11	9	10	9	8	6	7	12	8	6	19		
12-Jan	13	11	20	7	8	4	3	3	4	7	7	7	4	5	6	6	7	7	8	8	8	6	7	7	20		
13-Jan	10	8	36	72	22	33	31	46	5	7	11	9	9	10	7	7	6	4	4	4	4	5	5	3	72		
14-Jan	3	3	4	3	3	4	5	4	6	5	5	16	6	10	10	7	7	14	9	8	8	8	12	8	16		
15-Jan	13	6	6	6	6	8	10	9	7	8	10	8	17	13	10	10	30	18	12	12	19	13	9	6	30		
16-Jan	14	15	6	15	9	11	5	5	4	12	9	14	10	12	11	10	8	6	6	5	8	5	5	6	15		
17-Jan	6	7	9	7	8	11	12	8	6	4	8	8	8	9	23	13	4	9	6	7	12	9	11	5	23		
18-Jan	5	9	5	6	39	28	7	14	9	13	85	73	46	30	25	15	18	13	6	3	4	7	4	6	85		
19-Jan	30	52	12	19	15	15	11	13	11	10	14	11	9	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	52		
20-Jan	AF	AF	AF	AF	AF	AF	AF	AF	4	3	5	7	5	6	9	8	3	3	5	16	26	20	11	AF	26		
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--		
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--		
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--		
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--		
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	4	3	3	3	4	2	2	4	
26-Jan	3	6	4	6	6	12	11	10	8	12	8	11	17	18	29	8	5	6	7	7	5	5	7	39	39		
27-Jan	14	9	15	7	5	6	14	7	9	6	6	5	6	7	19	22	12	6	9	4	4	7	7	5	22		
28-Jan	22	15	14	20	26	10	52	38	21	30	25	17	10	13	8	13	13	6	12	14	26	16	7	6	52		
29-Jan	12	10	10	7	8	8	46	33	31	9	18	30	14	9	7	16	4	11	5	5	7	4	4	3	46		
30-Jan	3	5	8	10	3	4	5	4	6	6	56	10	22	20	14	14	21	10	11	11	13	9	9	9	56		
31-Jan	12	11	18	13	17	9	13	62	7	14	23	36	32	27	8	7	7	7	6	5	6	7	16	8	62		
														Diurnal Maximum													
														93 52 36 72 39 43 52 70 31 30 85 73 46 32 29 22 66 21 12 65 29 26 83 39													
AF - Analyzer Failure																											



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction 45 m (WD45m) - deg
Mannix - January 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 75 m (WD75m) - deg

Mannix - January 2017

Direction of Maximum Speed: 352 deg on Jan 11 12:00		Hours in Service:	744
Direction of Maximum Daily Speed Average: 193.5 deg on Jan 16		Hours of Data:	498
Direction of Minimum Speed: 41 deg on Jan 4 08:00		Hours of Missing Data:	246
Direction of Minimum Daily Speed Average: 4.1 deg on Jan 4		Percent Operational Time:	66.9
Monthly Average Direction: 231.3 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-Jan	286	326	345	353	354	4	10	2	301	246	301	318	305	281	304	328	6	49	106	96	100	142	131	201	331.2	
2-Jan	259	127	207	251	291	265	278	300	163	241	208	192	221	156	171	163	163	165	177	193	197	198	205	173	199.2	
3-Jan	212	179	161	160	182	208	186	181	210	197	187	185	209	232	242	242	252	261	277	278	266	264	280	298	237.7	
4-Jan	351	7	14	22	19	25	29	41	148	133	152	142	145	141	144	163	170	163	161	167	161	271	355	127.4		
5-Jan	10	340	359	8	11	360	7	6	AF	AF	AF	4	8	9	15	14	25	11	5	348	6	327	322	289	4.4	
6-Jan	234	218	207	231	222	191	216	227	233	AF	AF	AF	145	140	136	145	143	166	164	169	172	183	150	181	182.1	
7-Jan	242	343	4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
8-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
9-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
10-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
11-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	350	344	352	331	344	326	329	331	325	321	322	321	307	293	285	--	
12-Jan	274	265	189	174	165	161	161	156	157	145	137	146	153	151	136	138	134	132	133	135	137	138	144	149	148.0	
13-Jan	157	173	206	248	237	242	283	235	156	156	145	147	157	146	156	169	176	177	188	175	178	176	178	176	174.3	
14-Jan	169	163	168	164	168	176	184	158	164	177	181	210	217	220	234	227	224	241	238	233	226	224	214	208	196.9	
15-Jan	235	254	254	252	256	255	249	247	243	247	250	253	245	229	234	234	226	205	228	230	207	199	199	186	238.8	
16-Jan	204	202	204	195	191	178	167	183	172	193	196	198	206	204	200	208	199	195	199	207	195	181	179	174	193.5	
17-Jan	180	181	194	198	213	221	232	250	244	241	232	234	247	248	224	180	164	159	187	207	195	182	195	162	210.0	
18-Jan	152	145	139	137	119	133	131	127	126	120	125	234	146	154	164	158	153	160	158	151	153	145	155	161	148.6	
19-Jan	168	14	344	343	342	358	344	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
20-Jan	AF	AF	AF	AF	AF	150	152	160	156	160	151	138	139	140	130	139	143	136	130	142	145	6	AF	AF	--	
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	174	177	169	169	174	176	--
26-Jan	175	189	183	204	204	211	233	223	211	211	194	192	192	186	227	243	241	241	244	251	257	260	257	238	227.6	
27-Jan	252	257	247	254	257	255	249	258	252	251	250	250	250	247	245	252	255	266	253	249	246	244	248	256	251.9	
28-Jan	248	229	235	245	246	237	244	235	229	251	231	209	183	141	156	183	176	161	183	205	238	256	259	254	219.0	
29-Jan	243	237	247	250	249	252	250	205	183	194	197	191	257	258	260	230	225	239	249	255	253	260	254	258	242.8	
30-Jan	257	252	238	241	246	245	252	255	259	253	343	13	8	352	308	321	359	6	353	351	353	338	337	335	309.0	
31-Jan	341	1	355	341	350	14	4	300	260	265	255	224	246	254	262	259	255	256	271	275	273	294	315	334	305.8	

223.8 234.9 235.8 241.7 248.2 234.1 230.5 214.5 205.6 217.3 223.6 230.3 229.2 217.2 219.0 220.6 202.1 205.6 212.8 221.4 216.1 222.5 226.2 219.3
Diurnal Average

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction 75 m (WD75m) - deg

Mannix - January 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 83 deg on Jan 19 01:00			Hours of Data:	498
Minimum Value: 2 deg on Jan 14 00:00			Hours of Missing Data:	246
			Hours of Calibration:	0
			Percent Operational Time:	66.9
Percentiles: P ₁ = 3 P ₁₀ = 4 Q ₁ = 6 Median = 8 Q ₃ = 12 P ₉₀ = 21 P ₉₉ = 75				

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-Jan	21	9	6	10	11	9	8	24	22	11	12	8	9	9	16	13	42	49	16	18	24	11	10	39	49	
2-Jan	56	58	23	18	14	21	18	78	26	42	32	16	23	17	7	3	3	5	3	11	9	8	10	10	78	
3-Jan	12	19	7	6	8	17	12	10	15	13	9	13	18	29	11	4	4	6	4	3	6	5	9	21	29	
4-Jan	11	11	8	7	9	10	16	56	19	13	13	7	6	6	11	12	9	3	6	4	8	13	43	30	56	
5-Jan	29	18	8	9	8	10	7	7	AF	AF	AF	8	7	7	8	8	7	11	10	12	15	9	10	18	29	
6-Jan	10	13	6	9	11	21	17	15	3	AF	AF	AF	4	5	12	10	3	9	3	2	3	7	22	20	22	
7-Jan	33	18	7	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	33	
8-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
9-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
10-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
11-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	17	11	13	10	10	10	7	8	7	6	3	6	10	10	4	17	
12-Jan	10	19	30	8	6	5	3	2	3	5	5	7	3	5	4	4	5	7	6	6	7	5	5	3	30	
13-Jan	9	6	32	11	9	13	15	75	6	5	12	6	9	8	8	6	5	5	8	5	3	4	2	75		
14-Jan	3	3	4	4	5	6	10	4	8	11	7	9	7	8	9	7	6	13	8	7	6	6	8	6	13	
15-Jan	11	6	6	5	6	7	8	8	6	7	9	7	15	10	8	10	23	15	10	10	18	9	9	8	23	
16-Jan	9	11	5	10	8	13	6	9	5	9	8	12	9	11	10	10	8	5	5	5	8	4	4	5	13	
17-Jan	4	6	6	6	7	11	10	7	6	3	7	7	7	7	18	13	6	8	7	10	17	11	12	6	18	
18-Jan	6	6	7	6	25	21	5	13	9	13	82	75	34	22	15	4	13	10	5	3	4	5	3	4	82	
19-Jan	83	38	8	14	12	10	9	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	83	
20-Jan	AF	AF	AF	AF	AF	7	5	4	5	4	9	6	3	3	6	3	8	4	5	16	8	40	AF	AF	40	
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	4	3	3	4	3	3	4
26-Jan	3	10	6	11	11	11	8	6	7	8	14	10	15	24	16	8	4	5	6	6	5	5	6	21	24	
27-Jan	8	7	9	6	5	6	10	6	9	6	5	4	5	5	13	12	10	6	7	3	3	5	6	4	13	
28-Jan	13	11	7	8	13	8	38	27	7	10	7	12	17	14	9	8	8	5	12	10	16	12	7	6	38	
29-Jan	11	9	8	6	7	6	37	32	39	11	9	24	11	8	8	15	4	9	4	3	4	4	5	2	39	
30-Jan	3	5	7	7	3	3	3	4	5	5	56	9	20	19	14	14	20	9	9	9	12	8	8	7	56	
31-Jan	10	11	17	12	15	7	15	63	8	12	14	31	32	20	8	7	6	6	5	4	6	6	15	6	63	
	83	58	32	18	25	21	38	78	39	42	82	75	34	29	18	15	42	49	16	18	24	40	43	39		

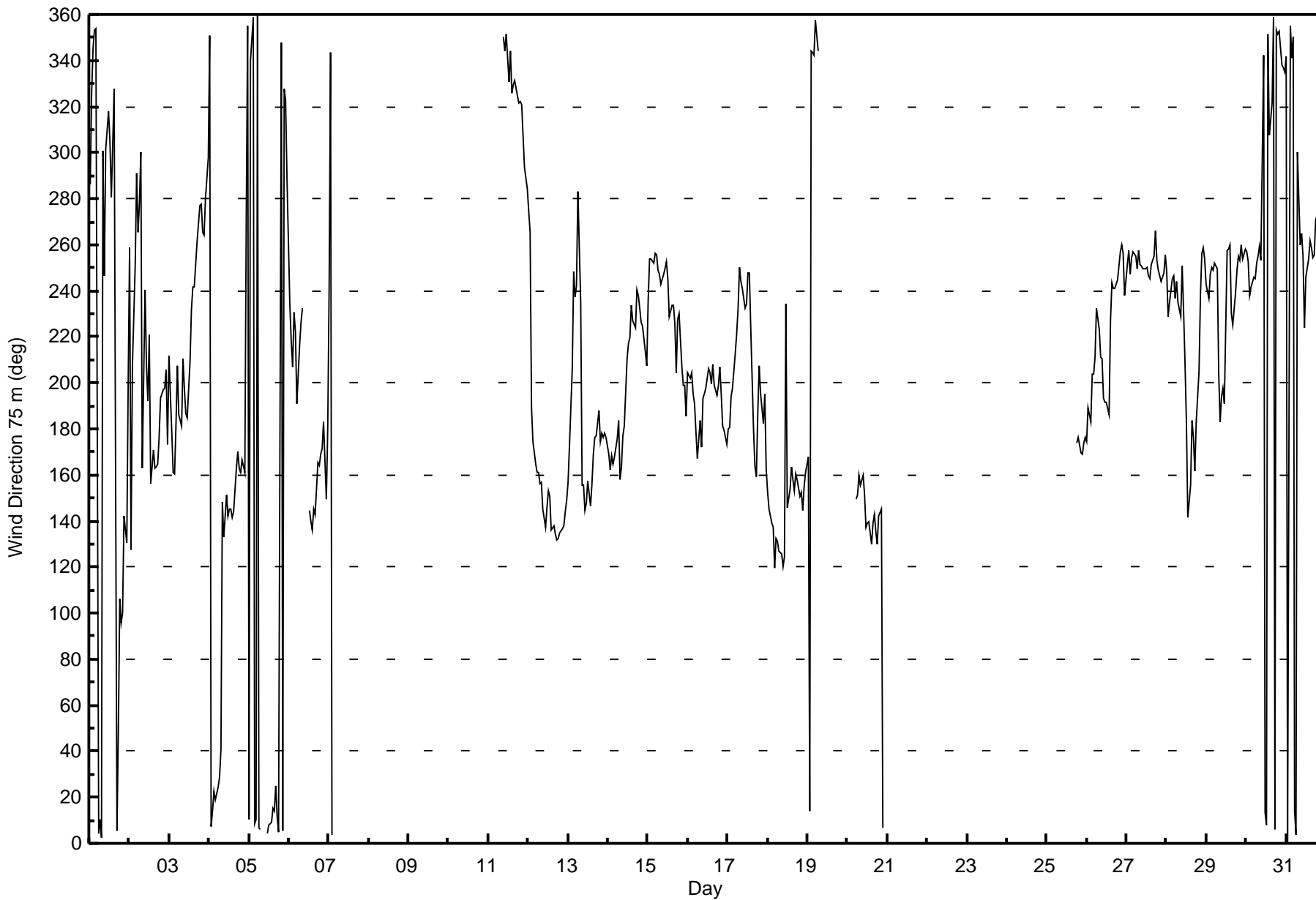
Diurnal Maximum

AF - Analyzer Failure



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction 75 m (WD75m) - deg
Mannix - January 2017





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

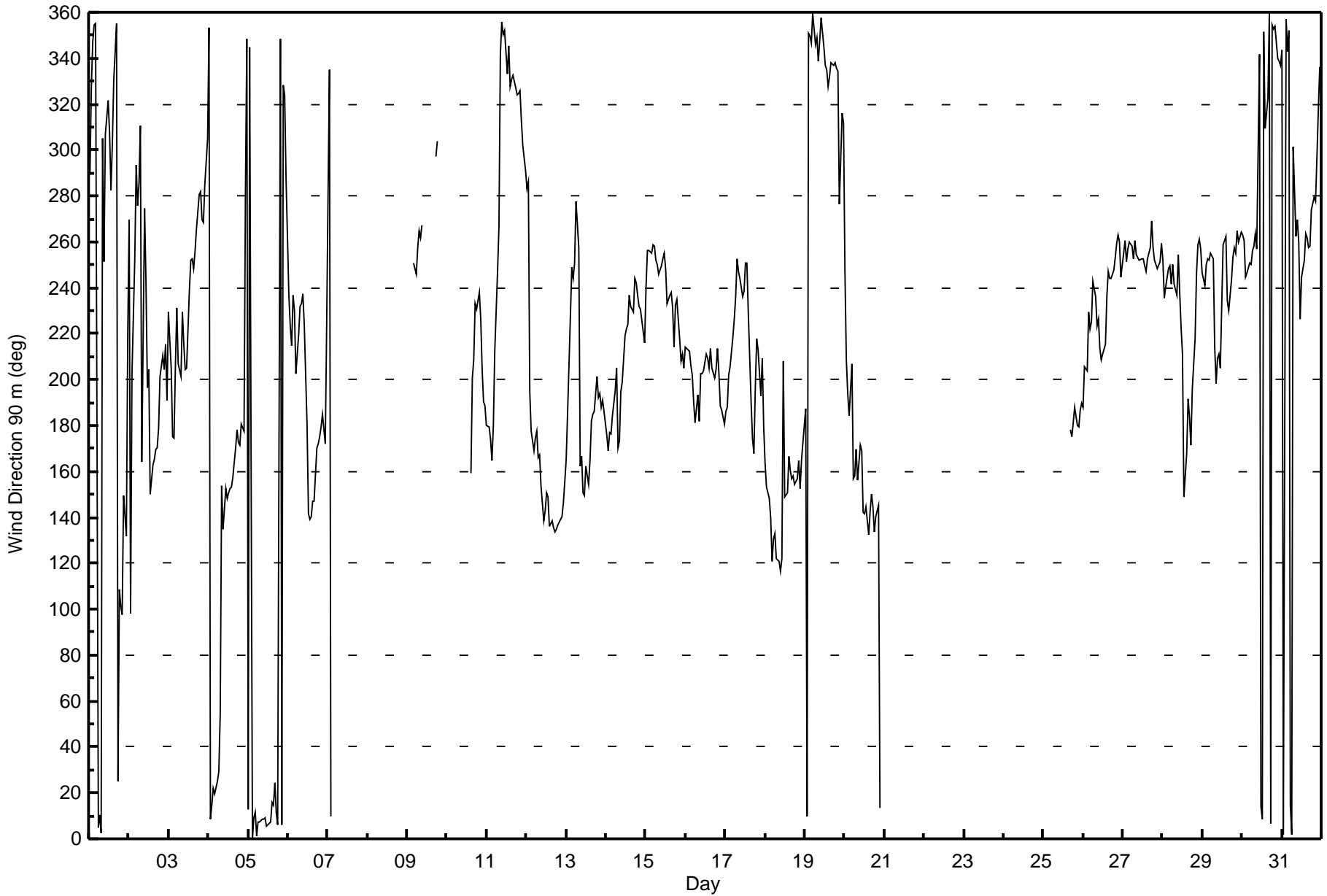
Wind Direction 90 m (WD90m) - deg
Mannix - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 95 deg on Jan 20 02:00 Minimum Value: 2 deg on Jan 6 19:00 Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 6 Median = 8 Q ₃ = 12 P ₉₀ = 19 P ₉₉ = 66																		Hours in Service: 744 Hours of Data: 556 Hours of Missing Data: 188 Hours of Calibration: 0 Percent Operational Time: 74.7								
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-Jan	20	8	5	9	10	9	7	21	26	12	10	7	8	8	15	12	31	50	8	12	23	13	8	36	50	
2-Jan	38	68	29	19	14	12	18	20	65	18	28	11	38	14	6	6	3	2	4	10	8	8	9	13	68	
3-Jan	10	21	10	12	10	10	12	11	12	12	9	11	15	10	6	3	3	7	4	3	7	5	9	19	21	
4-Jan	10	10	7	7	8	9	18	65	18	11	13	7	8	7	17	15	8	3	5	4	11	17	30	28	65	
5-Jan	16	16	7	9	8	9	7	6	11	8	7	7	7	7	8	7	6	10	9	11	15	9	12	18	18	
6-Jan	8	11	5	8	10	19	16	12	6	6	7	33	3	4	9	8	4	7	2	2	3	3	17	30	33	
7-Jan	17	14	7	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	17	
8-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
9-Jan	AF	AF	AF	AF	10	13	8	7	15	11	AF	AF	14	AF	AF	AF	AF	5	8	AF	AF	AF	AF	AF	15	
10-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	21	12	11	7	6	5	9	9	13	13	21	
11-Jan	11	5	6	4	11	17	7	5	39	15	10	8	10	9	9	6	7	6	5	3	6	10	9	5	39	
12-Jan	8	32	30	8	5	8	9	3	2	6	5	6	4	5	3	3	4	5	5	5	6	4	4	4	32	
13-Jan	8	6	25	9	8	8	12	40	7	9	17	6	9	7	9	10	6	5	7	8	7	4	3	2	40	
14-Jan	3	3	5	5	7	8	11	5	9	11	7	7	7	7	8	6	5	12	8	6	5	5	7	5	12	
15-Jan	10	6	6	5	6	7	8	8	5	7	9	8	15	9	8	9	20	13	8	9	16	8	7	7	20	
16-Jan	7	8	5	8	6	12	8	10	6	8	7	11	9	11	10	9	8	5	5	5	7	4	4	4	12	
17-Jan	4	6	6	6	7	10	9	7	5	3	6	6	6	7	16	13	7	8	7	11	16	10	9	9	16	
18-Jan	10	7	7	6	15	17	4	10	6	6	79	50	30	19	13	4	10	9	4	3	4	4	4	5	79	
19-Jan	66	40	7	10	11	9	7	10	9	7	10	13	14	16	18	20	18	24	17	20	26	25	32	83	83	
20-Jan	79	95	18	16	21	13	9	11	7	9	21	4	4	4	5	2	9	8	5	13	8	44	AF	AF	95	
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	3	2	5	2	4	4	5	5
26-Jan	5	8	7	9	9	9	6	5	7	8	15	9	12	15	11	7	4	5	5	5	5	5	6	14	15	
27-Jan	7	7	7	6	5	5	9	6	8	5	5	4	5	5	11	11	10	5	7	3	3	5	6	4	11	
28-Jan	11	9	6	7	11	7	18	17	5	8	5	10	13	19	12	8	5	5	11	9	13	10	6	6	19	
29-Jan	9	9	8	6	6	6	32	31	44	10	9	20	11	8	8	14	4	8	4	3	4	4	5	2	44	
30-Jan	4	6	7	6	3	3	3	4	5	4	55	8	19	17	14	13	19	8	8	8	11	7	7	7	55	
31-Jan	10	10	16	11	14	6	18	60	9	6	13	25	30	19	9	7	6	6	5	4	6	6	13	5	60	
79 95 30 19 21 19 32 65 65 18 79 50 38 19 21 20 31 50 17 20 26 44 32 83																										
Diurnal Maximum																										
AF - Analyzer Failure																										



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction 90 m (WD90m) - deg
Mannix - January 2017





Maximum Value: 1.2 km/h on Jan 25 17:00																				Maximum Daily Average: 0.4 km/h on Jan 13					Hours in Service: 744				
Minimum Value: -1.0 km/h on Jan 11 11:00																				Minimum Daily Average: -0.3 km/h on Jan 15					Hours of Data: 594				
Maximum Diurnal Average: 0.1 km/h at hour 24																				Minimum Diurnal Average: -0.1 km/h at hour 6					Hours of Missing Data: 150				
Monthly Average: 0.02 km/h																				Percentiles: P ₁ = -0.8 P ₁₀ = -0.5 Q ₁ = -0.3 Median = 0.0 Q ₃ = 0.3 P ₉₀ = 0.5 P ₉₉ = 1.0					Hours of Calibration: 0				
																				Percent Operational Time: 79.8									
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-Jan	-0.6	-0.9	-0.3	-0.5	-0.2	0.0	0.1	0.1	-0.1	-0.2	-0.2	-0.3	-0.2	-0.1	0.0	-0.1	0.1	0.1	0.3	0.1	0.0	0.1	0.3	0.0	-0.1	0.3			
2-Jan	0.0	0.0	-0.2	-0.1	0.0	-0.1	0.0	0.1	0.2	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.3	0.3	0.2	0.2	0.3	0.0	0.2	0.3	0.1	0.3			
3-Jan	0.1	0.5	0.5	0.5	0.0	0.2	0.3	0.4	0.3	0.3	0.4	0.4	0.1	0.0	0.2	0.0	-0.1	-0.3	-0.3	-0.4	-0.2	-0.3	-0.3	-0.1	0.1	0.5			
4-Jan	0.0	0.0	0.1	0.3	0.0	0.2	0.4	0.2	0.1	0.3	0.1	0.4	0.6	0.6	0.5	0.5	0.5	0.3	0.6	0.8	0.5	0.2	0.2	0.2	0.3	0.8			
5-Jan	0.1	0.0	0.0	-0.1	0.1	-0.1	0.0	0.0	0.0	0.1	0.0	0.1	-0.1	0.2	0.1	0.2	0.6	0.2	-0.1	0.0	0.0	-0.1	-0.1	0.0	0.0	0.6			
6-Jan	-0.2	-0.1	-0.2	-0.3	-0.2	0.0	-0.4	-0.4	-0.3	-0.2	0.1	0.1	0.2	0.4	0.5	0.3	0.3	-0.1	0.2	0.0	0.0	0.2	0.3	-0.1	0.0	0.5			
7-Jan	-0.2	0.1	0.1	0.0	0.1	0.0	0.1	-0.2	-0.1	-0.3	-0.3	-0.5	-0.3	-0.4	-0.2	0.1	0.0	-0.3	0.0	0.3	0.0	-0.1	0.0	-0.1	-0.1	0.3			
8-Jan	-0.3	-0.2	-0.1	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.2	0.3	0.2	0.2	0.2	-0.2	-0.7	-0.6	-0.3	--	0.3			
9-Jan	-0.5	-0.4	-0.3	-0.4	-0.4	-0.5	-0.4	-0.3	-0.3	-0.1	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	-0.2	-0.2	-0.1	-0.1	0.0	-0.1	0.0	-0.2	0.0			
10-Jan	-0.1	-0.1	-0.1	-0.1	-0.2	-0.2	-0.1	-0.1	-0.1	0.0	-0.1	-0.1	0.4	0.5	0.4	0.3	0.1	-0.1	-0.2	-0.3	-0.1	0.2	0.6	0.8	0.0	0.8			
11-Jan	0.8	0.9	0.9	1.0	0.9	0.4	0.1	-0.1	-0.1	-0.3	-1.0	-0.7	-0.9	-0.7	-0.9	-0.6	-0.5	-0.6	-0.5	-0.6	-0.4	-0.1	0.2	AF	-0.1	1.0			
12-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.7	0.4	0.5	0.8	0.8	0.7	0.6	0.7	0.7	0.5	0.5	--	0.8		
13-Jan	0.7	0.4	0.2	0.1	0.1	0.1	0.1	0.2	0.5	0.7	0.7	0.4	0.4	0.5	0.5	0.5	0.3	0.3	0.4	0.4	0.5	0.6	0.7	0.7	0.4	0.7			
14-Jan	0.9	0.8	0.9	0.4	0.6	0.3	0.4	0.4	0.6	0.5	0.6	0.2	-0.4	-0.4	-0.3	-0.4	-0.4	-0.4	-0.5	-0.2	-0.2	-0.4	-0.3	-0.1	0.1	0.9			
15-Jan	-0.6	-0.4	-0.6	-0.7	-0.6	-0.7	-0.5	-0.6	-0.9	-0.7	-0.7	-0.4	-0.3	-0.2	-0.2	-0.4	0.0	0.1	-0.2	-0.1	0.0	0.0	0.2	0.4	-0.3	0.4			
16-Jan	0.1	0.3	-0.2	0.4	0.2	0.6	0.7	0.7	0.9	0.3	0.0	-0.4	-0.5	-0.4	-0.4	-0.3	-0.4	-0.3	-0.2	-0.3	-0.1	-0.1	0.2	0.7	0.1	0.9			
17-Jan	0.0	0.0	-0.1	-0.2	-0.5	-0.4	-0.8	-0.4	-0.5	-0.7	-0.3	-0.4	-0.5	-0.4	0.0	0.4	0.5	0.4	0.0	0.1	0.2	0.3	0.3	0.4	-0.1	0.5			
18-Jan	0.6	0.6	0.6	0.3	0.2	0.1	0.3	0.2	0.4	0.2	-0.1	0.1	0.2	0.3	0.3	0.3	0.2	0.4	0.2	0.5	0.4	0.5	0.4	0.3	0.3	0.6			
19-Jan	0.3	0.2	0.0	-0.2	-0.1	-0.1	-0.3	-0.1	-0.2	-0.2	-0.1	-0.1	-0.3	-0.1	-0.1	-0.1	-0.2	-0.1	0.1	AF	AF	AF	AF	AF	-0.1	0.3			
20-Jan	AF	AF	AF	AF	AF	AF	AF	1.2	0.8	0.7	0.5	0.6	0.7	0.7	0.5	0.5	0.5	0.4	0.8	0.3	0.3	-0.1	0.0	AF	--	1.2			
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--			
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--			
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--			
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--			
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.9	1.2	1.0	0.7	0.7	0.8	0.9	1.2	1.2	--	1.2			
26-Jan	1.0	0.5	0.5	0.3	0.3	0.3	0.0	-0.3	0.2	0.2	0.3	0.2	0.2	0.4	-0.1	-0.3	-0.7	-0.7	-0.7	-0.6	-0.6	-0.5	-0.5	0.1	0.0	1.0			
27-Jan	-0.1	-0.1	-0.2	-0.2	-0.4	-0.4	-0.2	-0.4	-0.6	-0.6	-0.8	-0.6	-0.6	-0.5	-0.1	0.0	-0.2	-0.2	-0.2	-0.3	-0.3	-0.3	-0.4	-0.5	-0.3	0.0			
28-Jan	-0.1	0.0	-0.1	0.1	0.2	-0.3	0.2	0.1	0.0	0.1	0.0	0.1	0.3	0.4	0.6	0.2	0.4	0.6	0.4	0.2	0.1	0.2	-0.3	-0.5	0.1	0.6			
29-Jan	-0.4	-0.3	-0.2	-0.5	-0.5	-0.7	-0.3	0.0	0.5	0.2	0.4	0.5	-0.2	-0.4	-0.2	-0.3	-0.4	-0.3	-0.5	-0.1	-0.2	-0.3	-0.6	-0.6	-0.2	0.5			
30-Jan	-0.6	-0.6	-0.6	-0.5	-0.5	-0.5	-0.8	-0.3	-0.5	-0.4	-0.1	0.3	0.2	-0.2	-0.2	-0.4	-0.2	0.1	-0.3	-0.3	-0.2	-0.5	-0.4	-0.5	-0.3	0.3			
31-Jan	-0.3	-0.1	-0.2	0.0	-0.3	0.2	0.0	0.1	-0.2	-0.2	-0.2	0.0	-0.2	-0.1	-0.1	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.4	-0.2	-0.4	-0.2	0.2			
																								Diurnal Average					
																								Diurnal Maximum					
AF - Analyzer Failure																													



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.6 km/h on Jan 11 12:00 Minimum Value: 0.2 km/h on Jan 18 06:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 0.5 Median = 0.9 Q ₃ = 1.5 P ₉₀ = 2.2 P ₉₉ = 3.4																								Hours in Service: 744 Hours of Data: 594 Hours of Missing Data: 150 Hours of Calibration: 0 Percent Operational Time: 79.8		
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-Jan	2.4	3.8	2.7	2.6	2.5	2.4	2.3	1.4	0.4	0.3	0.5	1.2	1.1	0.4	0.6	0.5	0.2	0.2	0.4	0.5	0.2	0.5	0.5	0.7	3.8	
2-Jan	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.6	0.5	0.5	0.4	0.5	0.3	0.4	0.4	0.4	0.5	0.5	0.6	0.5	0.8	
3-Jan	0.6	0.5	0.5	0.5	0.4	0.3	0.5	0.5	0.5	0.5	0.8	0.8	0.8	0.6	0.6	0.6	0.5	1.1	1.2	1.4	1.1	1.0	1.1	0.9	1.4	
4-Jan	0.9	1.4	1.4	1.3	1.4	1.1	0.9	0.4	0.3	0.5	0.7	0.8	0.9	0.9	0.7	0.5	0.8	1.2	0.8	0.9	0.8	0.8	0.4	0.2	1.4	
5-Jan	0.3	1.1	1.7	1.9	1.9	1.7	2.0	1.8	1.8	1.7	2.1	2.5	2.5	2.2	2.2	2.3	1.8	1.4	1.5	1.0	1.1	0.6	0.5	0.3	2.5	
6-Jan	0.6	0.5	0.5	0.4	0.3	0.4	0.5	0.4	0.6	0.5	0.5	0.3	0.5	0.7	0.7	0.5	0.3	0.5	0.6	0.6	0.8	0.3	0.4	0.5	0.8	
7-Jan	0.4	0.2	0.2	0.4	0.5	1.0	0.8	0.6	0.4	1.6	2.1	2.6	2.4	2.6	2.6	2.4	2.4	2.1	2.1	1.8	1.3	0.9	0.4	0.3	2.6	
8-Jan	0.3	0.2	0.2	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.6	0.5	0.7	0.4	0.4	0.7	1.3	1.1	0.9	1.3	
9-Jan	1.0	1.2	0.9	0.9	1.2	1.4	1.0	0.7	0.6	0.5	0.5	0.5	1.0	0.8	0.4	0.4	0.4	0.3	0.5	0.5	0.2	0.2	0.3	0.4	1.4	
10-Jan	0.3	0.3	0.7	0.9	1.0	0.4	0.5	0.5	0.4	0.7	0.2	0.4	0.6	0.7	0.7	0.5	0.6	0.4	0.5	0.6	0.5	0.7	1.0	1.3	1.3	
11-Jan	1.2	1.2	1.4	1.6	1.2	1.0	0.6	0.7	2.4	2.7	4.5	4.6	4.1	4.0	3.4	3.5	2.9	2.2	1.7	1.5	1.3	0.6	0.4	AF	4.6	
12-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	1.3	1.0	0.9	1.8	2.1	1.7	1.5	1.3	1.2	0.7	0.7	2.1
13-Jan	1.0	0.9	0.5	0.2	0.3	0.4	0.2	0.4	0.8	1.1	1.0	0.8	0.7	0.9	0.8	0.8	0.4	0.5	0.6	0.5	0.7	0.8	0.9	0.7	1.1	
14-Jan	1.0	0.9	1.0	1.0	1.4	1.3	1.3	1.0	1.0	1.2	1.1	0.7	0.8	1.8	1.5	1.1	1.6	1.9	1.7	1.4	1.3	1.6	1.6	0.8	1.9	
15-Jan	1.3	1.8	2.0	2.4	2.1	2.3	2.0	2.3	2.6	2.5	2.6	1.8	1.7	1.5	1.1	1.4	1.0	0.8	1.5	1.2	1.2	1.2	1.3	0.6	2.6	
16-Jan	0.8	0.6	0.8	0.8	1.0	0.8	0.8	0.8	1.0	1.3	1.5	2.2	2.6	2.6	2.7	2.1	2.2	2.5	2.2	1.8	1.3	1.6	1.5	1.1	2.7	
17-Jan	1.8	2.0	1.4	1.4	1.9	1.5	2.0	1.6	1.3	1.7	1.7	1.8	2.2	1.8	0.9	0.5	0.5	0.6	1.2	0.5	0.5	0.6	0.6	1.0	2.2	
18-Jan	0.9	0.8	0.6	0.4	0.4	0.2	0.5	0.4	0.7	0.5	0.4	0.6	0.7	0.7	0.7	0.7	0.5	0.6	0.4	0.5	0.5	0.9	0.7	0.6	0.9	
19-Jan	0.6	0.5	0.9	1.2	1.5	1.4	1.4	0.9	1.1	1.5	1.3	1.4	1.3	1.3	1.2	1.2	1.0	0.9	1.1	AF	AF	AF	AF	AF	1.5	
20-Jan	AF	AF	AF	AF	AF	AF	AF	0.9	0.8	0.8	0.9	0.9	0.9	0.9	0.8	0.7	0.5	0.4	0.4	0.5	0.4	0.8	2.1	AF	2.1	
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.9	1.0	1.0	0.6	0.7	1.0	1.0	1.1	1.0	1.1	
26-Jan	1.0	0.7	0.8	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.6	0.9	0.6	0.8	1.2	1.5	2.0	2.3	2.5	1.7	1.6	1.4	0.8	2.5	
27-Jan	1.1	0.7	0.9	1.8	1.8	1.8	1.6	1.6	1.6	1.8	2.1	2.9	2.0	2.1	1.6	1.1	1.4	1.0	0.6	0.9	0.8	1.2	1.6	1.6	2.9	
28-Jan	1.2	0.7	0.5	0.5	0.9	1.2	1.0	0.6	0.4	0.5	0.6	0.8	0.6	0.7	0.9	1.1	0.5	0.9	0.7	0.4	0.5	1.3	1.5	2.2	2.2	
29-Jan	1.7	1.5	1.9	1.8	2.4	2.5	2.6	1.3	1.0	0.8	0.8	1.1	1.2	1.6	0.9	1.0	1.3	0.9	0.8	0.4	0.3	1.0	1.3	1.1	2.6	
30-Jan	1.0	0.8	0.9	0.5	0.6	0.7	1.4	1.2	1.4	1.8	2.4	2.5	1.7	1.6	1.1	2.3	2.4	2.6	2.9	3.2	3.0	2.8	2.8	2.8	3.2	
31-Jan	2.8	3.0	2.4	2.0	1.7	1.4	0.8	0.4	0.5	0.6	0.8	0.9	1.0	0.9	1.0	1.0	1.0	1.0	1.0	0.9	0.9	1.7	1.8	1.8	3.0	
Diurnal Maximum																										
AF - Analyzer Failure																										



Maximum Value: 2.1 km/h on Jan 25 23:00 Maximum Daily Average: 1.0 km/h on Jan 12																								Hours in Service:	744	
Minimum Value: -2.3 km/h on Jan 11 14:00 Minimum Daily Average: -0.8 km/h on Jan 30																								Hours of Data:	511	
Maximum Diurnal Average: 0.3 km/h at hour 18 Minimum Diurnal Average: 0.0 km/h at hour 5																								Hours of Missing Data:	233	
Monthly Average: 0.11 km/h Percentiles: P ₁ = -1.8 P ₁₀ = -0.7 Q ₁ = -0.4 Median = 0.0 Q ₃ = 0.6 P ₉₀ = 1.1 P ₉₉ = 1.8																								Hours of Calibration:	0	
																								Percent Operational Time:	68.7	
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-Jan	-1.1	-2.1	-1.4	-1.1	-0.8	-0.6	-0.4	-0.3	-0.1	-0.1	-0.6	-0.7	-0.5	-0.3	-0.2	-0.2	0.1	0.2	0.3	0.1	0.1	0.6	0.5	0.3	-0.3	0.6
2-Jan	0.1	0.2	-0.1	-0.1	-0.2	0.0	0.0	0.2	0.4	0.3	0.3	0.1	0.0	0.0	0.2	0.2	0.6	0.7	0.3	0.3	0.4	0.0	0.3	0.6	0.2	0.7
3-Jan	0.4	0.9	0.9	1.0	0.5	0.6	0.7	0.8	0.5	0.4	0.7	0.4	0.2	0.1	0.2	-0.1	-0.1	-0.2	-0.5	-0.7	-0.4	-0.5	-0.5	-0.5	0.2	1.0
4-Jan	-0.4	-0.3	-0.4	0.0	-0.4	-0.1	0.4	0.2	0.0	0.5	0.3	0.6	0.7	0.8	0.6	0.6	0.9	0.8	0.9	1.3	0.9	0.3	0.1	-0.1	0.3	1.3
5-Jan	0.0	-0.4	-0.6	-0.7	-0.4	-0.5	-0.6	-0.7	-0.7	-0.6	-0.8	-0.8	-0.8	-0.5	-0.7	-0.9	-0.1	-0.1	-0.7	-0.4	-0.2	-0.4	-0.4	-0.2	-0.5	0.0
6-Jan	-0.2	0.0	0.0	-0.2	0.0	0.1	-0.1	-0.1	-0.2	-0.3	0.2	0.4	0.3	0.6	0.8	0.4	0.8	0.4	0.9	0.7	0.5	0.2	0.3	0.5	0.3	0.9
7-Jan	-0.1	-0.1	-0.2	-0.5	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	-0.1
8-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
9-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
10-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
11-Jan	AF	AF	AF	AF	AF	AF	AF	-0.1	AF	-1.1	0.7	-1.3	-2.1	-2.3	-1.4	-1.9	-1.5	-1.2	-1.1	-1.3	-1.1	-0.4	0.1	-0.3	--	0.7
12-Jan	-0.1	-0.1	0.3	0.3	1.0	1.3	1.5	1.9	1.4	1.4	1.2	1.0	1.2	1.2	0.9	0.8	1.4	1.2	1.0	0.9	1.0	1.3	0.8	0.9	1.0	1.9
13-Jan	1.1	0.7	0.2	0.0	0.0	0.0	0.0	0.2	0.9	1.1	1.1	0.6	0.5	0.7	1.1	1.1	0.9	0.9	0.8	0.9	1.0	1.1	1.2	1.2	0.7	1.2
14-Jan	1.8	1.7	1.6	1.5	1.9	0.8	1.2	1.2	1.9	1.6	1.7	0.2	-0.3	-0.2	-0.1	-0.1	-0.1	-0.4	-0.3	-0.2	0.0	-0.1	-0.1	0.1	0.6	1.9
15-Jan	-0.5	-0.5	-0.7	-0.7	-0.9	-0.8	-0.5	-0.5	-0.7	-0.9	-0.5	-0.3	0.1	0.1	-0.3	-0.2	0.0	0.3	0.0	-0.1	0.2	0.5	0.9	0.7	-0.2	0.9
16-Jan	0.3	0.4	0.1	0.7	0.7	1.2	1.2	0.9	1.3	0.7	0.5	0.4	-0.2	-0.1	0.1	0.1	0.1	0.3	0.1	-0.1	0.4	0.7	0.9	1.1	0.5	1.3
17-Jan	0.9	1.0	0.5	0.3	-0.3	-0.4	-0.4	-0.5	-0.6	-0.6	-0.1	-0.2	-0.3	-0.3	-0.1	0.6	1.0	0.9	0.6	0.3	0.4	0.9	0.7	1.2	0.2	1.2
18-Jan	1.6	1.1	1.1	0.7	0.3	0.2	0.6	0.7	0.6	0.5	0.1	0.0	0.3	0.3	0.5	0.7	0.7	0.7	0.5	0.9	0.9	1.1	1.2	0.8	0.7	1.6
19-Jan	0.5	0.1	-0.2	-0.5	-0.6	-0.4	-0.6	-0.3	-0.5	-0.8	-0.3	-0.6	-0.7	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	0.5
20-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	1.0	1.2	0.9	0.8	1.4	1.2	0.9	1.2	1.2	0.8	1.5	0.6	0.6	-0.5	-0.5	AF	1.5
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	1.6	1.3	1.4	1.5	1.8	2.1	1.8	2.1
26-Jan	1.8	0.9	1.1	0.6	0.5	0.5	0.0	-0.1	0.4	0.2	0.5	0.4	0.5	0.4	-0.1	-0.4	-0.8	-0.7	-0.6	-0.7	-0.8	-0.8	-0.5	-0.1	0.1	1.8
27-Jan	-0.2	-0.3	-0.2	-0.3	-0.5	-0.5	0.0	-0.5	-0.7	-0.4	-0.7	-0.7	-0.4	-0.4	-0.1	0.0	-0.2	-0.3	-0.3	-0.5	-0.4	-0.3	-0.5	-0.5	-0.4	0.0
28-Jan	-0.2	0.0	0.0	0.0	0.2	-0.2	0.1	0.2	0.0	-0.1	0.0	0.2	0.5	0.6	1.2	0.7	0.6	1.3	0.8	0.4	0.0	0.1	-0.4	-0.6	0.2	1.3
29-Jan	-0.3	-0.2	-0.3	-0.5	-0.4	-0.5	-0.1	0.1	0.9	0.6	0.7	0.6	-0.3	-0.4	-0.2	-0.2	-0.2	-0.4	-0.5	-0.4	-0.4	-0.5	-0.5	-0.6	-0.2	0.9
30-Jan	-0.6	-0.6	-0.5	-0.4	-0.4	-0.6	-0.7	-0.5	-0.6	-0.5	-0.6	-0.7	-0.2	-0.7	-0.4	-1.0	-0.9	-0.5	-0.8	-1.3	-1.0	-1.7	-1.5	-1.8	-0.8	-0.2
31-Jan	-1.3	-0.7	-1.1	-0.5	-0.9	-0.3	-0.3	0.0	-0.2	-0.2	-0.2	0.0	0.0	-0.2	0.0	-0.3	-0.3	-0.2	-0.5	-0.5	-0.3	-0.8	-0.8	-1.3	-0.4	0.0
																								Diurnal Average		
																								Diurnal Maximum		
AF - Analyzer Failure																										



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Vertical Wind Speed 45 m (VW45m) - km/h
Mannix - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 4.6 km/h on Jan 11 13:00	Hours of Data: 511
Minimum Value: 0.1 km/h on Jan 6 03:00	Hours of Missing Data: 233
Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 0.6 Median = 0.9 Q ₃ = 1.6 P ₉₀ = 2.4 P ₉₉ = 4.1	Hours of Calibration: 0
	Percent Operational Time: 68.7

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-Jan	2.6	4.5	2.6	2.8	2.6	2.7	2.4	1.7	0.6	0.3	0.6	1.5	1.3	0.5	0.7	0.7	0.4	0.4	0.5	0.5	0.2	0.4	0.7	0.4	4.5	
2-Jan	0.6	0.4	0.2	0.2	0.4	0.3	0.3	0.5	0.3	0.4	0.4	0.5	0.4	0.4	0.4	0.3	0.4	0.4	0.3	0.4	0.3	0.4	0.6	0.6	0.6	
3-Jan	0.6	0.5	0.5	0.5	0.4	0.4	0.5	0.5	0.5	0.5	0.7	0.7	0.7	0.6	0.5	0.4	0.5	0.9	1.1	1.2	1.1	1.0	1.0	1.0	1.2	
4-Jan	1.1	1.6	1.5	1.4	1.5	1.3	1.0	0.4	0.4	0.8	0.7	1.1	1.2	1.1	0.9	0.6	0.6	0.9	0.8	0.8	0.8	0.9	0.3	0.3	1.6	
5-Jan	0.6	1.4	1.7	2.0	1.9	1.7	1.7	1.9	2.0	2.1	2.3	2.6	2.6	2.3	2.5	2.4	1.9	1.6	1.4	1.2	1.3	0.6	0.6	0.6	2.6	
6-Jan	0.7	0.6	0.1	0.2	0.4	0.4	0.4	0.2	0.3	0.2	0.5	0.4	0.4	0.8	0.8	0.6	0.3	0.5	0.3	0.3	0.4	0.3	0.5	0.4	0.8	
7-Jan	0.3	0.2	0.4	0.6	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.6	
8-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
9-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
10-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
11-Jan	AF	AF	AF	AF	AF	AF	AF	0.8	AF	2.7	3.9	4.5	4.6	4.0	4.1	4.1	3.4	2.6	2.1	1.6	1.5	0.8	0.6	0.2	4.6	
12-Jan	0.2	0.2	0.5	0.3	0.6	0.8	0.8	1.1	1.1	0.9	0.9	1.3	1.2	1.2	1.2	1.1	2.1	2.3	2.1	1.9	1.5	1.4	0.7	0.6	2.3	
13-Jan	1.0	0.8	0.6	0.3	0.5	0.3	0.4	0.6	0.8	1.1	1.2	1.0	0.8	1.0	0.9	0.7	0.4	0.4	0.3	0.5	0.5	0.4	0.6	0.5	1.2	
14-Jan	0.6	0.8	0.7	0.8	1.4	1.2	1.2	1.0	0.6	1.0	1.2	1.0	0.9	1.8	1.7	1.2	1.5	2.5	2.0	1.6	1.4	1.6	1.3	0.8	2.5	
15-Jan	1.1	2.2	2.4	2.3	2.3	2.4	2.2	2.6	2.7	2.7	2.8	2.0	2.1	1.6	1.2	1.6	1.3	1.1	1.7	1.6	1.6	1.1	1.0	0.6	2.8	
16-Jan	0.6	0.9	0.9	0.8	0.8	0.9	0.9	0.8	1.0	1.6	1.9	2.6	2.8	2.9	2.7	2.4	2.3	2.1	2.0	1.4	0.9	1.3	1.1	1.3	2.9	
17-Jan	1.7	1.6	1.1	1.2	2.2	1.8	2.1	1.8	1.3	1.2	1.6	2.0	2.4	2.0	1.1	0.7	0.6	0.5	0.6	0.5	0.4	0.5	0.6	0.8	2.4	
18-Jan	0.8	0.6	0.7	0.4	0.4	0.3	0.7	0.6	1.0	0.7	0.5	0.4	0.7	0.7	0.8	0.7	0.5	0.4	0.4	0.3	0.3	0.7	0.6	0.7	1.0	
19-Jan	0.8	0.5	0.9	1.3	1.6	1.5	1.4	1.1	1.2	1.5	1.2	1.3	1.3	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	1.6	
20-Jan	AF	AF	AF	AF	AF	AF	AF	AF	0.6	0.7	0.9	1.2	1.0	1.1	0.9	0.5	0.4	0.3	0.4	0.5	0.5	0.7	2.0	AF	2.0	
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.7	0.6	0.5	0.8	0.9	0.6	0.5	0.9
26-Jan	0.6	0.7	0.7	0.5	0.6	0.7	0.7	0.4	0.6	0.5	0.5	0.6	0.7	0.8	1.0	1.5	1.2	1.9	2.4	2.5	1.9	1.8	1.3	1.4	2.5	
27-Jan	1.3	1.0	1.2	1.8	1.9	1.8	2.1	2.0	2.1	2.1	2.8	1.9	1.9	2.0	1.8	1.4	1.6	1.3	0.6	0.8	0.7	1.3	1.5	1.2	2.8	
28-Jan	1.2	0.8	0.7	0.9	1.4	1.4	1.4	0.7	0.5	0.8	0.6	0.6	0.7	0.9	0.9	0.8	0.6	0.8	0.6	0.6	1.1	1.8	2.0	2.2	2.2	
29-Jan	2.0	1.9	2.2	1.9	2.7	2.8	2.8	1.8	1.5	1.0	1.1	1.5	1.7	1.9	1.3	1.0	1.0	0.9	0.7	0.6	0.5	0.9	0.6	0.6	2.8	
30-Jan	0.7	0.4	0.5	0.6	0.4	0.7	0.9	1.3	1.2	1.6	2.4	2.7	1.9	1.8	1.4	2.6	2.7	2.7	3.3	3.2	3.3	3.1	3.2	3.1	3.3	
31-Jan	3.1	3.1	2.6	2.4	1.7	1.6	1.0	0.6	0.3	0.5	0.9	1.0	1.2	1.1	1.2	1.0	1.1	1.1	1.1	0.9	0.9	1.6	2.0	1.9	3.1	
Diurnal Maximum																										

AF - Analyzer Failure



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Vertical Wind Speed 75 m (VW75m) - km/h
Mannix - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 4.7 km/h on Jan 11 12:00	Hours of Data: 498
Minimum Value: 0.2 km/h on Jan 2 11:00	Hours of Missing Data: 246
Percentiles: P ₁ = 0.2 P ₁₀ = 0.3 Q ₁ = 0.5 Median = 0.9 Q ₃ = 1.6 P ₉₀ = 2.4 P ₉₉ = 3.8	Hours of Calibration: 0
	Percent Operational Time: 66.9

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-Jan	2.6	4.2	2.2	2.7	2.6	2.6	2.3	1.7	0.8	0.4	0.8	1.5	1.3	0.5	0.8	0.9	0.6	0.7	0.9	0.9	0.6	0.4	0.8	0.4	4.2
2-Jan	0.8	0.5	0.2	0.3	0.6	0.4	0.4	0.3	0.2	0.4	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.3	0.2	0.4	0.6	0.6	0.8
3-Jan	0.6	0.6	0.5	0.4	0.3	0.4	0.6	0.5	0.7	0.6	0.5	0.6	0.6	0.5	0.4	0.3	0.5	0.6	1.1	1.0	1.1	1.0	0.9	1.1	1.1
4-Jan	1.2	1.7	1.5	1.2	1.4	1.3	1.1	0.4	0.3	0.7	0.5	0.9	0.9	0.7	0.8	0.5	0.4	0.6	0.6	0.5	0.6	0.6	0.4	0.4	1.7
5-Jan	0.9	1.6	1.5	1.6	1.7	1.5	1.5	1.8	AF	AF	AF	2.5	2.3	2.0	2.0	1.9	1.5	1.5	1.4	1.2	1.2	0.5	0.6	0.8	2.5
6-Jan	1.0	0.7	0.2	0.3	0.5	0.4	0.4	0.3	0.4	AF	AF	AF	0.2	0.5	0.9	0.6	0.3	0.3	0.3	0.2	0.3	0.3	0.5	0.4	1.0
7-Jan	0.3	0.3	0.4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.4
8-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
9-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
10-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
11-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	2.6	4.6	4.7	4.7	3.9	4.0	3.7	3.1	2.2	1.6	0.9	1.2	0.9	0.8	0.3	4.7
12-Jan	0.2	0.2	0.3	0.2	0.3	0.5	0.5	0.7	0.9	0.5	0.7	1.0	0.9	0.9	1.1	0.9	1.8	2.2	2.0	1.6	1.2	1.1	0.6	0.5	2.2
13-Jan	0.8	0.5	0.5	0.5	0.8	0.3	0.4	0.5	0.5	0.5	1.0	0.7	0.6	0.8	0.5	0.6	0.4	0.3	0.3	0.3	0.3	0.3	0.6	0.5	1.0
14-Jan	0.6	0.8	0.5	0.9	1.1	1.0	1.2	0.9	0.8	1.0	1.2	1.2	1.2	1.8	1.9	1.4	1.7	2.8	2.3	1.7	1.6	1.5	1.2	1.0	2.8
15-Jan	1.2	2.8	2.5	2.3	2.7	2.4	2.2	2.5	2.6	2.9	3.0	2.5	2.2	1.7	1.2	1.6	1.4	1.4	2.0	1.8	2.0	1.3	1.1	0.8	3.0
16-Jan	0.6	0.9	1.0	0.8	0.8	0.9	0.8	1.0	1.0	1.9	2.1	3.0	2.9	2.9	2.8	2.6	2.4	1.8	1.7	1.2	0.8	1.1	1.0	1.1	3.0
17-Jan	1.5	1.2	1.1	1.3	2.1	2.1	2.5	2.0	1.6	1.2	1.5	2.0	2.2	1.9	1.2	0.9	0.8	0.5	0.5	0.6	0.5	0.5	0.8	0.7	2.5
18-Jan	0.6	0.7	0.7	0.5	0.9	0.5	0.8	1.1	1.4	1.3	0.9	0.4	1.0	0.6	0.6	0.5	0.3	0.3	0.3	0.2	0.3	0.6	0.5	0.6	1.4
19-Jan	0.6	0.5	0.9	1.1	1.5	1.5	1.3	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	1.5
20-Jan	AF	AF	AF	AF	AF	0.5	0.6	0.4	0.7	0.6	0.6	0.8	0.8	0.6	1.2	0.4	0.4	0.3	0.9	0.5	0.4	0.5	AF	AF	1.2
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.5	0.3	0.3	0.5	0.5	0.6	0.6
26-Jan	0.7	0.8	0.8	0.6	0.7	0.8	0.7	0.5	0.6	0.5	0.5	0.7	0.7	0.9	1.3	1.8	1.2	1.9	2.1	2.3	2.1	1.9	1.3	1.7	2.3
27-Jan	1.3	1.1	1.4	1.9	2.0	2.0	2.3	2.2	2.4	2.1	2.5	1.9	2.0	1.7	2.0	1.7	1.8	1.5	0.7	0.8	0.8	1.3	1.4	1.2	2.5
28-Jan	1.2	1.1	1.0	1.2	1.9	1.7	1.6	1.1	0.7	0.9	0.6	0.5	0.4	0.7	0.6	0.5	0.6	0.7	0.5	0.8	1.5	2.2	2.3	2.4	2.4
29-Jan	2.1	2.2	2.3	1.9	2.7	2.7	2.8	2.1	1.6	1.2	1.2	1.6	2.1	2.1	1.6	1.2	1.0	0.9	0.9	0.7	0.8	0.9	0.6	0.4	2.8
30-Jan	0.8	0.3	0.6	0.7	0.4	0.6	0.9	1.3	1.3	1.4	2.2	2.4	1.8	1.9	1.5	2.4	2.4	2.5	3.1	3.2	3.3	2.9	3.2	2.8	3.3
31-Jan	3.0	3.0	2.4	2.2	1.4	1.3	0.9	0.5	0.3	0.3	0.5	0.9	1.3	1.1	1.3	1.0	0.9	1.2	1.3	0.9	1.0	1.4	1.8	1.6	3.0
Diurnal Maximum																									

AF - Analyzer Failure



Maximum Value: 3.8 km/h on Jan 10 18:00																				Maximum Daily Average: 1.0 km/h on Jan 19					Hours in Service: 744			
Minimum Value: -2.4 km/h on Jan 20 09:00																				Minimum Daily Average: -0.4 km/h on Jan 16					Hours of Data: 556			
Maximum Diurnal Average: 0.3 km/h at hour 18																				Minimum Diurnal Average: -0.1 km/h at hour 9					Hours of Missing Data: 188			
Monthly Average: 0.15 km/h																				Percentiles: P ₁ = -0.9 P ₁₀ = -0.3 Q ₁ = -0.1 Median = 0.1 Q ₃ = 0.3 P ₉₀ = 0.7 P ₉₉ = 2.4					Hours of Calibration: 0			
																				Percent Operational Time: 74.7								
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-Jan	0.2	0.2	0.2	0.7	1.4	1.5	1.2	0.7	0.0	0.0	-0.1	0.1	0.1	0.0	0.3	0.4	0.2	0.2	0.2	0.2	0.1	0.2	0.0	0.0	0.3	1.5		
2-Jan	0.2	0.2	0.0	0.0	0.3	0.2	0.3	0.2	0.1	0.1	0.1	0.0	0.1	0.0	0.2	0.1	0.1	0.0	0.1	-0.1	-0.1	-0.4	-0.1	0.0	0.1	0.3		
3-Jan	0.0	0.0	0.0	0.1	-0.1	0.2	-0.1	-0.2	0.1	0.0	-0.1	-0.2	0.0	0.0	0.1	0.0	0.2	0.4	0.2	0.1	0.0	-0.2	0.3	0.5	0.1	0.5		
4-Jan	0.1	0.6	0.6	0.6	0.3	0.2	0.6	0.2	-0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0	-0.1	0.1	0.0	0.2	0.6	
5-Jan	0.3	0.3	0.6	0.6	0.9	0.8	0.7	0.3	0.7	0.9	0.5	0.1	1.7	1.7	0.1	-0.3	0.4	0.6	0.2	0.2	0.2	0.1	-0.1	0.2	0.5	1.7		
6-Jan	-0.3	0.0	0.1	-0.1	0.0	0.1	0.0	-0.2	-0.1	0.0	0.1	0.2	0.3	0.7	0.3	0.3	0.6	0.3	0.0	-0.1	0.1	-0.1	0.1	0.1	0.1	0.7		
7-Jan	0.0	0.2	0.4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.4		
8-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
9-Jan	AF	AF	AF	AF	1.0	2.4	0.6	0.5	0.0	-0.1	AF	AF	0.5	AF	AF	AF	AF	AF	1.0	0.9	AF	AF	AF	AF	AF	2.4		
10-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	1.4	2.1	2.8	3.8	3.7	2.7	2.0	1.3	1.9	0.5	--	3.8		
11-Jan	0.3	0.1	-0.1	-0.6	-0.4	-0.3	0.0	0.3	0.5	0.1	0.0	0.3	0.0	0.0	0.7	0.0	0.0	0.1	0.0	-0.2	-0.1	0.1	0.6	0.1	0.1	0.7		
12-Jan	0.1	0.2	0.1	0.0	0.2	0.1	0.0	0.2	0.0	0.5	0.8	0.6	0.4	0.4	0.8	0.7	0.7	0.6	0.4	0.3	0.4	0.6	0.4	0.2	0.4	0.8		
13-Jan	0.2	-0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.6	0.5	0.2	0.4	0.2	0.1	0.1	-0.1	-0.3	-0.3	-0.3	-0.3	-0.2	-0.4	0.0	0.6		
14-Jan	0.3	-0.1	0.1	0.0	0.2	-0.3	-0.2	-0.1	0.1	-0.1	-0.2	-0.3	-0.6	-0.5	-0.1	-0.3	-0.4	-0.3	-0.3	-0.4	-0.2	-0.2	-0.5	-0.5	-0.2	0.3		
15-Jan	-0.4	-0.3	-0.4	-0.2	-0.3	0.0	-0.2	-0.2	-0.7	-0.7	-0.2	-0.1	0.4	0.1	-0.3	-0.2	-0.1	-0.3	0.2	0.2	-0.3	-0.1	-0.1	-0.2	-0.2	0.4		
16-Jan	-0.3	-0.3	-0.4	-0.4	-0.4	-0.1	0.0	-0.4	-0.1	-0.1	-0.3	-0.4	-1.1	-0.5	-0.7	-0.6	-0.8	-1.0	-1.0	-0.8	-0.5	-0.4	-0.1	0.2	-0.4	0.2		
17-Jan	-0.1	-0.1	-0.5	-0.6	-0.8	-0.5	-0.6	-0.1	-0.5	-0.5	0.1	-0.1	0.0	0.1	-0.2	0.0	0.2	0.1	-0.4	-0.3	-0.1	0.1	-0.2	0.1	-0.2	0.2		
18-Jan	0.5	0.6	0.6	0.4	0.2	0.2	0.3	0.3	-0.3	0.1	0.2	0.0	0.0	0.1	0.1	0.3	0.2	0.2	0.2	0.1	0.1	0.5	0.2	0.1	0.2	0.6		
19-Jan	0.0	0.3	0.7	0.5	0.5	0.6	1.2	1.0	0.4	0.6	0.9	1.3	1.8	2.4	2.1	1.7	1.9	1.5	1.3	0.9	1.2	0.5	1.1	0.7	1.0	2.4		
20-Jan	0.2	0.0	0.2	0.9	-0.2	-0.2	-1.1	-1.0	-2.4	-0.7	0.0	0.5	0.5	0.6	0.7	0.6	0.5	0.5	0.9	0.4	0.5	0.3	AF	AF	0.1	0.9		
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.5	0.1	-0.4	-0.1	0.1	0.2	-0.1	-0.1	--	0.5	
26-Jan	0.0	-0.2	-0.2	0.3	0.1	0.2	0.8	0.2	-0.1	-0.1	-0.1	-0.3	-0.1	0.0	-0.4	-0.2	-0.7	-0.5	-0.3	0.0	-0.6	-0.5	-0.1	-0.1	-0.1	0.8		
27-Jan	0.2	0.0	-0.1	0.4	0.0	-0.2	0.3	0.0	-0.4	-0.1	-0.1	-0.5	-0.3	-0.1	0.4	0.3	0.3	-0.1	-0.1	0.0	-0.1	0.2	0.0	-0.2	0.0	0.4		
28-Jan	0.2	-0.1	0.1	0.3	0.1	-0.2	0.3	0.0	0.0	0.2	-0.1	-0.1	0.0	0.3	0.2	-0.2	-0.1	0.1	-0.2	-0.2	-0.1	0.3	-0.1	-0.2	0.0	0.3		
29-Jan	-0.2	-0.1	-0.1	-0.3	-0.1	0.0	0.5	-0.1	0.1	-0.1	0.3	0.0	-0.1	0.2	0.1	-0.3	-0.4	-0.4	-0.3	-0.1	-0.1	-0.1	-0.1	0.0	-0.1	0.5		
30-Jan	-0.2	-0.1	-0.5	-0.4	-0.3	-0.4	-0.3	-0.1	-0.2	-0.1	0.7	0.9	0.6	0.4	0.2	0.4	0.4	1.3	1.5	0.6	1.0	-0.3	-0.2	-0.4	0.2	1.5		
31-Jan	0.3	1.5	0.4	0.8	0.2	0.4	0.1	0.2	0.1	0.0	0.0	0.0	0.1	-0.1	0.5	-0.1	0.0	0.0	0.1	0.0	0.0	0.5	0.5	-0.3	0.2	1.5		
																								Diurnal Average				
																								Diurnal Maximum				
0.1 0.1 0.1 0.1 0.1 0.2 0.2 0.1 -0.1 0.0 0.1 0.1 0.2 0.3 0.3 0.2 0.3 0.3 0.3 0.1 0.1 0.1 0.2 0.0																												
0.5 1.5 0.7 0.9 1.4 2.4 1.2 1.0 0.7 0.9 0.9 1.3 1.8 2.4 2.1 2.1 2.8 3.8 3.7 2.7 2.0 1.3 1.9 0.7																												
AF - Analyzer Failure																												



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Vertical Wind Speed 90 m (VW90m) - km/h
Mannix - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 4.4 km/h on Jan 11 12:00	Hours of Data: 556
Minimum Value: 0.2 km/h on Jan 2 12:00	Hours of Missing Data: 188
Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 0.6 Median = 1.0 Q ₃ = 1.8 P ₉₀ = 2.4 P ₉₉ = 3.7	Hours of Calibration: 0
	Percent Operational Time: 74.7

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-Jan	2.6	4.1	2.2	2.8	2.7	2.7	2.2	1.7	0.9	0.5	0.8	1.3	1.3	0.6	0.9	1.0	0.8	0.7	0.6	0.5	0.4	0.4	0.7	0.4	4.1	
2-Jan	0.8	0.5	0.3	0.4	0.8	0.5	0.4	0.3	0.2	0.4	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.4	0.7	0.7	0.8	
3-Jan	0.7	0.6	0.5	0.4	0.3	0.4	0.6	0.5	0.7	0.5	0.4	0.5	0.6	0.4	0.3	0.3	0.5	0.6	1.1	0.9	1.1	1.1	0.9	1.1	1.1	
4-Jan	1.3	1.7	1.6	1.2	1.3	1.2	1.1	0.4	0.3	0.6	0.4	0.8	0.8	0.7	0.7	0.5	0.4	0.5	0.4	0.4	0.4	0.7	0.5	0.4	1.7	
5-Jan	1.0	1.8	1.6	1.5	1.7	1.5	1.5	2.3	2.8	2.3	2.0	3.4	3.2	2.8	2.0	1.9	1.4	1.5	1.4	1.3	1.2	0.5	0.6	0.8	3.4	
6-Jan	1.0	0.7	0.2	0.3	0.6	0.5	0.3	1.0	1.0	0.8	0.5	0.3	0.2	0.4	0.8	0.4	0.2	0.3	0.2	0.2	0.3	0.3	0.2	0.3	1.0	
7-Jan	0.3	0.3	0.4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.4	
8-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
9-Jan	AF	AF	AF	AF	1.5	2.1	1.2	0.7	0.9	1.2	AF	AF	1.1	AF	AF	AF	AF	0.6	1.2	AF	AF	AF	AF	AF	2.1	
10-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2.0	1.7	1.8	2.2	2.0	1.9	1.7	1.5	1.3	1.6	2.2	
11-Jan	1.1	0.9	0.8	0.9	0.7	1.1	1.1	1.0	2.5	2.9	3.9	4.4	4.2	3.8	3.7	3.5	2.9	2.2	1.4	0.7	1.0	0.7	0.8	0.4	4.4	
12-Jan	0.2	0.2	0.3	0.2	0.2	0.3	0.4	0.5	0.5	0.3	0.7	1.0	0.8	0.9	1.0	0.9	1.6	2.1	1.8	1.5	1.1	1.1	0.6	0.6	2.1	
13-Jan	0.7	0.5	0.5	0.6	0.8	0.4	0.5	0.5	0.4	0.5	0.8	0.5	0.4	0.6	0.4	0.6	0.4	0.4	0.2	0.3	0.3	0.3	0.4	0.4	0.8	
14-Jan	0.6	0.8	0.6	0.9	1.2	1.0	1.3	1.0	0.8	1.1	1.2	1.4	1.4	1.9	2.0	1.6	1.9	3.0	2.5	1.9	1.6	1.5	1.2	1.2	3.0	
15-Jan	1.4	2.9	2.7	2.5	2.7	2.5	2.3	2.7	2.7	3.1	3.3	2.6	2.3	1.8	1.3	1.8	1.6	1.6	2.3	2.0	2.1	1.4	1.3	0.9	3.3	
16-Jan	0.7	0.9	1.2	0.8	0.8	1.0	0.9	0.9	1.1	2.0	2.3	3.2	3.2	3.1	3.0	3.0	2.6	1.8	1.7	1.3	0.8	1.0	0.9	1.2	3.2	
17-Jan	1.4	1.2	1.1	1.5	2.4	2.3	2.5	2.1	1.7	1.2	1.6	2.1	2.2	2.0	1.3	1.0	0.9	0.5	0.5	0.6	0.5	0.5	0.8	0.7	2.5	
18-Jan	0.6	0.5	0.6	0.5	0.6	0.5	0.7	0.9	1.1	1.1	1.1	0.4	0.7	0.6	0.6	0.4	0.3	0.2	0.2	0.2	0.3	0.4	0.5	0.5	1.1	
19-Jan	0.5	0.5	0.9	1.1	1.4	1.5	1.8	1.6	1.4	1.6	2.1	2.5	2.3	2.3	2.4	2.5	2.4	2.3	2.3	2.2	2.2	2.0	1.9	1.9	2.5	
20-Jan	1.3	0.4	0.8	1.5	0.9	1.5	2.1	2.0	2.0	0.7	0.7	0.7	0.9	0.7	0.8	0.4	0.3	0.5	0.6	0.4	0.4	0.5	AF	AF	2.1	
21-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	0.8	0.7	0.5	0.3	0.4	0.8	0.6	0.6	0.8
26-Jan	0.8	0.8	0.7	0.7	0.8	1.1	0.7	0.6	0.6	0.6	0.5	0.8	0.7	1.1	1.4	2.0	1.2	2.0	2.2	2.4	2.3	2.0	1.3	1.8	2.4	
27-Jan	1.4	1.2	1.5	2.0	2.1	2.1	2.4	2.3	2.6	2.2	2.6	2.0	2.1	1.8	2.1	1.9	1.9	1.5	0.8	0.9	0.8	1.3	1.5	1.3	2.6	
28-Jan	1.2	1.2	1.0	1.2	2.0	1.8	1.9	1.2	0.8	0.9	0.6	0.5	0.4	0.7	0.6	0.6	0.7	0.7	0.6	0.9	1.7	2.4	2.4	2.5	2.5	
29-Jan	2.2	2.5	2.6	2.1	2.8	2.9	2.9	2.4	1.8	1.2	1.3	1.9	2.1	2.3	1.6	1.2	1.1	1.0	1.0	0.7	1.0	0.9	0.6	0.4	2.9	
30-Jan	0.8	0.3	0.6	0.8	0.5	0.5	1.0	1.2	1.3	1.3	2.1	2.4	1.7	1.9	1.4	2.3	2.2	2.4	3.2	3.3	3.4	2.8	2.9	2.7	3.4	
31-Jan	3.0	3.2	2.3	2.2	1.4	1.2	0.9	0.6	0.4	0.2	0.5	0.8	1.4	1.1	1.4	1.1	0.9	1.3	1.3	0.8	1.0	1.4	1.7	1.4	3.2	
Diurnal Maximum																										

AF - Analyzer Failure



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	January 11, 2017	Last Calibration	December 1, 2016
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	8:15	End Time (MST)	11:21
Gas Cert Reference	S960161A	Station temp.	22 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	September 26, 2017
Calibrator Make/Model	API T700	Serial Number	746
ZAG Make/Model	API 701	Serial Number	1083
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2633

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-634	-634
Analyzer IP address	192.168.1.43		Lamp voltage	825	825
Calculated slope	1.001984	0.998755	Chamber temp	44.9	44.9
Calculated intercept	0.551272	0.801166	Pressure	684.2	684.2
Analyzer Background	7.5	7.4	Flow	0.420	0.420
Analyzer Coefficient	0.995	0.972	Intensity	89	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	0.1	----
as found span	5000	60.0	600.0	615.0	0.976
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	60.0	600.0	600.3	1.000
second point	5000	30.0	300.0	299.3	1.002
third point	5000	15.0	150.0	148.5	1.010
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	60.0	600.0	599.1	1.002
Average Correction Factor					1.004

Corrected As found 614.9 Previous response 598.3 % change -2.7%

Notes:

span adjusted, filter changed out, no maintenance done

Calibration Performed By: Melissa Lemay



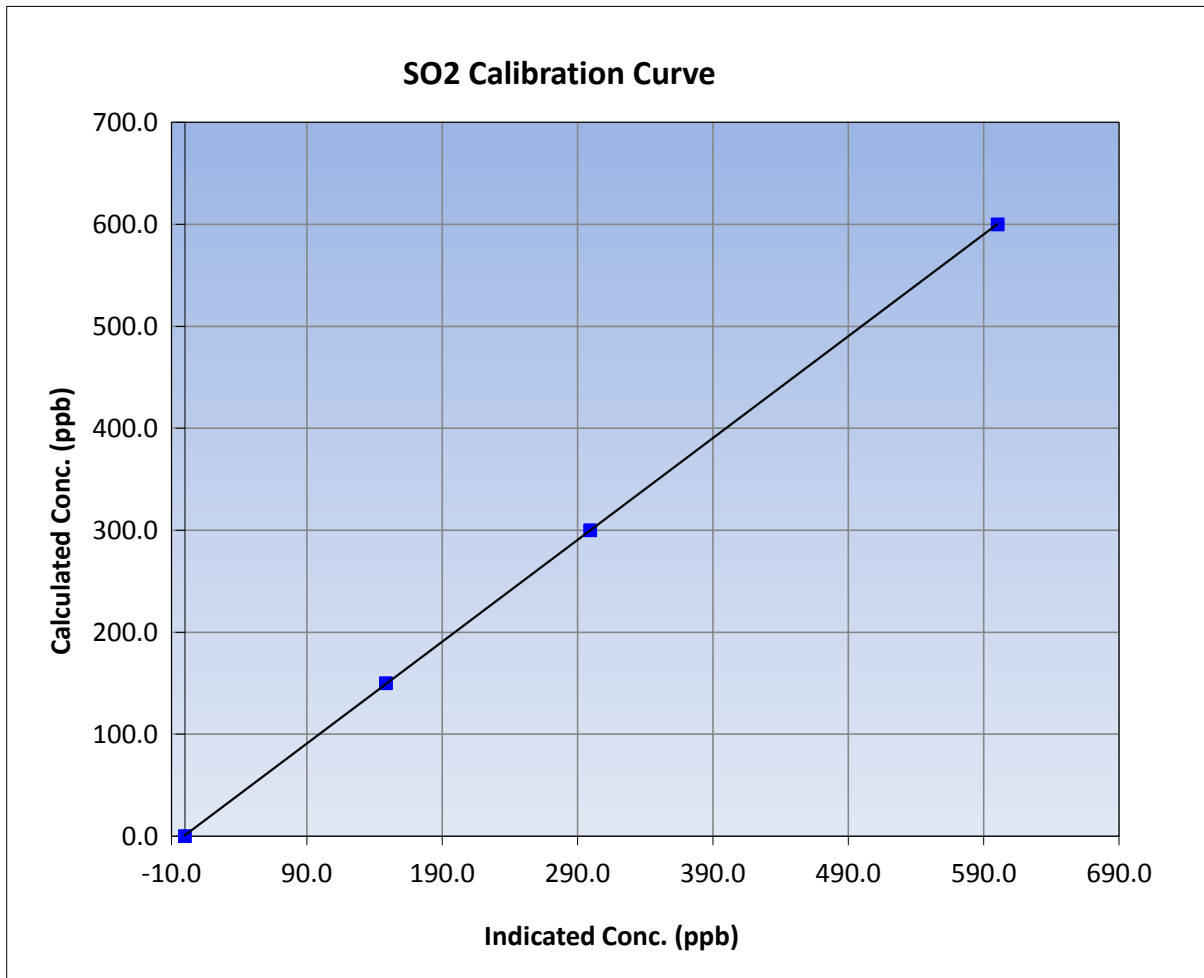
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 11, 2017	Previous Calibration	December 1, 2016
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	8:15	End Time (MST)	11:21
Analyzer make	TEI 43i	Analyzer serial #	1008841399

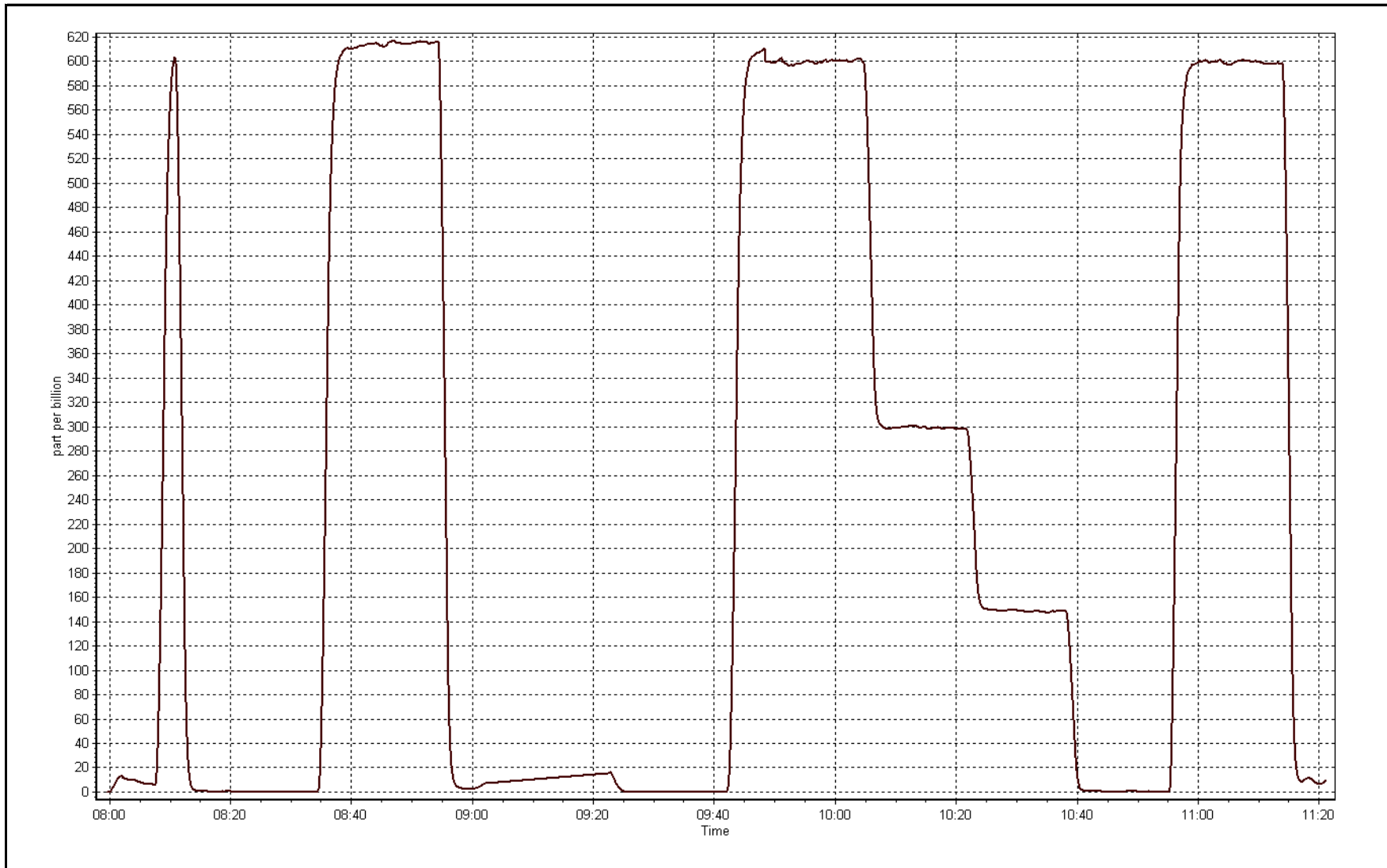
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999992
600.0	600.3	0.9995		
300.0	299.3	1.0023	Slope	0.998755
150.0	148.5	1.0101		
			Intercept	0.801166



SO2 Calibration Plot

Date: January 11, 2017





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	January 12, 2017	Last Calibration	December 1, 2016
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	11:05	End Time (MST)	15:09
Gas Cert Reference	ET0005008	Station temp.	21 Deg C
Cal Gas Concentration	5.03 ppm	Cal Gas Exp Date	02/12/2019
Calibrator Make/Model	Sabio 4010	Serial Number	14300410
ZAG air Make/Model	API 701	Serial Number	138
DACS make/model	Campbell Scientific CR3000	Serial Number	2633
SO2 gas concentration	50.1 ppm	SO2 gas cert/exp	LL104186 02-Jun-19

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-643	-643
Analyzer IP address	192.168.1.42		Lamp voltage	796	796
Calculated slope	0.998423	1.005588	Chamber temp	45	45
Calculated intercept	0.072194	-0.241936	Pressure	507.1	507.1
Analyzer Background	16.2	16.2	Flow	1.010	1.010
Analyzer Coefficient	0.980	0.98	Intensity	95	95
			Converter temp.	325	325

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	6000	0.0	0.0	-0.1	----
as found span	6000	85.2	71.4	72.8	0.981
SO2 scrubber check	5000	15.0	150.3	0.3	----
calibrator zero	6000	0.0	0.0	0.2	----
high point	6000	85.2	71.4	71.3	1.002
second point	6000	45.5	38.1	38.0	1.004
third point	6000	28.4	23.8	24.1	0.988
as left zero	5000	0.0	0.0	0.5	----
as left span	6000	85.2	71.4	72.6	0.984
Average Correction Factor					0.998

Corrected As found	72.9	Previous response	71.5	% change	-2.0%
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Notes:

Scrubber changed out after as founds, no adjustments done, filter changed out

Calibration Performed By: Melissa Lemay



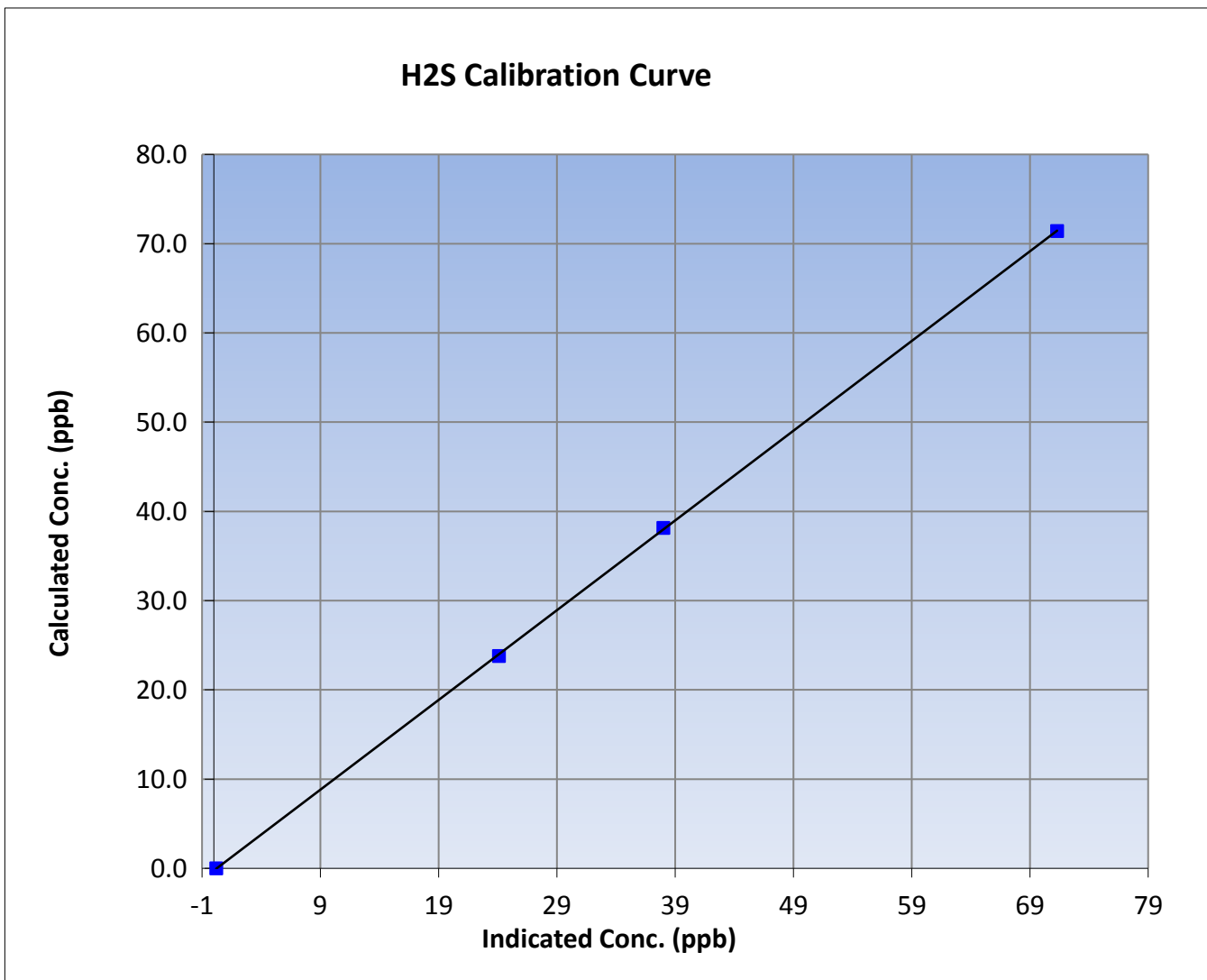
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

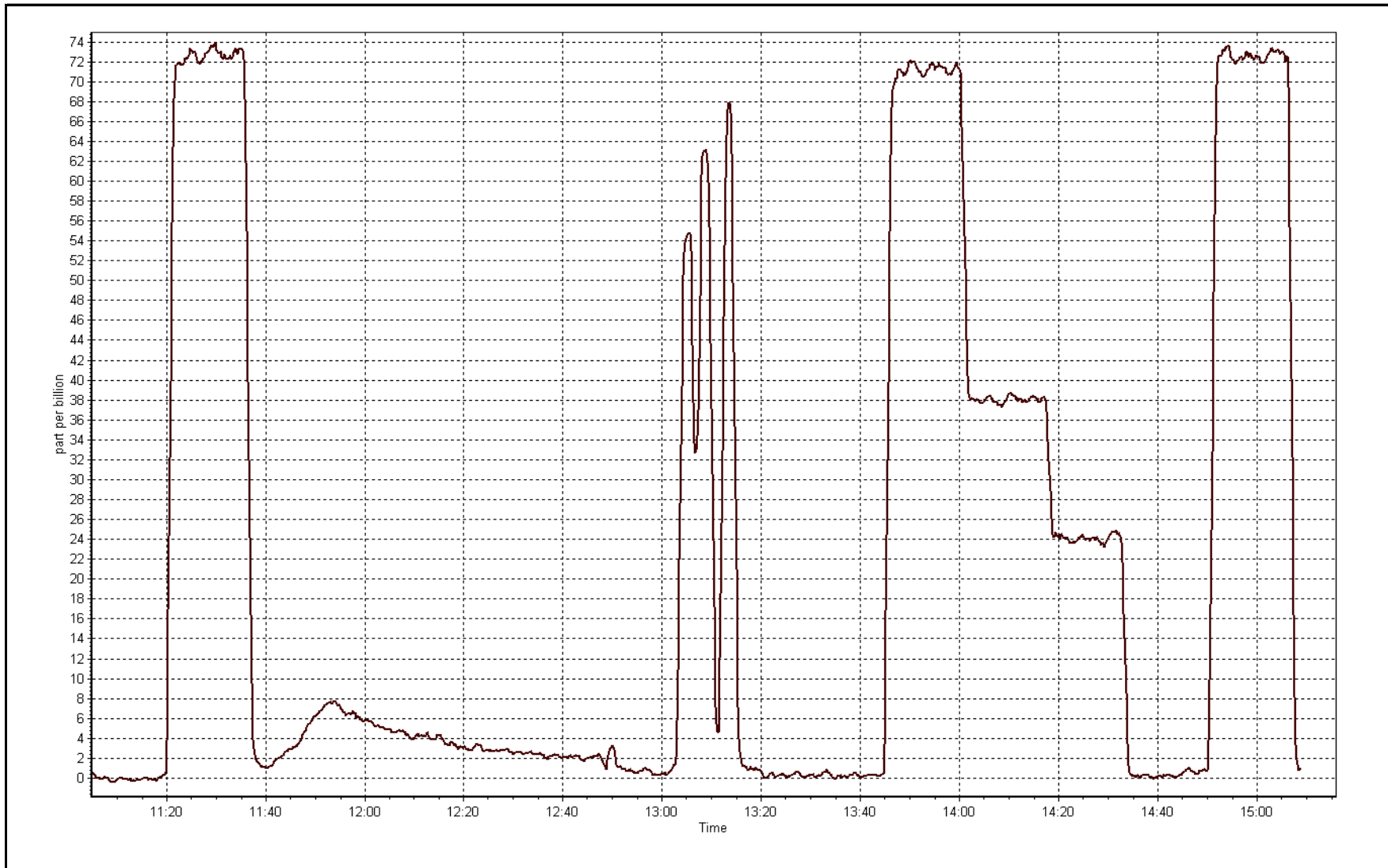
Calibration Date	January 12, 2017	Previous Calibration	December 1, 2016
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	11:05	End Time (MST)	15:09
Analyzer make	Thermo 450i	Analyzer serial #	815129108

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999975
71.4	71.3	1.0018		
38.1	38.0	1.0038	Slope	1.005588
23.8	24.1	0.9879		
			Intercept	-0.241936



Melissa Lemay





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	January 11, 2017	Last Calibration	December 1, 2016
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	8:15	End Time (MST)	11:21
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	API T700	Serial Number	746
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	1.003591	1.003494	Fuel Pressure	20.2	20.2
Calculated intercept	-0.030106	-0.052157	Analyzer Coeff	3.582	3.489
			Analyzer BKG	3.12	3.07

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	-0.06	----
as found span	5000	60.0	12.46	11.19	1.113
calibrator zero	5000	0.0	0.00	0.04	----
high point	5000	60.0	12.46	12.46	1.000
second point	5000	30.0	6.23	6.26	0.995
third point	5000	15.0	3.11	3.17	0.982
as left zero	5000	0.0	0.00	0.03	----
as left span	5000	60.0	12.46	12.09	1.030
Average Correction Factor					0.992

Corrected As found 11.25 Previous response 12.44 % change 10.6%

Notes:

pump changed out, zero and span adjusted, filter changed out

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association THC Calibration Report

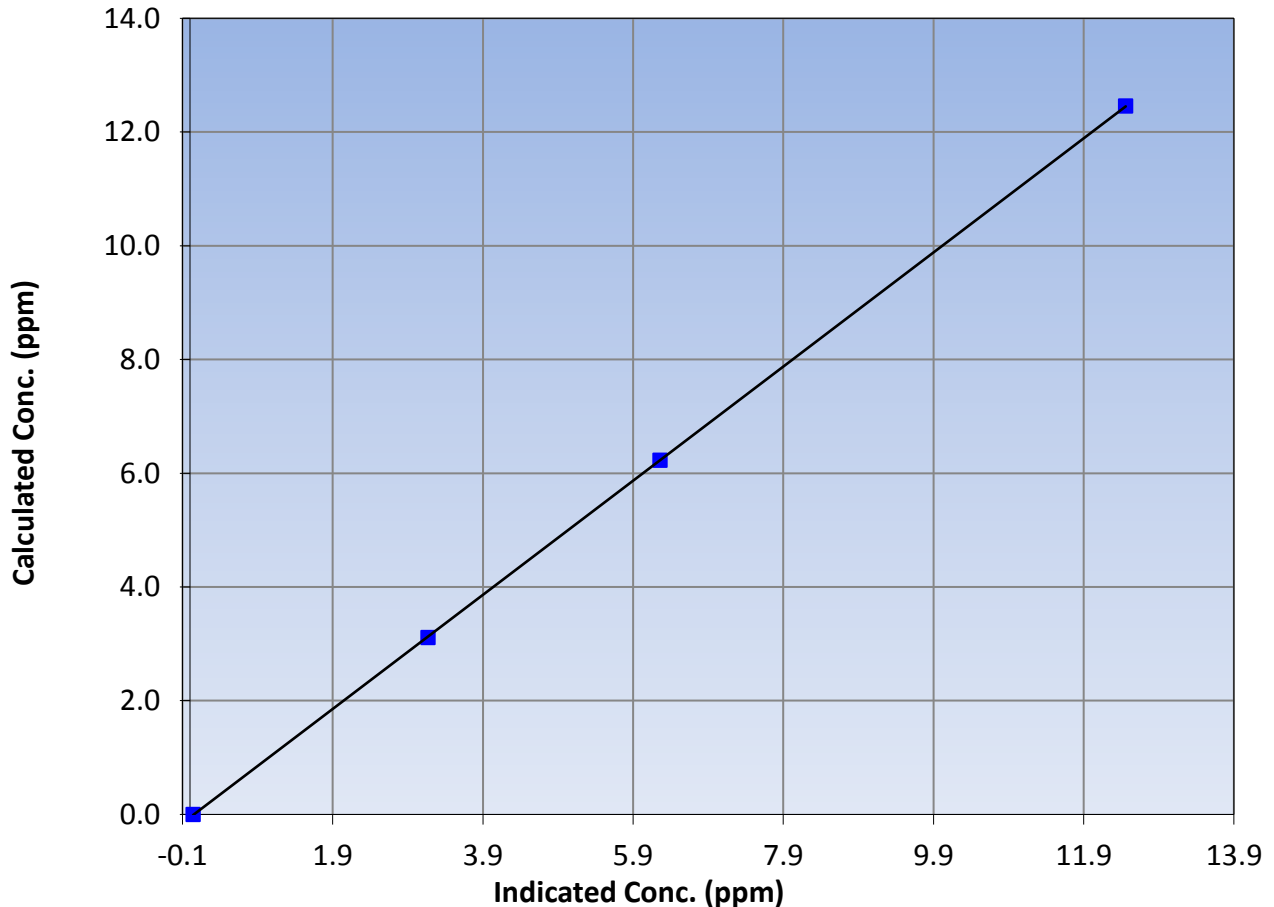
Station Information

Calibration Date	January 11, 2017	Previous Calibration	December 1, 2016
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	8:15	End Time (MST)	11:21
Analyzer make	Thermo 51i-LT	Analyzer serial #	1317958295

Calibration Data

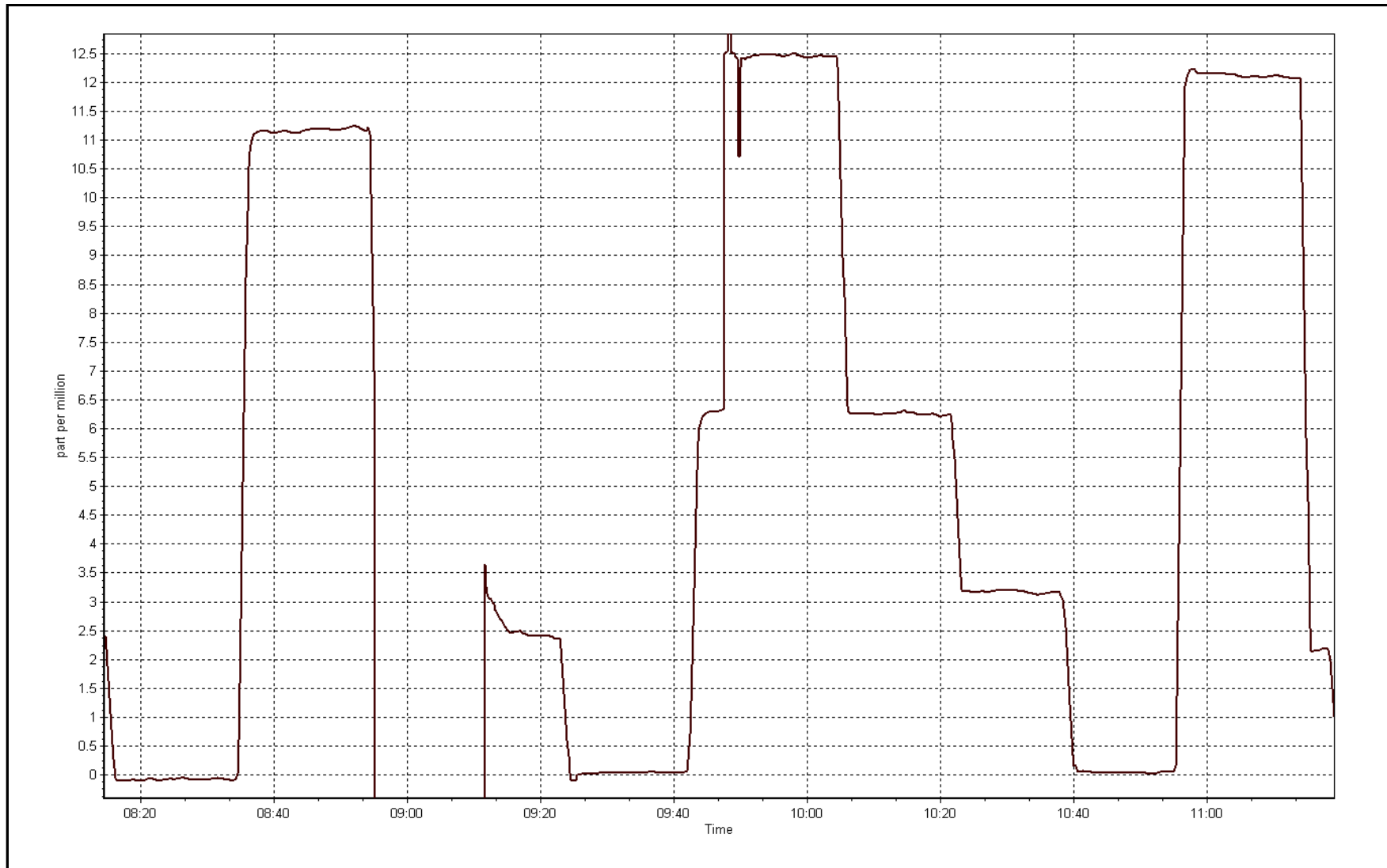
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.04	----	Correlation Coefficient	0.999995
12.46	12.46	0.9997		
6.23	6.26	0.9949	Slope	1.003494
3.11	3.17	0.9823		
			Intercept	-0.052157

THC Calibration Curve



THC Calibration Plot

Date: January 11, 2017





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 6
PATRICIA MCINNES
JANUARY 2017**

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

February 27, 2017



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)
JANUARY 2017

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	710	34	34	100.00	26	0	7	0
TRS (ppb) Average	708	36	36	100.00	2	0	1	0
THC (ppm) Average	689	34	55	97.18	2.9	-	2.2	-
NMHC(ppm) Average	689	34	55	97.18	0.234	-	0.028	-
CH4(ppm) Average	689	34	55	97.18	2.7	-	2.2	-
O3 (ppb) Average	710	34	34	100.00	47	0	41	-
NO2 (ppb) Average	704	37	40	99.60	46	0	18	-
NO (ppb) Average	704	37	40	99.60	89	-	22	-
NOX (ppb) Average	704	37	40	99.60	133	-	40	-
NH3 (ppb) Average	668	44	76	95.70	11	0	1	-
PM2.5 (ug/m3) Average	743	1	1	100.00	57.5	-	16.7	0
Temperature 2 m (C) Average	744	0	0	100.00	7.7	-	3.1	-
Relative Humidity (%) Average	744	0	0	100.00	96	-	94	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	34	-	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 - PATRICIA McINNES (AMS 6)
 JANUARY 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	710	1.1	3	-	0	0	0	0	1	3	26
TRS (ppb) Average	708	0.3	0	-	0	0	0	0	0	0	2
THC (ppm) Average	689	1.99	0.1	-	1.9	1.9	1.9	2	2	2.1	2.9
NMHC(ppm) Average	689	0.003	0.017	-	0	0	0	0	0	0	0.234
CH4(ppm) Average	689	1.99	0.1	-	1.9	1.9	1.9	2	2	2.1	2.7
O3 (ppb) Average	710	25.7	11	-	3	7	17	28	35	40	47
NO2 (ppb) Average	704	8.9	9	-	0	1	3	6	13	22	46
NO (ppb) Average	704	4.8	11	-	0	0	0	1	3	13	89
NOX (ppb) Average	704	13.6	19	-	0	1	3	7	16	34	133
NH3 (ppb) Average	668	0	0	-	0	0	0	0	0	0	11
PM2.5 (ug/m3) Average	743	5.07	6.2	-	0.1	0.5	1.3	3.1	6.2	12	57.5
Temperature 2 m (C) Average	744	-12.03	10.4	-	-35.2	-25.3	-20.3	-13.1	-2.3	2.2	7.7
Relative Humidity (%) Average	744	77.6	9	-	46	66	72	77	84	91	96
Wind Speed 10 m (km/h) Average	744	9.3	5	-	0	3	5	9	12	16	34
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)
JANUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NMHC, CH4, THC	16 Jan 2017 11:00	16 Jan 2017 15:00	5	Unstable operation - excessive baseline drift
NMHC, CH4, THC	16 Jan 2017 17:00	16 Jan 2017 17:00	1	Unstable operation - excessive baseline drift
NMHC, CH4, THC	20 Jan 2017 06:00	20 Jan 2017 06:00	1	Unstable operation - excessive baseline drift
NMHC, CH4, THC	20 Jan 2017 12:00	20 Jan 2017 12:00	1	Unstable operation - excessive baseline drift
NMHC, CH4, THC	20 Jan 2017 15:00	20 Jan 2017 15:00	1	Unstable operation - excessive baseline drift
NMHC, CH4, THC	20 Jan 2017 16:00	20 Jan 2017 16:00	1	Maintenance- collect diagnostic information.
NMHC, CH4, THC	20 Jan 2017 20:00	20 Jan 2017 20:00	1	Unstable operation - excessive baseline drift
NMHC, CH4, THC	21 Jan 2017 07:00	21 Jan 2017 07:00	1	Unstable operation - excessive baseline drift
NMHC, CH4, THC	21 Jan 2017 23:00	21 Jan 2017 23:00	1	Unstable operation - excessive baseline drift
NMHC, CH4, THC	22 Jan 2017 14:00	22 Jan 2017 14:00	1	Unstable operation - excessive baseline drift
NMHC, CH4, THC	23 Jan 2017 03:00	23 Jan 2017 03:00	1	Unstable operation - excessive baseline drift
NMHC, CH4, THC	23 Jan 2017 05:00	23 Jan 2017 05:00	1	Unstable operation - excessive baseline drift
NMHC, CH4, THC	23 Jan 2017 11:00	23 Jan 2017 13:00	3	Maintenance- adjust carrier pressure and recalibrate.
NMHC, CH4, THC	31 Jan 2017 10:00	31 Jan 2017 11:00	2	Maintenance - replaced zero air generator
NO2, NO, NOX	18 Jan 2017 11:00	18 Jan 2017 13:00	3	Maintenance - confirmed calibration points.
NH3	01 Jan 2017 03:00	31 Jan 2017 03:00	31	Stabilization after daily span



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

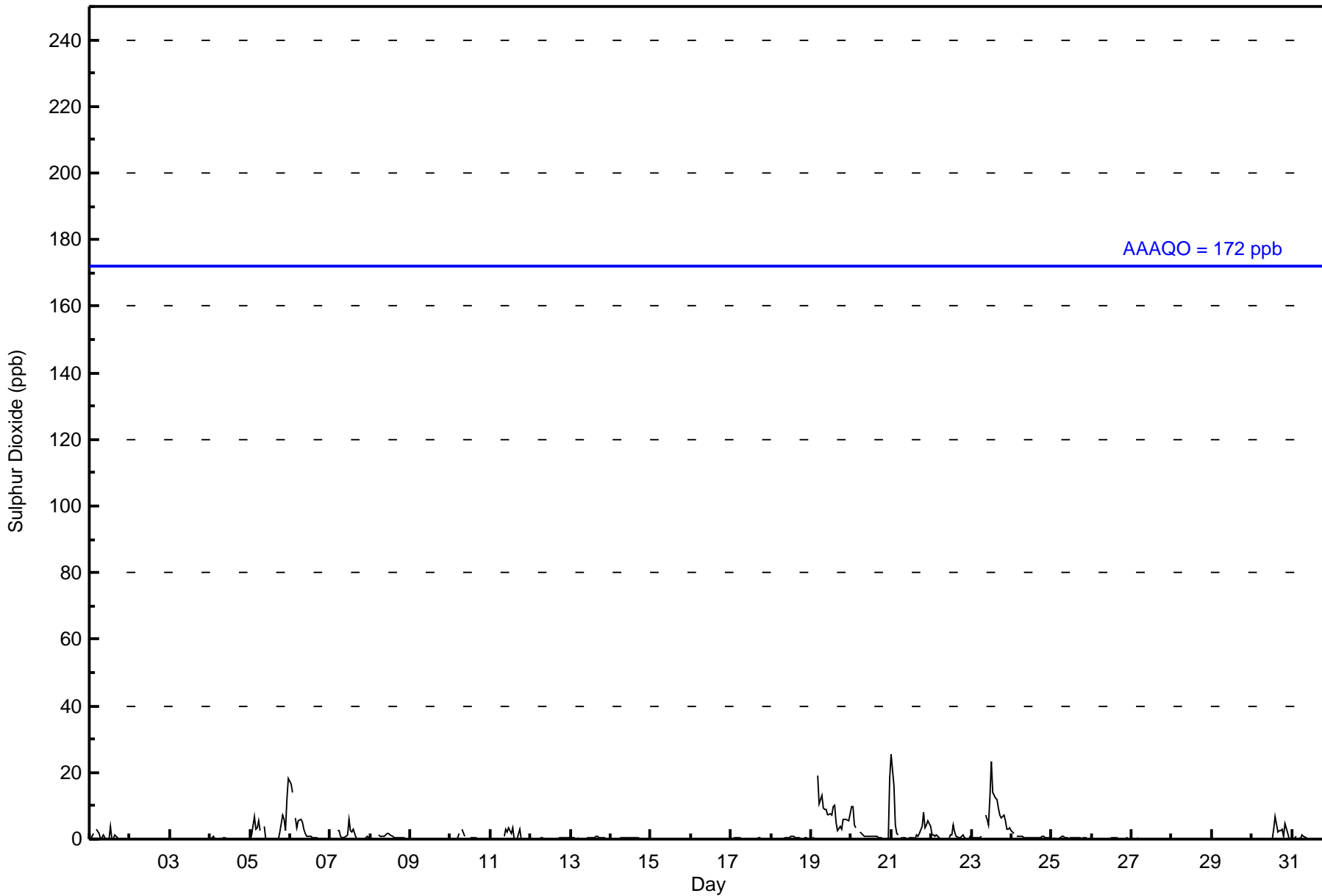
Patricia McInnes - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 26 ppb on Jan 21 01:00 Maximum Daily Average: 6.8 ppb on Jan 19										Hours in Service: 744 Hours of Data: 710 Hours of Missing Data: 34 Hours of Calibration: 34 Percent Operational Time: 100.0																	
Minimum Value: 0 ppb on Jan 2 07:00 Maximum Diurnal Average: 1.9 ppb at hour 1 Monthly Average: 1.1 ppb										Minimum Daily Average: 0.0 ppb on Jan 3 Minimum Diurnal Average: 0.7 ppb at hour 22 Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 3 P ₉₉ = 16																	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jan	0	1	2	Z	3	2	0	0	1	0	0	0	4	0	0	1	1	0	0	0	0	0	0	0	0.7	4	
2-Jan	0	0	0	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-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
4-Jan	0	0	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1	
5-Jan	0	1	7	3	3	5	3	Z	4	0	0	0	0	0	0	0	0	0	0	2	7	6	2	12	18	3.3	18
6-Jan	16	14	Z	6	3	5	6	5	3	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	2.8	16	
7-Jan	0	0	0	Z	2	2	1	0	0	1	1	6	2	2	3	0	0	0	0	0	0	0	1	0	1.1	6	
8-Jan	0	0	0	0	Z	1	1	1	1	1	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0.6	2	
9-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
10-Jan	0	0	0	0	0	2	Z	3	1	C	C	C	1	0	0	0	0	0	0	0	0	0	0	0	0.4	3	
11-Jan	0	0	0	0	0	0	0	Z	1	3	2	3	2	3	0	0	0	3	0	0	0	0	0	0	0.8	3	
12-Jan	0	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	
13-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0.3	1	
14-Jan	0	0	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
15-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
16-Jan	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	
17-Jan	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
18-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0.3	1	
19-Jan	0	0	0	Z	19	11	13	9	9	9	7	8	7	10	10	5	2	4	3	6	6	6	6	8	6.8	19	
20-Jan	10	10	4	3	Z	2	2	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	18	2.5	18	
21-Jan	26	16	4	2	1	Z	1	0	0	0	0	0	0	0	1	1	2	4	8	4	4	4	4	4	3.7	26	
22-Jan	1	1	1	1	1	0	Z	0	0	0	0	1	1	4	2	1	0	0	1	1	1	0	0	1	0.9	4	
23-Jan	1	0	0	0	1	0	1	Z	7	6	4	13	23	14	12	12	9	7	6	7	5	3	3	3	6.0	23	
24-Jan	3	2	Z	1	1	1	1	1	1	0	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0.7	3	
25-Jan	0	0	0	Z	0	0	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.4	1	
26-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
27-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
28-Jan	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	
29-Jan	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
30-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	3	7	2	3	2	3	1	5	2	0	0	1.2	7	
31-Jan	0	0	1	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
1.9 1.5 0.8 0.7 1.4 1.3 1.2 0.9 1.0 0.9 0.7 1.3 1.5 1.4 1.3 0.9 0.7 0.7 0.7 1.1 0.9 0.7 1.0 1.7																								Diurnal Average			
26 16 7 6 19 11 13 9 9 9 7 13 23 14 12 12 9 7 6 8 6 6 12 18																								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 (SO₂) - ppb
Patricia McInnes - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Patricia McInnes - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	695	97.89	97.89
11 - 20	13	1.83	99.72
21 - 60	2	0.28	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Patricia McInnes - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	93	15	5	1	0	1	26	46	77	105	116	88	39	24	21	38	695
11 - 20	3	0	0	0	0	0	0	0	1	2	0	2	1	0	1	3	13
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	96	15	5	1	0	1	26	46	78	107	116	90	40	25	22	42	710

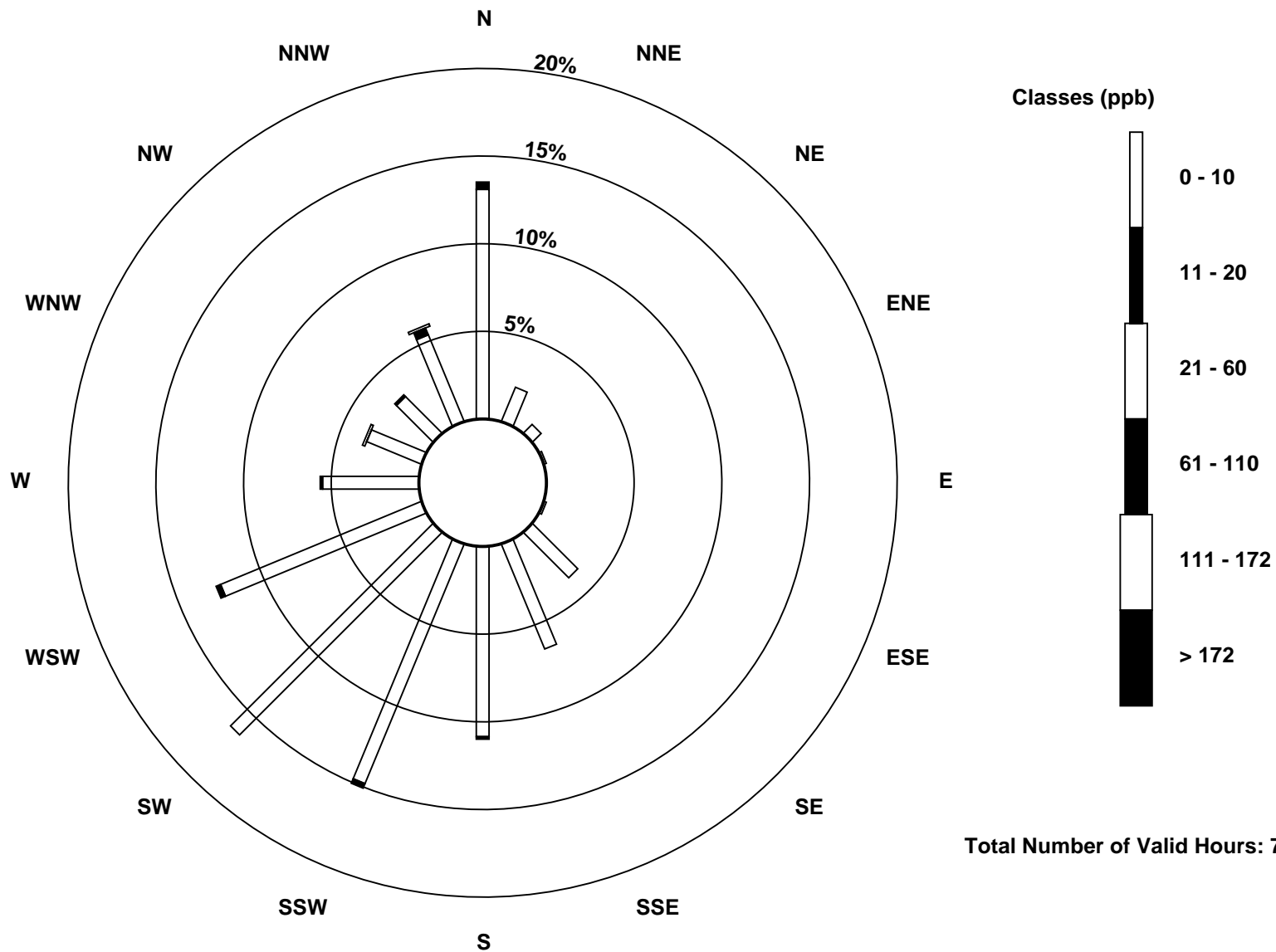
Total Number of Valid Hours: 710

Total Number of Hours: 744

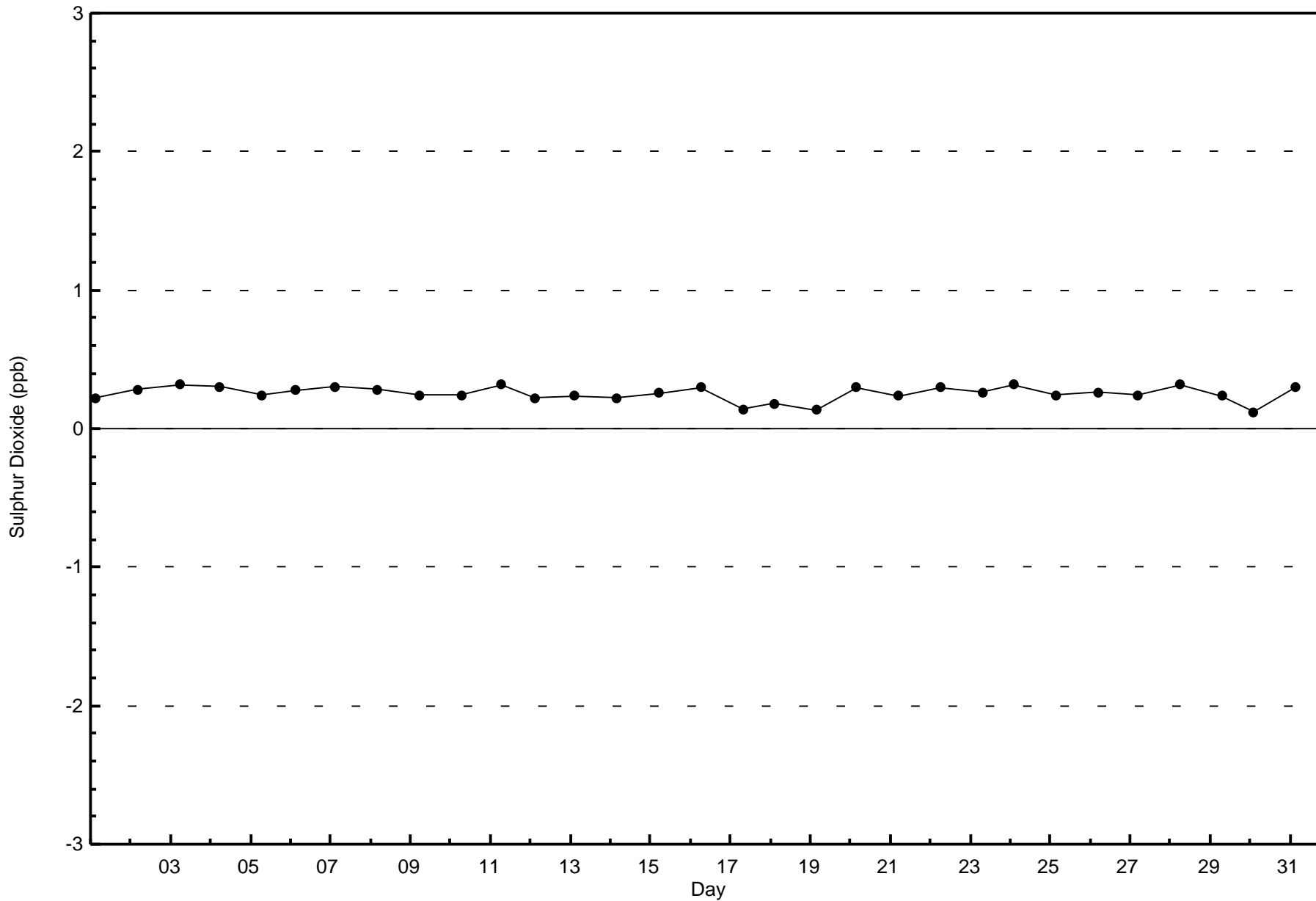


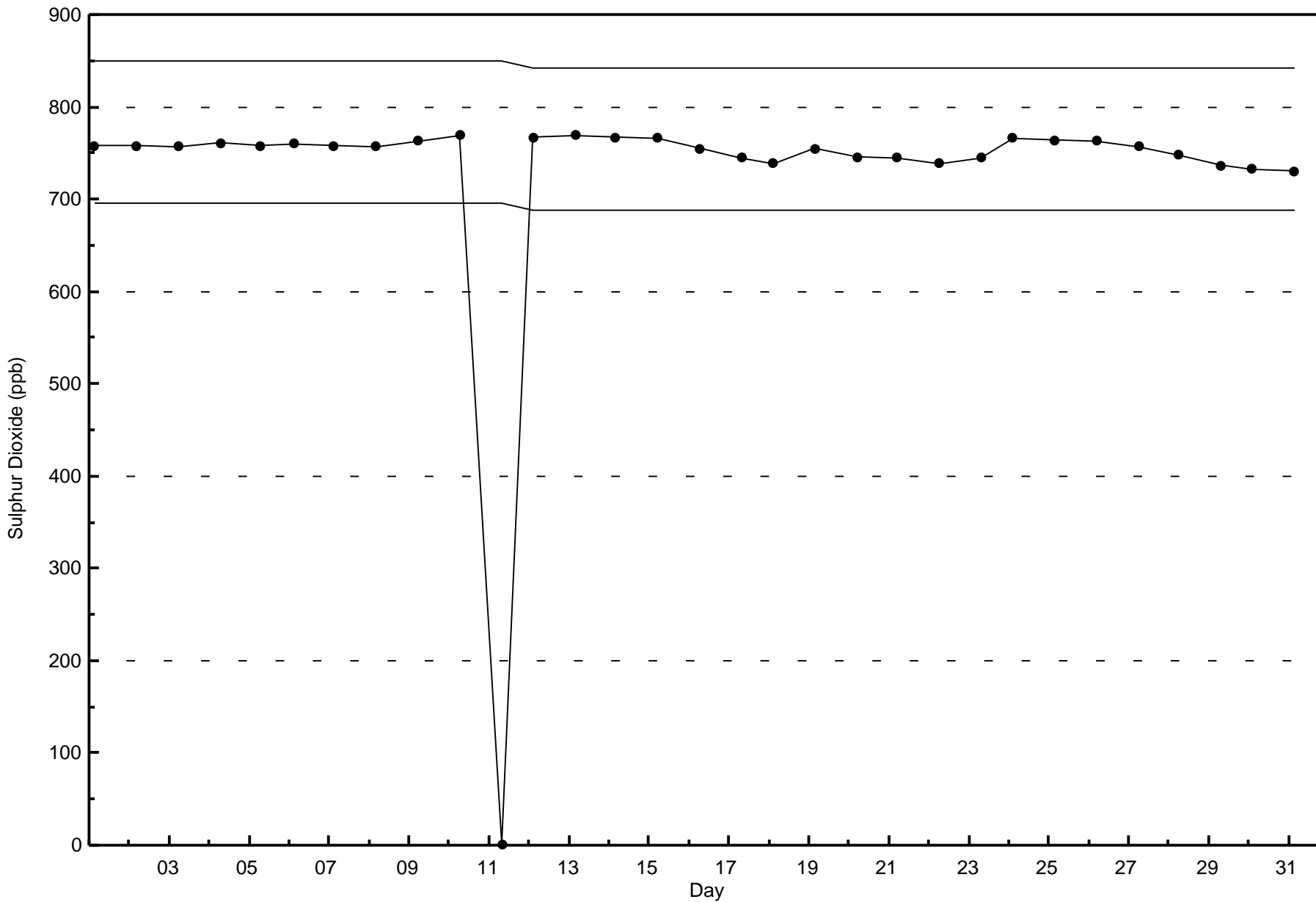
Wood Buffalo Environmental Association
Wind Rose 2012-2017

Sulphur Dioxide (SO₂) - ppb
Patricia McInnes (AMS 6)



Total Number of Valid Hours: 710







Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

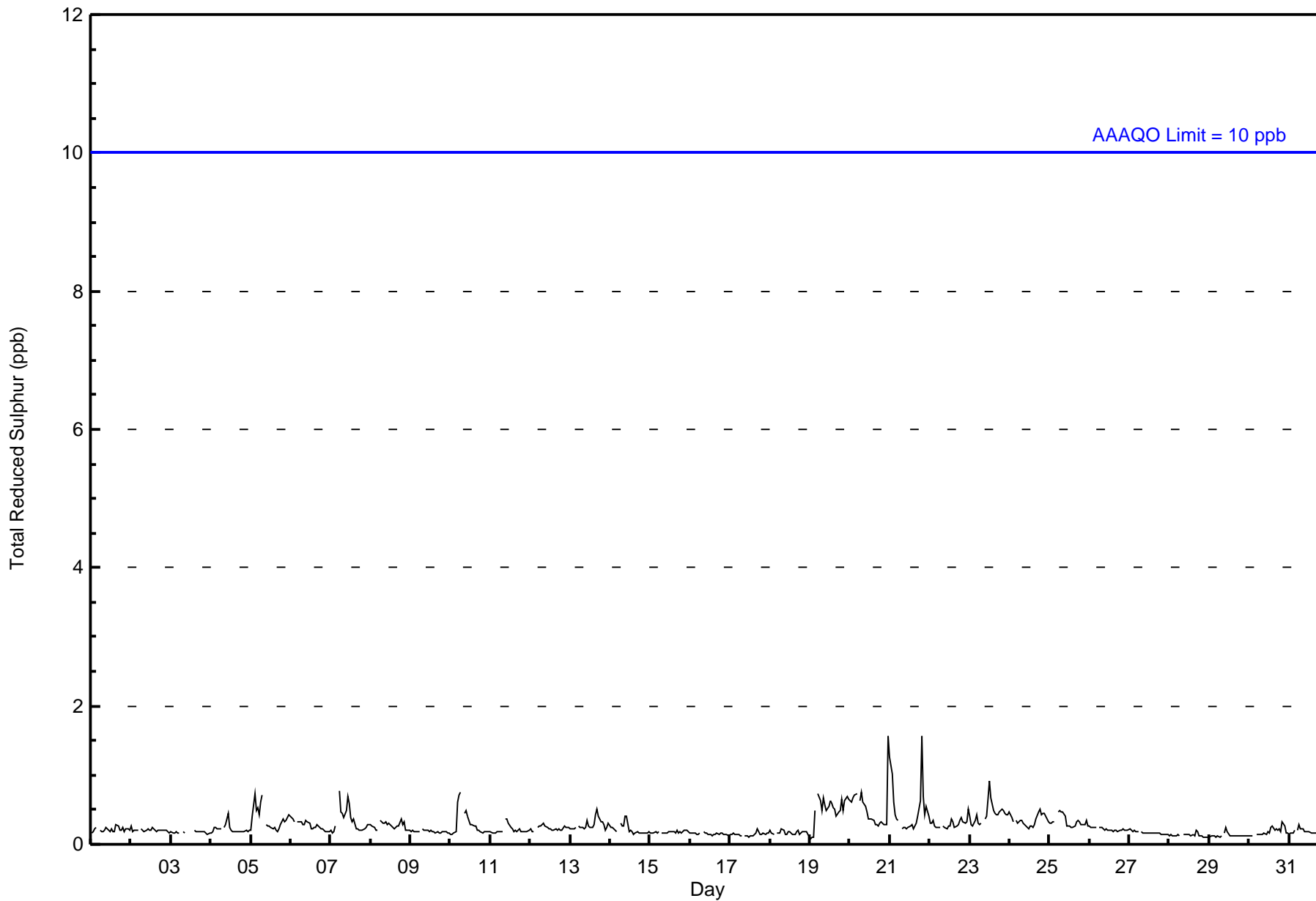
Patricia McInnes - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 2 ppb on Jan 21 20:00 Maximum Daily Average: 0.5 ppb on Jan 20																	Hours in Service: 744 Hours of Data: 708									
Minimum Value: 0 ppb on Jan 19 01:00 Minimum Daily Average: 0.1 ppb on Jan 29 Maximum Diurnal Average: 0.3 ppb at hour 7 Minimum Diurnal Average: 0.2 ppb at hour 16 Monthly Average: 0.3 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1																	Hours of Missing Data: 36 Hours of Calibration: 36 Percent Operational Time: 100.0									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	0	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-Jan	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-Jan	0	0	0	0	0	0	Z	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.2	0
4-Jan	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
5-Jan	0	0	1	0	1	0	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
6-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
7-Jan	0	0	0	0	Z	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
8-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
9-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
10-Jan	0	0	0	0	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
11-Jan	0	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
12-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
13-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
14-Jan	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-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
16-Jan	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
17-Jan	0	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
18-Jan	0	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-Jan	0	0	0	0	Z	1	1	0	1	1	0	1	1	1	1	1	0	0	0	1	0	1	1	1	0.5	1
20-Jan	1	1	1	1	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.5	2
21-Jan	1	1	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	1	0	0.5	2
22-Jan	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1
23-Jan	0	0	0	0	0	0	0	0	Z	0	0	1	1	1	0	0	0	0	0	1	0	0	0	0	0.4	1
24-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.4	1
25-Jan	0	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-Jan	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-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
28-Jan	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
29-Jan	0	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
30-Jan	0	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-Jan	0	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
0.3 0.2 0.2 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.2 0.2 0.2 0.2 0.2 0.3 0.3 0.3 0.2 0.2 0.3																								Diurnal Average		
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 1 2 1 1 1 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
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Patricia McInnes - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Patricia McInnes - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
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 - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	94	17	5	1	0	1	26	44	78	107	116	87	42	25	22	43	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
Totals	94	17	5	1	0	1	26	44	78	107	116	87	42	25	22	43	708

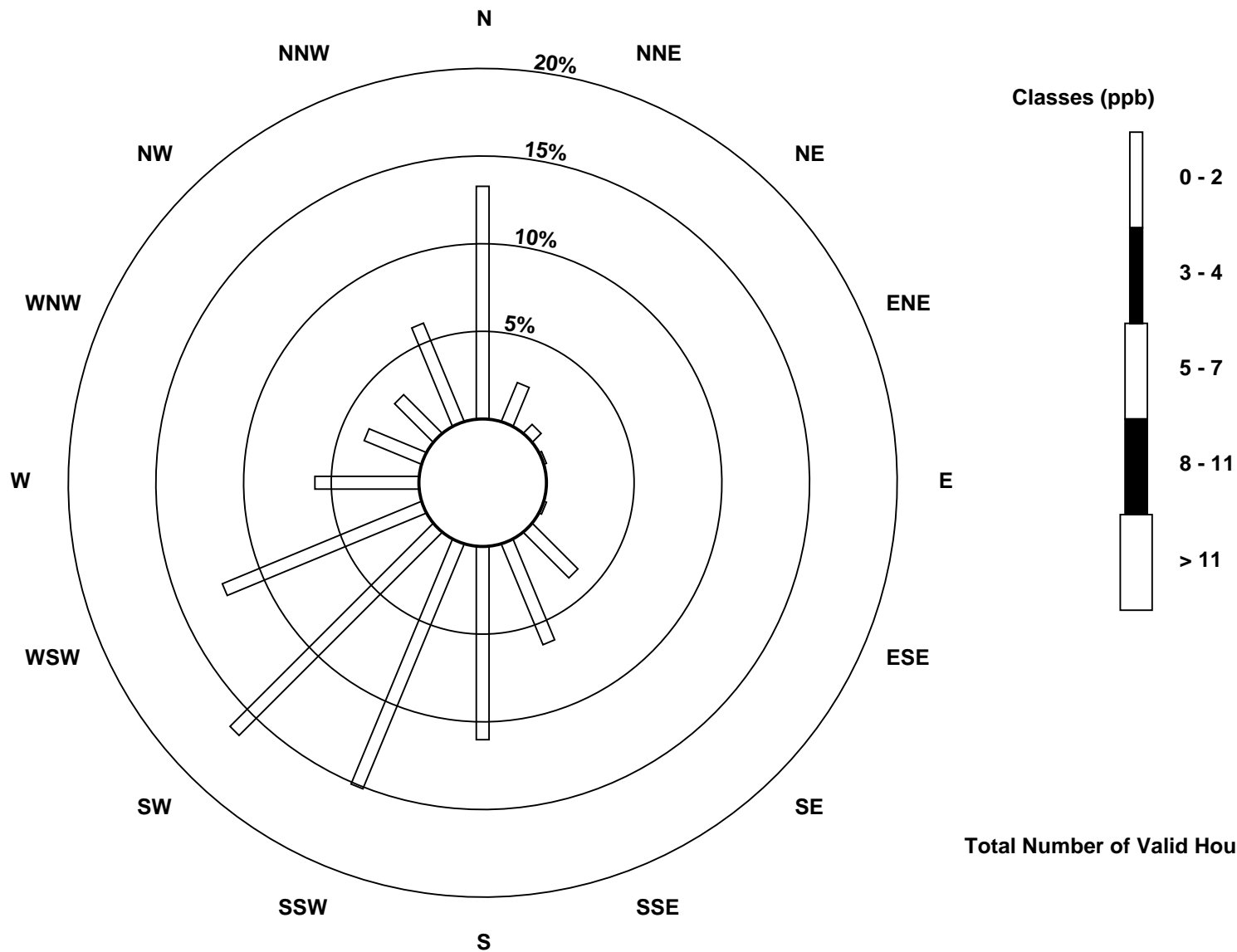
Total Number of Valid Hours: 708

Total Number of Hours: 744

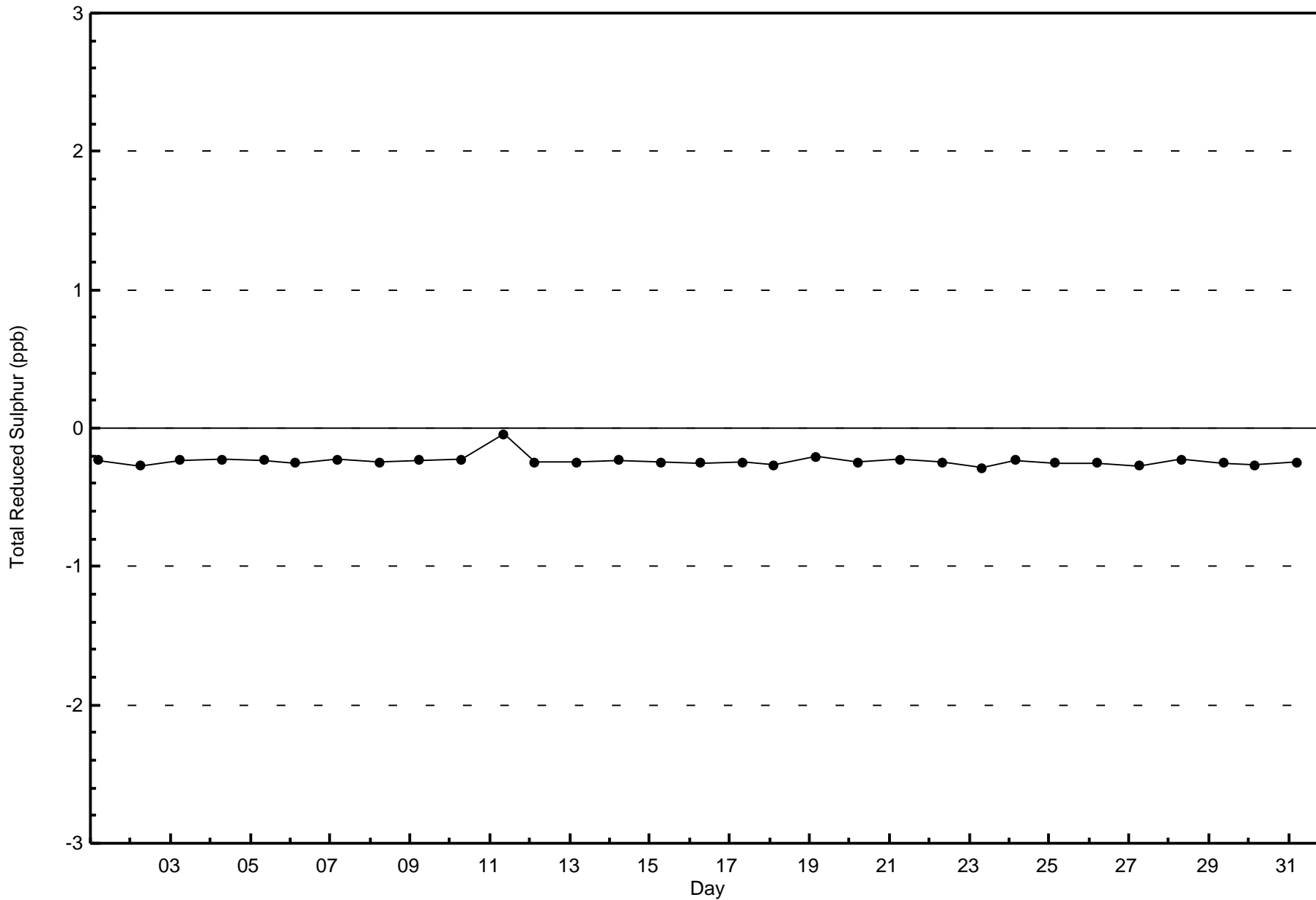


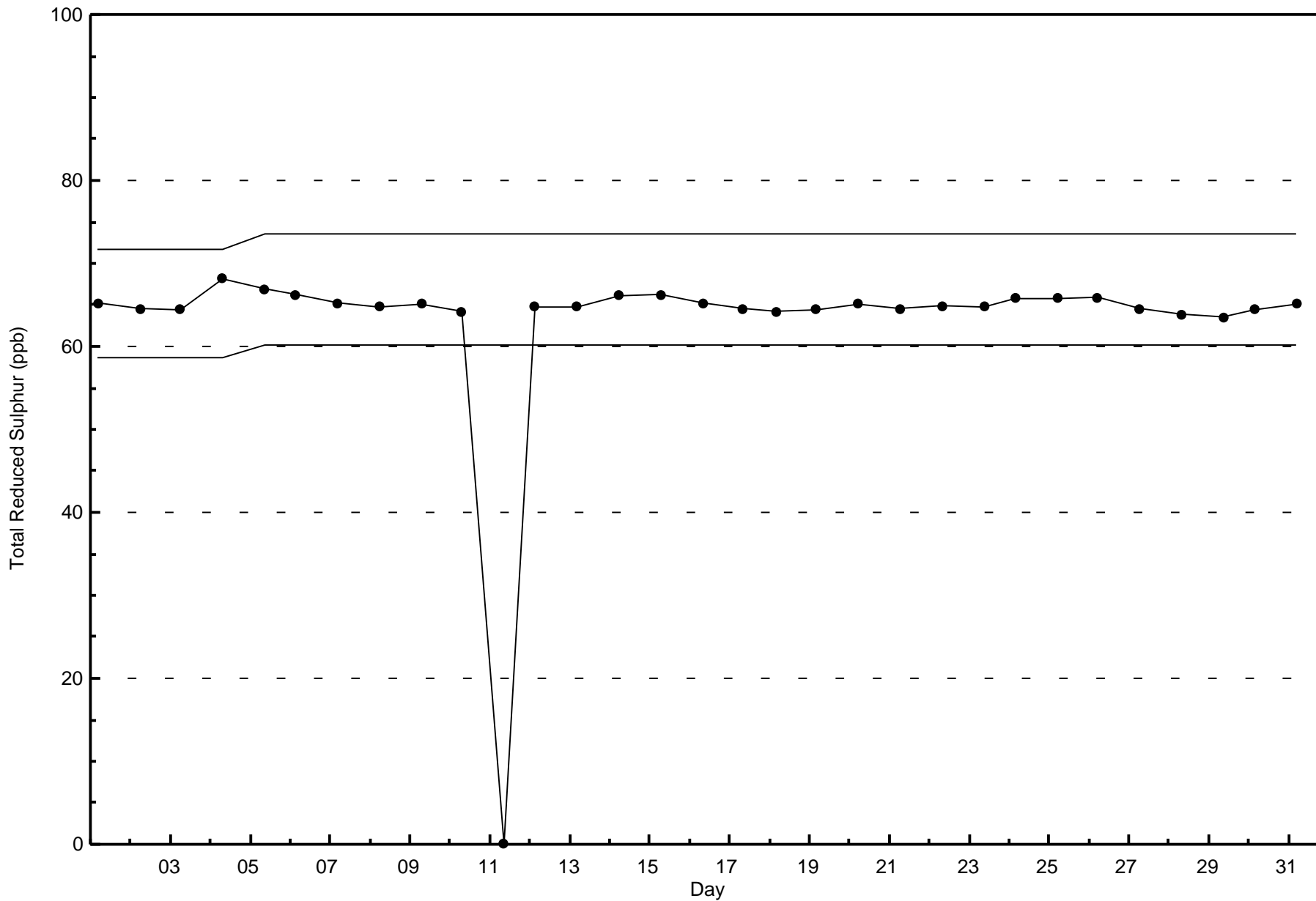
Wood Buffalo Environmental Association
Wind Rose 2012-2017

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



Total Number of Valid Hours: 708

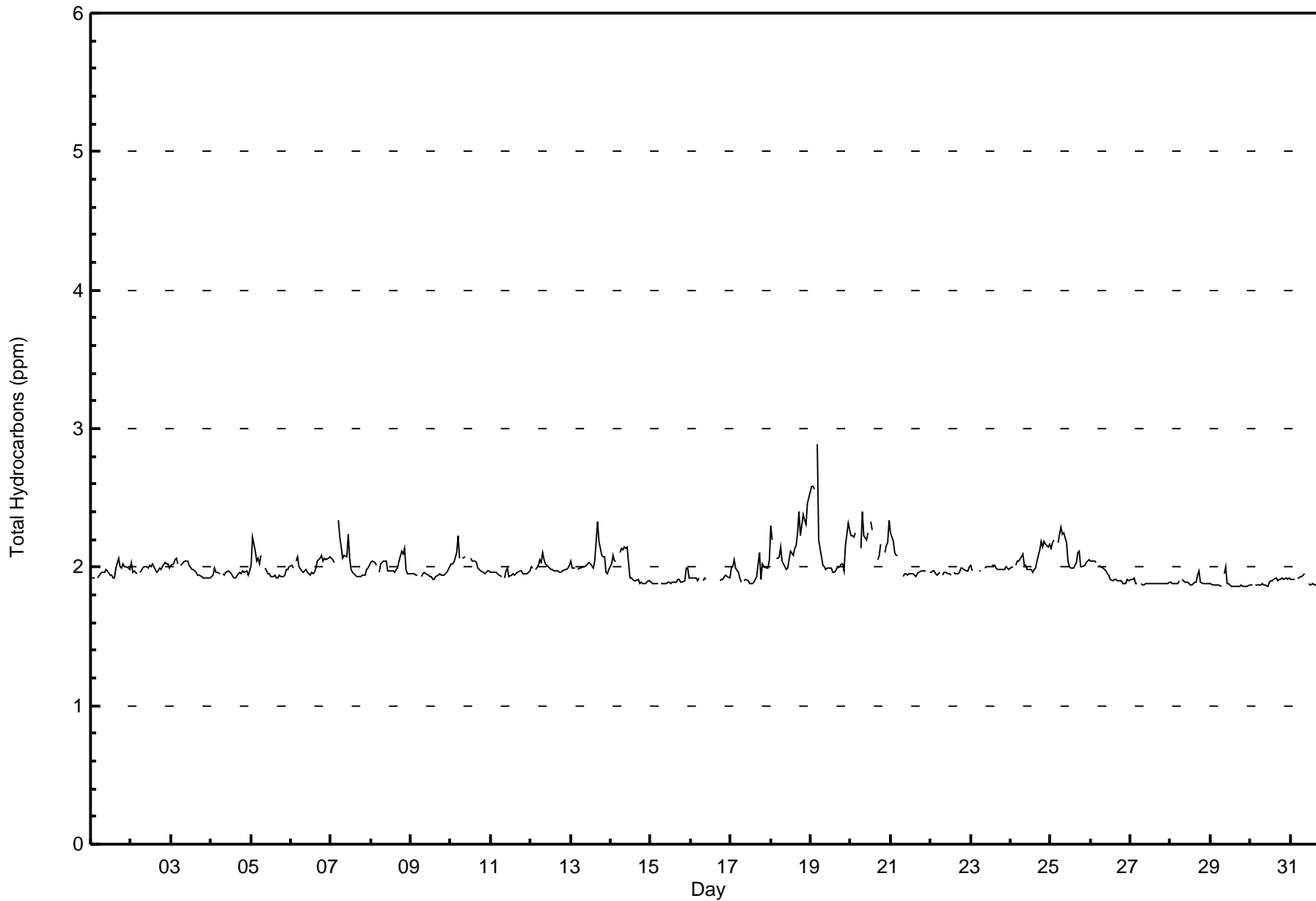






Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Patricia McInnes - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Patricia McInnes - January 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	567	82.29	82.29
2.1 - 3.0	122	17.71	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 689

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Patricia McInnes - January 2017**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	80	13	2	1	0	1	19	15	49	89	107	84	36	21	18	32	567
2.1 - 3.0	14	2	3	0	0	0	6	27	28	17	5	3	2	3	3	9	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
Totals	94	15	5	1	0	1	25	42	77	106	112	87	38	24	21	41	689

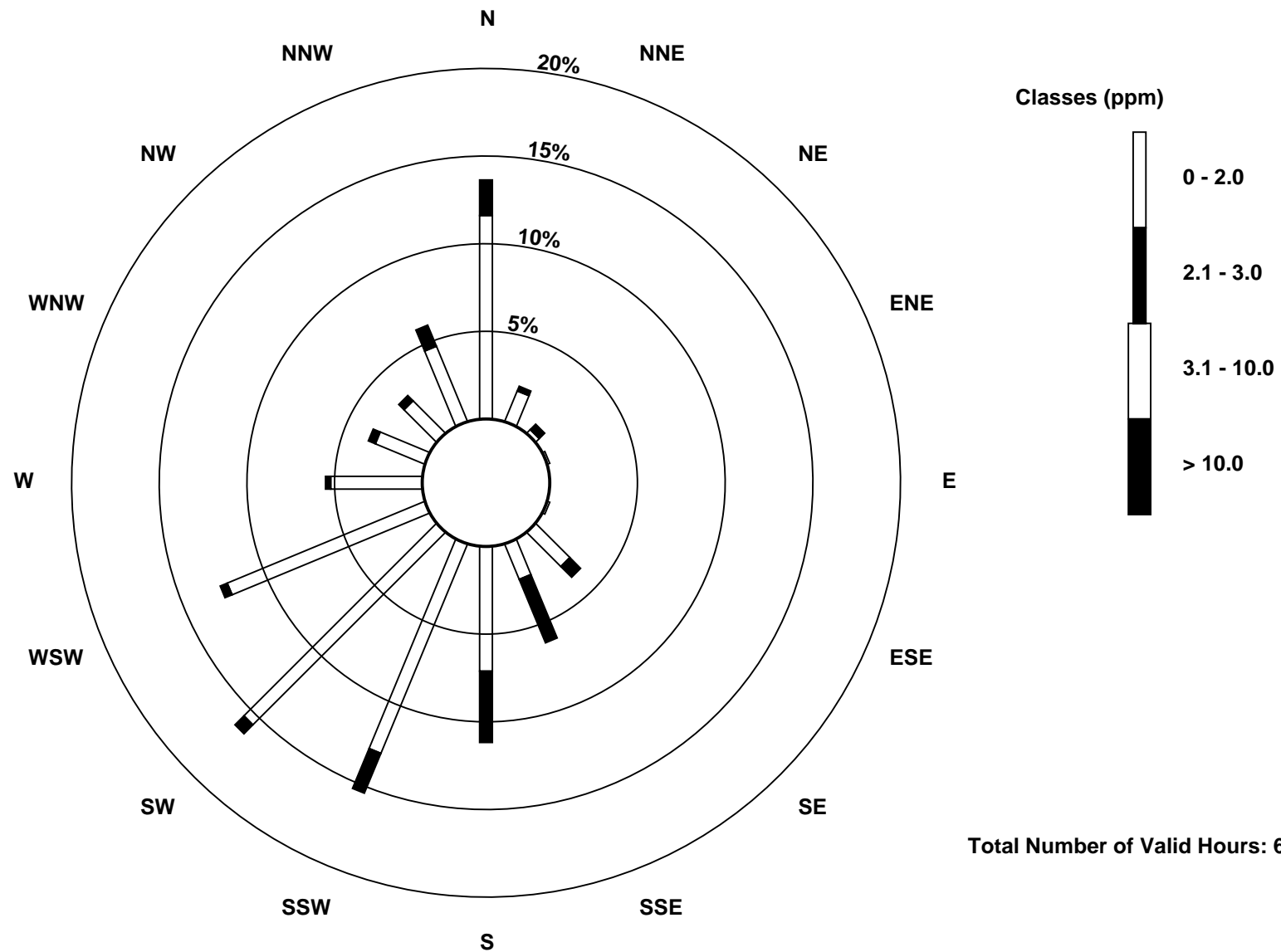
Total Number of Valid Hours: 689

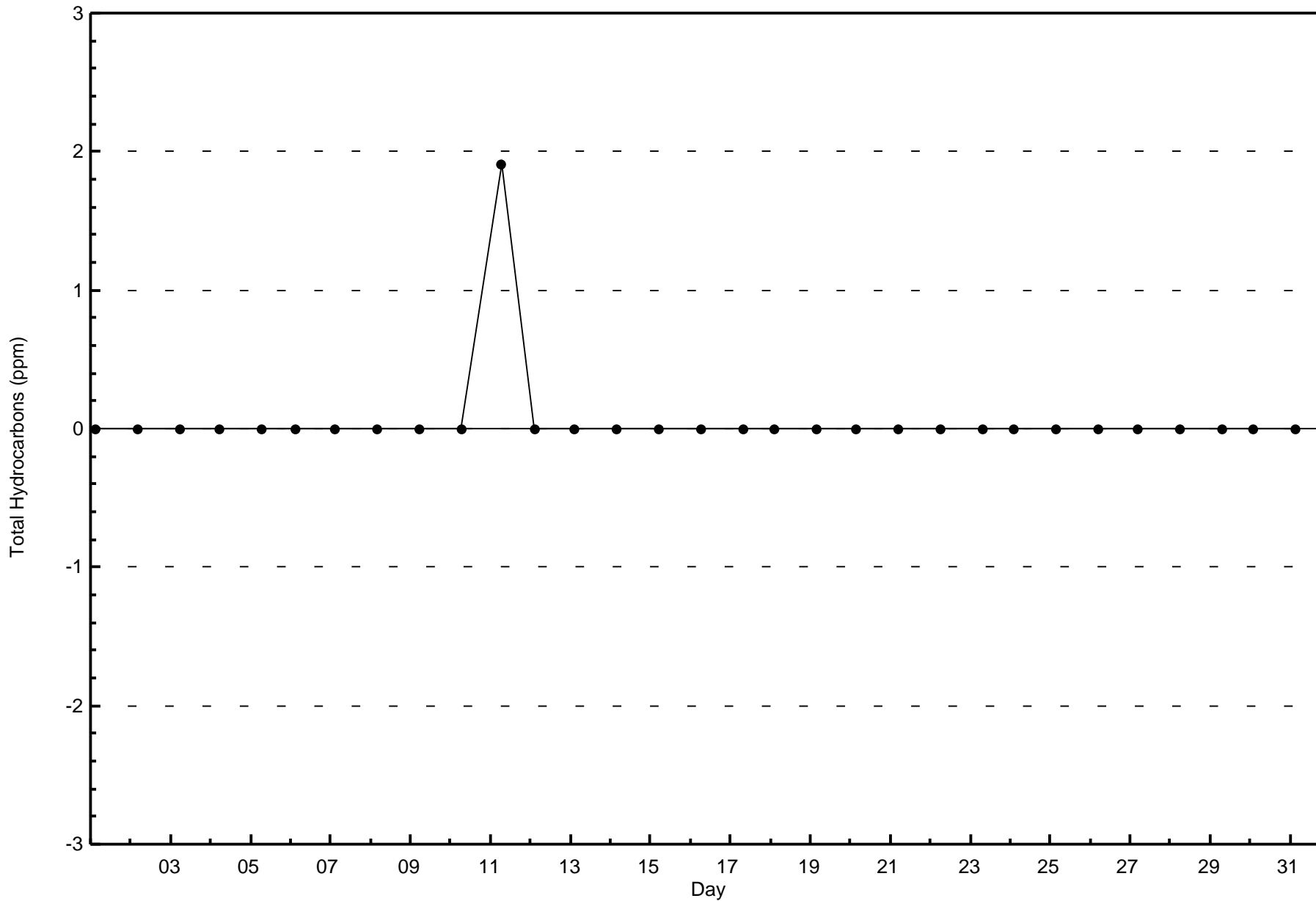
Total Number of Hours: 744

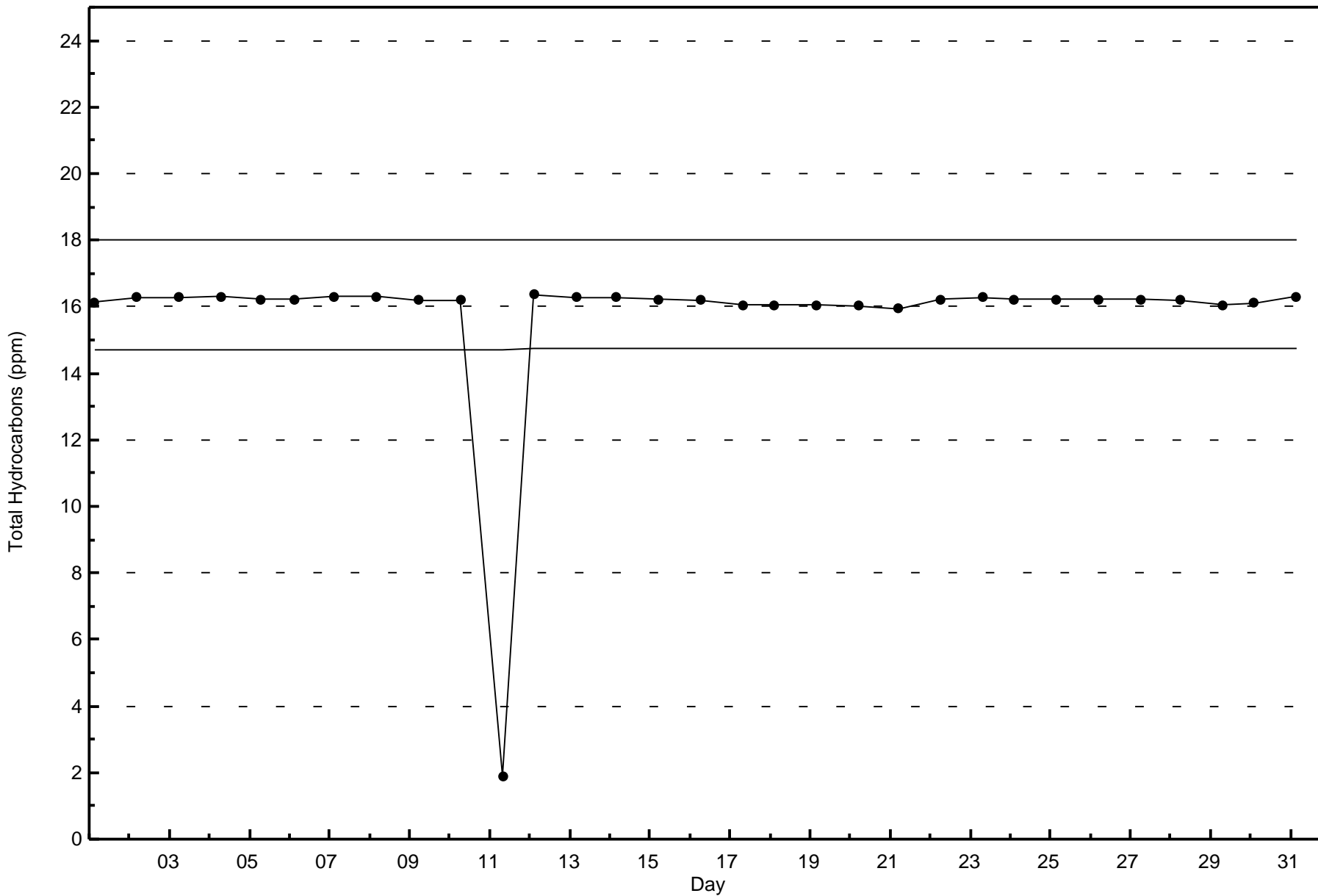


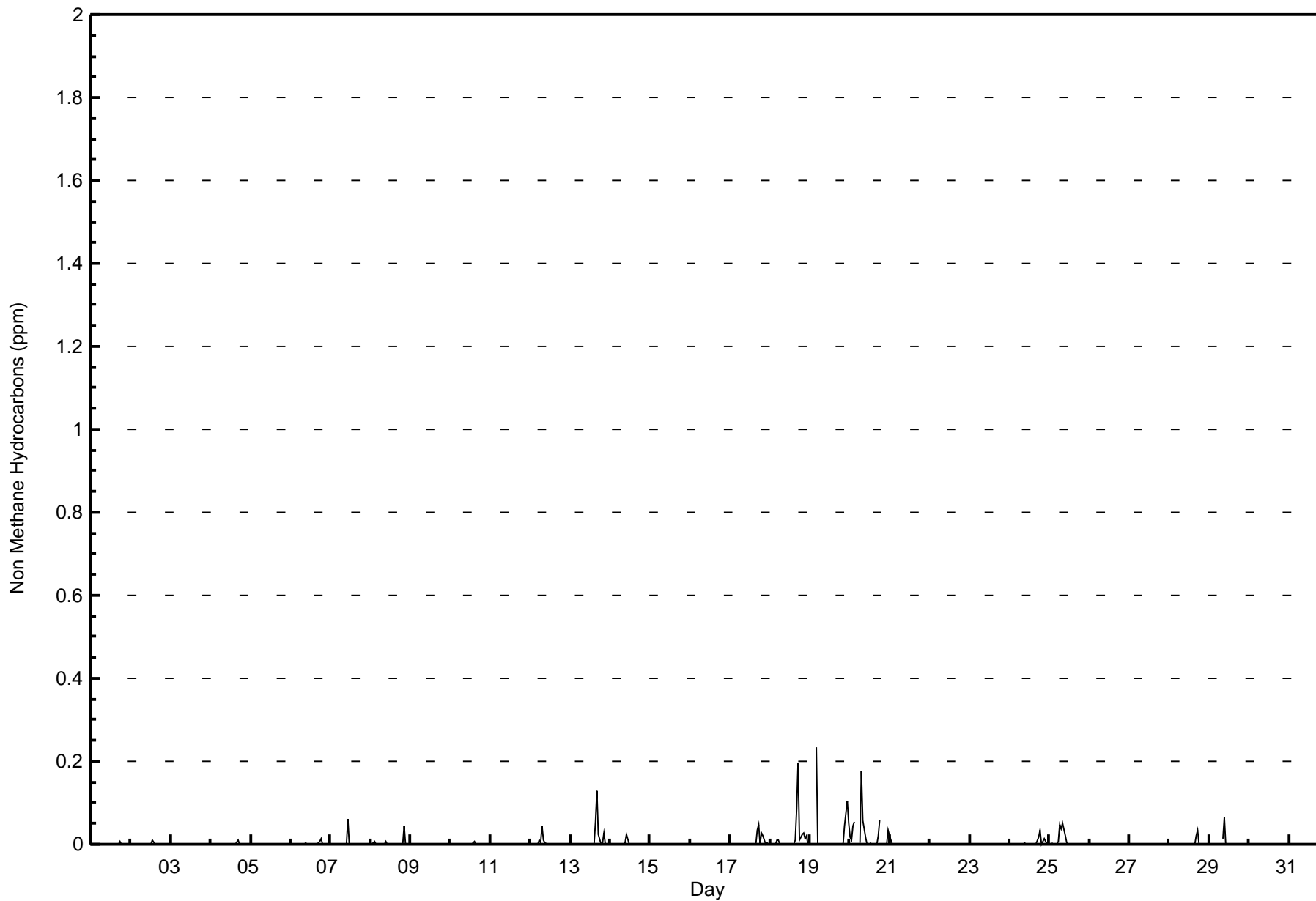
Wood Buffalo Environmental Association
Wind Rose 2012-2017

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











**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Patricia McInnes - January 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	633	91.87	91.87
0.006 - 0.05	46	6.68	98.55
0.06 - 0.1	7	1.02	99.56
> 0.1	3	0.44	100.00

Total Number of Valid Hours: 689

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Patricia McInnes - January 2017**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	92	14	4	1	0	1	21	30	64	93	108	85	38	23	20	39	633
0.006 - 0.05	0	1	0	0	0	0	4	10	10	11	4	2	0	1	1	2	46
0.06 - 0.1	1	0	1	0	0	0	0	0	3	2	0	0	0	0	0	0	7
> 0.1	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	3
Totals	94	15	5	1	0	1	25	42	77	106	112	87	38	24	21	41	689

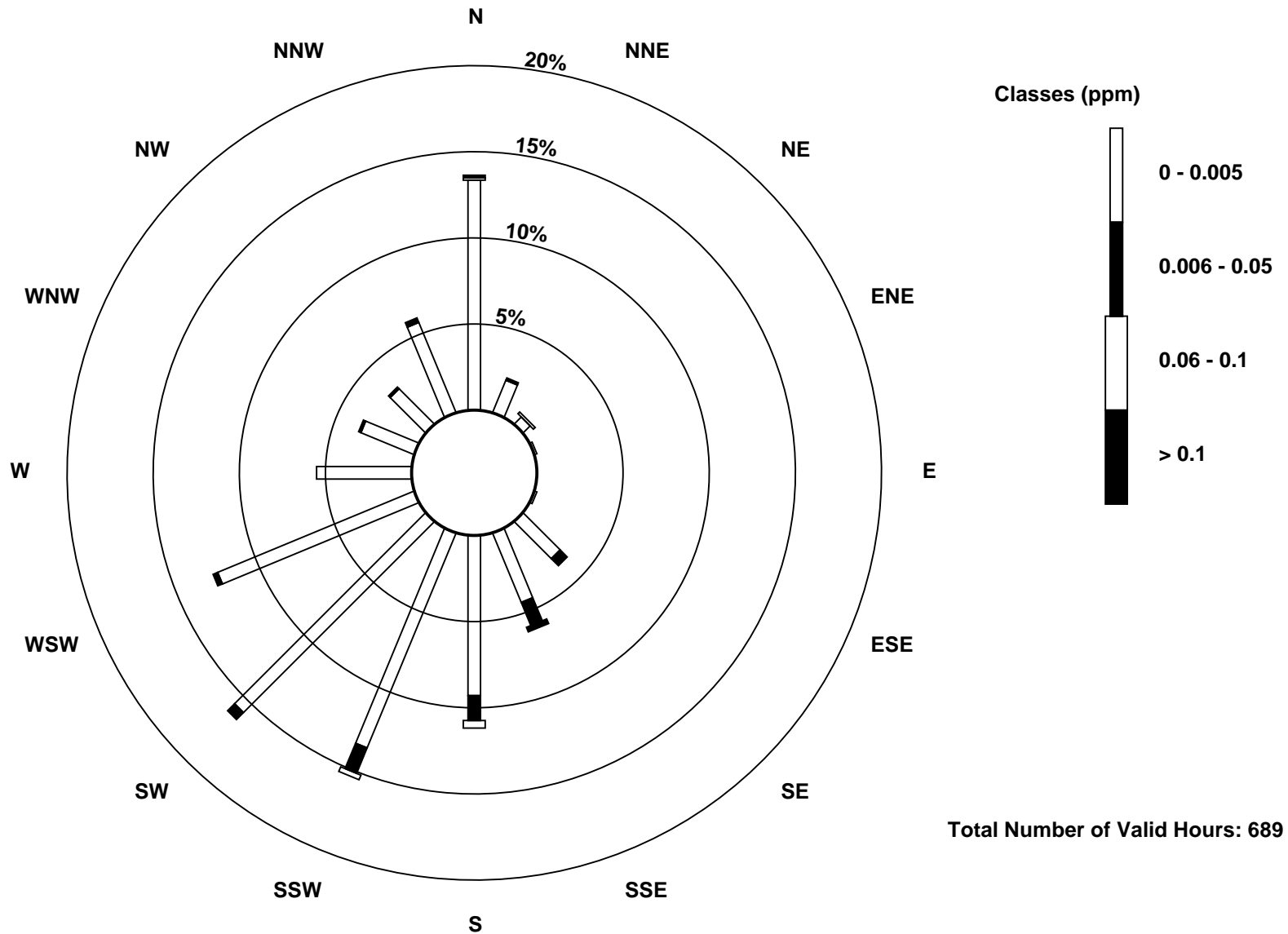
Total Number of Valid Hours: 689

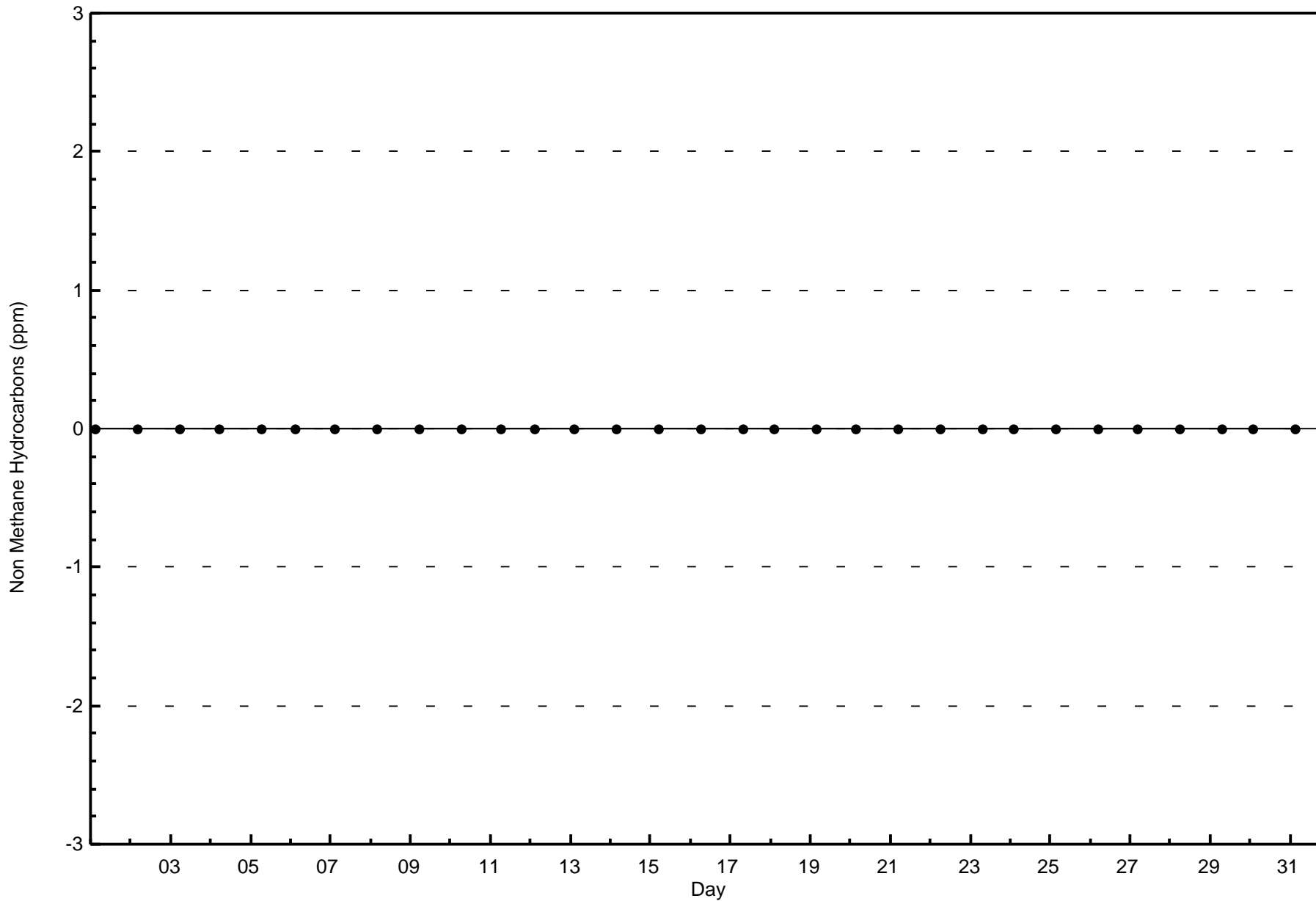
Total Number of Hours: 744

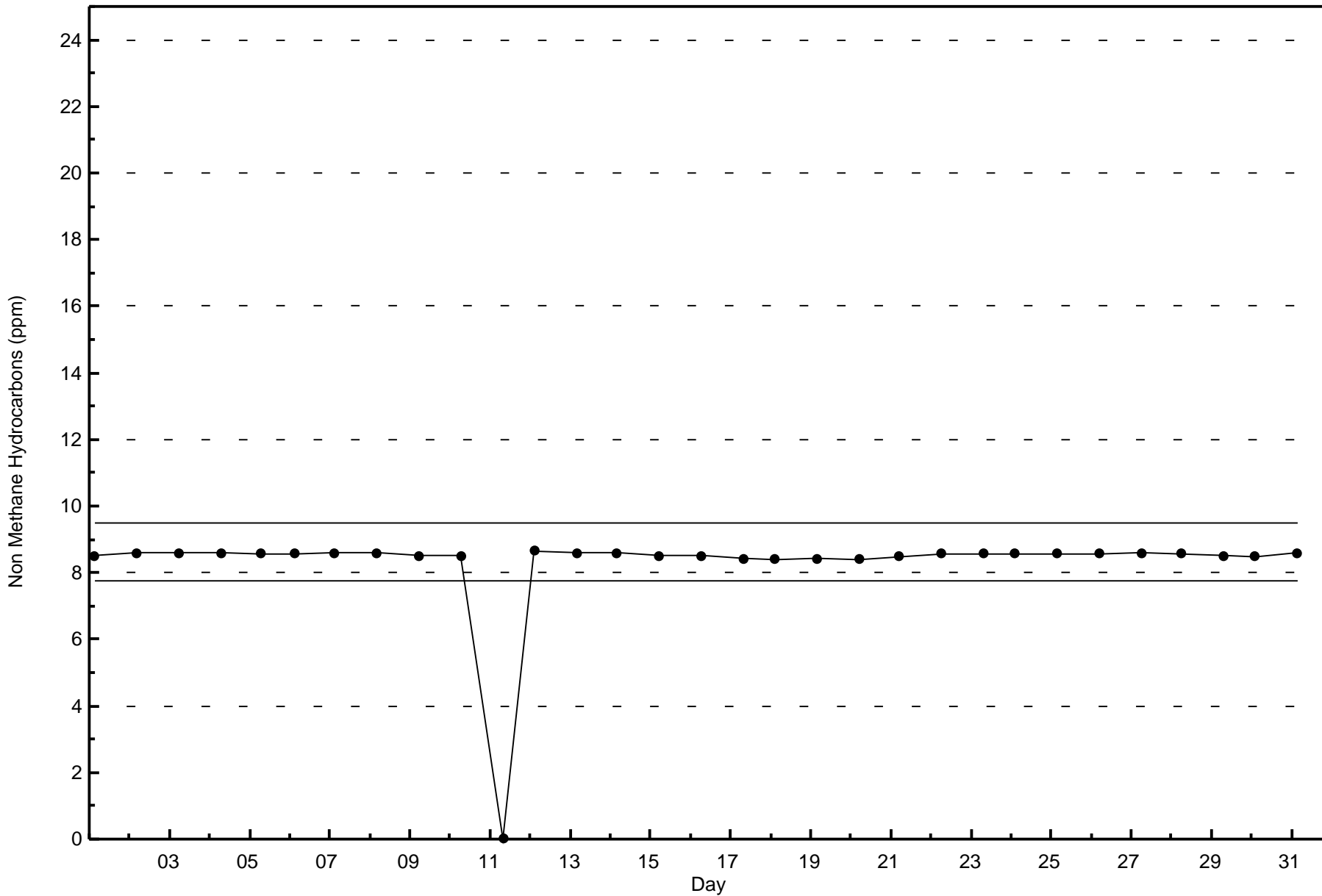


Wood Buffalo Environmental Association
Wind Rose 2012-2017

Non Methane Hydrocarbons (NMHC) - ppm
Patricia McInnes (AMS 6)



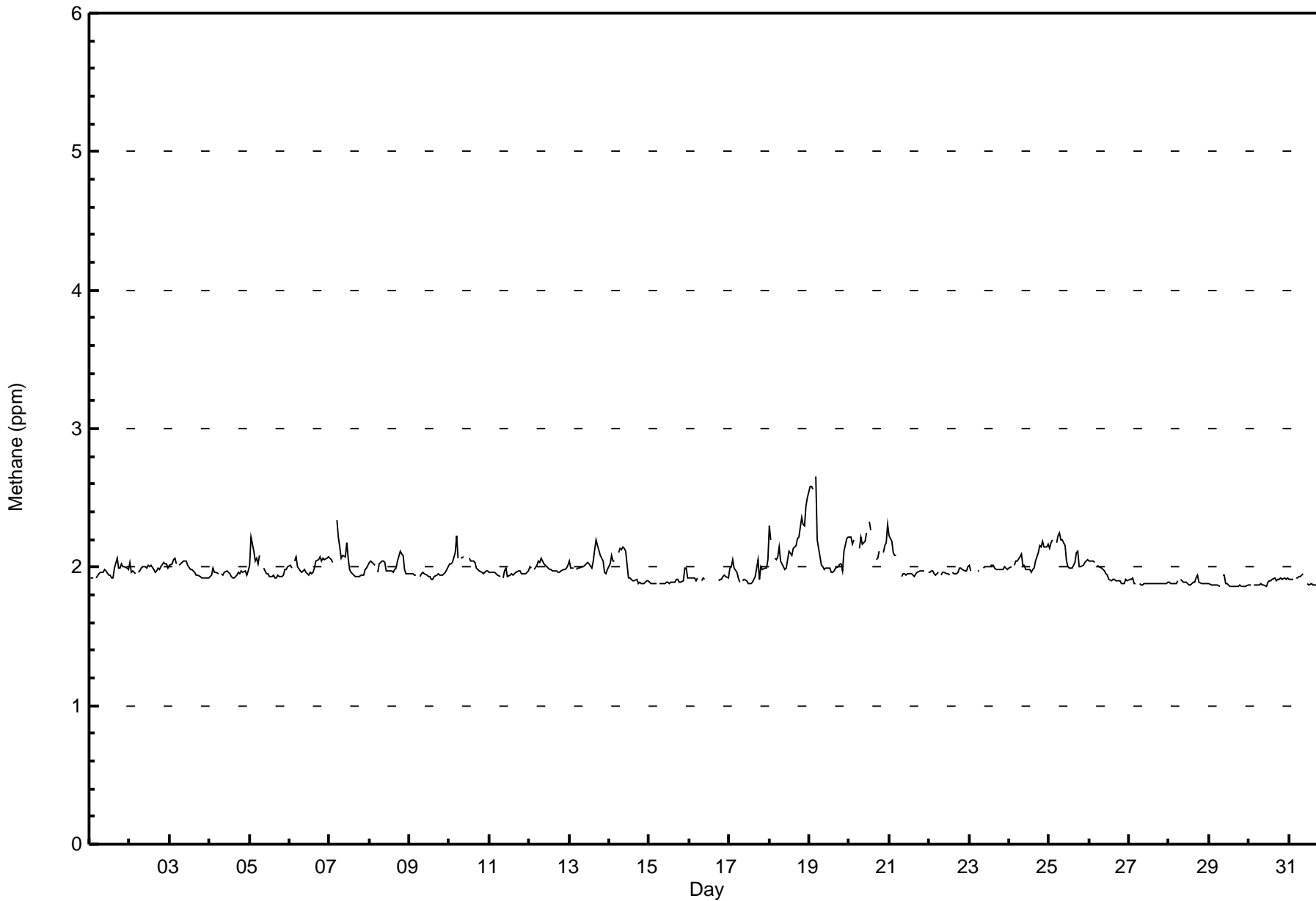






Wood Buffalo Environmental Association
Hourly Averages

Methane (CH₄) - ppm
Patricia McInnes - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Patricia McInnes - January 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	570	82.73	82.73
2.1 - 3.0	119	17.27	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 689

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Methane (CH₄) - ppm
Patricia McInnes - January 2017

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	80	13	2	1	0	1	20	15	50	90	107	84	36	21	18	32	570
2.1 - 3.0	14	2	3	0	0	0	5	27	27	16	5	3	2	3	3	9	119
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
Totals	94	15	5	1	0	1	25	42	77	106	112	87	38	24	21	41	689

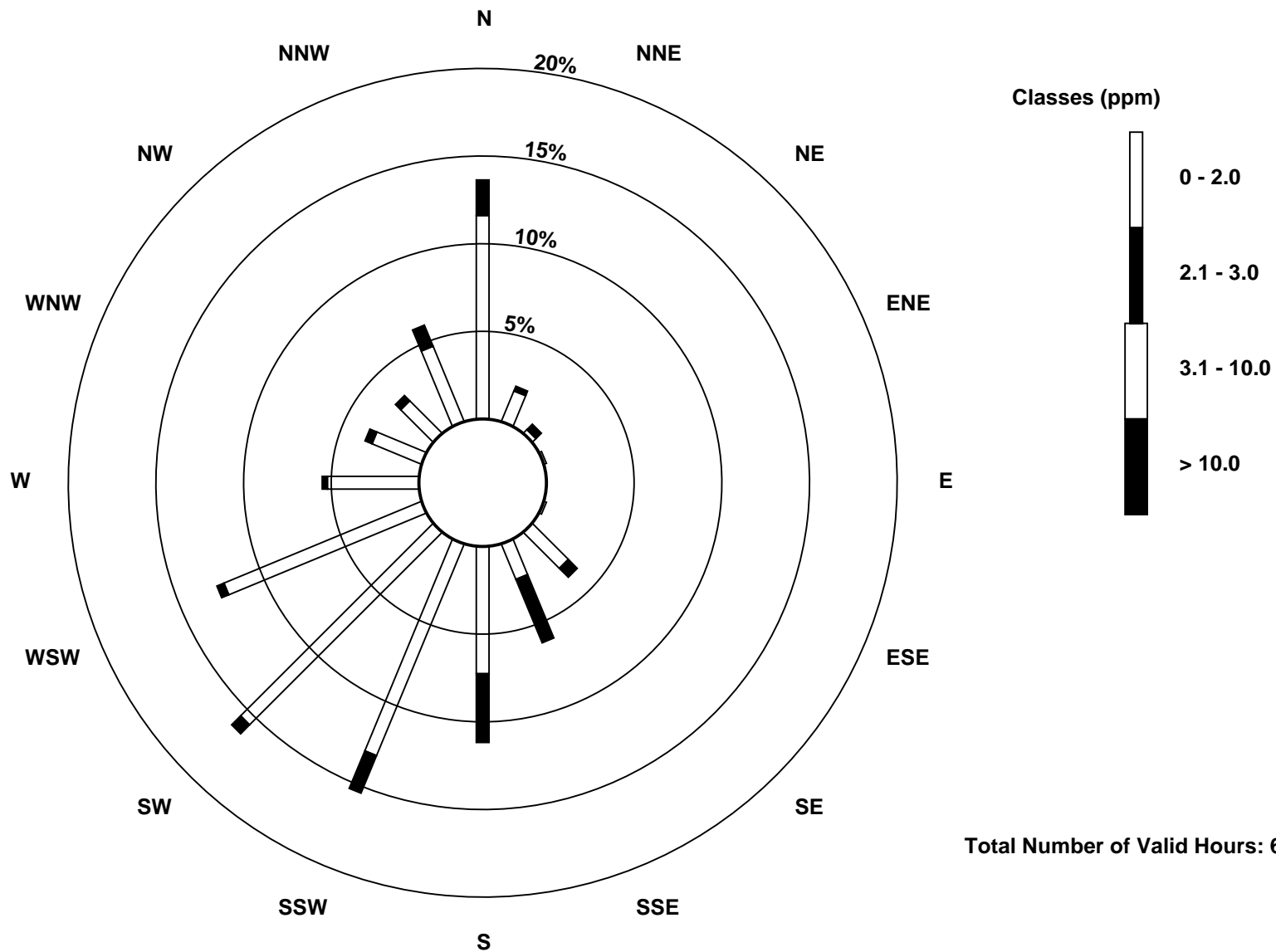
Total Number of Valid Hours: 689

Total Number of Hours: 744

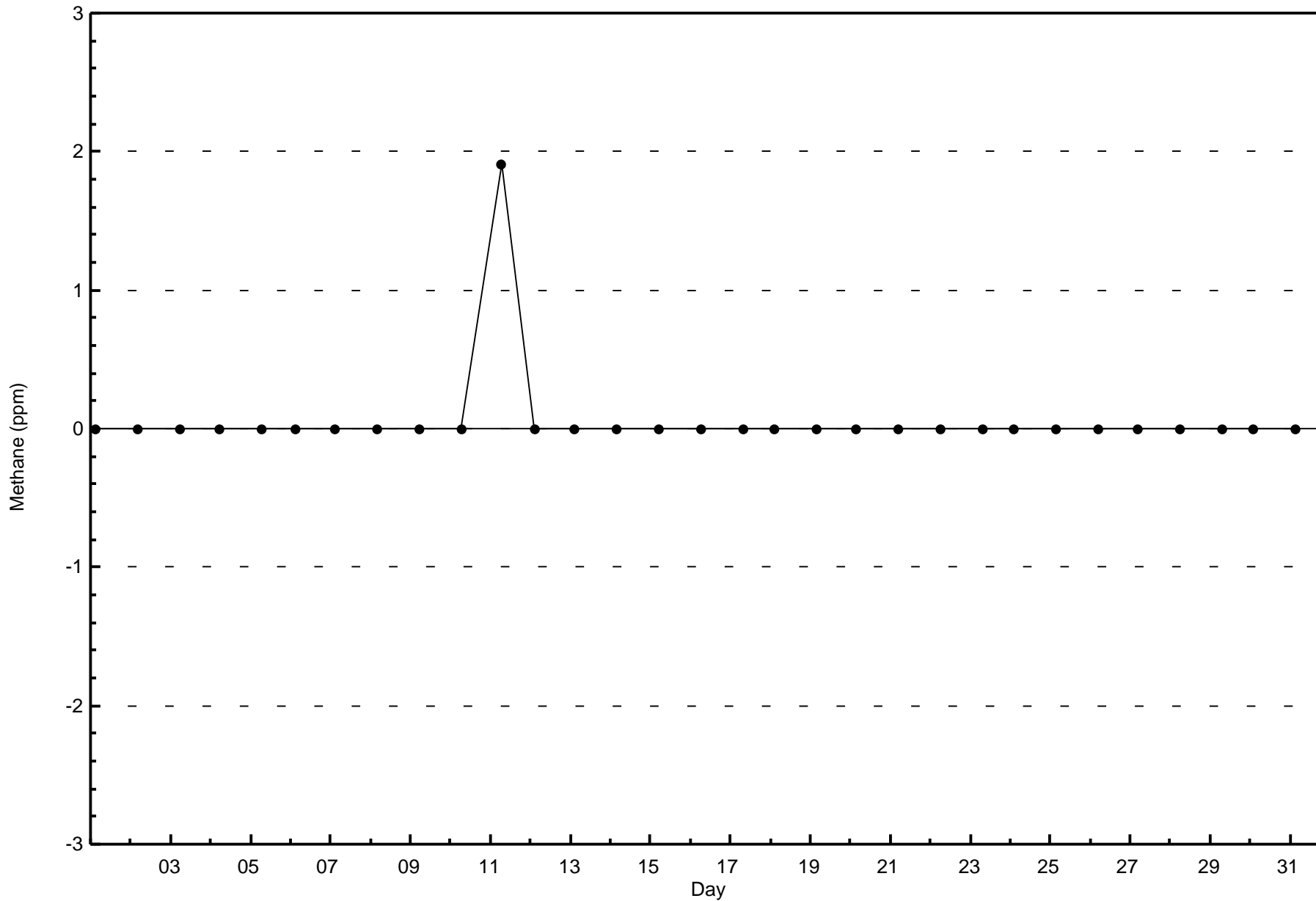


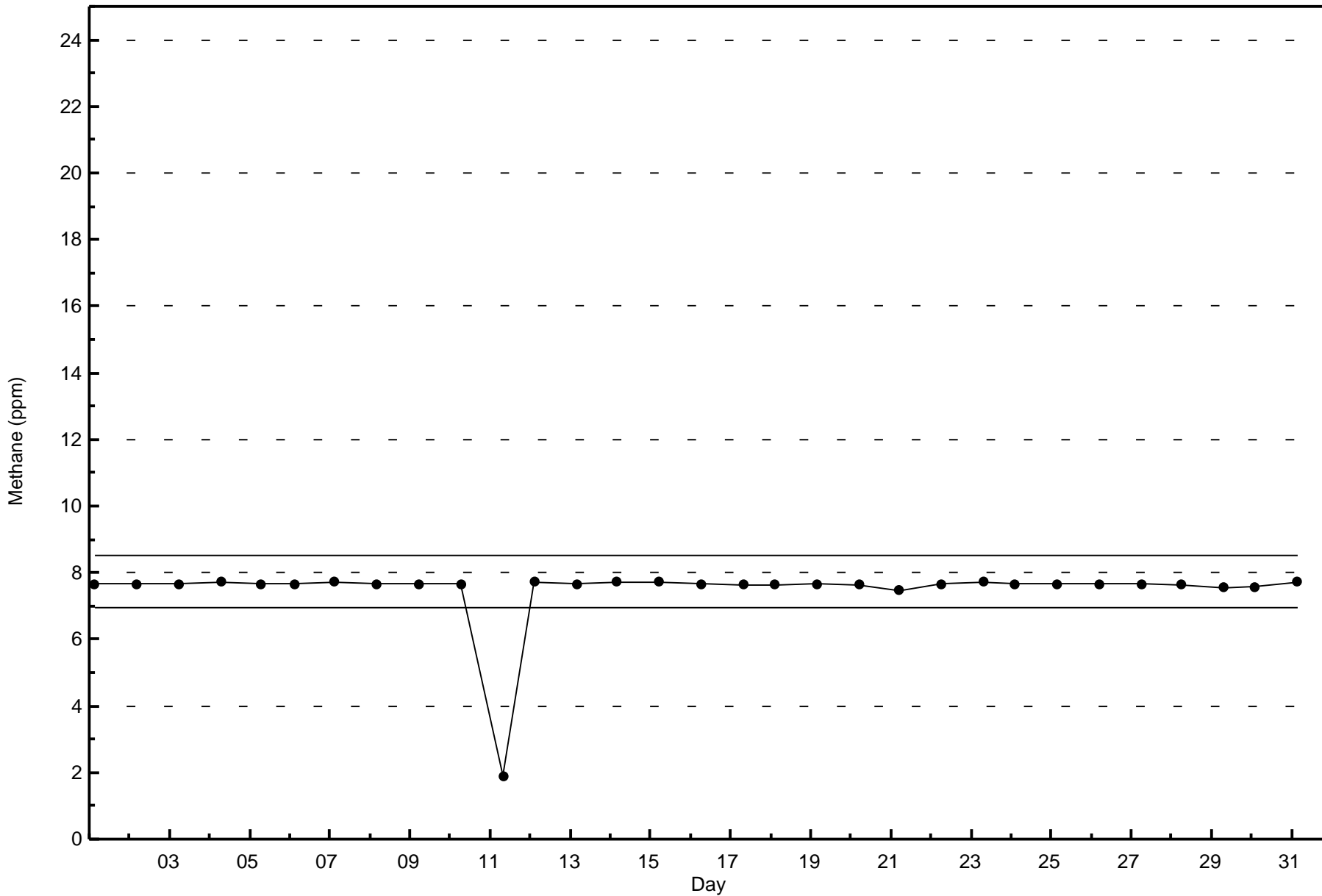
Wood Buffalo Environmental Association
Wind Rose 2012-2017

Methane (CH₄) - ppm
Patricia McInnes (AMS 6)



Total Number of Valid Hours: 689







Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Patricia McInnes - January 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 47 ppb on Jan 16 15:00	Maximum Daily Average: 40.6 ppb on Jan 16		Hours of Data:	710
Minimum Value: 3 ppb on Jan 7 06:00	Minimum Daily Average: 7.7 ppb on Jan 20		Hours of Missing Data:	34
Maximum Diurnal Average: 30.6 ppb at hour 14	Minimum Diurnal Average: 21.6 ppb at hour 7		Hours of Calibration:	34
Monthly Average: 25.7 ppb	Percentiles: P ₁ = 4 P ₁₀ = 7 Q ₁ = 17 Median = 28 Q ₃ = 35 P ₉₀ = 40 P ₉₉ = 43		Percent Operational Time:	100.0

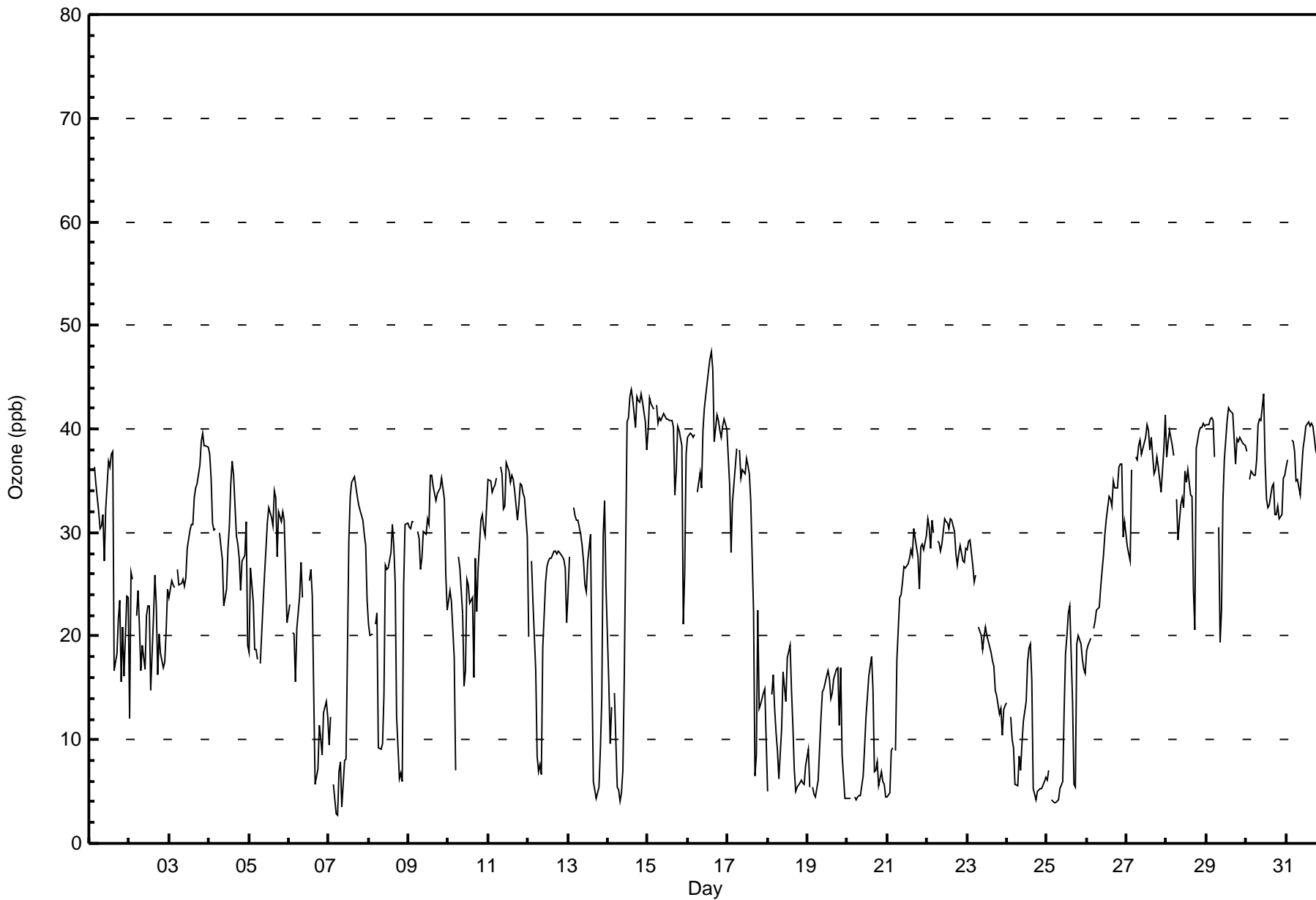
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jan	40	40	Z	36	35	32	30	31	32	27	32	37	36	38	38	17	18	22	23	16	21	16	24	24	28.9	40	
2-Jan	12	26	25	Z	22	24	21	17	19	17	22	23	23	15	22	26	23	16	20	18	17	18	20	25	20.5	26	
3-Jan	24	25	25	25	Z	26	25	25	25	25	26	29	30	31	31	33	34	35	36	39	40	38	38	38	30.6	40	
4-Jan	38	35	31	30	30	Z	30	29	27	23	24	29	31	35	37	36	30	29	28	24	27	28	31	19	29.6	38	
5-Jan	18	27	23	19	19	18	Z	17	23	26	28	31	32	31	31	34	33	28	32	31	32	31	26	21	26.6	34	
6-Jan	23	Z	20	20	16	21	24	27	24	C	C	C	25	26	24	15	6	7	11	10	9	13	14	12	17.3	27	
7-Jan	9	12	Z	6	3	3	7	8	4	8	8	18	29	33	35	35	35	33	33	32	31	30	29	24	20.2	35	
8-Jan	21	20	20	Z	21	22	9	9	10	14	27	26	27	28	31	29	25	12	6	7	6	25	31	31	19.9	31	
9-Jan	31	30	31	31	Z	30	29	26	28	30	30	31	31	35	36	34	33	34	34	34	35	33	26	23	31.1	36	
10-Jan	24	24	23	18	7	Z	28	27	22	15	17	26	25	23	24	16	28	22	27	31	32	30	30	32	23.9	32	
11-Jan	35	35	34	34	35	35	Z	36	36	32	33	37	36	35	36	35	34	31	33	35	35	34	33	30	34.2	37	
12-Jan	20	Z	27	23	17	8	7	8	7	19	25	27	27	27	28	28	28	28	28	28	28	27	27	21	22.3	28	
13-Jan	24	28	Z	32	32	31	31	30	29	27	25	24	27	30	16	6	5	4	5	9	14	30	33	25	22.5	33	
14-Jan	15	10	13	Z	14	5	5	4	5	7	16	41	41	43	44	43	40	43	43	43	43	41	38	38	27.8	44	
15-Jan	40	43	42	42	Z	42	40	41	41	41	41	41	41	41	41	40	34	36	40	40	38	21	26	38	38.7	43	
16-Jan	39	40	40	39	39	Z	34	36	34	40	42	43	46	47	47	46	39	41	41	40	39	40	41	40	40.6	47	
17-Jan	37	35	28	33	36	38	Z	38	35	36	36	37	37	36	33	22	6	9	22	13	13	15	15	10	27.0	38	
18-Jan	5	Z	14	16	13	11	9	6	11	17	15	14	18	19	15	11	7	5	5	6	6	6	6	7	10.5	19	
19-Jan	9	5	Z	5	5	4	6	9	12	15	15	16	17	16	14	15	16	17	17	11	17	9	4	4	11.2	17	
20-Jan	4	4	4	Z	4	4	4	5	5	7	9	12	14	16	18	15	7	7	8	6	7	6	6	4	7.7	18	
21-Jan	4	5	9	9	Z	9	18	24	24	25	27	27	27	27	28	28	30	29	28	25	29	29	28	30	22.5	30	
22-Jan	31	30	29	31	30	Z	29	29	28	29	31	31	31	30	31	31	30	31	30	28	27	28	29	27	29	29.4	31
23-Jan	28	29	29	27	25	26	Z	21	20	19	20	21	20	20	18	18	17	15	14	13	13	11	13	13	19.5	29	
24-Jan	13	Z	12	10	9	6	6	8	7	10	12	14	17	19	19	16	5	4	5	5	5	6	6	6	9.6	19	
25-Jan	6	7	Z	4	4	4	4	4	5	6	13	18	20	22	23	14	6	5	19	20	19	18	17	16	12.0	23	
26-Jan	19	19	20	Z	21	21	23	23	25	26	28	30	31	33	33	32	35	34	34	36	37	37	30	31	28.6	37	
27-Jan	29	28	27	36	Z	37	37	38	39	38	38	39	40	40	38	39	36	36	37	36	35	34	38	41	36.4	41	
28-Jan	37	39	40	38	37	Z	33	29	33	33	32	36	35	36	34	33	25	21	38	40	40	40	41	40	35.3	41	
29-Jan	40	40	41	41	41	37	Z	31	19	23	33	37	41	42	42	42	41	37	39	39	39	39	39	38	37.4	42	
30-Jan	38	Z	35	36	35	36	37	40	41	41	43	37	33	32	33	34	35	32	32	33	31	32	35	35	35.5	43	
31-Jan	36	37	Z	39	39	38	35	35	34	36	38	39	40	41	40	40	40	39	38	37	37	38	38	37	37.8	41	
24.2 25.9 25.8 26.2 22.7 21.9 21.6 22.9 22.7 23.7 26.2 29.0 30.0 30.6 30.3 27.8 25.2 23.9 26.0 25.3 25.9 25.8 26.2 25.3																								Diurnal Average			
40 43 42 42 41 42 40 41 41 41 43 43 46 47 47 46 41 43 43 43 43 43 43 41 41																								Diurnal Maximum			

Z - zerospan C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Patricia McInnes - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ozone (O₃) - ppb
Patricia McInnes - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	228	32.11	32.11
21 - 50	482	67.89	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 (O₃) - ppb
Patricia McInnes - January 2017

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	29	3	4	1	0	0	15	36	55	43	13	9	4	3	3	10	228
21 - 50	69	13	1	0	0	1	12	9	21	63	107	76	39	23	19	29	482
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
Totals	98	16	5	1	0	1	27	45	76	106	120	85	43	26	22	39	710

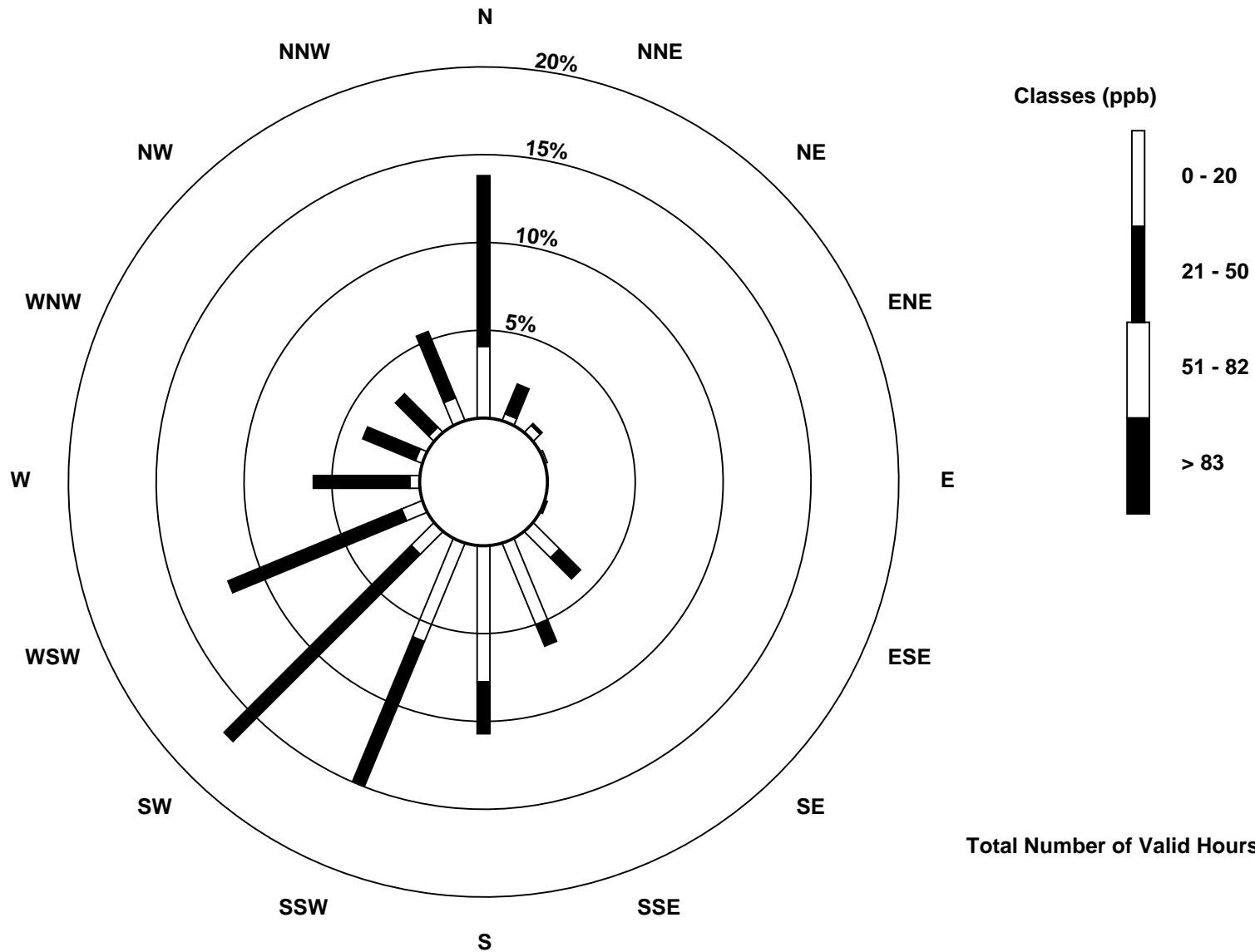
Total Number of Valid Hours: 710

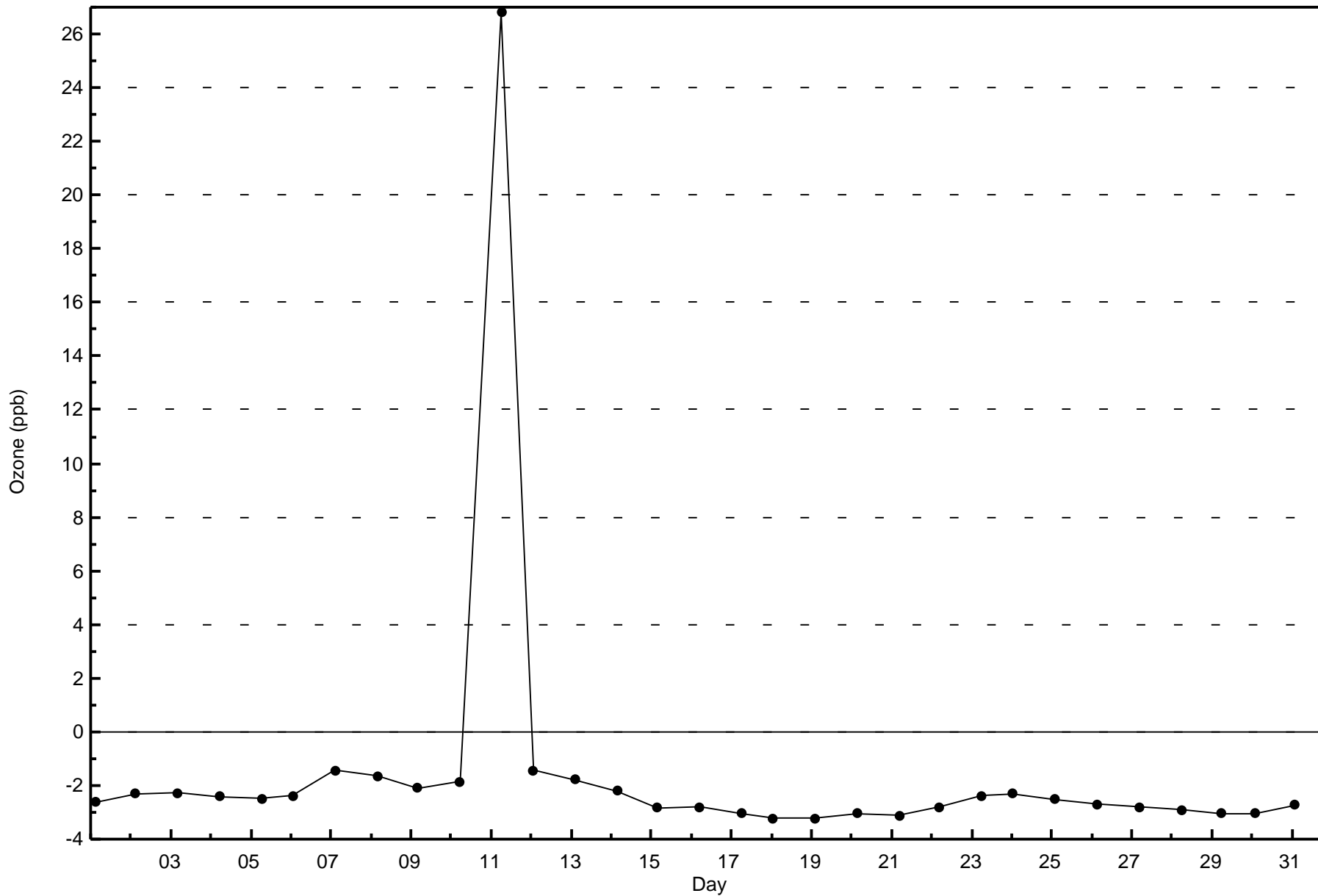
Total Number of Hours: 744

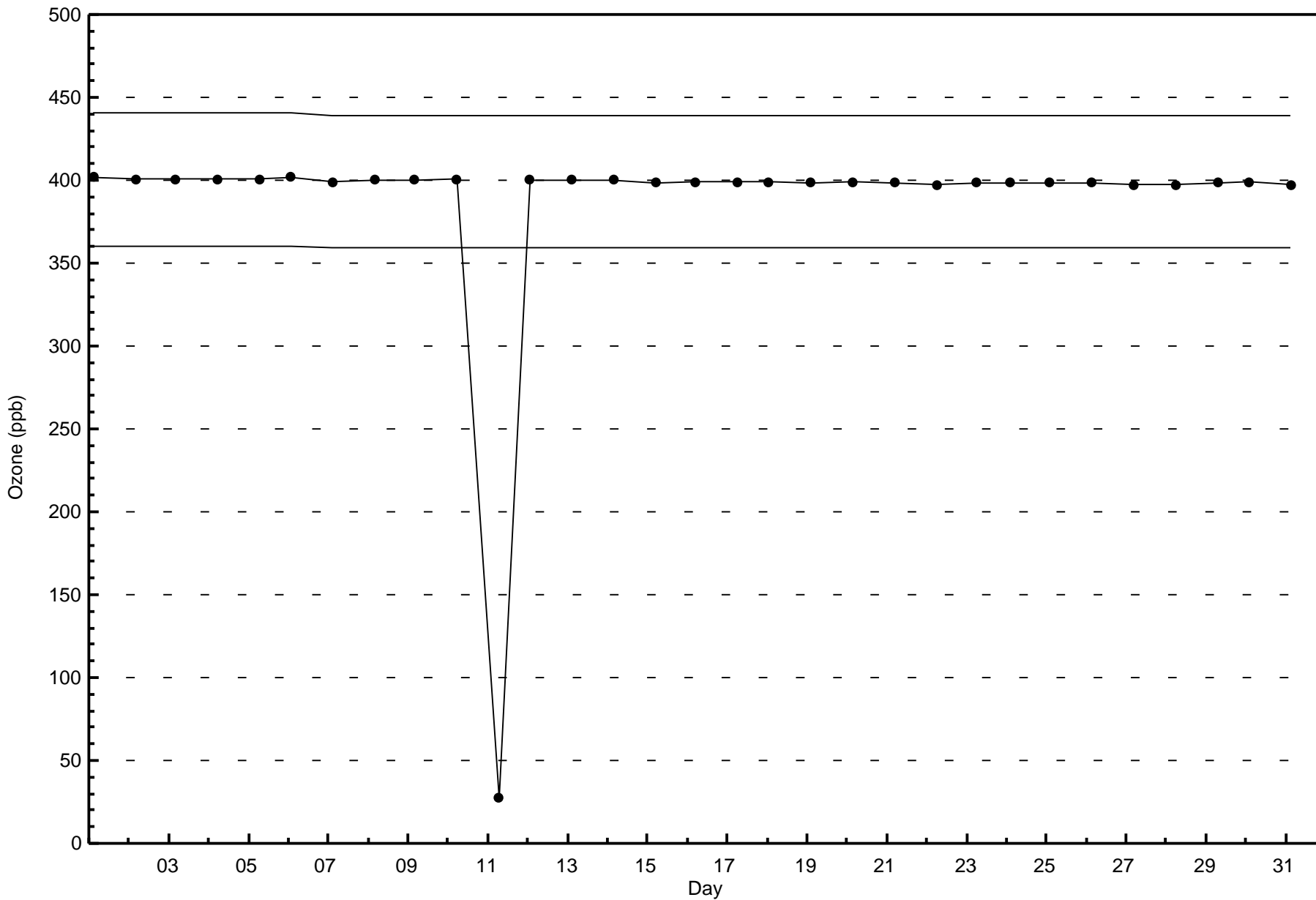


Wood Buffalo Environmental Association
Wind Rose 2012-2017

Ozone (O₃) - ppb
Patricia McInnes (AMS 6)









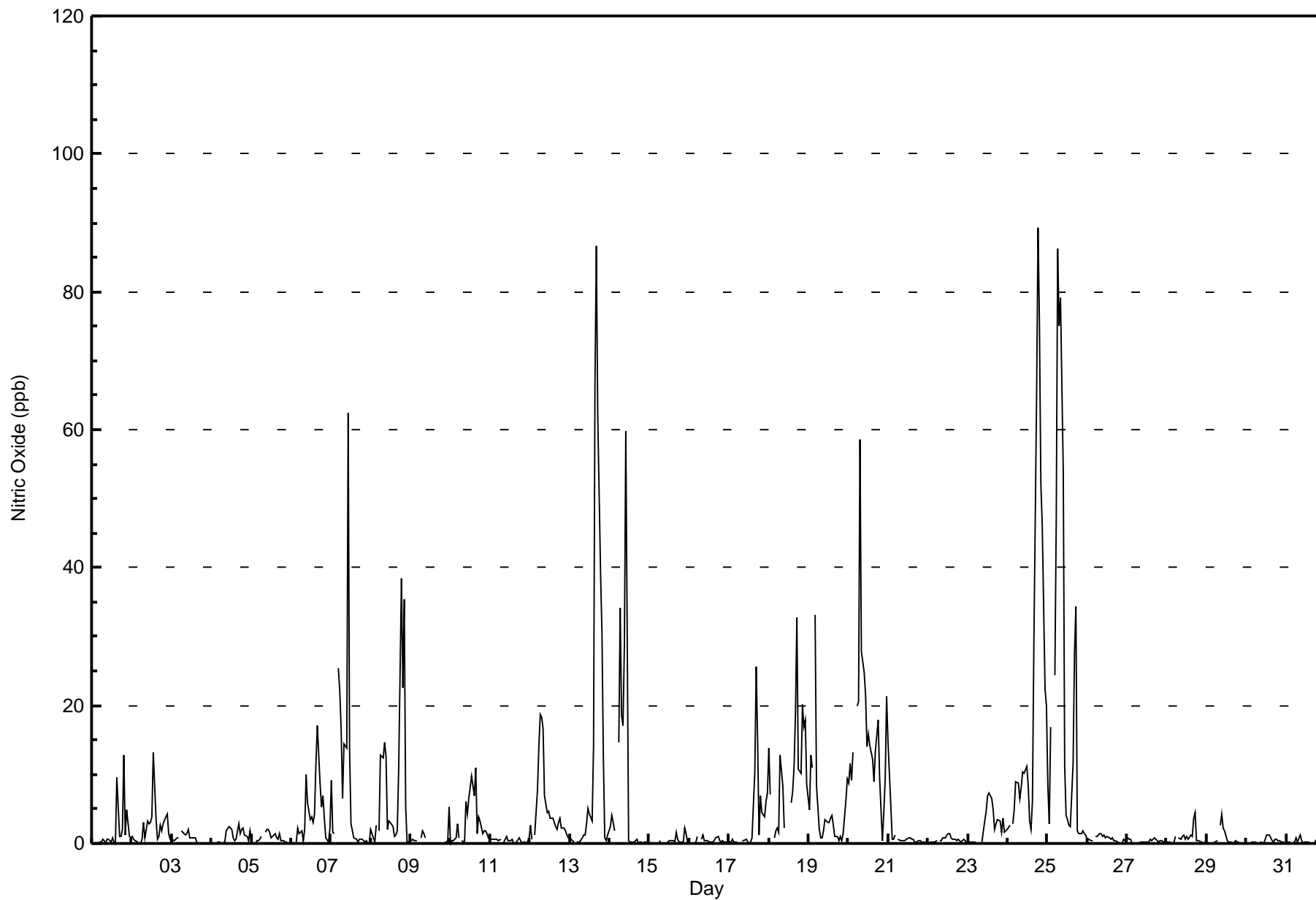
Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

Patricia McInnes - January 2017

Maximum Value: 89 ppb on Jan 24 19:00 Maximum Daily Average: 21.8 ppb on Jan 25																		Hours in Service: 744 Hours of Data: 704 Hours of Missing Data: 40 Hours of Calibration: 37 Percent Operational Time: 99.6									
Minimum Value: 0 ppb on Jan 1 02:00 Minimum Daily Average: 0.2 ppb on Jan 31 Maximum Diurnal Average: 8.8 ppb at hour 18 Minimum Diurnal Average: 1.1 ppb at hour 4 Monthly Average: 4.8 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 3 P ₉₀ = 13 P ₉₉ = 62																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jan	0	0	0	Z	0	0	1	0	0	1	1	0	1	0	0	10	1	1	2	13	1	5	1	1	1.7	13	
2-Jan	1	1	0	0	Z	0	1	3	1	3	3	3	4	13	3	1	1	3	2	3	4	4	1	1	2.4	13	
3-Jan	1	0	1	1	1	Z	2	1	1	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0.6	2	
4-Jan	0	0	0	0	0	0	Z	0	0	2	2	2	2	2	1	0	1	3	1	2	2	1	1	0	2	1.1	3
5-Jan	0	0	0	0	0	1	1	Z	2	2	2	2	1	1	1	1	1	1	0	0	0	0	0	0	0.8	2	
6-Jan	0	0	Z	0	2	1	2	0	2	10	6	3	4	3	4	12	17	9	5	7	4	1	0	2	4.2	17	
7-Jan	9	2	1	Z	25	22	16	6	14	14	62	14	3	2	1	1	0	1	1	1	0	0	0	0	8.5	62	
8-Jan	2	2	0	3	Z	2	13	12	15	13	2	3	3	2	1	1	2	11	38	23	35	6	0	0	8.2	38	
9-Jan	0	1	0	0	0	Z	1	2	2	1	C	C	C	C	C	C	0	0	0	0	0	0	0	5	--	5	
10-Jan	0	0	0	1	3	1	Z	0	0	6	4	6	8	10	7	11	2	4	3	2	2	2	1	1	3.2	11	
11-Jan	1	1	1	1	1	0	1	Z	0	1	1	0	0	1	0	0	0	1	0	0	0	0	0	1	0.4	1	
12-Jan	3	1	Z	1	8	14	19	18	17	7	5	5	4	4	4	2	2	3	4	2	2	2	1	1	5.5	19	
13-Jan	1	1	0	Z	0	0	0	1	1	1	3	5	4	3	14	66	87	62	39	31	12	1	0	1	14.6	87	
14-Jan	2	4	3	2	Z	15	34	19	17	29	60	0	0	0	0	0	1	0	0	0	0	0	0	0	8.1	60	
15-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	2	1	0	0.4	2	
16-Jan	0	0	0	0	0	1	Z	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.4	1	
17-Jan	0	0	1	0	0	0	0	Z	0	0	1	0	0	0	1	10	26	15	1	7	4	4	6	7	3.7	26	
18-Jan	14	7	Z	1	2	2	2	13	8	2	M	M	M	6	7	11	19	33	11	10	20	17	18	8	10.6	33	
19-Jan	5	13	11	Z	33	8	2	1	1	2	3	3	3	4	4	3	1	1	1	1	0	1	6	9	5.1	33	
20-Jan	9	12	9	13	Z	20	21	59	28	25	22	14	16	14	12	9	13	16	18	10	0	4	9	21	16.2	59	
21-Jan	15	5	1	1	1	Z	1	0	0	0	0	1	1	1	1	1	0	0	0	1	0	0	0	0	1.3	15	
22-Jan	0	0	0	0	0	0	Z	0	0	1	1	1	1	1	1	1	1	1	0	1	0	0	1	0	0.6	1	
23-Jan	0	0	0	0	0	0	0	Z	0	2	3	5	7	7	6	5	2	3	3	3	2	4	2	2	2.5	7	
24-Jan	2	3	Z	3	5	9	9	6	8	10	10	11	8	3	2	6	28	66	89	75	52	46	22	20	21.6	89	
25-Jan	8	3	17	Z	24	47	86	75	79	54	11	4	4	3	2	12	28	34	2	1	1	2	2	1	21.8	86	
26-Jan	1	1	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	0	0.7	1	
27-Jan	1	1	1	0	0	Z	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0.3	1	
28-Jan	0	0	0	0	0	1	Z	1	1	1	1	1	1	1	1	1	4	5	0	0	0	0	0	0	0.8	5	
29-Jan	0	0	0	0	0	0	0	Z	3	4	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0.6	4	
30-Jan	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	0	0	1	1	0	0	0	0	0	0.4	1	
31-Jan	0	0	0	Z	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
2.4 1.8 1.8 1.1 4.2 5.7 8.2 8.5 6.6 6.3 7.2 3.1 2.7 2.8 2.6 5.5 7.8 8.8 7.3 6.2 4.7 3.4 2.4 2.8																								Diurnal Average			
15 13 17 13 33 47 86 75 79 54 62 14 16 14 14 66 87 66 89 75 52 46 22 21																								Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance																											





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Patricia McInnes - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	666	94.60	94.60
21 - 40	22	3.13	97.73
41 - 80	13	1.85	99.57
81 - 159	3	0.43	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



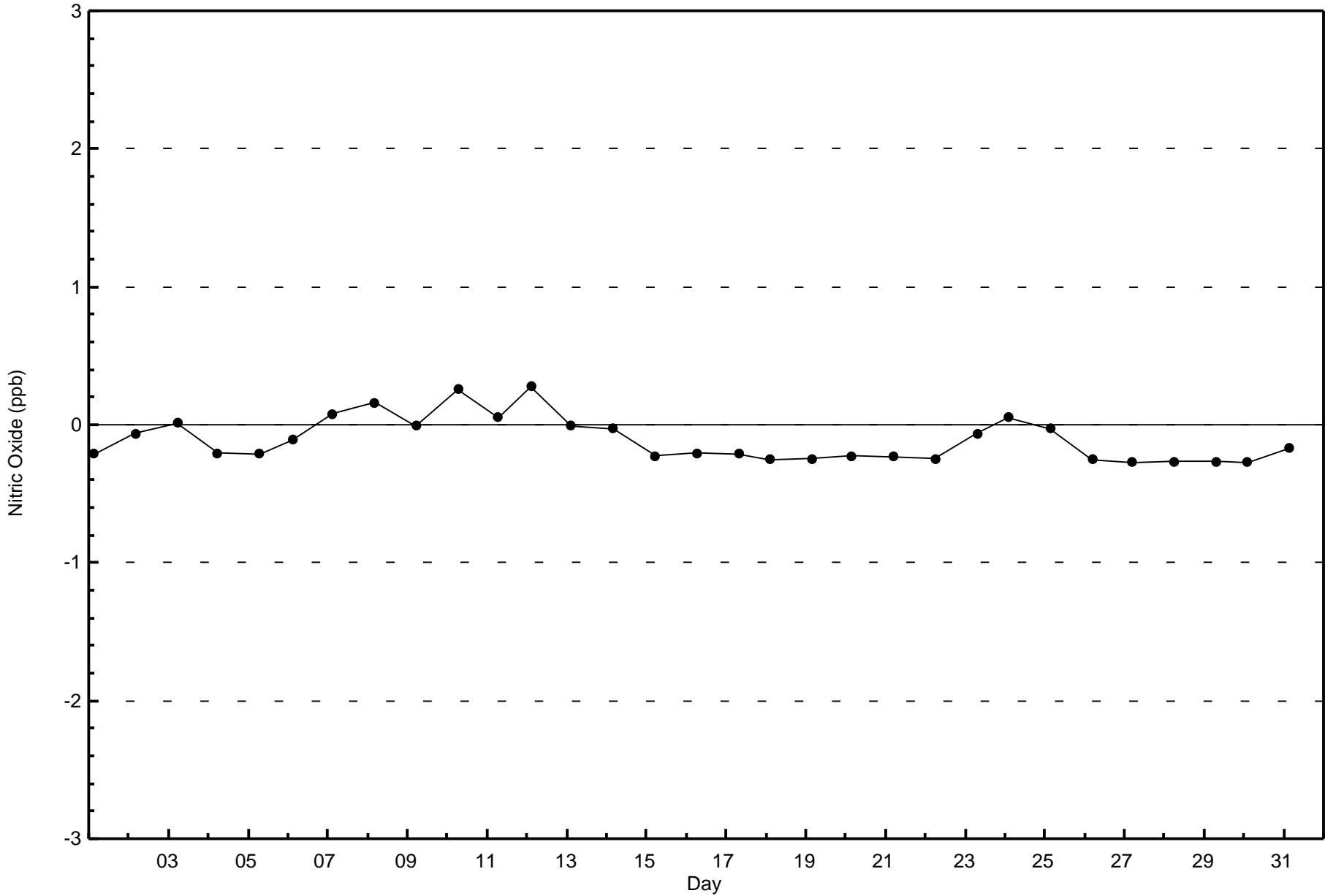
Wood Buffalo Environmental Association
Frequency Distribution

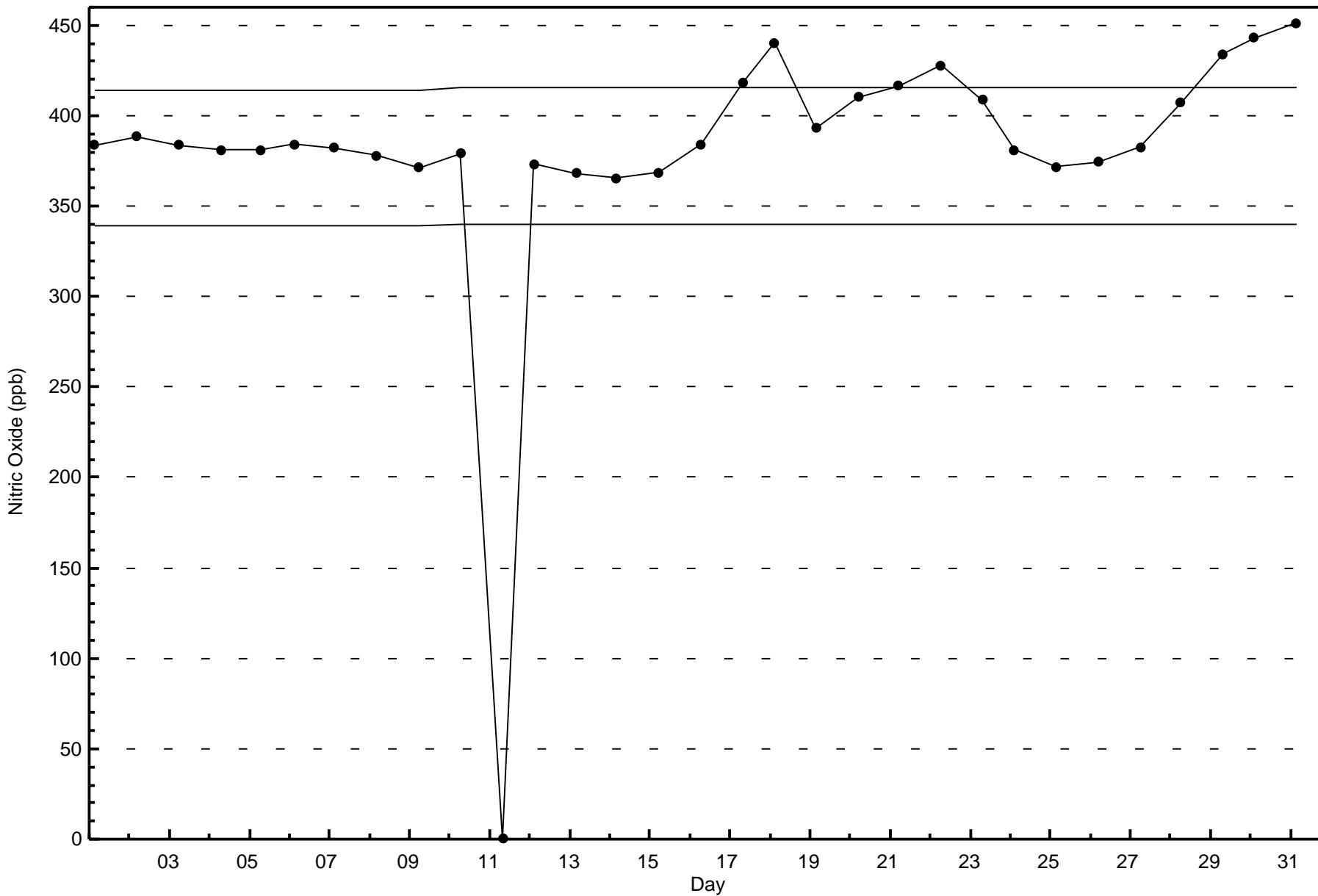
Nitric Oxide (NO) - ppb
Patricia McInnes - January 2017

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	93	15	4	1	0	1	24	31	65	100	116	90	40	24	21	41	666
21 - 40	3	0	0	0	0	0	1	6	8	3	0	0	0	0	0	1	22
11 - 80	0	0	1	0	0	0	0	6	3	3	0	0	0	0	0	0	13
81 - 159	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	3
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	96	15	5	1	0	1	25	44	78	106	116	90	40	24	21	42	704

Total Number of Valid Hours: 704

Total Number of Hours: 744







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

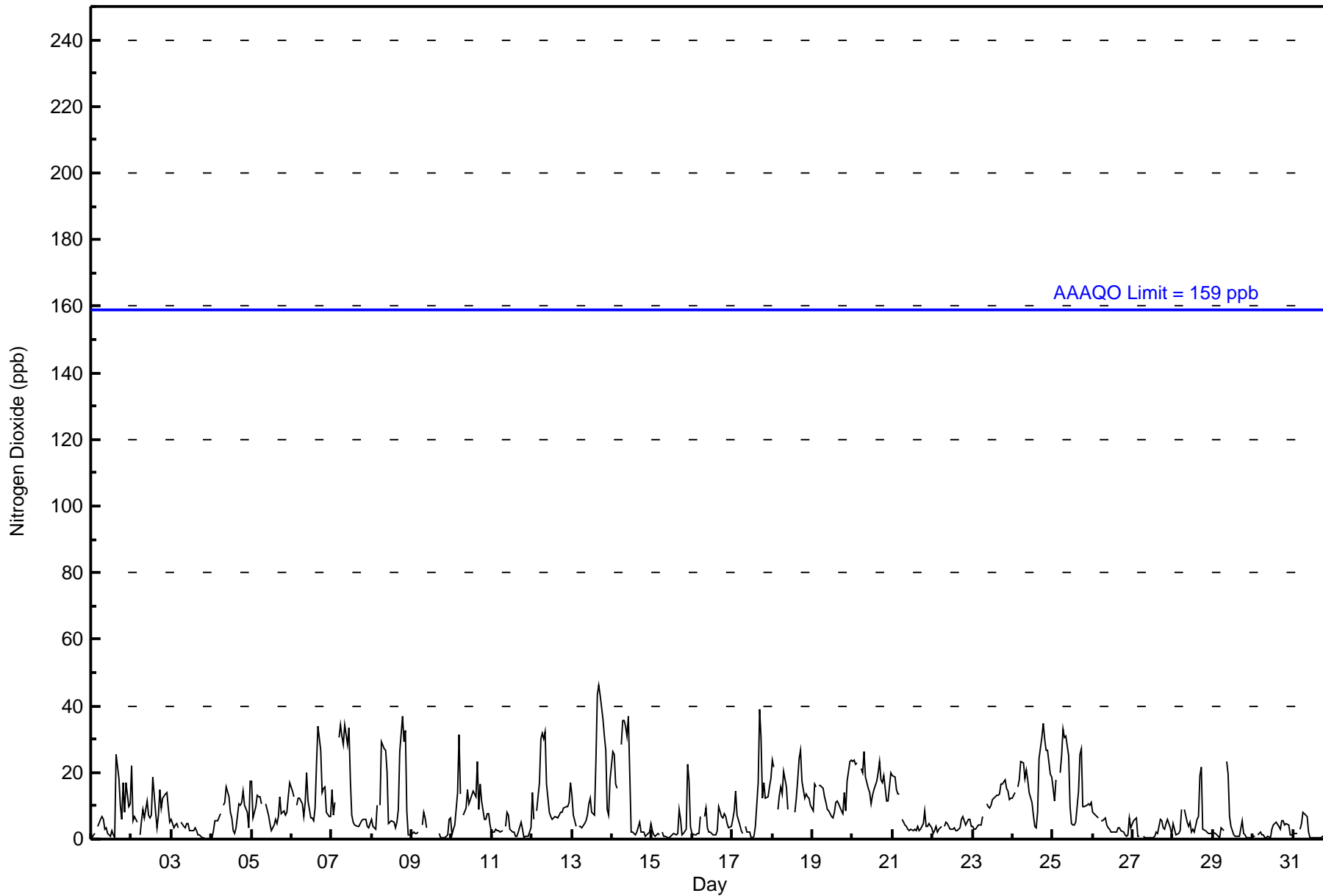
Patricia McInnes - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 46 ppb on Jan 13 17:00										Maximum Daily Average: 18.3 ppb on Jan 24										Hours of Data: 704						
Minimum Value: 0 ppb on Jan 3 21:00										Minimum Daily Average: 1.9 ppb on Jan 31										Hours of Missing Data: 40						
Maximum Diurnal Average: 13.0 ppb at hour 18										Minimum Diurnal Average: 4.6 ppb at hour 13										Hours of Calibration: 37						
Monthly Average: 8.9 ppb										Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 3 Median = 6 Q ₃ = 13 P ₉₀ = 22 P ₉₉ = 36										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-Jan	0	1	2	Z	4	6	7	6	3	3	2	1	3	1	0	26	18	10	6	17	8	17	10	10	7.0	26
2-Jan	22	6	7	5	Z	1	5	9	6	11	7	7	7	19	8	4	7	15	9	12	13	14	9	5	9.1	22
3-Jan	6	4	4	5	3	Z	5	4	3	5	5	3	2	3	3	3	1	1	0	0	0	0	0	0	2.6	6
4-Jan	0	2	6	5	6	8	Z	10	11	16	13	8	6	3	2	3	10	10	11	14	10	8	4	17	8.0	17
5-Jan	17	6	10	13	13	13	11	Z	10	9	7	5	2	4	6	5	7	13	8	9	7	8	13	17	9.2	17
6-Jan	14	13	Z	10	12	12	11	7	11	20	11	6	6	6	9	23	34	27	14	15	16	8	7	7	13.0	34
7-Jan	15	7	11	Z	30	34	31	29	35	29	33	18	7	5	4	4	4	5	5	6	6	4	4	5	14.4	35
8-Jan	6	4	3	10	Z	10	29	27	27	21	5	5	6	5	3	5	9	26	37	29	33	8	1	1	13.5	37
9-Jan	2	2	2	2	2	Z	4	8	6	3	C	C	C	C	C	C	2	1	1	1	1	1	6	6	--	8
10-Jan	1	3	4	14	32	14	Z	7	9	15	11	12	13	14	13	24	9	16	12	6	6	8	8	4	11.0	32
11-Jan	2	2	3	3	3	2	3	Z	4	8	7	3	2	2	1	1	2	5	3	1	1	1	1	4	2.7	8
12-Jan	14	6	Z	8	17	30	32	30	32	16	8	7	6	6	7	6	7	8	8	9	10	10	11	17	13.3	32
13-Jan	13	7	4	Z	4	4	4	5	6	7	11	12	8	7	23	43	46	43	36	31	27	9	7	18	16.3	46
14-Jan	26	26	17	15	Z	28	36	35	34	31	37	2	2	2	1	2	5	2	2	2	1	1	2	5	13.7	37
15-Jan	3	1	1	2	1	Z	2	1	1	1	1	1	1	2	1	2	9	6	1	2	3	22	18	4	3.6	22
16-Jan	2	1	1	2	2	7	Z	7	9	3	2	2	1	1	1	3	10	7	7	8	7	5	4	4	4.1	10
17-Jan	6	8	14	7	4	3	2	Z	4	2	2	1	0	1	4	17	39	30	12	17	12	13	16	18	10.1	39
18-Jan	24	22	Z	9	13	16	14	20	16	9	M	M	M	8	12	18	24	27	17	12	13	13	12	10	15.4	27
19-Jan	8	17	16	Z	16	16	15	13	11	9	8	7	6	8	11	11	10	8	8	14	8	17	23	24	12.4	24
20-Jan	23	24	23	23	Z	21	20	26	19	15	14	11	13	15	18	20	23	18	17	19	12	12	16	20	18.3	26
21-Jan	19	19	15	14	14	Z	6	4	4	3	3	3	3	3	3	4	2	3	5	8	4	4	5	3	6.5	19
22-Jan	2	2	4	2	3	4	Z	4	5	5	3	3	3	4	3	3	4	6	7	6	4	6	6	4	3.9	7
23-Jan	4	3	3	4	4	4	7	Z	11	10	9	10	12	13	13	14	17	17	18	15	14	12	12	10.3	18	
24-Jan	12	14	Z	16	18	23	23	18	21	18	14	11	7	4	8	24	31	35	30	27	27	20	19	18.3	35	
25-Jan	15	11	18	Z	20	25	33	31	31	25	10	5	4	4	5	14	26	27	10	10	10	10	11	15.9	33	
26-Jan	8	8	7	6	Z	6	5	6	4	3	3	2	2	2	4	3	3	2	1	1	1	7	3	3.9	8	
27-Jan	5	6	6	1	1	Z	1	1	1	1	1	1	1	1	2	2	6	6	3	3	5	6	3	1	2.7	6
28-Jan	5	3	1	2	3	9	Z	9	5	4	5	2	3	2	6	7	19	22	3	2	2	2	2	2	5.1	22
29-Jan	2	2	1	1	1	4	3	Z	23	19	7	4	1	1	1	1	1	6	2	1	0	1	1	1	3.5	23
30-Jan	1	1	Z	1	2	1	1	1	0	1	0	3	4	5	5	4	3	5	6	4	5	4	1	1	2.6	6
31-Jan	1	2	2	Z	3	5	8	8	7	2	0	1	1	1	1	0	0	1	1	0	1	1	1	2	1.9	8
9.0 7.5 7.1 7.2 8.8 11.7 12.1 12.5 11.9 10.4 8.2 5.3 4.6 5.0 5.7 9.2 12.2 13.0 9.8 9.9 8.6 8.2 7.6 8.2																								Diurnal Average		
26 26 23 23 32 34 36 35 35 31 37 18 13 19 23 43 46 43 37 31 33 27 23 24																								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 (NO₂) - ppb
Patricia McInnes - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	629	89.35	89.35
21 - 40	72	10.23	99.57
41 - 80	3	0.43	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	91	14	2	0	0	1	18	26	51	96	115	90	40	24	20	41	629
21 - 40	5	1	3	1	0	0	7	17	26	9	1	0	0	0	1	1	72
11 - 80	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	3
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	96	15	5	1	0	1	25	44	78	106	116	90	40	24	21	42	704

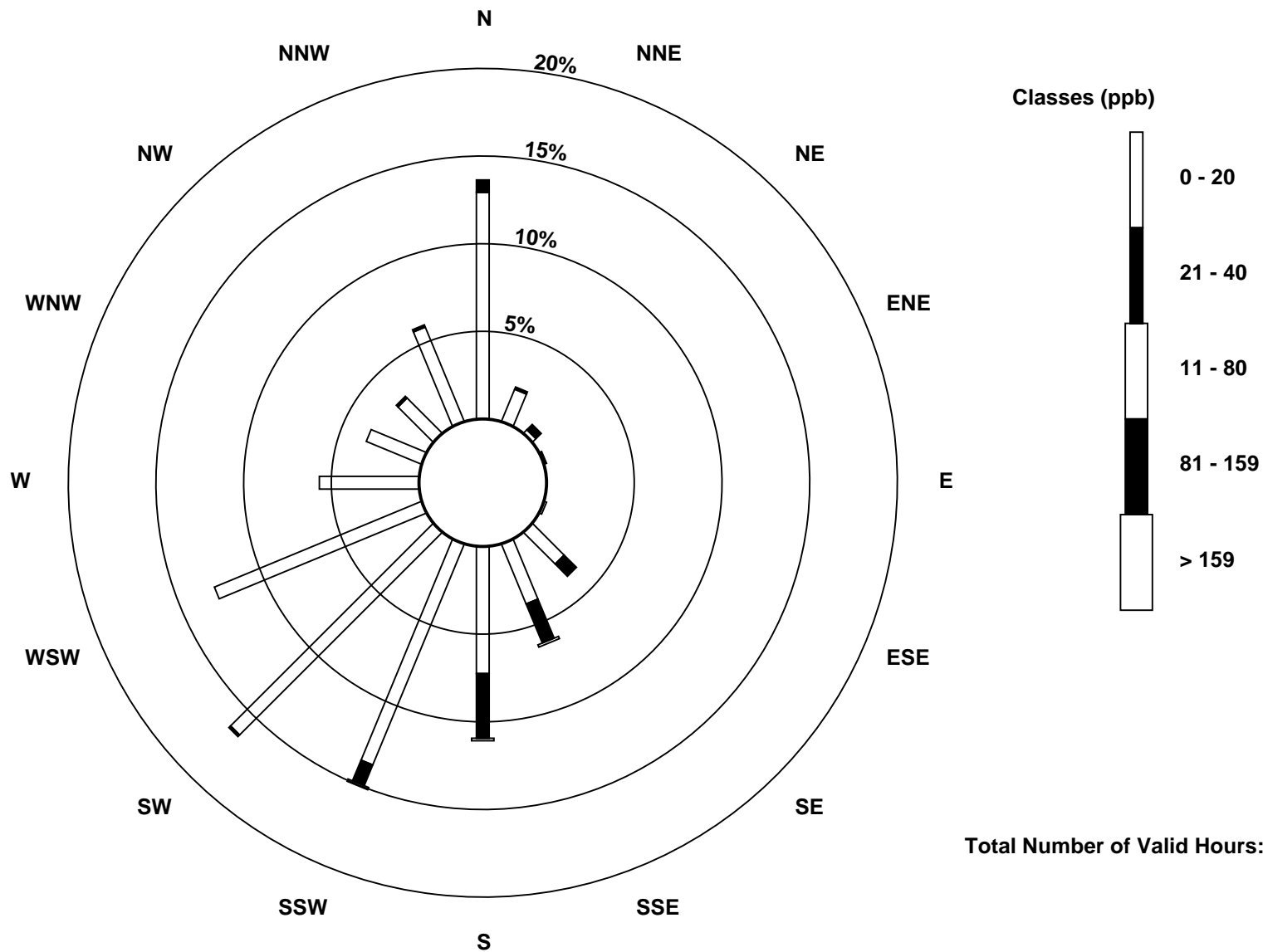
Total Number of Valid Hours: 704

Total Number of Hours: 744

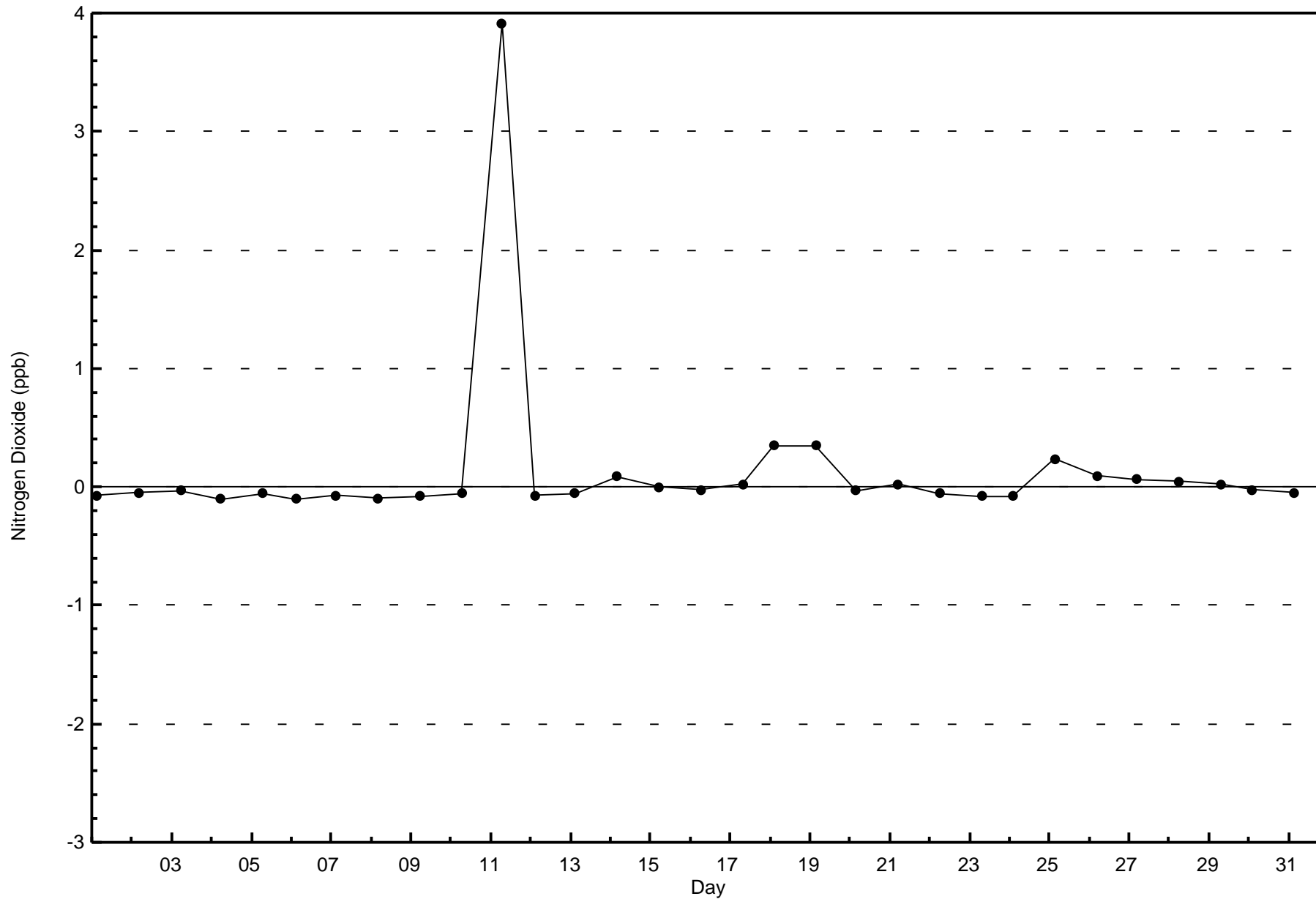


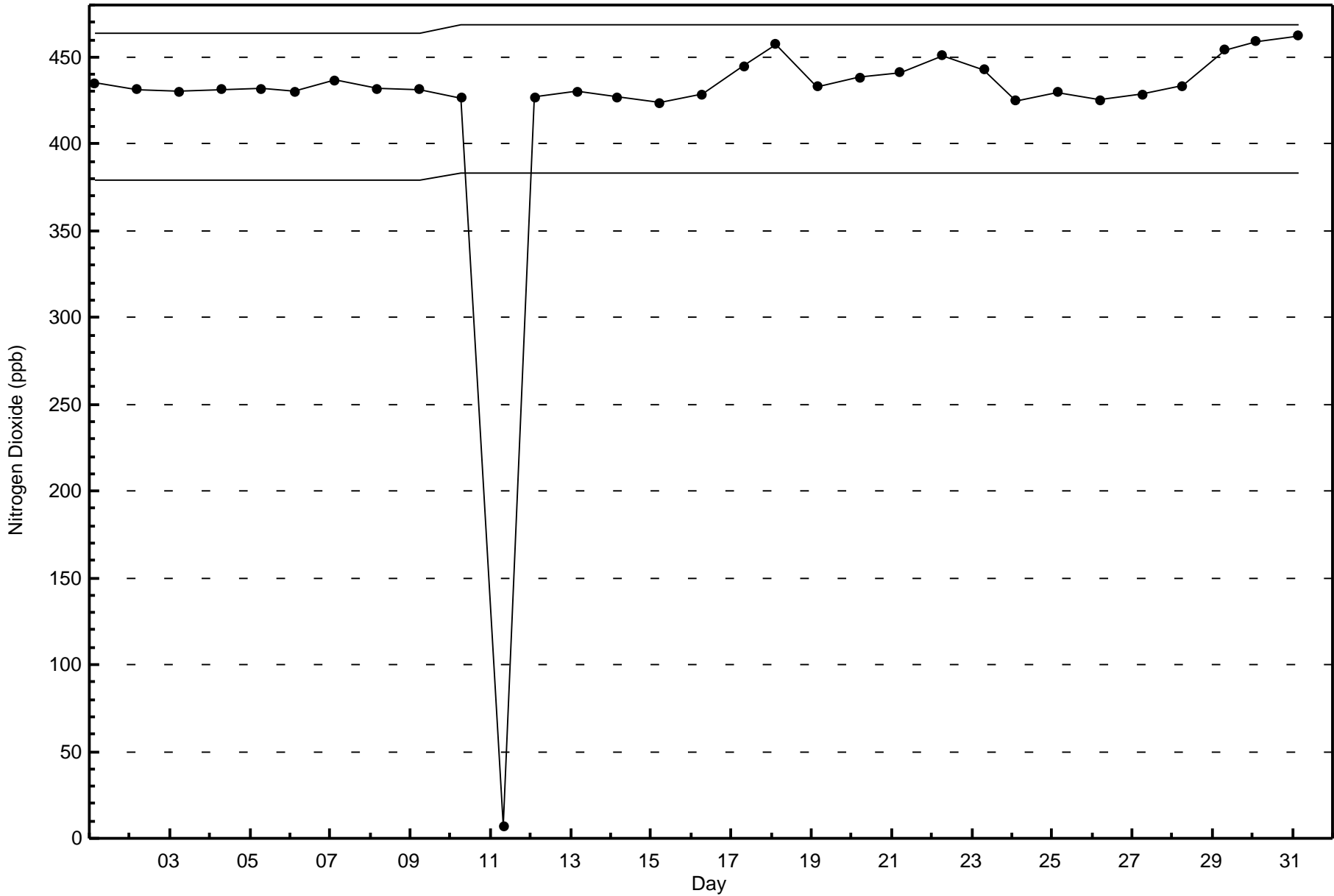
Wood Buffalo Environmental Association
Wind Rose 2012-2017

Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes (AMS 6)



Total Number of Valid Hours: 704







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb

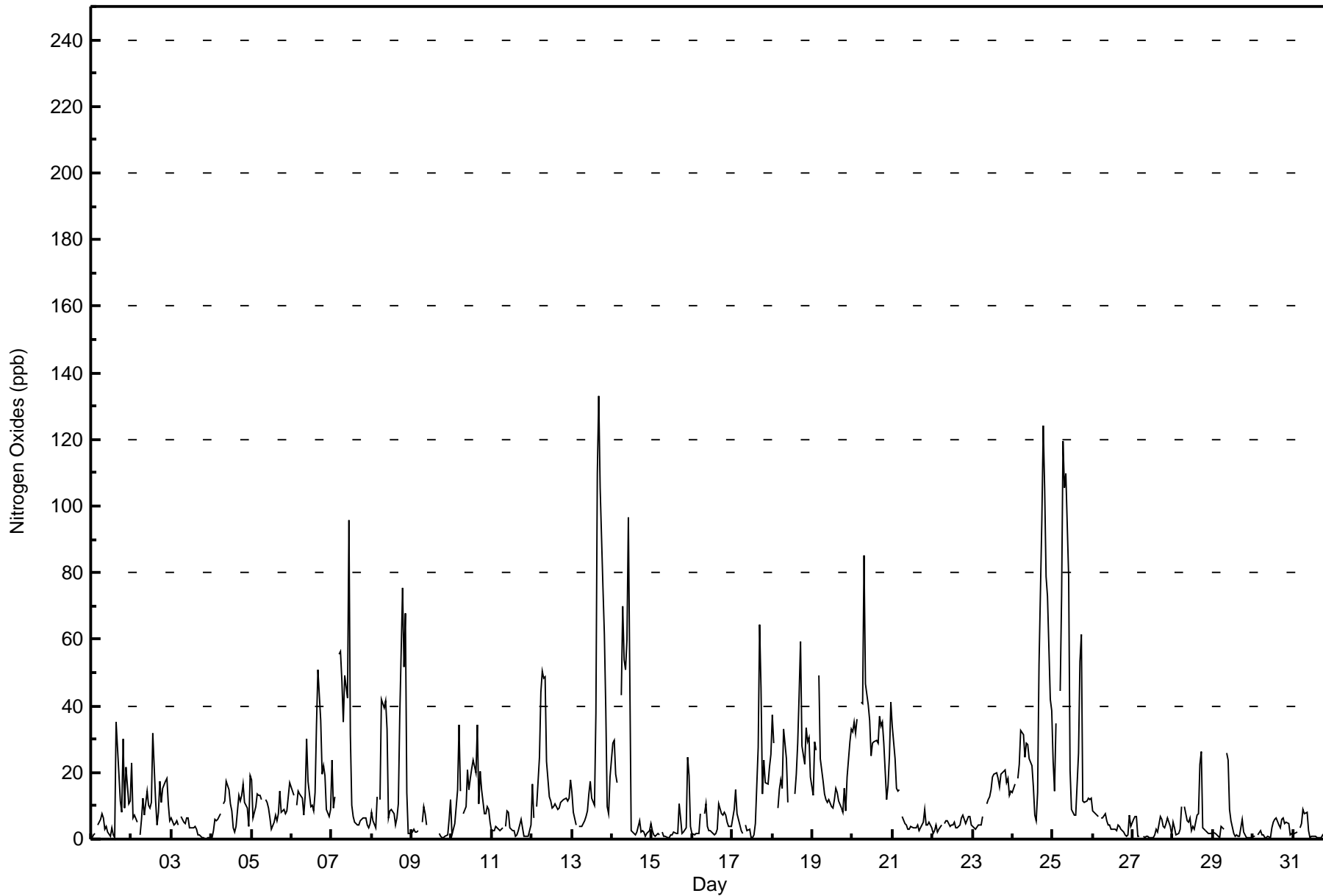
Patricia McInnes - January 2017

Maximum Value: 133 ppb on Jan 13 17:00																			Maximum Daily Average: 39.9 ppb on Jan 24						Hours in Service: 744		
Minimum Value: 0 ppb on Jan 3 22:00																			Minimum Daily Average: 2.2 ppb on Jan 31						Hours of Data: 704		
Maximum Diurnal Average: 21.8 ppb at hour 18																			Minimum Diurnal Average: 7.3 ppb at hour 13						Hours of Missing Data: 40		
Monthly Average: 13.6 ppb																			Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 3 Median = 7 Q ₃ = 16 P ₉₀ = 34 P ₉₉ = 105						Hours of Calibration: 37		
																									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-Jan	0	1	2	Z	4	6	7	6	3	4	2	1	3	1	0	35	19	11	8	30	9	22	11	11	8.6	35	
2-Jan	23	6	7	5	Z	1	6	12	7	15	10	10	11	32	11	4	8	17	11	15	17	18	11	6	11.5	32	
3-Jan	6	4	5	5	4	Z	7	5	5	6	7	3	3	3	4	3	1	1	0	0	0	0	0	0	3.3	7	
4-Jan	0	2	6	5	6	8	Z	10	11	17	15	10	8	3	2	4	13	12	13	16	11	9	4	19	9.0	19	
5-Jan	18	6	10	14	13	13	12	Z	12	11	9	6	3	5	7	5	7	14	8	9	8	8	13	17	10.0	18	
6-Jan	14	13	Z	10	15	14	12	7	13	30	17	10	10	9	14	34	51	35	19	22	19	9	7	9	17.2	51	
7-Jan	24	9	13	Z	56	56	47	35	49	42	96	32	10	7	5	4	4	5	6	6	6	4	3	5	22.9	96	
8-Jan	8	5	3	13	Z	12	42	40	41	33	7	8	9	8	4	6	11	37	75	52	68	14	2	2	21.7	75	
9-Jan	2	3	2	2	3	Z	5	10	8	4	C	C	C	C	C	C	2	1	1	1	1	1	6	12	--	12	
10-Jan	1	3	4	15	34	14	Z	8	10	21	15	18	21	24	20	34	10	20	15	7	8	10	9	5	14.2	34	
11-Jan	3	3	4	3	3	2	3	Z	4	8	8	4	2	3	1	1	2	6	3	1	1	1	1	4	3.1	8	
12-Jan	17	7	Z	10	24	44	50	48	49	23	13	11	9	10	11	9	9	11	12	12	12	12	12	18	18.8	50	
13-Jan	14	8	4	Z	4	4	4	6	7	9	14	17	12	10	38	110	133	105	75	62	39	10	8	19	30.9	133	
14-Jan	29	30	20	17	Z	43	70	54	51	60	97	3	2	2	1	2	5	2	2	2	1	2	5	21.8	97		
15-Jan	3	1	1	2	1	Z	2	1	1	0	1	1	1	2	2	2	10	7	2	2	3	25	19	4	4.0	25	
16-Jan	2	1	2	2	2	8	Z	7	10	4	3	3	2	1	1	3	11	8	7	8	7	5	4	4	4.5	11	
17-Jan	6	9	15	8	4	3	2	Z	4	3	3	1	0	1	5	27	64	45	14	24	17	17	21	25	13.8	64	
18-Jan	37	29	Z	9	15	18	15	33	24	11	M	M	M	14	20	29	43	59	28	22	33	29	30	19	26.0	59	
19-Jan	13	29	27	Z	49	24	17	14	12	11	12	10	9	12	15	14	11	9	8	15	9	19	29	33	17.5	49	
20-Jan	32	35	32	36	Z	41	41	85	47	40	36	25	29	29	30	29	37	34	35	29	12	16	25	41	34.5	85	
21-Jan	34	24	15	14	15	Z	7	5	4	3	3	4	3	4	3	4	3	3	5	9	4	4	5	3	7.8	34	
22-Jan	2	3	4	2	3	4	Z	5	5	6	4	4	4	5	3	3	4	6	7	6	5	7	7	4	4.5	7	
23-Jan	4	3	3	4	4	4	7	Z	11	12	13	15	19	20	18	16	19	20	21	17	18	13	14	12.8	21		
24-Jan	14	17	Z	18	23	32	31	25	29	28	24	22	16	7	5	14	53	96	124	105	79	73	42	39	39.9	124	
25-Jan	24	14	35	Z	44	73	119	105	110	79	21	9	8	7	7	26	53	62	12	11	12	12	12	12	37.7	119	
26-Jan	9	8	7	7	Z	6	6	8	6	4	4	3	3	3	4	4	4	3	2	1	1	1	7	4	4.5	9	
27-Jan	6	7	7	1	1	Z	1	0	1	1	1	1	1	1	3	2	7	6	4	3	5	6	4	1	2.9	7	
28-Jan	5	3	1	2	3	10	Z	10	6	5	6	3	4	3	7	7	23	26	3	3	2	2	2	2	6.0	26	
29-Jan	2	2	1	1	1	4	3	Z	26	24	9	6	2	1	1	1	1	6	2	1	0	0	1	1	4.1	26	
30-Jan	1	1	Z	1	2	1	1	1	0	1	0	3	5	6	6	4	3	6	6	5	5	5	1	1	3.0	6	
31-Jan	1	2	2	Z	3	5	9	8	8	2	0	1	1	1	1	0	0	1	1	0	1	1	1	1	2.2	9	
																			11.4 9.3 8.9 8.3 12.9 17.4 20.3 21.0 18.5 16.7 15.4 8.3 7.3 7.8 8.4 14.7 20.0 21.8 17.1 16.1 13.3 11.6 10.0 10.9						Diurnal Average		
																			37 35 35 36 56 73 119 105 110 79 97 32 29 32 38 110 133 105 124 105 79 73 42 41						Diurnal Maximum		
Z - zerospan			C - Calibration			M - Maintenance																					



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	570	80.97	80.97
21 - 40	82	11.65	92.61
41 - 80	40	5.68	98.30
81 - 159	12	1.70	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - January 2017

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	86	14	2	0	0	0	13	14	33	86	113	89	39	23	20	38	570
21 - 40	5	1	1	1	0	1	10	13	28	12	3	1	1	1	1	3	82
11 - 80	5	0	1	0	0	0	2	11	15	5	0	0	0	0	0	1	40
81 - 159	0	0	1	0	0	0	0	6	2	3	0	0	0	0	0	0	12
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	96	15	5	1	0	1	25	44	78	106	116	90	40	24	21	42	704

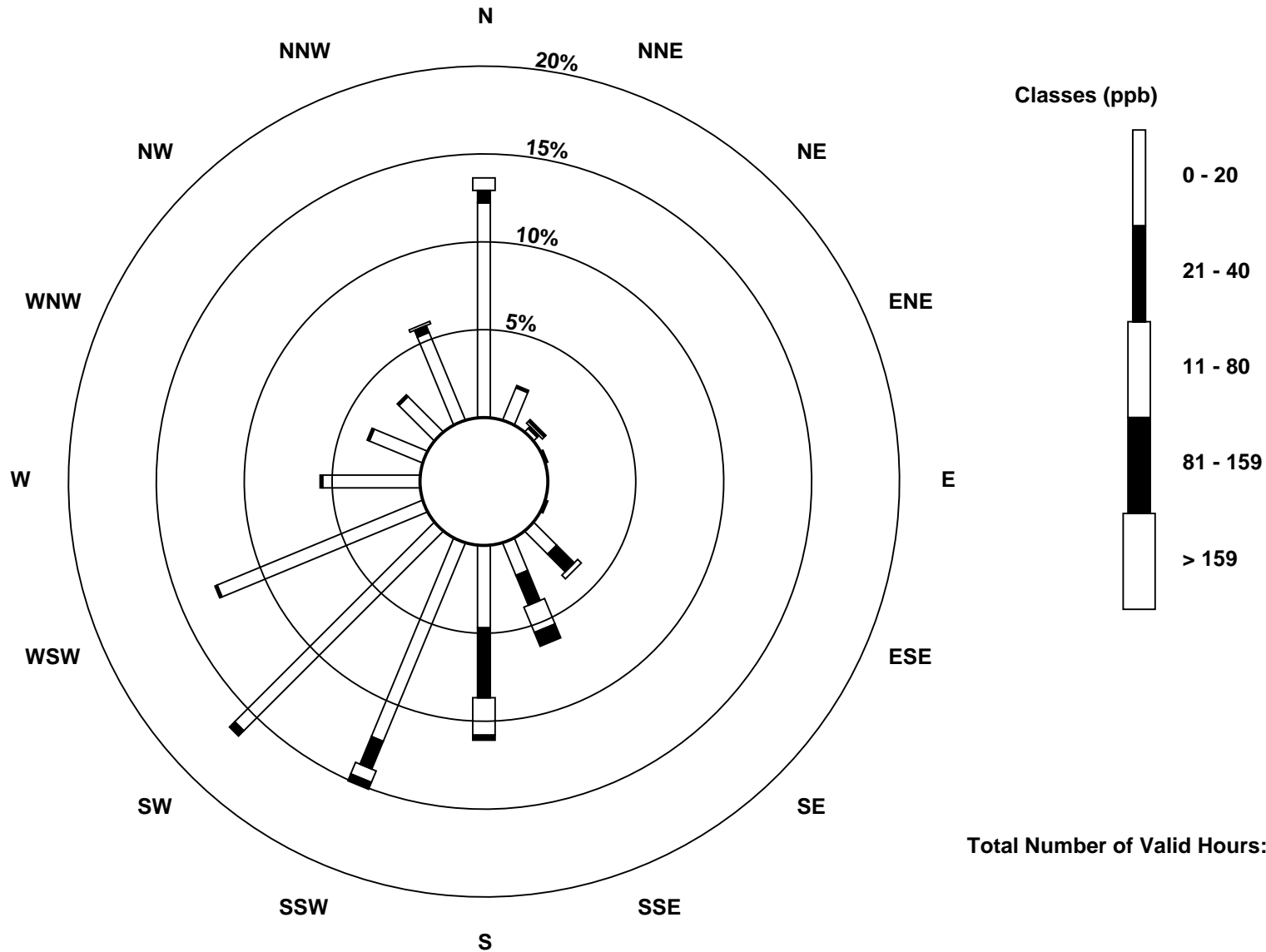
Total Number of Valid Hours: 704

Total Number of Hours: 744

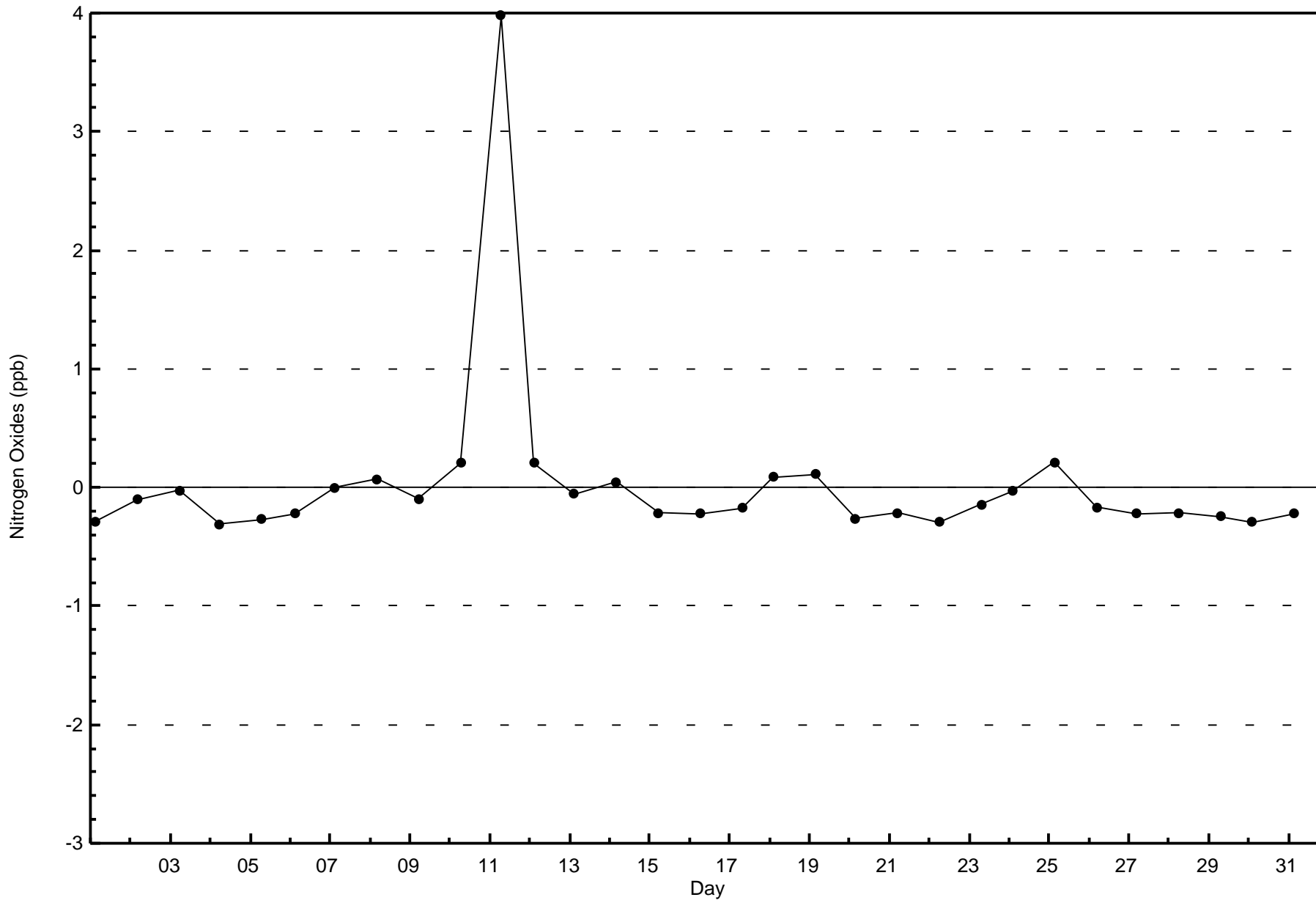


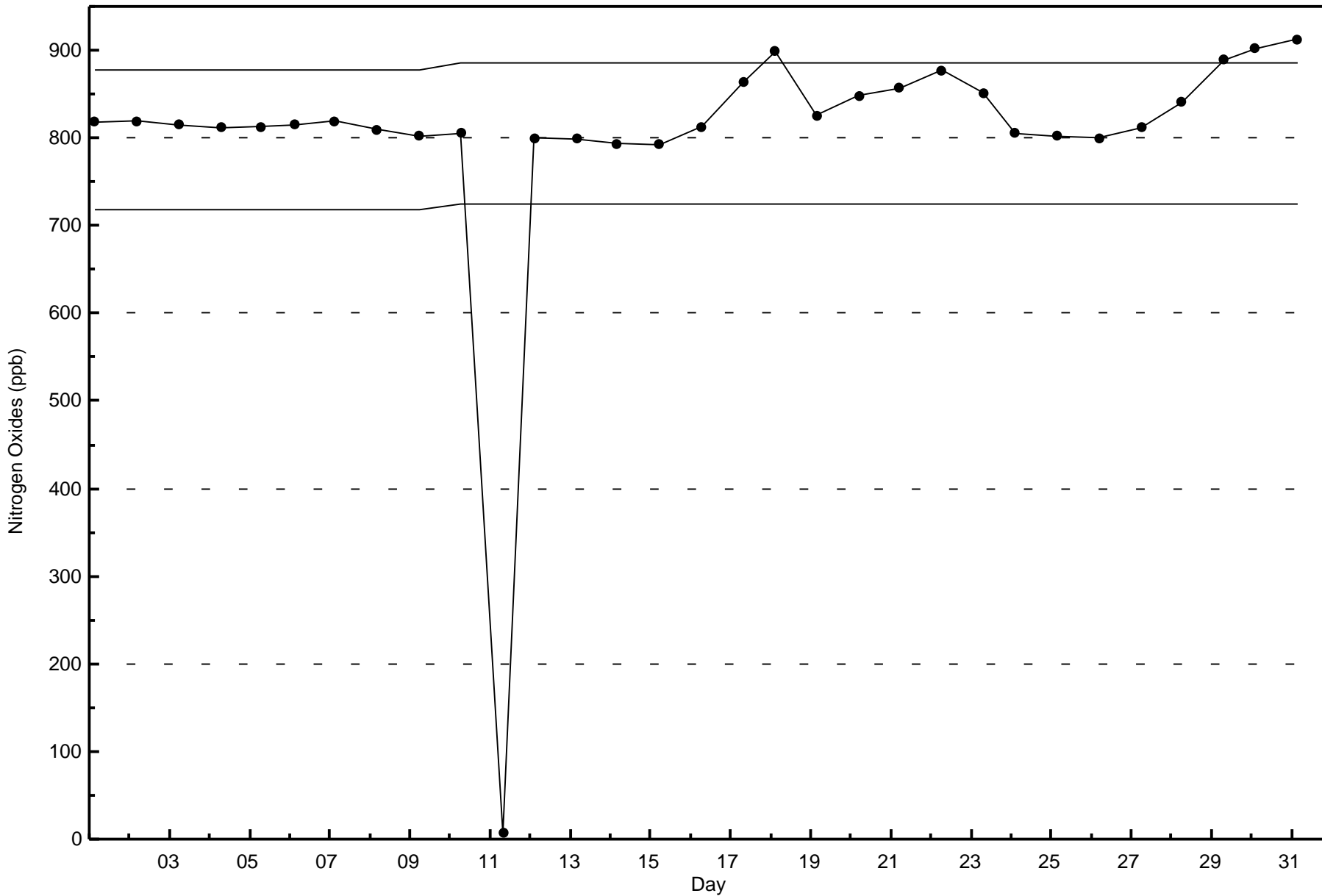
Wood Buffalo Environmental Association
Wind Rose 2012-2017

Nitrogen Oxides (NO_x) - ppb
Patricia McInnes (AMS 6)



Total Number of Valid Hours: 704







Wood Buffalo Environmental Association

Summary of Hour Averages

Ammonia (NH₃) - ppb

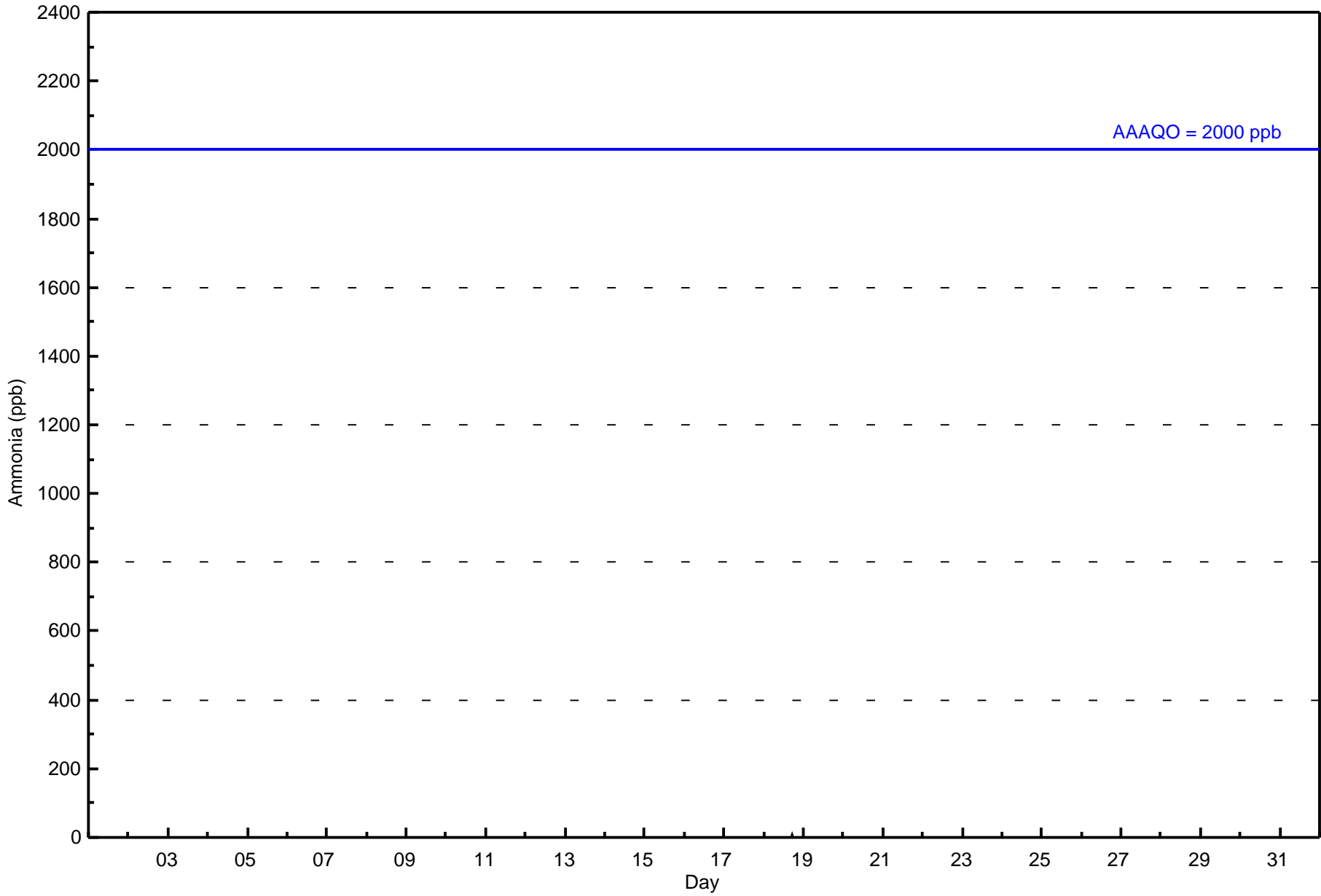
Patricia McInnes - January 2017

Number of Exceedences (AAAQO): 1-hr: 0										Hours in Service: 744																							
Maximum Value: 11 ppb on Jan 18 18:00										Maximum Daily Average: 0.5 ppb on Jan 18																							
Minimum Value: 0 ppb on Jan 1 01:00										Minimum Daily Average: 0.0 ppb on Jan 1																							
Maximum Diurnal Average: 0.4 ppb at hour 18										Minimum Diurnal Average: 0.0 ppb at hour 1																							
Monthly Average: 0.0 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 0																							
										Hours of Data: 668																							
										Hours of Missing Data: 76																							
										Hours of Calibration: 44																							
										Percent Operational Time: 95.7																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24									
1-Jan	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0							
2-Jan	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0							
3-Jan	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0							
4-Jan	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0							
5-Jan	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0							
6-Jan	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0							
7-Jan	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0							
8-Jan	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0							
9-Jan	0	0	0	Z	RE	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	--	0							
10-Jan	0	0	0	0	Z	0	0	0	0	0	C	C	C	C	C	C	C	C	0	0	0	0	0	0	--	0							
11-Jan	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							
12-Jan	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0							
13-Jan	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0							
14-Jan	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0							
15-Jan	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0							
16-Jan	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0							
17-Jan	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0							
18-Jan	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0.5	11							
19-Jan	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							
20-Jan	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0							
21-Jan	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0							
22-Jan	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0							
23-Jan	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0							
24-Jan	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0							
25-Jan	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							
26-Jan	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0							
27-Jan	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0							
28-Jan	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0							
29-Jan	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0							
30-Jan	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0							
31-Jan	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0							
0.0																		0.4		0.0				0.0		0.0		0.0		0.0		Diurnal Average	
0																		11		0				0		0		0		0		Diurnal Maximum	
Z - zerospan C - Calibration RE - Recovery																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 2000 ppb																																	



Wood Buffalo Environmental Association
Hourly Averages

Ammonia (NH₃) - ppb
Patricia McInnes - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ammonia (NH₃) - ppb
Patricia McInnes - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 5	667	99.85	99.85
6 - 10	0	0.00	99.85
11 - 15	1	0.15	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: 668

Total Number of Hours: 744



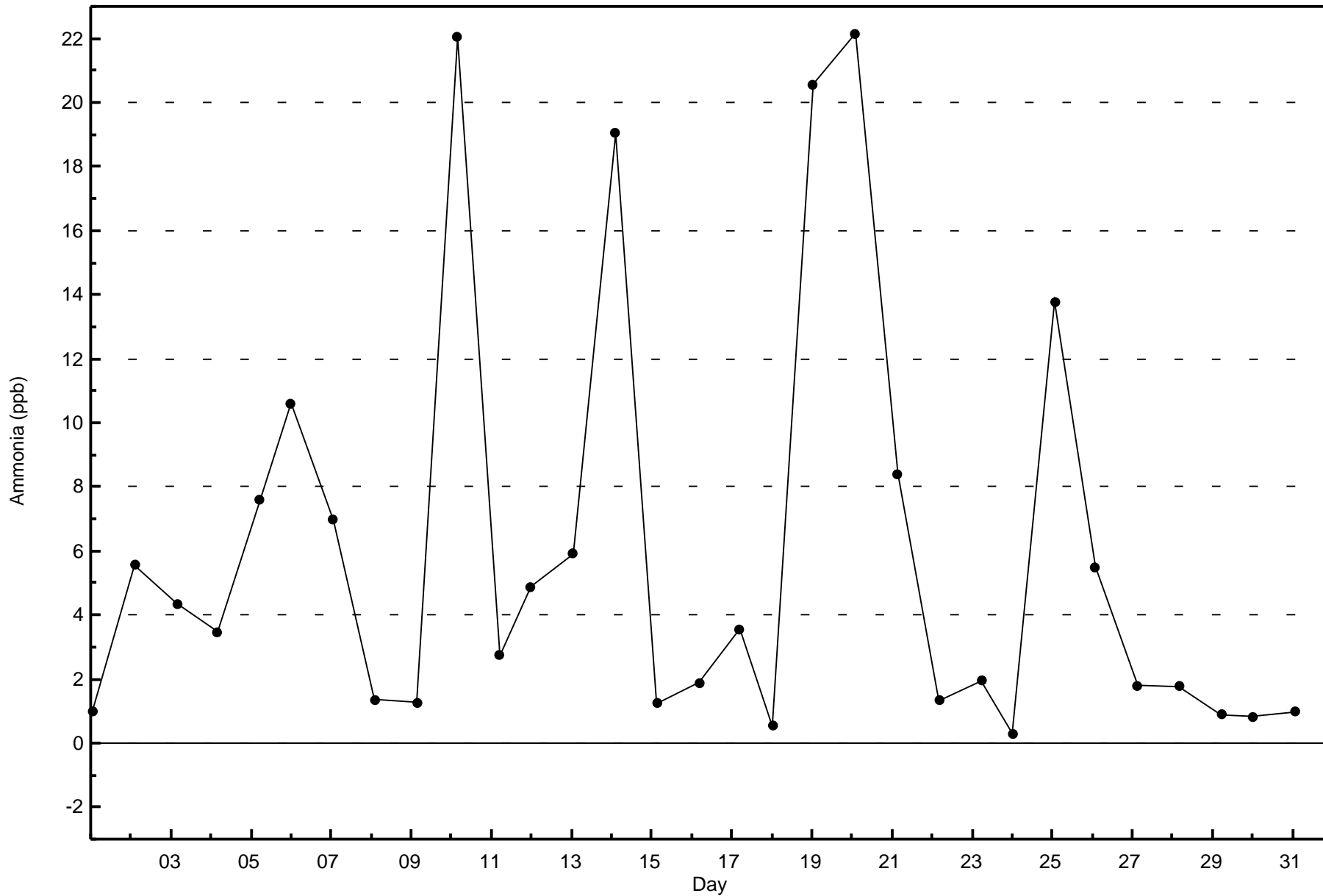
**Wood Buffalo Environmental Association
Frequency Distribution**

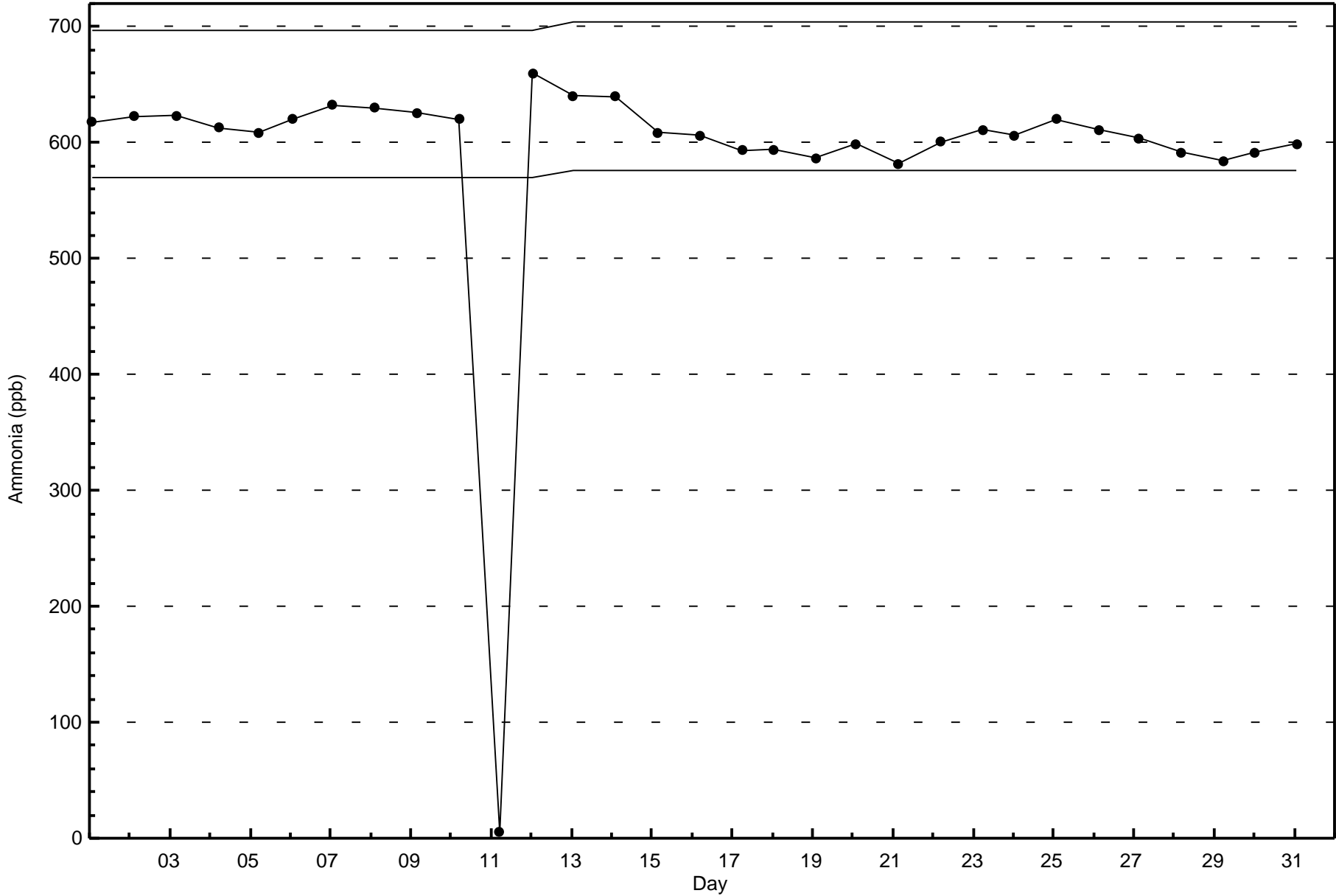
**Ammonia (NH₃) - ppb
Patricia McInnes - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	93	15	5	1	0	0	25	39	73	102	111	83	39	24	20	37	667
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	1	0	0	0	0	0	0	0	0	1
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
Totals	93	15	5	1	0	0	25	40	73	102	111	83	39	24	20	37	668

Total Number of Valid Hours: 668

Total Number of Hours: 744







Wood Buffalo Environmental Association

Summary of Hour Averages

Particulate Matter 2.5 (PM_{2.5}) - µg/m³

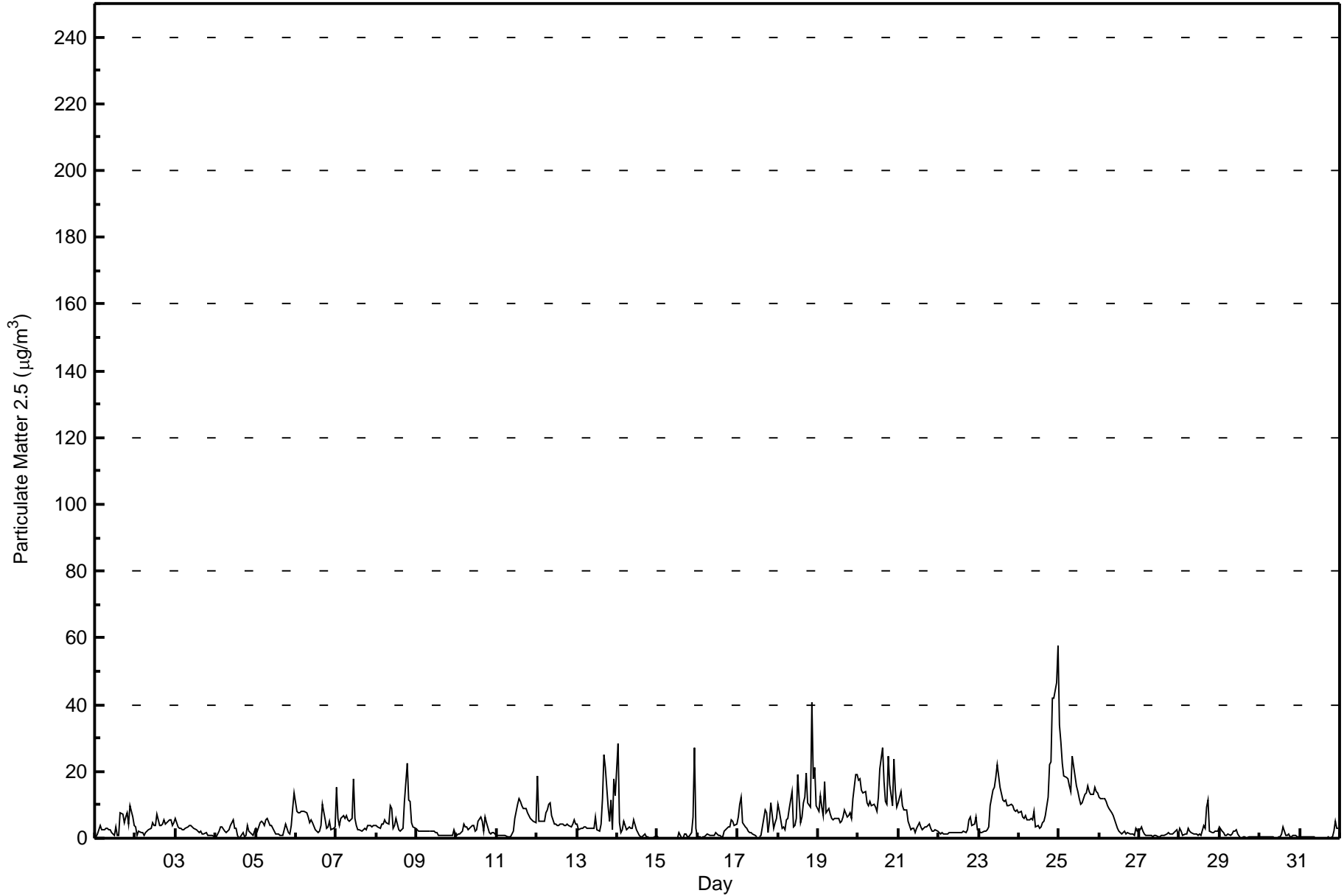
Patricia McInnes - January 2017

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 57.5 µg/m ³ on Jan 25 00:00 Minimum Value: 0.1 µg/m ³ on Jan 15 11:00 Maximum Diurnal Average: 7.8 µg/m ³ at hour 23 Monthly Average: 5.07 µg/m ³		Maximum Daily Average: 16.7 µg/m ³ on Jan 25 Minimum Daily Average: 0.6 µg/m ³ on Jan 30 Minimum Diurnal Average: 3.7 µg/m ³ at hour 14 Percentiles: P ₁ = 0.1 P ₁₀ = 0.5 Q ₁ = 1.3 Median = 3.1 O ₃ = 6.2 P ₉₀ = 12.0 P ₉₉ = 24.1		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-Jan	0.3	1.2	2.4	3.6	2.7	2.5	2.8	2.8	2.6	2.4	1.7	1.0	3.4	0.8	0.8	7.7	7.0	4.5	6.2	7.6	4.4	9.8	6.2	3.6	3.7	9.8
2-Jan	3.5	0.8	2.2	1.6	1.6	1.0	1.7	2.0	2.4	3.1	4.6	4.0	4.0	7.1	3.8	3.7	4.2	5.5	4.2	4.8	5.3	5.4	3.7	4.8	3.5	7.1
3-Jan	6.1	3.2	3.1	3.1	2.5	2.5	3.1	3.3	3.6	3.7	3.4	2.8	2.3	2.2	1.8	2.2	1.2	1.6	1.0	0.7	0.7	0.7	0.6	2.4	6.1	
4-Jan	0.5	1.2	2.0	3.2	3.4	2.2	1.7	1.9	2.7	3.9	5.3	2.9	2.8	1.0	0.1	0.3	1.7	0.5	0.7	4.0	2.2	1.3	1.0	2.0	2.0	5.3
5-Jan	3.0	2.0	4.6	5.1	4.6	3.6	5.4	6.0	4.0	3.7	2.8	2.1	1.2	1.1	0.9	0.7	0.8	2.7	4.1	1.8	1.4	3.7	8.9	13.5	3.7	13.5
6-Jan	7.9	7.7	7.6	8.0	7.8	8.1	7.6	6.2	4.5	5.4	4.5	2.4	2.1	1.9	2.2	4.0	10.0	5.3	3.0	3.2	5.2	2.6	2.9	3.4	5.1	10.0
7-Jan	15.2	5.9	3.8	5.7	6.7	6.0	6.8	5.3	5.0	5.9	17.6	5.8	3.8	2.5	2.3	2.1	2.4	2.8	2.7	3.6	3.7	3.4	3.8	3.8	5.3	17.6
8-Jan	3.7	3.5	3.1	4.1	4.3	5.5	4.5	4.3	9.6	8.7	3.2	3.8	5.7	2.8	2.0	2.5	3.0	11.2	22.6	11.3	11.0	4.7	3.4	3.1	5.9	22.6
9-Jan	2.6	2.3	2.2	2.3	2.2	2.2	2.2	2.3	2.3	2.1	2.0	1.8	1.6	0.8	0.7	0.7	0.9	0.8	0.8	0.8	0.8	0.9	2.7	1.3	1.6	2.7
10-Jan	1.0	1.2	1.3	2.1	4.1	3.4	3.2	2.5	3.3	4.0	3.6	2.2	2.5	5.2	6.3	5.1	2.2	6.3	4.8	1.7	1.5	1.7	1.9	1.1	3.0	6.3
11-Jan	0.9	0.9	0.9	1.0	1.0	0.8	0.6	0.4	0.4	1.4	2.1	6.1	10.2	12.1	11.0	9.9	8.8	8.9	7.7	6.9	5.9	5.5	5.1	4.7	4.7	12.1
12-Jan	18.7	5.1	4.9	5.0	5.0	7.4	8.5	10.0	10.8	6.6	4.3	4.1	4.0	4.0	4.1	4.1	3.8	3.8	4.0	3.6	3.4	4.1	5.5	4.2	5.8	18.7
13-Jan	4.3	2.7	3.1	3.1	3.2	3.2	3.1	3.1	3.0	3.0	6.4	2.4	2.0	4.2	11.9	25.1	21.4	9.2	5.3	11.4	2.3	17.8	12.5	6.9	25.1	
14-Jan	28.5	4.7	1.8	2.4	4.9	2.7	3.1	3.4	3.1	3.1	5.6	2.5	1.9	0.9	0.5	0.6	1.3	0.2	0.2	0.2	0.2	0.5	0.8	3.1	28.5	
15-Jan	0.5	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	1.2	1.3	0.4	0.3	1.7	6.2	27.0	3.2	1.9	27.0
16-Jan	0.2	0.2	0.2	0.3	0.4	0.7	1.1	0.9	0.9	0.7	1.0	1.8	0.8	0.7	0.6	0.6	1.9	2.8	3.3	3.3	5.5	5.1	3.7	4.3	1.7	5.5
17-Jan	6.3	10.0	12.5	4.7	3.3	2.8	1.9	1.8	1.8	1.3	0.9	0.5	C	0.5	0.8	5.8	8.7	7.6	1.6	4.9	10.6	3.0	4.6	5.8	4.4	12.5
18-Jan	10.3	8.1	3.0	3.5	2.6	5.4	6.0	8.8	14.0	3.2	3.9	5.8	19.0	4.8	6.3	10.5	12.2	19.7	10.6	9.3	40.8	17.8	21.0	10.0	10.7	40.8
19-Jan	8.0	12.8	9.3	6.7	17.1	7.7	8.8	7.3	6.1	5.4	5.8	6.1	5.8	4.6	5.1	6.3	8.4	6.5	6.8	7.7	5.7	12.0	18.9	18.9	8.7	18.9
20-Jan	17.4	17.8	14.4	13.7	13.8	10.6	9.9	11.0	9.6	10.3	9.5	7.9	12.3	20.6	27.1	16.9	11.2	10.1	24.7	16.2	9.5	23.6	14.5	9.4	14.3	27.1
21-Jan	10.6	14.0	9.8	8.3	8.3	8.3	5.0	2.4	2.9	2.9	1.8	3.2	4.8	3.3	2.7	2.9	3.2	3.6	4.4	2.8	2.3	2.2	2.6	1.9	4.8	14.0
22-Jan	1.5	1.5	1.6	1.1	1.4	1.4	1.6	1.7	1.8	1.7	1.5	1.5	1.8	1.8	1.8	2.1	1.7	2.6	5.3	6.2	3.8	4.4	6.4	2.5	2.5	6.4
23-Jan	2.4	1.7	1.6	1.9	2.2	2.3	3.3	9.8	14.6	15.3	18.2	21.9	18.6	15.4	11.4	11.1	11.3	9.9	9.7	10.3	9.6	8.7	7.9	8.4	9.5	21.9
24-Jan	7.8	8.0	6.3	5.8	6.8	5.4	5.4	5.9	5.3	8.2	3.4	3.6	3.1	3.6	4.5	5.1	6.6	12.1	22.0	23.0	42.0	41.8	46.8	57.5	14.2	57.5
25-Jan	34.0	28.9	22.6	18.9	18.3	17.7	15.5	14.1	24.5	18.5	15.7	13.8	11.9	10.2	10.5	13.0	13.6	15.5	13.8	13.1	13.2	15.5	14.1	13.7	16.7	34.0
26-Jan	12.5	11.9	12.0	11.7	10.8	9.6	8.7	7.8	6.9	5.7	4.2	3.0	2.1	1.5	1.8	2.0	1.4	1.6	1.4	1.1	1.1	1.0	3.0	1.9	5.2	12.5
27-Jan	2.3	3.3	2.0	1.1	1.0	0.9	0.8	0.7	0.6	0.7	0.7	0.6	0.5	0.7	0.8	0.8	1.2	1.5	1.3	1.3	1.4	1.9	2.5	1.0	1.2	3.3
28-Jan	3.1	1.9	1.0	1.2	1.2	2.8	2.0	1.7	1.4	1.1	1.1	0.8	1.4	1.0	3.8	3.0	9.5	11.6	2.3	1.7	1.7	2.1	2.0	2.3	2.6	11.6
29-Jan	3.2	2.0	1.5	1.0	1.0	1.1	0.9	1.1	2.0	1.9	2.5	1.1	0.2	0.2	0.2	0.2	0.2	0.5	0.3	0.3	0.3	0.3	0.3	0.3	1.0	3.2
30-Jan	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.5	0.6	1.2	3.3	0.9	0.7	1.1	0.6	0.5	0.8	1.0	0.6	0.4	0.6	3.3
31-Jan	0.3	0.3	0.3	0.4	0.4	0.5	0.6	0.6	0.6	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.4	2.2	5.1	3.1	2.8	0.8	5.1
																								Diurnal Average		
																								Diurnal Maximum		
7.0 5.3 4.6 4.2 4.6 4.2 4.1 4.2 4.9 4.3 4.3 3.9 4.4 3.7 3.9 4.4 5.3 5.9 5.8 5.1 6.7 6.4 7.8 6.6																										
34.0 28.9 22.6 18.9 18.3 17.7 15.5 14.1 24.5 18.5 18.2 21.9 19.0 20.6 27.1 16.9 25.1 21.4 24.7 23.0 42.0 41.8 46.8 57.5																										
C - Calibration																										
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																										



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Patricia McInnes - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Patricia McInnes - January 2017**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	378	50.87	50.87
6 - 15	174	23.42	74.29
16 - 25	32	4.31	78.60
26 - 80	10	1.35	79.95
> 81.0	0	0.00	79.95

Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Patricia McInnes - January 2017

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	64	10	4	0	0	1	15	13	30	64	81	41	11	12	8	24	378
6 - 15	21	4	0	1	0	0	9	23	34	31	17	7	3	3	5	16	174
16 - 25	2	1	1	0	0	0	2	7	10	5	0	2	0	1	1	0	32
26 - 80	0	0	0	0	0	0	1	4	3	2	0	0	0	0	0	0	10
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	87	15	5	1	0	1	27	47	77	102	98	50	14	16	14	40	594

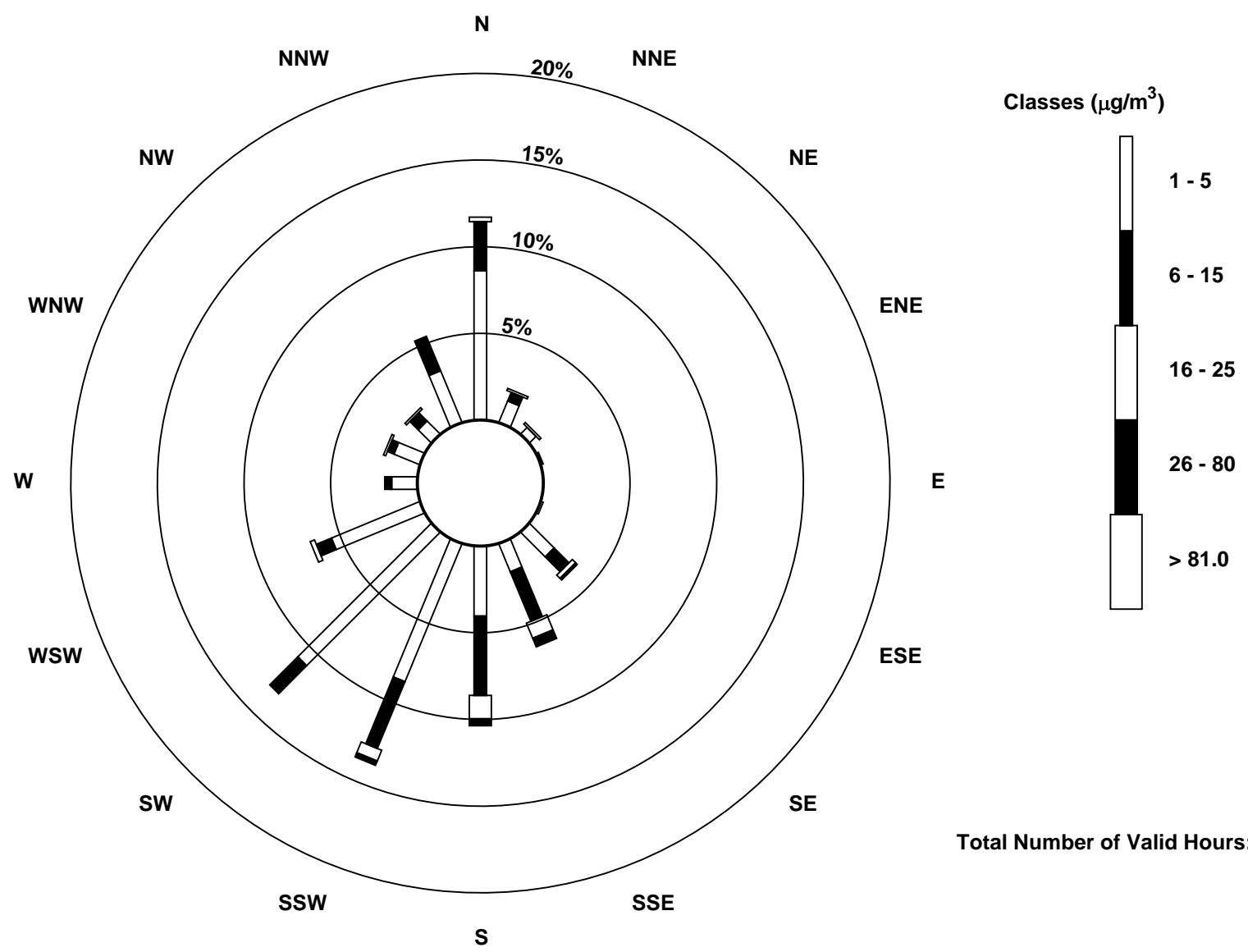
Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose 2012-2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Patricia McInnes (AMS 6)





Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

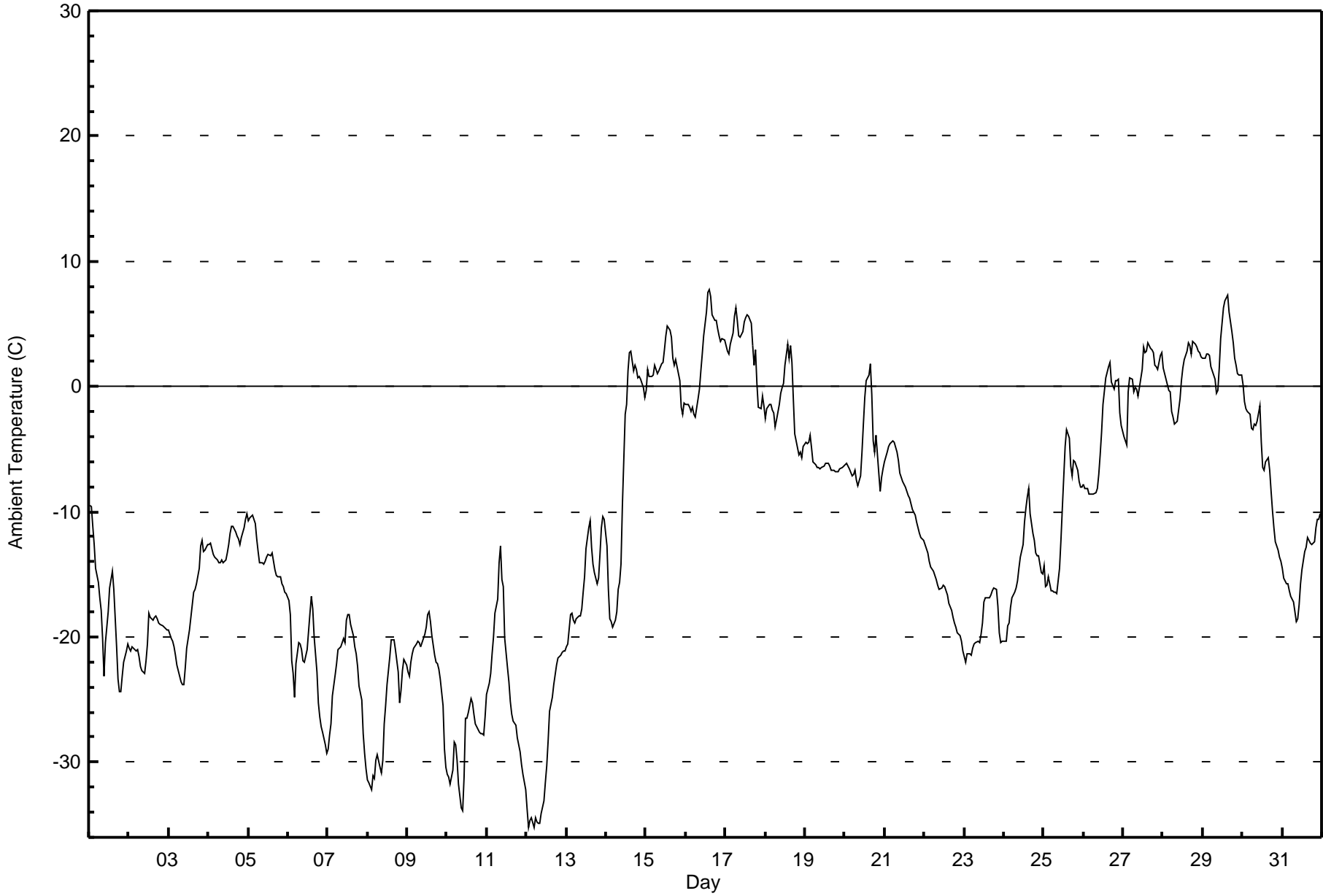
Patricia McInnes - January 2017

Maximum Value: 7.7 C on Jan 16 15:00		Maximum Daily Average: 3.1 C on Jan 17		Hours in Service: 744																						
Minimum Value: -35.2 C on Jan 12 02:00		Minimum Daily Average: -29.0 C on Jan 12		Hours of Data: 744																						
Maximum Diurnal Average: -9.0 C at hour 15		Minimum Diurnal Average: -13.6 C at hour 9		Hours of Missing Data: 0																						
Monthly Average: -12.03 C		Percentiles: P₁ = -34.5 P₁₀ = -25.3 Q₁ = -20.3 Median = -13.1 Q₃ = -2.3 P₉₀ = 2.2 P₉₉ = 5.8		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-Jan	-9.5	-9.6	-11.2	-12.6	-14.6	-15.6	-16.9	-17.9	-20.1	-23.2	-20.5	-18.0	-16.0	-15.4	-14.7	-16.2	-20.7	-23.4	-24.4	-24.4	-23.2	-22.0	-21.2	-20.6	-18.0	-9.5
2-Jan	-20.9	-21.1	-20.8	-21.0	-21.1	-21.0	-21.6	-22.3	-22.7	-22.9	-21.9	-20.6	-18.1	-18.4	-18.7	-18.4	-18.3	-18.5	-18.9	-18.9	-19.1	-19.2	-19.3	-19.4	-20.1	-18.1
3-Jan	-19.4	-20.1	-20.3	-20.8	-21.5	-22.3	-22.7	-23.6	-23.8	-22.5	-20.9	-19.4	-18.4	-17.4	-16.4	-16.2	-15.7	-14.5	-12.8	-12.3	-13.2	-13.1	-12.7	-18.5	-12.3	
4-Jan	-12.6	-12.6	-13.0	-13.4	-13.7	-13.9	-14.1	-14.1	-13.9	-14.1	-13.9	-13.3	-12.6	-11.7	-11.1	-11.1	-11.6	-12.0	-12.2	-12.7	-12.0	-11.3	-10.6	-10.2	-12.6	-10.2
5-Jan	-10.7	-10.5	-10.2	-10.6	-11.0	-12.2	-13.2	-14.0	-14.1	-14.2	-13.9	-13.7	-13.4	-13.5	-13.3	-14.0	-14.6	-15.0	-15.2	-15.2	-15.8	-16.0	-16.4	-16.6	-13.6	-10.2
6-Jan	-17.1	-18.2	-21.9	-22.9	-24.8	-22.2	-20.5	-20.6	-21.0	-22.0	-22.0	-21.0	-19.6	-18.1	-16.8	-17.8	-20.0	-22.9	-25.3	-26.3	-27.2	-27.6	-28.6	-29.2	-22.2	-16.8
7-Jan	-28.9	-27.8	-26.9	-24.7	-23.1	-22.2	-21.0	-20.9	-20.7	-20.1	-20.4	-18.7	-18.2	-18.3	-19.0	-19.9	-20.8	-21.4	-22.4	-23.9	-25.0	-27.7	-29.3	-30.6	-23.0	-18.2
8-Jan	-31.4	-31.6	-32.2	-31.0	-31.3	-29.9	-29.4	-30.4	-30.9	-29.9	-27.0	-25.5	-23.8	-21.6	-20.2	-20.3	-20.2	-21.0	-22.9	-25.3	-24.3	-22.7	-21.8	-22.2	-26.1	-20.2
9-Jan	-22.8	-23.1	-22.0	-21.3	-20.9	-20.6	-20.4	-20.4	-20.8	-20.5	-19.8	-19.3	-18.2	-18.0	-18.8	-19.9	-21.4	-22.1	-22.1	-22.6	-23.4	-25.5	-28.9	-30.4	-21.8	-18.0
10-Jan	-31.0	-31.2	-31.8	-30.6	-28.4	-28.7	-29.9	-31.8	-33.6	-33.8	-31.2	-26.5	-26.5	-26.0	-24.9	-25.2	-26.2	-27.0	-27.2	-27.6	-27.7	-27.8	-27.8	-26.4	-28.7	-24.9
11-Jan	-24.5	-23.7	-22.9	-21.3	-20.0	-18.1	-17.0	-14.1	-12.8	-15.4	-15.9	-20.1	-22.5	-23.6	-25.2	-26.1	-26.7	-27.1	-28.0	-28.7	-29.1	-30.2	-31.0	-32.2	-23.2	-12.8
12-Jan	-33.8	-35.2	-34.7	-34.5	-35.2	-34.5	-34.8	-34.9	-34.9	-34.1	-33.1	-31.6	-30.3	-28.3	-25.9	-24.8	-23.9	-23.0	-22.2	-21.7	-21.4	-21.3	-21.1	-21.1	-29.0	-21.1
13-Jan	-20.8	-20.6	-18.2	-18.1	-18.7	-18.9	-18.5	-18.3	-18.4	-17.8	-16.4	-15.2	-12.9	-11.3	-10.7	-12.8	-14.2	-14.8	-15.7	-15.3	-13.4	-11.3	-10.4	-10.6	-15.6	-10.4
14-Jan	-12.7	-16.2	-18.5	-18.8	-19.2	-18.6	-18.0	-16.2	-15.6	-14.1	-9.5	-2.2	-1.4	1.2	2.7	2.8	1.3	1.7	1.4	0.7	0.8	0.6	-0.1	-0.9	-7.0	2.8
15-Jan	-0.3	1.4	0.8	0.8	0.9	1.7	1.4	1.0	1.3	1.8	1.9	3.0	4.0	4.9	4.4	3.9	2.3	1.7	2.1	1.6	0.4	-1.6	-2.2	-1.3	1.5	4.9
16-Jan	-1.4	-1.5	-1.7	-2.0	-1.6	-2.2	-2.4	-1.0	-0.2	1.2	2.6	4.0	5.9	7.5	7.7	7.2	5.7	5.3	5.2	4.6	4.0	3.6	3.8	3.7	2.4	7.7
17-Jan	3.2	2.9	2.5	3.4	4.2	5.6	6.3	5.3	4.1	4.0	4.3	5.1	5.5	5.8	5.7	5.0	3.2	1.7	2.9	0.2	-1.7	-1.7	-0.8	-1.6	3.1	6.3
18-Jan	-2.5	-1.7	-1.4	-1.5	-1.8	-2.1	-3.2	-2.6	-1.4	-0.5	-0.1	0.3	1.7	3.3	2.2	3.3	1.9	-1.0	-3.7	-4.9	-5.4	-5.3	-5.7	-4.8	-1.5	3.3
19-Jan	-4.5	-4.6	-4.5	-3.9	-4.9	-6.0	-6.3	-6.5	-6.5	-6.6	-6.5	-6.4	-6.1	-6.1	-6.2	-6.3	-6.7	-6.7	-6.8	-6.8	-6.9	-6.6	-6.4	-6.4	-6.0	-3.9
20-Jan	-6.3	-6.2	-6.3	-6.6	-7.2	-7.0	-6.7	-7.5	-7.9	-7.2	-5.3	-3.1	-0.9	0.4	0.9	1.8	-0.7	-4.3	-5.3	-3.9	-6.9	-8.3	-7.2	-6.6	-4.9	1.8
21-Jan	-6.0	-5.3	-4.7	-4.6	-4.4	-4.3	-4.5	-5.2	-5.9	-6.9	-7.2	-7.5	-8.0	-8.4	-8.7	-9.0	-9.4	-9.8	-10.3	-10.8	-11.3	-11.7	-12.1	-12.3	-7.8	-4.3
22-Jan	-12.6	-12.9	-13.3	-14.0	-14.4	-14.7	-15.1	-15.4	-15.8	-16.2	-16.1	-15.9	-15.9	-16.3	-16.6	-17.3	-17.9	-18.5	-18.9	-19.2	-19.7	-19.9	-20.4	-21.1	-16.6	-12.6
23-Jan	-21.6	-22.0	-21.3	-21.3	-21.4	-20.9	-20.6	-20.5	-20.3	-20.4	-19.8	-18.9	-17.2	-16.9	-16.9	-16.8	-16.6	-16.3	-16.1	-16.2	-17.6	-19.7	-20.5	-20.3	-19.2	-16.1
24-Jan	-20.3	-20.4	-19.2	-18.8	-17.7	-16.9	-16.5	-16.1	-15.5	-14.5	-13.6	-12.6	-10.9	-9.7	-8.8	-8.1	-10.2	-11.7	-12.3	-13.3	-13.5	-13.6	-14.9	-15.0	-14.3	-8.1
25-Jan	-14.3	-16.0	-15.8	-15.2	-16.3	-16.3	-16.4	-16.4	-16.5	-14.6	-12.3	-9.7	-7.2	-4.8	-3.5	-4.1	-6.3	-7.2	-5.9	-6.0	-6.7	-7.6	-8.0	-8.1	-10.6	-3.5
26-Jan	-7.8	-8.1	-8.1	-8.6	-8.6	-8.6	-8.6	-8.5	-8.2	-7.1	-5.5	-3.7	-1.5	0.7	1.2	1.6	1.9	0.3	-0.2	0.5	0.4	0.6	-2.1	-3.1	-3.8	1.9
27-Jan	-4.0	-4.3	-4.7	-0.4	0.7	0.6	-0.4	0.0	-0.2	-0.8	-0.1	1.3	3.1	2.8	2.8	3.5	3.1	2.9	2.7	1.7	1.6	1.4	2.5	2.7	0.8	3.5
28-Jan	1.5	1.1	0.6	-0.3	-0.4	-2.0	-2.5	-3.0	-2.8	-1.9	-1.0	0.5	1.4	2.1	2.8	3.4	3.2	2.6	3.6	3.4	3.1	2.8	2.7	2.4	1.0	3.6
29-Jan	2.3	2.2	2.6	2.6	2.5	1.6	0.9	0.5	-0.6	-0.3	1.5	3.8	6.2	6.8	7.1	7.2	6.0	4.4	3.5	2.3	1.7	1.1	0.9	0.9	2.8	7.2
30-Jan	0.1	-1.2	-1.8	-2.0	-2.3	-3.3	-3.5	-3.0	-3.1	-2.8	-1.6	-4.4	-6.5	-6.7	-6.0	-5.7	-6.7	-8.4	-9.9	-11.3	-12.4	-13.1	-13.7	-14.0	-6.0	0.1
31-Jan	-14.5	-15.3	-15.7	-15.7	-16.4	-16.7	-16.9	-17.2	-18.8	-18.6	-17.4	-15.8	-14.7	-13.1	-12.8	-12.1	-12.2	-12.5	-12.6	-12.4	-11.2	-10.6	-10.6	-10.2	-14.3	-10.2
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Patricia McInnes - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Patricia McInnes - January 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	196	26.34	26.34
-20 - 0	413	55.51	81.85
0 - 10	135	18.15	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

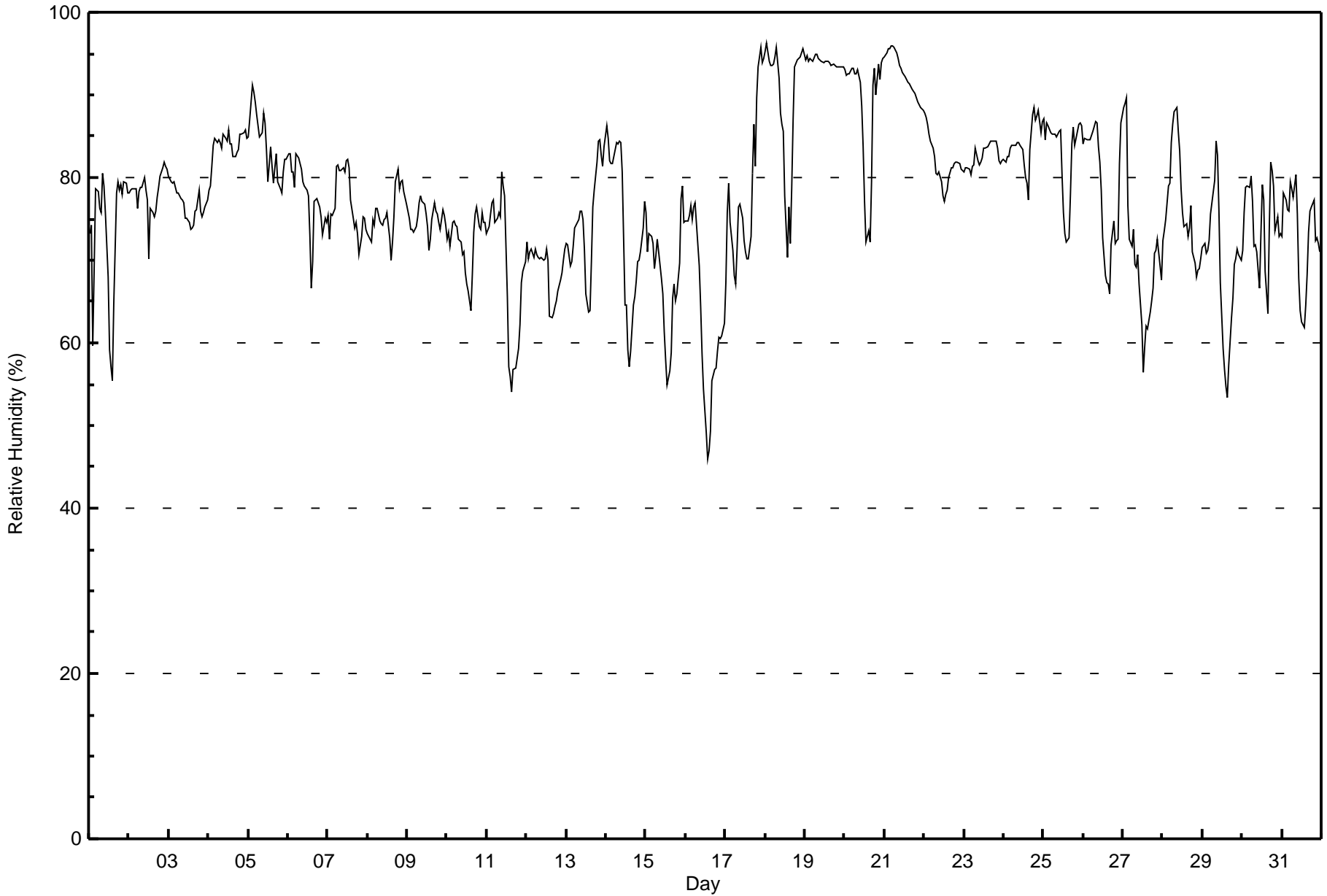
Patricia McInnes - January 2017

Maximum Value: 96 % on Jan 18 02:00 Maximum Daily Average: 94.0 % on Jan 19																	Hours in Service: 744 Hours of Data: 744																																																	
Minimum Value: 46 % on Jan 16 14:00 Minimum Daily Average: 63.0 % on Jan 16 Maximum Diurnal Average: 80.7 % at hour 7 Minimum Diurnal Average: 70.2 % at hour 15 Monthly Average: 77.6 % Percentiles: P ₁ = 55 P ₁₀ = 66 Q ₁ = 72 Median = 77 Q ₃ = 84 P ₉₀ = 91 P ₉₉ = 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-Jan	73	74	60	69	79	78	76	76	80	79	76	68	59	57	55	65	78	79	78	79	78	79	79	78	73.1	80																																								
2-Jan	78	79	79	79	79	76	78	79	79	80	78	77	70	76	76	75	76	78	79	80	81	82	81	81	78.1	82																																								
3-Jan	80	80	79	80	79	78	78	78	77	77	75	75	74	74	74	76	76	79	76	75	76	76	77	76.8	80																																									
4-Jan	78	79	81	84	85	84	85	84	83	85	85	84	86	84	84	83	83	83	83	85	85	85	86	85	83.8	86																																								
5-Jan	85	87	91	90	89	88	86	85	85	88	87	83	80	84	81	79	81	83	80	79	78	81	82	82	83.9	91																																								
6-Jan	83	83	81	81	79	83	82	82	81	80	79	79	78	73	67	70	77	77	77	76	75	73	75	75	77.7	83																																								
7-Jan	75	73	76	75	76	81	82	81	81	81	81	82	82	81	77	75	74	74	73	71	73	75	75	74	77.0	82																																								
8-Jan	73	73	72	75	74	76	76	75	74	74	75	75	76	73	70	72	75	80	81	79	79	80	78	77	75.5	81																																								
9-Jan	76	75	74	74	73	74	75	77	78	77	77	76	74	71	72	75	77	76	76	75	74	76	75	74	75.0	78																																								
10-Jan	73	73	72	75	75	74	74	73	72	71	71	68	67	66	64	68	73	76	76	74	74	76	75	75	72.2	76																																								
11-Jan	73	74	76	77	77	75	75	76	75	81	79	78	66	57	56	54	57	57	58	59	62	67	69	70	68.6	81																																								
12-Jan	72	70	71	71	70	71	71	70	70	70	70	70	71	70	63	63	64	64	65	66	68	68	70	71	68.9	72																																								
13-Jan	72	72	69	70	72	74	74	75	76	76	75	71	66	64	64	70	76	78	82	84	84	83	81	84	74.7	84																																								
14-Jan	86	85	82	82	82	83	84	84	84	84	81	65	65	59	57	59	64	66	67	70	70	71	74	77	74.2	86																																								
15-Jan	76	71	73	73	72	69	71	73	71	68	66	61	58	55	57	59	65	67	65	66	70	77	79	75	68.1	79																																								
16-Jan	75	75	75	77	75	76	77	72	69	64	59	54	49	46	47	49	55	57	57	59	61	61	61	62	63.0	77																																								
17-Jan	67	76	79	75	71	68	67	71	76	77	75	72	71	70	70	73	81	86	81	90	93	96	94	94	78.1	96																																								
18-Jan	95	96	94	94	94	94	95	96	92	88	86	86	78	70	77	72	79	87	93	94	94	95	95	96	89.1	96																																								
19-Jan	94	95	94	94	94	94	95	95	94	94	94	94	94	94	94	94	94	94	94	93	93	93	93	93	94.0	95																																								
20-Jan	93	92	93	93	93	93	92	93	93	92	89	84	77	72	74	72	79	91	93	90	94	92	94	94	88.4	94																																								
21-Jan	95	95	96	96	96	96	96	95	94	93	93	93	92	92	92	91	91	91	90	90	89	89	88	88	92.5	96																																								
22-Jan	88	87	86	85	84	84	83	81	80	81	79	78	77	78	78	80	81	81	82	82	82	82	81	81	81.7	88																																								
23-Jan	81	81	81	81	80	81	82	83	82	82	82	82	84	84	84	84	84	84	84	84	84	82	82	82	82.5	84																																								
24-Jan	82	82	83	83	84	84	84	84	84	84	84	83	82	80	79	77	83	88	89	87	88	88	86	87	83.9	89																																								
25-Jan	87	85	87	86	85	85	85	85	85	86	86	80	76	73	72	73	78	84	86	84	86	86	87	86	83.0	87																																								
26-Jan	84	85	85	85	85	85	86	87	87	84	82	79	73	68	67	67	66	72	75	72	72	72	82	87	78.5	87																																								
27-Jan	89	89	90	77	73	72	74	70	69	71	67	62	56	59	62	62	64	65	67	71	71	73	69	68	70.3	90																																								
28-Jan	72	74	75	79	79	84	86	88	89	86	83	79	76	74	74	73	74	77	71	70	68	69	69	70	76.6	89																																								
29-Jan	71	72	71	71	72	76	78	80	84	83	76	67	59	57	55	53	57	63	65	70	70	71	71	70	69.3	84																																								
30-Jan	71	76	79	79	79	80	77	72	72	71	67	73	79	77	69	64	74	82	81	79	74	75	73	73	74.8	82																																								
31-Jan	73	78	77	76	76	79	79	78	80	76	68	64	63	62	65	68	73	76	76	77	72	73	72	71	73.0	80																																								
																	79.7		80.1		80.0		80.1		80.0		80.5		80.7		80.4		80.7		80.0		78.2		75.6		72.8		71.0		70.2		70.8		74.6		77.2		77.5		77.8		78.0		78.9		79.1		79.3		Diurnal Average	
																	95		96		96		96		96		96		96		96		94		94		94		94		94		94		94		94		94		94		94		94		94		96		95		96		Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Patricia McInnes - January 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Patricia McInnes - January 2017

Maximum Speed: 34 km/h on Jan 11 13:00	Maximum Daily Speed Average: 13.4 km/h on Jan 27	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jan 19 03:00	Minimum Daily Speed Average: 1.6 km/h on Jan 4	Hours of Data: 744
Maximum Diurnal Speed Average: 4.9 km/h at hour 22	Minimum Diurnal Speed Average: 2.2 km/h at hour 17	Hours of Missing Data: 0
Monthly Average Velocity: 4.0 km/h 257.1 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 9 O ₃ = 12 P ₉₀ = 16 P ₉₉ = 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-Jan	W20	NNW26	NNW28	N19	NNE16	NNE14	NNE12	N11	WNW5	WSW5	WNW10	NW11	NNW10	NW8	NW7	ENE2	NW3	WSW4	WSW2	SSW2	WSW2	SSW2	SSW4	SSE1	NNW6.8	NNW28																					
2-Jan	SSW2	SW4	SSW3	SW3	SW3	W3	SW3	SSW3	SW3	SSW4	SSW5	SSW3	NE1	SSE3	S5	SW4	SSW2	S5	SSW4	S5	S5	SSW6	SSW7	SSW6	SSW3.7	SSW7																					
3-Jan	S5	SSW7	SSW7	SSW7	SW10	SW10	SW11	SW12	SW13	SW8	SSW7	SW10	SW11	SW10	SW9	WSW10	WSW10	WSW12	W11	WNW12	W13	W13	W13	WNW10	WSW8.7	W13																					
4-Jan	NW8	NNW8	NNE9	N9	N9	NNE8	NNE6	NNE5	NW2	S3	SSW4	SSW6	S8	SW10	SW12	SW9	SSW8	S8	S7	S6	S6	S5	SW5	NE3	SW1.6	SW12																					
5-Jan	N5	NNW10	NNW13	N13	N13	N14	N15	N13	N14	N13	N12	N12	N20	N17	NNE15	N15	NNE12	NNE7	N9	N9	N8	N7	NNW7	NW5	N11.2	N20																					
6-Jan	W5	WSW4	SW4	WSW5	SW3	SW7	SW7	WSW6	SW4	S4	SSW4	SSW5	S5	SSE6	SE5	SE5	SSE3	SW4	WSW1	WSW3	SW3	WSW1	NW1	W2	SSW3.0	SW7																					
7-Jan	W3	NNW0	NNW4	N4	N5	N8	N9	NE8	NE3	N4	NE2	N7	N14	N17	N19	N21	N17	N13	N13	N12	NNW5	WNW6	WNW5	WSW3	N7.6	N21																					
8-Jan	WSW3	WSW4	WSW3	S4	SSW5	SSW7	SSW4	S5	S6	S7	SW11	SSW8	S8	SW9	SW11	SSW9	SSW7	S5	S5	S6	S4	WSW11	WSW13	WSW14	SSW6.4	WSW14																					
9-Jan	WSW10	SW11	SW13	SW10	SW10	SW11	SW9	SW7	SW8	SW9	SSW8	SW6	W2	NW8	WNW8	WNW7	WNW8	NW11	WNW10	NW11	NW9	NW6	SW4	SW4	WSW6.6	SW13																					
10-Jan	SW4	W3	NW2	NNW8	NNW9	NNW9	NNW8	WNW7	WNW7	WNW5	W3	SW1	SSE4	ESE4	SSE4	SSE3	WSW7	SW6	SW8	SW10	SW9	SW9	SSW7	SSW8	WSW3.3	SW10																					
11-Jan	SSW10	SSW12	S11	SSW12	SSW12	SW15	WSW13	W10	WNW17	N21	N22	N33	N34	NNW34	NNW34	NNW32	NNW24	NNW18	NW12	NW9	NW10	WNW9	W8	WNW8	NW11.1	N34																					
12-Jan	SSW3	SW4	SW5	SSW6	S5	S4	S6	SSE6	SE4	SE9	SE10	SSE10	SE10	SE11	SE12	SE15	SE17	SE17	SE15	SE11	SE9	SE10	SSE9	S5	SSE8.1	SE17																					
13-Jan	S5	SW8	WSW14	WSW15	WSW15	WSW15	WSW16	SW13	SW11	SSW6	S5	SSE6	S6	SSW7	S4	SSE4	S4	SSW6	S4	SSW7	SW8	SSW10	SSW10	S9	SW7.7	WSW16																					
14-Jan	S6	S5	S4	SSW5	SSW5	S4	SSE4	SSE3	S5	SSW8	SSW9	WSW18	SW15	SW19	WSW20	SW15	SW11	WSW16	WSW15	SW15	WSW18	SW16	SW12	SW9	SW10.0	WSW20																					
15-Jan	WSW12	WSW15	WSW15	WSW14	WSW16	W15	WSW13	WSW15	WSW18	WSW23	WSW23	WSW15	WSW14	SW9	SW13	WSW11	SSW7	SW13	WSW17	SW14	SSW8	SSE6	SSW8	SW10	WSW13.0	WSW23																					
16-Jan	SW13	SW13	SW14	SW13	SW13	SSW8	SSW8	SSW10	SSW10	SSW11	SSW13	SW17	SW21	SW17	SW16	SW13	SSE11	SSW11	SW10	SW9	SSW12	SW11	SSW11	SSW10	SW11.9	SW21																					
17-Jan	S9	S8	S7	SSW9	SW12	SW14	WSW20	WSW14	SW11	SW14	SW14	WSW15	W15	WSW12	SW8	SSW4	SSE3	SSW4	SW7	SSW2	SW5	SW7	SSW6	S5	SW8.5	WSW20																					
18-Jan	SE2	SSE6	SSE4	SSE5	SSW5	SSE4	SSE2	S4	SE6	SE9	SSE4	SE4	SSE6	SSE5	SSE6	SSE5	S6	SSE3	SW2	SW1	SSW4	SSW5	S5	S8	SSE4.3	SE9																					
19-Jan	SSW5	S3	NNW0	NNE10	N14	N12	NNW11	NNW9	NNW9	N10	N9	N9	NNW9	N9	N8	N9	N8	N7	NNW7	N8	N7	WNW4	N5	NNE2	N6.8	N14																					
20-Jan	NW1	SE2	SE3	S3	SE4	SSE3	S4	SSE4	SSW5	S7	S8	SSE7	SE6	SE7	SE7	SSE5	S4	SSW4	S4	S5	WSW2	S4	N7	NNW14	SSE2.8	NNW14																					
21-Jan	NNW10	N11	N12	N10	NNE11	NNE10	N12	N13	N14	N14	N14	N13	N13	N12	N12	N11	N11	N10	N12	N12	N12	N13	N11	N10	N11.6	N14																					
22-Jan	NNW10	N10	N11	N14	N12	NNE11	NNE12	N11	N11	N9	N10	N10	N10	NNW9	NNW10	NNW9	NNW9	NNW9	NNW8	NNW8	NNW8	N7	N7	NNW6	N9.4	N14																					
23-Jan	NNW6	NW6	NW5	WNW4	W3	NW3	WNW4	WNW3	W4	WSW4	WSW3	WSW2	WNW1	SSW2	S3	SSW3	SSW3	S3	SSE4	S4	SSW3	SSW3	SSW3	SSW4	WSW2.0	NW6																					
24-Jan	S3	S3	S3	S3	SSE4	S3	S3	S3	S3	S4	S5	S5	S7	SSW7	SSW7	S7	SE5	SSE3	S5	SSW4	S4	S5	SSE4	SSE6	S4.3	SSW7																					
25-Jan	SSE6	SSE3	SSE5	S5	SSE4	SSE5	SSE5	SSE5	SSE6	S6	S7	SSW9	SSW9	SSW10	SSW12	SSE7	SSE7	S9	SSW11	SW9	SSW10	SSW8	SSW7	SSW8	S6.7	SSW12																					
26-Jan	SW10	SW13	SW17	WSW16	SW16	SW16	SW13	SSW12	SW17	SW12	SW13	SW14	SW12	SW16	SW15	SSW10	SW12	WSW15	WSW15	W19	W19	W16	S9	SW10	SW13.4	W19																					
27-Jan	SSW10	SSW9	SW6	W17	W22	W20	WSW16	W21	WSW23	WSW24	W23	WSW18	W22	WSW15	WSW12	WSW12	SW6	WSW6	WSW11	WSW11	SW10	SW9	WSW7	W8	WSW13.4	WSW24																					
28-Jan	SW9	WSW10	WSW11	SW8	SW7	SSW8	SSW10	SSW9	SW10	SW8	SW8	SW10	SW8	SW11	SSW7	SSW9	S7	SSW8	SW14	SW16	WSW14	WSW15	WSW13	WSW13	SW9.8	SW16																					
29-Jan	SW13	SW13	WSW12	WSW15	WSW18	SSW9	SSW9	SSW6	SE7	SSW6	SSW8	SSW10	W12	W19	W15	WNW14	W11	WSW11	WSW12	WSW13	W13	W11	W11	W14	WSW10.1	W19																					
30-Jan	W12	WSW13	SW11	WSW12	WSW12	WSW14	WSW13	WSW17	WSW13	WSW12	W18	N19	N17	N12	NNW12	NNW14	NNW17	N19	N20	NNE20	N20	N18	N22	N24	NW9.6	N24																					
31-Jan	N23	N21	N18	N15	N10	N8	N8	NNW4	NW4	WSW7	W8	WSW6	W8	WNW8	W10	WNW11	W12	WSW11	W11	W11	WNW13	WNW15	NW12	NNW11	NW8.3	N23																					
WSW4.3																								WSW4.2	W3.8	W4.0	W4.2	W3.9	W4.1	WSW3.9	WSW4.4	WSW4.0	WSW4.7	WSW3.6	W3.8	W4.2	W4.3	W2.9	W2.2	WSW3.4	WSW4.2	W4.4	W4.8	WSW4.9	WSW4.0	W4.0	Diurnal Average
N23																								NNW26	NNW28	N19	W22	W20	WSW20	W21	WSW23	WSW24	W23	NNE33	N34	NNW34	NNW34	NNW32	NNW24	N19	N20	NNE20	N20	N18	N22	N24	Diurnal Maximum

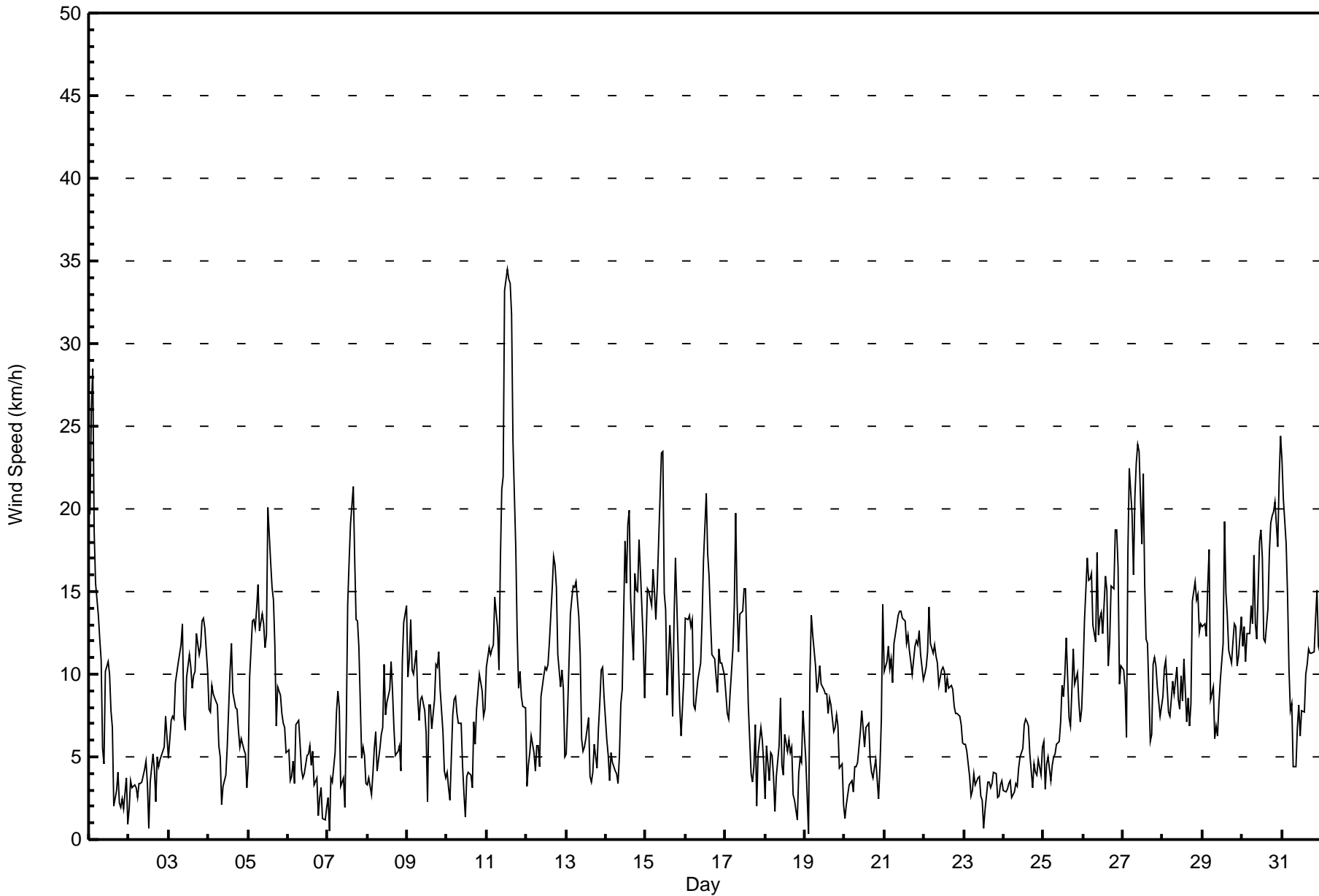
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Patricia McInnes - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Jan 11 11:00 Minimum Value: 0 km/h on Jan 24 07:00 Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 3 P ₉₉ = 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-Jan	4	8	7	5	4	3	2	3	1	1	2	2	2	2	2	2	1	1	1	1	2	1	2	2	8	
2-Jan	1	2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2
3-Jan	1	2	2	1	2	2	2	2	3	2	2	2	2	2	2	2	1	2	3	2	2	3	3	2	3	
4-Jan	2	1	2	2	2	2	2	1	1	2	1	1	1	2	2	3	2	1	1	2	2	1	2	2	3	
5-Jan	1	2	3	3	4	2	4	3	3	3	2	3	5	4	3	3	3	2	2	2	2	2	2	2	5	
6-Jan	2	1	1	2	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	
7-Jan	1	1	1	1	1	2	2	2	1	1	2	3	3	4	4	5	5	3	3	2	2	1	1	1	5	
8-Jan	1	1	1	1	1	1	1	1	1	2	2	1	1	2	2	2	1	1	1	1	2	3	2	3	3	
9-Jan	2	2	3	2	2	2	2	1	1	2	1	2	1	2	2	1	1	1	1	2	1	2	1	1	3	
10-Jan	1	1	2	2	2	1	1	1	1	2	1	1	1	1	1	1	1	1	2	1	1	2	2	3	3	
11-Jan	2	3	2	2	3	3	3	5	5	4	9	7	8	6	6	6	5	5	3	3	2	1	1	1	9	
12-Jan	1	1	1	1	1	1	1	1	1	3	2	2	3	2	3	3	4	3	3	3	3	3	2	1	4	
13-Jan	1	2	2	2	3	2	2	3	2	2	2	2	1	2	1	2	1	1	1	2	2	1	2	1	3	
14-Jan	2	1	1	1	1	1	2	2	1	1	6	4	3	4	4	3	2	3	3	3	3	3	2	1	6	
15-Jan	2	2	2	2	2	3	3	2	3	4	4	4	3	4	3	3	2	4	3	3	2	1	1	2	4	
16-Jan	2	2	2	2	2	2	2	2	1	2	3	6	5	5	5	5	2	2	2	1	2	2	2	2	6	
17-Jan	2	1	1	2	3	3	4	4	2	2	2	3	3	3	2	2	1	2	1	2	2	2	1	2	4	
18-Jan	1	2	2	2	1	1	1	2	1	2	3	2	2	2	1	2	1	1	0	1	1	1	1	2	3	
19-Jan	2	2	2	3	3	2	2	2	2	2	2	2	1	1	2	2	1	2	2	1	2	2	2	1	3	
20-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	2	2	1	2	3	3	3	
21-Jan	2	2	2	2	2	2	3	3	3	3	3	3	3	2	3	3	2	2	2	2	2	2	2	2	3	
22-Jan	2	2	2	3	2	2	2	2	2	2	2	2	2	1	2	2	1	1	1	1	1	1	1	1	3	
23-Jan	1	1	1	1	0	1	1	0	1	0	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	
24-Jan	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	2	
25-Jan	1	2	1	1	1	1	1	1	0	1	2	2	2	3	2	2	2	1	2	2	2	2	2	2	3	
26-Jan	2	2	3	3	3	3	4	3	3	4	3	3	3	3	4	2	2	2	2	3	3	4	2	4	4	
27-Jan	2	2	2	6	4	3	3	4	4	4	4	3	4	4	2	3	2	3	2	1	1	1	2	2	6	
28-Jan	2	3	3	2	2	2	1	2	4	3	3	3	2	2	2	2	2	3	2	3	2	3	2	2	4	
29-Jan	2	2	3	3	3	3	4	1	2	2	2	2	4	4	3	2	2	1	1	2	2	1	2	3	4	
30-Jan	2	2	2	2	2	2	2	2	3	2	4	6	4	3	2	4	4	4	4	5	5	4	5	5	6	
31-Jan	5	4	5	3	3	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	3	3	3	5	
Diurnal Maximum																										





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Patricia McInnes - January 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	212	28.49	28.49
6 - 11	311	41.80	70.30
12 - 19	189	25.40	95.70
20 - 28	27	3.63	99.33
29 - 38	5	0.67	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
Patricia McInnes - January 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	5	2	4	1	0	1	9	31	53	37	21	17	9	8	9	5	212
6 - 11	40	9	1	0	0	0	13	16	27	68	57	17	12	14	11	26	311
12 - 19	44	6	0	0	0	0	5	0	0	7	45	52	17	5	2	6	189
20 - 28	10	1	0	0	0	0	0	0	0	0	1	6	6	0	0	3	27
29 - 38	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	100	19	5	1	0	1	27	47	80	112	124	92	44	27	22	43	744

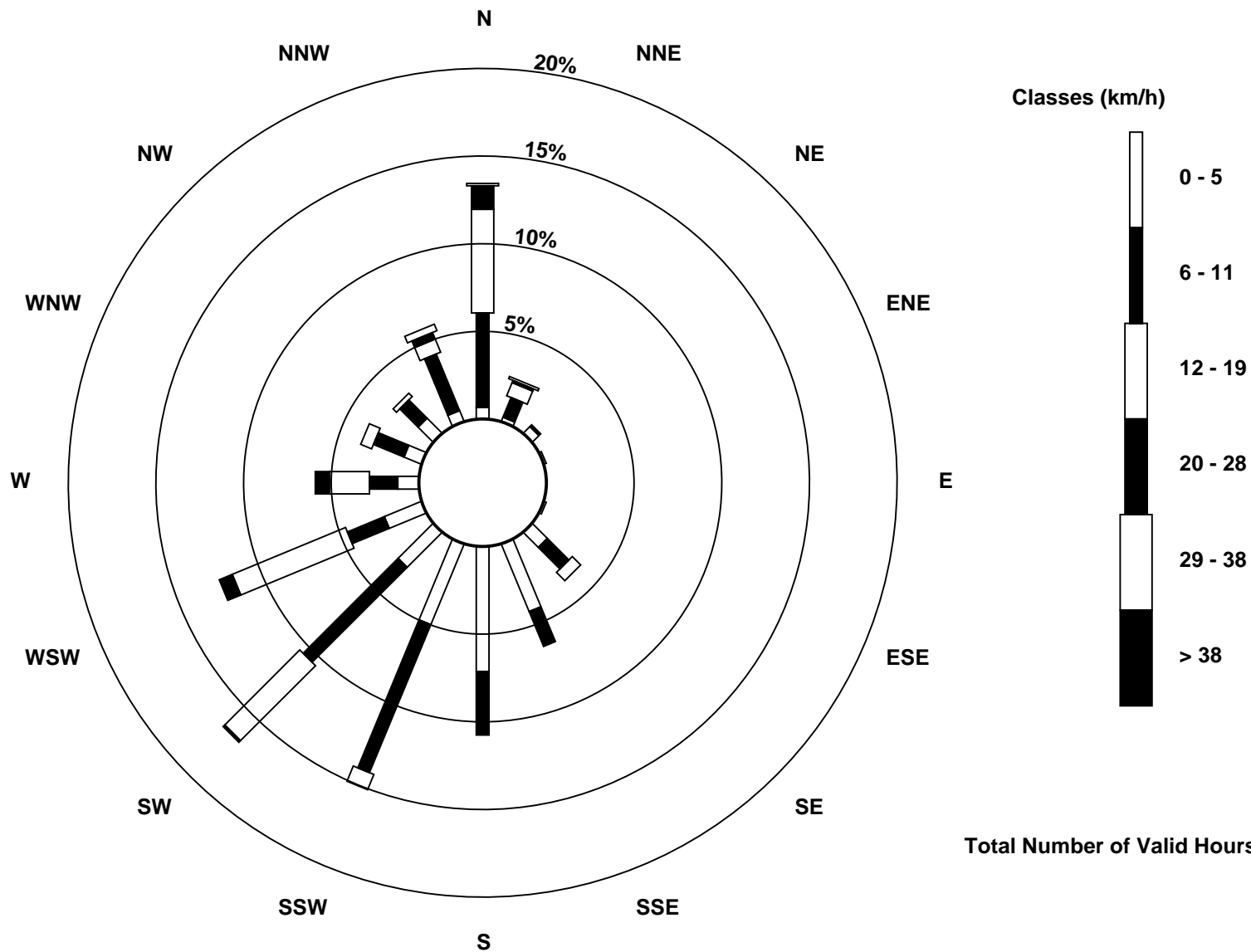
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose 2012-2017

Wind Speed (WS) - km/h
Patricia McInnes (AMS 6)





Wood Buffalo Environmental Association

Summary of Hour Averages

**Wind Direction (WD) - deg
Patricia McInnes - January 2017**

Direction of Maximum Speed: 352 deg on Jan 11 13:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 252.7 deg on Jan 27	Hours of Data: 744
Direction of Minimum Speed: 342 deg on Jan 19 03:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 1.6 deg on Jan 4	Percent Operational Time: 100.0
Monthly Average Direction: 245.4 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-Jan	279	334	342	359	13	23	19	8	296	247	295	309	333	307	324	67	324	244	257	211	241	200	198	155	331.9
2-Jan	200	232	194	221	219	266	226	210	217	212	197	212	43	151	190	223	201	190	210	190	187	192	192	207	203.4
3-Jan	191	202	195	198	215	224	221	218	225	227	200	220	227	231	227	243	258	251	269	299	274	268	277	294	239.8
4-Jan	311	343	12	9	7	16	12	15	304	183	201	194	181	214	228	217	192	188	189	178	180	190	225	46	228.8
5-Jan	350	335	343	4	7	7	355	354	10	10	11	6	9	9	14	10	19	13	358	0	358	352	337	313	2.2
6-Jan	270	257	222	249	216	231	230	250	221	184	193	195	169	162	146	124	150	215	246	256	229	241	314	268	213.5
7-Jan	263	327	345	356	1	358	3	34	51	6	42	3	354	359	358	10	7	4	10	355	334	302	293	247	358.7
8-Jan	254	239	252	189	207	209	196	189	183	191	221	197	184	217	220	210	206	179	178	183	182	246	248	244	212.8
9-Jan	242	228	225	233	231	228	229	215	215	232	212	229	271	323	297	295	291	304	301	305	318	310	222	228	256.6
10-Jan	231	273	321	343	335	345	330	302	301	282	260	218	149	122	155	151	239	227	235	236	231	225	208	211	256.1
11-Jan	207	211	189	196	211	234	239	262	302	2	354	11	352	347	339	341	340	340	324	321	318	293	278	299	324.4
12-Jan	197	215	231	212	187	173	176	167	139	142	146	148	145	134	135	130	131	126	124	138	138	145	154	186	147.1
13-Jan	177	214	242	249	247	249	248	235	224	198	174	158	178	212	180	148	176	203	189	211	214	213	203	182	218.0
14-Jan	170	179	190	192	197	186	161	157	190	201	211	240	234	234	237	229	223	246	241	236	243	232	216	221	224.8
15-Jan	239	243	242	238	244	260	241	249	249	258	256	251	242	230	236	241	194	233	242	234	209	167	195	214	239.9
16-Jan	226	229	230	226	220	201	199	195	192	206	213	218	222	219	231	217	167	203	214	226	207	216	213	206	214.3
17-Jan	190	187	186	203	218	235	248	245	235	232	236	254	260	249	216	193	155	199	220	194	216	223	207	180	226.9
18-Jan	137	164	161	168	194	152	148	173	136	136	164	130	148	148	161	166	172	167	219	227	192	198	174	191	164.9
19-Jan	192	172	342	16	2	351	346	339	347	358	2	355	343	351	359	359	354	3	345	353	354	291	7	14	353.2
20-Jan	321	136	144	179	138	162	186	163	197	183	169	168	145	126	136	160	175	204	170	169	256	180	7	345	164.0
21-Jan	346	351	3	10	12	13	4	3	5	2	359	2	360	4	6	1	352	349	353	354	349	355	2	355	359.7
22-Jan	347	353	350	5	10	15	13	8	11	8	357	354	352	344	337	336	339	342	342	341	337	350	350	328	353.8
23-Jan	329	323	320	297	273	305	300	287	275	246	257	252	286	208	183	200	206	176	165	182	213	205	210	213	252.0
24-Jan	191	191	191	176	147	179	181	184	178	172	174	176	186	193	197	180	145	155	172	196	173	180	159	165	177.5
25-Jan	161	168	156	169	152	147	156	147	161	172	181	195	196	202	206	166	156	180	206	214	212	201	194	206	185.8
26-Jan	219	227	229	237	236	234	229	208	219	219	217	226	222	235	224	213	235	244	245	265	266	276	188	223	233.1
27-Jan	194	200	215	275	276	271	253	259	258	253	260	258	263	253	245	246	253	258	239	240	232	225	251	270	252.7
28-Jan	227	241	241	234	225	202	210	201	218	220	220	221	217	219	201	206	188	208	226	228	241	241	239	239	223.9
29-Jan	225	234	242	248	255	192	213	196	140	199	195	197	261	272	275	286	268	249	251	248	261	264	273	279	247.4
30-Jan	266	246	230	239	238	245	252	257	256	251	271	359	10	3	340	329	346	8	9	13	11	1	351	351	322.0
31-Jan	350	357	7	354	3	8	11	348	306	249	274	244	260	301	278	284	267	256	267	280	286	302	306	338	313.7

247.7 255.8 261.3 264.6 262.5 261.4 259.7 252.6 247.3 241.4 245.8 256.9 269.4 267.4 261.7 268.0 261.4 252.9 256.2 262.0 259.1 253.2 248.9 260.0
Diurnal Average

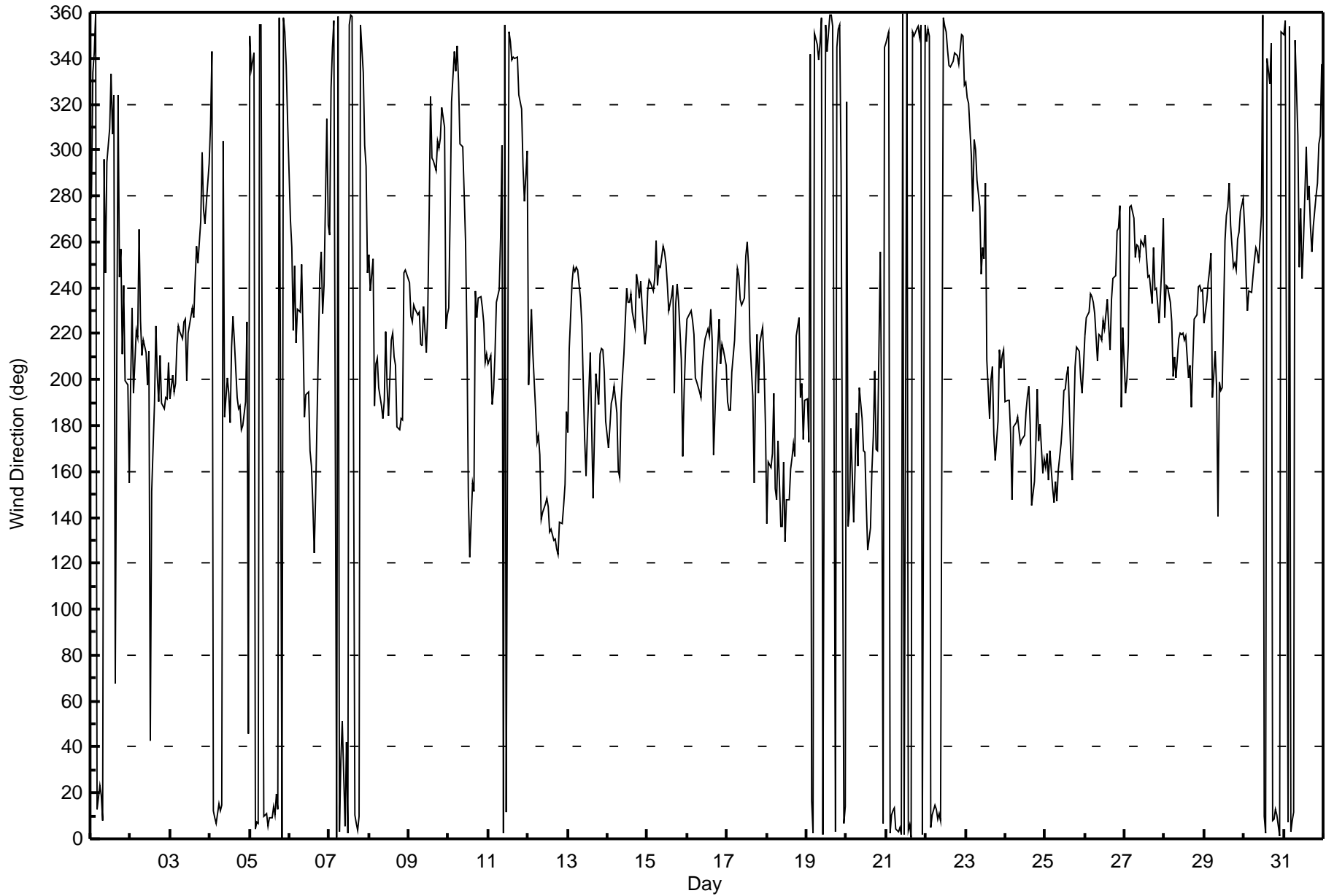
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Patricia McInnes - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 100 deg on Jan 19 03:00 Minimum Value: 5 deg on Jan 25 07:00 Percentiles: P ₁ = 7 P ₁₀ = 9 Q ₁ = 11 Median = 14 Q ₃ = 19 P ₉₀ = 32 P ₉₉ = 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-Jan	13	21	12	17	10	12	10	15	23	13	17	8	15	18	15	50	27	24	66	61	56	76	54	87	87
2-Jan	58	63	45	29	27	24	32	23	22	18	19	31	73	32	26	19	50	19	19	15	12	12	11	24	73
3-Jan	24	14	13	13	12	11	9	10	13	13	16	14	11	10	9	11	11	9	12	10	15	12	9	14	24
4-Jan	14	12	12	15	13	13	18	23	47	46	22	19	15	17	12	17	13	10	14	15	15	17	26	41	47
5-Jan	24	8	12	13	13	12	14	13	14	13	13	13	13	13	13	14	12	18	14	15	19	15	24	32	32
6-Jan	21	18	14	20	35	9	11	11	22	15	13	12	18	15	14	25	30	15	52	20	17	69	62	64	69
7-Jan	35	91	18	17	12	14	15	13	28	28	58	37	14	14	15	13	13	14	12	12	34	13	19	23	91
8-Jan	21	18	32	20	14	12	16	13	13	19	11	15	12	22	18	13	13	19	13	7	32	12	8	10	32
9-Jan	15	14	11	13	13	10	10	10	13	10	16	20	58	15	17	15	8	6	7	10	8	19	25	25	58
10-Jan	13	61	70	12	6	11	7	10	10	18	26	53	32	35	25	30	14	15	10	7	11	10	23	16	70
11-Jan	15	16	13	13	15	15	11	32	42	15	16	15	17	16	12	12	12	13	11	12	13	11	8	8	42
12-Jan	41	16	14	10	18	12	11	11	19	14	15	14	14	15	13	13	12	12	12	14	26	38	17	17	41
13-Jan	34	16	12	8	8	8	10	10	10	26	21	24	28	25	33	47	57	10	13	9	9	8	12	9	57
14-Jan	17	14	15	16	23	18	40	31	20	10	29	11	11	11	12	11	10	10	10	10	10	11	10	13	40
15-Jan	10	9	9	9	9	14	10	10	10	10	10	15	14	44	17	12	36	17	9	11	18	16	10	12	44
16-Jan	9	9	9	9	11	13	12	14	11	11	13	15	13	15	18	25	19	15	11	9	11	11	10	12	25
17-Jan	13	19	17	12	13	16	10	12	9	9	11	10	10	13	19	41	30	41	7	61	12	7	25	45	61
18-Jan	53	26	43	47	16	26	44	29	21	14	41	49	25	38	20	24	28	37	36	74	26	13	28	19	74
19-Jan	36	65	100	22	14	14	11	13	13	14	14	14	14	13	14	16	16	22	25	14	32	50	23	57	100
20-Jan	78	59	42	21	26	40	14	15	16	23	11	12	21	12	17	20	15	23	28	18	41	18	41	10	78
21-Jan	11	13	14	12	12	12	15	15	13	14	15	14	14	16	13	14	13	12	15	14	13	14	14	14	16
22-Jan	12	13	12	14	13	12	11	13	12	12	14	13	12	13	10	10	9	8	10	11	10	11	10	8	14
23-Jan	9	9	10	10	14	13	10	16	19	9	17	22	96	56	19	19	20	19	17	12	23	14	10	12	96
24-Jan	13	18	13	17	14	15	14	18	18	11	13	14	14	11	12	28	8	13	11	26	51	23	12	7	51
25-Jan	8	57	8	24	17	13	5	7	14	10	13	12	13	14	13	26	13	11	12	14	10	14	15	13	57
26-Jan	13	10	10	11	11	10	14	11	9	24	13	10	10	11	13	13	10	9	9	12	10	12	19	22	24
27-Jan	11	16	46	12	10	11	10	10	11	9	9	9	11	13	8	11	32	29	17	8	7	12	38	22	46
28-Jan	11	17	20	17	18	24	11	19	12	23	15	15	10	10	18	20	14	26	10	10	10	9	9	9	26
29-Jan	9	9	11	11	10	37	20	31	21	29	10	13	29	14	13	13	10	7	10	8	9	9	10	9	37
30-Jan	14	8	9	9	7	8	8	8	10	9	15	40	13	14	18	16	13	16	14	13	14	15	15	14	40
31-Jan	12	17	13	15	18	13	12	28	21	9	23	25	22	24	21	15	13	8	9	10	11	11	10	26	28
Diurnal Maximum																									





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	January 10, 2017	Last Calibration	December 6, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	8:50	End Time (MST)	11:45
Gas Cert Reference	LL107926	Station temp.	21 Deg C
Cal Gas Concentration	50.8 ppm	Cal Gas Exp Date	February-16-19
Calibrator Make/Model	Teledyne API T700	Serial Number	2449
ZAG Make/Model	Teledyne API 701H	Serial Number	201
DACS make/model	Campbell Scientific CR3000	DACS serial No.	10957

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-678	-678
Analyzer IP address	192.168.1.43		Lamp voltage	763	762
Calculated slope	1.000149	0.998083	Chamber temp	45.0	45.2
Calculated intercept	1.165957	1.224972	Pressure	709.7	696.1
Analyzer Background	6.0	6.0	Flow	0.451	0.441
Analyzer Coefficient	1.137	1.137	Intensity	91	91
Analyzer make	Thermo 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	5542	0.0	0.0	0.2	----
as found span	5542	84.1	770.9	771.8	0.999
calibrator zero	5542	0.0	0.0	0.5	----
high point	5542	84.1	770.9	771.9	0.999
second point	5542	42.1	385.9	384.8	1.003
third point	5542	21.1	193.4	190.7	1.014
as left zero	5542	0.0	0.0	0.5	----
as left span	5542	84.1	770.9	770.7	1.000
Average Correction Factor					1.005

Corrected As found 771.6 Previous response 769.6 % change -0.3%

Notes:

Inlet filter changed after as founds. No adjustments made.

Calibration Performed By:

Devin Russell



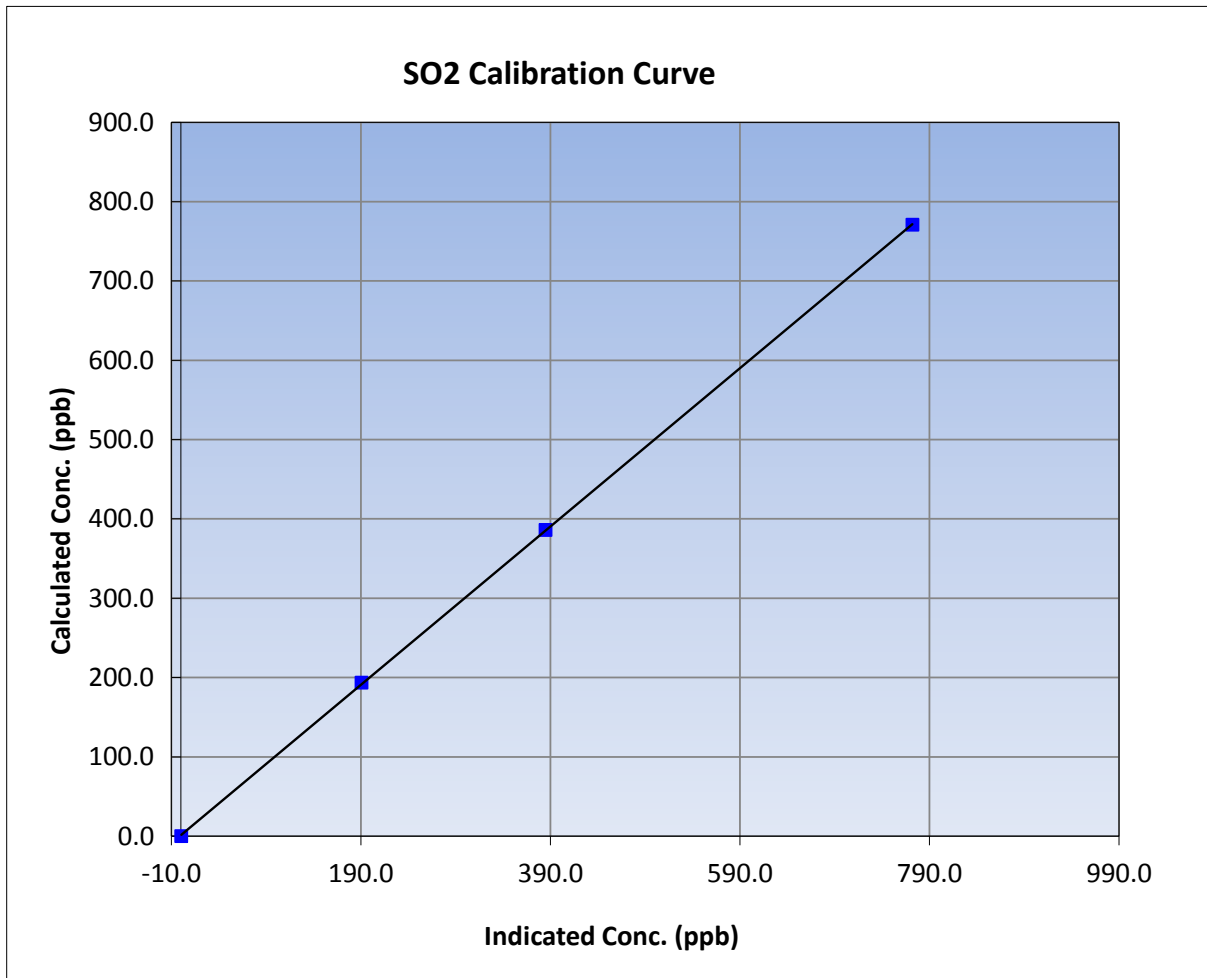
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 10, 2017	Previous Calibration	December 6, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:50	End Time (MST)	11:45
Analyzer make	Thermo 43i	Analyzer serial #	1008841397

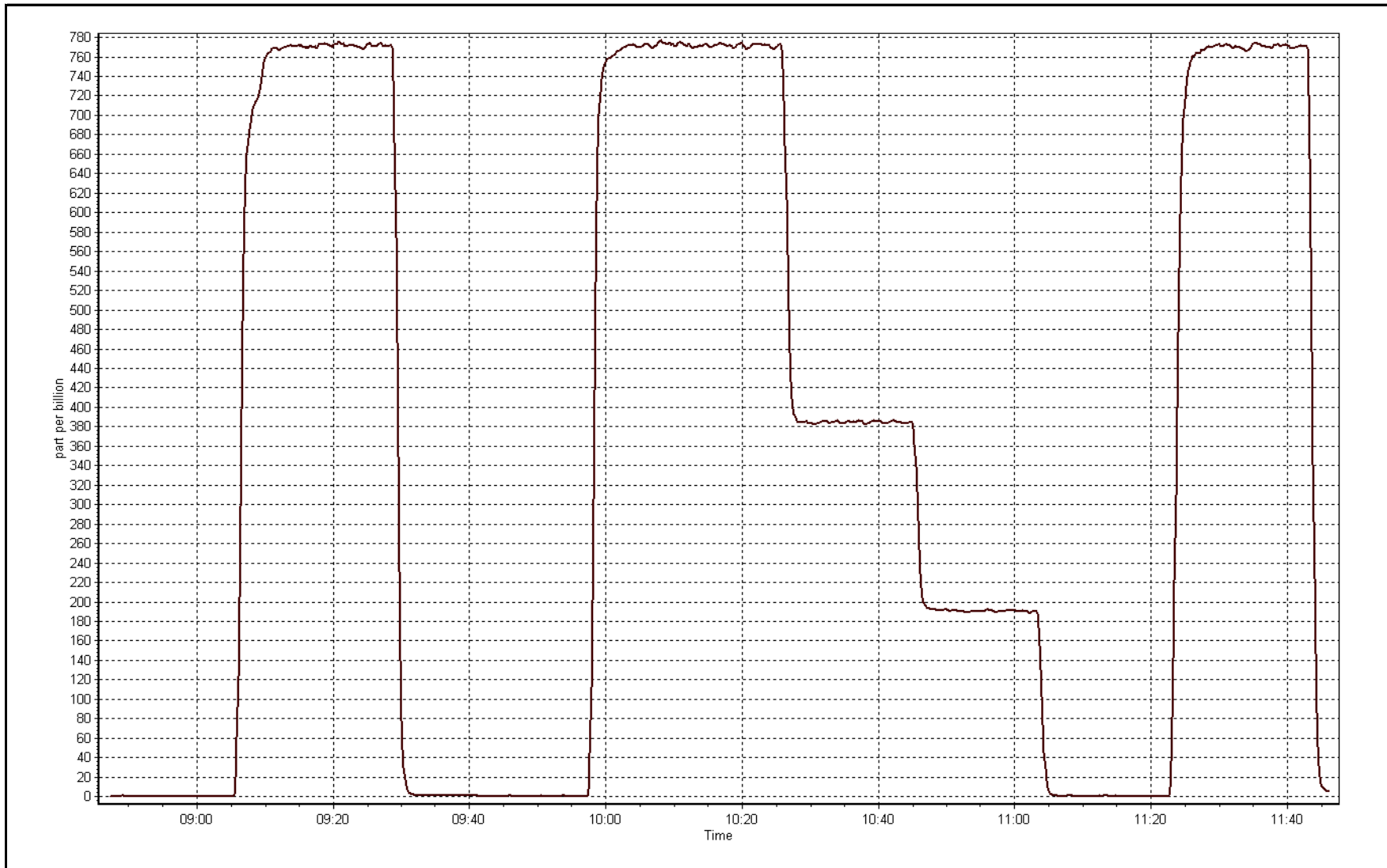
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	----	Correlation Coefficient	0.999978
770.9	771.9	0.9987		
385.9	384.8	1.0029	Slope	0.998083
193.4	190.7	1.0142		
			Intercept	1.224972



SO2 Calibration Plot

Date: January 10, 2017





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	January 3, 2017	Last Calibration	December 7, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	9:10	End Time (MST)	13:26
Gas Cert Reference	SA5551	Station temp.	22 Deg C
Cal Gas Concentration	5.28 ppm	Cal Gas Exp Date	2/13/18
Calibrator Make/Model	Teledyne API T700	Serial Number	2449
Dil air Make/Model	Teledyne API 701H	Serial Number	201
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9036
SO2 gas concentration	49.8 ppm	SO2 gas cert/exp	LL107926 6/Feb/19

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-720	-720
Analyzer IP address	192.168.1.44		Lamp voltage	999	1007
Calculated slope	0.998877	0.994731	Chamber temp	45	45
Calculated intercept	0.268551	0.155507	Pressure	702.4	688.8
Analyzer Background	2.41	2.46	Flow	0.438	0.430
Analyzer Coefficient	1.107	1.118	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	5542	0.0	0.0	-0.3	----
as found span	5542	73.1	69.6	68.5	1.017
SO2 scrubber check	5542	21.1	189.6	0.1	----
calibrator zero	5542	0.0	0.0	-0.1	----
high point	5542	73.1	69.6	69.8	0.997
second point	5542	41.8	39.8	40.0	0.996
third point	5542	20.9	19.9	19.7	1.009
as left zero	5542	0.0	0.0	-0.1	----
as left span	5542	73.1	69.6	69.9	0.996
Average Correction Factor					1.001

Corrected As found	68.7	Previous response	69.5	% change	1.0%
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Notes:

Inlet filter changed after as founds. Scrubber check completed after as founds. Span adjusted slightly.

Calibration Performed By:

Devin Russell



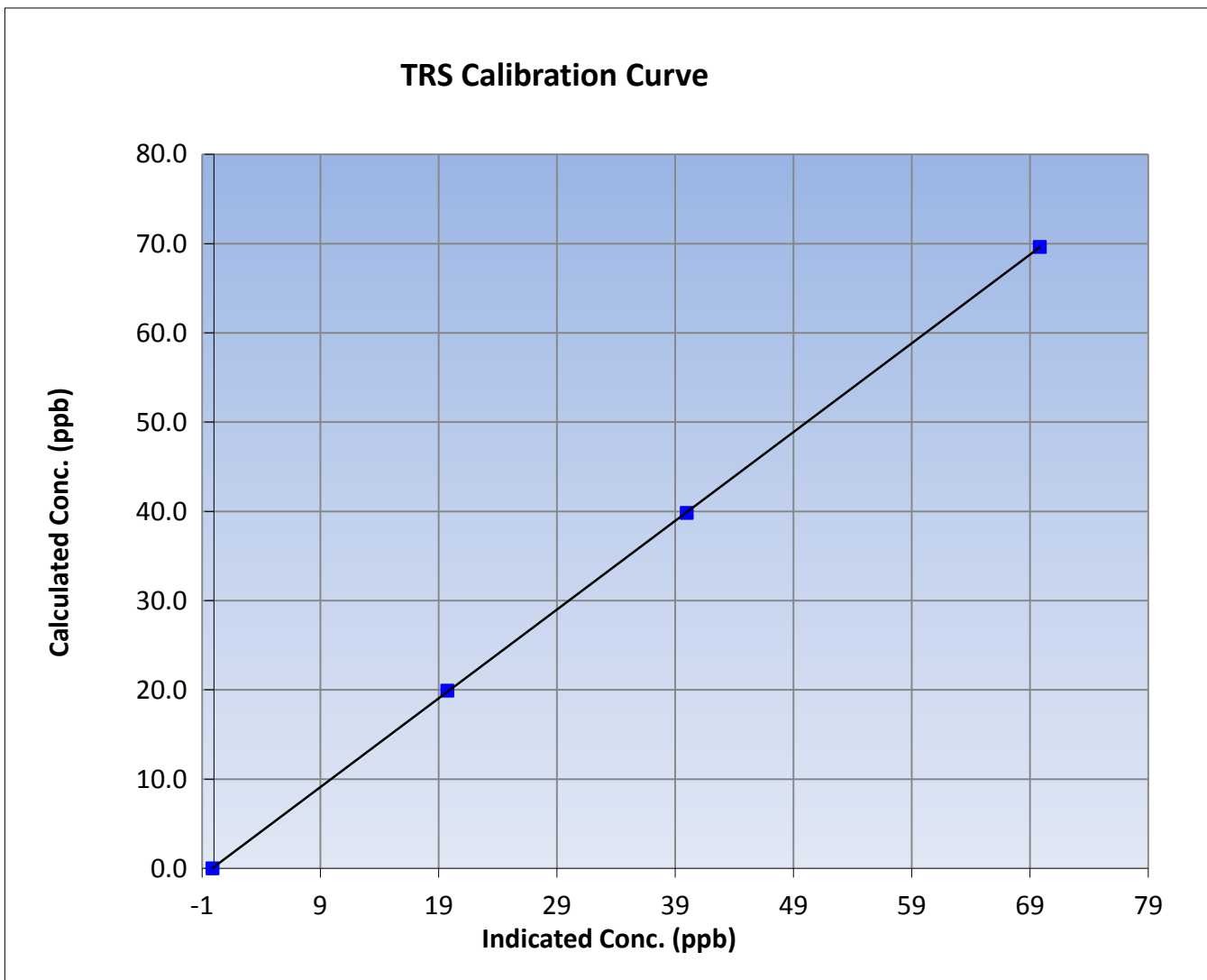
Wood Buffalo Environmental Association TRS Calibration Report

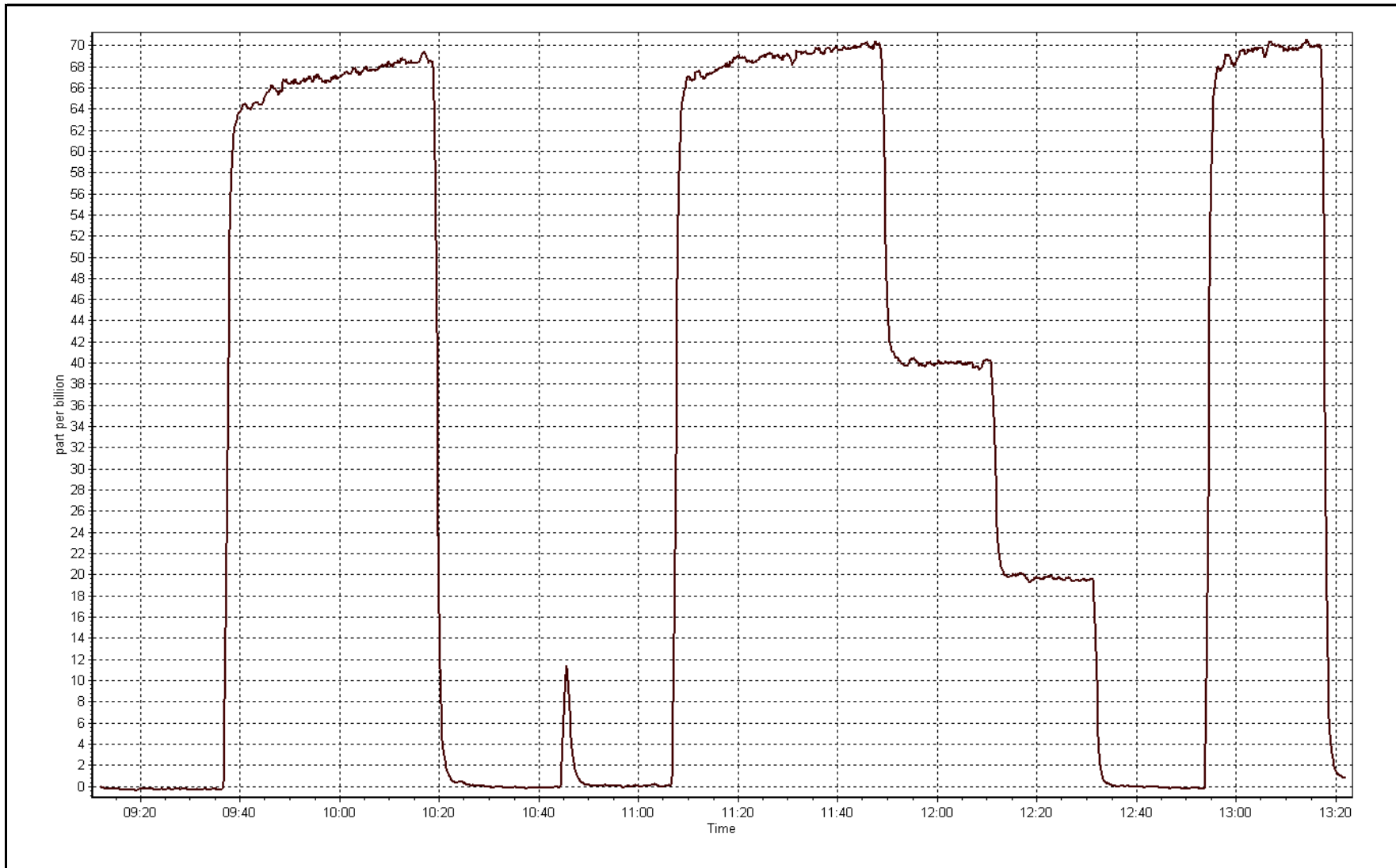
Station Information

Calibration Date	January 3, 2017	Previous Calibration	November 23, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:10	End Time (MST)	13:26
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	0.999988
69.6	69.8	0.9973		
39.8	40.0	0.9958	Slope	0.994731
19.9	19.7	1.0092		
			Intercept	0.155507







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	January 10, 2017	Last Calibration	December 6, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	8:50	End Time (MST)	11:45
Gas Cert Reference	LL107926	Cal Gas Expiry Date	February-16-19
CH4 Cal Gas Conc.	505.0 ppm	CH4 Equiv Conc.	1068.8 ppm
C3H8 Cal Gas Conc.	205.0 ppm	Station temp.	21 Deg C
Calibrator Model	Teledyne API T700	Serial Number	2449
ZAG make/model	Teledyne API 701H	Serial Number	201
DACS make/model	Campbell Scientific CR3000	Serial Number	10957

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.2	75.1
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.1	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	1.000863	0.998677	Carrier Pressure	34.6	34.6
THC Calc intercept	0.052140	0.045886	Fuel Pressure	42.3	42.3
NMHC Calc slope	1.002335	1.000883	Air Pressure	32.4	32.4
NMHC Calc intercept	0.028337	0.020169			

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	5542	0.0	0.00	0.00	----
as found span	5542	84.1	16.22	16.16	1.004
calibrator zero	5542	0.0	0.00	0.00	----
high point	5542	84.1	16.22	16.22	1.000
second point	5542	42.1	8.12	8.05	1.009
third point	5542	21.1	4.07	3.99	1.020
as left zero	5542	0.0	0.00	0.00	----
as left span	5542	84.1	16.22	16.23	0.999
Average Correction Factor					1.009

Corrected As found 16.16 Previous response 16.15 % change 0.0%

Notes:

Inlet filter changed after 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	5542	0	0.00	0.00	----
as found span	5542	84.1	8.55	8.51	1.005
calibrator zero	5542	0.0	0.00	0.00	----
high point	5542	84.1	8.55	8.54	1.002
second point	5542	42.1	4.28	4.24	1.010
third point	5542	21.1	2.15	2.11	1.017
as left zero	5542	0.0	0.00	0.00	----
as left span	5542	84.1	8.55	8.56	0.999
Average Correction Factor					1.010

Corrected As found 8.51 Previous response 8.51 % change 0.0%

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	5542	0	0.00	0.00	----
as found span	5542	84.1	7.66	7.66	1.000
calibrator zero	5542	0.0	0.00	0.00	----
high point	5542	84.1	7.66	7.67	0.999
second point	5542	42.1	3.84	3.80	1.010
third point	5542	21.1	1.92	1.89	1.017
as left zero	5542	0.0	0.00	0.00	----
as left span	5542	84.1	7.66	7.67	0.999
Average Correction Factor					1.009

Corrected As found 7.66 Previous response 7.65 % change -0.2%



Wood Buffalo Environmental Association

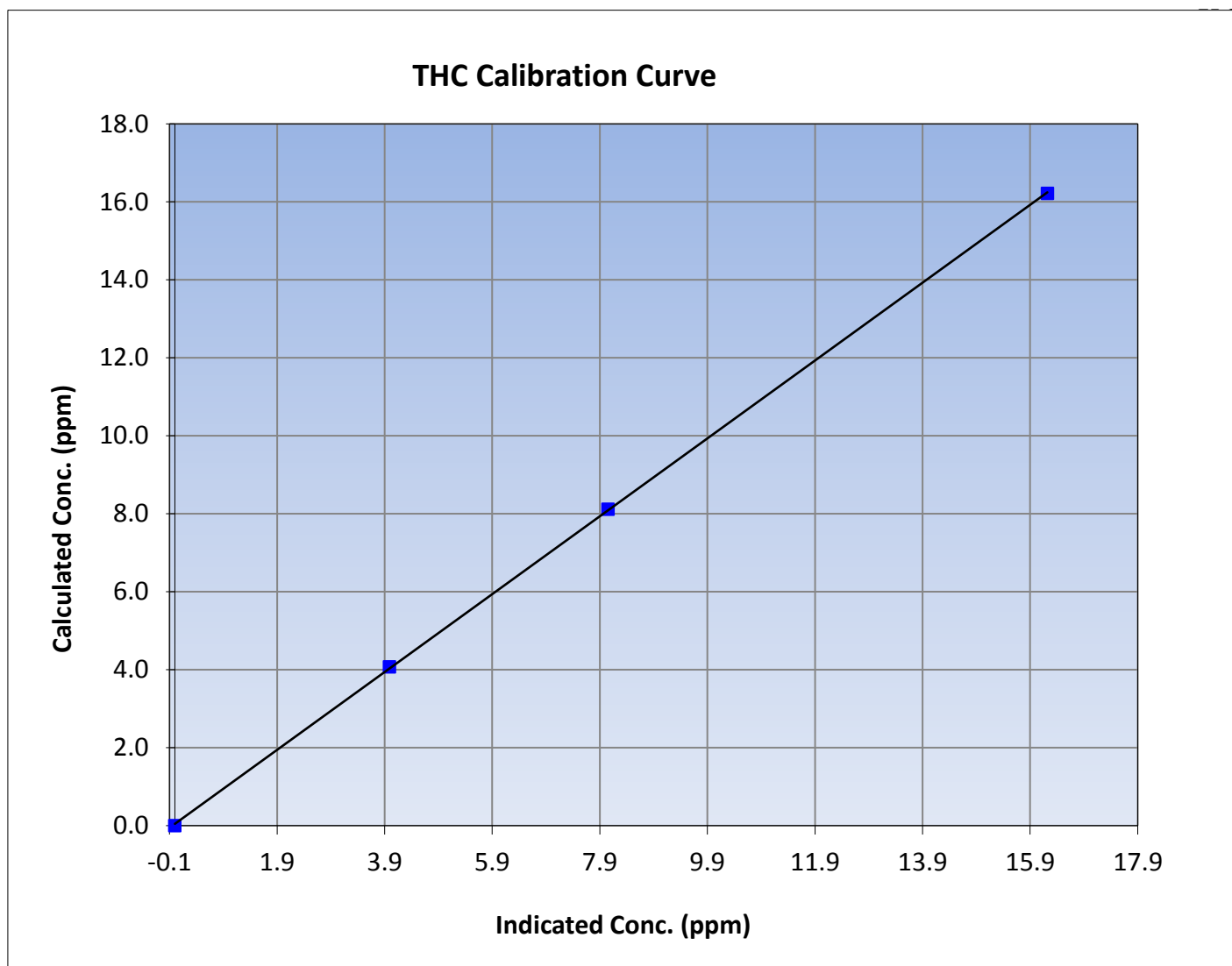
THC Calibration Summary

Station Information

Calibration Date	January 10, 2017	Previous Calibration	December 6, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:50	End Time (MST)	11:45
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	0.999963
16.22	16.22	0.9999		
8.12	8.05	1.0085	Slope	0.998677
4.07	3.99	1.0198		
			Intercept	0.045886





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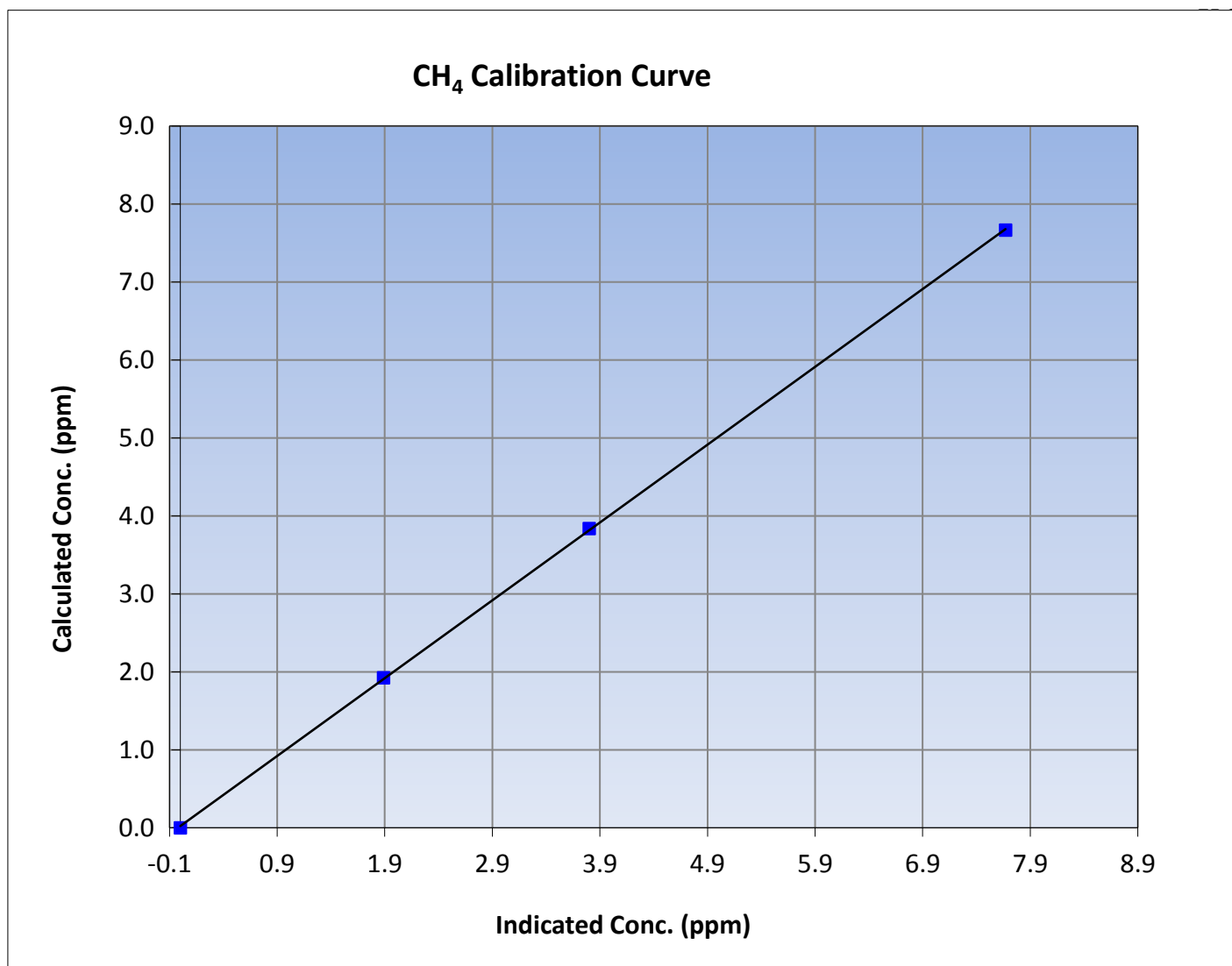
CH₄ Calibration Summary

Station Information

Calibration Date	January 10, 2017	Previous Calibration	December 6, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:50	End Time (MST)	11:45
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	0.999958
7.66	7.67	0.9991		
3.84	3.80	1.0095	Slope	0.998158
1.92	1.89	1.0173		
			Intercept	0.021732





Wood Buffalo Environmental Association

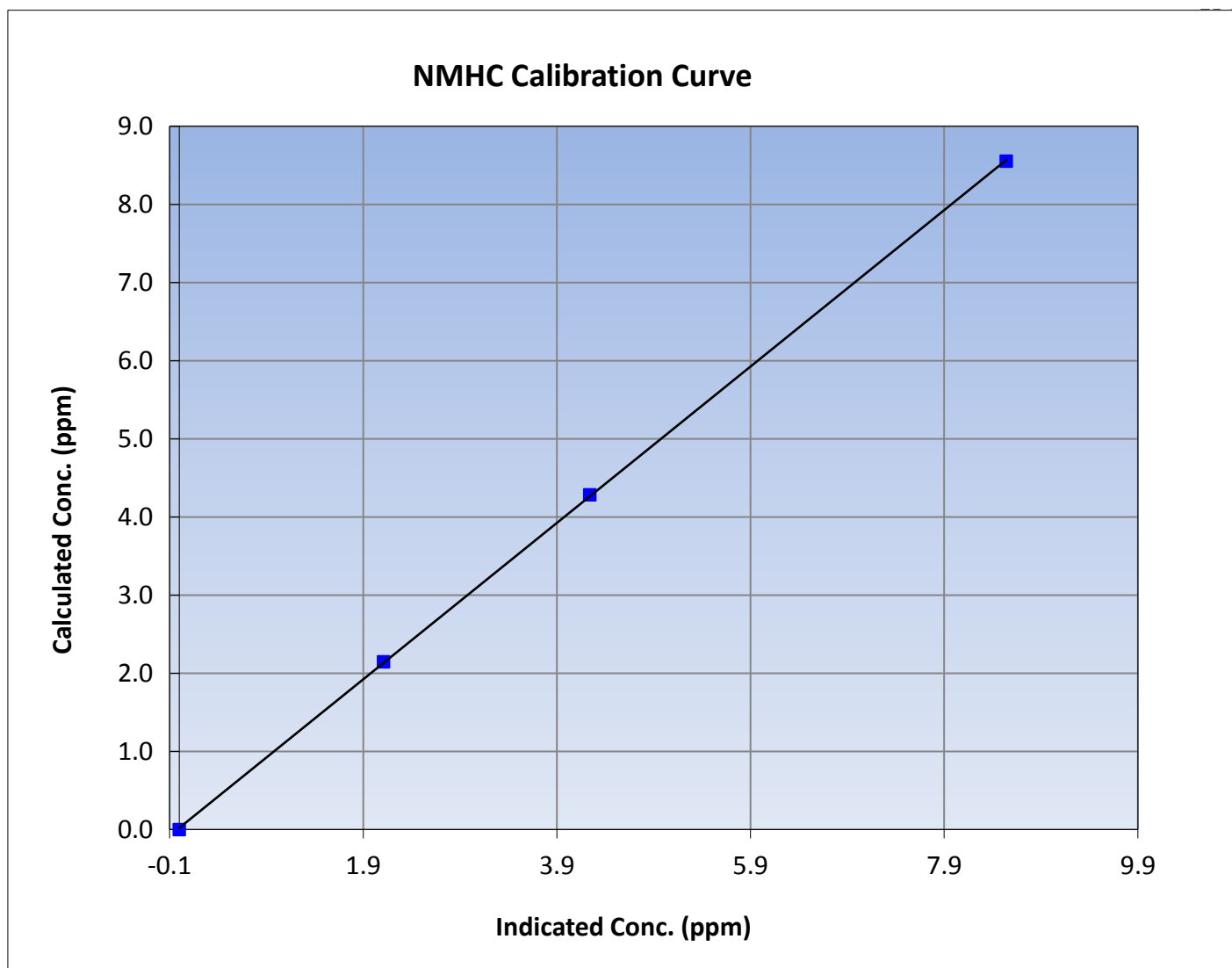
NMHC Calibration Summary

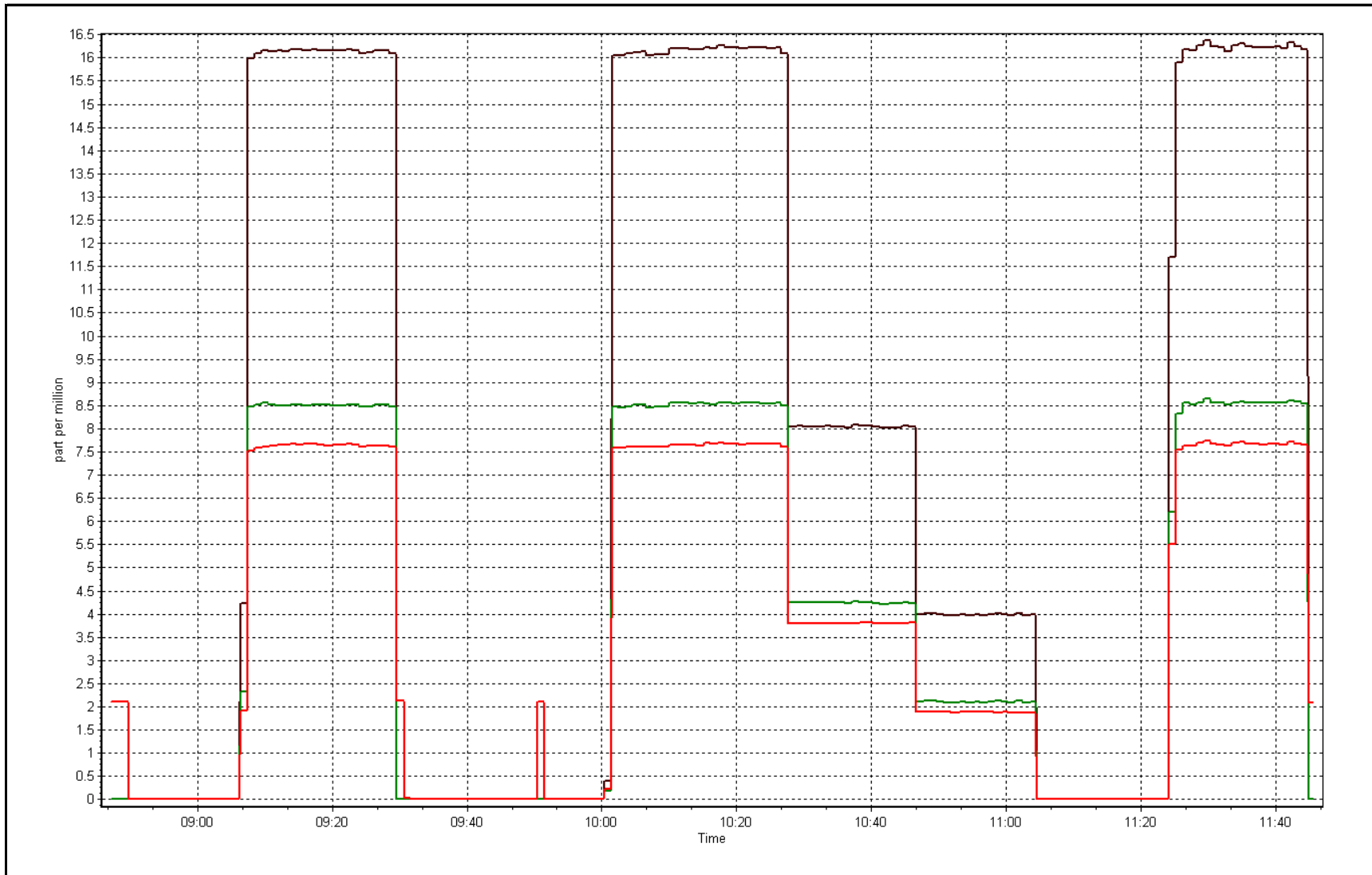
Station Information

Calibration Date	January 10, 2017	Previous Calibration	December 6, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:50	End Time (MST)	11:45
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	0.999972
8.55	8.54	1.0017		
4.28	4.24	1.0100	Slope	1.000883
2.15	2.11	1.0172		
			Intercept	0.020169







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	January 23, 2017	Last Calibration	January 10, 2017
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	<input type="checkbox"/> Other: <input checked="" type="checkbox"/> Maintenance		
Start Time (MST)	9:45	End Time (MST)	12:50
Gas Cert Reference	LL107926	Cal Gas Expiry Date	February-16-19
CH4 Cal Gas Conc.	505.0 ppm	CH4 Equiv Conc.	1068.8 ppm
C3H8 Cal Gas Conc.	205.0 ppm	Station temp.	21 Deg C
Calibrator Model	Teledyne API T700	Serial Number	2449
ZAG make/model	Teledyne API 701H	Serial Number	201
DACS make/model	Campbell Scientific CR3000	Serial Number	10957

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.1	75.0
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.1
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	0.998677	0.996835	Carrier Pressure	34.6	35.8
THC Calc intercept	0.045886	0.053914	Fuel Pressure	42.3	42.3
NMHC Calc slope	1.000883	0.997544	Air Pressure	32.4	32.4
NMHC Calc intercept	0.020169	0.020128			

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	5542	0.0	0.00	0.00	----
as found span	5542	84.1	16.22	16.24	0.999
calibrator zero	5542	0.0	0.00	0.00	----
high point	5542	84.1	16.22	16.25	0.998
second point	5542	42.1	8.12	8.04	1.010
third point	5542	21.1	4.07	3.99	1.020
as left zero	5542	0.0	0.00	0.00	----
as left span	5542	84.1	16.22	16.26	0.997
Average Correction Factor					1.009

Corrected As found 16.24 Previous response 16.19 % change -0.3%

Notes:

As founds completed. Dips noticed in data. Carrier pressure increased to get CH4 peak closer to 12.0 seconds. 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	5542	0	0.00	0.00	----
as found span	5542	84.1	8.55	8.55	1.001
calibrator zero	5542	0.0	0.00	0.00	----
high point	5542	84.1	8.55	8.57	0.998
second point	5542	42.1	4.28	4.25	1.008
third point	5542	21.1	2.15	2.12	1.012
as left zero	5542	0.0	0.00	0.00	----
as left span	5542	84.1	8.55	8.59	0.996
Average Correction Factor					1.006

Corrected As found 8.55 Previous response 8.53 % change -0.3%

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	5542	0	0.00	0.00	----
as found span	5542	84.1	7.66	7.70	0.995
calibrator zero	5542	0.0	0.00	0.00	----
high point	5542	84.1	7.66	7.67	0.999
second point	5542	42.1	3.84	3.79	1.012
third point	5542	21.1	1.92	1.88	1.023
as left zero	5542	0.0	0.00	0.00	----
as left span	5542	84.1	7.66	7.67	0.999
Average Correction Factor					1.011

Corrected As found 7.70 Previous response 7.67 % change -0.4%



Wood Buffalo Environmental Association

THC Calibration Summary

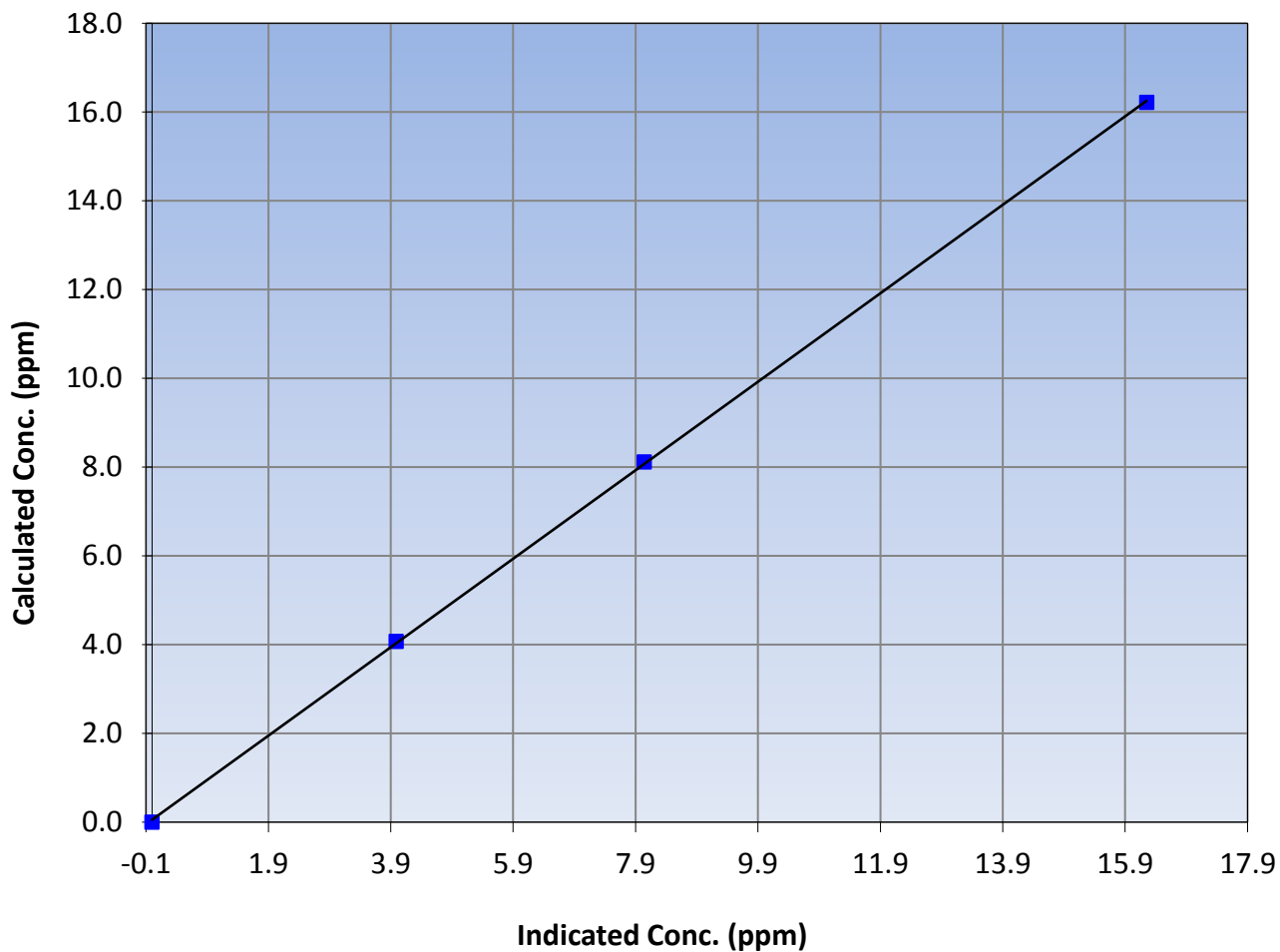
Station Information

Calibration Date	January 23, 2017	Previous Calibration	January 10, 2017
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:45	End Time (MST)	12:50
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	0.999944
16.22	16.25	0.9980		
8.12	8.04	1.0098	Slope	0.996835
4.07	3.99	1.0198		
			Intercept	0.053914

THC Calibration Curve





Wood Buffalo Environmental Association

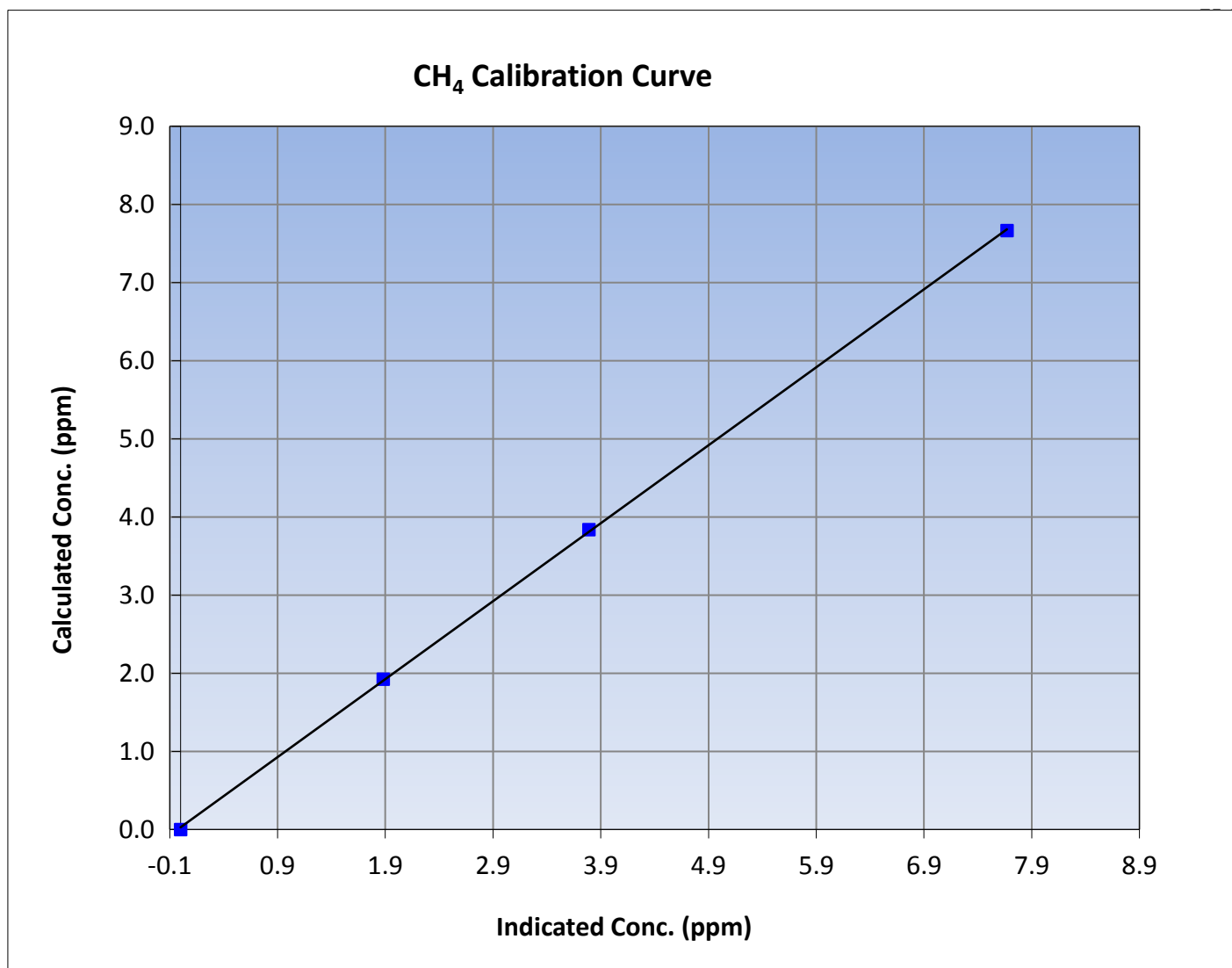
CH₄ Calibration Summary

Station Information

Calibration Date	January 23, 2017	Previous Calibration	January 10, 2017
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:45	End Time (MST)	12:50
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	0.999933
7.66	7.67	0.9991		
3.84	3.79	1.0122	Slope	0.997837
1.92	1.88	1.0227		
			Intercept	0.027792





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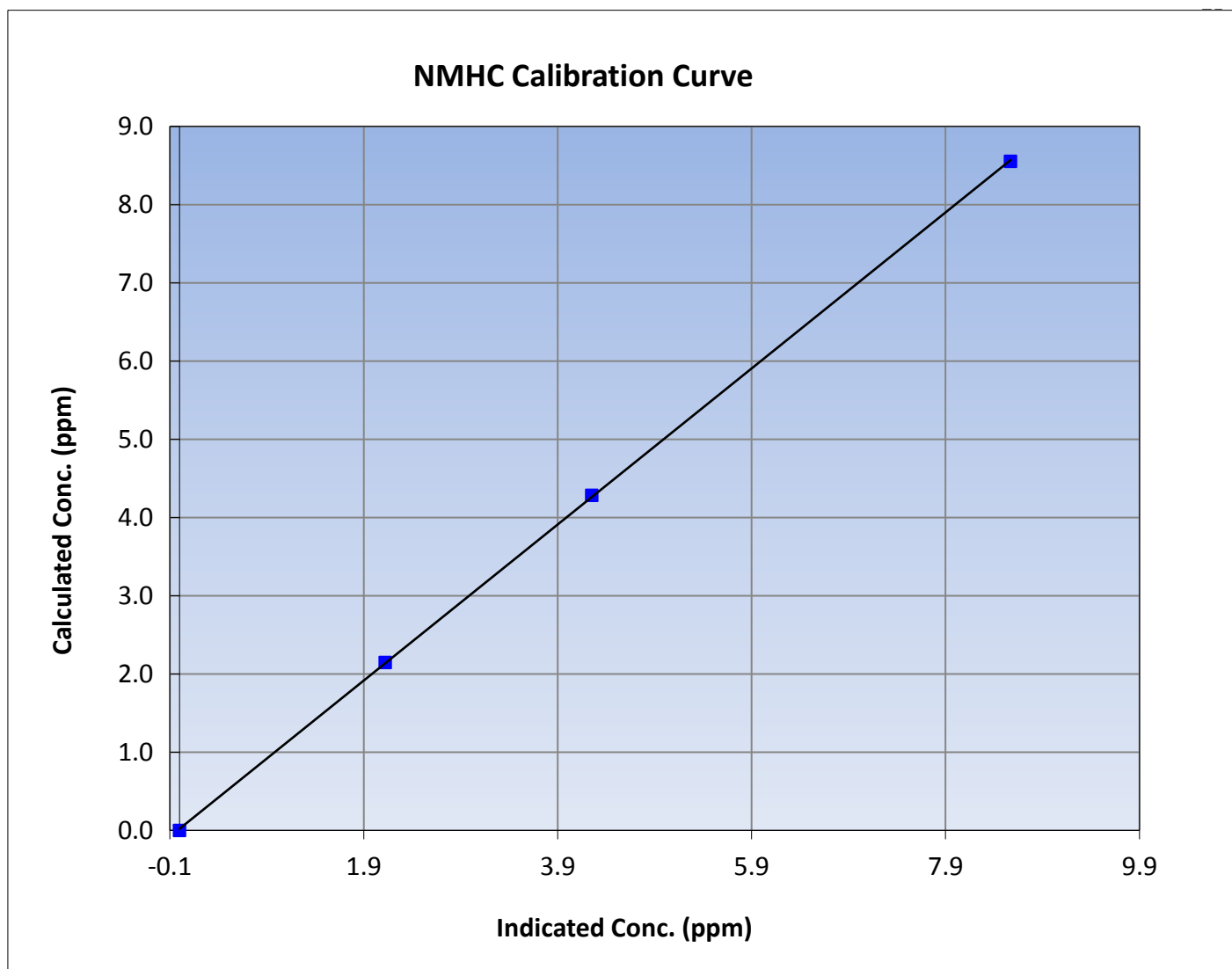
NMHC Calibration Summary

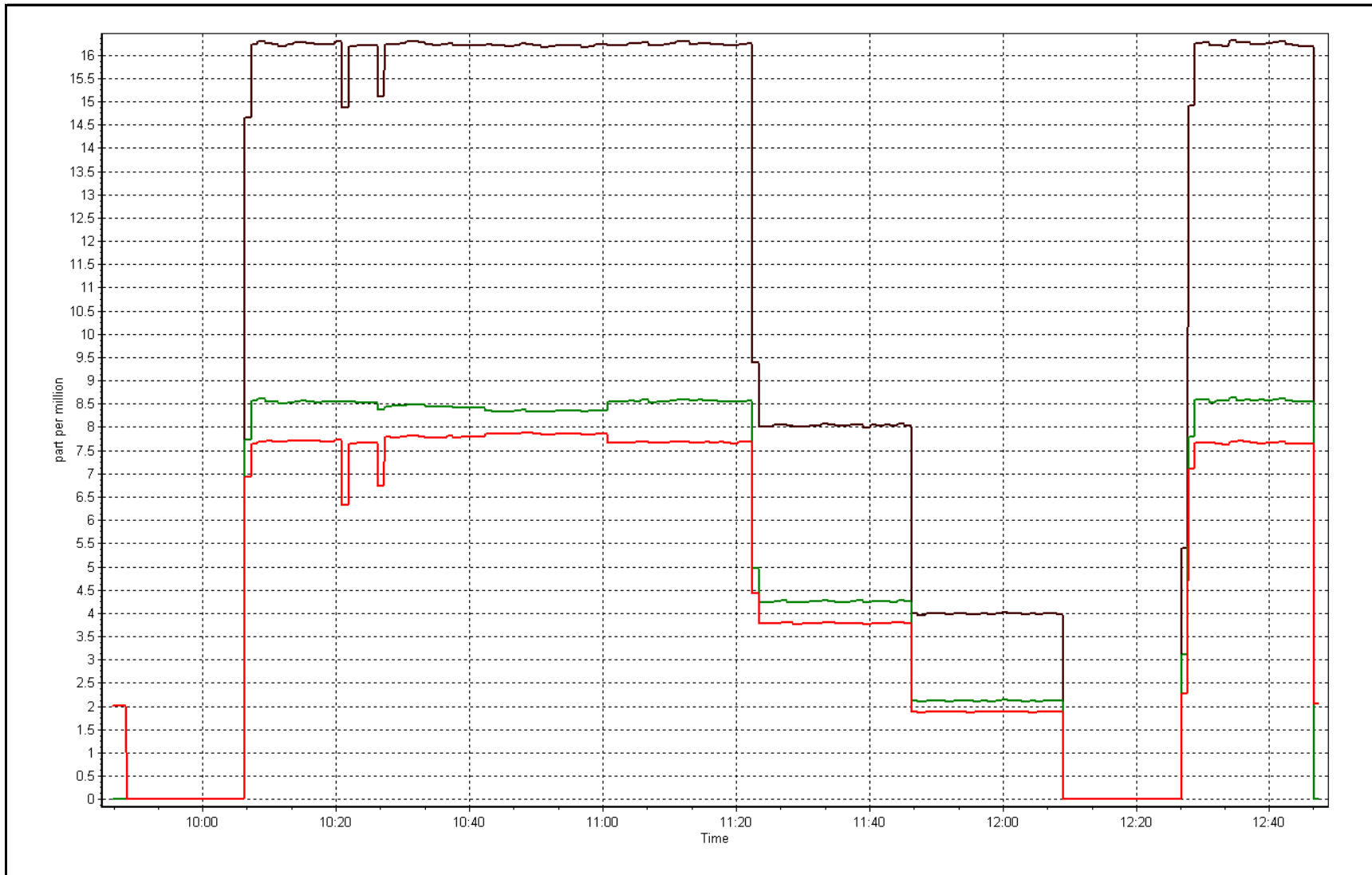
Station Information

Calibration Date	January 23, 2017	Previous Calibration	January 10, 2017
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:45	End Time (MST)	12:50
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	0.999969
8.55	8.57	0.9982		
4.28	4.25	1.0077	Slope	0.997544
2.15	2.12	1.0124		
			Intercept	0.020128







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	January 6, 2017	Previous Calibration	December 6, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	9:10	End Time (MST)	12:07
NO2 GPT Ref date	NA	Transfer Standard	API T700
Calibrator Make/Model	Teledyne API T700	Station temp.	23 Deg C
ZAG make/model	Teledyne API T701H	Serial Number	2449
DACS make/model	Campbell Scientific CR3000	Serial Number	201
		Serial Number	10957

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	31.2	30.7
Analyzer IP address	192.168.1.49		Lamp temp.	53.6	53.6
Calculated slope	0.999685	1.002663	Pressure	681.3	683.7
Calculated intercept	-1.556858	-1.571451	Flow cell A	0.712	0.713
Analyzer Background	-0.7	-0.7	Flow cell B	0.737	0.739
Analyzer Coefficient	0.999	0.993	Cell A Intensity	80894	79558
			Cell B Intensity	81515	79953

Analyzer make	Thermo 49i	Analyzer serial #	1300156234
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator O3 Generator Drive Voltage (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	800.0	0.0	-0.2	----
as found span	5500	1121.5	400.0	401.3	0.997
calibrator zero	5500	800.0	0.0	-0.2	----
high point	5500	1108.2	400.0	399.6	1.001
second point	5500	936.6	200.0	201.8	0.991
third point	5500	823.4	100.0	103.2	0.969
as left zero	5500	800.0	0.0	-0.2	----
as left span	5500	1121.5	400.0	399.8	1.001
Average Correction Factor					0.987

Corrected As found	401.6	Previous response	401.7	% change	0.0%
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Notes:

No maintenance completed. Span adjusted slightly.

Calibration Performed By: Devin Russell



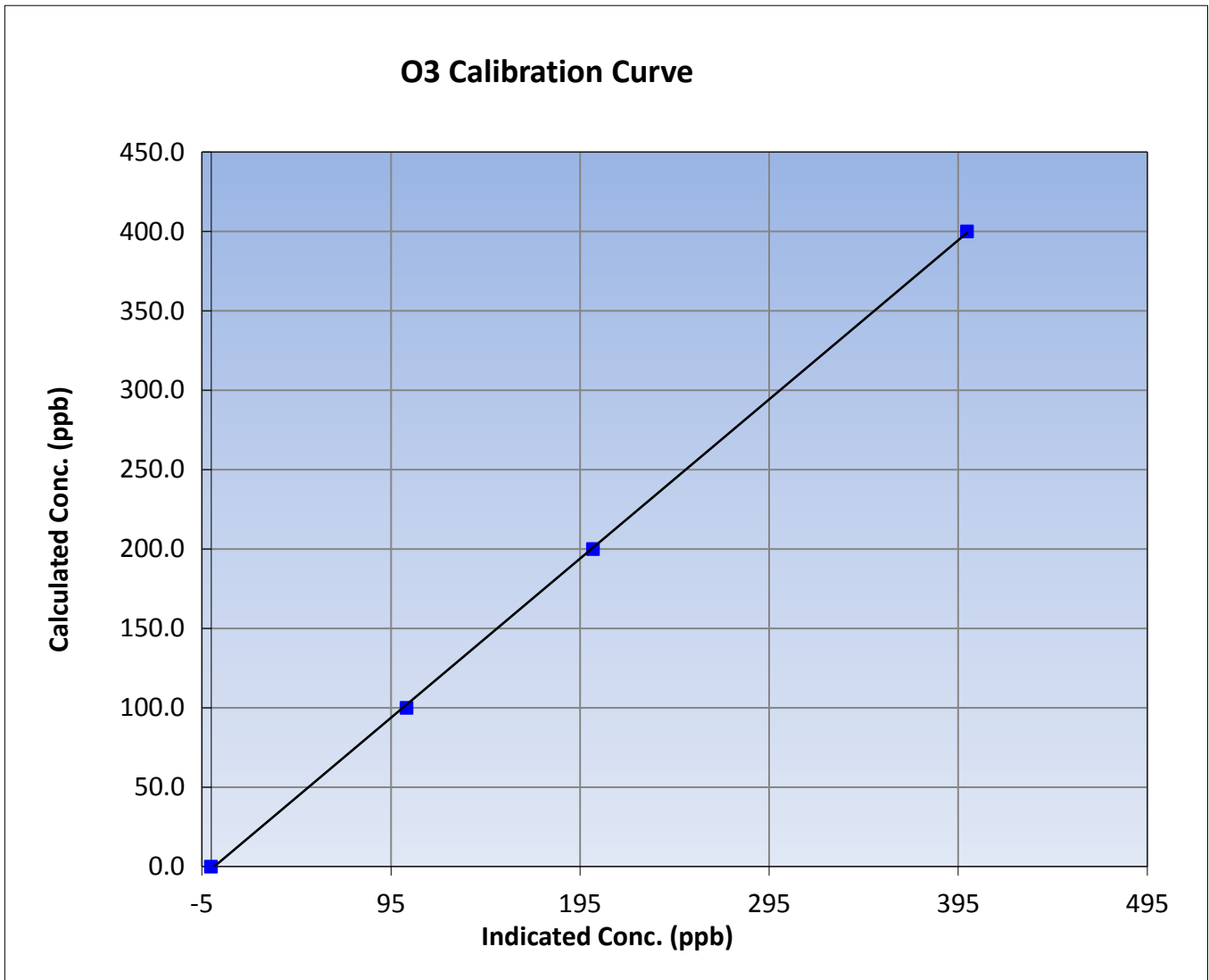
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	Friday, January 06, 2017	Previous Calibration	Tuesday, December 06, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:10	End Time (MST)	12:07
Analyzer make	Thermo 49i	Analyzer serial #	1300156234

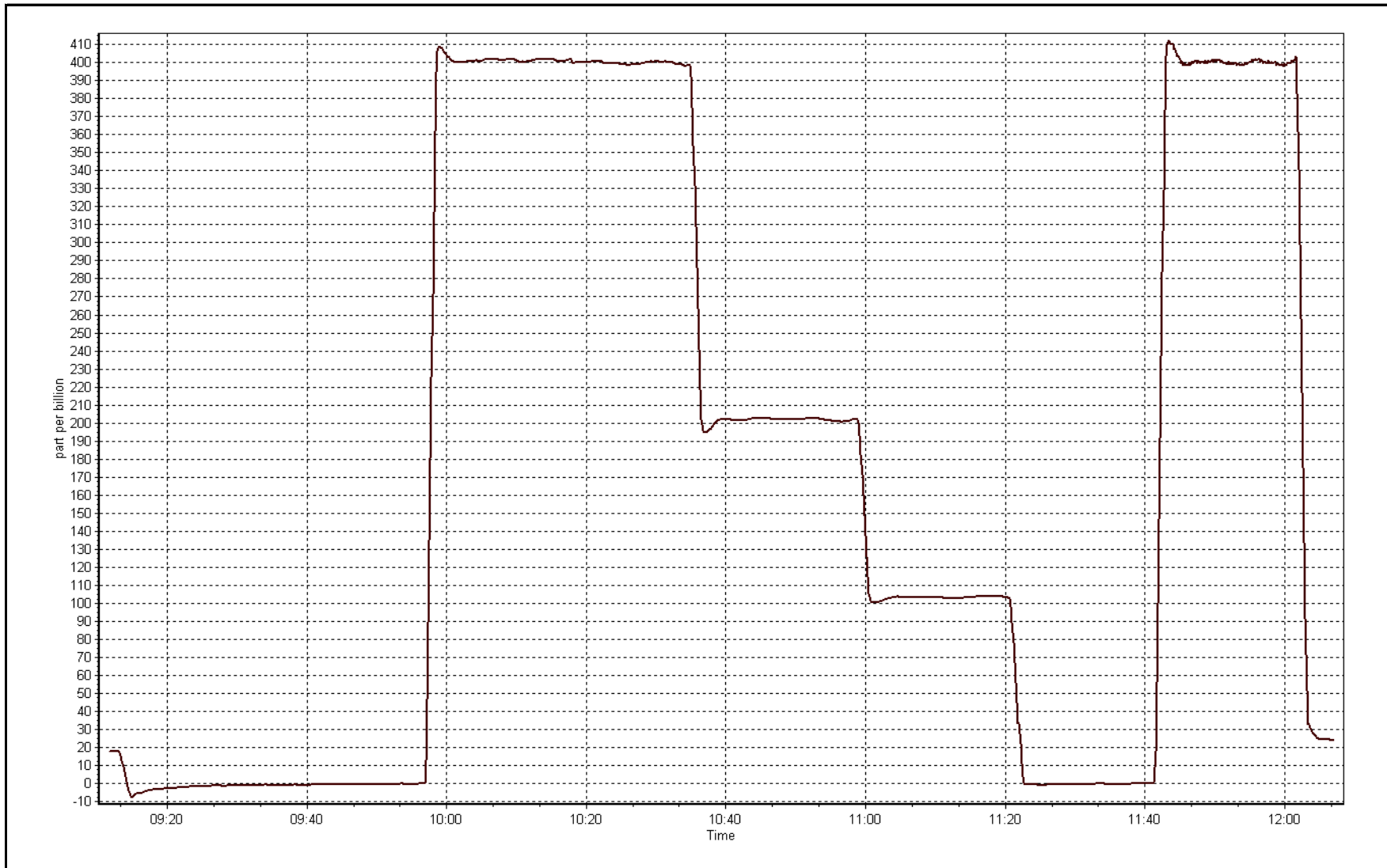
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999904
400.0	399.6	1.0010		
200.0	201.8	0.9909	Slope	1.002663
100.0	103.2	0.9689		
			Intercept	-1.571451



O3 Calibration Plot

Date: January 6, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 9, 2017	Previous Calibration	December 5, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	9:50	End Time (MST)	15:30
NO Cal Gas Conc	52.4 ppm	Gas Cert Reference	LL107926
NOX Cal Gas Conc	52.4 ppm	Cal Gas Expiry Date	2/16/19
Calibrator	Teledyne API T700	Serial Number	2449
Zero air Generator	Teledyne API 701H	Serial Number	201

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	10957
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.998732	0.998095	0.998255
	Data Offset	1.957371	1.975012	-0.339522
Current Calibration	Data Slope	0.989997	0.990444	1.000910
	Data Offset	2.688764	2.631211	0.024791

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153460
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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	1.040		1.044	
NOX coefficient	1.000		1.001	
NO2 coefficient	1.000		1.000	
NO bkgrnd	3.1		3.1	
NOX bkgrnd	3.3		3.3	
Chamber Temp	50.5	Deg C	50.5	Deg C
Moly Temp	323.0	Deg C	324.7	Deg C
PMT voltage	-772.6	V	-772.6	V
PMT Temp	-1.8	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	187.1	mmHg	185.9	mmHg
R Cell Press Nox	187.1	mmHg	185.9	mmHg
NO sample flow	0.770	lpm	0.771	lpm
Nox sample Flow	0.770	lpm	0.771	lpm

Notes:

Inlet filter changed after as founds. Span adjusted.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: January 9, 2017 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	5500	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	----	----
as found span	5500	84.1	801.2	801.2	0.0	794.4	793.7	0.7	1.0087	1.0095
calibrator zero	5500	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
high point	5542	84.1	795.2	795.2	0.0	802.0	801.7	0.3	0.9915	0.9918
second point	5500	42.1	401.1	401.1	0.0	400.5	400.3	0.2	1.0015	1.0020
third point	5500	21.1	201.0	201.0	0.0	198.1	198.2	-0.1	1.0148	1.0142
as left zero	5500	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	----	----
as left span	5500	84.1	801.2	373.4	427.8	808.1	375.6	432.5	0.9916	0.9943
Average Correction Factor									1.0026	1.0027

Corrected As found NO_x= 794.4 NO= 793.6 Percent Change NO_x= 0.7% NO= 0.9%
 Previous Response NO_x= 800.3 NO= 800.8

GPT Calibration Data

Dilution Flow (total) 5500 ccm Source Gas Flow 86.90 ccm NOx ref calc conc = 827.9 ppb NO ref calc conc = 827.9 ppb

O3 Setpoint (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
1st NO ref point		0.0	803.6	801.9	0.0	1.0303	1.0324	----	----
1st NO2 (400)	373.4	428.5	801.5	373.4	428.0	1.0330	----	1.0011	99.9%
2nd NO2 (200)	589.4	212.5	802.0	589.4	212.6	1.0323	----	0.9998	100.0%
3rd NO2 (100)	693.6	108.3	801.6	693.6	108.0	1.0328	----	1.0032	99.7%
2nd NO ref point	----	0.0	800.8	799.4	1.4	1.0338	1.0356	----	----
Average Correction Factor						1.0330		1.0014	99.9%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

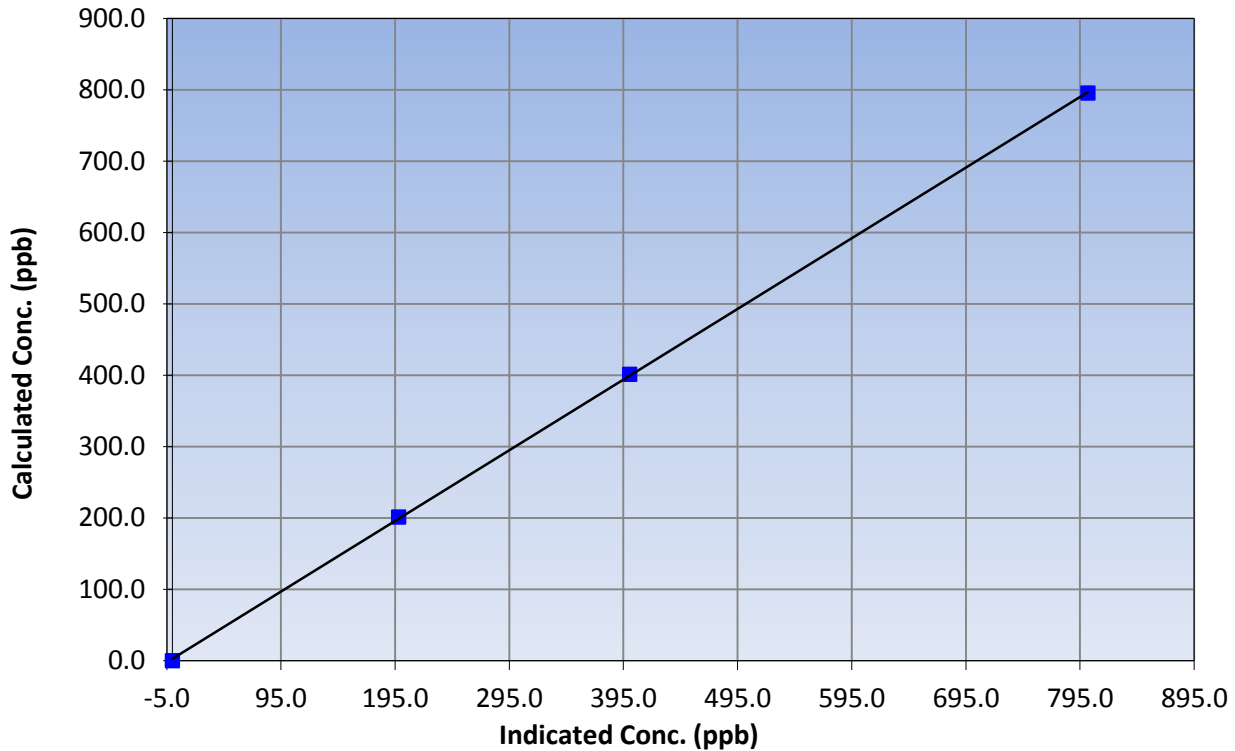
Station Information

Calibration Date	January 9, 2017	Previous Calibration	December 5, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:50	End Time (MST)	15:30
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	----	Correlation Coefficient	0.999948
795.2	802.0	0.9915		
401.1	400.5	1.0015	Slope	0.989997
201.0	198.1	1.0148		
			Intercept	2.688764

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

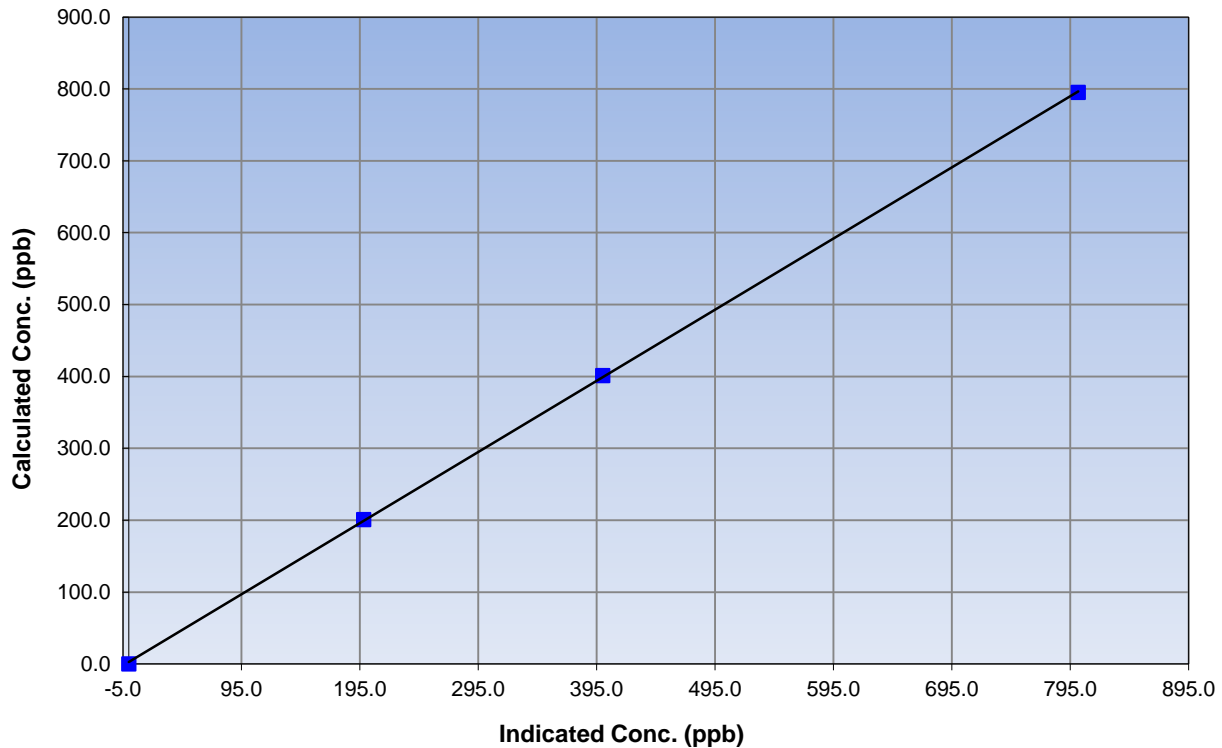
Station Information

Calibration Date	January 9, 2017	Previous Calibration	December 5, 2016
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:50	End Time (MST)	15:30
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	0.999950
795.2	801.7	0.9918		
401.1	400.3	1.0020	Slope	0.990444
201.0	198.2	1.0142		
			Intercept	2.631211

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

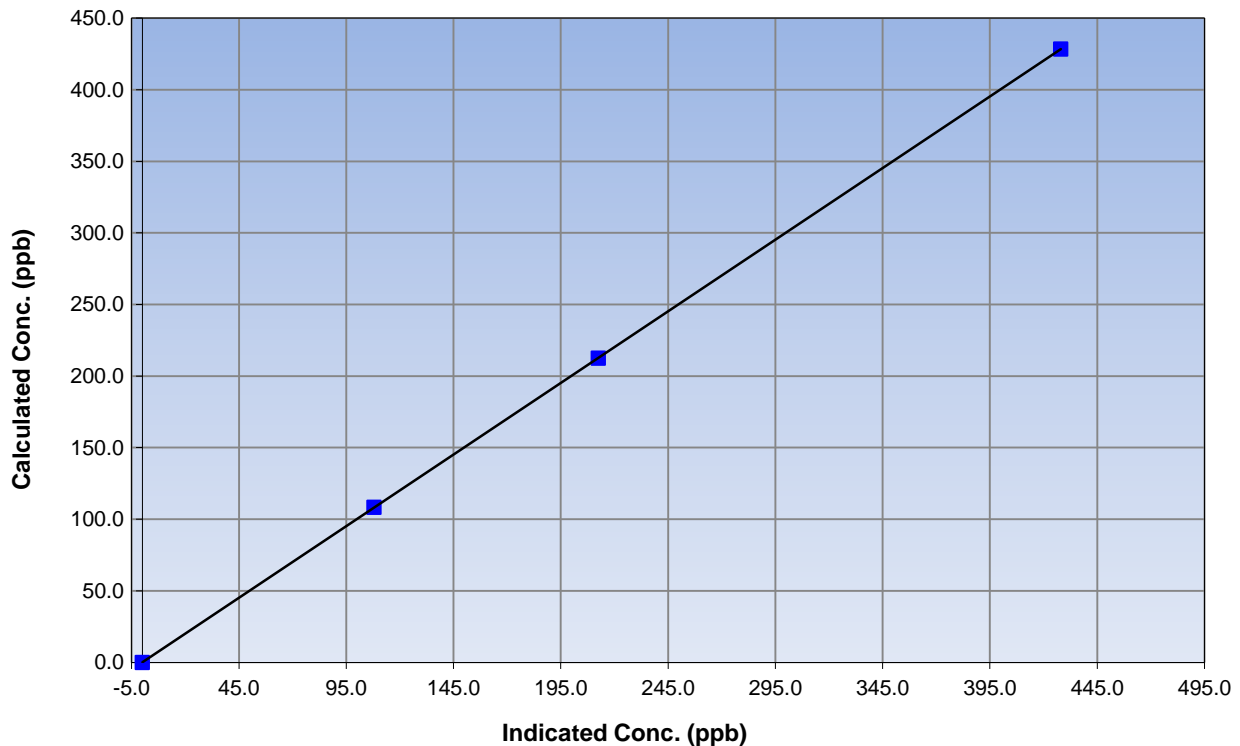
Station Information

Calibration Date	January 9, 2017	Previous Calibration	December 5, 2016
Station Number	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:50	End Time (MST)	15:30
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	0.0	N/A	Correlation Coefficient	0.999999
428.5	428.0	1.0011		
212.5	212.6	0.9998	Slope	1.000910
108.3	108.0	1.0032		
			Intercept	0.024791

NO₂ Calibration Curve





Wood Buffalo Environmental Association

N_t-NO_x-NH₃ Calibration Report

Station Information

Station Name	Patricia McInnis	Station Number	AMS 6
NOX Calibration Date	January 9, 2017	NOX Previous Cal Date	December 5, 2016
NH3 Calibration Date	January 10, 2017	NH3 Previous Cal Date	December 5, 2016
Reason:	Routine		
Start Time (MST)	9:50	End Time (MST)	15:30
Calibrator	Teledyne API T700	Station Temperature	21.0 Deg C
NH3 Cal Gas Conc	95.4 ppm	Serial Number	2449
NOx Cal Gas Conc	52.4 ppm	NH3 Expiry Date / SN	24/May/2017 SA25992
NO Cal Gas Conc	52.4 ppm	NO Expiry Date / SN	16/Feb/2019 LL107926

DACs Information

DACS make & model Campbell Scientific CR3000 DACS serial No. 10957

Parameter		NH3	Nt	NOx	NO	NO2
Cal Stats As Found	Data Slope	0.999941	0.976055	1.000355	1.001682	0.997825
	Data Offset	-0.995341	-3.7539179	1.185372	1.111948	-0.025036
Cal Stats After	Data Slope	1.002487	0.974373	1.000629	0.999556	1.002084
	Data Offset	0.084183	-0.85561247	1.659831	0.814693	0.926895
IP address		192.168.1.77				

Analyzer Information

Analyzer make/model	Teledyne T201	Analyzer serial #	215	
Converter	Teledyne 501	Converter serial #	217	
Test Point	before		after	
NH3 Conc range	2500	ppb	2500	ppb
NOX Conc range	1000	ppb	1000	ppb
NO BKG	-2.9		-2.9	ppb
NOx BKG	-2.5		-2.5	ppb
Nt BKG	-1.9		-1.9	
NO coefficient	1.057		1.066	
NO2 coefficient	1.000		1.000	ppb
NOx coefficient	1.083		1.088	
NH3 coefficient	1.003		1.000	
Nt coefficient	1.091		1.091	
NH3 conv temp	825	DegC	825	Deg C
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	315.8	Deg C	315.1	Deg C
PMT Temp	7.1	Deg C	7.1	Deg C
O3 flow	87.0	ccm	86.0	ccm
R Cell Press	6.1	"Hg	6.1	mmHg
PMT Voltage	693.0	v	693.0	v
Sample Flow 1 NO	554.0	ccm	561.0	ccm
Sample Flow 2 Nox	549.0	ccm	557.0	ccm
Sample Flow 3 Nt	565.0	ccm	570.0	ccm

Notes:

Inlet filter changed after as founds. Nox and NO span adjusted slightly. NH3 span adjusted.



Wood Buffalo Environmental Association

NH₃ Calibration Report

Station Information

Calibration Date:

January 10, 2017

Station Number:

AMS 6

NH₃ Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated Nt conc (ppb)	Calculated NOx conc (ppb)	Calculated NH ₃ conc (ppb)	Indicated Nt conc (ppb)	Indicated NOx conc (ppb)	Indicated NH ₃ conc (ppb)	Nt Correction factor	NH ₃ Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	-1.0	-1.3	0.3	----	----
as found NO	5500	84.1	801.2	801.2	----	813.7	804.9	9.3	0.985	----
calibrator zero	5500	0.0	0.0	0.0	0.0	0.2	0.1	0.2	----	----
high NO point	5500	84.1	801.2	801.2	----	800.7	800.1	0.6	1.001	----
NO/O ₃ point	5500	84.1	801.2	801.2	----	804.6	800.5	4.1	0.996	----
as found NH ₃	3538	73.5	1981.9	NA	1981.9	2014.7	56.4	1958.1	0.984	1.012
first NH ₃	3538	73.5	1981.9	NA	1981.9	2034.4	57.2	1977.2	0.974	1.002
second NH ₃	3538	36.8	992.3	NA	992.3	1020.1	30.9	989.0	0.973	1.003
third NH ₃	3538	18.5	498.8	NA	498.8	513.2	15.5	497.7	0.972	1.002
Average Correction Factor									0.9982	1.0027

Nt Corrected As Found Nt = 814.7 ppb
 NOx Corrected As Found NOx = 806.2 ppb
 NH₃ Previous Converter Efficiency = 100.3 %

Previous Response Nt = 824.7 ppb
 Previous Response NOx = 799.8 ppb
 NH₃ Current Converter Efficiency = 100.0 %

Nt percent change 1.2%
 NOx percent change -0.8%
 NH₃ percent change -0.3%



Wood Buffalo Environmental Association

NO_x(NH₃) Calibration Report

Station Information

Calibration Date:

January 9, 2017

Station Number:

AMS 6

NO_x / NO / Nt Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated Nt conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated Nt conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	1.2	1.2	1.5	----	----
as found span	5500	84.1	801.2	801.2	801.2	794.6	791.0	797.7	1.0084	1.0129
calibrator zero	5500	0.0	0.0	0.0	0.0	0.1	0.2	0.2	----	----
high point	5500	84.1	801.2	801.2	801.2	800.1	801.2	800.7	1.0015	1.0001
second point	5500	42.1	401.1	401.1	401.1	397.9	400.3	398.7	1.0079	1.0020
third point	5500	21.1	201.0	201.0	201.0	197.8	199.1	198.2	1.0164	1.0099
Average Correction Factor									1.0086	1.0040

	<u>Nt</u>	<u>NOX</u>	<u>NO</u>	<u>NO2</u>
Corrected As found	796.2	793.3	789.8	----
Previous Response	824.7	799.8	798.8	----
Percent Change	3.6%	0.8%	1.1%	-0.3%

GPT Calibration Data

Dilution Flow (total) 5500 ccm Source Gas Flow 86.9 ccm NO_x ref calc conc = 827.9 ppb NO ref calc conc = 827.9 ppb

O ₃ Setpoint (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
1st NO ref point	----	0.0	800.5	801.7	-1.2	1.0342	1.0327	----	----
1st NO ₂ (400)	377.7	424.1	799.6	377.7	422.0	1.0354	----	1.0050	99.5%
2nd NO ₂ (200)	594.7	207.1	802.0	594.7	207.3	1.0323	----	0.9986	100.1%
3rd NO ₂ (100)	697.2	104.5	798.5	697.2	101.2	1.0369	----	1.0323	96.9%
2nd NO ref point	----	0.0	799.6	796.0	3.6	1.0354	1.0401	----	----
Average Correction Factor						1.0350	1.0364	1.0120	98.8%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NH3 Calibration Summary

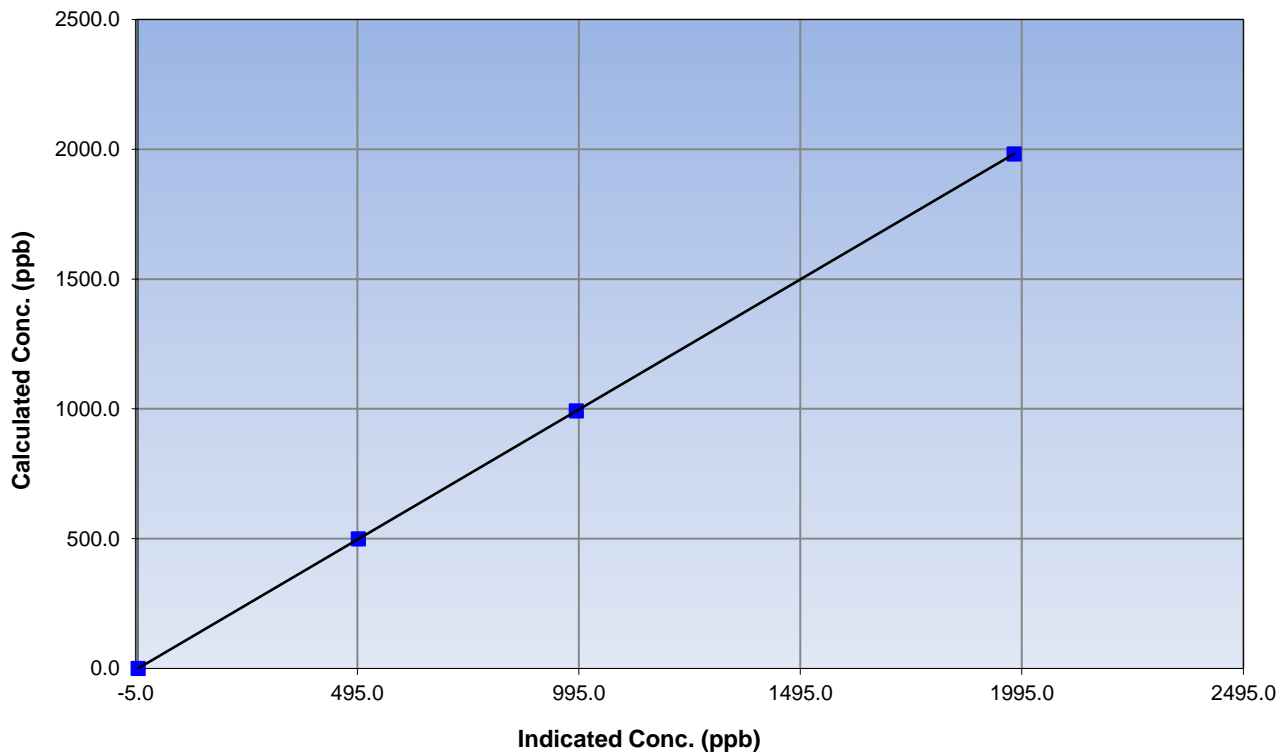
Station Information

Calibration Date	January 10, 2017	Previous Calibration	December 5, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:50	End Time (MST)	15:30
Analyzer make	Teledyne T201	Analyzer serial #	215

NH3 Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	1.000000
1981.9	1977.2	1.0024		
992.3	989.0	1.0033	Slope	1.002487
498.8	497.7	1.0023		
			Intercept	0.084183

NH3 Calibration Curve





Wood Buffalo Environmental Association

Nt Calibration Summary

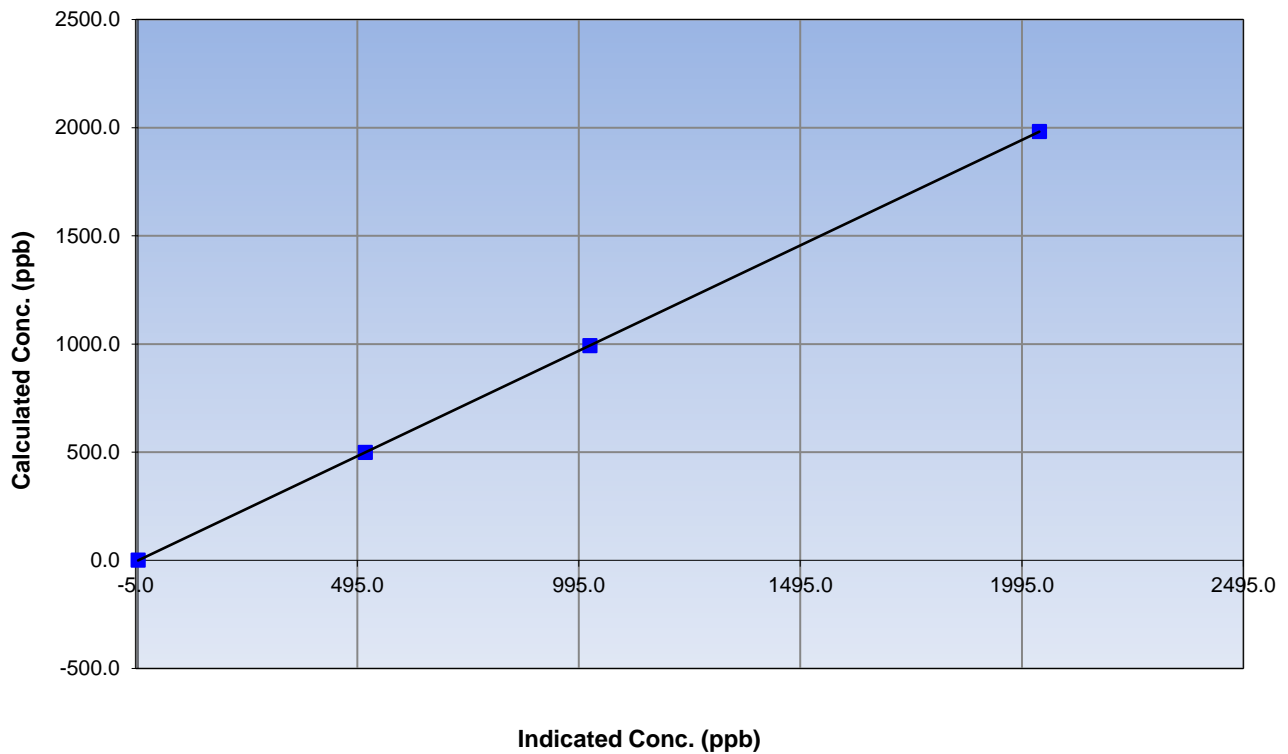
Station Information

Calibration Date	January 10, 2017	Previous Calibration	December 5, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:50	End Time (MST)	15:30
Analyzer make	Teledyne T201	Analyzer serial #	215

Nt (NH₃) Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999999
1981.9	2034.4	0.9742		
992.3	1020.1	0.9728		
498.8	513.2	0.9720	Slope	0.974373
			Intercept	-0.855612

Nt Calibration Curve





Wood Buffalo Environmental Association

NOx Calibration Summary

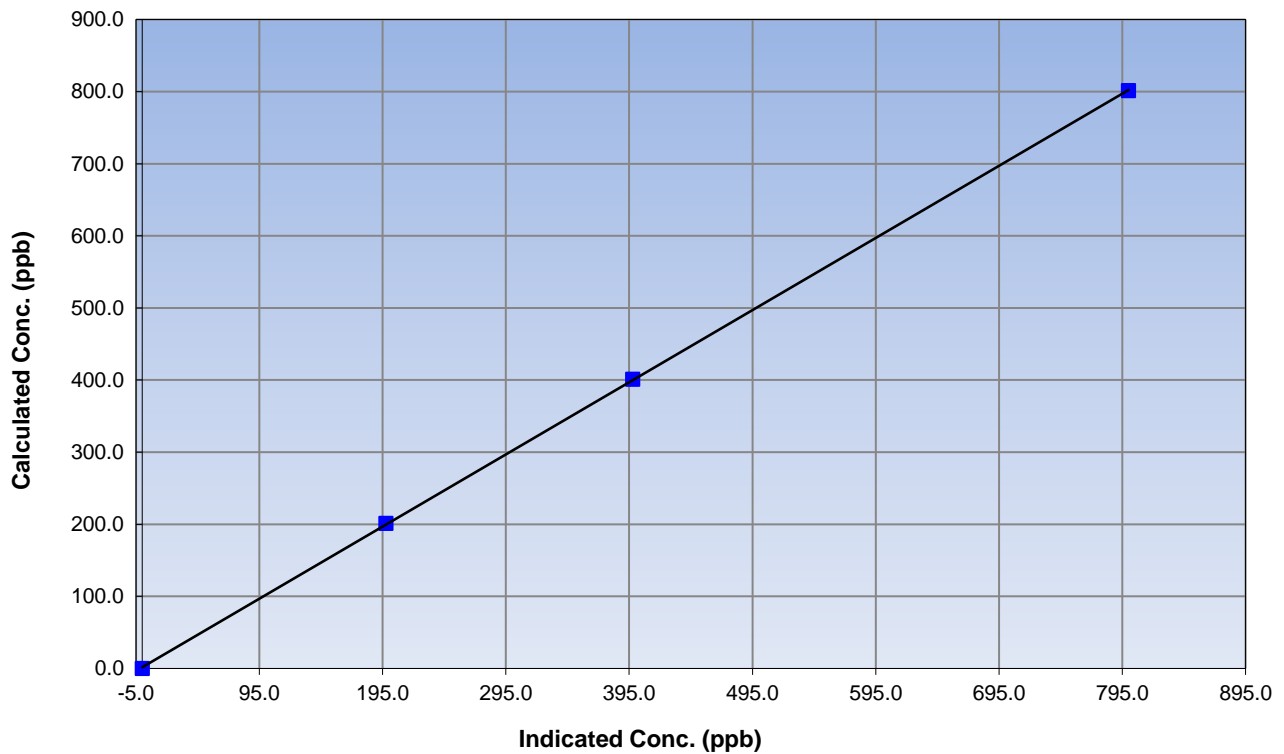
Station Information

Calibration Date	January 9, 2017	Previous Calibration	December 5, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:50	End Time (MST)	15:30
Analyzer make	Teledyne T201	Analyzer serial #	215

NO_x Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999978
801.2	800.1	1.0015		
401.1	397.9	1.0079	Slope	1.000629
201.0	197.8	1.0164		
			Intercept	1.659831

NOx Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

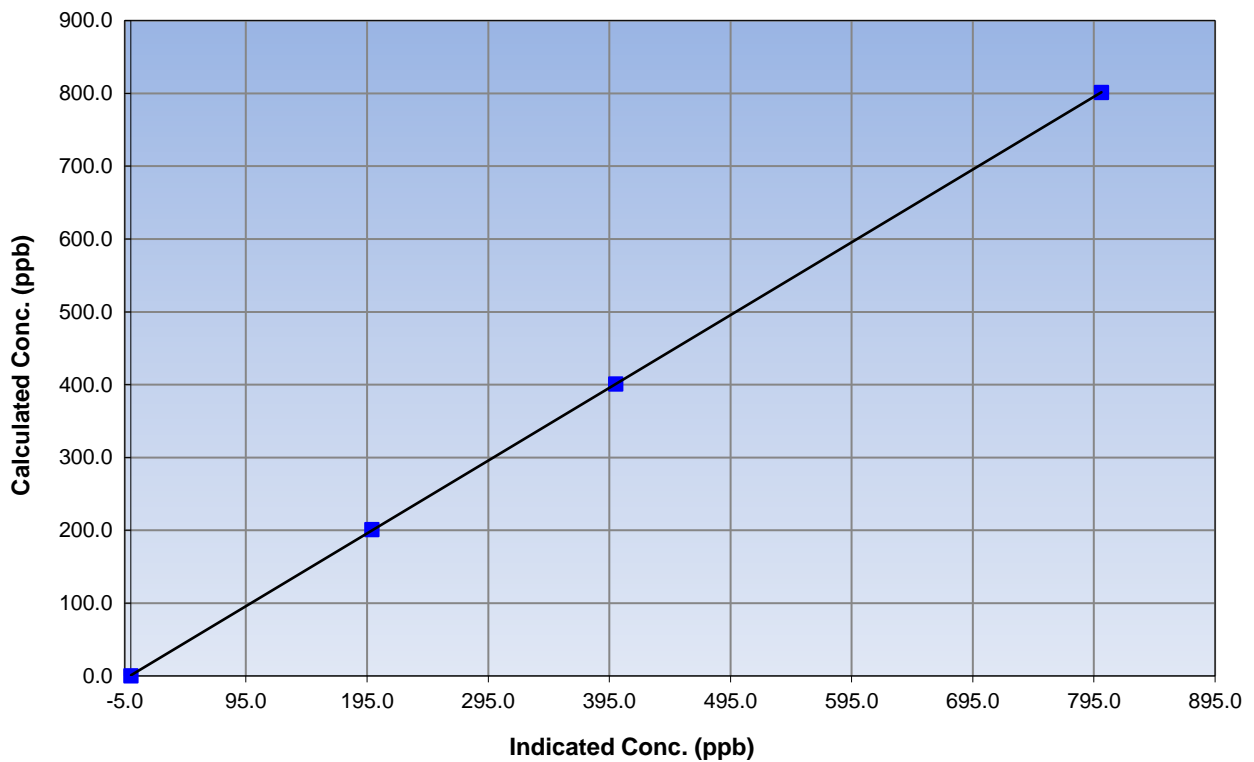
Station Information

Calibration Date	January 9, 2017	Previous Calibration	December 5, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:50	End Time (MST)	15:30
Analyzer make	Teledyne 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	0.999992
801.2	801.2	1.0001		
401.1	400.3	1.0020	Slope	0.999556
201.0	199.1	1.0099		
			Intercept	0.814693

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

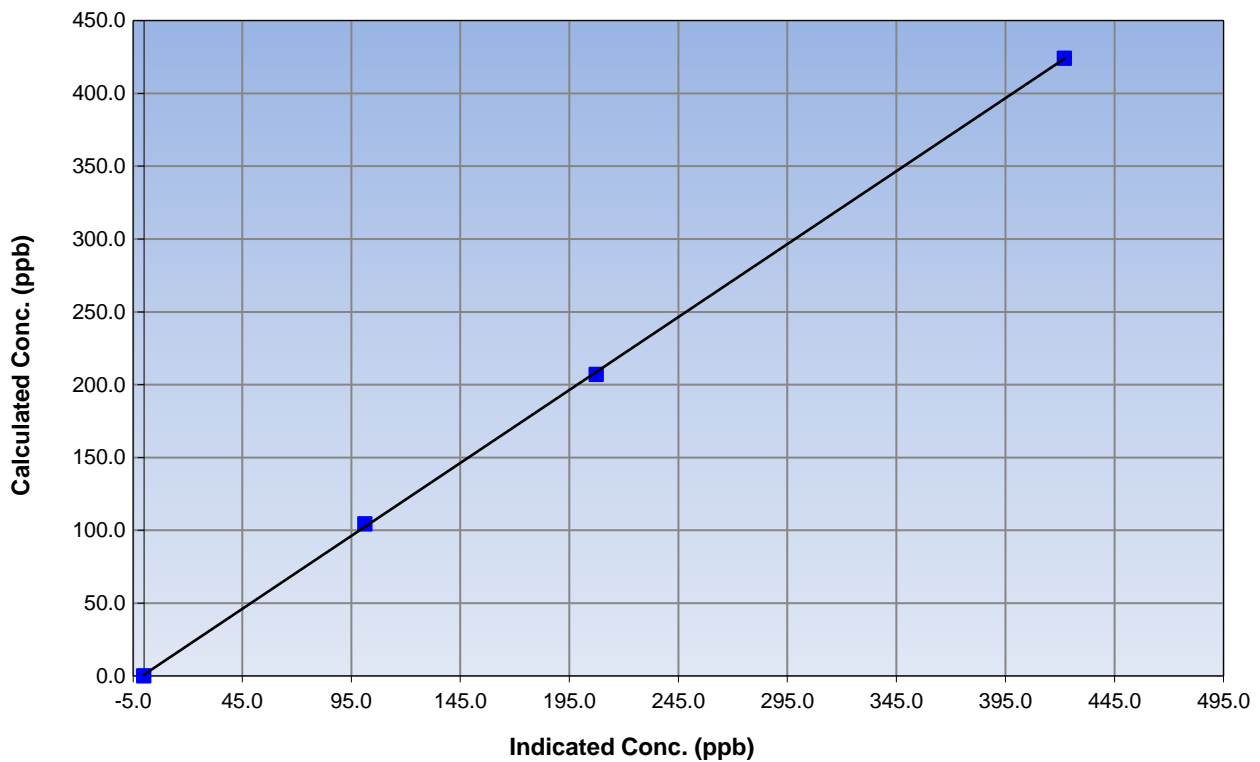
Station Information

Calibration Date	January 9, 2017	Previous Calibration	December 5, 2016
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:50	End Time (MST)	15:30
Analyzer make	Teledyne T201	Analyzer serial #	215

Calibration Information

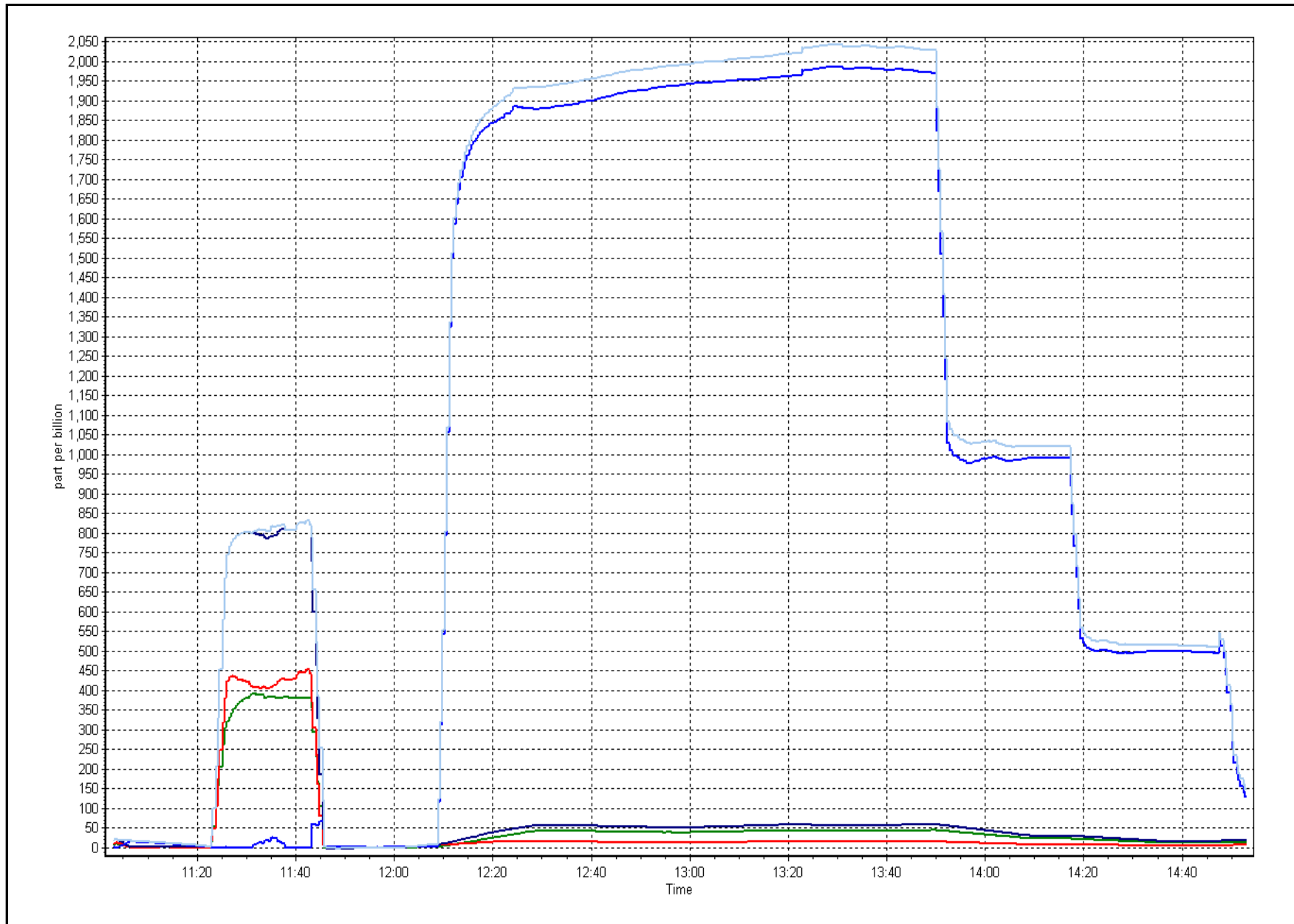
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999919
424.1	422.0	1.0050		
207.1	207.3	0.9986	Slope	1.002084
104.5	101.2	1.0323		
			Intercept	0.926895

NO₂ Calibration Curve



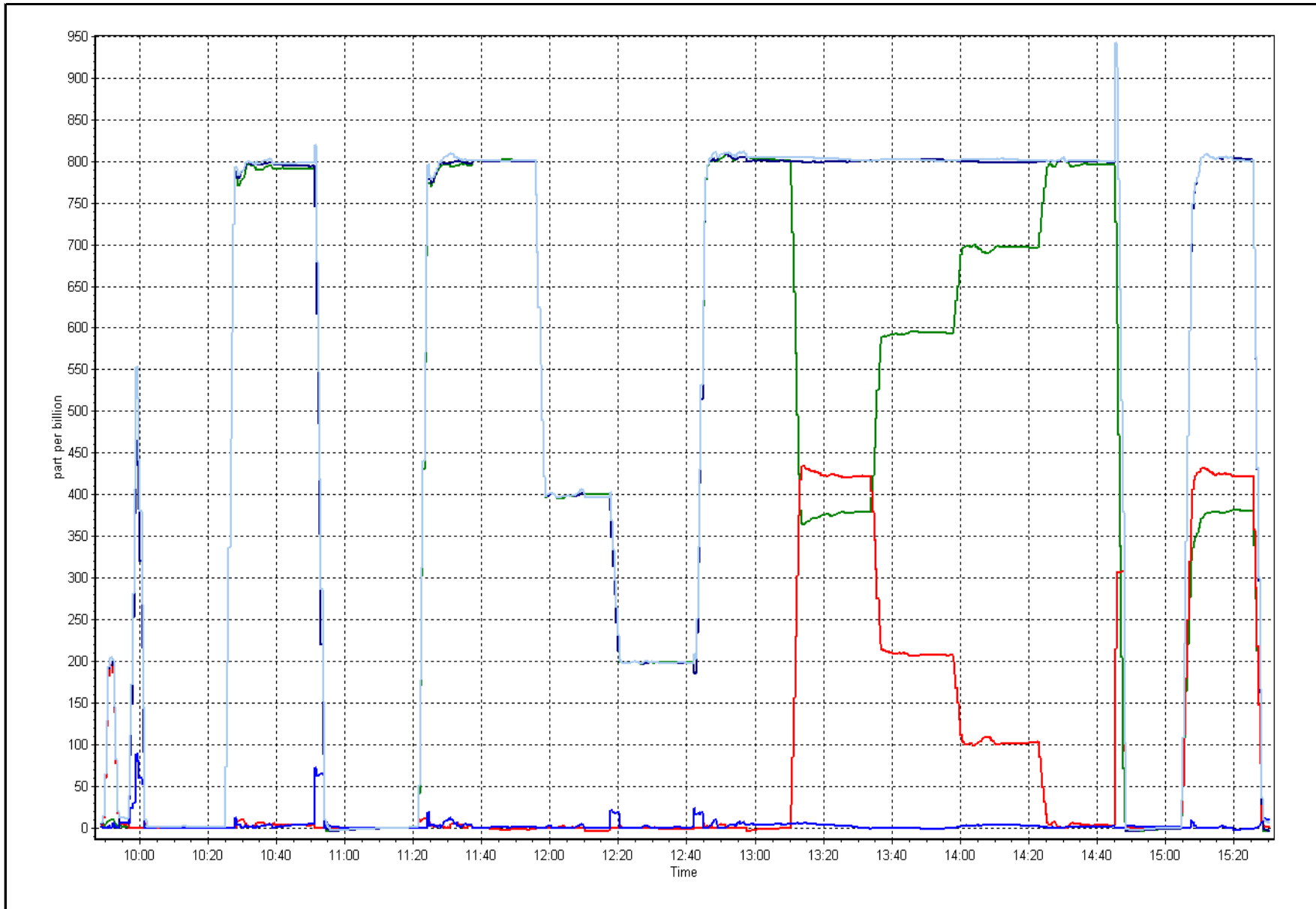
NH₃ Calibration Plot

Date: January 10, 2017



NOX Calibration Plot

Date: January 9, 2017





Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-08-2016

Station Information

Station Name:	Patricia McInnis	Station number:	AMS 6
Calibration Date:	January 17, 2017	Last Cal Date:	December 7, 2016
Start time (MST):	12:05	End time (MST):	12:40
Sharp Model:	Thermo SHARP 5030	S/N:	E-1475
Particulate Fraction:	PM2.5	C14 Source S/N:	5680
Flow Standard Model:	Delta Cal	S/N:	1451
Temp/RH standard:	Delta Cal	S/N:	1451

Monthly Calibration Test

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<u>Tolerance</u>
T1 (°C)	4	5.1	4	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	948	945.25	948	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	997.8	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	-0.1	-----	-0.1	<input type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified	<input checked="" type="checkbox"/>			
Cyclone cleaning :	PM10 Cyclone	<input checked="" type="checkbox"/>	PM2.5 Cyclone	<input checked="" type="checkbox"/>	
Filter Tape Installed:	<input type="checkbox"/>				

Quarterly Calibration Test

			<u>Tolerance</u>
Leak Test:	Date of check: <u>January 17, 2017</u>	Last Cal Date: _____	
	Flow w/o adaptor: <u>16.65</u>	Flow w/ adaptor: <u>16.47</u>	0.4 LPM

Annual Calibration Test

Foil Calibration	Foil Mass: _____	S/N: _____
	Date of check: _____	Last Cal Date: <u>June 9, 2016</u>
	New Correction Factor: _____	Previous Correction Factor: _____

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<u>Tolerance</u>
T2 (°C)				<input type="checkbox"/>	+/- 2 °C
T3 (°C)				<input type="checkbox"/>	+/- 2 °C
T4 (°C)				<input type="checkbox"/>	+/- 2 °C
RH (%)				<input type="checkbox"/>	+/- 10%

Notes: Cyclone head cleaned. No adjustments made to temperature or flow. Leak check completed and passed. Nephelometer did not require an adjustment.

Calibration by: Devin Russell



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 7
ATHABASCA VALLEY
JANUARY 2017

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

February 27, 2017



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
 JANUARY 2017

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	707	36	37	99.87	14	0	5	0
TRS (ppb) Average	708	34	36	99.73	2	0	1	0
THC (ppm) Average	706	36	38	99.73	3.6	-	2.8	-
NMHC (ppm) Average	706	36	38	99.73	0.651	-	0.206	-
CH4(ppm) Average	706	36	38	99.73	3.6	-	2.8	-
O3 (ppb) Average	708	34	36	99.73	41	0	33	-
NO2 (ppb) Average	704	36	40	99.46	45	0	26	-
NO (ppb) Average	704	36	40	99.46	132	-	27	-
NOX (ppb) Average	704	36	40	99.46	169	-	48	-
PM2.5 (ug/m3) Average	735	1	9	98.92	36.7	-	14.2	0
CO(ppm) Average	709	33	35	99.73	0.7	0	0.3	-
Temperature 2 m (C) Average	744	0	0	100.00	7.6	-	1.4	-
Barometric Pressure (inHg) Average	744	0	0	100.00	29.6	-	29.5	-
Relative Humidity (%) Average	744	0	0	100.00	96	-	92	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	34	-	16	-
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)
JANUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, TRS, O3, CO	19 Jan 2017 11:00	19 Jan 2017 11:00	1	Station power failure
TRS, O3, CO	05 Jan 2017 11:00	05 Jan 2017 11:00	1	Maintenance - sample manifold cleaned
NMHC, CH4, THC	19 Jan 2017 11:00	19 Jan 2017 12:00	2	Station power failure
NO2, NO, NOX	17 Jan 2017 09:00	17 Jan 2017 10:00	2	Maintenance - sample manifold cleaned
NO2, NO, NOX	19 Jan 2017 11:00	19 Jan 2017 12:00	2	Station power failure
PM2.5	14 Jan 2017 16:00	14 Jan 2017 16:00	1	Unstable operation - excessive baseline drift
PM2.5	15 Jan 2017 07:00	15 Jan 2017 07:00	1	Unstable operation - excessive baseline drift
PM2.5	15 Jan 2017 12:00	15 Jan 2017 12:00	1	Unstable operation - excessive baseline drift
PM2.5	15 Jan 2017 15:00	15 Jan 2017 15:00	1	Unstable operation - excessive baseline drift
PM2.5	19 Jan 2017 11:00	19 Jan 2017 11:00	1	Station power failure
PM2.5	19 Jan 2017 12:00	19 Jan 2017 13:00	2	Unstable operation - stabilization following power failure
PM2.5	29 Jan 2017 14:00	29 Jan 2017 14:00	1	Unstable operation - excessive baseline drift



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

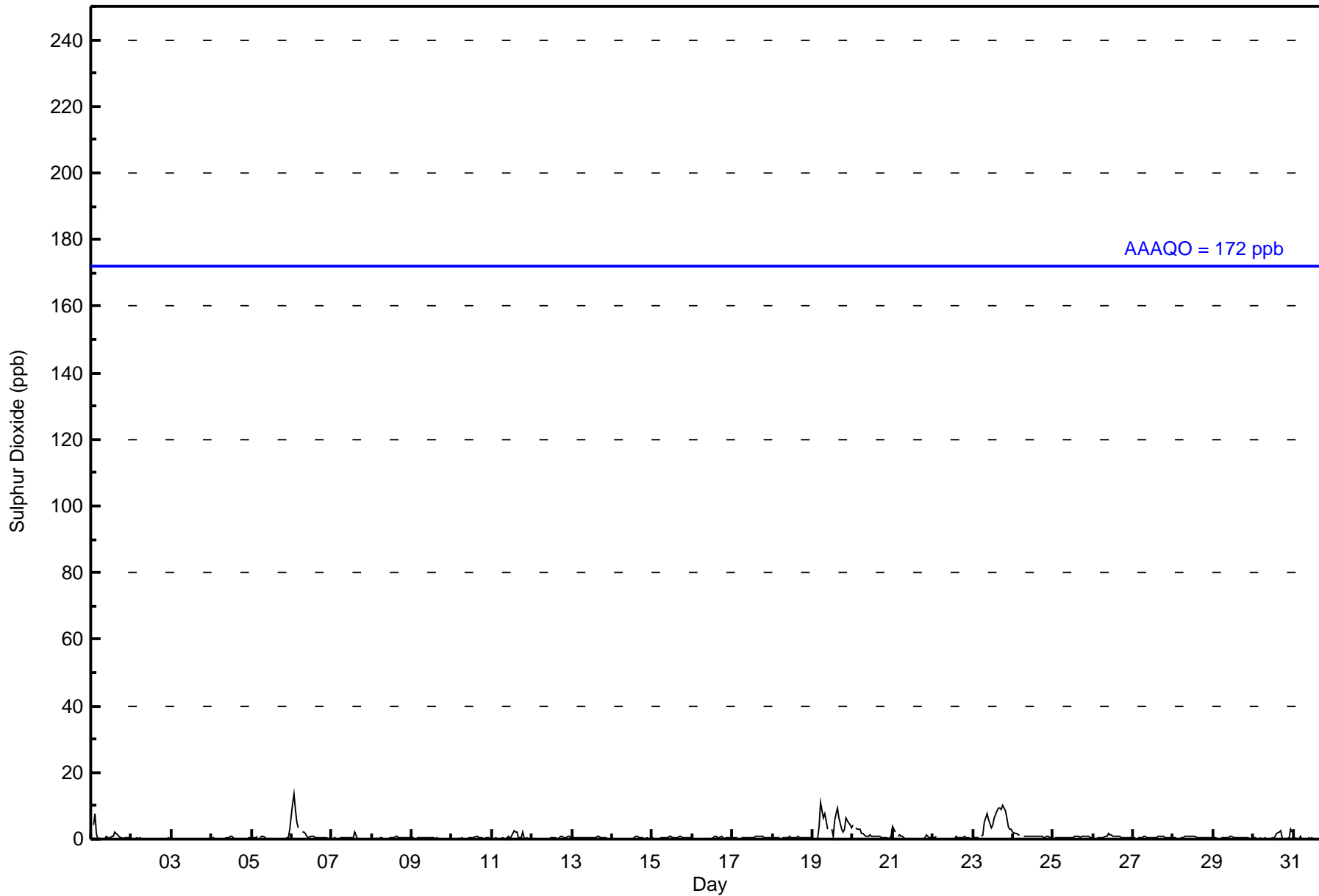
Athabasca Valley - January 2017

Number of Exceedences (AAAQO):		1-hr: 0 24-hr: 0		Hours in Service:		744																																											
Maximum Value: 14 ppb on Jan 6 02:00		Maximum Daily Average: 4.8 ppb on Jan 23		Hours of Data:		707																																											
Minimum Value: 0 ppb on Jan 3 17:00		Minimum Daily Average: 0.0 ppb on Jan 3		Hours of Missing Data:		37																																											
Maximum Diurnal Average: 1.2 ppb at hour 15		Minimum Diurnal Average: 0.6 ppb at hour 11		Hours of Calibration:		36																																											
Monthly Average: 0.8 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 9		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-Jan	Z	4	7	2	0	0	0	0	0	1	0	0	1	1	2	2	1	1	0	0	0	0	0	0	1.0	7																							
2-Jan	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																							
3-Jan	0	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																							
4-Jan	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																							
5-Jan	0	0	0	1	Z	1	1	1	1	C	C	C	C	C	0	0	0	0	0	0	0	0	1	3	0.6	3																							
6-Jan	11	14	9	5	3	Z	2	2	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	2.4	14																								
7-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0.3	2																							
8-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0.3	1																							
9-Jan	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
10-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0.3	1																							
11-Jan	0	0	0	0	Z	0	0	0	0	0	1	0	2	3	2	2	1	0	2	0	0	0	0	0	0.7	3																							
12-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0.3	1																							
13-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0.4	1																							
14-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0.2	1																							
15-Jan	0	0	Z	0	0	0	0	1	1	0	1	1	1	1	0	1	1	1	1	0	0	0	0	0	0.4	1																							
16-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	0	0	0	0	0	0.3	1																							
17-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0.5	1																							
18-Jan	0	0	0	0	0	Z	0	0	0	0	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0.4	1																							
19-Jan	Z	0	0	0	4	11	6	8	5	3	PF	3	1	5	8	9	6	3	2	3	6	5	4	3	4.5	11																							
20-Jan	4	Z	3	3	3	2	2	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1.3	4																							
21-Jan	4	2	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0.7	4																							
22-Jan	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	0	0	0	0	0.4	1																							
23-Jan	0	0	0	0	Z	1	1	5	8	6	5	4	4	6	9	9	9	9	10	8	6	4	3	3	4.8	10																							
24-Jan	2	2	2	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1.0	2																							
25-Jan	Z	0	0	0	0	0	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1																							
26-Jan	0	Z	0	0	1	0	1	1	1	2	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.7	2																							
27-Jan	0	1	Z	0	0	1	1	1	0	0	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0.5	1																							
28-Jan	0	1	0	Z	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1																							
29-Jan	0	0	0	0	Z	0	1	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1																							
30-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	2	2	3	1	0	0	0	0	3	2	0.7	3																							
31-Jan	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
																								1.0	1.1	1.0	0.7	0.7	0.8	0.7	0.8	0.8	0.7	0.6	0.6	0.7	0.9	1.2	1.2	1.0	0.8	0.8	0.7	0.7	0.6	0.6	0.6	Diurnal Average	
																								11	14	9	5	4	11	6	8	8	6	5	4	4	6	9	9	9	9	9	10	8	6	5	4	3	Diurnal Maximum
Z - zerospan C - Calibration PF - Power Failure																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																																																	



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	704	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: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	42	7	6	7	6	32	130	110	35	48	91	44	27	14	21	84	704
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	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
Totals	42	7	6	7	6	32	130	110	35	48	91	44	28	15	21	85	707

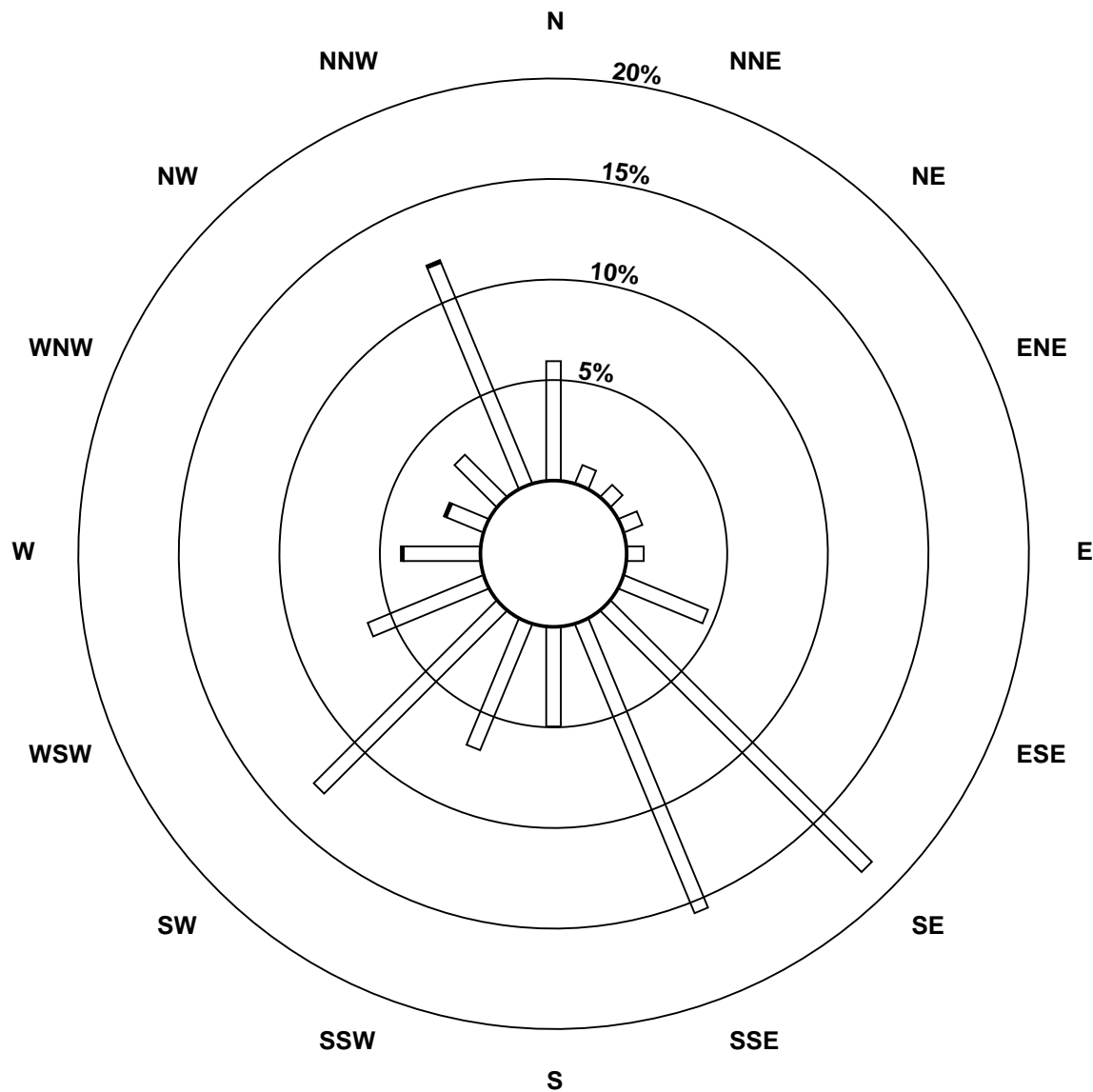
Total Number of Valid Hours: 707

Total Number of Hours: 744

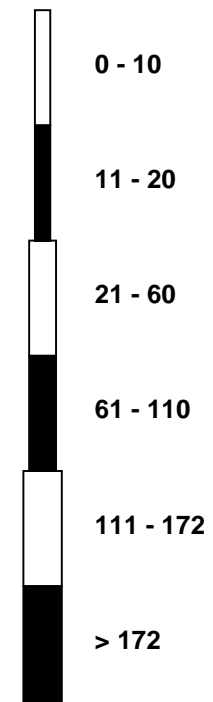


Wood Buffalo Environmental Association
Wind Rose 2012-2017

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley (AMS 7)



Classes (ppb)

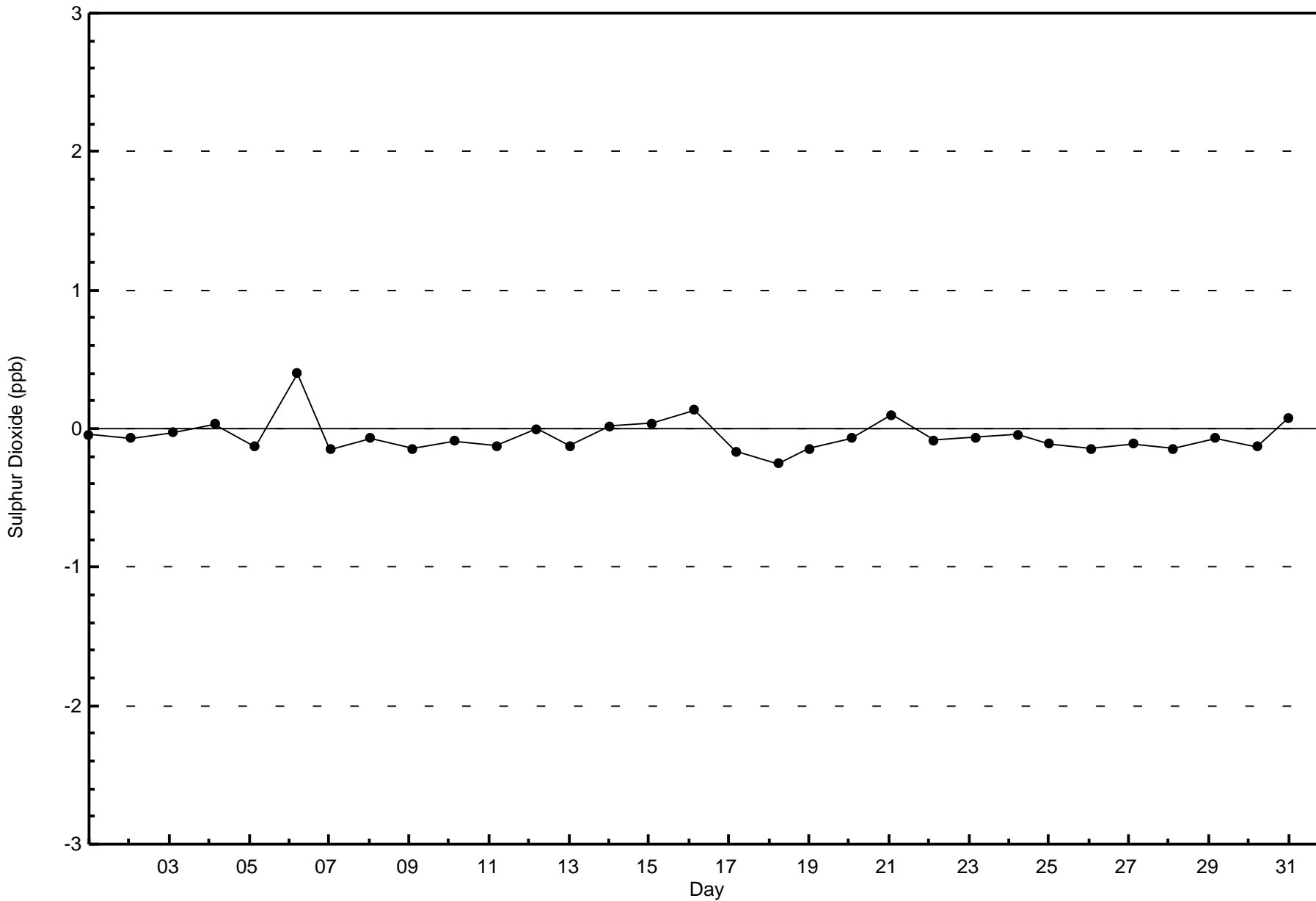


Total Number of Valid Hours: 707



Wood Buffalo Environmental Association
Zero Responses

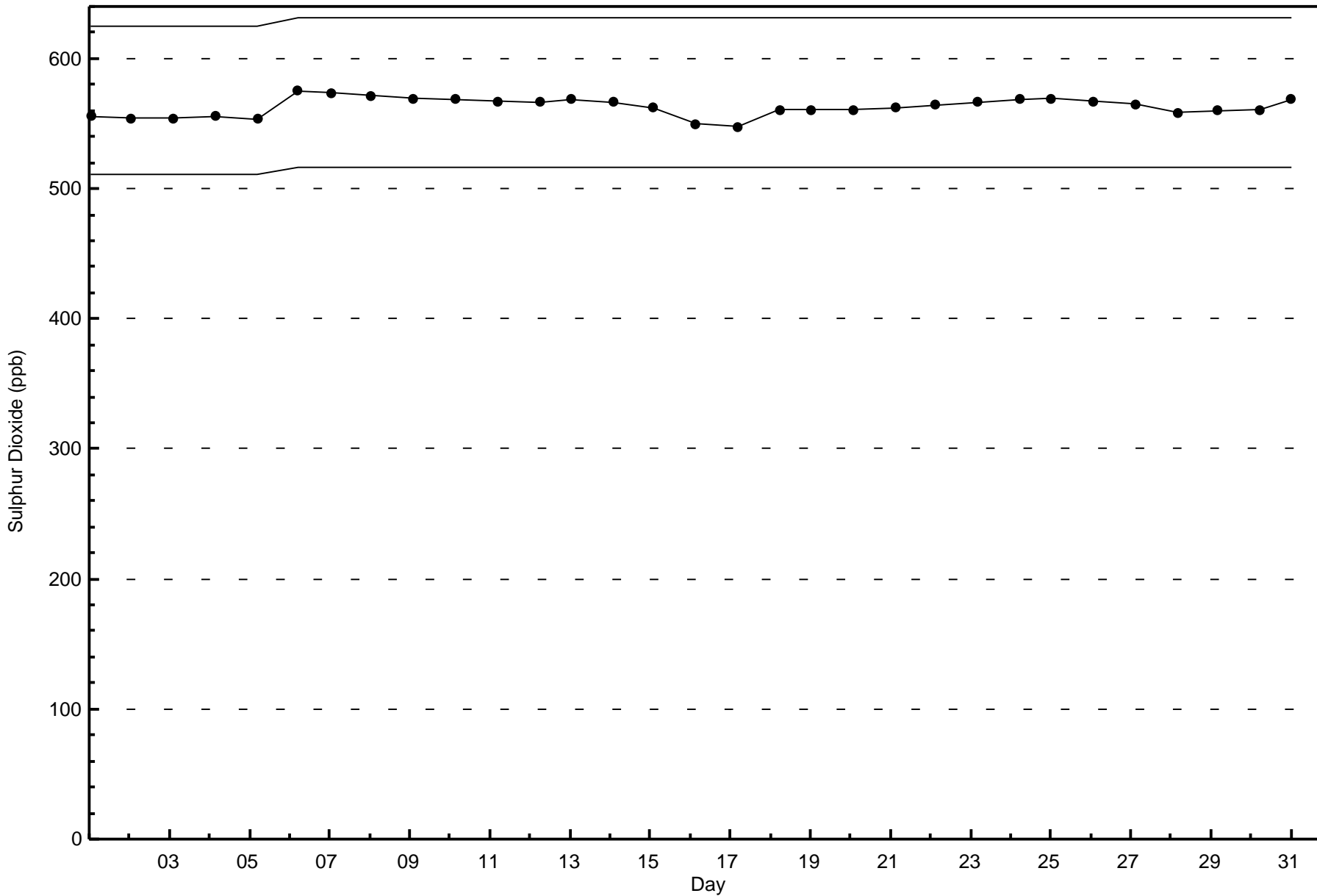
Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - January 2017





Wood Buffalo Environmental Association
Span Responses

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - January 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

Athabasca Valley - January 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 2 ppb on Jan 19 06:00	Maximum Daily Average: 0.9 ppb on Jan 19		Hours of Data:	708
Minimum Value: 0 ppb on Jan 16 20:00	Minimum Daily Average: 0.3 ppb on Jan 17		Hours of Missing Data:	36
Maximum Diurnal Average: 0.4 ppb at hour 5	Minimum Diurnal Average: 0.4 ppb at hour 3		Hours of Calibration:	34
Monthly Average: 0.4 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 1		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-Jan	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
2-Jan	0	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
3-Jan	0	0	0	Z	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
4-Jan	0	1	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
5-Jan	0	0	0	1	0	Z	1	1	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	1
6-Jan	1	0	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
7-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1
8-Jan	0	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
9-Jan	0	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
10-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
11-Jan	0	0	0	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
12-Jan	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
13-Jan	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
14-Jan	0	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
15-Jan	0	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
16-Jan	0	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
17-Jan	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
18-Jan	0	0	0	0	0	0	Z	0	0	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	2
19-Jan	0	Z	0	1	1	2	1	1	1	1	PF	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	2
20-Jan	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	0.7	1
21-Jan	1	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0.5	1
22-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0.4	1
23-Jan	0	0	0	1	1	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	1	0.5	1
24-Jan	1	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
25-Jan	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
26-Jan	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
27-Jan	0	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
28-Jan	0	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
29-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.3	1
30-Jan	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
31-Jan	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

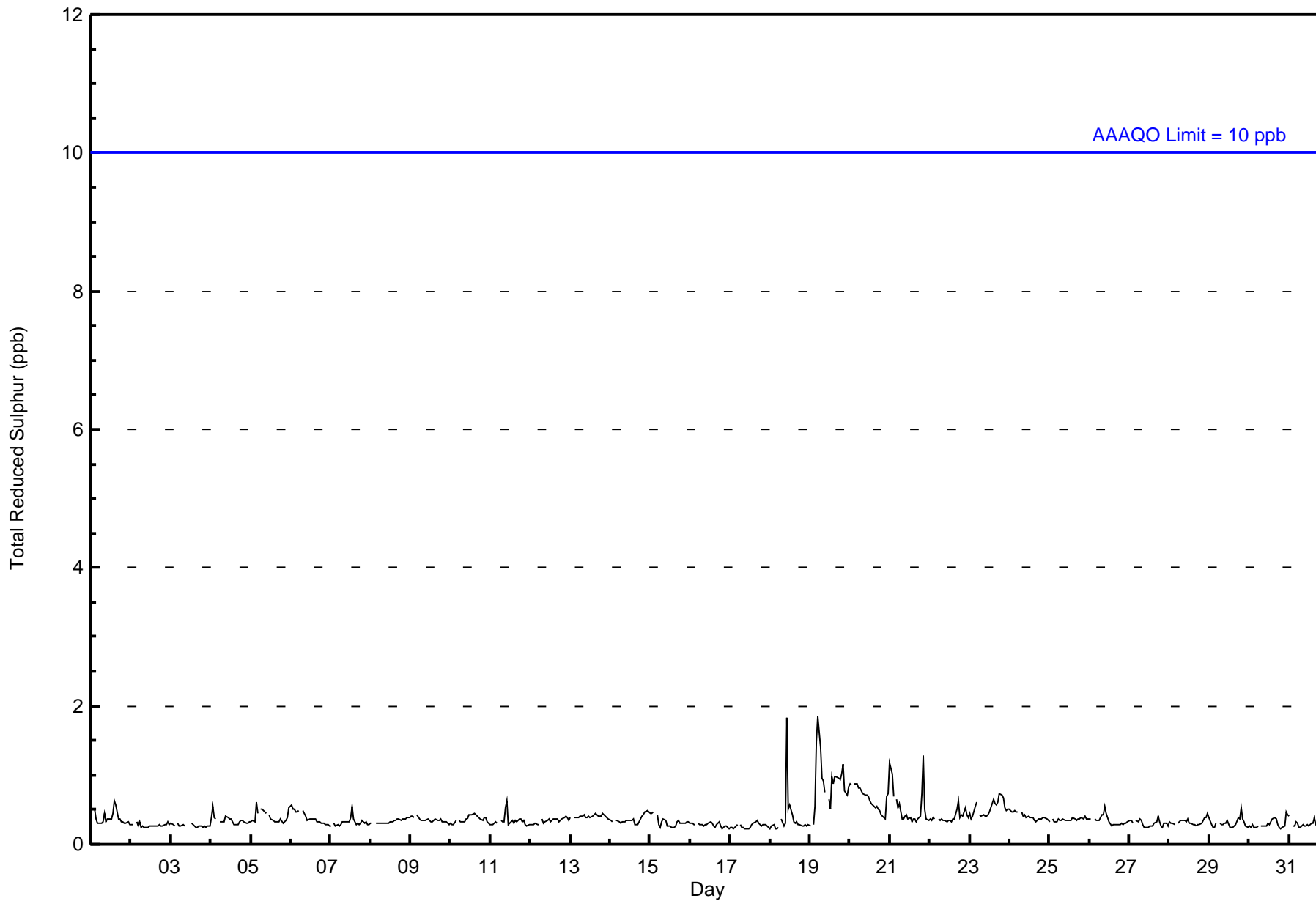
0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	Diurnal Average
1	1	1	1	1	1	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
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
Athabasca Valley - January 2017

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	43	4	7	7	5	34	131	110	34	50	90	42	27	14	20	90	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
Totals	43	4	7	7	5	34	131	110	34	50	90	42	27	14	20	90	708

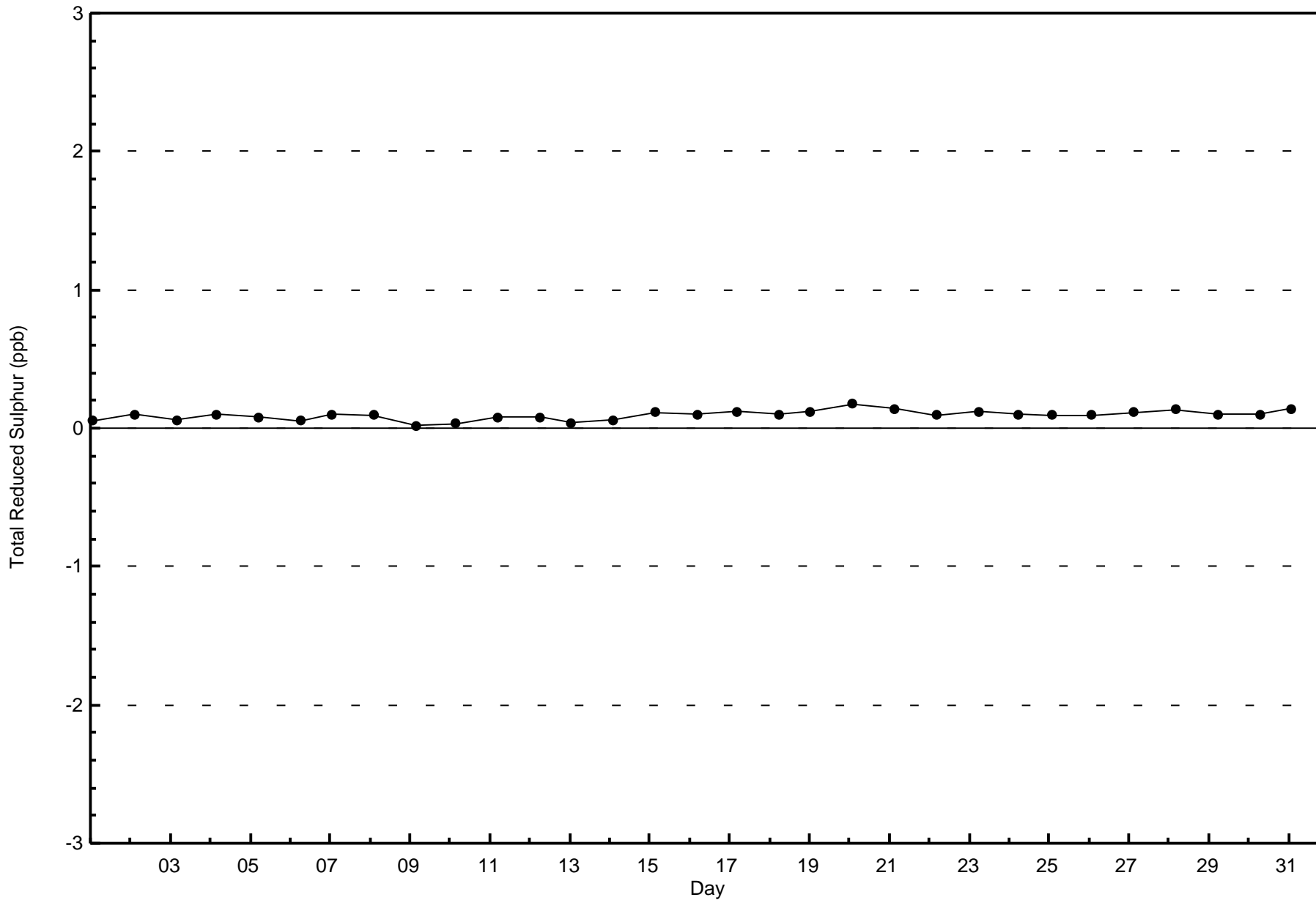
Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Zero Responses

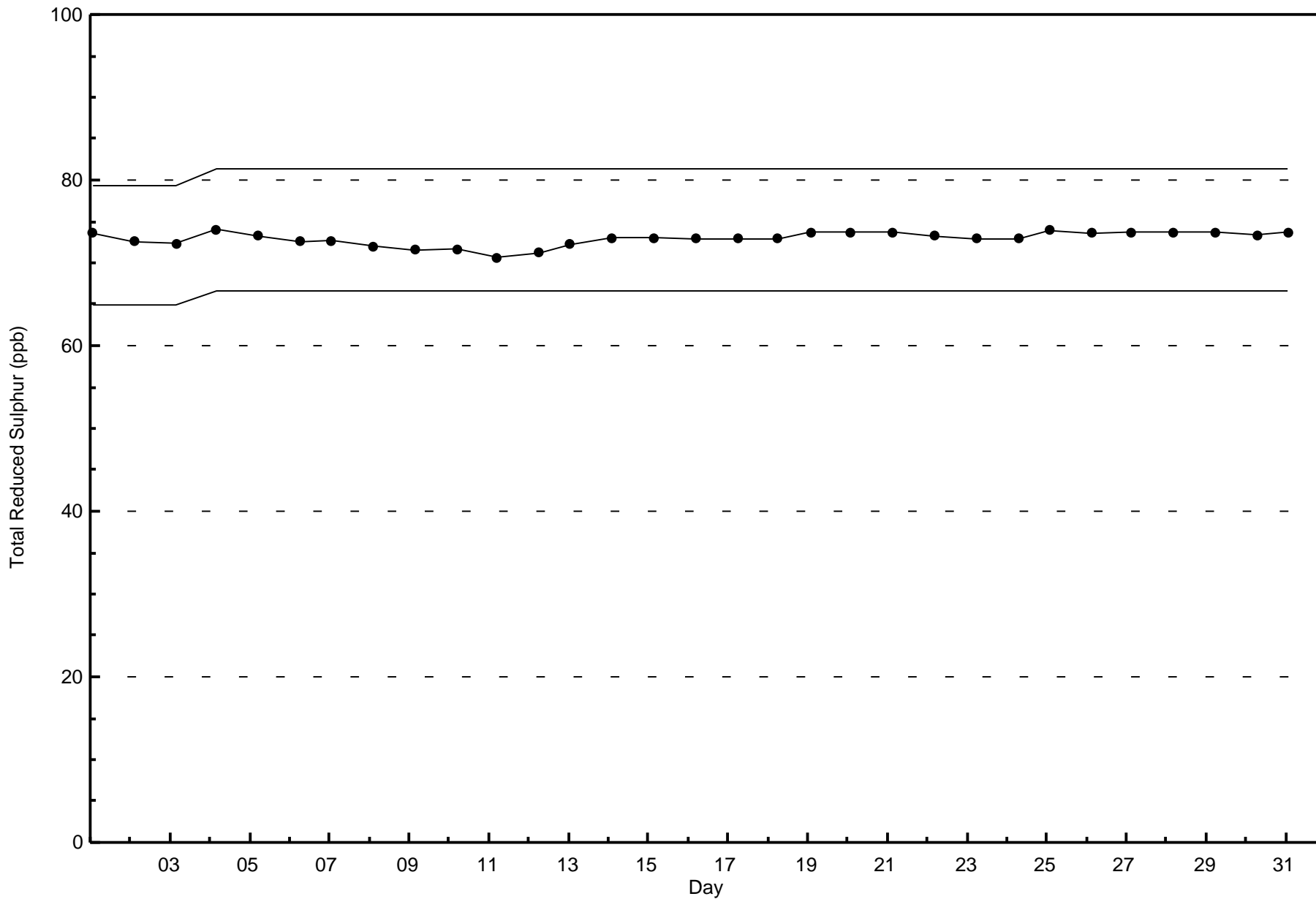
Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - January 2017





Wood Buffalo Environmental Association
Span Responses

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - January 2017





Wood Buffalo Environmental Association
Summary of Hour Averages

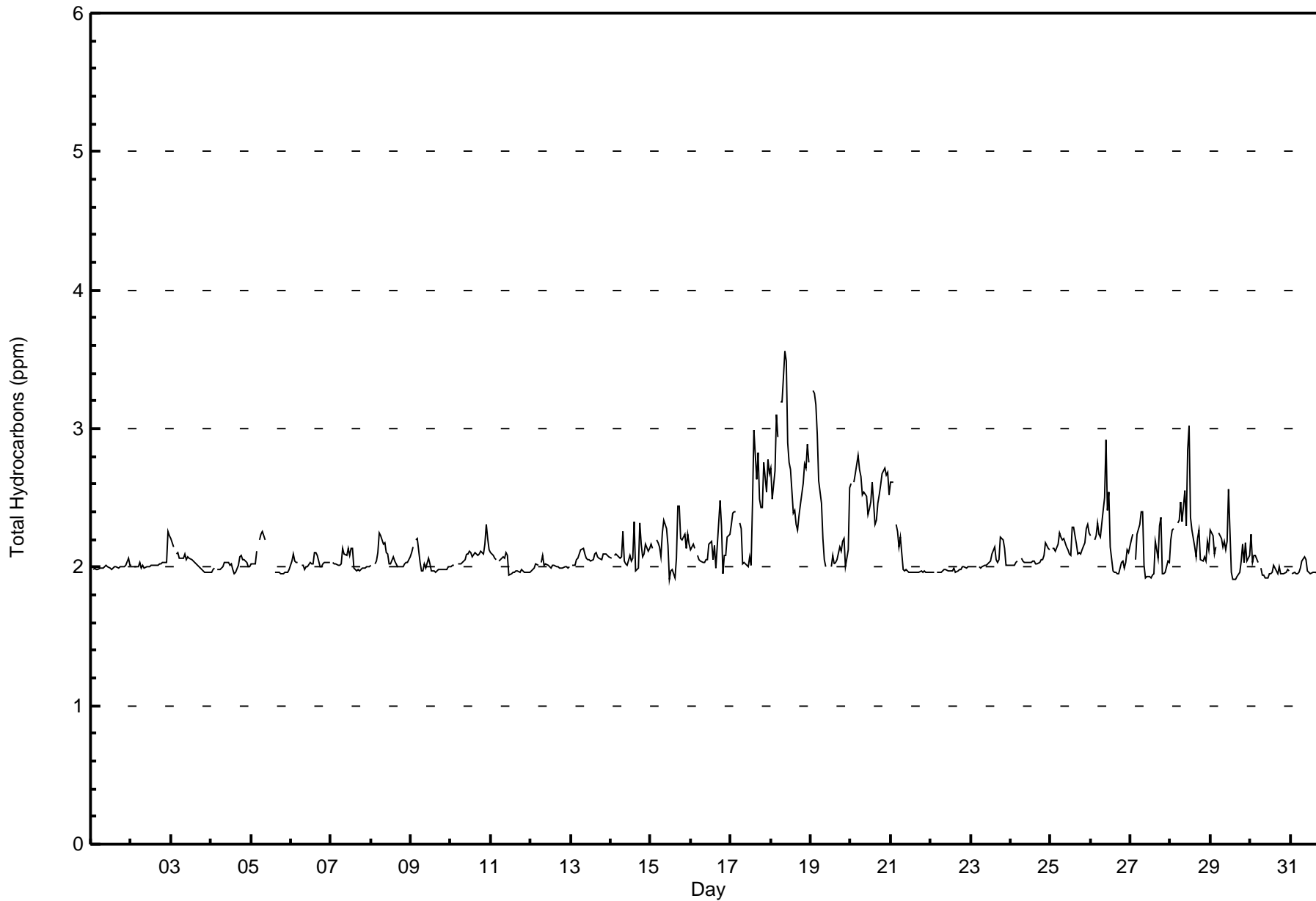
Total Hydrocarbons (THC) - ppm
Athabasca Valley - January 2017

Maximum Value: 3.6 ppm on Jan 18 09:00 Maximum Daily Average: 2.8 ppm on Jan 18		Hours in Service: 744 Hours of Data: 706 Hours of Missing Data: 38 Hours of Calibration: 36 Percent Operational Time: 99.7																																																
Minimum Value: 1.9 ppm on Jan 29 15:00 Minimum Daily Average: 2.0 ppm on Jan 31 Maximum Diurnal Average: 2.2 ppm at hour 4 Minimum Diurnal Average: 2.1 ppm at hour 16 Monthly Average: 2.13 ppm Percentiles: P ₁ = 1.9 P ₁₀ = 2.0 Q ₁ = 2.0 Median = 2.0 Q ₃ = 2.2 P ₉₀ = 2.4 P ₉₉ = 3.2																																																		
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-Jan	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	2.1	2.0	2.0	2.1																								
2-Jan	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	2.3	2.2	2.0	2.3																								
3-Jan	2.2	2.1	Z	2.1	2.1	2.1	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	2.0	2.0	2.0	2.0	2.0	2.0	2.2																							
4-Jan	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	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1																								
5-Jan	2.0	2.0	2.0	2.1	Z	2.2	2.2	2.3	2.2	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	2.3																								
6-Jan	2.0	2.1	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1																								
7-Jan	Z	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1																								
8-Jan	2.0	Z	2.0	2.0	2.1	2.2	2.2	2.2	2.2	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	2.0	2.0	2.1	2.2																								
9-Jan	2.1	2.1	Z	2.2	2.2	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	2.0	2.2																								
10-Jan	2.0	2.0	2.0	Z	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	2.1	2.2	2.3	2.2	2.1	2.1	2.3																								
11-Jan	2.1	2.1	2.1	2.1	Z	2.0	2.1	2.1	2.1	2.1	2.1	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	2.0	2.1																								
12-Jan	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1																								
13-Jan	Z	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	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1																								
14-Jan	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.3	2.0	2.0	2.0	2.1	2.0	2.1	2.3	2.0	2.0	2.3	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.3																								
15-Jan	2.2	2.1	Z	2.2	2.2	2.1	2.1	2.2	2.3	2.3	2.2	1.9	2.0	2.0	1.9	2.1	2.4	2.4	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.4																								
16-Jan	2.1	2.2	2.1	Z	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.1	2.2	2.0	2.2	2.5	2.3	1.9	2.1	2.1	2.2	2.2	2.1	2.5																								
17-Jan	2.3	2.4	2.4	2.4	Z	2.3	2.3	2.0	2.0	2.0	2.0	2.1	2.0	2.4	3.0	2.6	2.8	2.5	2.4	2.4	2.8	2.5	2.8	2.7	2.4	3.0																								
18-Jan	2.7	2.5	2.7	3.1	2.9	Z	3.2	3.2	3.6	3.5	2.9	2.8	2.7	2.4	2.4	2.3	2.3	2.4	2.5	2.6	2.7	2.7	2.9	2.8	2.8	3.6																								
19-Jan	Z	3.3	3.3	3.2	3.0	2.6	2.5	2.2	2.1	2.0	PF	PF	2.0	2.1	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.0	2.1	2.6	2.4	3.3																								
20-Jan	2.6	Z	2.6	2.7	2.8	2.7	2.7	2.5	2.5	2.5	2.4	2.4	2.5	2.6	2.3	2.3	2.5	2.5	2.6	2.7	2.7	2.7	2.7	2.5	2.6	2.8																								
21-Jan	2.6	2.6	Z	2.3	2.3	2.1	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	2.0	2.0	2.6																								
22-Jan	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																								
23-Jan	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	2.1	2.1	2.1	2.0	2.1	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.2																								
24-Jan	2.0	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	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2																								
25-Jan	Z	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.3	2.3	2.2	2.1	2.1	2.1	2.2	2.3	2.3	2.3	2.2	2.3																								
26-Jan	2.2	Z	2.2	2.2	2.3	2.2	2.2	2.4	2.5	2.9	2.4	2.5	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.9																								
27-Jan	2.2	2.2	Z	2.1	2.2	2.3	2.4	2.4	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.2	2.1	2.3	2.4	2.0	1.9	2.0	2.0	2.0	2.4																								
28-Jan	2.2	2.3	2.3	Z	2.3	2.3	2.5	2.3	2.6	2.3	2.9	3.0	2.4	2.3	2.1	2.1	2.2	2.3	2.1	2.0	2.1	2.0	2.2	2.1	2.3	3.0																								
29-Jan	2.3	2.2	2.1	2.1	Z	2.2	2.2	2.1	2.2	2.1	2.2	2.6	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.2	2.0	2.2	2.0	2.1	2.6																								
30-Jan	2.2	2.0	2.1	2.1	2.0	Z	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2																								
31-Jan	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.1																								
																								2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	Diurnal Average	
																								2.7	3.3	3.3	3.2	3.0	2.7	3.2	3.2	3.6	3.5	2.9	3.0	2.7	2.6	3.0	2.6	2.8	2.5	2.6	2.7	2.8	2.7	2.9	2.8	2.0	2.2	Diurnal Maximum
Z - zerospan C - Calibration PF - Power Failure																																																		



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Athabasca Valley - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Athabasca Valley - January 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	372	52.69	52.69
2.1 - 3.0	326	46.18	98.87
3.1 - 10.0	8	1.13	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Athabasca Valley - January 2017

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	38	4	3	2	1	7	46	19	12	19	70	41	21	11	16	62	372
2.1 - 3.0	4	3	3	5	5	25	84	91	23	29	21	1	6	3	3	20	326
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	2	2	8
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	42	7	6	7	6	32	130	110	35	48	91	44	28	15	21	84	706

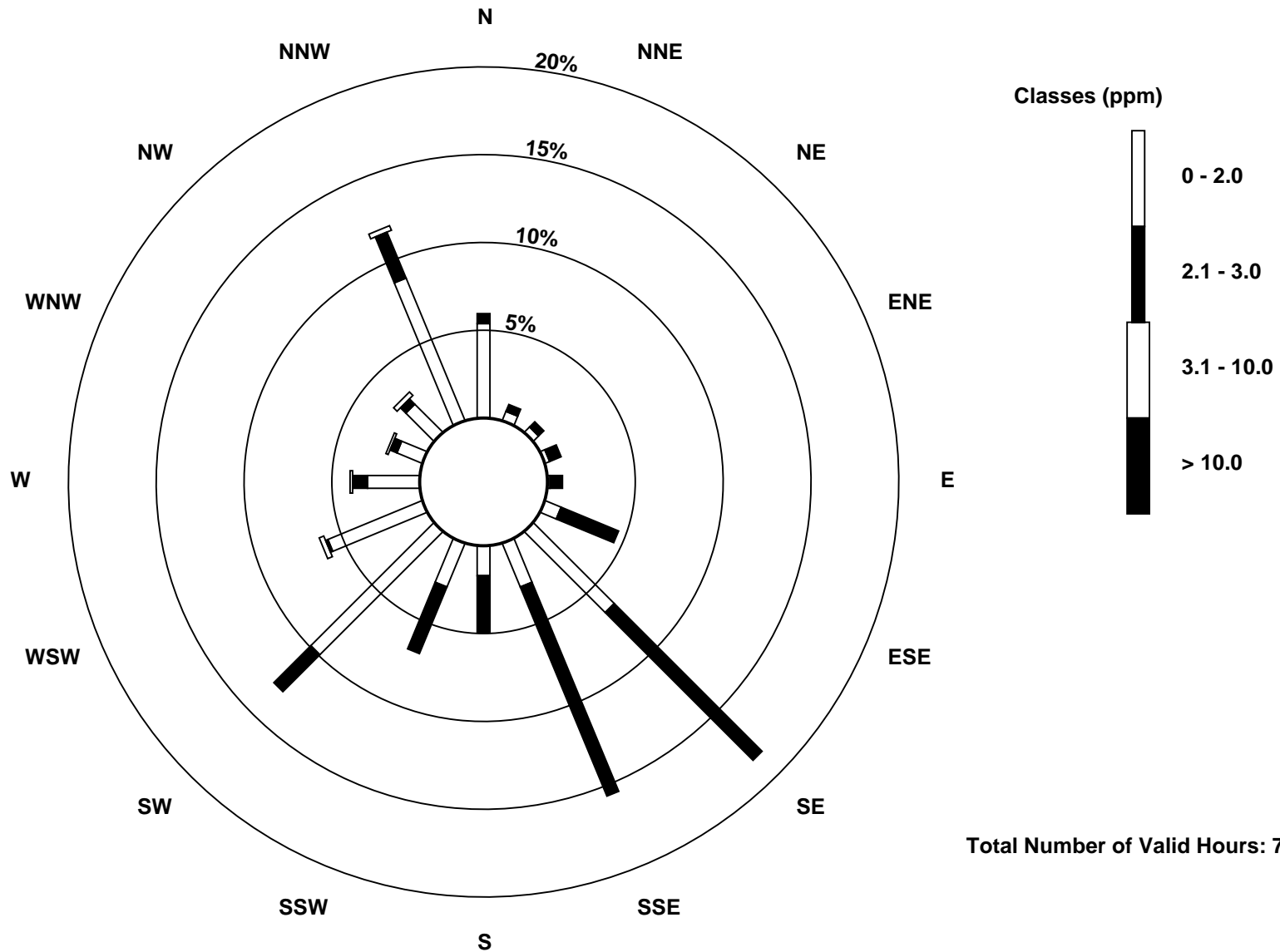
Total Number of Valid Hours: 706

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose 2012-2017

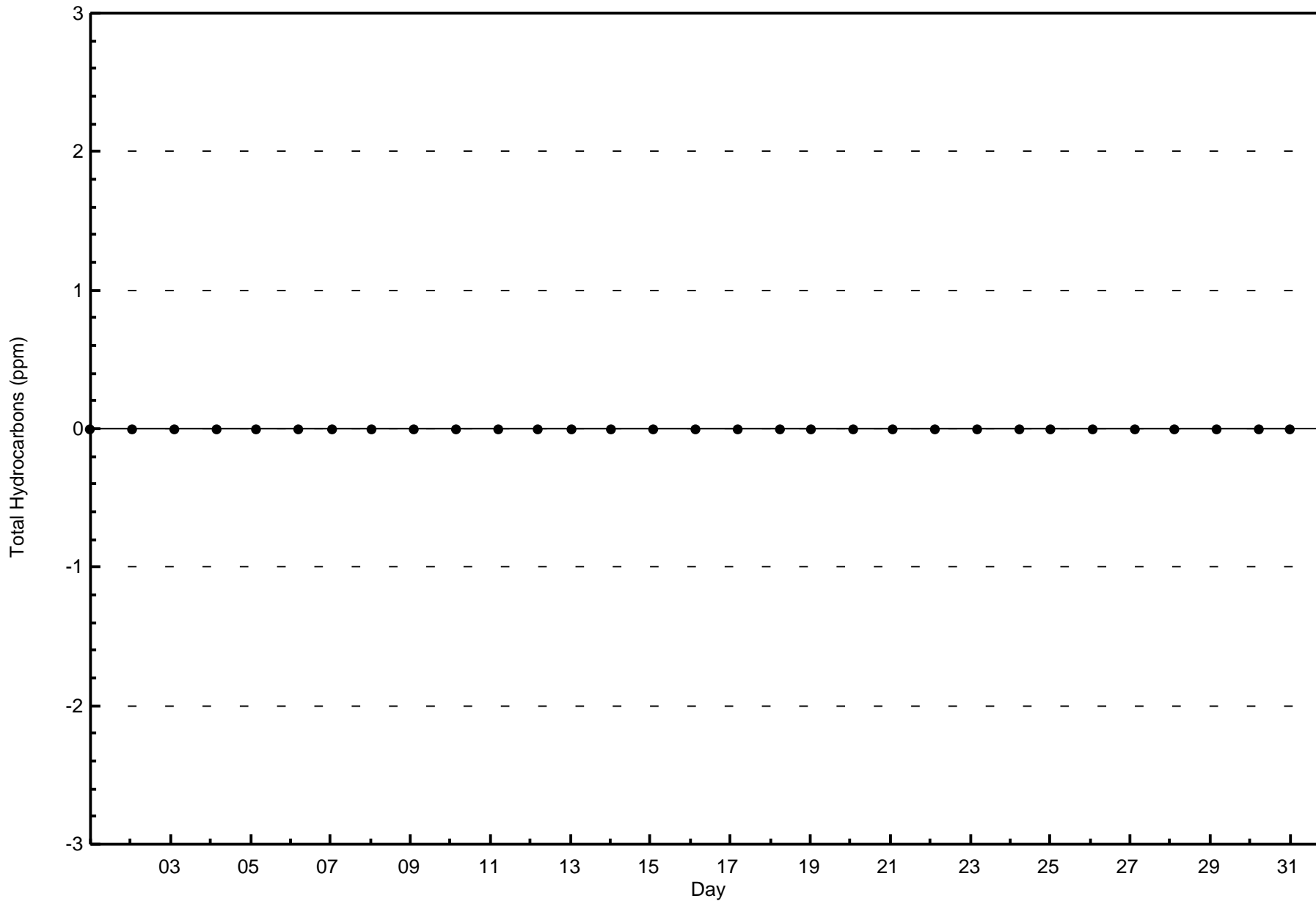
Total Hydrocarbons (THC) - ppm
Athabasca Valley (AMS 7)

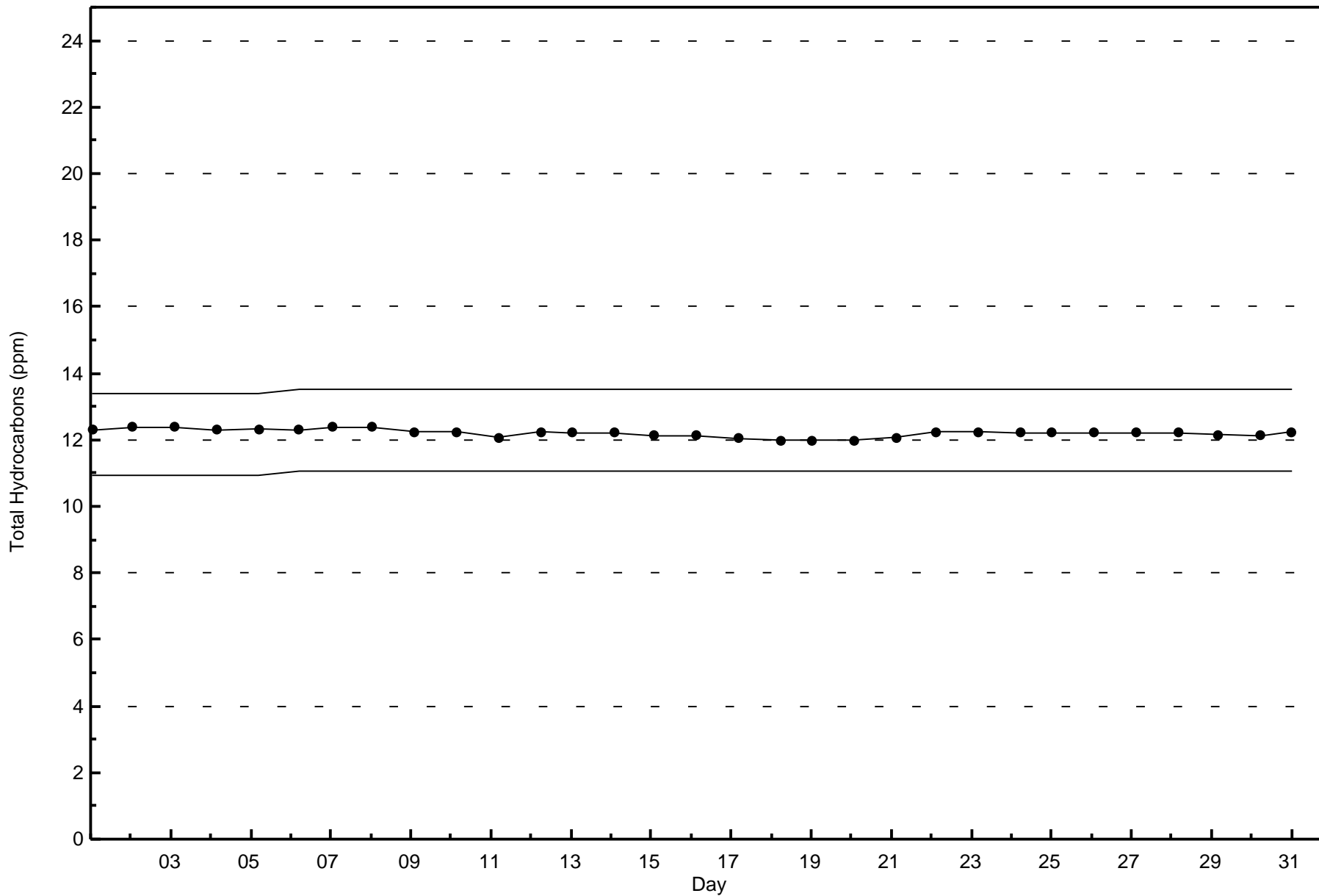




Wood Buffalo Environmental Association
Zero Responses

Total Hydrocarbons (THC) - ppm
Athabasca Valley - January 2017







Wood Buffalo Environmental Association

Summary of Hour Averages

Non Methane Hydrocarbons (NMHC) - ppm

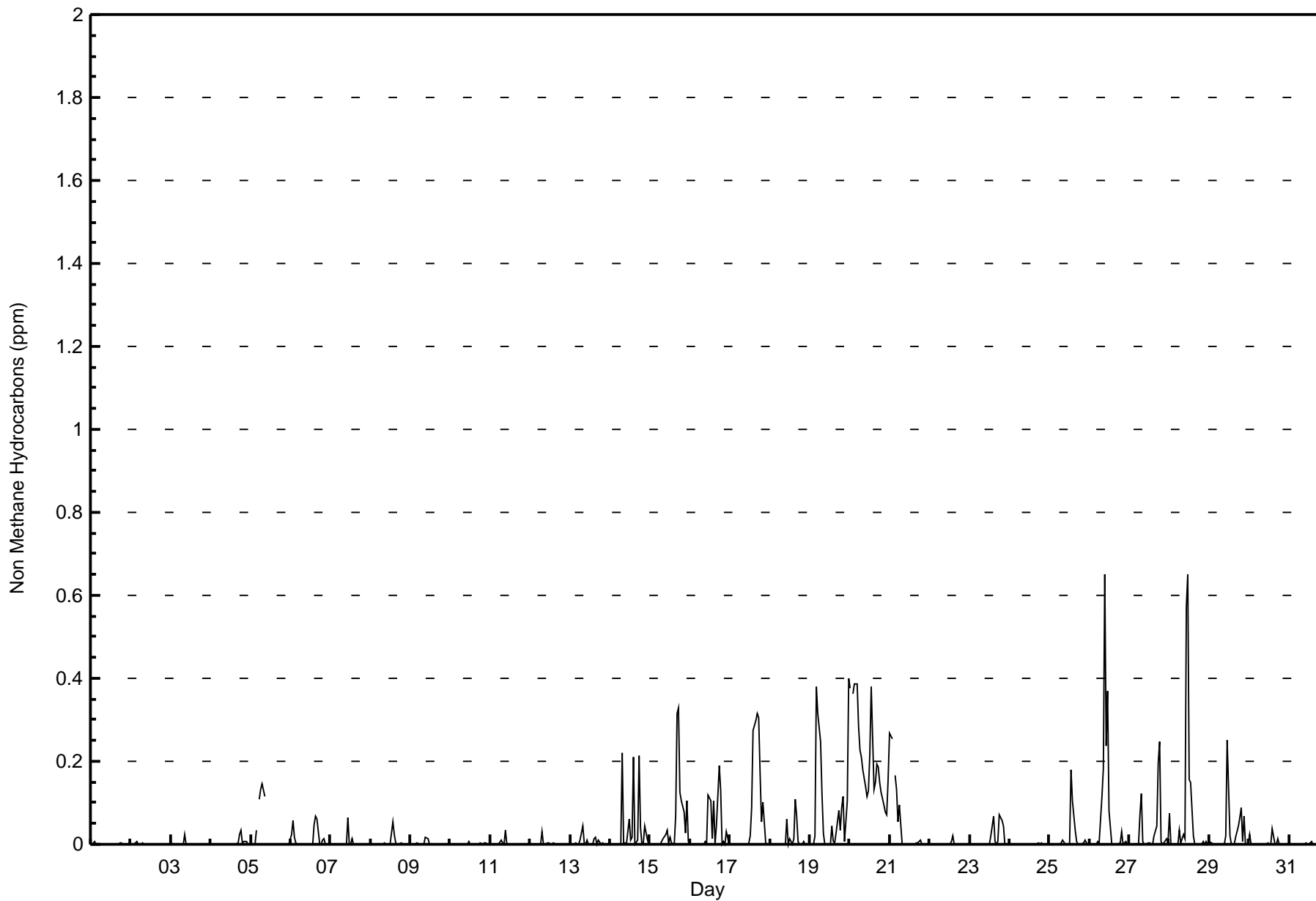
Athabasca Valley - January 2017

Maximum Value: 0.651 ppm on Jan 26 10:00		Maximum Daily Average: 0.206 ppm on Jan 20		Hours in Service:	744																						
Minimum Value: 0.000 ppm on Jan 1 04:00		Minimum Daily Average: 0.000 ppm on Jan 24		Hours of Data:	706																						
Maximum Diurnal Average: 0.055 ppm at hour 12		Minimum Diurnal Average: 0.008 ppm at hour 22		Hours of Missing Data:	38																						
Monthly Average: 0.027 ppm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.1 P ₉₉ = 0.4		Hours of Calibration:	36																						
				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-Jan	Z	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	0.001	0.000	0.003	0.004	0.001	0.000	0.000	0.000	0.000	0.001	0.007	
2-Jan	0.000	Z	0.000	0.007	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	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007
3-Jan	0.002	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.022	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.022	
4-Jan	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.003	0.024	0.035	0.002	0.006	0.007	0.000	0.000	0.000	0.003	0.035	
5-Jan	0.000	0.000	0.000	0.033	Z	0.108	0.132	0.145	0.115	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	0.030	0.145	
6-Jan	0.022	0.056	0.016	0.005	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.047	0.069	0.062	0.000	0.000	0.012	0.012	0.000	0.000	0.000	0.013	0.069	
7-Jan	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.064	0.001	0.000	0.015	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.064	
8-Jan	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.056	0.024	0.005	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.004	0.056	
9-Jan	0.000	0.000	Z	0.000	0.003	0.000	0.000	0.001	0.000	0.016	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.016	
10-Jan	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	0.000	0.000	0.000	0.003	0.000	0.002	0.004	0.000	0.000	0.001	0.007	
11-Jan	0.000	0.000	0.000	0.000	Z	0.000	0.009	0.004	0.000	0.036	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.036	
12-Jan	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.030	0.000	0.000	0.005	0.003	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.030	
13-Jan	Z	0.000	0.000	0.002	0.000	0.000	0.010	0.043	0.003	0.000	0.011	0.002	0.001	0.000	0.015	0.015	0.000	0.009	0.000	0.004	0.002	0.000	0.000	0.000	0.005	0.043	
14-Jan	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.220	0.003	0.002	0.000	0.062	0.009	0.016	0.210	0.000	0.012	0.214	0.042	0.000	0.002	0.043	0.009	0.000	0.037	0.220	
15-Jan	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.006	0.012	0.025	0.034	0.002	0.015	0.005	0.000	0.067	0.316	0.330	0.126	0.104	0.078	0.026	0.105	0.007	0.055	0.330	
16-Jan	0.000	0.001	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.007	0.002	0.119	0.106	0.013	0.106	0.000	0.048	0.189	0.128	0.000	0.006	0.000	0.031	0.000	0.033	0.189	
17-Jan	0.000	0.000	0.000	0.002	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.020	0.089	0.273	0.299	0.317	0.304	0.172	0.055	0.101	0.003	0.000	0.000	0.071	0.317	
18-Jan	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.061	0.000	0.014	0.000	0.015	0.108	0.069	0.008	0.001	0.000	0.008	0.000	0.000	0.012	0.108	
19-Jan	Z	0.000	0.000	0.021	0.380	0.315	0.246	0.122	0.027	0.000	PF	PF	0.001	0.045	0.007	0.002	0.027	0.081	0.034	0.087	0.114	0.008	0.104	0.401	0.096	0.401	
20-Jan	0.378	Z	0.364	0.387	0.386	0.284	0.229	0.210	0.180	0.139	0.115	0.129	0.217	0.378	0.133	0.149	0.193	0.186	0.148	0.126	0.096	0.077	0.071	0.154	0.206	0.387	
21-Jan	0.267	0.255	Z	0.165	0.133	0.053	0.094	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.002	0.011	0.001	0.000	0.000	0.000	0.000	0.000	0.043	0.267	
22-Jan	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	0.006	0.021	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.021	
23-Jan	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	0.021	0.067	0.007	0.000	0.007	0.072	0.058	0.043	0.000	0.000	0.000	0.012	0.072	
24-Jan	0.000	0.001	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	0.003	0.000	0.003	0.000	0.005	0.000	0.000	0.000	0.000	0.005	
25-Jan	Z	0.000	0.000	0.000	0.000	0.000	0.004	0.010	0.000	0.001	0.001	0.000	0.181	0.107	0.035	0.005	0.000	0.001	0.000	0.003	0.009	0.004	0.000	0.000	0.016	0.181	
26-Jan	0.000	Z	0.000	0.000	0.000	0.008	0.003	0.116	0.183	0.651	0.237	0.370	0.080	0.000	0.000	0.000	0.000	0.000	0.005	0.031	0.000	0.005	0.006	0.000	0.074	0.651	
27-Jan	0.000	0.000	Z	0.000	0.000	0.000	0.071	0.122	0.007	0.000	0.000	0.003	0.003	0.000	0.000	0.022	0.043	0.196	0.248	0.006	0.000	0.003	0.012	0.007	0.032	0.248	
28-Jan	0.076	0.000	0.000	Z	0.000	0.000	0.035	0.005	0.024	0.015	0.573	0.650	0.158	0.150	0.022	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.007	0.000	0.075	0.650	
29-Jan	0.006	0.003	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.002	0.021	0.251	0.020	0.000	0.000	0.000	0.018	0.044	0.066	0.088	0.007	0.066	0.000	0.000	0.026	0.251	
30-Jan	0.023	0.000	0.001	0.001	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.036	0.000	0.000	0.014	0.000	0.000	0.000	0.000	0.000	0.003	0.036	
31-Jan	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	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	
		0.031	0.012	0.015	0.024	0.035	0.030	0.027	0.033	0.019	0.030	0.039	0.055	0.021	0.033	0.035	0.025	0.036	0.052	0.035	0.019	0.016	0.008	0.011	0.018	Diurnal Average	
		0.378	0.255	0.364	0.387	0.386	0.315	0.246	0.220	0.183	0.651	0.573	0.650	0.217	0.378	0.273	0.299	0.317	0.330	0.248	0.126	0.114	0.077	0.105	0.401	Diurnal Maximum	
Z - zerospan		C - Calibration			PF - Power Failure																						



Wood Buffalo Environmental Association
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - January 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	516	73.09	73.09
0.006 - 0.05	93	13.17	86.26
0.06 - 0.1	55	7.79	94.05
> 0.1	42	5.95	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - January 2017**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	37	5	4	4	1	21	87	67	22	35	79	41	25	13	18	57	516
0.006 - 0.05	3	1	0	2	3	9	19	17	4	5	10	3	3	0	1	13	93
0.06 - 0.1	1	0	2	1	1	2	12	14	4	5	2	0	0	1	1	9	55
> 0.1	1	1	0	0	1	0	12	12	5	3	0	0	0	1	1	5	42
Totals	42	7	6	7	6	32	130	110	35	48	91	44	28	15	21	84	706

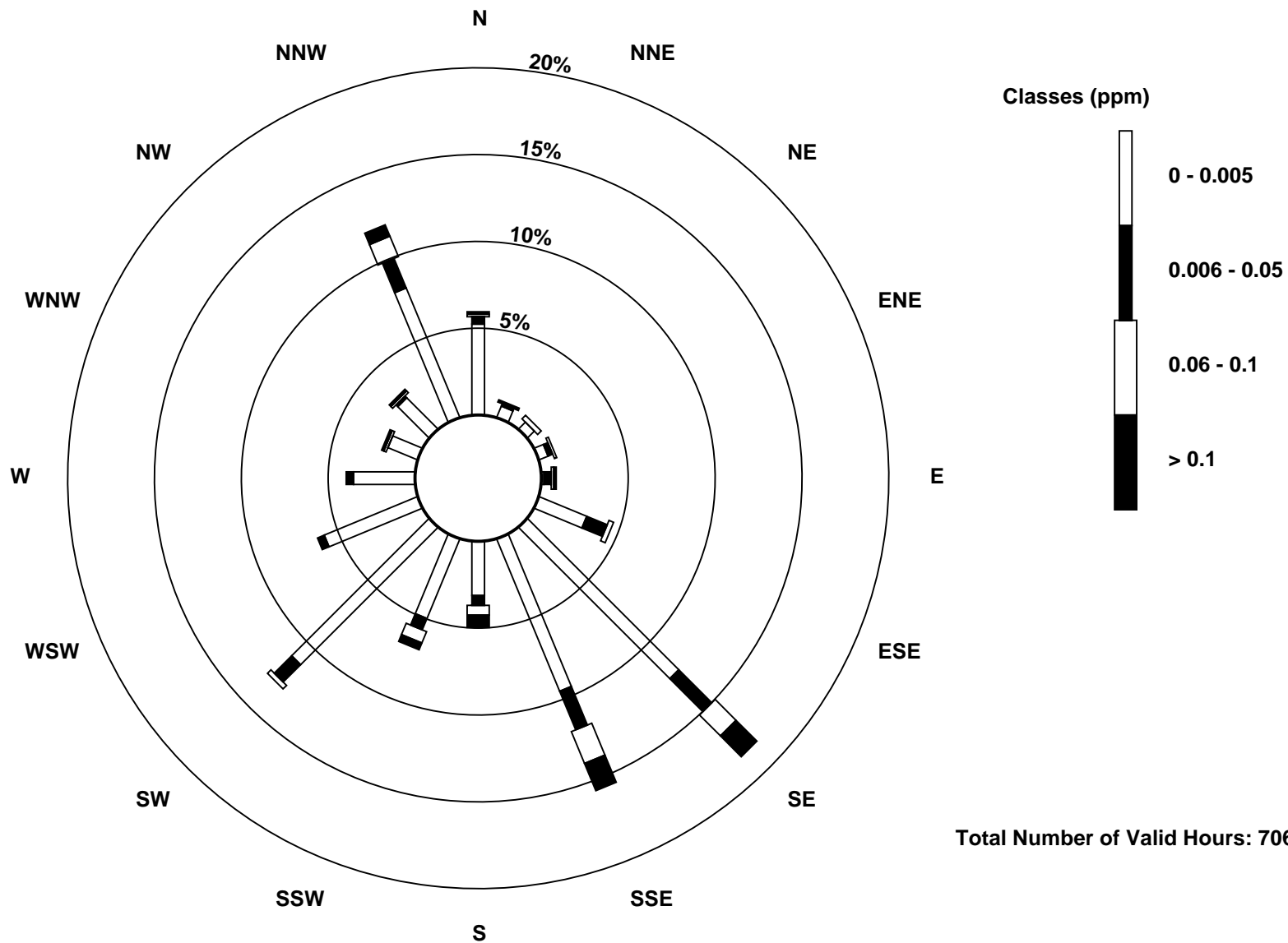
Total Number of Valid Hours: 706

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose 2012-2017

Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley (AMS 7)



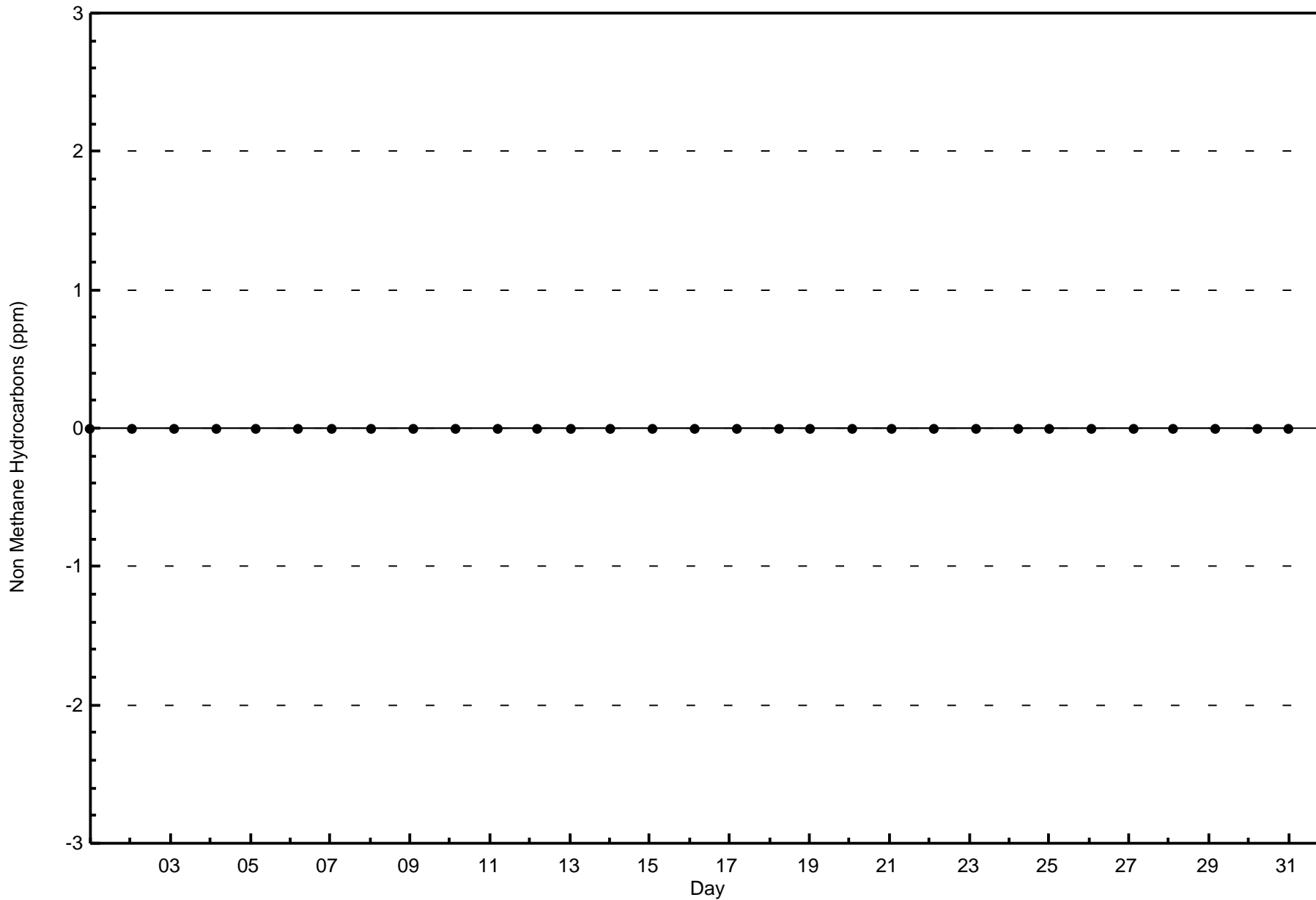


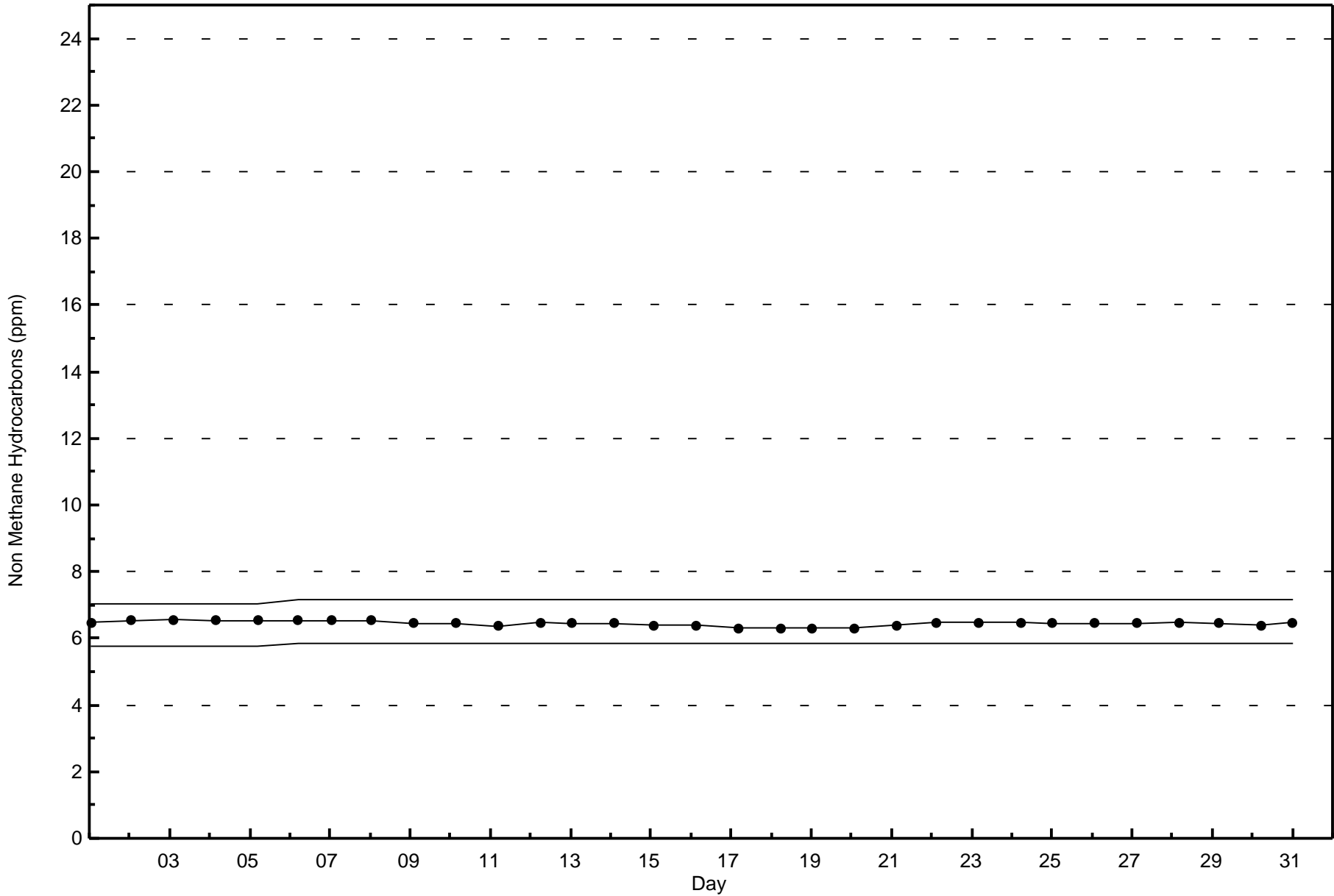
Wood Buffalo Environmental Association

Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm

Athabasca Valley - January 2017







Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm

Athabasca Valley - January 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 3.6 ppm on Jan 18 09:00	Maximum Daily Average: 2.8 ppm on Jan 18		Hours of Data:	706
Minimum Value: 1.9 ppm on Jan 29 15:00	Minimum Daily Average: 2.0 ppm on Jan 31		Hours of Missing Data:	38
Maximum Diurnal Average: 2.2 ppm at hour 4	Minimum Diurnal Average: 2.0 ppm at hour 16		Hours of Calibration:	36
Monthly Average: 2.10 ppm	Percentiles: P ₁ = 1.9 P ₁₀ = 2.0 Q ₁ = 2.0 Median = 2.0 Q ₃ = 2.1 P ₉₀ = 2.3 P ₉₉ = 3.1		Percent Operational Time:	99.7

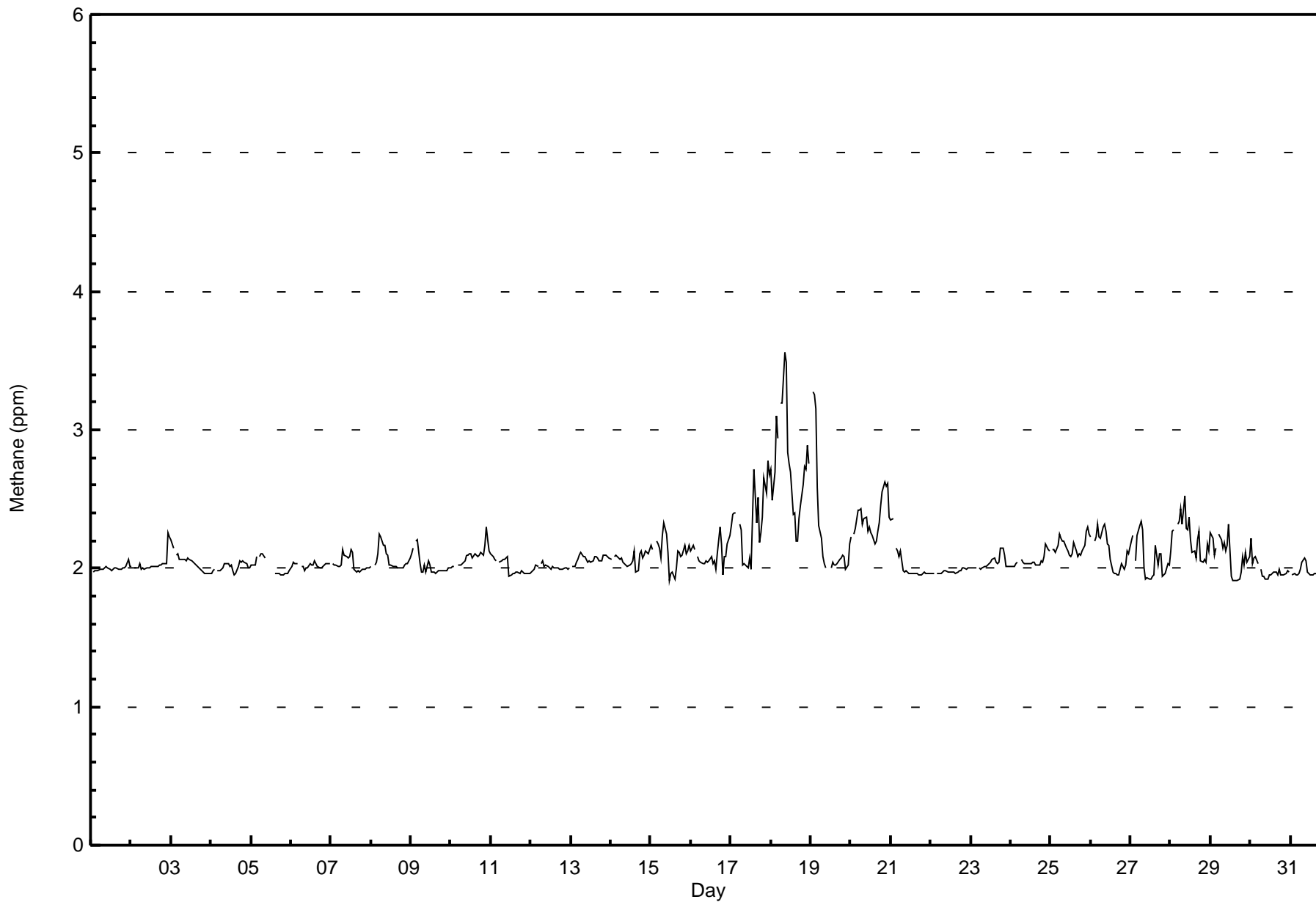
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-Jan	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.1																								
2-Jan	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	2.3	2.2	2.0	2.3																								
3-Jan	2.2	2.1	Z	2.1	2.1	2.1	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	2.0	2.0	2.0	2.0	2.0	2.2																								
4-Jan	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	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.1																								
5-Jan	2.0	2.0	2.0	2.1	Z	2.1	2.1	2.1	2.1	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	2.1																								
6-Jan	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	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1																								
7-Jan	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1																								
8-Jan	2.0	Z	2.0	2.0	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2																								
9-Jan	2.1	2.1	Z	2.2	2.2	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	2.0	2.2																								
10-Jan	2.0	2.0	2.0	Z	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	2.1	2.2	2.3	2.2	2.1	2.1	2.3																								
11-Jan	2.1	2.1	2.1	2.1	Z	2.0	2.1	2.1	2.1	2.1	2.1	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	2.0	2.1																								
12-Jan	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1																								
13-Jan	Z	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1																								
14-Jan	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	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-Jan	2.2	2.1	Z	2.2	2.2	2.1	2.1	2.2	2.3	2.2	2.1	1.9	2.0	2.0	1.9	2.0	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.3																								
16-Jan	2.1	2.2	2.1	Z	2.1	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.1	2.0	2.1	2.0	2.1	2.3	2.2	1.9	2.1	2.1	2.2	2.2	2.1	2.3																								
17-Jan	2.3	2.4	2.4	2.4	Z	2.3	2.3	2.0	2.0	2.0	2.0	2.1	2.0	2.4	2.7	2.3	2.5	2.2	2.3	2.4	2.7	2.5	2.8	2.7	2.3	2.8																								
18-Jan	2.7	2.5	2.7	3.1	2.9	Z	3.2	3.2	3.6	3.5	2.8	2.8	2.7	2.4	2.4	2.2	2.2	2.4	2.5	2.6	2.7	2.7	2.9	2.8	2.8	3.6																								
19-Jan	Z	3.3	3.3	3.2	2.6	2.3	2.2	2.1	2.0	2.0	PF	PF	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.2	2.3	3.3																								
20-Jan	2.2	Z	2.2	2.3	2.4	2.4	2.4	2.3	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.5	2.5	2.6	2.6	2.6	2.4	2.4	2.6																								
21-Jan	2.4	2.4	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	2.4																								
22-Jan	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																								
23-Jan	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	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1																								
24-Jan	2.0	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	2.1	2.0	2.1	2.2	2.1	2.1	2.1	2.2																								
25-Jan	Z	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.3	2.2	2.3																								
26-Jan	2.2	Z	2.2	2.2	2.3	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.3																								
27-Jan	2.2	2.2	Z	2.1	2.2	2.3	2.3	2.3	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.2	2.0	2.1	2.1	1.9	1.9	2.0	2.0	2.0	2.1	2.3																								
28-Jan	2.1	2.3	2.3	Z	2.3	2.3	2.4	2.3	2.5	2.3	2.3	2.4	2.2	2.1	2.1	2.1	2.2	2.3	2.1	2.0	2.1	2.0	2.2	2.1	2.2	2.5																								
29-Jan	2.3	2.2	2.1	2.1	Z	2.2	2.2	2.1	2.2	2.1	2.2	2.3	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.0	2.1	2.0	2.1	2.1	2.3																								
30-Jan	2.2	2.0	2.1	2.1	2.0	Z	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2																								
31-Jan	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.1																								
																								2.1	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	Diurnal Average	
																								2.7	3.3	3.3	3.2	2.9	2.4	3.2	3.2	3.6	3.5	2.8	2.8	2.7	2.4	2.7	2.3	2.5	2.4	2.5	2.6	2.7	2.7	2.9	2.8	2.0	2.2	Diurnal Maximum

Z - zerospan C - Calibration PF - Power Failure



Wood Buffalo Environmental Association
Hourly Averages

Methane (CH₄) - ppm
Athabasca Valley - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Athabasca Valley - January 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	393	55.67	55.67
2.1 - 3.0	305	43.20	98.87
3.1 - 10.0	8	1.13	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Athabasca Valley - January 2017**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	38	4	3	3	1	8	55	21	13	21	70	41	21	12	16	66	393
2.1 - 3.0	4	3	3	4	5	24	75	89	22	27	21	1	6	2	3	16	305
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	2	2	8
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	42	7	6	7	6	32	130	110	35	48	91	44	28	15	21	84	706

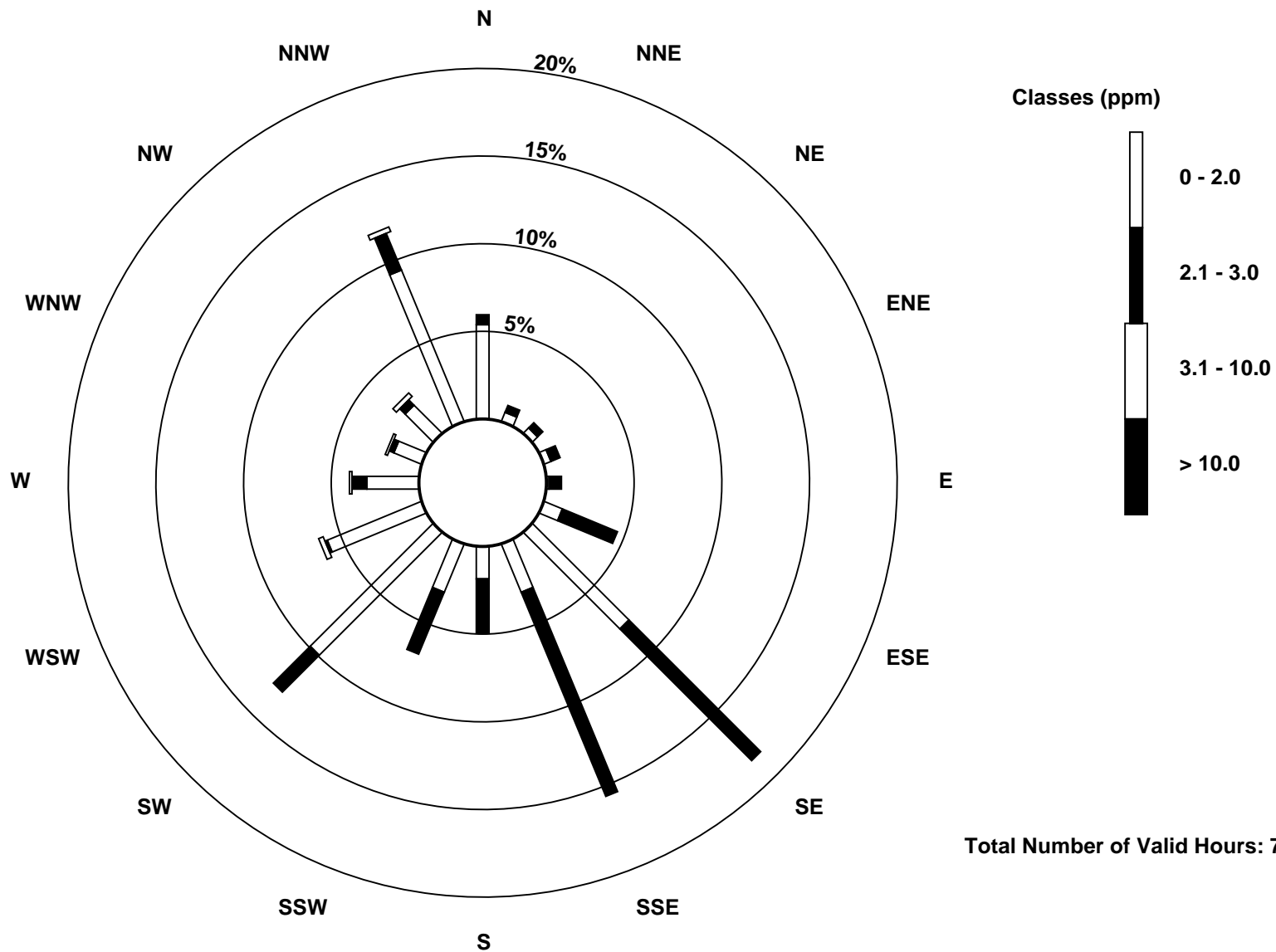
Total Number of Valid Hours: 706

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose 2012-2017

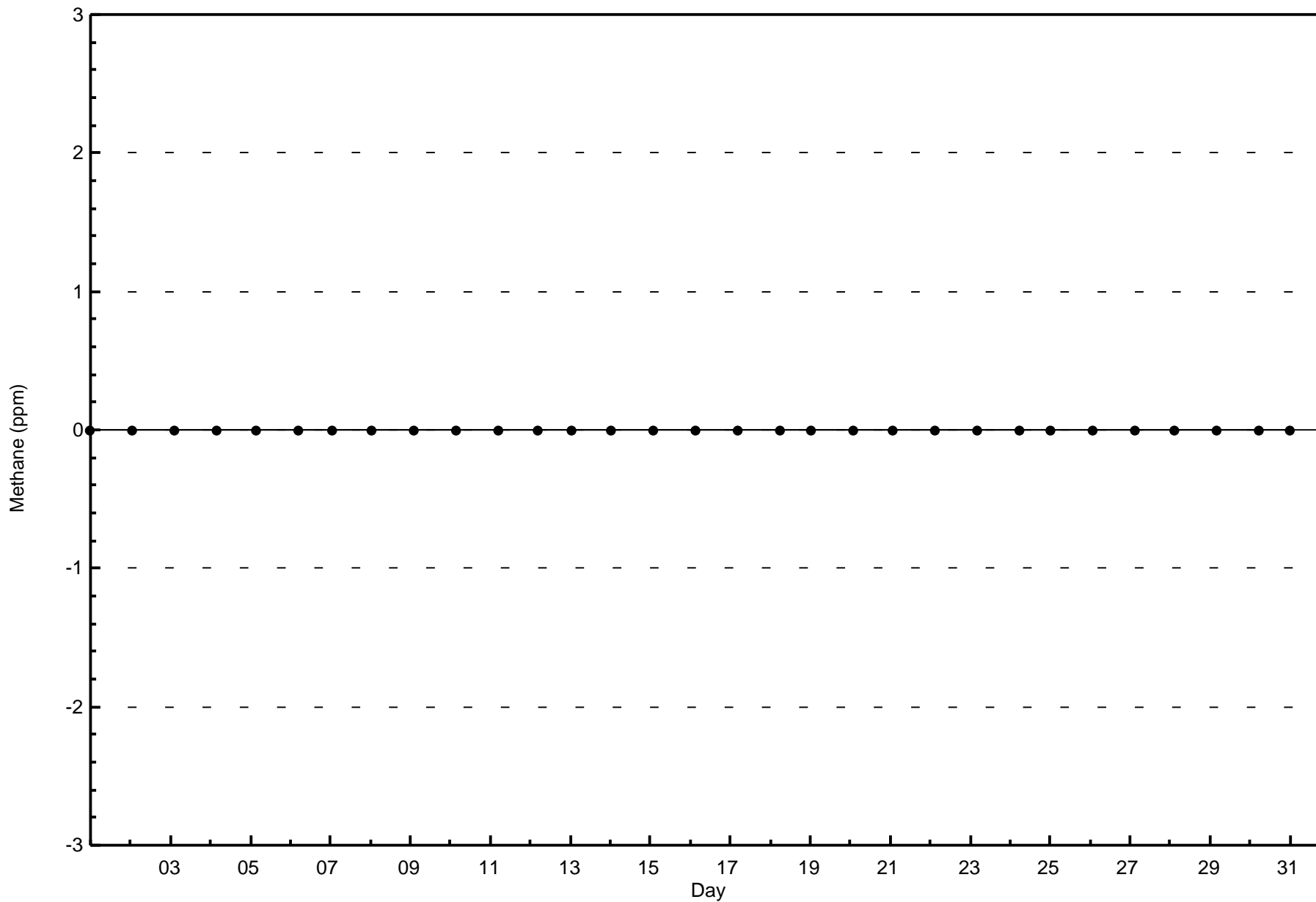
Methane (CH₄) - ppm
Athabasca Valley (AMS 7)





Wood Buffalo Environmental Association
Zero Responses

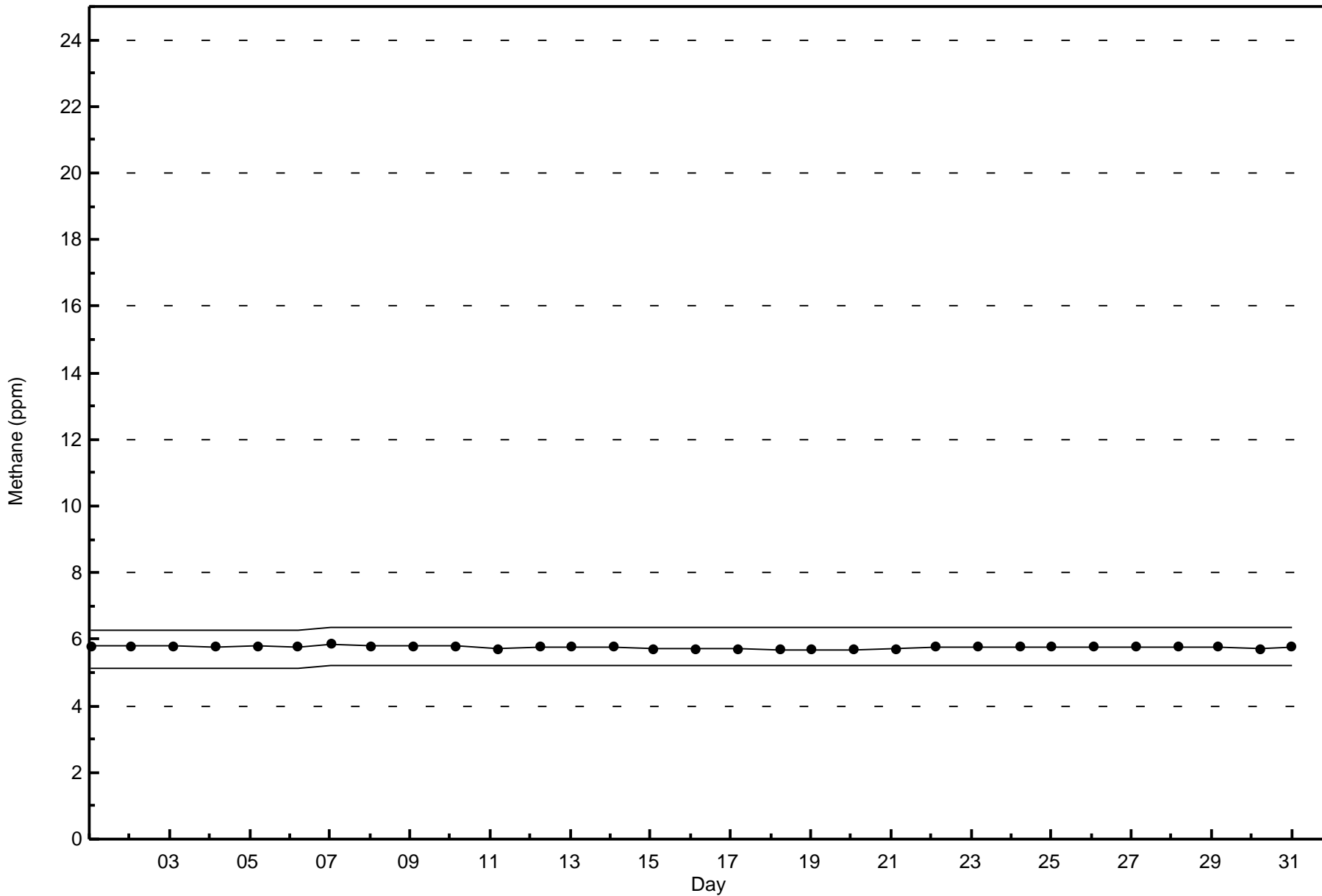
Methane (CH₄) - ppm
Athabasca Valley - January 2017





Wood Buffalo Environmental Association
Span Responses

Methane (CH₄) - ppm
Athabasca Valley - January 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

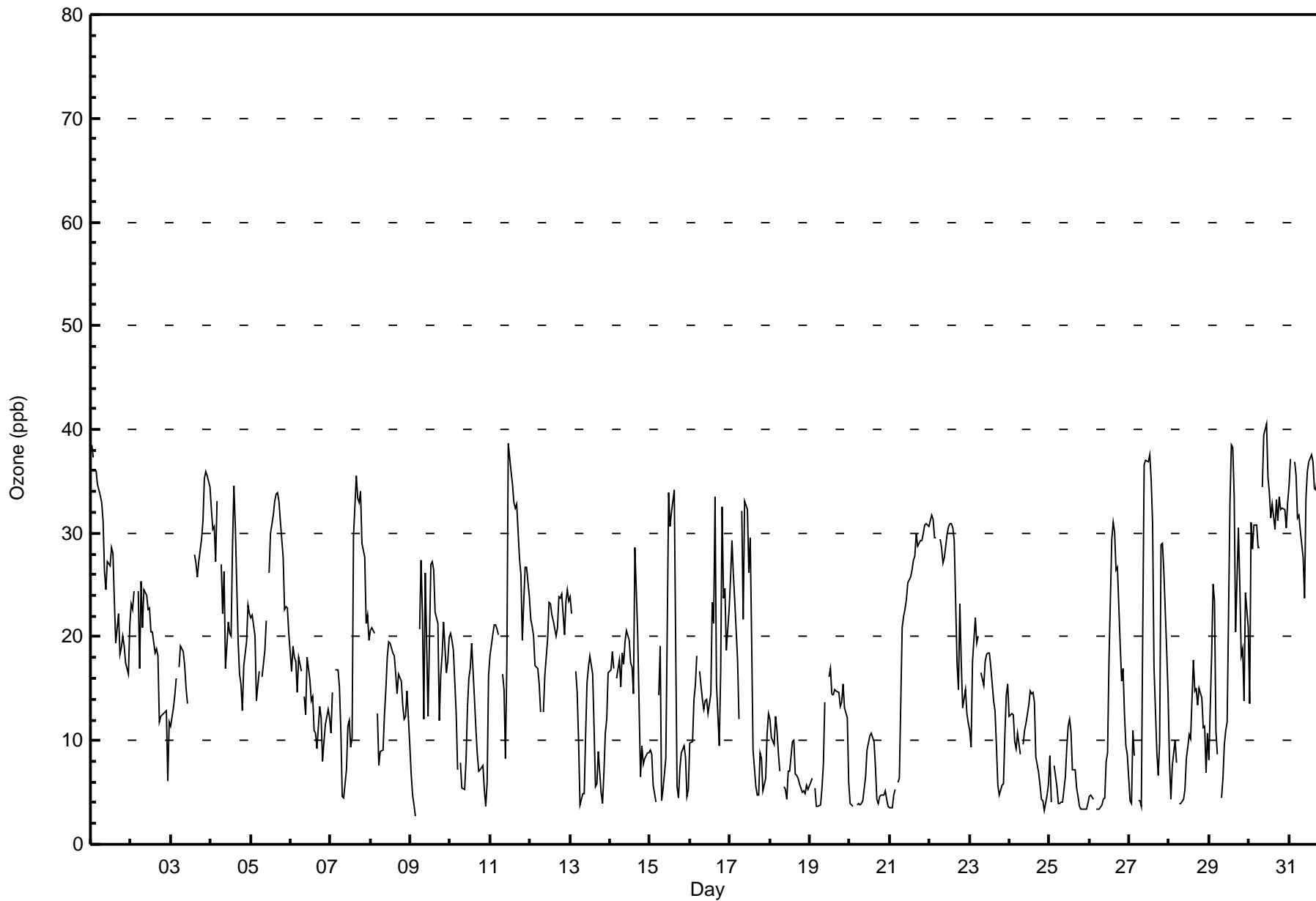
Athabasca Valley - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																							
Maximum Value: 41 ppb on Jan 30 11:00										Maximum Daily Average: 33.3 ppb on Jan 31										Hours of Data: 708																													
Minimum Value: 3 ppb on Jan 9 04:00										Minimum Daily Average: 5.7 ppb on Jan 20										Hours of Missing Data: 36																													
Maximum Diurnal Average: 22.7 ppb at hour 14										Minimum Diurnal Average: 14.1 ppb at hour 8										Hours of Calibration: 34																													
Monthly Average: 17.4 ppb										Percentiles: P ₁ = 3 P ₁₀ = 5 Q ₁ = 9 Median = 16 Q ₃ = 24 P ₉₀ = 32 P ₉₉ = 37										Percent Operational Time: 99.7																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jan	38	37	Z	36	35	34	33	31	26	25	27	27	29	28	24	19	22	18	19	20	19	17	16	21	26.2	38																							
2-Jan	23	23	24	Z	24	17	25	21	25	24	23	23	20	21	18	19	18	12	12	13	13	13	6	12	18.6	25																							
3-Jan	11	13	14	16	Z	17	19	19	17	15	14	C	C	C	28	27	26	27	29	31	35	36	35	34	23.3	36																							
4-Jan	32	30	31	27	33	Z	27	22	26	17	21	20	20	29	35	31	20	16	15	13	17	20	23	22	23.8	35																							
5-Jan	22	22	20	14	15	17	Z	16	19	22	M	26	30	32	33	34	34	33	31	28	23	23	23	20	24.3	34																							
6-Jan	17	19	18	18	15	18	17	Z	14	12	18	16	14	14	11	11	9	13	12	8	10	12	13	12	13.9	19																							
7-Jan	11	15	Z	17	17	15	11	5	4	7	11	12	9	10	30	36	33	33	34	29	28	21	22	20	18.7	36																							
8-Jan	21	21	20	Z	13	8	9	9	12	15	18	19	19	18	18	16	15	16	16	13	12	12	15	10	15.1	21																							
9-Jan	7	5	4	3	Z	21	27	22	12	26	12	20	27	27	26	22	21	12	16	18	21	17	18	20	17.6	27																							
10-Jan	20	20	19	13	7	Z	8	5	5	8	13	16	17	19	14	11	9	7	7	8	5	4	6	16	11.2	20																							
11-Jan	18	20	21	21	21	20	Z	16	15	8	17	39	36	35	33	32	33	28	26	20	23	27	27	24	24.4	39																							
12-Jan	22	21	20	17	17	16	13	Z	13	16	20	23	23	22	22	20	21	24	24	24	20	24	24	23	20.4	24																							
13-Jan	24	22	Z	17	15	10	4	5	5	11	16	17	18	16	11	6	6	9	5	4	7	11	12	17	11.5	24																							
14-Jan	17	19	17	Z	16	18	15	18	17	20	21	20	17	17	14	29	20	13	6	9	8	8	9	9	15.6	29																							
15-Jan	9	9	6	4	Z	14	19	4	5	8	21	34	31	32	34	19	6	4	7	9	9	8	5	5	13.2	34																							
16-Jan	10	10	14	15	18	Z	17	14	13	14	14	13	14	23	21	34	15	10	17	33	24	25	19	23	17.7	34																							
17-Jan	26	29	26	23	18	12	Z	32	22	33	32	26	30	20	9	5	5	5	9	8	5	6	11	13	17.6	33																							
18-Jan	12	10	10	12	11	9	7	Z	5	5	4	7	7	10	10	7	7	6	6	5	5	5	6	5	7.5	12																							
19-Jan	6	6	Z	5	4	4	4	5	8	14	PF	16	17	15	14	15	15	15	13	14	16	13	12	6	10.7	17																							
20-Jan	4	4	4	Z	4	4	4	4	4	6	9	10	10	11	10	7	4	4	5	5	5	5	4	4	5.7	11																							
21-Jan	4	4	5	5	Z	6	6	21	22	23	24	25	26	26	27	28	30	29	29	29	30	31	31	31	21.3	31																							
22-Jan	31	32	31	30	30	Z	29	29	27	28	30	31	31	31	31	29	17	15	23	18	13	15	13	12	24.9	32																							
23-Jan	11	9	18	22	19	20	Z	17	15	18	18	18	18	17	14	13	9	6	5	6	6	11	14	15	13.9	22																							
24-Jan	12	13	12	10	9	11	9	Z	10	11	12	13	15	15	15	14	8	7	6	4	4	3	5	6	9.7	15																							
25-Jan	9	4	Z	8	6	4	4	4	4	7	9	11	12	11	7	7	5	5	4	3	3	3	3	4	6.0	12																							
26-Jan	5	5	4	Z	3	3	3	4	4	4	8	9	18	29	31	30	26	27	19	16	17	13	10	9	12.9	31																							
27-Jan	4	4	11	9	Z	4	4	4	21	37	37	37	38	35	31	17	9	7	10	29	29	26	19	14	18.9	38																							
28-Jan	8	4	8	10	8	Z	4	4	4	5	8	9	11	10	18	15	15	13	15	14	11	11	7	11	9.7	18																							
29-Jan	8	18	25	23	11	9	Z	4	6	10	11	12	33	39	38	34	21	30	25	18	19	14	24	21	19.7	39																							
30-Jan	14	31	29	31	31	29	29	Z	34	39	41	35	34	31	33	30	33	31	33	32	32	32	31	33	31.7	41																							
31-Jan	35	37	Z	37	36	31	32	30	28	24	33	36	37	38	37	34	34	35	36	33	34	31	29	29	33.3	38																							
																								15.8	16.6	16.4	17.0	16.7	14.2	14.6	14.1	14.4	16.5	18.7	20.7	22.1	22.7	22.5	21.0	17.6	16.5	16.6	16.6	16.3	16.0	15.8	16.1	Diurnal Average	
																								38	37	31	37	36	34	33	32	34	39	41	39	38	39	38	36	34	35	36	33	35	36	35	34	Diurnal Maximum	
Z - zerospan C - Calibration M - Maintenance PF - Power Failure																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																																																	



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Athabasca Valley - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Athabasca Valley - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	462	65.25	65.25
21 - 50	246	34.75	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 (O₃) - ppb
Athabasca Valley - January 2017

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	8	5	5	6	6	32	113	96	33	36	41	16	16	9	12	28	462
21 - 50	34	2	1	0	0	4	16	10	6	13	47	28	10	6	9	60	246
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
Totals	42	7	6	6	6	36	129	106	39	49	88	44	26	15	21	88	708

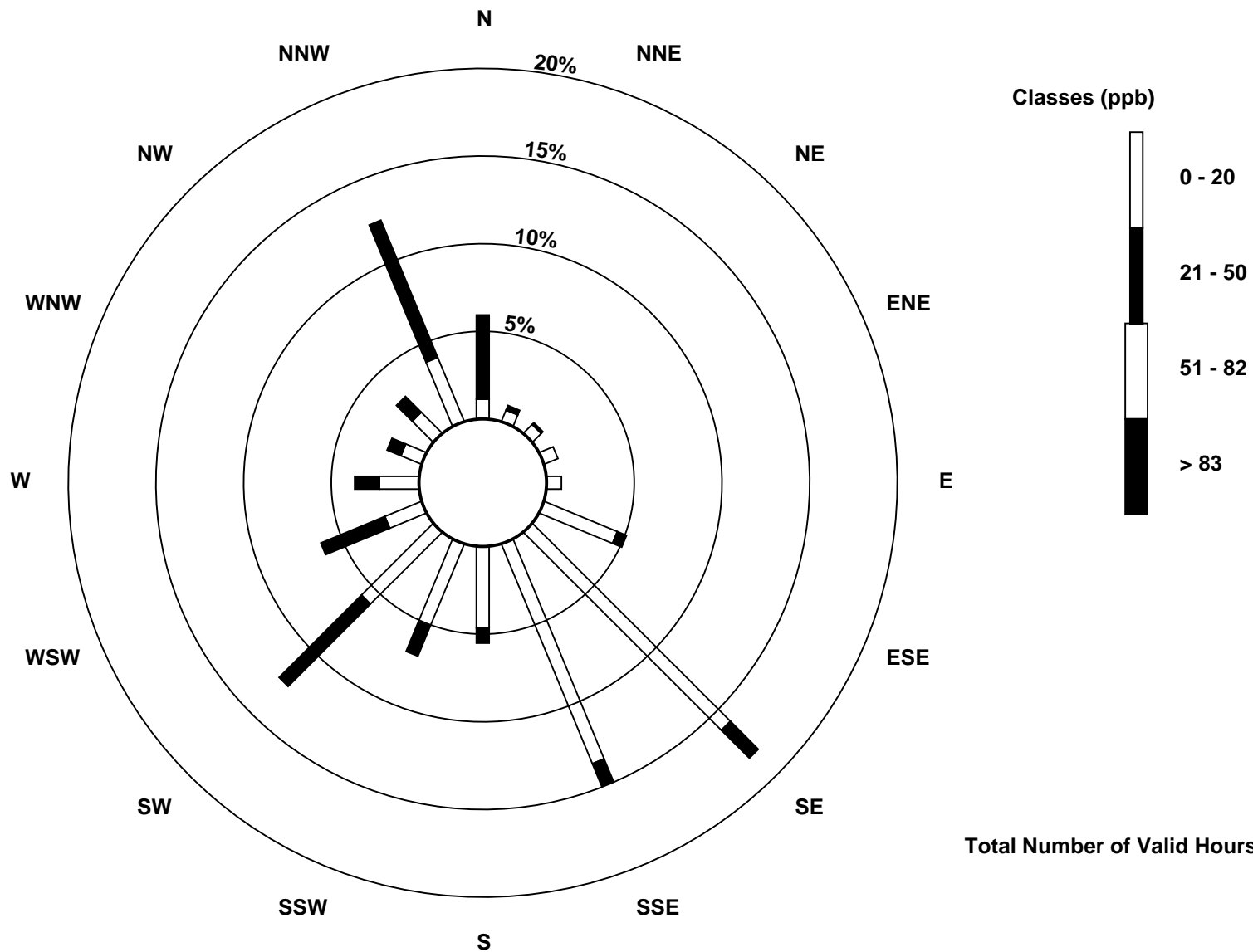
Total Number of Valid Hours: 708

Total Number of Hours: 744

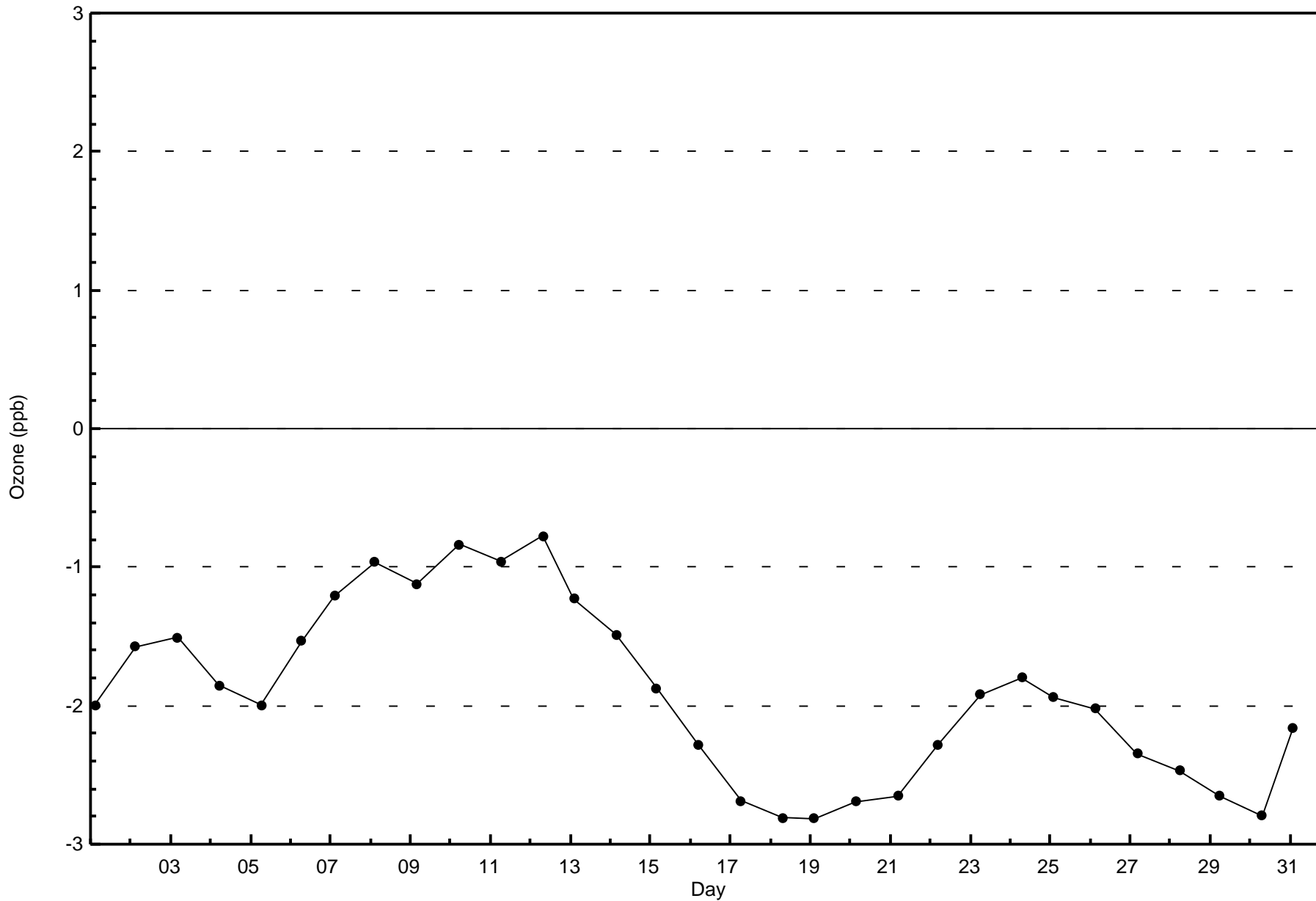


Wood Buffalo Environmental Association
Wind Rose 2012-2017

Ozone (O₃) - ppb
Athabasca Valley (AMS 7)



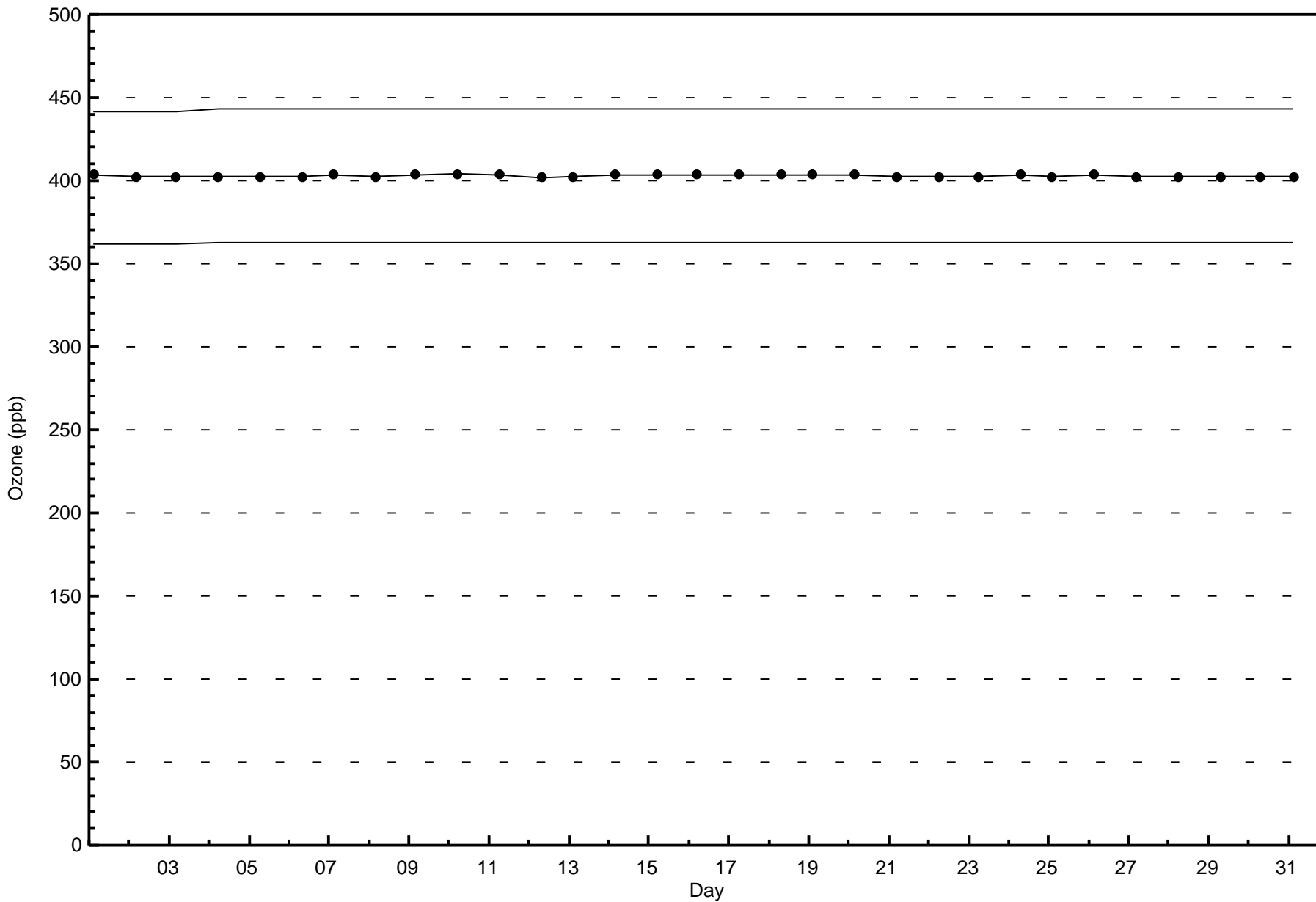
Total Number of Valid Hours: 708





Wood Buffalo Environmental Association
Span Responses

Ozone (O₃) - ppb
Athabasca Valley - January 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

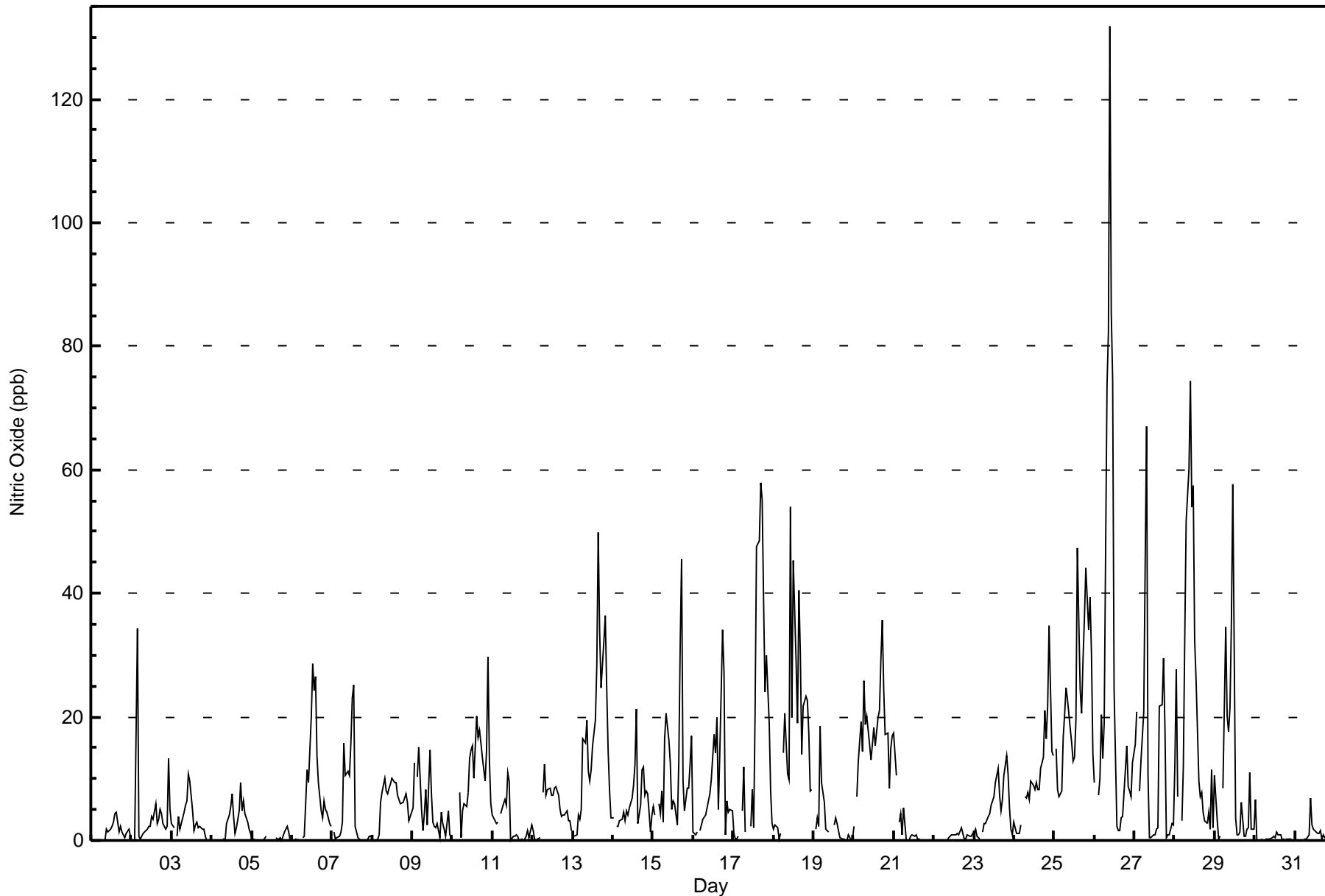
Athabasca Valley - January 2017

Maximum Value: 132 ppb on Jan 26 10:00																		Maximum Daily Average: 27.3 ppb on Jan 26																		Hours in Service: 744			
Minimum Value: 0 ppb on Jan 1 02:00																		Minimum Daily Average: 0.5 ppb on Jan 5																		Hours of Data: 704			
Maximum Diurnal Average: 14.1 ppb at hour 11																		Minimum Diurnal Average: 1.8 ppb at hour 3																		Hours of Missing Data: 40			
Monthly Average: 8.8 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 4 Q ₃ = 11 P ₉₀ = 22 P ₉₉ = 63																		Hours of Calibration: 36			
																																				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-Jan	Z	0	0	0	0	0	0	0	0	2	1	2	2	3	4	5	1	2	1	1	0	1	2	1	1.3	5													
2-Jan	0	Z	0	34	1	0	1	1	1	2	2	2	4	4	6	3	3	5	4	3	2	2	13	5	4.3	34													
3-Jan	3	2	Z	1	4	2	3	5	6	6	11	10	5	2	2	3	2	2	2	1	0	0	0	3.1	11														
4-Jan	0	0	0	Z	0	0	0	0	0	0	3	4	6	8	4	1	2	5	9	5	6	4	3	2	1	2.7	9												
5-Jan	0	0	0	0	Z	0	0	0	1	C	C	C	C	C	1	0	0	1	0	1	2	2	1	0	0.5	2													
6-Jan	0	0	0	0	0	Z	1	1	6	11	9	20	29	24	27	14	9	5	4	7	5	5	3	2	7.9	29													
7-Jan	Z	1	0	1	1	1	3	16	10	11	11	16	23	25	2	0	0	0	0	0	0	0	1	1	5.4	25													
8-Jan	1	Z	0	0	1	6	8	10	8	8	8	9	10	9	9	7	7	6	6	7	8	6	3	4	6.2	10													
9-Jan	5	13	Z	10	15	5	2	4	8	3	15	7	3	2	2	3	0	5	3	2	1	5	1	1	5.0	15													
10-Jan	0	0	0	Z	8	0	5	6	6	8	13	15	15	10	20	17	18	16	13	10	15	30	13	6	10.5	30													
11-Jan	4	3	3	3	Z	4	6	7	6	11	10	0	1	1	1	1	0	0	0	0	1	2	1	3	2.8	11													
12-Jan	2	0	0	0	0	Z	8	12	7	8	9	7	7	8	9	7	5	4	4	4	5	3	3	2	5.0	12													
13-Jan	Z	1	1	4	4	5	17	16	20	11	10	11	15	20	28	50	34	25	32	36	25	15	8	4	17.0	50													
14-Jan	4	Z	2	2	3	3	5	3	5	4	5	7	9	12	21	3	6	12	12	7	8	8	1	4	6.4	21													
15-Jan	5	4	Z	6	4	8	3	17	21	16	13	5	6	6	2	13	32	46	10	5	8	8	12	17	11.6	46													
16-Jan	1	1	1	Z	2	2	3	4	5	6	7	10	17	14	20	5	14	34	27	1	6	5	5	5	8.6	34													
17-Jan	1	0	0	1	Z	5	12	1	M	M	2	8	2	21	48	49	58	55	39	24	30	19	8	3	18.4	58													
18-Jan	2	3	2	0	1	Z	14	21	11	10	54	20	45	29	19	41	30	14	22	23	23	17	8	8	18.1	54													
19-Jan	Z	2	4	2	19	9	6	2	2	1	PF	PF	3	4	3	2	0	0	0	0	0	1	0	0	2.9	19													
20-Jan	2	Z	7	13	19	15	26	19	20	16	13	16	18	15	20	21	29	36	25	17	17	9	15	17	17.6	36													
21-Jan	17	10	Z	3	4	1	5	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	2.0	17													
22-Jan	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	2	1	0	0	1	1	1	1	0.6	2													
23-Jan	1	2	1	0	Z	1	3	3	4	4	6	6	7	9	12	7	5	7	10	14	11	5	2	1	5.2	14													
24-Jan	3	1	1	1	2	Z	7	7	8	7	10	9	8	9	8	8	12	14	21	16	22	35	14	14	10.3	35													
25-Jan	Z	15	8	7	8	17	20	25	23	18	16	13	14	19	47	25	21	29	36	44	34	39	30	14	22.7	47													
26-Jan	9	Z	7	10	20	13	19	74	82	132	86	74	25	2	2	2	4	4	11	15	9	8	7	13	27.3	132													
27-Jan	16	21	Z	8	13	21	45	67	11	0	1	1	1	2	2	22	22	30	18	1	1	1	3	3	13.3	67													
28-Jan	12	28	7	Z	3	12	33	52	60	74	54	57	32	26	10	7	8	5	3	3	5	2	11	2	22.0	74													
29-Jan	11	3	0	1	Z	8	34	20	18	21	35	58	4	1	1	1	6	1	1	2	2	11	2	2	10.6	58													
30-Jan	7	0	0	0	0	Z	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.6	7													
31-Jan	Z	0	0	0	0	0	0	0	1	7	3	2	2	1	1	2	0	1	0	1	1	0	0	1	1.0	7													
																								Diurnal Average															
																								Diurnal Maximum															
Z - zerospan C - Calibration M - Maintenance PF - Power Failure																																							



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Athabasca Valley - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Athabasca Valley - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	622	88.35	88.35
21 - 40	58	8.24	96.59
41 - 80	21	2.98	99.57
81 - 159	3	0.43	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Athabasca Valley - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	42	7	6	7	6	31	119	66	26	37	88	44	27	14	21	81	622
21 - 40	0	0	0	0	0	1	8	30	6	8	2	0	0	1	0	2	58
11 - 80	0	0	0	0	0	0	3	12	3	2	0	0	0	0	0	1	21
81 - 159	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	3
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	42	7	6	7	6	32	130	110	35	48	90	44	27	15	21	84	704

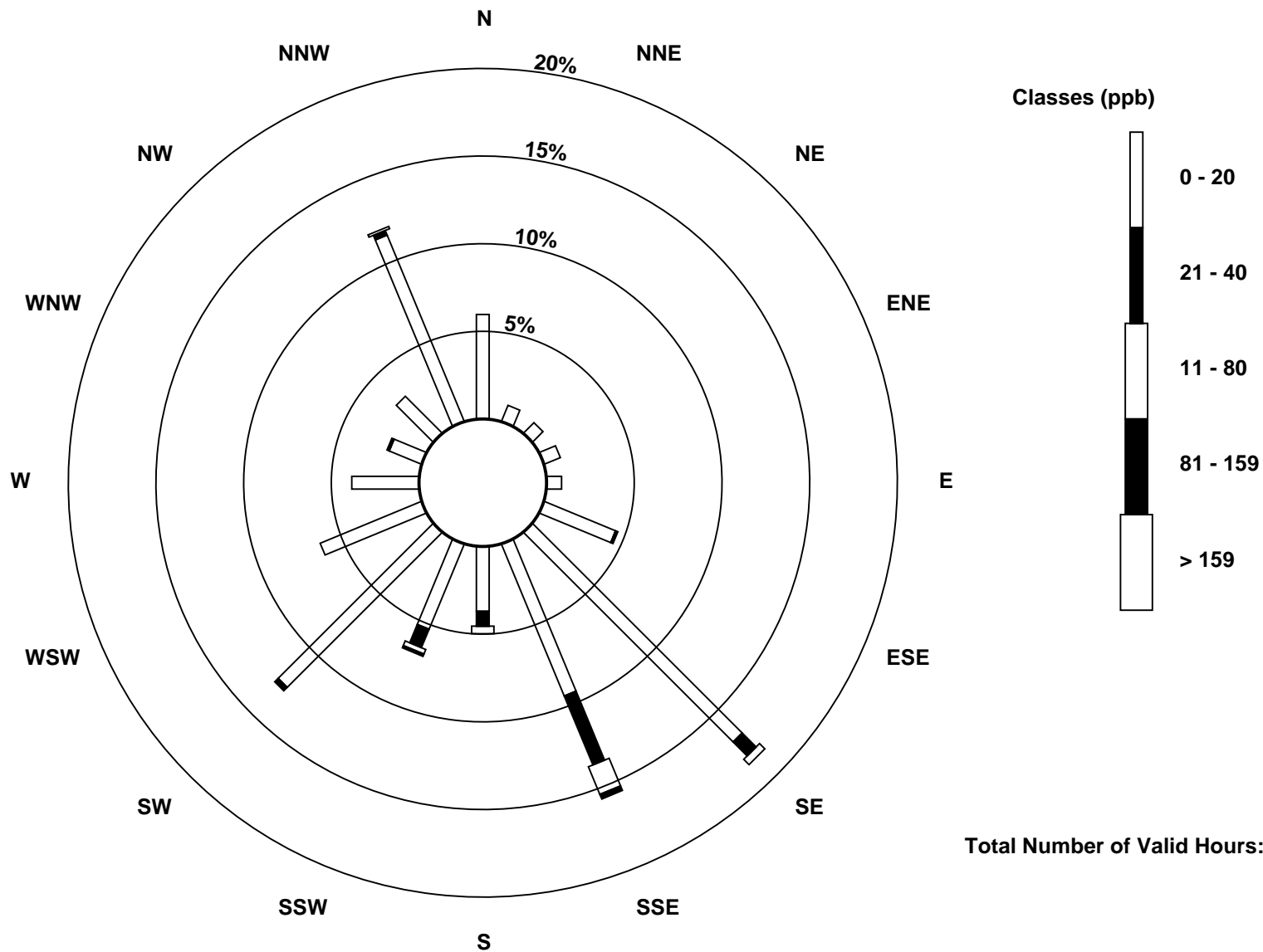
Total Number of Valid Hours: 704

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose 2012-2017

Nitric Oxide (NO) - ppb
Athabasca Valley (AMS 7)

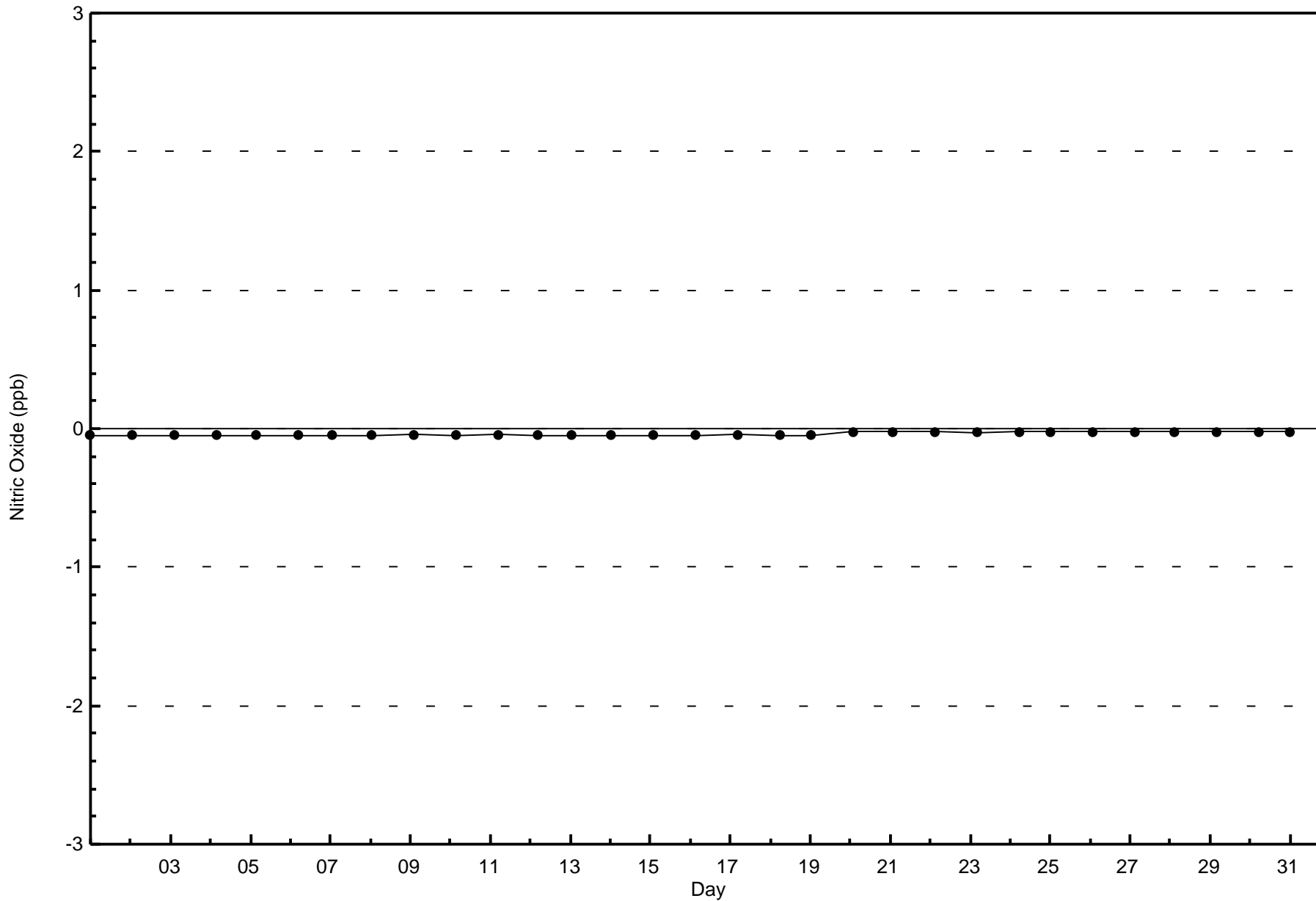


Total Number of Valid Hours: 704



Wood Buffalo Environmental Association
Zero Responses

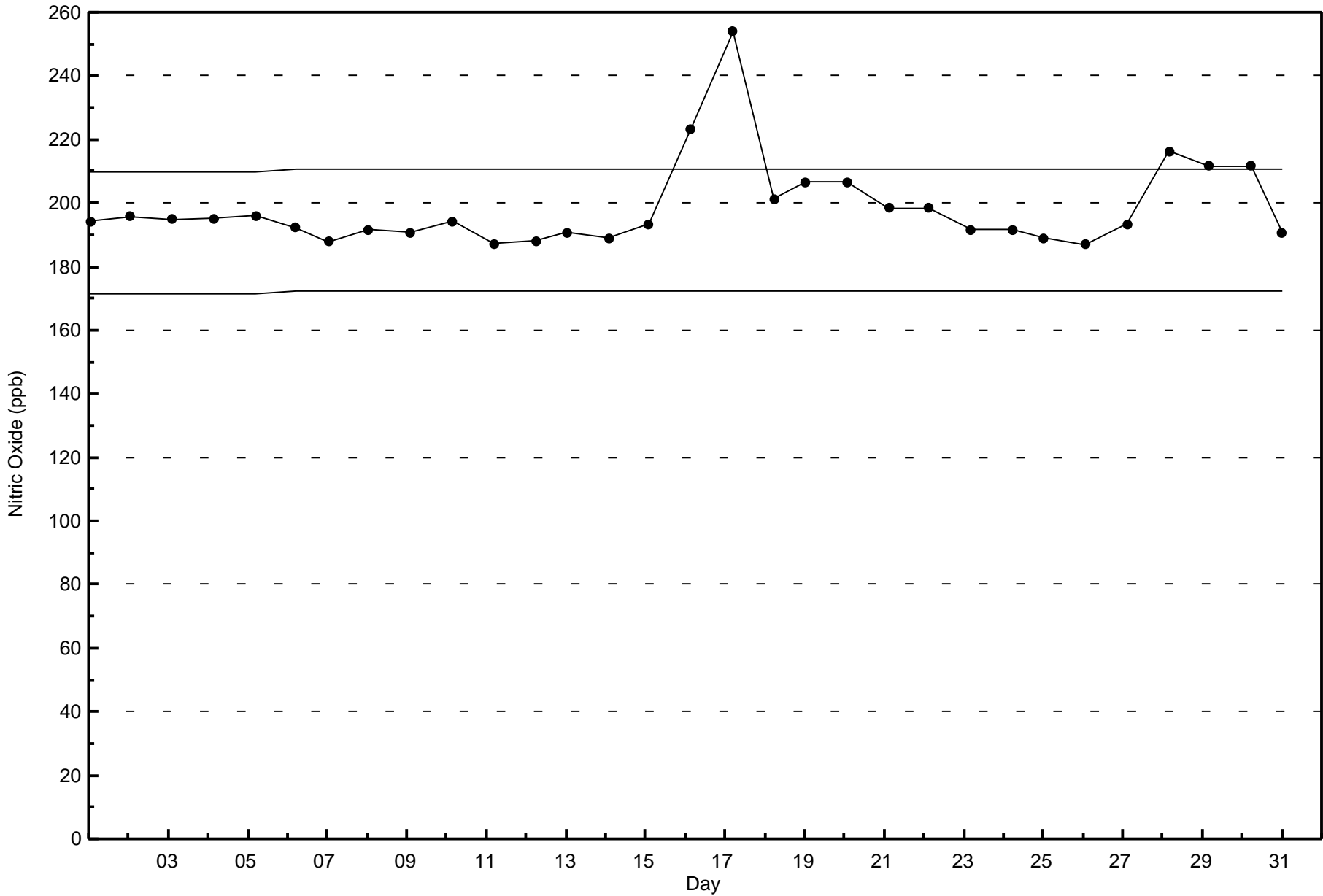
Nitric Oxide (NO) - ppb
Athabasca Valley - January 2017





Wood Buffalo Environmental Association
Span Responses

Nitric Oxide (NO) - ppb
Athabasca Valley - January 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Athabasca Valley - January 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 45 ppb on Jan 16 18:00	Maximum Daily Average: 25.9 ppb on Jan 28		Hours of Data:	704
Minimum Value: 1 ppb on Jan 31 02:00	Minimum Daily Average: 4.7 ppb on Jan 30		Hours of Missing Data:	40
Maximum Diurnal Average: 18.3 ppb at hour 18	Minimum Diurnal Average: 9.3 ppb at hour 3		Hours of Calibration:	36
Monthly Average: 14.3 ppb	Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 8 Median = 13 Q ₃ = 20 P ₉₀ = 27 P ₉₉ = 37		Percent Operational Time:	99.5

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	Z	4	5	3	3	4	4	5	9	9	5	4	5	7	14	18	11	13	10	7	9	13	15	9	8.1	18
2-Jan	6	Z	5	10	5	11	4	8	4	3	4	3	6	6	9	8	9	17	15	15	13	13	22	14	9.1	22
3-Jan	15	11	Z	8	12	7	6	7	8	10	13	11	8	3	5	6	8	8	7	6	3	3	3	4	7.4	15
4-Jan	5	6	5	Z	3	5	10	15	10	21	16	17	18	10	4	9	21	25	25	26	21	17	12	12	13.6	26
5-Jan	12	11	12	17	Z	13	11	12	12	C	C	C	C	C	3	3	4	5	7	9	12	12	11	14	10.0	17
6-Jan	19	17	15	12	13	Z	9	13	15	20	15	20	24	23	27	27	27	16	16	21	17	14	11	10	17.3	27
7-Jan	Z	6	4	4	4	5	11	22	22	19	14	14	17	22	8	4	6	5	4	9	9	14	12	12	10.7	22
8-Jan	9	Z	7	8	16	23	21	21	19	16	12	11	12	14	15	16	17	14	15	18	20	18	14	19	15.3	23
9-Jan	23	26	Z	28	29	11	6	11	22	7	23	15	7	7	9	14	14	24	17	12	7	12	9	6	14.7	29
10-Jan	6	6	4	Z	17	10	15	18	18	15	13	13	14	12	23	23	27	27	26	24	29	35	29	21	18.3	35
11-Jan	16	12	10	10	Z	12	16	16	19	27	21	1	2	3	4	4	4	10	11	18	13	8	7	9	10.9	27
12-Jan	10	7	7	11	11	Z	16	22	16	15	12	9	10	12	13	15	16	13	14	14	18	14	13	11	13.0	22
13-Jan	Z	8	8	18	21	27	36	34	34	26	20	18	18	20	28	36	33	28	31	32	28	23	18	14	24.2	36
14-Jan	12	Z	10	11	11	11	11	9	12	10	9	10	13	14	22	14	22	25	27	23	24	24	20	21	15.9	27
15-Jan	21	19	Z	25	23	26	22	33	32	30	23	8	12	10	8	25	42	43	34	32	31	31	33	34	25.9	43
16-Jan	23	22	17	Z	12	12	13	16	18	17	17	20	21	23	32	17	37	45	31	8	19	15	19	15	20.4	45
17-Jan	12	8	7	10	Z	19	16	7	M	M	5	12	7	19	34	39	36	33	23	20	22	17	9	6	17.2	39
18-Jan	5	7	7	2	3	Z	7	10	8	8	18	11	17	15	14	23	20	15	15	15	14	13	9	10	11.5	23
19-Jan	Z	6	6	7	14	16	16	15	15	9	PF	PF	6	9	10	10	10	9	11	10	8	11	12	19	10.9	19
20-Jan	22	Z	22	23	23	20	20	17	15	12	10	9	10	11	12	16	20	19	17	15	14	12	13	15	15.9	23
21-Jan	17	17	Z	17	19	16	17	6	5	5	5	4	3	4	4	4	3	4	3	3	2	2	2	2	7.1	19
22-Jan	2	1	2	Z	3	3	3	4	6	5	4	3	3	3	4	5	18	20	10	15	18	16	17	15	7.8	20
23-Jan	15	15	9	7	Z	10	12	12	13	11	10	10	11	14	19	19	22	26	29	29	25	15	10	8	15.3	29
24-Jan	11	9	9	10	11	Z	12	11	11	11	9	10	12	11	11	12	19	16	19	17	18	19	16	15	13.0	19
25-Jan	Z	14	13	11	12	15	15	15	15	12	10	8	8	12	19	16	17	18	20	22	21	21	20	18	15.3	22
26-Jan	17	Z	15	16	19	17	17	28	29	38	31	32	19	5	4	6	11	10	20	23	21	24	25	24	19.5	38
27-Jan	28	27	Z	21	25	28	36	40	17	2	2	2	2	5	9	26	33	34	30	7	7	8	17	20	18.5	40
28-Jan	27	34	30	Z	26	28	31	33	34	31	27	31	28	28	21	21	22	22	17	17	21	19	26	23	25.9	34
29-Jan	29	21	8	10	Z	27	32	29	30	27	26	35	8	3	4	8	21	9	12	19	17	23	10	14	18.3	35
30-Jan	22	3	4	2	3	Z	4	3	5	3	3	4	3	6	4	7	5	6	4	4	4	4	6	4	4.7	22
31-Jan	Z	1	2	5	6	11	11	11	13	17	6	4	3	3	4	7	7	5	5	6	3	6	7	7	6.5	17

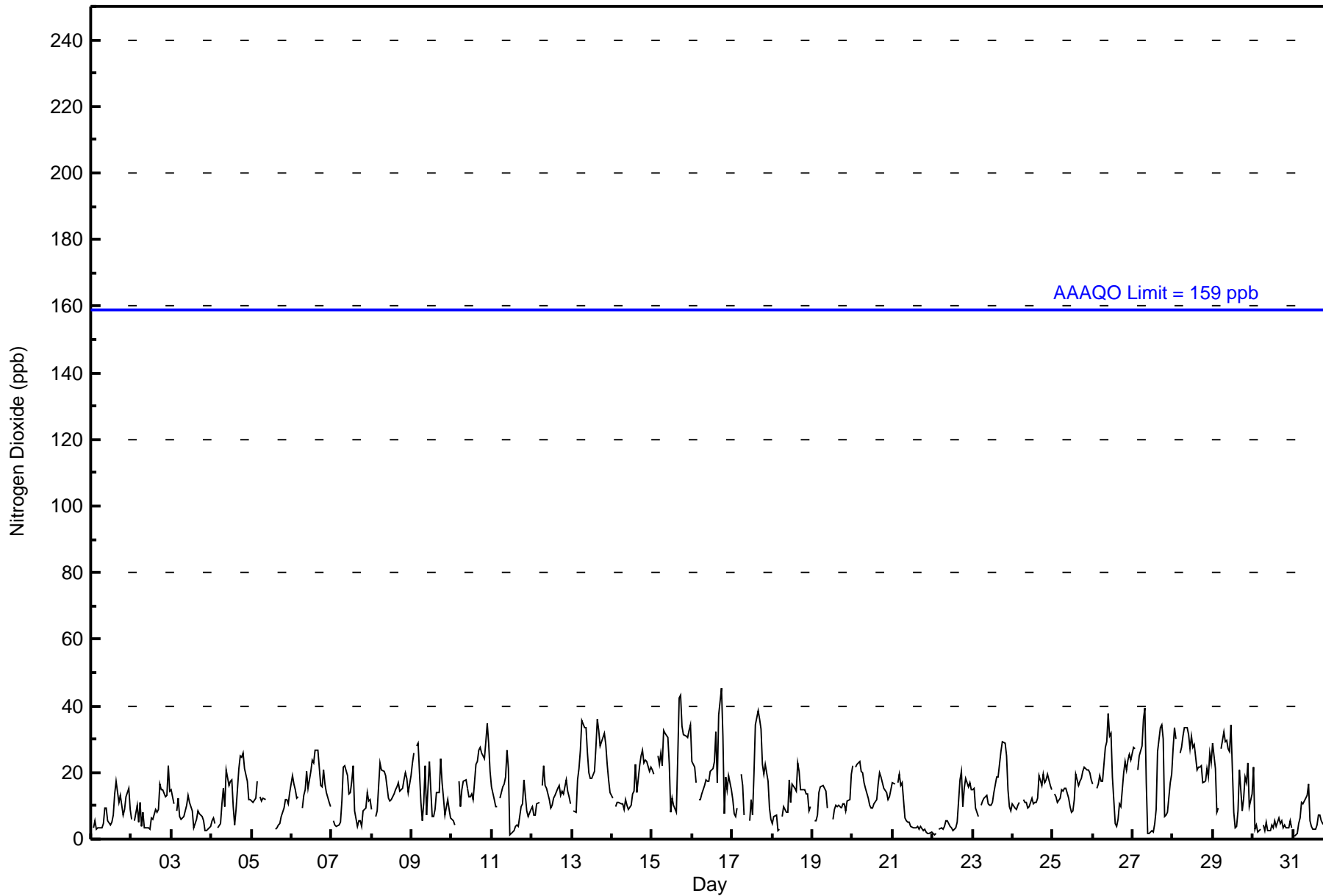
15.3	12.2	9.3	11.7	13.3	14.8	14.8	16.2	16.1	15.0	13.2	12.2	10.9	11.1	12.7	14.7	18.1	18.3	16.8	15.9	15.7	15.3	14.3	13.6	Diurnal Average
29	34	30	28	29	28	36	40	34	38	31	35	28	28	34	39	42	45	34	32	31	35	33	34	Diurnal Maximum

Z - zerospan C - Calibration M - Maintenance PF - Power Failure
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	545	77.41	77.41
21 - 40	156	22.16	99.57
41 - 80	3	0.43	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	39	7	5	5	3	15	88	50	20	40	85	43	27	15	20	83	545
21 - 40	3	0	1	2	3	17	41	58	15	8	5	1	0	0	1	1	156
11 - 80	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	3
81 - 159	0	0	0	0	0	0	0	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
Totals	42	7	6	7	6	32	130	110	35	48	90	44	27	15	21	84	704

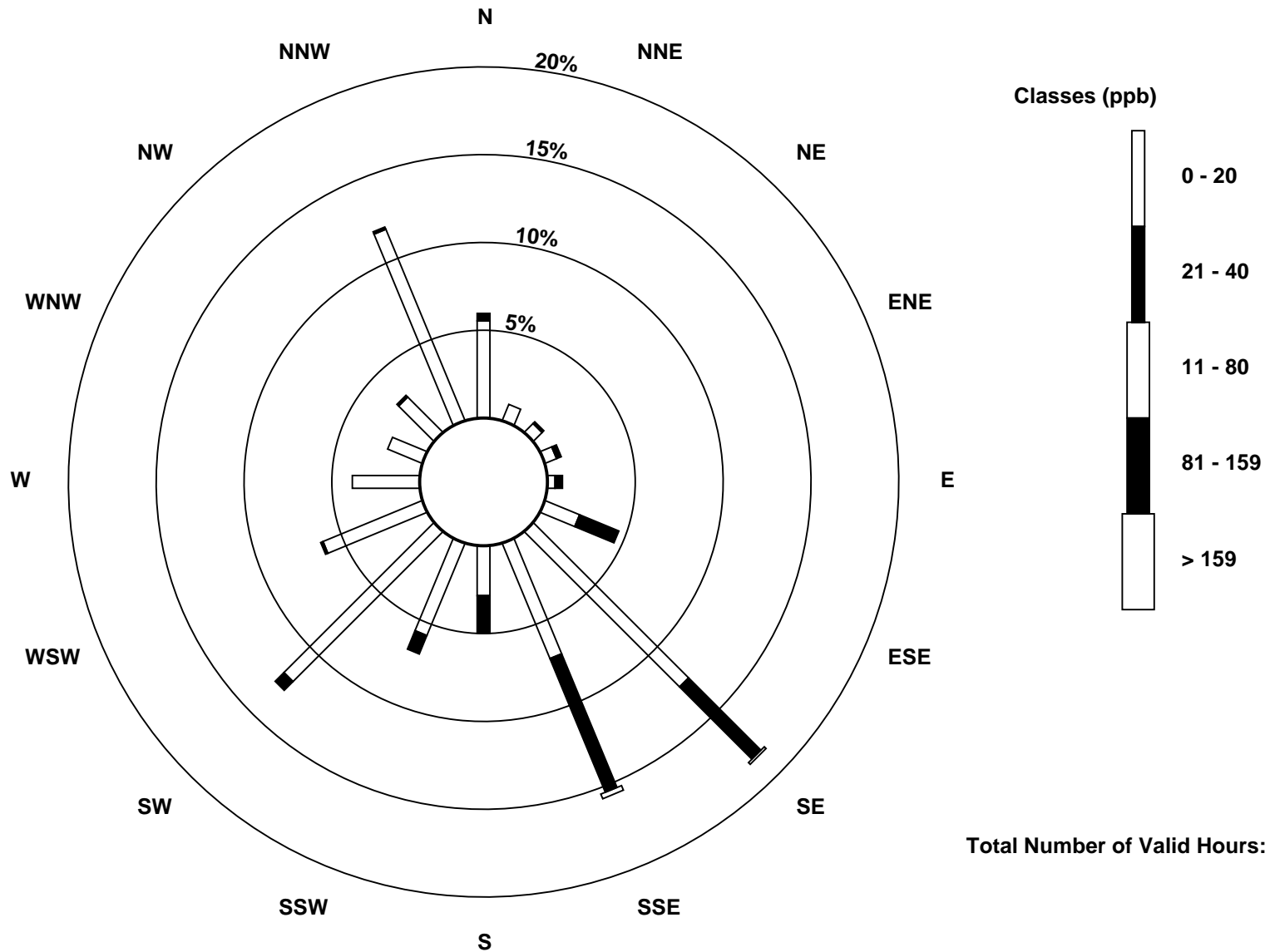
Total Number of Valid Hours: 704

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose 2012-2017

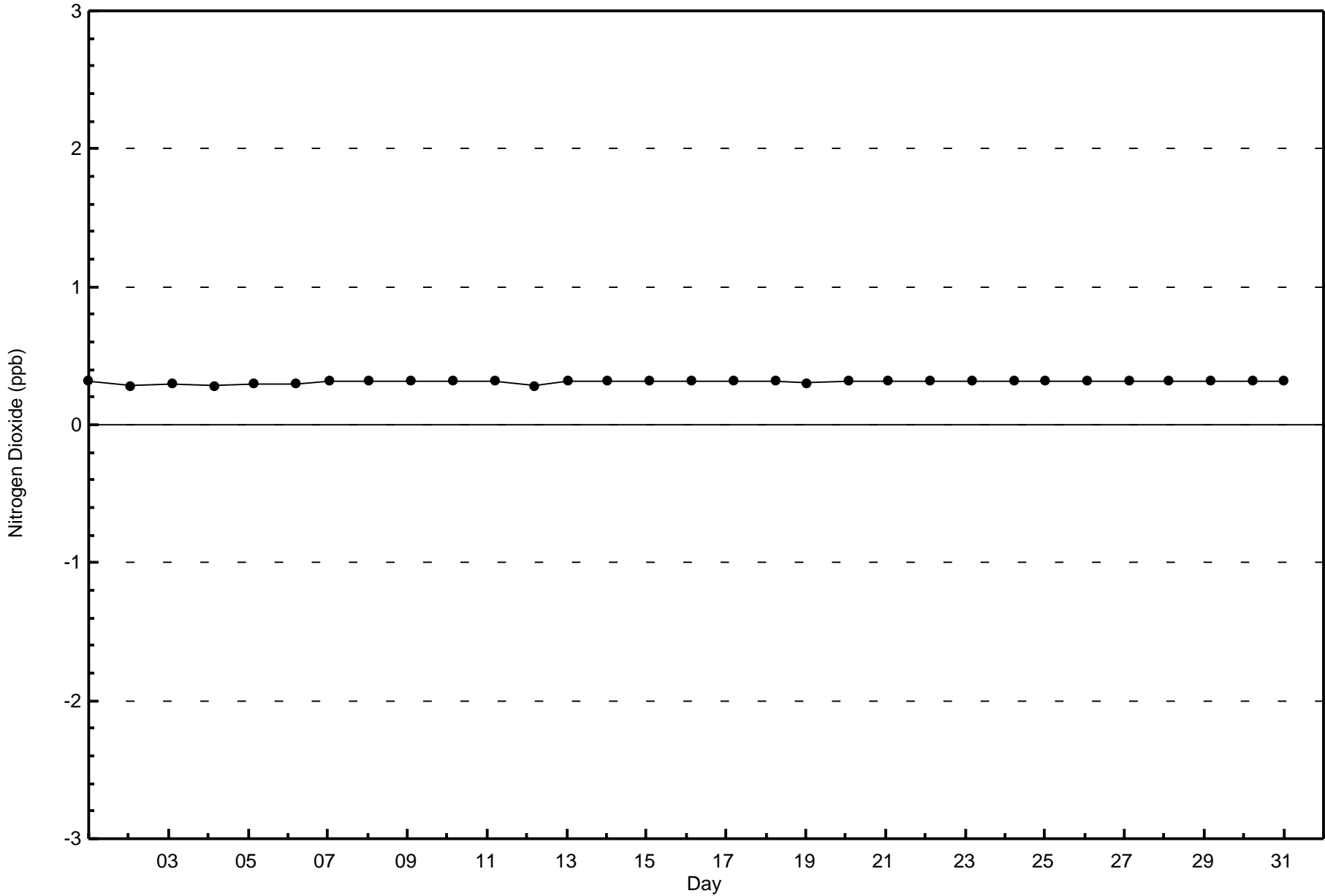
Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley (AMS 7)





Wood Buffalo Environmental Association
Zero Responses

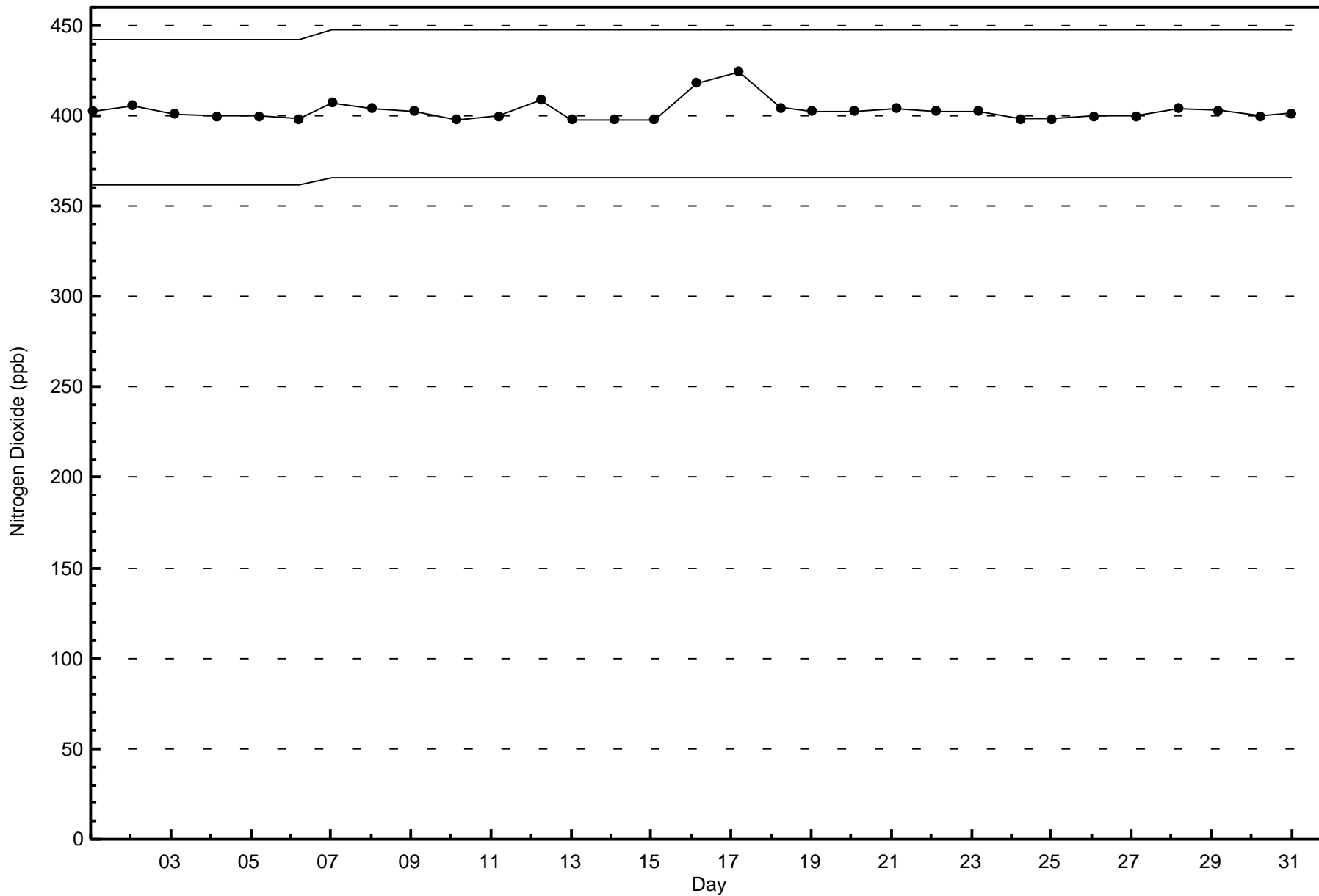
Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - January 2017





Wood Buffalo Environmental Association
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - January 2017





Wood Buffalo Environmental Association
Summary of Hour Averages

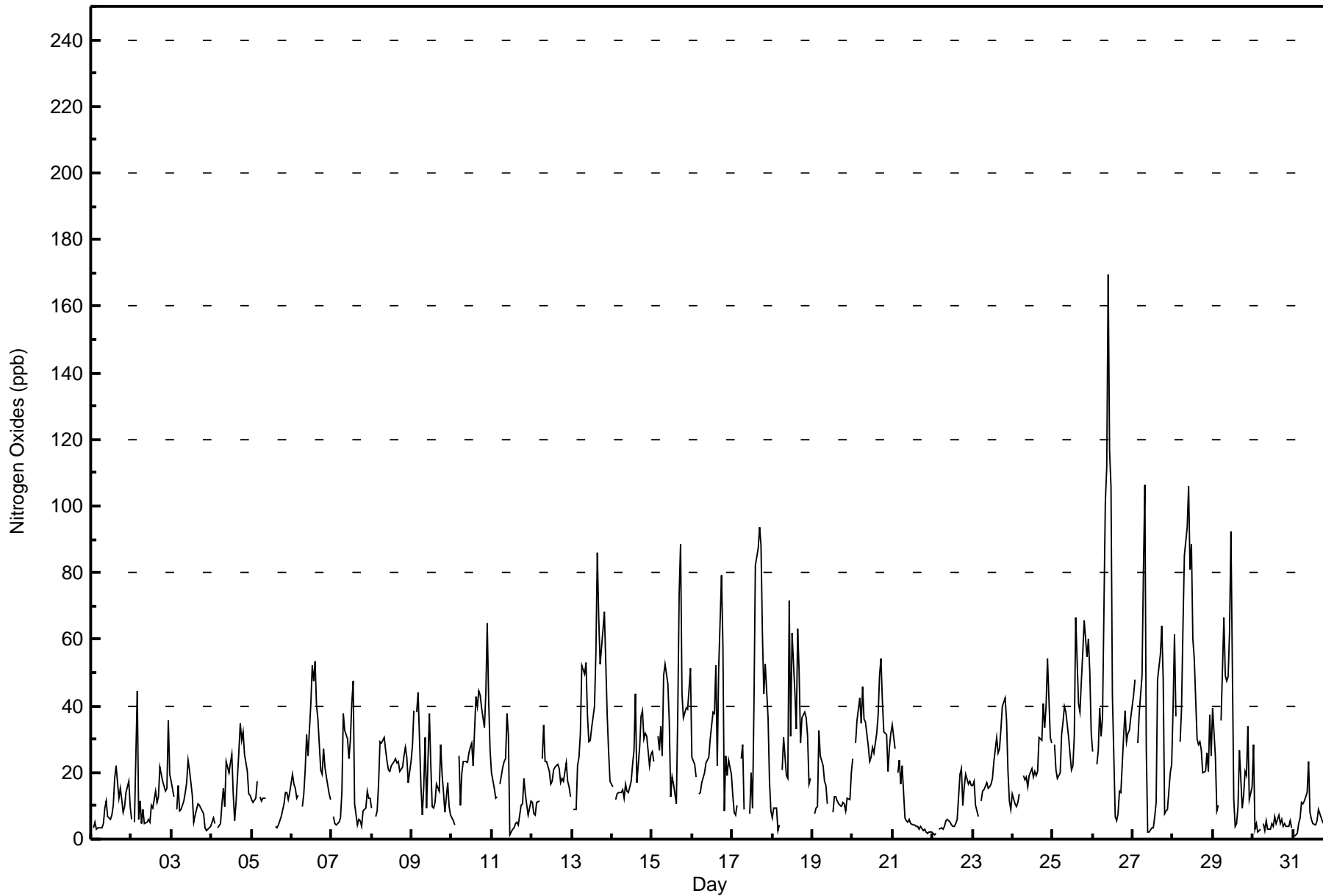
Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - January 2017

Maximum Value: 169 ppb on Jan 26 10:00 Maximum Daily Average: 47.9 ppb on Jan 28																		Hours in Service: 744 Hours of Data: 704 Hours of Missing Data: 40 Hours of Calibration: 36 Percent Operational Time: 99.5								
Minimum Value: 1 ppb on Jan 31 02:00 Minimum Daily Average: 5.3 ppb on Jan 30 Maximum Diurnal Average: 30.1 ppb at hour 18 Minimum Diurnal Average: 11.1 ppb at hour 3 Monthly Average: 23.1 ppb Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 9 Median = 18 Q ₃ = 31 P ₉₀ = 47 P ₉₉ = 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-Jan	Z	4	5	3	3	3	4	5	9	11	7	6	7	10	18	22	12	15	12	8	10	14	17	10	9.4	22
2-Jan	6	Z	5	45	6	11	5	9	5	5	6	5	10	9	15	11	13	22	19	18	14	15	35	19	13.4	45
3-Jan	18	13	Z	9	16	8	9	11	14	17	24	21	13	5	7	9	11	10	9	8	3	3	3	4	10.6	24
4-Jan	5	6	5	Z	3	5	11	15	10	23	20	23	25	14	5	11	26	35	29	32	25	20	14	13	16.4	35
5-Jan	12	11	12	17	Z	13	11	12	12	C	C	C	C	C	4	3	4	5	7	11	14	14	12	14	10.5	17
6-Jan	19	17	15	12	13	Z	10	14	21	31	25	41	52	47	53	40	36	21	19	27	22	19	14	12	25.2	53
7-Jan	Z	7	4	4	5	6	14	38	32	30	24	30	41	47	11	4	6	5	4	8	9	14	12	12	16.1	47
8-Jan	9	Z	7	9	16	29	29	31	27	23	21	21	22	23	24	23	24	20	22	25	27	25	17	23	21.5	31
9-Jan	28	38	Z	38	44	16	7	16	30	9	38	23	10	9	11	17	14	29	20	14	8	17	10	7	19.7	44
10-Jan	6	6	4	Z	25	10	20	23	23	23	26	27	29	22	43	40	44	43	39	34	44	65	42	27	28.9	65
11-Jan	20	15	12	13	Z	17	21	23	24	38	31	1	3	3	5	5	4	10	11	18	14	10	7	11	13.8	38
12-Jan	11	8	7	11	11	Z	24	34	23	23	20	17	17	21	22	23	21	17	18	18	23	17	16	13	18.0	34
13-Jan	Z	9	9	22	25	32	52	49	53	37	29	30	34	40	56	86	66	53	63	68	53	37	26	17	41.1	86
14-Jan	16	Z	12	13	14	14	15	12	17	14	14	17	22	27	44	17	28	37	39	30	32	31	22	25	22.2	44
15-Jan	26	23	Z	31	27	34	25	49	52	47	35	13	19	16	10	37	74	89	44	36	39	39	45	51	37.5	89
16-Jan	25	23	18	Z	13	14	17	20	23	24	25	30	38	38	52	22	51	79	58	9	25	19	24	20	29.0	79
17-Jan	13	8	7	10	Z	24	28	9	M	M	8	20	9	40	82	87	94	88	61	44	52	36	17	9	35.6	94
18-Jan	6	9	9	3	4	Z	21	30	19	18	72	31	62	44	33	63	51	29	37	38	36	31	17	18	29.6	72
19-Jan	Z	8	9	10	33	25	22	17	16	11	PF	PF	8	13	13	11	11	10	11	10	9	12	12	20	13.8	33
20-Jan	24	Z	29	35	43	35	46	36	35	28	23	25	28	26	32	37	49	54	42	32	31	20	28	32	33.5	54
21-Jan	35	27	Z	20	24	17	22	6	5	5	6	5	4	4	4	4	3	4	3	3	2	1	2	2	9.0	35
22-Jan	2	1	2	Z	3	3	3	4	6	6	5	4	4	4	5	6	20	21	10	16	19	16	17	16	8.4	21
23-Jan	16	17	10	7	Z	12	14	15	17	15	16	17	18	23	30	26	27	33	40	43	36	20	11	9	20.5	43
24-Jan	14	11	10	11	13	Z	19	18	19	16	19	21	19	20	19	21	31	30	40	34	40	54	31	29	23.3	54
25-Jan	Z	29	21	18	20	31	35	40	38	30	25	21	22	31	67	41	38	48	56	66	55	60	50	32	38.0	67
26-Jan	26	Z	23	26	39	31	36	101	112	169	117	106	43	7	5	7	14	14	31	39	29	32	33	37	46.9	169
27-Jan	43	48	Z	29	38	49	81	107	27	2	2	3	3	7	11	48	55	64	48	7	8	9	20	22	31.9	107
28-Jan	39	61	37	Z	29	39	63	85	94	106	81	89	60	54	30	28	29	27	20	20	26	20	37	25	47.9	106
29-Jan	39	24	8	10	Z	36	67	49	47	49	62	92	12	4	5	10	27	9	13	20	19	34	12	16	28.9	92
30-Jan	28	3	4	2	3	Z	5	3	5	3	3	5	4	7	5	7	5	6	4	5	4	4	6	4	5.3	28
31-Jan	Z	1	2	5	6	11	11	11	14	23	8	6	5	4	6	9	8	6	5	7	3	6	7	8	7.5	23
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance PF - Power Failure																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	391	55.54	55.54
21 - 40	219	31.11	86.65
41 - 80	75	10.65	97.30
81 - 159	16	2.27	99.57
> 159	1	0.14	99.72

Total Number of Valid Hours: 704

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	38	6	3	1	1	8	33	22	11	28	75	38	21	12	18	76	391
21 - 40	4	1	3	6	5	19	83	39	13	11	13	5	6	2	3	6	219
11 - 80	0	0	0	0	0	5	11	37	9	7	2	1	0	1	0	2	75
81 - 159	0	0	0	0	0	0	3	10	1	2	0	0	0	0	0	0	16
> 159	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Totals	42	7	6	7	6	32	130	109	34	48	90	44	27	15	21	84	702

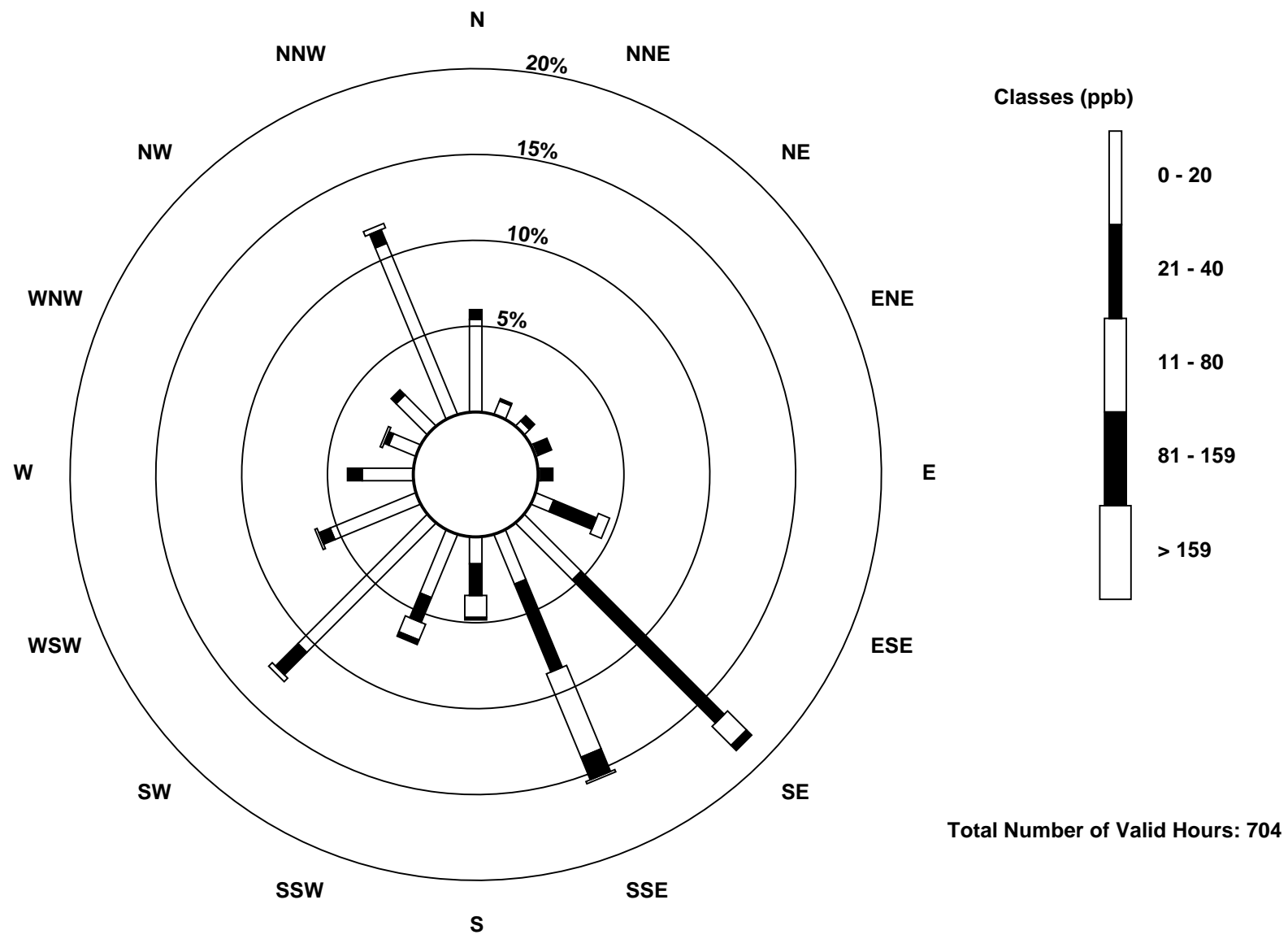
Total Number of Valid Hours: 704

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose 2012-2017

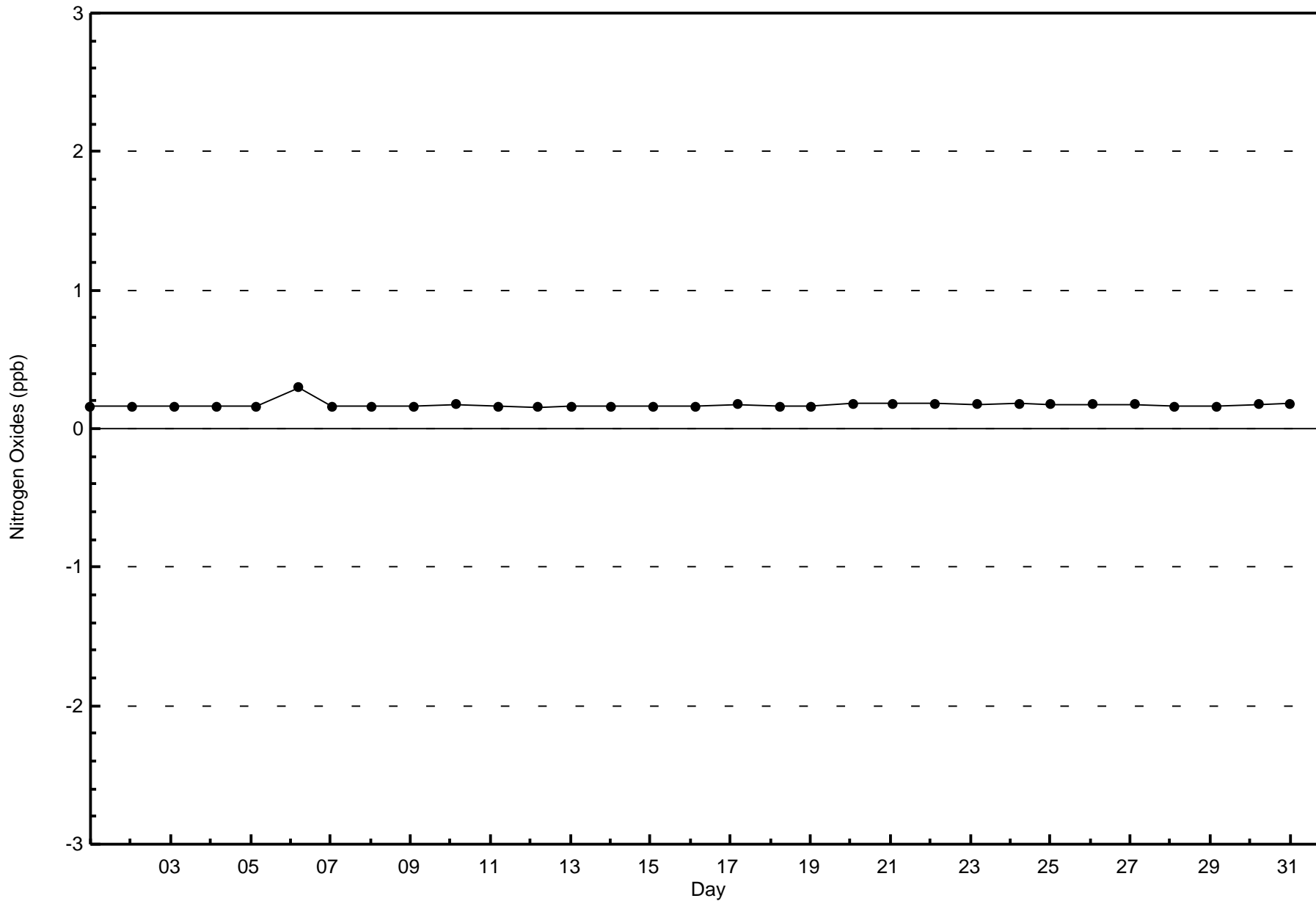
Nitrogen Oxides (NO_x) - ppb
Athabasca Valley (AMS 7)





Wood Buffalo Environmental Association
Zero Responses

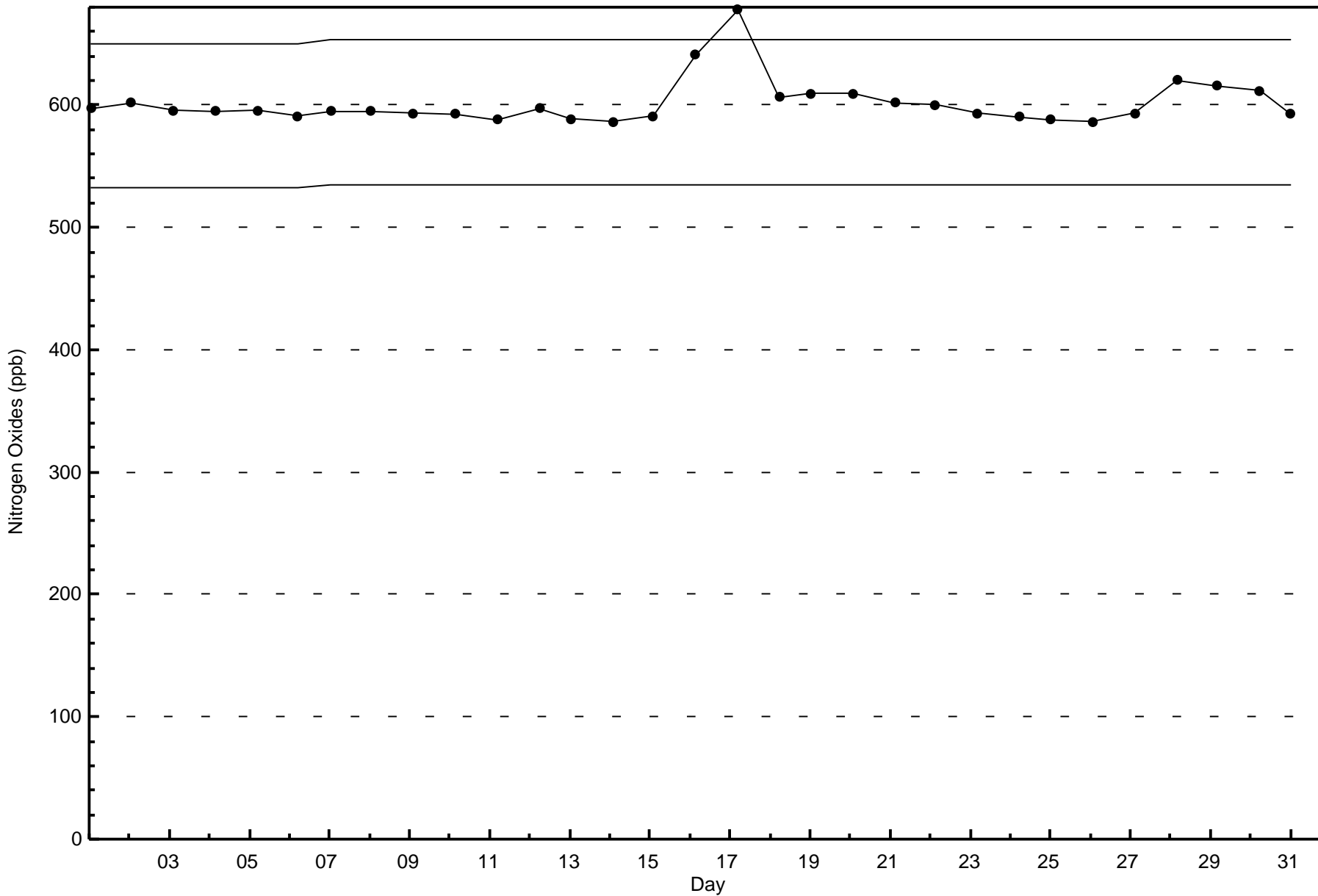
Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - January 2017





Wood Buffalo Environmental Association
Span Responses

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - January 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Particulate Matter 2.5 (PM_{2.5}) - µg/m³

Athabasca Valley - January 2017

Number of Exceedences (AAAQO):		24-hr: 0		Hours in Service:		744																																										
Maximum Value: 36.7 µg/m ³ on Jan 23 20:00		Maximum Daily Average: 14.2 µg/m ³ on Jan 20		Hours of Data:		735																																										
Minimum Value: 0.3 µg/m ³ on Jan 29 15:00		Minimum Daily Average: 2.8 µg/m ³ on Jan 30		Hours of Missing Data:		9																																										
Maximum Diurnal Average: 9.1 µg/m ³ at hour 19		Minimum Diurnal Average: 5.7 µg/m ³ at hour 8		Hours of Calibration:		1																																										
Monthly Average: 6.99 µg/m ³		Percentiles: P ₁ = 1.4 P ₁₀ = 3.0 Q ₁ = 3.8 Median = 5.9 Q ₃ = 9.2 P ₉₀ = 12.6 P ₉₉ = 20.9		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-Jan	3.0	5.2	7.8	4.3	4.2	3.9	3.6	3.5	4.6	5.2	4.8	4.3	3.8	3.8	5.2	6.0	6.4	6.6	4.7	3.9	3.4	4.0	4.3	3.6	4.6	7.8																						
2-Jan	4.3	4.7	4.3	6.2	3.5	4.8	3.4	3.4	2.6	2.4	2.4	2.5	2.9	3.0	3.3	3.5	4.2	5.5	5.9	7.9	6.4	7.3	9.3	5.3	4.5	9.3																						
3-Jan	7.2	6.4	6.7	6.0	5.2	4.4	4.1	3.7	3.8	4.0	3.7	3.6	3.9	3.7	3.8	3.9	4.4	4.2	4.2	3.9	3.5	3.5	3.5	3.5	4.4	7.2																						
4-Jan	2.8	3.2	4.2	4.6	3.6	3.4	3.2	3.3	3.2	4.5	4.7	5.9	5.8	4.1	2.8	2.6	2.9	6.3	16.7	9.7	9.0	5.2	5.5	5.6	5.1	16.7																						
5-Jan	5.3	5.8	6.2	5.9	5.8	5.0	5.1	5.7	4.3	3.7	3.4	3.1	2.6	2.5	2.4	2.4	3.4	4.1	4.3	4.4	4.3	4.1	6.3	4.3	4.3	6.3																						
6-Jan	12.4	12.6	11.1	10.1	8.8	7.7	6.8	7.1	C	3.5	2.9	4.9	6.3	5.4	4.6	3.9	8.7	9.8	9.6	13.7	12.9	14.6	10.7	7.6	8.5	14.6																						
7-Jan	8.4	10.9	12.4	12.1	9.9	10.5	7.6	11.1	10.2	12.1	11.5	11.8	11.5	12.4	5.2	4.4	4.6	5.1	5.3	6.1	6.3	6.2	6.5	5.8	8.7	12.4																						
8-Jan	3.8	3.5	3.5	3.6	4.4	5.4	4.4	4.0	4.4	5.0	6.0	6.1	6.1	5.6	6.1	5.8	6.7	6.3	6.8	7.0	7.5	6.1	6.3	9.5	5.6	9.5																						
9-Jan	7.8	8.7	8.3	7.5	7.6	4.4	3.3	3.4	4.7	3.9	6.8	5.0	3.4	3.5	3.4	3.0	2.7	3.9	3.7	3.0	2.7	2.7	2.3	2.0	4.5	8.7																						
10-Jan	2.5	3.1	4.9	5.7	4.5	4.0	3.8	3.1	4.0	5.3	4.5	6.2	5.4	5.3	7.9	6.3	8.1	12.5	11.3	8.3	10.4	9.4	6.7	6.0	6.2	12.5																						
11-Jan	5.2	3.7	3.3	3.5	3.3	3.0	4.1	4.3	4.5	5.0	5.3	8.9	13.9	15.4	15.9	13.5	10.9	9.7	11.6	8.9	7.8	7.6	7.0	6.6	7.6	15.9																						
12-Jan	6.3	6.6	6.1	5.5	5.5	5.0	4.8	5.5	4.4	5.3	5.4	5.8	5.7	6.5	7.4	7.5	7.4	7.1	7.2	7.0	6.3	6.1	5.4	5.9	6.1	7.5																						
13-Jan	5.9	6.3	6.1	6.9	5.9	6.6	9.0	7.6	9.6	11.2	9.8	9.9	8.6	10.6	8.8	11.3	12.0	9.9	10.5	10.7	9.9	10.1	6.8	5.9	8.7	12.0																						
14-Jan	4.9	4.7	4.0	4.3	3.4	3.9	3.6	3.6	4.7	6.1	5.8	6.4	6.8	8.0	6.7	UO	1.0	6.3	12.6	7.9	11.1	10.6	8.7	9.1	6.3	12.6																						
15-Jan	7.8	8.9	11.0	8.3	5.1	1.3	UO	3.1	5.1	5.6	2.5	UO	1.4	1.2	UO	2.4	13.2	18.1	13.2	12.9	10.4	8.7	9.8	8.0	7.5	18.1																						
16-Jan	7.9	8.0	4.7	4.0	3.3	3.0	3.1	3.1	3.3	3.3	3.5	3.6	5.0	3.8	4.9	2.1	5.9	10.5	9.9	5.6	9.6	8.2	8.9	9.5	5.6	10.5																						
17-Jan	6.8	5.6	6.1	6.7	7.3	7.6	6.8	3.5	4.8	2.9	2.1	3.4	1.9	6.0	13.1	13.2	18.4	14.0	10.6	7.4	9.1	7.2	5.4	4.2	7.3	18.4																						
18-Jan	3.5	3.6	3.5	3.4	3.4	3.6	3.5	3.8	3.7	4.1	6.2	5.4	7.3	6.3	5.5	7.7	6.9	8.3	10.5	10.7	8.7	6.8	5.4	5.3	5.7	10.7																						
19-Jan	5.4	5.8	5.8	6.8	12.6	11.6	11.9	13.1	11.3	9.3	PF	UO	UO	9.8	9.4	10.5	11.2	12.3	13.1	14.1	14.2	10.9	11.9	22.5	11.1	22.5																						
20-Jan	23.1	22.3	21.5	20.8	18.9	14.6	12.3	11.3	11.0	11.6	12.0	11.8	11.7	11.2	10.4	10.9	12.6	14.6	15.3	14.7	13.2	11.1	10.9	12.7	14.2	23.1																						
21-Jan	14.2	14.7	14.0	10.8	9.5	8.7	9.7	4.9	5.4	6.3	4.9	4.8	6.6	5.9	5.5	5.0	5.3	5.9	5.9	5.1	4.5	4.1	3.8	3.7	7.0	14.7																						
22-Jan	3.8	4.0	3.9	4.0	4.1	3.7	3.7	3.7	4.6	4.6	4.4	4.1	4.1	3.7	3.5	3.6	2.8	2.9	3.7	4.7	4.4	3.6	3.4	3.2	3.8	4.7																						
23-Jan	3.4	3.4	3.2	3.2	3.5	3.7	5.0	8.0	12.7	14.0	14.3	15.5	18.0	19.9	21.5	17.2	16.3	16.7	28.0	36.7	32.2	14.5	11.5	13.6	14.0	36.7																						
24-Jan	12.1	11.4	11.1	11.3	11.1	9.9	9.7	9.0	9.5	9.4	8.7	9.0	8.7	7.3	6.8	6.8	6.8	8.9	9.5	9.8	9.4	8.9	8.3	8.0	9.2	12.1																						
25-Jan	8.1	11.6	9.0	7.9	9.2	9.2	9.2	8.4	9.7	9.9	10.5	11.8	11.9	13.0	13.8	12.1	12.8	14.7	16.4	16.7	16.5	15.3	14.8	14.3	11.9	16.7																						
26-Jan	18.8	16.6	13.0	13.4	14.6	12.5	12.4	14.8	13.8	14.5	12.9	12.2	7.6	4.6	4.2	3.8	3.3	3.5	7.1	7.3	6.0	6.4	8.7	7.5	10.0	18.8																						
27-Jan	8.4	7.6	6.4	5.4	6.7	8.1	6.5	6.3	4.6	2.5	2.1	1.8	1.3	0.9	1.5	3.5	4.9	8.3	8.1	2.4	2.3	3.5	4.9	5.9	4.7	8.4																						
28-Jan	8.8	6.2	4.7	3.8	3.6	3.3	3.3	3.5	6.8	9.5	9.5	13.0	17.0	14.5	12.9	8.7	6.4	7.6	7.0	9.2	9.7	8.5	10.5	7.9	8.2	17.0																						
29-Jan	8.8	5.4	4.1	4.3	5.6	5.6	5.4	6.8	5.7	5.7	6.5	9.3	1.4	UO	0.3	1.1	2.3	1.7	2.7	5.2	4.7	7.3	4.1	3.7	4.7	9.3																						
30-Jan	4.6	2.3	2.3	2.1	2.1	2.0	2.0	1.8	2.2	2.5	2.4	2.7	3.1	3.0	2.9	3.4	3.3	3.1	3.0	2.9	3.0	3.2	3.4	3.3	2.8	4.6																						
31-Jan	3.0	2.5	2.5	2.6	2.5	2.6	2.7	2.7	3.4	4.2	3.9	4.4	3.2	3.5	6.6	7.8	5.0	4.3	4.1	4.3	4.1	5.6	6.9	7.1	4.1	7.8																						
																								7.4	7.3	7.0	6.6	6.4	5.9	5.8	5.7	6.1	6.4	6.1	6.8	6.6	6.8	6.9	6.5	7.1	8.2	9.1	8.8	8.5	7.5	7.1	7.2	Diurnal Average
																								23.1	22.3	21.5	20.8	18.9	14.6	12.4	14.8	13.8	14.5	14.3	15.5	18.0	19.9	21.5	17.2	18.4	18.1	28.0	36.7	32.2	15.3	14.8	22.5	Diurnal Maximum
C - Calibration																								UO - Unstable Operation						PF - Power Failure																		
Alberta Ambient Air Quality Objectives (AAAQO):																								24-hr						30 µg/m ³																		

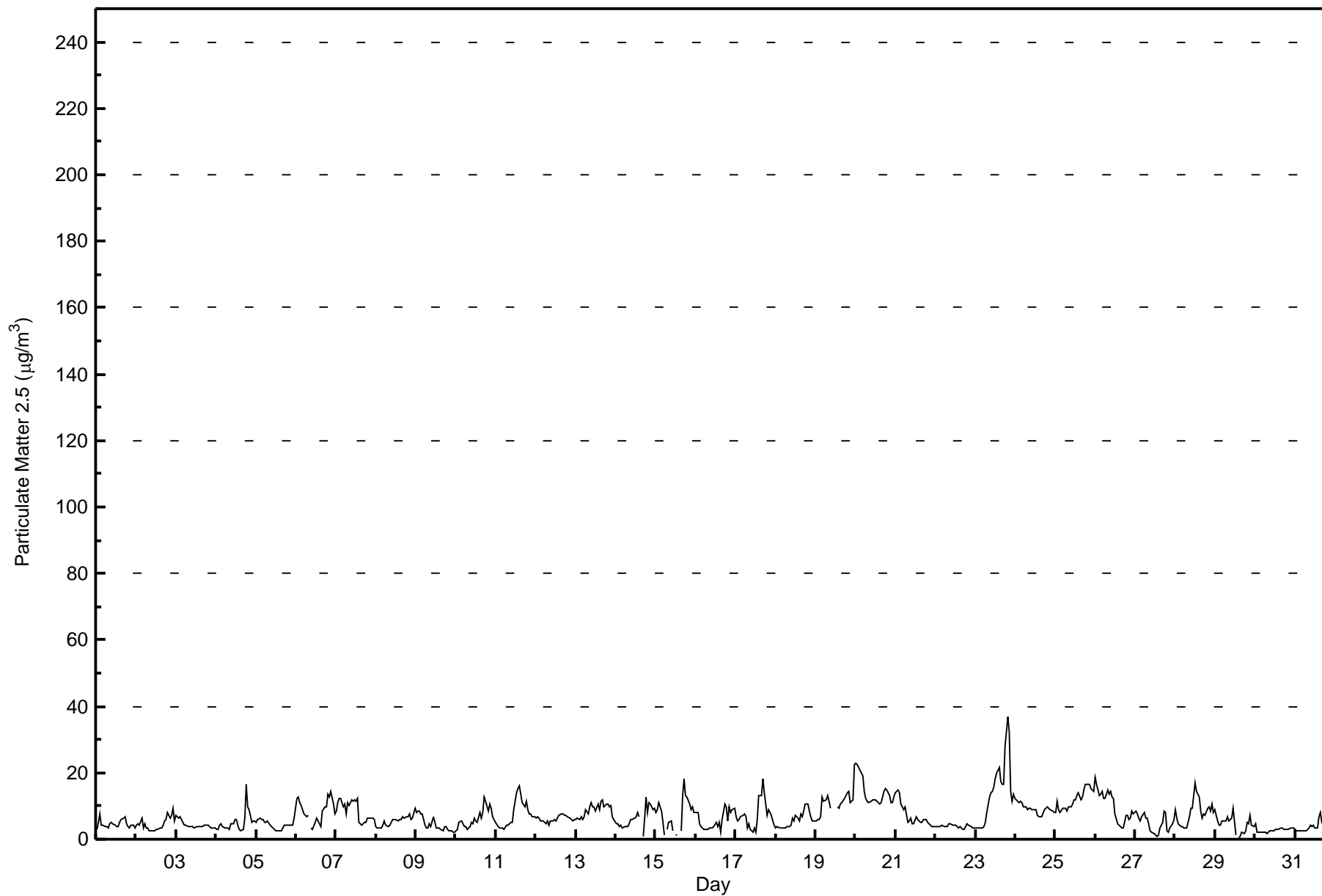


Wood Buffalo Environmental Association

Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$

Athabasca Valley - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley - January 2017

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	338	45.99	45.99
6 - 15	369	50.20	96.19
16 - 25	23	3.13	99.32
26 - 80	3	0.41	99.73
> 81.0	0	0.00	99.73

Total Number of Valid Hours: 735

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley - January 2017

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	39	4	2	1	0	8	37	29	14	23	57	33	17	7	14	53	338
6 - 15	5	3	5	2	5	27	92	77	23	25	34	11	10	7	7	36	369
16 - 25	1	0	0	4	1	1	7	4	1	0	2	0	0	0	0	2	23
26 - 80	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	3
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	45	7	7	7	6	36	136	112	39	48	93	44	27	14	21	91	733

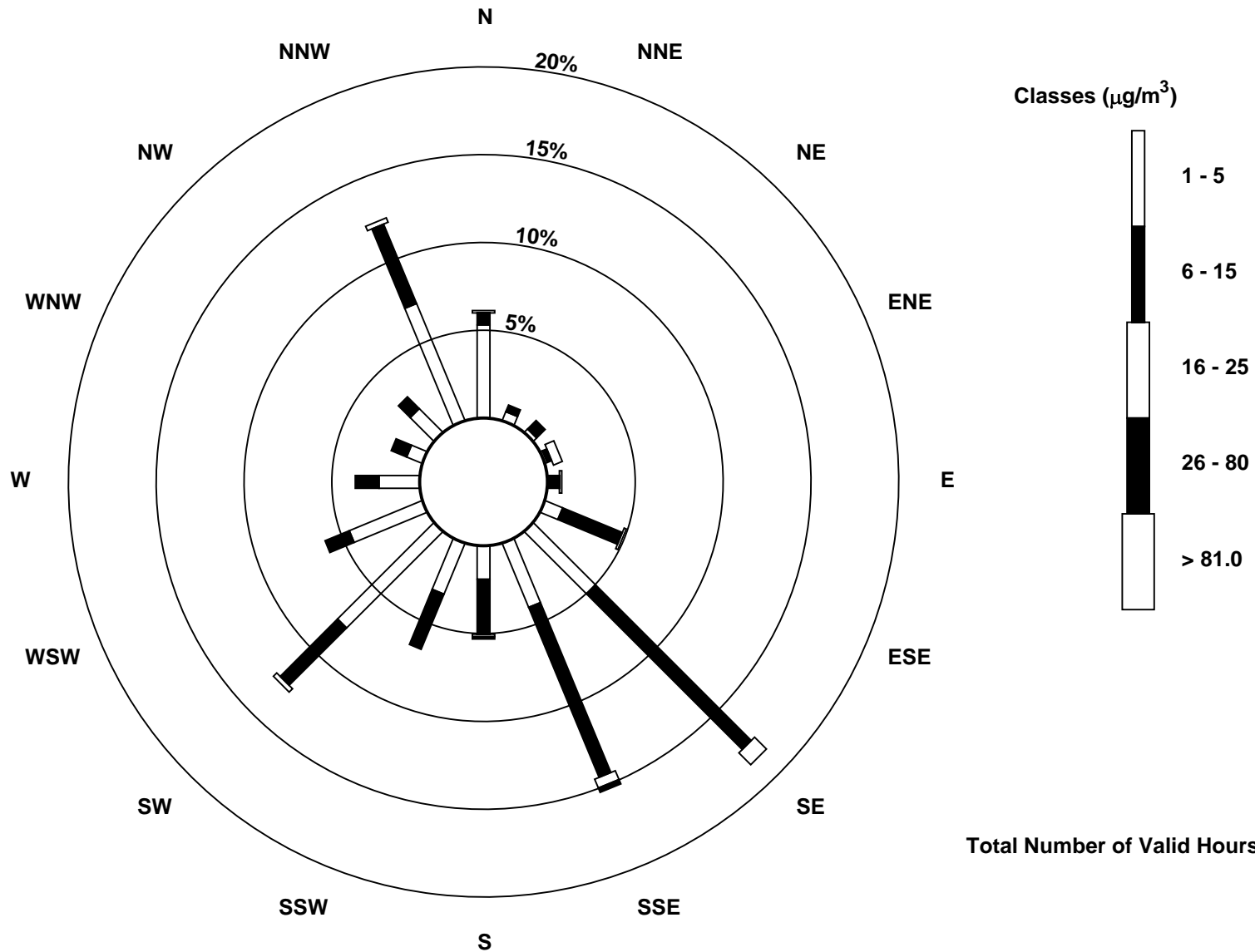
Total Number of Valid Hours: 735

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose 2012-2017

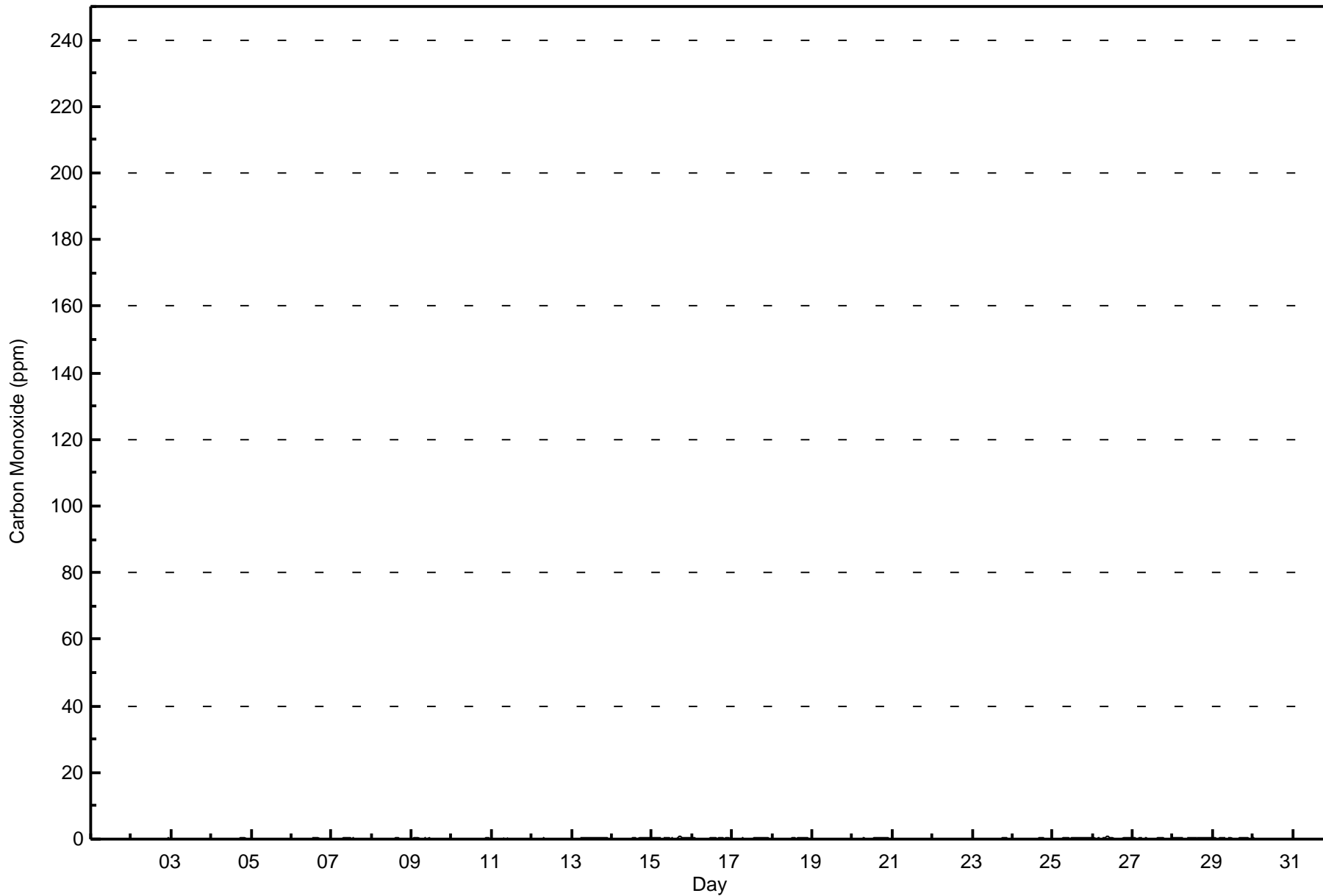
Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley (AMS 7)





Wood Buffalo Environmental Association
Hourly Averages

Carbon Monoxide (CO) - ppm
Athabasca Valley - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Carbon Monoxide (CO) - ppm
Athabasca Valley - January 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.3	655	92.38	92.38
0.4 - 0.5	41	5.78	98.17
0.6 - 0.7	13	1.83	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 - January 2017**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.3	42	7	6	7	5	26	116	85	31	46	91	43	26	15	20	89	655
0.4 - 0.5	0	0	0	0	1	7	11	15	5	2	0	0	0	0	0	0	41
0.6 - 0.7	0	0	0	0	0	0	3	7	1	2	0	0	0	0	0	0	13
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
Totals	42	7	6	7	6	33	130	107	37	50	91	43	26	15	20	89	709

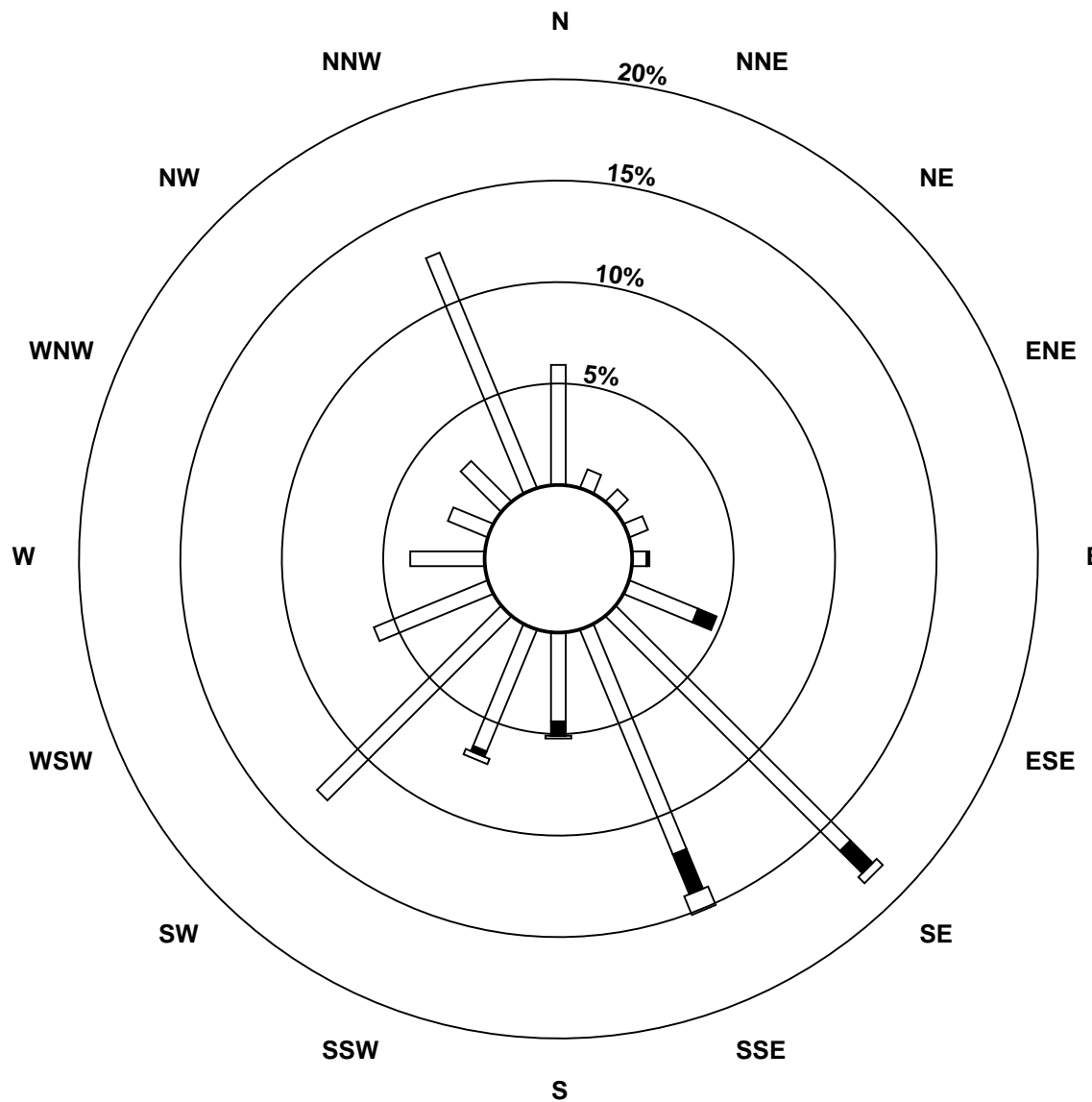
Total Number of Valid Hours: 709

Total Number of Hours: 744

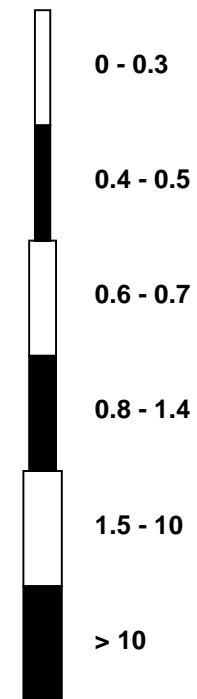


Wood Buffalo Environmental Association
Wind Rose 2012-2017

Carbon Monoxide (CO) - ppm
Athabasca Valley (AMS 7)



Classes (ppm)

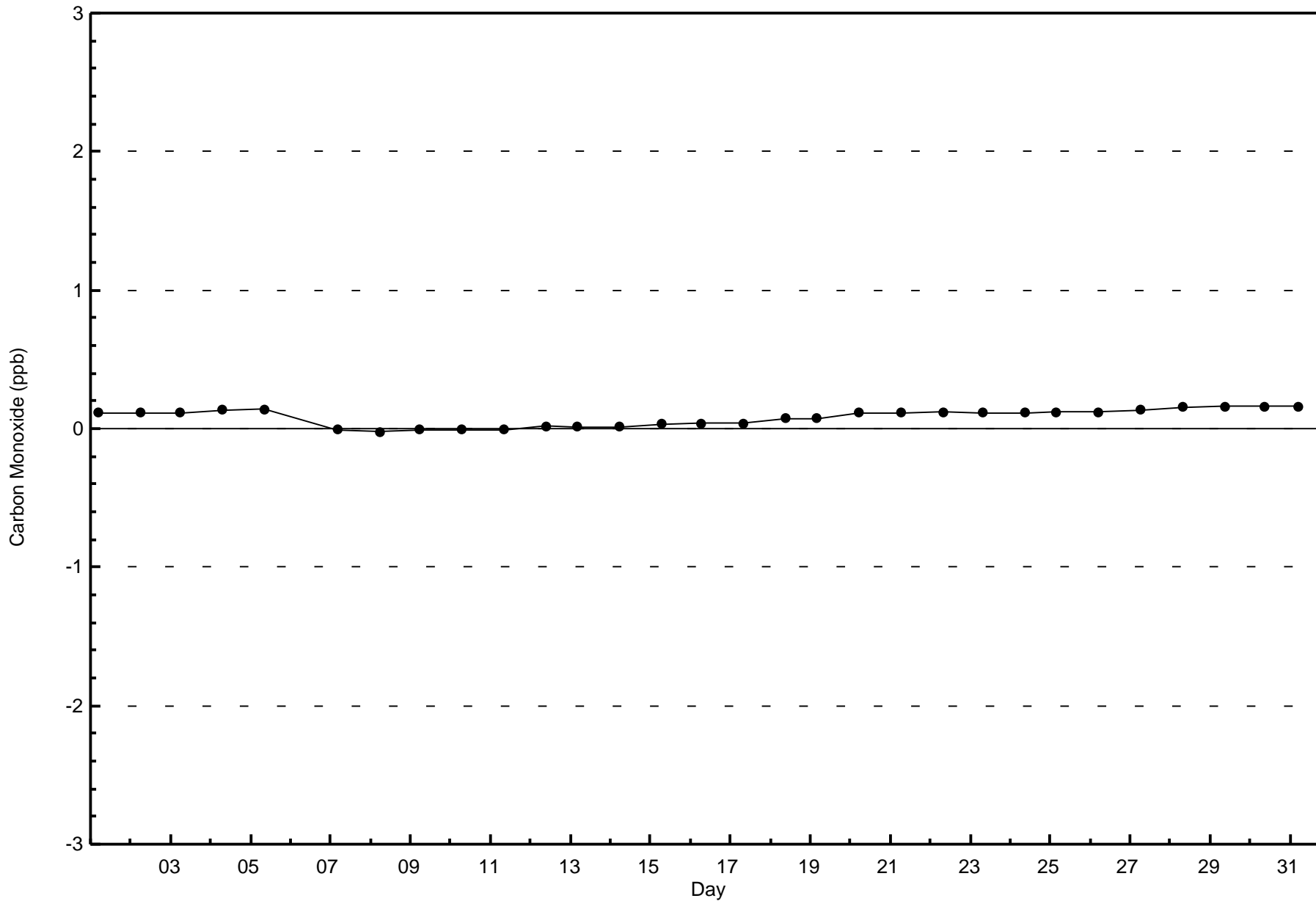


Total Number of Valid Hours: 709



Wood Buffalo Environmental Association
Zero Responses

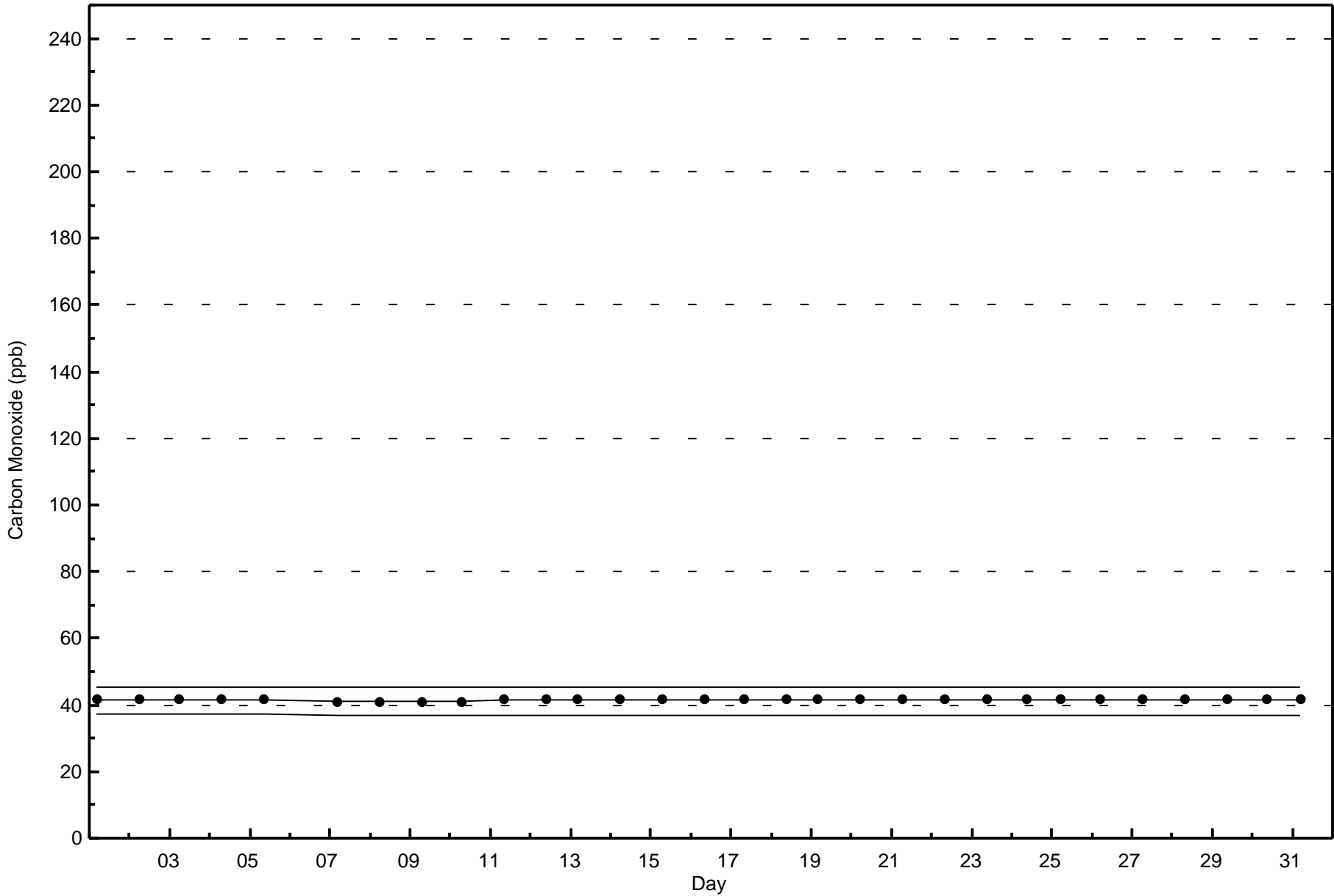
Carbon Monoxide (CO) - ppb
Athabasca Valley - January 2017





Wood Buffalo Environmental Association
Span Responses

Carbon Monoxide (CO) - ppb
Athabasca Valley - January 2017





Wood Buffalo Environmental Association
Summary of Hour Averages

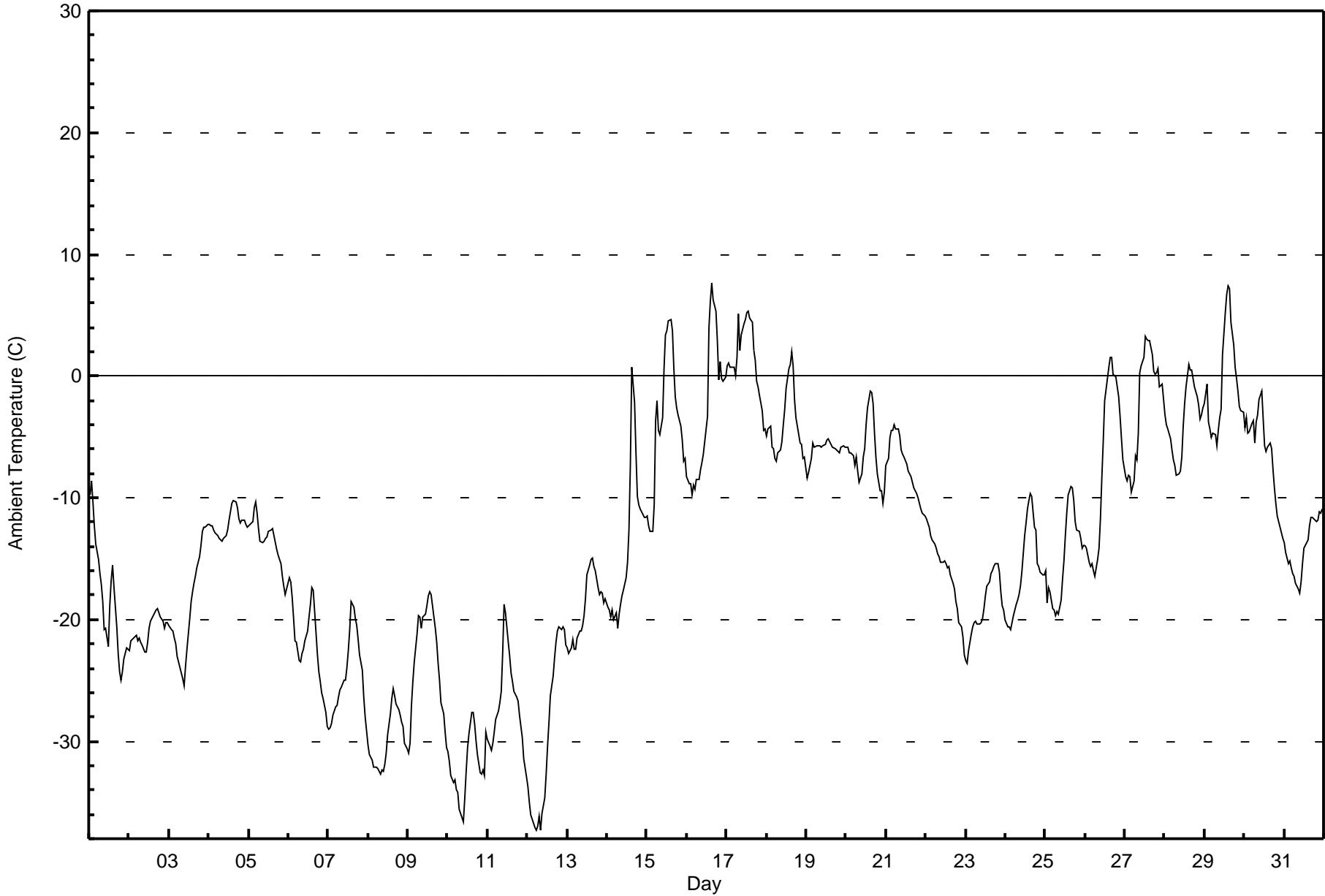
Ambient Temperature (AT) - C
Athabasca Valley - January 2017

Maximum Value: 7.6 C on Jan 16 16:00 Maximum Daily Average: 1.4 C on Jan 17		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Minimum Value: -37.4 C on Jan 12 06:00 Maximum Diurnal Average: -9.8 C at hour 16 Monthly Average: -14.00 C		Minimum Daily Average: -32.1 C on Jan 10 Minimum Diurnal Average: -16.0 C at hour 5 Percentiles: P ₁ = -36.1 P ₁₀ = -27.9 Q ₁ = -20.8 Median = -13.7 Q ₃ = -5.9 P ₉₀ = -0.8 P ₉₉ = 4.7																								
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-Jan	-9.7	-8.6	-10.4	-12.3	-13.8	-15.0	-16.3	-17.1	-18.5	-20.9	-20.7	-22.2	-18.9	-16.8	-15.5	-17.4	-20.6	-22.8	-24.3	-25.0	-24.3	-23.2	-22.4	-22.4	-18.3	-8.6
2-Jan	-22.5	-21.8	-21.6	-21.3	-21.3	-21.7	-21.5	-21.8	-22.1	-22.6	-22.7	-21.9	-20.8	-20.2	-19.7	-19.4	-19.2	-19.1	-19.5	-19.8	-20.1	-20.7	-20.2	-20.3	-20.9	-19.1
3-Jan	-20.5	-20.8	-20.9	-21.5	-22.0	-23.0	-23.5	-24.4	-24.9	-25.5	-23.8	-22.5	-19.9	-18.6	-17.7	-17.0	-16.4	-15.8	-14.8	-13.9	-12.8	-12.4	-12.4	-12.2	-19.0	-12.2
4-Jan	-12.2	-12.3	-12.3	-12.6	-12.9	-13.2	-13.3	-13.5	-13.6	-13.3	-13.1	-12.6	-11.8	-11.1	-10.5	-10.2	-10.4	-10.8	-11.7	-12.1	-11.8	-11.8	-12.2	-12.4	-12.2	-10.2
5-Jan	-12.3	-12.2	-12.0	-10.8	-10.4	-11.2	-12.5	-13.5	-13.7	-13.6	-13.3	-13.2	-12.8	-12.6	-13.1	-13.7	-14.3	-14.7	-15.4	-16.4	-17.3	-17.9	-17.4	-13.6	-10.4	
6-Jan	-16.6	-16.9	-18.2	-19.9	-21.8	-21.9	-23.4	-23.4	-22.8	-22.5	-21.8	-21.0	-19.7	-18.7	-17.4	-17.6	-19.3	-22.9	-24.3	-25.1	-26.0	-26.5	-27.6	-28.8	-21.8	-16.6
7-Jan	-29.0	-28.9	-28.6	-27.9	-27.2	-27.0	-26.4	-25.8	-25.5	-24.9	-25.0	-23.9	-22.5	-20.8	-18.5	-19.0	-19.8	-20.5	-21.6	-22.9	-24.2	-26.4	-28.0	-29.1	-24.7	-18.5
8-Jan	-30.2	-31.1	-31.5	-32.1	-32.2	-32.1	-32.2	-32.7	-32.3	-32.5	-31.9	-30.9	-29.4	-27.8	-26.4	-25.7	-26.3	-26.9	-27.4	-27.9	-28.5	-28.8	-30.1	-30.6	-29.9	-25.7
9-Jan	-30.9	-30.1	-27.0	-25.1	-23.5	-21.2	-19.7	-19.8	-20.8	-19.8	-19.5	-18.9	-18.1	-17.7	-17.9	-18.9	-20.7	-21.8	-23.6	-25.0	-26.8	-27.7	-29.2	-30.5	-23.1	-17.7
10-Jan	-30.8	-31.7	-32.8	-33.4	-33.2	-33.9	-34.2	-35.5	-36.2	-36.6	-34.7	-32.4	-30.5	-29.4	-27.7	-27.6	-28.6	-29.9	-31.1	-32.6	-32.7	-32.4	-32.8	-29.3	-32.1	-27.6
11-Jan	-29.8	-30.4	-30.8	-30.2	-29.3	-28.2	-27.5	-26.9	-25.9	-22.8	-18.8	-19.4	-21.8	-23.0	-24.4	-25.1	-25.9	-26.3	-26.7	-27.9	-28.8	-29.6	-31.4	-32.9	-26.8	-18.8
12-Jan	-33.7	-35.0	-36.0	-36.4	-37.1	-37.4	-37.0	-36.1	-37.3	-36.0	-34.7	-32.7	-30.4	-28.4	-26.2	-24.6	-23.1	-21.8	-20.9	-20.6	-20.8	-20.6	-20.9	-22.1	-29.6	-20.6
13-Jan	-22.4	-22.8	-22.3	-21.6	-22.4	-22.5	-21.6	-20.9	-20.9	-20.5	-19.6	-18.3	-16.3	-15.5	-15.1	-15.0	-15.6	-15.9	-17.4	-17.9	-17.7	-17.9	-18.6	-18.3	-19.0	-15.0
14-Jan	-18.9	-19.3	-19.8	-19.3	-20.0	-19.4	-20.7	-19.5	-18.8	-18.1	-17.6	-16.6	-15.3	-12.6	-7.4	0.7	-2.2	-6.3	-9.9	-10.6	-10.9	-11.2	-11.5	-11.6	-14.0	0.7
15-Jan	-11.5	-12.3	-12.7	-12.7	-10.6	-3.6	-2.0	-4.4	-4.8	-3.5	0.7	3.4	3.8	4.5	4.7	3.7	0.6	-1.7	-2.6	-3.2	-4.2	-5.3	-7.0	-6.8	-3.7	4.7
16-Jan	-8.2	-8.8	-8.8	-9.7	-9.0	-9.3	-8.5	-8.5	-7.7	-7.1	-6.5	-5.3	-3.3	4.0	6.1	7.6	6.3	5.3	3.0	-0.3	1.2	-0.2	-0.4	-0.1	-2.9	7.6
17-Jan	0.8	1.1	0.7	0.8	0.8	0.0	1.5	5.1	2.2	3.3	4.3	4.7	5.2	5.4	4.7	4.4	2.2	1.3	-0.4	-0.9	-1.6	-2.9	-4.5	-4.3	1.4	5.4
18-Jan	-4.9	-4.3	-4.1	-5.8	-6.0	-6.7	-6.9	-6.3	-6.1	-5.4	-4.0	-2.7	-1.0	0.7	1.0	2.0	0.9	-1.9	-3.4	-4.8	-5.4	-5.6	-6.7	-6.6	-3.9	2.0
19-Jan	-8.3	-7.9	-7.4	-6.8	-5.4	-5.8	-5.8	-5.7	-5.8	-5.8	-5.8	-5.7	-5.2	-5.2	-5.3	-5.6	-5.8	-6.0	-6.1	-6.1	-6.3	-5.9	-5.8	-5.9	-6.0	-5.2
20-Jan	-5.9	-5.8	-6.3	-6.3	-6.5	-7.3	-6.7	-7.8	-8.7	-8.0	-6.7	-5.9	-4.0	-2.6	-1.3	-1.3	-2.3	-4.7	-6.6	-8.0	-9.5	-9.4	-10.4	-9.5	-6.3	-1.3
21-Jan	-7.3	-6.7	-5.1	-4.5	-4.5	-4.0	-4.4	-4.4	-4.9	-6.1	-6.5	-6.6	-7.3	-7.7	-8.0	-8.3	-8.7	-9.2	-9.6	-10.0	-10.4	-10.9	-11.3	-11.5	-7.4	-4.0
22-Jan	-11.7	-12.0	-12.4	-13.1	-13.5	-13.8	-14.2	-14.5	-14.9	-15.3	-15.3	-15.2	-15.5	-15.8	-15.7	-16.3	-17.0	-17.5	-18.5	-19.0	-20.3	-20.6	-21.4	-22.9	-16.1	-11.7
23-Jan	-23.4	-23.6	-22.5	-21.2	-20.6	-20.2	-20.1	-20.4	-20.4	-20.2	-19.9	-19.1	-18.0	-17.3	-16.9	-16.2	-16.0	-15.6	-15.4	-15.4	-16.1	-17.7	-18.9	-19.2	-18.9	-15.4
24-Jan	-20.0	-20.7	-20.6	-20.8	-20.3	-19.7	-18.8	-18.5	-17.9	-17.3	-16.1	-13.1	-12.1	-11.0	-10.2	-9.7	-9.9	-12.5	-12.7	-15.4	-15.7	-16.1	-16.4	-16.3	-15.9	-9.7
25-Jan	-16.0	-18.7	-17.3	-17.8	-19.1	-19.3	-19.7	-19.4	-19.6	-18.4	-16.7	-15.1	-13.1	-11.2	-9.8	-9.1	-9.2	-10.2	-11.9	-12.6	-12.8	-13.4	-14.2	-13.9	-14.9	-9.1
26-Jan	-13.9	-14.1	-15.3	-15.6	-15.4	-16.0	-16.5	-15.1	-14.2	-11.7	-8.4	-5.4	-2.0	0.2	0.7	1.6	1.5	0.2	-0.1	-0.9	-1.7	-3.4	-5.1	-6.8	-7.4	1.6
27-Jan	-8.3	-8.7	-8.2	-8.3	-9.6	-8.6	-6.5	-6.8	-4.7	0.2	0.8	1.5	3.3	3.1	2.9	3.0	1.7	0.3	0.1	0.2	0.6	-0.9	-0.7	-1.9	-2.3	3.3
28-Jan	-3.2	-4.0	-4.3	-5.1	-6.1	-6.9	-7.3	-8.1	-8.0	-7.8	-6.6	-4.1	-2.2	-0.8	0.9	0.5	0.5	-0.1	-0.9	-1.6	-2.4	-3.6	-3.2	-2.6	-3.6	0.9
29-Jan	-2.3	-0.6	-3.7	-4.4	-5.0	-4.7	-4.8	-5.8	-4.5	-3.4	-2.7	1.7	5.3	6.7	7.4	7.2	4.5	2.6	0.7	-0.2	-1.3	-2.5	-2.8	-3.0	-0.7	7.4
30-Jan	-4.3	-3.4	-4.7	-4.6	-3.9	-3.6	-5.5	-3.8	-3.2	-2.0	-1.2	-3.5	-5.7	-6.2	-5.8	-5.5	-6.0	-7.7	-9.2	-10.5	-11.5	-12.4	-12.9	-13.3	-6.3	-1.2
31-Jan	-13.7	-14.5	-15.4	-15.2	-15.8	-16.3	-16.5	-17.0	-17.4	-17.9	-16.9	-15.4	-14.2	-13.7	-13.4	-12.3	-11.6	-11.6	-11.8	-12.0	-11.8	-11.2	-11.3	-10.9	-14.1	-10.9
	-15.5	-15.7	-15.9	-16.0	-16.0	-15.9	-15.9	-15.9	-15.9	-15.3	-14.3	-13.3	-12.1	-11.0	-10.2	-9.8	-10.6	-11.7	-12.7	-13.5	-13.9	-14.5	-15.1	-15.3	Diurnal Average	
	0.8	1.1	0.7	0.8	0.8	0.0	1.5	5.1	2.2	3.3	4.3	4.7	5.3	6.7	7.4	7.6	6.3	5.3	3.0	0.2	1.2	-0.2	-0.4	-0.1	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Athabasca Valley - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Athabasca Valley - January 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	217	29.17	29.17
-20 - 0	463	62.23	91.40
0 - 10	64	8.60	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

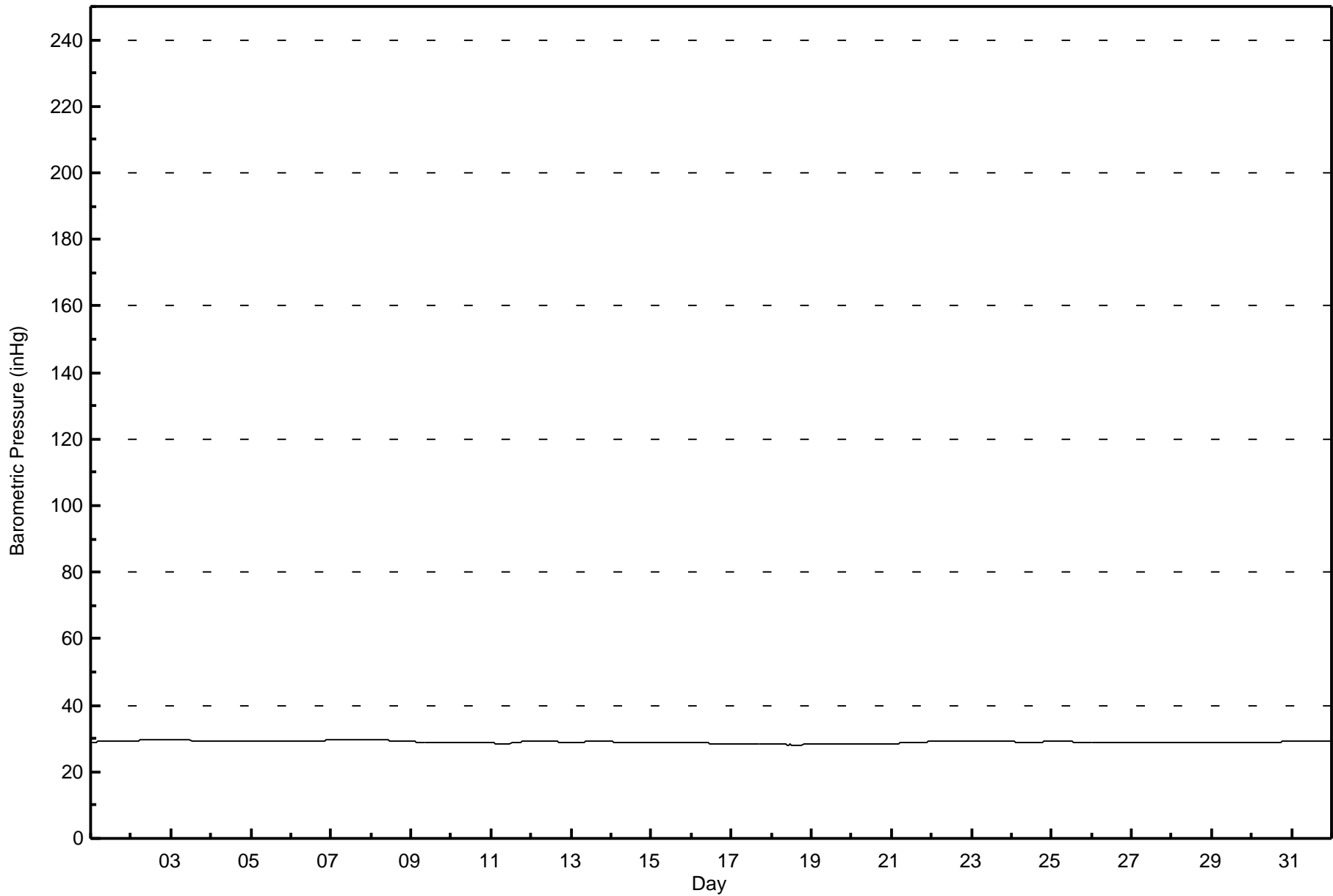
Barometric Pressure (BP) - inHg
Athabasca Valley - January 2017

Maximum Value: 29.6 inHg on Jan 2 20:00 Maximum Daily Average: 29.5 inHg on Jan 7																						Hours in Service: 744				
Minimum Value: 28.2 inHg on Jan 18 17:00 Minimum Daily Average: 28.2 inHg on Jan 18																						Hours of Data: 744				
Maximum Diurnal Average: 29.0 inHg at hour 11 Minimum Diurnal Average: 29.0 inHg at hour 1																						Hours of Missing Data: 0				
Monthly Average: 28.96 inHg Percentiles: P₁ = 28.2 P₁₀ = 28.3 Q₁ = 28.7 Median = 29.0 Q₃ = 29.2 P₉₀ = 29.4 P₉₉ = 29.6																						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-Jan	28.9	28.9	29.0	29.0	29.0	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.4	29.2	29.4
2-Jan	29.4	29.4	29.4	29.4	29.4	29.5	29.5	29.5	29.5	29.5	29.5	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.5	29.6
3-Jan	29.6	29.6	29.6	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.3	29.3	29.3	29.3	29.3	29.4	29.6
4-Jan	29.3	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.2	29.2	29.3	29.4
5-Jan	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3
6-Jan	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.5	29.5	29.5	29.4	29.5
7-Jan	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.6	29.5	29.5	29.5	29.6	29.6	29.6	29.5	29.5	29.6
8-Jan	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.4	29.4	29.4	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.1	29.1	29.4	29.5
9-Jan	29.1	29.1	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.1
10-Jan	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.7	28.9	29.0
11-Jan	28.7	28.6	28.6	28.5	28.5	28.4	28.4	28.3	28.3	28.4	28.4	28.5	28.6	28.7	28.8	28.8	28.9	29.0	29.0	29.1	29.1	29.1	29.2	29.2	28.7	29.2
12-Jan	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	29.1	29.2
13-Jan	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.1
14-Jan	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.8	29.0
15-Jan	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.8
16-Jan	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.4	28.4	28.4	28.3	28.3	28.6	28.8
17-Jan	28.3	28.3	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3
18-Jan	28.3	28.3	28.3	28.3	28.3	28.3	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.3
19-Jan	28.2	28.2	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.4	28.4	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.4
20-Jan	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.5	28.5	28.4	28.5
21-Jan	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.1	28.8	29.1
22-Jan	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2
23-Jan	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1
24-Jan	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.0	29.1
25-Jan	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1
26-Jan	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
27-Jan	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
28-Jan	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	29.0
29-Jan	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.8
30-Jan	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	29.0	29.0	29.0	29.1	29.1	29.1	29.2	28.9	29.2
31-Jan	29.2	29.3	29.3	29.3	29.3	29.3	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.3	29.3	29.3	29.4	29.4	29.3	29.4
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Barometric Pressure (BP) - inHg
Athabasca Valley - January 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

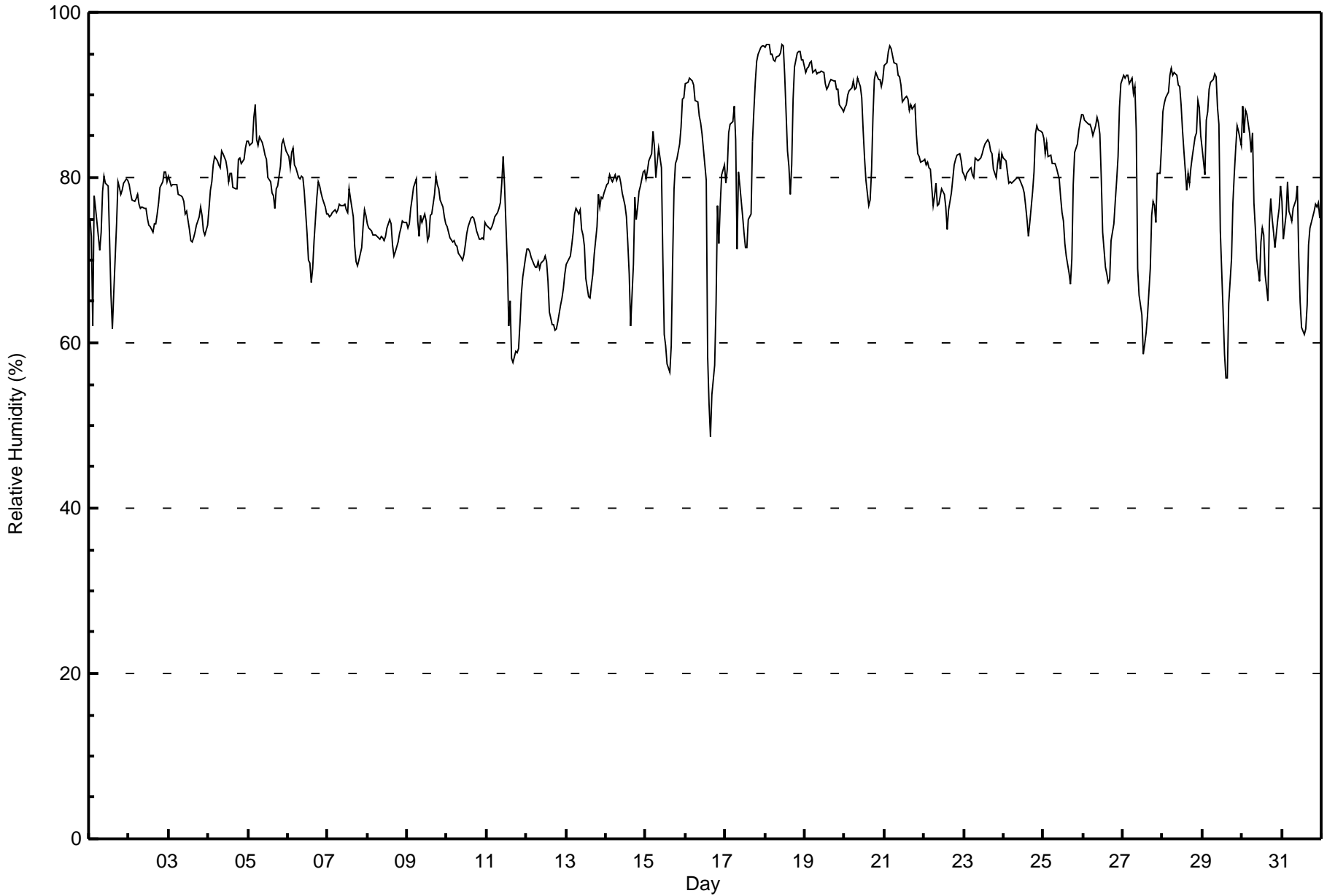
Athabasca Valley - January 2017

Maximum Value: 96 % on Jan 18 02:00																	Maximum Daily Average: 92.3 % on Jan 18																	Hours in Service: 744								
Minimum Value: 49 % on Jan 16 16:00																	Minimum Daily Average: 67.4 % on Jan 12																	Hours of Data: 744								
Maximum Diurnal Average: 82.9 % at hour 5																	Minimum Diurnal Average: 71.1 % at hour 16																	Hours of Missing Data: 0								
Monthly Average: 79.0 %																	Percentiles: P ₁ = 57 P ₁₀ = 69 Q ₁ = 74 Median = 79 Q ₃ = 84 P ₉₀ = 91 P ₉₉ = 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-Jan	75	73	62	78	76	73	71	73	78	80	79	79	73	66	62	66	74	79	79	78	79	79	80	80	74.7	80																
2-Jan	79	78	77	77	77	78	77	76	77	76	76	75	74	74	73	74	74	76	77	79	80	81	81	79	76.9	81																
3-Jan	80	79	79	79	79	79	78	78	78	77	76	76	74	72	72	73	73	74	75	76	75	74	73	74	76.0	80																
4-Jan	76	79	79	81	83	82	81	81	83	83	82	81	79	80	80	79	79	79	82	82	82	82	84	84	81.0	84																
5-Jan	84	84	84	87	89	85	84	85	84	84	83	82	80	79	88	78	76	79	79	81	84	85	84	83	82.5	89																
6-Jan	83	81	83	84	82	81	80	80	80	80	78	73	70	70	67	69	72	78	80	79	78	77	76	76	77.4	84																
7-Jan	76	75	75	76	76	76	76	77	77	77	77	76	76	79	78	75	72	70	69	70	72	74	76	75	74.9	79																
8-Jan	74	74	74	73	73	73	73	73	73	73	72	73	74	75	74	72	70	71	72	73	74	75	75	75	73.2	75																
9-Jan	74	74	76	78	79	80	75	73	75	75	76	75	72	73	75	76	78	80	79	79	77	76	75	74	76.0	80																
10-Jan	74	73	73	72	72	72	72	71	70	70	71	72	73	74	75	75	75	74	74	73	73	73	72	75	72.8	75																
11-Jan	74	74	74	74	75	75	76	76	77	79	82	79	69	62	65	58	58	59	59	59	62	66	68	70	69.7	82																
12-Jan	71	71	71	70	70	69	69	70	69	70	70	71	70	67	64	62	62	61	62	63	65	65	67	68	67.4	71																
13-Jan	70	70	71	72	73	76	76	76	76	74	73	72	68	66	65	67	68	71	74	78	76	78	77	78	72.6	78																
14-Jan	79	79	80	80	79	80	80	80	80	79	78	77	75	72	68	62	69	78	75	76	78	79	81	81	77.0	81																
15-Jan	80	81	82	83	86	84	80	82	84	81	70	61	60	57	57	60	70	79	82	82	84	86	89	90	77.0	90																
16-Jan	91	91	92	92	92	91	89	89	87	87	85	83	80	58	53	49	54	57	65	77	72	77	80	81	78.1	92																
17-Jan	79	81	86	86	87	89	85	71	81	79	75	73	72	72	75	76	84	88	92	94	95	96	96	96	83.6	96																
18-Jan	96	96	96	95	95	94	94	95	95	95	96	96	92	83	81	78	81	90	93	95	95	95	94	94	92.3	96																
19-Jan	93	93	93	94	94	93	93	92	93	93	93	93	91	91	91	91	92	92	92	91	91	89	88	88	91.8	94																
20-Jan	88	89	90	91	91	92	91	91	92	91	90	86	82	80	77	77	81	87	92	93	92	92	91	92	88.1	93																
21-Jan	94	94	95	96	96	95	94	94	92	92	91	89	90	90	89	88	89	88	89	85	83	83	82	82	90.0	96																
22-Jan	82	82	82	81	81	77	78	79	77	77	79	78	78	76	74	76	78	80	82	82	83	83	82	81	79.4	83																
23-Jan	80	80	80	81	81	80	80	82	82	82	82	83	84	84	85	84	83	83	81	80	82	83	81	83	82.0	85																
24-Jan	82	82	81	79	79	79	80	80	80	80	80	79	78	77	75	73	75	78	81	85	86	86	86	85	80.2	86																
25-Jan	85	83	84	82	83	82	82	82	81	80	78	76	75	72	70	69	67	70	79	83	84	86	87	88	79.4	88																
26-Jan	88	87	87	86	86	86	85	86	87	87	85	80	73	69	68	67	68	72	74	77	80	83	89	91	80.9	91																
27-Jan	92	92	92	92	91	92	90	91	86	69	66	63	59	60	61	63	69	75	77	77	75	80	81	84	78.2	92																
28-Jan	88	89	90	90	92	93	92	93	92	91	91	89	86	83	78	80	79	81	83	85	85	89	89	85	87.3	93																
29-Jan	83	80	87	88	91	92	92	93	92	89	86	74	64	59	56	56	65	70	77	81	84	86	86	84	79.7	93																
30-Jan	89	85	88	88	85	83	85	77	74	70	67	72	74	73	68	65	74	77	75	73	71	75	76	79	76.9	89																
31-Jan	77	72	76	79	76	75	75	76	77	79	70	65	62	61	62	65	72	74	75	76	77	76	77	75	72.9	79																
																	81.9	81.4	81.9	82.8	82.9	82.4	81.7	81.3	81.6	80.6	79.3	77.4	75.0	72.7	71.5	71.1	73.7	76.5	78.1	79.4	79.8	80.9	81.3	81.7	Diurnal Average	
																	96	96	96	96	96	95	94	95	95	95	96	96	92	91	91	91	92	92	93	95	95	96	96	96	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Athabasca Valley - January 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Athabasca Valley - January 2017

Maximum Speed: 34 km/h on Jan 11 13:00	Maximum Daily Speed Average: 13.6 km/h on Jan 21	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jan 8 02:00	Minimum Daily Speed Average: 1.2 km/h on Jan 4	Hours of Data: 744
Maximum Diurnal Speed Average: 3.1 km/h at hour 10	Minimum Diurnal Speed Average: 0.1 km/h at hour 3	Hours of Missing Data: 0
Monthly Average Velocity: 0.8 km/h 207.4 deg	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 3 Median = 6 O ₃ = 9 P ₉₀ = 14 P ₉₉ = 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-Jan	WSW21	NW26	NNW27	N15	N12	N13	N9	N8	NW5	WSW4	SW4	WSW4	WNW3	NNW3	WNW2	WSW3	WSW3	WSW3	S1	SSW0	W2	SE2	SSE4	SW3	NW4.8	NNW27	
2-Jan	WSW1	S2	WSW2	SW4	SSW2	ESE2	SW5	SSW3	SW7	SW7	SW7	SW7	WSW4	WSW4	SW4	WSW5	SW5	WSW1	SSW1	SE1	NNE0	ESE1	S5	SSW5	SW3.2	SW7	
3-Jan	SSE4	SSW4	S3	S4	SSW4	SW4	SW6	SW7	SW6	SW5	SW2	SW4	SSW6	SW10	SW9	SW9	SSW7	SW8	SW9	SW10	SW15	WSW9	SW5	WSW6	SW6.1	SW15	
4-Jan	NW3	NW6	NNW11	NNW8	N7	N7	N3	N3	NNW2	SE1	NE2	ESE0	SE4	SSW6	SW9	SSW6	SSE6	SSE7	SE8	SE8	SE8	SE8	SE9	SE7	SE1.2	NNW11	
5-Jan	ESE4	ESE3	WNW2	NNW8	NNW13	NNW17	NNW17	NNW17	NNW12	N7	NNW8	NNW10	NNW9	NNW14	N14	N14	N10	N9	N6	N4	NNW2	N1	N3	NNW4	NW4	N7.5	NNW17
6-Jan	W4	WNW3	WSW3	WNW3	W3	SW2	SSW1	ENE0	SSW5	S5	S6	SSE7	S6	SSE6	SSE6	SE7	SSE4	W1	SW2	SW2	SE1	SW2	SW2	N1	SSW2.5	SSE7	
7-Jan	NE1	W2	W3	WSW4	W4	WSW3	W2	SE6	SE7	SE7	E5	ENE2	WNW3	NNW9	NNW19	N16	NNW15	NNW16	NNW14	NNW13	NNW6	W4	SW3	E1	NNW4.0	NNW19	
8-Jan	WSW1	SE0	NNE1	SE1	ESE2	SE3	SSE4	SE5	SSE10	SSE10	SSE11	SE11	SE9	SE9	SE10	SE10	SE12	SE11	SE10	SE11	SE9	SE9	SE5	ESE4	SE6.8	SE12	
9-Jan	ESE3	SE4	ESE3	ESE4	SE4	SW5	SW8	SSW7	SSE3	SW8	E3	SE3	SW4	WSW3	NNW5	NW5	N3	NW3	W3	WSW2	NW4	W2	NE1	WNW2	SW1.3	SW8	
10-Jan	W1	NW2	NNW4	N4	NNE2	NW2	W4	WSW5	WSW5	W5	SW4	W1	NW1	W3	WSW4	SW3	SW5	SSW3	S2	SE2	SE2	SSE3	SSE4	SE10	SW1.6	SE10	
11-Jan	SE12	SE16	SE20	SE20	SE18	SE17	SE14	SE16	ESE8	N4	N9	N29	NNW34	NNW31	NNW30	NNW32	NNW23	NNW19	NW13	NW8	WNW6	WSW7	SW3	SW3	N4.6	NNW34	
12-Jan	SW0	ESE1	S0	S1	NE1	SSW1	S2	SSE7	SE4	SE9	SE9	SSE12	SE11	SE10	SSE12	SE12	SE14	SE15	SE14	SE16	SSE9	SE9	SSE11	SSE6	SE7.6	SE16	
13-Jan	SSE7	S5	SSE8	SE9	SE6	ESE5	ESE5	ESE5	ESE5	SE7	SE8	SE6	SE8	SE9	SSE5	SSE5	SSE5	SSE7	SSE4	SSE4	SSE7	SSE8	SSE7	SSE10	SE6.2	SSE10	
14-Jan	SSE8	SSE8	S6	SSE7	SSE5	SSE9	SSE6	SSE9	SSE9	SE12	SE12	SE10	SE9	SE7	SE3	SW6	SSW3	SSE2	SE9	ESE9	ESE8	ESE7	E8	ESE8	SE6.9	SE12	
15-Jan	SE5	SE4	ESE5	SE4	SW1	ENE1	SSW0	ESE4	SE8	SE8	SE6	SSW4	SSE5	S7	SW8	S3	SE6	SSE5	SE6	SE7	SE7	SE6	SE3	SE3	SSE4.2	SE8	
16-Jan	ESE6	ESE6	SE9	SE7	SE10	SE11	SE11	SE10	SE11	SE8	SE6	SE8	SE8	ESE5	SSE8	S11	SSE9	SSE8	SSW5	SW6	SW4	SW3	SSW3	SSE6.3	S11		
17-Jan	SSE5	SSE6	SSW3	S4	S4	ESE4	SW5	WSW5	W5	SW17	SW13	SW5	W2	SE2	SE5	SE6	SE3	SSW2	S2	SSW2	S3	SSE3	SSW3	SSW3	SSW3.7	SW17	
18-Jan	S3	SSE3	S2	WSW2	SW3	SW3	WNW1	NNW1	NW2	NW3	NNW5	W2	SSW1	SSE2	S3	SSE4	SSE6	ESE2	SSW3	SSW2	SW4	SW3	SSW3	SSW5	SSW1.8	SSE6	
19-Jan	S3	WSW2	W1	NNW5	NNW12	NNW12	NNW7	NW8	NNW9	NNW10	NNW11	NNW11	NNW11	NNW12	NNW11	NNW11	NNW9	NNW8	NNW10	NNW10	NNW9	NW3	NNW4	NNW6	NNW7.8	NNW12	
20-Jan	N4	E2	E2	SSE2	SE7	SE4	SSE4	SSE4	SSW3	SSE8	SE10	SSE7	SE9	SE9	SE10	SE7	SE5	S2	SSW3	SSW3	SW3	SSW4	NNW6	NW5	SSE3.5	SE10	
21-Jan	WNW2	NNW2	N6	NNE6	NE4	NNE6	NE5	NNW14	NNW17	NNW19	NNW19	NNW20	NNW20	NNW18	NNW16	NNW18	NNW19	NNW19	NNW19	NNW19	NNW18	NNW19	NNW18	NNW17	NNW15	NNW13.6	NNW20
22-Jan	NNW15	NNW16	NNW15	NNW19	N15	N14	N14	NNW13	N10	N9	NNW11	NNW11	NNW12	N10	NNW11	NW11	NNW9	N8	N7	NW4	WNW2	NW4	WNW4	WSW4	NNW10.0	NNW19	
23-Jan	W4	SW4	WSW6	SW3	S1	SW3	SW5	SW8	SW10	SW10	SW8	SW6	SW3	ENE1	ENE4	ENE1	ENE2	SE4	SSE6	SSE6	S4	SSW6	SW9	SW10	SSW4.1	SW10	
24-Jan	SSW6	SW5	SW4	SW7	SW7	SW8	SW7	SW9	SW8	SW9	SSW7	SSE9	SSE9	SSE7	SE9	SE10	SSE9	SE3	SSE5	SSW4	SSW4	SSW4	SE5	SSE7	S5.5	SE10	
25-Jan	SE10	SSE3	SE7	SE8	SE5	SSE5	SSE5	SSE6	SSE6	SE8	SSE9	SE11	SE10	SE10	SSE8	SE10	SE8	SSE7	SSE3	S2	SSE3	SSE3	S1	SE4	SSE6.2	SE11	
26-Jan	SE4	SE5	SE5	SE5	SE6	ESE6	ESE6	SSE5	SSE5	SSE2	SSW4	SSE3	S5	SSW11	SW14	SW11	SW9	SW12	SSW10	S5	SSE4	SSE6	SE6	SSE4	S5.1	SW14	
27-Jan	SSE3	SSE3	SSW5	S3	SSE5	SSE7	SSE6	SSE6	WSW10	WSW29	WSW25	WSW19	WSW21	SW11	SE3	SSE4	SSW2	SSE2	S3	WSW7	SW6	SW2	SSE3	S4	SW6.2	WSW29	
28-Jan	SSE3	SSE3	SE6	SE8	SE7	SE5	SSE4	SSE4	SSE4	SSE3	S3	SSE4	SE3	ESE4	SE9	SE6	SSE8	SSE6	SE6	SE7	SE6	ESE5	E2	NE3	SE4.6	SE9	
29-Jan	ESE3	SSE1	SW4	S3	SE4	SSE4	SSE4	S3	SSE6	SSE3	SSE2	S3	SSW4	WNW11	W10	W8	SW4	SW8	SW2	ESE3	SW3	S3	SSW6	SSW6	SSW3.0	WNW11	
30-Jan	SSW3	WSW4	SSE1	W4	SW12	SW7	WSW6	WSW10	W7	WSW17	W19	NNW20	N16	NNW15	NNW10	NNW9	NNW18	N17	N18	N16	N16	N15	NNW19	NNW21	NW8.7	NNW21	
31-Jan	NNW21	NNW18	N12	N11	NNW12	NNW7	NNE6	N2	NE2	W1	WSW5	SW2	SW5	N5	N2	NW2	W6	WSW11	WSW8	SW7	SW10	WSW6	NNW3	NNW4	NW4.4	NNW21	

S1.1 SW0.5 SW0.1 SE0.5 ESE0.6 ESE0.7 S0.9 S1.4 SSW1.7 SW3.1 SW2.3 SW0.4 W0.5WNW0.9 W0.9 W1.0 SW0.3WSW0.7SSW0.5 S0.6SSW1.3SSW1.6 S1.1SSW1.1	Diurnal Average
NNW21 NW26 NNW27 SE20 SE18 SE17 NNW17 SE16 NNW17 WSW29WSW25 N29 NNW34 NNW31 NNW30 NNW32 NNW23 NNW19 NNW19 NNW18 NNW19 NNW18 NNW19 NNW21	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

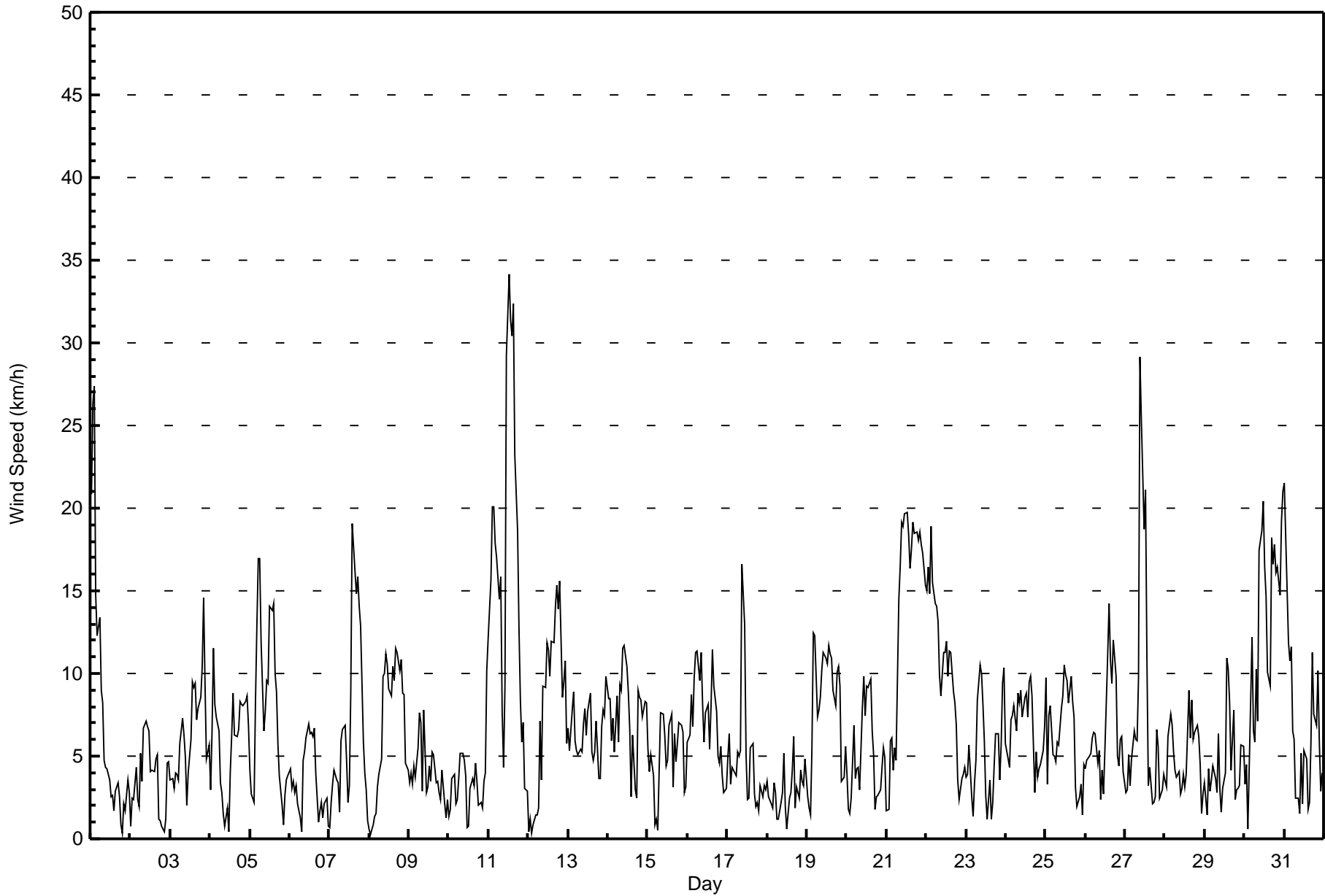
Wind Speed (WS) - km/h
Athabasca Valley - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Jan 11 14:00 Minimum Value: 1 km/h on Jan 5 20:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 3 P ₉₉ = 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-Jan	4	7	9	5	3	3	3	2	1	2	3	1	2	1	1	1	1	2	1	2	1	2	1	1	9
2-Jan	1	2	2	2	2	1	1	2	2	1	1	1	2	1	1	1	1	1	1	2	1	1	1	1	2
3-Jan	2	1	2	2	1	2	2	1	2	1	1	1	2	2	2	2	2	2	2	2	3	3	3	2	3
4-Jan	2	3	2	2	2	2	1	1	1	1	1	1	2	4	3	2	1	1	2	1	2	1	2	2	4
5-Jan	1	1	2	3	3	4	4	4	2	3	2	2	4	4	3	3	2	1	1	1	1	1	1	2	4
6-Jan	2	2	1	1	1	2	2	1	1	1	1	2	1	1	1	2	2	2	2	2	2	2	2	1	2
7-Jan	1	1	1	1	1	1	1	2	1	2	1	1	1	3	4	5	3	3	3	4	3	1	1	1	5
8-Jan	1	1	1	1	1	2	2	3	2	2	2	2	2	2	3	2	3	3	2	2	3	2	2	2	3
9-Jan	2	1	2	1	1	3	2	2	2	2	1	2	2	1	1	2	1	1	1	1	1	1	1	1	3
10-Jan	2	1	2	1	1	2	1	1	1	1	1	1	1	1	1	3	2	2	1	1	2	1	1	3	3
11-Jan	2	3	3	3	3	3	3	3	4	4	10	8	10	10	8	6	5	3	4	2	2	2	1	2	10
12-Jan	1	1	1	1	1	1	2	3	2	2	2	3	3	2	2	2	3	3	3	3	3	3	3	3	3
13-Jan	2	2	2	2	2	1	2	1	1	2	2	2	2	2	2	2	2	3	1	2	2	3	3	2	3
14-Jan	3	3	2	2	1	3	3	4	3	3	3	3	2	3	2	2	1	2	2	3	2	2	2	2	4
15-Jan	2	2	2	2	2	1	1	1	3	2	3	2	2	2	2	2	2	2	2	1	2	2	2	2	3
16-Jan	2	1	2	2	2	3	4	3	3	3	2	2	2	2	3	4	2	1	2	2	2	2	2	1	4
17-Jan	2	2	2	2	2	2	3	2	2	3	5	2	2	1	2	2	1	1	1	2	2	2	1	2	5
18-Jan	1	1	1	2	1	1	1	1	1	1	3	3	3	4	3	2	2	2	1	2	2	2	2	1	4
19-Jan	1	2	2	3	3	4	2	1	1	2	2	2	2	2	2	3	2	2	3	3	2	2	1	1	4
20-Jan	2	1	2	2	2	2	1	2	2	4	3	4	4	3	4	2	2	1	1	2	1	2	3	2	4
21-Jan	1	1	2	2	2	2	2	3	5	3	3	3	4	4	3	3	4	4	4	3	3	4	3	3	5
22-Jan	3	4	4	4	4	4	3	3	2	2	2	2	2	2	2	2	2	2	1	2	1	1	1	1	4
23-Jan	1	2	2	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	2	3	3	3	3
24-Jan	3	3	2	2	1	2	2	2	2	1	2	2	2	2	2	2	2	3	3	2	1	1	2	2	3
25-Jan	3	2	3	2	2	1	2	1	2	2	3	3	3	2	1	2	2	3	1	2	1	1	1	2	3
26-Jan	2	2	2	2	1	1	1	2	1	1	2	1	2	4	3	3	2	3	4	2	2	2	2	2	4
27-Jan	2	2	3	1	1	2	2	2	8	5	5	4	4	7	2	2	2	2	2	3	4	2	1	1	8
28-Jan	1	1	2	2	2	2	2	1	2	1	2	2	2	2	2	2	2	3	3	3	3	2	2	2	3
29-Jan	1	1	2	2	2	2	1	2	2	1	1	2	2	7	3	1	2	2	2	2	2	2	2	3	7
30-Jan	2	2	2	2	5	3	2	3	5	2	4	6	4	3	2	7	5	5	5	5	5	5	4	5	7
31-Jan	4	5	4	3	3	3	2	1	1	2	1	2	1	1	2	3	3	2	3	2	2	2	1	1	5
	4	7	9	5	5	4	4	4	8	5	10	8	10	10	8	7	5	5	5	5	5	4	5	5	
Diurnal Maximum																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Athabasca Valley - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Athabasca Valley - January 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	369	49.60	49.60
6 - 11	274	36.83	86.42
12 - 19	82	11.02	97.45
20 - 28	13	1.75	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
Athabasca Valley - January 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	12	4	7	7	5	25	39	57	34	39	49	27	23	13	15	13	369
6 - 11	16	3	0	0	1	11	81	53	5	12	40	12	4	2	4	30	274
12 - 19	16	0	0	0	0	0	14	2	0	0	6	2	1	0	1	40	82
20 - 28	0	0	0	0	0	0	2	0	0	0	0	3	0	0	1	7	13
29 - 38	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	4	6
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	45	7	7	7	6	36	136	112	39	51	95	45	28	15	21	94	744

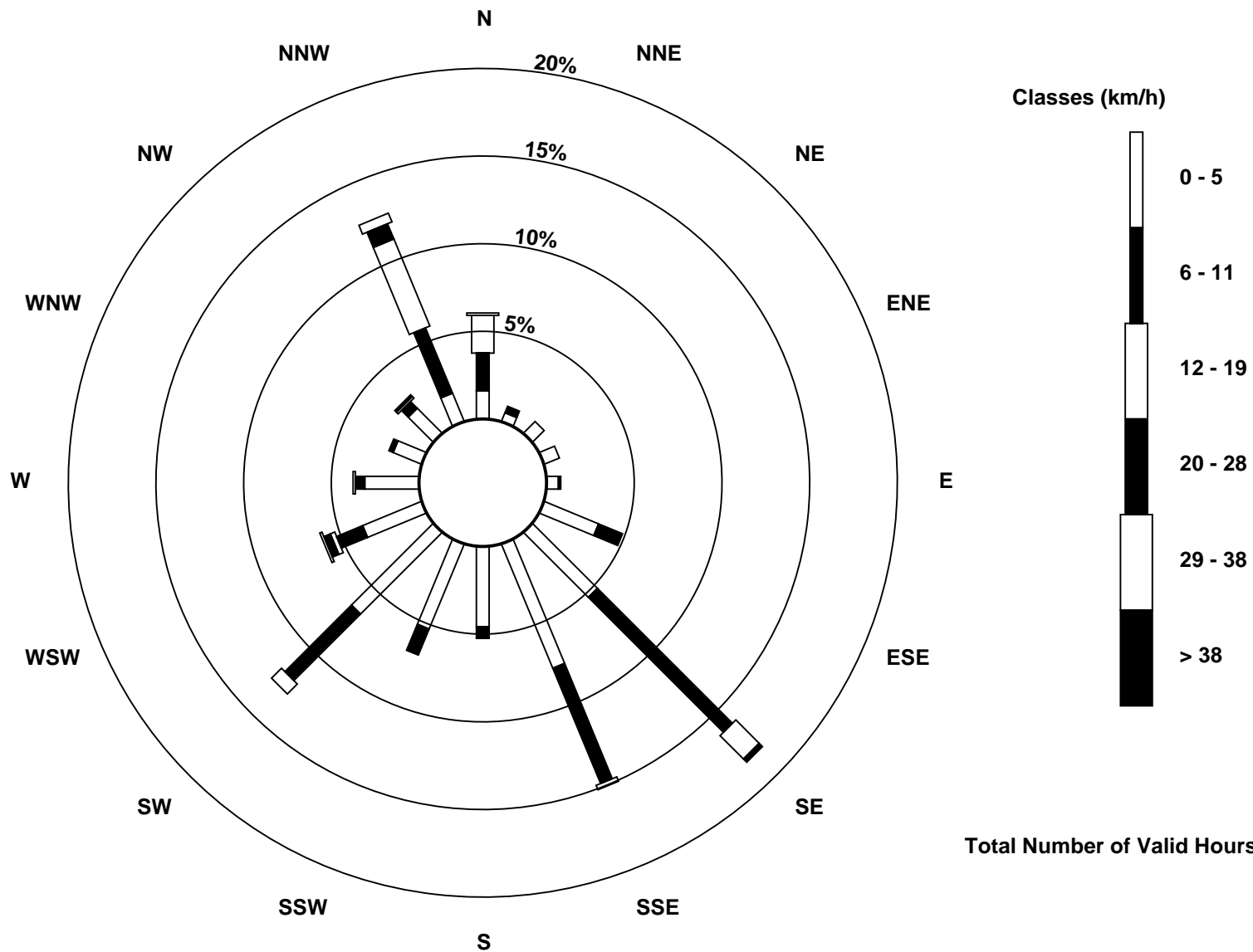
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose 2012-2017

Wind Speed (WS) - km/h
Athabasca Valley (AMS 7)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Athabasca Valley - January 2017

Direction of Maximum Speed: 343 deg on Jan 11 13:00		Hours in Service: 744
Direction of Maximum Daily Speed Average: 345.4 deg on Jan 21		Hours of Data: 744
Direction of Minimum Speed: 144 deg on Jan 8 02:00	Direction of Minimum Daily Speed Average: 1.2 deg on Jan 4	Hours of Missing Data: 0
Monthly Average Direction: 237.9 deg		Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jan	254	319	340	350	355	11	6	352	312	237	222	237	290	331	284	251	243	242	181	203	280	144	166	224	317.8
2-Jan	244	183	248	220	208	105	215	198	227	222	230	235	241	243	234	239	231	248	200	135	14	117	178	194	219.9
3-Jan	149	194	183	186	194	220	224	225	222	230	217	220	208	223	221	224	211	221	218	224	232	256	232	245	221.0
4-Jan	326	325	341	348	2	6	5	9	294	134	54	103	135	208	225	192	164	157	135	139	138	140	138	126	132.5
5-Jan	104	103	297	337	345	341	344	347	358	345	339	339	347	357	6	8	0	9	351	345	351	354	347	319	350.9
6-Jan	275	282	245	284	273	236	210	61	209	172	179	167	171	160	167	146	155	281	220	224	126	230	220	350	193.7
7-Jan	55	267	277	246	259	248	279	126	133	134	82	63	287	338	342	353	342	343	341	342	341	274	230	87	338.4
8-Jan	238	144	33	138	105	136	153	136	147	148	147	144	136	141	142	140	142	135	141	138	142	142	126	115	140.4
9-Jan	107	131	117	108	136	220	222	211	164	221	94	131	225	252	331	322	352	319	264	251	315	265	34	295	225.0
10-Jan	274	320	329	353	23	326	268	252	255	264	230	277	306	261	239	234	218	212	186	133	126	168	166	144	232.1
11-Jan	138	139	141	140	139	139	138	135	106	5	359	7	343	347	336	334	341	333	320	325	288	246	226	231	4.8
12-Jan	227	111	176	184	37	213	188	161	133	141	141	149	142	145	148	143	141	137	134	140	155	145	150	154	144.5
13-Jan	153	181	166	145	132	121	122	117	119	129	142	133	138	143	155	162	154	148	168	156	155	157	158	153	146.2
14-Jan	157	160	176	155	168	149	160	147	148	144	141	145	141	127	144	233	202	161	124	120	122	116	95	117	143.3
15-Jan	138	127	107	127	223	69	213	106	129	128	140	197	163	189	221	181	145	159	128	132	143	144	158	133	146.5
16-Jan	106	123	127	124	125	129	142	125	139	140	136	130	131	116	156	183	153	167	202	249	215	216	215	208	146.8
17-Jan	168	168	197	170	179	120	220	256	259	230	232	231	262	144	142	144	142	192	169	210	173	162	194	203	199.2
18-Jan	185	168	179	237	224	232	290	328	317	312	327	272	197	154	180	156	157	118	209	211	214	217	212	209	208.5
19-Jan	191	241	265	335	342	342	336	314	330	340	345	344	343	331	335	347	343	340	336	343	335	306	332	332	336.2
20-Jan	358	101	92	165	145	143	152	157	197	155	145	155	145	139	139	137	145	181	203	211	216	213	339	322	152.6
21-Jan	295	341	356	20	52	21	41	342	345	340	341	342	343	345	344	343	346	340	342	341	344	345	342	341	345.4
22-Jan	344	344	345	343	352	358	350	344	360	359	345	348	348	350	339	325	342	350	352	325	295	309	303	255	343.9
23-Jan	259	235	237	218	188	223	221	225	220	223	222	225	225	61	76	71	73	146	148	164	183	211	215	218	209.9
24-Jan	213	215	219	222	227	231	225	226	228	226	208	152	153	151	143	141	147	142	161	200	199	204	142	154	188.3
25-Jan	144	157	141	144	145	166	161	153	150	142	151	137	132	139	154	149	144	155	168	172	160	162	175	139	147.7
26-Jan	134	138	133	124	131	118	113	151	152	163	196	157	175	209	218	217	221	227	202	169	149	161	141	150	176.3
27-Jan	167	166	211	183	156	151	159	157	242	251	248	243	255	236	145	162	196	161	178	247	234	229	154	176	224.8
28-Jan	168	158	139	138	125	141	152	159	157	168	183	161	141	122	143	141	147	149	130	127	142	109	93	38	140.7
29-Jan	122	155	223	180	144	155	159	171	147	166	158	174	196	283	269	260	234	231	214	115	220	182	201	194	206.4
30-Jan	209	241	165	259	228	233	251	245	265	250	260	335	353	338	341	332	341	358	356	4	2	352	344	343	323.6
31-Jan	342	345	355	355	343	348	22	10	34	269	258	235	215	349	6	325	273	248	246	232	230	257	287	343	315.8

185.1 226.2 217.0 126.9 118.5 110.8 179.8 185.2 191.8 215.4 221.2 225.8 275.5 299.4 272.6 258.8 221.8 249.3 198.4 182.4 207.6 197.1 184.6 193.1
 Diurnal Average

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

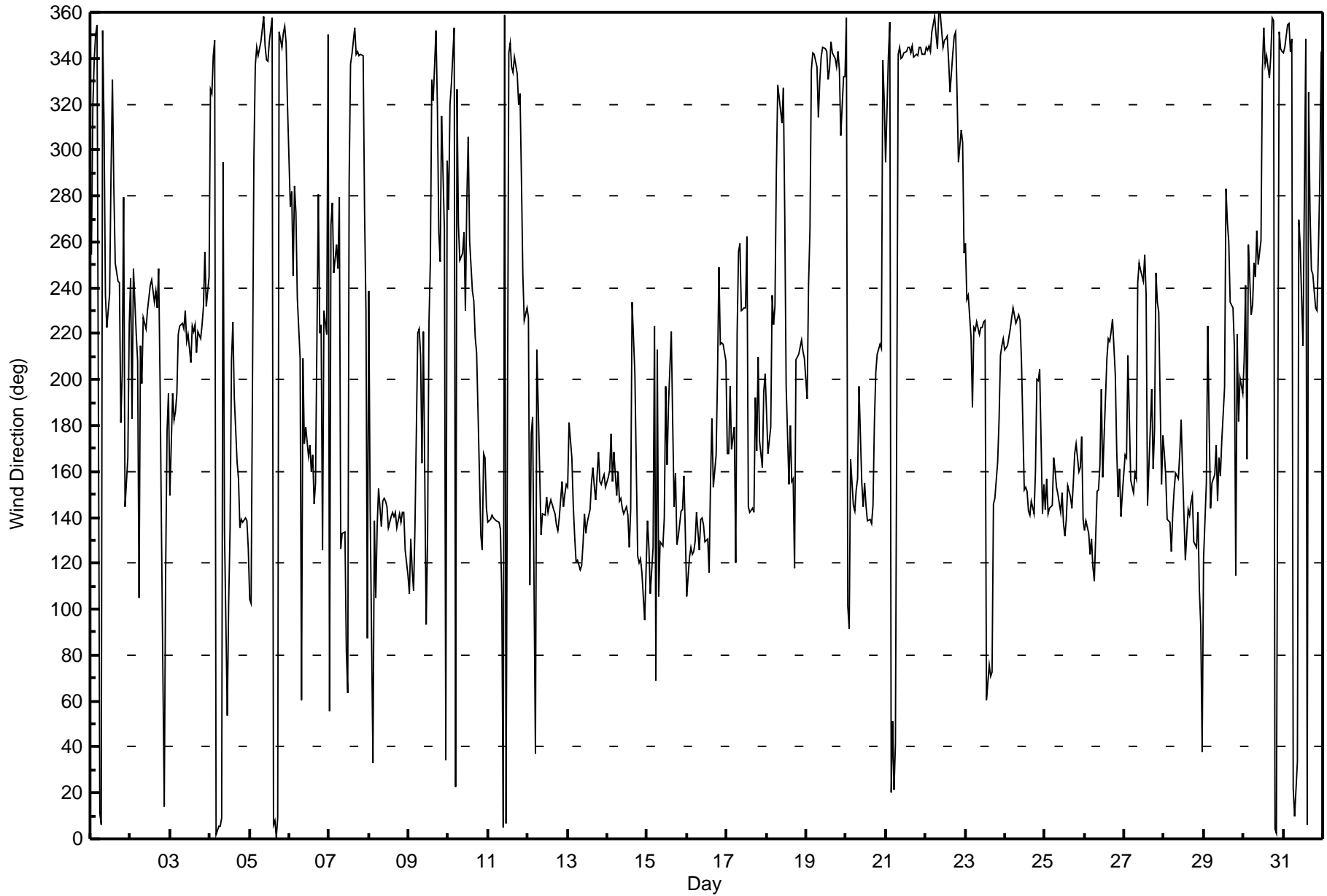
Wind Direction (WD) - deg
Athabasca Valley - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 112 deg on Jan 15 05:00 Minimum Value: 7 deg on Jan 23 11:00 Percentiles: P ₁ = 9 P ₁₀ = 12 Q ₁ = 16 Median = 26 Q ₃ = 49 P ₉₀ = 72 P ₉₉ = 100																			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-Jan	16	24	14	19	21	16	17	18	23	55	70	24	45	36	53	27	63	79	87	101	87	87	53	72	101
2-Jan	100	72	83	56	84	66	24	42	10	11	12	11	19	12	20	12	15	85	79	102	92	79	41	33	102
3-Jan	50	32	67	53	26	69	19	10	25	17	66	64	34	15	14	15	26	16	14	10	11	23	52	20	69
4-Jan	25	11	11	18	18	20	29	20	66	83	41	90	55	50	15	22	13	20	13	11	13	13	14	12	90
5-Jan	26	41	40	30	15	13	14	15	19	18	12	12	15	19	19	20	17	18	16	41	57	23	30	45	57
6-Jan	31	58	27	52	58	84	105	95	30	21	20	16	13	16	11	17	48	71	87	74	74	67	54	73	105
7-Jan	94	72	26	19	30	28	71	28	16	15	13	75	35	15	12	19	14	13	11	15	24	16	53	86	94
8-Jan	98	96	83	75	84	60	43	44	14	15	14	14	14	17	16	16	13	15	16	12	17	21	51	50	98
9-Jan	65	40	47	29	42	52	15	33	62	18	55	57	42	45	13	28	22	34	67	79	28	81	79	41	81
10-Jan	72	55	21	35	45	50	35	14	21	17	22	86	80	16	22	64	28	46	54	67	67	45	32	12	86
11-Jan	10	9	8	8	11	10	12	11	57	74	35	20	21	19	20	12	12	9	13	12	34	20	54	84	84
12-Jan	105	91	90	88	55	99	85	29	72	19	21	16	15	13	13	14	12	14	14	13	20	22	19	53	105
13-Jan	34	19	20	12	21	22	29	27	27	21	21	26	18	17	30	29	29	23	27	35	23	22	23	16	35
14-Jan	21	25	25	23	26	20	36	32	20	15	16	15	15	27	66	25	63	93	15	30	16	28	16	22	93
15-Jan	27	35	24	35	112	94	102	33	19	18	38	36	43	26	16	50	25	44	28	17	16	32	44	55	112
16-Jan	33	17	16	25	17	15	16	23	18	22	30	26	29	43	34	36	19	13	36	38	38	27	45	61	61
17-Jan	54	37	48	63	42	51	62	37	38	10	24	26	63	45	20	21	51	52	65	80	45	45	35	35	80
18-Jan	37	56	67	70	44	17	66	73	46	26	45	66	87	72	72	40	31	68	33	28	19	12	33	20	87
19-Jan	45	82	93	59	18	14	16	13	11	12	14	14	14	11	12	15	16	16	22	13	25	67	27	25	93
20-Jan	47	79	78	58	24	43	28	48	54	37	20	36	22	18	18	17	19	52	34	17	24	36	43	26	79
21-Jan	53	33	22	23	28	20	39	12	14	9	9	11	11	13	14	12	13	10	12	11	13	13	11	10	53
22-Jan	14	13	14	12	17	17	16	13	18	19	13	15	13	15	16	10	10	16	13	36	24	20	24	20	36
23-Jan	23	51	15	81	82	45	15	9	7	7	7	9	75	81	17	62	25	41	21	17	39	14	16	17	82
24-Jan	18	29	25	13	10	10	10	8	8	10	27	18	17	19	16	13	15	84	33	39	37	26	33	23	84
25-Jan	14	49	20	33	55	22	37	22	24	16	17	16	17	12	14	10	11	34	47	78	48	34	81	34	81
26-Jan	30	27	22	36	16	17	21	52	28	75	39	54	34	18	16	26	20	14	38	50	53	31	31	43	75
27-Jan	43	59	40	37	35	20	25	21	66	10	11	12	12	52	59	46	62	64	76	36	62	84	53	33	84
28-Jan	41	38	19	19	25	52	45	54	58	56	52	50	46	41	18	38	27	27	41	40	44	35	89	75	89
29-Jan	69	88	61	65	56	58	42	57	14	42	63	36	41	42	12	9	35	28	83	64	65	71	28	35	88
30-Jan	80	55	103	53	22	46	30	24	39	9	14	32	18	9	13	22	13	19	18	19	19	18	13	13	103
31-Jan	13	15	19	20	13	21	15	31	46	53	38	83	20	51	74	73	29	11	17	16	11	47	51	38	83
	105	96	103	88	112	99	105	95	72	83	70	90	87	81	74	73	63	93	87	102	92	87	89	86	
Diurnal Maximum																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Athabasca Valley - January 2017





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 5, 2017	Last Calibration	December 2, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	9:20	End Time (MST)	12:37
Gas Cert Reference	LL110103	Station temp.	22 Deg C
Cal Gas Concentration	49.2 ppm	Cal Gas Exp Date	February 16, 2019
Calibrator Make/Model	API T700	Serial Number	2445
ZAG Make/Model	API 701	Serial Number	1864
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8205

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-619	-619
Analyzer IP address	192.168.1.103		Lamp voltage	800	801
Calculated slope	1.004189	0.994023	Chamber temp	44.0	44.3
Calculated intercept	1.096595	1.026180	Pressure	701.9	695.4
Analyzer Background	18.3	18.5	Flow	0.478	0.475
Analyzer Coefficient	1.022	1.040	Intensity	43300	43689
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	0.0	----
as found span	5000	59.1	581.5	566.1	1.027
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	59.1	581.5	584.4	0.995
second point	5000	29.5	290.3	290.7	0.999
third point	5000	14.8	145.6	144.3	1.009
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	59.1	581.5	583.5	0.997
Average Correction Factor					1.001

Corrected As found	566.1	Previous response	578.0	% change	2.1%
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Notes:

No maintenance done, filter changed out, Span adjusted

Calibration Performed By:

Melissa Lemay



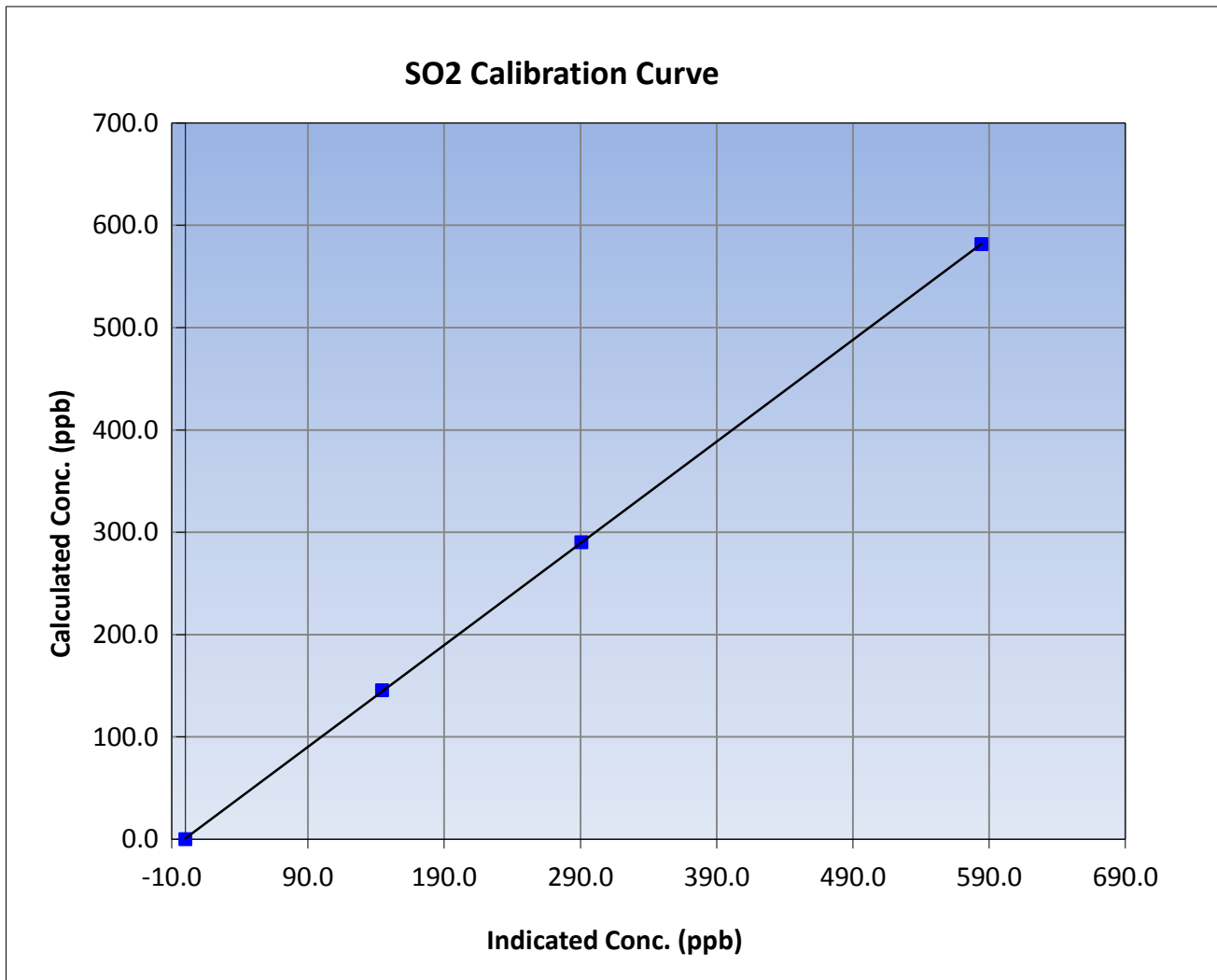
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 5, 2017	Previous Calibration	December 2, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:20	End Time (MST)	12:37
Analyzer make	Thermo 45C	Analyzer serial #	630718530

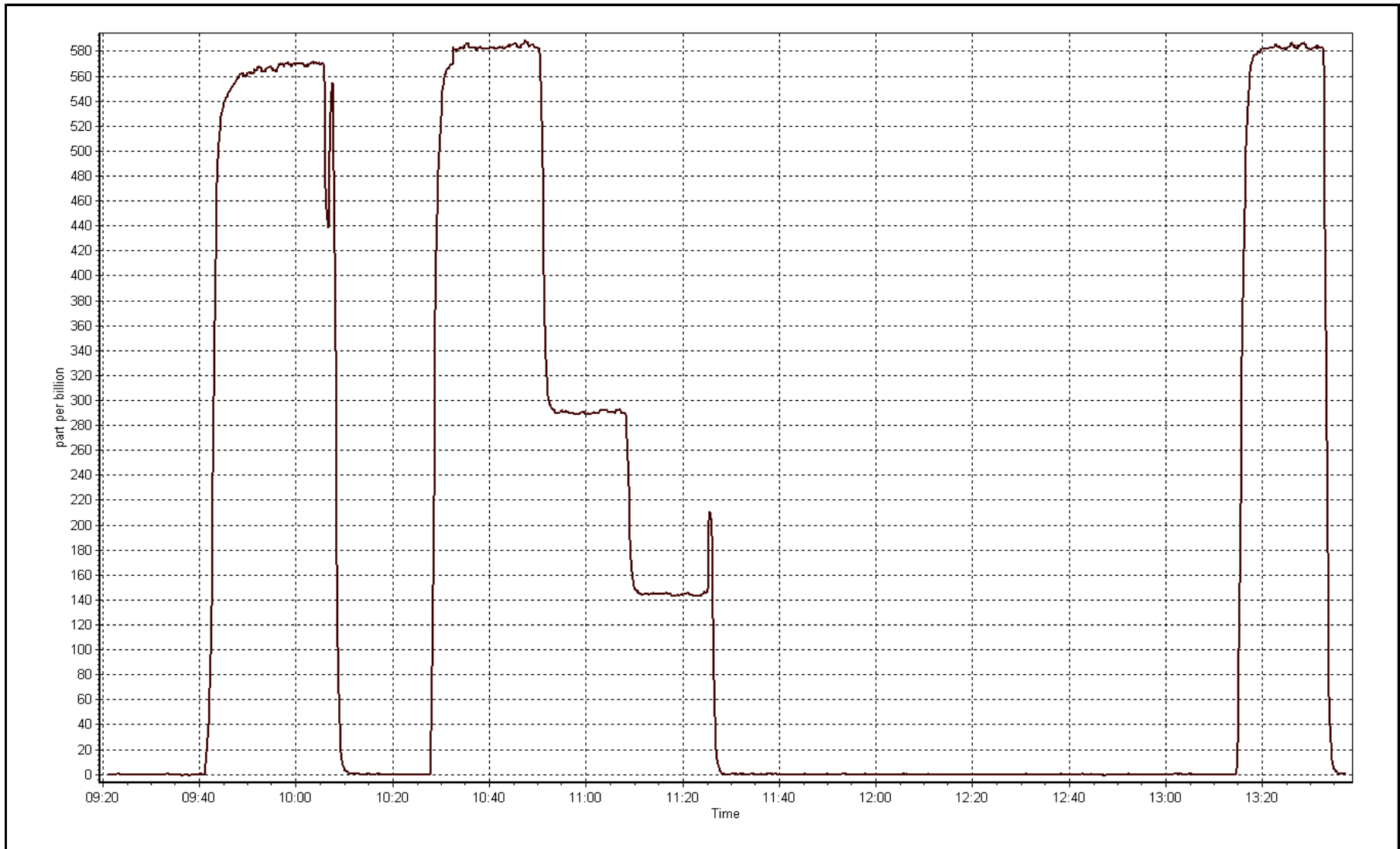
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999985
581.5	584.4	0.9950		
290.3	290.7	0.9986	Slope	0.994023
145.6	144.3	1.0092		
			Intercept	1.026180



SO2 Calibration Plot

Date: January 5, 2017





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	January 3, 2017	Last Calibration	December 12, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	11:47
Gas Cert Reference	ALM052589	Station temp.	22 Deg C
Cal Gas Concentration	5.02 ppm	Cal Gas Exp Date	September 9, 2017
Calibrator Make/Model	API T700	Serial Number	2445
Dil air Make/Model	API 701-H	Serial Number	198
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8205
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S970259A 26/Sep/17

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-699.3	-699.3
Analyzer IP address	192.168.1.44		Lamp voltage	1142	1142
Calculated slope	0.999560	1.002910	Chamber temp	45	45
Calculated intercept	0.024913	-0.113635	Pressure	714.7	714.7
Analyzer Background	2.5	2.5	Flow	0.453	0.453
Analyzer Coefficient	1.028	1.028	Intensity	72	72
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-LTE		Analyzer serial #	1507864683	
Converter make/model	CDN-101		Converter serial #	460	

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	75.0	75.3	75.0	1.004
SO2 scrubber check	5000	14.8	148.0	0.4	----
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	75.0	75.3	75.1	1.003
second point	5000	40.0	40.2	40.4	0.994
third point	5000	20.0	20.1	20.0	1.004
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	75.0	75.3	75.0	1.004
Average Correction Factor					1.000

Corrected As found	74.9	Previous response	75.3	% change	0.5%
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Notes:

no maintenance or adjustments done, filter changed out, scrubber checked after the as founds

Calibration Performed By:

Melissa Lemay



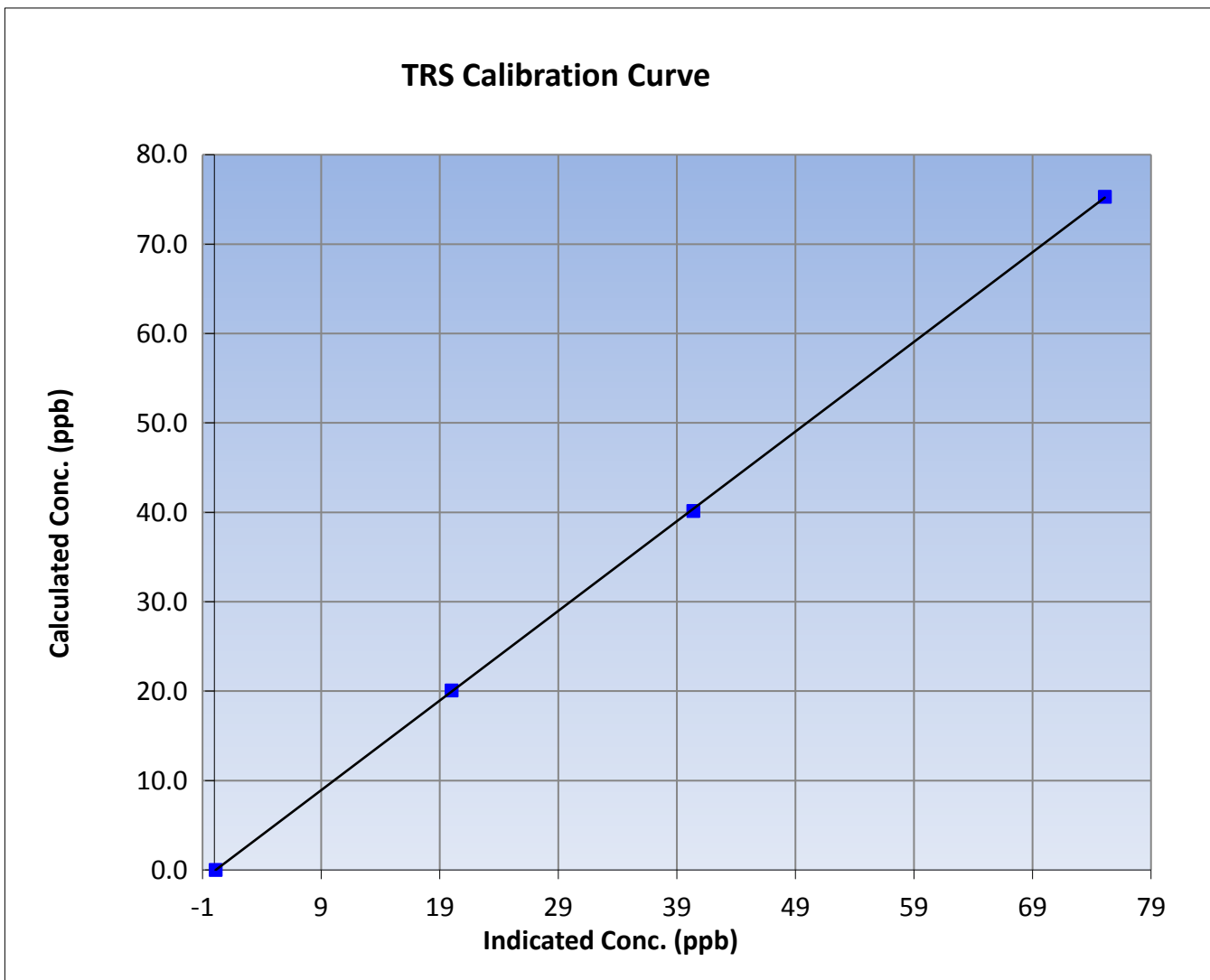
Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	January 3, 2017	Previous Calibration	December 12, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:00	End Time (MST)	11:47
Analyzer make	Thermo 43i-LTE	Analyzer serial #	1507864683

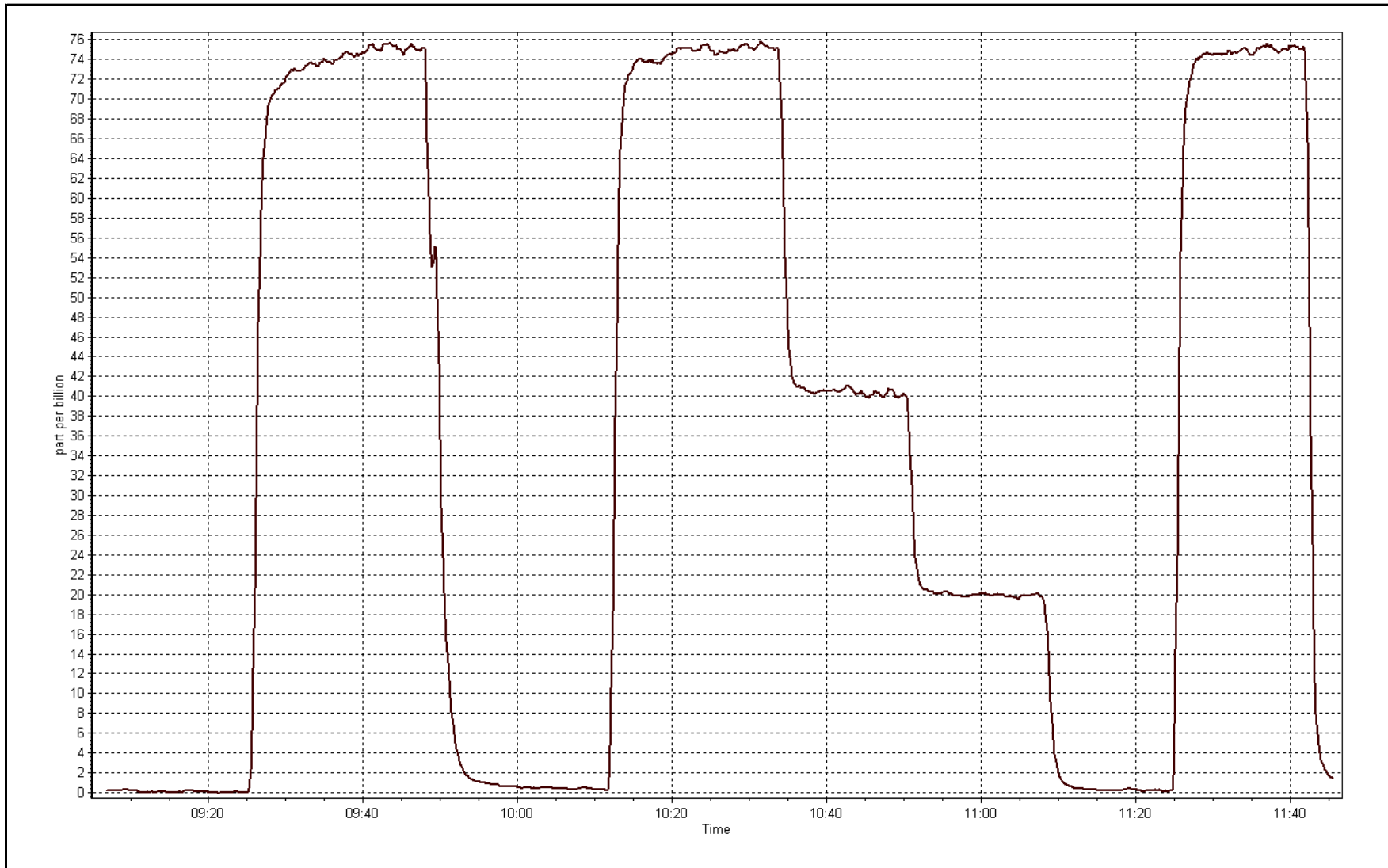
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999972
75.3	75.1	1.0027		
40.2	40.4	0.9941	Slope	1.002910
20.1	20.0	1.0040		
			Intercept	-0.113635



TRS Calibration Plot

Date: January 3, 2017





Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	January 5, 2017	Last Calibration	December 5, 2016
Station Name	Athabasca Valley	Station Number	AMS 7

Reason: Routine

Start Time (MST)	9:20	End Time (MST)	13:36
Gas Cert Reference	LL110103	Cal Gas Expiry Date	February 16, 2019
CH4 Cal Gas Conc.	488.0 ppm	CH4 Equiv Conc.	1035.3 ppm
C3H8 Cal Gas Conc.	199.0 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	75.2	75.2
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	1.005381	0.998358	Carrier Pressure	35.9	35.9
THC Calc intercept	-0.044142	-0.003947	Fuel Pressure	44.7	44.7
NMHC Calc slope	1.010542	0.999389	Air Pressure	25.9	25.9
NMHC Calc intercept	-0.048236	-0.013978			

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	59.1	12.24	12.30	0.995
calibrator zero	5000	0.0	0.00	0.02	----
high point	5000	59.1	12.24	12.27	0.997
second point	5000	29.5	6.11	6.11	1.000
third point	5000	14.8	3.06	3.06	1.001
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	59.1	12.24	12.28	0.996
Average Correction Factor					0.999

Corrected As found 12.30 Previous response 12.22 % change -0.7%

Notes:

Filter changed out, zero and span adjusted, Nitrogen 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	59.1	6.47	6.52	0.992
calibrator zero	5000	0.0	0.00	0.02	----
high point	5000	59.1	6.47	6.49	0.997
second point	5000	29.5	3.23	3.24	0.997
third point	5000	14.8	1.62	1.63	0.994
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	59.1	6.47	6.50	0.995
Average Correction Factor					0.996

Corrected As found 6.52 Previous response 6.45 % change -1.1%

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	59.1	5.77	5.78	0.998
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	59.1	5.77	5.78	0.998
second point	5000	29.5	2.88	2.87	1.003
third point	5000	14.8	1.44	1.43	1.010
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	59.1	5.77	5.78	0.998
Average Correction Factor					1.004

Corrected As found 5.78 Previous response 5.77 % change -0.2%



Wood Buffalo Environmental Association

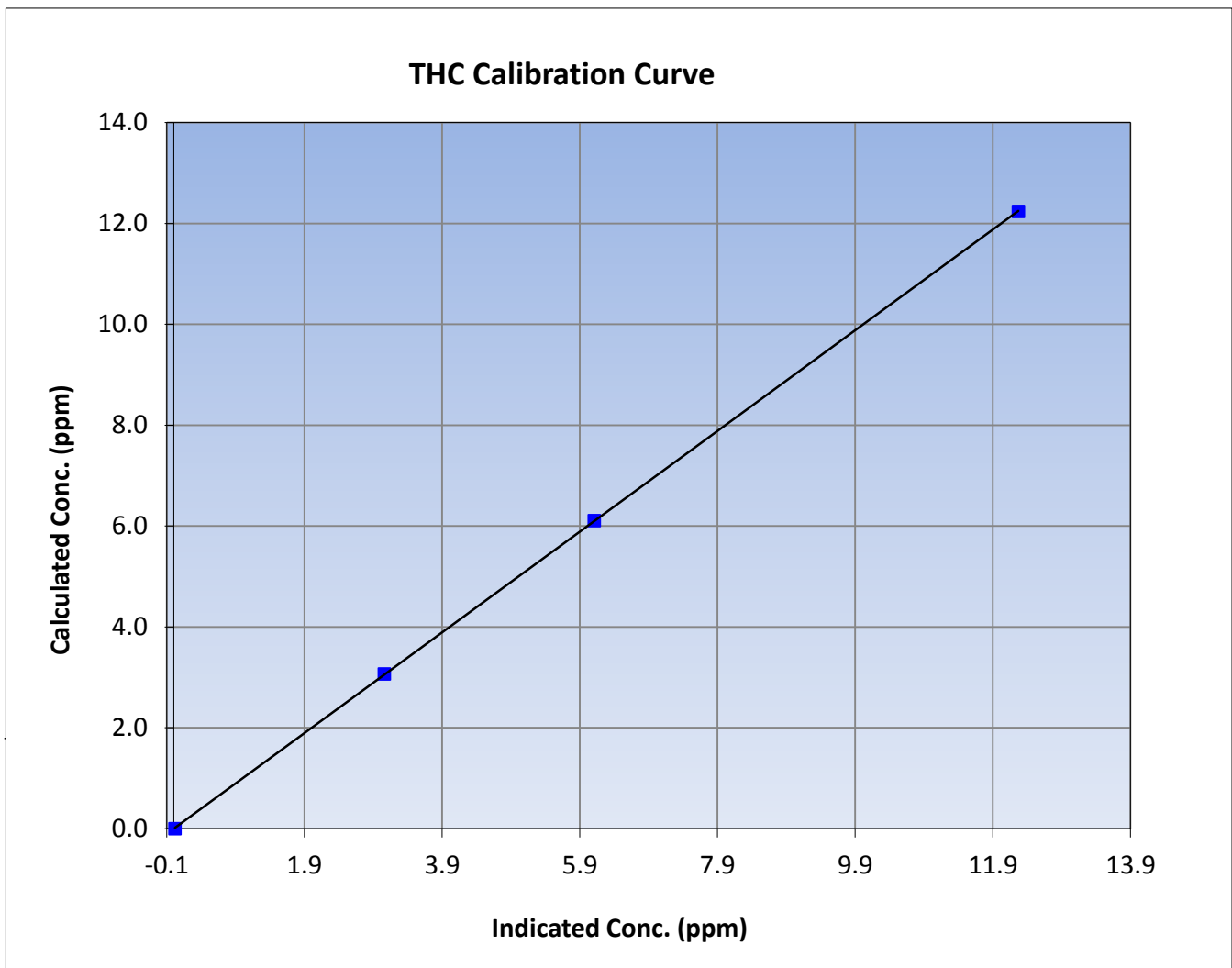
THC Calibration Summary

Station Information

Calibration Date	January 5, 2017	Previous Calibration	December 5, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:20	End Time (MST)	13:36
Analyzer make	Thermo 55i	Analyzer serial #	1426262594
		0.528	

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.02	----	Correlation Coefficient	0.999992
12.24	12.27	0.9973		
6.11	6.11	0.9997	Slope	0.998358
3.06	3.06	1.0014		
			Intercept	-0.003947





Wood Buffalo Environmental Association

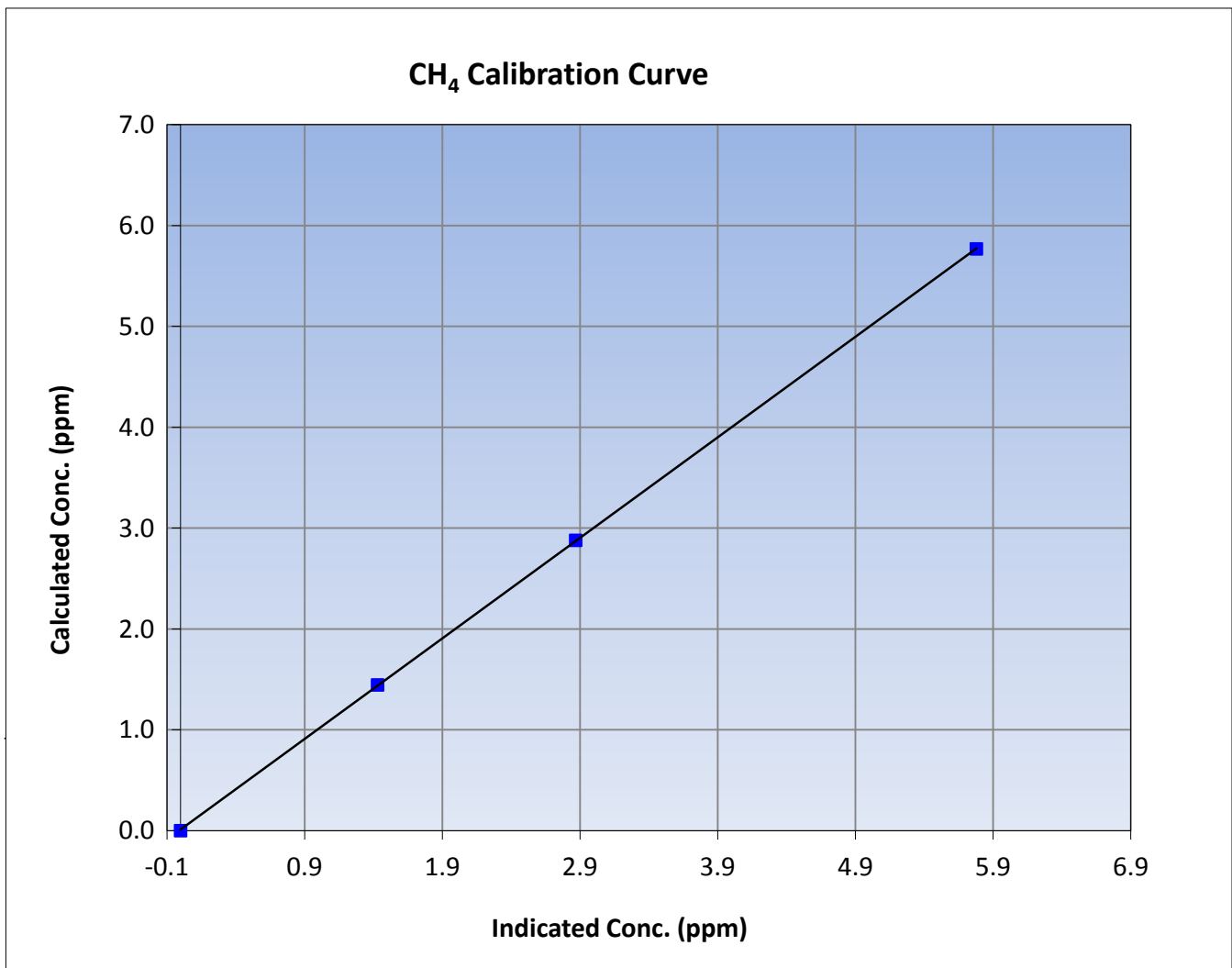
CH₄ Calibration Summary

Station Information

Calibration Date	January 5, 2017	Previous Calibration	December 5, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:20	End Time (MST)	13:36
Analyzer make	Thermo 55i	Analyzer serial #	1426262594
		0.528	

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999986
5.77	5.78	0.9980		
2.88	2.87	1.0032	Slope	0.997203
1.44	1.43	1.0101		
			Intercept	0.010010





Wood Buffalo Environmental Association

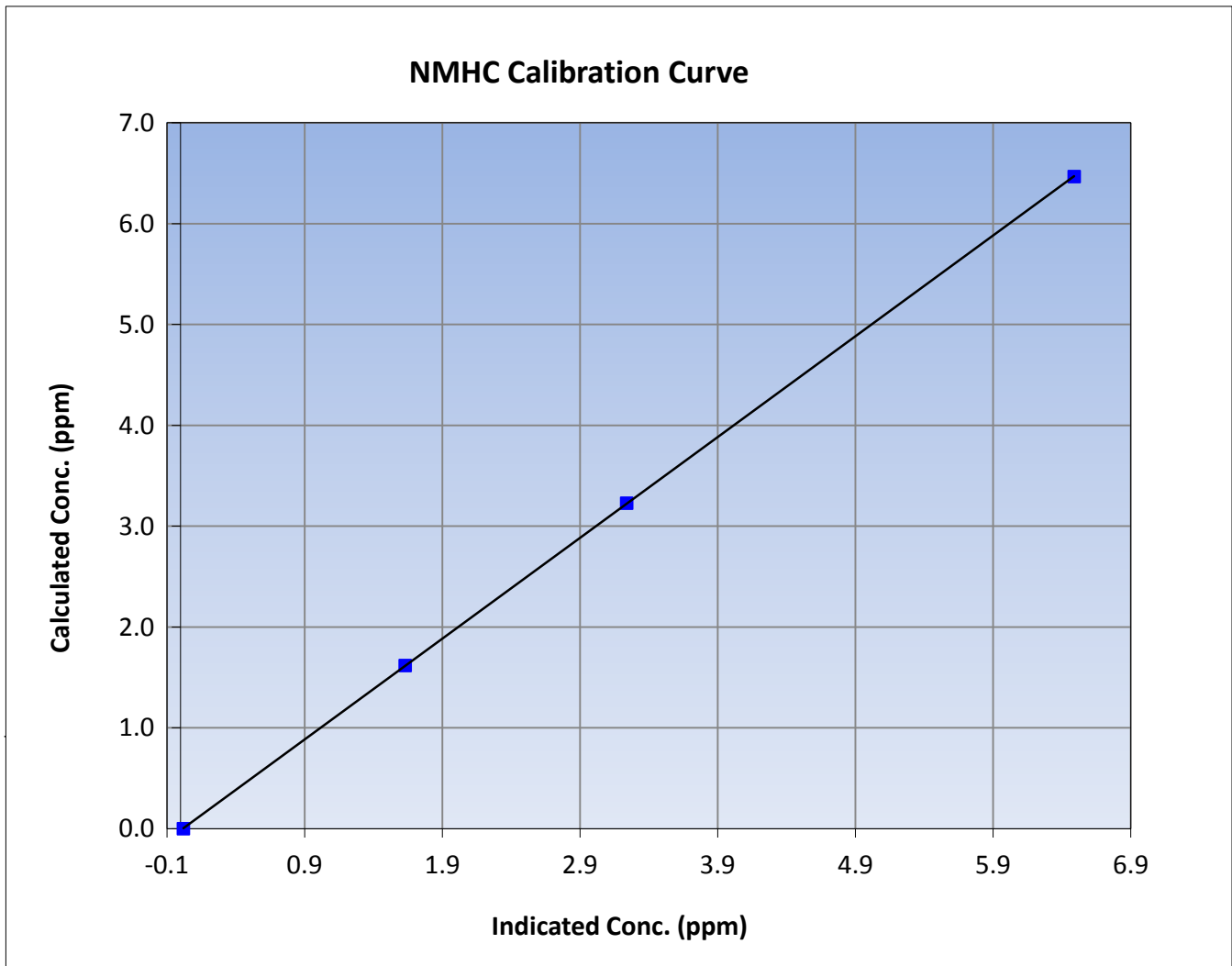
NMHC Calibration Summary

Station Information

Calibration Date	January 5, 2017	Previous Calibration	December 5, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:20	End Time (MST)	13:36
Analyzer make	Thermo 55i	Analyzer serial #	1426262594
0.528			

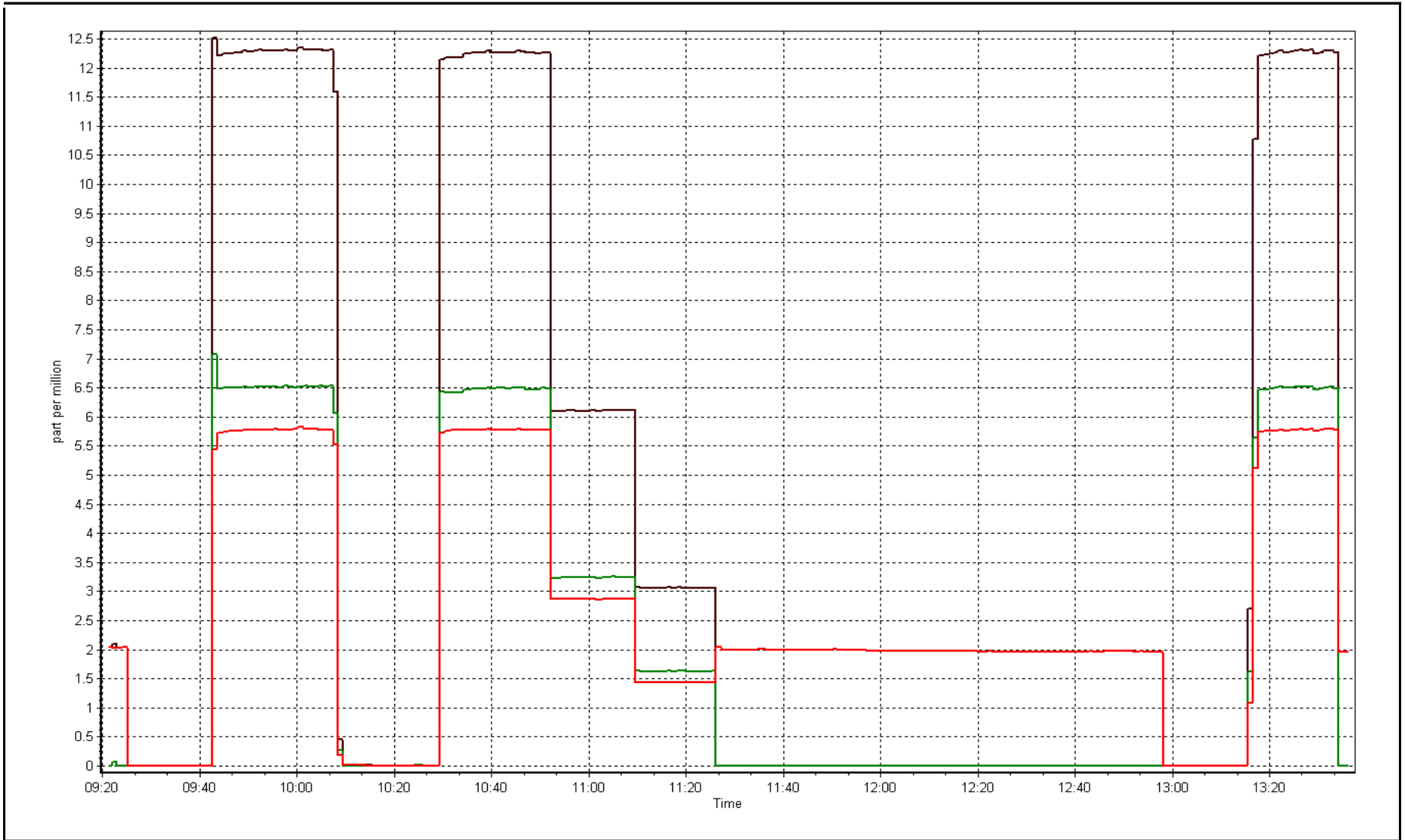
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.02	----	Correlation Coefficient	0.999996
6.47	6.49	0.9967		
3.23	3.24	0.9965	Slope	0.999389
1.62	1.63	0.9938		
			Intercept	-0.013978



THC Calibration Plot

Date: January 5, 2017





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	January 3, 2017	Previous Calibration	December 5, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	11:42	End Time (MST)	13:54
NO2 GPT Ref date	NA	Transfer Standard	GPTPS
Calibrator Make/Model	API T700	Station temp.	22 Deg C
ZAG make/model	Teledyne API 701	Serial Number	2445
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.	29.1	29.1
Analyzer IP address	192.168.1.48		Lamp temp.	67.9	67.9
Calculated slope	0.996186	1.002169	Pressure	723.7	723.7
Calculated intercept	-0.079680	-0.078994	Flow cell A	0.762	0.762
Analyzer Background	-0.8	-0.8	Flow cell B	0.782	0.782
Analyzer Coefficient	1.027	1.027	Cell A Intensity	111261	111261
			Cell B Intensity	97716	97716

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	-0.4	----
as found span	5000	995.40	400.0	399.0	1.003
calibrator zero	5000	0.00	0.0	-0.4	----
high point	5000	994.20	400.0	399.0	1.003
second point	5000	848.50	200.0	199.8	1.001
third point	5000	750.90	100.0	100.4	0.996
as left zero	5000	0.00	0.0	-0.3	----
as left span	5000	994.10	400.0	402.4	0.994
Average Correction Factor					1.000

Corrected As found	399.4	Previous response	401.6	% change	0.6%
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Notes:

No maintenance or adjustments done, filter changed out

Calibration Performed By:

_____ Melissa Lemay



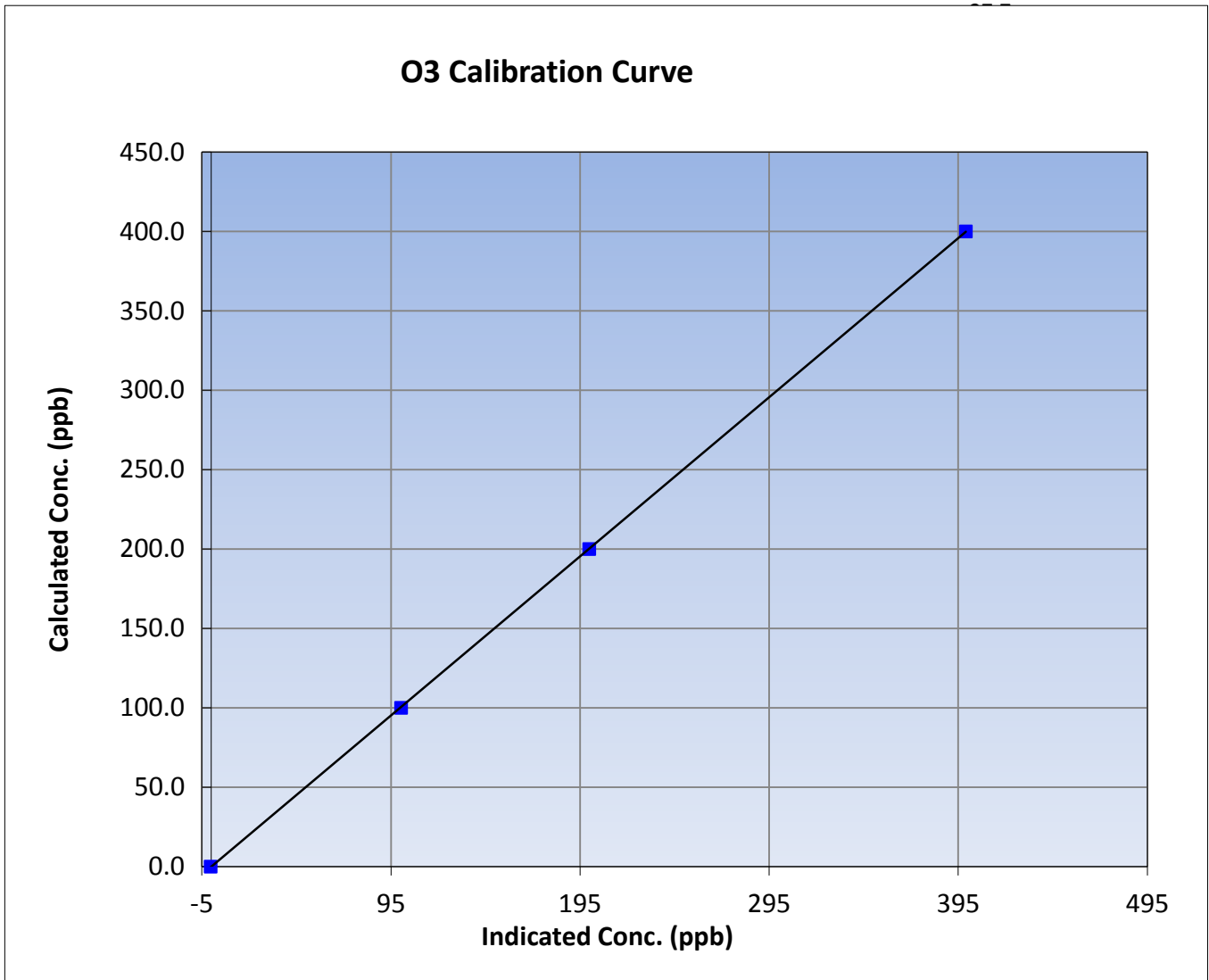
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	December-05-16	Previous Calibration	November 9, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	11:42	End Time (MST)	14:16
Analyzer make	TEI 49i	Analyzer serial #	1507964700

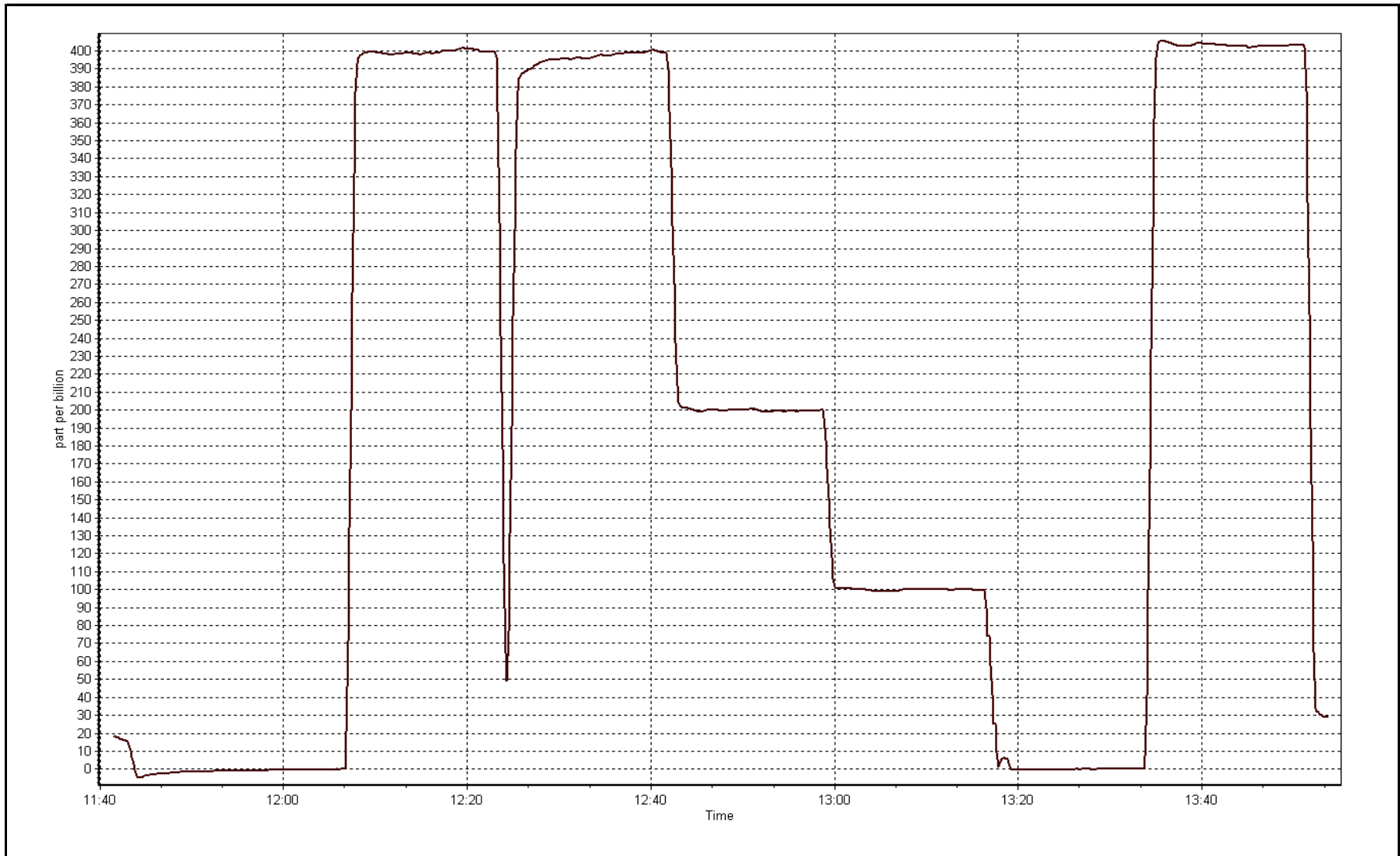
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	0.999993
400.0	399.0	1.0025		
200.0	199.8	1.0010	Slope	1.002169
100.0	100.4	0.9960		
			Intercept	-0.078994



O3 Calibration Plot

Date: January 3, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 5, 2017	Previous Calibration	December 2, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	9:20	End Time (MST)	13:36
NO Cal Gas Conc	50.8 ppm	Gas Cert Reference	LL110103
NOx Cal Gas Conc	50.8 ppm	Cal Gas Expiry Date	February 16, 2019
Calibrator	API T700	Serial Number	2445
Zero air Generator	Teledyne PAI T701	Serial Number	1864

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	1.002038	1.003456	1.006989
	Data Offset	1.229209	1.411315	-1.162295
Current Calibration	Data Slope	1.000301	1.004036	1.003918
	Data Offset	2.182532	2.164042	0.232137

Analyzer Information

Analyzer make/model	Thermo 42C	Analyzer serial #	601114773
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Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
Analyzer IP	192.168.1.103		192.168.1.103	
NO coefficient	1.135		1.135	
NOX coefficient	1.001		1.001	
NO2 coefficient	1.000		1.000	
NO bkgrnd	3.2		3.2	
NOX bkgrnd	3.3		3.3	
Chamber Temp	49.7	Deg C	49.7	Deg C
Moly Temp	323	Deg C	324	Deg C
PMT voltage	-784	V	-784	V
PMT Temp	-3.6	Deg C	-3.7	Deg C
O3 flow	ok		ok	
R Cell press NO	138.5	mmHg	135.5	mmHg
R Cell Press Nox	138.5	mmHg	135.5	mmHg
NO sample flow	0.894	lpm	0.908	lpm
Nox sample Flow	0.894	lpm	0.908	lpm

Notes:

No adjustments or maintenance done, filter changed out



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: January 5, 2017 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	0.2	-0.1	0.3	----	----
as found span	5000	59.1	600.5	600.5	0.0	599.6	597.1	2.7	1.0014	1.0056
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	-0.1	0.3	----	----
high point	5000	59.1	600.5	600.5	0.0	599.6	597.1	2.7	1.0014	1.0056
second point	5000	29.5	299.7	299.7	0.0	295.2	294.7	0.6	1.0153	1.0170
third point	5000	14.8	150.4	150.4	0.0	146.5	146.0	0.4	1.0264	1.0299
as left zero	5000	0.0	0.0	0.0	0.0	0.2	-0.1	0.3	----	----
as left span	5000	59.1	600.5	188.4	412.1	586.7	185.8	400.8	1.0234	1.0140
Average Correction Factor									1.0144	1.0175

Corrcted As found NO_x= 599.4 NO= 597.2 Percent Change NO_x= -0.2% NO= 0.0%
 Previous Response NO_x= 598.0 NO= 597.0

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 59.10 ccm NOX ref calc conc = 600.5 ppb NO ref calc conc = 600.5 ppb

O3 Setpoint (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
1st NO ref point		0.0	591.8	591.7	0.3	1.0146	1.0148	----	----
1st NO2 (300)	188.4	403.3	590.3	188.4	401.8	1.0172	----	1.0037	99.6%
2nd NO2 (200)	387.2	204.5	590.2	387.2	203.1	1.0174	----	1.0069	99.3%
3rd NO2 (100)	488.5	103.2	590.6	488.5	102.1	1.0167	----	1.0108	98.9%
2nd NO ref point		0.0	590.9	591.1	-0.2	1.0161	1.0158	----	----
Average Correction Factor						1.0168		1.0071	99.3%

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

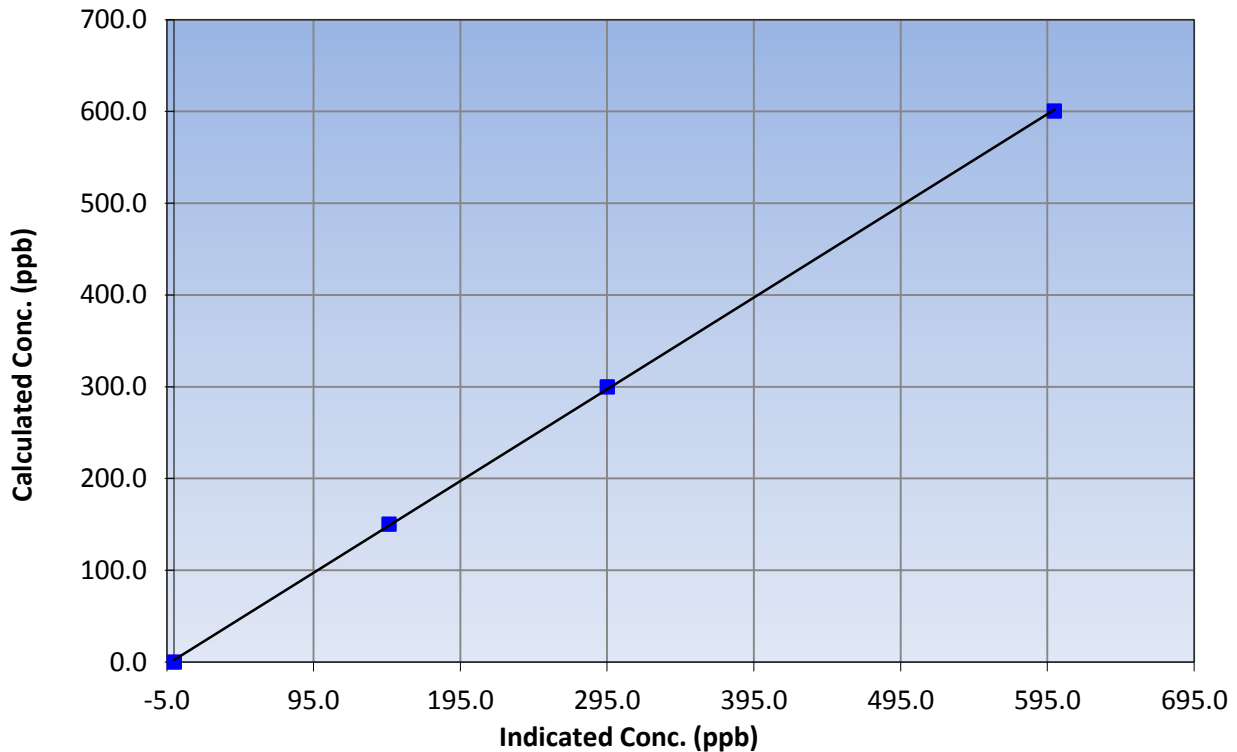
Station Information

Calibration Date	January 5, 2017	Previous Calibration	December 2, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:20	End Time (MST)	13:36
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	0.2	----	Correlation Coefficient	0.999920
600.5	599.6	1.0014		
299.7	295.2	1.0153	Slope	1.000301
150.4	146.5	1.0264		
			Intercept	2.182532

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

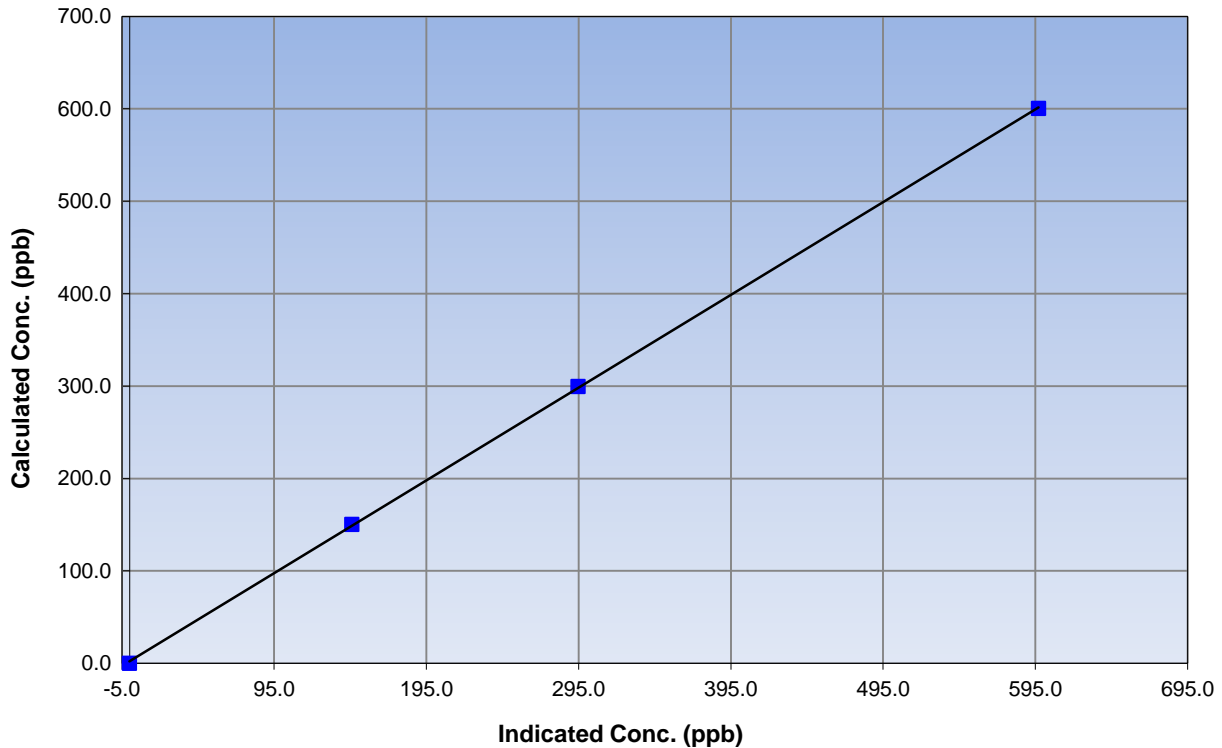
Station Information

Calibration Date	January 5, 2017	Previous Calibration	December 2, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:20	End Time (MST)	13:36
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	0.999944
600.5	597.1	1.0056		
299.7	294.7	1.0170	Slope	1.004036
150.4	146.0	1.0299		
			Intercept	2.164042

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

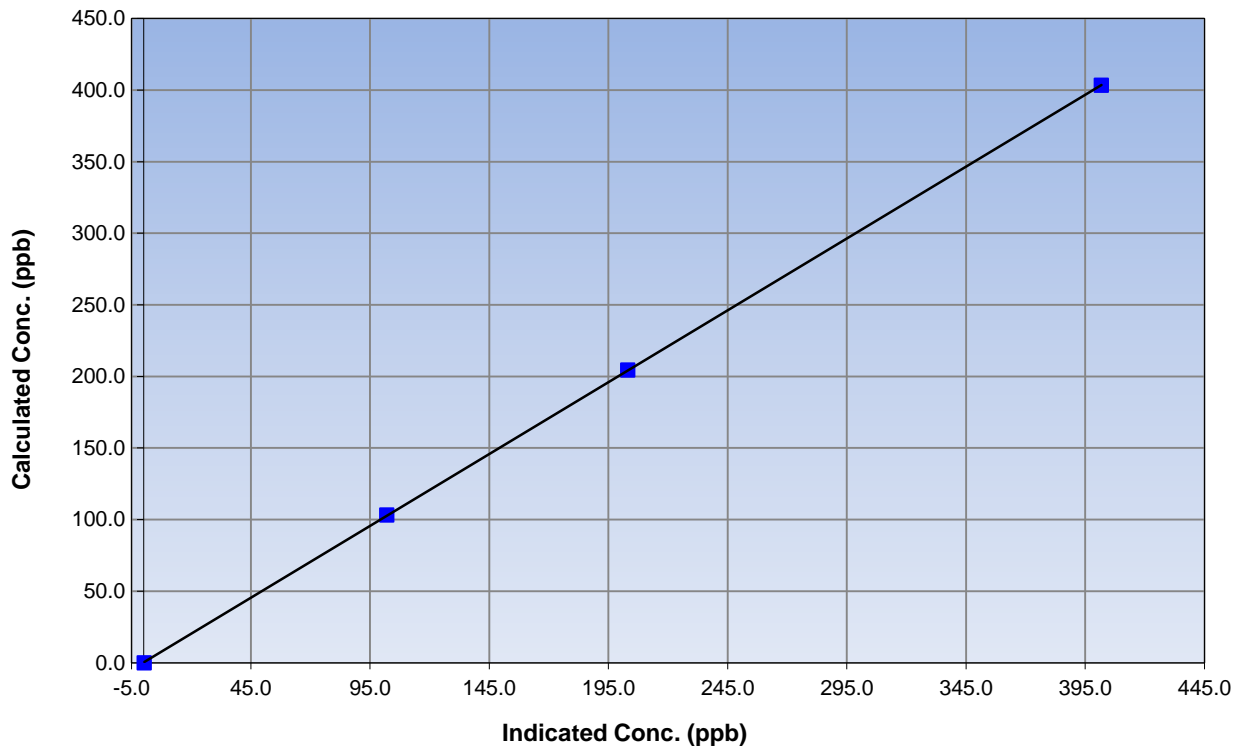
Station Information

Calibration Date	January 5, 2017	Previous Calibration	December 2, 2016
Station Number	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:20	End Time (MST)	13:36
Analyzer make	Thermo 42C	Analyzer serial #	601114773

Calibration Information

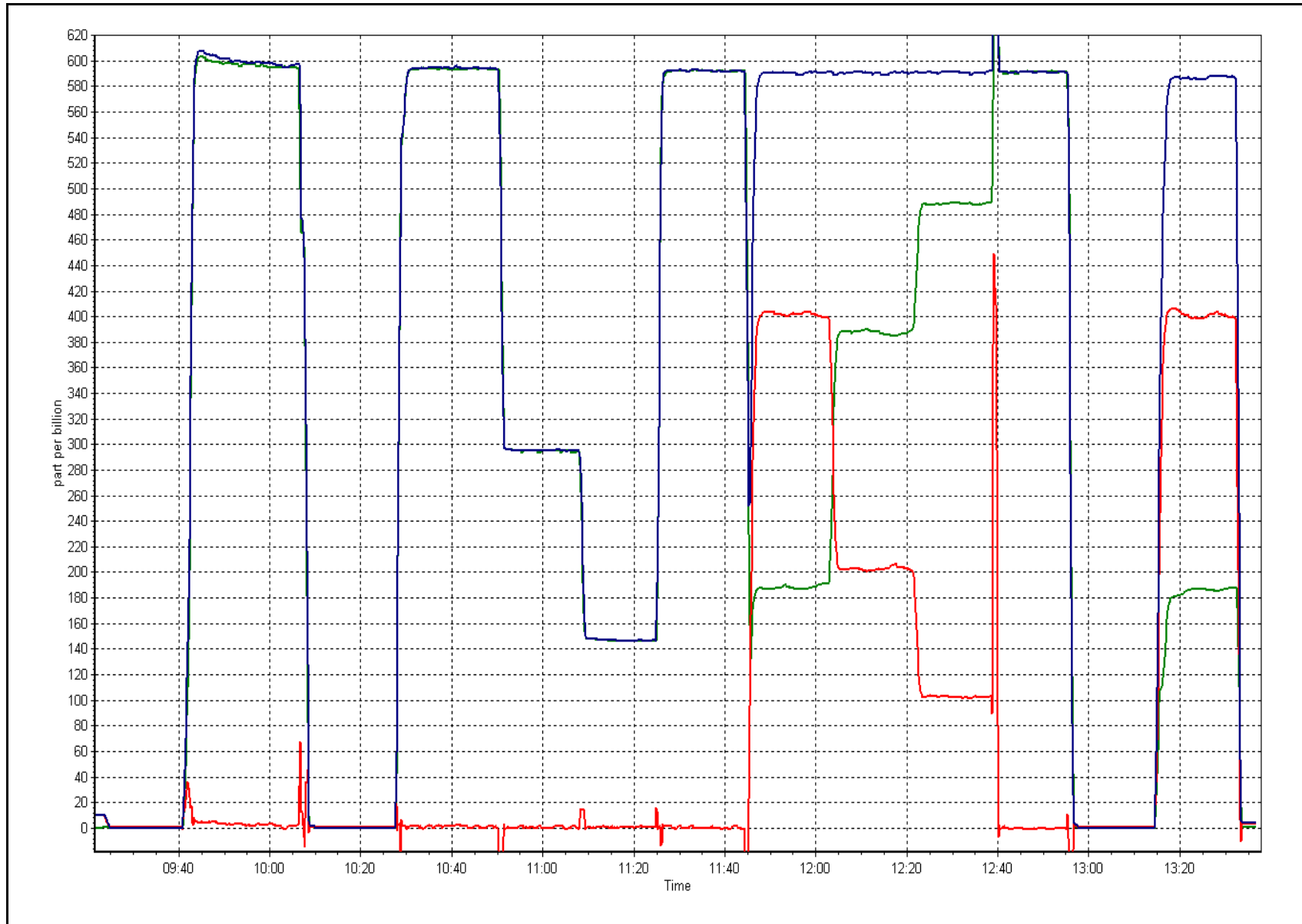
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999992
403.3	401.8	1.0037		
204.5	203.1	1.0069		
103.2	102.1	1.0108		
			Slope	1.003918
			Intercept	0.232137

NO₂ Calibration Curve



NOX Calibration Plot

Date: January 5, 2017





Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-08-2016

Station Information

Station Name:	Athabasca Valley	Station number:	AMS 7
Calibration Date:	January 6, 2017	Last Cal Date:	December 22, 2016
Start time (MST):	8:00	End time (MST):	9:05
Sharp Model:	Thermo 5030	S/N:	E515
Particulate Fraction:	PM2.5	C14 Source S/N:	3256
Flow Standard Model:	Delta Cal	S/N:	1045
Temp/RH standard:	Delta Cal	S/N:	1045

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	Tolerance
T1 (°C)	-20	-20	-20	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	997	991	997	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	1000	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	1.9	-----	-0.1	<input checked="" type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified <input type="checkbox"/>				
Cyclone cleaning :	PM10 Cyclone <input type="checkbox"/>		PM2.5 Cyclone <input type="checkbox"/>		
Filter Tape Installed:	<input type="checkbox"/>				

Quarterly Calibration Test

				Tolerance
Leak Test:	Date of check:	<u>November 19, 2016</u>	Last Cal Date:	<u>Sep 22, 2016</u>
	Flow w/o adaptor:	<u>16.57</u>	Flow w/ adaptor:	<u>16.32</u> 0.4 LPM

Annual Calibration Test

Foil Calibration	Foil Mass:	<u>1337</u>	S/N:	<u>2518</u>
	Date of check:	<u>July 22, 2016</u>	Last Cal Date:	<u>June 2, 2016</u>
	New Correction Factor:	<u>6895</u>	Previous Correction Factor:	<u>6885</u>

Parameter	As found	Measured	As left	Adjusted	Tolerance
T2 (°C)	21			<input type="checkbox"/>	+/- 2 °C
T3 (°C)	23			<input type="checkbox"/>	+/- 2 °C
T4 (°C)	20			<input type="checkbox"/>	+/- 2 °C
RH (%)	12			<input type="checkbox"/>	+/- 10%

Notes: Batteries changed out, cyclone head cleaned, nephelometer adjusted

Calibration by: Melissa Lemay



Wood Buffalo Environmental Association CO Calibration Report

Station Information

Calibration Date	January 6, 2017	Last Calibration	December 12, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	8:56	End Time (MST)	11:32
Gas Cert Reference	CC101396	Station temp.	22 Deg C
Cal Gas Concentration	2970 ppm	Cal Gas Exp Date	February 2, 2023
Calibrator Make/Model	API T700	Serial Number	2445
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 - 50 ppm		Chamber temp.	48.5	47.9
Analyzer IP address	192.168.1.48		Pressure	740.0	747.1
Calculated slope	0.999602	1.002238	Flow	0.499	0.503
Calculated intercept	-0.023032	-0.047590	Intensity	199428	199355
Analyzer Background	6.794	6.862	S/R ratio	1.169851	1.169860
Analyzer Coefficient	1.088	1.088			

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	0.1	----
as found span	5000	69.7	41.4	41.7	0.992
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	69.7	41.4	41.3	1.002
second point	5000	35.2	20.9	21.0	0.996
third point	5000	15.2	9.0	9.1	0.997
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	69.7	41.4	41.2	1.004
Average Correction Factor					0.998

Corrected As found 41.6 Previous response 41.4 % change -0.4%

Notes:

Inlet filter changed. No maintenance done, Zero adjusted

Calibration Performed By: Melissa Lemay



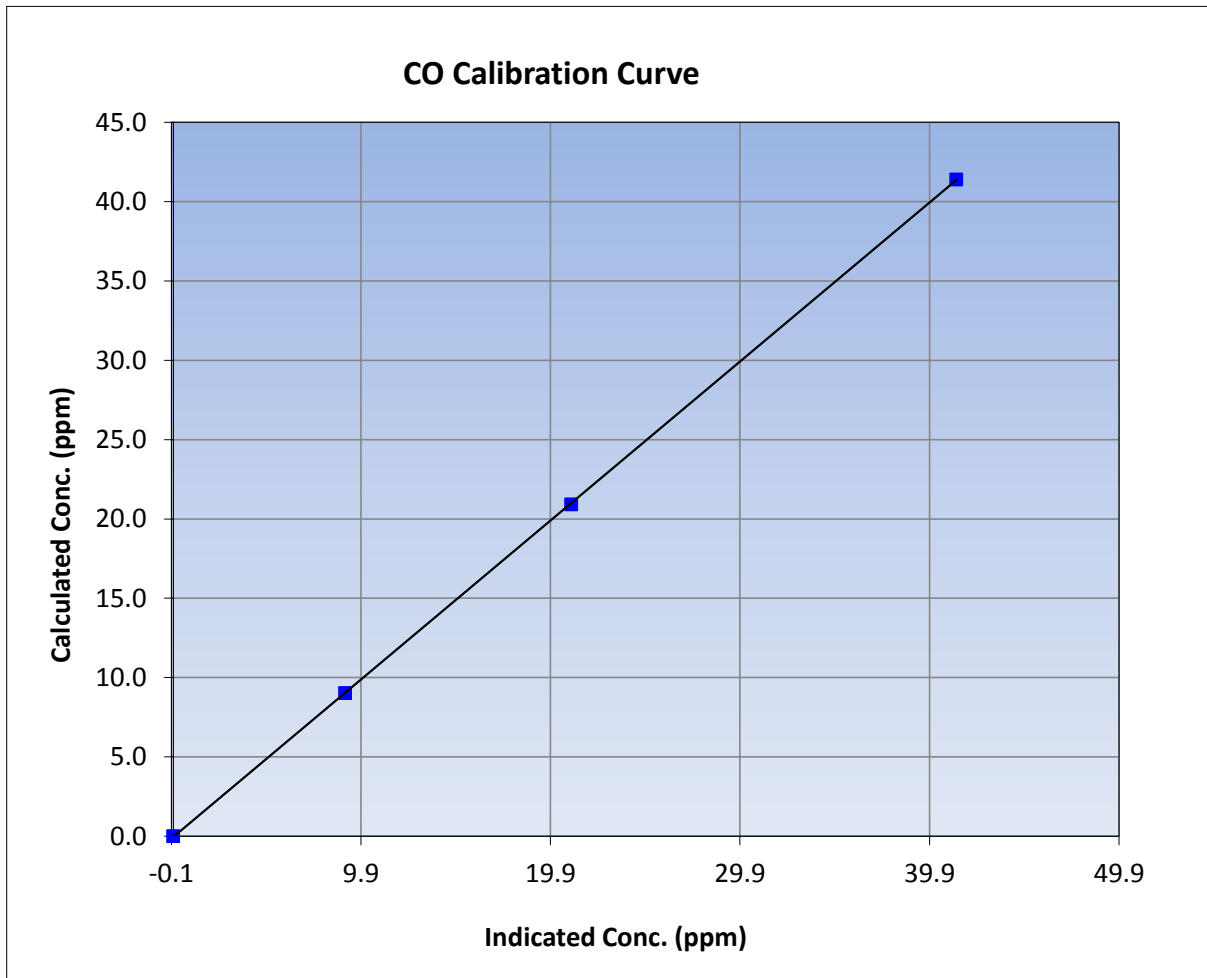
Wood Buffalo Environmental Association CO Calibration Report

Station Information

Calibration Date	January 6, 2017	Previous Calibration	December 12, 2016
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	8:56	End Time (MST)	11:32
Analyzer make	Thermo 48i-TLE	Analyzer serial #	1408761381

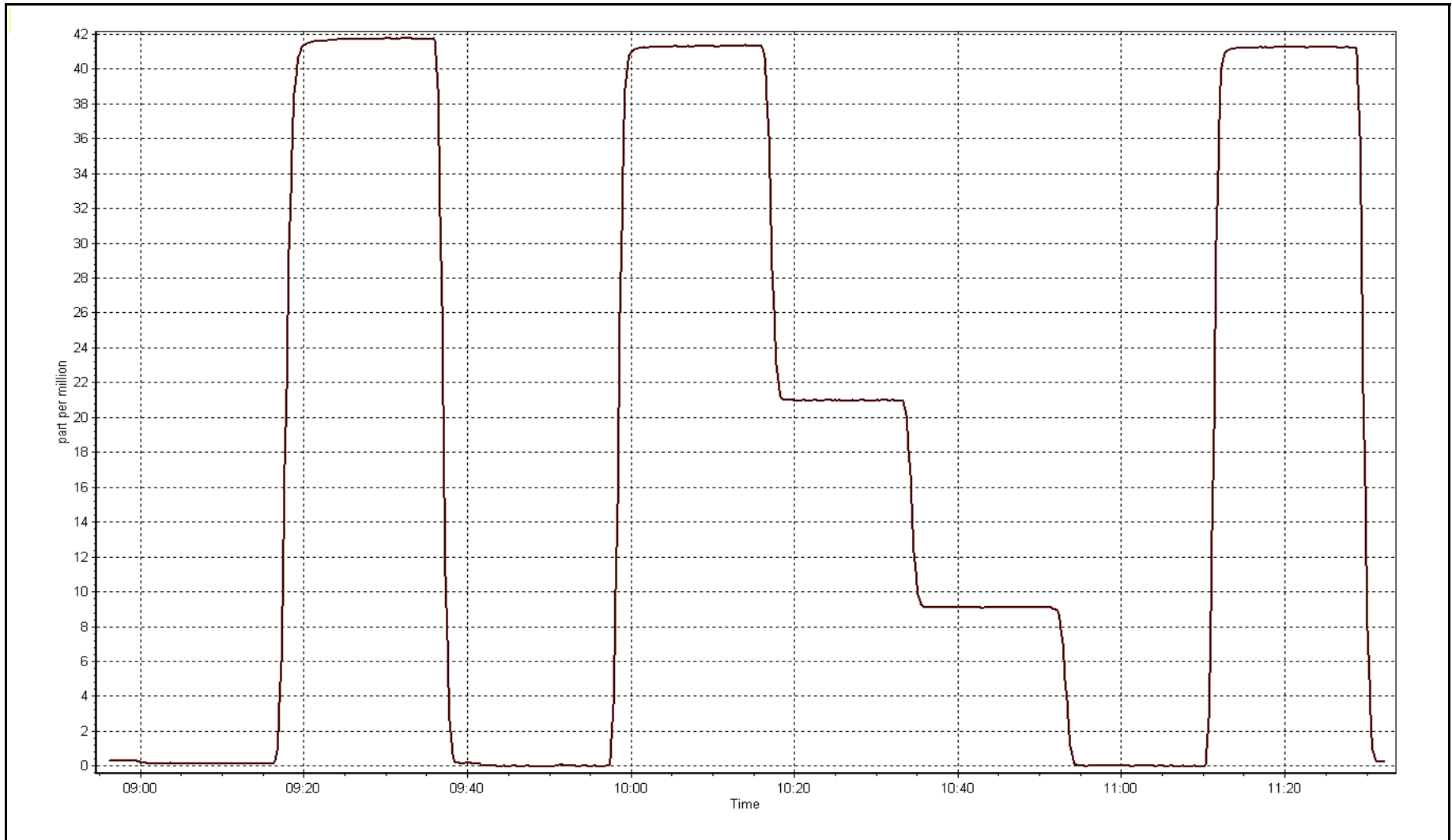
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999987
41.4	41.3	1.0022		
20.9	21.0	0.9957	Slope	1.002238
9.0	9.1	0.9966		
			Intercept	-0.047590



CO Calibration Plot

Date: January 6, 2017





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 8
FORT CHIPEWYAN
JANUARY 2017**

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

February 27, 2017



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
 JANUARY 2017

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	705	37	39	99.73	18	0	5	0
O3(ppb) Average	707	34	37	99.60	42	0	39	-
NO2(ppb) Average	701	37	43	99.19	25	0	12	-
NO(ppb) Average	701	37	43	99.19	13	-	3	-
NOX(ppb) Average	701	37	43	99.19	25	-	15	-
PM2.5(ug/m3) Average	742	2	2	100.00	19.5	-	11.4	0
Wind Speed 10 m (km/h) Average	735	0	9	98.79	23	-	16	-
Wind Direction 10 m (deg) Average	735	0	9	98.79	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100.00	4	-	1.7	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	97	-
Precipitation (mm) Total	0	0	744	0.00	-	-	-	-
Leaf Wetness (% of range) Average	744	0	0	100.00	26	-	9	-
Global Solar Radiation (W/m2) Average	744	0	0	100.00	310	-	61	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
 JANUARY 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile							
					Min	P10	Q1	Median	Q3	P90	Max	
SO2(ppb) Average	705	0.4	1	-	0	0	0	0	0	0	1	18
O3(ppb) Average	707	30.4	7	-	2	20	28	32	35	38	42	42
NO2(ppb) Average	701	2	4	-	0	0	0	1	2	6	25	25
NO(ppb) Average	701	0.2	1	-	0	0	0	0	0	0	0	13
NOX(ppb) Average	701	2.2	4	-	0	0	0	1	2	6	25	25
PM2.5(ug/m3) Average	742	3.41	2.5	-	0.7	1.2	1.6	2.6	4.4	6.5	19.5	19.5
Wind Speed 10 m (km/h) Average	735	8.3	5	-	0	3	5	7	12	16	23	23
Wind Direction 10 m (deg) Average	735	-	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	-14.45	9.3	-	-35.1	-26.9	-21.1	-15.3	-6.4	-1.4	4	4
Relative Humidity (%) Average	744	83.5	7	-	66	74	78	83	88	93	99	99
Precipitation (mm) Total	0	-	-	--	-	-	-	-	-	-	-	-
Leaf Wetness (% of range) Average	744	3.5	4	-	0	0	1	1	7	9	26	26
Global Solar Radiation (W/m2) Average	744	26.3	56	-	0	0	0	0	21	97	310	310

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
JANUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	17 Jan 2017 14:00	17 Jan 2017 15:00	2	Maintenance - WBEA audit
O3	17 Jan 2017 17:00	17 Jan 2017 19:00	3	Maintenance - WBEA audit
NO2, NO, NOX	14 Jan 2017 13:00	14 Jan 2017 14:00	2	Power spike followed by stabilization period
NO2, NO, NOX	17 Jan 2017 14:00	17 Jan 2017 17:00	4	Maintenance - WBEA audit
Wind Speed, Wind Direction	04 Jan 2017 08:00	04 Jan 2017 11:00	4	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	04 Jan 2017 14:00	04 Jan 2017 14:00	1	Maintenance - frost removal
Wind Speed, Wind Direction	22 Jan 2017 23:00	23 Jan 2017 01:00	3	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	23 Jan 2017 08:00	23 Jan 2017 08:00	1	Flat line in sensor output signal - Sensor frozen
Precipitation Collector	01 Jan 2017 01:00	01 Feb 2017 00:00	744	Analyzer removed from site for repairs



Wood Buffalo Environmental Association

Summary of Hour Averages

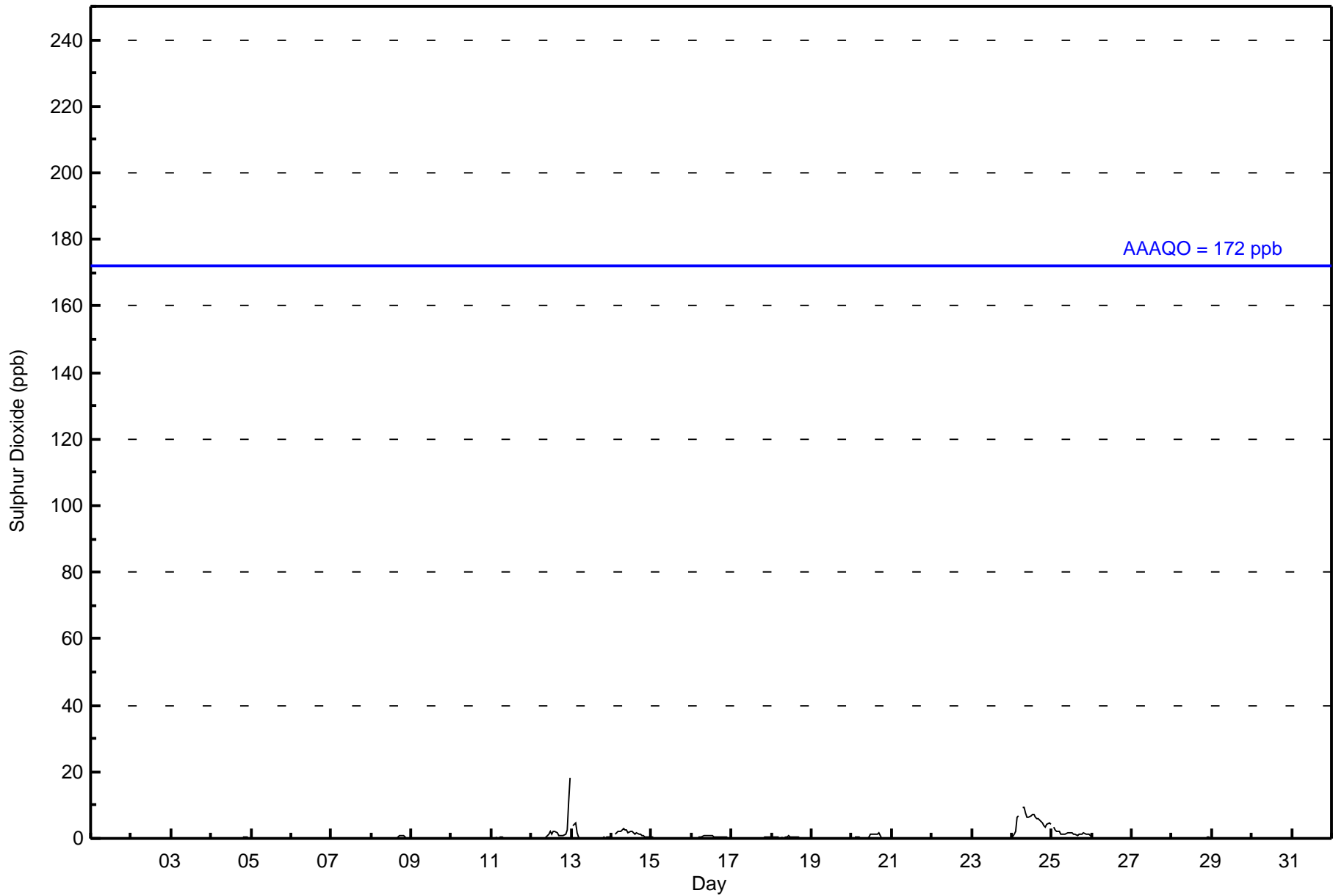
Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 744													
Maximum Value: 18 ppb on Jan 13 00:00														Maximum Daily Average: 5.5 ppb on Jan 24													
Minimum Value: 0 ppb on Jan 1 02:00														Minimum Daily Average: 0.0 ppb on Jan 6													
Maximum Diurnal Average: 0.8 ppb at hour 24														Minimum Diurnal Average: 0.1 ppb at hour 1													
Monthly Average: 0.4 ppb														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P 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-Jan	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
2-Jan	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
3-Jan	0	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
4-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	C	C	1	0	0	0	0	0	--	1	
5-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
6-Jan	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	
7-Jan	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	
8-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0.2	1	
9-Jan	0	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	
10-Jan	0	0	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	
11-Jan	0	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1	
12-Jan	0	0	0	0	0	Z	0	0	0	0	1	2	1	2	2	2	1	1	1	1	1	2	11	18	2.0	18	
13-Jan	Z	4	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	5	
14-Jan	0	Z	1	2	2	2	3	2	3	2	2	2	2	1	1	1	1	1	1	1	0	0	0	0	1.5	3	
15-Jan	0	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	
16-Jan	0	0	0	Z	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
17-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	M	M	0	0	0	0	0	0	0	0	1	0.2	1	
18-Jan	0	0	0	0	0	Z	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1	
19-Jan	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	
20-Jan	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2	1	0	0	0	0	0	0	0.5	2	
21-Jan	0	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	
22-Jan	0	0	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	
23-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
24-Jan	0	1	2	6	7	Z	9	9	7	6	7	7	7	7	6	6	6	5	4	4	4	4	5	4	5.5	9	
25-Jan	Z	3	3	2	2	1	1	1	1	2	2	2	2	1	1	1	1	1	1	2	1	1	1	1	1.5	3	
26-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
27-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
28-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
29-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
30-Jan	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	
31-Jan	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	
																								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
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	703	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: 705

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	10	6	2	22	78	26	19	12	16	37	58	38	122	113	65	71	695
11 - 20	0	0	0	0	0	0	0	0	0	1	1	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
Totals	10	6	2	22	78	26	19	12	16	38	59	38	122	113	65	71	697

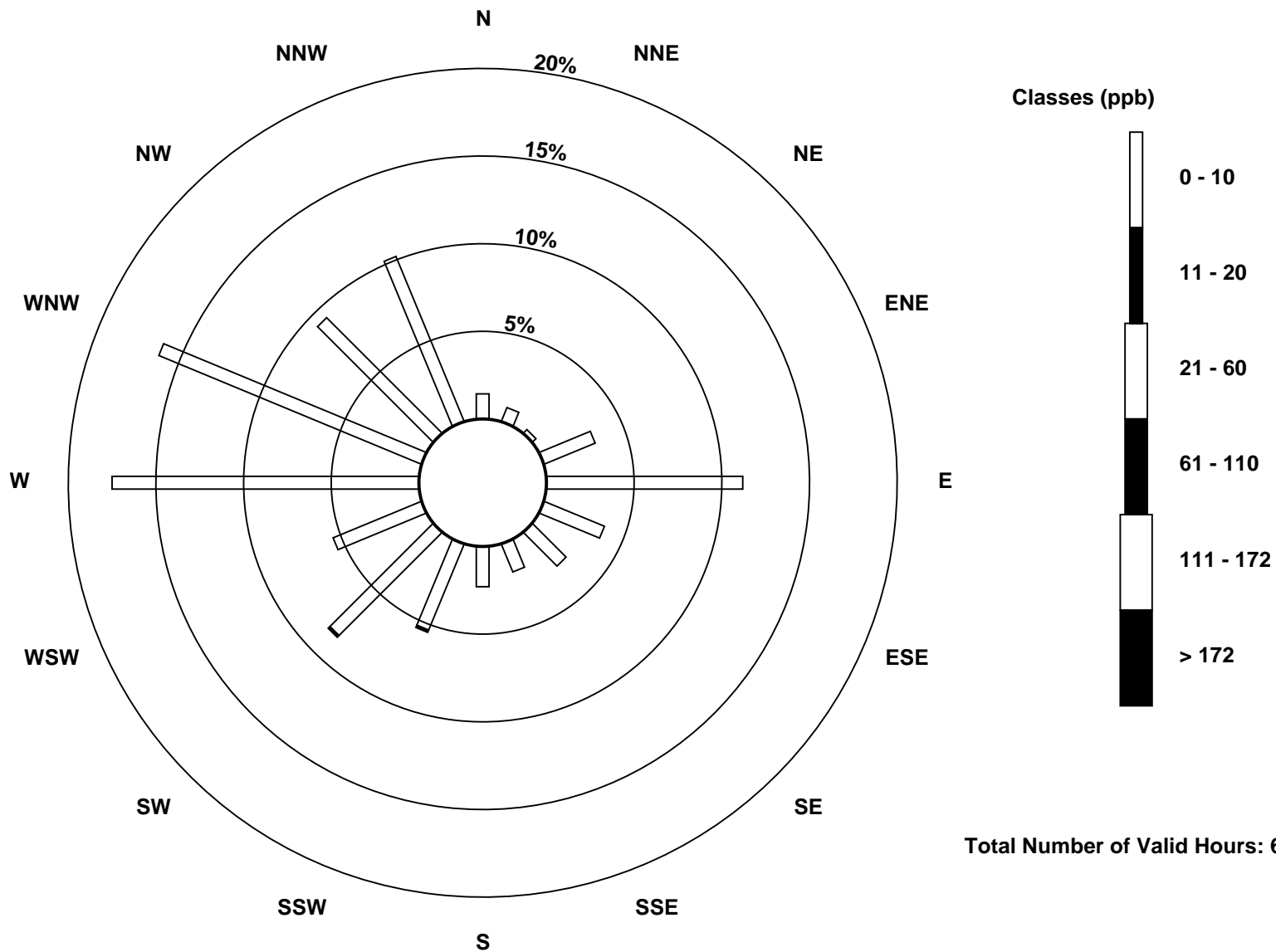
Total Number of Valid Hours: 697

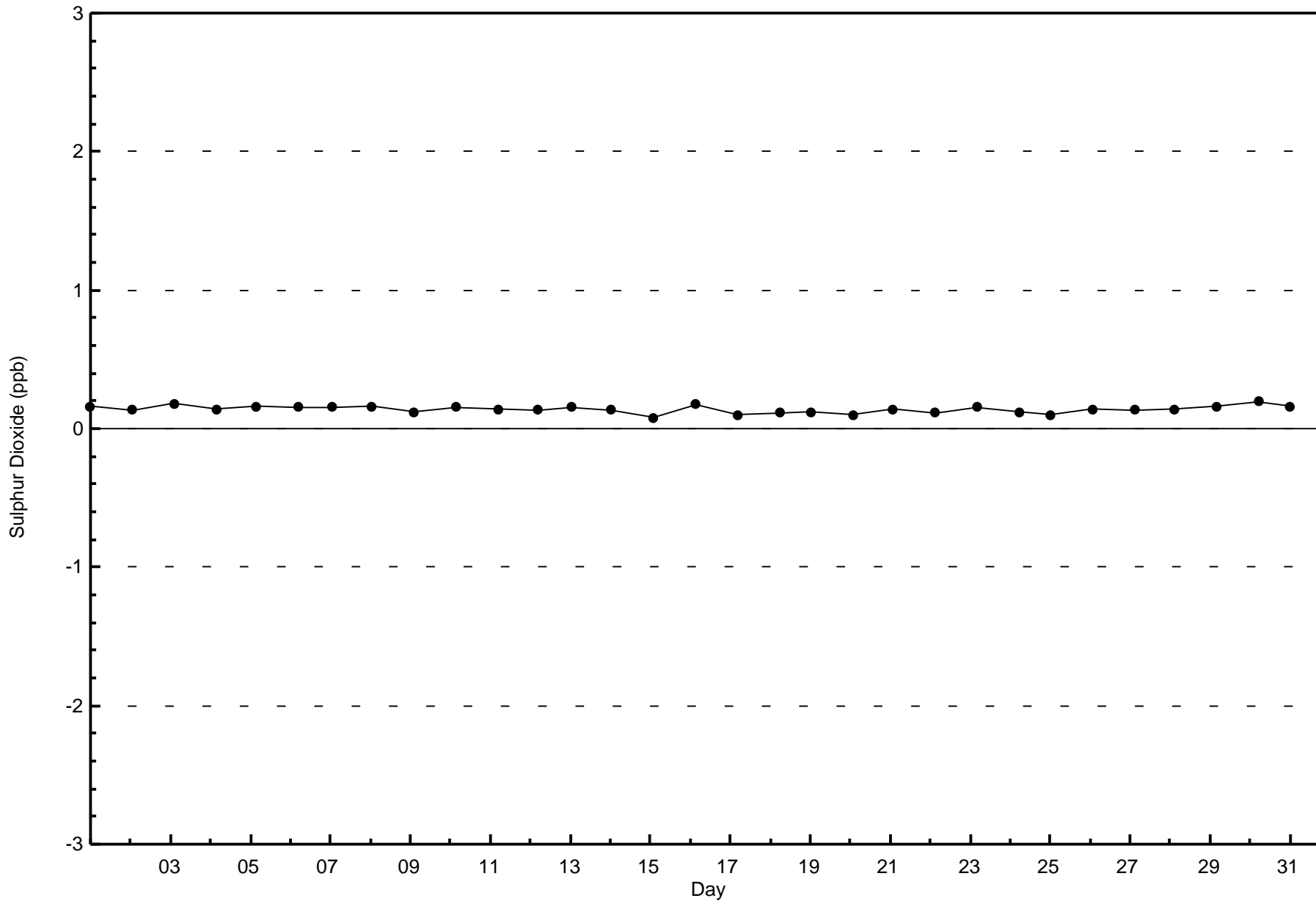
Total Number of Hours: 744

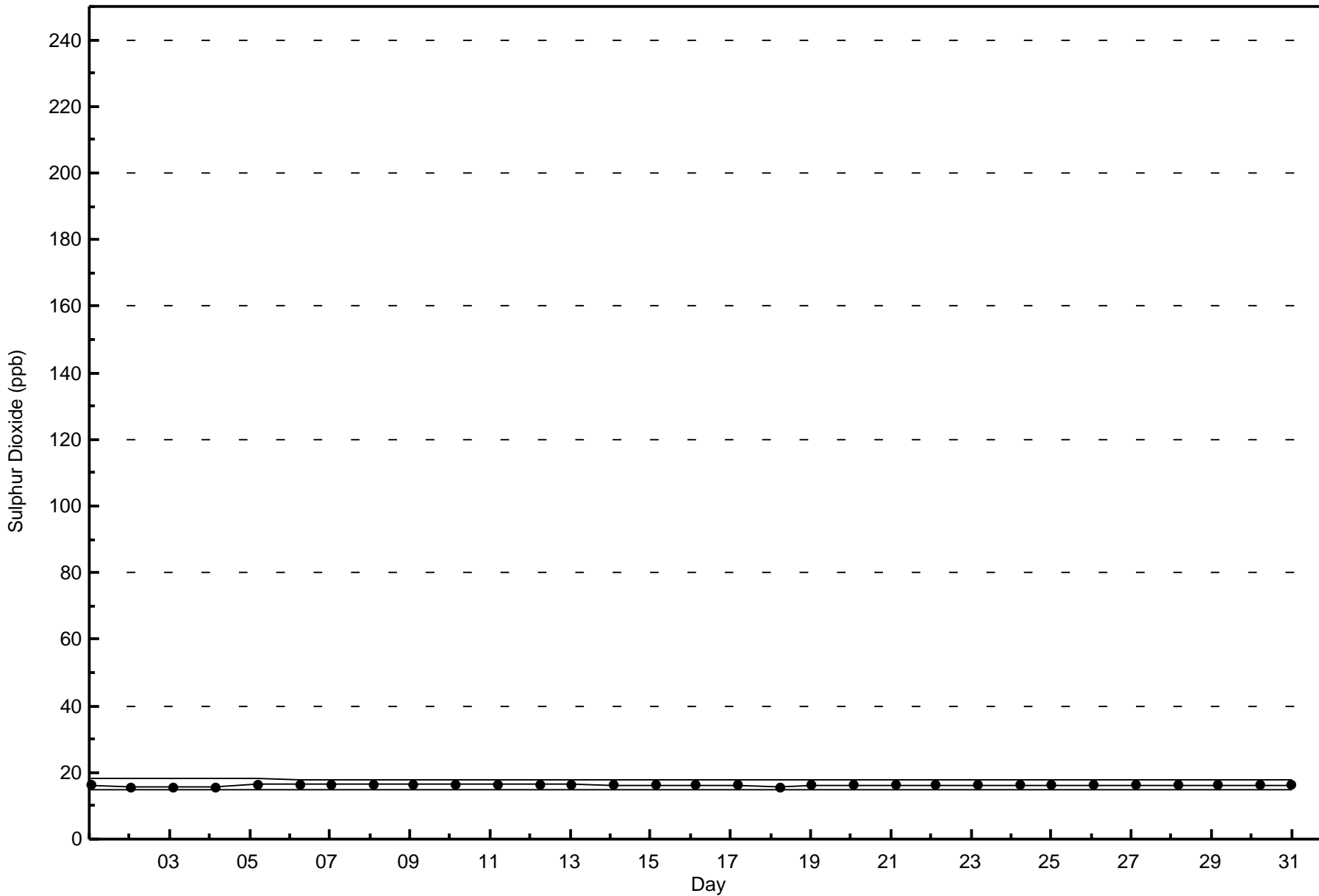


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan (AMS 8)



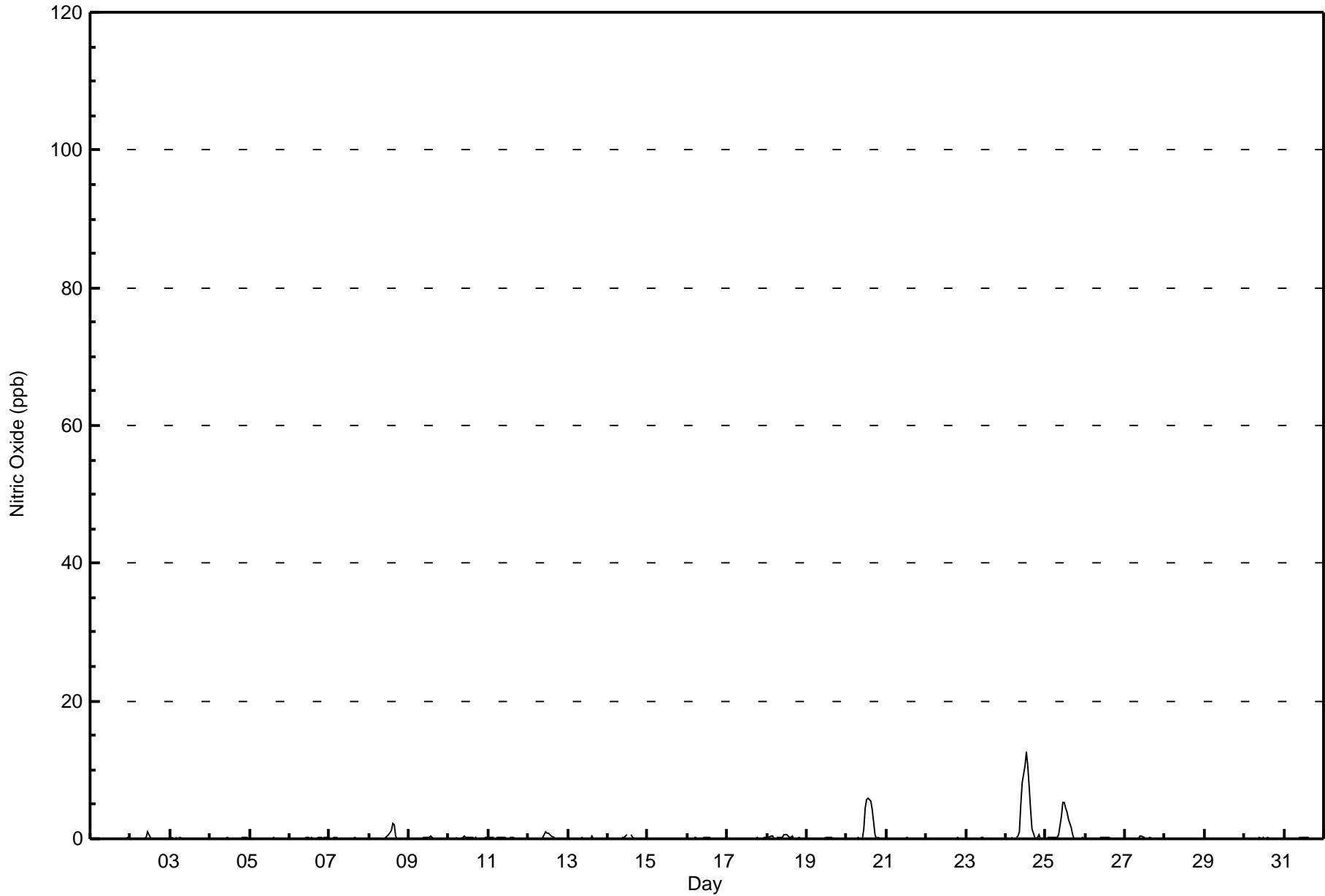






Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Fort Chipewyan - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Fort Chipewyan - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	701	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: 701

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Fort Chipewyan - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	10	6	2	22	76	26	19	12	16	38	59	36	122	113	65	71	693
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
Totals	10	6	2	22	76	26	19	12	16	38	59	36	122	113	65	71	693

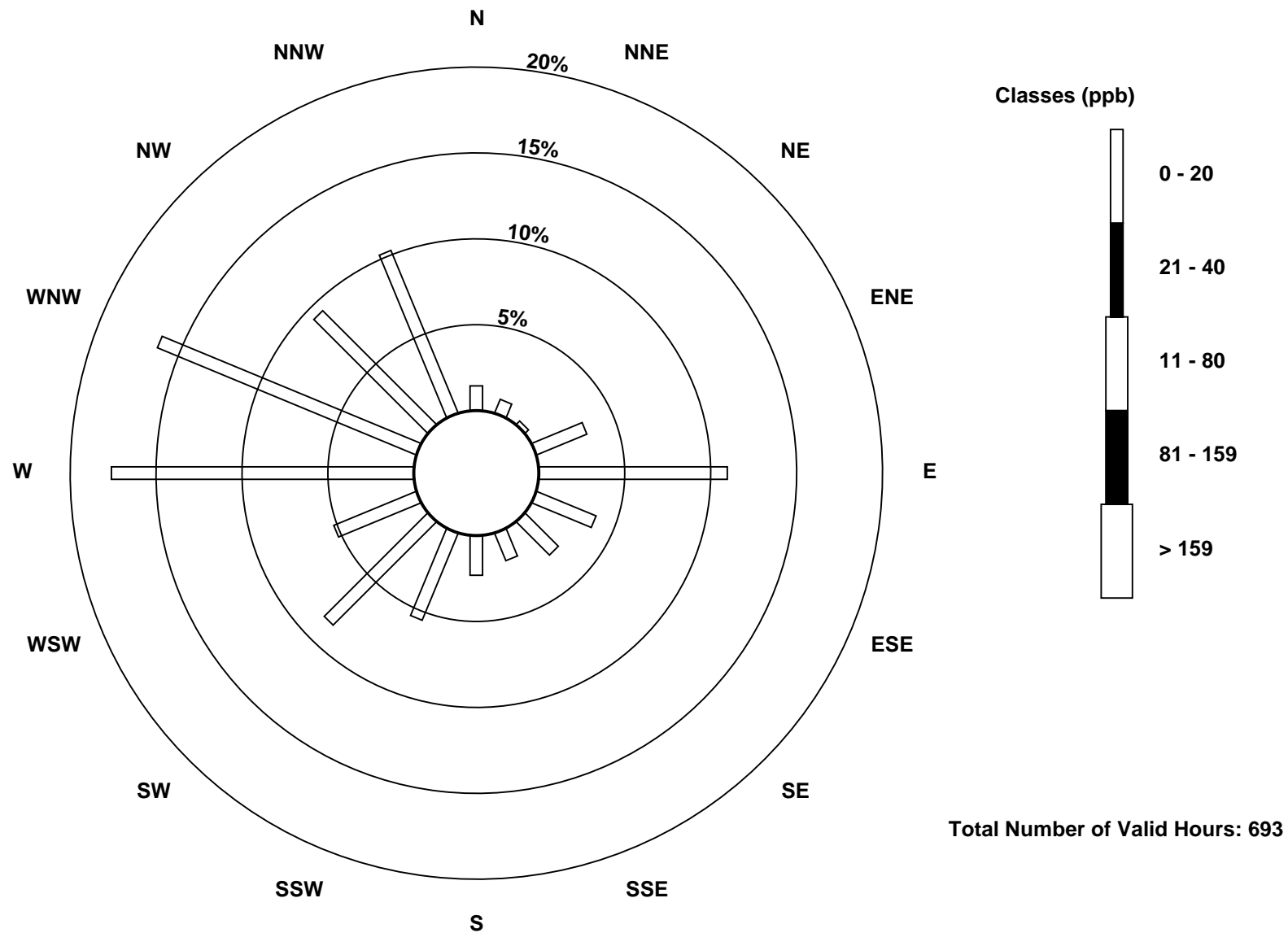
Total Number of Valid Hours: 693

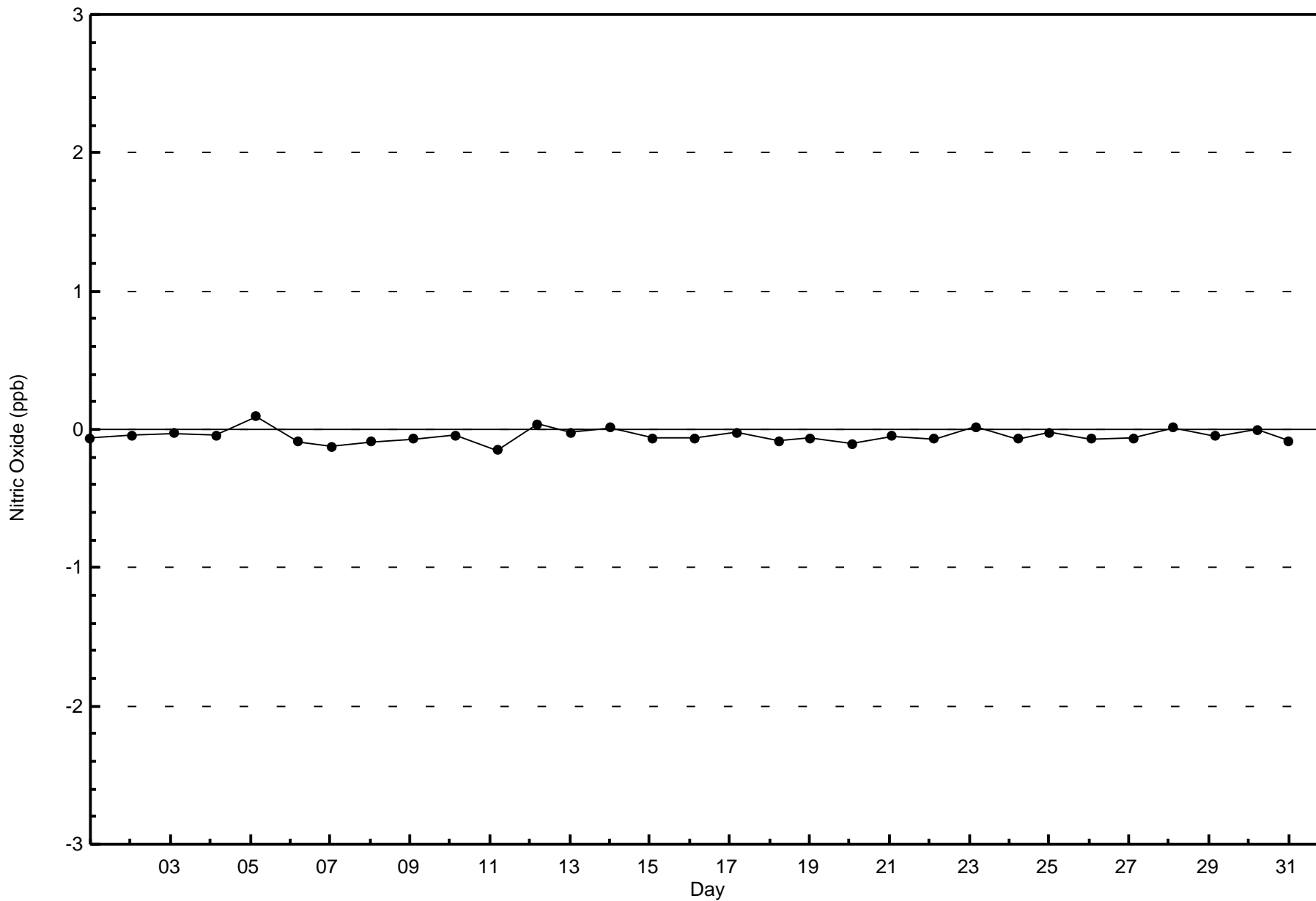
Total Number of Hours: 744

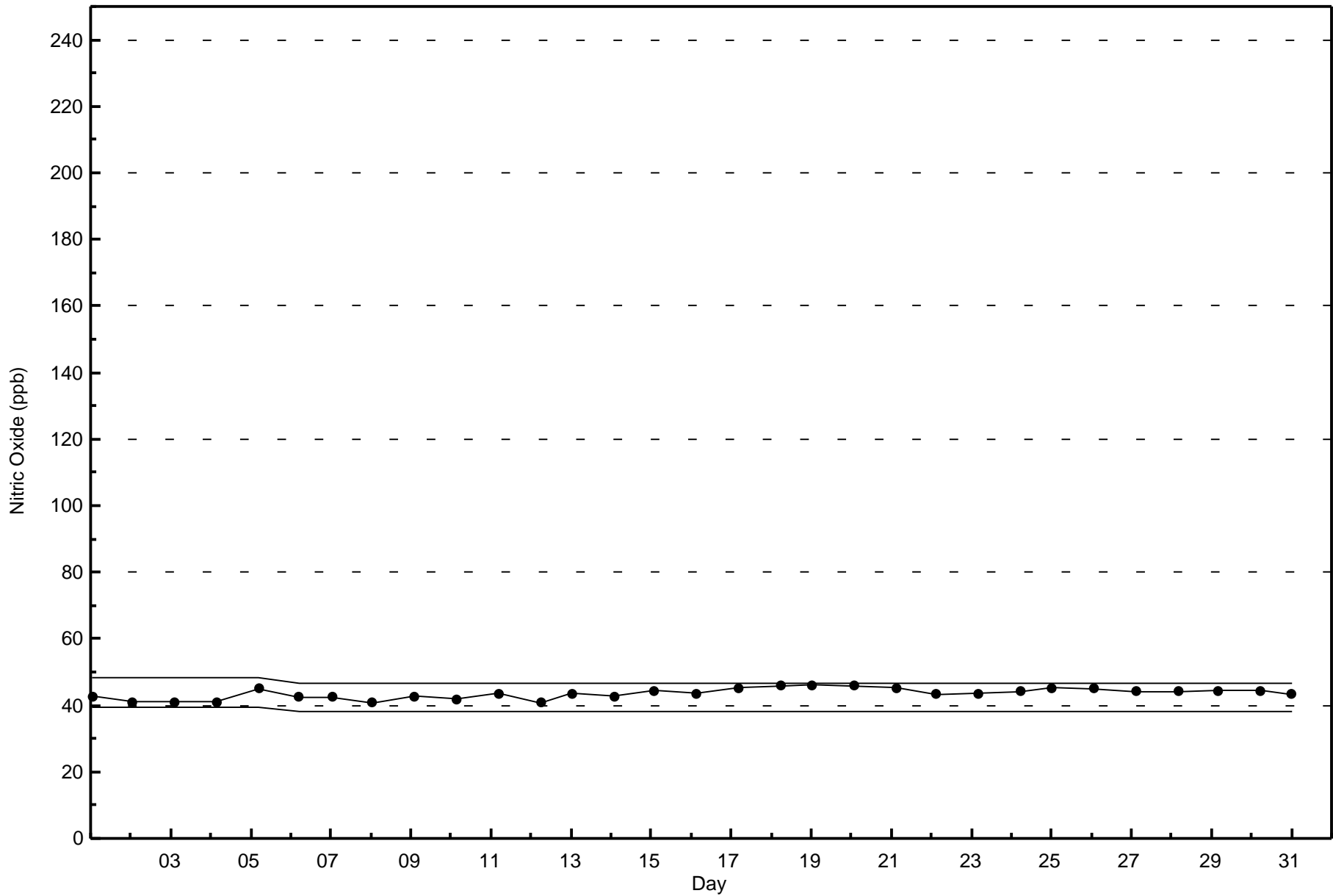


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Nitric Oxide (NO) - ppb
Fort Chipewyan (AMS 8)









Wood Buffalo Environmental Association
Summary of Hour Averages

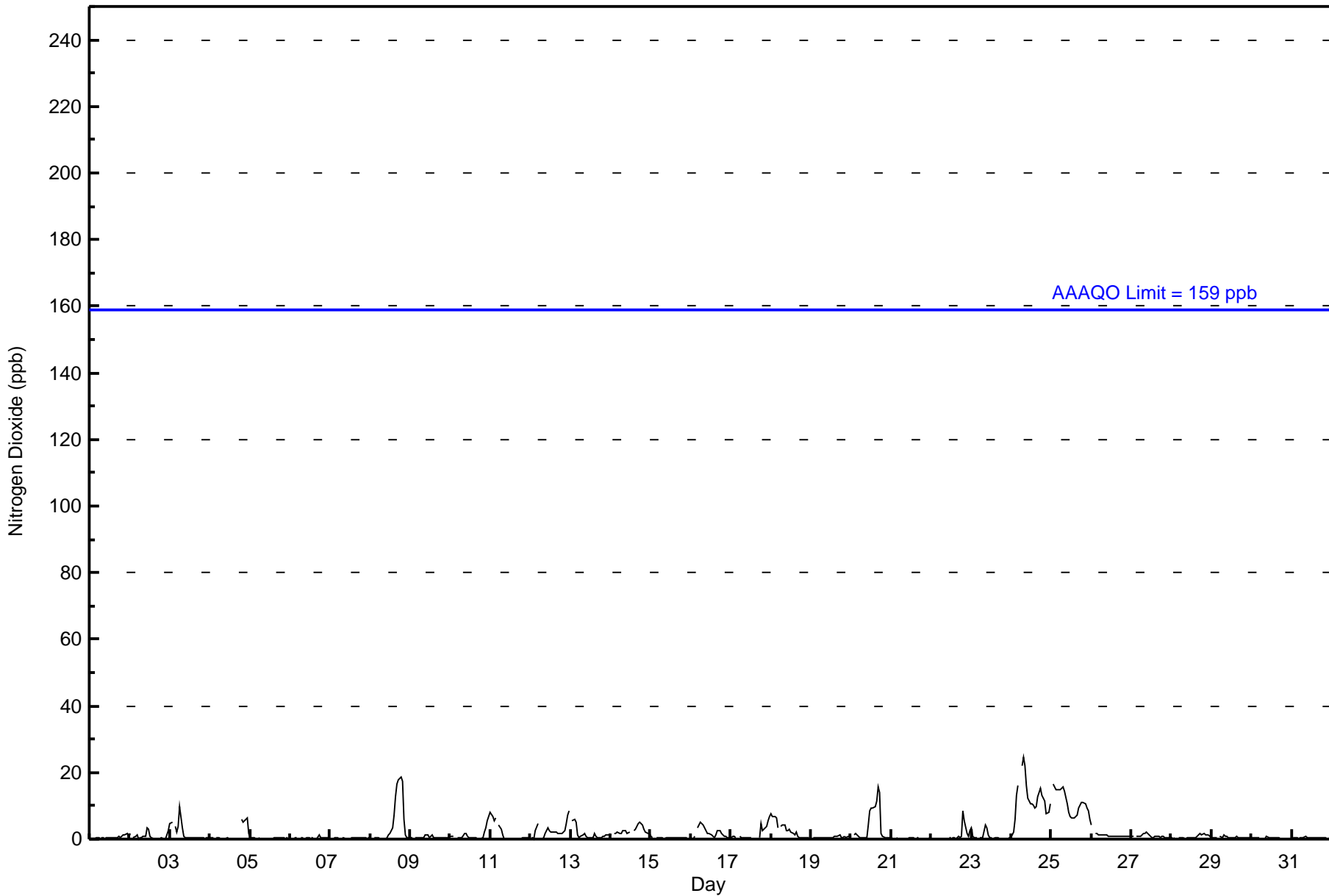
Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 25 ppb on Jan 24 08:00										Maximum Daily Average: 12.1 ppb on Jan 24																
Minimum Value: 0 ppb on Jan 12 08:00										Minimum Daily Average: 0.2 ppb on Jan 21																
Maximum Diurnal Average: 2.6 ppb at hour 18										Minimum Diurnal Average: 1.4 ppb at hour 13																
Monthly Average: 2.0 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 2 P ₉₀ = 6 P ₉₉ = 16																
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	2	1	0.5	2
2-Jan	2	Z	0	1	1	0	0	0	1	1	3	3	1	0	0	0	0	0	0	0	0	0	1	3	0.9	3
3-Jan	5	5	Z	4	2	4	10	4	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1.7	10	
4-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	C	C	C	C	C	C	6	5	6	6	2	--	6
5-Jan	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	1	0	0.3	1
6-Jan	0	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0.3	1
7-Jan	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
8-Jan	0	Z	0	0	0	0	0	0	0	1	1	2	4	7	13	17	18	19	17	6	1	1	1	1	4.7	19
9-Jan	1	1	Z	1	1	1	1	1	1	1	1	0	1	1	1	0	0	0	0	0	1	1	0	0	0.6	1
10-Jan	1	1	1	Z	1	0	0	0	2	2	1	1	0	0	0	0	0	0	0	0	2	3	6	7	1.3	7
11-Jan	8	7	6	6	Z	4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1.7	8
12-Jan	0	0	0	3	5	Z	0	0	0	2	3	3	2	2	2	2	2	2	2	2	3	5	7	9	2.4	9
13-Jan	Z	6	6	5	1	1	1	1	2	1	0	0	0	2	1	0	0	1	1	1	1	1	1	1	1.5	6
14-Jan	1	Z	2	2	2	2	2	2	2	3	2	2	PF	PF	3	3	5	5	5	4	3	2	2	2	2.6	5
15-Jan	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
16-Jan	0	0	1	Z	4	4	5	4	3	2	2	2	1	1	1	3	3	2	1	1	1	1	1	1	1.8	5
17-Jan	1	1	1	1	Z	1	0	0	0	1	0	0	0	M	M	M	M	1	5	3	3	4	5	7	1.7	7
18-Jan	8	7	7	6	3	Z	4	4	4	2	3	3	2	2	1	2	1	1	0	1	0	0	0	0	2.7	8
19-Jan	Z	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1	1	0	1	1	1	1	1	0.5	1
20-Jan	1	Z	1	2	1	1	1	0	0	0	4	8	9	9	10	12	16	14	2	1	1	0	0	0	4.0	16
21-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
22-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	8	6	2	1	3	1.1	8
23-Jan	4	1	1	1	Z	1	1	1	4	3	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0.9	4
24-Jan	1	2	6	13	16	Z	22	25	22	16	12	10	11	10	10	10	13	15	13	12	12	8	8	11	12.1	25
25-Jan	Z	17	16	15	15	15	15	16	15	11	8	7	6	6	7	7	9	10	11	11	11	10	8	6	10.9	17
26-Jan	4	Z	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	4
27-Jan	1	1	Z	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	0	0	0	0.9	2
28-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	2	1	2	1	1	1	1	0.7	2
29-Jan	0	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.5	1
30-Jan	0	0	0	0	0	Z	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
31-Jan	Z	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0.4	1
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance PF - Power Failure																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	698	99.57	99.57
21 - 40	3	0.43	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: 701

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	10	6	2	22	76	26	16	12	16	38	59	36	122	113	65	71	690
21 - 40	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3
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
Totals	10	6	2	22	76	26	19	12	16	38	59	36	122	113	65	71	693

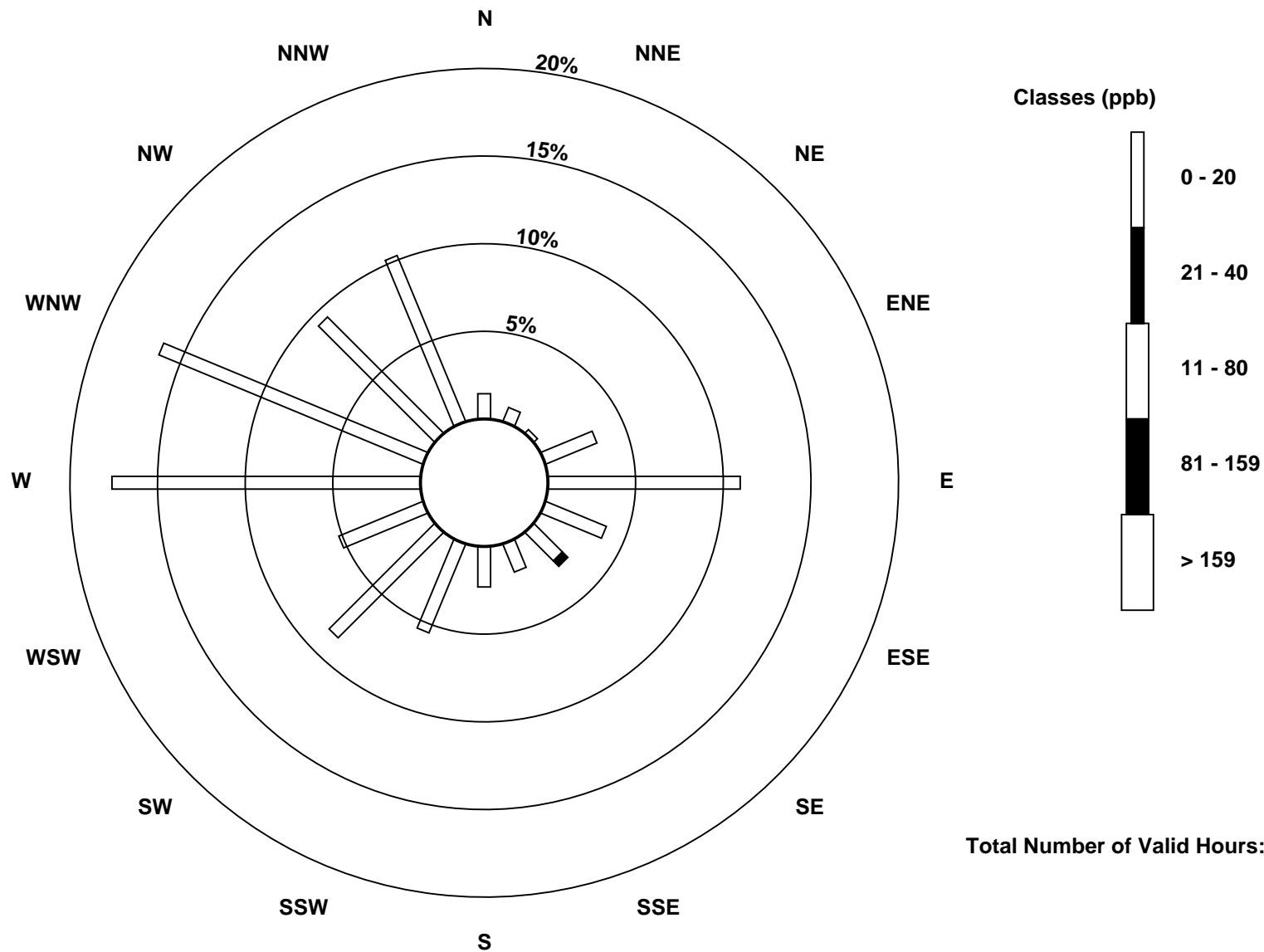
Total Number of Valid Hours: 693

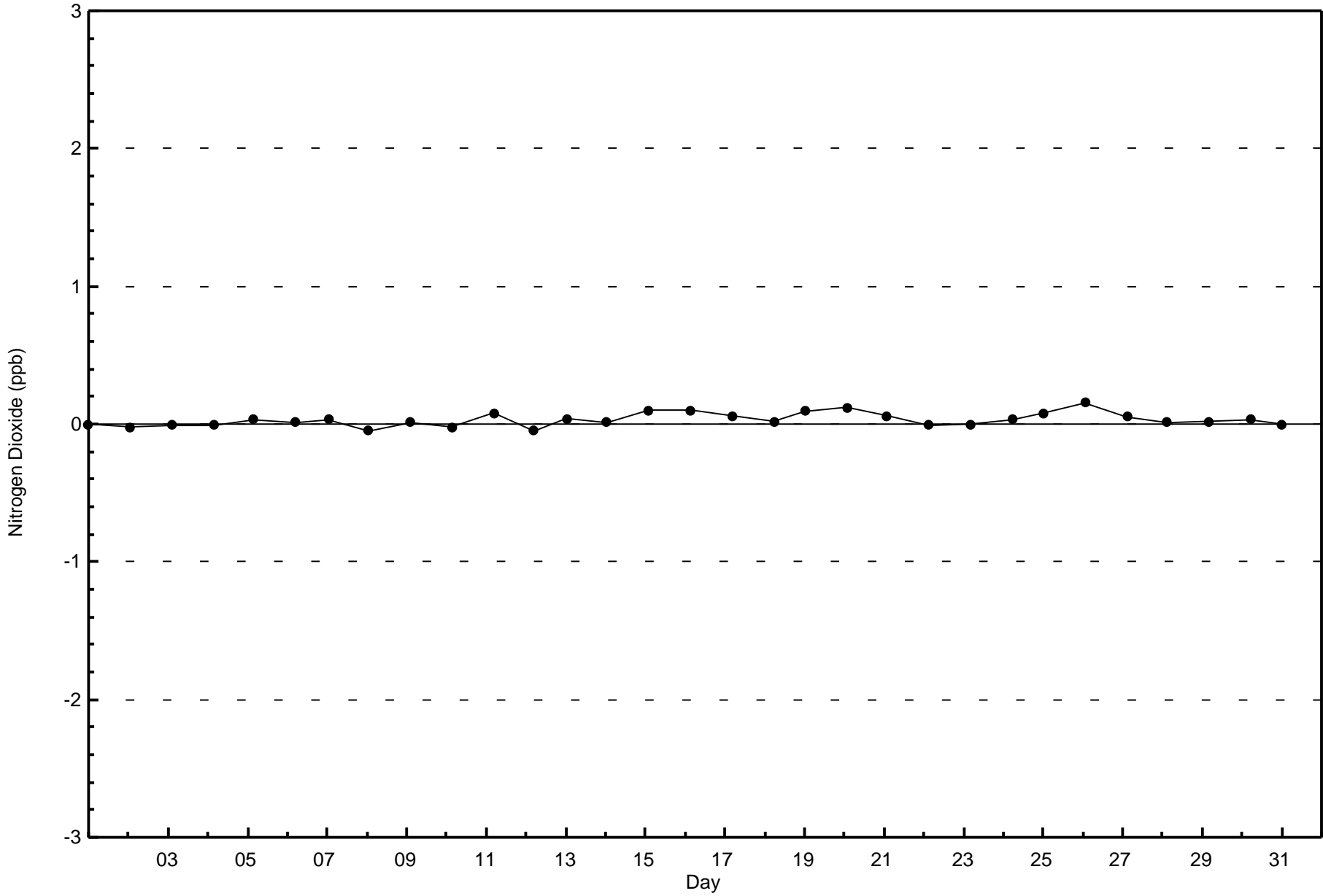
Total Number of Hours: 744

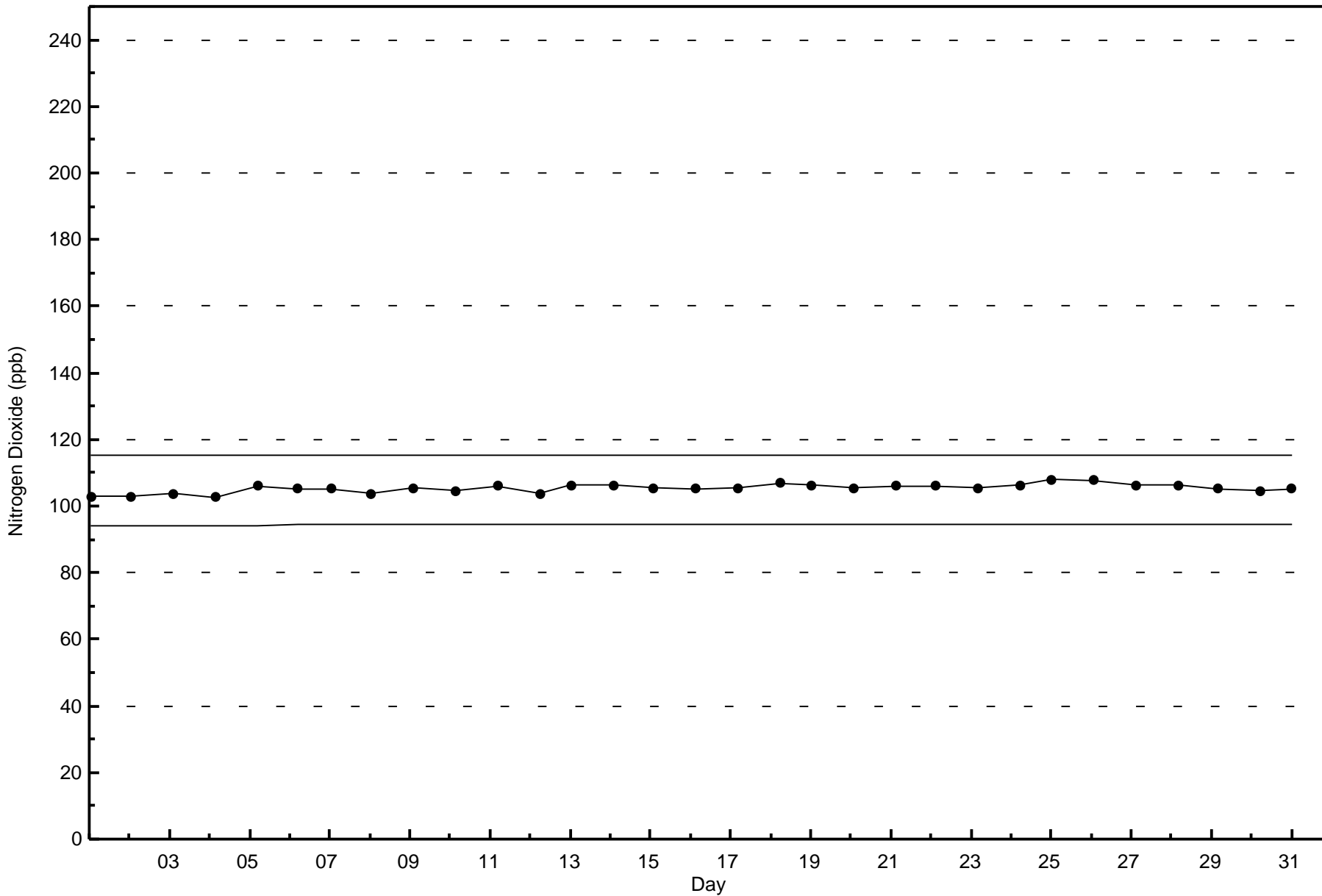


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan (AMS 8)









Wood Buffalo Environmental Association
Summary of Hour Averages

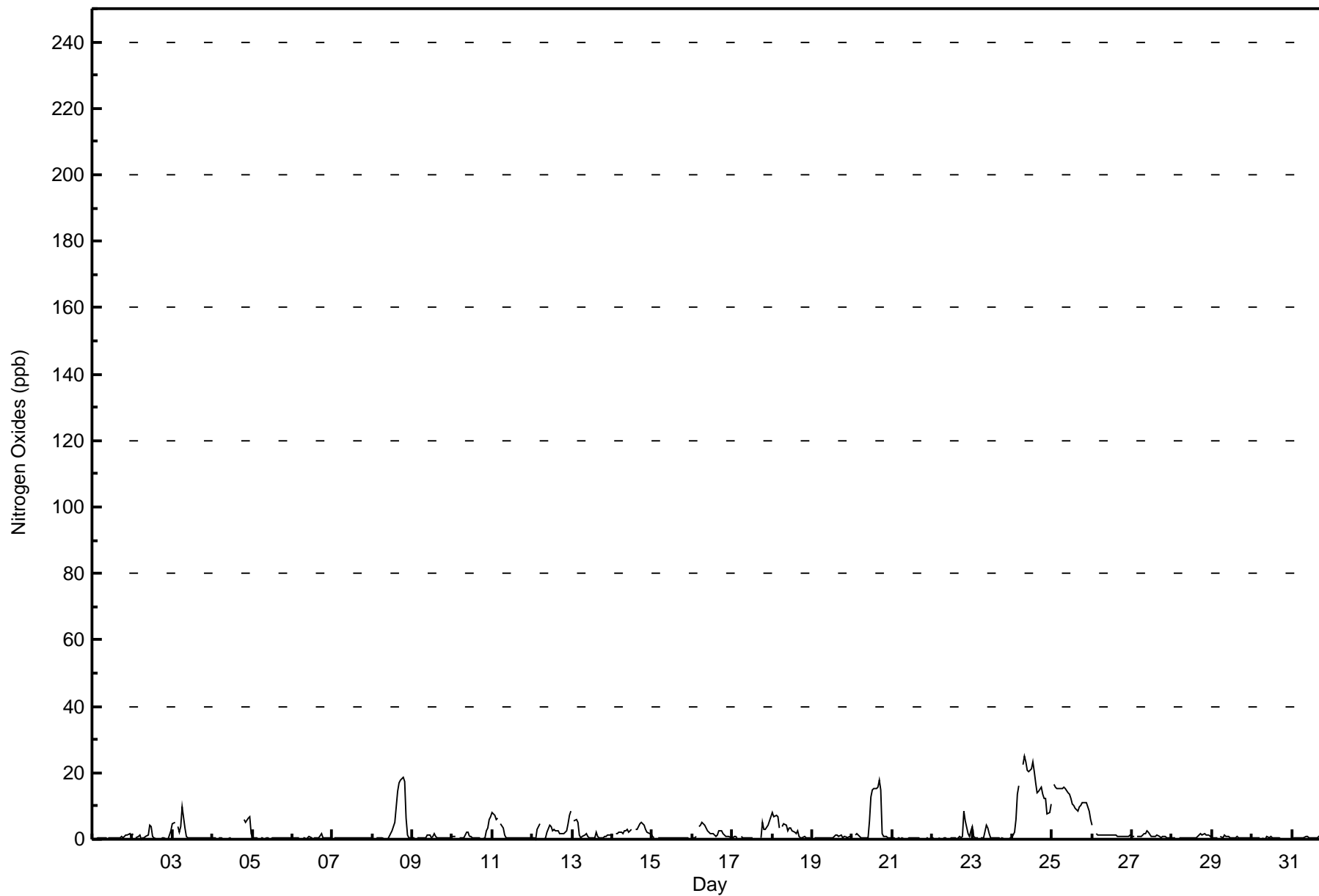
Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - January 2017

Maximum Value: 25 ppb on Jan 24 08:00		Maximum Daily Average: 14.8 ppb on Jan 24		Hours in Service: 744																																												
Minimum Value: 0 ppb on Jan 12 08:00		Minimum Daily Average: 0.2 ppb on Jan 21		Hours of Data: 701																																												
Maximum Diurnal Average: 2.7 ppb at hour 17		Minimum Diurnal Average: 1.5 ppb at hour 6		Hours of Missing Data: 43																																												
Monthly Average: 2.2 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 2 P ₉₀ = 6 P ₉₉ = 20		Hours of Calibration: 37																																												
				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-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	2	1	0.5	2																						
2-Jan	2	Z	0	1	1	0	0	0	1	1	4	4	1	0	0	0	0	0	0	0	0	0	1	3	1.0	4																						
3-Jan	5	5	Z	4	2	4	10	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.7	10																						
4-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	C	C	C	C	C	C	6	5	6	7	2	--	7																						
5-Jan	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0.4	1																						
6-Jan	0	0	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	2	1	0	0	0	0	0	0.4	2																						
7-Jan	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.4	1																						
8-Jan	0	Z	0	0	0	0	0	0	0	1	2	2	5	10	15	17	18	19	17	6	1	1	1	1	5.1	19																						
9-Jan	0	0	Z	1	0	0	1	1	1	1	1	1	2	1	0	0	1	1	0	0	1	1	0	0	0.6	2																						
10-Jan	1	1	1	Z	1	0	0	0	2	2	1	1	0	1	0	0	0	0	0	1	2	3	6	7	1.4	7																						
11-Jan	8	7	6	6	Z	4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1.8	8																						
12-Jan	0	1	0	3	5	Z	0	0	0	2	4	4	3	3	3	2	2	2	2	2	3	5	7	9	2.6	9																						
13-Jan	Z	6	6	5	1	1	1	1	2	1	0	0	0	1	2	1	0	0	1	1	1	1	1	1	1.5	6																						
14-Jan	1	Z	2	2	2	2	2	2	2	3	2	3	PF	PF	3	3	5	5	5	4	3	2	2	2	2.7	5																						
15-Jan	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
16-Jan	0	0	1	Z	4	4	5	4	3	2	2	2	1	1	1	3	2	2	1	1	1	1	0	0	1.9	5																						
17-Jan	1	1	1	1	Z	1	0	0	0	1	1	0	0	M	M	M	M	1	5	3	3	4	5	7	1.8	7																						
18-Jan	8	7	7	7	3	Z	4	5	4	3	3	3	3	2	2	2	1	1	0	1	1	0	0	0	2.9	8																						
19-Jan	Z	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	1	1	0	1	1	1	1	1	0.6	1																						
20-Jan	1	Z	1	2	1	1	0	1	0	0	6	13	15	15	15	16	18	15	2	1	1	0	0	0	5.4	18																						
21-Jan	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																						
22-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	8	6	2	1	2	1.1	8																						
23-Jan	4	1	1	0	Z	1	1	0	4	4	2	1	1	0	0	1	0	0	0	0	0	0	0	0	0.9	4																						
24-Jan	1	2	6	13	16	Z	22	25	23	21	20	21	23	20	17	14	14	16	13	12	8	8	11	14.8	25																							
25-Jan	Z	17	16	15	15	15	15	16	15	14	13	12	11	10	9	9	10	10	11	11	11	10	9	6	12.2	17																						
26-Jan	4	Z	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.3	4																						
27-Jan	1	1	Z	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	0	0	0	1.0	2																						
28-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	2	1	2	1	1	1	1	0.7	2																						
29-Jan	0	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.6	1																						
30-Jan	0	0	0	0	0	Z	0	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0.3	1																						
31-Jan	Z	0	0	0	0	0	1	0	1	1	1	1	0	0	1	0	1	0	0	0	0	0	0	0	0.4	1																						
																								1.6	2.0	2.0	2.5	2.2	1.5	2.3	2.2	2.2	2.1	2.3	2.4	2.3	2.4	2.5	2.5	2.7	2.7	2.3	2.5	2.0	1.7	1.9	1.9	Diurnal Average
																								8	17	16	15	16	15	22	25	23	21	20	21	23	20	17	16	18	18	19	17	12	10	9	11	Diurnal Maximum
Z - zerospan																								C - Calibration				M - Maintenance				PF - Power Failure																



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	695	99.14	99.14
21 - 40	6	0.86	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: 701

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	10	6	2	22	75	25	15	12	16	38	59	36	122	113	65	71	687
21 - 40	0	0	0	0	1	1	4	0	0	0	0	0	0	0	0	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
Totals	10	6	2	22	76	26	19	12	16	38	59	36	122	113	65	71	693

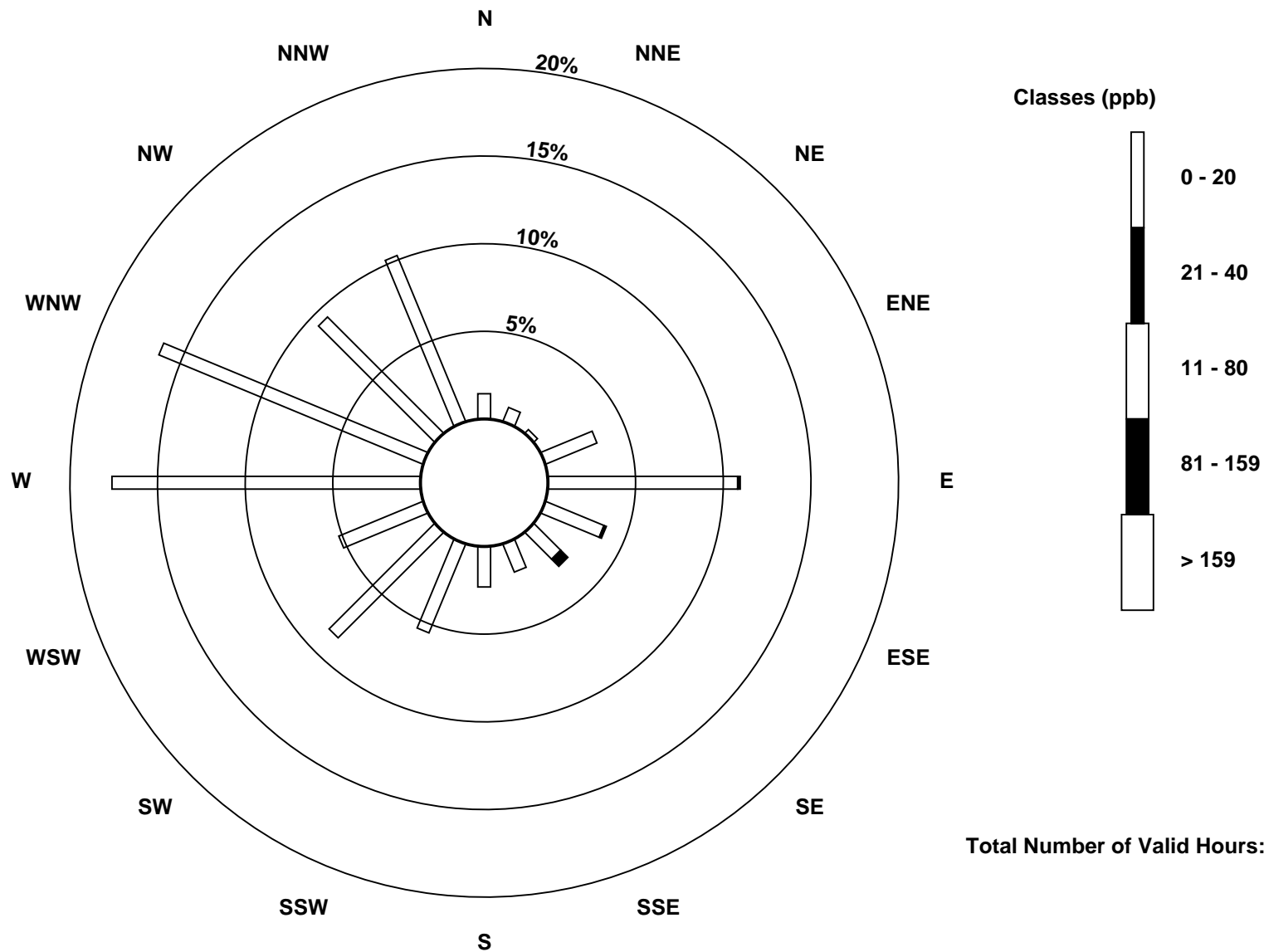
Total Number of Valid Hours: 693

Total Number of Hours: 744

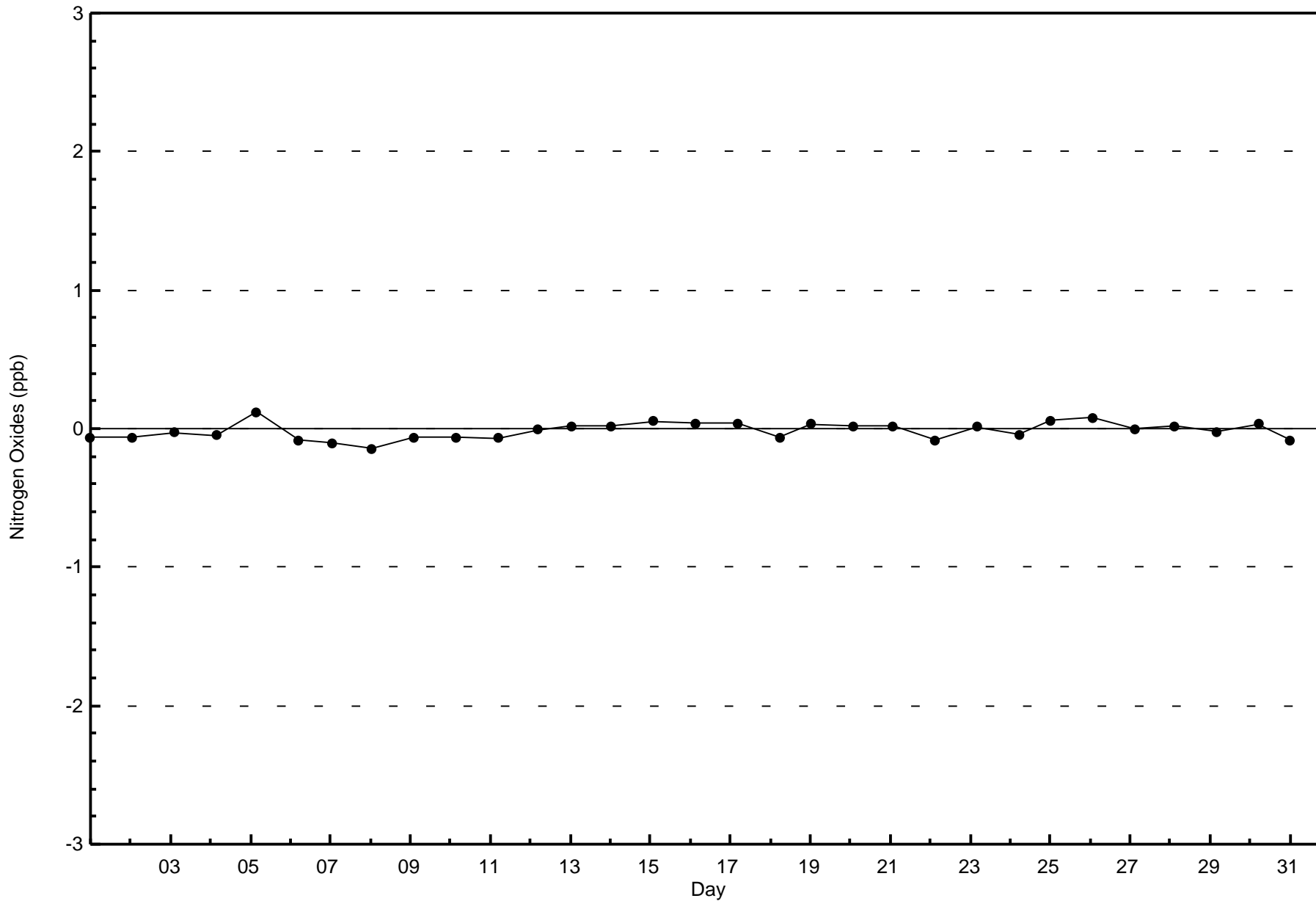


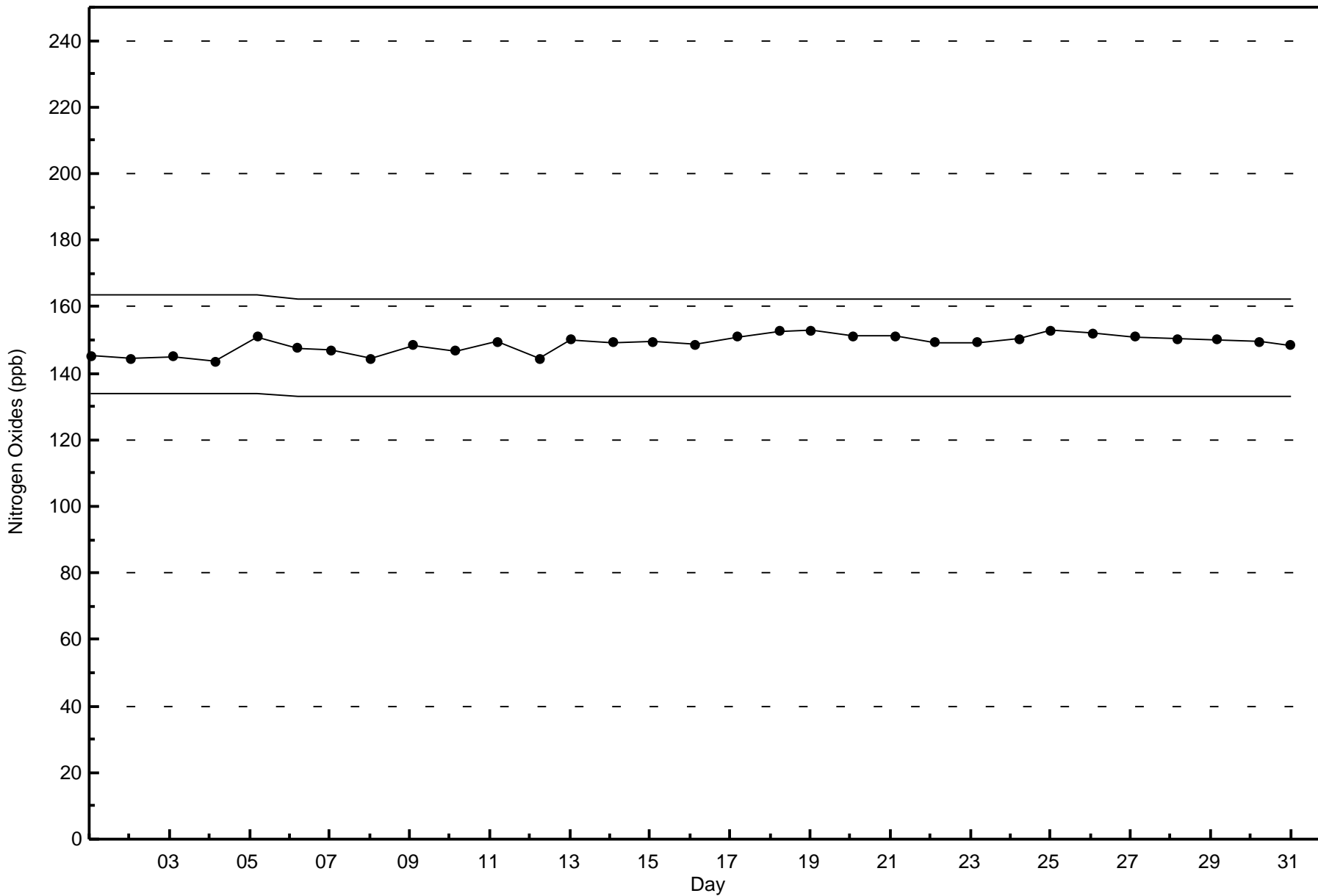
Wood Buffalo Environmental Association
Wind Rose Jan 2017

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan (AMS 8)



Total Number of Valid Hours: 693







Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

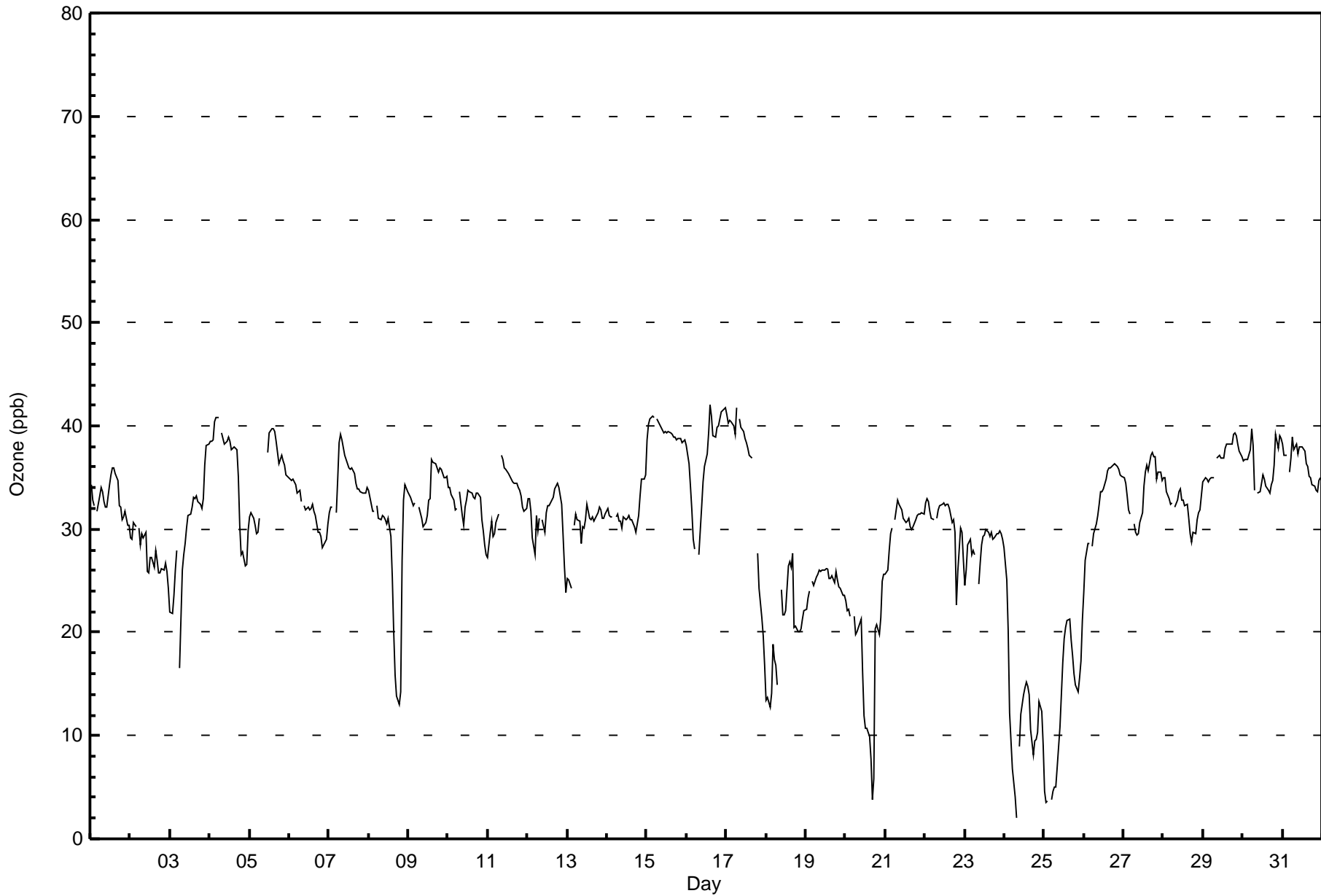
Fort Chipewyan - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 42 ppb on Jan 16 15:00										Maximum Daily Average: 39.5 ppb on Jan 15										Hours of Data: 707						
Minimum Value: 2 ppb on Jan 24 08:00										Minimum Daily Average: 12.4 ppb on Jan 24										Hours of Missing Data: 37						
Maximum Diurnal Average: 31.9 ppb at hour 15										Minimum Diurnal Average: 29.0 ppb at hour 8										Hours of Calibration: 34						
Monthly Average: 30.4 ppb										Percentiles: P ₁ = 4 P ₁₀ = 20 Q ₁ = 28 Median = 32 Q ₃ = 35 P ₉₀ = 38 P ₉₉ = 41										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-Jan	34	33	32	Z	32	33	34	34	33	32	32	34	35	36	36	35	35	32	32	31	31	32	30	30	33.0	36
2-Jan	29	29	31	30	Z	30	28	30	29	30	26	26	27	27	26	28	27	26	26	26	26	27	26	24	27.6	31
3-Jan	22	22	24	26	28	Z	17	26	28	29	30	31	31	32	33	33	33	32	32	33	36	38	38	29.9	38	
4-Jan	39	39	39	40	41	41	Z	39	39	38	38	39	38	38	38	38	38	35	30	28	28	26	27	30	35.9	41
5-Jan	31	32	31	30	30	30	31	Z	C	C	C	37	39	40	40	39	38	37	36	37	37	36	35	35	35.1	40
6-Jan	35	35	35	35	34	34	34	33	Z	32	32	32	32	32	32	31	30	30	29	28	29	29	30	31.9	35	
7-Jan	32	32	32	Z	32	35	38	39	39	37	37	36	36	36	36	35	34	34	34	34	34	33	33	34	34.9	39
8-Jan	34	33	32	32	Z	32	31	31	31	31	31	31	31	29	25	20	16	14	13	14	27	33	34	34	27.8	34
9-Jan	33	33	33	32	32	Z	32	32	31	30	31	31	33	33	37	37	36	36	36	36	36	35	35	35	33.7	37
10-Jan	34	34	33	33	32	32	Z	34	31	30	32	33	34	34	34	33	33	33	33	33	31	30	28	28	32.3	34
11-Jan	27	30	31	29	30	31	31	Z	37	37	36	36	35	35	35	35	34	34	34	34	33	32	32	32	33.0	37
12-Jan	33	33	32	29	28	31	30	31	Z	31	30	32	32	32	32	33	34	34	34	34	32	29	26	24	31.2	34
13-Jan	25	25	24	Z	30	31	31	31	29	30	30	31	32	31	31	31	31	31	32	32	32	31	31	32	30.2	32
14-Jan	32	31	31	31	Z	31	31	31	31	30	31	31	31	31	31	31	30	30	31	31	33	35	35	35	31.6	35
15-Jan	39	40	41	41	41	Z	41	40	40	40	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39.5	41
16-Jan	38	36	34	32	29	28	Z	28	30	32	35	36	37	39	42	41	39	39	40	40	41	41	41	42	36.5	42
17-Jan	41	40	41	40	40	39	42	Z	41	40	39	39	38	38	37	37	M	M	M	28	24	21	20	17	35.1	42
18-Jan	13	14	13	14	19	17	17	15	Z	24	22	22	22	26	27	26	28	20	21	20	20	20	21	22	20.2	28
19-Jan	22	23	24	Z	25	24	25	26	26	26	26	26	26	26	25	25	25	25	26	25	24	24	24	24	24.9	26
20-Jan	23	22	22	22	Z	22	20	20	21	21	16	12	11	11	10	8	4	6	20	21	20	21	25	26	17.5	26
21-Jan	26	26	28	30	30	Z	31	33	32	32	32	31	31	31	31	30	30	30	31	31	31	31	32	31	30.5	33
22-Jan	32	33	33	32	31	31	Z	31	32	32	32	32	32	32	32	32	31	31	30	23	26	30	30	27	30.8	33
23-Jan	25	26	29	29	28	28	Z	25	27	29	29	29	30	30	29	30	29	29	30	29	30	30	29	28.4	30	
24-Jan	28	25	20	12	10	7	4	2	Z	9	12	14	15	15	15	14	11	8	9	10	10	13	12	9	12.4	28
25-Jan	5	4	4	Z	4	5	5	5	7	11	14	17	19	20	21	21	19	18	16	15	14	16	17	21	12.9	21
26-Jan	24	27	29	29	Z	28	29	31	31	32	34	34	34	35	36	36	36	36	36	36	36	36	35	35	32.8	36
27-Jan	35	34	33	32	31	Z	31	30	29	30	31	32	34	36	36	36	37	37	37	37	35	36	36	35	33.8	37
28-Jan	35	35	34	33	32	33	Z	32	33	34	34	33	33	32	32	31	30	29	30	30	31	32	32	33	32.2	35
29-Jan	35	35	35	35	35	35	35	Z	37	37	37	37	37	37	38	38	38	38	38	39	39	39	38	37	36.9	39
30-Jan	37	37	37	37	38	40	38	34	Z	33	34	34	35	35	34	34	33	34	35	36	39	38	39	39	36.1	40
31-Jan	38	37	37	Z	36	37	39	38	38	37	38	38	38	38	36	36	35	35	34	34	34	34	35	35	36.4	39
30.2 30.2 30.0 30.6 29.8 29.4 29.0 29.0 31.2 30.5 30.6 31.1 31.6 31.9 31.9 31.4 30.5 29.8 30.2 29.8 30.1 30.5 30.4 30.4																								Diurnal Average		
41 40 41 41 41 41 42 40 41 40 39 39 39 40 42 41 39 39 40 40 41 41 41 42																								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 (O₃) - ppb
Fort Chipewyan - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Fort Chipewyan - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	73	10.33	10.33
21 - 50	634	89.67	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 (O₃) - ppb
Fort Chipewyan - January 2017

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	0	1	2	3	16	7	7	1	2	11	15	2	1	4	1	0	73
21 - 50	9	5	1	19	63	16	14	11	18	28	44	37	118	108	67	68	626
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
Totals	9	6	3	22	79	23	21	12	20	39	59	39	119	112	68	68	699

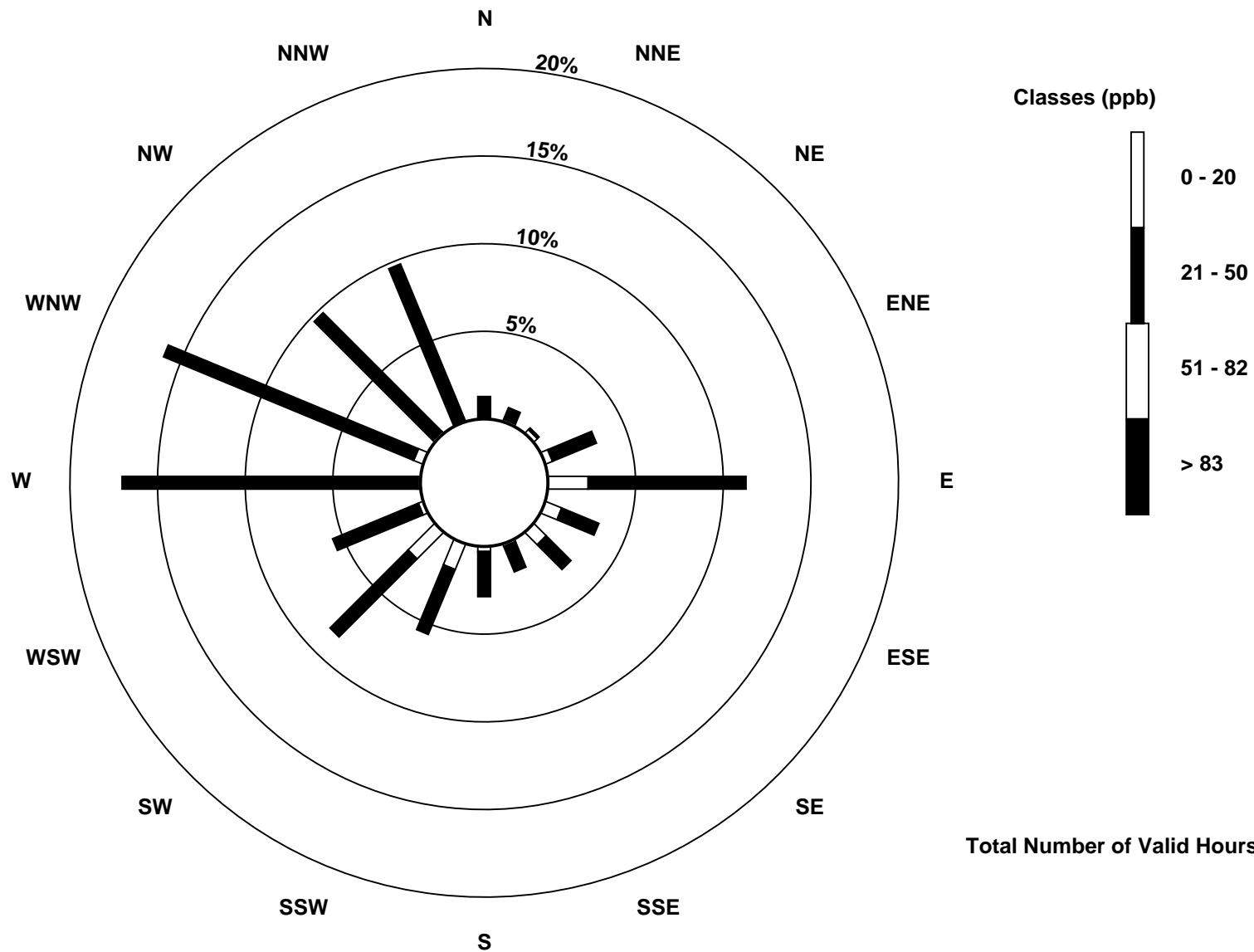
Total Number of Valid Hours: 699

Total Number of Hours: 744

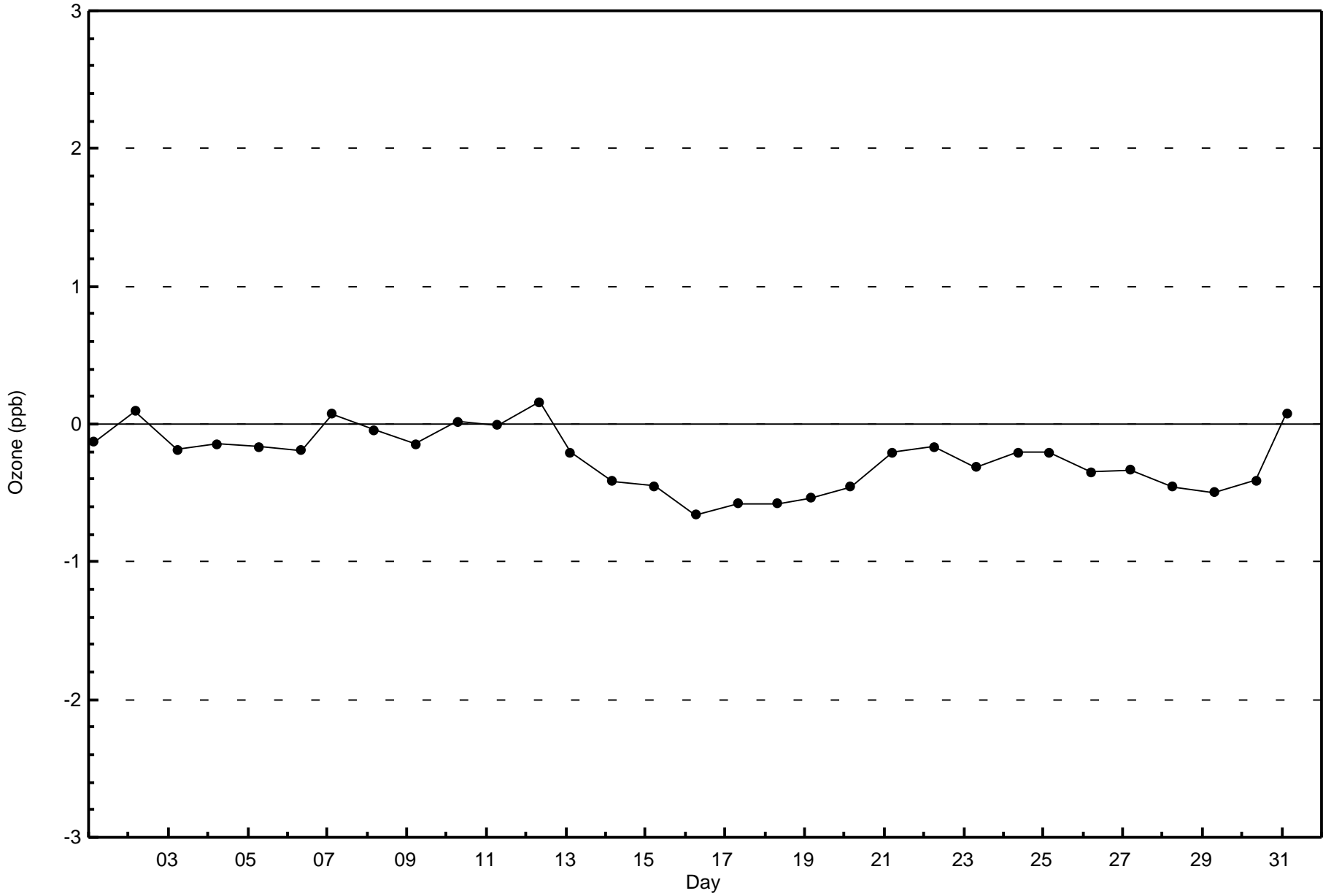


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Ozone (O₃) - ppb
Fort Chipewyan (AMS 8)



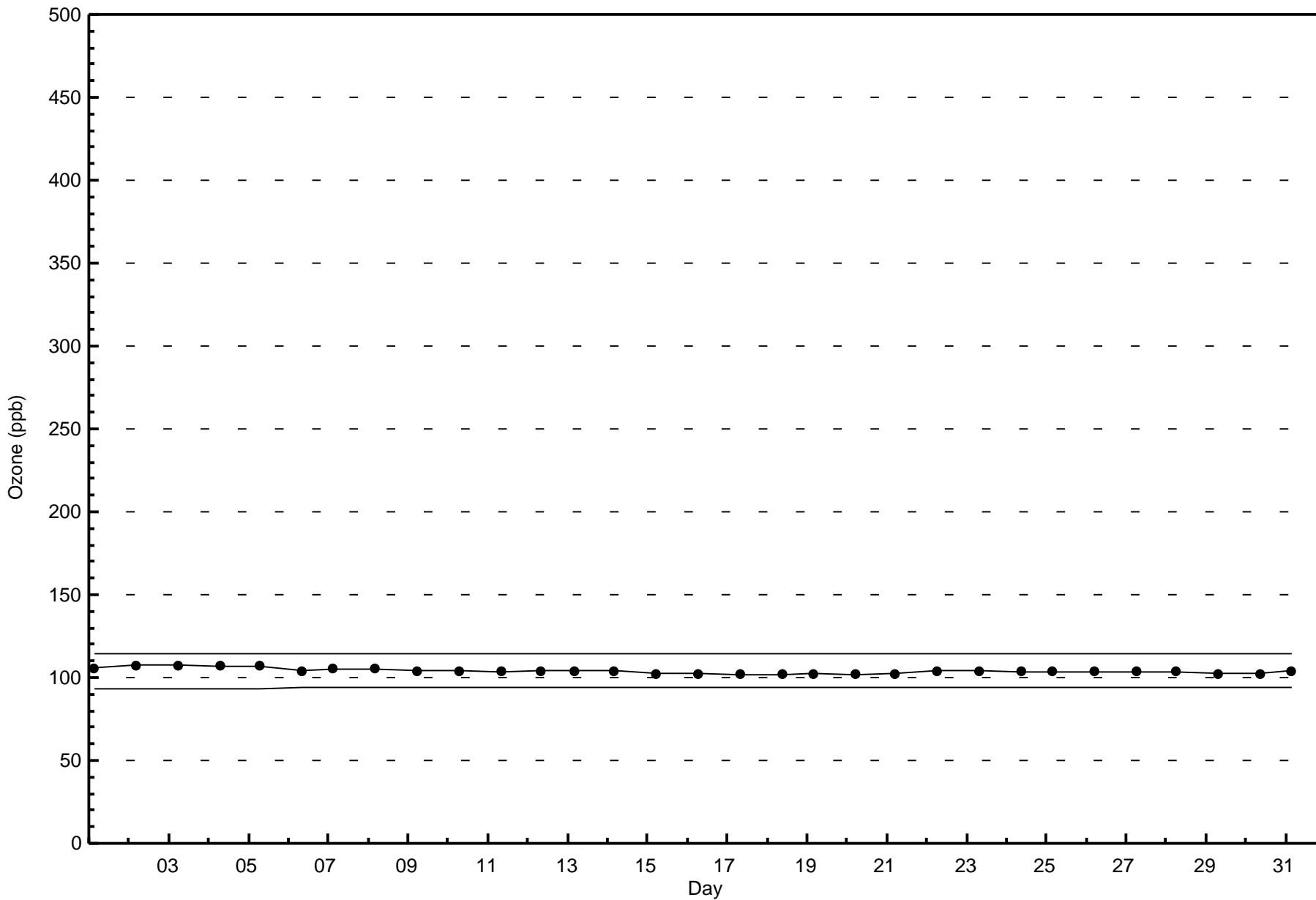
Total Number of Valid Hours: 699





Wood Buffalo Environmental Association
Span Responses

Ozone (O₃) - ppb
Fort Chipewyan - January 2017



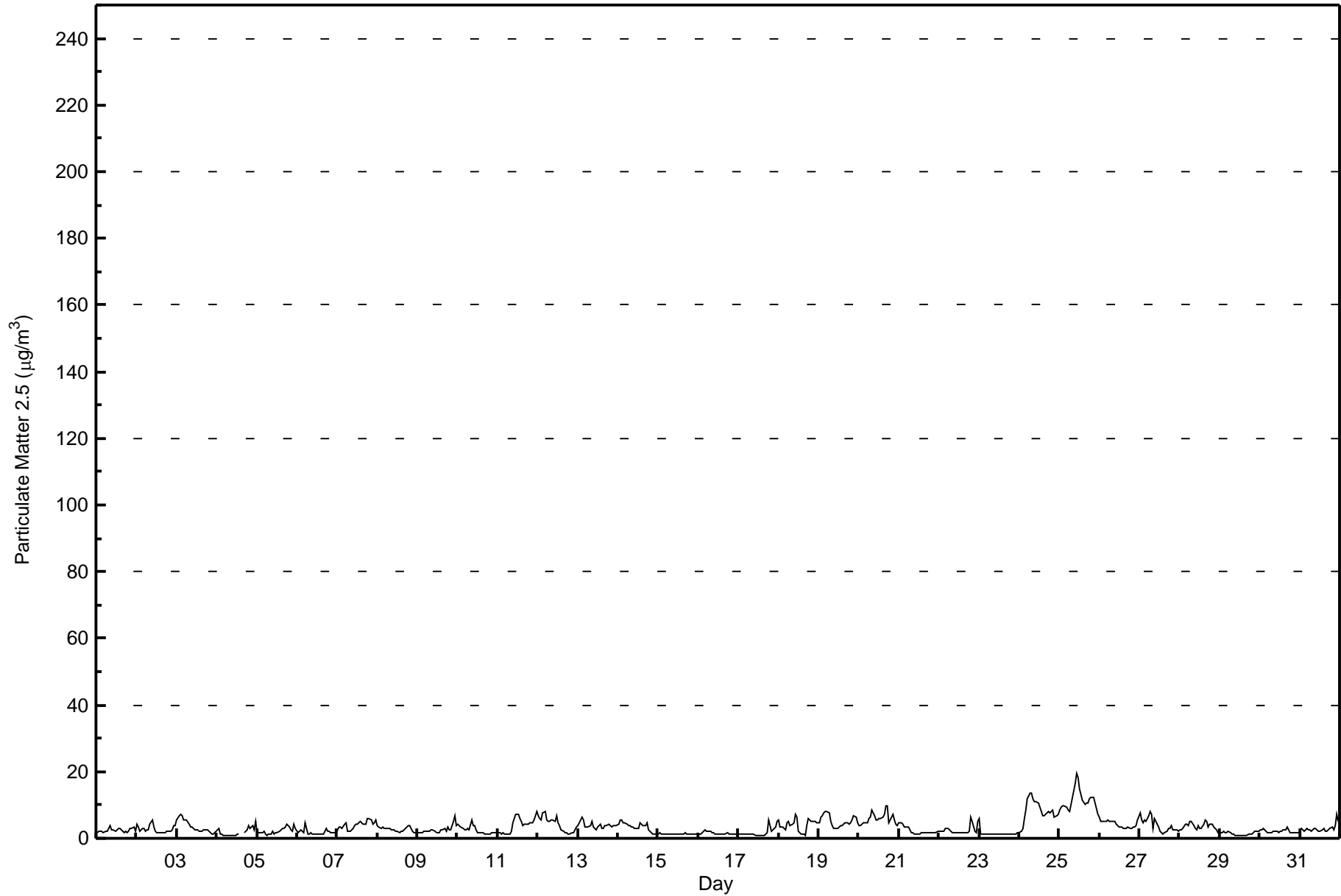


Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 19.5 µg/m ³ on Jan 25 11:00 Maximum Daily Average: 11.4 µg/m ³ on Jan 25		Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 2 Percent Operational Time: 100.0																																															
Minimum Value: 0.7 µg/m ³ on Jan 4 08:00 Maximum Diurnal Average: 3.7 µg/m ³ at hour 6 Monthly Average: 3.41 µg/m ³		Minimum Daily Average: 1.3 µg/m ³ on Jan 15 Minimum Diurnal Average: 2.9 µg/m ³ at hour 16 Percentiles: P ₁ = 0.9 P ₁₀ = 1.2 Q ₁ = 1.6 Median = 2.6 O ₃ = 4.4 P ₉₀ = 6.5 P ₉₉ = 13.0																																															
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jan	1.7	1.9	2.1	2.0	1.9	1.9	2.1	3.0	3.7	2.6	2.6	2.2	2.7	3.0	3.0	2.5	1.9	2.2	1.6	2.2	3.0	3.1	3.2	2.0	2.4	3.7																							
2-Jan	4.4	3.3	2.2	2.9	3.1	2.0	2.4	2.5	4.4	5.4	3.5	2.0	1.7	1.5	1.6	1.9	1.9	1.9	2.0	2.3	2.2	2.5	3.8	4.0	2.7	5.4																							
3-Jan	5.6	6.6	7.2	6.7	5.4	5.5	5.4	4.2	3.6	3.3	2.9	2.6	2.6	2.3	2.1	2.3	2.3	2.4	2.7	2.2	1.9	1.3	1.1	2.1	3.5	7.2																							
4-Jan	2.5	3.0	1.4	1.1	0.9	0.9	0.7	0.7	0.7	0.9	1.0	1.1	1.1	1.4	C	C	1.7	2.0	2.6	3.6	3.1	3.9	2.6	5.0	1.9	5.0																							
5-Jan	1.7	1.6	1.7	1.6	2.2	1.3	1.0	1.2	1.3	2.2	1.5	1.7	1.6	2.0	2.4	3.0	3.1	3.2	4.3	3.2	2.7	2.3	4.4	2.8	2.3	4.4																							
6-Jan	1.6	2.2	2.5	2.3	1.6	4.5	1.3	1.3	1.6	1.4	1.2	1.2	1.1	1.2	1.1	1.1	1.2	3.0	2.2	2.3	1.7	1.6	1.9	1.9	1.8	4.5																							
7-Jan	2.5	3.3	3.2	3.2	4.3	4.6	2.0	2.1	2.3	3.1	3.8	4.4	4.0	4.6	5.2	4.4	4.3	4.4	6.0	5.8	5.5	4.4	4.8	5.5	4.1	6.0																							
8-Jan	3.9	3.4	3.1	3.3	3.1	3.1	3.2	2.9	2.7	2.7	2.6	2.3	2.1	1.9	2.0	2.2	2.5	3.0	3.7	3.7	3.0	2.3	1.8	1.7	2.7	3.9																							
9-Jan	1.6	1.6	1.5	1.7	2.0	2.1	2.0	2.1	2.4	2.5	2.1	1.8	1.9	1.6	2.6	2.7	3.2	2.3	3.4	2.5	2.6	5.1	6.8	3.8	2.6	6.8																							
10-Jan	4.2	4.0	3.4	3.0	2.6	2.6	2.8	2.4	5.4	3.9	3.7	2.5	1.7	1.9	1.8	1.8	1.4	1.2	1.3	1.4	1.6	1.6	1.7	1.7	2.5	5.4																							
11-Jan	1.7	1.5	1.4	1.6	1.3	1.3	1.2	1.1	2.3	4.6	5.9	7.3	7.1	6.1	4.9	3.9	4.1	4.3	4.4	4.7	4.6	4.7	5.4	7.9	3.9	7.9																							
12-Jan	6.7	6.1	5.6	7.6	8.1	5.4	4.9	5.3	5.4	5.7	5.2	6.9	4.9	3.9	2.5	1.9	1.7	1.5	1.5	1.5	1.6	1.7	2.4	3.4	4.2	8.1																							
13-Jan	3.9	4.7	6.2	5.3	3.4	3.2	3.2	3.6	5.1	3.2	3.1	2.7	3.3	4.1	3.2	3.0	3.8	3.8	4.4	3.6	3.3	3.7	3.7	3.7	3.8	6.2																							
14-Jan	4.4	5.7	5.5	4.7	4.6	4.3	3.9	3.7	3.5	3.4	3.0	2.9	3.1	4.6	4.3	4.0	3.8	4.6	2.6	2.1	1.7	1.5	1.3	1.3	3.5	5.7																							
15-Jan	1.2	1.5	1.2	1.2	1.3	1.2	1.2	1.1	1.1	1.2	1.4	1.3	1.2	1.2	1.2	1.3	1.6	1.3	1.4	1.1	1.3	1.2	1.2	1.1	1.3	1.6																							
16-Jan	1.4	1.2	1.5	2.0	2.3	2.3	2.1	2.0	1.7	1.5	1.3	1.3	1.2	1.1	1.1	1.2	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.3	1.5	2.3																							
17-Jan	1.3	1.3	1.3	1.4	1.4	1.3	1.1	1.1	1.2	1.1	1.0	0.9	0.9	1.0	1.0	1.1	1.1	1.6	5.5	3.8	2.2	3.1	3.6	4.9	1.8	5.5																							
18-Jan	5.5	3.4	3.4	3.1	2.7	4.8	5.3	4.0	4.2	4.8	7.1	6.3	2.2	1.5	1.2	1.2	0.9	3.9	6.0	5.0	4.9	5.2	5.1	4.7	4.0	7.1																							
19-Jan	4.8	6.5	7.0	7.8	7.9	8.1	7.6	5.1	3.9	3.0	3.0	3.0	3.2	3.9	3.9	4.1	4.6	4.6	4.1	4.7	5.7	6.9	6.2	4.7	5.2	8.1																							
20-Jan	4.0	3.9	4.2	4.5	4.8	4.9	6.1	6.3	8.4	6.7	5.3	5.4	6.0	6.1	6.2	7.0	9.9	9.7	4.7	5.4	7.4	5.5	4.1	3.7	5.8	9.9																							
21-Jan	4.7	4.7	4.3	3.3	3.3	3.3	3.3	1.7	1.6	1.5	1.4	1.2	1.3	1.7	1.5	1.5	1.6	1.6	1.9	1.8	1.9	1.7	1.8	2.0	2.3	4.7																							
22-Jan	2.0	2.0	2.0	2.3	2.9	2.9	2.5	2.0	1.7	1.5	1.5	1.7	1.6	1.6	1.7	1.7	1.7	1.8	2.2	6.5	5.3	2.0	1.6	5.1	2.4	6.5																							
23-Jan	5.9	1.4	1.1	1.1	1.2	1.3	1.3	1.4	1.1	1.1	1.1	1.2	1.2	1.2	1.3	1.3	1.3	1.4	1.4	1.4	1.4	1.4	1.4	1.5	1.5	5.9																							
24-Jan	1.6	2.2	3.1	6.0	8.3	11.7	13.5	13.7	12.0	10.9	10.4	9.3	8.2	6.9	6.7	7.3	8.1	7.6	8.0	8.3	6.4	6.6	7.2	8.1	8.1	13.7																							
25-Jan	8.7	9.3	9.6	9.7	9.3	8.3	8.2	10.0	12.3	16.3	19.5	18.1	15.0	13.2	11.3	10.0	10.6	10.8	11.7	12.4	12.3	10.7	8.8	7.2	11.4	19.5																							
26-Jan	6.2	5.1	5.1	5.0	5.2	5.5	5.1	5.0	5.3	5.0	4.3	3.7	3.5	3.2	3.1	3.2	2.9	3.2	3.1	3.1	3.3	3.2	3.8	5.6	4.2	6.2																							
27-Jan	7.4	5.4	4.7	5.6	5.2	6.9	7.9	7.4	2.8	5.9	5.2	3.6	2.0	1.7	1.4	1.6	2.3	3.0	2.8	3.7	2.6	2.3	2.4	2.3	4.0	7.9																							
28-Jan	2.5	2.5	3.1	4.2	4.2	4.0	5.2	4.9	3.8	3.1	2.6	3.8	3.1	3.2	4.3	5.6	5.0	3.5	4.3	4.1	3.6	3.0	2.4	1.9	3.7	5.6																							
29-Jan	1.6	1.9	2.0	1.9	1.7	1.9	1.8	1.4	1.1	1.0	0.8	0.8	0.8	0.8	0.9	0.9	0.9	1.2	1.3	1.5	1.7	2.1	2.2	2.1	1.4	2.2																							
30-Jan	2.5	2.5	2.8	2.5	1.9	1.5	1.6	1.9	2.0	2.2	1.9	1.8	2.0	2.3	2.5	2.5	3.2	2.3	1.8	1.6	1.6	1.6	1.6	1.6	2.1	3.2																							
31-Jan	2.0	2.9	2.3	2.6	2.8	2.5	2.5	2.2	3.1	3.1	2.6	2.1	1.9	2.5	2.9	2.2	2.2	2.7	3.1	3.2	2.6	3.7	7.3	5.1	2.9	7.3																							
																								3.5	3.4	3.4	3.6	3.6	3.7	3.6	3.5	3.6	3.7	3.7	3.5	3.1	3.0	3.0	2.9	3.1	3.3	3.4	3.5	3.4	3.3	3.4	3.5	Diurnal Average	
																								8.7	9.3	9.6	9.7	9.3	11.7	13.5	13.7	12.3	16.3	19.5	18.1	15.0	13.2	11.3	10.0	10.6	10.8	11.7	12.4	12.3	10.7	8.8	7.9	Diurnal Maximum	
C - Calibration																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																																																	



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipewyan - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipewyan - January 2017

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	619	83.42	83.42
6 - 15	101	13.61	97.04
16 - 25	3	0.40	97.44
26 - 80	0	0.00	97.44
> 81.0	0	0.00	97.44

Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipewyan - January 2017

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	10	5	3	19	65	18	13	11	15	27	47	36	107	105	64	70	615
6 - 15	0	1	0	4	16	9	9	1	4	8	13	4	9	12	5	5	100
16 - 25	0	0	0	0	0	0	0	0	0	3	0	0	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
Totals	10	6	3	23	81	27	22	12	19	38	60	40	116	117	69	75	718

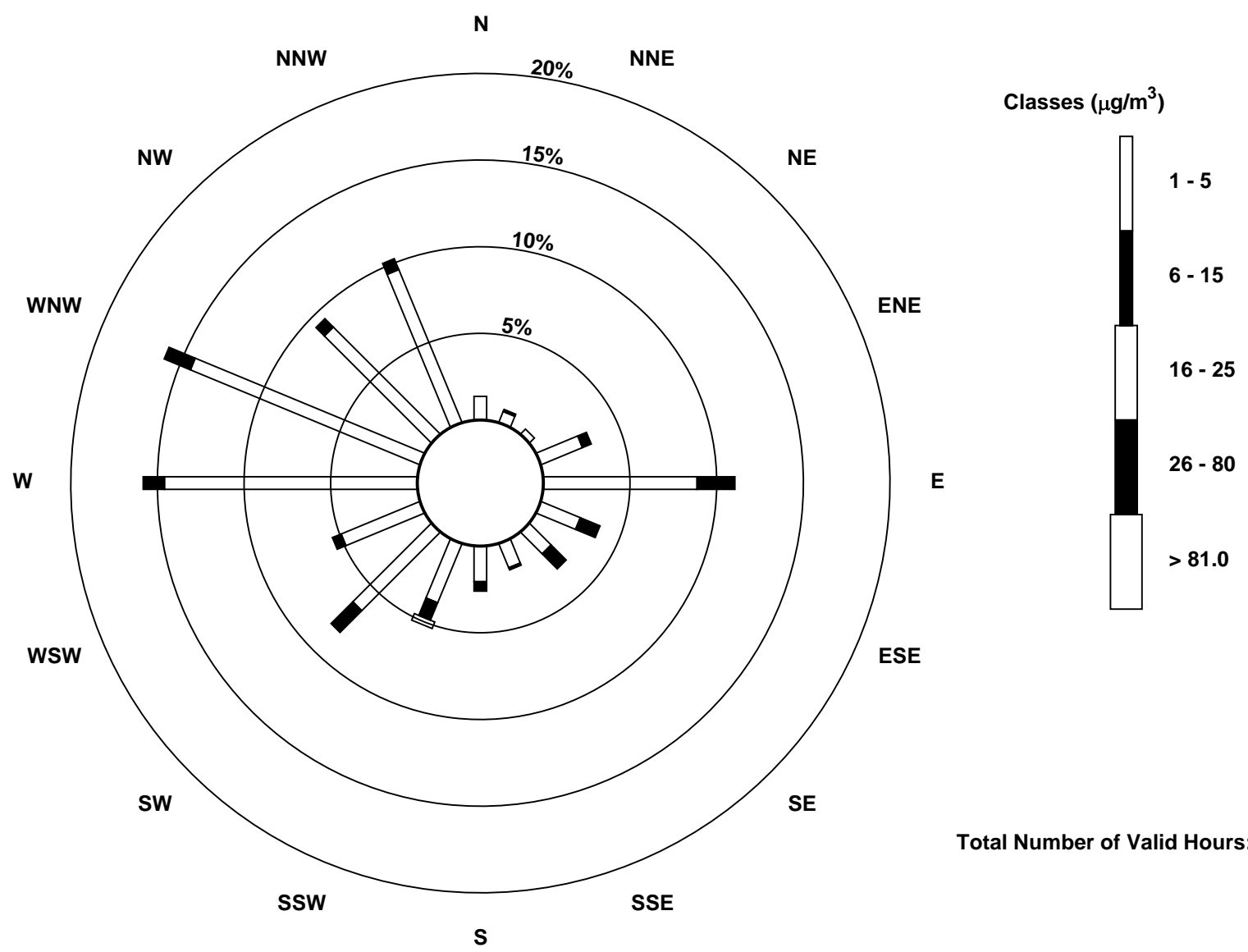
Total Number of Valid Hours: 733

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipewyan (AMS 8)



Total Number of Valid Hours: 733



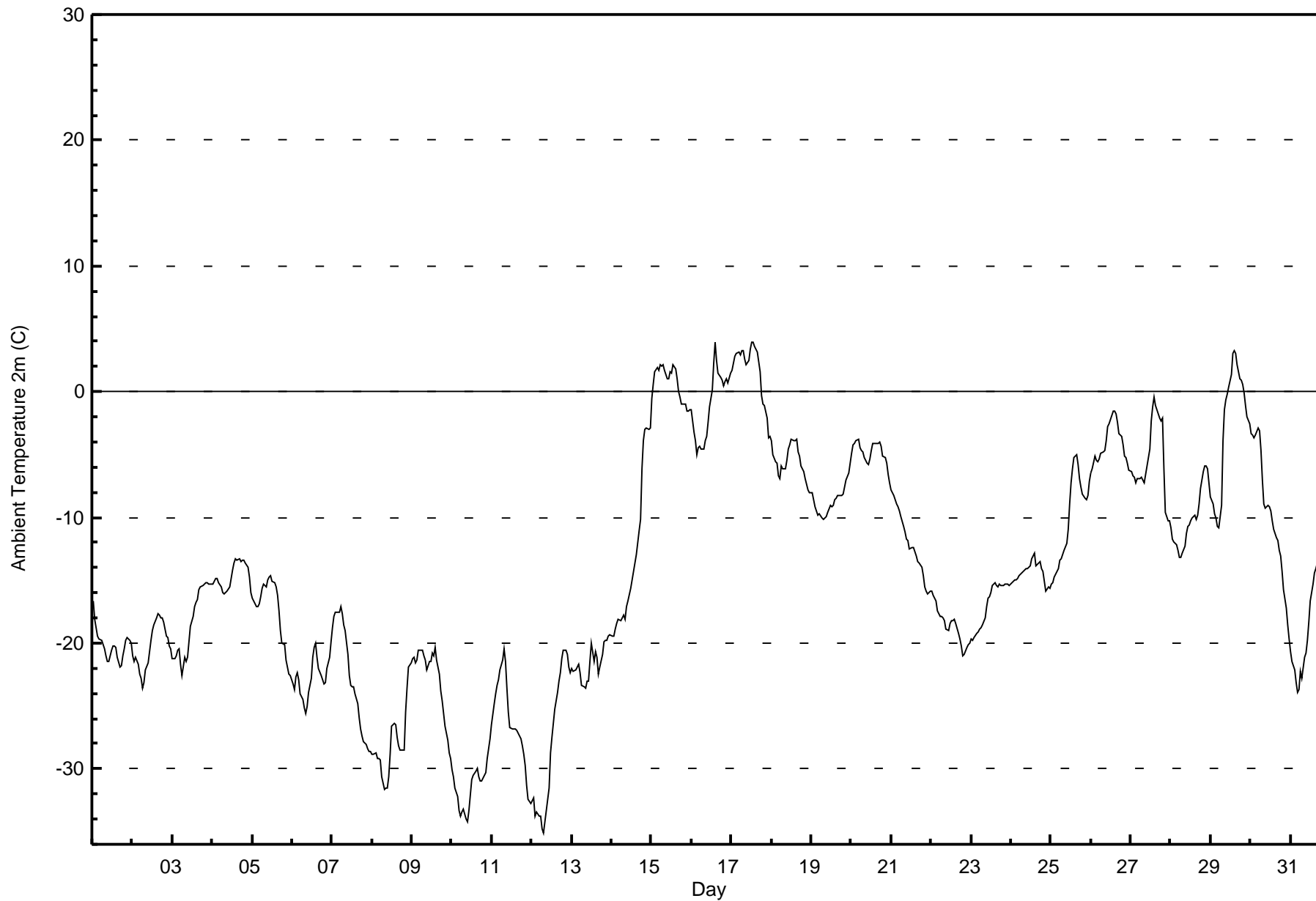
Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature 2m (AT 2m) - C

Fort Chipewyan - January 2017

Maximum Value: 4.0 C on Jan 17 13:00																				Maximum Daily Average: 1.7 C on Jan 17					Hours in Service: 744	
Minimum Value: -35.1 C on Jan 12 08:00																				Minimum Daily Average: -31.3 C on Jan 10					Hours of Data: 744	
Maximum Diurnal Average: -12.8 C at hour 15																				Minimum Diurnal Average: -15.4 C at hour 7					Hours of Missing Data: 0	
Monthly Average: -14.45 C																				Percentiles: P ₁ = -33.8 P ₁₀ = -26.9 Q ₁ = -21.1 Median = -15.3 Q ₃ = -6.4 P ₉₀ = -1.4 P ₉₉ = 3.2					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-Jan	-16.6	-18.2	-18.8	-19.5	-19.6	-19.7	-20.2	-20.4	-21.0	-21.4	-21.4	-20.5	-20.3	-20.2	-20.4	-21.1	-21.9	-21.8	-21.1	-20.4	-19.8	-19.6	-19.8	-20.0	-20.2	-16.6
2-Jan	-21.0	-21.4	-21.1	-21.7	-22.5	-22.8	-23.5	-23.1	-22.1	-21.6	-20.7	-19.8	-19.1	-18.6	-18.0	-17.7	-17.7	-17.9	-18.0	-18.4	-19.5	-19.6	-20.3	-20.4	-20.3	-17.7
3-Jan	-21.2	-21.3	-21.0	-20.5	-20.5	-21.7	-22.6	-21.2	-21.5	-21.1	-19.9	-18.7	-17.9	-17.1	-16.7	-16.5	-15.8	-15.5	-15.4	-15.3	-15.2	-15.2	-15.3	-15.4	-18.4	-15.2
4-Jan	-15.3	-15.1	-14.9	-14.9	-15.2	-15.5	-16.0	-16.1	-16.0	-15.8	-15.5	-14.9	-14.2	-13.6	-13.3	-13.4	-13.3	-13.5	-13.4	-13.3	-13.6	-14.0	-14.8	-16.0	-14.6	-13.3
5-Jan	-16.4	-16.6	-17.1	-17.1	-16.8	-16.3	-15.6	-15.3	-15.5	-15.0	-14.8	-14.7	-15.1	-15.2	-15.6	-16.2	-17.4	-19.0	-20.0	-20.1	-21.4	-21.9	-22.5	-22.6	-17.4	-14.7
6-Jan	-23.2	-23.7	-22.7	-22.4	-22.9	-24.1	-24.5	-25.2	-25.6	-25.0	-23.9	-22.8	-21.1	-20.3	-20.0	-21.1	-22.1	-22.6	-22.9	-23.3	-23.2	-22.0	-21.1	-19.8	-22.7	-19.8
7-Jan	-18.8	-17.9	-17.6	-17.5	-17.5	-17.1	-17.6	-18.6	-18.9	-20.9	-22.6	-23.4	-23.5	-23.4	-24.0	-24.9	-25.9	-26.9	-27.3	-27.8	-28.0	-28.4	-28.6	-28.6	-22.7	-17.1
8-Jan	-28.8	-28.8	-28.7	-29.2	-29.2	-29.3	-30.6	-31.6	-31.5	-31.5	-30.6	-28.8	-26.6	-26.3	-26.5	-27.5	-28.2	-28.5	-28.5	-28.6	-25.4	-23.5	-21.9	-21.5	-28.0	-21.5
9-Jan	-21.3	-21.2	-21.6	-21.4	-20.6	-20.5	-20.6	-21.0	-21.4	-22.1	-21.4	-21.4	-20.8	-21.1	-20.4	-21.4	-22.4	-23.8	-24.6	-25.6	-26.6	-27.8	-28.7	-29.2	-22.8	-20.4
10-Jan	-30.1	-30.7	-31.5	-32.2	-33.3	-33.8	-33.5	-33.2	-33.9	-34.2	-33.3	-32.1	-30.9	-30.5	-30.1	-29.9	-30.7	-31.0	-31.0	-30.5	-30.3	-29.2	-28.4	-27.6	-31.3	-27.6
11-Jan	-26.4	-24.9	-24.0	-23.4	-22.9	-22.2	-21.4	-20.5	-21.4	-23.6	-25.5	-26.7	-26.9	-26.9	-26.9	-26.9	-27.2	-27.6	-28.2	-28.8	-29.7	-31.4	-32.4	-32.8	-26.2	-20.5
12-Jan	-32.5	-32.3	-33.8	-33.4	-33.8	-33.8	-34.8	-35.1	-34.3	-33.3	-31.5	-28.7	-27.5	-26.3	-25.3	-23.9	-23.0	-22.3	-21.2	-20.6	-20.6	-20.9	-21.9	-22.4	-28.1	-20.6
13-Jan	-22.0	-22.3	-22.2	-21.9	-21.7	-22.3	-23.3	-23.4	-23.5	-23.0	-23.0	-21.5	-20.0	-21.5	-20.6	-21.1	-22.4	-21.9	-21.0	-19.9	-19.8	-19.7	-19.5	-19.3	-21.5	-19.3
14-Jan	-19.4	-19.4	-18.9	-18.4	-18.1	-18.2	-18.0	-17.7	-18.1	-17.1	-16.7	-15.6	-15.0	-14.3	-13.6	-12.9	-11.0	-10.2	-6.2	-3.9	-3.0	-2.9	-3.1	-2.9	-13.1	-2.9
15-Jan	-0.6	0.6	1.6	2.0	1.7	2.2	2.0	2.1	1.7	1.1	1.0	1.6	1.5	2.2	1.8	1.1	0.0	-0.4	-1.0	-1.0	-1.0	-1.6	-1.5	-1.4	0.7	2.2
16-Jan	-1.4	-3.2	-3.9	-5.0	-4.4	-4.4	-4.6	-4.6	-3.9	-3.5	-2.4	-1.2	0.2	2.3	4.0	2.5	1.5	1.1	0.9	0.4	0.8	1.0	0.7	1.5	-1.1	4.0
17-Jan	1.7	2.3	2.8	3.0	3.2	2.9	3.2	3.2	2.6	2.1	2.5	3.4	4.0	3.9	3.6	3.2	2.4	1.6	-0.3	-1.0	-1.1	-2.1	-3.7	-3.6	1.7	4.0
18-Jan	-3.9	-5.0	-5.6	-5.7	-6.7	-6.9	-5.9	-6.2	-6.1	-5.4	-4.6	-4.2	-3.7	-3.9	-3.9	-3.8	-4.8	-5.1	-5.9	-6.4	-6.9	-7.4	-7.8	-8.1	-5.6	-3.7
19-Jan	-8.1	-8.5	-9.1	-9.5	-9.8	-9.7	-10.0	-10.1	-10.0	-9.9	-9.6	-9.1	-9.2	-9.1	-8.6	-8.4	-8.3	-8.2	-8.3	-8.2	-7.6	-7.0	-6.5	-5.7	-8.7	-5.7
20-Jan	-4.9	-4.3	-4.1	-3.9	-3.8	-4.5	-4.7	-4.8	-5.2	-5.7	-5.8	-5.4	-4.7	-4.1	-4.1	-4.1	-4.1	-4.0	-4.4	-5.1	-5.2	-5.7	-6.6	-7.2	-4.9	-3.8
21-Jan	-7.8	-8.3	-8.6	-9.0	-9.2	-9.5	-9.9	-10.7	-11.1	-11.8	-11.9	-12.5	-12.3	-12.4	-12.7	-13.1	-13.5	-13.7	-13.9	-14.6	-15.5	-15.8	-16.1	-15.8	-12.1	-7.8
22-Jan	-15.9	-16.2	-16.5	-16.7	-17.4	-17.8	-17.9	-18.0	-18.2	-18.9	-18.9	-18.5	-18.2	-18.2	-18.1	-18.4	-19.2	-19.7	-20.3	-21.1	-20.9	-20.4	-20.1	-20.1	-18.6	-15.9
23-Jan	-19.7	-19.7	-19.5	-19.2	-19.1	-18.9	-18.8	-18.5	-18.0	-17.1	-16.4	-16.3	-16.0	-15.5	-15.2	-15.4	-15.5	-15.3	-15.4	-15.4	-15.3	-15.3	-15.3	-15.4	-16.9	-15.2
24-Jan	-15.3	-15.1	-15.0	-14.9	-14.8	-14.6	-14.4	-14.3	-14.2	-14.1	-14.1	-13.8	-13.3	-13.0	-12.9	-13.8	-13.8	-13.5	-14.1	-14.3	-15.1	-15.9	-15.6	-15.6	-14.4	-12.9
25-Jan	-15.3	-15.1	-14.7	-14.5	-14.1	-13.4	-13.3	-13.0	-12.6	-12.0	-11.0	-8.9	-7.2	-6.1	-5.2	-5.0	-5.8	-6.9	-7.6	-8.1	-8.4	-8.6	-8.2	-7.2	-10.1	-5.0
26-Jan	-6.5	-6.1	-5.2	-5.4	-5.6	-5.3	-4.9	-4.8	-4.7	-3.9	-2.8	-2.6	-2.2	-1.6	-1.6	-1.7	-2.4	-3.3	-3.6	-4.3	-5.1	-5.3	-5.7	-6.2	-4.2	-1.6
27-Jan	-6.4	-6.7	-6.8	-7.3	-6.9	-6.9	-6.8	-7.1	-7.2	-6.6	-5.9	-4.6	-2.3	-1.2	-0.4	-1.1	-1.8	-2.1	-2.3	-2.1	-6.1	-9.6	-10.3	-10.2	-5.4	-0.4
28-Jan	-10.9	-11.7	-11.9	-12.2	-12.6	-13.1	-13.1	-12.8	-12.3	-11.3	-10.8	-10.6	-10.3	-10.1	-9.9	-10.2	-9.8	-9.0	-7.8	-6.4	-6.0	-5.9	-6.1	-7.3	-10.1	-5.9
29-Jan	-8.4	-9.0	-9.7	-10.0	-10.7	-10.8	-9.0	-3.9	-1.4	-0.6	-0.2	0.4	1.4	3.1	3.2	3.0	2.1	1.1	0.9	0.6	-0.1	-1.1	-2.0	-2.6	-2.7	3.2
30-Jan	-3.4	-3.4	-3.6	-3.5	-2.9	-3.1	-4.7	-7.0	-8.9	-9.3	-9.1	-9.2	-9.5	-10.2	-11.0	-11.6	-11.9	-12.6	-13.1	-14.3	-15.8	-17.2	-18.5	-19.6	-9.7	-2.9
31-Jan	-20.7	-21.5	-22.1	-23.1	-24.0	-23.7	-22.3	-22.9	-21.2	-20.8	-19.8	-18.3	-16.6	-15.3	-14.5	-14.0	-13.7	-13.8	-13.8	-14.3	-14.8	-16.4	-17.7	-18.6	-18.5	-13.7
																								Diurnal Average		
																								Diurnal Maximum		





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C
Fort Chipewyan - January 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	236	31.72	31.72
-20 - 0	453	60.89	92.61
0 - 10	55	7.39	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

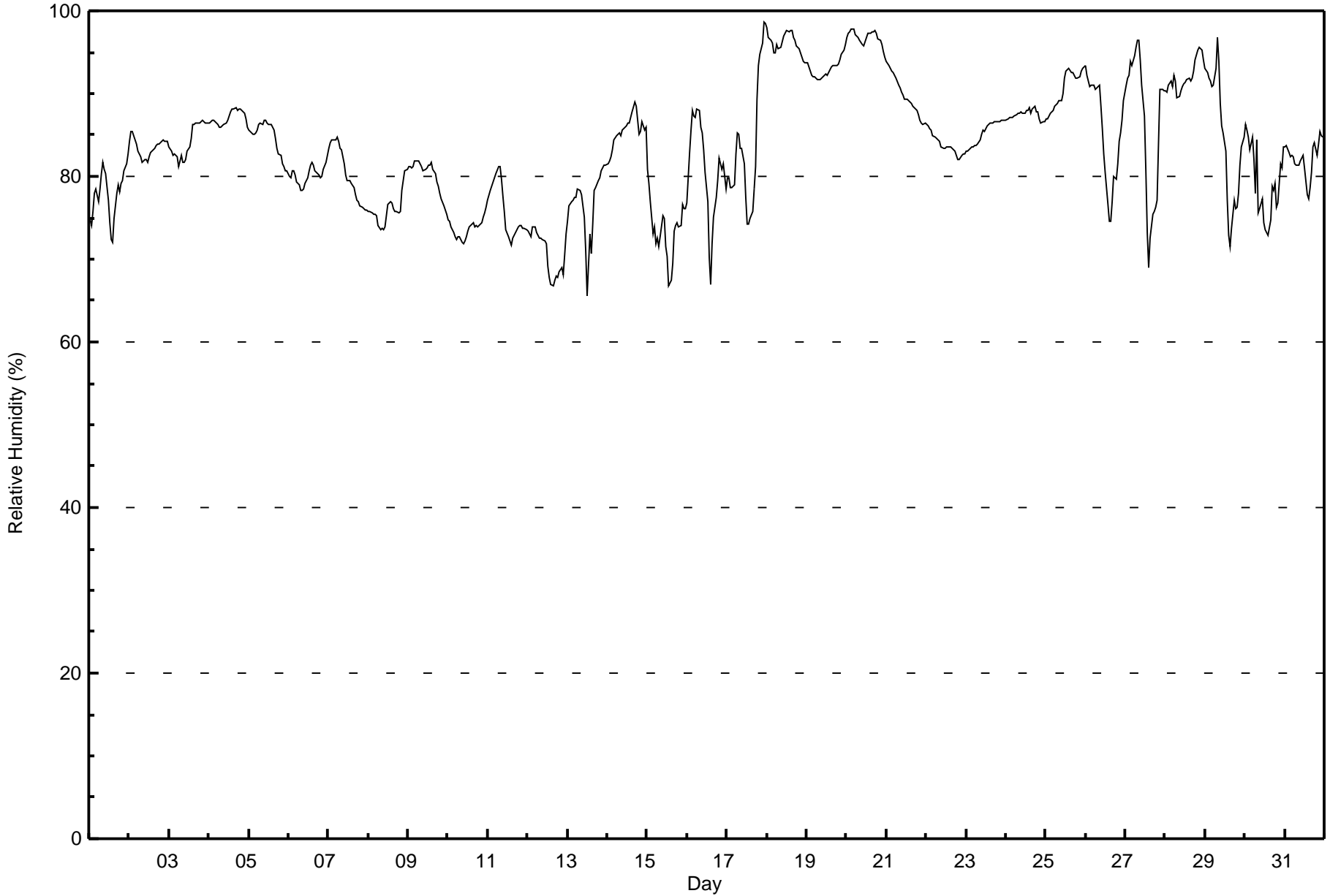
**Relative Humidity (RH) - %
Fort Chipewyan - January 2017**

Maximum Value: 99 % on Jan 17 23:00																		Maximum Daily Average: 96.8 % on Jan 20																		Hours in Service: 744												
Minimum Value: 66 % on Jan 13 13:00																		Minimum Daily Average: 70.7 % on Jan 12																		Hours of Data: 744												
Maximum Diurnal Average: 84.8 % at hour 8																		Minimum Diurnal Average: 80.7 % at hour 15																		Hours of Missing Data: 0												
Monthly Average: 83.5 %																		Percentiles: P ₁ = 68 P ₁₀ = 74 Q ₁ = 78 Median = 83 Q ₃ = 88 P ₉₀ = 93 P ₉₉ = 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-Jan	75	74	76	78	78	77	79	80	82	81	80	77	74	72	72	75	78	79	78	79	79	81	82	83	77.9	83																						
2-Jan	84	85	86	84	84	83	83	82	82	82	82	82	82	83	83	83	84	84	84	84	84	84	84	84	83.5	86																						
3-Jan	83	83	83	83	83	82	81	83	82	82	82	83	84	85	86	86	86	86	86	86	87	87	87	86	84.2	87																						
4-Jan	86	87	87	87	87	86	86	86	86	86	86	87	87	88	88	88	88	88	88	88	88	88	87	86	87.1	88																						
5-Jan	86	85	85	85	85	86	86	86	86	87	87	86	86	86	86	86	85	83	83	82	81	81	81	81	84.7	87																						
6-Jan	80	80	81	81	80	79	79	78	78	78	79	80	81	81	82	81	81	80	80	80	80	81	82	83	80.2	83																						
7-Jan	83	84	84	84	84	85	84	83	83	82	80	80	79	80	79	79	78	77	77	76	76	76	76	76	80.3	85																						
8-Jan	76	76	76	75	75	75	74	74	74	74	74	75	77	77	77	76	76	76	76	76	78	79	81	81	76.1	81																						
9-Jan	81	81	81	81	82	82	82	82	81	81	81	81	81	81	82	81	80	79	79	78	77	76	76	75	80.1	82																						
10-Jan	75	75	74	73	73	72	73	73	72	72	72	73	73	74	74	74	74	74	74	74	74	75	76	76	73.7	76																						
11-Jan	77	78	79	79	80	80	81	81	80	78	76	74	73	72	72	72	73	74	74	74	74	74	74	74	75.9	81																						
12-Jan	73	73	73	74	74	73	73	73	72	72	72	72	69	68	67	67	67	68	68	68	69	68	70	73	70.7	74																						
13-Jan	75	76	77	77	77	77	78	78	78	76	75	71	66	73	71	74	78	79	80	80	81	81	81	81	76.7	81																						
14-Jan	82	82	82	83	84	85	85	85	85	86	86	86	87	86	87	88	89	89	87	85	85	87	86	86	85.5	89																						
15-Jan	81	79	77	73	74	72	72	72	73	75	75	72	70	67	67	69	73	74	74	74	77	76	76	76	73.6	81																						
16-Jan	77	83	86	88	87	87	88	88	86	85	83	81	77	70	67	72	75	77	79	82	82	81	82	79	80.9	88																						
17-Jan	80	80	79	79	79	83	85	85	83	83	82	77	74	74	75	76	79	81	89	93	95	96	99	98	83.5	99																						
18-Jan	98	97	96	96	95	95	96	95	96	96	97	97	98	98	98	98	97	96	96	95	95	94	94	94	96.1	98																						
19-Jan	94	93	93	92	92	92	92	92	92	92	92	92	92	92	93	93	93	93	93	94	94	95	95	96	93.0	96																						
20-Jan	97	97	98	98	98	97	97	97	96	96	96	96	97	97	97	97	98	98	97	97	97	96	95	94	96.8	98																						
21-Jan	94	93	93	93	93	92	92	91	91	90	90	89	89	89	89	89	88	88	88	87	87	86	86	86	89.8	94																						
22-Jan	86	86	86	86	85	85	85	84	84	84	83	83	84	83	84	84	83	83	83	82	82	83	83	83	83.8	86																						
23-Jan	83	83	83	84	84	84	84	84	84	85	86	86	86	86	86	86	87	87	87	87	87	87	87	87	85.3	87																						
24-Jan	87	87	87	87	87	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	87	86	87	87	87.4	88																						
25-Jan	87	87	87	88	88	88	89	89	89	89	90	92	93	93	93	93	92	92	92	92	92	93	93	93	90.6	93																						
26-Jan	93	92	91	91	91	91	90	91	91	89	86	83	80	77	75	75	77	80	80	82	84	85	87	89	85.4	93																						
27-Jan	91	92	92	94	93	95	96	96	96	94	91	87	81	73	69	72	76	76	76	77	84	90	90	90	86.4	96																						
28-Jan	90	90	91	92	91	92	92	89	90	90	91	91	91	92	92	92	92	93	94	95	96	95	95	94	92.1	96																						
29-Jan	93	93	92	92	91	91	93	97	94	89	86	85	83	77	73	71	74	77	76	76	78	81	84	85	84.6	97																						
30-Jan	86	86	85	83	85	82	78	84	76	76	77	74	74	73	73	75	79	78	79	76	77	82	81	83	79.3	86																						
31-Jan	84	84	83	82	83	82	82	81	81	82	82	83	81	78	77	79	81	84	84	83	84	86	85	85	82.2	86																						
																								84.4	84.6	84.5	84.6	84.6	84.5	84.5	84.8	84.2	83.8	83.5	82.7	81.8	81.1	80.7	81.2	82.2	82.7	82.9	83.0	83.5	84.2	84.5	84.7	Diurnal Average
																								98	97	98	98	98	97	97	97	96	96	97	97	98	98	98	98	98	98	97	97	97	96	99	98	Diurnal Maximum



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Fort Chipewyan - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Fort Chipewyan - January 2017

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	0	0.00	0.00
60 - 80	238	31.99	31.99
80 - 100	506	68.01	100.00

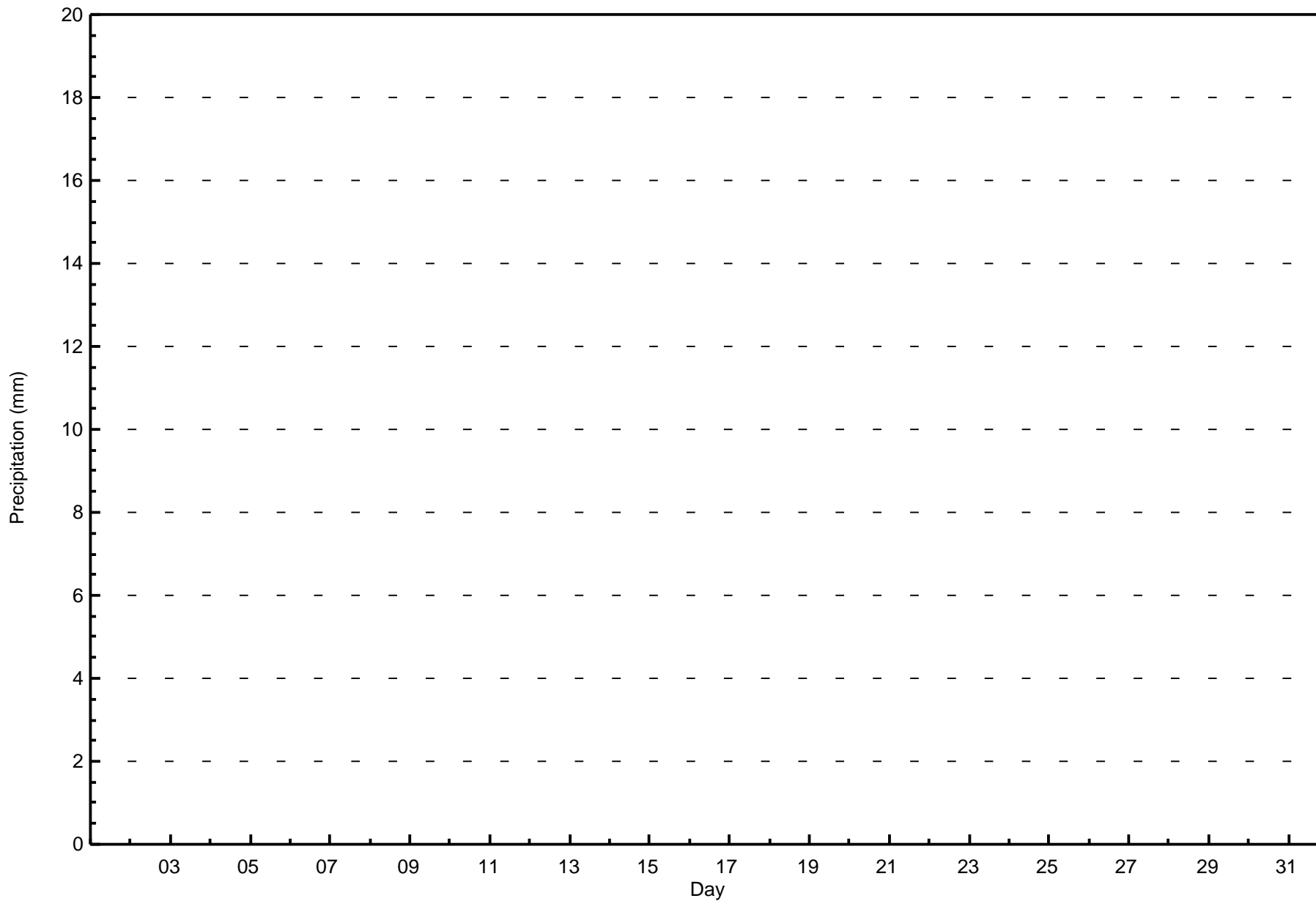
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Fort Chipewyan - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Precipitation (PC) - mm
Fort Chipewyan - January 2017

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	0	0.00	0.00
0.4 - 0.5	0	0.00	0.00
0.6 - 0.7	0	0.00	0.00
0.8 - 1.4	0	0.00	0.00
1.5 - 10	0	0.00	0.00
> 10	0	0.00	0.00

Total Number of Valid Hours: 0

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Leaf Wetness (SW) - %

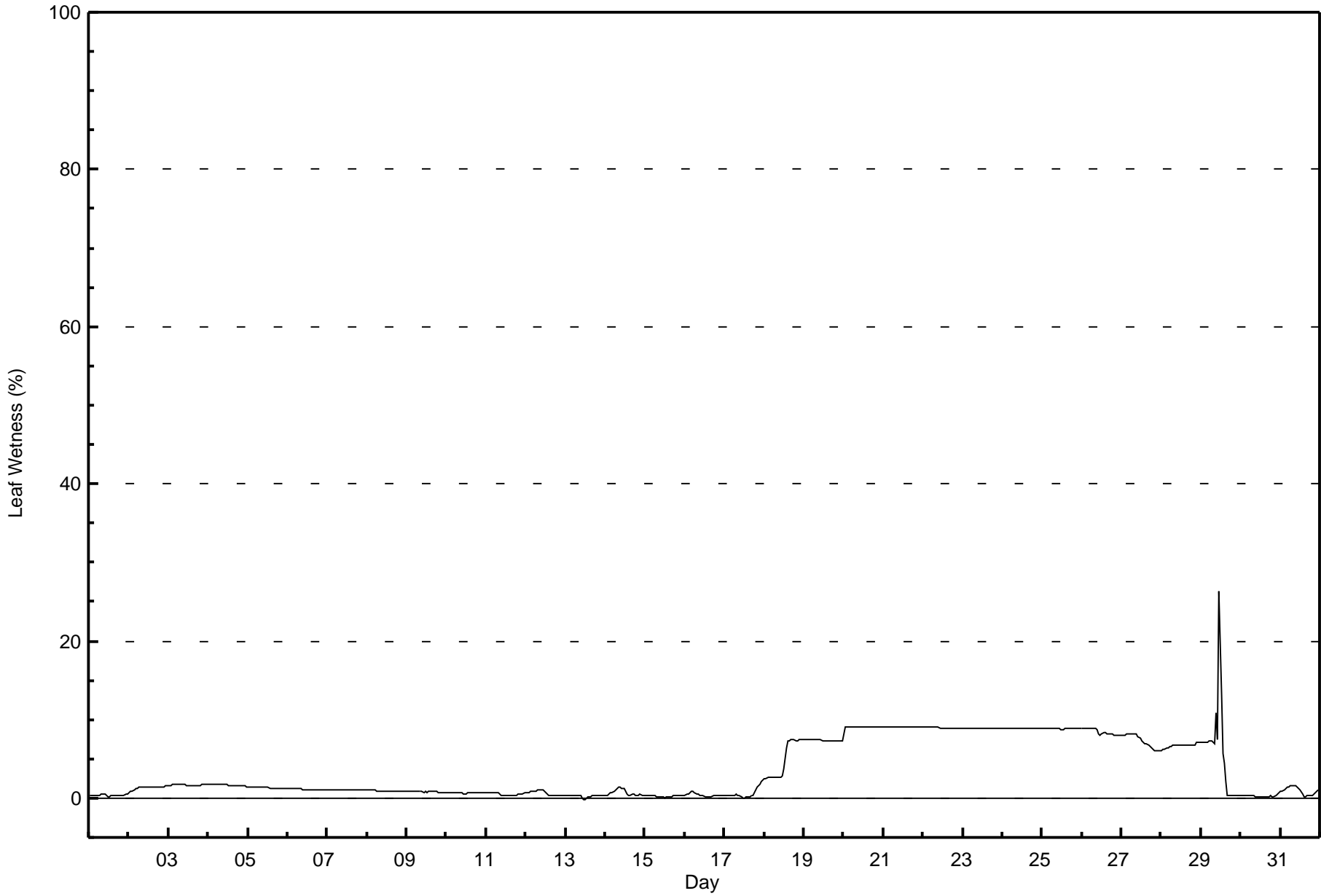
Fort Chipewyan - January 2017

Maximum Value: 26 % on Jan 29 12:00														Maximum Daily Average: 9.1 % on Jan 20														Hours in Service: 744			
Minimum Value: 0 % on Jan 13 12:00														Minimum Daily Average: 0.2 % on Jan 15														Hours of Data: 744			
Maximum Diurnal Average: 4.1 % at hour 12														Minimum Diurnal Average: 3.3 % at hour 19														Hours of Missing Data: 0			
Monthly Average: 3.5 %														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 7 P ₉₀ = 9 P ₉₉ = 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-Jan	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	1					
2-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1.3	2					
3-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.7	2					
4-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1.7	2					
5-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.3	1					
6-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	1					
7-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	1					
8-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1					
9-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1					
10-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1					
11-Jan	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.5	1					
12-Jan	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.6	1					
13-Jan	0	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					
14-Jan	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.7	1					
15-Jan	0	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-Jan	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1					
17-Jan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	2	2	0.6	2					
18-Jan	2	3	3	3	3	3	3	3	3	3	3	3	4	6	7	7	7	7	7	7	7	7	7	7	4.8	7					
19-Jan	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7.3	7					
20-Jan	8	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9.1	9					
21-Jan	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9.0	9					
22-Jan	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9.0	9					
23-Jan	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8.9	9					
24-Jan	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8.9	9					
25-Jan	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8.8	9					
26-Jan	9	9	9	9	9	9	9	9	9	9	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8.4	9					
27-Jan	8	8	8	8	8	8	8	8	8	8	8	8	7	7	7	7	7	7	6	6	6	6	6	6	7.3	8					
28-Jan	6	6	6	6	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6.7	7					
29-Jan	7	7	7	7	7	7	7	7	7	11	7	26	13	6	4	2	0	0	0	0	0	0	0	0	5.7	26					
30-Jan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1					
31-Jan	1	1	1	1	1	1	2	2	2	2	1	1	1	1	0	0	0	0	0	0	0	1	1	1	0.9	2					
3.5														3.5														Diurnal Average			
9														9														Diurnal Maximum			



Wood Buffalo Environmental Association
Hourly Averages

Leaf Wetness (SW) - %
Fort Chipewyan - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Leaf Wetness (SW) - %
Fort Chipewyan - January 2017

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	120	16.24	16.24
0.4 - 0.5	59	7.98	24.22
0.6 - 0.7	52	7.04	31.26
0.8 - 1.4	168	22.73	53.99
1.5 - 10	333	45.06	99.05
> 10	3	0.41	99.46

Total Number of Valid Hours: 739

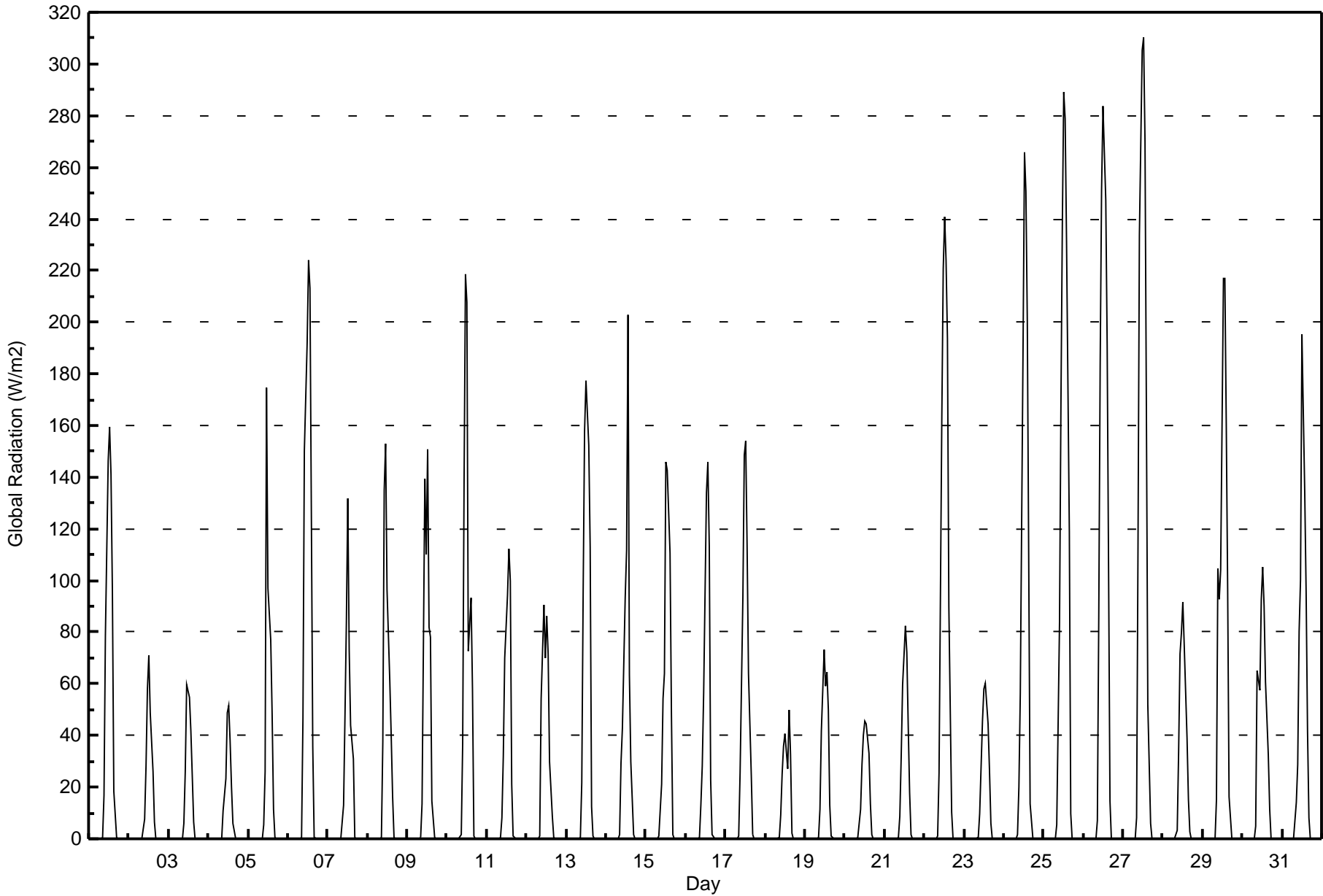
Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Global Radiation (GR) - W/m2
Fort Chipewyan - January 2017

Maximum Value: 310 W/m2 on Jan 27 13:00																			Maximum Daily Average: 61.0 W/m2 on Jan 27						Hours in Service: 744	
Minimum Value: 0 W/m2 on Jan 3 18:00																			Minimum Daily Average: 8.3 W/m2 on Jan 4						Hours of Data: 744	
Maximum Diurnal Average: 143.0 W/m2 at hour 13																			Minimum Diurnal Average: 0.0 W/m2 at hour 21						Hours of Missing Data: 0	
Monthly Average: 26.3 W/m2																			Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 21 P ₉₀ = 97 P ₉₉ = 262						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-Jan	0	0	0	0	0	0	0	0	0	17	79	146	159	141	95	19	0	0	0	0	0	0	0	0	27.4	159
2-Jan	0	0	0	0	0	0	0	0	0	8	28	58	71	49	26	7	0	0	0	0	0	0	0	0	10.3	71
3-Jan	0	0	0	0	0	0	0	0	0	6	26	60	55	41	24	6	0	0	0	0	0	0	0	0	9.1	60
4-Jan	0	0	0	0	0	0	0	0	0	11	23	49	52	38	20	6	0	0	0	0	0	0	0	0	8.3	52
5-Jan	0	0	0	0	0	0	0	0	0	5	26	175	97	77	48	11	1	0	0	0	0	0	0	0	18.3	175
6-Jan	0	0	0	0	0	0	0	0	1	47	150	192	224	213	126	36	1	0	0	0	0	0	0	0	41.2	224
7-Jan	0	0	0	0	0	0	0	0	0	13	48	84	132	73	44	31	1	0	0	0	0	0	0	0	17.7	132
8-Jan	0	0	0	0	0	0	0	0	1	38	135	153	97	61	40	17	1	0	0	0	0	0	0	0	22.5	153
9-Jan	0	0	0	0	0	0	0	0	0	13	139	110	151	82	78	15	1	0	0	0	0	0	0	0	24.6	151
10-Jan	0	0	0	0	0	0	0	0	1	37	138	219	208	72	93	58	1	0	0	0	0	0	0	0	34.5	219
11-Jan	0	0	0	0	0	0	0	0	1	8	32	70	95	113	100	21	1	0	0	0	0	0	0	0	18.3	113
12-Jan	0	0	0	0	0	0	0	0	1	54	91	70	86	72	30	9	0	0	0	0	0	0	0	0	17.2	91
13-Jan	0	0	0	0	0	0	0	0	0	22	96	158	177	152	113	13	1	0	0	0	0	0	0	0	30.5	177
14-Jan	0	0	0	0	0	0	0	0	1	29	43	93	111	203	63	30	1	0	0	0	0	0	0	0	24.0	203
15-Jan	0	0	0	0	0	0	0	0	1	21	54	64	146	143	111	48	2	0	0	0	0	0	0	0	24.6	146
16-Jan	0	0	0	0	0	0	0	0	1	13	28	56	134	146	113	23	2	0	0	0	0	0	0	0	21.5	146
17-Jan	0	0	0	0	0	0	0	0	1	26	94	149	154	113	64	24	2	0	0	0	0	0	0	0	26.1	154
18-Jan	0	0	0	0	0	0	0	0	0	9	25	36	41	27	50	33	2	0	0	0	0	0	0	0	9.3	50
19-Jan	0	0	0	0	0	0	0	0	1	11	42	73	59	65	50	13	1	0	0	0	0	0	0	0	13.1	73
20-Jan	0	0	0	0	0	0	0	0	1	11	29	40	45	44	33	14	2	0	0	0	0	0	0	0	9.1	45
21-Jan	0	0	0	0	0	0	0	0	1	9	32	60	82	72	44	18	2	0	0	0	0	0	0	0	13.3	82
22-Jan	0	0	0	0	0	0	0	0	1	25	164	220	241	224	194	90	10	0	0	0	0	0	0	0	48.8	241
23-Jan	0	0	0	0	0	0	0	0	1	10	28	46	58	60	44	27	6	0	0	0	0	0	0	0	11.6	60
24-Jan	0	0	0	0	0	0	0	0	1	20	57	193	266	251	200	108	14	0	0	0	0	0	0	0	46.2	266
25-Jan	0	0	0	0	0	0	0	0	5	84	168	238	289	279	231	119	10	0	0	0	0	0	0	0	59.3	289
26-Jan	0	0	0	0	0	0	0	0	7	86	183	251	284	247	191	104	15	0	0	0	0	0	0	0	57.0	284
27-Jan	0	0	0	0	0	0	0	0	8	113	234	305	310	270	165	52	6	0	0	0	0	0	0	0	61.0	310
28-Jan	0	0	0	0	0	0	0	0	3	34	72	80	92	75	39	15	3	0	0	0	0	0	0	0	17.2	92
29-Jan	0	0	0	0	0	0	0	0	15	104	93	104	217	217	161	97	17	0	0	0	0	0	0	0	42.6	217
30-Jan	0	0	0	0	0	0	0	0	5	65	57	93	105	90	61	33	11	0	0	0	0	0	0	0	21.6	105
31-Jan	0	0	0	0	0	0	0	0	14	29	80	101	195	135	95	42	8	0	0	0	0	0	0	0	29.1	195
																			0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4 31.6 80.4 120.8 143.0 124.0 88.5 36.7 3.9 0.0 0.0 0.0 0.0 0.0 0.0 0.0						Diurnal Average	
																			0 0 0 0 0 0 0 0 15 113 234 305 310 279 231 119 17 0 0 0 0 0 0 0						Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Global Radiation (GR) - W/m2
Fort Chipewyan - January 2017

Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	556	74.73	74.73
21 - 100	117	15.73	90.46
101 - 300	69	9.27	99.73
301 - 600	2	0.27	100.00
601 - 900	0	0.00	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h Fort Chipewyan - January 2017

Maximum Speed: 23 km/h on Jan 15 04:00	Maximum Daily Speed Average: 15.5 km/h on Jan 26	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jan 2 01:00	Minimum Daily Speed Average: 0.8 km/h on Jan 20	Hours of Data: 735
Maximum Diurnal Speed Average: 3.9 km/h at hour 12	Minimum Diurnal Speed Average: 2.0 km/h at hour 23	Hours of Missing Data: 9
Monthly Average Velocity: 3.2 km/h 275.9 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 7 O ₃ = 12 P ₉₀ = 16 P ₉₉ = 21	Percent Operational Time: 98.8

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	NNW18	NNW16	NNW14	NNW13	NW11	WNW12	WNW13	WNW11	WNW11	W8WNW11	NW14	NW12	NW11	WNW10	WNW8	W7	WNW7	W5	WSW3	WSW3	NW4	NW6	WNW6	NW9.2	NNW18	
2-Jan	N0	WSW4	WSW2	W2	WNW1	WNW4	NNW2	NW3	NNW4	WNW5	NW5	SW3	WSW2	SSW3	SW6	SW5	SW6	SW6	SW7	WSW6	SW8	SW5	SE2	SSW4	WSW3.0	SW8
3-Jan	SW4	WSW3	WSW5	W4	W5	W6	WSW6	W10	WNW10	W9	W8	W11	WNW12	WNW12	WNW11	WNW11	WNW11	WNW8	WNW6	NW6	NW5	NW5	NW5	WNW7.0	WNW12	
4-Jan	NW5	NW4	WNW3	NW2	W3	W3	WSW3	AF	AF	AF	AF	SSW1	SSW3	M	SSE6	S6	S6	S5	S2	NNE1	NNE2	NNE3	N3	NNW4	WSW0.9	S6
5-Jan	NNW5	NNW6	NNW4	NNW5	NW5	NW5	NW5	NNW7	NNW7	N7	NNW7	NNW7	NNW4	NW5	NW5	WNW5	W7	W6	W6	W7	W6	W6	WNW9	NNW5.4	WNW9	
6-Jan	WNW7	WNW7	W5	WNW5	WNW7	WNW8	W5	W4	WSW5	WSW3	WSW4	W3	WSW3	WSW3	WSW4	WSW6	W7	W6	WNW6	WNW4	W4	W5	WNW5	W4	W4.9	WNW8
7-Jan	W5	WNW6	WNW6	WNW4	WNW3	NNW4	NNW5	N4	NW5	NW7	NW6	NW6	NW6	WNW6	WNW5	W5	W6	WNW5	WNW5	WNW6	WNW7	WNW7	WNW6	WNW5.2	NW7	
8-Jan	WNW6	WSW6	W6	W6	W5	WSW5	SW5	SW5	SW8	SW8	SW8	SW6	SSW6	SSW6	SSW5	SSW4	SW6	SW7	SW7	SW7	W8	W9	W11	W12	WSW6.3	W12
9-Jan	W13	W10	W9	W9	W10	W9	WNW8	WNW7	W6	WNW5	W4	WNW6	WNW5	W7	WNW7	NW7	NW9	NW8	NW8	NW9	NW7	WNW4	NW4	NW3	WNW6.9	W13
10-Jan	WNW5	WNW4	WNW5	WNW5	WNW5	WNW6	WNW6	NW8	WNW6	WNW7	WNW6	WNW7	WNW7	W4	W5	W4	SW5	SW7	SW6	SSW6	SSW5	S4	SSE4	S5	W4.1	NW8
11-Jan	S7	S10	S10	S9	SSW9	WSW4	WNW6	NNW11	NW14	NW14	NW13	NNW13	NNW13	NNW12	NNW12	NNW12	NW10	NW10	NW8	WNW6	WNW5	W5	W6	WNW8	NW6.2	NW14
12-Jan	WNW8	NW6	SSW2	E3	ESE3	SE4	ESE7	ESE9	ESE10	ESE12	ESE11	SE12	SE14	SE14	SE14	SE15	SE17	SE15	SSE19	SSE20	S18	SSW16	SSW16	SW14	SSE8.6	SSE20
13-Jan	W13	WNW11	W11	W12	W11	W11	WNW9	WNW6	W5	W5	SW5	SW5	SW3	E4	ENE4	E6	E9	E10	E11	E13	E15	E15	E18	E19	ENE1.0	E19
14-Jan	E23	E21	E20	E20	E22	E19	E19	E17	E18	E17	E16	E14	E16	E15	E13	E12	E6	SE5	S6	SSW9	SSW7	SW9	SW12	SW12	E11.0	E23
15-Jan	WSW14	W12	W17	W23	W20	W21	W19	W18	W17	W13	W14	W14	W12	W13	W14	WSW13	WSW11	WSW14	WSW14	WSW14	WSW16	WSW16	W16	W14	W15.2	W23
16-Jan	WSW9	SSW8	SSW9	SE6	SSE7	S8	SSE8	SSE7	SSW11	S15	SSW14	SSW18	SSW15	SSW15	SW16	SW19	SW18	SW14	SW11	SW10	SW8	S6	ESE8	SSE7	SSW9.9	SW19
17-Jan	SSW11	SW15	SW15	SW11	SW12	SW12	WSW14	W17	W17	W14	W17	W17	W16	W13	WSW14	WSW13	WSW11	SW7	ESE4	SW7	SW10	ESE2	ENE7	E7	WSW9.4	W17
18-Jan	ENE6	E8	ENE8	E8	E4	NE2	NE6	NNE5	ENE7	ENE8	ENE6	NNE3	NNE5	E10	E5	E5	SSW1	WNW6	NW5	WNW6	WNW5	WNW5	WNW6	WNW6	NE2.8	E10
19-Jan	WNW6	W6	W6	W5	WNW5	W4	W6	NW5	NW3	WNW2	WNW2	ESE1	ESE3	E3	ENE2	E4	ENE4	ENE5	E8	ENE7	ENE8	E9	ENE8	ENE7	NNE1.3	E9
20-Jan	NE5	ENE6	ENE6	ENE4	ESE4	SW4	SW4	SSW4	S4	S4	SSW4	SSW4	SW3	SW2	SE1	SSW3	SSW3	WSW3	W5	WNW4	NW4	NNW4	NNW4	NNW4	SW0.8	ENE6
21-Jan	NNW4	NNW4	NNW4	NNW4	NNW4	NNW4	NNW4	NNW6	NNW6	NNW6	NNW4	NNW5	NNW4	NW4	NNW5	NNW5	NNW5	NNW7	NNW6	NNW6	NNW5	NNW4	NNW4	NNW4	NNW4.7	NNW7
22-Jan	NNW4	N5	NNW5	NNW5	NNW5	NNW5	NNW4	NNW4	NNW4	NNW4	NNW4	NW4	NW4	NW4	NNW3	NNW3	NNW1	N2	N2	ENE2	E2	ESE2	AF	AF	NNW3.2	NNW5
23-Jan	AF	NW2	NNW2	NW2	NW2	NW1	N1	AF	ENE2	SE2	S2	SW2	SW1	SSW1	SSW1	SE2	ESE4	SSE3	SSE3	SSE3	SSE3	SE3	ESE4	ESE6	SE1.1	ESE6
24-Jan	ESE4	SE4	ESE5	ESE5	SE4	SE4	SE4	SE4	SE3	SE3	ESE4	ESE5	E5	E5	E6	E6	E5	E5	E5	E5	E5	E6	E6	E5	ESE4.5	E6
25-Jan	ESE4	ESE4	ESE4	ESE3	SE3	SSE3	S3	SSW4	S4	SSW4	SSW6	SSW5	SW6	SSW7	SSW6	SSW8	SW8	SW10	SW9	SW10	SW10	SW11	SW11	SW11	SSW5.3	SW11
26-Jan	WSW12	W14	W18	W16	W16	W17	W16	W14	W14	W17	W22	W21	W16	W15	W18	WSW17	W15	W14	W16	W16	W14	WNW14	WNW13	WNW10	W15.5	W22
27-Jan	WNW9	WNW11	WNW12	WNW11	WNW13	WNW11	WNW7	W5	W5	WNW8	WNW9	WNW11	WNW13	W13	W6	WSW7	W10	W10	WNW11	WNW8	E4	E9	E10	E10	WNW6.6	WNW13
28-Jan	E10	E15	E14	E13	E13	E15	E13	E11	E12	E15	E18	E18	E18	E17	E13	E12	ENE12	ENE11	ENE11	ENE9	E8	E10	E9	E8	E12.7	E18
29-Jan	ESE7	E4	E4	E3	E4	E3	SW3	W7	W8	W8	WSW8	W8	W10	W16	W19	W17	W15	WSW17	W18	WNW16	W14	W16	W18	W18	W8.6	W19
30-Jan	W18	WNW18	WNW17	WNW16	WNW15	NW21	NW20	NNW16	NW19	NW16	WNW17	NW19	NW22	NW23	NW20	NW18	NW16	NNW16	NNW15	N14	N13	N8	NNW8	NNW7	NW15.2	NW23
31-Jan	NNW7	NW9	NW9	WNW9	WNW10	WNW9	WNW8	WNW10	WNW9	WNW9	W8	W9	W13	WNW10	WNW12	WNW14	WNW12	WNW11	NW9	NW11	NW10	NNW9	NNW12	NW11	WNW9.5	WNW14

WNW3.0	WNW3.0	W3.0	WNW2.8	W3.1	W3.7	WNW3.4	WNW3.7	WNW3.6	WNW3.3	W3.6	W3.9	W3.7	W3.3	W3.6	W3.4	WSW3.6	W3.8	W3.3	W3.2	W2.8	W2.1	WNW2.0	W2.6	Diurnal Average
E23	E21	E20	W23	E22	W21	NW20	W18	NW19	E17	W22	W21	NW22	NW23	NW20	SW19	SW18	WSW17	SSE19	SSE20	S18	WSW16	E18	E19	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

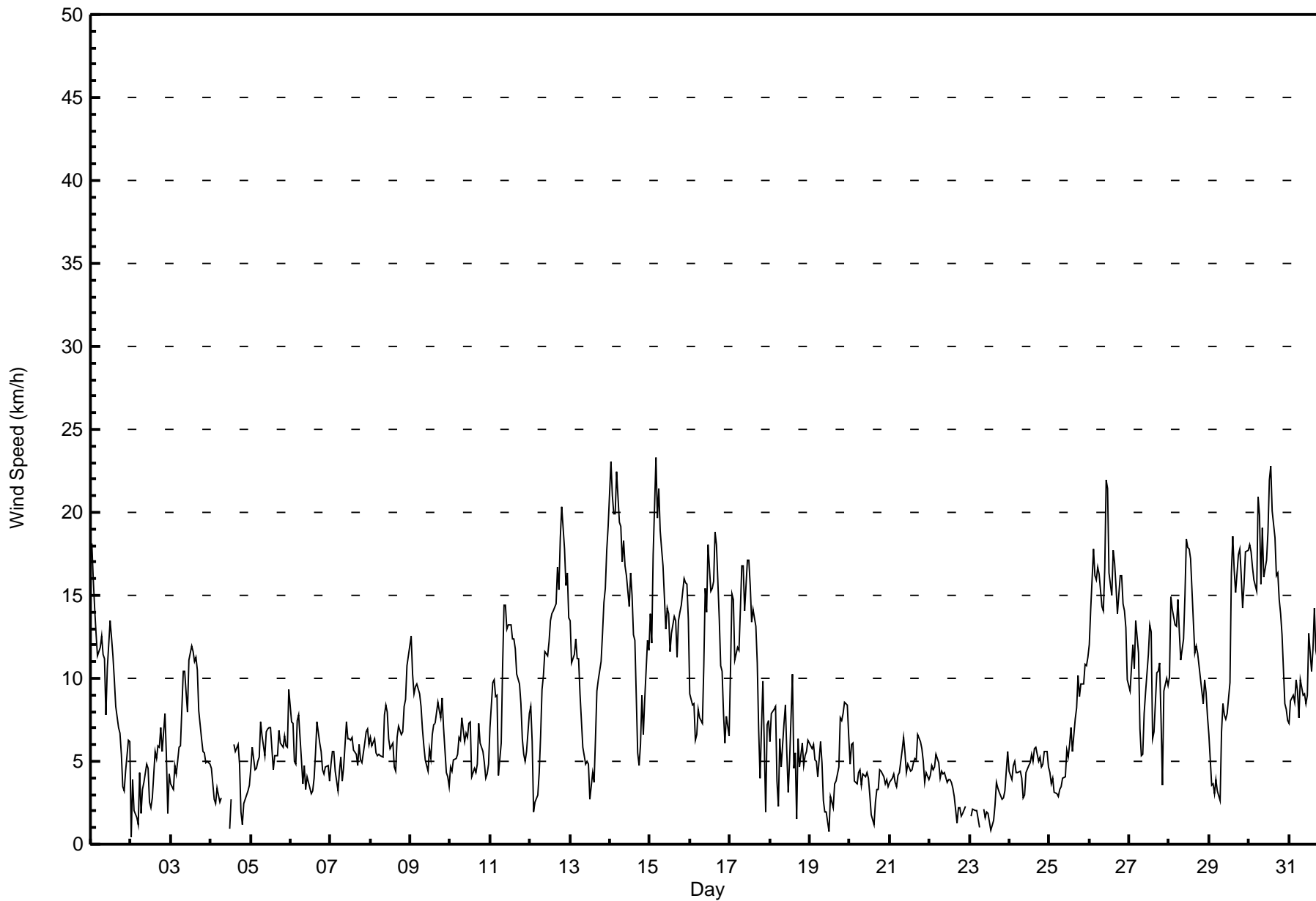
Wind Speed (WS) - km/h
Fort Chipewyan - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 8 km/h on Jan 30 06:00	Hours of Data: 735
Minimum Value: 0 km/h on Jan 23 11:00	Hours of Missing Data: 9
Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 1 Q ₃ = 2 P ₉₀ = 3 P ₉₉ = 6	Hours of Calibration: 0
	Percent Operational Time: 98.8

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-Jan	6	6	4	4	3	3	3	3	2	2	2	3	3	3	2	2	1	2	1	1	1	1	1	1	6
2-Jan	2	1	1	1	1	2	2	2	1	2	2	1	1	2	2	1	1	1	1	1	1	1	2	1	2
3-Jan	1	1	1	1	1	1	1	1	2	2	2	3	3	3	3	2	2	1	2	1	2	1	1	3	
4-Jan	1	1	1	1	1	1	1	AF	AF	AF	AF	1	2	M	1	1	1	1	1	1	0	1	1	2	
5-Jan	1	2	2	1	1	1	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2	
6-Jan	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	
7-Jan	1	1	1	1	1	2	2	1	2	2	2	2	1	2	1	1	1	1	1	1	1	1	1	2	
8-Jan	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	3	3	
9-Jan	2	2	2	2	2	2	2	1	1	1	2	2	1	2	2	2	2	2	2	2	2	1	1	2	
10-Jan	1	1	1	1	1	1	1	2	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	2	
11-Jan	1	2	2	2	2	2	3	4	5	5	4	5	4	4	4	4	3	3	3	2	1	1	1	5	
12-Jan	2	2	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	3	3	4	4	3	3	4	
13-Jan	3	3	3	3	3	2	2	1	1	1	1	1	2	1	1	3	1	1	2	1	2	2	3	3	
14-Jan	2	2	3	3	2	2	2	2	2	2	1	1	1	1	2	1	2	1	2	2	2	1	1	3	
15-Jan	2	3	4	5	5	7	4	4	4	3	3	3	3	3	2	3	2	3	3	3	3	3	2	7	
16-Jan	2	2	2	2	2	2	2	2	2	2	3	3	3	3	2	2	2	3	2	2	2	2	2	3	
17-Jan	4	1	2	2	4	3	3	4	4	3	3	4	3	3	3	2	3	2	1	4	3	2	3	4	
18-Jan	1	1	1	2	2	2	1	1	2	2	2	1	2	3	1	2	2	1	1	1	1	1	1	3	
19-Jan	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	
20-Jan	1	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0	0	1	1	1	1	1	1	1	
21-Jan	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	2	1	2	2	1	1	1	2	
22-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0	AF	AF	
23-Jan	AF	0	0	0	1	1	1	AF	1	0	0	0	1	1	0	1	0	0	0	0	0	1	0	1	
24-Jan	1	0	0	1	0	0	0	1	1	0	0	0	0	1	1	0	0	1	1	1	1	1	1	1	
25-Jan	1	0	0	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	2	
26-Jan	2	3	3	3	3	3	4	3	3	4	6	5	4	3	4	3	3	3	3	3	2	2	2	6	
27-Jan	2	2	3	4	2	2	2	1	1	1	2	4	3	3	4	3	2	2	2	3	2	1	1	4	
28-Jan	1	2	1	2	2	2	2	1	2	2	2	2	2	3	1	1	2	1	1	1	1	1	1	3	
29-Jan	1	1	0	1	1	1	1	2	2	1	1	1	3	4	4	4	3	4	4	4	3	3	3	4	
30-Jan	3	3	3	3	3	8	6	5	6	5	4	6	6	7	6	6	5	6	5	5	4	3	3	8	
31-Jan	2	2	2	2	1	2	2	2	3	2	2	2	3	3	3	3	3	2	2	3	3	3	3	3	
	6	6	4	5	5	8	6	5	6	5	6	6	6	7	6	6	5	6	5	5	4	3	3	3	

Diurnal Maximum

M - Maintenance AF - Analyzer Failure





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Fort Chipewyan - January 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	274	37.28	37.28
6 - 11	277	37.69	74.97
12 - 19	168	22.86	97.82
20 - 28	16	2.18	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 735

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Fort Chipewyan - January 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	6	6	2	7	22	19	14	6	9	19	17	18	27	28	29	45	274
6 - 11	2	0	1	15	24	7	1	5	9	14	32	9	45	71	25	17	277
12 - 19	2	0	0	1	30	1	7	1	2	6	11	15	51	18	10	13	168
20 - 28	0	0	0	0	5	0	0	1	0	0	0	0	5	0	5	0	16
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
Totals	10	6	3	23	81	27	22	13	20	39	60	42	128	117	69	75	735

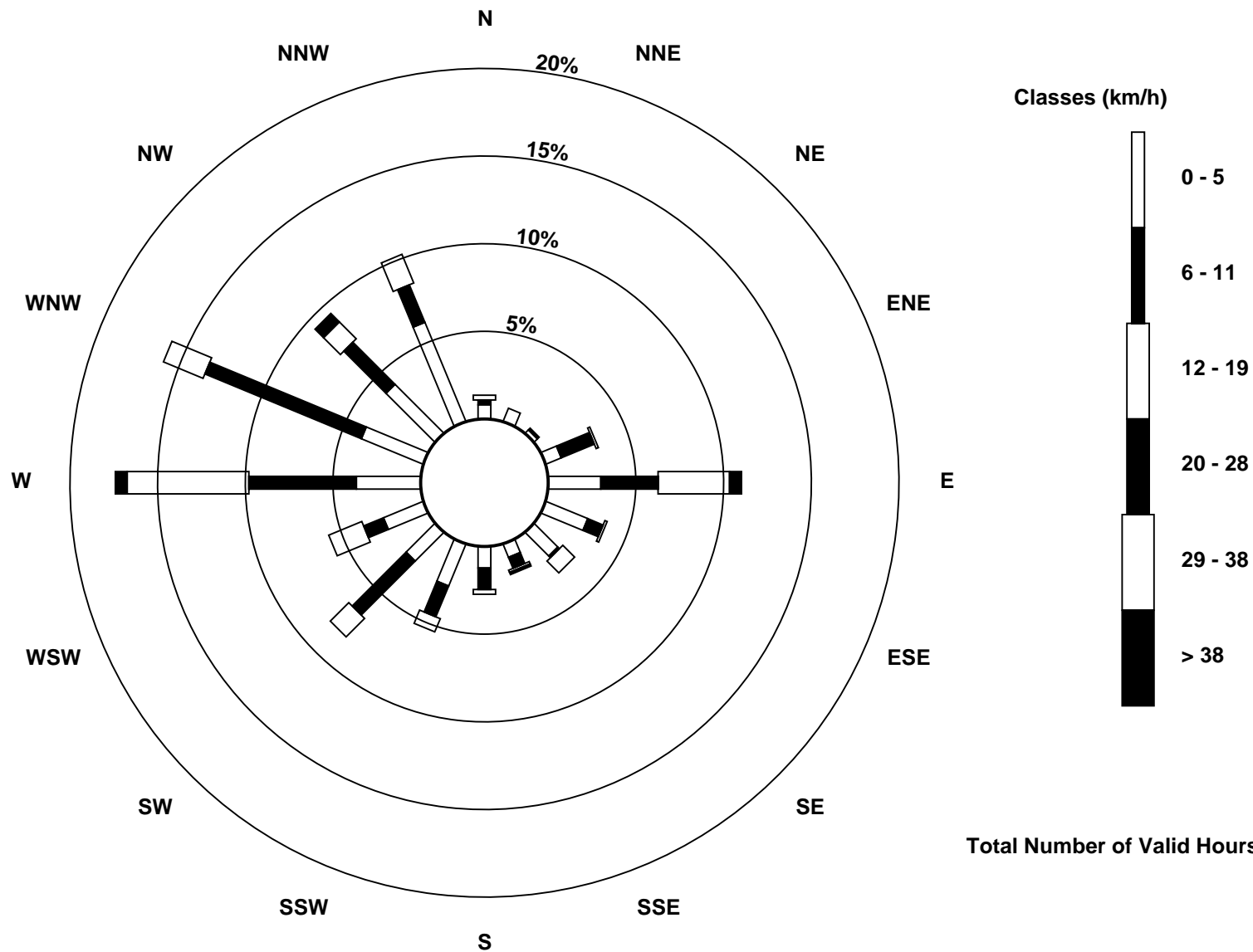
Total Number of Valid Hours: 735

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Wind Speed (WS) - km/h
Fort Chipewyan (AMS 8)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Fort Chipewyan - January 2017

Direction of Maximum Speed: 269 deg on Jan 15 04:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 266.5 deg on Jan 26	Hours of Data: 735
Direction of Minimum Speed: 350 deg on Jan 2 01:00	Direction of Minimum Daily Speed Average: 0.8 deg on Jan 20
Direction of Minimum Speed: 350 deg on Jan 2 01:00	Hours of Missing Data: 9
Monthly Average Direction: 284.1 deg	Percent Operational Time: 98.8

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jan	338	330	327	327	315	302	298	289	289	268	300	312	310	310	302	294	273	285	259	242	252	310	321	293	305.4
2-Jan	350	241	254	270	285	300	338	324	327	301	314	233	238	205	229	218	218	228	233	243	230	226	130	211	246.9
3-Jan	219	245	249	273	259	262	251	273	282	280	273	281	283	282	282	282	291	291	294	304	315	319	315	312	281.6
4-Jan	313	309	300	306	277	278	249	AF	AF	AF	AF	201	197	M	166	175	180	178	178	27	31	30	4	340	244.7
5-Jan	341	343	336	334	324	307	321	334	335	341	349	335	336	327	318	315	295	280	275	270	280	273	279	286	313.2
6-Jan	285	288	272	282	284	290	278	265	243	244	250	260	250	248	251	250	265	275	289	284	275	278	282	277	272.2
7-Jan	281	289	292	289	289	331	335	356	314	318	324	323	308	306	303	289	273	279	282	283	287	285	282	284	299.3
8-Jan	285	258	264	260	261	252	233	224	225	228	224	230	213	210	202	202	222	229	230	233	262	270	265	272	242.4
9-Jan	273	277	281	267	267	276	285	288	280	291	268	284	284	279	301	319	314	315	312	317	319	297	325	323	291.3
10-Jan	290	303	294	287	287	287	295	312	297	290	294	292	294	273	273	262	232	232	219	203	197	173	163	170	268.5
11-Jan	186	188	189	178	197	247	297	337	325	321	325	331	329	327	330	331	326	322	319	300	292	271	273	289	305.2
12-Jan	292	311	203	84	122	138	108	111	108	109	108	136	137	140	138	137	137	144	155	165	178	199	209	226	151.8
13-Jan	264	282	271	272	271	279	297	302	262	260	235	228	228	89	66	91	94	86	83	84	85	82	84	84	57.5
14-Jan	88	85	85	82	83	84	87	88	90	92	97	97	94	96	94	91	99	132	191	210	209	219	221	233	98.9
15-Jan	254	264	260	269	274	266	265	270	271	277	278	274	268	269	259	256	244	247	256	256	258	256	262	262	263.7
16-Jan	237	210	201	138	168	172	164	148	192	191	199	192	196	208	216	216	222	230	228	223	227	186	117	147	199.9
17-Jan	205	217	217	226	222	223	246	268	271	265	265	263	261	261	256	258	242	216	107	216	232	119	78	80	243.0
18-Jan	77	84	77	79	94	46	54	22	72	65	62	20	32	84	87	93	211	292	315	301	290	290	285	284	47.4
19-Jan	288	276	272	270	284	268	265	308	307	297	290	120	111	91	72	84	66	62	79	73	66	79	68	74	32.5
20-Jan	52	66	72	77	117	217	228	202	187	178	193	196	223	215	129	196	206	243	277	298	321	335	333	333	215.6
21-Jan	335	335	339	344	342	340	341	341	345	341	335	331	328	326	335	336	337	343	344	343	345	335	338	327	338.2
22-Jan	335	349	347	341	336	338	335	340	346	343	338	320	317	323	328	339	345	359	6	78	82	105	AF	AF	342.5
23-Jan	AF	323	328	322	320	322	356	AF	68	124	179	224	225	208	207	133	123	151	164	168	147	134	123	116	143.0
24-Jan	123	128	121	121	128	125	126	128	140	138	115	111	101	98	94	95	89	97	101	89	99	93	94	96	108.3
25-Jan	102	112	115	123	133	164	177	196	188	202	210	212	214	208	201	208	215	218	217	217	225	228	230	236	207.1
26-Jan	249	259	265	259	261	259	267	265	264	267	269	272	260	259	259	257	260	267	274	273	280	283	287	291	266.5
27-Jan	289	290	292	292	294	292	289	277	273	284	287	282	282	280	277	249	265	275	285	289	81	84	91	90	286.5
28-Jan	92	94	95	95	95	100	91	97	95	90	91	83	85	85	79	79	78	76	78	77	85	83	81	93	87.9
29-Jan	104	94	94	85	88	84	232	259	271	270	258	259	261	259	269	274	262	252	269	282	281	279	279	279	268.7
30-Jan	279	282	287	287	294	317	323	331	317	308	302	312	312	316	318	319	325	341	341	358	0	354	347	345	316.6
31-Jan	340	320	318	295	288	297	298	290	303	284	270	278	281	301	288	284	286	284	304	315	319	328	329	317	299.7

284.1 284.1 276.6 281.3 275.7 280.1 286.9 294.9 287.6 281.6 276.6 276.9 277.0 275.9 271.9 264.2 255.8 262.0 267.4 266.0 268.4 269.4 283.6 279.3
 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

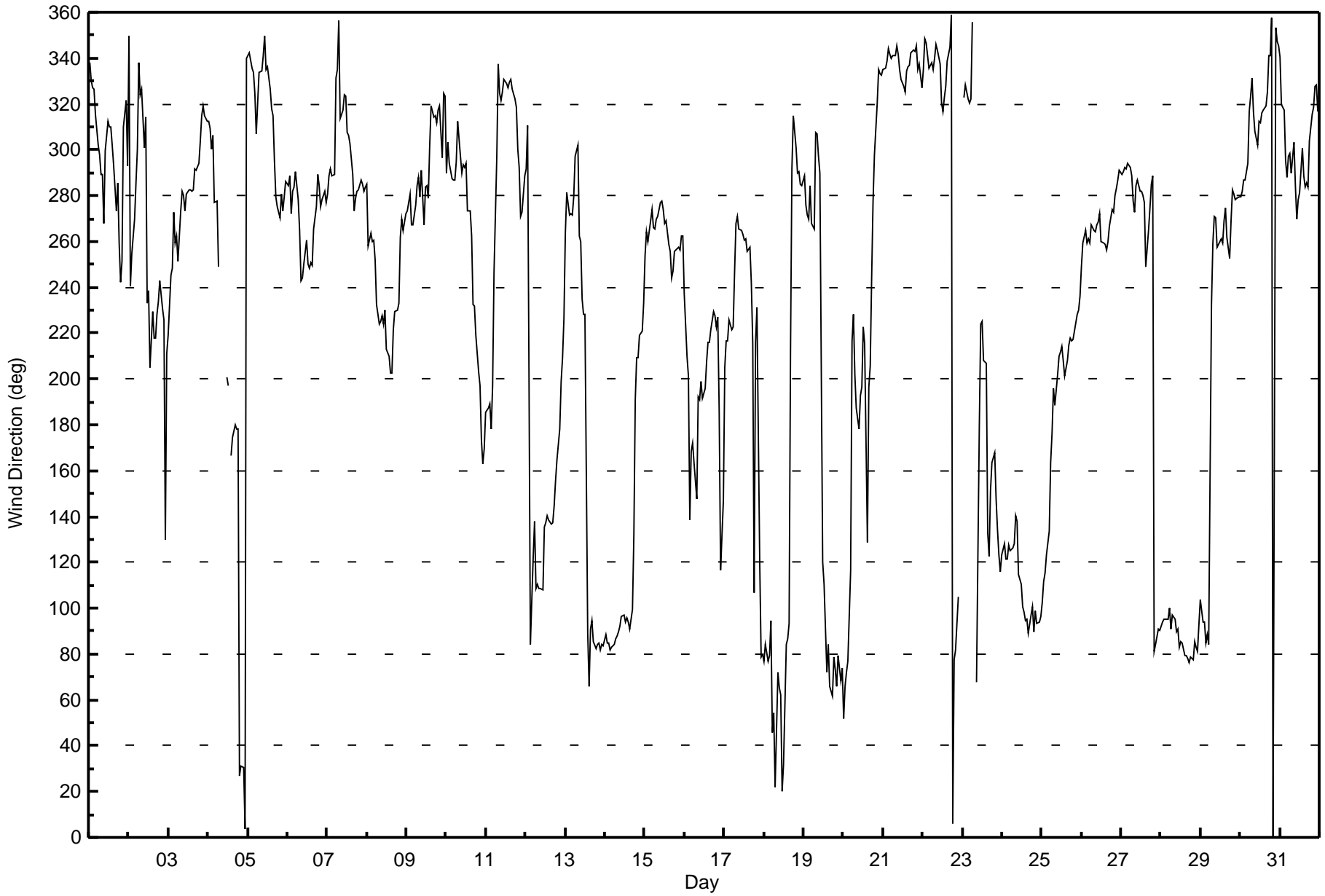
Wind Direction (WD) - deg
Fort Chipewyan - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 90 deg on Jan 2 01:00 Minimum Value: 3 deg on Jan 24 16:00 Percentiles: P ₁ = 5 P ₁₀ = 7 Q ₁ = 11 Median = 14 Q ₃ = 20 P ₉₀ = 25 P ₉₉ = 61																	Hours in Service: 744 Hours of Data: 735 Hours of Missing Data: 9 Hours of Calibration: 0 Percent Operational Time: 98.8								
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-Jan	22	22	20	21	19	14	15	17	14	17	14	15	16	16	14	15	10	19	16	26	24	32	11	14	32
2-Jan	90	19	45	54	54	22	66	51	18	15	24	33	26	46	16	17	17	10	10	18	10	13	73	34	90
3-Jan	22	30	13	14	14	14	16	14	15	15	15	15	14	15	15	15	15	17	19	18	22	18	17	30	
4-Jan	15	19	23	26	23	33	18	AF	AF	AF	AF	9	8	M	15	11	11	14	19	15	15	11	23	20	33
5-Jan	17	21	41	26	18	17	17	22	24	22	21	23	23	30	25	22	19	12	14	15	15	15	12	13	41
6-Jan	13	14	18	14	10	12	14	25	12	11	17	14	19	24	17	12	11	11	14	17	15	13	15	15	25
7-Jan	16	14	16	17	22	30	26	30	22	22	24	24	19	19	19	15	13	12	16	16	14	12	11	10	30
8-Jan	12	14	14	15	13	15	12	10	8	9	8	9	12	11	15	12	9	11	10	10	17	15	14	13	17
9-Jan	13	15	16	14	15	15	16	15	17	16	31	23	20	16	20	20	17	16	15	20	18	16	20	23	31
10-Jan	14	21	13	12	12	12	18	15	14	13	14	16	16	25	15	25	10	10	12	16	11	18	17	16	25
11-Jan	11	9	9	11	12	32	27	25	23	21	21	24	22	23	21	20	22	20	18	17	15	10	8	11	32
12-Jan	12	12	52	19	19	28	10	6	12	7	6	11	9	11	9	9	9	9	11	14	10	9	7	13	52
13-Jan	19	15	14	13	14	13	12	20	23	13	12	18	43	25	15	13	7	9	6	5	5	6	6	7	43
14-Jan	5	6	6	6	6	6	5	6	6	6	6	6	5	7	5	5	38	30	26	13	24	9	7	10	38
15-Jan	12	15	13	14	14	14	15	14	14	12	12	13	13	14	11	11	10	11	12	12	12	12	12	11	15
16-Jan	18	14	18	27	29	23	22	26	13	8	12	9	9	9	11	9	7	10	11	10	17	40	22	28	40
17-Jan	25	6	7	9	8	11	14	15	14	13	13	13	14	14	12	12	19	25	46	55	12	73	16	15	73
18-Jan	11	7	12	15	37	73	15	21	13	14	14	45	31	24	34	22	61	14	19	15	17	16	19	16	73
19-Jan	16	16	16	22	24	40	21	19	29	29	39	72	20	22	18	16	14	13	8	9	11	8	10	12	72
20-Jan	18	17	9	9	34	15	16	20	9	11	10	10	12	14	57	20	19	14	15	16	21	23	23	21	57
21-Jan	22	22	21	22	23	20	22	19	21	24	24	25	25	27	27	23	26	20	19	21	21	20	23	22	27
22-Jan	27	24	23	19	17	16	17	18	19	20	27	27	25	28	28	23	20	11	40	15	21	16	AF	AF	40
23-Jan	AF	16	20	20	23	25	30	AF	12	39	18	12	26	60	14	25	13	11	13	18	14	11	9	5	60
24-Jan	6	8	6	8	6	7	7	8	12	10	10	5	7	5	6	3	5	12	6	9	6	5	4	7	12
25-Jan	7	7	9	13	17	15	15	9	8	12	8	6	8	8	9	6	9	7	7	8	9	7	7	7	17
26-Jan	10	12	12	12	12	12	13	13	13	15	14	12	14	14	12	11	11	12	12	11	11	12	12	13	15
27-Jan	11	12	13	15	12	13	14	13	16	14	15	15	14	14	29	23	14	14	11	10	86	6	7	6	86
28-Jan	5	5	5	8	4	6	6	7	8	5	6	6	6	5	6	6	7	8	7	7	7	7	9	9	9
29-Jan	8	14	10	13	11	50	44	26	13	12	12	11	12	15	14	14	15	13	14	13	12	10	11	11	50
30-Jan	11	12	13	12	13	21	19	25	18	16	15	17	16	18	18	18	23	22	24	23	20	21	19	16	25
31-Jan	16	15	16	12	10	13	18	14	16	16	17	14	14	16	16	14	14	13	18	16	17	20	18	14	20
Diurnal Maximum																									
M - Maintenance AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Fort Chipewyan - January 2017





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 4, 2017	Last Calibration	December 1, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	13:25	End Time (MST)	18:20
Gas Cert Reference	LL79696	Station temp.	22 Deg C
Cal Gas Concentration	2.35 ppm	Cal Gas Exp Date	2/13/18
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.	11039

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-827	-826
Analyzer IP address	192.168.1.43		Lamp voltage	1006	1020
Calculated slope	1.005756	1.007654	Chamber temp	45.0	44.9
Calculated intercept	-0.122848	-0.132090	Pressure	716.0	721.9
Analyzer Background	1.21	1.23	Flow	0.433	0.435
Analyzer Coefficient	1.093	1.109	Intensity	91	90

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	44.8	17.5	17.0	1.030
calibrator zero	6000	0.0	0.0	0.2	----
high point	6000	44.8	17.5	17.5	1.000
second point	6000	29.9	11.7	11.8	0.993
third point	6000	15.0	5.9	5.9	0.996
as left zero	6000	0.0	0.0	0.1	----
as left span	6000	44.8	17.5	17.3	1.012
Average Correction Factor					0.996

Corrected As found 16.9 Previous response 17.6 % change 3.9%

Notes:

Inlet filter completed after as founds. Span adjusted.

Calibration Performed By: Devin Russell



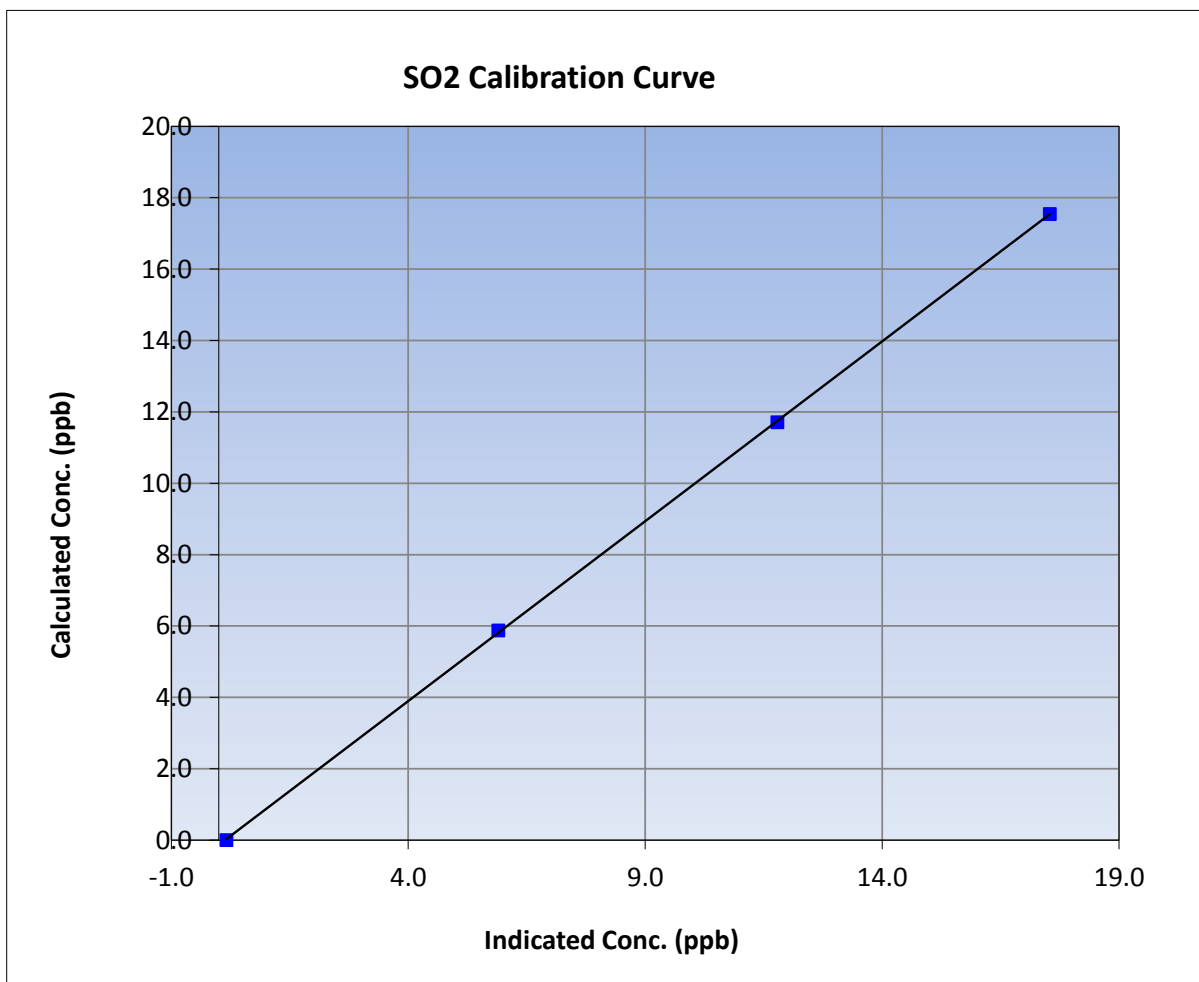
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 4, 2017	Previous Calibration	December 1, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	13:25	End Time (MST)	18:20
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1136451241

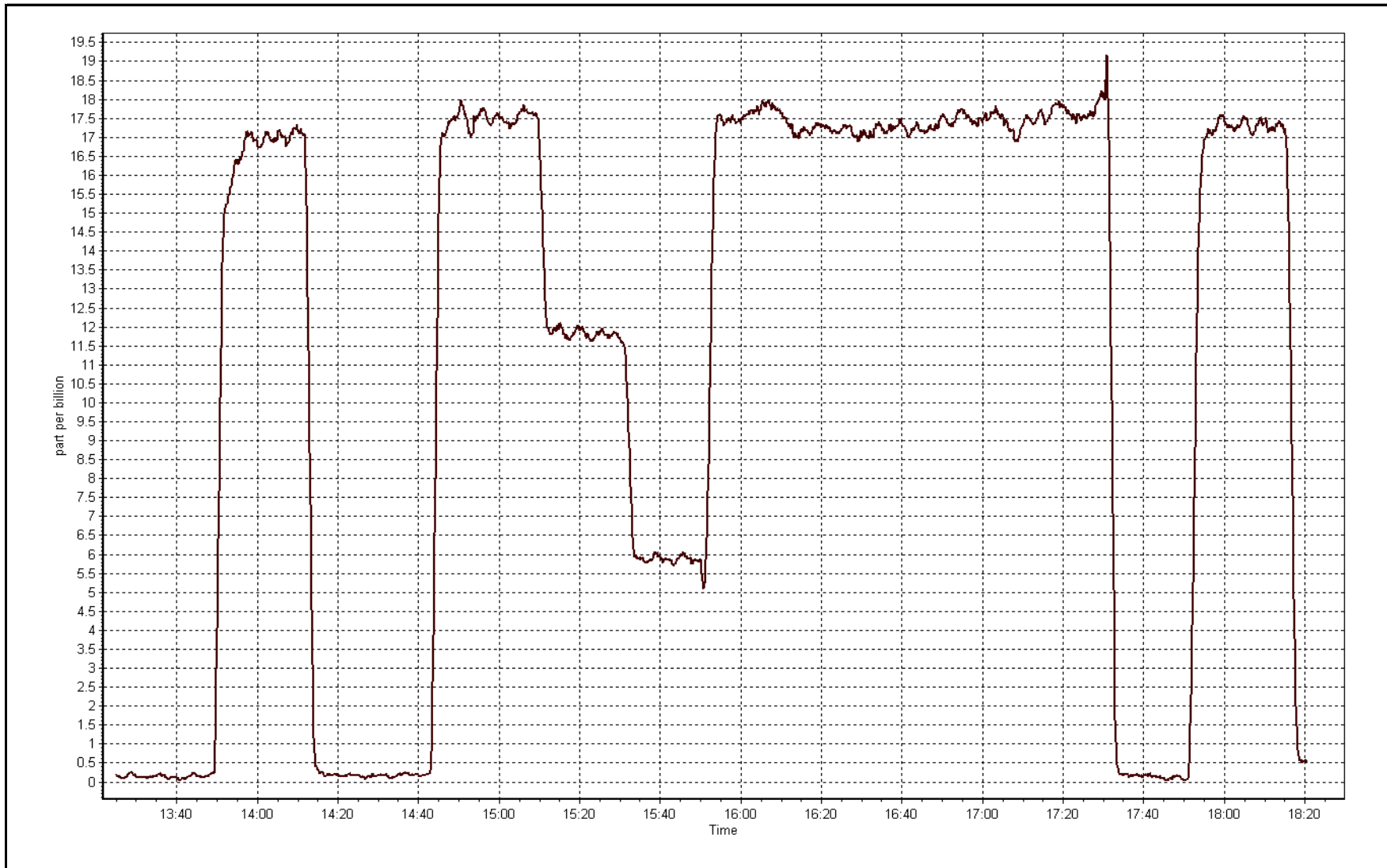
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999964
17.5	17.5	1.0004		
11.7	11.8	0.9933	Slope	1.007654
5.9	5.9	0.9958		
			Intercept	-0.132090



SO2 Calibration Plot

Date: January 4, 2017





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	January 5, 2017	Previous Calibration	December 1, 2016	
Station Name	Fort Chipewyan	Station Number	AMS 8	
Reason:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Routine</td> </tr> </table>			Routine
Routine				
Start Time (MST)	8:15	End Time (MST)	11:05	
NO2 GPT Ref date	January 5, 2017	Transfer Standard	NA	
		Station temp.	23 Deg C	
Calibrator Make/Model	Teledyne API T700	Serial Number	747	
ZAG make/model	Teledyne API 701	Serial Number	4698	
DACS make/model	Campbell Scientific CR3000	Serial Number	11039	

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	36.6	36.6
Analyzer IP address	192.168.1.79		Lamp temp.	58.0	58.0
Calculated slope	0.997382	0.994563	Pressure	27.4	26.2
Calculated intercept	-0.228114	-0.102668	Flow cell A	770.000	781.000
Analyzer Background	-0.4	-0.4	Flow cell B	766.000	779.000
Analyzer Coefficient	1.049	1.024	O3 Measure	4246.9	4038.1
			O3 Reference	4246.8	4042.3

Analyzer make	API T400	Analyzer serial #	1020
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator O3 generator reference voltage - generator drive voltage (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
As found zero	6000	800.00	0.0	0.0	----
As found span	6000	830.10	103.1	106.4	0.969
calibrator zero	6000	800.00	0.0	0.0	----
high point	6000	830.10	103.1	103.6	0.996
second point	6000	799.10	83.3	84.1	0.991
third point	6000	733.20	52.7	53.2	0.991
as left zero	6000	800.00	0.0	0.3	----
as left span	6000	830.10	103.1	104.7	0.985
Average Correction Factor					0.993

Corrected As found	106.5	Previous response	103.6	% change	-2.7%
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Notes:

Inlet filter changed after as founds. Span adjusted.

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association O3 Calibration Report

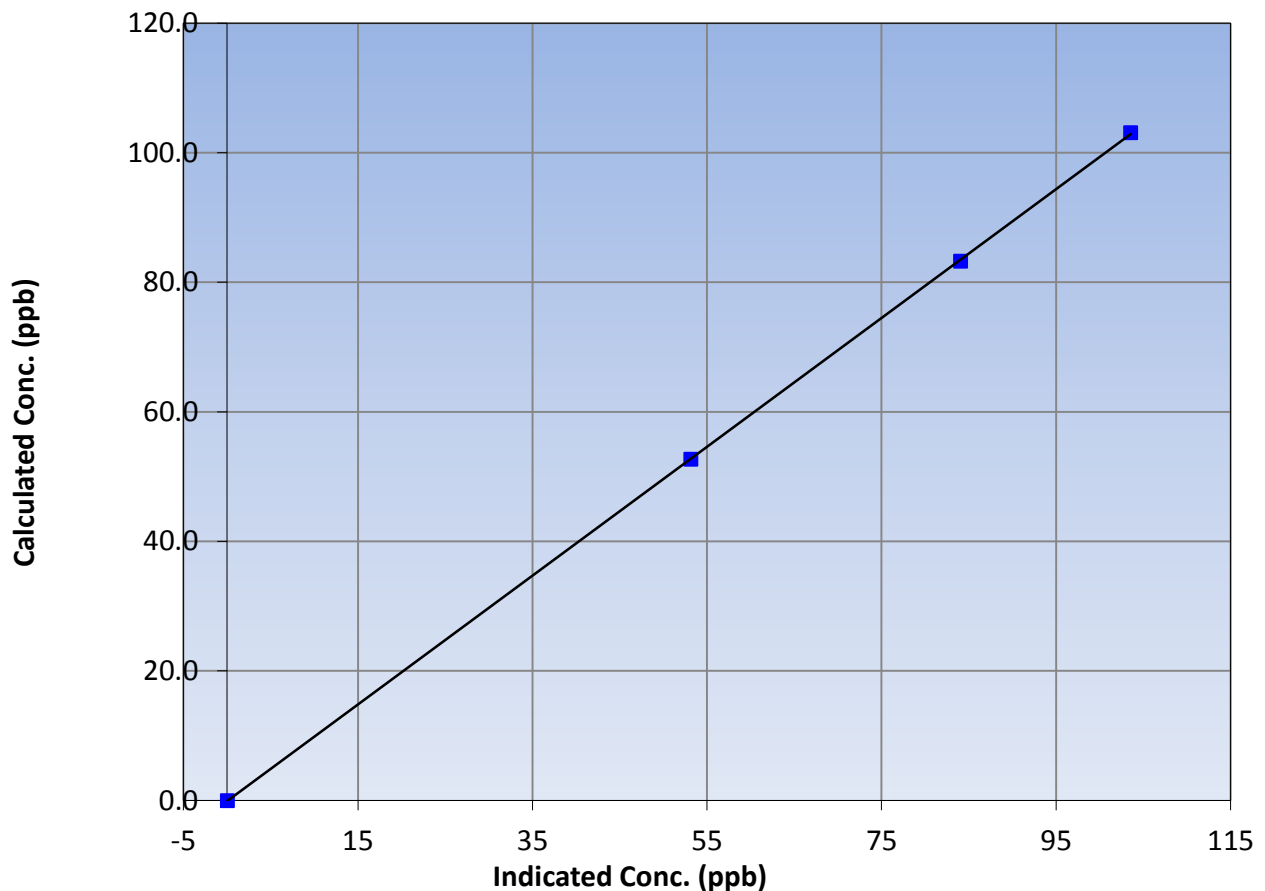
Station Information

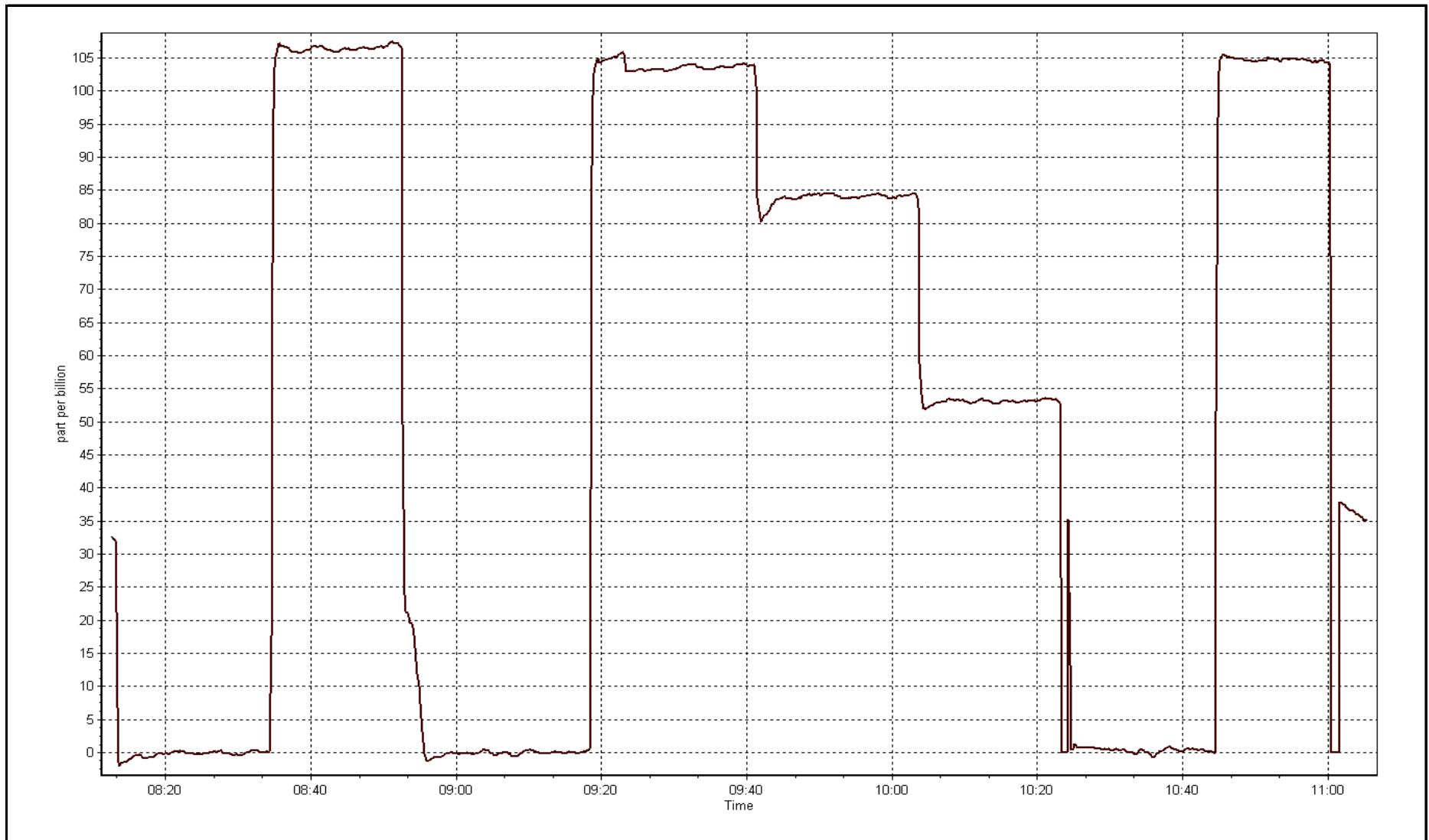
Calibration Date	Thursday, January 05, 2017	Previous Calibration	Thursday, December 01, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	8:15	End Time (MST)	11:05
Analyzer make	API T400	Analyzer serial #	1020

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999984
103.1	103.6	0.9956		
83.3	84.1	0.9908	Slope	0.994563
52.7	53.2	0.9913		
			Intercept	-0.102668

O3 Calibration Curve







Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 4, 2017	Previous Calibration	December 1, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	13:25	End Time (MST)	18:20
NO Cal Gas Conc	20.1 ppm	Gas Cert Reference	LL79696
NOx Cal Gas Conc	20.1 ppm	Cal Gas Expiry Date	2/13/18
Calibrator	Teledyne API T700	Serial Number	747
Zero air Generator	Teledyne API 701	Serial Number	4698

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	11039
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Calibration Statistics

Parameter	NOx	NO	NO2	
As Found (last calibration results)	Data Slope	0.996215	0.993494	0.999600
	Data Offset	0.452457	0.629076	0.016328
Current Calibration	Data Slope	0.999470	1.000737	1.000548
	Data Offset	0.665733	0.691427	0.074813

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	1.272		1.299	
NOx coefficient	1.285		1.313	
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	317.2	Deg C	316.7	Deg C
PMT voltage	502	V	502	V
PMT Temp	5.1	Deg C	5.1	Deg C
O3 flow	88	ccm	89	ccm
R Cell press NO	3.9	"Hg	4	"Hg
R Cell Press Nox	3.9	"Hg	4	"Hg
NO sample flow	1114	cc/min	1121	cc/min
Nox sample Flow	1091	cc/min	1099	cc/min

Notes:

Inlet filter completed after as founds. Span adjusted.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

January 4, 2017

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	44.8	150.1	150.1	0.0	146.0	145.8	0.1	1.0281	1.0291
calibrator zero	6000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
high point	6000	44.8	150.1	150.1	0.0	149.9	149.7	0.2	1.0012	1.0023
second point	6000	29.9	100.2	100.2	0.0	99.3	99.1	0.2	1.0092	1.0113
third point	6000	15.0	50.3	50.3	0.0	49.0	48.9	0.1	1.0259	1.0287
as left zero	6000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
as left span	6000	44.8	150.1	46.2	103.9	149.5	46.2	103.3	1.0039	0.9996
Average Correction Factor									1.0121	1.0141

Corrced As found NO_x= 146.0 NO= 145.9 Percent Change NO_x= 2.9% NO= 3.1%
 Previous Response NO_x= 150.2 NO= 150.4

GPT Calibration Data

Dilution Flow (total) 6000 ccm Source Gas Flow 44.80 ccm NOx ref calc conc = 150.1 ppb NO ref calc conc = 150.1 ppb

O3 Setpoint (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
1st NO ref point		0.0	149.4	149.3	0.0	1.0048	1.0055	----	----
1st NO2 (100)	46.2	103.1	149.2	46.2	103.0	1.0056	----	1.0002	100.0%
2nd NO2 (80)	65.9	83.3	149.1	65.9	83.1	1.0069	----	1.0025	99.7%
3rd NO2 (50)	96.6	52.7	149.1	96.6	52.5	1.0066	----	1.0034	99.7%
2nd NO ref point	----	0.0	149.0	149.1	-0.1	1.0072	1.0069	----	----
Average Correction Factor						1.0066		1.0021	99.8%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

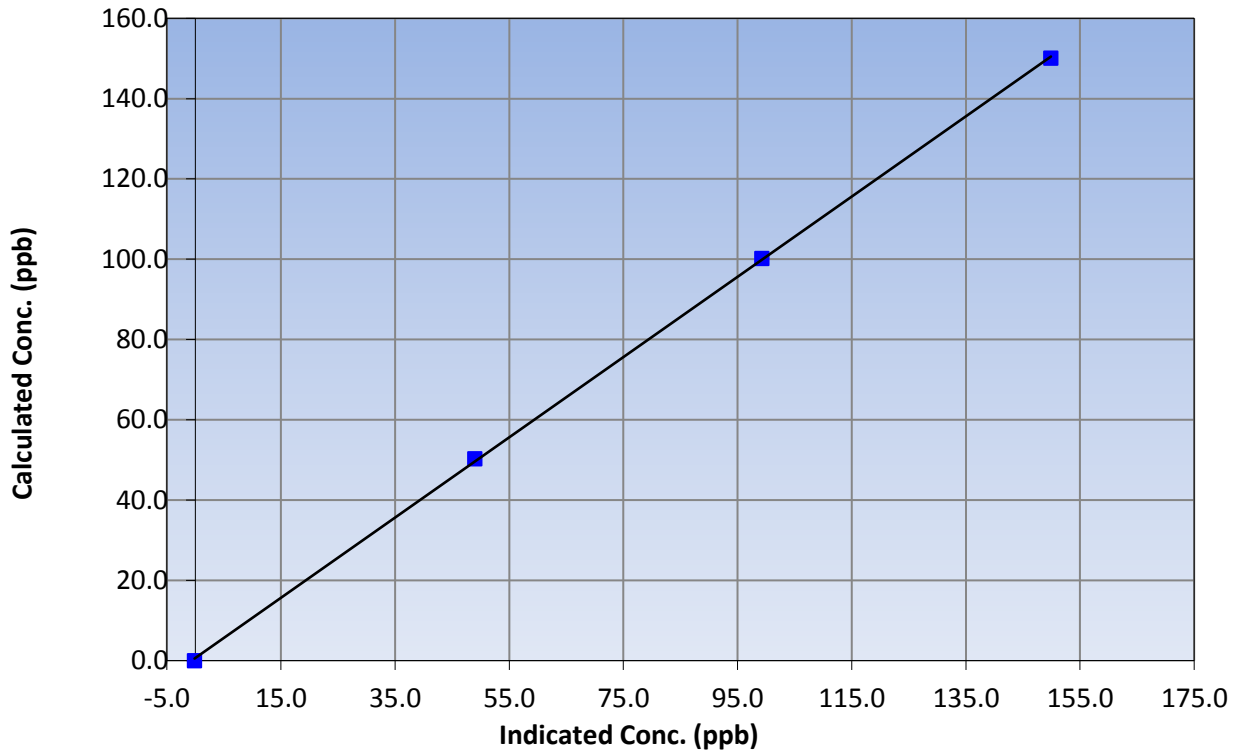
Station Information

Calibration Date	January 4, 2017	Previous Calibration	December 1, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	13:25	End Time (MST)	18:20
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	0.999926
150.1	149.9	1.0012		
100.2	99.3	1.0092	Slope	0.999470
50.3	49.0	1.0259		
			Intercept	0.665733

NO_x Calibration Curve





Wood Buffalo Environmental Association

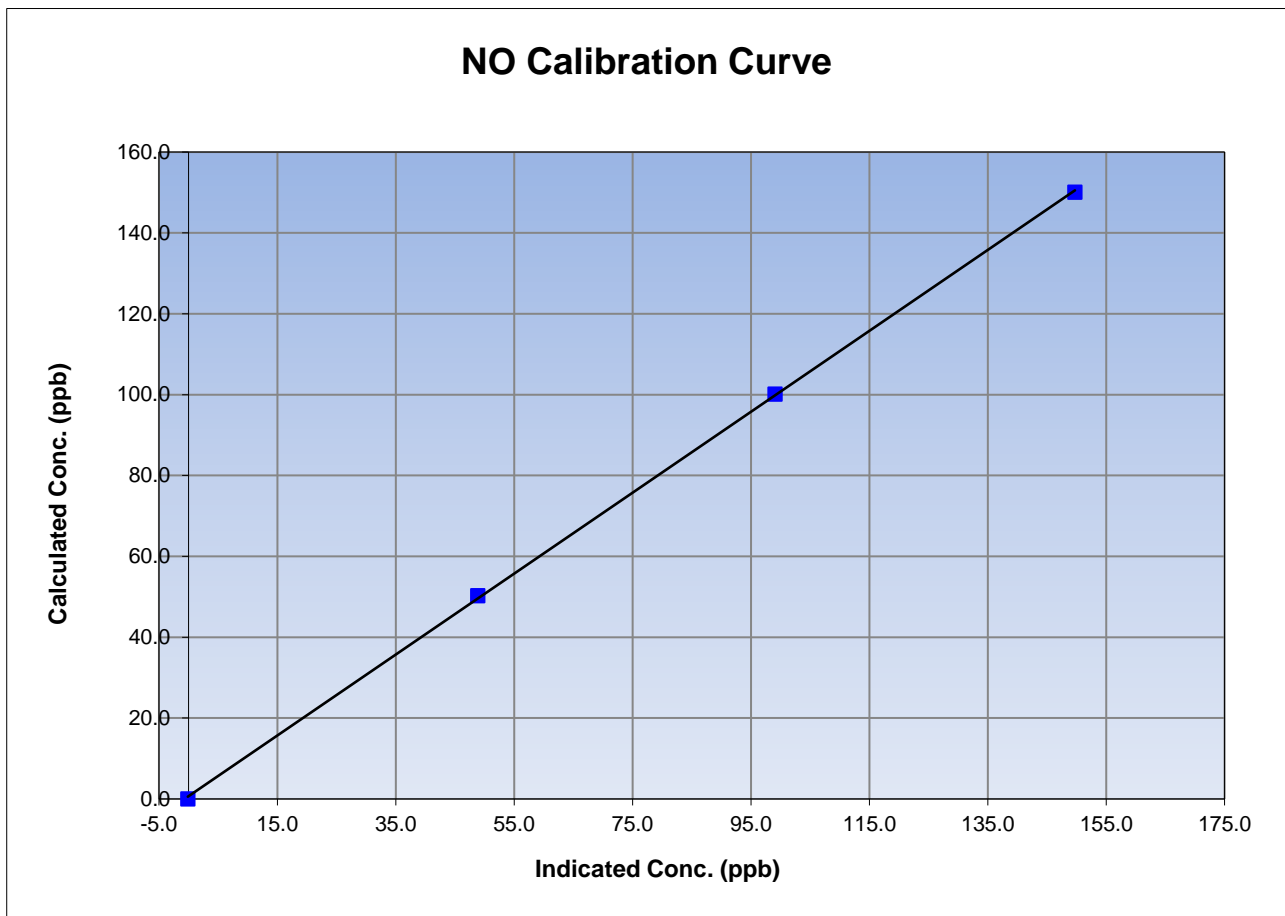
NO Calibration Summary

Station Information

Calibration Date	January 4, 2017	Previous Calibration	December 1, 2016
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	13:25	End Time (MST)	18:20
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	0.999912
150.1	149.7	1.0023		
100.2	99.1	1.0113	Slope	1.000737
50.3	48.9	1.0287		
			Intercept	0.691427





Wood Buffalo Environmental Association

NO₂ Calibration Summary

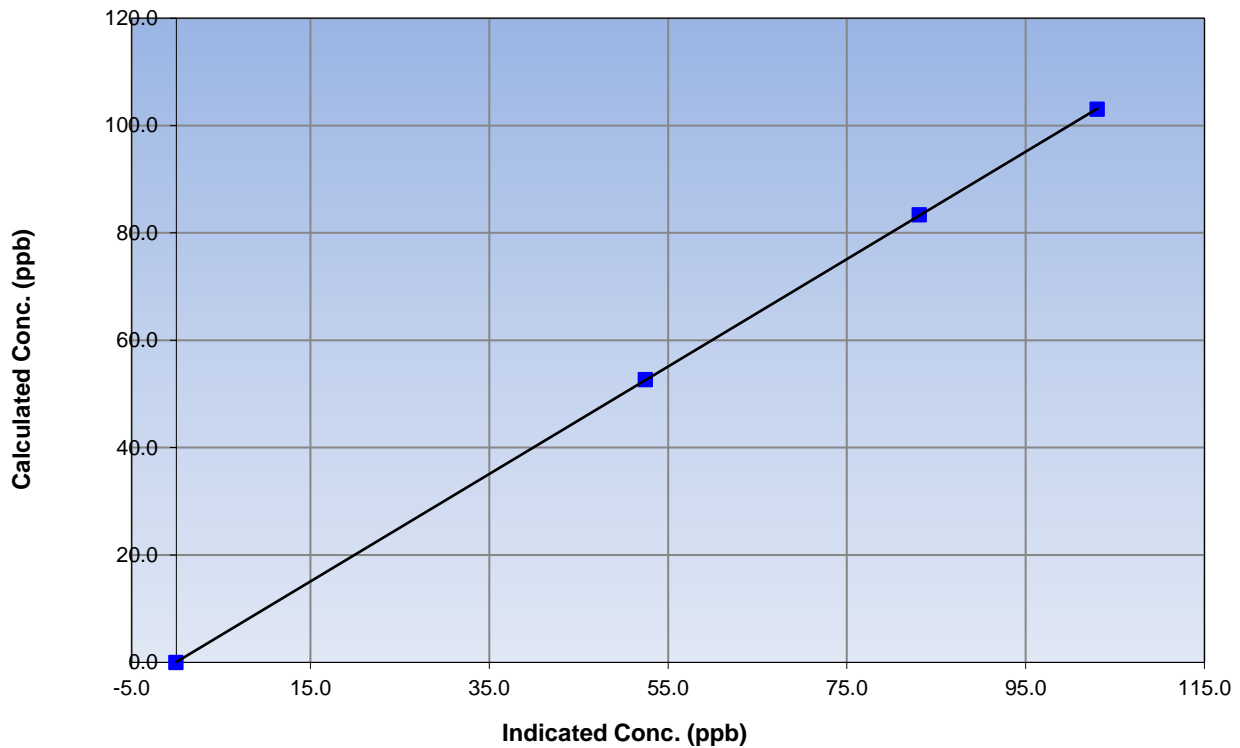
Station Information

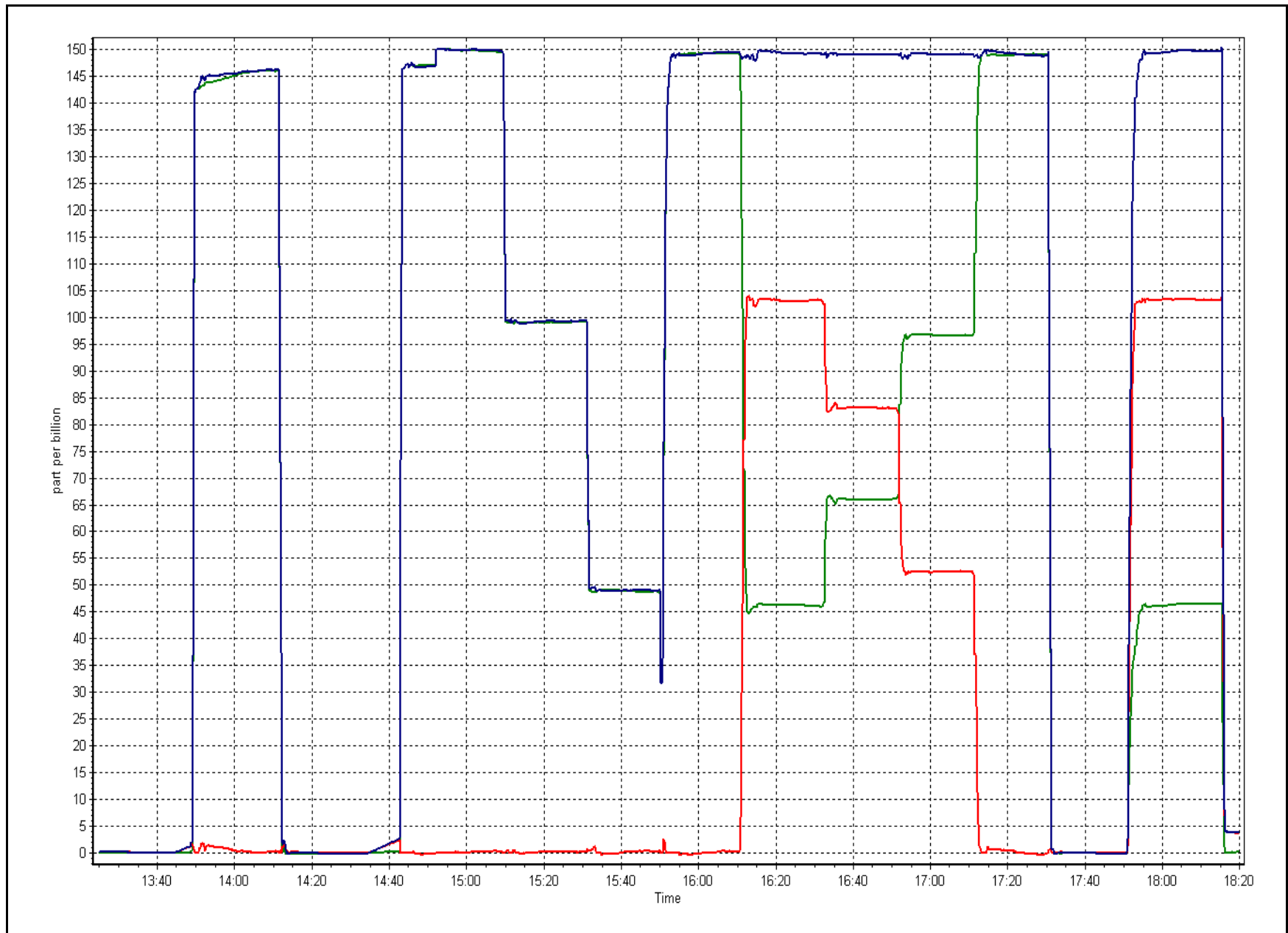
Calibration Date	January 4, 2017	Previous Calibration	December 1, 2016
Station Number	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	13:25	End Time (MST)	18:20
Analyzer make	Teledyne API T200u	Analyzer serial #	172

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999995
103.1	103.0	1.0002		
83.3	83.1	1.0025	Slope	1.000548
52.7	52.5	1.0034		
			Intercept	0.074813

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-08-2016

Station Information

Station Name:	Fort Chipewyan	Station number:	AMS 8
Calibration Date:	January 4, 2017	Last Cal Date:	December 1, 2016
Start time (MST):	13:50	End time (MST):	15:20
Sharp Model:	Thermo 5030	S/N:	E-2025
Particulate Fraction:	PM2.5	C14 Source S/N:	7414
Flow Standard Model:	Delta Cal	S/N:	1451
Temp/RH standard:	Delta Cal	S/N:	1451

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	Tolerance
T1 (°C)	-13	-12.9	-13	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	991	990.98	991	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	1006.2	1000	<input checked="" type="checkbox"/>	+/- 50 LPH
Nephelometer zero	0.3	----	0.3	<input type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified <input checked="" type="checkbox"/>				
Cyclone cleaning:	PM10 Cyclone <input checked="" type="checkbox"/>		PM2.5 Cyclone <input checked="" type="checkbox"/>		
Filter Tape Installed:	<input type="checkbox"/>				

Quarterly Calibration Test

Leak Test:	Date of check: _____	Last Cal Date: <u>September 1, 2016</u>	<u>Tolerance</u>
	Flow w/o adaptor: _____	Flow w/ adaptor: _____	0.4 LPM

Annual Calibration Test

Foil Calibration	Foil Mass: _____	S/N: _____
	Date of check: _____	Last Cal Date: _____
	New Correction Factor: _____	Previous Correction Factor: _____

Parameter	As found	Measured	As left	Adjusted	Tolerance
T2 (°C)				<input type="checkbox"/>	+/- 2 °C
T3 (°C)				<input type="checkbox"/>	+/- 2 °C
T4 (°C)				<input type="checkbox"/>	+/- 2 °C
RH (%)				<input type="checkbox"/>	+/- 10%

Notes: Cyclone head cleaned. No adjustments needed to temperature, pressure or nephelometer. Pump was changed after as found checks. New pump flow was adjusted.

Calibration by: Devin Russell



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 9
BARGE LANDING
JANUARY 2017**

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

February 27, 2017



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
 JANUARY 2017

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
TRS(ppb) Average	710	34	34	100.00	3	0	2	0
THC(ppm) Average	710	34	34	100.00	5.4	-	3.5	-
Temperature (C) Average	744	0	0	100.00	7.1	-	2.5	-
Relative Humidity (%) Average	744	0	0	100.00	98	-	95	-
Wind Speed 10 m (km/h) Average	736	0	8	98.92	21	-	10	-
Wind Direction 10 m (deg) Average	736	0	8	98.92	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
 JANUARY 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
TRS(ppb) Average	710	0.6	1	-	0	0	0	0	1	2	3
THC(ppm) Average	710	2.45	0.4	-	2	2.1	2.2	2.4	2.6	2.8	5.4
Temperature (C) Average	744	-12.64	10.1	-	-36.4	-25.3	-20.2	-13.5	-3.1	1	7.1
Relative Humidity (%) Average	744	81.2	8	-	56	72	77	81	86	92	98
Wind Speed 10 m (km/h) Average	736	5.4	3	-	0	2	3	5	7	9	21
Wind Direction 10 m (deg) Average	736	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
JANUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	09 Jan 2017 15:00	09 Jan 2017 15:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	11 Jan 2017 21:00	12 Jan 2017 03:00	7	Flat line in sensor output signal -sensor frozen

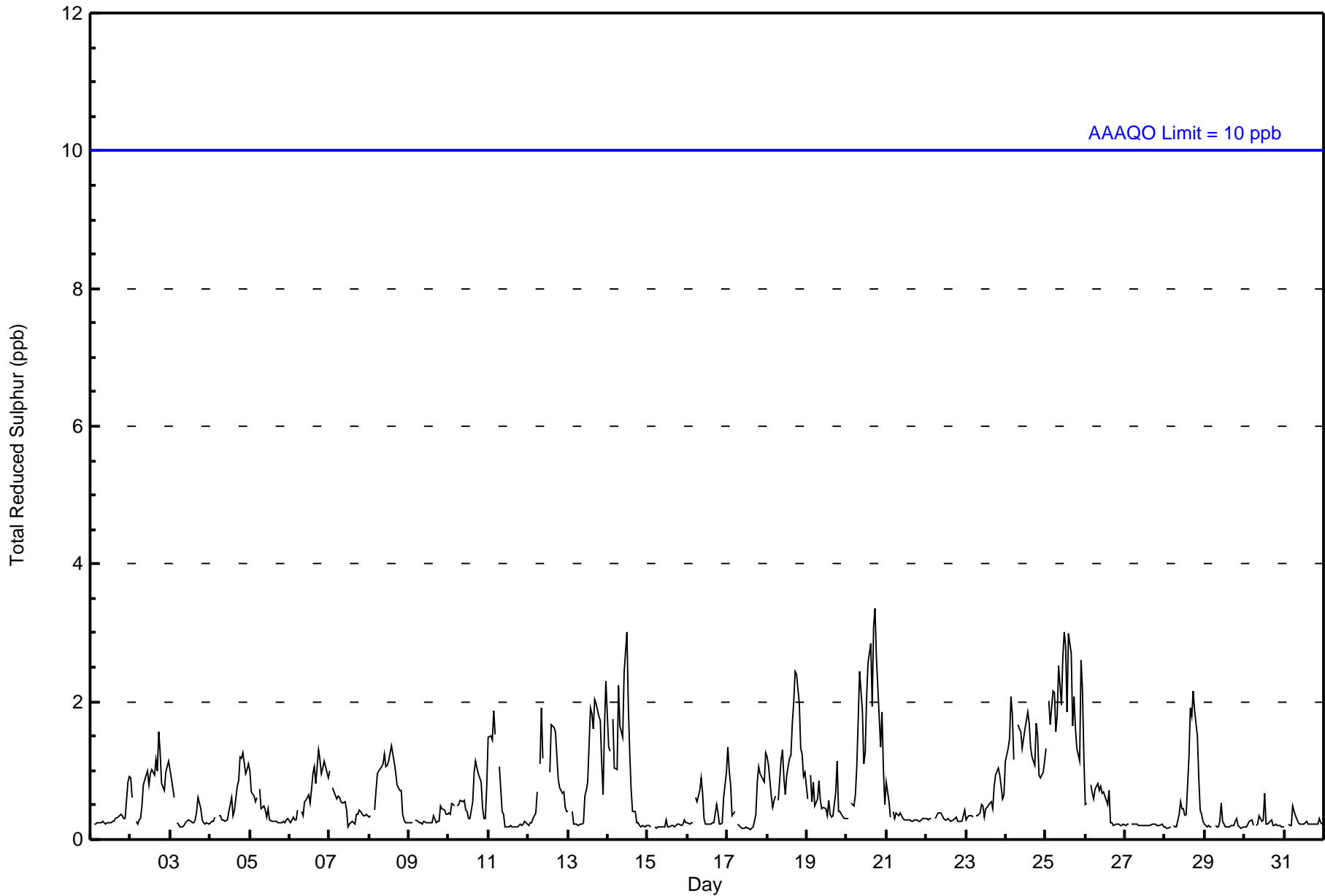


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3 ppb on Jan 20 18:00 Maximum Daily Average: 2.0 ppb on Jan 25																	Hours in Service: 744 Hours of Data: 710									
Minimum Value: 0 ppb on Jan 17 15:00 Minimum Daily Average: 0.2 ppb on Jan 15 Maximum Diurnal Average: 0.8 ppb at hour 18 Minimum Diurnal Average: 0.5 ppb at hour 2 Monthly Average: 0.6 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 3																	Hours of Missing Data: 34 Hours of Calibration: 34 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-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.3	1
2-Jan	1	1	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	0.8	2
3-Jan	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.3	1	
4-Jan	0	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	1	1	1	1	1	1	1	0.6	1	
5-Jan	1	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	
6-Jan	0	0	0	0	0	0	Z	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1	
7-Jan	1	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1	
8-Jan	0	0	Z	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.8	1	
9-Jan	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	
10-Jan	0	0	1	0	Z	0	1	1	1	1	0	0	0	0	1	1	1	1	1	1	0	0	1	0.6	1	
11-Jan	1	2	1	2	2	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2	
12-Jan	0	0	0	0	0	1	Z	1	2	1	C	C	C	1	2	2	2	1	1	1	1	1	0	0.9	2	
13-Jan	0	Z	0	0	0	0	0	0	0	0	1	1	1	2	2	2	2	2	2	2	1	1	2	1.0	2	
14-Jan	1	1	Z	2	1	1	2	2	2	1	2	3	2	1	1	0	0	0	0	0	0	0	0	1.1	3	
15-Jan	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	
16-Jan	0	0	0	0	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	1	
17-Jan	1	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.5	1	
18-Jan	1	1	1	0	1	1	Z	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1.2	2	
19-Jan	1	Z	1	1	1	0	1	1	1	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0.5	1	
20-Jan	0	0	Z	1	0	1	1	2	2	2	1	1	2	3	3	2	3	3	3	2	1	2	1	1.6	3	
21-Jan	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
22-Jan	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	
23-Jan	0	0	0	0	0	Z	0	0	0	1	0	0	0	0	1	1	0	1	1	1	1	1	1	0.5	1	
24-Jan	1	1	1	2	2	1	Z	2	2	2	1	2	2	2	2	1	1	1	2	1	1	1	1	1.4	2	
25-Jan	1	Z	2	2	2	2	2	2	3	2	3	3	3	2	3	3	2	2	2	1	1	3	2	2.0	3	
26-Jan	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.5	1	
27-Jan	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	
28-Jan	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	1	2	2	2	2	1	1	0	0	0.7	2	
29-Jan	0	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
30-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.2	1	
31-Jan	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	
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Barge Landing - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Barge Landing - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	697	98.17	98.17
3 - 4	13	1.83	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



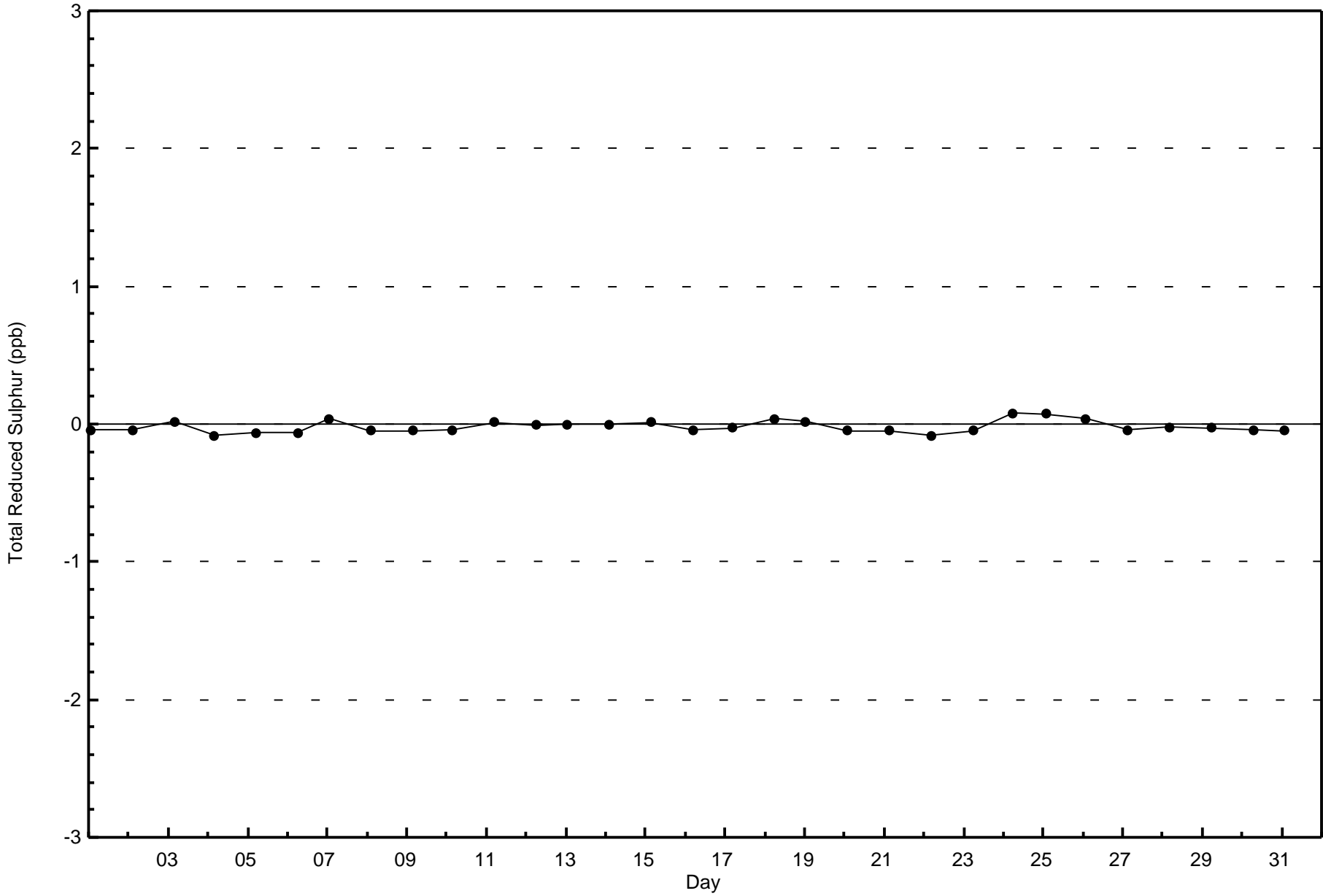
**Wood Buffalo Environmental Association
Frequency Distribution**

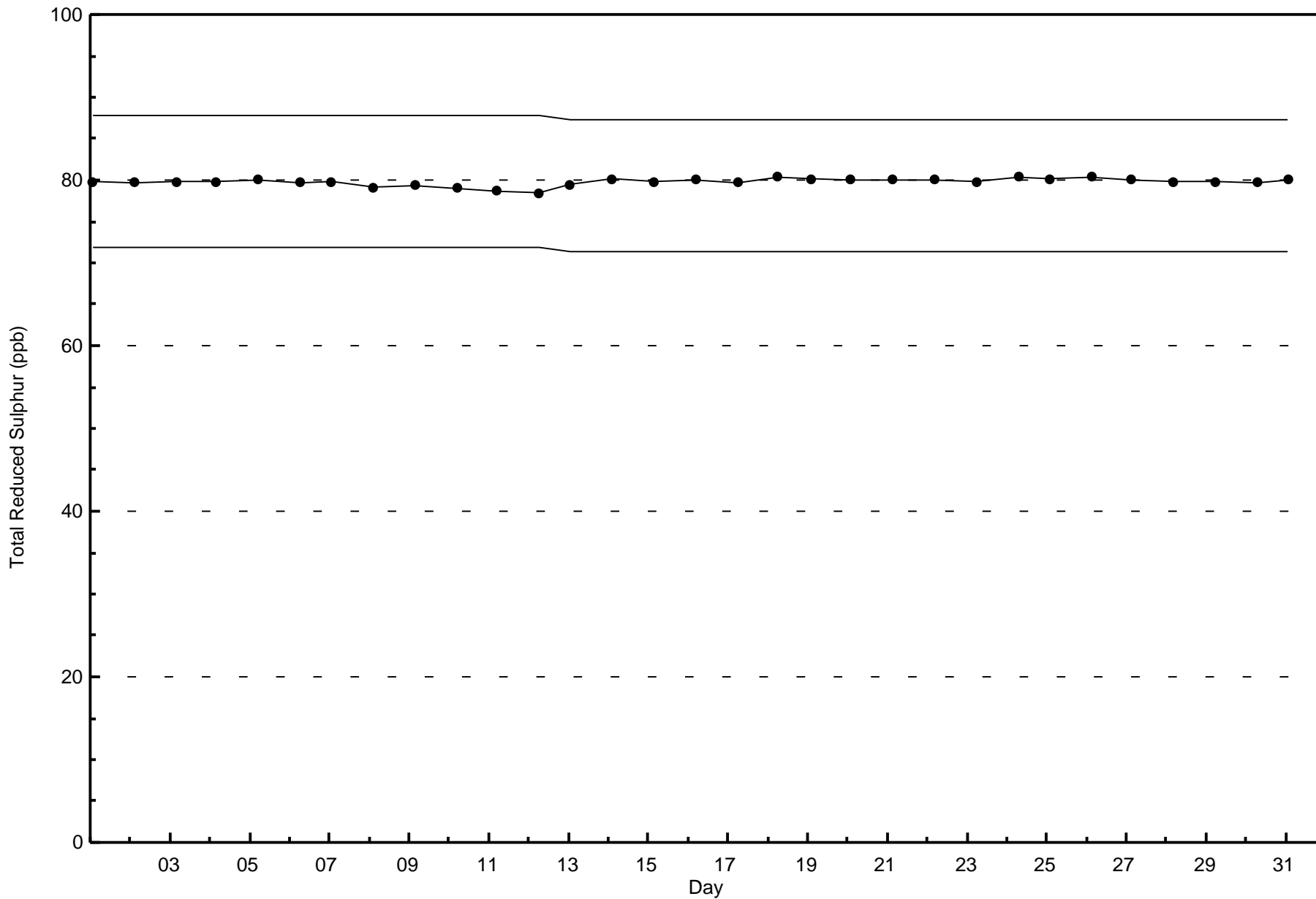
**Total Reduced Sulphur (TRS) - ppb
Barge Landing - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	56	70	14	2	3	11	23	96	155	69	57	60	19	10	19	25	689
3 - 4	0	0	0	0	0	0	0	1	7	4	0	0	0	0	0	1	13
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
Totals	56	70	14	2	3	11	23	97	162	73	57	60	19	10	19	26	702

Total Number of Valid Hours: 702

Total Number of Hours: 744







Wood Buffalo Environmental Association
Summary of Hour Averages

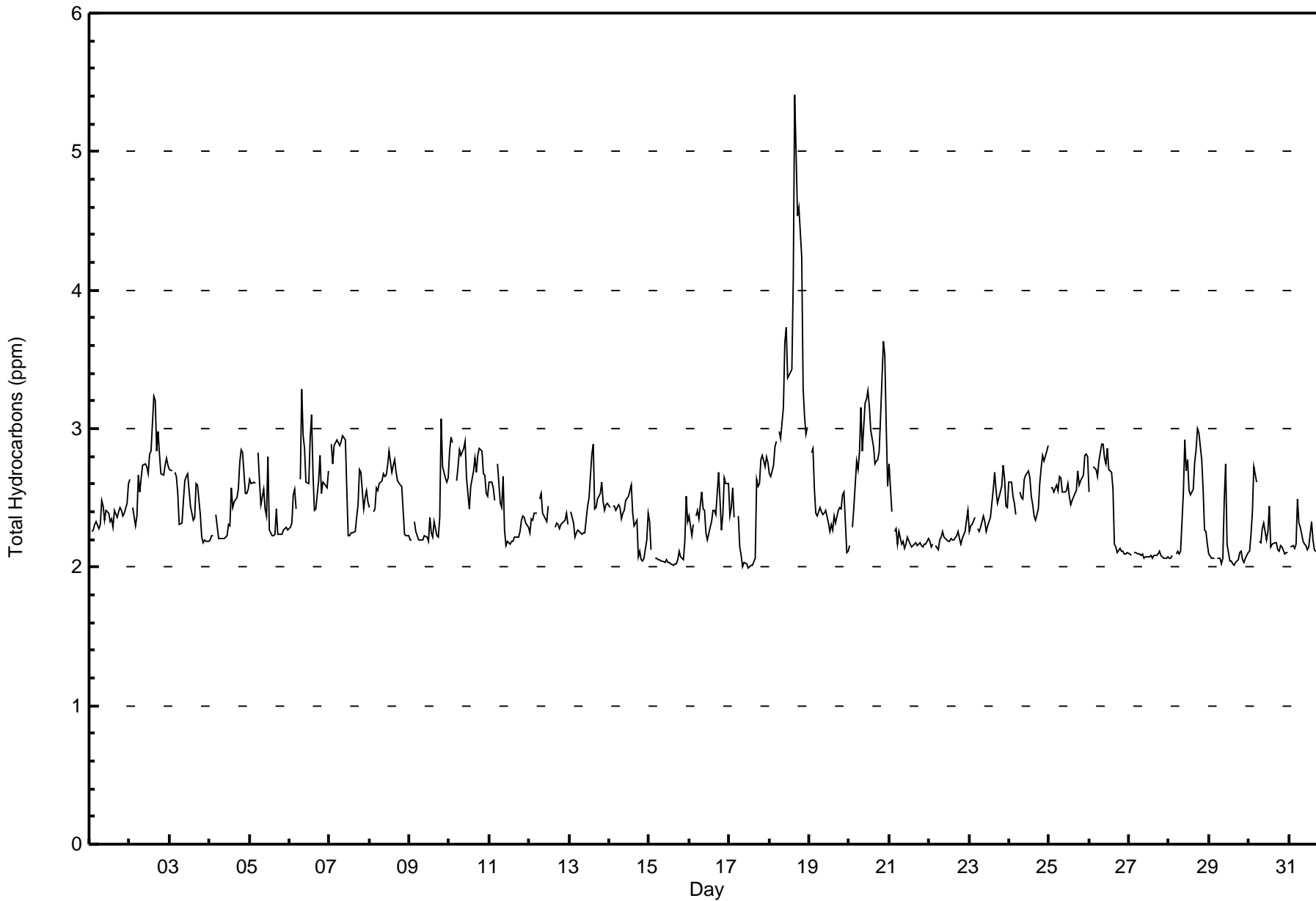
Total Hydrocarbons (THC) - ppm
Barge Landing - January 2017

Maximum Value: 5.4 ppm on Jan 18 16:00 Maximum Daily Average: 3.5 ppm on Jan 18		Hours in Service: 744 Hours of Data: 710 Hours of Missing Data: 34 Hours of Calibration: 34 Percent Operational Time: 100.0																																															
Minimum Value: 2.0 ppm on Jan 17 12:00 Minimum Daily Average: 2.1 ppm on Jan 27 Maximum Diurnal Average: 2.5 ppm at hour 20 Minimum Diurnal Average: 2.4 ppm at hour 1 Monthly Average: 2.45 ppm Percentiles: P ₁ = 2.0 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.4 Q ₃ = 2.6 P ₉₀ = 2.8 P ₉₉ = 3.5																																																	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jan	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.5	2.4	2.3	2.4	2.4	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.6	2.4	2.6																							
2-Jan	2.6	Z	2.4	2.3	2.4	2.7	2.5	2.6	2.7	2.7	2.7	2.7	2.8	2.8	3.2	3.2	2.8	3.0	2.8	2.7	2.7	2.7	2.8	2.7	2.7	3.2																							
3-Jan	2.7	2.7	Z	2.7	2.7	2.5	2.3	2.3	2.5	2.6	2.7	2.7	2.4	2.4	2.3	2.4	2.6	2.6	2.4	2.2	2.2	2.2	2.2	2.2	2.5	2.7																							
4-Jan	2.2	2.2	2.2	Z	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.6	2.4	2.5	2.5	2.6	2.8	2.8	2.8	2.5	2.5	2.6	2.4	2.8																							
5-Jan	2.6	2.6	2.6	2.6	Z	2.8	2.6	2.5	2.6	2.4	2.4	2.8	2.3	2.2	2.2	2.2	2.4	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.4	2.8																							
6-Jan	2.3	2.3	2.5	2.6	2.4	Z	2.6	3.3	3.0	2.9	2.6	2.6	2.9	3.1	2.7	2.4	2.4	2.6	2.8	2.5	2.6	2.6	2.6	2.7	2.7	3.3																							
7-Jan	Z	2.9	2.7	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.6	2.2	2.2	2.2	2.2	2.3	2.4	2.4	2.7	2.7	2.4	2.5	2.5	2.5	2.6	2.9																							
8-Jan	2.4	Z	2.4	2.4	2.6	2.6	2.6	2.6	2.7	2.7	2.7	2.7	2.8	2.7	2.7	2.8	2.7	2.6	2.6	2.6	2.4	2.2	2.2	2.2	2.6	2.8																							
9-Jan	2.2	2.2	Z	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.2	2.2	2.3	2.2	2.2	2.4	3.1	2.7	2.6	2.6	2.6	2.4	3.1																							
10-Jan	2.8	2.9	2.9	Z	2.6	2.7	2.8	2.8	2.9	2.9	2.6	2.5	2.4	2.6	2.7	2.8	2.7	2.8	2.9	2.8	2.7	2.7	2.5	2.5	2.7	2.9																							
11-Jan	2.6	2.6	2.6	2.5	Z	2.7	2.5	2.4	2.7	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.3	2.3	2.4	2.7																							
12-Jan	2.2	2.4	2.3	2.4	2.4	Z	2.5	2.5	2.4	2.4	2.3	2.4	C	C	C	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.4	2.5																							
13-Jan	Z	2.4	2.3	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.3	2.4	2.5	2.8	2.9	2.4	2.4	2.5	2.5	2.6	2.5	2.4	2.4	2.5	2.4	2.9																							
14-Jan	2.4	Z	2.4	2.4	2.4	2.4	2.4	2.3	2.4	2.4	2.5	2.5	2.6	2.4	2.3	2.3	2.1	2.1	2.1	2.1	2.0	2.1	2.2	2.4	2.3	2.6																							
15-Jan	2.3	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	2.1	2.1	2.0	2.2	2.5	2.3	2.1	2.5																							
16-Jan	2.4	2.2	2.3	Z	2.4	2.4	2.3	2.5	2.4	2.4	2.2	2.2	2.3	2.3	2.4	2.4	2.4	2.7	2.5	2.3	2.4	2.6	2.6	2.6	2.4	2.7																							
17-Jan	2.4	2.4	2.6	2.4	Z	2.4	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.6	2.6	2.6	2.8	2.8	2.7	2.8	2.8	2.4	2.8																							
18-Jan	2.7	2.7	2.7	2.9	2.9	Z	3.0	2.9	3.1	3.6	3.7	3.4	3.4	3.4	4.1	5.4	5.0	4.5	4.6	4.2	3.3	3.1	3.0	3.0	3.5	5.4																							
19-Jan	Z	2.8	2.9	2.6	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.4	2.3	2.4	2.4	2.4	2.5	2.5	2.1	2.1	2.4	2.9																							
20-Jan	2.2	Z	2.3	2.4	2.8	2.7	2.8	3.1	2.8	3.2	3.2	3.3	3.2	3.0	2.9	2.7	2.8	2.8	2.8	3.1	3.6	3.5	3.0	2.6	2.9	3.6																							
21-Jan	2.7	2.4	Z	2.3	2.3	2.2	2.3	2.2	2.2	2.1	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.7																							
22-Jan	2.2	2.1	2.2	Z	2.2	2.1	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.3	2.4	2.2	2.4																							
23-Jan	2.3	2.3	2.3	2.4	Z	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.4	2.6	2.7	2.5	2.5	2.5	2.5	2.6	2.7	2.6	2.4	2.4	2.4	2.7																							
24-Jan	2.6	2.6	2.5	2.5	2.4	Z	2.5	2.5	2.5	2.6	2.7	2.7	2.6	2.5	2.5	2.4	2.3	2.4	2.6	2.7	2.8	2.8	2.8	2.9	2.6	2.9																							
25-Jan	Z	2.6	2.6	2.5	2.6	2.6	2.7	2.6	2.5	2.5	2.6	2.6	2.5	2.5	2.5	2.5	2.6	2.7	2.6	2.6	2.7	2.8	2.8	2.8	2.6	2.8																							
26-Jan	2.5	Z	2.7	2.7	2.7	2.7	2.8	2.9	2.9	2.8	2.7	2.9	2.7	2.7	2.6	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.5	2.9																							
27-Jan	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1																							
28-Jan	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.5	2.9	2.7	2.8	2.6	2.5	2.6	2.8	2.8	3.0	3.0	2.8	2.6	2.3	2.3	2.2	2.5	3.0																							
29-Jan	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.0	2.1	2.5	2.7	2.2	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	2.7																							
30-Jan	2.1	2.2	2.4	2.7	2.6	Z	2.2	2.2	2.3	2.3	2.2	2.3	2.4	2.1	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.7																							
31-Jan	Z	2.1	2.2	2.1	2.2	2.5	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.5																							
																								2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.5	2.5	2.4	2.4	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.4	2.4	Diurnal Average		
																								2.8	2.9	2.9	2.9	2.9	2.9	3.0	3.3	3.1	3.6	3.7	3.4	3.4	3.4	4.1	5.4	5.0	4.5	4.6	4.2	3.6	3.5	3.0	3.0	Diurnal Maximum	
Z - zerospan C - Calibration																																																	



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Barge Landing - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Barge Landing - January 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	27	3.80	3.80
2.1 - 3.0	656	92.39	96.20
3.1 - 10.0	27	3.80	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Barge Landing - January 2017**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	1	0	4	10	11	1	0	0	0	27
2.1 - 3.0	55	70	12	3	3	11	21	95	150	67	44	49	18	10	16	24	648
3.1 - 10.0	1	1	1	0	1	0	2	4	5	5	2	2	0	0	1	2	27
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	56	71	13	3	4	11	23	100	155	76	56	62	19	10	17	26	702

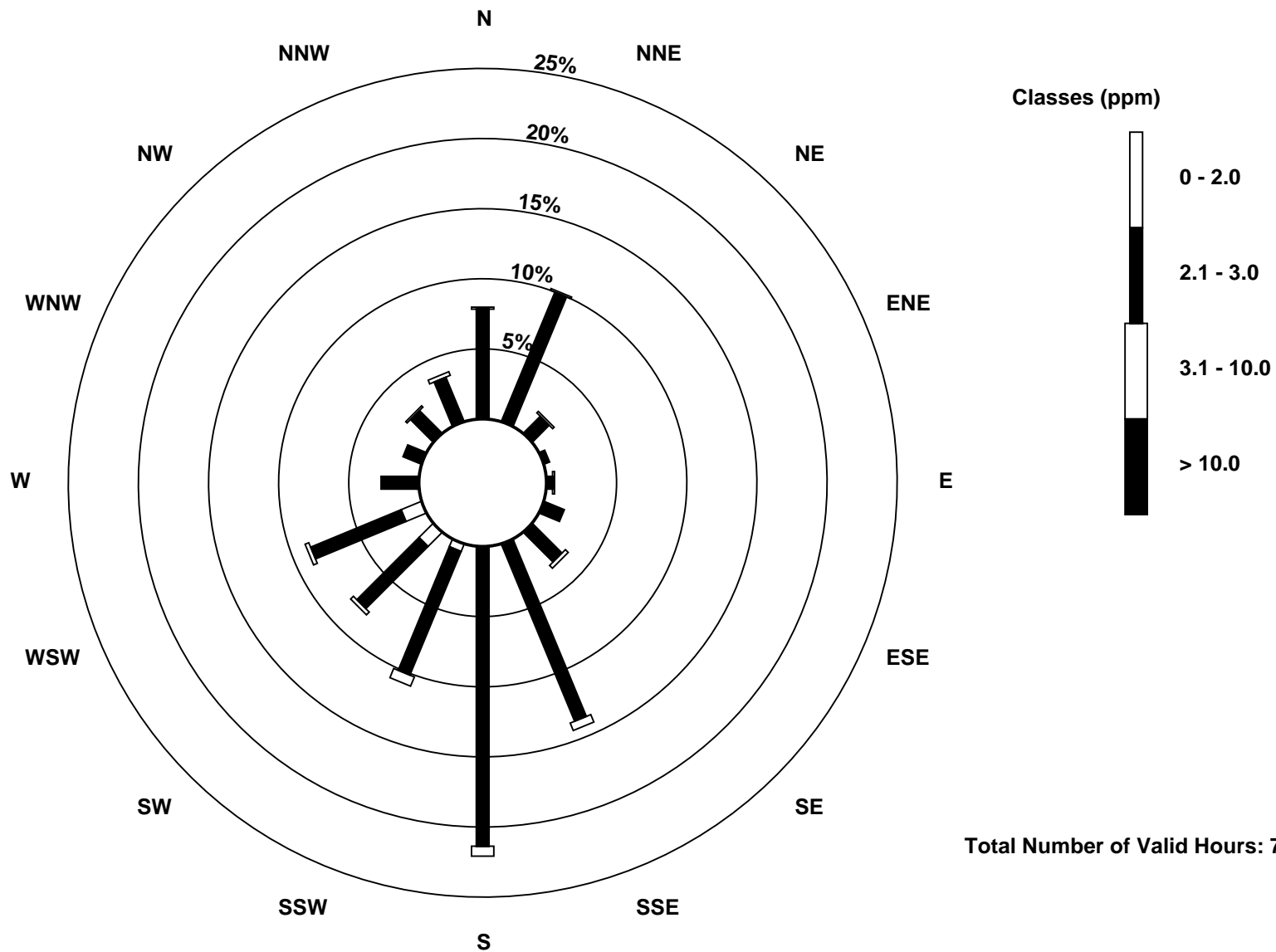
Total Number of Valid Hours: 702

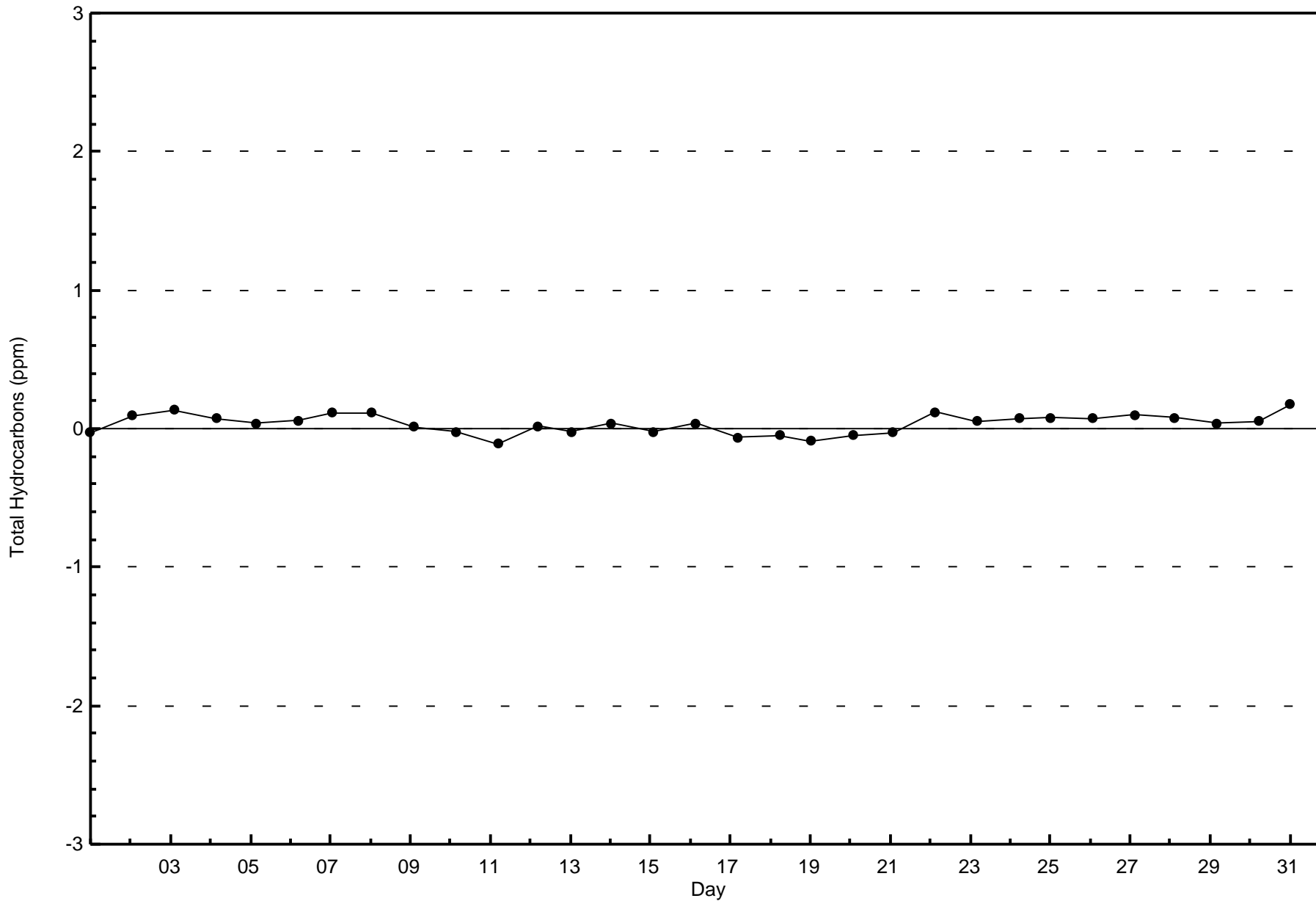
Total Number of Hours: 744

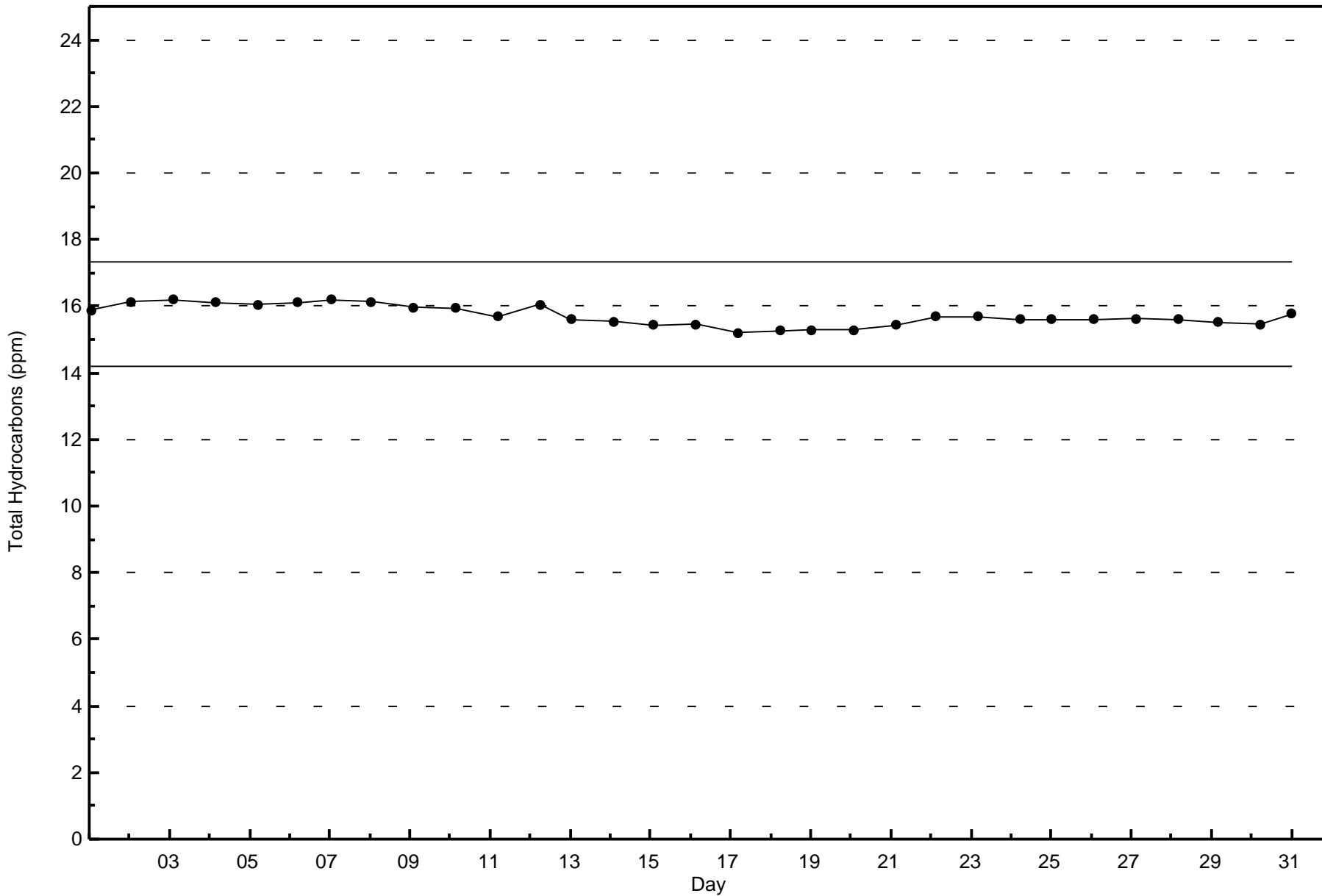


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Total Hydrocarbons (THC) - ppm
Barge Landing (AMS 9)









Wood Buffalo Environmental Association
Summary of Hour Averages

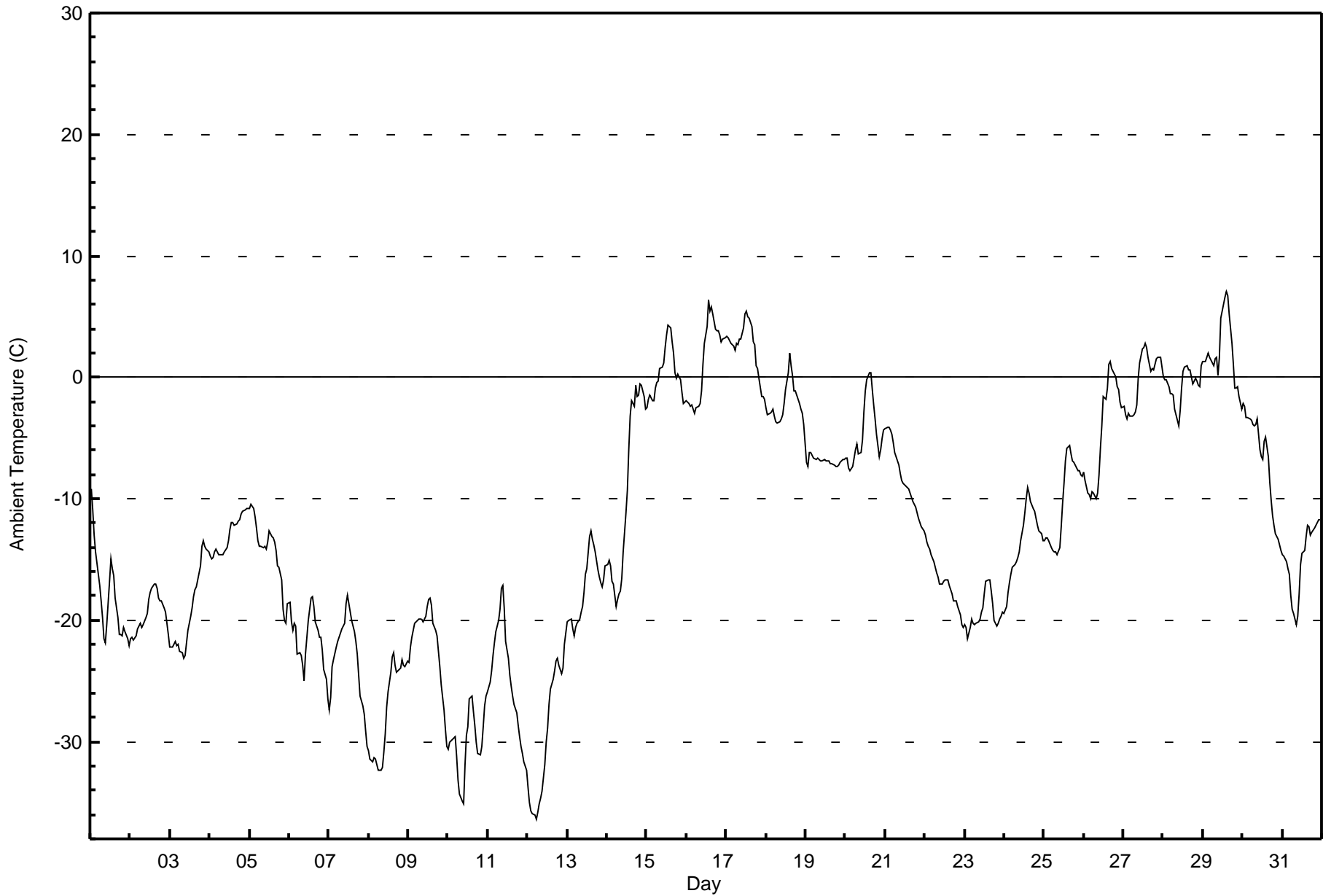
Ambient Temperature (AT) - C
Barge Landing - January 2017

Maximum Value: 7.1 C on Jan 29 15:00 Maximum Daily Average: 2.5 C on Jan 17		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Minimum Value: -36.4 C on Jan 12 06:00 Maximum Diurnal Average: -9.9 C at hour 15 Monthly Average: -12.64 C		Minimum Daily Average: -30.1 C on Jan 10 Minimum Diurnal Average: -14.2 C at hour 9 Percentiles: P ₁ = -35.0 P ₁₀ = -25.3 Q ₁ = -20.2 Median = -13.5 Q ₃ = -3.1 P ₉₀ = 1.0 P ₉₉ = 5.2																								
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-Jan	-9.2	-11.0	-13.0	-14.3	-15.3	-17.1	-18.4	-19.7	-21.5	-21.9	-20.4	-16.7	-15.0	-15.8	-16.3	-18.2	-19.8	-21.1	-21.2	-21.3	-20.6	-21.0	-21.5	-22.1	-18.0	-9.2
2-Jan	-21.5	-21.4	-21.7	-21.3	-20.7	-20.4	-20.3	-20.5	-20.3	-19.8	-19.5	-18.3	-17.7	-17.3	-17.0	-17.0	-17.4	-18.2	-18.4	-18.4	-19.0	-19.3	-20.3	-21.1	-19.5	-17.0
3-Jan	-22.2	-22.3	-22.0	-21.8	-22.1	-22.0	-22.6	-22.7	-23.1	-22.9	-21.8	-20.8	-19.7	-18.9	-18.1	-17.5	-17.3	-16.7	-15.5	-14.0	-13.5	-13.9	-14.2	-14.4	-19.2	-13.5
4-Jan	-14.7	-14.9	-14.9	-14.4	-14.2	-14.6	-14.6	-14.6	-14.4	-14.4	-14.0	-13.4	-12.6	-12.0	-12.0	-12.2	-12.1	-11.8	-11.8	-11.2	-11.1	-11.0	-10.8	-10.8	-13.0	-10.8
5-Jan	-10.8	-10.5	-10.8	-11.5	-12.4	-13.4	-13.9	-14.0	-14.0	-13.9	-14.1	-13.5	-12.6	-13.1	-13.3	-13.6	-14.3	-15.5	-15.7	-16.7	-19.2	-20.0	-20.3	-18.7	-14.4	-10.5
6-Jan	-18.5	-20.1	-20.8	-20.3	-20.5	-22.7	-22.7	-22.9	-23.7	-24.9	-22.8	-20.0	-19.1	-18.2	-18.1	-18.8	-20.1	-20.8	-21.4	-21.4	-22.4	-24.1	-24.9	-26.5	-21.5	-18.1
7-Jan	-27.3	-26.4	-23.8	-23.3	-22.3	-21.8	-21.4	-21.0	-20.7	-20.2	-18.7	-17.9	-18.6	-19.3	-20.0	-20.9	-21.7	-22.8	-24.6	-26.2	-27.1	-27.7	-29.1	-30.4	-23.0	-17.9
8-Jan	-30.7	-31.4	-31.7	-31.4	-31.4	-31.9	-32.4	-32.4	-32.1	-30.9	-29.4	-27.2	-25.9	-24.3	-23.0	-22.7	-23.7	-24.3	-24.1	-23.9	-23.3	-23.7	-23.9	-23.3	-27.5	-22.7
9-Jan	-23.5	-22.2	-21.4	-20.8	-20.3	-20.0	-19.9	-20.0	-19.9	-20.1	-19.7	-18.9	-18.3	-18.2	-18.8	-20.2	-20.8	-21.3	-22.6	-23.9	-25.3	-27.4	-29.1	-30.4	-21.8	-18.2
10-Jan	-30.6	-30.1	-29.9	-29.7	-29.6	-31.2	-33.1	-34.3	-34.9	-35.1	-31.9	-29.4	-28.8	-26.5	-26.2	-27.5	-28.7	-30.1	-31.0	-31.0	-30.4	-28.8	-27.0	-26.3	-30.1	-26.2
11-Jan	-25.8	-25.1	-24.2	-22.9	-21.8	-20.9	-20.1	-19.1	-17.4	-17.1	-19.0	-21.8	-23.1	-24.6	-25.4	-26.2	-27.0	-27.6	-28.6	-29.6	-30.4	-30.9	-31.7	-32.4	-24.7	-17.1
12-Jan	-33.8	-35.0	-35.7	-35.9	-36.1	-36.4	-35.8	-35.1	-34.6	-34.0	-31.9	-30.0	-28.9	-27.0	-25.6	-24.9	-24.2	-23.4	-23.1	-23.7	-24.4	-23.9	-22.0	-21.1	-29.4	-21.1
13-Jan	-20.1	-20.1	-19.9	-20.7	-21.3	-20.6	-20.2	-19.9	-19.3	-18.9	-17.7	-16.2	-15.8	-13.1	-12.7	-13.3	-13.8	-14.4	-15.8	-16.5	-16.9	-17.3	-16.6	-15.5	-17.4	-12.7
14-Jan	-15.4	-15.0	-15.5	-16.7	-17.0	-18.9	-18.2	-17.9	-17.6	-16.6	-14.4	-11.1	-9.3	-6.0	-3.2	-2.0	-2.4	-0.7	-1.6	-1.5	-0.6	-0.7	-1.6	-2.6	-9.4	-0.6
15-Jan	-2.5	-1.8	-1.5	-1.9	-2.0	-0.8	-0.5	-0.3	0.7	0.9	1.2	2.4	3.5	4.4	4.0	2.9	2.0	0.4	-0.1	0.2	-0.2	-1.2	-2.2	-2.1	0.2	4.4
16-Jan	-2.0	-2.1	-2.3	-2.3	-2.6	-3.0	-2.5	-2.3	-2.2	-1.1	1.1	2.8	4.2	6.4	5.5	5.8	5.2	4.0	3.9	3.8	3.4	3.0	3.1	3.3	1.4	6.4
17-Jan	3.4	3.2	3.1	2.8	2.6	2.2	2.8	2.7	3.2	3.1	4.1	5.2	5.4	5.0	4.8	4.2	3.0	2.6	1.0	0.8	-0.1	-1.6	-1.6	-1.8	2.5	5.4
18-Jan	-2.5	-3.0	-2.9	-2.8	-2.7	-3.1	-3.7	-3.8	-3.6	-3.4	-3.0	-2.1	-1.0	0.4	2.0	1.0	0.1	-1.1	-1.1	-1.8	-2.1	-2.6	-3.0	-3.9	-2.1	2.0
19-Jan	-7.0	-7.3	-6.2	-6.2	-6.4	-6.7	-6.8	-6.7	-6.7	-6.9	-6.9	-6.8	-6.9	-6.9	-6.9	-7.1	-7.1	-7.2	-7.3	-7.3	-7.2	-7.0	-6.8	-6.7	-6.9	-6.2
20-Jan	-6.6	-6.7	-7.5	-7.7	-7.3	-6.7	-6.0	-5.5	-6.3	-6.2	-5.2	-2.9	-1.1	-0.2	0.3	0.4	-1.0	-2.3	-3.5	-4.7	-6.5	-5.9	-5.1	-4.4	-4.5	0.4
21-Jan	-4.2	-4.2	-4.2	-4.4	-4.7	-5.4	-6.2	-6.9	-7.3	-8.0	-8.5	-8.7	-9.0	-9.0	-9.2	-9.6	-9.9	-10.2	-10.7	-11.1	-11.6	-12.0	-12.4	-12.6	-8.3	-4.2
22-Jan	-13.0	-13.6	-13.9	-14.1	-14.6	-15.2	-15.6	-16.1	-16.5	-17.0	-17.0	-16.8	-16.7	-16.6	-16.7	-17.1	-17.9	-18.4	-18.4	-18.4	-18.8	-19.5	-20.4	-20.6	-16.8	-13.0
23-Jan	-20.3	-20.7	-21.5	-20.6	-20.0	-20.3	-20.4	-20.2	-20.2	-19.9	-19.4	-18.9	-17.9	-16.8	-16.7	-16.7	-17.6	-18.7	-20.0	-20.5	-20.3	-19.9	-19.7	-19.3	-19.4	-16.7
24-Jan	-19.5	-18.9	-17.7	-16.9	-16.2	-15.6	-15.5	-15.2	-14.9	-14.4	-13.5	-12.2	-11.1	-10.0	-9.1	-9.5	-10.2	-10.8	-11.1	-11.6	-12.2	-12.7	-12.8	-13.4	-13.5	-9.1
25-Jan	-13.4	-13.2	-13.2	-13.5	-14.0	-14.2	-14.4	-14.4	-14.6	-14.0	-12.4	-10.4	-8.7	-6.9	-5.8	-5.6	-6.3	-6.8	-7.0	-7.2	-7.6	-7.7	-8.0	-8.2	-10.3	-5.6
26-Jan	-7.8	-8.5	-9.5	-9.7	-10.0	-9.5	-9.5	-10.0	-9.5	-8.0	-5.8	-4.0	-1.6	-1.8	-0.9	1.1	1.3	0.7	0.3	0.0	-0.7	-1.0	-2.0	-2.6	-4.5	1.3
27-Jan	-2.3	-3.1	-3.5	-2.9	-3.2	-3.2	-3.1	-2.9	-2.3	-0.1	1.1	2.3	2.5	2.8	2.4	1.6	0.5	0.8	0.7	1.1	1.5	1.7	1.6	0.8	-0.2	2.8
28-Jan	0.0	-0.1	-0.2	-0.7	-1.3	-1.4	-1.5	-2.6	-3.5	-3.9	-2.7	-0.9	0.5	0.8	1.0	0.6	0.6	0.1	-0.5	0.0	-0.3	-0.6	-0.7	1.0	-0.7	1.0
29-Jan	1.3	1.3	1.6	2.0	1.7	1.4	1.0	1.5	1.6	0.2	1.7	4.8	6.0	6.7	7.1	6.8	5.2	2.8	1.1	-0.9	-0.8	-0.8	-1.6	-2.6	2.0	7.1
30-Jan	-2.2	-2.4	-3.3	-3.3	-3.4	-3.6	-3.9	-4.0	-3.9	-3.4	-5.9	-6.5	-6.8	-5.3	-4.9	-6.5	-8.6	-10.1	-11.4	-12.1	-12.9	-13.4	-13.8	-14.2	-6.9	-2.2
31-Jan	-14.6	-14.8	-15.2	-15.8	-16.2	-17.9	-19.1	-19.4	-20.3	-19.7	-17.9	-15.5	-14.5	-14.2	-13.0	-12.2	-12.3	-13.0	-12.8	-12.5	-12.2	-12.0	-11.8	-11.7	-14.9	-11.7
	-13.5	-13.6	-13.7	-13.6	-13.7	-14.0	-14.1	-14.2	-14.2	-14.0	-13.0	-11.7	-10.9	-10.2	-9.9	-10.2	-10.8	-11.5	-12.0	-12.3	-12.7	-13.0	-13.2	-13.4	Diurnal Average	
	3.4	3.2	3.1	2.8	2.6	2.2	2.8	2.7	3.2	3.1	4.1	5.2	6.0	6.7	7.1	6.8	5.2	4.0	3.9	3.8	3.4	3.0	3.1	3.3	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Barge Landing - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Barge Landing - January 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	202	27.15	27.15
-20 - 0	445	59.81	86.96
0 - 10	97	13.04	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

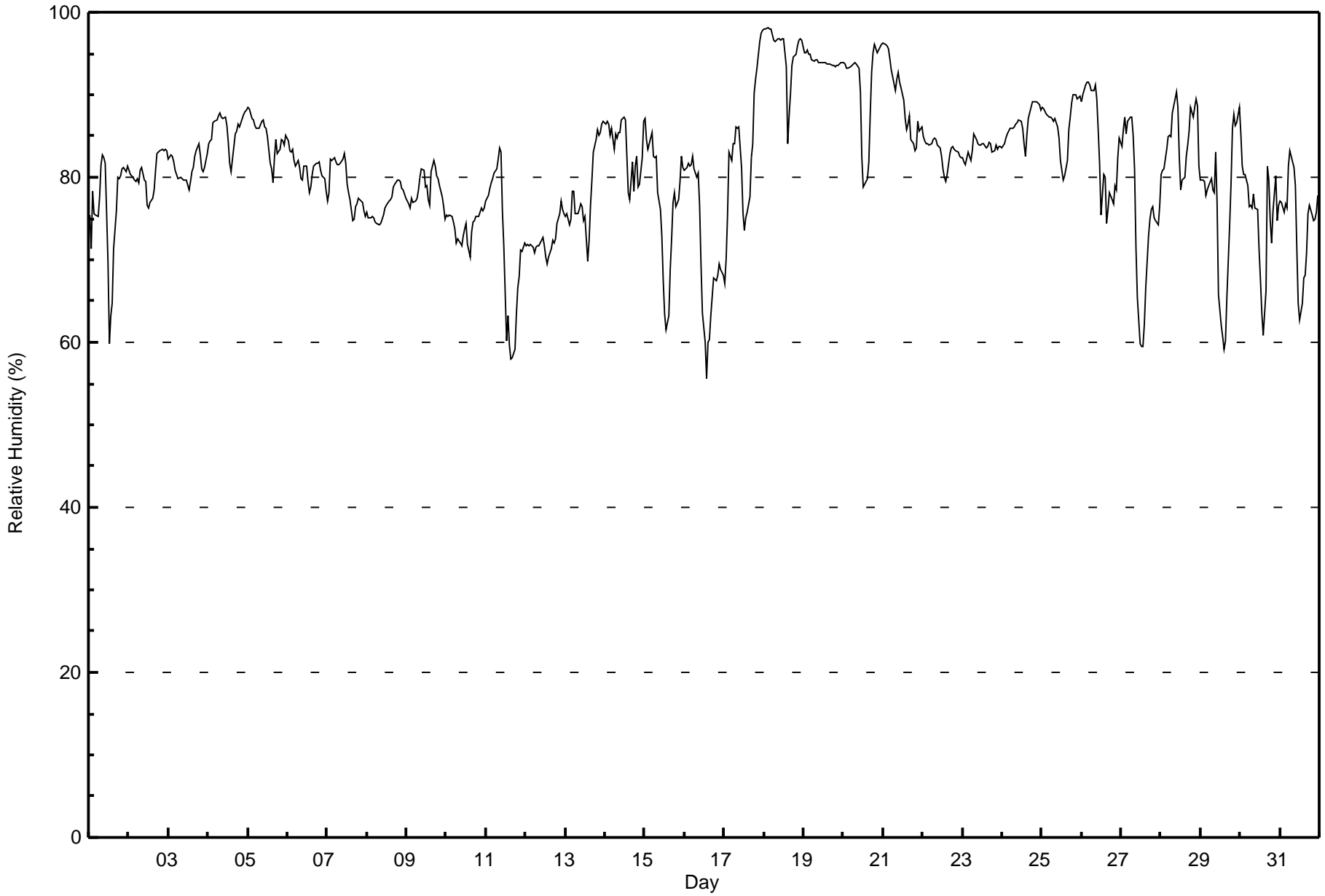
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Barge Landing - January 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Barge Landing - January 2017

Maximum Speed: 21 km/h on Jan 11 11:00	Maximum Daily Speed Average: 9.8 km/h on Jan 21	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jan 20 00:00	Minimum Daily Speed Average: 1.0 km/h on Jan 23	Hours of Data: 736
Maximum Diurnal Speed Average: 2.0 km/h at hour 15	Minimum Diurnal Speed Average: 0.9 km/h at hour 11	Hours of Missing Data: 8
Monthly Average Velocity: 1.6 km/h 197.1 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 5 O ₃ = 7 P ₉₀ = 9 P ₉₉ = 16	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-Jan	NNW14	N10	NNE12	NNE9	NNE8	N7	N4	WNW2	WSW2	WNW2	NW1	W3	WSW3	SSE3	ESE3	E4	ESE3	ENE1	SE3	SSE3	S3	SE3	SSW2	ESE2	NNE1.9	NNW14
2-Jan	SW3	SSW4	WSW3	SSW3	SSW2	SW2	S2	SE3	SSE2	SSW1	SSE3	WSW2	SW2	SSW3	SSW4	WSW2	S3	S3	SSE4	S3	SSE3	SSE4	SSE4	SSE4	S2.5	SSE4
3-Jan	S4	S4	S5	SSW5	SW5	SSW6	SSW6	SSW6	SSW7	SSW6	S6	S4	SW4	SSW5	S4	S4	SSE4	SSE2	WSW2	W5	W6	W6	W4	NW2	SSW3.8	SSW7
4-Jan	WSW3	W3	NNW2	NNE4	ENE4	ESE3	ESE2	ESE3	SSE2	SSE3	SSE5	SE5	SSE5	SSW6	S5	SSE5	S6	S6	SSE6	S7	SSE7	SSE4	SE2	NNE1	SSE2.9	S7
5-Jan	NW2	N5	NNE7	NE8	NE7	NNE5	NNE5	NNE7	NE4	NE3	NE3	NNE4	NNE10	N11	N9	NNE9	NNE5	N4	N6	NNW4	N3	N2	WSW2	SW4	NNE4.7	N11
6-Jan	SW4	S5	S5	SSW6	S4	SSE4	SSW4	SW3	SW3	S2	SSE4	S6	S6	S6	S6	SSE6	S6	SSE5	SSE5	SSW2	SE2	SE3	N2	S3.9	SSW6	
7-Jan	NW2	E1	NE1	NNW2	SW1	NW2	NW2	NNW2	N4	N6	NNE9	NNE11	NNE10	NNE9	NNE8	NNE7	NE6	NNE4	N3	WNW1	W2	SSW1	S1	NNE3.3	NNE11	
8-Jan	SE2	SSE3	SSE6	SE5	SSE5	SSE5	SE5	SSE4	S5	SSE6	SSE6	S7	S7	S7	S8	S7	SSE6	SSE4	S5	SSW5	SSW6	SSW4	SW5	WSW6	S4.8	S8
9-Jan	WSW5	SW4	SW6	SW5	WSW7	WSW4	WSW4	SW3	S3	S3	NNW1	WNW1	NNW3	NNW3	AF	SE2	WSW4	NW2	NNW2	E1	SSE2	SE2	ESE3	NW0	SW1.8	WSW7
10-Jan	NE2	NNE2	N3	N3	NNW3	N1	NW1	NNW1	NE1	SSW2	SE1	SSE4	SE4	S4	S5	S5	S4	S3	SSE5	SSW5	SSW5	SSW6	S7	S7	S2.0	S7
11-Jan	S7	SSE8	S8	S9	S9	S7	SSE4	E3	N3	N6	N21	N18	N16	N16	NNW16	NNW14	NNW9	NNW5	NW3	NW2	AF	AF	AF	AF	N3.7	N21
12-Jan	AF	AF	AF	S4	SSE3	S3	SSE6	SSE8	SSE7	S5	S6	SSW8	S8	S8	S9	S8	SSW7	SSW3	SSW2	NNW2	W0	SSW4	SSW3	SW4	S4.6	S9
13-Jan	SW4	SSW4	WSW5	S1	SE2	NE1	NNE1	SSE1	S3	ESE2	S4	S5	SSW4	S4	S5	S4	S4	S3	WNW1	WSW1	S4	S4	S6	S8	S2.9	S8
14-Jan	S7	S8	SSW6	SW4	S5	WSW4	WSW3	SSW3	SSW4	SW3	WSW4	S5	SSE7	S3	SSW4	SW7	SW4	SW6	S4	SW5	WSW8	SW6	SSW6	S5	SSW4.6	WSW8
15-Jan	S5	SW6	SW2	SW5	WSW6	SW6	SSE5	SSE5	SW7	WSW11	W9	WSW7	SW6	SW7	SW7	SSW5	SW7	SSE4	SSW5	WSW5	SW8	S6	S9	S9	SW5.4	WSW11
16-Jan	SSW9	SSW7	SSW9	S8	S8	S9	S9	S8	S8	S9	S11	SSW11	S10	SSE7	S10	S8	S7	S9	SSW9	SSW7	SSW6	SSW6	S7	S8	S8.2	SSW11
17-Jan	SSE9	S7	S7	S7	S6	S4	SSW7	SW7	WSW8	WSW7	WSW10	SW10	WSW8	WSW9	SW6	SSW6	SSE6	S3	SSW2	SE4	SE2	SSE4	SSE6	SE4	SSW4.9	WSW10
18-Jan	SE2	SSE3	SSE3	WSW1	ESE1	SE2	SE2	NNE1	NNW3	NNW4	NW4	SE2	WSW3	SE2	S4	S5	S4	SSE5	SSW5	SSE6	SSE5	SSE5	SSE6	ESE1	SSE1.9	SSE6
19-Jan	NNW7	N6	NE6	NE6	N6	N6	N5	NNE7	NNE7	NNE6	NNE5	N6	N6	NNE6	N5	N5	N4	NNE5	N4	N5	N4	WNW4	NW3	ENE0	N4.9	NNW7
20-Jan	S2	S2	S5	S5	S7	S7	S7	S7	S7	SSW4	SW3	SSW4	SSW4	SSW5	S5	S5	SSW4	S2	NNW2	NNE3	NE3	N5	NNE5	NE6	S2.6	S7
21-Jan	NNE7	NNE8	NNE8	NNE9	NNE10	NNE11	N11	NNE12	NNE10	NNE10	N9	NNE10	NNE11	NNE11	NNE12	NNE12	N10	NNE11	NNE10	N10	NNE10	N7	NNE10	N8	NNE9.8	NNE12
22-Jan	N9	NNE11	NNE9	NNE9	NNE13	NNE11	NNE9	NNE8	NE8	NNE8	NNE7	NNE7	NNE7	NNE7	NNE6	N6	N5	N4	N5	N5	N4	NNE3	N2	NNW2	NNE6.7	NNE13
23-Jan	NNW2	NNW2	NNW1	NNW2	NW2	NNW3	NW2	NW2	W3	W3	W3	WSW3	WSW3	SSW2	SSE3	SSE3	SSE3	SE2	ESE3	S3	SSW3	S3	SSE4	SSE4	SW1.0	SSE4
24-Jan	S4	SSE4	S4	SSE5	S4	S4	SSE4	SSE4	SSE4	SSE4	S4	S4	S5	S6	S7	S7	S7	S8	S7	SSE7	SSE7	S7	S6	S6	S5.4	S8
25-Jan	S7	SSE7	S9	S8	S8	SSE8	S8	S7	SSE7	S7	S7	S8	S8	SSW8	SSW7	SSW7	S8	S8	S7	S7	SSE8	S9	S8	S8	S7.6	S9
26-Jan	S8	S7	SSE6	SSE6	SSE7	SSE7	SSE7	SSE7	SSE7	SSE7	S8	S8	S6	S7	S7	SW6	SW7	WSW16	W16	W13	W10	WNW7	WSW7	WSW8	SSW5.8	WSW16
27-Jan	WSW6	SSW4	SW6	SSW5	SSE3	S4	SSW5	SSE6	SSW3	WSW11	WSW8	WSW5	WSW4	WSW6	SW6	WSW5	W3	WSW4	SSW4	WSW9	WSW9	WSW8	WSW4	WSW7	SW5.1	WSW11
28-Jan	SW5	WSW7	WSW7	SSW6	SW6	SW8	SW6	S6	S6	SSE6	S6	SSE6	SSE5	SSE6	S6	SSE6	S6	SSE4	WSW3	SSE4	SSE4	S4	SSE6	SSW6	S4.8	SW8
29-Jan	SSW5	S5	SSW6	SW6	SW5	SW6	SW2	SSW5	S5	SSE6	SSE8	SW10	WSW10	WSW10	WSW9	SW8	SSW5	SW4	WSW2	SW2	SW1	SW3	SW4	S5	SW4.9	SW10
30-Jan	SSW6	S6	SSE7	S7	SW8	SSW6	SW7	WSW8	SSE5	NNW3	NNE11	NNE9	NNE6	N5	N7	N10	NNE9	NNE11	NNE12	NNE11	N11	N10	N14	N13	N3.7	N14
31-Jan	N10	NNE9	NNE9	NNE8	N6	N3	W1	WSW2	WSW3	WSW3	SW3	SW5	SSW5	S5	SW5	SW5	SW4	WSW5	W5	NW2	W3	WNW2	WNW3	NW3	WNW1.7	N10
SSW1.6 S1.5 S1.5 S1.5 S1.4 S1.4 S1.7 S1.7 S1.9SSW1.5SSW0.9SSW1.6SSW1.4SSW1.6SSW2.0SSW1.6 S1.9SSW1.5SSW1.1 SW1.3 SW1.8SSW2.0SSW1.9SSW1.9																								Diurnal Average		
NNW14 NNE11 NNE12 S9 NNE13 NNE11 N11 NNE12 NNE10 WSW11 N21 N18 N16 N16 NNW16 NNW14 N10 WSW16 W16 W13 N11 N10 N14 N13																								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

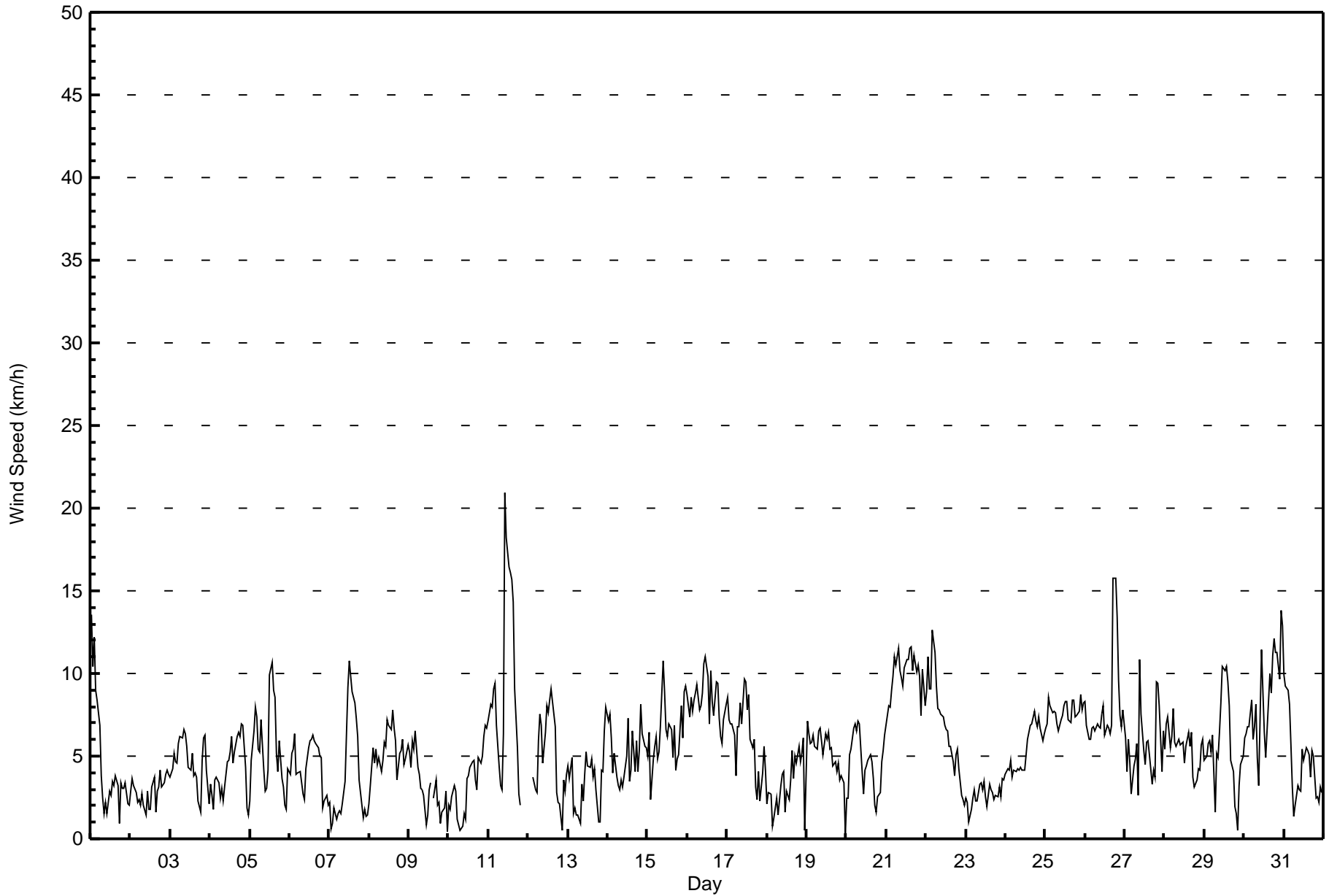
Wind Speed (WS) - km/h
Barge Landing - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Jan 11 11:00 Minimum Value: 0 km/h on Jan 23 19:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 2 P ₉₀ = 3 P ₉₉ = 5																	Hours in Service: 744 Hours of Data: 736 Hours of Missing Data: 8 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-Jan	6	4	3	3	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	6
2-Jan	1	2	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	2
3-Jan	1	1	1	1	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	2	2	1	1	2
4-Jan	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	2	2	2	2	2	2	2	1	1	2
5-Jan	1	2	2	2	2	2	2	2	2	1	1	2	4	3	3	2	2	2	1	2	1	0	1	1	4
6-Jan	1	1	1	2	2	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1	2
7-Jan	1	1	1	1	1	1	1	1	1	1	3	3	3	3	3	3	2	2	2	1	1	1	1	2	3
8-Jan	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	1	2	1	1	2	2	2	3	3
9-Jan	2	2	2	2	2	1	1	1	1	1	1	2	1	1	AF	1	1	1	1	1	1	1	1	1	2
10-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2
11-Jan	2	2	3	3	3	2	1	2	2	3	7	6	5	6	5	5	3	3	1	2	AF	AF	AF	AF	7
12-Jan	AF	AF	AF	1	1	2	1	2	2	1	3	3	3	3	3	3	3	1	1	1	1	2	2	2	3
13-Jan	2	2	2	1	1	1	1	2	1	1	2	2	1	1	2	2	1	1	1	1	1	1	2	2	2
14-Jan	2	2	2	1	2	1	1	1	1	2	1	2	2	2	2	2	2	2	1	2	2	2	1	1	2
15-Jan	2	3	2	2	3	3	1	1	3	4	4	4	2	2	2	2	2	1	2	2	2	2	2	2	4
16-Jan	3	2	2	2	2	2	3	2	2	2	3	3	3	3	3	3	2	2	3	2	2	2	2	2	3
17-Jan	2	2	2	2	2	2	2	2	3	2	3	3	2	2	2	2	1	2	1	1	1	1	1	0	3
18-Jan	2	1	1	1	1	2	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2	2
19-Jan	2	2	2	2	2	2	2	2	2	2	1	2	2	2	1	1	1	2	1	1	1	1	1	2	2
20-Jan	1	1	2	2	2	2	2	2	2	1	1	1	2	2	2	1	1	1	2	1	2	1	2	2	2
21-Jan	2	2	2	2	3	3	3	3	3	3	3	3	3	3	4	4	3	3	3	3	3	2	3	2	4
22-Jan	3	4	3	2	3	3	3	2	2	2	2	2	2	2	2	2	1	1	1	1	2	1	1	1	4
23-Jan	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1
24-Jan	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	1	1	1	1	2
25-Jan	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	2	3	2	2	2	2	2	2	2	3
26-Jan	3	2	2	1	1	2	1	1	1	2	2	2	2	2	2	2	3	5	5	4	3	4	3	3	5
27-Jan	3	1	2	1	1	2	2	1	3	4	4	2	2	3	2	2	1	1	1	2	2	3	2	2	4
28-Jan	2	2	2	2	2	3	2	2	1	1	2	2	2	2	2	2	2	1	1	2	1	1	1	2	3
29-Jan	1	1	2	2	2	2	1	2	2	2	2	4	3	3	2	2	1	2	1	1	2	2	2	1	4
30-Jan	2	1	1	2	2	2	1	2	2	3	3	3	2	2	3	4	3	3	4	4	4	3	5	4	5
31-Jan	4	3	3	2	2	1	1	1	1	1	1	2	2	2	1	2	1	1	2	1	1	1	1	1	4
Diurnal Maximum																									
AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Barge Landing - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Barge Landing - January 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	401	54.48	54.48
6 - 11	317	43.07	97.55
12 - 19	17	2.31	99.86
20 - 28	1	0.14	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 736

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Barge Landing - January 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	26	15	8	3	4	11	24	60	71	46	35	34	13	9	19	23	401
6 - 11	26	53	6	0	0	0	0	42	97	33	26	27	4	1	0	2	317
12 - 19	5	6	0	0	0	0	0	0	0	0	0	1	2	0	0	3	17
20 - 28	1	0	0	0	0	0	0	0	0	0	0	0	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
Totals	58	74	14	3	4	11	24	102	168	79	61	62	19	10	19	28	736

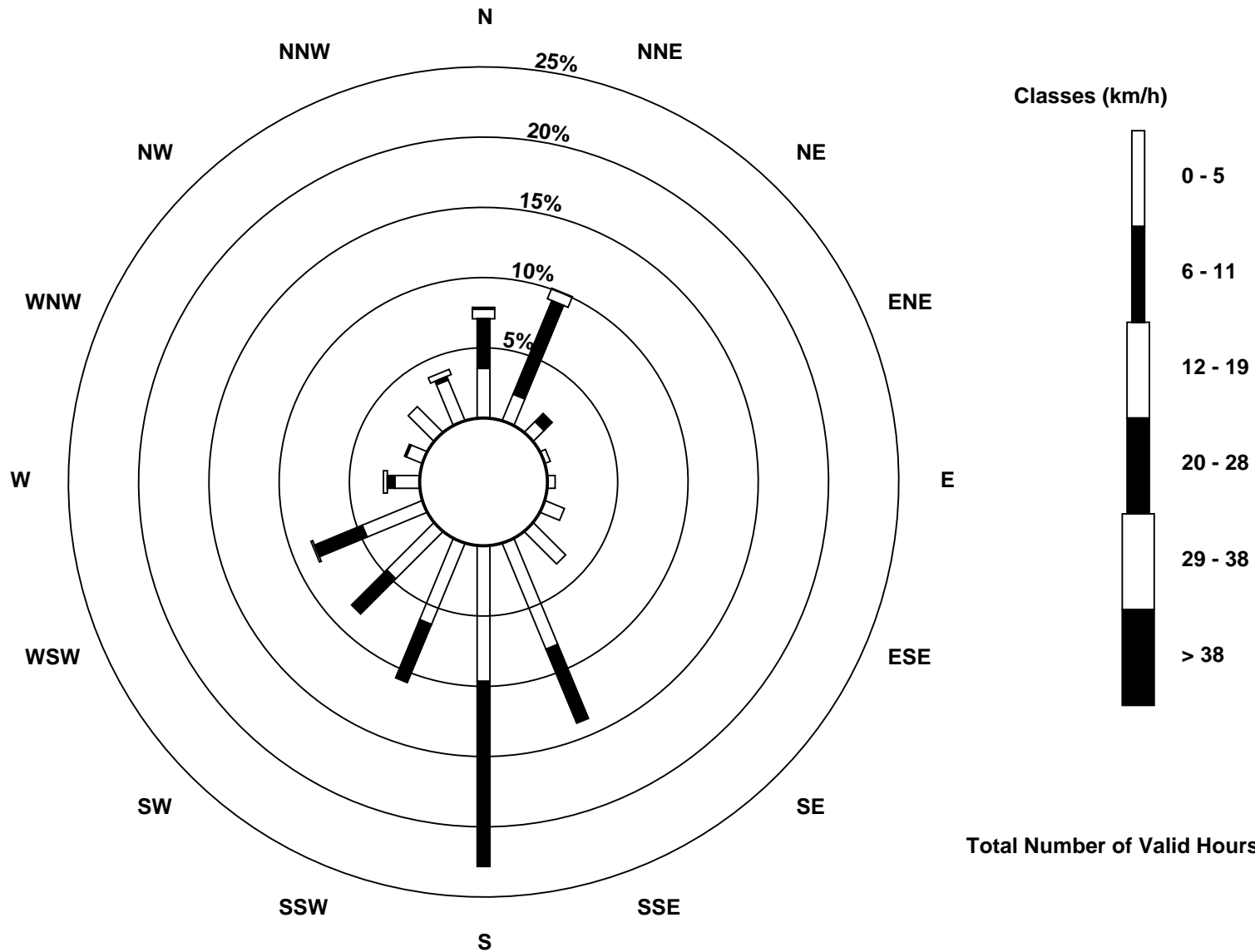
Total Number of Valid Hours: 736

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Wind Speed (WS) - km/h
Barge Landing (AMS 9)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Barge Landing - January 2017

Direction of Maximum Speed: 9 deg on Jan 11 11:00																						Hours in Service: 744			
Direction of Maximum Daily Speed Average: 13.7 deg on Jan 21																						Hours of Data: 736			
Direction of Minimum Speed: 70 deg on Jan 20 00:00											Direction of Minimum Daily Speed Average: 1.0 deg on Jan 23											Hours of Missing Data: 8			
Monthly Average Direction: 211.9 deg																						Percent Operational Time: 98.9			
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jan	335	357	20	16	21	5	359	298	251	282	317	278	250	152	104	95	106	73	127	157	180	136	210	114	14.4
2-Jan	227	197	254	211	196	219	189	138	156	197	168	240	236	203	205	237	177	186	168	169	151	166	152	156	187.0
3-Jan	170	175	183	201	214	205	203	204	195	197	190	188	224	192	179	176	161	158	258	262	263	265	276	318	207.0
4-Jan	255	263	328	24	59	118	112	114	147	167	152	146	165	212	191	162	175	180	168	173	164	150	146	29	163.3
5-Jan	319	8	22	36	37	31	23	30	43	44	45	18	17	9	8	20	28	360	10	347	359	349	255	234	16.9
6-Jan	217	179	178	201	190	158	205	217	229	189	161	175	184	179	169	179	168	191	154	156	210	125	142	11	179.7
7-Jan	319	100	50	330	236	318	310	323	328	349	6	18	20	25	23	19	33	40	27	359	287	268	192	177	12.3
8-Jan	136	158	152	137	158	162	144	156	171	168	156	172	182	182	184	177	162	164	178	204	212	205	222	245	175.9
9-Jan	242	229	231	221	242	237	246	226	185	172	336	301	347	331	AF	145	248	310	348	98	153	127	122	322	234.3
10-Jan	39	13	1	356	338	350	321	332	55	210	145	155	130	174	176	171	180	177	152	194	197	194	186	169	174.0
11-Jan	172	166	170	174	177	181	166	101	351	349	9	4	350	351	343	346	347	344	316	304	AF	AF	AF	AF	354.0
12-Jan	AF	AF	AF	178	165	172	162	156	164	171	184	195	186	182	180	184	192	209	211	347	276	210	210	216	183.4
13-Jan	216	192	248	178	125	38	25	150	175	121	172	182	192	185	185	179	172	182	296	252	171	182	172	182	183.2
14-Jan	184	185	206	221	187	254	237	212	200	226	246	180	157	175	203	218	223	222	181	215	238	214	205	177	205.0
15-Jan	176	227	227	236	255	221	157	160	223	245	262	250	225	233	227	194	214	156	212	258	228	181	182	178	216.3
16-Jan	197	205	194	191	189	170	189	178	172	183	188	194	178	163	179	188	178	179	200	210	201	199	178	171	186.2
17-Jan	164	171	171	172	175	169	213	227	238	248	243	234	248	244	232	198	166	177	208	144	136	165	162	141	201.5
18-Jan	136	160	156	257	108	129	132	18	338	344	323	130	251	128	189	173	190	166	195	148	164	151	151	107	163.0
19-Jan	348	2	34	42	10	9	4	19	24	13	26	5	9	12	355	4	3	18	2	355	358	294	326	70	7.6
20-Jan	174	185	178	187	186	173	174	176	169	193	224	197	195	193	189	190	194	187	333	24	40	10	23	46	177.6
21-Jan	31	17	14	17	22	13	9	12	19	14	11	12	14	14	15	14	11	16	13	11	13	3	12	5	13.7
22-Jan	9	13	15	20	21	14	31	33	41	27	17	16	16	19	12	353	3	1	3	0	357	12	350	343	15.4
23-Jan	343	348	345	294	310	327	309	312	271	268	271	249	239	203	159	159	150	145	122	176	198	169	157	167	223.4
24-Jan	170	166	174	150	170	178	165	164	161	162	170	172	181	184	179	175	172	174	171	167	163	171	172	170	170.5
25-Jan	169	168	173	171	170	167	172	173	165	172	186	182	185	192	193	192	176	172	173	169	167	174	184	188	176.4
26-Jan	187	178	157	161	157	167	167	159	162	163	180	180	177	169	179	228	226	256	259	261	262	286	254	248	208.8
27-Jan	245	212	231	208	153	173	198	156	197	254	248	237	237	239	228	238	259	249	203	243	241	241	249	247	230.9
28-Jan	218	248	237	212	216	220	223	188	170	147	172	166	165	159	179	167	177	164	252	168	162	188	160	205	191.1
29-Jan	197	174	204	214	214	236	216	208	189	165	163	230	245	251	247	232	197	233	255	221	220	229	226	187	216.9
30-Jan	203	184	164	190	230	211	227	250	167	346	24	28	17	358	351	8	19	21	18	15	6	358	2	0	1.4
31-Jan	8	15	17	20	10	10	274	251	256	255	222	214	197	190	224	224	216	248	278	307	280	288	294	320	297.8
211.3 190.9 184.9 179.2 181.9 187.3 187.4 175.5 179.8 209.0 208.6 206.2 213.0 207.6 204.2 194.8 181.3 198.8 212.4 222.8 215.3 206.2 192.5 194.7																									
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

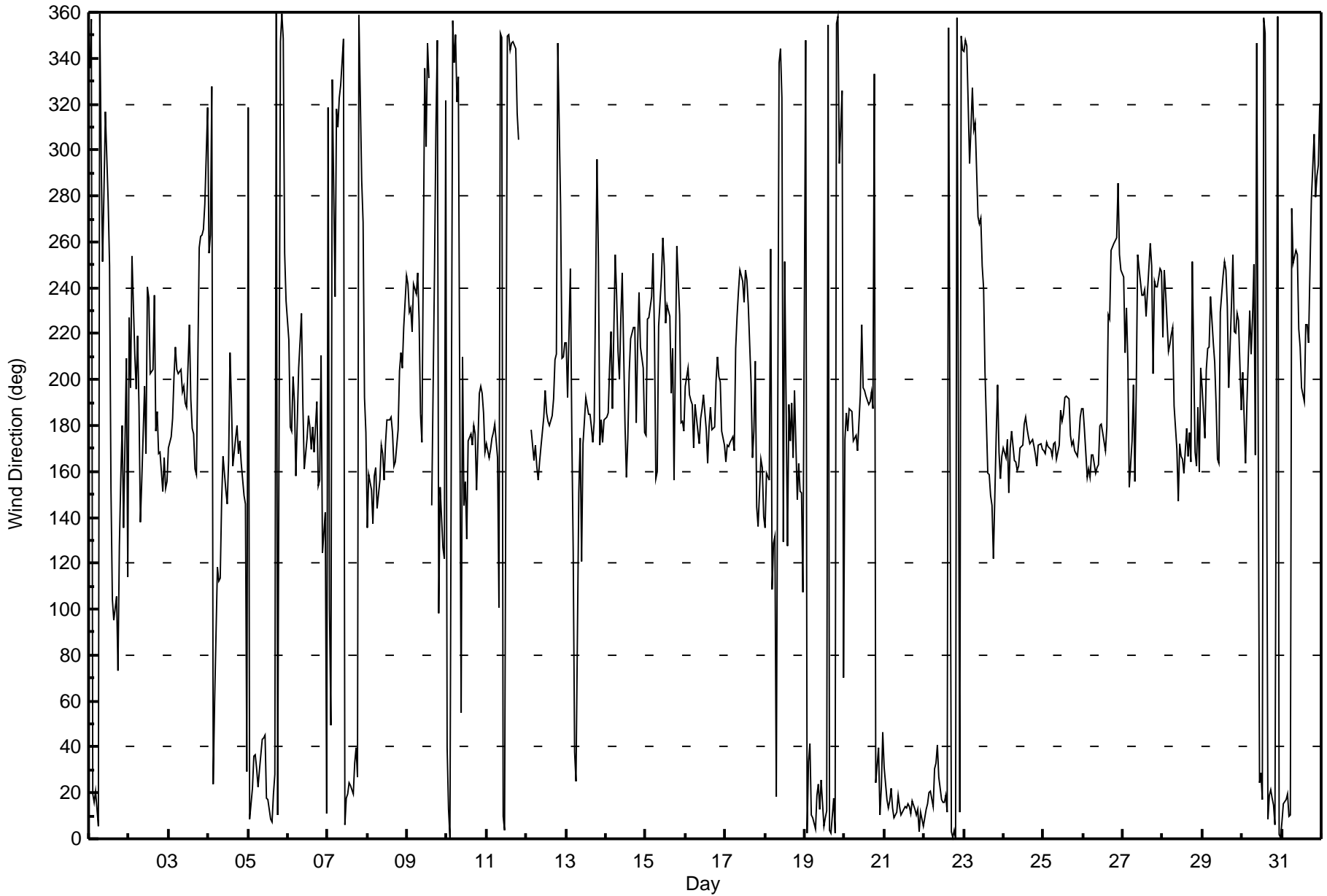
Wind Direction (WD) - deg
Barge Landing - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 97 deg on Jan 29 07:00		Hours in Service: 744 Hours of Data: 736 Hours of Missing Data: 8 Hours of Calibration: 0 Percent Operational Time: 98.9																								
Minimum Value: 9 deg on Jan 10 05:00																										
Percentiles: P ₁ = 13 P ₁₀ = 18 Q ₁ = 20 Median = 23 Q ₃ = 31 P ₉₀ = 46 P ₉₉ = 83																										
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-Jan	25	29	18	20	18	20	19	39	45	38	40	40	29	32	21	15	14	64	19	29	45	31	76	78	78	
2-Jan	55	46	49	43	34	45	29	16	31	30	34	40	61	38	36	46	33	26	22	40	41	27	15	10	61	
3-Jan	17	16	17	24	21	25	24	21	22	21	27	37	27	27	32	31	24	51	69	19	25	17	21	35	69	
4-Jan	31	23	42	25	26	22	43	18	28	26	24	22	30	27	29	23	21	21	18	22	24	49	45	45	49	
5-Jan	21	40	19	18	16	19	17	17	24	29	20	24	21	21	23	18	18	17	19	18	12	25	54	21	54	
6-Jan	25	18	15	23	35	21	20	21	17	31	17	26	26	26	23	21	25	20	20	18	69	61	57	65	69	
7-Jan	40	84	82	28	63	34	25	21	19	14	21	19	18	19	19	18	18	18	21	23	46	25	63	50	84	
8-Jan	37	34	17	22	12	13	19	32	18	20	19	22	25	26	24	23	14	56	17	22	30	31	28	26	56	
9-Jan	18	39	22	23	22	23	23	27	24	34	66	59	31	23	AF	34	15	27	33	79	56	54	24	76	79	
10-Jan	44	70	21	14	9	46	43	37	64	46	57	32	20	31	25	22	21	26	14	18	20	20	24	24	70	
11-Jan	22	20	23	24	24	26	25	45	39	23	21	24	23	22	21	22	19	18	23	27	AF	AF	AF	AF	45	
12-Jan	AF	AF	AF	22	27	35	16	15	20	21	23	23	29	28	25	26	31	39	33	50	91	50	33	23	91	
13-Jan	31	51	24	67	36	35	19	72	32	39	33	27	27	34	31	30	23	34	67	64	17	18	18	20	72	
14-Jan	18	20	23	29	24	24	32	44	42	48	31	41	17	43	32	20	56	24	41	28	21	26	26	15	56	
15-Jan	35	39	85	30	28	54	31	25	31	25	38	46	29	24	28	35	27	37	29	32	21	31	19	17	85	
16-Jan	23	22	22	22	22	21	21	20	20	20	22	24	22	28	21	28	22	18	22	21	23	22	21	22	28	
17-Jan	20	18	24	25	25	46	26	26	20	16	16	21	20	14	22	27	15	43	44	21	49	28	18	13	49	
18-Jan	43	32	38	67	38	55	43	50	34	21	18	89	75	68	37	20	33	24	23	11	19	22	16	86	89	
19-Jan	15	24	31	24	20	21	22	21	21	24	22	20	22	21	22	22	24	24	23	19	21	32	31	95	95	
20-Jan	47	54	24	29	23	22	24	24	21	42	46	30	31	30	27	22	19	38	27	27	48	21	23	19	54	
21-Jan	19	18	20	19	18	19	20	20	18	20	21	20	20	19	19	19	19	19	19	19	19	19	19	19	21	21
22-Jan	20	20	20	18	18	19	20	18	19	17	20	19	19	19	23	22	20	22	17	18	20	32	20	37	37	
23-Jan	16	23	20	24	16	17	18	20	21	21	27	20	36	45	24	22	16	15	10	27	18	32	16	17	45	
24-Jan	17	20	27	15	25	28	22	21	19	20	23	25	25	29	25	21	20	20	20	20	14	17	19	18	29	
25-Jan	18	20	22	22	22	21	22	22	20	23	23	24	24	26	25	21	24	20	22	20	18	20	23	21	26	
26-Jan	23	21	19	14	11	19	16	13	14	17	21	26	26	22	27	23	28	18	18	22	29	43	29	19	43	
27-Jan	28	43	20	25	50	40	51	27	80	27	33	36	55	40	23	19	30	33	42	13	15	13	49	20	80	
28-Jan	30	18	22	25	24	24	25	27	21	17	21	27	33	23	23	29	24	40	41	59	39	22	15	26	59	
29-Jan	26	28	24	23	25	28	97	39	38	22	21	28	19	17	17	20	24	30	40	95	95	62	39	31	97	
30-Jan	19	22	17	24	19	27	18	23	37	74	19	19	21	39	44	29	18	17	19	21	21	21	22	21	74	
31-Jan	22	19	20	19	20	22	61	47	20	27	53	32	47	29	27	23	21	22	22	32	44	41	21	21	61	
	55	84	85	67	63	55	97	72	80	74	66	89	75	68	44	46	56	64	69	95	95	62	76	95		
	Diurnal Maximum																									
AF - Analyzer Failure																										



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Barge Landing - January 2017





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	January 12, 2017	Last Calibration	December 2, 2016
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	9:45	End Time (MST)	12:56
Gas Cert Reference	LL29997	Station temp.	22 Deg C
Cal Gas Concentration	5.18 ppm	Cal Gas Exp Date	2/12/2019
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.	5564
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	192.168.1.42		Lamp voltage	1044	1043
Calculated slope	0.992205	0.999670	Chamber temp	45	45
Calculated intercept	-0.135654	-0.149986	Pressure	692.7	709.5
Analyzer Background	2.13	2.09	Flow	0.435	0.447
Analyzer Coefficient	1.062	1.069	Intensity	91	91
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1331259320	
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	77.2	80.0	79.5	1.007
SO2 scrubber check	5000	15.4	147.2	0.3	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	77.2	80.0	80.0	1.000
second point	5000	38.6	40.0	40.5	0.987
third point	5000	19.3	20.0	20.2	0.990
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	77.2	80.0	79.6	1.005
Average Correction Factor					0.993

Corrected As found	79.5	Previous response	80.7	% change	1.6%
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Notes:

Inlet filter changed and scrubber check done after as founds. Adjusted the span.

Calibration Performed By:

Jayme Marcoux



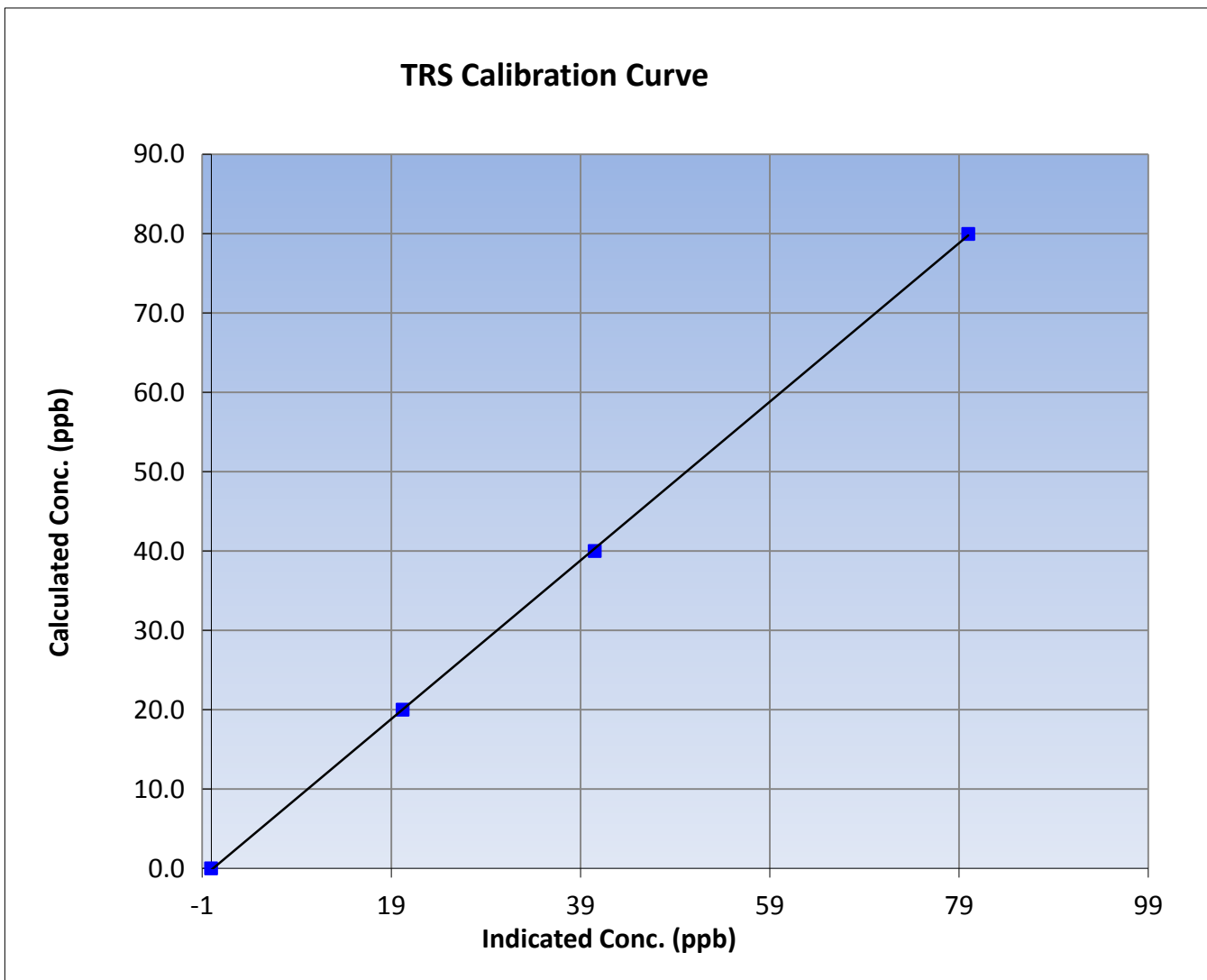
Wood Buffalo Environmental Association TRS Calibration Report

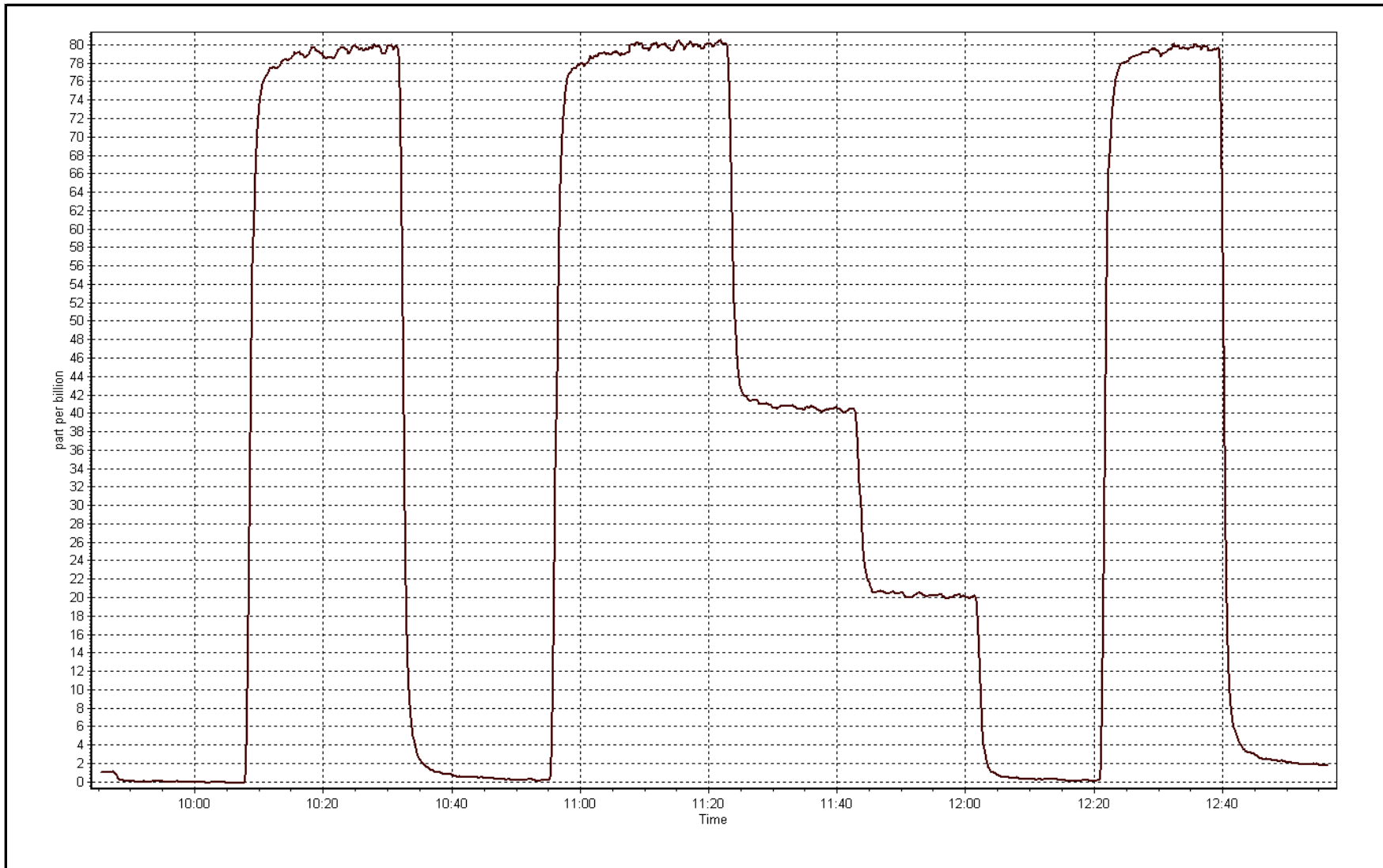
Station Information

Calibration Date	January 12, 2017	Previous Calibration	December 2, 2016
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	9:45	End Time (MST)	12:56
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1331259320

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999944
80.0	80.0	1.0001		
40.0	40.5	0.9874	Slope	0.999670
20.0	20.2	0.9903		
			Intercept	-0.149986







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	January 12, 2017	Last Calibration	December 2, 2016
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	12:39	End Time (MST)	15:04
Gas Cert Reference	LL104180	Cal Gas Expiry Date	February 12, 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	5564

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	9.1	9.1
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.7	34.7
Calculated slope	1.002666	1.003523	Fuel Pressure	24.1	24.1
Calculated intercept	-0.041828	-0.035142	Analyzer Coeff	4.377	4.377
			Analyzer BKG	5.54	5.54

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	-0.01	----
as found span	5000	76.7	15.70	15.97	0.983
calibrator zero	5000	0.0	0.00	0.03	----
high point	5000	76.7	15.70	15.67	1.002
second point	5000	41.0	8.39	8.42	0.997
third point	5000	15.4	3.15	3.17	0.994
as left zero	5000	0.0	0.00	0.03	----
as left span	5000	76.7	15.70	15.53	1.011
Average Correction Factor					0.998

Corrected As found	15.98	Previous response	15.70	% change	-1.7%
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Notes:

Changed out Hydrogen cylinder after as founds. Inlet filter changed after as founds. Adjusted the zero and span.

Calibration Performed By:

Jayme Marcoux



Wood Buffalo Environmental Association THC Calibration Report

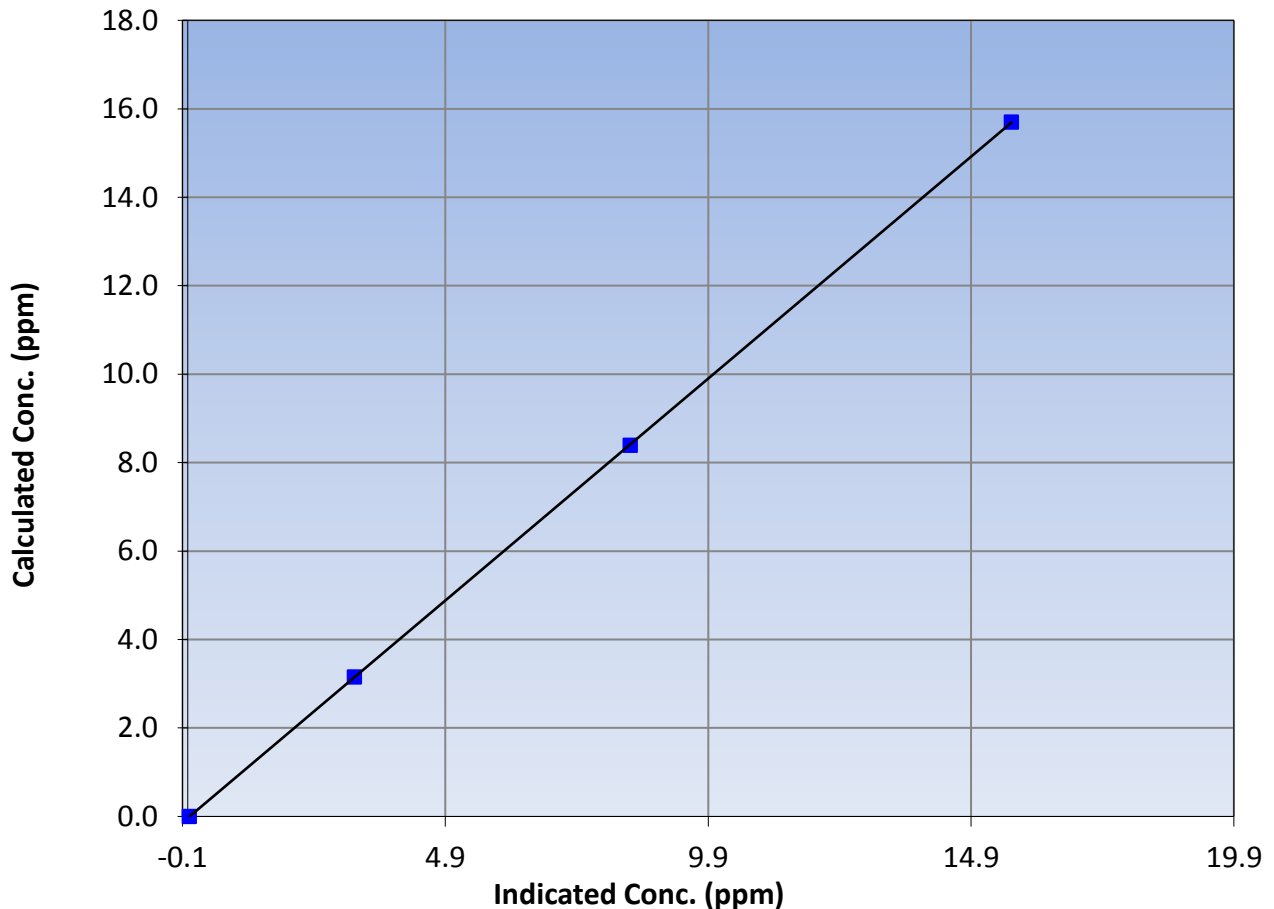
Station Information

Calibration Date	January 12, 2017	Previous Calibration	December 2, 2016
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	12:39	End Time (MST)	15:04
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296

Calibration Data

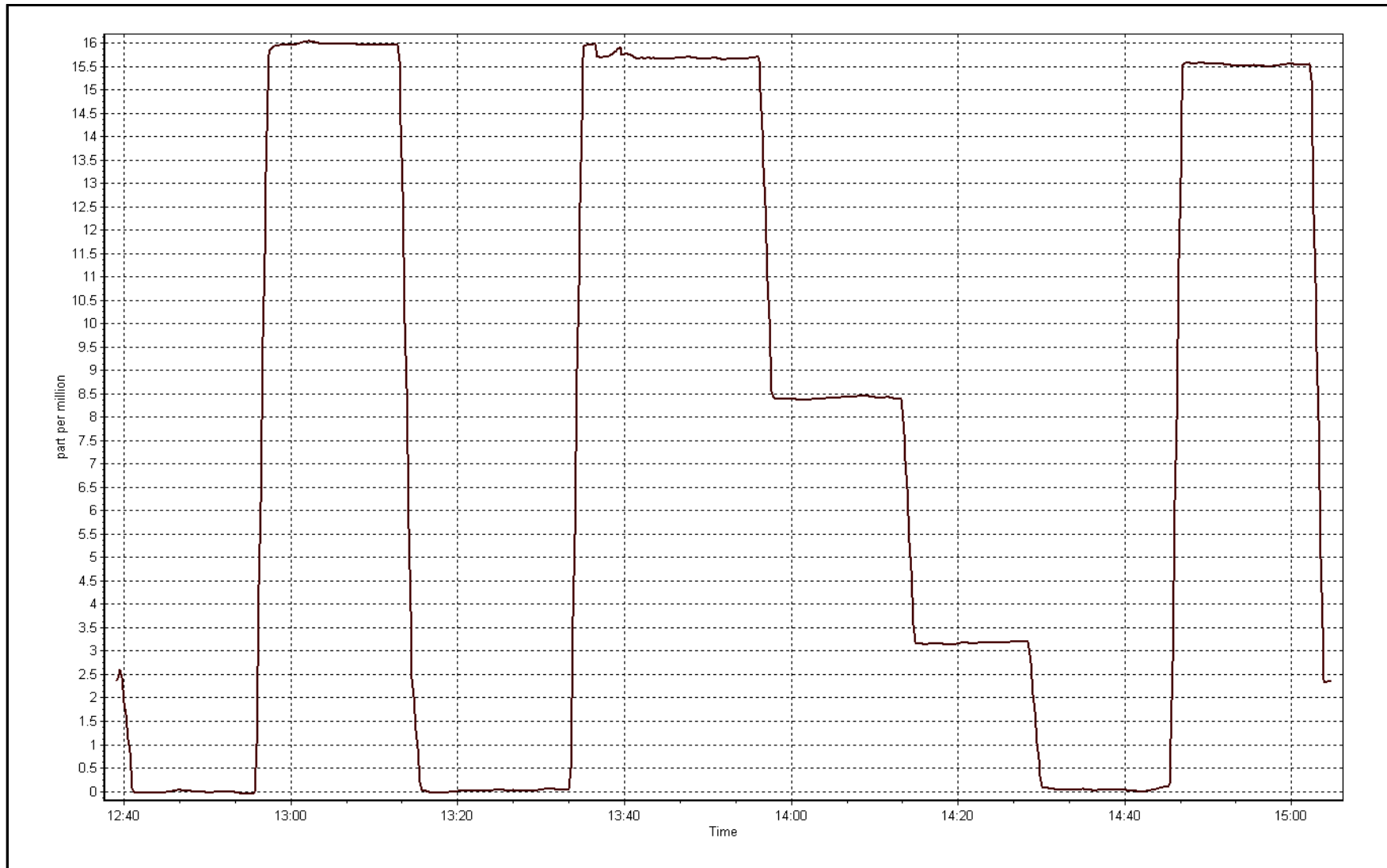
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.03	----	Correlation Coefficient	0.999995
15.70	15.67	1.0019		
8.39	8.42	0.9968	Slope	1.003523
3.15	3.17	0.9944		
			Intercept	-0.035142

THC Calibration Curve



THC Calibration Plot

Date: January 12, 2017





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 11
LOWER CAMP
JANUARY 2017**

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

February 27, 2017



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
 JANUARY 2017

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	709	35	35	100.00	125	0	20	0
H2S (ppb) Average	709	35	35	100.00	22	6	3	0
THC (ppm) Average	709	35	35	100.00	4.8	-	3.4	-
Temperature (C) Average	744	0	0	100.00	6.9	-	2.1	-
Relative Humidity (%) Average	744	0	0	100.00	96	-	93	-
Wind Speed 10 m (km/h) Average	743	0	1	99.87	34	-	17	-
Wind Direction 10 m (deg) Average	743	0	1	99.87	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
 JANUARY 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	709	3	11	-	0	0	0	1	1	4	125
H2S (ppb) Average	709	0.8	2	-	0	0	0	0	1	1	22
THC (ppm) Average	709	2.46	0.3	-	2	2.1	2.2	2.4	2.6	2.9	4.8
Temperature 2 m (C) Average	744	-13.3	10.3	-	-37.7	-27.1	-20.5	-13.6	-4.9	0.5	6.9
Relative Humidity (%) Average	744	79.1	8	-	53	70	74	79	84	90	96
Wind Speed 10 m (km/h) Average	743	9.1	6	-	0	2	4	9	13	16	34
Wind Direction 10 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
JANUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	01 Jan 2017 18:00	01 Jan 2017 18:00	1	Flat line in sensor output signal -sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

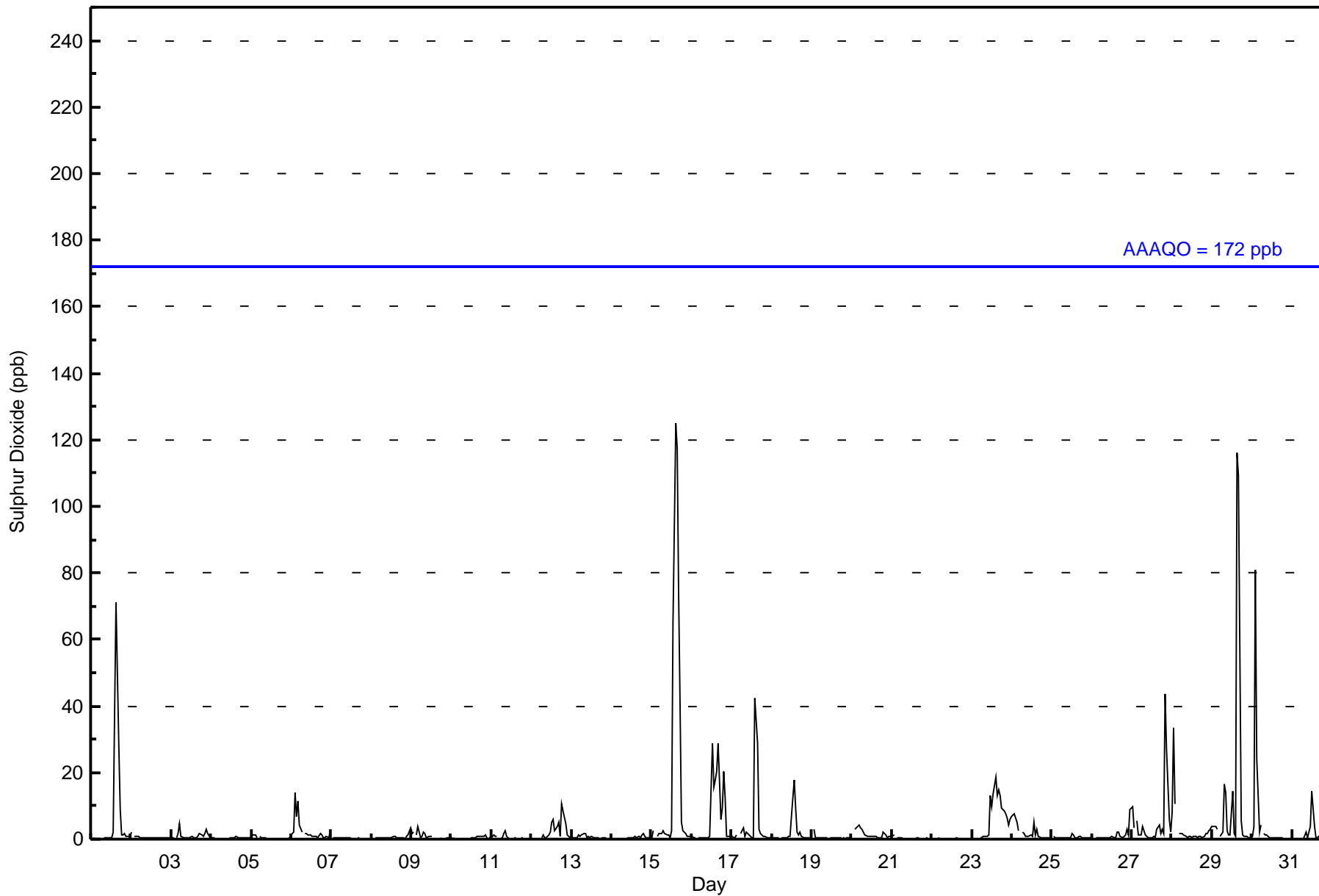
Lower Camp - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 125 ppb on Jan 15 15:00										Maximum Daily Average: 19.7 ppb on Jan 15										Hours of Data: 709						
Minimum Value: 0 ppb on Jan 12 00:00										Minimum Daily Average: 0.2 ppb on Jan 22										Hours of Missing Data: 35						
Maximum Diurnal Average: 13.0 ppb at hour 16										Minimum Diurnal Average: 0.7 ppb at hour 10										Hours of Calibration: 35						
Monthly Average: 3.0 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 4 P ₉₉ = 69										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-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	2	38	71	28	9	1	1	2	1	1	1	6.9	71
2-Jan	2	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.5	2
3-Jan	0	0	Z	0	2	5	1	0	0	0	0	1	0	0	0	1	2	1	1	2	3	2	0	1.0	5	
4-Jan	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0.3	1	
5-Jan	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	
6-Jan	2	2	14	7	11	4	2	Z	2	2	1	1	1	1	1	1	1	2	1	0	0	1	1	3	2.6	14
7-Jan	Z	1	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
8-Jan	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	1	1	4	0.6	4
9-Jan	2	2	Z	1	4	0	1	2	2	1	1	1	1	C	C	C	C	0	0	0	0	0	0	0	1.0	4
10-Jan	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0.4	1
11-Jan	0	1	1	1	Z	0	0	2	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3
12-Jan	0	0	0	0	0	Z	0	1	0	0	1	2	5	6	3	4	5	1	11	9	5	1	1	1	2.4	11
13-Jan	Z	0	0	1	1	1	1	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.6	2
14-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2	1	1	1	1	0.5	2
15-Jan	1	2	Z	1	2	2	2	3	2	1	1	1	3	65	125	117	74	41	5	3	2	1	1	1	19.7	125
16-Jan	1	1	1	Z	0	0	0	0	0	0	1	29	16	18	20	29	6	9	20	12	1	1	1	1	7.2	29
17-Jan	1	1	1	1	Z	1	3	3	1	2	1	1	0	0	43	29	3	2	1	1	1	0	0	0	4.2	43
18-Jan	0	0	0	0	0	Z	0	1	0	1	1	1	7	18	9	2	1	2	1	0	1	0	0	0	2.0	18
19-Jan	Z	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3
20-Jan	0	Z	3	3	4	3	3	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1.4	4
21-Jan	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
22-Jan	0	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
23-Jan	0	0	0	0	Z	0	0	1	1	1	1	13	10	14	18	13	15	13	9	8	8	6	4	6	6.2	18
24-Jan	7	8	6	5	3	Z	2	2	1	1	1	1	1	5	1	3	1	1	1	0	0	0	0	0	2.2	8
25-Jan	Z	1	1	1	0	0	0	0	0	0	0	0	2	1	0	1	1	1	1	0	0	0	0	0	0.6	2
26-Jan	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	2	2	1	0	1	1	3	1	9	9	1.2	9
27-Jan	10	4	Z	6	1	1	4	2	1	1	1	0	0	1	1	3	4	2	3	2	44	27	6	2	5.4	44
28-Jan	8	33	11	Z	2	2	2	1	1	1	1	1	1	1	1	1	1	1	0	1	2	2	2	3	3.3	33
29-Jan	4	4	4	3	Z	1	2	17	14	2	1	1	14	2	1	116	109	6	1	1	1	1	1	1	13.3	116
30-Jan	1	4	81	24	2	4	Z	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	5.4	81
31-Jan	Z	0	0	0	0	0	0	0	2	0	2	4	14	4	0	0	1	1	1	1	0	0	0	0	1.5	14
										Diurnal Average																
										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 (SO₂) - ppb
Lower Camp - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Lower Camp - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	670	94.50	94.50
11 - 20	20	2.82	97.32
21 - 60	11	1.55	98.87
61 - 110	5	0.71	99.58
111 - 172	3	0.42	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 (SO₂) - ppb
Lower Camp - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	69	12	4	5	11	27	311	16	3	2	8	22	36	38	45	60	669
11 - 20	0	0	1	0	2	3	5	3	4	0	1	0	1	0	0	0	20
21 - 60	0	1	0	0	0	0	2	1	3	2	2	0	0	0	0	0	11
61 - 110	0	0	0	0	0	0	1	2	0	0	2	0	0	0	0	0	5
111 - 172	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	3
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	69	13	5	5	13	30	319	23	11	5	13	22	37	38	45	60	708

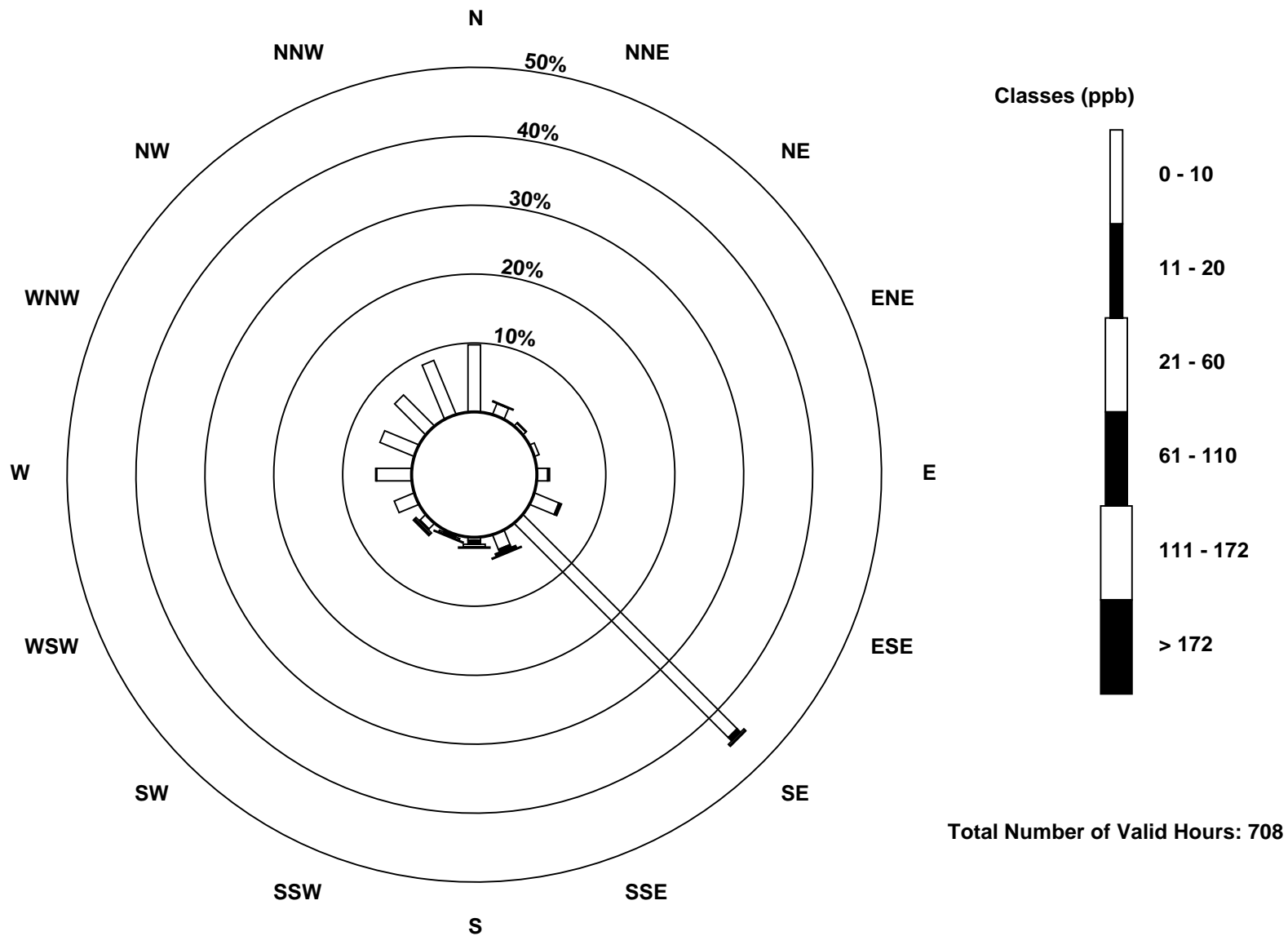
Total Number of Valid Hours: 708

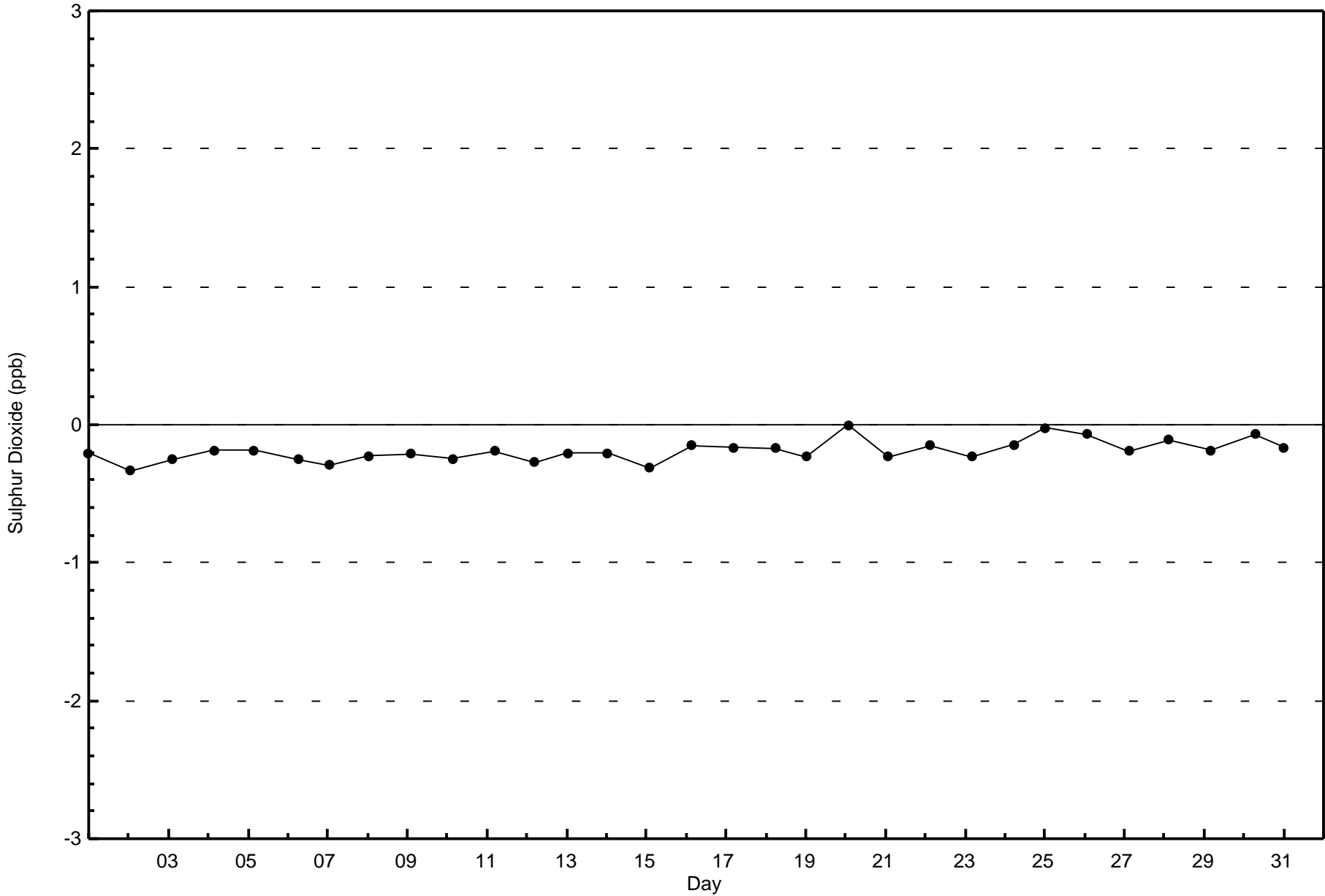
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Sulphur Dioxide (SO₂) - ppb
Lower Camp (AMS 11)

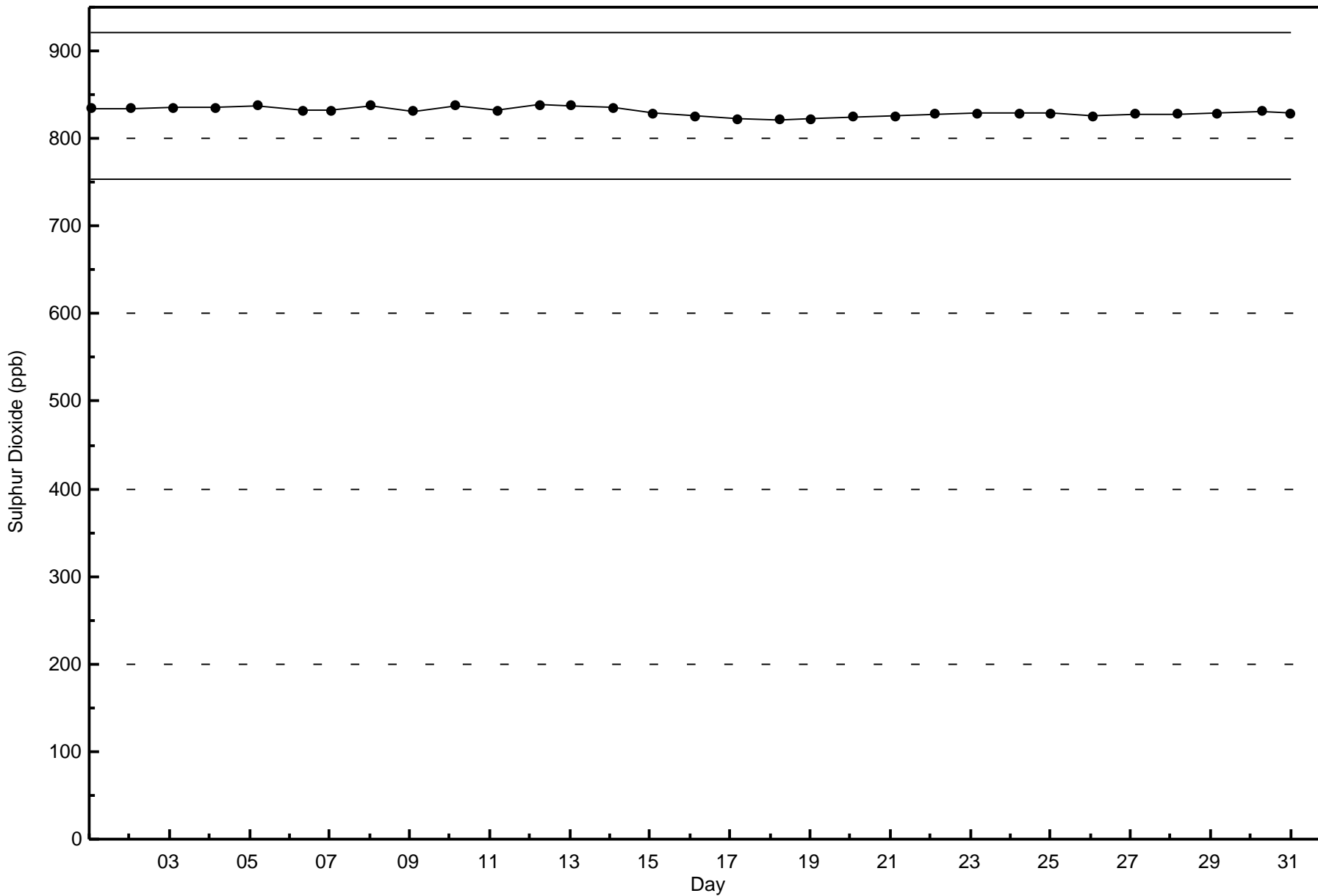






Wood Buffalo Environmental Association
Span Responses

Sulphur Dioxide (SO₂) - ppb
Lower Camp - January 2017





Number of Exceedences (AAAQO):	1-hr: 6	24-hr: 0	Hours in Service:	744
Maximum Value: 22 ppb on Jan 29 16:00	Maximum Daily Average: 2.6 ppb on Jan 29		Hours of Data:	709
Minimum Value: 0 ppb on Jan 26 14:00	Minimum Daily Average: 0.2 ppb on Jan 22		Hours of Missing Data:	35
Maximum Diurnal Average: 2.0 ppb at hour 16	Minimum Diurnal Average: 0.4 ppb at hour 12		Hours of Calibration:	35
Monthly Average: 0.8 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 10		Percent Operational Time:	100.0

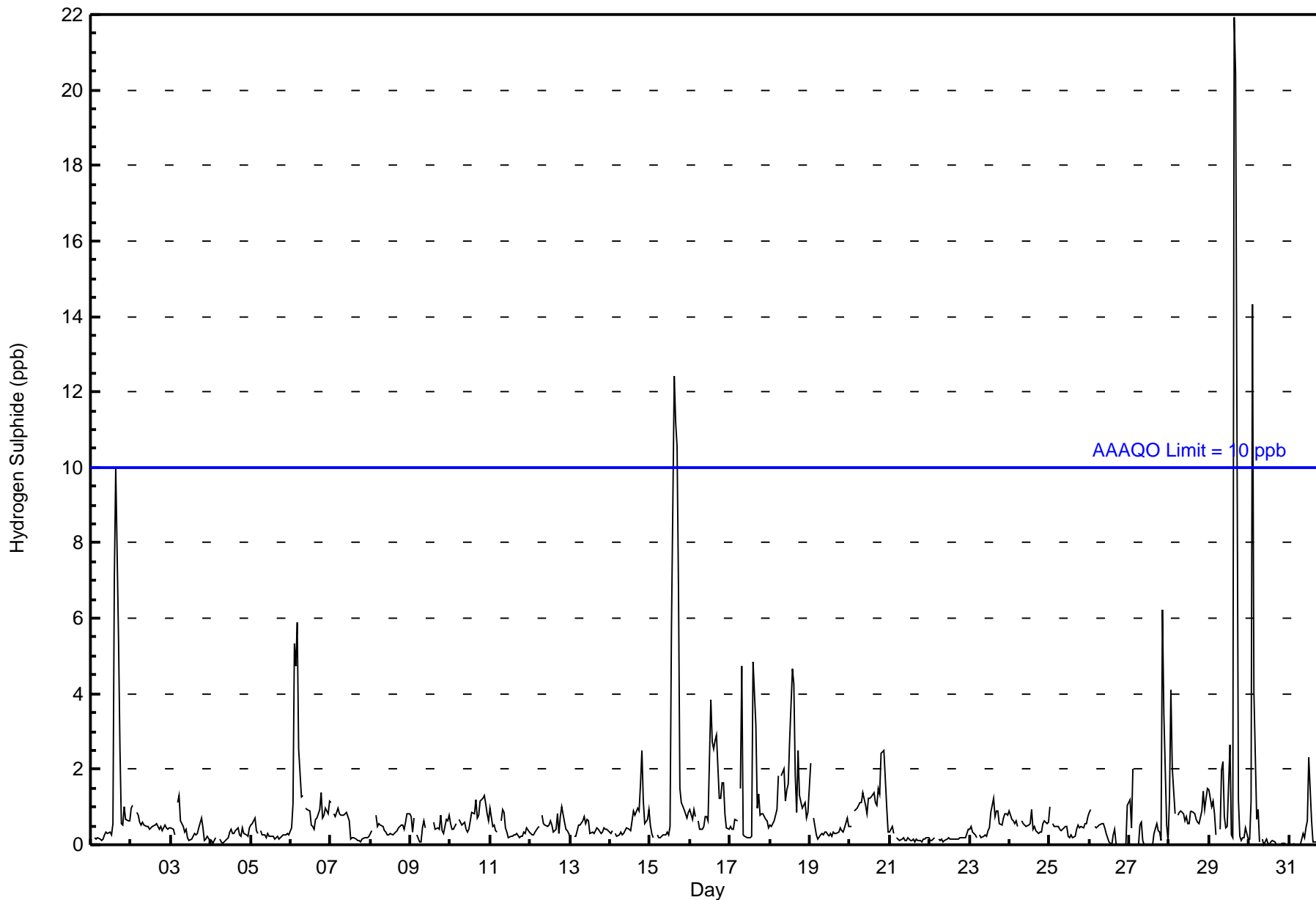
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	7	10	5	3	1	1	1	1	1	1	1.4	10
2-Jan	1	1	Z	1	1	1	1	1	1	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0.6	1
3-Jan	0	0	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.4	1
4-Jan	0	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
5-Jan	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
6-Jan	0	1	5	5	6	3	1	1	Z	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1.5	6
7-Jan	1	Z	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
8-Jan	0	0	Z	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	0.5	1
9-Jan	1	0	1	Z	0	0	0	0	1	0	C	C	C	C	1	0	0	0	1	0	0	1	1	1	0.5	1
10-Jan	1	0	0	1	Z	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
11-Jan	1	0	1	0	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
12-Jan	0	0	0	0	0	0	Z	1	1	1	0	1	1	1	0	0	1	0	1	1	1	0	0	0	0.5	1
13-Jan	0	Z	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
14-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	2	2	1	1	1	1	0.7	2
15-Jan	1	0	0	Z	0	0	0	0	0	0	0	0	0	6	12	11	11	7	1	1	1	1	1	1	2.4	12
16-Jan	1	1	1	1	Z	1	0	0	0	1	1	1	4	3	3	3	3	1	1	2	2	1	0	0	1.3	4
17-Jan	0	0	0	1	1	Z	2	5	0	0	0	0	0	0	5	3	1	1	1	1	1	1	1	0	1.1	5
18-Jan	1	0	1	1	1	2	Z	2	2	1	1	2	3	5	4	2	1	2	1	1	1	1	1	1	1.6	5
19-Jan	2	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.4	2
20-Jan	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	0	1.2	2
21-Jan	0	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
22-Jan	0	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
23-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0.5	1
24-Jan	1	1	1	1	1	1	Z	1	1	1	0	1	1	1	0	0	0	0	0	0	1	1	1	1	0.6	1
25-Jan	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	0.5	1
26-Jan	1	1	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1
27-Jan	1	0	2	Z	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	6	3	1	0	0.7	6
28-Jan	1	4	2	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	4
29-Jan	1	1	1	1	0	Z	0	2	2	1	0	0	3	0	0	22	20	1	0	0	0	0	0	0	2.6	22
30-Jan	0	1	14	4	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	14
31-Jan	0	Z	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0.3	2
	0.6	0.7	1.3	0.8	0.7	0.6	0.5	0.7	0.6	0.4	0.4	0.4	0.7	0.8	1.3	2.0	1.7	0.8	0.6	0.6	0.8	0.6	0.5	0.5	Diurnal Average	
	2	4	14	5	6	3	2	5	2	1	1	2	4	6	12	22	20	7	2	2	6	3	1	1	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Lower Camp - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Lower Camp - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	677	95.49	95.49
3 - 4	14	1.97	97.46
5 - 7	11	1.55	99.01
8 - 11	1	0.14	99.15
> 11	6	0.85	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Lower Camp - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	67	11	7	5	10	30	313	16	4	2	6	22	37	43	44	60	677
3 - 4	0	0	0	0	0	0	2	3	5	2	1	0	0	0	0	0	13
5 - 7	0	2	0	0	2	1	1	1	1	0	3	0	0	0	0	0	11
8 - 11	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
> 11	0	0	0	0	0	0	1	1	1	1	2	0	0	0	0	0	6
Totals	67	13	7	5	12	31	317	22	11	5	12	22	37	43	44	60	708

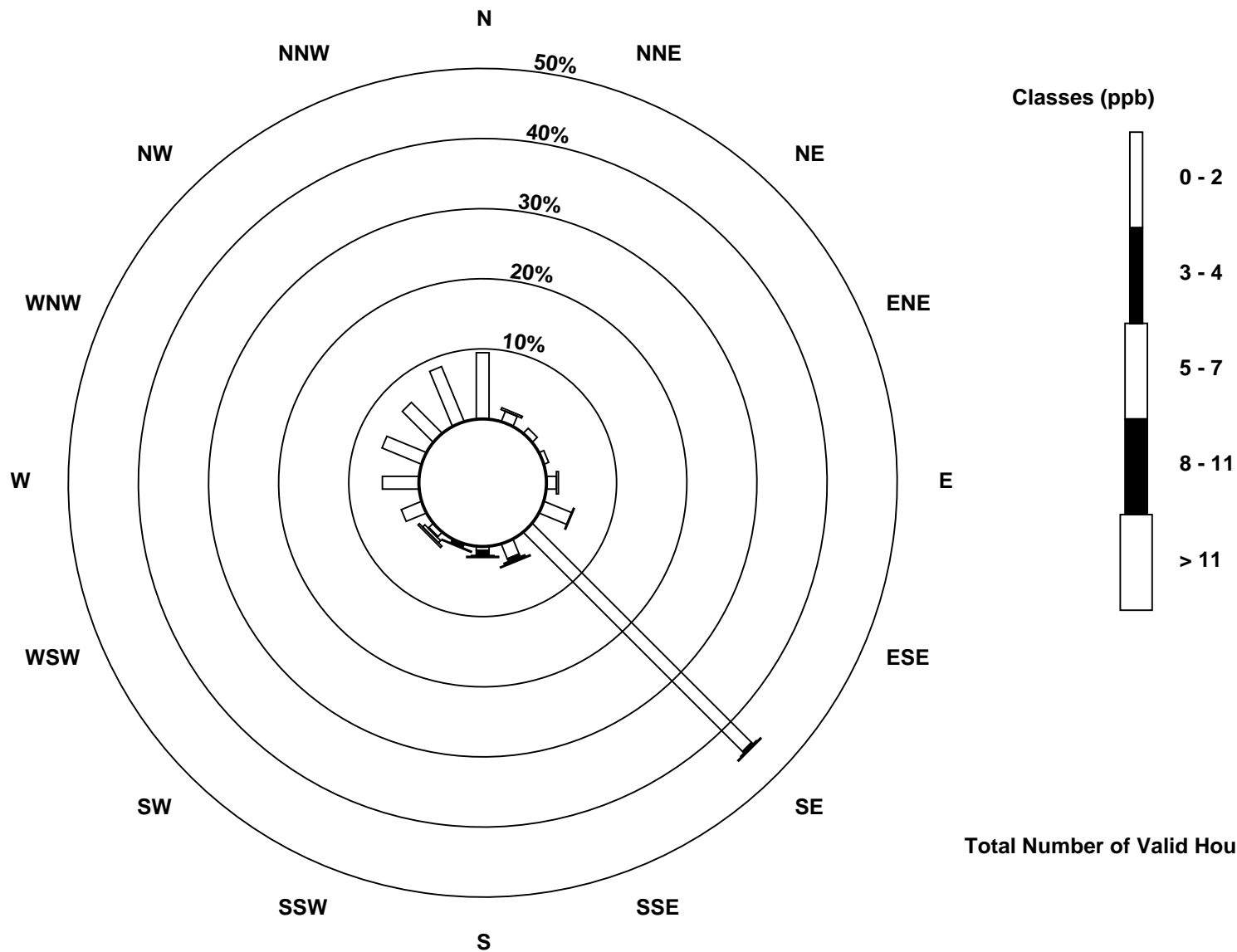
Total Number of Valid Hours: 708

Total Number of Hours: 744

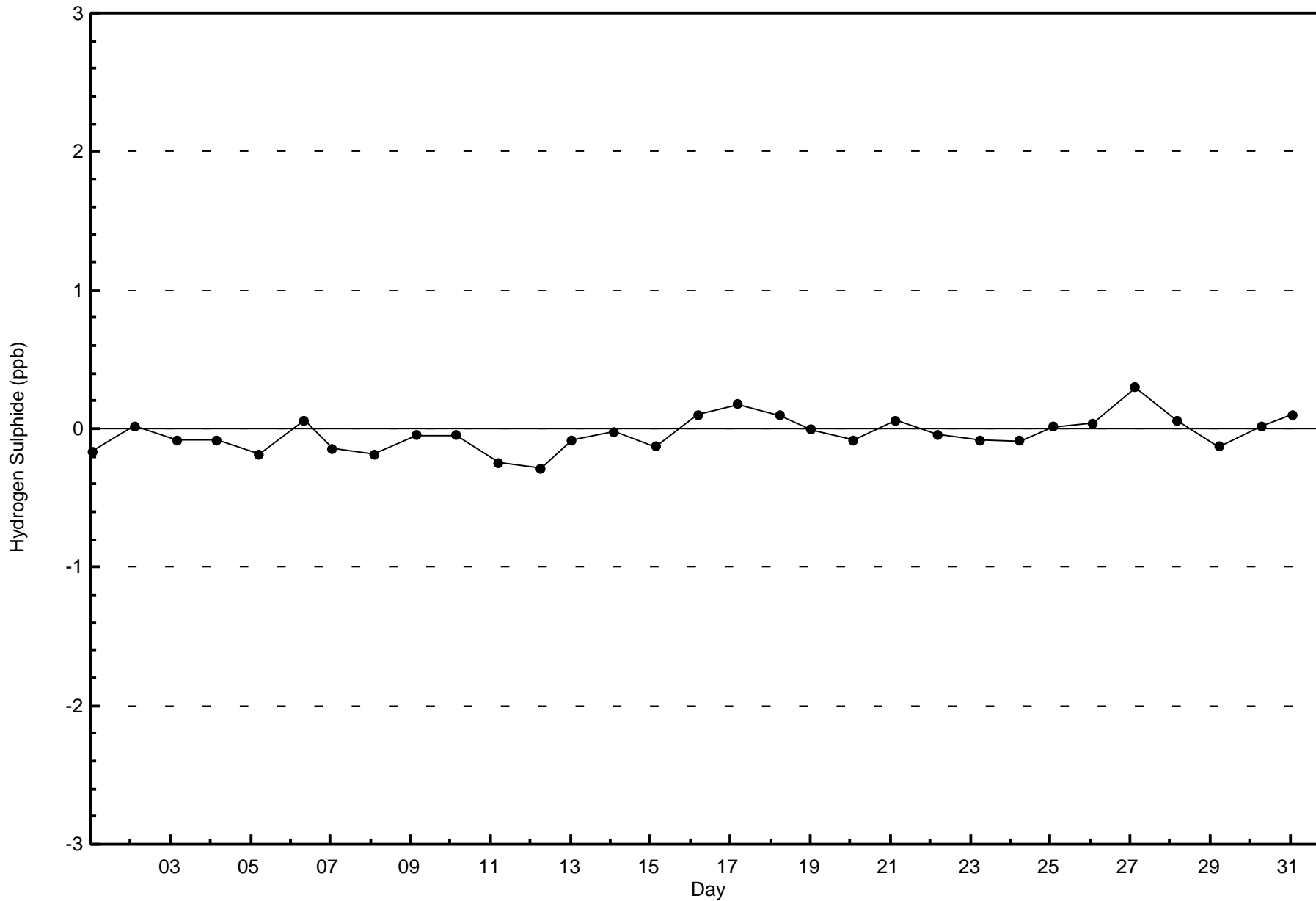


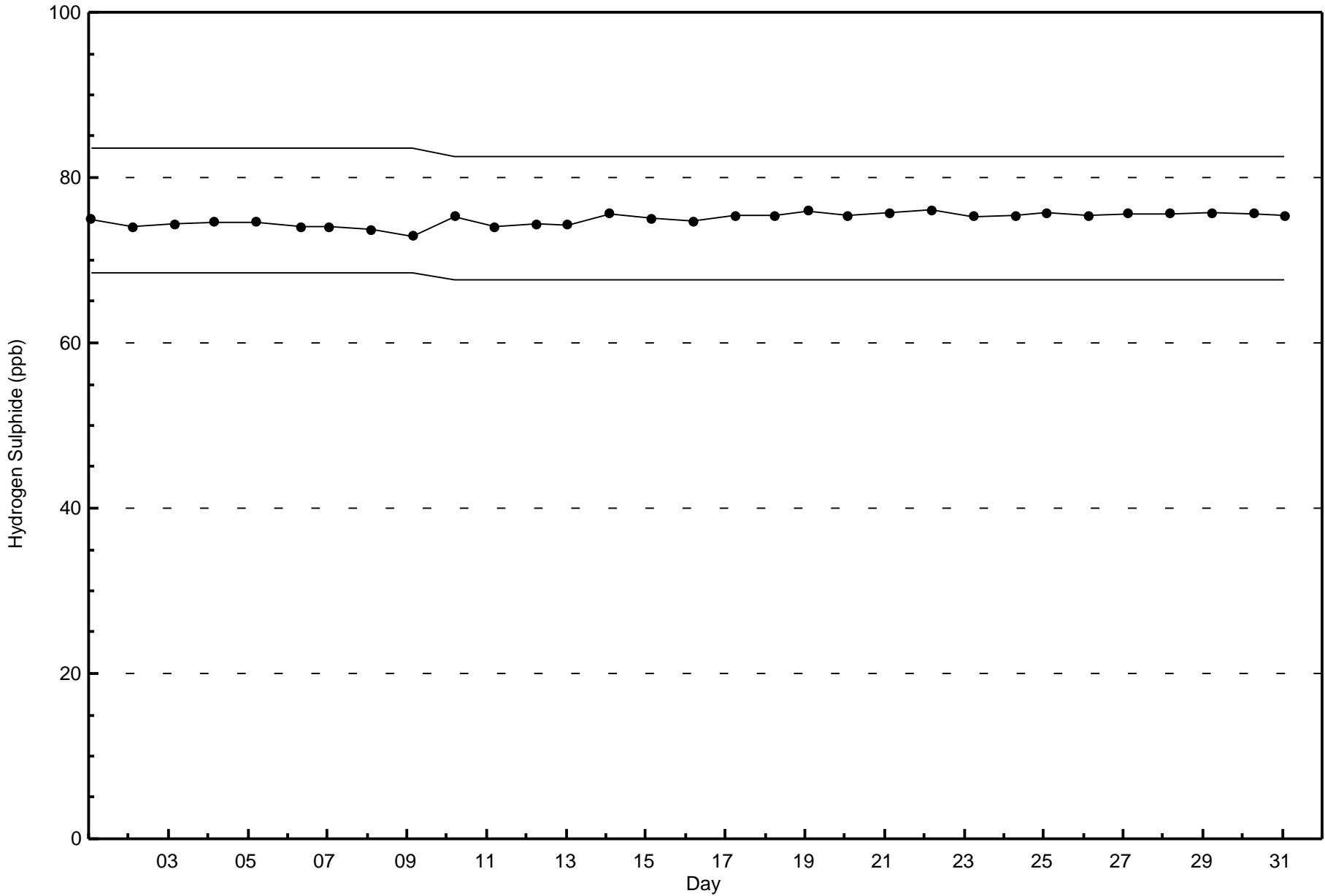
Wood Buffalo Environmental Association
Wind Rose Jan 2017

Hydrogen Sulphide (H₂S) - ppb
Lower Camp (AMS 11)



Total Number of Valid Hours: 708







Wood Buffalo Environmental Association
Summary of Hour Averages

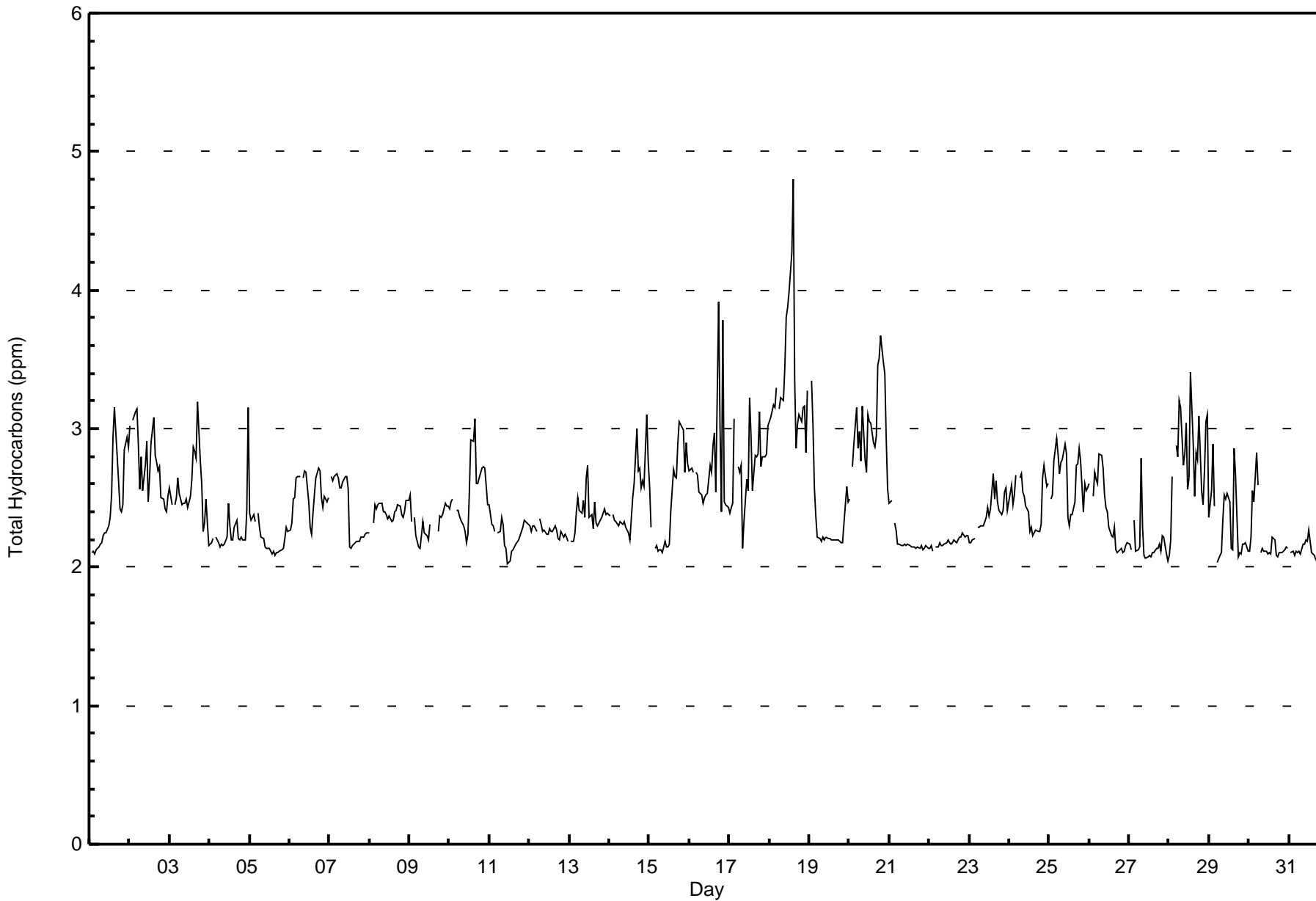
Total Hydrocarbons (THC) - ppm
Lower Camp - January 2017

Maximum Value: 4.8 ppm on Jan 18 15:00 Maximum Daily Average: 3.4 ppm on Jan 18		Hours in Service: 744 Hours of Data: 709 Hours of Missing Data: 35 Hours of Calibration: 35 Percent Operational Time: 100.0																								
Minimum Value: 2.0 ppm on Jan 11 12:00 Minimum Daily Average: 2.1 ppm on Jan 31 Maximum Diurnal Average: 2.5 ppm at hour 5 Minimum Diurnal Average: 2.4 ppm at hour 2 Monthly Average: 2.46 ppm Percentiles: P ₁ = 2.1 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.4 Q ₃ = 2.6 P ₉₀ = 2.9 P ₉₉ = 3.8																										
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-Jan	Z	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.5	2.9	3.1	2.8	2.6	2.4	2.4	2.5	2.8	2.9	2.9	2.4	3.1
2-Jan	3.0	Z	3.1	3.1	3.1	2.9	2.6	2.8	2.6	2.7	2.9	2.5	2.7	2.9	3.1	2.8	2.8	2.7	2.7	2.5	2.5	2.4	2.4	2.5	2.7	3.1
3-Jan	2.6	2.5	Z	2.5	2.5	2.6	2.5	2.5	2.5	2.5	2.4	2.5	2.6	2.9	2.8	2.8	3.2	2.8	2.6	2.3	2.3	2.5	2.2	2.6	3.2	
4-Jan	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.5	2.3	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.4	3.2	2.3	3.2	
5-Jan	2.4	2.3	2.4	2.3	Z	2.4	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	2.2	2.3	2.3	2.2	
6-Jan	2.3	2.3	2.5	2.5	2.6	2.7	2.7	Z	2.6	2.7	2.7	2.5	2.3	2.2	2.4	2.5	2.6	2.7	2.7	2.5	2.4	2.5	2.5	2.5	2.5	
7-Jan	Z	2.7	2.6	2.7	2.7	2.6	2.6	2.6	2.6	2.7	2.7	2.6	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	
8-Jan	2.3	Z	2.3	2.5	2.4	2.4	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.4	
9-Jan	2.5	2.3	Z	2.4	2.2	2.1	2.1	2.2	2.3	2.2	2.2	2.2	2.3	C	C	C	C	2.3	2.4	2.4	2.4	2.5	2.4	2.4	2.5	
10-Jan	2.4	2.5	2.5	Z	2.4	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.5	2.9	2.9	3.1	2.6	2.6	2.6	2.7	2.7	2.7	2.6	2.5	3.1	
11-Jan	2.4	2.3	2.3	2.3	Z	2.2	2.3	2.4	2.3	2.2	2.1	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.2	
12-Jan	2.3	2.3	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.3	
13-Jan	Z	2.2	2.2	2.2	2.4	2.5	2.4	2.4	2.5	2.4	2.6	2.7	2.4	2.4	2.3	2.5	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.4	
14-Jan	2.4	Z	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.4	2.5	2.6	3.0	2.7	2.7	2.6	2.6	2.6	3.1	2.8	2.5	
15-Jan	2.6	2.3	Z	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.4	2.7	2.7	2.6	2.9	3.1	3.0	3.0	2.7	2.9	2.7	
16-Jan	2.7	2.7	2.7	Z	2.7	2.7	2.5	2.5	2.5	2.5	2.5	2.5	2.7	2.7	2.9	3.0	2.5	3.9	3.0	2.4	3.8	2.5	2.5	2.4	2.7	
17-Jan	2.4	2.4	2.5	3.1	Z	2.7	2.7	2.7	2.7	2.1	2.3	2.6	2.5	3.2	2.9	2.6	2.8	2.8	2.8	3.1	2.7	2.8	2.8	3.0	2.7	
18-Jan	3.1	3.1	3.2	3.2	3.3	Z	3.1	3.2	3.2	3.4	3.8	3.9	4.0	4.3	4.8	3.4	2.9	3.0	3.1	3.1	3.2	3.2	2.8	3.3	3.4	
19-Jan	Z	3.3	3.0	2.6	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.6	2.5	2.3	
20-Jan	2.5	Z	2.7	2.9	3.1	2.9	3.0	2.8	3.2	2.8	2.7	3.1	3.1	3.0	2.9	2.9	2.9	3.5	3.5	3.7	3.5	3.4	2.9	2.6	3.0	
21-Jan	2.5	2.5	Z	2.3	2.3	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	2.1	2.1	2.2	2.1	2.2	
22-Jan	2.1	2.2	2.1	Z	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	
23-Jan	2.2	2.2	2.2	2.2	Z	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.7	2.5	2.6	2.5	2.4	2.4	2.4	2.5	2.6	2.4	2.4	
24-Jan	2.5	2.6	2.4	2.5	2.7	Z	2.6	2.7	2.5	2.5	2.4	2.4	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.6	2.7	2.6	2.6	2.5	
25-Jan	Z	2.5	2.5	2.8	2.9	2.8	2.7	2.8	2.8	2.9	2.8	2.4	2.3	2.4	2.4	2.5	2.7	2.7	2.9	2.8	2.4	2.6	2.5	2.6	2.6	
26-Jan	2.6	Z	2.5	2.7	2.6	2.6	2.8	2.8	2.7	2.5	2.4	2.4	2.3	2.2	2.2	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.4	
27-Jan	2.2	2.1	Z	2.3	2.1	2.1	2.1	2.8	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.1	2.0	2.2	
28-Jan	2.1	2.2	2.7	Z	2.9	2.8	3.2	3.2	2.7	2.8	3.0	2.6	2.6	3.4	2.9	2.5	2.8	2.8	3.1	2.5	2.5	2.7	3.1	3.1	2.8	
29-Jan	2.4	2.6	2.9	2.4	Z	2.0	2.1	2.1	2.3	2.5	2.5	2.5	2.5	2.1	2.1	2.9	2.7	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.3	
30-Jan	2.1	2.2	2.6	2.5	2.8	2.6	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	
31-Jan	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.1	2.1	2.1	2.1	2.0	2.1	2.6	2.3	2.1	2.1	2.1	2.6	
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration																										



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Lower Camp - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Lower Camp - January 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	5	0.71	0.71
2.1 - 3.0	653	92.10	92.81
3.1 - 10.0	51	7.19	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
Lower Camp - January 2017**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	1	0	0	0	0	0	0	0	0	0	0	1	2	0	0	1	5
2.1 - 3.0	67	13	5	5	12	26	292	18	10	5	12	20	35	31	42	59	652
3.1 - 10.0	1	0	0	0	1	4	27	5	1	0	1	1	0	7	3	0	51
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	69	13	5	5	13	30	319	23	11	5	13	22	37	38	45	60	708

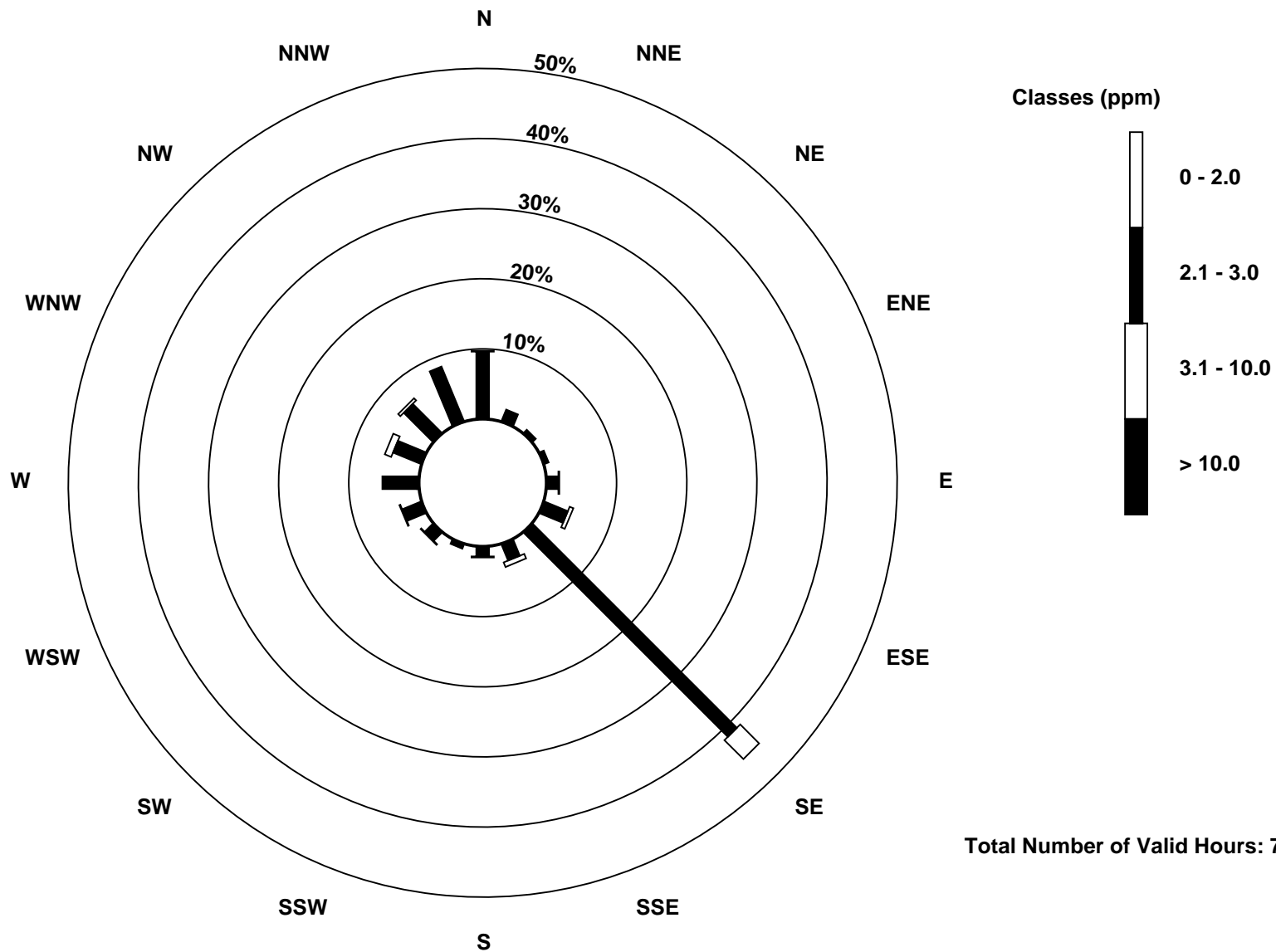
Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Total Hydrocarbons (THC) - ppm
Lower Camp (AMS 11)

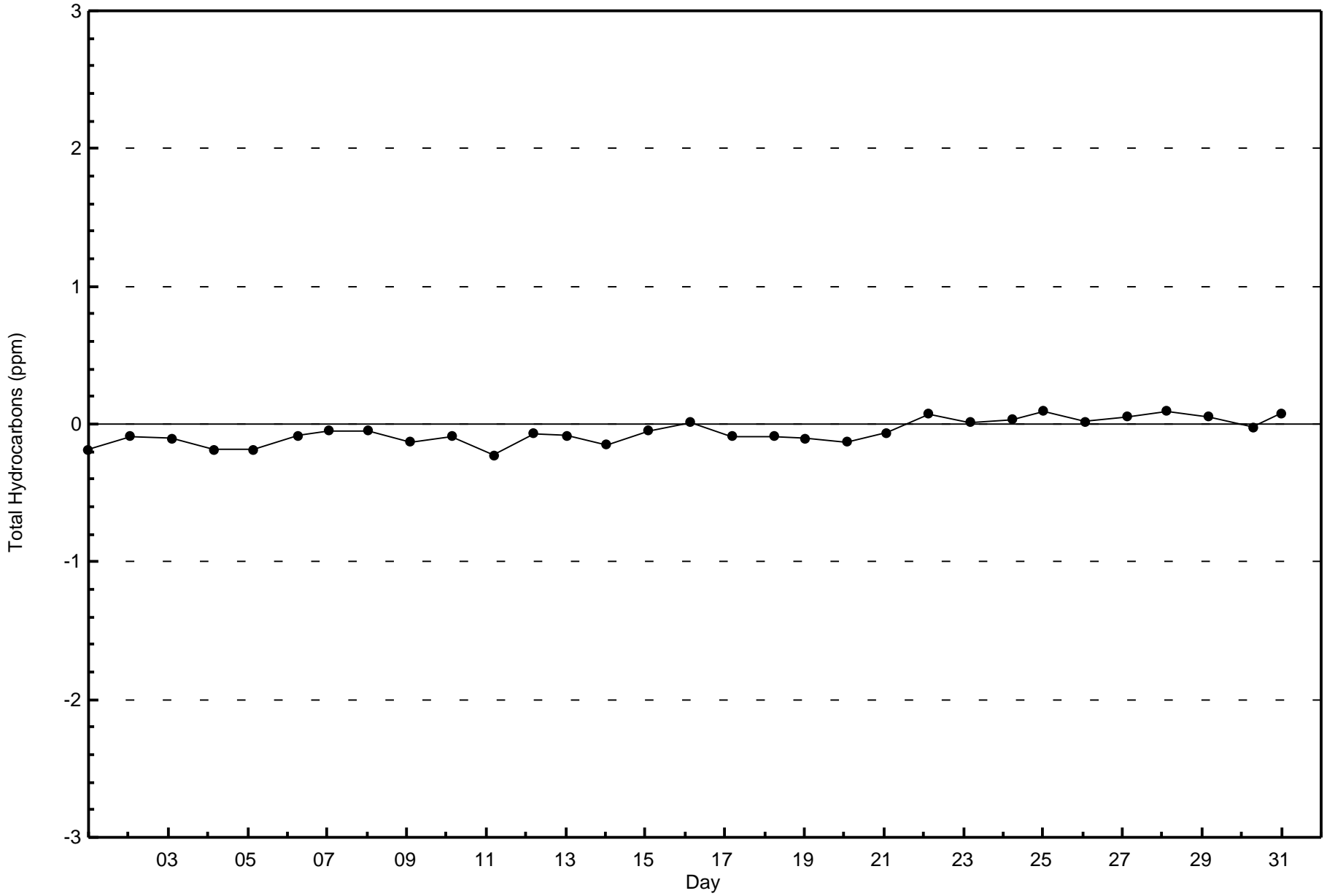


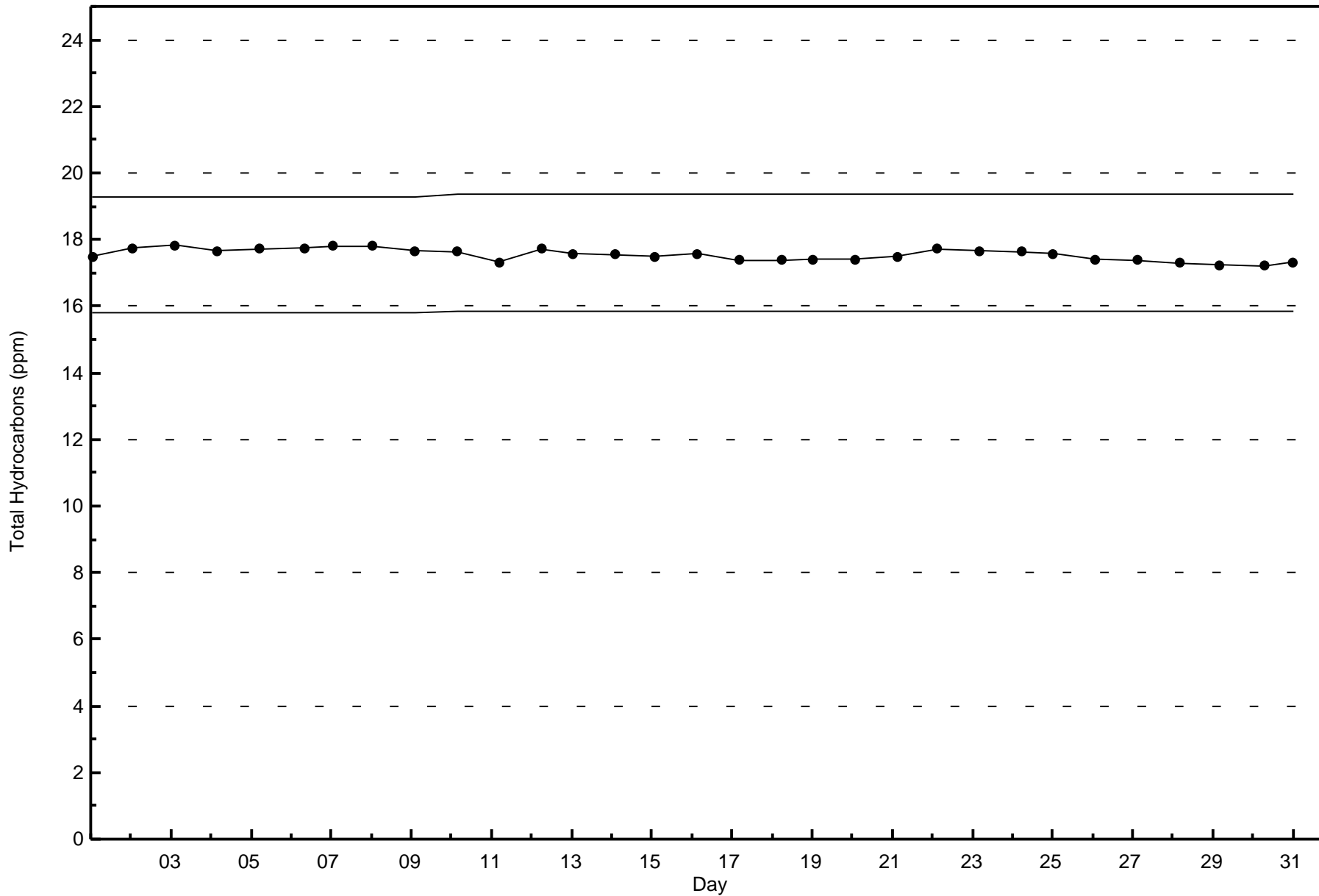
Total Number of Valid Hours: 708



Wood Buffalo Environmental Association
Zero Responses

Total Hydrocarbons (THC) - ppm
Lower Camp - January 2017







Wood Buffalo Environmental Association
Summary of Hour Averages

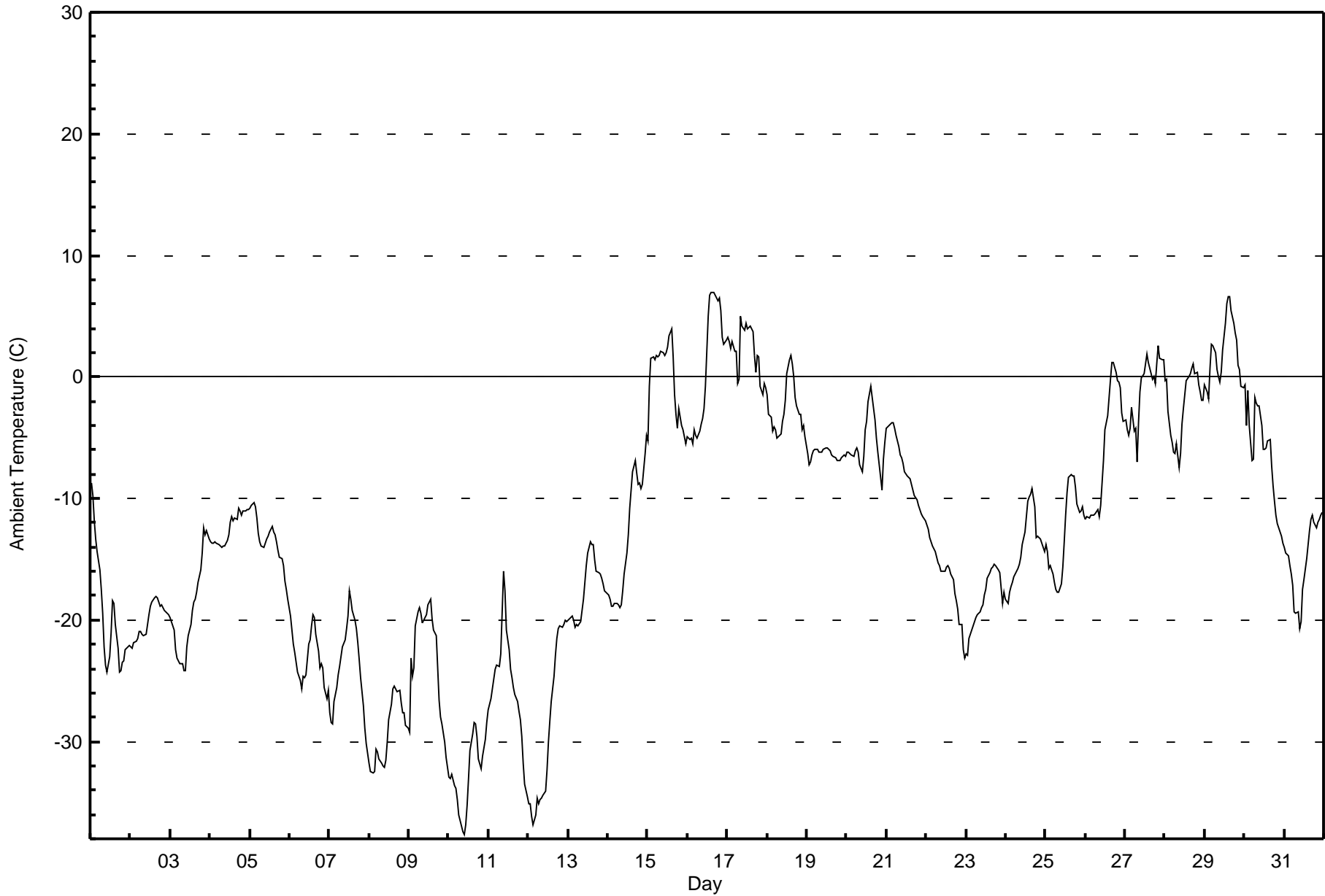
Ambient Temperature (AT) - C
Lower Camp - January 2017

Maximum Value: 6.9 C on Jan 16 16:00 Maximum Daily Average: 2.1 C on Jan 17		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Minimum Value: -37.7 C on Jan 10 10:00 Maximum Diurnal Average: -10.6 C at hour 15 Monthly Average: -13.30 C		Minimum Daily Average: -32.7 C on Jan 10 Minimum Diurnal Average: -15.0 C at hour 8 Percentiles: P ₁ = -36.1 P ₁₀ = -27.1 Q ₁ = -20.5 Median = -13.6 Q ₃ = -4.9 P ₉₀ = 0.5 P ₉₉ = 6.5																								
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-Jan	-8.7	-9.8	-11.8	-13.3	-14.4	-15.9	-17.4	-19.5	-22.2	-23.7	-24.3	-23.0	-21.0	-18.4	-18.6	-20.3	-22.3	-24.3	-24.2	-23.5	-23.4	-22.5	-22.3	-22.1	-19.5	-8.7
2-Jan	-22.2	-22.3	-21.9	-21.8	-21.5	-20.9	-21.0	-21.2	-21.2	-21.2	-20.3	-19.6	-18.8	-18.5	-18.2	-18.0	-18.2	-18.6	-18.9	-18.8	-19.2	-19.3	-19.5	-19.5	-20.0	-18.0
3-Jan	-19.8	-20.5	-20.9	-22.5	-23.1	-23.4	-23.6	-23.6	-24.2	-24.2	-22.3	-21.2	-20.3	-19.3	-18.6	-18.3	-17.8	-16.9	-15.9	-14.5	-12.4	-12.9	-12.7	-13.4	-19.3	-12.4
4-Jan	-13.6	-13.7	-13.7	-13.6	-13.7	-13.8	-14.0	-14.0	-13.9	-13.9	-13.5	-13.0	-12.0	-11.5	-11.9	-11.7	-11.7	-10.8	-11.1	-11.4	-11.0	-11.1	-10.9	-10.9	-12.5	-10.8
5-Jan	-10.8	-10.5	-10.3	-10.6	-11.6	-12.9	-13.6	-13.9	-14.0	-13.7	-13.4	-13.1	-12.7	-12.3	-12.7	-13.0	-13.6	-14.3	-14.8	-15.0	-15.5	-16.8	-17.5	-18.3	-13.5	-10.3
6-Jan	-19.7	-20.8	-21.9	-22.7	-23.4	-24.3	-25.0	-25.7	-24.6	-24.8	-24.5	-22.0	-21.6	-20.5	-19.5	-19.8	-21.1	-22.5	-24.0	-23.6	-24.0	-25.5	-26.5	-25.7	-23.1	-19.5
7-Jan	-27.6	-28.4	-28.5	-26.7	-25.6	-24.5	-23.8	-23.1	-22.2	-21.6	-20.7	-19.7	-17.6	-18.3	-19.2	-20.1	-20.7	-21.8	-23.3	-24.7	-27.1	-28.9	-30.1	-30.9	-24.0	-17.6
8-Jan	-31.7	-32.5	-32.5	-32.5	-30.6	-30.9	-31.4	-31.7	-32.0	-32.1	-31.5	-30.0	-28.2	-26.9	-25.7	-25.5	-25.7	-25.9	-25.8	-26.9	-27.7	-27.6	-28.7	-28.9	-29.3	-25.5
9-Jan	-29.2	-23.1	-24.6	-23.9	-20.5	-19.3	-19.0	-19.4	-20.3	-20.0	-19.6	-18.8	-18.6	-18.3	-20.0	-20.8	-21.3	-23.9	-26.6	-28.0	-28.5	-30.0	-31.4	-32.1	-23.2	-18.3
10-Jan	-33.0	-33.0	-32.7	-33.6	-33.8	-34.8	-36.0	-36.5	-37.4	-37.7	-36.8	-35.3	-33.0	-30.8	-29.4	-28.5	-28.6	-29.5	-31.4	-32.3	-31.2	-30.5	-29.8	-28.5	-32.7	-28.5
11-Jan	-27.4	-26.4	-25.6	-24.8	-24.1	-23.8	-23.8	-22.8	-19.4	-16.0	-17.6	-20.8	-22.4	-24.1	-24.8	-25.6	-26.2	-26.8	-27.5	-28.2	-29.6	-31.7	-33.5	-34.5	-25.3	-16.0
12-Jan	-35.1	-35.1	-36.2	-36.9	-36.1	-34.6	-35.1	-34.8	-34.7	-34.5	-34.0	-32.4	-30.1	-28.3	-26.7	-24.6	-22.9	-21.5	-20.7	-20.5	-20.6	-20.4	-20.0	-20.1	-29.0	-20.0
13-Jan	-20.0	-19.9	-19.7	-20.0	-20.5	-20.4	-20.5	-20.1	-19.2	-18.3	-16.9	-15.5	-14.5	-13.6	-13.7	-13.8	-15.1	-15.9	-16.1	-16.2	-16.5	-17.0	-17.6	-17.7	-17.5	-13.6
14-Jan	-17.9	-18.3	-18.9	-18.9	-18.6	-18.6	-18.7	-18.9	-18.7	-17.6	-16.3	-14.5	-13.0	-10.8	-9.2	-7.8	-6.9	-8.0	-8.8	-8.7	-9.2	-8.8	-6.3	-4.8	-13.3	-4.8
15-Jan	-5.3	-0.8	1.6	1.6	1.4	1.8	1.7	1.8	2.1	1.9	1.8	2.0	2.5	3.3	4.0	1.7	-1.5	-3.1	-4.3	-2.6	-4.0	-4.3	-4.9	-5.5	-0.3	4.0
16-Jan	-4.9	-5.2	-5.1	-5.5	-4.4	-4.8	-5.0	-4.5	-3.9	-3.4	-2.7	-0.8	5.0	6.7	6.9	6.9	6.9	6.5	6.3	6.5	5.5	3.3	2.7	3.0	0.7	6.9
17-Jan	3.3	2.9	2.3	2.9	2.1	2.1	-0.6	-0.2	5.0	4.2	3.8	4.4	4.0	4.0	4.2	3.7	1.7	0.4	1.8	1.6	-0.8	-1.5	-0.6	-0.9	2.1	5.0
18-Jan	-1.5	-3.1	-3.3	-4.4	-4.1	-4.4	-5.1	-4.9	-4.7	-3.7	-3.1	-2.0	0.3	1.4	1.7	1.0	0.1	-1.7	-2.3	-3.1	-3.1	-4.3	-3.9	-4.9	-2.6	1.7
19-Jan	-6.3	-7.2	-7.1	-6.5	-6.1	-6.0	-6.0	-6.2	-6.2	-6.2	-6.0	-5.8	-5.8	-5.9	-6.1	-6.4	-6.5	-6.7	-6.8	-6.9	-6.8	-6.6	-6.4	-6.5	-6.4	-5.8
20-Jan	-6.2	-6.1	-6.3	-6.4	-6.5	-6.1	-5.9	-6.2	-7.3	-7.8	-6.6	-4.4	-3.6	-2.1	-0.8	-1.7	-2.6	-3.6	-5.0	-6.1	-8.2	-9.3	-6.7	-5.3	-5.5	-0.8
21-Jan	-4.2	-4.0	-3.9	-3.8	-3.7	-4.2	-4.8	-5.7	-6.4	-6.7	-7.1	-7.9	-8.2	-8.3	-8.4	-8.8	-9.3	-9.7	-10.1	-10.5	-10.9	-11.3	-11.5	-11.8	-7.6	-3.7
22-Jan	-12.1	-12.5	-13.3	-13.6	-14.0	-14.4	-14.8	-15.3	-15.6	-16.0	-16.0	-15.9	-15.7	-15.5	-15.7	-16.2	-16.7	-17.8	-18.4	-19.1	-20.3	-20.4	-22.4	-23.1	-16.4	-12.1
23-Jan	-22.8	-22.9	-21.5	-20.9	-20.5	-20.1	-19.8	-19.6	-19.3	-19.0	-18.7	-18.0	-17.4	-16.6	-16.1	-15.8	-15.6	-15.4	-15.6	-15.9	-16.1	-17.4	-18.7	-17.7	-18.4	-15.4
24-Jan	-18.3	-18.6	-17.8	-17.2	-16.9	-16.5	-16.0	-15.8	-15.4	-14.8	-13.8	-12.8	-11.5	-10.2	-9.9	-9.6	-9.2	-10.7	-13.3	-13.1	-13.2	-13.4	-14.0	-14.4	-14.0	-9.2
25-Jan	-13.8	-14.3	-15.7	-15.5	-16.3	-16.9	-17.5	-17.7	-17.7	-17.1	-15.7	-13.6	-11.3	-9.5	-8.3	-8.0	-8.1	-8.1	-9.1	-10.5	-11.1	-11.1	-10.7	-11.4	-12.9	-8.0
26-Jan	-11.8	-11.5	-11.6	-11.4	-11.4	-11.4	-11.3	-10.9	-11.5	-10.5	-8.7	-6.8	-4.4	-3.2	-1.7	-0.2	1.2	1.1	0.4	-0.3	-0.5	-0.9	-2.9	-3.6	-6.0	1.2
27-Jan	-3.5	-4.3	-4.9	-4.2	-2.5	-4.5	-4.3	-7.0	-3.7	-1.3	-0.1	0.2	1.1	1.9	1.2	0.8	-0.2	0.0	-0.5	1.1	2.6	1.5	1.5	1.4	-1.2	2.6
28-Jan	-0.3	-0.2	-2.8	-4.8	-5.4	-6.2	-6.3	-5.5	-7.5	-6.3	-3.9	-2.7	-1.5	-0.3	0.0	0.3	0.8	1.1	0.3	0.4	-0.7	-1.2	-2.0	-1.9	-2.4	1.1
29-Jan	-0.6	-1.2	-1.8	0.8	2.7	2.6	2.0	0.6	0.1	-0.4	0.3	2.2	4.5	6.0	6.6	6.7	5.5	4.4	3.6	3.0	1.0	0.6	-0.7	-0.9	2.0	6.7
30-Jan	-0.7	-4.0	-1.1	-4.0	-6.9	-6.8	-1.7	-2.2	-2.4	-2.4	-3.9	-5.9	-5.9	-5.8	-5.2	-5.1	-7.4	-8.9	-10.2	-11.4	-12.1	-12.8	-13.1	-13.7	-6.4	-0.7
31-Jan	-14.1	-14.5	-14.8	-15.5	-16.2	-17.1	-19.3	-19.5	-19.3	-20.8	-20.2	-17.5	-16.7	-15.0	-13.8	-12.7	-11.8	-11.3	-11.9	-12.4	-11.9	-11.7	-11.4	-11.2	-15.0	-11.2
	-14.2	-14.3	-14.4	-14.5	-14.4	-14.5	-14.8	-15.0	-14.8	-14.5	-13.9	-13.0	-11.9	-11.0	-10.6	-10.7	-11.1	-11.7	-12.4	-12.6	-13.1	-13.7	-14.0	-14.1	Diurnal Average	
	3.3	2.9	2.3	2.9	2.7	2.6	2.0	1.8	5.0	4.2	3.8	4.4	5.0	6.7	6.9	6.9	6.9	6.5	6.3	6.5	5.5	3.3	2.7	3.0	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Lower Camp - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Lower Camp - January 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	204	27.42	27.42
-20 - 0	454	61.02	88.44
0 - 10	86	11.56	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

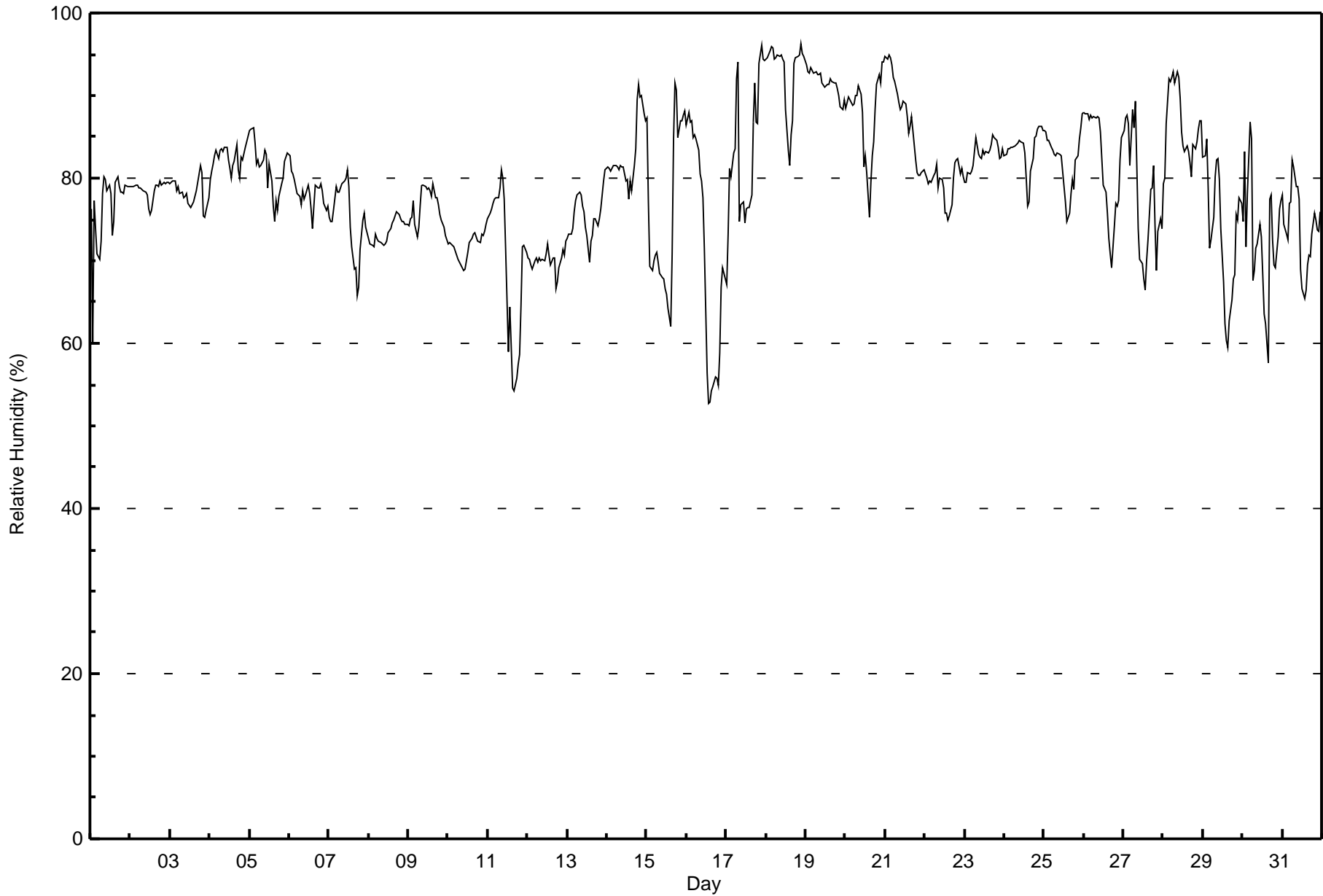
Relative Humidity (RH) - %
Lower Camp - January 2017

Maximum Value: 96 % on Jan 18 22:00														Maximum Daily Average: 92.8 % on Jan 18														Hours in Service: 744	
Minimum Value: 53 % on Jan 16 14:00														Minimum Daily Average: 69.5 % on Jan 11														Hours of Data: 744	
Maximum Diurnal Average: 81.6 % at hour 8														Minimum Diurnal Average: 74.0 % at hour 15														Hours of Missing Data: 0	
Monthly Average: 79.1 %														Percentiles: P ₁ = 56 P ₁₀ = 70 Q ₁ = 74 Median = 79 Q ₃ = 84 P ₉₀ = 90 P ₉₉ = 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-Jan	76	60	77	74	71	70	72	78	80	80	78	79	78	73	75	80	80	79	78	78	79	79	79	79	76.4	80			
2-Jan	79	79	79	79	79	79	79	79	78	78	78	76	76	76	78	79	79	79	80	79	80	79	79	80	78.6	80			
3-Jan	79	80	80	80	79	79	78	78	78	78	77	76	77	77	78	79	79	82	81	75	75	76	78	78.1	82				
4-Jan	80	81	82	83	83	82	83	84	83	84	84	82	81	80	82	82	84	81	80	83	82	84	84	85	82.4	85			
5-Jan	86	86	86	84	82	82	81	81	82	83	83	79	82	80	77	75	77	76	78	79	80	82	82	83	81.1	86			
6-Jan	83	81	81	80	79	78	78	77	79	78	78	79	78	76	74	77	79	79	79	79	79	77	76	77	78.3	83			
7-Jan	75	75	75	76	79	78	78	79	79	80	80	81	79	74	72	69	69	66	67	71	75	76	74	73	75.0	81			
8-Jan	73	72	72	72	73	73	72	72	72	72	72	72	73	74	75	75	75	76	76	75	75	75	74	74	73.5	76			
9-Jan	74	75	75	77	74	73	74	77	79	79	79	79	79	78	78	79	78	78	77	76	75	74	73	72	76.3	79			
10-Jan	72	72	72	72	71	71	70	70	69	69	69	70	71	72	73	73	73	73	72	72	73	73	74	74	71.7	74			
11-Jan	75	76	76	77	77	78	78	79	81	80	77	71	59	64	60	55	54	56	57	59	65	72	72	71	69.5	81			
12-Jan	70	70	69	69	70	70	70	70	70	70	70	71	72	71	69	70	70	67	67	69	70	71	71	72	70.0	72			
13-Jan	73	73	73	74	76	77	78	78	78	77	76	74	73	70	72	73	75	75	74	75	76	78	80	81	75.4	81			
14-Jan	81	81	81	81	82	81	81	81	81	81	80	77	80	78	82	83	90	91	90	90	88	87	87	87	82.9	91			
15-Jan	87	77	69	69	70	71	71	70	68	68	68	67	66	64	62	71	85	91	91	85	87	87	88	88	75.8	91			
16-Jan	86	88	87	87	85	85	85	83	80	80	78	72	56	53	53	54	55	56	56	55	59	67	69	68	70.7	88			
17-Jan	67	73	81	80	83	84	92	94	75	77	77	75	76	76	76	78	87	92	87	87	94	96	94	94	83.1	96			
18-Jan	94	95	95	96	96	94	95	95	95	95	94	94	88	83	82	85	87	94	94	95	95	96	95	95	92.8	96			
19-Jan	94	93	93	93	93	93	93	93	93	93	91	91	91	91	91	92	92	91	92	91	90	89	88	89	91.7	94			
20-Jan	88	89	90	89	89	89	90	90	91	90	88	81	83	81	75	80	83	84	88	91	93	92	94	94	87.6	94			
21-Jan	95	94	95	95	94	92	92	90	89	88	89	89	89	88	85	86	87	86	82	81	80	80	81	81	87.9	95			
22-Jan	80	80	79	80	79	80	81	82	79	80	80	79	76	76	75	75	77	80	82	82	82	81	81	80	79.4	82			
23-Jan	79	80	81	81	81	81	83	85	83	83	82	83	83	83	83	84	85	85	85	84	82	83	84	84	82.7	85			
24-Jan	83	83	84	84	84	84	84	84	84	85	84	84	83	80	77	77	81	82	85	85	86	86	86	86	83.3	86			
25-Jan	86	86	85	85	84	83	83	83	83	83	83	81	79	77	75	76	78	80	79	82	83	85	86	88	82.0	88			
26-Jan	88	88	88	87	88	87	88	87	88	87	86	82	79	78	76	73	71	69	74	77	77	77	82	85	81.7	88			
27-Jan	86	87	88	87	81	88	86	89	82	74	70	70	68	66	70	73	79	79	82	74	69	74	75	74	77.9	89			
28-Jan	79	80	87	92	92	92	93	91	93	92	90	86	84	83	84	83	82	80	84	83	84	86	87	87	86.4	93			
29-Jan	83	83	85	79	72	73	75	80	82	82	80	74	67	62	60	60	63	65	68	68	76	75	78	77	73.6	85			
30-Jan	75	83	72	78	87	85	68	69	72	72	74	73	68	64	62	58	77	78	72	70	69	73	76	77	73.0	87			
31-Jan	78	74	73	73	77	77	82	81	79	79	77	69	67	65	66	69	71	71	73	76	75	74	74	76	74.0	82			
														80.8 80.5 80.9 81.0 80.9 81.0 81.1 81.6 80.8 80.5 79.9 78.1 76.2 74.7 74.0 74.7 77.2 77.8 78.4 78.5 79.2 80.1 80.6 80.9														Diurnal Average	
														95 95 95 96 96 94 95 95 95 95 94 94 91 91 91 92 92 94 94 95 95 95 95 95														Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Lower Camp - January 2017





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Speed (WS) - km/h
Lower Camp - January 2017

Maximum Speed: 34 km/h on Jan 11 12:00	Maximum Daily Speed Average: 16.6 km/h on Jan 25	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jan 6 02:00	Minimum Daily Speed Average: 0.2 km/h on Jan 23	Hours of Data: 743
Maximum Diurnal Speed Average: 3.2 km/h at hour 24	Minimum Diurnal Speed Average: 1.6 km/h at hour 21	Hours of Missing Data: 1
Monthly Average Velocity: 2.3 km/h 135.8 deg	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 4 Median = 9 O ₃ = 13 P ₉₀ = 16 P ₉₉ = 24	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-Jan	WNW19	NNW27	N15	N14	NNW12	NNW10	NW7	WNW5	ESE0	E1	N0	NNW2	W3	S1	S2	SSE1	NNE1	AF	ESE1	NW1	ESE1	SE5	E2	SE4	NNW4.1	NNW27
2-Jan	WNW2	SE2	SE4	N1	SE5	SE7	SE3	SE6	SE6	SE4	SE7	SE8	SE6	SE7	SE6	SE7	SE6	SE5	SE3	SE8	SE10	SE10	SE10	SE11	SE5.8	SE11
3-Jan	SE8	SE7	SE8	SE4	SE1	SE1	SE8	SE6	SE6	SE10	SE11	SE11	SE8	SE10	SE10	SE10	SE9	SE7	ENE2	NNW3	W13	WNW12	NW8	NNW6	SE4.1	W13
4-Jan	NW4	NNW4	WNW3	NW3	NNE7	NNE6	NNE6	NNE3	SE1	ESE2	SE4	SE9	SE9	SE8	SE6	SE7	SE6	SSE8	SSE10	SE10	SE11	SE11	SE6	NW0	SE3.6	SE11
5-Jan	WNW4	NW5	N9	N13	NNE13	N14	N10	NNW7	NNW6	NNW5	NNW7	NNW10	N12	N15	NNE15	NNE13	N9	N8	NNW5	N4	N6	NW7	NNW6	W4	N8.0	N15
6-Jan	E1	N0	E2	NNE1	E1	SE3	ENE1	SE4	SE8	SE6	SE7	SE9	SE11	SE11	SE10	SE7	SE5	W2	ESE5	ESE9	ESE3	SE3	SE7	WNW2	SE4.5	SE11
7-Jan	NW2	NW1	N0	ESE1	WNW3	ESE2	ESE1	WNW2	NW3	W4	WNW4	NW4	N17	N18	N17	N16	N11	NNW12	NNW9	WNW7	NNW2	NW1	NE0	E1	NNW5.0	N18
8-Jan	E1	NE1	E2	ESE5	SE11	SE13	SE13	SE10	SE13	SE12	SE12	SE12	SE11	SE12	SE14	SE13	SE15	SE12	SE12	SE11	SE13	SE10	SE13	SE12	SE10.5	SE15
9-Jan	SE10	SW9	SE13	SE11	SW9	WSW13	WSW8	SSW4	SE5	SE6	SE6	SE2	SW0	WSW3	WSW6	WNW7	WNW6	NW3	NW4	NW1	NNE0	N1	N1	WNW1	SSW2.5	SE13
10-Jan	N1	WNW4	WNW4	WNW3	NW2	NNW1	WNW3	NNW1	WNW2	NNW1	SE1	E1	SE3	SE6	SE9	SE8	SE6	SE4	SE5	SE8	SE9	SSE10	SE16	SE17	SE3.4	SE17
11-Jan	SE17	SE17	SE18	SE18	SE18	SE20	SE17	SE13	WNW6	NW11	N25	N34	NNW28	N25	NNW24	NNW25	NNW18	NW13	WNW8	NW7	NW3	NW2	NNW2	NNW1	N4.1	N34
12-Jan	NE1	NE1	NNE1	N1	SE6	SE14	SE14	SE12	SE14	SE15	SE12	SE11	ESE10	SE11	SE11	SE9	SE16	ESE17	SE18	SE12	SE9	SE13	SE8	SE11	SE10.1	ESE18
13-Jan	SE12	SE12	SE10	SE9	SE8	ESE5	NW3	E0	SE5	SE10	SE9	SE10	SE11	SE11	SE12	SE14	SE14	SE14	SE10	SE14	SE13	SE14	SE15	SE16	SE10.1	SE16
14-Jan	SE17	SE17	SE18	SE19	SE20	SE18	SE17	SE16	SE19	SE23	SE24	SE19	SE14	SE16	SE11	SE11	SE8	SE7	SE5	SE4	SE6	SE10	SE12	SE9	SE14.1	SE24
15-Jan	SE7	WSW16	WSW21	WSW18	W14	W17	WSW10	W14	W20	W18	W19	W16	W4	SSE3	SSE4	S3	SE3	SE4	SE7	SE10	SE6	SE10	SE10	SE10	SW6.8	WSW21
16-Jan	SE13	SE12	SE11	SE12	SE16	SE17	ESE16	SE15	SE16	SE16	SE17	SE16	S9	SSE8	S7	S9	S10	S11	S12	S10	SSE5	ESE8	SE10	SE12	SE11.1	SE17
17-Jan	ESE8	ESE10	SE8	SE8	ESE7	SE7	WNW1	SW3	WSW16	WSW16	W8	WNW5	NW4	WNW3	SW4	SE2	SE4	SE4	SE9	ESE5	SE2	SE8	SE9	SE11	SSE3.0	WSW16
18-Jan	SE11	ESE7	SE7	SE5	WNW3	WNW2	WSW0	WNW3	WNW2	WNW4	WNW4	ESE2	SSE2	ESE1	SW1	SE4	SSE2	SE4	SE3	ESE3	E2	SE7	ESE4	SSE2	SE1.9	SE11
19-Jan	SW1	NW5	NW6	NW6	NW7	NNW8	NW8	NW7	WNW9	NW10	NNW8	NNW10	NNW9	NNW9	NW9	NNW9	NNW8	NW8	NW8	NW8	NW7	WNW9	NNW6	ENE1	NW6.9	NNW10
20-Jan	ESE1	NE1	SSE4	SE4	SE7	SE9	SE12	SE11	SE11	SE10	SE9	SE9	SE14	SE12	SE11	SE12	SE8	SE6	SE3	SE1	WNW4	WNW5	NW5	WNW6	SE5.7	SE14
21-Jan	N9	NNW9	NNW10	N13	N12	N14	N14	N17	N17	N13	N14	NNW13	N15	N16	N15	N15	N13	N17	N16	N16	N16	N15	NNW13	N14	N13.9	N17
22-Jan	N14	N15	N16	N17	N17	N15	N14	N13	N12	N11	NNW11	NNW10	N10	NNW10	NNW11	NNW10	NNW9	NW6	NW4	NNW5	WNW3	WNW5	NW3	NW3	NNW9.8	N17
23-Jan	WNW3	WNW3	WNW3	NW3	NW4	NW4	NNW4	NNW5	NNW3	N5	NNW6	W7	W6	SW3	SE6	SE7	SE6	SE8	SE6	SE4	SE3	SE4	ESE3	SE9	ESE0.2	SE9
24-Jan	SE7	SE9	SE11	SE13	SE12	SE10	SE9	SE9	SE10	SE10	SE12	SE15	SE13	SE14	SE11	SSE11	SE14	SE14	SE11	SE10	SE12	SE15	SE11	SE11.3	SE15	
25-Jan	SE15	SE15	SE16	SE13	SE18	SE15	SE16	SE15	SE16	SE15	SE16	SE14	SE16	SE16	SE18	SE20	SE17	SE17	SE18	SE16	SE16	SE20	SE19	SE17	SE16.6	SE21
26-Jan	SE16	SE11	SE14	SE9	SE14	SE13	SE14	SE13	SE15	SE14	SE16	SE16	SE14	SE14	SE11	SE6	W10	W18	W19	W19	W24	W18	NNW4	E3	SSE7.1	W24
27-Jan	SSE3	ENE2	SE6	SW4	W8	SSE2	SW4	SSE6	W9	W23	W28	W24	W22	W12	W2	SSE1	SW1	NNW3	ENE2	WSW8	SW10	SSE3	WSW5	W10	WSW6.6	W28
28-Jan	SSE2	SSW5	SSE6	SE9	SE10	SE11	SE10	SE10	SE9	SE10	SE11	SE13	SE11	SE11	SE12	SE12	SE10	SE13	SE14	SE7	SE7	SE9	SE7	SSE6	SE9.2	SE14
29-Jan	SE5	SE12	SE8	WSW8	W15	W19	W12	ESE4	SE6	SE9	SE13	SE12	S6	WSW9	WSW10	SSW7	SW9	WSW11	WSW11	WSW9	W7	WNW7	WNW7	WNW6	SW5.2	W19
30-Jan	WSW12	SE4	SW10	SSW3	ESE4	SSW4	WSW24	WSW22	WSW21	WSW23	N15	NNE15	N11	N9	NW10	NNW14	N16	N17	N16	N18	N19	NNW15	NNW17	NNW16	NW8.2	WSW24
31-Jan	N19	N17	N17	NNW11	N7	NNW5	NW2	E2	W6	NNW2	W4	SE1	NE2	NNE3	NE2	E1	W6	WSW16	W12	N3	NNW4	NNW6	NW6	NW5	NNW4.8	N19

SE2.6 SE1.7 SE2.7 ESE2.0 SE2.2 SE2.6 SSE2.3 SSE2.7 SSE2.7 SSE2.9 SE2.2 ESE2.6 ESE2.1 ESE2.6 ESE2.9 ESE2.7 SE2.2 SE1.9 SE2.1 SE1.8 SSE1.6 SSE2.6 SE2.9 SE3.2	Diurnal Average
WNW19 NNW27 WSW21 SE19 SE20 SE20 WSW24 WSW22 WSW21 SE23 W28 N34 NNW28 N25 NNW24 NNW25 NNW18 SE18 W19 W19 W24 SE21 SE19 SE17	Diurnal Maximum

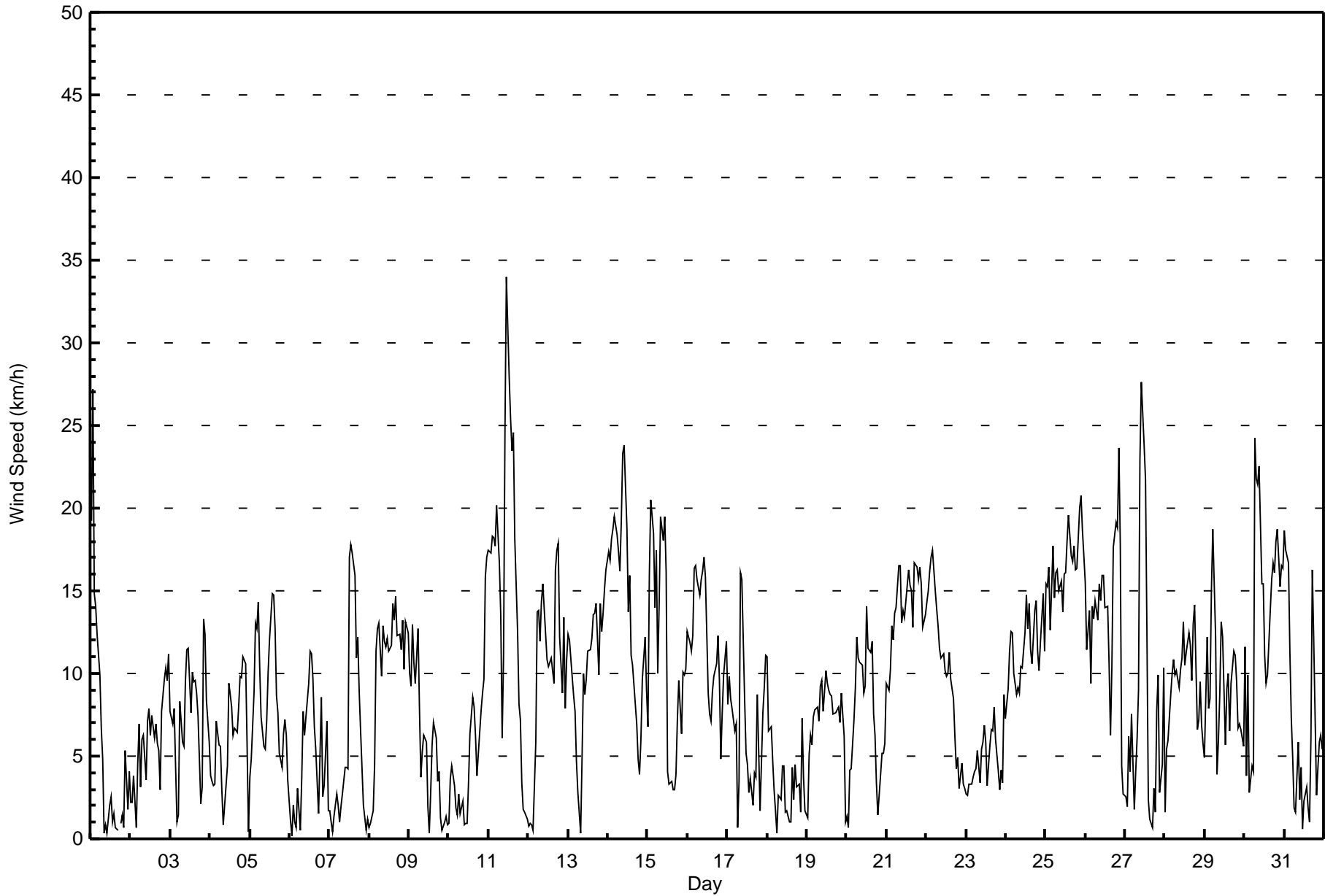
AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Lower Camp - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 12 km/h on Jan 11 11:00 Minimum Value: 1 km/h on Jan 9 14:00 Percentiles: P ₁ = 1 P ₁₀ = 1 O ₁ = 2 Median = 2 O ₃ = 3 P ₉₀ = 4 P ₉₉ = 7																		Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jan	5	9	3	4	3	3	2	1	1	1	1	2	1	1	1	1	1	AF	1	1	2	2	2	2	9
2-Jan	2	1	1	1	2	2	2	2	2	1	2	1	1	2	1	1	1	1	1	2	2	2	2	2	2
3-Jan	1	3	2	2	2	1	1	2	2	1	1	2	2	2	2	2	2	2	2	2	4	4	3	1	4
4-Jan	1	1	1	1	3	1	1	1	1	2	2	2	2	2	1	2	1	2	2	2	3	2	1	1	3
5-Jan	1	1	4	3	3	3	2	2	1	2	2	4	4	4	4	4	2	2	2	1	2	1	2	1	4
6-Jan	1	1	1	1	1	1	1	1	2	1	2	1	1	1	1	2	2	1	2	2	2	2	3	1	3
7-Jan	1	1	1	1	1	1	1	1	1	2	1	3	3	4	4	4	3	3	3	1	2	1	1	1	4
8-Jan	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
9-Jan	3	3	3	2	4	3	2	1	2	1	1	2	1	1	1	1	1	2	3	1	2	1	1	1	4
10-Jan	1	2	2	1	1	1	1	2	1	1	1	1	2	2	1	1	2	1	1	2	1	2	3	2	3
11-Jan	2	2	2	2	2	2	2	4	4	3	12	7	7	7	6	6	4	2	1	1	1	1	1	1	12
12-Jan	1	1	1	1	4	2	2	2	2	2	3	2	3	2	3	2	5	3	4	4	3	3	3	3	5
13-Jan	2	2	2	1	2	2	1	1	2	3	3	1	2	4	2	3	2	2	2	2	3	3	2	2	4
14-Jan	2	3	3	3	2	3	3	2	3	4	2	4	3	2	2	2	2	3	2	1	3	2	2	1	4
15-Jan	3	7	4	4	3	4	3	3	4	4	4	4	3	2	2	1	2	2	2	3	3	2	2	2	7
16-Jan	3	3	2	2	2	2	3	3	2	2	2	5	4	4	3	3	3	4	4	4	2	2	3	3	5
17-Jan	4	3	2	2	2	1	2	4	3	2	2	2	2	2	2	1	2	2	3	3	2	2	2	2	4
18-Jan	2	3	4	1	2	1	2	2	2	1	2	1	2	2	2	2	2	2	1	1	1	3	2	2	4
19-Jan	2	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	1	1	2	1	2	4
20-Jan	1	2	2	2	3	3	2	3	2	2	2	2	2	2	2	2	2	2	2	2	1	2	1	1	3
21-Jan	3	2	2	3	3	3	3	4	4	3	3	3	4	4	3	3	3	3	4	4	4	4	3	4	4
22-Jan	4	4	4	4	3	3	3	3	2	2	2	2	3	3	3	2	2	1	1	1	2	1	1	2	4
23-Jan	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	2	1	2	2
24-Jan	2	1	2	2	2	2	1	2	1	2	2	2	3	2	2	3	3	2	3	2	3	1	2	3	3
25-Jan	2	2	3	3	2	2	2	2	2	3	2	3	3	2	2	2	2	3	4	2	2	2	2	2	4
26-Jan	3	5	4	2	2	3	2	2	2	1	2	2	3	2	2	2	3	4	3	4	6	7	2	2	7
27-Jan	1	2	2	4	4	2	2	3	4	7	6	5	4	6	3	1	2	1	2	5	3	2	4	4	7
28-Jan	2	3	2	2	2	2	3	2	2	1	1	2	2	2	2	3	3	2	2	2	3	2	3	2	3
29-Jan	3	2	2	5	3	4	6	2	2	2	3	3	3	2	1	2	4	2	3	3	4	4	4	3	6
30-Jan	5	2	4	3	2	5	4	4	3	4	5	4	3	3	2	4	3	4	4	5	4	4	5	4	5
31-Jan	5	5	4	4	3	1	2	1	3	2	2	1	1	1	1	1	3	3	3	2	3	1	1	2	5
Diurnal Maximum																									
AF - Analyzer Failure																									





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Lower Camp - January 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	226	30.42	30.42
6 - 11	280	37.69	68.10
12 - 19	212	28.53	96.64
20 - 28	24	3.23	99.87
29 - 38	1	0.13	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
Lower Camp - January 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	11	6	7	5	13	21	46	13	3	4	9	3	7	30	28	20	226
6 - 11	12	4	0	0	0	7	158	9	7	1	5	10	10	11	19	27	280
12 - 19	45	4	0	0	0	3	122	1	1	0	0	8	15	2	1	10	212
20 - 28	2	0	0	0	0	0	7	0	0	0	0	5	6	0	0	4	24
29 - 38	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	71	14	7	5	13	31	333	23	11	5	14	26	38	43	48	61	743

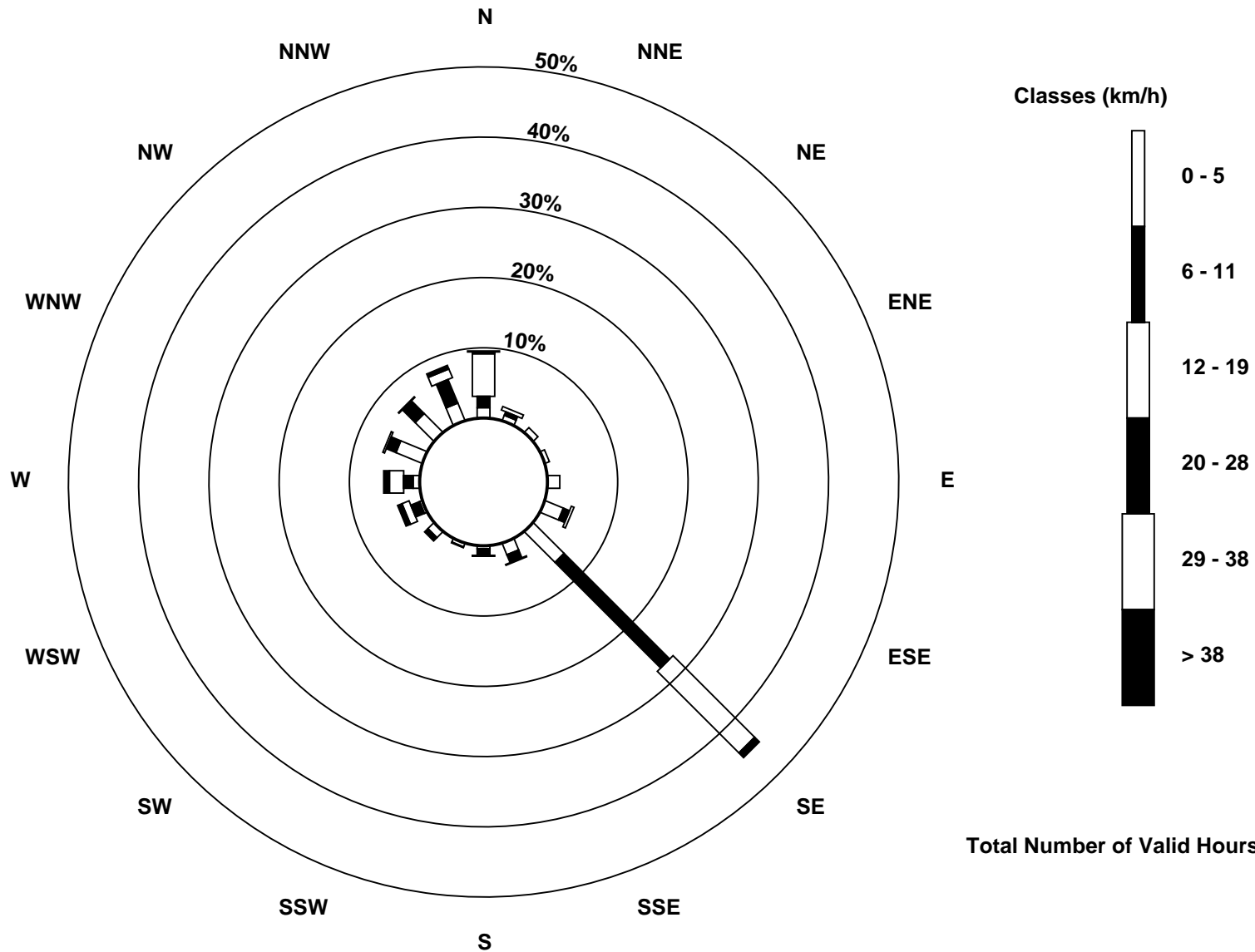
Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Wind Speed (WS) - km/h
Lower Camp (AMS 11)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Lower Camp - January 2017

Direction of Maximum Speed: 358 deg on Jan 11 12:00		Hours in Service:	744
Direction of Maximum Daily Speed Average: 135.7 deg on Jan 25		Hours of Data:	743
Direction of Minimum Speed: 9 deg on Jan 6 02:00		Hours of Missing Data:	1
Direction of Minimum Daily Speed Average: 0.2 deg on Jan 23		Percent Operational Time:	99.9
Monthly Average Direction: 307.1 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-Jan	297	331	349	350	344	335	319	293	114	99	10	341	271	189	186	164	23	AF	115	312	115	126	90	132	331.7	
2-Jan	282	132	134	349	134	145	143	134	142	135	137	138	138	138	139	139	138	140	143	138	136	138	137	138	138.4	
3-Jan	139	135	138	128	125	138	137	140	139	137	135	135	136	137	135	139	138	134	59	329	274	288	318	339	142.0	
4-Jan	320	327	299	323	29	26	29	19	139	105	126	127	140	141	131	141	146	154	148	143	139	132	138	320	125.6	
5-Jan	296	304	354	4	15	3	1	342	344	335	331	348	358	360	18	19	4	353	347	354	349	309	328	274	353.4	
6-Jan	88	9	82	30	100	126	61	124	138	142	136	140	138	136	139	143	132	274	122	123	122	146	133	287	133.6	
7-Jan	322	324	352	107	301	104	106	295	312	281	296	319	354	350	11	359	355	348	348	296	330	304	45	97	346.4	
8-Jan	88	41	99	116	142	139	139	140	139	138	139	139	137	137	138	140	140	140	143	141	141	141	135	135	138.1	
9-Jan	140	230	141	138	231	244	250	196	130	139	138	137	231	258	255	283	285	323	314	316	13	5	358	297	207.0	
10-Jan	355	288	286	295	324	345	297	330	298	335	127	101	133	133	129	135	133	129	131	133	143	148	140	135	139.1	
11-Jan	136	137	138	137	136	134	138	139	283	319	354	358	341	353	335	328	328	312	297	307	308	324	347	343	3.6	
12-Jan	40	39	12	354	124	139	137	126	124	129	135	128	121	127	139	139	125	117	124	128	140	141	145	140	129.9	
13-Jan	140	139	136	141	141	113	314	80	133	136	138	134	132	135	134	136	134	136	134	137	140	141	141	139	139	136.8
14-Jan	137	141	140	139	139	136	136	137	137	137	139	141	138	137	134	134	128	136	133	134	136	135	125	138	137.0	
15-Jan	140	256	253	252	260	259	252	259	262	266	266	272	168	165	175	134	133	130	139	132	136	136	136	138	235.4	
16-Jan	132	137	136	133	137	134	120	133	137	136	135	142	178	157	173	178	185	175	182	188	152	111	133	130	144.7	
17-Jan	104	116	135	135	109	127	296	225	250	255	268	298	316	299	228	125	124	129	133	104	144	138	142	139	160.5	
18-Jan	140	123	131	135	302	290	248	294	295	294	297	106	151	112	220	132	166	135	133	115	98	134	117	155	139.6	
19-Jan	220	322	319	314	318	334	314	308	303	321	333	345	346	340	324	328	333	324	322	311	316	288	344	78	323.4	
20-Jan	122	47	150	145	143	142	137	132	134	130	133	140	137	134	140	137	137	140	132	139	290	298	305	302	139.3	
21-Jan	349	347	348	3	1	357	356	353	2	8	358	344	355	360	356	355	352	358	2	352	350	352	348	350	355.1	
22-Jan	353	353	358	358	356	351	357	359	11	353	348	344	1	346	345	333	342	320	306	334	296	285	307	306	348.4	
23-Jan	300	303	289	316	318	307	337	329	334	356	347	276	277	229	136	131	129	132	133	136	131	125	108	134	123.5	
24-Jan	133	131	129	134	137	135	132	135	133	136	133	131	130	136	135	140	166	146	134	129	140	141	137	131	136.0	
25-Jan	139	139	134	133	133	135	136	135	137	138	137	135	134	135	137	137	138	134	130	132	134	138	138	138	135.7	
26-Jan	136	136	138	138	139	141	140	142	137	138	135	133	134	137	142	146	265	259	270	265	259	260	348	83	167.3	
27-Jan	164	60	142	227	272	149	227	162	271	260	261	260	261	276	260	155	218	335	71	246	235	154	249	264	253.0	
28-Jan	159	205	150	141	138	139	144	142	132	136	139	139	138	137	135	139	138	139	133	146	140	137	134	150	140.1	
29-Jan	138	140	138	249	268	266	261	108	138	141	138	136	188	255	242	210	217	248	252	255	272	286	290	288	225.9	
30-Jan	250	146	227	199	121	203	248	252	254	252	355	14	7	352	307	331	7	360	351	356	359	338	341	336	318.2	
31-Jan	353	5	350	345	350	334	313	97	262	330	266	135	54	26	46	100	272	254	266	358	335	327	320	322	327.7	

131.7 125.5 131.9 122.6 126.2 139.3 152.8 146.6 165.4 167.6 139.0 120.6 109.5 107.7 121.5 120.2 130.2 145.8 140.9 145.3 164.4 149.4 125.0 135.1
 Diurnal Average

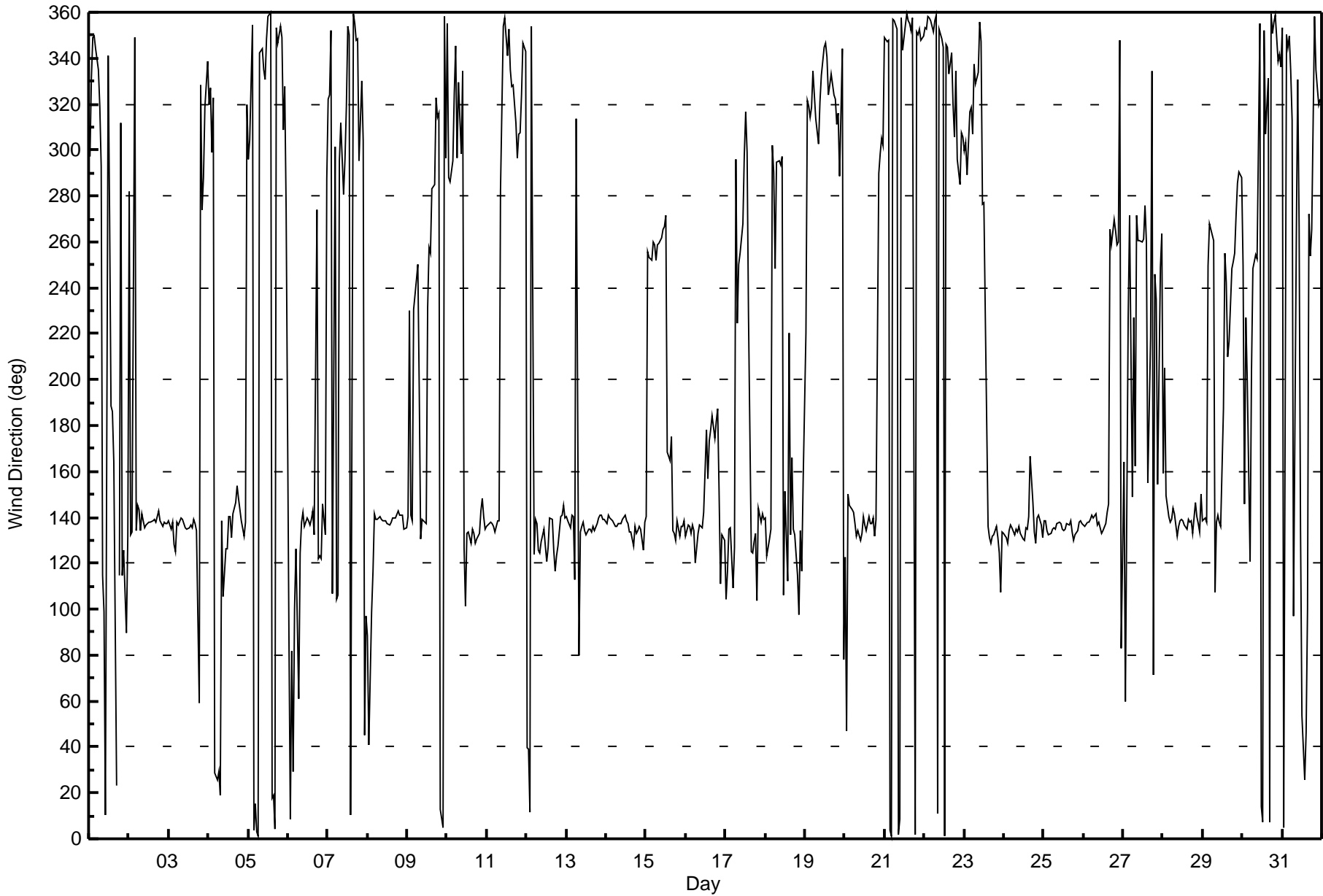
AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Lower Camp - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 102 deg on Jan 17 07:00 Minimum Value: 4 deg on Jan 25 15:00 Percentiles: P ₁ = 5 P ₁₀ = 7 Q ₁ = 10 Median = 17 Q ₃ = 33 P ₉₀ = 65 P ₉₉ = 94		Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9																							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jan	29	20	19	18	18	18	17	28	91	84	88	51	29	59	58	64	96	AF	49	76	89	49	71	45	96
2-Jan	86	39	27	98	38	13	16	11	12	12	9	6	6	7	10	8	7	11	20	10	9	7	8	7	98
3-Jan	7	15	9	37	68	63	8	15	18	8	7	6	9	7	6	7	8	15	65	79	23	23	18	18	79
4-Jan	33	22	19	16	16	16	23	23	68	57	15	8	17	14	10	10	12	17	15	13	14	9	9	89	89
5-Jan	19	21	21	15	17	15	16	17	20	29	18	23	16	17	16	15	20	16	27	39	24	17	21	36	39
6-Jan	83	96	46	76	65	31	87	40	12	10	11	8	6	5	6	15	10	81	19	13	93	62	19	55	96
7-Jan	61	62	86	60	28	41	51	52	30	31	24	34	17	19	17	20	18	18	20	14	64	70	90	33	90
8-Jan	89	72	61	18	10	8	6	11	8	8	9	8	8	6	6	8	6	9	11	10	8	12	8	6	89
9-Jan	16	43	13	11	48	13	16	55	28	11	15	84	82	14	13	10	21	44	31	81	79	77	55	73	84
10-Jan	64	30	32	45	61	55	39	47	40	63	22	79	23	9	5	7	16	40	13	8	11	13	7	6	79
11-Jan	7	6	6	6	6	5	6	12	66	18	20	19	20	21	19	13	14	11	11	18	18	49	48	69	69
12-Jan	73	18	55	39	19	7	7	15	8	7	8	13	17	12	11	13	16	10	11	18	17	10	17	8	73
13-Jan	11	7	9	8	12	40	36	91	13	8	11	8	7	8	6	7	6	5	8	9	11	12	8	7	91
14-Jan	5	8	8	7	6	7	7	8	7	6	5	9	8	8	6	9	14	26	36	22	17	8	9	11	36
15-Jan	20	69	12	12	12	12	17	14	14	14	13	14	78	50	42	55	52	23	14	19	39	11	10	11	78
16-Jan	11	7	11	7	6	6	6	8	7	6	7	14	35	42	33	27	25	24	25	34	63	30	16	13	63
17-Jan	33	31	12	36	32	23	102	70	11	10	16	40	36	56	56	68	66	47	50	78	67	14	12	10	102
18-Jan	8	23	24	14	62	69	79	45	47	20	29	83	88	95	83	23	58	39	42	40	80	19	43	59	95
19-Jan	67	49	16	22	23	18	15	17	12	13	17	17	18	18	14	15	18	14	13	16	19	17	19	77	77
20-Jan	68	87	41	77	28	15	9	12	8	8	16	10	7	7	8	8	17	16	36	73	38	19	18	21	87
21-Jan	19	18	17	16	17	16	17	17	17	18	15	19	17	17	16	17	18	18	15	17	18	18	18	18	19
22-Jan	18	17	17	16	17	17	16	16	16	17	18	18	29	23	18	20	18	15	17	16	34	22	42	32	42
23-Jan	49	32	25	24	23	19	24	21	25	15	24	15	16	58	12	11	10	9	13	15	33	25	30	9	58
24-Jan	13	9	10	10	7	9	10	9	8	9	10	9	7	8	8	13	18	14	4	18	8	11	6	8	18
25-Jan	8	7	9	14	7	8	6	6	7	7	8	9	9	6	4	5	7	7	7	5	5	4	5	5	14
26-Jan	6	24	15	10	7	10	7	10	6	6	6	9	9	7	13	15	19	13	12	12	12	19	53	71	71
27-Jan	70	74	27	71	52	84	62	59	50	13	12	12	13	38	95	79	99	44	90	77	16	64	97	33	99
28-Jan	91	31	27	13	10	8	12	10	11	8	7	7	8	8	7	11	10	10	8	22	26	11	25	53	91
29-Jan	78	9	15	54	14	13	66	39	22	11	10	11	46	13	8	22	22	16	13	16	50	48	48	51	78
30-Jan	38	65	42	71	24	65	9	10	9	9	43	17	24	21	15	26	17	19	20	18	18	17	18	17	71
31-Jan	19	15	19	20	28	25	55	45	35	31	42	94	66	47	30	62	46	10	15	57	29	19	20	23	94
91 96 86 98 68 84 102 91 91 84 88 94 88 95 95 79 99 81 90 81 93 77 97 89																									
Diurnal Maximum																									
AF - Analyzer Failure																									





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 9, 2017	Last Calibration	December 1, 2016
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	13:33	End Time (MST)	16:19
Gas Cert Reference	LL101792	Station temp.	20 Deg C
Cal Gas Concentration	49.5 ppm	Cal Gas Exp Date	2/16/2019
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.	2403

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	800	805
Calculated slope	0.999985	1.001456	Chamber temp	45.0	45.1
Calculated intercept	0.640351	0.011958	Pressure	707.8	711.7
Analyzer Background	11.9	11.9	Flow	0.595	0.599
Analyzer Coefficient	1.044	1.044	Intensity	90	91

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	-0.3	----
as found span	5000	83.8	829.6	828.0	1.002
calibrator zero	5000	0.0	0.0	-0.3	----
high point	5000	83.8	829.6	828.0	1.002
second point	5000	42.4	419.8	420.0	0.999
third point	5000	21.2	209.9	209.4	1.002
as left zero	5000	0.0	0.0	-0.1	----
as left span	5000	83.8	829.6	830.2	0.999
Average Correction Factor					1.001

Corrected As found 828.3 Previous response 829.0 % change 0.1%

Notes:

Changed inlet filter after as founds. No adjustments made.

Calibration Performed By:

Jayne Marcoux



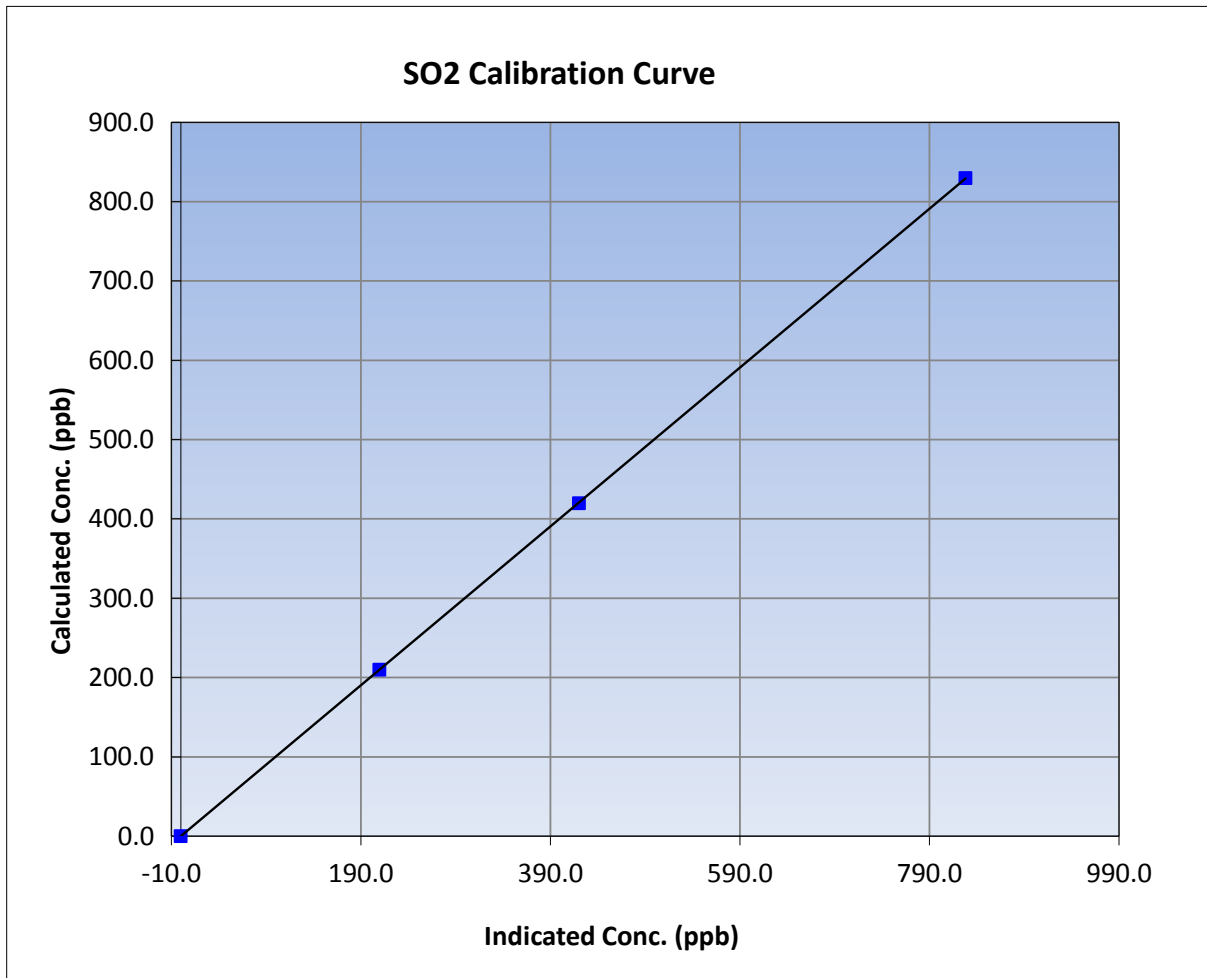
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 9, 2017	Previous Calibration	December 1, 2016
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	13:33	End Time (MST)	16:19
Analyzer make	TEI 43i	Analyzer serial #	100841398

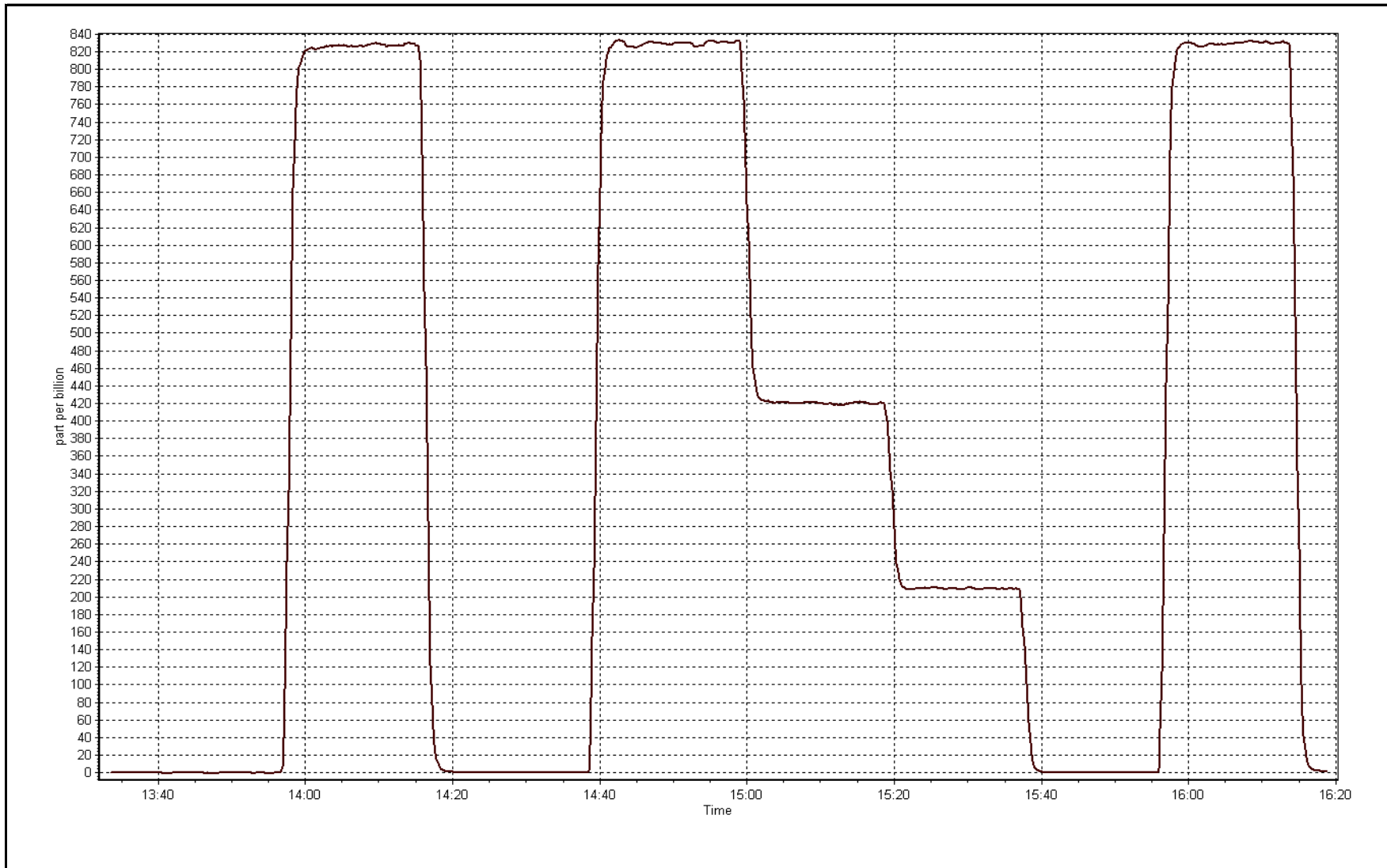
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999997
829.6	828.0	1.0020		
419.8	420.0	0.9994	Slope	1.001456
209.9	209.4	1.0025		
			Intercept	0.011958



SO2 Calibration Plot

Date: January 9, 2017





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	January 9, 2017	Last Calibration	December 1, 2016
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	10:20	End Time (MST)	13:45
Gas Cert Reference	ALM061435	Station temp.	22 Deg C
Cal Gas Concentration	5.15 ppm	Cal Gas Exp Date	9/9/2017
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	2403
SO2 gas concentration	49.5 ppm	SO2 gas cert/exp	LL101792 2/16/2019

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-671	-672
Analyzer IP address	192.168.1.42		Lamp voltage	801	800
Calculated slope	0.996984	1.001115	Chamber temp	45	45
Calculated intercept	-0.082705	-0.227832	Pressure	450.7	479.7
Analyzer Background	12.4	13	Flow	0.835	0.887
Analyzer Coefficient	1.251	1.271	Intensity	91	90
			Converter temp.	325	325

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	-0.2	----
as found span	5000	72.8	75.0	73.9	1.014
SO2 scrubber check	5000	21.2	209.9	1.8	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	72.8	75.0	74.9	1.001
second point	5000	38.8	40.0	40.5	0.987
third point	5000	19.4	20.0	20.4	0.981
as left zero	5000	0.0	0.0	0.5	----
as left span	5000	72.8	75.0	74.7	1.004
Average Correction Factor					0.990

Corrected As found	74.1	Previous response	75.3	% change	1.6%
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Notes:

Inlet filter changed and scrubber check done after as founds. Adjusted span zero and span.

Calibration Performed By: Jayme Marcoux



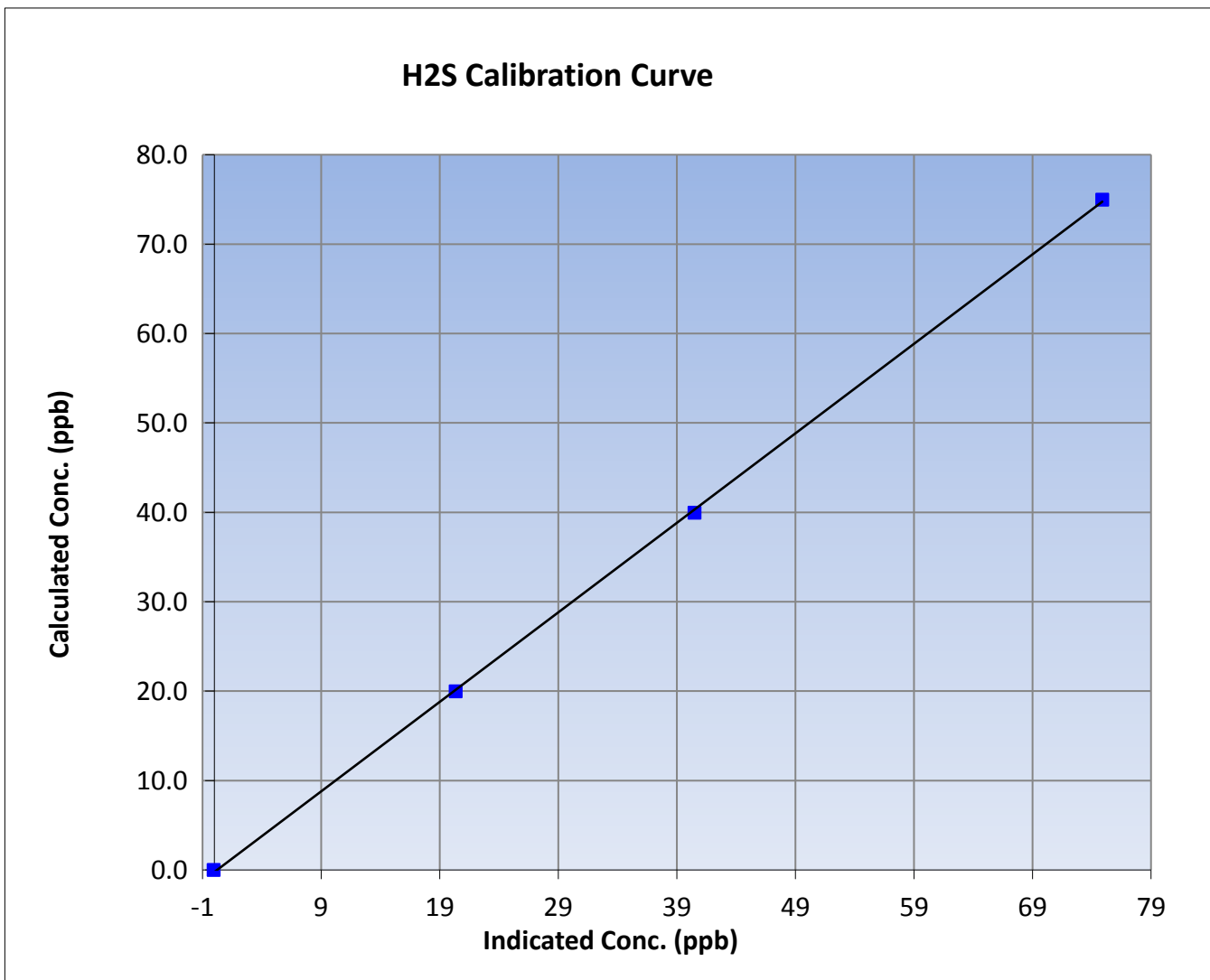
Wood Buffalo Environmental Association H2S Calibration Report

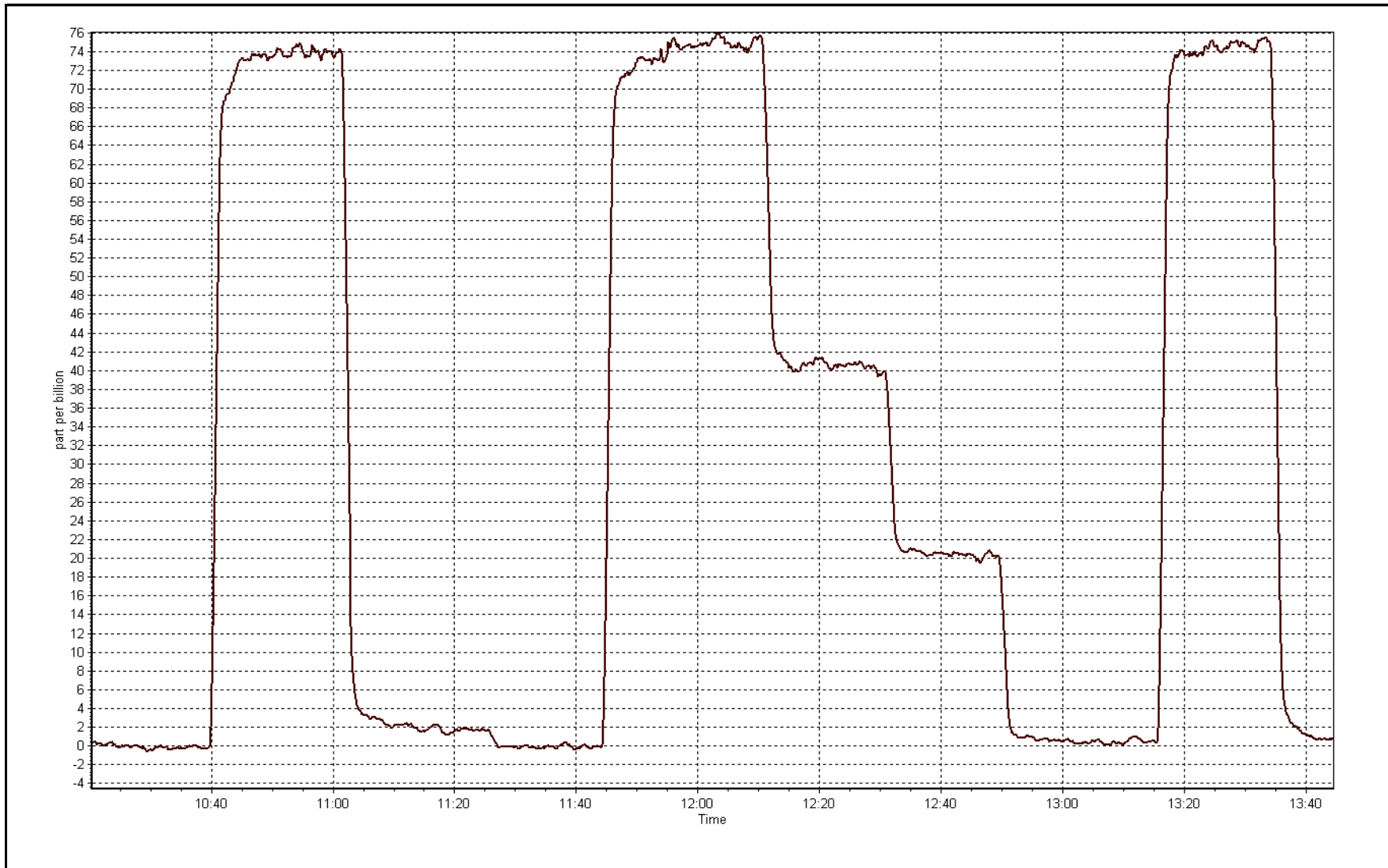
Station Information

Calibration Date	January 9, 2017	Previous Calibration	December 1, 2016
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	10:20	End Time (MST)	13:45
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	0.999904
75.0	74.9	1.0013		
40.0	40.5	0.9868	Slope	1.001115
20.0	20.4	0.9814		
			Intercept	-0.227832







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	January 9, 2017	Last Calibration	December 1, 2016
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	13:33	End Time (MST)	16:16
Gas Cert Reference	LL101792	Cal Gas Expiry Date	2/16/2019
CH4 Cal Gas Conc.	493 ppm	CH4 Equiv Conc.	1043.0 ppm
C3H8 Cal Gas Conc.	200 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	2403

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	7.8	7.8
Analyzer IP address	192.168.1.51		Air or Bypass Press	40.2	40.2
Calculated slope	0.994994	1.000135	Fuel Pressure	25.1	25.1
Calculated intercept	0.017994	0.045878	Analyzer Coeff	4.511	4.490
			Analyzer BKG	3.36	3.29

Analyzer make 51i-LT Analyzer serial # 1218153353

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	-0.06	----
as found span	5000	83.8	17.48	17.43	1.003
calibrator zero	5000	0.0	0.00	-0.06	----
high point	5000	83.8	17.48	17.42	1.003
second point	5000	42.4	8.84	8.82	1.003
third point	5000	21.2	4.42	4.38	1.010
as left zero	5000	0.0	0.00	-0.01	----
as left span	5000	83.8	17.48	17.53	0.997
Average Correction Factor					1.005

Corrected As found 17.49 Previous response 17.55 % change 0.3%

Notes:

Changed inlet filter after as founds. Adjusted zero and span.

Calibration Performed By:

Jayne Marcoux



Wood Buffalo Environmental Association THC Calibration Report

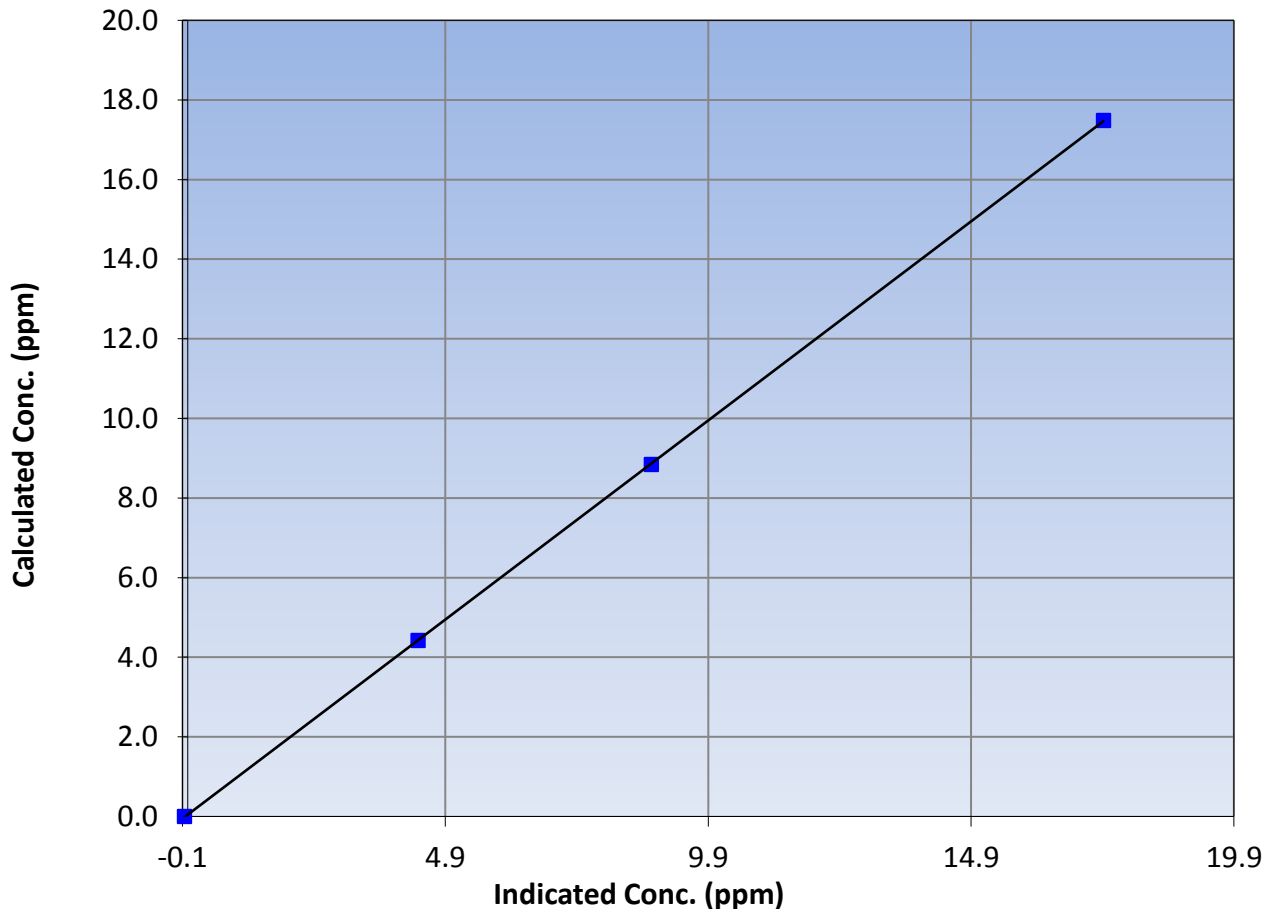
Station Information

Calibration Date	January 9, 2017	Previous Calibration	December 1, 2016
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	13:33	End Time (MST)	16:16
Analyzer make	51i-LT	Analyzer serial #	1218153353

Calibration Data

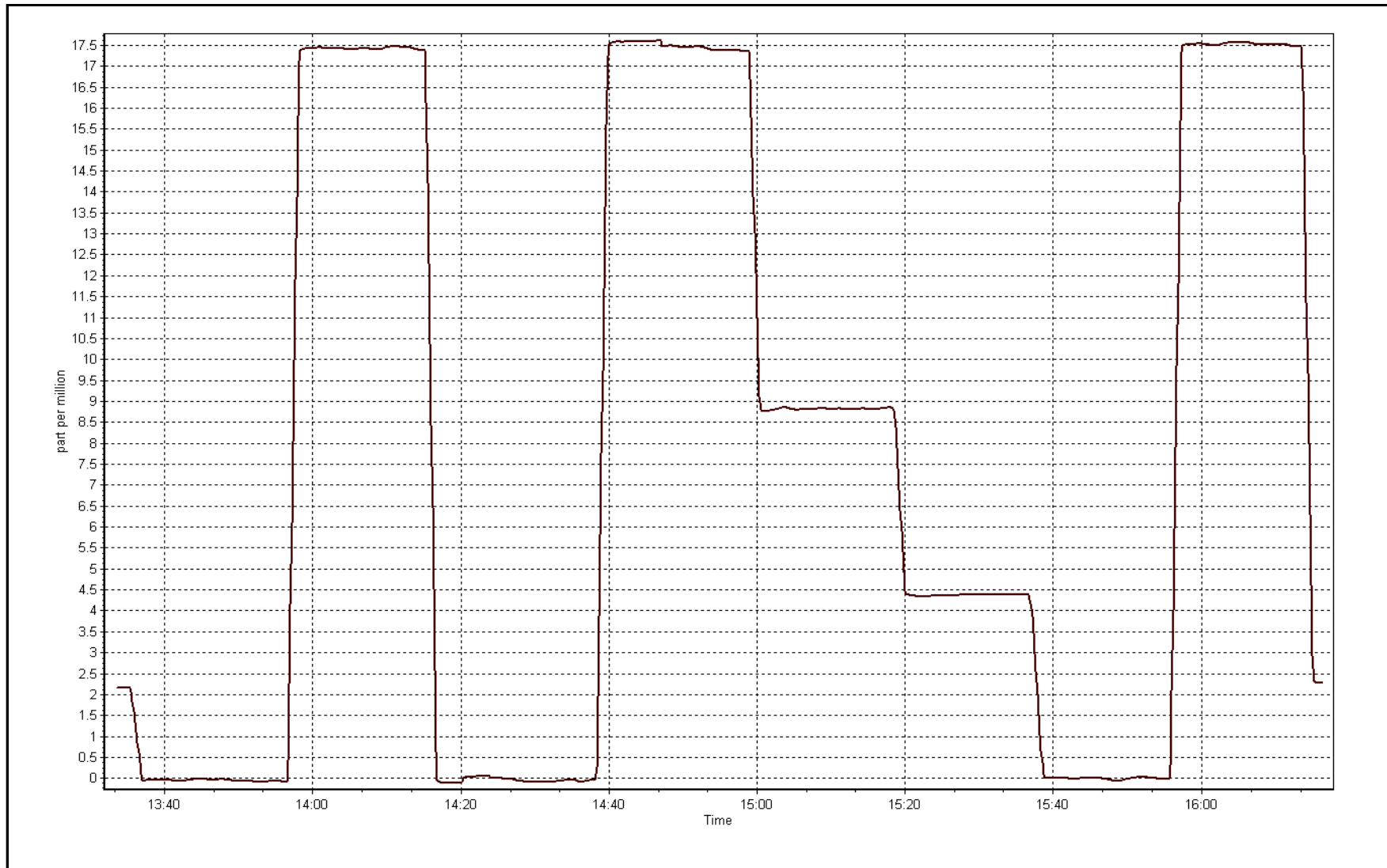
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.06	----	Correlation Coefficient	0.999995
17.48	17.42	1.0035		
8.84	8.82	1.0028	Slope	1.000135
4.42	4.38	1.0097		
			Intercept	0.045878

THC Calibration Curve



THC Calibration Plot

Date: January 9, 2017





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 13
FORT MCKAY SOUTH
JANUARY 2017**

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

February 27, 2017



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)
 JANUARY 2017

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	710	34	34	100.00	18	0	3	0
TRS(ppb) Average	710	34	34	100.00	3	0	1	0
THC(ppm) Average	710	34	34	100.00	6.8	-	4.4	-
O3(ppb) Average	711	33	33	100.00	39	0	32	-
NO2(ppb) Average	707	36	37	99.87	36	0	22	-
NO(ppb) Average	707	36	37	99.87	142	-	79	-
NOX(ppb) Average	707	36	37	99.87	154	-	89	-
PM2.5(ug/m3) Average	736	2	8	99.19	33.2	-	20.7	0
ET(C) Average	744	0	0	100.00	7.2	-	1.2	-
RH(%) Average	744	0	0	100.00	97	-	94	-
WS(km/h) Average	708	0	36	95.16	29	-	15	-
WD(deg) Average	708	0	36	95.16	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)
 JANUARY 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	710	0.8	1	-	0	0	0	0	1	2	18
TRS(ppb) Average	710	0.4	0	-	0	0	0	0	0	1	3
THC(ppm) Average	710	2.55	0.6	-	2	2.1	2.2	2.4	2.7	3.1	6.8
O3(ppb) Average	711	16	12	-	0	1	4	15	27	33	39
NO2(ppb) Average	707	11.1	8	-	0	1	3	10	18	22	36
NO(ppb) Average	707	7.9	17	-	0	0	0	1	8	24	142
NOX(ppb) Average	707	19	21	-	0	1	3	13	27	46	154
PM2.5(ug/m3) Average	736	5.33	5	-	0.2	1.2	2	3.6	7.4	11.4	33.2
Temperature 2 m (C) Average	744	-13.75	10.6	-	-38.9	-27.8	-21.1	-14	-4.9	0.4	7.2
Relative Humidity (%) Average	744	80.5	8	-	55	71	75	80	86	93	97
Wind Speed 10 m (km/h) Average	708	6.9	5	-	0	2	3	6	9	14	29
Wind Direction 10 m (deg) Average	708	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -FORT McKAY SOUTH (AMS 13)
JANUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NO2, NO, NOX	18 Jan 2017 12:00	18 Jan 2017 12:00	1	Maintenance - NOX reference point generated for O3 cal
PM2.5	27 Jan 2017 10:00	27 Jan 2017 15:00	6	Intermittent unstable operation - excessive baseline drift
Wind Speed, Wind Direction	01 Jan 2017 18:00	01 Jan 2017 18:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	01 Jan 2017 20:00	01 Jan 2017 20:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	02 Jan 2017 05:00	02 Jan 2017 05:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	04 Jan 2017 01:00	04 Jan 2017 03:00	3	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	04 Jan 2017 06:00	04 Jan 2017 06:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	04 Jan 2017 08:00	04 Jan 2017 09:00	2	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	04 Jan 2017 23:00	04 Jan 2017 23:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	06 Jan 2017 10:00	06 Jan 2017 10:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	06 Jan 2017 21:00	06 Jan 2017 21:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	07 Jan 2017 04:00	07 Jan 2017 08:00	5	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	08 Jan 2017 00:00	08 Jan 2017 00:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	09 Jan 2017 22:00	09 Jan 2017 22:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	10 Jan 2017 05:00	10 Jan 2017 05:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	10 Jan 2017 09:00	10 Jan 2017 11:00	3	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	12 Jan 2017 03:00	12 Jan 2017 03:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	13 Jan 2017 06:00	13 Jan 2017 06:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	13 Jan 2017 19:00	13 Jan 2017 19:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	18 Jan 2017 01:00	18 Jan 2017 01:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	18 Jan 2017 03:00	18 Jan 2017 03:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	18 Jan 2017 05:00	18 Jan 2017 07:00	2	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	18 Jan 2017 09:00	18 Jan 2017 09:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	20 Jan 2017 20:00	20 Jan 2017 20:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	23 Jan 2017 02:00	23 Jan 2017 02:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	28 Jan 2017 21:00	28 Jan 2017 21:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	31 Jan 2017 10:00	31 Jan 2017 10:00	1	Flat line in sensor output signal -sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

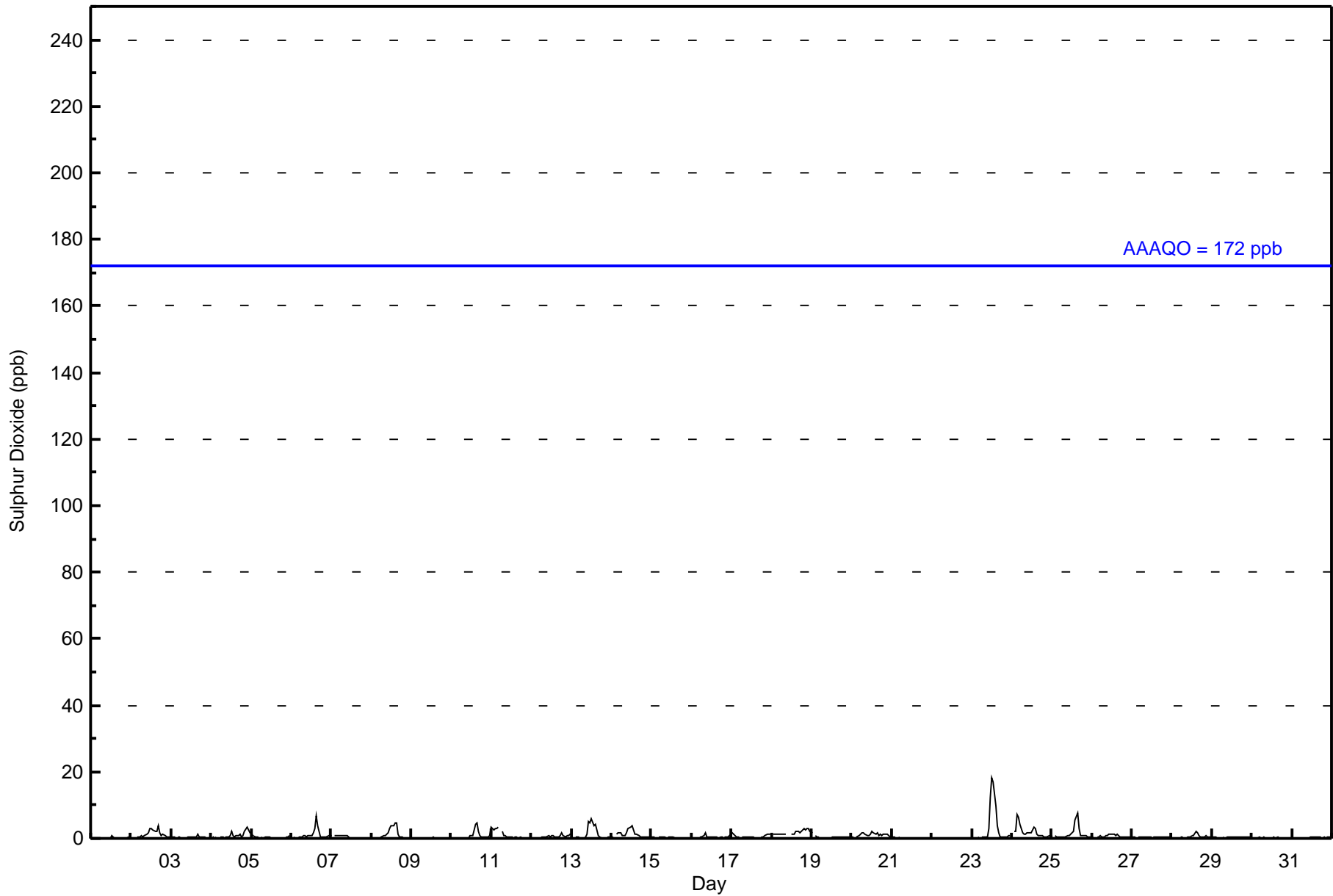
Fort McKay South - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																						
Maximum Value: 18 ppb on Jan 23 13:00										Maximum Daily Average: 3.1 ppb on Jan 23										Hours of Data: 710																												
Minimum Value: 0 ppb on Jan 1 10:00										Minimum Daily Average: 0.1 ppb on Jan 9										Hours of Missing Data: 34																												
Maximum Diurnal Average: 1.7 ppb at hour 13										Minimum Diurnal Average: 0.4 ppb at hour 19										Hours of Calibration: 34																												
Monthly Average: 0.8 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 7										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-Jan	0	Z	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																						
2-Jan	0	0	Z	0	1	1	1	1	1	1	2	3	3	3	2	2	4	2	1	1	1	1	0	0	1.3	4																						
3-Jan	1	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.4	1																							
4-Jan	0	0	0	0	Z	0	0	0	0	0	1	2	1	1	1	1	1	0	1	2	3	2	2	0.9	3																							
5-Jan	2	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.4	2																							
6-Jan	Z	0	0	0	0	0	1	1	1	0	1	1	1	2	3	7	4	1	0	0	0	0	1	1	1.1	7																						
7-Jan	1	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																						
8-Jan	0	0	Z	0	0	0	1	1	1	1	2	3	4	4	5	5	1	1	0	0	0	0	0	0	1.3	5																						
9-Jan	0	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																						
10-Jan	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	4	5	2	1	0	1	0	0	0	1	0.8	5																						
11-Jan	3	3	3	3	3	Z	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	3																						
12-Jan	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	1	2	1	1	1	1	1	0.6	2																						
13-Jan	1	Z	1	0	0	0	0	0	0	1	5	5	6	4	4	2	1	0	0	0	0	0	0	0	1.4	6																						
14-Jan	0	0	Z	1	2	2	1	1	1	2	3	3	4	3	1	1	1	0	1	0	0	0	0	0	1.2	4																						
15-Jan	0	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																						
16-Jan	0	0	0	0	Z	1	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	2																						
17-Jan	2	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.5	2																						
18-Jan	Z	1	1	1	1	1	1	1	1	C	C	C	1	1	2	2	2	2	2	3	3	3	3	2	1.8	3																						
19-Jan	2	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2																						
20-Jan	1	0	Z	0	1	1	2	2	1	1	1	1	2	2	1	2	1	1	1	1	1	1	1	0	1.1	2																						
21-Jan	0	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																						
22-Jan	0	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																						
23-Jan	0	0	0	0	0	Z	0	0	1	0	3	12	18	17	10	4	2	1	0	0	1	1	1	1	3.1	18																						
24-Jan	Z	2	2	7	6	4	2	1	1	2	2	2	3	3	1	1	1	1	1	1	0	1	1	1	2.0	7																						
25-Jan	1	Z	1	1	1	1	1	1	1	0	1	1	1	2	2	5	8	3	1	1	1	1	1	0	1.4	8																						
26-Jan	0	0	Z	1	1	1	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.7	1																						
27-Jan	0	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																						
28-Jan	0	0	0	0	Z	0	1	0	0	0	0	1	1	1	2	2	1	1	1	1	1	0	0	0	0.6	2																						
29-Jan	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																						
30-Jan	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																						
31-Jan	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																						
																								0.6	0.5	0.5	0.7	0.8	0.6	0.5	0.5	0.5	0.5	0.8	1.3	1.7	1.6	1.6	1.5	0.9	0.5	0.4	0.4	0.5	0.5	0.5	0.5	Diurnal Average
																								3	3	3	7	6	4	2	2	2	2	5	12	18	17	10	8	4	2	2	3	3	3	3	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 (SO₂) - ppb
Fort McKay South - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	707	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: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Fort McKay South - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	91	22	4	3	3	3	10	83	164	83	48	63	32	18	17	29	673
11 - 20	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	3
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	91	22	4	3	3	3	10	84	165	83	48	64	32	18	17	29	676

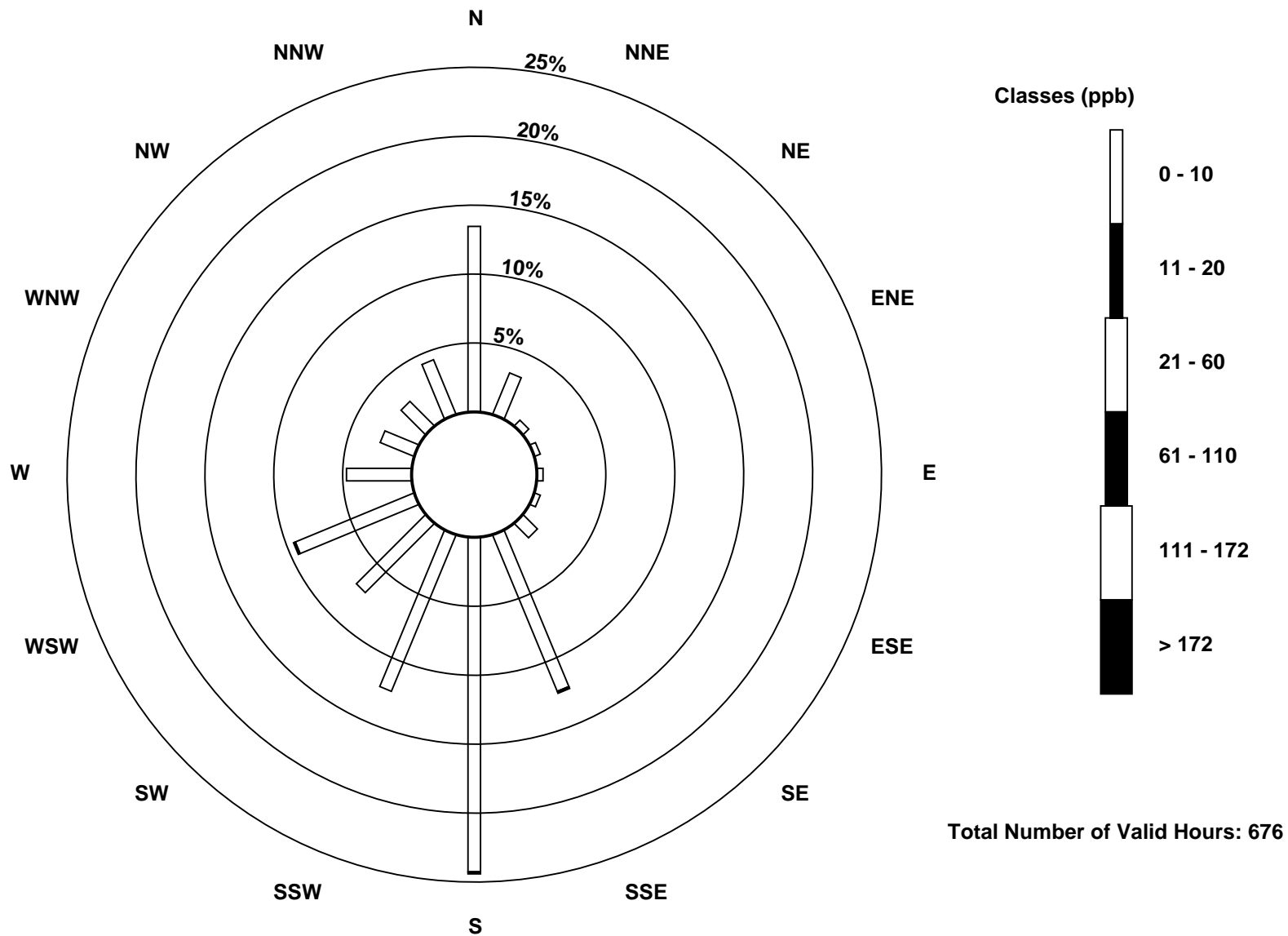
Total Number of Valid Hours: 676

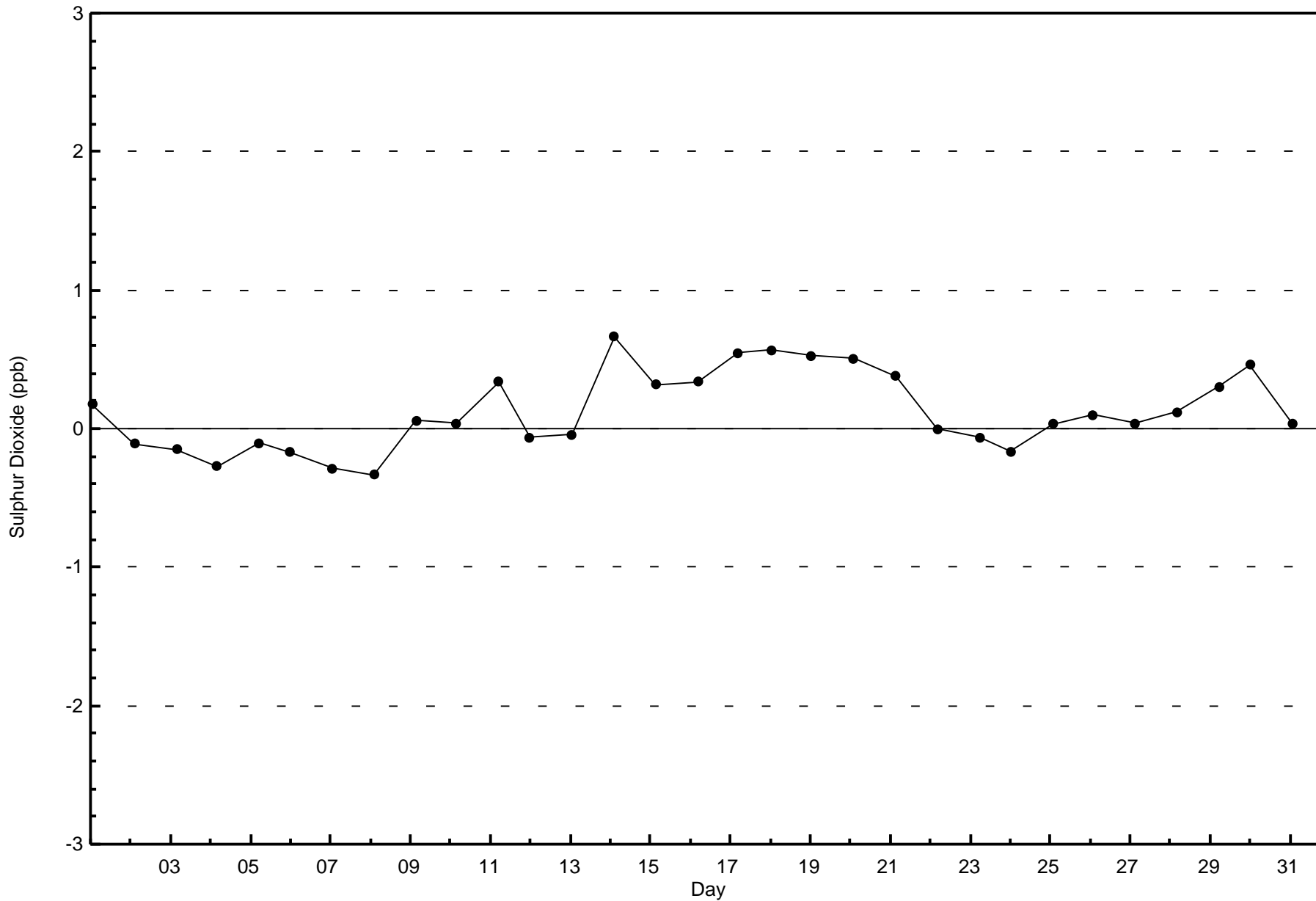
Total Number of Hours: 744

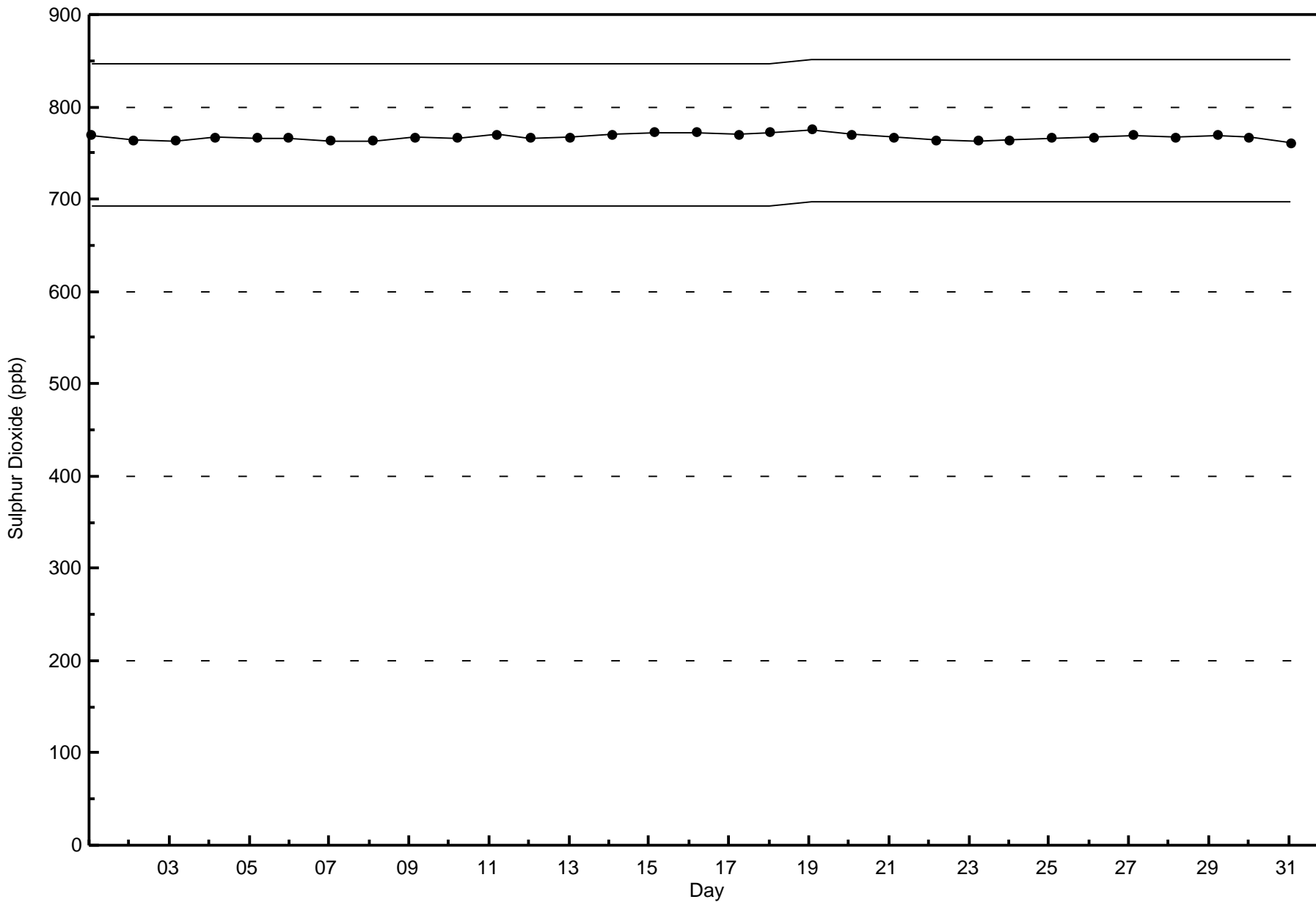


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Sulphur Dioxide (SO₂) - ppb
Fort McKay South (AMS 13)









Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

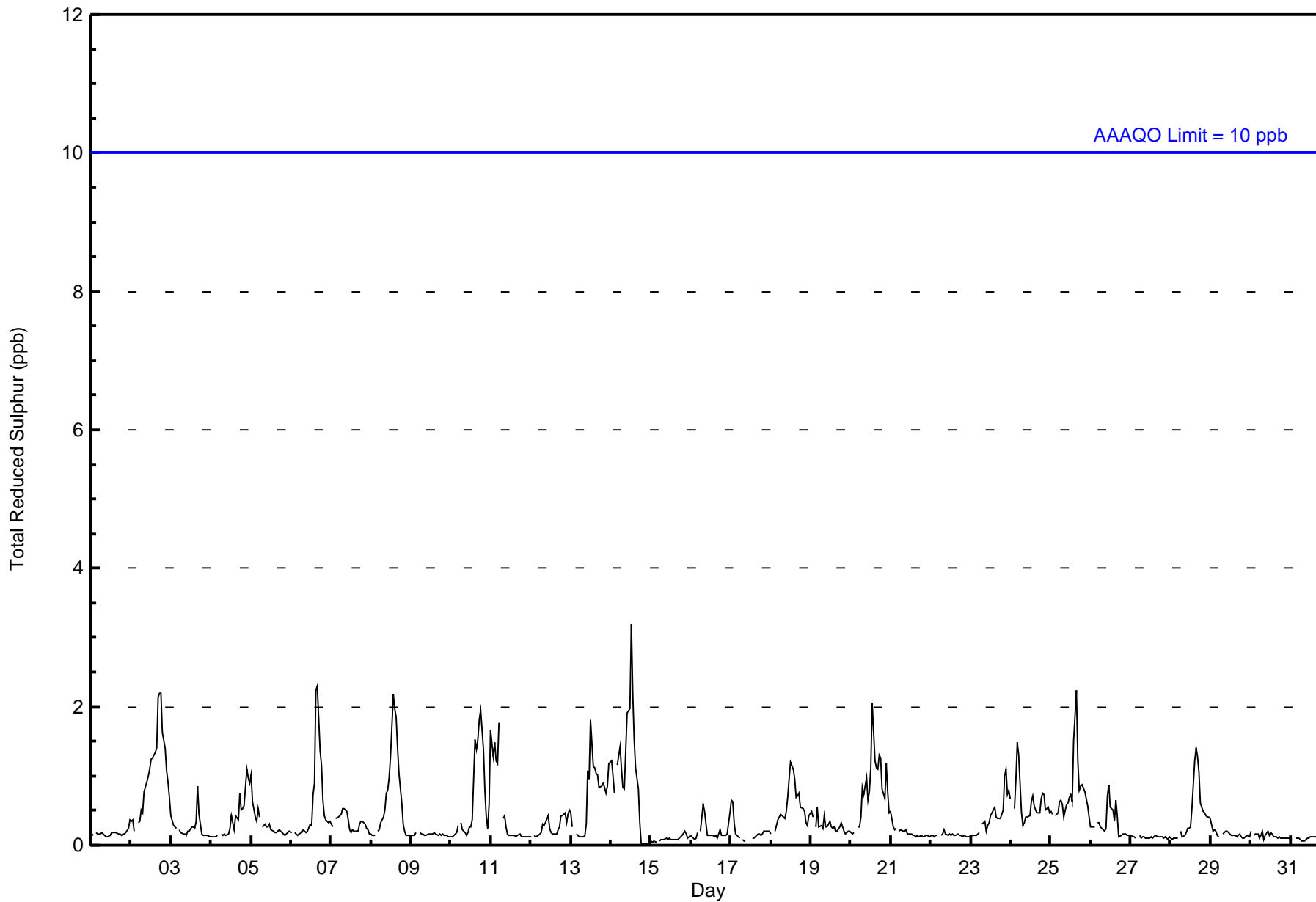
Fort McKay South - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3 ppb on Jan 14 13:00 Maximum Daily Average: 1.0 ppb on Jan 2																	Hours in Service: 744 Hours of Data: 710									
Minimum Value: 0 ppb on Jan 14 21:00 Minimum Daily Average: 0.1 ppb on Jan 15 Maximum Diurnal Average: 0.6 ppb at hour 16 Minimum Diurnal Average: 0.3 ppb at hour 4 Monthly Average: 0.4 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 2																	Hours of Missing Data: 34 Hours of Calibration: 34 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-Jan	0	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
2-Jan	0	0	0	Z	0	0	1	0	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1.0	2
3-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.3	1	
4-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0.4	1	
5-Jan	1	1	0	0	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
6-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	1	1	1	0	0	0	0.6	2	
7-Jan	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
8-Jan	0	0	0	Z	0	0	0	0	1	1	1	1	1	2	2	2	1	1	1	0	0	0	0	0.7	2	
9-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
10-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	2	1	2	2	2	1	1	0	0	0.6	2	
11-Jan	2	1	1	1	1	2	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2	
12-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
13-Jan	0	0	Z	0	0	0	0	0	0	0	1	1	2	1	1	1	1	1	1	1	1	1	1	0.7	2	
14-Jan	1	1	1	Z	1	1	1	1	1	1	2	2	3	2	2	1	1	0	0	0	0	0	0	1.0	3	
15-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
16-Jan	0	0	0	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
17-Jan	1	1	0	0	0	0	Z	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0.2	1	
18-Jan	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0.6	1	
19-Jan	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
20-Jan	0	0	0	Z	0	0	0	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	0.8	2	
21-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
22-Jan	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	
23-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1	0.4	1	
24-Jan	1	Z	1	1	1	1	0	0	0	0	0	1	1	1	1	1	0	0	1	1	1	1	1	0.6	1	
25-Jan	0	0	Z	0	0	1	1	1	0	1	1	1	1	1	2	2	1	1	1	1	1	1	1	0.8	2	
26-Jan	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	0	1	0	0	0	0	0	0	0	0.3	1	
27-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
28-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0.4	1	
29-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
30-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
31-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
0.4 0.3 0.3 0.3 0.4 0.4 0.3 0.3 0.3 0.3 0.4 0.4 0.5 0.5 0.6 0.6 0.6 0.5 0.5 0.4 0.4 0.4 0.3 0.3																								Diurnal Average		
2 1 1 1 1 2 1 1 1 1 2 2 3 2 2 2 2 2 2 2 2 1 1 1 1																								Diurnal Maximum		
Z - zerospan C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Fort McKay South - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	709	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: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Fort McKay South - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	92	22	4	3	3	3	11	83	167	83	45	61	31	18	18	30	674
3 - 4	0	0	0	0	0	0	0	1	0	0	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
Totals	92	22	4	3	3	3	11	84	167	83	45	61	31	18	18	30	675

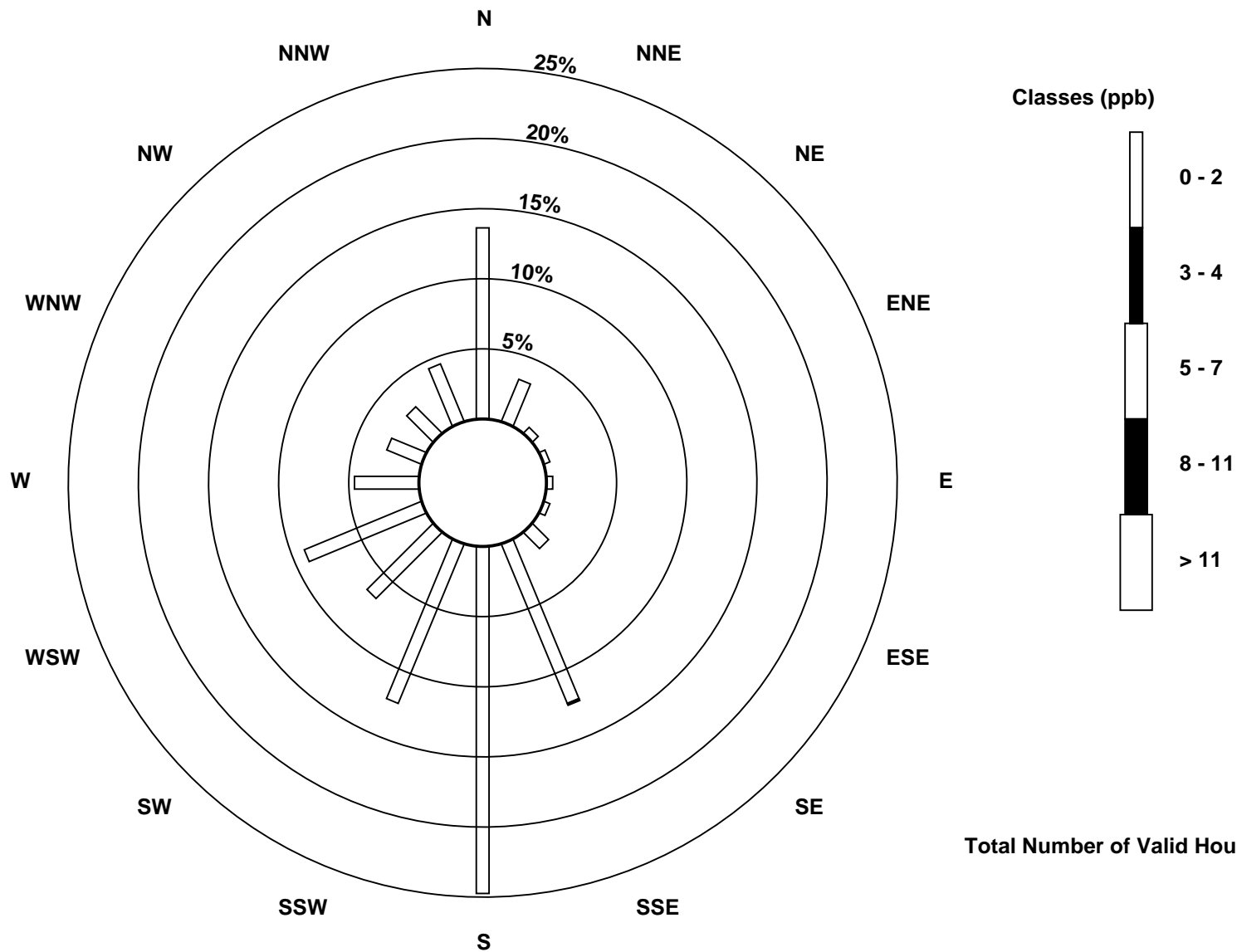
Total Number of Valid Hours: 675

Total Number of Hours: 744

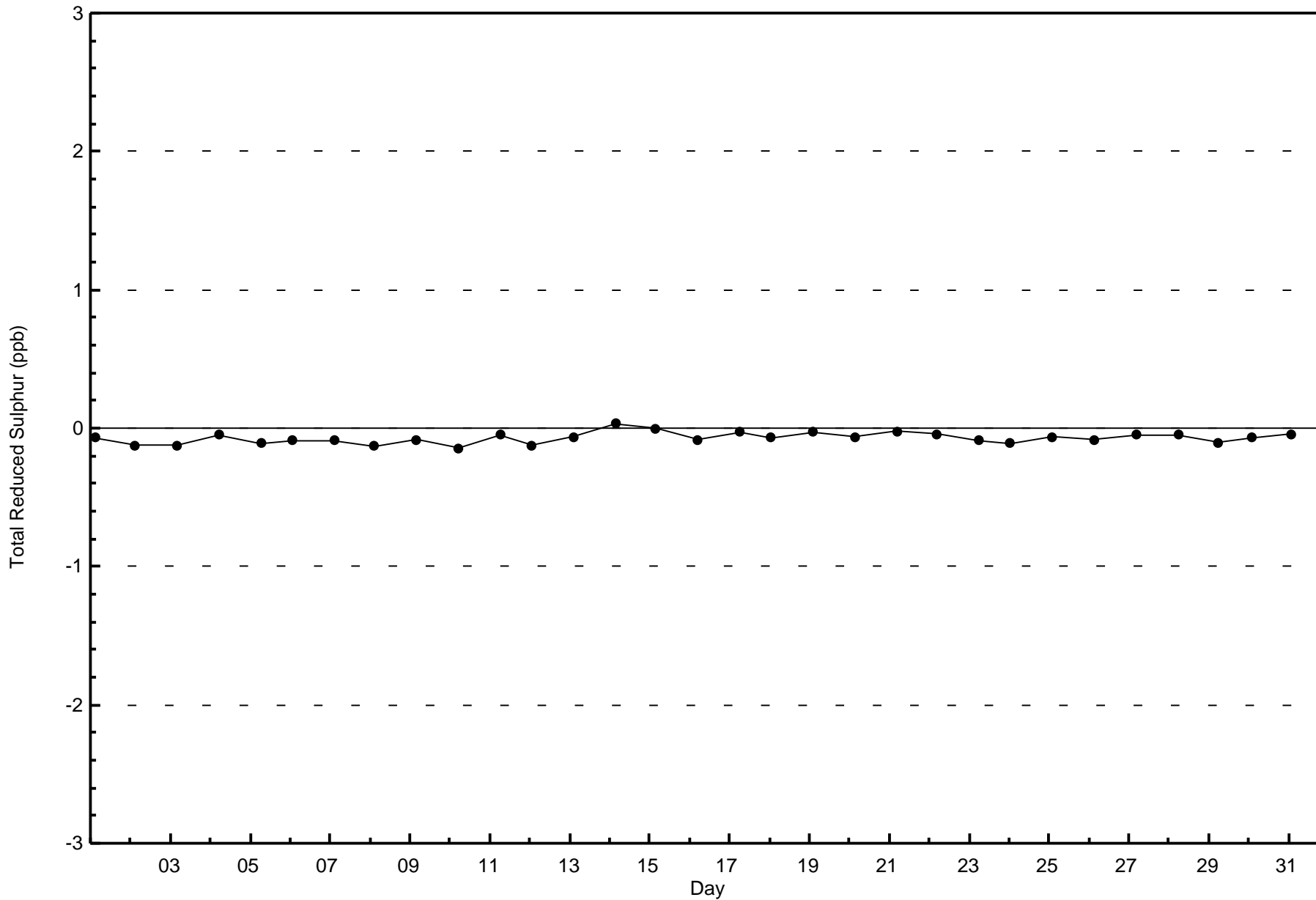


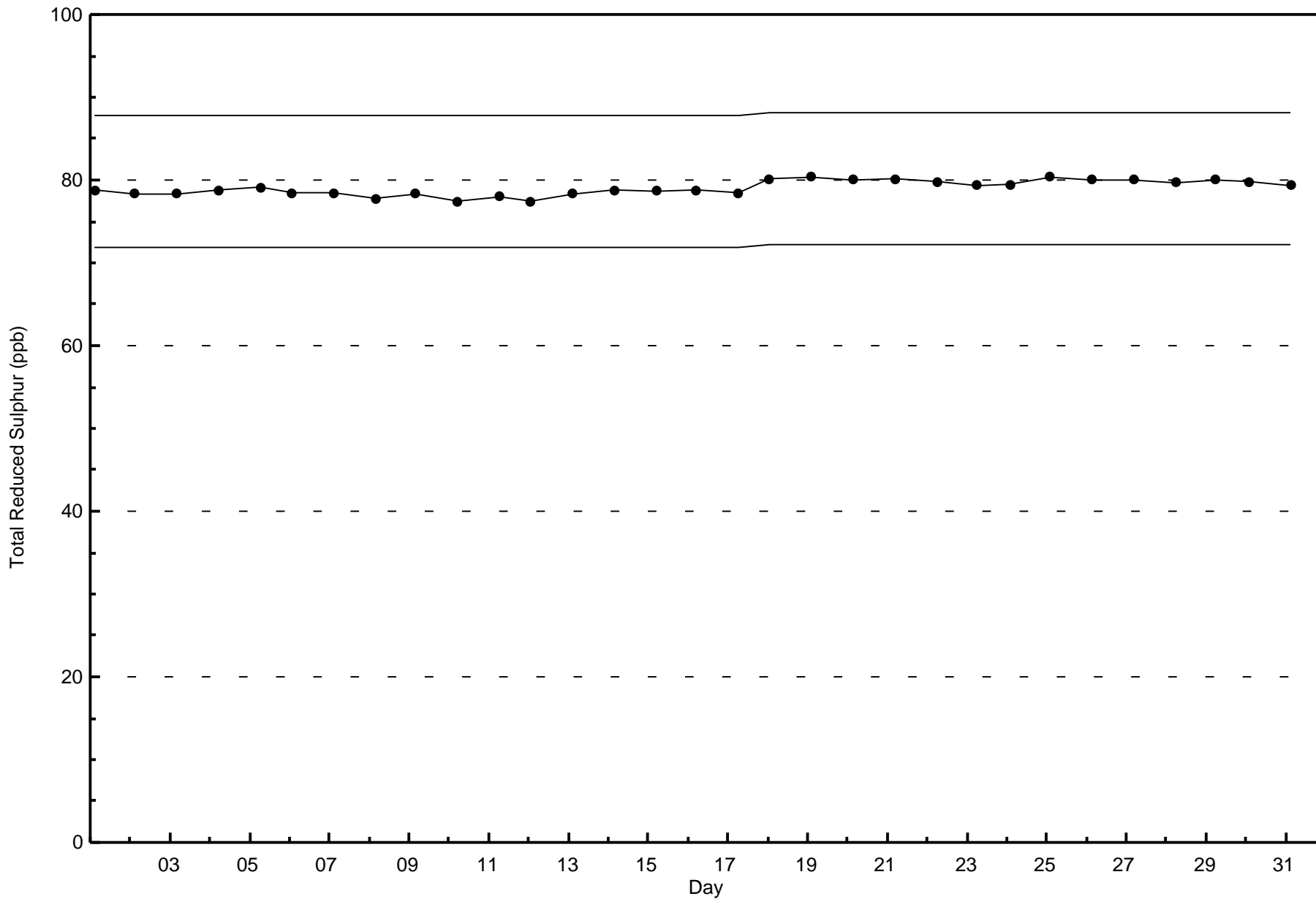
Wood Buffalo Environmental Association
Wind Rose Jan 2017

Total Reduced Sulphur (TRS) - ppb
Fort McKay South (AMS 13)



Total Number of Valid Hours: 675







Wood Buffalo Environmental Association
Summary of Hour Averages

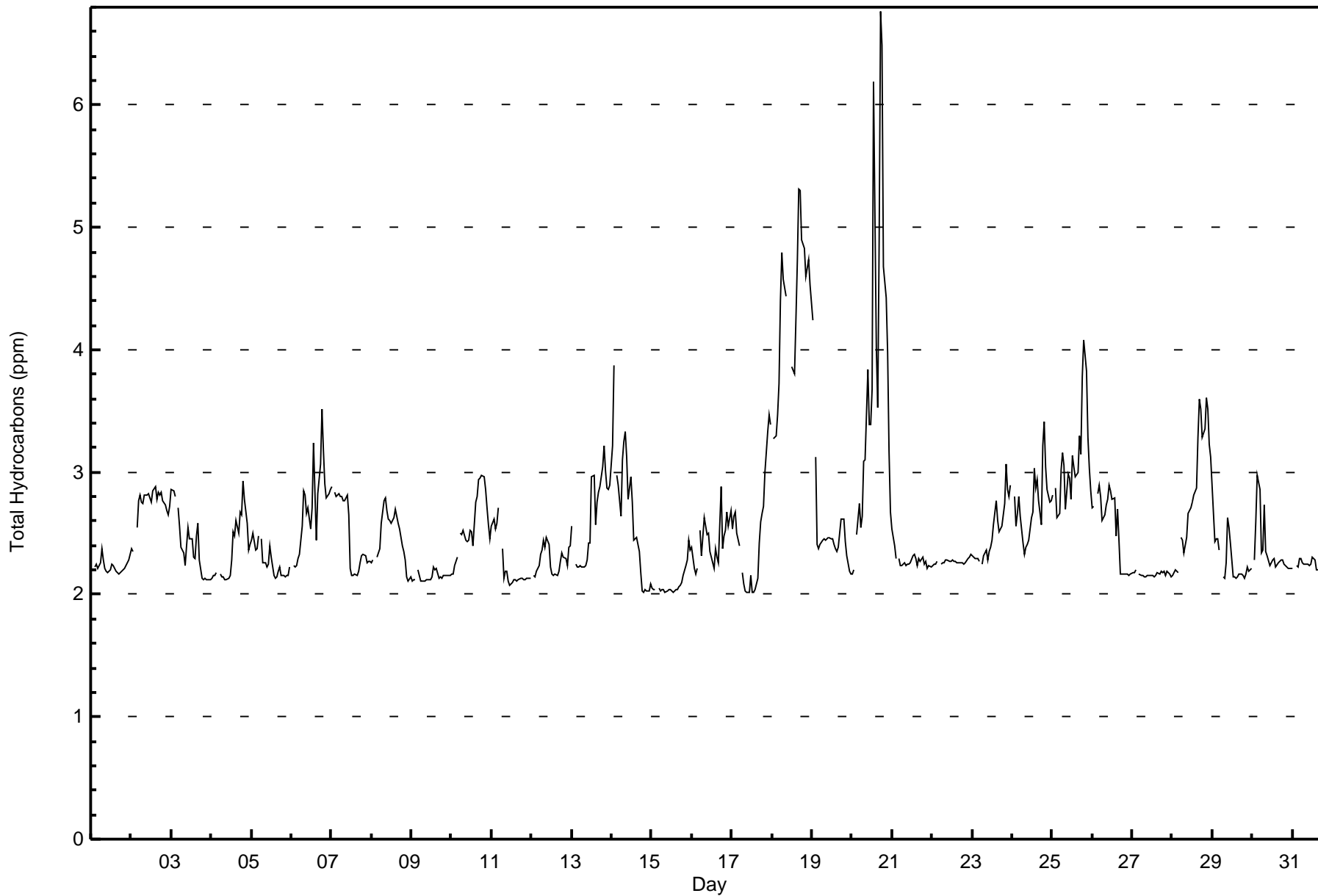
Total Hydrocarbons (THC) - ppm
Fort McKay South - January 2017

Maximum Value: 6.8 ppm on Jan 20 18:00 Maximum Daily Average: 4.4 ppm on Jan 18		Hours in Service: 744 Hours of Data: 710 Hours of Missing Data: 34 Hours of Calibration: 34 Percent Operational Time: 100.0																																															
Minimum Value: 2.0 ppm on Jan 15 14:00 Maximum Diurnal Average: 2.7 ppm at hour 19 Monthly Average: 2.55 ppm		Minimum Daily Average: 2.1 ppm on Jan 15 Minimum Diurnal Average: 2.4 ppm at hour 3 Percentiles: P ₁ = 2.0 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.4 Q ₃ = 2.7 P ₉₀ = 3.1 P ₉₉ = 4.9																																															
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-Jan	2.1	Z	2.2	2.2	2.2	2.3	2.4	2.3	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.4																							
2-Jan	2.4	2.4	Z	2.5	2.8	2.8	2.8	2.7	2.8	2.8	2.8	2.8	2.8	2.9	2.9	2.8	2.8	2.8	2.8	2.8	2.8	2.7	2.7	2.7	2.7	2.7	2.9																						
3-Jan	2.9	2.8	2.8	Z	2.7	2.6	2.4	2.3	2.2	2.4	2.6	2.5	2.5	2.3	2.3	2.5	2.6	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.9																							
4-Jan	2.1	2.1	2.2	2.2	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.5	2.5	2.6	2.5	2.7	2.6	2.9	2.8	2.6	2.4	2.4	2.4	2.9																							
5-Jan	2.4	2.5	2.4	2.4	2.5	Z	2.5	2.3	2.3	2.2	2.3	2.4	2.3	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.5																							
6-Jan	Z	2.2	2.2	2.2	2.3	2.3	2.6	2.8	2.8	2.7	2.7	2.5	2.7	3.2	2.8	2.4	2.8	3.1	3.5	3.2	2.9	2.8	2.8	2.9	2.9	3.5																							
7-Jan	2.9	Z	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.6	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	2.9																							
8-Jan	2.3	2.3	Z	2.3	2.3	2.4	2.6	2.8	2.8	2.7	2.6	2.6	2.6	2.6	2.7	2.6	2.6	2.5	2.4	2.3	2.3	2.1	2.1	2.1	2.1	2.8																							
9-Jan	2.1	2.1	2.1	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2																							
10-Jan	2.2	2.2	2.2	2.3	Z	2.5	2.5	2.5	2.4	2.4	2.4	2.5	2.5	2.4	2.8	2.8	2.9	2.9	3.0	3.0	2.9	2.7	2.6	2.5	2.5	3.0																							
11-Jan	2.6	2.6	2.5	2.6	2.7	Z	2.4	2.1	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	2.7																							
12-Jan	Z	2.2	2.1	2.2	2.2	2.3	2.4	2.4	2.4	2.5	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.4	2.4	2.4	2.5																							
13-Jan	2.6	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.4	3.0	3.0	2.6	2.8	2.8	2.9	3.0	3.2	3.0	2.9	2.9	2.9	2.9	3.2																							
14-Jan	3.2	3.9	Z	3.0	2.9	2.6	3.1	3.3	3.3	3.1	2.8	3.0	2.7	2.4	2.5	2.5	2.4	2.2	2.0	2.0	2.0	2.0	2.1	2.1	2.1	3.9																							
15-Jan	2.1	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	2.1	2.1	2.1	2.2	2.2	2.3	2.4	2.4	2.4	2.4																							
16-Jan	2.4	2.2	2.2	2.2	Z	2.5	2.3	2.6	2.6	2.5	2.5	2.3	2.3	2.2	2.4	2.3	2.3	2.9	2.4	2.5	2.5	2.7	2.6	2.7	2.7	2.9																							
17-Jan	2.5	2.6	2.7	2.5	2.4	Z	2.2	2.1	2.0	2.0	2.0	2.2	2.0	2.0	2.0	2.1	2.4	2.6	2.7	2.7	3.0	3.3	3.5	3.4	3.4	3.5																							
18-Jan	Z	3.3	3.3	3.5	3.7	4.4	4.8	4.6	4.4	C	C	C	3.9	3.8	4.2	4.7	5.3	5.3	4.9	4.8	4.6	4.7	4.7	4.5	4.5	5.3																							
19-Jan	4.2	Z	3.1	2.4	2.4	2.4	2.4	2.5	2.4	2.5	2.5	2.5	2.5	2.4	2.4	2.3	2.4	2.6	2.6	2.6	2.4	2.3	2.2	2.2	2.2	4.2																							
20-Jan	2.2	2.2	Z	2.5	2.7	2.5	2.6	3.1	3.1	3.8	3.4	3.4	3.7	6.2	4.0	3.5	4.9	6.8	6.5	4.7	4.4	4.0	3.2	2.7	2.7	6.8																							
21-Jan	2.5	2.4	2.3	Z	2.3	2.2	2.2	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.5																							
22-Jan	2.2	2.3	2.2	2.3	Z	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3																							
23-Jan	2.3	2.3	2.3	2.3	2.3	Z	2.3	2.3	2.4	2.3	2.3	2.4	2.4	2.6	2.8	2.6	2.5	2.5	2.6	2.7	3.1	2.9	2.8	2.9	2.9	3.1																							
24-Jan	Z	2.8	2.6	2.7	2.8	2.6	2.4	2.3	2.4	2.4	2.4	2.6	2.7	3.0	2.9	2.9	2.8	2.6	3.2	3.4	3.0	2.9	2.8	2.8	2.8	3.4																							
25-Jan	2.8	Z	2.9	2.6	2.7	3.0	3.2	3.1	2.7	3.0	3.0	2.8	3.1	3.0	3.0	3.0	3.3	3.1	3.8	4.1	3.8	3.3	3.0	2.8	2.8	4.1																							
26-Jan	2.7	2.7	Z	2.8	2.9	2.8	2.6	2.7	2.7	2.8	2.9	2.8	2.8	2.8	2.5	2.7	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.9																							
27-Jan	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2																							
28-Jan	2.2	2.2	2.2	2.2	Z	2.5	2.4	2.3	2.5	2.7	2.7	2.7	2.7	2.8	2.8	2.9	3.3	3.6	3.5	3.3	3.4	3.6	3.5	3.2	3.1	3.6																							
29-Jan	2.9	2.4	2.5	2.5	2.4	Z	2.1	2.1	2.3	2.6	2.5	2.4	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.9																							
30-Jan	Z	2.3	2.6	3.0	2.9	2.3	2.4	2.7	2.4	2.3	2.2	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	3.0																							
31-Jan	2.2	Z	2.2	2.2	2.3	2.3	2.3	2.3	2.2	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	2.2	2.2	2.2	2.3																							
																								2.5	2.4	2.4	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.4	2.5	2.6	2.5	2.5	2.6	2.7	2.7	2.7	2.7	2.6	2.5	2.5	Diurnal Average		
																								4.2	3.9	3.3	3.5	3.7	4.4	4.8	4.6	4.4	3.8	3.4	3.4	3.9	6.2	4.2	4.7	5.3	6.8	6.5	4.8	4.6	4.7	4.7	4.5	Diurnal Maximum	
Z - zerospan C - Calibration																																																	



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Fort McKay South - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Fort McKay South - January 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	25	3.52	3.52
2.1 - 3.0	612	86.20	89.72
3.1 - 10.0	73	10.28	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Fort McKay South - January 2017**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	2	3	7	12	1	0	0	0	25
2.1 - 3.0	88	20	4	2	2	3	9	79	136	61	39	49	31	17	17	28	585
3.1 - 10.0	3	2	0	1	1	0	1	5	27	19	2	3	0	1	0	1	66
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	91	22	4	3	3	3	10	84	165	83	48	64	32	18	17	29	676

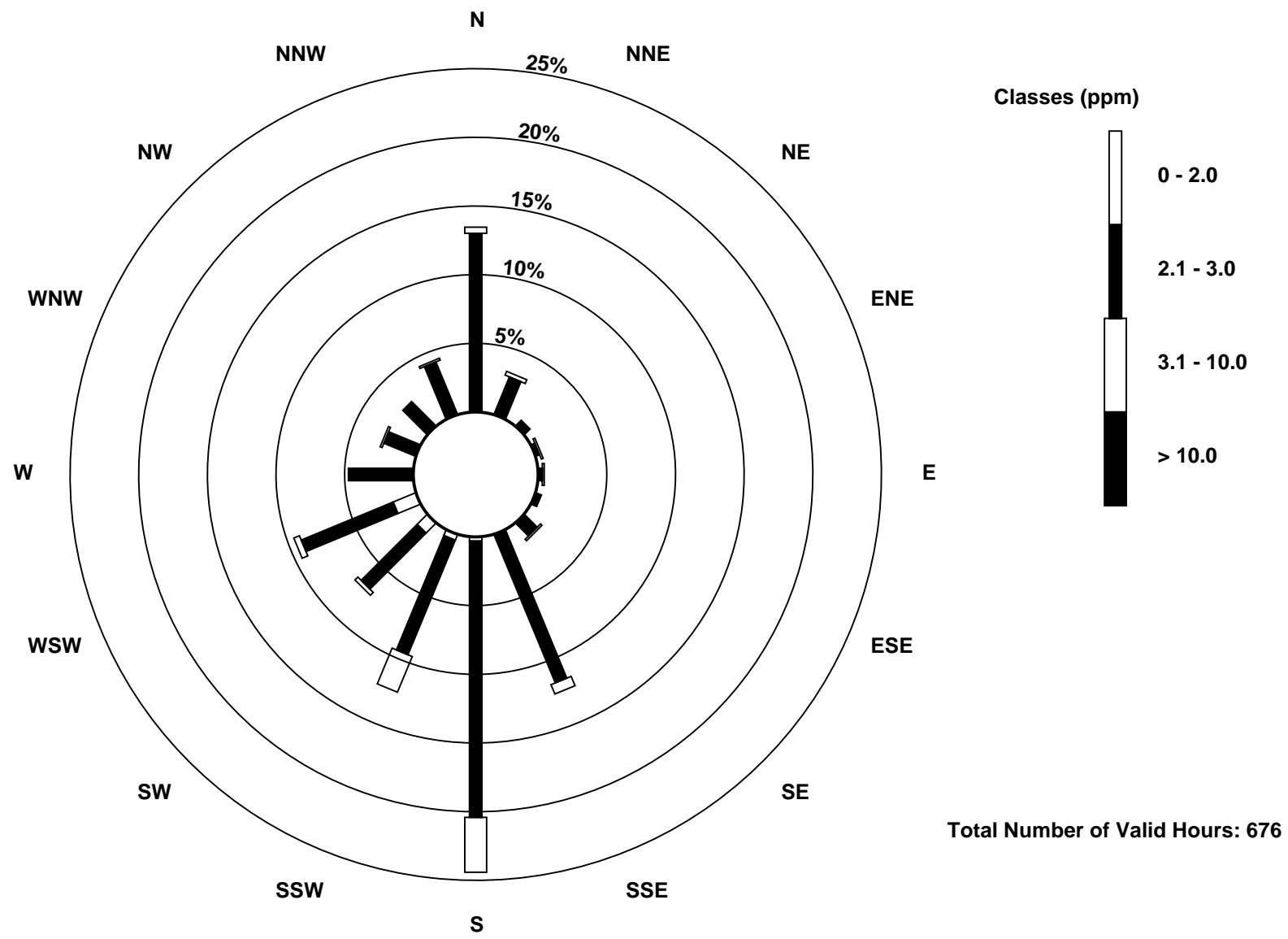
Total Number of Valid Hours: 676

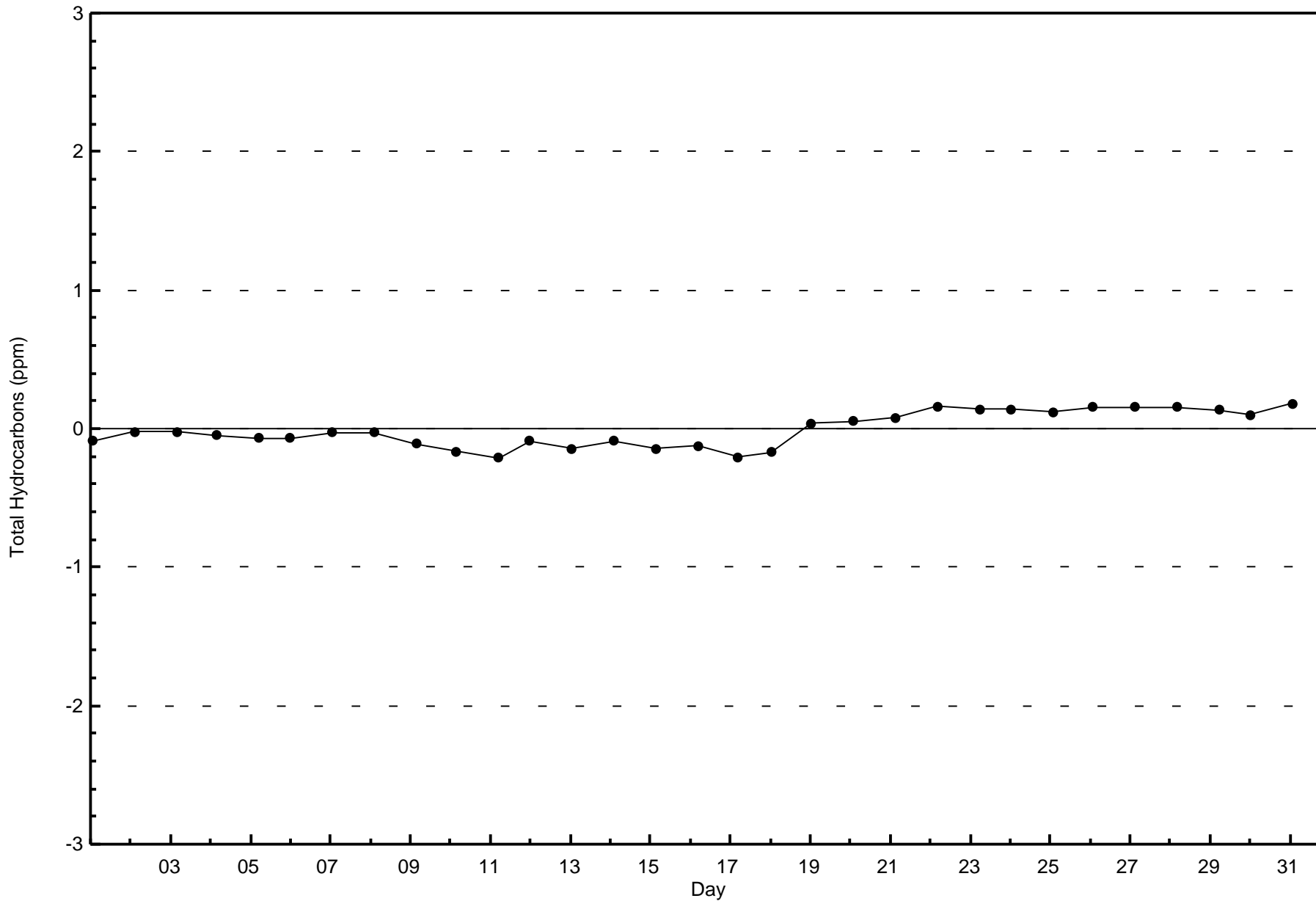
Total Number of Hours: 744

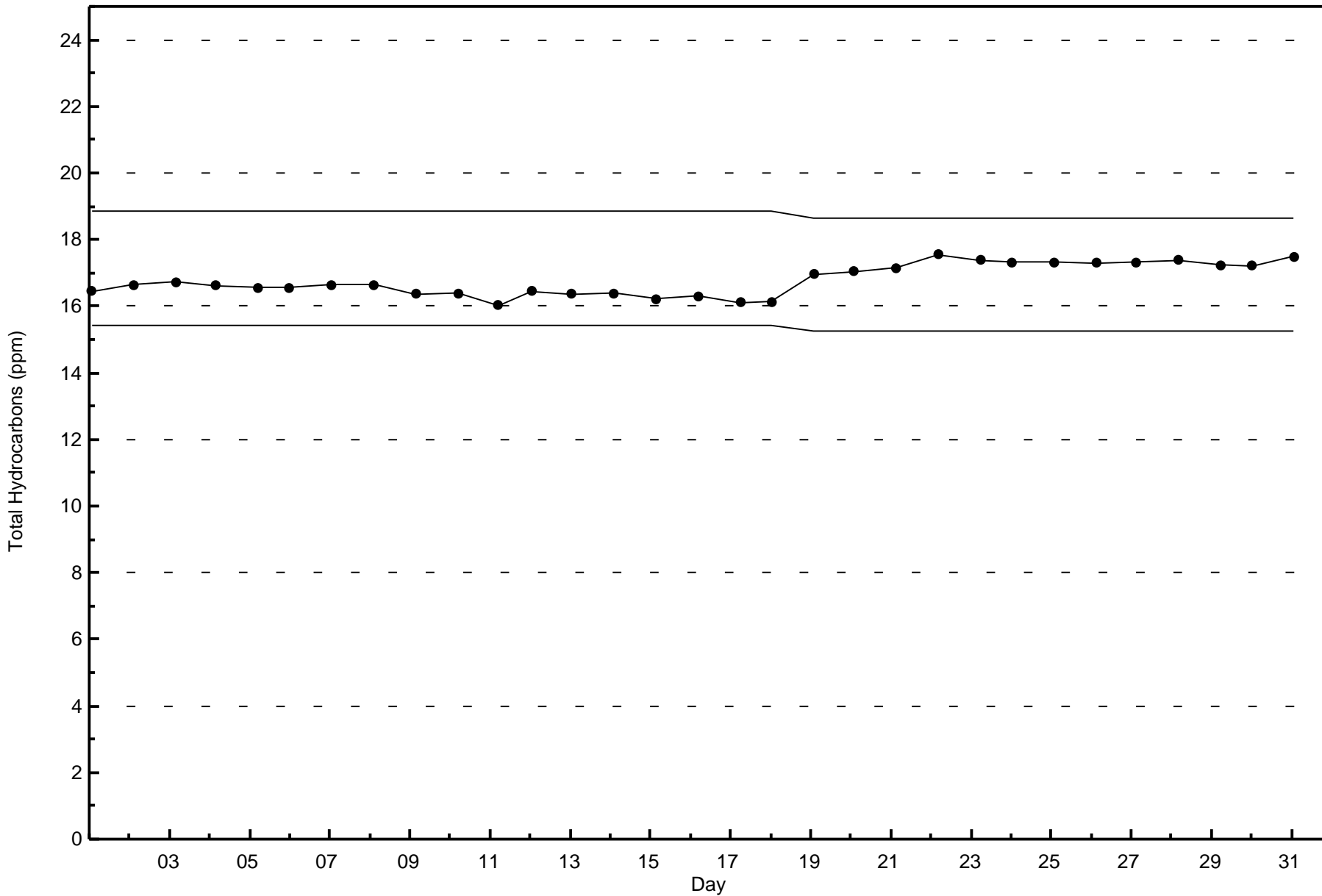


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Total Hydrocarbons (THC) - ppm
Fort McKay South (AMS 13)









Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

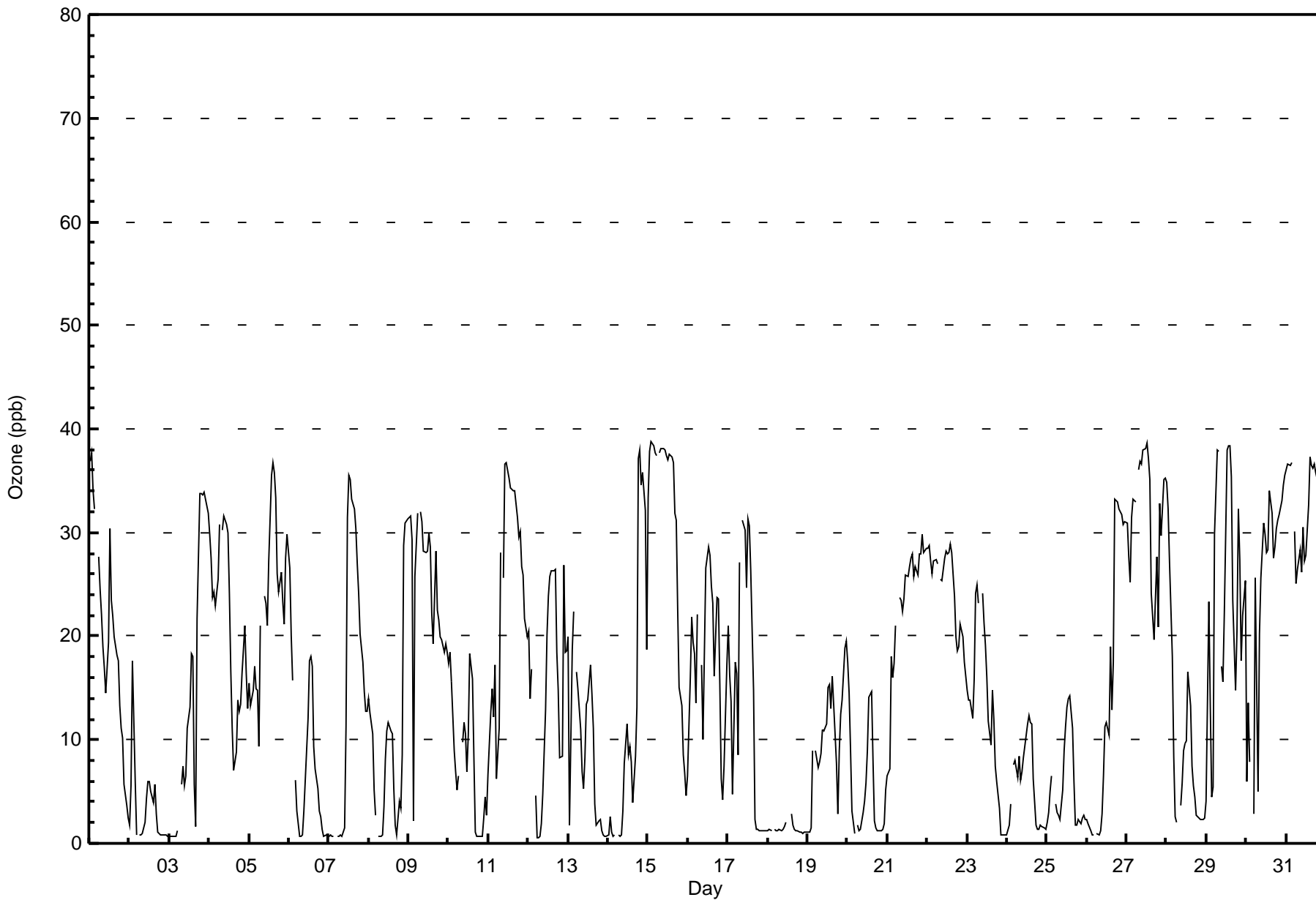
Fort McKay South - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																							
Maximum Value: 39 ppb on Jan 15 03:00										Maximum Daily Average: 32.5 ppb on Jan 31										Hours of Data: 711																													
Minimum Value: 0 ppb on Jan 12 07:00										Minimum Daily Average: 1.4 ppb on Jan 18										Hours of Missing Data: 33																													
Maximum Diurnal Average: 22.6 ppb at hour 14										Minimum Diurnal Average: 10.9 ppb at hour 7										Hours of Calibration: 33																													
Monthly Average: 16.0 ppb										Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 4 Median = 15 Q ₃ = 27 P ₉₀ = 33 P ₉₉ = 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-Jan	37	38	34	32	Z	28	25	22	19	17	15	19	30	23	22	20	18	18	13	11	10	6	4	2	20.1	38																							
2-Jan	2	6	18	6	1	Z	1	1	1	2	4	6	6	5	4	6	3	1	1	1	1	1	1	1	3.3	18																							
3-Jan	1	1	1	1	1	1	Z	6	7	6	7	11	13	18	18	6	2	22	34	34	34	34	33	32	13.9	34																							
4-Jan	30	28	24	24	23	26	31	Z	30	32	31	30	24	17	11	7	9	14	13	13	16	21	16	13	21.0	32																							
5-Jan	15	13	15	17	15	15	9	21	Z	24	23	21	27	36	37	36	33	26	24	26	23	21	28	30	23.3	37																							
6-Jan	27	20	16	Z	6	3	1	1	1	3	6	12	18	18	17	9	7	5	3	3	1	1	1	1	7.8	27																							
7-Jan	1	1	1	1	Z	1	1	1	1	1	11	31	36	35	33	32	30	27	24	20	17	15	13	13	15.0	36																							
8-Jan	14	13	11	5	3	Z	1	1	1	4	8	11	12	11	11	5	2	1	4	3	9	29	31	31	9.5	31																							
9-Jan	32	32	29	2	26	32	Z	32	31	28	28	28	30	29	22	19	28	23	22	20	20	18	19	18	24.7	32																							
10-Jan	17	18	16	9	7	5	6	Z	10	12	11	7	10	18	16	8	1	1	1	1	1	2	4	3	8.0	18																							
11-Jan	7	13	15	12	17	6	11	28	Z	26	37	37	35	34	34	34	34	31	30	30	27	26	22	20	24.6	37																							
12-Jan	21	14	17	Z	5	1	0	1	2	5	13	20	24	26	26	26	26	18	15	8	8	27	18	19	14.8	27																							
13-Jan	20	2	19	22	Z	16	15	11	7	5	8	13	14	17	14	11	4	2	2	2	1	1	1	1	9.1	22																							
14-Jan	1	3	1	1	1	Z	1	1	1	3	8	12	9	9	8	4	8	13	37	38	35	36	32	19	12.1	38																							
15-Jan	33	38	39	38	38	37	Z	38	38	38	38	38	37	37	38	37	37	32	31	23	15	13	9	7	5	30.2	39																						
16-Jan	6	16	22	19	18	14	22	Z	17	10	18	27	29	28	25	23	16	24	24	15	6	4	7	17	17.7	29																							
17-Jan	21	16	14	5	18	16	8	27	Z	31	30	25	31	31	26	15	2	1	1	1	1	1	1	1	14.2	31																							
18-Jan	1	1	1	Z	1	1	1	1	1	2	2	C	C	3	2	1	1	1	1	1	1	1	1	1	1.4	3																							
19-Jan	1	1	1	9	Z	9	7	8	9	11	11	12	15	15	13	16	13	8	3	9	12	14	19	20	10.3	20																							
20-Jan	17	15	9	3	1	Z	2	1	1	3	4	6	9	14	15	8	2	1	1	1	1	1	2	5	5.4	17																							
21-Jan	7	7	18	16	17	21	Z	24	23	22	24	26	26	27	28	28	26	27	26	28	28	30	28	29	23.2	30																							
22-Jan	28	29	27	26	27	27	27	Z	26	25	28	28	28	28	29	28	24	20	19	19	21	20	17	16	24.7	29																							
23-Jan	15	14	14	12	16	24	25	Z	24	21	19	16	12	10	15	12	7	6	3	1	1	1	1	1	12.7	25																							
24-Jan	1	2	4	Z	8	8	6	8	6	7	8	10	12	12	12	11	6	2	1	1	2	2	2	1	5.7	12																							
25-Jan	2	3	5	7	Z	4	3	3	2	5	9	11	13	14	14	11	6	2	2	2	2	3	3	2	5.5	14																							
26-Jan	2	2	1	1	1	Z	1	1	1	3	6	11	12	10	19	13	18	33	33	32	32	32	31	31	14.2	33																							
27-Jan	31	28	25	31	33	33	Z	36	37	37	38	38	39	37	35	24	20	24	28	21	33	30	35	35	31.6	39																							
28-Jan	35	32	27	18	8	3	2	Z	4	6	9	10	10	17	13	7	6	4	3	2	2	2	2	2	9.8	35																							
29-Jan	4	23	13	5	5	30	38	38	Z	17	16	22	38	38	38	35	23	15	20	32	27	18	22	25	23.7	38																							
30-Jan	6	14	8	Z	3	26	15	5	20	26	31	30	28	28	34	32	28	29	30	31	32	33	35	35	24.2	35																							
31-Jan	36	37	36	37	Z	30	25	26	28	26	31	27	28	33	37	36	36	37	36	35	34	33	33	30	32.5	37																							
																								15.2	15.4	15.5	13.8	11.9	16.0	10.9	14.0	12.5	14.8	17.2	19.4	21.9	22.6	21.3	18.3	15.4	15.1	15.4	14.9	14.6	15.1	15.1	14.8	Diurnal Average	
																								37	38	39	38	38	37	38	38	38	38	38	38	38	38	38	37	36	37	37	38	35	36	35	35	Diurnal Maximum	
Z - zerospan C - Calibration																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																																																	



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Fort McKay South - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Fort McKay South - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	449	63.15	63.15
21 - 50	262	36.85	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 711

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Ozone (O₃) - ppb
Fort McKay South - January 2017

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	32	8	1	3	1	1	10	70	150	58	28	21	10	9	8	11	421
21 - 50	58	16	2	0	1	2	1	12	19	23	20	41	22	9	11	19	256
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
Totals	90	24	3	3	2	3	11	82	169	81	48	62	32	18	19	30	677

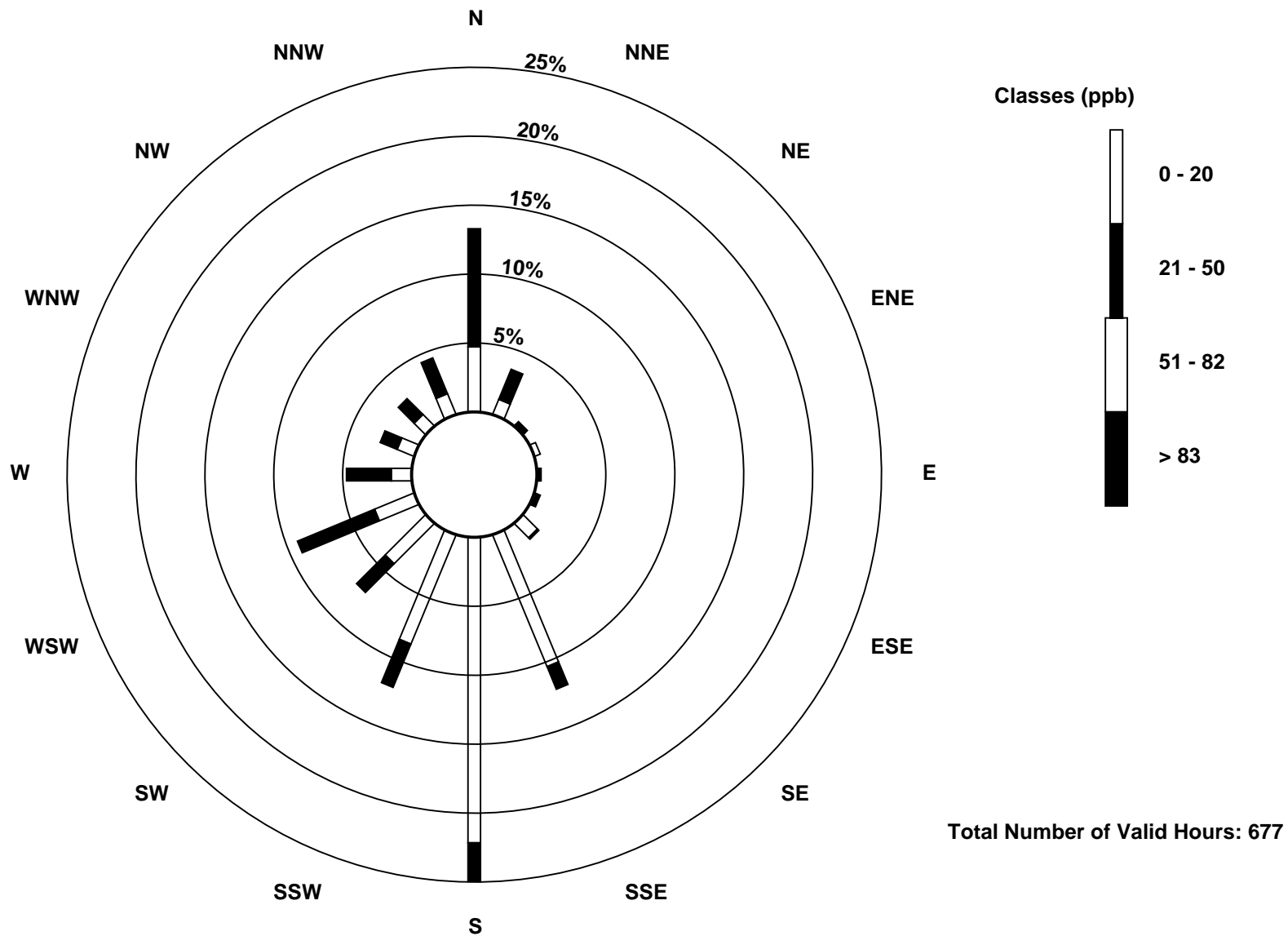
Total Number of Valid Hours: 677

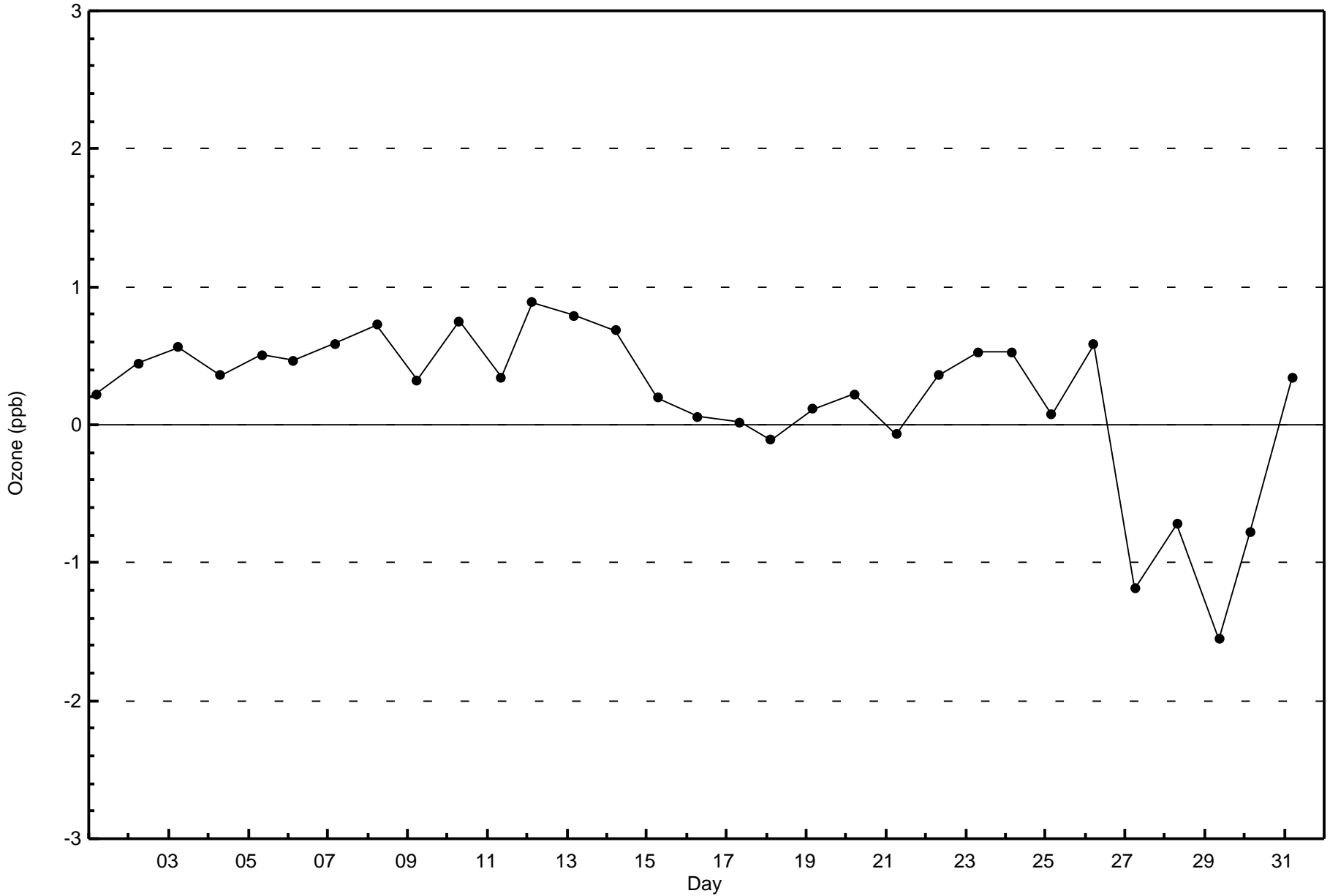
Total Number of Hours: 744

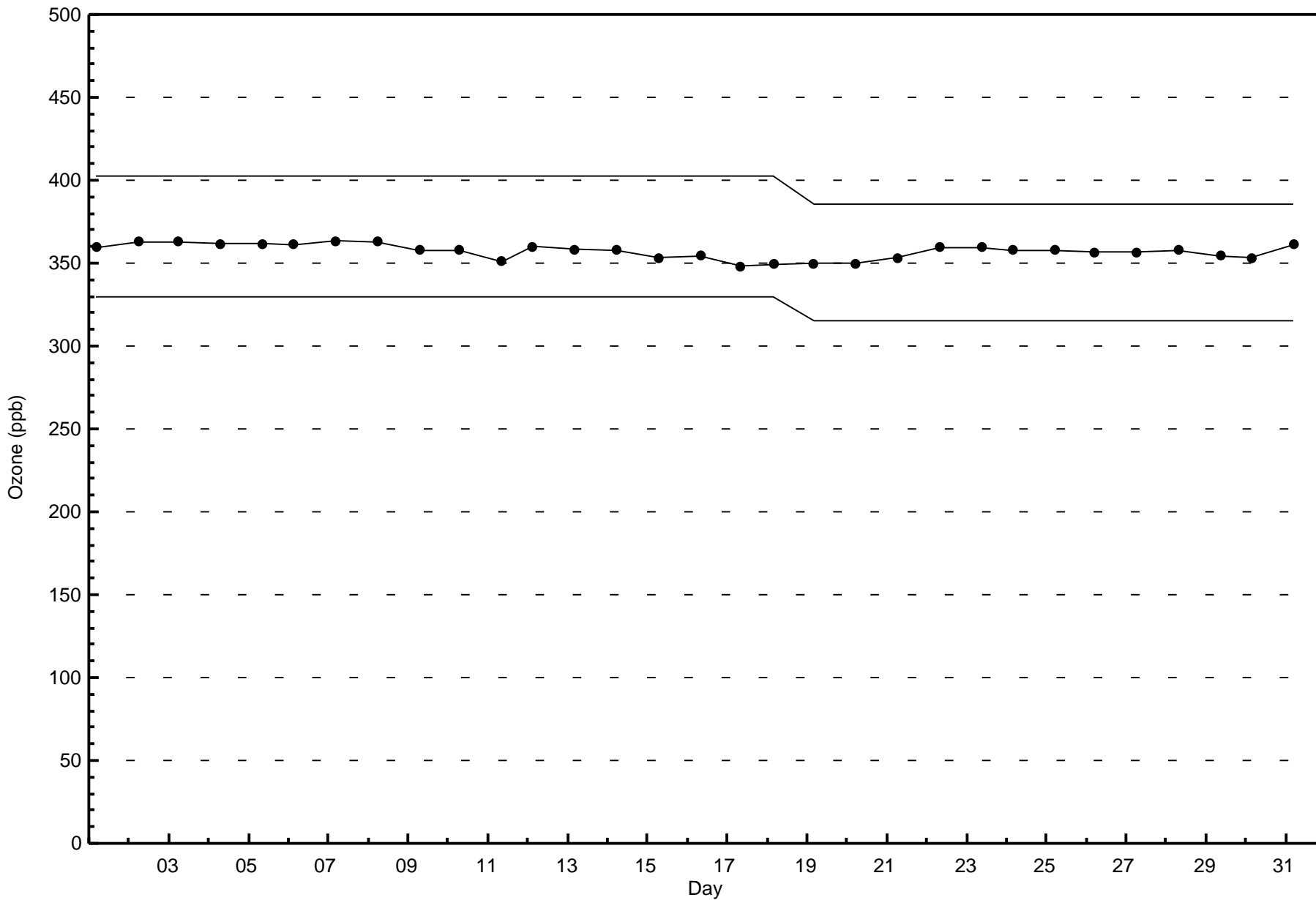


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Ozone (O₃) - ppb
Fort McKay South (AMS 13)

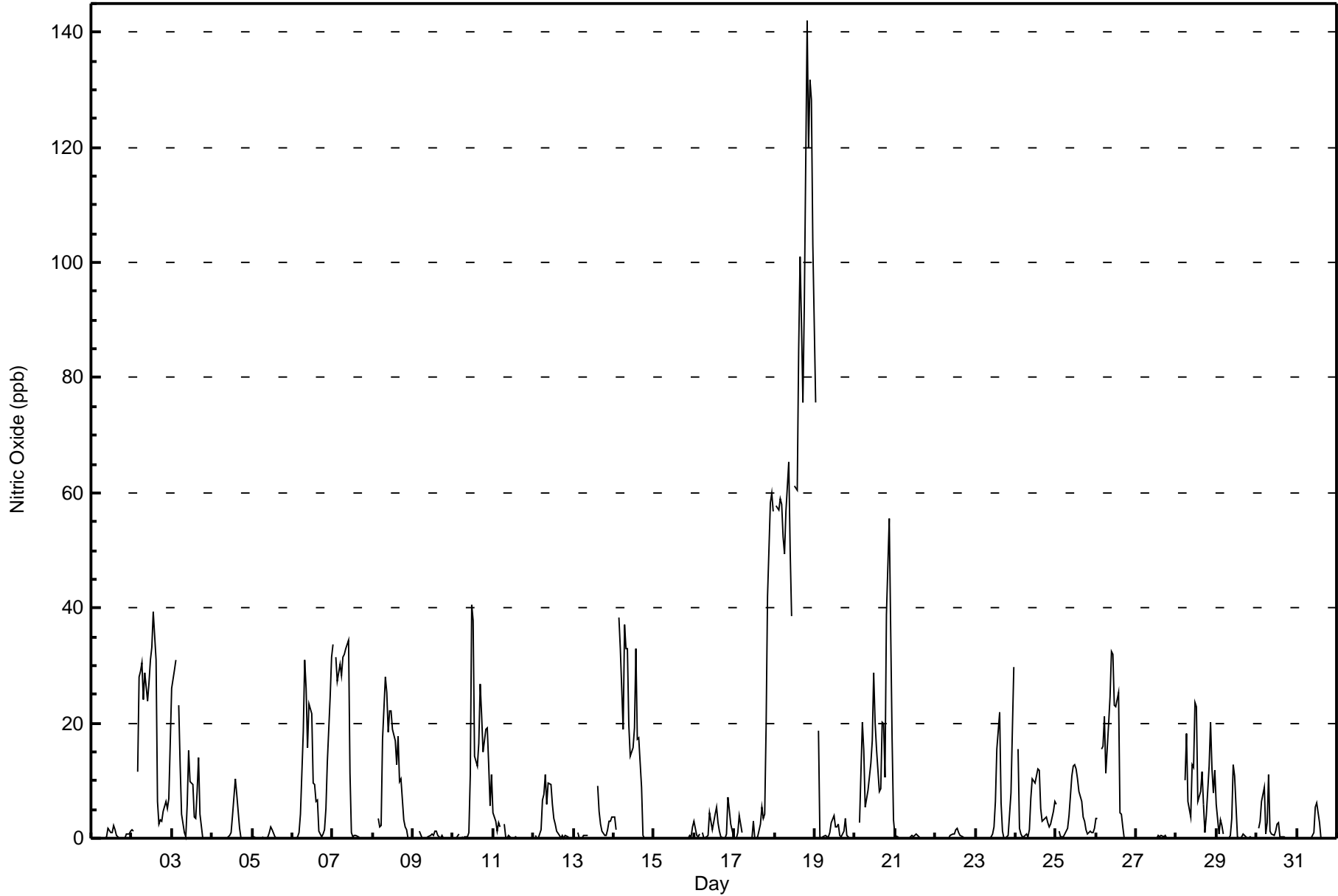








Maximum Value: 142 ppb on Jan 18 20:00 Maximum Daily Average: 78.8 ppb on Jan 18		Hours in Service: 744 Hours of Data: 707 Hours of Missing Data: 37 Hours of Calibration: 36 Percent Operational Time: 99.9																								
Minimum Value: 0 ppb on Jan 1 01:00 Maximum Diurnal Average: 10.4 ppb at hour 13 Monthly Average: 7.9 ppb		Minimum Daily Average: 0.1 ppb on Jan 27 Minimum Diurnal Average: 4.6 ppb at hour 2 Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 8 P ₉₀ = 24 P ₉₉ = 88																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	0	Z	0	0	0	0	0	0	0	0	2	1	1	2	1	0	0	0	0	0	0	1	1	1	0.5	2
2-Jan	1	1	Z	12	28	29	30	24	29	24	27	31	33	39	31	7	2	3	3	5	6	5	7	16	17.2	39
3-Jan	26	29	31	Z	23	13	4	1	0	6	15	10	9	4	3	8	14	4	0	0	0	0	0	8.8	31	
4-Jan	0	0	0	0	Z	0	0	0	0	0	1	1	4	7	10	8	2	0	0	0	0	0	0	1.4	10	
5-Jan	0	0	0	0	0	Z	0	0	0	0	1	2	2	0	0	0	0	0	0	0	0	0	0	0.3	2	
6-Jan	Z	0	0	0	1	4	19	31	26	16	23	22	10	9	6	7	1	0	1	1	5	13	25	31	11.0	31
7-Jan	34	Z	32	27	30	28	32	32	33	34	11	1	0	0	0	0	0	0	0	0	0	0	0	12.9	34	
8-Jan	0	0	Z	3	2	2	17	28	25	18	22	22	19	17	13	18	10	10	3	2	2	0	0	10.2	28	
9-Jan	0	0	0	Z	1	0	0	0	0	0	0	1	1	1	1	0	0	1	0	0	0	0	0	0.3	1	
10-Jan	0	0	0	1	Z	0	0	0	0	1	11	41	38	14	12	16	27	21	15	19	19	13	6	11	11.6	41
11-Jan	4	3	1	3	2	Z	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	4	
12-Jan	Z	0	0	0	2	7	8	11	6	10	9	6	3	2	1	0	0	0	0	1	0	0	0	2.9	11	
13-Jan	0	Z	1	0	0	0	0	0	1	C	C	C	C	C	9	5	2	1	1	0	1	3	3	4	1.8	9
14-Jan	4	1	Z	38	33	19	37	33	33	20	14	16	19	33	17	17	9	0	0	0	0	0	0	15.0	38	
15-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0.2	2	
16-Jan	3	0	0	1	Z	1	0	0	0	4	3	2	4	5	3	1	0	0	0	1	7	5	2	0	1.9	7
17-Jan	0	0	1	4	1	Z	0	0	0	0	0	3	0	0	0	2	5	4	4	19	42	58	60	57	11.4	60
18-Jan	Z	58	57	59	58	52	49	57	65	50	39	M	61	60	85	101	89	76	93	142	120	132	128	103	78.8	142
19-Jan	76	Z	19	0	0	0	0	0	0	1	3	4	2	2	2	1	0	1	4	0	0	0	0	0	5.0	76
20-Jan	0	0	Z	3	20	15	5	7	8	13	17	29	20	15	8	9	20	20	11	39	56	36	17	3	16.2	56
21-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.2	1
22-Jan	0	0	0	0	Z	0	0	0	0	0	1	1	1	2	1	1	0	0	0	0	0	0	0	0	0.3	2
23-Jan	0	0	0	0	0	Z	0	0	0	0	1	2	6	16	22	6	1	0	0	0	4	8	19	30	5.0	30
24-Jan	Z	15	2	1	0	0	1	0	1	7	10	10	11	12	12	5	3	3	4	3	2	2	5	6	5.0	15
25-Jan	6	Z	1	0	0	1	1	2	4	11	12	13	12	10	8	6	4	3	1	1	1	1	1	2	4.4	13
26-Jan	3	3	Z	15	16	21	11	20	25	32	32	23	23	25	4	4	2	0	0	0	0	0	0	0	11.4	32
27-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0.1	1
28-Jan	0	0	0	0	Z	10	18	6	4	13	12	24	23	6	8	12	6	1	4	13	20	12	8	12	9.2	24
29-Jan	6	1	3	2	1	Z	0	0	1	4	13	11	0	0	0	0	1	0	0	0	0	0	0	0	1.8	13
30-Jan	Z	2	3	6	9	1	3	11	1	1	1	1	2	3	0	0	0	0	0	0	0	0	0	0	1.9	11
31-Jan	0	Z	0	0	0	0	0	0	0	0	1	5	6	3	0	0	0	0	0	0	0	0	0	0	0.7	6
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																										





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Fort McKay South - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	621	87.84	87.84
21 - 40	58	8.20	96.04
41 - 80	19	2.69	98.73
81 - 159	9	1.27	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



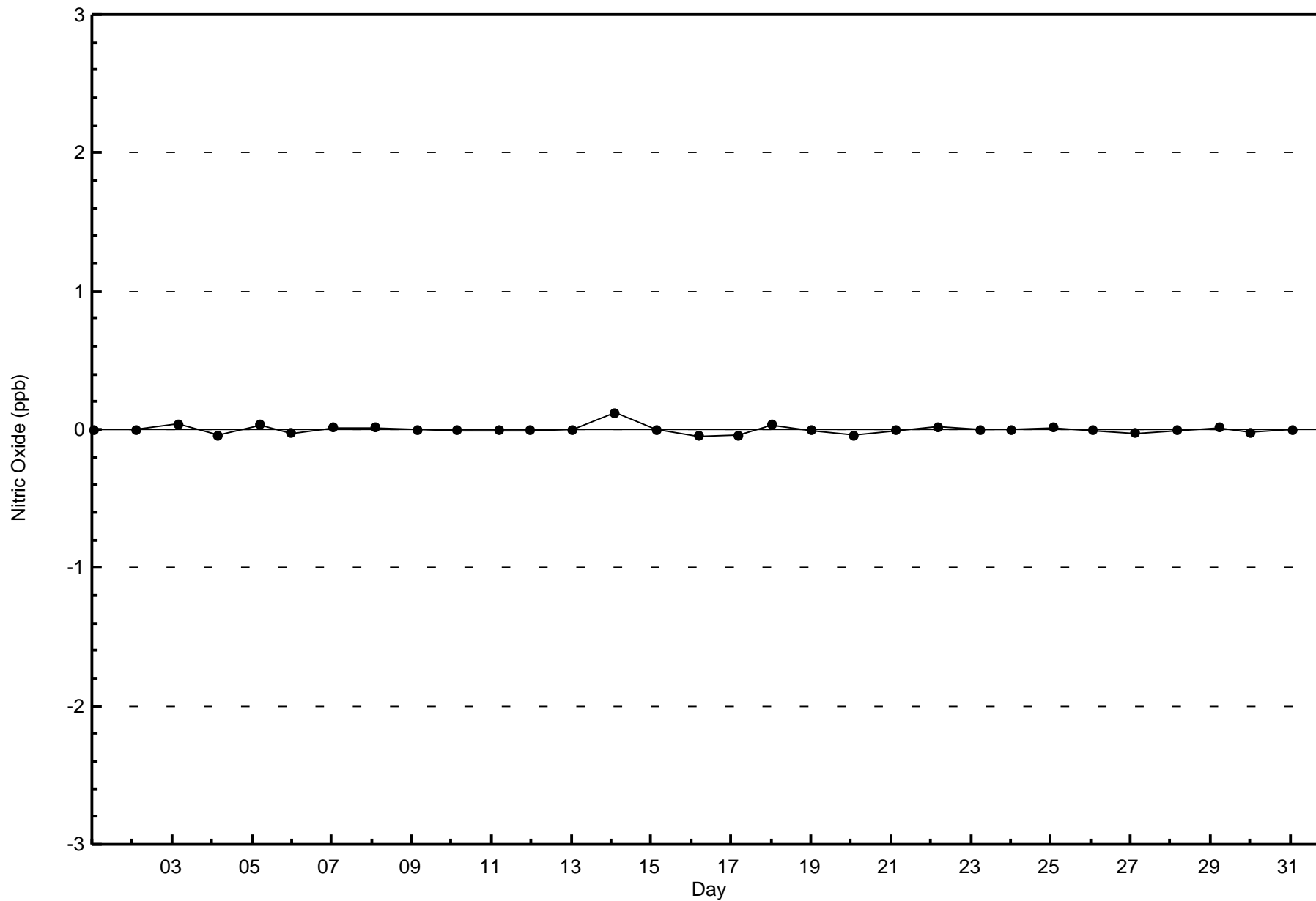
**Wood Buffalo Environmental Association
Frequency Distribution**

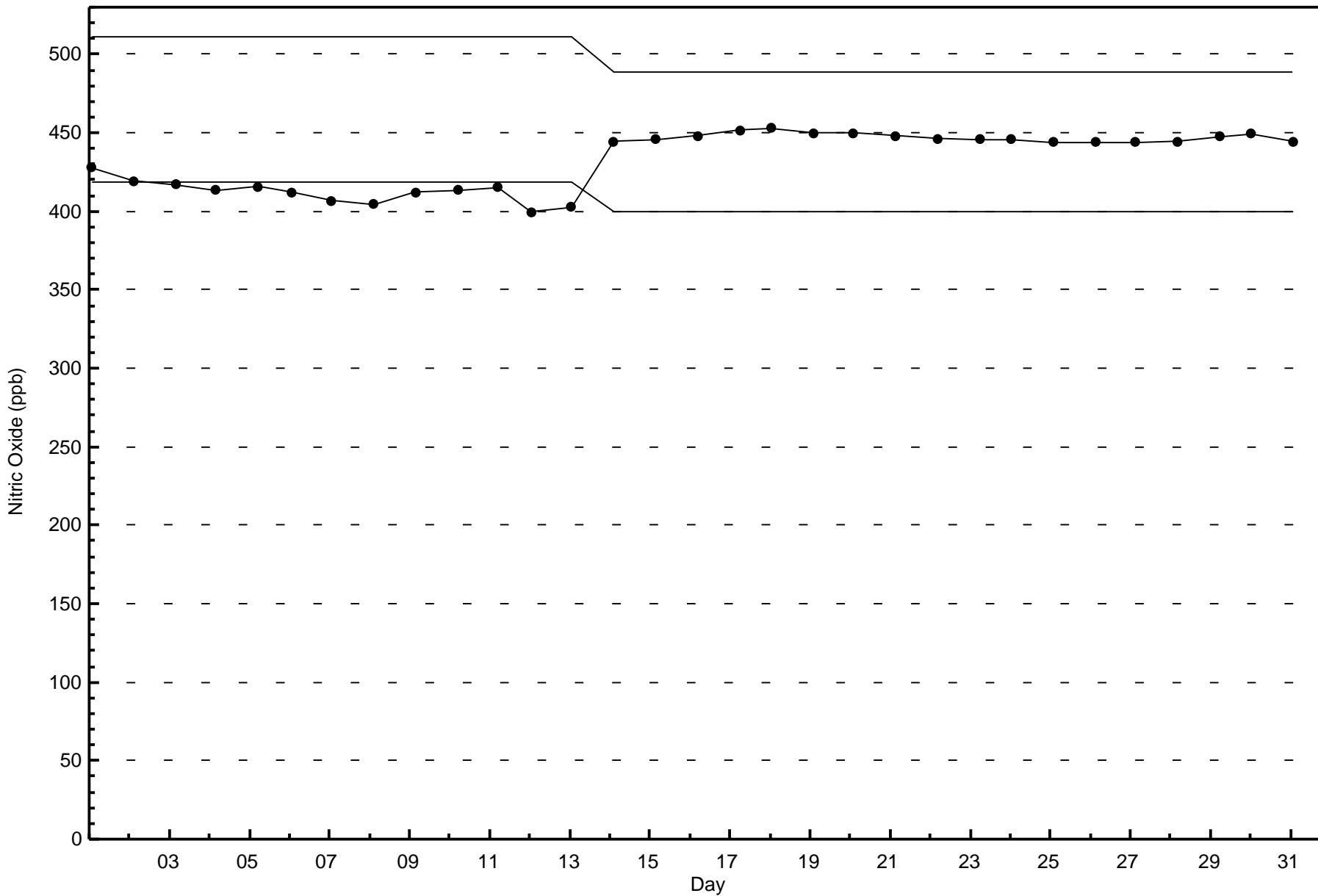
**Nitric Oxide (NO) - ppb
Fort McKay South - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	88	21	4	2	2	2	6	66	145	70	41	62	30	17	17	26	599
21 - 40	2	0	0	1	0	0	3	16	11	6	6	0	2	1	1	2	51
11 - 80	2	1	0	0	1	0	1	0	2	3	1	2	0	0	0	1	14
81 - 159	0	0	0	0	0	0	0	0	5	4	0	0	0	0	0	0	9
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	92	22	4	3	3	2	10	82	163	83	48	64	32	18	18	29	673

Total Number of Valid Hours: 673

Total Number of Hours: 744







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Fort McKay South - January 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 36 ppb on Jan 16 21:00	Maximum Daily Average: 22.4 ppb on Jan 2		Hours of Data:	707
Minimum Value: 0 ppb on Jan 31 01:00	Minimum Daily Average: 2.0 ppb on Jan 27		Hours of Missing Data:	37
Maximum Diurnal Average: 13.4 ppb at hour 17	Minimum Diurnal Average: 8.9 ppb at hour 2		Hours of Calibration:	36
Monthly Average: 11.1 ppb	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 3 Median = 10 Q ₃ = 18 P ₉₀ = 22 P ₉₉ = 31		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-Jan	1	Z	3	3	5	6	6	4	2	2	5	2	4	7	6	6	3	3	4	4	6	12	16	17	5.5	17
2-Jan	17	15	Z	18	24	24	25	22	25	25	24	24	25	26	26	22	24	24	21	23	23	21	20	19	22.4	26
3-Jan	18	17	18	Z	21	20	15	14	11	14	20	17	16	10	11	23	28	11	1	1	0	0	0	1	12.4	28
4-Jan	1	1	2	2	Z	4	3	3	3	3	5	5	11	17	21	24	21	16	14	13	13	10	14	13	9.4	24
5-Jan	9	14	13	11	13	Z	21	11	9	7	7	10	6	1	1	2	4	6	3	2	2	2	3	4	6.9	21
6-Jan	Z	3	5	12	15	18	22	24	24	20	18	20	16	16	15	21	22	17	18	20	22	22	21	21	17.8	24
7-Jan	21	Z	19	18	19	19	20	21	21	20	16	4	2	2	3	4	5	8	9	8	8	7	8	7	11.7	21
8-Jan	6	7	Z	16	17	18	22	25	24	22	21	21	21	21	21	27	26	26	22	20	16	4	2	1	17.6	27
9-Jan	1	1	2	Z	7	1	1	1	1	3	3	3	3	5	5	4	1	5	2	1	1	1	1	1	2.1	7
10-Jan	1	1	4	9	Z	15	14	12	9	5	8	20	22	18	21	28	35	32	28	27	25	24	26	33	18.0	35
11-Jan	28	22	19	23	17	Z	23	6	10	8	2	1	1	1	1	1	1	3	2	1	1	1	1	1	7.5	28
12-Jan	Z	10	3	5	14	19	21	23	25	21	15	11	8	7	6	6	6	13	14	18	16	6	10	10	12.5	25
13-Jan	10	Z	10	4	4	4	6	11	18	C	C	C	C	C	20	21	25	25	22	18	20	21	22	24	15.8	25
14-Jan	23	19	Z	30	27	27	25	23	23	20	19	20	26	26	22	23	22	12	2	1	1	1	2	19	18.0	30
15-Jan	3	1	1	Z	1	1	1	0	0	1	0	0	0	0	0	1	3	5	7	7	8	18	20	26	4.5	26
16-Jan	26	21	15	17	Z	20	12	19	14	23	21	15	13	15	14	14	13	11	17	26	36	35	22	9	18.6	36
17-Jan	8	6	19	31	18	Z	3	1	1	1	1	7	1	1	2	9	15	11	9	9	10	8	7	8	8.1	31
18-Jan	Z	4	4	5	5	4	4	4	5	9	11	M	18	18	27	24	16	10	8	12	11	8	9	10	10.2	27
19-Jan	10	Z	14	8	10	12	13	13	12	9	10	11	8	8	12	8	10	17	22	15	11	8	3	2	10.6	22
20-Jan	3	4	Z	13	16	15	14	17	15	12	9	14	14	21	16	16	19	15	12	13	13	20	18	13	13.8	21
21-Jan	12	13	6	Z	7	4	3	3	4	5	4	3	4	4	4	3	5	3	4	2	3	1	3	2	4.4	13
22-Jan	2	2	4	4	Z	3	3	4	5	5	3	3	4	4	4	4	5	4	5	4	4	3	3	3	3.7	5
23-Jan	3	3	3	3	3	Z	2	4	5	3	5	8	12	18	22	15	14	13	12	14	17	19	21	19	10.3	22
24-Jan	Z	20	20	18	15	15	17	14	17	16	15	13	12	13	13	12	16	19	17	15	14	15	17	15	15.6	20
25-Jan	16	Z	11	9	10	12	13	15	16	15	12	11	12	12	13	16	20	23	18	15	15	16	17	18	14.4	23
26-Jan	20	19	Z	19	18	19	21	22	20	17	21	20	19	23	12	16	12	1	1	1	1	1	1	1	13.2	23
27-Jan	1	2	4	Z	1	1	1	1	1	1	1	1	0	1	1	4	3	8	5	5	1	5	1	1	2.0	8
28-Jan	1	2	4	3	Z	20	27	23	17	19	14	21	24	19	21	28	24	21	16	16	15	14	14	16	16.4	28
29-Jan	19	7	17	23	14	Z	0	1	13	12	20	17	1	1	1	2	13	14	3	1	3	5	3	2	8.2	23
30-Jan	Z	10	29	29	23	12	22	35	17	9	5	5	7	7	2	4	7	7	4	3	2	1	0	0	10.4	35
31-Jan	0	Z	2	2	4	4	3	1	1	2	3	9	11	6	0	1	0	0	0	0	0	1	1	1	2.2	11

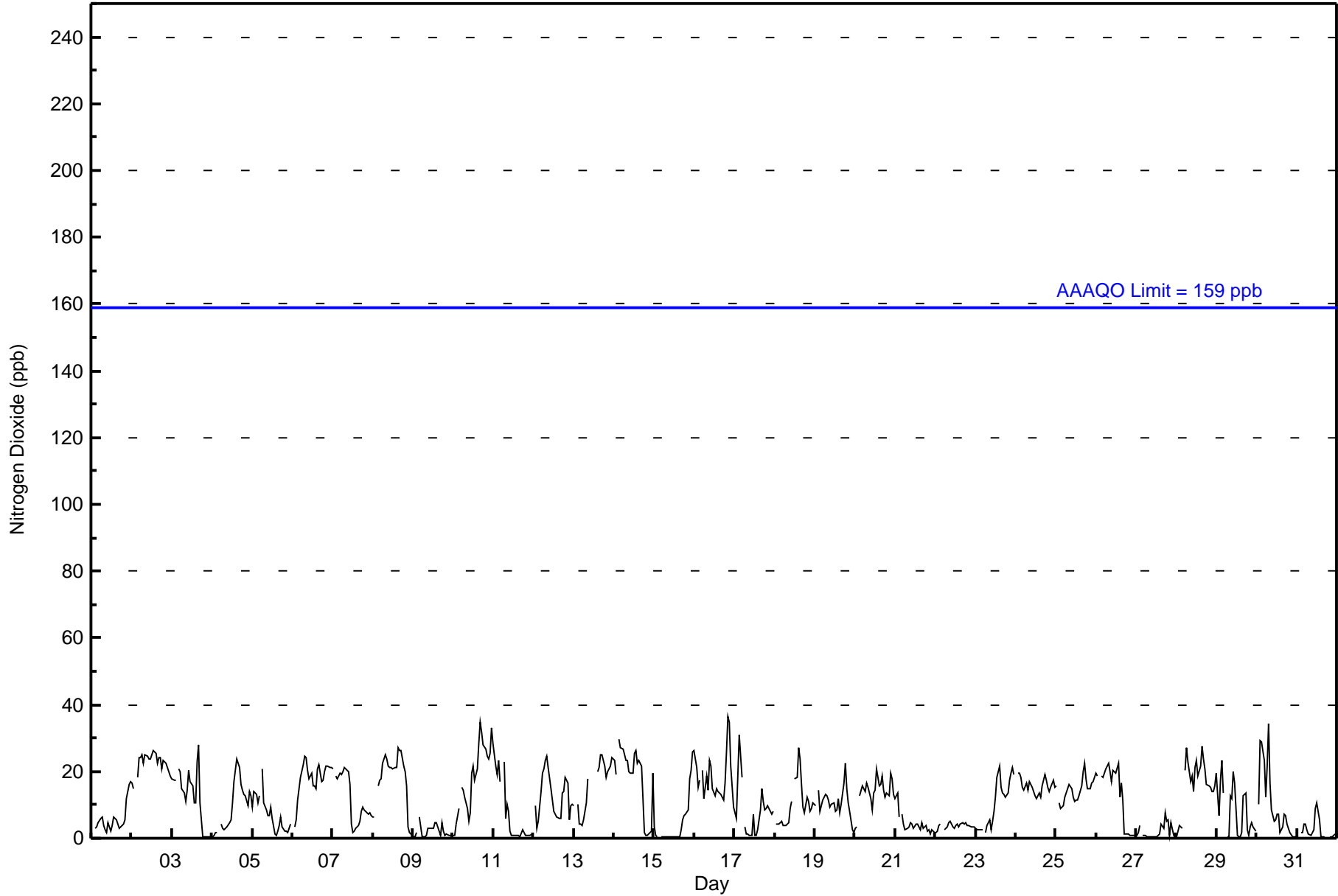
9.9	8.9	9.6	12.8	12.5	12.2	12.3	12.1	11.8	10.9	10.6	10.8	10.6	10.9	11.0	12.4	13.4	12.3	10.3	10.2	10.2	9.9	9.8	10.2	Diurnal Average
28	22	29	31	27	27	27	35	25	25	24	24	26	26	27	28	35	32	28	27	36	35	26	33	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	584	82.60	82.60
21 - 40	123	17.40	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	91	21	4	2	2	2	6	55	112	65	40	62	31	16	18	27	554
21 - 40	1	1	0	1	1	0	4	27	51	18	8	2	1	2	0	2	119
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
Totals	92	22	4	3	3	2	10	82	163	83	48	64	32	18	18	29	673

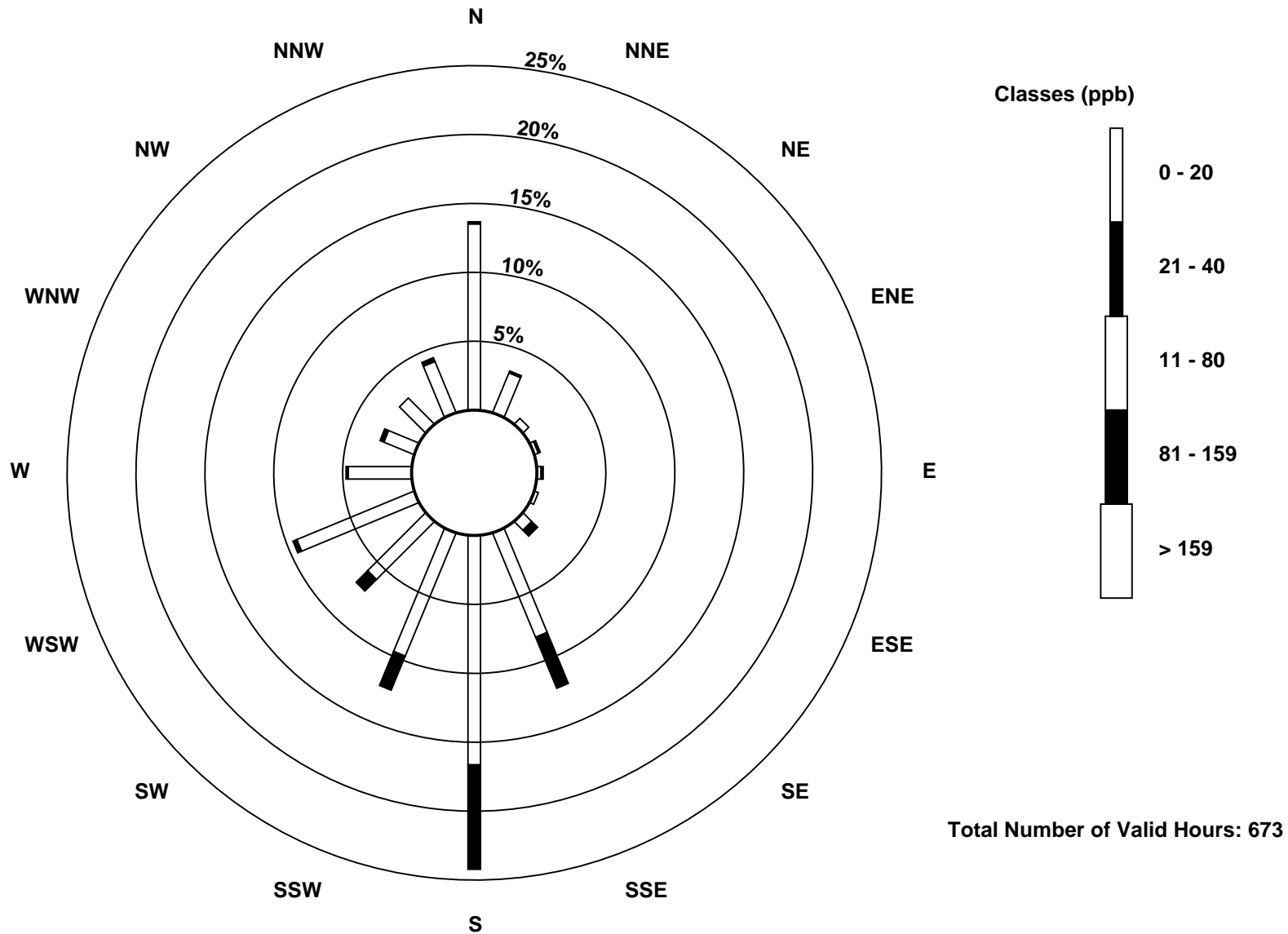
Total Number of Valid Hours: 673

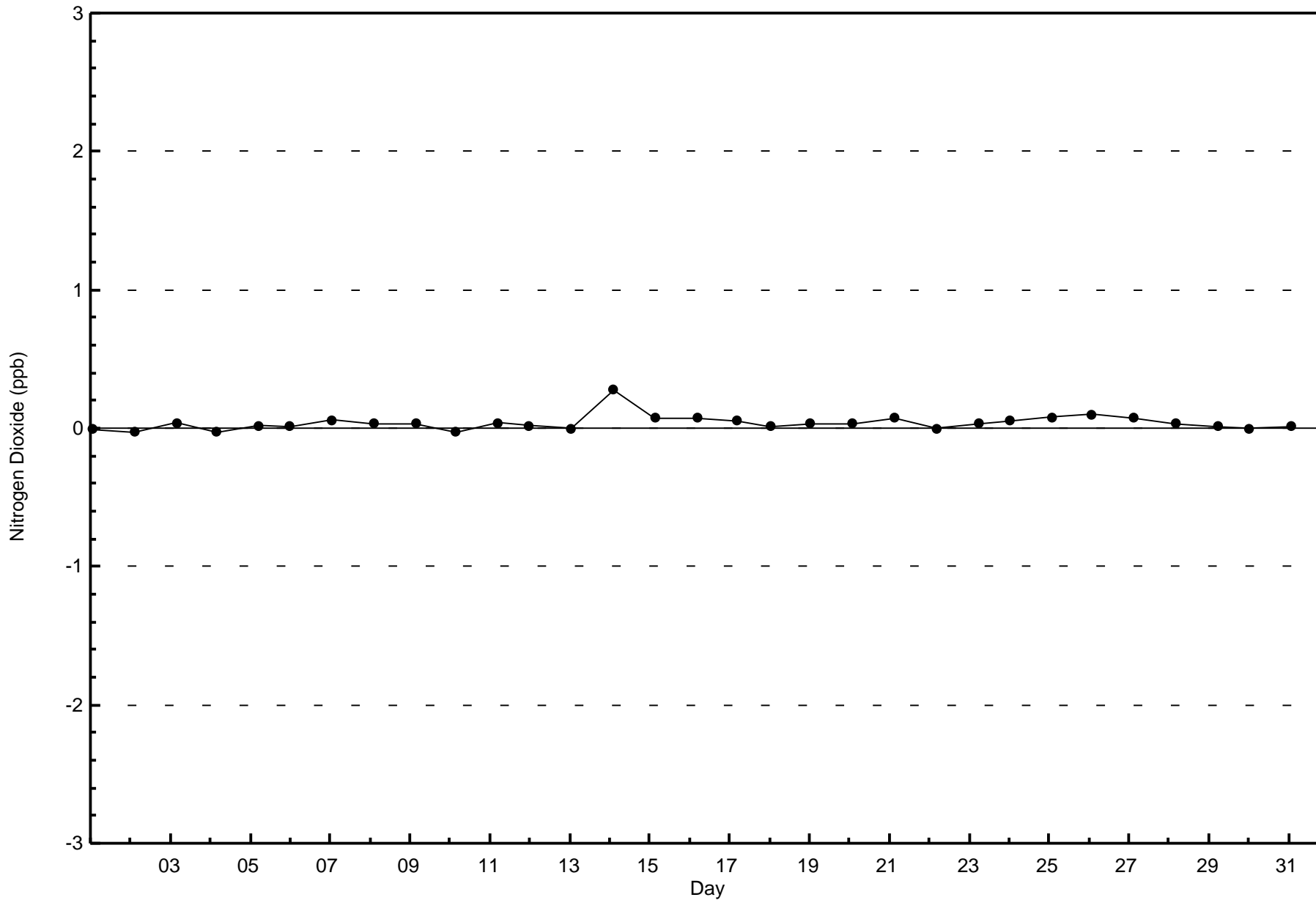
Total Number of Hours: 744

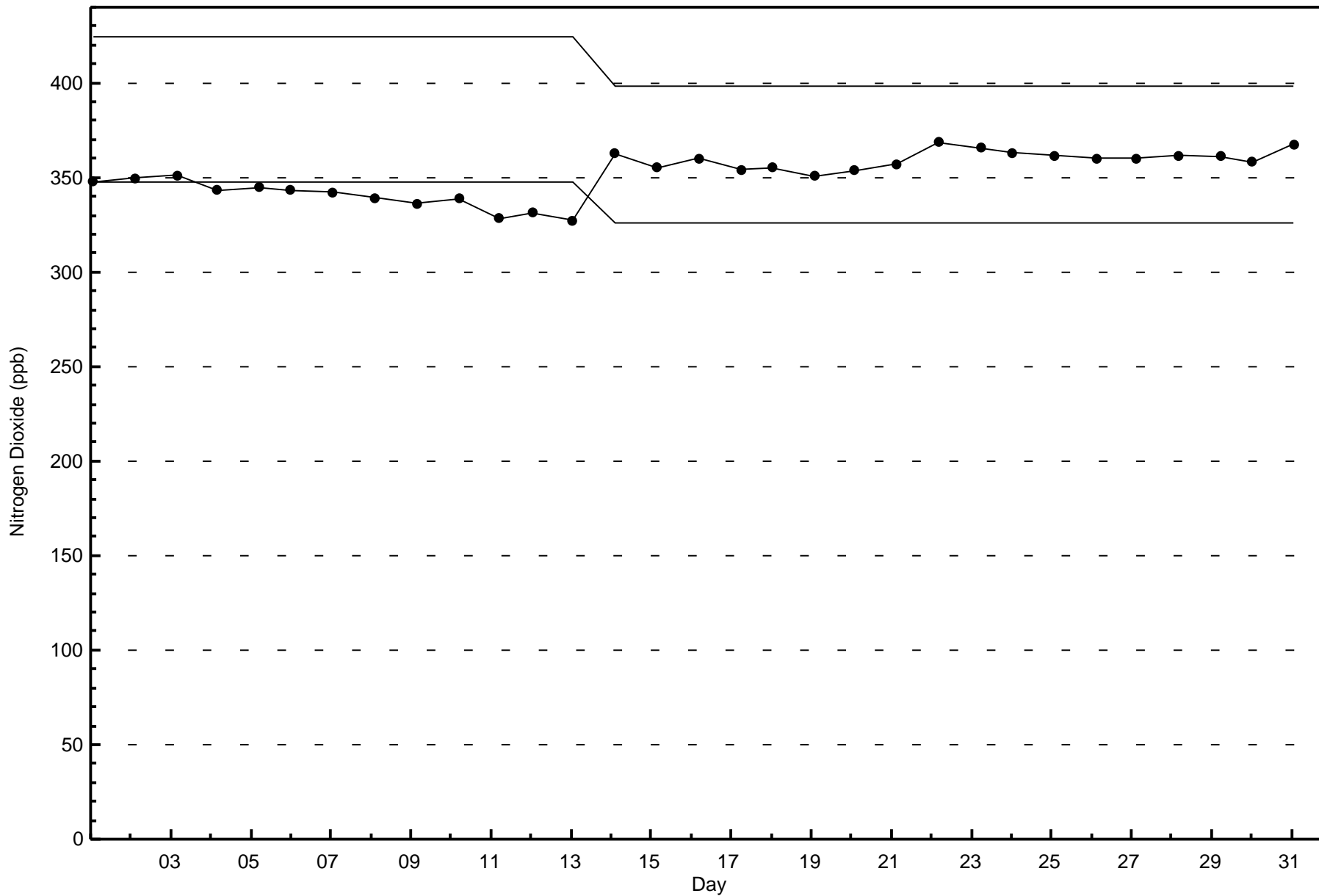


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South (AMS 13)





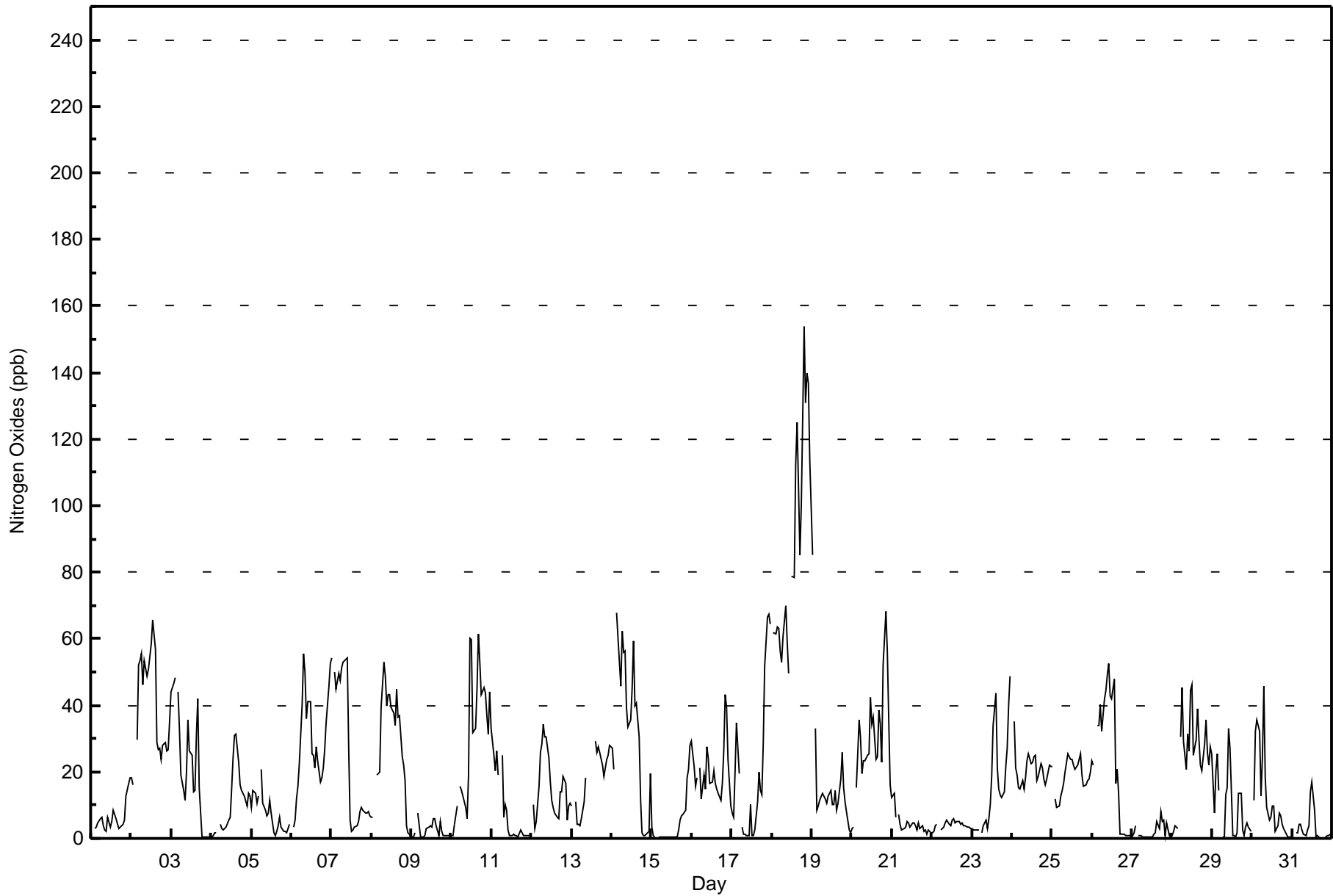




Wood Buffalo Environmental Association
Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - January 2017

Maximum Value: 154 ppb on Jan 18 20:00		Maximum Daily Average: 89.1 ppb on Jan 18		Hours in Service: 744																																													
Minimum Value: 0 ppb on Jan 31 20:00		Minimum Daily Average: 2.1 ppb on Jan 27		Hours of Data: 707																																													
Maximum Diurnal Average: 21.3 ppb at hour 5		Minimum Diurnal Average: 13.5 ppb at hour 2		Hours of Missing Data: 37																																													
Monthly Average: 19.0 ppb		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 3 Median = 13 Q ₃ = 27 P ₉₀ = 46 P ₉₉ = 111		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-Jan	1	Z	3	3	4	6	6	4	2	2	6	3	5	9	7	6	3	3	4	4	6	13	16	18	5.9	18																							
2-Jan	18	16	Z	30	52	53	56	46	54	49	51	55	58	66	57	29	27	27	24	28	29	26	27	35	39.6	66																							
3-Jan	44	47	48	Z	44	33	19	14	11	20	35	26	25	14	14	31	42	15	1	0	0	0	0	1	21.2	48																							
4-Jan	1	1	2	2	Z	4	3	3	3	3	5	6	15	24	31	32	23	16	14	13	13	10	14	13	10.9	32																							
5-Jan	9	14	13	11	13	Z	21	11	9	7	8	12	8	2	1	2	4	6	3	2	2	2	3	4	7.2	21																							
6-Jan	Z	3	5	12	16	22	40	56	50	36	41	41	25	25	21	28	23	17	18	21	27	35	46	53	28.8	56																							
7-Jan	54	Z	50	45	49	47	51	53	54	54	28	5	2	3	3	4	5	8	9	8	7	7	8	7	24.5	54																							
8-Jan	6	7	Z	19	19	20	39	53	49	40	43	43	40	38	34	45	36	37	25	22	17	4	2	1	27.7	53																							
9-Jan	1	1	2	Z	8	1	1	1	1	3	3	4	4	6	6	4	1	5	2	1	1	1	1	1	2.4	8																							
10-Jan	1	1	4	10	Z	16	15	13	9	6	19	60	60	32	33	45	61	53	43	45	44	37	31	44	29.6	61																							
11-Jan	33	25	20	26	19	Z	25	6	10	8	2	1	1	1	1	1	1	2	2	1	1	1	1	1	8.2	33																							
12-Jan	Z	10	3	5	16	26	29	34	31	30	24	17	12	9	8	6	6	14	14	19	17	6	10	10	15.4	34																							
13-Jan	10	Z	11	4	4	4	6	11	18	C	C	C	C	C	29	26	27	26	22	19	21	24	25	28	17.5	29																							
14-Jan	27	21	Z	68	60	46	62	56	56	40	34	35	45	59	40	41	31	12	2	1	1	1	2	20	33.0	68																							
15-Jan	3	1	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	2	5	7	7	8	18	21	28	4.7	28																							
16-Jan	29	22	16	18	Z	21	12	19	15	28	24	16	17	20	17	15	14	11	17	26	43	39	24	10	20.6	43																							
17-Jan	8	6	20	35	19	Z	3	1	1	1	1	10	1	1	3	11	20	14	13	28	52	66	67	65	19.4	67																							
18-Jan	Z	62	61	64	63	56	53	61	70	59	49	M	79	78	112	125	105	85	101	154	131	140	137	114	89.1	154																							
19-Jan	85	Z	33	8	10	12	13	13	12	10	13	15	10	10	14	8	11	18	26	15	11	8	2	2	15.6	85																							
20-Jan	3	3	Z	15	36	30	19	23	23	25	25	42	34	36	24	24	39	34	23	52	68	56	35	16	30.0	68																							
21-Jan	12	14	6	Z	7	4	3	3	4	5	5	3	5	5	4	3	5	3	4	2	3	1	2	2	4.5	14																							
22-Jan	2	2	4	4	Z	3	3	4	5	6	4	4	5	6	5	5	5	4	5	4	4	3	3	3	4.0	6																							
23-Jan	3	3	3	3	3	Z	2	4	5	3	6	10	19	34	44	21	15	13	12	14	21	27	40	49	15.3	49																							
24-Jan	Z	35	21	19	15	15	17	15	18	23	25	22	23	25	25	17	19	23	21	18	16	18	22	22	20.6	35																							
25-Jan	22	Z	12	9	10	13	15	16	20	25	25	24	24	22	21	22	24	25	19	16	16	17	18	20	18.8	25																							
26-Jan	23	22	Z	34	34	40	32	42	44	49	52	43	42	48	16	21	13	1	1	1	1	1	1	1	24.6	52																							
27-Jan	1	2	4	Z	1	1	1	1	1	1	1	1	1	1	2	5	3	8	5	5	1	5	1	1	2.1	8																							
28-Jan	1	2	4	3	Z	30	45	29	21	31	26	44	46	25	30	39	29	22	20	28	35	26	22	28	25.5	46																							
29-Jan	25	7	20	25	14	Z	0	1	13	15	33	27	1	1	1	2	14	14	3	1	3	5	3	2	10.0	33																							
30-Jan	Z	12	32	35	32	13	24	46	18	9	6	7	10	10	2	4	8	7	4	3	2	1	0	0	12.3	46																							
31-Jan	0	Z	2	2	4	4	3	1	1	2	4	14	17	8	0	1	0	0	0	0	0	1	1	1	2.9	17																							
																								16.2	13.5	15.4	19.6	21.3	20.0	20.0	20.6	20.3	19.7	20.0	20.4	21.0	20.6	19.4	20.0	19.8	17.1	15.0	18.1	19.4	19.3	18.9	19.2	Diurnal Average	
																								85	62	61	68	63	56	62	61	70	59	52	60	79	78	112	125	105	85	101	154	131	140	137	114	Diurnal Maximum	
Z - zerospan		C - Calibration				M - Maintenance																																											





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Fort McKay South - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	452	63.93	63.93
21 - 40	156	22.07	86.00
41 - 80	88	12.45	98.44
81 - 159	11	1.56	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



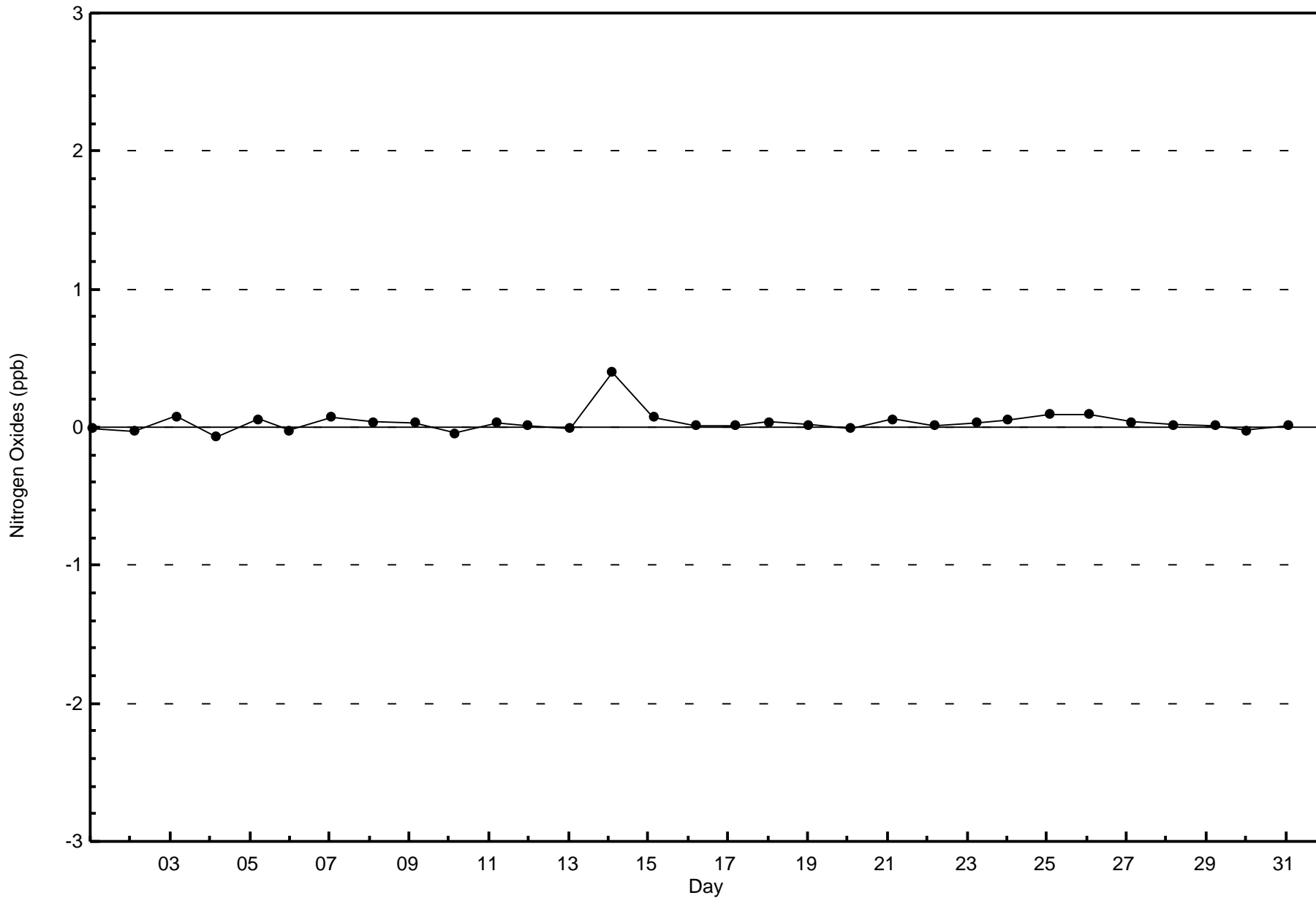
**Wood Buffalo Environmental Association
Frequency Distribution**

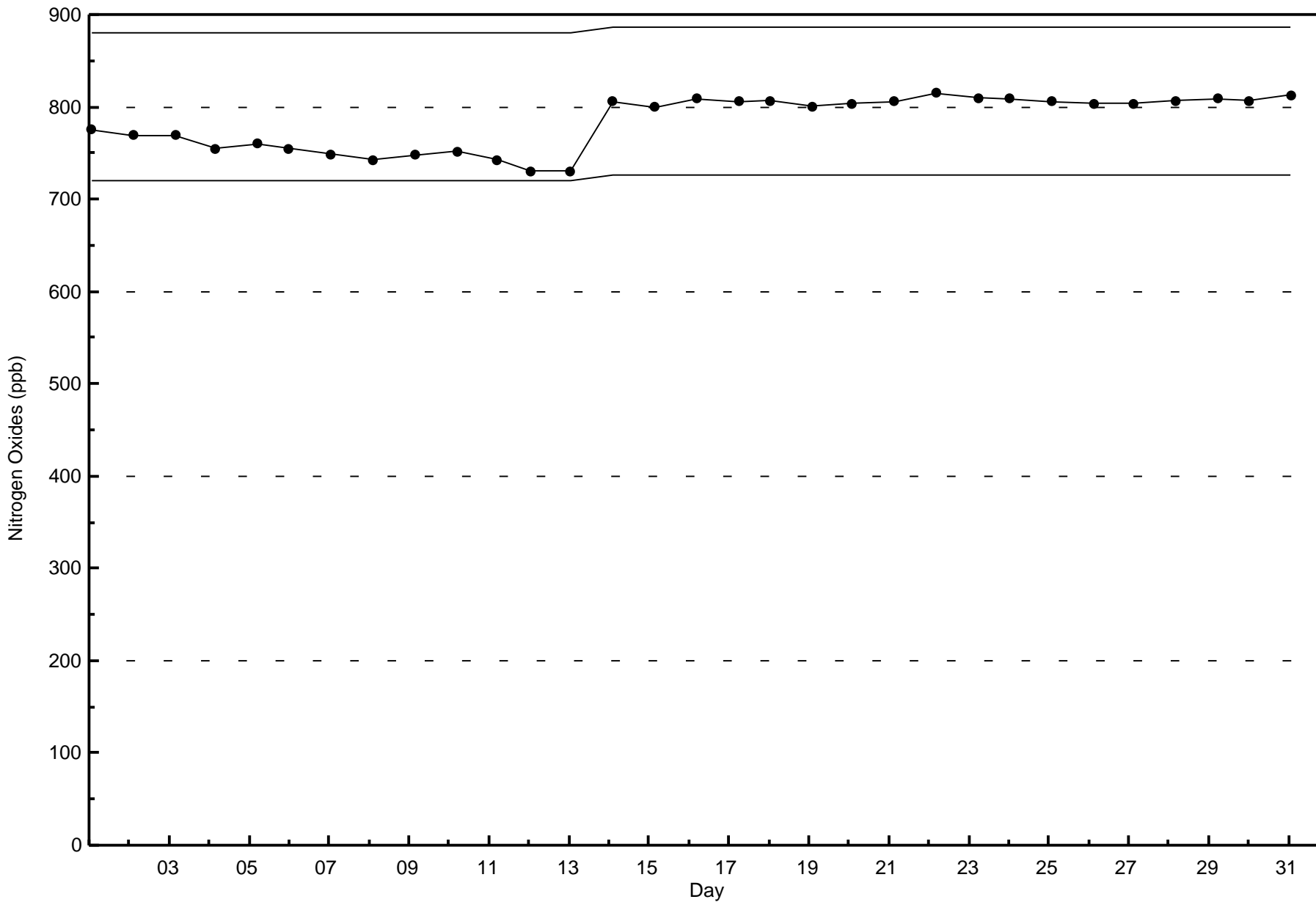
**Nitrogen Oxides (NO_x) - ppb
Fort McKay South - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	85	19	4	1	1	2	3	27	68	44	32	60	30	15	17	26	434
21 - 40	3	2	0	1	1	0	3	35	73	22	9	1	0	2	0	0	152
11 - 80	4	0	0	1	1	0	4	20	17	12	7	3	2	1	1	3	76
81 - 159	0	1	0	0	0	0	0	0	5	5	0	0	0	0	0	0	11
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	92	22	4	3	3	2	10	82	163	83	48	64	32	18	18	29	673

Total Number of Valid Hours: 673

Total Number of Hours: 744







Wood Buffalo Environmental Association

Summary of Hour Averages

Particulate Matter 2.5 (PM_{2.5}) - µg/m³

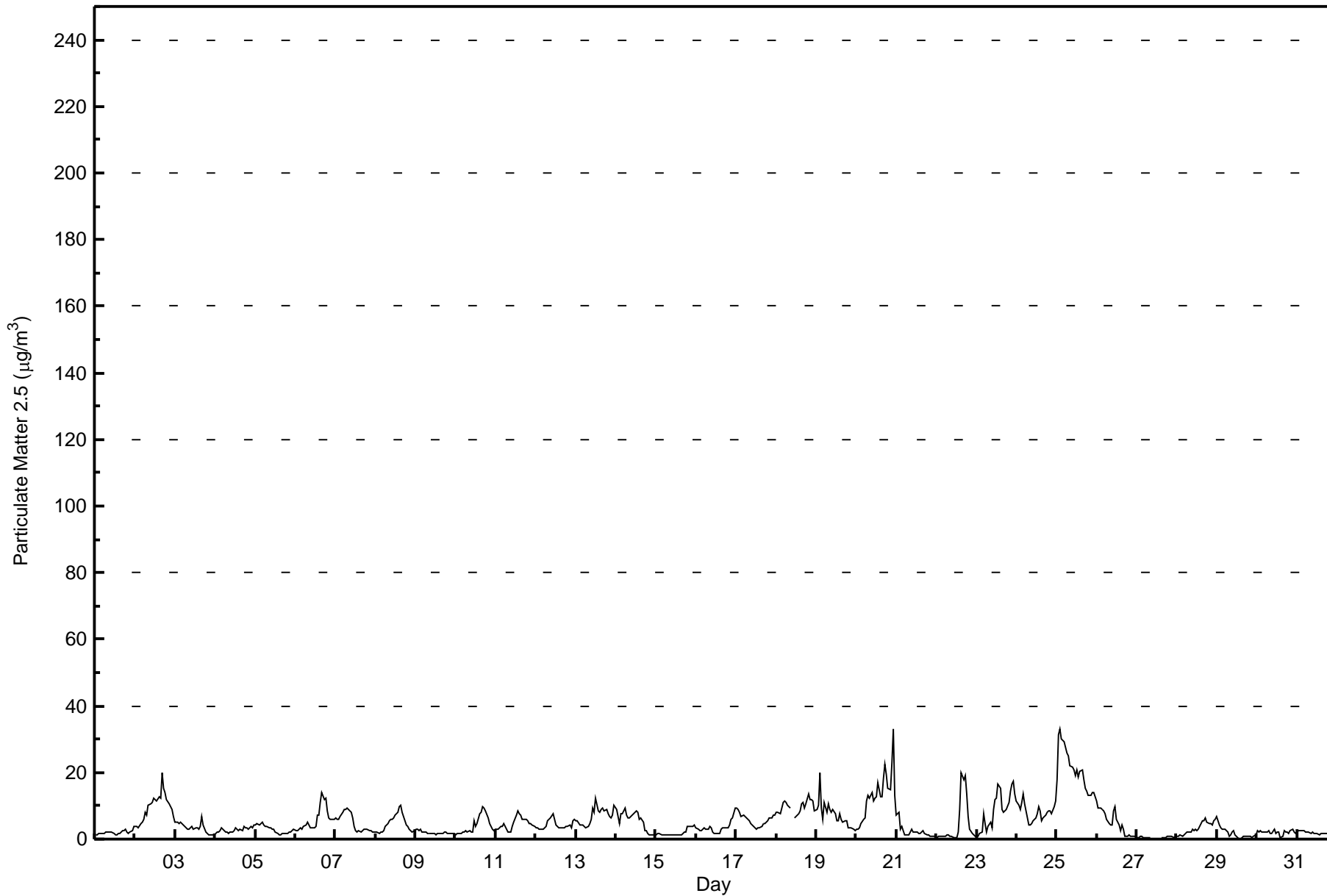
Fort McKay South - January 2017

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 33.2 µg/m ³ on Jan 25 03:00 Minimum Value: 0.2 µg/m ³ on Jan 29 14:00 Maximum Diurnal Average: 6.6 µg/m ³ at hour 17 Monthly Average: 5.33 µg/m ³		Maximum Daily Average: 20.7 µg/m ³ on Jan 25 Minimum Daily Average: 0.6 µg/m ³ on Jan 27 Minimum Diurnal Average: 4.8 µg/m ³ at hour 1 Percentiles: P ₁ = 0.4 P ₁₀ = 1.2 Q ₁ = 2.0 Median = 3.6 Q ₃ = 7.4 P ₉₀ = 11.4 P ₉₉ = 24.3		Hours in Service: 744 Hours of Data: 736 Hours of Missing Data: 8 Hours of Calibration: 2 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-Jan	1.2	1.3	1.7	1.7	1.6	1.6	2.1	2.3	2.0	2.2	2.0	1.5	1.4	1.3	1.9	1.9	2.4	2.7	2.8	2.2	1.8	1.9	2.5	3.7	2.0	3.7
2-Jan	3.9	3.6	3.3	4.5	5.0	5.9	7.9	7.2	10.0	10.6	11.2	12.4	12.0	11.3	12.7	12.5	20.0	15.1	14.0	11.7	10.7	9.8	8.8	6.8	9.6	20.0
3-Jan	5.2	5.1	4.8	5.0	4.6	4.1	3.9	3.1	3.0	3.5	3.8	3.2	3.4	3.3	2.8	3.7	7.0	4.1	2.2	1.8	1.4	1.1	1.1	1.2	3.4	7.0
4-Jan	1.9	2.3	2.3	2.8	3.2	2.4	2.1	2.1	1.8	2.2	2.2	2.7	3.4	3.1	2.4	3.1	2.7	3.9	3.4	3.4	3.0	3.8	3.3	4.2	2.8	4.2
5-Jan	4.4	4.7	4.4	4.6	5.1	4.2	3.9	3.7	3.5	3.3	3.1	2.8	2.1	1.5	1.4	1.4	1.5	1.6	1.5	1.9	2.0	2.1	2.4	2.8	2.9	5.1
6-Jan	2.7	2.7	3.0	3.2	3.1	3.7	4.4	5.3	4.3	3.5	3.2	3.3	3.8	7.1	7.0	11.2	13.8	12.0	12.3	8.3	6.5	6.1	6.1	6.1	5.9	13.8
7-Jan	6.4	5.9	5.9	7.0	7.9	8.7	8.8	9.2	8.7	7.9	6.4	3.8	2.6	2.3	2.3	2.1	2.4	2.9	2.9	2.8	2.5	2.5	2.2	2.2	4.8	9.2
8-Jan	2.1	2.2	1.6	2.1	2.2	2.6	3.8	4.9	5.6	5.9	5.8	6.2	7.2	8.0	9.9	10.1	8.0	6.9	4.2	3.6	2.8	2.6	2.2	2.3	4.7	10.1
9-Jan	2.8	2.9	2.4	3.2	2.3	2.1	1.9	1.9	1.9	1.7	1.7	1.7	1.5	1.6	1.5	1.5	1.8	1.9	2.0	1.8	1.7	1.7	1.6	1.5	1.9	3.2
10-Jan	1.5	1.5	1.8	1.8	2.0	2.1	2.4	2.2	2.5	2.1	2.1	5.4	3.9	4.5	7.5	8.2	9.9	9.5	8.3	6.3	4.5	3.7	2.8	2.7	4.1	9.9
11-Jan	2.8	2.9	3.4	3.6	3.7	4.6	3.1	2.2	2.0	1.9	3.8	5.0	7.1	8.4	7.7	7.4	6.1	5.9	5.7	5.4	4.9	4.7	4.2	3.9	4.6	8.4
12-Jan	3.3	3.5	3.0	2.9	3.1	3.5	3.7	5.4	6.1	6.5	7.6	5.8	4.4	4.0	3.3	3.4	3.4	3.2	3.8	4.0	4.4	3.6	5.5	6.0	4.3	7.6
13-Jan	5.4	5.4	4.2	4.1	4.2	3.8	3.4	3.8	4.8	6.0	9.4	8.1	12.2	8.4	8.2	8.7	9.1	8.7	8.8	7.8	6.6	6.5	7.4	10.1	6.9	12.2
14-Jan	8.9	7.0	4.7	7.5	7.8	9.4	7.3	6.5	6.3	7.0	7.4	7.9	8.3	8.0	6.0	6.2	4.9	2.7	2.4	1.7	1.4	1.3	1.2	1.3	5.6	9.4
15-Jan	1.1	1.5	1.6	1.5	1.2	1.4	1.4	1.4	1.4	1.4	1.4	1.2	1.2	1.2	1.3	1.3	1.8	2.3	2.3	3.9	4.0	4.0	3.9	4.2	2.0	4.2
16-Jan	3.2	2.9	2.4	2.4	3.2	3.5	3.0	3.0	3.7	3.6	2.0	1.8	1.8	1.6	1.7	2.9	3.4	3.6	3.4	3.5	4.3	5.8	6.5	9.3	3.4	9.3
17-Jan	9.5	8.9	8.0	6.8	7.3	6.6	6.3	6.1	5.5	4.8	3.6	3.3	2.8	3.3	3.6	4.0	4.7	4.6	5.3	5.7	6.1	6.4	7.2	7.2	5.7	9.5
18-Jan	8.0	8.1	7.7	9.4	10.9	11.5	10.9	10.0	9.4	C	C	6.6	6.8	7.7	8.6	10.8	11.0	9.4	10.8	13.5	11.9	11.9	11.4	8.6	9.8	13.5
19-Jan	8.8	10.2	19.9	9.3	6.1	10.9	7.9	10.4	8.7	8.3	8.8	7.5	5.6	5.7	7.7	5.7	5.2	5.4	5.5	3.5	3.3	3.4	2.9	2.6	7.2	19.9
20-Jan	3.0	3.0	3.3	4.5	6.1	6.5	11.4	13.1	12.1	13.8	11.3	12.2	12.6	17.1	12.6	12.8	18.3	22.6	19.5	15.1	14.8	22.9	33.2	13.1	13.1	33.2
21-Jan	7.1	8.0	3.0	3.7	2.5	1.2	1.3	1.3	2.3	2.9	2.2	2.2	2.0	1.8	1.8	2.1	2.4	1.7	1.2	1.1	1.0	0.7	0.8	0.7	2.3	8.0
22-Jan	0.6	0.7	0.7	0.8	1.0	1.0	1.1	1.1	0.9	0.9	0.5	0.5	0.4	2.1	9.0	19.8	18.0	19.2	13.6	6.7	2.9	1.6	1.3	1.0	4.4	19.8
23-Jan	0.8	0.7	1.8	2.0	7.7	4.6	2.1	3.8	5.1	3.5	9.0	12.0	12.2	16.3	15.4	8.7	7.9	8.5	8.9	11.1	14.5	16.7	17.4	13.5	8.5	17.4
24-Jan	11.3	10.2	9.0	10.9	13.5	10.5	6.2	4.4	4.1	4.6	5.5	6.3	7.6	9.8	8.5	5.6	6.3	7.3	8.2	8.6	8.3	7.7	9.7	11.5	8.1	13.5
25-Jan	17.6	31.4	33.2	30.2	29.1	27.4	25.7	25.0	21.9	21.7	20.6	18.9	20.7	18.4	20.2	20.6	17.8	15.4	14.3	13.1	13.1	14.2	14.2	12.6	20.7	33.2
26-Jan	11.4	9.5	9.5	8.9	8.5	7.7	5.9	4.8	4.3	4.1	8.4	9.6	6.1	4.4	2.4	4.4	3.0	0.9	1.0	1.1	0.9	0.8	0.7	0.7	5.0	11.4
27-Jan	0.6	0.5	0.7	0.9	0.6	0.5	0.5	0.3	0.2	UO	UO	UO	UO	UO	UO	0.4	0.3	0.6	0.8	0.8	0.8	0.9	0.6	0.9	0.6	0.9
28-Jan	0.9	0.9	1.1	1.0	1.4	1.7	2.1	2.3	2.1	3.0	2.7	2.8	2.6	2.8	4.8	5.5	5.4	6.5	5.3	4.9	4.6	4.2	5.3	6.1	3.3	6.5
29-Jan	6.9	4.2	3.5	3.0	2.8	2.9	2.1	0.9	1.2	2.2	2.3	1.3	0.3	0.2	0.2	0.3	0.7	0.8	0.7	0.8	0.7	0.6	0.8	1.3	1.7	6.9
30-Jan	2.4	1.9	2.5	2.2	2.3	2.2	2.1	2.7	1.8	1.9	3.0	1.8	2.0	2.1	0.6	0.9	2.5	2.3	2.1	1.9	2.4	2.9	2.2	1.8	2.1	3.0
31-Jan	2.0	2.4	2.4	2.5	2.4	1.9	2.2	2.2	1.9	2.1	1.5	1.9	1.5	1.5	1.5	1.6	1.7	1.8	1.8	1.8	4.3	7.4	8.6	7.0	2.7	8.6
																								Diurnal Average		
4.8 5.0 5.1 5.0 5.2 5.2 4.9 4.9 4.8 4.9 5.3 5.3 5.3 5.6 5.8 6.1 6.6 6.3 5.8 5.2 4.9 5.3 5.7 5.1																								Diurnal Maximum		
17.6 31.4 33.2 30.2 29.1 27.4 25.7 25.0 21.9 21.7 20.6 18.9 20.7 18.4 20.2 20.6 20.0 22.6 19.5 15.1 14.8 22.9 33.2 13.5																										
C - Calibration UO - Unstable Operation																										
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																										



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay South - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay South - January 2017**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	421	57.20	57.20
6 - 15	226	30.71	87.91
16 - 25	24	3.26	91.17
26 - 80	7	0.95	92.12
> 81.0	0	0.00	92.12

Total Number of Valid Hours: 736

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Fort McKay South - January 2017

Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	61	19	3	1	1	2	7	46	75	45	37	41	22	12	12	16	400
6 - 15	18	3	1	2	2	1	4	36	80	30	6	8	3	3	5	10	212
16 - 25	1	1	0	0	0	0	0	4	11	2	1	0	0	1	0	3	24
26 - 80	1	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	7
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	81	23	4	3	3	3	11	86	172	77	44	49	25	16	17	29	643

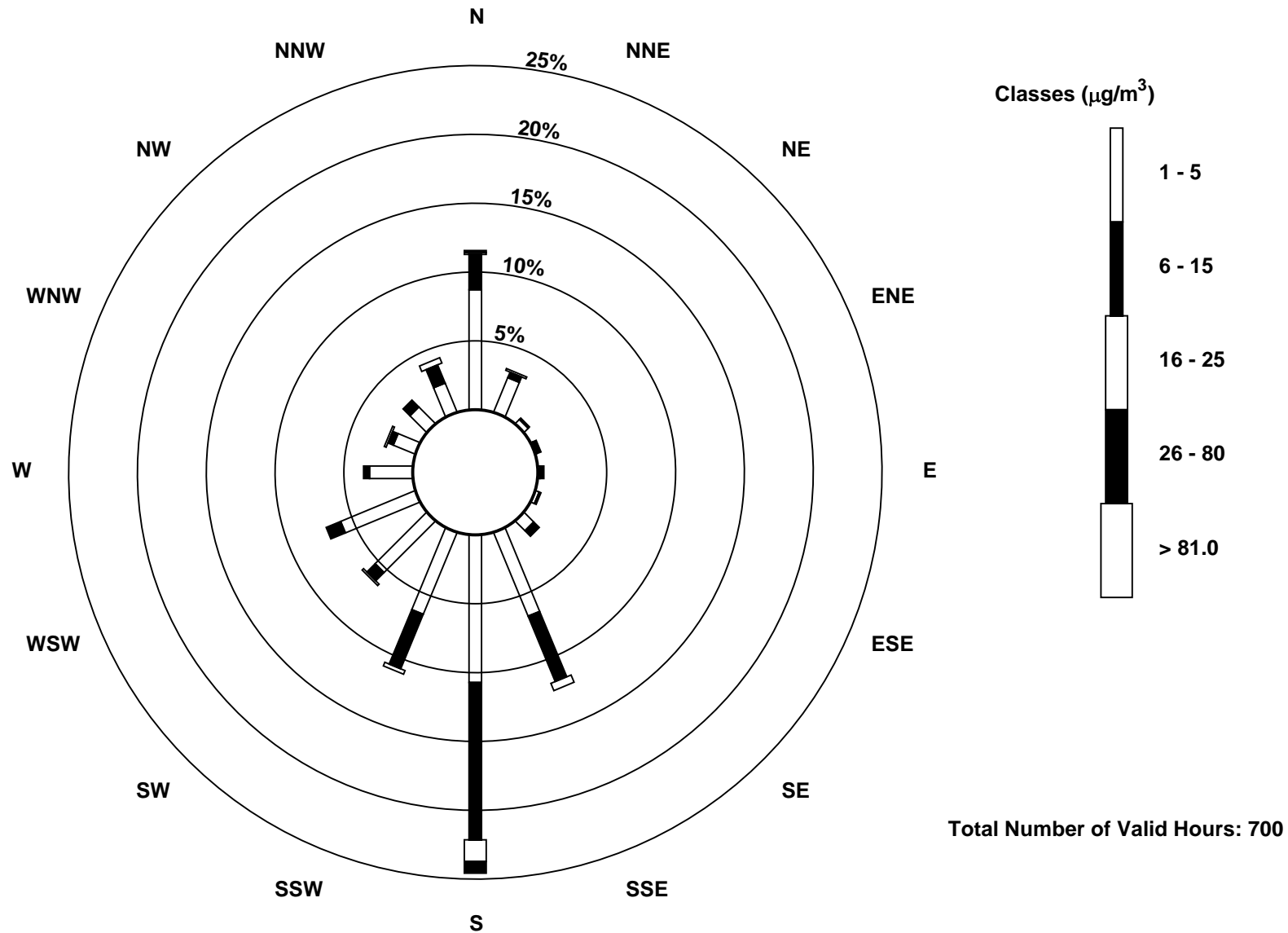
Total Number of Valid Hours: 700

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay South (AMS 13)

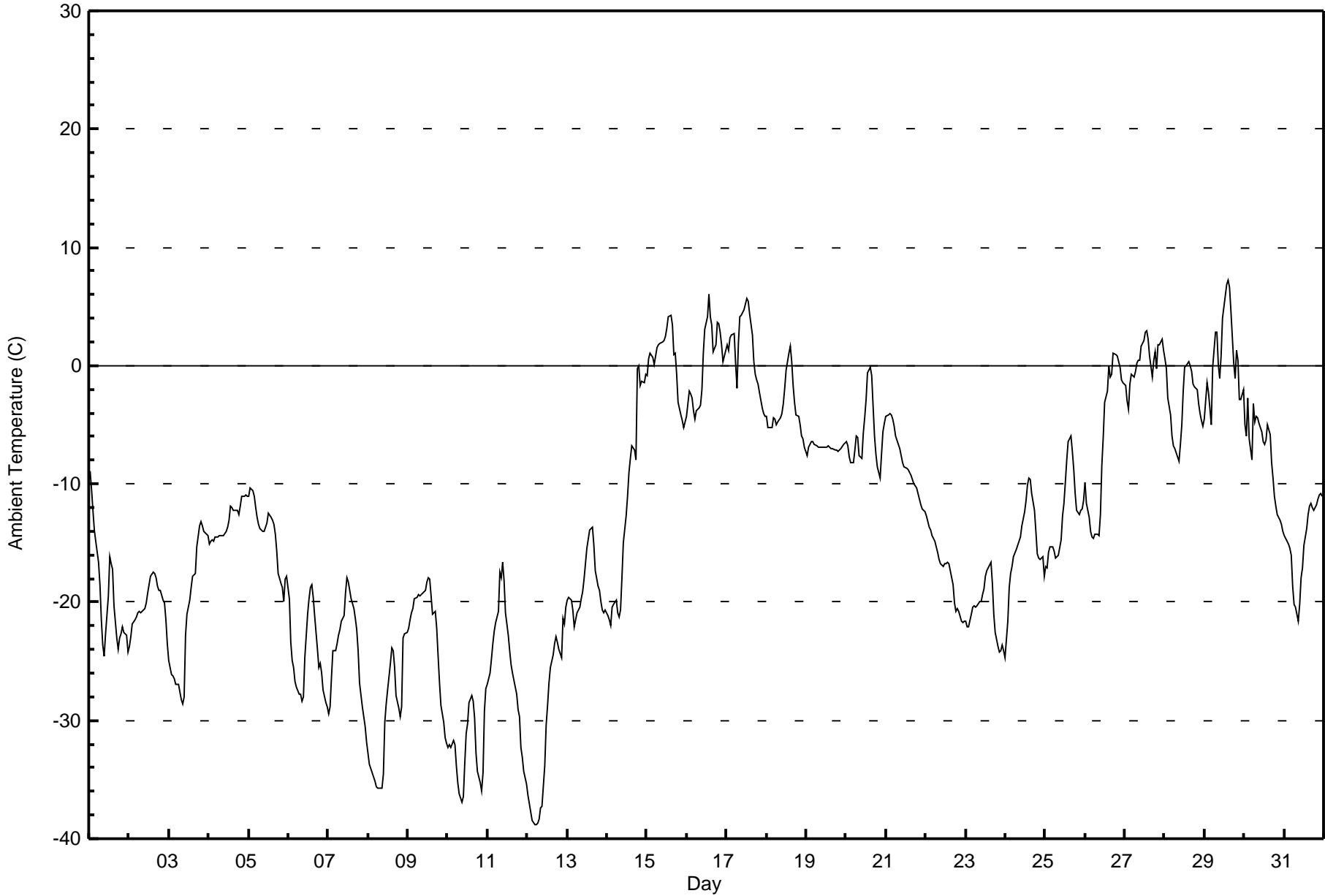




Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature (AT) - C
Fort McKay South - January 2017

Maximum Value: 7.2 C on Jan 29 15:00 Maximum Daily Average: 1.2 C on Jan 17		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Minimum Value: -38.9 C on Jan 12 06:00 Maximum Diurnal Average: -10.3 C at hour 15 Monthly Average: -13.75 C		Minimum Daily Average: -32.4 C on Jan 10 Minimum Diurnal Average: -15.4 C at hour 9 Percentiles: P ₁ = -37.2 P ₁₀ = -27.8 Q ₁ = -21.1 Median = -14.0 Q ₃ = -4.9 P ₉₀ = 0.4 P ₉₉ = 5.3																								
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-Jan	-8.9	-10.5	-12.2	-13.8	-14.8	-16.6	-18.5	-21.5	-23.7	-24.6	-22.6	-19.4	-16.1	-16.8	-17.2	-20.3	-23.1	-23.9	-23.0	-22.7	-22.1	-22.5	-22.8	-24.2	-19.2	-8.9
2-Jan	-23.8	-22.9	-21.8	-21.5	-21.3	-20.9	-20.7	-20.9	-20.8	-20.5	-20.1	-19.2	-18.5	-17.9	-17.5	-17.6	-17.9	-18.6	-19.0	-19.0	-19.9	-20.1	-21.5	-23.5	-20.2	-17.5
3-Jan	-24.9	-26.1	-26.2	-26.5	-26.9	-27.0	-27.0	-28.3	-28.6	-28.0	-22.8	-21.1	-19.9	-18.7	-17.8	-17.7	-17.5	-15.3	-13.5	-13.2	-13.6	-14.0	-14.2	-14.4	-21.0	-13.2
4-Jan	-15.1	-14.9	-14.8	-14.9	-14.5	-14.5	-14.4	-14.4	-14.3	-14.1	-13.7	-13.7	-13.0	-11.9	-12.0	-12.2	-12.2	-12.2	-12.6	-11.9	-11.0	-11.0	-10.9	-11.0	-13.2	-10.9
5-Jan	-11.0	-10.4	-10.5	-11.0	-12.0	-12.9	-13.5	-13.8	-14.0	-14.1	-13.7	-13.3	-12.5	-12.8	-13.1	-13.4	-14.2	-15.7	-17.6	-18.4	-18.7	-19.9	-18.0	-17.8	-14.3	-10.4
6-Jan	-19.7	-23.4	-24.9	-25.6	-26.7	-27.1	-27.8	-27.8	-28.3	-28.0	-24.7	-21.0	-19.7	-18.8	-18.5	-19.6	-21.1	-24.0	-25.5	-25.1	-26.0	-27.5	-28.5	-28.9	-24.5	-18.5
7-Jan	-29.4	-28.8	-26.4	-24.1	-24.1	-23.5	-22.8	-22.3	-21.6	-21.2	-19.2	-17.9	-18.3	-19.0	-19.8	-20.6	-21.3	-22.4	-24.2	-26.8	-28.9	-29.7	-30.5	-31.8	-23.9	-17.9
8-Jan	-32.7	-33.7	-34.4	-34.7	-35.1	-35.6	-35.8	-35.7	-35.7	-34.6	-30.2	-28.6	-27.4	-25.2	-23.9	-24.1	-25.6	-27.9	-29.0	-29.7	-28.9	-23.0	-22.7	-22.6	-29.9	-22.6
9-Jan	-22.2	-21.5	-20.9	-20.5	-19.7	-19.6	-19.4	-19.4	-19.4	-19.2	-18.9	-18.3	-17.9	-18.1	-19.5	-21.0	-20.8	-22.3	-24.5	-26.9	-28.8	-30.1	-31.4	-31.9	-22.2	-17.9
10-Jan	-32.3	-32.1	-32.3	-31.7	-32.1	-33.9	-35.2	-36.2	-36.9	-36.5	-33.5	-31.1	-30.3	-28.5	-27.8	-28.3	-29.8	-32.7	-34.4	-35.3	-36.0	-34.5	-29.2	-27.3	-32.4	-27.3
11-Jan	-26.9	-25.9	-24.9	-23.6	-22.4	-21.7	-20.7	-17.5	-18.0	-16.7	-18.2	-20.9	-22.8	-24.1	-25.3	-25.9	-26.6	-27.7	-29.1	-29.7	-32.2	-33.1	-34.3	-35.4	-25.2	-16.7
12-Jan	-36.4	-37.0	-37.7	-38.4	-38.8	-38.9	-38.7	-38.3	-37.4	-37.2	-33.8	-30.4	-28.8	-26.8	-25.5	-24.4	-23.5	-22.9	-23.4	-24.0	-24.7	-21.4	-21.8	-20.4	-30.4	-20.4
13-Jan	-19.8	-19.6	-19.8	-20.6	-22.1	-21.5	-20.9	-20.5	-19.7	-19.2	-18.0	-16.7	-15.4	-13.9	-13.7	-13.6	-15.2	-17.3	-18.6	-19.0	-20.0	-20.6	-20.9	-20.6	-18.6	-13.6
14-Jan	-21.2	-21.5	-21.9	-20.5	-20.2	-19.8	-20.9	-21.2	-20.7	-17.9	-14.9	-12.7	-11.0	-9.1	-7.8	-6.8	-7.2	-8.0	-0.3	-0.1	-1.7	-1.3	-1.4	-0.7	-12.0	-0.1
15-Jan	-0.8	0.6	1.1	0.7	0.1	0.8	1.5	1.8	1.9	1.9	2.1	2.4	3.2	4.2	4.3	3.4	1.0	1.1	-0.8	-3.1	-4.2	-4.7	-5.2	-4.8	0.4	4.3
16-Jan	-4.3	-2.1	-2.4	-2.8	-3.8	-4.6	-3.8	-3.6	-3.3	-2.0	1.1	3.1	4.1	6.0	4.2	3.4	1.2	1.7	3.7	3.6	2.9	1.7	0.3	1.3	0.2	6.0
17-Jan	1.7	1.3	2.4	2.5	2.7	0.2	-1.9	1.9	4.1	4.3	4.8	5.2	5.7	5.5	4.3	2.6	0.3	-0.8	-1.3	-1.6	-2.3	-3.5	-4.0	-4.2	1.2	5.7
18-Jan	-4.3	-5.2	-5.2	-5.2	-4.4	-4.5	-5.0	-4.8	-4.4	-4.0	-3.2	-1.9	-0.4	1.1	1.7	0.4	-1.7	-3.1	-4.2	-4.3	-5.0	-6.0	-6.2	-6.9	-3.6	1.7
19-Jan	-7.6	-6.9	-6.6	-6.5	-6.4	-6.7	-6.8	-6.9	-6.8	-6.9	-6.9	-6.9	-6.9	-6.8	-6.9	-7.0	-7.0	-7.1	-7.2	-7.2	-7.1	-7.0	-6.6	-6.5	-6.9	-6.4
20-Jan	-6.5	-6.7	-7.7	-8.2	-8.2	-7.1	-5.9	-6.1	-7.6	-7.9	-5.8	-4.5	-2.9	-0.6	-0.2	-0.9	-3.4	-6.0	-7.5	-8.6	-9.5	-7.5	-5.6	-4.9	-5.8	-0.2
21-Jan	-4.3	-4.1	-4.1	-4.2	-4.5	-5.2	-5.9	-6.7	-7.1	-7.6	-8.2	-8.6	-8.7	-8.8	-9.0	-9.3	-9.7	-10.0	-10.4	-10.8	-11.3	-11.8	-12.1	-12.4	-8.1	-4.1
22-Jan	-12.7	-13.2	-13.6	-13.8	-14.3	-14.9	-15.4	-15.8	-16.3	-16.8	-16.9	-16.7	-16.7	-16.6	-16.8	-17.3	-18.6	-20.0	-20.8	-20.5	-20.7	-21.6	-21.7	-21.6	-17.2	-12.7
23-Jan	-21.6	-22.1	-22.1	-21.1	-20.4	-20.3	-20.4	-20.3	-20.0	-19.3	-18.9	-17.8	-17.3	-16.8	-16.6	-18.4	-21.0	-22.5	-23.7	-24.2	-24.1	-23.6	-24.1	-20.7	-16.6	
24-Jan	-24.7	-21.6	-18.7	-17.6	-17.0	-16.2	-15.6	-15.3	-14.9	-14.5	-13.6	-12.4	-11.4	-10.1	-9.5	-9.6	-10.8	-12.2	-14.0	-16.0	-16.3	-16.4	-16.1	-17.8	-15.1	-9.5
25-Jan	-17.0	-17.1	-15.8	-15.3	-15.3	-15.7	-16.3	-16.2	-16.1	-14.8	-12.7	-11.7	-9.9	-8.0	-6.4	-6.0	-7.3	-8.7	-10.8	-12.3	-12.6	-12.2	-12.2	-11.4	-12.6	-6.0
26-Jan	-9.9	-11.6	-12.8	-14.0	-14.4	-14.6	-14.3	-14.2	-14.4	-12.6	-8.4	-6.1	-3.1	-2.2	0.0	-1.0	-0.7	1.1	1.0	0.8	0.3	-0.2	-1.2	-1.4	-6.4	1.1
27-Jan	-1.6	-3.0	-3.7	-1.6	-0.7	-1.0	-0.4	0.2	0.5	0.5	1.7	2.2	2.8	3.0	2.2	0.8	-1.0	0.5	1.2	-0.2	1.8	1.7	2.2	1.3	0.4	3.0
28-Jan	0.6	-0.3	-2.8	-4.2	-5.9	-6.8	-7.0	-7.4	-8.1	-6.7	-5.0	-2.2	-0.1	0.0	0.3	0.0	-0.5	-1.6	-1.8	-2.0	-3.2	-4.1	-4.7	-5.1	-3.3	0.6
29-Jan	-4.5	-1.4	-2.3	-3.6	-5.0	-0.1	2.9	2.8	0.1	-1.1	0.8	4.0	6.0	6.9	7.2	6.6	4.6	0.2	-1.1	1.3	0.4	-2.9	-2.9	-2.1	0.7	7.2
30-Jan	-5.0	-5.9	-2.8	-6.1	-7.9	-3.2	-4.8	-4.3	-4.4	-4.9	-5.6	-6.4	-6.6	-6.3	-5.0	-5.8	-8.2	-9.5	-11.0	-11.9	-12.6	-13.1	-13.4	-14.0	-7.4	-2.8
31-Jan	-14.4	-14.6	-15.0	-15.5	-16.1	-18.6	-20.2	-20.4	-21.6	-20.1	-18.0	-17.1	-15.2	-13.8	-12.6	-11.9	-11.7	-12.0	-12.3	-11.8	-11.3	-11.0	-10.8	-11.1	-14.9	-10.8
	-14.9	-14.9	-14.9	-15.0	-15.2	-15.2	-15.3	-15.3	-15.4	-15.0	-13.5	-12.3	-11.3	-10.5	-10.3	-10.8	-11.9	-12.9	-13.4	-13.9	-14.4	-14.6	-14.6	-14.7	Diurnal Average	
	1.7	1.3	2.4	2.5	2.7	0.8	2.9	2.8	4.1	4.3	4.8	5.2	6.0	6.9	7.2	6.6	4.6	1.7	3.7	3.6	2.9	1.7	2.2	1.3	Diurnal Maximum	





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Fort McKay South - January 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	226	30.38	30.38
-20 - 0	433	58.20	88.58
0 - 10	85	11.42	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

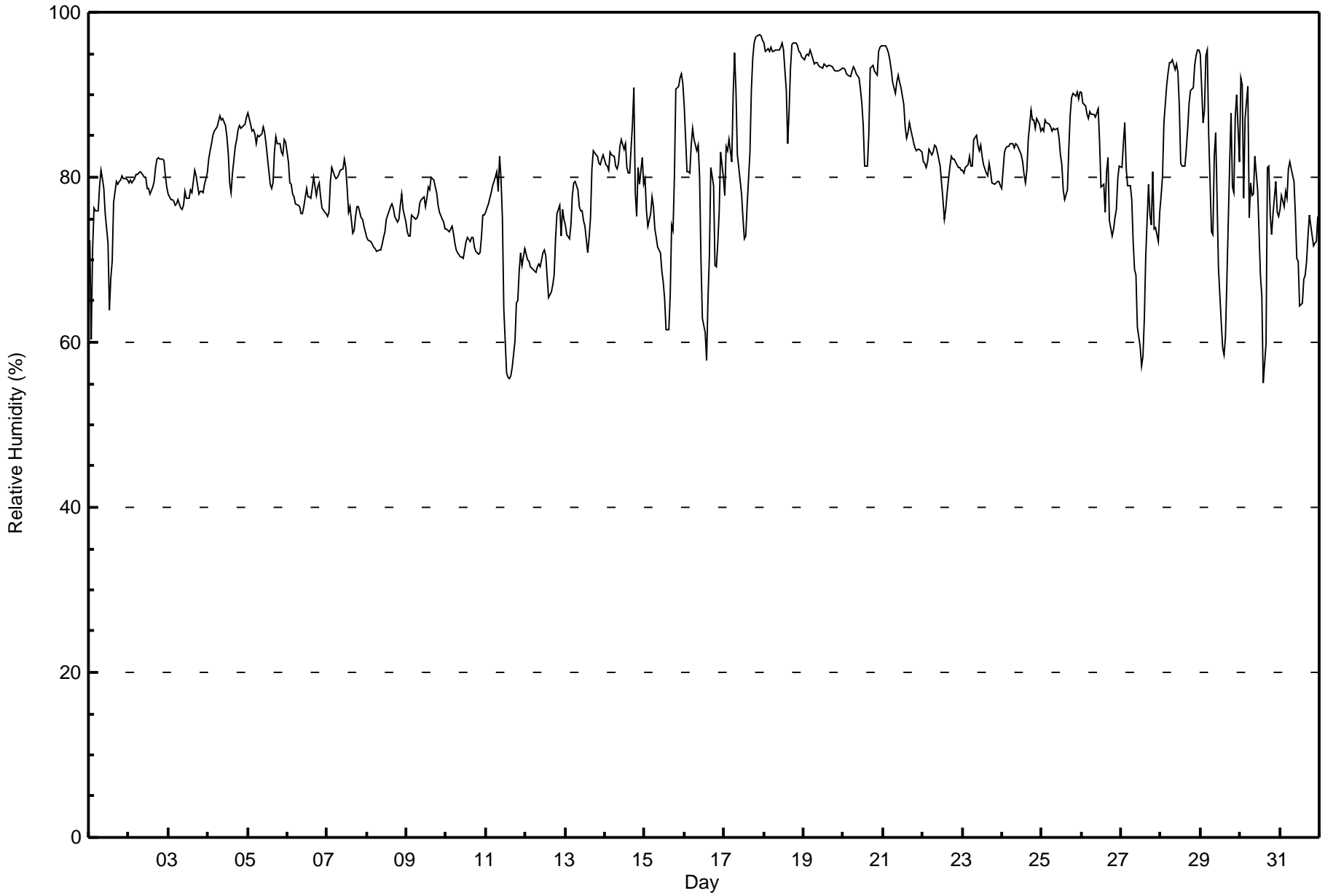
Fort McKay South - January 2017

Maximum Value: 97 % on Jan 17 22:00														Maximum Daily Average: 94.5 % on Jan 18														Hours in Service: 744	
Minimum Value: 55 % on Jan 30 15:00														Minimum Daily Average: 69.9 % on Jan 11														Hours of Data: 744	
Maximum Diurnal Average: 82.9 % at hour 5														Minimum Diurnal Average: 74.2 % at hour 15														Hours of Missing Data: 0	
Monthly Average: 80.5 %														Percentiles: P ₁ = 58 P ₁₀ = 71 Q ₁ = 75 Median = 80 Q ₃ = 86 P ₉₀ = 93 P ₉₉ = 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-Jan	72	60	71	76	76	76	79	81	80	79	76	72	64	68	70	77	79	79	80	80	80	80	80	80	75.6	81			
2-Jan	79	80	79	80	80	80	81	81	80	80	80	79	79	78	79	79	81	82	82	82	82	82	80	79	80.2	82			
3-Jan	78	77	77	77	77	77	77	76	76	77	78	78	78	79	78	79	81	80	78	78	78	78	79	81	78.0	81			
4-Jan	82	83	84	85	86	86	87	87	87	87	86	85	83	79	78	81	84	85	86	86	86	86	86	87	84.7	87			
5-Jan	88	87	86	86	85	84	85	85	85	86	86	84	82	79	79	83	85	84	84	83	83	84	84	84	84.0	88			
6-Jan	82	79	79	78	78	77	77	76	76	76	76	79	78	78	77	79	80	78	79	79	78	76	76	76	77.7	82			
7-Jan	75	76	79	81	80	80	80	80	81	81	82	81	79	76	76	73	74	75	76	76	75	75	74	73	77.5	82			
8-Jan	73	72	72	72	72	71	71	71	71	72	73	73	75	76	76	77	76	75	75	75	77	78	76	75	73.9	78			
9-Jan	73	73	73	75	75	75	75	76	77	77	78	76	78	79	79	80	80	79	78	77	76	75	74	74	76.3	80			
10-Jan	74	73	73	74	73	72	71	71	70	70	70	71	72	73	72	73	73	71	71	71	71	73	75	75	72.3	75			
11-Jan	76	77	77	78	79	79	81	78	82	80	75	64	56	56	56	56	57	60	65	65	69	71	69	71	69.9	82			
12-Jan	71	70	70	69	69	69	69	69	70	69	71	71	71	68	65	66	67	68	73	76	77	73	76	75	70.4	77			
13-Jan	74	73	72	74	78	79	79	79	76	76	76	75	74	71	73	75	81	83	83	83	82	82	82	83	77.6	83			
14-Jan	82	81	81	83	83	83	81	81	82	84	85	83	84	81	80	80	86	91	78	75	81	79	82	79	81.9	91			
15-Jan	80	76	74	76	78	76	74	73	72	71	69	67	65	61	61	66	74	74	80	91	91	92	93	91	76.0	93			
16-Jan	89	81	81	81	84	86	85	83	84	80	70	63	61	58	65	70	81	79	69	69	72	76	83	80	76.2	89			
17-Jan	78	84	83	85	82	90	95	91	83	81	78	75	73	73	77	83	91	94	96	97	97	97	97	97	86.5	97			
18-Jan	96	95	96	95	96	95	95	95	95	95	96	96	95	91	84	88	93	96	96	96	96	95	95	95	94.5	96			
19-Jan	94	95	95	95	95	95	94	94	94	94	93	93	94	94	93	93	93	93	93	93	93	93	93	93	93.7	95			
20-Jan	93	93	93	92	92	93	93	93	92	92	91	89	86	81	81	85	93	93	94	93	92	95	96	96	91.4	96			
21-Jan	96	96	96	95	94	93	92	90	91	92	92	91	89	86	85	85	87	86	84	84	83	83	83	83	89.0	96			
22-Jan	82	82	81	82	83	83	83	84	84	83	81	79	77	75	76	78	81	83	82	82	82	81	81	81	81.1	84			
23-Jan	81	81	81	82	83	81	81	85	85	84	83	84	83	82	80	80	82	81	79	79	79	80	80	79	81.4	85			
24-Jan	79	83	84	84	84	84	84	84	84	84	84	83	82	80	79	81	85	88	87	87	86	87	86	86	83.9	88			
25-Jan	86	86	87	87	86	86	86	86	86	86	85	83	82	78	77	78	84	88	90	90	90	90	90	90	85.6	90			
26-Jan	90	89	89	88	87	88	88	88	87	88	88	84	79	79	76	81	82	75	73	74	75	76	80	81	82.7	90			
27-Jan	81	84	87	81	79	79	77	72	69	68	62	59	57	58	63	71	79	75	74	81	74	74	72	76	73.0	87			
28-Jan	78	80	87	91	93	94	94	94	93	94	93	89	82	81	81	83	86	89	90	91	94	95	95	95	89.2	95			
29-Jan	95	87	88	95	95	85	73	73	83	85	77	69	62	59	58	61	67	82	88	79	78	87	90	82	79.1	95			
30-Jan	92	91	77	87	91	75	79	78	78	83	78	73	68	66	55	60	81	81	75	73	76	79	76	75	77.1	92			
31-Jan	76	78	76	78	78	81	82	81	79	75	70	70	64	65	68	68	70	73	75	73	72	72	72	75	73.8	82			
																												Diurnal Average	
82.1														81.4														96	
96														96														96	
																												Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Fort McKay South - January 2017





Maximum Speed: 29 km/h on Jan 11 11:00	Maximum Daily Speed Average: 15.3 km/h on Jan 21	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jan 20 11:00	Minimum Daily Speed Average: 1.8 km/h on Jan 18	Hours of Data: 708
Maximum Diurnal Speed Average: 2.7 km/h at hour 22	Minimum Diurnal Speed Average: 0.3 km/h at hour 11	Hours of Missing Data: 36
Monthly Average Velocity: 1.4 km/h 230.8 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 6 O ₃ = 9 P ₉₀ = 14 P ₉₉ = 20	Percent Operational Time: 95.2

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jan	NNW20	NNW21	N16	N12	N12	N8	NNW4	W3	SW3	SSW2	WSW0	W2	NW2	ESE2	SE1	SSW2	NW2	AF	SW1	AF	SSW3	WSW1	SW2	W0	NNW3.7	NNW21	
2-Jan	WSW3	SSW4	WSW3	SSE2	AF	SSE1	SSE1	S2	S3	S3	SSE4	SSE2	SSE5	SSE5	SE4	E2	S3	S3	S3	S4	S3	S4	SSW2	SW2	S2.6	SSE5	
3-Jan	SW3	SW2	SW4	SSW3	SW3	SSW4	SSW6	S6	SSW5	S6	S7	SSE5	SE4	SE4	SSE6	SE6	SSE5	WSW5	W7	W10	W13	W9	NW4	NW2	SW3.5	W13	
4-Jan	AF	AF	AF	N3	N2	AF	ESE2	AF	AF	SSE5	SSE6	SSE9	SSE9	SSW8	S5	SSE5	S7	S6	S6	SSE5	SSE4	AF	N2	---	SSE9		
5-Jan	NW3	N9	N13	NNE13	NNE12	NNE12	NNE7	N10	NE6	NE3	NE2	NNE7	N17	N20	N16	N13	NNE8	N3	NNW4	NNW3	NNW3	WNW4	WSW3	WSW3	N7.5	N20	
6-Jan	S3	S5	S5	SSW3	S4	SW3	SW4	S2	SW2	AF	SSE5	S8	S9	SSE9	SSE10	S8	SSW7	S5	S5	S2	AF	WSW2	W2	NNW2	S4.1	SSE10	
7-Jan	WNW3	SW1	W1	AF	AF	AF	AF	AF	NNW2	N2	N9	N15	N19	NNE19	N16	N16	NNE13	NNE12	NNE6	WNW2	WSW3	WSW3	SSW2	AF	N6.8	NNE19	
8-Jan	NW1	S2	SSE4	S4	SSW2	SSW2	S4	SSW4	S5	S6	S5	SSE7	SSE7	SE7	SSE10	SSE6	S4	S4	S4	S5	SSW8	SW10	SW9	WSW9	S4.5	SSE10	
9-Jan	W10	WSW11	SSW6	S5	WSW8	WSW10	W8	W4	SSW3	SSW3	NNW4	N3	NNW5	N2	SSW2	WSW3	W6	WNW4	NW4	W3	SW3	AF	WSW1	SW2	W3.6	WSW11	
10-Jan	NNW2	WNW2	NW3	NNW2	AF	WSW1	WSW2	WSW1	AF	AF	AF	SE2	SE2	SSE9	SSE8	SSE9	SSW4	SW3	SSW3	SSW3	S4	S5	SSE7	SSE7	S2.7	SSE9	
11-Jan	SSE9	SSE9	SSE9	SSE10	SSE10	SSE6	S5	W4	N6	NNW10	N29	N27	NNW28	NNW26	NNW24	NNW19	NNW15	NW7	NW6	WNW6	WNW4	W6	WSW3	W3	NNW6.1	N29	
12-Jan	SSW2	WSW3	AF	SSW2	SW2	SW3	SSW4	S6	S4	SSW4	S6	SSE10	SSE12	SSE14	SSE15	S12	S12	SSE4	W1	N3	SSW1	S11	SSW3	S6	S5.5	SSE15	
13-Jan	SSW6	S6	SW2	SSE1	S2	AF	N3	WSW1	S4	ESE1	S3	SSE5	S6	SSE7	SSE8	S5	S4	SSW3	AF	WSW2	S5	S4	S6	S7	S3.6	SSE8	
14-Jan	S6	S6	S5	S6	S7	SSW5	SSW2	SSW3	SSW2	S3	S1	SSE2	SSE6	ENE1	WNW1	S2	SW3	S3	WSW8	SSW6	SSW7	S7	SSW7	SSW9	SSW4.1	SSW9	
15-Jan	SSW7	SW11	WSW11	WSW10	W9	WSW11	WSW8	WSW9	WSW12	WSW16	WSW16	WSW16	WSW16	WSW11	SW8	SW7	SW7	S6	SSW7	S1	NNW1	SSE4	S6	S7	S9	SW7.7	WSW16
16-Jan	S8	SSW8	SSW9	S9	S10	S10	S9	S7	S10	S11	S12	S13	S11	SSE11	S11	S10	S7	S11	SSW12	SSW9	SSW8	SSW7	S8	S7	S9.4	S13	
17-Jan	S9	S6	S11	S10	S10	W1	SSW4	SW8	SW9	WSW8	SW9	SW10	WSW9	SW7	S5	S6	SSW4	SSW3	W1	SSW2	WSW3	SSW3	S2	S3	SSW5.5	S11	
18-Jan	AF	SSW3	AF	WSW1	AF	AF	AF	NNW2	AF	N3	NW2	SE3	SW1	E3	S5	S5	SSW3	SSW3	SSW3	S4	SSW3	S3	S2	SSW4	S1.8	S5	
19-Jan	NNE5	N10	NNE6	NE5	N10	N11	N10	N10	N9	N10	N8	N11	N10	N9	N9	N8	N7	N8	N7	N7	N7	WNW3	NNW3	ENE2	N7.4	N11	
20-Jan	SSE3	SE2	S6	SSW6	S7	S7	S7	S6	S7	SSW3	ENE0	SE2	SSE3	S5	S6	SSW5	SSW3	SW2	WNW1	AF	N4	N8	N7	NNE7	S2.2	N8	
21-Jan	NNE9	N12	N11	N13	N13	N16	N17	N18	N16	N16	N15	N16	NNE17	NNE18	N19	N18	N17	N15	N15	N14	N16	N15	N16	N16	N15.3	N19	
22-Jan	N16	N17	N18	N16	NNE16	N18	NNE14	N13	NNE11	N12	N13	N11	N12	N11	N10	NNW8	NNW5	NNW5	NNW5	NNW5	NNW5	NNW4	NW3	NW2	N10.2	N18	
23-Jan	WNW2	AF	WNW2	WNW2	NW3	NW5	NW4	NNW3	W3	W4	WSW3	WSW4	S5	SSE5	SSE6	SSE6	S3	WSW3	WSW3	SW3	SSW5	S4	S3	SSW4	SW2.1	SSE6	
24-Jan	SSW5	S8	S7	SSE8	S7	S7	SSE7	S9	S7	SSE7	SSE8	SSE10	SSE11	SSE11	SSE11	S12	S10	S10	SSW6	S7	S8	S9	S9	SSW7	S8.2	S12	
25-Jan	SSW6	S6	S8	S8	S9	S9	S8	S9	S9	S9	S9	S9	S9	SSE11	SSE14	SSE14	S12	S10	S11	S10	SSW6	S9	S8	S8	S8	S9.0	SSE14
26-Jan	S10	S4	S2	S4	S5	SSE6	S6	S5	S4	S6	SSE7	SSE9	SSE8	SSE8	S5	S5	SW5	WSW15	WSW15	WSW17	WSW16	W15	WSW11	WSW10	SW6.0	WSW17	
27-Jan	W5	SSW6	SSW4	W10	W8	WSW7	WSW10	WSW10	W14	WSW15	WSW12	WSW12	WSW8	S3	SSW3	S3	WSW3	WNW3	SW4	SSW4	SW6	SSW4	W9	WSW8	WSW6.6	WSW15	
28-Jan	SSW5	SSW3	SSE3	S3	S4	SSE6	S2	S5	S4	S4	S6	SSE5	SSE5	SSE7	SSE6	SSE5	S5	SSW3	WSW3	SSW1	AF	SSW3	S6	SSE4	S4.1	SSE7	
29-Jan	SSE4	SSW5	SSE4	SW3	SSE3	SW9	WSW13	SW9	SSE6	SSE7	SSE9	S8	WSW10	W10	WSW9	SSW7	SSW8	SW3	W5	WSW7	W4	SW3	SW6	SW5	SW5.3	WSW13	
30-Jan	S5	SW7	SSW7	S6	SW6	WSW9	SW7	WSW8	SSW5	NW2	NNE17	NNE14	NNE9	NNE5	NNW15	N16	N14	N17	N19	N19	N14	N13	N18	N20	N6.8	N20	
31-Jan	N18	N16	N14	N11	N9	NW4	WSW2	W4	SW3	AF	E2	SSE7	S10	SSW7	SW6	SW5	SW5	WSW6	W6	WNW6	WNW6	WNW6	NW6	NW5	NNW3.2	N18	

WSW1.6	WSW1.6	SW0.8	SSW0.8	SW0.9	WSW1.6	WSW2.0	WSW2.1	SW2.2	SW1.9	SW0.3	S0.8	S0.6	SE1.1	SSE1.2	S1.3	SSW1.3	WSW1.8	W2.2	W2.2	WSW2.5	SW2.7	WSW2.2	SW1.9	Diurnal Average
NNW20	NNW21	N18	N16	NNE16	N18	N17	N18	N16	WSW16	N29	N27	NNW28	NNW26	NNW24	NNW19	N17	N17	N19	N19	N16	N15	N18	N20	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 - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 10 km/h on Jan 1 01:00	Hours of Data: 708
Minimum Value: 0 km/h on Jan 3 00:00	Hours of Missing Data: 36
Percentiles: P ₁ = 1 P ₁₀ = 1 O ₁ = 1 Median = 2 O ₃ = 2 P ₉₀ = 4 P ₉₉ = 6	Hours of Calibration: 0
	Percent Operational Time: 95.2

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-Jan	10	8	4	3	3	3	2	1	1	1	1	1	2	2	1	1	1	AF	1	AF	1	1	2	2	10
2-Jan	1	2	2	1	AF	1	1	1	1	1	0	1	1	2	2	1	2	1	1	1	1	2	1	0	2
3-Jan	1	1	1	1	1	2	2	1	1	1	1	2	2	1	1	1	1	3	2	3	3	3	2	3	
4-Jan	AF	AF	AF	1	1	AF	1	AF	AF	1	1	1	2	3	1	1	1	1	1	1	2	2	AF	1	
5-Jan	1	5	4	3	3	2	2	2	2	1	1	4	5	5	5	3	2	1	1	1	2	1	1	5	
6-Jan	1	1	1	1	1	1	1	1	1	AF	1	2	1	1	1	1	1	1	2	2	AF	1	1	2	
7-Jan	1	1	1	AF	AF	AF	AF	AF	1	1	3	4	4	4	3	3	3	3	2	1	1	1	AF	4	
8-Jan	1	1	2	2	1	1	1	2	1	1	1	1	1	2	2	2	2	2	1	1	2	2	3	3	
9-Jan	4	4	1	2	3	3	3	2	1	1	2	2	2	1	1	1	2	1	2	1	1	AF	1	4	
10-Jan	1	1	1	1	AF	1	1	1	AF	AF	AF	1	3	1	1	2	1	1	1	1	1	2	1	3	
11-Jan	2	2	2	2	1	2	2	3	5	5	8	8	6	8	6	5	3	3	1	1	1	2	2	8	
12-Jan	1	1	AF	1	1	1	1	1	1	1	2	2	3	4	3	2	3	2	1	1	2	4	1	4	
13-Jan	1	2	1	1	1	AF	1	1	1	1	1	2	2	1	2	1	1	AF	1	1	1	1	1	2	
14-Jan	1	1	1	1	1	1	1	1	1	2	1	2	1	1	1	2	2	1	3	2	2	2	2	3	
15-Jan	2	3	4	3	3	3	3	3	4	5	5	5	5	4	3	3	1	2	2	2	2	1	1	5	
16-Jan	1	2	2	1	1	2	2	2	2	1	2	3	2	2	1	2	2	2	2	2	1	1	2	3	
17-Jan	2	2	2	2	1	2	2	3	3	3	3	3	4	3	1	2	1	1	1	1	2	1	1	4	
18-Jan	AF	1	AF	1	AF	AF	AF	1	AF	1	1	2	2	1	1	1	1	1	1	1	1	1	1	2	
19-Jan	2	3	3	2	2	2	2	2	3	2	2	2	2	2	1	2	2	1	1	2	1	1	1	3	
20-Jan	1	1	2	2	1	1	1	1	1	2	1	1	1	1	1	2	1	1	1	AF	2	2	1	2	
21-Jan	2	2	2	3	3	3	4	4	3	3	3	3	4	4	4	3	3	3	3	3	3	3	3	4	
22-Jan	3	4	4	3	4	4	3	3	3	3	2	2	2	2	2	2	1	1	1	1	1	0	1	4	
23-Jan	1	AF	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	2	
24-Jan	1	1	1	2	1	1	2	1	1	1	1	2	2	2	2	2	2	1	1	2	1	1	1	2	
25-Jan	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	1	2	2	1	1	1	2	2	
26-Jan	2	1	1	1	1	2	1	1	1	1	2	2	1	2	2	1	4	4	4	5	5	5	3	5	
27-Jan	3	2	2	3	3	3	3	4	5	5	4	4	4	3	2	1	2	2	2	2	2	3	3	5	
28-Jan	2	2	2	1	1	2	1	1	1	1	1	1	1	2	1	2	1	1	1	AF	1	1	1	2	
29-Jan	1	2	2	1	1	4	4	4	2	1	2	3	4	4	3	2	2	1	1	2	2	2	2	4	
30-Jan	1	2	2	1	2	3	2	2	2	6	5	4	2	3	6	4	3	5	4	4	4	3	5	6	
31-Jan	5	4	4	3	3	2	1	2	2	AF	1	2	3	2	2	1	1	2	2	2	2	2	1	5	
	10	8	4	3	4	4	4	4	5	6	8	8	6	8	6	5	4	5	4	5	5	5	5	4	

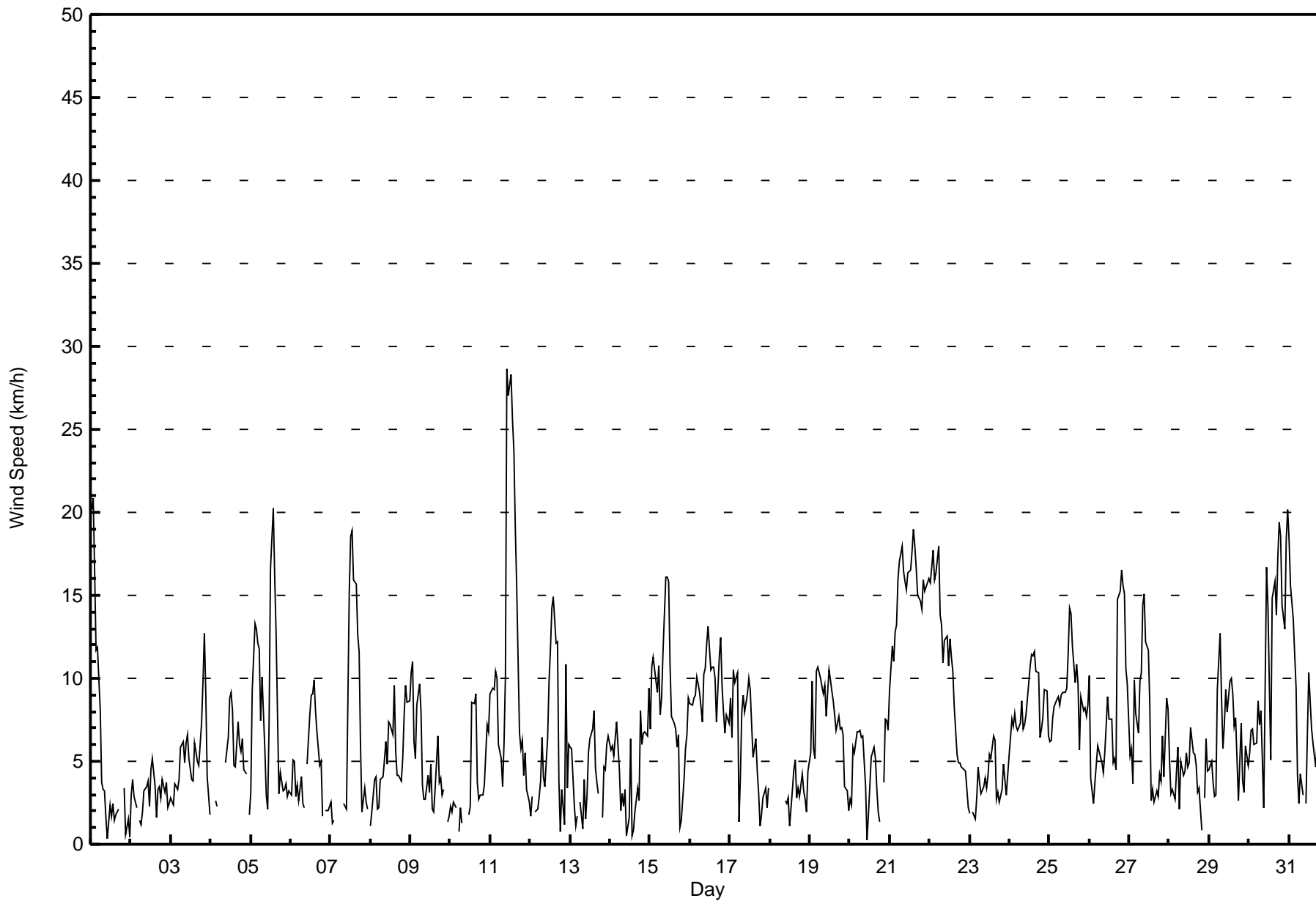
Diurnal Maximum

AF - Analyzer Failure



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Fort McKay South - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Fort McKay South - January 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	326	46.05	46.05
6 - 11	280	39.55	85.59
12 - 19	93	13.14	98.73
20 - 28	8	1.13	99.86
29 - 38	1	0.14	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Fort McKay South - January 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	11	2	3	3	3	3	9	31	76	58	31	28	18	14	16	20	326
6 - 11	31	9	1	0	0	0	2	50	93	27	19	26	13	4	3	2	280
12 - 19	50	13	0	0	0	0	0	5	6	1	0	12	3	0	0	3	93
20 - 28	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	8
29 - 38	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	96	24	4	3	3	3	11	86	175	86	50	66	34	18	19	30	708

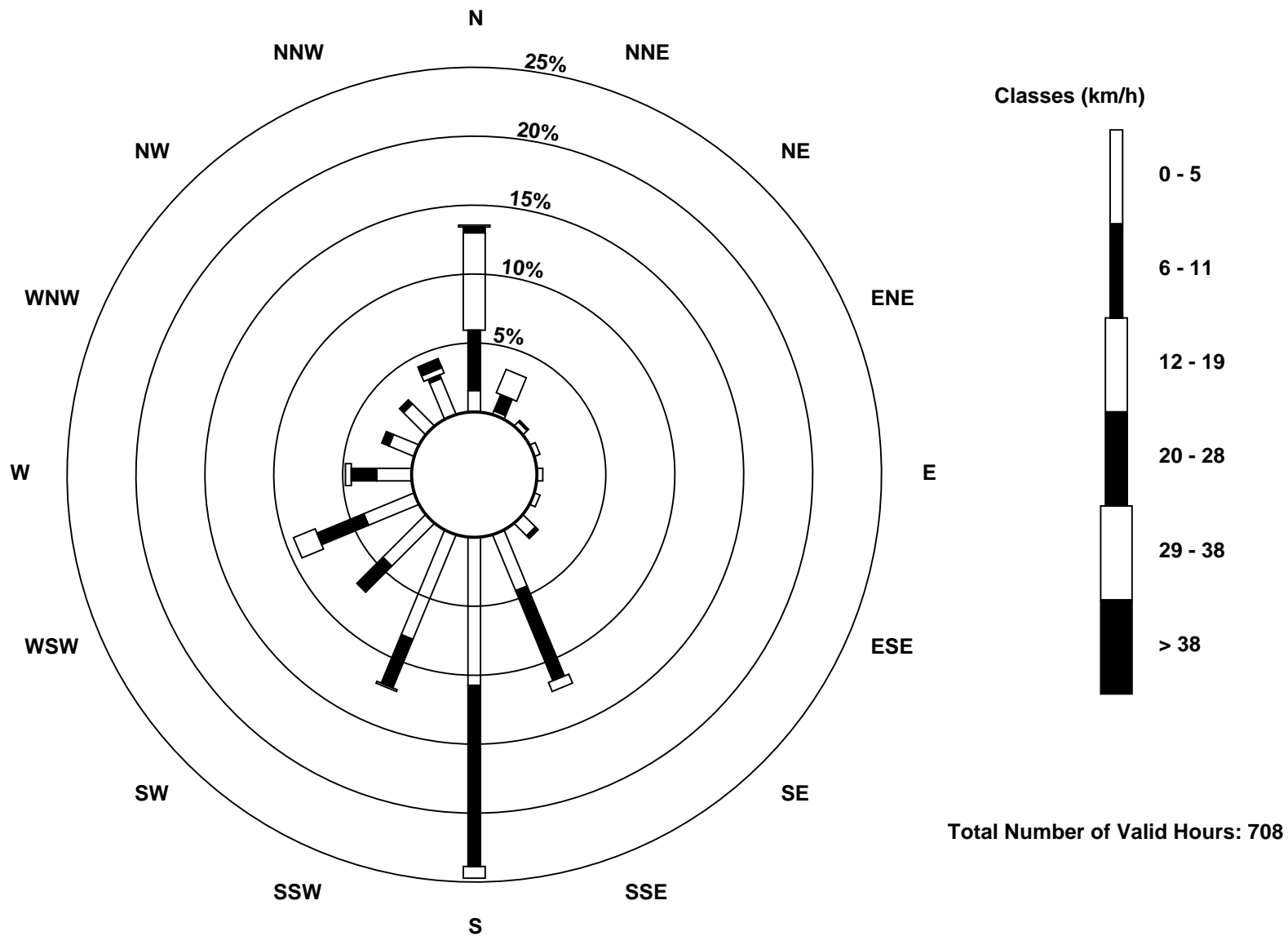
Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

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 - January 2017

Direction of Maximum Speed: 6 deg on Jan 11 11:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 7.0 deg on Jan 21	Hours of Data: 708
Direction of Minimum Speed: 69 deg on Jan 20 11:00	Hours of Missing Data: 36
Direction of Minimum Daily Speed Average: 1.8 deg on Jan 18	Percent Operational Time: 95.2
Monthly Average Direction: 223.2 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-Jan	332	331	4	10	6	3	341	281	218	201	247	274	319	114	139	200	304	AF	217	AF	193	250	225	262	339.8
2-Jan	242	199	242	166	AF	163	167	183	189	187	158	154	148	152	134	96	171	183	189	189	187	191	199	217	178.8
3-Jan	224	229	215	207	224	197	198	189	200	188	172	162	133	135	150	146	159	258	271	266	263	270	304	312	215.0
4-Jan	AF	AF	AF	353	1	AF	112	AF	AF	167	151	150	152	197	172	164	178	179	183	174	160	152	AF	355	--
5-Jan	324	352	7	13	21	14	18	8	35	39	39	13	9	4	359	11	14	354	339	327	330	303	257	241	4.8
6-Jan	186	185	177	200	184	234	227	191	217	AF	168	172	172	155	151	173	195	189	177	180	AF	251	259	327	181.8
7-Jan	294	236	265	AF	AF	AF	AF	AF	329	8	357	9	7	12	10	10	14	20	14	302	258	241	213	AF	3.6
8-Jan	307	188	167	183	199	207	190	204	191	188	177	150	149	145	148	160	176	186	189	177	205	217	236	252	186.7
9-Jan	262	256	193	177	246	257	262	274	198	192	329	353	342	356	212	252	266	298	308	277	225	AF	250	235	259.0
10-Jan	331	287	318	348	AF	250	257	238	AF	AF	AF	136	138	147	149	166	204	236	201	196	177	180	159	149	174.1
11-Jan	156	159	160	157	161	151	189	279	359	343	6	351	344	343	342	346	346	316	306	303	294	276	257	274	340.3
12-Jan	197	254	AF	213	230	224	198	185	184	197	189	159	164	162	166	176	174	150	261	2	195	177	192	176	177.3
13-Jan	194	176	219	154	186	AF	349	246	185	123	169	160	174	147	160	179	189	209	AF	253	182	191	178	180	178.0
14-Jan	187	177	182	188	182	199	202	210	207	189	171	154	151	61	290	171	229	186	243	308	195	179	208	203	194.3
15-Jan	212	234	249	252	263	248	250	238	237	240	251	254	252	234	226	226	174	210	184	327	168	173	177	178	233.4
16-Jan	189	201	192	178	172	176	181	172	182	182	176	185	171	164	174	178	176	191	196	201	206	207	188	189	183.8
17-Jan	187	188	190	189	187	274	202	223	228	238	231	218	245	231	173	176	192	206	276	200	257	204	177	190	208.4
18-Jan	AF	198	AF	257	AF	AF	AF	346	AF	11	322	136	221	82	179	186	196	212	208	173	195	187	191	197	190.1
19-Jan	16	360	20	38	0	3	355	359	354	355	1	1	1	358	359	360	4	2	0	352	358	291	342	67	0.4
20-Jan	157	133	187	198	173	175	178	173	185	193	69	145	152	180	172	194	209	225	284	AF	357	9	6	26	175.1
21-Jan	13	7	8	8	11	6	3	5	6	7	7	4	12	14	10	5	9	7	9	7	9	3	1	0	7.0
22-Jan	1	8	10	9	12	10	16	10	18	7	6	357	7	9	357	343	343	340	335	344	345	330	320	307	2.9
23-Jan	298	AF	291	296	309	311	307	332	268	270	237	246	189	150	151	150	170	245	237	235	208	186	189	192	222.5
24-Jan	192	185	186	162	178	180	166	170	169	164	162	162	162	163	155	170	179	183	194	187	187	187	183	194	174.5
25-Jan	197	188	176	182	186	184	182	182	183	177	169	155	165	168	170	177	182	185	194	185	190	190	190	182	179.1
26-Jan	172	171	183	184	183	168	169	174	177	170	157	154	165	168	185	185	222	249	253	258	258	262	255	252	214.9
27-Jan	267	193	206	263	269	237	245	257	264	256	249	248	241	180	200	190	249	286	222	201	219	200	259	258	245.2
28-Jan	204	192	154	186	176	165	170	176	179	177	172	157	154	160	157	163	180	203	248	210	AF	199	175	165	174.9
29-Jan	168	205	157	222	166	236	251	232	166	168	161	188	252	261	246	201	211	221	263	257	271	221	236	225	221.5
30-Jan	189	219	211	171	222	240	224	241	207	314	16	20	15	13	331	349	11	9	8	8	3	351	0	0	351.9
31-Jan	357	358	3	3	3	321	245	264	233	AF	98	164	189	204	224	215	228	251	265	299	289	292	308	320	307.7

247.9 250.8 221.9 207.8 231.0 252.0 238.1 239.2 219.6 223.6 231.7 176.3 178.8 136.8 161.1 180.0 210.2 246.6 268.2 261.5 245.8 232.8 240.1 231.2
 Diurnal Average

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



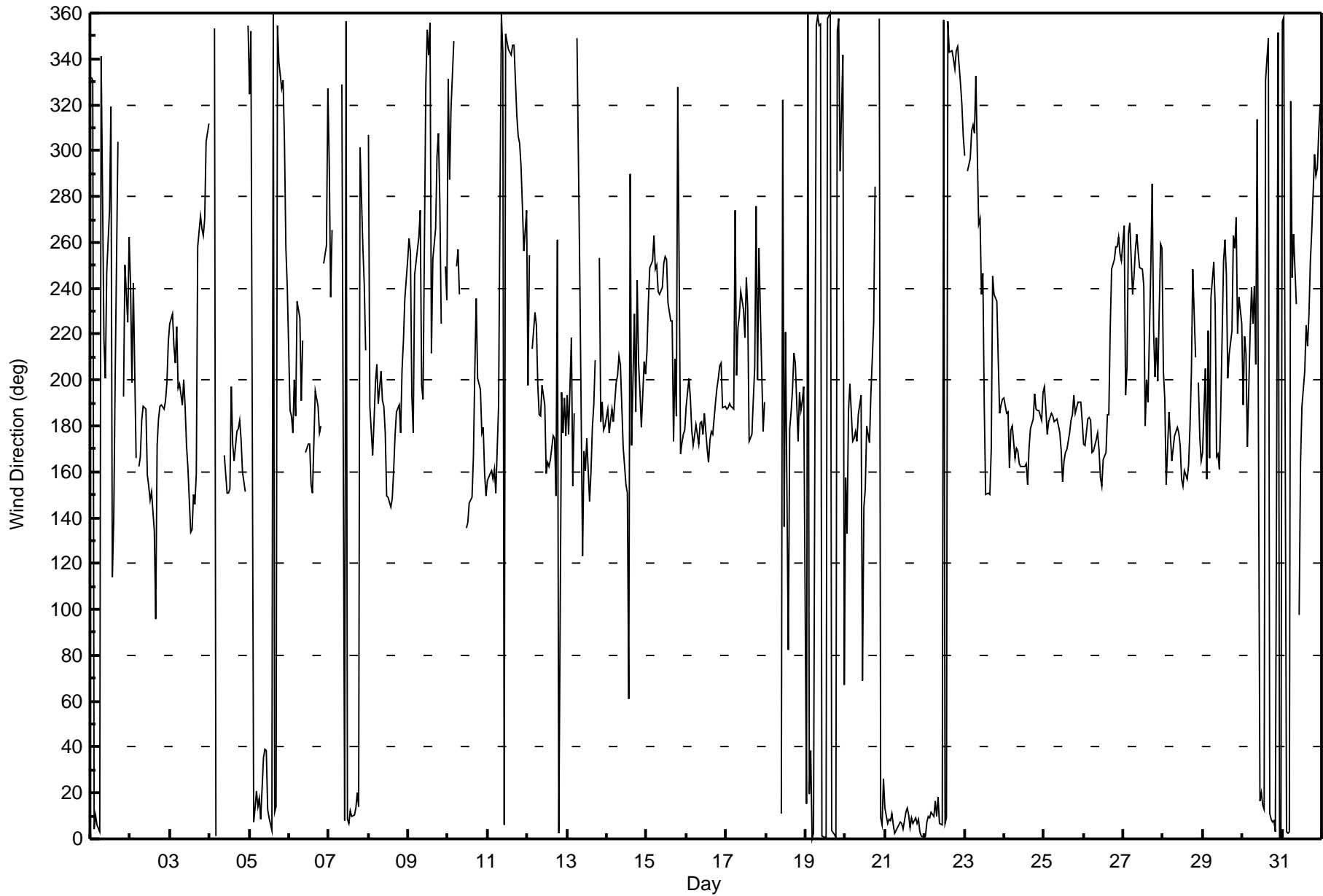
Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Fort McKay South - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 105 deg on Jan 2 00:00	Hours of Data: 708
Minimum Value: 5 deg on Jan 24 23:00	Hours of Missing Data: 36
Percentiles: P ₁ = 6 P ₁₀ = 10 Q ₁ = 13 Median = 18 Q ₃ = 31 P ₉₀ = 55 P ₉₉ = 93	Hours of Calibration: 0
	Percent Operational Time: 95.2

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-Jan	27	17	20	14	18	17	23	33	39	69	94	61	78	71	55	54	43	AF	51	AF	33	89	90	105	105
2-Jan	31	25	67	60	AF	77	81	43	16	16	15	25	15	9	27	42	21	22	18	20	18	25	19	16	81
3-Jan	18	26	15	13	20	16	15	12	14	10	10	16	18	28	17	11	13	59	24	21	19	29	51	80	80
4-Jan	AF	AF	AF	37	32	AF	28	AF	AF	15	12	9	10	23	20	18	6	11	8	12	36	28	AF	63	63
5-Jan	22	29	13	15	13	12	16	15	19	24	35	23	15	16	16	15	16	22	17	29	34	18	46	34	46
6-Jan	39	12	23	21	12	15	19	31	19	AF	14	15	18	10	8	15	12	15	11	94	AF	57	56	57	94
7-Jan	55	69	61	AF	AF	AF	AF	AF	23	29	13	15	13	15	16	15	14	15	12	48	10	31	67	AF	69
8-Jan	55	36	53	14	40	51	13	21	10	11	13	8	7	16	7	13	16	21	15	13	11	17	22	25	55
9-Jan	28	23	25	12	26	23	23	60	51	53	39	47	26	80	63	32	19	35	29	42	44	AF	81	73	81
10-Jan	36	47	25	40	AF	71	39	54	AF	AF	AF	48	72	6	6	12	16	29	14	20	23	22	12	14	72
11-Jan	9	11	9	8	12	15	40	73	26	19	18	20	17	18	19	17	15	30	14	12	18	19	37	60	73
12-Jan	53	19	AF	34	22	18	19	7	16	13	12	11	12	11	10	11	11	58	75	14	87	16	24	13	87
13-Jan	21	20	50	99	69	AF	14	72	17	50	41	11	14	7	13	19	18	23	AF	65	8	10	14	13	99
14-Jan	11	9	11	13	7	17	68	22	44	38	90	91	7	82	78	83	65	72	31	35	25	18	20	15	91
15-Jan	20	20	24	27	28	20	30	29	24	20	22	22	38	46	36	33	26	28	93	80	55	17	13	9	93
16-Jan	18	15	20	14	8	15	10	19	10	10	9	14	10	10	12	12	14	9	12	13	12	13	10	12	20
17-Jan	10	25	11	9	10	68	31	21	22	21	20	21	26	31	30	17	11	23	73	38	43	38	39	19	73
18-Jan	AF	27	AF	54	AF	AF	AF	30	AF	21	42	69	102	31	26	13	48	28	27	18	26	33	57	18	102
19-Jan	62	15	36	38	14	14	15	14	16	15	14	15	15	16	14	17	16	14	14	17	14	37	32	59	62
20-Jan	33	42	15	14	12	10	12	13	9	38	97	52	13	15	17	10	13	27	59	AF	73	9	13	15	97
21-Jan	14	14	13	15	14	15	16	14	14	14	15	16	14	14	14	15	14	13	14	14	14	13	14	15	16
22-Jan	15	16	13	14	14	13	14	13	16	14	13	15	13	16	16	14	12	12	11	14	14	17	11	11	17
23-Jan	20	AF	62	28	22	17	25	22	30	39	36	35	26	25	14	11	35	10	20	10	12	14	22	9	62
24-Jan	9	9	9	13	10	10	10	11	9	11	12	10	13	10	9	11	9	6	9	10	9	7	5	10	13
25-Jan	12	10	6	6	8	7	6	6	7	7	10	8	9	8	9	9	8	10	17	7	8	8	8	7	17
26-Jan	7	13	31	21	9	15	13	9	18	16	12	12	14	23	42	25	68	19	21	20	20	21	21	24	68
27-Jan	54	38	54	25	33	47	24	32	26	22	22	22	35	73	53	44	24	55	43	43	21	47	28	34	73
28-Jan	53	75	49	35	17	21	49	23	30	28	25	20	27	11	20	25	16	22	21	100	AF	25	12	36	100
29-Jan	46	40	67	54	37	26	21	37	28	15	13	58	32	29	30	21	15	70	22	18	51	73	29	51	73
30-Jan	17	14	16	25	24	15	16	15	46	76	16	16	15	42	26	21	14	15	15	15	15	17	15	16	76
31-Jan	15	15	15	13	17	29	49	22	50	AF	62	30	17	29	28	26	22	20	19	27	35	27	21	16	62
	62	75	67	99	69	77	81	73	51	76	97	91	102	82	78	83	68	72	93	100	87	89	90	105	
	Diurnal Maximum																								

AF - Analyzer Failure





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 18, 2017	Last Calibration	December 7, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	8:50	End Time (MST)	11:28
Gas Cert Reference	LL110515	Station temp.	22 Deg C
Cal Gas Concentration	49.8 ppm	Cal Gas Exp Date	9/08/18
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.	11038

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		HVPS voltage	524	524
Analyzer IP address	192.168.1.73		Lamp voltage	2855	2855
Calculated slope	0.999259	1.002504	Box temp	31.9	31.9
Calculated intercept	2.622764	1.590705	Pressure	25.6	25.6
Analyzer Background	32.2	32.2	Flow	663	663
Analyzer Coefficient	1.026	1.026	Lamp Ratio	96	96
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	-0.3	----
as found span	5000	78.9	785.8	780.8	1.006
calibrator zero	5000	0.0	0.0	-0.3	----
high point	5000	78.9	785.8	783.1	1.004
second point	5000	39.4	392.4	388.7	1.010
third point	5000	19.7	196.2	193.2	1.016
as left zero	5000	0.0	0.0	0.9	----
as left span	5000	78.9	785.8	777.3	1.011
Average Correction Factor					1.010

Corrected As found 781.1 Previous response 783.8 % change 0.3%

Notes:

filter changed out, no maintenance done, no adjustments done

Calibration Performed By:

Melissa Lemay



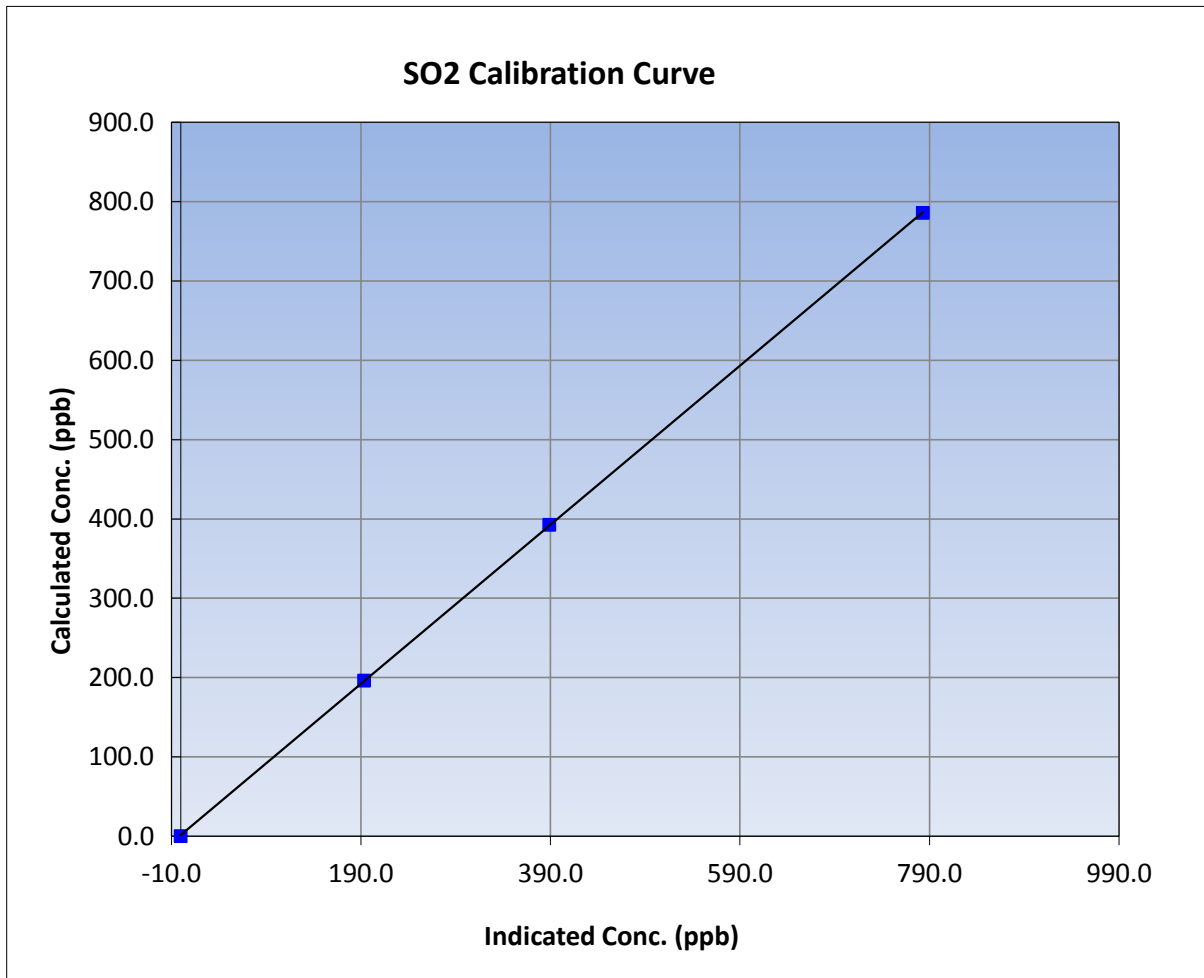
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 18, 2017	Previous Calibration	December 7, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	8:50	End Time (MST)	11:28
Analyzer make	API T100	Analyzer serial #	599

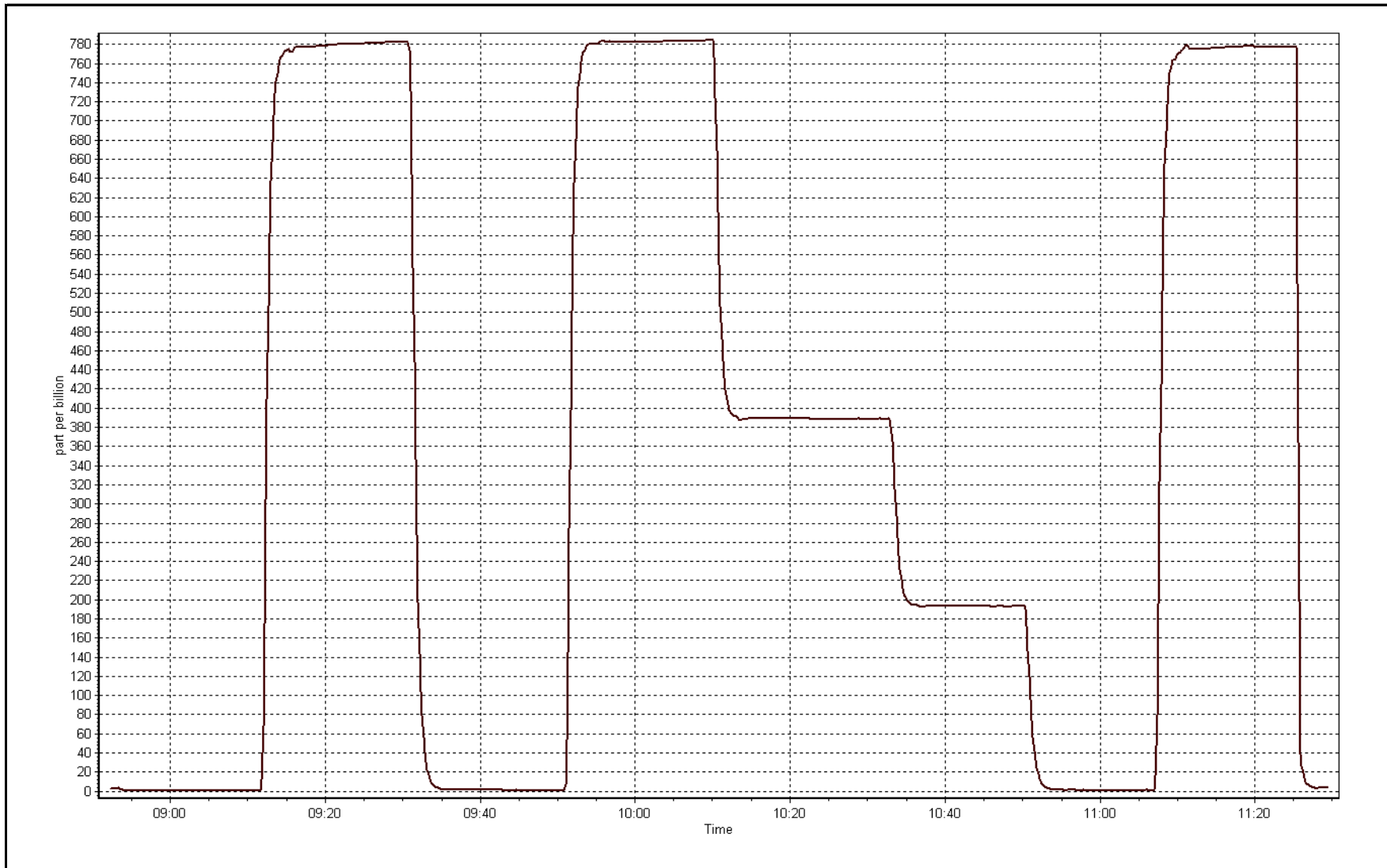
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999987
785.8	783.1	1.0035		
392.4	388.7	1.0096	Slope	1.002504
196.2	193.2	1.0156		
			Intercept	1.590705



SO2 Calibration Plot

Date: January 18, 2017





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	January 17, 2017	Last Calibration	December 7, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	12:28
Gas Cert Reference	CC178364	Station temp.	22 Deg C
Cal Gas Concentration	5.07 ppm	Cal Gas Exp Date	September 9, 2017
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.	11038
SO2 gas concentration	49.8 ppm	SO2 gas cert/exp	LL110515 8/Sep/18

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	1017	1017
Calculated slope	0.994173	0.996231	Chamber temp	45	45
Calculated intercept	0.460342	0.239437	Pressure	696.2	696.2
Analyzer Background	2	2.07	Flow	0.453	0.453
Analyzer Coefficient	1.001	1.016	Intensity	89	89
			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	-0.1	----
as found span	5000	78.9	80.0	78.6	1.018
SO2 scrubber check	5000	17.6	175.3	0.2	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	78.9	80.0	80.1	0.999
second point	5000	39.4	40.0	39.9	1.001
third point	5000	19.7	20.0	19.6	1.019
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	78.9	80.0	80.2	0.998
Average Correction Factor					1.006

Corrected As found	78.7	Previous response	80.0	% change	1.7%
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Notes:

Scrubber check done after as founds. Inlet filter changed. No maintenance done, Span adjusted

Calibration Performed By:

Melissa Lemay



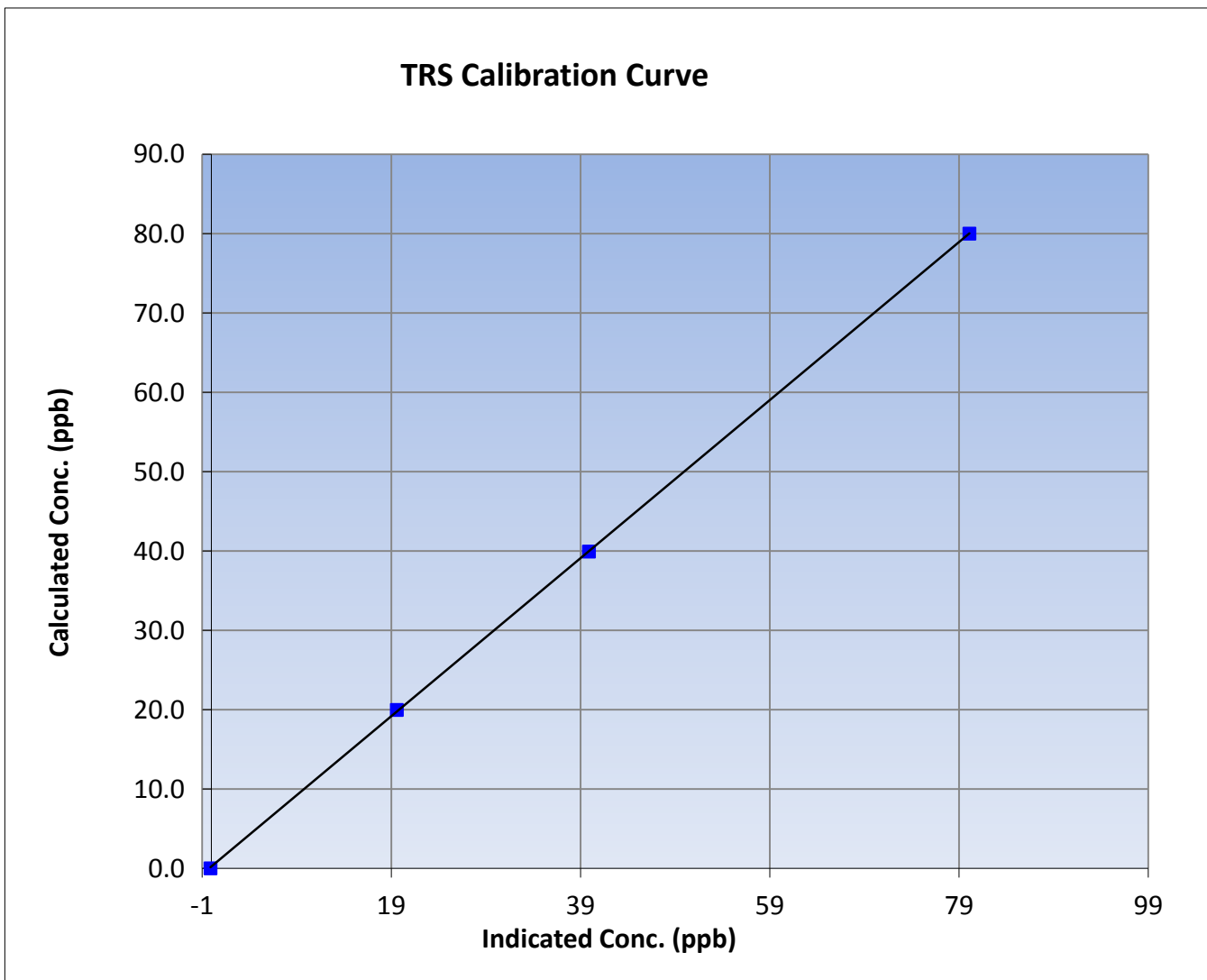
Wood Buffalo Environmental Association TRS Calibration Report

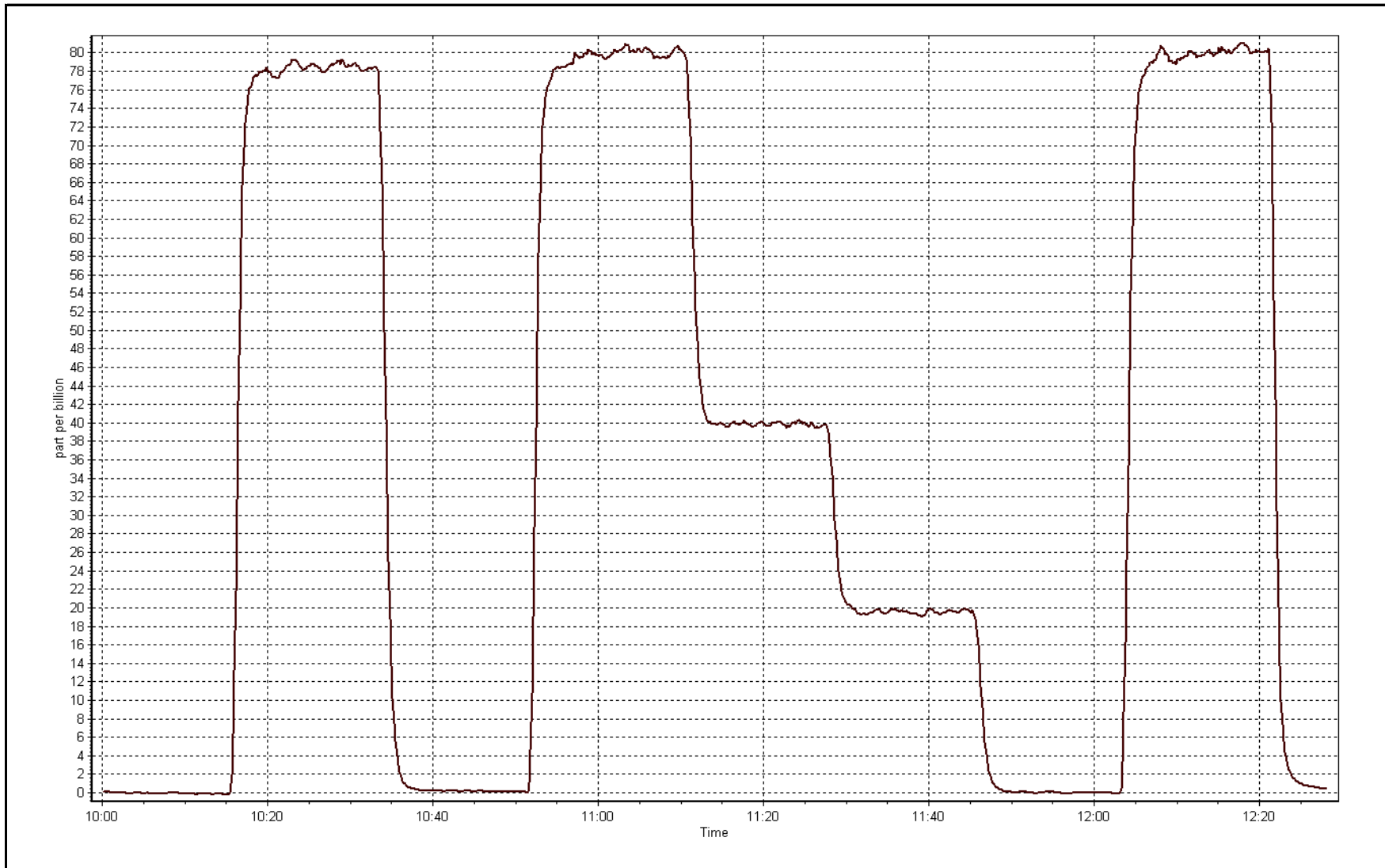
Station Information

Calibration Date	January 17, 2017	Previous Calibration	December 7, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	10:00	End Time (MST)	13:53
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	-0.1	----	Correlation Coefficient	0.999981
80.0	80.1	0.9988		
40.0	39.9	1.0013	Slope	0.996231
20.0	19.6	1.0192		
			Intercept	0.239437







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February 7, 2017	Last Calibration	January 18, 2017
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	9:35	End Time (MST)	11:28
Gas Cert Reference	LL110515	Cal Gas Expiry Date	September 8, 2018
CH4 Cal Gas Conc.	517 ppm	CH4 Equiv Conc.	1067.0 ppm
C3H8 Cal Gas Conc.	200 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	11038

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	34.3	34.3
Calculated slope	0.994026	1.000129	Fuel Pressure	23.1	23.1
Calculated intercept	0.021051	0.033517	Analyzer Coeff	3.107	3.074
			Analyzer BKG	1.190	1.320

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	0.12	----
as found span	5000	78.9	16.84	17.10	0.985
calibrator zero	5000	0.0	0.00	0.01	----
high point	5000	78.9	16.84	16.83	1.000
second point	5000	39.4	8.41	8.33	1.009
third point	5000	19.6	4.18	4.12	1.015
as left zero	5000	0.0	0.00	-0.02	----
as left span	5000	78.9	16.84	16.85	0.999
Average Correction Factor					1.008

Corrected As found 16.98 Previous response 16.92 % change -0.4%

Notes:

no maintenance done, filter changed out, zero and span adjusted

Calibration Performed By:

Melissa Lemay



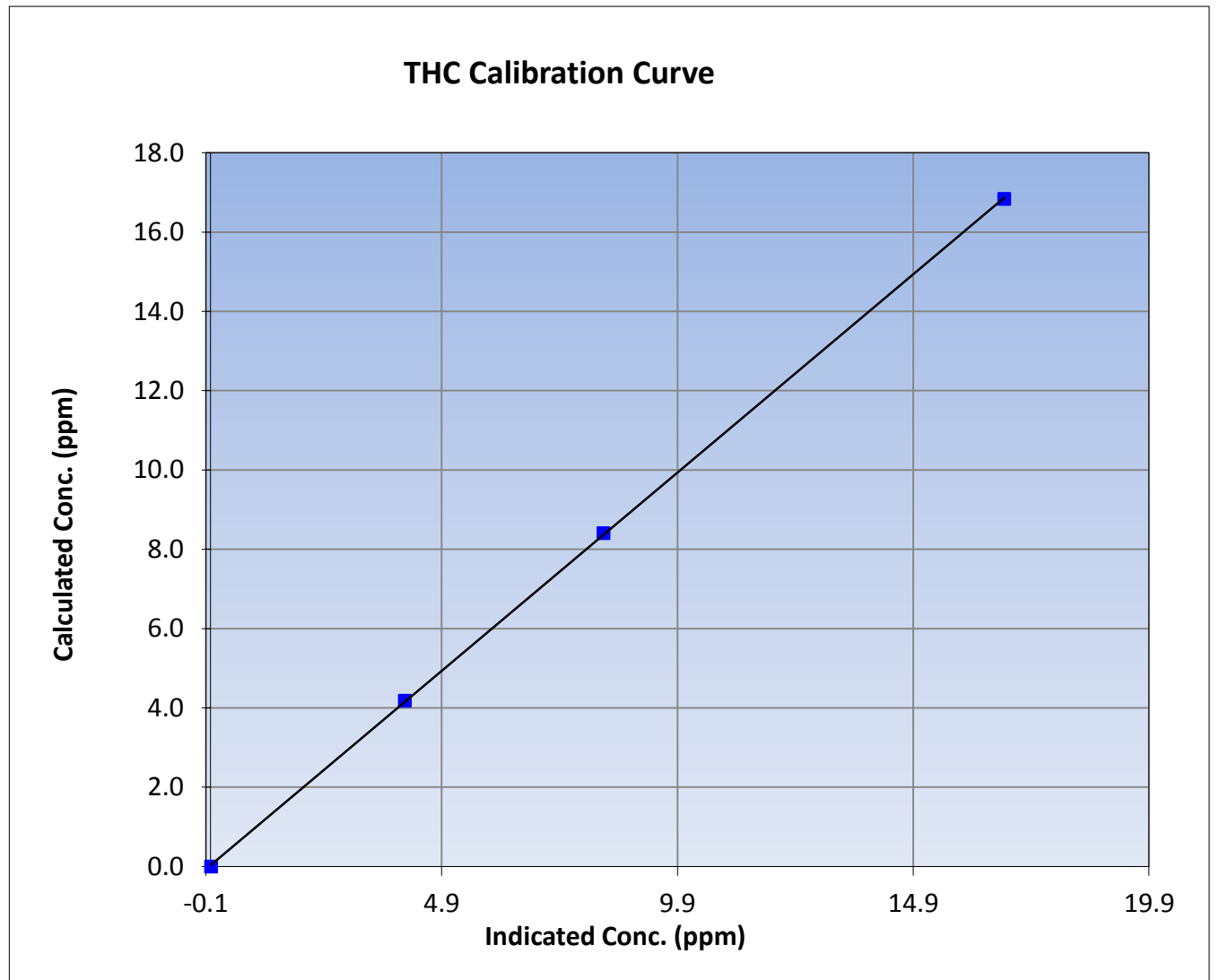
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	February 7, 2017	Previous Calibration	January 18, 2017
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:35	End Time (MST)	11:28
Analyzer make	51i-LT	Analyzer serial #	1505164380

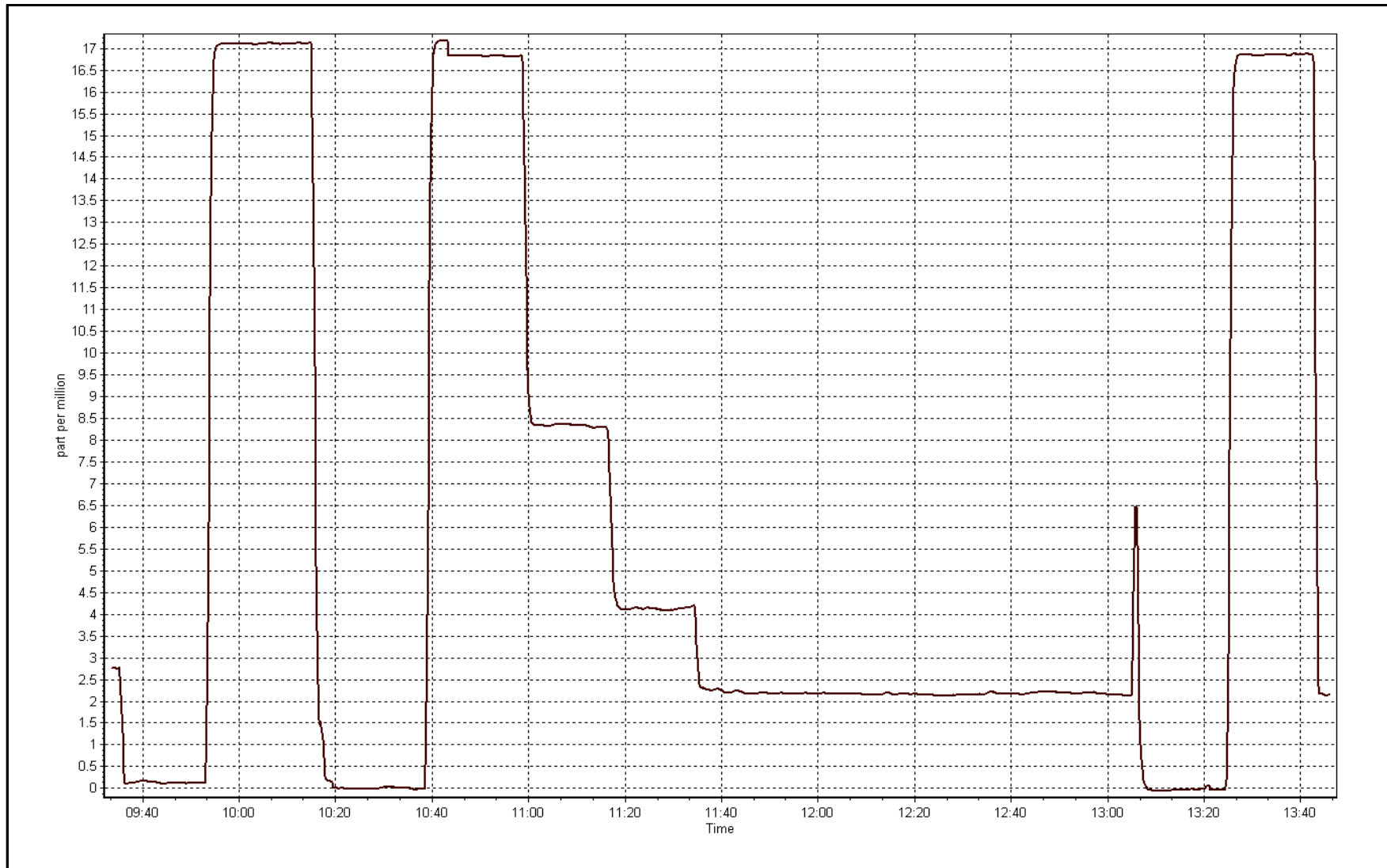
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	----	Correlation Coefficient	0.999965
16.84	16.83	1.0004		
8.41	8.33	1.0094		
4.18	4.12	1.0152		
			Slope	1.000129
			Intercept	0.033517



THC Calibration Plot

Date: February 7, 2017





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	January 18, 2017	Previous Calibration	December 14, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	12:13	End Time (MST)	14:08
NO2 GPT Ref date	January 13, 2017	Transfer Standard	Nox GPT
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	5613
		Serial Number	11038

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Box temp.	25.0	25.0
Analyzer IP address	192.168.1.79		Lamp temp.	58.0	58.0
Calculated slope	1.008612	1.035269	Pressure	25.9	25.9
Calculated intercept	-1.587993	-2.400209	Flow	735.0	735.0
Analyzer Background	1.2	1.2	Intensity	4314.7	4314.7
Analyzer Coefficient	1.002	1.002			

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	0.3	----
as found span	5000	0.89	359.7	347.3	1.036
calibrator zero	5000	0.00	0.0	0.3	----
high point	5000	0.89	359.7	347.3	1.036
second point	5000	0.47	207.8	206.8	1.005
third point	5000	0.36	109.8	109.1	1.006
as left zero	5000	0.00	0.0	1.0	----
as left span	5000	0.89	359.7	348.1	1.033
Average Correction Factor					1.016

Corrected As found	347.0	Previous response	358.2	% change	3.2%
--------------------	-------	-------------------	-------	----------	------

Notes:

filter changed out, no adjustments or maintenance done, NO2 GPT Ref was checked on Jan 18, 2017 was within 3% of NO2 GPT on Jan 13, 2017; Jan 13, 2017 Nox GPT used for O3 calibration

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association O3 Calibration Report

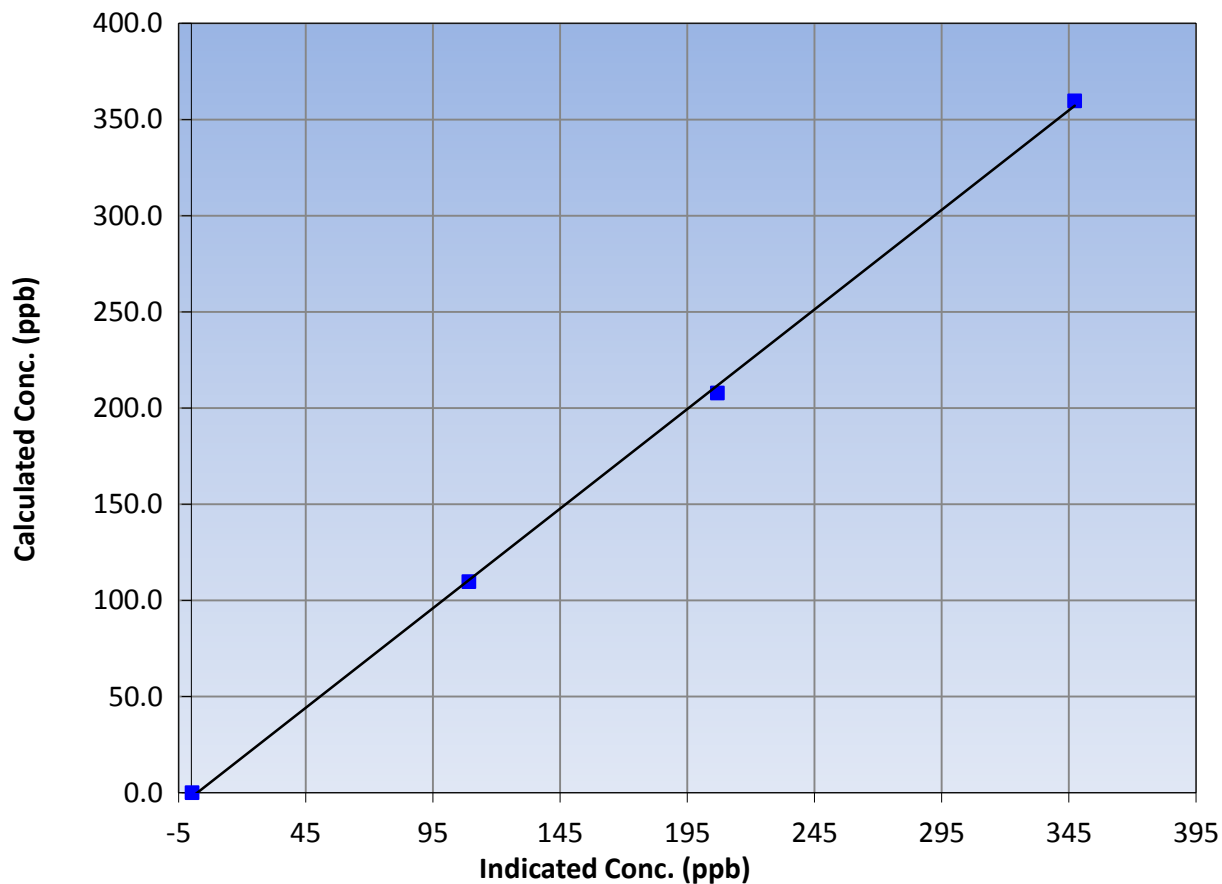
Station Information

Calibration Date	January-18-17	Previous Calibration	December 14, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	12:13	End Time (MST)	14:08
Analyzer make	API T400	Analyzer serial #	825

Calibration Data

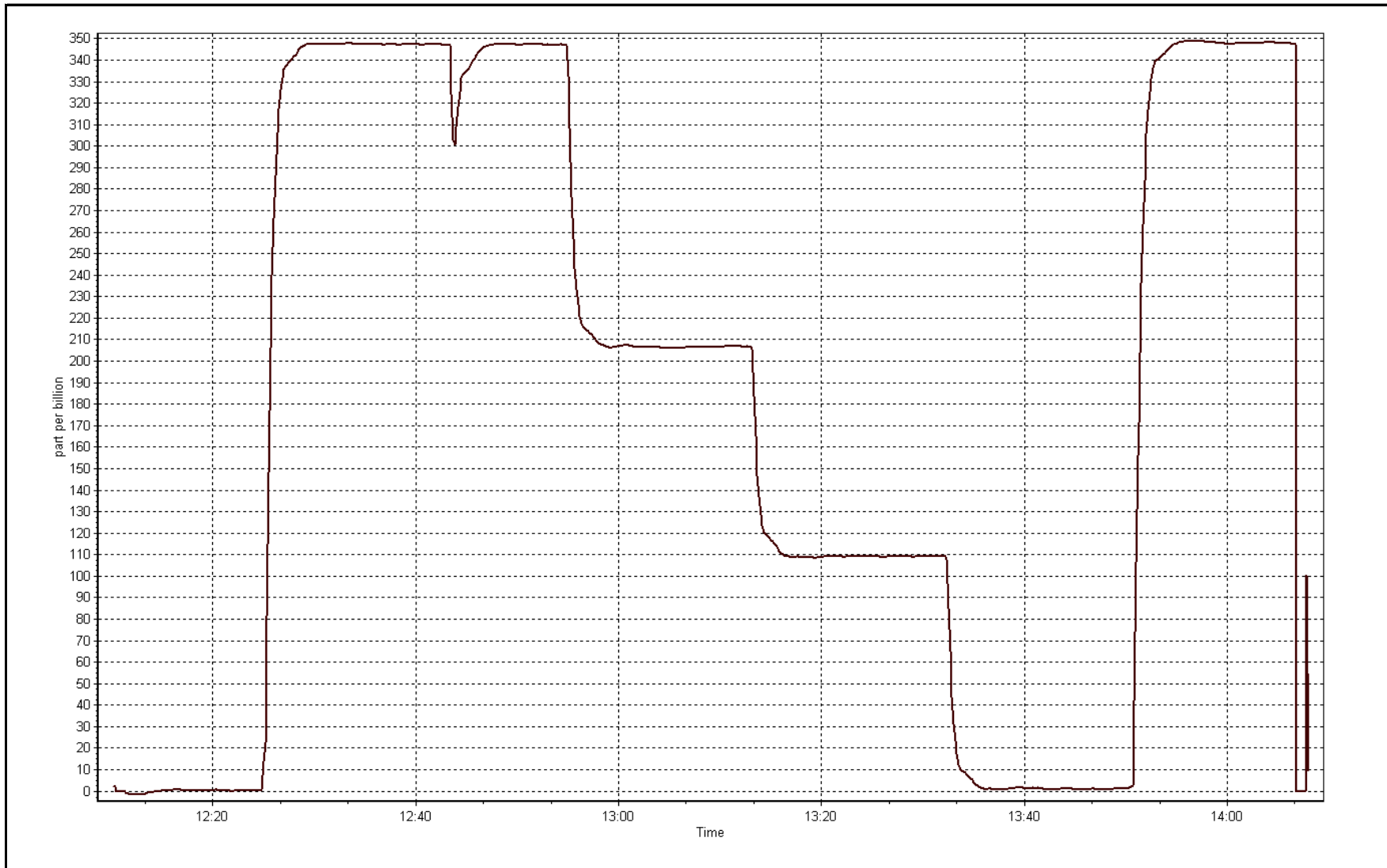
Calculated concentration (ppb) (Cc)	11/10/16	Correction factor (Cc/lc)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999620
359.7	347.3	1.0357		
207.8	206.8	1.0048	Slope	1.035269
109.8	109.1	1.0064		
			Intercept	-2.400209

O3 Calibration Curve



O3 Calibration Plot

Date: January 18, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 13, 2017	Previous Calibration	December 14, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	9:40	End Time (MST)	13:44
NO Cal Gas Conc	50.7 ppm	Gas Cert Reference	LL110515
NOx Cal Gas Conc	50.9 ppm	Cal Gas Expiry Date	September 8, 2018
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.	11038
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.999105	0.998232	1.005421
	Data Offset	2.697226	2.969484	-0.765164
Current Calibration	Data Slope	1.000624	1.000283	0.999911
	Data Offset	0.941527	0.881312	-1.142541

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1410661329
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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	1.254		1.016	
NOx coefficient	1.000		1.003	
NO2 coefficient	1.000		1.000	
NO bkgnd	9.4		7.5	
NOx bkgnd	9.5		7.6	
Chamber Temp	50.5	Deg C	50.2	Deg C
Moly Temp	326.8	Deg C	323.7	Deg C
PMT voltage	-828.1	V	-827.7	V
PMT Temp	-2.8	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	255.5	mmHg	181.2	mmHg
R Cell Press Nox	255.5	mmHg	181.2	mmHg
NO sample flow	0.617	lpm	0.881	lpm
Nox sample Flow	0.619	lpm	0.884	lpm

Notes:

pump and charcoal changed out, filter changed out, span adjusted; During as found span pressure changed from 256mmHg to 248mmHg. Nox span slowly went up from 680 to 720ppb. Let it stabilize before changing the pump.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: January 13, 2017 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	0.0	0.0	0.0	----	----
as found span	5000	78.9	803.2	800.0	3.2	724.4	722.7	1.7	1.1088	1.1070
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	0.2	0.0	----	----
high point	5000	78.9	803.2	800.0	3.2	802.5	799.6	2.8	1.0009	1.0006
second point	5000	39.4	401.1	399.5	1.6	398.8	397.6	1.2	1.0057	1.0048
third point	5000	19.7	200.5	199.8	0.8	198.7	198.0	0.7	1.0093	1.0089
as left zero	5000	0.0	0.0	0.0	0.0	0.2	0.1	0.0	----	----
as left span	5000	78.9	803.2	441.0	362.2	808.3	442.7	365.6	0.9937	0.9962
Average Correction Factor									1.0053	1.0048

Corrected As found NO_x= 724.4 NO= 722.7 Percent Change NO_x= 10.6% NO= 10.5%
 Previous Response NO_x= 801.2 NO= 798.5

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 78.90 ccm NOx ref calc conc = 803.2 ppb NO ref calc conc = 800.0 ppb

O3 Setpoint (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
1st NO ref point		3.2	803.7	800.7	0.0	0.9994	0.9992	----	----
1st NO2 (300)	441.0	362.9	804.3	441.0	363.3	0.9986	----	0.9988	100.1%
2nd NO2 (200)	588.1	215.8	805.5	588.1	217.4	0.9971	----	0.9924	100.8%
3rd NO2 (100)	690.9	113.0	806.3	690.9	115.5	0.9962	----	0.9780	102.3%
2nd NO ref point		3.2	808.0	805.0	3.0	0.9941	0.9938	----	----
Average Correction Factor						0.9965		0.9897	101.0%

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

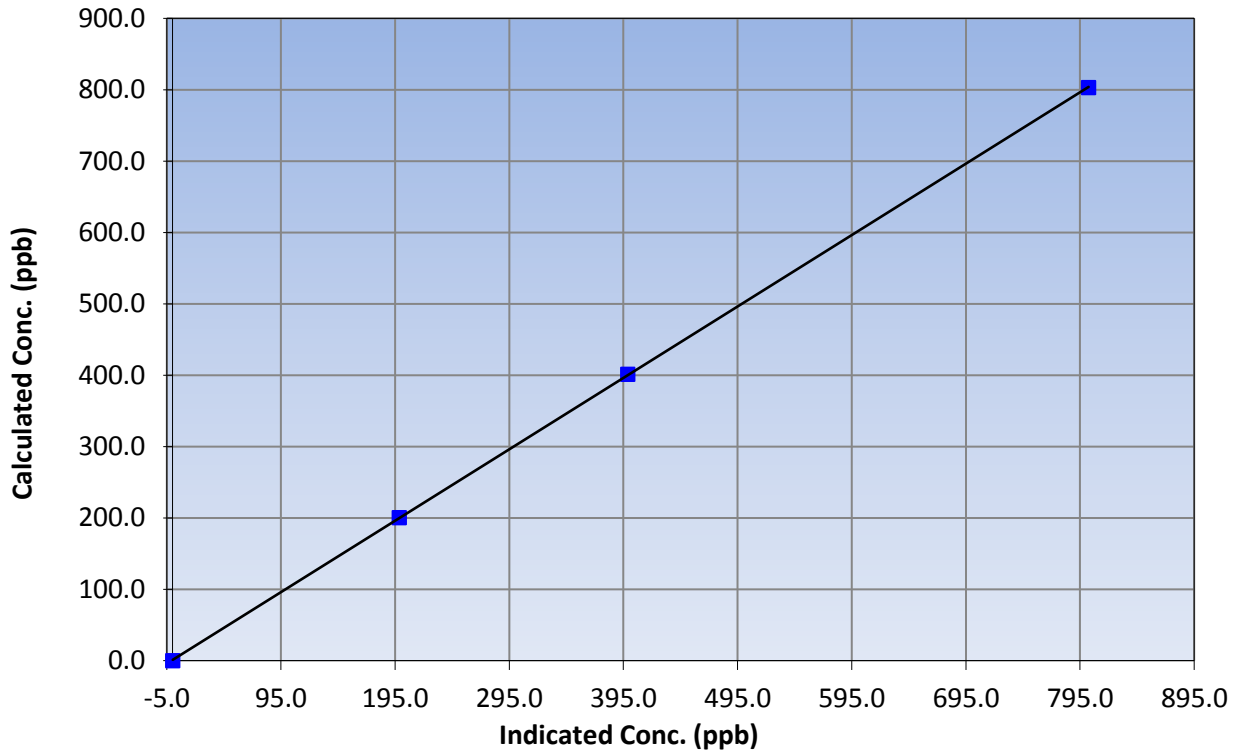
Station Information

Calibration Date	January 13, 2017	Previous Calibration	December 14, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:40	End Time (MST)	13:44
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	0.999990
803.2	802.5	1.0009		
401.1	398.8	1.0057	Slope	1.000624
200.5	198.7	1.0093		
			Intercept	0.941527

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

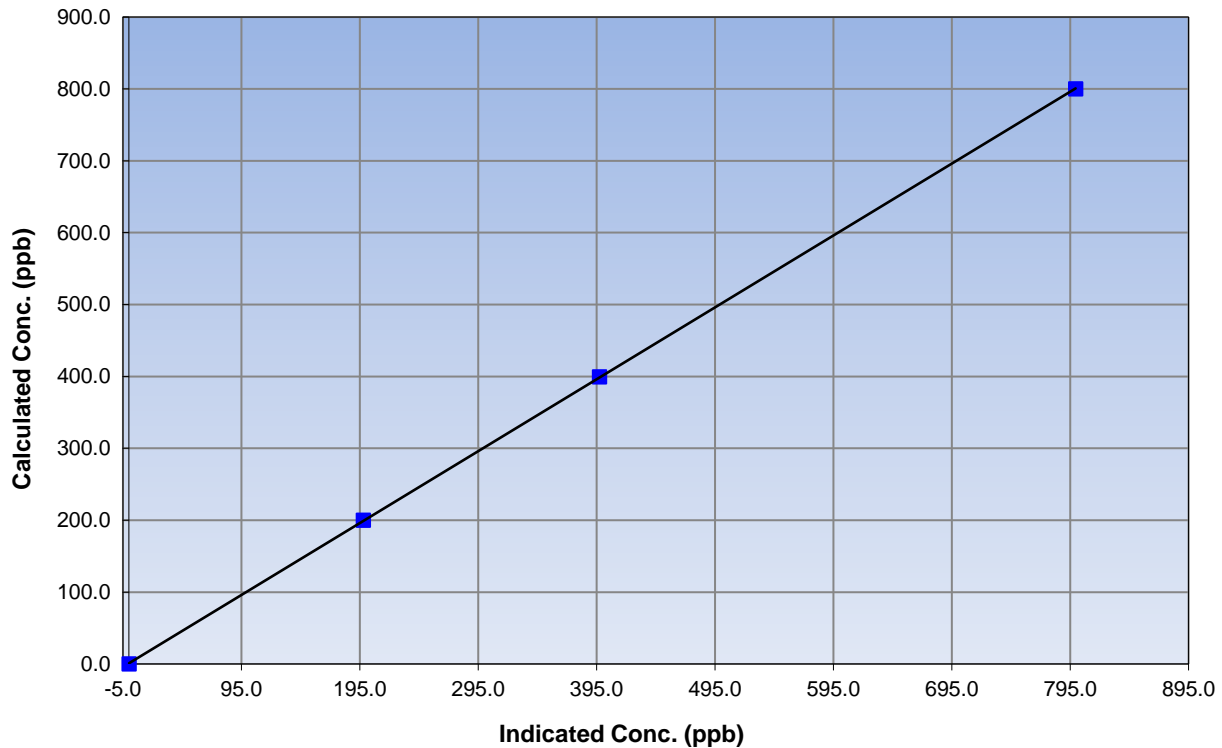
Station Information

Calibration Date	October 26, 2016	Previous Calibration	December 14, 2016
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:40	End Time (MST)	13:44
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	0.999991
800.0	799.6	1.0006		
399.5	397.6	1.0048	Slope	1.000283
199.8	198.0	1.0089		
			Intercept	0.881312

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

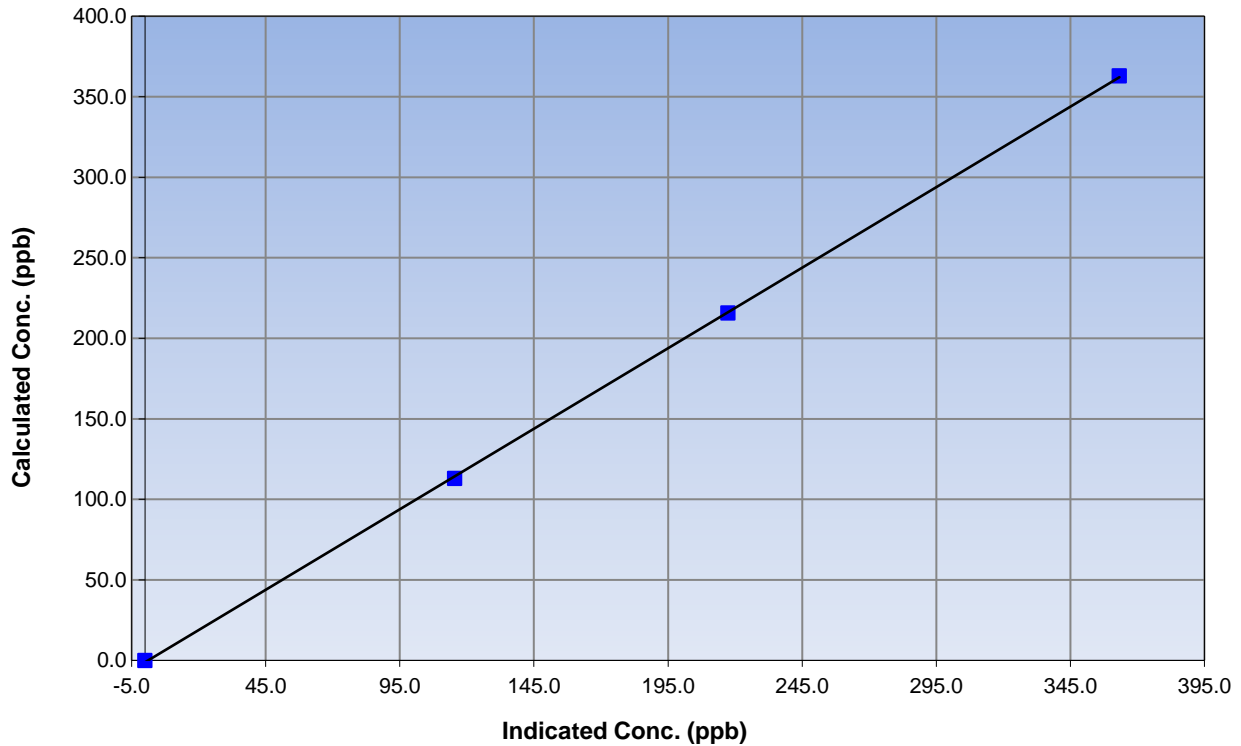
Station Information

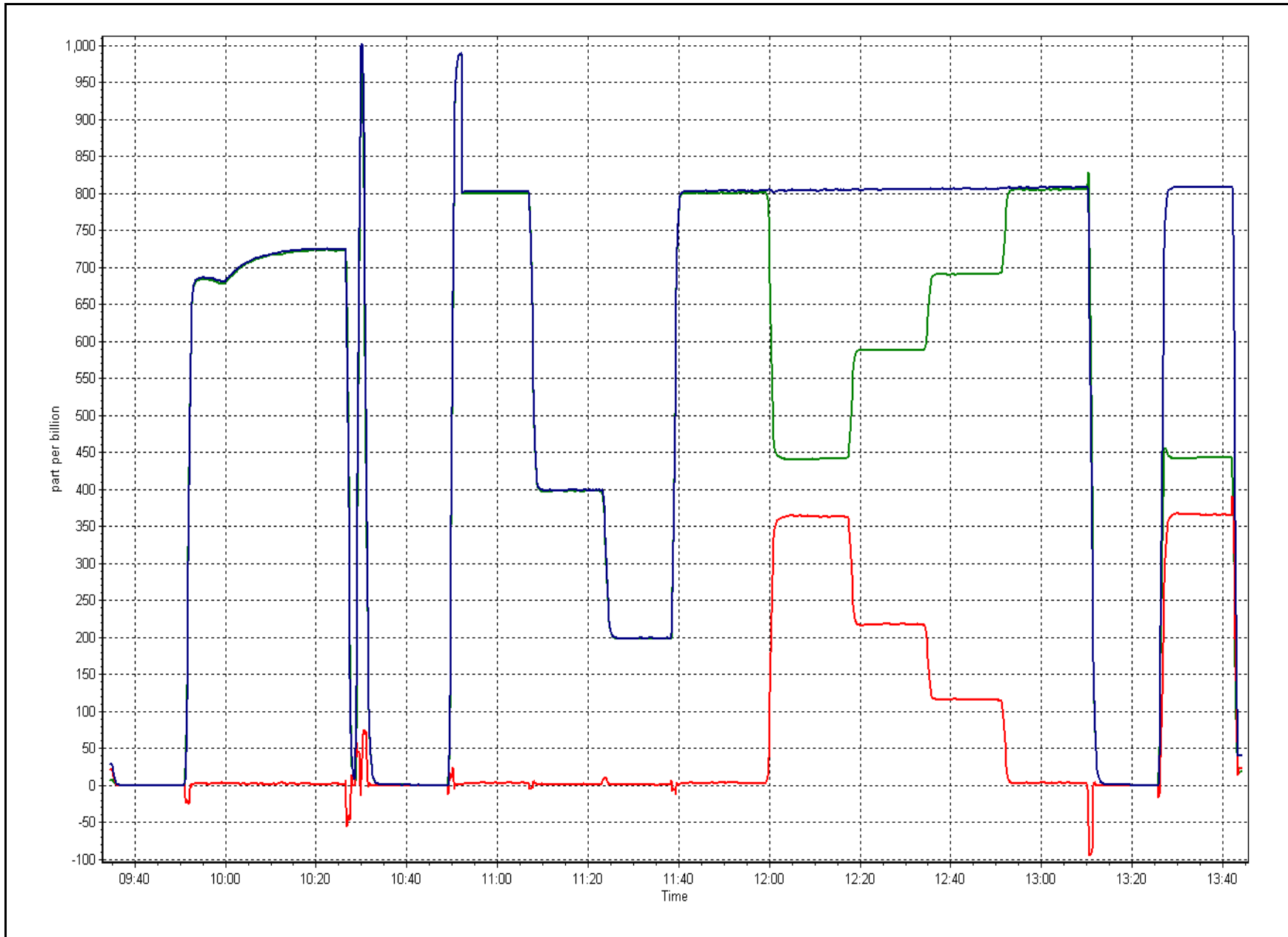
Calibration Date	January 13, 2017	Previous Calibration	December 14, 2016
Station Number	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:40	End Time (MST)	13:44
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999944
362.9	363.3	0.9988		
215.8	217.4	0.9924	Slope	0.999911
113.0	115.5	0.9780		
			Intercept	-1.142541

NO₂ Calibration Curve







Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 18, 2017	Previous Calibration	January 13, 2017
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	<input checked="" type="checkbox"/> Routine <input type="checkbox"/> GPT check		
Start Time (MST)	11:00	End Time (MST)	13:44
NO Cal Gas Conc	50.7 ppm	Gas Cert Reference	LL110515
NOX Cal Gas Conc	50.9 ppm	Cal Gas Expiry Date	September 8, 2018
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.	11038
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.999105	0.998232	1.005421
	Data Offset	2.697226	2.969484	-0.765164
Current Calibration	Data Slope			1.000508
	Data Offset			-0.459508

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1410661329
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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	1.016		1.016	
NOX coefficient	1.003		1.003	
NO2 coefficient	1.000		1.000	
NO bkgrnd	7.5		7.5	
NOX bkgrnd	7.6		7.6	
Chamber Temp	50.2	Deg C	50.2	Deg C
Moly Temp	323.7	Deg C	323.7	Deg C
PMT voltage	-827.7	V	-827.7	V
PMT Temp	-3	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	173	mmHg	173	mmHg
R Cell Press Nox	173.1	mmHg	173.1	mmHg
NO sample flow	0.875	lpm	0.875	lpm
Nox sample Flow	0.877	lpm	0.877	lpm

Notes:

Checking GPT for O3 calibration



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: January 18, 2017 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										
as found span	5000	78.9	803.2	800.0	3.2	805.0	801.0	3.7	0.9978	0.9988
calibrator zero										
high point	5000	78.9	803.2	800.0	3.2	805.0	801.0	3.7	0.9978	0.9988
second point										
third point										
as left zero										
as left span										
Average Correction Factor									0.9978	0.9988

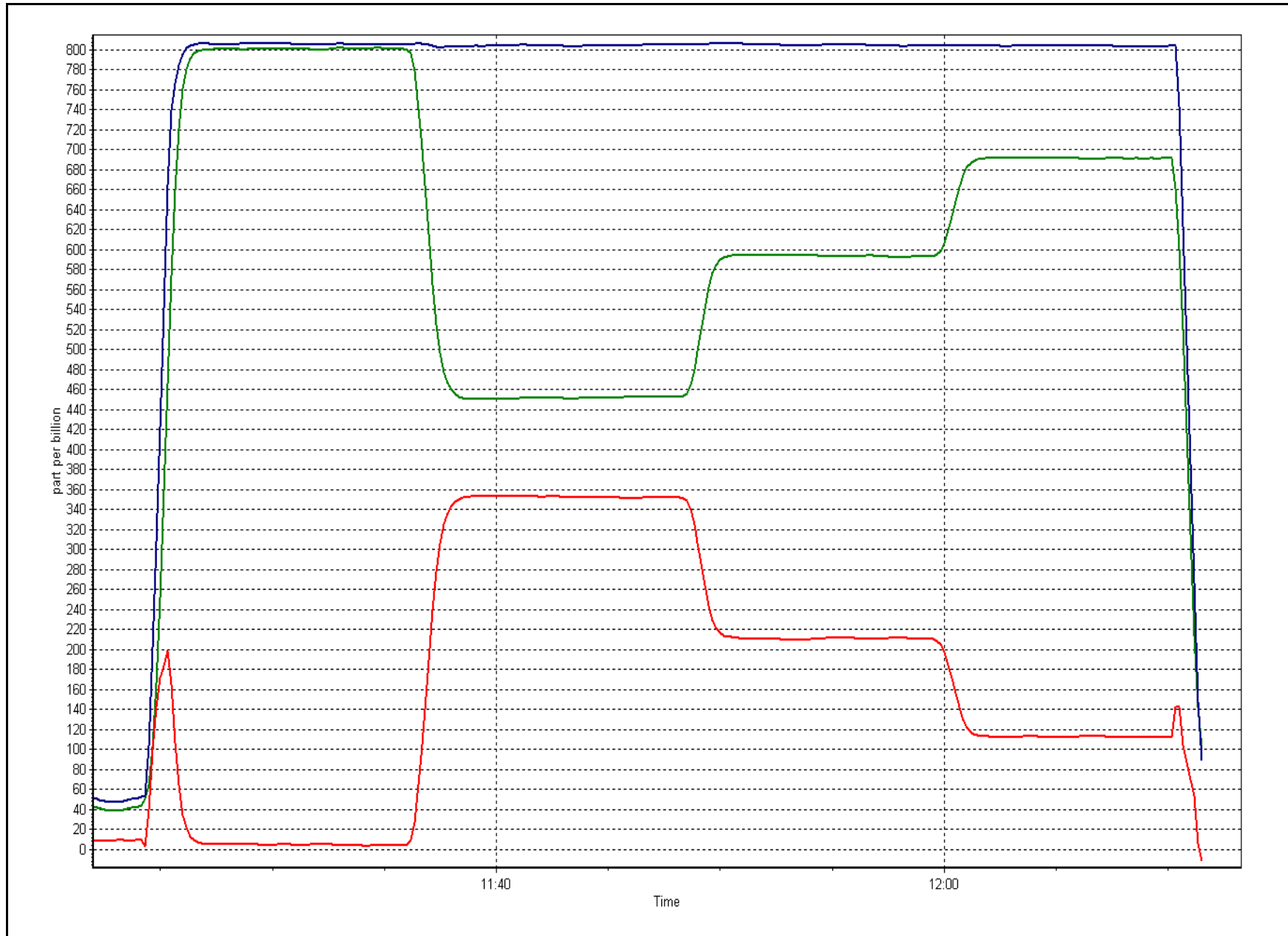
Corrcted As found NO_x= #VALUE! NO= #VALUE! Percent Change NO_x= N/A NO= N/A
 Previous Response NO_x= 801.2 NO= 798.5

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 78.90 ccm NOx ref calc conc = 803.2 ppb NO ref calc conc = 800.0 ppb

O3 Setpoint (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
1st NO ref point			805.0	801.0		0.9978	0.9988		----
1st NO2 (300)	451.7	352.5	805.0	451.7	352.3	0.9978	----	1.0004	100.0%
2nd NO2 (200)	588.1	216.1	805.5	588.1	217.4	0.9971	----	0.9938	100.6%
3rd NO2 (100)	692.0	112.2	804.0	692.0	112.0	0.9990	----	1.0014	99.9%
2nd NO ref point									
Average Correction Factor						0.9980		0.9986	100.1%

Calibration Performed By: Melissa Lemay





Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-08-2016

Station Information

Station Name:	Fort McKay South	Station number:	AMS 13
Calibration Date:	January 18, 2017	Last Cal Date:	December 14, 2016
Start time (MST):	9:30	End time (MST):	10:23
Sharp Model:	5030	S/N:	E-803
Particulate Fraction:	PM2.5	C14 Source S/N:	4066
Flow Standard Model:	Delta Cal	S/N:	1450
Temp/RH standard:	Delta Cal	S/N:	1450

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	Tolerance
T1 (°C)	-3.9	-5	-3.9	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	953	952	953	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	995	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	4.3	-----	-0.3	<input checked="" type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified	<input type="checkbox"/>			
Cyclone cleaning :	PM10 Cyclone	<input checked="" type="checkbox"/>	PM2.5 Cyclone	<input checked="" type="checkbox"/>	
Filter Tape Installed:	<input checked="" type="checkbox"/>				

Quarterly Calibration Test

				Tolerance
Leak Test:	Date of check:	<u>November 18, 2016</u>	Last Cal Date:	<u>October 27, 2016</u>
	Flow w/o adaptor:	<u>16.7</u>	Flow w/ adaptor:	<u>16.66</u> 0.4 LPM

Annual Calibration Test

Foil Calibration	Foil Mass:	<u>1337</u>	S/N:	<u>NA</u>
	Date of check:	<u>June 9, 2016</u>	Last Cal Date:	<u>July 14, 2016</u>
	New Correction Factor:	<u>7150</u>	Previous Correction Factor:	<u>7079</u>

Parameter	As found	Measured	As left	Adjusted	Tolerance
T2 (°C)				<input type="checkbox"/>	+/- 2 °C
T3 (°C)				<input type="checkbox"/>	+/- 2 °C
T4 (°C)				<input type="checkbox"/>	+/- 2 °C
RH (%)				<input type="checkbox"/>	+/- 10%

Notes: Cyclone head cleaned, Nephelometer adjusted

Calibration by: Melissa Lemay



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 14
ANZAC
JANUARY 2017**

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

February 27, 2017



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
 JANUARY 2017

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	701	35	43	98.92	13	0	5	0
TRS(ppb) Average	702	35	42	99.06	5	0	1	0
THC(ppm) Average	699	37	45	98.92	2.7	-	2.3	-
NMHC(ppm) Average	699	37	45	98.92	0.281	-	0.096	-
CH4(ppm) Average	699	37	45	98.92	2.4	-	2.2	-
NO2(ppb) Average	693	37	51	98.12	24	0	11	-
NO(ppb) Average	693	37	51	98.12	32	-	7	-
NOX(ppb) Average	693	37	51	98.12	45	-	18	-
O3(ppb) Average	703	33	41	98.92	49	0	43	-
PM2.5(ug/m3) Average	736	1	8	99.06	153.5	-	33.6	1
AT 2m(C) Average	744	0	0	100.00	9.3	-	4	-
RH(%) Average	744	0	0	100.00	96	-	93	-
Leaf Wetness (% of range) Average	744	0	0	100.00	9	-	5	-
WS(km/h) Average	711	0	33	95.56	23	-	15	-
WD(deg) Average	711	0	33	95.56	-	-	-	-
PC(mm) Total	744	0	0	100.00	0	-	0	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
 JANUARY 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	701	0.6	1	-	0	0	0	0	0	1	13
TRS(ppb) Average	702	0.3	0	-	0	0	0	0	0	0	5
THC(ppm) Average	699	1.97	0.1	-	1.9	1.9	1.9	1.9	2	2.1	2.7
NMHC (ppm) Average	699	0.007	0.028	-	0	0	0	0	0	0	0.281
CH4(ppm) Average	699	1.97	0.1	-	1.9	1.9	1.9	1.9	2	2.1	2.4
NO2(ppb) Average	693	4.6	4	-	0	1	1	3	6	12	24
NO(ppb) Average	693	1	3	-	0	0	0	0	1	2	32
NOX(ppb) Average	693	5.6	7	-	0	1	1	3	7	14	45
O3(ppb) Average	703	28.8	11	-	3	10	21	33	37	41	49
PM2.5(ug/m3) Average	736	5.78	11.2	-	1	1.8	2.3	3.4	5.5	8.8	153.5
Temperature 2 m (C) Average	744	-11.5	10.8	-	-36.6	-25.9	-19.8	-13.4	-0.8	2.8	9.3
Relative Humidity (%) Average	744	78.4	10	-	43	65	72	79	86	91	96
Leaf Wetness (% of range) Average	744	1.5	2	-	0	0	1	1	2	5	9
Wind Speed 20 m (km/h) Average	711	8.2	5	-	0	2	4	7	12	15	23
Wind Direction 20 m (deg) Average	711	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	744	-	-	0	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
JANUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
AIR QUALITY ANALYZERS	04 Jan 2017 15:00	04 Jan 2017 16:00	2	Maintenance - replaced calibrator and verified zero/spans
NO2, NO, NOX	11 Jan 2017 11:00	11 Jan 2017 16:00	6	Unstable Operation - shelter temp fluctuation
SO2, THC, NO2, O3	21 Jan 2017 04:00	21 Jan 2017 09:00	6	Station power failure
TRS	21 Jan 2017 05:00	21 Jan 2017 09:00	5	Station power failure
PM2.5	21 Jan 2017 04:00	21 Jan 2017 10:00	7	Station power failure
Wind Speed, Wind Direction	02 Jan 2017 15:00	02 Jan 2017 17:00	3	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	06 Jan 2017 23:00	06 Jan 2017 23:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	08 Jan 2017 04:00	08 Jan 2017 04:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	23 Jan 2017 06:00	23 Jan 2017 06:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	23 Jan 2017 12:00	23 Jan 2017 12:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	23 Jan 2017 16:00	23 Jan 2017 19:00	4	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	23 Jan 2017 22:00	23 Jan 2017 22:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	24 Jan 2017 01:00	24 Jan 2017 03:00	3	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	24 Jan 2017 07:00	24 Jan 2017 09:00	3	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	24 Jan 2017 13:00	24 Jan 2017 13:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	24 Jan 2017 15:00	24 Jan 2017 17:00	3	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	25 Jan 2017 00:00	25 Jan 2017 10:00	11	Flat line in sensor output signal -sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Anzac - January 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 13 ppb on Jan 23 11:00	Maximum Daily Average: 4.9 ppb on Jan 23		Hours of Data:	701
Minimum Value: 0 ppb on Jan 5 22:00	Minimum Daily Average: 0.1 ppb on Jan 17		Hours of Missing Data:	43
Maximum Diurnal Average: 1.0 ppb at hour 10	Minimum Diurnal Average: 0.3 ppb at hour 24		Hours of Calibration:	35
Monthly Average: 0.6 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 8		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-Jan	Z	0	1	1	0	0	0	0	0	0	0	1	4	4	7	4	2	1	0	0	0	0	0	0	1.1	7
2-Jan	0	Z	0	0	0	0	0	0	0	0	1	3	5	6	6	3	2	1	1	1	1	1	1	0	1.5	6
3-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-Jan	0	0	0	Z	0	0	2	2	12	9	2	1	1	1	M	M	0	0	0	0	0	0	0	0	1.5	12
5-Jan	2	4	2	2	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	4
6-Jan	0	3	3	2	2	Z	1	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.7	3
7-Jan	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.3	1
8-Jan	0	Z	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0.6	1
9-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0.3	1
10-Jan	0	0	0	Z	0	0	0	0	0	1	1	2	4	1	0	1	1	1	0	1	0	1	0	0	0.7	4
11-Jan	0	0	0	0	Z	1	1	1	1	1	1	0	0	1	1	0	1	2	2	1	0	0	0	0	0.7	2
12-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0.4	1
13-Jan	Z	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
14-Jan	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
15-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
16-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
17-Jan	0	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
18-Jan	0	0	0	0	0	Z	0	1	1	1	2	1	1	2	2	1	1	0	0	0	0	0	0	0	0.6	2
19-Jan	Z	0	0	0	0	0	0	0	0	2	2	2	1	1	1	1	0	0	0	0	1	1	1	1	0.7	2
20-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.3	1
21-Jan	0	0	Z	PF	PF	PF	PF	PF	PF	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	--	2
22-Jan	0	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
23-Jan	0	0	0	0	Z	4	7	8	7	8	13	9	8	5	5	7	7	6	5	4	3	3	2	1	4.9	13
24-Jan	1	1	1	1	0	Z	1	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.5	1
25-Jan	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1
26-Jan	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
27-Jan	0	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
28-Jan	0	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
29-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
30-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	2	3	4	2	1	0	0	0	0	0	0.7	4
31-Jan	Z	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	2

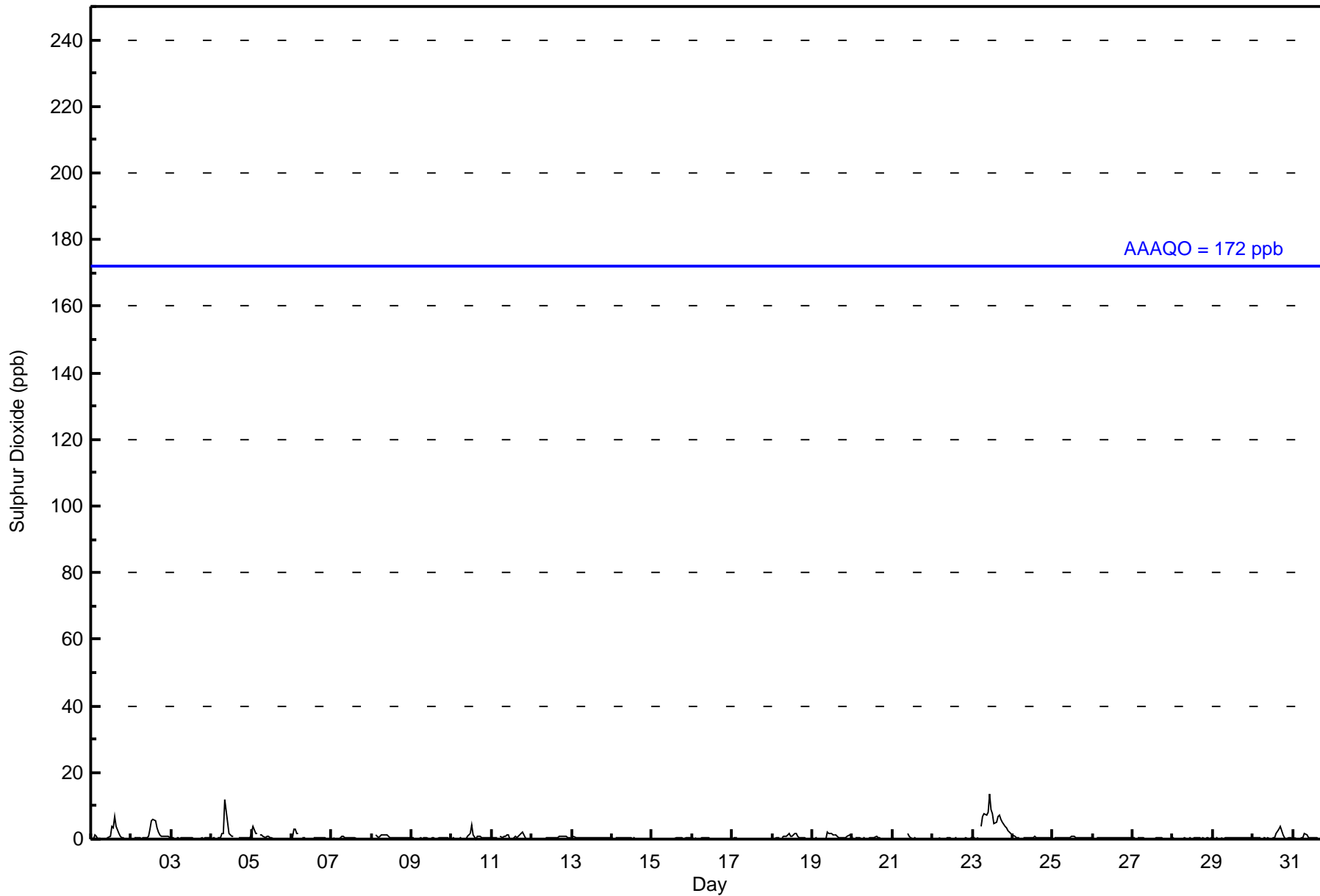
0.4	0.5	0.5	0.4	0.3	0.4	0.6	0.7	1.0	1.0	1.0	0.8	1.0	0.8	1.0	0.8	0.8	0.6	0.5	0.4	0.4	0.3	0.3	0.3	Diurnal Average	
2	4	3	2	2	4	7	8	12	9	13	9	8	6	7	7	7	6	5	4	3	3	2	1	Diurnal Maximum	

Z - zerospan C - Calibration M - Maintenance PF - Power Failure
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Anzac - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Anzac - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	699	99.71	99.71
11 - 20	2	0.29	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: 701

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Anzac - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	56	5	0	0	6	6	18	24	39	31	47	24	75	183	69	84	667
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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
Totals	56	5	0	0	6	6	18	24	39	31	47	24	75	184	69	85	669

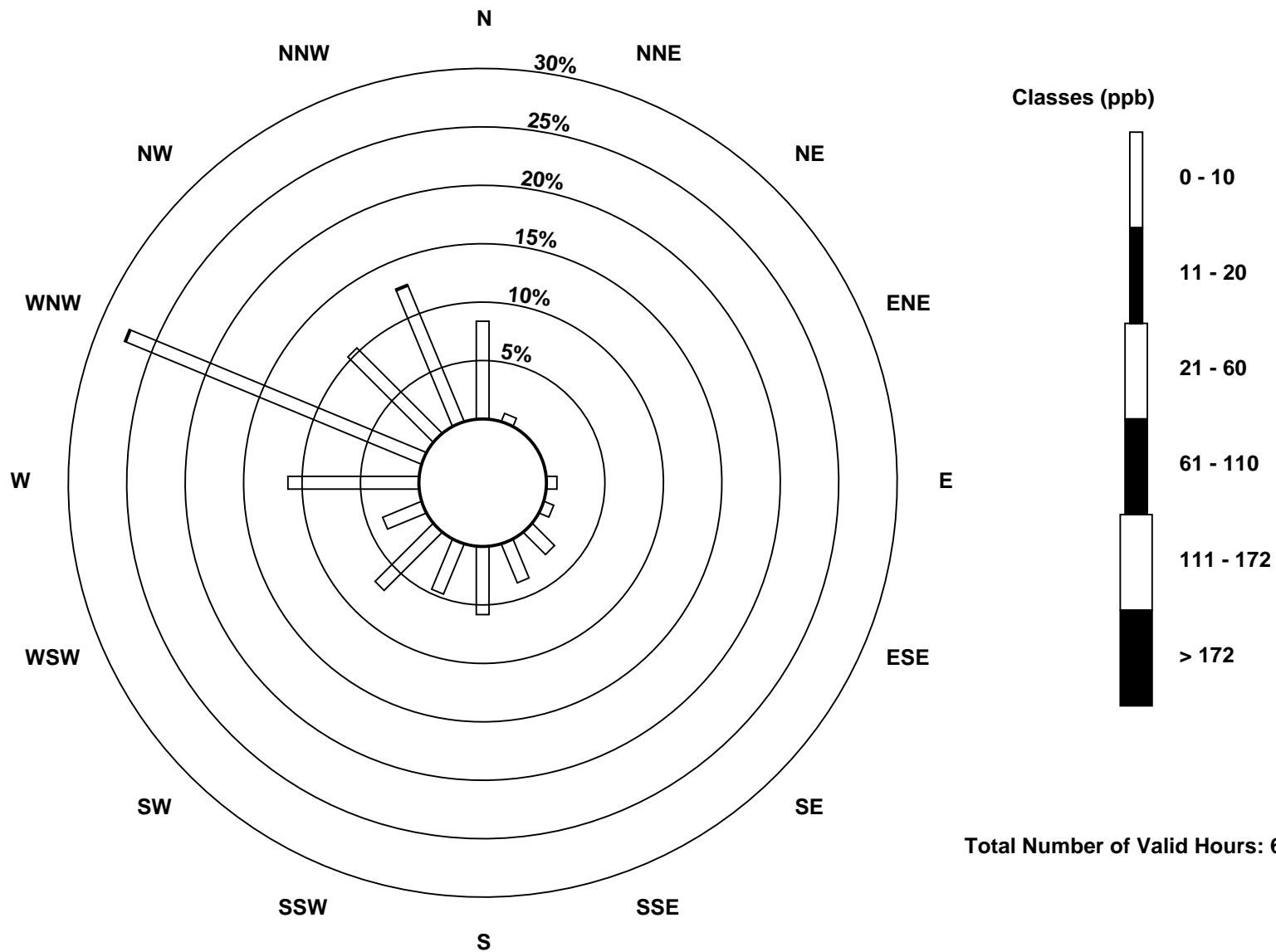
Total Number of Valid Hours: 669

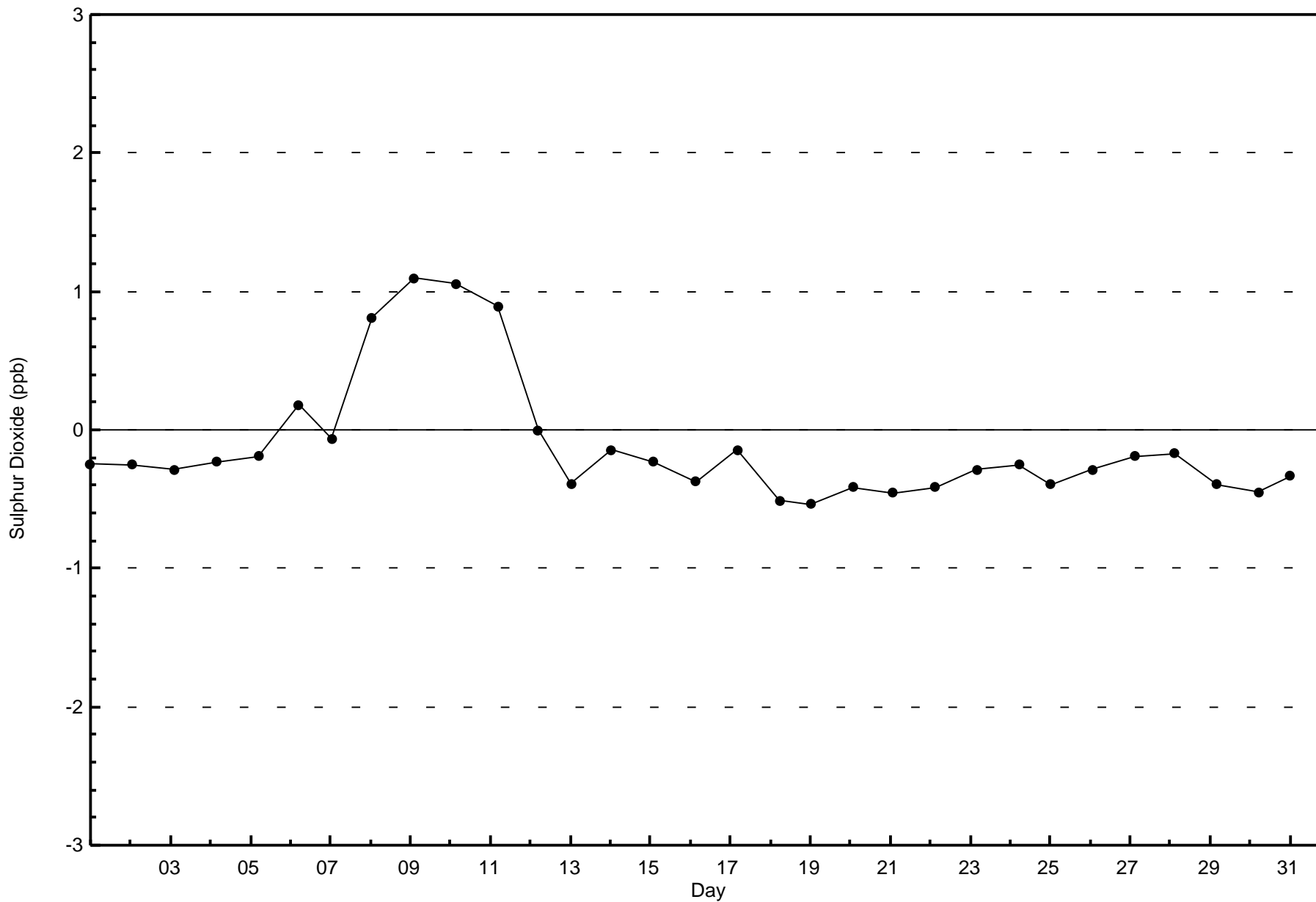
Total Number of Hours: 744

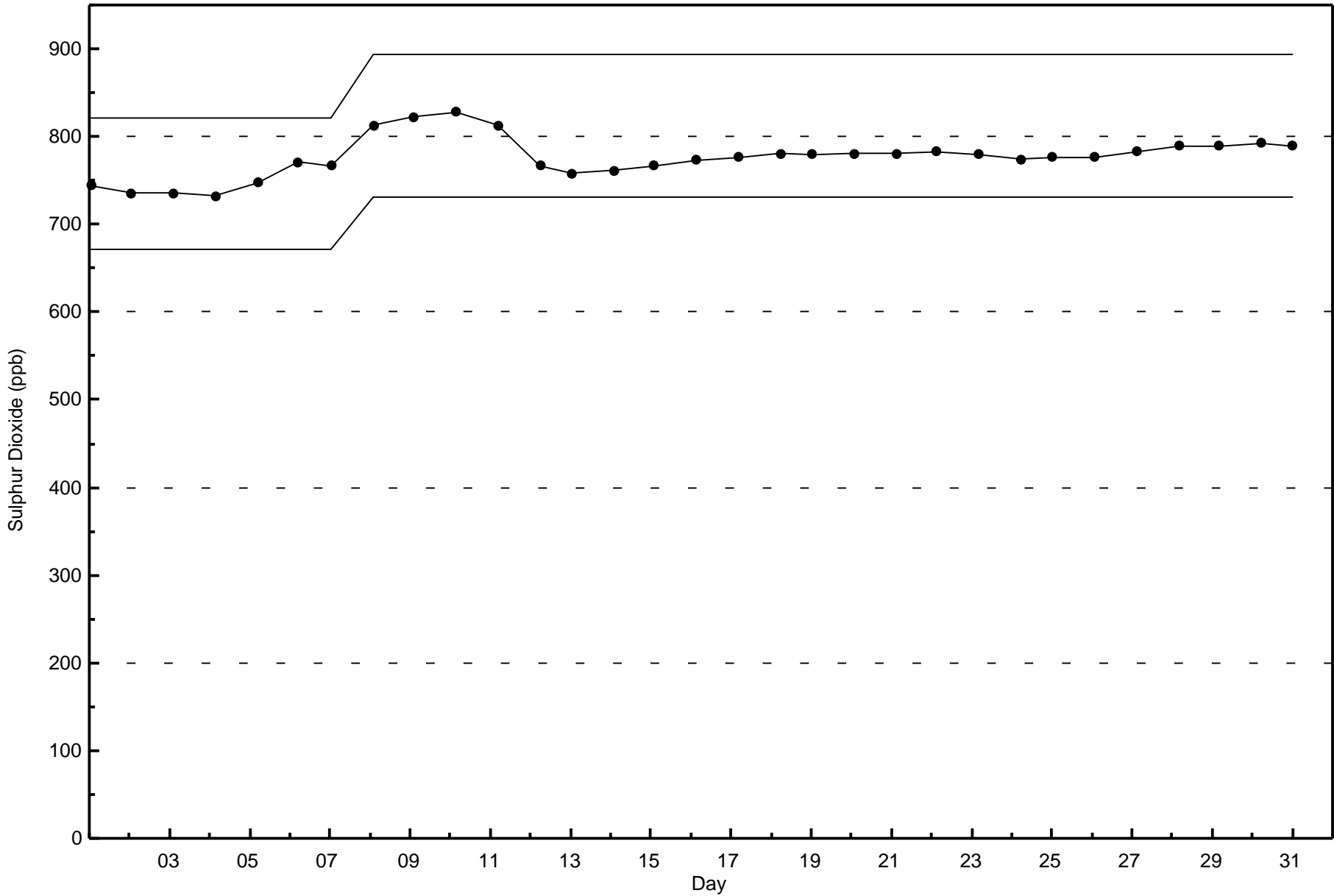


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Sulphur Dioxide (SO₂) - ppb
Anzac (AMS 14)









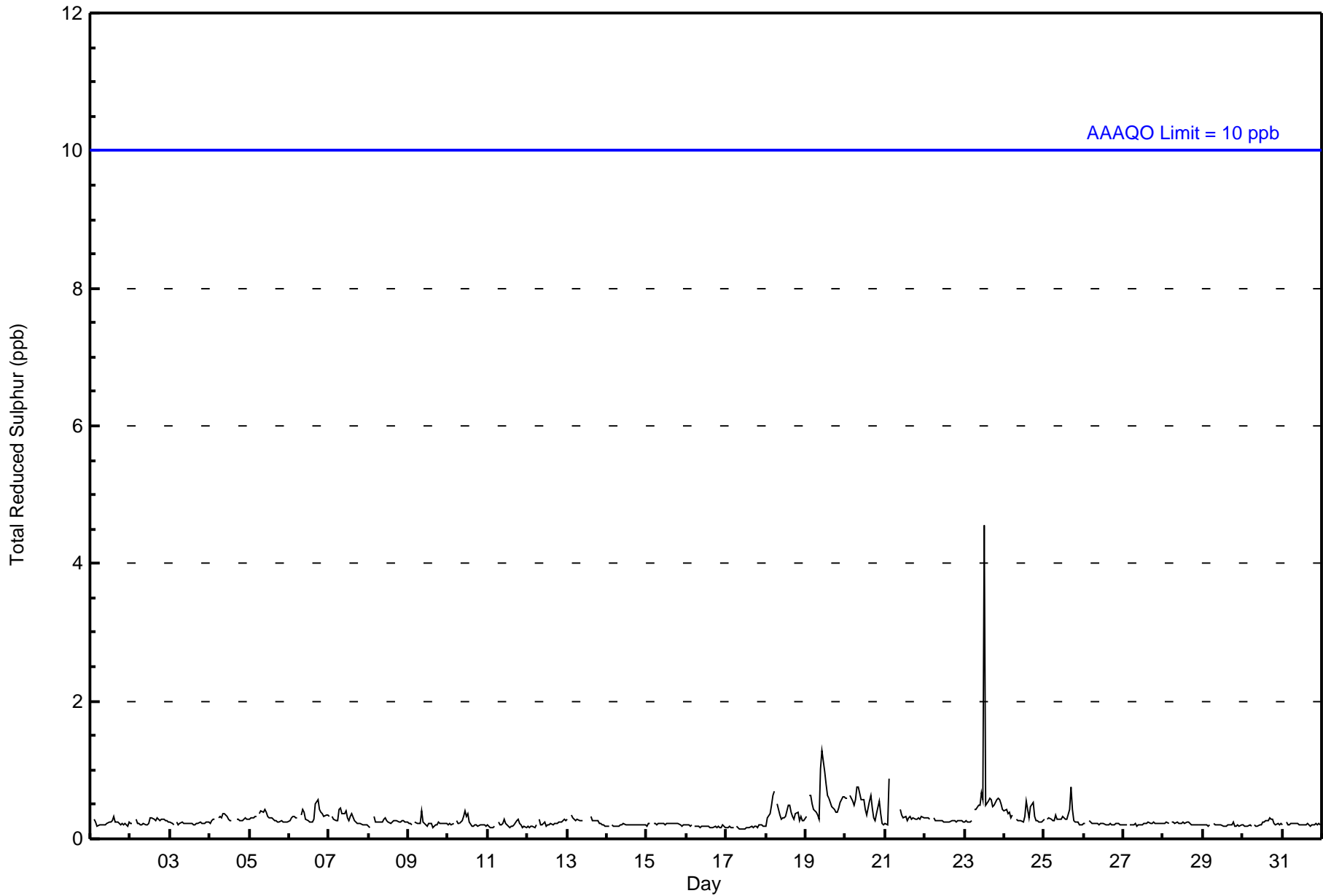
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

Anzac - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 5 ppb on Jan 23 13:00 Maximum Daily Average: 0.6 ppb on Jan 23														Hours in Service: 744 Hours of Data: 702 Hours of Missing Data: 42 Hours of Calibration: 35 Percent Operational Time: 99.1												
Minimum Value: 0 ppb on Jan 17 11:00 Minimum Daily Average: 0.2 ppb on Jan 17 Maximum Diurnal Average: 0.4 ppb at hour 13 Minimum Diurnal Average: 0.2 ppb at hour 2 Monthly Average: 0.3 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	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
2-Jan	0	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
3-Jan	0	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
4-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	M	M	0	0	0	0	0	0	0	0	0.3	0
5-Jan	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
6-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0.3	1
7-Jan	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
8-Jan	0	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
9-Jan	0	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
10-Jan	0	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
11-Jan	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
12-Jan	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
13-Jan	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.3	0
14-Jan	0	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
15-Jan	0	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
16-Jan	0	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
17-Jan	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
18-Jan	0	0	0	0	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
19-Jan	0	Z	1	1	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	1	1	1	0.6	1
20-Jan	1	1	Z	1	1	0	1	1	1	1	1	1	0	0	1	1	0	0	0	0	1	0	0	0	0.5	1
21-Jan	0	0	1	Z	PF	PF	PF	PF	PF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
22-Jan	0	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
23-Jan	0	0	0	0	0	Z	0	0	0	1	1	5	0	1	1	1	0	0	1	1	1	1	0	0.6	5	
24-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0.3	1
25-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.3	1
26-Jan	0	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
27-Jan	0	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
28-Jan	0	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
29-Jan	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
30-Jan	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
31-Jan	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
0.2 0.2 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.2 1 1 1 1 1 1 1 1 1 1 1 1 5 1 1 1 1 1 1 0 1 1 1 1 1																								Diurnal Average	Diurnal Maximum	
Z - zerospan C - Calibration M - Maintenance PF - Power Failure Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Anzac - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	701	99.86	99.86
3 - 4	0	0.00	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: 702

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Anzac - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	57	4	0	0	6	5	19	25	39	32	45	29	73	182	68	87	671
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	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
Totals	57	4	0	0	6	5	19	25	39	32	45	29	73	183	68	87	672

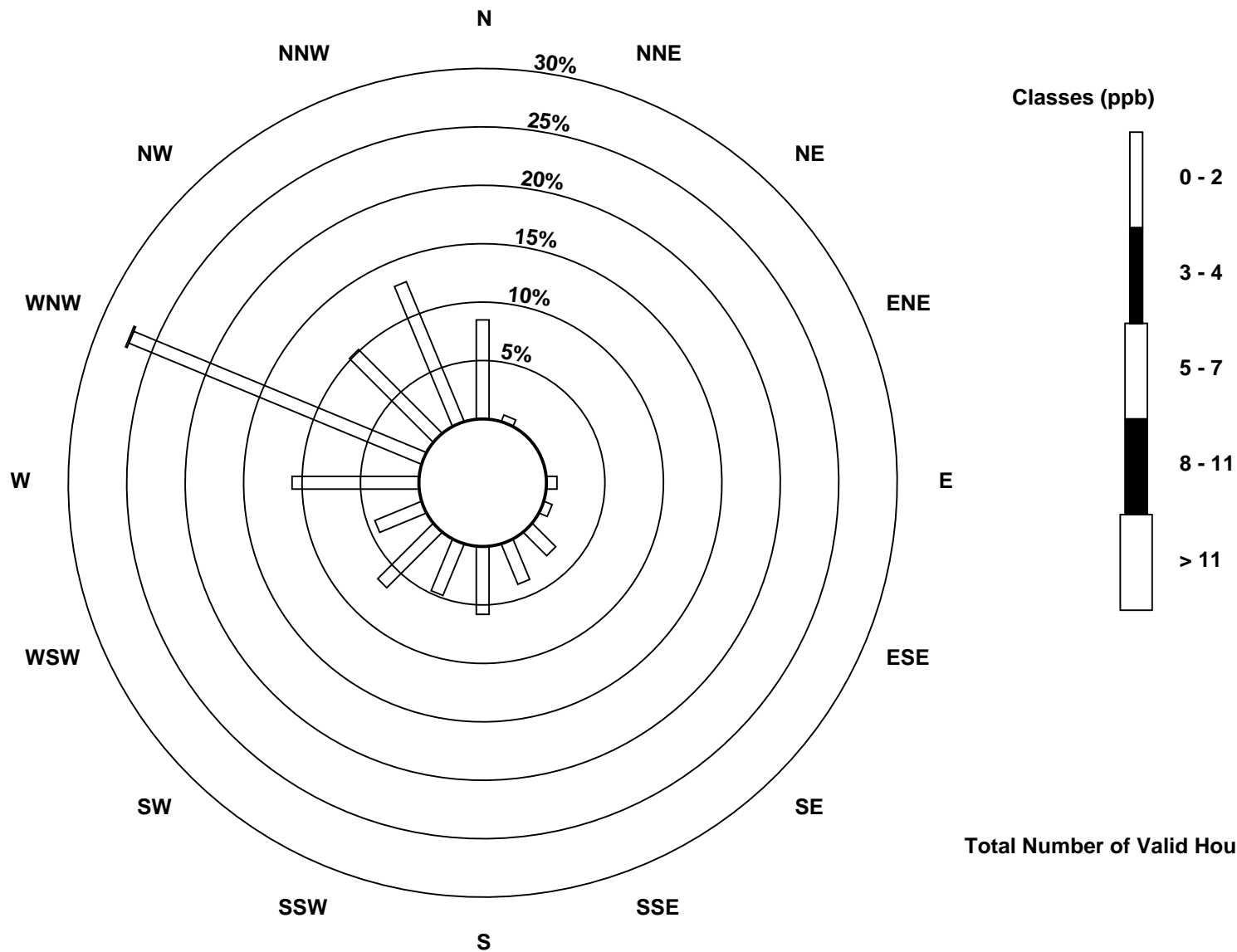
Total Number of Valid Hours: 672

Total Number of Hours: 744

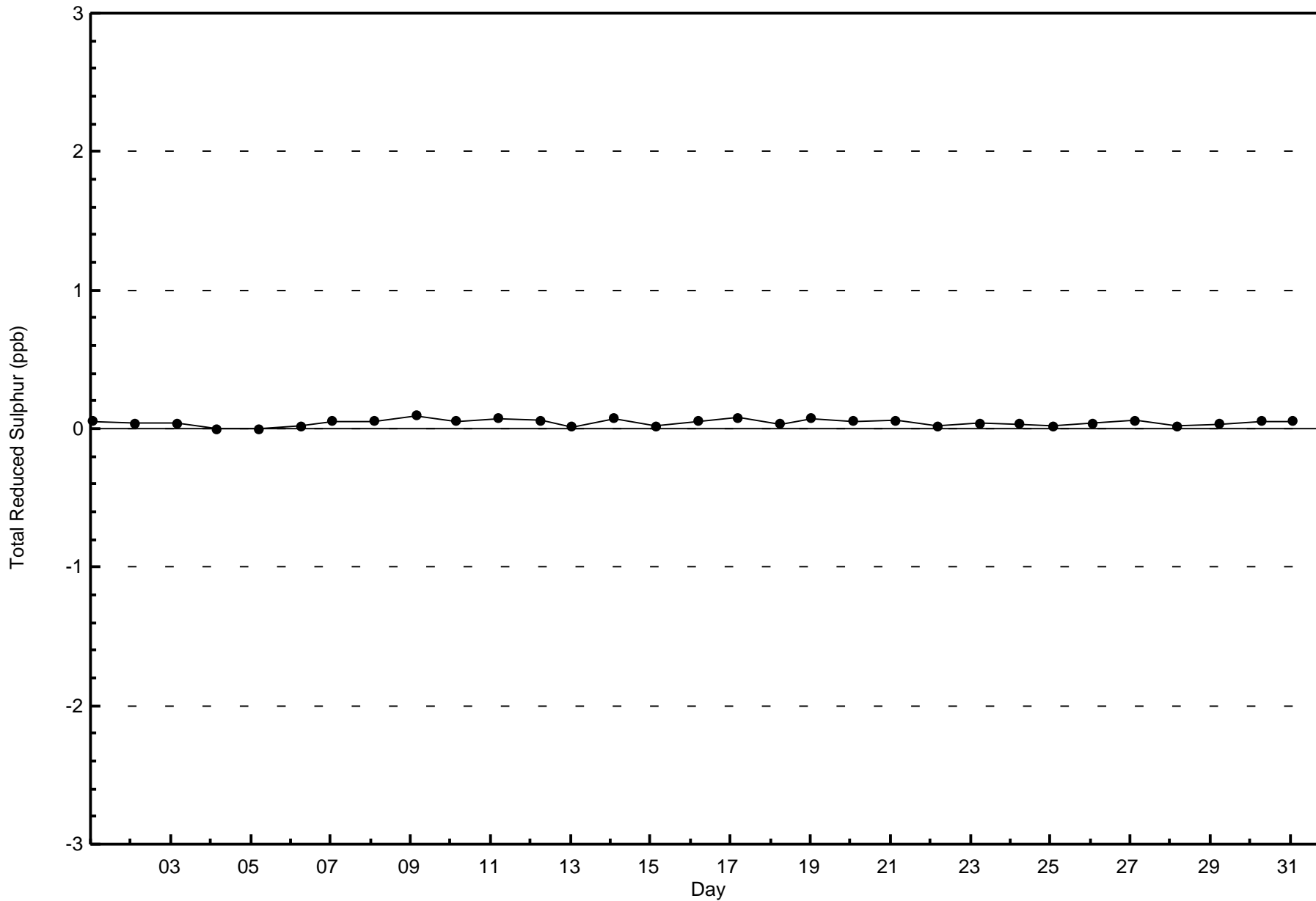


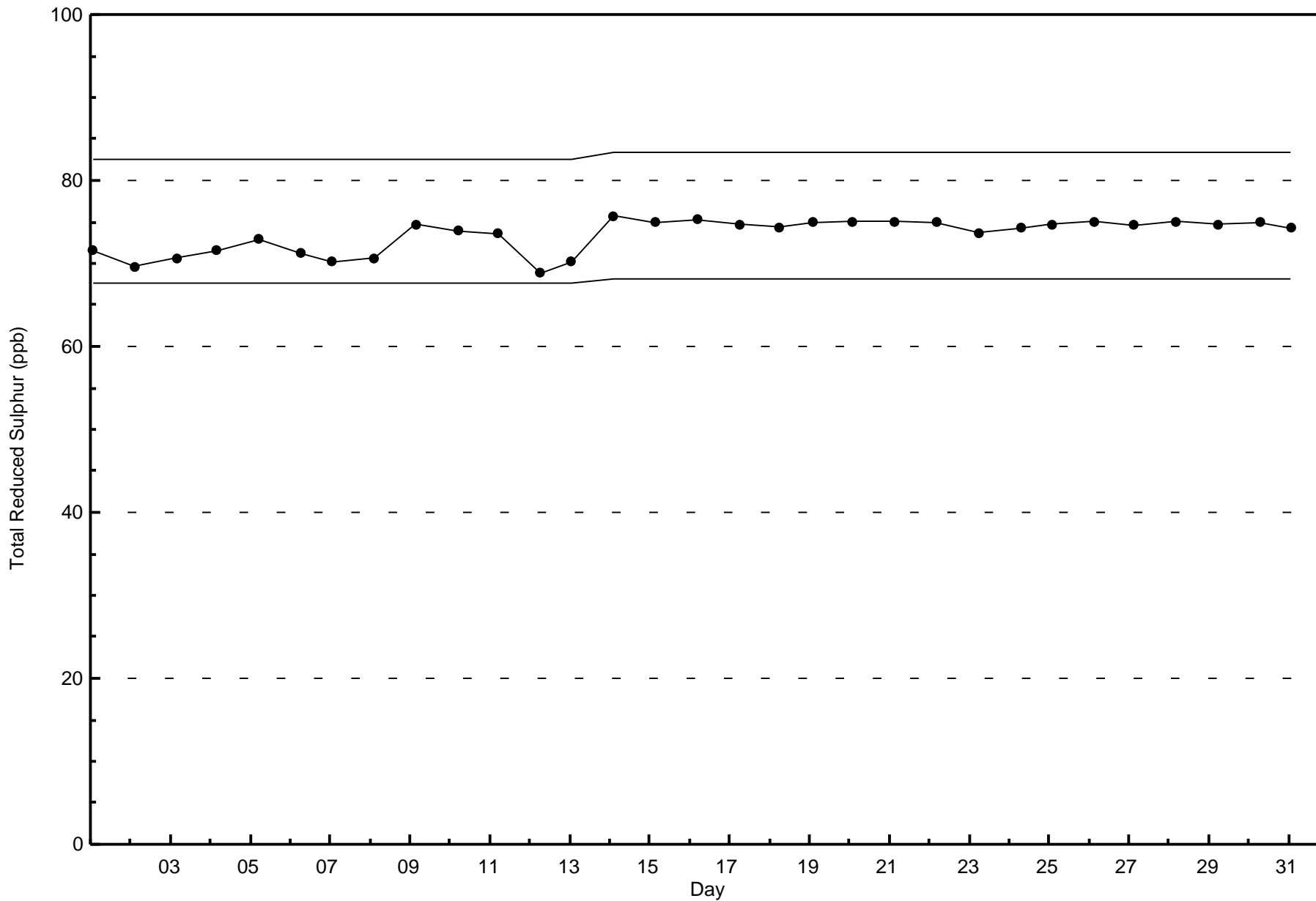
Wood Buffalo Environmental Association
Wind Rose Jan 2017

Total Reduced Sulphur (TRS) - ppb
Anzac (AMS 14)



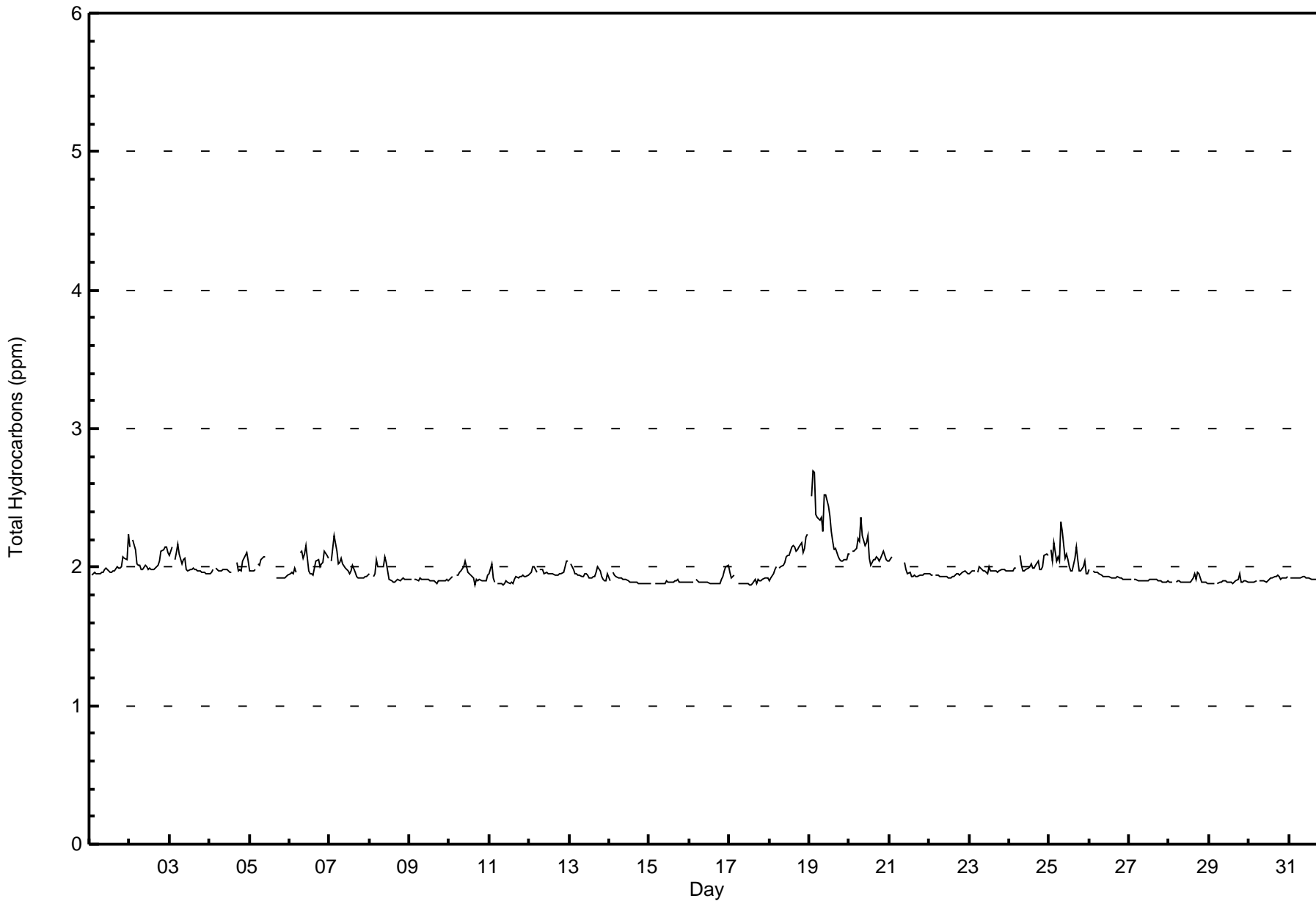
Total Number of Valid Hours: 672







Maximum Value: 2.7 ppm on Jan 19 03:00		Maximum Daily Average: 2.3 ppm on Jan 19		Hours in Service: 744																						
Minimum Value: 1.9 ppm on Jan 10 16:00		Minimum Daily Average: 1.9 ppm on Jan 15		Hours of Data: 699																						
Maximum Diurnal Average: 2.0 ppm at hour 4		Minimum Diurnal Average: 2.0 ppm at hour 15		Hours of Missing Data: 45																						
Monthly Average: 1.97 ppm		Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 1.9 Q ₃ = 2.0 P ₉₀ = 2.1 P ₉₉ = 2.4		Hours of Calibration: 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-Jan	Z	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	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.0	2.2
2-Jan	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	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.2
3-Jan	2.1	2.1	Z	2.1	2.1	2.2	2.1	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	2.0	2.0	2.0	2.2
4-Jan	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	M	M	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.1
5-Jan	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.1	2.1	2.1	C	C	C	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	--	2.1
6-Jan	2.0	2.0	2.0	2.0	2.0	Z	2.1	2.1	2.1	2.1	2.2	2.0	2.0	2.0	1.9	2.0	2.0	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.2
7-Jan	Z	2.0	2.1	2.2	2.1	2.0	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	2.0	2.2
8-Jan	1.9	Z	1.9	1.9	2.1	2.0	2.0	2.0	2.0	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1
9-Jan	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
10-Jan	1.9	1.9	1.9	Z	1.9	1.9	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	2.0
11-Jan	2.0	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
12-Jan	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	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
13-Jan	Z	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.0
14-Jan	1.9	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	2.0
15-Jan	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
16-Jan	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	2.0	2.0	1.9	2.0
17-Jan	2.0	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	2.0
18-Jan	1.9	1.9	2.0	2.0	2.0	Z	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	2.2	2.1	2.1	2.2	2.2	2.1	2.2
19-Jan	Z	2.5	2.7	2.7	2.4	2.4	2.3	2.4	2.3	2.5	2.5	2.4	2.4	2.3	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.3	2.7
20-Jan	2.1	Z	2.1	2.1	2.1	2.2	2.2	2.4	2.2	2.2	2.2	2.2	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.0	2.1	2.4
21-Jan	2.0	2.1	Z	PF	PF	PF	PF	PF	PF	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	--	2.1
22-Jan	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	1.9	2.0
23-Jan	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
24-Jan	2.0	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	2.0	2.1	2.1	2.1	2.1	2.0	2.1
25-Jan	Z	2.1	2.0	2.2	2.0	2.1	2.0	2.3	2.3	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	1.9	2.1	2.3
26-Jan	2.0	Z	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
27-Jan	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
28-Jan	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	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0
29-Jan	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	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0
30-Jan	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
31-Jan	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
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan		C - Calibration				M - Maintenance				PF - Power Failure																





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Anzac - January 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	588	84.12	84.12
2.1 - 3.0	111	15.88	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 699

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Anzac - January 2017

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	40	5	0	0	1	3	15	13	29	21	37	21	69	176	61	74	565
2.1 - 3.0	14	0	0	0	5	3	3	11	11	10	10	4	8	8	8	7	102
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
Totals	54	5	0	0	6	6	18	24	40	31	47	25	77	184	69	81	667

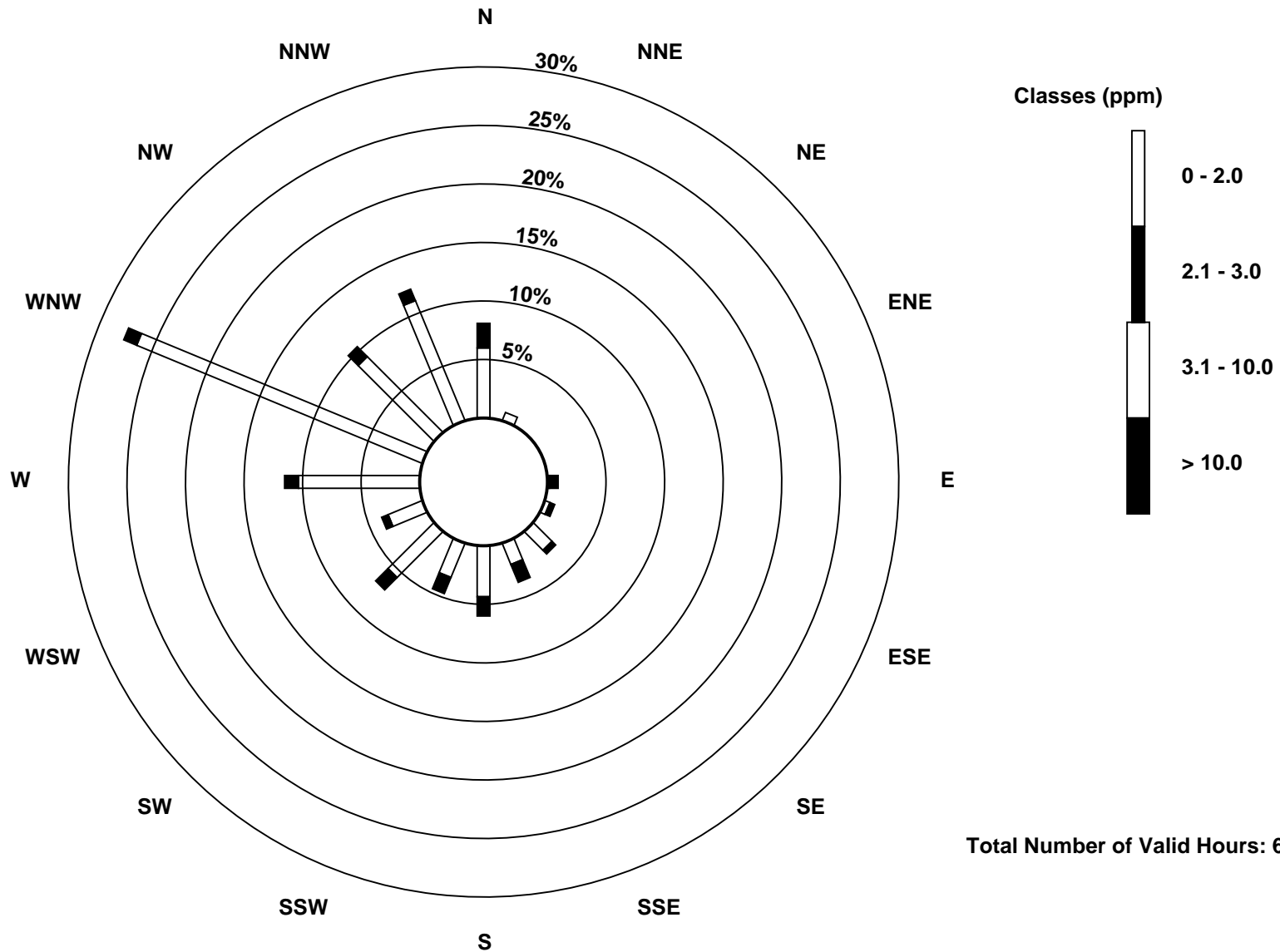
Total Number of Valid Hours: 667

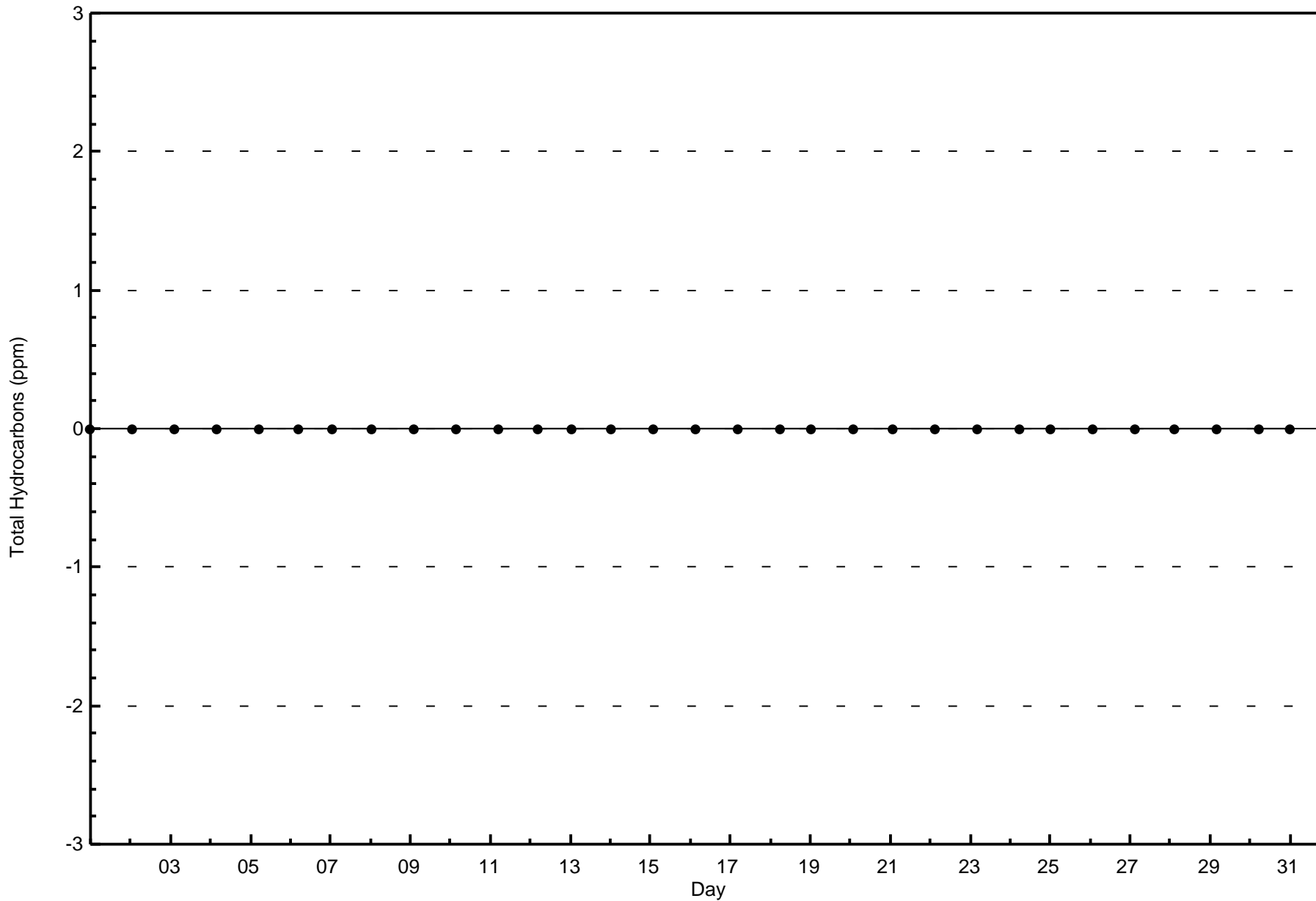
Total Number of Hours: 744

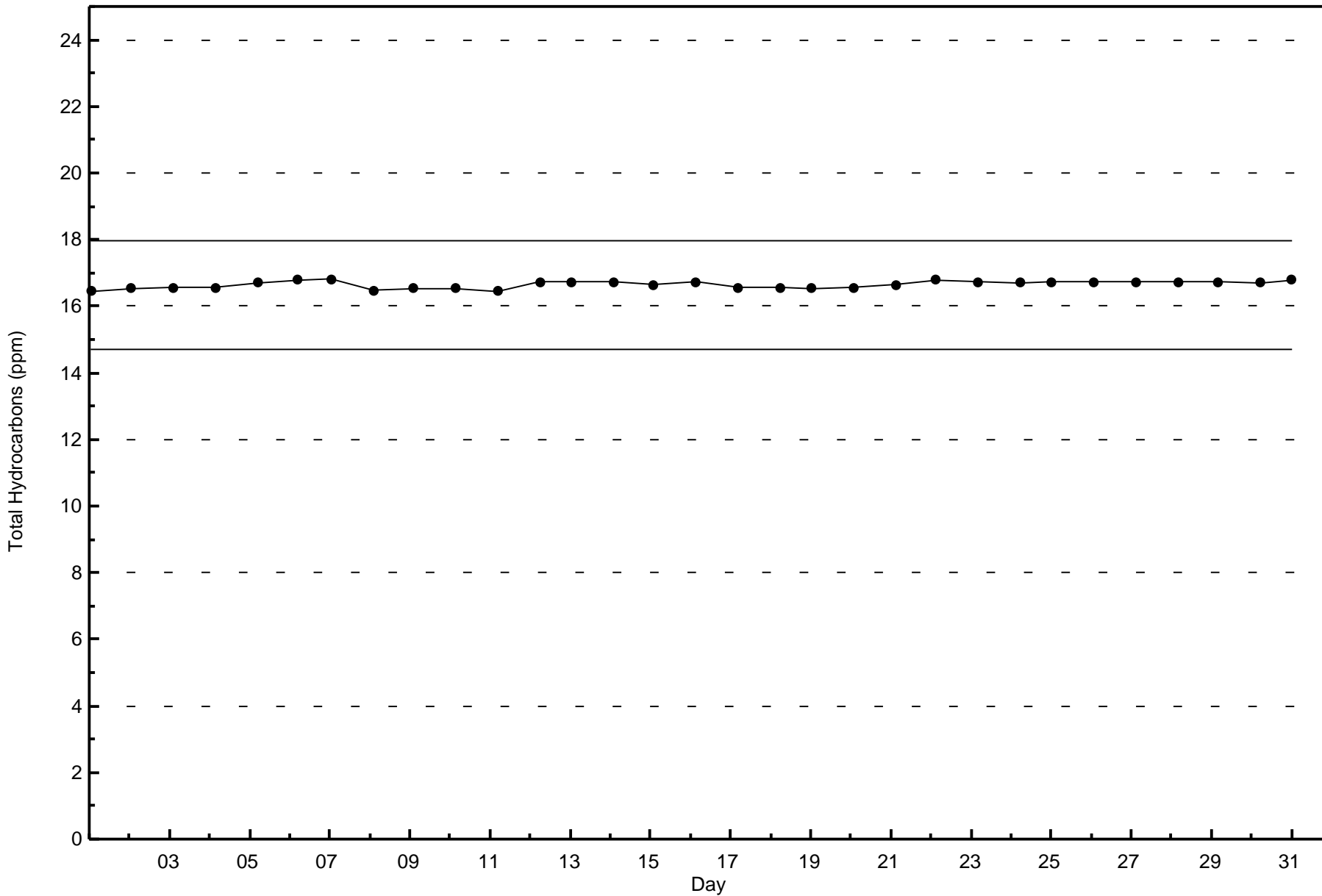


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Total Hydrocarbons (THC) - ppm
Anzac (AMS 14)

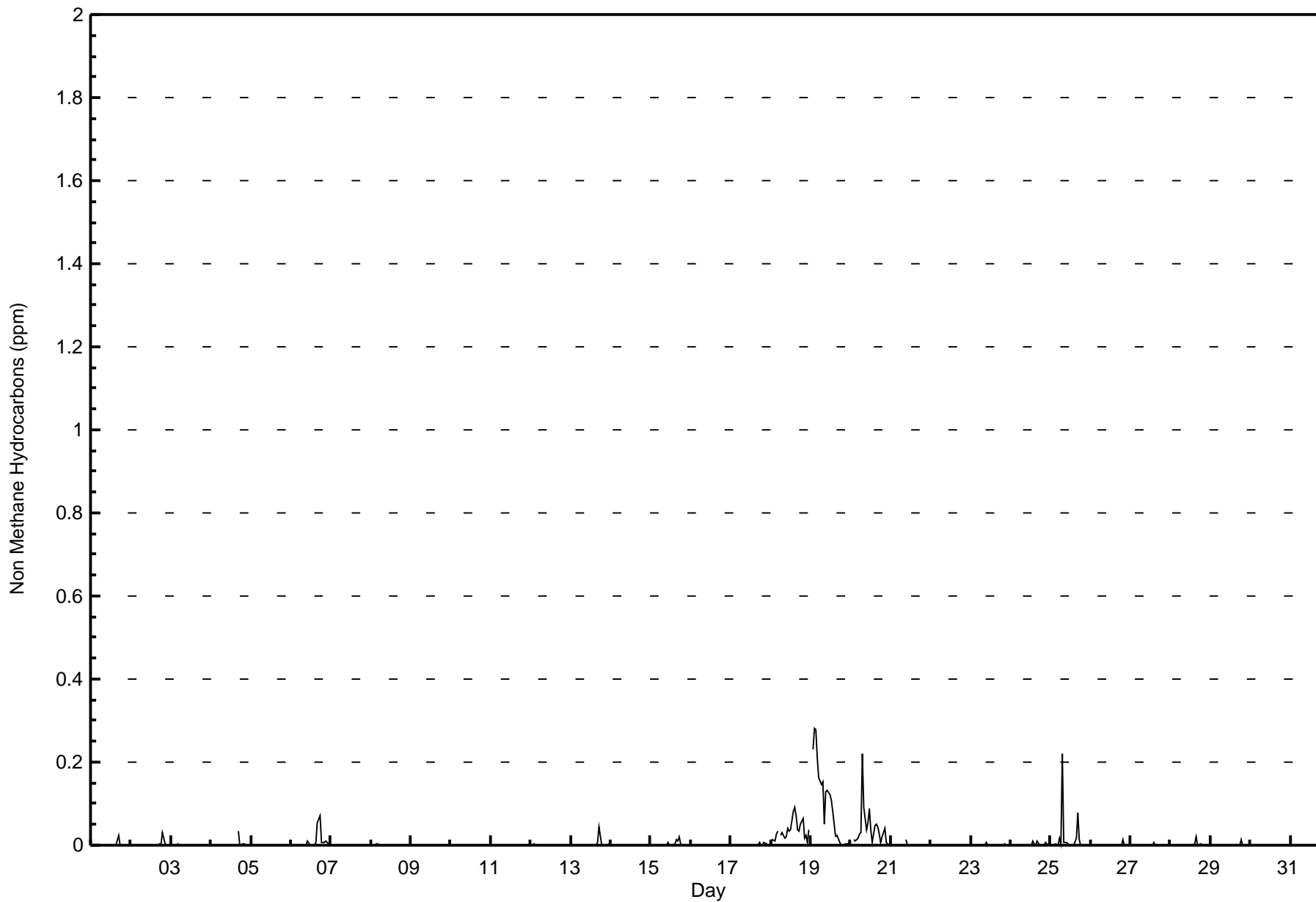








Maximum Value: 0.281 ppm on Jan 19 03:00		Maximum Daily Average: 0.096 ppm on Jan 19		Hours in Service: 744																						
Minimum Value: 0.000 ppm on Jan 1 02:00		Minimum Daily Average: 0.000 ppm on Jan 9		Hours of Data: 699																						
Maximum Diurnal Average: 0.021 ppm at hour 8		Minimum Diurnal Average: 0.000 ppm at hour 1		Hours of Missing Data: 45																						
Monthly Average: 0.007 ppm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.1		Hours of Calibration: 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-Jan	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	0.023	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.023
2-Jan	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.030	0.005	0.000	0.000	0.001	0.002	0.030
3-Jan	0.000	0.000	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	0.000	0.000	0.000	0.005
4-Jan	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	M	M	0.034	0.000	0.000	0.002	0.004	0.000	0.001	0.000	0.002	0.034
5-Jan	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.001	C	C	C	C	C	C	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	--	0.001
6-Jan	0.000	0.000	0.000	0.000	0.000	Z	0.001	0.001	0.000	0.000	0.009	0.000	0.000	0.000	0.000	0.006	0.054	0.070	0.006	0.005	0.008	0.010	0.004	0.002	0.008	0.070
7-Jan	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	0.000	0.000	0.000	0.000	0.000	0.000	0.001
8-Jan	0.000	Z	0.000	0.004	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	0.000	0.000	0.004
9-Jan	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
10-Jan	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	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
11-Jan	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
12-Jan	0.000	0.000	0.003	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	0.003
13-Jan	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	0.007	0.044	0.000	0.000	0.000	0.000	0.000	0.004	0.002	0.044
14-Jan	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	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
15-Jan	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.001	0.000	0.000	0.003	0.013	0.010	0.021	0.002	0.001	0.000	0.000	0.000	0.000	0.003	0.021
16-Jan	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001
17-Jan	0.000	0.000	0.000	0.001	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.006	0.000	0.000	0.007	0.004	0.001	0.000	0.001	0.001	0.007
18-Jan	0.000	0.012	0.011	0.029	0.034	Z	0.024	0.031	0.018	0.019	0.039	0.034	0.038	0.081	0.091	0.072	0.037	0.033	0.052	0.065	0.017	0.024	0.006	0.036	0.035	0.091
19-Jan	Z	0.229	0.281	0.279	0.210	0.162	0.146	0.153	0.050	0.128	0.133	0.122	0.107	0.082	0.052	0.021	0.023	0.008	0.002	0.001	0.000	0.005	0.003	0.006	0.096	0.281
20-Jan	0.007	Z	0.015	0.010	0.018	0.026	0.032	0.221	0.091	0.037	0.053	0.089	0.038	0.006	0.047	0.051	0.043	0.027	0.007	0.020	0.042	0.008	0.004	0.000	0.039	0.221
21-Jan	0.000	0.000	Z	PF	PF	PF	PF	PF	PF	0.014	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	--	0.014
22-Jan	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
23-Jan	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.007
24-Jan	0.000	0.000	0.000	0.000	0.000	Z	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.005	0.000	0.009	0.001	0.000	0.000	0.001	0.007	0.001	0.000	0.001	0.009
25-Jan	Z	0.001	0.002	0.003	0.000	0.017	0.003	0.220	0.007	0.007	0.003	0.001	0.000	0.000	0.000	0.016	0.078	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.016	0.220
26-Jan	0.000	Z	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	0.000	0.000	0.000	0.000	0.012	0.000	0.000	0.000	0.000	0.001	0.012
27-Jan	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	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005
28-Jan	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	0.005	0.019	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.001	0.019
29-Jan	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	0.012	0.000	0.000	0.000	0.000	0.000	0.001	0.012
30-Jan	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
31-Jan	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
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan		C - Calibration				M - Maintenance				PF - Power Failure																





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Anzac - January 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	605	86.55	86.55
0.006 - 0.05	72	10.30	96.85
0.06 - 0.1	14	2.00	98.86
> 0.1	8	1.14	100.00

Total Number of Valid Hours: 699

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Anzac - January 2017**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	44	5	0	0	1	0	9	9	32	23	41	24	67	182	65	76	578
0.006 - 0.05	3	0	0	0	4	5	8	12	5	7	5	1	9	2	3	4	68
0.06 - 0.1	6	0	0	0	1	1	1	2	2	0	1	0	0	0	0	0	14
> 0.1	1	0	0	0	0	0	0	1	1	1	0	0	1	0	1	1	7
Totals	54	5	0	0	6	6	18	24	40	31	47	25	77	184	69	81	667

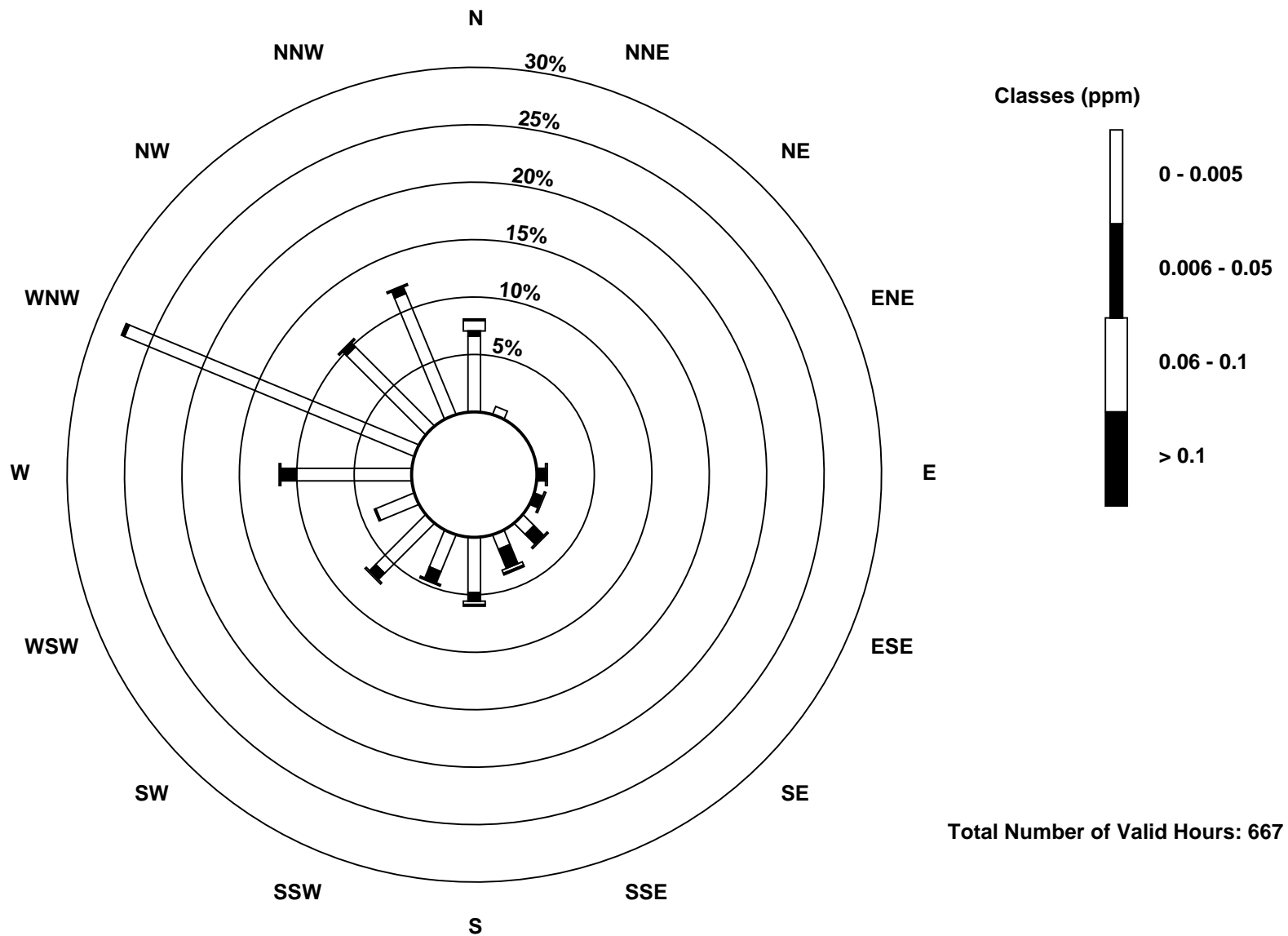
Total Number of Valid Hours: 667

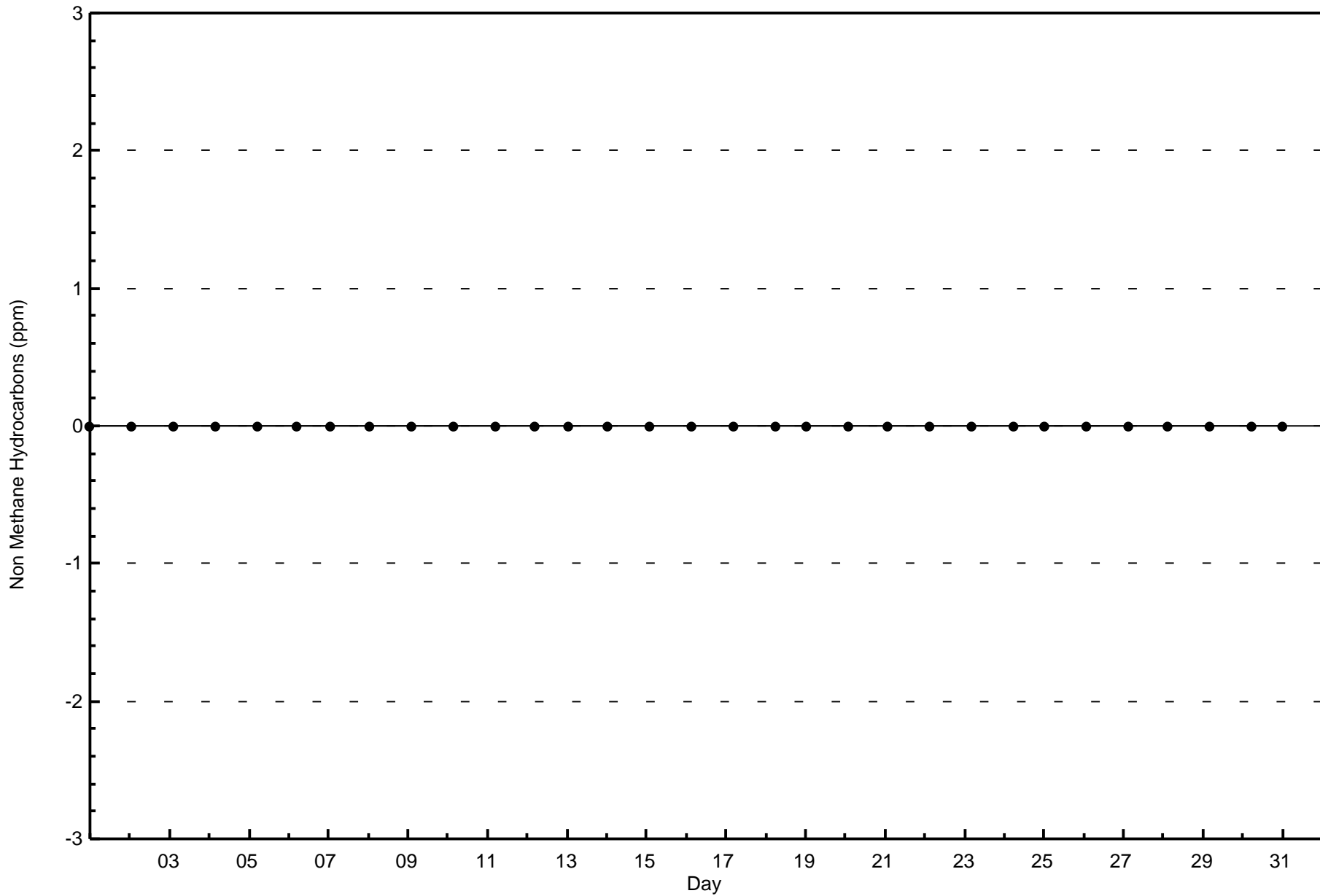
Total Number of Hours: 744

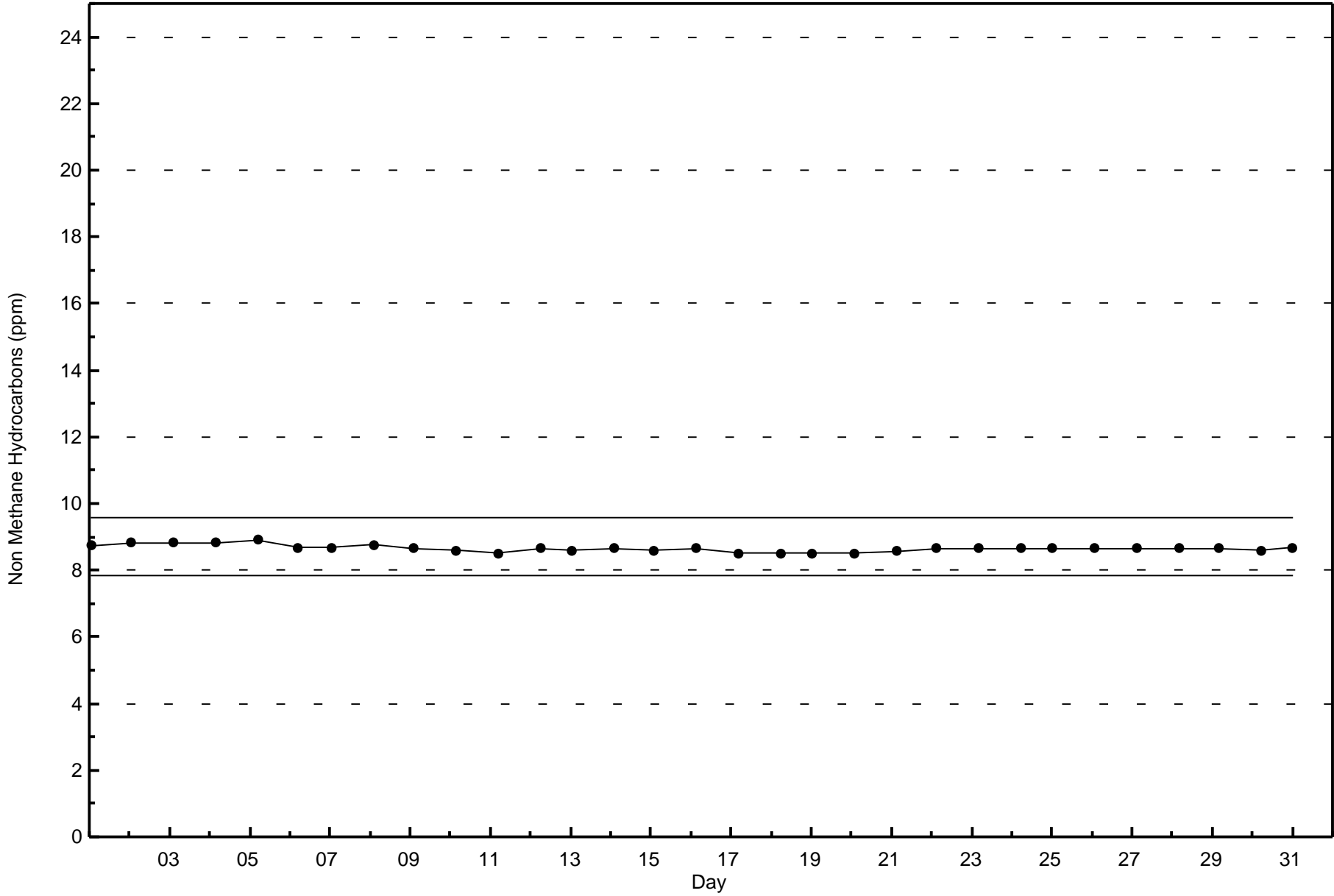


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Non Methane Hydrocarbons (NMHC) - ppm
Anzac (AMS 14)









Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm

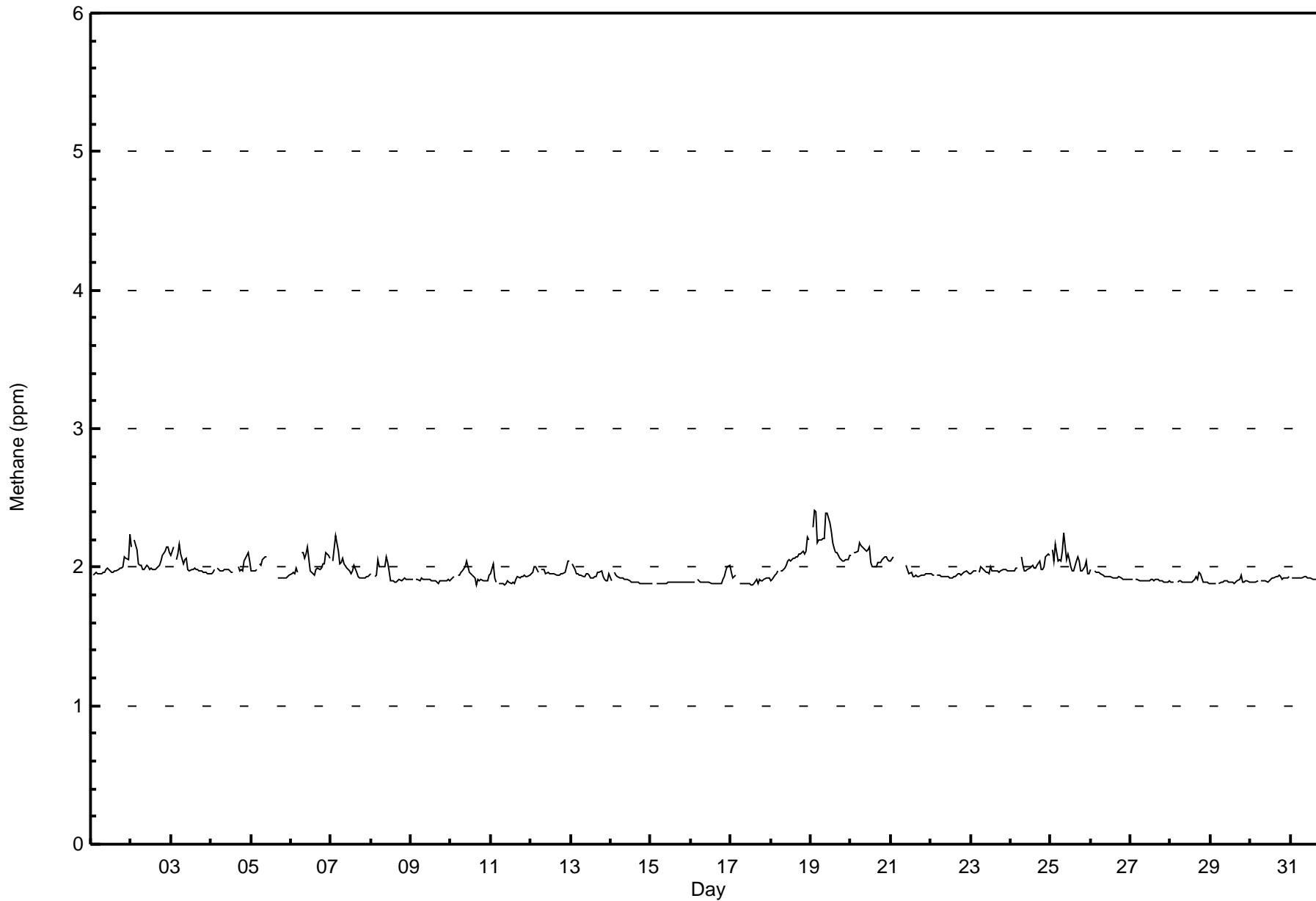
Anzac - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 744												
Maximum Value: 2.4 ppm on Jan 19 03:00														Maximum Daily Average: 2.2 ppm on Jan 19												
Minimum Value: 1.9 ppm on Jan 10 16:00														Minimum Daily Average: 1.9 ppm on Jan 15												
Maximum Diurnal Average: 2.0 ppm at hour 4														Minimum Diurnal Average: 1.9 ppm at hour 15												
Monthly Average: 1.97 ppm														Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 1.9 Q ₃ = 2.0 P ₉₀ = 2.1 P ₉₉ = 2.3												
														Hours of Data: 699												
														Hours of Missing Data: 45												
														Hours of Calibration: 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-Jan	Z	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	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.0	2.2
2-Jan	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	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.2
3-Jan	2.1	2.1	Z	2.1	2.1	2.2	2.1	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	2.0	2.0	2.0	2.2
4-Jan	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	M	M	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.1
5-Jan	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.1	2.1	2.1	C	C	C	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	--	2.1
6-Jan	2.0	2.0	2.0	2.0	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.1
7-Jan	Z	2.0	2.1	2.2	2.1	2.0	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	2.0	2.2
8-Jan	1.9	Z	1.9	1.9	2.1	2.0	2.0	2.0	2.0	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1
9-Jan	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
10-Jan	1.9	1.9	1.9	Z	1.9	1.9	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	2.0
11-Jan	2.0	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
12-Jan	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	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0
13-Jan	Z	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	1.9	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	2.0
14-Jan	1.9	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	2.0
15-Jan	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
16-Jan	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	2.0	2.0	1.9	2.0
17-Jan	2.0	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	2.0
18-Jan	1.9	1.9	1.9	2.0	2.0	Z	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	2.1	2.1	2.1	2.2	2.2	2.0	2.2
19-Jan	Z	2.3	2.4	2.4	2.2	2.2	2.2	2.2	2.2	2.4	2.4	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.2	2.4
20-Jan	2.1	Z	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.1	2.2
21-Jan	2.0	2.1	Z	PF	PF	PF	PF	PF	PF	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	--	2.1
22-Jan	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	1.9	2.0
23-Jan	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
24-Jan	2.0	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	2.0	2.1	2.1	2.1	2.1	2.0	2.1
25-Jan	Z	2.1	2.0	2.2	2.0	2.1	2.0	2.1	2.3	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	1.9	2.0	2.3
26-Jan	2.0	Z	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
27-Jan	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
28-Jan	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	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0
29-Jan	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
30-Jan	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
31-Jan	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
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerspan			C - Calibration			M - Maintenance			PF - Power Failure																	



Wood Buffalo Environmental Association
Hourly Averages

Methane (CH₄) - ppm
Anzac - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Methane (CH₄) - ppm
Anzac - January 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	598	85.55	85.55
2.1 - 3.0	101	14.45	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 699

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Methane (CH₄) - ppm
Anzac - January 2017

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	40	5	0	0	4	5	16	16	29	22	37	21	69	176	61	74	575
2.1 - 3.0	14	0	0	0	2	1	2	8	11	9	10	4	8	8	8	7	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
Totals	54	5	0	0	6	6	18	24	40	31	47	25	77	184	69	81	667

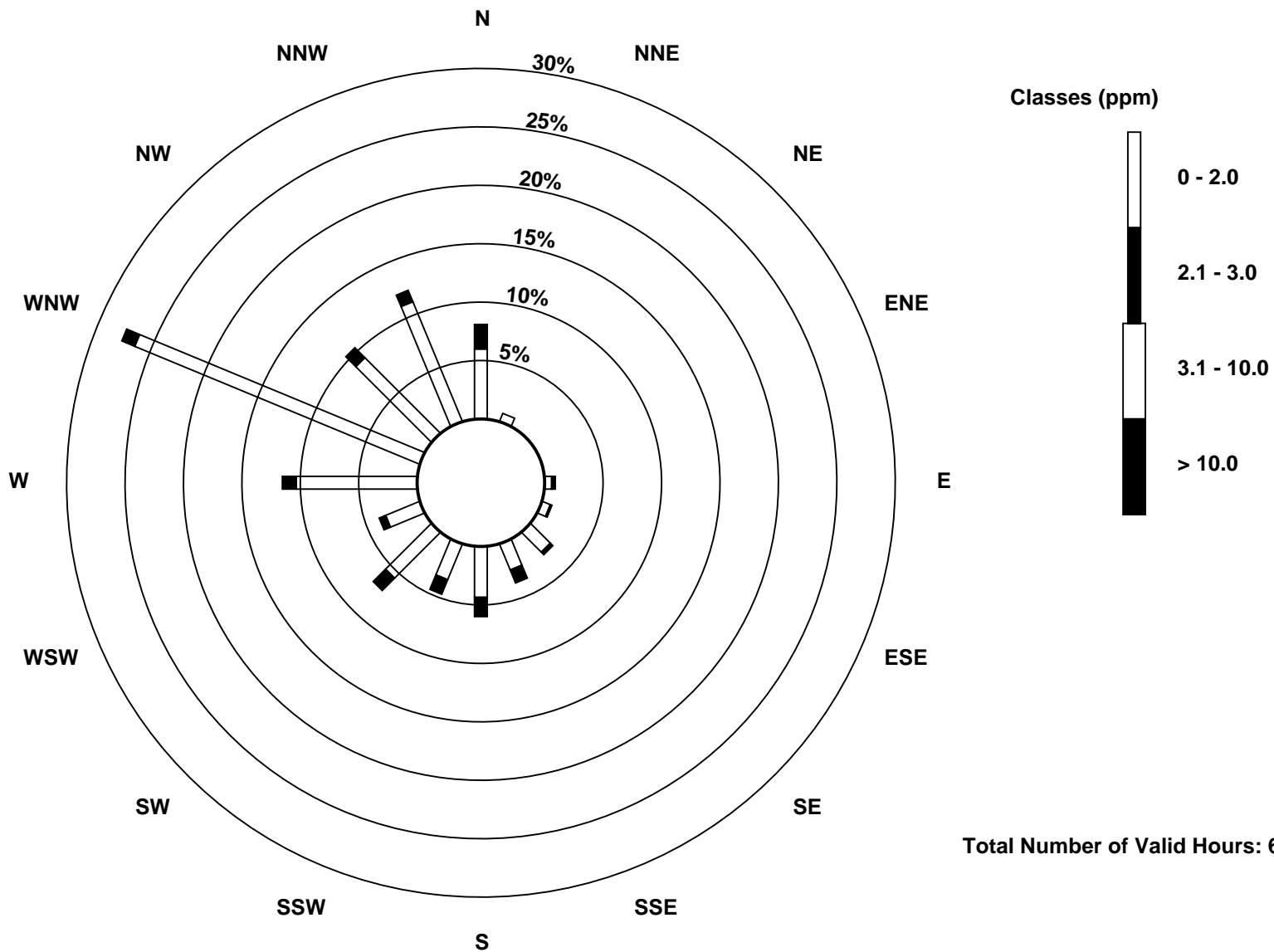
Total Number of Valid Hours: 667

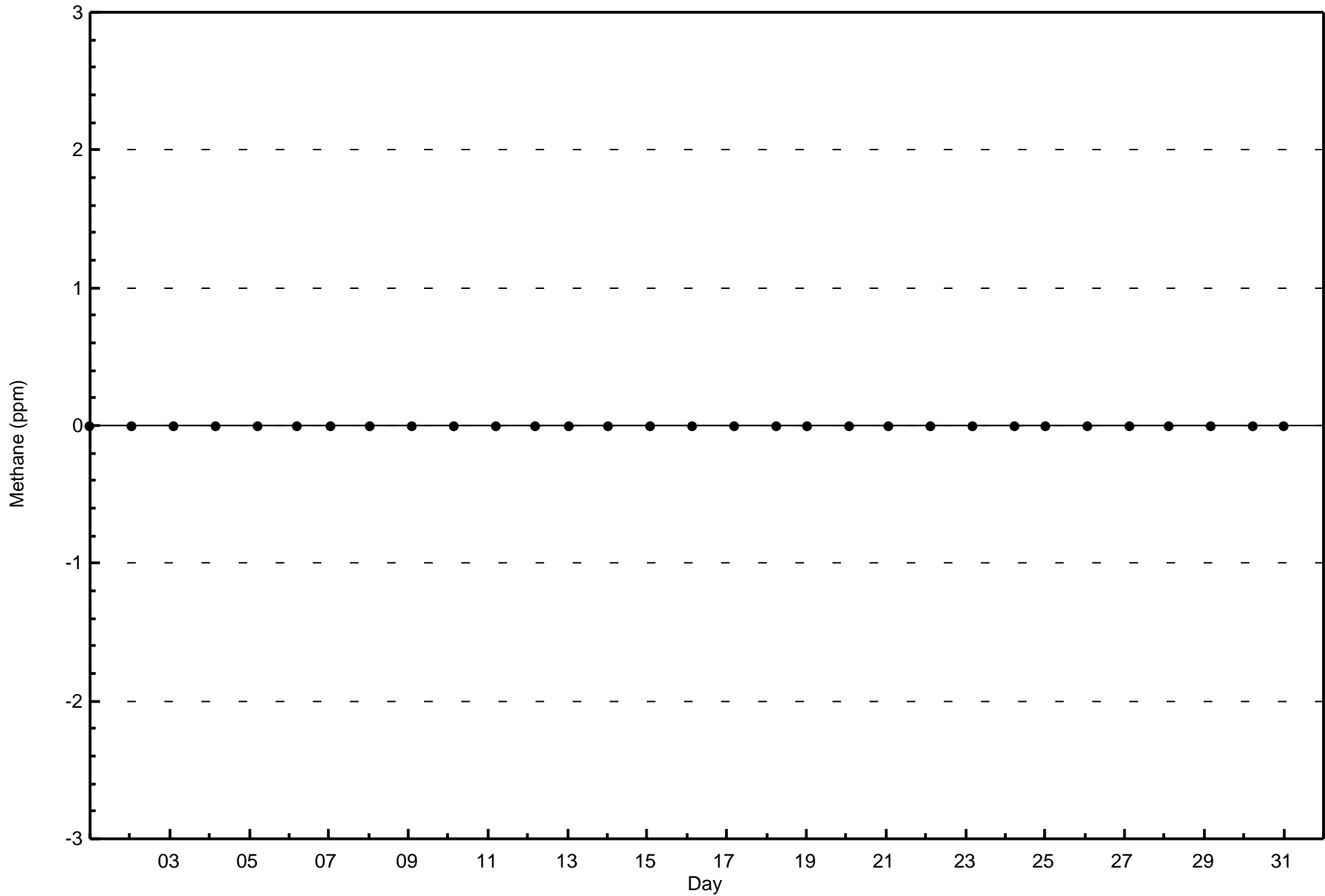
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Methane (CH₄) - ppm
Anzac (AMS 14)

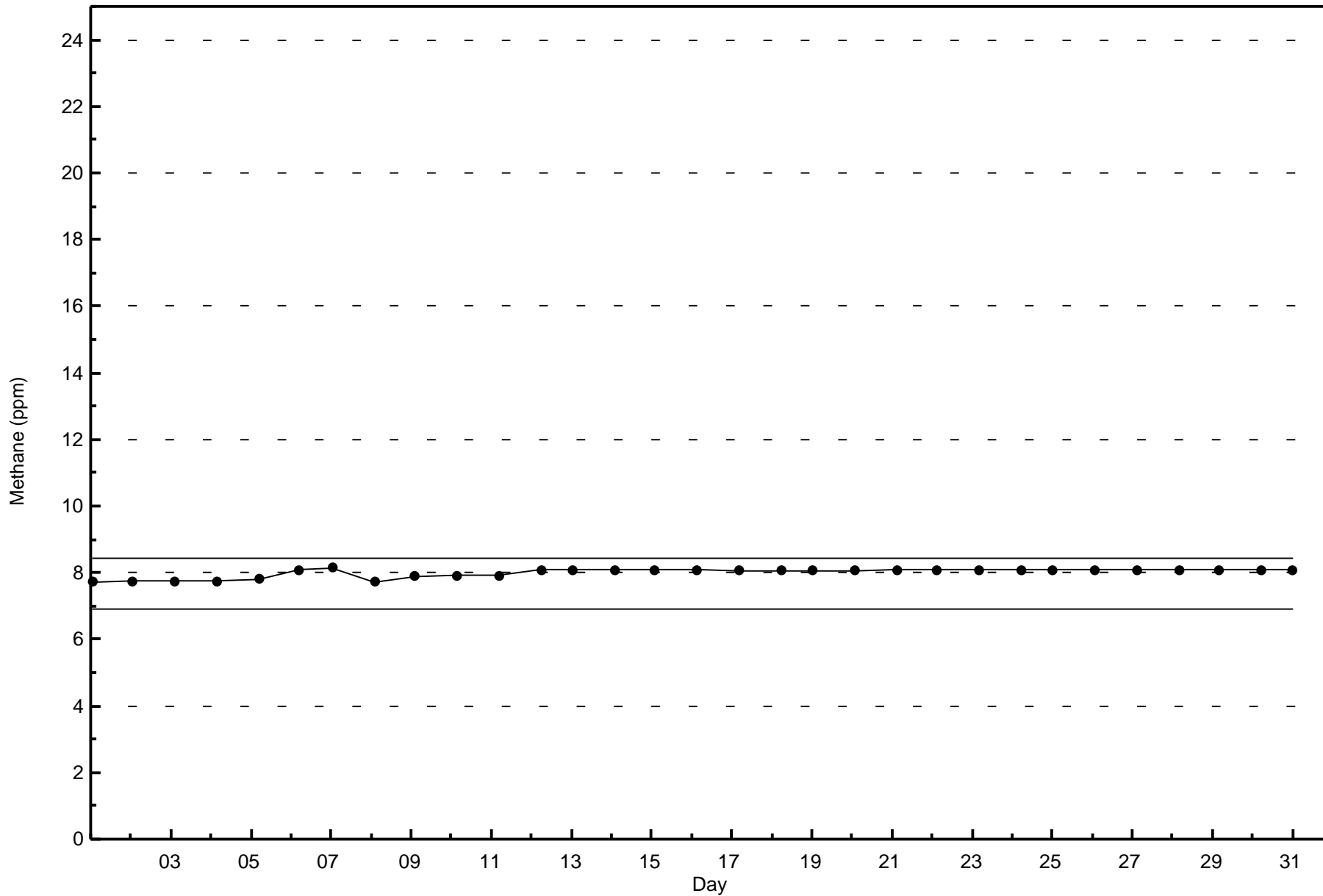






Wood Buffalo Environmental Association
Span Responses

Methane (CH₄) - ppm
Anzac - January 2017





Wood Buffalo Environmental Association
Summary of Hour Averages

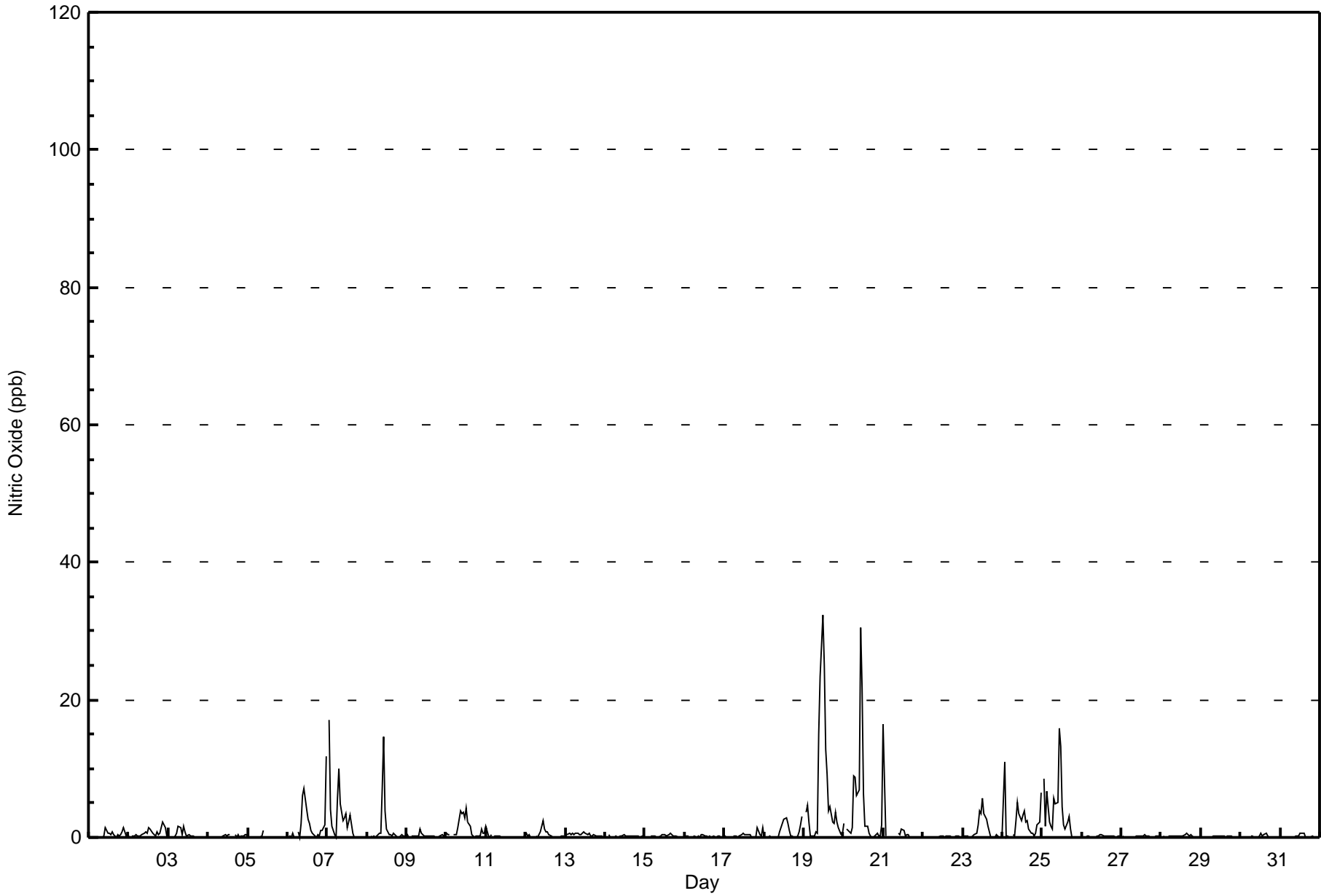
Nitric Oxide (NO) - ppb
Anzac - January 2017

Maximum Value: 32 ppb on Jan 19 12:00 Maximum Daily Average: 6.6 ppb on Jan 19																		Hours in Service: 744 Hours of Data: 693 Hours of Missing Data: 51 Hours of Calibration: 37 Percent Operational Time: 98.1																							
Minimum Value: 0 ppb on Jan 1 05:00 Minimum Daily Average: 0.1 ppb on Jan 22 Maximum Diurnal Average: 4.0 ppb at hour 11 Minimum Diurnal Average: 0.2 ppb at hour 19 Monthly Average: 1.0 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 16																																									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																	
1-Jan	Z	0	0	0	0	0	0	0	0	0	2	1	1	0	1	0	0	0	0	0	1	1	0	1	0.4	2															
2-Jan	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	1	0	1	2	2	1	0	0.7	2															
3-Jan	0	0	Z	0	0	1	2	1	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2															
4-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	M	M	0	0	0	0	0	0	0	0	0.2	0															
5-Jan	0	0	0	0	Z	0	0	0	0	1	C	C	C	C	M	M	0	0	0	0	0	0	0	0	--	1															
6-Jan	0	0	0	1	0	Z	1	0	2	6	7	4	3	2	1	1	0	0	0	0	1	1	2	12	1.9	12															
7-Jan	Z	17	4	2	0	0	6	10	5	2	3	3	1	2	3	1	0	0	0	0	0	0	0	0	2.6	17															
8-Jan	0	Z	0	0	0	0	0	1	1	7	15	4	1	0	0	0	1	0	0	0	0	0	0	0	1.4	15															
9-Jan	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1															
10-Jan	1	0	0	Z	0	0	0	1	4	3	4	3	4	2	2	0	0	0	0	0	0	1	1	1	1.3	4															
11-Jan	2	0	0	0	Z	0	0	0	0	0	UO	UO	UO	UO	UO	UO	0	0	0	0	0	0	0	0	--	2															
12-Jan	1	0	0	0	0	Z	0	0	0	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0.4	2															
13-Jan	Z	0	1	0	1	0	1	1	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0.4	1															
14-Jan	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															
15-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1															
16-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0															
17-Jan	0	0	0	0	Z	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2	0	0	1	0.3	2															
18-Jan	0	0	0	0	0	Z	0	0	0	1	1	2	3	3	2	1	0	0	0	0	0	1	2	3	0.9	3															
19-Jan	Z	4	5	2	0	0	0	1	1	15	23	32	25	13	9	4	5	2	2	4	2	2	0	1	6.6	32															
20-Jan	2	Z	1	1	1	1	9	9	6	7	30	22	6	2	2	1	0	0	0	0	1	0	0	2	4.5	30															
21-Jan	16	0	Z	PF	PF	PF	PF	PF	PF	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	--	16															
22-Jan	0	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															
23-Jan	0	0	0	0	Z	0	0	0	1	2	4	3	6	3	3	2	1	0	0	0	1	0	0	0	1.1	6															
24-Jan	0	11	0	0	0	Z	1	0	3	5	4	2	3	4	2	3	1	1	1	0	1	2	2	6	2.2	11															
25-Jan	Z	8	2	7	2	2	1	6	5	5	16	13	4	2	1	2	3	1	0	0	0	0	0	0	3.5	16															
26-Jan	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															
27-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0															
28-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1															
29-Jan	0	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															
30-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0.1	1															
31-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.1	1															
																		Diurnal Average						Diurnal Maximum																	
																		0.9 1.6 0.6 0.6 0.3 0.3 0.7 1.0 1.0 2.0 4.0 3.4 2.3 1.4 1.1 0.7 0.5 0.3 0.2 0.2 0.4 0.4 0.4 0.9						16 17 5 7 2 2 9 10 6 15 30 32 25 13 9 4 5 2 2 4 2 2 2 12																	
Z - zerospan																		C - Calibration						M - Maintenance						UO - Unstable Operation						PF - Power Failure					



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Anzac - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Anzac - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	688	99.28	99.28
21 - 40	5	0.72	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 693

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitric Oxide (NO) - ppb
Anzac - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	45	5	0	0	6	6	18	22	40	31	47	25	77	184	69	81	656
21 - 40	3	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	5
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	48	5	0	0	6	6	18	24	40	31	47	25	77	184	69	81	661

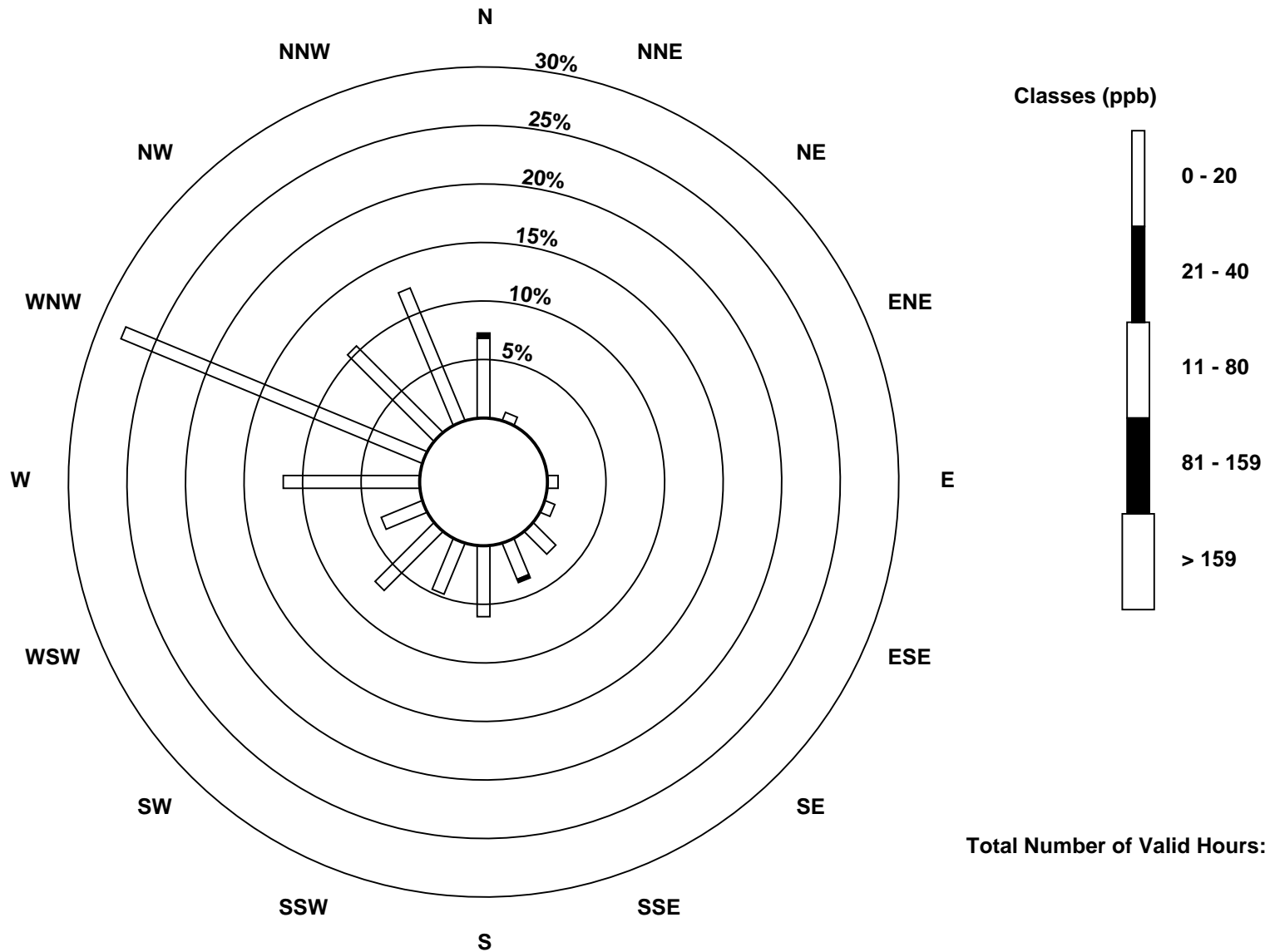
Total Number of Valid Hours: 661

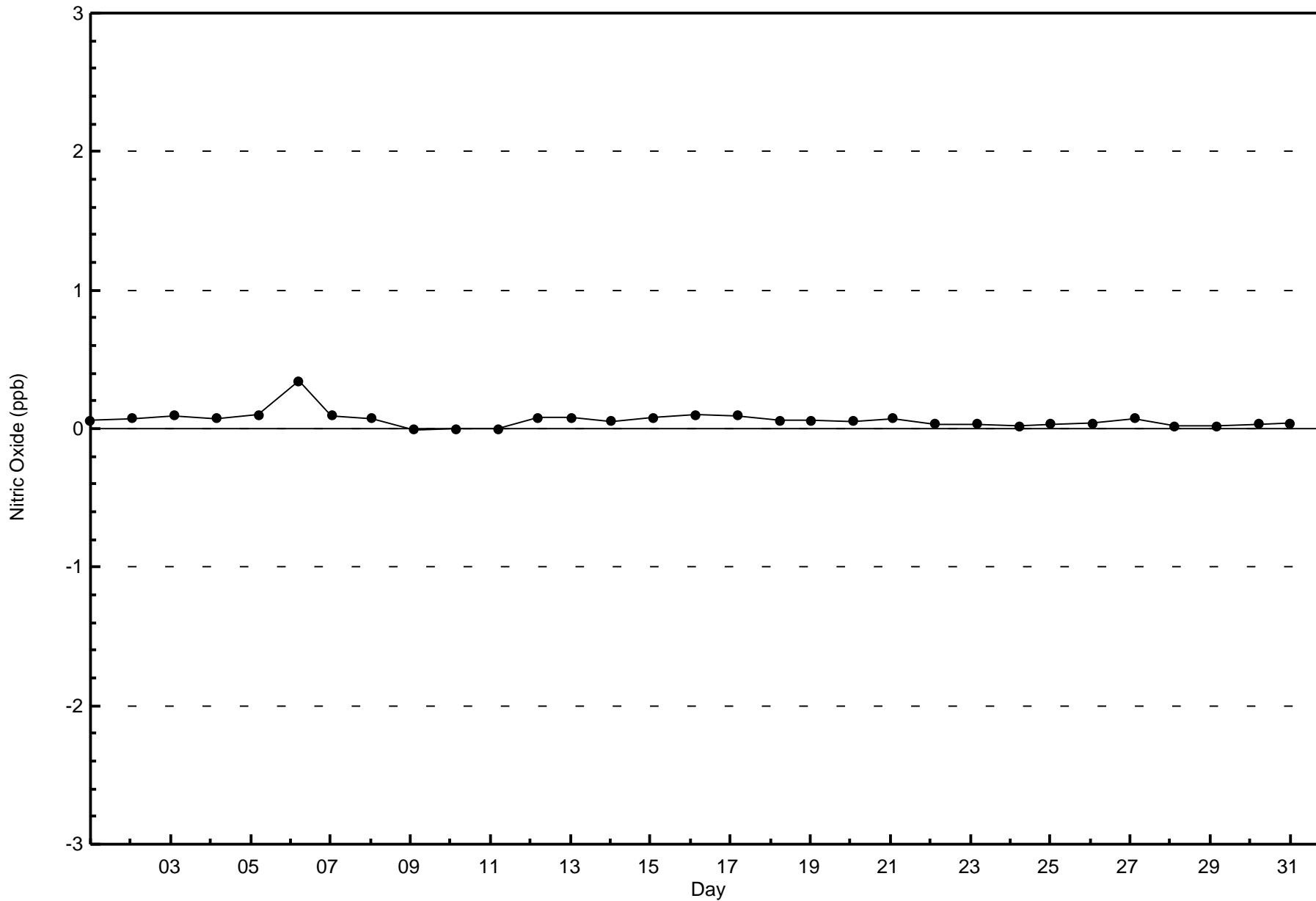
Total Number of Hours: 744

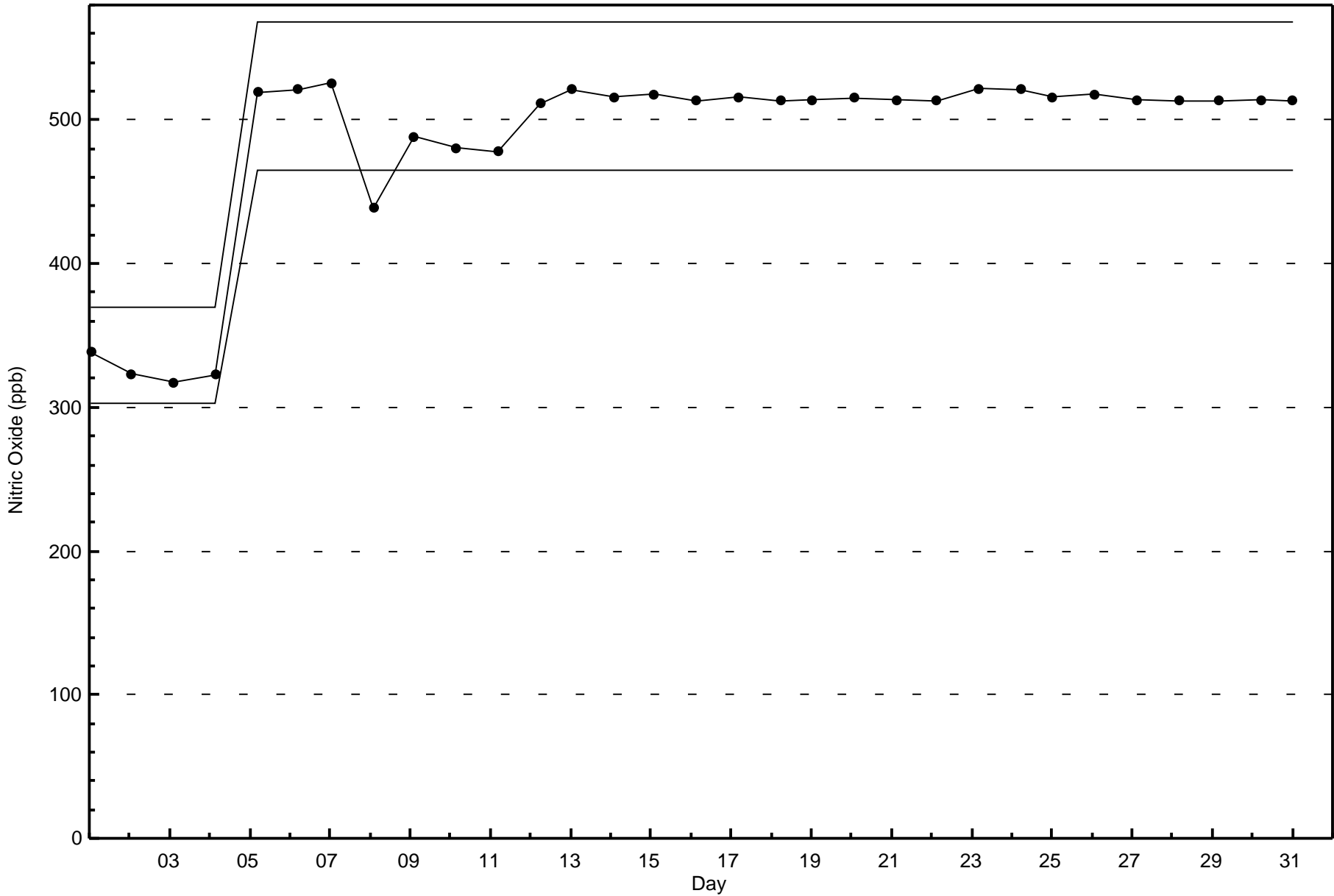


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Nitric Oxide (NO) - ppb
Anzac (AMS 14)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Anzac - January 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 24 ppb on Jan 7 09:00	Maximum Daily Average: 11.4 ppb on Jan 19		Hours of Data:	693
Minimum Value: 0 ppb on Jan 1 06:00	Minimum Daily Average: 0.9 ppb on Jan 29		Hours of Missing Data:	51
Maximum Diurnal Average: 6.6 ppb at hour 9	Minimum Diurnal Average: 3.1 ppb at hour 14		Hours of Calibration:	37
Monthly Average: 4.6 ppb	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 3 Q ₃ = 6 P ₉₀ = 12 P ₉₉ = 18		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-Jan	Z	0	1	3	0	0	0	0	1	4	4	2	2	2	5	4	3	4	5	5	7	14	10	9	3.8	14
2-Jan	7	Z	8	6	4	3	2	2	3	5	5	3	5	5	4	4	7	8	7	7	13	18	19	14	7.0	19
3-Jan	11	9	Z	3	3	9	8	14	12	11	3	1	1	1	1	1	1	1	1	1	1	1	1	1	4.2	14
4-Jan	0	1	3	Z	5	2	5	5	9	7	4	2	2	2	M	M	4	3	4	5	9	7	7	6	4.3	9
5-Jan	2	3	3	3	Z	13	8	14	14	12	C	C	C	C	M	M	0	0	0	1	1	1	3	5	--	14
6-Jan	5	7	6	7	6	Z	7	7	12	13	10	8	6	5	4	6	10	8	9	9	9	10	15	19	8.5	19
7-Jan	Z	22	17	14	12	7	20	24	24	15	10	9	5	8	13	8	4	1	1	1	1	1	1	3	9.6	24
8-Jan	5	Z	6	6	5	6	6	7	9	17	17	8	3	2	1	1	2	2	1	2	2	2	1	1	4.8	17
9-Jan	2	1	Z	1	1	1	1	1	3	2	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1.2	3
10-Jan	3	3	3	Z	3	3	5	9	17	15	10	6	7	5	2	1	2	2	2	2	1	4	4	2	4.8	17
11-Jan	3	2	1	2	Z	1	1	1	1	2	UO	UO	UO	UO	UO	UO	3	2	3	4	3	2	1	2	--	4
12-Jan	4	3	4	2	5	Z	4	4	5	6	6	3	2	2	2	3	4	4	4	4	5	4	5	5	3.9	6
13-Jan	Z	6	5	3	3	3	3	3	3	3	3	4	2	2	3	2	3	12	10	4	3	2	4	2	3.8	12
14-Jan	1	Z	3	3	2	2	2	2	2	2	2	1	1	1	1	2	2	2	2	1	1	1	1	1	1.5	3
15-Jan	1	1	Z	1	1	1	1	1	1	1	2	2	1	1	1	2	3	2	2	1	1	1	1	1	1.3	3
16-Jan	1	1	1	Z	1	1	1	1	2	1	2	2	1	1	1	2	2	2	1	2	2	3	3	3	1.6	3
17-Jan	5	3	3	3	Z	2	1	1	1	2	2	2	2	2	3	3	2	4	4	3	5	3	3	5	2.7	5
18-Jan	3	2	3	4	4	Z	4	5	5	6	10	9	6	7	9	7	5	4	4	4	4	5	7	10	5.5	10
19-Jan	Z	13	12	11	6	6	5	5	5	11	11	13	12	10	11	10	13	15	16	16	16	16	15	16	11.4	16
20-Jan	15	Z	15	14	11	10	14	13	13	10	14	13	8	4	6	5	5	5	3	4	6	6	6	8	9.0	15
21-Jan	12	5	Z	PF	PF	PF	PF	PF	PF	6	4	4	6	2	3	4	2	4	5	5	4	5	4	5	--	12
22-Jan	5	5	5	Z	4	3	2	1	1	1	1	1	0	1	2	7	6	5	5	5	6	6	5	5	3.3	7
23-Jan	4	6	9	8	Z	9	16	17	15	10	10	8	8	7	7	8	12	10	10	10	13	11	10	8	9.8	17
24-Jan	9	14	9	9	10	Z	13	8	20	17	11	6	5	7	6	9	11	12	9	13	12	11	15	15	10.8	20
25-Jan	Z	15	11	13	13	11	11	14	14	9	14	14	8	5	5	9	14	14	5	6	4	3	3	4	9.5	15
26-Jan	4	Z	3	3	3	2	2	2	2	2	1	2	1	1	1	1	2	3	2	1	1	1	1	1	1.9	4
27-Jan	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1	1	2	1	1.2	2
28-Jan	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	2	3	2	5	3	1	1	1	1	1	1.4	5
29-Jan	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	2	3	1	1	1	1	1	0.9	3
30-Jan	1	1	1	1	1	Z	1	1	1	1	0	0	2	1	2	5	5	5	3	1	1	1	1	2	1.5	5
31-Jan	Z	1	1	1	1	2	2	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	3

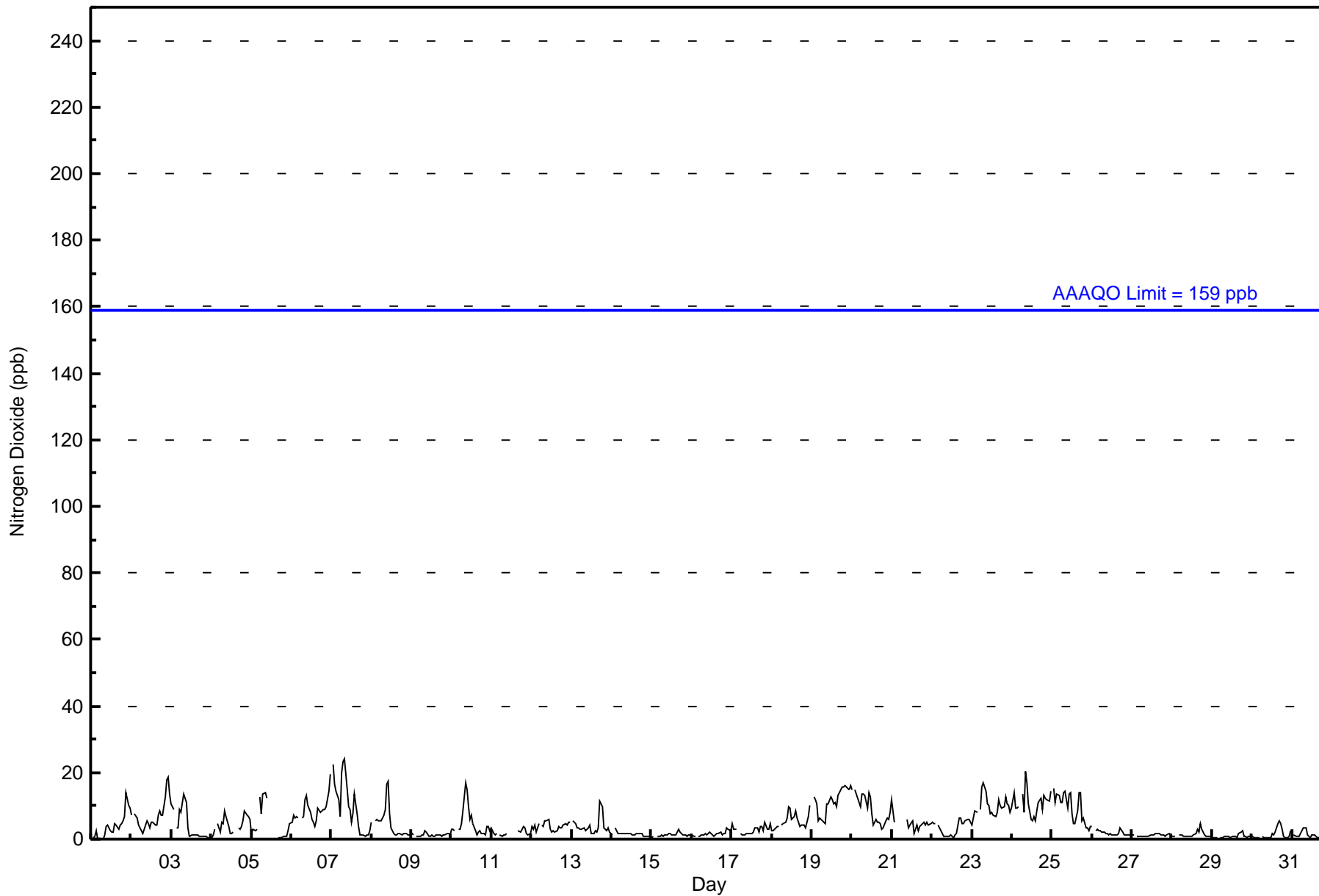
4.2	4.9	5.1	4.8	4.2	3.9	4.9	5.5	6.6	6.2	5.5	4.4	3.5	3.1	3.5	3.7	4.3	4.7	4.0	3.9	4.3	4.7	4.7	5.0	Diurnal Average
15	22	17	14	13	13	20	24	24	17	17	14	12	10	13	10	14	15	16	16	16	18	19	19	Diurnal Maximum

Z - zerospan C - Calibration M - Maintenance UO - Unstable Operation PF - Power Failure
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Anzac - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Anzac - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	690	99.57	99.57
21 - 40	3	0.43	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: 693

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Anzac - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	47	4	0	0	6	6	18	24	40	31	47	25	76	184	69	81	658
21 - 40	1	1	0	0	0	0	0	0	0	0	0	0	1	0	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
Totals	48	5	0	0	6	6	18	24	40	31	47	25	77	184	69	81	661

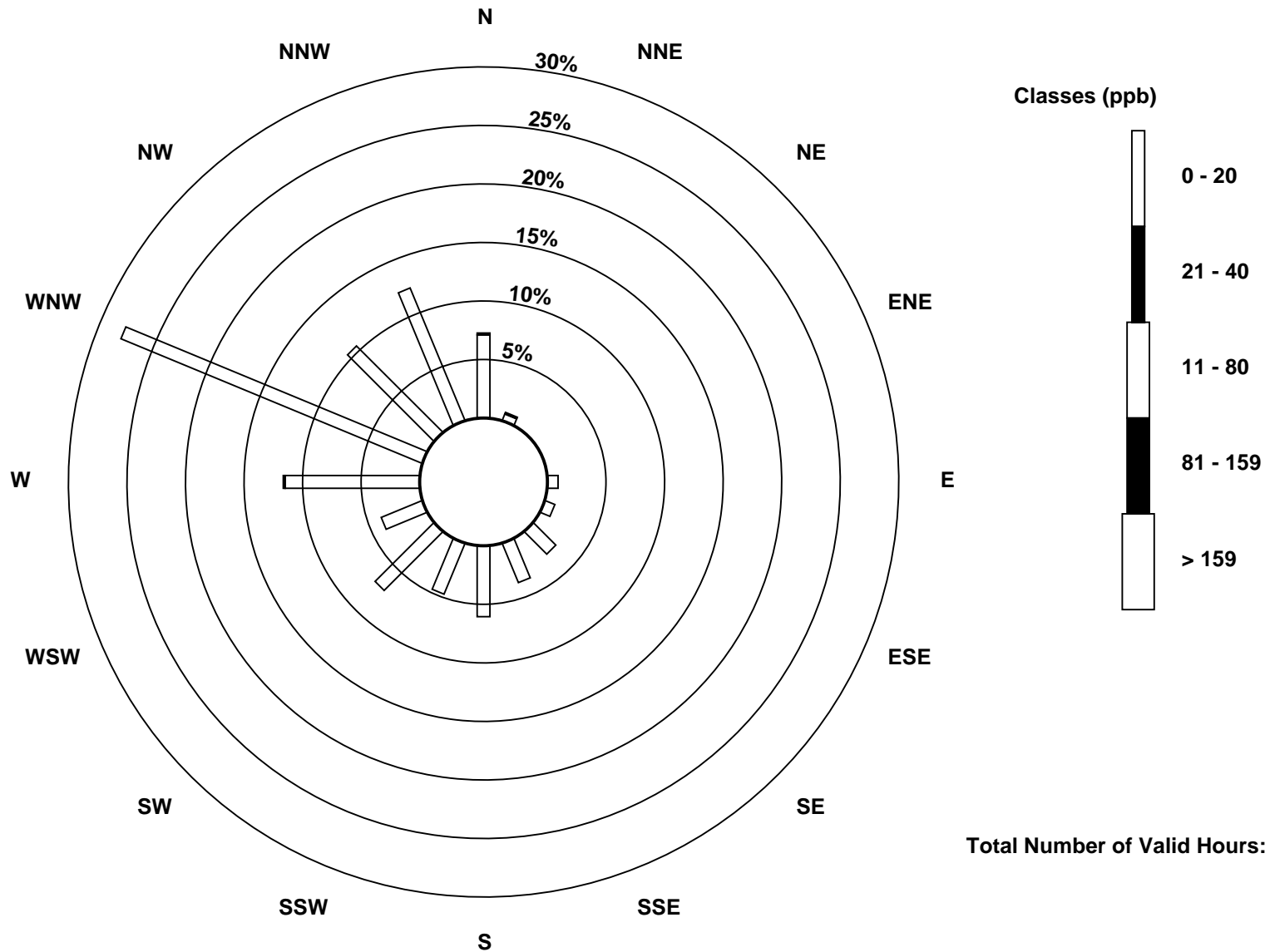
Total Number of Valid Hours: 661

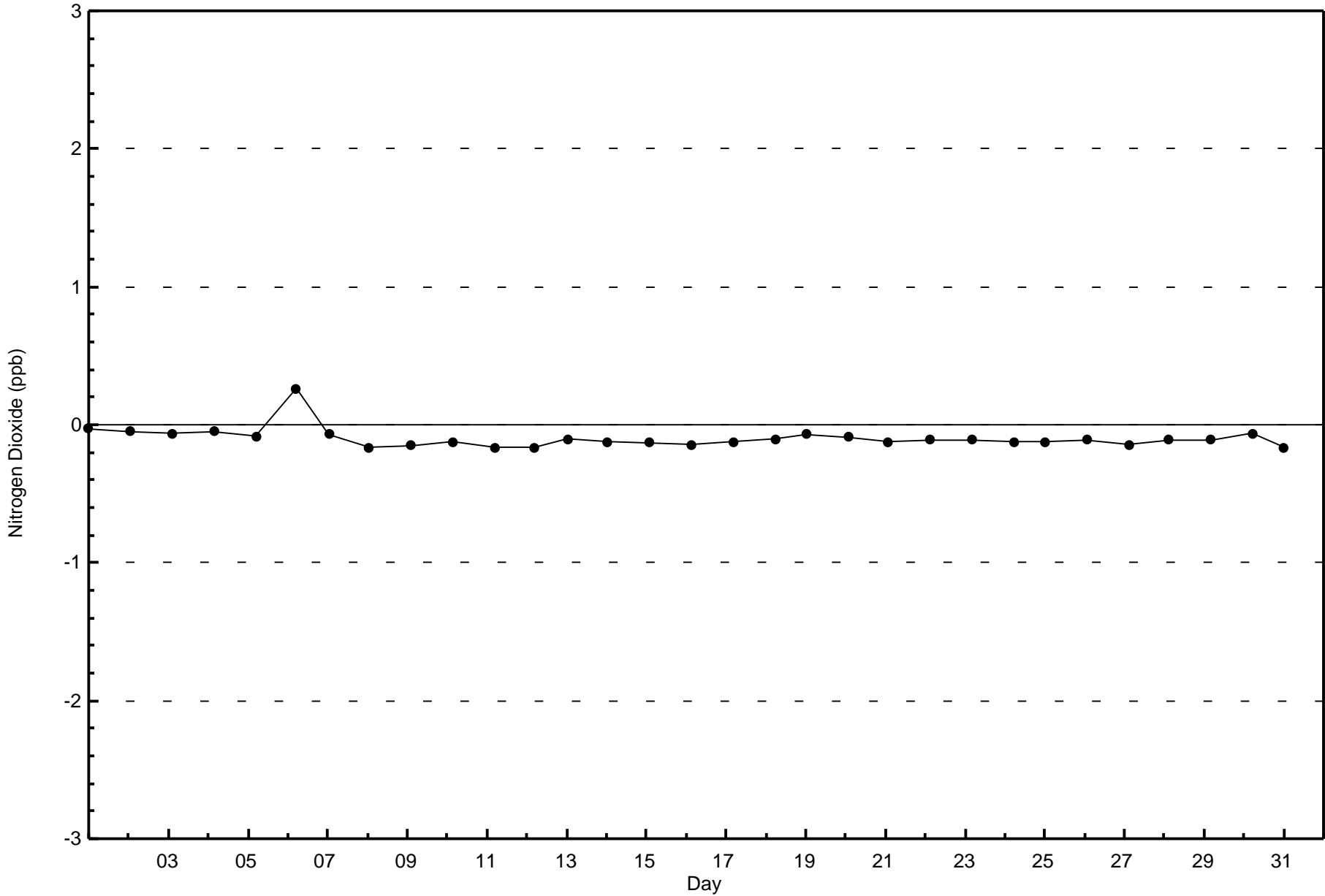
Total Number of Hours: 744

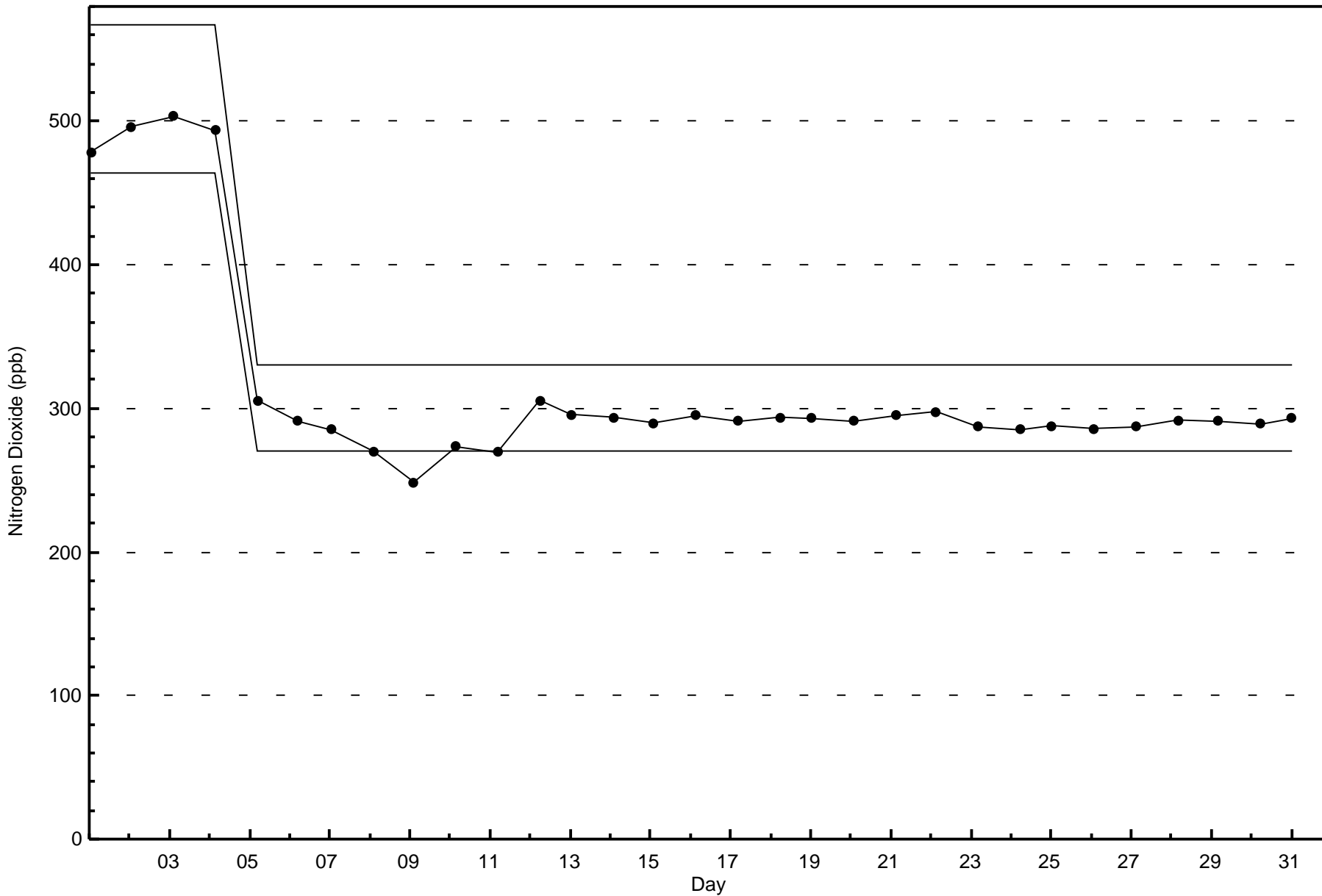


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Nitrogen Dioxide (NO₂) - ppb
Anzac (AMS 14)





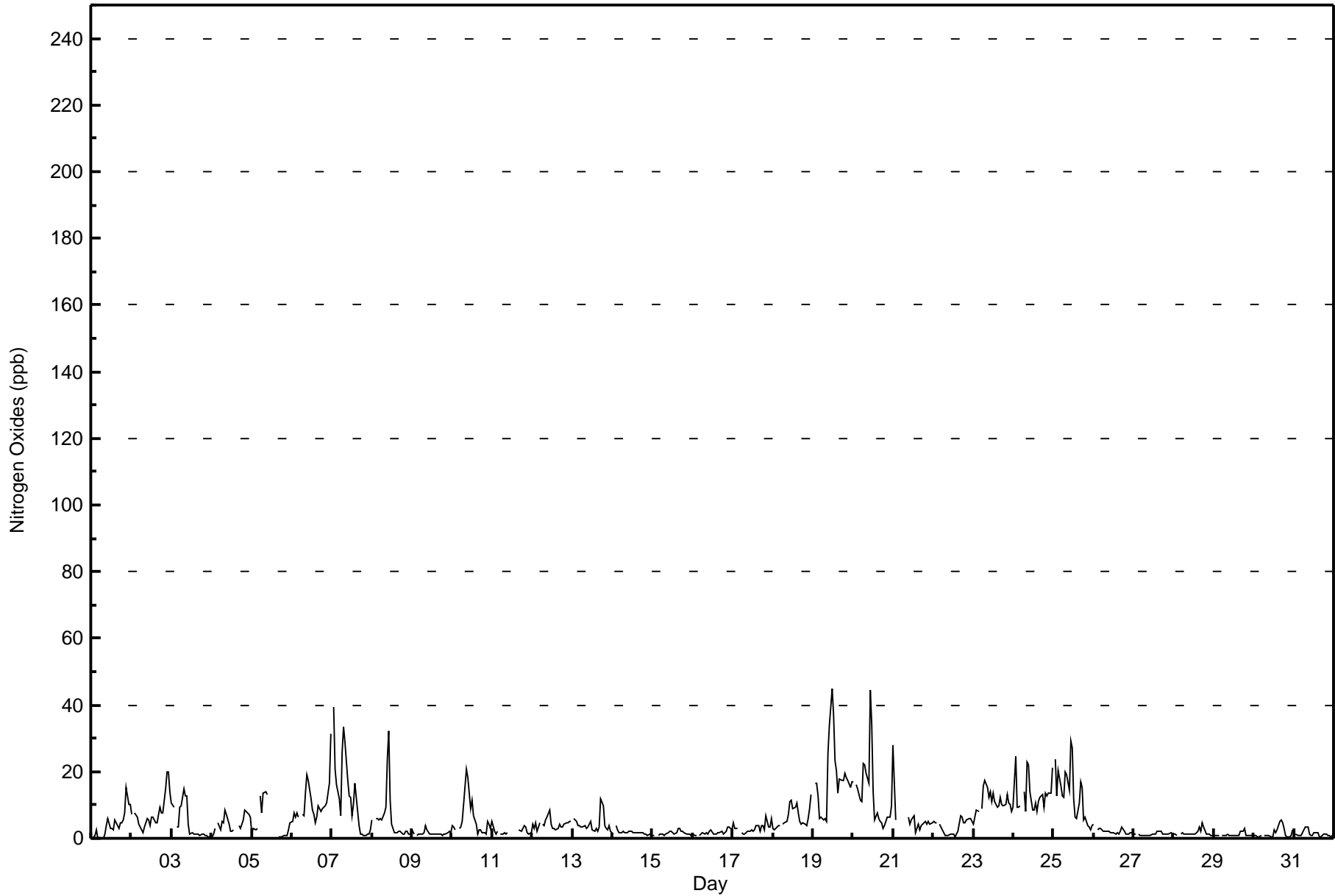




Wood Buffalo Environmental Association
Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb
Anzac - January 2017

Maximum Value: 45 ppb on Jan 19 12:00 Maximum Daily Average: 18.0 ppb on Jan 19																		Hours in Service: 744 Hours of Data: 693								
Minimum Value: 0 ppb on Jan 1 06:00 Minimum Daily Average: 1.0 ppb on Jan 29 Maximum Diurnal Average: 9.5 ppb at hour 11 Minimum Diurnal Average: 4.1 ppb at hour 20 Monthly Average: 5.6 ppb Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 3 Q ₃ = 7 P ₉₀ = 14 P ₉₉ = 33																		Hours of Missing Data: 51 Hours of Calibration: 37 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-Jan	Z	0	1	3	0	0	0	0	1	4	6	3	3	3	5	5	3	5	5	6	8	15	10	10	4.2	15
2-Jan	7	Z	8	7	4	4	2	2	3	6	6	4	6	6	5	5	7	9	8	8	15	20	20	14	7.6	20
3-Jan	11	9	Z	3	4	9	10	15	13	13	4	1	2	1	1	1	1	1	1	1	1	1	1	1	4.5	15
4-Jan	1	1	3	Z	5	2	5	5	9	7	4	2	2	3	M	M	4	3	4	5	9	8	7	6	4.5	9
5-Jan	2	3	3	3	Z	13	8	14	14	13	C	C	C	C	M	M	0	0	0	1	1	1	3	5	--	14
6-Jan	5	7	6	8	6	Z	7	7	14	19	17	12	8	7	5	6	10	8	9	9	10	11	16	31	10.4	31
7-Jan	Z	39	21	16	12	7	26	33	29	17	13	12	7	10	17	8	4	1	1	1	1	1	1	3	12.2	39
8-Jan	5	Z	6	6	5	6	6	8	10	24	32	11	4	2	2	2	2	2	1	1	2	2	1	1	6.2	32
9-Jan	2	1	Z	1	1	1	1	1	4	3	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1.5	4
10-Jan	4	3	3	Z	3	3	5	10	21	18	13	9	11	7	4	1	2	2	2	2	1	5	4	3	6.0	21
11-Jan	5	2	1	2	Z	1	1	2	1	2	UO	UO	UO	UO	UO	UO	3	2	3	4	3	2	1	2	--	5
12-Jan	4	3	4	2	5	Z	4	4	6	7	8	4	3	3	3	3	4	4	4	4	5	5	5	5	4.3	8
13-Jan	Z	6	5	4	4	3	3	4	3	4	4	5	3	2	3	2	3	12	10	4	3	3	4	2	4.1	12
14-Jan	1	Z	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1.7	4
15-Jan	1	1	Z	1	1	1	1	1	1	2	2	2	2	1	2	3	3	2	2	2	1	1	1	1	1.5	3
16-Jan	1	1	1	Z	1	1	2	1	2	1	2	3	1	1	1	2	2	2	1	2	2	3	3	3	1.7	3
17-Jan	5	3	3	3	Z	2	1	1	1	2	2	3	2	3	4	4	2	4	4	3	7	3	3	6	3.0	7
18-Jan	3	3	3	4	4	Z	4	5	5	7	11	11	9	9	11	8	5	4	4	4	4	6	9	13	6.4	13
19-Jan	Z	16	17	13	6	6	6	6	5	25	34	45	37	23	20	14	18	17	17	19	18	17	15	17	18.0	45
20-Jan	17	Z	16	15	12	11	22	22	19	16	44	34	14	6	8	6	5	5	3	4	6	7	6	10	13.4	44
21-Jan	28	6	Z	PF	PF	PF	PF	PF	PF	6	4	6	7	2	3	4	2	4	5	5	4	5	4	5	--	28
22-Jan	5	5	5	Z	4	3	2	1	1	1	1	1	0	1	2	7	6	5	5	6	6	6	5	5	3.4	7
23-Jan	4	6	9	8	Z	9	16	17	15	12	14	11	14	11	10	10	12	10	10	10	13	11	10	8	10.9	17
24-Jan	9	25	9	10	10	Z	14	8	23	22	14	8	9	11	8	11	12	13	9	13	13	14	14	21	13.0	25
25-Jan	Z	24	13	20	16	13	12	20	19	14	29	27	12	7	6	11	17	15	5	6	4	3	3	4	13.0	29
26-Jan	4	Z	3	3	3	3	2	2	2	2	2	2	1	2	1	2	3	2	1	1	1	2	2	2	2.1	4
27-Jan	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1	1	2	1	1.3	2
28-Jan	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	2	4	2	5	3	1	1	1	1	1	1.6	5
29-Jan	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	2	3	1	1	1	1	1	1.0	3
30-Jan	1	1	1	1	1	Z	1	1	1	1	0	1	2	2	3	5	5	5	3	1	1	0	1	2	1.6	5
31-Jan	Z	1	1	1	1	2	2	3	3	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1.3	3
5.1 6.5 5.6 5.4 4.4 4.2 5.7 6.6 7.6 8.2 9.5 7.8 5.8 4.5 4.7 4.4 4.8 5.0 4.2 4.1 4.6 5.1 5.1 6.0																								Diurnal Average		
28 39 21 20 16 13 26 33 29 25 44 45 37 23 20 14 18 17 17 19 18 20 20 31																								Diurnal Maximum		
Z - zerspan C - Calibration M - Maintenance UO - Unstable Operation PF - Power Failure																										





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Anzac - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	667	96.25	96.25
21 - 40	24	3.46	99.71
41 - 80	2	0.29	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 693

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Anzac - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	41	4	0	0	6	6	18	20	37	29	47	24	75	183	69	80	639
21 - 40	6	1	0	0	0	0	0	3	3	2	0	1	2	1	0	1	20
11 - 80	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	48	5	0	0	6	6	18	24	40	31	47	25	77	184	69	81	661

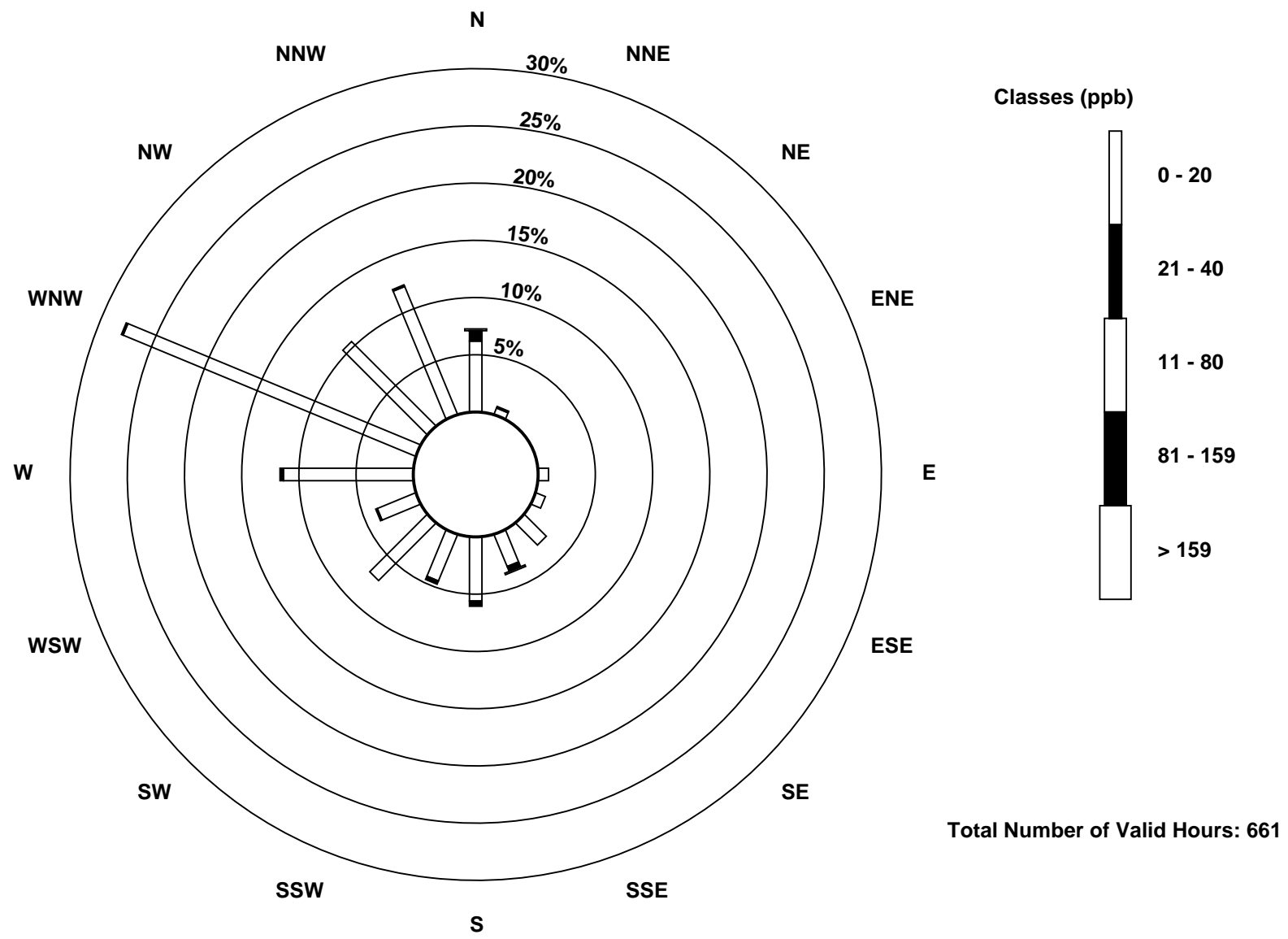
Total Number of Valid Hours: 661

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

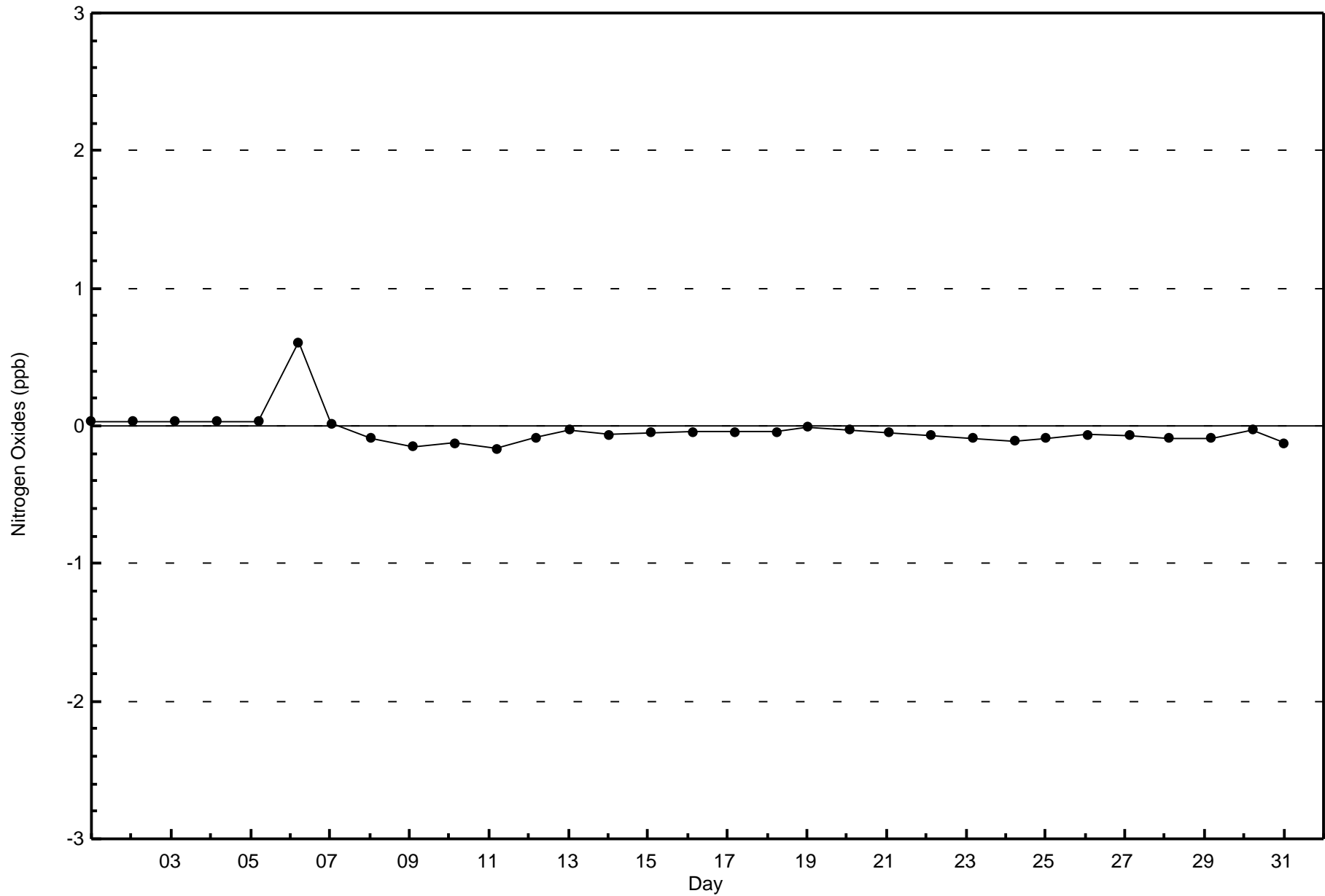
Nitrogen Oxides (NO_x) - ppb
Anzac (AMS 14)

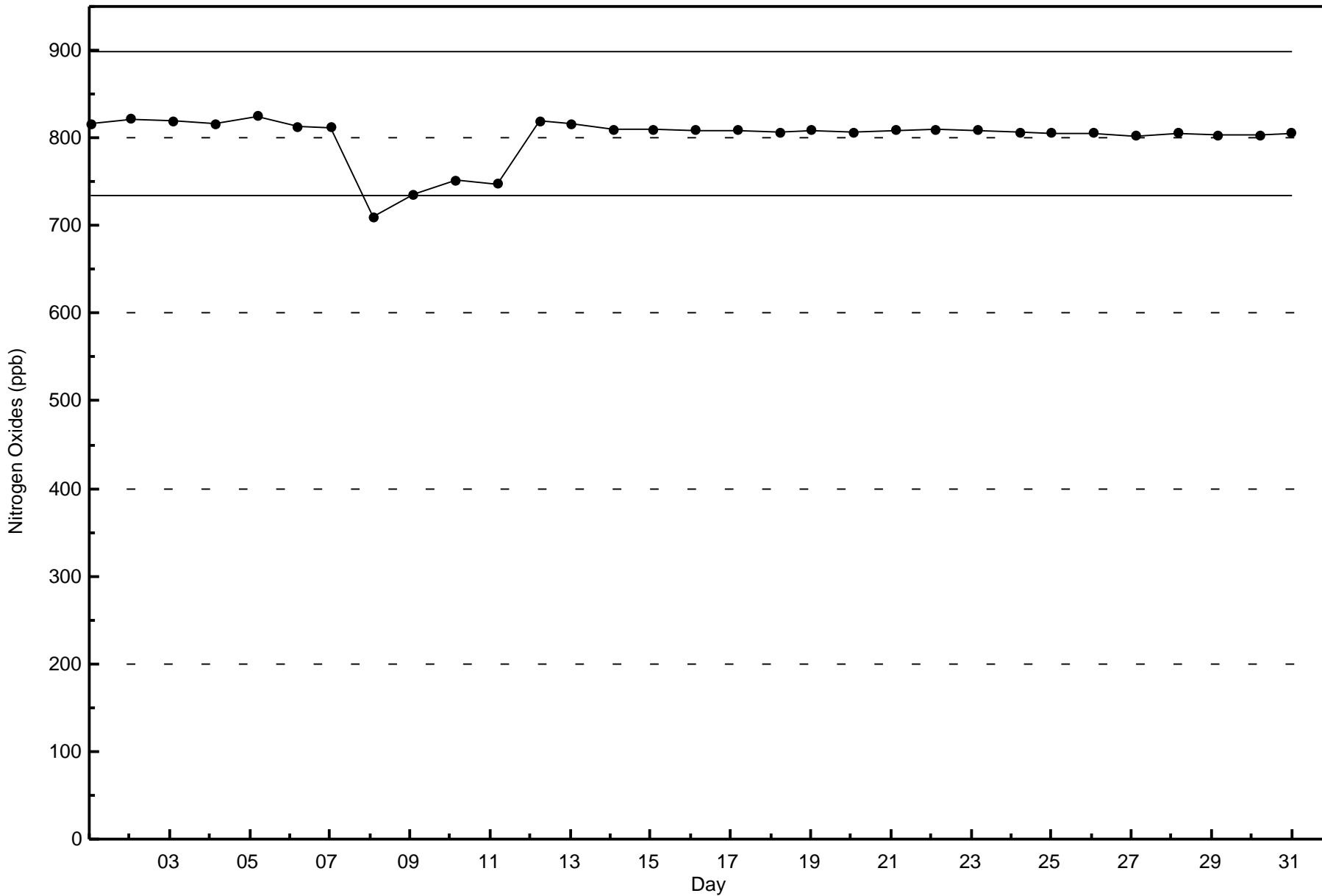




Wood Buffalo Environmental Association
Zero Responses

Nitrogen Oxides (NO_x) - ppb
Anzac - January 2017







Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

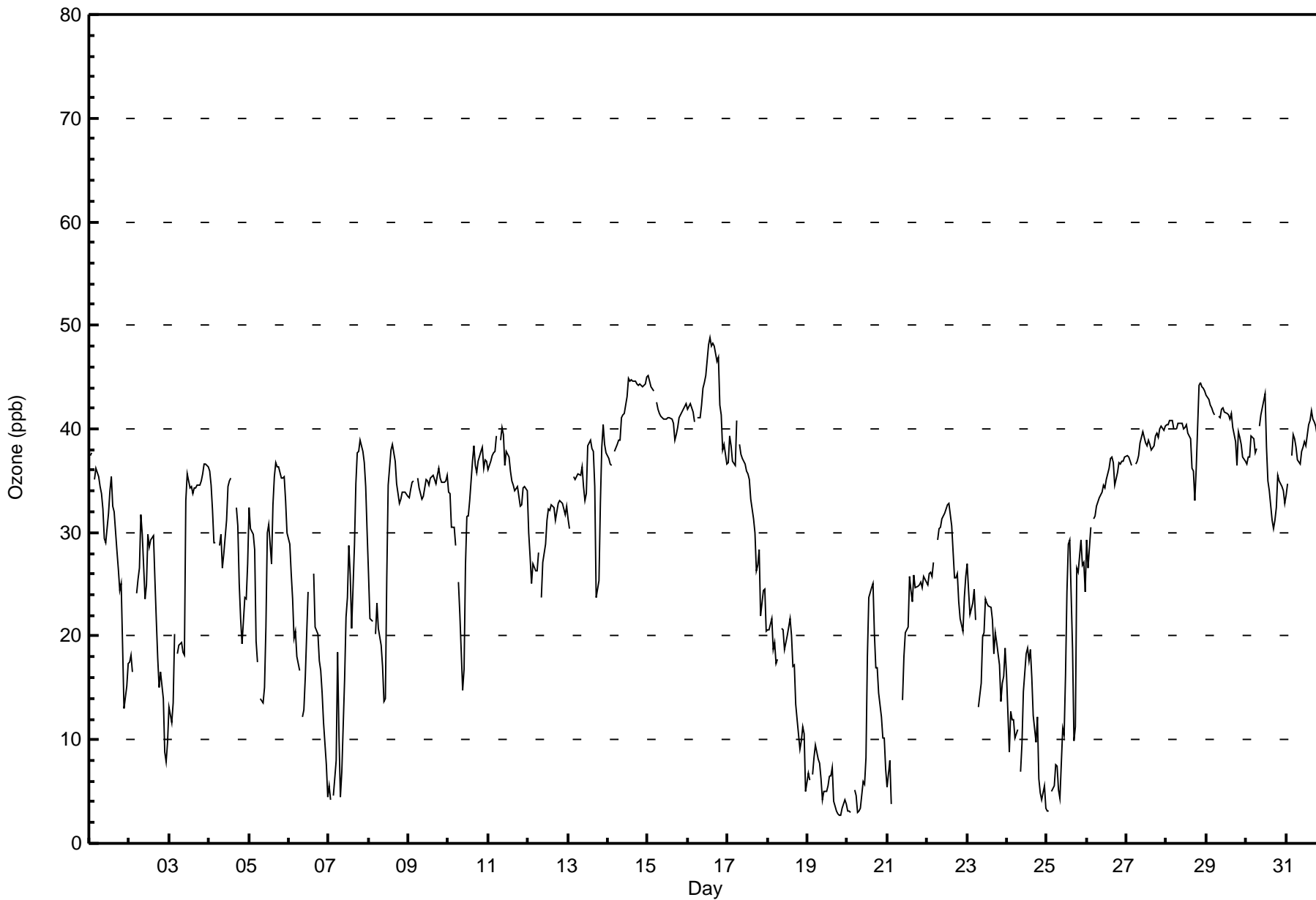
Anzac - January 2017

Number of Exceedences (AAAQO):		1-hr: 0 24-hr: 0		Hours in Service:		744																																											
Maximum Value: 49 ppb on Jan 16 14:00		Maximum Daily Average: 43.4 ppb on Jan 16		Hours of Data:		703																																											
Minimum Value: 3 ppb on Jan 19 21:00		Minimum Daily Average: 5.5 ppb on Jan 19		Hours of Missing Data:		41																																											
Maximum Diurnal Average: 32.7 ppb at hour 14		Minimum Diurnal Average: 26.2 ppb at hour 9		Hours of Calibration:		33																																											
Monthly Average: 28.8 ppb		Percentiles: P ₁ = 3 P ₁₀ = 10 Q ₁ = 21 Median = 33 Q ₃ = 37 P ₉₀ = 41 P ₉₉ = 46		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-Jan	37	38	Z	35	36	35	34	34	32	29	29	32	34	35	32	32	28	26	24	25	19	13	15	17	29.4	38																							
2-Jan	18	18	17	Z	24	25	27	32	30	24	25	30	29	29	30	25	22	18	15	17	14	9	8	10	21.4	32																							
3-Jan	13	12	14	20	Z	18	19	19	18	18	33	36	34	34	34	34	35	35	35	35	36	37	37	36	27.9	37																							
4-Jan	36	35	32	29	29	Z	29	30	27	28	31	34	35	35	M	M	32	31	25	22	19	24	24	27	29.2	36																							
5-Jan	32	30	30	28	20	18	Z	14	14	15	21	30	31	27	33	35	37	36	36	35	35	35	33	30	28.5	37																							
6-Jan	29	26	24	20	20	18	17	Z	12	13	16	24	C	C	C	26	21	20	18	17	14	12	8	5	17.9	29																							
7-Jan	6	4	Z	5	8	18	10	4	7	16	22	24	29	26	21	29	35	38	38	39	38	37	34	30	22.5	39																							
8-Jan	26	22	21	Z	20	23	21	19	17	14	14	26	35	38	39	38	37	35	33	33	34	34	34	33	28.0	39																							
9-Jan	33	34	35	35	Z	35	34	34	33	33	35	35	35	35	35	35	35	35	36	36	35	35	35	36	34.8	36																							
10-Jan	34	34	31	31	29	Z	25	22	15	17	27	32	32	33	37	38	36	36	37	38	38	36	37	37	31.7	38																							
11-Jan	36	37	37	38	38	39	Z	39	40	39	37	38	37	36	35	35	34	34	34	32	33	34	34	34	36.1	40																							
12-Jan	30	28	25	27	26	26	28	Z	24	27	29	31	32	32	33	32	31	32	33	33	33	32	32	33	30.0	33																							
13-Jan	31	30	Z	35	35	35	36	36	36	34	33	34	38	39	38	38	34	24	25	33	38	40	39	38	34.8	40																							
14-Jan	37	37	36	Z	38	38	39	39	41	41	41	41	43	45	45	45	44	44	44	44	44	44	44	45	42.0	45																							
15-Jan	45	45	44	44	Z	43	42	42	41	41	41	41	41	41	41	40	39	40	40	41	42	42	42	42	41.7	45																							
16-Jan	42	42	42	42	41	Z	41	41	42	44	44	45	48	49	48	48	48	47	47	42	41	38	38	37	43.4	49																							
17-Jan	37	39	38	37	36	41	Z	39	38	37	37	36	36	35	33	31	30	26	27	28	22	24	24	20	32.7	41																							
18-Jan	21	21	22	19	19	17	18	Z	21	21	19	19	20	22	20	17	17	13	12	9	10	11	11	5	16.6	22																							
19-Jan	7	6	Z	7	8	10	8	8	6	4	5	5	6	7	6	7	4	3	3	3	3	3	4	4	5.5	10																							
20-Jan	3	3	3	Z	5	5	3	3	3	6	6	8	18	24	25	25	20	17	17	15	12	10	10	7	10.8	25																							
21-Jan	5	8	4	PF	PF	PF	PF	PF	PF	14	18	20	21	26	24	23	26	25	25	25	25	25	26	25	20.3	26																							
22-Jan	25	26	26	26	27	Z	29	30	31	31	32	32	33	33	32	31	26	26	26	23	22	21	24	26	27.6	33																							
23-Jan	27	24	22	23	25	22	Z	13	16	20	20	24	23	23	22	18	20	19	17	14	15	16	19	20.2	27																								
24-Jan	16	9	13	12	12	10	11	Z	7	10	15	18	19	18	19	16	12	10	12	6	5	4	6	3	11.4	19																							
25-Jan	3	3	Z	5	6	8	7	5	4	11	10	16	24	29	29	19	10	11	27	26	29	27	27	24	15.7	29																							
26-Jan	29	27	31	Z	31	32	33	33	34	34	35	34	35	36	37	37	37	35	36	37	37	37	37	37	34.3	37																							
27-Jan	37	37	37	36	Z	37	37	37	39	39	40	39	38	39	39	38	38	39	40	39	40	40	40	40	38.5	40																							
28-Jan	40	40	41	41	40	Z	40	41	41	41	40	40	40	40	39	36	36	33	36	44	44	44	44	44	40.2	44																							
29-Jan	43	43	42	42	42	41	Z	41	41	42	42	42	42	41	41	42	40	39	36	40	39	39	37	37	40.6	43																							
30-Jan	37	37	37	39	39	38	38	Z	40	41	43	43	38	35	34	31	30	31	32	36	35	34	34	33	36.4	43																							
31-Jan	34	35	Z	37	39	39	38	37	37	38	38	39	38	40	41	42	41	41	40	38	37	36	36	37	38.2	42																							
																								27.4	26.8	28.1	28.5	26.7	26.9	26.6	27.7	26.2	26.5	28.3	30.6	32.2	32.7	32.5	31.6	30.1	29.0	29.3	29.3	28.6	28.2	28.1	27.4	Diurnal Average	
																								45	45	44	44	42	43	42	42	42	44	44	45	48	49	48	48	48	47	47	44	44	44	44	45	Diurnal Maximum	
Z - zerospan C - Calibration M - Maintenance PF - Power Failure																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																																																	



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Anzac - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ozone (O₃) - ppb
Anzac - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	175	24.89	24.89
21 - 50	528	75.11	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Anzac - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	19	4	0	0	5	3	5	17	23	14	11	4	14	11	10	11	151
21 - 50	37	1	0	0	0	3	12	8	17	16	36	24	63	173	58	74	522
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
Totals	56	5	0	0	5	6	17	25	40	30	47	28	77	184	68	85	673

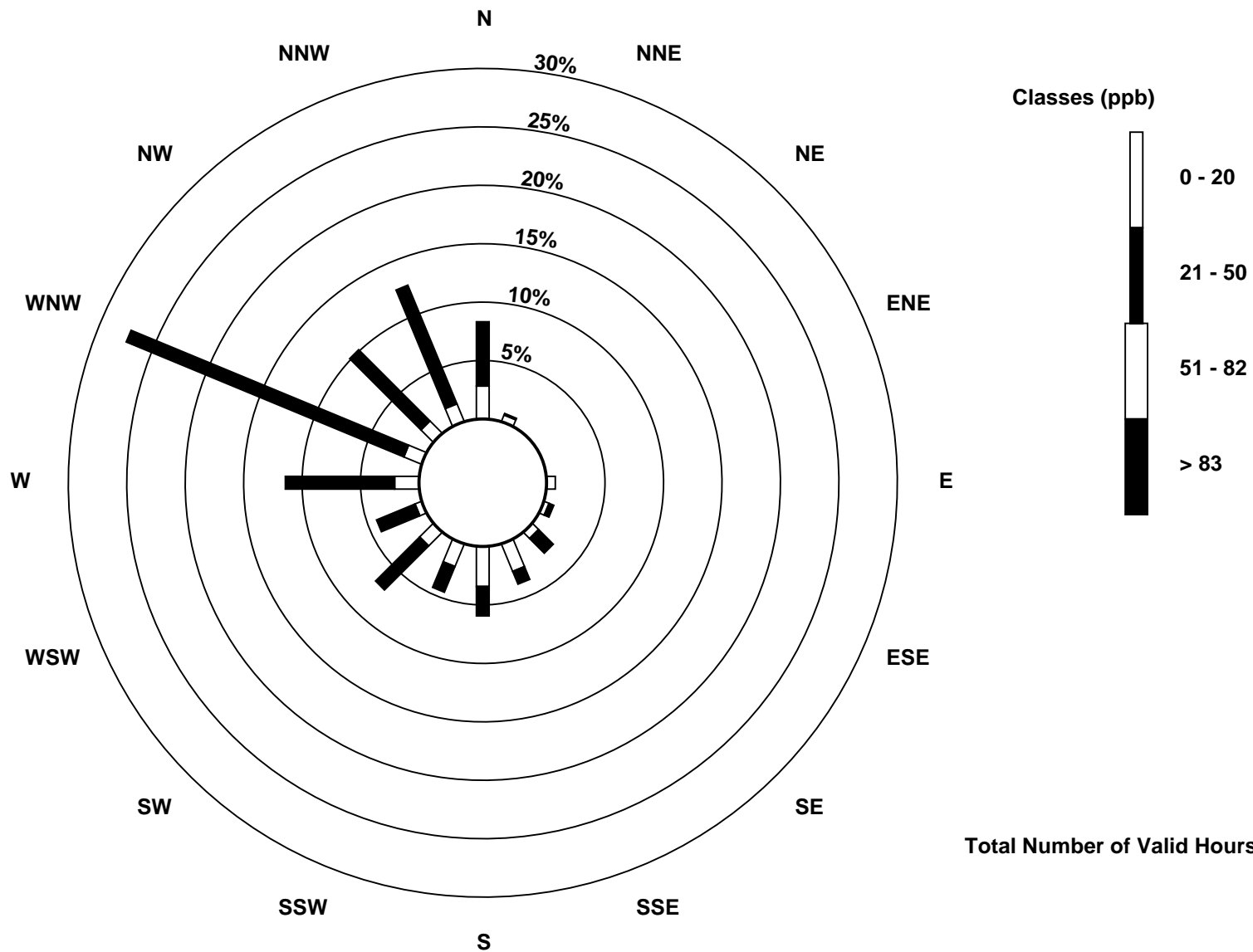
Total Number of Valid Hours: 673

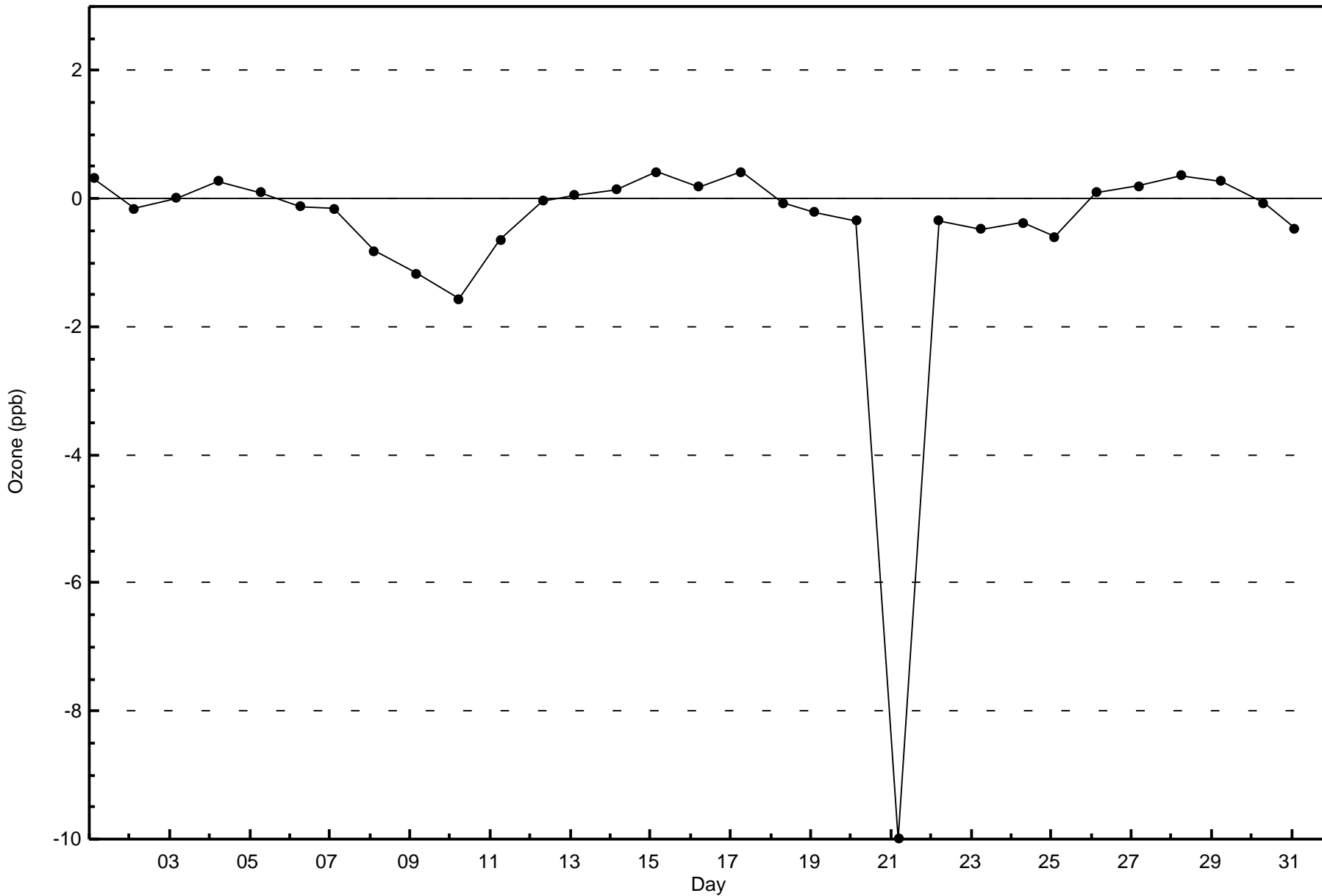
Total Number of Hours: 744

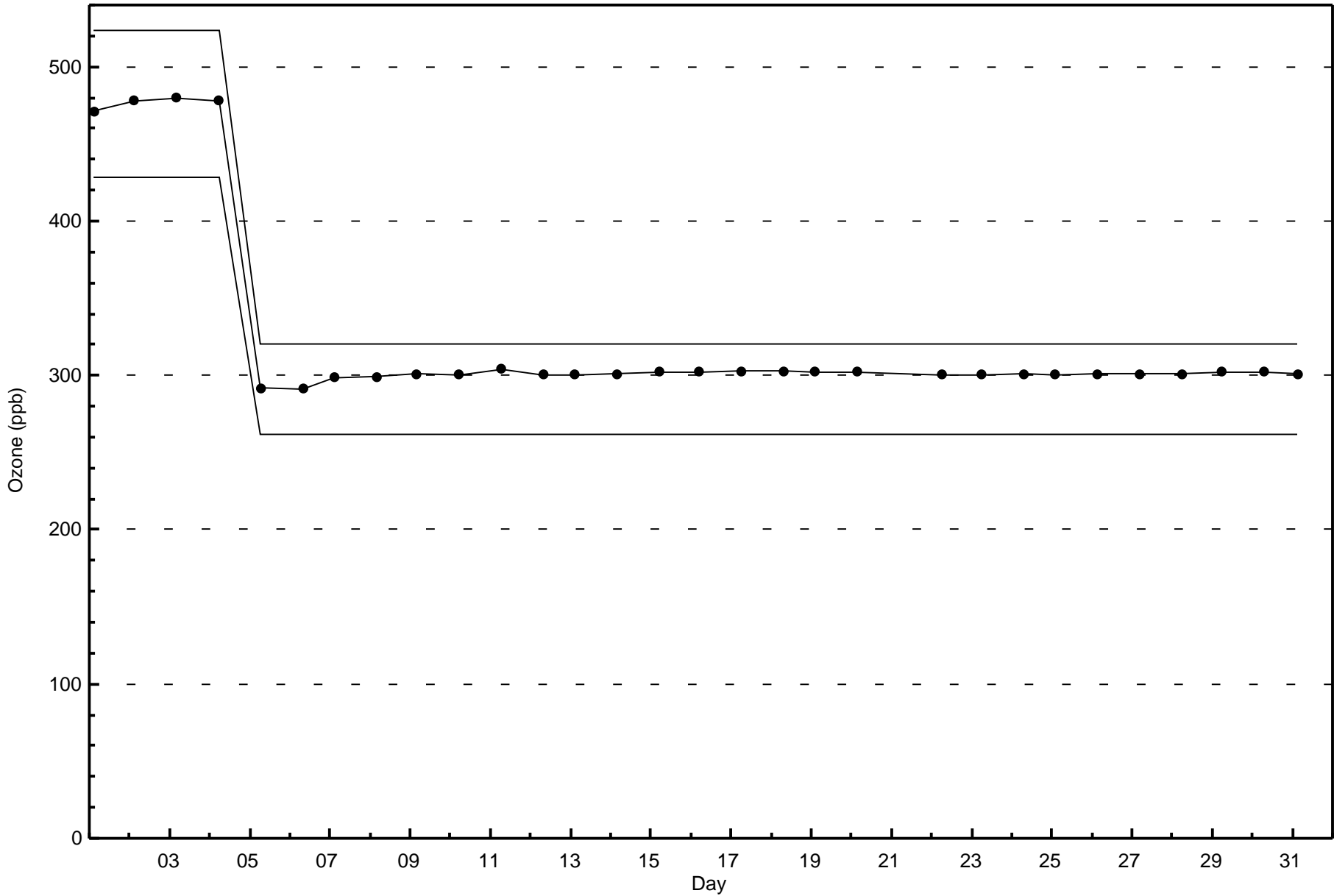


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Ozone (O₃) - ppb
Anzac (AMS 14)









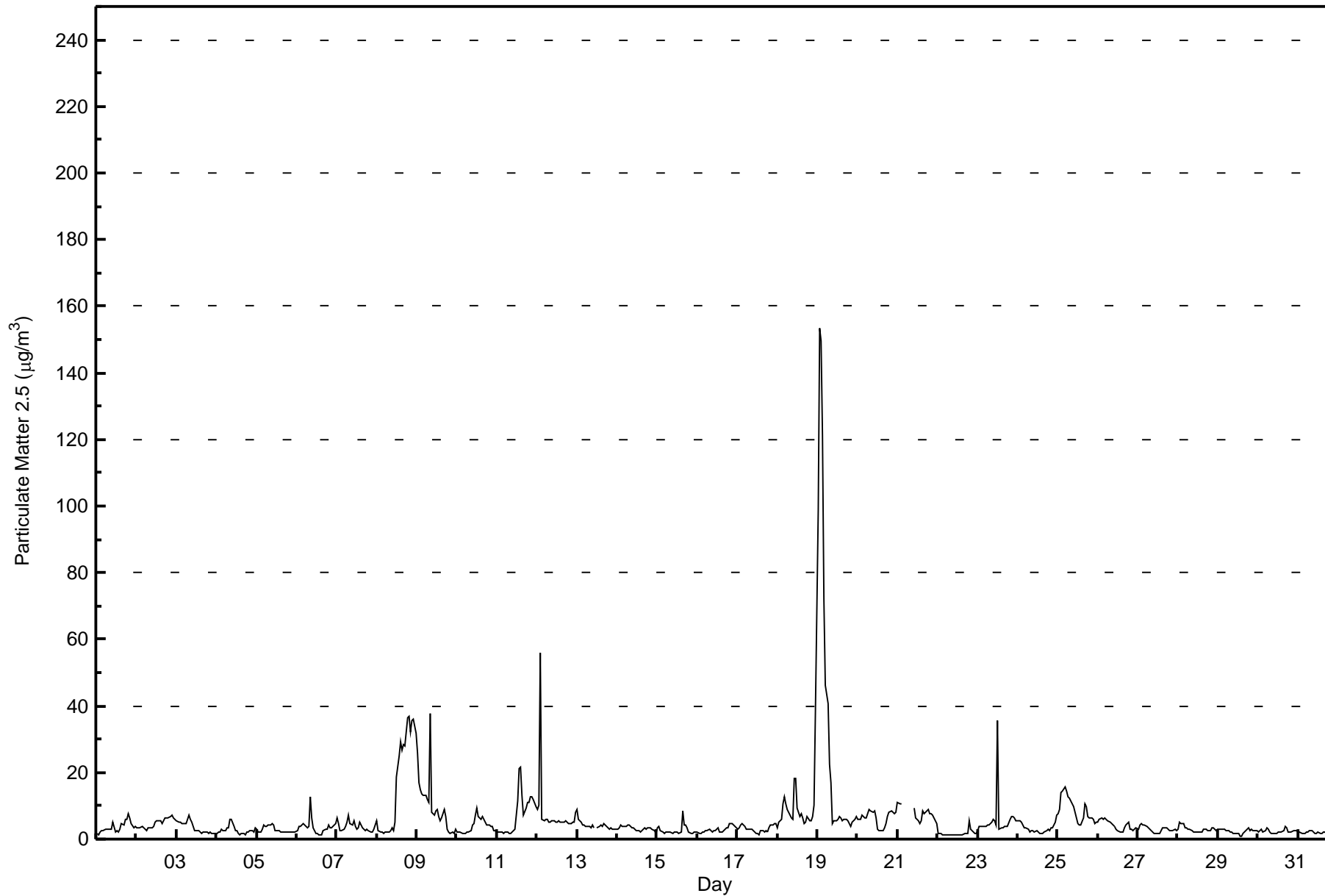
Wood Buffalo Environmental Association

Summary of Hour Averages

Particulate Matter 2.5 (PM_{2.5}) - µg/m³

Anzac - January 2017

Number of Exceedences (AAAQO):		24-hr: 1		Hours in Service:		744																																											
Maximum Value: 153.5 µg/m ³ on Jan 19 02:00		Maximum Daily Average: 33.6 µg/m ³ on Jan 19		Hours of Data:		736																																											
Minimum Value: 1.0 µg/m ³ on Jan 29 14:00		Minimum Daily Average: 1.7 µg/m ³ on Jan 22		Hours of Missing Data:		8																																											
Maximum Diurnal Average: 10.8 µg/m ³ at hour 3		Minimum Diurnal Average: 4.0 µg/m ³ at hour 12		Hours of Calibration:		1																																											
Monthly Average: 5.78 µg/m ³		Percentiles: P ₁ = 1.3 P ₁₀ = 1.8 Q ₁ = 2.3 Median = 3.4 Q ₃ = 5.5 P ₉₀ = 8.8 P ₉₉ = 37.4		Percent Operational Time:		99.1																																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jan	1.7	1.3	1.9	2.4	2.7	3.1	2.8	3.0	3.1	3.0	5.1	2.1	2.8	2.3	3.0	4.6	4.4	5.8	5.9	7.6	6.5	4.6	3.6	3.8	3.6	7.6																							
2-Jan	3.3	3.3	3.4	4.0	3.2	2.9	2.5	3.3	3.5	3.5	3.7	5.3	5.5	5.3	5.3	4.7	5.6	6.5	6.2	6.4	6.8	7.1	6.3	6.0	4.7	7.1																							
3-Jan	5.4	5.1	5.1	4.8	4.9	4.7	4.7	7.0	5.7	5.1	3.8	2.5	2.4	2.6	2.3	1.8	2.0	1.9	1.9	1.9	2.0	1.9	1.6	1.5	3.4	7.0																							
4-Jan	1.5	2.0	2.3	2.9	2.7	2.3	3.3	3.3	5.7	5.9	3.7	2.6	2.4	1.8	1.4	1.6	1.8	1.5	1.9	2.3	2.7	2.5	2.2	3.3	2.6	5.9																							
5-Jan	2.9	2.3	2.1	2.8	4.2	4.0	3.8	4.4	4.0	4.5	4.0	2.7	2.5	2.4	2.1	2.2	2.2	2.0	2.1	2.2	2.0	1.9	2.0	2.2	2.8	4.5																							
6-Jan	2.7	3.8	3.8	4.0	4.5	4.1	3.5	3.9	12.8	6.4	3.5	1.7	1.6	1.3	1.2	1.5	2.4	2.8	3.1	4.2	3.5	3.5	4.4	4.5	3.7	12.8																							
7-Jan	6.2	4.6	2.6	2.3	2.8	3.7	5.0	7.2	4.5	4.4	5.5	3.8	2.9	3.3	4.9	3.3	2.8	2.6	2.8	2.4	2.0	2.3	3.1	4.0	3.7	7.2																							
8-Jan	5.3	2.4	2.2	2.0	1.8	2.1	2.1	2.2	2.4	3.4	2.5	5.2	18.6	25.0	29.1	26.5	28.5	27.8	36.6	37.0	32.4	35.4	35.9	31.6	16.6	37.0																							
9-Jan	25.8	17.1	14.9	13.4	13.0	13.2	12.0	11.2	37.6	7.9	7.0	8.3	8.8	6.7	5.7	6.5	8.7	6.7	3.0	2.2	1.6	2.0	1.8	2.9	9.9	37.6																							
10-Jan	2.3	1.9	2.1	1.7	1.6	1.7	2.1	2.1	2.3	4.3	4.9	7.0	9.4	6.8	5.7	6.6	5.9	5.0	4.4	4.1	3.7	3.7	2.6	2.6	3.9	9.4																							
11-Jan	2.0	2.2	2.3	2.1	1.8	2.0	2.0	1.9	1.8	2.1	2.5	2.8	11.6	21.4	21.6	12.9	7.2	9.3	10.9	11.2	12.6	12.9	12.0	9.7	7.4	21.6																							
12-Jan	8.9	10.3	55.9	6.0	5.4	5.8	6.0	5.1	5.1	5.6	5.7	4.9	5.0	5.4	5.3	5.1	5.2	5.3	5.0	4.7	4.6	5.2	5.3	7.9	7.9	55.9																							
13-Jan	9.0	5.9	5.2	4.3	4.3	4.0	3.7	3.7	3.5	4.1	3.5	C	3.2	3.9	4.4	4.0	4.6	4.1	3.6	2.8	3.4	3.1	2.9	3.0	4.1	9.0																							
14-Jan	2.9	3.6	4.3	4.0	3.9	4.0	4.3	4.2	3.7	3.4	3.3	2.5	2.5	2.3	2.3	2.6	3.2	3.0	3.3	3.4	3.3	3.0	2.4	1.8	3.2	4.3																							
15-Jan	3.5	3.7	2.4	2.0	1.7	2.1	2.2	2.1	2.0	1.9	2.2	2.1	2.0	1.8	2.0	8.5	4.2	4.0	3.2	2.0	1.6	1.7	2.0	2.2	2.6	8.5																							
16-Jan	1.9	1.7	1.9	2.0	2.2	2.6	2.7	3.0	2.4	2.3	2.6	2.5	3.5	2.2	2.1	2.2	2.5	3.5	3.2	4.8	4.5	4.7	4.3	3.2	2.9	4.8																							
17-Jan	3.0	3.3	4.0	4.5	4.0	2.8	2.9	3.0	3.2	2.8	2.1	1.7	1.6	1.3	2.7	2.4	2.0	2.3	2.3	3.5	4.2	4.3	4.5	4.5	3.0	4.5																							
18-Jan	3.5	5.0	6.1	10.8	12.7	10.6	9.0	8.0	6.5	5.9	18.0	18.1	9.1	6.7	7.7	6.3	4.5	4.9	6.9	5.6	5.5	6.8	10.1	38.4	9.4	38.4																							
19-Jan	98.8	153.5	149.5	121.1	72.0	46.0	40.8	22.4	16.8	4.5	5.5	5.5	6.1	6.9	6.4	5.7	5.9	6.0	5.5	4.8	4.0	5.0	5.8	6.8	33.6	153.5																							
20-Jan	6.1	6.0	6.1	7.1	6.5	6.5	7.5	8.8	8.6	8.2	8.3	6.3	3.1	2.6	2.5	2.7	3.6	4.7	6.6	7.9	8.4	8.0	7.4	8.0	6.3	8.8																							
21-Jan	11.0	10.7	10.7	PF	PF	PF	PF	PF	PF	PF	9.4	6.3	5.5	4.5	5.4	8.4	7.6	7.9	8.8	7.7	7.5	7.0	6.2	4.5	--	11.0																							
22-Jan	1.6	1.6	1.5	1.4	1.4	1.2	1.2	1.3	1.4	1.3	1.3	1.3	1.3	1.5	1.5	1.7	1.7	1.8	5.5	3.0	1.9	1.9	1.9	1.9	1.7	5.5																							
23-Jan	2.4	3.7	3.7	3.7	3.8	4.0	4.2	4.3	5.0	5.9	5.4	4.2	35.6	3.1	3.2	3.5	4.0	3.6	4.0	6.1	6.7	6.8	6.2	5.6	5.8	35.6																							
24-Jan	5.4	5.6	5.1	4.3	3.4	3.4	2.9	2.1	2.5	2.6	2.3	2.3	2.1	1.7	1.7	1.8	2.1	2.6	2.8	2.7	3.3	3.5	4.9	7.4	3.3	7.4																							
25-Jan	7.6	8.9	14.1	14.3	15.8	14.3	12.8	12.3	11.6	9.7	7.9	6.3	4.5	4.1	4.2	6.5	10.8	9.7	6.8	6.6	6.3	5.9	4.8	4.9	8.8	15.8																							
26-Jan	5.0	6.0	6.4	6.1	6.3	6.1	5.4	5.0	4.7	4.2	3.6	3.0	2.6	2.3	2.1	2.2	3.4	4.3	4.9	2.9	3.1	2.6	3.1	3.4	4.1	6.4																							
27-Jan	3.2	4.4	4.5	4.4	4.3	3.7	3.2	3.0	2.5	2.3	1.9	1.7	1.7	1.8	2.7	3.3	3.2	3.2	3.0	2.5	2.7	2.7	3.1	2.6	3.0	4.5																							
28-Jan	3.1	4.9	4.5	4.5	3.5	3.4	3.0	2.8	2.6	2.2	2.1	2.2	2.1	2.2	2.3	3.1	2.8	2.9	2.5	2.7	3.2	3.5	2.9	2.4	3.0	4.9																							
29-Jan	2.8	2.9	3.0	3.0	2.9	2.5	2.4	2.3	2.0	1.7	1.6	1.6	1.6	1.0	1.0	1.5	1.9	3.1	3.3	2.7	2.8	2.5	2.4	2.3	2.3	3.3																							
30-Jan	2.2	2.4	3.0	2.2	2.3	3.4	2.9	2.2	1.8	1.7	1.7	1.6	2.0	1.9	2.2	2.7	3.8	3.2	2.3	2.2	2.3	2.6	2.6	2.6	2.4	3.8																							
31-Jan	2.3	2.0	1.8	1.8	1.9	2.0	2.0	2.7	2.4	2.3	1.8	1.8	2.0	1.8	1.8	2.1	2.0	1.8	2.0	2.3	2.1	2.7	3.2	3.7	2.2	3.7																							
																								7.8	9.4	10.8	8.3	6.7	5.7	5.4	4.9	5.7	4.1	4.4	4.0	5.3	4.4	4.7	4.8	4.9	5.0	5.2	5.3	5.1	5.2	5.2	6.1	Diurnal Average	
																								98.8	153.5	149.5	121.1	72.0	46.0	40.8	22.4	37.6	9.7	18.0	18.1	35.6	25.0	29.1	26.5	28.5	27.8	36.6	37.0	32.4	35.4	35.9	38.4	Diurnal Maximum	
C - Calibration																								PF - Power Failure																									
Alberta Ambient Air Quality Objectives (AAAQO):																								24-hr	30	µg/m ³																							





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac - January 2017

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	549	74.59	74.59
6 - 15	153	20.79	95.38
16 - 25	10	1.36	96.74
26 - 80	18	2.45	99.18
> 81.0	4	0.54	99.73

Total Number of Valid Hours: 736

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac - January 2017

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	43	5	0	0	3	4	11	11	28	23	39	22	65	154	55	67	530
6 - 15	10	0	0	0	3	2	8	12	13	7	8	3	8	30	15	21	140
16 - 25	3	0	0	0	0	0	0	1	0	0	1	1	0	2	1	0	9
26 - 80	2	0	0	0	0	0	0	0	0	1	1	3	4	6	0	1	18
> 81.0	0	0	0	0	0	0	0	1	1	1	0	0	1	0	0	0	4
Totals	58	5	0	0	6	6	19	25	42	32	49	29	78	192	71	89	701

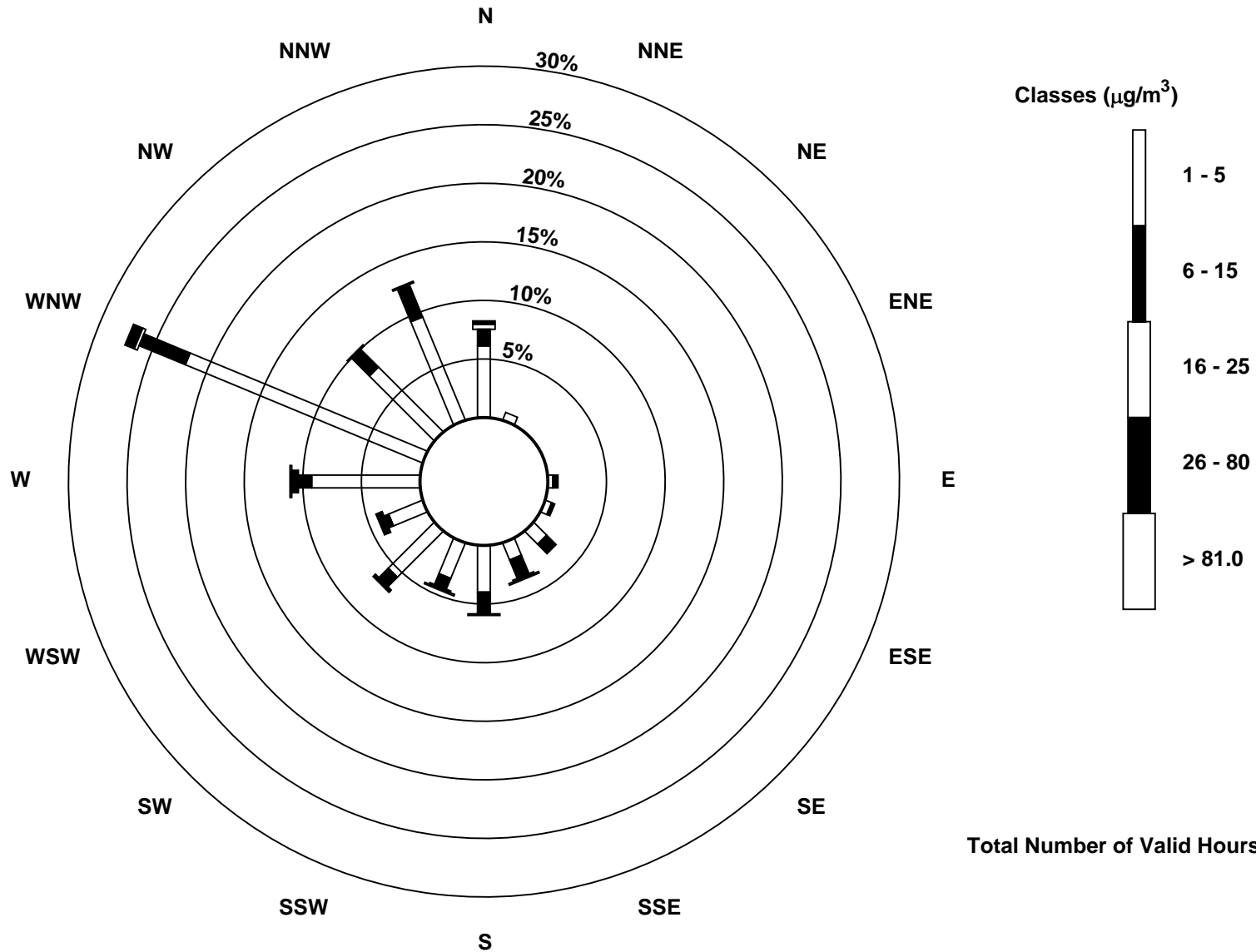
Total Number of Valid Hours: 703

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

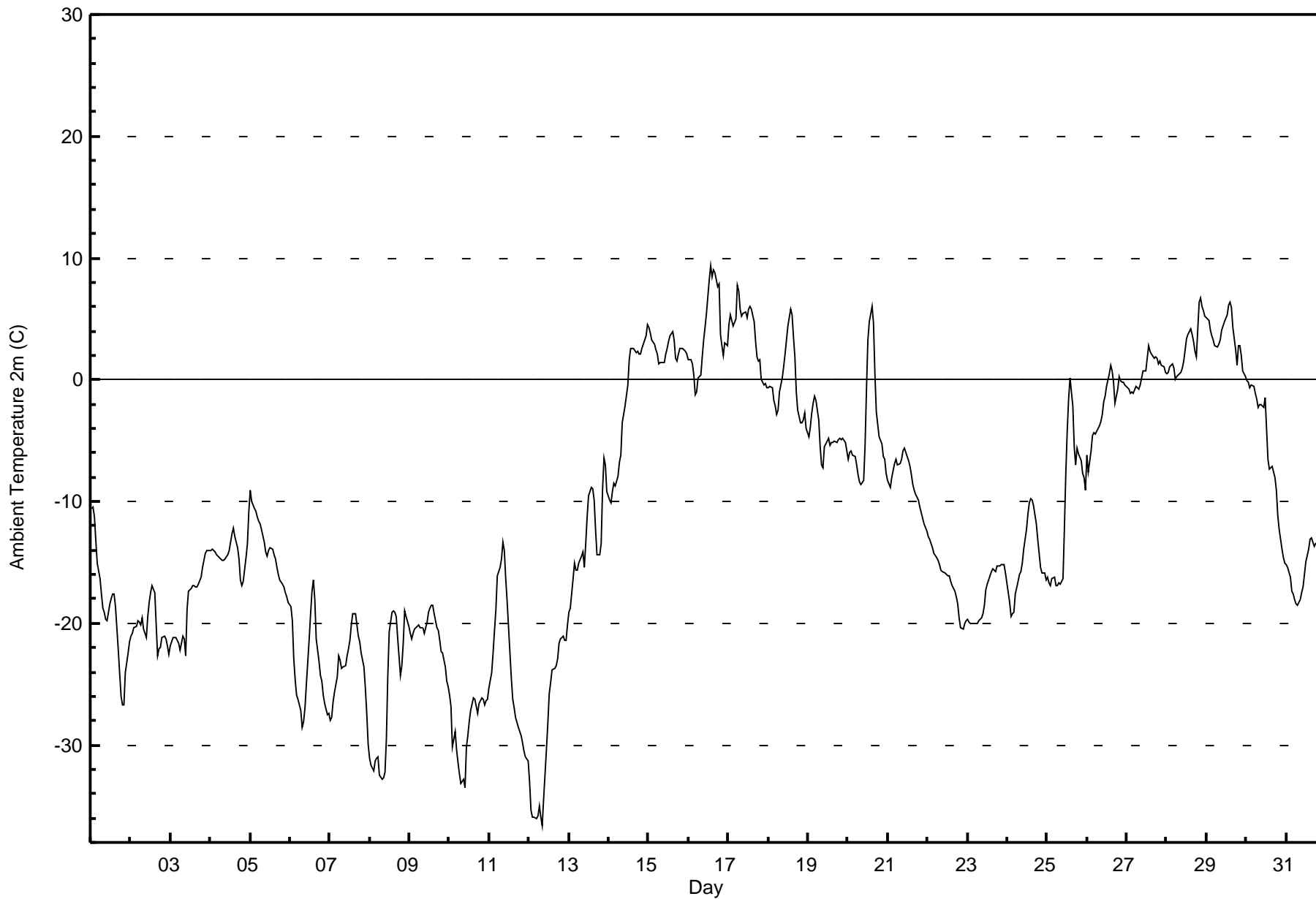
Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac (AMS 14)



Total Number of Valid Hours: 703



Maximum Value: 9.3 C on Jan 16 14:00		Maximum Daily Average: 4.0 C on Jan 17		Hours in Service: 744																						
Minimum Value: -36.6 C on Jan 12 09:00		Minimum Daily Average: -28.5 C on Jan 10		Hours of Data: 744																						
Maximum Diurnal Average: -8.6 C at hour 15		Minimum Diurnal Average: -12.9 C at hour 8		Hours of Missing Data: 0																						
Monthly Average: -11.50 C		Percentiles: P ₁ = -35.1 P ₁₀ = -25.9 Q ₁ = -19.8 Median = -13.4 Q ₃ = -0.8 P ₉₀ = 2.8 P ₉₉ = 7.6		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-Jan	-10.5	-10.5	-11.3	-13.3	-15.1	-16.3	-17.6	-18.8	-19.1	-19.6	-19.8	-18.4	-17.9	-17.6	-17.6	-18.6	-22.2	-24.1	-26.0	-26.7	-26.7	-24.0	-22.5	-21.6	-19.0	-10.5
2-Jan	-21.1	-20.8	-20.4	-20.3	-19.8	-20.0	-20.2	-19.5	-20.4	-21.2	-19.5	-18.3	-17.5	-16.9	-17.4	-20.1	-22.7	-22.1	-22.0	-21.2	-21.0	-21.3	-21.9	-22.6	-20.3	-16.9
3-Jan	-21.9	-21.1	-21.1	-21.1	-21.4	-21.6	-22.2	-21.1	-21.3	-22.6	-18.9	-17.4	-17.2	-16.9	-16.9	-17.0	-17.1	-16.7	-16.3	-15.5	-14.8	-14.3	-14.1	-14.1	-18.4	-14.1
4-Jan	-14.1	-13.9	-14.0	-14.2	-14.4	-14.6	-14.7	-14.9	-14.9	-14.7	-14.3	-14.0	-13.4	-12.7	-12.2	-12.8	-13.8	-14.7	-16.5	-16.9	-16.6	-14.6	-13.5	-10.8	-14.2	-10.8
5-Jan	-9.1	-10.0	-10.5	-10.7	-11.2	-11.6	-11.9	-12.3	-13.3	-14.2	-14.5	-14.0	-13.8	-13.9	-14.3	-14.7	-15.5	-16.0	-16.4	-16.8	-17.1	-17.5	-17.9	-18.3	-14.0	-9.1
6-Jan	-18.7	-19.7	-22.9	-24.6	-25.9	-26.2	-27.2	-28.5	-28.1	-27.0	-24.9	-21.3	-19.2	-17.4	-16.5	-18.1	-21.3	-23.1	-24.2	-24.7	-25.9	-26.6	-27.5	-27.4	-23.6	-16.5
7-Jan	-28.0	-27.7	-26.5	-25.7	-24.4	-22.7	-23.0	-23.7	-23.6	-23.5	-22.7	-22.1	-21.4	-20.1	-19.2	-19.3	-20.2	-21.1	-21.5	-22.4	-23.6	-25.4	-27.4	-29.9	-23.5	-19.2
8-Jan	-31.1	-31.6	-32.1	-31.3	-31.0	-31.0	-32.5	-32.8	-32.7	-32.2	-29.5	-24.3	-20.7	-19.1	-19.0	-19.0	-19.4	-21.2	-24.3	-23.5	-21.6	-19.0	-19.4	-20.3	-25.8	-19.0
9-Jan	-20.8	-21.3	-20.8	-20.4	-20.4	-20.2	-20.3	-20.4	-20.4	-20.8	-19.9	-19.1	-18.8	-18.5	-18.5	-19.2	-20.3	-20.6	-21.4	-22.3	-22.5	-23.6	-24.7	-25.2	-20.8	-18.5
10-Jan	-25.9	-26.9	-30.2	-28.9	-30.4	-31.4	-32.3	-33.1	-32.8	-33.5	-30.2	-29.2	-28.1	-27.1	-26.1	-26.2	-26.8	-27.4	-26.6	-26.2	-26.3	-26.7	-26.4	-26.2	-28.5	-25.9
11-Jan	-25.3	-24.1	-22.5	-20.6	-18.8	-16.1	-15.4	-14.7	-13.3	-14.0	-16.3	-18.2	-22.4	-24.5	-26.2	-27.0	-27.8	-28.5	-28.9	-29.2	-29.8	-30.5	-30.9	-31.3	-23.2	-13.3
12-Jan	-33.0	-35.4	-35.9	-35.9	-36.1	-35.8	-35.1	-35.9	-36.6	-34.4	-30.4	-28.2	-25.8	-24.8	-23.9	-23.7	-23.5	-22.9	-21.7	-21.3	-21.1	-21.4	-21.4	-20.1	-28.5	-20.1
13-Jan	-19.2	-18.8	-16.4	-15.1	-15.7	-15.7	-15.1	-14.5	-14.2	-15.4	-13.5	-11.3	-9.5	-8.9	-9.0	-9.9	-12.3	-14.3	-14.4	-13.4	-9.0	-6.4	-7.0	-9.2	-12.8	-6.4
14-Jan	-9.9	-10.1	-9.2	-8.4	-8.8	-7.9	-6.8	-6.2	-3.5	-2.9	-2.2	-0.4	1.6	2.5	2.6	2.6	2.3	2.4	2.1	2.1	2.5	2.9	3.6	4.5	-1.9	4.5
15-Jan	4.3	3.8	3.2	2.9	2.4	2.1	1.3	1.4	1.4	1.4	2.1	2.6	3.1	3.6	4.0	3.3	1.8	1.6	2.1	2.6	2.5	2.5	2.3	2.2	2.5	4.3
16-Jan	1.6	1.7	1.3	0.4	-1.2	-1.0	0.1	0.4	1.8	3.3	4.3	5.5	8.2	9.3	8.4	9.0	8.7	7.6	7.8	3.7	2.8	2.0	3.1	2.7	3.8	9.3
17-Jan	4.6	5.3	4.8	4.4	5.0	7.7	7.3	5.8	5.2	5.4	5.5	5.2	5.8	6.0	5.8	4.8	3.2	1.8	1.5	1.7	0.1	-0.5	-0.4	-0.6	4.0	7.7
18-Jan	-0.7	-0.6	-0.6	-1.6	-2.2	-2.9	-2.5	-1.1	0.2	1.1	2.1	3.2	4.4	5.7	5.3	3.5	1.9	-1.0	-2.5	-3.5	-3.5	-3.4	-2.7	-4.0	-0.2	5.7
19-Jan	-4.7	-3.9	-2.8	-1.9	-1.4	-1.7	-3.3	-5.5	-7.0	-7.3	-5.5	-5.0	-4.8	-5.3	-5.2	-5.1	-5.1	-5.1	-4.9	-4.8	-4.9	-4.8	-5.2	-5.9	-4.6	-1.4
20-Jan	-6.5	-6.0	-5.8	-6.2	-6.3	-7.0	-7.8	-8.3	-8.7	-8.3	-5.4	-0.8	3.2	4.7	6.0	4.7	0.5	-2.7	-3.6	-4.7	-5.3	-6.3	-6.5	-7.7	-4.0	6.0
21-Jan	-8.3	-8.8	-8.1	-7.5	-6.8	-6.5	-7.0	-6.9	-6.5	-5.9	-5.6	-5.9	-6.6	-7.1	-7.8	-8.6	-9.0	-9.4	-9.9	-10.5	-10.9	-11.4	-11.9	-12.5	-8.3	-5.6
22-Jan	-12.8	-13.1	-13.4	-13.7	-14.2	-14.6	-14.9	-15.2	-15.6	-15.8	-15.9	-16.0	-16.1	-16.1	-16.6	-16.9	-17.4	-17.8	-18.5	-19.6	-20.4	-20.5	-20.0	-19.8	-16.5	-12.8
23-Jan	-19.6	-19.9	-20.0	-20.0	-20.0	-20.1	-20.0	-19.8	-19.6	-19.2	-18.5	-17.3	-16.8	-16.4	-15.8	-15.5	-15.6	-15.7	-15.4	-15.3	-15.2	-15.2	-15.2	-15.9	-17.6	-15.2
24-Jan	-16.7	-18.3	-19.4	-19.2	-19.1	-17.6	-16.6	-16.0	-15.8	-15.1	-13.9	-12.3	-11.0	-10.1	-9.8	-9.8	-10.3	-11.8	-13.1	-14.3	-15.4	-15.9	-15.9	-16.4	-14.7	-9.8
25-Jan	-16.3	-16.7	-16.9	-16.3	-16.2	-16.9	-16.9	-16.7	-16.8	-16.3	-12.2	-7.7	-4.2	-1.6	0.2	-2.2	-5.6	-7.0	-5.6	-6.0	-6.7	-7.7	-8.1	-9.1	-10.4	0.2
26-Jan	-6.2	-7.6	-5.8	-4.6	-4.4	-4.5	-4.2	-3.8	-3.4	-2.9	-1.8	-1.3	-0.6	0.5	1.2	0.7	-0.2	-2.0	-0.7	0.3	-0.1	-0.2	-0.2	-0.4	-2.2	1.2
27-Jan	-0.7	-0.8	-1.1	-1.1	-1.2	-0.6	-0.7	-0.7	-0.5	0.1	0.7	0.7	1.8	2.9	2.4	2.1	1.7	1.8	1.7	1.3	1.6	1.2	1.0	0.7	0.6	2.9
28-Jan	0.5	0.6	1.0	1.3	0.9	0.0	0.3	0.4	0.6	0.9	1.6	2.4	3.4	3.7	4.2	3.7	3.2	2.3	1.9	6.3	6.8	6.1	5.6	5.2	2.6	6.8
29-Jan	5.1	4.9	4.1	3.6	3.2	2.9	2.6	2.9	3.3	4.1	4.4	4.7	5.3	6.2	6.4	5.9	4.3	2.4	1.2	2.7	2.7	2.0	0.7	0.2	3.6	6.4
30-Jan	-0.1	-0.2	-0.7	-0.5	-0.5	-1.1	-1.6	-2.2	-2.1	-2.0	-2.3	-1.4	-4.0	-6.5	-7.4	-7.1	-7.6	-8.0	-9.1	-11.1	-12.3	-13.9	-14.6	-15.1	-5.5	-0.1
31-Jan	-15.1	-15.5	-16.2	-17.3	-17.6	-18.1	-18.4	-18.5	-18.0	-17.5	-17.0	-16.0	-14.9	-14.0	-13.1	-13.0	-13.3	-13.7	-13.4	-13.3	-13.0	-12.6	-12.4	-12.0	-15.2	-12.0
																								Diurnal Average		
																								Diurnal Maximum		





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C
Anzac - January 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	177	23.79	23.79
-20 - 0	406	54.57	78.36
0 - 10	161	21.64	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

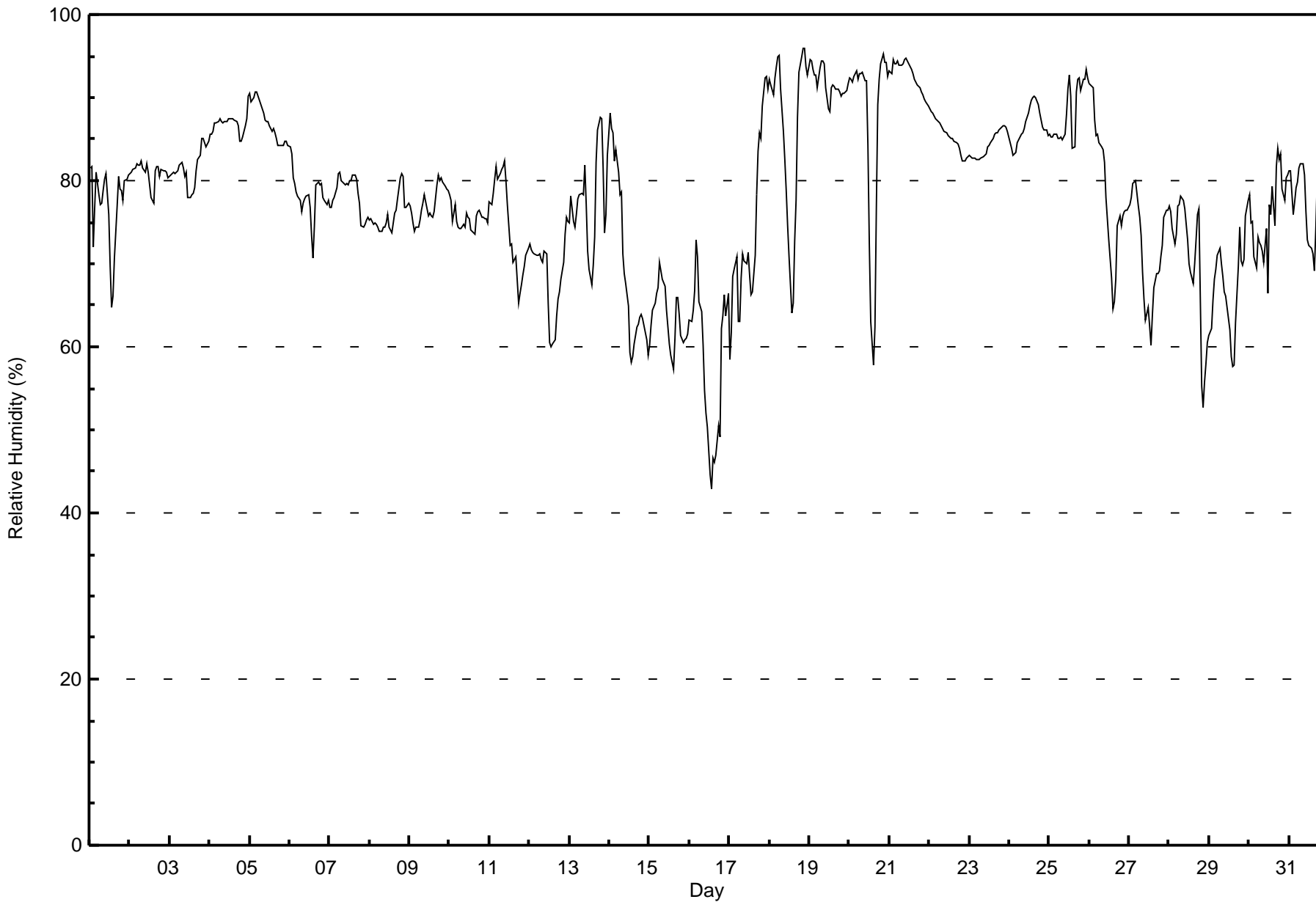
Anzac - January 2017

Maximum Value: 96 % on Jan 18 21:00														Maximum Daily Average: 92.7 % on Jan 21														Hours in Service: 744	
Minimum Value: 43 % on Jan 16 14:00														Minimum Daily Average: 58.2 % on Jan 16														Hours of Data: 744	
Maximum Diurnal Average: 80.5 % at hour 5														Minimum Diurnal Average: 72.8 % at hour 15														Hours of Missing Data: 0	
Monthly Average: 78.4 %														Percentiles: P ₁ = 50 P ₁₀ = 65 Q ₁ = 72 Median = 79 Q ₃ = 86 P ₉₀ = 91 P ₉₉ = 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-Jan	82	82	72	77	81	78	77	77	79	80	81	76	70	65	66	71	77	81	79	79	78	80	80	81	76.9	82			
2-Jan	81	81	81	81	82	82	82	82	82	81	82	81	80	78	77	81	82	82	80	81	81	81	81	80	81.0	82			
3-Jan	80	81	81	81	81	81	82	82	81	81	81	78	78	79	79	81	83	83	85	85	85	84	85	81.5	85				
4-Jan	86	86	86	87	87	87	88	87	87	87	87	87	88	87	87	87	87	87	85	85	85	87	87	90	86.8	90			
5-Jan	90	90	90	91	91	90	90	89	88	87	87	87	87	86	86	86	85	84	84	84	84	85	85	84	87.1	91			
6-Jan	84	83	80	80	79	78	78	76	77	78	78	78	77	73	71	75	79	80	79	80	78	78	77	78	78.1	84			
7-Jan	77	77	78	78	79	81	81	80	80	79	80	79	80	80	81	81	80	78	77	75	74	75	75	76	78.4	81			
8-Jan	75	75	75	75	75	74	74	74	74	74	74	75	76	74	74	75	76	77	78	80	81	80	77	77	75.9	81			
9-Jan	77	76	75	74	74	74	75	76	77	78	77	76	76	76	76	76	80	81	80	80	80	79	79	79	77.1	81			
10-Jan	78	78	75	77	75	74	74	74	75	74	76	76	75	74	74	74	76	76	76	76	76	75	75	75	75.4	78			
11-Jan	77	77	79	80	82	80	81	81	82	82	80	77	72	72	70	70	71	65	66	67	69	70	71	72	74.8	82			
12-Jan	72	72	71	71	71	71	71	71	70	71	71	65	61	60	60	61	64	66	67	68	70	74	76	75	68.7	76			
13-Jan	75	78	75	74	76	78	78	79	78	82	77	72	69	67	70	73	82	86	88	87	82	74	76	83	77.5	88			
14-Jan	88	86	86	82	84	81	78	79	71	69	68	65	59	58	59	60	62	63	64	64	63	63	61	59	69.7	88			
15-Jan	60	63	64	65	66	67	70	69	68	67	64	62	60	59	57	61	66	66	64	61	60	61	61	62	63.6	70			
16-Jan	63	63	64	67	73	71	65	64	60	55	52	50	45	43	47	46	47	51	49	62	64	66	64	67	58.2	73			
17-Jan	58	62	68	69	71	63	63	68	71	70	70	71	69	66	67	71	78	84	86	85	89	92	92	91	74.0	92			
18-Jan	92	91	90	92	94	95	95	91	86	82	79	75	71	64	65	73	78	88	93	95	96	96	94	93	86.1	96			
19-Jan	95	94	93	93	93	91	94	94	94	94	91	89	88	91	92	91	91	91	91	90	91	91	91	92	91.8	95			
20-Jan	92	92	92	93	93	92	93	93	93	92	92	84	72	63	58	62	77	89	92	94	95	94	94	93	86.9	95			
21-Jan	93	93	95	94	94	94	94	94	94	95	95	94	94	93	93	92	92	92	91	91	90	90	89	89	92.7	95			
22-Jan	89	88	88	88	87	87	87	87	86	86	86	85	85	85	85	85	84	84	84	83	82	82	83	83	85.4	89			
23-Jan	83	83	83	83	83	83	83	83	83	83	83	84	84	85	85	86	86	86	86	86	87	87	86	86	84.3	87			
24-Jan	85	84	83	83	83	85	85	86	86	86	87	88	89	90	90	90	89	88	87	86	86	86	85	85	86.6	90			
25-Jan	86	85	85	86	86	85	85	85	85	86	88	91	93	90	84	84	91	92	92	91	92	92	93	92	88.3	93			
26-Jan	92	92	91	87	86	86	85	84	84	82	78	75	73	68	65	65	68	75	76	75	76	76	76	76	78.7	92			
27-Jan	77	78	80	80	80	77	76	73	69	66	63	65	62	60	64	67	69	69	69	71	72	76	76	76	71.5	80			
28-Jan	77	76	74	72	74	77	77	78	78	77	75	73	70	69	68	70	73	76	77	55	53	56	58	60	70.5	78			
29-Jan	61	62	66	68	69	71	72	70	68	67	66	65	62	59	58	58	63	70	74	70	70	71	76	78	67.2	78			
30-Jan	78	75	75	71	69	73	73	72	72	70	74	66	77	76	79	75	82	84	83	83	79	78	80	81	76.0	84			
31-Jan	81	81	76	77	79	80	82	82	82	81	76	73	72	72	71	69	74	80	84	85	85	84	84	81	78.8	85			
	80.2	80.1	79.8	79.9	80.5	80.2	80.2	80.1	79.4	78.8	78.0	76.3	74.6	73.0	72.8	74.1	77.1	79.1	79.6	79.3	79.1	79.3	79.6	79.9	Diurnal Average				
	95	94	95	94	94	95	95	94	94	95	95	94	94	93	93	92	92	92	93	95	96	96	94	93	Diurnal Maximum				



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Anzac - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Anzac - January 2017

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	26	3.49	3.49
60 - 80	370	49.73	53.23
80 - 100	348	46.77	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

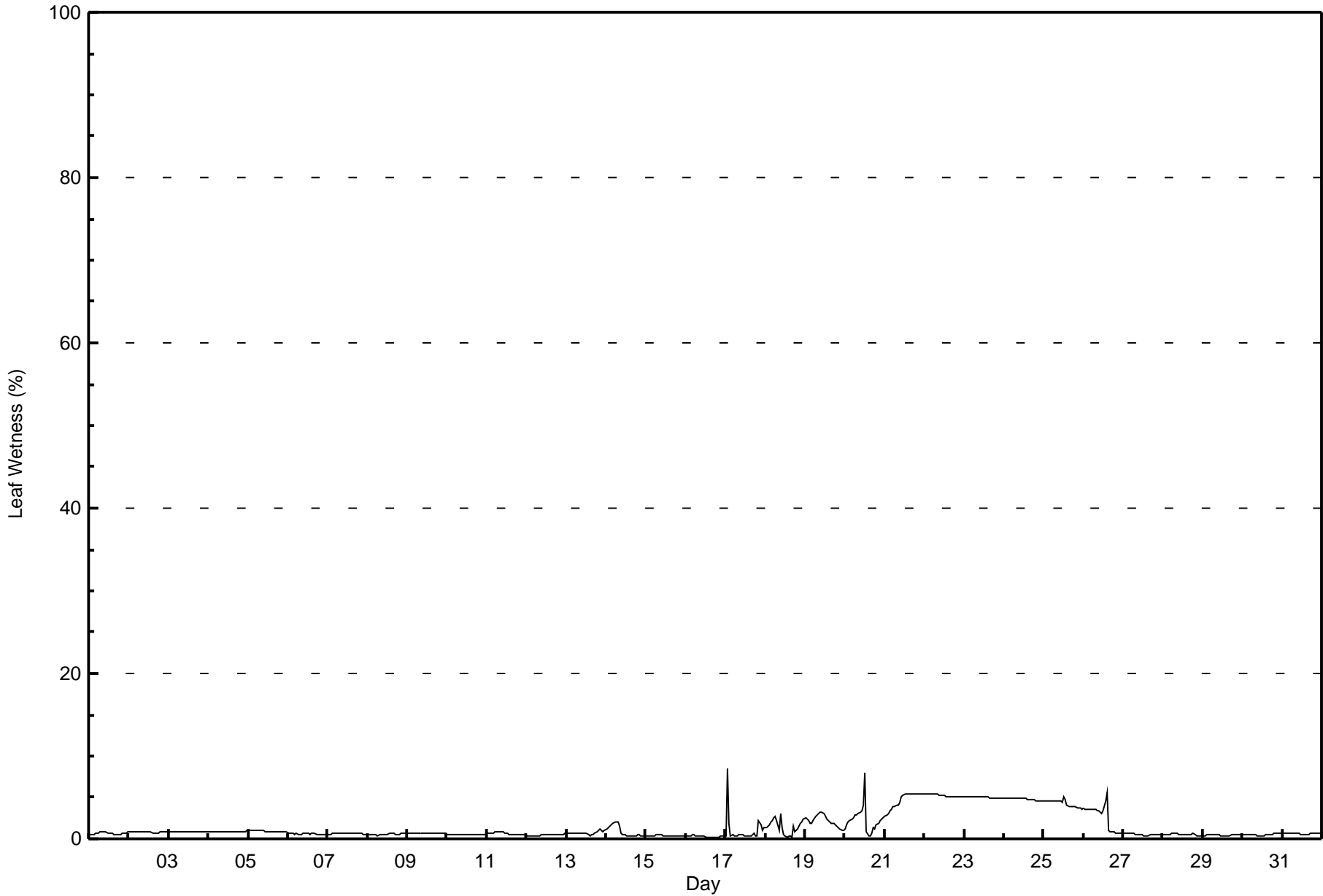
Leaf Wetness (SW) - %
Anzac - January 2017

Maximum Value: 9 % on Jan 17 02:00																	Maximum Daily Average: 5.2 % on Jan 22																	Hours in Service: 744	
Minimum Value: 0 % on Jan 16 14:00																	Minimum Daily Average: 0.3 % on Jan 16																	Hours of Data: 744	
Maximum Diurnal Average: 1.7 % at hour 2																	Minimum Diurnal Average: 1.3 % at hour 16																	Hours of Missing Data: 0	
Monthly Average: 1.5 %																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 2 P ₉₀ = 5 P ₉₉ = 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-Jan	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1									
2-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1									
3-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1									
4-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1									
5-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1									
6-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1									
7-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0.6	1									
8-Jan	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0.5	1									
9-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1									
10-Jan	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0.5	1									
11-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.6	1									
12-Jan	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0.5	1									
13-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	0.7	1									
14-Jan	1	1	2	2	2	2	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	2									
15-Jan	0	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									
16-Jan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0									
17-Jan	0	9	2	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	2	1	1	1	1.0	9									
18-Jan	1	1	2	2	2	2	3	2	1	3	1	1	0	0	0	0	0	1	1	1	2	2	2	2	1.4	3									
19-Jan	3	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	2	2	2	2	1	1	1	1	2.2	3									
20-Jan	1	2	2	2	2	3	3	3	3	3	3	4	8	1	0	0	1	1	1	2	2	2	2	3	2.3	8									
21-Jan	3	3	3	3	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.6	5									
22-Jan	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.2	5									
23-Jan	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5.1	5									
24-Jan	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.8	5									
25-Jan	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	4	4	4	4	4	4	4	4	4	4.3	5									
26-Jan	4	4	4	4	4	4	4	4	3	3	3	3	3	5	6	1	1	1	1	1	1	1	1	1	2.6	6									
27-Jan	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1									
28-Jan	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	0	0	0	0	0	0	0.5	1									
29-Jan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0.4	1									
30-Jan	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0.5	1									
31-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1									
1.5																	1.7																	Diurnal Average	
5																	9																	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Leaf Wetness (SW) - %
Anzac - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Leaf Wetness (SW) - %
Anzac - January 2017**

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	35	4.70	4.70
0.4 - 0.5	184	24.73	29.44
0.6 - 0.7	192	25.81	55.24
0.8 - 1.4	138	18.55	73.79
1.5 - 10	194	26.08	99.87
> 10	0	0.00	99.87

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Anzac - January 2017

Maximum Speed: 23 km/h on Jan 11 13:00	Maximum Daily Speed Average: 15.0 km/h on Jan 15	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jan 20 06:00	Minimum Daily Speed Average: 0.6 km/h on Jan 6	Hours of Data: 711
Maximum Diurnal Speed Average: 6.5 km/h at hour 3	Minimum Diurnal Speed Average: 3.8 km/h at hour 18	Hours of Missing Data: 33
Monthly Average Velocity: 5.6 km/h 290.9 deg	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 4 Median = 7 O ₃ = 12 P ₉₀ = 15 P ₉₉ = 21	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-Jan	WNW17	NW18	NNW20	N15	N11	N11	N10	N8	NNW8	NNW8	WNW5	NW9	NNW12	NNW12	NW7	NW4	NNW4	WNW3	NW2	NW3	W3	WNW2	NNW2	W4	NNW7.5	NNW20	
2-Jan	WNW2	NNW2	W3	NNW3	NW4	WNW3	NW4	WNW4	WNW4	WNW3	WNW3	WNW4	WNW3	WNW2	AF	AF	AF	W2	WNW3	W3	WSW4	SW4	SW4	SW5	WNW2.8	SW5	
3-Jan	SW3	SW3	W3	S1	SW3	WSW5	WNW6	W6	WSW5	WNW5	WNW8	WNW11	WNW12	WNW15	NW13	WNW14	WNW13	WNW16	NW15	WNW14	NW14	NW14	NW12	WNW8.7	WNW16		
4-Jan	NW10	NNW11	NNW10	NNW10	NNW6	NNW8	NNW8	NNW7	NNW8	NNW7	NNW6	NNW7	NW6	WNW6	NW6	WNW5	WSW3	S5	S2	SE2	S3	SSW2	WNW4	NW7	NW4.8	NNW11	
5-Jan	NNW8	N7	N6	N6	N6	NNE5	N5	N7	NNW5	NNW6	NNW5	NNW6	NNW8	NNW7	N7	N7	N7	NNE5	N5	N4	NNW5	NNW4	NNW4	NNW4	N5.6	NNW8	
6-Jan	NW4	WNW4	NNW2	WNW3	N2	WSW1	SW2	WNW2	NW3	W2	W2	WSW1	S1	SE1	E2	S2	ESE4	SSE4	SSW2	SSE1	SSE2	SSW2	AF	WNW1	WSW0.6	SSE4	
7-Jan	NNW1	W2	WSW2	SW1	N2	N3	N2	N2	NNE2	NW1	N0	WNW3	WNW3	NW4	NNW6	NNW8	N8	N7	NNW6	NNW7	NNW6	NNW6	NNW4	NNW3	NNW3.3	NNW8	
8-Jan	NW2	W4	WNW2	AF	SSW4	S4	S3	S2	SSW4	SSW4	SSW3	SW3	WSW6	WNW7	WNW7	W6	WSW9	SW4	W2	WSW4	W7	W11	WNW15	WNW14	W4.4	WNW15	
9-Jan	WNW11	WNW11	WNW14	WNW13	WNW11	WNW14	WNW12	WNW11	WNW10	WNW12	WNW12	WNW13	WNW12	WNW10	NW8	NW7	NW7	NNW9	NW8	NW8	NW8	WNW8	WNW7	WNW8	WNW10.0	WNW14	
10-Jan	WNW7	WNW5	NW6	NNW4	NNW4	NNW4	WNW3	WNW4	W5	NW7	WNW5	WNW6	NW8	WNW8	WNW9	NW9	WNW7	WNW7	WNW11	WNW12	WNW10	W8	W9	WSW7	WNW6.4	WNW12	
11-Jan	WSW8	SW7	SW7	SW8	SW7	WNW15	WNW18	WNW15	WNW15	NNW16	N12	N23	N23	N22	N21	N20	NNW19	NNW17	NNW18	NNW16	NNW12	NW9	NW10	WNW7	NNW11.1	N23	
12-Jan	WNW4	WNW4	W4	S4	S6	S8	S7	S6	S4	SSE7	SE7	SE10	SE12	SE13	SE15	SSE15	SSE16	SSE16	SSE14	SE10	SE8	SSE6	S9	SSW9	SSE7.8	SSE16	
13-Jan	WSW3	WNW8	WNW13	WNW15	WNW12	NW11	NW10	WNW8	WNW6	SSW6	SW4	W1	WNW8	WNW10	WNW7	WNW2	SW3	SW4	SSW6	WSW6	W9	W10	W7	SW6	W6.2	WNW15	
14-Jan	SSW7	SW8	SW8	SW8	SW10	SW10	SW10	WSW17	WSW15	SW14	WSW13	W15	W16	W16	W16	W15	W15	W16	WNW12	W15	W16	W14	W14	W16	WSW11.9	WSW17	
15-Jan	W20	W19	WNW19	WNW18	WNW17	WNW18	WNW16	WNW15	W14	W15	W15	W14	W16	W16	W15	W13	W9	W11	W12	W15	W15	W15	W13	W13	W15.0	W20	
16-Jan	W12	WSW13	WSW11	WSW10	SW11	SW13	SW15	SW14	SW11	SW16	SW18	SW14	WSW19	WSW21	WSW17	W18	W15	W13	WSW11	S10	S9	SW6	SW8	SW4	WSW12.1	WSW21	
17-Jan	WSW8	SW12	SW12	SSW9	WSW6	W17	W22	WNW20	WNW15	W14	WNW15	WNW14	WNW8	WNW7	WSW7	SW7	SSW4	SSW6	SSW7	SSW6	S5	S8	S8	SSW6	WSW8.0	W22	
18-Jan	S4	ESE6	SE6	SE7	SE5	SE7	ESE7	SE9	SSE11	SSE12	SSE12	SW6	E5	SE5	ESE4	E4	SE4	S2	S3	SW3	SSE2	SSW5	SSW7	SSW3	SSE4.9	SSE12	
19-Jan	SSE2	S5	SSW5	W2	N1	NW3	N4	NW2	N3	N1	N3	N3	N4	N5	N4	N3	NNW4	NW3	N0	NNE2	NNE1	NW5	NW4	NW4	NNW2.0	NW5	
20-Jan	E1	SSW3	W2	WNW4	NW5	NNW0	SSE3	SSE5	S5	SSE4	SSE4	SSE3	E4	SE7	SE5	ESE5	E5	ESE6	SE6	SSE4	SSE6	S5	S5	SW2	SSE2.9	SE7	
21-Jan	NNW4	NW5	WNW7	NW6	NW4	NNW4	N5	N3	NW3	NNW4	N6	NNW6	NNW6	N7	NNW7	NNW7	NNW7	NNW7	NNW6	NNW6	NNW7	NNW6	NNW6	NNW6	NNW5.4	N7	
22-Jan	NNW6	NNW6	NNW6	NNW6	NNW5	NNW5	NNW5	NNW4	N4	N4	N4	N4	NNW4	NNW4	NNW4	NNW4	NNW4	NNW3	NW2	WNW2	NW2	NW2	NW1	NW2	NNW3.8	NNW6	
23-Jan	NW2	WNW3	WNW2	WNW2	NW2	AF	NW1	WNW1	WNW1	W2	WNW2	AF	WNW1	WNW1	WNW1	AF	AF	AF	AF	AF	S1	S1	AF	SSW0	S1	----	WNW3
24-Jan	AF	AF	AF	AF	S1	SSE1	S0	AF	AF	AF	AF	S0	SSE0	AF	AF	AF	AF	AF	S2	S2	S2	SSW1	SW1	S1	AF	----	S2
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	S2	S3	SSW3	SSW3	SSW3	SSE2	S4	SSW5	SSW7	SSW8	SSW5	SSW5	SW4	WSW3	----	SW8
26-Jan	W7	WNW4	NW8	WNW7	WNW11	WNW14	WNW14	WNW13	WNW13	WNW13	WNW13	WNW15	WNW16	WNW13	WNW11	WNW11	WNW9	W7	W12	WNW14	WNW13	WNW14	WNW14	WNW14	WNW11.7	WNW16	
27-Jan	WNW14	WNW15	WNW15	WNW16	WNW17	WNW18	WNW17	WNW19	WNW17	WNW17	WNW17	WNW19	WNW14	W14	W13	W11	WNW7	WNW8	WNW9	WNW11	WNW10	WNW13	WNW10	WNW11	WNW10	WNW13.4	WNW19
28-Jan	WNW11	WNW13	WNW14	WNW13	W12	W9	W10	WNW12	WNW12	WNW11	WNW10	WNW10	WNW9	WNW6	W4	SW6	SSW6	SSW7	SW8	W15	WNW19	WNW19	WNW18	WNW18	WNW10.4	WNW19	
29-Jan	WNW20	WNW21	WNW16	WNW17	WNW16	WNW15	WNW15	W14	W12	W14	W13	WNW14	W16	WNW14	WNW11	WNW11	WNW6	W6	W7	WNW12	NW11	NW12	WNW13	WNW14	WNW13.1	WNW21	
30-Jan	NW13	NW15	NW13	WNW15	NW14	WNW16	WNW18	NW16	WNW17	WNW19	WNW18	NW20	N15	N12	NNW11	NNW10	NNW9	NNW14	N12	N13	N14	N14	N13	NNW15	NW13.1	NW20	
31-Jan	N14	N13	N14	NNW10	N11	N9	NNW9	NNW8	NNW7	NW9	WNW12	WNW14	WNW12	WNW13	NW13	NW12	NW10	NW9	WNW10	NW12	NW13	NW13	NW12	NW11	NW10.6	WNW14	

WNW6.2	WNW6.5	WNW6.5	WNW5.7	WNW5.1	WNW6.0	WNW6.5	WNW6.1	WNW6.0	WNW5.7	WNW5.5	WNW6.5	WNW6.5	WNW6.0	WNW5.5	WNW5.1	WNW3.9	WNW3.8	WNW4.2	WNW4.8	WNW5.1	WNW5.9	WNW6.0	WNW6.1	Diurnal Average
W20	WNW21	NNW20	WNW18	WNW17	WNW18	W22	WNW20	WSW17	WNW19	WNW19	N23	N23	N22	N21	N20	NNW19	NNW17	NNW18	NNW16	WNW19	WNW19	WNW18	WNW18	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 - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 7 km/h on Jan 11 13:00	Hours of Data: 711
Minimum Value: 0 km/h on Jan 24 19:00	Hours of Missing Data: 33
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 7	Hours of Calibration: 0
	Percent Operational Time: 95.6

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-Jan	5	5	7	5	3	3	3	2	3	2	2	3	4	4	3	2	1	1	1	2	1	1	1	1	7
2-Jan	1	1	1	1	1	1	1	2	1	1	1	2	1	1	AF	AF	AF	1	1	1	1	1	1	1	2
3-Jan	1	1	1	1	2	1	2	1	1	3	2	4	4	4	5	5	4	5	5	4	4	4	4	4	5
4-Jan	4	3	3	3	2	3	3	3	3	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2	4
5-Jan	2	2	2	2	1	2	2	2	1	2	2	2	3	2	2	2	2	2	2	1	1	1	2	2	3
6-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	2	1	1	1	AF	1	2
7-Jan	1	1	1	1	1	1	1	1	2	1	1	1	1	2	2	2	2	2	2	2	2	2	1	1	2
8-Jan	1	1	1	AF	2	1	1	1	1	1	1	1	2	2	3	2	2	3	2	2	3	4	5	5	5
9-Jan	4	4	4	4	4	5	4	4	3	3	3	3	3	3	3	2	2	2	2	2	3	2	2	2	5
10-Jan	2	2	1	1	2	1	1	1	2	2	2	2	3	3	3	3	2	2	3	4	3	2	2	1	4
11-Jan	1	1	2	2	2	5	6	5	5	6	3	7	7	7	6	6	6	5	5	5	4	3	3	2	7
12-Jan	1	1	1	1	1	2	2	1	1	2	2	3	3	3	4	4	4	4	4	3	2	2	2	2	4
13-Jan	2	5	4	5	4	3	3	3	3	2	2	1	4	4	3	2	2	1	1	2	3	3	2	2	5
14-Jan	2	2	2	1	2	2	2	4	5	4	3	5	6	6	5	5	5	6	5	5	5	5	7	7	7
15-Jan	7	7	6	6	6	6	6	5	5	4	4	5	5	5	5	4	2	3	4	5	5	5	5	5	7
16-Jan	4	4	3	3	3	3	3	4	3	4	5	5	6	7	6	6	5	5	5	3	3	2	2	3	7
17-Jan	4	4	3	3	5	6	7	7	6	4	5	4	3	2	2	1	1	1	2	1	2	1	2	7	7
18-Jan	1	1	2	2	2	2	2	2	3	3	3	3	2	2	1	2	2	1	1	1	1	2	1	2	3
19-Jan	2	2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	3	2	2	3
20-Jan	2	2	1	2	2	1	1	1	1	1	1	1	2	2	2	1	1	1	1	1	2	1	1	2	2
21-Jan	1	2	2	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
22-Jan	2	2	2	2	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
23-Jan	1	1	1	1	1	AF	1	1	1	1	1	AF	1	1	1	AF	AF	AF	AF	AF	AF	AF	0	1	1
24-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	1	0	AF	0	AF	AF	AF	0	0	1	1	1	1	AF	1
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	1	1	1	1	1	2	1	1	1	1	1	2	2	2	2
26-Jan	2	2	2	3	4	4	4	4	4	4	4	4	4	4	4	3	3	2	5	5	4	4	4	5	5
27-Jan	4	5	5	5	5	6	5	6	5	6	6	5	4	4	4	2	2	3	3	3	4	3	3	3	6
28-Jan	3	4	5	4	4	2	3	4	4	3	3	3	2	2	2	2	1	2	3	6	6	6	6	7	7
29-Jan	7	7	6	6	5	5	4	4	4	5	4	4	5	5	4	4	2	1	2	3	3	4	4	4	7
30-Jan	4	5	4	5	5	5	5	5	5	6	6	7	5	4	3	3	3	4	3	3	4	4	4	4	7
31-Jan	5	4	4	3	3	3	2	2	2	3	4	4	4	4	4	4	3	3	3	4	4	4	4	3	5
	7	7	7	6	6	6	7	7	6	6	6	7	7	7	6	6	6	6	5	6	6	6	6	7	

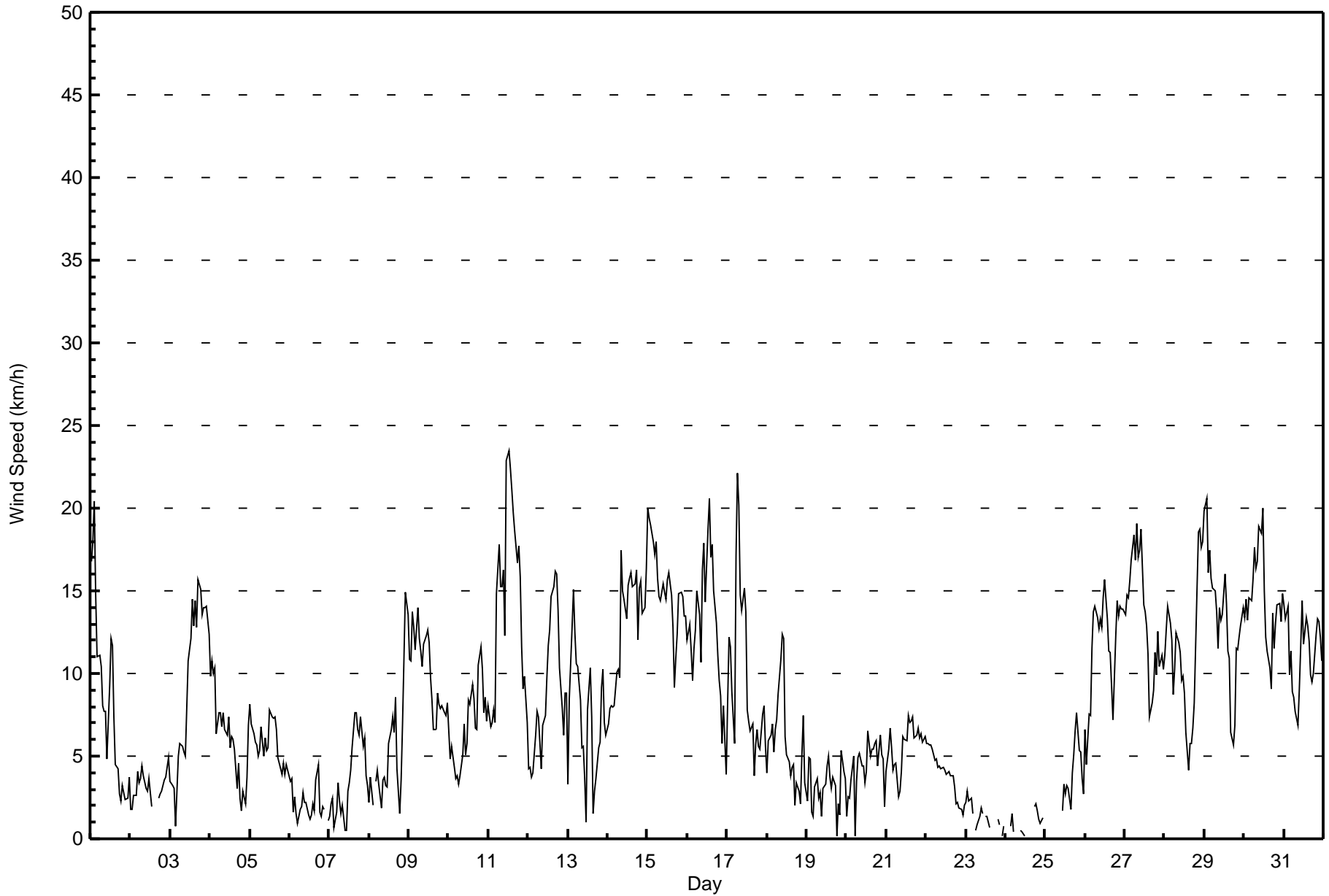
Diurnal Maximum

AF - Analyzer Failure



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Anzac - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Anzac - January 2017

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	262	36.85	36.85
6 - 11	238	33.47	70.32
12 - 19	198	27.85	98.17
20 - 28	13	1.83	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 711

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Anzac - January 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	25	5	0	0	6	3	6	15	33	19	19	10	18	42	29	32	262
6 - 11	18	0	0	0	0	3	10	4	9	13	21	12	17	57	26	48	238
12 - 19	12	0	0	0	0	0	3	6	0	0	9	6	42	92	18	10	198
20 - 28	5	0	0	0	0	0	0	0	0	0	0	1	2	3	1	1	13
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
Totals	60	5	0	0	6	6	19	25	42	32	49	29	79	194	74	91	711

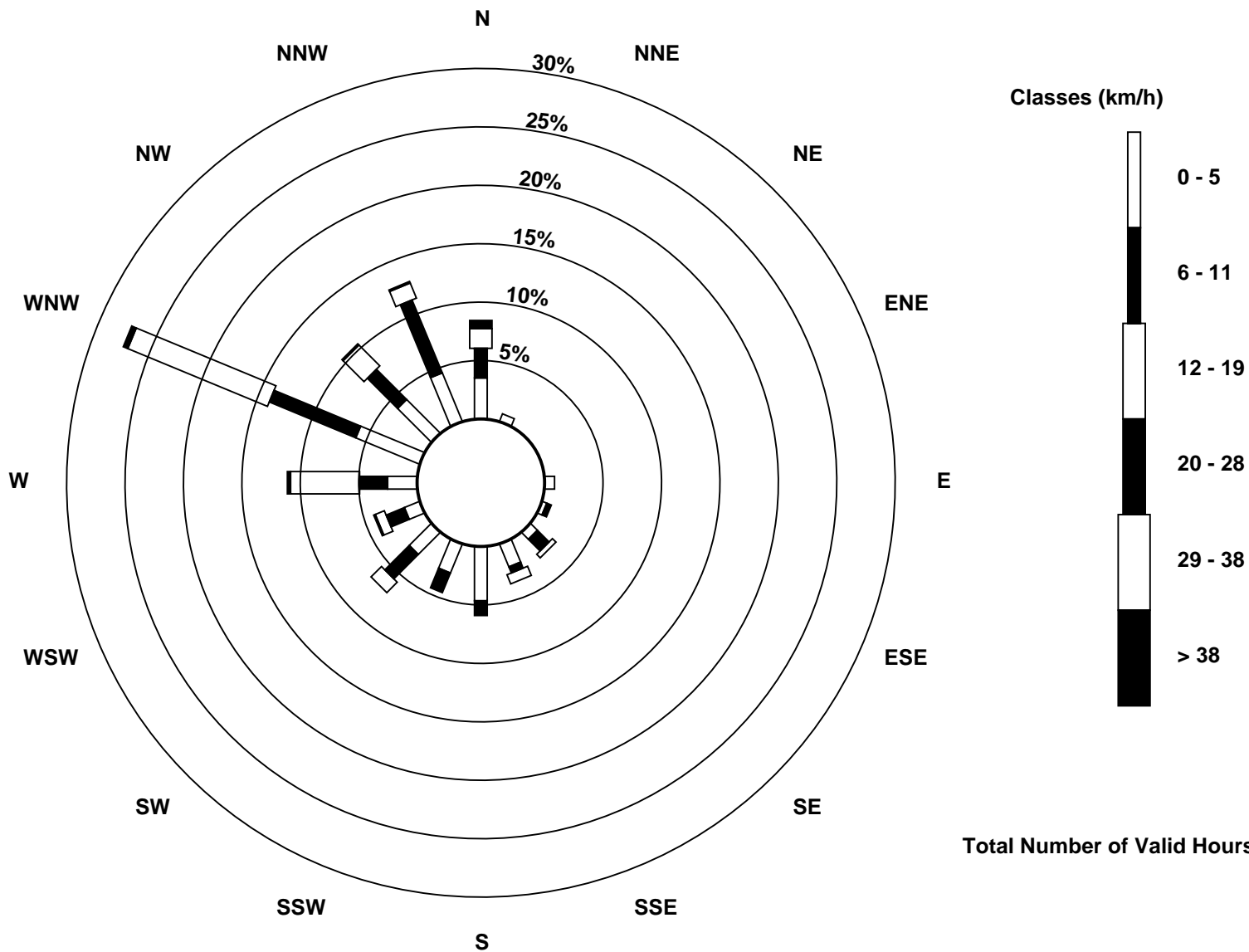
Total Number of Valid Hours: 711

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Wind Speed (WS) - km/h
Anzac (AMS 14)





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Anzac - January 2017

Direction of Maximum Speed: 2 deg on Jan 11 13:00																							Hours in Service:	744	
Direction of Maximum Daily Speed Average: 275.5 deg on Jan 15																							Hours of Data:	711	
Direction of Minimum Speed: 348 deg on Jan 20 06:00											Direction of Minimum Daily Speed Average: 0.6 deg on Jan 6												Hours of Missing Data:	33	
Monthly Average Direction: 294.0 deg																							Percent Operational Time:	95.6	
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jan	295	309	343	353	2	4	356	352	336	330	283	310	328	338	326	307	328	297	304	319	263	293	348	272	329.2
2-Jan	291	334	277	332	313	298	311	296	285	283	288	303	290	294	AF	AF	AF	276	292	279	248	230	225	231	281.6
3-Jan	227	229	268	179	214	238	285	273	247	284	289	302	296	303	308	301	302	303	304	303	306	307	308	312	296.2
4-Jan	313	330	336	348	348	347	344	342	335	335	329	332	319	302	304	301	247	179	174	140	183	206	294	312	323.7
5-Jan	334	351	354	3	0	12	357	351	341	346	348	329	332	332	359	8	9	21	359	358	337	344	330	327	350.0
6-Jan	320	295	330	301	7	245	226	289	307	278	277	257	190	144	93	171	118	147	204	150	166	198	AF	284	244.3
7-Jan	348	261	239	236	351	5	358	359	18	307	9	290	303	316	330	340	349	353	342	344	344	339	333	329	336.4
8-Jan	307	272	303	AF	211	185	186	182	201	206	204	232	258	283	289	260	239	222	278	248	259	280	291	292	260.3
9-Jan	285	291	287	293	292	298	299	292	302	297	300	300	300	303	312	313	324	335	320	306	307	300	299	301	300.6
10-Jan	293	295	312	329	330	335	291	296	276	314	303	299	304	303	303	320	301	297	300	301	294	272	276	248	298.4
11-Jan	242	220	217	219	230	285	291	293	298	346	4	1	2	359	1	353	346	335	336	333	327	309	310	302	327.8
12-Jan	297	298	264	182	177	170	177	188	178	149	143	143	143	143	146	152	153	156	153	142	145	161	179	203	160.0
13-Jan	246	301	299	299	303	304	305	299	293	200	218	266	294	298	285	287	222	216	201	250	268	270	264	226	280.1
14-Jan	193	217	236	231	221	219	227	216	238	238	234	258	280	275	272	268	262	267	283	277	265	279	272	265	254.9
15-Jan	279	281	285	283	282	287	295	287	270	267	275	275	270	271	276	266	264	264	259	261	269	272	274	277	275.5
16-Jan	267	253	258	241	223	228	232	222	234	234	233	232	251	252	242	266	264	261	245	189	190	214	236	226	240.5
17-Jan	252	235	222	207	239	274	277	289	284	273	292	294	296	282	244	227	200	204	206	208	175	180	189	203	254.4
18-Jan	171	120	126	145	145	141	123	138	154	161	167	222	101	124	115	83	126	180	180	235	157	205	195	208	152.7
19-Jan	148	184	209	262	5	326	351	313	5	350	354	351	359	359	3	355	331	311	11	28	15	310	321	316	334.6
20-Jan	97	209	266	288	320	348	163	165	169	154	148	147	96	125	133	118	101	103	129	151	168	183	170	220	148.1
21-Jan	339	311	301	306	317	347	2	352	314	347	355	347	346	354	346	338	337	337	334	335	335	337	333	334	336.2
22-Jan	331	333	335	335	335	340	344	344	349	357	354	349	346	342	340	326	327	323	311	301	306	313	317	316	335.7
23-Jan	321	298	303	302	313	AF	307	283	285	276	284	AF	300	301	283	AF	AF	AF	AF	174	171	AF	193	174	--
24-Jan	AF	AF	AF	174	166	179	AF	AF	AF	172	176	159	AF	165	AF	AF	AF	180	175	176	207	225	183	AF	--
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	186	183	203	192	200	157	176	206	213	217	223	228	230	237	--
26-Jan	277	296	306	298	299	296	294	295	294	289	293	285	292	289	289	288	282	274	278	282	284	290	286	291	289.4
27-Jan	296	298	291	293	296	299	298	295	299	300	297	286	272	272	277	285	284	293	295	299	301	296	291	298	293.0
28-Jan	299	296	292	282	274	277	277	285	287	294	290	288	293	293	267	230	192	202	230	279	288	291	294	296	282.5
29-Jan	292	289	294	297	298	294	293	279	269	274	279	283	269	282	297	300	293	271	275	297	305	304	299	303	289.5
30-Jan	306	308	308	298	305	302	303	305	299	298	298	305	349	5	347	328	332	347	2	2	359	360	350	339	323.4
31-Jan	349	350	350	346	350	351	342	339	330	315	300	302	288	298	305	313	319	306	302	307	305	308	317	324	320.6
291.4 290.2 294.7 293.9 293.7 293.3 293.5 289.6 284.1 284.3 284.6 293.6 298.9 299.7 300.0 298.2 291.9 283.4 283.4 288.4 286.2 286.7 285.8 288.1																									
Diurnal Average																									
AF - Analyzer Failure																									
All monthly, daily, and diurnal averages have been calculated using vector methods																									



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Anzac - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 100 deg on Jan 19 19:00	Hours of Data: 711
Minimum Value: 8 deg on Jan 3 06:00	Hours of Missing Data: 33
Percentiles: P ₁ = 10 P ₁₀ = 15 Q ₁ = 17 Median = 20 Q ₃ = 23 P ₉₀ = 33 P ₉₉ = 77	Hours of Calibration: 0
	Percent Operational Time: 95.6

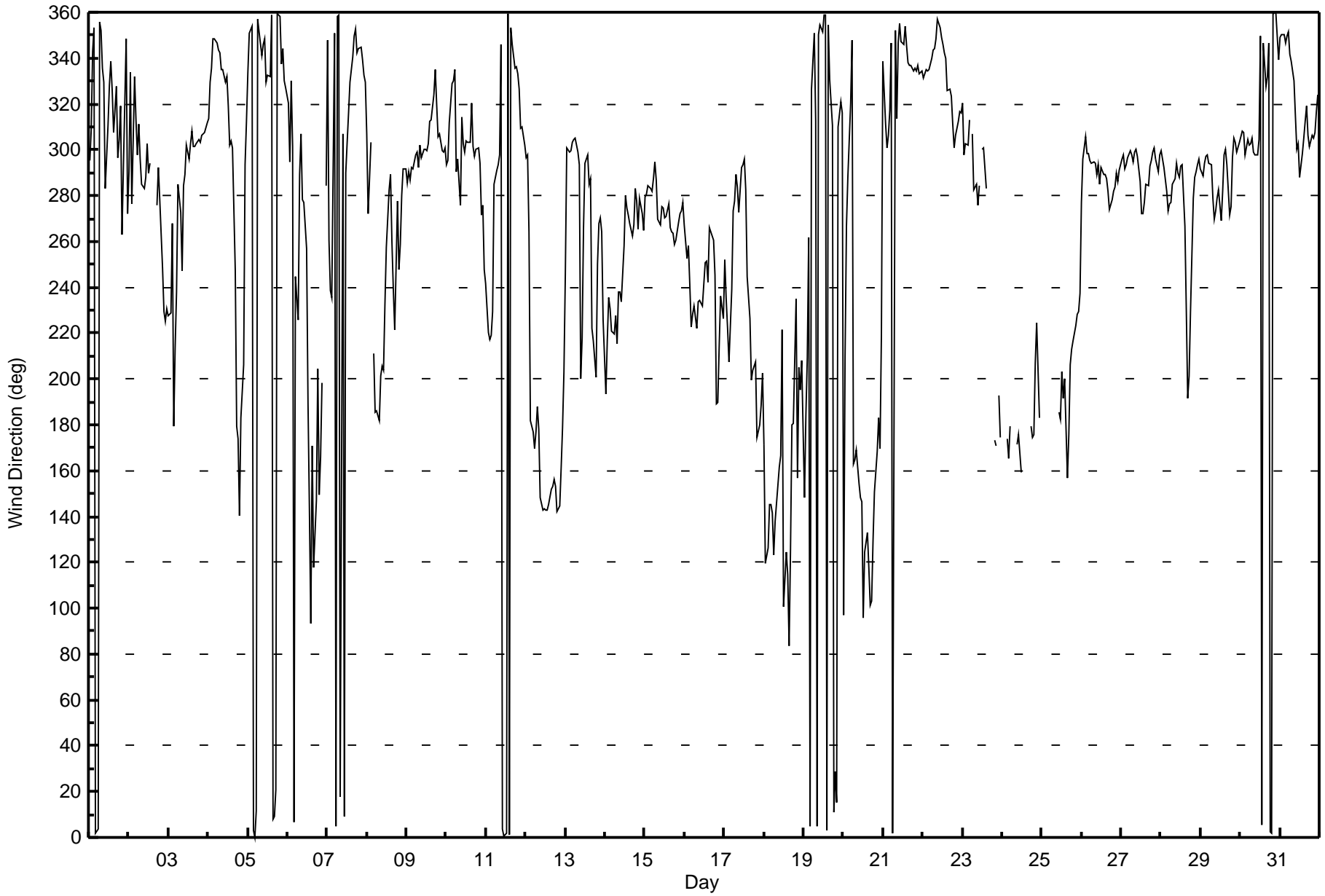
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jan	23	21	18	17	16	17	16	13	17	15	24	24	16	15	19	17	9	17	22	33	31	24	16	29	33
2-Jan	33	44	38	27	26	23	21	20	27	21	29	24	28	55	AF	AF	AF	17	19	21	15	11	10	9	55
3-Jan	20	20	25	51	19	8	18	14	13	22	20	20	22	17	18	20	20	18	18	18	18	18	17	51	
4-Jan	18	15	15	15	20	16	16	16	16	16	21	25	23	25	23	42	14	49	43	19	48	19	17	49	
5-Jan	15	16	16	17	17	19	17	18	17	16	20	17	16	16	19	19	20	22	19	21	19	21	20	22	
6-Jan	19	20	19	41	27	60	47	30	19	23	21	41	70	35	28	50	26	12	81	54	52	51	AF	35	81
7-Jan	21	29	15	55	17	13	16	36	26	68	37	19	19	21	20	15	19	17	15	16	16	14	13	11	68
8-Jan	15	15	22	AF	18	13	12	17	22	12	12	21	21	24	22	24	15	19	55	35	31	23	21	23	55
9-Jan	25	24	23	21	22	20	21	20	19	19	18	18	18	17	18	18	15	14	16	17	19	19	17	15	25
10-Jan	16	17	12	17	20	18	16	22	19	16	19	17	18	20	19	16	19	18	20	20	19	17	18	17	22
11-Jan	12	13	16	14	28	24	22	24	23	35	17	18	19	17	18	17	18	15	14	14	15	15	14	17	35
12-Jan	14	16	15	22	11	12	20	13	14	14	17	17	17	18	18	16	19	18	19	18	17	27	18	18	27
13-Jan	37	22	19	21	20	20	20	23	32	19	28	77	36	26	30	81	25	24	14	31	21	22	17	28	81
14-Jan	13	16	12	14	14	16	13	17	17	15	15	25	25	24	24	22	24	22	26	24	23	28	26	25	28
15-Jan	25	23	25	23	25	25	23	24	22	19	22	22	23	21	22	20	19	16	19	19	21	23	22	22	25
16-Jan	21	21	21	22	14	14	15	17	20	15	15	23	22	23	22	23	24	29	47	20	23	24	15	69	69
17-Jan	25	18	18	22	67	24	24	23	27	24	22	21	29	27	21	14	23	20	17	20	16	13	10	20	67
18-Jan	15	17	20	21	17	18	14	16	18	16	16	50	25	39	27	22	15	59	17	38	37	13	10	49	59
19-Jan	64	29	22	66	65	31	15	31	43	53	16	17	16	16	15	22	33	43	100	73	77	37	40	41	100
20-Jan	71	69	61	45	30	90	19	10	10	21	31	33	24	17	24	22	16	16	12	16	13	15	9	66	90
21-Jan	30	19	16	17	16	16	17	30	21	17	16	20	18	17	20	16	15	16	16	16	16	15	16	16	30
22-Jan	16	16	16	16	16	18	19	21	19	22	21	18	20	20	16	17	15	17	20	16	17	15	22	20	22
23-Jan	18	21	20	18	19	AF	29	25	21	25	31	AF	33	30	37	AF	AF	AF	AF	AF	16	53	AF	71	71
24-Jan	AF	AF	AF	10	13	77	AF	AF	AF	66	24	69	AF	78	AF	AF	AF	14	11	9	13	10	51	AF	78
25-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	16	14	23	19	26	51	17	16	14	14	13	15	38	42	51
26-Jan	17	21	19	25	21	18	18	17	20	22	22	22	19	20	22	20	20	15	22	22	23	21	20	21	25
27-Jan	21	23	21	22	22	21	22	20	20	20	21	22	20	21	23	23	20	23	20	19	19	19	19	19	23
28-Jan	21	22	20	20	18	19	23	22	22	20	21	19	18	23	38	23	18	18	21	24	23	23	22	23	38
29-Jan	23	22	23	20	21	21	22	24	19	23	24	23	23	24	23	22	23	18	19	24	21	19	20	20	24
30-Jan	20	20	18	21	21	21	20	18	21	22	21	20	31	18	18	17	15	17	21	17	18	17	16	15	31
31-Jan	16	17	16	16	17	15	15	14	14	20	19	18	24	20	20	19	17	19	19	18	18	18	16	17	24
	71	69	61	66	67	90	47	36	43	68	37	77	70	78	38	81	42	59	100	73	77	51	71	69	
	Diurnal Maximum																								

AF - Analyzer Failure



Wood Buffalo Environmental Association
Hourly Averages

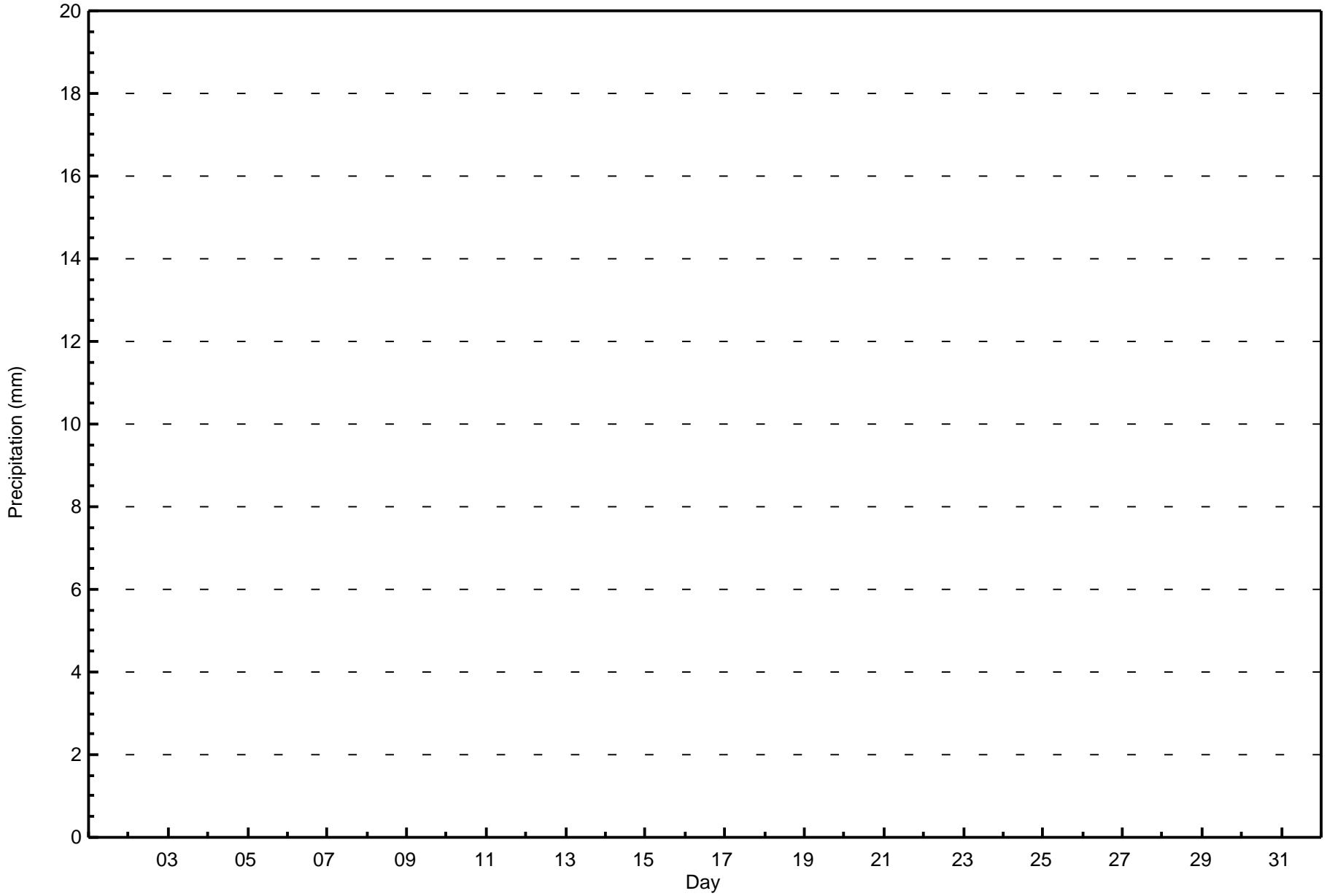
Wind Direction (WD) - deg
Anzac - January 2017





Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Anzac - January 2017





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 6, 2017	Last Calibration	December 8, 2016
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:30	End Time (MST)	10:20
Gas Cert Reference	LL104186	Station temp.	22 Deg C
Cal Gas Concentration	50.1 ppm	Cal Gas Exp Date	February 6, 2019
Calibrator Make/Model	API T700	Serial Number	2659
ZAG Make/Model	API 701	Serial Number	4764
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	-638	-638
Analyzer IP address	192.168.1.43		Lamp voltage	792	792
Calculated slope	1.001805	1.012429	Chamber temp	45.2	45.2
Calculated intercept	0.070479	0.253107	Pressure	717.6	697.5
Analyzer Background	13.9	13.9	Flow	0.443	0.431
Analyzer Coefficient	0.977	0.977	Intensity	85	85
Analyzer make			Thermo 43i	Analyzer serial #	
				1152430005	

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	79.8	799.6	789.5	1.013
calibrator zero	5000	0.0	0.0	-0.3	----
high point	5000	79.8	799.6	789.5	1.013
second point					
third point					
as left zero					
as left span					
Average Correction Factor					1.013

Corrected As found 789.8 Previous response 798.1 % change 1.1%

Notes:

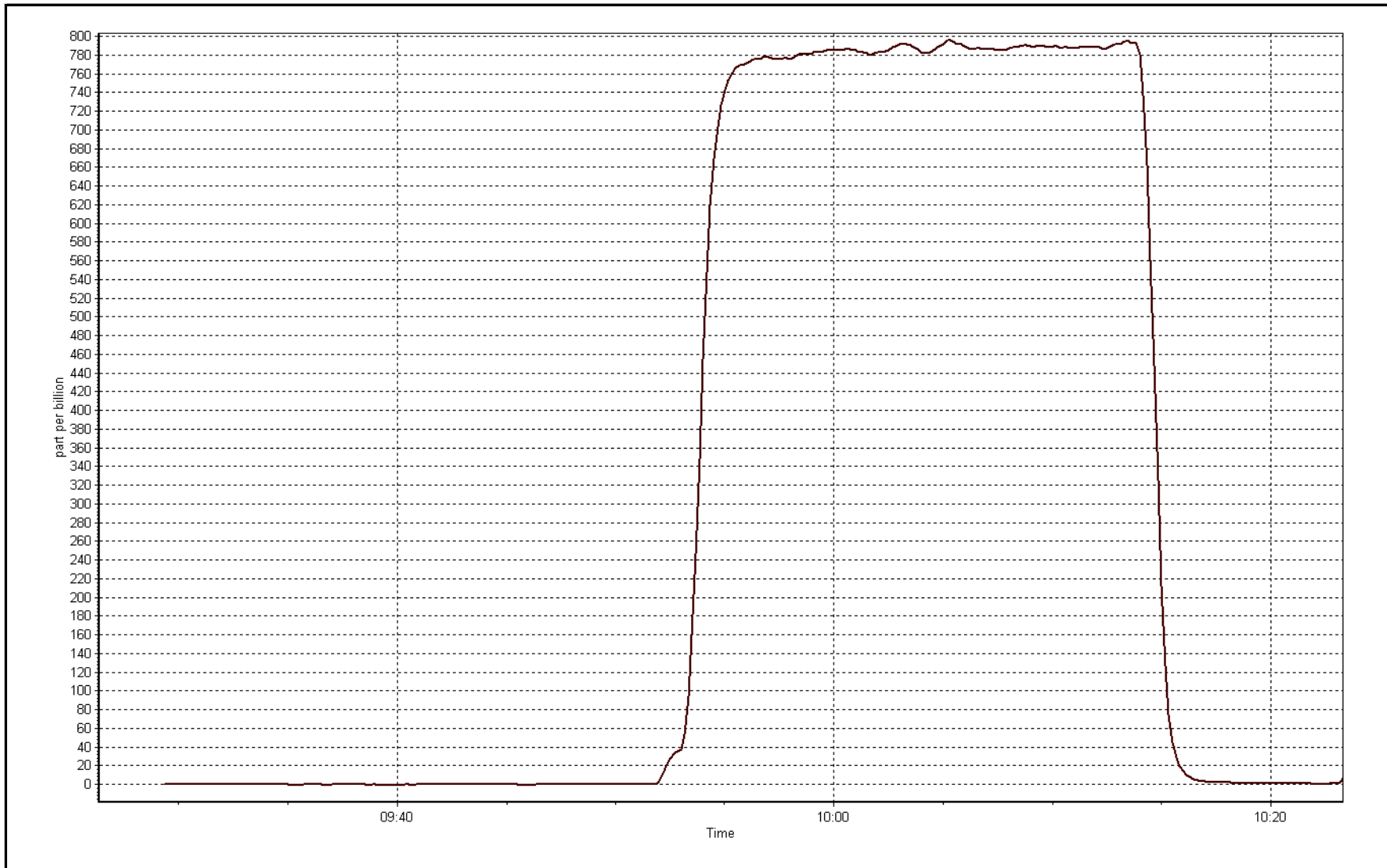
No adjustments. Removing the SO2 cylinder and replacing it with the mix cal gas cylinder.

Calibration Performed By:

Asad Hidayat

SO2 Calibration Plot

Date: January 6, 2017





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 6, 2017	Last Calibration	December 8, 2016
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:30	End Time (MST)	12:30
Gas Cert Reference	EY0000647	Station temp.	22 Deg C
Cal Gas Concentration	49.1 ppm	Cal Gas Exp Date	November 4, 2019
Calibrator Make/Model	API T700	Serial Number	2659
ZAG Make/Model	API 701	Serial Number	4764
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-638	-638
Analyzer IP address	192.168.1.43		Lamp voltage	792	791
Calculated slope	1.012429	0.999165	Chamber temp	45.2	45.3
Calculated intercept	0.253107	1.401295	Pressure	717.6	705.1
Analyzer Background	13.9	13.8	Flow	0.443	0.436
Analyzer Coefficient	0.977	0.962	Intensity	85	84
Analyzer make	Thermo 43i		Analyzer serial #	1152430005	

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	79.2	777.7	785.6	0.990
calibrator zero	5000	0.0	0.0	-0.3	----
high point	5000	79.2	777.7	778.0	1.000
second point	5000	39.6	388.9	385.8	1.008
third point	5000	19.8	194.4	193.0	1.008
as left zero	5000	0.0	0.0	0.6	----
as left span	5000	79.2	777.7	775.5	1.003
Average Correction Factor					1.005

Corrected As found 785.9 Previous response 767.9 % change -2.3%

Notes:

Sample inlet filter replaced after as founds. Removed the existing SO2 cylinder at site after as founds and conducted 3-point cal with the new multi-blend cylinder that was installed on Jan 05, 2017. Adjusted span to correct concentration.

Calibration Performed By:

Asad Hidayat



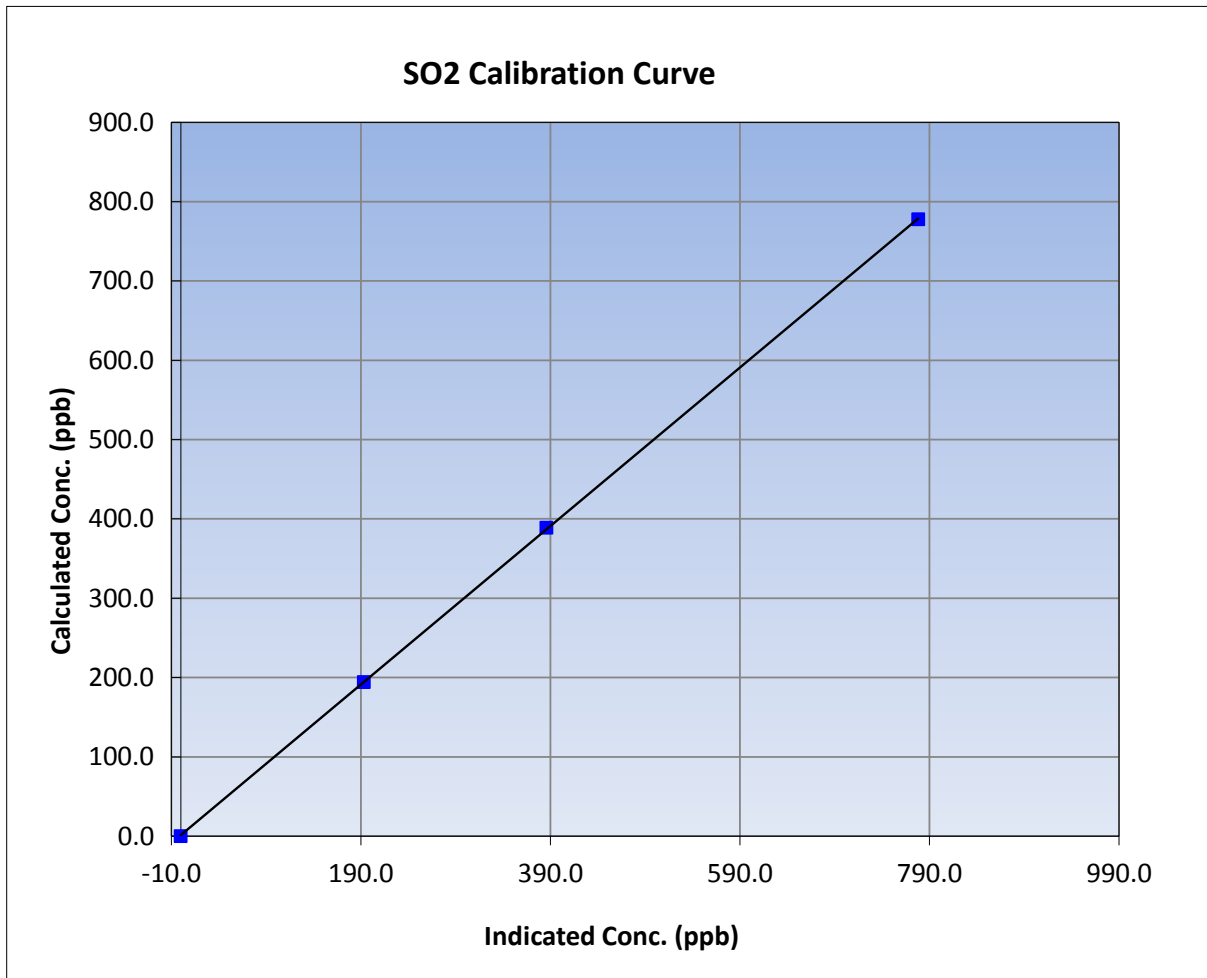
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 6, 2017	Previous Calibration	December 8, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:30	End Time (MST)	12:30
Analyzer make	Thermo 43i	Analyzer serial #	1152430005

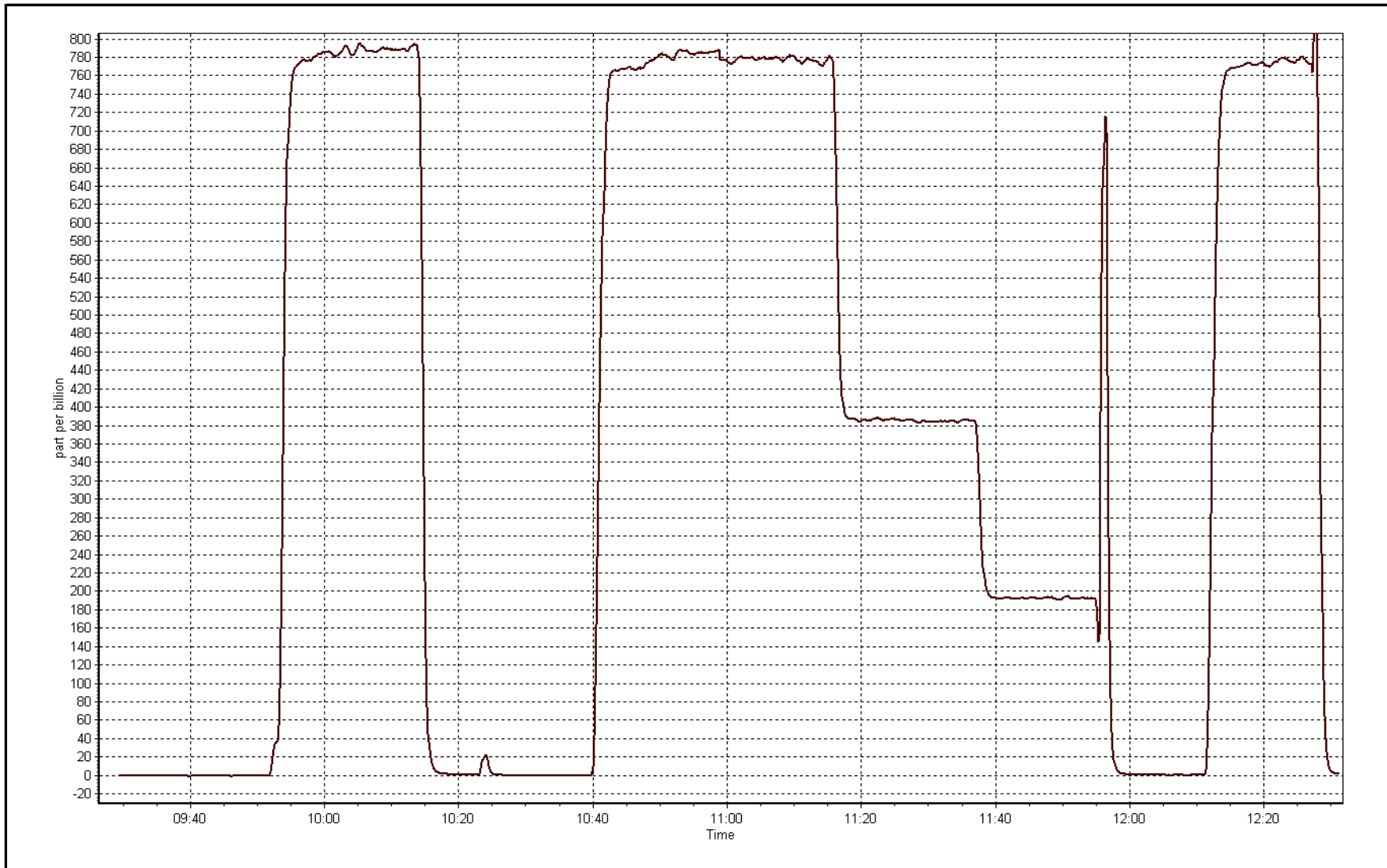
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999981
777.7	778.0	0.9996		
388.9	385.8	1.0079	Slope	0.999165
194.4	193.0	1.0075		
			Intercept	1.401295



SO2 Calibration Plot

Date: January 6, 2017





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	January 13, 2017	Last Calibration	December 19, 2016
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	10:40	End Time (MST)	13:40
Gas Cert Reference	ALM033528	Station temp.	22 Deg C
Cal Gas Concentration	5.05 ppm	Cal Gas Exp Date	September 9, 2017
Calibrator Make/Model	API T700	Serial Number	2659
Dil air Make/Model	API 701	Serial Number	4764
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582
SO2 gas concentration	49.1 ppm	SO2 gas cert/exp	EY0000647 November 4, 2019

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-731	-731
Analyzer IP address	192.168.1.42		Lamp voltage	1010	1007
Calculated slope	0.990823	0.994873	Chamber temp	44	45
Calculated intercept	0.053943	-0.036580	Pressure	638.4	657.8
Analyzer Background	1.76	1.71	Flow	0.399	0.407
Analyzer Coefficient	1.171	1.198	Intensity	97	98
			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	73.4	1.022
SO2 scrubber check	5000	20.4	200.3	0.7	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	74.3	75.0	75.5	0.994
second point	5000	39.6	40.0	40.3	0.993
third point	5000	19.8	20.0	20.1	0.994
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	74.3	75.0	75.5	0.994
Average Correction Factor					0.994

Corrected As found	73.4	Previous response	75.7	% change	3.1%
--------------------	------	-------------------	------	----------	------

Notes:

Sample inlet filter replaced after as founds. Sample pump replaced after as founds for preventative maintenance. Slightly adjusted span. Sox scrubber test completed after 3rd point.

Calibration Performed By:

Asad Hidayat



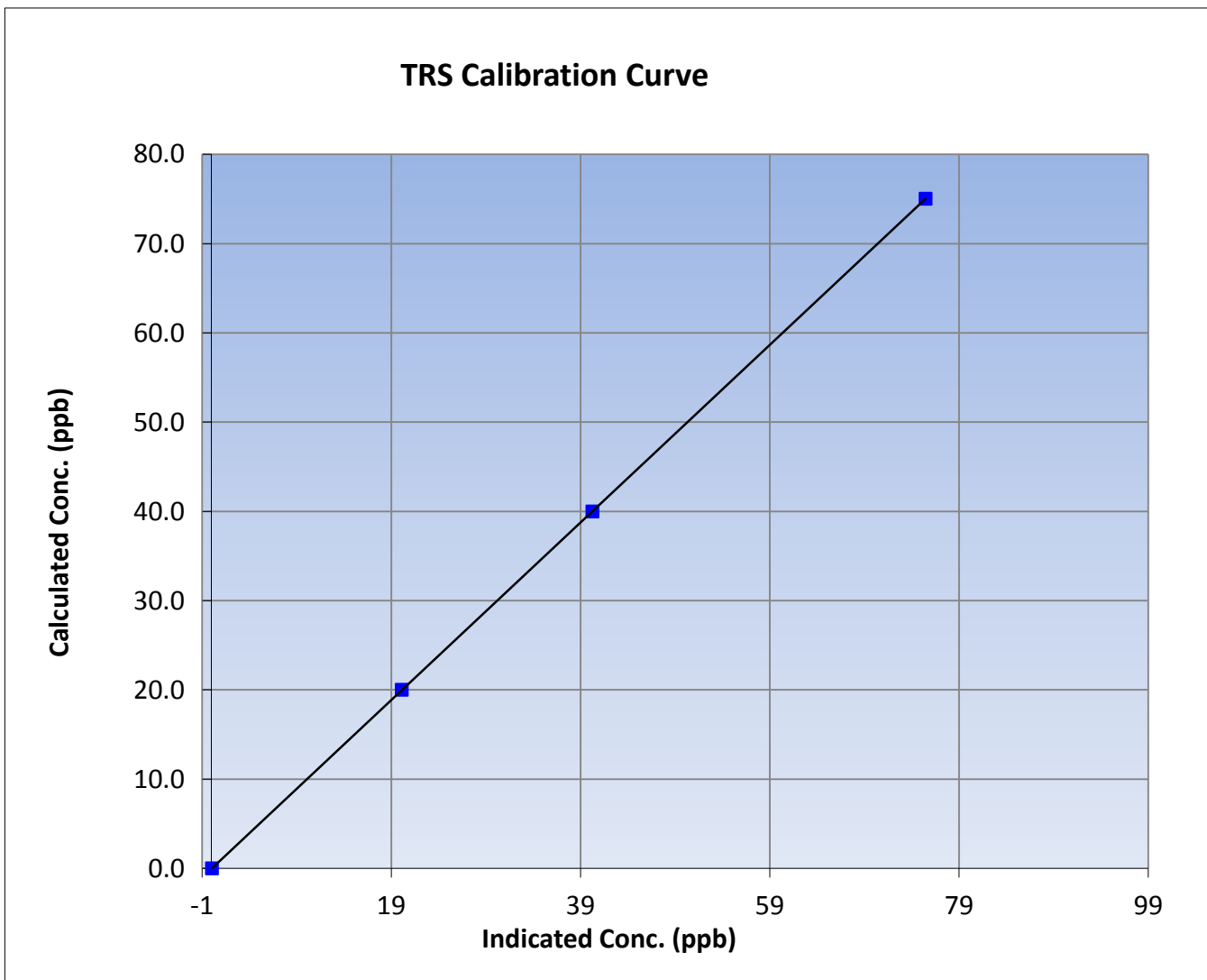
Wood Buffalo Environmental Association TRS Calibration Report

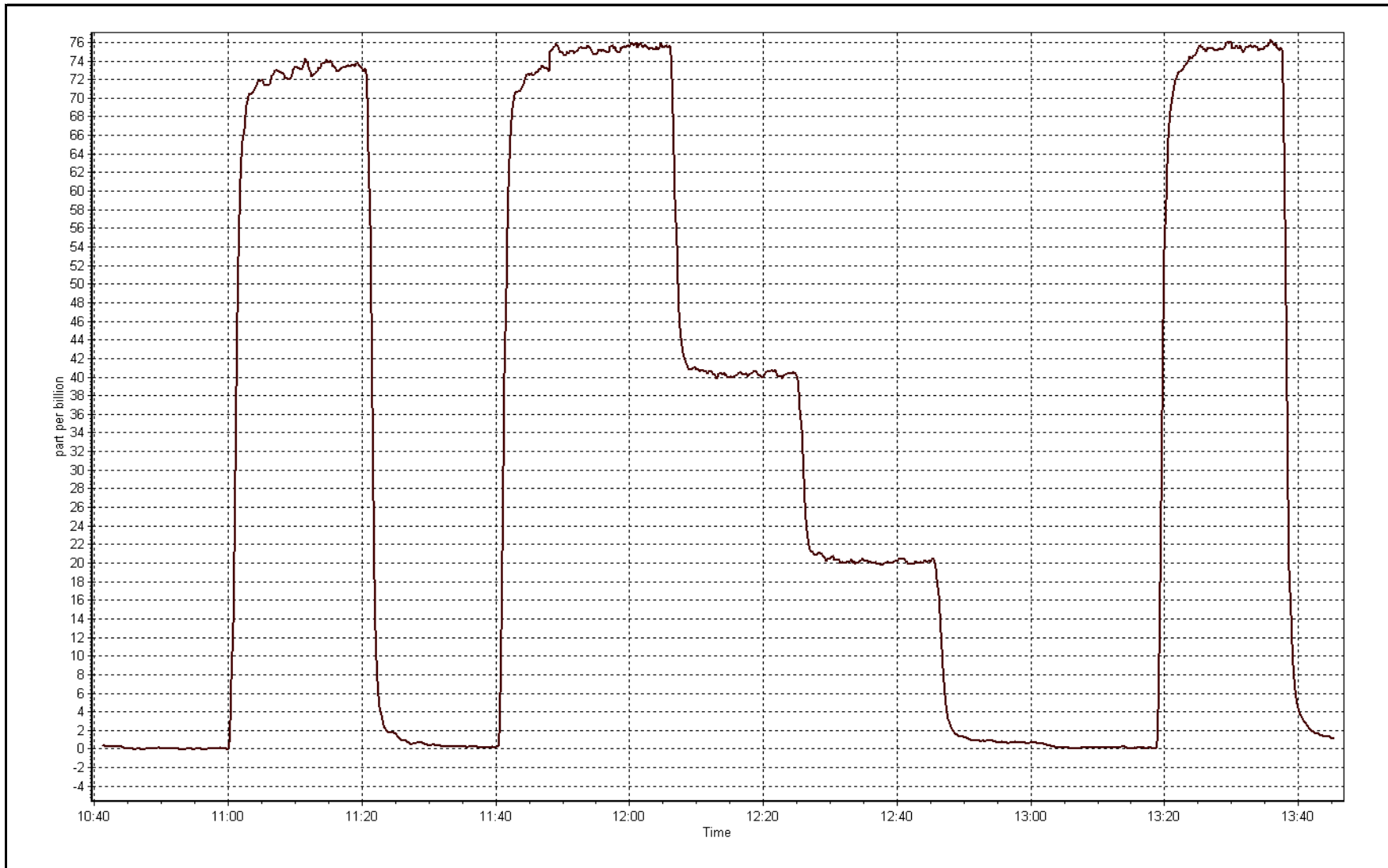
Station Information

Calibration Date	January 13, 2017	Previous Calibration	December 19, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	10:40	End Time (MST)	13:40
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	1.000000
75.0	75.5	0.9945		
40.0	40.3	0.9934	Slope	0.994873
20.0	20.1	0.9939		
			Intercept	-0.036580







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	January 5, 2017	Last Calibration	December 3, 2016
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	10:32	End Time (MST)	
Gas Cert Reference	SA130026A	Cal Gas Expiry Date	December 12, 2016
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	Teledyne API 700	Serial Number	2659
ZAG make/model	Teledyne API 701	Serial Number	4764
DACS make/model	Campbell Scientific CR3000	Serial Number	2582

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.1	75.1
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.1	175.1
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	0.999451	0.979755	Carrier Pressure	33.3	33.3
THC Calc intercept	0.015661	0.000000	Fuel Pressure	47.9	47.9
NMHC Calc slope	1.000119	0.977744	Air Pressure	36.6	36.6
NMHC Calc intercept	-0.002317	0.000000			

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	16.71	0.979
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	16.36	16.70	0.980
second point					
third point					
as left zero					
as left span					
Average Correction Factor					0.980

Corrected As found 16.71 Previous response 16.36 % change -2.1%

Notes:

No adjustments. Replaced hydrogen and nitrogen cylinders after as founds. Replacing mix cal gas cylinder.

Calibration Performed By: Asad Hidayat



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	8.89	0.978
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	8.69	8.89	0.978
second point					
third point					
as left zero					
as left span					
Average Correction Factor					0.978

Corrected As found 8.89 Previous response 8.69 % change -2.2%

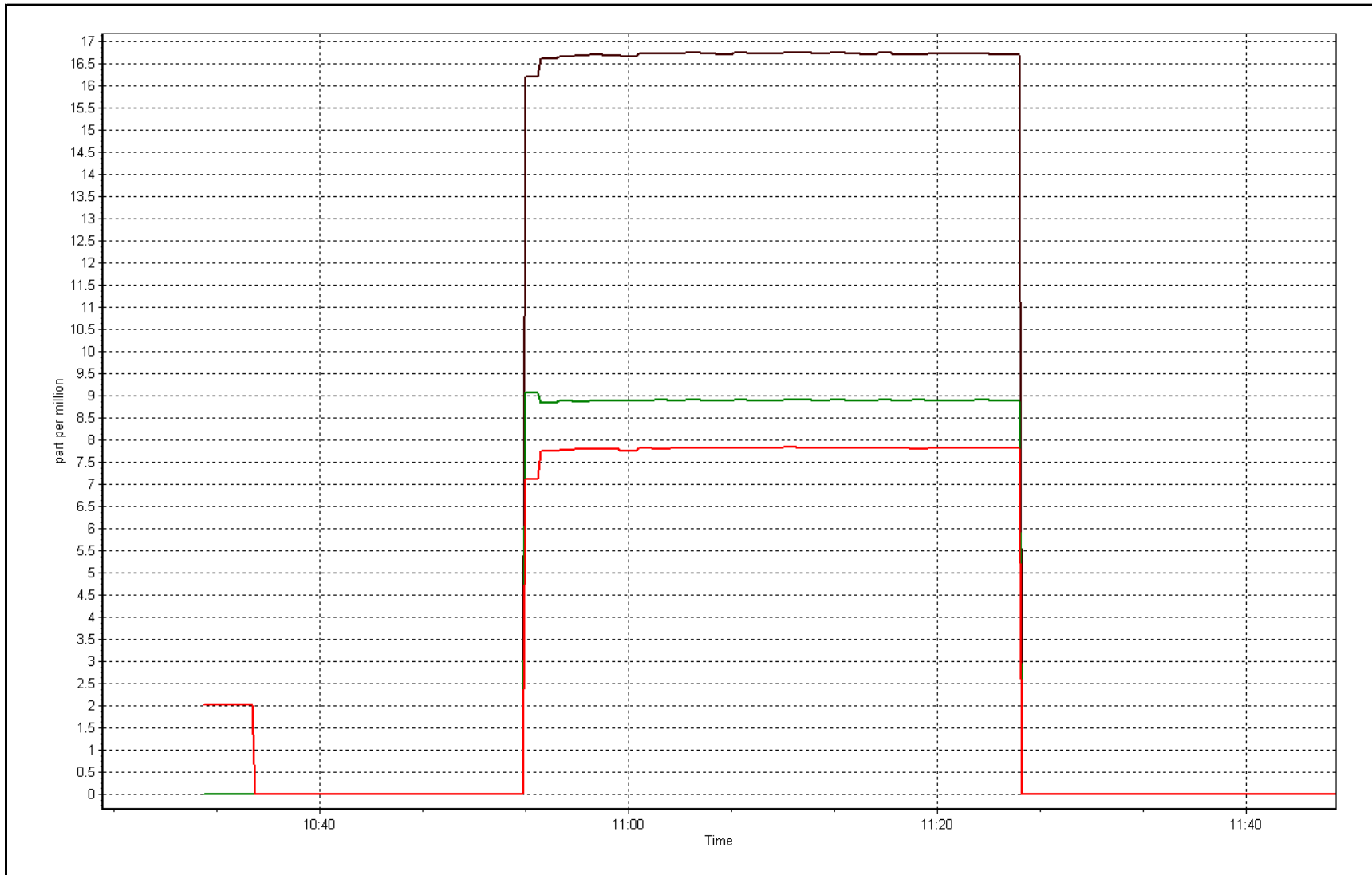
CH4 Calibration Data

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	7.82	0.981
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	7.67	7.81	0.982
second point					
third point					
as left zero					
as left span					
Average Correction Factor					0.982

Corrected As found 7.82 Previous response 7.66 % change -2.0%

THC Calibration Plot

Date: January 5, 2017





Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	January 5, 2017	Last Calibration	December 3, 2016
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	15:42
Gas Cert Reference	EY0000647	Cal Gas Expiry Date	November 4, 2019
CH4 Cal Gas Conc.	513.0 ppm	CH4 Equiv Conc.	1060.3 ppm
C3H8 Cal Gas Conc.	199.0 ppm	Station temp.	22 Deg C
Calibrator Model	Teledyne API 700	Serial Number	2659
ZAG make/model	Teledyne API 701	Serial Number	4764
DACS make/model	Campbell Scientific CR3000	Serial Number	2582

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.1	75.1
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.1	175.1
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope		0.998987	Carrier Pressure	33.3	33.3
THC Calc intercept		0.052433	Fuel Pressure	47.9	47.9
NMHC Calc slope		0.998774	Air Pressure	36.6	36.6
NMHC Calc intercept		0.012084			

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					
as found span					
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	79.2	16.79	16.80	1.000
second point	5000	39.6	8.40	8.28	1.014
third point	5000	19.8	4.20	4.13	1.017
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	79.2	16.79	16.76	1.002
Average Correction Factor					1.010

Corrected As found NA Previous response NA % change NA

Notes:

Sample inlet filter replaced after as founds. Hydrogen, nitrogen and mix cal gas cylinders were all replaced after as founds.
Adjusted span. Negative spike seen around 15:28 MST is from a COMM error.

Calibration Performed By: Asad Hidayat



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	5000	0.0	0.00	0.00	----
high point	5000	79.2	8.67	8.68	0.999
second point	5000	39.6	4.33	4.30	1.008
third point	5000	19.8	2.17	2.16	1.003
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	79.2	8.67	8.65	1.002
Average Correction Factor					1.003

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	5000	0.0	0.00	0.00	----
high point	5000	79.2	8.13	8.13	0.999
second point	5000	39.6	4.06	3.98	1.021
third point	5000	19.8	2.03	1.97	1.031
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	79.2	8.13	8.11	1.002
Average Correction Factor					1.017

Corrected As found NA Previous response NA % change NA



Wood Buffalo Environmental Association

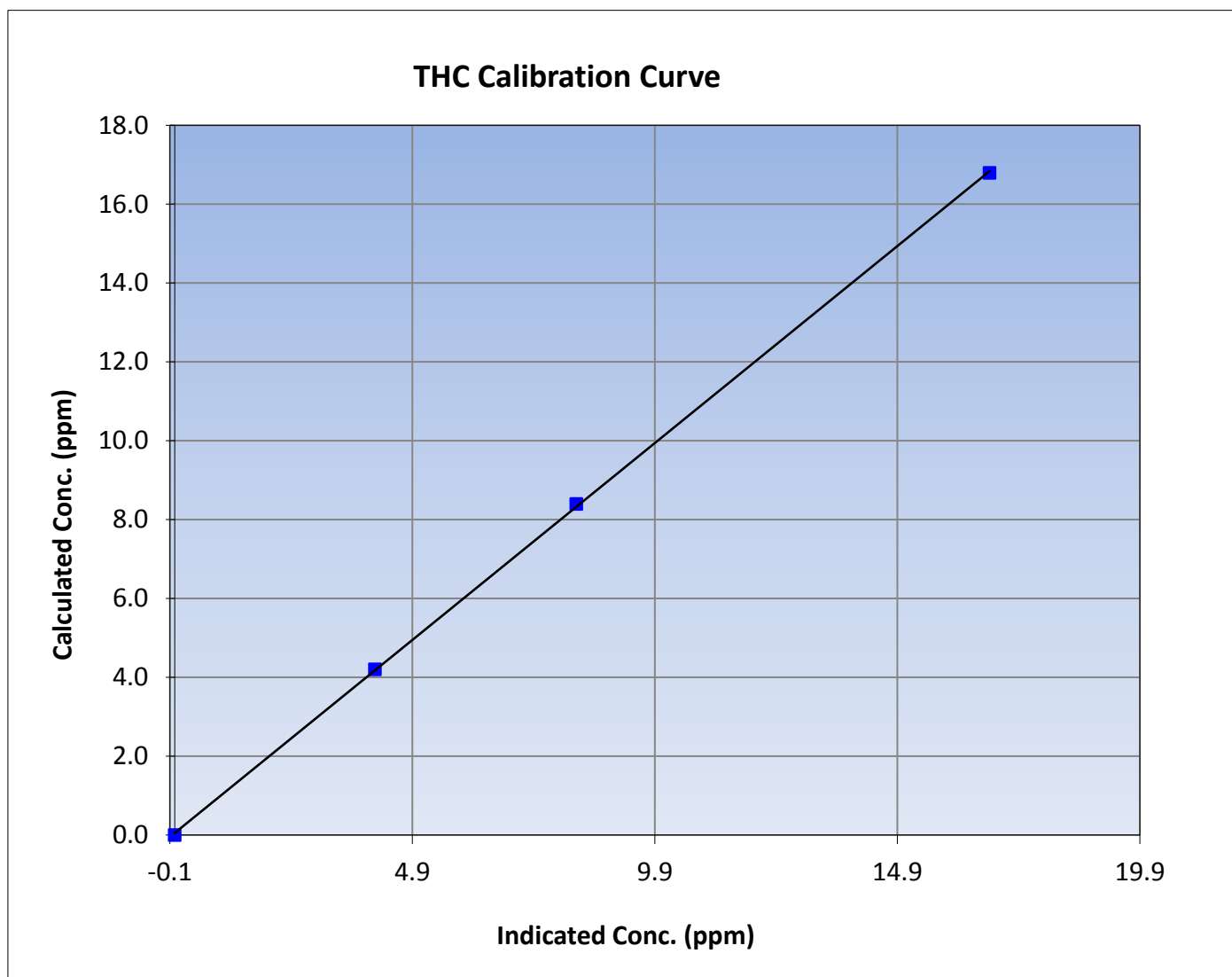
THC Calibration Summary

Station Information

Calibration Date	January 5, 2017	Previous Calibration	December 3, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	10:30	End Time (MST)	15:42
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	0.999934
16.79	16.80	0.9997		
8.40	8.28	1.0142	Slope	0.998987
4.20	4.13	1.0166		
			Intercept	0.052433





Wood Buffalo Environmental Association

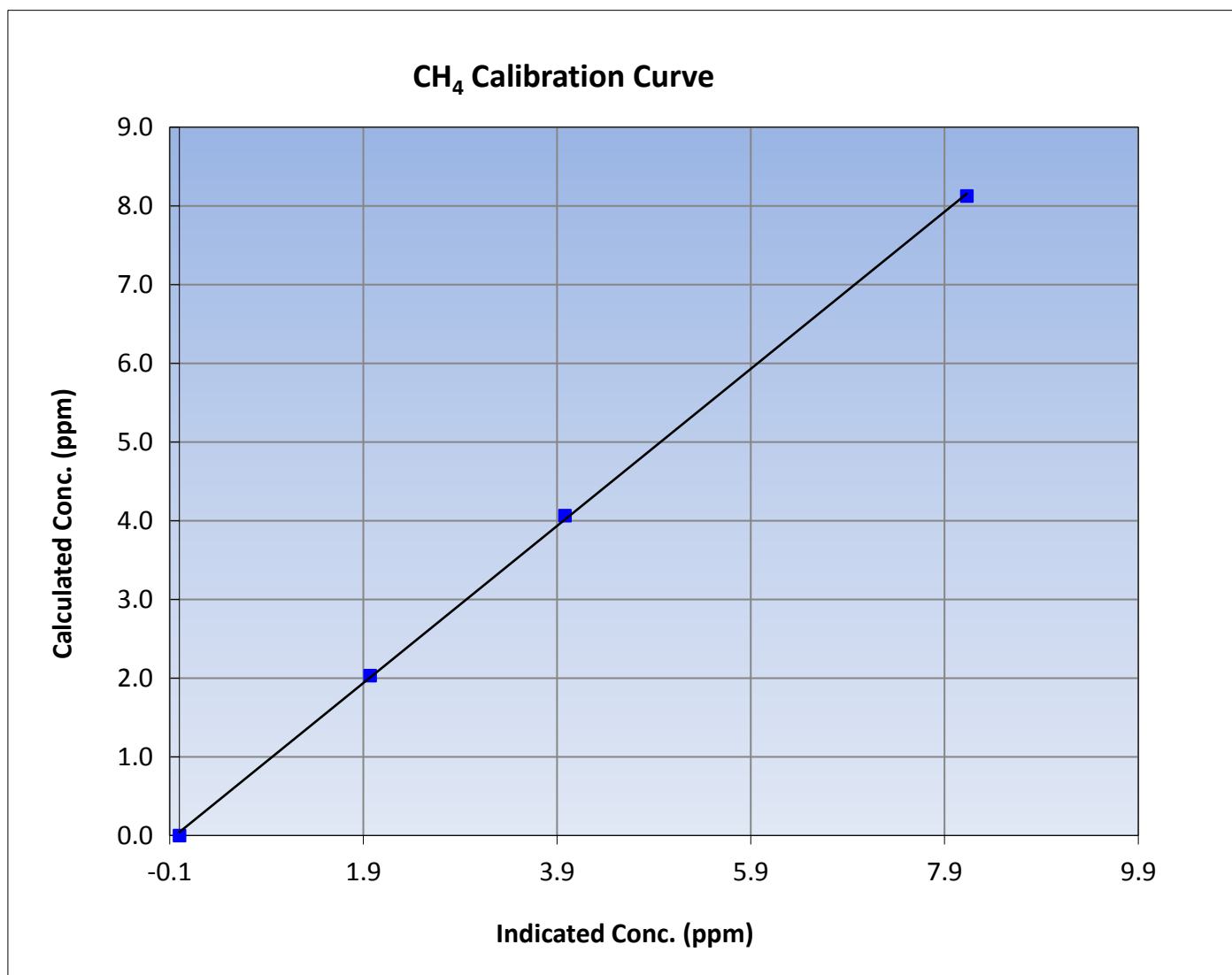
CH₄ Calibration Summary

Station Information

Calibration Date	January 5, 2017	Previous Calibration	December 3, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	10:30	End Time (MST)	15:42
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	0.999845
8.13	8.13	0.9995		
4.06	3.98	1.0208	Slope	0.997905
2.03	1.97	1.0312		
			Intercept	0.042463





Wood Buffalo Environmental Association

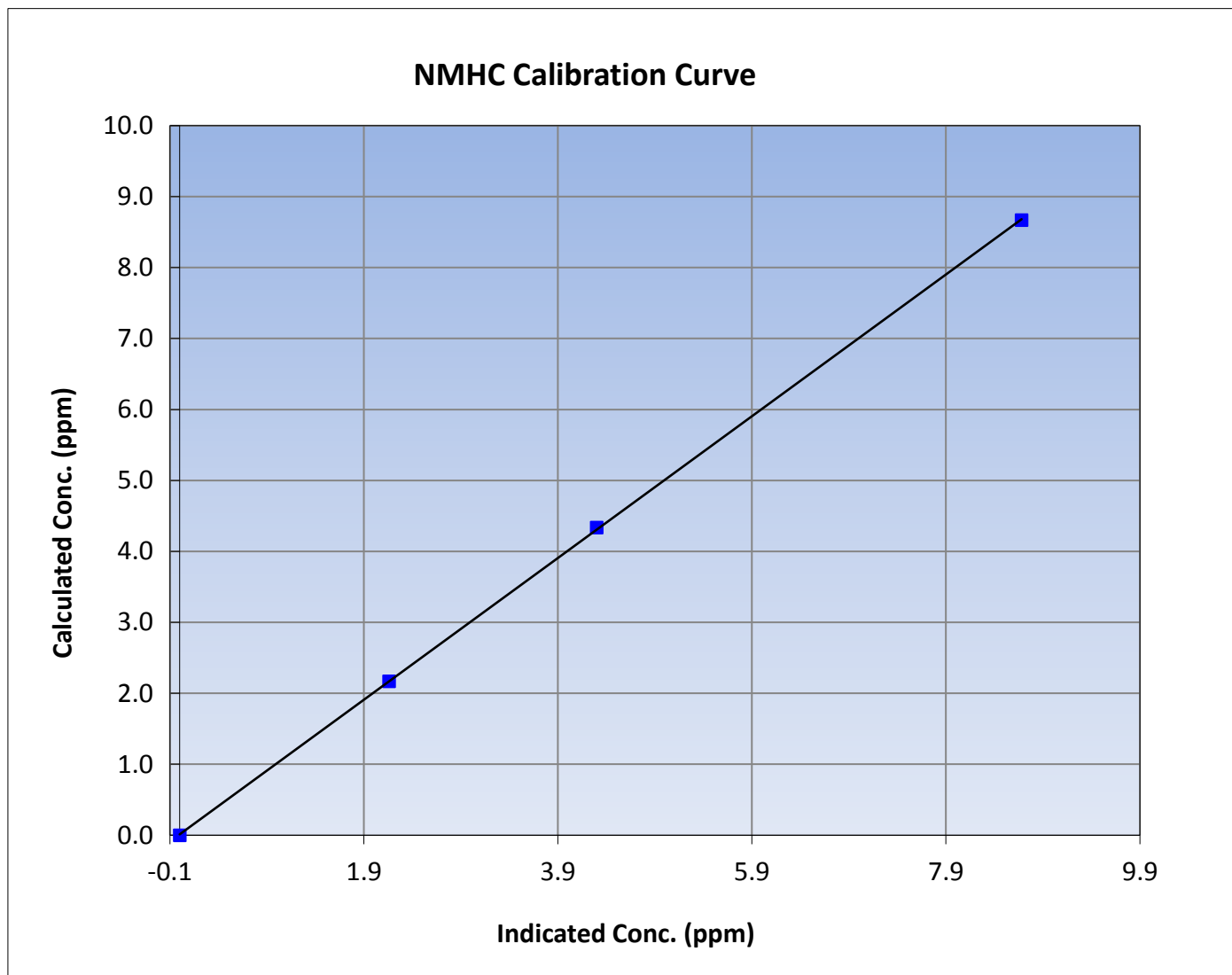
NMHC Calibration Summary

Station Information

Calibration Date	January 5, 2017	Previous Calibration	December 3, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	10:30	End Time (MST)	15:42
Analyzer make	Thermo 55i	Analyzer serial #	1218153355

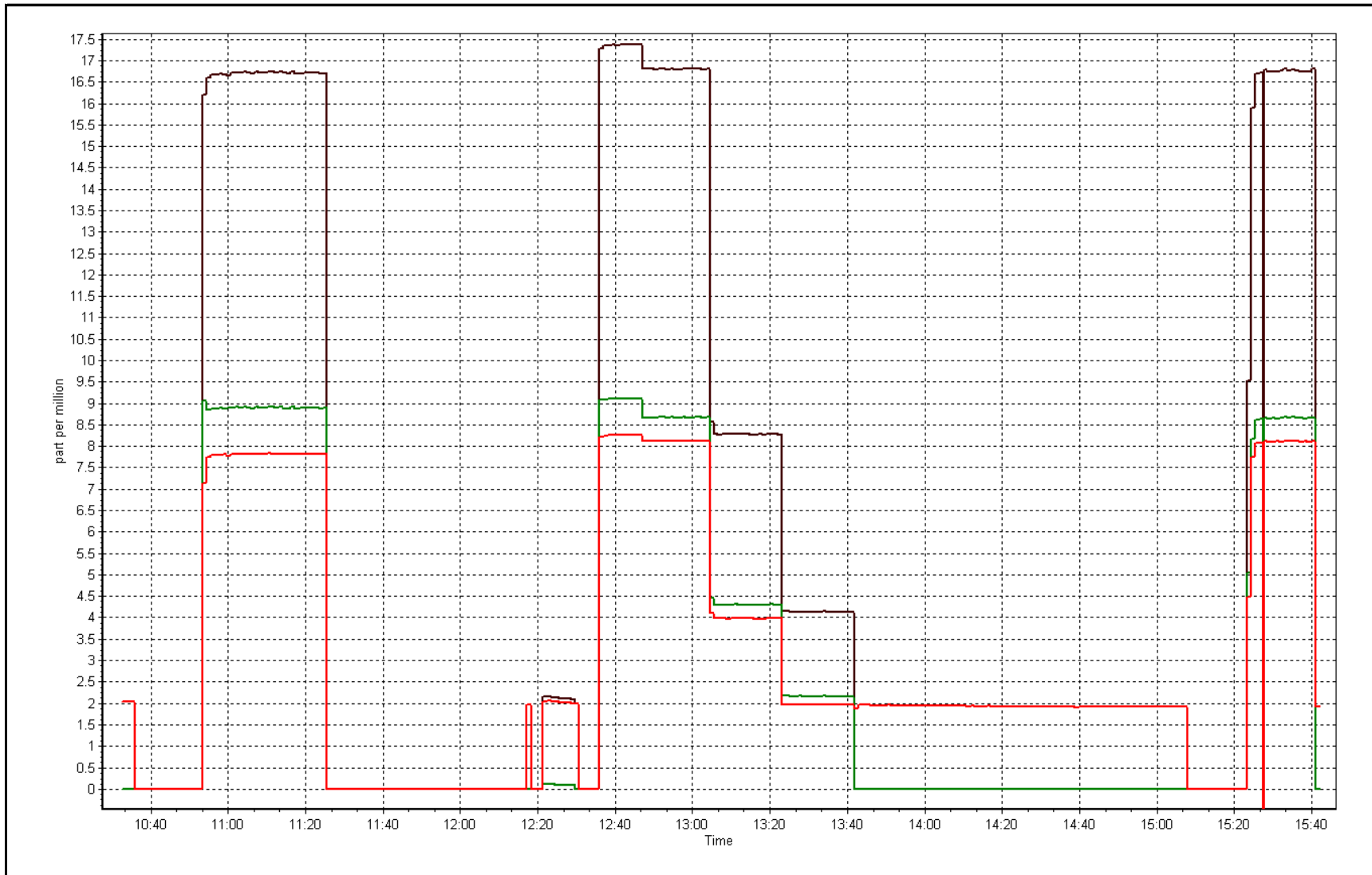
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999974
8.67	8.68	0.9987		
4.33	4.30	1.0080	Slope	0.998774
2.17	2.16	1.0033		
			Intercept	0.012084



THC Calibration Plot

Date: January 5, 2017





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	January 6, 2017	Previous Calibration	December 14, 2016
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	12:28	End Time (MST)	14:53
NO2 GPT Ref date		Transfer Standard	Calibrator photometer
Calibrator Make/Model	API T700	Station temp.	23 Deg C
ZAG make/model	Teledyne API 701	Serial Number	2659
DACS make/model	Campbell Scientific CR3000	Serial Number	4764
		Serial Number	2582

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	25.7	27.4
Analyzer IP address	192.168.1.48		Lamp temp.	53.8	53.8
Calculated slope	0.998983	0.999735	Pressure	667.1	668.8
Calculated intercept	-1.400966	-1.679734	Flow cell A	0.712	0.713
Analyzer Background	-1.7	-1.8	Flow cell B	0.720	0.723
Analyzer Coefficient	0.990	1.017	Cell A Intensity	95160	94517
			Cell B Intensity	108176	107160

Analyzer make	Thermo 49i	Analyzer serial #	1426262595
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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	800.00	0.0	0.6	----
as found span	5000	901.50	300.0	293.0	1.024
calibrator zero	5000	800.00	0.0	0.6	----
high point	5000	902.10	300.0	300.9	0.997
second point	5000	808.20	200.0	202.3	0.989
third point	5000	698.00	100.0	103.1	0.970
as left zero	5000	800.00	0.0	1.7	----
as left span	5000	901.70	300.0	300.2	0.999
Average Correction Factor					0.985

Corrected As found	292.4	Previous response	301.7	% change	3.2%
--------------------	-------	-------------------	-------	----------	------

Notes:

Sample inlet filter replaced after as founds. Sample pump replaced for preventative maintenance. Sample flow, pressure and zero/span response were very similar to what they were prior to changing out the pump. Adjusted span.

Calibration Performed By: Asad Hidayat



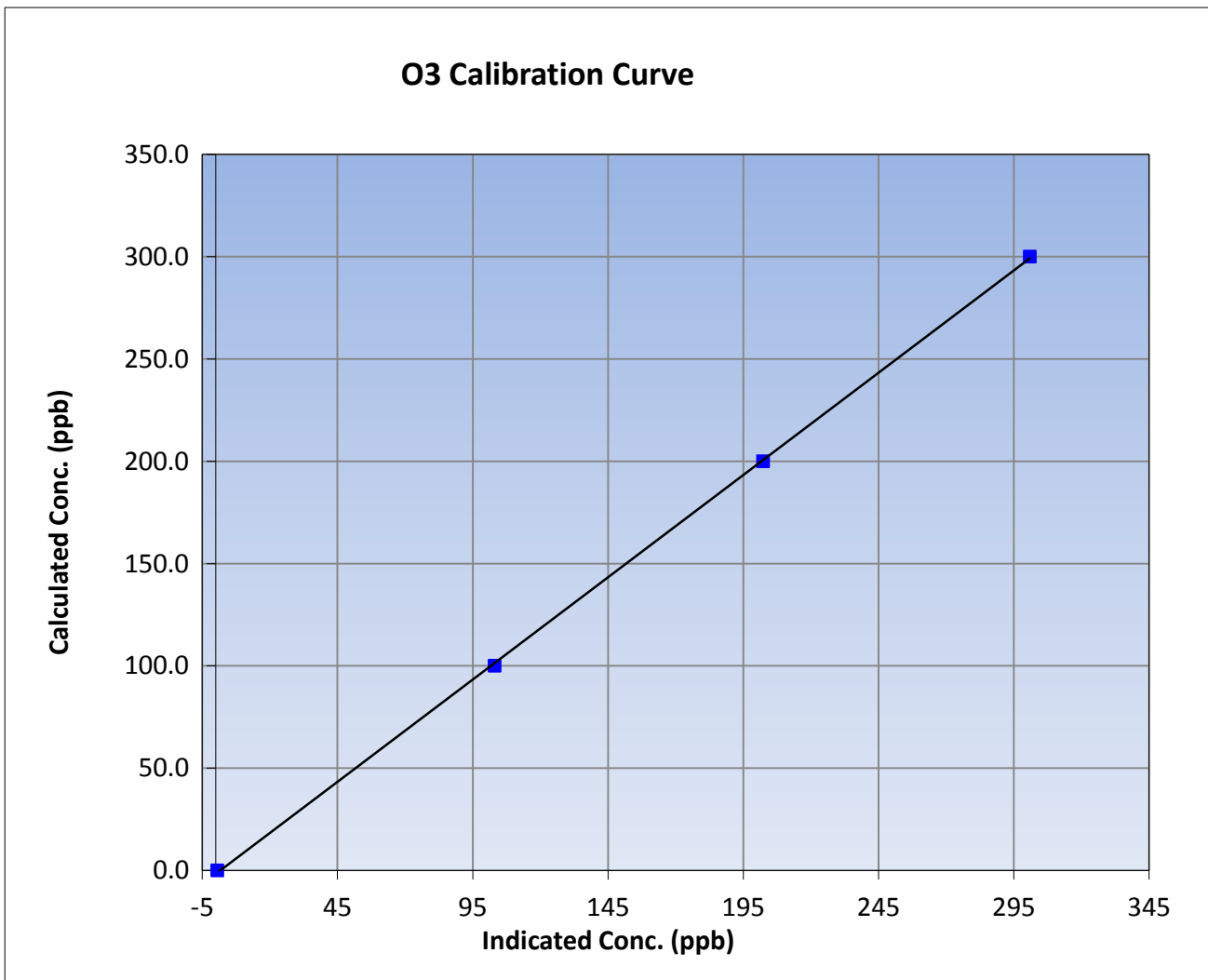
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	January 6, 2017	Previous Calibration	December 14, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	12:28	End Time (MST)	14:53
Analyzer make	Thermo 49i	Analyzer serial #	1426262595

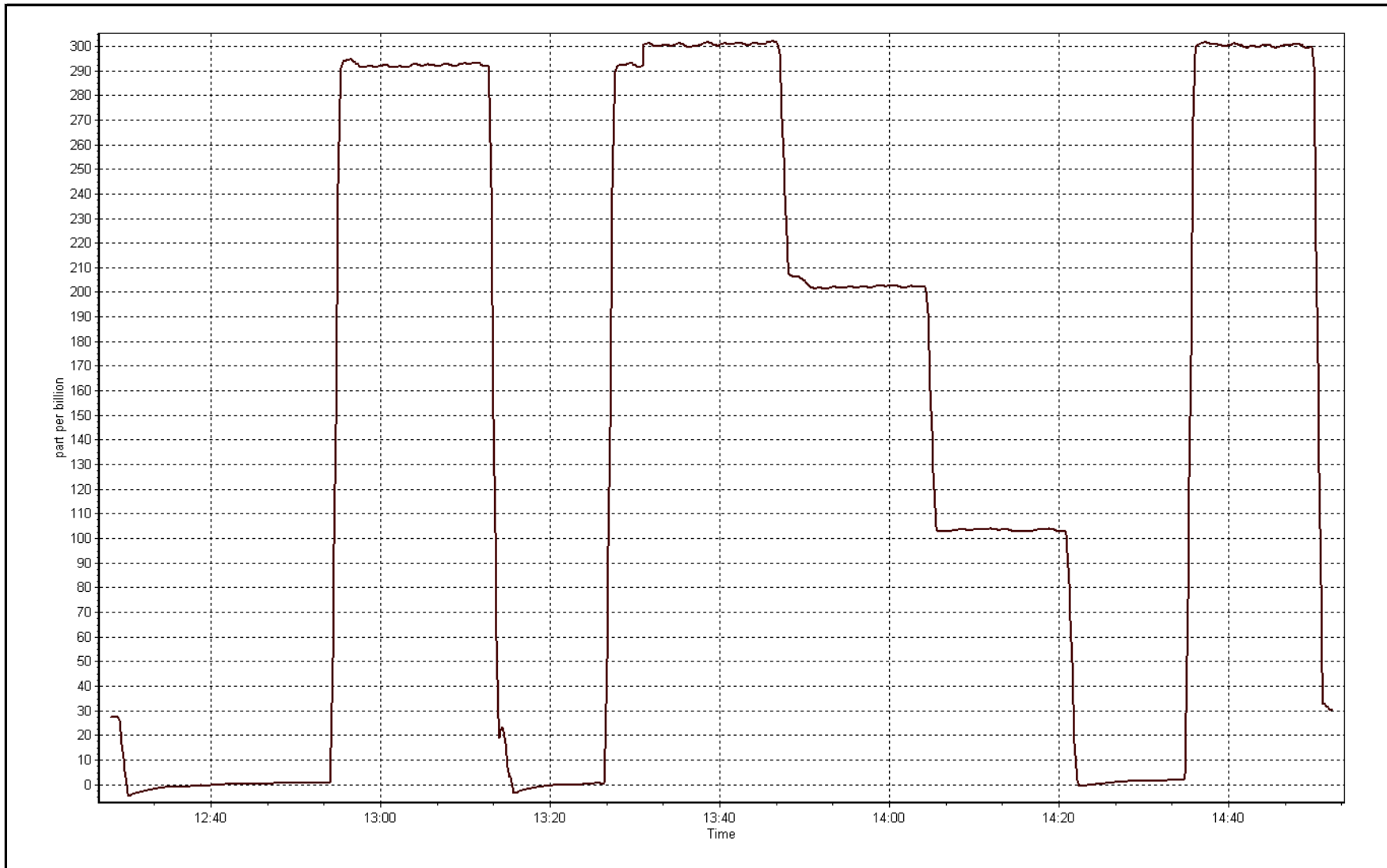
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.6	----	Correlation Coefficient	0.999915
300.0	300.9	0.9970		
200.0	202.3	0.9885	Slope	0.999735
100.0	103.1	0.9699		
			Intercept	-1.679734



O3 Calibration Plot

Date: January 6, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 5, 2017	Previous Calibration	December 1, 2016
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	10:32	End Time (MST)	
NO Cal Gas Conc	53.4 ppm	Gas Cert Reference	SA130026A
NOX Cal Gas Conc	53.4 ppm	Cal Gas Expiry Date	December 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.	2582
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.996542	0.996205	1.002433
	Data Offset	0.756785	0.760487	-0.182479
Current Calibration	Data Slope	0.984604	0.982717	
	Data Offset	-0.049230	-0.088445	

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1426262592
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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	1.084		1.084	
NOX coefficient	0.999		0.999	
NO2 coefficient	1.000		1.000	
NO bkgrnd	4.0		4.1	
NOX bkgrnd	4.2		4.2	
Chamber Temp	50.3	Deg C	50.3	Deg C
Moly Temp	325.5	Deg C	322.4	Deg C
PMT voltage	-808.1	V	-808.1	V
PMT Temp	-2.7	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	170.6	mmHg	171.9	mmHg
R Cell Press Nox	170.6	mmHg	171.9	mmHg
NO sample flow	0.736	lpm	0.742	lpm
Nox sample Flow	0.738	lpm	0.742	lpm

Notes:

No adjustments. Replacing mix cal gas cylinder.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

January 5, 2017

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	0.1	0.1	0.0	----	----
as found span	5000	74.9	799.9	799.9	0.0	812.5	814.1	-1.6	0.9845	0.9826
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0	----	----
high point	5000	74.9	799.9	799.9	0.0	812.5	814.1	-1.6	0.9845	0.9826
second point										
third point										
as left zero										
as left span										
									0.9845	0.9826

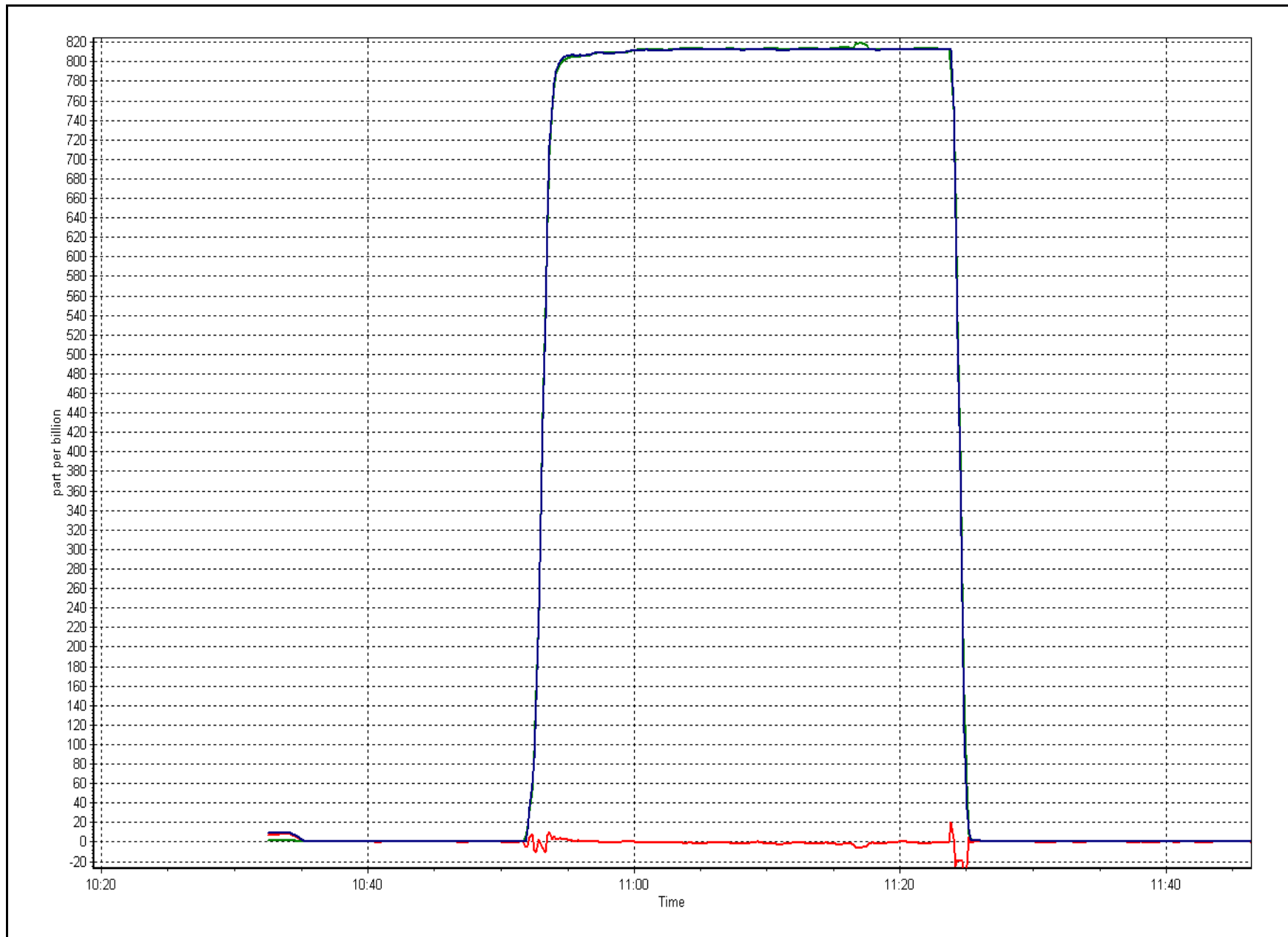
Corrced As found NO_x= 812.4 NO= 814.0 Percent Change NO_x= -1.3% NO= -1.4%
 Previous Response NO_x= 802.0 NO= 802.2

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 74.90 ccm NOx ref calc conc = 799.9 ppb NO ref calc conc = 799.9 ppb

O3 Setpoint (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
1st NO ref point		0.0			0.0			----	
1st NO2 (300)									
2nd NO2 (200)									
3rd NO2 (100)									
2nd NO ref point		0.0							
						Average Correction Factor			

Calibration Performed By: Asad Hidayat





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 5, 2017	Previous Calibration	December 1, 2016
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	10:32	End Time (MST)	15:42
NO Cal Gas Conc	50.5 ppm	Gas Cert Reference	EY0000647
NOX Cal Gas Conc	50.5 ppm	Cal Gas Expiry Date	November 4, 2019
Calibrator	Teledyne API T700	Serial Number	2659
Zero air Generator	Teledyne API T701	Serial Number	4764

DACS Information

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

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope			
	Data Offset			
Current Calibration	Data Slope	1.001275	1.001915	0.999745
	Data Offset	1.416241	1.361116	-0.247898

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1426262592
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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	1.084		1.048	
NOX coefficient	0.999		1.002	
NO2 coefficient	1.000		1.000	
NO bkgnd	4.0		3.9	
NOX bkgnd	4.2		4.1	
Chamber Temp	50.3	Deg C	50.1	Deg C
Moly Temp	325.5	Deg C	327.1	Deg C
PMT voltage	-808.1	V	-808.1	V
PMT Temp	-2.7	Deg C	-3.1	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	170.6	mmHg	171.2	mmHg
R Cell Press Nox	170.6	mmHg	171.2	mmHg
NO sample flow	0.736	lpm	0.776	lpm
Nox sample Flow	0.738	lpm	0.774	lpm

Notes:

Mix cal gas cylinder replaced after as founds. Sample inlet filter replaced after as founds. Adjusted span.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

January 5, 2017

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										
as found span										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0	----	----
high point	5000	79.2	799.9	799.9	0.0	798.5	798.1	0.4	1.0018	1.0023
second point	5000	39.6	400.0	400.0	0.0	396.5	396.2	0.3	1.0088	1.0095
third point	5000	19.8	200.0	200.0	0.0	197.4	197.4	0.0	1.0130	1.0130
as left zero	5000	0.0	0.0	0.0	0.0	0.2	0.3	0.0	----	----
as left span	5000	79.2	799.9	503.3	296.7	807.8	512.0	295.8	0.9902	0.9829
									1.0079	1.0083

Corrected As found
Previous Response

NO_x= NA
NO_x= NA

NO= NA
NO= NA

Percent Change

NO_x= N/A

NO= N/A

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 79.20 ccm NOx ref calc conc = 799.9 ppb NO ref calc conc = 799.9 ppb

O3 Setpoint (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
1st NO ref point		0.0	794.8	792.9	0.0	1.0065	1.0089	----	----
1st NO2 (300)	503.3	289.6	793.2	503.3	289.9	1.0085	----	0.9990	100.1%
2nd NO2 (200)	597.8	195.0	792.9	597.8	195.1	1.0088	----	0.9997	100.0%
3rd NO2 (100)	695.8	97.1	793.7	695.8	98.0	1.0078	----	0.9915	100.9%
2nd NO ref point		0.0	793.1	791.0	2.1	1.0086	1.0113	----	----
Average Correction Factor						1.0084		0.9967	100.3%

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

NO_x Calibration Summary

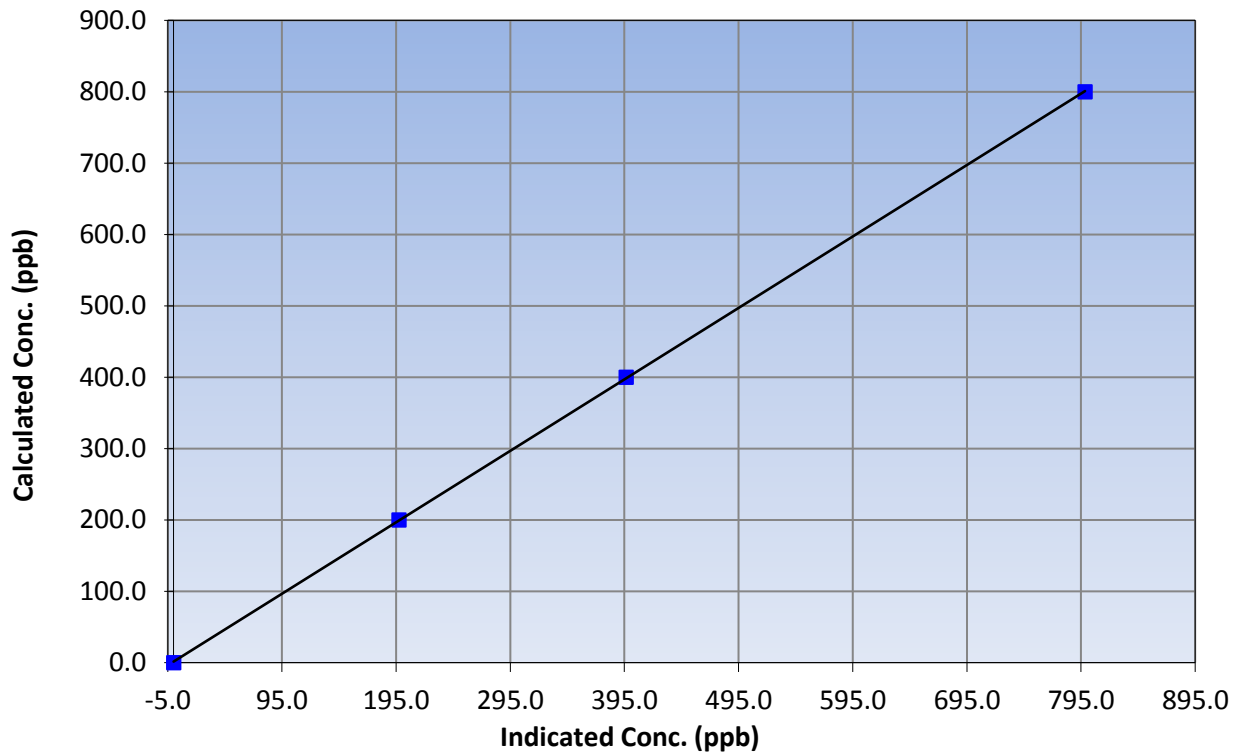
Station Information

Calibration Date	January 5, 2017	Previous Calibration	December 1, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	10:32	End Time (MST)	15:42
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	----	Correlation Coefficient	0.999982
799.9	798.5	1.0018		
400.0	396.5	1.0088	Slope	1.001275
200.0	197.4	1.0130		
			Intercept	1.416241

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

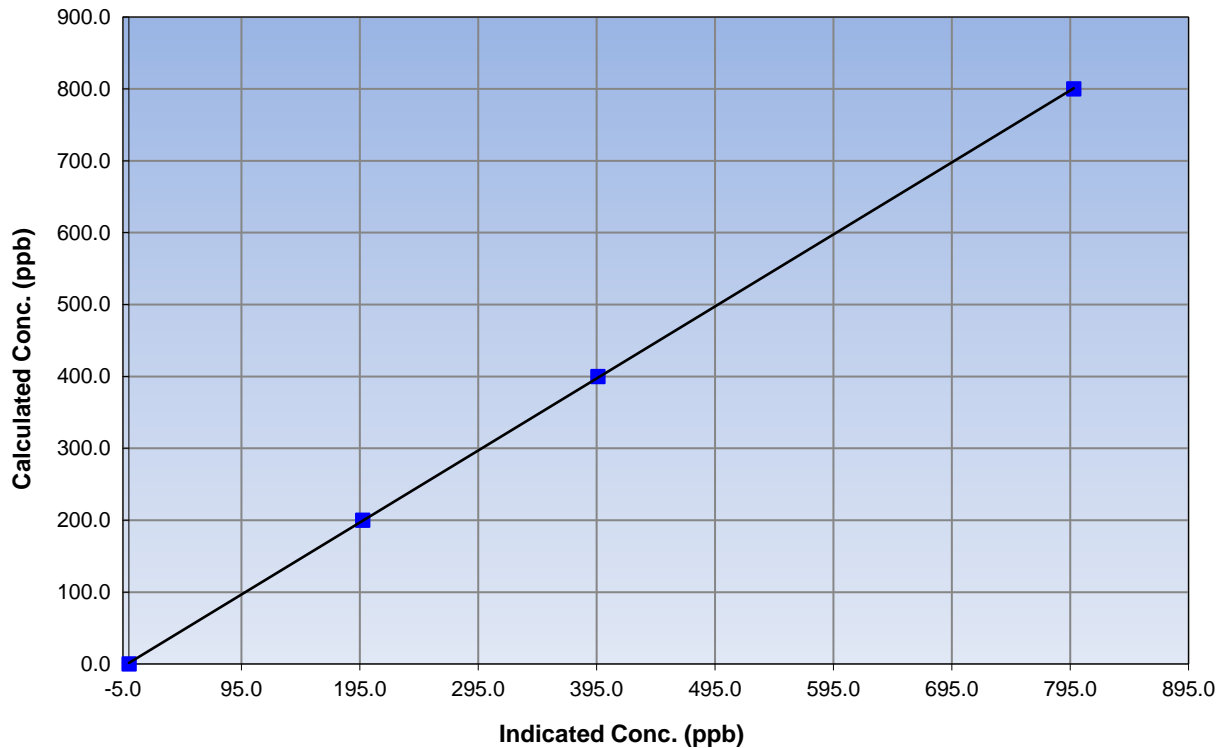
Station Information

Calibration Date	January 5, 2017	Previous Calibration	December 1, 2016
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	10:32	End Time (MST)	15:42
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	0.999981
799.9	798.1	1.0023		
400.0	396.2	1.0095	Slope	1.001915
200.0	197.4	1.0130		
			Intercept	1.361116

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

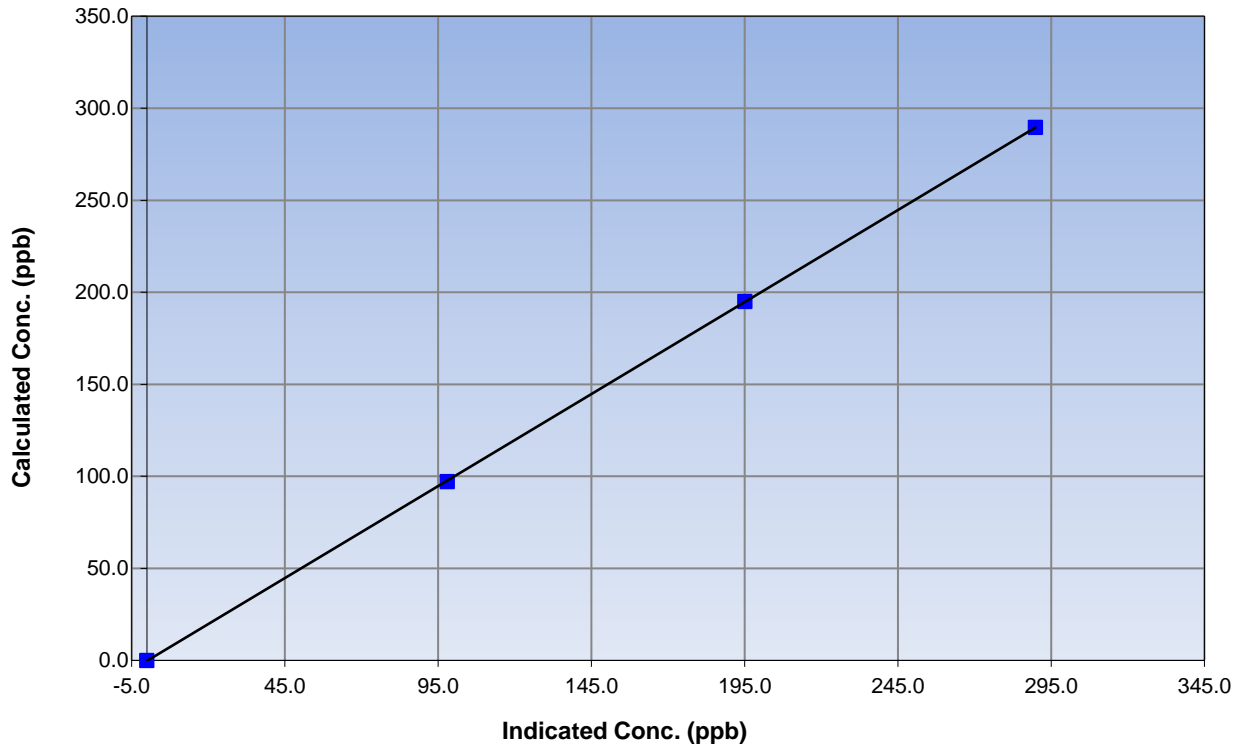
Station Information

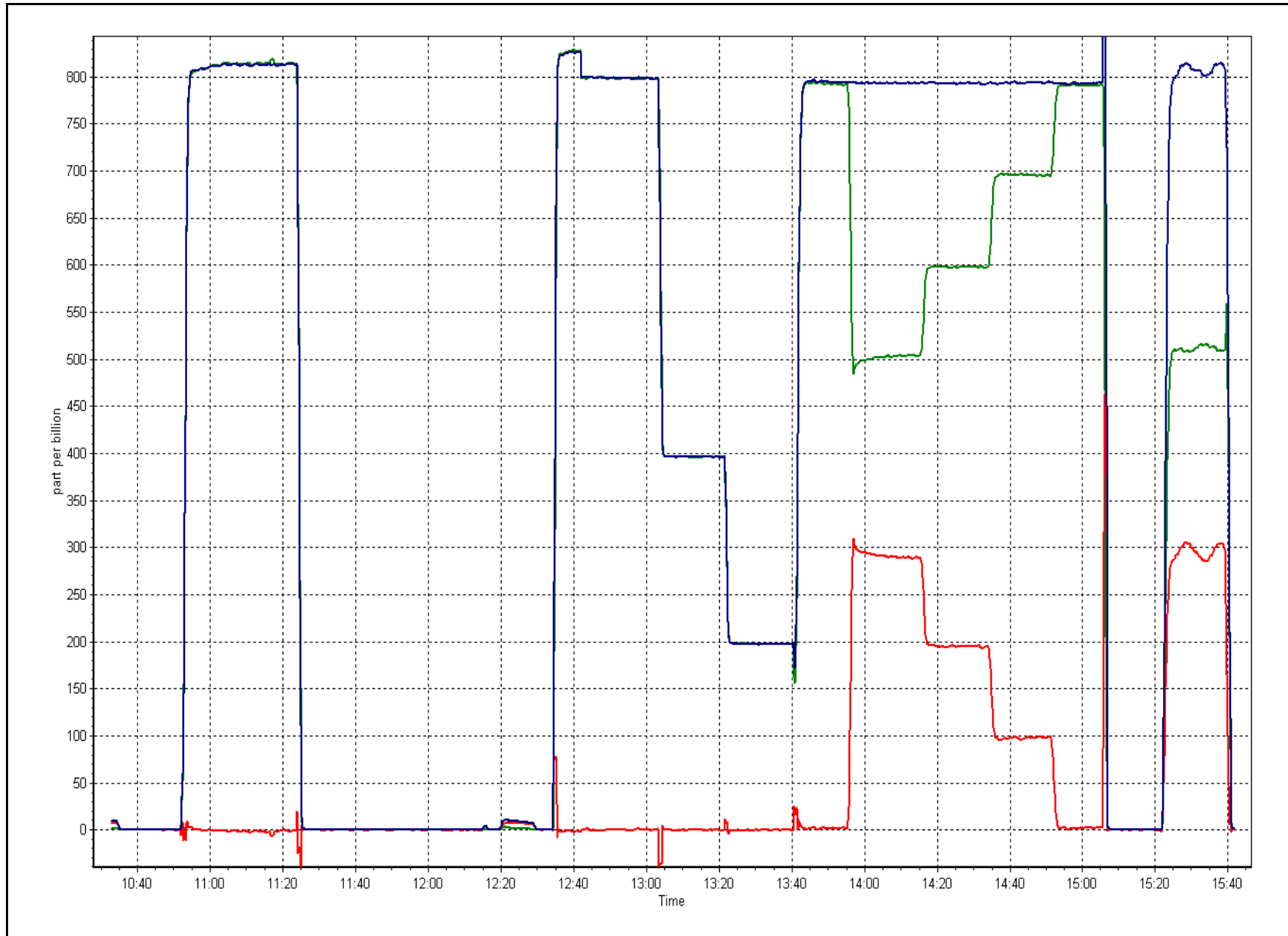
Calibration Date	January 5, 2017	Previous Calibration	December 1, 2016
Station Number	Anzac	Station Number	AMS 14
Start Time (MST)	10:32	End Time (MST)	15:42
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999990
289.6	289.9	0.9990		
195.0	195.1	0.9997	Slope	0.999745
97.1	98.0	0.9915		
			Intercept	-0.247898

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-08-2016

Station Information

Station Name:	Anzac	Station number:	AMS 14
Calibration Date:	January 13, 2017	Last Cal Date:	December 14, 2016
Start time (MST):	11:00	End time (MST):	12:00
Sharp Model:	5030	S/N:	E1093
Particulate Fraction:	PM2.5	C14 Source S/N:	4933
Flow Standard Model:	Delta Cal	S/N:	1019
Temp/RH standard:	Delta Cal	S/N:	1019

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	Tolerance
T1 (°C)	-10	-10.5	-10	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	954	951	954	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	999	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	0.5	-----	0.5	<input type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified <input checked="" type="checkbox"/>				
Cyclone cleaning :	PM10 Cyclone <input checked="" type="checkbox"/>		PM2.5 Cyclone <input checked="" type="checkbox"/>		
Filter Tape Installed:	<input type="checkbox"/>				

Quarterly Calibration Test

Leak Test:	Date of check:	January 13, 2017	Last Cal Date:	September 22, 2016	Tolerance
	Flow w/o adaptor:	<u>16.63</u>	Flow w/ adaptor:	<u>16.51</u>	0.4 LPM

Annual Calibration Test

Foil Calibration	Foil Mass: <u>1337</u>	S/N: <u>5872</u>
	Date of check: <u>June 15, 2016</u>	Last Cal Date: <u>March 16, 2016</u>
	New Correction Factor: <u>7212</u>	Previous Correction Factor: <u>7124</u>

Parameter	As found	Measured	As left	Adjusted	Tolerance
T2 (°C)	18		18	<input type="checkbox"/>	+/- 2 °C
T3 (°C)	21		21	<input type="checkbox"/>	+/- 2 °C
T4 (°C)	19		19	<input type="checkbox"/>	+/- 2 °C
RH (%)	9		9	<input type="checkbox"/>	+/- 10%

Notes: Cyclone head cleaned. No adjustment made. Quarterly leak check completed; passed.

Calibration by: Asad Hidayat



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 15
CNRL HORIZON
JANUARY 2017**

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

February 27, 2017



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
 JANUARY 2017

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	707	36	37	99.87	513	2	38	0
TRS (ppb) Average	704	40	40	100.00	9	0	2	0
THC (ppm) Average	708	36	36	100.00	8.1	-	3.7	-
NO2 (ppb) Average	708	36	36	100.00	36	0	16	-
NO (ppb) Average	708	36	36	100.00	152	-	35	-
NOX (ppb) Average	708	36	36	100.00	180	-	51	-
PM2.5 (ug/m3) Average	743	1	1	100.00	40.2	-	14.6	0
Temperature 2 m (C) Average	744	0	0	100.00	6.8	-	1.2	-
Wind Speed 10 m (km/h) Average	735	0	9	98.79	38	-	16	-
Wind Direction 10 m (deg) Average	735	0	9	98.79	-	-	-	-
Precipitation (mm) Total	744	0	0	100.00	0.3	-	0.3	-
Relative Humidity (%) Average	744	0	0	100.00	98	-	95	-
Global Solar Radiation (W/m2) Average	744	0	0	100.00	316	-	59	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
 JANUARY 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	707	1.8	21	-	0	0	0	0	1	1	513
TRS (ppb) Average	704	0.4	1	-	0	0	0	0	0	1	9
THC (ppm) Average	708	2.3	0.5	-	2	2.1	2.1	2.1	2.3	2.7	8.1
NO2 (ppb) Average	708	6.1	9	-	0	0	1	2	9	21	36
NO (ppb) Average	708	3.5	12	-	0	0	0	0	1	8	152
NOX (ppb) Average	708	9.6	19	-	0	0	1	2	10	26	180
PM2.5 (ug/m3) Average	743	5.56	5.1	-	0.9	1.9	2.2	3.5	7	12.5	40.2
Temperature 2 m (C) Average	744	-12.92	10	-	-37.1	-25.9	-20.6	-13.3	-3.7	0.2	6.8
Wind Speed 10 m (km/h) Average	735	9.5	5	-	0	4	6	9	12	16	38
Wind Direction 10 m (deg) Average	735	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	744	-	-	0.51	-	-	-	-	-	-	-
Relative Humidity (%) Average	744	80.5	9	-	55	70	75	81	86	93	98
Global Solar Radiation (W/m2) Average	744	25.9	54	-	0	0	0	0	23	98	316

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
JANUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	01 Jan 2017 17:00	01 Jan 2017 17:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	04 Jan 2017 07:00	04 Jan 2017 07:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	04 Jan 2017 23:00	04 Jan 2017 23:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	07 Jan 2017 06:00	07 Jan 2017 09:00	4	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	13 Jan 2017 07:00	13 Jan 2017 07:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	19 Jan 2017 23:00	19 Jan 2017 23:00	1	Flat line in sensor output signal -sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

CNRL Horizon - January 2017

Number of Exceedences (AAAQO): 1-hr: 2 24-hr: 0	Hours in Service: 744
Maximum Value: 513 ppb on Jan 12 17:00	Maximum Daily Average: 38.2 ppb on Jan 12
Minimum Value: 0 ppb on Jan 17 22:00	Hours of Data: 707
Maximum Diurnal Average: 17.4 ppb at hour 17	Hours of Missing Data: 37
Monthly Average: 1.8 ppb	Hours of Calibration: 36
Minimum Daily Average: 0.2 ppb on Jan 3	Percent Operational Time: 99.9
Minimum Diurnal Average: 0.5 ppb at hour 10	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P 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-Jan	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
2-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0.4	1
3-Jan	0	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
4-Jan	0	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	2	0	0.4	2
5-Jan	1	0	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0	0.5	1
6-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	2	0.6	2
7-Jan	2	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
8-Jan	0	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
9-Jan	0	0	0	Z	0	0	0	0	0	0	0	1	1	2	2	1	1	1	1	1	0	0	0	0	0.6	2
10-Jan	0	1	1	0	Z	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0.5	2
11-Jan	0	0	0	0	0	Z	0	0	0	2	2	0	0	1	3	2	0	0	2	1	0	0	0	0	0.8	3
12-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	149	513	177	29	2	2	1	1	1	1	38.2	513
13-Jan	1	Z	1	1	1	1	2	2	1	1	1	1	0	1	2	2	2	2	2	1	1	1	1	1	1.1	2
14-Jan	1	0	Z	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0.5	1
15-Jan	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1
16-Jan	1	1	1	AF	Z	2	2	2	2	2	C	C	C	C	C	1	1	1	1	1	1	1	1	1	--	2
17-Jan	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	0.5	1
18-Jan	Z	1	1	1	1	1	0	1	1	1	2	2	2	2	3	2	1	1	1	0	0	0	1	1	1.0	3
19-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0.4	2
20-Jan	2	3	Z	2	2	2	2	1	1	1	1	1	0	1	0	0	0	0	0	1	1	1	0	0	0.9	3
21-Jan	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
22-Jan	0	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
23-Jan	0	0	0	0	0	Z	0	0	1	1	3	10	2	3	1	3	7	4	3	3	3	4	2	2	2.4	10
24-Jan	Z	2	2	2	2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	3
25-Jan	1	Z	1	1	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
26-Jan	0	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
27-Jan	0	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
28-Jan	0	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
29-Jan	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
30-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5	4	0	0	0.7	5
31-Jan	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

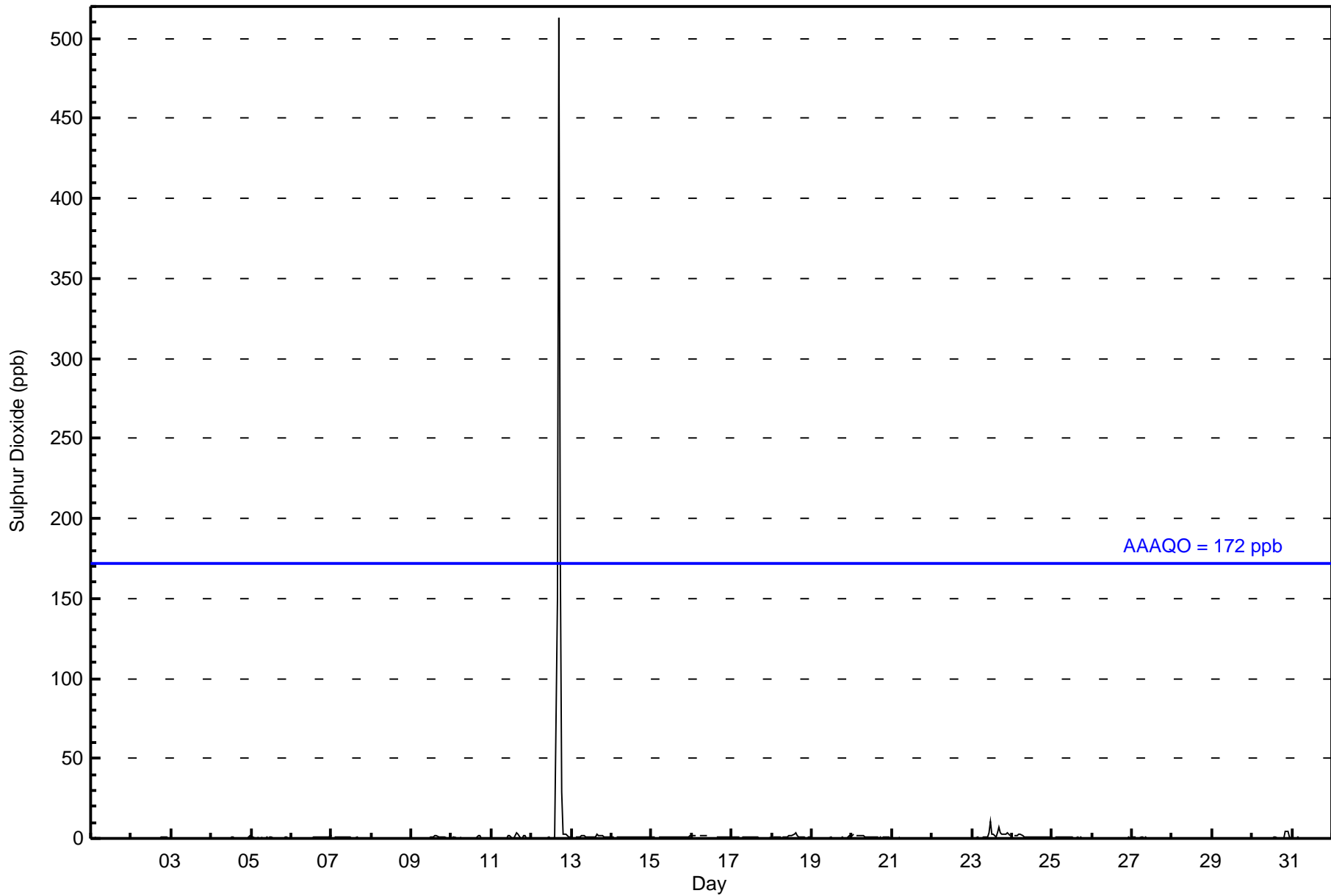
0.5	0.6	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.6	0.9	0.5	0.6	0.7	5.6	17.4	6.3	1.5	0.6	0.8	0.7	0.6	0.6	Diurnal Average
2	3	2	2	2	3	2	2	2	2	3	10	2	3	3	149	513	177	29	3	5	4	2	2	Diurnal Maximum	

Z - zerospan C - Calibration AF - Analyzer Failure
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	703	99.43	99.43
11 - 20	0	0.00	99.43
21 - 60	1	0.14	99.58
61 - 110	0	0.00	99.58
111 - 172	1	0.14	99.72
> 172	2	0.28	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	13	79	53	5	1	4	11	17	98	208	96	61	17	6	8	17	694
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	1	0	0	0	0	1
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
> 172	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
Totals	13	79	53	5	1	4	11	17	99	209	97	62	17	6	8	17	698

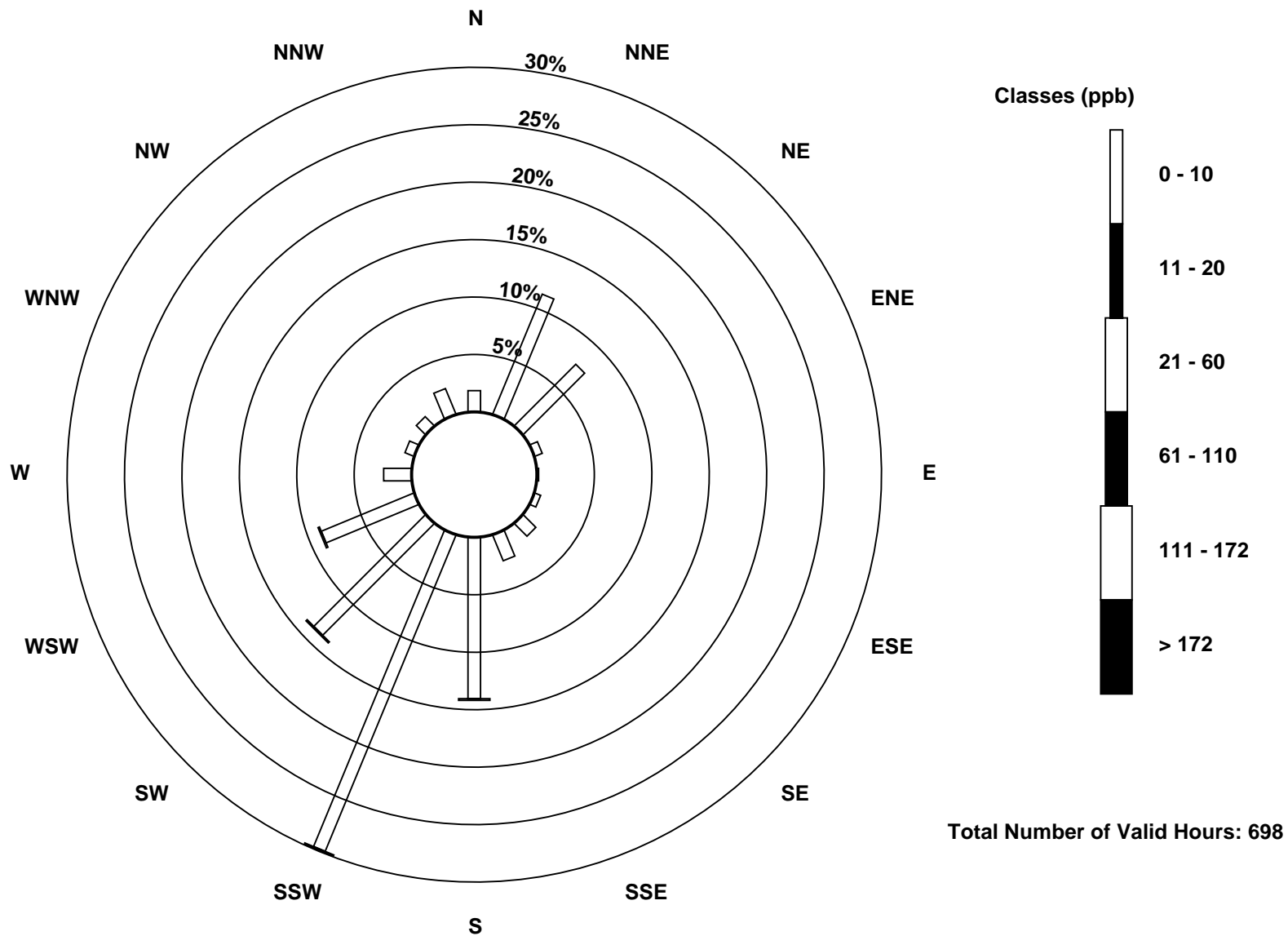
Total Number of Valid Hours: 698

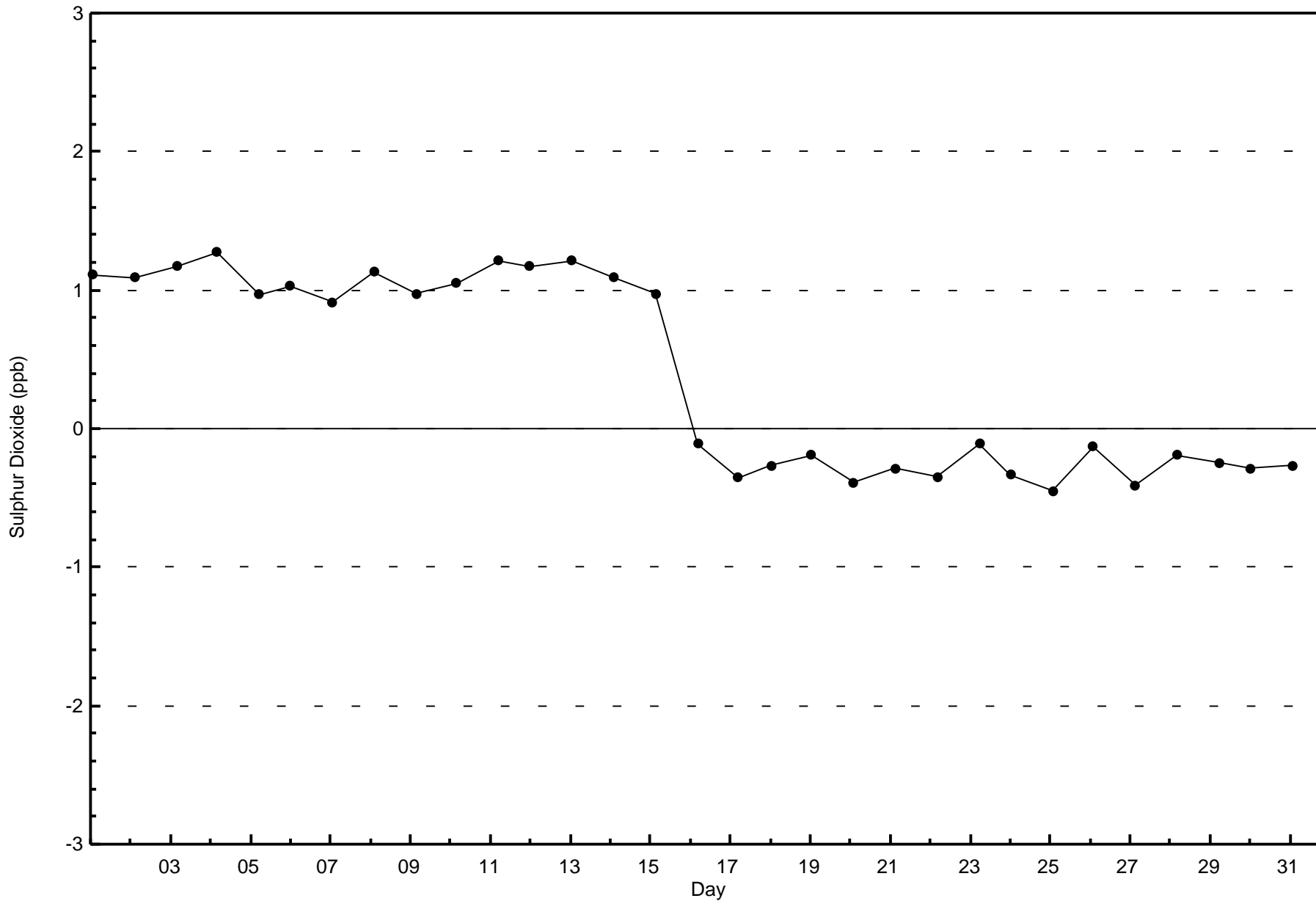
Total Number of Hours: 744

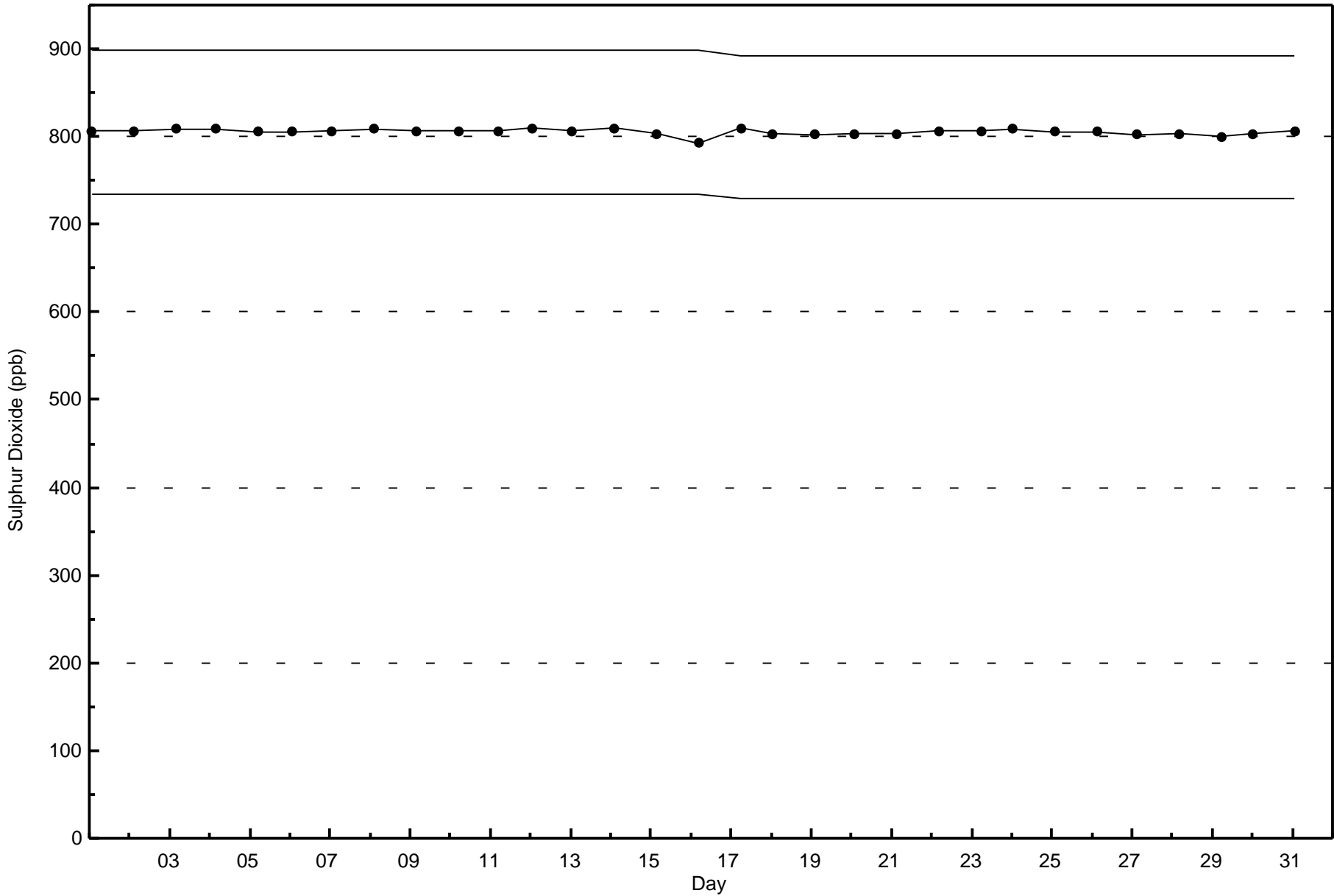


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon (AMS 15)









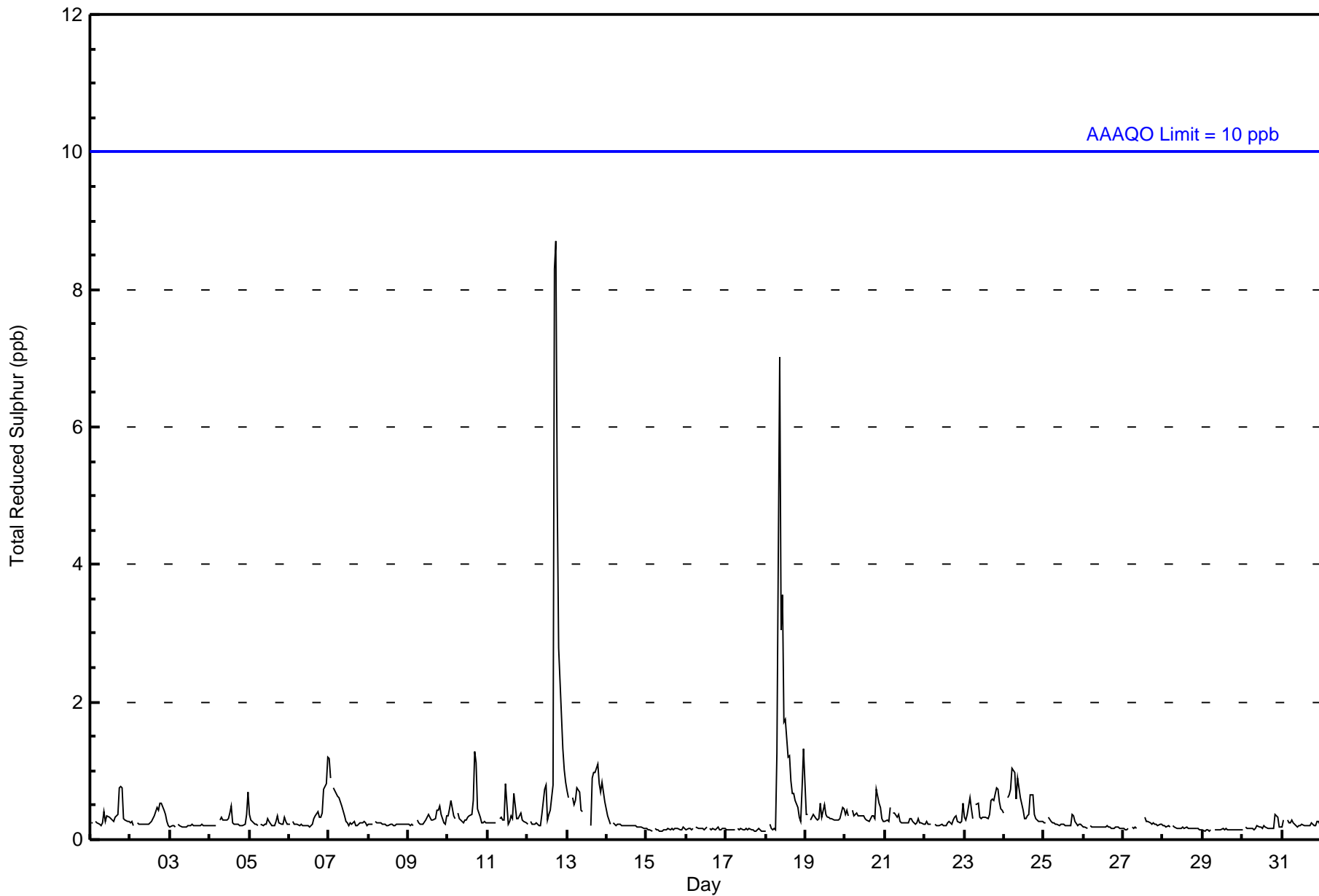
Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

CNRL Horizon - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 ppb on Jan 12 18:00 Maximum Daily Average: 1.5 ppb on Jan 12																	Hours in Service: 744 Hours of Data: 704									
Minimum Value: 0 ppb on Jan 18 01:00 Minimum Daily Average: 0.1 ppb on Jan 29 Maximum Diurnal Average: 0.6 ppb at hour 18 Minimum Diurnal Average: 0.2 ppb at hour 3 Monthly Average: 0.4 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 3																	Hours of Missing Data: 40 Hours of Calibration: 40 Percent Operational Time: 100.0									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0.3	1
2-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.3	1
3-Jan	0	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
4-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1
5-Jan	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
6-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.3	1
7-Jan	1	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
8-Jan	0	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
9-Jan	0	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
10-Jan	0	0	1	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0.4	1
11-Jan	0	0	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0.3	1
12-Jan	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	1	8	9	5	3	2	1	1	1	1.5	9
13-Jan	1	1	Z	1	1	1	1	1	0	0	C	C	C	C	0	1	1	1	1	1	1	1	1	1	0.7	1
14-Jan	0	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
15-Jan	0	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
16-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	C	0	0	0	0	0	0	0	0	0	0	0.2	0
17-Jan	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
18-Jan	0	Z	0	0	0	0	0	1	7	3	4	2	2	1	1	1	1	1	1	0	0	0	1	1	1.2	7
19-Jan	0	0	Z	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
20-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.4	1
21-Jan	0	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
22-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1
23-Jan	0	0	0	1	0	0	Z	1	1	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0.4	1
24-Jan	0	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0.5	1
25-Jan	0	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
26-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
27-Jan	0	0	0	0	Z	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.2	0
28-Jan	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
29-Jan	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
30-Jan	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
31-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
0.3 0.3 0.2 0.3 0.3 0.3 0.3 0.3 0.5 0.4 0.4 0.3 0.3 0.3 0.3 0.3 0.6 0.6 0.5 0.4 0.3 0.3 0.3 0.3																								Diurnal Average		
1 1 1 1 1 1 1 1 7 3 4 2 2 1 1 1 1 8 9 5 3 2 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
CNRL Horizon - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	697	99.01	99.01
3 - 4	3	0.43	99.43
5 - 7	2	0.28	99.72
8 - 11	2	0.28	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
CNRL Horizon - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	12	81	50	5	1	3	12	18	98	213	92	57	15	6	8	17	688
3 - 4	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	3
5 - 7	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2
8 - 11	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	12	82	50	5	1	3	12	18	98	214	94	58	16	6	8	18	695

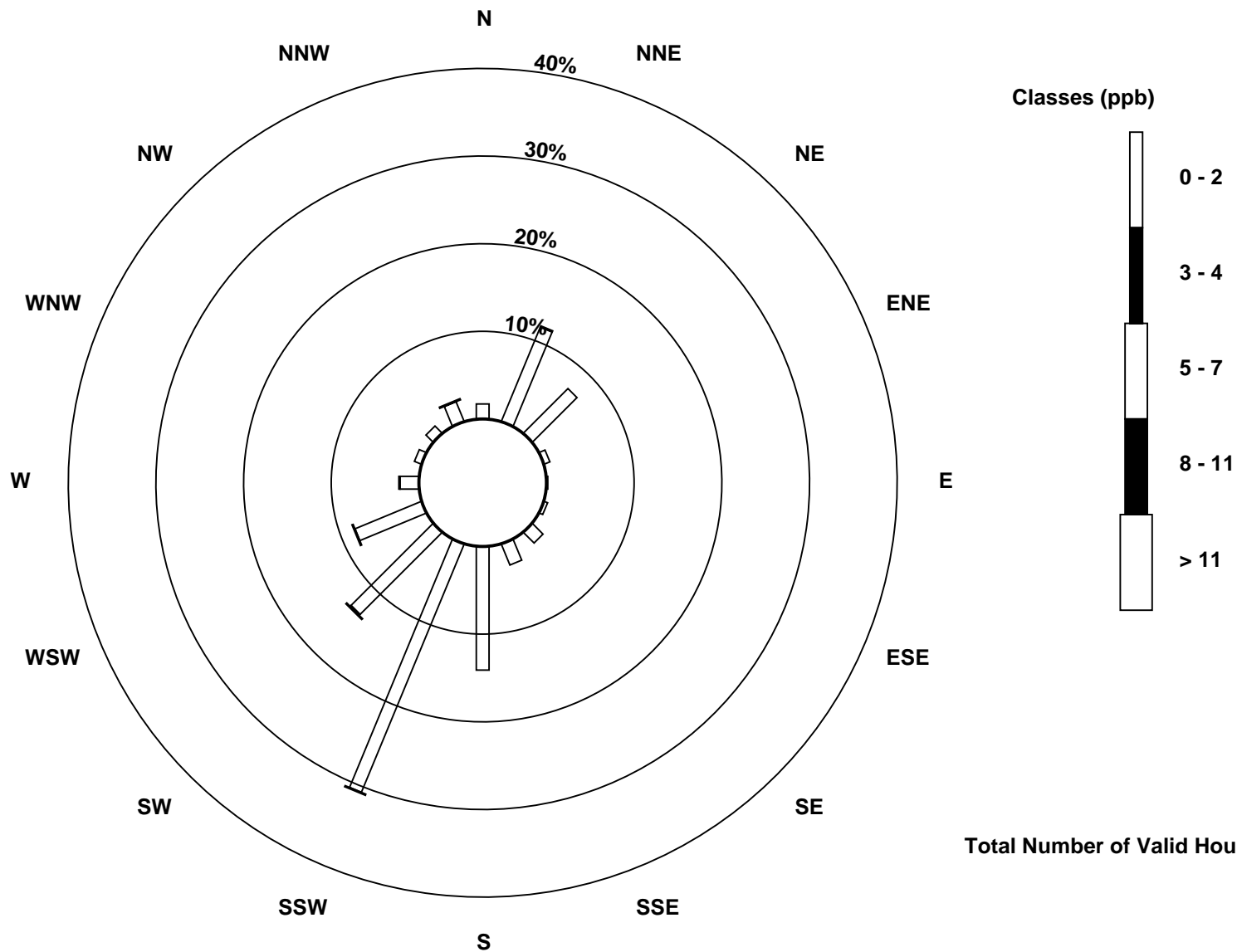
Total Number of Valid Hours: 695

Total Number of Hours: 744

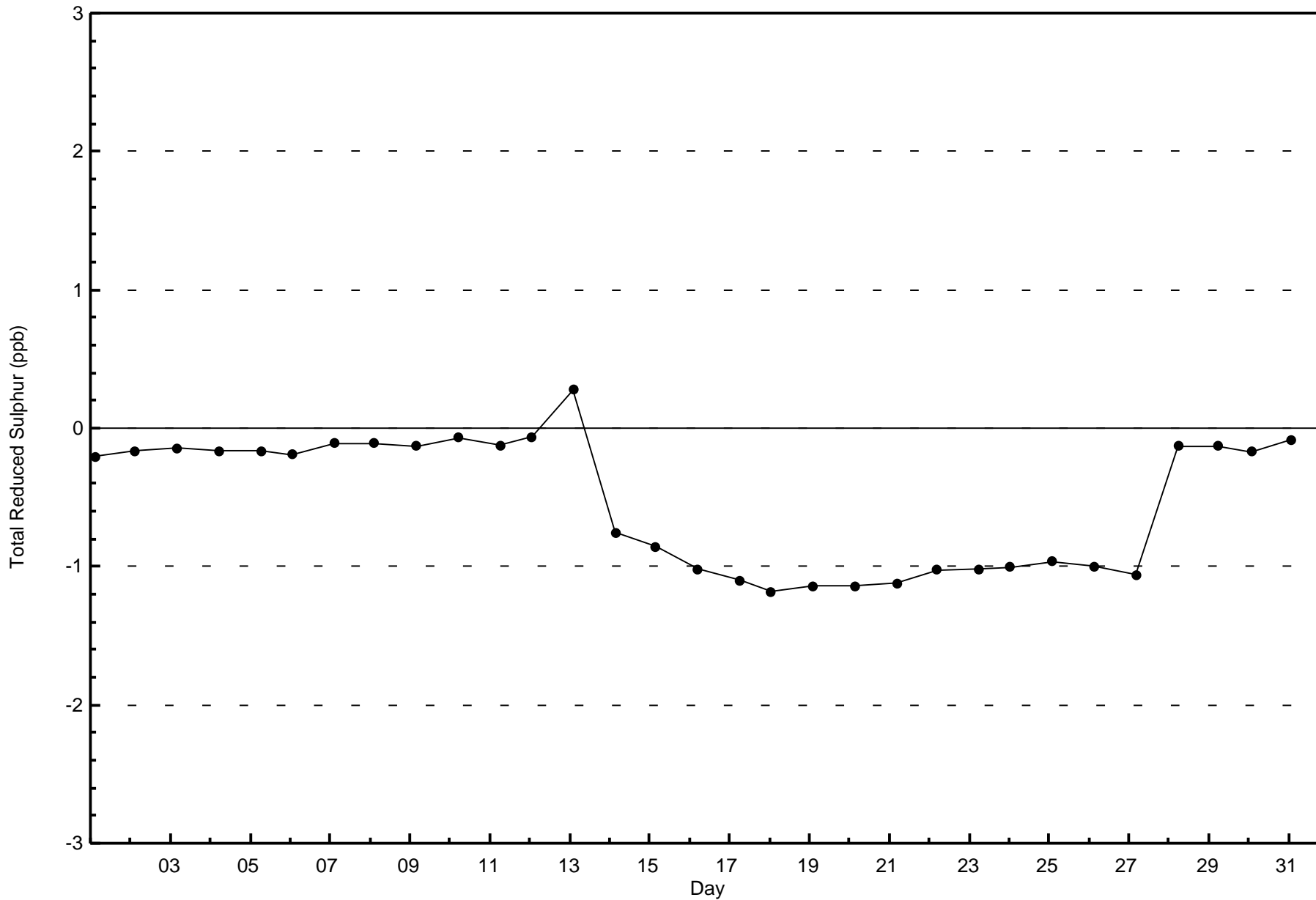


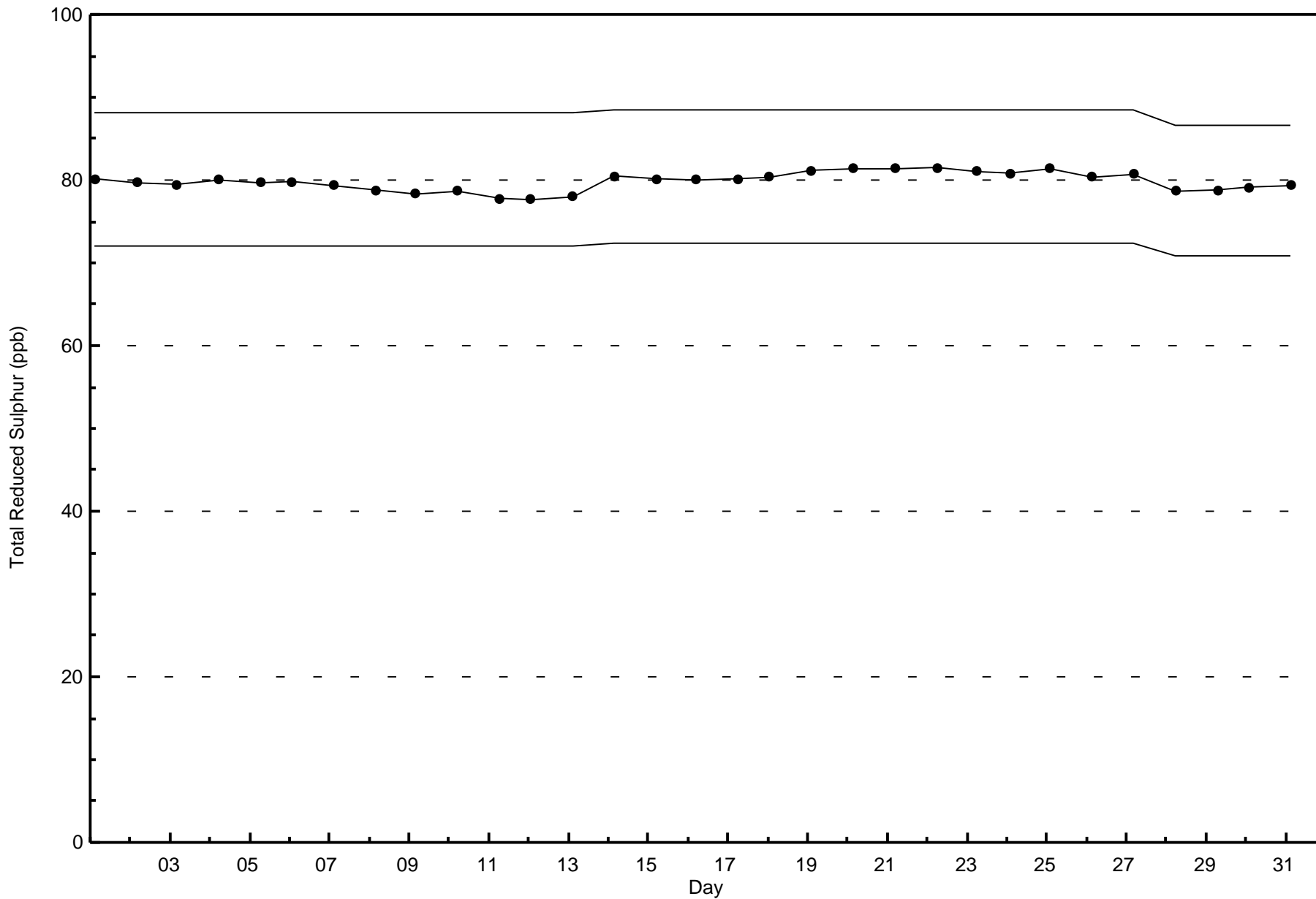
Wood Buffalo Environmental Association
Wind Rose Jan 2017

Total Reduced Sulphur (TRS) - ppb
CNRL Horizon (AMS 15)



Total Number of Valid Hours: 695



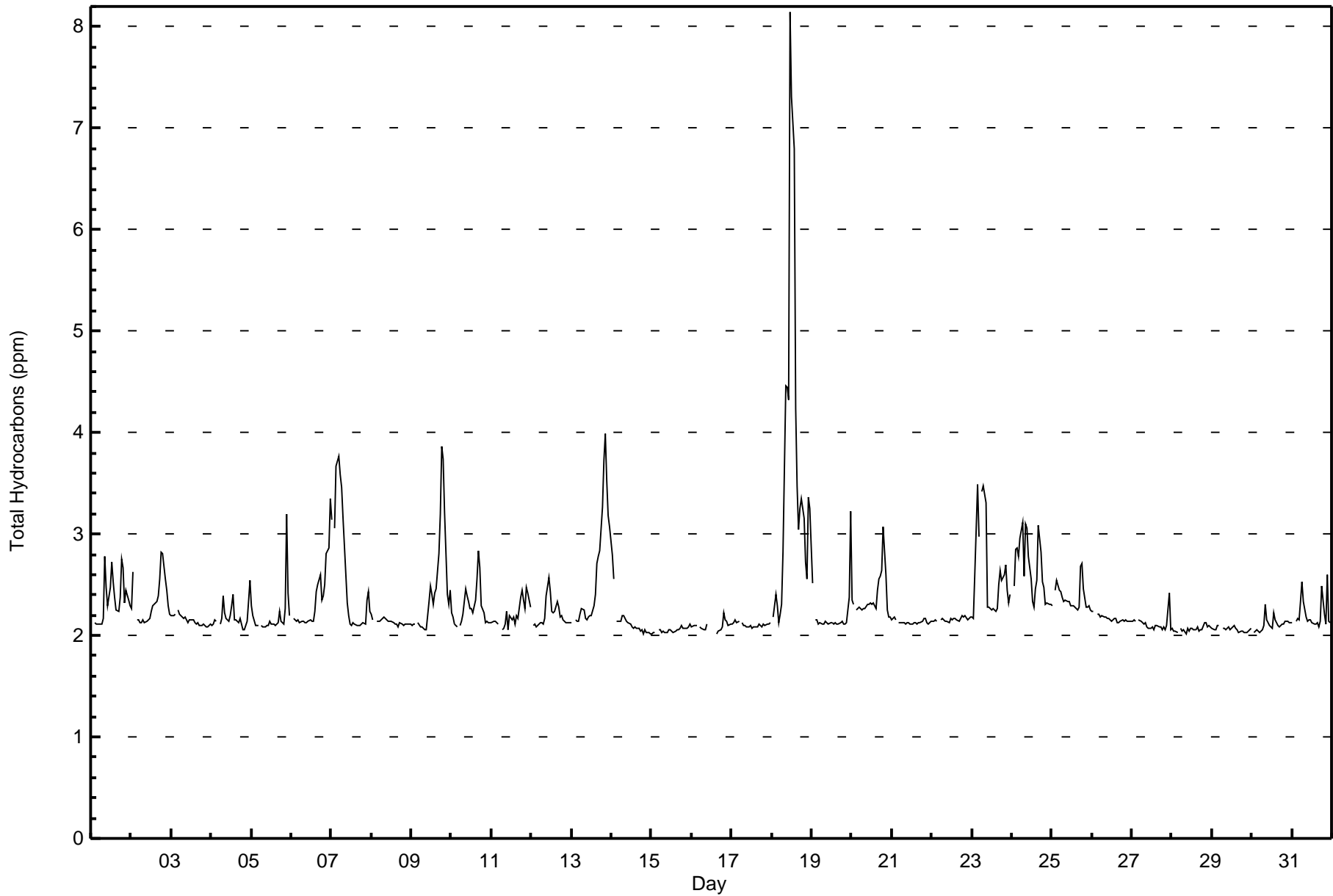




Wood Buffalo Environmental Association
Summary of Hour Averages

Total Hydrocarbons (THC) - ppm
CNRL Horizon - January 2017

Maximum Value: 8.1 ppm on Jan 18 12:00 Maximum Daily Average: 3.7 ppm on Jan 18		Hours in Service: 744 Hours of Data: 708 Hours of Missing Data: 36 Hours of Calibration: 36 Percent Operational Time: 100.0																								
Minimum Value: 2.0 ppm on Jan 16 16:00 Maximum Diurnal Average: 2.4 ppm at hour 12 Monthly Average: 2.30 ppm		Minimum Daily Average: 2.1 ppm on Jan 15 Minimum Diurnal Average: 2.2 ppm at hour 2 Percentiles: P ₁ = 2.0 P ₁₀ = 2.1 Q ₁ = 2.1 Median = 2.1 Q ₃ = 2.3 P ₉₀ = 2.7 P ₉₉ = 4.2																								
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-Jan	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.2	2.8	2.5	2.3	2.5	2.7	2.5	2.4	2.2	2.2	2.4	2.8	2.7	2.3	2.4	2.4	2.3	2.4	2.8
2-Jan	2.3	2.6	Z	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.6	2.8	2.8	2.6	2.4	2.3	2.2	2.3	2.8
3-Jan	2.2	2.2	2.2	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3
4-Jan	2.1	2.1	2.2	2.1	Z	2.1	2.2	2.4	2.2	2.2	2.1	2.2	2.3	2.4	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.3	2.5	2.2	2.5
5-Jan	2.3	2.2	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.3	3.2	2.4	2.2	2.2	3.2
6-Jan	Z	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.4	2.5	2.6	2.3	2.4	2.5	2.8	2.9	3.3	2.3	3.3
7-Jan	3.1	Z	3.1	3.7	3.8	3.6	3.5	3.2	2.9	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.4	2.2	2.6	3.8
8-Jan	2.2	2.2	Z	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	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
9-Jan	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.5	2.4	2.3	2.4	2.5	2.8	3.2	3.9	3.7	3.2	2.4	2.3	2.5	2.5	3.9
10-Jan	2.2	2.2	2.1	2.1	Z	2.1	2.1	2.2	2.5	2.4	2.3	2.3	2.3	2.2	2.3	2.6	2.8	2.7	2.3	2.2	2.1	2.1	2.1	2.1	2.3	2.8
11-Jan	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.2	2.1	2.2	2.2	2.4	2.4	2.3	2.3	2.5	2.4	2.3	2.2	2.5
12-Jan	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4	2.6	2.4	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.6
13-Jan	2.1	Z	2.2	2.1	2.1	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.7	2.8	2.8	3.3	3.7	4.0	3.5	3.2	3.1	2.6	4.0
14-Jan	2.8	2.6	Z	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	2.0	2.1	2.0	2.1	2.0	2.0	2.0	2.1	2.8
15-Jan	2.0	2.0	2.0	Z	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
16-Jan	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	C	C	C	C	C	2.0	2.0	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.2
17-Jan	2.1	2.1	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	2.2
18-Jan	Z	2.2	2.4	2.3	2.1	2.2	2.3	2.8	4.5	4.4	4.3	8.1	7.3	6.8	4.2	3.5	3.1	3.3	3.4	3.1	2.7	2.6	3.4	3.3	3.7	8.1
19-Jan	2.5	Z	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	2.1	2.4	3.2	2.2	3.2
20-Jan	2.4	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.6	2.6	2.6	3.1	2.6	2.3	2.2	2.2	2.4	3.1
21-Jan	2.2	2.2	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.2
22-Jan	2.1	2.1	2.2	2.1	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
23-Jan	2.2	2.2	2.6	3.5	3.0	Z	3.4	3.5	3.3	2.3	2.3	2.3	2.3	2.2	2.3	2.5	2.6	2.5	2.6	2.5	2.6	2.7	2.5	2.3	2.4	2.6
24-Jan	Z	2.5	2.8	2.9	2.8	3.0	3.1	2.6	3.1	3.1	2.8	2.6	2.3	2.3	2.5	2.5	3.1	2.8	2.5	2.5	2.3	2.3	2.3	2.3	2.6	3.1
25-Jan	2.3	Z	2.4	2.5	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.7	2.7	2.5	2.3	2.3	2.3	2.4	2.7
26-Jan	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	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.2
27-Jan	2.1	2.2	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	2.4	2.1	2.1	2.4
28-Jan	2.1	2.0	2.0	2.0	Z	2.1	2.0	2.1	2.0	2.1	2.0	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	2.1
29-Jan	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1
30-Jan	Z	2.0	2.0	2.1	2.0	2.0	2.1	2.1	2.3	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3
31-Jan	2.1	Z	2.1	2.2	2.1	2.3	2.5	2.3	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.5	2.2	2.1	2.6	2.1	2.1	2.2	2.6
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
CNRL Horizon - January 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	35	4.94	4.94
2.1 - 3.0	630	88.98	93.93
3.1 - 10.0	43	6.07	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 - January 2017

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	1	11	9	14	0	0	0	0	35
2.1 - 3.0	13	75	51	5	1	3	11	16	89	191	81	46	15	6	5	16	624
3.1 - 10.0	0	4	2	0	0	1	0	1	9	8	7	2	2	0	3	1	40
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	13	79	53	5	1	4	11	17	99	210	97	62	17	6	8	17	699

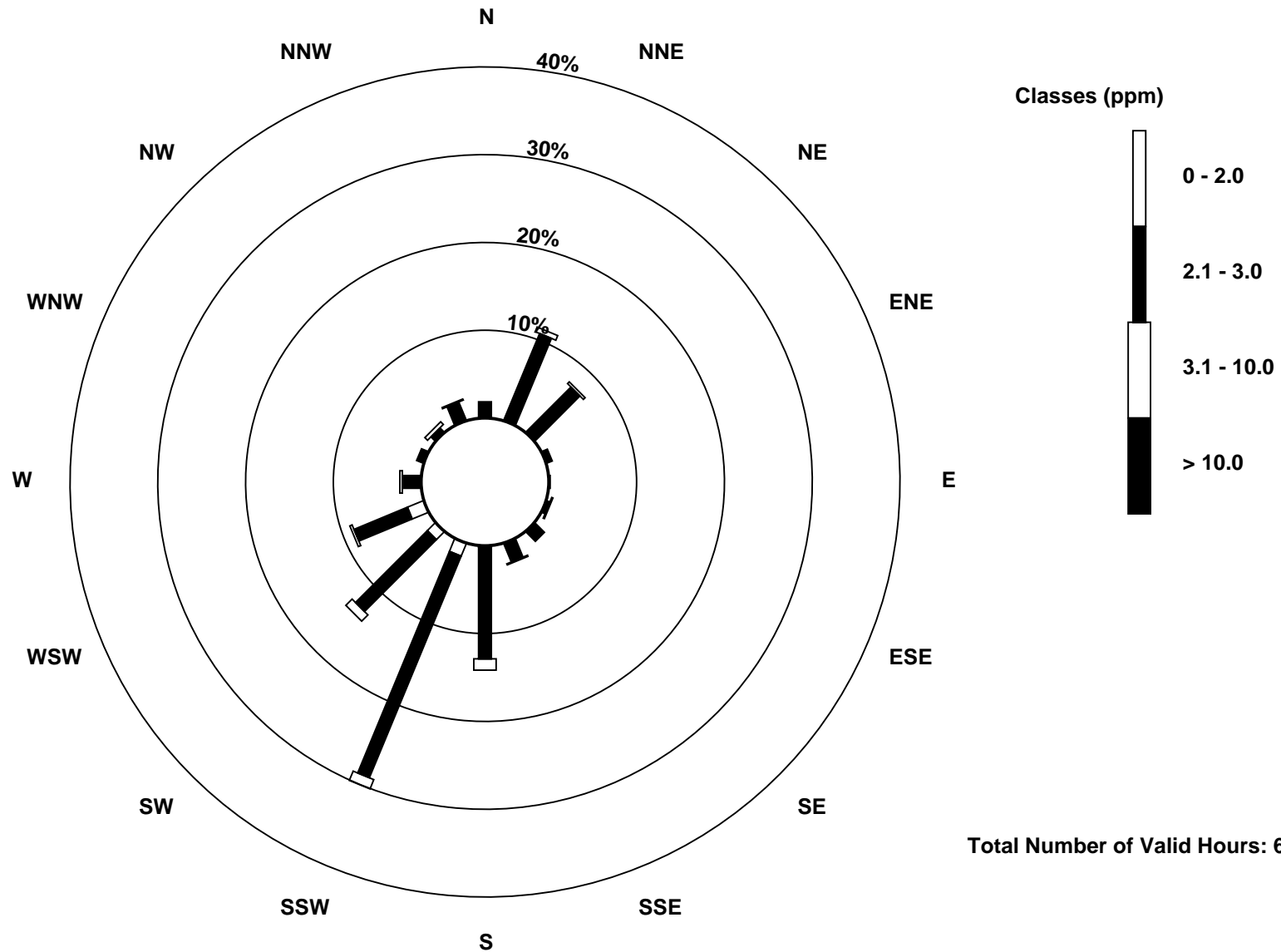
Total Number of Valid Hours: 699

Total Number of Hours: 744

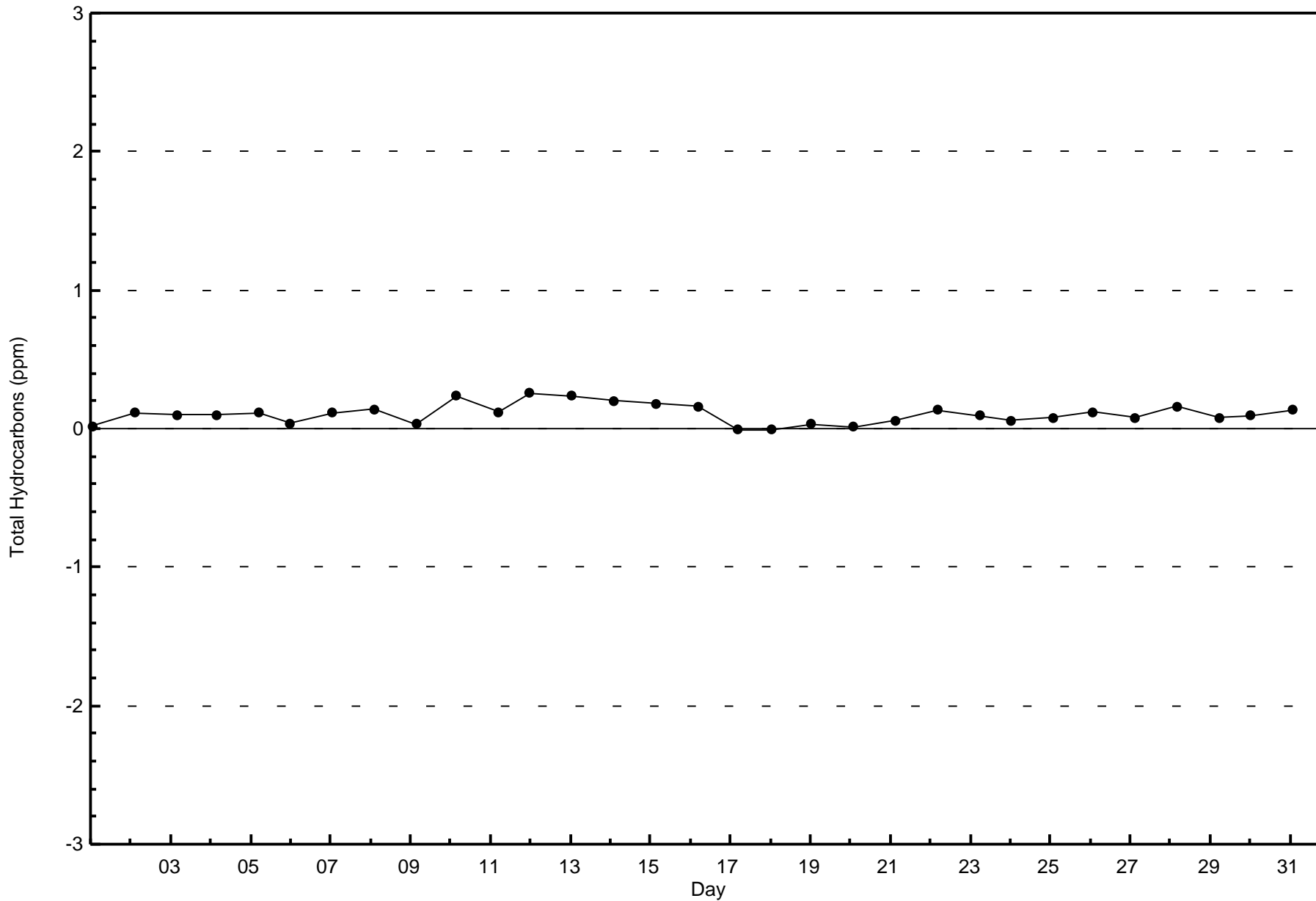


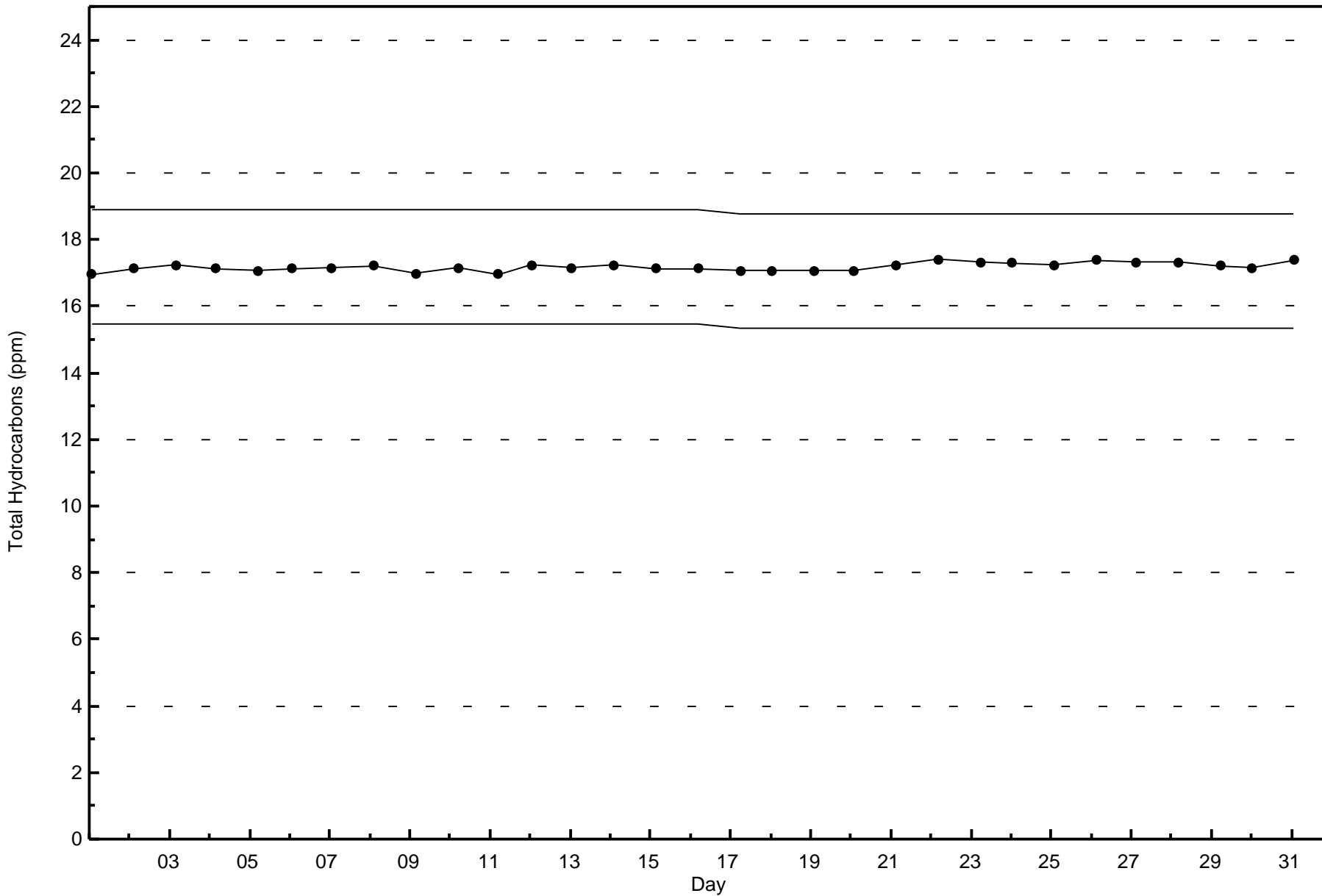
Wood Buffalo Environmental Association
Wind Rose Jan 2017

Total Hydrocarbons (THC) - ppm
CNRL Horizon (AMS 15)



Total Number of Valid Hours: 699







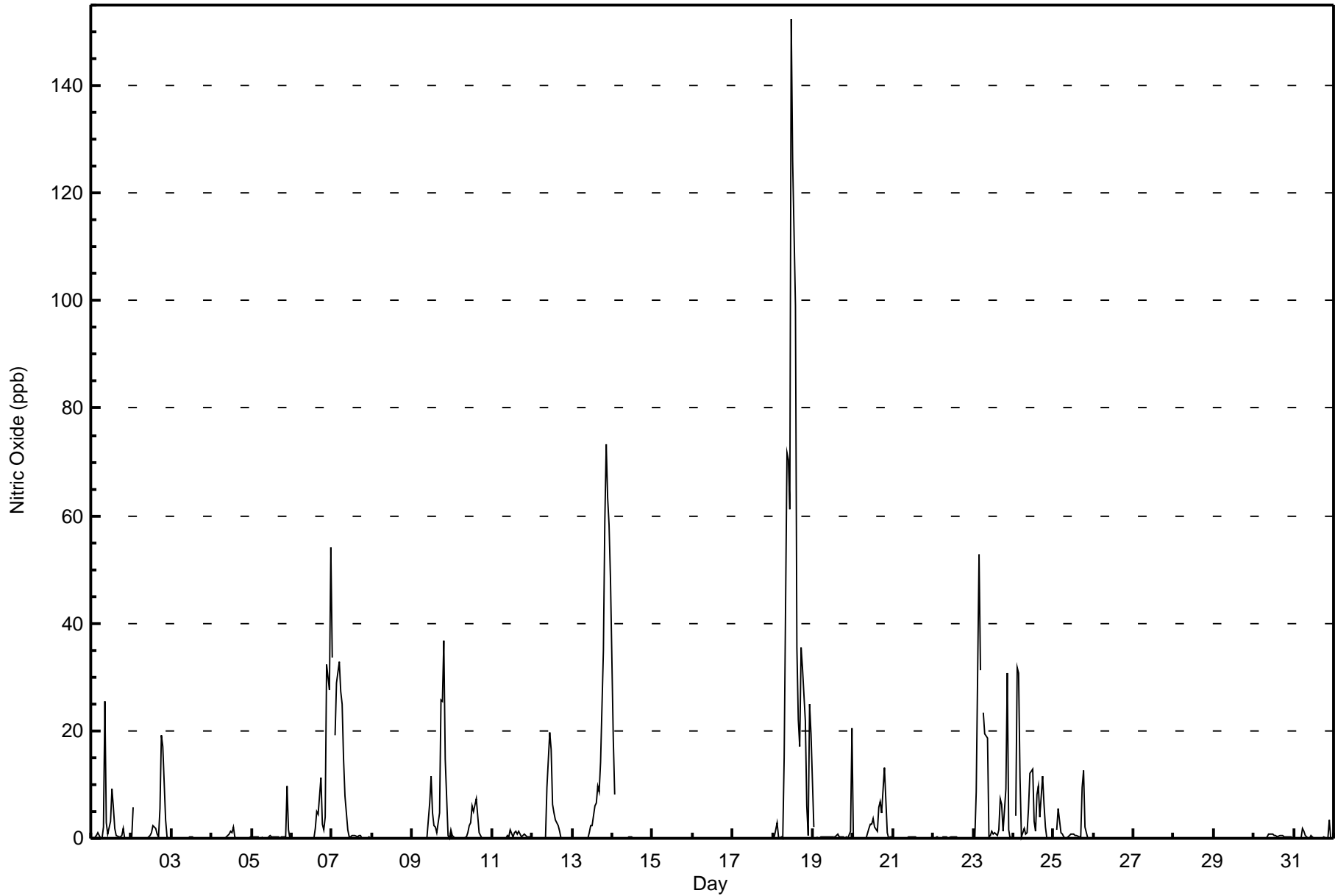
Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

CNRL Horizon - January 2017

Maximum Value: 152 ppb on Jan 18 12:00																		Maximum Daily Average: 35.4 ppb on Jan 18																		Hours in Service: 744			
Minimum Value: 0 ppb on Jan 3 17:00																		Minimum Daily Average: 0.0 ppb on Jan 28																		Hours of Data: 708			
Maximum Diurnal Average: 7.1 ppb at hour 12																		Minimum Diurnal Average: 0.8 ppb at hour 2																		Hours of Missing Data: 36			
Monthly Average: 3.5 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 8 P ₉₉ = 59																		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-Jan	0	Z	0	1	1	0	0	2	26	3	1	3	9	6	2	1	0	0	0	2	0	0	0	0	2.5	26													
2-Jan	0	6	Z	0	0	0	0	0	0	0	0	1	1	2	2	1	0	6	19	17	3	0	0	0	2.6	19													
3-Jan	0	0	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-Jan	0	0	0	0	Z	0	0	0	0	0	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0.3	2													
5-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	2	0	0.7	10													
6-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	2	5	4	11	3	2	4	32	28	54	6.3	54													
7-Jan	34	Z	19	29	33	27	25	15	8	2	0	0	1	1	0	0	1	1	0	0	0	0	0	0	8.5	34													
8-Jan	0	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													
9-Jan	0	0	0	Z	0	0	0	0	0	0	7	12	5	2	2	1	5	26	26	37	15	1	0	2	6.1	37													
10-Jan	0	0	0	0	Z	0	0	0	0	1	2	3	6	5	7	4	1	1	0	0	0	0	0	0	1.4	7													
11-Jan	0	0	0	0	0	Z	0	0	0	1	0	2	0	1	1	1	1	0	0	1	0	0	0	0	0.4	2													
12-Jan	Z	0	0	0	0	0	0	0	0	10	20	16	6	5	3	2	1	0	0	0	0	0	0	0	2.8	20													
13-Jan	0	Z	0	0	0	0	0	0	0	0	1	2	2	6	6	10	9	14	35	59	73	63	58	48	16.9	73													
14-Jan	18	8	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2	18													
15-Jan	0	0	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													
16-Jan	0	0	0	0	Z	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0.0	0													
17-Jan	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													
18-Jan	Z	0	3	0	0	0	0	15	72	70	61	152	126	99	35	22	17	36	32	22	6	0	25	19	35.4	152													
19-Jan	2	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	20	1.2	20													
20-Jan	0	0	Z	0	0	0	0	0	0	2	3	3	4	2	1	6	7	5	9	13	1	0	0	0	2.4	13													
21-Jan	0	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													
22-Jan	0	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													
23-Jan	0	0	9	53	31	Z	23	19	19	0	1	1	1	1	2	7	6	1	9	31	2	0	0	0	9.4	53													
24-Jan	Z	4	32	31	11	0	2	1	1	5	12	13	3	1	8	10	4	12	6	2	0	0	0	0	6.9	32													
25-Jan	0	Z	2	6	1	1	0	0	0	1	1	1	1	1	0	0	0	9	13	2	0	0	0	0	1.6	13													
26-Jan	0	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													
27-Jan	0	0	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													
28-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0													
29-Jan	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													
30-Jan	Z	0	0	0	0	0	0	0	0	1	1	1	0	1	0	1	0	1	0	0	0	0	0	0	0.3	1													
31-Jan	0	Z	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0.4	3													
																								Diurnal Average															
																								Diurnal Maximum															
2.1 0.8 2.5 4.6 3.0 1.2 1.7 1.7 4.1 3.1 3.7 7.1 5.6 4.5 2.5 2.2 1.9 4.1 4.7 5.4 4.3 3.7 3.7 4.7																																							
34 8 32 53 33 27 25 19 72 70 61 152 126 99 35 22 17 36 35 59 73 63 58 54																																							
Z - zerospan C - Calibration																																							





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
CNRL Horizon - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	672	94.92	94.92
21 - 40	23	3.25	98.16
41 - 80	10	1.41	99.58
81 - 159	3	0.42	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



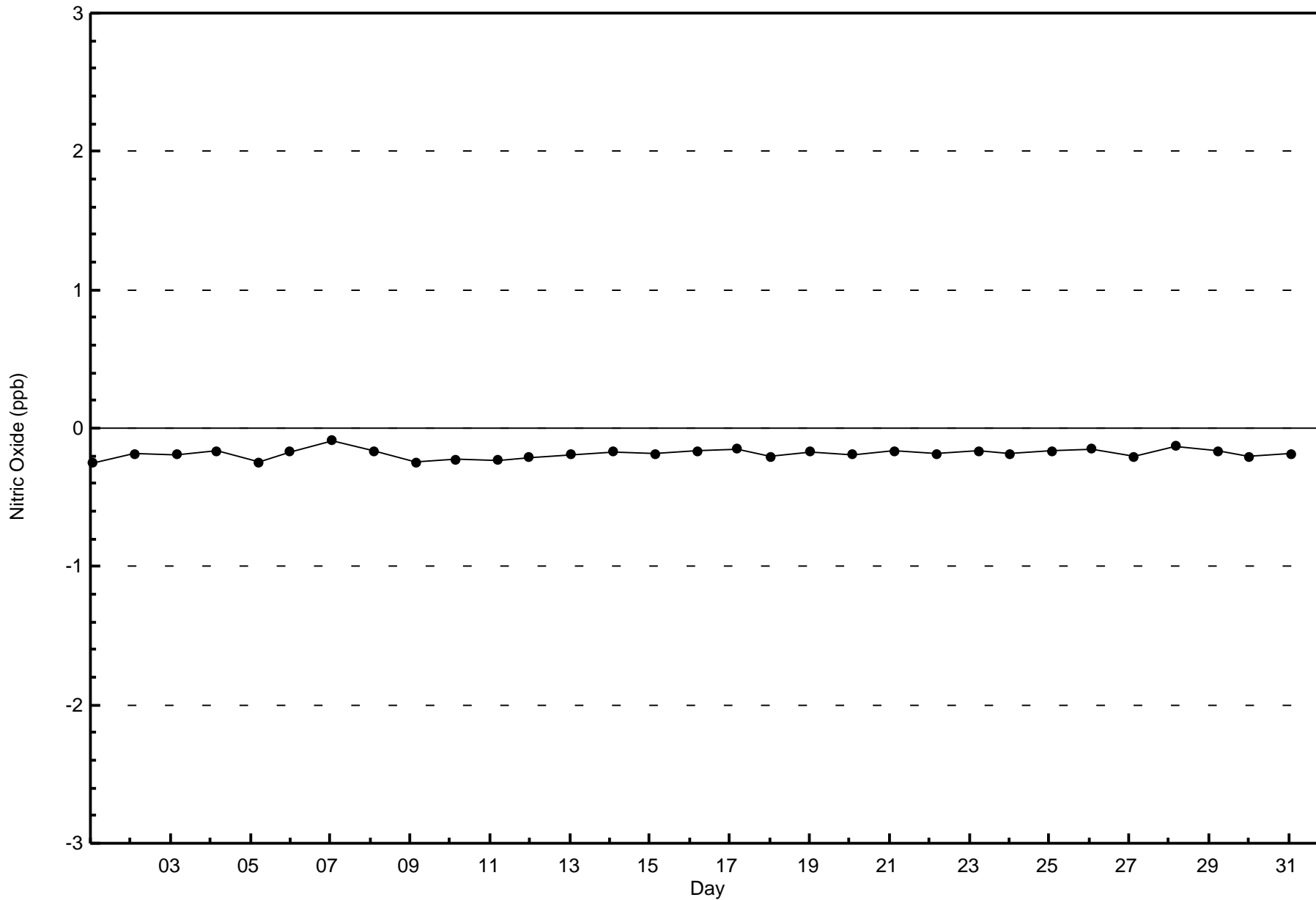
Wood Buffalo Environmental Association
Frequency Distribution

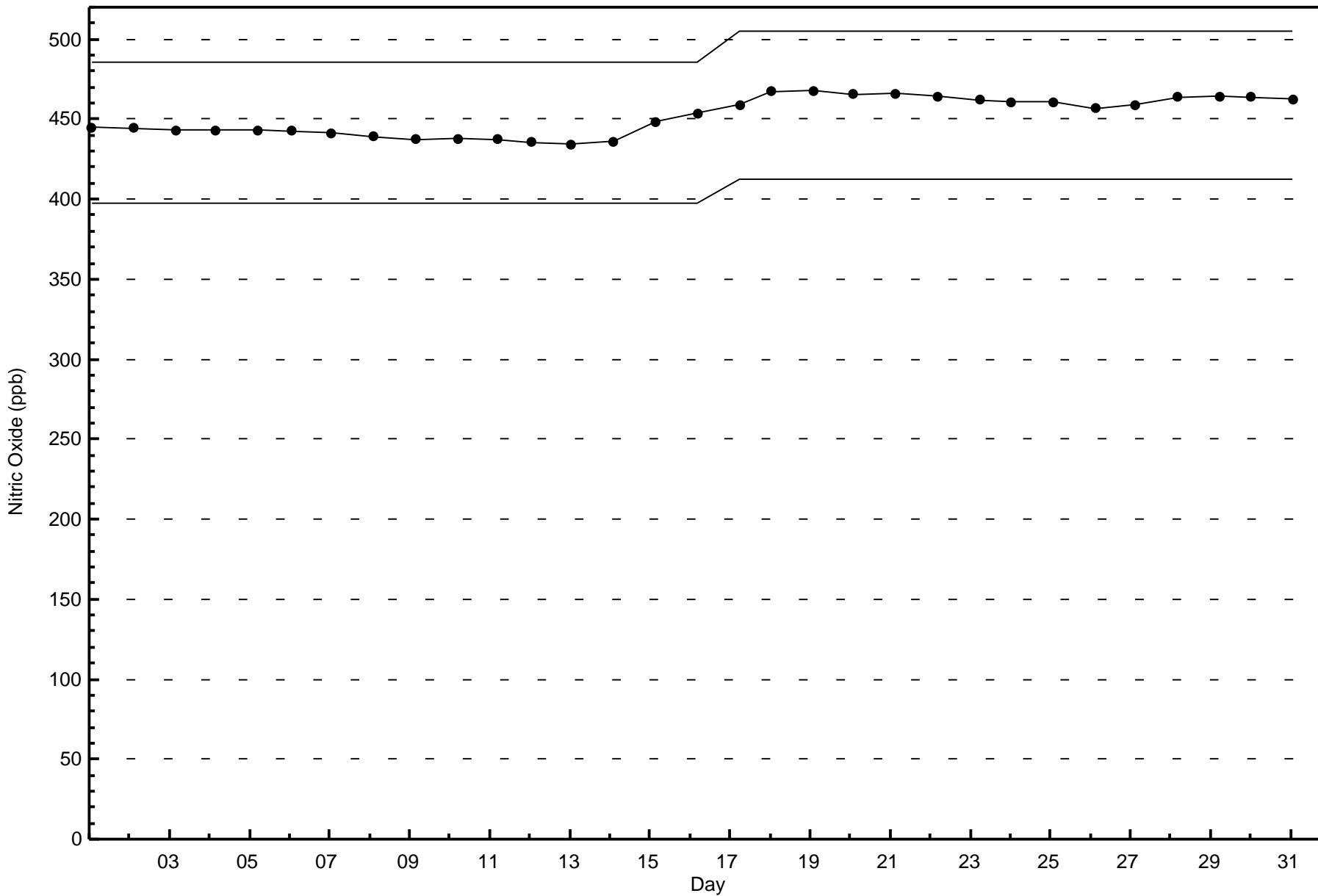
Nitric Oxide (NO) - ppb
CNRL Horizon - January 2017

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	13	77	51	4	1	4	11	15	94	201	92	61	16	5	4	16	665
21 - 40	0	0	2	1	0	0	0	1	3	4	4	1	0	1	4	0	21
11 - 80	0	2	0	0	0	0	0	0	1	4	1	0	1	0	0	1	10
81 - 159	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	3
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	13	79	53	5	1	4	11	17	99	210	97	62	17	6	8	17	699

Total Number of Valid Hours: 699

Total Number of Hours: 744







Wood Buffalo Environmental Association
Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 36 ppb on Jan 9 20:00	Maximum Daily Average: 15.9 ppb on Jan 18
Minimum Value: 0 ppb on Jan 1 06:00	Hours of Data: 708
Maximum Diurnal Average: 11.0 ppb at hour 18	Hours of Missing Data: 36
Monthly Average: 6.1 ppb	Hours of Calibration: 36
Minimum Daily Average: 0.3 ppb on Jan 29	Percent Operational Time: 100.0
Minimum Diurnal Average: 3.8 ppb at hour 6	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 9 P ₉₀ = 21 P ₉₉ = 32	

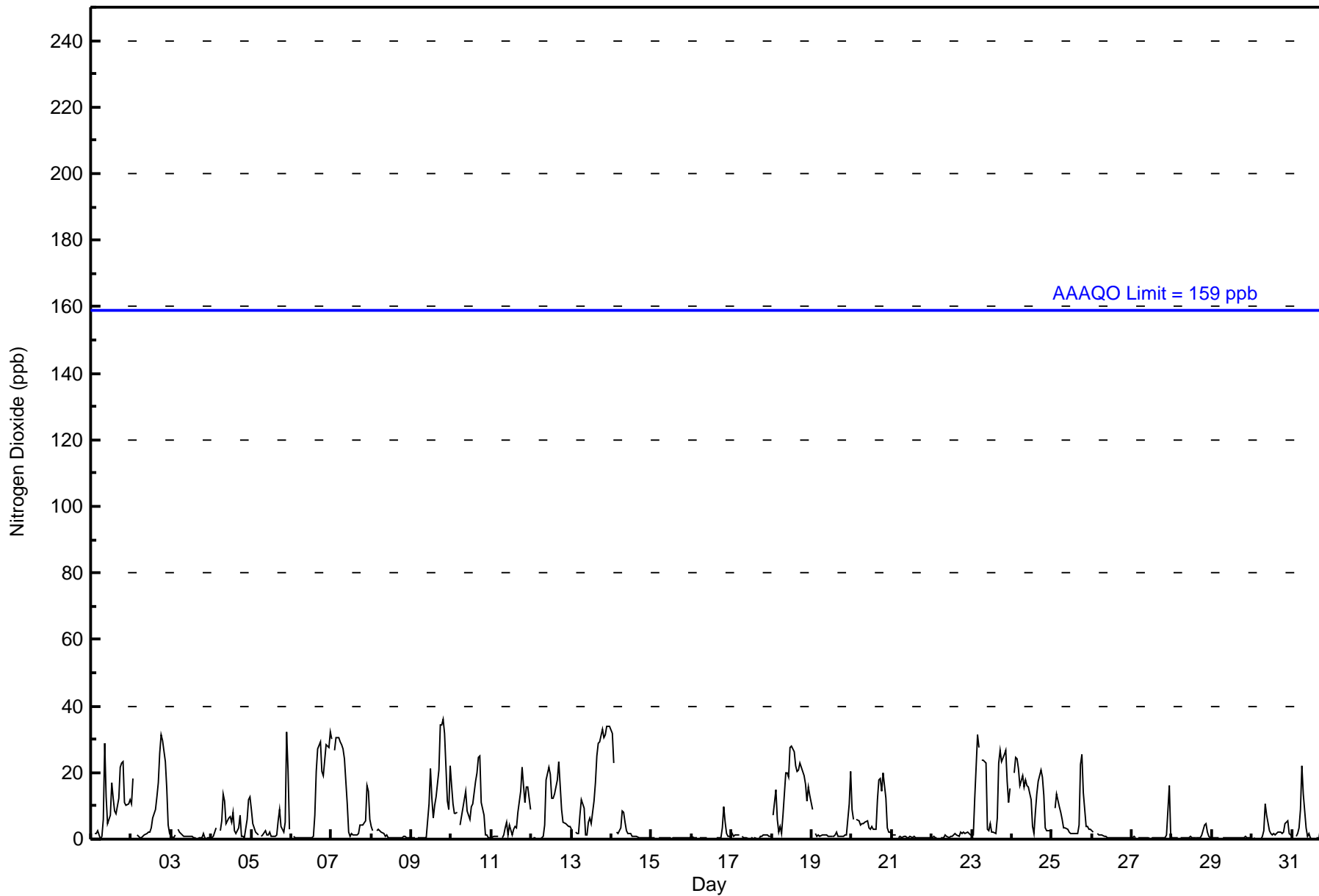
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	2	Z	2	2	3	0	1	6	29	13	5	7	17	12	9	8	12	22	23	23	11	10	11	12	10.4	29
2-Jan	11	18	Z	1	1	0	0	1	1	2	2	2	3	7	9	13	17	26	31	30	23	15	4	2	9.5	31
3-Jan	1	1	1	Z	3	2	2	1	1	1	1	1	1	0	0	0	0	0	0	2	0	0	0	0	0.9	3
4-Jan	1	1	2	3	Z	2	5	14	11	5	6	7	5	8	3	2	3	7	1	1	1	6	12	13	5.1	14
5-Jan	9	5	2	2	1	Z	1	1	3	1	1	2	1	1	1	1	6	9	4	2	5	32	21	3	4.9	32
6-Jan	Z	1	1	1	0	0	0	0	0	0	0	0	0	1	7	21	27	29	21	19	24	29	28	32	10.5	32
7-Jan	30	Z	27	30	31	29	28	27	24	10	2	1	2	1	1	1	2	4	4	4	6	16	14	6	13.2	31
8-Jan	4	3	Z	3	3	2	2	2	1	1	1	0	0	0	0	0	0	0	1	1	1	1	0	0	1.2	4
9-Jan	0	0	0	Z	0	0	0	0	0	0	11	21	12	7	10	13	21	35	34	36	32	11	9	22	12.0	36
10-Jan	16	11	8	8	Z	4	7	9	14	9	7	6	10	11	18	20	25	25	11	7	1	1	1	1	9.9	25
11-Jan	1	1	1	1	1	Z	1	1	3	5	1	4	1	3	4	4	8	15	22	16	11	16	16	9	6.2	22
12-Jan	Z	0	0	0	0	0	0	1	4	18	22	20	12	12	14	18	23	16	9	5	5	4	4	4	8.3	23
13-Jan	3	Z	2	2	2	7	12	9	1	1	5	7	5	12	17	25	29	29	33	31	32	34	34	34	15.8	34
14-Jan	32	23	Z	2	2	3	8	5	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	4.2	32
15-Jan	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0.4	1
16-Jan	1	1	1	1	Z	1	1	0	0	1	C	C	C	C	C	1	1	0	4	10	5	2	1	1	1.6	10
17-Jan	2	1	1	1	1	Z	1	1	0	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0.7	2
18-Jan	Z	7	15	6	2	4	2	7	20	20	19	28	28	26	22	21	21	23	21	19	17	12	16	13	15.9	28
19-Jan	9	Z	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	11	20	2.7	20
20-Jan	9	6	Z	6	6	4	5	5	5	5	3	3	4	3	3	12	18	18	15	20	12	3	2	2	7.3	20
21-Jan	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	1	1	0	1	0.7	1
22-Jan	1	1	1	1	Z	0	1	1	1	1	1	1	1	1	2	1	1	2	2	2	2	2	2	1	1.2	2
23-Jan	1	1	12	31	27	Z	24	24	23	3	3	5	2	2	2	6	23	27	23	26	27	17	11	15	14.6	31
24-Jan	Z	20	25	24	21	16	19	16	18	16	16	12	4	2	8	14	17	21	19	13	3	2	3	3	13.5	25
25-Jan	3	Z	9	14	10	8	6	3	3	3	2	2	2	2	2	4	23	25	14	4	4	3	3	3	6.4	25
26-Jan	3	2	Z	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.9	3
27-Jan	0	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	16	1	1.1	16
28-Jan	0	0	0	0	Z	0	0	0	0	0	1	1	0	1	1	1	1	1	1	4	5	2	1	1	0.9	5
29-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.3	1
30-Jan	Z	0	0	0	0	0	1	3	11	7	3	2	1	2	1	2	2	2	2	2	5	5	2	1	2.3	11
31-Jan	1	Z	1	2	3	9	22	14	4	1	2	1	0	0	0	0	0	3	17	8	2	20	5	5	5.1	22
5.4 4.2 4.4 5.5 4.7 3.8 4.9 5.1 6.1 4.2 3.9 4.5 3.9 3.9 4.5 6.1 8.5 11.0 10.5 9.7 7.7 8.1 7.3 6.7																								Diurnal Average		
32 23 27 31 31 29 28 27 29 20 22 28 28 26 22 25 29 35 34 36 32 34 34 34																								Diurnal Maximum		

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



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	634	89.55	89.55
21 - 40	74	10.45	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 (NO₂) - ppb
CNRL Horizon - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	13	75	52	4	0	3	10	13	84	192	88	59	14	2	4	16	629
21 - 40	0	4	1	1	1	1	1	4	15	18	9	3	3	4	4	1	70
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
Totals	13	79	53	5	1	4	11	17	99	210	97	62	17	6	8	17	699

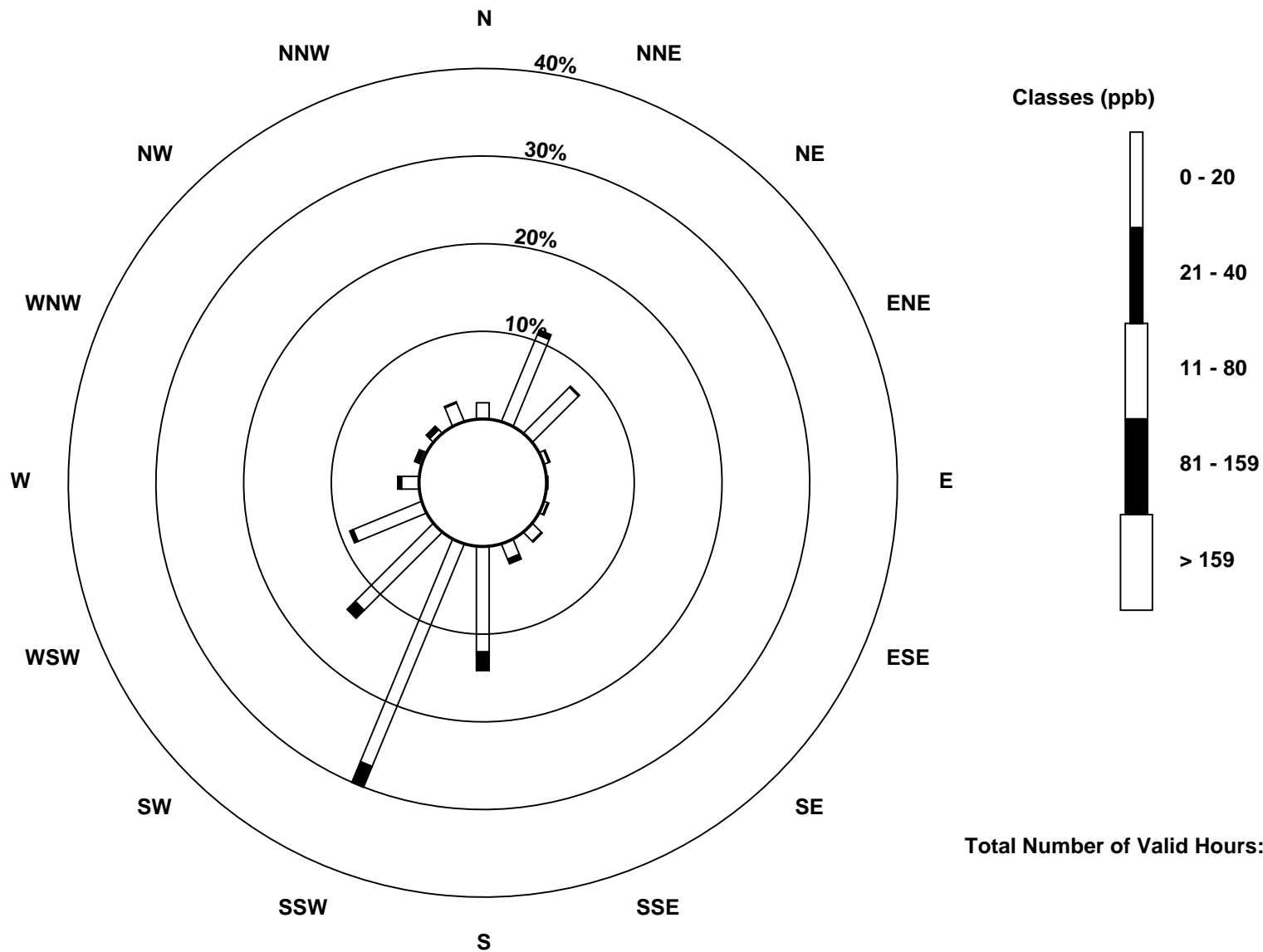
Total Number of Valid Hours: 699

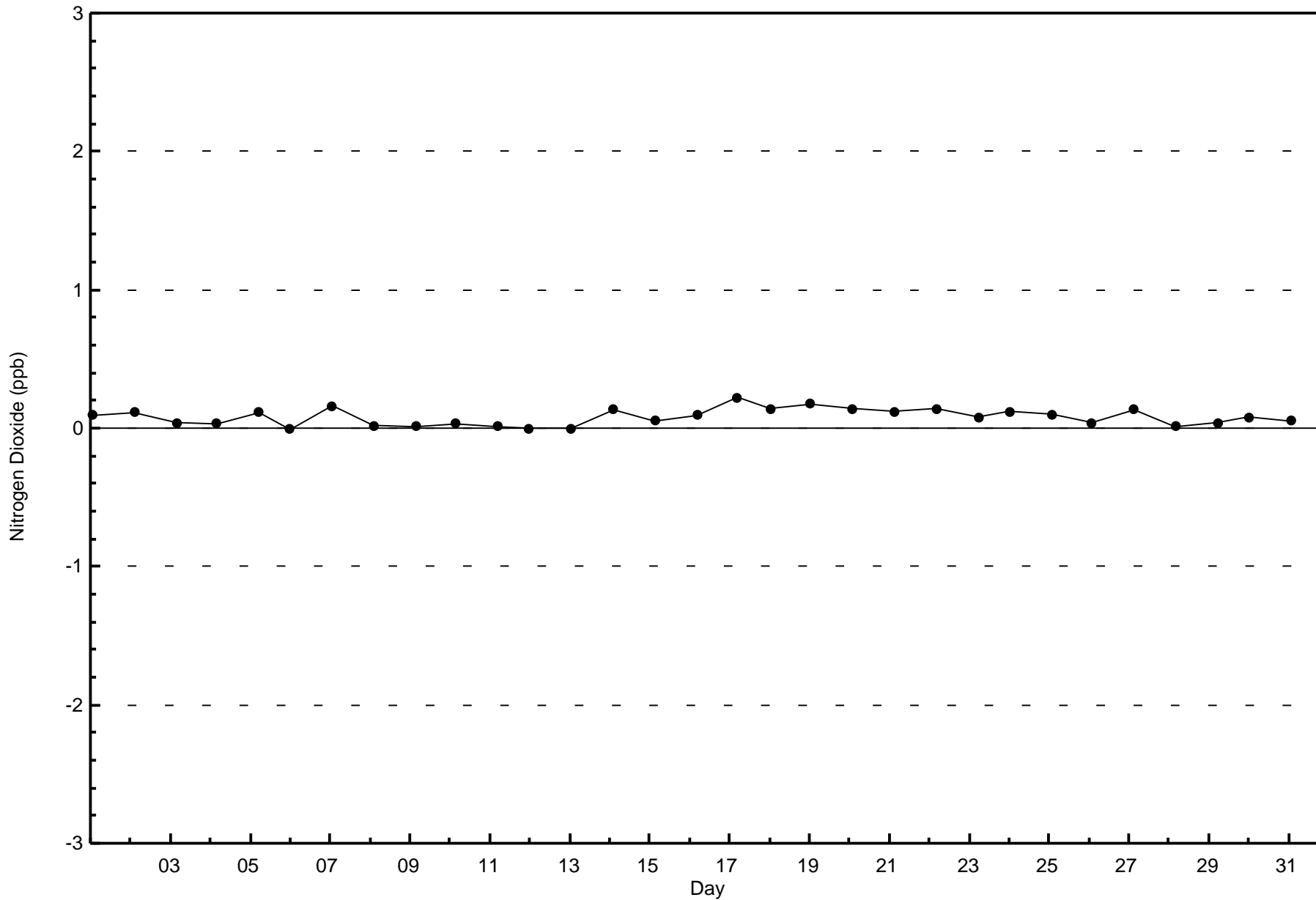
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon (AMS 15)

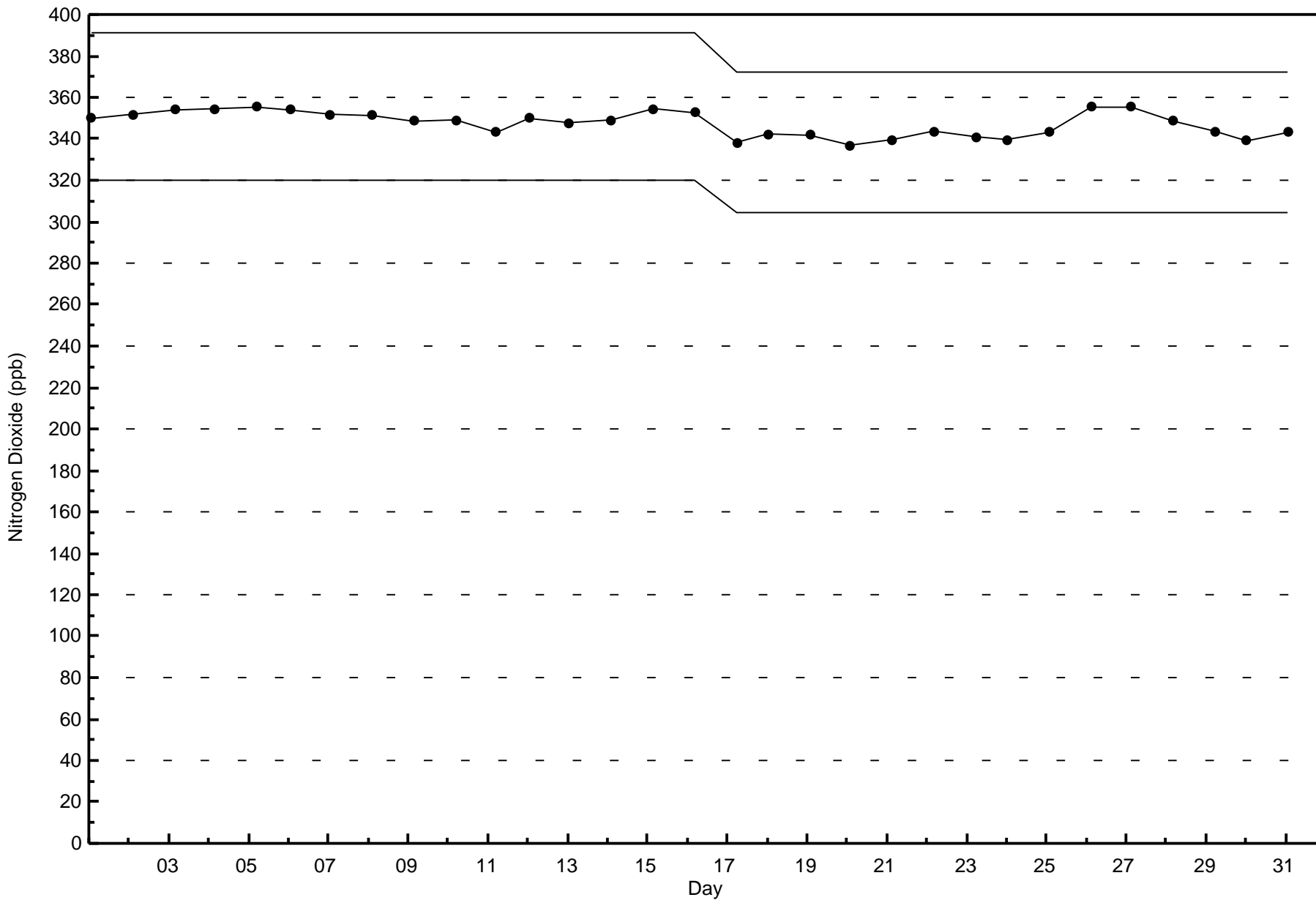






Wood Buffalo Environmental Association
Span Responses

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - January 2017



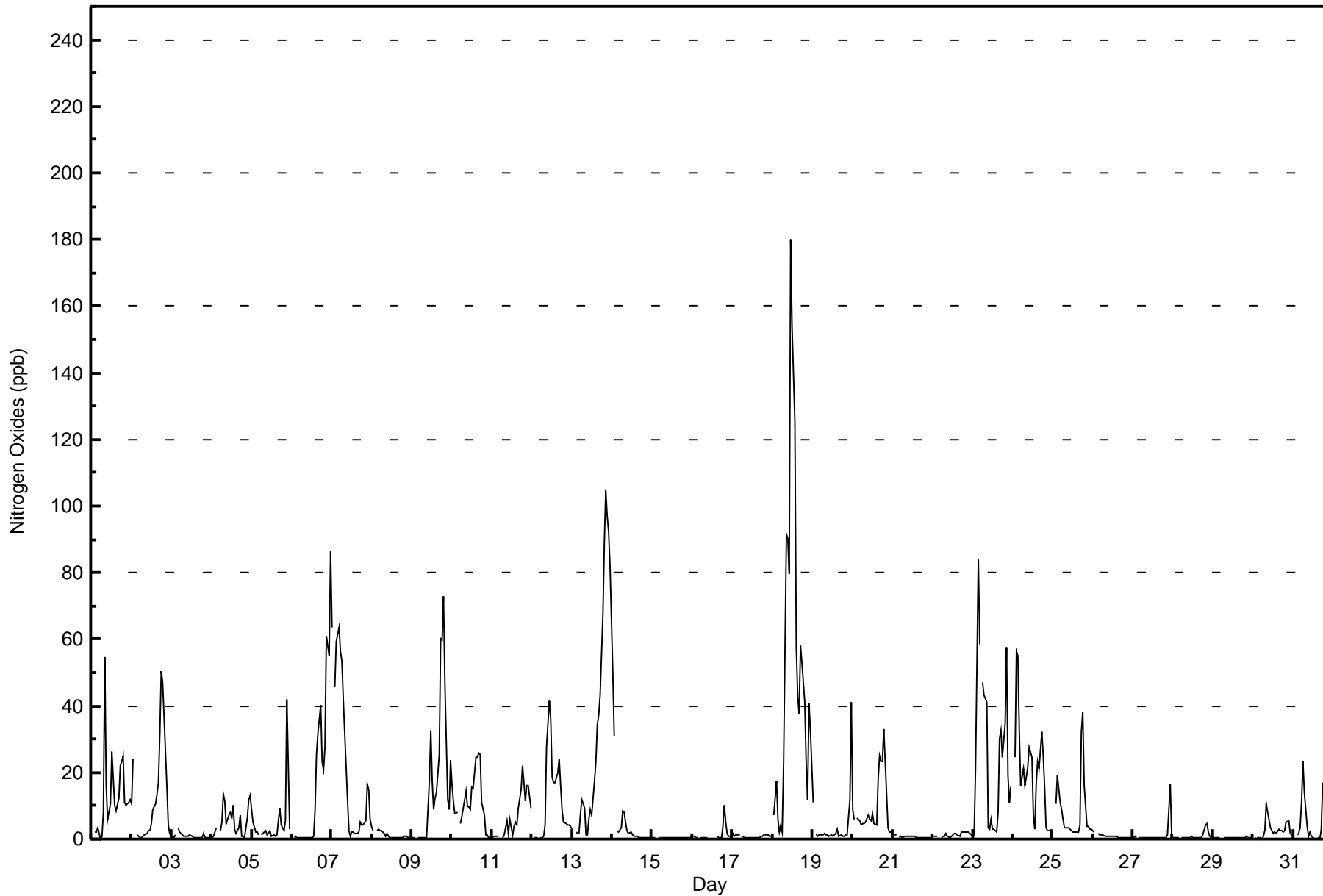


Wood Buffalo Environmental Association
Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - January 2017

Maximum Value: 180 ppb on Jan 18 12:00																		Maximum Daily Average: 51.4 ppb on Jan 18																		Hours in Service: 744			
Minimum Value: 0 ppb on Jan 31 17:00																		Minimum Daily Average: 0.4 ppb on Jan 29																		Hours of Data: 708			
Maximum Diurnal Average: 15.2 ppb at hour 19																		Minimum Diurnal Average: 5.0 ppb at hour 6																		Hours of Missing Data: 36			
Monthly Average: 9.6 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 10 P ₉₀ = 26 P ₉₉ = 91																		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-Jan	2	Z	2	2	4	0	1	8	55	16	6	11	26	18	10	8	12	22	23	25	11	10	11	12	12.9	55													
2-Jan	11	24	Z	1	1	0	0	1	1	2	2	3	4	9	11	13	17	32	51	47	26	16	4	2	12.1	51													
3-Jan	1	1	1	Z	3	2	2	1	1	1	1	1	1	0	0	0	0	0	2	0	0	0	0	0.9	3														
4-Jan	0	1	2	3	Z	2	5	14	11	5	7	8	6	10	3	2	3	7	1	1	1	6	12	13	5.4	14													
5-Jan	9	5	2	2	1	Z	1	2	3	1	2	2	1	1	1	1	6	9	4	2	5	42	23	3	5.6	42													
6-Jan	Z	1	1	1	0	0	0	0	0	0	0	0	0	1	9	25	32	40	23	21	27	61	55	86	16.8	86													
7-Jan	64	Z	46	59	63	56	53	42	32	12	2	1	2	2	2	2	2	5	4	4	6	16	15	6	21.6	64													
8-Jan	4	3	Z	3	3	2	2	2	1	1	1	0	0	0	0	0	0	0	0	1	1	1	0	0	1.2	4													
9-Jan	0	0	0	Z	1	1	0	0	1	0	17	33	17	9	12	14	25	60	60	73	47	12	9	24	18.1	73													
10-Jan	17	11	8	8	Z	4	7	9	15	10	10	9	16	15	25	24	26	25	11	7	1	1	1	1	11.3	26													
11-Jan	1	1	1	1	1	Z	1	1	3	5	2	6	1	4	5	4	9	15	22	17	11	16	16	9	6.6	22													
12-Jan	Z	0	0	0	0	0	0	1	4	28	41	36	18	17	17	20	24	16	9	5	5	4	4	4	11.1	41													
13-Jan	3	Z	2	2	2	7	12	10	1	1	6	9	7	17	23	35	37	43	68	89	105	97	92	82	32.6	105													
14-Jan	50	31	Z	2	2	3	8	5	2	2	2	1	1	1	1	1	1	1	1	0	0	0	0	0	5.4	50													
15-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	1													
16-Jan	1	1	1	0	Z	1	0	0	0	1	C	C	C	C	C	1	1	1	4	10	5	2	1	1	1.6	10													
17-Jan	2	1	1	1	1	Z	1	1	0	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0.8	2													
18-Jan	Z	7	18	6	2	4	2	22	92	90	80	180	154	125	58	43	38	58	53	41	23	12	41	33	51.4	180													
19-Jan	11	Z	2	1	1	1	1	2	1	1	1	1	1	1	2	3	1	1	1	1	1	1	12	41	3.9	41													
20-Jan	9	6	Z	6	6	4	5	5	5	7	6	6	7	5	4	18	25	23	24	33	13	3	2	2	9.7	33													
21-Jan	2	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	1	0	1	0	1	0.7	2													
22-Jan	1	1	1	1	Z	1	1	1	2	1	1	1	1	2	2	1	1	2	2	2	2	2	2	1	1.3	2													
23-Jan	1	1	21	84	58	Z	47	43	41	3	3	6	3	3	2	8	30	33	25	35	57	19	11	15	24.0	84													
24-Jan	Z	24	56	55	32	16	21	16	19	22	28	25	7	3	16	23	21	32	25	15	3	2	2	3	20.4	56													
25-Jan	3	Z	11	19	11	9	6	3	3	3	3	2	2	2	2	2	4	32	38	16	4	4	3	3	8.1	38													
26-Jan	3	2	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0.9	3													
27-Jan	0	1	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	16	1	1.2	16													
28-Jan	0	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	1	0	0	1	4	5	2	1	1	0.9	5													
29-Jan	0	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0.4	1													
30-Jan	Z	0	0	0	0	0	1	3	11	8	3	3	2	2	1	3	3	3	2	3	5	6	2	1	2.7	11													
31-Jan	1	Z	1	2	3	11	23	14	4	1	2	1	0	0	0	0	0	0	3	17	8	2	23	5	5	5.5	23												
7.5																		5.0																		Diurnal Average			
64																		31																		Diurnal Maximum			
6.9																		10.1																					
7.7																		7.7																					
5.0																		5.0																					
6.6																		6.6																					
6.8																		6.8																					
10.1																		10.1																					
7.3																		7.3																					
7.6																		7.6																					
11.7																		11.7																					
9.5																		9.5																					
8.4																		8.4																					
7.0																		7.0																					
8.2																		8.2																					
10.4																		10.4																					
15.1																		15.1																					
15.2																		15.2																					
15.0																		15.0																					
12.0																		12.0																					
11.7																		11.7																					
11.0																		11.0																					
11.4																		11.4																					

Z - zerospan C - Calibration





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	603	85.17	85.17
21 - 40	57	8.05	93.22
41 - 80	36	5.08	98.31
81 - 159	11	1.55	99.86
> 159	1	0.14	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	11	72	51	4	0	2	7	12	76	186	86	59	12	2	3	15	598
21 - 40	2	5	0	0	1	1	4	3	18	11	3	1	3	3	1	0	56
11 - 80	0	0	2	1	0	1	0	1	3	8	8	2	1	1	4	1	33
81 - 159	0	2	0	0	0	0	0	1	2	4	0	0	1	0	0	1	11
> 159	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Totals	13	79	53	5	1	4	11	17	99	210	97	62	17	6	8	17	699

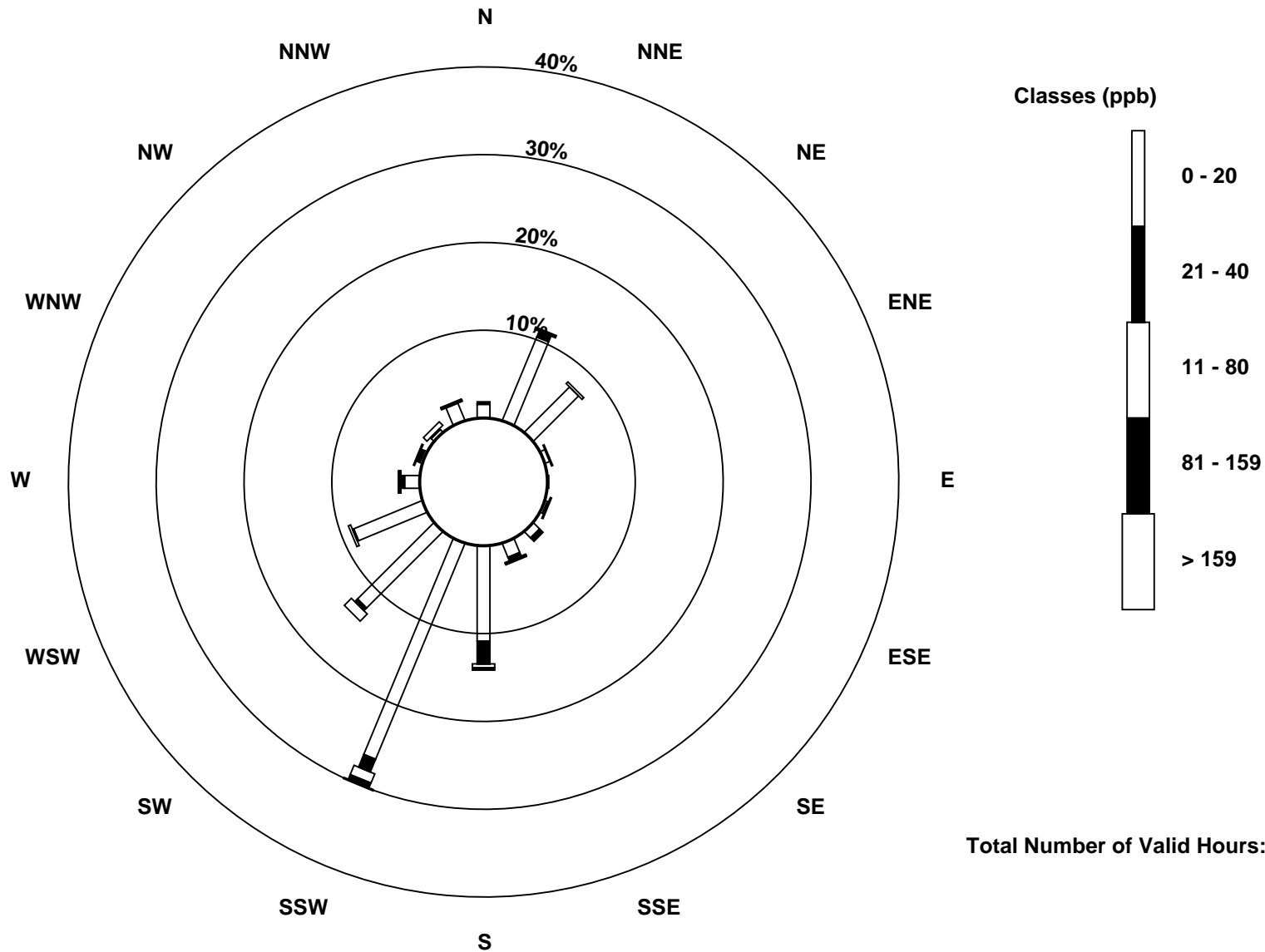
Total Number of Valid Hours: 699

Total Number of Hours: 744

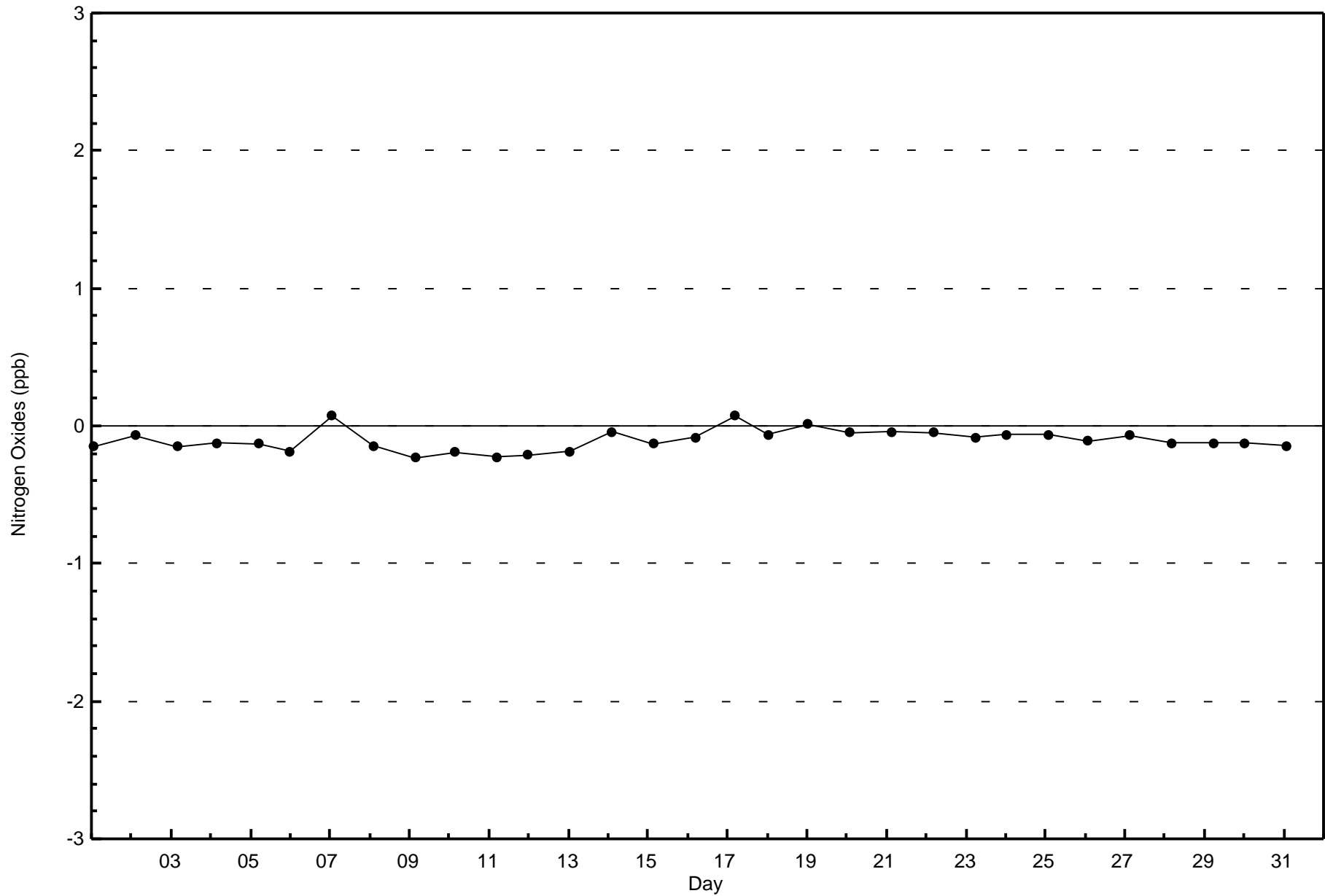


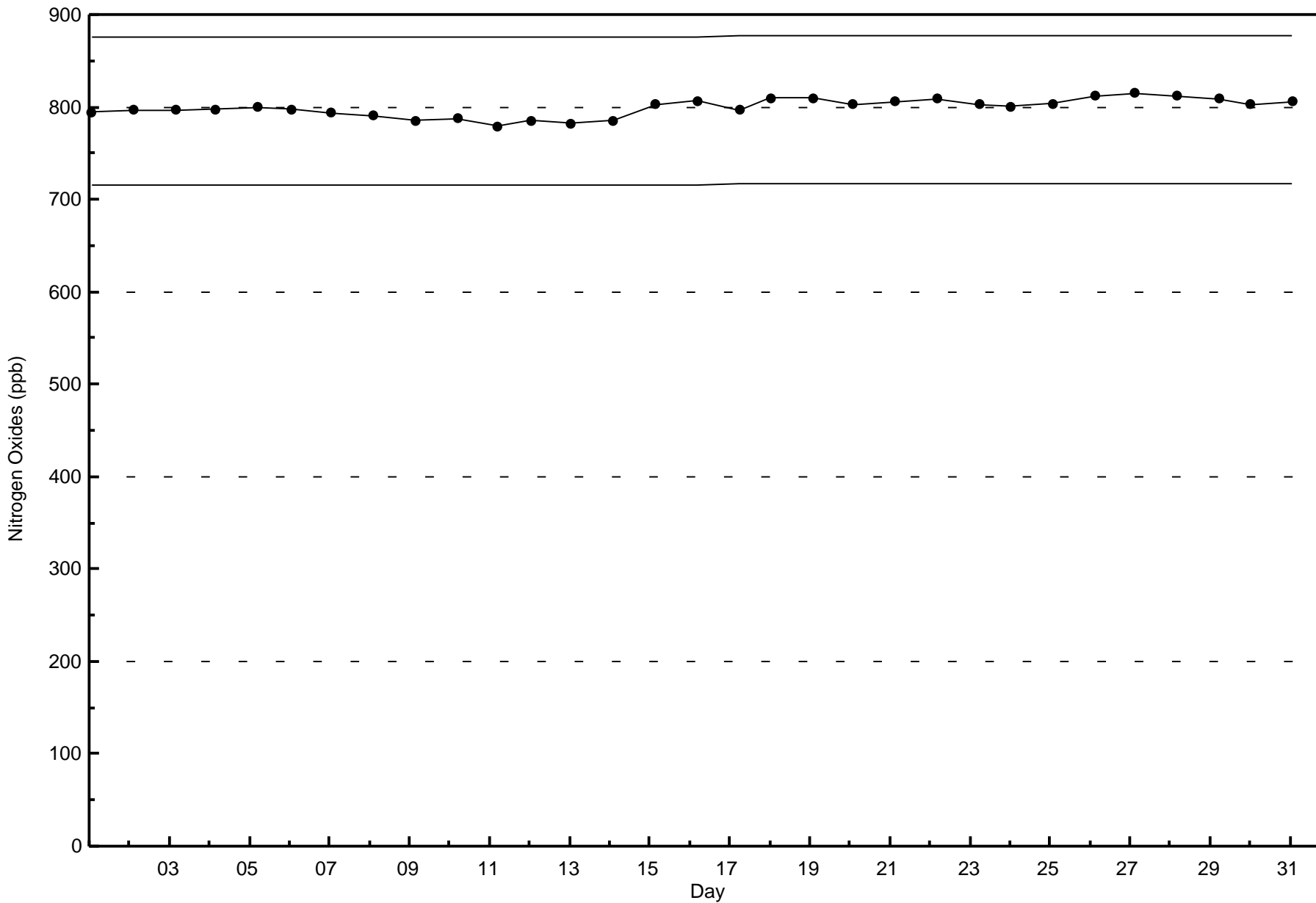
Wood Buffalo Environmental Association
Wind Rose Jan 2017

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon (AMS 15)



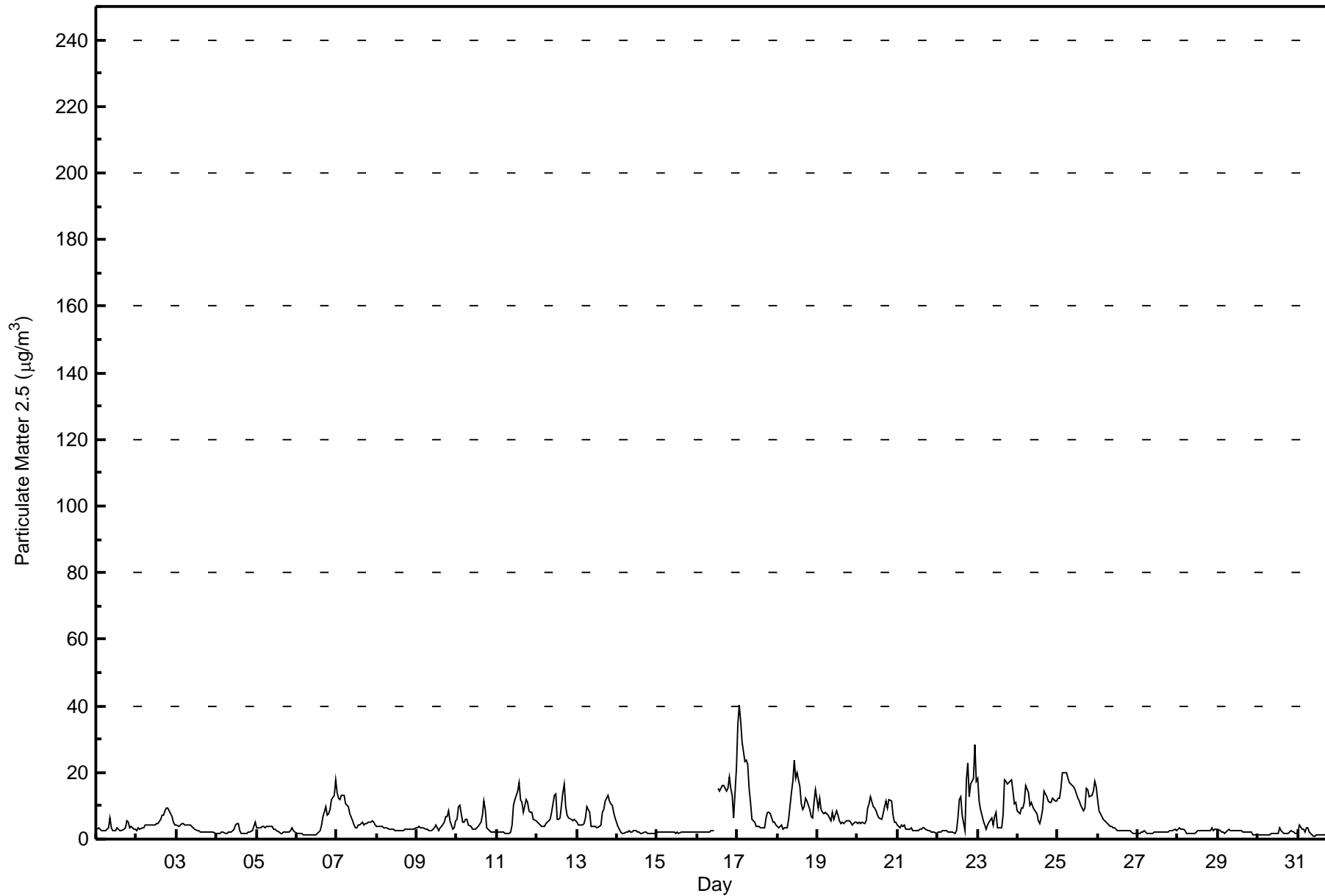
Total Number of Valid Hours: 699







Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 40.2 µg/m ³ on Jan 17 02:00 Minimum Value: 0.9 µg/m ³ on Jan 31 10:00 Maximum Diurnal Average: 7.0 µg/m ³ at hour 18 Monthly Average: 5.56 µg/m ³		Maximum Daily Average: 14.6 µg/m ³ on Jan 25 Minimum Daily Average: 1.7 µg/m ³ on Jan 30 Minimum Diurnal Average: 4.6 µg/m ³ at hour 10 Percentiles: P ₁ = 1.1 P ₁₀ = 1.9 Q ₁ = 2.2 Median = 3.5 Q ₃ = 7.0 P ₉₀ = 12.5 P ₉₉ = 23.6		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-Jan	3.1	3.2	3.1	2.6	2.7	2.6	2.8	3.5	6.4	3.3	2.6	2.7	3.3	3.1	2.8	2.7	3.1	3.6	5.6	4.9	3.2	3.8	3.2	3.1	3.4	6.4																						
2-Jan	2.7	3.6	3.0	3.2	3.5	4.1	4.4	4.2	4.1	4.2	4.2	4.3	4.5	4.8	6.0	7.1	7.3	8.5	9.4	9.2	7.4	6.6	4.9	4.3	5.2	9.4																						
3-Jan	4.2	4.0	4.4	4.6	4.7	4.4	4.2	4.2	4.0	3.9	3.4	3.0	2.7	2.4	2.3	2.2	2.2	2.2	2.3	2.2	2.1	2.0	1.9	3.1	4.7																							
4-Jan	1.8	1.8	1.9	2.0	2.0	1.8	1.8	2.0	2.1	2.1	3.0	4.2	4.7	4.5	2.6	1.9	1.6	1.8	1.8	2.0	2.0	2.7	3.9	5.1	2.5	5.1																						
5-Jan	3.5	3.5	3.5	3.6	3.8	3.4	3.8	3.9	3.7	3.6	3.2	3.0	2.5	2.0	1.6	1.7	2.3	2.1	2.0	2.2	2.4	3.3	2.4	2.0	2.9	3.9																						
6-Jan	1.8	1.8	1.8	1.5	1.3	1.2	1.2	1.1	1.1	1.2	1.1	1.3	1.5	2.0	2.6	4.3	7.0	9.6	7.4	7.5	8.7	11.9	13.2	17.9	4.6	17.9																						
7-Jan	14.0	12.4	12.1	13.3	13.0	10.6	10.3	9.7	7.6	5.7	4.3	3.5	3.4	4.1	4.1	5.3	4.4	4.6	4.8	4.9	4.9	5.4	5.1	4.2	7.2	14.0																						
8-Jan	3.9	3.8	3.8	3.8	3.6	3.5	3.5	3.2	3.1	3.1	2.8	2.5	2.3	2.4	2.5	2.6	2.7	2.8	2.8	2.9	2.8	3.0	3.1	3.4	3.1	3.9																						
9-Jan	3.5	3.8	3.6	3.5	3.3	3.1	2.8	2.7	2.7	2.5	3.5	4.4	3.5	2.6	3.3	3.7	5.3	6.9	6.8	8.5	5.4	2.9	3.4	5.6	4.1	8.5																						
10-Jan	5.7	9.7	10.0	4.9	5.2	5.8	5.8	4.3	3.7	3.0	3.1	2.8	3.2	3.6	5.0	7.4	11.4	8.7	3.2	2.6	2.1	2.1	2.0	1.9	4.9	11.4																						
11-Jan	1.9	2.0	2.1	2.0	1.9	1.9	1.9	1.9	2.2	4.4	10.1	11.8	14.3	16.9	11.9	11.0	8.2	12.0	11.0	8.4	8.1	7.8	6.1	5.3	6.9	16.9																						
12-Jan	5.2	4.7	4.2	3.9	4.0	4.8	5.1	5.4	5.8	8.1	13.1	13.6	6.1	6.1	6.4	14.0	16.3	9.9	7.2	6.3	6.0	5.6	5.7	5.7	7.2	16.3																						
13-Jan	4.9	4.4	4.3	4.3	4.5	6.3	9.8	7.9	3.8	3.6	3.9	3.5	3.7	4.4	8.1	9.0	11.4	13.0	11.3	10.7	10.0	8.0	6.4	6.7	13.0																							
14-Jan	4.0	3.1	2.0	1.9	1.8	1.9	2.2	2.4	2.1	1.9	2.4	2.4	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.9	1.9	1.9	2.1	4.0																						
15-Jan	2.0	2.1	2.1	2.2	2.2	2.1	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	2.1	2.1	2.1	2.0	2.2																						
16-Jan	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.4	2.4	2.4	C	15.4	14.6	15.1	15.9	16.1	14.5	15.1	18.5	15.4	13.3	6.5	21.4	9.0	21.4																						
17-Jan	34.3	40.2	35.7	29.2	23.4	23.6	22.4	15.2	10.9	5.9	5.1	4.0	3.8	3.6	3.6	3.4	3.3	6.3	7.9	7.9	7.5	5.3	4.9	4.4	13.0	40.2																						
18-Jan	3.7	3.4	4.1	2.9	3.4	3.4	3.4	5.8	13.8	17.3	23.6	18.4	19.8	15.7	10.7	9.0	9.7	12.5	11.2	8.9	6.9	6.4	11.1	14.7	10.0	23.6																						
19-Jan	9.5	12.4	8.8	8.2	7.8	7.9	7.0	6.3	5.6	7.9	6.1	8.4	7.3	5.5	4.9	5.0	4.8	5.7	5.4	5.4	5.0	4.1	5.1	5.2	6.6	12.4																						
20-Jan	4.7	5.0	4.8	4.9	4.6	5.6	9.5	10.5	12.6	9.6	9.3	8.4	7.1	6.2	5.8	7.6	9.6	11.2	9.2	11.7	11.3	7.3	5.2	5.0	7.8	12.6																						
21-Jan	4.0	3.5	4.1	4.0	4.2	2.9	2.8	2.8	3.5	2.6	2.3	2.5	2.7	2.9	2.9	3.2	3.5	2.9	2.3	2.5	2.2	2.0	1.9	1.9	2.9	4.2																						
22-Jan	1.9	2.2	2.1	2.4	2.6	2.6	2.3	2.2	2.1	2.0	1.7	2.5	6.2	11.7	12.6	7.2	2.7	17.7	22.8	12.9	16.7	18.4	28.3	17.4	8.4	28.3																						
23-Jan	18.3	11.6	8.8	5.5	4.1	2.8	4.4	5.2	6.2	4.1	6.7	8.0	3.4	3.3	3.6	7.0	17.8	17.3	16.5	17.6	17.9	14.6	10.5	11.0	9.4	18.3																						
24-Jan	8.5	7.8	9.3	9.3	10.9	16.2	14.1	10.0	11.0	9.8	8.8	7.7	5.5	4.6	6.4	8.8	14.2	12.7	11.4	11.0	11.1	12.3	11.6	11.5	10.2	16.2																						
25-Jan	12.3	12.4	15.1	20.1	20.0	19.7	18.1	16.8	16.7	15.9	15.0	13.6	12.1	11.5	10.0	8.3	9.2	15.1	14.8	12.7	13.3	14.5	17.3	15.6	14.6	20.1																						
26-Jan	11.8	8.4	6.6	5.9	5.3	5.2	4.7	4.0	3.6	3.3	3.2	2.9	2.7	2.4	2.4	2.4	2.4	2.7	2.6	2.5	2.0	1.8	1.8	1.9	3.9	11.8																						
27-Jan	1.8	1.7	2.0	2.3	2.4	1.7	1.7	1.7	1.6	1.7	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.4	2.4	2.7	3.1	2.5	2.1	3.1																					
28-Jan	2.8	3.2	3.1	3.1	2.6	1.8	1.7	1.7	1.6	1.6	1.7	2.2	2.6	2.5	2.6	2.7	2.7	2.6	2.7	2.7	3.3	2.5	3.1	2.9	2.5	3.3																						
29-Jan	2.9	2.5	2.0	1.9	1.9	1.9	2.9	2.7	2.6	2.6	2.7	2.5	2.4	2.4	2.3	2.2	2.2	2.3	2.2	2.2	2.2	1.4	1.1	1.1	2.2	2.9																						
30-Jan	1.1	1.2	1.1	1.2	1.1	1.1	1.1	1.3	1.8	1.7	1.6	1.8	1.8	3.5	2.3	1.8	1.8	1.8	1.8	2.0	2.5	2.1	1.7	1.6	1.7	3.5																						
31-Jan	2.0	4.2	3.0	3.0	2.2	3.2	3.3	2.2	1.2	0.9	1.0	1.2	1.3	1.3	1.3	1.4	1.4	1.9	3.2	2.4	2.3	5.5	2.3	2.3	2.3	5.5																						
																								5.9	6.0	5.6	5.3	5.0	5.1	5.3	4.8	4.9	4.6	5.0	5.1	5.0	5.0	4.8	5.3	6.1	7.0	6.9	6.5	6.2	6.0	5.9	6.2	Diurnal Average
																								34.3	40.2	35.7	29.2	23.4	23.6	22.4	16.8	16.7	17.3	23.6	18.4	19.8	16.9	15.1	15.9	17.8	17.7	22.8	18.5	17.9	18.4	28.3	21.4	Diurnal Maximum
C - Calibration																																																
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																																																





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
CNRL Horizon - January 2017

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	509	68.51	68.51
6 - 15	192	25.84	94.35
16 - 25	36	4.85	99.19
26 - 80	5	0.67	99.87
> 81.0	0	0.00	99.87

Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
CNRL Horizon - January 2017

Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	10	57	36	4	0	4	9	11	51	151	87	58	13	4	2	8	505
6 - 15	3	22	13	1	1	0	2	5	42	57	14	6	4	2	6	9	187
16 - 25	0	5	3	0	0	0	1	2	9	14	1	0	0	0	0	1	36
26 - 80	0	0	1	0	0	0	0	0	1	3	0	0	0	0	0	0	5
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	13	84	53	5	1	4	12	18	103	225	102	64	17	6	8	18	733

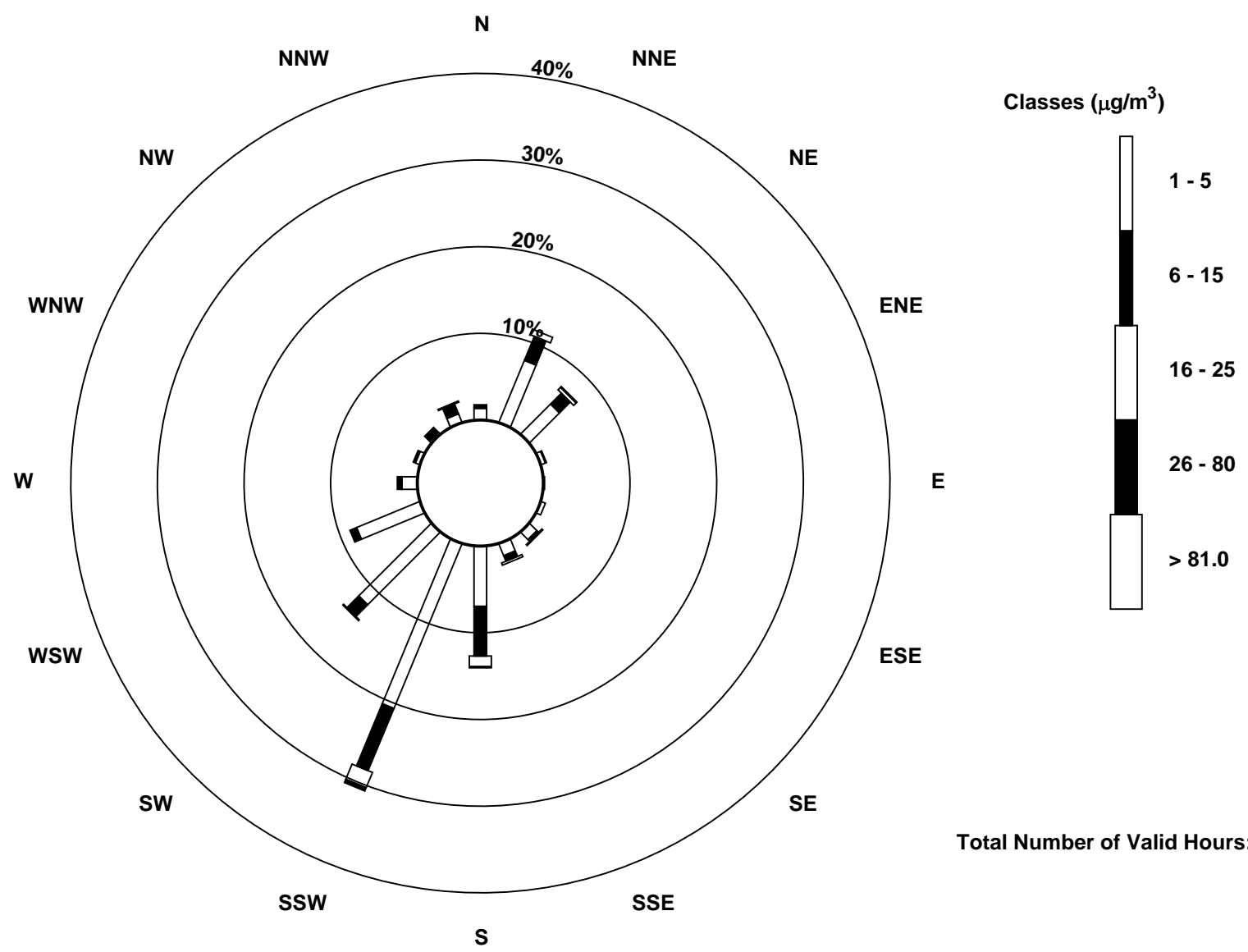
Total Number of Valid Hours: 734

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
CNRL Horizon (AMS 15)



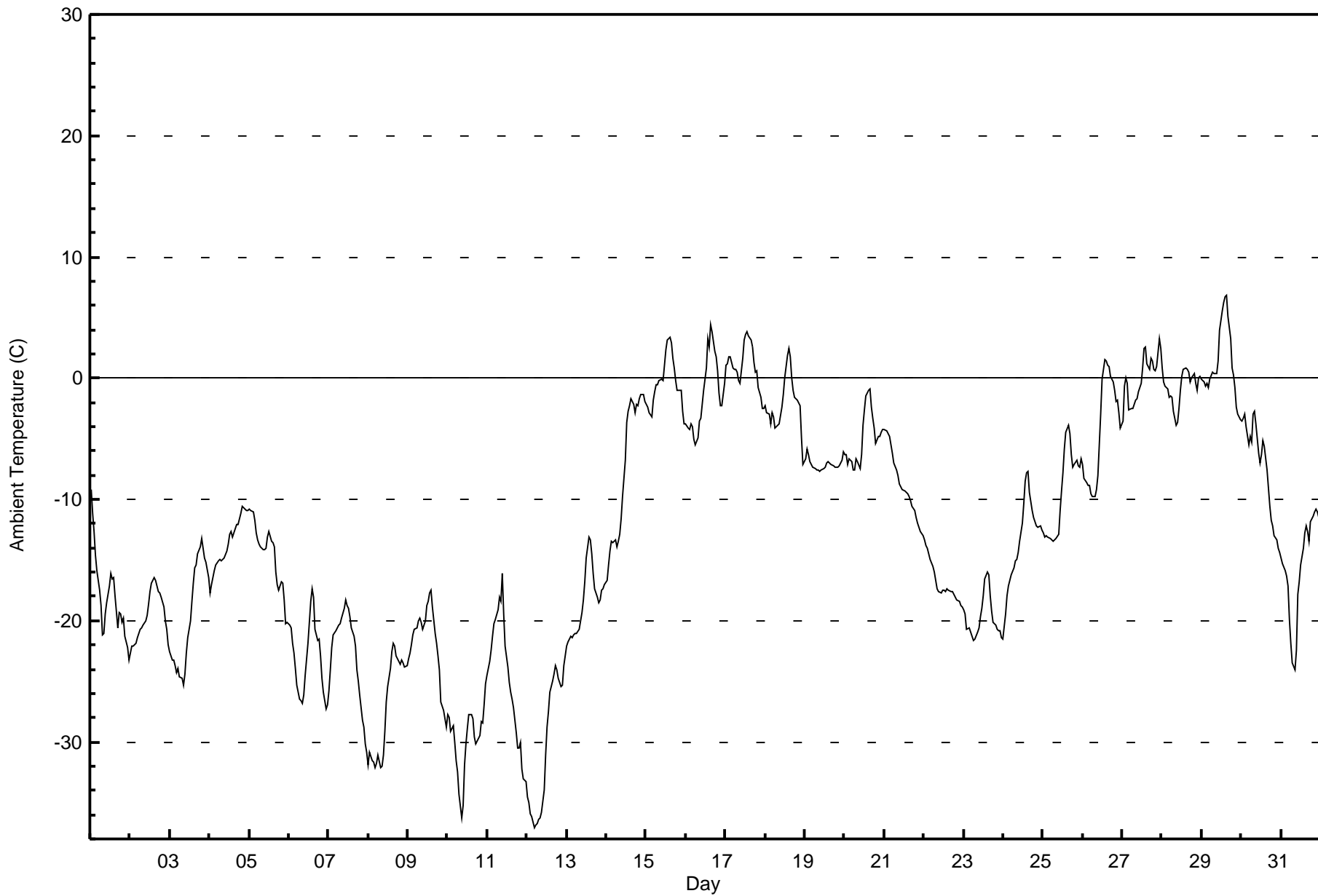
Total Number of Valid Hours: 734



Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature (AT) - C
CNRL Horizon - January 2017

Maximum Value: 6.8 C on Jan 29 16:00 Maximum Daily Average: 1.2 C on Jan 29		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Minimum Value: -37.1 C on Jan 12 05:00 Maximum Diurnal Average: -9.9 C at hour 15 Monthly Average: -12.92 C		Minimum Daily Average: -30.3 C on Jan 12 Minimum Diurnal Average: -14.7 C at hour 9 Percentiles: P ₁ = -35.9 P ₁₀ = -25.9 Q ₁ = -20.6 Median = -13.3 Q ₃ = -3.7 P ₉₀ = 0.2 P ₉₉ = 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-Jan	-9.2	-11.2	-12.7	-14.6	-15.8	-17.5	-18.7	-21.1	-21.0	-19.5	-18.5	-17.1	-16.1	-16.5	-16.4	-17.9	-20.6	-19.4	-19.5	-20.1	-19.8	-21.3	-22.2	-23.2	-17.9	-9.2
2-Jan	-22.7	-22.1	-22.1	-21.9	-21.4	-21.0	-20.7	-20.6	-20.4	-20.1	-19.6	-18.6	-17.5	-16.9	-16.4	-16.7	-17.2	-17.7	-17.7	-18.0	-18.8	-20.1	-20.7	-22.0	-19.6	-16.4
3-Jan	-22.6	-23.3	-23.2	-23.8	-24.2	-23.9	-24.6	-24.8	-25.3	-24.4	-22.7	-21.4	-20.0	-18.4	-16.9	-15.6	-15.4	-14.5	-13.9	-13.3	-14.0	-14.9	-15.1	-16.4	-19.7	-13.3
4-Jan	-17.8	-17.1	-16.5	-15.9	-15.4	-15.0	-15.0	-14.9	-14.8	-14.3	-13.7	-12.9	-12.6	-13.1	-12.8	-13.1	-12.8	-12.1	-11.6	-11.1	-10.6	-10.8	-10.9	-11.0	-13.6	-10.6
5-Jan	-10.8	-10.9	-11.0	-11.7	-12.7	-13.3	-13.7	-14.0	-14.1	-14.1	-14.1	-13.1	-12.6	-13.5	-13.6	-14.0	-16.0	-17.0	-17.5	-16.8	-16.9	-18.3	-20.2	-20.1	-14.6	-10.8
6-Jan	-20.4	-20.6	-21.9	-22.7	-23.9	-25.3	-26.4	-26.5	-26.9	-26.2	-24.5	-21.8	-20.1	-18.3	-17.4	-18.1	-20.7	-21.6	-21.5	-22.9	-24.7	-25.9	-27.3	-27.0	-23.0	-17.4
7-Jan	-25.8	-24.0	-22.2	-21.2	-20.8	-20.5	-20.4	-20.2	-19.8	-19.0	-18.2	-18.8	-19.0	-19.7	-20.6	-21.3	-22.1	-24.0	-25.0	-26.1	-28.2	-28.7	-30.1	-30.9	-22.8	-18.2
8-Jan	-31.9	-30.8	-31.6	-31.7	-32.1	-31.7	-31.1	-32.1	-32.0	-31.1	-29.1	-26.6	-25.4	-23.9	-22.6	-21.8	-22.1	-22.9	-23.4	-23.5	-23.2	-23.5	-23.9	-23.7	-27.2	-21.8
9-Jan	-23.2	-22.7	-22.0	-21.2	-20.8	-20.5	-20.0	-19.8	-20.2	-20.7	-20.0	-18.7	-18.4	-17.8	-17.5	-18.8	-21.1	-21.9	-22.9	-24.1	-26.7	-27.4	-28.1	-28.7	-21.8	-17.5
10-Jan	-27.7	-28.0	-29.1	-28.7	-30.1	-31.5	-32.5	-34.3	-36.2	-35.2	-31.9	-30.2	-28.9	-27.7	-27.7	-28.0	-29.5	-30.2	-29.9	-29.5	-28.3	-28.4	-27.0	-25.2	-29.8	-25.2
11-Jan	-24.5	-23.3	-22.5	-21.2	-20.3	-19.9	-19.1	-18.0	-18.4	-16.1	-19.4	-22.1	-23.8	-25.1	-25.9	-26.5	-27.1	-29.2	-30.6	-30.5	-30.0	-32.3	-33.1	-33.2	-24.7	-16.1
12-Jan	-34.5	-34.9	-35.9	-36.2	-37.1	-36.8	-36.8	-36.4	-36.3	-35.8	-33.9	-31.1	-28.8	-27.5	-25.9	-25.0	-24.5	-23.7	-24.1	-24.7	-25.4	-25.3	-23.7	-22.9	-30.3	-22.9
13-Jan	-22.2	-21.8	-21.3	-21.4	-21.2	-21.0	-21.0	-20.7	-20.0	-19.3	-18.3	-16.8	-14.8	-13.1	-13.3	-14.5	-16.1	-17.4	-18.0	-18.5	-18.3	-17.5	-17.3	-17.0	-18.4	-13.1
14-Jan	-16.7	-15.4	-14.2	-13.4	-13.5	-13.3	-13.9	-13.4	-12.9	-11.6	-9.8	-6.7	-3.7	-2.7	-2.3	-1.7	-2.2	-2.9	-2.2	-2.2	-1.7	-1.3	-1.3	-1.9	-7.5	-1.3
15-Jan	-2.1	-2.3	-2.8	-3.2	-1.8	-1.2	-0.5	-0.5	-0.2	-0.1	-0.2	1.0	2.4	3.2	3.4	2.9	1.7	0.9	-0.2	-1.1	-1.0	-1.0	-2.8	-3.8	-0.4	3.4
16-Jan	-3.8	-4.1	-4.3	-3.8	-4.0	-5.0	-5.5	-4.9	-3.6	-3.3	-2.2	-1.0	0.9	3.3	2.5	4.4	3.8	2.2	1.8	0.6	-1.3	-2.3	-2.3	-0.5	-1.4	4.4
17-Jan	1.1	1.2	1.7	1.7	0.8	0.7	0.7	0.5	-0.2	-0.4	1.6	3.2	3.7	3.8	3.5	3.1	2.5	1.3	0.5	0.6	-0.8	-1.6	-2.5	-2.5	1.0	3.8
18-Jan	-2.2	-2.8	-3.0	-3.8	-2.9	-3.2	-4.1	-4.0	-3.7	-3.1	-2.4	-1.3	0.0	1.9	2.5	1.8	0.0	-1.0	-1.6	-1.8	-2.1	-2.2	-5.0	-7.1	-2.1	2.5
19-Jan	-6.7	-5.8	-6.3	-6.8	-7.1	-7.4	-7.4	-7.5	-7.6	-7.7	-7.6	-7.5	-7.3	-7.0	-6.9	-7.0	-7.1	-7.2	-7.3	-7.4	-7.3	-7.2	-6.7	-6.1	-7.1	-5.8
20-Jan	-6.3	-6.3	-7.1	-6.7	-6.8	-7.6	-7.6	-6.6	-6.9	-7.5	-6.3	-3.9	-2.7	-1.4	-1.0	-0.9	-2.4	-3.3	-4.2	-5.4	-4.8	-4.8	-4.5	-4.3	-5.0	-0.9
21-Jan	-4.2	-4.4	-4.5	-4.9	-5.5	-6.2	-7.0	-7.5	-8.1	-8.7	-9.0	-9.2	-9.4	-9.4	-9.5	-9.8	-10.1	-10.6	-10.9	-11.4	-12.0	-12.3	-12.7	-13.0	-8.8	-4.2
22-Jan	-13.4	-13.8	-14.1	-14.5	-14.9	-15.5	-16.0	-16.6	-17.3	-17.6	-17.7	-17.4	-17.5	-17.5	-17.4	-17.5	-17.6	-17.6	-17.8	-18.0	-18.2	-18.4	-18.7	-18.8	-16.8	-13.4
23-Jan	-19.1	-19.5	-20.7	-20.6	-20.9	-21.3	-21.6	-21.5	-21.0	-20.6	-19.6	-18.9	-18.0	-16.5	-16.0	-16.2	-18.0	-19.2	-20.1	-20.4	-20.7	-20.9	-20.9	-21.4	-19.7	-16.0
24-Jan	-21.5	-19.5	-17.9	-17.1	-16.7	-16.2	-15.7	-15.1	-15.0	-14.4	-13.4	-12.0	-10.4	-8.5	-7.8	-7.7	-9.4	-10.9	-11.5	-11.8	-12.2	-12.3	-12.1	-12.5	-13.4	-7.7
25-Jan	-12.8	-13.2	-13.0	-13.1	-13.2	-13.3	-13.5	-13.3	-13.3	-12.9	-11.0	-9.3	-7.8	-5.8	-4.5	-3.9	-4.6	-6.3	-7.4	-7.1	-6.7	-7.2	-7.3	-6.6	-9.5	-3.9
26-Jan	-7.2	-8.3	-8.6	-8.8	-8.8	-9.5	-9.7	-9.7	-9.1	-8.0	-5.5	-3.0	-0.1	1.5	1.4	1.1	1.0	0.2	-0.4	-1.0	-1.9	-1.8	-2.9	-4.1	-4.3	1.5
27-Jan	-3.6	-0.6	0.0	-0.4	-2.6	-2.5	-2.5	-2.2	-1.8	-1.7	-1.1	-0.4	0.8	2.5	2.5	1.2	0.7	1.7	1.4	0.7	0.6	1.0	3.2	2.5	0.0	3.2
28-Jan	0.9	-0.3	-0.7	-0.9	-1.5	-1.5	-1.5	-2.8	-3.9	-3.6	-2.5	-1.0	0.2	0.8	0.8	0.7	0.5	-0.3	0.0	0.4	-0.5	-1.0	0.0	0.2	-0.7	0.9
29-Jan	-0.1	-0.3	-0.7	-0.5	-0.8	-0.1	0.5	0.4	0.4	0.3	1.4	3.9	5.6	6.3	6.7	6.8	5.2	3.2	0.9	0.2	-0.8	-2.4	-2.9	-3.4	1.2	6.8
30-Jan	-3.5	-3.3	-2.9	-4.0	-5.4	-4.9	-5.2	-3.0	-2.8	-3.8	-6.2	-6.9	-6.3	-5.2	-5.7	-7.6	-9.0	-10.5	-11.7	-12.2	-13.0	-13.3	-14.0	-14.4	-7.3	-2.8
31-Jan	-14.8	-15.3	-15.9	-16.4	-17.2	-19.9	-21.9	-23.5	-24.0	-22.4	-17.9	-16.8	-15.4	-14.0	-12.8	-12.2	-12.6	-13.4	-11.9	-11.4	-11.0	-10.8	-11.0	-11.5	-15.6	-10.8
	-13.8	-13.7	-13.8	-13.8	-14.2	-14.4	-14.6	-14.7	-14.7	-14.3	-13.3	-12.2	-11.1	-10.2	-9.9	-10.1	-11.0	-11.8	-12.2	-12.5	-12.9	-13.4	-13.7	-13.9	Diurnal Average	
	1.1	1.2	1.7	1.7	0.8	0.7	0.7	0.5	0.4	0.3	1.6	3.9	5.6	6.3	6.7	6.8	5.2	3.2	1.8	0.7	0.6	1.0	3.2	2.5	Diurnal Maximum	





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
CNRL Horizon - January 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	207	27.82	27.82
-20 - 0	459	61.69	89.52
0 - 10	78	10.48	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

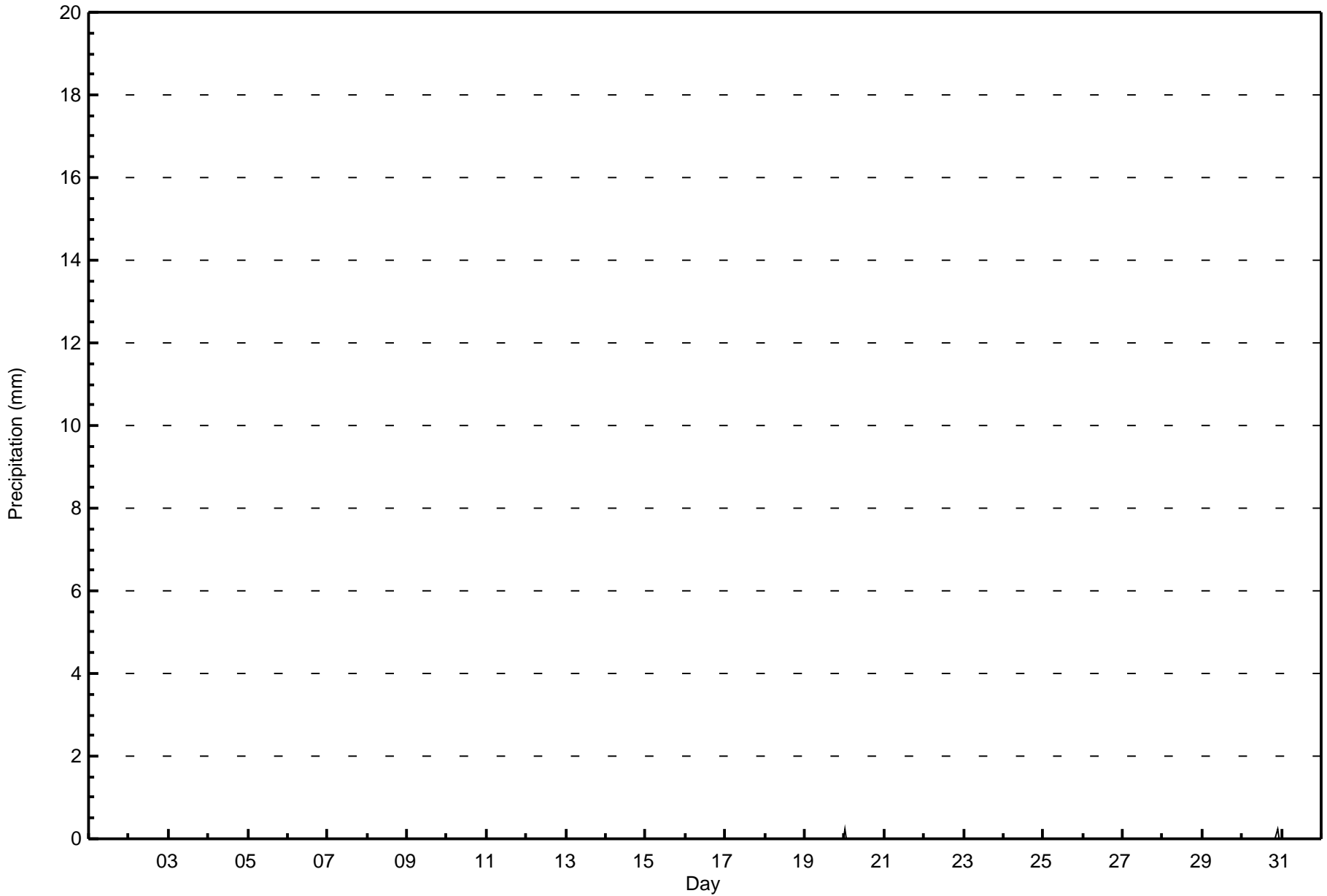
CNRL Horizon - January 2017

Maximum Value: 0.3 mm on Jan 20 01:00		Maximum Daily Total: 0.3 mm on Jan 20		Hours in Service: 744																								
Minimum Value: 0.0 mm on Jan 1 01:00		Minimum Daily Total: 0.0 mm on Jan 1		Hours of Data: 744																								
Maximum Diurnal Total: 0.3 mm at hour 1		Minimum Diurnal Total: 0.0 mm at hour 2		Hours of Missing Data: 0																								
Monthly Total: 0.51 mm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.0		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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	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
21-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
31-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
CNRL Horizon - January 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

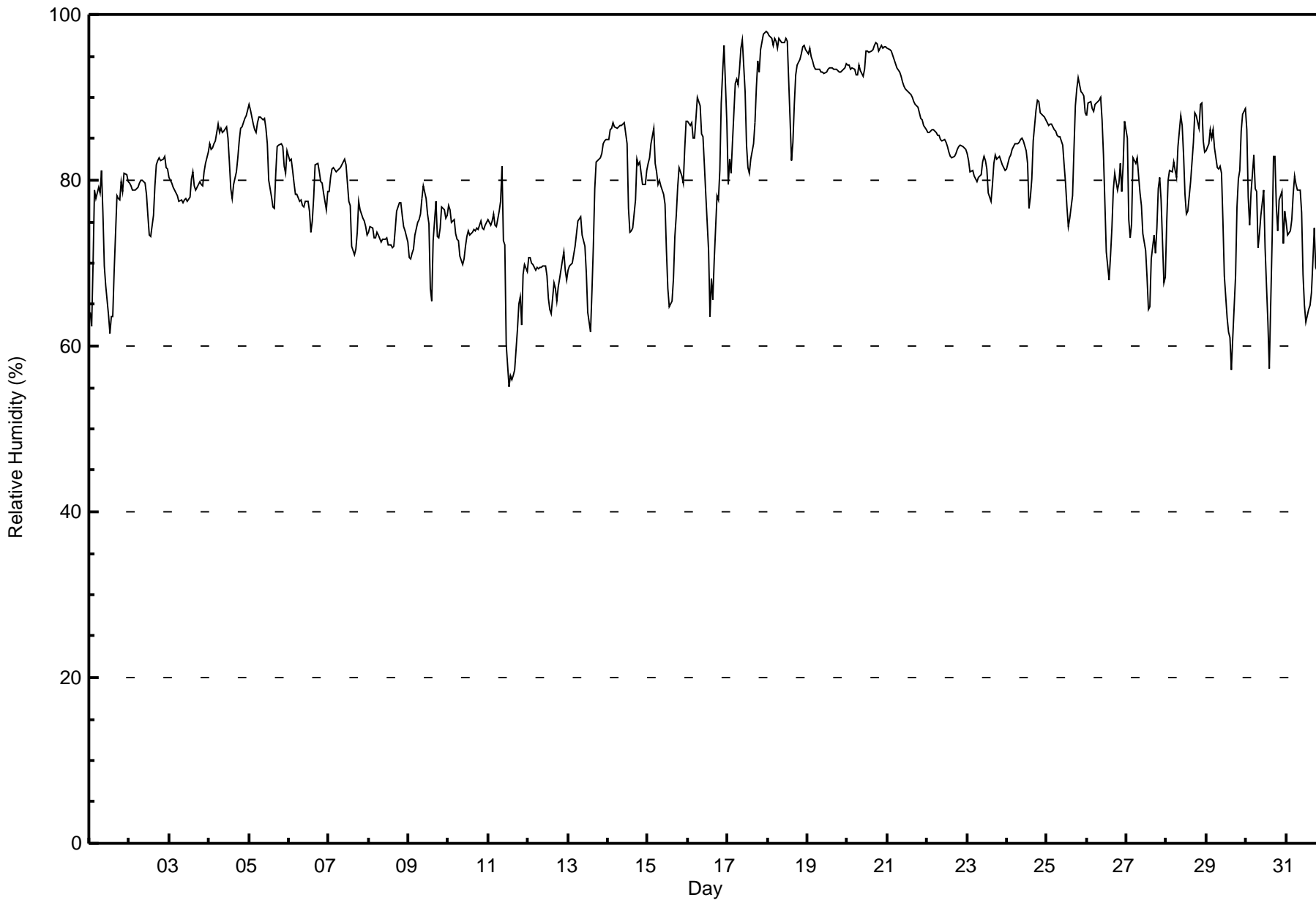
**Relative Humidity (RH) - %
CNRL Horizon - January 2017**

Maximum Value: 98 % on Jan 18 00:00 Maximum Daily Average: 94.8 % on Jan 20																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 55 % on Jan 11 13:00 Minimum Daily Average: 68.1 % on Jan 11 Maximum Diurnal Average: 82.7 % at hour 6 Minimum Diurnal Average: 73.5 % at hour 14 Monthly Average: 80.5 % Percentiles: P ₁ = 60 P ₁₀ = 70 Q ₁ = 75 Median = 81 Q ₃ = 86 P ₉₀ = 93 P ₉₉ = 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-Jan	64	62	70	79	78	79	78	81	76	70	67	64	62	64	64	69	78	78	78	80	79	81	81	80	73.3	81
2-Jan	80	79	79	79	79	79	80	80	80	80	78	76	73	73	76	79	82	82	83	82	83	83	82	81	79.5	83
3-Jan	80	80	79	79	78	78	77	78	77	78	78	78	80	81	79	79	79	80	79	79	81	82	83	79.2	83	
4-Jan	84	84	84	84	85	87	86	86	86	86	85	82	79	78	79	81	83	85	86	87	88	88	88	84.5	88	
5-Jan	89	89	87	86	86	87	88	88	87	88	86	84	80	78	77	81	84	84	84	84	82	81	84	84.1	89	
6-Jan	82	83	81	80	78	78	77	78	77	77	77	76	74	75	78	82	82	81	80	80	78	77	79	78.6	83	
7-Jan	79	80	81	82	81	81	81	82	82	82	82	80	77	77	72	71	72	74	77	76	75	75	74	73	77.8	82
8-Jan	74	74	74	73	73	74	73	73	73	73	73	73	72	72	72	72	74	76	77	77	76	74	74	73	73.7	77
9-Jan	71	71	71	72	73	75	75	76	78	79	78	76	75	67	65	73	78	73	73	74	77	76	75	76	74.0	79
10-Jan	77	76	75	75	74	73	73	71	70	71	72	73	74	73	74	74	74	74	74	75	74	74	75	75	73.7	77
11-Jan	75	75	75	76	75	74	76	77	82	73	72	60	55	56	56	56	57	62	65	66	62	69	70	69	68.1	82
12-Jan	71	71	70	70	69	70	69	70	70	70	70	68	66	64	64	68	67	65	67	68	70	71	69	68	68.5	71
13-Jan	69	70	70	71	72	74	75	76	73	73	72	69	64	62	67	72	79	82	83	83	83	84	85	85	74.6	85
14-Jan	85	86	86	87	87	86	86	87	87	87	87	84	77	74	74	78	83	82	82	81	79	80	81	82.4	87	
15-Jan	82	83	84	86	82	81	80	80	79	78	77	72	67	65	65	68	73	76	79	82	80	84	87	77.9	87	
16-Jan	87	87	87	85	85	88	90	89	86	85	82	78	72	64	68	66	70	78	78	81	89	93	96	87	82.1	96
17-Jan	79	83	81	85	92	92	92	93	96	97	91	84	82	81	83	84	87	91	94	93	96	98	98	98	89.5	98
18-Jan	98	97	97	96	97	97	96	97	97	97	97	97	97	87	82	85	89	93	94	95	95	96	96	96	94.5	98
19-Jan	95	96	95	94	94	93	93	93	93	93	93	93	93	94	94	94	93	93	93	93	93	93	94	94	93.7	96
20-Jan	94	94	93	94	93	93	93	94	93	93	93	96	96	95	96	96	96	97	96	96	96	96	96	96	94.8	97
21-Jan	96	96	96	95	95	94	94	93	93	92	91	91	91	90	90	90	90	89	89	88	87	87	87	86	91.2	96
22-Jan	86	86	86	86	86	86	85	85	85	85	85	85	84	83	83	83	83	83	84	84	84	84	84	84	84.5	86
23-Jan	83	82	81	81	81	80	80	80	81	82	83	82	81	79	77	79	82	83	83	83	82	82	81	81	81.3	83
24-Jan	81	83	83	84	84	84	84	85	85	85	85	84	82	77	78	80	85	89	90	90	88	88	87	87	84.4	90
25-Jan	87	87	87	87	86	86	85	85	85	84	82	80	77	74	75	78	84	89	91	92	91	91	90	88	85.0	92
26-Jan	88	89	90	89	88	89	89	90	90	87	83	77	71	68	71	74	79	81	79	80	82	79	82	87	82.6	90
27-Jan	85	75	73	75	83	82	83	80	78	77	74	72	68	64	65	70	73	71	74	79	80	78	68	68	74.8	85
28-Jan	75	80	81	81	82	81	80	84	88	87	83	78	76	76	80	82	85	88	88	86	89	89	85	83	82.8	89
29-Jan	84	84	86	85	86	84	82	81	82	81	75	68	63	62	61	57	61	68	77	80	81	86	88	89	77.1	89
30-Jan	86	78	75	78	83	79	79	72	74	76	79	72	67	63	57	73	83	83	77	74	78	79	72	76	75.5	86
31-Jan	75	73	74	75	78	80	79	79	79	76	69	65	63	64	65	66	70	74	69	69	69	71	72	79	72.3	80
																		82.0 81.7 81.7 82.2 82.7 82.7 82.6 82.6 82.6 81.9 80.6 78.1 75.5 73.5 73.7 75.7 78.8 80.8 81.4 81.9 82.3 82.7 82.3 82.7						Diurnal Average		
																		98 97 97 96 97 97 96 97 97 97 97 97 97 95 96 96 96 97 96 96 96 98 98 98						Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
CNRL Horizon - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
CNRL Horizon - January 2017

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	7	0.94	0.94
60 - 80	347	46.64	47.58
80 - 100	390	52.42	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

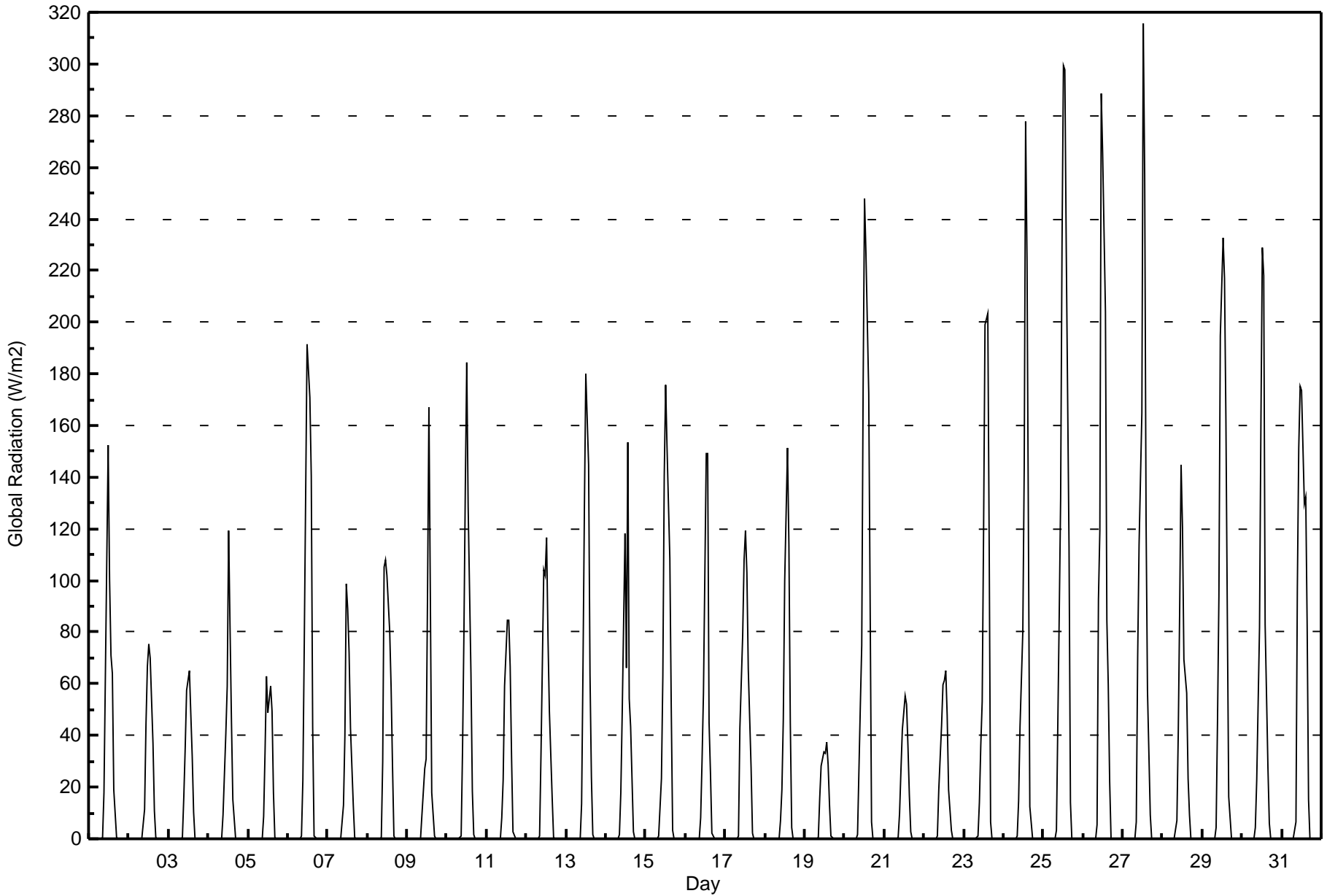
CNRL Horizon - January 2017

Maximum Value: 316 W/m2 on Jan 27 13:00 Maximum Daily Average: 58.6 W/m2 on Jan 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: 0 W/m2 on Jan 1 01:00 Minimum Daily Average: 8.0 W/m2 on Jan 19 Maximum Diurnal Average: 140.3 W/m2 at hour 13 Minimum Diurnal Average: 0.0 W/m2 at hour 1 Monthly Average: 25.9 W/m2 Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 23 P ₉₀ = 98 P ₉₉ = 250																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	0	0	0	0	0	0	0	0	0	18	63	152	100	71	64	19	0	0	0	0	0	0	0	0	20.4	152
2-Jan	0	0	0	0	0	0	0	0	0	11	44	67	75	70	37	11	0	0	0	0	0	0	0	0	13.1	75
3-Jan	0	0	0	0	0	0	0	0	0	16	35	58	65	48	32	10	0	0	0	0	0	0	0	0	11.1	65
4-Jan	0	0	0	0	0	0	0	0	0	9	41	59	120	82	46	15	0	0	0	0	0	0	0	0	15.5	120
5-Jan	0	0	0	0	0	0	0	0	0	9	34	63	49	59	49	18	1	0	0	0	0	0	0	0	11.7	63
6-Jan	0	0	0	0	0	0	0	1	23	75	191	181	171	140	44	1	0	0	0	0	0	0	0	0	34.5	191
7-Jan	0	0	0	0	0	0	0	0	13	39	99	89	72	43	13	1	0	0	0	0	0	0	0	0	15.3	99
8-Jan	0	0	0	0	0	0	0	1	30	105	108	102	80	59	28	1	0	0	0	0	0	0	0	0	21.4	108
9-Jan	0	0	0	0	0	0	0	0	9	27	31	94	167	94	18	1	0	0	0	0	0	0	0	0	18.4	167
10-Jan	0	0	0	0	0	0	0	1	35	80	137	184	128	64	18	2	0	0	0	0	0	0	0	0	27.0	184
11-Jan	0	0	0	0	0	0	0	0	8	23	59	85	85	67	32	3	0	0	0	0	0	0	0	0	15.0	85
12-Jan	0	0	0	0	0	0	0	1	32	104	102	116	78	49	16	1	0	0	0	0	0	0	0	0	20.8	116
13-Jan	0	0	0	0	0	0	0	0	14	67	128	180	145	63	24	2	0	0	0	0	0	0	0	0	25.9	180
14-Jan	0	0	0	0	0	0	0	2	18	49	118	66	154	54	44	3	0	0	0	0	0	0	0	0	21.1	154
15-Jan	0	0	0	0	0	0	0	1	23	63	140	176	151	108	51	3	0	0	0	0	0	0	0	0	29.9	176
16-Jan	0	0	0	0	0	0	0	0	8	31	56	149	149	45	25	2	0	0	0	0	0	0	0	0	19.4	149
17-Jan	0	0	0	0	0	0	0	1	43	78	108	120	103	66	27	2	0	0	0	0	0	0	0	0	22.9	120
18-Jan	0	0	0	0	0	0	0	0	7	19	46	100	151	114	45	5	0	0	0	0	0	0	0	0	20.3	151
19-Jan	0	0	0	0	0	0	0	1	16	28	34	33	37	29	13	1	0	0	0	0	0	0	0	0	8.0	37
20-Jan	0	0	0	0	0	0	0	2	52	75	175	248	227	173	91	6	0	0	0	0	0	0	0	0	43.7	248
21-Jan	0	0	0	0	0	0	0	0	10	27	42	55	52	36	17	3	0	0	0	0	0	0	0	0	10.1	55
22-Jan	0	0	0	0	0	0	0	1	19	44	60	61	65	48	19	3	0	0	0	0	0	0	0	0	13.3	65
23-Jan	0	0	0	0	0	0	0	1	14	36	53	120	199	204	113	7	0	0	0	0	0	0	0	0	31.1	204
24-Jan	0	0	0	0	0	0	0	1	15	43	80	144	277	224	120	13	0	0	0	0	0	0	0	0	38.2	277
25-Jan	0	0	0	0	0	0	0	3	87	132	230	300	298	229	113	14	0	0	0	0	0	0	0	0	58.6	300
26-Jan	0	0	0	0	0	0	0	5	93	119	288	265	204	85	60	22	0	0	0	0	0	0	0	0	47.6	288
27-Jan	0	0	0	0	0	0	0	6	70	114	165	316	257	123	57	9	0	0	0	0	0	0	0	0	46.6	316
28-Jan	0	0	0	0	0	0	0	7	42	89	145	120	70	57	23	9	0	0	0	0	0	0	0	0	23.4	145
29-Jan	0	0	0	0	0	0	0	4	46	94	195	233	217	162	87	16	0	0	0	0	0	0	0	0	43.9	233
30-Jan	0	0	0	0	0	0	0	5	23	82	162	229	218	83	28	6	0	0	0	0	0	0	0	0	34.8	229
31-Jan	0	0	0	0	0	0	0	7	97	151	175	174	129	132	83	15	0	0	0	0	0	0	0	0	40.2	175
																			Diurnal Average							
																			Diurnal Maximum							



Wood Buffalo Environmental Association
Hourly Averages

Global Radiation (GR) - W/m²
CNRL Horizon - January 2017





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Speed (WS) - km/h
CNRL Horizon - January 2017

Maximum Speed: 38 km/h on Jan 11 13:00	Maximum Daily Speed Average: 15.6 km/h on Jan 25	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jan 1 19:00	Minimum Daily Speed Average: 2.5 km/h on Jan 31	Hours of Data: 735
Maximum Diurnal Speed Average: 5.9 km/h at hour 7	Minimum Diurnal Speed Average: 3.3 km/h at hour 15	Hours of Missing Data: 9
Monthly Average Velocity: 4.6 km/h 217.1 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 6 Median = 9 Q ₃ = 12 P ₉₀ = 16 P ₉₉ = 25	Percent Operational Time: 98.8

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jan	NNW36	NNW27	N15	NE10	NE9	ENE8	NE5	WSW6	WNW10	NW14	NNW6	W3	W7	NNW4	SE4	ESE5	AF	ESE4	NNE0	S3	SSW6	WSW3	SSW6	SSE3	NNW4.4	NNW36	
2-Jan	SSW6	SSW5	SSW6	SSW6	SSW6	SSW5	SSW5	SSE4	SSE3	SSE2	S3	S2	S3	SSW4	SW4	S5	S5	SSW5	SSW6	SSW6	S6	SSW10	SSW9	SSW11	SSW5.2	SSW11	
3-Jan	SSW12	SSW13	SSW13	SSW13	SSW13	SSW11	SSW7	SSW12	SSW9	SSW8	S8	S4	SSW5	S7	S6	SW9	SW9	SW10	SW7	WSW10	WSW12	SW9	SW6	SW6	SSW8.7	SSW13	
4-Jan	SW6	SSW5	SSW1	SSE3	SE2	ESE2	AF	SE3	SSW4	SSW3	S5	SSW5	S7	SSW9	SSW9	S11	S13	S12	SSW11	SSW9	S5	SE4	AF	NNE5	S5.3	S13	
5-Jan	NNE8	NNE10	NNE12	NNE15	NNE12	NNE10	NE9	NE7	NE6	ENE5	NE3	NNE8	NNE17	NNE16	NNE15	NNE12	NNE7	N6	NNE8	NE7	NNE3	SW3	SW6	SW7	NNE7.3	NNE17	
6-Jan	SW9	SSW12	SSW8	SSW8	SSW6	SSW6	SW7	SSW7	SSW10	SSW10	S8	S10	S8	S9	SSE7	S7	SSE4	S10	SSW11	SE4	WSW2	ENE2	NW3	NNE5	SSW6.3	SSW12	
7-Jan	NE4	SSW1	W3	SW3	SW1	AF	AF	AF	AF	NNE7	NNE15	NNE16	NE13	NE15	NNE16	NE13	NE13	NE7	NE6	N5	W2	WSW4	SW7	SW8	NNE5.1	NNE16	
8-Jan	SW9	SW9	SSW5	SW6	SSW8	S9	S9	SSW10	S11	S12	S11	SSW12	SSW14	SSW13	SSW16	SSW13	SW12	SSW10	S14	SSW15	SW17	SW17	SW16	WSW15	SSW11.2	SW17	
9-Jan	WSW16	SW12	SW13	SSW13	SW11	SW10	SW9	SW8	SSW5	SW5	NW4	WNW5	NNW4	N1	SSW3	S4	WNW4	NW6	NW8	NW5	WSW4	SSW3	ENE1	NNE4	WSW4.7	WSW16	
10-Jan	NNE6	NNE6	NE2	NE3	S2	SSW1	SE2	ENE1	S3	SSW6	SSW6	S7	SE8	SE6	SE5	SSE6	S7	SW8	SW9	SW11	SW13	SSW11	SSW10	SSW12	S4.1	SW13	
11-Jan	SSW14	SSW14	SSW13	SSW15	SSW17	SSW13	SW10	WNW1	S3	NNW21	N31	NNW33	NNW38	NNW38	NNW30	NNW23	NNW14	NW1	WNW5	NNW6	NNW8	W6	WSW7	WSW6	NNW8.0	NNW38	
12-Jan	SW5	SW7	SSW7	SSW8	SSW8	SSW10	SSW11	SSW12	SSW12	SSW10	SSW9	SSW11	SSW11	SSW11	SSW7	S9	SSW11	SW6	WSW4	W6	SW6	SW6	SW9	SSW10	SSW8.3	SSW12	
13-Jan	SSW12	SSW12	SW9	SW4	WSW6	NE1	AF	SSW3	SSW5	S4	S5	SSW9	SSW8	SSW6	SE4	E4	NNE3	NNW4	WSW2	SSW7	SSW10	SSW10	S12	SSW14	SSW5.4	SSW14	
14-Jan	SSW15	SSW15	SSW13	SSW15	SSW13	S10	SSE8	SSE9	S11	S11	S10	SSW12	SSW11	SW18	SW14	SW16	SSW9	SSW9	SW14	SW17	SW17	WSW16	WSW14	SW16	SSW12.3	SSW18	
15-Jan	SW18	SW19	WSW7	SW12	WSW15	SW17	WSW16	SW15	WSW18	WSW20	WSW23	WSW19	WSW19	WSW18	WSW16	WSW15	SW15	WSW18	WSW14	WSW11	SW15	SW14	SSW13	SSW13	SSW15.5	WSW23	
16-Jan	SSW13	SSW16	SSW16	SSW15	SSW14	SSW13	SSW9	SSW10	SSW7	SSW7	SSW10	SSW8	WSW4	SSW9	SSE6	SSW9	SSW5	SSW10	SSW10	SSW9	SW6	SW5	SW6	S10	SSW9.2	SSW16	
17-Jan	SSW8	SSW8	SSW9	S6	SSW7	SSW11	SSW15	SSW12	S10	SSW8	SW14	SW17	SW14	SW11	SSW8	SW12	SW9	SSW9	SSW8	SSW10	S6	SSW10	SSW12	SSW10	SSW9.8	SW17	
18-Jan	S7	S7	SSW7	WSW4	S2	SSE3	W2	N4	NNW3	NNE3	SW2	SSW1	S2	S4	S6	S10	S11	SSW11	SSW12	SSW10	SSW10	SSW6	NE5	NNE8	SSW3.7	SSW12	
19-Jan	NNE8	NNE10	NE11	NE8	NNE6	NNE6	NE7	NNE8	NNE6	NNE6	NE5	NNE8	NNE7	NE6	NE6	NE6	NE6	NE6	NE6	NE5	NE5	N2	AF	ESE1	NNE6.2	NE11	
20-Jan	SE3	SSE2	S5	S6	SSW6	S8	S9	SSW10	S7	S6	SSW6	S5	S6	S7	S8	S9	SSW7	SW7	N3	NNE5	NNE7	NNE8	NNE6	NE8	S3.3	SSW10	
21-Jan	NNE9	NNE9	NNE9	NNE10	NNE11	NNE9	NNE10	NNE9	NNE8	NNE8	NNE8	NNE8	NE9	NNE8	NNE8	NNE9	NNE8	NNE9	NNE8	NNE9	NNE8	NNE10	NNE10	NNE10	NE9	NNE8.9	NNE11
22-Jan	NNE10	NNE10	NE8	NNE9	NNE10	NE10	NE10	NE11	NE12	NE10	NE10	NNE8	NNE7	NE7	NNE7	NNE6	NE6	NE6	NNE7	NE7	NE7	NNE6	NE6	NNE4	NE8.1	NE12	
23-Jan	NE2	NE1	W2	W3	SW2	SW1	SW2	SW2	SW4	WSW6	WSW6	SW6	SSW5	S5	S6	SSE4	SE4	SSE4	S5	SSW7	SSW8	SSW8	S8	S8	SSW3.8	SW8	
24-Jan	S8	S8	S8	SSE4	S7	S6	S7	S7	S7	S6	S6	S8	SSW8	SSW10	S9	S9	S11	S9	S8	S9	SSW10	SSW13	SSW14	SSW14	S8.4	SSW14	
25-Jan	SSW14	SSW14	S13	S17	SSW19	S17	S16	S16	S15	SSW16	SSW18	SSW19	SSW17	SSW17	SSW18	SSW20	SSW12	S10	SSW9	S12	SSW16	SSW16	SSW18	SSW17	SSW15.6	SSW20	
26-Jan	SSW15	SSW7	SSW10	SSW11	SW11	S10	SSW12	SSW12	S11	SSW12	SSW14	SSW12	SW13	WSW18	WSW18	WSW17	SW17	WSW18	WSW18	WSW19	WSW17	W14	SW12	SW12	SSW12.8	WSW19	
27-Jan	WSW12	W10	W16	WSW16	SW13	WSW17	SW19	WSW22	WSW23	WSW25	WSW24	WSW23	WSW22	SW17	SSW8	SSW8	WSW8	WSW10	SSW9	SSW10	SSW11	S6	W10	WSW13	WSW14.1	WSW25	
28-Jan	WSW15	WSW17	WSW20	WSW18	SW15	WSW19	SSW9	SSW13	SSW12	SSW9	S7	SSW7	SSW8	S6	SSW10	SSW11	SSW11	SSW8	S7	S9	SSE6	SSW11	SW14	SW13	SW10.6	WSW20	
29-Jan	SSW12	SSW13	SSW12	SSW13	SSW12	SW14	SW20	SW19	S5	S10	S11	SW11	SW15	SW13	SW11	WSW11	SW7	SSW3	SW8	WSW9	WSW8	SW10	SSW13	SSW14	SW11.0	SW20	
30-Jan	SSW13	SW8	SW12	SW12	SSW13	SSW13	SW11	SW5	W8	N13	NE13	NE14	NE8	NNW8	NNW20	N14	NE12	NE15	NNE14	NNE13	N14	N12	NNE16	NNE16	N4.6	NNW20	
31-Jan	NNE19	NNE17	NNE12	N8	NNE5	WNW5	W5	WSW5	SW6	SW7	SSW5	SSW6	SSW8	SSW9	SSW10	SSW9	SSW8	WSW8	W9	W11	W9	NW5	NE6	NNE2	W2.5	NNE19	

SW4.8 SW4.8 SW4.7SSW4.9SSW5.4SSW5.6SSW5.9SSW5.6SSW5.2 SW3.9 SW3.4 SW3.9 SW3.8 SW4.3 SW3.3SSW4.2SSW3.9 SW4.1 SW4.1 SW4.5 SW5.0 SW5.1 SW5.6 SW5.1	Diurnal Average
NNW36 NNW27 WSW20WSW18 SSW19WSW19 SW20WSW22WSW23WSW25 N31 NNW33 NNW38 NNW38 NNW30 NNW23 SW17WSW18WSW18WSW19 SW17 SW17 SSW18 SSW17	Diurnal Maximum

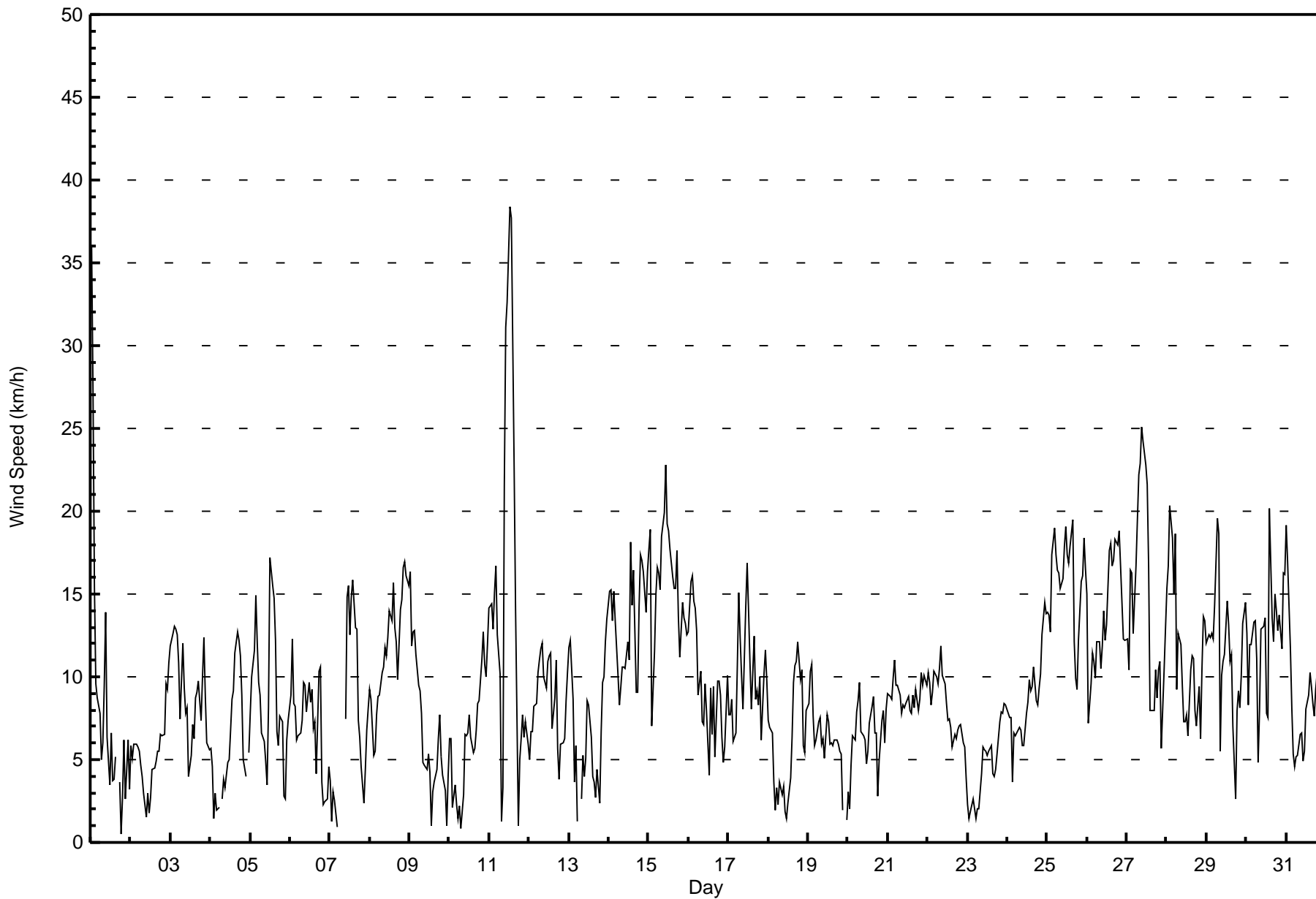
AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
CNRL Horizon - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 13 km/h on Jan 11 10:00 Minimum Value: 0 km/h on Jan 23 18:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6																	Hours in Service: 744 Hours of Data: 735 Hours of Missing Data: 9 Hours of Calibration: 0 Percent Operational Time: 98.8																														
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-Jan	8	6	9	2	2	2	2	3	2	2	4	2	2	3	1	1	AF	1	1	2	2	2	2	2	9																						
2-Jan	1	3	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	2	1	1	2	3																						
3-Jan	1	2	2	2	2	3	2	3	2	1	2	2	1	1	1	2	1	2	1	2	2	2	2	3																							
4-Jan	1	1	2	1	1	2	AF	1	1	2	1	1	2	2	2	2	2	2	2	2	2	1	AF	2																							
5-Jan	4	3	4	4	3	2	2	1	2	1	2	6	5	4	4	4	2	2	2	2	2	2	1	2	6																						
6-Jan	3	2	2	2	1	1	1	1	1	1	1	2	1	2	2	2	2	3	4	2	1	2	2	4																							
7-Jan	2	1	1	1	1	AF	AF	AF	AF	2	5	4	3	4	4	4	3	2	1	1	1	1	2	5																							
8-Jan	1	2	1	2	1	1	1	2	1	2	2	3	2	3	3	2	3	3	2	2	3	3	3	3																							
9-Jan	3	2	2	2	2	2	1	2	1	1	1	2	2	1	1	1	2	2	3	2	2	2	1	3																							
10-Jan	1	1	1	2	1	2	1	1	0	1	1	2	2	1	2	1	1	1	1	2	2	2	2	3																							
11-Jan	3	3	3	3	4	3	3	4	1	13	9	8	7	7	8	7	5	2	1	3	3	1	1	13																							
12-Jan	1	1	1	1	2	2	2	2	1	2	2	2	3	3	2	4	3	2	1	1	2	1	1	4																							
13-Jan	3	3	3	2	2	1	AF	2	1	1	1	2	2	2	2	1	2	1	1	1	2	2	3	3																							
14-Jan	2	2	2	3	2	2	1	2	2	2	2	3	4	4	4	4	2	4	3	3	3	5	3	5																							
15-Jan	3	3	5	3	2	3	3	3	3	4	4	4	4	4	3	3	3	3	2	2	2	3	2	5																							
16-Jan	2	2	3	3	3	2	1	3	2	1	3	2	2	4	1	2	3	1	1	2	1	1	1	4																							
17-Jan	2	2	2	2	2	3	2	2	2	2	4	3	4	3	3	2	3	2	2	2	3	1	2	4																							
18-Jan	2	1	2	2	2	2	2	1	2	1	1	1	2	1	1	2	2	2	2	1	2	2	1	2																							
19-Jan	2	3	3	3	2	1	2	2	1	1	1	2	2	2	1	1	2	1	1	1	1	2	AF	3																							
20-Jan	2	1	1	2	1	2	1	2	1	1	1	1	1	2	2	1	1	2	2	1	2	2	1	2																							
21-Jan	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3																							
22-Jan	2	3	2	3	2	3	3	3	3	3	3	2	2	2	2	2	1	2	2	2	2	2	1	3																							
23-Jan	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1																							
24-Jan	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2																							
25-Jan	2	2	2	3	3	3	3	2	3	3	3	3	3	3	3	4	2	1	2	2	3	3	3	4																							
26-Jan	3	3	3	2	3	2	2	2	2	3	2	3	2	3	3	4	3	3	4	3	3	3	2	4																							
27-Jan	3	3	5	3	3	3	4	4	4	4	5	5	5	5	2	3	2	2	1	1	2	3	3	5																							
28-Jan	3	3	4	4	3	4	5	3	2	2	2	4	3	2	2	2	2	2	1	2	1	2	2	5																							
29-Jan	2	2	2	2	2	3	3	3	3	2	3	3	3	3	3	3	3	2	1	2	3	2	2	3																							
30-Jan	2	2	3	2	2	3	2	4	4	4	4	3	2	4	5	6	3	4	3	4	4	3	5	6																							
31-Jan	5	5	3	2	1	1	1	1	1	2	1	1	2	2	2	2	1	2	3	2	2	2	2	5																							
Diurnal Maximum																								8	6	9	4	4	4	5	4	4	13	9	8	7	7	8	7	5	4	4	4	4	5	5	5
AF - Analyzer Failure																																															





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
CNRL Horizon - January 2017

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	150	20.41	20.41
6 - 11	366	49.80	70.20
12 - 19	198	26.94	97.14
20 - 28	15	2.04	99.18
29 - 38	6	0.82	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 735

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
CNRL Horizon - January 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	5	12	11	4	1	4	10	12	22	24	15	9	7	5	5	4	150
6 - 11	2	54	34	1	0	0	2	6	71	119	46	15	9	1	2	4	366
12 - 19	5	18	8	0	0	0	0	0	10	82	41	31	1	0	1	1	198
20 - 28	0	0	0	0	0	0	0	0	0	1	1	9	0	0	0	4	15
29 - 38	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	6
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	13	84	53	5	1	4	12	18	103	226	103	64	17	6	8	18	735

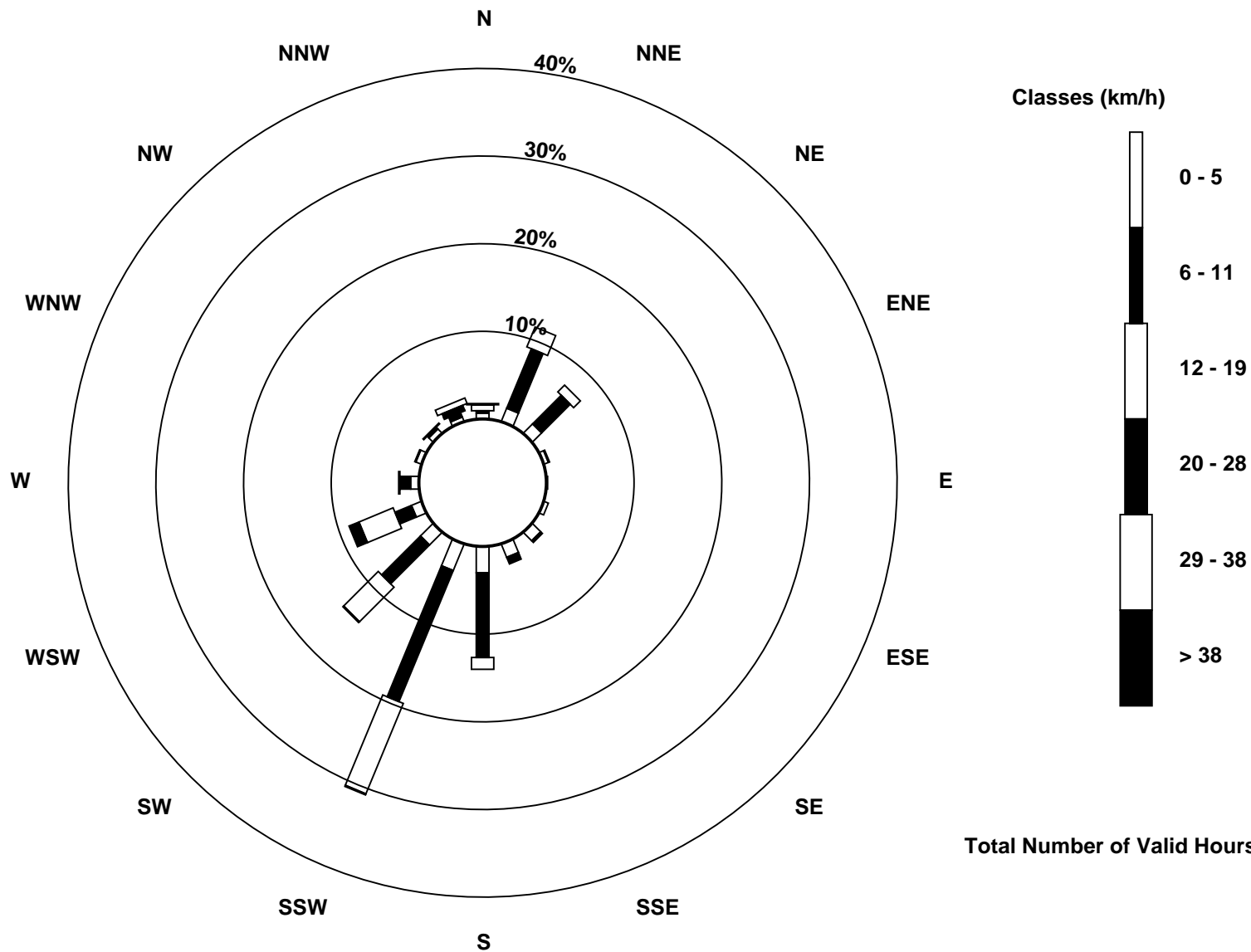
Total Number of Valid Hours: 735

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Wind Speed (WS) - km/h
CNRL Horizon (AMS 15)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
CNRL Horizon - January 2017

Direction of Maximum Speed: 339 deg on Jan 11 13:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 194.7 deg on Jan 25	Hours of Data: 735
Direction of Minimum Speed: 18 deg on Jan 1 19:00	Hours of Missing Data: 9
Direction of Minimum Daily Speed Average: 2.5 deg on Jan 31	Percent Operational Time: 98.8
Monthly Average Direction: 215.8 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jan	331	328	359	43	35	59	43	256	299	310	347	263	265	338	126	108	AF	112	18	183	212	242	210	152	334.1
2-Jan	201	207	206	207	205	202	196	155	164	152	174	172	181	205	227	190	190	210	207	213	183	200	201	199	198.0
3-Jan	206	206	202	201	208	211	203	212	204	197	184	171	194	185	184	217	227	236	229	244	242	226	215	220	211.1
4-Jan	219	207	198	156	134	115	AF	138	206	202	174	194	184	204	200	188	189	191	200	196	174	139	AF	29	188.6
5-Jan	33	31	28	32	27	30	49	56	50	64	36	19	20	26	19	22	14	358	27	37	20	235	234	222	26.9
6-Jan	214	206	204	213	199	201	214	205	197	196	189	190	185	184	163	175	165	183	194	143	244	72	324	24	193.8
7-Jan	55	207	265	225	223	AF	AF	AF	AF	32	20	27	34	35	32	34	40	35	40	7	271	246	234	228	24.9
8-Jan	230	222	197	215	199	184	183	196	188	191	187	202	201	199	197	201	221	208	188	206	222	230	233	240	207.3
9-Jan	244	219	215	209	214	215	224	222	203	220	312	292	348	356	199	177	289	307	312	309	237	203	69	29	237.8
10-Jan	26	19	55	37	184	208	126	72	188	199	201	172	138	141	126	147	182	226	227	216	218	206	207	202	190.1
11-Jan	204	200	203	204	210	211	214	296	178	341	9	341	339	332	344	343	344	323	293	346	340	273	248	249	316.0
12-Jan	221	214	212	207	205	199	200	198	195	195	196	201	201	201	202	187	204	224	244	268	233	230	226	212	207.4
13-Jan	206	212	228	230	244	46	AF	200	206	182	174	196	196	193	133	80	23	330	243	200	193	193	190	193	200.1
14-Jan	196	195	195	195	194	184	167	168	174	183	184	199	212	214	221	221	205	205	231	233	235	244	239	227	208.5
15-Jan	235	236	241	235	243	231	238	231	241	243	240	238	238	240	241	238	232	241	246	241	232	223	202	197	235.1
16-Jan	201	206	210	207	207	201	213	200	195	211	202	192	248	192	147	209	210	196	201	203	228	231	217	189	203.8
17-Jan	206	202	198	179	206	192	210	202	190	199	236	235	226	225	212	223	217	194	193	203	184	195	210	208	208.9
18-Jan	180	185	207	245	183	151	259	351	347	24	216	205	169	188	181	174	185	197	211	197	202	204	35	24	193.9
19-Jan	14	25	34	48	25	33	35	32	32	28	39	25	27	40	36	51	37	39	36	29	34	1	AF	117	32.8
20-Jan	143	148	178	190	195	189	191	197	189	189	193	184	184	188	187	189	205	222	358	23	24	26	31	39	182.7
21-Jan	28	28	27	23	22	21	25	30	27	31	29	32	36	32	30	27	28	26	27	29	23	25	29	34	27.8
22-Jan	30	31	38	32	33	37	40	41	34	41	35	31	26	47	32	27	47	34	30	39	42	33	44	31	35.8
23-Jan	55	54	274	269	224	224	231	218	234	242	239	218	195	190	186	155	134	164	177	198	201	198	188	186	199.0
24-Jan	189	189	183	163	176	177	180	182	177	176	173	183	193	198	180	174	176	187	188	191	195	201	198	193	186.2
25-Jan	192	194	189	190	193	191	190	190	191	195	199	196	197	197	197	202	194	175	192	189	194	198	201	212	194.7
26-Jan	209	200	195	211	215	191	202	198	191	198	212	193	220	253	245	237	234	237	250	250	244	259	226	222	224.8
27-Jan	240	268	264	249	217	237	232	244	246	243	241	240	242	236	204	211	241	247	209	213	212	188	269	253	238.7
28-Jan	251	241	241	242	233	239	208	201	207	194	190	197	200	177	199	193	203	207	180	182	151	208	226	217	215.4
29-Jan	203	206	200	206	204	225	234	234	183	187	186	220	233	223	235	237	224	197	232	239	244	214	209	210	217.9
30-Jan	213	228	223	216	201	211	233	219	273	11	37	50	44	342	338	6	34	36	31	28	1	7	14	19	358.6
31-Jan	17	23	24	11	13	290	262	255	219	233	202	193	193	200	205	204	213	255	280	275	280	324	45	13	278.8

228.9 224.0 217.1 212.1 208.9 207.0 210.9 209.1 208.4 220.0 214.4 220.1 227.3 223.7 217.2 207.3 210.9 217.0 224.1 224.9 226.3 222.3 220.0 214.6
 Diurnal Average

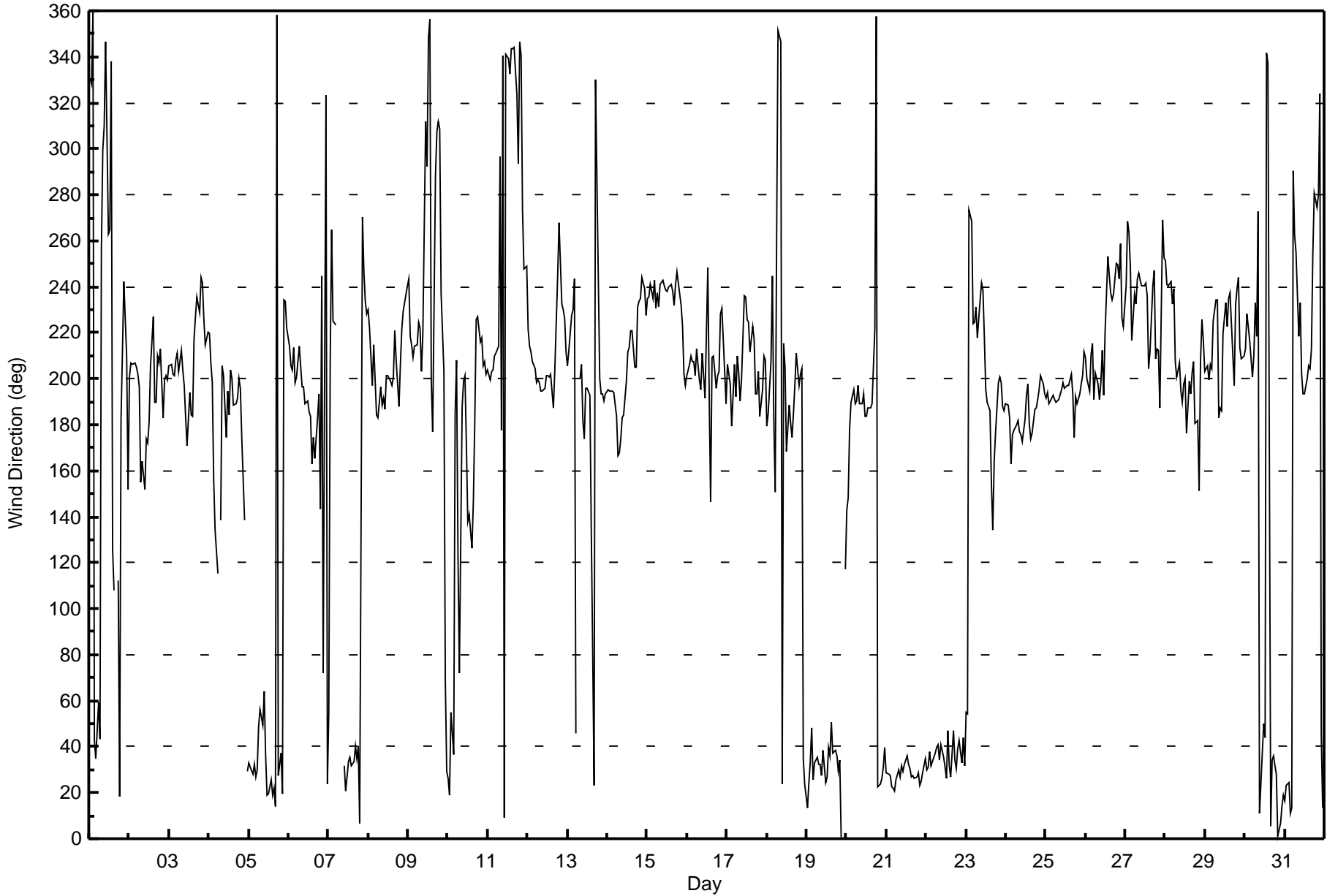
AF - Analyzer Failure
 All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
CNRL Horizon - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 106 deg on Jan 11 08:00 Minimum Value: 6 deg on Jan 23 18:00 Percentiles: P ₁ = 8 P ₁₀ = 11 Q ₁ = 13 Median = 16 Q ₃ = 20 P ₉₀ = 37 P ₉₉ = 86																	Hours in Service: 744 Hours of Data: 735 Hours of Missing Data: 9 Hours of Calibration: 0 Percent Operational Time: 98.8								
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-Jan	13	9	34	17	16	14	60	34	12	8	37	53	28	54	20	9	AF	23	82	56	15	56	34	50	82
2-Jan	22	33	15	16	13	17	17	17	17	67	23	58	52	16	17	20	11	13	13	14	14	10	10	10	67
3-Jan	10	10	11	11	9	16	15	10	13	15	15	34	20	16	20	14	12	10	13	12	12	16	17	9	34
4-Jan	9	26	86	32	49	69	AF	12	20	61	22	18	21	16	16	13	14	13	15	16	34	29	AF	17	86
5-Jan	19	19	18	18	18	17	15	14	15	14	28	23	19	18	19	21	21	16	18	17	56	33	12	13	56
6-Jan	13	14	15	10	15	8	8	13	12	12	13	13	14	15	17	13	29	10	29	66	61	71	28	36	71
7-Jan	14	80	18	41	22	AF	AF	AF	AF	17	17	18	19	17	17	19	15	14	10	18	54	16	13	11	80
8-Jan	10	9	15	37	21	12	11	10	8	11	13	15	13	14	13	15	14	14	10	14	11	15	13	15	37
9-Jan	11	13	12	12	11	12	11	16	29	26	30	43	22	94	42	34	43	15	42	37	62	53	92	39	94
10-Jan	24	19	51	34	29	76	55	77	28	12	12	30	17	17	19	19	10	15	13	9	13	11	13	15	77
11-Jan	13	14	14	16	16	16	22	106	39	58	24	19	12	10	16	19	15	99	19	29	28	20	13	30	106
12-Jan	39	13	14	9	12	11	12	11	10	9	14	15	14	14	22	17	16	17	37	18	19	20	13	18	39
13-Jan	15	15	17	61	17	91	AF	72	18	26	22	15	17	21	46	35	19	22	51	7	9	11	11	12	91
14-Jan	11	10	11	12	13	14	10	12	13	16	14	18	21	13	15	14	19	33	14	11	13	15	14	12	33
15-Jan	11	10	24	15	13	12	13	13	11	11	12	12	13	13	13	13	13	12	10	11	11	14	13	13	24
16-Jan	13	11	12	12	13	13	14	13	16	13	15	13	65	20	31	14	18	10	12	12	10	37	14	9	65
17-Jan	24	20	16	17	29	12	10	12	14	16	13	13	17	19	22	13	28	13	13	13	52	10	8	9	52
18-Jan	15	9	22	45	47	45	60	32	58	27	81	87	69	22	16	11	11	13	11	10	14	64	14	15	87
19-Jan	18	19	20	18	19	20	18	18	20	19	19	19	19	19	20	18	20	19	19	19	18	65	AF	87	87
20-Jan	27	43	22	14	18	13	11	15	12	12	15	18	15	13	13	12	12	12	55	19	18	17	18	16	55
21-Jan	19	18	18	18	18	19	19	18	18	18	19	19	17	19	18	18	17	17	18	17	18	17	19	18	19
22-Jan	17	18	17	18	19	18	17	16	16	16	20	19	20	17	20	21	14	20	20	20	18	20	23	35	35
23-Jan	28	22	36	25	17	41	16	17	10	12	17	17	19	18	18	27	17	6	7	9	10	13	9	8	41
24-Jan	7	12	14	24	15	12	12	11	13	17	18	15	14	13	15	14	12	12	12	13	12	13	12	12	24
25-Jan	13	13	12	11	11	12	12	11	12	13	13	13	14	13	12	13	12	12	11	12	12	12	13	12	14
26-Jan	12	25	36	19	13	13	13	12	12	13	10	17	16	16	12	14	13	12	18	11	11	13	14	14	36
27-Jan	15	23	23	16	18	14	12	12	12	11	12	12	13	16	31	15	20	13	20	10	11	38	21	22	38
28-Jan	14	14	12	12	13	13	54	22	14	16	22	36	24	16	13	15	14	9	18	16	33	20	10	11	54
29-Jan	12	11	13	11	12	14	11	11	49	17	16	25	15	15	17	14	44	75	12	16	23	12	12	10	75
30-Jan	12	22	15	15	12	11	20	63	38	49	17	16	23	36	15	37	17	17	18	18	20	20	19	18	63
31-Jan	19	18	18	19	17	23	29	24	12	22	26	23	18	15	15	14	10	26	14	15	13	54	20	44	54
39 80 86 61 49 91 60 106 58 67 81 87 69 94 46 37 44 99 82 66 62 71 92 87																								Diurnal Maximum	
AF - Analyzer Failure																									





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	January 16, 2017	Last Calibration	December 13, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	10:31	End Time (MST)	14:59
Gas Cert Reference	S0002488	Station temp.	21 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	September 26, 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.	11040

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-622	-622
Analyzer IP address	192.168.1.43		Lamp voltage	864	864
Calculated slope	0.992125	0.997802	Chamber temp	44.9	45.0
Calculated intercept	1.493461	0.144423	Pressure	700.8	698.1
Analyzer Background	18.4	20.0	Flow	0.309	0.348
Analyzer Coefficient	1.008	1.017	Intensity	91	90

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	1.2	----
as found span	5000	81.5	815.0	814.4	1.001
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	81.5	815.0	817.0	0.998
second point	5000	40.7	407.0	406.7	1.001
third point	5000	20.3	203.0	203.8	0.996
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	81.5	815.0	818.1	0.996
Average Correction Factor					0.998

Corrected As found 813.2 Previous response 820.0 % change 0.8%

Notes:

Changed inlet filter after as founds. Installed new pump. Adjusted zero and span.

Calibration Performed By: Jayne Marcoux



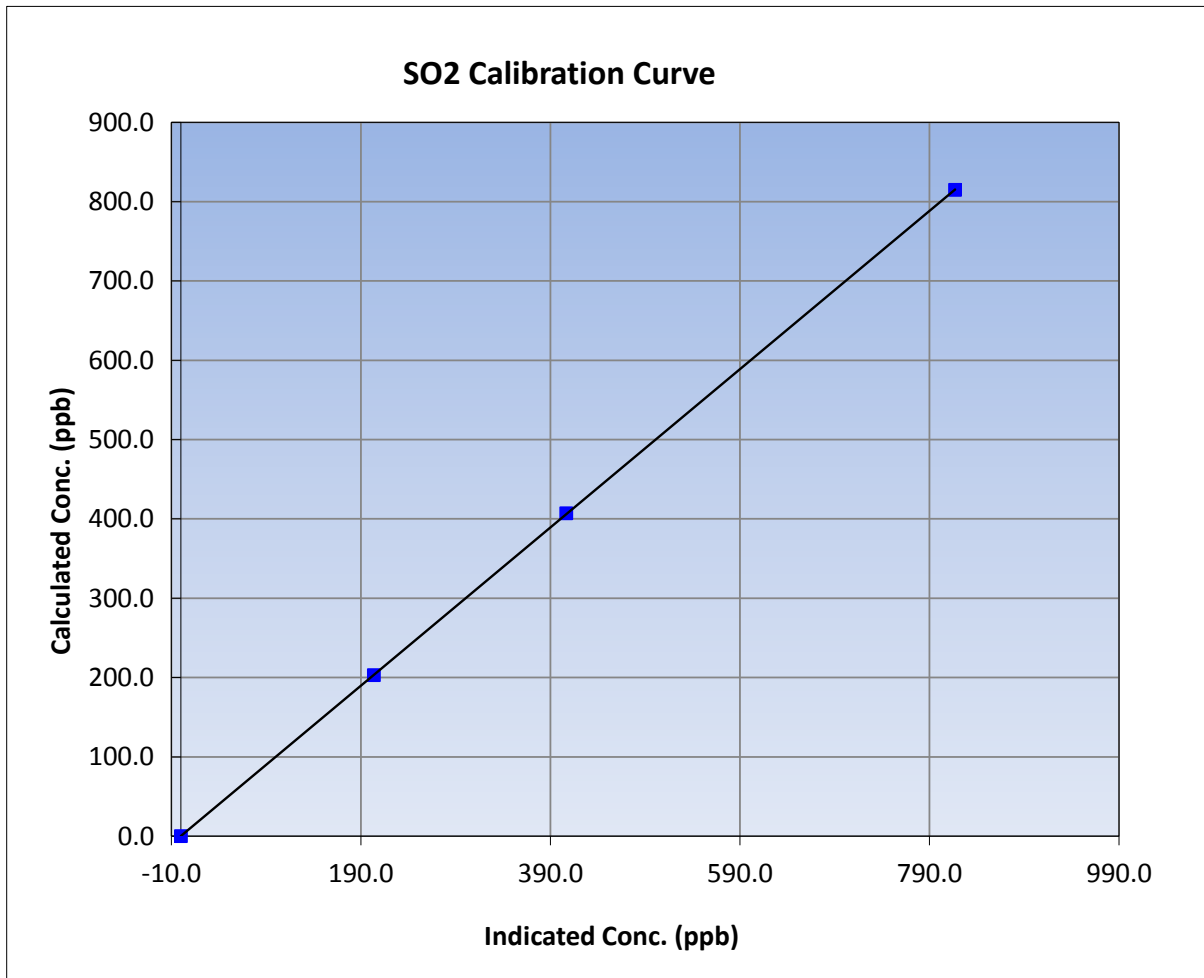
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 16, 2017	Previous Calibration	December 13, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:31	End Time (MST)	14:59
Analyzer make	Thermo 43i	Analyzer serial #	710321322

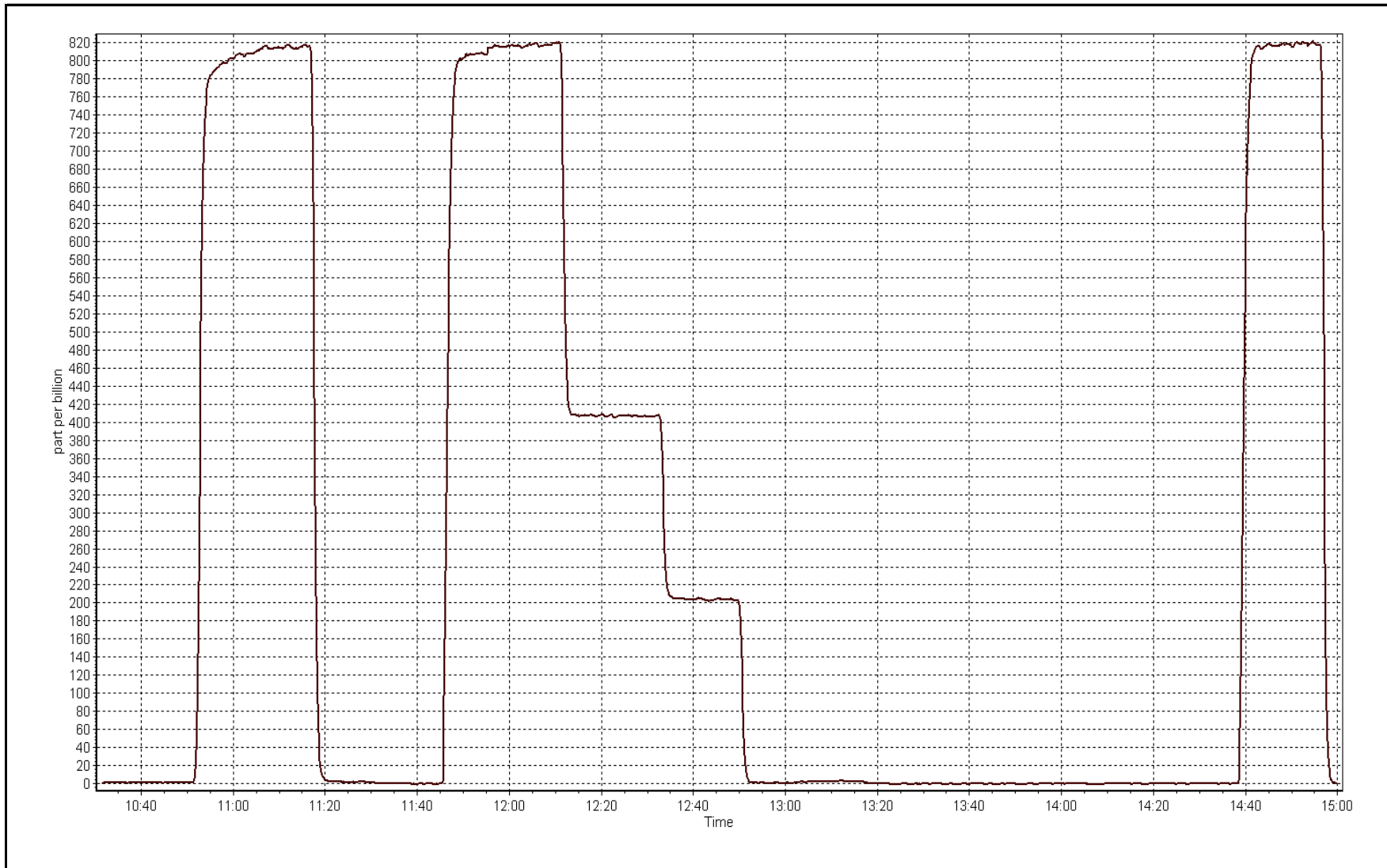
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999996
815.0	817.0	0.9975		
407.0	406.7	1.0007	Slope	0.997802
203.0	203.8	0.9960		
			Intercept	0.144423



SO2 Calibration Plot

Date: January 16, 2017





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	January 13, 2017	Last Calibration	December 14, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	10:41	End Time (MST)	13:58
Gas Cert Reference	LL119538	Station temp.	22 Deg C
Cal Gas Concentration	4.95 ppm	Cal Gas Exp Date	February 12, 2019
Calibrator Make/Model	API T700	Serial Number	1223
Dil air Make/Model	API 701	Serial Number	1004
DACS make/model	Campbell Scientific CR3000	DACS serial No.	11040
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S0002486 September 26, 2017

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-684	-684
Analyzer IP address	192.168.1.44		Lamp voltage	1006	1004
Calculated slope	0.990353	0.994580	Chamber temp	45	45
Calculated intercept	0.071762	0.030244	Pressure	639.9	642.0
Analyzer Background	2.76	3.56	Flow	0.407	0.409
Analyzer Coefficient	1.191	1.204	Intensity	91	90
			Converter temp.	800	800
Analyzer make/model	Thermo 43i TLE		Analyzer serial #	1151680032	
Converter make/model	CDN-101		Converter serial #	531	

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	80.6	79.8	79.7	1.001
SO2 scrubber check	5000	20.2	202.0	2.0	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	80.6	79.8	80.2	0.996
second point	5000	40.2	39.8	40.1	0.993
third point	5000	20.0	19.8	19.9	0.996
as left zero	5000	0.0	0.0	-0.2	----
as left span	5000	80.6	79.8	80.4	0.993
Average Correction Factor					0.995

Corrected As found	79.7	Previous response	80.5	% change	1.1%
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Notes:

Completed scrubber check and changed inlet filter after asfinds. Adjusted the zero and span.

Calibration Performed By:

Jayme Marcoux



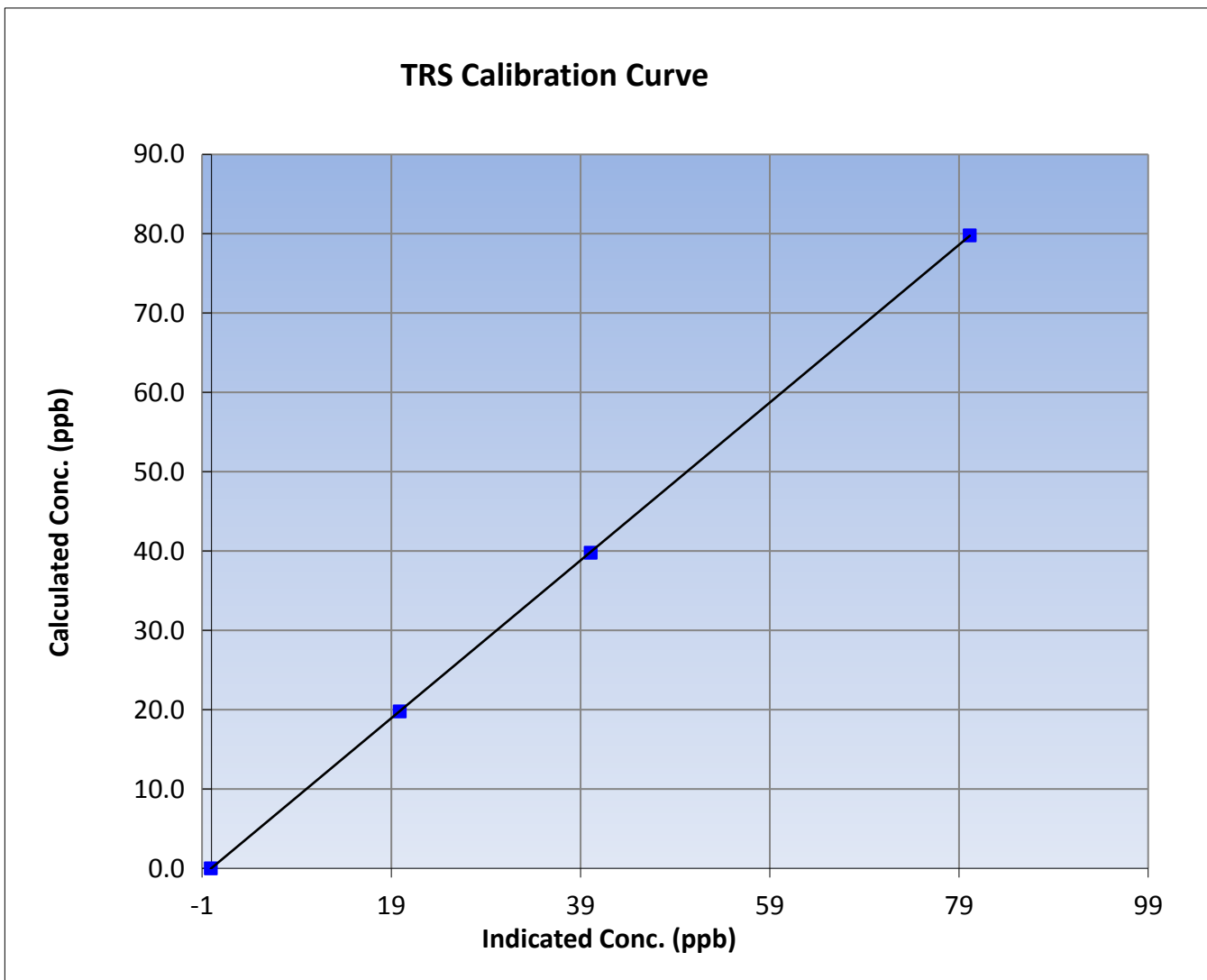
Wood Buffalo Environmental Association TRS Calibration Report

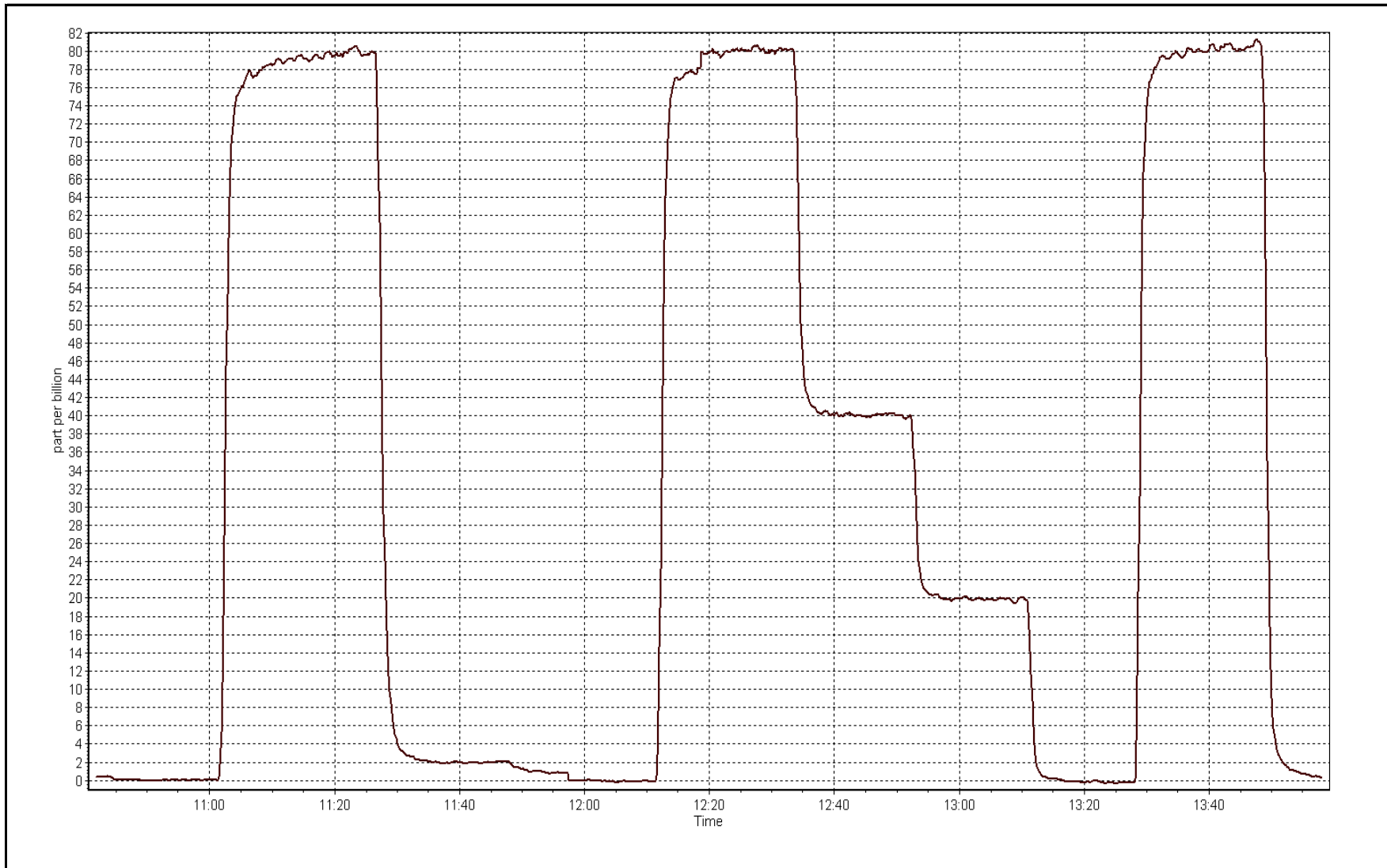
Station Information

Calibration Date	January 13, 2017	Previous Calibration	December 14, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:41	End Time (MST)	13:58
Analyzer make	Thermo 43i TLE	Analyzer serial #	1151680032

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999996
79.8	80.2	0.9956		
39.8	40.1	0.9930	Slope	0.994580
19.8	19.9	0.9960		
			Intercept	0.030244







Wood Buffalo Environmental Association TRS Calibration Report

W B E A

Station Information

Calibration Date	January 27, 2017	Last Calibration	January 13, 2017
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Other: Maintenance Due to baseline drift		
Start Time (MST)	9:30	End Time (MST)	12:55
Gas Cert Reference	LL119538	Station temp.	22 Deg C
Cal Gas Concentration	4.95 ppm	Cal Gas Exp Date	February 12, 2019
Calibrator Make/Model	API T700	Serial Number	1223
Dil air Make/Model	API 701	Serial Number	1004
DACS make/model	Campbell Scientific CR3000	DACS serial No.	11040
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S0002486 September 26, 2017

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-684	-685
Analyzer IP address	192.168.1.44		Lamp voltage	991	996
Calculated slope	0.994580	0.994430	Chamber temp	45	45
Calculated intercept	0.030244	-0.137055	Pressure	638.4	641.4
Analyzer Background	3.56	2.46	Flow	0.404	0.406
Analyzer Coefficient	1.204	1.158	Intensity	90	88
			Converter temp.	800	800
Analyzer make/model	Thermo 43i TLE		Analyzer serial #	1151680032	
Converter make/model	CDN-101		Converter serial #	531	

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	5031	80.5	79.2	82.1	0.965
SO2 scrubber check	5000	20.2	202.0	0.7	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5001	80.6	79.8	80.3	0.993
second point	5001	40.2	39.8	40.2	0.990
third point	5000	20.0	19.8	20.2	0.980
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	80.6	79.8	80.5	0.991
Average Correction Factor					0.988

Corrected As found	83.2	Previous response	79.6	% change	-4.3%
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Notes:

Baseline drifted below -1ppb, Adjusted the zero and span. Completed scrubber check after third point, changed inlet filter after asfinds.

Calibration Performed By:

Melissa Lemay



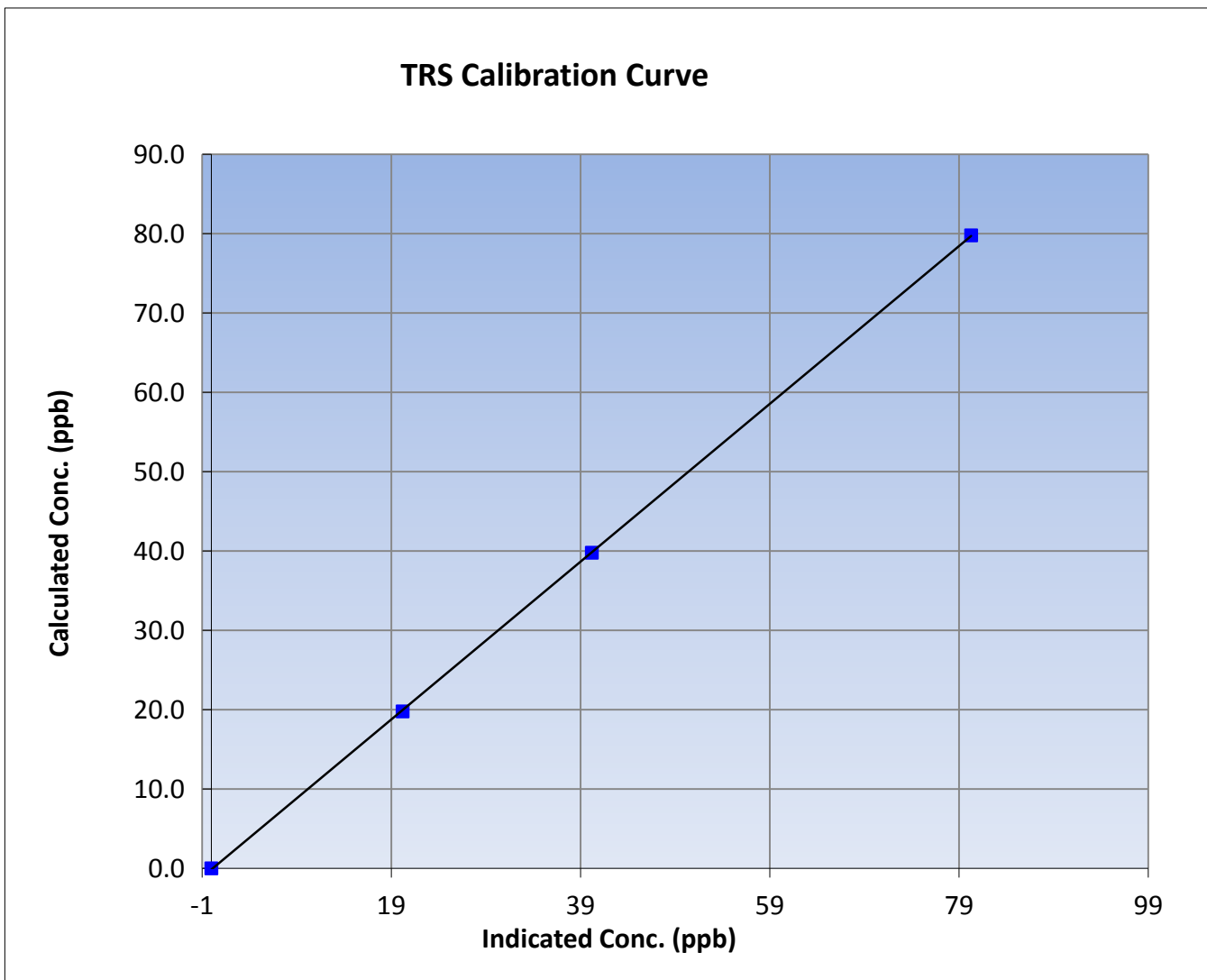
Wood Buffalo Environmental Association TRS Calibration Report

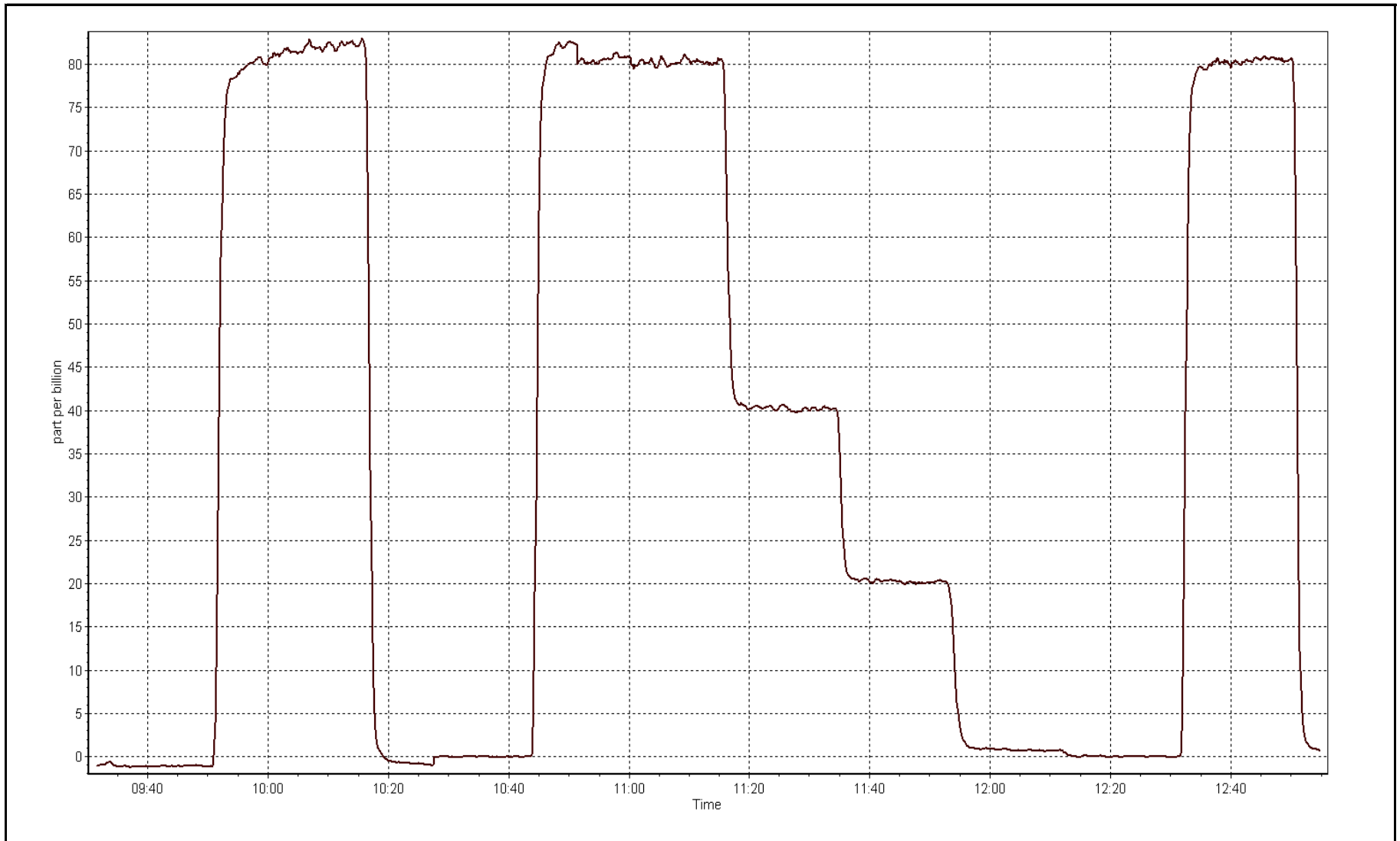
Station Information

Calibration Date	January 27, 2017	Previous Calibration	January 13, 2017
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:30	End Time (MST)	12:55
Analyzer make	Thermo 43i TLE	Analyzer serial #	1151680032

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999986
79.8	80.3	0.9935		
39.8	40.2	0.9898	Slope	0.994430
19.8	20.2	0.9802		
			Intercept	-0.137055







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	January 16, 2017	Last Calibration	December 13, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	10:31	End Time (MST)	14:58
Gas Cert Reference	S0002488	Cal Gas Expiry Date	September 26, 2017
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	11040

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.7	8.7
Analyzer IP address	192.168.1.51		Air or Bypass Press	38.0	38.0
Calculated slope	0.996260	0.999325	Fuel Pressure	26.3	26.3
Calculated intercept	0.013543	-0.024353	Analyzer Coeff	3.154	3.216
			Analyzer BKG	2.13	2.28

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	0.18	----
as found span	5000	81.5	17.06	16.90	1.010
calibrator zero	5000	0.0	0.00	0.02	----
high point	5000	81.5	17.06	17.10	0.998
second point	5000	40.7	8.52	8.54	0.998
third point	5000	20.3	4.25	4.29	0.991
as left zero	5000	0.0	0.00	-0.03	----
as left span	5000	81.5	17.06	17.18	0.993
Average Correction Factor					0.995

Corrected As found: 16.72 Previous response: 17.11 % change: 2.3%

Notes:

Changed out inlet filter after as founds. Adjusted the zero and the span.

Calibration Performed By:

Jayme Marcoux



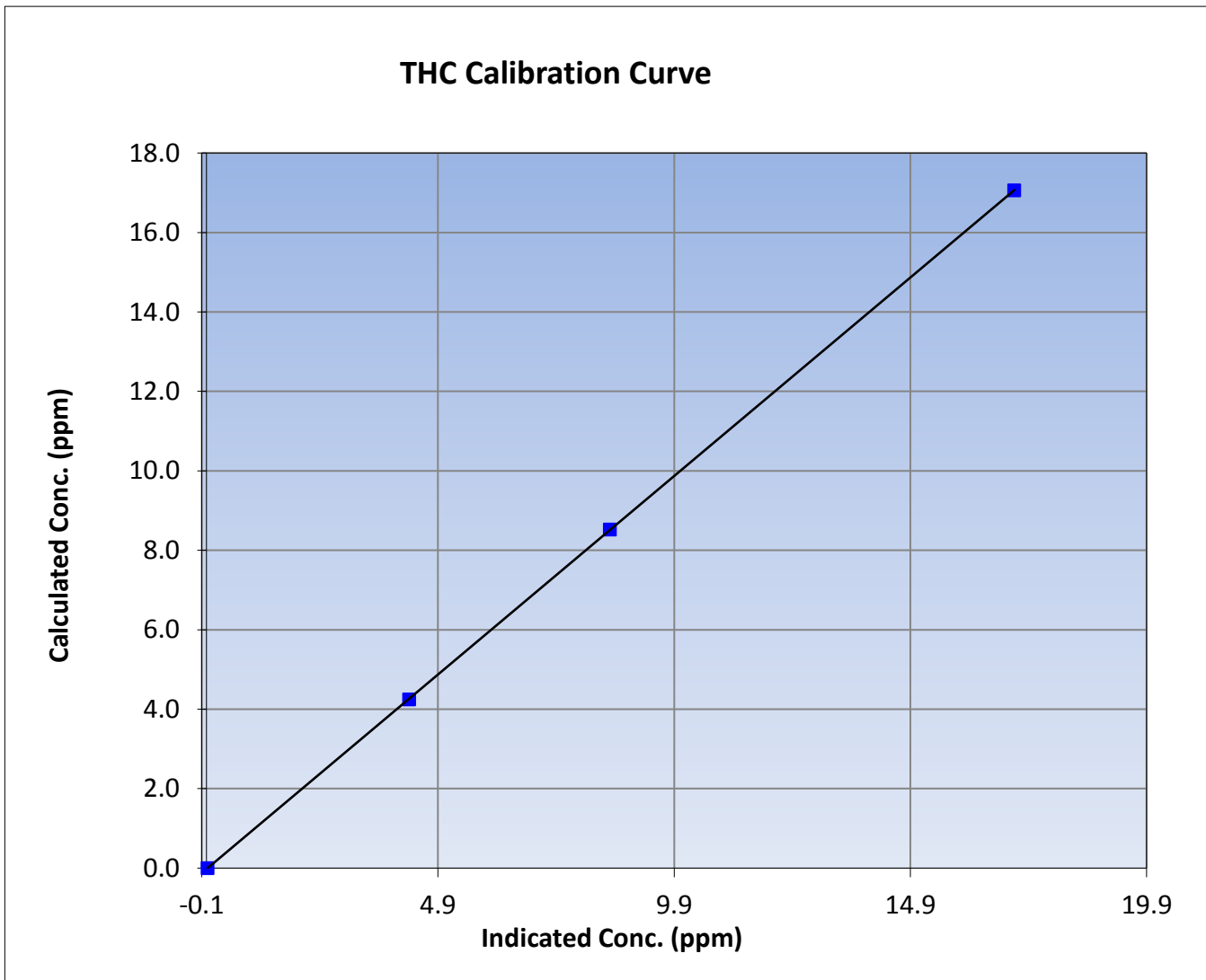
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	January 16, 2017	Previous Calibration	December 13, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:31	End Time (MST)	14:58
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059295

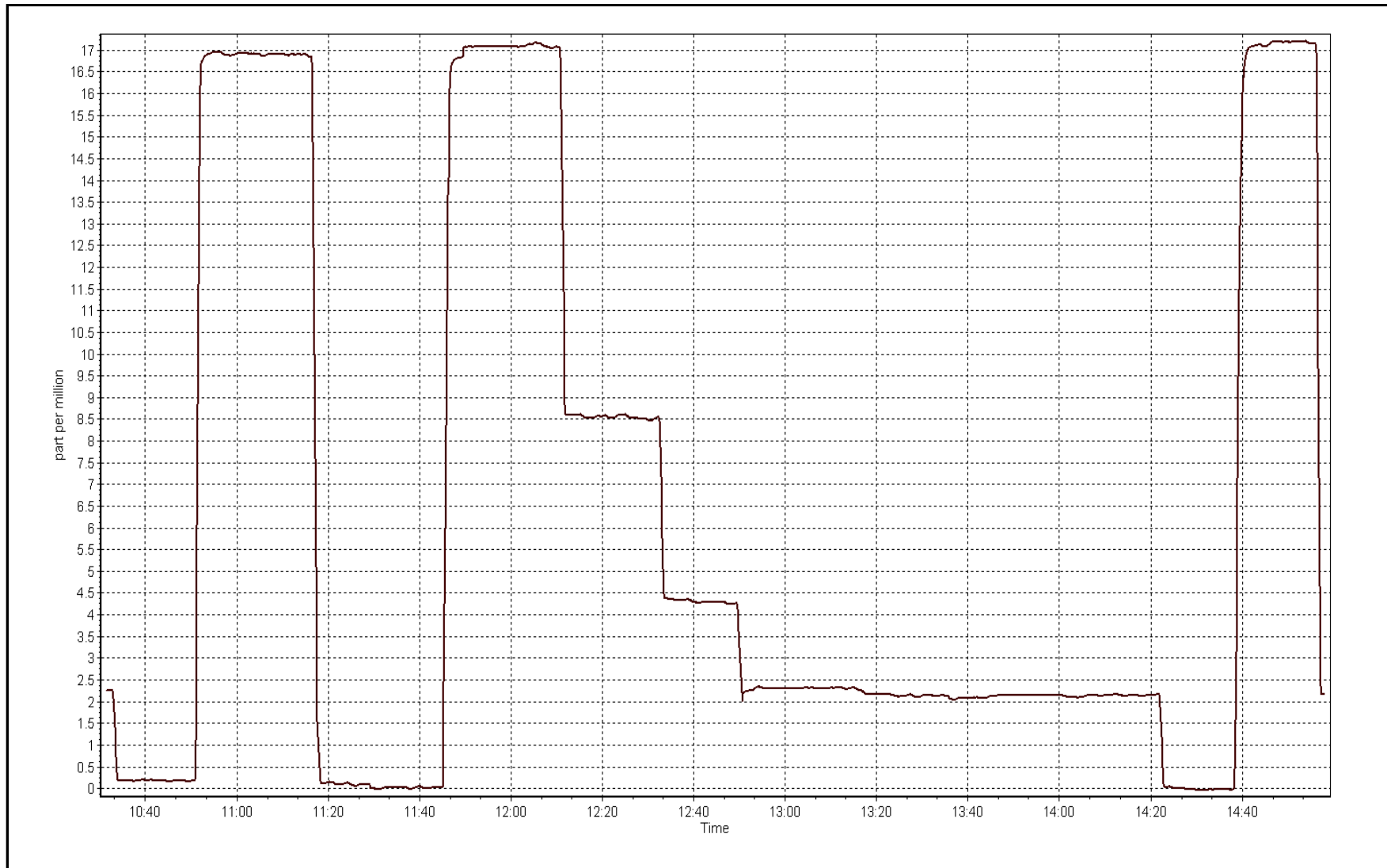
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.02	----	Correlation Coefficient	0.999998
17.06	17.10	0.9978		
8.52	8.54	0.9977	Slope	0.999325
4.25	4.29	0.9906		
			Intercept	-0.024353



THC Calibration Plot

Date: January 16, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 16, 2017	Previous Calibration	December 13, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	10:31	End Time (MST)	14:58
NO Cal Gas Conc	48.9 ppm	Gas Cert Reference	S0002488
NOX Cal Gas Conc	48.9 ppm	Cal Gas Expiry Date	September 26, 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.	11040
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.992995	0.993268	0.997191
	Data Offset	1.594148	1.570703	-0.174852
Current Calibration	Data Slope	0.994621	0.995108	0.993809
	Data Offset	0.081238	0.117082	-0.451370

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	0.709		0.734	
NOX coefficient	1.000		1.000	
NO2 coefficient	1.000		1.000	
NO bkgrnd	8.9		9.2	
NOX bkgrnd	9.0		9.3	
Chamber Temp	49.9	Deg C	49.8	Deg C
Moly Temp	323.9	Deg C	326.5	Deg C
PMT voltage	-778.9	V	-778.9	V
PMT Temp	-3	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	148.2	mmHg	146.7	mmHg
R Cell Press Nox	148.5	mmHg	147	mmHg
NO sample flow	0.767	lpm	0.754	lpm
Nox sample Flow	0.768	lpm	0.757	lpm

Notes:

Changed out inlet filter after as founds. Adjusted the span.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

January 16, 2017

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	-0.1	-0.2	-0.1	----	----
as found span	5000	81.5	797.1	797.1	0.0	781.3	779.4	1.9	1.0202	1.0227
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.1	----	----
high point	5000	81.5	797.1	797.1	0.0	801.6	801.1	0.5	0.9943	0.9949
second point	5000	40.7	398.0	398.0	0.0	399.3	399.2	0.1	0.9968	0.9972
third point	5000	20.3	198.5	198.5	0.0	199.9	199.8	0.2	0.9931	0.9939
as left zero	5000	0.0	0.0	0.0	0.0	3.9	3.8	0.1	----	----
as left span	5000	81.5	797.1	458.5	338.6	796.5	459.9	336.7	1.0007	0.9971
Average Correction Factor									0.9948	0.9953

Corrected As found
Previous Response

NO_x= 781.4
NO_x= 801.1

NO= 779.6
NO= 800.9

Percent Change

NO_x= 2.5%

NO= 2.7%

GPT Calibration Data

Dilution Flow (total) 5000 ccm 0.999911 81.50 ccm NOx ref calc conc = 797.1 ppb NO ref calc conc = 797.1 ppb

O3 Setpoint (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
1st NO ref point		0.0	796.0	794.1	0.1	1.0013	1.0037	----	----
1st NO2 (300)	458.5	335.6	796.4	458.5	337.9	1.0008	----	0.9932	100.7%
2nd NO2 (200)	566.6	227.6	796.1	566.6	229.5	1.0013	----	0.9915	100.9%
3rd NO2 (100)	676.1	118.0	795.8	676.1	119.8	1.0016	----	0.9856	101.5%
2nd NO ref point		0.0	795.7	793.3	2.4	1.0018	1.0048	----	----
Average Correction Factor						1.0014		0.9901	101.0%

Calibration Performed By: Jayne Marcoux



Wood Buffalo Environmental Association

NO_x Calibration Summary

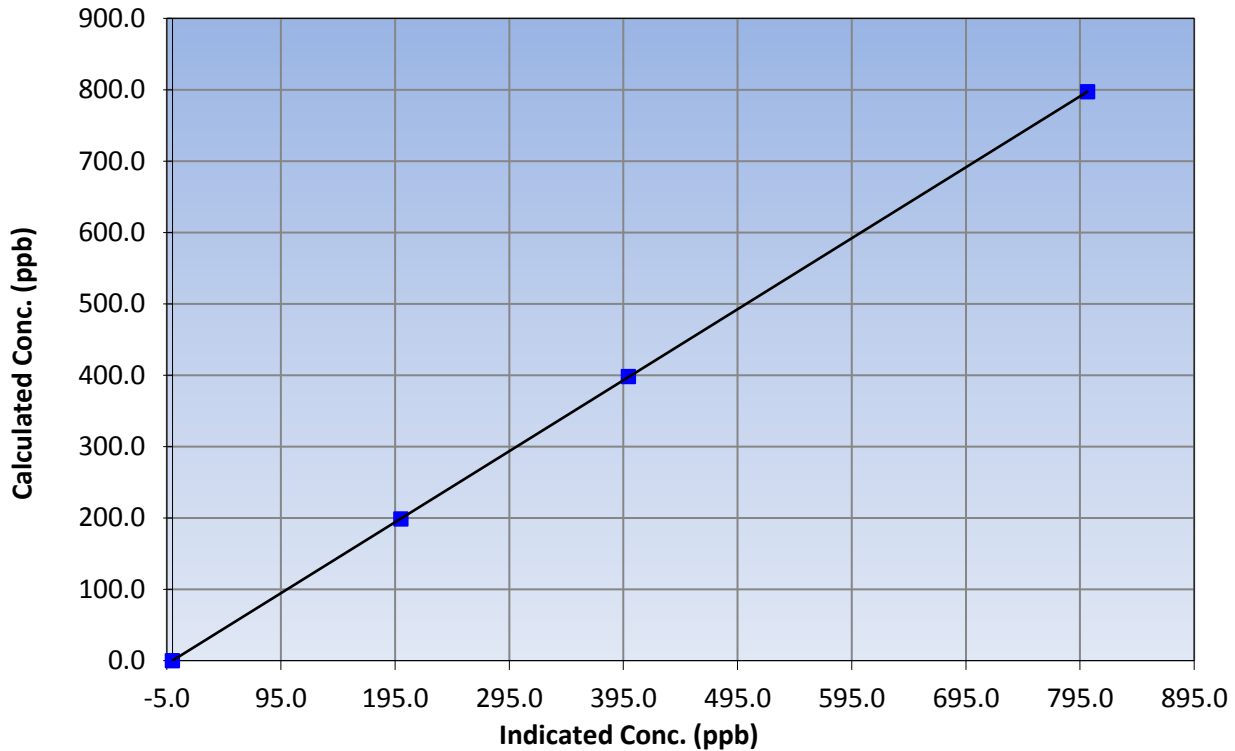
Station Information

Calibration Date	January 16, 2017	Previous Calibration	December 13, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:31	End Time (MST)	14:58
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	0.0	----	Correlation Coefficient	0.999997
797.1	801.6	0.9943		
398.0	399.3	0.9968	Slope	0.994621
198.5	199.9	0.9931		
			Intercept	0.081238

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

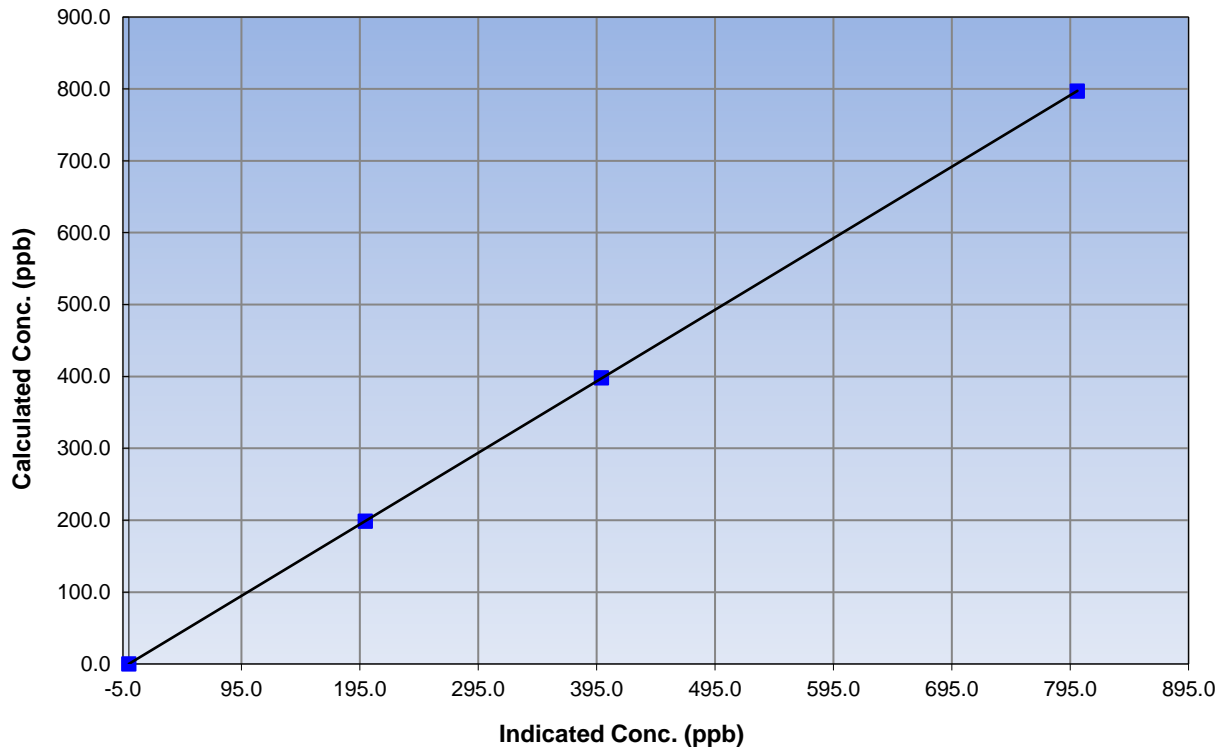
Station Information

Calibration Date	January 16, 2017	Previous Calibration	December 13, 2016
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:31	End Time (MST)	14:58
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	0.0	N/A	Correlation Coefficient	0.999998
797.1	801.1	0.9949		
398.0	399.2	0.9972	Slope	0.995108
198.5	199.8	0.9939		
			Intercept	0.117082

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

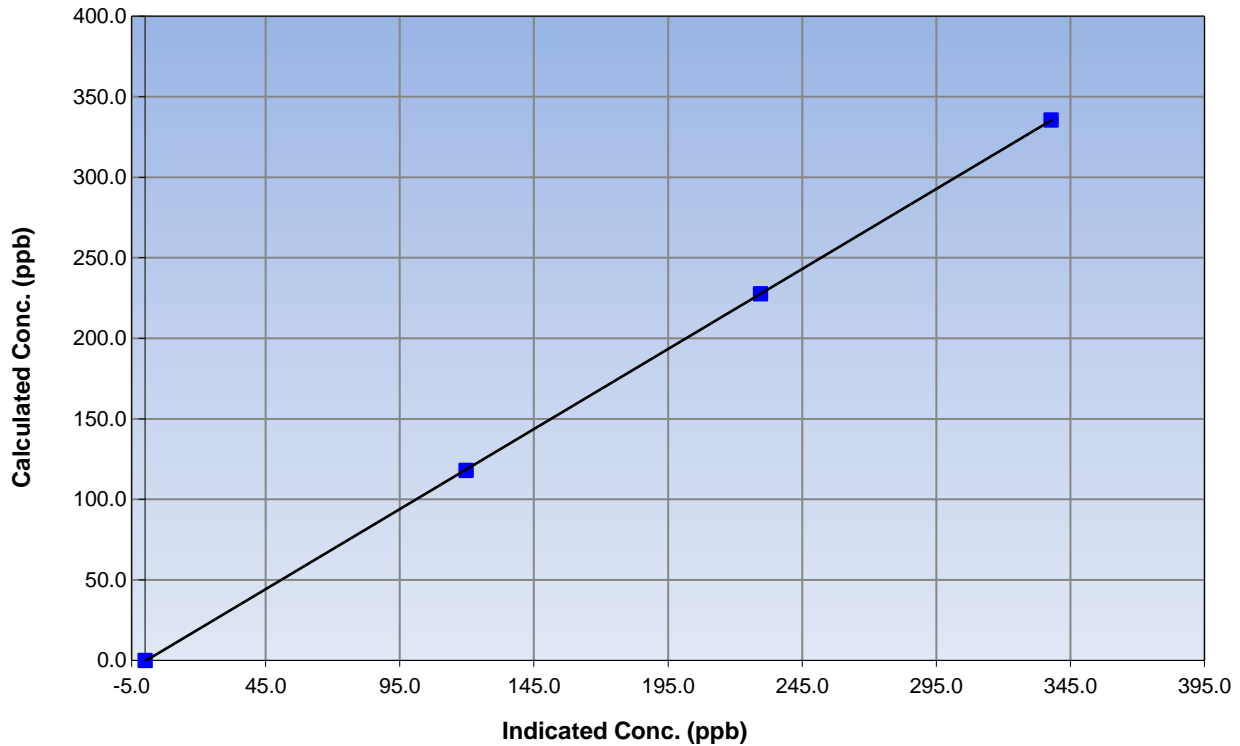
Station Information

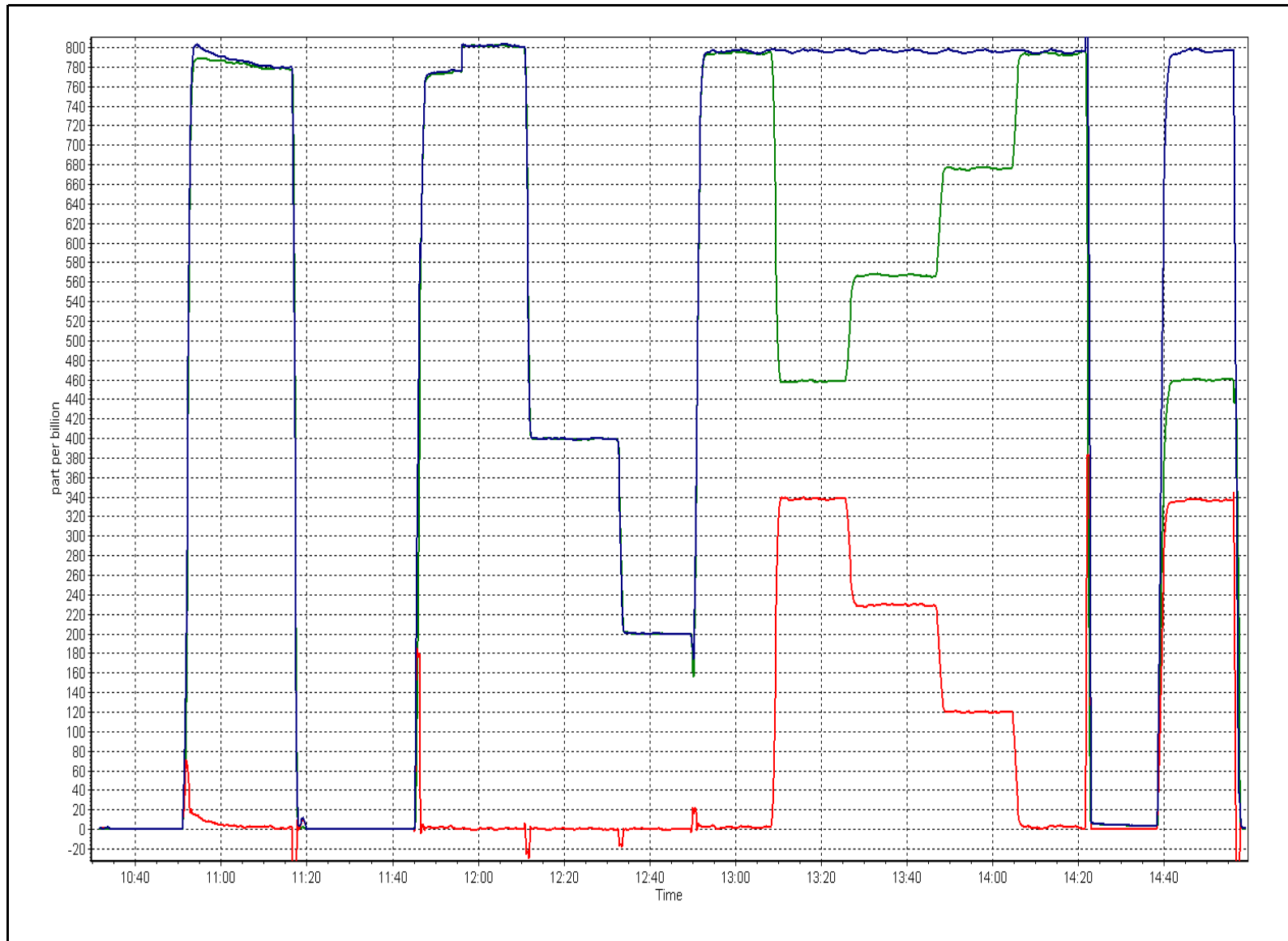
Calibration Date	January 16, 2017	Previous Calibration	December 13, 2016
Station Number	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:31	End Time (MST)	14:58
Analyzer make	Thermo 42i	Analyzer serial #	710321429

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999992
335.6	337.9	0.9932		
227.6	229.5	0.9915	Slope	0.993809
118.0	119.8	0.9856		
			Intercept	-0.451370

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-08-2016

Station Information

Station Name:	CNRL Horizon	Station number:	AMS 15
Calibration Date:	January 16, 2017	Last Cal Date:	December 24, 2016
Start time (MST):	10:54	End time (MST):	11:47
Sharp Model:	5030	S/N:	E-2020
Particulate Fraction:	PM2.5	C14 Source S/N:	7409
Flow Standard Model:	DeltaCal	S/N:	628
Temp/RH standard:	NA	S/N:	NA

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	Tolerance
T1 (°C)	-1.4	-1.2	-1.4	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	950	948	950	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	920	1000	<input checked="" type="checkbox"/>	+/- 50 LPH
Nephelometer zero	0.9	-----	0	<input checked="" type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified <input checked="" type="checkbox"/>				
Cyclone cleaning :	PM10 Cyclone <input checked="" type="checkbox"/>		PM2.5 Cyclone <input checked="" type="checkbox"/>		
Filter Tape Installed:	<input type="checkbox"/>				

Quarterly Calibration Test

				Tolerance
Leak Test:	Date of check:	<u>January 16, 2017</u>	Last Cal Date:	<u>December 24, 2016</u>
	Flow w/o adaptor:	<u>15.34</u>	Flow w/ adaptor:	<u>15.22</u> 0.4 LPM

Annual Calibration Test

Foil Calibration	Foil Mass:	_____	S/N:	_____
	Date of check:	_____	Last Cal Date:	<u>November 7, 2016</u>
	New Correction Factor:	_____	Previous Correction Factor:	_____

Parameter	As found	Measured	As left	Adjusted	Tolerance
T2 (°C)	15	NA	15	<input type="checkbox"/>	+/- 2 °C
T3 (°C)	19	NA	19	<input type="checkbox"/>	+/- 2 °C
T4 (°C)	7	NA	7	<input type="checkbox"/>	+/- 2 °C
RH (%)	7	NA	7	<input type="checkbox"/>	+/- 10%

Notes: The flow was low at 920LPH. Completed leak test and it passed. Cleaned cyclone head. Adjusted flow.

Calibration by: Jayme Marcoux



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 16
SHELL MUSKEG RIVER
JANUARY 2017**

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

February 27, 2017



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
 JANUARY 2017

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	708	36	36	100.00	27	0	12	0
THC (ppm) Average	708	36	36	100.00	4.7	-	3.6	-
NO2 (ppb) Average	708	36	36	100.00	52	0	29	-
NO (ppb) Average	708	36	36	100.00	96	-	41	-
NOX (ppb) Average	708	36	36	100.00	118	-	63	-
PM2.5 (ug/m3) Average	743	1	1	100.00	65.5	-	23.1	0
Temperature 2 m (C) Average	744	0	0	100.00	6.3	-	1.5	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	96	-
Barometric Pressure (inHg) Average	744	0	0	100.00	29.5	-	29.4	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	39	-	18	-
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 - SHELL MUSKEG RIVER (AMS 16)
 JANUARY 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	1.8	3	-	0	0	0	0	2	5	27
THC (ppm) Average	708	2.53	0.3	-	2.1	2.2	2.4	2.5	2.6	2.8	4.7
NO2 (ppb) Average	708	15.8	10	-	0	4	8	14	23	30	52
NO (ppb) Average	708	8.4	12	-	0	0	0	5	12	21	96
NOX (ppb) Average	708	24.2	19	-	0	4	10	20	32	50	118
PM2.5 (ug/m3) Average	743	6.55	5.7	-	0.5	1.6	2.8	5.2	8.6	12.9	65.5
Temperature 2 m (C) Average	744	-13.26	9.9	-	-38.1	-25.7	-20.6	-13.8	-4.2	-0.4	6.3
Relative Humidity (%) Average	744	83	8	-	54	73	78	83	88	94	99
Barometric Pressure (inHg) Average	744	28.85	0.4	-	28.1	28.2	28.6	28.9	29.1	29.3	29.5
Wind Speed 10 m (km/h) Average	744	8.9	6	-	0	3	5	8	11	17	39
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
JANUARY 2017

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: 27 ppb on Jan 25 12:00	Maximum Daily Average: 12.3 ppb on Jan 25		Hours of Data:	708
Minimum Value: 0 ppb on Jan 1 09:00	Minimum Daily Average: 0.1 ppb on Jan 1		Hours of Missing Data:	36
Maximum Diurnal Average: 2.9 ppb at hour 14	Minimum Diurnal Average: 1.1 ppb at hour 24		Hours of Calibration:	36
Monthly Average: 1.8 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 2 P ₉₀ = 5 P ₉₉ = 15		Percent Operational Time:	100.0

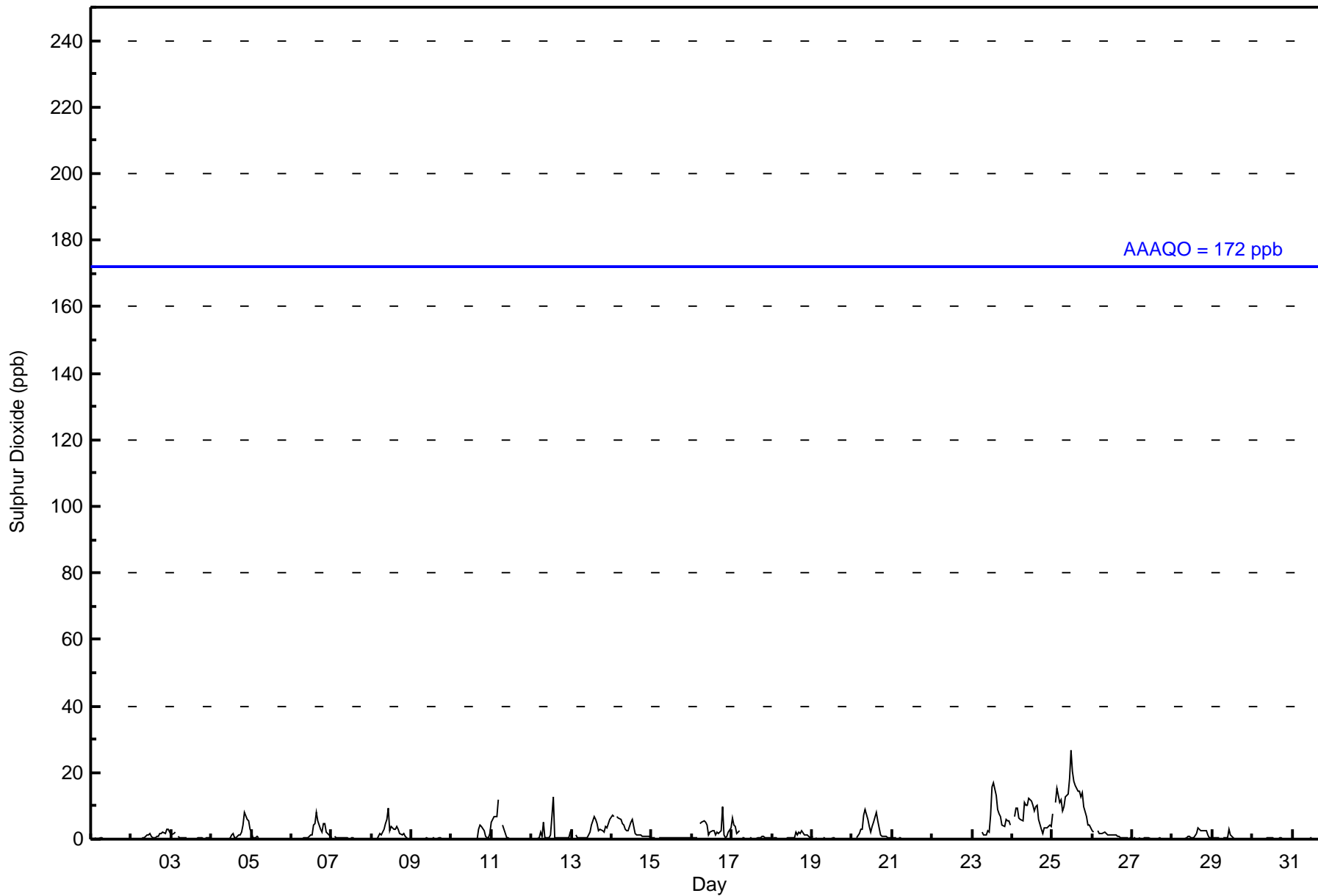
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Jan	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	0	1	1	2	2	2	2	3	3	2	1.0	3
3-Jan	1	2	2	Z	1	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0.6	2	
4-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	1	2	1	0	1	2	4	8	6	5	3	1.6	8	
5-Jan	2	0	0	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2	
6-Jan	Z	0	0	0	0	0	0	0	0	0	1	1	1	4	5	8	6	3	2	5	5	2	1	2.0	8	
7-Jan	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
8-Jan	0	0	Z	0	1	2	1	3	5	6	10	2	4	3	3	4	3	2	1	2	1	0	0	2.2	10	
9-Jan	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	
10-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	3	4	4	2	1	0	0	0.8	4	
11-Jan	5	7	7	7	12	Z	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2.0	12	
12-Jan	Z	0	0	0	1	2	1	5	0	1	0	1	7	13	0	1	0	0	0	0	0	0	1	1.6	13	
13-Jan	3	Z	1	0	0	0	0	0	0	0	1	2	4	7	6	5	2	3	3	2	4	4	5	2.6	7	
14-Jan	7	7	Z	7	6	6	5	4	3	2	3	5	6	4	2	1	1	1	1	1	1	1	1	3.2	7	
15-Jan	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	
16-Jan	0	0	0	1	Z	5	5	5	5	4	1	2	3	2	1	2	2	3	10	1	0	1	2	2.6	10	
17-Jan	7	4	4	2	3	Z	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1.1	7	
18-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	2	2	2	1	1	1	1	0.8	2	
19-Jan	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
20-Jan	0	0	Z	1	2	3	3	7	9	6	4	2	4	5	8	6	3	1	1	1	1	1	0	2.9	9	
21-Jan	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
22-Jan	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	
23-Jan	0	0	0	0	0	Z	2	1	1	3	2	7	16	17	13	9	8	7	4	4	6	6	5	5.0	17	
24-Jan	Z	7	9	9	6	6	6	11	10	10	12	11	10	8	10	6	3	2	3	4	3	4	4	7.2	12	
25-Jan	8	Z	11	15	11	12	9	10	13	14	18	27	20	17	16	14	14	13	14	10	7	4	3	12.3	27	
26-Jan	2	2	Z	3	2	2	1	2	2	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1.2	3	
27-Jan	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	
28-Jan	0	0	0	0	Z	0	0	0	0	1	1	1	1	1	2	3	3	3	3	3	2	1	1	1.1	3	
29-Jan	0	0	0	0	0	Z	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0.4	3	
30-Jan	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	
31-Jan	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	
	1.5	1.3	1.5	1.8	1.8	1.5	1.3	1.8	1.7	1.7	2.0	2.3	2.7	2.9	2.4	2.2	1.9	1.6	1.7	1.4	1.4	1.1	1.2	1.1	Diurnal Average	
	8	7	11	15	12	12	9	11	13	14	18	27	20	17	16	14	14	13	14	10	8	6	5	6	Diurnal Maximum	

Z - zerospan C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	685	96.75	96.75
11 - 20	22	3.11	99.86
21 - 60	1	0.14	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	36	65	42	20	5	9	10	31	178	157	66	31	11	5	7	12	685
11 - 20	0	0	0	0	0	0	0	0	16	5	1	0	0	0	0	0	22
21 - 60	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	36	65	42	20	5	9	10	31	194	163	67	31	11	5	7	12	708

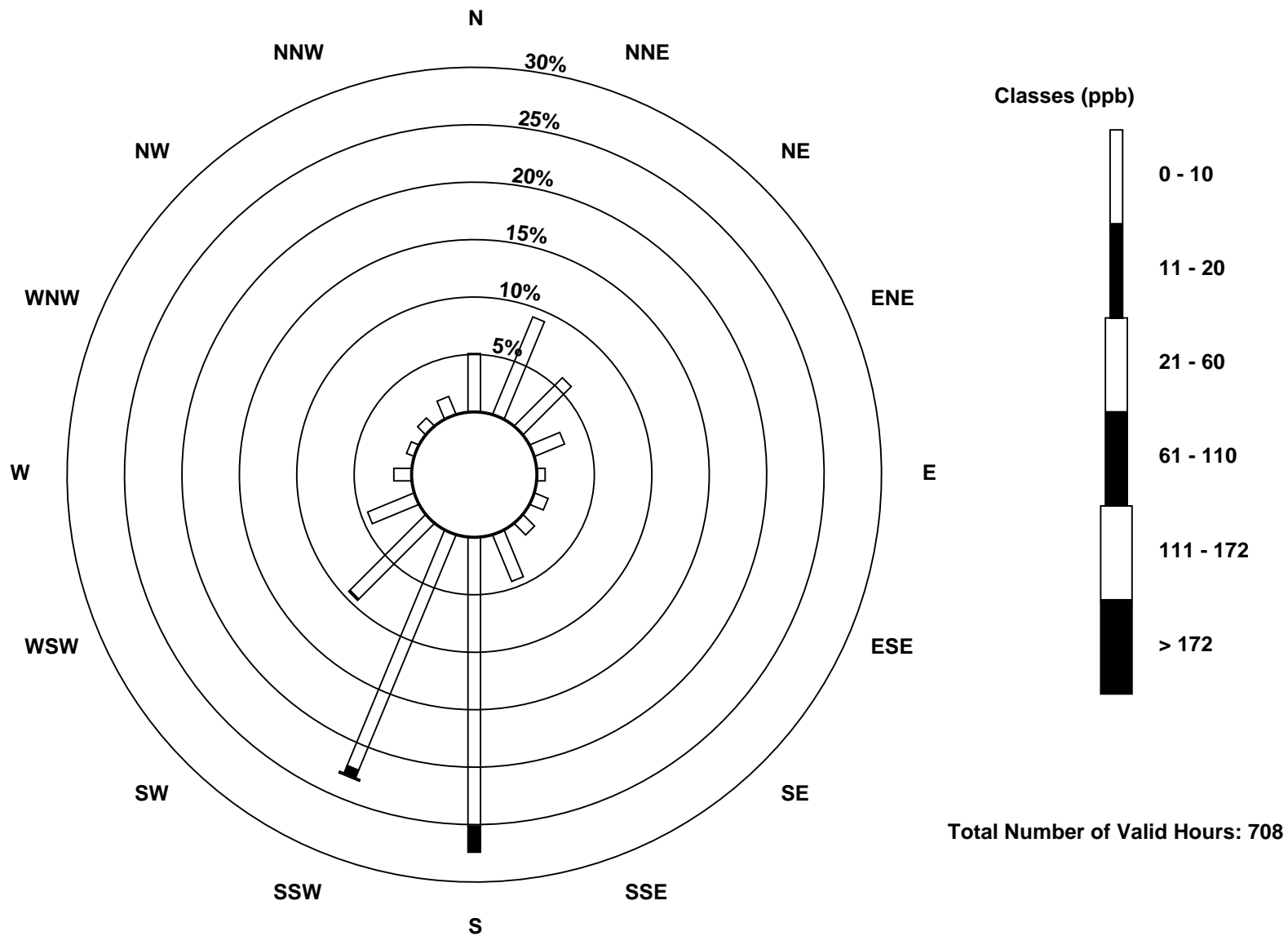
Total Number of Valid Hours: 708

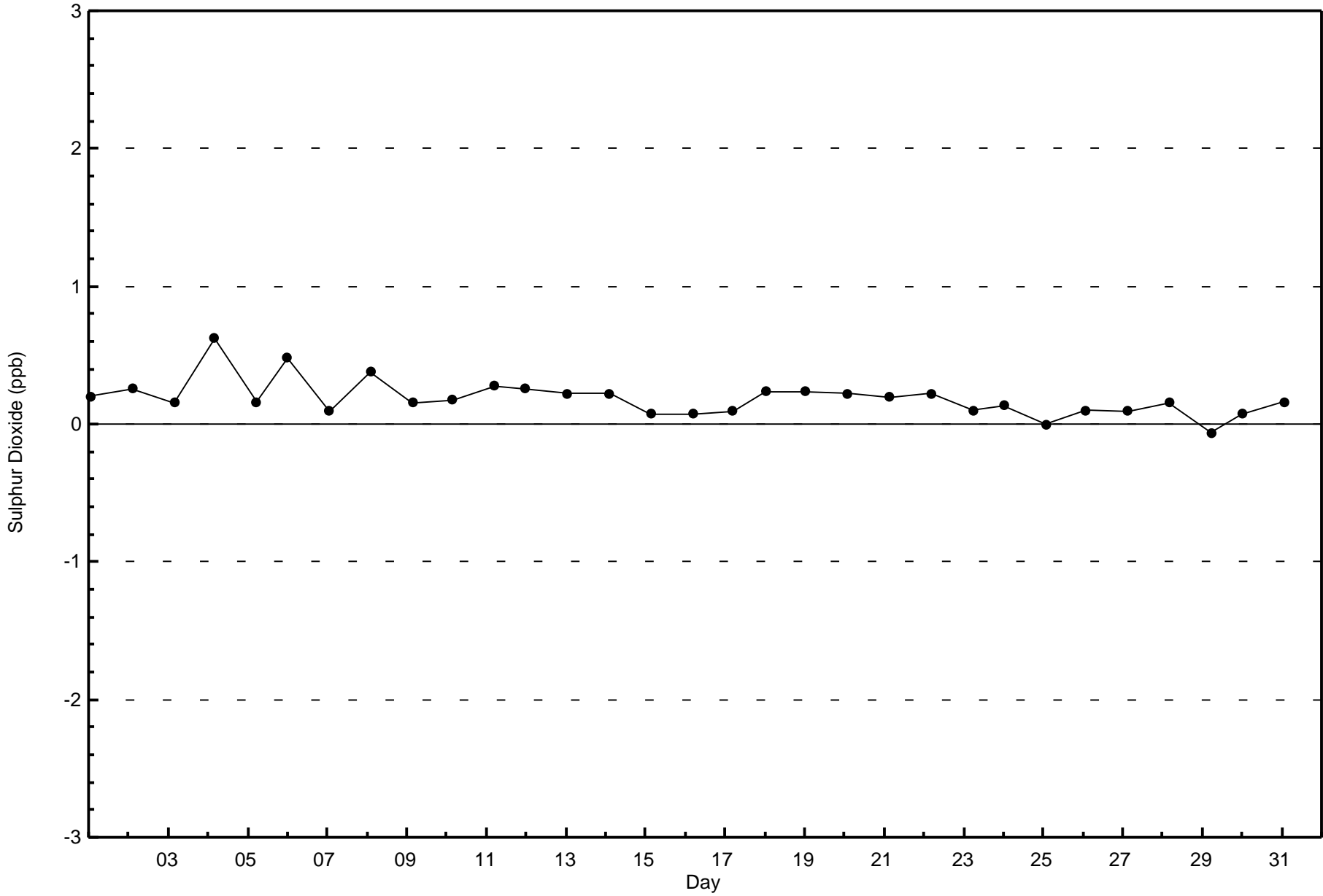
Total Number of Hours: 744

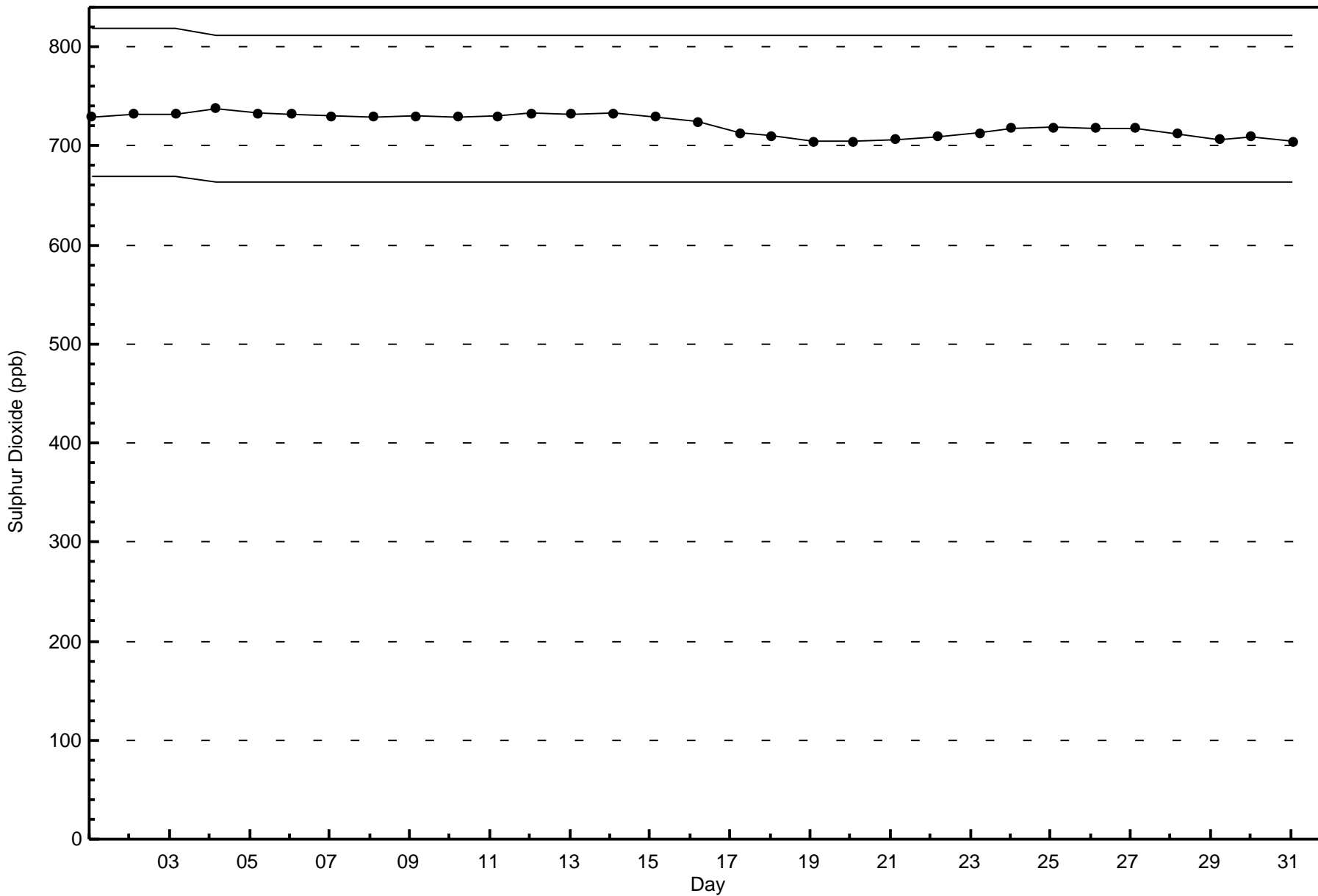


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River (AMS 16)









Wood Buffalo Environmental Association
Summary of Hour Averages

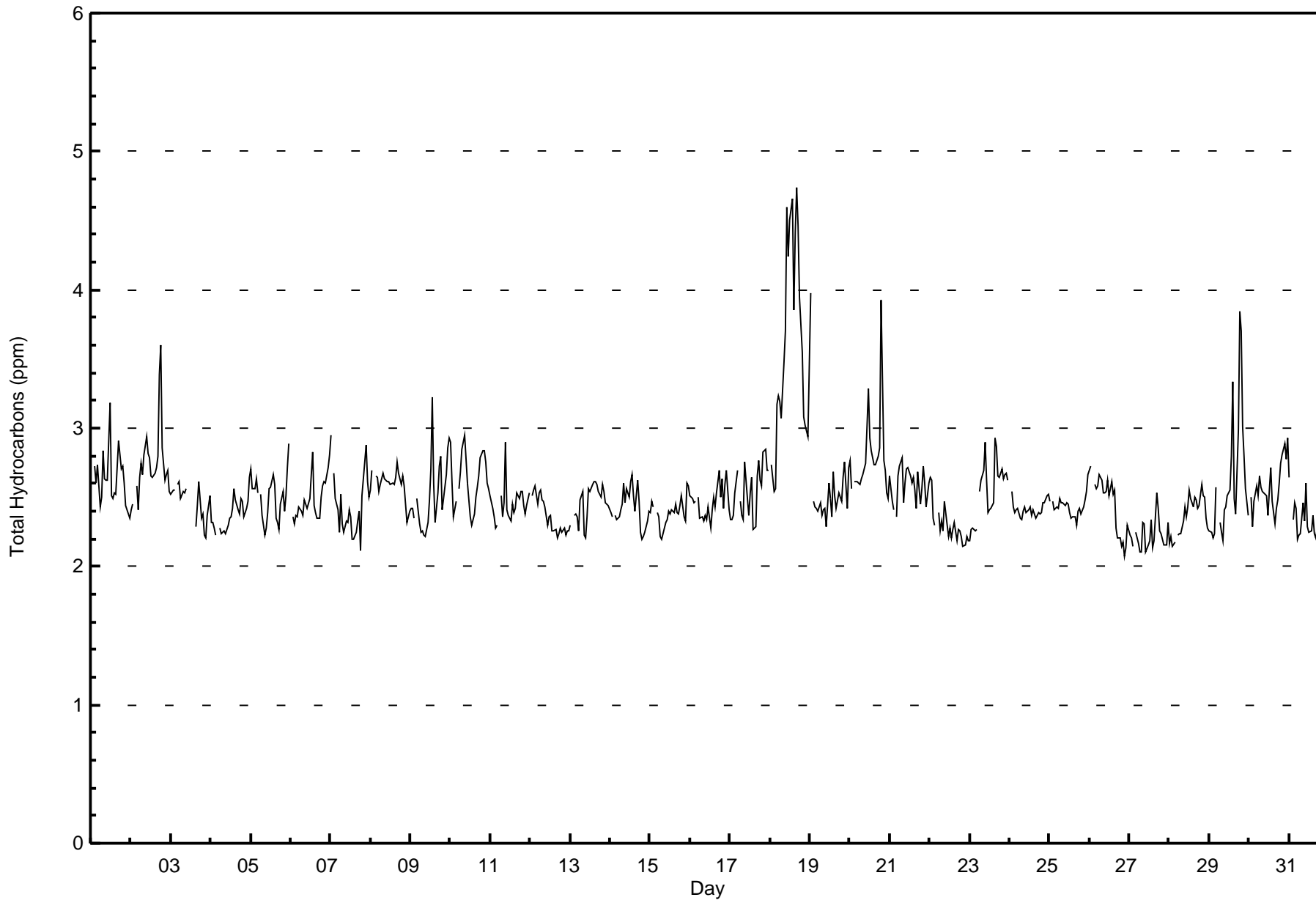
Total Hydrocarbons (THC) - ppm
Shell Muskeg River - January 2017

Maximum Value: 4.7 ppm on Jan 18 17:00		Maximum Daily Average: 3.6 ppm on Jan 18		Hours in Service: 744																						
Minimum Value: 2.1 ppm on Jan 26 22:00		Minimum Daily Average: 2.2 ppm on Jan 27		Hours of Data: 708																						
Maximum Diurnal Average: 2.6 ppm at hour 20		Minimum Diurnal Average: 2.4 ppm at hour 3		Hours of Missing Data: 36																						
Monthly Average: 2.53 ppm		Percentiles: P ₁ = 2.1 P ₁₀ = 2.2 Q ₁ = 2.4 Median = 2.5 Q ₃ = 2.6 P ₉₀ = 2.8 P ₉₉ = 4.1		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-Jan	2.6	Z	2.7	2.6	2.7	2.4	2.5	2.8	2.6	2.6	2.6	3.2	2.5	2.5	2.5	2.5	2.9	2.8	2.7	2.7	2.6	2.4	2.4	2.3	2.6	3.2
2-Jan	2.4	2.5	Z	2.6	2.4	2.6	2.7	2.7	2.8	2.9	2.8	2.8	2.7	2.6	2.7	2.7	2.8	3.4	3.6	2.9	2.6	2.7	2.7	2.5	2.7	3.6
3-Jan	2.5	2.6	2.5	Z	2.6	2.6	2.5	2.5	2.5	2.6	C	C	C	C	C	2.3	2.4	2.6	2.3	2.4	2.2	2.2	2.4	2.5	2.5	2.6
4-Jan	2.3	2.3	2.3	2.2	Z	2.3	2.2	2.2	2.3	2.2	2.3	2.4	2.4	2.4	2.6	2.5	2.4	2.4	2.5	2.5	2.4	2.4	2.5	2.6	2.4	2.6
5-Jan	2.7	2.6	2.6	2.6	2.5	Z	2.5	2.4	2.2	2.3	2.4	2.6	2.6	2.7	2.6	2.3	2.3	2.3	2.4	2.5	2.4	2.5	2.7	2.9	2.5	2.9
6-Jan	Z	2.4	2.3	2.4	2.4	2.4	2.4	2.5	2.5	2.4	2.5	2.7	2.8	2.4	2.4	2.3	2.3	2.5	2.6	2.6	2.6	2.7	2.8	2.5	2.5	2.8
7-Jan	3.0	Z	2.7	2.5	2.4	2.2	2.5	2.3	2.2	2.3	2.3	2.4	2.4	2.2	2.2	2.3	2.3	2.4	2.1	2.5	2.8	2.9	2.6	2.5	2.4	3.0
8-Jan	2.5	2.7	Z	2.7	2.6	2.5	2.6	2.7	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.8	2.7	2.6	2.7	2.6	2.5	2.3	2.4	2.6	2.8
9-Jan	2.4	2.4	2.3	Z	2.5	2.3	2.2	2.3	2.2	2.2	2.3	2.5	2.7	3.2	2.6	2.3	2.5	2.7	2.8	2.4	2.5	2.7	2.9	2.9	2.5	3.2
10-Jan	2.9	2.6	2.4	2.5	Z	2.6	2.7	2.8	2.9	2.8	2.6	2.5	2.4	2.3	2.4	2.5	2.6	2.7	2.8	2.8	2.8	2.8	2.6	2.6	2.6	2.9
11-Jan	2.5	2.4	2.4	2.3	2.3	Z	2.5	2.4	2.5	2.9	2.4	2.4	2.3	2.4	2.4	2.4	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.5	2.5	2.9
12-Jan	Z	2.5	2.6	2.6	2.4	2.5	2.6	2.5	2.5	2.4	2.3	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.3	2.2	2.3	2.2	2.3	2.3	2.4	2.6
13-Jan	2.3	Z	2.4	2.4	2.4	2.3	2.5	2.5	2.2	2.2	2.4	2.6	2.5	2.6	2.6	2.6	2.6	2.5	2.5	2.6	2.5	2.5	2.4	2.4	2.5	2.6
14-Jan	2.4	2.4	Z	2.4	2.3	2.4	2.4	2.5	2.6	2.5	2.6	2.5	2.6	2.7	2.5	2.4	2.6	2.5	2.2	2.2	2.2	2.3	2.4	2.4	2.4	2.7
15-Jan	2.4	2.5	2.4	Z	2.4	2.4	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.4	2.3	2.6	2.6	2.4	2.6
16-Jan	2.5	2.5	2.5	2.5	Z	2.5	2.3	2.4	2.3	2.4	2.3	2.4	2.3	2.4	2.5	2.4	2.5	2.7	2.5	2.6	2.4	2.6	2.7	2.4	2.5	2.7
17-Jan	2.3	2.3	2.4	2.5	2.7	Z	2.5	2.4	2.3	2.8	2.5	2.4	2.5	2.6	2.3	2.3	2.7	2.8	2.6	2.6	2.8	2.8	2.7	2.7	2.5	2.8
18-Jan	Z	2.7	2.5	2.6	3.2	3.2	3.1	3.5	3.7	4.6	4.2	4.5	4.7	3.9	4.4	4.7	4.5	3.9	3.6	3.1	3.0	3.0	2.9	3.6	4.7	
19-Jan	4.0	Z	2.5	2.4	2.4	2.4	2.5	2.4	2.4	2.4	2.3	2.6	2.5	2.4	2.7	2.5	2.4	2.5	2.5	2.5	2.6	2.8	2.4	2.7	2.6	4.0
20-Jan	2.8	2.6	Z	2.6	2.6	2.6	2.6	2.6	2.7	2.7	3.0	3.3	2.9	2.8	2.7	2.7	2.8	2.8	2.9	3.9	2.8	2.7	2.5	2.5	2.8	3.9
21-Jan	2.7	2.5	2.4	Z	2.4	2.7	2.7	2.8	2.5	2.6	2.7	2.7	2.7	2.6	2.6	2.6	2.4	2.7	2.4	2.6	2.7	2.6	2.4	2.6	2.6	2.8
22-Jan	2.6	2.6	2.4	2.3	Z	2.4	2.3	2.3	2.3	2.5	2.3	2.2	2.3	2.2	2.3	2.3	2.2	2.3	2.3	2.2	2.1	2.2	2.2	2.2	2.3	2.6
23-Jan	2.2	2.3	2.3	2.3	2.3	Z	2.5	2.6	2.7	2.9	2.6	2.4	2.4	2.4	2.5	2.9	2.9	2.6	2.6	2.7	2.6	2.7	2.7	2.6	2.6	2.9
24-Jan	Z	2.5	2.4	2.4	2.4	2.4	2.4	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.5	2.5	2.4	2.5
25-Jan	2.5	Z	2.5	2.4	2.4	2.4	2.5	2.5	2.5	2.4	2.5	2.4	2.4	2.4	2.3	2.4	2.4	2.3	2.4	2.4	2.4	2.5	2.5	2.7	2.4	2.7
26-Jan	2.7	2.7	Z	2.6	2.6	2.6	2.7	2.6	2.5	2.5	2.5	2.6	2.5	2.6	2.5	2.6	2.3	2.2	2.2	2.1	2.2	2.1	2.1	2.3	2.5	2.7
27-Jan	2.2	2.2	2.1	Z	2.2	2.2	2.1	2.1	2.3	2.3	2.1	2.2	2.2	2.3	2.1	2.2	2.5	2.4	2.3	2.2	2.2	2.2	2.2	2.3	2.2	2.5
28-Jan	2.2	2.2	2.1	2.2	Z	2.2	2.2	2.2	2.3	2.4	2.4	2.4	2.6	2.5	2.4	2.5	2.5	2.4	2.4	2.6	2.5	2.5	2.4	2.3	2.4	2.6
29-Jan	2.3	2.2	2.2	2.2	2.6	Z	2.3	2.3	2.2	2.4	2.4	2.5	2.6	2.8	3.3	2.5	2.4	3.0	3.8	3.7	3.0	2.8	2.6	2.4	2.6	3.8
30-Jan	Z	2.5	2.3	2.5	2.6	2.5	2.7	2.6	2.5	2.5	2.5	2.4	2.5	2.7	2.5	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.8	2.9	2.6	2.9
31-Jan	2.6	Z	2.3	2.5	2.4	2.2	2.2	2.2	2.5	2.3	2.6	2.3	2.2	2.3	2.4	2.2	2.2	2.3	2.2	2.2	2.2	2.4	3.0	2.7	2.4	3.0
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration																										



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Shell Muskeg River - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Shell Muskeg River - January 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	681	96.19	96.19
3.1 - 10.0	27	3.81	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
Shell Muskeg River - January 2017**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	35	64	42	18	5	7	10	30	190	157	65	27	11	4	5	11	681
3.1 - 10.0	1	1	0	2	0	2	0	1	4	6	2	4	0	1	2	1	27
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	36	65	42	20	5	9	10	31	194	163	67	31	11	5	7	12	708

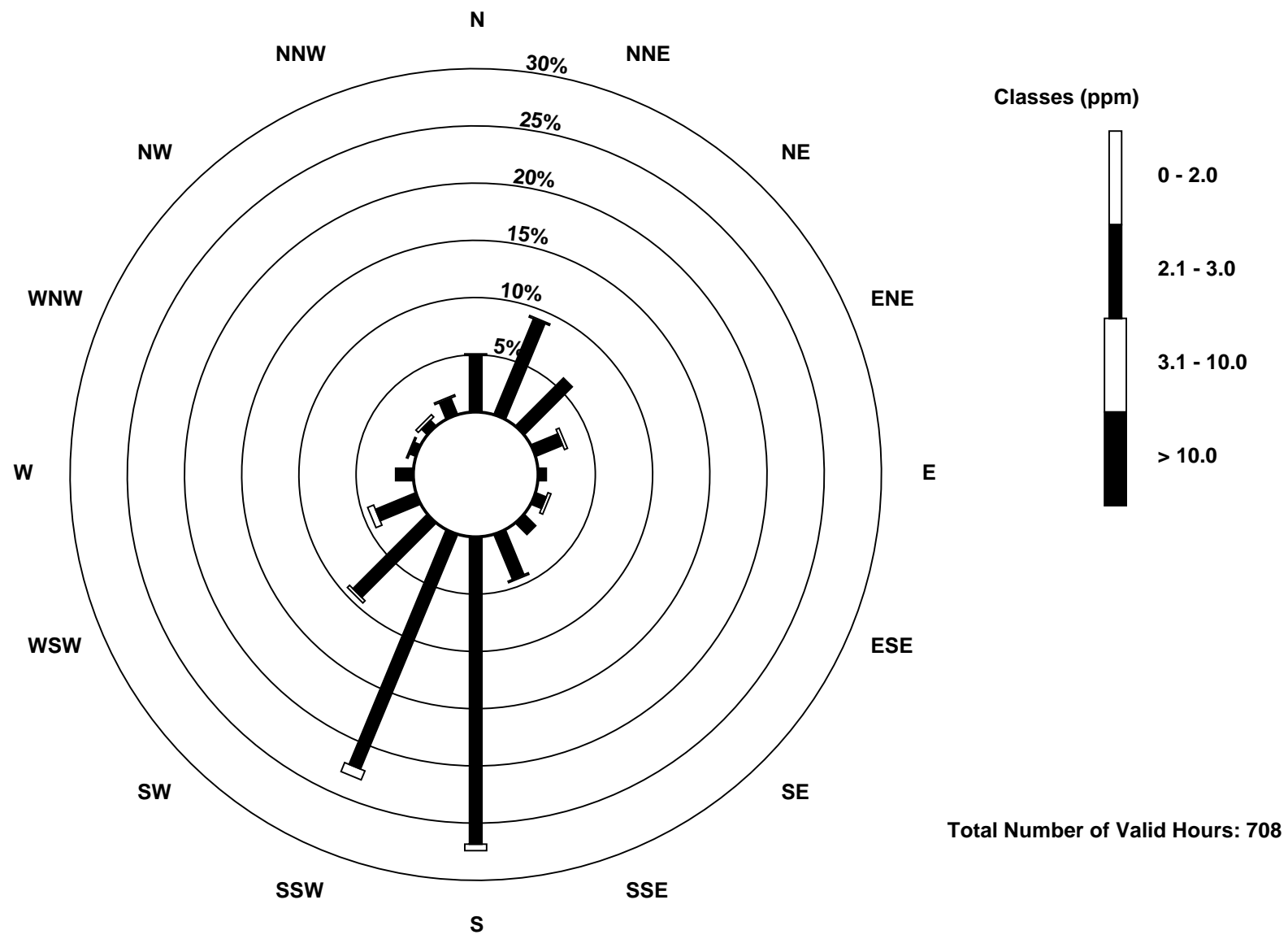
Total Number of Valid Hours: 708

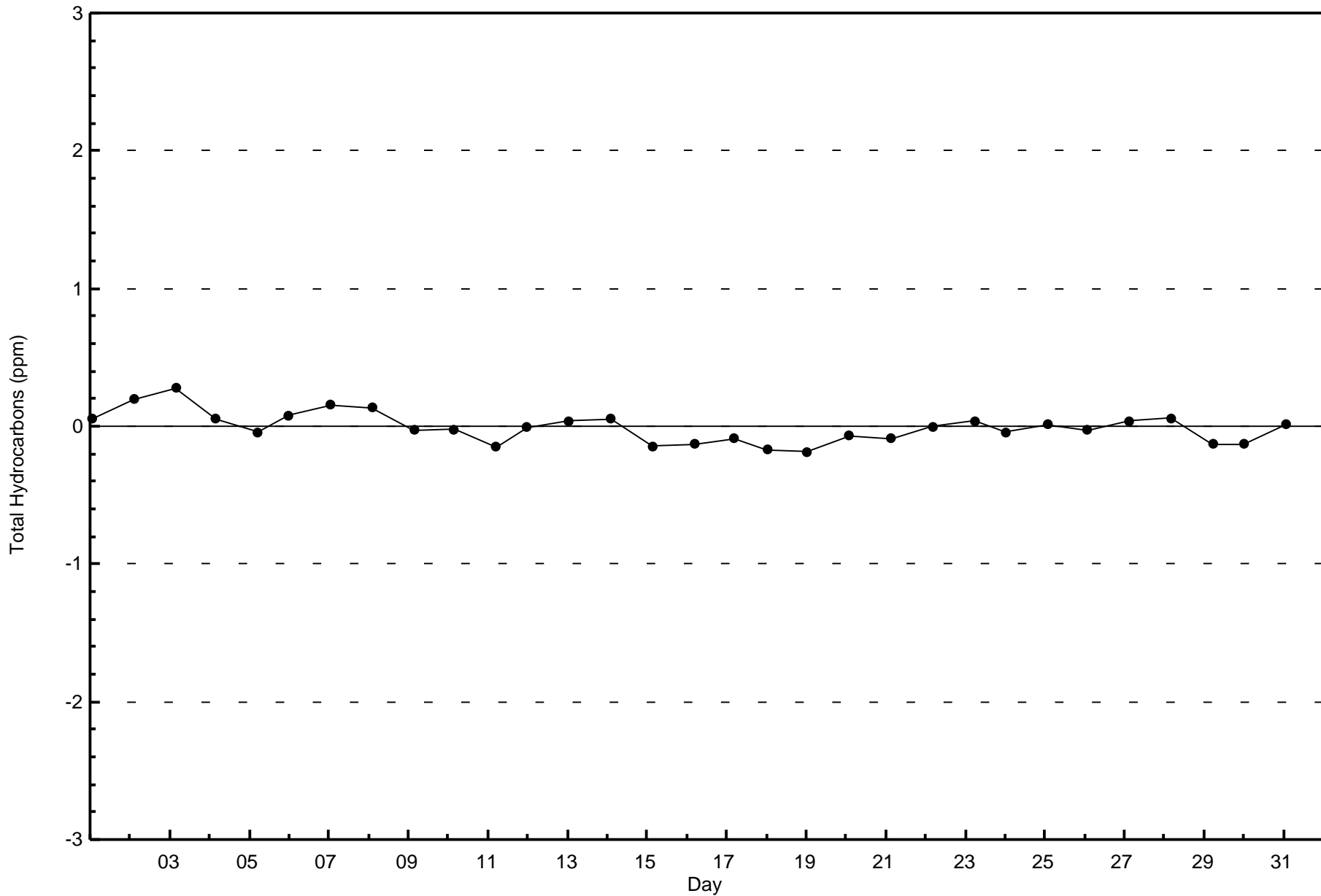
Total Number of Hours: 744

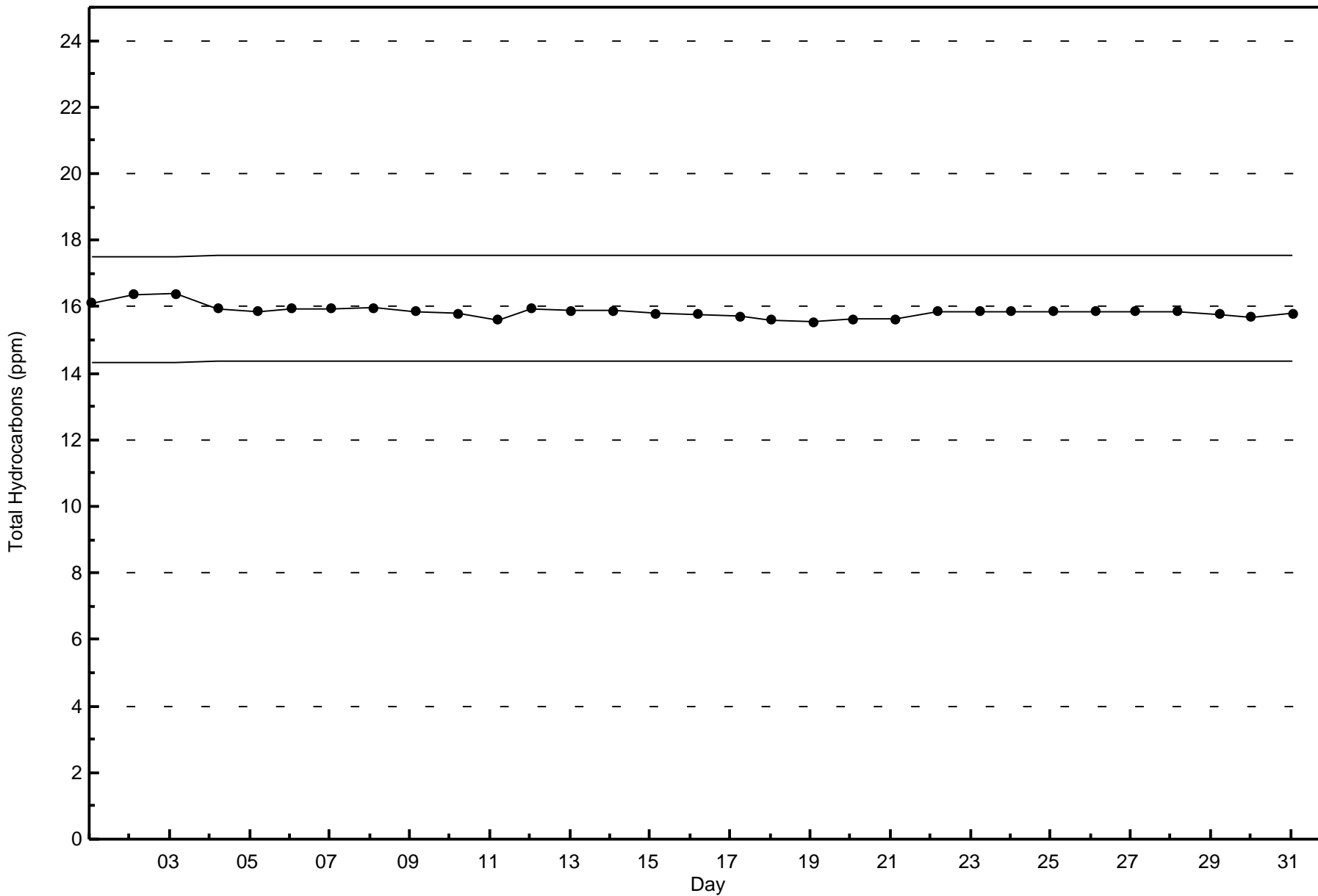


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Total Hydrocarbons (THC) - ppm
Shell Muskeg River (AMS 16)







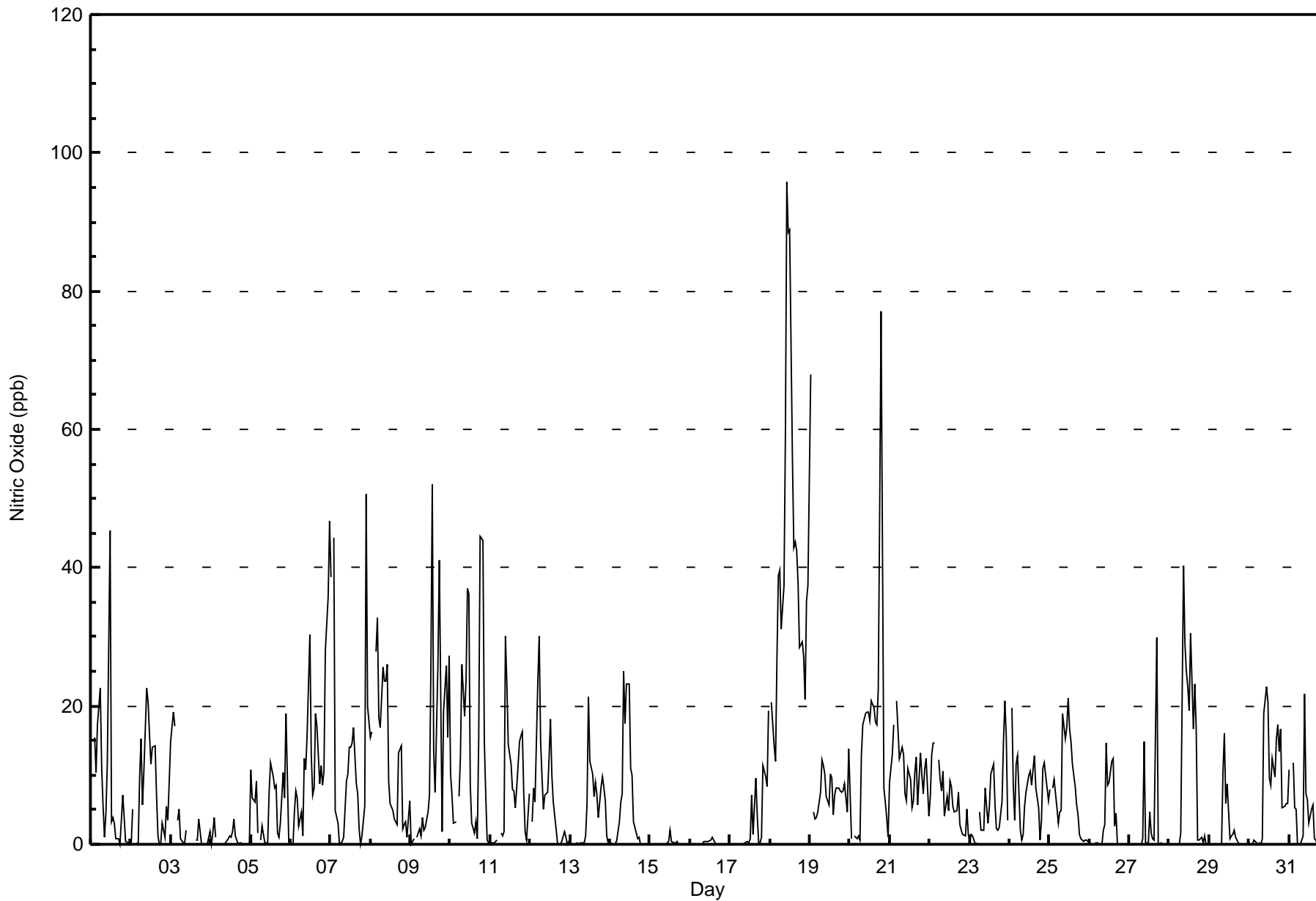


Maximum Value: 96 ppb on Jan 18 11:00																		Maximum Daily Average: 41.5 ppb on Jan 18						Hours in Service: 744		
Minimum Value: 0 ppb on Jan 3 20:00																		Minimum Daily Average: 0.2 ppb on Jan 15						Hours of Data: 708		
Maximum Diurnal Average: 15.7 ppb at hour 12																		Minimum Diurnal Average: 4.7 ppb at hour 4						Hours of Missing Data: 36		
Monthly Average: 8.4 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 5 Q ₃ = 12 P ₉₀ = 21 P ₉₉ = 54						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-Jan	6	Z	16	10	17	23	11	5	1	4	12	45	3	4	3	1	1	0	4	7	4	0	0	0	7.7	45
2-Jan	0	5	Z	0	0	10	15	6	11	22	21	16	12	14	14	7	1	0	0	3	1	6	4	9	7.6	22
3-Jan	15	19	17	Z	3	5	1	0	0	2	C	C	C	C	C	1	1	4	0	0	0	0	0	2	3.9	19
4-Jan	0	2	4	1	Z	0	0	0	0	0	1	1	1	2	4	1	0	0	0	0	0	0	0	0	0.8	4
5-Jan	11	7	6	9	2	Z	1	3	0	0	0	7	12	10	8	8	2	1	3	10	7	19	10	0	5.9	19
6-Jan	Z	0	5	8	7	3	5	1	12	11	16	30	13	7	8	19	17	9	11	9	11	28	36	47	13.5	47
7-Jan	39	Z	44	5	3	0	0	0	1	9	10	14	14	15	17	9	7	2	0	1	5	51	20	18	12.4	51
8-Jan	15	16	Z	28	33	18	17	26	24	24	26	9	6	5	4	3	3	13	14	2	3	3	1	6	13.0	33
9-Jan	0	0	1	Z	1	2	1	4	2	2	5	7	25	52	13	7	26	41	22	2	19	26	15	27	13.2	52
10-Jan	10	7	3	3	Z	7	13	26	18	24	37	36	9	3	2	3	1	15	45	44	15	7	1	0	14.3	45
11-Jan	0	0	0	0	1	Z	2	1	2	30	23	14	12	8	8	5	8	15	16	16	7	2	1	7	7.7	30
12-Jan	Z	3	8	6	23	30	15	10	5	7	8	12	18	10	6	2	0	0	0	0	2	1	0	0	7.3	30
13-Jan	0	Z	0	0	0	0	0	0	0	1	6	21	12	10	7	9	7	4	8	10	8	6	1	0	4.9	21
14-Jan	0	0	Z	0	0	3	6	7	25	18	23	23	11	10	3	2	1	1	0	0	0	0	0	0	5.9	25
15-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0.2	2
16-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.2	1
17-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	1	7	1	9	4	0	0	1	11	10	8	19	3.2	19
18-Jan	Z	21	14	12	27	39	40	31	37	59	96	89	89	56	43	44	43	38	28	29	27	21	35	37	41.5	96
19-Jan	68	Z	5	4	4	5	8	12	11	10	7	6	10	10	4	7	8	8	8	7	8	9	5	14	10.3	68
20-Jan	7	1	Z	1	1	1	1	13	17	19	19	19	18	21	20	18	17	22	48	77	8	6	4	1	15.6	77
21-Jan	9	13	17	Z	21	17	12	14	13	7	6	11	9	5	6	10	13	6	13	10	7	11	12	4	10.8	21
22-Jan	7	13	15	15	Z	12	9	8	10	4	7	5	9	8	5	5	5	7	3	2	1	1	5	1	6.9	15
23-Jan	1	1	1	0	0	Z	5	2	2	8	6	3	5	10	12	6	2	2	6	15	21	16	4	5.6	21	
24-Jan	Z	20	8	4	12	13	2	1	1	5	7	10	11	9	11	13	8	5	1	3	11	12	8	6	7.8	20
25-Jan	8	Z	8	9	5	3	5	5	19	15	17	21	17	15	12	8	6	4	1	1	0	1	1	0	7.9	21
26-Jan	0	0	Z	0	0	0	0	0	2	3	15	9	9	12	12	3	4	0	0	0	0	0	0	0	3.0	15
27-Jan	0	0	0	Z	0	0	0	0	1	15	0	0	5	2	1	1	30	0	0	0	0	0	0	0	2.4	30
28-Jan	0	0	0	0	Z	0	0	2	40	29	25	23	19	30	17	23	17	1	1	1	0	1	0	0	10.0	40
29-Jan	0	0	0	0	0	Z	0	0	10	16	6	9	1	1	1	2	1	0	0	0	0	0	0	0	2.1	16
30-Jan	Z	0	0	1	0	0	0	0	1	19	23	21	10	8	12	10	15	17	14	17	5	5	6	6	8.3	23
31-Jan	11	Z	12	5	5	0	0	0	1	22	7	7	3	5	6	1	1	0	0	0	0	3	23	3	5.0	23
7.9 5.2 7.1 4.7 6.4 7.3 5.4 5.7 8.7 12.5 14.3 15.7 12.2 11.7 8.7 7.7 8.0 7.0 7.8 8.4 5.7 8.0 6.8 6.9																								Diurnal Average		
68 21 44 28 33 39 40 31 40 59 96 89 89 56 43 44 43 41 48 77 27 51 36 47																								Diurnal Maximum		
Z - zerospan		C - Calibration																								



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Shell Muskeg River - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Shell Muskeg River - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	630	88.98	88.98
21 - 40	59	8.33	97.32
41 - 80	16	2.26	99.58
81 - 159	3	0.42	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
Shell Muskeg River - January 2017

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	32	59	39	17	5	5	9	28	173	143	64	30	9	4	3	10	630
21 - 40	3	5	2	2	0	4	1	2	21	15	2	0	1	0	1	0	59
11 - 80	1	1	1	1	0	0	0	0	0	5	1	0	1	0	3	2	16
81 - 159	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	3
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	36	65	42	20	5	9	10	31	194	163	67	31	11	5	7	12	708

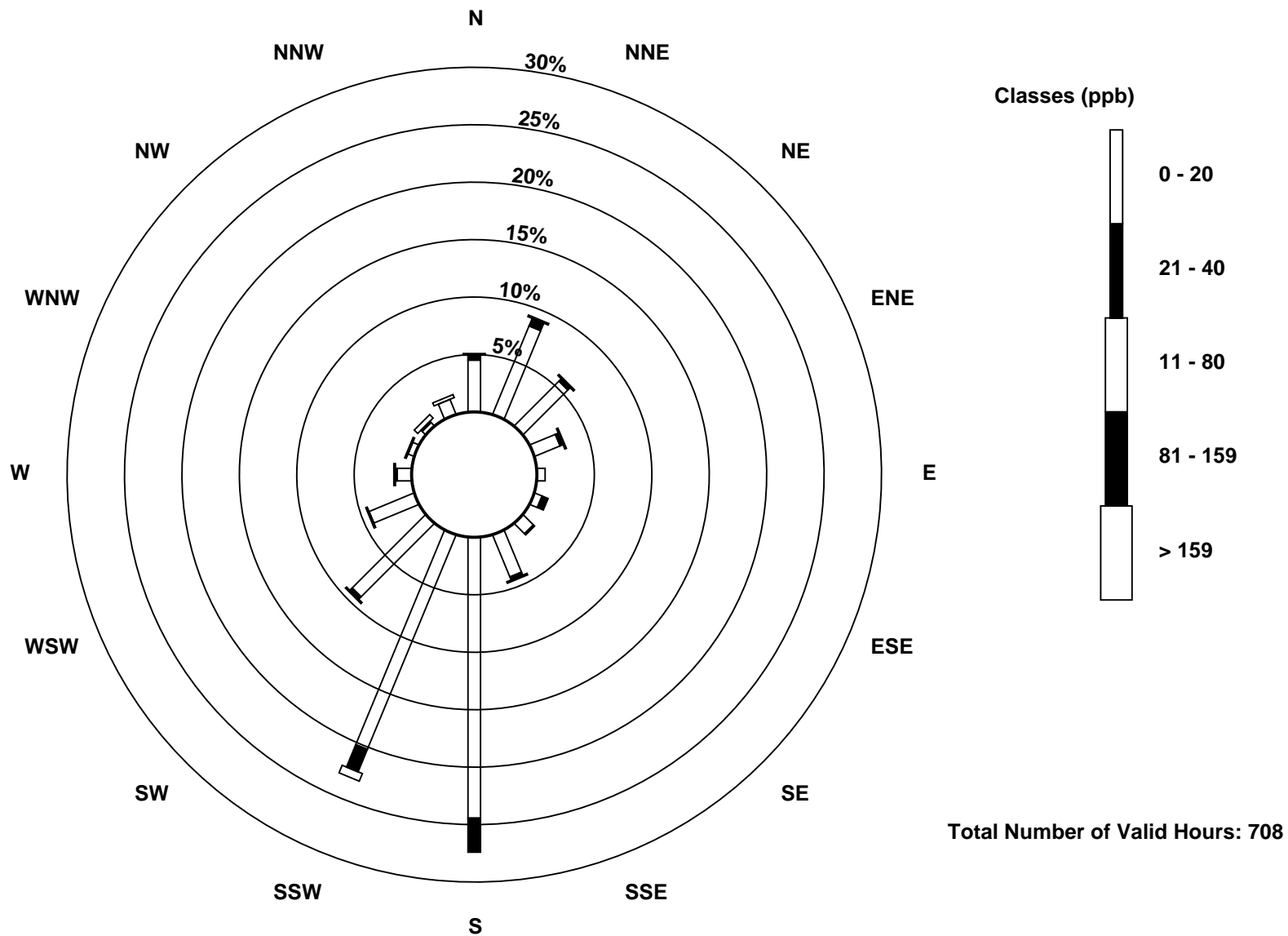
Total Number of Valid Hours: 708

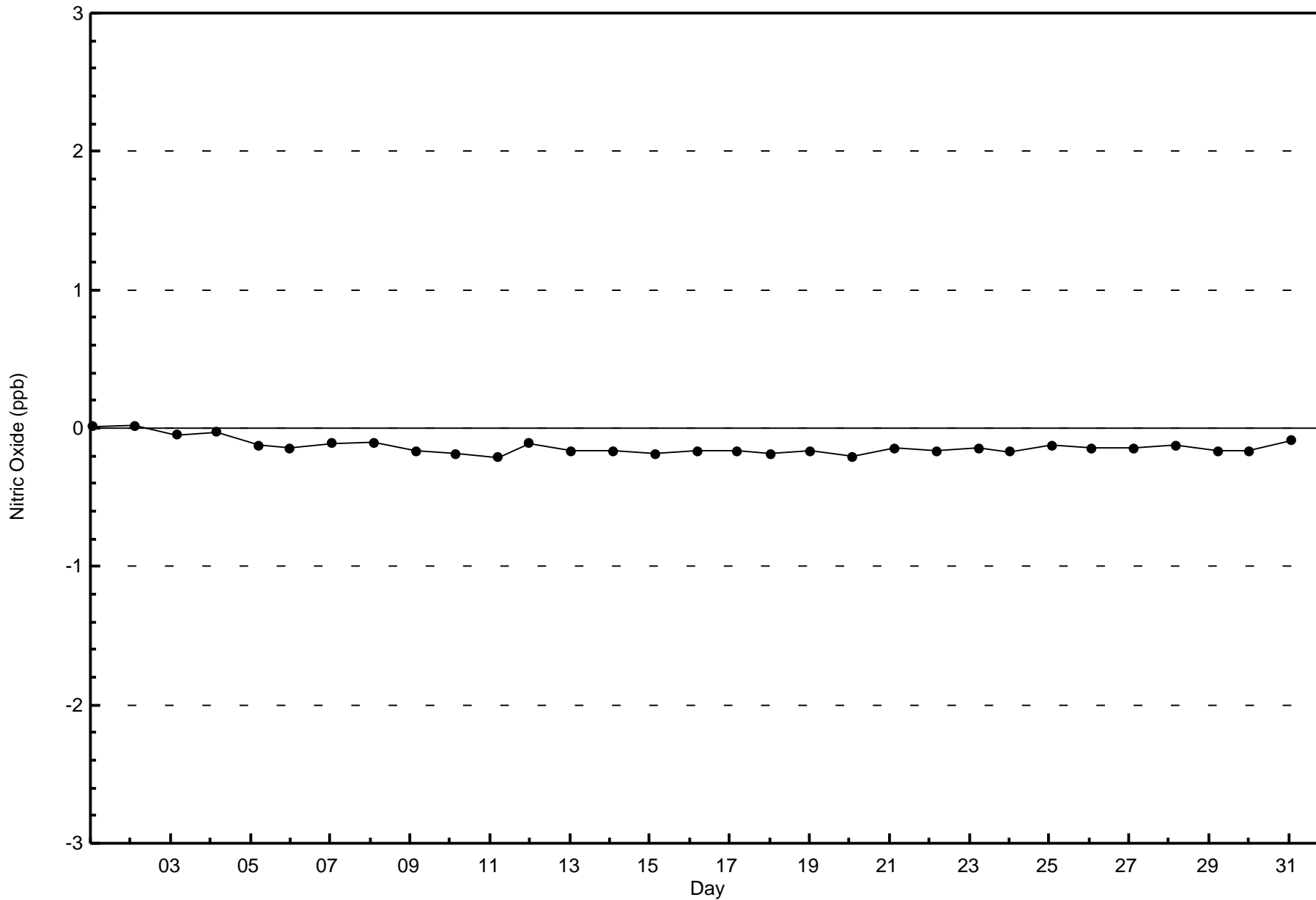
Total Number of Hours: 744

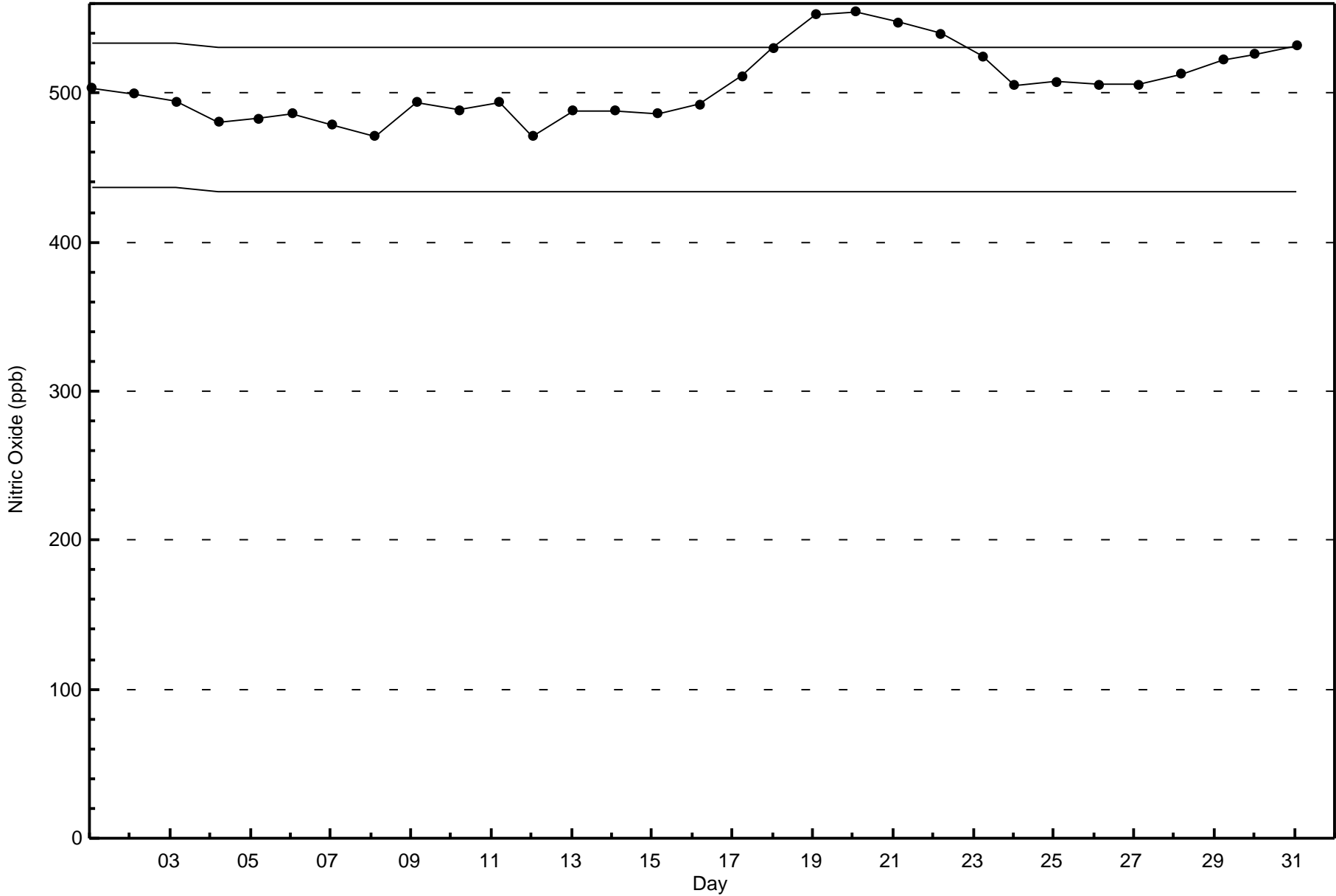


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Nitric Oxide (NO) - ppb
Shell Muskeg River (AMS 16)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

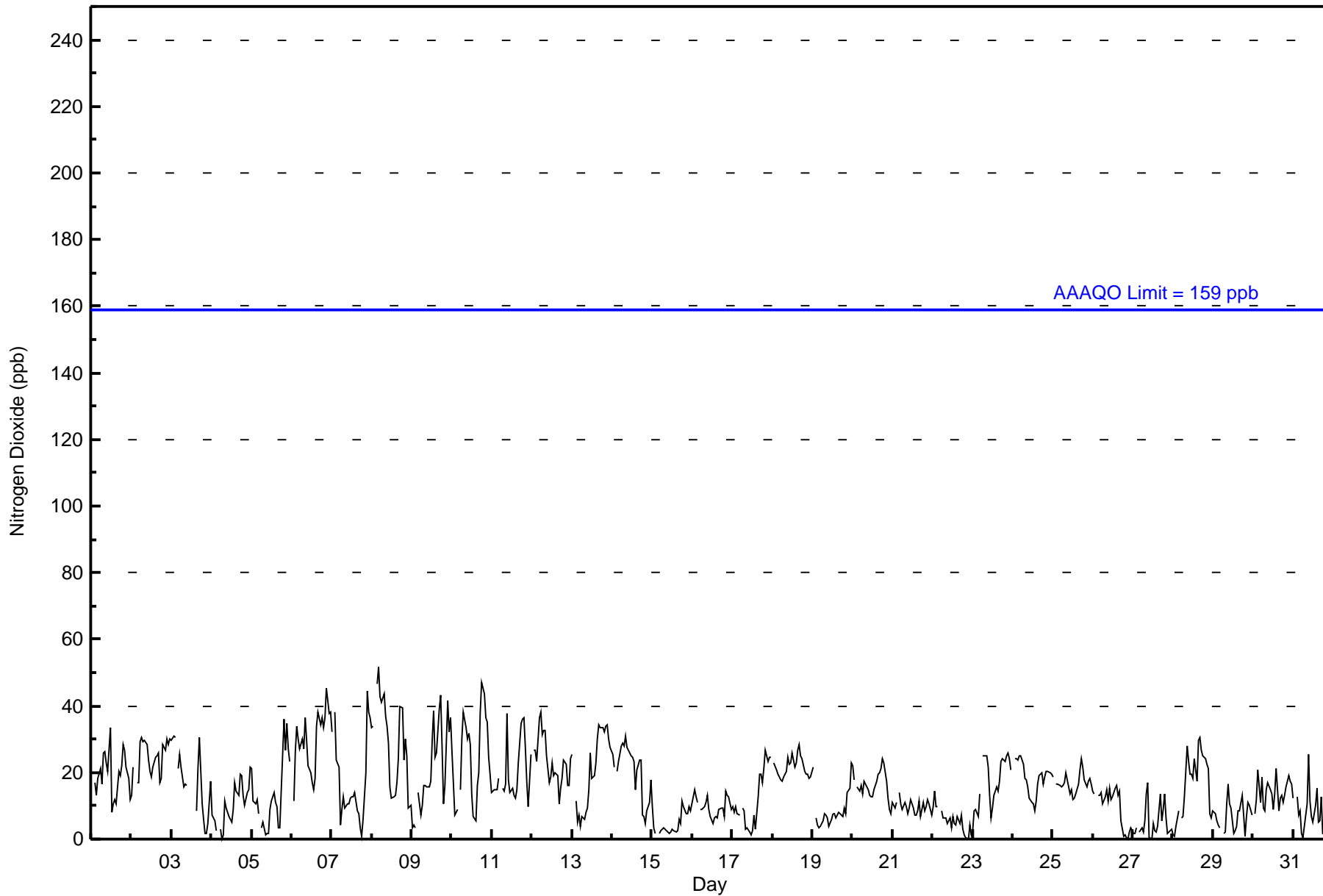
Shell Muskeg River - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																							
Maximum Value: 52 ppb on Jan 8 05:00										Maximum Daily Average: 29.5 ppb on Jan 6										Hours of Data: 708																													
Minimum Value: 0 ppb on Jan 22 22:00										Minimum Daily Average: 4.8 ppb on Jan 15										Hours of Missing Data: 36																													
Maximum Diurnal Average: 19.4 ppb at hour 18										Minimum Diurnal Average: 12.1 ppb at hour 13										Hours of Calibration: 36																													
Monthly Average: 15.8 ppb										Percentiles: P ₁ = 0 P ₁₀ = 4 Q ₁ = 8 Median = 14 Q ₃ = 23 P ₉₀ = 30 P ₉₉ = 44										Percent Operational Time: 100.0																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jan	20	Z	17	13	18	21	16	26	26	23	20	33	8	11	12	11	20	19	22	29	27	22	18	12	19.3	33																							
2-Jan	13	21	Z	17	17	29	30	29	30	28	24	20	19	22	25	25	26	17	18	29	27	30	28	30	24.1	30																							
3-Jan	30	31	30	Z	21	26	21	16	16	16	C	C	C	C	C	8	21	30	10	6	2	2	5	17	17.2	31																							
4-Jan	7	6	5	2	Z	3	0	1	12	9	7	6	5	9	17	15	13	20	19	13	10	14	15	22	10.0	22																							
5-Jan	21	11	11	12	8	Z	4	5	1	2	2	9	11	14	11	10	3	3	14	36	27	35	27	23	13.0	36																							
6-Jan	Z	11	26	34	30	27	30	27	37	30	22	20	17	15	18	34	38	34	36	33	36	45	38	38	29.5	45																							
7-Jan	32	Z	38	24	22	4	9	13	9	11	11	12	13	13	14	9	8	3	1	6	20	44	38	37	16.9	44																							
8-Jan	34	34	Z	47	52	43	41	44	37	34	29	16	12	13	13	17	24	40	40	24	30	25	9	10	28.9	52																							
9-Jan	4	4	4	Z	14	7	10	16	16	16	16	17	30	39	25	26	39	43	28	10	16	42	32	36	21.3	43																							
10-Jan	26	17	7	9	Z	15	30	38	34	30	32	28	13	7	6	16	20	38	47	44	36	35	25	20	24.9	47																							
11-Jan	14	15	15	15	18	Z	15	14	17	38	18	14	15	13	12	15	23	35	36	37	28	17	10	25	19.9	38																							
12-Jan	Z	27	27	23	36	38	31	33	33	25	17	19	23	19	20	19	11	15	18	24	23	16	16	24	23.3	38																							
13-Jan	26	Z	12	5	7	4	7	6	8	9	15	26	18	19	23	30	34	34	34	32	34	34	30	28	20.6	34																							
14-Jan	26	22	Z	20	24	28	29	28	31	27	27	25	24	23	15	21	24	24	7	7	5	9	11	18	20.6	31																							
15-Jan	10	4	2	Z	2	3	3	4	3	2	2	2	3	3	2	3	6	5	11	10	8	8	10	9	4.8	11																							
16-Jan	10	15	13	11	Z	9	9	10	11	13	9	7	5	6	7	7	9	10	10	7	14	13	13	9	9.7	15																							
17-Jan	10	8	10	8	7	Z	9	8	3	3	2	1	2	7	3	13	20	19	17	21	27	23	25	25	11.8	27																							
18-Jan	Z	23	21	19	19	18	17	19	21	25	23	23	26	22	23	27	28	25	24	20	20	20	18	19	21.6	28																							
19-Jan	22	Z	6	4	3	4	6	8	7	6	4	6	8	8	6	7	8	7	7	9	8	14	15	23	8.5	23																							
20-Jan	22	18	Z	16	15	16	13	17	17	15	13	13	13	15	18	19	20	21	24	23	18	12	9	8	16.2	24																							
21-Jan	11	10	11	Z	14	10	9	11	10	8	9	12	9	7	7	8	11	7	11	9	10	12	10	7	9.7	14																							
22-Jan	10	14	10	10	Z	9	7	6	7	5	6	3	7	5	4	7	5	7	3	1	0	0	4	1	5.7	14																							
23-Jan	3	8	9	7	14	Z	25	25	25	22	13	6	9	13	16	14	17	24	24	24	25	26	24	21	17.1	26																							
24-Jan	Z	24	24	24	25	25	22	18	18	16	12	11	11	9	11	17	19	20	17	19	21	20	20	20	18.3	25																							
25-Jan	19	Z	17	17	16	16	16	17	20	16	14	15	12	12	14	16	21	24	22	18	16	18	18	17	16.8	24																							
26-Jan	14	13	Z	13	13	14	11	13	15	11	15	12	13	15	16	13	15	6	1	1	0	0	2	3	10.0	16																							
27-Jan	2	2	3	Z	2	4	2	5	13	17	0	0	5	2	2	4	13	6	9	14	7	2	3	3	5.2	17																							
28-Jan	1	1	4	9	Z	6	7	13	28	23	20	19	18	24	17	30	31	27	25	24	23	21	8	6	16.7	31																							
29-Jan	8	8	6	4	3	Z	2	2	10	17	11	9	2	3	4	8	9	13	7	1	7	11	10	7	7.0	17																							
30-Jan	Z	8	12	21	11	19	9	9	15	17	15	14	9	14	21	9	12	13	11	13	16	19	17	16	13.8	21																							
31-Jan	12	Z	13	7	8	2	0	4	11	25	11	7	5	10	15	5	6	13	2	1	0	7	25	10	8.7	25																							
																								15.6	14.2	13.5	15.0	16.1	15.3	14.3	15.6	17.3	17.3	13.9	13.5	12.1	13.0	13.2	14.9	17.9	19.4	17.9	17.5	17.3	19.2	17.2	17.5	Diurnal Average	
																								34	34	38	47	52	43	41	44	37	38	32	33	30	39	25	34	39	43	47	44	36	45	38	38	Diurnal Maximum	
Z - zerospan C - Calibration																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																																																	



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	498	70.34	70.34
21 - 40	199	28.11	98.45
41 - 80	11	1.55	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 (NO₂) - ppb
Shell Muskeg River - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	30	61	38	15	3	5	7	26	120	96	57	26	4	4	2	4	498
21 - 40	6	4	4	5	2	4	2	5	71	62	10	5	7	1	4	7	199
11 - 80	0	0	0	0	0	0	1	0	3	5	0	0	0	0	1	1	11
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
Totals	36	65	42	20	5	9	10	31	194	163	67	31	11	5	7	12	708

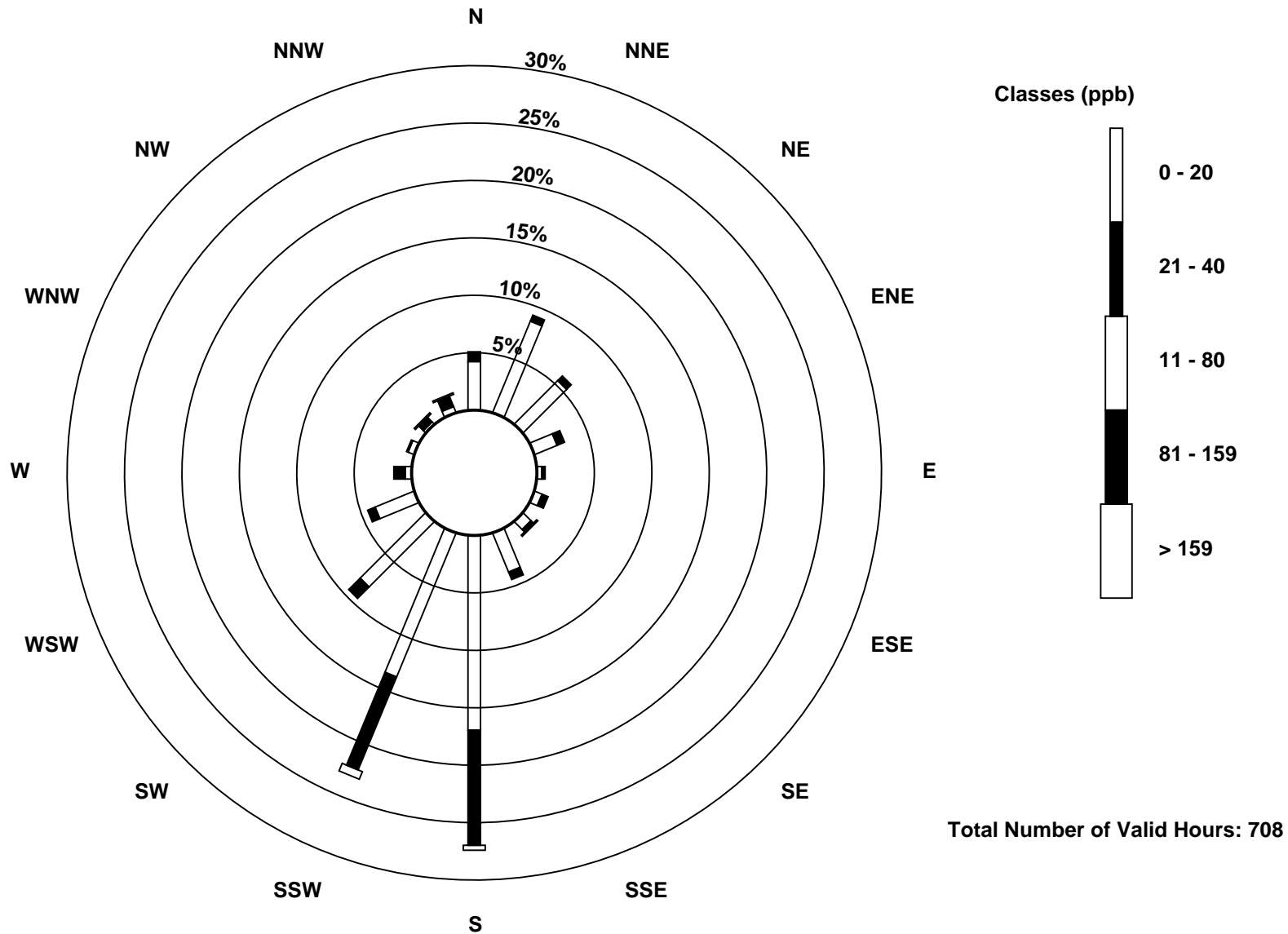
Total Number of Valid Hours: 708

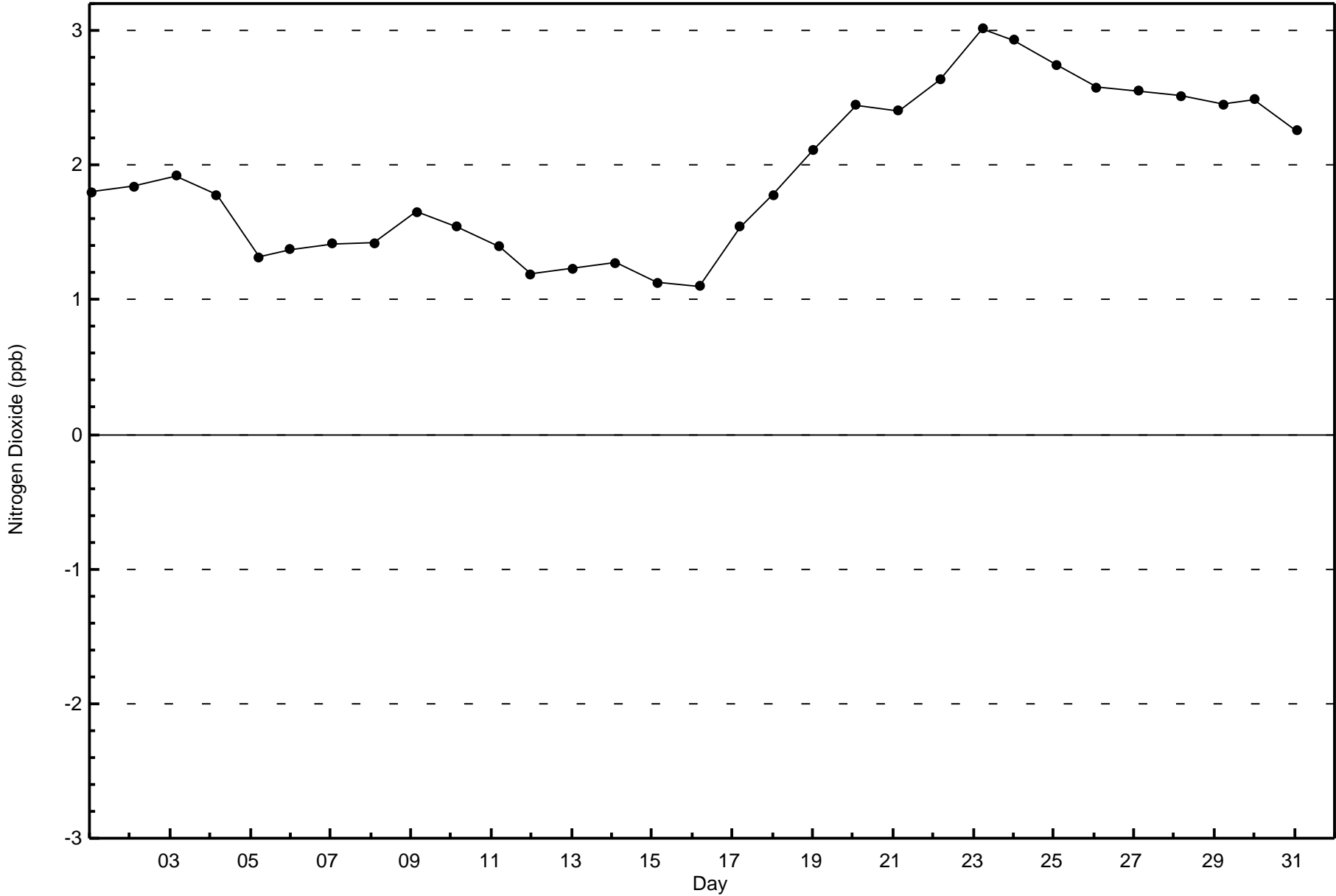
Total Number of Hours: 744

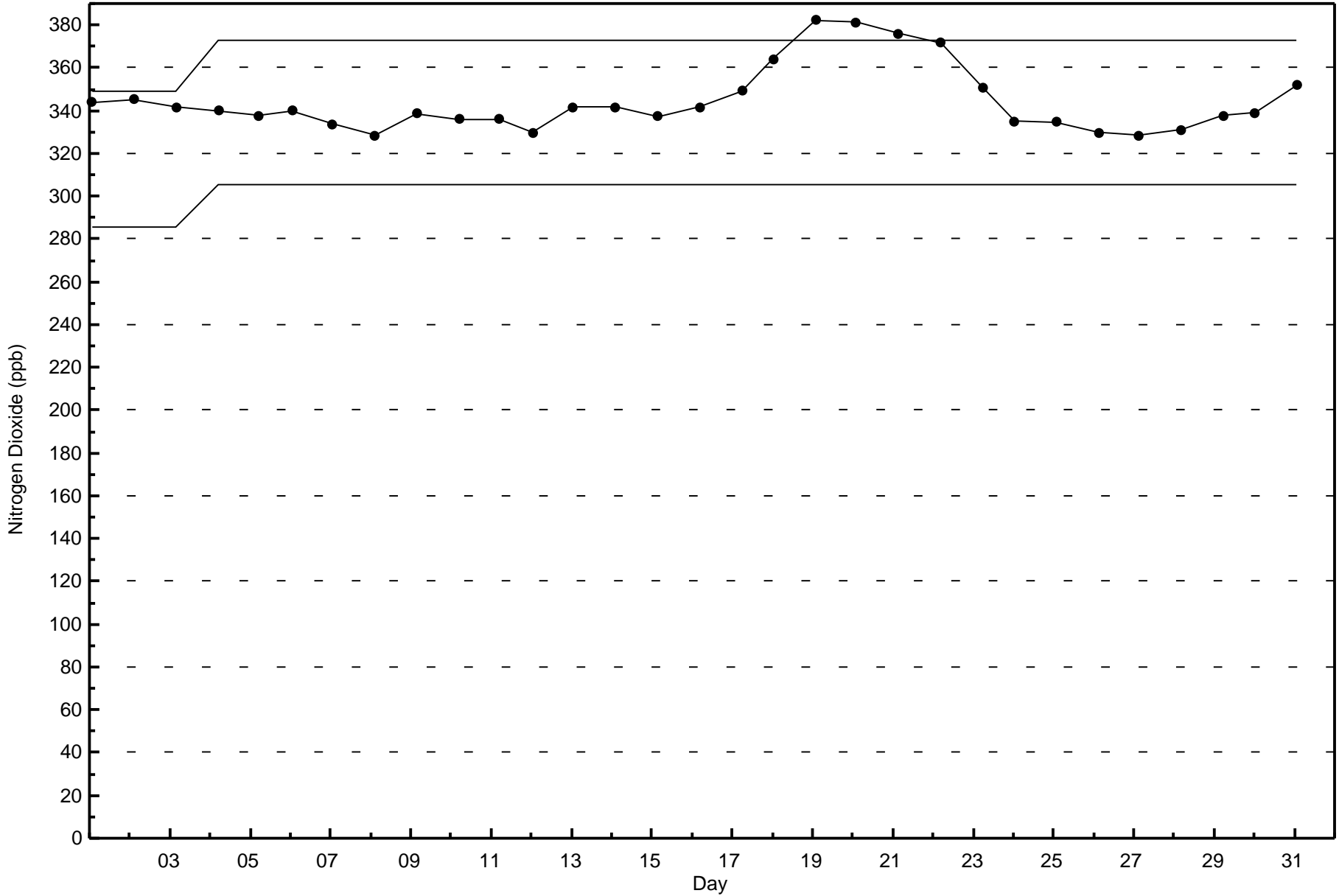


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River (AMS 16)





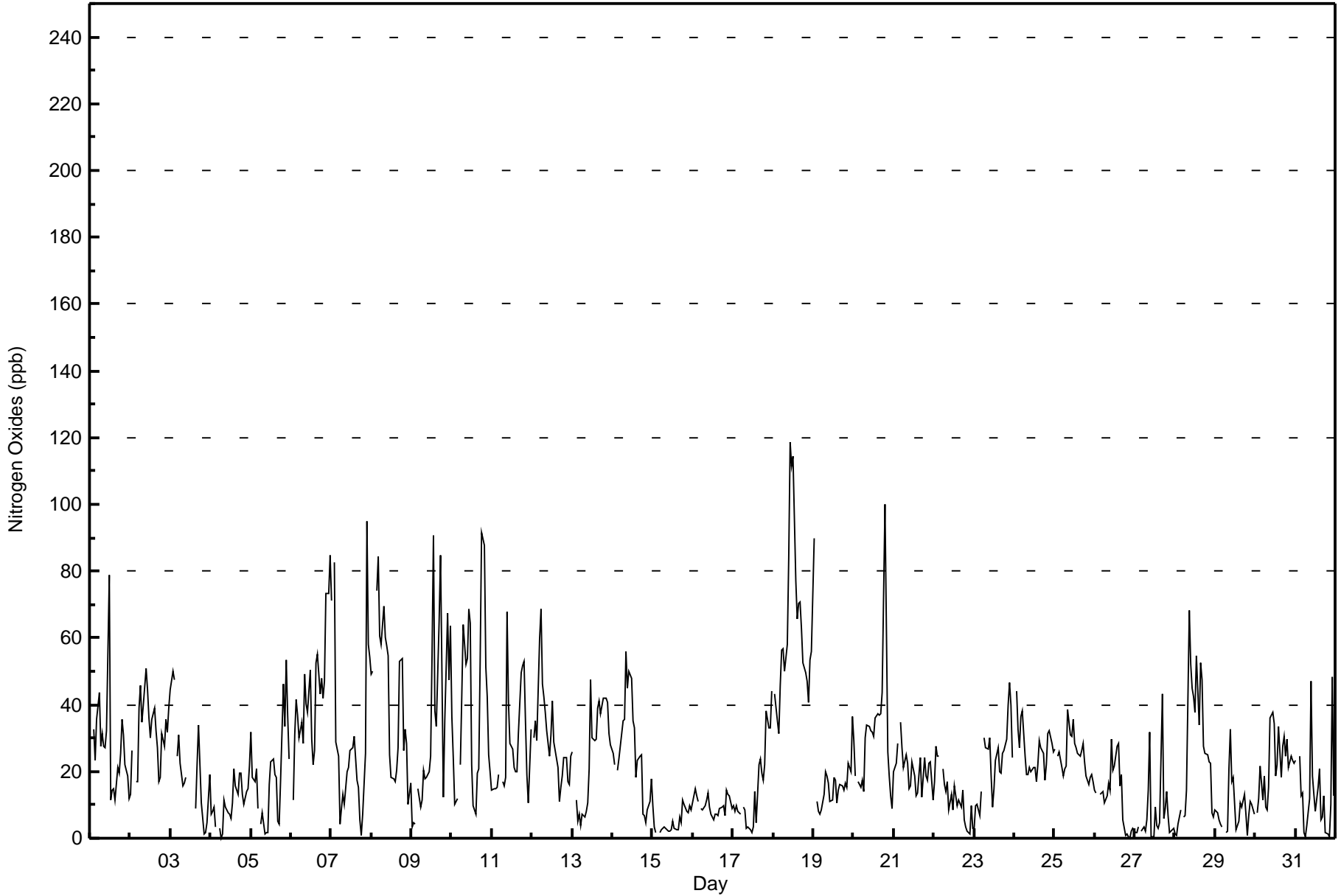




Wood Buffalo Environmental Association
Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - January 2017

Maximum Value: 118 ppb on Jan 18 11:00		Maximum Daily Average: 63.1 ppb on Jan 18		Hours in Service: 744																																													
Minimum Value: 0 ppb on Jan 26 22:00		Minimum Daily Average: 5.0 ppb on Jan 15		Hours of Data: 708																																													
Maximum Diurnal Average: 29.8 ppb at hour 10		Minimum Diurnal Average: 19.3 ppb at hour 2		Hours of Missing Data: 36																																													
Monthly Average: 24.2 ppb		Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 10 Median = 20 Q ₃ = 32 P ₉₀ = 50 P ₉₉ = 90		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-Jan	25	Z	33	24	36	44	27	31	27	27	32	79	12	15	15	11	21	19	26	35	31	22	18	12	27.0	79																							
2-Jan	13	26	Z	17	17	39	46	35	40	51	45	36	30	36	39	32	27	17	18	31	28	36	32	39	31.7	51																							
3-Jan	45	50	47	Z	25	31	22	16	17	18	C	C	C	C	C	9	22	34	10	6	1	2	5	19	21.0	50																							
4-Jan	7	8	9	3	Z	3	0	1	12	9	8	7	6	11	21	16	13	20	19	13	10	14	15	22	10.8	22																							
5-Jan	32	18	17	21	9	Z	4	8	1	2	2	16	23	24	19	18	5	4	17	46	34	53	37	24	18.9	53																							
6-Jan	Z	11	31	42	37	30	35	28	49	40	38	50	30	22	26	53	55	43	48	42	47	73	73	85	43.0	85																							
7-Jan	71	Z	82	29	25	4	9	13	10	20	21	26	27	27	31	17	15	5	1	7	25	95	58	54	29.3	95																							
8-Jan	49	50	Z	74	84	61	58	69	60	57	55	25	18	18	17	20	27	53	54	26	33	28	10	16	41.9	84																							
9-Jan	3	5	4	Z	15	9	12	20	18	18	20	25	55	91	38	33	65	85	50	12	35	67	48	64	34.4	91																							
10-Jan	36	24	10	12	Z	22	43	64	52	54	69	64	22	10	7	20	21	53	91	88	51	42	25	20	39.2	91																							
11-Jan	14	15	15	15	19	Z	17	15	18	68	41	28	27	21	20	20	31	50	52	53	35	19	10	33	27.7	68																							
12-Jan	Z	30	35	29	60	68	46	43	38	32	25	31	41	29	26	21	11	15	19	24	24	17	16	25	30.6	68																							
13-Jan	26	Z	11	5	7	4	7	6	8	11	21	47	30	29	30	39	41	37	42	42	42	41	31	28	25.5	47																							
14-Jan	26	22	Z	20	24	31	35	35	56	45	50	48	35	33	18	23	25	25	7	7	5	9	11	18	26.4	56																							
15-Jan	10	4	2	Z	2	3	3	4	3	2	2	3	5	3	2	3	6	5	11	10	8	8	10	8	5.0	11																							
16-Jan	10	15	13	11	Z	9	9	10	12	14	9	7	5	7	7	7	9	10	10	7	14	13	13	9	9.9	15																							
17-Jan	10	8	10	8	7	Z	9	8	3	4	3	2	3	14	4	22	24	20	17	22	38	33	33	44	15.0	44																							
18-Jan	Z	43	35	32	46	56	57	50	58	84	118	111	115	77	66	70	71	63	53	49	47	41	53	56	63.1	118																							
19-Jan	90	Z	11	8	7	8	13	20	19	17	11	12	18	17	11	15	16	16	14	17	15	22	20	37	18.8	90																							
20-Jan	29	19	Z	17	15	17	14	30	34	34	32	32	31	36	37	37	37	43	72	100	26	19	13	9	31.8	100																							
21-Jan	20	23	28	Z	35	27	21	25	23	15	16	23	19	13	14	19	24	12	24	18	17	23	23	11	20.5	35																							
22-Jan	17	28	24	24	Z	21	16	14	17	9	13	8	16	13	10	11	9	15	6	3	2	1	10	3	12.6	28																							
23-Jan	3	10	10	7	14	Z	30	27	27	30	19	9	15	23	27	20	20	26	26	30	40	46	40	24	22.7	46																							
24-Jan	Z	44	33	27	37	38	25	19	19	21	20	21	21	17	22	29	27	25	17	22	31	32	28	26	26.2	44																							
25-Jan	27	Z	25	26	21	19	21	22	39	31	30	36	28	27	25	25	26	29	23	19	16	18	19	17	24.7	39																							
26-Jan	14	13	Z	13	13	14	11	13	17	14	30	21	22	27	28	16	19	6	1	1	0	0	2	3	13.0	30																							
27-Jan	2	2	3	Z	2	3	2	5	14	32	1	0	9	4	3	4	43	6	9	14	7	2	3	3	7.6	43																							
28-Jan	1	1	4	9	Z	6	7	15	68	52	45	42	38	55	34	53	47	27	25	25	23	23	8	6	26.7	68																							
29-Jan	8	8	6	4	3	Z	2	2	21	32	17	18	2	4	5	11	9	13	7	1	7	11	10	7	9.1	32																							
30-Jan	Z	8	12	22	11	19	9	9	15	36	38	34	19	22	34	18	27	30	25	30	21	24	23	22	22.1	38																							
31-Jan	23	Z	25	13	13	2	0	4	12	47	19	13	8	15	21	6	6	13	2	1	0	10	48	13	13.7	48																							
																								23.5	19.3	20.6	19.7	22.5	22.7	19.7	21.3	26.0	29.8	28.2	29.2	24.3	24.7	21.9	22.5	25.9	26.4	25.7	25.9	23.0	27.3	24.0	24.4	Diurnal Average	
																								90	50	82	74	84	68	58	69	68	84	118	111	115	91	66	70	71	85	91	100	51	95	73	85	Diurnal Maximum	
Z - zerospan		C - Calibration																																															





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	361	50.99	50.99
21 - 40	231	32.63	83.62
41 - 80	102	14.41	98.02
81 - 159	14	1.98	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_x) - ppb
Shell Muskeg River - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	11	35	35	13	2	3	7	22	77	69	53	25	4	3	1	1	361
21 - 40	20	27	3	3	3	2	0	5	77	64	9	5	5	1	2	5	231
11 - 80	4	2	3	3	0	4	3	3	39	28	5	0	2	0	2	4	102
81 - 159	1	1	1	1	0	0	0	1	1	2	0	1	0	1	2	2	14
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	36	65	42	20	5	9	10	31	194	163	67	31	11	5	7	12	708

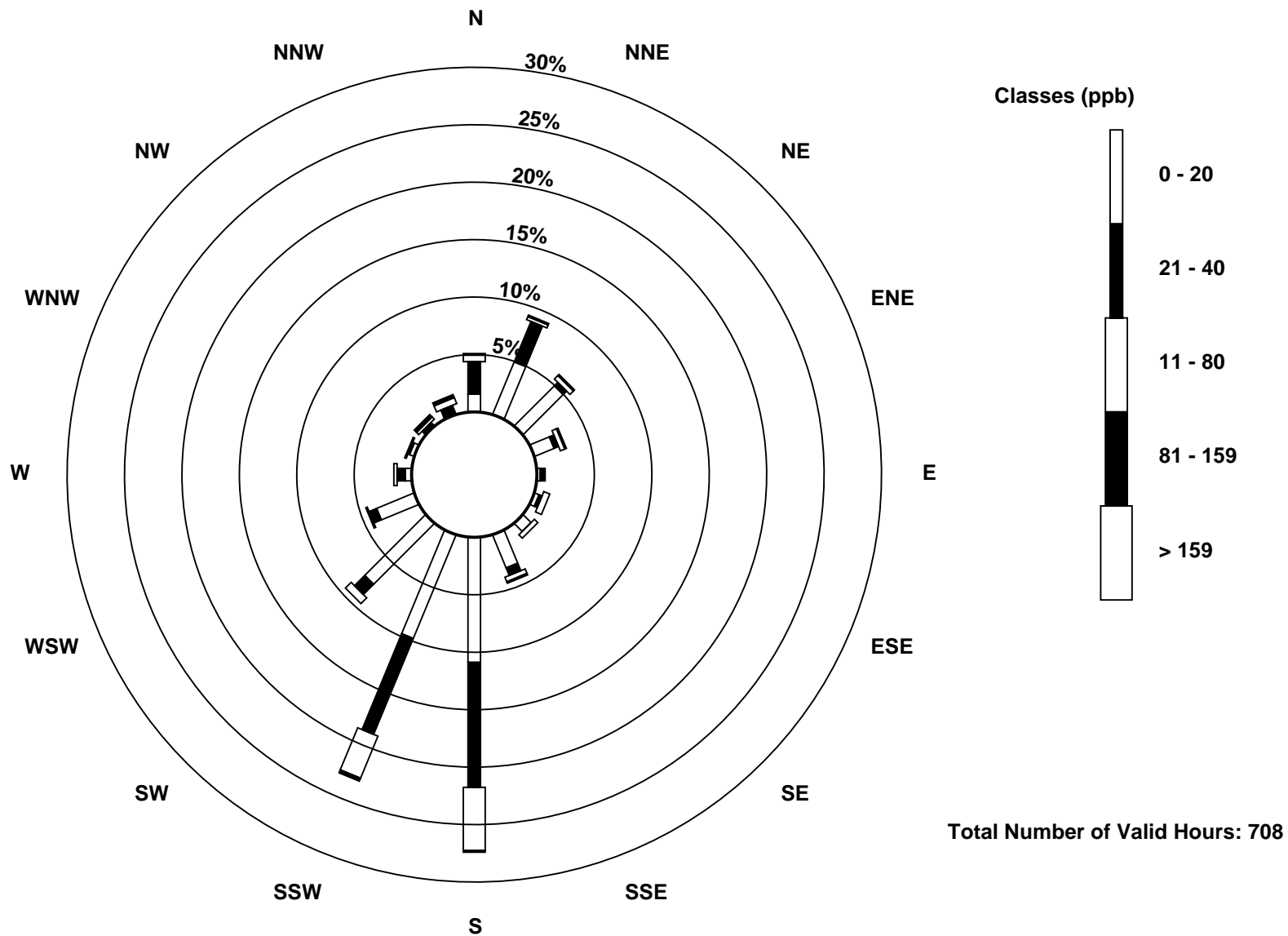
Total Number of Valid Hours: 708

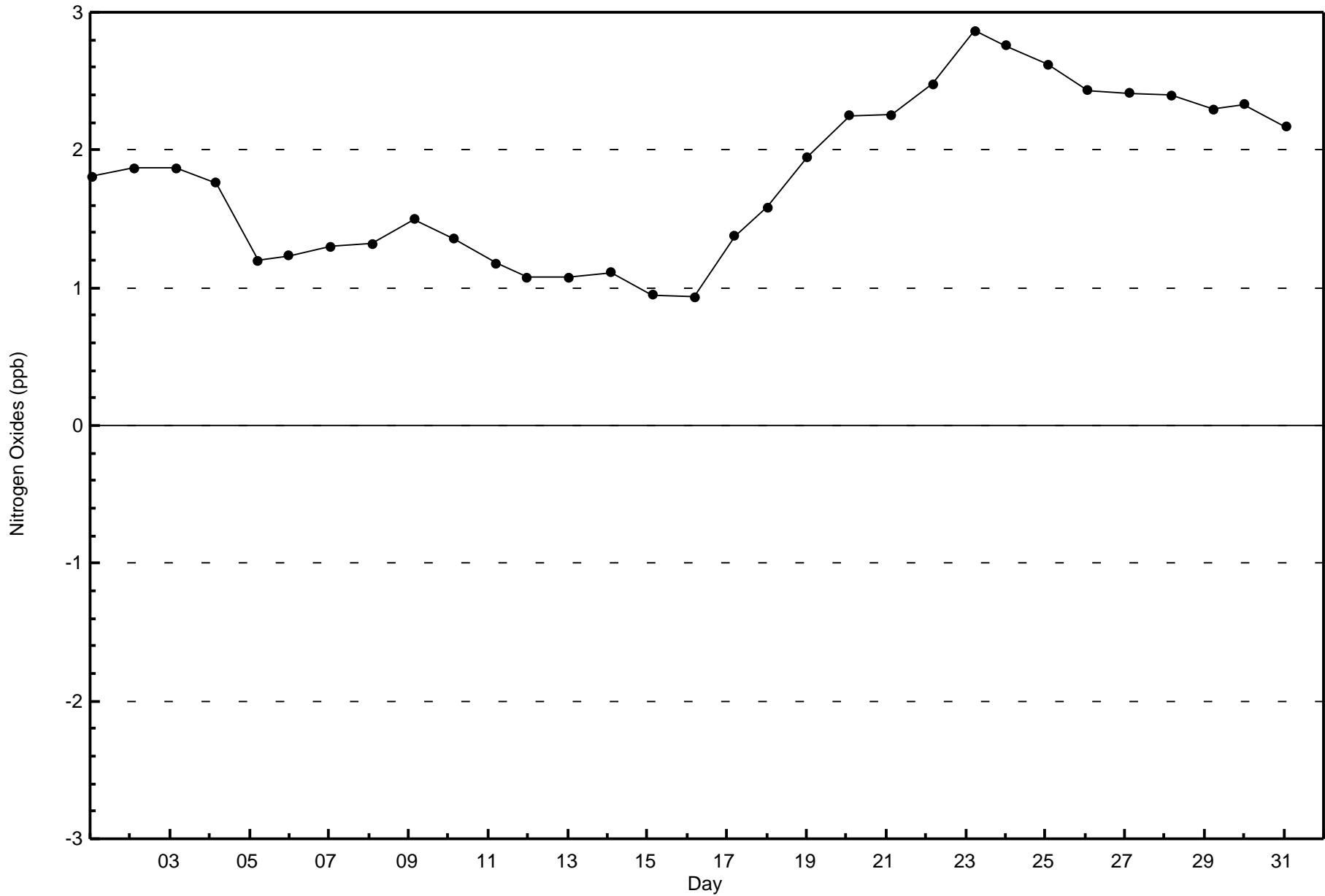
Total Number of Hours: 744

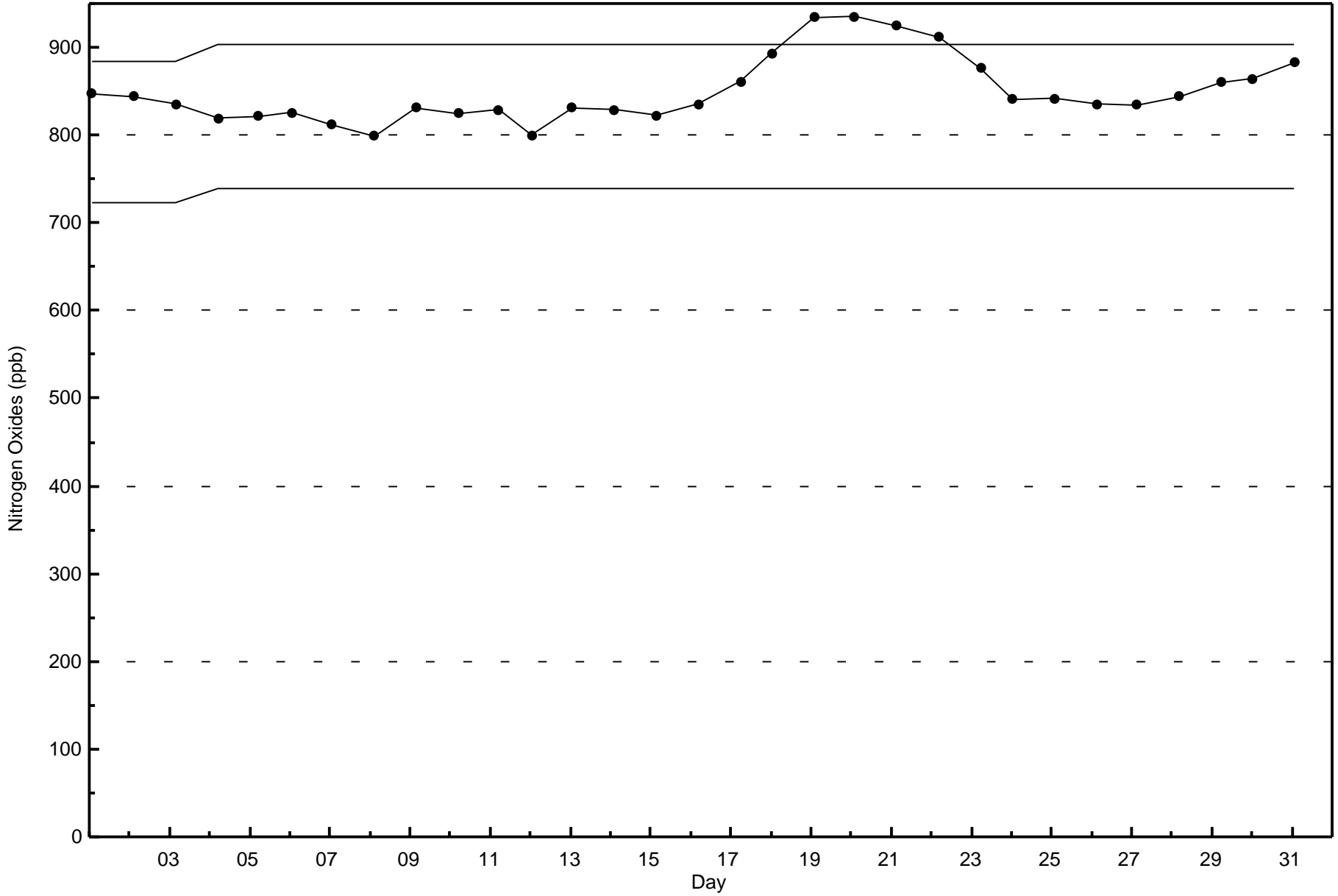


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River (AMS 16)









Wood Buffalo Environmental Association

Summary of Hour Averages

Particulate Matter 2.5 (PM_{2.5}) - µg/m³

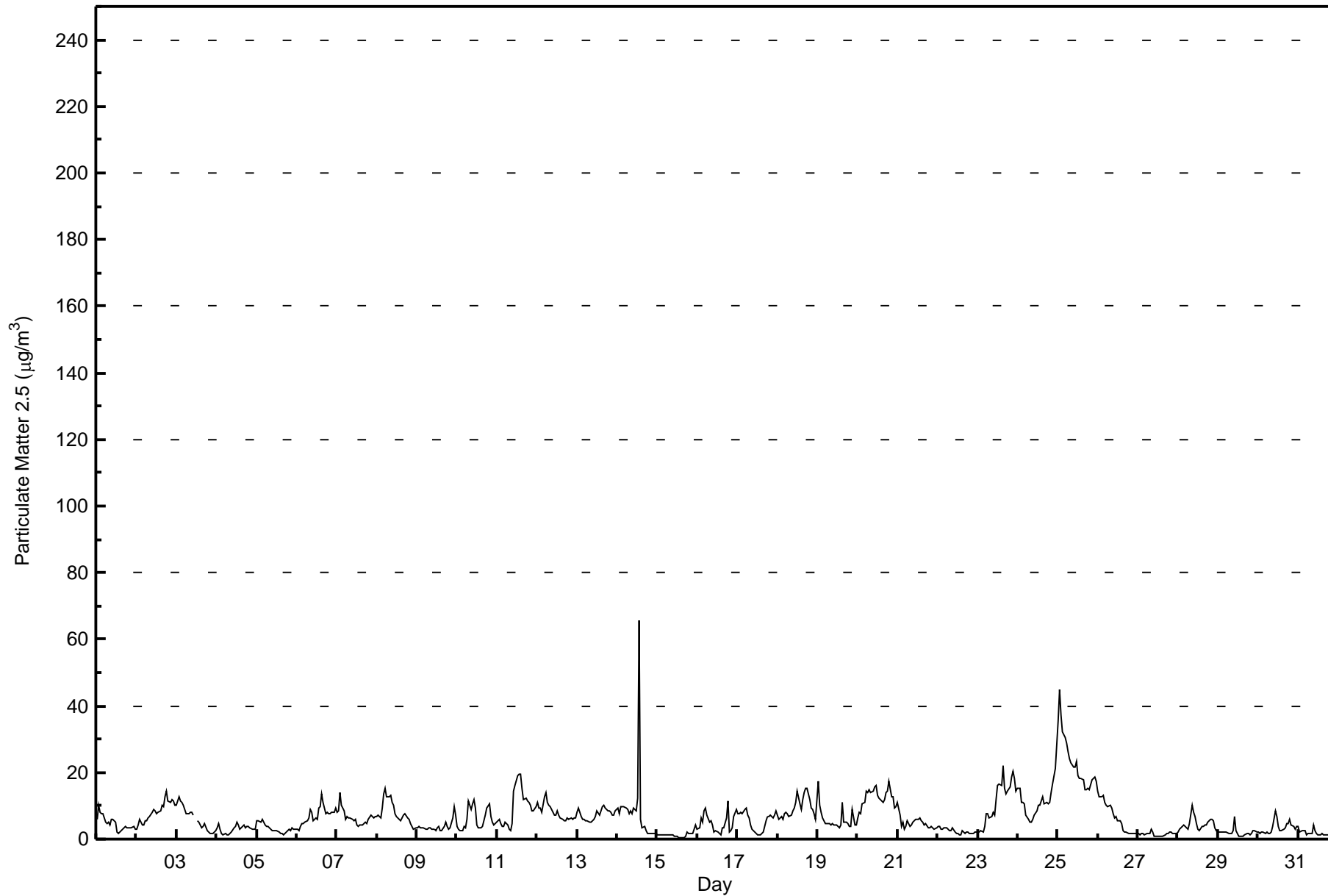
Shell Muskeg River - January 2017

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 65.5 µg/m ³ on Jan 14 14:00 Minimum Value: 0.5 µg/m ³ on Jan 15 16:00 Maximum Diurnal Average: 7.8 µg/m ³ at hour 14 Monthly Average: 6.55 µg/m ³		Maximum Daily Average: 23.1 µg/m ³ on Jan 25 Minimum Daily Average: 1.4 µg/m ³ on Jan 15 Minimum Diurnal Average: 5.8 µg/m ³ at hour 15 Percentiles: P ₁ = 0.7 P ₁₀ = 1.6 Q ₁ = 2.8 Median = 5.2 Q ₃ = 8.6 P ₉₀ = 12.9 P ₉₉ = 27.4		Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 1 Percent Operational Time: 100.0																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jan	6.0	10.1	8.2	7.6	7.5	4.9	4.8	5.0	4.3	6.0	6.0	5.0	2.1	1.7	2.2	2.4	3.5	3.7	3.3	3.5	3.3	3.3	3.6	3.0	4.6	10.1																							
2-Jan	3.0	4.2	5.8	4.2	4.3	5.4	5.4	6.3	6.7	8.0	8.9	8.6	7.8	8.0	8.3	10.3	9.7	12.8	14.4	11.5	10.8	11.8	11.3	10.1	8.2	14.4																							
3-Jan	10.1	12.6	11.4	11.1	10.4	8.7	7.5	7.7	8.2	8.0	7.3	C	5.6	5.0	4.1	3.2	3.8	4.6	2.6	2.3	1.9	1.7	1.7	2.6	6.2	12.6																							
4-Jan	3.5	4.5	3.1	1.5	1.4	1.6	1.4	1.3	1.6	2.1	3.5	3.8	5.0	4.1	3.1	3.2	4.2	3.3	3.7	3.9	3.4	2.8	3.1	2.8	3.0	5.0																							
5-Jan	5.3	5.7	5.2	6.0	5.2	4.2	3.8	3.7	2.9	2.7	2.5	2.4	2.3	2.1	1.9	1.7	1.4	1.6	2.3	3.0	2.7	3.3	2.9	3.0	3.3	6.0																							
6-Jan	2.9	2.6	3.7	4.8	4.9	5.3	5.5	6.2	8.9	8.0	5.7	6.2	5.9	9.5	9.8	13.4	10.9	7.7	8.1	7.6	7.8	8.1	8.0	9.2	7.1	13.4																							
7-Jan	7.9	8.4	14.1	10.0	8.4	5.8	6.8	6.4	6.2	6.1	5.5	5.9	4.4	3.8	4.2	4.2	4.8	5.1	4.8	5.9	7.0	6.9	6.3	6.6	6.5	14.1																							
8-Jan	6.9	7.4	6.2	9.4	13.5	15.2	12.7	12.7	13.0	11.0	10.0	7.5	6.6	5.8	5.4	6.3	7.1	7.5	6.4	5.8	4.6	3.7	3.1	3.3	8.0	15.2																							
9-Jan	3.3	3.6	3.4	3.4	3.5	3.1	3.2	3.6	3.6	2.9	3.1	2.7	3.4	4.0	2.5	2.7	3.7	5.2	3.8	3.0	3.5	6.6	9.5	7.2	3.9	9.5																							
10-Jan	3.8	3.0	2.6	2.7	3.7	3.5	6.0	11.5	8.9	10.5	11.7	9.1	4.1	3.5	3.3	3.9	5.3	7.1	9.5	10.6	7.0	5.3	4.2	4.7	6.1	11.7																							
11-Jan	4.9	5.9	4.6	3.8	3.9	5.1	4.2	3.1	2.7	4.5	14.4	16.2	19.1	19.5	19.3	15.4	12.0	12.1	11.4	11.1	10.1	8.6	8.4	9.6	9.6	19.5																							
12-Jan	11.1	9.4	9.3	8.2	12.8	14.1	11.2	10.3	9.8	8.9	7.1	7.2	8.6	7.3	6.2	5.7	5.4	5.7	6.2	6.1	6.4	6.1	6.5	6.4	8.2	14.1																							
13-Jan	8.0	9.2	6.9	6.0	6.0	5.5	5.6	5.3	5.2	5.5	6.1	6.9	8.4	7.2	8.4	9.9	10.0	9.5	8.7	8.3	8.1	7.0	7.3	8.7	7.4	10.0																							
14-Jan	9.4	7.8	10.0	9.9	10.0	9.1	8.8	7.4	8.4	7.6	9.4	8.4	12.2	65.5	5.9	3.3	3.7	2.8	1.6	1.5	1.6	1.7	1.6	1.5	8.7	65.5																							
15-Jan	1.4	1.4	1.3	1.4	1.2	1.3	1.4	1.3	1.3	1.1	0.9	0.8	0.7	0.6	0.5	0.5	0.6	0.9	2.2	1.7	1.8	1.8	3.0	4.2	1.4	4.2																							
16-Jan	2.9	3.5	6.5	4.9	8.4	9.5	7.3	5.0	5.5	4.2	2.0	2.5	2.3	1.9	1.1	3.3	3.2	6.5	11.4	2.3	2.6	3.2	6.7	8.8	4.8	11.4																							
17-Jan	7.5	7.8	8.1	7.7	9.1	9.2	7.3	6.2	4.3	3.0	2.1	1.5	1.2	1.4	1.4	2.2	3.7	5.5	6.8	7.0	7.3	6.5	7.2	8.5	5.5	9.2																							
18-Jan	7.0	6.1	6.6	5.8	7.5	8.1	7.8	7.0	7.3	8.3	9.3	11.0	14.5	10.7	9.0	11.9	14.0	15.1	15.2	12.1	9.5	8.8	7.5	6.1	9.4	15.2																							
19-Jan	17.5	10.1	7.9	6.3	5.3	4.6	4.7	4.7	4.3	4.9	4.1	4.3	3.8	3.4	4.2	11.2	4.9	5.1	4.7	3.7	3.9	8.8	4.4	4.4	5.9	17.5																							
20-Jan	6.5	8.1	7.5	10.6	11.0	14.4	14.0	14.7	14.0	14.2	15.5	16.1	13.2	12.4	11.5	11.1	11.9	14.2	14.3	17.4	12.5	12.7	9.2	9.9	12.4	17.4																							
21-Jan	11.1	7.0	3.8	4.9	3.0	3.9	5.4	4.0	4.2	5.1	5.4	5.9	5.9	6.2	5.7	5.2	4.1	4.8	3.4	3.4	3.6	3.6	3.0	3.2	4.8	11.1																							
22-Jan	3.8	3.6	3.1	2.9	3.4	3.5	2.8	2.7	2.4	3.2	2.0	1.5	1.5	1.1	1.3	2.6	1.5	2.2	2.1	1.9	1.7	1.7	1.9	1.9	2.4	3.8																							
23-Jan	2.1	2.2	2.5	2.3	3.8	7.5	7.4	6.3	6.6	8.0	7.2	11.8	16.0	16.5	16.1	21.9	15.2	13.5	14.3	15.5	18.5	20.2	18.1	14.3	11.2	21.9																							
24-Jan	15.2	15.3	11.1	10.9	10.5	7.1	5.8	5.0	5.1	6.1	7.1	8.3	10.3	10.2	11.3	12.5	10.6	11.2	10.7	11.2	14.0	16.6	21.1	28.6	11.5	28.6																							
25-Jan	35.6	44.8	37.3	32.1	30.4	28.8	26.2	24.3	22.9	21.6	21.4	23.2	18.9	18.2	18.1	17.9	14.9	14.8	15.1	15.0	17.6	18.4	18.5	17.4	23.1	44.8																							
26-Jan	14.3	12.9	12.9	13.0	11.1	10.0	9.6	10.3	9.3	7.5	6.2	6.6	5.7	5.4	4.7	2.6	2.2	1.9	1.7	1.8	1.7	1.6	1.5	1.8	6.5	14.3																							
27-Jan	1.5	1.4	1.5	1.7	1.4	1.6	1.5	1.8	2.9	2.1	1.0	0.8	0.9	0.7	0.7	0.7	1.3	1.7	1.8	2.1	2.2	1.8	1.8	1.7	1.5	2.9																							
28-Jan	2.1	2.9	3.3	4.2	3.7	3.3	3.0	4.8	10.3	8.0	6.7	4.7	3.0	2.5	4.0	3.8	4.3	4.1	5.1	5.7	6.0	5.5	3.3	2.7	4.5	10.3																							
29-Jan	2.3	2.3	2.1	2.2	2.3	2.1	1.7	1.6	1.7	2.7	6.8	2.7	1.0	0.8	0.7	0.9	1.2	1.8	1.9	1.3	1.8	2.4	2.5	2.3	2.0	6.8																							
30-Jan	2.1	1.9	2.1	2.2	1.9	2.1	1.7	1.7	1.9	3.6	8.4	6.6	4.0	2.5	2.3	2.9	3.4	4.6	4.8	5.8	4.2	3.6	2.9	3.8	3.4	8.4																							
31-Jan	3.7	2.2	2.4	2.7	2.4	1.5	1.5	1.6	1.8	4.1	2.7	1.8	1.1	1.3	1.5	1.1	1.2	1.4	1.3	1.5	1.3	1.9	6.7	6.4	2.3	6.7																							
																								7.2	7.4	6.9	6.6	6.8	6.8	6.3	6.2	6.3	6.4	6.8	6.7	6.4	7.8	5.8	6.4	5.9	6.4	6.6	6.2	6.1	6.3	6.4	6.6	Diurnal Average	
																								35.6	44.8	37.3	32.1	30.4	28.8	26.2	24.3	22.9	21.6	21.4	23.2	19.1	65.5	19.3	21.9	15.2	15.1	15.2	17.4	18.5	20.2	21.1	28.6	Diurnal Maximum	
C - Calibration																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																																																	



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Shell Muskeg River - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Shell Muskeg River - January 2017**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	375	50.47	50.47
6 - 15	312	41.99	92.46
16 - 25	30	4.04	96.50
26 - 80	9	1.21	97.71
> 81.0	0	0.00	97.71

Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Shell Muskeg River - January 2017

Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	19	57	32	13	3	5	7	23	65	68	41	25	5	4	3	5	375
6 - 15	13	11	12	9	2	4	3	7	119	86	22	6	6	1	4	7	312
16 - 25	5	1	0	0	0	0	0	0	10	13	1	0	0	0	0	0	30
26 - 80	0	0	0	0	0	0	0	0	7	2	0	0	0	0	0	0	9
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	37	69	44	22	5	9	10	30	201	169	64	31	11	5	7	12	726

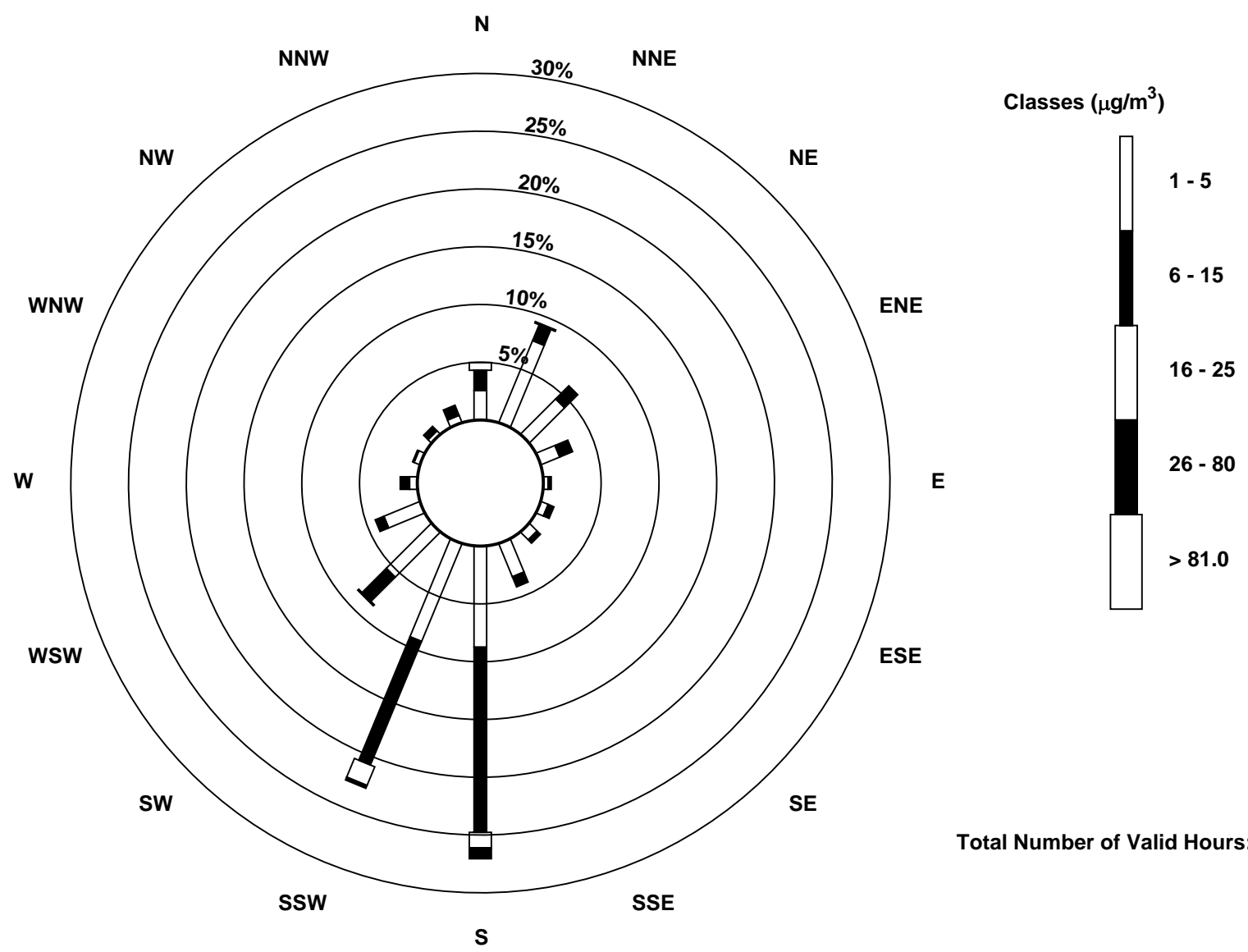
Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Shell Muskeg River (AMS 16)



Total Number of Valid Hours: 743



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

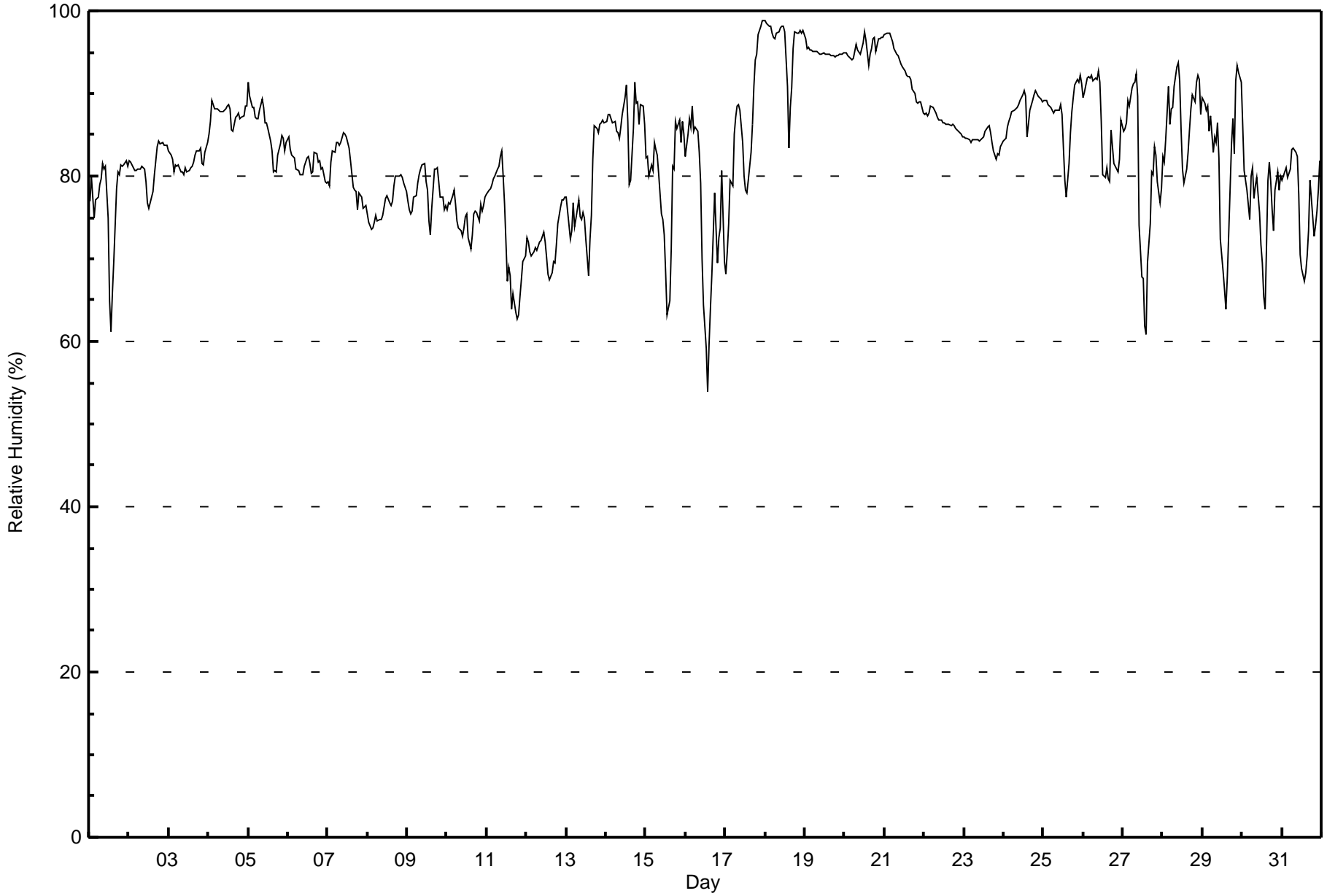
Shell Muskeg River - January 2017

Maximum Value: 99 % on Jan 18 01:00																		Maximum Daily Average: 96.0 % on Jan 18																		Hours in Service: 744																																																																																					
Minimum Value: 54 % on Jan 16 14:00																		Minimum Daily Average: 72.0 % on Jan 12																		Hours of Data: 744																																																																																					
Maximum Diurnal Average: 84.9 % at hour 9																		Minimum Diurnal Average: 76.9 % at hour 15																		Hours of Missing Data: 0																																																																																					
Monthly Average: 83.0 %																		Percentiles: P ₁ = 63 P ₁₀ = 73 Q ₁ = 78 Median = 83 Q ₃ = 88 P ₉₀ = 94 P ₉₉ = 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-Jan	77	80	77	75	77	77	79	80	82	81	81	75	65	61	66	70	78	81	80	81	81	81	82	81	77.0	82																																																																																															
2-Jan	82	82	81	81	81	81	81	81	81	81	79	77	76	77	78	80	82	84	84	84	84	84	84	84	81.1	84																																																																																															
3-Jan	83	83	82	81	81	81	81	81	80	80	81	81	81	81	81	82	83	83	83	83	81	81	83	84	81.7	84																																																																																															
4-Jan	85	87	89	89	88	88	88	88	88	88	88	88	89	88	86	85	87	87	88	87	87	87	88	88	87.6	89																																																																																															
5-Jan	91	90	88	88	87	87	87	88	89	88	86	86	86	84	83	80	81	81	83	84	85	85	83	84	85.6	91																																																																																															
6-Jan	85	83	82	82	82	81	81	80	80	80	81	82	82	82	80	81	83	83	82	82	81	81	79	79	81.5	85																																																																																															
7-Jan	79	79	82	83	83	84	84	84	84	85	85	85	84	83	82	79	78	78	76	78	78	76	76	76	80.9	85																																																																																															
8-Jan	75	74	74	74	74	75	75	75	75	75	76	77	78	77	76	77	79	80	80	80	80	80	79	78	76.8	80																																																																																															
9-Jan	77	76	75	76	78	78	79	80	81	81	81	79	78	75	73	76	81	81	81	79	78	78	76	76	78.0	81																																																																																															
10-Jan	76	77	77	78	78	77	75	74	73	73	74	75	75	72	71	73	75	76	76	75	77	76	77	77	75.2	78																																																																																															
11-Jan	78	78	78	79	80	80	81	81	82	83	80	77	67	69	68	64	66	64	63	63	65	68	70	70	73.1	83																																																																																															
12-Jan	73	72	71	70	71	71	71	72	72	72	73	72	70	68	67	68	70	69	72	74	76	77	77	77	72.0	77																																																																																															
13-Jan	78	76	72	73	77	74	75	77	75	75	76	75	72	68	72	75	82	86	86	85	86	86	87	87	78.1	87																																																																																															
14-Jan	87	87	87	87	86	87	86	85	85	86	88	89	91	87	79	80	86	91	89	89	86	89	88	86	86.7	91																																																																																															
15-Jan	82	82	80	81	81	84	83	83	80	75	75	73	68	63	65	71	81	81	87	86	87	84	87	85	79.3	87																																																																																															
16-Jan	82	85	87	86	88	85	86	86	83	79	70	64	59	54	60	64	68	78	73	70	73	74	81	70	75.2	88																																																																																															
17-Jan	68	71	74	79	79	85	87	89	89	88	84	80	78	78	79	83	86	91	94	95	97	98	99	99	85.4	99																																																																																															
18-Jan	99	98	98	98	97	97	97	97	97	98	98	98	98	97	91	83	88	91	96	98	97	97	98	97	96.0	99																																																																																															
19-Jan	97	95	96	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	94	95	95	95	95	95	95.0	97																																																																																															
20-Jan	95	95	95	94	94	94	95	96	95	95	95	96	97	96	93	95	95	97	97	95	97	97	97	97	95.5	97																																																																																															
21-Jan	97	97	97	97	97	96	95	95	95	94	94	93	93	92	92	92	92	90	90	89	89	89	89	88	93.0	97																																																																																															
22-Jan	87	88	87	88	89	88	88	88	87	87	87	87	86	86	86	86	86	86	86	86	86	85	85	85	86.6	89																																																																																															
23-Jan	85	85	85	84	84	84	84	84	84	84	84	84	85	85	86	86	85	84	83	82	83	83	84	84	84.3	86																																																																																															
24-Jan	84	85	86	87	87	88	88	88	88	89	89	90	90	90	85	86	88	89	90	90	90	90	89	89	88.1	90																																																																																															
25-Jan	89	89	89	89	88	88	88	88	88	88	89	87	83	79	78	81	85	88	89	91	92	91	92	91	87.6	92																																																																																															
26-Jan	89	90	92	92	92	92	92	92	92	93	91	87	80	80	81	80	79	86	81	81	81	80	82	87	86.3	93																																																																																															
27-Jan	85	86	86	89	88	91	91	91	92	90	74	68	68	62	61	69	74	80	80	84	83	79	77	78	80.3	92																																																																																															
28-Jan	82	82	84	91	86	88	88	91	93	94	91	86	81	79	81	83	86	88	90	89	91	92	92	87	87.3	94																																																																																															
29-Jan	90	89	88	88	85	87	83	85	84	86	82	72	68	66	64	68	73	84	87	83	92	93	93	91	82.6	93																																																																																															
30-Jan	86	81	80	78	75	80	81	77	79	80	76	72	70	65	64	79	82	79	76	73	78	80	78	80	77.1	86																																																																																															
31-Jan	79	80	81	80	80	81	83	83	83	82	78	71	69	67	68	70	73	79	77	73	74	76	78	82	77.1	83																																																																																															
																		84.0				83.9				83.9				84.3				84.2				84.7				84.7				84.9				84.9				84.7				83.3				81.3				79.5				77.5				76.9				78.9				81.6				83.7				83.7				83.3				84.1				84.3				84.6				84.4				Diurnal Average				Diurnal Maximum			
																		99				98				98				97				97				97				97				98				98				98				98				97				96				95				95				95				95				97				98				97				97				98				99				99											



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Shell Muskeg River - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Shell Muskeg River - January 2017

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	3	0.40	0.40
60 - 80	235	31.59	31.99
80 - 100	506	68.01	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



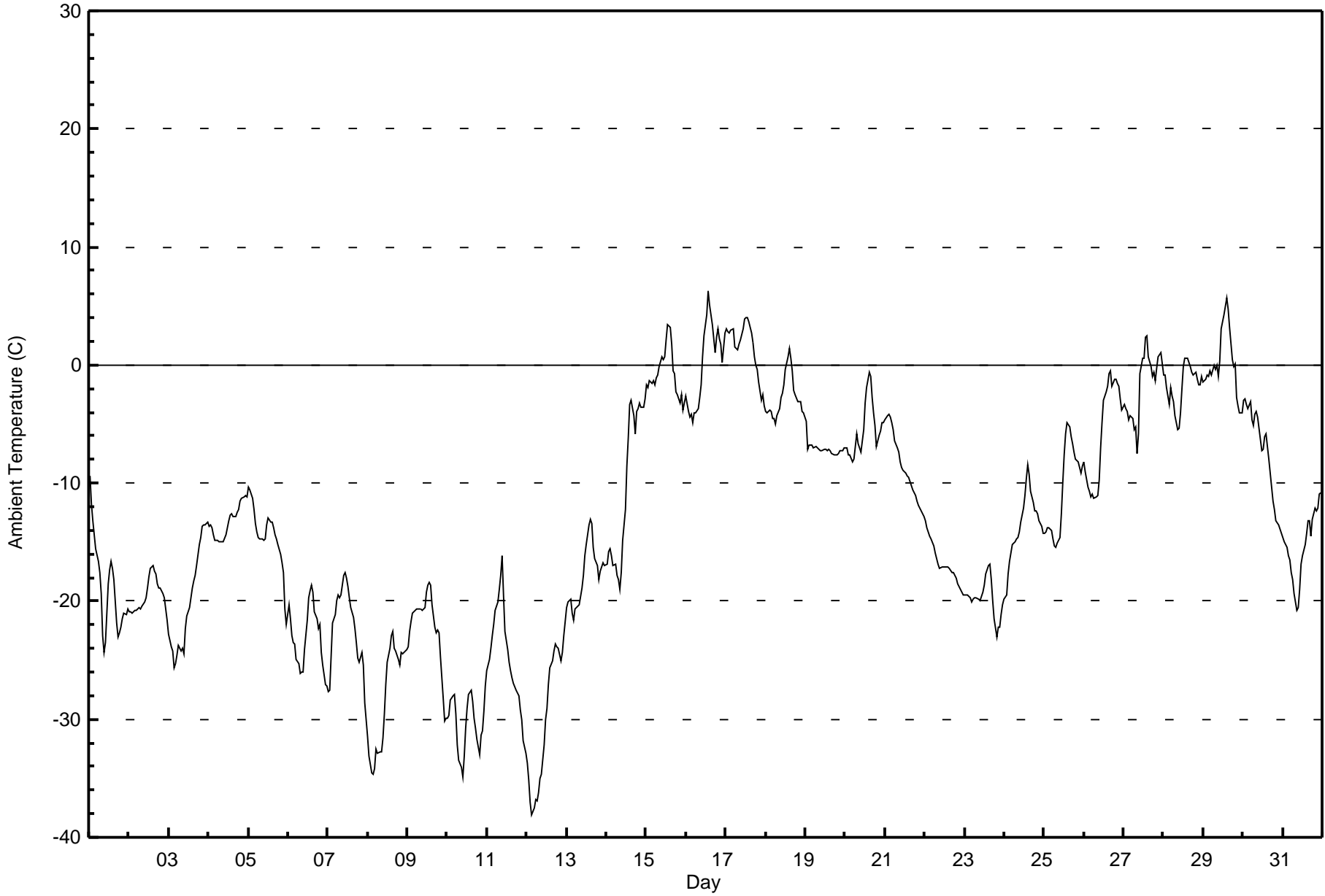
Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

Shell Muskeg River - January 2017

Maximum Value: 6.3 C on Jan 16 14:00		Maximum Daily Average: 1.5 C on Jan 17		Hours in Service: 744																						
Minimum Value: -38.1 C on Jan 12 04:00		Minimum Daily Average: -30.4 C on Jan 10		Hours of Data: 744																						
Maximum Diurnal Average: -10.3 C at hour 15		Minimum Diurnal Average: -14.9 C at hour 9		Hours of Missing Data: 0																						
Monthly Average: -13.26 C		Percentiles: P ₁ = -35.0 P ₁₀ = -25.7 Q ₁ = -20.6 Median = -13.8 O ₃ = -4.2 P ₉₀ = -0.4 P ₉₉ = 4.2		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-Jan	-9.4	-11.8	-13.2	-14.4	-15.5	-16.6	-17.6	-19.4	-22.9	-24.4	-23.5	-18.6	-17.3	-16.6	-17.2	-18.2	-21.8	-23.1	-22.7	-22.2	-21.5	-21.0	-21.1	-20.7	-18.8	-9.4
2-Jan	-20.9	-20.9	-21.0	-20.8	-20.8	-20.6	-20.6	-20.7	-20.4	-20.1	-19.8	-18.9	-18.0	-17.3	-17.0	-17.4	-17.7	-18.5	-18.9	-18.9	-19.4	-19.7	-20.7	-21.6	-19.6	-17.0
3-Jan	-22.7	-23.8	-24.3	-25.7	-25.3	-24.6	-23.8	-24.3	-24.0	-24.4	-22.4	-21.2	-20.5	-19.7	-18.9	-18.2	-17.8	-17.0	-15.2	-14.6	-13.7	-13.5	-13.5	-13.3	-20.1	-13.3
4-Jan	-13.7	-13.6	-13.8	-14.4	-14.8	-14.9	-15.0	-15.0	-14.9	-14.3	-13.8	-13.2	-12.7	-12.6	-12.8	-12.8	-12.4	-12.2	-11.5	-11.3	-11.1	-11.1	-11.1	-11.1	-13.3	-11.1
5-Jan	-10.4	-10.6	-11.3	-12.2	-13.4	-14.1	-14.6	-14.7	-14.8	-14.9	-14.8	-13.6	-12.9	-13.3	-13.3	-13.8	-14.3	-14.8	-15.2	-16.0	-16.7	-17.6	-20.7	-22.0	-14.6	-10.4
6-Jan	-20.3	-21.5	-22.9	-23.6	-23.6	-25.0	-25.3	-26.1	-26.0	-26.0	-24.1	-21.6	-19.7	-19.2	-18.6	-19.2	-20.9	-21.5	-22.3	-22.0	-24.3	-25.4	-27.0	-27.2	-23.1	-18.6
7-Jan	-27.7	-27.6	-24.7	-21.8	-21.2	-20.0	-19.5	-19.7	-19.5	-17.8	-17.6	-18.0	-18.8	-19.8	-20.5	-21.3	-22.3	-23.5	-24.9	-25.2	-24.3	-25.4	-28.7	-30.0	-22.5	-17.6
8-Jan	-31.4	-33.2	-34.6	-34.6	-34.2	-32.6	-32.9	-32.8	-32.8	-31.6	-29.6	-27.0	-25.2	-24.0	-22.9	-22.6	-24.0	-24.2	-24.9	-25.4	-24.4	-24.4	-24.3	-24.1	-28.2	-22.6
9-Jan	-23.8	-22.5	-21.7	-21.0	-20.8	-20.6	-20.6	-20.6	-20.6	-20.8	-20.6	-19.2	-18.6	-18.4	-18.7	-20.3	-22.3	-22.7	-22.4	-22.7	-24.6	-28.3	-30.1	-29.9	-22.2	-18.4
10-Jan	-29.9	-29.7	-28.4	-28.0	-27.9	-29.5	-32.2	-33.5	-34.1	-34.9	-33.2	-30.7	-29.1	-27.9	-27.5	-28.5	-30.0	-30.7	-31.6	-33.0	-31.4	-31.0	-29.3	-27.2	-30.4	-27.2
11-Jan	-25.9	-24.9	-24.0	-22.9	-21.9	-20.8	-20.1	-19.0	-17.8	-16.2	-19.5	-22.5	-24.1	-25.2	-25.9	-26.4	-26.9	-27.5	-27.7	-28.0	-29.2	-30.0	-31.8	-32.9	-24.6	-16.2
12-Jan	-33.7	-35.2	-37.0	-38.1	-37.6	-36.8	-36.9	-36.2	-35.0	-34.7	-32.2	-30.0	-29.1	-27.1	-25.7	-25.1	-24.2	-23.7	-23.8	-24.0	-25.0	-24.3	-22.9	-21.7	-30.0	-21.7
13-Jan	-20.6	-20.1	-19.8	-21.0	-21.6	-20.7	-20.5	-20.3	-19.6	-18.9	-17.8	-16.2	-15.1	-13.6	-13.1	-13.5	-15.4	-16.3	-17.0	-18.1	-17.4	-17.2	-16.8	-16.9	-17.8	-13.1
14-Jan	-16.8	-15.8	-15.5	-16.1	-17.0	-16.8	-17.8	-18.1	-18.9	-17.6	-14.8	-12.2	-8.6	-6.2	-3.3	-3.0	-4.2	-5.8	-3.9	-3.7	-3.2	-3.6	-3.6	-2.9	-10.4	-2.9
15-Jan	-1.6	-1.9	-1.4	-1.6	-1.4	-1.7	-1.1	-0.8	-0.1	0.7	0.4	0.8	2.1	3.4	3.1	1.8	-0.5	-0.7	-2.2	-2.6	-3.2	-2.5	-3.8	-3.3	-0.8	3.4
16-Jan	-2.7	-3.9	-4.4	-4.2	-4.9	-4.0	-4.1	-3.7	-2.8	-1.6	0.7	2.5	4.2	6.3	5.1	4.3	3.5	1.1	2.4	3.1	2.2	1.7	0.2	2.7	0.2	6.3
17-Jan	3.1	2.9	2.7	2.9	3.0	1.6	1.4	1.3	1.8	2.1	3.1	3.9	4.1	4.1	3.7	2.7	1.8	0.8	0.0	-0.3	-1.5	-2.9	-2.5	-3.4	1.5	4.1
18-Jan	-3.9	-4.1	-3.9	-3.9	-4.5	-4.6	-5.0	-4.3	-3.8	-2.8	-2.4	-1.6	-0.4	0.7	1.5	0.5	-0.5	-2.2	-2.5	-3.2	-3.1	-3.1	-3.9	-4.0	-2.7	1.5
19-Jan	-4.8	-7.1	-6.8	-6.8	-6.8	-7.0	-6.9	-7.0	-7.1	-7.3	-7.2	-7.1	-7.2	-7.3	-7.1	-7.3	-7.5	-7.6	-7.7	-7.6	-7.5	-7.2	-7.2	-7.1	-7.1	-4.8
20-Jan	-7.0	-7.0	-7.6	-7.7	-8.2	-8.0	-6.9	-5.8	-6.7	-7.4	-6.4	-5.4	-3.2	-1.9	-0.6	-1.0	-2.7	-4.1	-5.1	-6.9	-6.0	-5.5	-4.9	-4.9	-5.5	-0.6
21-Jan	-4.6	-4.3	-4.2	-4.4	-4.9	-5.5	-6.4	-7.0	-7.4	-8.2	-8.7	-8.9	-9.2	-9.4	-9.5	-9.9	-10.2	-10.6	-11.1	-11.5	-11.9	-12.1	-12.3	-12.9	-8.5	-4.2
22-Jan	-13.2	-13.7	-14.2	-14.5	-14.8	-15.4	-15.9	-16.3	-16.9	-17.2	-17.1	-17.1	-17.1	-17.2	-17.1	-17.2	-17.5	-17.6	-17.8	-18.1	-18.5	-18.9	-19.2	-19.5	-16.7	-13.2
23-Jan	-19.5	-19.5	-19.5	-19.7	-20.1	-19.8	-19.7	-19.7	-19.8	-19.9	-19.6	-19.2	-18.7	-17.7	-16.9	-16.9	-18.1	-20.0	-21.5	-23.0	-22.2	-22.2	-21.1	-20.3	-19.8	-16.9
24-Jan	-19.8	-19.5	-17.7	-16.7	-15.9	-15.3	-14.9	-14.8	-14.6	-14.2	-13.4	-12.1	-11.0	-9.7	-8.4	-9.3	-10.7	-11.7	-12.4	-12.4	-12.5	-13.2	-13.7	-14.2	-13.7	-8.4
25-Jan	-14.2	-14.1	-13.8	-13.7	-14.0	-14.7	-15.3	-15.4	-15.1	-14.6	-12.6	-10.0	-7.7	-5.8	-4.9	-5.2	-6.1	-6.7	-7.3	-7.9	-8.2	-8.7	-9.1	-8.5	-10.6	-4.9
26-Jan	-8.2	-9.0	-10.4	-10.7	-11.2	-10.9	-11.3	-11.2	-11.1	-9.7	-7.0	-4.9	-3.0	-2.3	-1.8	-0.7	-0.4	-1.8	-1.2	-1.2	-1.5	-1.8	-2.9	-3.8	-5.8	-0.4
27-Jan	-3.3	-3.7	-3.9	-4.6	-4.3	-4.6	-5.5	-5.2	-7.5	-5.8	-0.7	0.6	0.6	2.4	2.5	0.7	-0.2	-0.9	-0.6	-1.3	-0.3	0.7	1.0	0.2	-1.8	2.5
28-Jan	-0.8	-0.8	-2.0	-3.4	-1.9	-2.7	-3.1	-4.3	-5.5	-5.3	-4.0	-2.0	-0.1	0.5	0.6	0.3	-0.1	-0.6	-0.8	-0.6	-1.2	-1.7	-1.6	-1.0	-1.8	0.6
29-Jan	-1.4	-1.2	-0.8	-1.0	-0.5	-0.9	0.0	-0.3	0.0	-1.0	0.3	3.0	4.2	5.0	5.7	4.7	3.2	0.4	-0.1	0.1	-2.7	-3.5	-4.1	-4.0	0.2	5.7
30-Jan	-2.9	-2.9	-3.4	-3.7	-3.1	-4.7	-5.1	-4.2	-3.9	-4.4	-6.3	-7.3	-7.2	-6.1	-5.9	-8.0	-9.1	-10.3	-11.5	-12.3	-13.1	-13.5	-14.0	-14.2	-7.4	-2.9
31-Jan	-14.6	-14.9	-15.4	-16.1	-16.5	-17.5	-18.1	-19.4	-20.7	-20.6	-18.9	-16.9	-16.1	-15.2	-14.2	-13.1	-13.2	-14.5	-13.1	-12.1	-12.3	-12.1	-10.9	-10.8	-15.3	-10.8
	-13.8	-14.1	-14.2	-14.3	-14.4	-14.5	-14.7	-14.8	-14.9	-14.7	-13.7	-12.4	-11.5	-10.7	-10.3	-10.8	-11.7	-12.5	-12.8	-13.0	-13.2	-13.5	-13.9	-13.9		Diurnal Average
	3.1	2.9	2.7	2.9	3.0	1.6	1.4	1.3	1.8	2.1	3.1	3.9	4.2	6.3	5.7	4.7	3.5	1.1	2.4	3.1	2.2	1.7	1.0	2.7		Diurnal Maximum





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Shell Muskeg River - January 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	201	27.02	27.02
-20 - 0	479	64.38	91.40
0 - 10	64	8.60	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

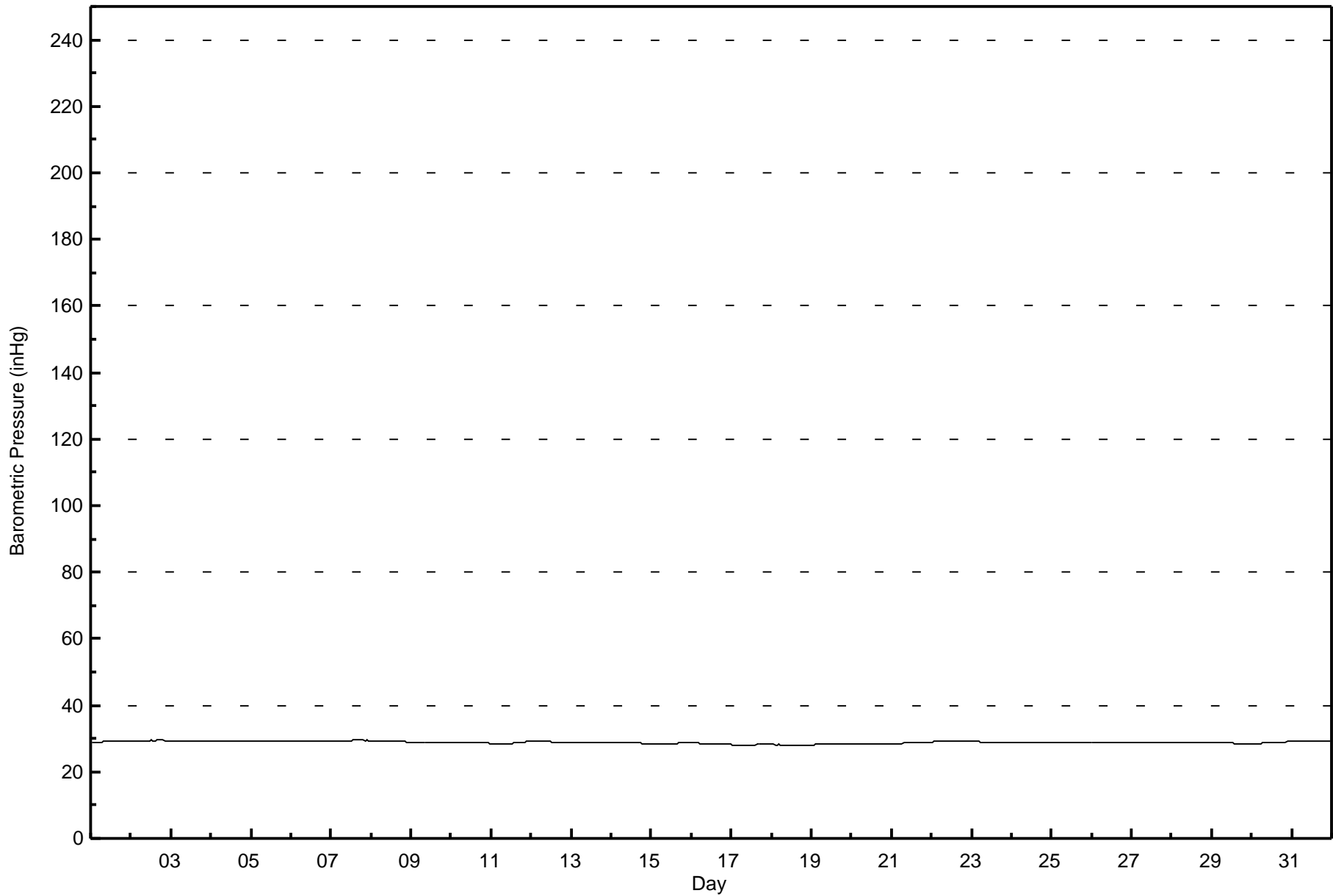
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Hourly Averages

Barometric Pressure (BP) - inHg
Shell Muskeg River - January 2017





Maximum Speed: 39 km/h on Jan 11 11:00	Maximum Daily Speed Average: 16.2 km/h on Jan 21	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jan 23 02:00	Minimum Daily Speed Average: 1.6 km/h on Jan 20	Hours of Data: 744
Maximum Diurnal Speed Average: 2.7 km/h at hour 8	Minimum Diurnal Speed Average: 0.9 km/h at hour 11	Hours of Missing Data: 0
Monthly Average Velocity: 1.5 km/h 199.7 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 8 O ₃ = 11 P ₉₀ = 17 P ₉₉ = 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-Jan	NNW25	N24	N23	N22	NNE17	NNE21	NNE12	NNW5	WSW4	W3	NW5	NW6	SSW4	S4	ESE4	SE2	SSE2	ESE2	ESE3	S3	SSW5	SSW5	SSW5	SE3	N4.8	NNW25
2-Jan	S3	S6	SW8	SSW5	S4	SSW4	S4	S5	S3	S3	S5	SW3	S4	S5	SSW5	SW7	SSW5	SSW5	S4	S6	S6	S6	S7	SSW5	SSW4.6	SW8
3-Jan	S6	S6	S5	SSW6	SSW7	S7	S7	SSW8	SSW8	SSW7	S6	SSW6	SSW5	SSW6	S6	S6	SSW6	WSW7	WSW4	WSW7	W5	S2	ENE8	SSW5.0	ENE8	
4-Jan	ENE10	ENE12	NE17	NE16	ENE11	ENE8	E3	SE3	SE3	SW3	SSE3	SSE4	S6	SSW7	SSW7	S8	S9	S9	S8	S8	S5	SSE3	E2	SE3.4	NE17	
5-Jan	NNE15	NNE19	NNE18	NE21	NE16	NE14	ENE12	NE16	NE15	ENE13	ENE12	NNE16	N22	N20	NNE18	NNE19	NE17	NE14	N11	NNW6	N5	N3	W5	SW8	NNE12.2	N22
6-Jan	SW6	S5	SSW5	SSW6	S5	SSW5	SSW4	SSW5	SSW5	S5	S6	S6	S5	S7	S7	S8	S7	SSW7	S8	S7	S5	SE3	SSE2	NE4	S5.1	S8
7-Jan	NE11	ENE7	ENE4	ENE6	E3	ENE7	ENE6	E2	ENE5	NNE16	NNE20	NNE20	NNE20	NNE23	NNE22	NE20	NE18	NE14	ENE10	NNE6	N10	NW5	SSW3	S4	NE9.6	NNE23
8-Jan	S4	S5	S5	SSW6	S7	S5	S4	SSW6	SSW5	S5	S6	SSW8	SSW7	SSW9	SSW9	SSW9	SSW6	SSW7	SSW7	SSW9	SSW10	SSW11	SW12	SSW8	SSW6.8	SW12
9-Jan	SW10	SW8	SW12	SW11	SSW8	SSW6	SSW5	S5	S5	S4	WSW2	WNW6	NW8	NW4	WSW2	SW4	W4	NNW3	NE4	ENE3	E3	SSW3	SE2	E1	SW3.1	SW12
10-Jan	ENE4	ENE8	NE9	NE8	NNE5	NE4	NE2	NNE1	ENE3	ESE1	S2	S2	SSE5	SE5	SE5	SSE5	S6	SSW5	SSW4	SSW5	SW11	SSW8	SSW9	S8	SSE2.2	SW11
11-Jan	S10	S11	S12	S15	S12	SSW9	S6	ESE4	NE6	N15	N39	N32	N32	N27	N26	NNW22	N17	NNW12	NNW14	NNW12	NW9	NW7	W9	WSW3	NNW7.8	N39
12-Jan	S2	S3	S5	S6	S6	S6	S7	S10	S10	S6	S7	SSW8	SSW8	SSW9	S10	SSW8	S10	SW4	SW3	SW3	SSW7	SSW7	SSW6	SSW7	SSW6.4	S10
13-Jan	SSW6	SW14	SW11	SW6	SW4	WSW5	SW5	S4	S5	SSE4	SSE6	S6	S6	S5	SSW3	SSE3	SE3	S3	SSE2	S5	SSW6	SSW6	SSW9	SSW9	SSW5.3	SW14
14-Jan	SSW9	SSW10	SSW9	SSW7	SSW8	SSW8	SSW8	SSW7	SW7	S3	SSW6	SSW9	SSW9	SSW9	SSW15	SSW15	SSW9	SSW7	SSW7	S9	S9	SSE8	SSW9	SSW16	SSW8.3	SW16
15-Jan	SW19	SW13	WSW17	WSW19	WSW18	S9	SSE10	S9	SSW12	WSW23	SW9	S6	S8	S7	SSW9	SSW8	SSE7	SSE10	SSE9	SSE9	SSE11	S11	SSW10	SSW11	SSW9.5	WSW23
16-Jan	SSW11	S10	S10	S10	S11	S12	S11	S12	S12	S12	SSW14	SSW17	SSW14	SSW9	SSW12	SSW11	SSW10	SSW9	SSW14	SSW13	SW12	SSW9	S9	S11	SSW11.1	SSW17
17-Jan	S13	S11	S10	SSW11	SSW10	SSW8	SW17	SW16	SW17	WSW18	WSW18	SSW10	SW13	S6	SSW9	S9	S9	SSE5	SSW8	S5	SSE3	S7	SSW6	SSW6	SSW9.4	WSW18
18-Jan	S5	SSW5	SSW5	SW4	SW2	ESE1	ESE4	ENE4	ENE3	NNW1	WNW4	SSE2	WSW2	SSW3	SW7	SSW7	SSW8	S7	SSW8	S8	S8	SSW5	S6	SSW5	SSW3.7	S8
19-Jan	N5	NE18	NE19	NE14	NE14	NE15	NNE16	NNE15	NNE14	NNE12	NE10	NNE10	NNE10	NNE9	NNE6	NNE8	NNE8	NNE8	NNE8	NNE8	NNE8	NNW3	WNW4	ESE1	NNE9.6	NE19
20-Jan	S2	SSW3	SSW5	SSW5	S5	S5	S5	S7	SSW6	SSW6	SW5	SSW5	SSW5	SSW6	SSW5	SSW5	SSW8	SSW7	W3	NNE5	NE15	NE15	NE16	NE17	SSE1.6	NE17
21-Jan	NE14	NNE19	NNE18	NNE19	NNE20	NNE16	N16	N16	NNE16	NNE15	N14	N15	N15	N17	N16	NNE17	NNE16	N16	NNE18	NNE16	N15	NNE16	NNE17	N18	NNE16.2	NNE20
22-Jan	N17	NNE18	NNE18	NNE21	NNE18	NNE18	NE17	NNE14	NNE16	NNE12	NNE11	NE11	NNE10	NE10	NE11	NNE9	NE11	NNE10	NE11	NE12	NE11	NE11	NE9	NE5	NNE12.7	NNE21
23-Jan	NE2	WSW0	S1	SSE2	SW1	WSW3	W3	W3	WSW4	W5	WSW4	SW4	SW3	SSW2	S2	S2	SSW2	SSW1	S2	SSW2	SSW3	S2	S3	S3	SW2.0	W5
24-Jan	S3	S3	S3	S3	S3	S3	S3	S3	S3	S3	S3	S4	S5	S5	S6	S7	S7	S6	S7	S7	S8	S7	SSW7	SSW7	S4.7	S8
25-Jan	S7	S8	S9	S9	S8	S6	S6	S6	S6	SSW7	SSW8	SSW6	S6	S7	SSW5	S7	S9	S10	S9	S9	SSW9	SSW7	SSW7	SSW9	S7.5	S10
26-Jan	SSW8	S7	S7	S7	S8	S7	S7	S8	S6	S6	S7	SSW10	S10	SSW8	S8	WSW16	SW9	SW12	WSW13	WSW22	WSW24	W23	SW7	SW9	SW8.7	WSW24
27-Jan	SW11	SSW8	S11	S8	SW10	S9	SSE11	SSE7	SE7	WSW14	WSW22	WSW20	SW8	SW7	SW9	SW13	SSW7	S4	SSE7	SSW8	SW13	SW14	SSW11	S9	SSW9.0	WSW22
28-Jan	SSW9	SW14	SSW10	SSW11	SSW13	SW16	SW13	S9	S8	S6	S6	SSE6	S6	S6	S8	S8	S8	S7	SSW5	SSW7	S6	S8	SSE8	SSE9	S8.2	SSW16
29-Jan	SSE7	SSE8	S10	SW10	SSW9	SSE9	SW9	SSE9	S8	S8	S10	SSW10	SW16	SW16	SW15	SW17	SW13	WSW8	WSW14	WSW12	SW4	SSW7	SSW5	S8	SSW9.0	SW17
30-Jan	WSW16	SW9	SW14	SW15	SW20	SSW7	WSW11	SW7	WSW10	NNE17	NNE25	NNE24	NNE14	NNW10	NNW12	NNE21	NNE22	NNE23	N26	N27	N23	N23	N25	N24	N9.9	N27
31-Jan	N25	NNE24	NNE22	NNE19	NNE16	NE13	ENE4	SW5	SW5	SSW4	SW5	SSW7	SSW7	SSW7	SSW6	SSW8	SSW5	SW6	W11	WNW10	WSW6	WNW6	N10	N13	N3.4	N25

SW1.4 SE1.1 SSE1.2 S1.1 S1.7 SE1.8 S2.3 SSE2.7 S2.4 SW1.6 W0.9 W1.0WSW1.2 SW1.2 SW1.8SSW2.1 S1.9 S1.4 SW1.3 SW2.0 SW2.4 SW2.4SSW2.4SSW2.2	Diurnal Average
N25 N24 N23 N22 SW20 NNE21 SW17 NE16 SW17WSW23 N39 N32 N32 N27 N26 NNW22 NNE22 NNE23 N26 N27 WSW24 N23 N25 N24	Diurnal Maximum

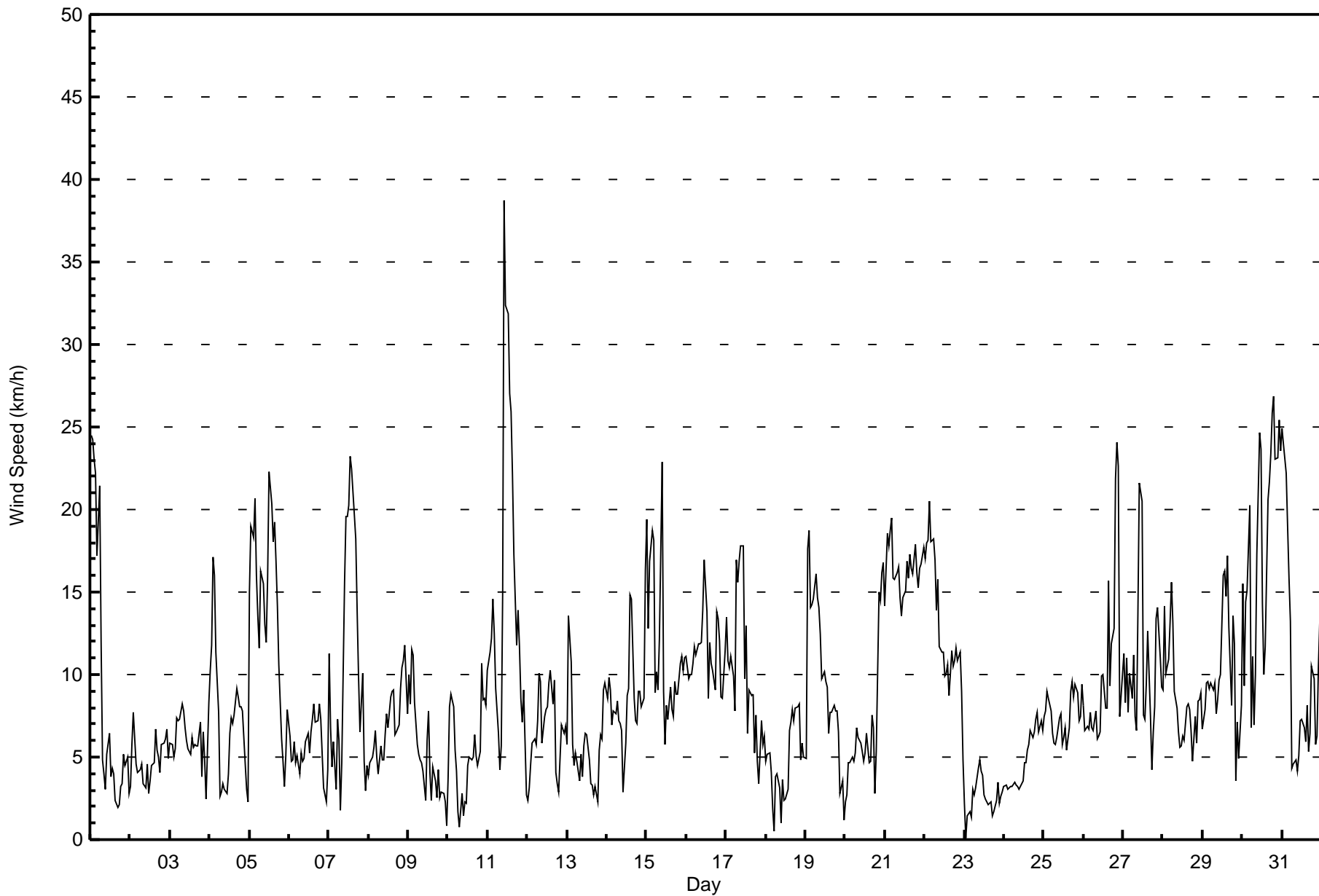
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Shell Muskeg River - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Jan 11 10:00 Minimum Value: 0 km/h on Jan 23 19:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 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-Jan	8	6	5	5	4	5	4	2	1	1	2	2	1	2	2	1	1	1	1	1	2	2	3	1	8
2-Jan	2	2	2	2	2	2	1	1	1	1	1	1	1	1	2	1	1	1	1	2	2	1	1	1	2
3-Jan	1	1	1	2	2	3	2	3	3	2	2	1	2	2	2	1	2	2	2	2	2	2	2	4	4
4-Jan	2	4	3	3	3	4	1	1	1	1	1	2	2	2	2	1	2	2	2	2	2	2	1	1	4
5-Jan	6	4	3	3	3	2	2	3	3	2	2	5	5	4	4	4	3	3	3	3	3	2	1	2	6
6-Jan	2	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	2	2	2	2	1	1	4	4
7-Jan	3	2	2	2	2	1	1	2	2	5	4	4	4	4	4	4	3	3	3	4	4	3	1	2	5
8-Jan	1	1	1	1	1	2	2	1	2	1	2	3	3	3	3	2	2	2	2	2	2	2	3	2	3
9-Jan	2	3	3	4	2	2	2	1	1	1	2	2	2	3	1	2	2	2	3	2	2	1	1	1	4
10-Jan	3	3	5	4	4	2	1	1	1	1	1	1	2	1	1	1	1	1	1	2	3	2	2	2	5
11-Jan	3	3	3	3	3	3	2	3	5	9	9	9	9	9	7	6	5	4	3	3	2	2	1	3	9
12-Jan	2	1	1	1	1	1	2	2	3	2	2	2	3	4	3	3	3	1	1	1	1	2	2	2	4
13-Jan	2	3	3	3	2	2	1	2	2	1	1	2	2	1	2	2	2	1	2	2	2	1	2	2	3
14-Jan	2	2	2	2	1	2	2	2	1	1	1	2	3	3	4	4	2	2	2	2	2	2	4	2	4
15-Jan	3	4	3	3	4	3	2	2	5	5	6	2	2	2	2	2	3	2	1	2	2	2	2	3	6
16-Jan	3	2	2	2	2	3	2	2	2	3	4	5	4	2	3	3	2	2	4	3	2	2	2	3	5
17-Jan	3	3	2	3	3	2	4	2	2	3	3	4	4	2	2	2	2	2	2	1	1	1	2	1	4
18-Jan	1	1	1	1	1	1	1	3	2	2	2	2	2	1	1	1	2	1	1	1	2	2	2	2	3
19-Jan	2	3	4	3	3	2	3	3	3	3	2	3	2	2	2	1	2	2	2	2	1	2	1	1	4
20-Jan	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	2	2	2	1	2	2	2	2	2	2
21-Jan	2	3	3	3	4	4	4	4	4	4	3	4	4	3	4	5	4	4	4	4	4	4	4	4	5
22-Jan	4	5	4	4	4	4	3	3	3	3	3	2	3	2	2	3	2	2	2	2	2	1	2	3	5
23-Jan	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	0	1	1	2
24-Jan	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	2
25-Jan	1	1	2	2	2	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
26-Jan	3	2	2	2	1	1	1	1	1	1	2	4	3	3	2	3	4	5	6	5	3	4	4	3	6
27-Jan	4	2	3	2	3	2	2	2	1	4	4	4	5	2	3	3	2	3	2	2	3	3	2	2	5
28-Jan	3	3	4	2	3	3	4	3	2	2	1	1	2	1	2	1	1	1	2	3	2	1	1	1	4
29-Jan	1	1	2	3	3	3	4	3	2	2	2	4	2	2	2	2	2	3	4	2	2	2	2	2	4
30-Jan	4	4	4	4	4	2	4	4	2	7	5	5	3	3	7	4	4	5	5	6	7	7	6	6	7
31-Jan	6	6	4	4	3	4	4	1	1	1	2	2	2	2	2	3	1	2	3	2	1	3	4	3	6
Diurnal Maximum																									





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Shell Muskeg River - January 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	219	29.44	29.44
6 - 11	347	46.64	76.08
12 - 19	135	18.15	94.22
20 - 28	40	5.38	99.60
29 - 38	2	0.27	99.87
> 38	1	0.13	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Wind Speed (WS) - km/h
Shell Muskeg River - January 2017

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	3	3	6	8	5	9	9	14	69	47	18	11	8	2	3	4	219
6 - 11	3	15	13	10	0	0	1	18	127	116	27	6	2	3	4	2	347
12 - 19	14	36	23	4	0	0	0	0	8	9	25	12	0	0	0	4	135
20 - 28	14	15	2	0	0	0	0	0	0	0	1	5	1	0	0	2	40
29 - 38	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
> 38	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Totals	37	69	44	22	5	9	10	32	204	172	71	34	11	5	7	12	744

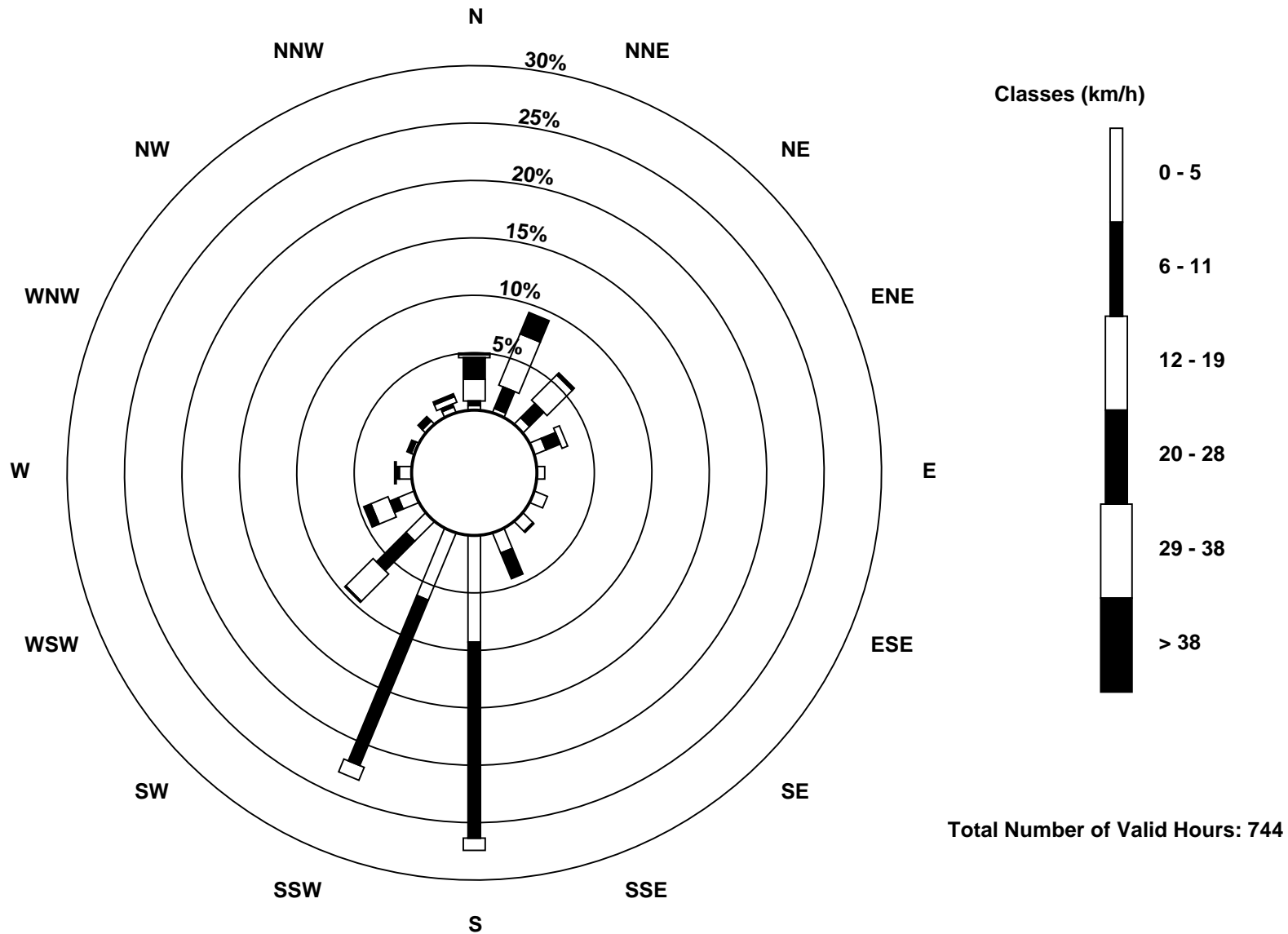
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

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 - January 2017

Direction of Maximum Speed: 9 deg on Jan 11 11:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 16.2 deg on Jan 21	Hours of Data: 744
Direction of Minimum Speed: 253 deg on Jan 23 02:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 1.6 deg on Jan 20	Percent Operational Time: 100.0
Monthly Average Direction: 202.9 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-Jan	343	3	9	8	16	25	30	332	240	260	308	315	207	175	108	135	155	112	118	177	200	193	195	129	5.4
2-Jan	191	173	224	193	185	201	174	182	169	174	183	214	189	175	209	222	202	205	187	186	183	191	185	193	192.4
3-Jan	183	186	184	198	192	190	179	199	195	198	190	205	208	201	191	177	183	193	254	242	255	270	174	71	197.5
4-Jan	71	61	45	49	58	61	94	130	137	219	158	162	172	202	203	180	179	187	182	180	172	175	151	80	125.0
5-Jan	27	28	31	42	50	54	58	46	55	61	57	24	9	9	14	30	50	53	6	338	3	356	274	229	32.4
6-Jan	214	173	193	195	175	195	205	204	196	186	174	176	187	184	176	176	174	206	182	185	185	139	153	37	184.3
7-Jan	50	71	72	63	84	62	67	83	68	28	20	14	18	30	28	34	43	52	61	29	0	324	192	185	35.9
8-Jan	186	172	191	197	180	188	189	194	196	190	187	197	200	206	201	209	201	192	202	213	207	210	223	201	200.0
9-Jan	232	226	220	215	211	204	198	177	174	184	237	302	321	307	243	214	263	327	53	76	98	196	146	101	222.2
10-Jan	73	66	52	49	30	36	51	33	64	120	173	171	148	131	130	158	189	205	202	208	218	208	205	188	151.6
11-Jan	185	189	184	184	181	194	179	119	45	353	9	4	357	352	352	348	350	342	345	343	319	306	275	246	346.3
12-Jan	177	172	173	183	189	186	190	181	181	188	183	210	207	192	190	196	185	229	232	221	197	205	207	203	193.5
13-Jan	204	216	224	226	229	252	226	176	189	160	168	185	191	181	196	165	135	180	168	190	196	194	205	203	199.8
14-Jan	198	205	202	206	203	209	210	205	214	216	191	200	197	206	219	223	210	209	192	172	176	147	196	219	203.3
15-Jan	230	225	246	240	246	176	164	170	213	240	229	181	173	186	208	205	163	157	147	151	148	177	196	199	204.2
16-Jan	201	178	185	179	178	184	180	172	177	187	197	203	194	193	193	205	210	198	205	213	215	206	184	188	193.3
17-Jan	185	188	190	195	202	203	224	225	227	244	242	212	223	184	209	172	188	163	202	187	149	190	197	196	207.5
18-Jan	188	199	201	234	234	112	117	57	62	343	284	167	243	194	225	198	210	186	203	178	191	194	186	209	196.8
19-Jan	350	45	45	39	44	39	25	31	28	33	38	18	22	31	13	28	30	24	21	24	19	347	289	107	30.2
20-Jan	169	204	203	199	186	187	190	188	195	205	214	210	197	209	203	210	207	203	276	24	51	43	42	44	162.4
21-Jan	41	26	26	26	27	15	11	8	23	15	7	11	10	3	5	18	20	6	20	15	8	19	21	3	16.2
22-Jan	6	16	23	24	20	23	34	31	26	12	28	38	25	38	37	29	43	28	36	42	48	46	46	44	29.1
23-Jan	48	253	174	162	224	237	270	266	256	263	242	232	220	194	178	190	192	195	178	202	207	188	191	188	218.6
24-Jan	190	184	176	174	181	186	184	182	182	178	185	181	184	187	178	178	177	183	181	188	186	188	197	193	184.1
25-Jan	187	188	185	186	183	185	187	187	183	196	196	192	191	190	203	183	182	185	184	185	192	192	199	203	189.1
26-Jan	195	189	174	183	178	189	178	175	181	189	185	201	186	198	172	238	223	232	246	253	254	263	220	217	217.4
27-Jan	217	204	183	184	234	185	160	155	144	243	252	250	222	214	218	220	211	188	152	209	223	218	200	187	211.4
28-Jan	192	225	211	201	205	214	217	171	176	176	179	164	181	171	184	174	179	174	196	208	171	169	167	167	190.5
29-Jan	161	168	187	220	209	161	219	166	191	184	184	206	223	233	236	227	226	237	247	251	218	199	200	191	211.1
30-Jan	241	220	218	226	233	194	243	220	247	15	17	23	24	345	345	30	22	15	8	8	357	352	355	358	351.5
31-Jan	10	25	22	22	29	53	70	220	220	205	215	206	209	209	203	212	198	223	273	287	252	301	0	10	353.4

213.9 145.8 165.4 169.4 186.1 146.0 174.3 168.6 178.0 230.5 270.5 266.1 237.3 219.7 221.2 205.6 175.7 187.4 226.2 229.5 218.0 221.2 208.1 194.1
 Diurnal Average

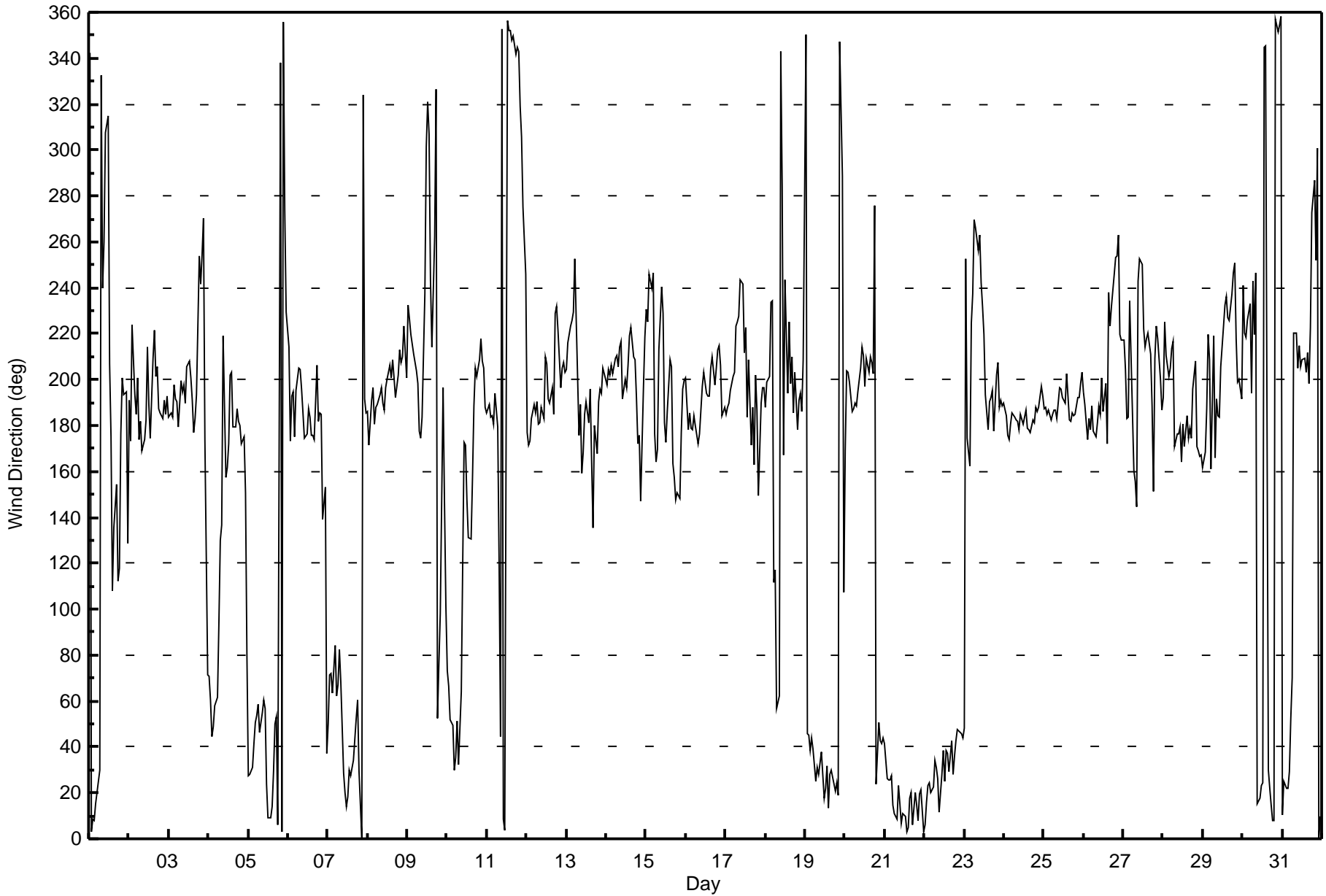
All monthly, daily, and diurnal averages have been calculated using vector methods



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Shell Muskeg River - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 93 deg on Jan 23 02:00 Minimum Value: 5 deg on Jan 29 17:00 Percentiles: P ₁ = 7 P ₁₀ = 11 Q ₁ = 14 Median = 17 Q ₃ = 22 P ₉₀ = 34 P ₉₉ = 73																	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-Jan	19	16	18	16	17	12	26	37	31	54	26	21	25	29	27	45	41	32	27	18	25	32	59	44	59
2-Jan	58	28	23	23	26	24	14	12	15	13	15	21	28	19	27	10	18	15	15	16	14	16	10	14	58
3-Jan	13	9	14	15	15	19	27	17	22	21	21	22	22	20	21	21	20	28	18	38	18	34	74	34	74
4-Jan	12	19	12	9	12	18	35	30	13	54	24	19	18	22	20	13	12	15	16	16	13	22	20	45	54
5-Jan	22	13	12	10	12	11	12	14	9	9	9	22	16	15	17	20	10	20	27	32	55	57	19	10	57
6-Jan	16	24	15	13	20	15	13	14	13	11	10	13	20	16	14	12	13	19	14	14	26	25	79	28	79
7-Jan	15	13	16	19	61	10	13	72	21	14	14	17	19	11	11	13	11	10	16	41	21	56	22	12	72
8-Jan	22	11	16	13	8	14	21	14	17	18	21	19	21	20	21	19	16	12	14	14	16	15	12	19	22
9-Jan	15	21	17	18	17	18	20	15	12	16	59	17	16	55	45	22	39	70	33	69	50	24	27	57	70
10-Jan	32	25	50	32	37	52	44	71	30	42	20	26	16	17	14	14	13	14	14	13	10	13	13	16	71
11-Jan	16	17	16	15	15	25	20	50	79	23	18	18	20	20	21	18	14	18	14	15	19	23	11	35	79
12-Jan	42	19	13	14	9	11	13	12	13	14	17	18	18	20	18	19	18	16	17	21	16	18	13	17	42
13-Jan	18	11	17	20	26	26	17	24	20	21	14	22	22	20	44	32	47	19	25	23	12	16	15	16	47
14-Jan	16	13	13	15	12	12	10	19	23	19	45	18	21	18	16	10	14	20	23	15	20	12	29	10	45
15-Jan	9	16	11	9	14	28	15	15	31	16	60	44	27	23	17	19	35	17	13	16	14	14	14	16	60
16-Jan	19	17	15	15	18	17	13	12	11	17	18	19	19	21	17	18	13	13	16	15	13	17	17	18	21
17-Jan	17	17	16	19	19	14	10	8	10	7	10	24	16	28	15	21	16	22	19	13	31	14	13	12	31
18-Jan	13	11	13	10	48	82	33	27	57	73	24	67	82	44	18	15	18	13	13	12	14	23	24	48	82
19-Jan	52	6	13	17	10	12	10	12	12	13	13	16	17	17	21	18	17	16	14	13	15	50	27	71	71
20-Jan	33	26	19	19	17	20	18	18	17	13	14	16	14	14	18	16	12	15	39	37	10	11	9	7	39
21-Jan	10	8	10	9	10	16	17	17	14	16	17	16	18	15	17	17	15	17	15	17	18	15	13	15	18
22-Jan	14	18	12	12	16	15	13	15	10	18	18	18	20	17	23	27	14	17	16	15	13	7	11	29	29
23-Jan	63	93	45	29	34	25	27	15	11	13	12	12	25	24	23	21	16	11	10	13	14	13	16	16	93
24-Jan	15	16	16	14	16	19	19	19	17	16	20	18	19	21	16	14	13	16	14	15	16	16	15	15	21
25-Jan	14	14	14	14	15	16	15	17	15	15	15	21	24	21	19	17	15	15	15	13	15	16	14	16	24
26-Jan	21	18	15	16	11	12	13	9	10	17	17	21	19	19	19	9	24	23	25	10	8	10	50	32	50
27-Jan	27	32	26	31	23	17	10	21	22	16	9	10	51	18	15	11	20	57	29	21	9	11	15	24	57
28-Jan	31	12	31	21	15	11	18	24	13	16	15	18	23	12	14	16	18	13	27	18	32	15	20	17	32
29-Jan	23	15	17	16	40	21	43	28	27	18	17	26	10	9	8	6	5	15	6	7	48	20	46	26	48
30-Jan	11	30	12	11	9	23	18	43	13	49	15	11	21	22	27	17	13	16	15	17	17	18	18	17	49
31-Jan	17	14	15	22	18	11	73	39	11	25	19	24	23	23	23	21	21	23	12	10	19	34	23	18	73
63 93 50 32 61 82 73 72 79 73 60 67 82 55 45 45 47 70 39 69 55 57 79 71																									
Diurnal Maximum																									





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 3, 2017	Last Calibration	December 12, 2016
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	10:01	End Time (MST)	14:35
Gas Cert Reference	EY0000638	Station temp.	22 Deg C
Cal Gas Concentration	48.2 ppm	Cal Gas Exp Date	04-Nov-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

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	-710	-710
Analyzer IP address	192.168.1.43		Lamp voltage	832	832
Calculated slope	0.990192	0.996637	Chamber temp	44.9	44.8
Calculated intercept	1.060315	2.061891	Pressure	719.2	722.8
Analyzer Background	8.4	8.4	Flow	0.457	0.459
Analyzer Coefficient	1.033	1.021	Intensity	90	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	0.3	----
as found span	5000	76.6	738.4	744.0	0.992
calibrator zero	5000	0.0	0.0	0.3	----
high point	5000	76.6	738.4	740.2	0.998
second point	5000	38.5	371.1	368.6	1.007
third point	5000	19.4	187.0	183.6	1.019
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	76.6	738.4	742.6	0.994
Average Correction Factor					1.008

Corrected As found 743.8 Previous response 744.7 % change 0.1%

Notes:

Changed inlet filter after as founds. Adjusted the span.

Calibration Performed By: Jayne Marcoux



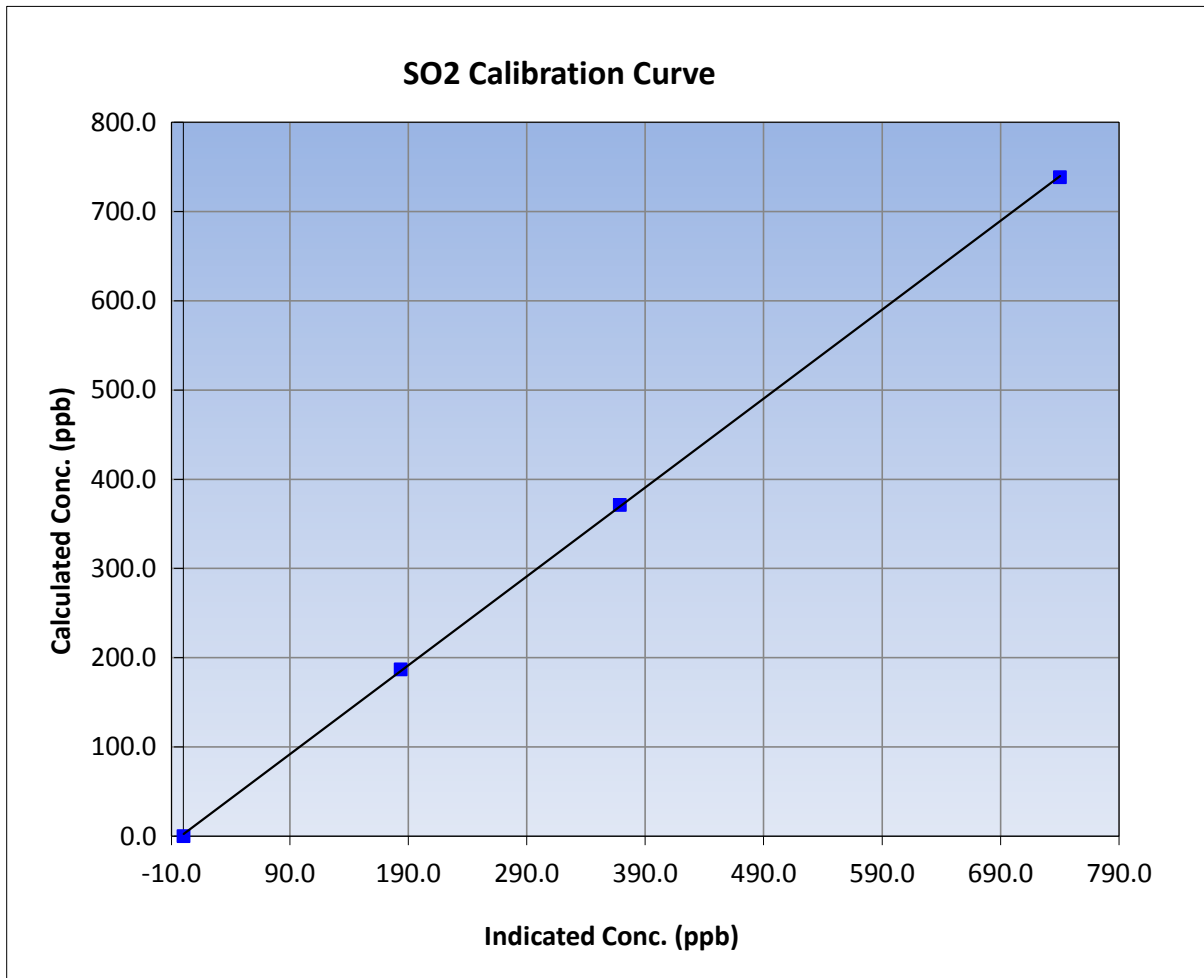
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 3, 2017	Previous Calibration	December 12, 2016
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:01	End Time (MST)	14:35
Analyzer make	Thermo 43i	Analyzer serial #	1118148498

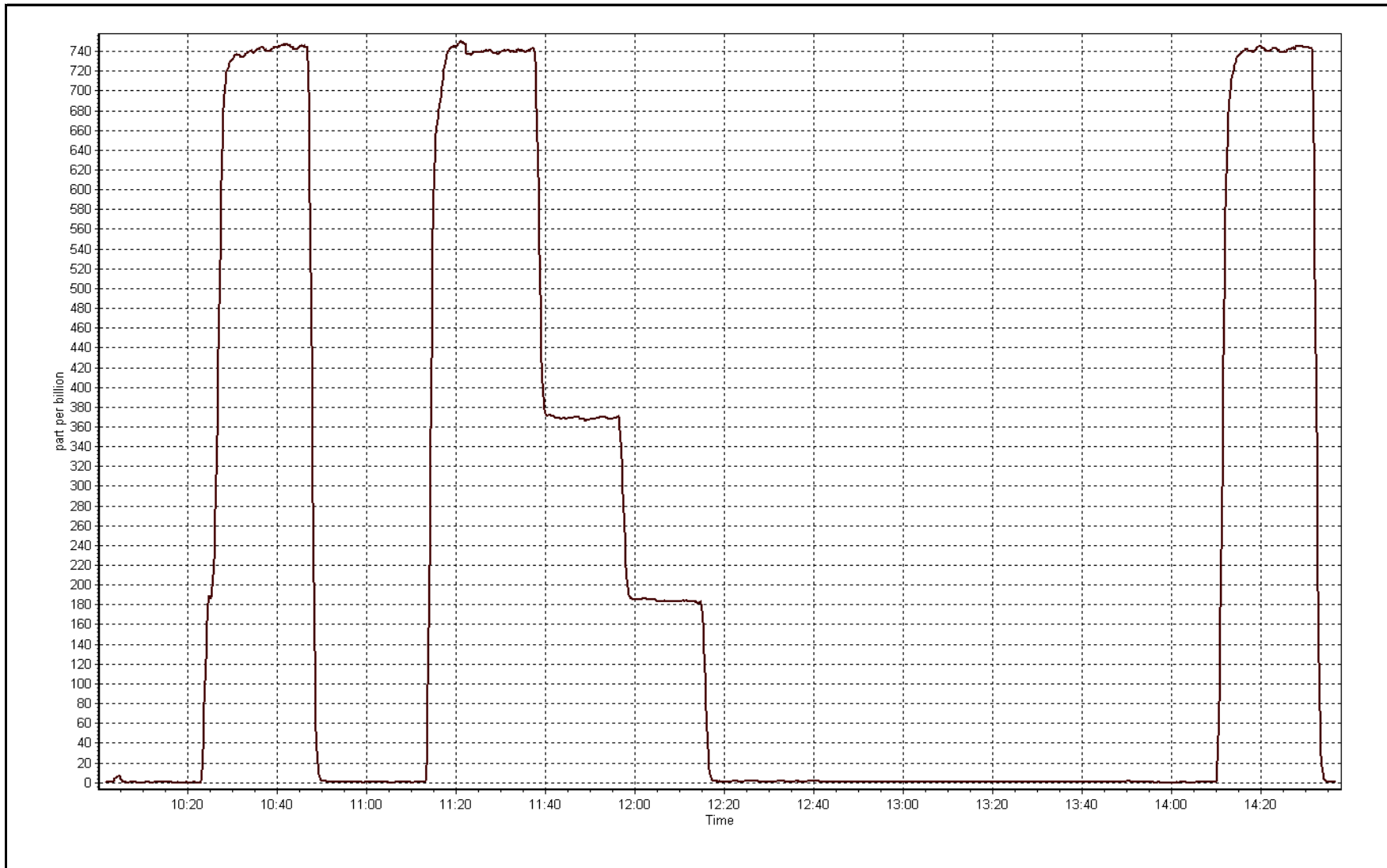
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999952
738.4	740.2	0.9976		
371.1	368.6	1.0068	Slope	0.996637
187.0	183.6	1.0188		
			Intercept	2.061891



SO2 Calibration Plot

Date: January 3, 2017





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	January-03-17	Last Calibration	December-12-16
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	10:01	End Time (MST)	14:34
Gas Cert Reference	EY0000638	Cal Gas Expiry Date	04-Nov-18
CH4 Cal Gas Conc.	502 ppm	CH4 Equiv Conc.	1035.5 ppm
C3H8 Cal Gas Conc.	194 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

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	8.2	8.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.9	34.9
Calculated slope	1.007785	1.010273	Fuel Pressure	24.2	24.2
Calculated intercept	-0.025252	-0.047555	Analyzer Coeff	4.575	4.508
			Analyzer BKG	2.20	2.30

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	0.11	----
as found span	5000	76.6	15.86	16.23	0.977
calibrator zero	5000	0.0	0.00	0.07	----
high point	5000	76.6	15.86	15.78	1.005
second point	5000	38.5	7.97	7.87	1.013
third point	5000	19.4	4.02	4.04	0.994
as left zero	5000	0.0	0.00	0.06	----
as left span	5000	76.6	15.86	15.81	1.003
Average Correction Factor					1.004

Corrected As found	16.12	Previous response	15.77	% change	-2.2%
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Notes:

Changed the inlet filter after as founds. Adjusted the zero and span.

Calibration Performed By:

Jayme Marcoux



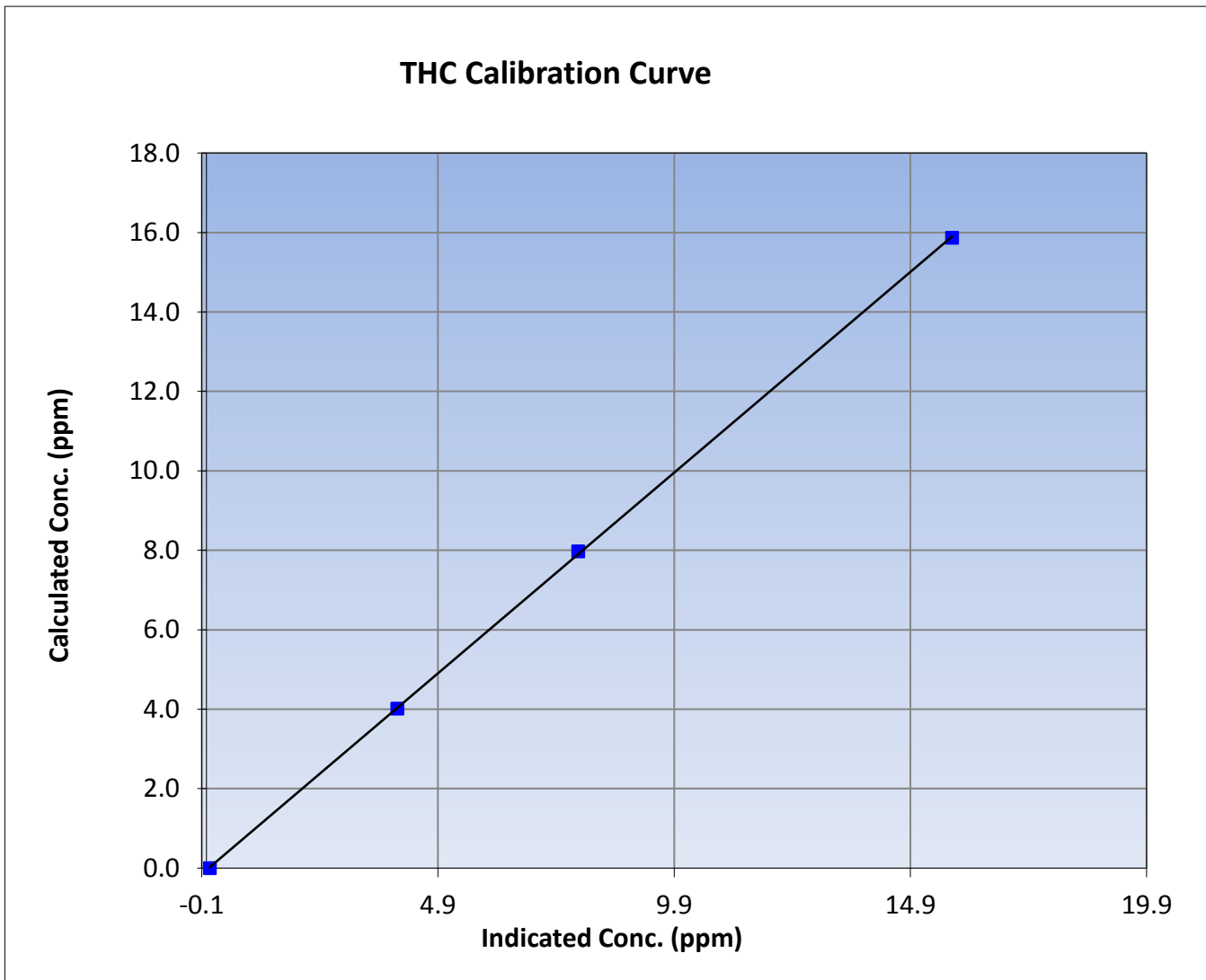
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	January 3, 2017	Previous Calibration	December 12, 2016
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:01	End Time (MST)	14:34
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458

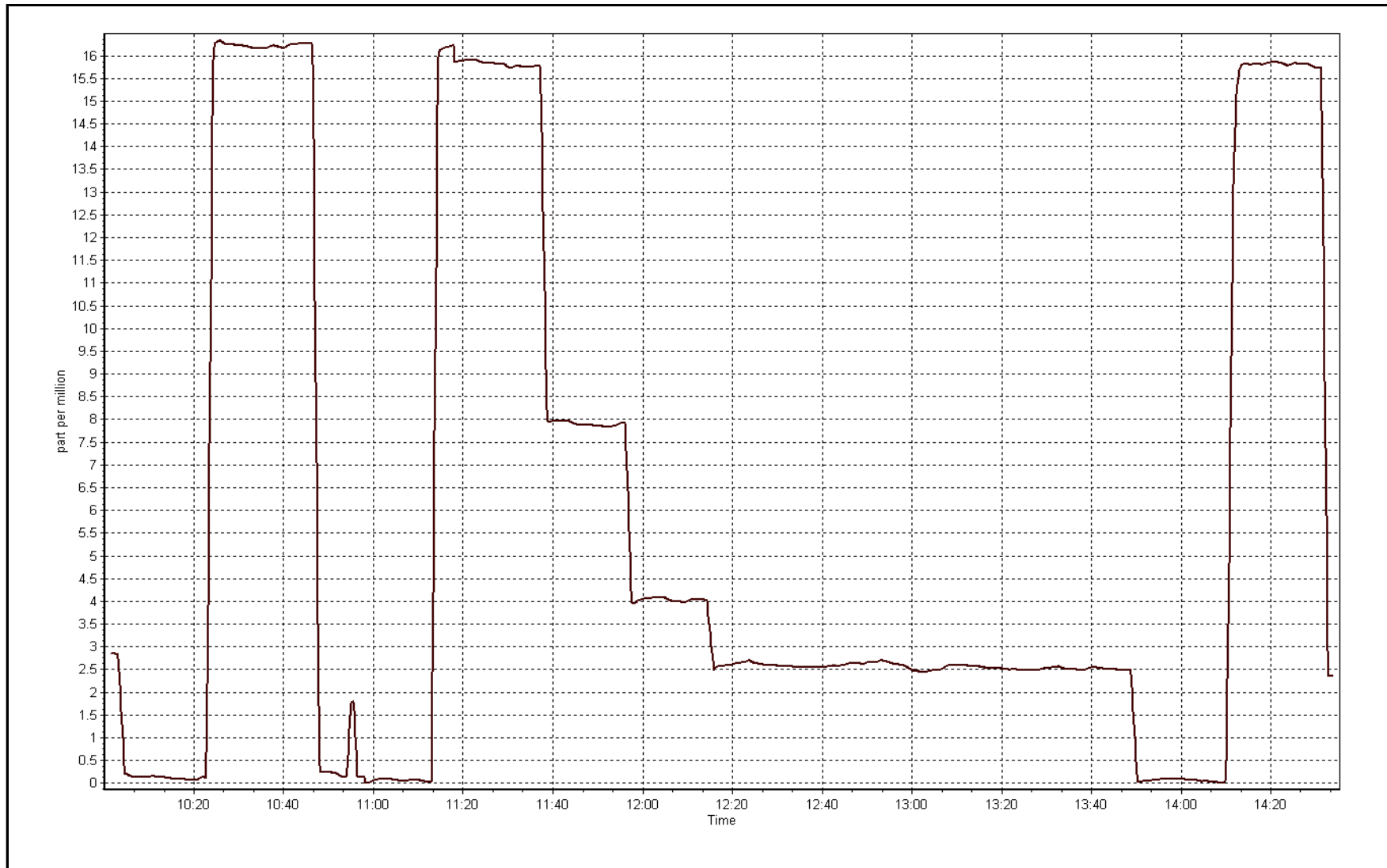
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.07	----	Correlation Coefficient	0.999952
15.86	15.78	1.0053		
7.97	7.87	1.0131	Slope	1.010273
4.02	4.04	0.9945		
			Intercept	-0.047555



THC Calibration Plot

Date: January 3, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 3, 2017	Previous Calibration	December 12, 2016
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	10:01	End Time (MST)	14:35
NO Cal Gas Conc	52.4 ppm	Gas Cert Reference	EY0000638
NOX Cal Gas Conc	52.4 ppm	Cal Gas Expiry Date	November 4, 2019
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	0.999474	0.999342	0.994758
	Data Offset	2.146791	2.560071	0.494924
Current Calibration	Data Slope	1.004968	1.003820	0.984477
	Data Offset	-1.200540	-0.573308	0.531172

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	192.168.1.43		192.168.1.43	
NO coefficient	1.100		1.098	
NOX coefficient	0.996		0.996	
NO2 coefficient	1.000		1.000	
NO bkgrnd	9.0		9.0	
NOX bkgrnd	9.4		9.2	
Chamber Temp	50.4	Deg C	50.1	Deg C
Moly Temp	325	Deg C	325	Deg C
PMT voltage	-744.8	V	-744.8	V
PMT Temp	-3.1	Deg C	-2.9	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	171.9	mmHg	172.2	mmHg
R Cell Press Nox	171.6	mmHg	171.9	mmHg
NO sample flow	0.92	lpm	0.911	lpm
Nox sample Flow	0.924	lpm	0.913	lpm

Notes:

Changed the inlet filter after as founds. Adjusted the zero and span. Used second GPT point as the reference point.



Wood Buffalo Environmental Association

NO_x Calibration Summary

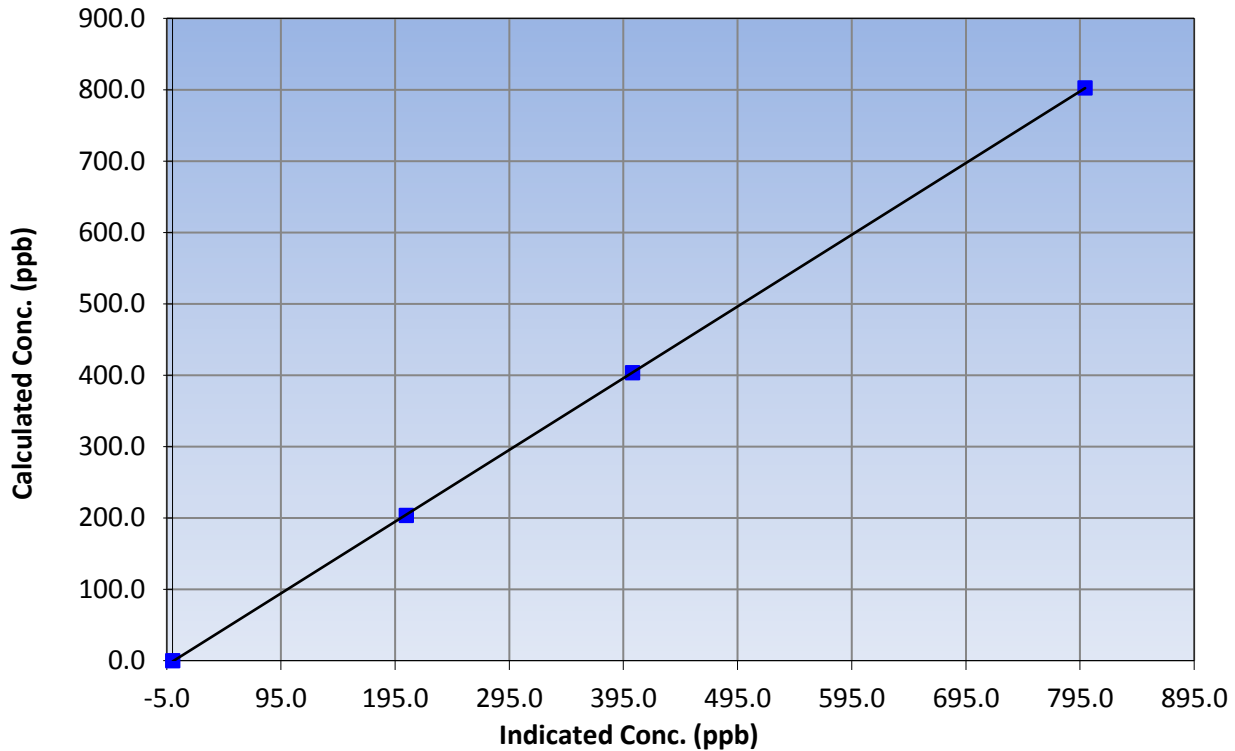
Station Information

Calibration Date	January 3, 2017	Previous Calibration	December 12, 2016
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:01	End Time (MST)	14:35
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	----	Correlation Coefficient	0.999990
802.8	799.5	1.0041		
403.5	403.0	1.0011	Slope	1.004968
203.3	204.8	0.9927		
			Intercept	-1.200540

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

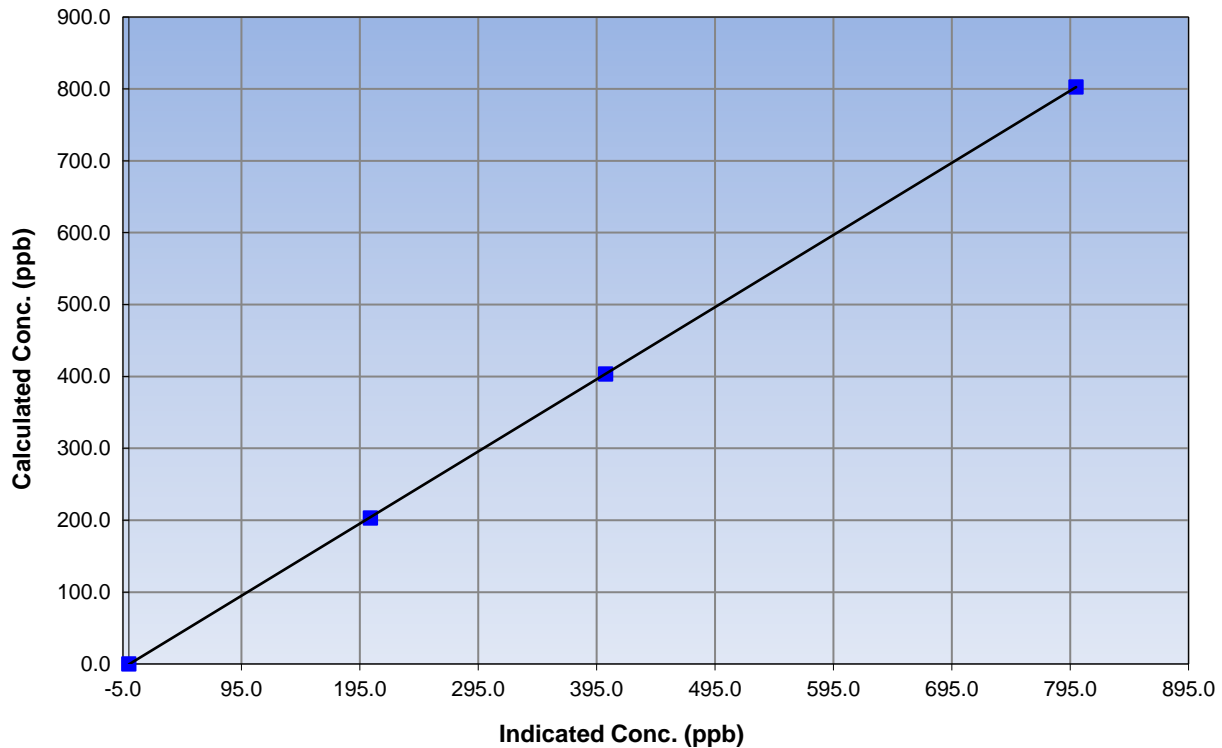
Station Information

Calibration Date	January 3, 2017	Previous Calibration	December 12, 2016
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:01	End Time (MST)	14:35
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	0.999997
802.8	800.0	1.0034		
403.5	402.6	1.0022	Slope	1.003820
203.3	203.9	0.9972		
			Intercept	-0.573308

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

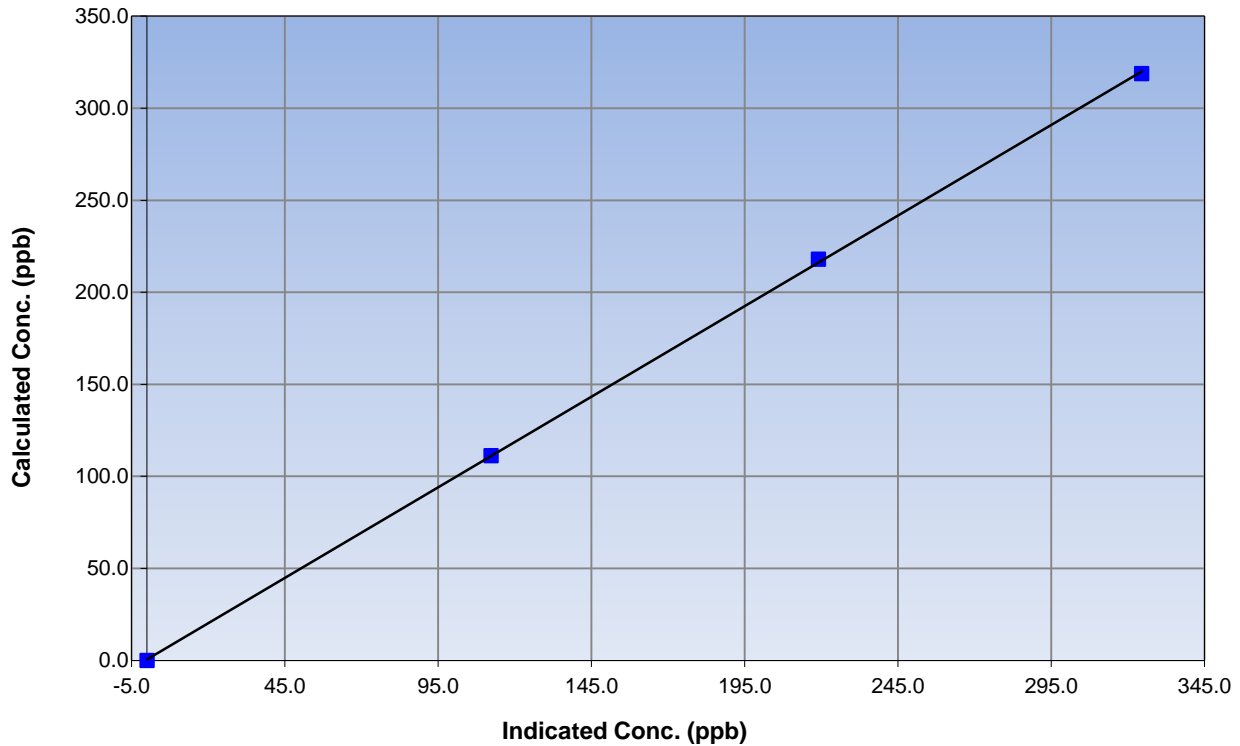
Station Information

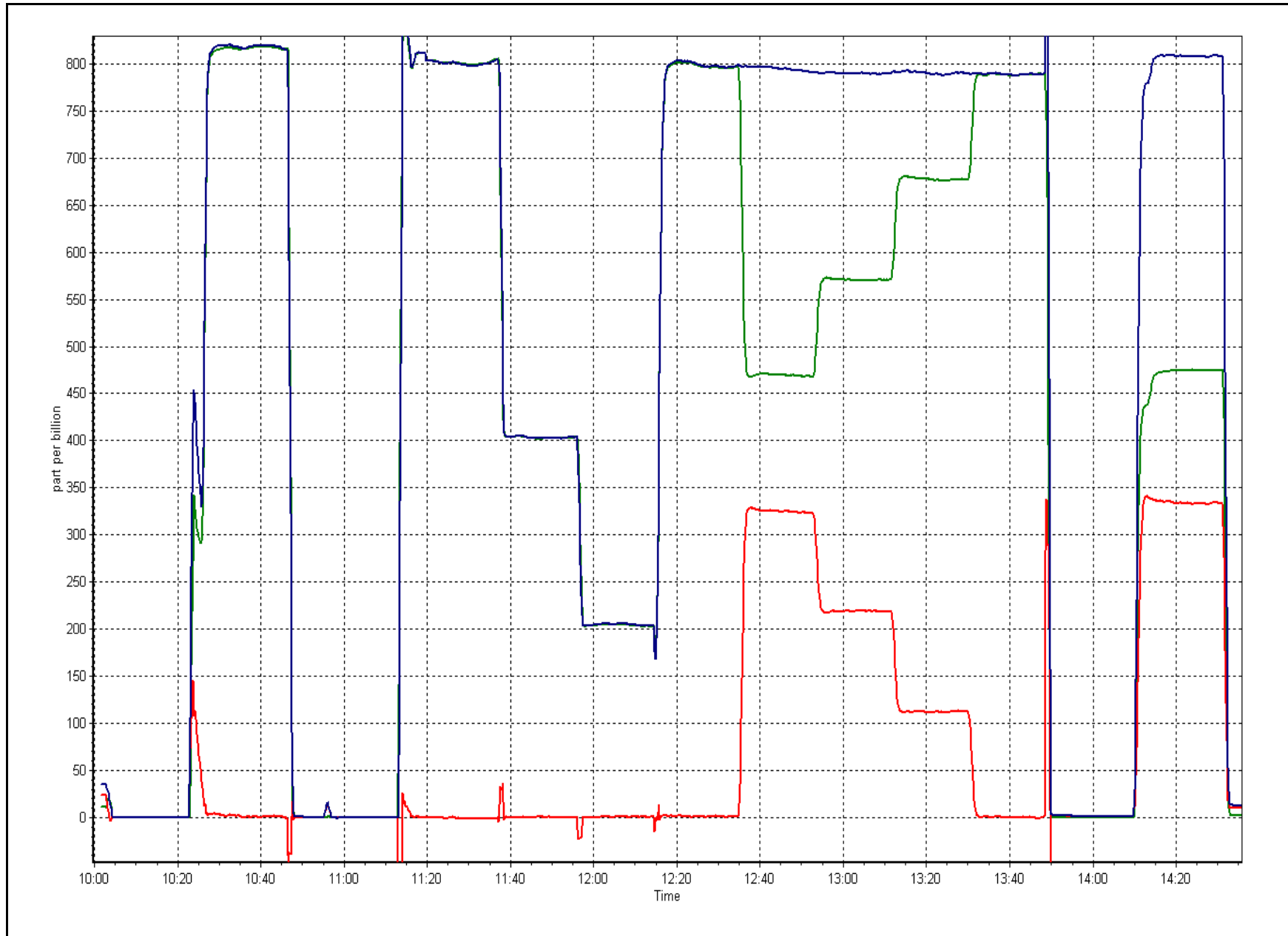
Calibration Date	January 3, 2017	Previous Calibration	December 12, 2016
Station Number	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:01	End Time (MST)	14:35
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999917
318.9	324.6	0.9825		
217.9	219.1	0.9946	Slope	0.984477
111.3	112.4	0.9903		
			Intercept	0.531172

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-08-2016

Station Information

Station Name:	Shell Muskeg River	Station number:	AMS 16
Calibration Date:	January 3, 2017	Last Cal Date:	December 12, 2016
Start time (MST):	11:00	End time (MST):	11:51
Sharp Model:	Thermo / SHARP 5030	S/N:	E-798
Particulate Fraction:	PM2.5	C14 Source S/N:	4142
Flow Standard Model:	DeltaCal	S/N:	628
Temp/RH standard:	NA	S/N:	NA

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	Tolerance
T1 (°C)	-19.7	-20.3	-17.7	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	980	980	964	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	1010	1000	<input checked="" type="checkbox"/>	+/- 50 LPH
Nephelometer zero	0.7	-----	0.1	<input checked="" type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified <input checked="" type="checkbox"/>				
Cyclone cleaning:	PM10 Cyclone <input checked="" type="checkbox"/>		PM2.5 Cyclone <input checked="" type="checkbox"/>		
Filter Tape Installed:	<input type="checkbox"/>				

Quarterly Calibration Test

Leak Test:	Date of check:	<u>December 12, 2016</u>	Last Cal Date:	<u>June 24, 2016</u>	<u>Tolerance</u>
	Flow w/o adaptor:	_____	Flow w/ adaptor:	_____	0.4 LPM

Annual Calibration Test

Foil Calibration	Foil Mass:	<u>NA</u>	S/N:	<u>NA</u>
	Date of check:	<u>NA</u>	Last Cal Date:	<u>June 24, 2016</u>
	New Correction Factor:	<u>NA</u>	Previous Correction Factor:	<u>NA</u>

Parameter	As found	Measured	As left	Adjusted	Tolerance
T2 (°C)				<input type="checkbox"/>	+/- 2 °C
T3 (°C)				<input type="checkbox"/>	+/- 2 °C
T4 (°C)				<input type="checkbox"/>	+/- 2 °C
RH (%)				<input type="checkbox"/>	+/- 10%

Notes: Cleaned cyclone head. Adjusted nephelometer and flow.

Calibration by: Jayme Marcoux



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

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

**AMS 17
WAPASU
JANUARY 2017**

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

February 27, 2017



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
 JANUARY 2017

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	710	34	34	100.00	31	0	10	0
H2S (ppb) Average	710	34	34	100.00	1	0	0	0
THC (ppm) Average	710	34	34	100.00	4.5	-	2.4	-
O3 (ppb) Average	711	33	33	100.00	39	0	33	-
NO2 (ppb) Average	708	36	36	100.00	30	0	11	-
NO (ppb) Average	708	36	36	100.00	15	-	3	-
NOX (ppb) Average	708	36	36	100.00	44	-	12	-
PM2.5 (ug/m3) Average	743	1	1	100.00	50.4	-	13.9	0
Temperature 2 m (C) Average	744	0	0	100.00	5.5	-	2.6	-
Relative Humidity (%) Average	744	0	0	100.00	98	-	94	-
Precipitation (mm) Total	315	0	429	42.34	0.5	-	0.9	-
Wind Speed 10 m (km/h) Average	691	0	53	92.88	28	-	13	-
Wind Direction 10 m (deg) Average	691	0	53	92.88	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
 JANUARY 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	710	3.2	5	-	0	0	0	1	4	9	31
H2S (ppb) Average	710	0.3	0	-	0	0	0	0	0	0	1
THC (ppm) Average	710	2.3	0.1	-	2.1	2.2	2.2	2.3	2.3	2.4	4.5
O3 (ppb) Average	711	25.4	8	-	1	16	20	26	32	34	39
NO2 (ppb) Average	708	5.7	5	-	0	1	2	4	9	13	30
NO (ppb) Average	708	0.8	2	-	0	0	0	0	1	2	15
NOX (ppb) Average	708	6.5	6	-	0	1	2	5	10	14	44
PM2.5 (ug/m3) Average	743	5.34	4.2	-	0.7	2.1	2.7	4.1	6.8	9.6	50.4
Temperature 2 m (C) Average	744	-12.85	10.6	-	-40	-26.1	-20.5	-14	-3.6	1.1	5.5
Relative Humidity (%) Average	744	82.9	7	-	59	73	79	83	87	92	98
Precipitation (mm) Total	315	-	-	2.54	-	-	-	-	-	-	-
Wind Speed 10 m (km/h) Average	691	6.9	4	-	0	2	4	6	9	12	28
Wind Direction 10 m (deg) Average	691	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
JANUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Precipitation Collector	05 Jan 2017 11:00	23 Jan 2017 07:00	429	DAS collection error - data not recorded
Wind Speed, Wind Direction	04 Jan 2017 23:00	05 Jan 2017 00:00	2	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	06 Jan 2017 23:00	07 Jan 2017 00:00	2	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	07 Jan 2017 22:00	08 Jan 2017 02:00	5	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	09 Jan 2017 20:00	09 Jan 2017 23:00	4	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	10 Jan 2017 01:00	10 Jan 2017 01:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	10 Jan 2017 03:00	10 Jan 2017 07:00	5	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	10 Jan 2017 15:00	10 Jan 2017 16:00	2	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	22 Jan 2017 11:00	23 Jan 2017 12:00	26	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	23 Jan 2017 15:00	23 Jan 2017 20:00	6	Flat line in sensor output signal -sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

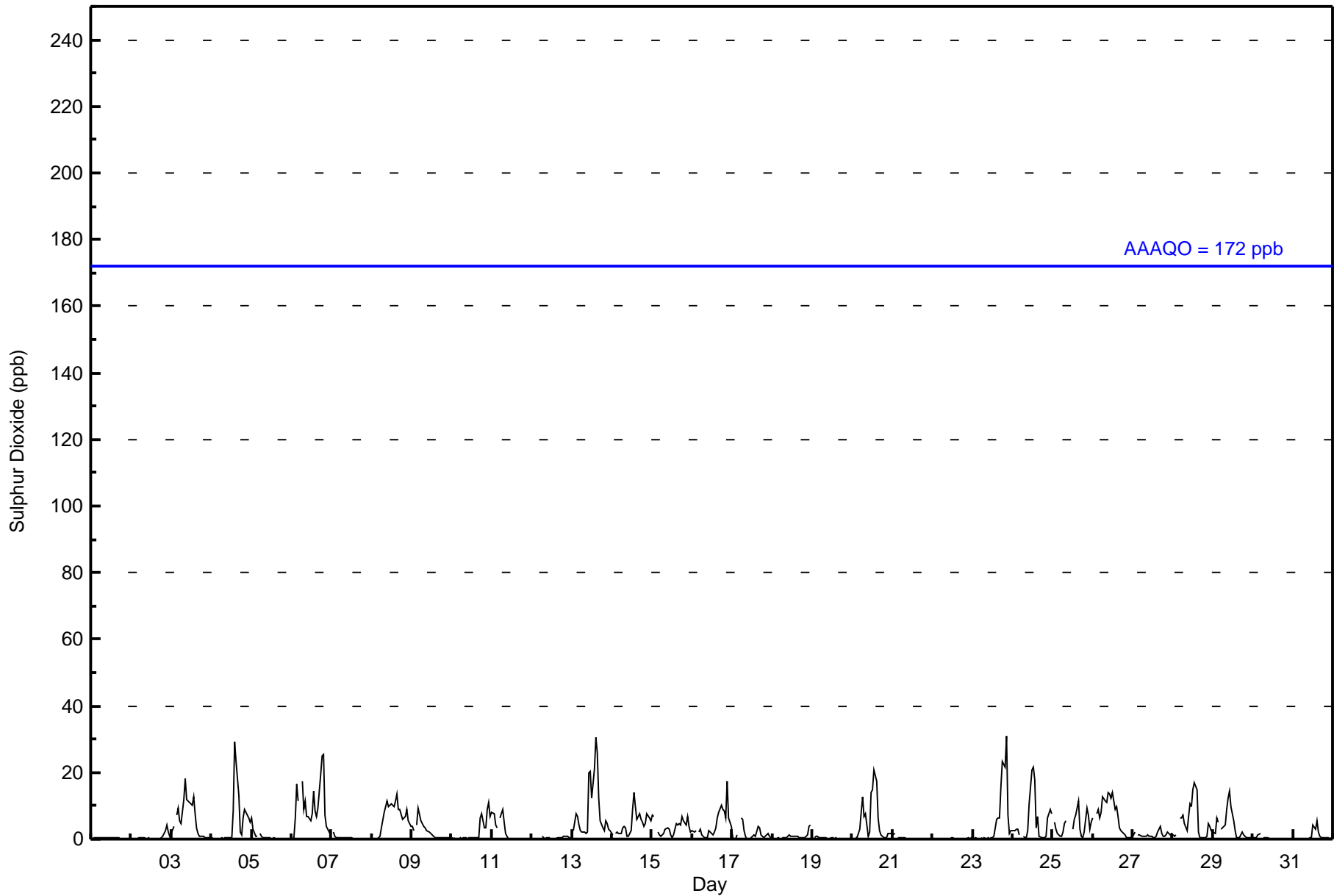
Wapasu - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 31 ppb on Jan 23 21:00										Maximum Daily Average: 9.7 ppb on Jan 6										Hours of Data: 710						
Minimum Value: 0 ppb on Jan 11 23:00										Minimum Daily Average: 0.2 ppb on Jan 22										Hours of Missing Data: 34						
Maximum Diurnal Average: 5.6 ppb at hour 15										Minimum Diurnal Average: 1.8 ppb at hour 2										Hours of Calibration: 34						
Monthly Average: 3.2 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 4 P ₉₀ = 9 P ₉₉ = 22										Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	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
2-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	4	2	1	0.6	4
3-Jan	2	4	Z	7	9	5	5	12	18	12	11	10	13	8	3	2	1	1	1	1	1	0	0	0	5.9	18
4-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	9	29	23	13	2	1	6	9	7	6	5	5.0	29	
5-Jan	6	3	1	1	Z	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	6	
6-Jan	0	0	7	17	12	Z	18	9	12	7	7	6	8	15	9	7	9	20	25	25	7	4	2	1	9.7	25
7-Jan	Z	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
8-Jan	0	Z	0	0	0	1	3	8	10	11	10	10	11	10	11	14	9	9	6	6	7	9	5	4	6.7	14
9-Jan	4	3	Z	4	9	5	5	4	3	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	2.1	9
10-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	6	8	4	3	9	11	7	2.2	11
11-Jan	8	8	4	3	Z	6	9	5	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.0	9
12-Jan	0	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	0.3	1
13-Jan	Z	2	8	7	4	2	2	2	2	2	20	20	12	21	31	26	12	5	3	3	6	5	3	2	8.7	31
14-Jan	1	Z	2	2	2	2	4	4	3	1	1	3	9	14	10	6	7	6	5	4	4	8	6	5	4.8	14
15-Jan	7	7	Z	2	1	1	1	2	3	3	3	1	1	1	5	4	5	4	7	5	4	7	4	2	3.5	7
16-Jan	3	2	2	Z	2	3	1	1	1	1	2	2	1	2	3	6	8	10	9	8	6	17	6	4	4.5	17
17-Jan	0	0	0	1	Z	6	6	2	1	0	0	0	1	1	1	4	3	1	1	0	1	2	1	0	1.5	6
18-Jan	0	0	0	0	0	Z	0	1	1	1	1	1	1	1	1	0	0	0	0	0	1	1	4	4	0.9	4
19-Jan	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
20-Jan	0	Z	0	0	3	8	13	7	8	1	2	14	15	21	18	6	3	1	1	0	1	2	1	2	5.5	21
21-Jan	1	2	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
22-Jan	0	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
23-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	6	6	7	16	23	22	31	7	2	2	5.5	31
24-Jan	3	3	3	3	1	Z	1	1	0	2	11	21	22	18	4	7	1	0	0	1	6	9	8	5.3	22	
25-Jan	Z	5	3	2	1	1	2	5	5	C	C	C	3	6	7	11	3	1	0	2	9	7	3	5	4.1	11
26-Jan	7	Z	8	9	6	8	13	11	11	14	13	12	14	9	10	7	3	3	2	1	1	1	1	1	7.1	14
27-Jan	1	2	Z	1	1	1	1	1	1	1	1	1	1	0	1	2	4	2	1	1	1	2	1	2	1.3	4
28-Jan	1	1	1	Z	6	6	7	5	3	7	11	10	15	17	15	2	1	1	1	0	1	5	4	2	5.3	17
29-Jan	2	2	6	5	Z	3	4	4	9	12	14	10	5	3	1	0	0	2	1	1	1	0	0	1	3.8	14
30-Jan	1	1	1	1	2	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
31-Jan	Z	0	0	0	0	0	0	0	0	0	1	1	4	3	5	2	1	1	1	0	0	0	0	0	0.9	5
																								Diurnal Average		
																								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 (SO₂) - ppb
Wapasu - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Wapasu - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	652	91.83	91.83
11 - 20	45	6.34	98.17
21 - 60	13	1.83	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 (SO₂) - ppb
Wapasu - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	64	62	24	5	1	2	15	56	142	74	97	21	4	5	3	30	605
11 - 20	0	0	0	0	0	0	0	8	18	12	6	0	0	0	0	0	44
21 - 60	0	0	0	0	0	0	0	1	5	3	2	0	0	0	0	0	11
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
Totals	64	62	24	5	1	2	15	65	165	89	105	21	4	5	3	30	660

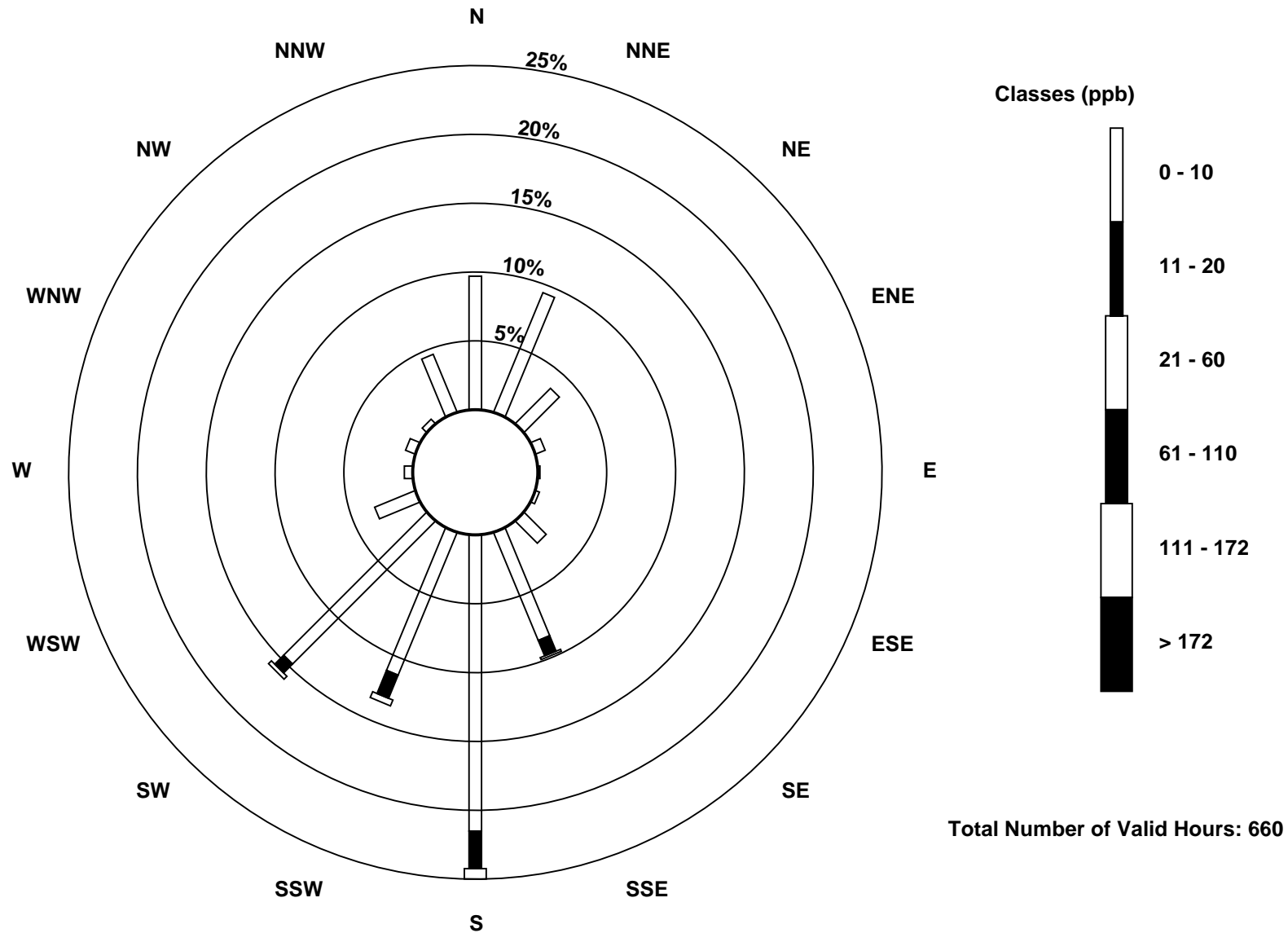
Total Number of Valid Hours: 660

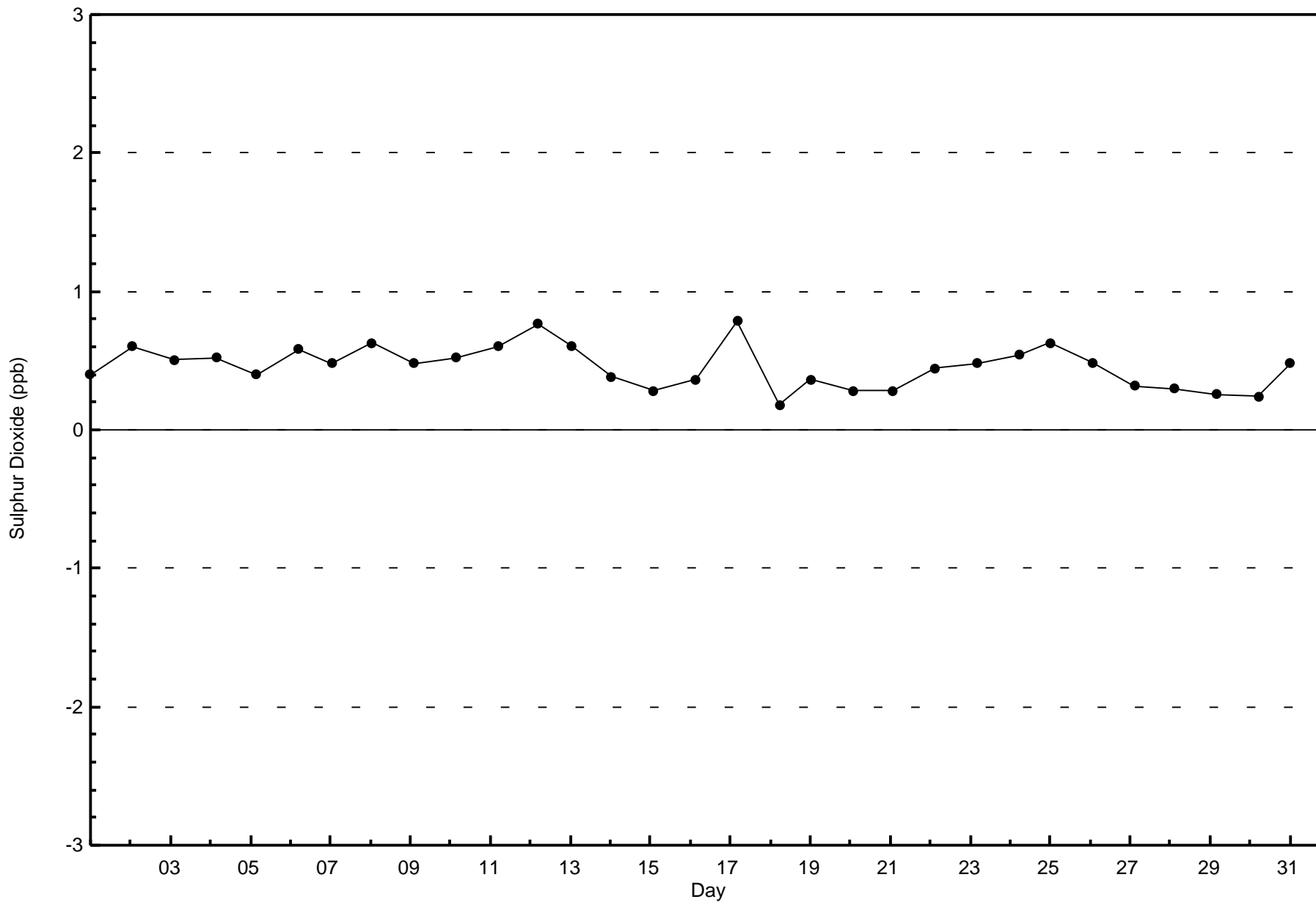
Total Number of Hours: 744

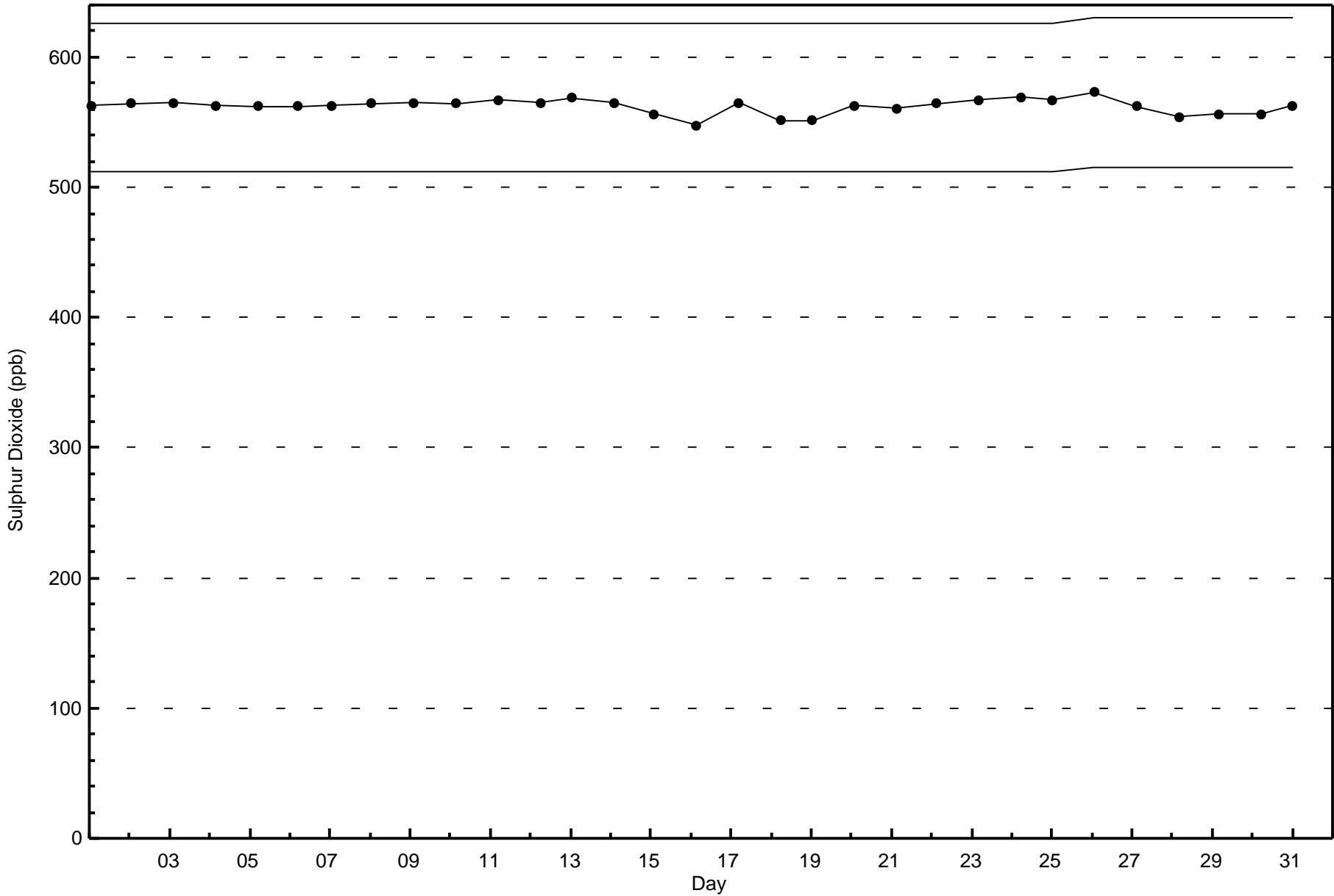


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Sulphur Dioxide (SO₂) - ppb
Wapasu (AMS 17)







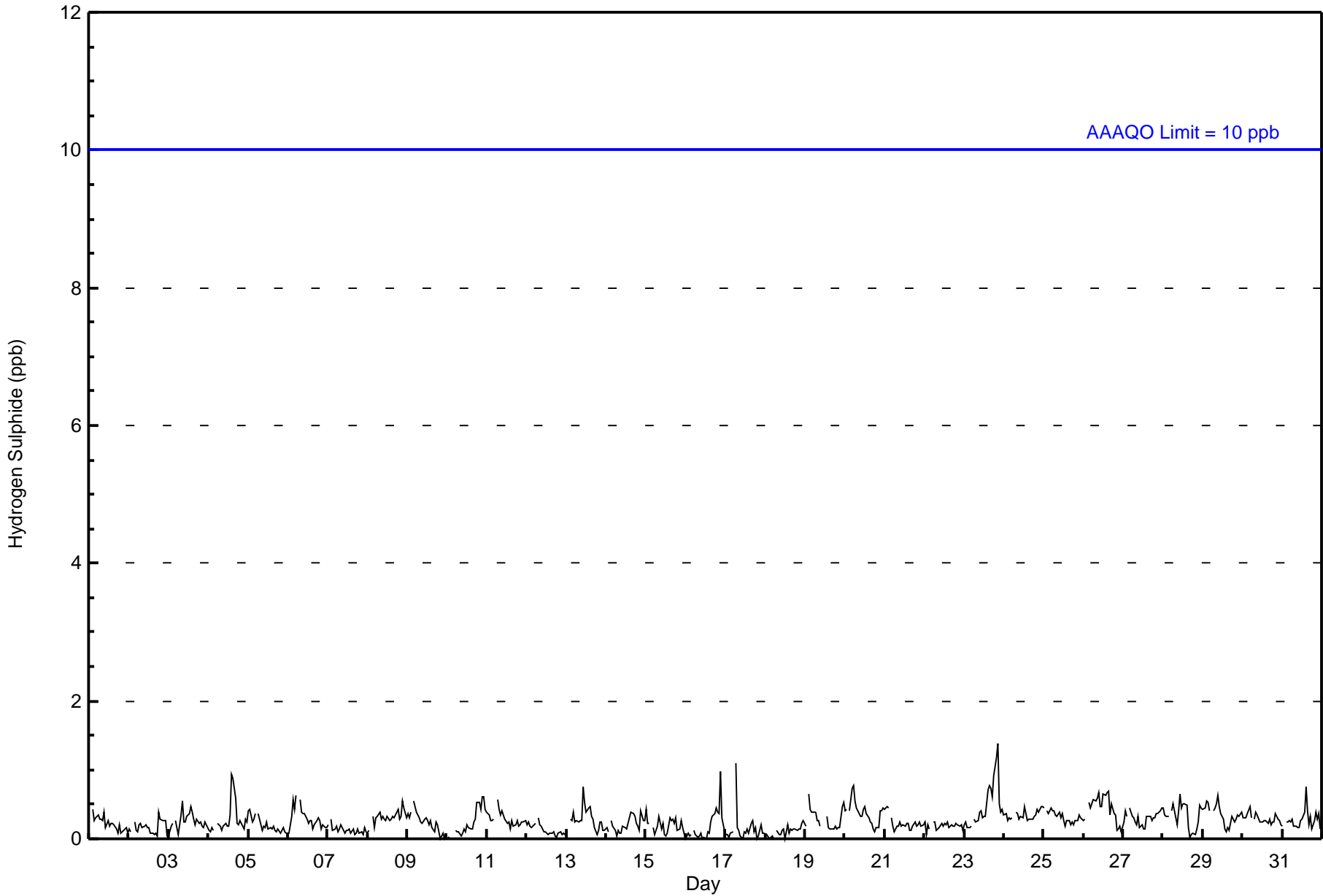


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 1 ppb on Jan 23 21:00 Maximum Daily Average: 0.5 ppb on Jan 23																	Hours in Service: 744 Hours of Data: 710																															
Minimum Value: 0 ppb on Jan 9 23:00 Minimum Daily Average: 0.1 ppb on Jan 18 Maximum Diurnal Average: 0.3 ppb at hour 7 Minimum Diurnal Average: 0.2 ppb at hour 18 Monthly Average: 0.3 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1																	Hours of Missing Data: 34 Hours of Calibration: 34 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-Jan	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																						
2-Jan	0	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																						
3-Jan	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
4-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0.3	1																						
5-Jan	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																						
6-Jan	0	0	0	1	0	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
7-Jan	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																						
8-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.3	1																						
9-Jan	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
10-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0.2	1																						
11-Jan	0	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
12-Jan	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																						
13-Jan	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
14-Jan	0	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																						
15-Jan	0	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																						
16-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	1																						
17-Jan	0	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																						
18-Jan	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																						
19-Jan	0	Z	1	0	0	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	1	0.3	1																						
20-Jan	0	0	Z	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																						
21-Jan	0	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																						
22-Jan	0	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																						
23-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0.5	1																						
24-Jan	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																						
25-Jan	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																						
26-Jan	0	0	Z	1	0	1	1	1	1	1	0	0	1	1	1	1	0	1	0	0	0	0	0	0	0.4	1																						
27-Jan	0	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																						
28-Jan	0	0	0	0	Z	0	1	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1																						
29-Jan	0	0	1	1	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																						
30-Jan	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																						
31-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.3	1																						
																								0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.3	0.2	0.3	0.3	0.3	0.2	Diurnal Average
																								0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Diurnal Maximum
Z - zerospan C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																																																



Wood Buffalo Environmental Association
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Wapasu - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Wapasu - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
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 (H₂S) - ppb
Wapasu - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	64	59	24	4	1	2	15	66	165	93	104	20	4	5	3	30	659
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
Totals	64	59	24	4	1	2	15	66	165	93	104	20	4	5	3	30	659

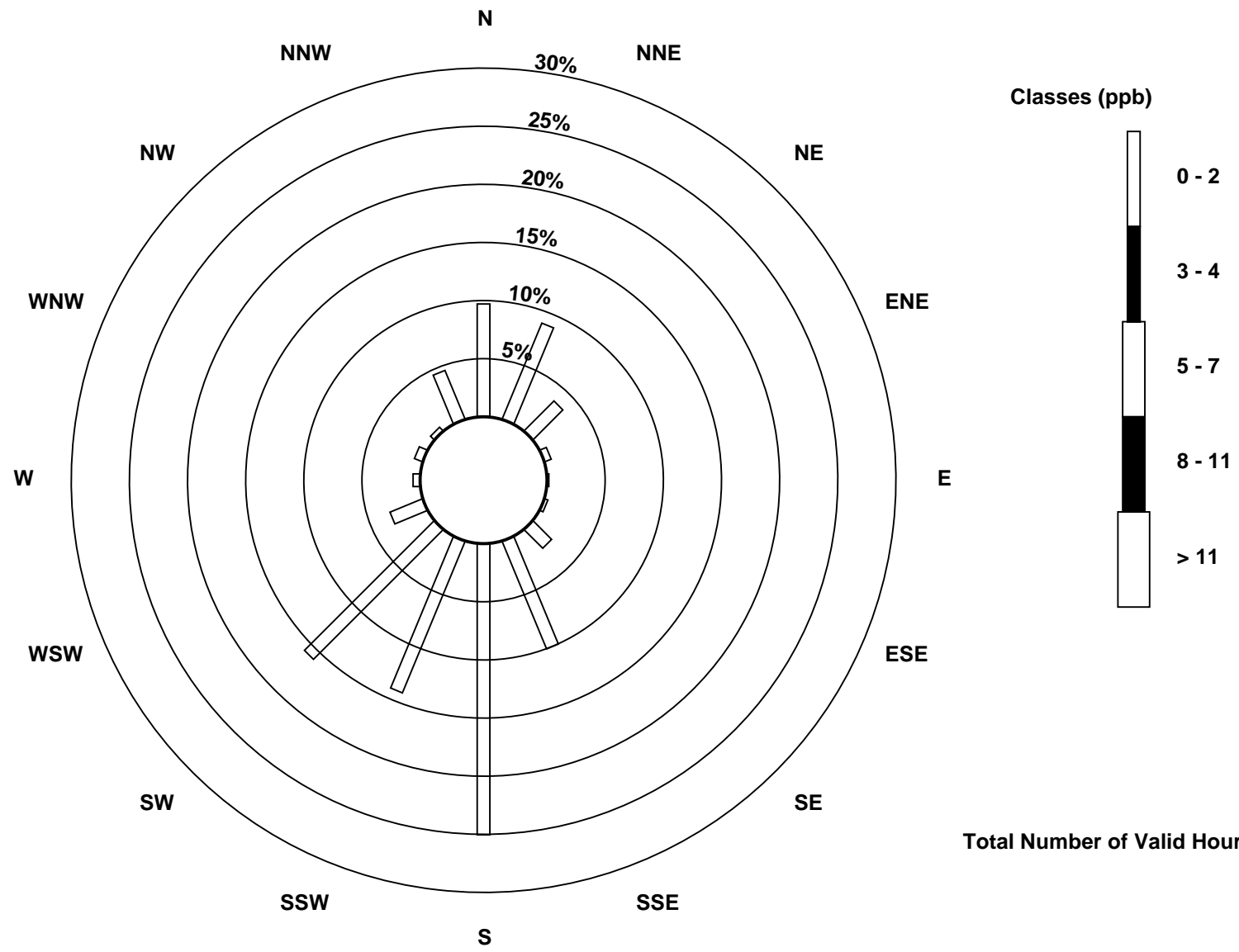
Total Number of Valid Hours: 659

Total Number of Hours: 744

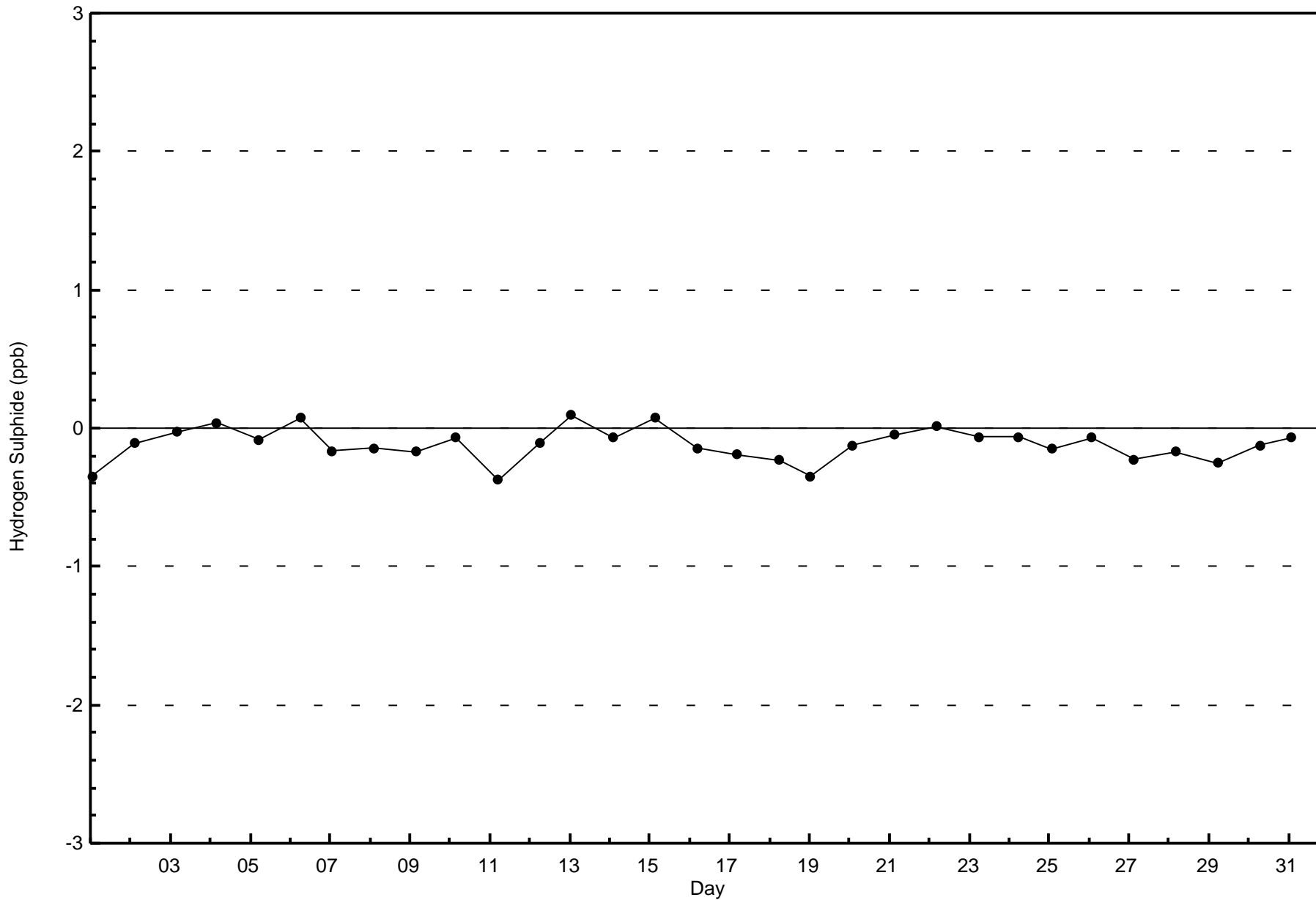


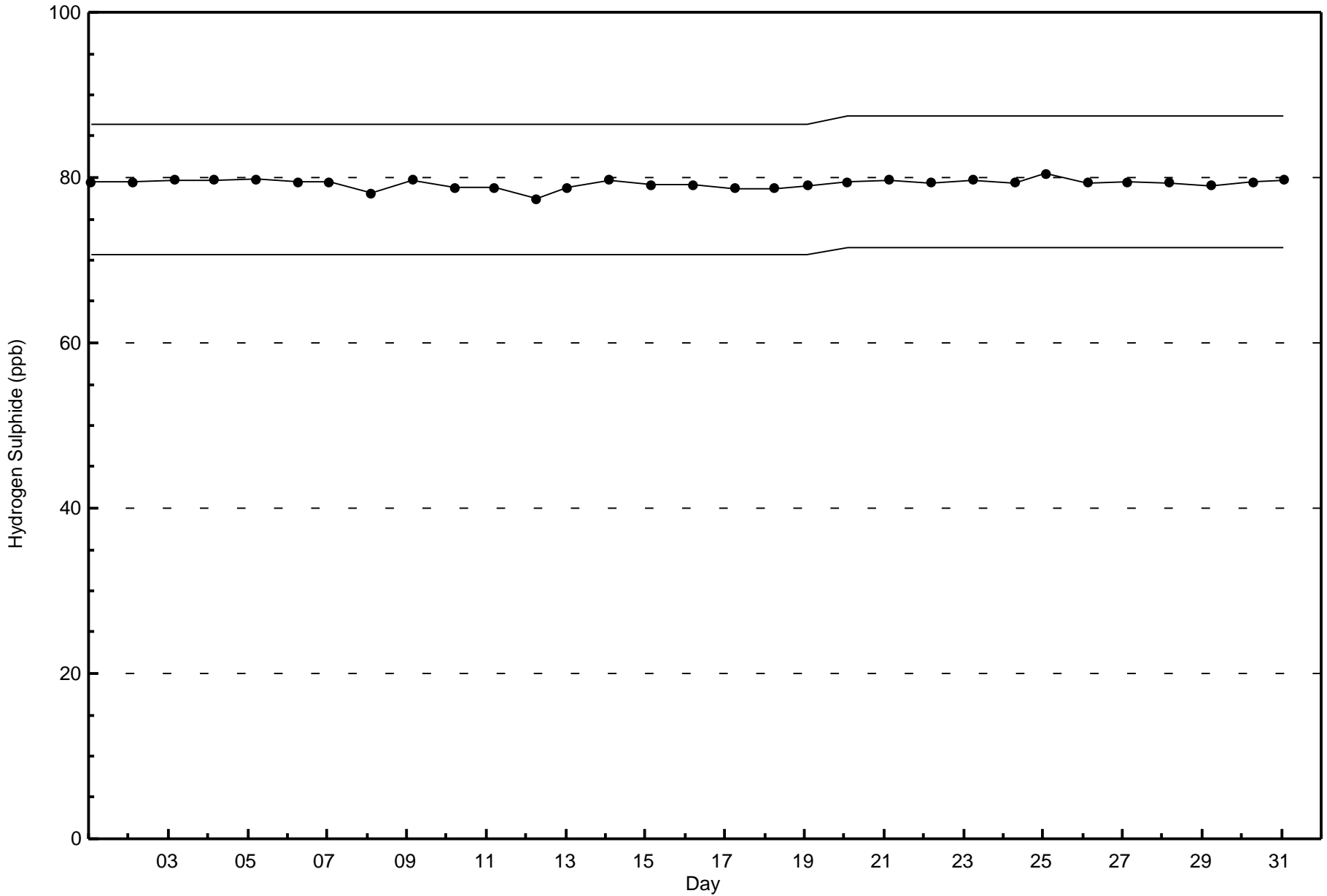
Wood Buffalo Environmental Association
Wind Rose Jan 2017

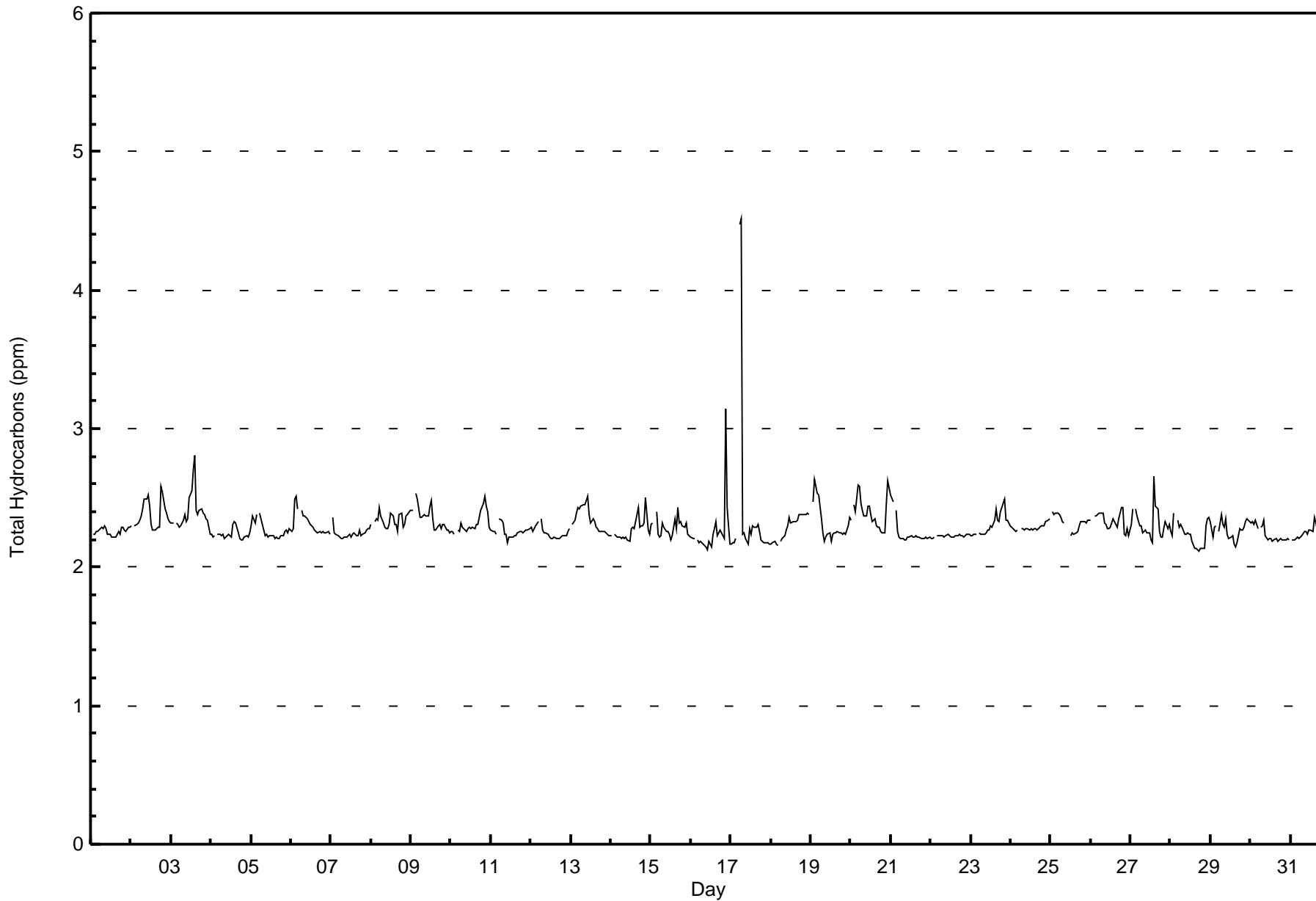
Hydrogen Sulphide (H₂S) - ppb
Wapasu (AMS 17)



Total Number of Valid Hours: 659









Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Wapasu - January 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	707	99.58	99.58
3.1 - 10.0	3	0.42	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Total Hydrocarbons (THC) - ppm
Wapasu - January 2017**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	64	62	24	5	1	2	15	65	165	89	102	21	4	5	3	30	657
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	64	62	24	5	1	2	15	65	165	89	105	21	4	5	3	30	660

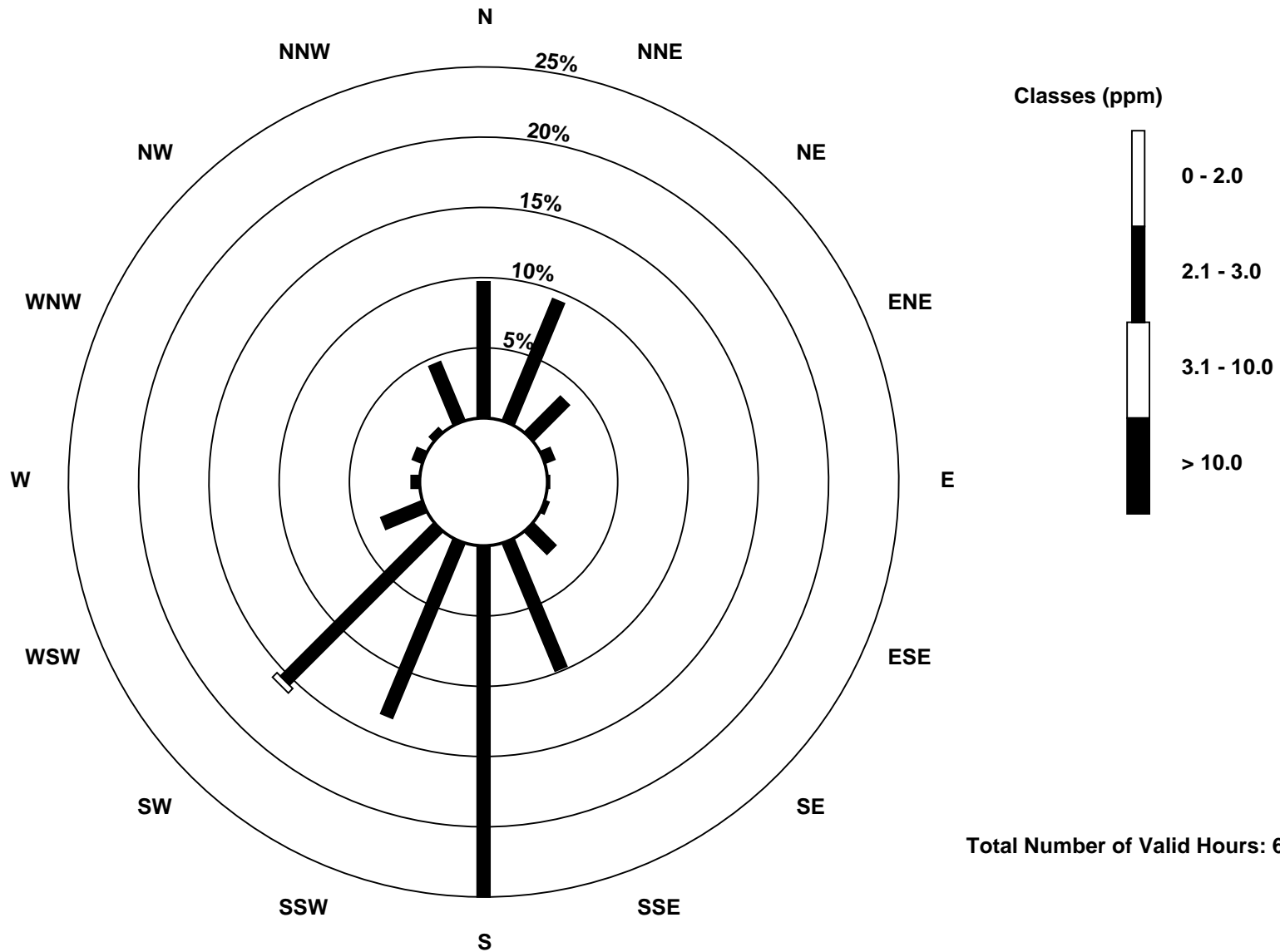
Total Number of Valid Hours: 660

Total Number of Hours: 744

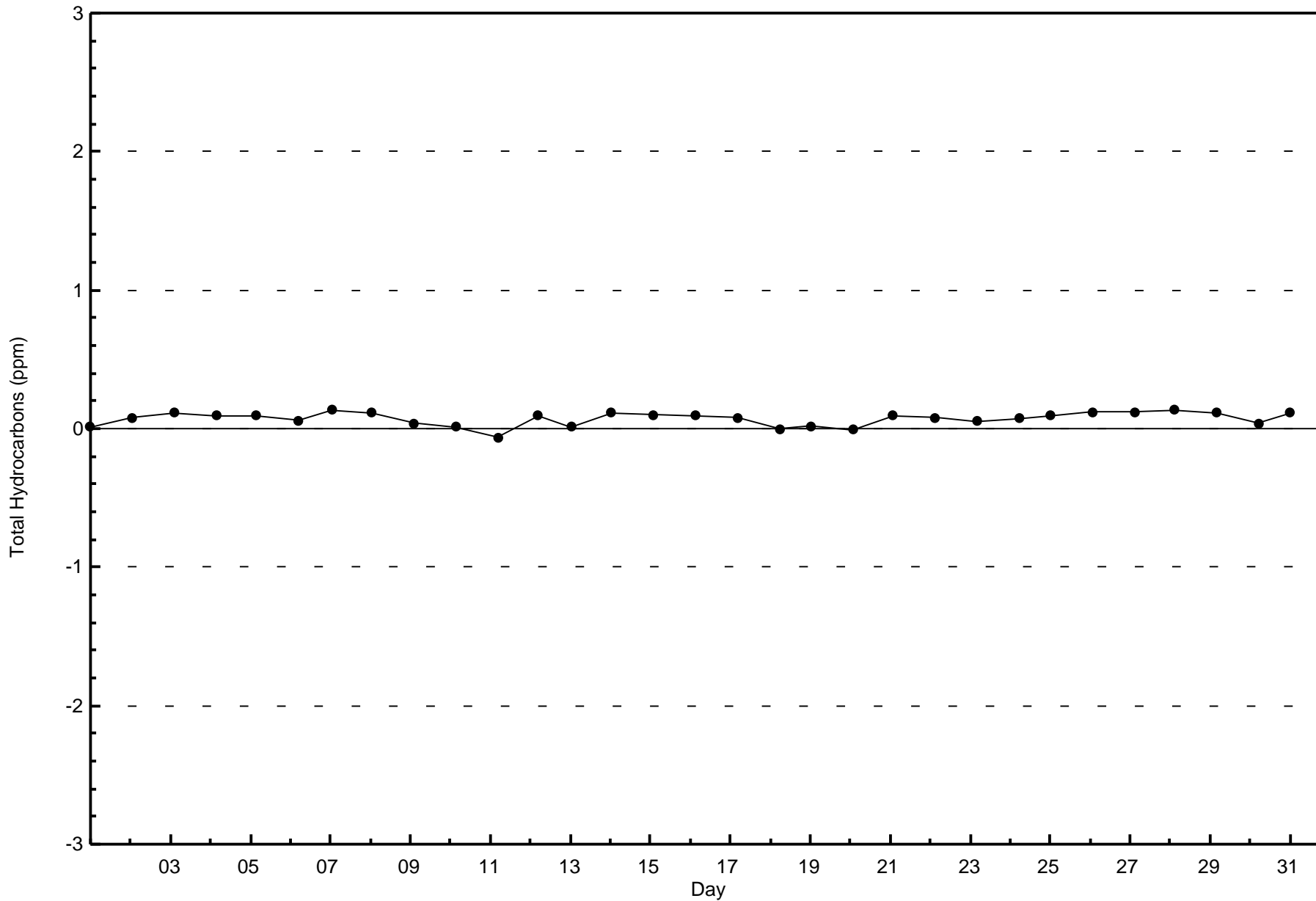


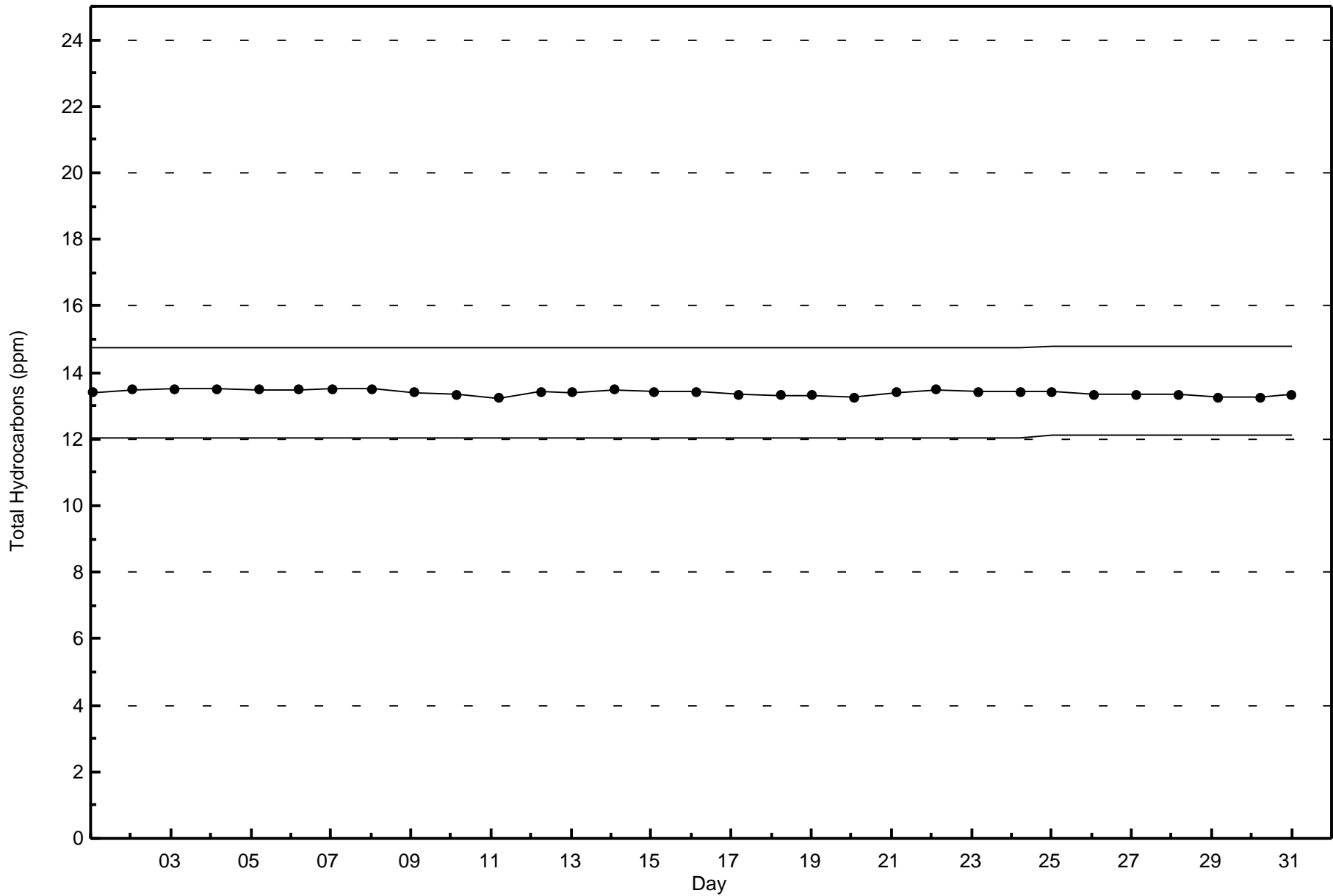
Wood Buffalo Environmental Association
Wind Rose Jan 2017

Total Hydrocarbons (THC) - ppm
Wapasu (AMS 17)



Total Number of Valid Hours: 660







Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

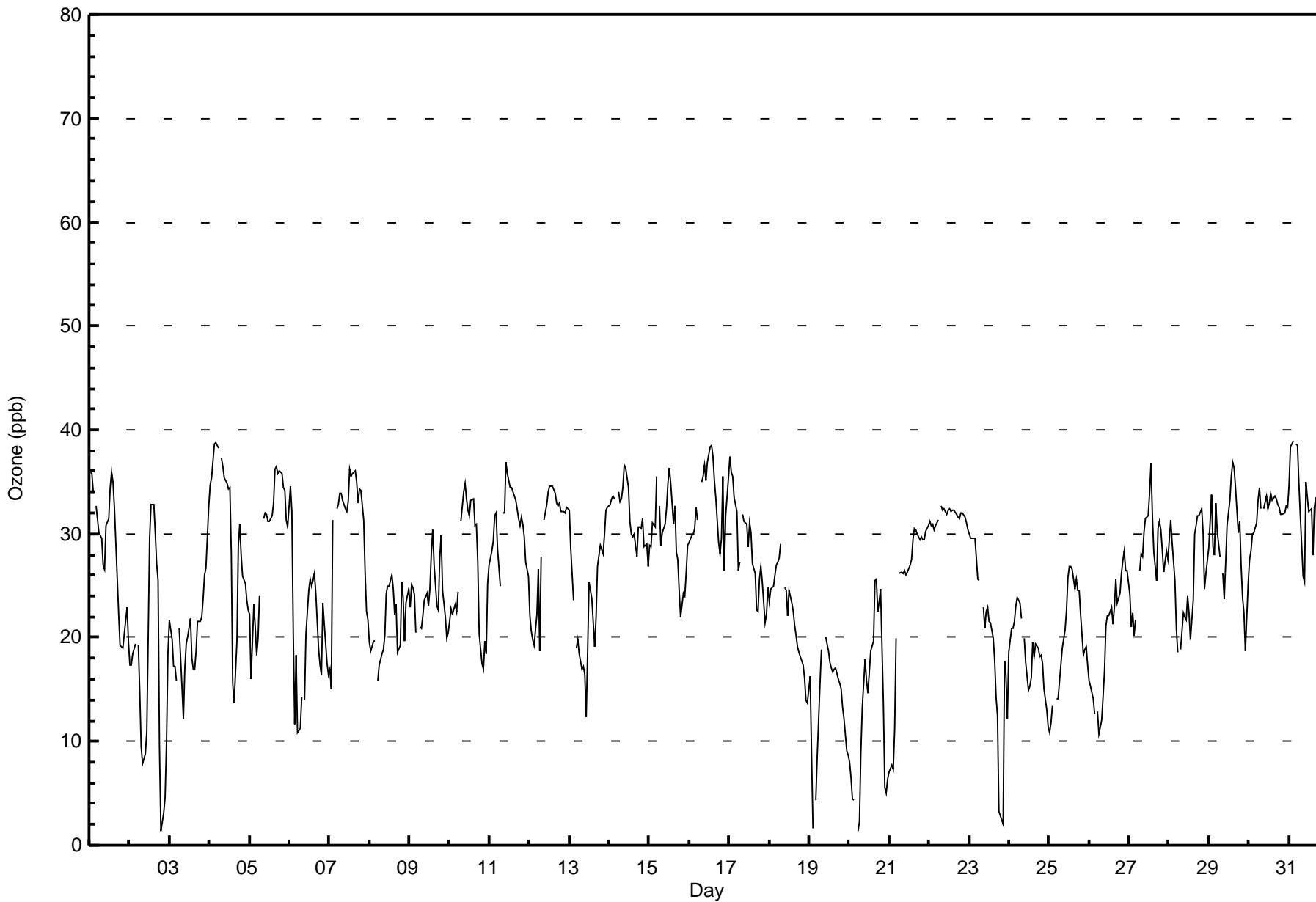
Wapasu - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 39 ppb on Jan 31 03:00										Maximum Daily Average: 33.1 ppb on Jan 16										Hours of Data: 711						
Minimum Value: 1 ppb on Jan 20 06:00										Minimum Daily Average: 13.3 ppb on Jan 20										Hours of Missing Data: 33						
Maximum Diurnal Average: 28.6 ppb at hour 14										Minimum Diurnal Average: 23.0 ppb at hour 23										Hours of Calibration: 33						
Monthly Average: 25.4 ppb										Percentiles: P ₁ = 3 P ₁₀ = 16 Q ₁ = 20 Median = 26 Q ₃ = 32 P ₉₀ = 34 P ₉₉ = 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-Jan	36	36	34	Z	33	30	30	30	27	27	31	31	34	36	35	33	26	22	19	19	19	20	23	19	28.2	36
2-Jan	17	17	18	19	Z	19	15	10	8	9	11	20	30	33	33	30	27	25	9	1	3	5	10	18	16.9	33
3-Jan	22	20	17	17	16	Z	21	15	12	17	19	20	22	18	17	17	19	22	22	22	24	26	27	33	20.1	33
4-Jan	35	35	37	39	39	38	Z	37	36	35	35	34	34	28	16	14	20	29	31	28	26	25	24	23	30.3	39
5-Jan	22	16	23	21	18	20	24	Z	31	32	32	31	31	32	33	36	36	36	36	36	34	34	31	31	29.5	36
6-Jan	35	32	20	12	18	11	11	14	Z	14	20	25	26	25	25	26	24	19	17	16	23	21	17	16	20.4	35
7-Jan	17	15	31	Z	32	33	34	34	33	32	32	33	36	36	36	36	35	33	34	34	31	26	23	22	30.8	36
8-Jan	20	19	20	20	Z	16	17	18	19	20	24	25	25	26	25	22	23	19	19	25	24	20	23	25	21.4	26
9-Jan	23	25	25	24	20	Z	21	21	22	24	24	23	25	28	30	27	23	23	28	30	24	22	20	21	24.0	30
10-Jan	22	23	22	23	23	24	Z	31	34	35	33	32	32	33	33	31	31	27	20	17	17	20	18	25	26.4	35
11-Jan	27	28	29	32	32	29	25	Z	32	32	37	36	34	34	34	34	33	32	31	32	31	30	27	26	31.1	37
12-Jan	22	21	20	19	22	27	19	28	Z	31	33	34	35	35	35	34	33	33	33	32	32	32	33	32	29.2	35
13-Jan	32	29	24	Z	19	20	18	17	17	16	12	19	25	24	21	19	22	27	29	28	28	30	32	32	23.6	32
14-Jan	33	33	34	33	Z	34	33	33	34	37	36	35	31	30	30	30	28	31	31	30	31	29	29	27	31.8	37
15-Jan	29	29	31	31	36	Z	33	29	30	31	32	35	36	35	31	33	28	28	24	22	24	24	26	29	29.8	36
16-Jan	29	30	30	31	33	31	Z	35	36	37	35	37	38	39	37	35	34	29	28	30	36	26	32	35	33.1	39
17-Jan	37	36	35	33	32	26	27	Z	32	31	31	29	31	30	27	26	23	22	26	27	25	21	22	25	28.5	37
18-Jan	24	25	25	26	27	27	28	29	Z	25	25	22	25	23	22	21	20	19	19	18	17	16	14	14	22.2	29
19-Jan	16	9	2	Z	4	9	16	19	C	C	20	19	18	17	17	17	17	16	16	15	13	12	9	9	13.7	20
20-Jan	8	7	5	4	Z	1	2	9	13	18	16	15	17	19	20	25	26	23	23	25	14	5	5	6	13.3	26
21-Jan	7	8	7	11	20	Z	26	26	26	26	26	26	27	28	29	31	30	30	29	30	29	29	30	31	24.6	31
22-Jan	31	31	31	30	31	31	Z	33	32	32	32	32	32	32	32	32	32	32	31	32	32	32	31	30	31.7	33
23-Jan	30	30	30	30	28	26	26	Z	23	21	22	23	22	21	20	18	14	12	3	2	2	18	16	12	19.5	30
24-Jan	19	21	21	22	23	24	23	22	Z	20	18	15	15	16	20	18	19	19	18	18	18	15	13	11	18.6	24
25-Jan	11	12	13	Z	14	14	16	17	19	21	23	26	27	27	27	25	26	25	24	22	18	19	19	17	20.0	27
26-Jan	16	15	14	13	Z	13	11	12	14	17	21	22	22	23	21	23	26	23	24	26	27	28	26	26	20.2	28
27-Jan	24	21	22	20	22	Z	27	28	28	30	31	32	34	37	32	28	26	31	31	30	28	26	28	28	28.0	37
28-Jan	29	31	29	25	21	19	Z	19	22	22	22	24	22	20	24	30	31	32	32	32	30	25	26	27	25.9	32
29-Jan	29	34	29	28	33	30	28	Z	26	24	27	31	33	36	37	36	34	30	31	27	24	22	19	25	29.2	37
30-Jan	27	28	30	30	31	33	35	32	Z	32	34	32	33	34	33	34	33	33	33	32	32	32	33	33	32.1	35
31-Jan	35	38	39	Z	39	38	35	32	26	25	35	33	32	32	28	33	33	30	31	26	21	22	25	33	31.4	39
24.6 24.3 24.1 23.7 25.6 24.0 23.0 24.2 25.4 25.8 26.8 27.4 28.5 28.6 27.7 27.5 26.8 26.1 25.3 24.7 23.9 23.0 23.0 23.9																								Diurnal Average		
37 38 39 39 39 38 35 37 36 37 37 37 38 39 37 36 36 36 36 36 36 36 34 33 35																								Diurnal Maximum		
Z - zerospan C - Calibration																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Wapasu - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Wapasu - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	191	26.86	26.86
21 - 50	520	73.14	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 711

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Ozone (O₃) - ppb
Wapasu - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	3	14	14	3	1	2	7	23	77	25	6	3	0	1	1	0	180
21 - 50	61	47	8	2	0	0	9	44	87	70	98	15	3	4	2	30	480
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
Totals	64	61	22	5	1	2	16	67	164	95	104	18	3	5	3	30	660

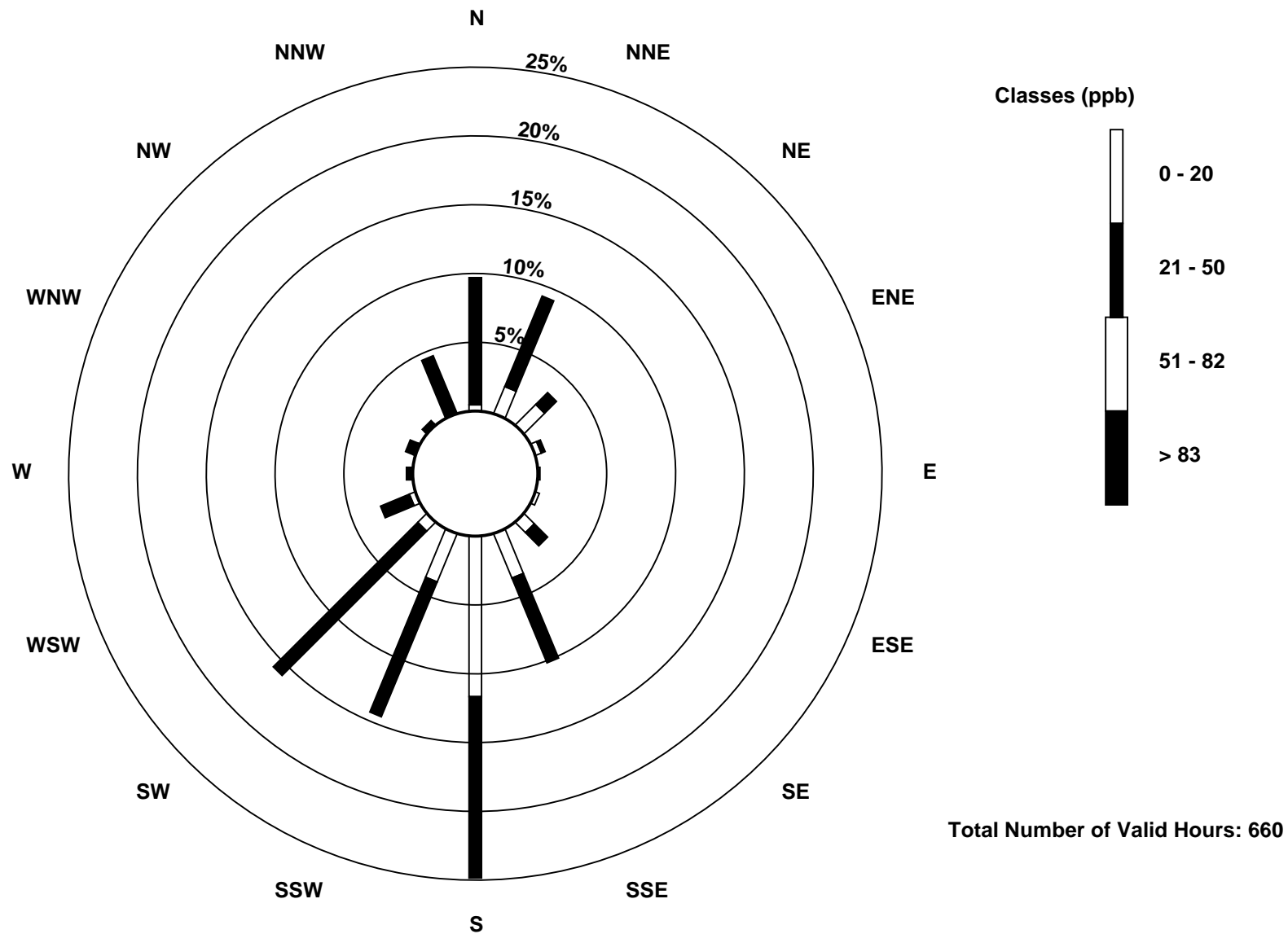
Total Number of Valid Hours: 660

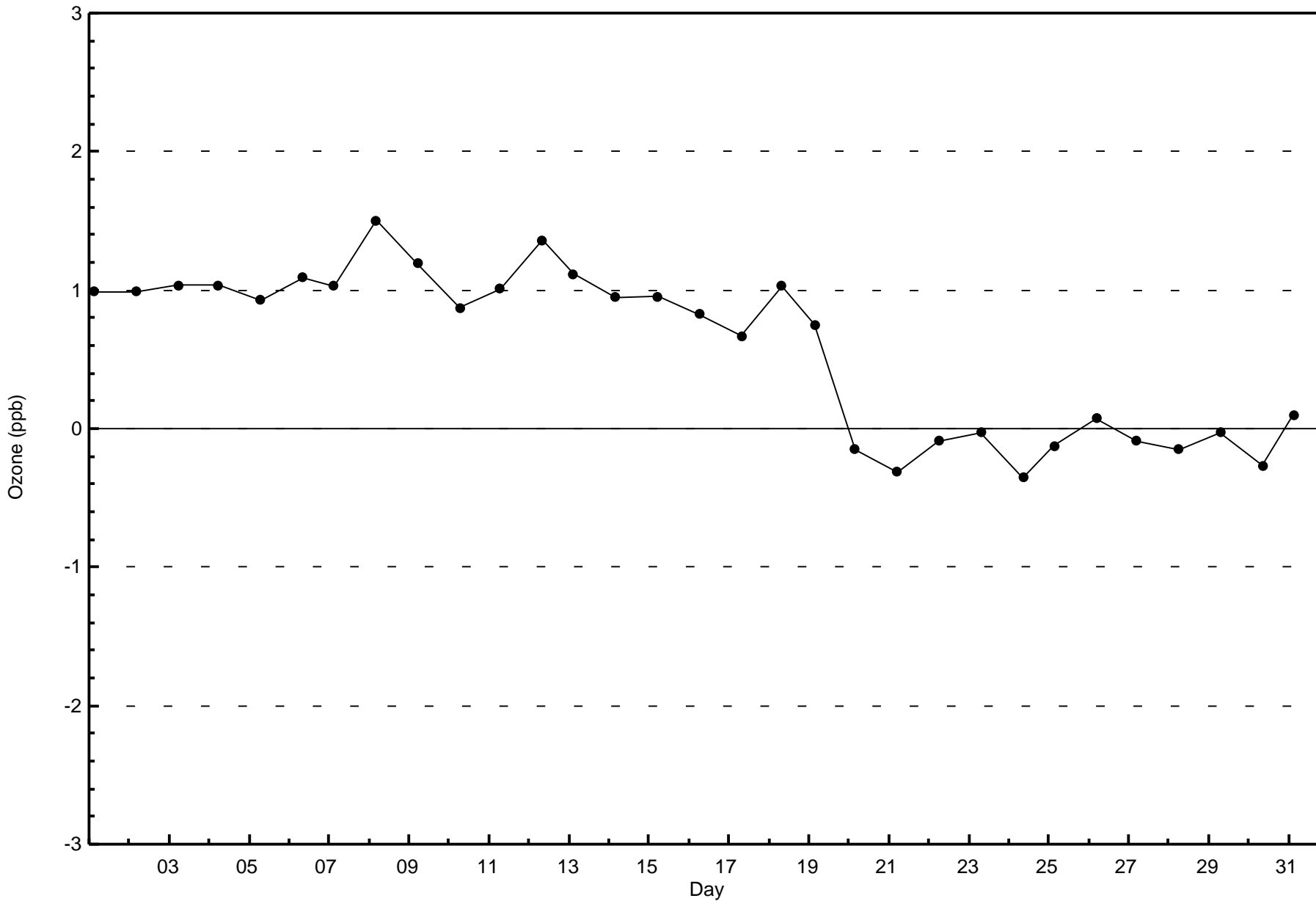
Total Number of Hours: 744

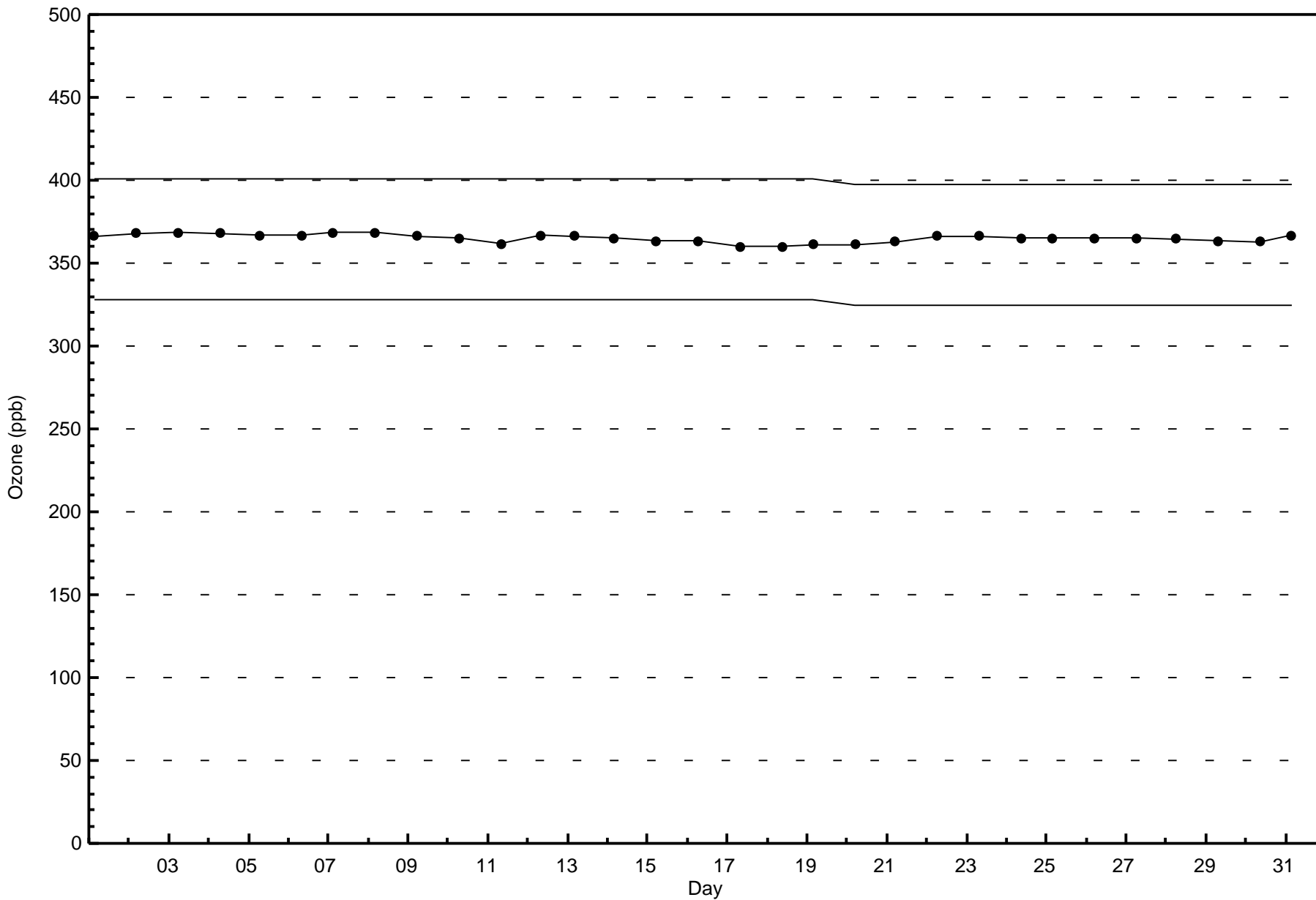


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Ozone (O₃) - ppb
Wapasu (AMS 17)









Wood Buffalo Environmental Association
Summary of Hour Averages

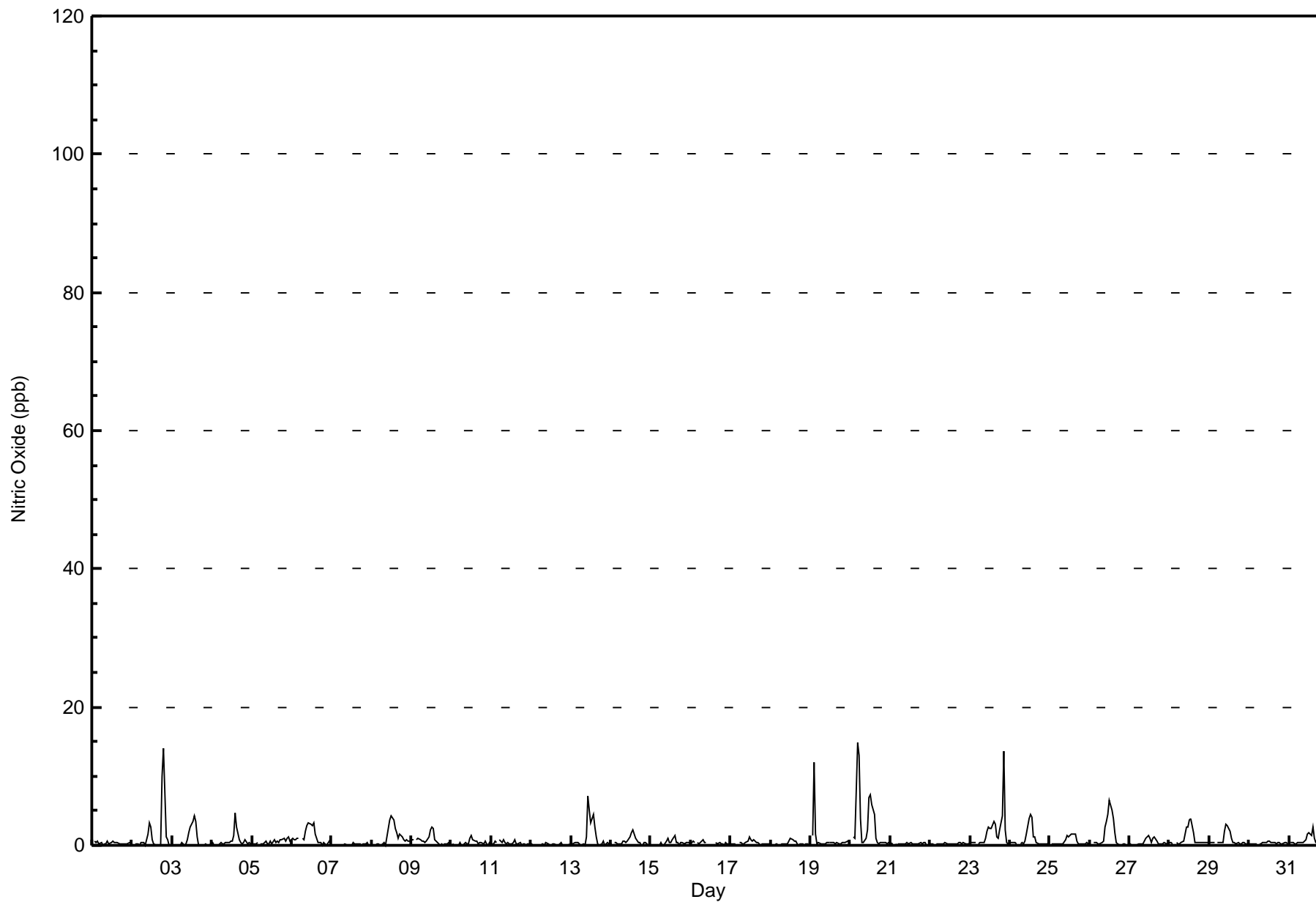
Nitric Oxide (NO) - ppb
Wapasu - January 2017

Maximum Value: 15 ppb on Jan 20 05:00		Maximum Daily Average: 2.9 ppb on Jan 20		Hours in Service: 744																						
Minimum Value: 0 ppb on Jan 1 07:00		Minimum Daily Average: 0.1 ppb on Jan 7		Hours of Data: 708																						
Maximum Diurnal Average: 1.9 ppb at hour 13		Minimum Diurnal Average: 0.2 ppb at hour 24		Hours of Missing Data: 36																						
Monthly Average: 0.8 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 6		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-Jan	Z	1	0	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
2-Jan	0	Z	0	0	0	0	0	0	0	2	3	3	1	0	0	0	0	0	10	14	1	1	0	0	1.6	14
3-Jan	0	0	Z	0	0	0	0	0	0	1	2	3	3	4	3	1	0	0	0	0	0	0	0	0	0.8	4
4-Jan	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	5	3	1	0	0	0	1	0	0	0	0.7	5
5-Jan	0	0	0	0	Z	0	0	0	1	0	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0.5	1
6-Jan	1	1	1	1	1	Z	1	1	2	3	3	3	3	3	2	1	0	0	0	0	0	0	1	0	1.2	3
7-Jan	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
8-Jan	0	Z	0	0	0	0	0	0	0	1	2	4	4	4	2	2	1	2	1	1	1	1	1	1	1.2	4
9-Jan	1	1	Z	1	1	1	1	1	0	1	1	2	3	2	1	1	0	0	0	0	0	0	0	0	0.8	3
10-Jan	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	1	0	0	0	0.4	1
11-Jan	0	0	1	0	Z	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.3	1
12-Jan	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
13-Jan	Z	0	0	0	0	0	0	0	0	1	7	5	3	4	3	1	0	0	0	1	0	0	0	0	1.3	7
14-Jan	0	Z	0	0	0	0	0	1	1	0	1	1	2	2	1	0	0	0	0	0	0	0	0	0	0.6	2
15-Jan	0	0	Z	0	0	0	0	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0.4	1
16-Jan	0	1	0	Z	0	0	0	1	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0.3	1
17-Jan	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1
18-Jan	0	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0.3	1
19-Jan	Z	1	12	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.9	12
20-Jan	0	Z	1	1	15	13	4	0	0	1	2	7	7	6	4	1	0	0	0	0	0	0	0	0	2.9	15
21-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
22-Jan	0	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
23-Jan	0	0	0	0	Z	0	0	0	0	1	2	3	2	3	3	3	1	1	2	4	14	2	0	0	2.0	14
24-Jan	0	0	0	0	0	Z	0	0	0	1	2	4	4	4	1	1	0	0	0	0	0	0	0	0	0.9	4
25-Jan	Z	0	0	0	0	0	0	0	0	1	1	1	1	2	2	2	1	0	0	0	0	0	0	0	0.6	2
26-Jan	0	Z	0	0	0	0	0	0	1	3	4	4	7	5	4	2	0	0	0	0	0	0	0	0	1.4	7
27-Jan	0	0	Z	0	0	0	0	0	0	1	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0.4	1
28-Jan	0	0	0	Z	0	0	0	0	1	2	3	3	4	4	2	0	0	0	0	0	0	0	0	0	1.0	4
29-Jan	0	0	0	0	Z	0	0	0	0	2	3	3	2	1	0	0	0	0	0	0	0	0	0	0	0.8	3
30-Jan	0	0	0	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
31-Jan	Z	0	0	0	0	0	0	0	0	1	1	2	2	1	3	1	0	0	0	0	0	0	0	0	0.7	3
		0.3	0.3	0.8	0.4	0.8	0.8	0.4	0.3	0.3	0.8	1.4	1.8	1.9	1.8	1.5	0.8	0.4	0.3	0.6	0.9	0.8	0.4	0.3	0.2	Diurnal Average
		1	1	12	2	15	13	4	1	2	3	7	7	7	6	5	3	1	2	10	14	14	2	1	1	Diurnal Maximum
Z - zerospan		C - Calibration																								



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Wapasu - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Wapasu - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
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 - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	64	62	24	5	1	2	15	65	167	85	105	21	4	5	3	30	658
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
Totals	64	62	24	5	1	2	15	65	167	85	105	21	4	5	3	30	658

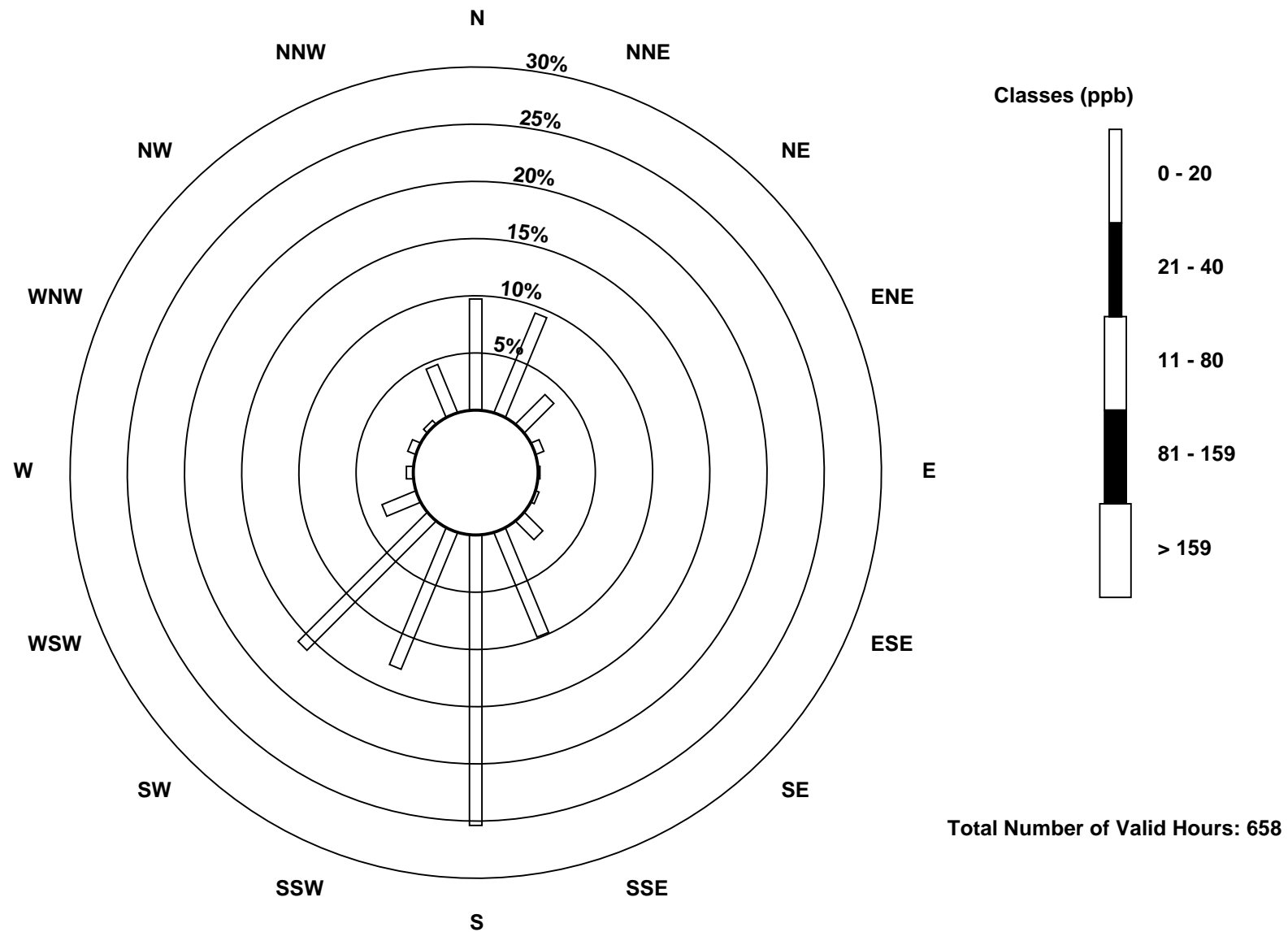
Total Number of Valid Hours: 658

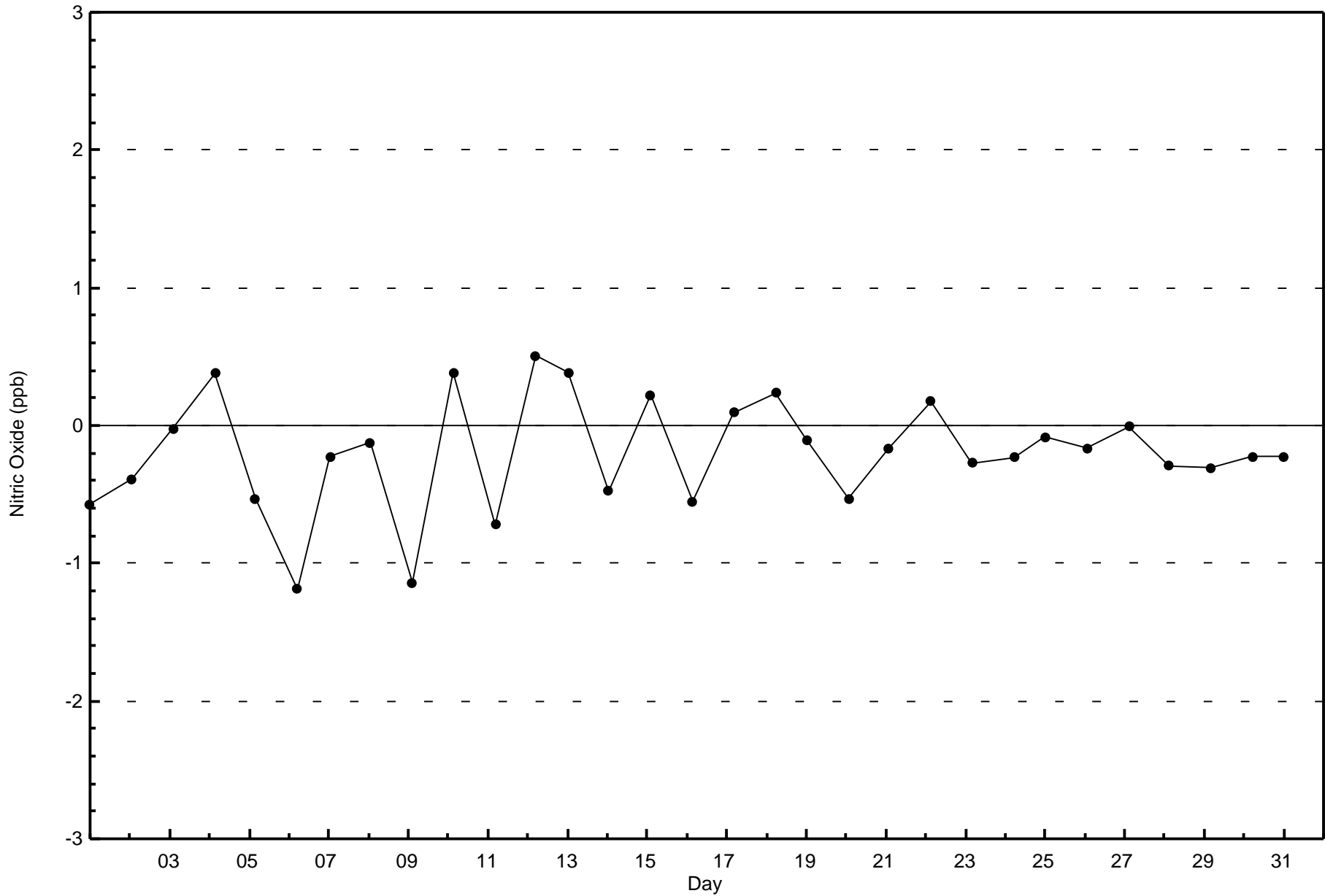
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Nitric Oxide (NO) - ppb
Wapasu (AMS 17)

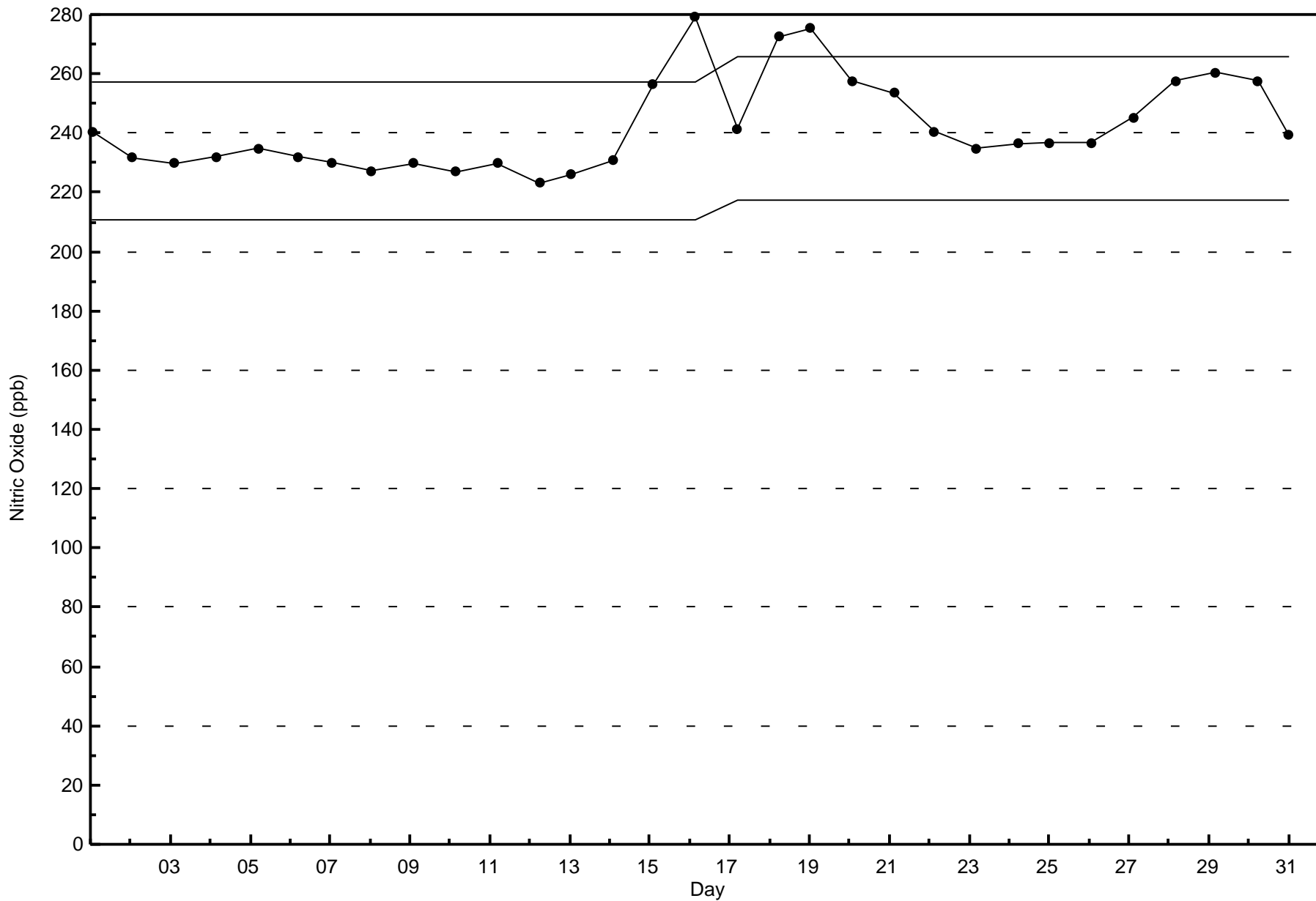






Wood Buffalo Environmental Association
Span Responses

Nitric Oxide (NO) - ppb
Wapasu - January 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Wapasu - January 2017

Number of Exceedences (AAAO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 30 ppb on Jan 2 20:00	Maximum Daily Average: 10.8 ppb on Jan 6		Hours of Data:	708
Minimum Value: 0 ppb on Jan 22 10:00	Minimum Daily Average: 0.1 ppb on Jan 22		Hours of Missing Data:	36
Maximum Diurnal Average: 7.0 ppb at hour 22	Minimum Diurnal Average: 4.6 ppb at hour 13		Hours of Calibration:	36
Monthly Average: 5.7 ppb	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 4 Q ₃ = 9 P ₉₀ = 13 P ₉₉ = 23		Percent Operational Time:	100.0

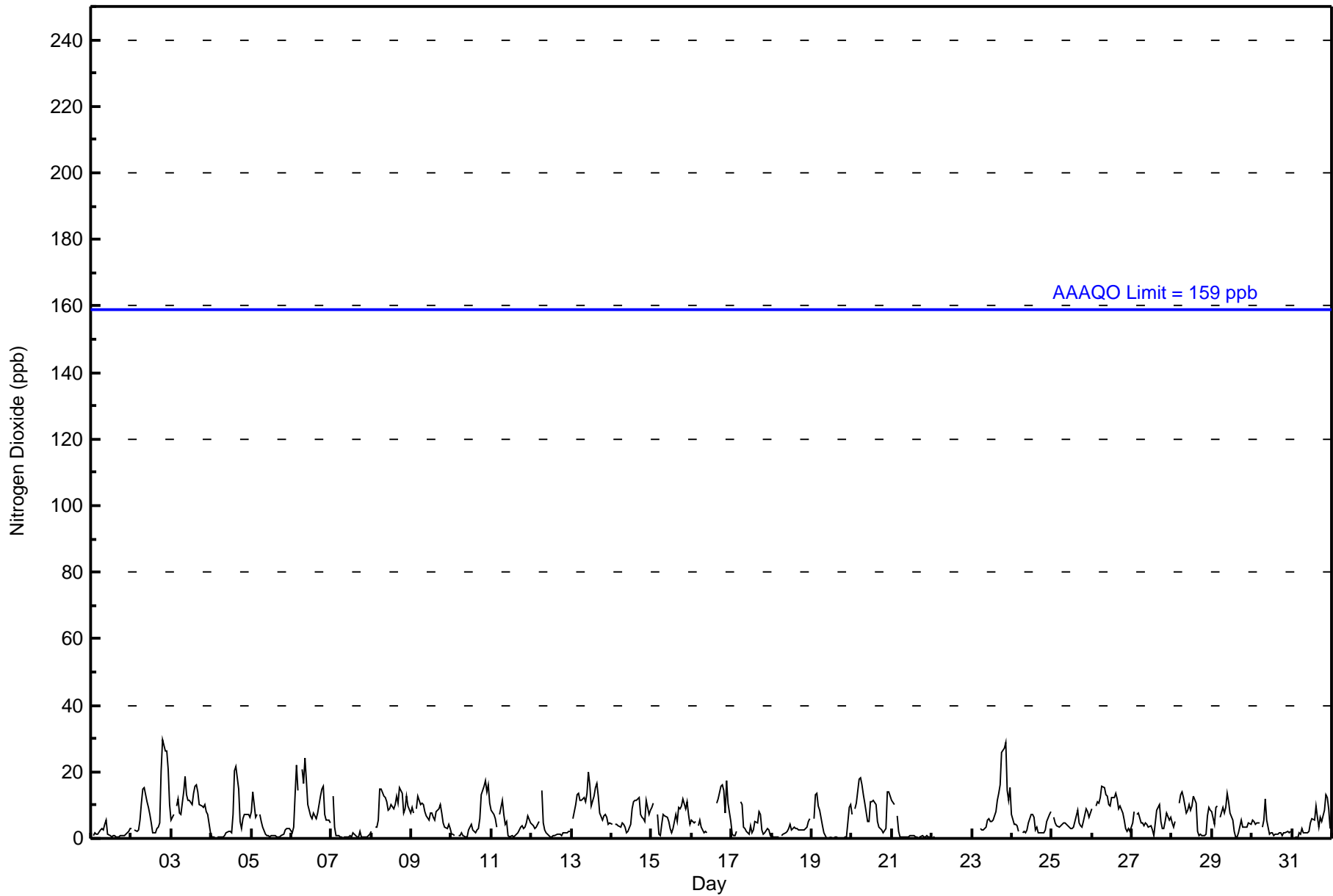
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jan	Z	1	2	1	1	3	3	3	4	5	1	1	1	1	1	0	0	1	1	1	1	1	2	3	1.6	5																							
2-Jan	3	Z	2	2	3	6	11	15	15	11	9	7	5	2	2	3	3	5	20	30	26	26	21	10	10.3	30																							
3-Jan	6	7	Z	10	12	8	7	14	19	13	12	11	10	14	16	16	14	10	10	9	10	8	7	2	10.6	19																							
4-Jan	0	0	0	Z	0	0	1	1	1	2	2	2	2	7	21	22	15	5	3	6	7	7	7	6	5.1	22																							
5-Jan	8	14	6	7	Z	7	5	4	1	1	1	1	1	1	1	0	0	1	1	3	3	3	3	3	3.1	14																							
6-Jan	2	4	13	22	14	Z	21	16	24	17	10	7	6	8	7	6	8	13	15	16	7	6	5	5	10.8	24																							
7-Jan	Z	13	4	1	1	1	1	0	0	1	1	1	1	2	1	1	1	2	1	1	1	1	1	1	1.4	13																							
8-Jan	2	Z	4	3	5	15	15	13	12	11	9	9	10	9	10	13	10	15	14	8	9	13	10	8	9.8	15																							
9-Jan	10	8	Z	9	13	10	11	10	8	7	6	8	8	6	5	8	9	10	8	5	4	3	4	3	7.4	13																							
10-Jan	1	1	1	Z	1	1	2	1	0	1	3	3	4	2	2	3	3	6	13	16	17	14	16	11	5.2	17																							
11-Jan	9	7	6	4	Z	7	11	7	4	5	1	0	1	1	1	2	3	4	3	4	5	7	5	5	4.2	11																							
12-Jan	4	4	3	4	5	Z	14	5	3	2	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2.6	14																							
13-Jan	Z	6	10	13	13	11	12	12	11	14	20	16	10	13	15	17	13	8	6	7	7	6	4	5	10.7	20																							
14-Jan	4	Z	4	4	4	4	5	4	3	2	2	4	9	11	12	11	12	7	7	6	5	12	7	8	6.4	12																							
15-Jan	9	11	Z	7	1	1	4	7	7	6	5	3	2	3	7	5	9	9	10	12	9	11	7	4	6.5	12																							
16-Jan	5	5	5	Z	4	5	3	2	2	2	C	C	C	C	C	11	12	16	16	15	8	17	11	5	7.9	17																							
17-Jan	1	1	1	2	Z	11	10	3	3	2	1	4	2	2	5	5	8	7	3	1	2	3	3	1	3.5	11																							
18-Jan	1	1	1	1	1	Z	1	1	2	2	3	4	3	3	3	3	3	3	3	3	3	3	5	6	2.4	6																							
19-Jan	Z	6	13	14	10	9	4	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10	3.5	14																							
20-Jan	7	Z	9	11	18	18	16	13	11	Z	5	5	11	11	11	10	5	3	3	3	2	3	14	13	9.4	18																							
21-Jan	12	10	Z	7	2	1	1	1	0	0	0	1	1	1	1	0	0	0	1	0	1	1	0	0	1.7	12																							
22-Jan	0	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																							
23-Jan	0	0	0	0	Z	3	3	2	4	6	6	5	5	6	8	11	14	16	26	27	29	14	12	15	9.2	29																							
24-Jan	7	4	4	4	2	Z	2	2	2	3	5	7	7	6	2	4	2	2	2	2	2	5	7	8	4.0	8																							
25-Jan	Z	6	5	4	3	4	4	5	5	4	4	3	3	4	5	8	5	4	4	5	9	8	7	8	5.0	9																							
26-Jan	9	Z	10	11	11	12	16	15	13	13	10	10	12	12	14	12	9	10	8	5	3	2	3	2	9.6	16																							
27-Jan	5	8	Z	7	8	5	5	4	5	4	3	4	3	1	5	8	10	5	3	3	5	8	6	6	5.2	10																							
28-Jan	5	3	5	Z	11	13	14	12	8	8	10	8	10	13	10	2	1	1	1	1	1	7	9	8	7.0	14																							
29-Jan	8	4	9	10	Z	6	9	8	9	13	11	8	5	2	0	1	2	6	3	3	3	3	5	4	5.8	13																							
30-Jan	6	5	4	5	5	Z	3	5	12	5	1	2	2	1	1	1	2	2	1	2	2	2	2	2	3.1	12																							
31-Jan	Z	0	0	0	2	1	3	2	2	2	2	5	6	6	10	6	4	6	5	9	13	12	9	3	4.6	13																							
																								4.9	4.9	4.7	6.2	5.7	6.2	6.9	6.1	6.1	5.4	4.8	4.8	4.6	4.9	5.8	5.9	5.6	5.7	6.1	6.4	6.3	7.0	6.6	5.4	Diurnal Average	
																								12	14	13	22	18	18	21	16	24	17	20	16	12	14	21	22	15	16	26	30	29	26	21	15	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Wapasu - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Wapasu - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	696	98.31	98.31
21 - 40	12	1.69	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 (NO₂) - ppb
Wapasu - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	64	62	24	5	1	2	15	62	163	82	105	21	4	5	3	30	648
21 - 40	0	0	0	0	0	0	0	3	4	3	0	0	0	0	0	0	10
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
Totals	64	62	24	5	1	2	15	65	167	85	105	21	4	5	3	30	658

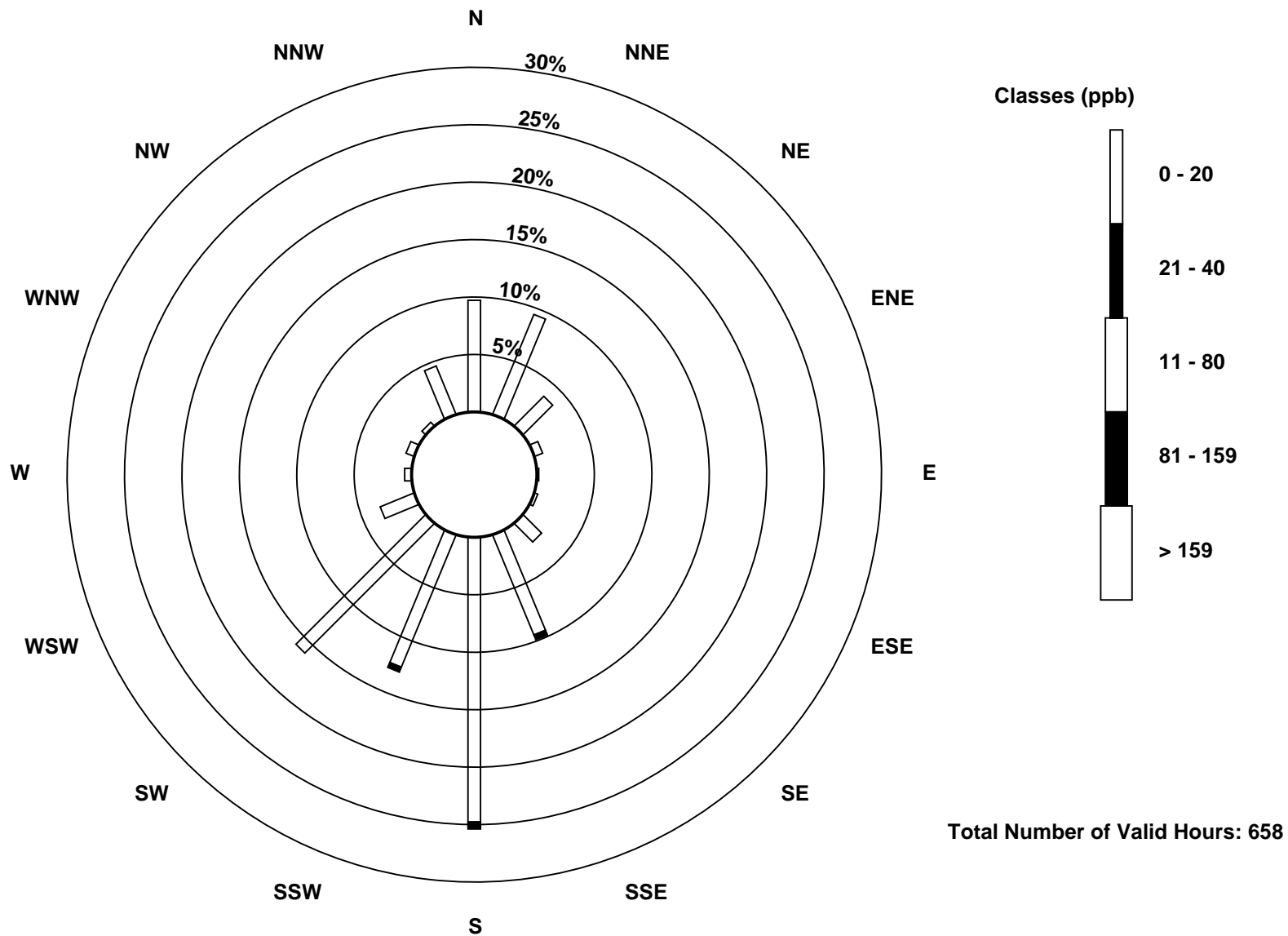
Total Number of Valid Hours: 658

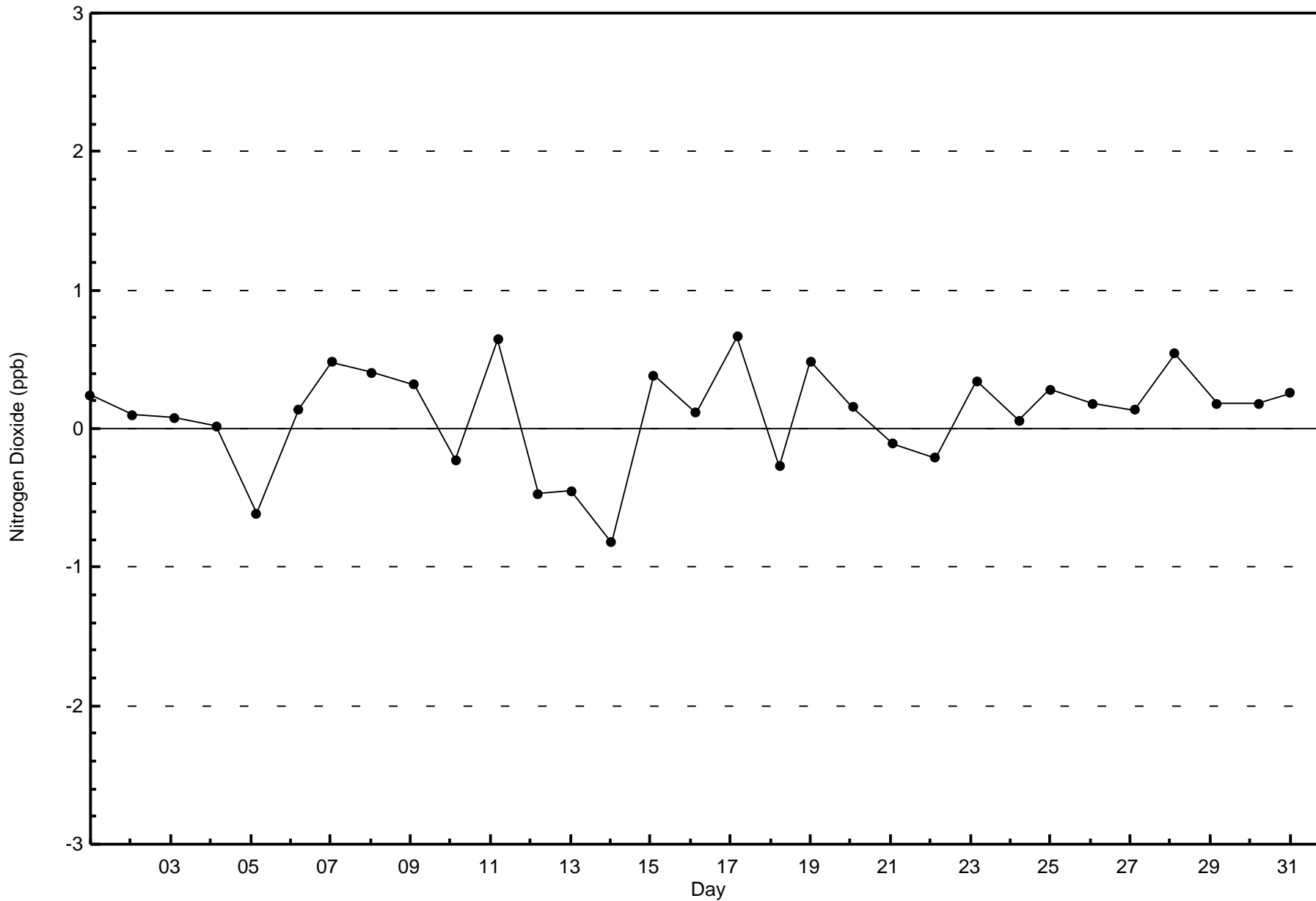
Total Number of Hours: 744

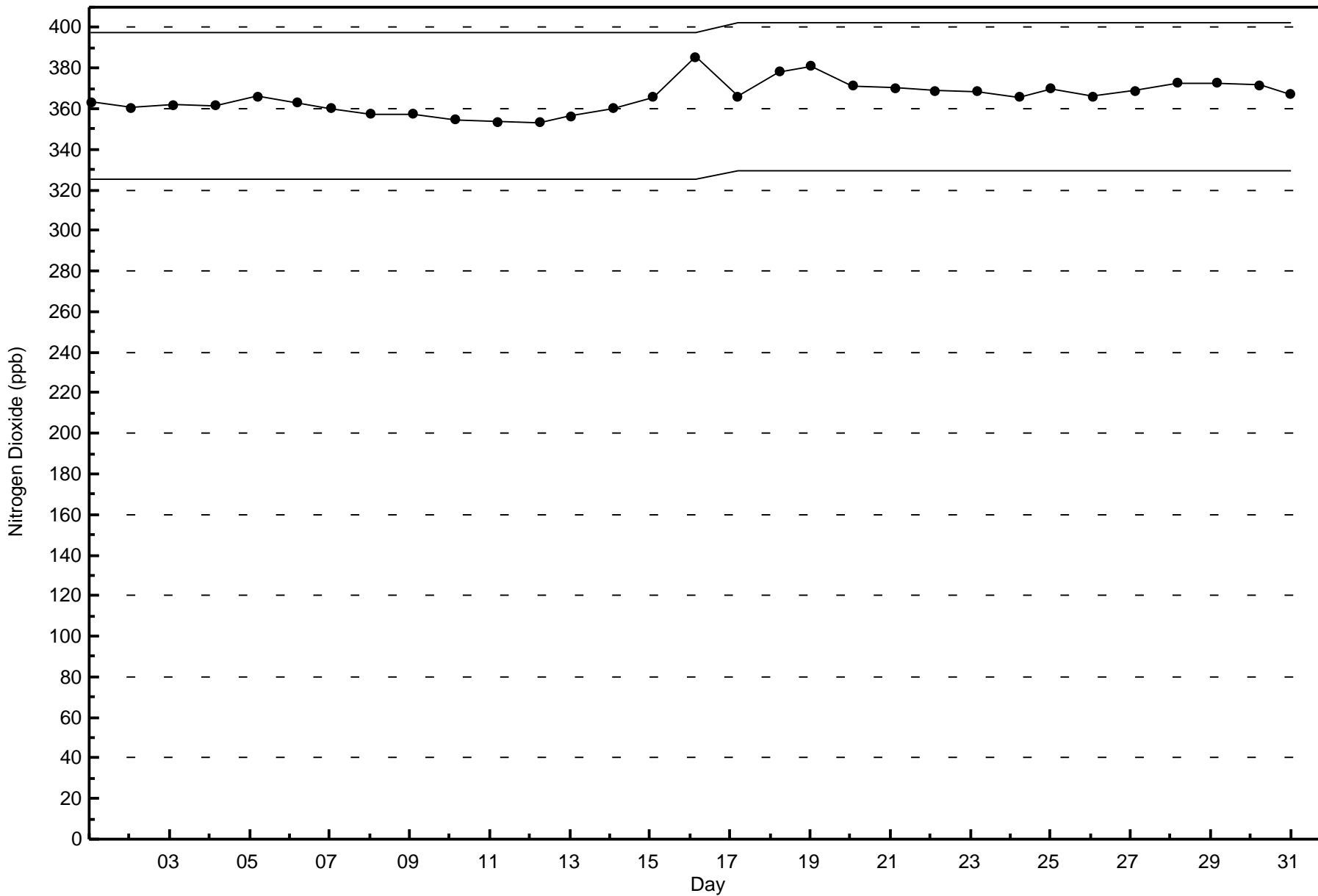


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Nitrogen Dioxide (NO₂) - ppb
Wapasu (AMS 17)







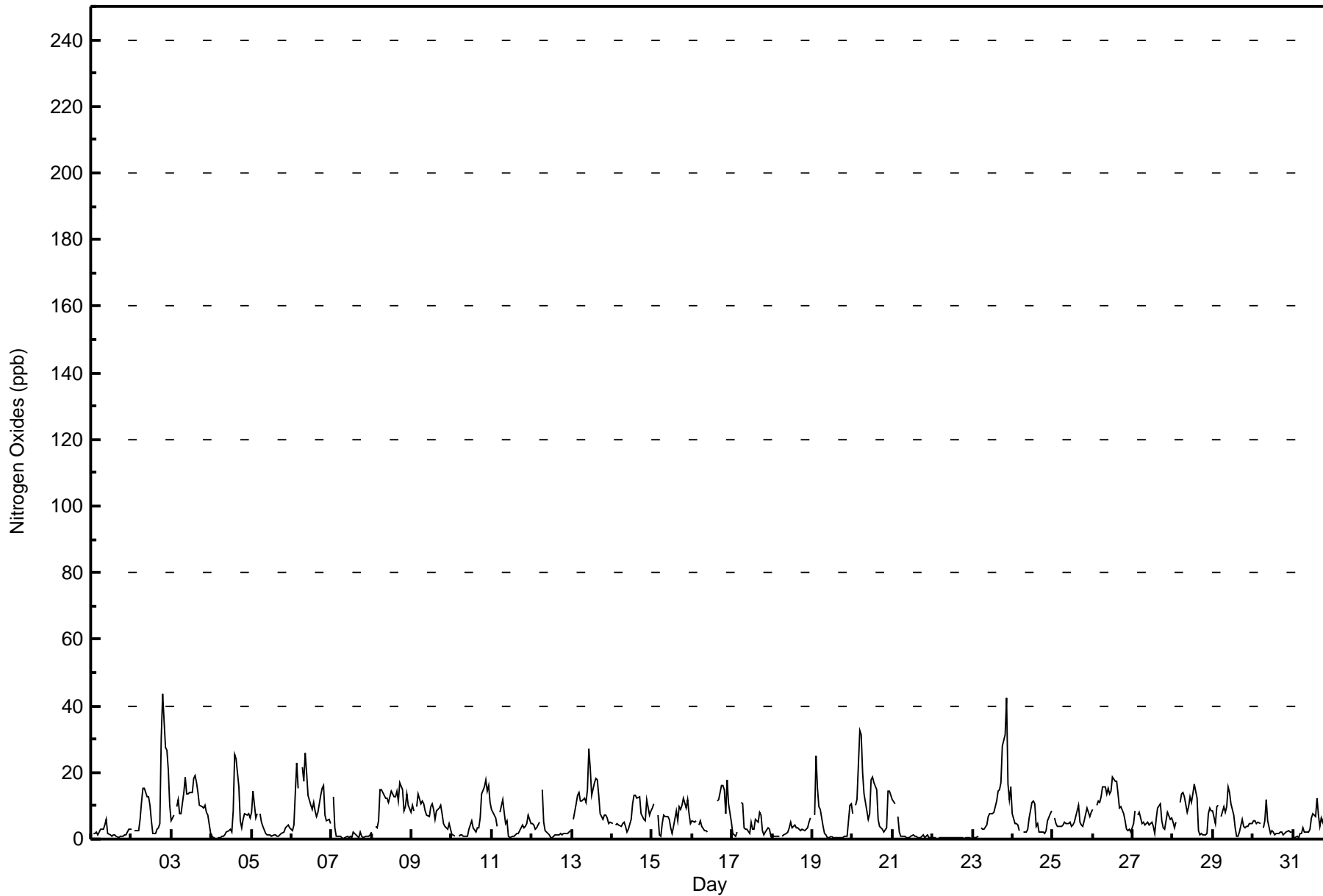


Wood Buffalo Environmental Association
Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb
Wapasu - January 2017

Maximum Value: 44 ppb on Jan 2 20:00														Maximum Daily Average: 12.3 ppb on Jan 20														Hours in Service: 744	
Minimum Value: 0 ppb on Jan 7 08:00														Minimum Daily Average: 0.3 ppb on Jan 22														Hours of Data: 708	
Maximum Diurnal Average: 7.4 ppb at hour 22														Minimum Diurnal Average: 5.2 ppb at hour 1														Hours of Missing Data: 36	
Monthly Average: 6.5 ppb														Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 5 Q ₃ = 10 P ₉₀ = 14 P ₉₉ = 27														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-Jan	Z	2	2	2	1	3	3	3	4	6	2	1	1	1	1	1	1	1	1	1	1	1	3	3	2.0	6			
2-Jan	3	Z	3	2	3	6	11	15	15	13	13	10	6	2	2	3	3	5	30	44	28	27	21	10	11.9	44			
3-Jan	6	7	Z	10	12	7	8	14	19	14	13	14	14	18	19	17	14	10	10	9	10	8	7	2	11.4	19			
4-Jan	1	0	0	Z	0	1	1	1	1	2	3	3	2	8	25	24	15	5	3	6	8	7	8	6	5.8	25			
5-Jan	8	14	6	8	Z	8	5	4	2	1	1	1	1	1	1	1	1	2	2	3	4	4	3	3.6	14				
6-Jan	3	4	14	23	15	Z	22	17	26	20	13	10	9	11	8	7	8	13	15	16	7	6	6	5	12.1	26			
7-Jan	Z	13	4	1	1	1	1	0	1	1	1	1	1	2	2	1	1	2	1	1	1	1	1	1	1.5	13			
8-Jan	2	Z	4	3	6	15	15	13	12	12	11	13	14	13	13	15	11	17	15	9	10	14	10	8	11.0	17			
9-Jan	10	8	Z	10	13	11	11	11	9	7	7	10	11	9	6	9	9	10	8	5	4	3	4	3	8.2	13			
10-Jan	1	1	1	Z	1	1	1	1	1	1	3	4	6	3	2	3	3	6	14	16	18	14	16	11	5.6	18			
11-Jan	9	7	6	4	Z	8	12	8	4	5	1	1	1	1	2	2	3	4	3	4	5	7	5	5	4.5	12			
12-Jan	4	4	3	4	5	Z	15	5	3	2	1	1	1	1	1	1	1	2	1	2	2	2	2	2	2.8	15			
13-Jan	Z	6	11	13	14	12	12	12	11	15	27	21	13	17	18	18	13	8	6	7	7	6	5	5	12.0	27			
14-Jan	5	Z	4	4	4	4	5	5	4	2	3	6	11	13	13	12	13	8	7	6	6	12	7	8	7.0	13			
15-Jan	9	11	Z	7	1	1	5	7	7	7	6	3	2	4	9	5	10	9	10	12	9	12	8	4	6.9	12			
16-Jan	6	5	5	Z	4	6	4	3	3	2	C	C	C	C	C	11	12	16	16	15	8	18	11	5	8.2	18			
17-Jan	2	1	1	2	Z	11	11	4	3	3	2	5	3	3	6	5	8	7	3	1	2	3	3	1	3.9	11			
18-Jan	1	1	1	1	1	Z	1	1	2	2	3	5	4	4	3	3	3	3	3	3	3	4	5	6	2.7	6			
19-Jan	Z	7	25	15	10	9	4	2	1	0	1	1	0	1	1	0	1	0	1	1	1	1	10	11	4.4	25			
20-Jan	8	Z	10	12	33	31	20	13	11	Z	6	8	18	19	17	15	6	4	3	3	2	3	14	14	13	12.3	33		
21-Jan	12	10	Z	7	2	1	1	1	1	0	1	1	1	1	1	0	0	1	1	1	1	1	0	0	2.0	12			
22-Jan	0	1	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			
23-Jan	0	0	0	1	Z	3	3	3	4	7	8	8	8	8	12	14	15	17	28	31	42	16	12	16	11.1	42			
24-Jan	8	5	5	4	3	Z	2	2	2	3	6	11	11	11	4	5	2	2	2	2	3	5	7	8	4.9	11			
25-Jan	Z	7	5	4	4	4	4	5	5	5	5	4	4	5	7	10	5	4	4	5	9	8	7	8	5.5	10			
26-Jan	9	Z	10	12	11	13	16	16	14	15	14	14	19	17	17	13	9	10	8	5	3	2	3	2	11.0	19			
27-Jan	5	8	Z	7	8	5	5	4	5	5	4	5	4	2	6	9	11	5	3	3	6	8	6	6	5.7	11			
28-Jan	5	4	5	Z	11	14	14	13	8	10	13	11	14	17	12	3	1	2	1	1	2	7	10	9	8.0	17			
29-Jan	8	4	10	10	Z	7	10	8	10	16	14	11	7	3	1	1	2	6	4	4	4	4	5	5	6.6	16			
30-Jan	6	5	5	5	5	Z	3	6	12	6	2	2	2	1	2	2	2	2	2	1	2	2	3	2	2	3.5	12		
31-Jan	Z	0	1	0	2	2	3	2	2	2	3	6	8	7	12	7	4	7	5	9	13	12	9	3	5.3	13			
																												Diurnal Average	
5.2														12														Diurnal Maximum	
5.3														14															
5.4														25															
6.6														23															
6.5														33															
7.0														31															
7.2														22															
6.4														17															
6.4														26															
6.1														20															
6.2														27															
6.7														21															
6.5														19															
6.7														18															
7.4														25															
6.8														24															
6.0														15															
6.0														17															
6.7														30															
7.2														44															
7.1														42															
7.4														27															
6.9														21															
5.6														16															

Z - zerospan C - Calibration





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Wapasu - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	690	97.46	97.46
21 - 40	16	2.26	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_x) - ppb
Wapasu - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	64	62	23	5	1	2	15	62	161	79	105	21	4	5	3	30	642
21 - 40	0	0	1	0	0	0	0	3	5	5	0	0	0	0	0	0	14
11 - 80	0	0	0	0	0	0	0	0	1	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
Totals	64	62	24	5	1	2	15	65	167	85	105	21	4	5	3	30	658

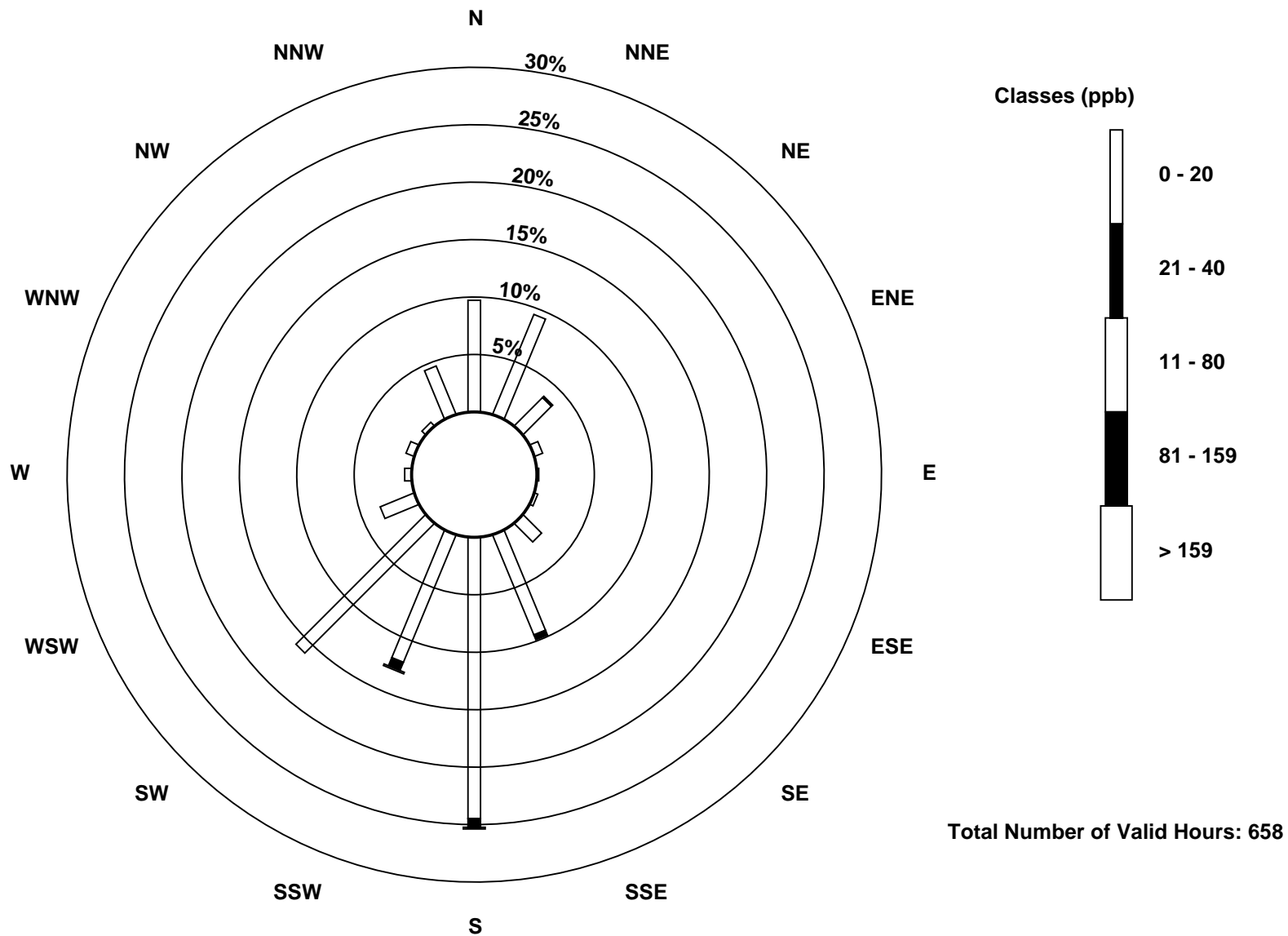
Total Number of Valid Hours: 658

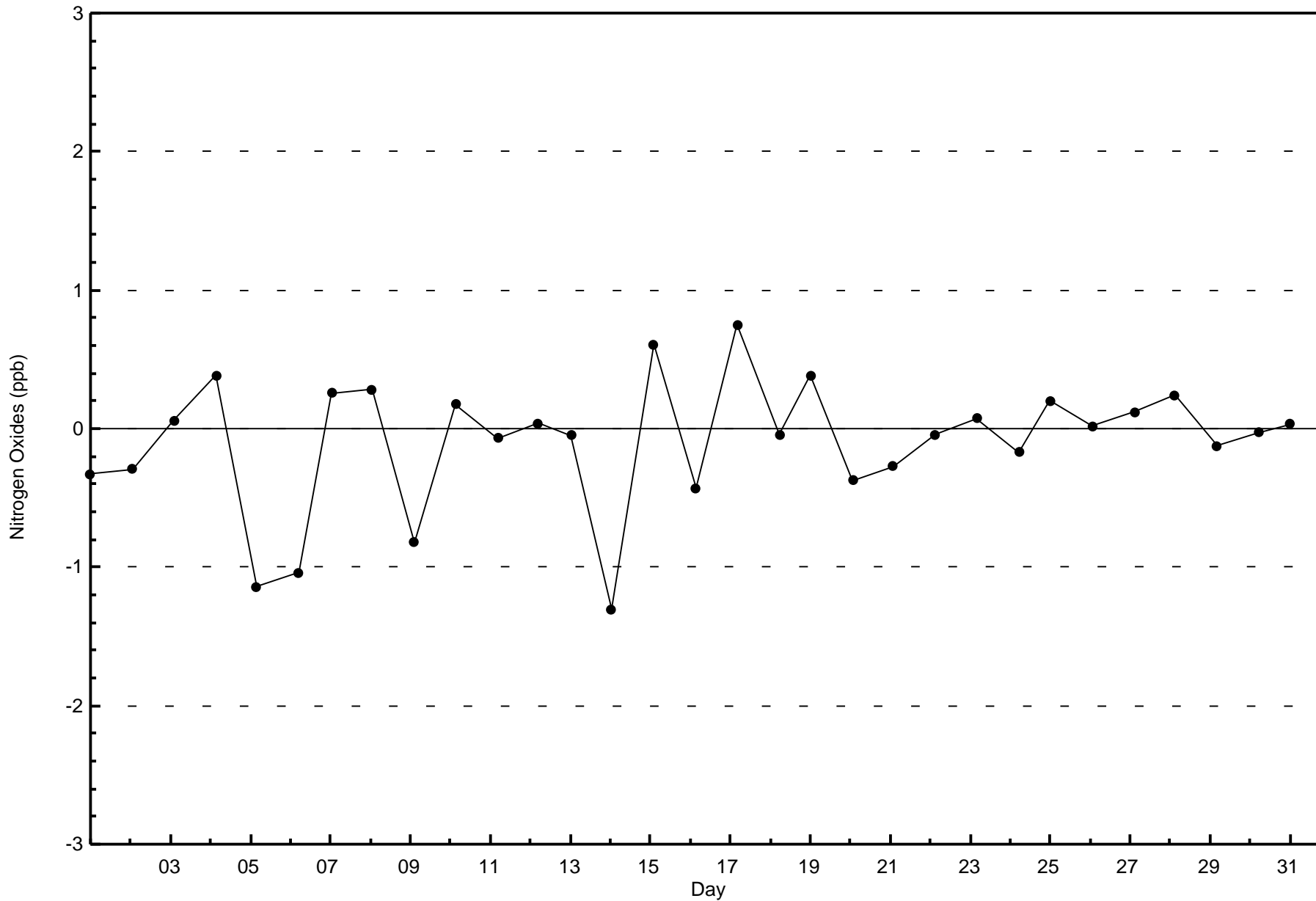
Total Number of Hours: 744

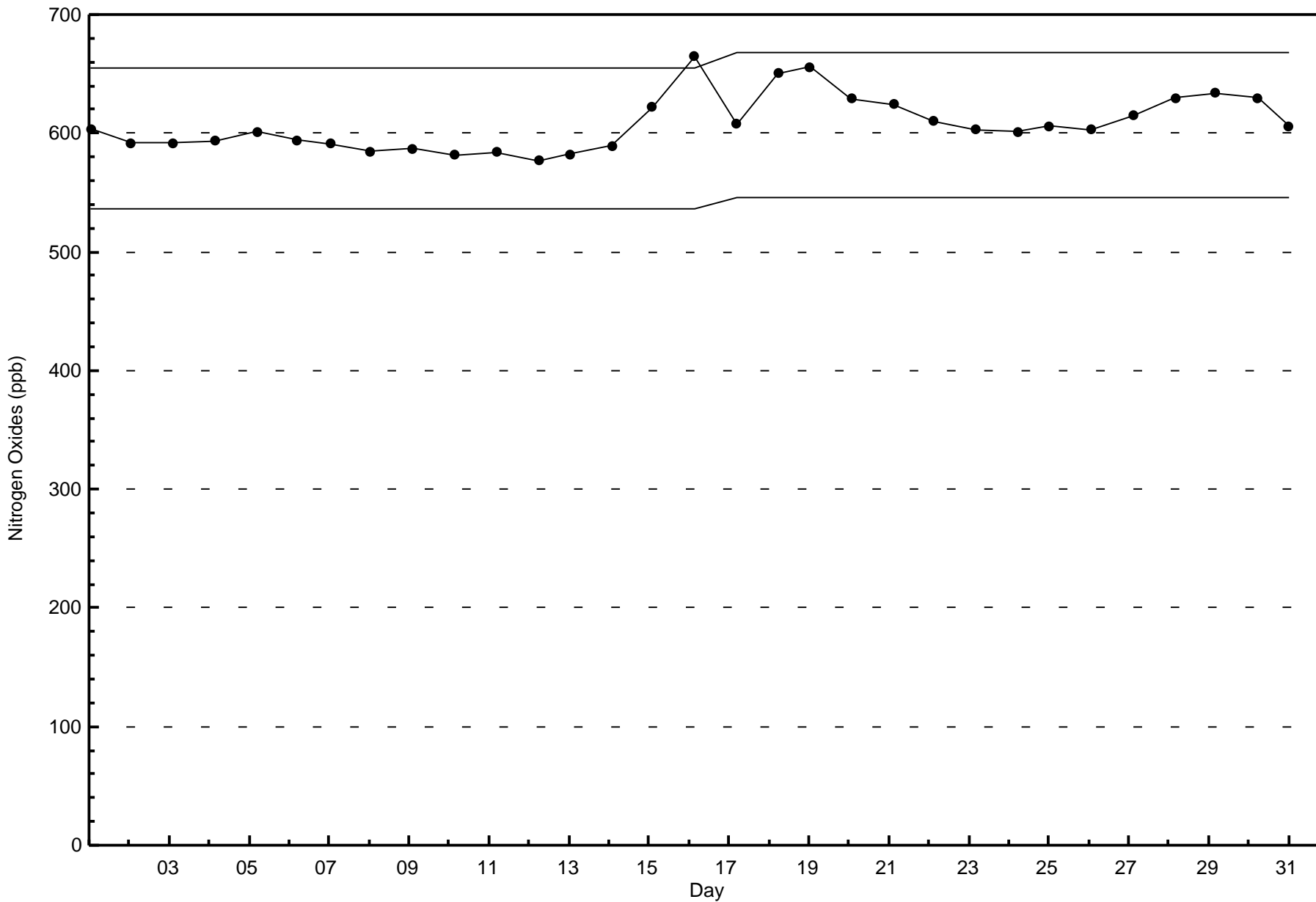


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Nitrogen Oxides (NO_x) - ppb
Wapasu (AMS 17)







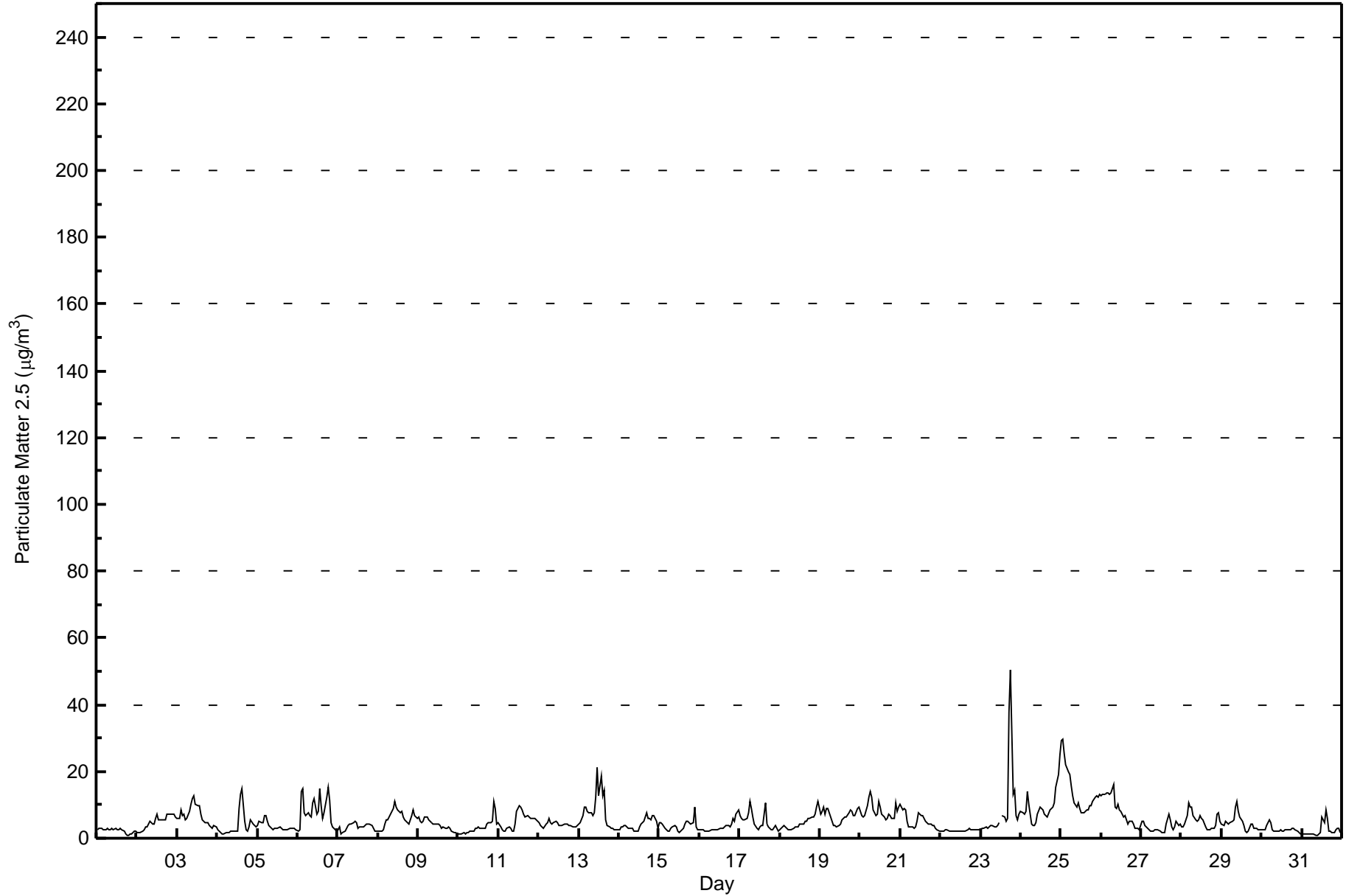


Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 50.4 µg/m ³ on Jan 23 19:00 Minimum Value: 0.7 µg/m ³ on Jan 31 10:00 Maximum Diurnal Average: 6.3 µg/m ³ at hour 19 Monthly Average: 5.34 µg/m ³		Maximum Daily Average: 13.9 µg/m ³ on Jan 25 Minimum Daily Average: 2.3 µg/m ³ on Jan 22 Minimum Diurnal Average: 4.7 µg/m ³ at hour 9 Percentiles: P ₁ = 1.1 P ₁₀ = 2.1 Q ₁ = 2.7 Median = 4.1 Q ₃ = 6.8 P ₉₀ = 9.6 P ₉₉ = 18.9		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-Jan	2.3	3.2	3.0	3.0	2.7	2.6	2.8	2.7	2.7	2.9	2.7	2.8	2.7	2.6	2.8	2.7	1.9	1.3	1.0	1.0	1.1	1.3	2.0	2.0	2.3	3.2
2-Jan	1.8	1.8	1.9	2.0	2.5	3.3	3.6	4.2	4.9	4.2	4.1	6.0	7.1	5.4	5.4	5.7	5.6	5.6	7.0	7.3	7.3	7.1	7.3	6.4	4.9	7.3
3-Jan	5.9	6.1	8.4	6.8	7.1	5.4	6.0	8.1	10.2	11.7	12.9	10.2	9.7	9.6	7.1	5.7	5.0	4.7	4.6	4.0	3.3	3.1	3.7	3.2	6.8	12.9
4-Jan	2.6	2.1	1.6	1.4	1.5	1.6	1.7	1.8	2.0	2.1	2.1	2.1	2.2	8.8	13.2	15.0	5.3	2.7	2.2	3.5	5.4	4.3	3.6	3.4	3.8	15.0
5-Jan	3.9	4.9	4.6	4.6	6.7	6.9	5.0	3.9	3.0	2.7	3.1	3.1	3.2	3.2	2.9	2.6	2.6	2.7	2.7	2.8	3.1	3.0	2.8	2.5	3.6	6.9
6-Jan	2.3	2.7	14.0	15.0	7.6	6.6	7.5	6.8	6.4	10.7	11.7	7.4	8.1	14.8	9.6	6.1	7.5	12.4	15.3	11.4	4.8	3.4	2.7	2.0	8.2	15.3
7-Jan	2.5	3.5	1.4	1.6	2.0	2.9	4.0	4.3	4.1	4.7	4.9	4.5	3.1	3.3	3.3	3.3	3.7	4.3	4.1	4.1	3.9	3.1	2.3	2.0	3.4	4.9
8-Jan	2.0	2.0	2.3	2.5	4.2	5.4	5.6	7.3	8.2	9.0	11.0	9.5	8.5	7.7	7.9	6.4	5.6	5.2	4.1	5.5	6.8	8.5	6.8	6.1	6.2	11.0
9-Jan	6.2	4.9	4.9	5.0	6.3	6.6	5.6	5.3	4.6	4.1	4.1	4.2	4.4	3.9	3.0	3.5	2.8	3.2	3.5	3.1	2.1	1.8	1.6	1.4	4.0	6.6
10-Jan	1.2	1.4	1.3	1.5	1.2	1.8	1.9	2.0	2.1	2.2	3.0	3.1	3.4	3.1	3.0	3.0	2.9	4.1	4.7	4.7	5.1	10.9	8.9	4.2	3.4	10.9
11-Jan	4.8	3.4	2.5	2.1	2.1	2.8	3.3	3.1	2.2	2.1	4.4	8.2	9.8	9.3	8.6	7.2	6.4	6.7	6.4	5.8	5.8	5.9	6.0	5.2	5.2	9.8
12-Jan	4.5	4.0	3.3	3.0	4.0	4.5	5.9	4.7	4.1	4.5	5.0	4.6	4.0	3.6	3.8	4.3	4.3	4.1	3.9	3.7	3.4	3.2	3.4	4.0	4.1	5.9
13-Jan	4.2	4.8	6.9	9.5	9.3	8.0	7.6	7.5	6.6	7.7	12.1	21.0	12.8	18.7	12.9	14.3	5.4	3.7	3.3	2.9	2.9	2.7	2.6	2.4	7.9	21.0
14-Jan	2.7	3.3	3.4	3.8	3.7	3.1	3.1	3.0	2.8	2.3	2.2	2.3	3.6	4.2	4.7	5.1	7.8	6.0	5.7	5.4	6.9	6.8	5.0	2.8	4.1	7.8
15-Jan	4.5	4.8	4.0	3.0	2.4	2.2	2.1	3.1	3.6	3.6	3.5	2.3	1.7	1.9	3.2	4.2	5.1	5.0	4.7	4.2	4.5	9.3	3.6	2.5	3.7	9.3
16-Jan	2.6	2.4	2.3	2.2	2.2	2.3	2.1	2.4	2.4	2.4	2.6	2.7	3.1	3.0	3.0	3.6	3.7	3.6	3.6	4.2	5.9	5.2	7.4	8.6	3.5	8.6
17-Jan	6.9	6.1	5.5	5.4	5.8	7.4	11.0	9.0	6.5	4.1	2.9	2.6	3.5	3.7	4.0	10.6	4.2	3.4	3.0	2.7	2.5	3.7	3.2	2.2	5.0	11.0
18-Jan	2.5	2.9	3.6	3.2	3.1	2.5	2.4	2.6	2.8	3.3	3.3	3.4	4.1	4.1	4.4	5.2	5.1	6.0	6.1	6.6	6.6	7.2	9.4	11.2	4.6	11.2
19-Jan	7.1	8.2	9.3	7.0	8.9	9.1	6.4	4.9	4.0	3.8	3.4	3.7	4.4	5.5	6.1	6.3	6.5	7.8	8.4	8.2	7.0	6.6	8.8	9.2	6.7	9.3
20-Jan	8.0	6.8	6.4	6.7	9.6	12.4	14.0	12.1	8.4	6.8	7.0	11.2	9.4	7.2	6.5	5.4	5.8	7.0	6.8	5.8	5.9	10.5	8.3	9.1	8.2	14.0
21-Jan	10.2	8.6	9.1	8.6	5.0	3.3	3.4	3.5	3.1	3.4	4.9	7.8	6.9	6.7	6.0	5.0	4.7	4.2	4.1	3.8	3.6	3.1	2.6	2.3	5.2	10.2
22-Jan	2.3	2.2	2.3	2.5	2.4	2.3	2.0	2.0	2.1	2.1	2.2	2.0	2.0	2.0	2.1	2.4	2.8	2.7	2.4	2.5	2.4	2.6	2.6	2.6	2.3	2.8
23-Jan	2.7	2.9	3.2	3.2	3.1	3.4	3.8	3.7	3.5	3.5	3.7	4.5	C	6.8	6.2	5.0	6.1	37.9	50.4	13.0	14.5	6.6	5.7	7.3	8.7	50.4
24-Jan	8.0	7.7	7.4	8.2	14.2	10.3	4.2	3.9	3.6	4.9	7.1	9.3	8.9	8.3	7.0	6.8	6.5	8.3	9.1	9.3	10.8	15.1	19.0	25.1	9.3	25.1
25-Jan	29.1	29.5	25.6	21.9	20.0	19.1	15.9	12.6	10.5	9.5	10.6	8.8	7.7	7.8	7.8	8.3	8.6	9.7	9.9	11.1	12.5	12.6	12.5	12.9	13.9	29.5
26-Jan	12.9	13.3	13.2	13.6	13.6	13.0	13.5	16.2	9.3	9.1	10.0	8.4	7.9	6.5	6.8	5.6	4.2	5.2	4.9	4.3	2.8	2.8	2.8	2.6	8.4	16.2
27-Jan	4.9	4.9	3.6	3.6	3.0	2.2	1.9	2.2	2.4	2.6	2.5	2.2	1.8	1.6	1.8	4.1	7.4	5.7	3.3	2.7	3.5	5.1	3.9	4.4	3.4	7.4
28-Jan	3.6	3.2	4.4	6.8	10.6	9.2	9.3	6.8	5.7	5.0	5.4	7.0	5.7	5.6	3.5	2.4	2.4	2.5	2.8	3.2	3.7	7.1	7.5	5.0	5.3	10.6
29-Jan	4.4	3.8	4.9	4.8	4.3	4.8	5.2	5.6	9.5	11.2	8.1	6.2	5.2	3.7	1.9	1.9	2.0	4.3	4.2	3.0	2.9	2.8	2.7	2.7	4.6	11.2
30-Jan	2.4	2.7	2.7	3.7	5.7	4.7	2.5	2.1	2.2	2.1	2.1	2.4	2.2	2.2	2.4	2.4	2.4	2.5	2.8	2.9	2.7	2.1	1.8	1.5	2.6	5.7
31-Jan	1.3	1.1	1.2	1.2	1.4	1.3	1.3	1.1	0.8	0.7	1.1	1.5	6.4	4.9	8.3	5.8	2.0	2.0	1.5	1.6	2.6	3.1	3.0	1.7	2.4	8.3
																								Diurnal Average		
																								Diurnal Maximum		
5.2 5.1 5.4 5.4 5.7 5.5 5.3 5.1 4.7 4.8 5.3 5.6 5.5 5.8 5.5 5.5 4.7 5.9 6.3 5.0 5.0 5.5 5.3 5.1 29.1 29.5 25.6 21.9 20.0 19.1 15.9 16.2 10.5 11.7 12.9 21.0 12.8 18.7 13.2 15.0 8.6 37.9 50.4 13.0 14.5 15.1 19.0 25.1																										
C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																										



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Wapasu - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Wapasu - January 2017

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	480	64.60	64.60
6 - 15	247	33.24	97.85
16 - 25	9	1.21	99.06
26 - 80	5	0.67	99.73
> 81.0	0	0.00	99.73

Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Wapasu - January 2017

Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	59	54	14	5	1	1	15	41	78	46	74	14	4	5	2	19	432
6 - 15	7	11	12	0	0	1	2	27	84	50	32	6	0	0	1	11	244
16 - 25	0	0	0	0	0	0	0	0	7	1	1	0	0	0	0	0	9
26 - 80	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	3
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	66	65	26	5	1	2	17	68	172	97	107	20	4	5	3	30	688

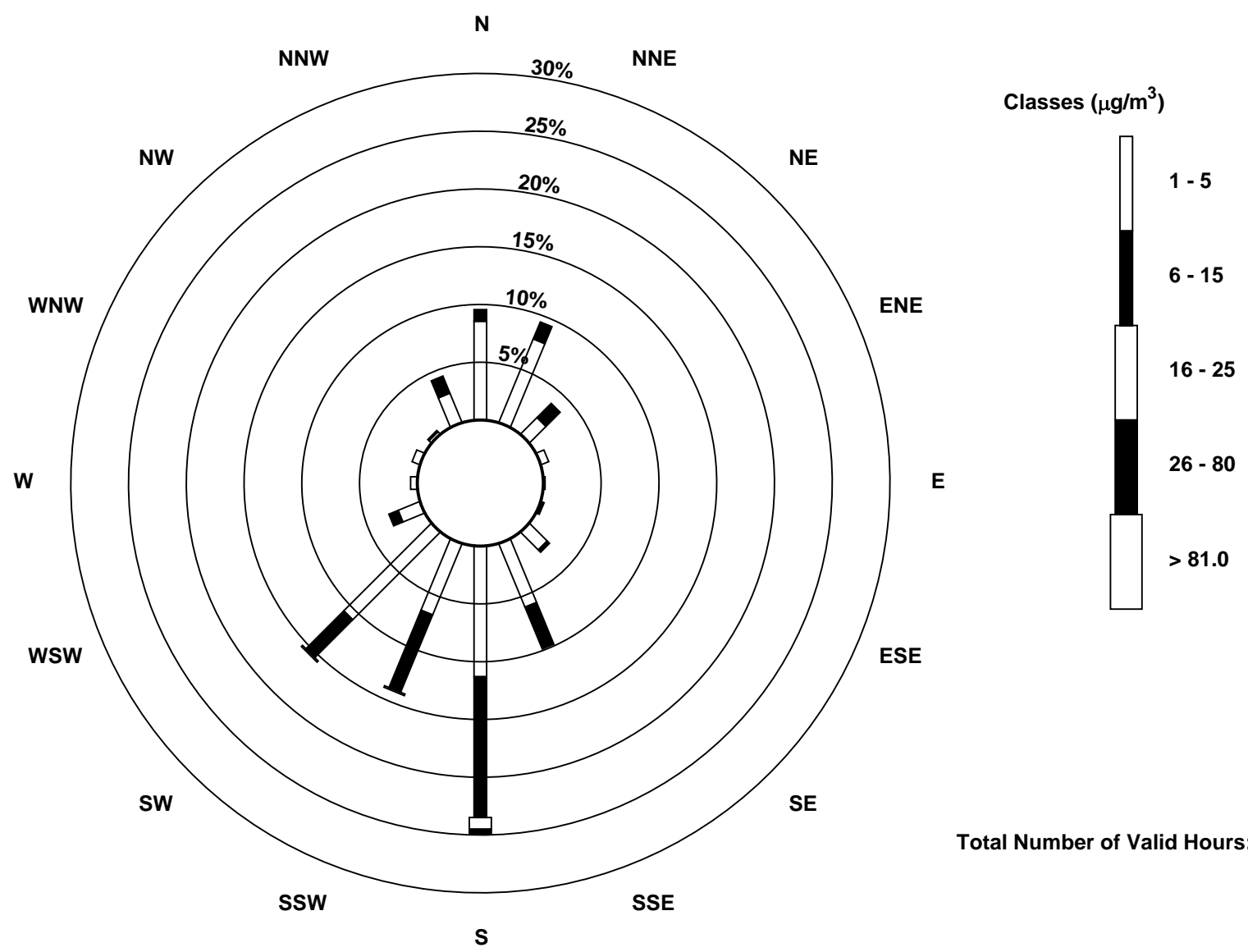
Total Number of Valid Hours: 690

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Wapasu (AMS 17)

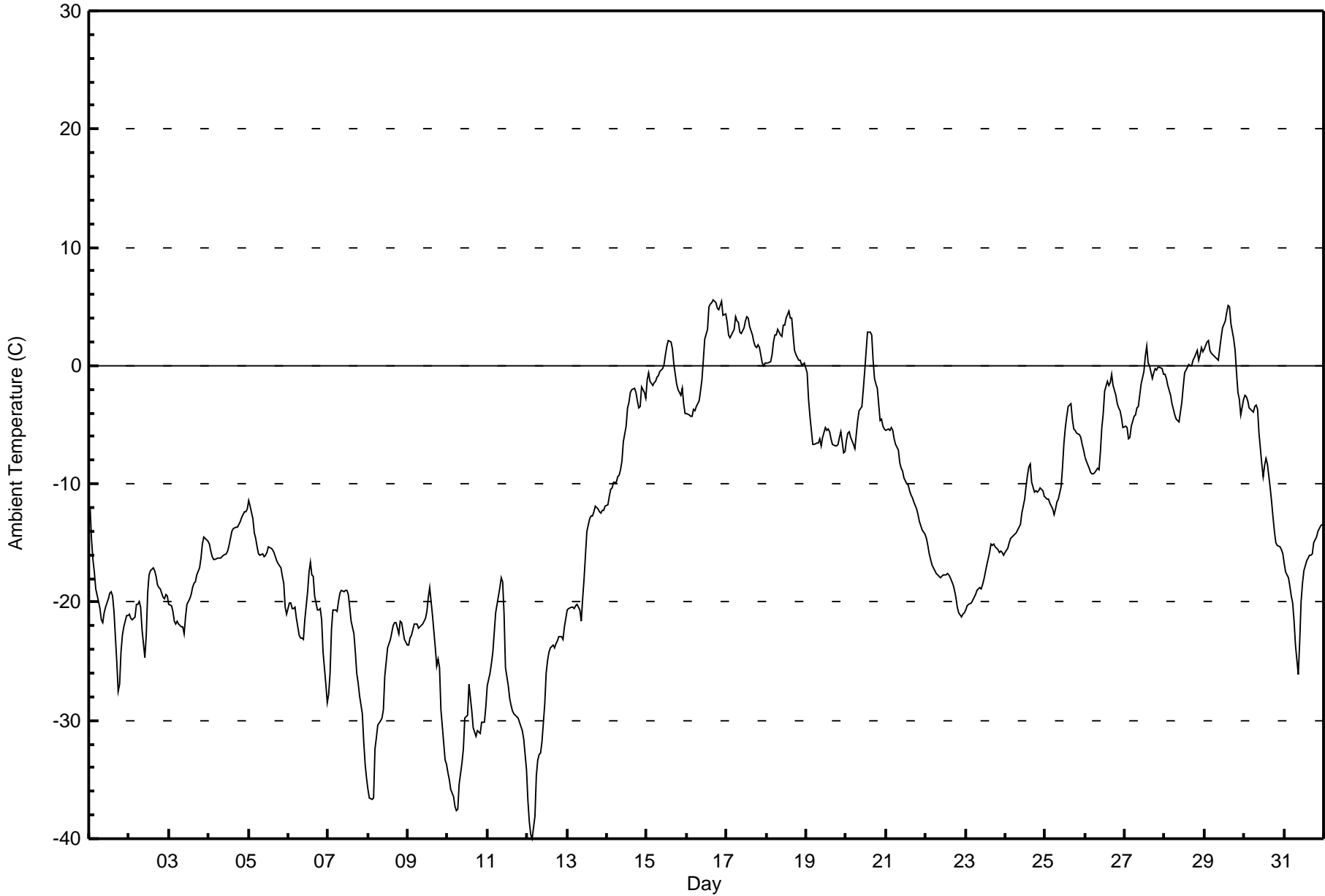




Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature (AT) - C
Wapasu - January 2017

Maximum Value: 5.5 C on Jan 16 17:00		Maximum Daily Average: 2.6 C on Jan 17		Hours in Service: 744																						
Minimum Value: -40.0 C on Jan 12 04:00		Minimum Daily Average: -32.3 C on Jan 10		Hours of Data: 744																						
Maximum Diurnal Average: -10.5 C at hour 14		Minimum Diurnal Average: -14.3 C at hour 4		Hours of Missing Data: 0																						
Monthly Average: -12.85 C		Percentiles: P ₁ = -36.8 P ₁₀ = -26.1 Q ₁ = -20.5 Median = -14.0 Q ₃ = -3.6 P ₉₀ = 1.1 P ₉₉ = 5.1		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-Jan	-12.0	-14.7	-16.4	-17.5	-18.8	-20.0	-20.5	-21.5	-21.7	-20.9	-20.4	-19.7	-19.2	-19.1	-19.4	-20.8	-25.0	-27.5	-27.0	-24.3	-22.8	-22.1	-21.1	-21.1	-20.6	-12.0
2-Jan	-21.0	-21.3	-21.5	-21.2	-20.1	-20.1	-20.0	-20.4	-22.3	-24.7	-22.7	-19.2	-17.7	-17.3	-17.2	-17.4	-17.9	-18.5	-18.7	-18.9	-19.6	-19.7	-19.4	-19.5	-19.9	-17.2
3-Jan	-20.2	-20.4	-20.8	-21.6	-21.8	-21.6	-21.9	-22.1	-22.1	-22.7	-21.3	-20.2	-19.7	-19.4	-18.8	-18.4	-18.3	-17.7	-17.1	-16.3	-15.1	-14.5	-14.6	-14.8	-19.2	-14.5
4-Jan	-15.1	-15.7	-16.1	-16.4	-16.4	-16.3	-16.3	-16.2	-16.2	-16.1	-16.0	-15.7	-15.2	-14.6	-14.1	-13.7	-13.7	-13.7	-13.4	-13.2	-12.8	-12.4	-12.4	-12.1	-14.7	-12.1
5-Jan	-11.4	-11.9	-13.0	-14.1	-14.7	-15.3	-16.0	-16.0	-15.9	-16.1	-16.0	-15.8	-15.4	-15.4	-15.5	-15.8	-16.2	-16.5	-16.7	-17.1	-17.8	-18.4	-20.4	-21.0	-15.9	-11.4
6-Jan	-20.1	-20.1	-20.5	-20.5	-20.5	-21.4	-22.8	-23.1	-23.0	-23.2	-21.5	-19.1	-17.5	-16.6	-17.7	-17.8	-19.5	-20.7	-20.7	-20.5	-21.5	-24.2	-27.0	-28.5	-21.2	-16.6
7-Jan	-27.8	-26.0	-22.3	-20.7	-20.7	-20.8	-19.9	-19.2	-19.0	-19.1	-19.0	-19.0	-19.3	-20.4	-21.6	-22.7	-24.3	-26.0	-26.9	-27.9	-29.4	-31.8	-33.8	-34.9	-23.9	-19.0
8-Jan	-35.8	-36.5	-36.7	-36.6	-32.4	-31.4	-30.4	-30.1	-29.8	-29.1	-26.2	-25.1	-23.9	-23.1	-22.5	-22.0	-21.7	-21.8	-22.7	-21.6	-21.7	-22.4	-23.2	-23.6	-27.1	-21.6
9-Jan	-23.6	-23.1	-22.8	-22.3	-21.8	-21.8	-22.2	-22.1	-22.0	-21.8	-21.4	-20.8	-19.7	-18.7	-19.9	-21.2	-23.9	-25.4	-24.8	-25.5	-29.1	-31.9	-33.4	-33.8	-23.9	-18.7
10-Jan	-34.4	-35.1	-35.8	-36.4	-37.3	-37.7	-37.5	-35.4	-33.6	-32.4	-29.8	-29.7	-29.6	-27.0	-29.2	-30.6	-31.0	-31.3	-30.9	-31.1	-30.1	-30.2	-30.2	-28.8	-32.3	-27.0
11-Jan	-27.1	-26.0	-25.1	-24.2	-22.5	-20.9	-19.4	-18.8	-17.9	-18.2	-21.0	-25.5	-27.1	-28.2	-28.7	-29.2	-29.4	-29.6	-29.8	-30.1	-30.5	-30.9	-31.5	-34.2	-26.1	-17.9
12-Jan	-36.8	-38.6	-39.6	-40.0	-38.1	-34.7	-33.4	-32.8	-32.8	-31.8	-28.7	-26.0	-24.9	-24.2	-23.8	-23.7	-23.9	-23.5	-23.2	-22.9	-22.9	-23.2	-22.1	-21.4	-28.9	-21.4
13-Jan	-20.7	-20.5	-20.4	-20.4	-20.5	-20.3	-20.2	-20.7	-21.6	-19.8	-18.0	-16.0	-14.1	-12.9	-12.7	-12.7	-12.3	-11.9	-12.2	-12.4	-12.4	-12.3	-12.2	-11.9	-16.2	-11.9
14-Jan	-11.8	-11.1	-10.4	-10.3	-9.8	-9.8	-9.4	-9.2	-8.8	-8.0	-6.4	-5.1	-3.5	-3.2	-2.3	-2.0	-1.9	-2.2	-3.0	-3.6	-3.4	-1.8	-2.3	-2.8	-5.9	-1.8
15-Jan	-1.2	-0.6	-1.3	-1.7	-1.4	-1.4	-1.0	-0.8	-0.5	-0.3	0.1	0.9	1.7	2.1	2.0	1.4	0.1	-0.8	-1.6	-2.1	-2.6	-2.0	-3.2	-4.1	-0.7	2.1
16-Jan	-4.0	-4.2	-4.3	-4.2	-3.7	-3.8	-3.5	-3.0	-2.1	-1.2	0.5	2.3	3.0	5.0	5.2	5.3	5.5	5.3	4.9	4.8	5.1	5.4	4.3	4.4	1.1	5.5
17-Jan	3.6	2.6	2.4	2.5	3.0	4.2	3.8	3.6	2.9	2.8	3.2	3.8	4.2	4.1	3.4	2.6	2.0	1.6	1.5	1.7	1.5	0.2	0.0	0.2	2.6	4.2
18-Jan	0.2	0.2	0.3	0.9	2.0	2.6	2.6	3.1	2.6	2.4	3.4	3.4	4.0	4.6	4.0	4.0	2.6	1.3	0.9	0.4	0.4	0.2	0.1	0.2	1.9	4.6
19-Jan	-0.7	-2.8	-4.3	-5.5	-6.6	-6.7	-6.5	-6.5	-6.2	-6.8	-6.1	-5.3	-5.4	-5.3	-5.6	-6.2	-6.7	-6.8	-6.7	-6.6	-6.1	-5.6	-7.3	-7.2	-5.8	-0.7
20-Jan	-6.4	-5.7	-5.6	-6.1	-6.7	-7.0	-5.9	-4.6	-3.8	-3.5	-2.1	-0.5	1.2	2.8	2.9	2.6	0.5	-1.1	-1.6	-2.0	-4.7	-4.5	-5.1	-5.3	-3.0	2.9
21-Jan	-5.5	-5.4	-5.4	-5.3	-5.5	-6.2	-6.6	-7.2	-8.2	-8.7	-8.9	-9.5	-10.0	-10.1	-10.5	-10.9	-11.2	-11.6	-12.1	-12.6	-13.1	-13.5	-14.0	-14.3	-9.4	-5.3
22-Jan	-14.6	-15.2	-15.9	-16.4	-16.9	-17.4	-17.6	-17.7	-17.8	-17.9	-17.7	-17.6	-17.7	-17.6	-17.7	-17.9	-18.5	-19.0	-19.6	-20.4	-20.9	-21.2	-21.0	-20.9	-18.1	-14.6
23-Jan	-20.6	-20.3	-20.2	-20.1	-19.8	-19.6	-19.3	-19.0	-18.8	-18.9	-18.5	-18.0	-17.5	-16.8	-15.8	-15.1	-15.2	-15.1	-15.3	-15.6	-15.7	-15.6	-15.8	-16.0	-17.6	-15.1
24-Jan	-15.8	-15.5	-15.0	-14.6	-14.5	-14.4	-14.2	-13.9	-13.7	-13.4	-12.5	-11.3	-10.2	-9.2	-8.6	-8.4	-9.8	-10.6	-10.6	-10.7	-10.6	-10.4	-10.6	-11.1	-12.1	-8.4
25-Jan	-11.1	-11.2	-11.3	-11.7	-12.1	-12.5	-12.1	-11.5	-11.2	-10.2	-8.6	-6.6	-5.2	-4.3	-3.4	-3.3	-4.6	-5.4	-5.4	-5.7	-5.8	-6.1	-6.7	-7.2	-8.1	-3.3
26-Jan	-7.7	-8.1	-8.6	-9.0	-9.1	-9.1	-9.0	-8.6	-8.8	-7.3	-5.2	-4.0	-2.1	-1.3	-1.7	-1.4	-0.8	-1.7	-2.5	-3.2	-3.6	-3.8	-4.5	-5.3	-5.3	-0.8
27-Jan	-5.1	-5.3	-6.2	-6.1	-5.2	-4.3	-4.2	-3.6	-3.5	-2.5	-1.6	-0.5	0.8	1.6	0.2	0.0	-1.1	-0.6	-0.2	-0.3	-0.2	-0.1	-0.2	-0.7	-2.0	1.6
28-Jan	-0.8	-1.1	-1.6	-2.6	-3.2	-3.7	-4.2	-4.5	-4.7	-3.9	-3.1	-1.8	-0.7	-0.4	0.1	0.0	0.0	0.4	0.7	1.3	0.5	0.9	1.5	1.2	-1.2	1.5
29-Jan	1.4	2.1	2.1	1.3	1.1	0.9	0.7	0.6	0.4	1.5	2.4	3.2	3.8	4.5	5.1	5.0	3.5	2.2	1.3	-0.7	-2.3	-2.9	-4.1	-2.9	1.3	5.1
30-Jan	-2.5	-2.6	-3.0	-3.6	-3.8	-4.0	-3.4	-3.4	-3.7	-5.7	-8.3	-9.4	-8.5	-7.9	-8.3	-10.3	-11.5	-12.9	-14.0	-15.0	-15.2	-15.4	-15.5	-15.9	-8.5	-2.5
31-Jan	-16.7	-17.4	-17.9	-18.7	-19.4	-20.1	-21.6	-23.7	-26.1	-23.4	-20.0	-18.4	-17.3	-16.5	-16.2	-16.0	-16.0	-15.9	-14.9	-14.4	-14.0	-13.7	-13.5	-13.5	-17.7	-13.5
																								Diurnal Average		
																								Diurnal Maximum		





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Wapasu - January 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	209	28.09	28.09
-20 - 0	430	57.80	85.89
0 - 10	105	14.11	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

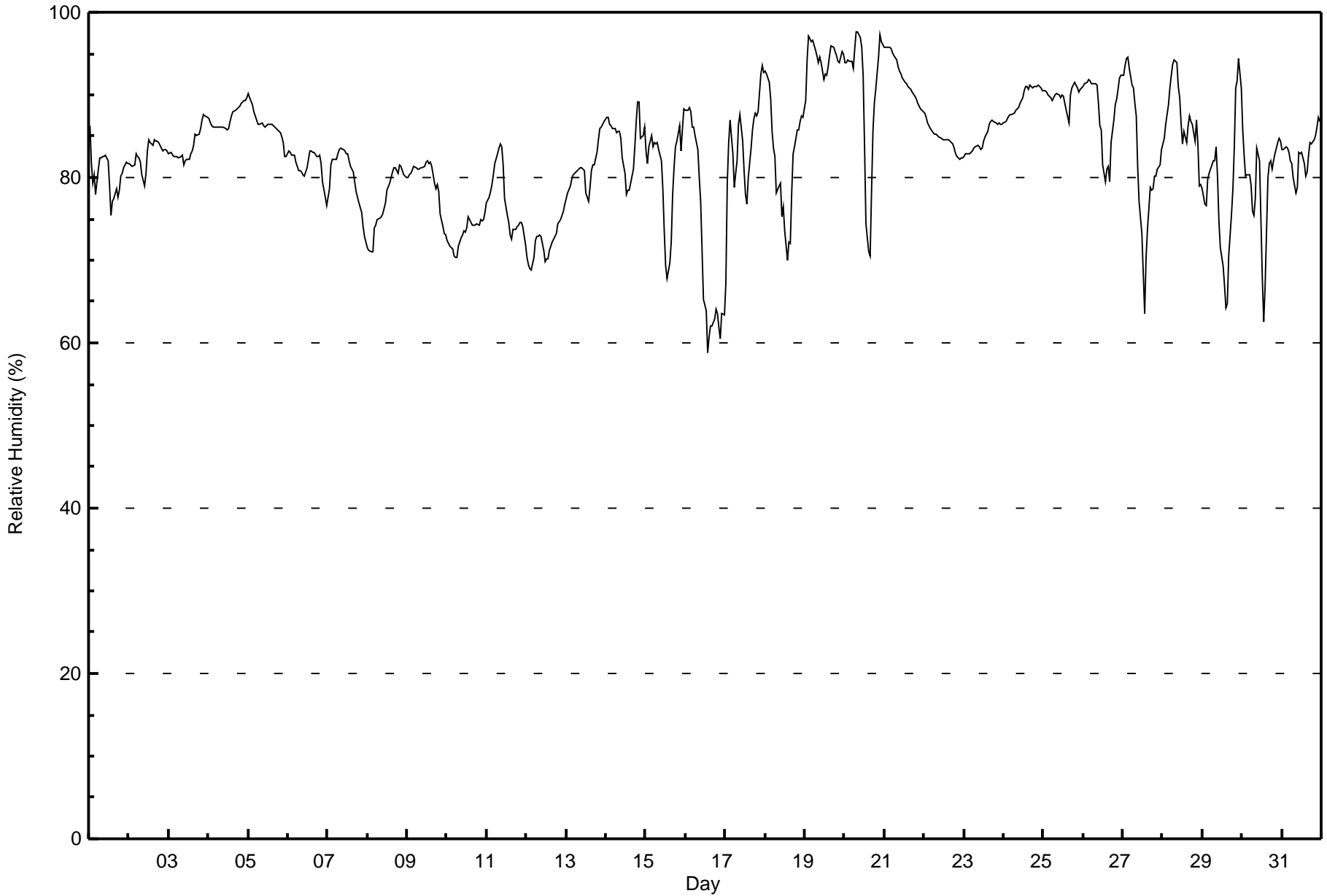
Wapasu - January 2017

Maximum Value: 98 % on Jan 20 08:00																		Maximum Daily Average: 94.5 % on Jan 19																		Hours in Service: 744																																																																																					
Minimum Value: 59 % on Jan 16 14:00																		Minimum Daily Average: 72.2 % on Jan 12																		Hours of Data: 744																																																																																					
Maximum Diurnal Average: 84.6 % at hour 4																		Minimum Diurnal Average: 78.7 % at hour 14																		Hours of Missing Data: 0																																																																																					
Monthly Average: 82.9 %																		Percentiles: P ₁ = 63 P ₁₀ = 73 Q ₁ = 79 Median = 83 Q ₃ = 87 P ₉₀ = 92 P ₉₉ = 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-Jan	86	82	79	80	78	81	82	82	83	83	83	82	79	75	77	77	79	78	78	80	81	81	82	82	80.4	86																																																																																															
2-Jan	82	82	81	82	83	83	82	82	80	79	81	83	85	84	84	85	84	84	84	84	83	83	83	83	82.8	85																																																																																															
3-Jan	83	83	83	83	83	83	82	83	83	82	82	82	82	83	83	84	85	85	85	85	86	87	88	87	83.9	88																																																																																															
4-Jan	87	87	86	86	86	86	86	86	86	86	86	86	86	87	88	88	88	88	88	89	89	89	89	90	87.2	90																																																																																															
5-Jan	90	90	89	88	88	87	86	86	86	87	86	86	86	86	86	86	86	86	86	85	85	84	83	83	86.4	90																																																																																															
6-Jan	83	83	83	83	83	82	81	81	81	80	80	81	82	83	83	83	83	82	83	83	82	80	78	77	81.6	83																																																																																															
7-Jan	78	79	82	82	82	82	83	83	84	83	83	83	83	82	81	81	80	78	78	77	76	74	73	72	79.9	84																																																																																															
8-Jan	72	71	71	71	74	74	75	75	75	76	76	77	78	79	80	81	81	81	80	81	81	81	80	80	77.2	81																																																																																															
9-Jan	80	80	81	81	81	81	81	81	81	81	81	82	82	82	82	81	79	79	79	78	76	74	73	73	79.6	82																																																																																															
10-Jan	72	72	72	71	71	70	70	72	73	73	74	73	74	75	75	74	74	74	74	74	75	75	75	76	73.3	76																																																																																															
11-Jan	77	78	78	79	80	82	83	83	84	84	81	77	75	75	73	73	74	74	74	74	75	75	74	72	77.2	84																																																																																															
12-Jan	70	70	69	69	70	72	73	73	73	73	71	70	70	71	72	72	73	73	74	75	75	76	77	77	72.2	77																																																																																															
13-Jan	77	78	79	80	80	80	81	81	81	81	81	81	78	77	79	81	81	82	83	85	86	86	86	87	81.3	87																																																																																															
14-Jan	87	87	87	86	86	86	85	86	86	85	82	80	78	78	79	81	84	87	89	89	85	85	86	86	84.3	89																																																																																															
15-Jan	83	82	84	85	84	84	84	84	83	82	79	74	69	68	70	72	78	81	84	84	86	83	86	88	80.7	88																																																																																															
16-Jan	88	88	88	88	86	86	85	83	80	77	71	65	64	59	61	62	62	63	64	64	62	61	64	63	72.3	88																																																																																															
17-Jan	67	79	84	87	83	79	80	82	86	88	84	81	78	77	80	84	86	87	88	87	88	93	93	93	83.9	93																																																																																															
18-Jan	93	93	92	90	86	84	83	78	79	79	75	76	73	70	72	72	78	83	84	86	86	87	87	87	82.2	93																																																																																															
19-Jan	89	94	97	97	97	97	95	95	94	95	94	92	92	92	93	95	96	96	95	95	94	94	95	95	94.5	97																																																																																															
20-Jan	94	94	94	94	94	93	96	98	98	97	96	92	84	74	71	70	78	86	89	91	95	97	96	96	90.3	98																																																																																															
21-Jan	96	96	96	96	96	95	95	94	93	93	93	92	92	91	91	91	91	90	90	90	89	89	88	88	92.2	96																																																																																															
22-Jan	88	87	87	86	86	85	85	85	85	85	85	85	85	85	85	85	84	84	84	83	83	82	82	82	84.7	88																																																																																															
23-Jan	83	83	83	83	83	83	83	84	84	84	83	84	84	85	86	86	87	87	87	87	87	87	87	86	84.8	87																																																																																															
24-Jan	87	87	87	87	88	88	88	88	88	88	89	90	90	91	91	91	91	91	91	91	91	91	91	91	89.4	91																																																																																															
25-Jan	91	90	90	90	90	89	90	90	90	90	90	90	90	89	88	87	90	91	91	92	91	90	91	91	90.0	92																																																																																															
26-Jan	91	91	92	92	92	91	91	91	91	89	86	86	82	79	81	81	79	84	87	89	90	91	92	92	88.0	92																																																																																															
27-Jan	92	94	94	95	93	91	91	89	87	81	77	73	68	64	70	74	79	78	79	80	80	81	82	83	82.4	95																																																																																															
28-Jan	84	85	87	89	91	92	94	94	94	91	90	87	84	86	84	86	87	87	86	84	87	84	79	79	87.1	94																																																																																															
29-Jan	79	77	77	80	80	81	82	82	84	80	75	71	69	67	64	65	71	76	79	84	91	92	94	91	78.7	94																																																																																															
30-Jan	86	83	80	80	80	79	76	75	77	84	82	75	68	63	67	80	82	82	81	82	83	84	85	84	79.1	86																																																																																															
31-Jan	83	83	84	84	83	82	82	80	78	79	83	83	83	82	80	81	83	84	84	85	85	86	87	87	82.9	87																																																																																															
																		83.8				84.1				84.3				84.6				84.4				84.2				84.2				84.1				84.1				83.7				82.6				81.3				79.8				78.7				79.2				80.2				81.6				82.5				83.1				83.6				84.0				83.9				84.0				83.9				Diurnal Average							
																		96				97				97				97				96				98				98				97				96				98				98				97				96				92				92				93				95				96				96				95				95				95				97				96				96				Diurnal Maximum			



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Wapasu - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Wapasu - January 2017

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	1	0.13	0.13
60 - 80	200	26.88	27.02
80 - 100	543	72.98	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

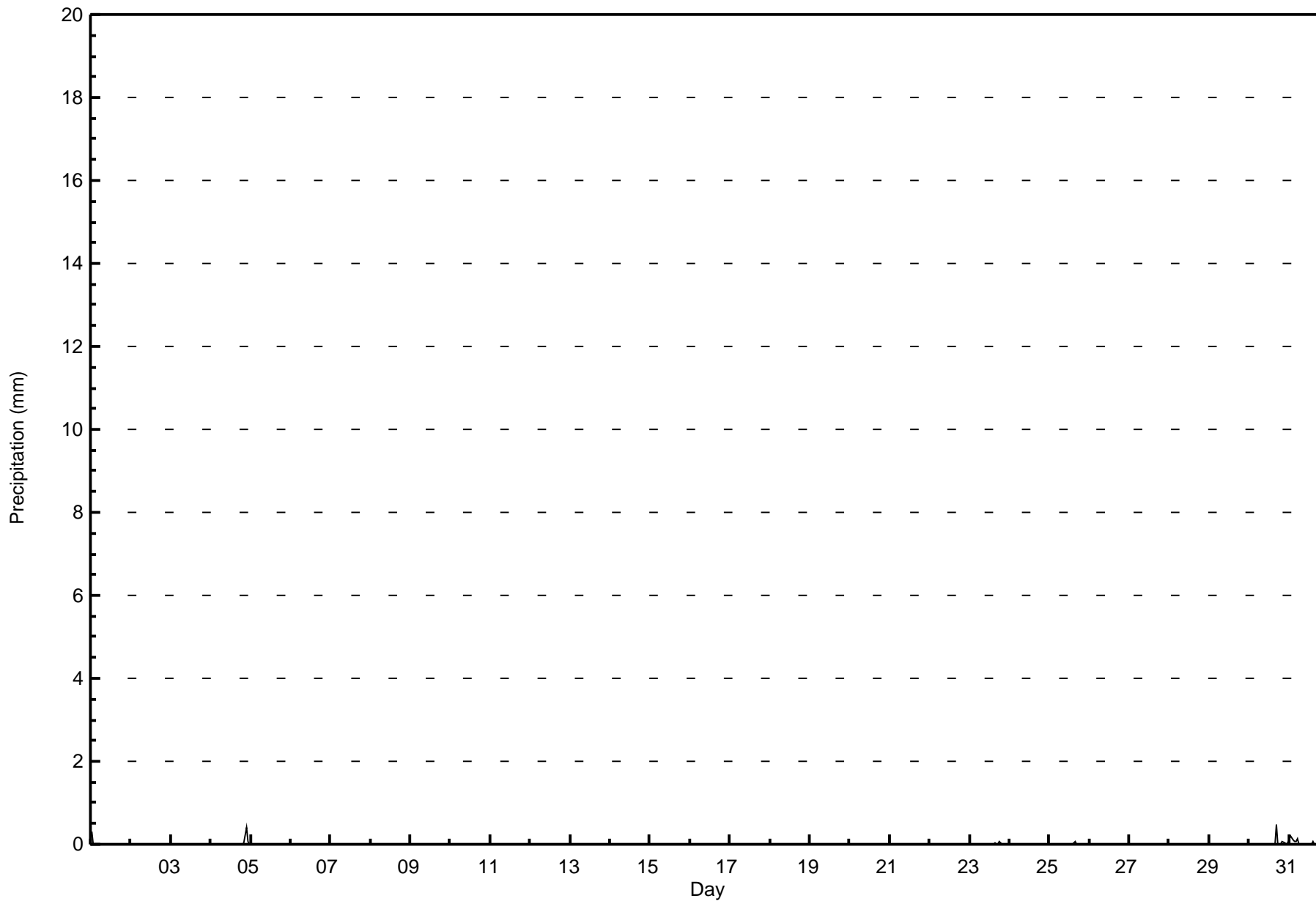
Wapasu - January 2017

Maximum Value: 0.5 mm on Jan 30 17:00 Maximum Daily Total: 0.9 mm on Jan 31																								Hours in Service: 744			
Minimum Value: 0.0 mm on Jan 1 02:00 Minimum Daily Total: 0.0 mm on Jan 2																								Hours of Data: 315			
Maximum Diurnal Total: 0.5 mm at hour 22 Minimum Diurnal Total: 0.0 mm at hour 7																								Hours of Missing Data: 429			
Monthly Total: 2.54 mm Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.3																								Hours of Calibration: 0			
																								Percent Operational Time: 42.3			
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-Jan	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	
2-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.1	0.0	0.5	0.4
5-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	--	0.0
6-Jan	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	--	--
7-Jan	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	--	--
8-Jan	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	--	--
9-Jan	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	--	--
10-Jan	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	--	--
11-Jan	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	--	--
12-Jan	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	--	--
13-Jan	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	--	--
14-Jan	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	--	--
15-Jan	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	--	--
16-Jan	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	--	--
17-Jan	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	--	--
18-Jan	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	--	--
19-Jan	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	--	--
20-Jan	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	--	--
21-Jan	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	--	--
22-Jan	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	--	--
23-Jan	DF	DF	DF	DF	DF	DF	DF	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	--	0.1	
24-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
26-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	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	0.1	0.1	0.0	0.1	0.6	0.5	
31-Jan	0.1	0.2	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	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.9	0.2	
																								Diurnal Average			
																								Diurnal Maximum			
DF - DAS Failure																											



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Wapasu - January 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Wapasu - January 2017

Maximum Speed: 28 km/h on Jan 11 12:00	Maximum Daily Speed Average: 12.2 km/h on Jan 16	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jan 23 21:00	Minimum Daily Speed Average: 0.6 km/h on Jan 4	Hours of Data: 691
Maximum Diurnal Speed Average: 3.3 km/h at hour 14	Minimum Diurnal Speed Average: 1.8 km/h at hour 3	Hours of Missing Data: 53
Monthly Average Velocity: 2.4 km/h 209.3 deg	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 4 Median = 6 O ₃ = 9 P ₉₀ = 12 P ₉₉ = 20	Percent Operational Time: 92.9

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-Jan	N19	N20	N18	N16	N20	N11	N9	N5	N5	NNW3	NW4	WNW4	NNW9	NNW10	NNW6	WNW2	SE1	NNE1	SSE3	SE1	ESE3	SSE3	NNE3	ENE2	N6.3	N20
2-Jan	SE2	SE3	SE2	SSE2	WSW2	SSE4	E0	SW2	WNW2	NE1	SE3	N3	NNE5	NNE3	ENE0	SW3	SSW2	SSW3	SSW3	S4	SSE4	S5	S5	S5	S1.3	NNE5
3-Jan	SSE5	S5	S6	S5	S5	S5	S6	S6	SSW5	S5	S6	SSW4	SW6	SW5	SSW4	WSW5	SW5	SW5	W3	NW3	NNW5	NNW8	N9	NNE9	SSW2.5	NNE9
4-Jan	NNE10	NNE8	NNE7	NNE6	NNE4	N4	NNE3	NNE2	N2	SW0	SSW2	SSW3	SSW3	SSW4	S3	S4	SSW4	SSW4	SSW3	S3	S2	AF	AF	NNE0.6	NNE10	
5-Jan	N3	NNE3	NE4	NNE4	NNE4	NNE4	NNE4	NNE4	NNE4	NNE4	NNE5	N5	N4	NNE4	N4	NNE4	NNE3	N3	NNE3	NNE2	NNW3	NNW1	SW1	SSW2	NNE3.1	N5
6-Jan	SW3	SW3	SSW2	SSW2	S2	SSE2	SSE2	SSE2	SSE2	SSE2	SSE2	SSE2	S2	SSE2	SSE2	SSE2	SSE2	S2	SSE2	SSE2	SSE1	AF	AF	S2.1	SW3	
7-Jan	NE2	ENE1	NE2	NE2	NNE2	NE2	NE3	NE3	NNE3	NNE3	NNE3	NNE4	NNE4	N5	N5	N4	N4	N3	NNE3	NNE2	NNE2	AF	AF	NNE2.8	N5	
8-Jan	AF	AF	SSE2	SSE2	S2	SSE3	S3	S3	S3	SSW4	SSW4	SW4	SW4	SSW4	SW5	SW6	SW5	S3	SW4	SW5	SW5	SW5	SW4	SSW3.4	SW6	
9-Jan	SW4	SW4	SSW3	SSW4	SW4	SW4	S2	S2	SSE2	SSE1	SSE1	SW1	WNW1	NNW3	N2	NNW2	N1	NNE2	N3	AF	AF	AF	AF	ENE2	SW1.0	SW4
10-Jan	AF	NE1	AF	AF	AF	AF	AF	NNE0	NE3	NNE2	N3	N3	N3	NNE1	AF	AF	S2	S2	S2	S2	SSW3	S3	S3	---	N3	
11-Jan	S4	SSW4	SSW4	S5	SSW5	SSW5	SW6	WSW3	NNW5	N6	N20	NNW28	NNW26	N25	NNW25	NNW23	NNW19	NNW19	NNW17	NNW15	NNW12	NNW10	NNW6	SW1	NNW9.5	NNW28
12-Jan	SE3	SE4	SE4	SSE5	SSE7	SSE7	S10	S11	S11	SSE11	SSE11	S12	S13	SSE13	SSE12	SSE15	SSE19	SSE15	SSE17	S13	SSE16	SSE15	S12	S10	SSE10.9	SSE19
13-Jan	SSW9	SSW9	SSW7	SW8	SW5	WSW2	S3	SSE4	SSE6	S6	S6	SSW6	SW9	SW8	SW7	S7	S6	S6	S7	S7	S7	S7	S8	S10	SSW6.3	S10
14-Jan	S10	S10	S9	S9	S10	S9	S10	S9	S10	S10	S11	SSW11	SW11	SSW12	SW15	SW11	SSW8	S7	S6	S7	S8	SSW10	S8	S7	SSW9.0	SW15
15-Jan	SW13	SW13	SSW7	SW9	SW11	SW10	SW9	SSW8	SW14	SW15	SW14	SW14	SW11	SW12	SSW8	S7	S7	S7	S7	S8	S7	SSW8	S8	S8	SSW9.9	SW15
16-Jan	S8	S9	S10	S10	S11	S10	S11	S10	SSW13	S10	SSW12	SSW16	SSW13	SSW13	SSW14	SW17	SW18	SW19	SW17	SW17	SW15	SW14	SSW11	SSW9	SSW12.2	SW19
17-Jan	S8	S9	S11	S9	SSW9	SW13	SW14	WSW16	WSW16	WSW12	WSW12	SW10	SW10	SW9	SSW8	S8	S7	S6	S7	S8	SSE6	SSE6	SSE7	S8	SSW8.2	WSW16
18-Jan	SSE7	SSE8	SSE7	SSE6	SSE5	SE5	SE7	SE9	SE10	SE9	SSE5	SW6	SSE10	SW8	S6	SSW6	S7	S7	S7	S7	S7	S6	SSE6	SSE6	SSE6.4	SE10
19-Jan	SSW3	NNE3	NE8	NE5	NE7	NE8	NE10	ENE10	NE6	NE8	NE7	NNE6	NNE6	N6	N6	NNE6	NNE6	NNE5	NNE5	NNE5	NNE3	NW3	WSW7	ESE3	NNE4.9	ENE10
20-Jan	SE2	SSE1	SSW5	SSW7	S8	SSW9	S8	S8	S8	S7	SSW8	SSW9	SSW7	SSW7	S8	S7	S6	SSE7	SSE7	SE3	NE3	NNE6	NE9	NE9	S4.3	NE9
21-Jan	NE9	NE9	NE9	NE9	NNE10	NNE9	NNE8	NNE9	NNE8	NNE7	N8	N9	N9	N7	N8	N7	N7	N7	N6	N7	N6	N7	NNE7	N7	NNE7.5	NNE10
22-Jan	N7	N7	NNE7	NNE7	NNE6	NNE5	NNE5	NNE4	NE4	NNE4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	N7
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	WSW2	SW1	AF	AF	AF	AF	AF	AF	SSW0	SSW0	SSW1	S2	---	S2
24-Jan	S3	S3	S3	S3	S3	S3	S3	SSE3	S3	S4	S3	S4	S4	S4	S4	S4	S4	S5	S5	S4	S5	S4	S4	S4	S3.7	S5
25-Jan	S5	S5	S5	S5	S5	S5	S5	S5	S5	S5	S4	S5	SSW5	SSW5	SSW5	SSW4	SSW5	SSW5	S6	SSW6	SSW7	SSW7	SSW7	S7	S5.2	SSW7
26-Jan	S6	SSW6	S6	S6	S5	S5	S5	S5	SSE5	S5	S6	SSW7	SSW6	SW7	SW9	SW9	SW10	SW7	SSW6	SW7	SW5	SSW5	S5	S5	SSW5.8	SW10
27-Jan	SSW7	SSW6	S4	S5	SSW6	SSW6	SW7	SSW6	SW9	SW7	SW8	SW9	WSW9	WSW10	SSW7	SW9	SSW7	SW11	SW8	SW7	SW9	SW11	SW10	SW8	SSW7.4	SW11
28-Jan	SW9	SW9	SSW8	S7	S7	S8	S8	S7	SSE7	S7	SSE6	SSE7	SSE7	SSE7	SSE8	S8	S9	S8	SSE7	SSE8	SE5	SSW7	SW9	SSW8	S7.0	SW9
29-Jan	SSW9	SW14	SW12	SW10	SW11	SW11	SSW9	SSW7	SSW8	SW14	SW18	SW16	WSW15	WSW15	WSW12	WSW12	SW9	SW9	SW6	S2	SW5	SSW4	S5	SSW7	SSW9.8	SW18
30-Jan	SW7	SW8	SW7	SW8	SW11	SW9	WSW9	W7	W8	N16	N15	N18	N16	NNW15	N14	N14	N15	N18	N18	NNW18	NNW17	NNW17	N18	N17	NNW9.4	NNW18
31-Jan	N15	N10	N13	N11	NNW12	N8	NNW5	NNE4	S2	S3	SW6	WSW7	SW9	WSW10	WSW10	SW8	SW6	SW6	WSW7	W6	WNW4	NNW6	NNW10	N14	NNW4.2	N15

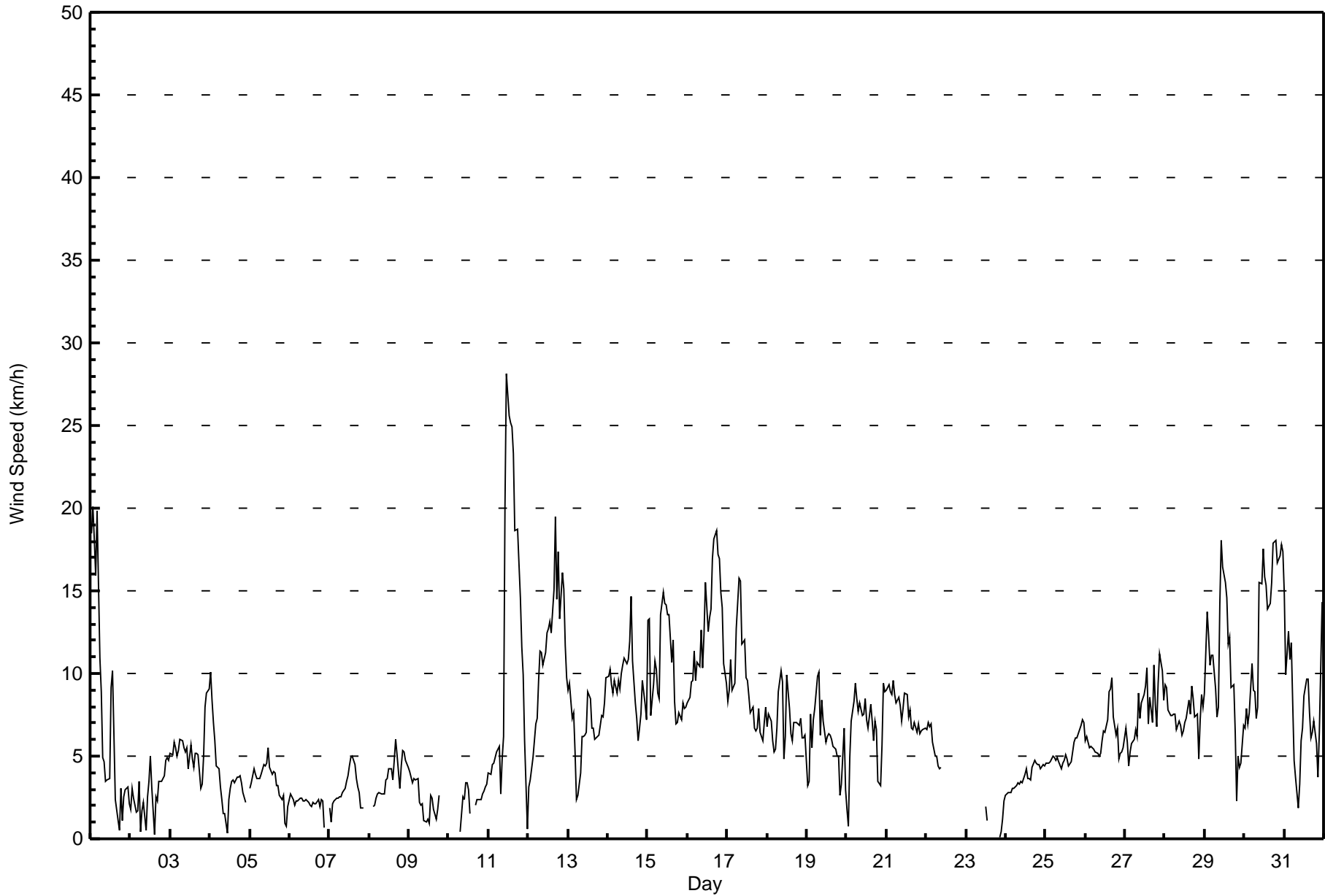
SSW2.0	SSW2.0	S1.8	S2.1	SSW2.1	SSW2.5	S2.7	S2.6	S2.8	SSW2.2	SSW2.5	WSW3.1	WSW3.0	WSW3.3	SW3.1	SW3.2	SSW3.1	SSW2.8	SSW2.5	SSW2.4	SSW2.2	SW2.5	SSW2.2	S2.1	Diurnal Average
N19	N20	N18	N16	N20	SW13	SW14	WSW16	WSW16	N16	N20	NNW28	NNW26	N25	NNW25	NNW23	SSE19	NNW19	N18	NNW18	NNW17	NNW17	N18	N17	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Wapasu - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Wapasu - January 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	304	43.99	43.99
6 - 11	301	43.56	87.55
12 - 19	78	11.29	98.84
20 - 28	8	1.16	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 691

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Wapasu - January 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	21	45	13	4	1	2	13	34	81	42	26	5	1	5	3	8	304
6 - 11	24	20	13	1	0	0	4	26	89	48	57	8	3	0	0	8	301
12 - 19	17	0	0	0	0	0	0	8	4	7	24	8	0	0	0	10	78
20 - 28	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	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
Totals	66	65	26	5	1	2	17	68	174	97	107	21	4	5	3	30	691

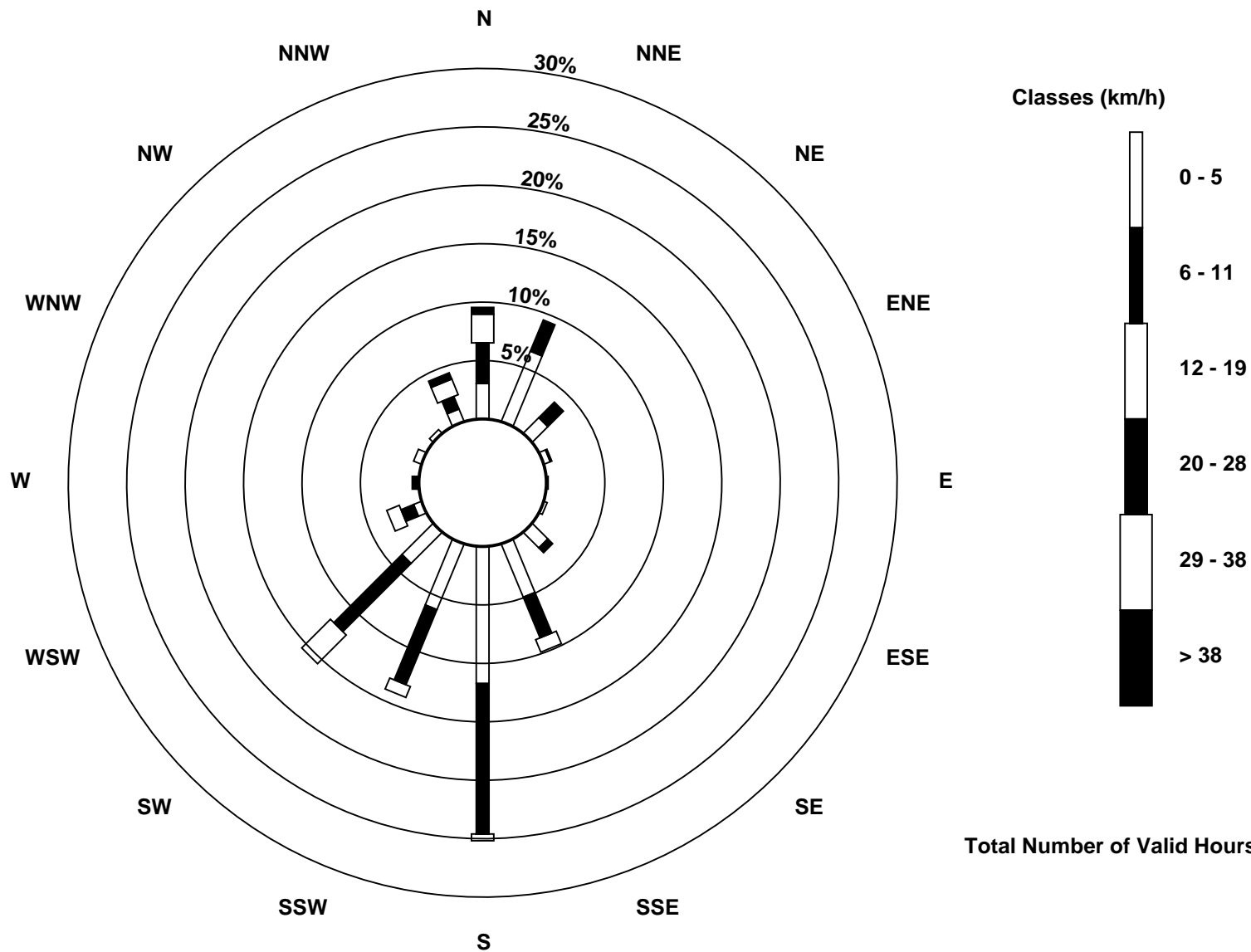
Total Number of Valid Hours: 691

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Wind Speed (WS) - km/h
Wapasu (AMS 17)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Wapasu - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 12 km/h on Jan 11 11:00	Hours of Data: 691
Minimum Value: 0 km/h on Jan 6 19:00	Hours of Missing Data: 53
Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6	Hours of Calibration: 0
	Percent Operational Time: 92.9

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-Jan	6	6	5	5	6	4	3	1	2	1	2	2	3	3	2	1	1	1	2	1	1	1	1	1	6	
2-Jan	1	1	1	1	1	1	2	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	3	
3-Jan	1	1	1	1	1	1	2	2	1	1	2	1	1	1	1	1	1	1	1	1	1	2	3	3	3	
4-Jan	3	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	AF	AF	3	
5-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
6-Jan	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	AF	AF	1	
7-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	AF	AF	AF	1	
8-Jan	AF	AF	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
9-Jan	1	1	1	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	AF	AF	AF	AF	0	1	
10-Jan	AF	1	AF	AF	AF	AF	AF	1	1	1	1	1	1	1	AF	AF	0	0	0	0	1	1	1	1	1	
11-Jan	1	1	1	1	1	1	2	1	1	2	12	9	8	8	7	6	5	5	5	5	3	3	2	2	1	12
12-Jan	1	1	1	1	1	1	3	3	3	3	3	4	4	4	4	4	5	4	5	5	5	4	3	3	5	
13-Jan	3	3	2	2	3	1	1	1	1	2	2	2	3	3	2	2	2	2	2	2	2	2	2	3	3	
14-Jan	3	3	3	2	3	3	3	3	3	3	4	3	3	4	4	3	3	2	2	2	1	2	4	2	4	
15-Jan	4	4	2	3	2	2	3	3	4	4	3	3	3	3	3	3	3	2	2	2	2	2	2	2	4	
16-Jan	2	2	2	2	3	3	3	3	4	3	4	5	4	4	4	5	4	5	5	4	3	4	4	3	5	
17-Jan	3	3	3	3	3	4	4	3	4	3	3	3	2	2	2	2	2	2	2	2	2	1	1	2	4	
18-Jan	1	2	2	1	1	1	2	3	3	4	3	3	4	3	2	2	2	2	2	2	2	1	1	1	4	
19-Jan	1	2	3	2	3	2	3	3	2	3	2	2	2	2	2	2	2	2	2	1	2	1	1	3	3	
20-Jan	1	2	2	2	3	3	3	2	2	2	2	2	2	2	2	2	1	2	1	1	2	2	3	3	3	
21-Jan	3	3	3	3	4	3	3	3	3	2	2	3	3	2	2	2	2	2	2	2	2	2	2	2	4	
22-Jan	2	2	2	2	2	2	2	3	2	2	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	3	
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	1	1	AF	AF	AF	AF	AF	AF	0	1	1	1	1	
24-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
25-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	
26-Jan	2	2	1	1	1	1	1	1	1	1	2	2	2	3	2	2	2	2	2	2	2	2	1	2	3	
27-Jan	2	2	1	1	1	1	2	2	2	2	3	2	3	3	2	3	2	2	2	2	2	2	2	2	3	
28-Jan	2	2	2	2	2	2	2	2	1	2	1	1	2	2	2	3	2	2	2	3	2	2	2	2	3	
29-Jan	3	3	4	3	3	3	3	2	2	4	5	4	4	4	3	3	2	2	2	2	2	2	2	2	5	
30-Jan	3	2	2	2	3	2	3	2	2	6	5	6	5	5	4	5	5	5	5	5	5	5	5	5	6	
31-Jan	5	3	4	3	3	2	2	1	1	1	1	2	2	2	2	1	1	1	2	2	1	1	3	4	5	
	6	6	5	5	6	4	4	3	4	6	12	9	8	8	7	6	5	5	5	5	5	5	5	5		

Diurnal Maximum

AF - Analyzer Failure



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Wapasu - January 2017

Direction of Maximum Speed: 347 deg on Jan 11 12:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 206.7 deg on Jan 16	Hours of Data: 691
Direction of Minimum Speed: 194 deg on Jan 23 21:00	Hours of Missing Data: 53
Direction of Minimum Daily Speed Average: 0.6 deg on Jan 4	Percent Operational Time: 92.9
Monthly Average Direction: 207.3 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-Jan	353	353	353	352	351	357	357	360	350	338	323	285	339	339	329	294	134	21	150	136	123	151	23	70	351.2
2-Jan	131	146	130	148	256	149	89	235	284	47	137	2	12	19	71	228	211	210	203	175	164	173	174	177	173.0
3-Jan	167	178	172	171	175	181	183	188	196	179	185	203	227	214	212	243	221	235	263	306	329	342	4	15	209.7
4-Jan	14	14	28	14	12	8	20	19	351	353	221	210	197	199	211	190	188	196	194	194	178	191	AF	AF	12.7
5-Jan	354	17	40	33	29	25	23	24	20	15	17	10	10	13	11	21	20	8	25	14	343	339	222	212	16.4
6-Jan	222	214	200	192	173	165	154	156	162	165	163	168	163	172	165	160	157	154	171	167	153	158	AF	AF	171.1
7-Jan	47	70	51	44	33	46	46	41	33	31	29	15	12	358	1	8	8	6	21	22	21	AF	AF	AF	22.2
8-Jan	AF	AF	147	158	169	163	172	169	177	179	197	205	216	215	208	216	227	222	186	218	233	228	228	222	206.1
9-Jan	224	218	210	210	217	221	189	179	163	167	156	216	293	329	358	340	9	15	9	AF	AF	AF	AF	71	223.2
10-Jan	AF	44	AF	AF	AF	AF	AF	33	34	13	7	1	351	18	AF	AF	170	178	181	187	192	187	178	181	--
11-Jan	191	192	196	191	204	212	222	250	346	358	356	347	346	349	346	347	344	348	347	348	346	345	334	227	342.1
12-Jan	132	130	135	148	151	164	169	175	172	168	164	175	177	164	161	153	155	160	159	175	168	168	178	188	165.1
13-Jan	194	210	208	224	221	240	173	162	153	173	179	194	230	227	217	186	177	190	181	181	178	179	180	178	193.6
14-Jan	180	186	178	171	178	177	184	177	180	176	188	202	214	213	226	220	205	187	185	179	184	208	186	183	192.0
15-Jan	224	225	210	217	235	228	215	202	224	226	225	231	236	229	220	226	205	190	182	179	185	195	186	180	215.7
16-Jan	182	188	182	183	182	187	188	181	196	191	202	210	202	206	212	223	227	225	223	226	228	223	206	195	206.7
17-Jan	178	170	176	191	195	221	229	239	238	258	240	225	228	225	203	181	182	181	175	176	157	164	168	169	205.4
18-Jan	162	158	154	158	154	127	130	134	130	138	164	224	155	218	180	193	179	171	177	180	171	175	158	161	162.8
19-Jan	199	29	36	35	34	49	50	57	45	43	49	28	26	11	6	15	15	27	25	30	23	324	250	104	32.4
20-Jan	137	158	203	195	190	196	186	184	182	179	193	212	209	200	175	177	175	158	149	129	34	27	39	45	176.2
21-Jan	47	43	39	38	33	33	27	24	15	14	7	1	0	3	1	8	9	6	8	3	8	5	12	8	17.5
22-Jan	5	3	16	17	18	23	16	23	39	28	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	242	233	AF	AF	AF	AF	AF	AF	194	194	196	189	--
24-Jan	185	183	183	184	181	172	172	167	170	171	180	183	183	185	187	188	173	175	181	183	189	186	190	181	180.7
25-Jan	186	182	179	173	169	170	170	176	180	180	182	194	201	198	196	197	192	180	192	196	193	193	192	189	186.3
26-Jan	187	195	179	183	177	172	173	177	167	172	185	202	203	216	223	226	236	226	212	218	218	211	176	181	199.9
27-Jan	195	197	171	184	201	211	214	203	226	217	226	234	254	247	212	216	207	225	227	218	225	230	226	219	219.5
28-Jan	223	222	207	187	185	171	186	175	157	171	166	166	166	156	166	174	176	171	163	164	145	200	218	210	181.7
29-Jan	208	226	219	218	221	219	208	210	194	221	224	232	237	244	252	238	233	226	226	180	215	196	184	198	223.0
30-Jan	226	215	225	224	228	227	252	260	270	350	1	357	355	343	354	357	351	352	350	347	347	347	349	351	335.1
31-Jan	360	7	360	2	347	354	337	14	177	184	229	238	232	245	242	234	227	229	255	274	288	327	343	355	310.7

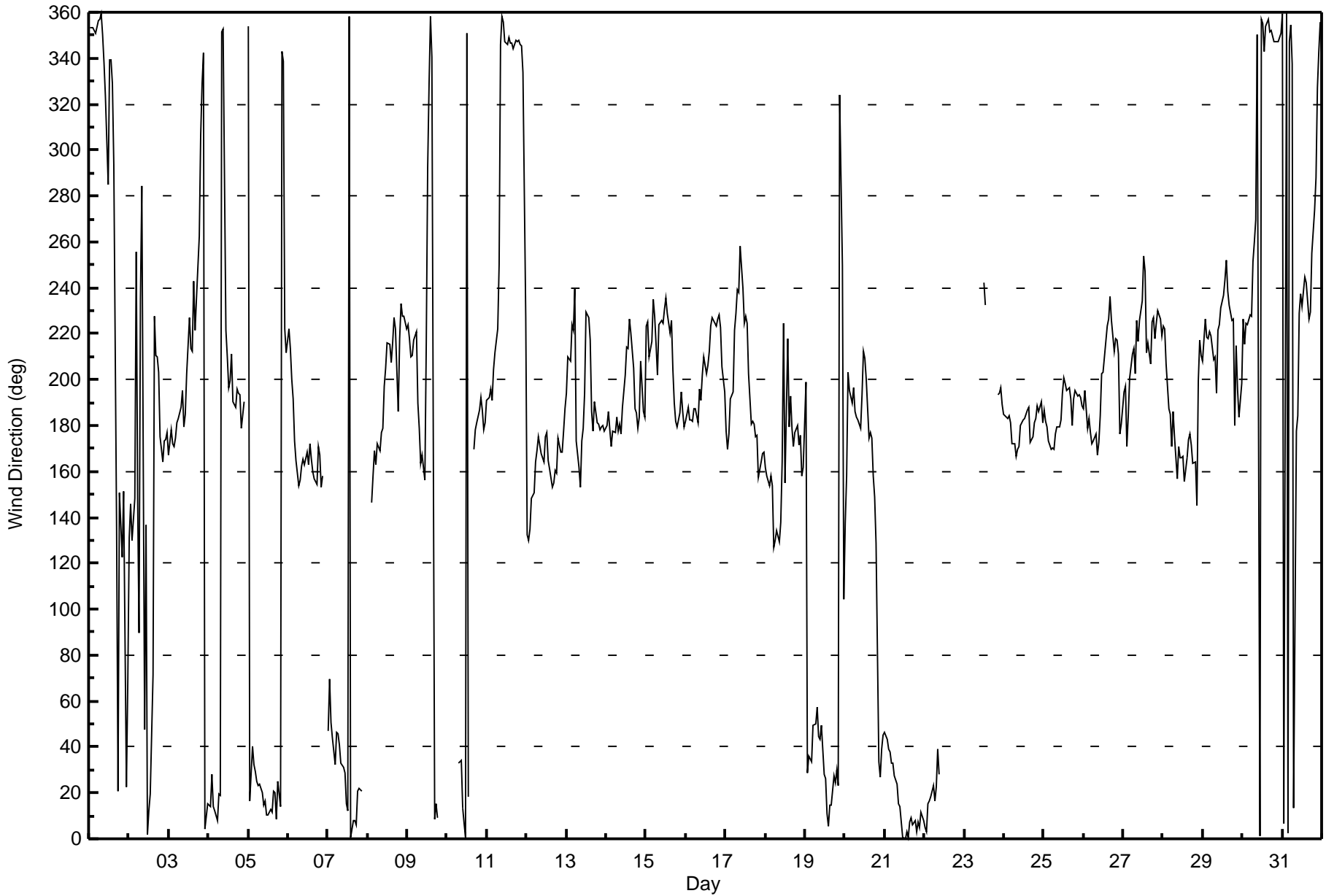
201.1 203.9 180.4 188.2 200.9 192.3 190.9 183.0 191.1 194.5 211.2 239.2 244.2 246.7 235.6 226.2 210.4 210.3 202.2 206.1 204.8 216.4 208.2 185.1
 Diurnal Average

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Wapasu - January 2017





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Wapasu - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 93 deg on Jan 2 15:00	Hours of Data: 691
Minimum Value: 7 deg on Jan 12 05:00	Hours of Missing Data: 53
Percentiles: P ₁ = 11 P ₁₀ = 16 Q ₁ = 20 Median = 25 O ₃ = 29 P ₉₀ = 33 P ₉₉ = 82	Hours of Calibration: 0
	Percent Operational Time: 92.9

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-Jan	25	22	23	21	20	23	22	25	25	34	42	39	19	18	18	42	84	82	45	88	23	26	28	42	88	
2-Jan	35	21	26	57	61	21	82	56	35	73	42	41	31	33	93	23	22	18	23	25	15	21	21	25	93	
3-Jan	14	22	17	19	17	22	26	28	27	24	28	28	18	22	23	21	21	28	41	36	20	16	26	31	41	
4-Jan	29	29	30	28	30	27	31	30	41	46	89	30	28	28	27	29	26	27	27	28	24	25	26	31	89	
5-Jan	22	32	29	29	30	29	29	30	31	29	31	29	30	29	29	33	33	30	34	36	24	25	69	87	87	
6-Jan	19	24	27	28	24	16	10	11	15	19	18	24	18	22	14	12	9	8	12	15	14	64	AF	AF	64	
7-Jan	21	16	31	27	29	27	26	27	28	30	31	31	30	25	29	29	30	30	29	26	19	AF	AF	AF	31	
8-Jan	AF	AF	9	11	15	15	21	19	23	26	27	28	24	25	25	25	18	22	31	26	17	16	16	19	31	
9-Jan	19	24	25	25	23	22	25	22	17	14	18	32	54	38	34	42	61	49	37	AF	AF	AF	AF	35	61	
10-Jan	AF	39	AF	AF	AF	AF	AF	14	28	35	32	30	28	49	AF	AF	12	18	16	19	23	26	23	28	49	
11-Jan	29	31	31	30	30	26	22	66	30	26	28	21	19	21	20	18	17	18	18	18	16	15	17	79	79	
12-Jan	11	8	10	12	7	15	23	25	25	25	24	29	27	23	22	19	20	26	22	33	23	24	27	31	33	
13-Jan	28	25	24	17	33	58	35	19	13	23	24	29	17	17	21	29	24	26	23	20	20	23	28	26	58	
14-Jan	28	28	24	23	25	28	26	28	26	28	29	26	26	23	18	22	26	23	23	18	23	28	26	27	29	
15-Jan	18	21	32	25	15	19	23	25	18	16	16	17	16	16	19	16	26	26	23	21	25	25	24	22	32	
16-Jan	26	27	26	25	28	28	29	29	29	31	26	24	27	26	22	18	15	16	17	17	16	21	27	30	31	
17-Jan	28	24	32	31	29	20	19	14	19	24	19	20	15	20	28	25	23	23	22	22	15	16	17	20	32	
18-Jan	17	18	17	18	19	13	16	22	18	21	49	31	31	34	25	28	22	23	22	22	21	18	16	16	49	
19-Jan	60	43	27	29	28	26	22	26	32	30	22	28	34	26	23	29	28	32	28	33	55	49	31	56	60	
20-Jan	46	86	33	29	29	29	28	27	29	27	31	24	23	28	27	25	20	16	12	54	35	30	26	23	86	
21-Jan	22	26	27	28	27	29	29	30	29	31	27	25	25	27	27	28	29	29	30	28	28	27	30	30	31	
22-Jan	28	26	30	31	31	31	30	28	29	32	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	32	
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	28	13	AF	AF	AF	AF	AF	AF	AF	13	16	21	29	29
24-Jan	28	28	27	28	27	24	24	23	23	22	25	27	28	30	30	29	23	27	31	32	28	30	29	30	32	
25-Jan	29	29	30	26	26	24	23	26	26	30	30	30	28	28	27	28	30	31	32	29	29	28	30	27	32	
26-Jan	30	30	24	24	21	20	20	23	22	24	30	24	29	26	18	14	14	17	22	22	44	30	15	24	44	
27-Jan	25	21	25	18	26	22	19	27	18	21	22	25	24	21	25	21	22	17	19	18	16	15	15	19	27	
28-Jan	16	16	25	28	26	19	23	21	12	22	19	21	23	20	25	28	27	23	21	24	31	24	21	21	31	
29-Jan	27	16	23	20	17	21	22	35	29	20	16	16	17	20	23	18	17	14	19	58	29	33	31	26	58	
30-Jan	35	23	22	18	15	16	23	25	26	31	27	26	23	21	25	25	24	21	21	19	19	19	20	21	35	
31-Jan	25	27	24	27	19	20	19	28	48	33	21	30	18	20	18	18	16	16	26	29	37	17	22	24	48	
	60	86	33	57	61	58	82	66	48	73	89	41	54	49	93	42	84	82	45	88	55	69	87	79		

Diurnal Maximum

AF - Analyzer Failure



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	January 25, 2017	Last Calibration	December 20, 2017
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	9:05	End Time (MST)	11:38
Gas Cert Reference	SA130010A	Station temp.	22 Deg C
Cal Gas Concentration	47.8 ppm	Cal Gas Exp Date	December 12, 2016
Calibrator Make/Model	API T700	Serial Number	997
ZAG Make/Model	API 701	Serial Number	4427
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2633

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-654	-654
Analyzer IP address	192.168.1.43		Lamp voltage	1002	1002
Calculated slope	0.994993	1.001116	Chamber temp	45.1	45.1
Calculated intercept	1.417486	0.219122	Pressure	690.4	690.4
Analyzer Background	8.8	8.8	Flow	0.452	0.452
Analyzer Coefficient	1.047	1.047	Intensity	92	92

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	0.4	----
as found span	5000	60.5	578.4	577.1	1.002
calibrator zero	5000	0.0	0.0	0.4	----
high point	5000	60.5	578.4	577.1	1.002
second point	5000	30.2	288.7	290.0	0.996
third point	5000	15.2	145.3	142.9	1.017
as left zero	5000	0.0	0.0	0.7	----
as left span	5000	60.5	578.4	583.9	0.991
Average Correction Factor					1.005

Corrected As found 576.7 Previous response 579.9 % change 0.6%

Notes:

Inlet filter changed after as founds. No maintenance or adjustments done

Calibration Performed By: Melissa Lemay



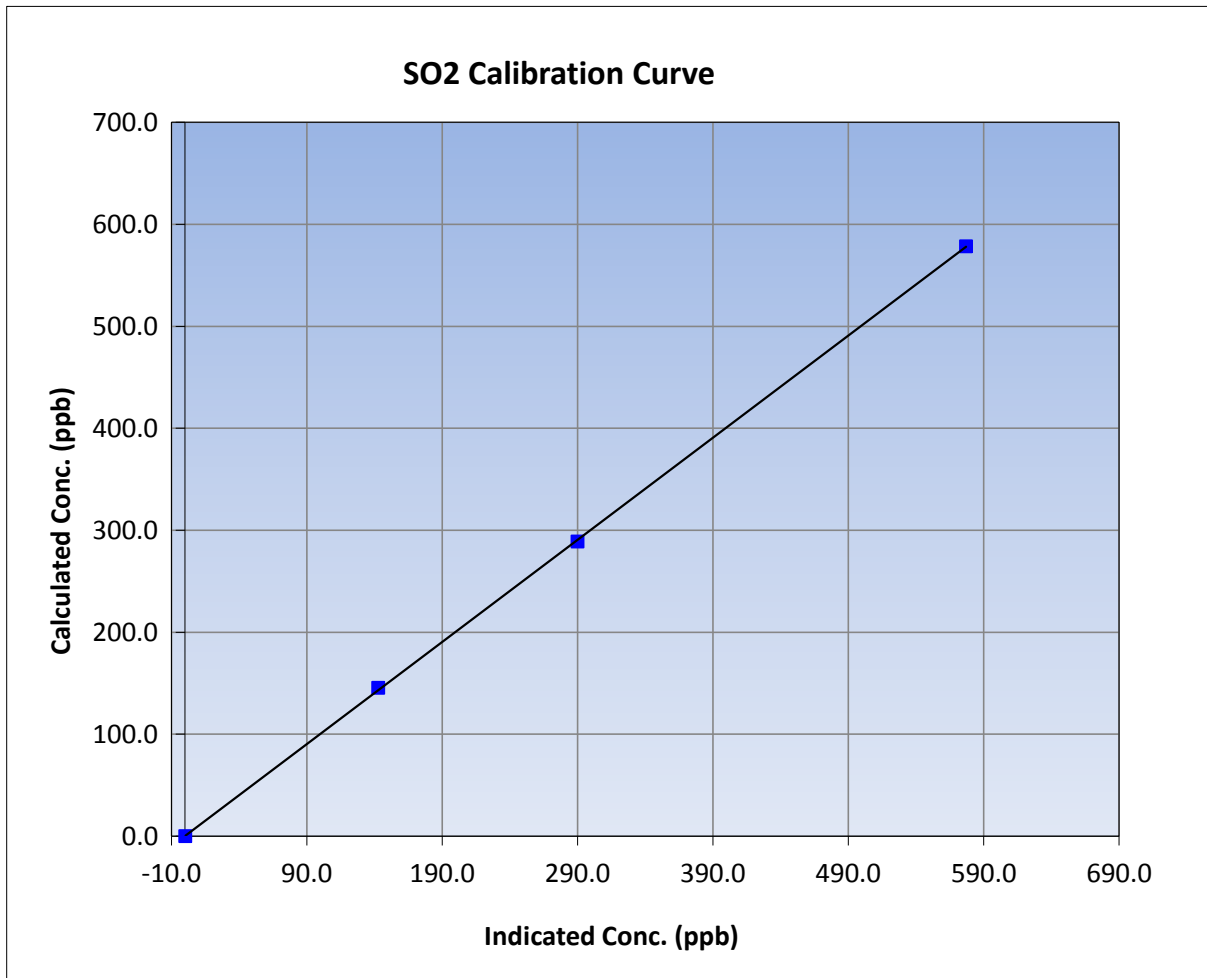
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 25, 2017	Previous Calibration	December 20, 2017
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	9:05	End Time (MST)	11:38
Analyzer make	Thermo 43i	Analyzer serial #	1218153459

Calibration Data

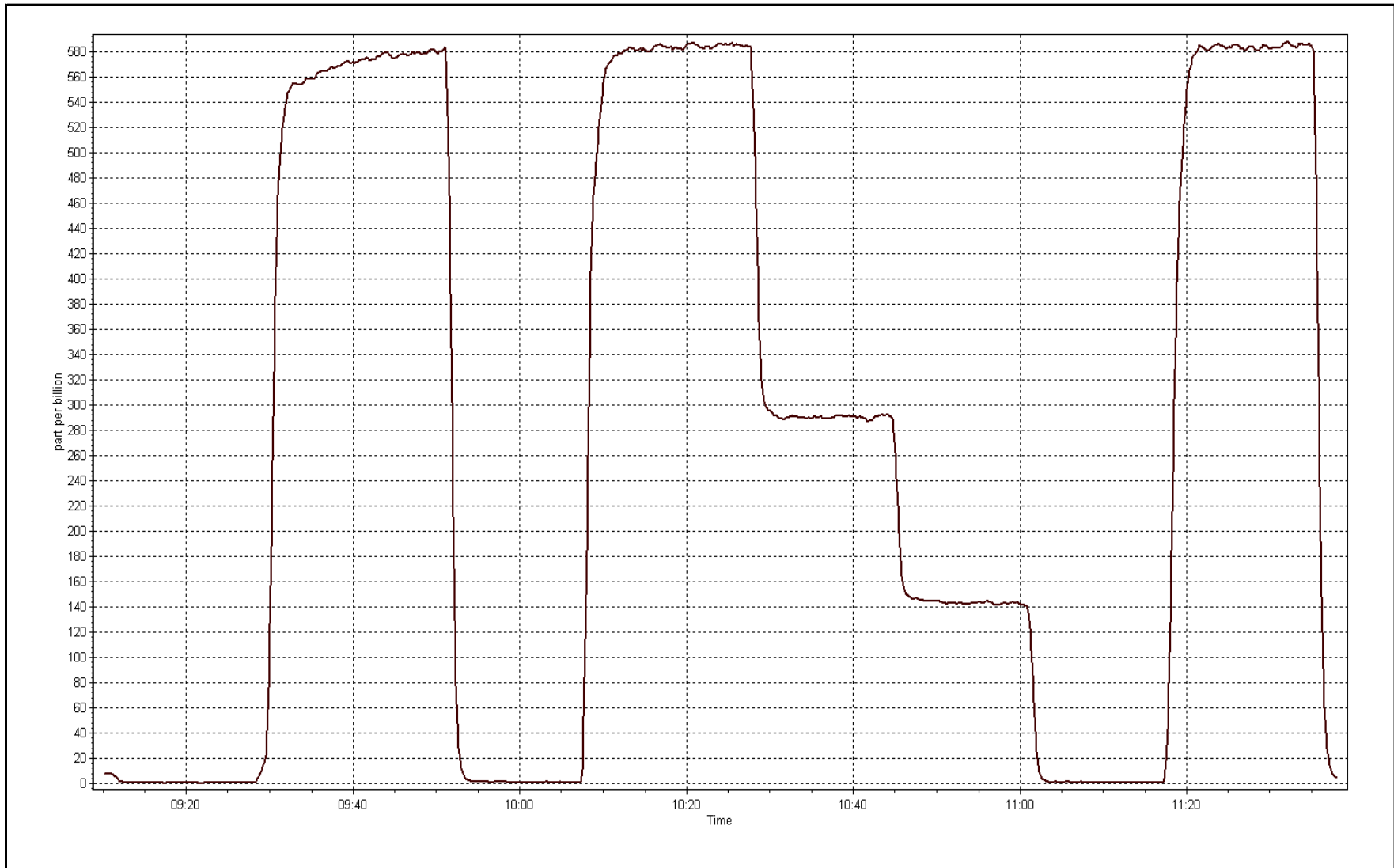
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	----	Correlation Coefficient	0.999956
578.4	577.1	1.0022		
288.7	290.0	0.9956	Slope	1.001116
145.3	142.9	1.0169		
			Intercept	0.219122



SO2 Calibration Plot

Date:

January 25, 2017





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	January 19, 2017	Last Calibration	December 8, 2016
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	10:06	End Time (MST)	12:32
Gas Cert Reference	CC107167	Station temp.	21 Deg C
Cal Gas Concentration	5.1 ppm	Cal Gas Exp Date	September-09-17
Calibrator Make/Model	API T700	Serial Number	997
ZAG air Make/Model	API 701	Serial Number	4427
DACS make/model	Campbell Scientific CR3000	Serial Number	2633
SO2 gas concentration	47.8 ppm	SO2 gas cert/exp	SA130010A December-12-16

Analyzer Information

	Before	After		Before	Before
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-675	-675
Analyzer IP address	192.168.1.45		Lamp voltage	760	760
Calculated slope	0.989458	0.996339	Chamber temp	45	45
Calculated intercept	-0.114267	0.051175	Pressure	536.9	536.9
Analyzer Background	15	15	Flow	0.970	0.970
Analyzer Coefficient	1.055	1.055	Intensity	100	100
			Converter temp.	339	339

Analyzer make/model	Thermo 450i	Analyzer serial #	1218153583
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	5018	78.2	79.5	79.7	0.997
SO2 scrubber check	5081	14.8	139.2	1.4	----
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5019	78.3	79.6	79.7	0.998
second point	5056	39.1	39.4	39.7	0.993
third point	5076	19.5	19.6	19.7	0.995
as left zero	5019	0.0	0.0	0.1	----
as left span	5020	78.2	79.4	80.4	0.988
Average Correction Factor					0.995

Corrected As found	79.9	Previous response	80.4	% change	0.7%
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Notes:

filter changed out, no maintenance or adjustments done

Calibration Performed By: Melissa Lemay



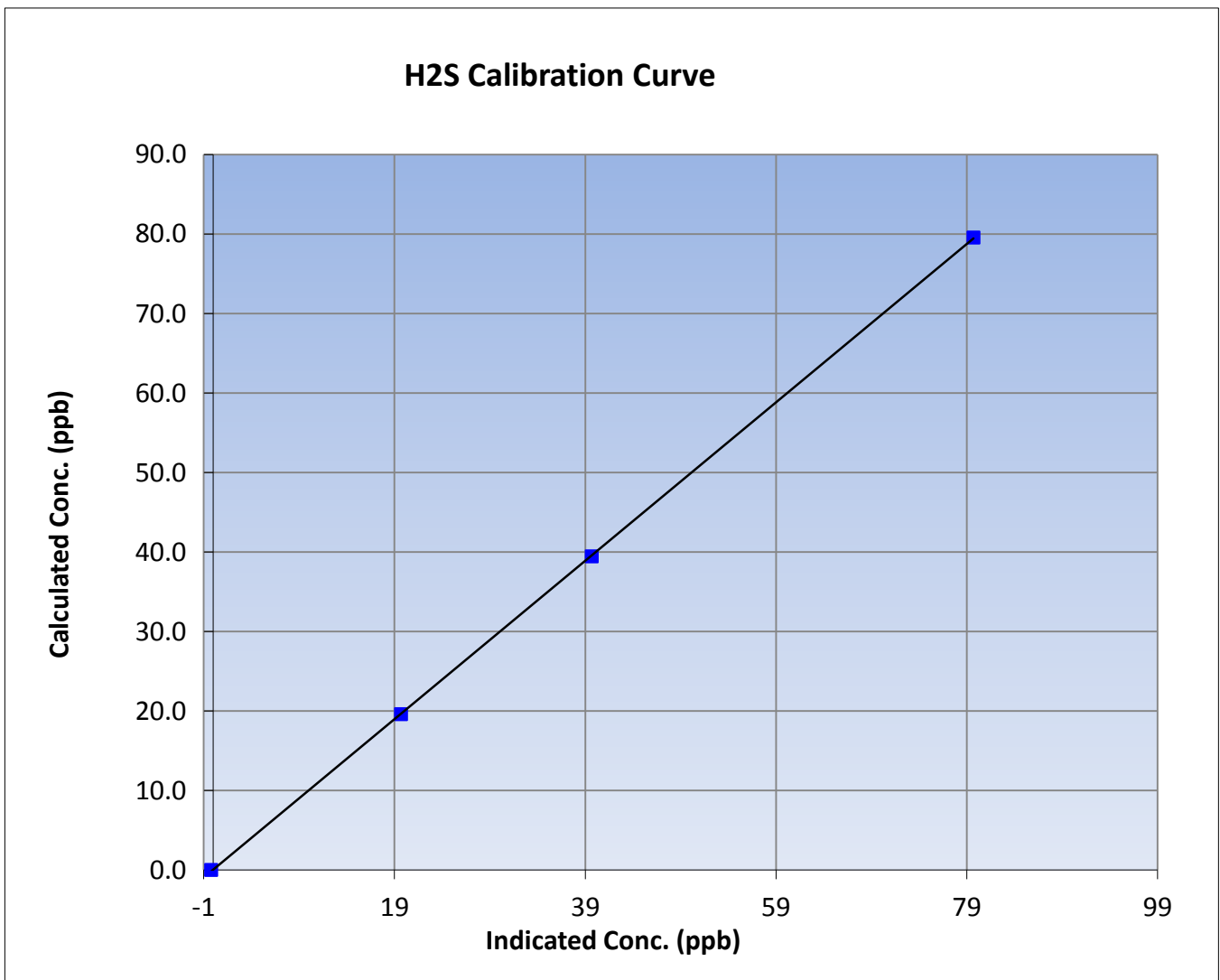
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	January 19, 2017	Previous Calibration	December 8, 2016
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	10:06	End Time (MST)	12:32
Analyzer make	Thermo 450i	Analyzer serial #	1218153583

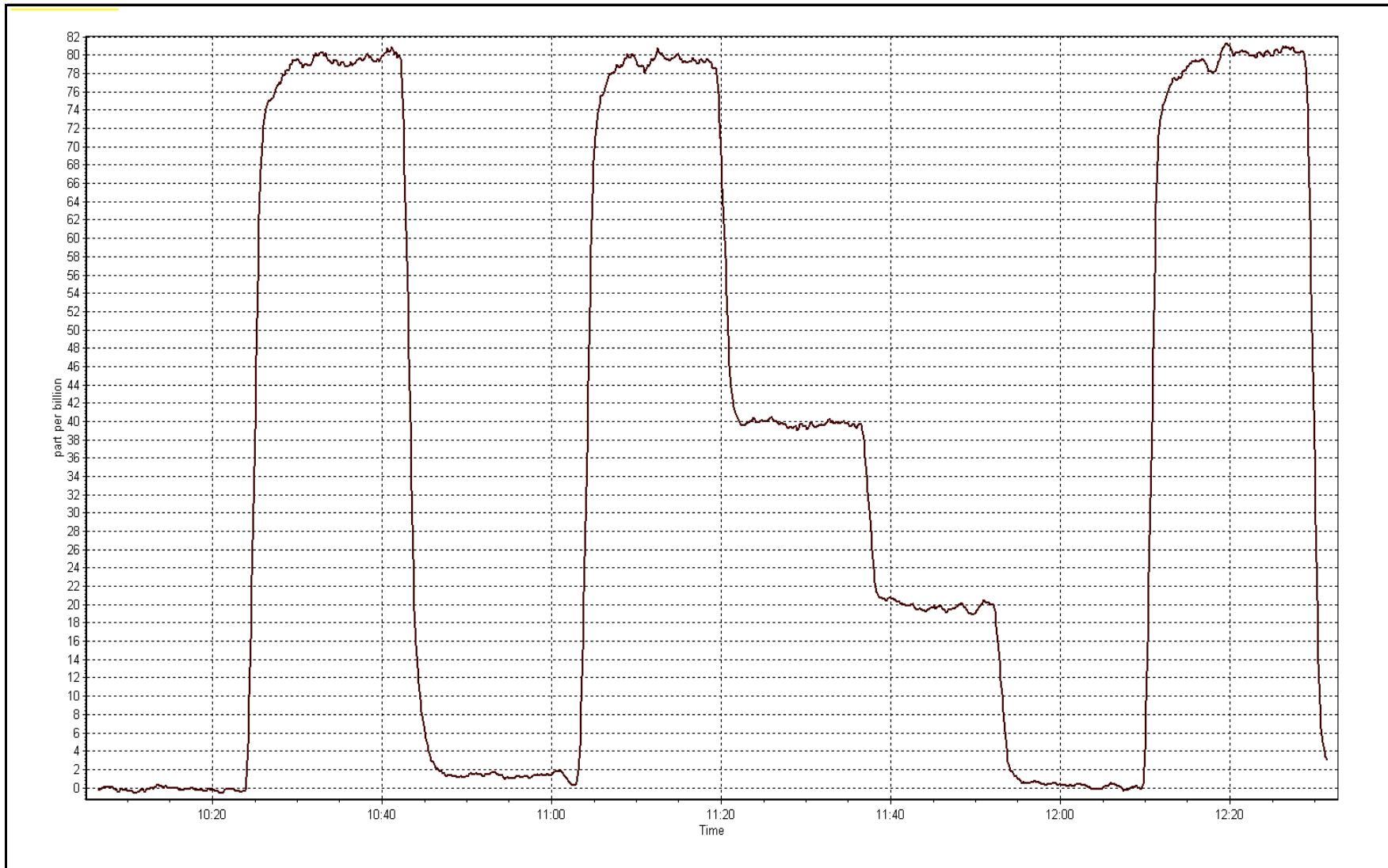
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999980
79.6	79.7	0.9983		
39.4	39.7	0.9935	Slope	0.996339
19.6	19.7	0.9945		
			Intercept	0.051175



H2S Calibration Plot

Date: January 19, 2017





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	January 25, 2017	Last Calibration	December 20, 2016
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	9:05	End Time (MST)	11:37
Gas Cert Reference	SA130010A	Cal Gas Expiry Date	December 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	997
ZAG make/model	Teledyne API 701	Serial Number	4427
DACS make/model	Campbell Scientific CR3000	Serial Number	2633

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	38.6	38.6
Calculated slope	0.997598	0.997649	Fuel Pressure	24.8	24.8
Calculated intercept	0.002385	-0.025346	Analyzer Coeff	4.513	4.466
			Analyzer BKG	2.950	2.920

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	-0.09	----
as found span	5000	60.5	13.22	13.38	0.988
calibrator zero	5000	0.0	0.00	-0.01	----
high point	5000	60.5	13.22	13.25	0.997
second point	5000	30.2	6.60	6.67	0.989
third point	5000	15.2	3.32	3.38	0.982
as left zero	5000	0.0	0.00	0.13	----
as left span	5000	60.5	13.22	13.22	1.000
Average Correction Factor					0.990

Corrected As found 13.47 Previous response 13.25 % change -1.7%

Notes:

Inlet filter changed after as founds. Adjusted span. Hydrogen changed out

Calibration Performed By:

Melissa Lemay



Wood Buffalo Environmental Association THC Calibration Report

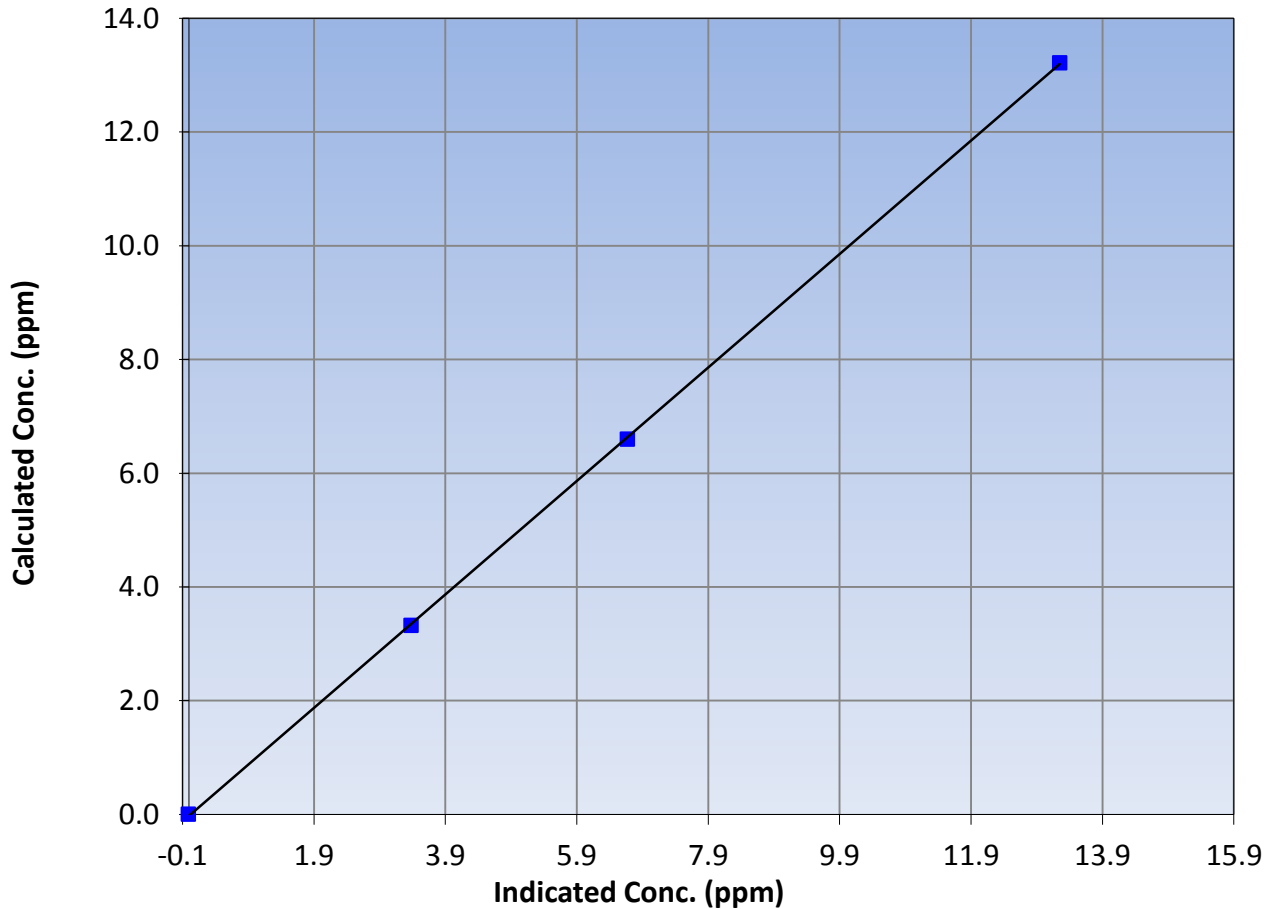
Station Information

Calibration Date	January 25, 2017	Previous Calibration	December 20, 2016
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	9:05	End Time (MST)	11:37
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153352

Calibration Data

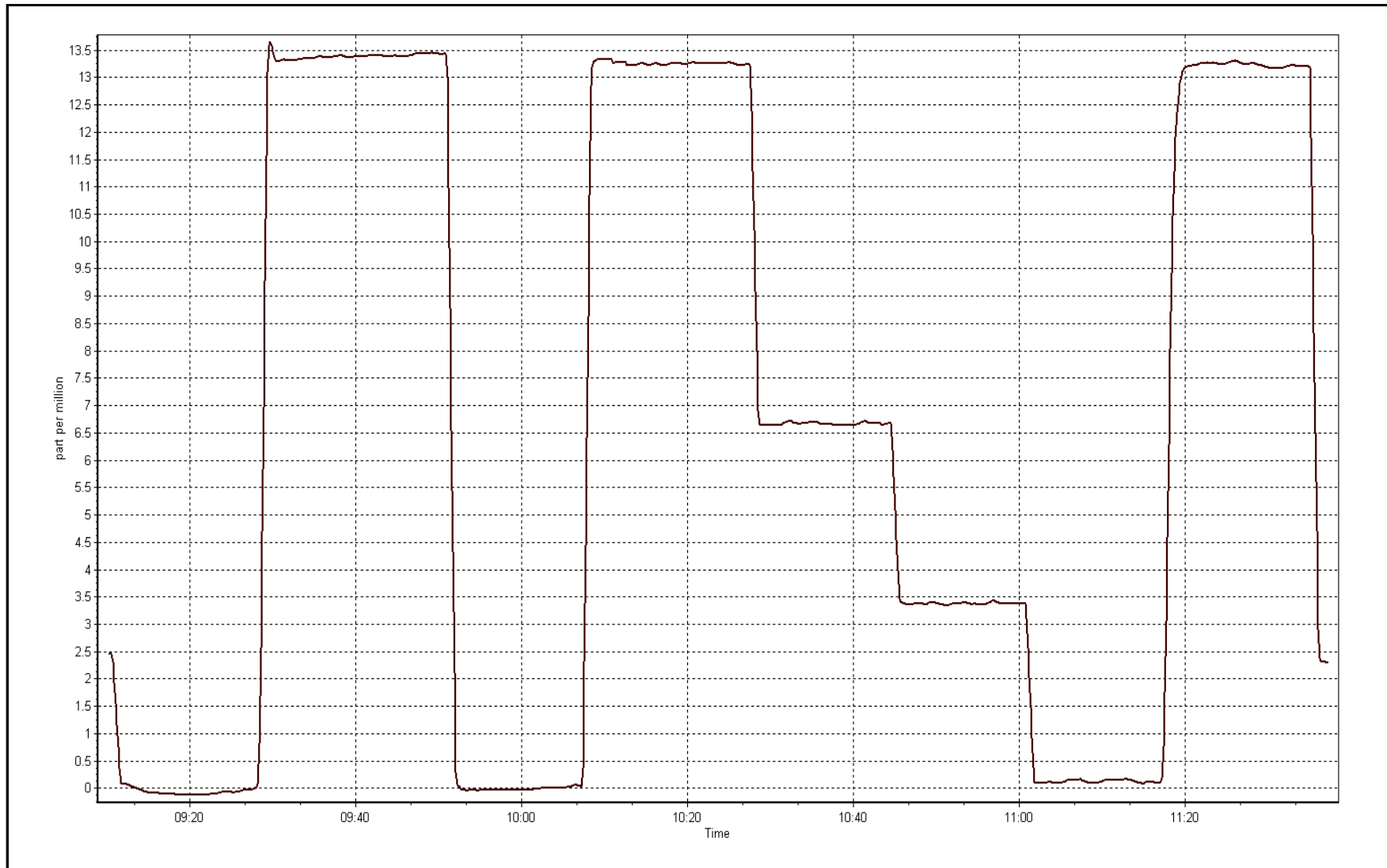
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.01	----	Correlation Coefficient	0.999964
13.22	13.25	0.9975		
6.60	6.67	0.9891	Slope	0.997649
3.32	3.38	0.9824		
			Intercept	-0.025346

THC Calibration Curve



THC Calibration Plot

Date: January 25, 2017





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	January 19, 2017	Previous Calibration	December 20, 2016
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	7:55	End Time (MST)	10:08
NO2 GPT Ref date	January 16, 2017	Transfer Standard	GPT
		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	2633

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	25.8	25.8
Analyzer IP address	192.168.1.72		Lamp temp.	58.0	58.0
Calculated slope	1.003685	1.005907	Pressure	25.6	25.6
Calculated intercept	-1.725603	0.279809	Flow cell A	687	687
Analyzer Background	5.282	6.327	Flow cell B	687	687
Analyzer Coefficient	0.989	0.992	O3 measure	4579.6	4579.6
			O3 reference	4579.9	4579.9

Analyzer make	Teledyne 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	197.7/800	0.0	0.8	----
as found span	5000	713.2/1079.8	360.5	358.3	1.006
calibrator zero	5000	197.7/800	0.0	0.1	----
high point	5000	713.2/1079.8	360.5	358.1	1.007
second point	5000	494.7/971.3	243.5	242.2	1.005
third point	5000	260.9/844.3	126.1	124.3	1.014
as left zero	5000	197.7/800	0.0	0.7	----
as left span	5000	713.2/1079.8	360.5	361.2	0.998
Average Correction Factor					1.009

Corrected As found	357.5	Previous response	360.9	% change	1.0%
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Notes:

Inlet filter changed after as founds. Adjusted zero and span. No maintenance done

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association O3 Calibration Report

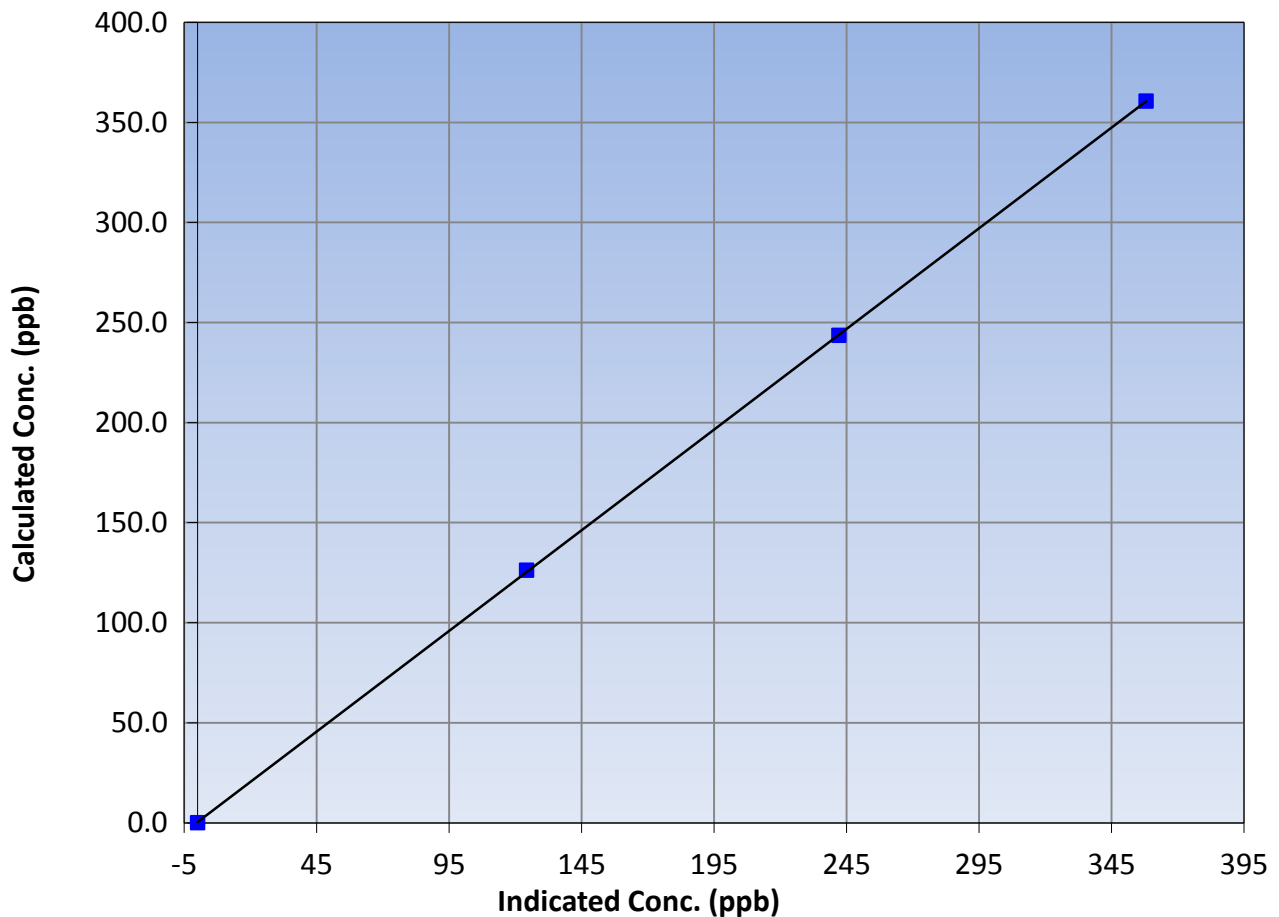
Station Information

Calibration Date	January 19, 2017	Previous Calibration	December 20, 2016
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	7:55	End Time (MST)	10:08
Analyzer make	Teledyne T400	Analyzer serial #	824

Calibration Data

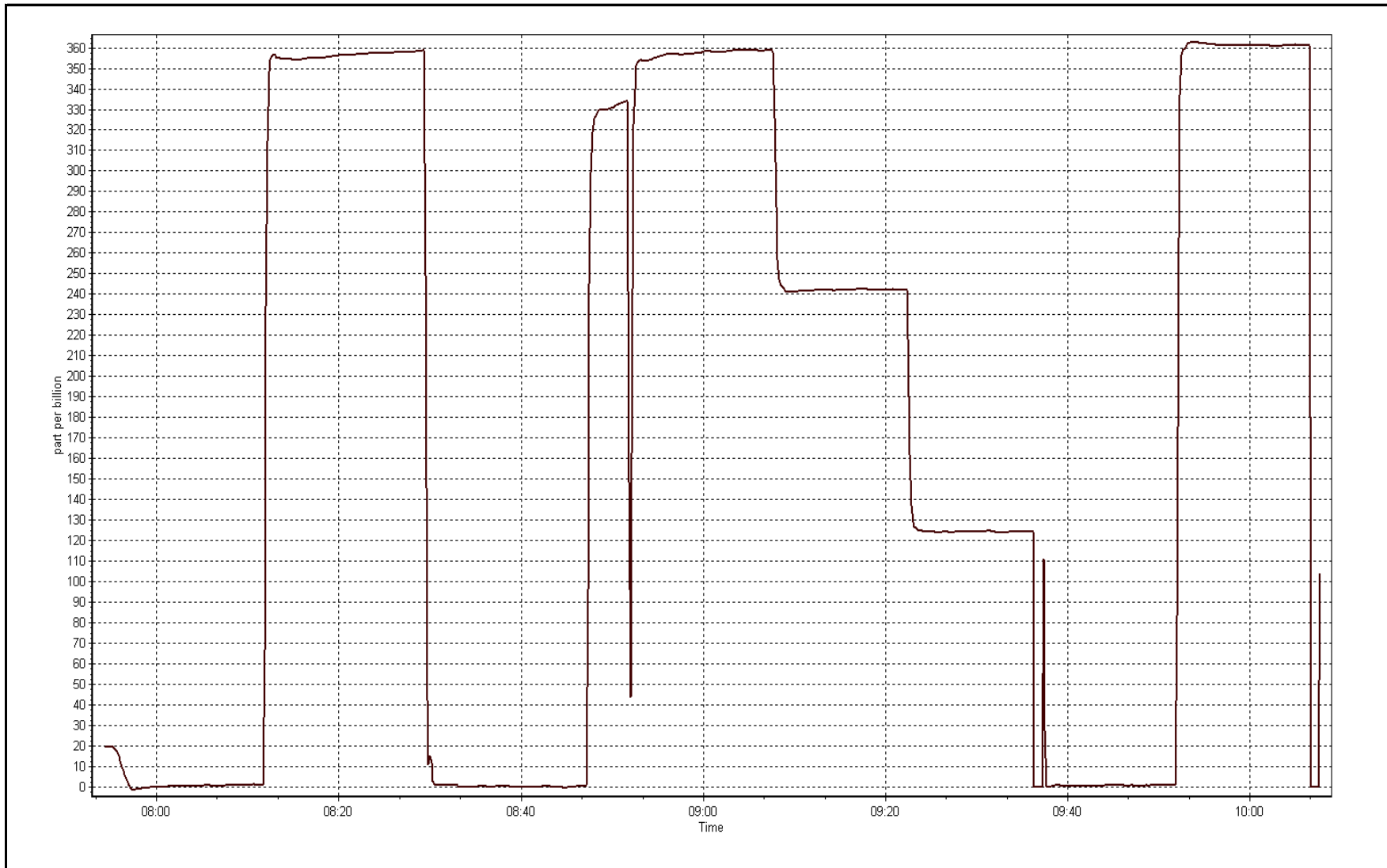
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999987
360.5	358.1	1.0067		
243.5	242.2	1.0054	Slope	1.005907
126.1	124.3	1.0145		
			Intercept	0.279809

O3 Calibration Curve



O3 Calibration Plot

Date: January 19, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 16, 2017	Previous Calibration	December 20, 2016
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	10:35	End Time (MST)	12:48
NO Cal Gas Conc	49.7 ppm	Gas Cert Reference	SA130010A
NOx Cal Gas Conc	49.7 ppm	Cal Gas Expiry Date	December 12, 2016
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.	2633
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.001638	0.995283	1.016061
	Data Offset	0.741828	1.478200	0.755758
Current Calibration	Data Slope	0.991072	0.996100	1.011795
	Data Offset	-0.170732	-0.464759	-0.230493

Analyzer Information

Analyzer make/model	API T200	Analyzer serial #	722
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.72		192.168.1.72	
NO coefficient	1.121		0.933	
NOx coefficient	1.117		0.933	
NO2 coefficient	1.000		1.000	
NO bkgnd	0.0		0.0	
NOx bkgnd	0.1		0.1	
Chamber Temp	50	Deg C	50	Deg C
Moly Temp	316.2	Deg C	316.2	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	9.1	mmHg	3.3	mmHg
R Cell Press Nox	9.1	mmHg	3.3	mmHg
NO sample flow	433	lpm	438	lpm
Nox sample Flow	433	lpm	433	lpm

Notes:

pump and charcoal changed out, filter changed out



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

January 16, 2017

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	-0.4	-0.5	0.1	----	----
as found span	5036	60.3	595.1	595.1	0.0	607.3	607.6	-0.3	0.9799	0.979
calibrator zero	5091	0.0	0.0	0.0	0.0	0.3	0.1	0.2	----	----
high point	5036	60.3	595.1	595.1	0.0	600.5	597.4	3.1	0.9910	0.996
second point	5067	30.0	294.3	294.3	0.0	297.6	297.0	0.6	0.9888	0.991
third point	5081	15.0	146.7	146.7	0.0	147.7	147.5	0.1	0.9934	0.995
as left zero	5000	0.0	0.0	0.0	0.0	0.3	0.3	0.0	----	----
as left span	5000	60.5	601.4	237.6	363.8	593.5	237.2	356.2	1.0133	1.002
Average Correction Factor									0.9911	0.9939

Corrected As found
Previous Response

NO_x= 607.7
NO_x= 593.4

NO= 608.1
NO= 596.4

Percent Change

NO_x= -2.4%

NO= -1.9%

GPT Calibration Data

Dilution Flow (total) 5036 ccm Source Gas Flow 60.30 ccm NOx ref calc conc = 595.1 ppb NO ref calc conc = 595.1 ppb

O3 Setpoint (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
1st NO ref point		0.0	599.4	598.1	0.2	0.9928	0.9950	----	----
1st NO2 (300)	237.6	360.5	593.7	237.6	356.1	1.0024	----	1.0124	98.8%
2nd NO2 (200)	354.6	243.5	596.3	354.6	241.7	0.9980	----	1.0074	99.3%
3rd NO2 (100)	472.0	126.1	596.5	472.0	124.5	0.9976	----	1.0129	98.7%
2nd NO ref point	----	0.0	598.1	598.3	-0.2	0.9950	0.9946	----	----
Average Correction Factor						0.9982		1.0109	98.9%

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

NO_x Calibration Summary

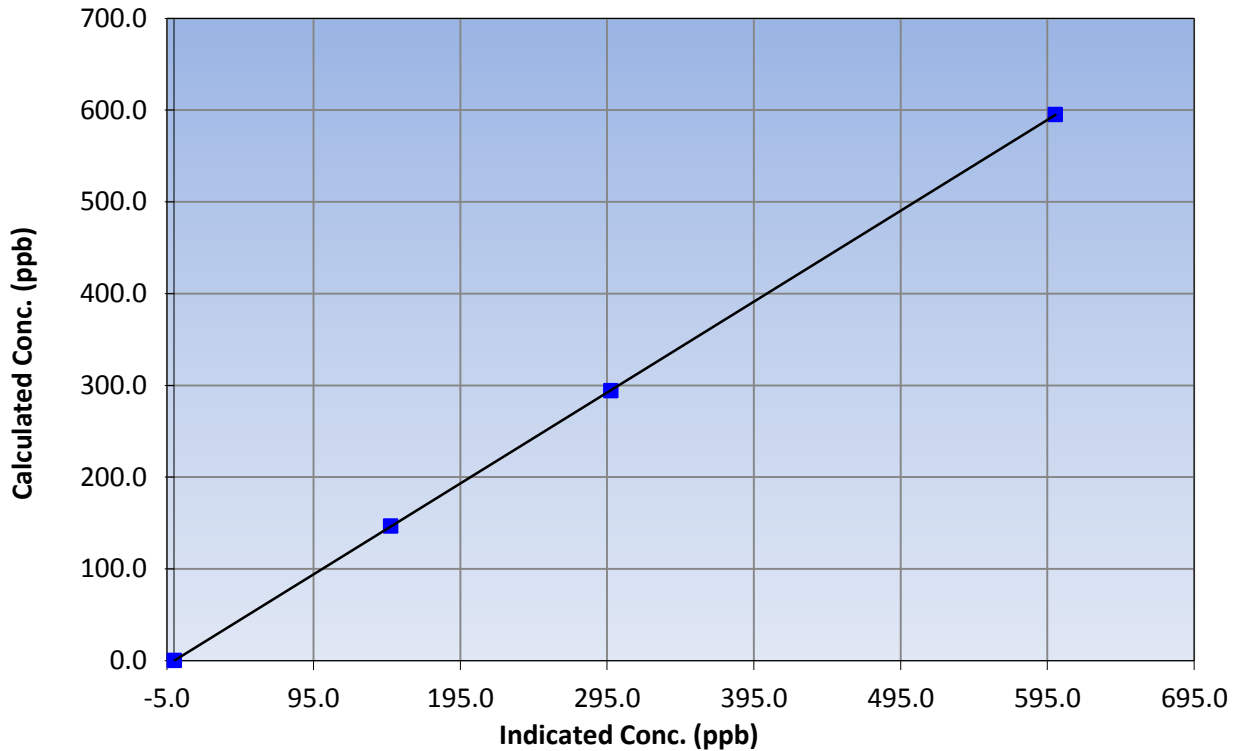
Station Information

Calibration Date	January 16, 2017	Previous Calibration	December 20, 2016
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	10:35	End Time (MST)	12:48
Analyzer make	API T200	Analyzer serial #	722

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999997
595.1	600.5	0.9910		
294.3	297.6	0.9888	Slope	0.991072
146.7	147.7	0.9934		
			Intercept	-0.170732

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

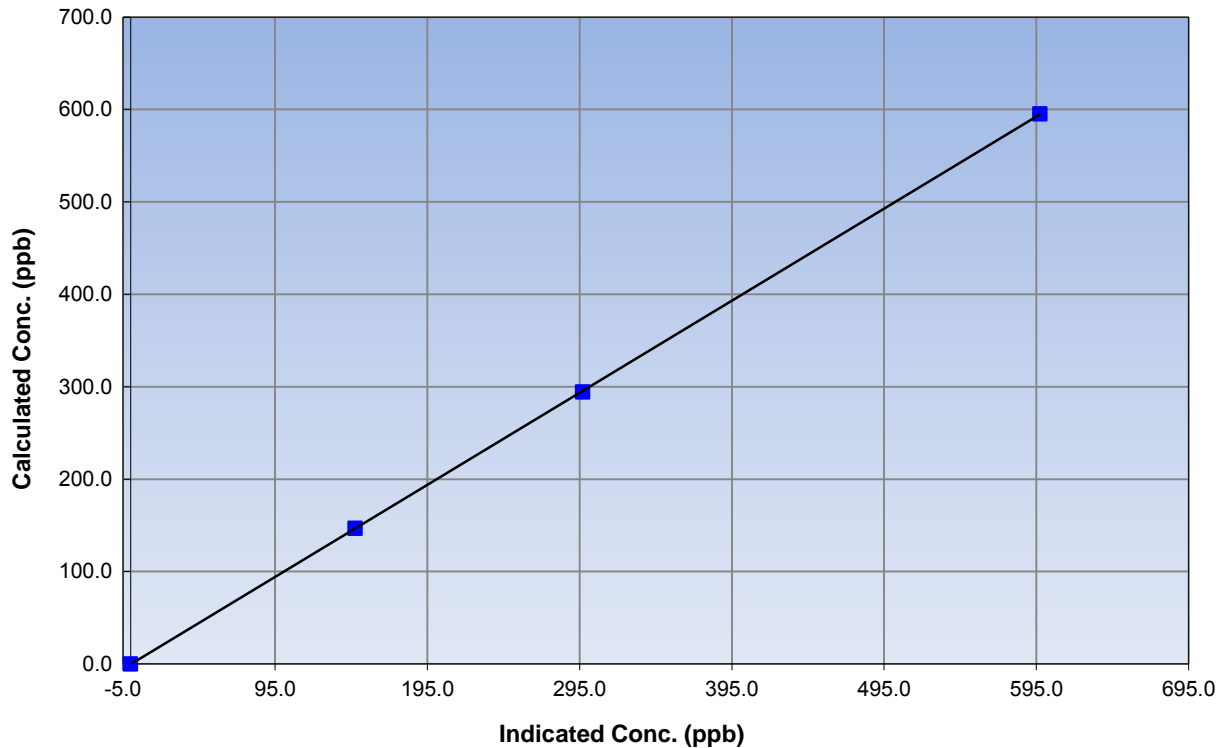
Station Information

Calibration Date	January 16, 2017	Previous Calibration	December 20, 2016
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	10:35	End Time (MST)	12:48
Analyzer make	API T200	Analyzer serial #	722

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999991
595.1	597.4	0.9961		
294.3	297.0	0.9908	Slope	0.996100
146.7	147.5	0.9947		
			Intercept	-0.464759

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

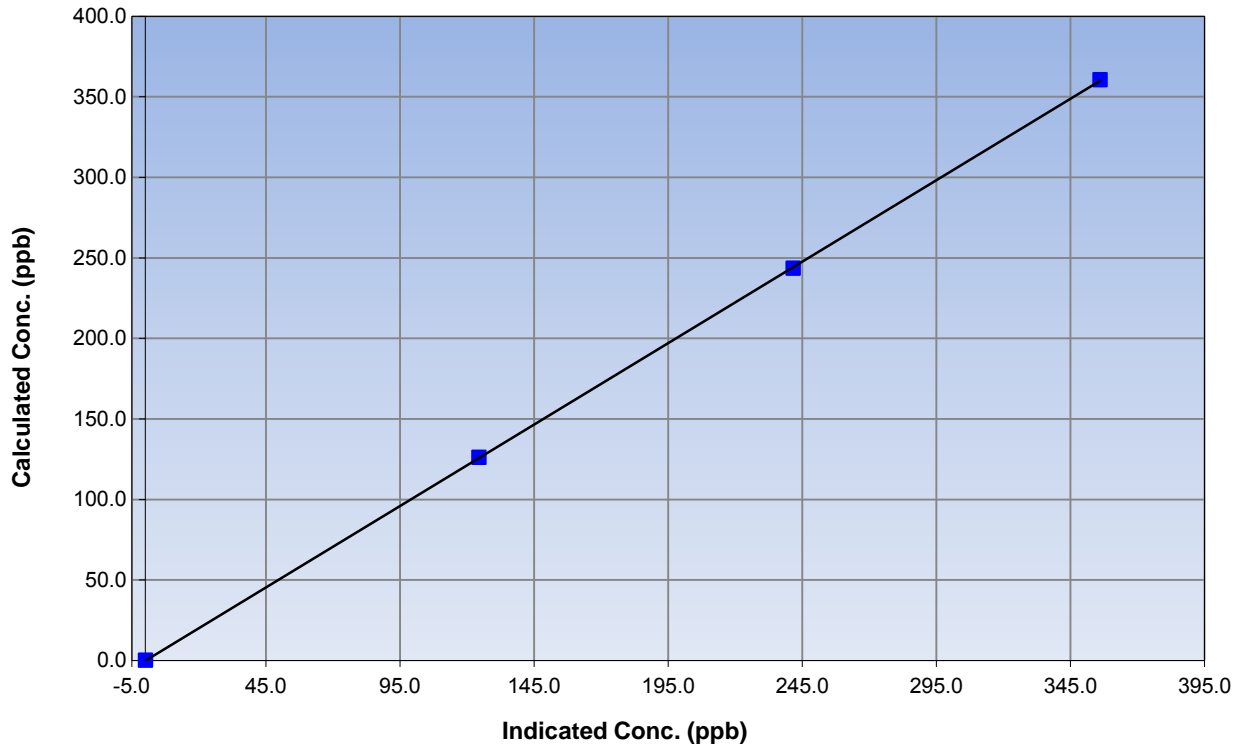
Station Information

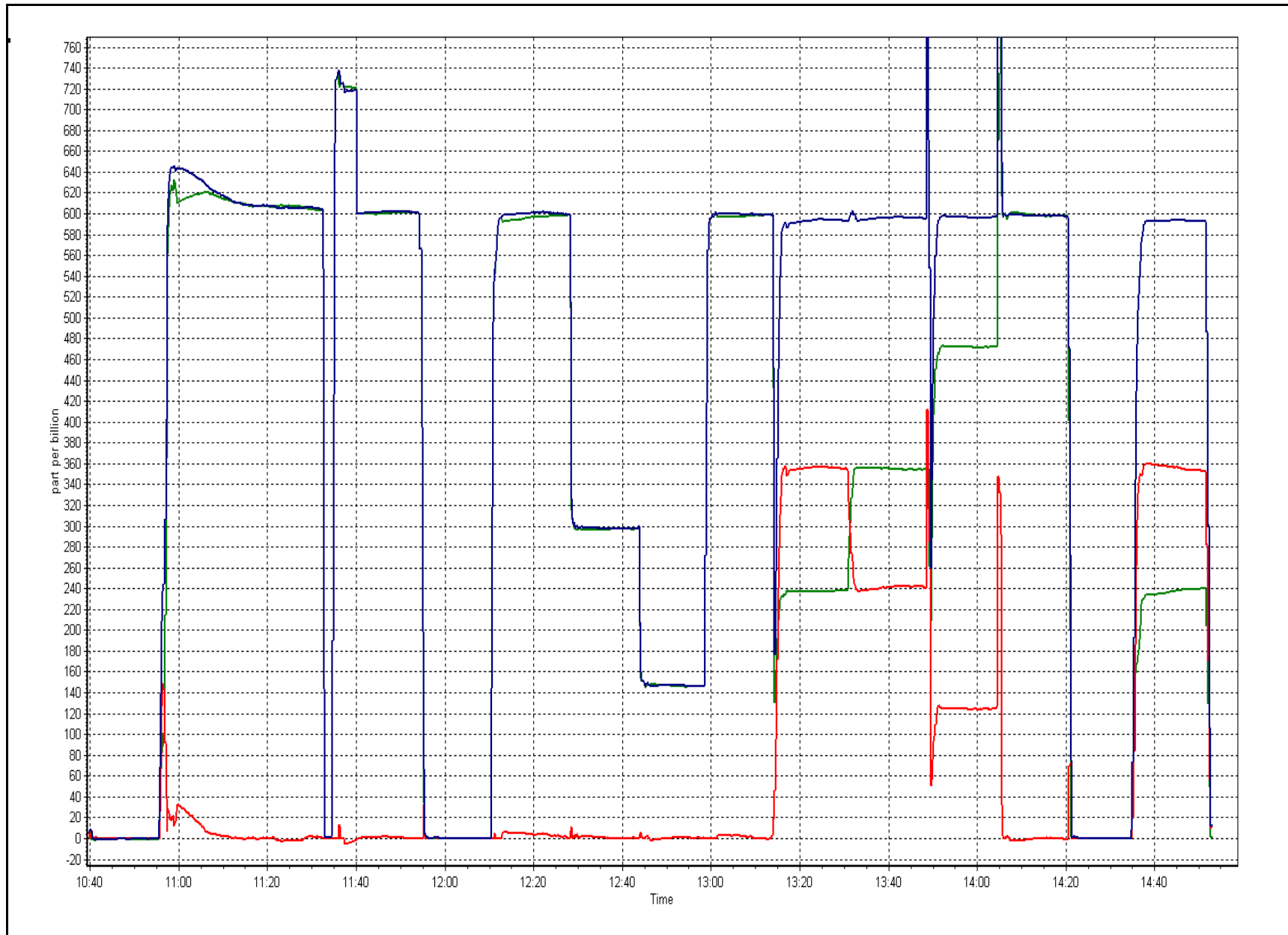
Calibration Date	January 16, 2017	Previous Calibration	December 20, 2016
Station Number	Wapasu	Station Number	AMS 17
Start Time (MST)	10:35	End Time (MST)	12:48
Analyzer make	API T200	Analyzer serial #	722

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999986
360.5	356.1	1.0124		
243.5	241.7	1.0074	Slope	1.011795
126.1	124.5	1.0129		
			Intercept	-0.230493

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-08-2016

Station Information

Station Name:	Wapasu	Station number:	AMS 17
Calibration Date:	January 23, 2017	Last Cal Date:	December 8, 2016
Start time (MST):	12:01	End time (MST):	13:03
Sharp Model:	5030	S/N:	CM-2390
Particulate Fraction:	PM2.5	C14 Source S/N:	10391
Flow Standard Model:	DeltaCal	S/N:	1450
Temp/RH standard:	NA	S/N:	NA

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	Tolerance
T1 (°C)	-18	-18	-18	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	951	949	951	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	990	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	1.2	-----	0.2	<input checked="" type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified	<input type="checkbox"/>			
Cyclone cleaning:	PM10 Cyclone	<input checked="" type="checkbox"/>	PM2.5 Cyclone	<input checked="" type="checkbox"/>	
Filter Tape Installed:	<input type="checkbox"/>				

Quarterly Calibration Test

				Tolerance
Leak Test:	Date of check:	<u>December 8, 2016</u>	Last Cal Date:	<u>October 28, 2016</u>
	Flow w/o adaptor:	<u>16.9</u>	Flow w/ adaptor:	<u>16.51</u> 0.4 LPM

Annual Calibration Test

Foil Calibration	Foil Mass:	<u>1326</u>	S/N:	<u>2519</u>
	Date of check:	<u>December 8, 2016</u>	Last Cal Date:	<u>October 28, 2016</u>
	New Correction Factor:	<u>7072</u>	Previous Correction Factor:	<u>7090</u>

Parameter	As found	Measured	As left	Adjusted	Tolerance
T2 (°C)	NA	NA	NA	<input type="checkbox"/>	+/- 2 °C
T3 (°C)	NA	NA	NA	<input type="checkbox"/>	+/- 2 °C
T4 (°C)	NA	NA	NA	<input type="checkbox"/>	+/- 2 °C
RH (%)	NA	NA	NA	<input type="checkbox"/>	+/- 10%

Notes: Nephelometer adjusted, cyclone head cleaned

Calibration by: Melissa Lemay



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 18
STONY MOUNTAIN
JANUARY 2017**

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

February 27, 2017



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STONY MOUNTAIN (AMS 18)
 JANUARY 2017

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	708	35	36	99.87	5	0	1	0
TRS(ppb) Average	709	34	35	99.87	1	0	0	0
THC(ppm) Average	708	35	36	99.87	2.4	-	2.1	-
NMHC(ppm) Average	708	35	36	99.87	0.117	-	0.058	-
CH4(ppm) Average	708	35	36	99.87	2.3	-	2	-
O3 (ppb) Average	672	32	72	94.62	49	0	46	-
NO2 (ppb) Average	709	34	35	99.87	17	0	8	-
NO (ppb) Average	709	34	35	99.87	3	-	1	-
NOX (ppb) Average	709	34	35	99.87	19	-	9	-
PM2.5 (ug/m3) Average	742	2	2	100.00	22.3	-	15.4	0
Wind Speed 10 m (km/h) Average	739	0	5	99.33	23	-	17	-
Wind Direction 10 m (deg) Average	739	0	5	99.33	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100.00	7.1	-	3.6	-
Relative Humidity (%) Average	744	0	0	100.00	97	-	93.0	-
Precipitation (mm) Total	744	0	0	100.00	1.2	-	2.3	-
Leaf Wetness (% of range) Average	744	0	0	100.00	14	-	6.0	-
Global Solar Radiation (W/m2) Average	744	0	0	100.00	378	-	70.0	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STONY MOUNTAIN (AMS 18)
 JANUARY 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile							
					Min	P10	Q1	Median	Q3	P90	Max	
SO2 (ppb) Average	708	0.5	1	-	0	0	0	0	0	0	1	5
TRS (ppb) Average	709	0.3	0	-	0	0	0	0	0	0	0	1
THC (ppm) Average	708	1.93	0.1	-	1.8	1.9	1.9	1.9	1.9	1.9	2	2.4
NMHC(ppm) Average	708	0.007	0.018	-	0	0	0	0	0	0	0	0.117
CH4(ppm) Average	708	1.93	0.1	-	1.8	1.9	1.9	1.9	1.9	1.9	2	2.3
O3 (ppb) Average	672	36.1	8	-	10	26	32	37	41	46	49	49
NO2 (ppb) Average	709	2.3	2	-	0	0	1	2	3	5	17	17
NO (ppb) Average	709	0.1	0	-	0	0	0	0	0	0	0	3
NOX (ppb) Average	709	2.4	2	-	0	1	1	2	3	6	19	19
PM2.5 (ug/m3) Average	742	4.08	3	-	1.3	1.9	2.3	3.2	4.5	6.9	22.3	22.3
Wind Speed 10 m (km/h) Average	739	8.6	5	-	0	3	4	8	13	16	23	23
Wind Direction 10 m (deg) Average	739	-	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	-10.63	10.2	-	-33	-23.1	-18.8	-12.5	-0.3	2.6	7.1	7.1
Relative Humidity (%) Average	744	78	9	-	51	64	72	80	85	89	97	97
Precipitation (mm) Total	744	-	-	4.62	-	-	-	-	-	-	-	-
Surface Wetness (% of range) Average	744	3	1	-	1	2	2	3	4	5	14	14
Global Solar Radiation (W/m2) Average	744	29.8	62	-	0	0	0	0	30	114	378	378

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - STONY MOUNTAIN (AMS 18)
 JANUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
AIR QUALITY ANALYZERS	10 Jan 2017 16:00	10 Jan 2017 16:00	1	Maintenance - sample manifold cleaned
O3	12 Jan 2017 23:00	14 Jan 2017 11:00	37	Analyzer Failure - pump failure
O3	14 Jan 2017 12:00	14 Jan 2017 13:00	2	Maintenance - replace pump
Wind Speed, Wind Direction	23 Jan 2017 02:00	23 Jan 2017 03:00	2	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	23 Jan 2017 05:00	23 Jan 2017 05:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	23 Jan 2017 17:00	23 Jan 2017 18:00	2	Flat line in sensor output signal - Sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb
Stony Mountain - January 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 5 ppb on Jan 2 15:00	Maximum Daily Average: 1.4 ppb on Jan 2		Hours of Data:	708
Minimum Value: 0 ppb on Jan 4 02:00	Minimum Daily Average: 0.1 ppb on Jan 23		Hours of Missing Data:	36
Maximum Diurnal Average: 0.7 ppb at hour 14	Minimum Diurnal Average: 0.3 ppb at hour 2		Hours of Calibration:	35
Monthly Average: 0.5 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 3		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-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.2	1
2-Jan	0	0	Z	0	1	1	1	1	1	1	1	1	1	4	5	4	4	2	1	0	0	0	0	0	1.4	5
3-Jan	0	0	0	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
4-Jan	0	0	0	0	Z	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
5-Jan	0	0	0	0	1	Z	3	3	3	3	3	2	1	1	1	1	1	1	0	0	0	0	0	0	1.1	3
6-Jan	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
7-Jan	0	Z	0	0	0	0	0	0	0	1	1	1	2	2	1	0	0	0	0	0	0	0	0	0	0.5	2
8-Jan	0	0	Z	0	1	1	1	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2
9-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0.2	0
10-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	2	2	1	M	1	1	0	0	0	0	0	0	0.4	2
11-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	2	1	1	0	0	0	0	0	0	0	0	1	0.4	2
12-Jan	Z	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	0.5	1
13-Jan	1	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
14-Jan	0	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
15-Jan	0	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
16-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	3	3	3	2	0.9	3
17-Jan	2	2	1	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2
18-Jan	Z	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	0	0	0	0.8	2
19-Jan	0	Z	1	1	1	1	1	1	1	1	1	1	4	1	1	0	0	0	0	1	0	0	0	1	0.8	4
20-Jan	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	2	1	1	0	1	1	0.7	3
21-Jan	1	1	1	Z	0	0	1	0	0	0	0	0	1	2	2	1	1	0	1	1	0	0	0	0	0.7	2
22-Jan	0	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
23-Jan	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
24-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.3	1
25-Jan	0	Z	1	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	1	1	0.6	1
26-Jan	0	0	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
27-Jan	0	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
28-Jan	0	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
29-Jan	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
30-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	2	2	0.4	2
31-Jan	1	Z	3	2	2	2	1	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	3

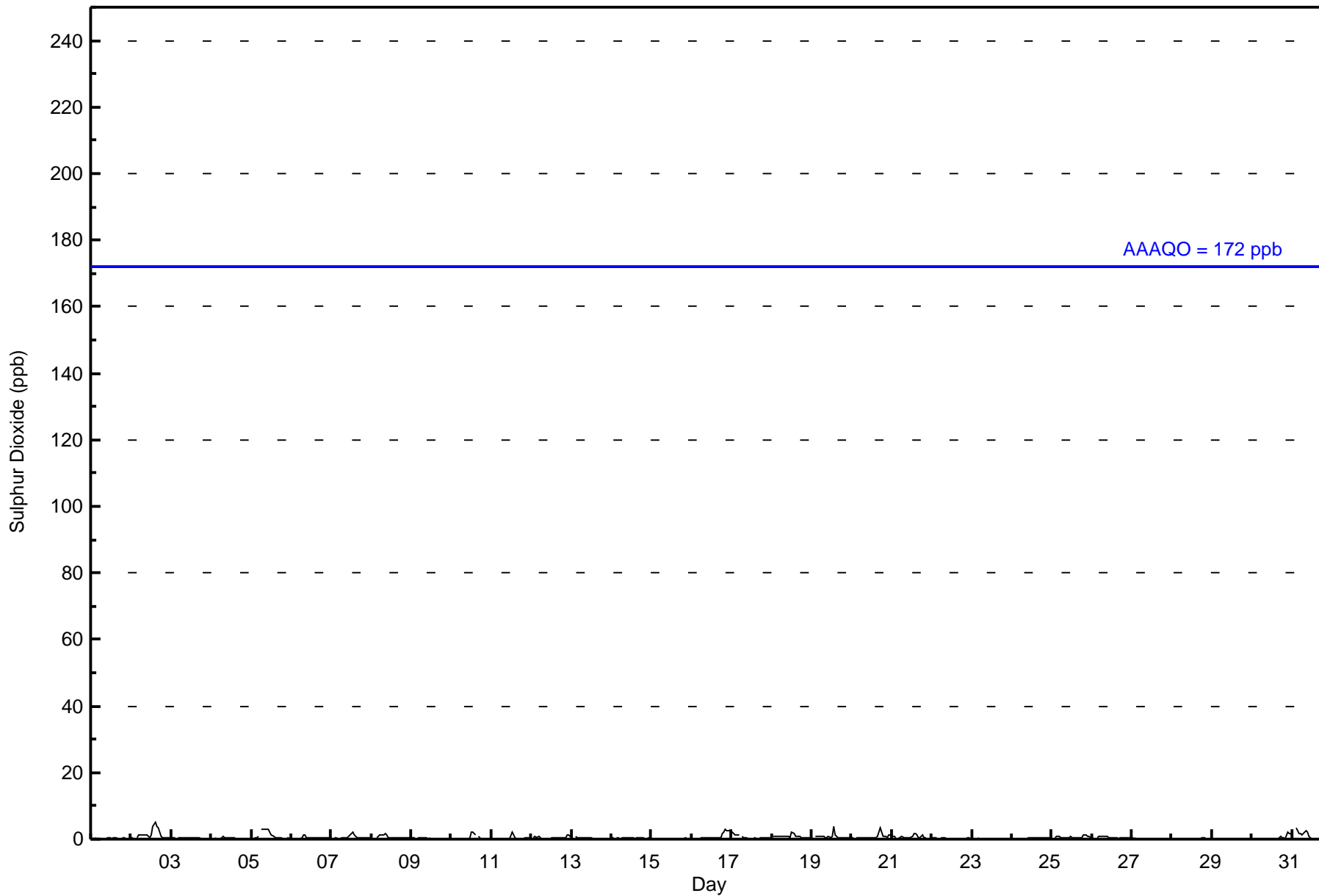
0.4	0.3	0.5	0.5	0.5	0.4	0.5	0.5	0.6	0.5	0.4	0.4	0.6	0.7	0.6	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	Diurnal Average
2	2	3	2	2	2	3	3	3	3	3	3	2	2	4	5	4	4	3	2	2	3	3	3	2	2	Diurnal Maximum

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 (SO₂) - ppb
Stony Mountain - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Stony Mountain - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
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 (SO₂) - ppb
Stony Mountain - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	39	44	20	2	1	1	4	4	14	85	162	49	92	86	50	50	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
Totals	39	44	20	2	1	1	4	4	14	85	162	49	92	86	50	50	703

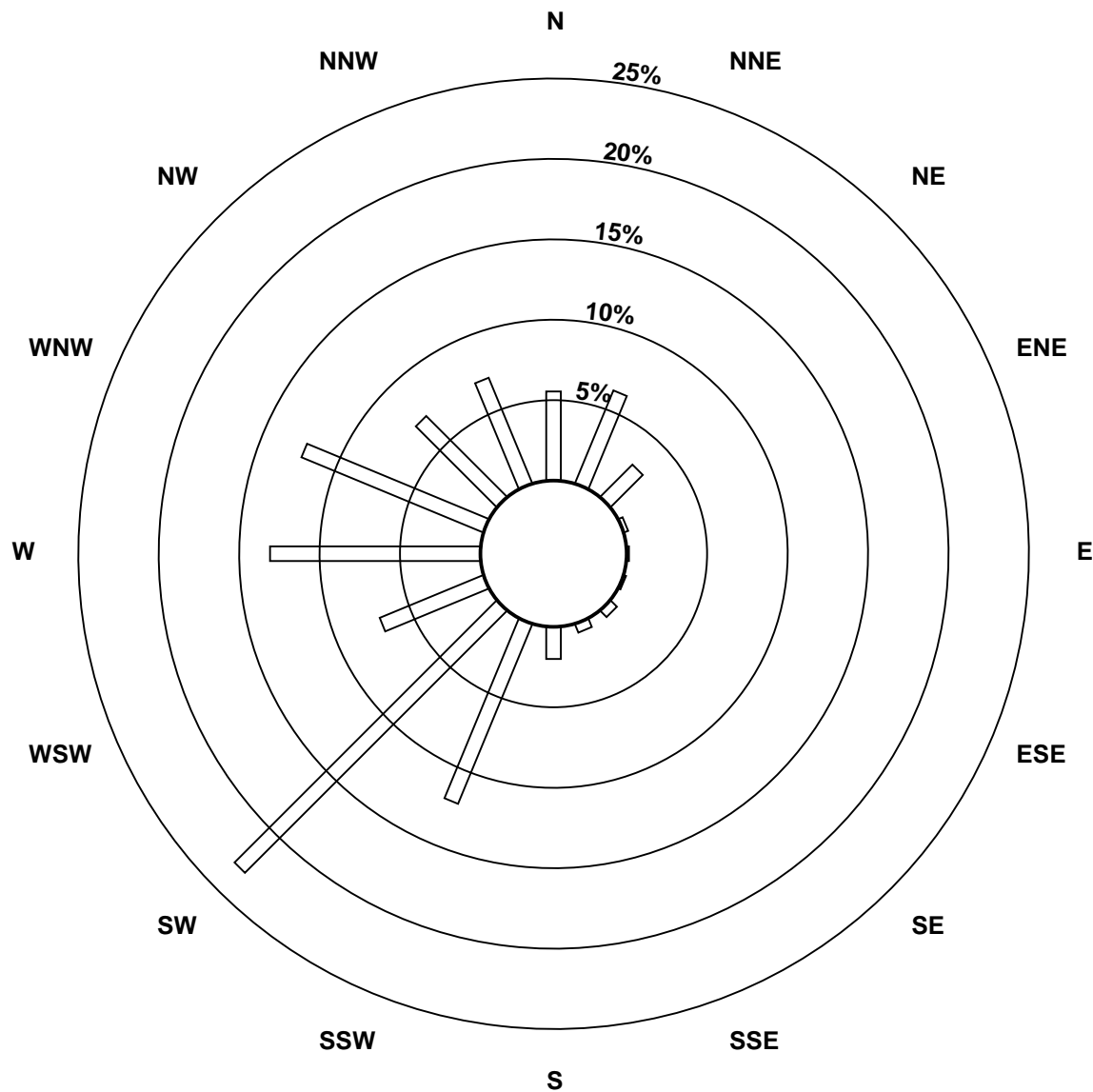
Total Number of Valid Hours: 703

Total Number of Hours: 744

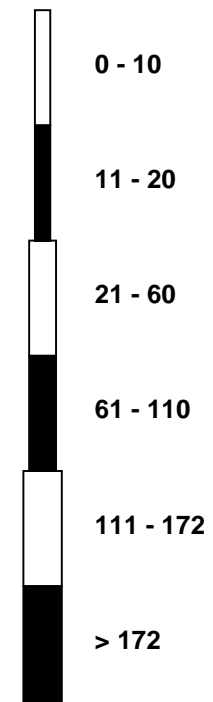


Wood Buffalo Environmental Association
Wind Rose Jan 2017

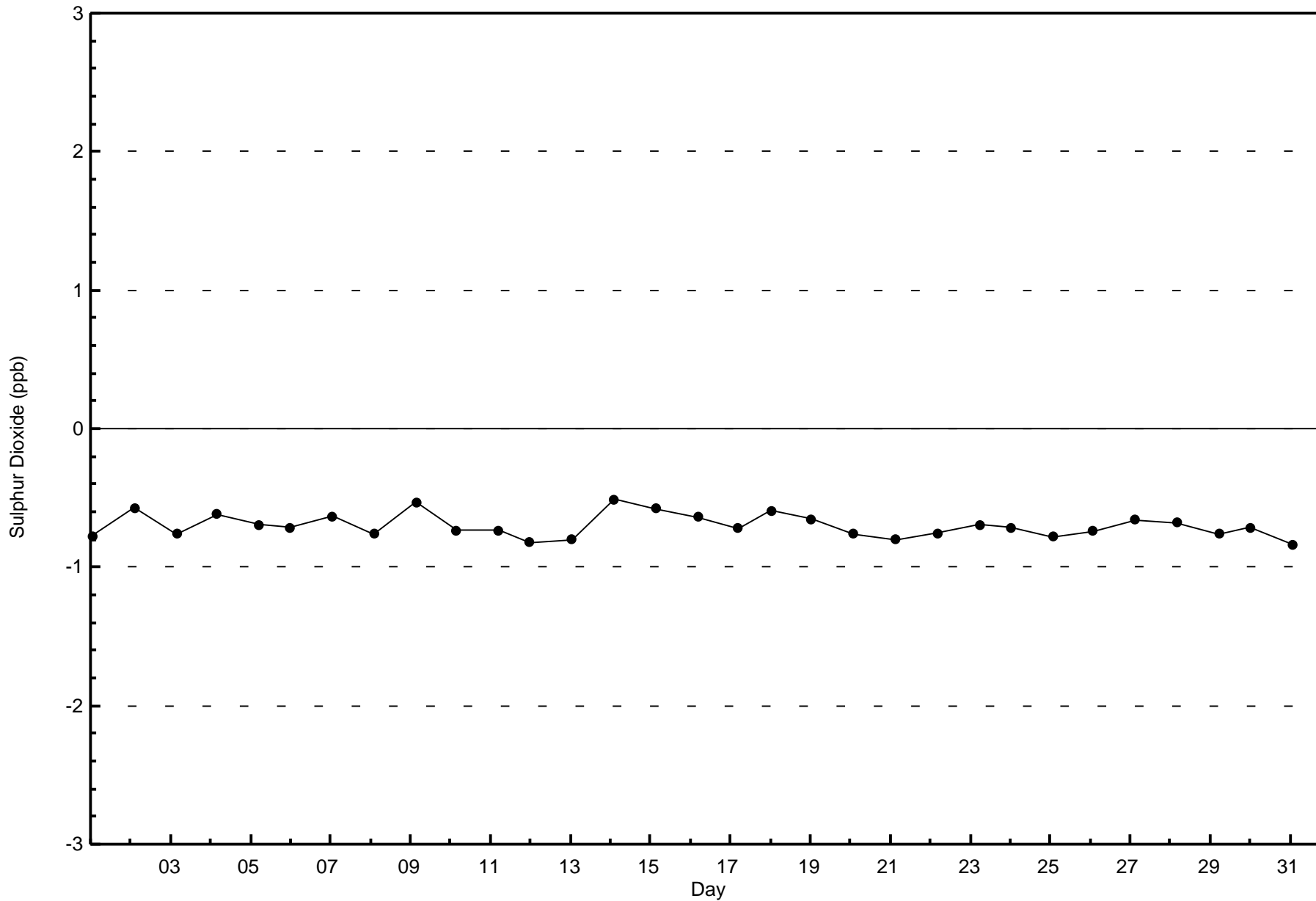
Sulphur Dioxide (SO₂) - ppb
Stony Mountain (AMS 18)

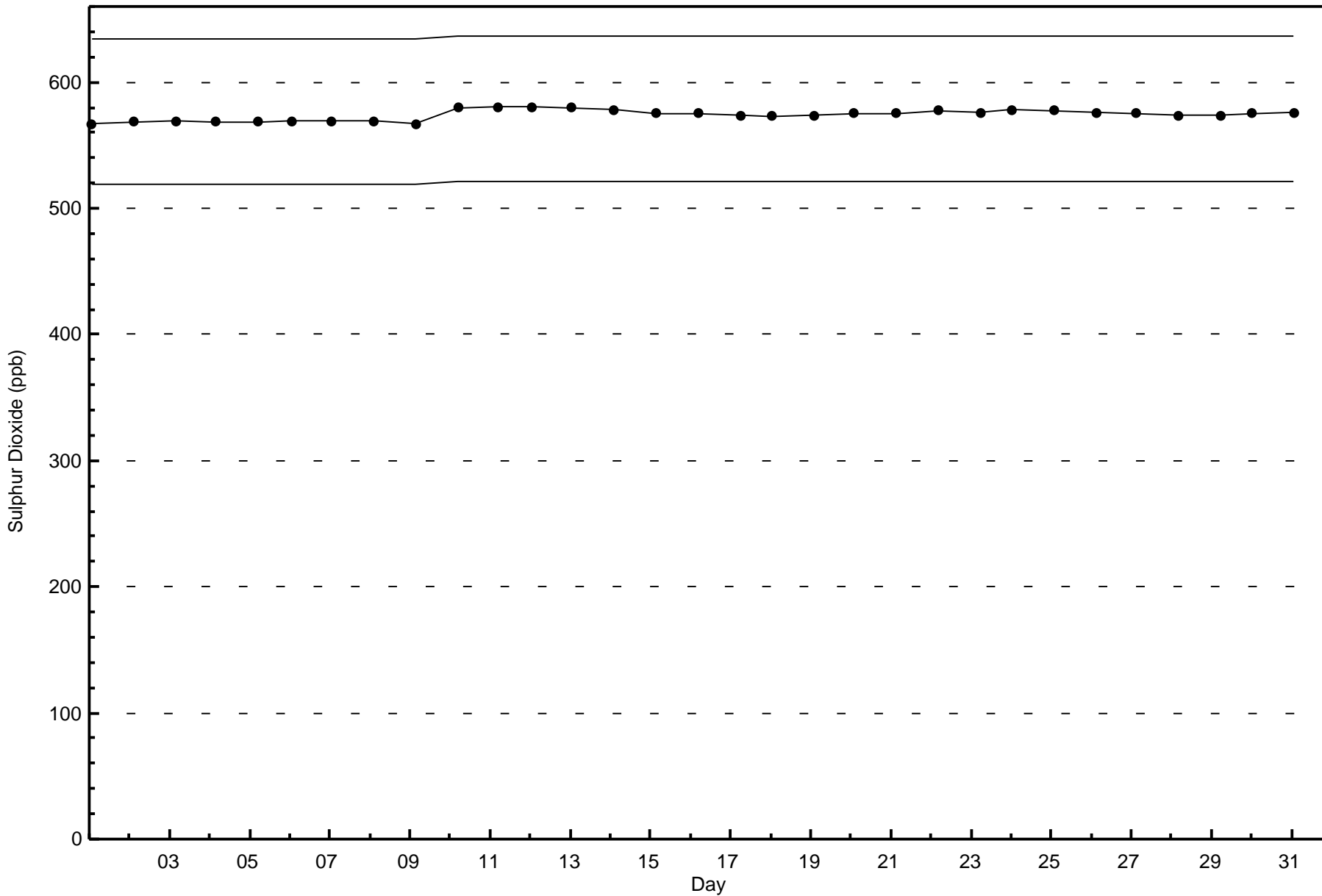


Classes (ppb)



Total Number of Valid Hours: 703







Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

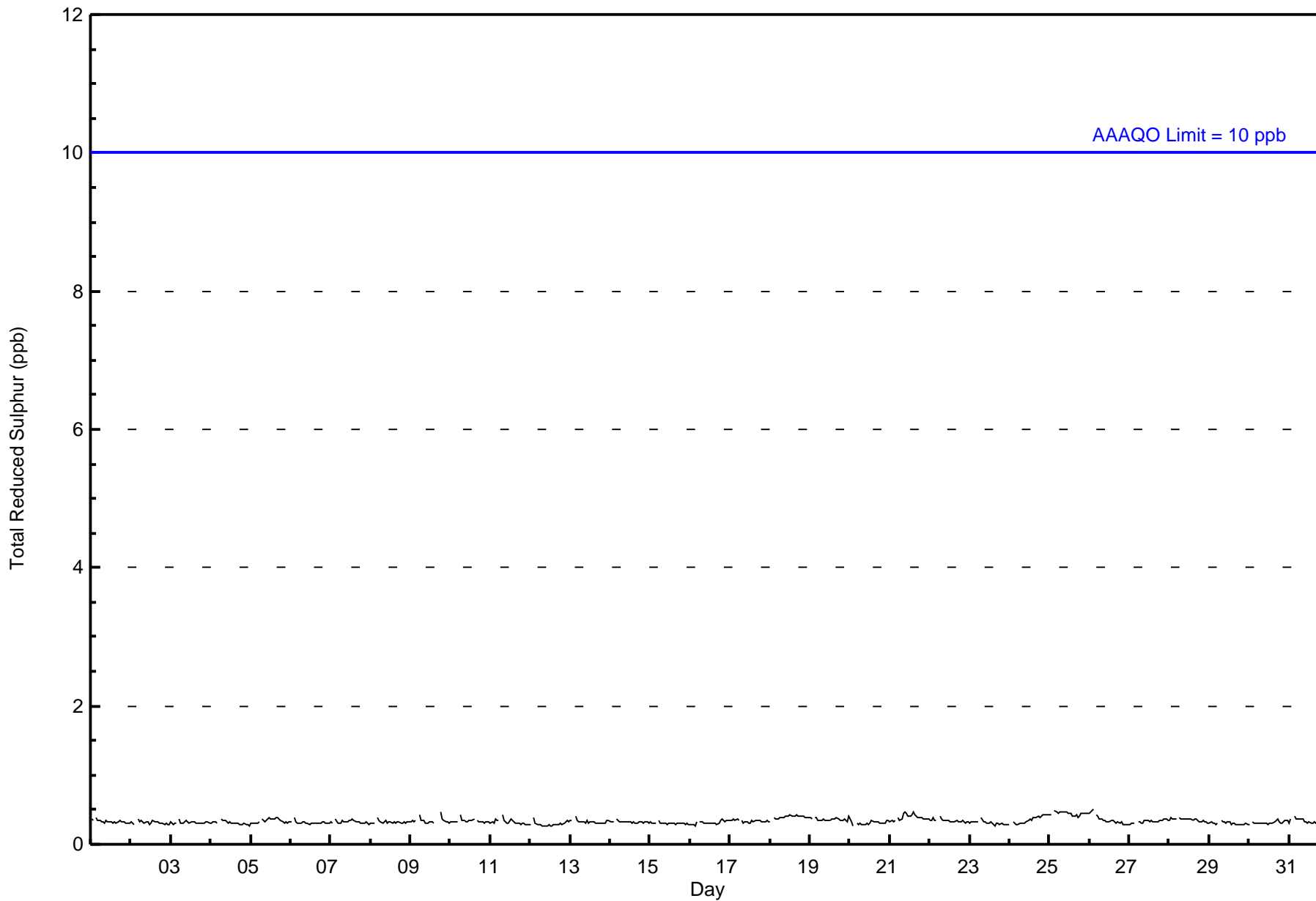
Stony Mountain - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 1 ppb on Jan 26 03:00 Maximum Daily Average: 0.4 ppb on Jan 25														Hours in Service: 744 Hours of Data: 709												
Minimum Value: 0 ppb on Jan 12 13:00 Minimum Daily Average: 0.3 ppb on Jan 12 Maximum Diurnal Average: 0.3 ppb at hour 4 Minimum Diurnal Average: 0.3 ppb at hour 21 Monthly Average: 0.3 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 0														Hours of Missing Data: 35 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-Jan	0	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
2-Jan	0	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
3-Jan	0	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
4-Jan	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
5-Jan	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
6-Jan	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
7-Jan	0	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
8-Jan	0	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
9-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0.3	0
10-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0.3	0
11-Jan	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
12-Jan	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
13-Jan	0	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
14-Jan	0	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
15-Jan	0	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
16-Jan	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
17-Jan	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
18-Jan	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
19-Jan	0	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
20-Jan	0	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
21-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
22-Jan	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
23-Jan	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
24-Jan	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
25-Jan	0	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
26-Jan	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
27-Jan	0	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
28-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
29-Jan	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
30-Jan	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
31-Jan	0	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
0.3 0.3																								Diurnal Average		
0 0 1 0																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Stony Mountain - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Stony Mountain - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
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
Stony Mountain - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	39	44	20	2	1	1	4	4	14	86	162	48	92	87	49	51	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
Totals	39	44	20	2	1	1	4	4	14	86	162	48	92	87	49	51	704

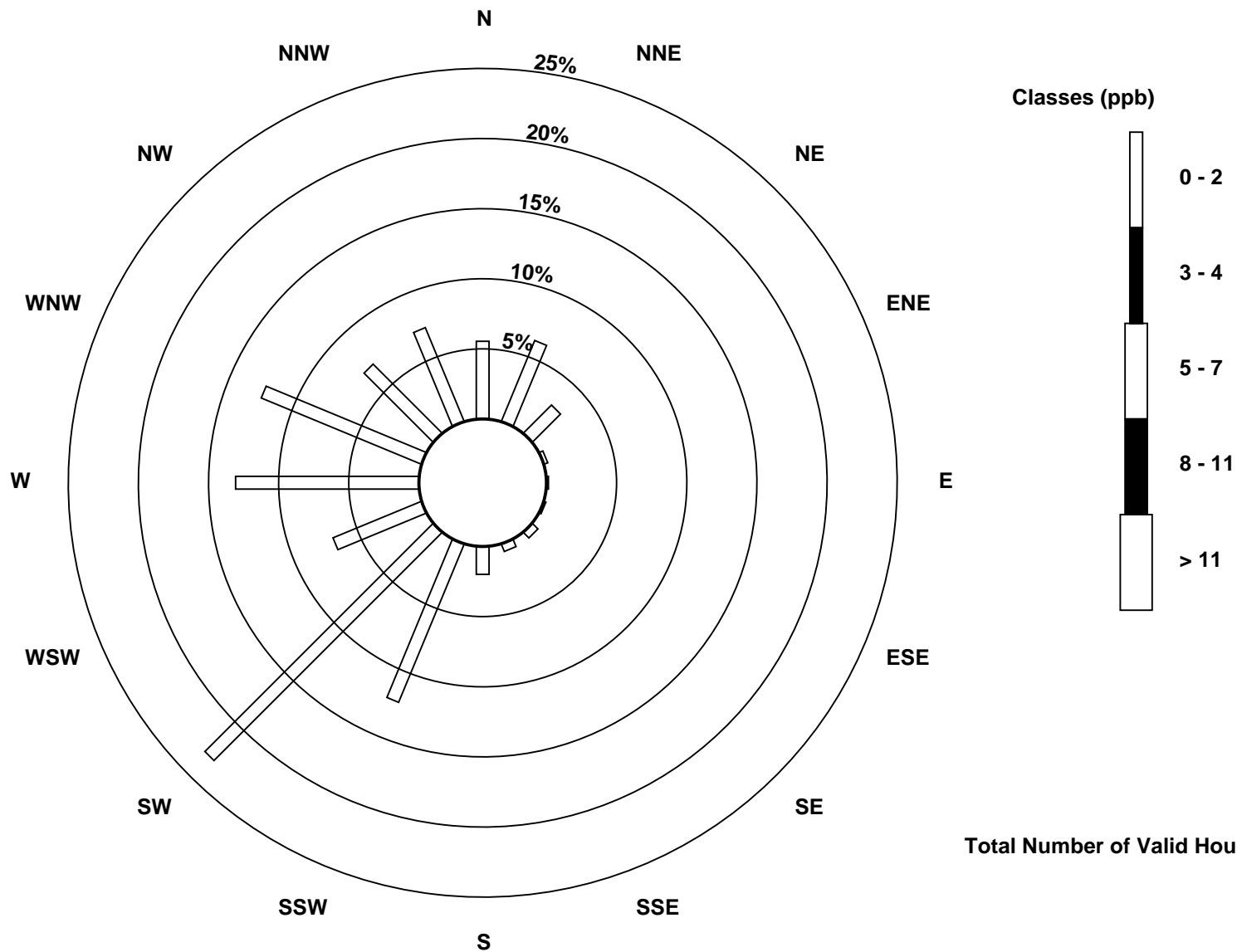
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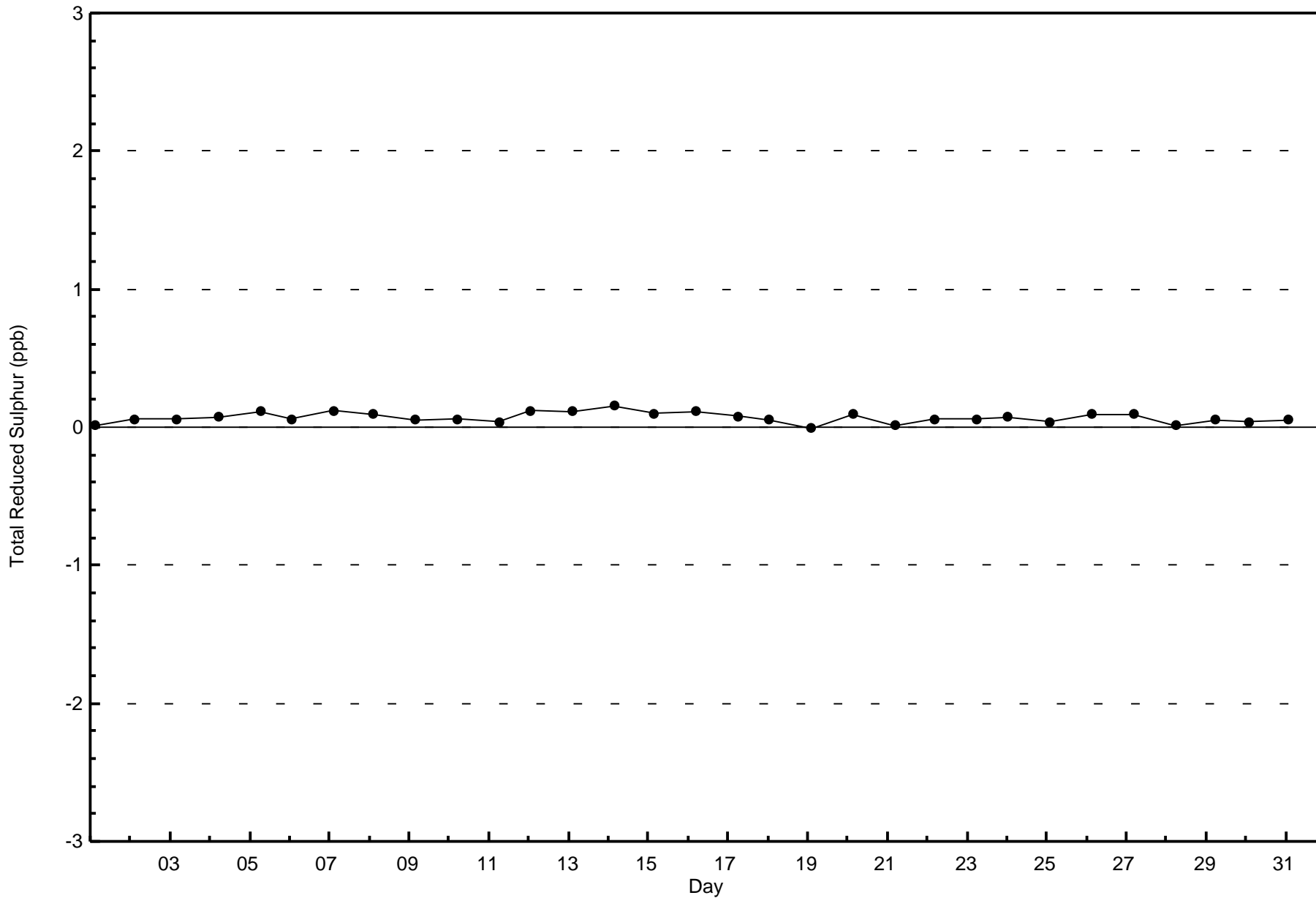
Total Number of Hours: 744

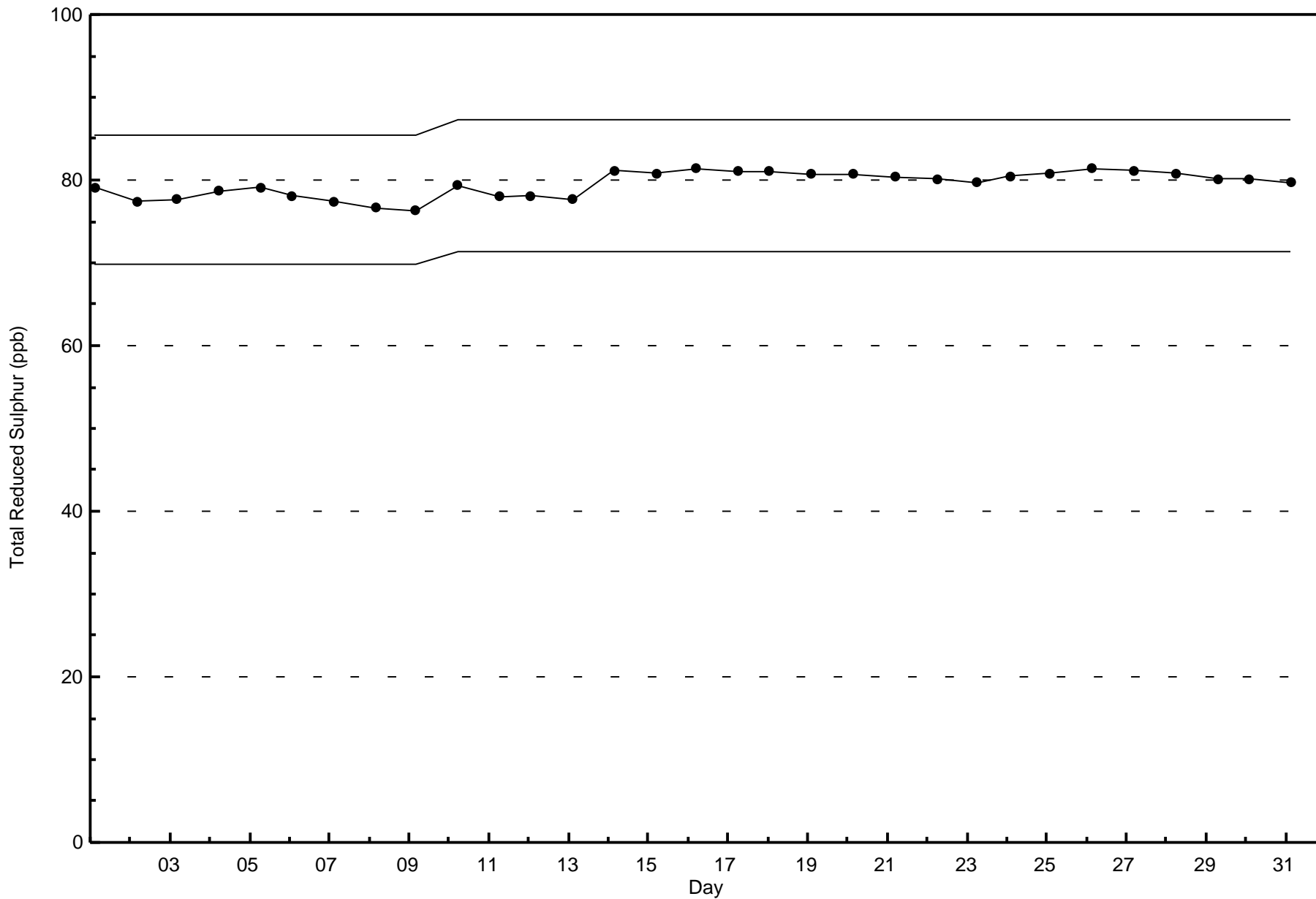


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Total Reduced Sulphur (TRS) - ppb
Stony Mountain (AMS 18)



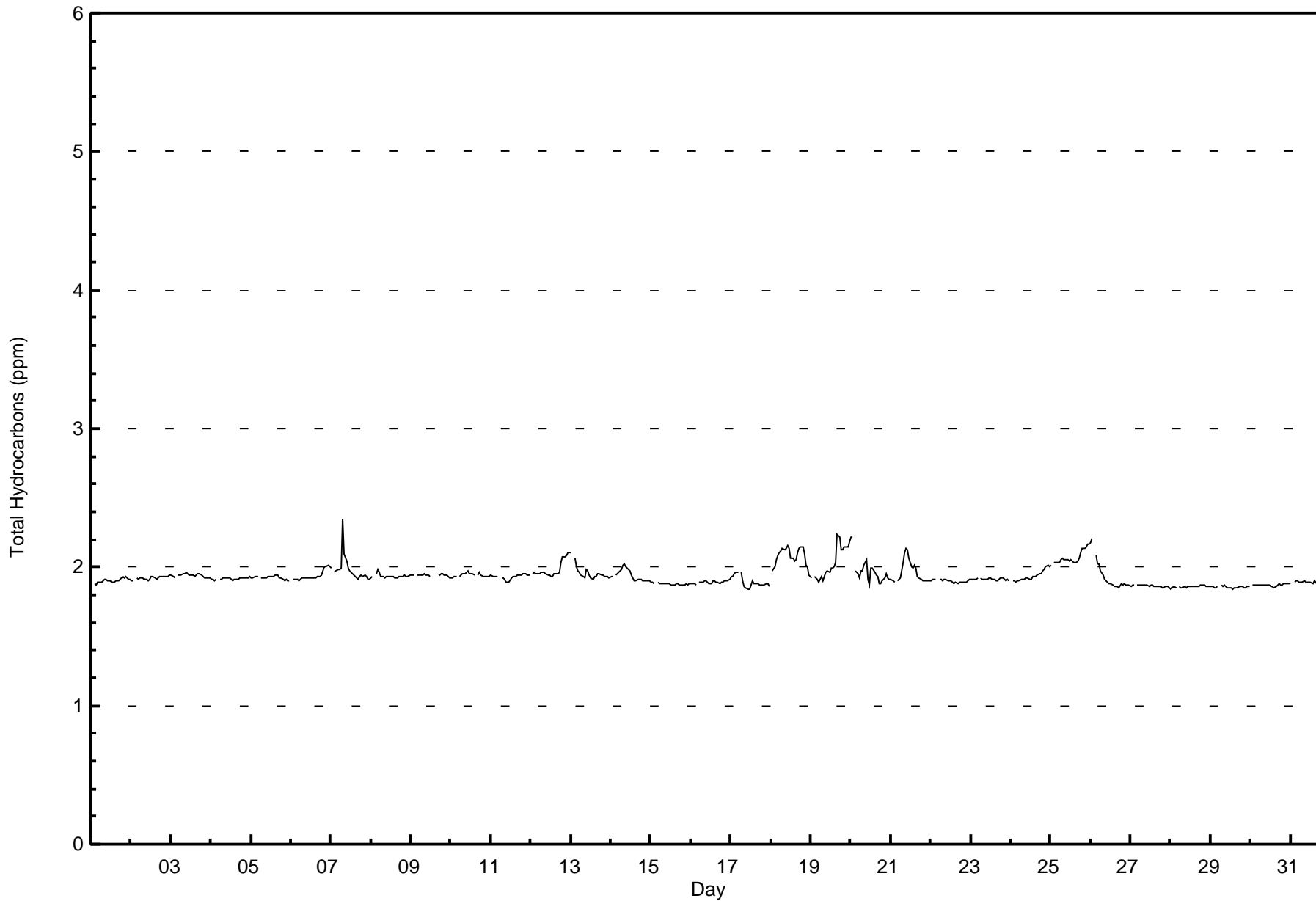






Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Stony Mountain - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Stony Mountain - January 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	652	92.09	92.09
2.1 - 3.0	56	7.91	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
Stony Mountain - January 2017

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	38	36	20	1	1	1	3	3	11	70	139	48	92	85	50	49	647
2.1 - 3.0	1	8	0	1	0	0	1	1	3	15	23	1	0	1	0	1	56
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
Totals	39	44	20	2	1	1	4	4	14	85	162	49	92	86	50	50	703

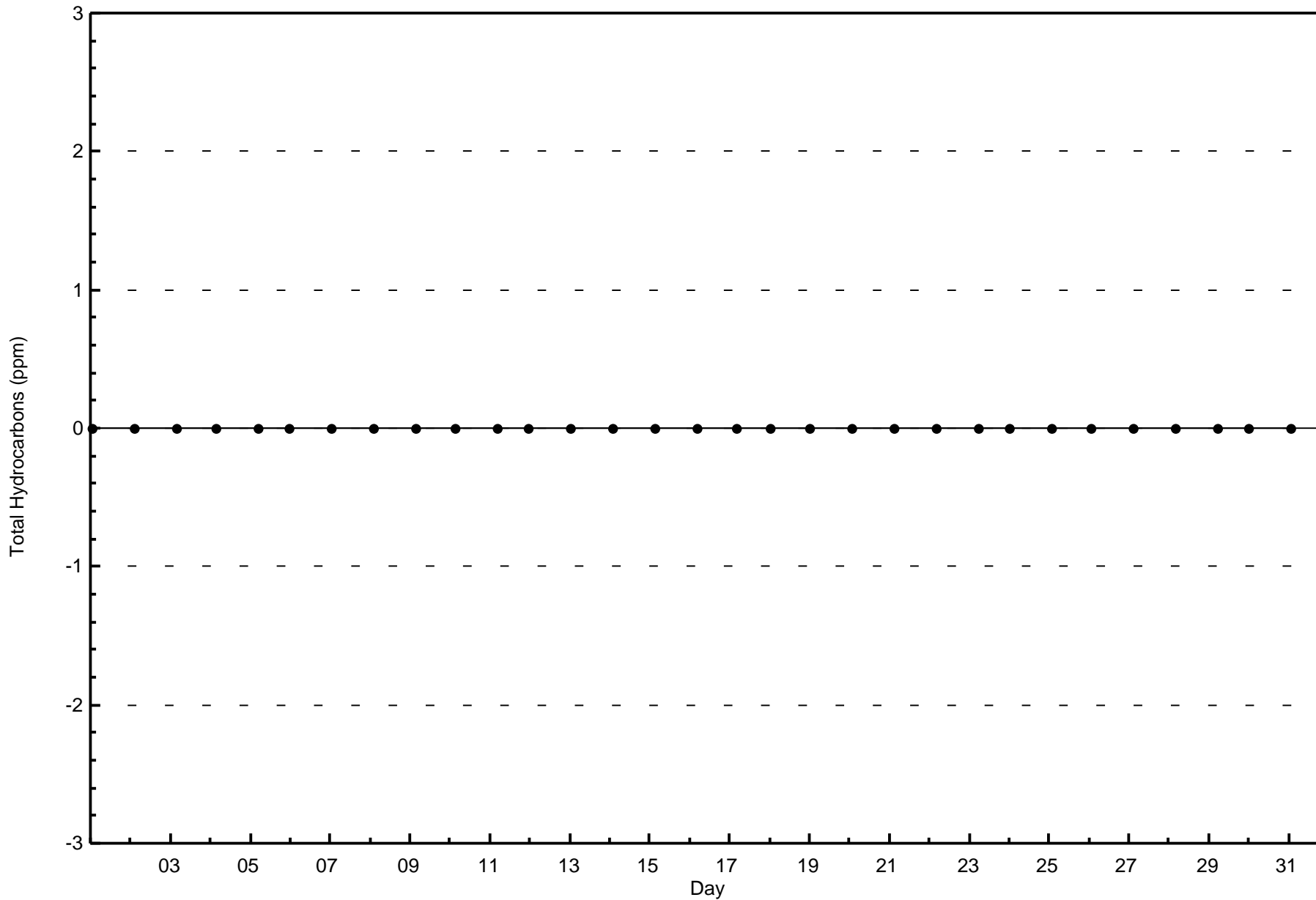
Total Number of Valid Hours: 703

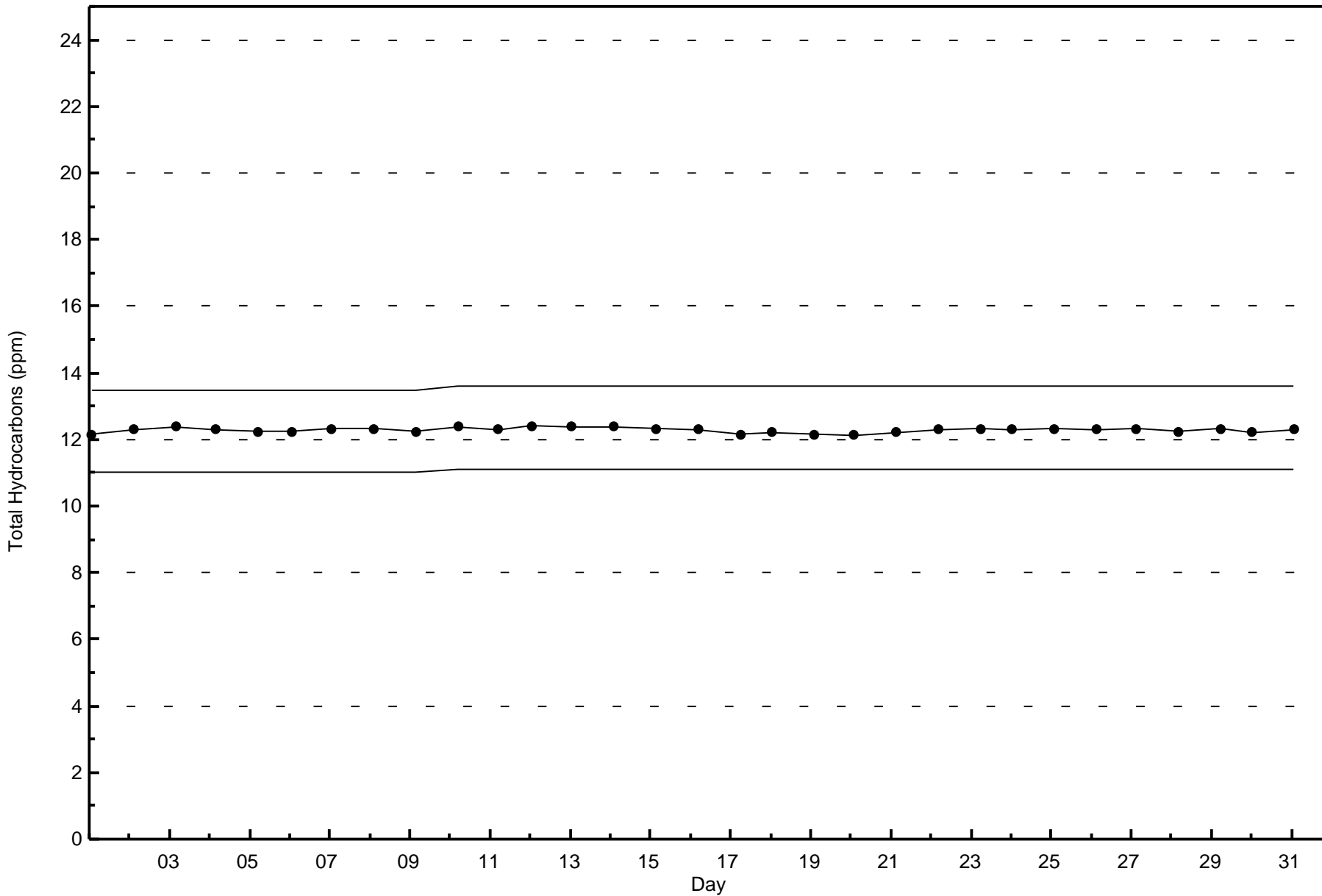
Total Number of Hours: 744



Wood Buffalo Environmental Association
Zero Responses

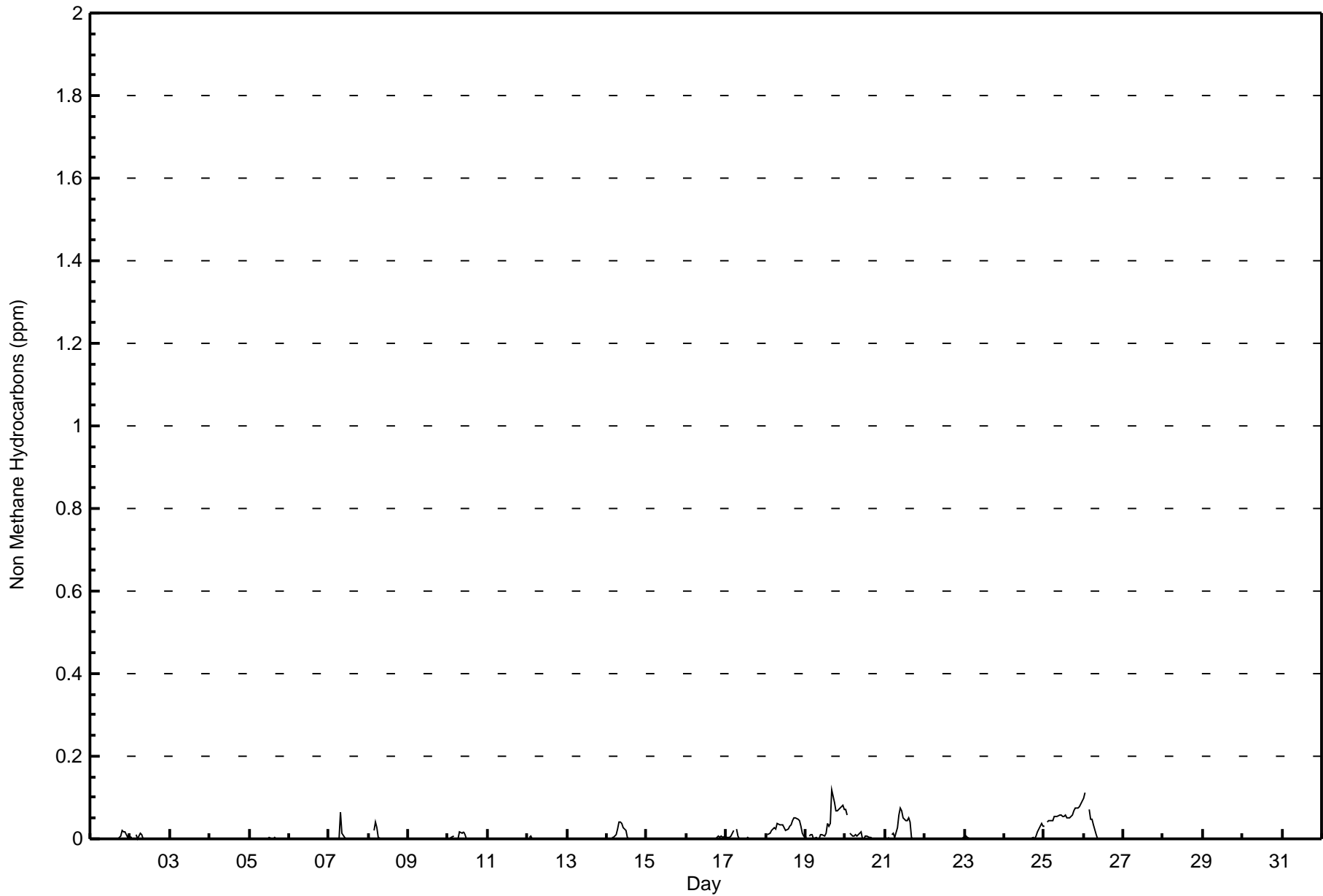
Total Hydrocarbons (THC) - ppm
Stony Mountain - January 2017







Maximum Value: 0.117 ppm on Jan 19 17:00		Maximum Daily Average: 0.058 ppm on Jan 25		Hours in Service:	744																																												
Minimum Value: 0.000 ppm on Jan 1 01:00		Minimum Daily Average: 0.000 ppm on Jan 3		Hours of Data:	708																																												
Maximum Diurnal Average: 0.009 ppm at hour 8		Minimum Diurnal Average: 0.003 ppm at hour 3		Hours of Missing Data:	36																																												
Monthly Average: 0.007 ppm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.1		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-Jan	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	0.001	0.000	0.004	0.007	0.019	0.016	0.018	0.002	0.010	0.003	0.019																								
2-Jan	0.003	0.005	Z	0.010	0.001	0.008	0.014	0.011	0.002	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.014																							
3-Jan	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																							
4-Jan	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	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001																							
5-Jan	0.000	0.000	0.000	0.001	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002																							
6-Jan	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																							
7-Jan	0.000	Z	0.001	0.000	0.000	0.000	0.000	0.064	0.013	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	0.001	0.004	0.064																							
8-Jan	0.001	0.004	Z	0.020	0.042	0.027	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	0.000	0.000	0.000	0.000	0.004	0.042																							
9-Jan	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.001	C	C	C	C	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001																							
10-Jan	0.000	0.000	0.003	0.005	Z	0.002	0.001	0.018	0.013	0.016	0.011	0.000	0.000	0.000	M	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.018																								
11-Jan	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																							
12-Jan	Z	0.003	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	0.000	0.000	0.000	0.000	0.007																							
13-Jan	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																							
14-Jan	0.000	0.000	Z	0.002	0.003	0.011	0.023	0.040	0.042	0.038	0.026	0.019	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.042																							
15-Jan	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																							
16-Jan	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.001	0.001	0.001	0.003	0.005	0.005	0.008	0.005	0.005	0.001	0.008																							
17-Jan	0.005	0.003	0.005	0.008	0.020	Z	0.023	0.007	0.001	0.000	0.000	0.000	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.023																							
18-Jan	Z	0.012	0.015	0.020	0.023	0.028	0.024	0.036	0.034	0.034	0.035	0.029	0.021	0.024	0.029	0.033	0.045	0.052	0.050	0.049	0.045	0.029	0.015	0.006	0.030	0.052																							
19-Jan	0.003	Z	0.007	0.009	0.010	0.000	0.002	0.000	0.002	0.010	0.011	0.006	0.013	0.036	0.031	0.036	0.117	0.088	0.068	0.066	0.073	0.075	0.081	0.072	0.035	0.117																							
20-Jan	0.073	0.057	Z	0.012	0.008	0.007	0.009	0.006	0.009	0.018	0.002	0.000	0.007	0.008	0.004	0.003	0.002	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.010	0.073																							
21-Jan	0.005	0.000	0.004	Z	0.009	0.015	0.004	0.028	0.059	0.073	0.068	0.051	0.043	0.044	0.051	0.041	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.073																							
22-Jan	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	0.002	0.000	0.002	0.000																							
23-Jan	0.001	0.005	0.003	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.005	0.005																							
24-Jan	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	0.000	0.007	0.017	0.023	0.036	0.031	0.005	0.036																							
25-Jan	0.031	Z	0.042	0.043	0.044	0.044	0.054	0.056	0.055	0.056	0.057	0.054	0.055	0.057	0.051	0.052	0.056	0.059	0.069	0.075	0.076	0.078	0.086	0.091	0.058	0.091																							
26-Jan	0.098	0.111	Z	0.073	0.047	0.049	0.033	0.012	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	0.000	0.000	0.018	0.111	0.000																							
27-Jan	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																							
28-Jan	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																							
29-Jan	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																							
30-Jan	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	0.000	0.001																							
31-Jan	0.000	Z	0.001	0.000	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	0.000	0.000	0.000	0.000	0.001																							
																								0.008	0.008	0.003	0.008	0.008	0.007	0.006	0.009	0.007	0.008	0.007	0.005	0.005	0.006	0.006	0.006	0.007	0.007	0.006	0.007	0.007	0.007	0.007	0.007	0.007	Diurnal Average
																								0.098	0.111	0.042	0.073	0.047	0.049	0.054	0.064	0.059	0.073	0.068	0.054	0.055	0.057	0.051	0.052	0.117	0.088	0.069	0.075	0.076	0.078	0.086	0.091	0.000	Diurnal Maximum
Z - zerospan		C - Calibration				M - Maintenance																																											





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Stony Mountain - January 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	579	81.78	81.78
0.006 - 0.05	100	14.12	95.90
0.06 - 0.1	29	4.10	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



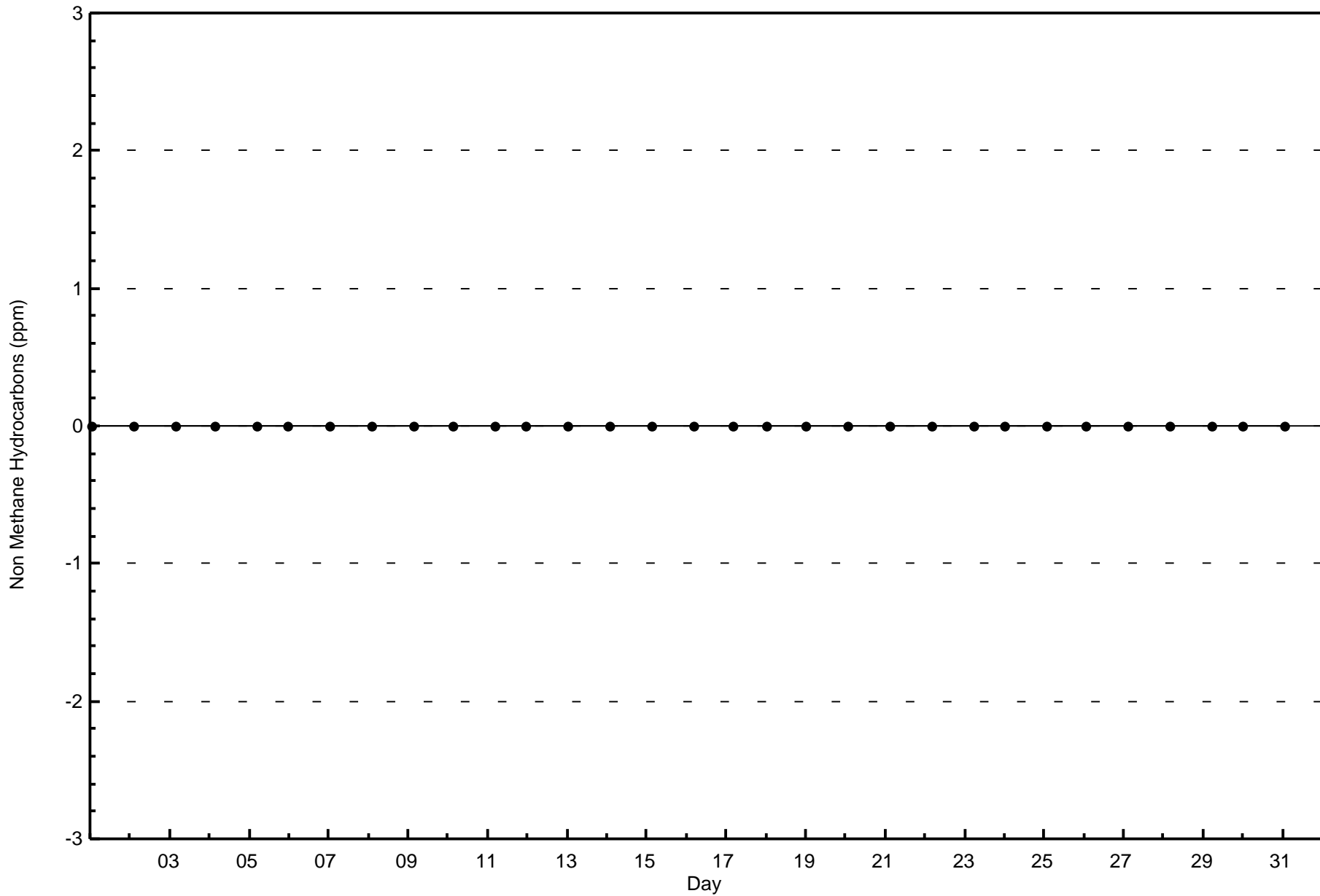
**Wood Buffalo Environmental Association
Frequency Distribution**

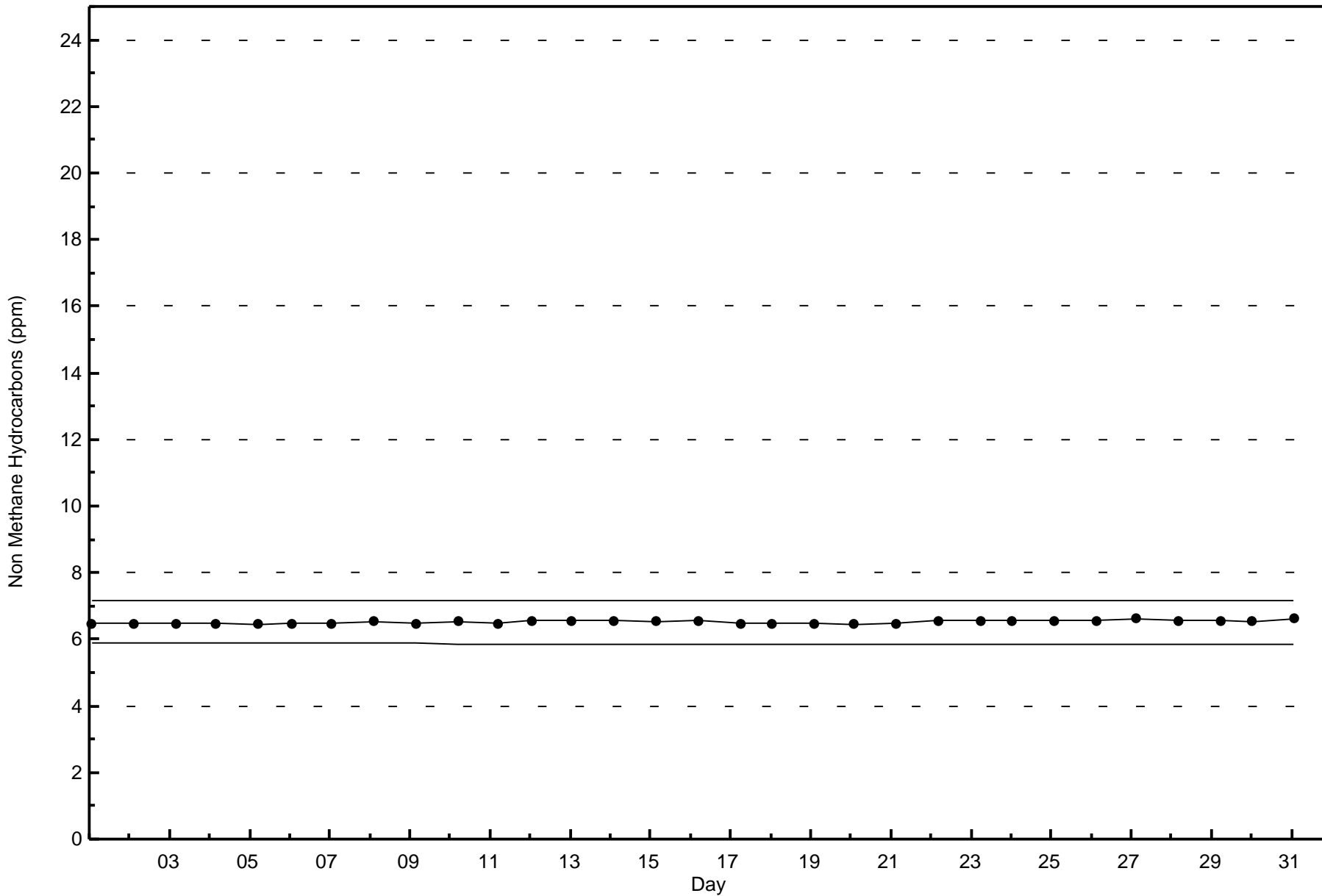
**Non Methane Hydrocarbons (NMHC) - ppm
Stony Mountain - January 2017**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	35	32	19	1	1	0	0	3	9	59	120	46	85	81	39	44	574
0.006 - 0.05	3	6	1	0	0	1	3	1	5	19	32	2	7	4	11	5	100
0.06 - 0.1	1	6	0	1	0	0	1	0	0	7	10	1	0	1	0	1	29
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	39	44	20	2	1	1	4	4	14	85	162	49	92	86	50	50	703

Total Number of Valid Hours: 703

Total Number of Hours: 744

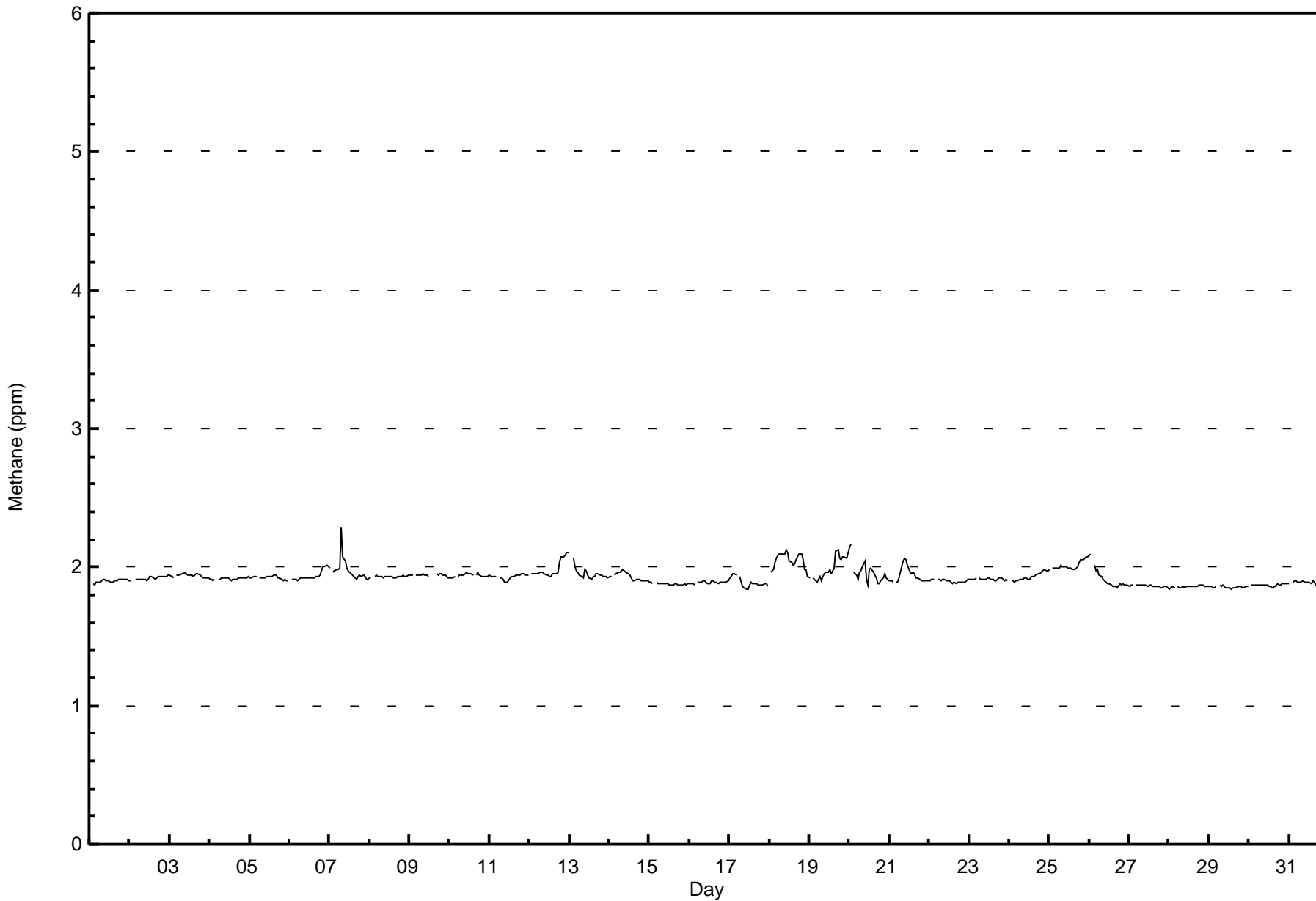






Wood Buffalo Environmental Association
Hourly Averages

Methane (CH₄) - ppm
Stony Mountain - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Methane (CH₄) - ppm
Stony Mountain - January 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	667	94.21	94.21
2.1 - 3.0	41	5.79	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 (CH₄) - ppm
Stony Mountain - January 2017**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	38	38	20	1	1	1	3	3	11	77	144	49	92	85	50	49	662
2.1 - 3.0	1	6	0	1	0	0	1	1	3	8	18	0	0	1	0	1	41
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	39	44	20	2	1	1	4	4	14	85	162	49	92	86	50	50	703

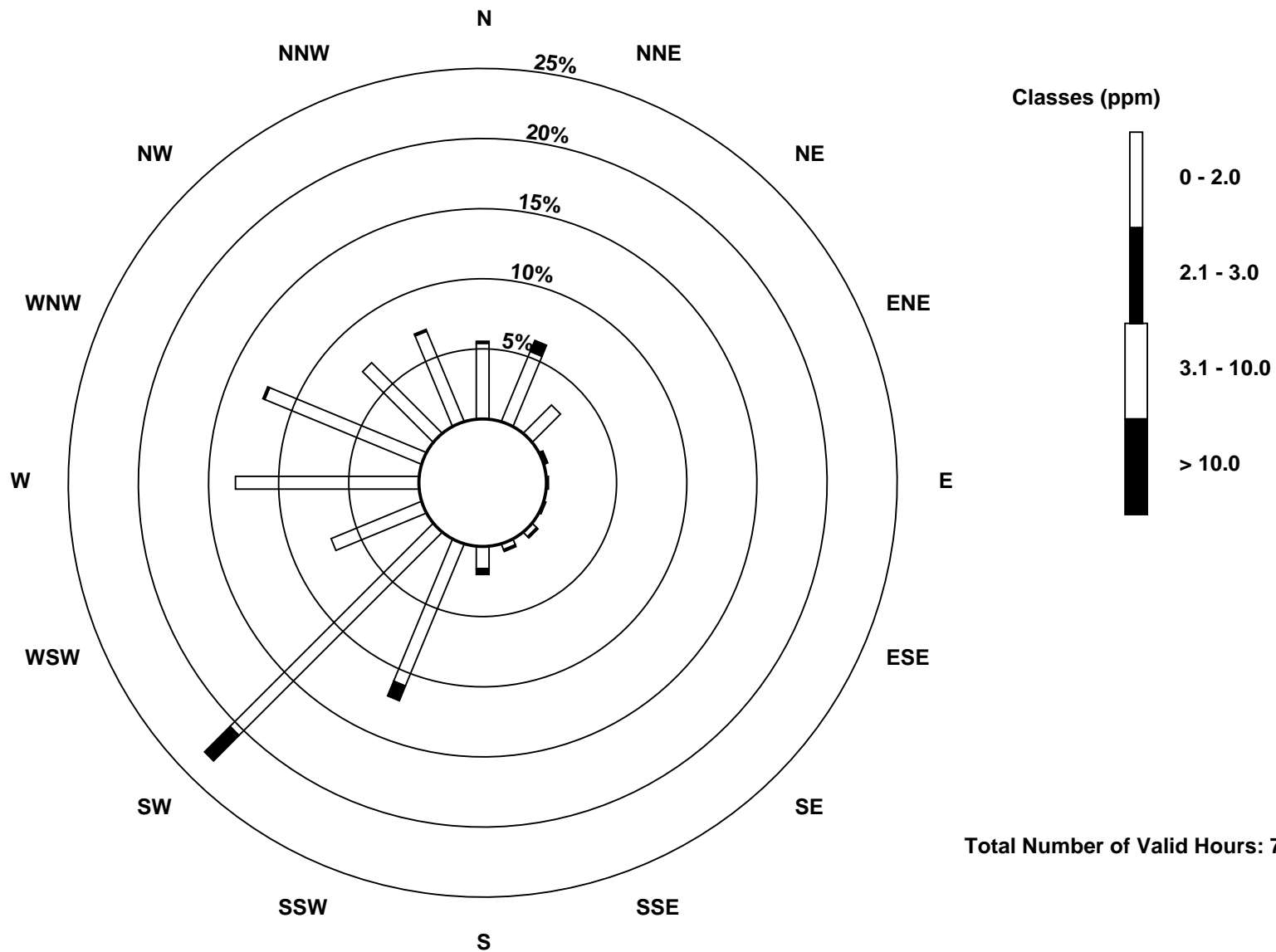
Total Number of Valid Hours: 703

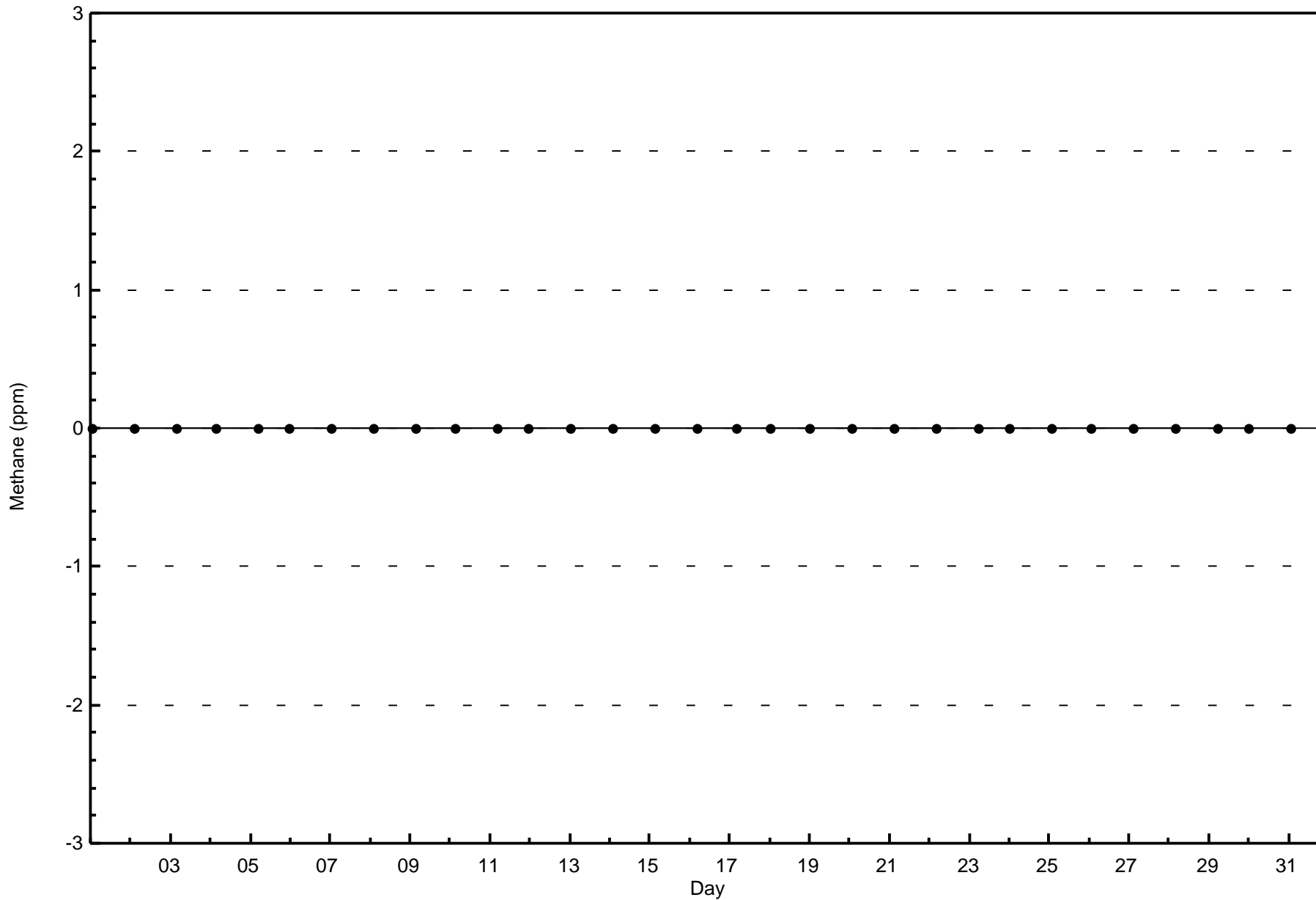
Total Number of Hours: 744

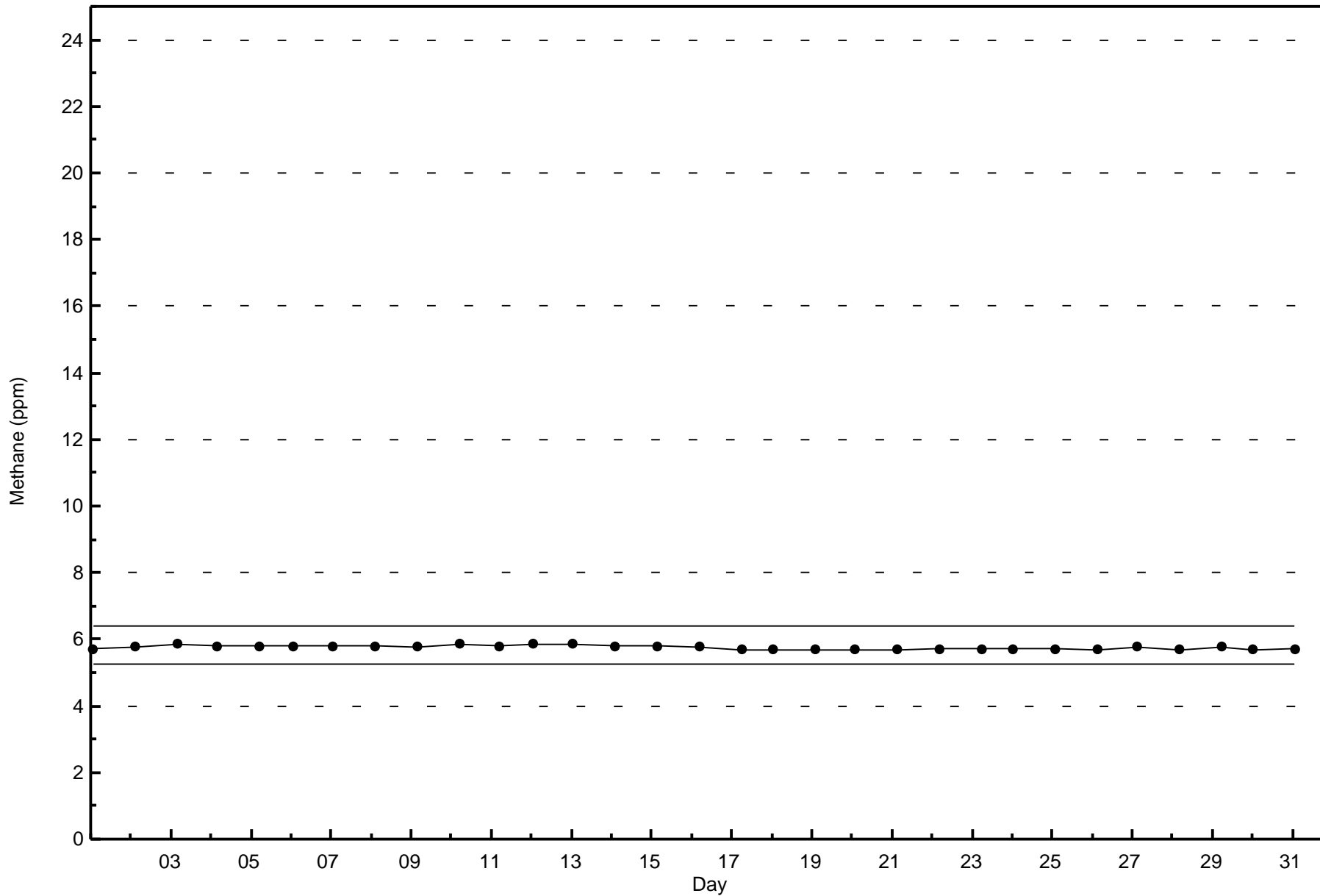


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Methane (CH₄) - ppm
Stony Mountain (AMS 18)







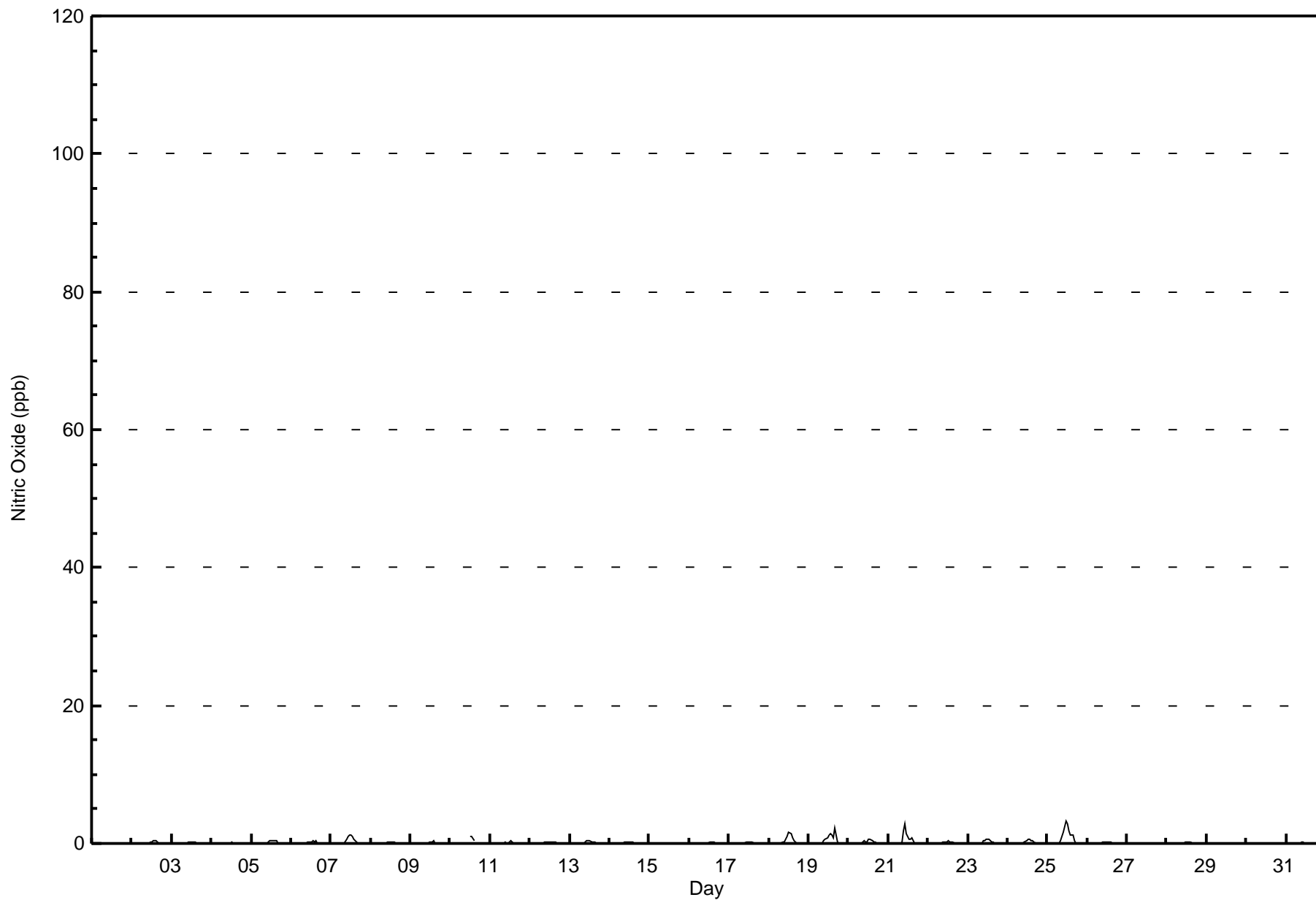


Maximum Value: 3 ppb on Jan 25 12:00														Maximum Daily Average: 0.7 ppb on Jan 25														Hours in Service: 744	
Minimum Value: 0 ppb on Jan 1 01:00														Minimum Daily Average: 0.0 ppb on Jan 1														Hours of Data: 709	
Maximum Diurnal Average: 0.5 ppb at hour 13														Minimum Diurnal Average: 0.0 ppb at hour 1														Hours of Missing Data: 35	
Monthly Average: 0.1 ppb														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 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-Jan	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		
2-Jan	0	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		
3-Jan	0	0	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		
4-Jan	0	0	0	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		
5-Jan	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		
6-Jan	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		
7-Jan	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1		
8-Jan	0	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		
9-Jan	0	0	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		
10-Jan	0	0	0	0	Z	0	0	0	0	C	C	C	1	1	0	M	0	0	0	0	0	0	0	0	0	0.1	1		
11-Jan	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		
12-Jan	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		
13-Jan	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		
14-Jan	0	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		
15-Jan	0	0	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		
16-Jan	0	0	0	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		
17-Jan	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		
18-Jan	Z	0	0	0	0	0	0	0	0	0	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0.3	2		
19-Jan	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2	0	0	0	0	0	0	0	0	0.4	2		
20-Jan	0	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1		
21-Jan	0	0	0	Z	0	0	0	0	0	2	3	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	3		
22-Jan	0	0	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		
23-Jan	0	0	0	0	0	Z	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1		
24-Jan	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1		
25-Jan	0	Z	0	0	0	0	0	0	0	2	3	3	3	2	1	1	0	0	0	0	0	0	0	0	0	0.7	3		
26-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0		
27-Jan	0	0	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		
28-Jan	0	0	0	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		
29-Jan	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		
30-Jan	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		
31-Jan	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		
																								Diurnal Average					
																								Diurnal Maximum					
Z - zerospan																													
C - Calibration																													
M - Maintenance																													



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Stony Mountain - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Stony Mountain - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
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
Stony Mountain - January 2017

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	39	44	20	2	1	1	4	4	14	85	162	49	92	88	51	48	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
Totals	39	44	20	2	1	1	4	4	14	85	162	49	92	88	51	48	704

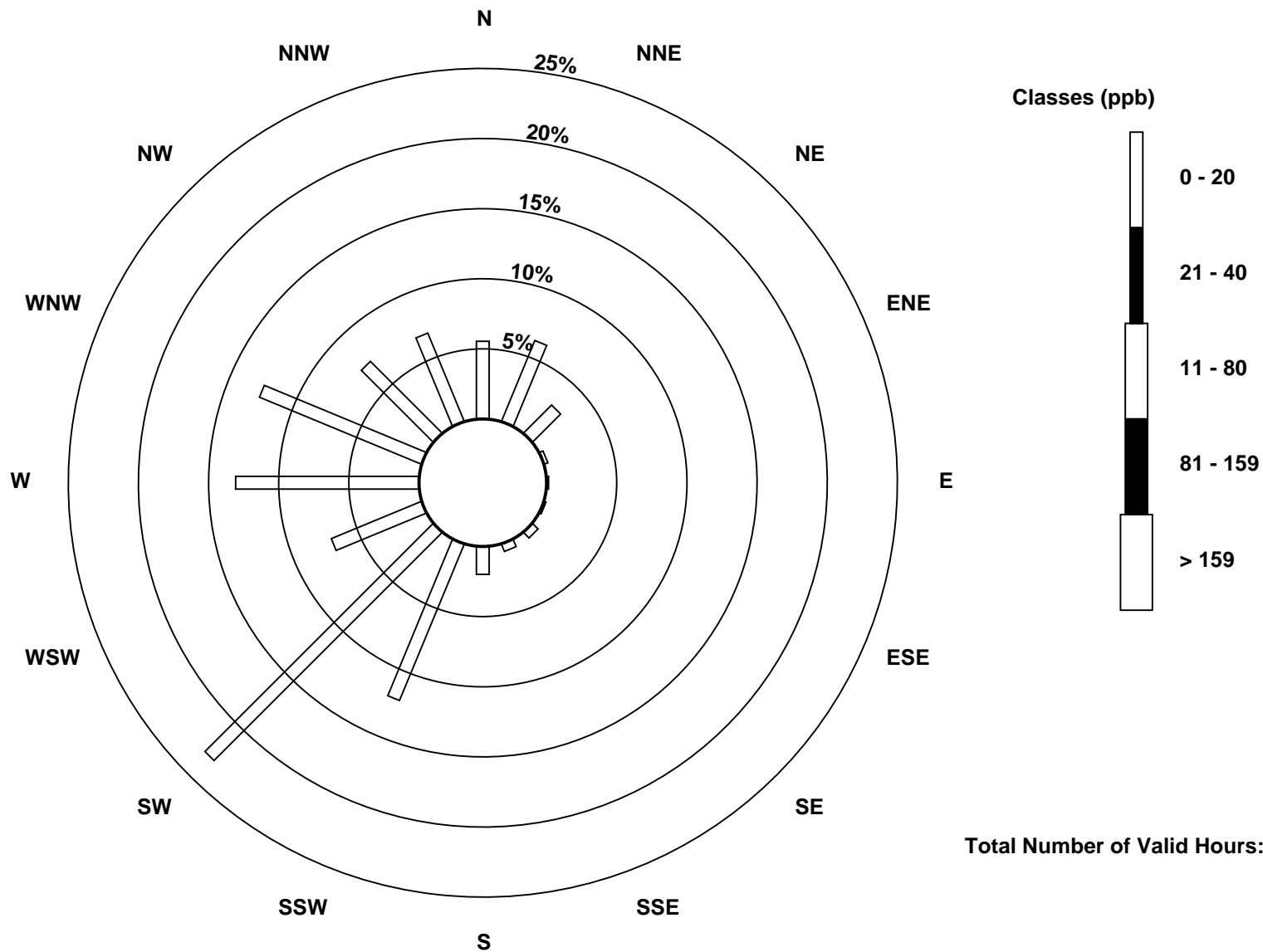
Total Number of Valid Hours: 704

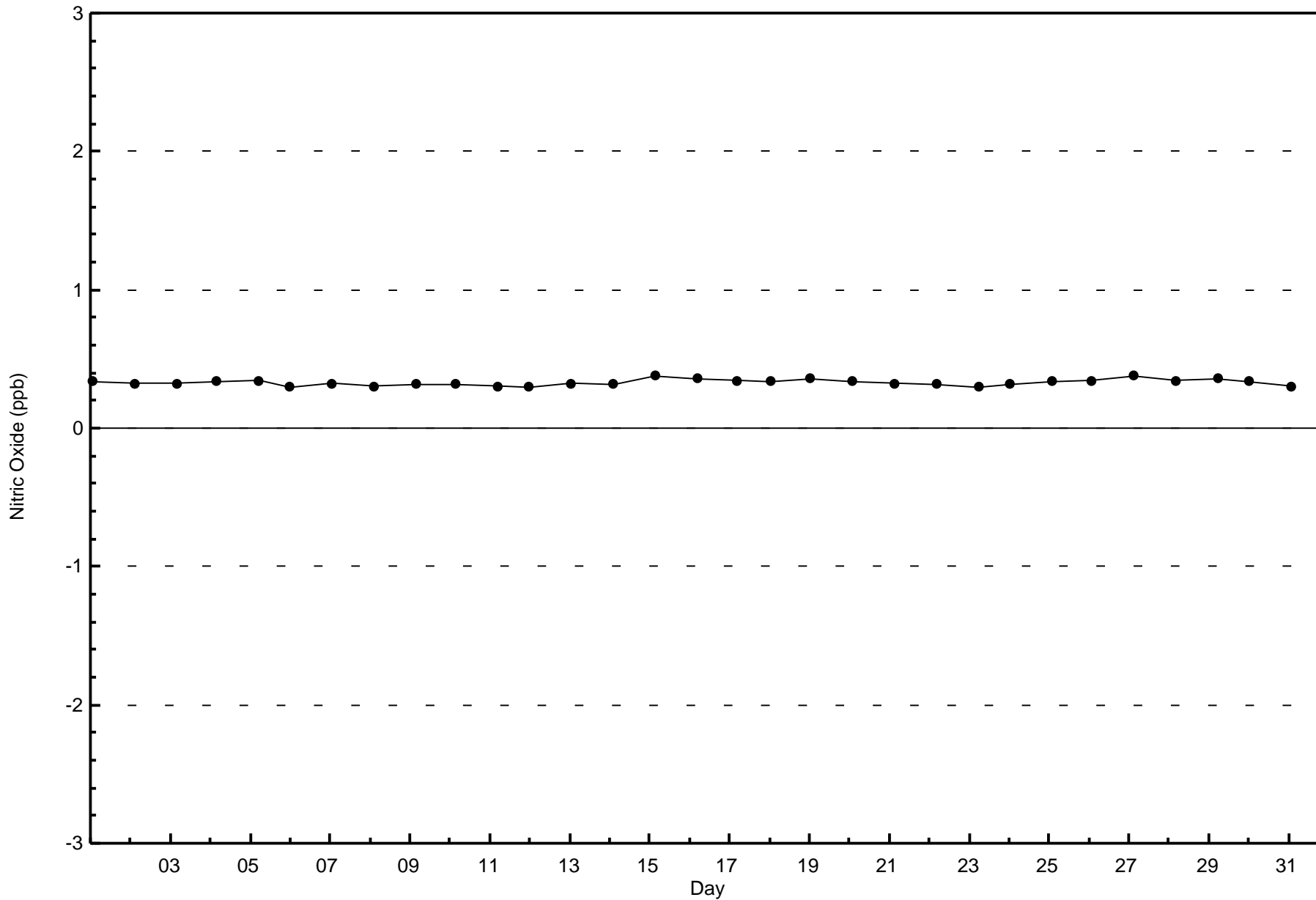
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Nitric Oxide (NO) - ppb
Stony Mountain (AMS 18)

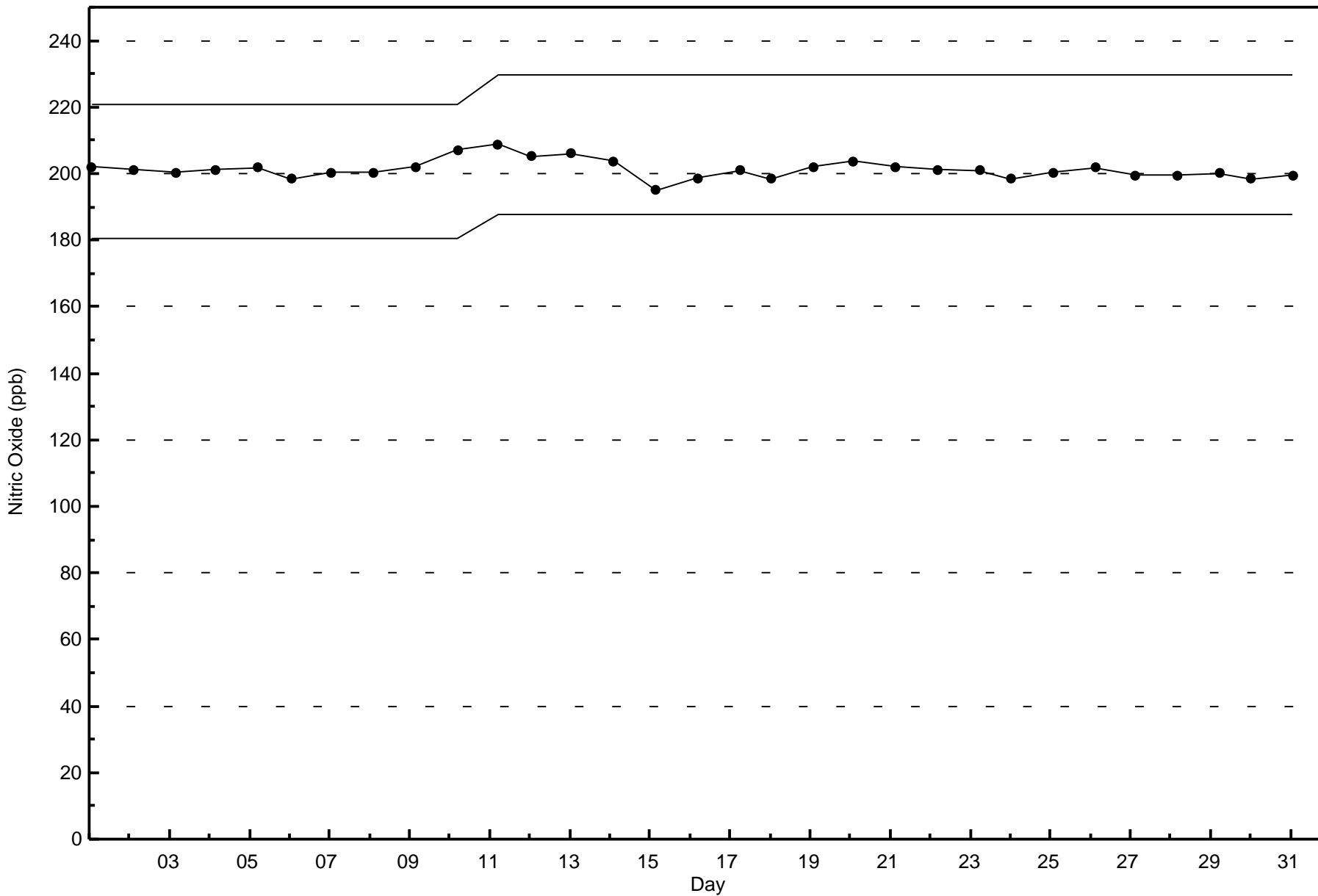






Wood Buffalo Environmental Association
Span Responses

Nitric Oxide (NO) - ppb
Stony Mountain - January 2017





Wood Buffalo Environmental Association
Summary of Hour Averages

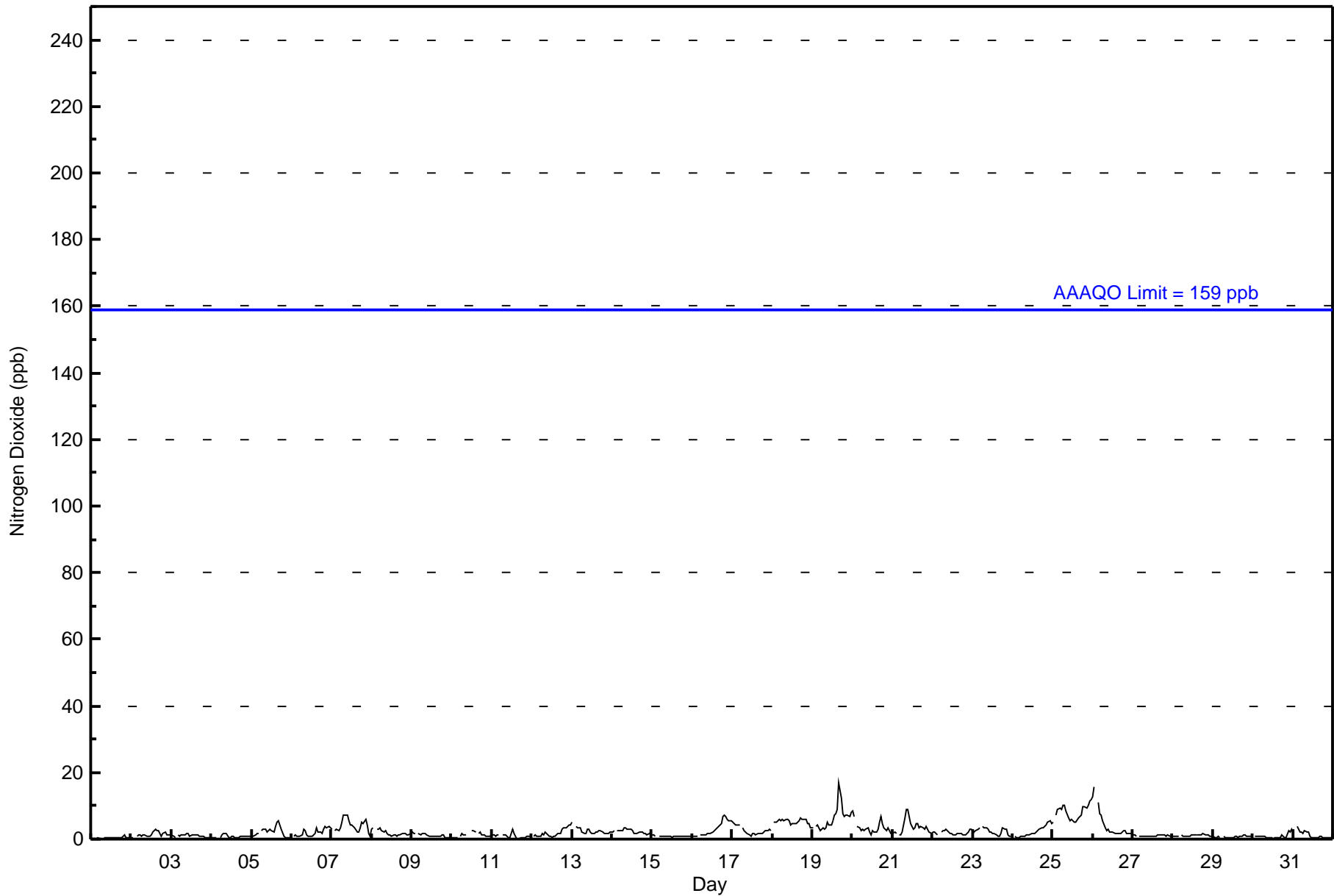
Nitrogen Dioxide (NO₂) - ppb
Stony Mountain - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 17 ppb on Jan 19 17:00 Maximum Daily Average: 8.0 ppb on Jan 25														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 ppb on Jan 30 13:00 Minimum Daily Average: 0.4 ppb on Jan 1 Maximum Diurnal Average: 2.6 ppb at hour 18 Minimum Diurnal Average: 1.8 ppb at hour 12 Monthly Average: 2.3 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 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-Jan	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	1	0	1	1	1	1	0	0.4	1
2-Jan	1	1	Z	1	1	1	1	1	1	1	1	1	1	2	3	3	3	2	1	2	2	1	1	1	1.4	3
3-Jan	1	1	1	Z	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	2
4-Jan	1	0	0	1	Z	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	2
5-Jan	1	1	1	2	2	Z	3	3	3	2	3	3	3	2	4	5	5	4	3	1	1	1	1	1	2.3	5
6-Jan	Z	1	1	1	1	1	1	3	3	1	1	1	1	1	2	3	2	2	2	3	4	4	4	3	2.0	4
7-Jan	3	Z	2	3	3	4	5	7	7	7	5	4	4	4	3	2	2	3	5	5	6	4	2	1	4.0	7
8-Jan	3	3	Z	3	3	3	3	2	3	2	1	1	1	1	1	1	1	1	2	2	2	1	1	2	1.8	3
9-Jan	2	2	2	Z	2	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1.1	2
10-Jan	0	0	0	0	Z	1	2	1	1	C	C	C	2	3	2	M	2	2	1	1	1	1	1	1	1.3	3
11-Jan	1	1	1	1	1	Z	1	1	1	1	1	1	3	2	1	0	0	0	0	0	0	1	1	1	0.9	3
12-Jan	Z	1	1	1	1	1	2	1	2	2	1	1	1	1	1	2	2	2	3	4	3	4	4	4	1.8	4
13-Jan	5	Z	4	4	3	3	2	2	2	3	3	2	2	2	2	3	3	2	2	2	2	2	2	2	2.5	5
14-Jan	2	3	Z	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	1	2	1	2.3	3
15-Jan	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
16-Jan	1	1	1	1	Z	1	1	1	1	2	2	2	2	2	3	3	4	5	7	7	7	6	5	5	3.0	7
17-Jan	5	5	4	4	4	Z	4	3	2	2	1	1	2	2	1	2	2	2	2	2	3	3	3	3	2.5	5
18-Jan	Z	5	5	6	6	6	6	6	6	6	6	4	5	5	5	5	6	6	6	6	6	5	5	3	5.3	6
19-Jan	3	Z	4	4	3	3	4	3	4	5	4	4	5	7	8	9	17	12	8	7	7	7	7	8	6.2	17
20-Jan	8	7	Z	4	3	3	3	3	3	3	2	1	2	2	2	3	5	7	5	4	3	3	2	2	3.5	8
21-Jan	2	2	2	Z	1	1	2	6	9	9	7	5	3	3	5	5	4	4	4	3	4	3	2	2	3.8	9
22-Jan	2	2	2	1	Z	2	2	3	3	2	2	2	1	1	1	2	2	2	1	1	1	2	3	3	1.9	3
23-Jan	2	2	3	3	3	Z	4	4	4	3	2	2	2	2	1	1	1	2	3	3	3	1	1	1	2.3	4
24-Jan	Z	1	1	1	1	1	1	1	1	1	1	2	2	2	2	3	3	3	4	4	4	5	5	5	2.3	5
25-Jan	5	Z	7	9	9	9	10	10	8	6	5	6	6	5	5	6	7	7	10	10	9	10	12	12	8.0	12
26-Jan	13	16	Z	11	8	7	5	4	3	3	2	2	2	2	2	2	2	2	3	2	2	2	2	2	4.1	16
27-Jan	1	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	1
28-Jan	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1.0	2
29-Jan	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
30-Jan	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	0	3	2	0.9	3
31-Jan	2	Z	4	3	2	2	2	3	2	2	1	0	0	0	0	1	1	1	0	0	1	1	0	0	1.2	4
2.6 2.3 1.9 2.6 2.5 2.2 2.4 2.5 2.6 2.5 2.0 1.8 1.9 1.9 2.0 2.2 2.6 2.6 2.6 2.5 2.5 2.4 2.4 2.3																								Diurnal Average		
13 16 7 11 9 9 10 10 9 9 7 6 6 7 8 9 17 12 10 10 9 10 12 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 (NO₂) - ppb
Stony Mountain - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Stony Mountain - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
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 (NO₂) - ppb
Stony Mountain - January 2017

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	39	44	20	2	1	1	4	4	14	85	162	49	92	88	51	48	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
Totals	39	44	20	2	1	1	4	4	14	85	162	49	92	88	51	48	704

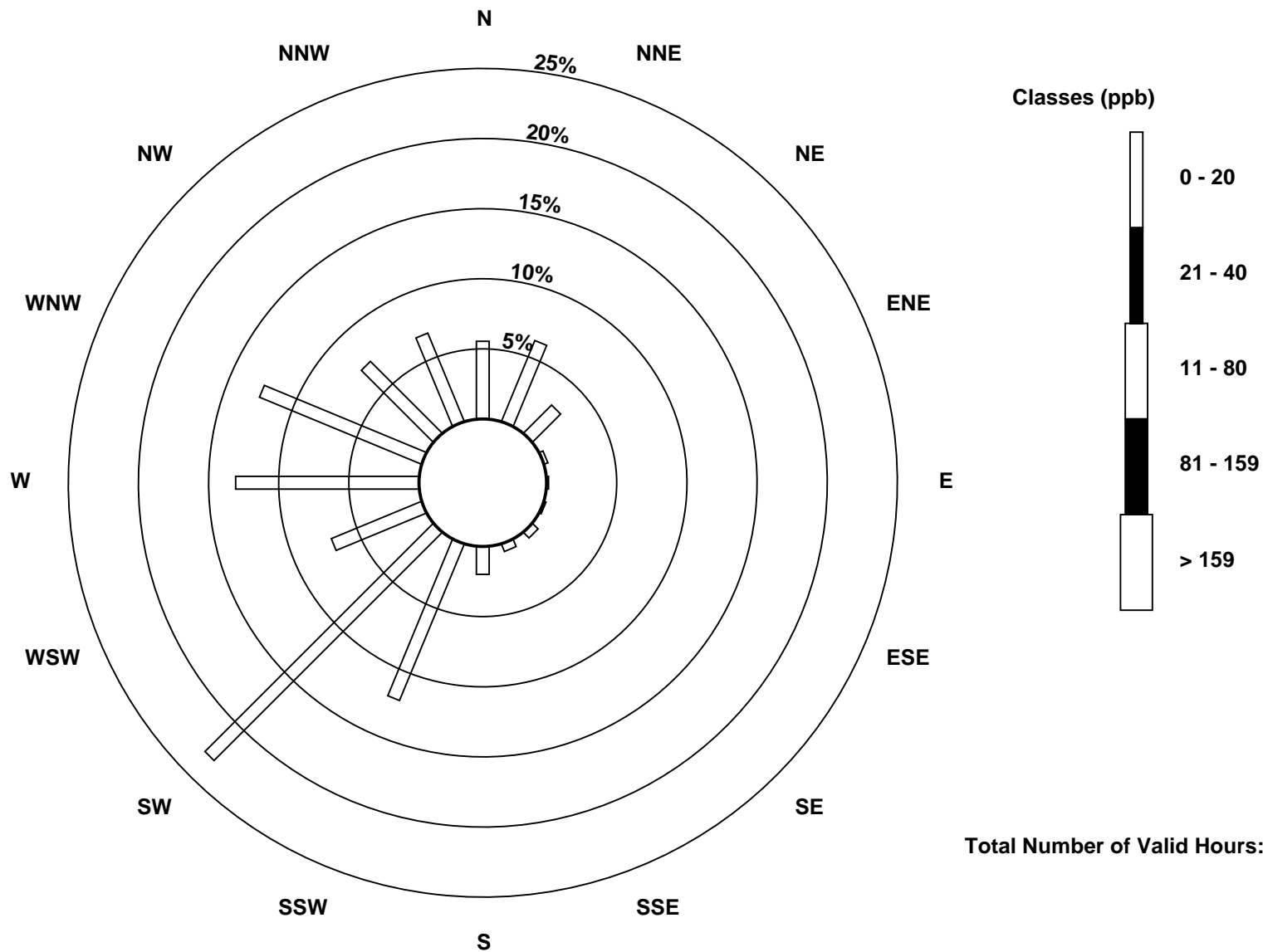
Total Number of Valid Hours: 704

Total Number of Hours: 744

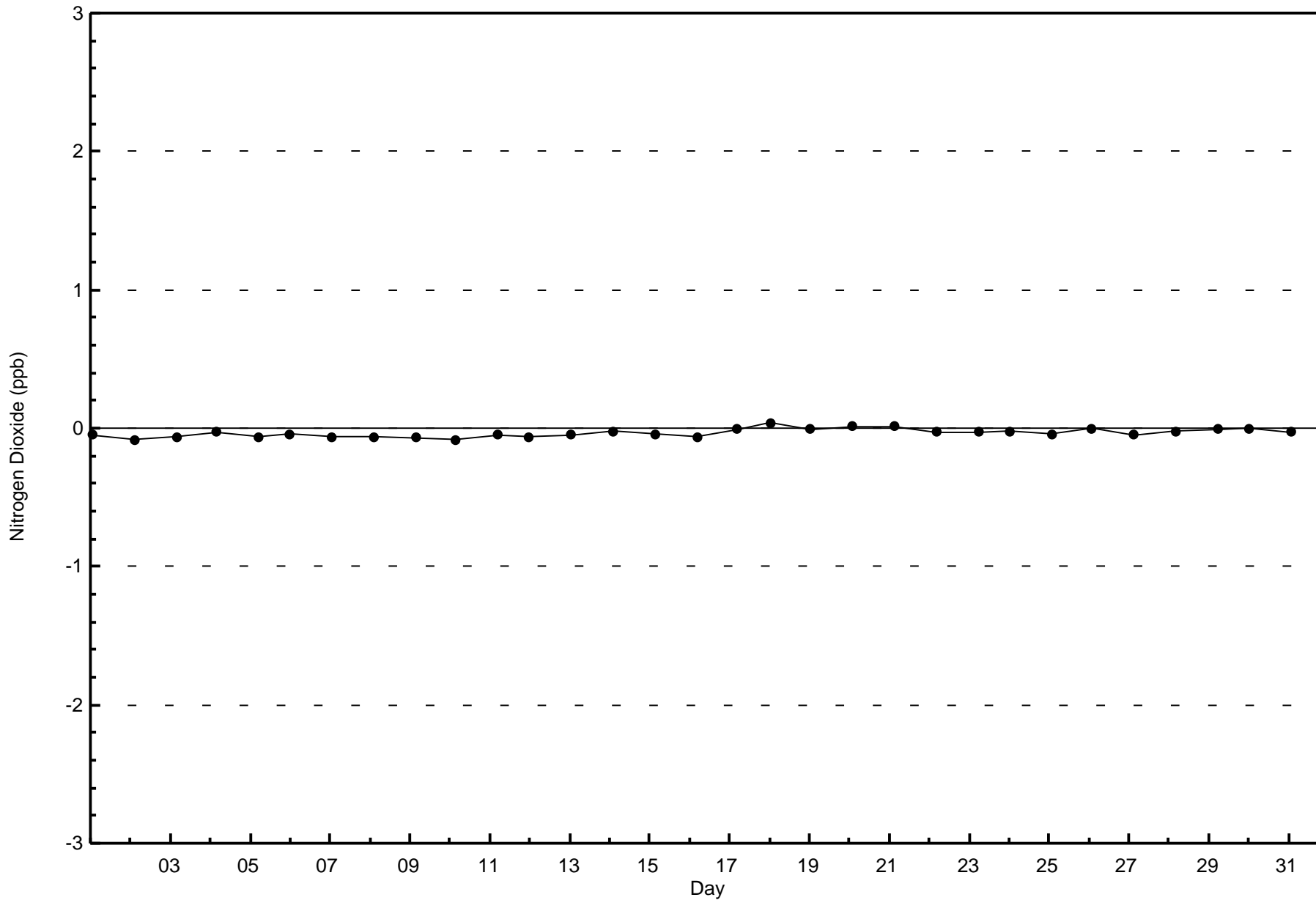


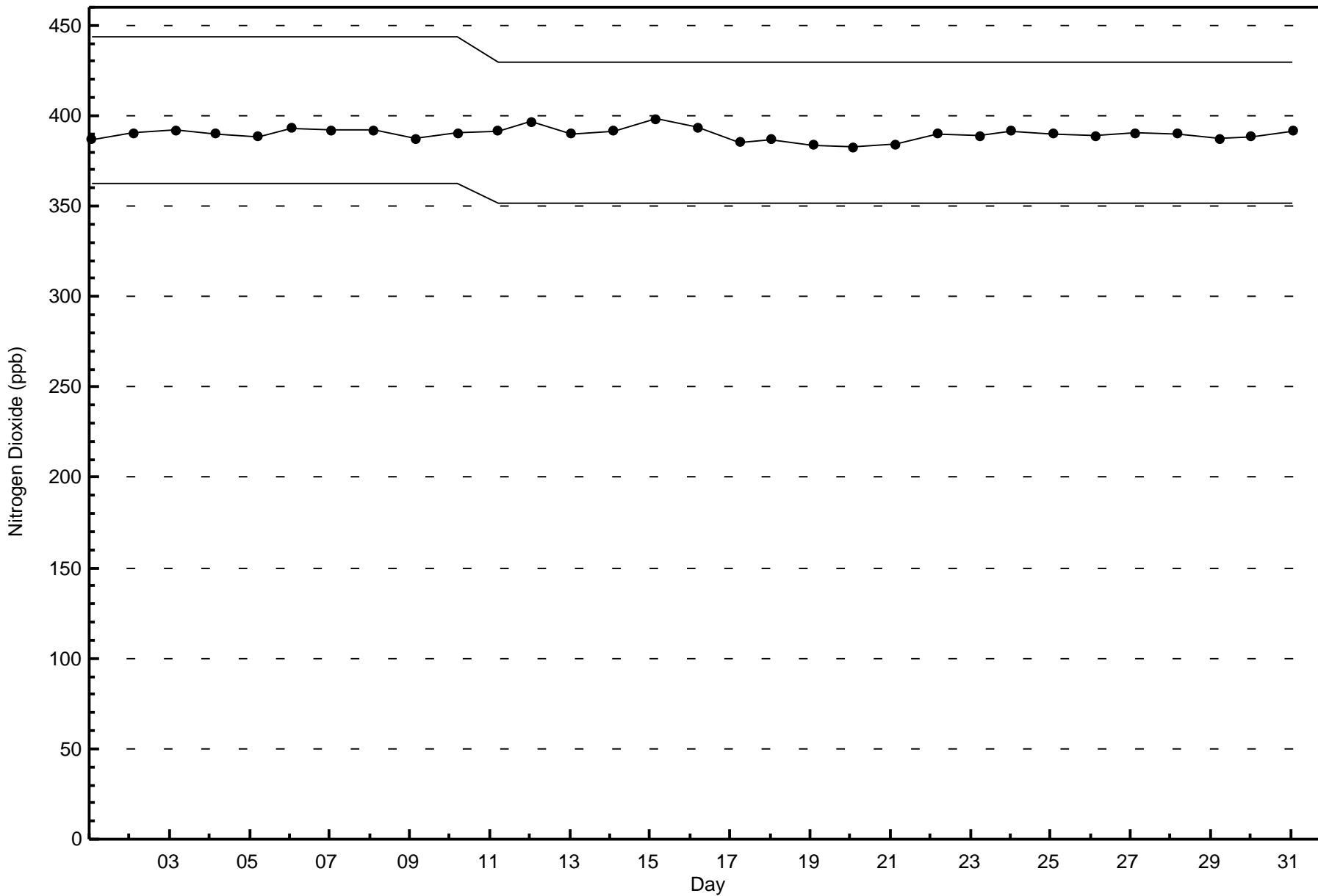
Wood Buffalo Environmental Association
Wind Rose Jan 2017

Nitrogen Dioxide (NO₂) - ppb
Stony Mountain (AMS 18)



Total Number of Valid Hours: 704







Wood Buffalo Environmental Association
Summary of Hour Averages

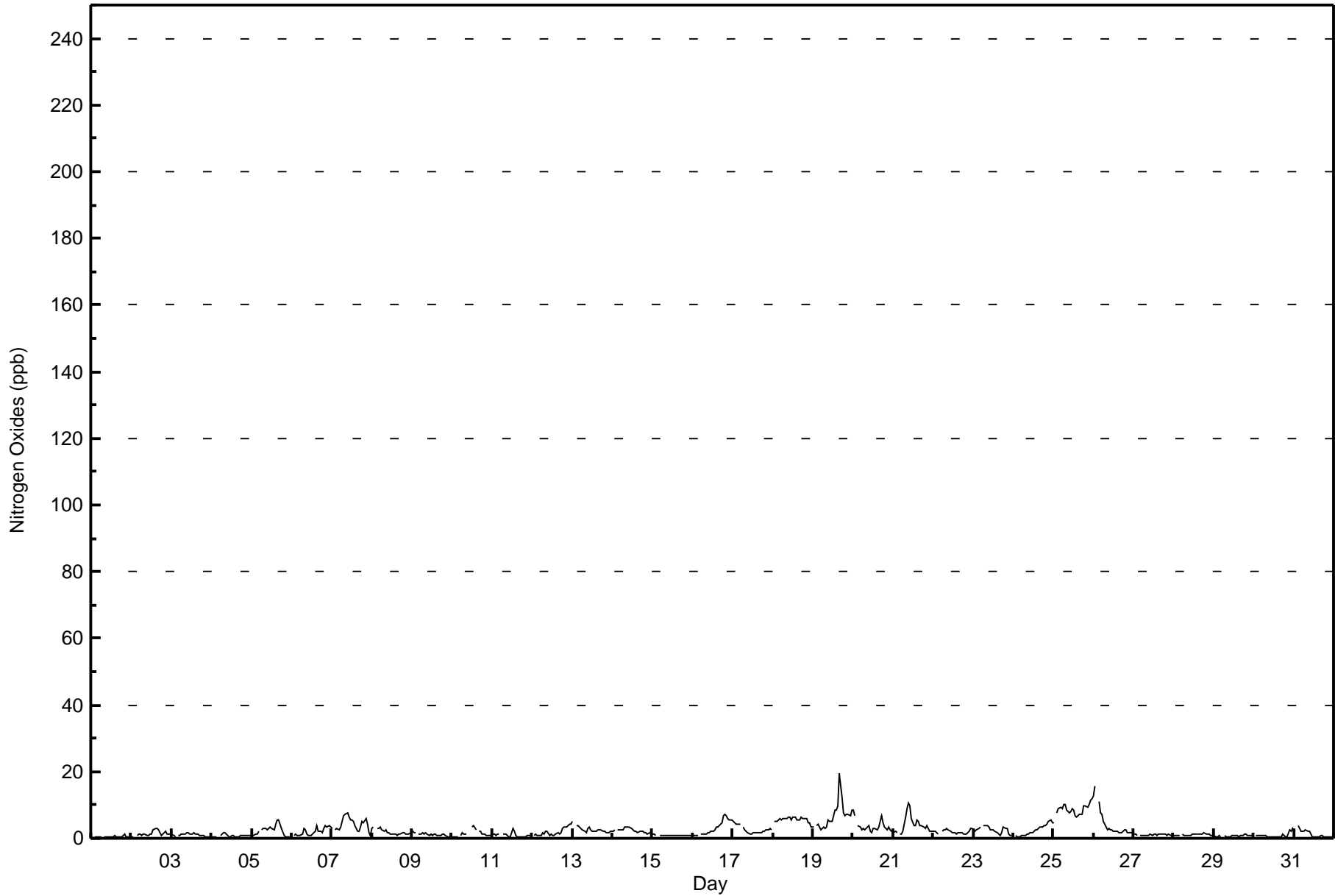
Nitrogen Oxides (NO_x) - ppb
Stony Mountain - January 2017

Maximum Value: 19 ppb on Jan 19 17:00																	Maximum Daily Average: 8.6 ppb on Jan 25																	Hours in Service: 744	
Minimum Value: 0 ppb on Jan 1 08:00																	Minimum Daily Average: 0.4 ppb on Jan 1																	Hours of Data: 709	
Maximum Diurnal Average: 2.7 ppb at hour 17																	Minimum Diurnal Average: 1.9 ppb at hour 3																	Hours of Missing Data: 35	
Monthly Average: 2.4 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 6 P ₉₉ = 10																	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-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	1	1	0	0.4	1									
2-Jan	1	1	Z	1	1	1	1	1	1	1	1	1	3	3	3	3	2	1	1	2	1	1	1	1.4	3										
3-Jan	1	1	1	Z	1	1	1	1	1	2	2	1	2	1	1	1	1	1	1	1	1	1	0	1.1	2										
4-Jan	0	0	0	1	Z	1	1	2	2	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0.8	2										
5-Jan	1	1	1	1	2	Z	3	3	3	2	3	4	3	3	4	5	5	4	3	1	0	0	1	2.4	5										
6-Jan	Z	1	1	1	1	1	1	3	3	1	1	1	2	2	4	2	2	2	3	4	3	4	3	2.0	4										
7-Jan	3	Z	2	3	3	4	5	7	7	8	6	6	5	5	4	2	2	3	5	5	6	4	2	4.3	8										
8-Jan	3	3	Z	3	3	3	2	2	2	2	2	1	1	1	1	1	1	1	1	2	1	1	1	1.9	3										
9-Jan	2	2	2	Z	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1.2	2										
10-Jan	0	0	0	0	Z	1	2	1	1	C	C	C	3	4	3	M	2	2	1	1	1	1	1	1.4	4										
11-Jan	1	1	1	1	1	Z	1	1	1	1	0	0	3	2	1	0	0	0	0	0	0	1	1	0.9	3										
12-Jan	Z	1	1	1	1	1	2	1	2	2	1	1	1	1	1	2	1	2	3	3	3	4	4	1.9	4										
13-Jan	5	Z	4	4	3	3	2	2	2	3	3	3	2	2	2	2	3	2	2	2	2	2	2	2.6	5										
14-Jan	2	2	Z	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	1	2	2.3	3										
15-Jan	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1										
16-Jan	1	1	1	1	Z	1	1	1	1	2	2	2	2	3	3	3	4	5	7	7	7	6	5	3.1	7										
17-Jan	5	5	4	4	4	Z	3	2	2	2	1	1	2	2	2	2	2	2	2	2	2	3	3	2.6	5										
18-Jan	Z	5	5	6	6	6	6	6	6	6	6	5	6	6	5	5	6	6	6	6	6	5	5	5.6	6										
19-Jan	3	Z	4	4	3	3	3	3	4	5	5	5	7	9	9	10	19	12	8	7	7	7	7	6.6	19										
20-Jan	8	7	Z	4	3	3	3	3	3	4	2	2	3	3	3	3	5	7	5	4	3	3	2	3.6	8										
21-Jan	2	2	2	Z	1	1	2	6	9	11	10	6	4	4	6	5	4	4	4	3	4	3	2	4.2	11										
22-Jan	2	2	2	1	Z	2	2	3	3	3	2	2	2	2	1	2	2	2	1	1	1	2	3	2.0	3										
23-Jan	2	2	3	3	3	Z	4	4	4	3	3	3	3	2	2	1	1	2	3	3	3	1	1	2.4	4										
24-Jan	Z	1	1	1	1	1	1	1	1	1	2	2	2	2	3	3	3	3	4	4	4	5	5	2.4	5										
25-Jan	5	Z	7	9	9	9	10	10	10	9	8	8	9	8	7	6	7	7	10	10	9	10	12	8.6	12										
26-Jan	13	16	Z	11	8	7	5	4	3	3	3	2	2	2	2	2	2	2	3	2	2	2	2	4.2	16										
27-Jan	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	1										
28-Jan	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1.1	2										
29-Jan	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1										
30-Jan	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	1	0	3	0.9	3										
31-Jan	1	Z	4	3	2	2	2	2	2	2	1	0	0	0	0	1	1	1	0	0	0	0	0	1.2	4										
																								Diurnal Average											
																								Diurnal Maximum											
Z - zerospan C - Calibration M - Maintenance																																			



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Stony Mountain - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Stony Mountain - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
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_x) - ppb
Stony Mountain - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	39	44	20	2	1	1	4	4	14	85	162	49	92	88	51	48	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
Totals	39	44	20	2	1	1	4	4	14	85	162	49	92	88	51	48	704

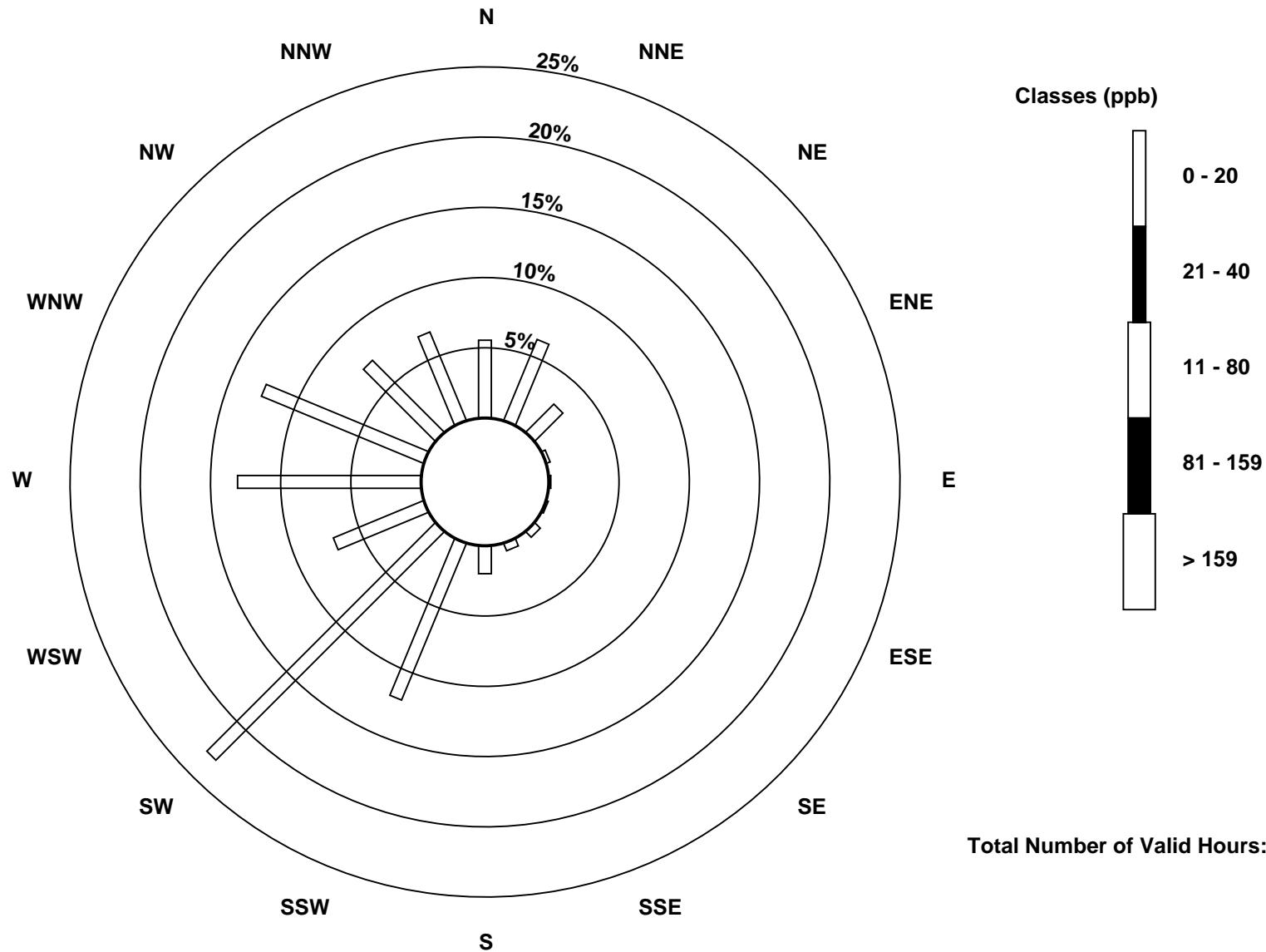
Total Number of Valid Hours: 704

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

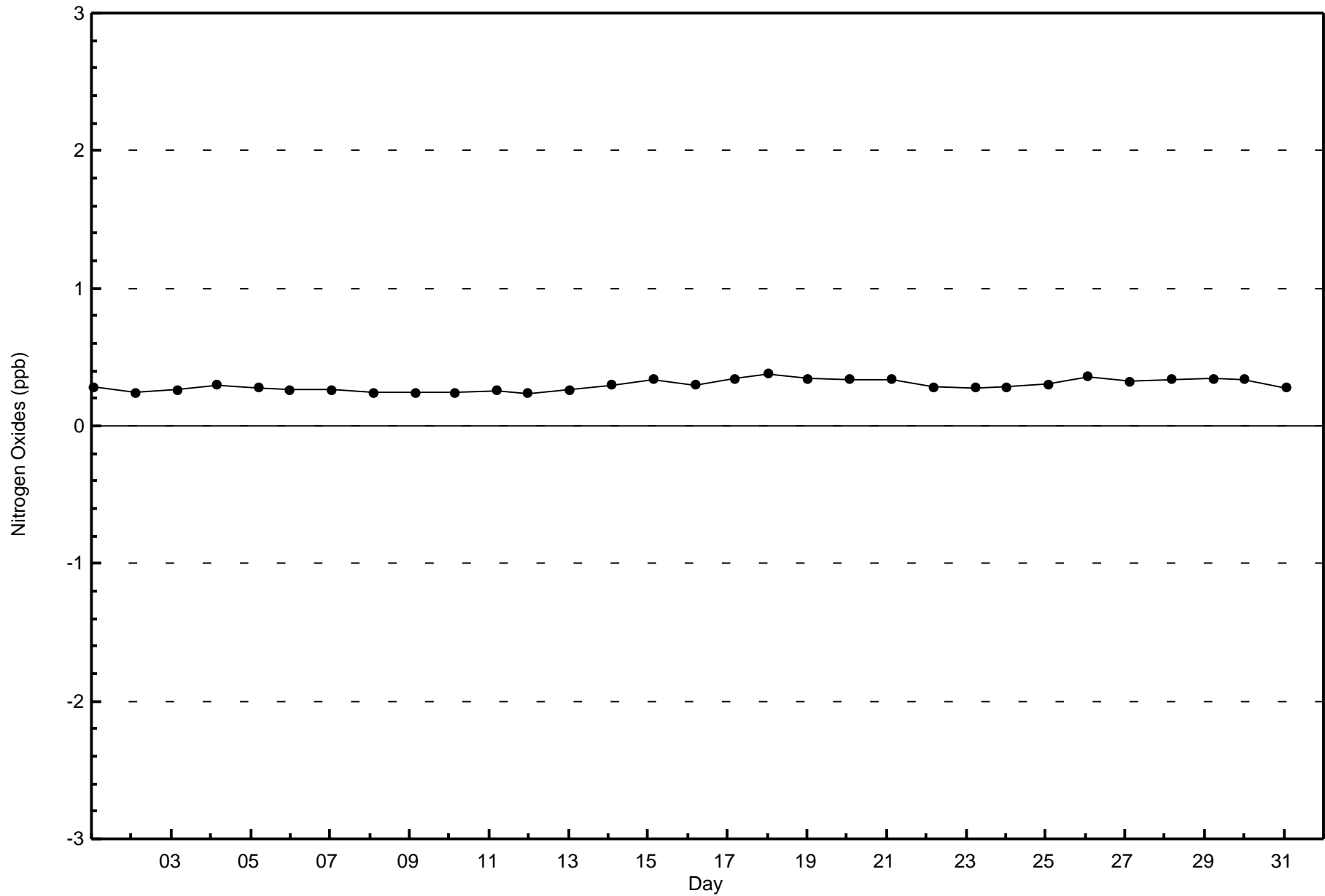
Nitrogen Oxides (NO_x) - ppb
Stony Mountain (AMS 18)

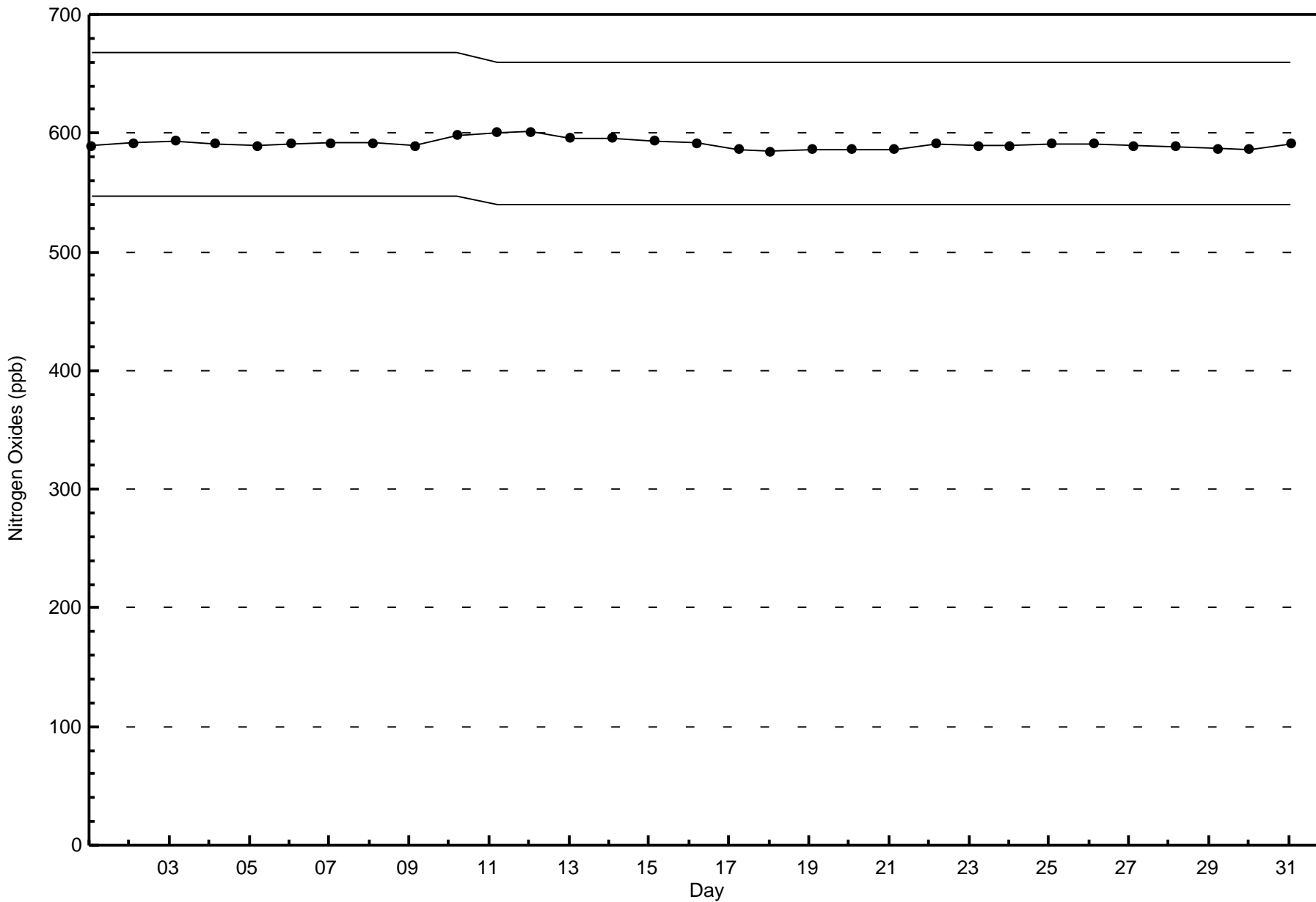




Wood Buffalo Environmental Association
Zero Responses

Nitrogen Oxides (NO_x) - ppb
Stony Mountain - January 2017







Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

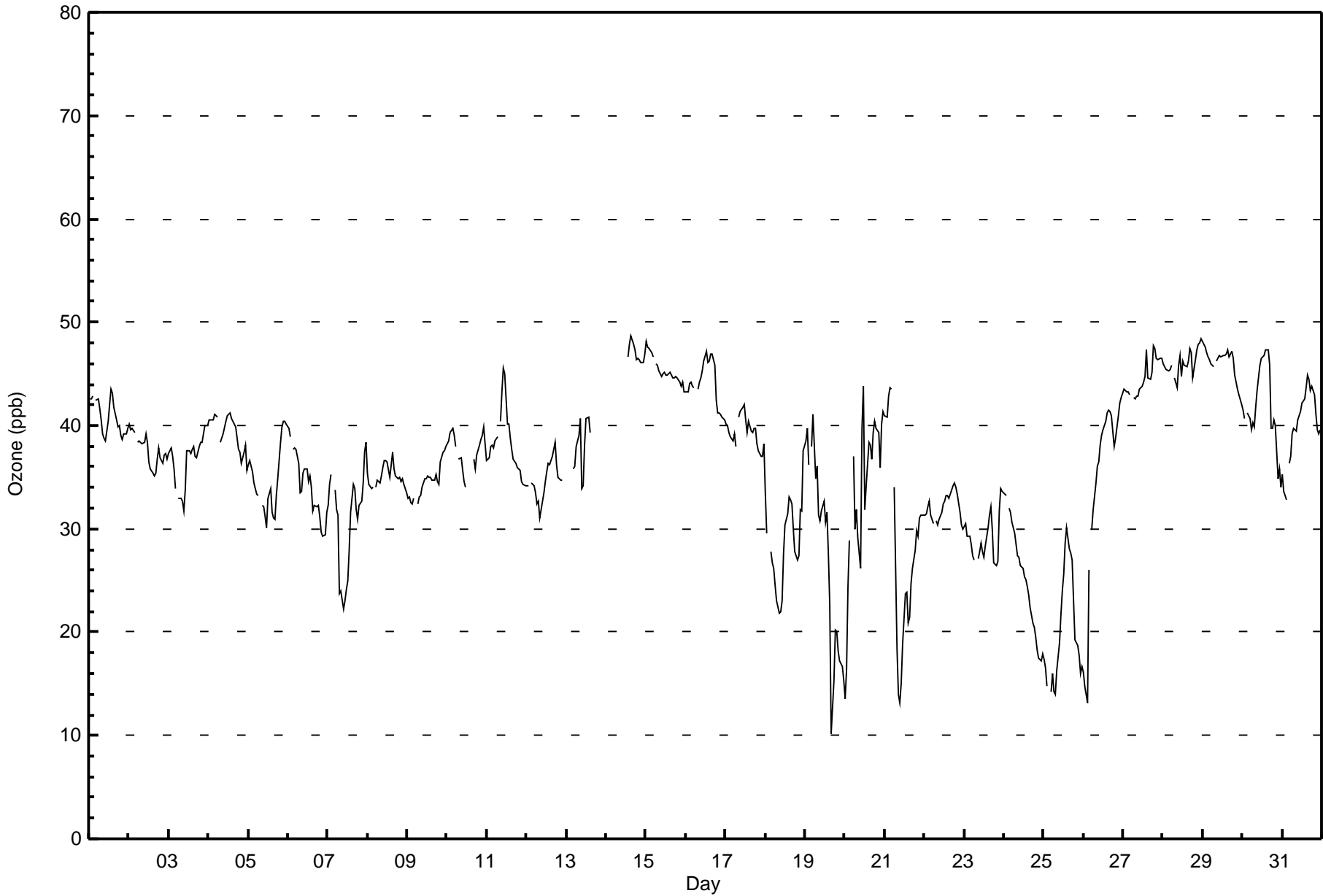
Stony Mountain - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 49 ppb on Jan 14 16:00										Maximum Daily Average: 46.1 ppb on Jan 28										Hours of Data: 684						
Minimum Value: 10 ppb on Jan 19 17:00										Minimum Daily Average: 20.3 ppb on Jan 25										Hours of Missing Data: 60						
Maximum Diurnal Average: 37.6 ppb at hour 15										Minimum Diurnal Average: 34.3 ppb at hour 8										Hours of Calibration: 33						
Monthly Average: 36.1 ppb										Percentiles: P ₁ = 14 P ₁₀ = 26 Q ₁ = 32 Median = 37 O ₃ = 41 P ₉₀ = 46 P ₉₉ = 48										Percent Operational Time: 96.4						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	43	43	43	Z	42	43	42	41	39	39	38	40	42	44	43	42	41	40	40	39	39	39	39	40	40.8	44
2-Jan	40	40	40	39	Z	38	38	38	38	38	39	38	37	36	35	35	35	37	38	37	36	37	37	37	37.6	40
3-Jan	37	38	37	36	34	Z	33	33	33	32	34	38	38	37	38	38	37	37	38	38	38	39	40	40	36.6	40
4-Jan	41	41	41	41	41	41	Z	38	39	39	40	41	41	41	40	40	39	38	37	36	37	38	36	36	39.4	41
5-Jan	36	37	36	34	34	33	33	Z	32	32	31	30	33	34	32	31	31	33	35	38	40	40	40	40	34.6	40
6-Jan	40	39	Z	38	38	38	36	34	34	35	36	36	35	35	34	32	32	32	32	31	30	29	29	32	34.1	40
7-Jan	32	34	35	Z	34	32	31	24	24	22	23	24	25	28	32	34	34	32	31	32	33	34	37	38	30.7	38
8-Jan	35	34	34	34	Z	34	35	34	35	36	37	37	37	35	36	37	36	35	35	35	35	35	34	34	35.1	37
9-Jan	33	33	32	32	33	Z	32	33	33	34	35	35	35	35	35	35	35	35	35	34	36	37	38	38	34.5	38
10-Jan	38	38	39	40	39	38	Z	37	37	36	35	34	C	C	C	M	37	36	37	38	39	39	40	38	37.6	40
11-Jan	37	37	38	38	38	39	39	Z	40	43	46	45	40	40	39	38	37	36	36	36	36	35	34	34	38.2	46
12-Jan	34	34	Z	34	34	33	32	33	31	32	34	35	36	36	37	38	38	36	35	35	35	35	AF	AF	34.7	38
13-Jan	AF	AF	34	Z	36	36	38	39	41	34	34	38	41	41	39	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	41
14-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	47	48	49	48	47	46	46	46	46	47	47	--	49
15-Jan	48	48	47	47	47	Z	46	46	45	45	45	45	45	45	45	45	45	45	45	44	44	44	43	43	45.3	48
16-Jan	43	43	44	44	44	44	Z	44	44	45	45	46	47	46	46	47	47	46	42	41	41	41	41	41	44.0	47
17-Jan	40	40	39	39	39	39	38	Z	41	41	42	42	41	39	40	39	39	40	40	38	38	37	37	38	39.4	42
18-Jan	34	30	Z	28	27	26	25	23	22	22	23	28	30	31	33	33	32	30	28	27	27	32	32	38	28.6	38
19-Jan	39	40	36	Z	38	41	35	36	31	31	32	33	31	32	28	23	10	15	20	20	18	17	17	15	27.7	41
20-Jan	14	16	24	29	Z	37	30	32	29	26	40	44	32	34	38	38	37	39	40	40	39	36	40	41	33.8	44
21-Jan	41	41	43	44	43	Z	34	18	14	13	15	19	24	24	21	21	25	26	28	30	29	31	31	31	28.1	44
22-Jan	31	31	32	33	31	31	Z	31	30	31	32	32	33	33	33	33	34	34	34	34	33	32	30	30	32.1	34
23-Jan	30	31	29	29	28	27	Z	27	28	29	28	27	28	30	31	32	30	27	26	27	32	34	34	34	29.2	34
24-Jan	33	33	Z	32	32	31	30	28	27	27	27	26	25	25	24	24	22	21	20	19	18	17	17	18	25.2	33
25-Jan	17	17	15	Z	14	16	14	14	16	19	22	24	26	29	30	28	28	27	23	19	19	18	16	17	20.3	30
26-Jan	16	15	13	26	Z	30	32	34	36	36	38	39	40	40	41	41	41	41	38	39	40	41	42	43	34.9	43
27-Jan	43	43	43	43	43	Z	43	43	43	43	43	44	44	45	47	45	45	45	48	47	46	46	47	46	44.6	48
28-Jan	46	46	45	45	45	46	Z	45	44	46	47	45	46	46	46	46	47	47	45	46	47	48	48	48	46.1	48
29-Jan	48	48	47	47	46	46	46	Z	46	46	47	47	47	47	47	47	47	47	47	45	44	44	43	42	46.1	48
30-Jan	41	41	Z	41	41	40	40	40	42	43	46	47	47	47	47	47	47	46	40	40	40	35	36	34	41.7	47
31-Jan	35	34	33	Z	36	37	39	40	40	41	41	41	42	43	44	45	44	43	44	43	41	40	39	40	40.2	45
36.1 35.9 36.0 37.2 36.8 35.8 34.7 34.3 34.4 34.5 35.8 36.6 36.7 37.4 37.6 37.3 36.7 36.5 36.2 36.0 35.7 35.8 36.1 36.3																								Diurnal Average		
48 48 47 47 47 46 46 46 46 46 47 47 47 47 48 49 48 47 48 47 47 48 48 48																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance AF - Analyzer Failure																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Stony Mountain - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Stony Mountain - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	38	5.56	5.56
21 - 50	646	94.44	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 744



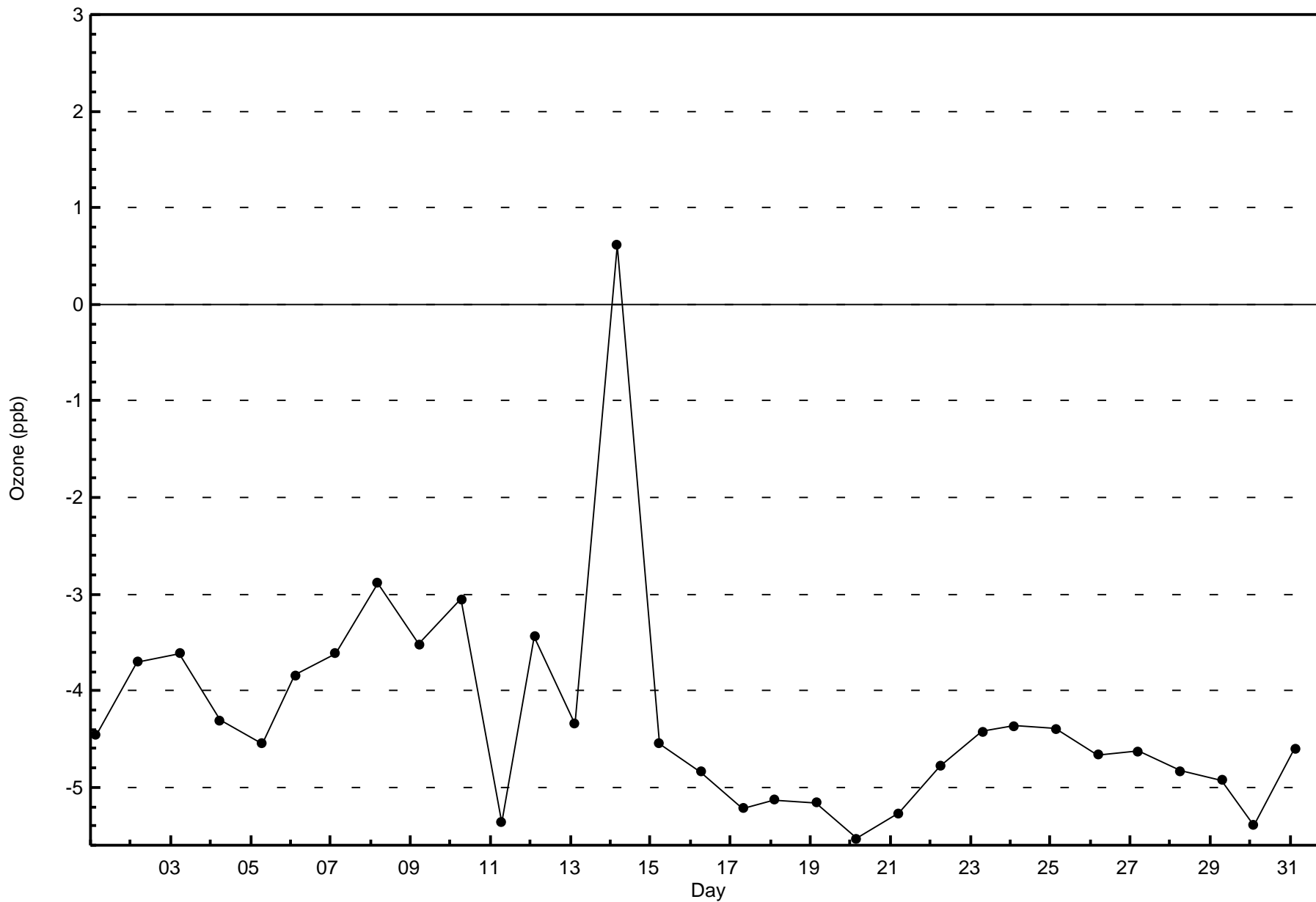
Wood Buffalo Environmental Association
Frequency Distribution

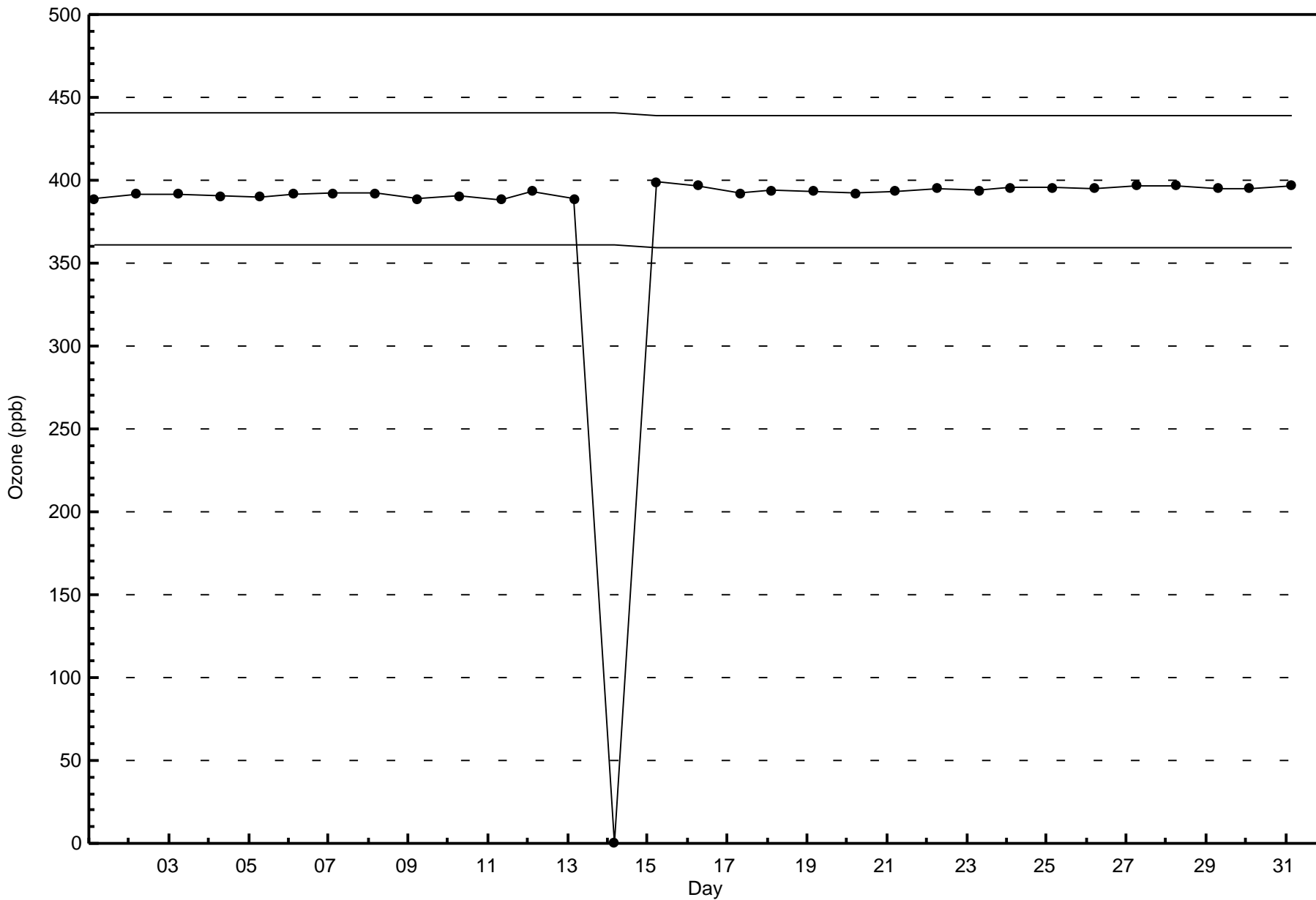
Ozone (O₃) - ppb
Stony Mountain - January 2017

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	1	6	1	1	0	0	1	0	0	12	14	0	0	1	0	1	38
21 - 50	37	39	20	1	0	1	3	4	15	69	129	48	89	89	49	48	641
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
Totals	38	45	21	2	0	1	4	4	15	81	143	48	89	90	49	49	679

Total Number of Valid Hours: 679

Total Number of Hours: 744







Number of Exceedences (AAAQO):	24-hr: 0	Hours in Service:	744
Maximum Value: 22.3 µg/m ³ on Jan 26 03:00	Maximum Daily Average: 15.4 µg/m ³ on Jan 25	Hours of Data:	742
Minimum Value: 1.3 µg/m ³ on Jan 31 12:00	Minimum Daily Average: 1.8 µg/m ³ on Jan 4	Hours of Missing Data:	2
Maximum Diurnal Average: 4.7 µg/m ³ at hour 17	Minimum Diurnal Average: 3.6 µg/m ³ at hour 12	Hours of Calibration:	2
Monthly Average: 4.08 µg/m ³	Percentiles: P ₁ = 1.4 P ₁₀ = 1.9 Q ₁ = 2.3 Median = 3.2 Q ₃ = 4.5 P ₉₀ = 6.9 P ₉₉ = 17.1	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-Jan	1.8	1.6	1.7	1.7	1.9	2.0	2.0	2.6	2.7	2.7	2.6	2.2	1.6	1.4	1.4	1.6	1.9	2.2	2.0	2.0	2.1	2.0	2.2	2.0	2.0	2.7																						
2-Jan	2.1	2.1	2.3	2.4	3.9	4.1	4.3	4.0	4.7	4.4	3.7	3.5	4.6	7.1	7.6	8.0	7.5	6.4	5.6	4.9	4.9	4.9	4.6	4.4	4.7	8.0																						
3-Jan	4.3	4.9	5.0	4.2	3.7	3.7	3.9	4.2	4.5	4.4	4.8	3.8	3.1	3.4	3.3	3.3	4.2	3.9	3.2	3.2	3.1	2.6	2.5	2.5	3.7	5.0																						
4-Jan	2.2	1.7	1.7	1.7	1.7	1.6	1.9	2.8	2.3	2.1	1.8	1.7	1.7	1.6	1.6	1.5	1.5	1.5	1.6	1.6	1.7	2.0	2.9	2.4	1.8	2.9																						
5-Jan	2.6	4.0	4.8	5.1	5.2	3.7	3.6	3.9	4.2	4.0	3.9	4.1	3.7	3.5	3.5	3.1	2.8	2.3	2.3	1.9	1.7	1.7	1.8	1.7	3.3	5.2																						
6-Jan	1.8	1.9	1.9	1.8	1.7	1.7	1.8	2.0	2.1	1.7	1.7	1.6	1.8	1.7	1.4	1.5	2.0	2.8	3.0	3.2	3.3	3.2	3.3	3.0	2.2	3.3																						
7-Jan	2.8	2.3	2.2	2.1	2.2	2.3	2.3	3.4	3.2	3.1	3.2	3.3	3.2	3.1	2.6	2.2	3.4	3.6	4.0	3.0	2.9	2.6	2.4	2.8	2.8	4.0																						
8-Jan	2.6	2.6	4.2	7.8	6.8	3.9	4.6	5.2	3.5	3.4	3.4	3.1	2.9	2.8	3.1	3.5	4.0	4.0	3.7	3.2	3.1	3.1	3.5	3.6	3.8	7.8																						
9-Jan	3.8	4.6	4.8	5.3	5.4	5.5	5.8	5.2	4.8	4.3	3.8	3.7	3.6	3.4	3.6	3.6	3.6	2.9	3.5	3.8	2.4	2.0	1.9	1.8	3.9	5.8																						
10-Jan	1.5	1.5	1.5	1.6	1.9	1.8	2.0	1.9	2.0	2.1	2.0	2.3	2.8	2.7	2.5	C	10.3	9.1	6.9	5.7	5.0	4.8	3.9	4.2	3.5	10.3																						
11-Jan	5.2	5.2	4.7	5.4	4.7	4.4	3.9	3.4	3.2	2.4	2.1	2.0	3.3	5.4	7.4	7.7	7.5	7.2	7.1	6.5	5.7	5.6	5.4	5.1	5.0	7.7																						
12-Jan	4.4	4.1	4.2	4.4	4.6	4.9	4.9	4.7	4.5	C	6.1	5.8	5.1	5.1	5.2	5.3	5.0	4.7	5.0	5.0	5.1	4.8	4.3	4.1	4.8	6.1																						
13-Jan	3.9	4.0	4.3	4.3	3.8	3.8	3.5	3.3	2.5	4.0	5.4	3.6	2.4	2.6	3.6	5.1	6.9	5.4	4.3	4.2	3.6	3.5	3.4	3.4	4.0	6.9																						
14-Jan	4.1	5.6	7.1	6.8	6.8	7.0	8.1	9.8	9.1	8.4	7.0	5.6	5.4	4.8	4.2	4.4	5.0	5.4	5.1	4.6	4.3	4.2	4.5	4.2	5.9	9.8																						
15-Jan	3.9	4.4	4.3	3.9	3.6	3.4	3.3	3.2	3.1	2.8	2.6	2.4	2.3	2.3	2.1	2.1	2.3	2.6	2.5	2.6	2.7	2.7	2.7	3.1	2.9	4.4																						
16-Jan	2.8	2.5	2.2	2.1	2.2	2.7	3.3	3.1	2.9	2.5	2.7	2.7	2.7	3.0	2.6	2.6	2.4	2.6	2.8	2.9	2.8	2.7	2.7	2.5	2.7	3.3																						
17-Jan	2.5	2.7	2.8	3.0	3.2	3.7	3.9	4.1	3.7	4.1	3.9	3.3	3.3	4.0	3.7	3.5	3.9	5.6	6.7	5.1	3.7	3.3	3.0	2.8	3.7	6.7																						
18-Jan	3.0	3.9	4.5	4.5	4.4	4.3	4.4	4.3	4.4	4.7	4.6	4.1	3.7	4.1	5.3	6.3	12.0	12.9	9.2	7.7	8.0	6.1	4.3	4.1	5.6	12.9																						
19-Jan	3.9	3.8	4.4	4.6	4.2	3.9	3.6	4.1	4.5	4.0	4.1	3.7	3.3	3.7	3.4	3.7	5.3	5.1	4.3	4.5	4.3	4.5	4.5	4.8	4.2	5.3																						
20-Jan	5.4	7.1	13.6	10.2	9.7	12.0	10.9	11.4	10.0	9.4	6.3	3.1	4.2	4.6	4.3	4.3	4.5	4.0	3.6	3.4	3.6	3.4	3.1	2.9	6.5	13.6																						
21-Jan	3.0	3.2	2.9	3.0	3.0	3.0	4.5	4.5	4.9	6.2	6.0	6.0	5.2	5.8	6.3	5.8	4.0	3.3	3.2	3.1	3.1	3.4	3.1	3.1	4.1	6.3																						
22-Jan	2.9	2.8	2.5	2.2	1.9	1.9	1.9	2.0	1.9	1.8	1.7	1.6	1.6	1.7	1.8	1.8	1.8	1.7	1.7	1.7	1.9	1.8	1.8	2.1	1.9	2.9																						
23-Jan	2.4	2.1	2.2	1.9	2.0	2.2	2.5	2.8	3.0	3.2	2.9	3.4	3.1	2.7	2.2	2.0	1.8	2.2	2.8	2.7	2.6	1.9	1.6	1.6	2.4	3.4																						
24-Jan	2.2	2.5	2.4	2.2	2.1	2.3	2.5	2.5	2.5	3.0	4.0	4.9	6.7	8.4	9.6	10.8	11.0	8.5	8.4	9.2	10.0	9.7	10.0	10.6	6.1	11.0																						
25-Jan	11.7	12.1	12.6	14.1	14.9	15.1	17.7	18.5	15.9	16.5	17.1	17.3	18.1	17.4	18.3	15.1	14.3	13.0	14.3	13.5	14.4	15.0	16.4	16.2	15.4	18.5																						
26-Jan	17.0	19.2	22.3	13.5	10.1	10.0	8.2	6.2	5.2	5.0	4.1	3.5	3.3	3.1	2.9	2.8	3.0	3.4	5.9	5.4	4.1	3.1	2.9	2.8	7.0	22.3																						
27-Jan	2.9	3.3	3.5	3.2	3.1	3.0	2.8	2.9	2.8	2.5	2.1	2.0	2.0	2.4	2.3	3.0	3.6	3.8	3.1	2.8	2.8	2.5	2.3	2.3	2.8	3.8																						
28-Jan	2.5	2.8	2.8	2.6	2.3	2.2	2.2	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.4	2.3	2.4	2.3	2.6	2.6	2.6	2.6	2.6	2.4	2.8																						
29-Jan	4.0	5.4	5.0	5.3	4.3	3.8	3.4	3.2	2.8	2.4	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.6	2.7	2.5	2.6	2.7	2.7	2.6	3.1	5.4																						
30-Jan	2.5	2.5	2.4	2.6	2.8	2.9	2.7	2.6	2.4	2.1	2.0	1.9	2.0	2.0	2.0	2.1	2.2	2.2	2.0	1.8	1.8	2.3	2.1	2.0	2.2	2.9																						
31-Jan	2.0	2.0	2.5	2.3	1.7	1.6	1.5	2.1	2.5	2.4	1.8	1.3	1.3	1.3	1.3	1.4	2.2	2.7	2.1	2.1	2.1	2.2	2.2	2.2	2.0	2.7																						
																								3.8	4.1	4.6	4.4	4.2	4.1	4.3	4.4	4.1	4.1	3.9	3.6	3.6	3.9	4.0	4.1	4.7	4.5	4.4	4.1	3.9	3.8	3.7	3.7	Diurnal Average
																								17.0	19.2	22.3	14.1	14.9	15.1	17.7	18.5	15.9	16.5	17.1	17.3	18.1	17.4	18.3	15.1	14.3	13.0	14.3	13.5	14.4	15.0	16.4	16.2	Diurnal Maximum

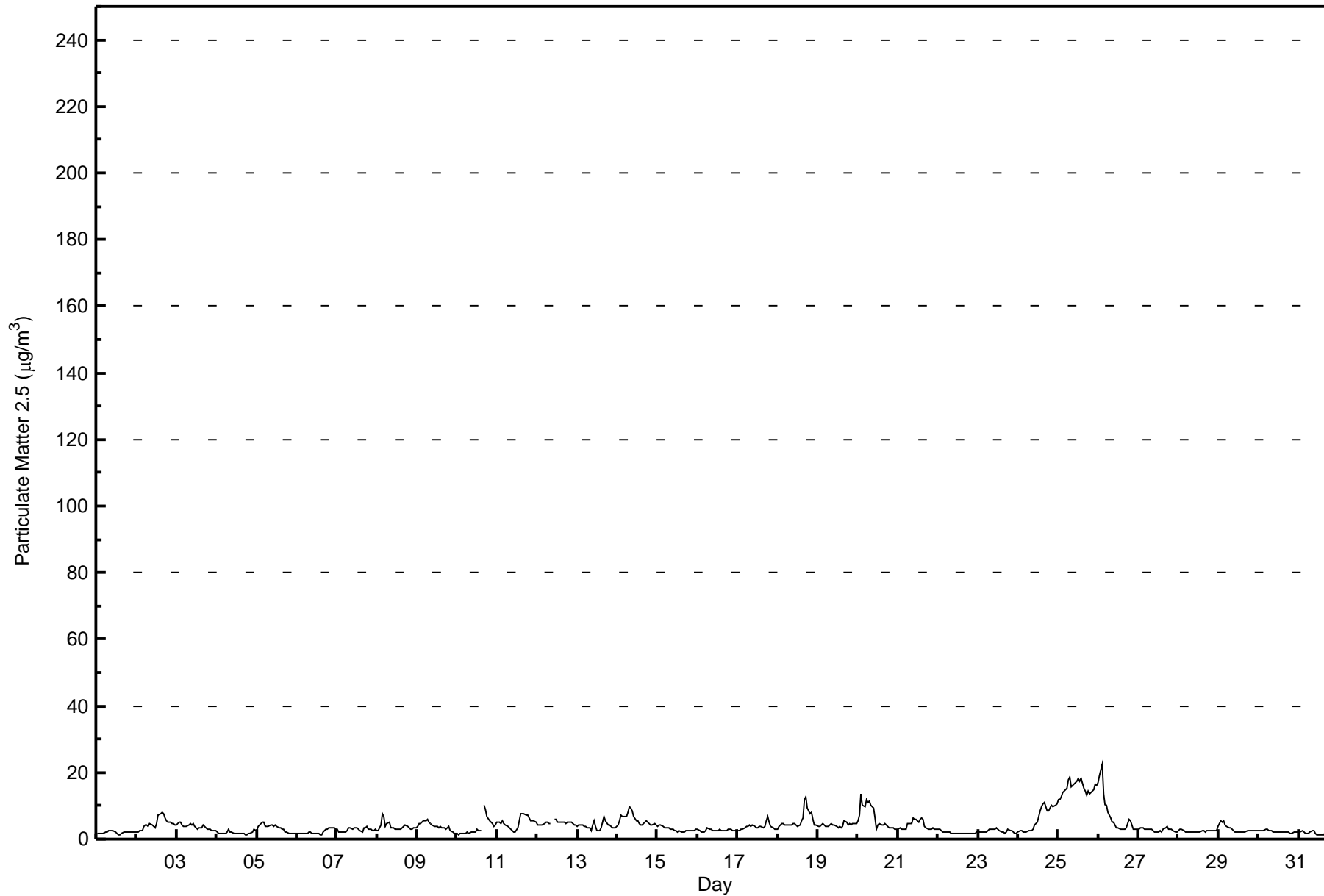
C - Calibration

Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³



Wood Buffalo Environmental Association
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Stony Mountain - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Stony Mountain - January 2017**

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	637	85.85	85.85
6 - 15	91	12.26	98.11
16 - 25	14	1.89	100.00
26 - 80	0	0.00	100.00
> 81.0	0	0.00	100.00

Total Number of Valid Hours: 742

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Stony Mountain - January 2017

Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	40	41	21	2	1	1	4	4	15	60	128	47	86	87	52	43	632
6 - 15	1	6	0	0	0	0	0	0	0	22	32	3	11	5	2	9	91
16 - 25	0	0	0	0	0	0	0	0	0	5	9	0	0	0	0	0	14
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
Totals	41	47	21	2	1	1	4	4	15	87	169	50	97	92	54	52	737

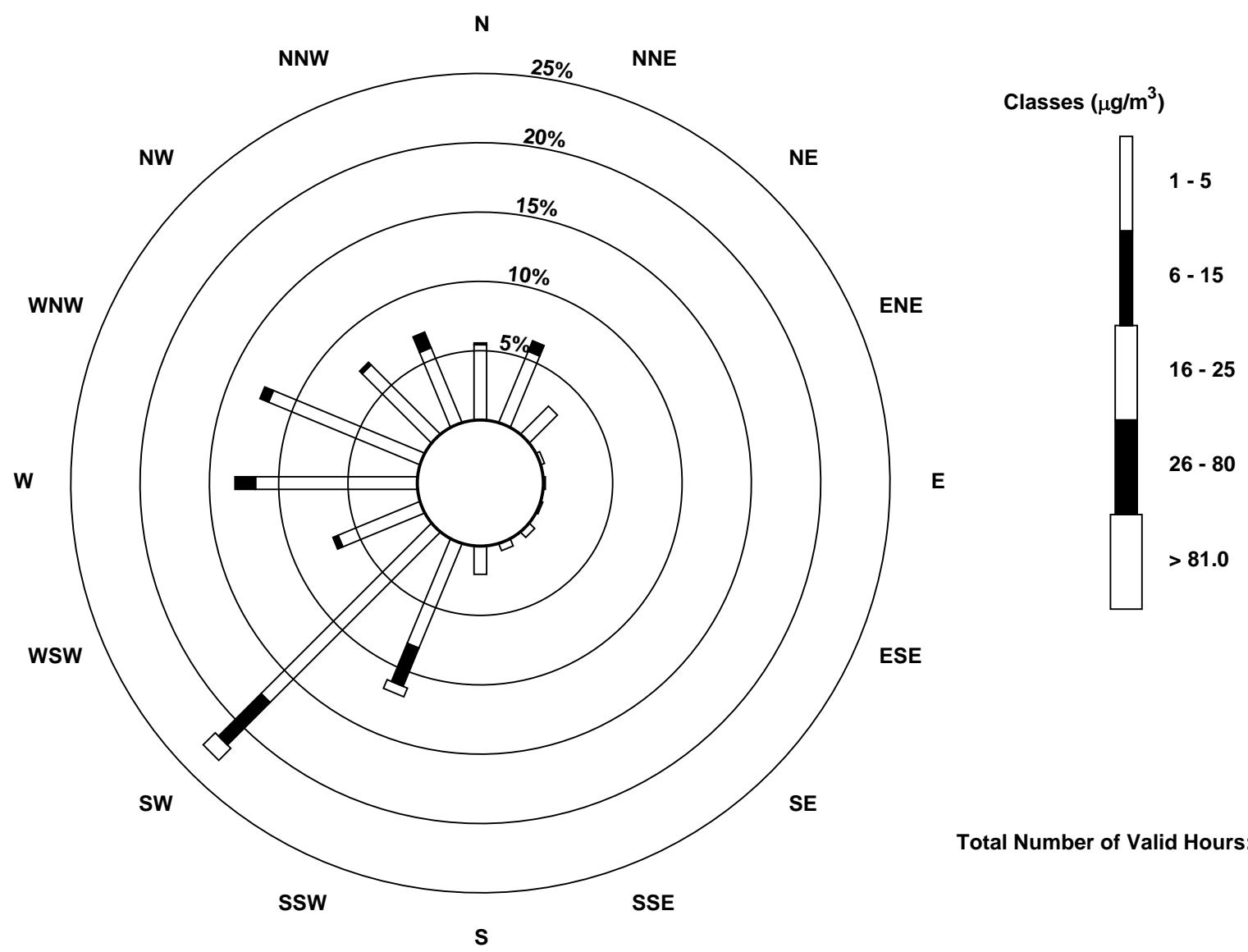
Total Number of Valid Hours: 737

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Stony Mountain (AMS 18)



Total Number of Valid Hours: 737

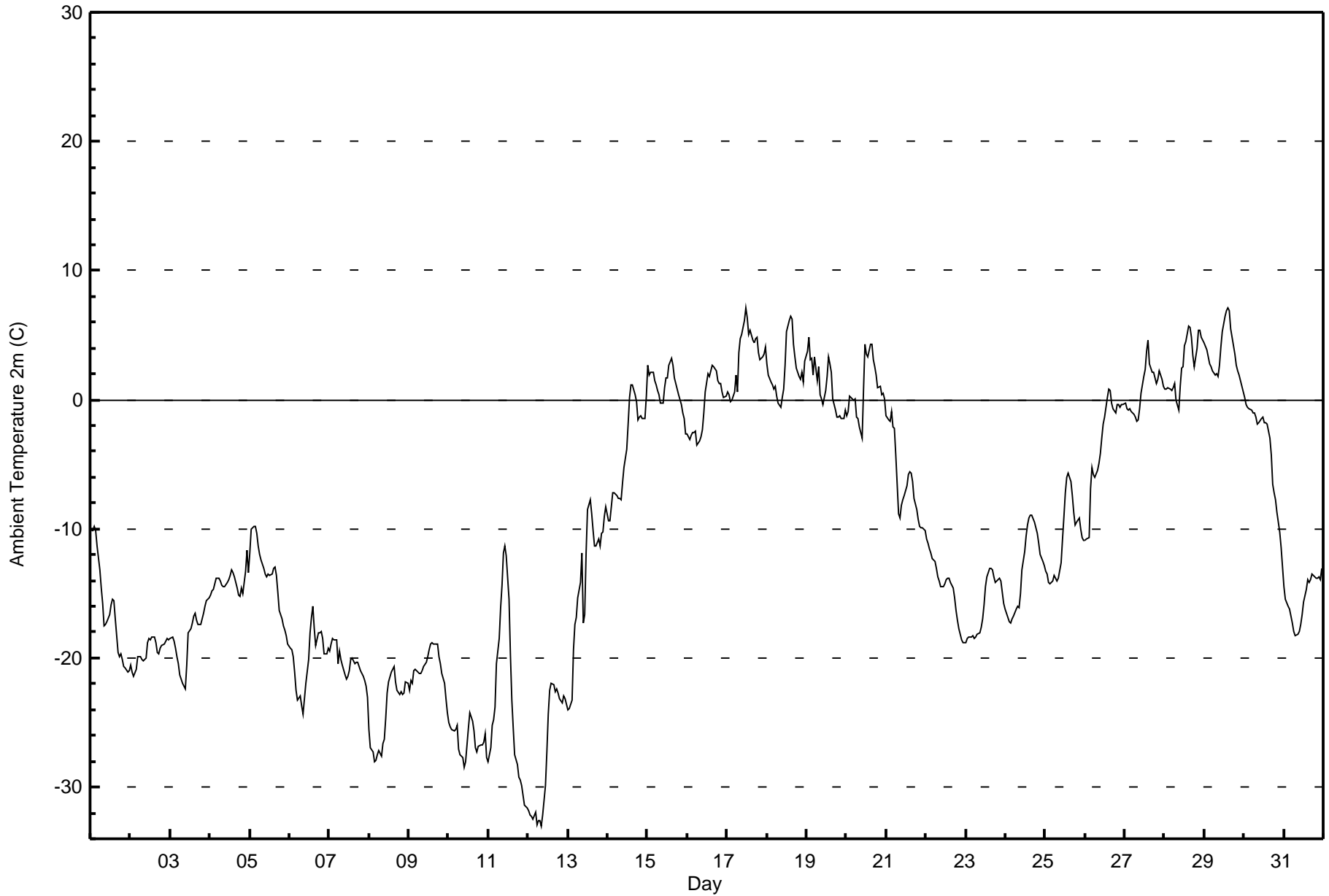


Maximum Value: 7.1 C on Jan 17 12:00		Maximum Daily Average: 3.6 C on Jan 29		Hours in Service: 744																						
Minimum Value: -33.0 C on Jan 12 09:00		Minimum Daily Average: -27.3 C on Jan 12		Hours of Data: 744																						
Maximum Diurnal Average: -8.1 C at hour 15		Minimum Diurnal Average: -12.0 C at hour 9		Hours of Missing Data: 0																						
Monthly Average: -10.63 C		Percentiles: P ₁ = -32.1 P ₁₀ = -23.1 Q ₁ = -18.8 Median = -12.5 Q ₃ = -0.3 P ₉₀ = 2.6 P ₉₉ = 6.4		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-Jan	-10.1	-10.2	-9.8	-10.1	-11.4	-13.2	-14.6	-15.8	-17.5	-17.4	-17.1	-16.7	-15.9	-15.5	-15.5	-17.0	-19.5	-19.9	-19.7	-20.1	-20.7	-20.8	-21.1	-21.0	-16.3	-9.8
2-Jan	-20.5	-21.1	-21.4	-20.9	-19.9	-19.9	-19.9	-20.1	-20.2	-20.0	-18.8	-18.4	-18.6	-18.4	-18.3	-18.8	-19.6	-19.7	-19.2	-19.1	-18.9	-18.7	-18.5	-18.6	-19.5	-18.3
3-Jan	-18.5	-18.4	-18.7	-19.2	-19.8	-20.5	-21.3	-21.9	-22.2	-22.4	-20.6	-18.0	-17.7	-17.3	-16.7	-16.6	-17.1	-17.4	-17.4	-17.0	-16.6	-16.0	-15.6	-15.4	-18.4	-15.4
4-Jan	-15.1	-14.9	-14.7	-14.3	-13.8	-13.8	-14.1	-14.3	-14.5	-14.4	-14.2	-13.9	-13.6	-13.1	-13.3	-13.8	-14.6	-15.1	-15.2	-14.5	-15.1	-13.3	-11.6	-13.4	-14.1	-11.6
5-Jan	-11.9	-10.1	-9.8	-9.8	-10.3	-11.3	-12.0	-12.4	-13.0	-13.5	-13.5	-13.5	-13.5	-13.1	-13.0	-13.6	-14.9	-16.3	-16.9	-17.5	-17.8	-18.3	-18.9	-13.7	-9.8	
6-Jan	-19.3	-19.3	-19.9	-21.0	-22.5	-23.2	-22.9	-23.7	-24.4	-23.1	-21.9	-20.1	-18.0	-16.9	-16.0	-17.8	-19.0	-18.1	-18.1	-17.9	-18.5	-19.7	-19.7	-19.3	-20.0	-16.0
7-Jan	-19.4	-18.9	-18.4	-18.6	-18.5	-20.4	-19.5	-20.1	-20.5	-21.3	-21.6	-21.4	-21.0	-20.1	-20.0	-20.4	-20.3	-20.4	-20.7	-21.0	-21.4	-21.7	-22.2	-23.1	-20.5	-18.4
8-Jan	-25.6	-27.0	-27.3	-28.0	-28.0	-27.5	-27.2	-27.6	-26.6	-26.3	-24.6	-22.8	-21.8	-21.1	-20.8	-20.7	-21.8	-22.5	-22.8	-22.6	-22.8	-22.7	-21.8	-22.0	-24.2	-20.7
9-Jan	-22.5	-21.8	-22.0	-21.0	-20.8	-21.1	-21.2	-21.2	-21.0	-20.7	-20.3	-19.9	-19.3	-18.9	-18.8	-18.9	-18.9	-19.0	-19.9	-20.4	-21.2	-21.9	-23.2	-24.2	-20.8	-18.8
10-Jan	-25.0	-25.4	-25.5	-25.6	-25.6	-25.2	-27.0	-27.4	-27.7	-28.5	-28.1	-26.7	-25.4	-24.3	-24.9	-25.6	-27.0	-27.3	-26.8	-26.7	-26.5	-25.9	-27.7	-26.4	-24.3	-24.3
11-Jan	-28.1	-26.9	-25.3	-24.8	-23.8	-20.5	-18.4	-16.1	-14.4	-11.9	-11.3	-12.1	-15.4	-19.8	-23.2	-25.4	-27.5	-28.3	-29.2	-29.5	-29.9	-30.7	-31.4	-31.6	-23.1	-11.3
12-Jan	-31.8	-32.1	-32.3	-32.5	-32.0	-32.9	-32.6	-32.6	-33.0	-32.1	-29.9	-27.3	-24.4	-22.5	-22.0	-22.1	-22.6	-22.4	-22.7	-23.1	-23.5	-23.0	-23.1	-23.6	-27.3	-22.0
13-Jan	-24.0	-23.9	-23.3	-19.3	-17.4	-16.8	-15.4	-14.1	-11.9	-17.3	-16.6	-11.9	-8.5	-7.7	-8.8	-10.1	-11.3	-11.3	-10.8	-11.4	-10.3	-10.2	-9.0	-8.3	-13.7	-7.7
14-Jan	-9.3	-9.4	-8.2	-7.2	-7.2	-7.4	-7.6	-7.6	-7.8	-6.4	-5.2	-3.8	-1.9	0.2	1.2	1.2	0.4	-0.1	-1.6	-1.4	-1.2	-1.5	-1.5	0.3	-3.9	1.2
15-Jan	2.7	1.9	2.1	2.1	1.5	1.1	0.7	0.4	-0.2	-0.2	0.9	1.7	1.7	2.7	3.2	2.7	1.6	1.2	0.8	0.4	-0.4	-1.0	-1.5	-2.7	1.0	3.2
16-Jan	-2.6	-3.0	-2.7	-2.6	-2.5	-2.5	-3.5	-3.2	-2.9	-2.4	-1.0	0.6	2.0	1.8	2.3	2.6	2.6	2.2	1.4	1.2	1.3	0.6	0.2	0.3	-0.4	2.6
17-Jan	0.6	0.4	-0.1	0.0	0.6	1.9	0.6	3.6	4.8	5.1	6.1	7.1	6.4	5.0	5.4	4.6	4.4	4.7	4.8	3.6	3.1	3.3	3.6	4.1	3.5	7.1
18-Jan	2.8	1.9	1.4	1.1	0.8	1.0	0.3	-0.2	-0.6	0.1	0.8	2.6	5.3	6.1	6.4	6.3	4.3	3.4	2.4	1.8	1.6	2.1	1.4	3.0	2.3	6.4
19-Jan	3.7	4.8	3.1	3.2	1.9	3.4	1.4	2.5	0.4	0.1	-0.4	0.7	1.8	3.3	2.7	2.1	0.1	-0.8	-1.3	-1.4	-1.2	-1.5	-1.5	-0.9	1.1	4.8
20-Jan	-1.2	-0.9	0.2	0.1	-0.1	0.1	-1.4	-1.4	-2.1	-2.9	0.8	4.3	3.6	3.3	4.3	4.3	3.1	2.6	1.9	0.9	1.0	0.4	0.5	0.1	0.9	4.3
21-Jan	-1.2	-1.6	-1.7	-0.9	-2.1	-2.2	-4.3	-8.8	-9.1	-8.2	-7.8	-7.5	-6.7	-5.8	-5.6	-5.7	-6.4	-7.6	-8.6	-9.3	-9.8	-10.0	-9.9	-10.2	-6.3	-0.9
22-Jan	-10.7	-11.2	-11.6	-11.8	-12.3	-12.5	-13.1	-13.7	-14.1	-14.4	-14.4	-14.3	-14.0	-13.9	-13.9	-14.1	-14.6	-15.4	-16.4	-17.1	-17.7	-18.6	-18.8	-18.8	-14.5	-10.7
23-Jan	-18.8	-18.5	-18.4	-18.3	-18.3	-18.5	-18.4	-18.2	-18.1	-17.6	-16.9	-15.9	-14.5	-13.7	-13.1	-13.0	-13.1	-13.7	-14.2	-13.9	-13.8	-14.0	-15.0	-15.8	-16.0	-13.0
24-Jan	-16.3	-16.9	-17.2	-17.3	-17.0	-16.8	-16.2	-16.0	-16.1	-15.0	-13.2	-11.8	-10.6	-9.7	-9.1	-8.9	-8.9	-9.5	-9.9	-10.4	-11.2	-12.0	-12.5	-12.9	-13.1	-8.9
25-Jan	-13.3	-13.5	-14.1	-14.3	-14.0	-13.6	-13.8	-14.0	-13.8	-12.6	-10.8	-9.0	-7.2	-6.0	-5.7	-6.3	-7.4	-8.7	-9.7	-9.5	-9.1	-10.0	-10.7	-10.9	-10.8	-5.7
26-Jan	-10.9	-10.8	-10.6	-6.8	-5.2	-5.8	-6.0	-5.5	-4.9	-4.1	-3.0	-1.9	-1.3	0.1	0.8	0.7	-0.3	-0.7	-1.0	-0.4	-0.4	-0.6	-0.4	-0.3	-3.3	0.8
27-Jan	-0.3	-0.7	-0.8	-0.7	-0.9	-1.2	-1.4	-1.7	-1.6	-0.7	0.5	1.8	2.4	3.8	4.6	2.8	2.1	2.1	1.7	1.3	1.6	2.2	1.6	1.1	0.8	4.6
28-Jan	0.8	0.8	0.9	0.8	0.7	1.0	1.3	-0.1	-0.9	1.0	2.4	2.6	4.2	4.5	5.7	5.6	4.8	3.5	2.6	4.0	5.4	5.4	4.9	4.6	2.8	5.7
29-Jan	4.5	3.8	3.3	2.8	2.6	2.2	1.9	2.0	1.8	2.7	4.0	5.3	6.5	6.8	7.1	6.9	5.5	4.2	3.5	2.6	2.2	2.0	1.5	0.6	3.6	7.1
30-Jan	0.1	-0.3	-0.6	-0.7	-0.9	-1.0	-1.0	-1.3	-1.8	-1.8	-1.5	-1.3	-1.8	-1.8	-1.9	-3.0	-4.3	-6.6	-7.2	-7.7	-8.7	-10.2	-11.4	-12.9	-3.7	0.1
31-Jan	-14.5	-15.5	-16.0	-16.2	-16.7	-17.3	-18.0	-18.3	-18.2	-18.0	-17.4	-16.7	-15.7	-14.7	-14.0	-14.1	-13.9	-13.5	-13.6	-13.9	-13.8	-13.8	-13.9	-13.1	-15.4	-13.1
																								Diurnal Average		
																								Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature 2m (AT 2m) - C
Stony Mountain - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C
Stony Mountain - January 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	150	20.16	20.16
-20 - 0	417	56.05	76.21
0 - 10	177	23.79	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

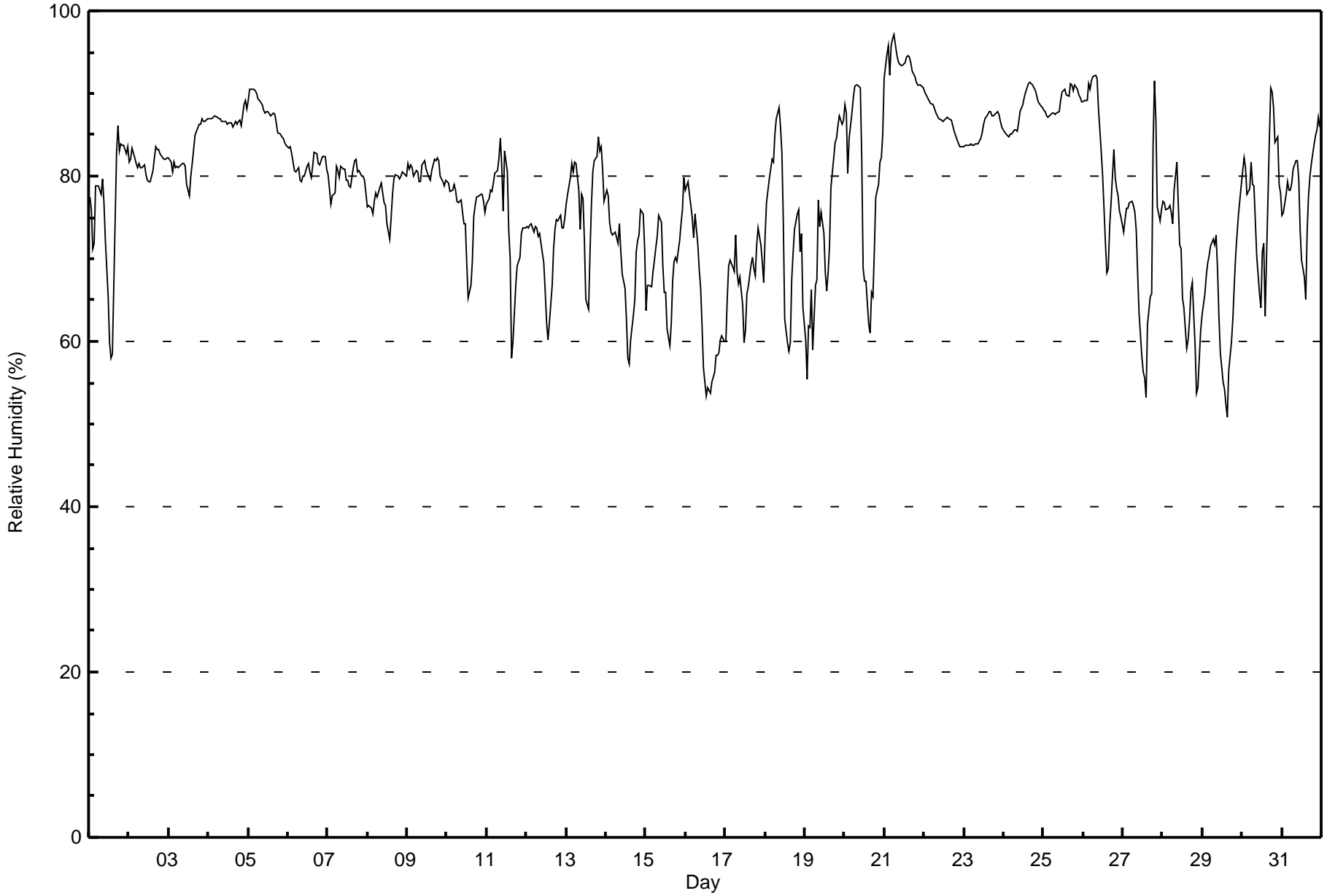


Wood Buffalo Environmental Association

Summary of Hour Averages

**Relative Humidity (RH) - %
Stony Mountain - January 2017**

Maximum Value: 97 % on Jan 21 07:00 Maximum Daily Average: 93.5 % on Jan 21																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 51 % on Jan 29 16:00 Minimum Daily Average: 64.3 % on Jan 16 Maximum Diurnal Average: 80.7 % at hour 9 Minimum Diurnal Average: 71.5 % at hour 15 Monthly Average: 78.0 % Percentiles: P ₁ = 54 P ₁₀ = 64 Q ₁ = 72 Median = 80 Q ₃ = 85 P ₉₀ = 89 P ₉₉ = 95																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	78	76	71	72	79	79	78	78	80	77	72	65	60	58	59	67	83	86	83	84	84	84	83	84	75.7	86
2-Jan	82	82	83	82	82	81	82	81	81	81	80	79	79	79	81	82	83	83	83	83	82	82	82	82	81.6	83
3-Jan	82	82	81	82	81	81	81	81	82	82	81	79	78	80	82	83	85	85	86	86	87	87	87	87	82.8	87
4-Jan	87	87	87	87	87	87	87	87	87	87	87	86	86	86	86	86	87	86	87	87	86	89	89	88	86.9	89
5-Jan	89	91	91	91	90	90	89	89	89	88	88	88	88	87	87	88	87	86	85	85	85	85	84	84	87.6	91
6-Jan	83	83	83	82	81	81	81	80	79	80	80	81	81	80	80	81	83	83	81	81	82	82	82	81	81.3	83
7-Jan	80	79	77	78	78	81	81	80	81	81	81	80	79	79	79	81	82	82	81	81	80	80	79	78	79.8	82
8-Jan	76	76	76	75	77	78	77	79	79	78	77	76	74	72	75	78	80	80	80	80	80	81	80	80	77.7	81
9-Jan	82	81	81	81	80	81	80	79	79	81	82	81	80	80	79	81	82	82	82	82	80	79	79	79	80.6	82
10-Jan	79	79	78	78	79	78	77	77	77	76	74	74	69	65	67	70	75	76	77	78	78	77	76	75.5	79	
11-Jan	77	77	78	78	79	80	81	82	85	81	76	83	81	73	70	58	60	67	69	70	70	73	74	74	74.8	85
12-Jan	74	74	74	74	73	74	74	73	73	72	69	66	62	60	62	67	71	74	75	75	75	74	74	75	71.4	75
13-Jan	77	78	80	82	81	82	82	78	74	78	77	72	65	64	71	76	81	82	82	85	83	83	81	77	77.9	85
14-Jan	78	78	74	73	73	73	72	72	74	71	68	67	63	58	57	60	63	65	71	72	73	76	75	71	69.9	78
15-Jan	64	67	67	67	69	70	71	73	75	74	69	66	66	62	60	62	67	70	70	70	72	74	76	80	69.1	80
16-Jan	78	79	78	76	75	72	75	72	69	66	62	57	53	54	54	55	56	58	58	59	60	61	60	60	64.3	79
17-Jan	60	65	69	70	69	69	73	68	67	68	64	60	61	66	67	69	70	69	68	72	74	72	70	67	67.8	74
18-Jan	73	77	80	81	82	82	85	87	88	86	83	75	63	60	59	60	67	71	74	75	76	71	73	64	74.6	88
19-Jan	60	55	62	62	66	59	67	67	77	74	76	73	68	66	68	72	79	82	84	85	86	87	86	87	72.9	87
20-Jan	89	88	80	85	88	90	91	91	91	91	82	69	67	67	62	61	66	65	71	77	79	82	82	85	79.1	91
21-Jan	92	95	96	92	96	97	97	95	94	94	93	93	94	94	95	94	94	93	92	91	91	91	91	91	93.5	97
22-Jan	90	90	89	89	89	89	88	88	87	87	87	87	87	87	87	87	87	86	85	85	84	84	84	84	86.9	90
23-Jan	84	84	84	84	84	84	84	84	84	84	85	85	86	87	88	88	88	87	87	88	88	87	87	86	85.6	88
24-Jan	86	85	85	85	85	85	86	86	86	86	88	89	90	90	91	91	91	91	91	90	90	89	89	88	87.9	91
25-Jan	88	88	87	87	88	88	88	87	88	88	89	90	90	91	90	90	91	91	90	91	91	90	89	89	89.1	91
26-Jan	89	89	89	91	91	91	92	92	92	88	86	83	80	72	68	69	74	77	83	80	78	78	76	75	82.6	92
27-Jan	73	75	76	76	77	77	76	76	73	68	63	58	56	56	53	62	65	66	84	92	87	76	75	76	71.5	92
28-Jan	77	77	76	76	77	76	74	78	82	77	72	71	65	64	59	60	63	66	67	60	54	54	58	61	68.5	82
29-Jan	63	66	68	70	70	72	72	72	73	69	63	59	55	54	52	51	56	60	63	67	71	73	75	79	65.5	79
30-Jan	81	82	81	78	78	82	79	79	75	70	66	64	71	72	63	77	84	91	90	88	84	85	79	78	78.2	91
31-Jan	75	76	78	79	78	78	79	81	82	82	80	73	70	68	65	73	78	80	82	84	85	86	87	86	78.5	87
																		78.9 79.3 79.3 79.4 80.0 80.1 80.6 80.3 80.7 79.5 77.4 75.1 73.2 72.0 71.5 73.5 76.7 78.0 79.5 80.0 79.7 79.7 79.4 79.1						Diurnal Average		
																		92 95 96 92 96 97 97 95 94 94 93 93 94 94 95 94 94 93 92 92 91 91 91						Diurnal Maximum		





Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

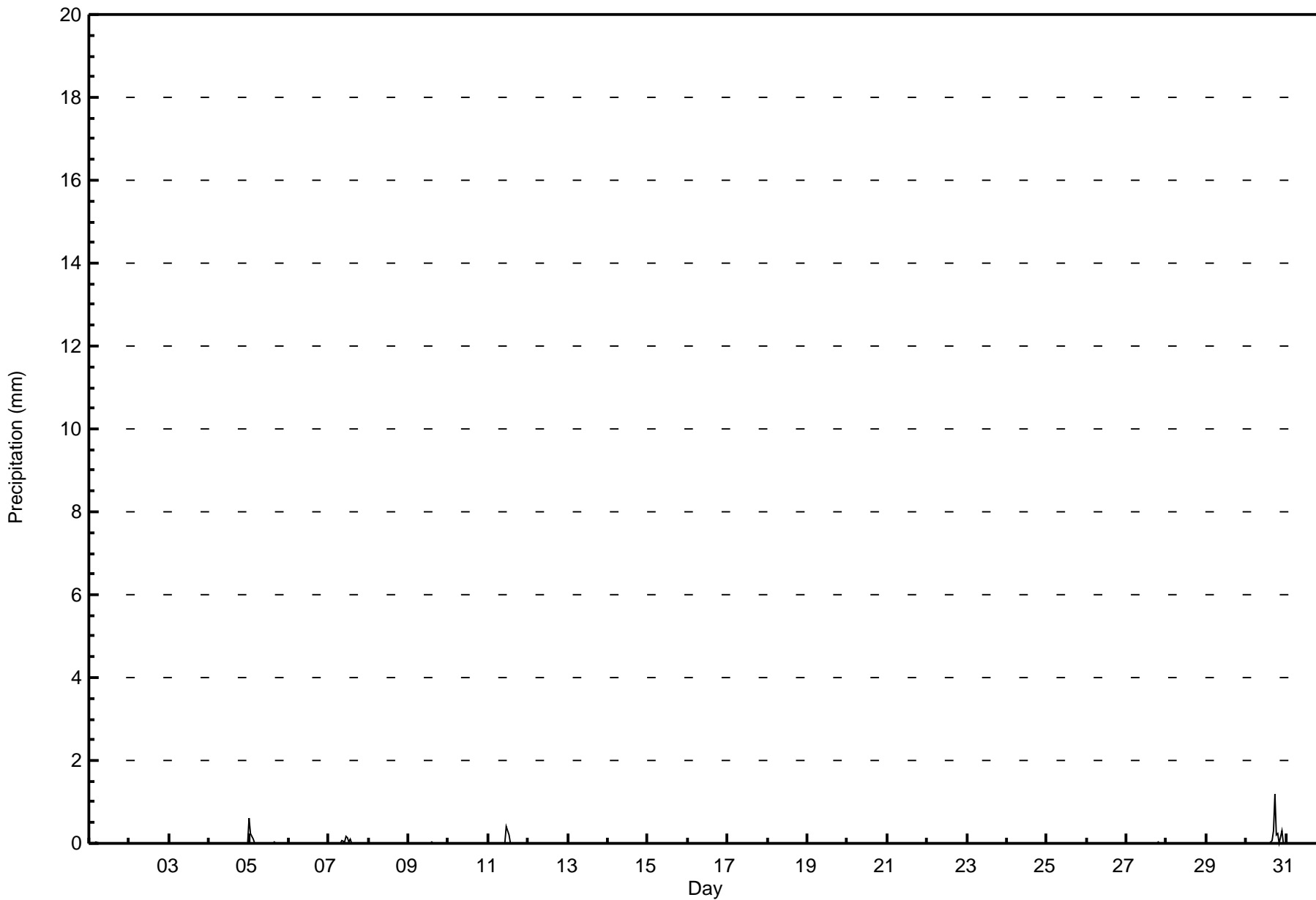
Stony Mountain - January 2017

Maximum Value: 1.2 mm on Jan 30 18:00		Maximum Daily Total: 2.3 mm on Jan 30		Hours in Service: 744																							
Minimum Value: 0.0 mm on Jan 1 01:00		Minimum Daily Total: 0.0 mm on Jan 2		Hours of Data: 744																							
Maximum Diurnal Total: 1.2 mm at hour 18		Minimum Diurnal Total: 0.0 mm at hour 4		Hours of Missing Data: 0																							
Monthly Total: 4.62 mm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.2		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-Jan	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	
2-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.6	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.6
6-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.2
8-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
10-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.4
12-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1
28-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	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	1.2	0.2	0.2	0.0	0.3	0.0	0.0	0.0	0.0	2.3	1.2
31-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
Stony Mountain - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Precipitation (PC) - mm
Stony Mountain - January 2017

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	741	99.60	99.60
0.4 - 0.5	1	0.13	99.73
0.6 - 0.7	1	0.13	99.87
0.8 - 1.4	1	0.13	100.00
1.5 - 10	0	0.00	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



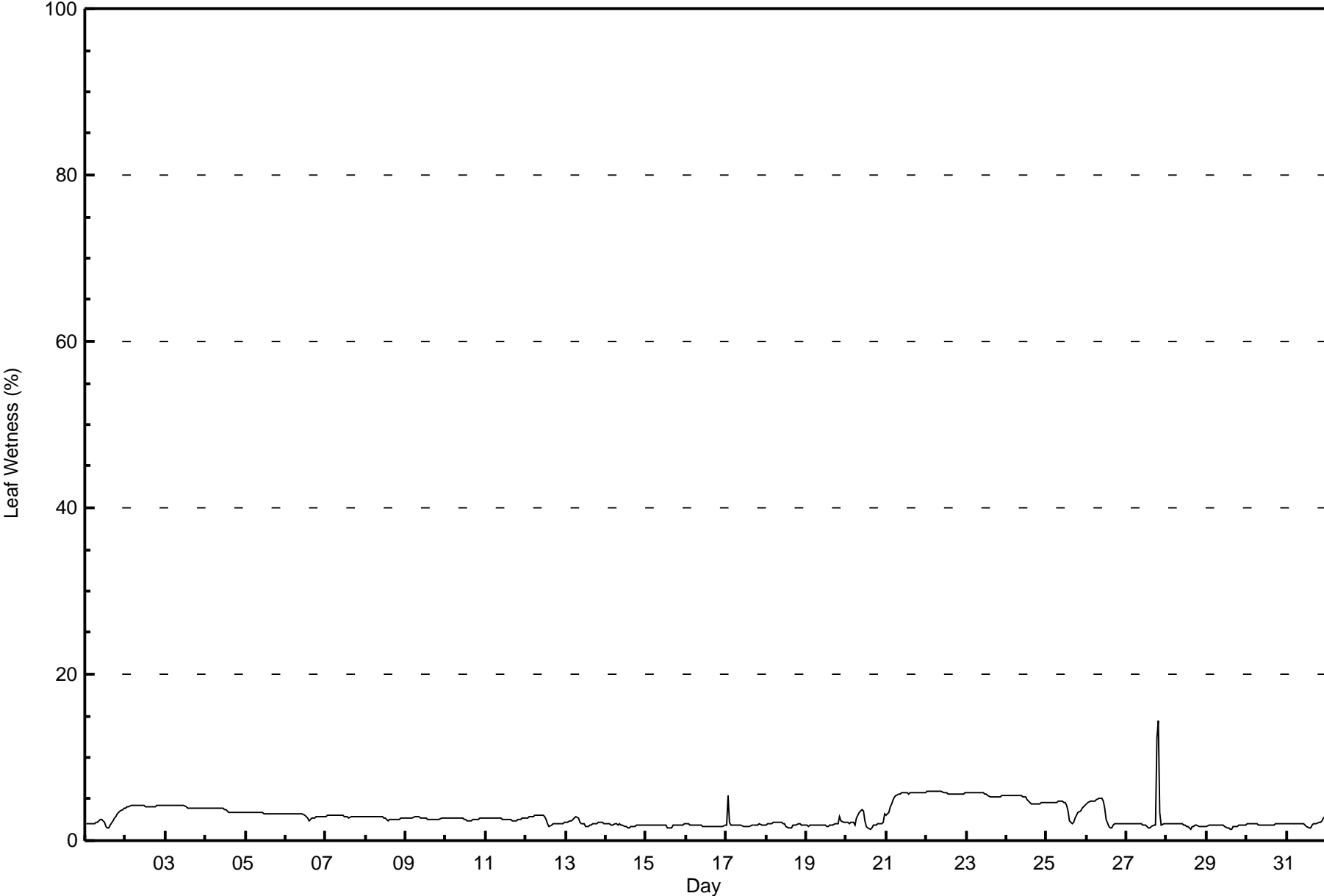
Wood Buffalo Environmental Association

Summary of Hour Averages

Leaf Wetness (LW) - %

Stony Mountain - January 2017

Maximum Value: 14 % on Jan 27 20:00														Maximum Daily Average: 5.7 % on Jan 22														Hours in Service: 744	
Minimum Value: 1 % on Jan 29 16:00														Minimum Daily Average: 1.8 % on Jan 29														Hours of Data: 744	
Maximum Diurnal Average: 3.2 % at hour 20														Minimum Diurnal Average: 2.5 % at hour 15														Hours of Missing Data: 0	
Monthly Average: 3.0 %														Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 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-Jan	2	2	2	2	2	2	2	2	2	3	3	2	2	2	2	2	2	3	3	3	3	4	4	4	2.5	4			
2-Jan	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4.2	4			
3-Jan	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4.1	4			
4-Jan	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	3	3	3	3.7	4			
5-Jan	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3.3	3			
6-Jan	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3	3.0	3			
7-Jan	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2.9	3			
8-Jan	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	3	3	3	3	3	3	3	3	3	2.7	3			
9-Jan	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2.7	3			
10-Jan	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	3	3	3	3	3	3	3	3	2.6	3			
11-Jan	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	3	3	3	3	2.6	3			
12-Jan	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2.5	3			
13-Jan	2	2	2	2	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.2	3			
14-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.9	2			
15-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	1.8	2			
16-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.8	2			
17-Jan	2	5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2.0	5			
18-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	1.9	2			
19-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2.0	3			
20-Jan	2	2	2	2	2	2	3	3	3	4	4	2	2	2	1	1	2	2	2	2	2	2	2	3	2.3	4			
21-Jan	3	3	4	4	5	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5.3	6			
22-Jan	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5.7	6			
23-Jan	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	5	5	5	5	5	5	5	5.5	6			
24-Jan	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4	5	4.9	5			
25-Jan	5	5	5	5	5	5	5	5	5	5	5	5	4	4	2	2	2	3	3	3	4	4	4	4	3.9	5			
26-Jan	4	5	5	5	5	5	5	5	5	5	5	4	2	2	2	2	2	2	2	2	2	2	2	2	3.4	5			
27-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	12	14	3	2	2	2	2.9	14			
28-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	1.8	2			
29-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2	2	2	2	2	2	1.8	2			
30-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.9	2			
31-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	2.0	3			
3.0														3.1														Diurnal Average	
6														6														Diurnal Maximum	





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Leaf Wetness (LW) - %
Stony Mountain - January 2017

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	0	0.00	0.00
0.4 - 0.5	0	0.00	0.00
0.6 - 0.7	0	0.00	0.00
0.8 - 1.4	4	0.54	0.54
1.5 - 10	733	98.52	99.06
> 10	2	0.27	99.33

Total Number of Valid Hours: 744

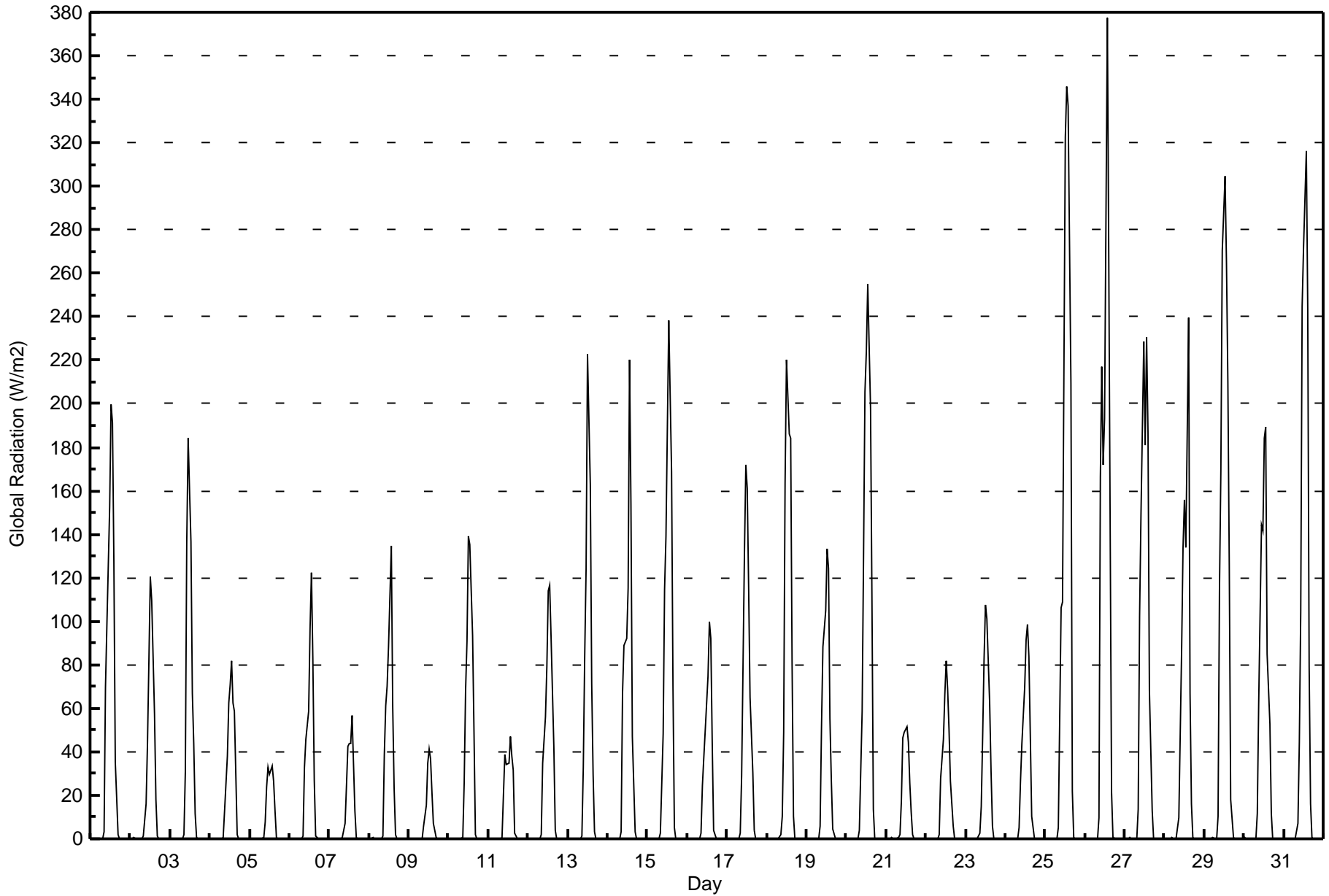
Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Global Radiation (GR) - W/m2
Stony Mountain - January 2017

Maximum Value: 378 W/m2 on Jan 26 14:00		Maximum Daily Average: 69.7 W/m2 on Jan 25		Hours in Service: 744																						
Minimum Value: 0 W/m2 on Jan 2 04:00		Minimum Daily Average: 6.8 W/m2 on Jan 9		Hours of Data: 744																						
Maximum Diurnal Average: 151.5 W/m2 at hour 14		Minimum Diurnal Average: 0.0 W/m2 at hour 21		Hours of Missing Data: 0																						
Monthly Average: 29.8 W/m2		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 30 P ₉₀ = 114 P ₉₉ = 240		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-Jan	0	0	0	0	0	0	0	0	3	69	98	152	200	191	128	35	2	0	0	0	0	0	0	0	36.7	200
2-Jan	0	0	1	0	0	0	0	0	1	16	44	82	120	110	57	18	1	0	0	0	0	0	0	0	18.8	120
3-Jan	0	0	0	0	0	0	0	0	2	31	136	184	137	67	44	12	1	0	0	0	0	0	0	0	25.6	184
4-Jan	0	0	0	0	0	0	0	0	1	13	38	62	71	82	62	58	2	0	0	0	0	0	0	0	16.2	82
5-Jan	0	0	0	0	0	0	0	0	0	8	24	33	30	34	27	13	1	0	0	0	0	0	0	0	7.1	34
6-Jan	0	0	0	0	0	0	0	0	1	33	46	58	97	122	82	27	1	0	0	0	0	0	0	0	19.5	122
7-Jan	0	0	0	0	0	0	0	0	1	7	24	43	44	44	57	13	1	0	0	0	0	0	0	0	9.7	57
8-Jan	0	0	0	0	0	0	0	0	1	39	61	70	88	135	61	23	2	0	0	0	0	0	0	0	20.0	135
9-Jan	0	0	0	0	0	0	0	0	0	6	15	35	41	37	21	7	0	0	0	0	0	0	0	0	6.8	41
10-Jan	0	0	0	0	0	0	0	0	1	26	68	91	139	135	93	49	2	0	0	0	0	0	0	0	25.2	139
11-Jan	0	0	0	0	0	0	0	0	1	20	39	34	35	47	38	32	3	0	0	0	0	0	0	0	10.3	47
12-Jan	0	0	0	0	0	0	0	0	2	35	56	79	114	116	93	42	4	0	0	0	0	0	0	0	22.5	116
13-Jan	0	0	0	0	0	0	0	0	1	33	84	124	223	163	71	30	3	0	0	0	0	0	0	0	30.5	223
14-Jan	0	0	0	0	0	0	0	0	3	67	89	92	115	220	154	47	3	0	0	0	0	0	0	0	32.9	220
15-Jan	0	0	0	0	0	0	0	0	3	48	115	139	190	239	169	70	5	0	0	0	0	0	0	0	40.7	239
16-Jan	0	0	0	0	0	0	0	0	2	25	38	50	75	100	92	44	4	0	0	0	0	0	0	0	17.9	100
17-Jan	0	0	0	0	0	0	0	0	3	29	131	172	161	116	65	30	4	0	0	0	0	0	0	0	29.6	172
18-Jan	0	0	0	0	0	0	0	0	2	10	49	164	221	186	184	80	10	0	0	0	0	0	0	0	37.7	221
19-Jan	0	0	0	0	0	0	0	0	6	52	89	105	133	124	55	27	5	0	0	0	0	0	0	0	24.9	133
20-Jan	0	0	0	0	0	0	0	0	4	59	130	205	224	255	198	109	13	0	0	0	0	0	0	0	49.9	255
21-Jan	0	0	0	0	0	0	0	0	2	17	47	49	52	44	26	12	2	0	0	0	0	0	0	0	10.5	52
22-Jan	0	0	0	0	0	0	0	0	2	28	46	66	82	69	50	26	6	0	0	0	0	0	0	0	15.7	82
23-Jan	0	0	0	0	0	0	0	0	2	15	47	83	108	101	62	31	6	0	0	0	0	0	0	0	19.0	108
24-Jan	0	0	0	0	0	0	0	0	5	26	44	70	91	99	84	48	10	0	0	0	0	0	0	0	19.9	99
25-Jan	0	0	0	0	0	0	0	0	5	106	109	216	323	346	337	209	22	0	0	0	0	0	0	0	69.7	346
26-Jan	0	0	0	0	0	0	0	0	10	166	217	172	193	378	266	143	21	0	0	0	0	0	0	0	65.3	378
27-Jan	0	0	0	0	0	0	0	0	14	102	149	229	181	231	187	68	13	0	0	0	0	0	0	0	49.0	231
28-Jan	0	0	0	0	0	0	0	0	10	48	87	134	156	134	240	67	16	1	0	0	0	0	0	0	37.2	240
29-Jan	0	0	0	0	0	0	0	0	10	114	170	271	305	264	210	126	18	0	0	0	0	0	0	0	62.0	305
30-Jan	0	0	0	0	0	0	0	0	12	62	145	142	184	189	85	53	12	0	0	0	0	0	0	0	36.9	189
31-Jan	0	0	0	0	0	0	0	0	7	45	105	245	272	316	244	79	16	0	0	0	0	0	0	0	55.4	316
																								Diurnal Average		
																								Diurnal Maximum		





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Global Radiation (GR) - W/m2
Stony Mountain - January 2017

Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	541	72.72	72.72
21 - 100	118	15.86	88.58
101 - 300	79	10.62	99.19
301 - 600	6	0.81	100.00
601 - 900	0	0.00	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

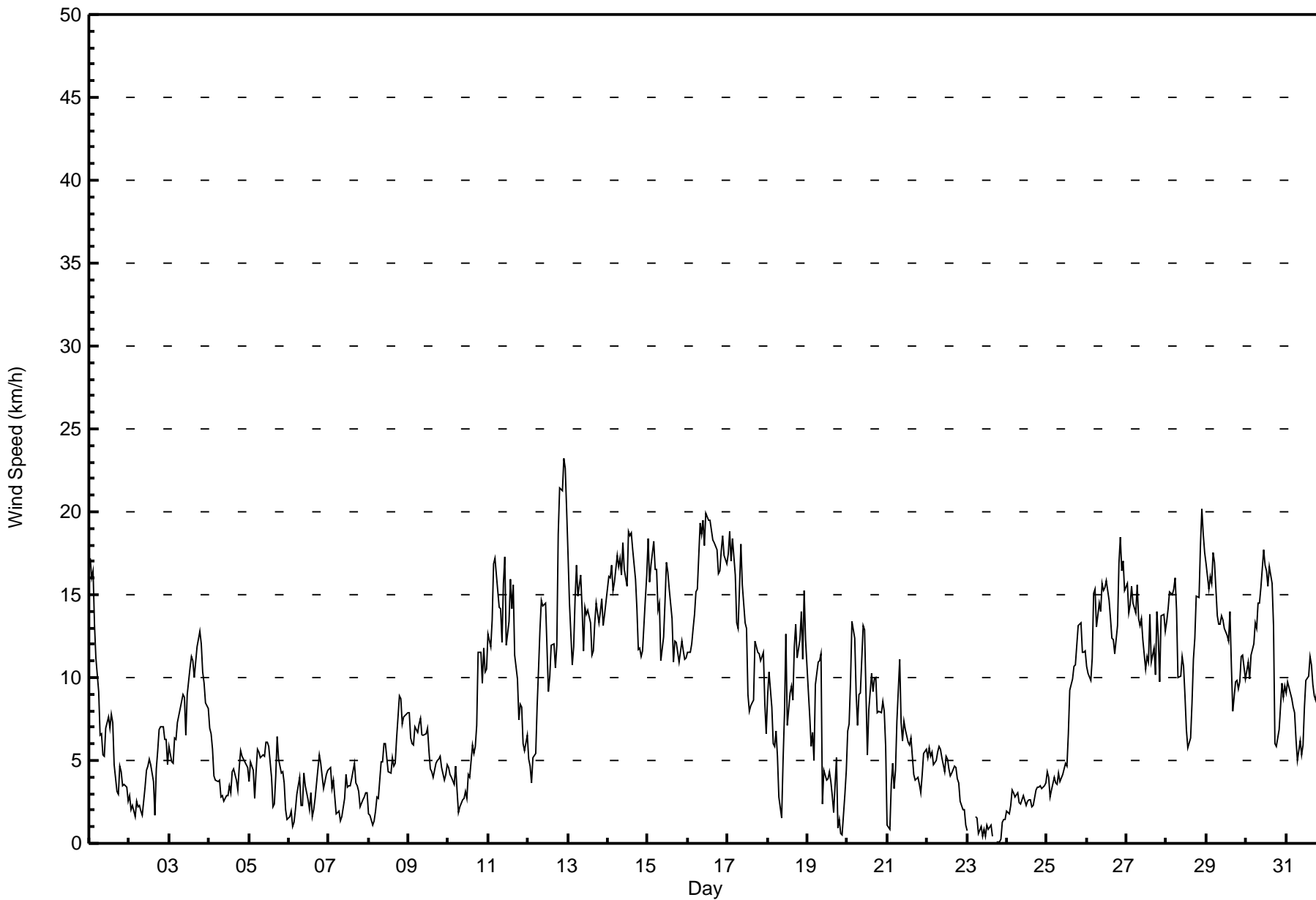


Maximum Speed: 23 km/h on Jan 12 22:00	Maximum Daily Speed Average: 16.7 km/h on Jan 16	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jan 23 19:00	Minimum Daily Speed Average: 0.5 km/h on Jan 23	Hours of Data: 739
Maximum Diurnal Speed Average: 6.7 km/h at hour 5	Minimum Diurnal Speed Average: 5.2 km/h at hour 16	Hours of Missing Data: 5
Monthly Average Velocity: 5.9 km/h 257.3 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 4 Median = 8 O ₃ = 13 P ₉₀ = 16 P ₉₉ = 20	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-Jan	NW17	WNW16	NW16	NW13	NNW11	NNW9	NNW7	NNW7	NNW5	NNW5	NNW7	NNW8	NNW7	NNW8	NW7	NW5	NW3	WNW3	NW5	NW4	NW4	NW4	NW3	N3	NW7.1	NW17	
2-Jan	NNE3	NNW2	N2	NNW2	NNW3	NNW2	NW2	N2	W2	W3	WNW4	NW5	NNW5	NNW5	NNW4	S2	SW4	W6	WNW7	WNW7	WNW7	WNW6	WNW6	W5	NW3.3	WNW7	
3-Jan	WNW6	W5	W5	W6	SW6	SW7	SW8	SW9	SW9	SW9	WSW7	W9	W11	W11	W11	WNW10	WNW11	WNW12	WNW13	NW12	WNW10	NW10	NW8	NW8	W7.6	WNW13	
4-Jan	NW7	NW7	NW6	NNW4	NNW4	N4	N4	N3	N3	NNW3	NNW3	NNW3	NW3	WNW3	W4	W4	W4	WSW3	SW5	WSW6	SW5	W5	WSW5	SW5	WNW3.0	NW7	
5-Jan	WSW4	WNW5	NW4	NNW3	NNE4	NNE6	NNE6	NNE5	NNE5	NE5	NE6	NE6	NE6	NNE4	N2	NNE2	NE4	NE6	NE5	NNE4	NE4	ENE4	NE2	NNE1	NNE3.5	NE6	
6-Jan	NE2	NE2	E1	SSW1	SW2	SW3	SW4	SW2	SW2	SW4	SSW3	SSW3	S2	SSW3	SSE2	S2	SSW3	SSW5	SSW5	SW5	SSW4	SSW3	SSW4	SW4	SSW2.6	SSW5	
7-Jan	SSW4	SSW5	SW3	SSW4	SSW2	S2	SSE2	NNE1	N2	N3	NNE4	NNE3	N4	N3	N4	N5	N4	N3	N3	N3	N3	N3	N3	N3	N3	N1.4	N5
8-Jan	NNW2	NW2	NNW1	NW1	NW2	NW3	WSW3	SW5	SW5	SW6	SW6	SW5	SW4	SSW4	SW5	SW5	SW5	SW6	SW9	SW9	SW7	SW8	WSW8	SW8	SW4.4	SW9	
9-Jan	SW8	SW6	WSW6	WSW6	W7	W7	W7	WNW8	WNW6	WNW7	WNW7	NW7	NW6	NW4	WNW4	WNW4	WNW5	NW5	NW5	NW5	NW5	NW4	NW4	WNW5	WNW5.1	SW8	
10-Jan	WNW5	W4	WNW4	WNW4	W5	WNW3	NNW2	NW2	NW3	NW3	NNW3	NNW3	NW4	NW4	NW6	WNW5	WNW6	W7	W12	W12	W10	W12	W10	SW11	W5.1	W12	
11-Jan	SW13	SW12	SW13	SW17	SW17	SW16	WSW14	W14	W12	WNW16	NW17	NNW12	N13	N16	N14	NNW16	NNW11	NNW10	NNW7	NNW8	NNW8	NNW6	NNW6	NNW7	WNW7.5	NW17	
12-Jan	NW5	NW5	W4	SW5	SW5	SW8	SW11	SW13	SSW15	SSW14	SSW15	SSW12	S9	S10	S12	S12	S11	S12	SSW19	SSW21	SSW21	SSW23	SSW23	SW20	SSW11.5	SSW23	
13-Jan	SW17	SSW15	SW11	WSW12	W15	W17	W15	W16	W14	SW12	SW14	WSW14	WSW14	WSW13	WSW11	SW12	SW13	SW14	SW13	SW14	SW15	SW13	SW14	SW15	WSW12.9	SW17	
14-Jan	SW16	SW16	SW17	SW15	SW16	SW17	SW17	SW17	SW16	SW18	SSW17	SW16	SW19	WSW19	WSW19	WSW19	WSW18	WSW16	SW14	SW12	SW12	SW11	SW12	SW15	SW16	WSW15.6	SW19
15-Jan	WSW18	WSW16	WSW17	W18	W16	W17	W14	W14	WSW11	WSW12	W15	W17	W16	W15	W14	W11	WSW12	WSW12	WSW11	WSW11	WSW12	SW12	SW11	SW11	WSW13.5	WSW18	
16-Jan	SW11	SW12	SW12	SW13	SW14	SW15	SW15	SW19	SW19	SW19	SW18	SW20	SW19	SW20	SSW19	SW18	SW18	SSW18	SSW16	SSW16	SSW18	SSW19	SSW17	SSW17	SW16.7	SW20	
17-Jan	SSW17	SSW19	SSW17	SW18	SW16	SW13	SW13	WSW15	W18	W16	W13	W13	WSW9	SW8	SW8	SW9	SW12	SW12	SW12	SW12	SW11	SW11	SSW9	SSW7	SW12.1	SSW19	
18-Jan	S9	S10	SSW8	S6	S6	SSW7	S5	SSE3	S2	SSW5	SSW8	SW13	SW7	SW9	SW10	SW9	SW12	SW13	SW11	SW12	SW14	SW11	SW15	SW12	SSW8.7	SW15	
19-Jan	SW9	SW8	SSW6	SW7	W5	SW10	SW11	SW11	SW11	W2	NNW4	N4	ESE4	SE4	SE4	SE3	ENE2	NNE5	NNE1	N1	NNW1	SE1	WNW3	SW4	SW2.8	SW11	
20-Jan	SSW7	SW7	W10	W13	W12	W9	WSW7	SW9	SW9	SW13	WSW13	WSW9	SSW5	SSW8	SW10	SSW9	SW10	SW10	SW8	SSW8	SW8	SW9	SW8	SW6	SW8.3	W13	
21-Jan	NW1	SSW1	WNW4	NW5	NW3	NNW4	NNE7	NE11	NNE7	NNE6	NNE7	NNE7	NNE6	NNE6	NNE6	NNE5	N4	N4	N4	N4	N3	NNE4	NNE5	NNE6	NNE4.5	NE11	
22-Jan	NNE5	NNE6	NNE5	NNE5	NNE5	NNE5	NNE5	NE6	NE6	NNE5	NNE4	NNE5	NE5	NNE4	NNE4	NE4	NE5	NE5	NE4	NE4	NE3	NNE2	NE2	N1	NNE4.3	NE6	
23-Jan	NNW1	AF	AF	NNE1	AF	NNE2	NNE2	N1	NNE1	NNW0	NW1	NNW0	WNW1	W1	NW1	NW0	AF	AF	SSE0	SSW0	SW0	WSW1	SW1	SSW1	NW0.5	NNE2	
24-Jan	SSW2	SW2	SSW2	SSW3	SW3	SSW3	SSW3	SSW2	SSW2	SSW3	SW3	SSW2	SSW3	SSW3	SSW3	SSW2	SSW2	SSW3	SSW3	SSW3	SSW3	SSW3	SW3	SSW3	SSW4	SSW2.8	SSW4
25-Jan	SSW4	SW4	SSW3	SSW3	SW4	SSW4	SSW4	SSW4	SSW4	SSW4	SSW5	SW5	SW5	SW7	SW9	SSW10	SSW11	SSW11	SSW12	SSW12	SSW13	SSW13	SW12	SW12	SW12	SW7.1	SW13
26-Jan	SW11	SW10	SW10	SSW11	W15	WNW15	WNW13	WNW15	WNW14	WNW16	WNW15	WNW15	WNW16	WNW15	W14	W12	W12	W11	W13	W17	W18	WNW16	W17	W15	W13.3	W18	
27-Jan	WNW16	WNW14	WNW14	WNW16	WNW14	WNW14	WNW16	W14	W13	W14	W12	W11	WSW11	W11	W14	WSW11	WSW12	WSW10	WNW14	WNW12	WNW10	W14	WNW14	WNW13	W12.6	WNW16	
28-Jan	WNW13	WNW14	WNW15	WNW15	W16	W14	WSW10	WSW10	WSW11	W11	WSW9	WSW7	WSW6	SW6	SW8	SW11	SSW12	SW15	WSW15	W18	W20	W19	WNW18	W11.9	W20		
29-Jan	WNW17	WNW15	WNW16	W16	W18	W17	W14	W13	WSW13	WSW14	WSW13	W13	W13	W12	W14	W11	W8	W10	W10	WNW9	WNW10	WNW11	WNW11	WNW10	W12.5	W18	
30-Jan	WNW10	WNW11	WNW10	W11	W12	W13	WNW13	WNW14	WNW14	WNW15	WNW18	WNW17	WNW16	WNW15	WNW17	WNW16	WNW13	NNW6	NNW6	NNW6	NNW7	N10	N9	N9	WNW11.0	WNW18	
31-Jan	N9	N10	N9	N9	N8	N8	N6	NNW5	NNW6	NNW5	NW6	WNW8	WNW10	WNW10	W11	WNW11	WNW10	WNW9	WNW9	WNW10	NW11	NW9	NW8	NW9	NW7.7	W11	

WSW6.0	WSW6.1	W6.1	W6.4	W6.7	W6.5	WSW5.7	W5.9	WSW5.7	WSW6.0	W5.9	W5.8	W5.3	W5.4	W5.6	WSW5.2	WSW5.7	WSW5.6	WSW5.8	WSW6.0	WSW6.0	WSW6.0	WSW6.3	WSW5.8	Diurnal Average	
WSW18	SSW19	SSW17	SW18	W18	SW17	SW17	SW19	SW19	SW19	SW18	SW20	SW19	SW20	SSW19	SW18	SW18	SSW18	SSW19	SSW21	SSW21	SSW23	SSW23	SW20	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
Stony Mountain - January 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	277	37.48	37.48
6 - 11	225	30.45	67.93
12 - 19	229	30.99	98.92
20 - 28	8	1.08	100.00
29 - 38	0	0.00	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
Stony Mountain - January 2017

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	29	35	14	2	1	1	4	4	5	50	33	5	15	17	34	28	277
6 - 11	9	12	7	0	0	0	0	0	7	14	61	22	25	31	15	22	225
12 - 19	3	0	0	0	0	0	0	0	3	20	72	23	56	45	5	2	229
20 - 28	0	0	0	0	0	0	0	0	0	4	3	0	1	0	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
Totals	41	47	21	2	1	1	4	4	15	88	169	50	97	93	54	52	739

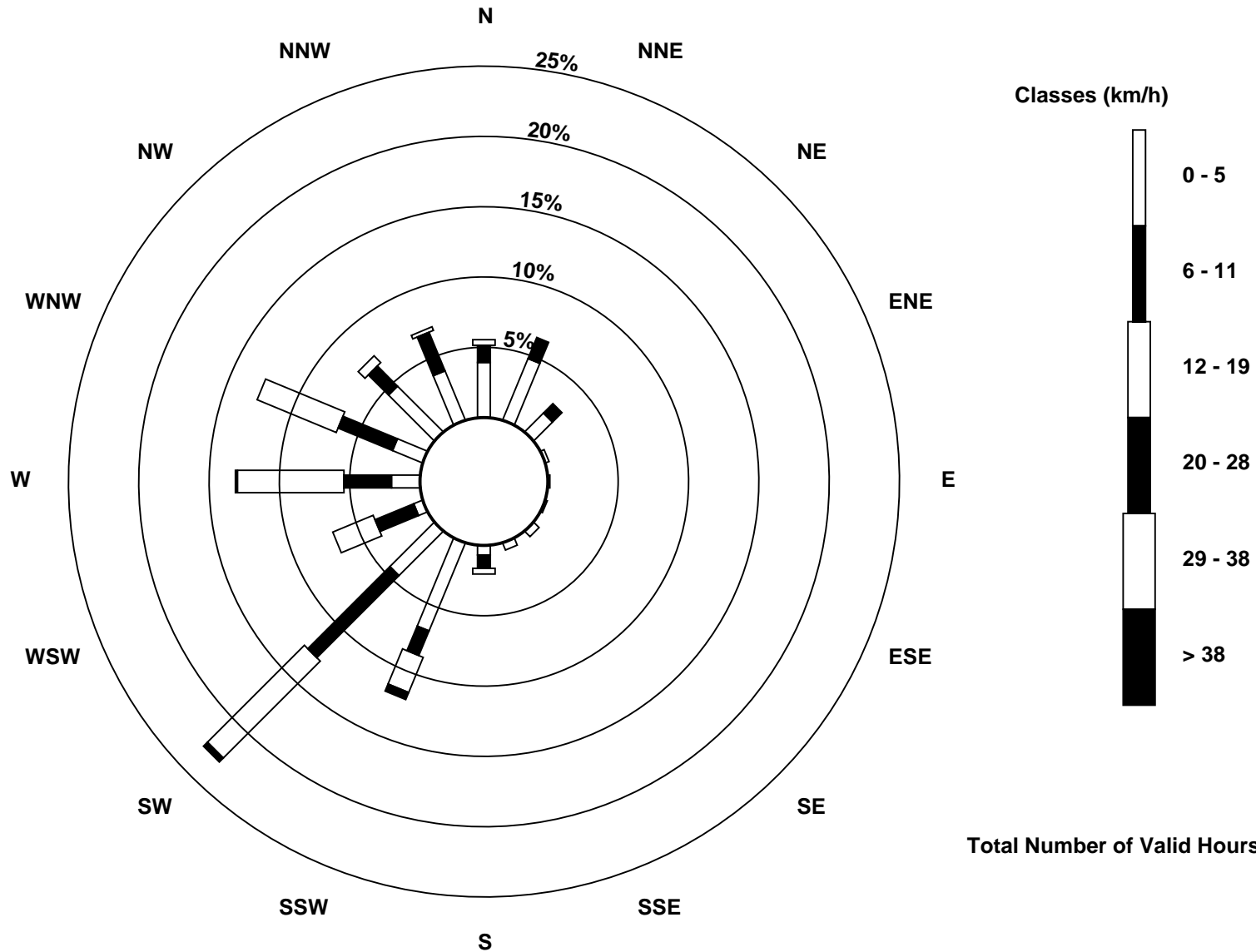
Total Number of Valid Hours: 739

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Wind Speed (WS) - km/h
Stony Mountain (AMS 18)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Stony Mountain - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Jan 11 14:00 Minimum Value: 0 km/h on Jan 23 19:00 Percentiles: P ₁ = 0 P ₁₀ = 1 O ₁ = 1 Median = 2 O ₃ = 4 P ₉₀ = 5 P ₉₉ = 6																	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-Jan	6	5	5	5	5	4	3	3	2	2	3	3	3	3	2	1	1	1	1	1	1	1	1	1	1	6
2-Jan	1	0	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	2	2	2	2	2	2	2	1	2
3-Jan	1	2	2	2	2	2	2	2	2	2	2	3	3	4	4	3	3	4	4	4	3	3	3	3	4	
4-Jan	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	2	1	2	
5-Jan	1	1	1	1	2	2	2	2	1	2	2	2	2	2	1	1	1	2	2	2	1	1	1	1	2	
6-Jan	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	
7-Jan	1	1	1	1	2	1	0	1	1	1	1	1	1	2	1	2	1	1	1	1	1	1	1	1	2	
8-Jan	1	0	1	1	1	0	1	1	1	1	2	2	1	1	2	2	2	2	3	2	2	2	2	2	3	
9-Jan	2	2	2	2	3	2	2	2	2	2	2	2	2	2	1	1	1	2	1	2	2	1	1	1	3	
10-Jan	1	1	1	1	1	1	1	0	1	1	1	1	2	2	2	2	2	3	4	3	3	4	3	3	4	
11-Jan	3	3	3	5	4	4	4	4	4	6	7	5	5	7	6	6	5	4	3	4	3	2	2	2	7	
12-Jan	1	2	1	1	1	2	3	3	4	4	4	4	3	4	4	4	3	4	5	6	6	6	6	5	6	
13-Jan	4	4	3	4	5	5	4	5	4	3	3	4	4	4	3	3	3	3	3	3	3	3	4	4	5	
14-Jan	4	4	4	4	4	4	4	4	3	5	4	4	5	6	6	6	5	5	3	3	3	3	4	5	6	
15-Jan	6	5	6	6	6	5	5	5	3	4	4	5	5	5	4	4	3	3	4	3	3	3	3	2	6	
16-Jan	2	3	3	3	3	4	4	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	5	
17-Jan	4	5	4	4	4	4	3	5	5	5	4	5	3	2	2	2	3	3	3	3	2	3	2	1	5	
18-Jan	2	2	2	2	2	2	1	2	3	3	4	4	2	3	2	2	3	3	3	3	3	3	4	3	4	
19-Jan	2	2	3	2	2	3	2	3	3	3	1	2	1	1	1	2	2	2	1	2	1	2	2	2	3	
20-Jan	3	2	3	4	3	3	2	2	2	3	3	3	1	2	3	2	2	2	2	2	2	2	2	2	4	
21-Jan	1	1	2	1	1	1	3	3	2	2	2	2	2	2	2	2	2	2	2	1	1	2	2	2	3	
22-Jan	2	2	2	2	1	1	1	2	1	1	1	1	1	2	1	1	1	1	1	1	1	1	0	1	2	
23-Jan	1	AF	AF	1	AF	0	1	1	1	1	1	1	1	1	1	1	AF	AF	0	0	1	1	0	1	1	
24-Jan	0	0	0	1	0	1	0	0	0	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	
25-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	3	3	3	3	2	2	2	2	3	
26-Jan	2	2	2	4	5	5	4	4	4	4	5	4	4	4	4	3	3	4	4	5	6	5	5	5	6	
27-Jan	5	4	4	5	5	4	4	4	4	4	4	3	4	5	5	3	3	4	5	4	3	4	4	4	5	
28-Jan	4	4	5	4	4	5	5	3	3	3	3	3	2	2	3	2	3	3	4	4	6	6	6	5	6	
29-Jan	5	5	5	5	5	5	4	5	4	4	4	5	4	4	5	3	3	3	3	3	3	3	3	3	5	
30-Jan	3	3	3	3	3	4	4	5	4	5	6	6	5	6	6	5	6	2	2	3	3	4	3	4	6	
31-Jan	4	4	3	4	3	3	3	2	3	2	3	3	3	4	4	3	3	3	3	3	3	3	2	3	4	
																	Diurnal Maximum									
AF - Analyzer Failure																										



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Stony Mountain - January 2017

Direction of Maximum Speed: 208 deg on Jan 12 22:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 215.2 deg on Jan 16	Hours of Data: 739
Direction of Minimum Speed: 153 deg on Jan 23 19:00	Hours of Missing Data: 5
Direction of Minimum Daily Speed Average: 0.5 deg on Jan 23	Percent Operational Time: 99.3
Monthly Average Direction: 267.8 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jan	307	300	306	313	327	336	339	341	337	331	330	329	330	334	322	317	310	299	308	312	322	320	321	358	320.1
2-Jan	21	346	5	347	336	334	314	349	268	275	295	317	332	338	346	191	227	272	288	300	294	293	290	280	303.8
3-Jan	285	275	272	281	222	229	222	224	222	226	244	266	269	273	278	293	292	303	303	304	302	309	309	314	275.8
4-Jan	310	306	311	330	346	351	1	352	353	348	336	328	311	300	278	281	271	237	234	237	224	260	242	218	292.4
5-Jan	240	284	304	337	27	23	21	30	33	53	50	53	38	30	10	18	39	39	40	32	51	59	56	28	28.8
6-Jan	40	47	83	212	216	216	217	228	224	217	213	204	185	206	165	188	209	211	210	214	209	201	210	219	208.7
7-Jan	212	211	219	206	194	177	154	12	11	7	17	17	2	0	7	11	10	4	358	355	357	352	358	11	355.3
8-Jan	343	314	331	310	316	304	237	217	222	223	229	236	233	204	226	226	218	222	221	220	216	228	243	231	230.8
9-Jan	226	236	241	249	264	266	278	282	302	295	294	307	310	309	303	283	294	308	309	319	317	321	306	297	285.8
10-Jan	297	281	289	290	280	287	346	316	309	318	335	330	323	321	311	295	282	260	272	274	264	276	259	220	281.1
11-Jan	215	215	218	221	223	232	240	266	281	300	318	328	359	352	349	341	346	339	337	336	333	329	329	327	294.5
12-Jan	320	320	277	233	225	220	214	214	203	197	198	194	179	181	171	171	170	183	192	199	200	208	212	214	201.4
13-Jan	214	210	222	258	277	281	276	269	274	229	224	239	257	257	246	226	224	226	225	228	228	225	230	227	240.8
14-Jan	224	223	225	221	222	223	222	221	216	219	212	220	233	243	242	242	239	228	216	227	220	217	220	232	225.9
15-Jan	246	245	255	262	267	271	268	274	256	256	260	270	267	273	274	262	251	251	246	244	243	234	229	218	256.6
16-Jan	220	223	223	223	223	226	217	223	220	217	215	218	222	217	213	215	216	212	205	202	203	207	208	209	215.2
17-Jan	207	211	213	220	221	224	220	249	265	260	260	259	237	219	229	217	228	230	223	221	215	216	213	197	228.2
18-Jan	191	191	192	182	189	205	190	167	181	202	206	222	225	226	227	214	217	220	222	220	218	226	220	231	212.9
19-Jan	230	230	212	223	272	217	214	218	216	263	345	10	121	144	138	124	57	12	33	0	334	140	292	222	221.5
20-Jan	201	234	266	279	276	273	240	234	228	222	242	238	198	211	217	211	216	221	222	209	215	214	225	224	232.2
21-Jan	320	195	298	308	305	333	31	37	30	18	24	21	28	21	29	22	4	355	3	357	351	12	17	24	12.5
22-Jan	16	19	26	25	28	32	32	36	35	28	22	28	34	31	26	34	50	47	39	46	41	28	34	4	31.2
23-Jan	330	AF	AF	12	AF	24	17	1	12	333	319	336	286	279	307	309	AF	AF	153	208	231	237	235	208	316.6
24-Jan	208	217	210	213	214	213	213	206	207	209	217	212	204	207	203	205	212	208	207	206	207	217	213	209	209.9
25-Jan	213	215	199	202	220	221	204	210	213	212	213	217	217	217	216	212	213	213	212	218	219	217	217	215	214.6
26-Jan	216	219	222	256	272	282	287	285	285	288	295	282	288	288	276	274	266	263	265	275	279	282	280	276	274.2
27-Jan	282	290	289	291	289	290	286	275	269	264	261	261	258	271	275	244	249	255	288	298	291	281	284	284	277.2
28-Jan	282	289	286	285	283	272	266	248	239	255	260	240	257	249	221	233	236	213	225	246	268	278	281	285	262.8
29-Jan	288	288	285	277	279	276	266	264	252	255	257	263	271	268	274	274	272	263	275	285	292	283	291	297	274.7
30-Jan	287	290	296	278	273	272	284	299	301	296	295	300	293	294	298	291	302	344	338	341	342	10	349	1	301.6
31-Jan	349	353	354	351	353	349	352	347	332	329	325	300	282	283	279	296	288	294	302	295	309	317	309	309	316.1

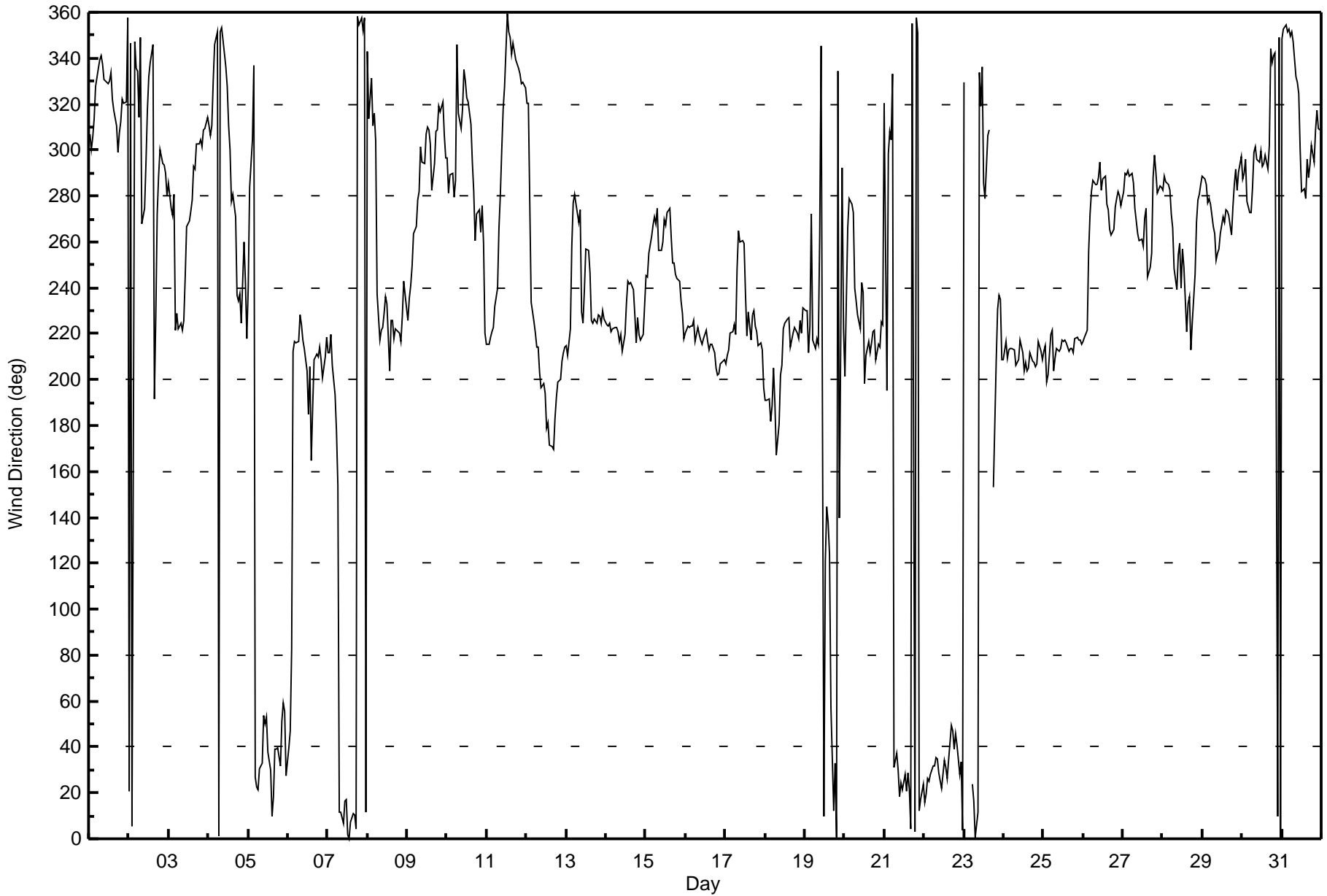
252.5 254.0 258.9 261.8 264.2 263.2 257.7 259.9 257.7 255.8 263.1 265.1 267.9 266.2 262.8 254.9 250.0 247.4 248.7 252.3 251.5 254.6 254.2 250.8
 Diurnal Average

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Stony Mountain - January 2017





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Stony Mountain - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 105 deg on Jan 18 09:00	Hours of Data: 739
Minimum Value: 10 deg on Jan 8 04:00	Hours of Missing Data: 5
Percentiles: P ₁ = 12 P ₁₀ = 17 Q ₁ = 18 Median = 22 Q ₃ = 25 P ₉₀ = 31 P ₉₉ = 70	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-Jan	23	22	23	24	30	29	27	28	26	23	26	30	30	28	26	18	12	12	16	14	13	13	22	27	30	
2-Jan	16	17	17	48	27	25	20	34	49	18	22	24	26	30	30	67	17	21	16	17	16	17	16	18	67	
3-Jan	16	22	28	21	20	19	15	16	15	18	25	24	24	23	23	20	21	22	21	21	21	21	23	26	28	
4-Jan	25	25	27	38	45	44	38	40	39	49	43	39	33	31	27	26	25	27	24	25	21	29	36	19	49	
5-Jan	23	26	23	35	27	23	21	22	21	19	18	21	24	24	30	27	18	21	26	26	20	21	35	51	51	
6-Jan	42	37	46	28	19	15	16	22	28	16	17	30	33	20	22	12	19	16	18	17	18	14	17	19	46	
7-Jan	18	18	29	18	71	17	13	57	35	23	21	28	25	34	23	23	23	27	26	34	27	23	28	23	71	
8-Jan	17	25	15	10	13	14	32	12	14	15	19	23	27	30	27	31	22	18	19	19	17	20	24	21	32	
9-Jan	20	22	29	28	26	26	25	21	20	19	22	20	23	24	22	23	20	20	18	22	23	25	20	20	29	
10-Jan	19	19	17	17	16	17	14	13	13	17	21	23	29	29	24	21	23	27	23	23	25	24	26	21	29	
11-Jan	17	16	16	18	17	20	24	27	23	24	24	30	31	31	31	32	32	31	27	27	25	21	18	13	32	
12-Jan	13	12	41	16	16	13	16	18	17	17	19	21	23	25	21	21	19	20	19	18	18	18	18	18	41	
13-Jan	18	17	19	30	25	20	21	22	22	20	17	20	25	26	24	20	17	18	17	17	16	15	19	18	30	
14-Jan	16	16	17	17	17	17	17	18	16	17	18	23	21	22	22	23	22	24	20	22	19	17	18	24	24	
15-Jan	23	22	24	24	24	23	23	21	21	23	23	24	23	22	23	24	22	22	22	22	21	19	19	17	15	24
16-Jan	16	17	16	17	17	19	18	18	18	18	18	19	19	18	18	19	19	18	18	17	17	18	17	17	19	
17-Jan	18	19	18	17	17	21	18	23	24	25	26	26	31	18	23	20	17	17	18	16	15	16	15	17	31	
18-Jan	16	17	19	18	20	17	18	86	105	48	48	27	29	23	21	17	16	17	17	16	15	25	16	18	105	
19-Jan	19	25	46	39	33	19	16	16	17	65	11	33	30	26	30	53	66	45	91	73	86	92	59	41	92	
20-Jan	21	21	24	19	21	21	20	17	15	17	20	24	23	17	17	18	17	15	17	15	14	15	14	18	24	
21-Jan	72	77	17	19	30	20	25	18	21	20	20	20	23	24	22	24	37	36	38	39	37	31	28	25	77	
22-Jan	27	24	24	23	21	23	20	22	23	26	22	23	26	27	23	18	22	22	19	27	43	20	27	43	43	
23-Jan	23	AF	AF	25	AF	24	24	21	21	26	34	35	30	42	27	38	AF	AF	69	46	40	27	27	19	69	
24-Jan	21	24	17	17	18	19	18	18	20	18	20	20	27	26	31	45	43	23	19	22	23	28	24	19	45	
25-Jan	17	22	24	20	19	18	18	20	28	20	20	17	18	18	18	17	17	17	17	17	16	16	16	17	28	
26-Jan	18	18	18	26	25	23	22	20	20	19	19	20	19	23	20	20	22	22	22	22	21	21	20	22	26	
27-Jan	20	21	20	20	20	20	19	22	22	24	24	23	25	33	24	22	22	25	23	24	23	21	20	21	33	
28-Jan	20	20	20	20	19	21	23	23	19	24	24	28	30	27	30	23	19	18	19	21	24	21	21	21	30	
29-Jan	21	21	20	22	20	21	24	24	22	24	26	26	25	25	23	22	23	23	20	23	21	20	21	21	26	
30-Jan	21	21	21	21	21	24	24	22	22	22	22	23	25	24	24	23	40	31	33	30	31	26	29	29	40	
31-Jan	27	28	26	28	26	29	27	29	29	29	33	24	27	27	23	22	21	22	20	19	20	18	20	20	33	
	72	77	46	48	71	44	38	86	105	65	48	39	33	42	31	67	66	45	91	73	86	92	59	51		
Diurnal Maximum																										

AF - Analyzer Failure



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	January 9, 2017	Last Calibration	December 7, 2016
Station Name	Stony Mountain	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	12:30	End Time (MST)	15:15
Gas Cert Reference	LL110090	Station temp.	22 Deg C
Cal Gas Concentration	49.4 ppm	Cal Gas Exp Date	February 16, 2019
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.	11041

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-302	-302
Analyzer IP address	192.168.1.43		Lamp voltage	902	902
Calculated slope	1.000396	0.992142	Chamber temp	45.0	45.0
Calculated intercept	1.194096	1.933714	Pressure	656.0	656.0
Analyzer Background	20.9	21.7	Flow	0.377	0.377
Analyzer Coefficient	0.889	0.902	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	-0.5	----
as found span	5000	58.9	581.9	573.6	1.015
calibrator zero	5000	0.0	0.0	-0.5	----
high point	5000	58.9	581.9	585.7	0.994
second point	5000	29.5	291.5	289.9	1.005
third point	5000	14.7	145.2	143.8	1.010
as left zero	5000	0.0	0.0	-0.5	----
as left span	5000	58.9	581.9	583.5	0.997
Average Correction Factor					1.003

Corrected As found 574.1 Previous response 580.5 % change 1.1%

Notes:

Noticed slight drop in flow and pressure over past couple of months, new pump to be installed during routine calibrations next month.

Calibration Performed By: Zack Eastman



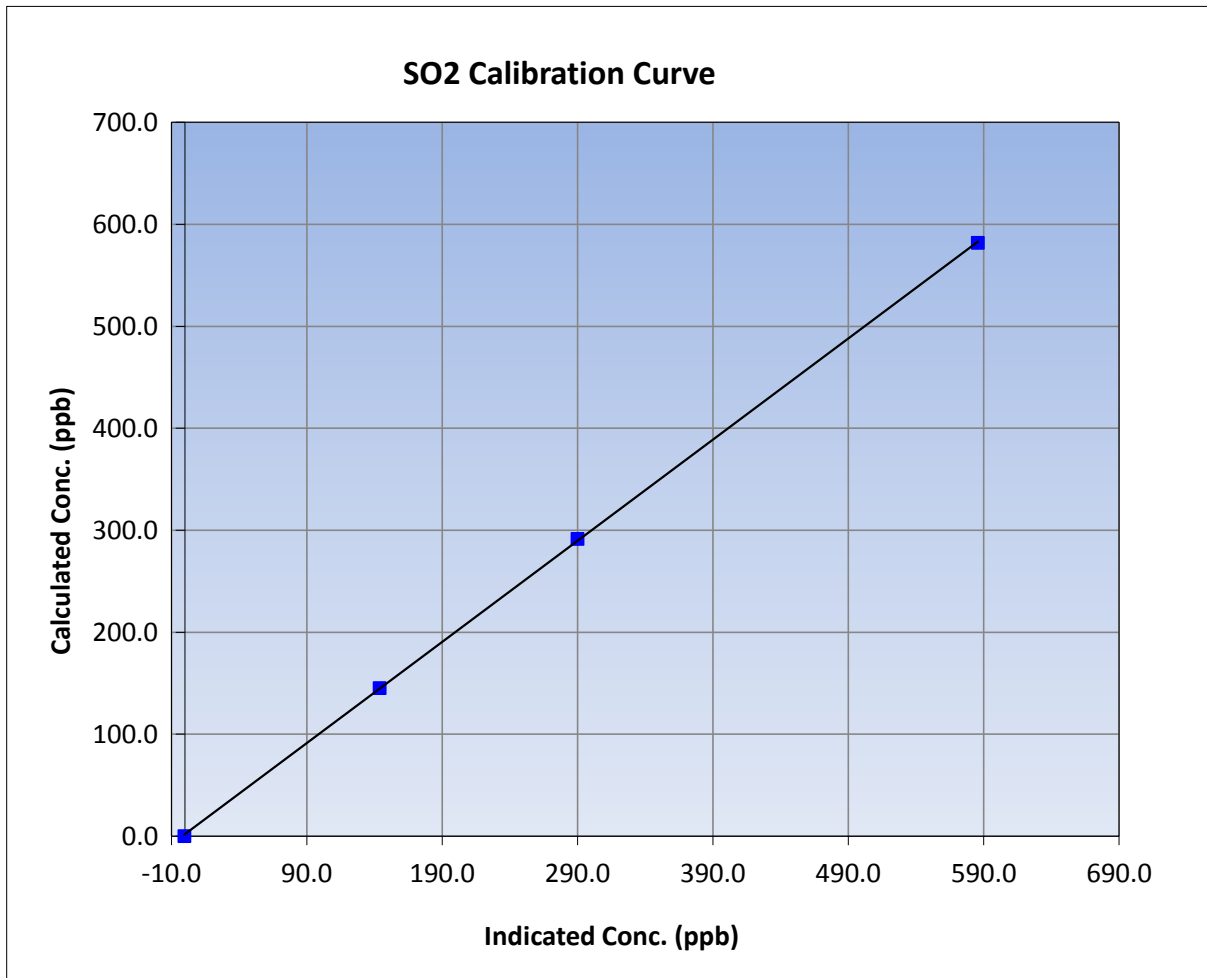
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 9, 2017	Previous Calibration	December 7, 2016
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	12:30	End Time (MST)	15:15
Analyzer make	Thermo 43i	Analyzer serial #	JC1501301453

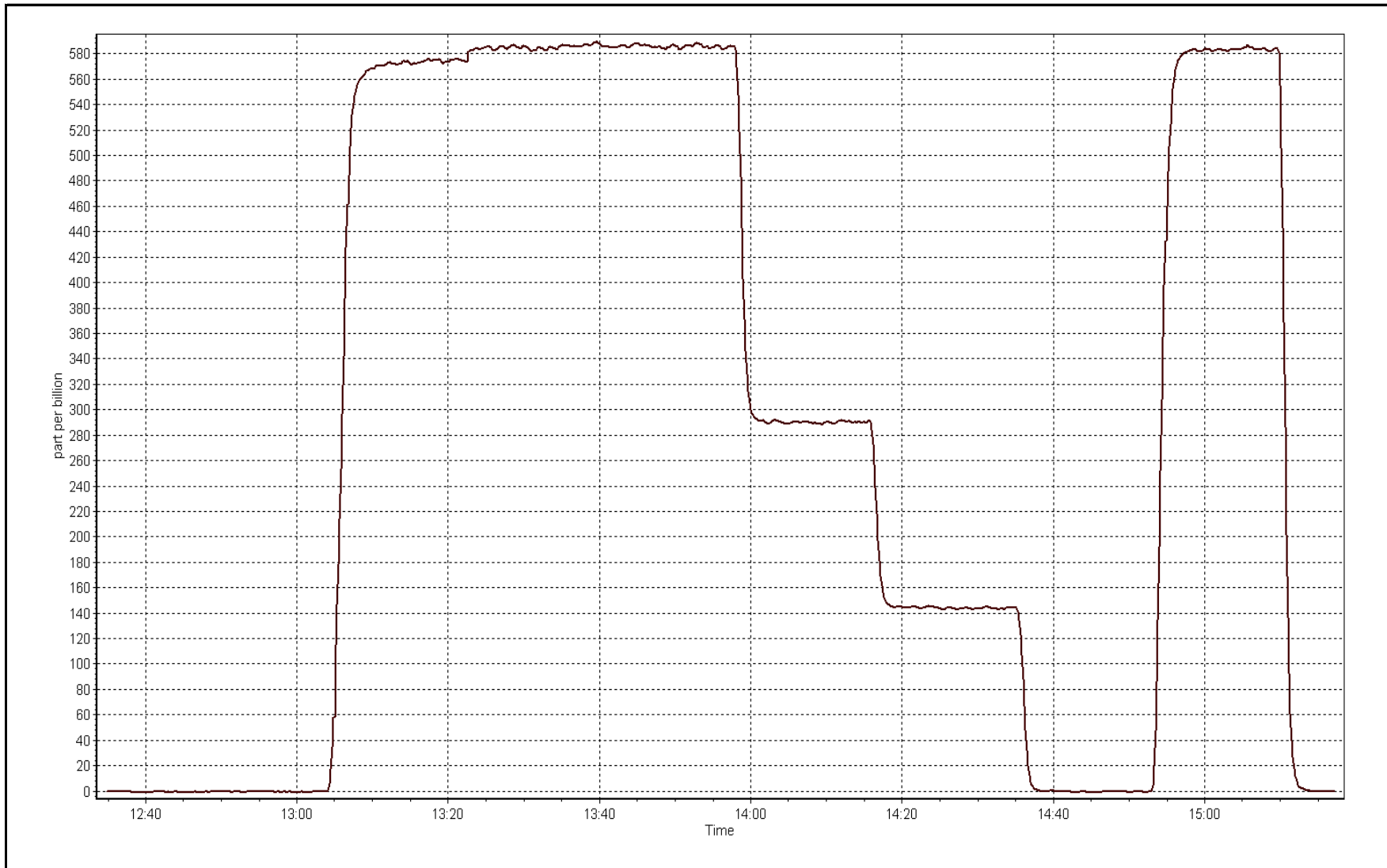
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.5	----	Correlation Coefficient	0.999961
581.9	585.7	0.9936		
291.5	289.9	1.0054	Slope	0.992142
145.2	143.8	1.0100		
			Intercept	1.933714



SO2 Calibration Plot

Date: January 9, 2017





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	January 9, 2017	Last Calibration	December 8, 2016
Station Name	Stony Mountain	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	13:15	End Time (MST)	17:45
Gas Cert Reference	CC233389	Station temp.	22 Deg C
Cal Gas Concentration	4.88 ppm	Cal Gas Exp Date	10/6/2014
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.	11041
SO2 gas concentration	49.4 ppm	SO2 gas cert/exp	LL11090 16/Feb/19

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-698	-698
Analyzer IP address	192.168.1.44		Lamp voltage	1024	1024
Calculated slope	0.998922	0.998161	Chamber temp	45	45
Calculated intercept	-0.328995	-0.172269	Pressure	630.0	630.0
Analyzer Background	2.79	2.91	Flow	0.408	0.408
Analyzer Coefficient	1.078	1.103	Intensity	91	91
			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	0.0	----
as found span	5000	82.0	80.0	77.5	1.033
SO2 scrubber check	5000	10.0	98.8	0.5	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	82.0	80.0	80.3	0.997
second point	5000	41.1	40.1	40.5	0.990
third point	5000	20.6	20.1	20.4	0.986
as left zero	5000	0.0	0.0	0.5	----
as left span	5000	82.0	80.0	80.6	0.993
Average Correction Factor					0.991

Corrected As found	77.5	Previous response	80.4	% change	3.9%
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Notes:

Span adjusted slightly. No issues noted during calibration.

Calibration Performed By:

Zach Eastman



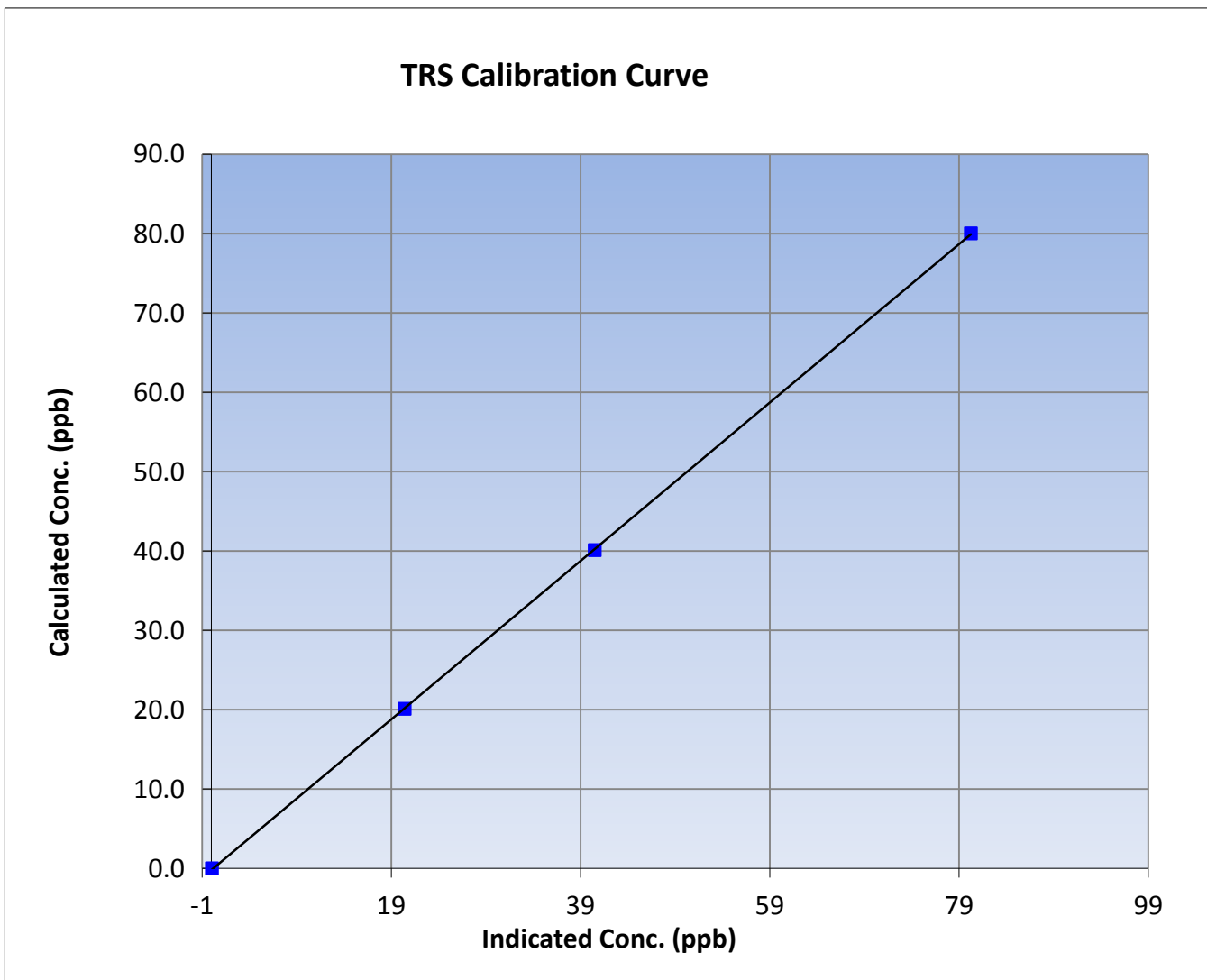
Wood Buffalo Environmental Association TRS Calibration Report

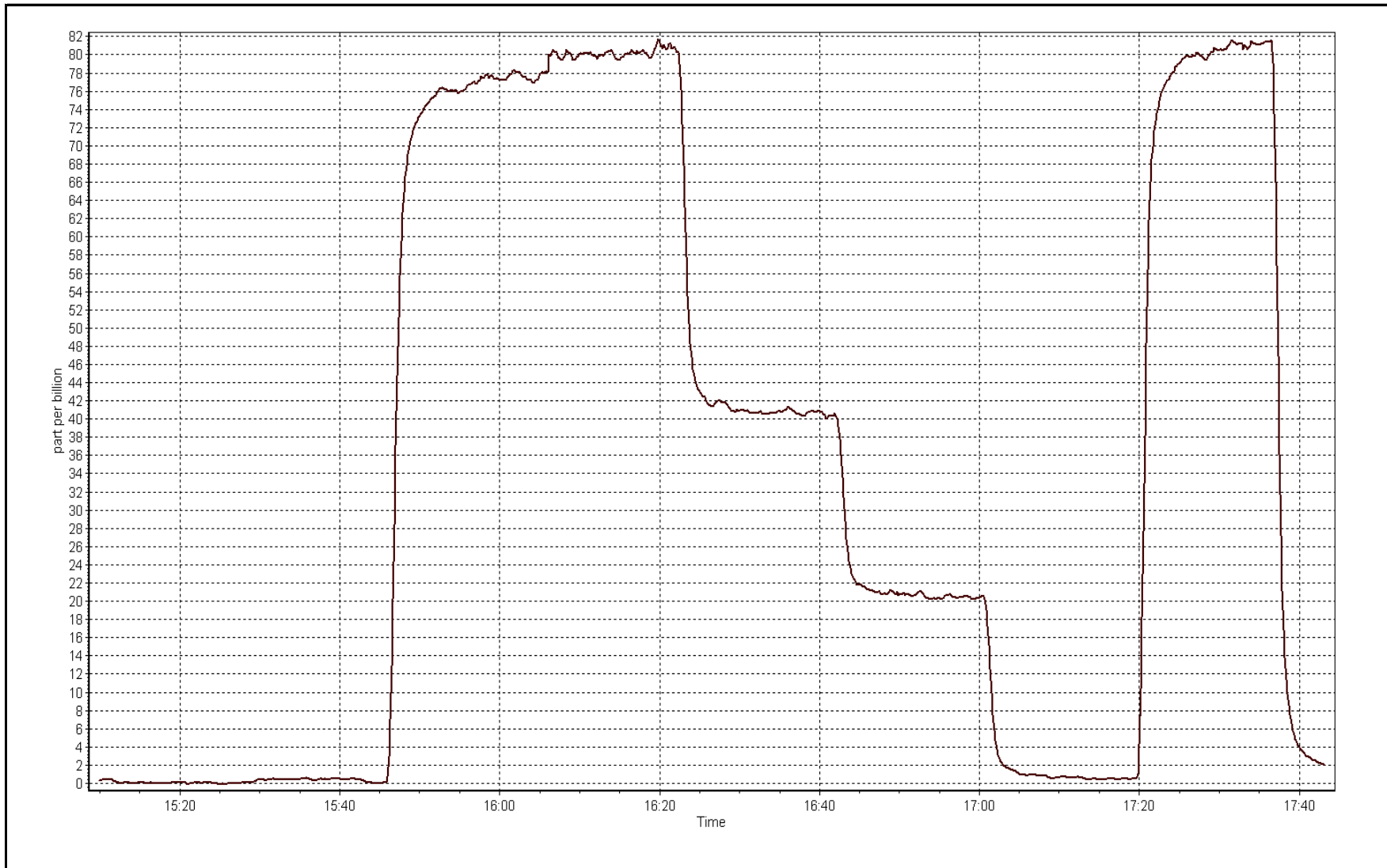
Station Information

Calibration Date	January 9, 2017	Previous Calibration	December 8, 2016
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	13:15	End Time (MST)	17:45
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	0.0	----	Correlation Coefficient	0.999985
80.0	80.3	0.9972		
40.1	40.5	0.9905	Slope	0.998161
20.1	20.4	0.9856		
			Intercept	-0.172269







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	January 9, 2017	Last Calibration	December 7, 2016
Station Name	Stony Mountain	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	12:30	End Time (MST)	15:15
Gas Cert Reference	LL110090	Cal Gas Expiry Date	February 16, 2019
CH4 Cal Gas Conc.	491.0 ppm	CH4 Equiv Conc.	1041.0 ppm
C3H8 Cal Gas Conc.	200.0 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	11041

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	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	0.997981	1.000223	Carrier Pressure	30.9	30.9
THC Calc intercept	0.032147	0.030164	Fuel Pressure	44.3	44.3
NMHC Calc slope	0.997774	0.997238	Air Pressure	34.4	34.4
NMHC Calc intercept	0.014043	0.018053			

Analyzer make Thermo 55i Analyzer serial # 1505164831

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	58.9	12.26	12.09	1.014
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	58.9	12.26	12.25	1.001
second point	5000	29.5	6.14	6.08	1.010
third point	5000	14.7	3.06	3.01	1.017
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	58.9	12.26	12.35	0.993
Average Correction Factor					1.009

Corrected As found 12.09 Previous response 12.26 % change 1.4%

Notes:

Span slightly adjusted after as found.

Calibration Performed By: Zach Eastman



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	58.9	6.48	6.38	1.016
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	58.9	6.48	6.49	0.998
second point	5000	29.5	3.25	3.22	1.008
third point	5000	14.7	1.62	1.59	1.017
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	58.9	6.48	6.55	0.989
Average Correction Factor					1.008

Corrected As found 6.38 Previous response 6.48 % change 1.6%

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	0.00	----
as found span	5000	58.9	5.78	5.71	1.013
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	58.9	5.78	5.76	1.004
second point	5000	29.5	2.90	2.86	1.013
third point	5000	14.7	1.44	1.42	1.017
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	58.9	5.78	5.80	0.997
Average Correction Factor					1.011

Corrected As found 5.71 Previous response 5.78 % change 1.2%



Wood Buffalo Environmental Association

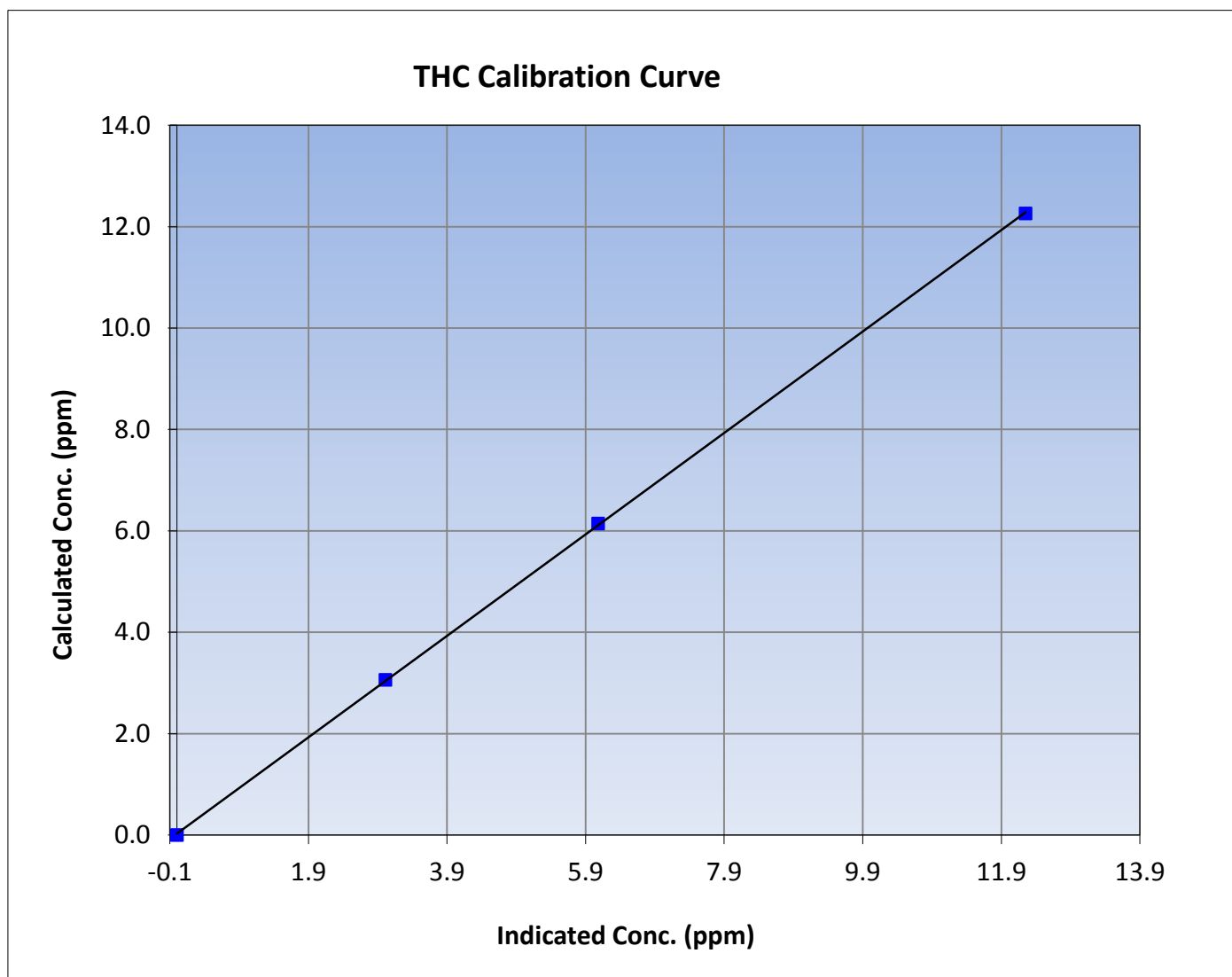
THC Calibration Summary

Station Information

Calibration Date	January 9, 2017	Previous Calibration	December 7, 2016
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	12:30	End Time (MST)	15:15
Analyzer make	Thermo 55i	Analyzer serial #	1505164831

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999968
12.26	12.25	1.0011		
6.14	6.08	1.0102	Slope	1.000223
3.06	3.01	1.0168		
			Intercept	0.030164





Wood Buffalo Environmental Association

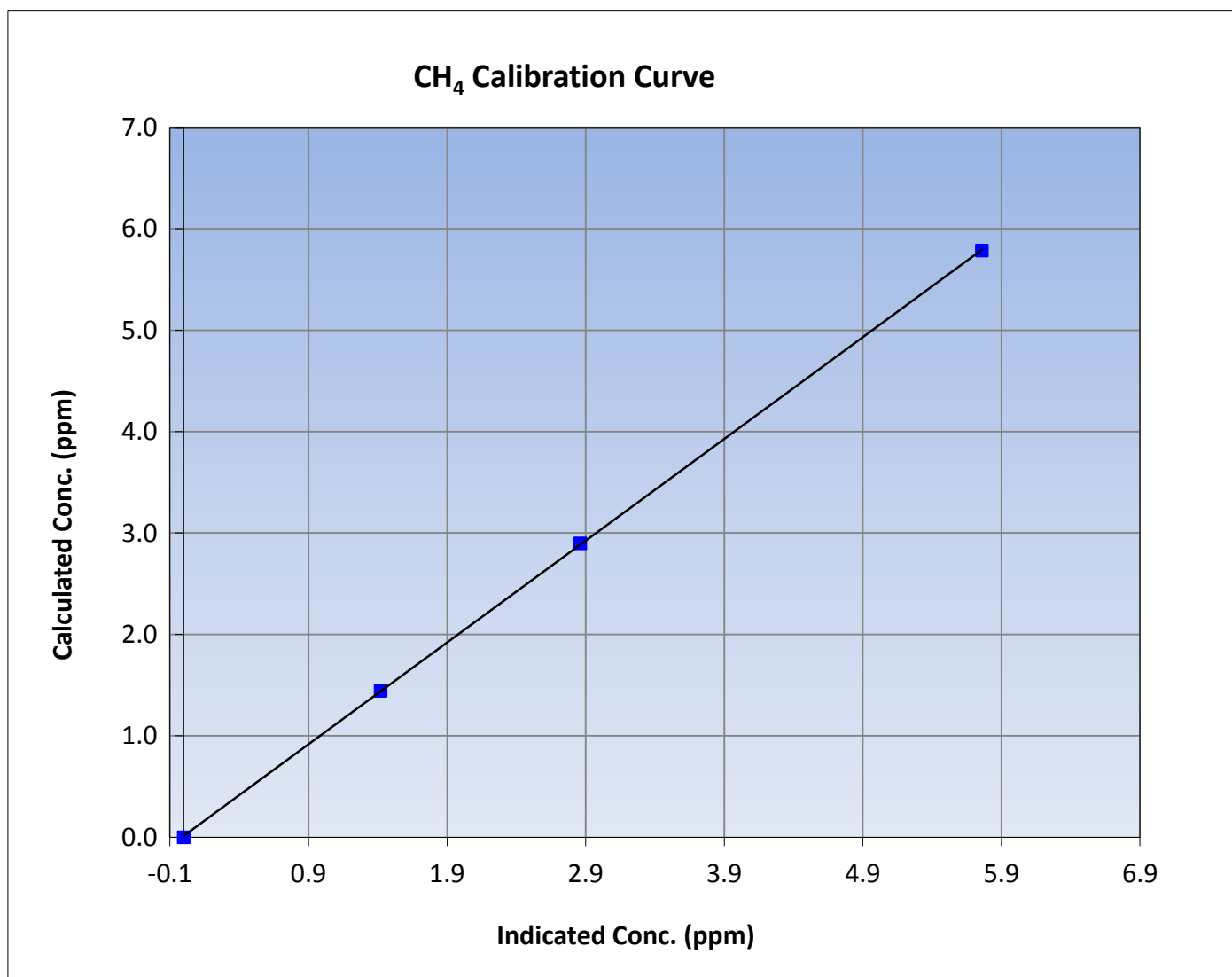
CH₄ Calibration Summary

Station Information

Calibration Date	January 9, 2017	Previous Calibration	December 7, 2016
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	12:30	End Time (MST)	15:15
Analyzer make	Thermo 55i	Analyzer serial #	1505164831

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999974
5.78	5.76	1.0042		
2.90	2.86	1.0129	Slope	1.003587
1.44	1.42	1.0166		
			Intercept	0.012101





Wood Buffalo Environmental Association

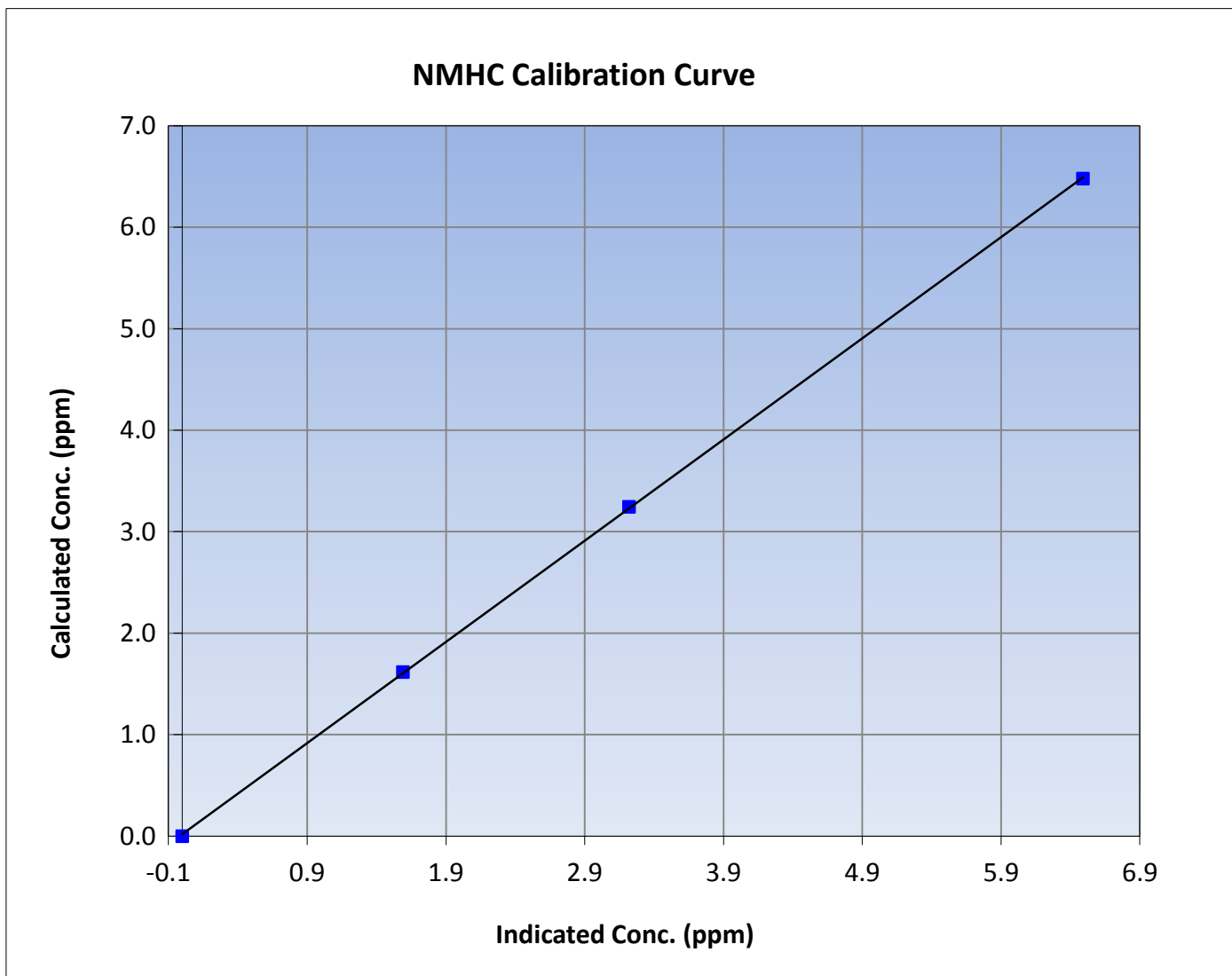
NMHC Calibration Summary

Station Information

Calibration Date	January 9, 2017	Previous Calibration	December 7, 2016
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	12:30	End Time (MST)	15:15
Analyzer make	Thermo 55i	Analyzer serial #	1505164831

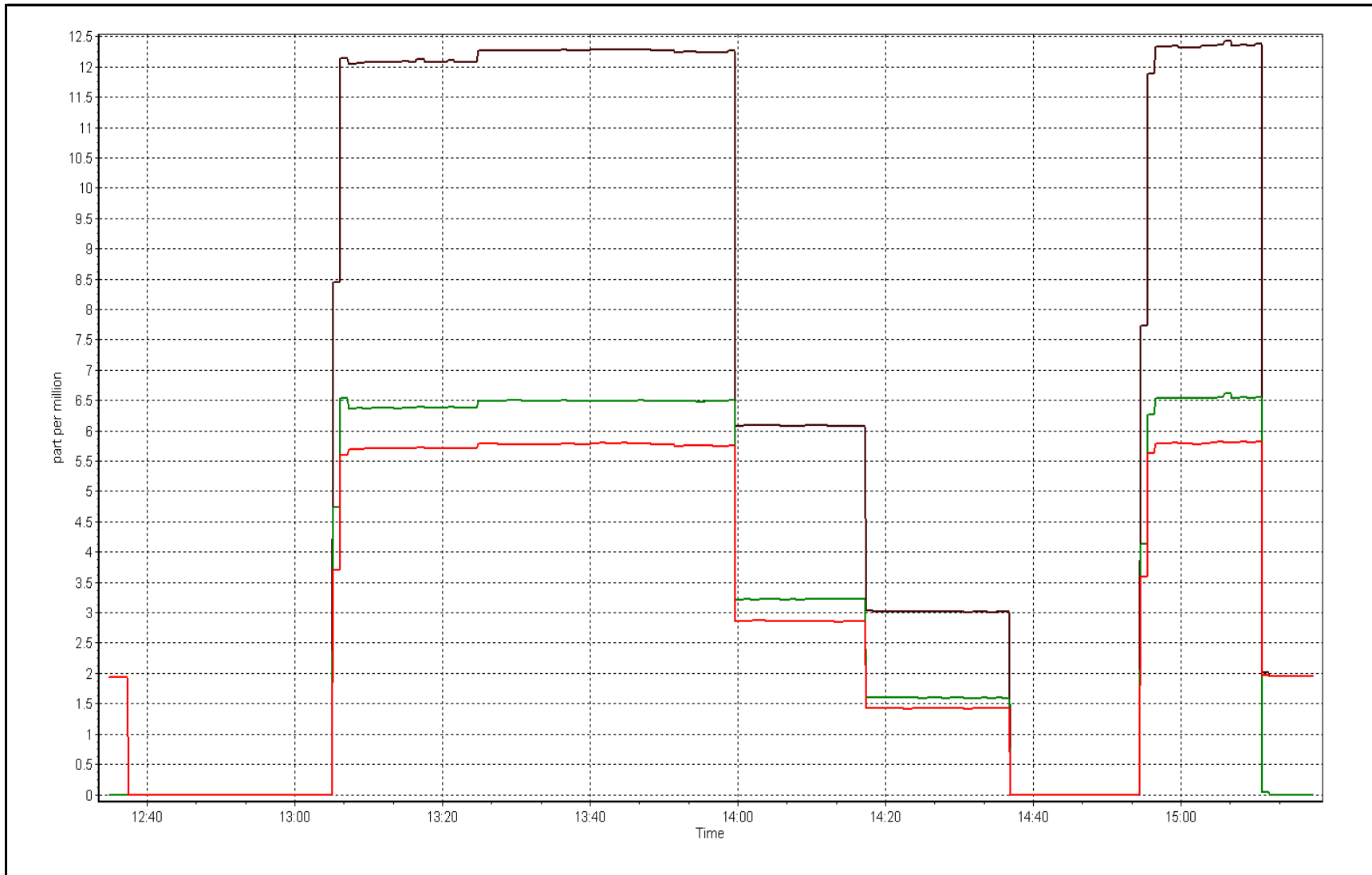
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999962
6.48	6.49	0.9983		
3.25	3.22	1.0078	Slope	0.997238
1.62	1.59	1.0170		
			Intercept	0.018053



THC Calibration Plot

Date: January 9, 2017





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	January 10, 2017	Previous Calibration	December 7, 2016
Station Name	Stony Mountain	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	12:07	End Time (MST)	14:55
NO2 GPT Ref date	December 07 2016	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	11041

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	27.0	27.0
Analyzer IP address	192.168.1.48		Lamp temp.	53.0	53.0
Calculated slope	1.001355	0.998332	Pressure	609.0	609.0
Calculated intercept	0.110853	0.332752	Flow cell A	0.684	0.684
Analyzer Background	-2.1	-0.7	Flow cell B	0.685	0.685
Analyzer Coefficient	1.377	1.371	Cell A Intensity	647xx	647xx
			Cell B Intensity	657xx	657xx

Analyzer make	Thermo 49i	Analyzer serial #	1501663733
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp O3 Gen Drive	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	-1.0	----
as found span	5000	1084	394.1	395.6	0.996
calibrator zero	5000	0.00	0.0	-0.4	----
high point	5000	1084	394.1	394.7	0.998
second point	5000	975	267.7	267.2	1.002
third point	5000	846	136.4	136.7	0.998
as left zero	5000	0.00	0.0	-1.0	----
as left span	5000	1084	394.1	395.5	0.996
Average Correction Factor					0.999

Corrected As found	396.6	Previous response	393.5	% change	-0.8%
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Notes:

Zero and span adjusted slightly.

Calibration Performed By: Zach Eastman



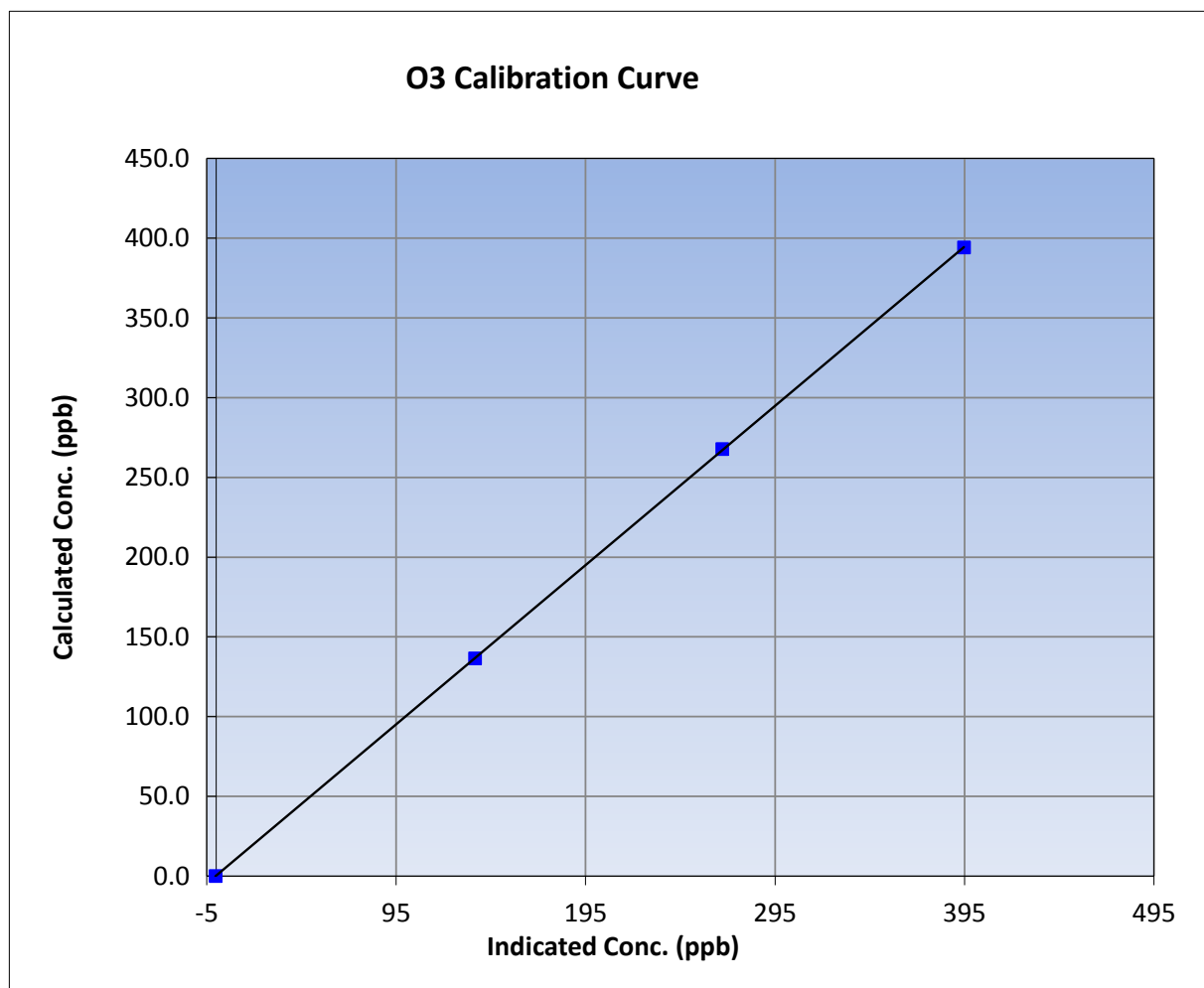
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	Tuesday, January 10, 2017	Previous Calibration	December 7, 2016
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	12:07	End Time (MST)	14:55
Analyzer make	Thermo 49i	Analyzer serial #	1501663733

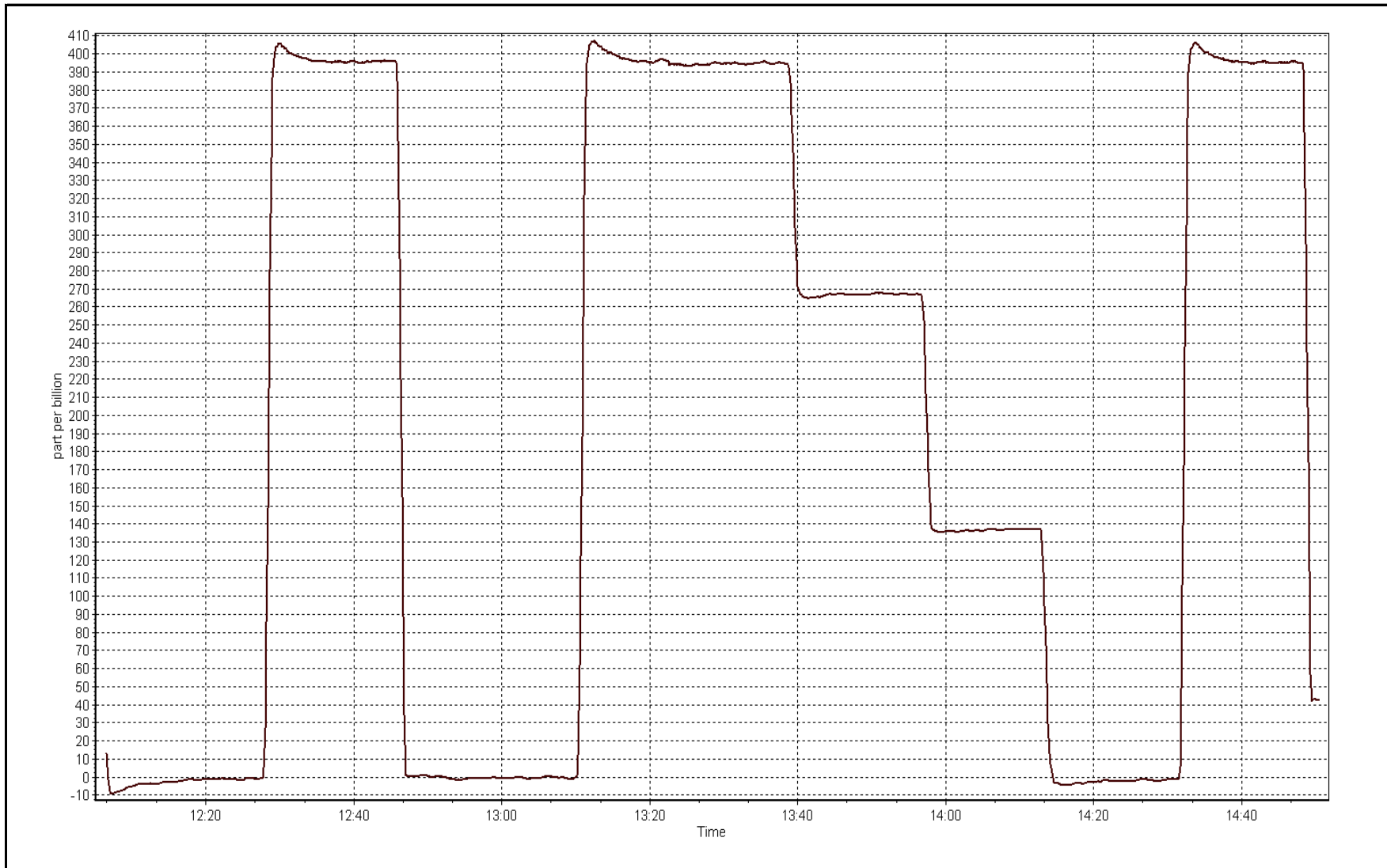
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	0.999993
394.1	394.7	0.9985		
267.7	267.2	1.0019	Slope	0.998332
136.4	136.7	0.9978		
			Intercept	0.332752



O3 Calibration Plot

Date: January 10, 2017





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	January 14, 2017	Previous Calibration	January 10, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	10:08	End Time (MST)	12:43
NO2 GPT Ref date	December 07 2016	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	11041

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	27.0	27.3
Analyzer IP address	192.168.1.48		Lamp temp.	53.2	53.2
Calculated slope	0.998332	0.994364	Pressure	607.4	623.0
Calculated intercept	0.332752	-0.963417	Flow cell A	0.003	0.699
Analyzer Background	-0.7	-2.2	Flow cell B	0.002	0.700
Analyzer Coefficient	1.371	1.393	Cell A Intensity	64458	64258
			Cell B Intensity	65618	65670

Analyzer make	Thermo 49i	Analyzer serial #	1501663733
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp O3 Gen Drive	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	5000	0.00	0.0	0.3	----
high point	5000	1084	394.1	397.0	0.993
second point	5000	974	267.7	270.0	0.991
third point	5000	846	136.4	139.3	0.979
as left zero	5000	0.00	0.0	0.1	----
as left span	5000	1084	394.1	402.7	0.979
Average Correction Factor					0.988

Corrected As found	NA	Previous response	NA	% change	NA
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Notes:

Pump was dead on arrival. Could not capture as founds. Adjusted the zero and span.

Calibration Performed By:

Jayme Marcoux



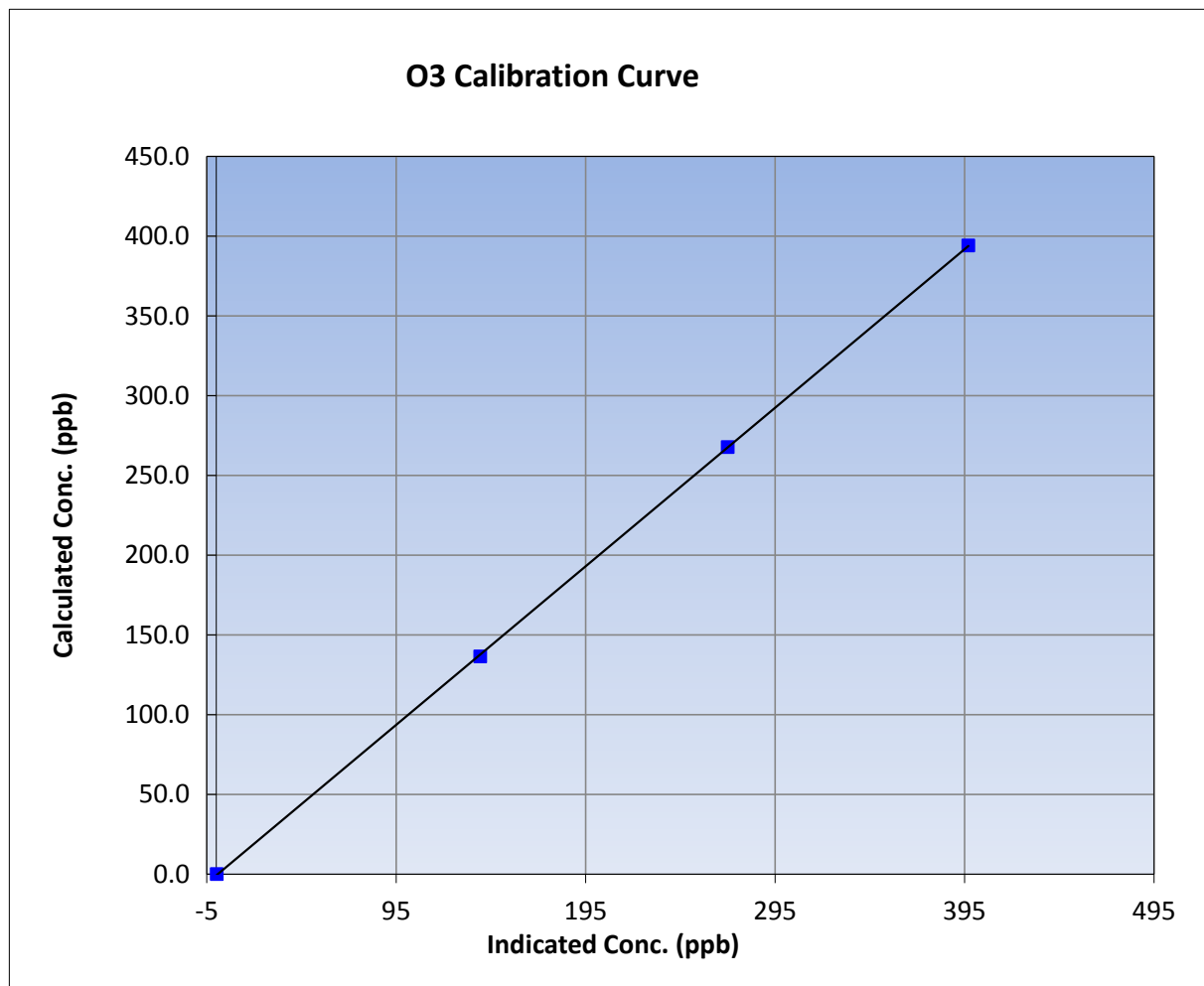
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	Saturday, January 14, 2017	Previous Calibration	January 10, 2017
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	10:08	End Time (MST)	12:43
Analyzer make	Thermo 49i	Analyzer serial #	1501663733

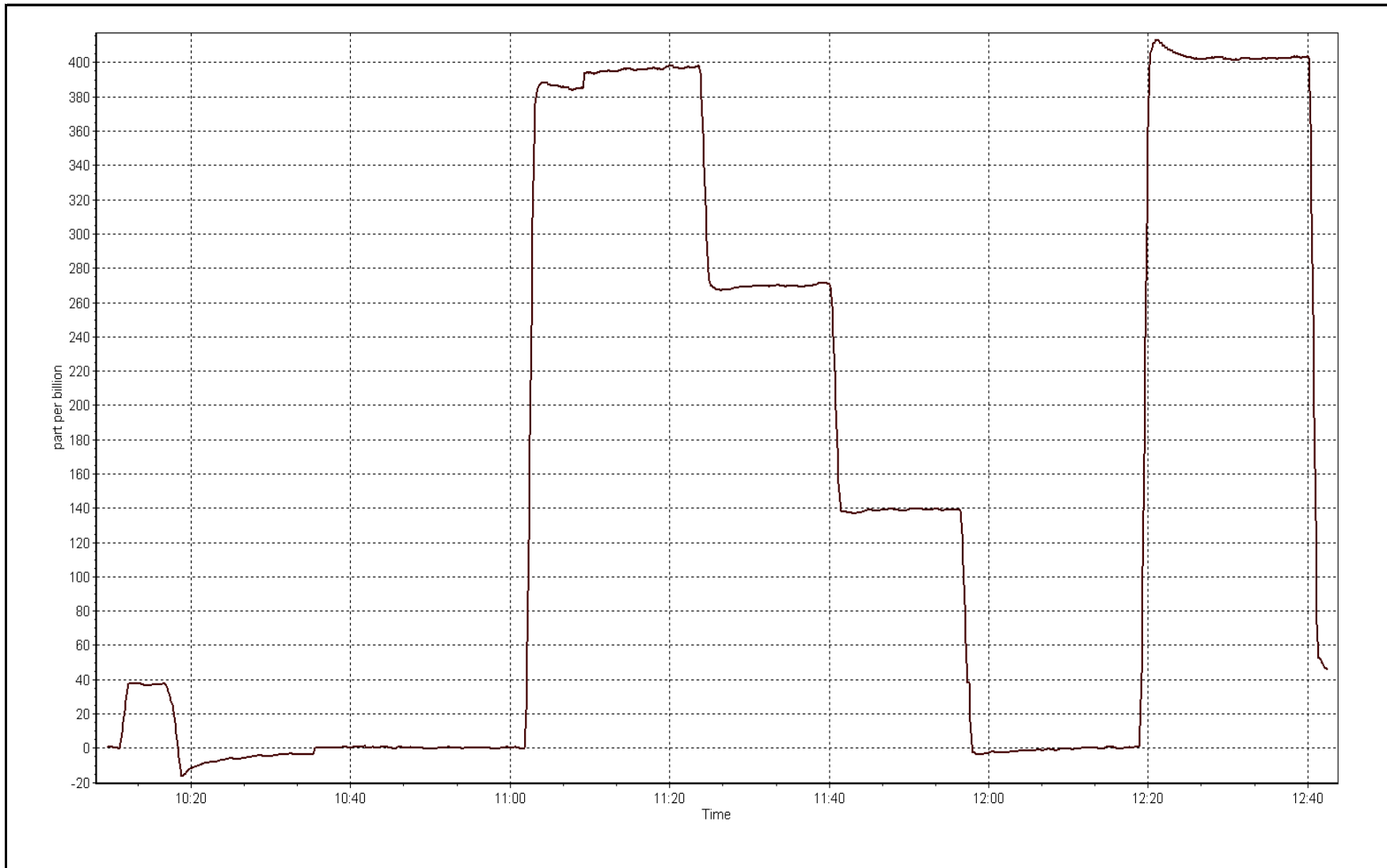
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999978
394.1	397.0	0.9927		
267.7	270.0	0.9913	Slope	0.994364
136.4	139.3	0.9793		
			Intercept	-0.963417



O3 Calibration Plot

Date: January 14, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 10, 2017	Previous Calibration	December 7, 2016
Station Name	Stony Mountain	Station Number	AMS 18
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	12:07
NO Cal Gas Conc	50.9 ppm	Gas Cert Reference	LL110090
NOx Cal Gas Conc	50.9 ppm	Cal Gas Expiry Date	February 16, 2019
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.	11041
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.996628	0.998457	1.001591
	Data Offset	0.670099	0.803728	-0.783057
Current Calibration	Data Slope	0.999710	1.001389	0.997751
	Data Offset	1.127763	1.154762	-1.052906

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1336160088
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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	0.965		0.965	
NOX coefficient	0.999		0.999	
NO2 coefficient	1.000		1.000	
NO bkgnd	1.7		1.7	
NOX bkgnd	1.8		1.8	
Chamber Temp	50	Deg C	50	Deg C
Moly Temp	323	Deg C	323	Deg C
PMT voltage	-813.6	V	-813.6	V
PMT Temp	-2.9	Deg C	-2.9	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	204	mmHg	204	mmHg
R Cell Press Nox	204	mmHg	204	mmHg
NO sample flow	0.732	lpm	0.732	lpm
Nox sample Flow	0.732	lpm	0.732	lpm

Notes:

No adjustments required. No issues with calibration.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

January 10, 2017

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	0.2	0.3	-0.1	----	----
as found span	5000	58.9	599.6	599.6	0.0	599.5	598.5	1.0	1.000	1.002
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	0.3	-0.1	----	----
high point	5000	58.9	599.6	599.6	0.0	599.5	598.5	1.0	1.000	1.002
second point	5000	29.5	300.3	300.3	0.0	298.2	297.6	0.6	1.007	1.009
third point	5000	14.7	149.6	149.6	0.0	147.5	147.1	0.4	1.015	1.017
as left zero	5000	0.0	0.0	0.0	0.0	0.4	0.5	-0.1	----	----
as left span	5000	58.9	599.6	205.8	393.8	604.5	204.4	400.2	0.992	1.007
Average Correction Factor									1.007	1.009

Corrected As found
Previous Response

NO_x= 599.2
NO_x= 601.0

NO= 598.2
NO= 599.7

Percent Change

NO_x= 0.3%

NO= 0.3%

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 58.90 ccm NOx ref calc conc = 599.6 ppb NO ref calc conc = 599.6 ppb

O3 Setpoint (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
1st NO ref point		0.0	600.7	599.9	-0.1	0.9982	0.9995	----	----
1st NO2 (300)	205.8	394.1	600.9	205.8	395.2	0.9978	----	0.9972	100.3%
2nd NO2 (200)	332.2	267.7	602.1	332.2	269.8	0.9959	----	0.9922	100.8%
3rd NO2 (100)	463.5	136.4	602.7	463.5	139.3	0.9949	----	0.9792	102.1%
2nd NO ref point		0.0							
Average Correction Factor						0.9962		0.9895	101.1%

Calibration Performed By: Zach Eastman



Wood Buffalo Environmental Association

NO_x Calibration Summary

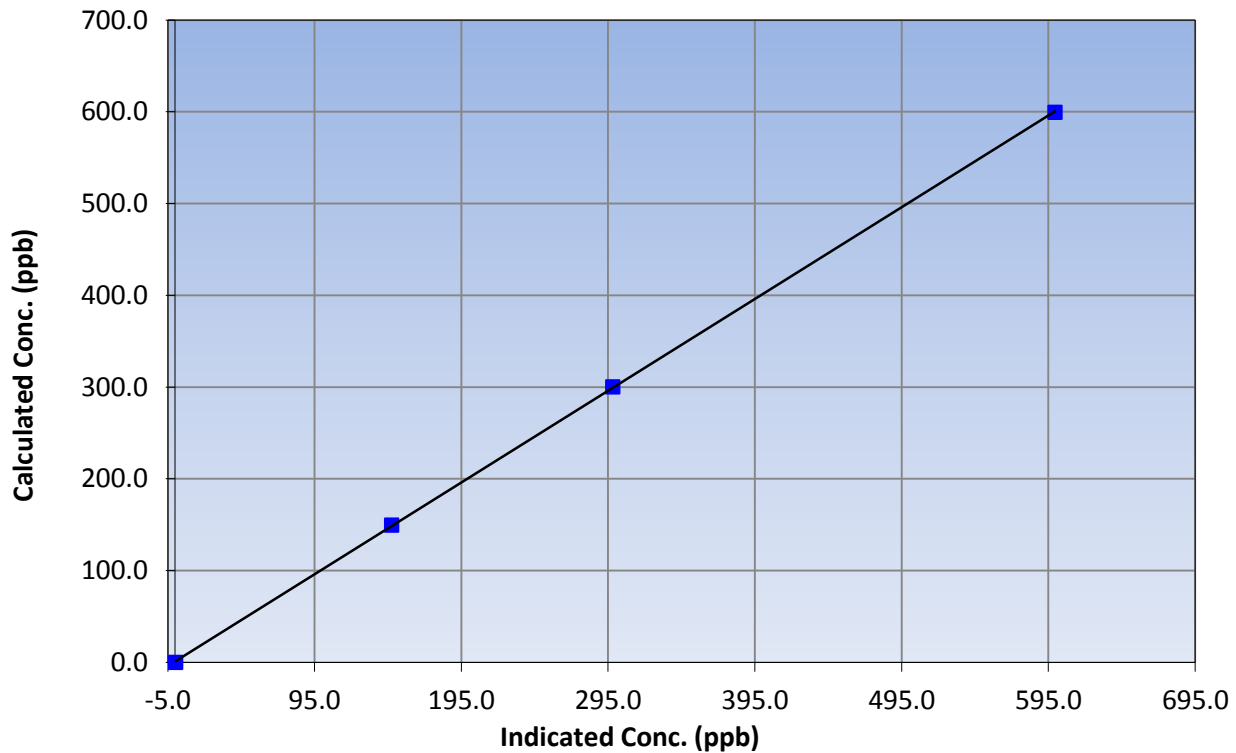
Station Information

Calibration Date	January 10, 2017	Previous Calibration	December 7, 2016
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	9:00	End Time (MST)	12:07
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	0.2	----	Correlation Coefficient	0.999975
599.6	599.5	1.0002		
300.3	298.2	1.0072	Slope	0.999710
149.6	147.5	1.0145		
			Intercept	1.127763

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

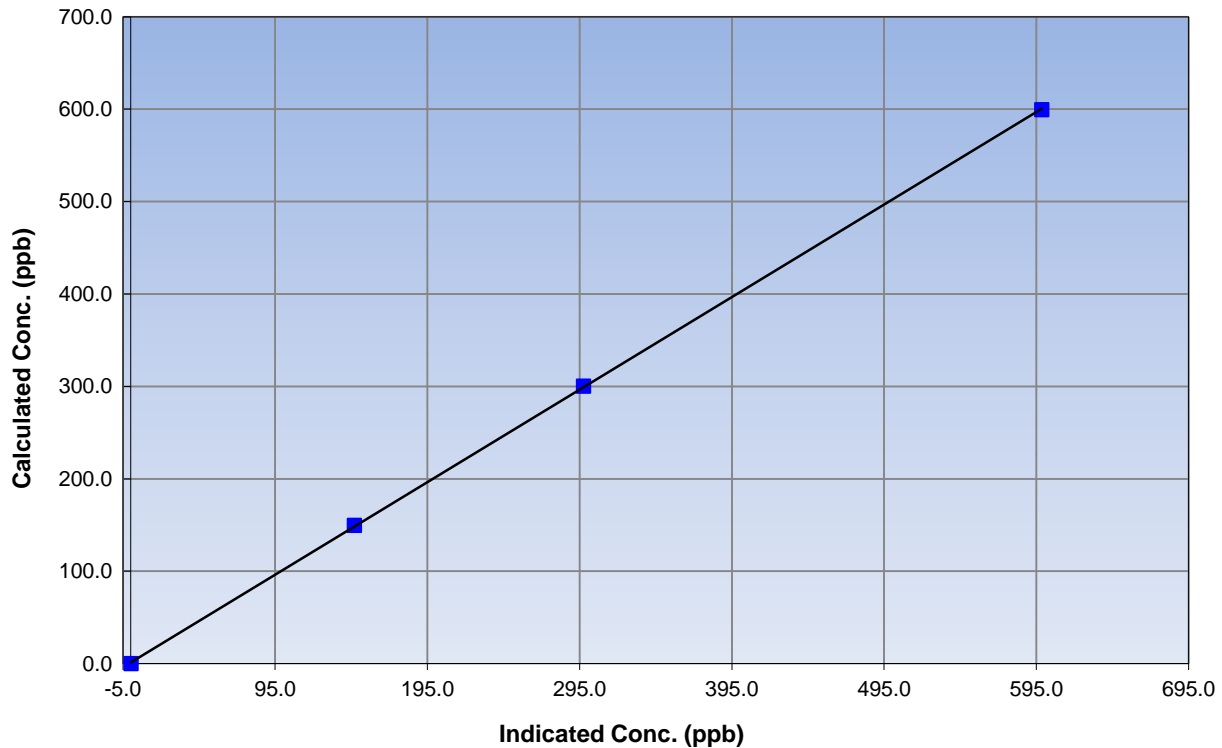
Station Information

Calibration Date	January 10, 2017	Previous Calibration	December 7, 2016
Station Name	Stony Mountain	Station Number	AMS 18
Start Time (MST)	9:00	End Time (MST)	12:07
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	0.3	N/A	Correlation Coefficient	0.999971
599.6	598.5	1.0019		
300.3	297.6	1.0091	Slope	1.001389
149.6	147.1	1.0173		
			Intercept	1.154762

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

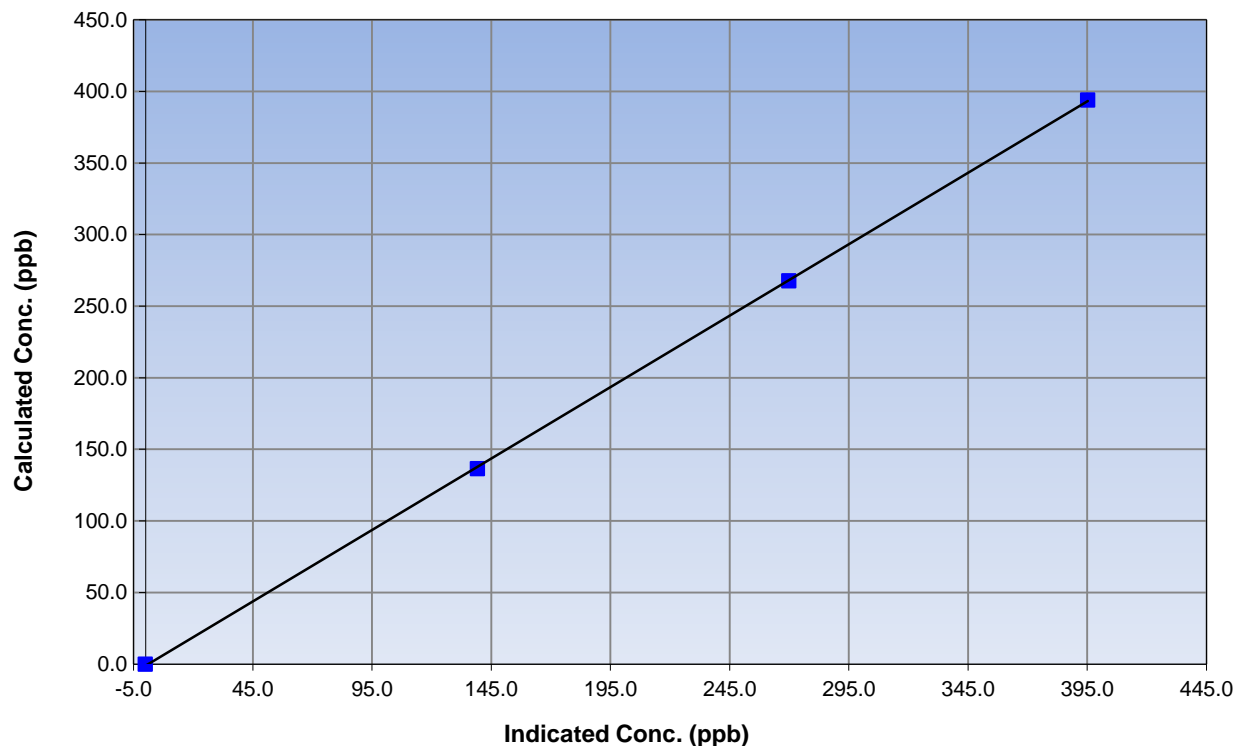
Station Information

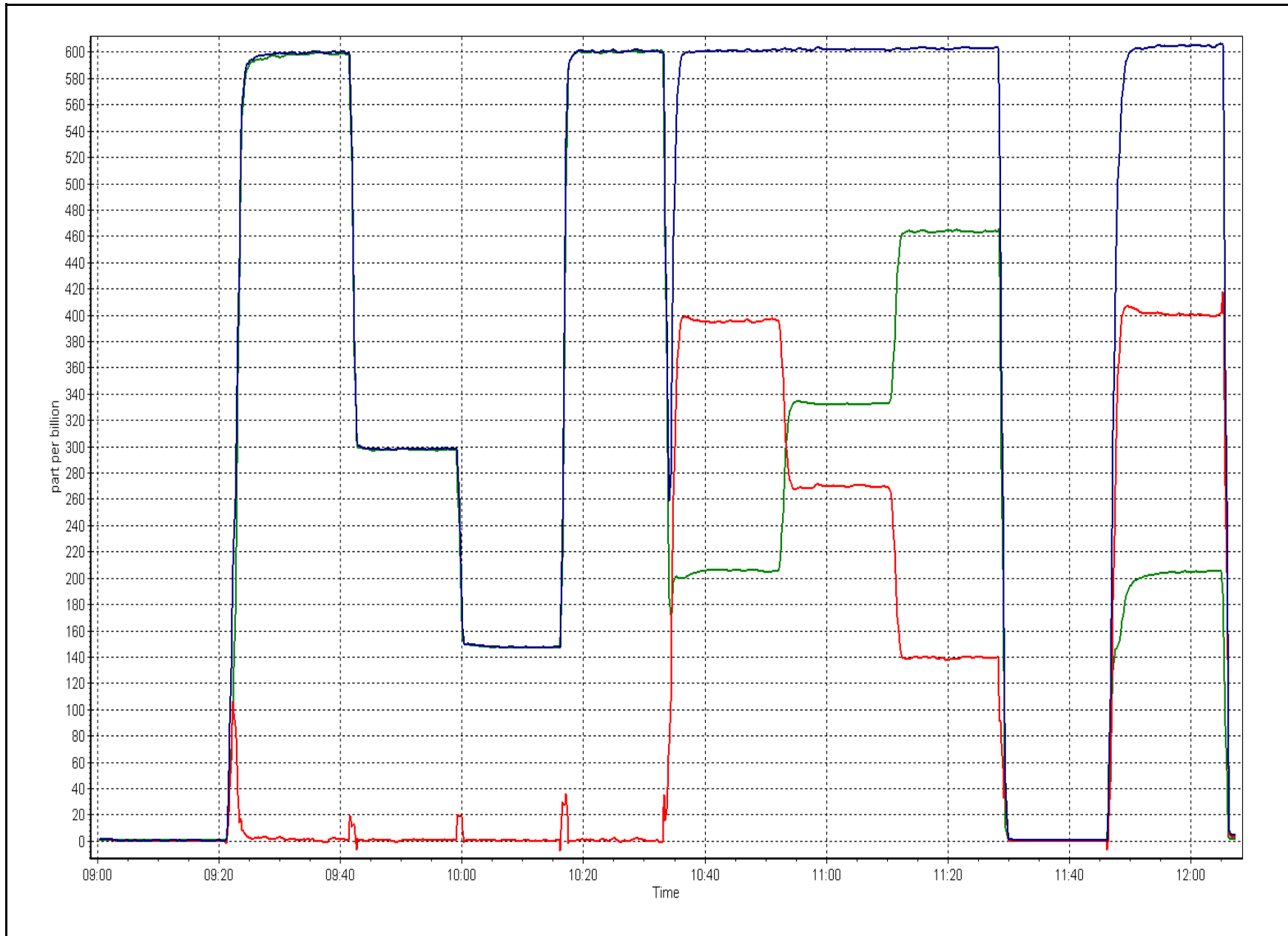
Calibration Date	January 10, 2017	Previous Calibration	December 7, 2016
Station Number	Stony Mountain	Station Number	AMS 18
Start Time (MST)	9:00	End Time (MST)	12:07
Analyzer make	Thermo 42i	Analyzer serial #	1336160088

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999947
394.1	395.2	0.9972		
267.7	269.8	0.9922	Slope	0.997751
136.4	139.3	0.9792		
			Intercept	-1.052906

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-08-2016

Station Information

Station Name:	Stony Mountain	Station number:	AMS 18
Calibration Date:	January 12, 2017	Last Cal Date:	December 8, 2016
Start time (MST):	8:50	End time (MST):	9:30
Sharp Model:	Thermo 5030 SHARP	S/N:	E-781
Particulate Fraction:	PM2.5	C14 Source S/N:	4048
Flow Standard Model:	Delta-Cal	S/N:	954
Temp/RH standard:	Delta-Cal	S/N:	954

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	Tolerance
T1 (°C)	-25	-25	-25	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	925	923	925	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1001	1020	999	<input checked="" type="checkbox"/>	+/- 50 LPH
Nephelometer zero	0.3	-----	0.3	<input type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified <input checked="" type="checkbox"/>				
Cyclone cleaning :	PM10 Cyclone <input checked="" type="checkbox"/>		PM2.5 Cyclone <input checked="" type="checkbox"/>		
Filter Tape Installed:	<input type="checkbox"/>				

Quarterly Calibration Test

Leak Test:	Date of check:	<u>Jan 10 2016</u>	Last Cal Date:	<u>Oct 18 2016</u>	<u>Tolerance</u>
	Flow w/o adaptor:	<u>16.63</u>	Flow w/ adaptor:	<u>16.40</u>	0.4 LPM

Annual Calibration Test

Foil Calibration	Foil Mass:	<u>1337</u>	S/N:	<u>5872</u>
	Date of check:	<u>June 22 2016</u>	Last Cal Date:	<u>March 23 2016</u>
	New Correction Factor:	<u>7027</u>	Previous Correction Factor:	<u>6985</u>

Parameter	As found	Measured	As left	Adjusted	Tolerance
T2 (°C)	17	NA	20	<input type="checkbox"/>	+/- 2 °C
T3 (°C)	20	NA	23	<input type="checkbox"/>	+/- 2 °C
T4 (°C)	14	NA	18	<input type="checkbox"/>	+/- 2 °C
RH (%)	5	NA	19	<input type="checkbox"/>	+/- 10%

Notes: Leak test performed this monthly calibration check. Unable to perform NEPH zero check this day as adaptor for HEPA filter will not fit over inlet adaptor, possible damage to adaptor causing the issue. HEPA check performed on Jan 12 2017

Calibration by: Zach Eastman



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 19
FIREBAG
JANUARY 2017**

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

February 27, 2017



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
 JANUARY 2017

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	708	36	36	100.00	46	0	17	0
H2S (ppb) Average	710	34	34	100.00	2	0	1	0
THC (ppm) Average	707	36	37	99.87	2.6	-	2.4	-
NO2 (ppb) Average	708	36	36	100.00	27	0	14	-
NO (ppb) Average	708	36	36	100.00	11	-	2	-
NOX (ppb) Average	708	36	36	100.00	34	-	16	-
Temperature 2 m (C) Average	744	0	0	100.00	4.5	-	2	-
Relative Humidity (%) Average	744	0	0	100.00	97	-	93	-
Wind Speed 10 m (km/h) Average	679	0	65	91.26	38	-	22	-
Wind Direction 10 m (deg) Average	679	0	65	91.26	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
 JANUARY 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	3.2	6	-	0	0	0	1	4	10	46
H2S (ppb) Average	710	0.3	0	-	0	0	0	0	0	0	2
THC (ppm) Average	707	2.26	0.1	-	2.1	2.2	2.2	2.2	2.3	2.4	2.6
NO2 (ppb) Average	708	5	5	-	0	0	1	4	7	11	27
NO (ppb) Average	708	0.6	1	-	0	0	0	0	1	2	11
NOX (ppb) Average	708	5.6	5	-	0	0	2	4	8	13	34
Temperature 2 m (C) Average	744	-13.07	10.3	-	-35.8	-26.4	-20.8	-14.4	-3.5	0.6	4.5
Relative Humidity (%) Average	744	83.3	6	-	63	74	80	84	87	91	97
Wind Speed 10 m (km/h) Average	679	11.8	7	-	0	2	6	12	17	21	38
Wind Direction 10 m (deg) Average	679	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
JANUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC	23 Jan 2017 12:00	23 Jan 2017 12:00	1	Unstable operation.
Wind Speed, Wind Direction	06 Jan 2017 06:00	06 Jan 2017 10:00	5	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	06 Jan 2017 12:00	06 Jan 2017 12:00	1	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	06 Jan 2017 14:00	06 Jan 2017 21:00	8	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	06 Jan 2017 23:00	07 Jan 2017 03:00	5	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	07 Jan 2017 22:00	08 Jan 2017 04:00	7	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	08 Jan 2017 06:00	08 Jan 2017 06:00	1	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	09 Jan 2017 02:00	09 Jan 2017 02:00	1	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	09 Jan 2017 07:00	09 Jan 2017 13:00	7	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	09 Jan 2017 15:00	09 Jan 2017 15:00	1	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	09 Jan 2017 17:00	10 Jan 2017 07:00	15	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	22 Jan 2017 19:00	22 Jan 2017 19:00	1	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	22 Jan 2017 23:00	23 Jan 2017 11:00	13	Flat line in sensor output signal - sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Firebag - January 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 46 ppb on Jan 6 19:00	Maximum Daily Average: 16.7 ppb on Jan 6		Hours of Data:	708
Minimum Value: 0 ppb on Jan 5 13:00	Minimum Daily Average: 0.1 ppb on Jan 22		Hours of Missing Data:	36
Maximum Diurnal Average: 5.1 ppb at hour 14	Minimum Diurnal Average: 1.9 ppb at hour 4		Hours of Calibration:	36
Monthly Average: 3.2 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 4 P ₉₀ = 10 P ₉₉ = 28		Percent Operational Time:	100.0

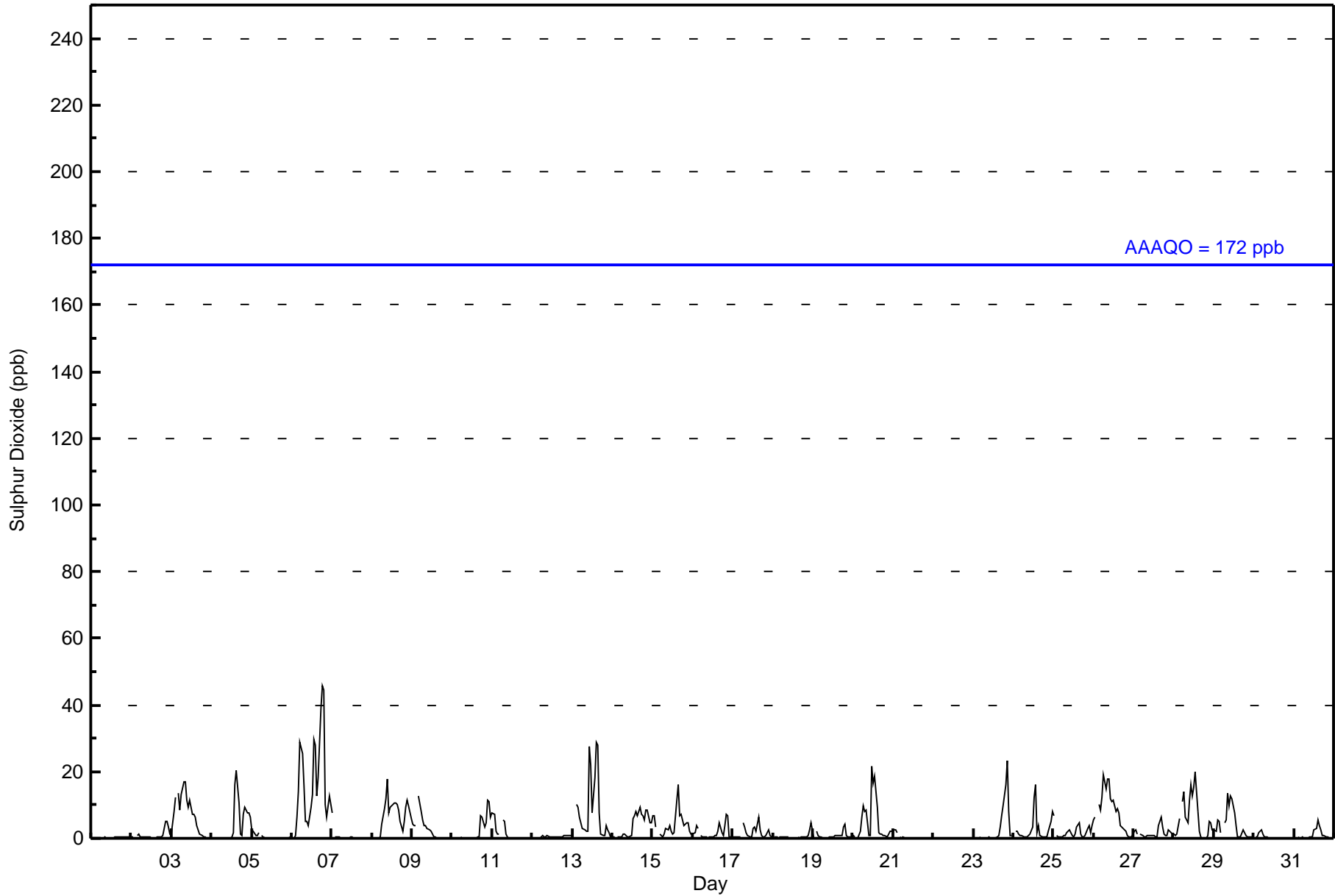
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Jan	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	5	3	1	1.0	5
3-Jan	1	8	12	Z	14	8	13	17	17	11	9	12	7	7	6	4	3	1	1	0	0	0	0	0	6.7	17
4-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	2	16	21	11	1	1	7	9	8	8	7	3.9	21
5-Jan	3	2	1	1	2	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3
6-Jan	Z	0	1	6	14	29	25	16	5	5	4	9	13	30	28	13	18	39	46	44	10	6	13	10	16.7	46
7-Jan	8	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	8
8-Jan	0	0	Z	0	0	0	4	9	12	18	8	9	10	11	11	10	8	5	2	5	9	11	10	6	6.9	18
9-Jan	4	4	4	Z	13	8	5	4	4	3	2	2	1	0	0	0	0	0	0	0	0	0	0	0	2.4	13
10-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	7	6	3	5	12	11	7	2.3	12
11-Jan	8	7	2	1	1	Z	6	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.4	8
12-Jan	Z	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1	1	0.5	1
13-Jan	1	Z	10	9	6	4	3	3	2	2	28	22	8	18	29	28	8	1	1	1	4	3	2	1	8.4	29
14-Jan	0	0	Z	0	0	1	1	1	1	0	0	1	6	7	8	7	10	7	7	6	8	9	5	5	3.9	10
15-Jan	7	7	4	Z	1	1	0	1	3	3	4	2	1	2	11	16	7	7	6	4	5	5	2	1	4.3	16
16-Jan	1	2	4	3	Z	1	0	0	0	0	0	0	1	1	2	5	2	1	4	7	7	1	0	1.8	7	
17-Jan	0	0	0	1	1	Z	4	3	1	1	0	1	3	3	2	6	2	1	0	0	1	3	1	0	1.6	6
18-Jan	Z	0	0	0	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	1	3	5	0.7	5
19-Jan	0	Z	2	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	3	4	1	0	0	0	0.8	4
20-Jan	1	1	Z	0	2	6	10	8	8	1	1	21	16	19	9	2	1	1	1	1	0	1	2	2	5.0	21
21-Jan	2	3	2	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3
22-Jan	0	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
23-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	3	7	10	16	23	8	1	1	3.1	23
24-Jan	Z	2	2	1	1	1	1	0	0	1	1	4	12	16	2	4	1	1	1	0	0	2	5	8	2.9	16
25-Jan	7	Z	1	1	1	0	1	1	2	2	2	1	1	1	3	5	1	0	0	1	3	4	2	4	1.9	7
26-Jan	6	6	Z	10	8	12	19	15	18	18	12	11	12	8	9	8	4	3	3	2	1	1	1	1	8.1	19
27-Jan	2	3	1	Z	1	1	1	1	1	1	1	1	1	0	0	4	7	4	1	1	1	2	2	1	1.6	7
28-Jan	1	1	1	6	Z	11	14	6	5	12	16	13	15	20	8	2	0	0	0	0	1	5	5	2	6.3	20
29-Jan	2	2	6	5	2	Z	5	5	13	10	13	12	8	4	0	0	0	2	2	1	0	0	1	0	4.1	13
30-Jan	Z	0	1	2	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
31-Jan	0	Z	0	0	0	0	0	0	0	0	0	1	3	3	6	4	3	1	1	0	0	0	0	0	1.0	6

Z - zerospan	C - Calibration																									Diurnal Average	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb		2.1	1.9	2.1	1.9	2.8	3.4	3.8	3.2	3.1	2.9	3.4	4.1	3.9	5.1	5.1	4.5	3.1	3.0	3.0	3.4	3.1	3.0	2.5	2.1		
		8	8	12	10	14	29	25	17	18	18	28	22	16	30	29	28	18	39	46	44	23	12	13	10		
																										Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Firebag - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Firebag - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	645	91.10	91.10
11 - 20	49	6.92	98.02
21 - 60	14	1.98	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 (SO₂) - ppb
Firebag - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	59	20	28	22	8	6	2	7	7	59	111	137	53	17	17	42	595
11 - 20	0	0	0	0	0	0	0	0	0	6	27	8	4	0	0	0	45
21 - 60	0	0	0	0	0	0	0	0	0	1	1	3	2	0	0	0	7
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	59	20	28	22	8	6	2	7	7	66	139	148	59	17	17	42	647

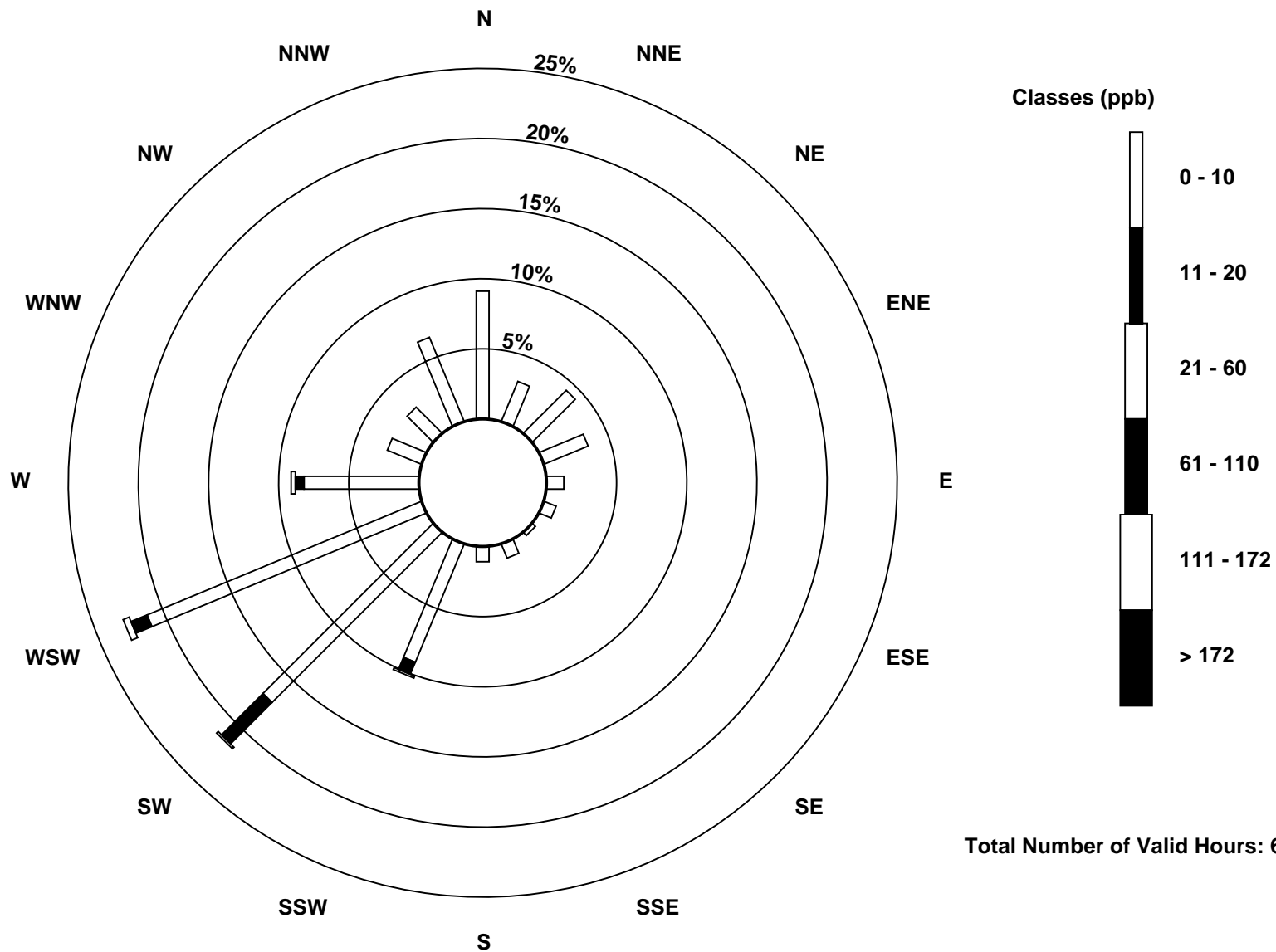
Total Number of Valid Hours: 647

Total Number of Hours: 744

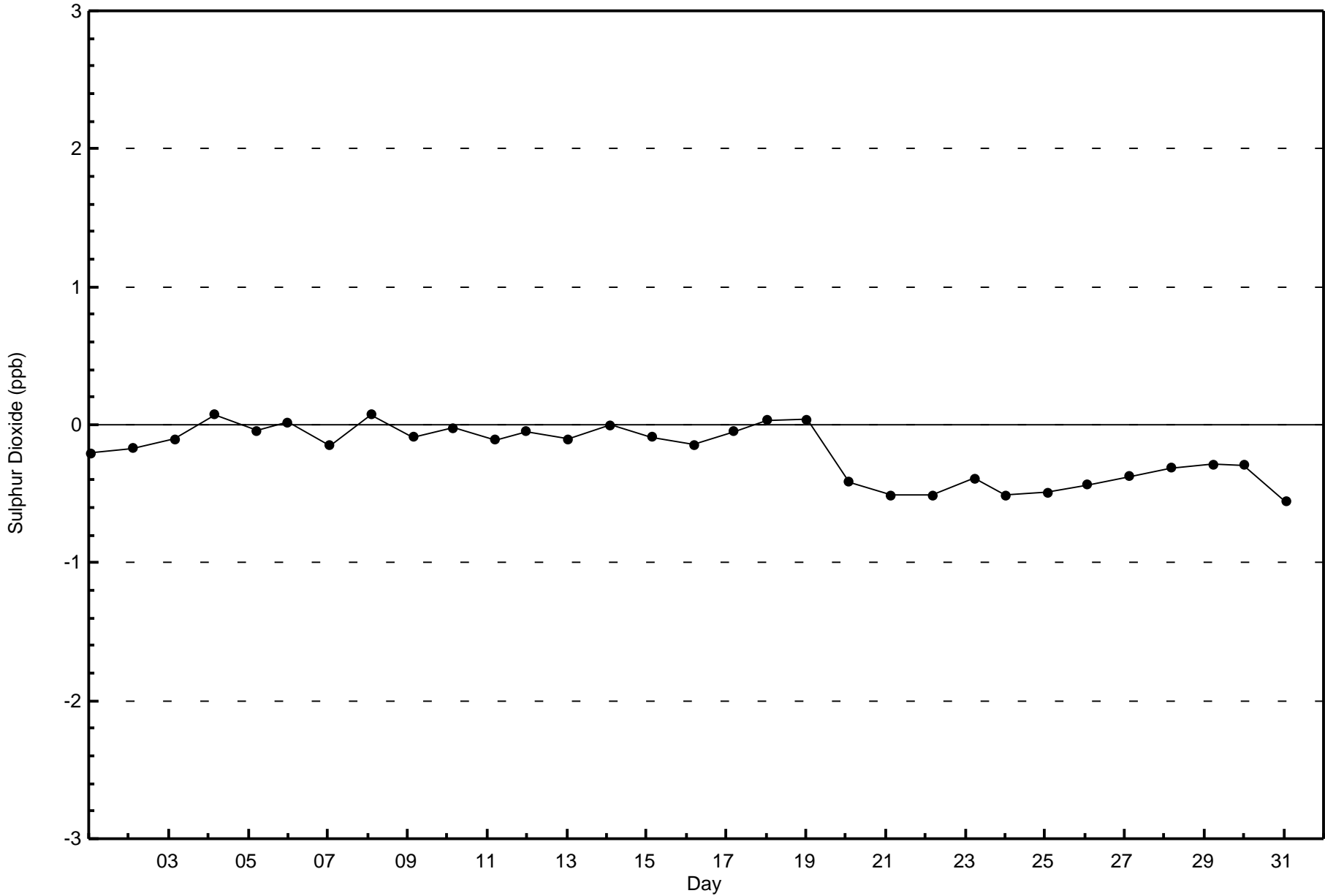


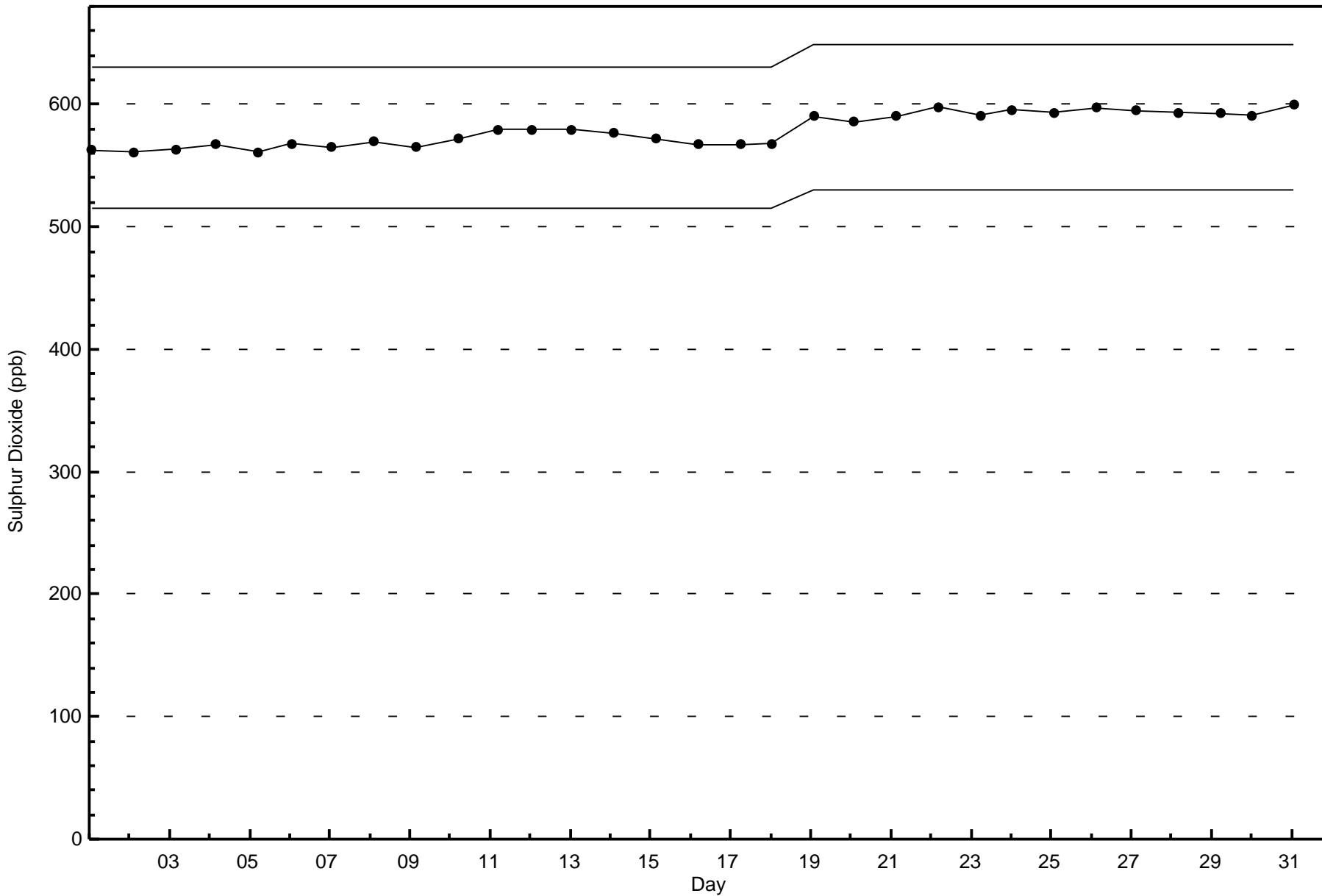
Wood Buffalo Environmental Association
Wind Rose Jan 2017

Sulphur Dioxide (SO₂) - ppb
Firebag (AMS 19)



Total Number of Valid Hours: 647





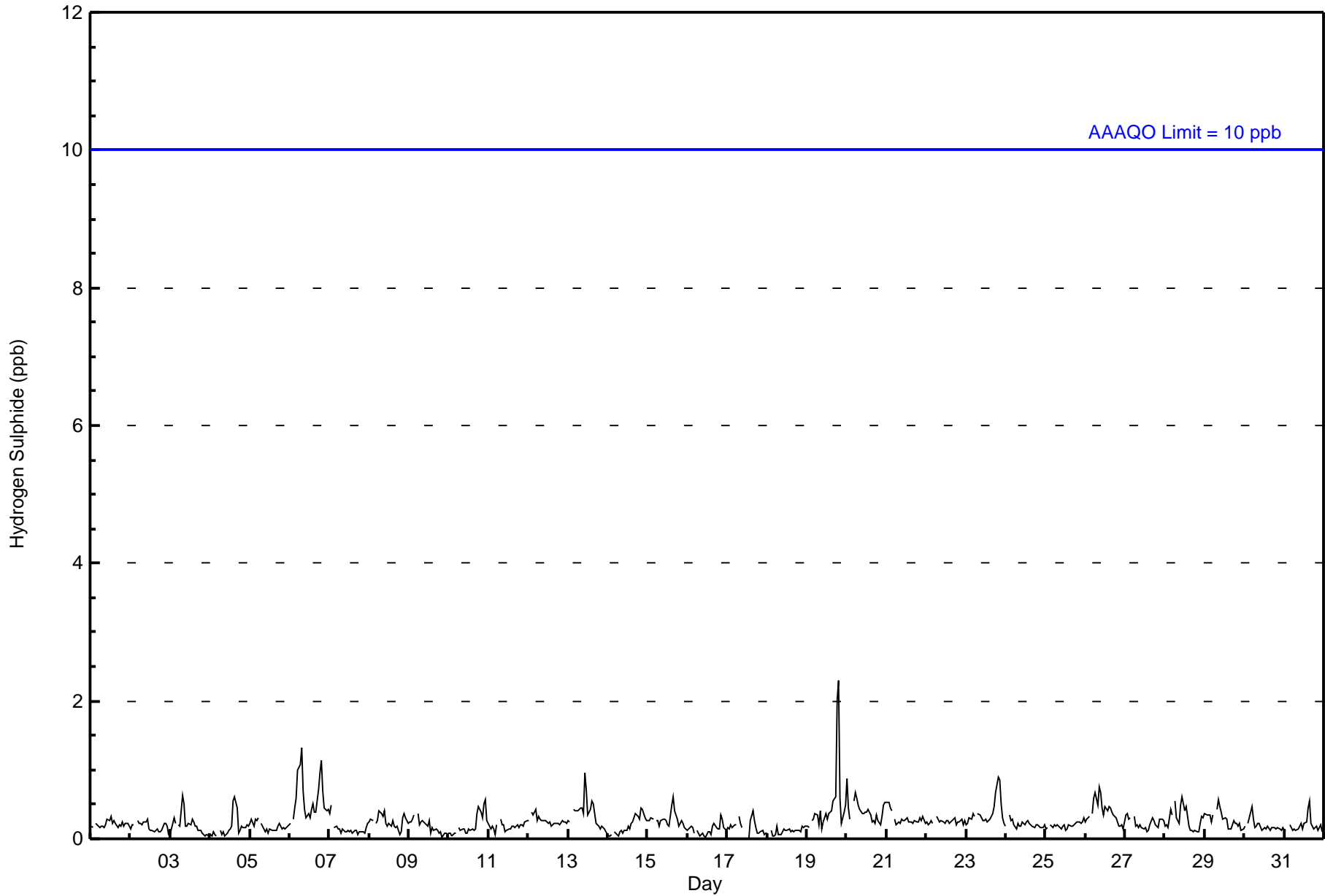


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 2 ppb on Jan 19 20:00	Maximum Daily Average: 0.6 ppb on Jan 6		Hours of Data:	710
Minimum Value: 0 ppb on Jan 17 14:00	Minimum Daily Average: 0.1 ppb on Jan 18		Hours of Missing Data:	34
Maximum Diurnal Average: 0.3 ppb at hour 20	Minimum Diurnal Average: 0.2 ppb at hour 24		Hours of Calibration:	34
Monthly Average: 0.3 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 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-Jan	0	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
2-Jan	0	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
3-Jan	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
4-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.2	1
5-Jan	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
6-Jan	0	Z	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0.6	1
7-Jan	0	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
8-Jan	0	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
9-Jan	0	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
10-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.2	1
11-Jan	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
12-Jan	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
13-Jan	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0.4	1
14-Jan	0	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
15-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.3	1
16-Jan	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
17-Jan	0	0	0	0	0	0	Z	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.2	0
18-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
19-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	1	0	0	0	0.5	2
20-Jan	1	0	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	1
21-Jan	1	1	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
22-Jan	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
23-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0.4	1
24-Jan	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
25-Jan	0	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
26-Jan	0	0	0	Z	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
27-Jan	0	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
28-Jan	0	0	0	0	0	Z	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
29-Jan	0	0	0	0	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
30-Jan	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
31-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1

0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	Diurnal Average
1	1	0	0	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	2	2	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 (H₂S) - ppb
Firebag - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
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 (H₂S) - ppb
Firebag - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	58	21	28	21	8	6	2	7	8	68	145	146	57	15	17	42	649
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
Totals	58	21	28	21	8	6	2	7	8	68	145	146	57	15	17	42	649

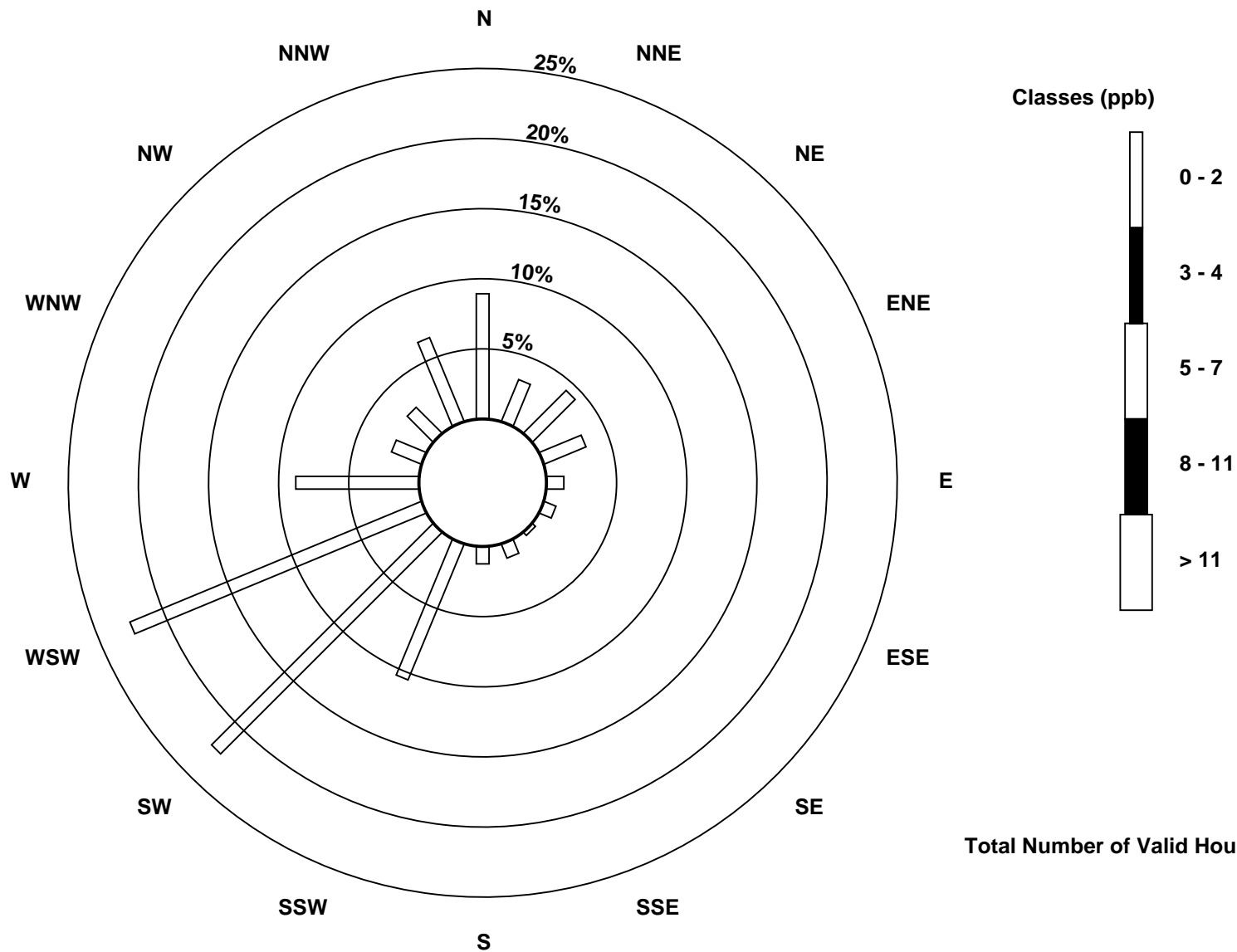
Total Number of Valid Hours: 649

Total Number of Hours: 744

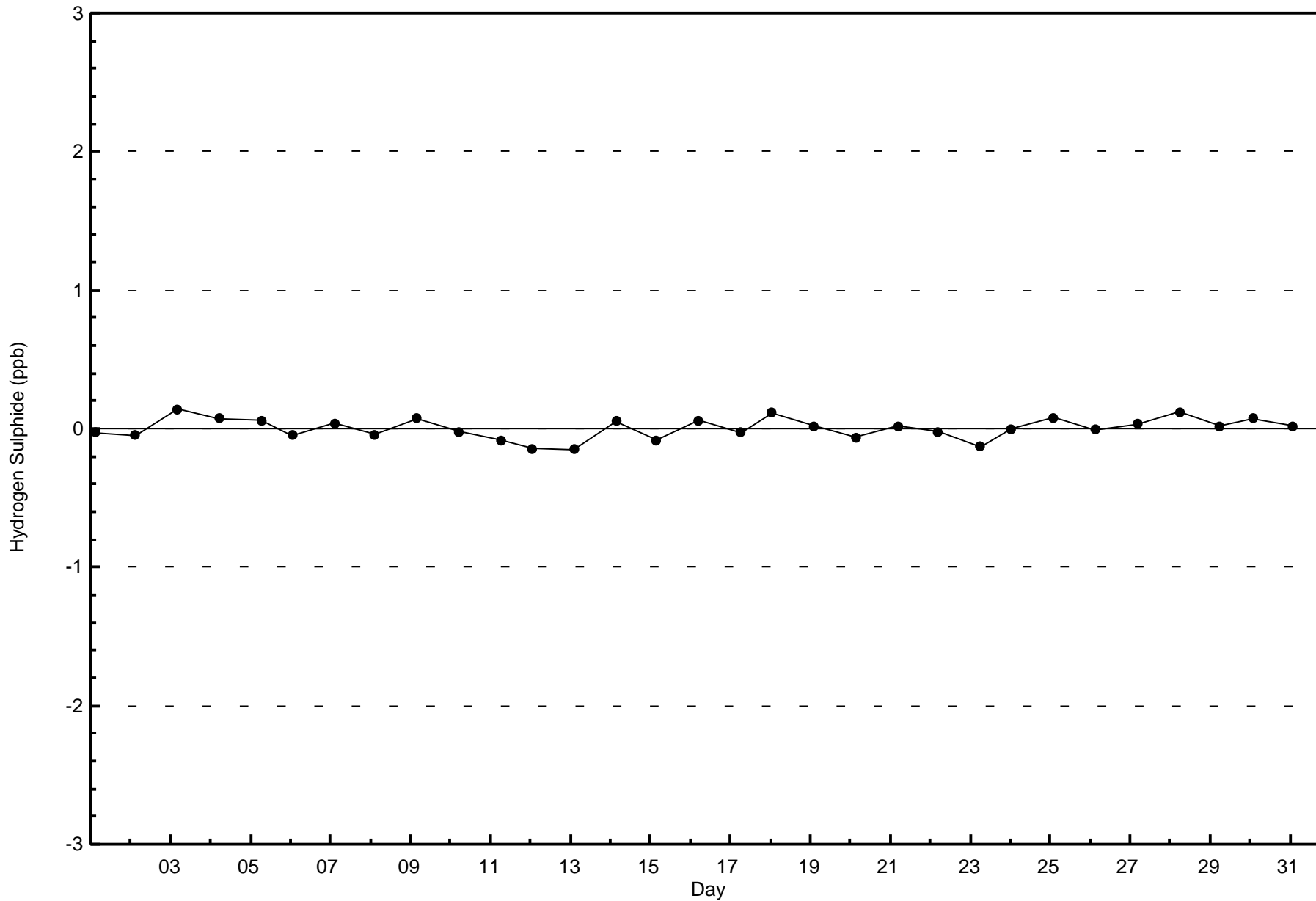


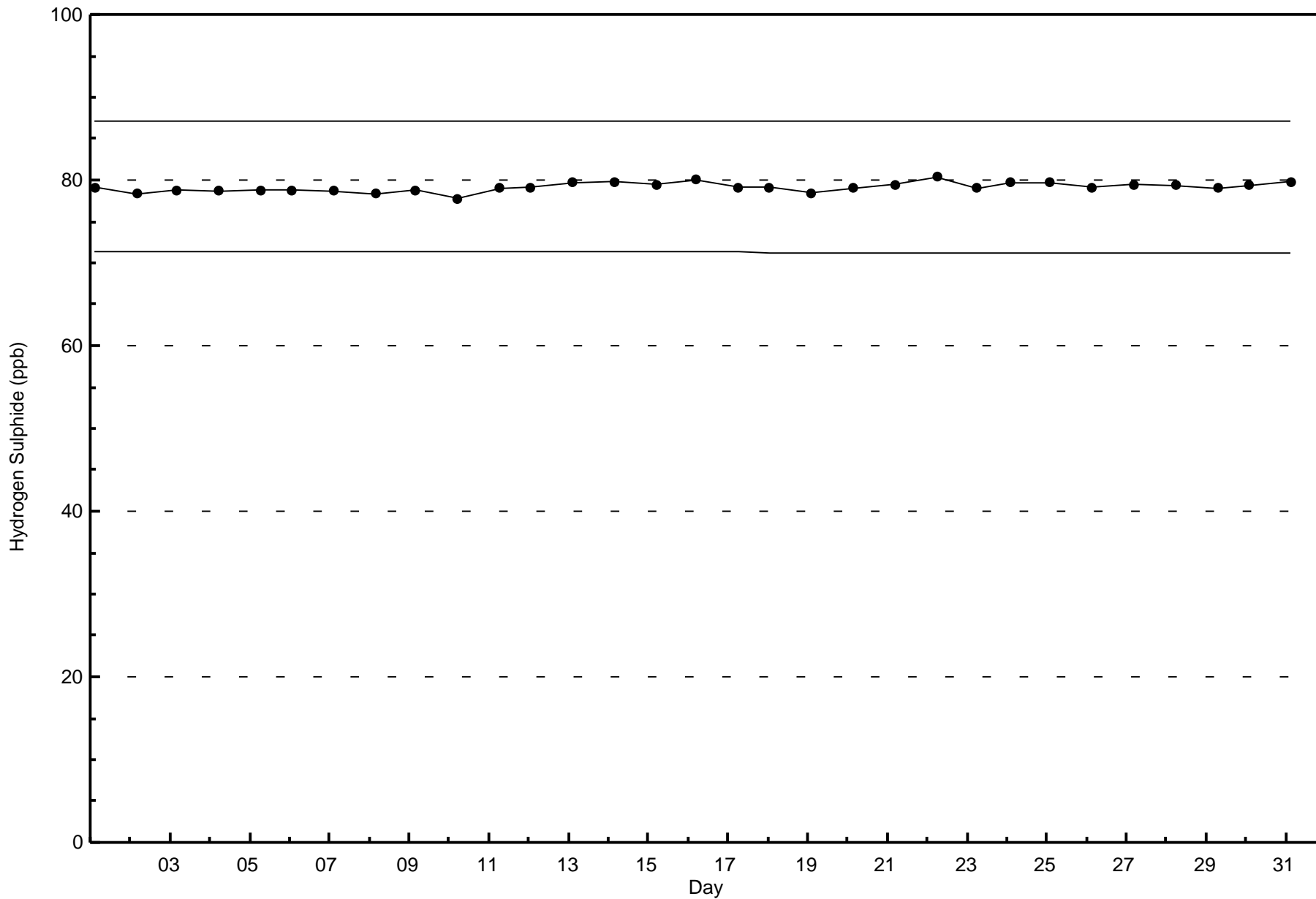
Wood Buffalo Environmental Association
Wind Rose Jan 2017

Hydrogen Sulphide (H₂S) - ppb
Firebag (AMS 19)



Total Number of Valid Hours: 649







Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

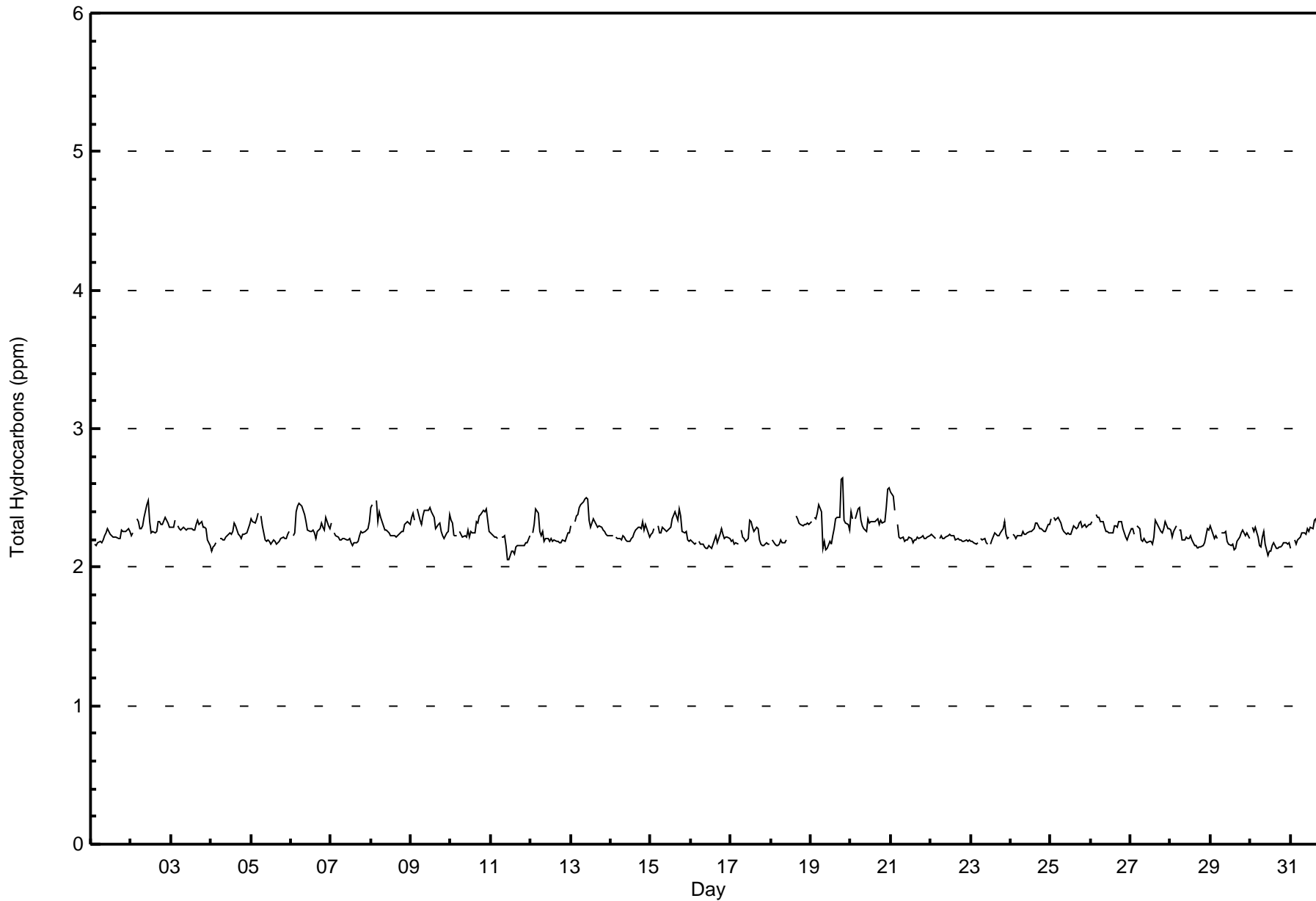
Firebag - January 2017

Maximum Value: 2.6 ppm on Jan 19 20:00																				Maximum Daily Average: 2.4 ppm on Jan 20					Hours in Service: 744	
Minimum Value: 2.1 ppm on Jan 11 11:00																				Minimum Daily Average: 2.2 ppm on Jan 11					Hours of Data: 707	
Maximum Diurnal Average: 2.3 ppm at hour 5																				Minimum Diurnal Average: 2.2 ppm at hour 13					Hours of Missing Data: 37	
Monthly Average: 2.26 ppm																				Percentiles: P ₁ = 2.1 P ₁₀ = 2.2 Q ₁ = 2.2 Median = 2.2 Q ₃ = 2.3 P ₉₀ = 2.4 P ₉₉ = 2.5					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-Jan	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3
2-Jan	2.2	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.5	2.3	2.2	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.2	2.3
3-Jan	2.3	2.3	2.3	Z	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	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3
4-Jan	2.1	2.1	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.3
5-Jan	2.4	2.3	2.3	2.4	2.4	Z	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3
6-Jan	Z	2.2	2.3	2.4	2.4	2.5	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.2	2.3
7-Jan	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.3	2.3	2.2	2.3
8-Jan	2.4	2.4	Z	2.5	2.3	2.4	2.4	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	2.3	2.3	2.2	2.3
9-Jan	2.4	2.4	2.3	Z	2.4	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.4	2.2	2.4
10-Jan	2.3	2.3	2.2	2.2	Z	2.3	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.2	2.2	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.2	2.4
11-Jan	2.2	2.2	2.2	2.2	2.2	Z	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	2.2	2.2	2.2	2.2
12-Jan	Z	2.3	2.3	2.4	2.4	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3
13-Jan	2.3	Z	2.3	2.4	2.4	2.4	2.4	2.5	2.5	2.5	2.5	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	2.3
14-Jan	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3
15-Jan	2.2	2.3	2.3	Z	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.4	2.4	2.3	2.2	2.3	2.2	2.2	2.2	2.3
16-Jan	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2
17-Jan	2.2	2.2	2.2	2.2	2.2	Z	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
18-Jan	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	C	C	C	C	C	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3
19-Jan	2.3	Z	2.4	2.4	2.4	2.4	2.4	2.1	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.4	2.4	2.4	2.6	2.6	2.3	2.3	2.3	2.3	2.3
20-Jan	2.4	2.4	Z	2.3	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.4	2.6	2.6	2.4	2.6
21-Jan	2.5	2.5	2.4	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
22-Jan	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
23-Jan	2.2	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	UO	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2
24-Jan	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3
25-Jan	2.3	Z	2.4	2.3	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
26-Jan	2.3	2.3	Z	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3
27-Jan	2.3	2.3	2.2	Z	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.2	2.3
28-Jan	2.3	2.2	2.3	2.3	Z	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.2	2.3
29-Jan	2.3	2.2	2.2	2.2	2.2	Z	2.3	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2
30-Jan	Z	2.3	2.3	2.3	2.2	2.2	2.1	2.2	2.3	2.2	2.1	2.1	2.1	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
31-Jan	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.4
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan																										
C - Calibration																										
UO - Unstable Operation																										



Wood Buffalo Environmental Association
Hourly Averages

Total Hydrocarbons (THC) - ppm
Firebag - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Firebag - January 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	707	100.00	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



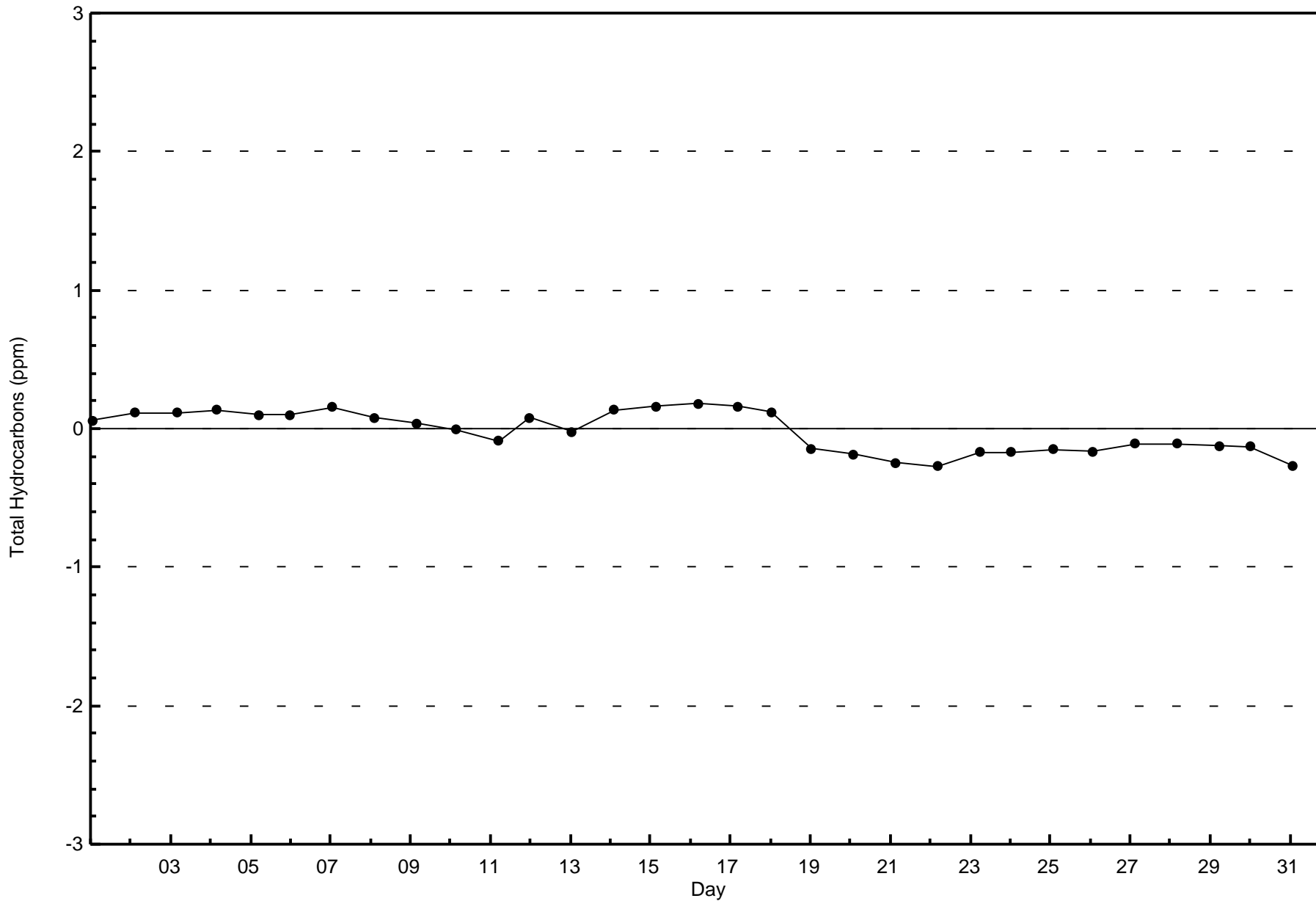
**Wood Buffalo Environmental Association
Frequency Distribution**

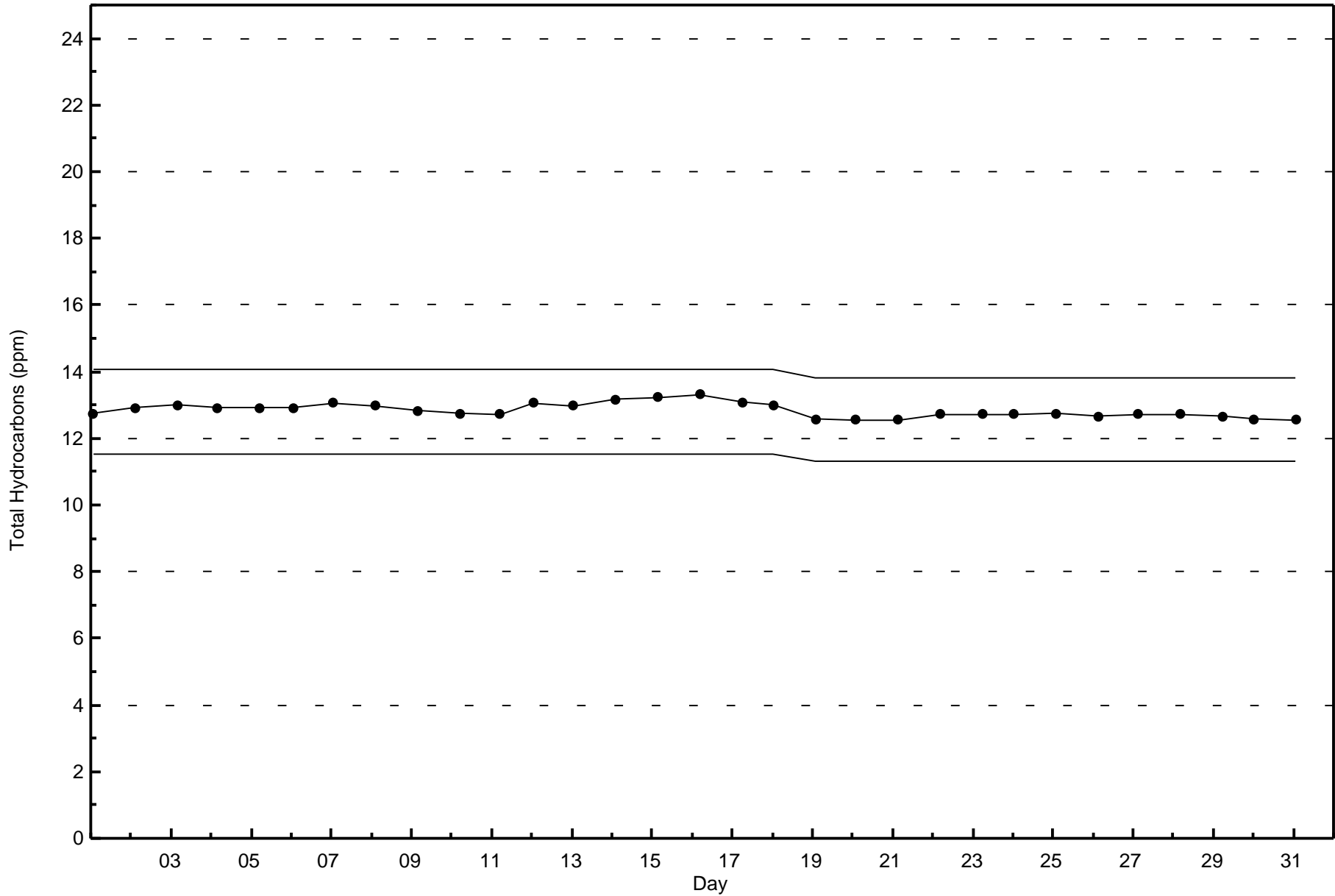
**Total Hydrocarbons (THC) - ppm
Firebag - January 2017**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	59	20	28	22	8	6	2	7	7	66	139	147	59	17	17	42	646
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
Totals	59	20	28	22	8	6	2	7	7	66	139	147	59	17	17	42	646

Total Number of Valid Hours: 646

Total Number of Hours: 744







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxide (NO) - ppb

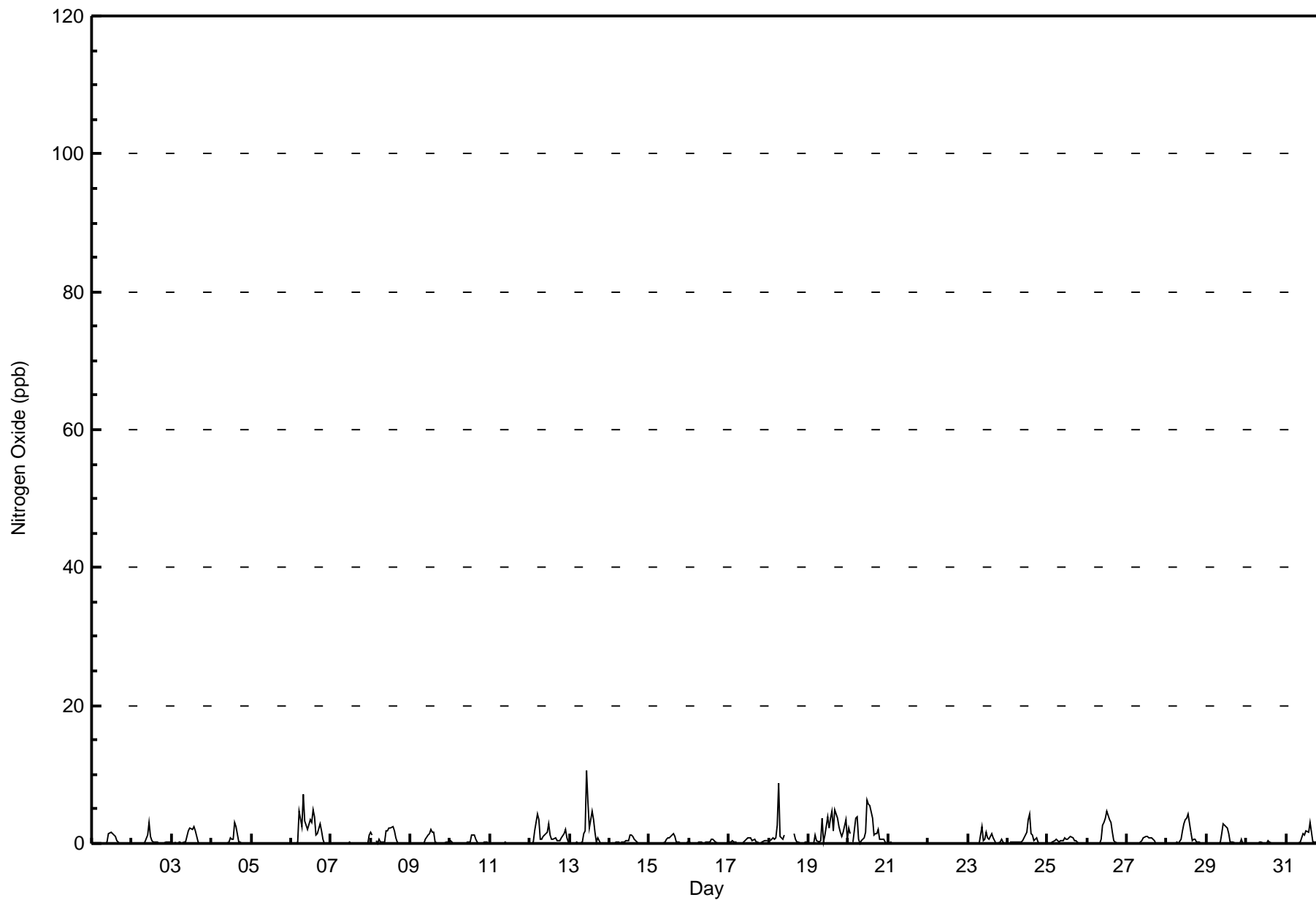
Firebag - January 2017

Maximum Value: 11 ppb on Jan 13 11:00																		Maximum Daily Average: 2.0 ppb on Jan 6						Hours in Service: 744																								
Minimum Value: 0 ppb on Jan 11 12:00																		Minimum Daily Average: 0.1 ppb on Jan 11						Hours of Data: 708																								
Maximum Diurnal Average: 1.7 ppb at hour 12																		Minimum Diurnal Average: 0.1 ppb at hour 3						Hours of Missing Data: 36																								
Monthly Average: 0.6 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 5						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-Jan	0	Z	0	0	0	0	0	0	0	0	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0.4	2																						
2-Jan	0	0	Z	0	0	0	0	0	0	1	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	3																						
3-Jan	0	0	0	Z	0	0	0	0	0	1	2	2	2	2	2	1	0	0	0	0	0	0	0	0.6	2																							
4-Jan	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	3	2	0	0	0	0	0	0	0	0.4	3																							
5-Jan	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																							
6-Jan	Z	0	0	0	0	5	2	7	3	3	2	3	3	5	4	1	1	3	2	1	0	0	0	2.0	7																							
7-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																							
8-Jan	2	1	Z	0	0	1	0	0	0	2	2	2	2	3	2	1	0	0	0	0	0	0	0	0.8	3																							
9-Jan	0	0	0	Z	0	0	0	0	0	1	1	2	2	2	2	0	0	0	0	0	0	0	0	0.4	2																							
10-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0.2	1																							
11-Jan	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																							
12-Jan	Z	0	0	2	4	3	1	1	1	1	2	3	1	1	1	1	0	0	0	1	2	2	1	1.2	4																							
13-Jan	0	Z	0	0	0	0	0	0	2	2	11	6	2	5	3	2	0	1	0	0	0	0	0	1.5	11																							
14-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0.3	1																							
15-Jan	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0.3	1																							
16-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.2	1																							
17-Jan	0	0	0	0	0	Z	0	0	0	0	1	1	1	1	0	1	0	0	0	0	0	0	0	0.3	1																							
18-Jan	Z	0	1	1	1	3	9	1	1	1	C	C	C	C	C	1	1	0	0	0	0	0	0	1.1	9																							
19-Jan	0	Z	0	0	1	0	0	0	4	0	1	4	2	4	5	2	5	4	3	2	1	2	3	1	1.9	5																						
20-Jan	2	1	Z	0	4	4	1	0	0	1	2	6	6	5	4	1	1	1	2	1	1	1	0	1.9	6																							
21-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
22-Jan	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																							
23-Jan	0	0	0	0	0	Z	0	0	3	0	1	2	1	1	1	1	0	0	0	1	0	0	0	0.5	3																							
24-Jan	Z	0	0	0	0	0	0	0	0	0	1	2	3	4	1	1	0	1	0	0	0	0	0	0.7	4																							
25-Jan	0	Z	0	0	0	1	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.4	1																							
26-Jan	0	0	Z	0	0	0	0	0	1	3	3	4	5	3	3	2	0	0	0	0	0	0	0	1.0	5																							
27-Jan	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.3	1																							
28-Jan	0	0	0	0	Z	0	0	0	1	2	3	3	4	4	2	0	1	1	0	0	0	0	0	0.9	4																							
29-Jan	0	0	0	0	0	Z	0	0	0	1	3	3	2	1	0	0	0	0	0	0	0	1	0	0.6	3																							
30-Jan	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																							
31-Jan	0	Z	0	0	0	0	0	0	0	1	1	1	2	2	3	2	0	0	0	0	0	0	0	0.6	3																							
																								0.2	0.2	0.1	0.2	0.5	0.7	0.5	0.4	0.5	0.7	1.4	1.7	1.5	1.7	1.5	0.8	0.4	0.4	0.3	0.2	0.2	0.2	0.2	0.2	Diurnal Average
																								2	1	1	2	4	5	9	7	4	3	11	6	6	5	5	2	5	4	3	2	2	2	3	1	Diurnal Maximum
Z - zerospan C - Calibration																																																



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxide (NO) - ppb
Firebag - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Firebag - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
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
Firebag - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	59	20	28	22	8	6	2	7	7	66	139	148	59	17	17	42	647
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
Totals	59	20	28	22	8	6	2	7	7	66	139	148	59	17	17	42	647

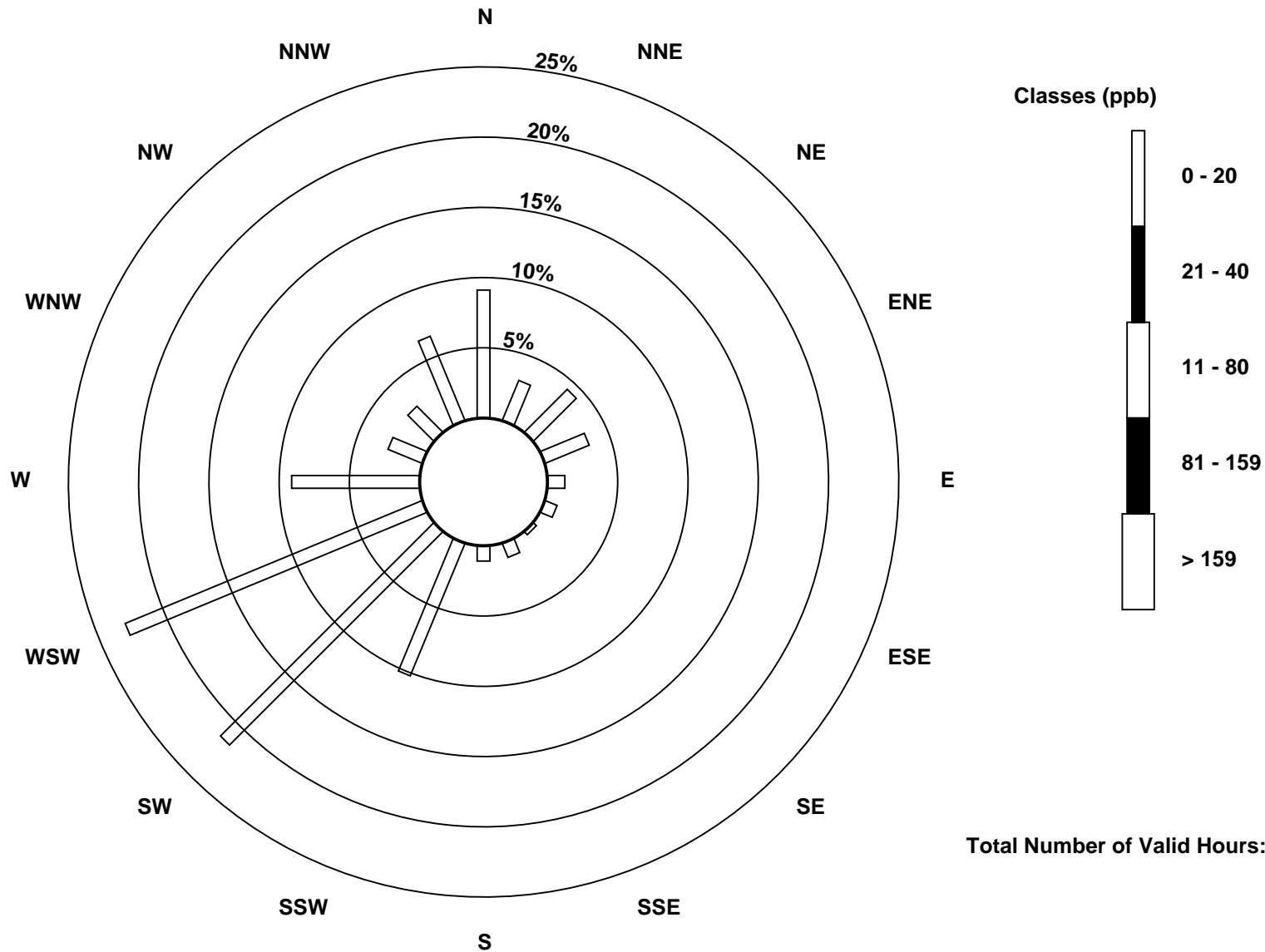
Total Number of Valid Hours: 647

Total Number of Hours: 744

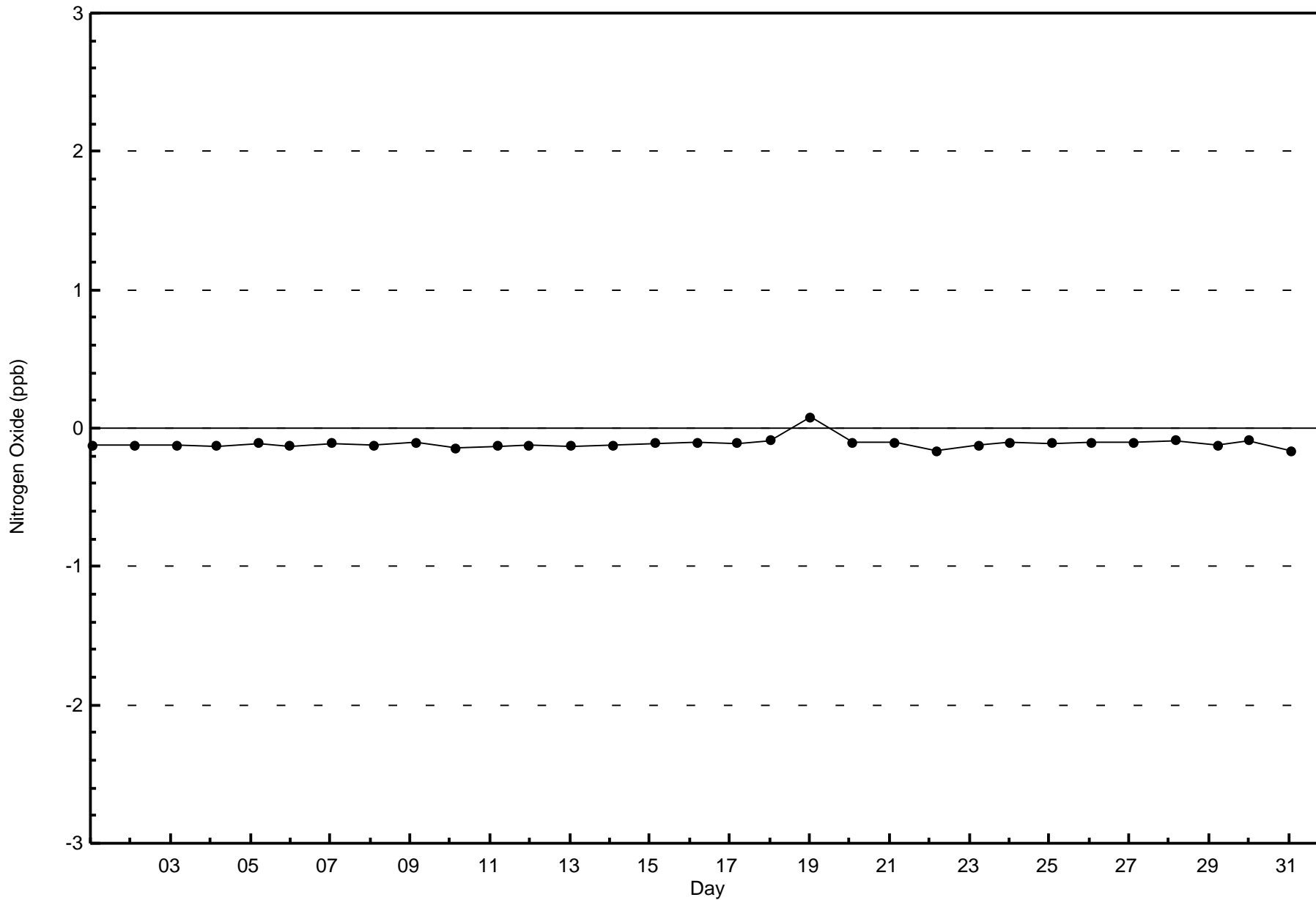


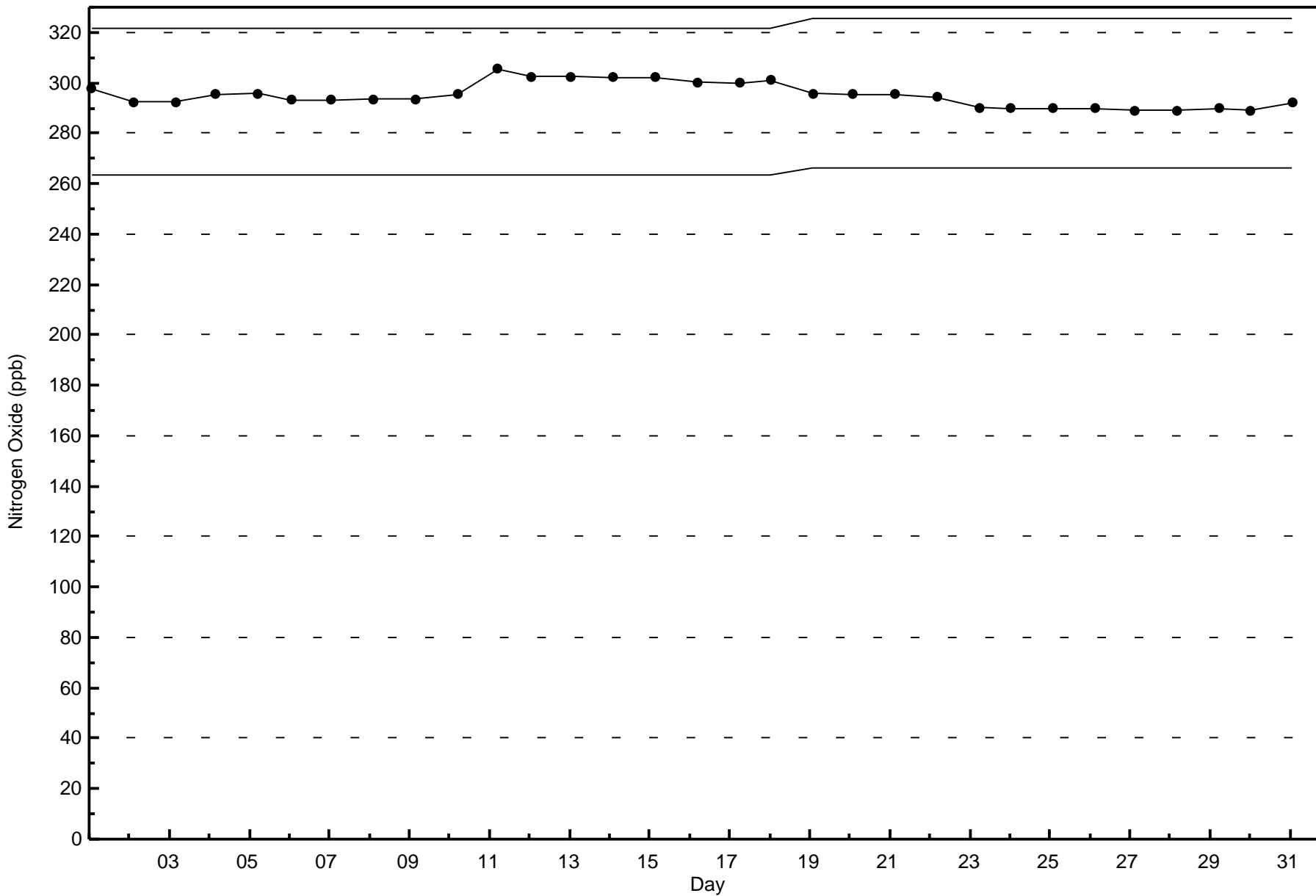
Wood Buffalo Environmental Association
Wind Rose Jan 2017

Nitrogen Oxide (NO) - ppb
Firebag (AMS 19)



Total Number of Valid Hours: 647







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Firebag - January 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 27 ppb on Jan 6 06:00	Maximum Daily Average: 13.7 ppb on Jan 6		Hours of Data:	708
Minimum Value: 0 ppb on Jan 22 19:00	Minimum Daily Average: 0.1 ppb on Jan 22		Hours of Missing Data:	36
Maximum Diurnal Average: 6.7 ppb at hour 6	Minimum Diurnal Average: 3.4 ppb at hour 13		Hours of Calibration:	36
Monthly Average: 5.0 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 4 Q ₃ = 7 P ₉₀ = 11 P ₉₉ = 24		Percent Operational Time:	100.0

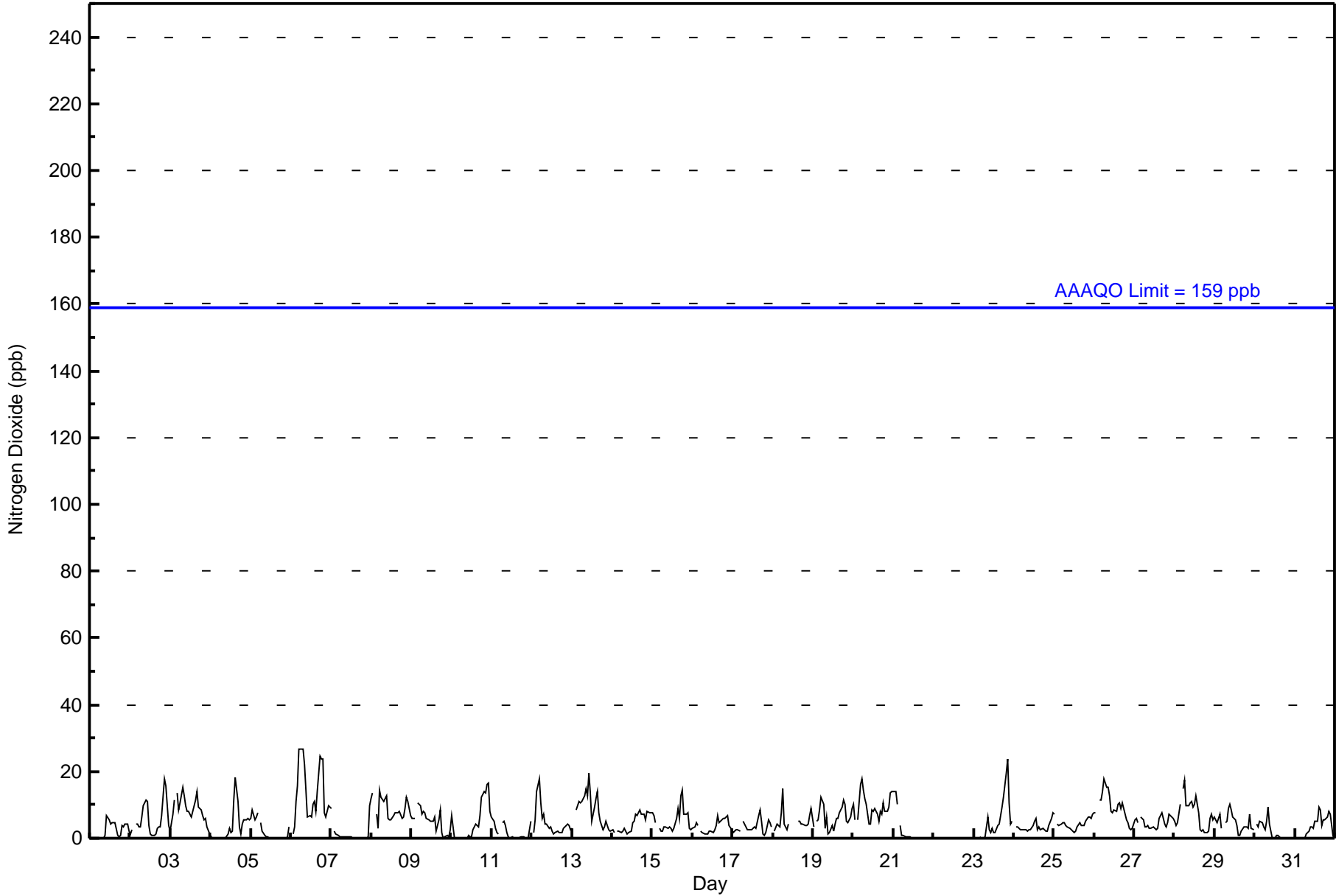
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Jan	0	Z	0	0	0	0	0	0	0	1	7	6	4	5	5	5	1	0	1	4	4	4	4	2	2.3	7																							
2-Jan	1	2	Z	4	4	3	3	6	10	12	11	4	1	1	1	1	3	4	3	7	18	16	10	4	5.6	18																							
3-Jan	2	7	12	Z	14	8	11	15	13	10	8	8	6	8	10	11	14	10	9	7	6	6	3	1	8.6	15																							
4-Jan	0	0	0	0	Z	0	0	0	0	0	1	3	2	2	12	18	11	3	1	4	6	6	6	5	3.5	18																							
5-Jan	6	8	6	7	8	Z	5	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	4	2.1	8																							
6-Jan	Z	1	3	11	16	27	27	22	14	7	7	6	10	11	8	14	24	24	24	24	8	6	10	9	13.7	27																							
7-Jan	9	Z	2	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	10	1.2	10																							
8-Jan	12	14	Z	7	3	14	12	11	12	13	6	5	5	7	8	8	8	8	6	6	9	12	11	7	8.8	14																							
9-Jan	6	6	6	Z	11	10	7	8	8	6	5	5	5	5	7	2	5	8	2	0	0	1	1	3	5.0	11																							
10-Jan	7	3	0	0	Z	0	0	0	0	0	1	0	1	3	4	4	4	7	12	14	14	16	17	8	4.9	17																							
11-Jan	6	5	3	2	1	Z	5	5	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1.8	6																							
12-Jan	Z	2	6	14	18	11	6	7	4	4	3	3	2	1	2	2	2	2	2	3	4	4	4	3	4.7	18																							
13-Jan	3	Z	8	10	11	11	11	13	15	13	19	14	5	10	12	14	8	5	2	4	5	4	3	2	8.7	19																							
14-Jan	2	2	Z	2	2	2	2	3	2	1	2	2	5	5	7	7	8	7	7	7	5	8	8	8	4.5	8																							
15-Jan	8	7	5	Z	3	2	2	3	4	3	3	3	2	3	6	9	6	13	14	7	7	8	3	3	5.4	14																							
16-Jan	3	3	5	4	Z	2	2	1	1	1	2	2	2	2	4	7	5	5	6	6	6	7	4	2	3.6	7																							
17-Jan	2	2	2	2	2	Z	5	4	3	3	2	3	3	3	3	7	8	5	1	1	2	5	5	3	3.4	8																							
18-Jan	Z	2	4	4	3	8	15	4	3	4	C	C	C	C	C	5	5	4	4	4	4	4	7	9	5.2	15																							
19-Jan	3	Z	5	5	9	12	10	3	7	1	2	4	2	4	6	6	8	9	12	10	5	5	6	9	6.2	12																							
20-Jan	10	5	Z	6	16	18	14	12	10	4	4	9	8	9	7	5	8	7	11	8	8	10	14	14	9.4	18																							
21-Jan	14	14	10	Z	4	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.1	14																							
22-Jan	0	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																							
23-Jan	0	0	0	0	0	Z	0	0	6	3	2	3	2	2	4	4	7	10	12	20	24	10	4	5	5.1	24																							
24-Jan	Z	4	4	3	3	3	3	2	2	3	3	4	5	6	3	3	3	3	3	2	2	4	6	8	3.4	8																							
25-Jan	7	Z	4	4	4	5	5	4	4	3	2	2	2	2	4	5	4	4	4	5	6	6	6	7	4.2	7																							
26-Jan	8	8	Z	12	11	14	18	15	15	13	8	8	8	8	10	11	9	10	7	5	5	3	2	3	9.1	18																							
27-Jan	5	6	5	Z	6	6	3	3	4	3	3	3	3	3	3	6	8	6	4	4	5	7	6	6	4.7	8																							
28-Jan	5	4	5	10	Z	15	17	10	10	10	11	9	10	13	8	3	2	3	2	2	2	6	7	6	7.3	17																							
29-Jan	7	5	6	7	3	Z	5	5	9	10	9	6	5	4	1	1	2	3	4	4	3	7	3	3	4.8	10																							
30-Jan	Z	4	4	5	5	3	3	5	9	4	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2.0	9																							
31-Jan	0	Z	0	0	0	0	0	1	2	4	4	3	5	5	9	9	4	6	6	7	8	7	4	1	3.6	9																							
																								4.9	4.6	4.0	4.7	6.1	6.7	6.2	5.5	5.8	4.7	4.2	3.9	3.4	4.0	4.8	5.1	5.0	5.4	5.1	5.3	5.3	5.5	4.9	4.7	Diurnal Average	
																								14	14	12	14	18	27	27	27	22	14	19	14	10	13	12	18	14	24	24	24	24	16	17	14	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Firebag - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Firebag - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	700	98.87	98.87
21 - 40	8	1.13	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Firebag - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	59	20	28	22	8	6	2	7	7	65	139	148	59	17	17	42	646
21 - 40	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	59	20	28	22	8	6	2	7	7	66	139	148	59	17	17	42	647

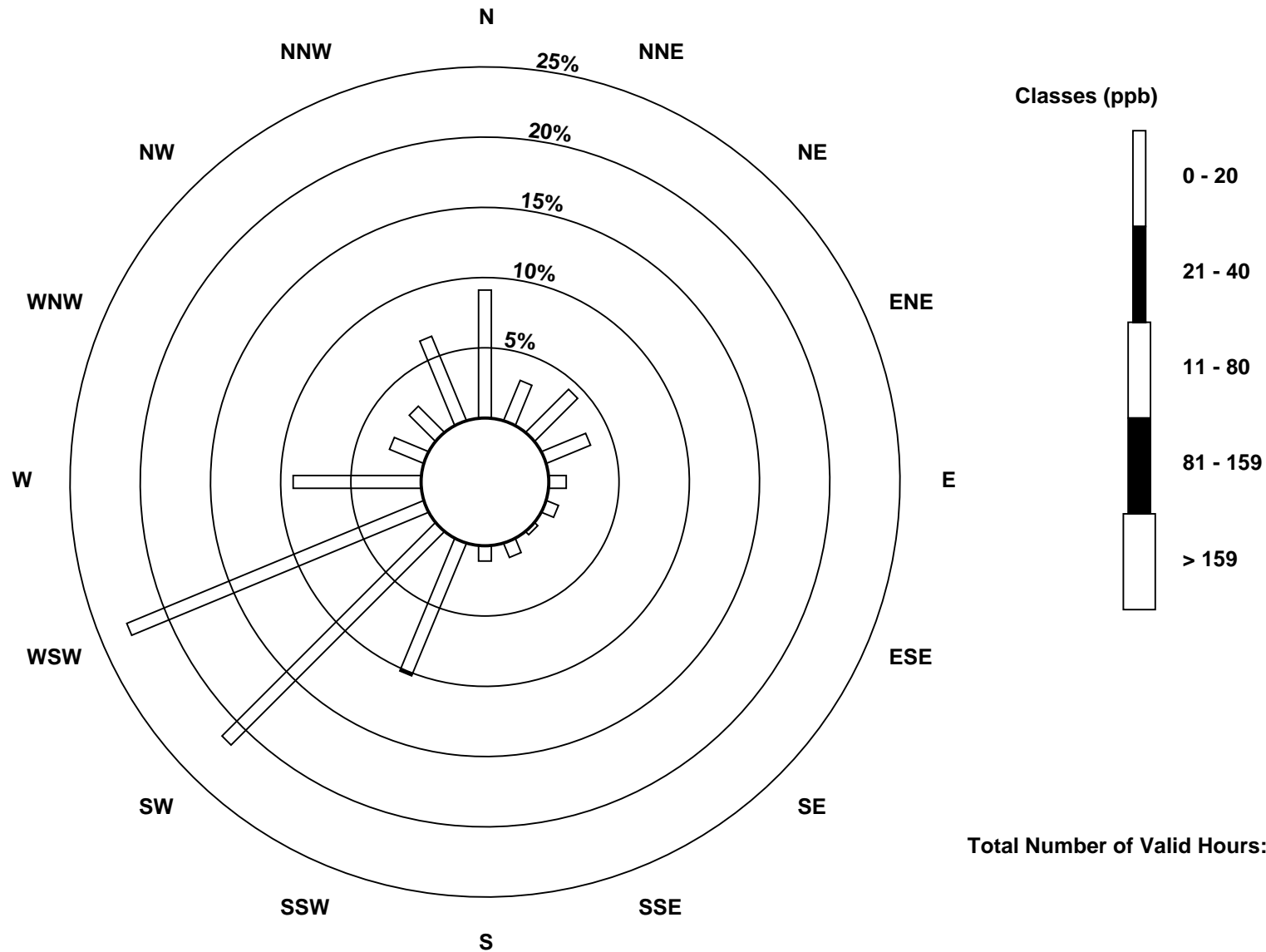
Total Number of Valid Hours: 647

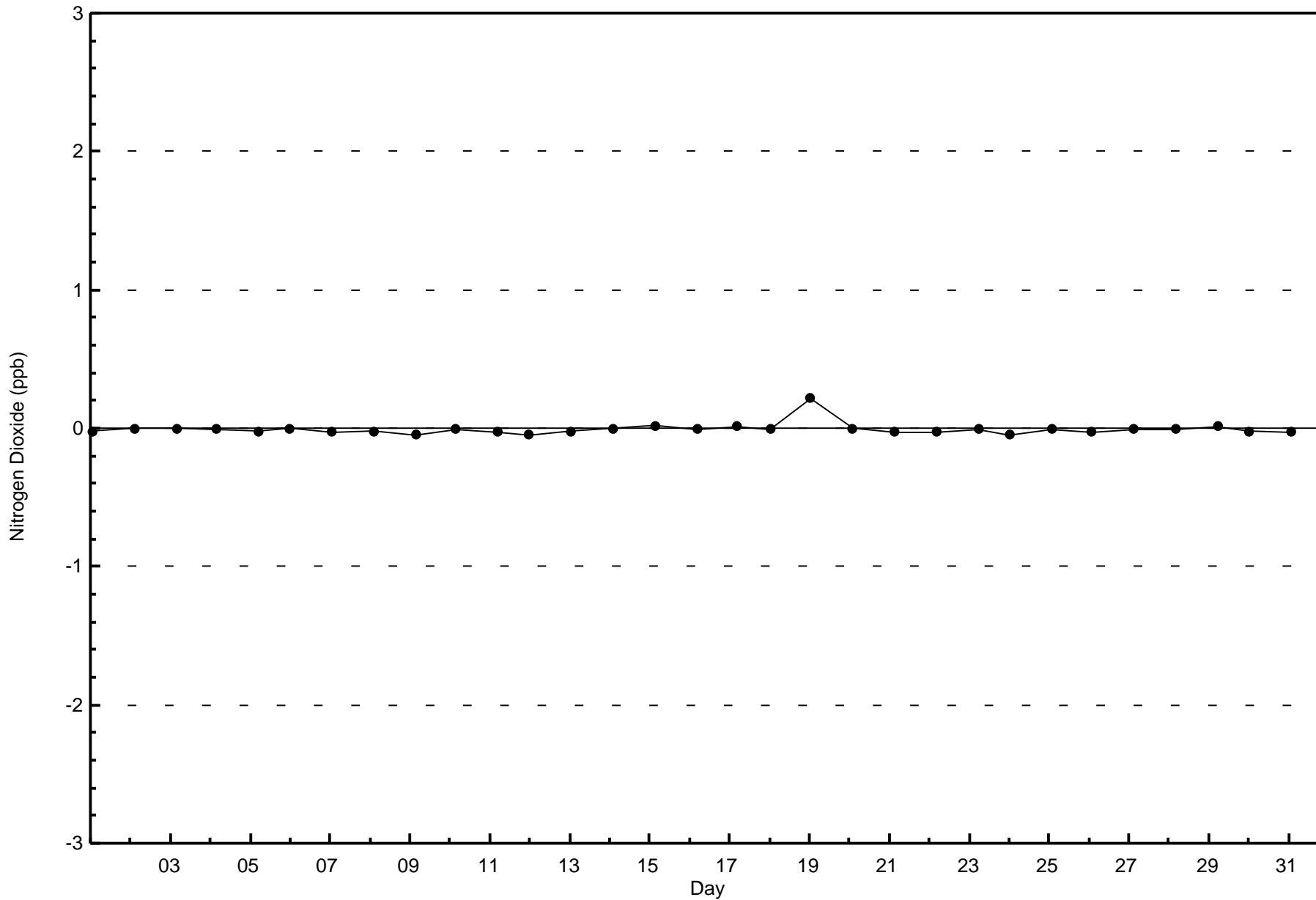
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Nitrogen Dioxide (NO₂) - ppb
Firebag (AMS 19)

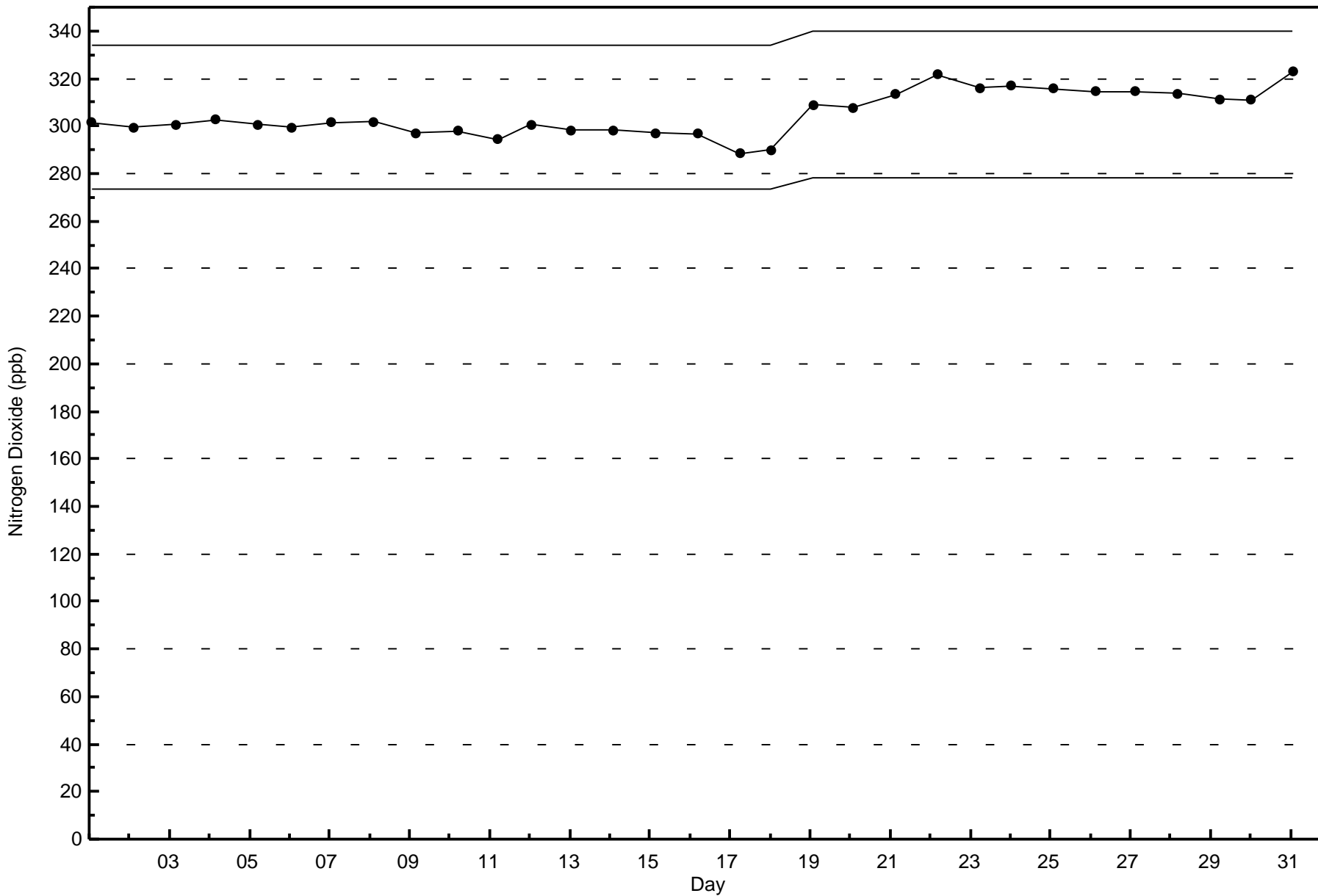






Wood Buffalo Environmental Association
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Firebag - January 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb

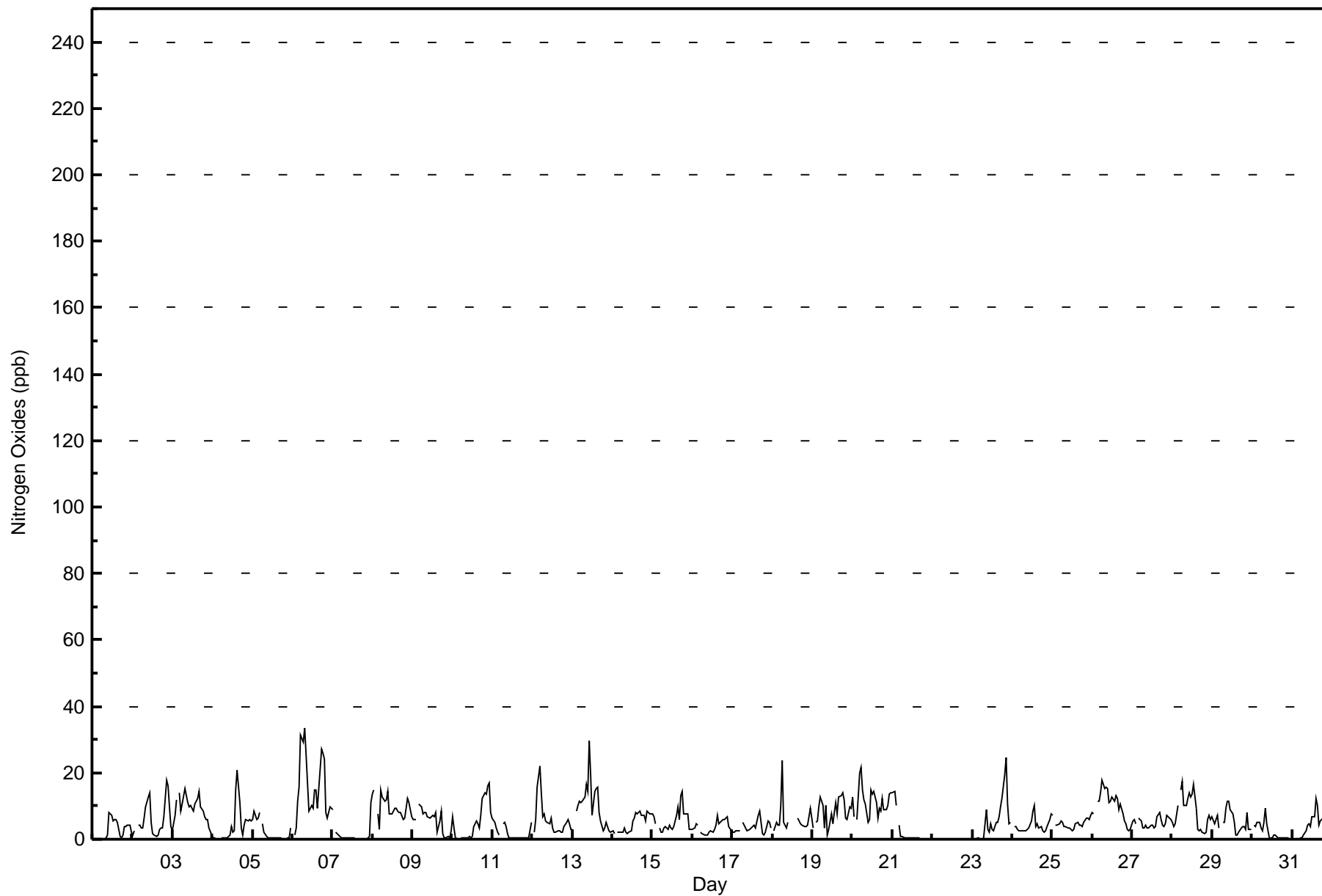
Firebag - January 2017

Maximum Value: 34 ppb on Jan 6 08:00																		Maximum Daily Average: 15.7 ppb on Jan 6						Hours in Service: 744		
Minimum Value: 0 ppb on Jan 22 22:00																		Minimum Daily Average: 0.2 ppb on Jan 22						Hours of Data: 708		
Maximum Diurnal Average: 7.4 ppb at hour 6																		Minimum Diurnal Average: 4.1 ppb at hour 3						Hours of Missing Data: 36		
Monthly Average: 5.6 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 2 Median = 4 Q ₃ = 8 P ₉₀ = 13 P ₉₉ = 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-Jan	0	Z	0	0	0	0	0	0	0	1	8	7	6	6	6	5	1	1	1	4	4	4	4	2	2.7	8
2-Jan	1	3	Z	4	4	4	3	7	10	13	14	5	2	1	1	1	3	4	3	7	18	16	10	4	5.9	18
3-Jan	2	7	12	Z	14	9	11	15	13	11	10	10	8	10	11	12	14	10	9	7	6	6	3	1	9.2	15
4-Jan	0	0	0	0	Z	0	0	0	0	0	1	4	2	3	15	21	11	3	1	4	6	6	6	5	3.9	21
5-Jan	6	8	6	7	8	Z	5	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	4	2.2	8
6-Jan	Z	1	3	11	16	31	29	34	25	17	9	10	9	15	15	9	15	27	26	24	8	6	10	9	15.7	34
7-Jan	9	Z	2	2	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	11	1.3	11
8-Jan	14	15	Z	7	3	15	13	11	12	15	7	8	8	9	9	8	8	8	6	6	9	12	11	7	9.6	15
9-Jan	6	6	6	Z	11	10	7	8	8	7	6	7	7	7	8	2	6	8	2	0	0	1	1	3	5.5	11
10-Jan	7	3	0	0	Z	0	0	0	0	0	1	1	1	4	5	4	4	7	12	14	14	16	17	8	5.2	17
11-Jan	6	5	3	2	1	Z	5	5	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1.8	6
12-Jan	Z	2	6	16	22	14	7	8	5	5	5	6	3	2	2	3	2	2	4	5	6	5	3	5.9	22	
13-Jan	3	Z	8	10	11	11	11	13	17	15	30	20	7	14	15	16	8	6	2	4	5	4	3	2	10.2	30
14-Jan	2	2	Z	2	2	2	2	3	2	2	2	2	6	6	8	7	8	7	7	7	6	8	8	8	4.8	8
15-Jan	8	7	5	Z	3	2	2	3	4	3	4	4	3	4	7	10	6	13	14	8	7	8	3	3	5.7	14
16-Jan	3	3	5	4	Z	2	2	1	1	1	2	2	2	3	4	7	5	5	6	6	6	7	4	3	3.7	7
17-Jan	2	2	3	3	2	Z	5	4	4	3	3	3	4	4	3	7	9	5	2	1	2	6	5	3	3.7	9
18-Jan	Z	2	5	4	4	10	24	5	3	5	C	C	C	C	C	6	5	4	4	4	4	4	7	9	6.2	24
19-Jan	3	Z	5	6	10	13	10	3	10	1	3	8	4	8	11	8	13	13	14	12	6	6	10	9	8.1	14
20-Jan	13	7	Z	6	20	22	15	12	11	5	6	15	14	14	11	6	10	8	12	9	9	10	14	14	11.3	22
21-Jan	14	14	10	Z	4	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.1	14
22-Jan	0	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
23-Jan	0	0	0	0	0	Z	0	0	9	3	2	5	3	2	5	5	7	10	12	20	25	10	5	5	5.6	25
24-Jan	Z	4	4	3	3	3	3	3	2	3	3	5	9	10	4	4	3	4	3	2	2	4	6	8	4.1	10
25-Jan	7	Z	4	4	5	5	5	4	4	4	3	3	2	3	5	5	4	4	4	5	6	6	6	7	4.7	7
26-Jan	8	8	Z	12	11	14	18	15	16	15	11	11	13	11	13	12	9	10	8	5	5	3	3	3	10.2	18
27-Jan	5	6	5	Z	6	6	4	3	4	3	4	4	4	3	4	7	8	6	4	4	5	7	6	6	5.0	8
28-Jan	5	4	5	10	Z	15	17	10	10	12	14	13	14	17	9	3	3	3	2	2	2	6	7	6	8.2	17
29-Jan	7	5	6	7	3	Z	5	5	9	12	11	9	8	5	1	1	2	3	4	4	3	8	3	3	5.4	12
30-Jan	Z	4	4	5	5	3	3	5	9	4	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2.1	9
31-Jan	0	Z	0	0	0	0	0	1	2	4	5	4	7	7	12	10	4	6	6	7	8	7	4	1	4.2	12
5.1 4.8 4.1 4.9 6.6 7.4 6.7 5.9 6.4 5.4 5.6 5.6 4.9 5.7 6.3 5.9 5.5 5.8 5.4 5.5 5.6 5.8 5.2 4.9																								Diurnal Average		
14 15 12 16 22 31 29 34 25 17 30 20 14 17 15 21 15 27 26 24 25 16 17 14																								Diurnal Maximum		
Z - zerospan C - Calibration																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Firebag - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Firebag - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	695	98.16	98.16
21 - 40	13	1.84	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_x) - ppb
Firebag - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	59	20	28	22	8	6	2	7	6	64	138	146	59	17	17	42	641
21 - 40	0	0	0	0	0	0	0	0	1	2	1	2	0	0	0	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
Totals	59	20	28	22	8	6	2	7	7	66	139	148	59	17	17	42	647

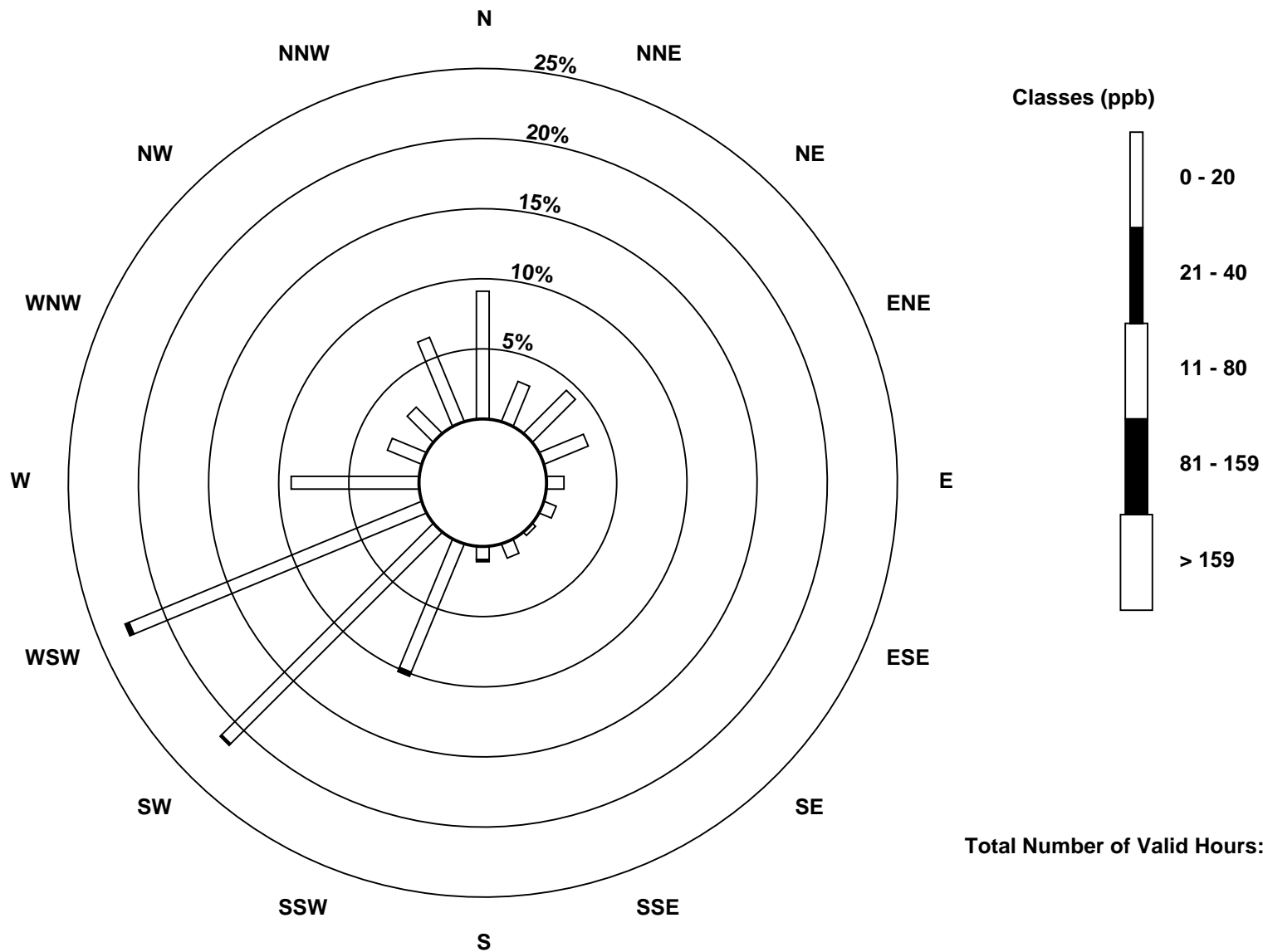
Total Number of Valid Hours: 647

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

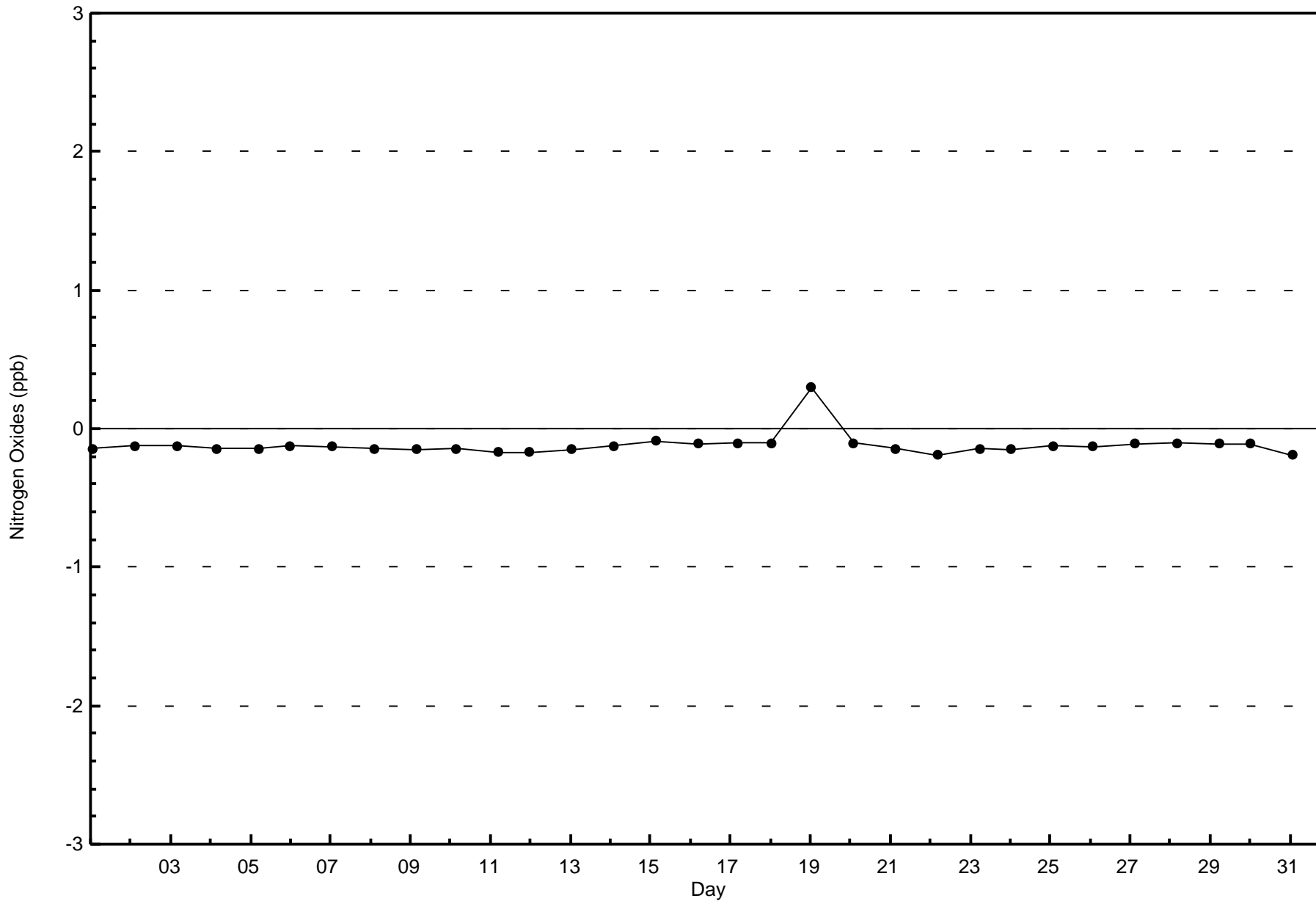
Nitrogen Oxides (NO_x) - ppb
Firebag (AMS 19)

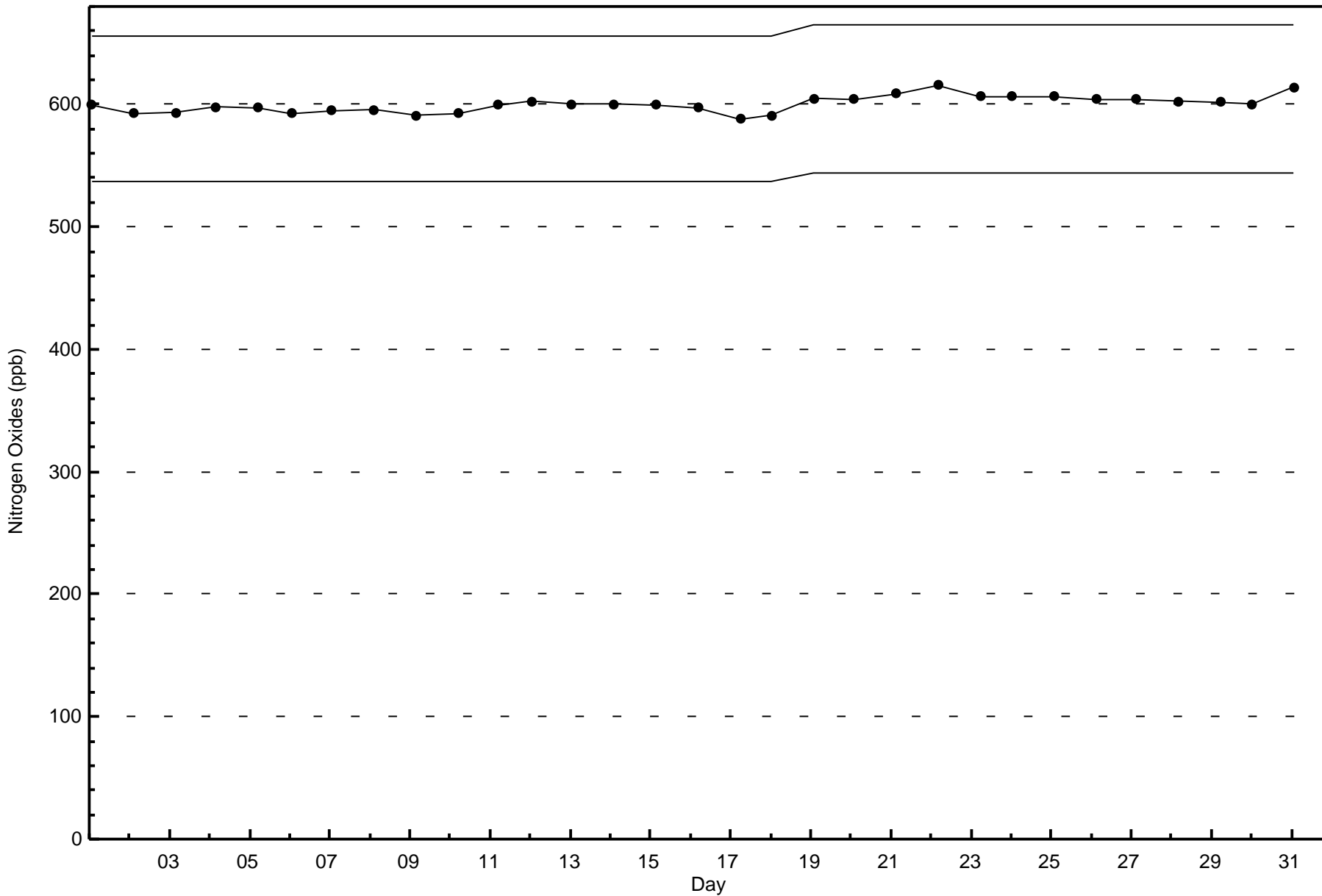




Wood Buffalo Environmental Association
Zero Responses

Nitrogen Oxides (NO_x) - ppb
Firebag - January 2017







Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

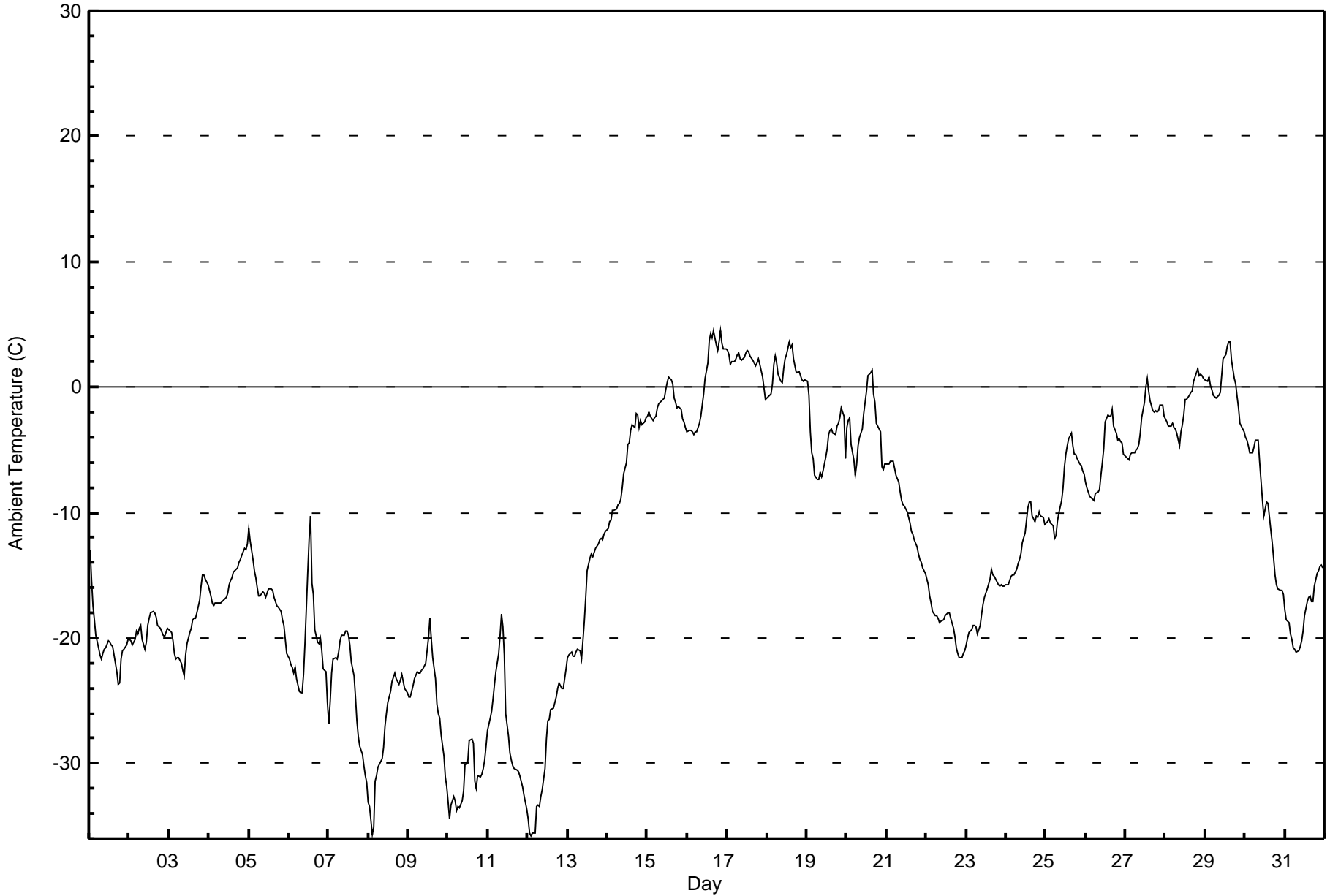
Firebag - January 2017

Maximum Value: 4.5 C on Jan 16 17:00		Maximum Daily Average: 2.0 C on Jan 17		Hours in Service: 744																																												
Minimum Value: -35.8 C on Jan 12 03:00		Minimum Daily Average: -31.3 C on Jan 10		Hours of Data: 744																																												
Maximum Diurnal Average: -11.0 C at hour 14		Minimum Diurnal Average: -14.3 C at hour 6		Hours of Missing Data: 0																																												
Monthly Average: -13.07 C		Percentiles: P ₁ = -34.5 P ₁₀ = -26.4 Q ₁ = -20.8 Median = -14.4 Q ₃ = -3.5 P ₉₀ = 0.6 P ₉₉ = 3.6		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-Jan	-13.0	-15.4	-17.4	-18.5	-19.8	-20.8	-21.4	-21.6	-21.3	-20.9	-20.8	-20.3	-20.3	-20.6	-20.7	-21.4	-22.7	-23.6	-23.5	-21.6	-21.0	-20.8	-20.5	-20.1	-20.3	-13.0																						
2-Jan	-20.1	-20.2	-20.6	-20.1	-19.5	-19.7	-19.2	-19.0	-20.1	-20.9	-20.4	-19.0	-18.5	-18.0	-17.9	-18.0	-18.3	-19.0	-19.1	-19.2	-19.8	-19.9	-19.5	-19.2	-19.4	-17.9																						
3-Jan	-19.4	-19.5	-20.2	-21.2	-21.6	-21.5	-21.6	-22.1	-22.6	-23.0	-21.4	-20.5	-19.6	-19.2	-18.5	-18.4	-18.0	-17.0	-15.8	-15.0	-15.0	-15.3	-15.8	-19.2	-15.0	-15.0																						
4-Jan	-16.2	-16.7	-17.2	-17.4	-17.2	-17.2	-17.2	-17.2	-17.1	-17.0	-16.7	-16.4	-15.8	-15.5	-15.2	-14.8	-14.5	-14.4	-14.0	-13.7	-13.4	-12.9	-13.0	-12.5	-15.6	-12.5																						
5-Jan	-11.2	-12.3	-13.7	-14.6	-15.2	-16.0	-16.7	-16.6	-16.3	-16.5	-16.5	-16.1	-16.2	-16.2	-16.7	-17.1	-17.4	-17.6	-17.9	-18.5	-19.0	-20.1	-21.2	-16.5	-11.2	-11.2																						
6-Jan	-21.7	-22.1	-22.3	-22.8	-22.4	-23.2	-24.2	-24.3	-24.3	-22.9	-20.5	-14.8	-12.1	-10.3	-15.6	-16.6	-19.3	-20.3	-20.5	-20.0	-21.0	-22.5	-22.7	-25.2	-20.5	-10.3																						
7-Jan	-26.8	-25.0	-22.8	-21.7	-21.5	-21.6	-21.1	-20.2	-19.8	-19.7	-19.5	-19.4	-19.7	-20.5	-21.9	-23.0	-24.7	-26.6	-27.9	-28.6	-29.3	-30.2	-31.0	-31.5	-23.9	-19.4																						
8-Jan	-33.1	-33.4	-35.7	-35.1	-31.4	-31.0	-30.3	-29.9	-29.6	-28.8	-27.1	-26.1	-25.2	-24.2	-23.5	-23.1	-22.8	-23.2	-23.7	-23.3	-22.9	-23.5	-24.0	-24.4	-27.3	-22.8																						
9-Jan	-24.7	-24.7	-24.2	-23.8	-23.3	-22.7	-22.8	-22.8	-22.6	-22.5	-22.0	-21.0	-20.0	-18.4	-20.2	-21.5	-23.3	-25.3	-26.0	-26.4	-27.7	-29.4	-31.1	-31.9	-24.1	-18.4																						
10-Jan	-33.1	-34.5	-33.3	-32.6	-33.0	-33.8	-33.5	-33.5	-32.9	-32.2	-30.1	-30.1	-29.8	-28.2	-28.1	-28.3	-31.4	-32.0	-30.9	-31.0	-30.9	-30.4	-29.8	-28.6	-31.3	-28.1																						
11-Jan	-27.4	-26.4	-25.9	-24.8	-23.7	-22.7	-21.2	-19.8	-18.1	-19.1	-21.4	-26.1	-27.8	-29.2	-29.8	-30.2	-30.4	-30.5	-30.6	-31.0	-31.4	-31.9	-32.6	-33.7	-26.9	-18.1																						
12-Jan	-34.5	-35.6	-35.8	-35.6	-35.5	-33.4	-33.3	-33.4	-32.6	-32.1	-30.4	-28.0	-26.7	-26.5	-25.8	-25.6	-25.1	-24.7	-24.1	-23.6	-24.1	-24.0	-23.3	-22.5	-29.0	-22.5																						
13-Jan	-21.6	-21.3	-21.1	-21.4	-21.4	-21.1	-20.9	-21.0	-21.7	-20.2	-18.6	-16.8	-14.6	-13.6	-13.3	-13.5	-13.2	-12.8	-12.5	-12.2	-12.1	-12.1	-11.7	-11.5	-16.7	-11.5																						
14-Jan	-11.3	-10.8	-10.6	-9.8	-9.8	-9.8	-9.3	-9.3	-8.9	-8.1	-6.9	-6.0	-4.6	-4.5	-3.5	-3.0	-3.2	-2.1	-2.3	-3.3	-2.7	-3.0	-2.8	-2.5	-6.2	-2.1																						
15-Jan	-2.4	-2.0	-2.3	-2.7	-2.4	-2.3	-1.6	-1.3	-1.2	-1.0	-0.9	-0.1	0.3	0.9	0.6	0.2	-0.9	-1.3	-1.6	-1.6	-1.8	-2.5	-2.7	-3.2	-1.4	0.9																						
16-Jan	-3.6	-3.4	-3.5	-3.6	-3.8	-3.6	-3.6	-2.9	-2.3	-1.4	-0.5	0.6	1.9	3.7	4.3	3.9	4.5	3.4	3.0	3.6	4.5	3.5	3.0	3.1	0.4	4.5																						
17-Jan	3.0	2.5	1.8	2.1	2.0	2.3	2.6	2.7	2.2	2.2	2.4	2.7	2.9	2.8	2.4	2.1	1.9	1.7	2.0	2.3	1.9	0.8	-0.1	-1.0	2.0	3.0																						
18-Jan	-0.8	-0.8	-0.5	0.3	1.8	2.5	1.9	1.0	0.5	0.4	1.5	2.2	2.6	3.6	3.1	3.4	2.3	1.7	1.2	1.2	1.0	0.6	0.4	0.6	1.3	3.6																						
19-Jan	0.4	-0.6	-3.5	-5.3	-5.6	-7.0	-7.4	-7.4	-6.8	-7.1	-6.7	-5.6	-4.9	-3.8	-3.5	-3.4	-3.7	-3.7	-3.1	-2.9	-2.4	-1.6	-2.3	-5.6	-4.3	0.4																						
20-Jan	-3.3	-2.6	-2.5	-4.6	-5.8	-7.0	-6.1	-4.7	-4.0	-3.3	-2.1	-1.2	-0.3	0.9	1.2	1.4	-0.5	-1.3	-2.8	-3.1	-3.6	-6.3	-6.5	-6.2	-3.1	1.4																						
21-Jan	-6.1	-6.1	-5.9	-5.9	-5.9	-6.5	-7.1	-7.5	-8.4	-9.1	-9.4	-9.5	-9.9	-10.3	-10.8	-11.5	-11.8	-12.2	-12.7	-13.3	-13.7	-14.0	-14.4	-14.9	-9.9	-5.9																						
22-Jan	-15.3	-15.7	-16.6	-17.2	-17.9	-18.2	-18.2	-18.5	-18.8	-18.7	-18.6	-18.2	-18.1	-18.0	-18.0	-18.5	-19.2	-19.9	-20.8	-21.2	-21.6	-21.6	-21.3	-21.0	-18.8	-15.3																						
23-Jan	-20.5	-20.0	-19.5	-19.3	-19.0	-19.0	-19.1	-19.7	-19.0	-18.1	-17.3	-16.8	-16.4	-16.1	-15.3	-14.6	-15.0	-15.1	-15.3	-15.7	-15.9	-15.8	-15.9	-15.8	-17.3	-14.6																						
24-Jan	-15.8	-15.7	-15.4	-15.1	-14.9	-15.0	-14.6	-14.0	-13.7	-13.3	-12.4	-11.6	-10.6	-9.6	-9.2	-9.1	-10.3	-10.8	-10.3	-10.4	-10.0	-10.3	-10.4	-11.0	-12.2	-9.1																						
25-Jan	-10.8	-10.7	-10.5	-10.9	-11.1	-12.1	-11.8	-10.7	-10.0	-9.1	-8.1	-6.3	-5.3	-4.6	-4.1	-3.7	-4.6	-5.3	-5.4	-5.7	-6.1	-6.3	-6.7	-6.9	-7.8	-3.7																						
26-Jan	-7.5	-8.0	-8.7	-8.9	-8.9	-9.0	-8.5	-8.4	-8.1	-7.0	-6.0	-4.9	-2.8	-2.2	-2.4	-2.4	-1.8	-3.1	-3.7	-4.2	-4.2	-4.3	-4.5	-5.3	-5.6	-1.8																						
27-Jan	-5.5	-5.6	-5.8	-5.4	-5.3	-5.3	-5.1	-4.9	-4.6	-3.6	-2.4	-1.2	0.0	0.7	-0.3	-1.1	-1.9	-2.0	-1.9	-1.9	-1.9	-1.5	-1.4	-2.3	-2.9	0.7																						
28-Jan	-2.5	-2.8	-3.1	-3.1	-2.9	-3.2	-3.4	-3.7	-4.7	-3.6	-2.9	-2.2	-1.0	-1.0	-0.7	-0.4	-0.3	0.5	0.8	1.5	0.9	1.0	0.9	0.7	-1.5	1.5																						
29-Jan	0.6	0.5	0.8	0.1	-0.2	-0.6	-0.8	-0.7	-0.7	-0.4	1.0	2.2	2.6	3.2	3.6	3.6	2.1	0.7	0.2	-0.8	-1.6	-2.9	-3.2	-3.6	0.2	3.6																						
30-Jan	-4.0	-4.3	-4.7	-5.2	-5.3	-4.8	-4.3	-4.3	-4.2	-5.9	-9.0	-10.3	-9.7	-9.2	-9.3	-11.3	-12.4	-13.7	-15.0	-15.7	-16.1	-16.2	-16.2	-16.6	-9.5	-4.0																						
31-Jan	-17.7	-18.6	-18.8	-19.7	-20.1	-20.8	-20.9	-21.1	-21.0	-20.6	-20.3	-19.4	-18.2	-17.1	-16.7	-16.7	-17.1	-17.1	-15.9	-14.9	-14.6	-14.3	-14.1	-14.4	-17.9	-14.1																						
																								-13.7	-13.9	-14.2	-14.3	-14.2	-14.3	-14.2	-14.1	-14.0	-13.7	-13.0	-12.3	-11.5	-11.0	-11.1	-11.4	-12.0	-12.5	-12.6	-12.6	-12.7	-13.1	-13.3	-13.7	Diurnal Average
																								3.0	2.5	1.8	2.1	2.0	2.5	2.6	2.7	2.2	2.2	2.4	2.7	2.9	3.7	4.3	3.9	4.5	3.4	3.0	3.6	4.5	3.5	3.0	3.1	Diurnal Maximum



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
Firebag - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Firebag - January 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	215	28.90	28.90
-20 - 0	444	59.68	88.58
0 - 10	85	11.42	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

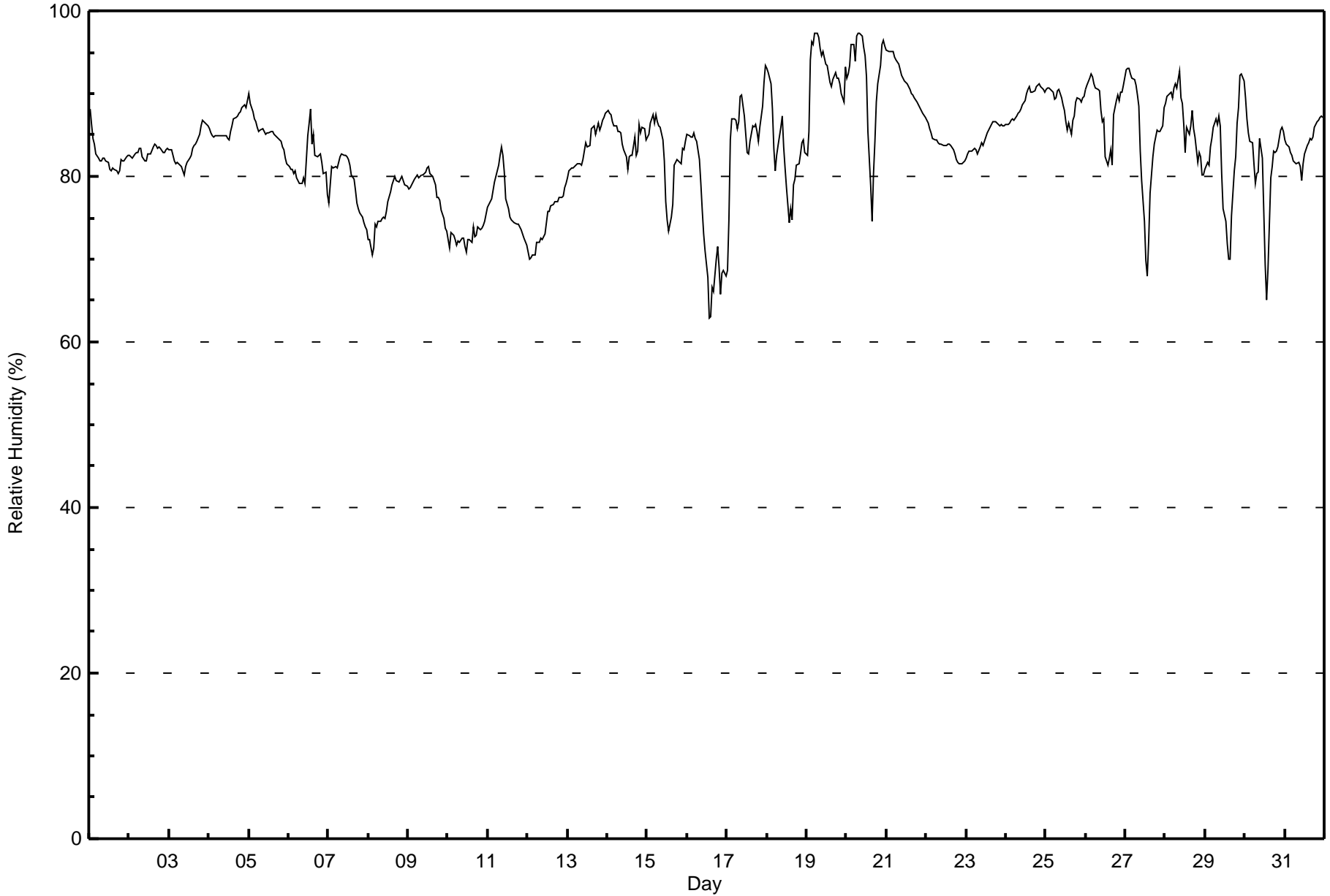
Firebag - January 2017

Maximum Value: 97 % on Jan 19 07:00														Maximum Daily Average: 92.7 % on Jan 19														Hours in Service: 744																										
Minimum Value: 63 % on Jan 16 14:00														Minimum Daily Average: 72.8 % on Jan 10														Hours of Data: 744																										
Maximum Diurnal Average: 84.8 % at hour 4														Minimum Diurnal Average: 80.6 % at hour 14														Hours of Missing Data: 0																										
Monthly Average: 83.3 %														Percentiles: P ₁ = 68 P ₁₀ = 74 Q ₁ = 80 Median = 84 Q ₃ = 87 P ₉₀ = 91 P ₉₉ = 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-Jan	88	86	85	84	83	82	82	82	82	82	82	82	81	81	81	81	81	80	81	82	82	82	82	83	82.3	88																												
2-Jan	83	82	82	83	83	83	83	83	82	82	82	83	83	83	84	84	84	83	84	83	83	83	83	83	82.9	84																												
3-Jan	83	83	83	82	82	82	82	81	81	80	81	82	82	83	83	84	84	84	85	86	87	87	86	86	83.2	87																												
4-Jan	86	85	85	85	85	85	85	85	85	85	85	85	84	85	86	87	87	87	88	88	88	89	88	89	86.1	89																												
5-Jan	90	89	88	87	87	86	85	86	86	85	85	85	85	85	85	85	85	85	85	84	84	83	82	82	85.4	90																												
6-Jan	81	81	81	80	81	80	79	79	79	80	79	85	86	88	84	85	83	82	83	83	82	80	80	78	81.6	88																												
7-Jan	77	79	81	81	81	81	82	82	83	83	83	82	82	81	80	80	78	77	76	76	75	74	74	74	79.2	83																												
8-Jan	72	72	70	71	74	74	75	75	75	75	75	76	77	78	79	80	80	79	79	80	80	79	79	79	76.4	80																												
9-Jan	79	79	79	79	80	80	80	80	80	80	81	81	81	80	80	80	79	78	78	77	76	75	74	73	78.7	81																												
10-Jan	72	71	73	73	72	72	72	72	73	73	72	71	72	72	72	74	73	73	74	74	74	74	75	75	72.8	75																												
11-Jan	76	77	77	78	79	80	81	83	84	83	80	77	76	75	75	75	74	74	74	74	74	73	72	72	76.8	84																												
12-Jan	71	70	70	71	71	72	72	72	73	72	73	74	76	76	76	77	77	77	77	77	77	78	79	79	74.4	79																												
13-Jan	80	81	81	81	81	81	82	81	81	82	83	84	84	84	86	86	86	85	86	86	86	87	87	88	83.7	88																												
14-Jan	88	88	88	87	86	86	85	85	85	84	83	82	81	82	83	83	85	83	83	86	85	86	86	84	84.8	88																												
15-Jan	85	85	86	87	86	87	87	86	86	84	82	77	75	73	75	77	81	82	82	82	83	83	84	82.4	87																													
16-Jan	85	85	85	85	85	85	84	82	79	76	73	71	68	63	63	67	66	70	71	69	66	68	69	68	74.3	85																												
17-Jan	69	75	84	87	87	87	86	87	90	90	87	85	83	83	84	86	86	86	85	84	86	88	91	93	85.4	93																												
18-Jan	93	93	91	88	83	81	83	84	86	87	84	81	79	74	76	75	79	80	81	82	83	84	84	83	83.0	93																												
19-Jan	83	85	94	96	96	97	97	97	97	95	95	95	94	93	92	91	91	92	93	92	92	91	90	89	92.7	97																												
20-Jan	92	92	93	96	96	94	97	97	97	97	96	95	92	85	79	75	80	84	89	91	93	96	96	96	91.6	97																												
21-Jan	95	95	95	95	95	94	94	94	93	92	92	92	91	91	90	90	90	90	89	89	88	88	88	87	91.5	95																												
22-Jan	87	86	86	85	85	84	84	84	84	84	84	84	84	84	84	84	83	83	82	82	81	82	82	82	83.7	87																												
23-Jan	82	83	83	83	83	83	83	83	84	84	84	84	85	85	86	86	87	87	87	86	86	86	86	86	84.7	87																												
24-Jan	86	86	87	87	87	87	87	88	88	88	89	89	90	91	91	90	90	90	91	91	91	91	91	90	89.0	91																												
25-Jan	91	91	91	90	90	89	90	90	90	89	89	88	87	86	86	85	87	87	89	89	89	89	89	90	88.8	91																												
26-Jan	90	91	92	92	92	91	91	91	90	88	87	87	82	81	82	83	81	88	89	90	89	90	90	91	88.3	92																												
27-Jan	93	93	93	92	92	92	91	90	88	83	80	75	70	68	72	78	82	84	85	86	85	86	86	88	84.6	93																												
28-Jan	89	90	90	90	90	91	91	91	93	90	89	86	83	86	85	86	88	86	85	82	83	82	80	80	86.8	93																												
29-Jan	81	82	81	84	85	86	87	86	87	86	80	76	75	72	70	70	75	81	82	86	88	92	92	92	82.4	92																												
30-Jan	89	87	85	84	84	81	79	80	80	85	82	76	69	65	69	80	81	83	83	83	84	86	86	85	81.1	89																												
31-Jan	84	84	84	83	82	82	82	82	82	81	80	81	83	84	84	85	84	85	86	87	87	87	87	87	83.8	87																												
	83.9		84.1		84.6		84.8		84.6		84.4		84.4		84.4		84.4		84.6		84.0		83.0		82.2		81.2		80.6		80.7		81.5		82.2		82.7		83.2		83.4		83.4		83.8		83.8		83.9		Diurnal Average			
	95		95		95		96		96		97		97		97		97		97		97		96		95		93		92		91		91		91		92		93		92		92		93		96		96		96		Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Firebag - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Firebag - January 2017

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	0	0.00	0.00
60 - 80	174	23.39	23.39
80 - 100	570	76.61	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

Firebag - January 2017

Maximum Speed: 38 km/h on Jan 11 12:00	Maximum Daily Speed Average: 21.2 km/h on Jan 16	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jan 8 05:00	Minimum Daily Speed Average: 0.5 km/h on Jan 8	Hours of Data: 679
Maximum Diurnal Speed Average: 7.5 km/h at hour 23	Minimum Diurnal Speed Average: 5.6 km/h at hour 10	Hours of Missing Data: 65
Monthly Average Velocity: 6.6 km/h 252.1 deg	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 6 Median = 12 Q ₃ = 17 P ₉₀ = 21 P ₉₉ = 29	Percent Operational Time: 91.3

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-Jan	NNW23	N25	N29	NNW28	NNW29	N22	N16	NNW11	NNW13	NNW12	NNW13	NNW15	NNW14	NNW15	NW11	WNW9	WNW6	NW6	NW6	NW5	NW5	WNW4	NNW7	N8	NNW13.3	N29	
2-Jan	NW5	WNW4	W4	WNW5	NW5	W2	NW4	NW7	NW5	NNW5	NNW4	N8	N8	N5	NW3	WNW3	W3	WSW5	WSW5	SW6	SW5	SW7	SW7	SW8	WNW3.4	SW8	
3-Jan	SW8	SW8	SW8	SW8	SW8	SW9	SW9	SW8	WSW7	SW7	WSW6	W5	W6	W6	WNW7	W7	W7	NW6	NNW7	NNW6	NNW5	N4	N3	WSW5.0	SW9		
4-Jan	N3	N3	NNE3	NNE3	N2	N2	N2	N1	N1	NNW1	WNW1	SW1	SW2	SW3	SW3	SW3	SW3	SW3	SW3	SW3	SW3	SW3	W2	N1	W0.8	SSW3	
5-Jan	N2	NNE2	NNE2	NNE2	NNE2	NNE3	N2	N3	N3	N3	N4	N4	N4	N3	NNE3	NNE3	NNE3	NNE2	N2	N2	N1	NNW0	WNW1	WSW2	N2.3	N4	
6-Jan	WSW2	WSW2	WSW2	SW1	SW1	AF	AF	AF	AF	AF	SW1	AF	SW1	AF	AF	AF	AF	AF	AF	AF	AF	W1	AF	AF	----	WSW2	
7-Jan	AF	AF	AF	NNE2	NNE2	NNE1	NE1	NE1	NNE1	NNE2	NNE2	NNE1	NNE1	N1	N2	N1	NNE1	N1	N1	N1	N1	AF	AF	AF	NNE1.3	NNE2	
8-Jan	AF	AF	AF	AF	SW0	AF	SW0	SW0	SW0	SW0	SW1	SW1	WSW1	SW1	SW0	SW0	SW1	SW0	SW0	SW1	WSW1	WSW1	WSW1	WSW1	SW0.5	WSW1	
9-Jan	WSW0	AF	SW0	SW1	WSW0	WSW0	AF	AF	AF	AF	AF	AF	AF	NNW1	AF	N1	AF	AF	AF	AF	AF	AF	AF	AF	----	SW1	
10-Jan	AF	AF	AF	AF	AF	AF	AF	NO	N1	N1	NNW1	NNW9	NNW16	NNW10	WNW5	SW6	SW7	SW9	WSW11	SW9	SW10	SW12	SW13	SW14	----	NNW16	
11-Jan	SW16	SW18	SW20	SW21	SW20	SW19	WSW17	W12	NNW24	N24	N34	N38	N32	NNE34	N30	N27	N27	N26	N24	N21	N19	N13	N9	NW7	NNW12.4	N38	
12-Jan	NW5	NW5	W4	SSW4	SSW6	SW9	SW13	SW15	SW18	SSW14	SSW14	SSW19	SSW20	SSW20	S20	S24	SSW29	SSW27	S29	SSW26	SSW25	SSW22	SW18	SW18	SSW15.8	SSW29	
13-Jan	SW17	WSW16	W15	W10	W8	WNW7	W5	WSW5	SSW8	SW9	WSW10	WSW12	W12	W10	W11	WSW13	WSW12	SW11	WSW12	WSW16	WSW16	WSW15	WSW17	WSW17	WSW11.4	WSW17	
14-Jan	WSW19	WSW20	WSW18	WSW19	WSW18	WSW16	WSW18	SW16	SW17	SW20	WSW20	WSW20	WSW21	WSW17	W21	W19	WSW18	W21	WSW17	WSW15	WSW18	WSW15	WSW17	WSW19	WSW17.9	W21	
15-Jan	W17	W19	W18	W17	W18	W16	W17	W18	W22	W23	W24	W19	W18	WSW18	W18	W19	WSW18	WSW17	WSW16	WSW17	WSW15	WSW18	WSW18	WSW18	W17.7	W24	
16-Jan	SW16	WSW19	WSW19	WSW20	SW20	WSW22	SW22	SW21	WSW26	WSW27	WSW25	WSW27	WSW24	WSW21	W21	W23	W26	W23	W21	W22	W21	WSW18	WSW20	WSW19	WSW21.2	WSW27	
17-Jan	SW18	SW17	SW20	WSW19	WSW17	W18	W22	WNW24	WNW24	WNW20	WNW19	W16	W15	W11	WSW13	WSW16	WSW15	WSW13	WSW15	WSW17	WSW12	WSW11	SW12	SSW13	WSW15.1	WNW24	
18-Jan	SSW12	SSW15	SSW12	SSW12	SSW12	S11	S11	SSE13	SSE16	SSE13	S10	SW11	SSW14	SW11	SW10	SW11	SW12	WSW14	SW12	WSW14	WSW15	WSW11	WSW10	SW10	SSW10.4	SSE16	
19-Jan	WSW12	WSW7	ENE10	ENE5	E7	ENE9	ENE14	E15	ESE10	ENE10	E8	E8	E10	ESE8	ESE8	ESE8	ESE8	ESE11	SE8	SE8	SSE10	SSE13	SW8	S2	ESE6.3	E15	
20-Jan	SSE7	S8	SSW11	WSW16	WSW20	WSW19	WSW15	WSW12	WSW14	WSW13	WSW14	W14	W11	WSW10	SW11	SW10	SW11	SW12	SW9	SW7	SSW6	ENE7	ENE11	ENE12	WSW8.4	WSW20	
21-Jan	E13	E11	ENE13	ENE13	ENE12	ENE13	ENE12	ENE12	NE10	NE9	NE9	NE9	NE9	NE9	NE9	NE8	NE8	NE8	NE8	NE7	NE8	NE8	NE8	NE7	NE9.4	ENE13	
22-Jan	NE7	NE7	NE7	NE6	NE6	NE5	NE5	ENE5	ENE4	ENE3	NE4	ENE3	NE3	NE3	NE4	NE4	ENE3	ENE2	AF	ENE2	ENE1	E0	AF	AF	NE4.0	NE7	
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	WSW5	WSW6	W5	WSW3	WSW4	WSW3	SW3	SW4	SW6	SSW6	SSW9	SSW9	SSW8	----	SSW9
24-Jan	SSW8	SSW9	SSW8	SSW9	SSW8	SSW8	SSW9	SSW9	SSW10	SSW9	SSW9	SSW10	SSW11	SSW10	SSW10	SSW11	SSW10	SSW11	SSW10	SSW17	SW18	SW16	SW18	SW15	SSW11.4	SSW19	
25-Jan	SSW15	SSW14	SSW15	SSW13	SSW12	SSW15	SSW13	SSW14	SSW14	SSW13	SSW15	SW17	SW19	SW18	SW17	SW18	SSW18	SSW19	SSW21	SSW23	SSW22	SSW23	SSW21	SSW22	WSW17.0	SSW23	
26-Jan	SW19	SW18	SW15	SW13	SW13	SW11	SW14	SW14	SW13	SW16	SW16	SW19	WSW19	SW16	WSW17	WSW17	WSW15	WSW15	WSW16	WSW14	WSW14	WSW14	WSW11	SW8	WSW14.7	SW19	
27-Jan	SW15	WSW12	WSW12	WSW16	WSW15	WSW12	WSW17	WSW15	WSW17	WSW14	WSW20	W19	W17	W15	WSW13	SW14	SW16	SW15	WSW10	WSW9	WSW13	WSW15	WSW15	WSW13	WSW14.3	WSW20	
28-Jan	WSW14	WSW13	SW13	SW16	SW18	SW17	SW18	SW15	SSW9	SW13	SW10	SSW9	SSW6	SSW13	SSE11	S14	SSW18	SSW17	SSW14	SSW15	SW10	SW14	WSW15	SW15	SW12.9	SW18	
29-Jan	SW17	SW18	SW18	SW16	WSW17	SW16	SW17	SW8	SW13	SW16	SW24	WSW25	WSW23	WSW22	W19	WSW15	WSW13	WSW14	WSW10	W7	W8	SW6	WSW12	SW10	WSW14.8	WSW25	
30-Jan	WSW10	WSW11	WSW11	WSW13	WSW15	WSW16	W15	W13	WNW15	NNW22	N26	NNW25	NNW25	NNW25	NNW20	N24	NNW25	NNW24	N25	NNW28	NNW27	NNW26	N26	N26	NNW16.6	NNW28	
31-Jan	N25	N22	N17	N17	N14	NNW16	NNW12	NNW11	NNW8	NW6	WSW7	WSW7	WSW9	WSW10	W11	WSW11	WSW8	WSW9	W11	WNW13	NW10	NW12	NNW20	NNW25	NNW9.6	N25	

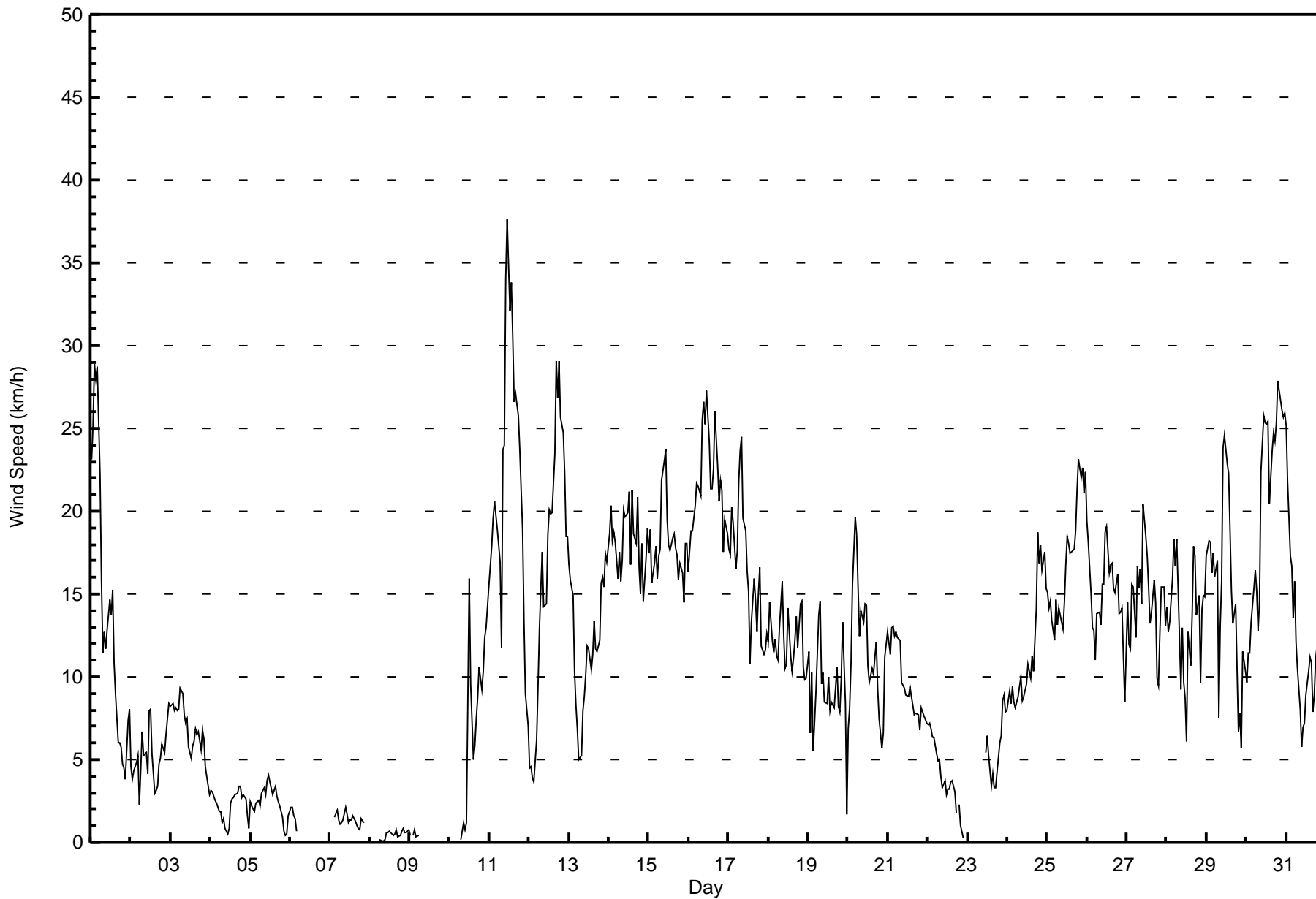
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N25	N25	N29	NNW28	NNW29	N22	W22	WNW24	WSW26	WSW27	N34	N38	N32	NNE34	N30	N27	SSW29	SSW27	S29	NNW28	NNW27	NNW26	N26	N26	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Firebag - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Firebag - January 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	160	23.56	23.56
6 - 11	177	26.07	49.63
12 - 19	246	36.23	85.86
20 - 28	87	12.81	98.67
29 - 38	9	1.33	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 679

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Firebag - January 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	34	20	8	10	1	0	0	0	1	2	32	20	9	7	9	7	160
6 - 11	4	0	21	5	5	6	2	3	4	29	40	24	14	4	8	8	177
12 - 19	5	0	0	8	2	0	0	4	1	31	63	92	26	3	1	10	246
20 - 28	14	0	0	0	0	0	0	0	1	8	14	18	13	3	0	16	87
29 - 38	5	1	0	0	0	0	0	0	1	1	0	0	0	0	0	1	9
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	62	21	29	23	8	6	2	7	8	71	149	154	62	17	18	42	679

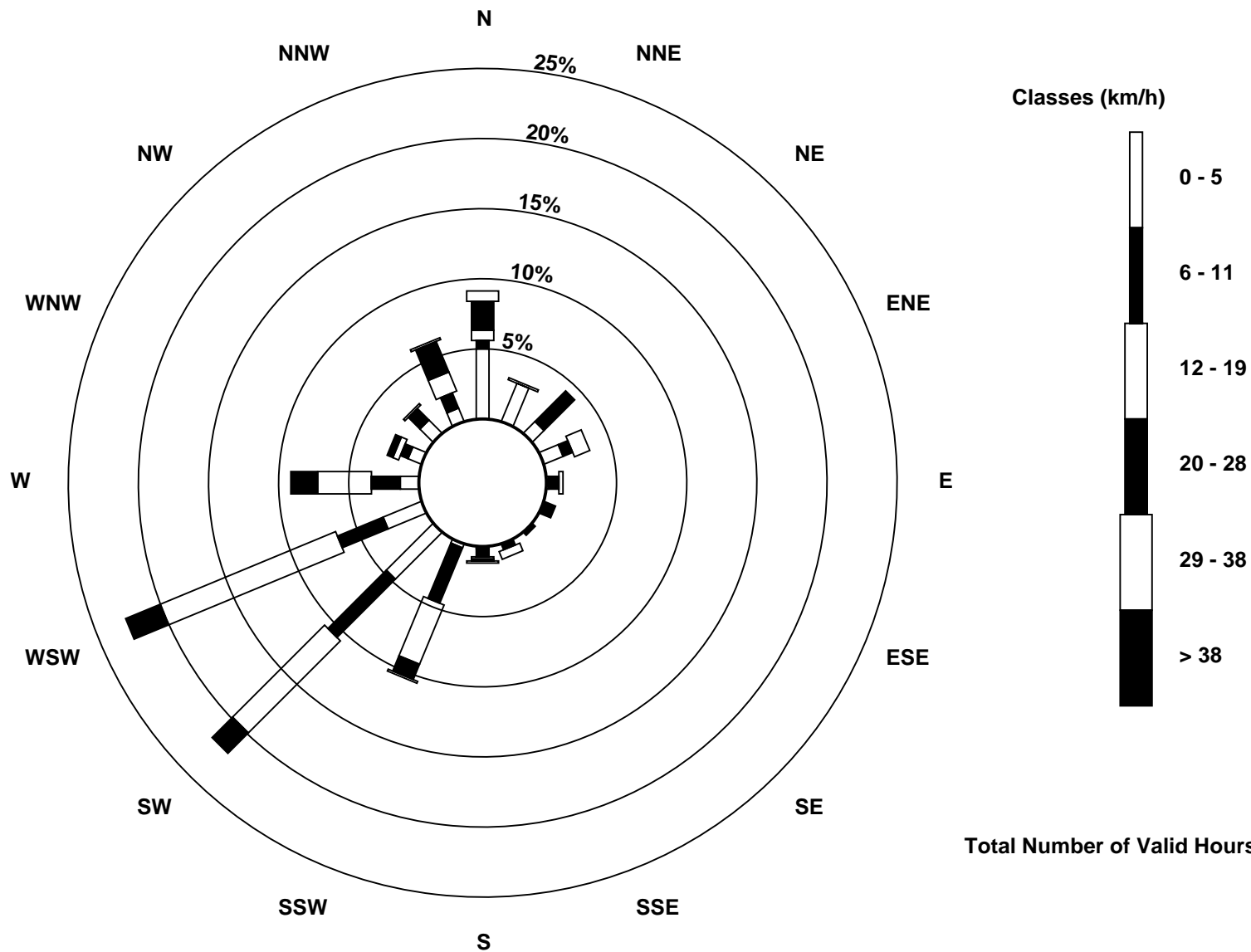
Total Number of Valid Hours: 679

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Wind Speed (WS) - km/h
Firebag (AMS 19)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Firebag - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 11 km/h on Jan 11 11:00	Hours of Data: 679
Minimum Value: 0 km/h on Jan 6 02:00	Hours of Missing Data: 65
Percentiles: P ₁ = 0 P ₁₀ = 1 O ₁ = 1 Median = 2 O ₃ = 3 P ₉₀ = 4 P ₉₉ = 7	Hours of Calibration: 0
	Percent Operational Time: 91.3

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-Jan	5	5	6	6	6	5	4	2	2	3	3	3	3	3	2	1	1	1	1	2	1	1	2	2	6
2-Jan	1	1	1	1	1	1	1	1	1	1	1	3	2	2	1	1	1	1	1	1	1	1	1	1	3
3-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5-Jan	1	1	1	1	0	1	1	1	1	0	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1
6-Jan	0	0	1	1	1	AF	AF	AF	AF	AF	1	AF	1	AF	AF	AF	AF	AF	AF	AF	AF	1	AF	AF	1
7-Jan	AF	AF	AF	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	AF	AF	1
8-Jan	AF	AF	AF	AF	0	AF	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9-Jan	1	AF	1	1	1	1	AF	AF	AF	AF	AF	AF	AF	1	AF	1	AF	AF	AF	AF	AF	AF	AF	AF	1
10-Jan	AF	AF	AF	AF	AF	AF	AF	1	1	1	1	8	3	2	2	1	1	1	1	1	1	2	1	2	8
11-Jan	2	2	3	3	3	2	2	3	5	6	11	9	7	7	7	7	6	6	6	4	4	3	2	1	11
12-Jan	1	1	1	1	1	1	1	3	2	2	2	2	2	3	3	4	4	4	4	4	4	4	2	3	4
13-Jan	2	2	2	2	2	1	1	1	2	1	2	2	2	2	2	3	2	2	2	2	2	2	2	3	3
14-Jan	3	3	2	2	3	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	2	2	2	3	3
15-Jan	3	3	2	3	3	2	2	3	4	3	3	3	3	3	2	3	2	2	2	2	2	2	2	2	4
16-Jan	2	3	2	3	3	4	3	3	4	4	4	4	4	3	3	4	4	3	3	3	3	2	3	3	4
17-Jan	2	2	3	3	2	3	3	4	4	4	3	3	3	2	2	3	2	2	2	2	2	2	1	1	4
18-Jan	2	2	2	1	2	2	2	2	2	2	2	3	3	2	2	2	1	2	2	2	2	2	1	2	3
19-Jan	1	3	3	1	3	2	2	2	2	2	1	1	2	2	2	2	1	2	2	2	2	2	3	3	3
20-Jan	2	2	2	3	3	3	2	3	2	2	2	2	2	1	1	1	2	1	1	2	2	3	2	2	3
21-Jan	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	3
22-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	AF	1	1	1	AF	1
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	1	1	1	1	1	1	1	1	1	1	1	1	2
24-Jan	2	1	1	1	1	1	1	2	1	1	1	2	1	1	2	2	1	3	2	2	2	2	2	2	3
25-Jan	2	2	2	2	2	1	1	2	2	1	2	3	3	3	2	2	2	2	2	3	3	3	3	3	3
26-Jan	3	2	3	2	2	2	2	2	2	2	2	3	3	2	2	3	2	2	2	2	3	2	3	1	3
27-Jan	3	1	2	2	3	2	2	2	3	2	4	3	4	3	2	2	2	2	2	2	1	2	2	1	4
28-Jan	2	2	4	2	2	2	2	3	2	2	2	2	3	2	1	3	2	2	2	3	3	2	2	2	4
29-Jan	3	3	2	2	2	2	3	4	2	2	4	4	4	4	4	2	2	1	3	1	3	3	1	1	4
30-Jan	2	2	2	1	2	2	2	2	2	6	6	6	5	6	4	5	5	6	5	5	5	5	6	5	6
31-Jan	5	6	3	3	3	4	3	3	2	1	2	1	1	2	2	2	2	2	2	3	2	2	5	5	6
	5	6	6	6	6	5	4	4	5	6	11	9	7	7	7	7	6	6	6	5	5	5	6	5	

Diurnal Maximum

AF - Analyzer Failure



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Firebag - January 2017

Direction of Maximum Speed: 9 deg on Jan 11 12:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 251.3 deg on Jan 16	Hours of Data: 679
Direction of Minimum Speed: 220 deg on Jan 8 05:00	Hours of Missing Data: 65
Direction of Minimum Daily Speed Average: 0.5 deg on Jan 8	Percent Operational Time: 91.3
Monthly Average Direction: 253.9 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-Jan	348	351	350	348	345	355	351	342	340	334	336	335	333	328	324	302	293	315	307	322	312	298	334	354	339.5
2-Jan	324	289	259	297	306	272	324	310	315	332	329	350	1	359	312	288	266	237	240	235	222	217	216	215	286.3
3-Jan	218	222	214	215	215	218	218	225	233	239	235	253	266	266	278	282	267	278	304	329	339	346	360	8	251.1
4-Jan	7	10	15	16	2	359	358	0	351	343	298	235	222	215	225	220	215	214	220	225	226	235	281	349	271.2
5-Jan	6	18	33	26	24	17	7	6	10	8	6	5	11	11	15	22	19	12	8	358	353	327	286	252	10.3
6-Jan	242	241	238	231	230	AF	AF	AF	AF	AF	221	AF	220	AF	AF	AF	AF	AF	AF	AF	AF	277	AF	AF	--
7-Jan	AF	AF	AF	33	26	28	38	37	30	28	26	22	14	5	2	9	13	9	9	2	5	AF	AF	AF	19.6
8-Jan	AF	AF	AF	AF	220	AF	216	220	222	228	231	232	238	231	236	229	234	229	219	232	248	242	249	244	235.4
9-Jan	241	AF	233	235	240	251	AF	AF	AF	AF	AF	AF	AF	337	AF	2	AF	AF	AF	AF	AF	AF	AF	AF	--
10-Jan	AF	AF	AF	AF	AF	AF	AF	8	4	356	343	340	342	330	296	225	227	227	237	234	225	226	223	220	--
11-Jan	219	222	220	215	218	229	243	279	346	4	2	9	9	13	8	7	7	9	9	10	11	7	356	324	348.1
12-Jan	324	322	270	210	209	217	217	220	218	208	204	201	202	196	191	188	192	192	191	197	203	206	220	227	204.4
13-Jan	234	250	263	274	268	288	277	242	213	227	237	249	278	265	262	241	243	232	248	238	238	237	237	238	247.0
14-Jan	238	240	240	241	237	238	239	229	234	233	240	248	256	247	269	266	258	261	257	249	250	247	246	251	246.7
15-Jan	262	268	280	269	277	276	268	262	265	270	268	270	267	255	262	263	257	249	248	247	245	242	244	240	261.0
16-Jan	233	241	243	244	234	245	236	234	240	248	247	257	253	256	259	265	273	265	262	266	271	257	249	241	251.3
17-Jan	233	231	231	240	248	265	272	288	288	303	287	274	280	271	256	247	255	243	248	248	250	238	229	209	258.0
18-Jan	206	207	209	208	210	181	181	156	149	157	172	222	205	231	233	236	229	241	235	249	249	253	242	236	212.6
19-Jan	246	248	66	67	80	76	76	88	112	78	92	101	100	102	119	122	111	121	128	129	157	161	227	183	111.8
20-Jan	153	175	213	242	244	250	256	248	243	239	255	276	267	241	223	231	234	232	218	217	211	77	69	67	236.5
21-Jan	81	81	70	71	66	64	60	59	49	46	47	40	39	42	40	43	42	42	43	41	41	39	43	41	53.7
22-Jan	36	37	43	46	48	50	50	58	65	65	56	69	56	37	47	46	61	67	AF	68	72	81	AF	AF	50.3
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	257	252	261	252	245	241	229	228	228	208	213	211	198	--
24-Jan	205	208	208	205	193	196	197	206	206	192	198	206	204	205	211	203	197	203	207	213	216	217	218	218	207.0
25-Jan	213	213	210	206	204	199	203	207	206	209	208	216	222	224	222	223	211	209	209	221	222	220	220	221	214.3
26-Jan	218	221	229	223	224	224	228	222	221	227	222	231	237	235	238	243	248	244	241	242	245	246	241	233	232.6
27-Jan	229	241	245	245	245	240	248	248	248	254	252	265	273	264	242	228	230	235	245	241	239	242	243	239	245.8
28-Jan	242	243	231	228	228	220	222	224	211	216	219	211	196	203	166	187	196	202	198	208	225	232	239	234	217.2
29-Jan	232	233	235	232	240	226	226	228	223	223	232	241	244	256	263	249	246	244	257	269	259	231	251	236	240.0
30-Jan	248	256	254	245	248	258	268	277	282	343	353	347	341	327	333	351	344	347	349	348	346	346	349	357	328.6
31-Jan	3	360	4	8	349	347	343	338	329	306	254	257	248	258	262	257	248	258	269	292	305	321	343	346	323.4

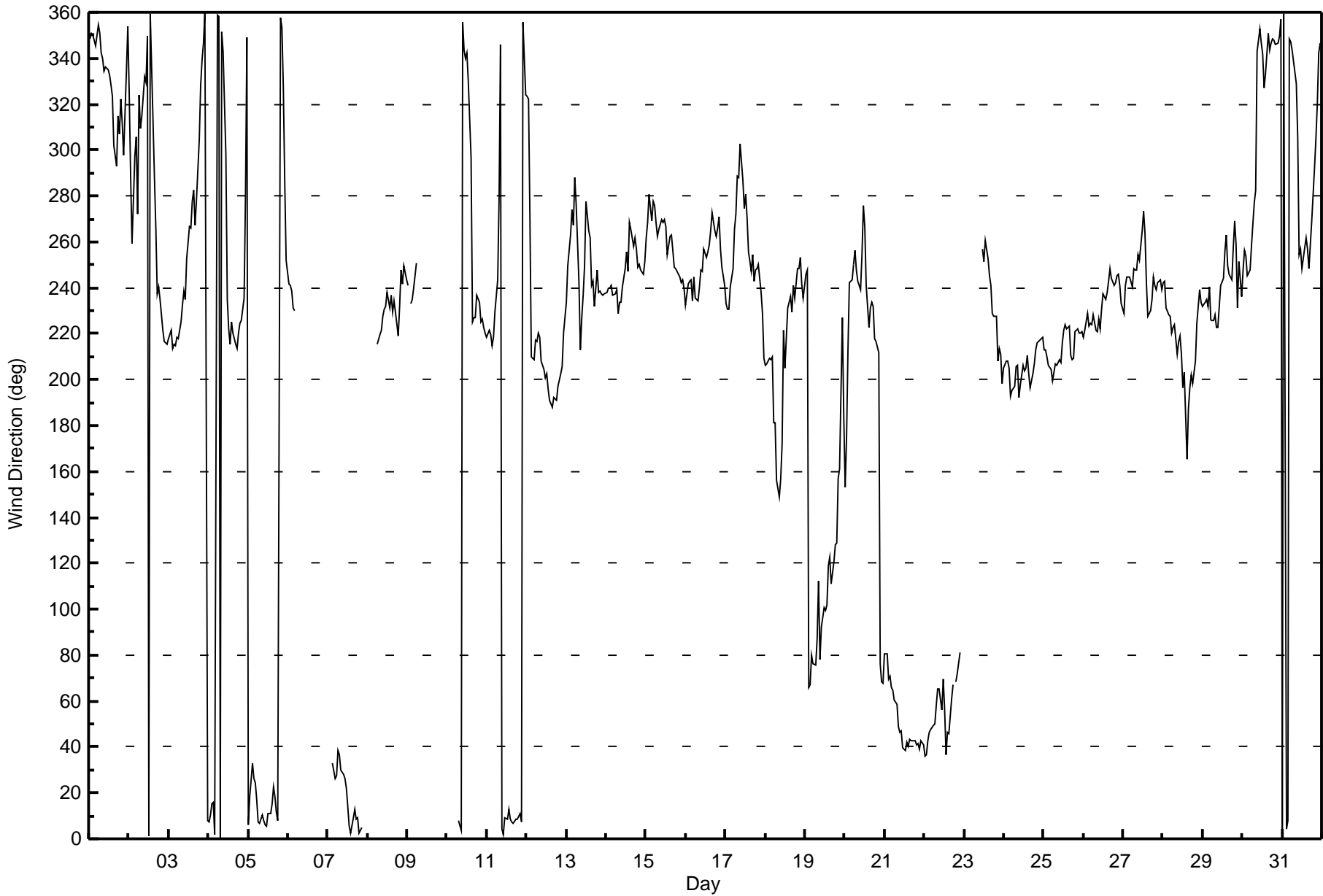
243.6 247.1 247.8 247.0 247.5 247.3 247.0 247.0 251.1 259.6 261.4 270.4 271.3 266.8 261.7 252.5 248.2 244.4 245.3 250.3 249.7 244.6 250.7 248.1
 Diurnal Average

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Firebag - January 2017





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Firebag - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 70 deg on Jan 20 00:00	Hours of Data: 679
Minimum Value: 4 deg on Jan 20 17:00	Hours of Missing Data: 65
	Hours of Calibration: 0
	Percent Operational Time: 91.3
Percentiles: P ₁ = 5 P ₁₀ = 7 Q ₁ = 7 Median = 9 Q ₃ = 12 P ₉₀ = 16 P ₉₉ = 49	

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-Jan	15	14	12	13	12	13	12	11	10	10	11	11	11	11	12	9	11	10	8	14	13	21	19	10	21
2-Jan	17	36	17	15	15	50	18	12	10	6	9	12	13	13	27	17	18	7	11	12	9	10	9	10	50
3-Jan	7	8	7	6	7	7	7	8	7	7	8	15	12	13	11	12	12	13	13	15	12	13	16	14	16
4-Jan	15	15	14	13	14	13	13	12	14	14	32	25	12	8	9	9	9	9	8	7	8	12	26	30	32
5-Jan	13	11	12	12	11	11	11	11	11	10	13	13	12	13	13	13	16	16	16	16	15	23	37	22	37
6-Jan	7	7	46	7	49	AF	AF	AF	AF	AF	66	AF	67	AF	AF	AF	AF	AF	AF	AF	AF	37	AF	AF	67
7-Jan	AF	AF	AF	8	9	10	9	9	11	11	10	11	12	12	13	10	10	8	8	9	7	AF	AF	AF	13
8-Jan	AF	AF	AF	AF	4	AF	5	6	4	4	5	6	7	6	5	6	7	7	5	8	7	6	5	7	8
9-Jan	33	AF	6	8	56	43	AF	AF	AF	AF	AF	AF	AF	12	AF	7	AF	AF	AF	AF	AF	AF	AF	AF	56
10-Jan	AF	AF	AF	AF	AF	AF	AF	5	10	10	10	12	12	12	21	14	6	6	7	6	9	9	8	8	21
11-Jan	8	8	8	7	10	9	9	28	14	15	17	15	17	14	16	15	15	14	13	13	11	14	14	7	28
12-Jan	20	15	10	32	8	5	6	8	6	7	9	7	7	7	8	9	7	8	7	8	7	7	9	8	32
13-Jan	9	9	8	11	14	15	17	12	8	9	8	9	10	12	10	11	10	11	8	6	6	6	6	6	17
14-Jan	7	7	7	8	7	7	7	8	8	7	8	8	10	8	9	7	6	8	8	7	7	10	7	8	10
15-Jan	9	8	8	9	8	11	8	11	12	8	9	9	9	8	8	9	6	7	6	6	7	7	7	8	12
16-Jan	7	8	8	8	8	10	8	9	9	8	7	8	7	9	8	9	8	8	8	8	8	8	8	7	10
17-Jan	7	8	10	9	9	9	10	9	10	11	10	9	7	15	8	7	8	9	7	7	7	8	7	5	15
18-Jan	7	6	8	6	9	14	9	12	9	11	14	32	24	29	15	15	10	10	9	7	6	8	10	7	32
19-Jan	11	25	24	13	33	13	7	9	20	12	11	18	17	16	13	12	16	10	12	12	13	15	50	70	70
20-Jan	15	24	28	17	8	8	7	8	9	8	12	9	13	11	9	11	4	5	6	5	14	45	8	9	45
21-Jan	9	12	9	10	10	10	11	10	11	11	12	13	13	11	12	11	11	12	11	12	11	12	11	12	13
22-Jan	11	12	11	12	12	11	12	13	13	11	17	15	18	14	15	15	14	10	AF	9	8	6	AF	AF	18
23-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	12	12	18	26	14	34	31	14	9	10	9	10	12	34
24-Jan	9	10	9	9	7	6	7	8	8	6	11	11	8	9	9	6	7	8	8	8	7	7	7	7	11
25-Jan	7	7	7	7	7	5	6	7	6	7	7	10	8	9	8	8	8	7	8	7	7	7	7	8	10
26-Jan	8	9	9	8	8	9	7	7	7	7	7	7	9	9	8	11	8	6	8	8	8	9	7	7	11
27-Jan	8	8	6	7	7	10	7	6	7	11	8	12	11	11	9	7	7	7	9	7	7	7	8	6	12
28-Jan	6	6	8	7	7	6	7	7	11	9	8	11	22	12	11	11	8	8	8	10	14	8	7	10	22
29-Jan	7	8	7	6	7	8	8	28	7	9	8	10	9	10	11	12	7	6	12	13	15	34	5	11	34
30-Jan	11	9	6	7	8	9	10	9	10	28	15	12	14	13	17	12	11	12	12	12	11	11	12	15	28
31-Jan	14	16	14	12	16	14	12	12	15	24	24	18	12	10	13	12	9	20	13	11	13	11	13	14	24
	33	36	46	32	56	50	18	28	20	28	66	32	67	29	27	17	34	31	16	16	15	45	50	70	
	Diurnal Maximum																								

AF - Analyzer Failure



Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 18, 2017	Last Calibration	December 15, 2016
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	10:55	End Time (MST)	14:57
Gas Cert Reference	EY0000652	Station temp.	22 Deg C
Cal Gas Concentration	49 ppm	Cal Gas Exp Date	November 4, 2019
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.	6466

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-606	-605
Analyzer IP address	192.168.1.43		Lamp voltage	808	807
Calculated slope	1.012984	0.998444	Chamber temp	44.9	45.1
Calculated intercept	-0.202597	-1.499750	Pressure	666.7	663.7
Analyzer Background	8.0	8.7	Flow	0.437	0.436
Analyzer Coefficient	0.965	0.994	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	-0.1	----
as found span	5000	59.8	586.0	570.4	1.027
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	59.8	586.0	587.4	0.998
second point	5000	30.0	294.0	297.5	0.988
third point	5000	15.1	148.0	150.9	0.981
as left zero	5000	0.0	0.0	-0.4	----
as left span	5000	59.8	586.0	588.2	0.996
Average Correction Factor					0.989

Corrected As found 570.5 Previous response 578.7 % change 1.4%

Notes:

Inlet filter changed after as founds. Adjusted the zero and span.

Calibration Performed By: Jayne Marcoux



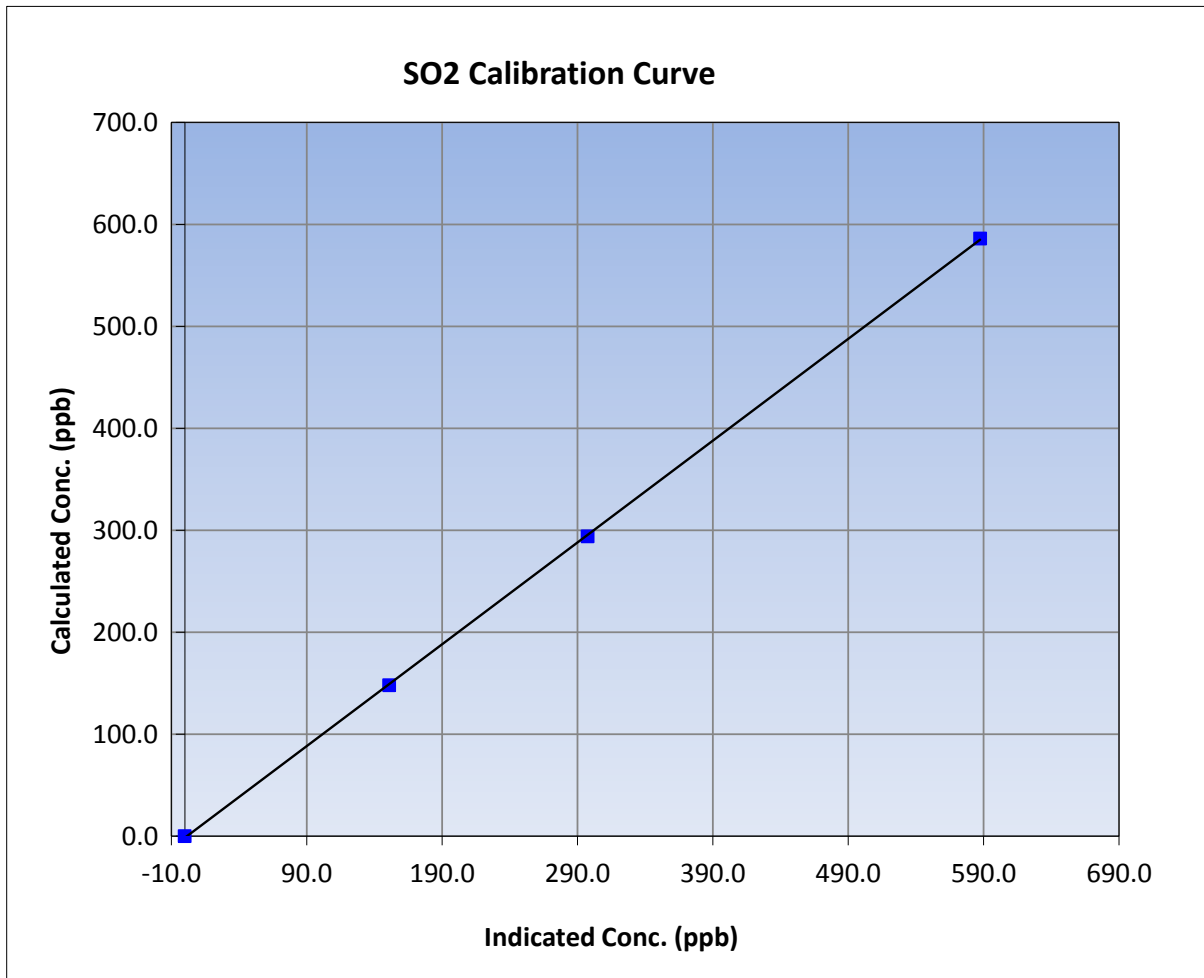
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 18, 2017	Previous Calibration	December 15, 2016
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	10:55	End Time (MST)	14:57
Analyzer make	Thermo 43i	Analyzer serial #	1410661308

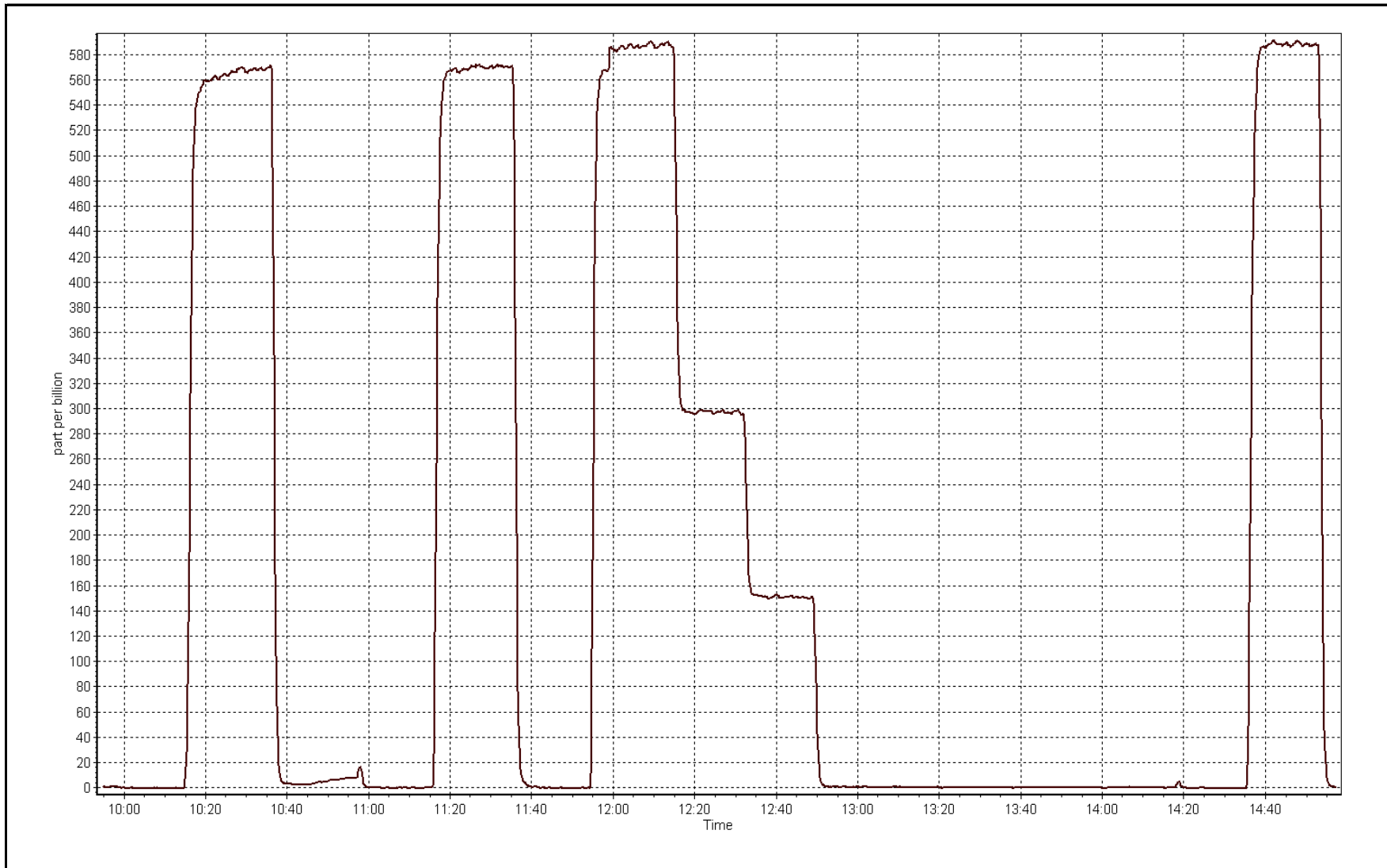
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999960
586.0	587.4	0.9977		
294.0	297.5	0.9883	Slope	0.998444
148.0	150.9	0.9806		
			Intercept	-1.499750



SO2 Calibration Plot

Date: January 18, 2017





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	January 18, 2017	Last Calibration	December 15, 2016
Station Name	Firebag	Station Number	AMS 19
Reason:	Other: <input type="checkbox"/> Cylinder Removal		
Start Time (MST)	9:54	End Time (MST)	10:43
Gas Cert Reference	SA130123A	Station temp.	22 Deg C
Cal Gas Concentration	49.3 ppm	Cal Gas Exp Date	December 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.	6466

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-606	-606
Analyzer IP address	192.168.1.43		Lamp voltage	808	808
Calculated slope	0.999412	1.012984	Chamber temp	44.9	44.9
Calculated intercept	1.366964	-0.202597	Pressure	666.7	666.7
Analyzer Background	8.0	8.0	Flow	0.437	0.437
Analyzer Coefficient	0.965	0.965	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	0.2	----
as found span	5000	58.3	574.8	567.7	1.013
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	58.3	574.8	567.7	1.013
second point					
third point					
as left zero					
as left span					
Average Correction Factor					1.013

Corrected As found 567.5 Previous response 573.8 % change 1.1%

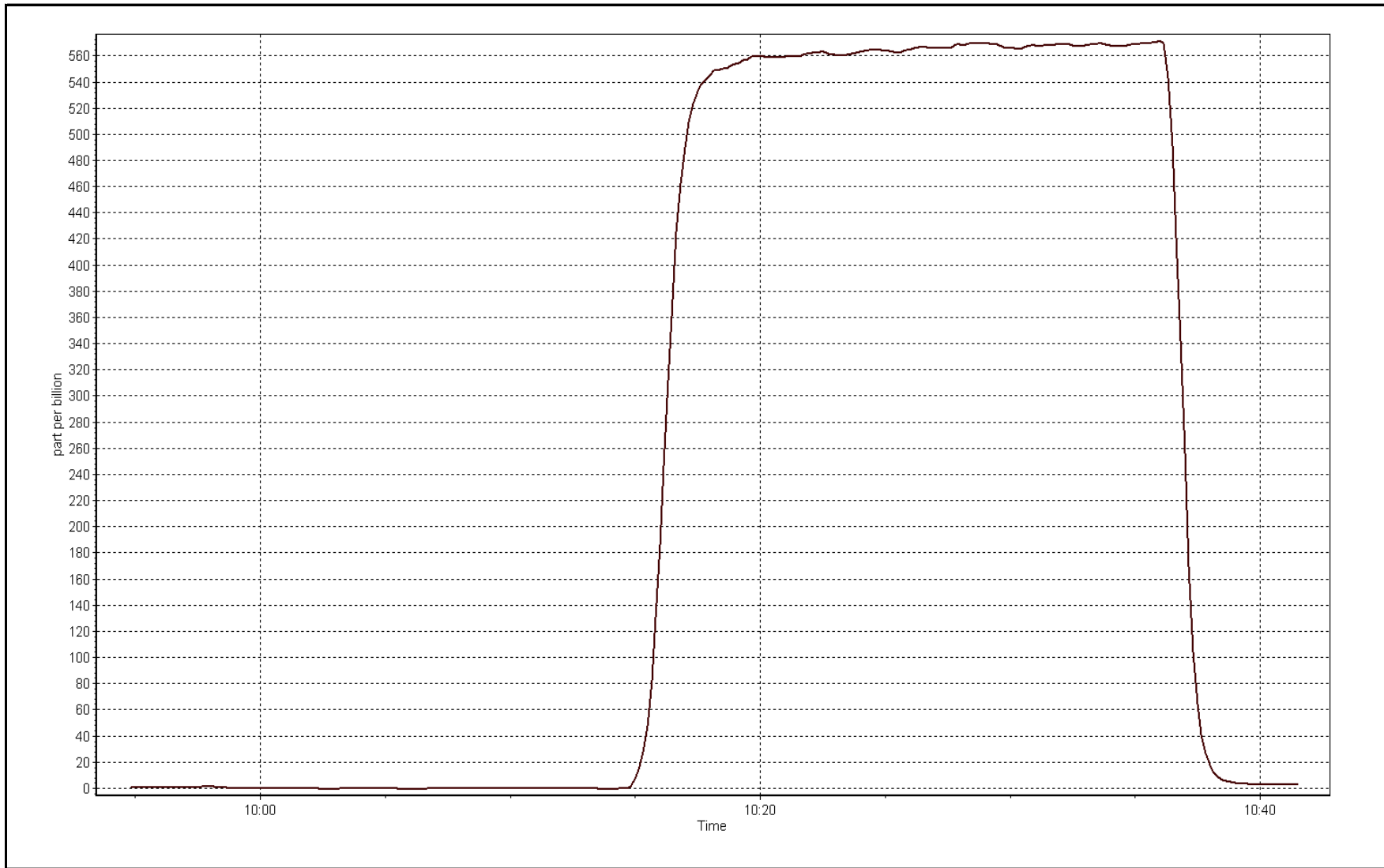
Notes:

Inlet filter changed after as founds. Adjusted the span.

Calibration Performed By: Jayme Marcoux

SO2 Calibration Plot

Date: January 18, 2017





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	January 17, 2017	Last Calibration	December 20, 2016
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	10:13	End Time (MST)	13:06
Gas Cert Reference	LL77486	Station temp.	22 Deg C
Cal Gas Concentration	5.3 ppm	Cal Gas Exp Date	February 13, 2018
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	6466
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	932	931
Calculated slope	0.996727	0.996984	Chamber temp	45	45
Calculated intercept	-0.078521	-0.304440	Pressure	541.6	528.9
Analyzer Background	13.3	13.7	Flow	0.960	0.936
Analyzer Coefficient	1.162	1.159	Intensity	85	86
			Converter temp.	335	334

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	0.0	----
as found span	5000	75.6	80.1	80.5	0.995
SO2 scrubber check	5000	15.2	149.9	1.2	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	75.6	80.1	80.5	0.995
second point	5000	37.8	40.1	40.7	0.984
third point	5000	19.0	20.1	20.7	0.972
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	75.6	80.1	79.8	1.004
Average Correction Factor					0.984

Corrected As found	80.5	Previous response	80.5	% change	0.0%
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Notes:

Changed inlet filter after as founds. Modem was reset after as founds. Adjusted the span.

Calibration Performed By: Jayme Marcoux



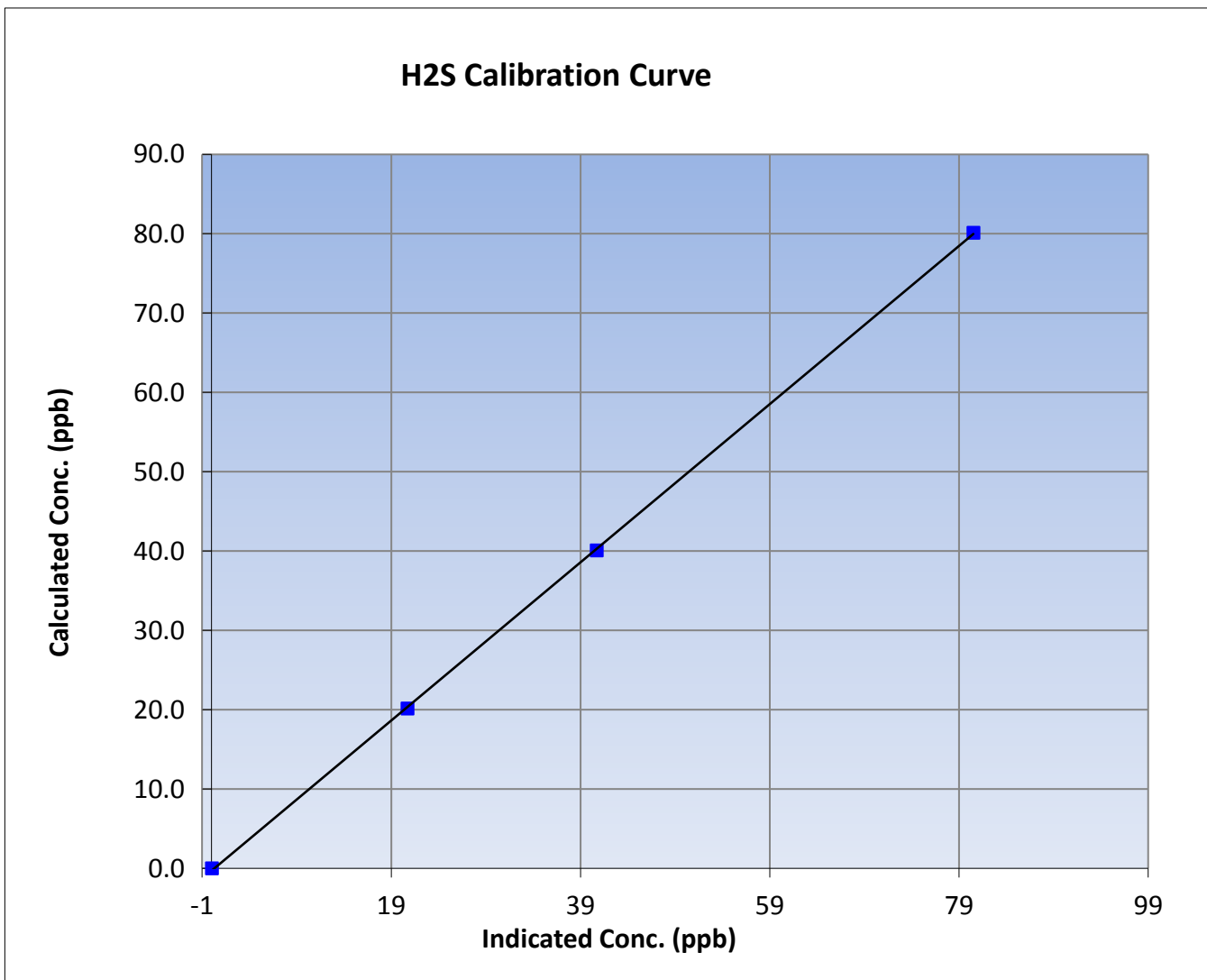
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	January 17, 2017	Previous Calibration	December 20, 2016
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	10:13	End Time (MST)	13:06
Analyzer make	Thermo 450i	Analyzer serial #	815129098

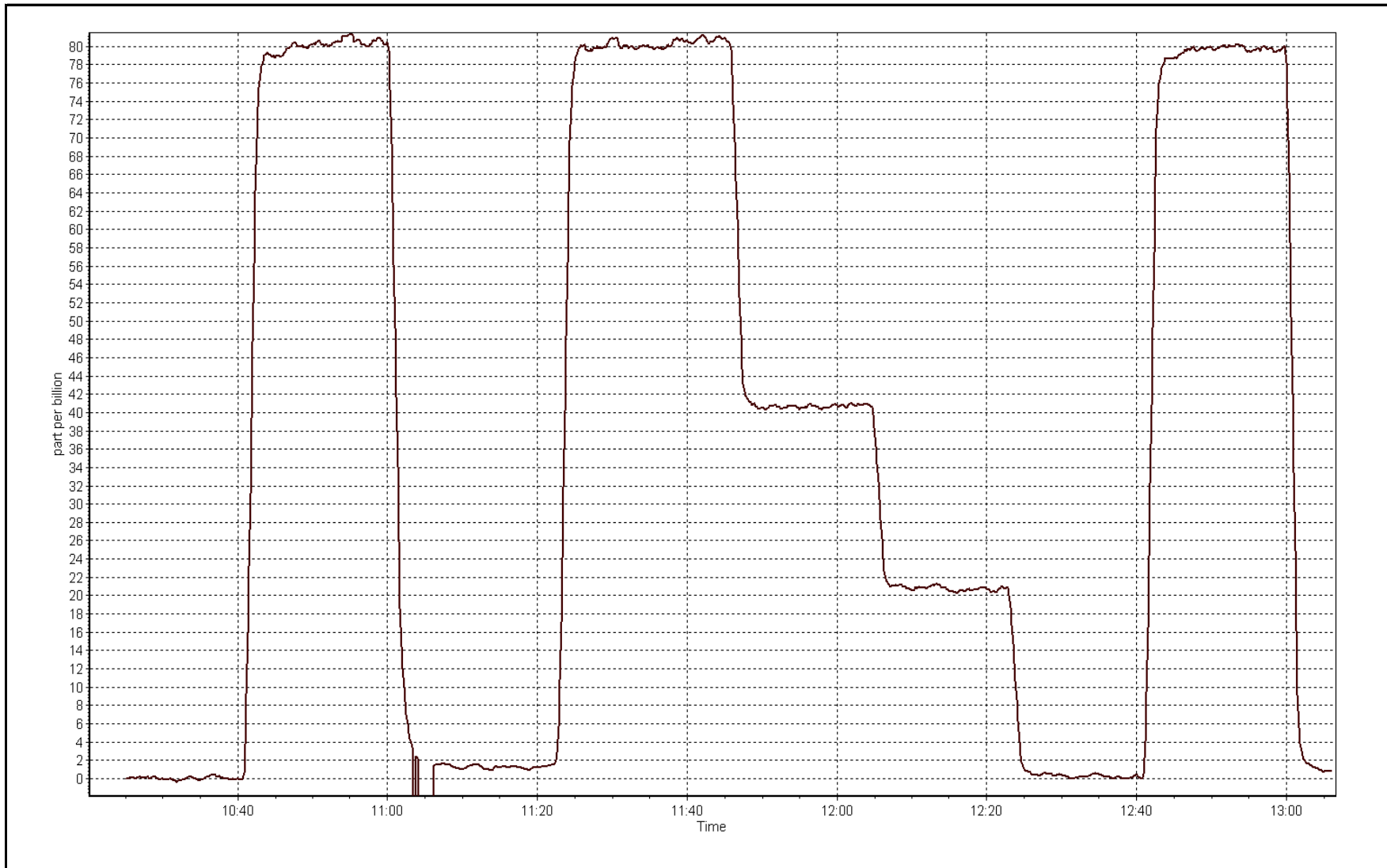
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999946
80.1	80.5	0.9952		
40.1	40.7	0.9842	Slope	0.996984
20.1	20.7	0.9720		
			Intercept	-0.304440



H2S Calibration Plot

Date: January 17, 2017





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	January 18, 2017	Last Calibration	December 15, 2016
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	10:55	End Time (MST)	14:55
Gas Cert Reference	EY0000652	Cal Gas Expiry Date	November 4, 2019
CH4 Cal Gas Conc.	513 ppm	CH4 Equiv Conc.	1057.5 ppm
C3H8 Cal Gas Conc.	198 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	6466

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	34.9	29.5
Calculated slope	0.990329	0.998873	Fuel Pressure	23.0	23.0
Calculated intercept	-0.118840	0.005337	Analyzer Coeff	3.586	3.532
			Analyzer BKG	4.76	4.95

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	0.17	----
as found span	5000	59.8	12.65	13.08	0.967
calibrator zero	5000	0.0	0.00	-0.04	----
high point	5000	59.8	12.65	12.65	1.000
second point	5000	30.0	6.35	6.33	1.002
third point	5000	15.1	3.19	3.25	0.983
as left zero	5000	0.0	0.00	-0.02	----
as left span	5000	59.8	12.65	12.63	1.001
Average Correction Factor					0.995

Corrected As found	12.91	Previous response	12.89	% change	-0.2%
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Notes:

Inlet filter changed after as founds. Adjusted the zero and the span. Replaced the ethernet cord after the 3 point calibration.

Calibration Performed By:

Jayme Marcoux



Wood Buffalo Environmental Association THC Calibration Report

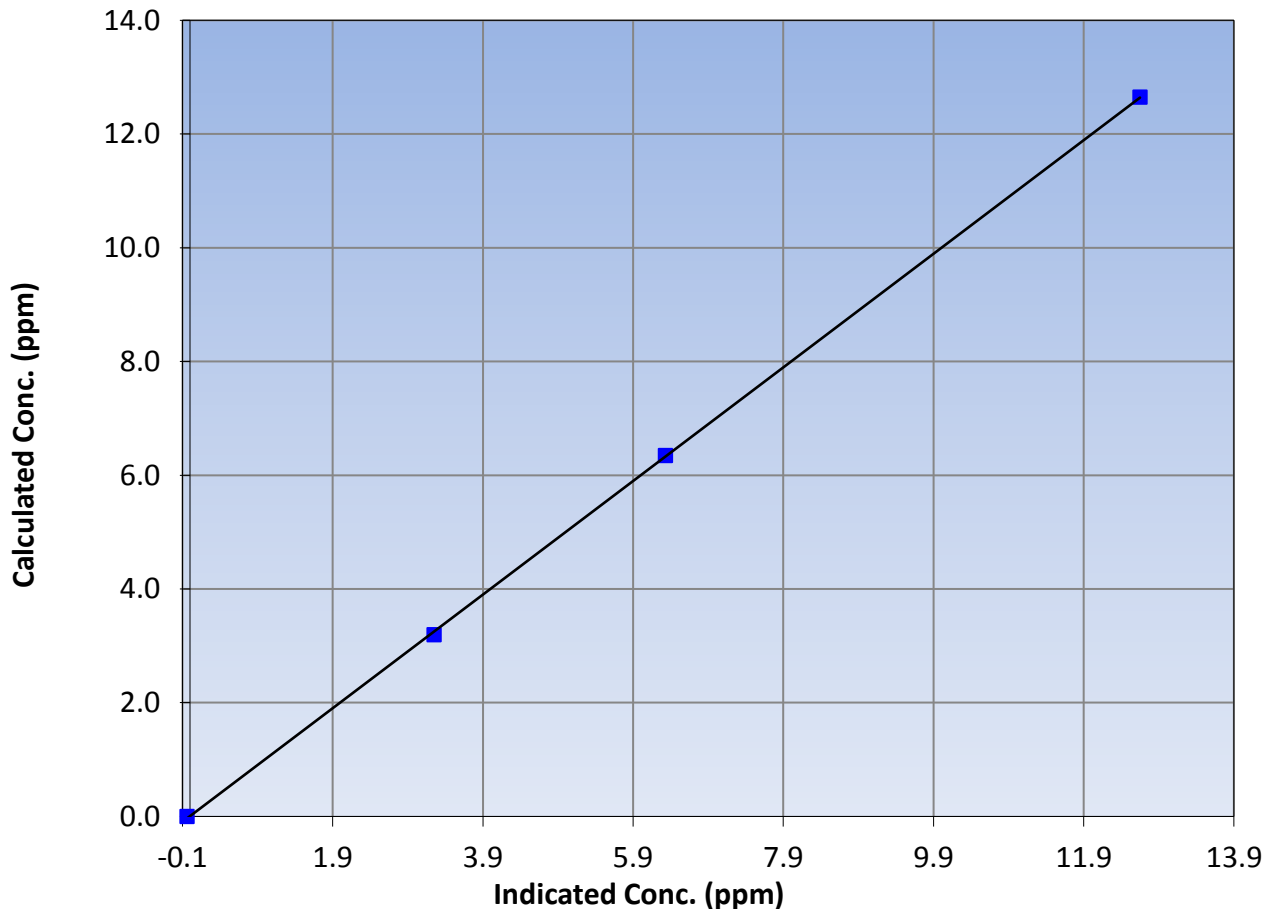
Station Information

Calibration Date	January 18, 2017	Previous Calibration	December 15, 2016
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	10:55	End Time (MST)	14:55
Analyzer make	Thermo 51i-LT	Analyzer serial #	1336160089

Calibration Data

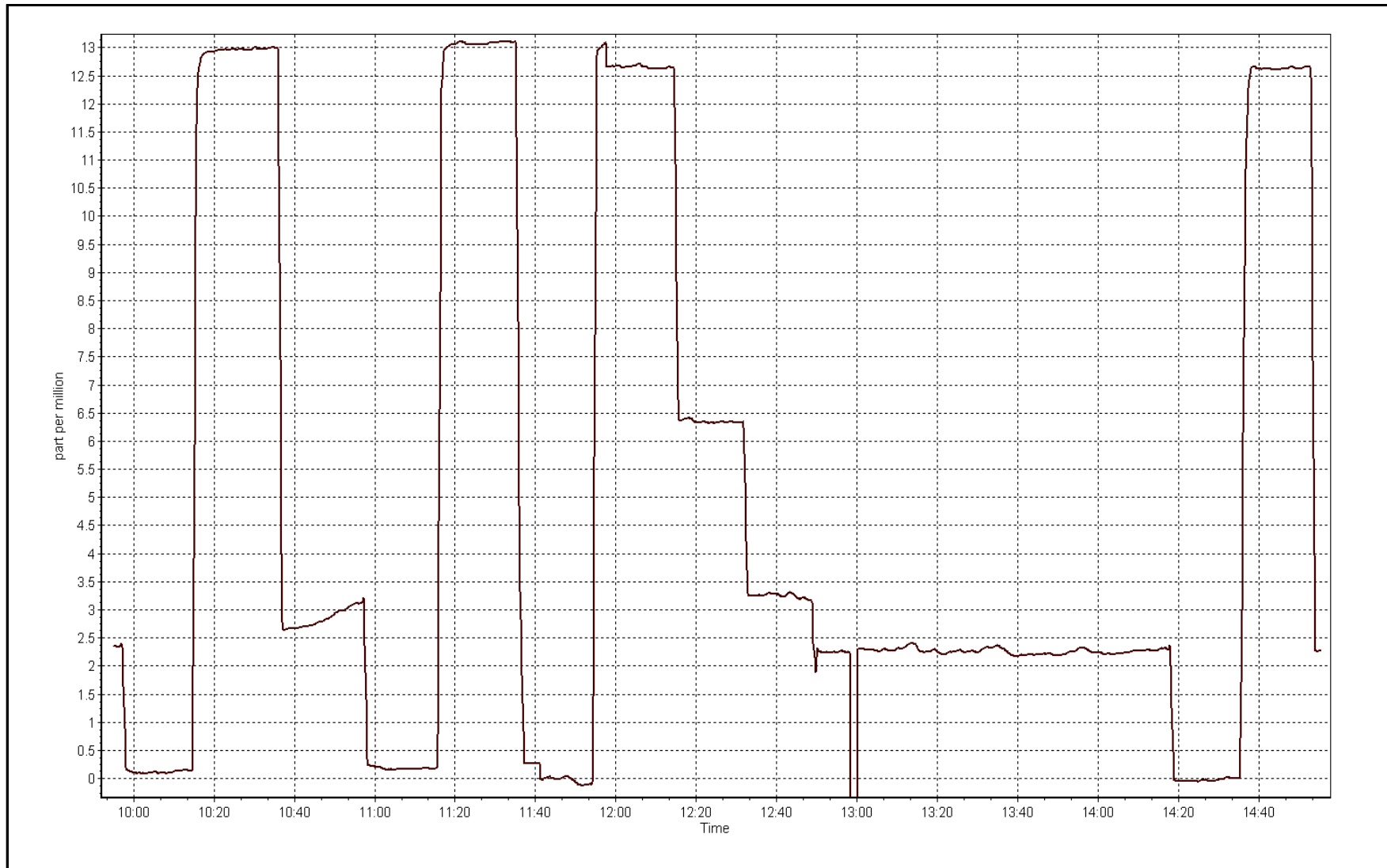
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.04	----	Correlation Coefficient	0.999944
12.65	12.65	0.9998		
6.35	6.33	1.0024	Slope	0.998873
3.19	3.25	0.9827		
			Intercept	0.005337

THC Calibration Curve



THC Calibration Plot

Date: January 18, 2017





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	January 18, 2017	Last Calibration	December 15, 2016
Station Name	Firebag	Station Number	AMS 19
Reason:	<input type="checkbox"/> Other: <input type="checkbox"/> Cylinder Removal		
Start Time (MST)	9:54	End Time (MST)	10:43
Gas Cert Reference	SA130123A	Cal Gas Expiry Date	December 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	6466

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	34.9	29.5
Calculated slope	1.003113	0.990329	Fuel Pressure	23.0	23.0
Calculated intercept	0.019583	-0.118840	Analyzer Coeff	3.586	3.586
			Analyzer BKG	4.76	4.76

Analyzer make: Thermo 51i-LT Analyzer serial #: 1336160089

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	58.3	12.74	12.98	0.981
calibrator zero	5000	0.0	0.00	0.12	----
high point	5000	58.3	12.74	12.98	0.981
second point					
third point					
as left zero					
as left span					
Average Correction Factor					0.981

Corrected As found: 12.86 Previous response: 12.68 % change: -1.4%

Notes:

Inlet filter changed after as founds. Adjusted the zero.

Calibration Performed By:

Jayne Marcoux



Wood Buffalo Environmental Association THC Calibration Report

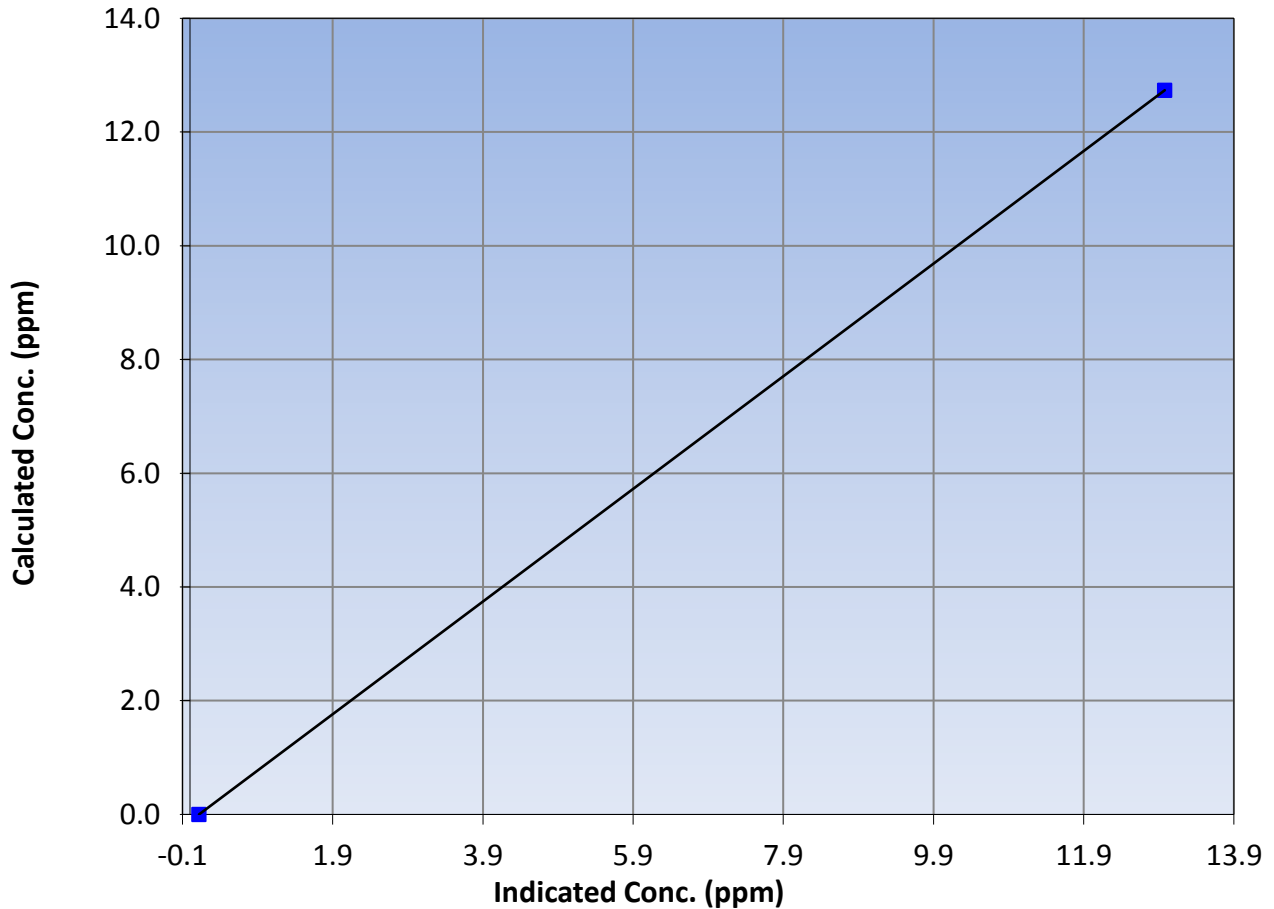
Station Information

Calibration Date	January 18, 2017	Previous Calibration	December 15, 2016
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:54	End Time (MST)	10:43
Analyzer make	Thermo 51i-LT	Analyzer serial #	1336160089

Calibration Data

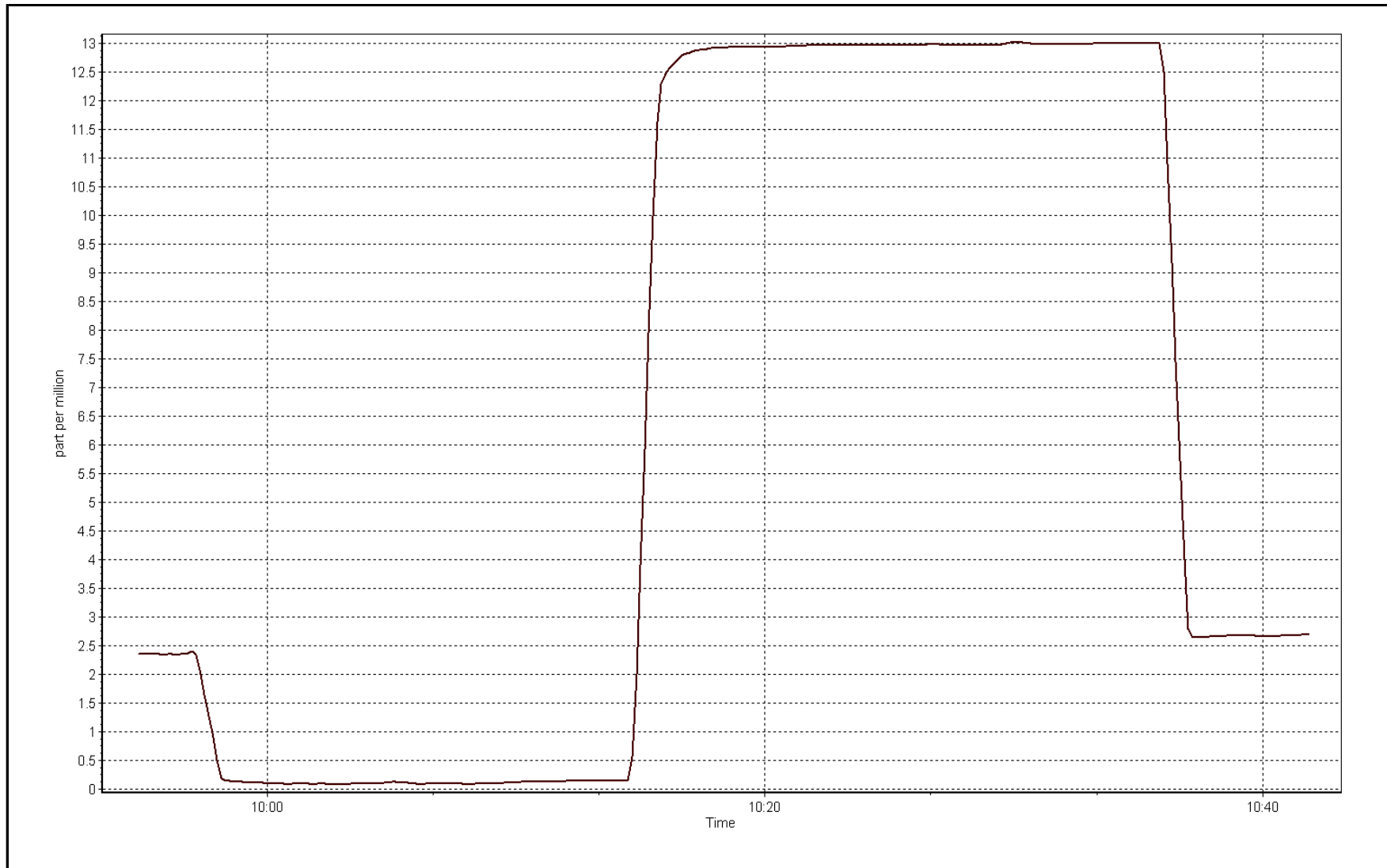
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.12	----	Correlation Coefficient	1.000000
12.74	12.98	0.9812		
			Slope	0.990329
			Intercept	-0.118840

THC Calibration Curve



THC Calibration Plot

Date: January 18, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 18, 2017	Previous Calibration	December 15, 2016
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	10:55	End Time (MST)	14:56
NO Cal Gas Conc	50.2 ppm	Gas Cert Reference	EY0000652
NOx Cal Gas Conc	50.2 ppm	Cal Gas Expiry Date	November 4, 2017
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.	6466
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.011420	1.013537	
	Data Offset	0.080914	0.111489	
Current Calibration	Data Slope	1.003446	1.004006	0.988380
	Data Offset	-1.392416	-1.397119	-0.070345

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	0.883		0.912	
NOx coefficient	1.000		1.000	
NO2 coefficient	1.000		1.000	
NO bkgrnd	3.8		4.0	
NOx bkgrnd	3.9		4.1	
Chamber Temp	50.7	Deg C	50.6	Deg C
Moly Temp	325	Deg C	322.6	Deg C
PMT voltage	-780.3	V	-780.3	V
PMT Temp	-2.7	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	158.9	mmHg	154.9	mmHg
R Cell Press Nox	158.6	mmHg	154.9	mmHg
NO sample flow	0.66	lpm	0.622	lpm
Nox sample Flow	0.658	lpm	0.623	lpm

Notes:

Inlet filter changed after as founds. Adjusted the span. Used second GPT point as the reference point.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

January 18, 2017

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	0.0	0.0	0.1	----	----
as found span	5000	59.8	600.4	600.4	0.0	566.0	565.5	0.6	1.0607	1.0618
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.1	----	----
high point	5000	59.8	600.4	600.4	0.0	599.0	598.7	0.4	1.0023	1.0029
second point	5000	30.0	301.2	301.2	0.0	302.2	302.2	0.0	0.9968	0.9969
third point	5000	15.1	151.6	151.6	0.0	153.9	153.8	0.1	0.9852	0.9859
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
as left span	5000	59.8	600.4	292.3	308.1	590.6	286.1	304.5	1.0166	1.0218
Average Correction Factor									0.9947	0.9952

Corrected As found
Previous Response

NO_x= 566.0
NO_x= 593.5

NO= 565.5
NO= 592.3

Percent Change

NO_x= 4.9%

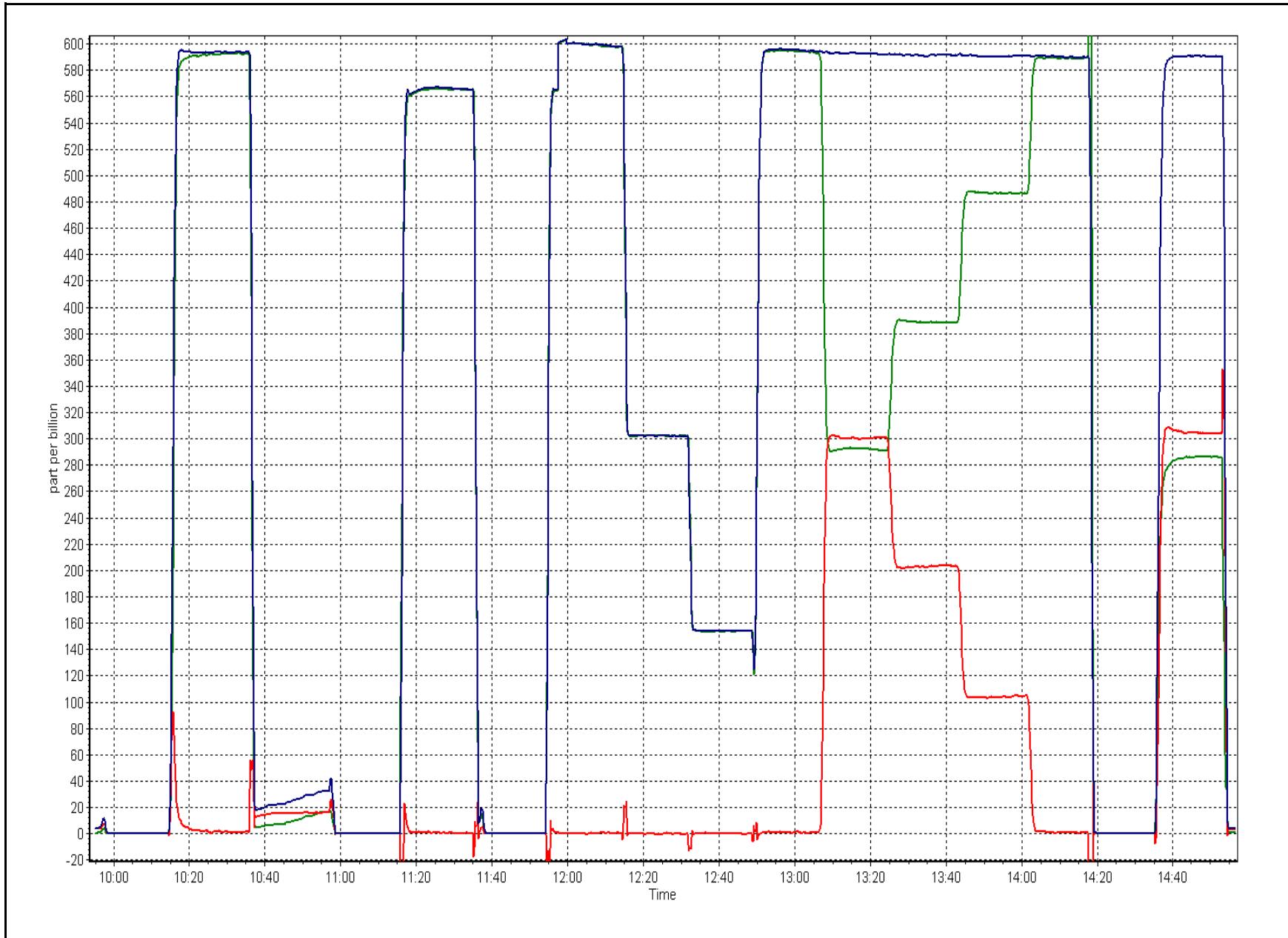
NO= 4.7%

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 59.80 ccm NOx ref calc conc = 600.4 ppb NO ref calc conc = 600.4 ppb

O3 Setpoint (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
1st NO ref point		0.0	590.0	589.1	0.1	1.0176	1.0192	----	----
1st NO2 (300)	292.3	296.8	592.7	292.3	300.4	1.0130	----	0.9880	101.2%
2nd NO2 (200)	388.4	200.7	591.5	388.4	203.1	1.0151	----	0.9884	101.2%
3rd NO2 (100)	486.5	102.6	590.5	486.5	104.0	1.0168	----	0.9870	101.3%
2nd NO ref point	----	0.0	590.0	589.1	0.9	1.0176	1.0192	----	----
Average Correction Factor						1.0156		0.9878	101.2%

Calibration Performed By: Jayne Marcoux





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 18, 2017	Previous Calibration	December 15, 2016
Station Name	Firebag	Station Number	AMS 19
Reason:	Other: <input type="checkbox"/> Cylinder Removal		
Start Time (MST)	9:54	End Time (MST)	10:43
NO Cal Gas Conc	51.5 ppm	Gas Cert Reference	SA130123A
NOX Cal Gas Conc	51.5 ppm	Cal Gas Expiry Date	December 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.	6466
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.000452	0.999924	0.996613
	Data Offset	1.564121	1.704906	-0.084796
Current Calibration	Data Slope	1.011420	1.013537	
	Data Offset	0.080914	0.111489	

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	0.862		0.862	
NOX coefficient	1.000		1.000	
NO2 coefficient	1.000		1.000	
NO bkgrnd	3.8		3.8	
NOX bkgrnd	3.8		3.8	
Chamber Temp	50.4	Deg C	50.4	Deg C
Moly Temp	327.4	Deg C	327.4	Deg C
PMT voltage	-780.3	V	-780.3	V
PMT Temp	-2.7	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	156.2	mmHg	156.2	mmHg
R Cell Press Nox	156.2	mmHg	156.2	mmHg
NO sample flow	0.63	lpm	0.63	lpm
Nox sample Flow	0.629	lpm	0.629	lpm

Notes:

Inlet filter changed after as founds. Adjusted the span.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

January 18, 2017

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	-0.1	-0.1	0.0	----	----
as found span	5000	58.3	600.5	600.5	0.0	593.6	592.4	1.3	1.0116	1.0137
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
high point	5000	58.3	600.5	600.5	0.0	593.6	592.4	1.3	1.0116	1.0137
second point										
third point										
as left zero										
as left span										
Average Correction Factor									1.0116	1.0137

Corrected As found

NO_x= 593.7

NO= 592.5

Percent Change

NO_x= 0.8%

NO= 1.1%

Previous Response

NO_x= 598.7

NO= 598.8

GPT Calibration Data

Dilution Flow (total) 5000 ccm

Source Gas Flow 58.30 ccm

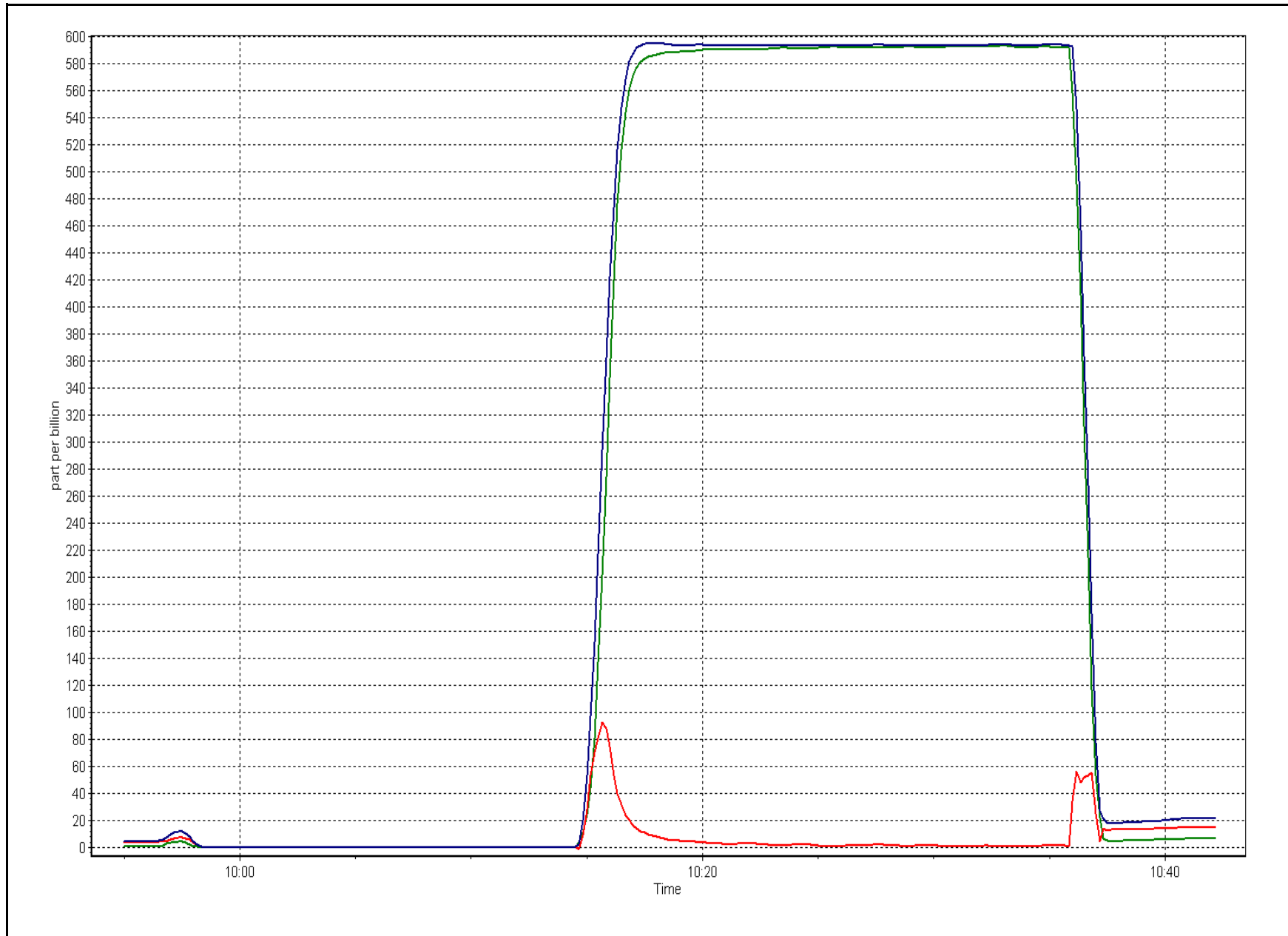
NOX ref calc conc = 600.5 ppb

NO ref calc conc = 600.5 ppb

O3 Setpoint (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
1st NO ref point		0.0			0.0			----	
1st NO2 (300)									
2nd NO2 (200)									
3rd NO2 (100)									
2nd NO ref point		0.0							
Average Correction Factor									

Calibration Performed By:

Jayne Marcoux





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 20
BRION MACKAY RIVER
JANUARY 2017**

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

February 27, 2017



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BRION MACKAY RIVER (AMS 20)
JANUARY 2017

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	706	38	38	100.00	21	0	8	0
H2S (ppb) Average	709	34	35	99.87	1	0	1	0
THC (ppm) Average	706	38	38	100.00	4	-	2.4	-
NO2 (ppb) Average	706	38	38	100.00	21	0	13	-
NO (ppb) Average	706	38	38	100.00	27	-	5	-
NOX (ppb) Average	706	38	38	100.00	46	-	18	-
Temperature 2 m (C) Average	744	0	0	100.00	6.5	-	2.3	-
Relative Humidity (%) Average	744	0	0	100.00	97	-	94	-
Precipitation (mm) Total	742	0	2	99.73	0.5	-	1.3	-
Wind Speed 10 m (km/h) Average	732	0	12	98.39	24	-	11	-
Wind Direction 10 m (deg) Average	732	0	12	98.39	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BRION MACKAY RIVER (AMS 20)
 JANUARY 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile							
					Min	P10	Q1	Median	Q3	P90	Max	
SO2 (ppb) Average	706	0.8	3	-	0	0	0	0	0	0	1	21
H2S (ppb) Average	709	0.2	0	-	0	0	0	0	0	0	0	1
THC (ppm) Average	706	2.2	0.2	-	1.9	2.1	2.1	2.2	2.2	2.2	2.3	4
NO2 (ppb) Average	706	2.6	4	-	0	0	1	1	3	7	21	
NO (ppb) Average	706	0.4	2	-	0	0	0	0	0	0	27	
NOX (ppb) Average	706	2.9	5	-	0	0	1	1	3	7	46	
Temperature 2 m (C) Average	744	-12.56	10.6	-	-38.2	-27	-20.6	-13.1	-2.6	1.3	6.5	
Relative Humidity (%) Average	744	81.1	8	-	55	71	76	81	87	91	97	
Precipitation (mm) Total	742	-	-	3.16	-	-	-	-	-	-	-	
Wind Speed 10 m (km/h) Average	732	5.9	3	-	0	2	4	6	8	10	24	
Wind Direction 10 m (deg) Average	732	-	-	-	-	-	-	-	-	-	-	

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BRION MACKAY RIVER (AMS 20)
 JANUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S	23 Jan 2017 17:00	23 Jan 2017 17:00	1	Maintenance - manifold cleaning
Precipitation Collector	23 Jan 2017 12:00	23 Jan 2017 13:00	2	Maintenance - precipitation bucket cleaned
Wind Speed, Wind Direction	08 Jan 2017 05:00	08 Jan 2017 05:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	23 Jan 2017 02:00	23 Jan 2017 02:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	23 Jan 2017 04:00	23 Jan 2017 11:00	8	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	23 Jan 2017 12:00	23 Jan 2017 12:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	23 Jan 2017 17:00	23 Jan 2017 17:00	1	Flat line in sensor output signal -sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Brion MacKay River - January 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 21 ppb on Jan 23 01:00	Maximum Daily Average: 8.4 ppb on Jan 19		Hours of Data:	706
Minimum Value: 0 ppb on Jan 1 02:00	Minimum Daily Average: 0.0 ppb on Jan 2		Hours of Missing Data:	38
Maximum Diurnal Average: 1.3 ppb at hour 1	Minimum Diurnal Average: 0.4 ppb at hour 3		Hours of Calibration:	38
Monthly Average: 0.8 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 15		Percent Operational Time:	100.0

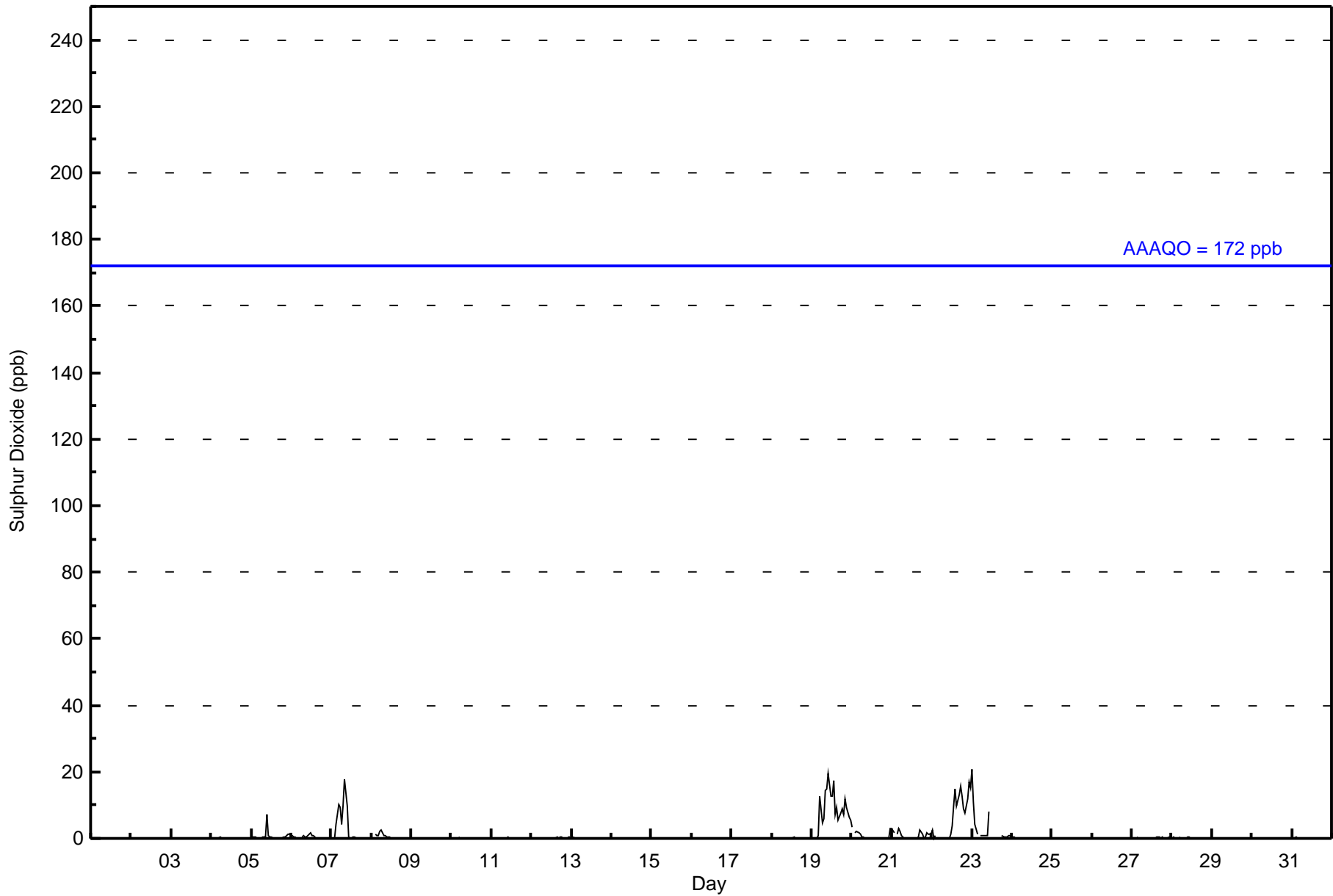
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
2-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
3-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
4-Jan	0	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
5-Jan	0	0	0	0	Z	0	0	0	0	7	1	1	0	0	0	0	0	0	0	0	0	1	1	1	0.7	7
6-Jan	1	1	0	0	0	Z	0	1	1	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0.4	2
7-Jan	Z	0	0	4	10	9	4	10	18	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2.9	18
8-Jan	0	Z	1	1	1	2	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3
9-Jan	0	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
10-Jan	0	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
11-Jan	0	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
12-Jan	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
13-Jan	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
14-Jan	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
15-Jan	0	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
16-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
17-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
18-Jan	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
19-Jan	Z	0	0	0	1	13	5	6	14	15	19	13	13	17	7	9	5	7	9	7	12	10	6	5	8.4	19
20-Jan	3	Z	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0.7	3
21-Jan	3	2	Z	1	3	2	1	0	0	0	0	0	0	0	0	0	0	2	1	0	1	2	1	1	0.9	3
22-Jan	2	0	1	Z	0	0	0	0	0	0	1	4	10	15	10	13	16	13	9	8	12	17	15	6.3	17	
23-Jan	21	11	4	1	Z	1	1	1	1	1	8	C	C	C	C	C	C	C	1	1	1	0	1	1	--	21
24-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
25-Jan	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
26-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
27-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
28-Jan	0	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
29-Jan	0	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
30-Jan	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
31-Jan	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
	1.3	0.6	0.4	0.4	0.7	1.2	0.5	0.6	1.2	1.1	1.0	0.6	0.7	1.0	0.8	0.7	0.7	0.9	0.8	0.6	0.7	0.8	0.9	0.9		Diurnal Average
	21	11	4	4	10	13	5	10	18	15	19	13	13	17	15	10	13	16	13	9	12	12	17	15		Diurnal Maximum

Z - zerospan C - Calibration
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Brion MacKay River - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Sulphur Dioxide (SO₂) - ppb
Brion MacKay River - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	688	97.45	97.45
11 - 20	17	2.41	99.86
21 - 60	1	0.14	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



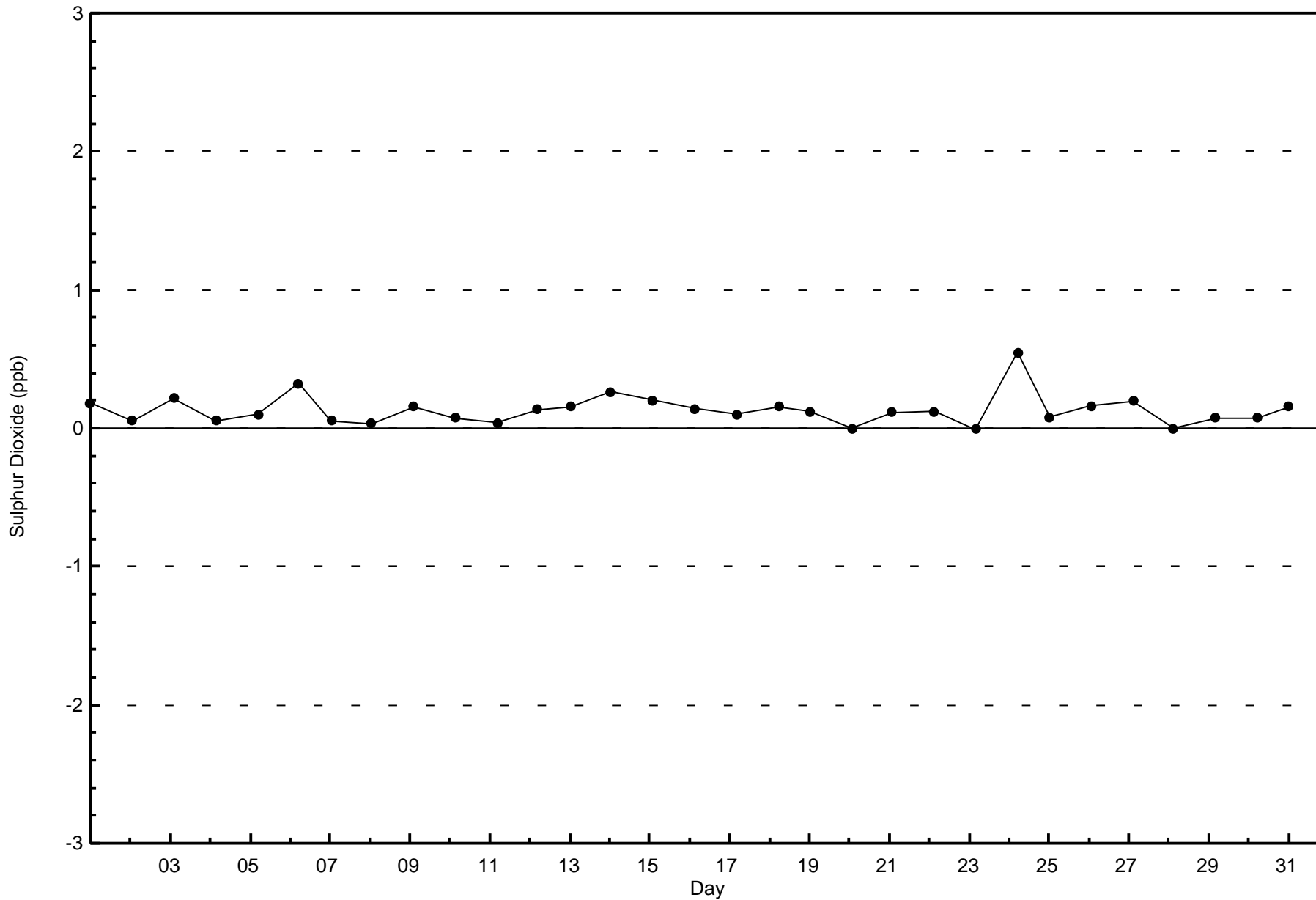
Wood Buffalo Environmental Association
Frequency Distribution

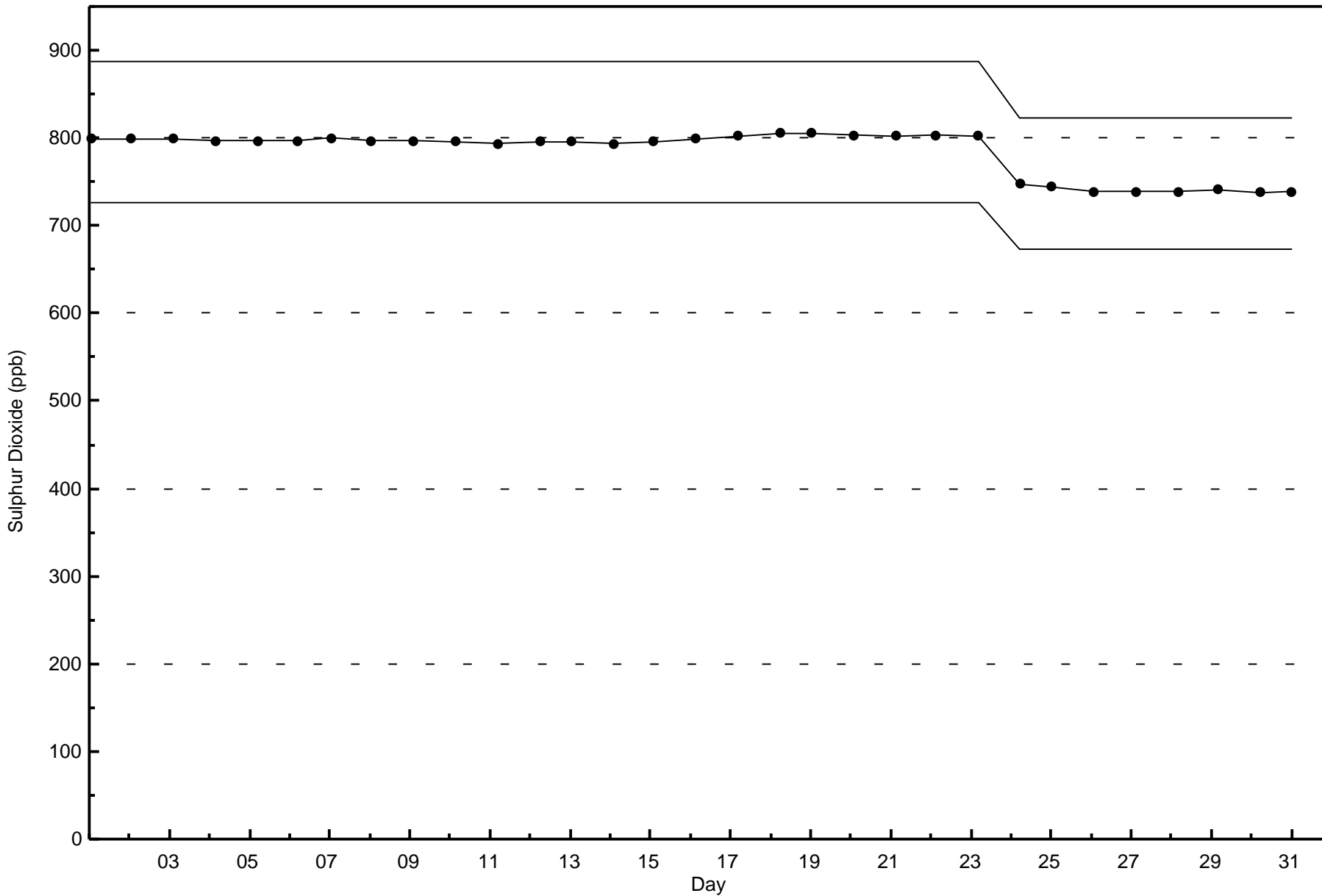
Sulphur Dioxide (SO₂) - ppb
Brion MacKay River - January 2017

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	12	60	28	0	2	4	16	55	82	117	62	88	87	26	15	26	680
11 - 20	0	11	5	0	0	0	0	0	0	0	0	0	0	0	0	0	16
21 - 60	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	12	72	33	0	2	4	16	55	82	117	62	88	87	26	15	26	697

Total Number of Valid Hours: 697

Total Number of Hours: 744







Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H₂S) - ppb

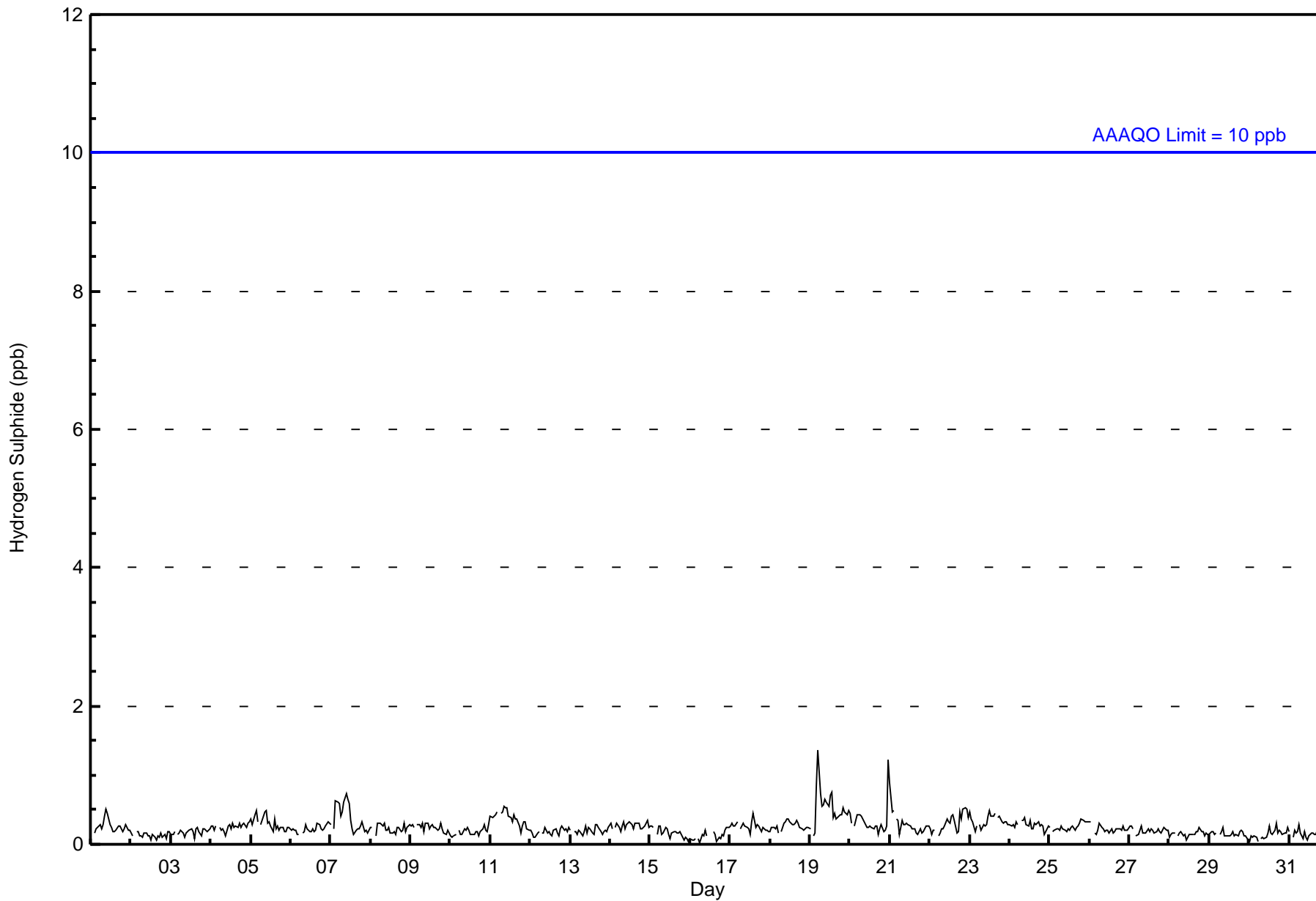
Brion MacKay River - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744										Daily Average		Daily Maximum					
Maximum Value: 1 ppb on Jan 19 06:00										Maximum Daily Average: 0.5 ppb on Jan 19										Hours of Data: 709							
Minimum Value: 0 ppb on Jan 16 07:00										Minimum Daily Average: 0.1 ppb on Jan 16										Hours of Missing Data: 35							
Maximum Diurnal Average: 0.3 ppb at hour 10										Minimum Diurnal Average: 0.2 ppb at hour 3										Hours of Calibration: 34							
Monthly Average: 0.2 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 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-Jan	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
2-Jan	0	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	
3-Jan	0	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	
4-Jan	0	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	
5-Jan	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	
6-Jan	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	
7-Jan	0	Z	0	1	1	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
8-Jan	0	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	
9-Jan	0	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	
10-Jan	0	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	
11-Jan	0	0	0	0	0	Z	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
12-Jan	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	
13-Jan	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	
14-Jan	0	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	
15-Jan	0	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	
16-Jan	0	0	0	0	Z	0	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0.1	0	
17-Jan	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	
18-Jan	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	
19-Jan	0	Z	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0.5	1	
20-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1	
21-Jan	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	
22-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0.3	1
23-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0.3	0	
24-Jan	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	
25-Jan	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	
26-Jan	0	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	
27-Jan	0	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	
28-Jan	0	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	
29-Jan	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	
30-Jan	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	
31-Jan	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	
0.3										0.2										Diurnal Average							
1										0										Diurnal Maximum							
Z - zerospan										C - Calibration										M - Maintenance							
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb										24-hr 3 ppb																	



Wood Buffalo Environmental Association
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Brion MacKay River - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Brion MacKay River - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
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



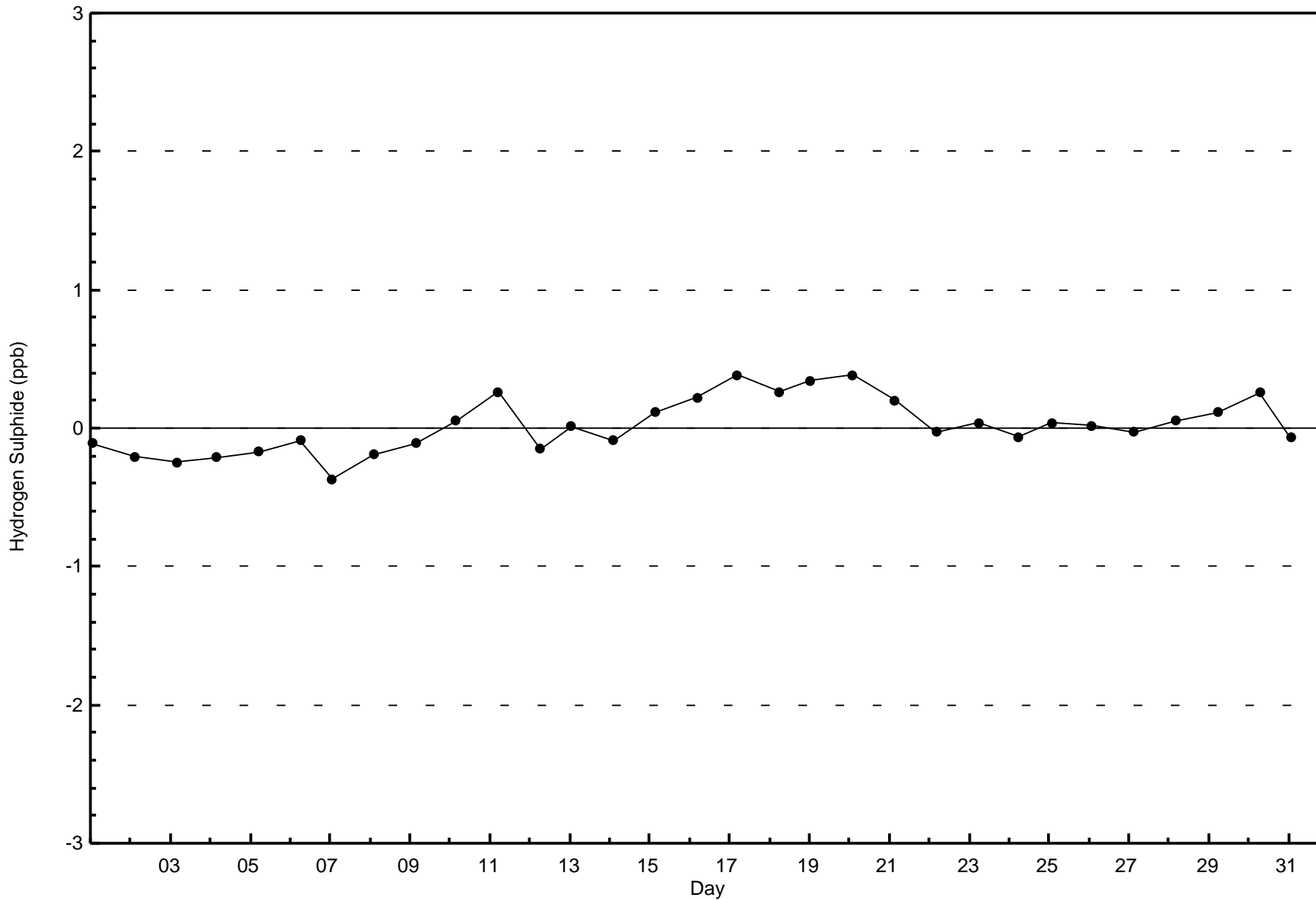
**Wood Buffalo Environmental Association
Frequency Distribution**

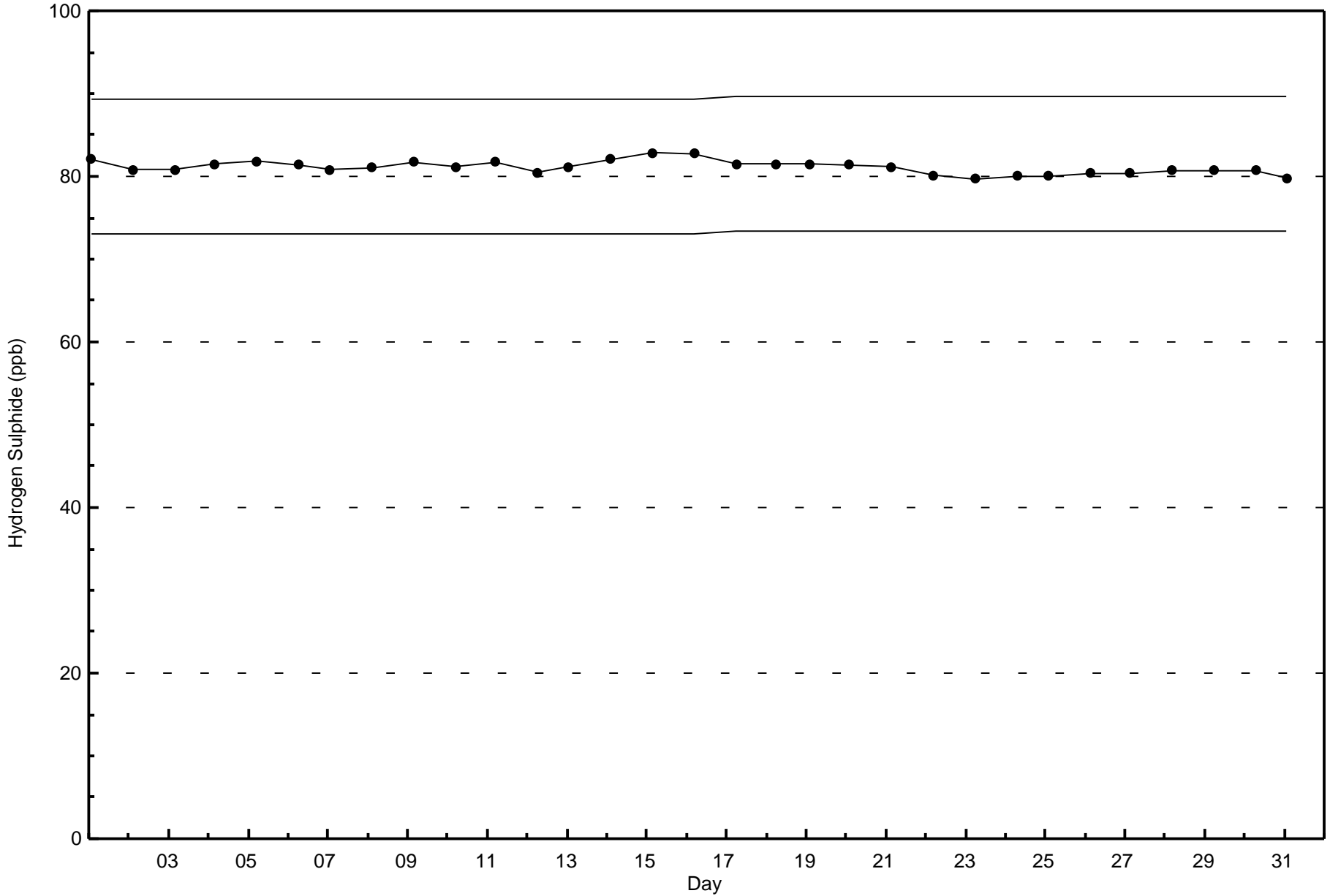
**Hydrogen Sulphide (H₂S) - ppb
Brion MacKay River - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	12	73	32	1	1	4	17	58	84	111	64	88	88	26	14	26	699
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
Totals	12	73	32	1	1	4	17	58	84	111	64	88	88	26	14	26	699

Total Number of Valid Hours: 699

Total Number of Hours: 744



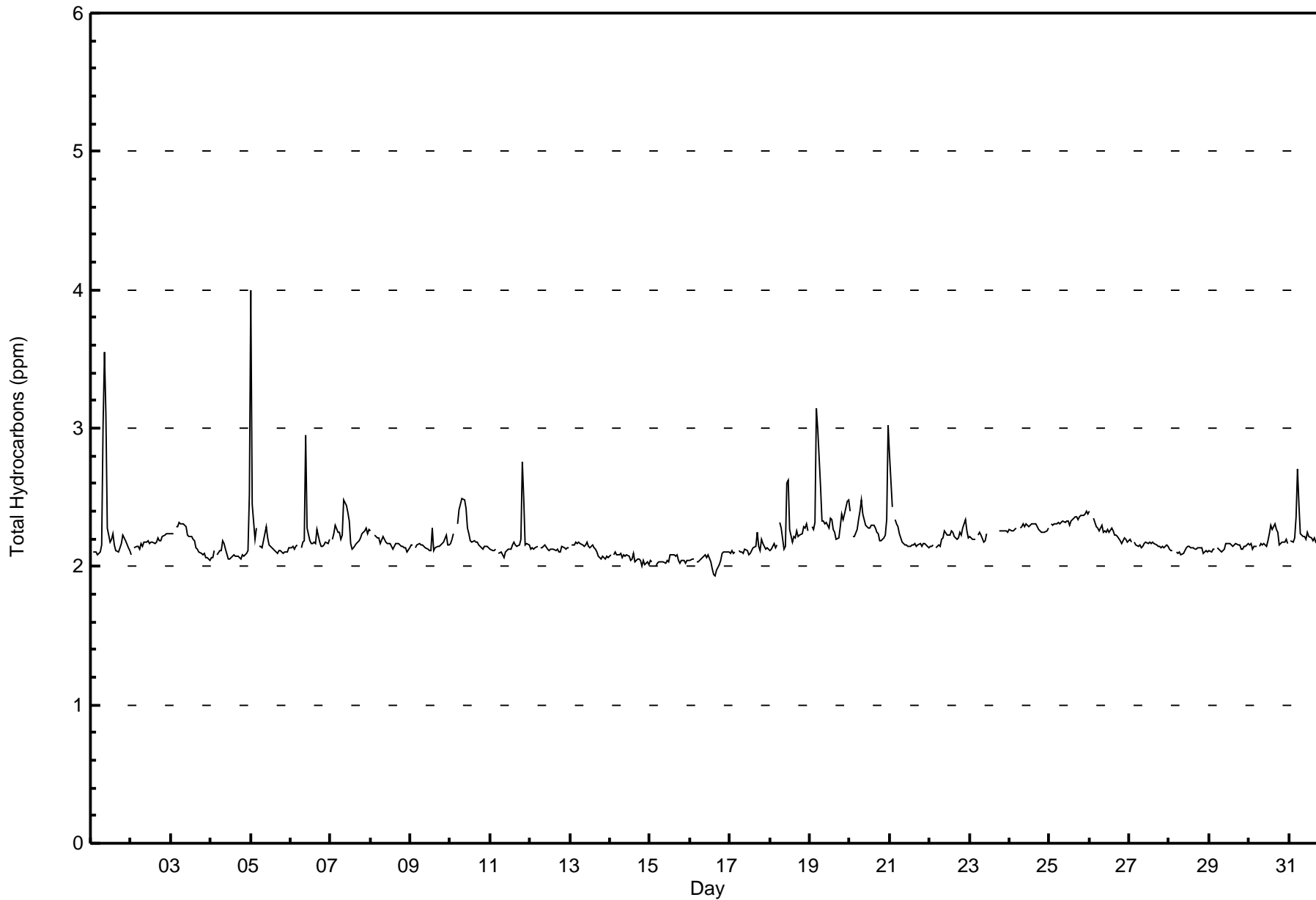




Wood Buffalo Environmental Association
Summary of Hour Averages

Total Hydrocarbons (THC) - ppm
Brion MacKay River - January 2017

Maximum Value: 4.0 ppm on Jan 5 01:00 Maximum Daily Average: 2.4 ppm on Jan 19		Hours in Service: 744 Hours of Data: 706 Hours of Missing Data: 38 Hours of Calibration: 38 Percent Operational Time: 100.0																								
Minimum Value: 1.9 ppm on Jan 16 16:00 Minimum Daily Average: 2.0 ppm on Jan 15 Maximum Diurnal Average: 2.3 ppm at hour 1 Minimum Diurnal Average: 2.2 ppm at hour 18 Monthly Average: 2.20 ppm Percentiles: P ₁ = 2.0 P ₁₀ = 2.1 Q ₁ = 2.1 Median = 2.2 Q ₃ = 2.2 P ₉₀ = 2.3 P ₉₉ = 3.0																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	Z	2.1	2.1	2.1	2.1	2.1	2.2	3.0	3.6	3.1	2.3	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	2.3	3.6
2-Jan	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
3-Jan	2.2	2.2	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	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	2.0	2.3	
4-Jan	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.2	2.2	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.5	2.5	
5-Jan	4.0	2.5	2.2	2.3	Z	2.2	2.1	2.1	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	4.0	
6-Jan	2.1	2.1	2.1	2.1	2.2	Z	2.1	2.2	2.2	2.9	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.9	
7-Jan	Z	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.5	2.4	2.4	2.3	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.3	2.5	
8-Jan	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.3	
9-Jan	2.2	2.2	Z	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.3	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.3	
10-Jan	2.2	2.2	2.2	Z	2.3	2.4	2.5	2.5	2.5	2.4	2.3	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	2.5	
11-Jan	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	2.1	2.2	2.2	2.8	2.5	2.2	2.2	2.2	2.8	
12-Jan	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	
13-Jan	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.2	
14-Jan	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	2.1	2.1	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	
15-Jan	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	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	
16-Jan	2.0	2.1	2.1	Z	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	
17-Jan	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.3	
18-Jan	2.1	2.1	2.2	2.1	2.2	Z	2.3	2.3	2.1	2.1	2.6	2.6	2.3	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.6	
19-Jan	Z	2.3	2.3	2.3	3.1	3.0	2.6	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.4	2.3	2.4	2.5	2.5	3.1	
20-Jan	2.4	Z	2.2	2.2	2.3	2.3	2.4	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	3.0	3.0		
21-Jan	2.8	2.4	Z	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.2	2.2	2.1	2.1	2.8	
22-Jan	2.1	2.1	2.2	Z	2.1	2.2	2.1	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.3	2.2	2.3	
23-Jan	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	C	C	C	C	C	C	C	C	2.3	2.3	2.3	2.3	2.3	2.3	
24-Jan	2.3	2.3	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.3	2.3	
25-Jan	Z	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	2.3	2.4	2.4	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	
26-Jan	2.4	Z	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	
27-Jan	2.2	2.2	Z	2.2	2.2	2.1	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	2.1	2.1	2.2	2.1	2.1	2.2	
28-Jan	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	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	
29-Jan	2.1	2.1	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	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	
30-Jan	2.2	2.2	2.1	2.1	2.1	Z	2.1	2.2	2.2	2.2	2.1	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	
31-Jan	Z	2.2	2.2	2.2	2.4	2.7	2.5	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	2.7	
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration																										





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Brion MacKay River - January 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	40	5.67	5.67
2.1 - 3.0	662	93.77	99.43
3.1 - 10.0	4	0.57	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Brion MacKay River - January 2017

Concentration Ranges (ppm)	Wind Direction																Totals	
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW		
0 - 2.0	0	0	0	0	0	0	0	0	0	3	17	10	7	3	0	0	0	40
2.1 - 3.0	12	71	33	0	2	4	16	55	79	100	52	81	84	25	14	25	653	
3.1 - 10.0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	4	
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Totals	12	72	33	0	2	4	16	55	82	117	62	88	87	26	15	26	697	

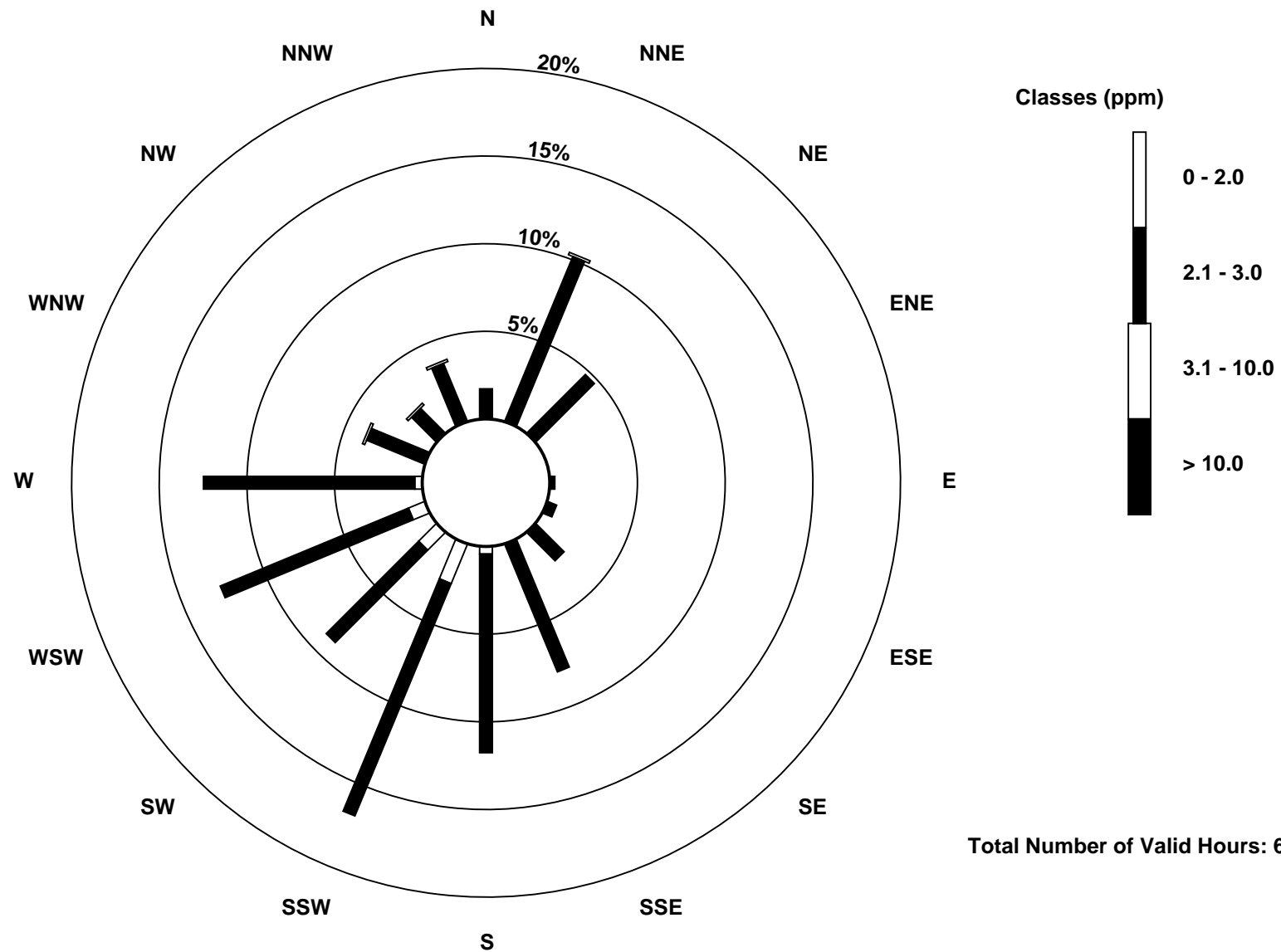
Total Number of Valid Hours: 697

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

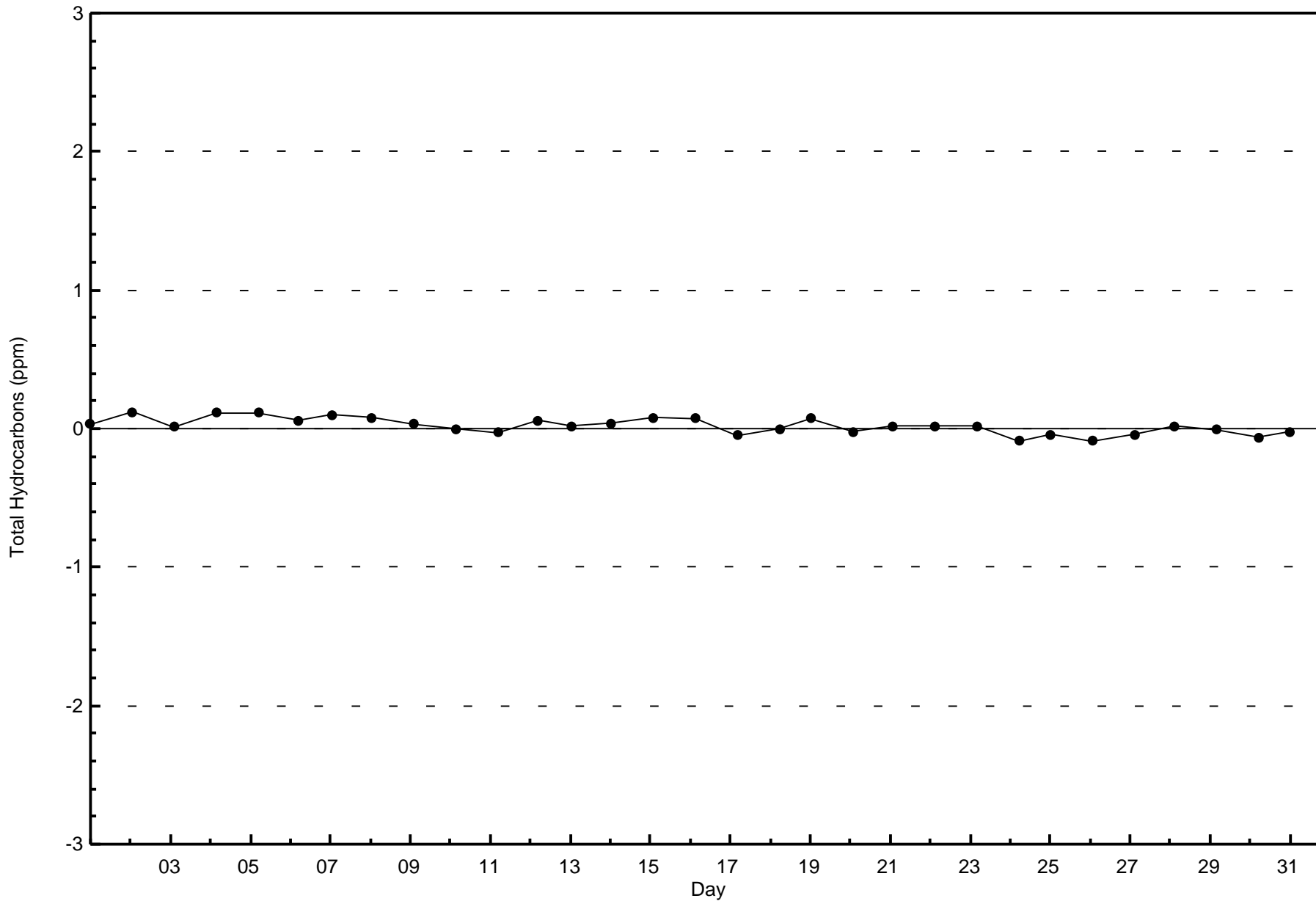
Total Hydrocarbons (THC) - ppm
Brion MacKay River (AMS 20)

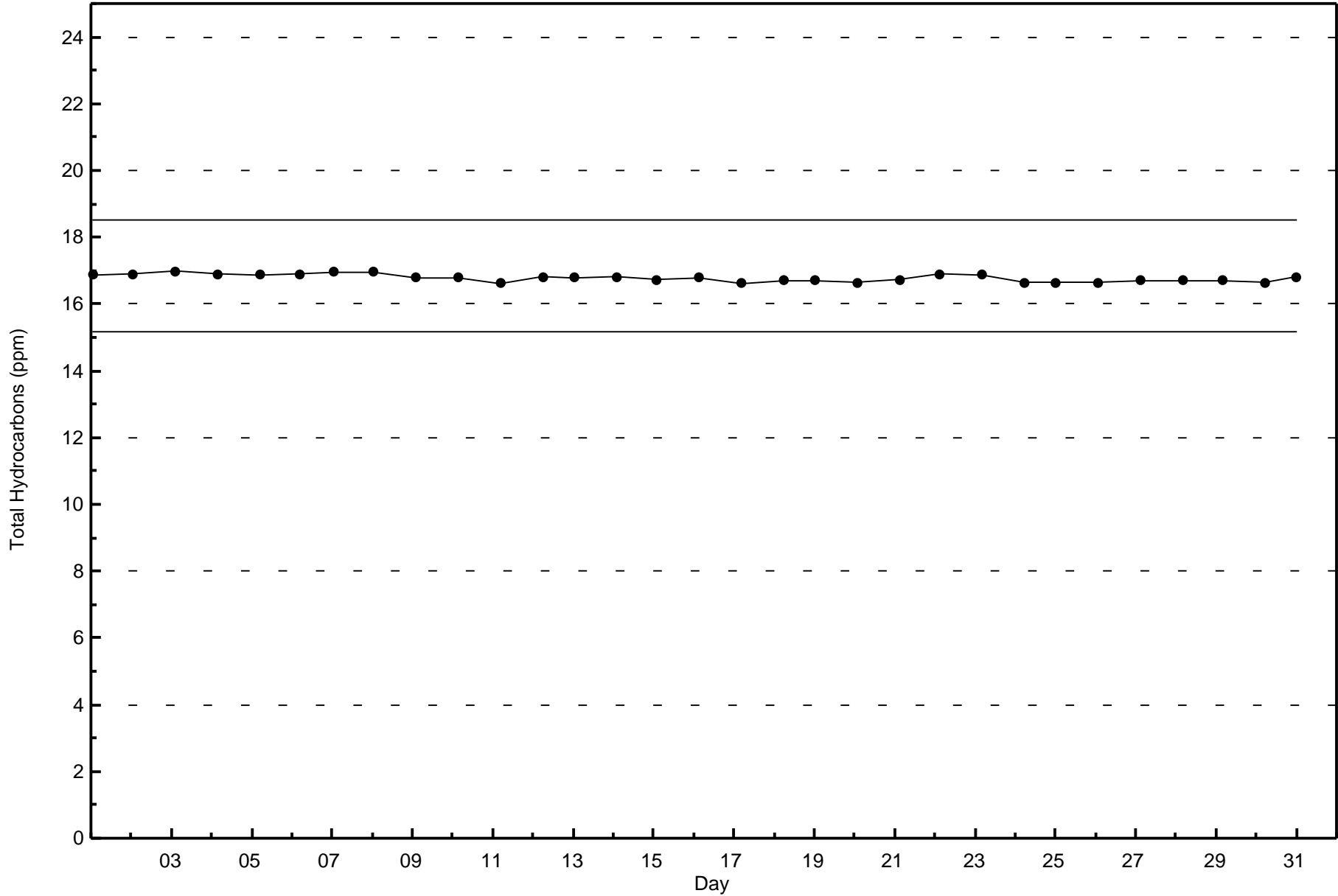




Wood Buffalo Environmental Association
Zero Responses

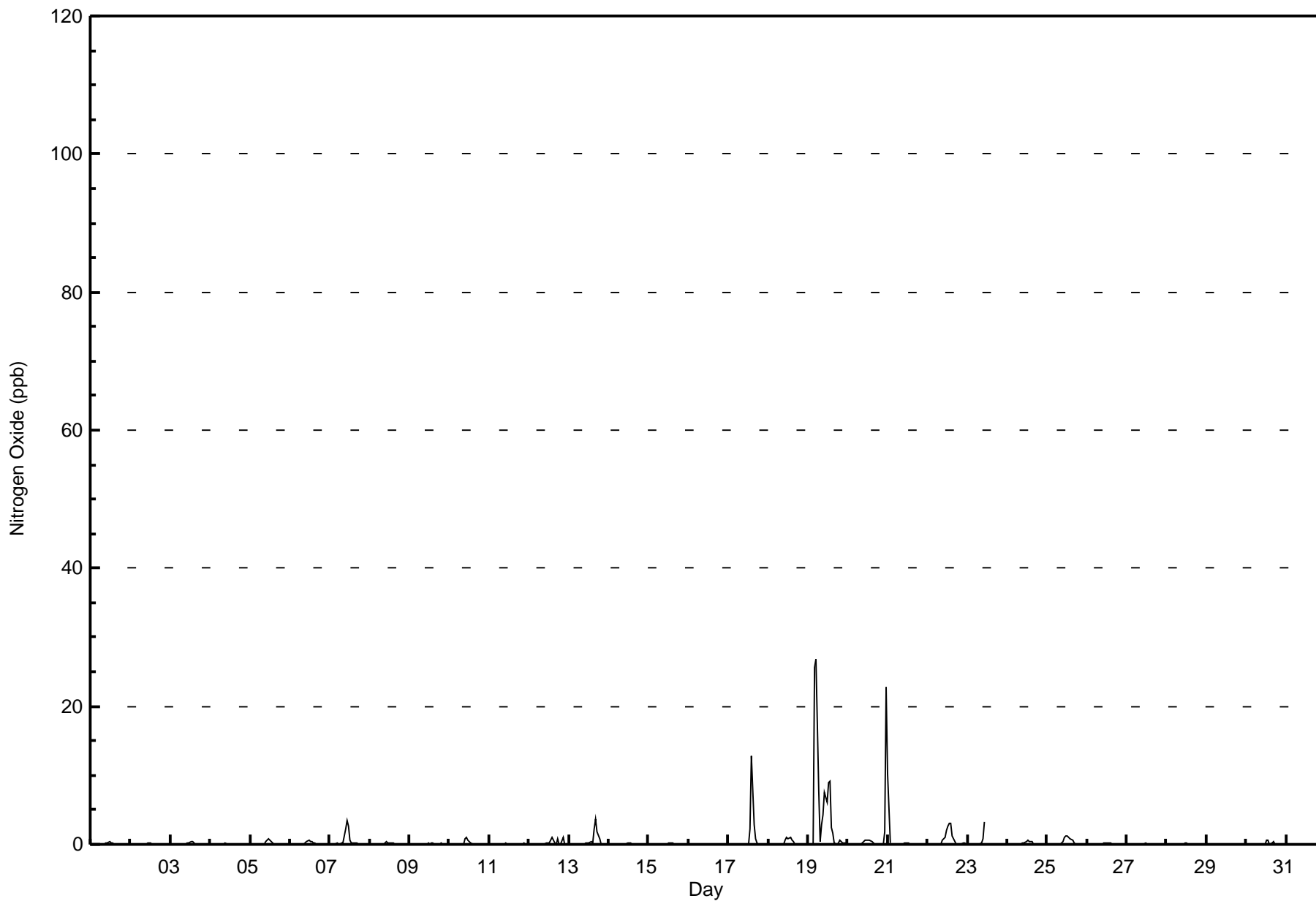
Total Hydrocarbons (THC) - ppm
Brion MacKay River - January 2017







Maximum Value: 27 ppb on Jan 19 06:00																		Maximum Daily Average: 4.6 ppb on Jan 19																		Hours in Service: 744																																																																																					
Minimum Value: 0 ppb on Jan 1 03:00																		Minimum Daily Average: 0.0 ppb on Jan 29																		Hours of Data: 706																																																																																					
Maximum Diurnal Average: 1.0 ppb at hour 6																		Minimum Diurnal Average: 0.0 ppb at hour 3																		Hours of Missing Data: 38																																																																																					
Monthly Average: 0.4 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 9																		Hours of Calibration: 38																																																																																					
																																				Percent Operational Time: 100.0																																																																																					
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																																																																																															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																																																																																																	
1-Jan	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																																																																																															
2-Jan	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																																																																																															
3-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																																																																																															
4-Jan	0	0	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																																																																																															
5-Jan	0	0	0	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.1	1																																																																																															
6-Jan	0	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																																																																																															
7-Jan	Z	0	0	0	0	0	0	0	0	2	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0.5	3																																																																																															
8-Jan	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																																																																																															
9-Jan	0	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																																																																																															
10-Jan	0	0	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																																																																																															
11-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																																																																																															
12-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	1	0	0	1	0	0	0	0.2	1																																																																																															
13-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	2	1	0	0	0	0	0	0.4	4																																																																																															
14-Jan	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																																																																																															
15-Jan	0	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																																																																																															
16-Jan	0	0	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																																																																																															
17-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	2	13	3	1	0	0	0	0	0	0	0	0	0.8	13																																																																																															
18-Jan	0	0	0	0	0	Z	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.2	1																																																																																															
19-Jan	Z	0	0	0	26	27	8	0	3	4	8	6	9	9	3	2	0	0	0	1	0	0	0	0	4.6	27																																																																																															
20-Jan	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	2	23	1.2	23																																																																																															
21-Jan	10	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	10																																																																																															
22-Jan	0	0	0	Z	0	0	0	0	0	1	1	2	3	3	3	1	0	0	0	0	0	0	0	0	0.6	3																																																																																															
23-Jan	0	0	0	0	Z	0	0	0	0	1	3	C	C	C	C	C	C	C	0	0	0	0	0	0	--	3																																																																																															
24-Jan	0	0	0	0	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.1	1																																																																																															
25-Jan	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.3	1																																																																																															
26-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																																																																																															
27-Jan	0	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																																																																																															
28-Jan	0	0	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																																																																																															
29-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																																																																																															
30-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.1	1																																																																																															
31-Jan	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																																																																																															
																		Diurnal Average				Diurnal Maximum																																																																																																			
0.4																		0.0				0.0				1.0				1.0				0.3				0.0				0.1				0.4				0.7				0.6				0.7				0.7				0.8				0.4				0.2				0.1				0.1				0.0				0.1				0.0				0.1				0.0				0.1				0.0				0.1				0.7			
10																		0				0				26				27				8				0				3				4				8				6				9				9				13				3				4				2				1				1				0				2				23																							
Z - zerospan																		C - Calibration																																																																																																							





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Brion MacKay River - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	703	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: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Brion MacKay River - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	12	71	31	0	2	4	16	55	82	117	62	88	87	26	15	26	694
21 - 40	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3
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
Totals	12	72	33	0	2	4	16	55	82	117	62	88	87	26	15	26	697

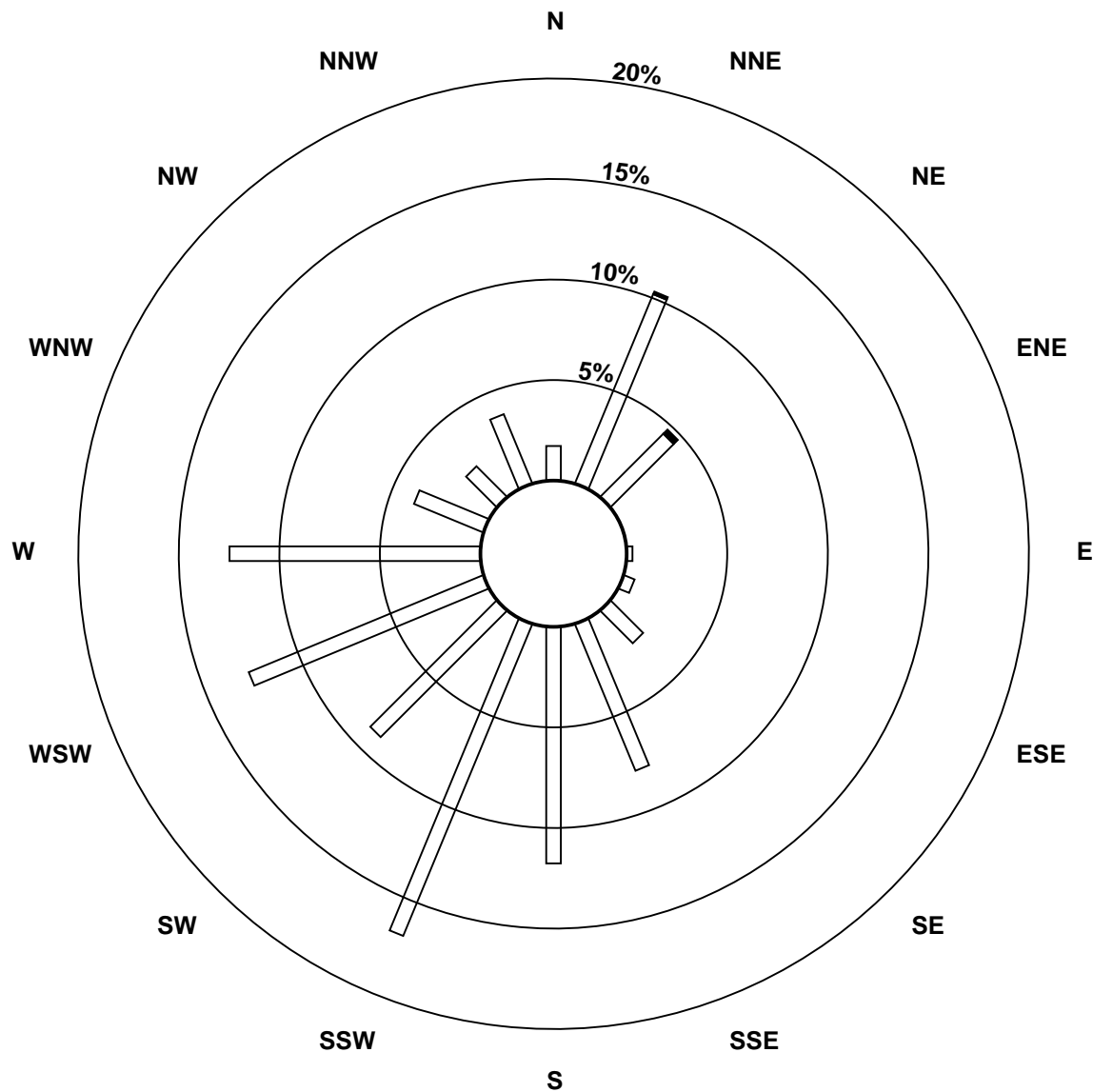
Total Number of Valid Hours: 697

Total Number of Hours: 744

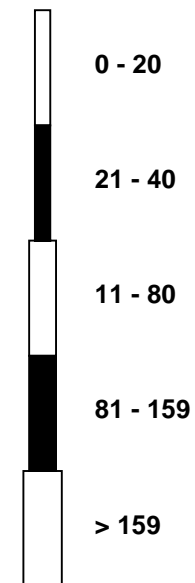


Wood Buffalo Environmental Association
Wind Rose Jan 2017

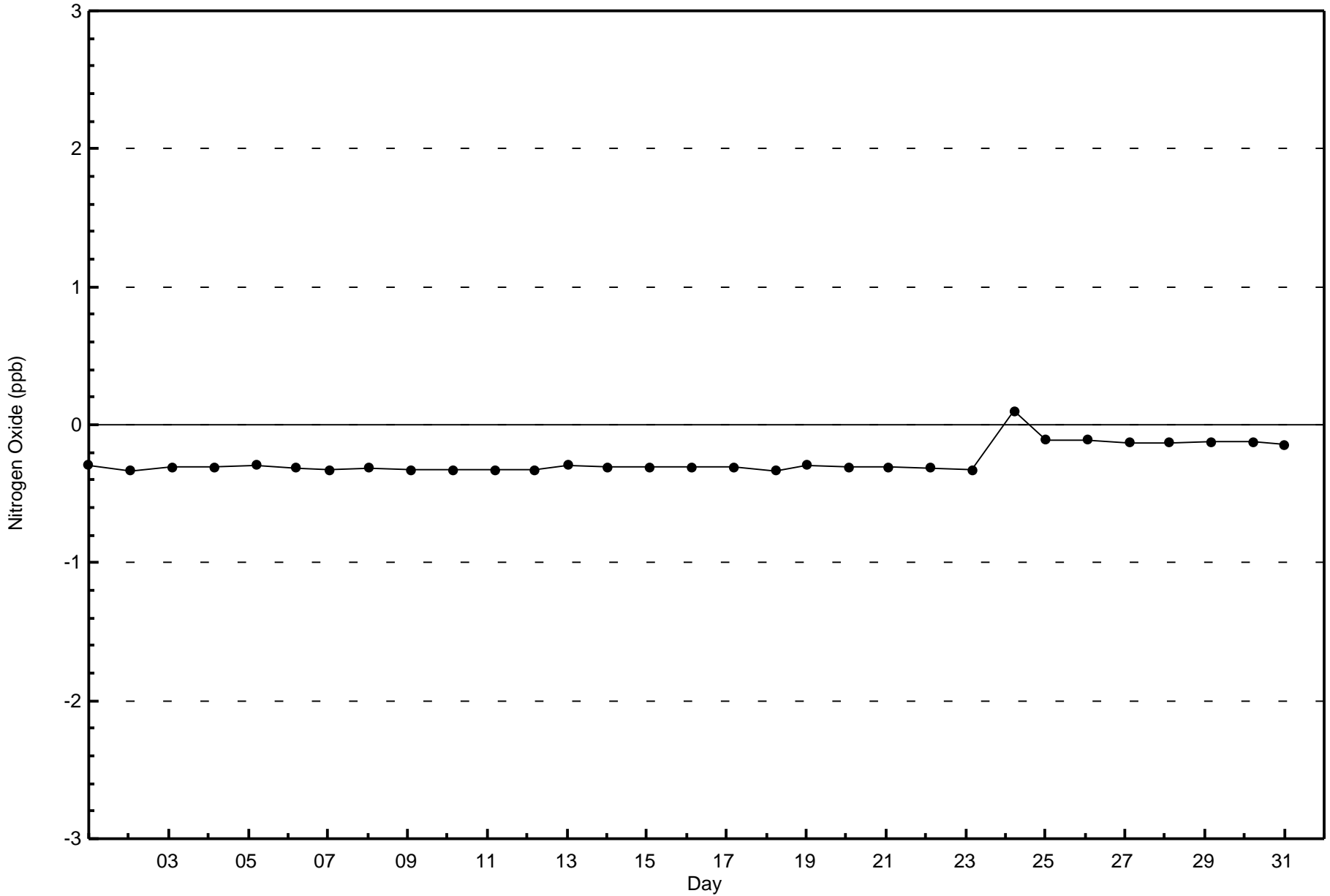
Nitrogen Oxide (NO) - ppb
Brion MacKay River (AMS 20)

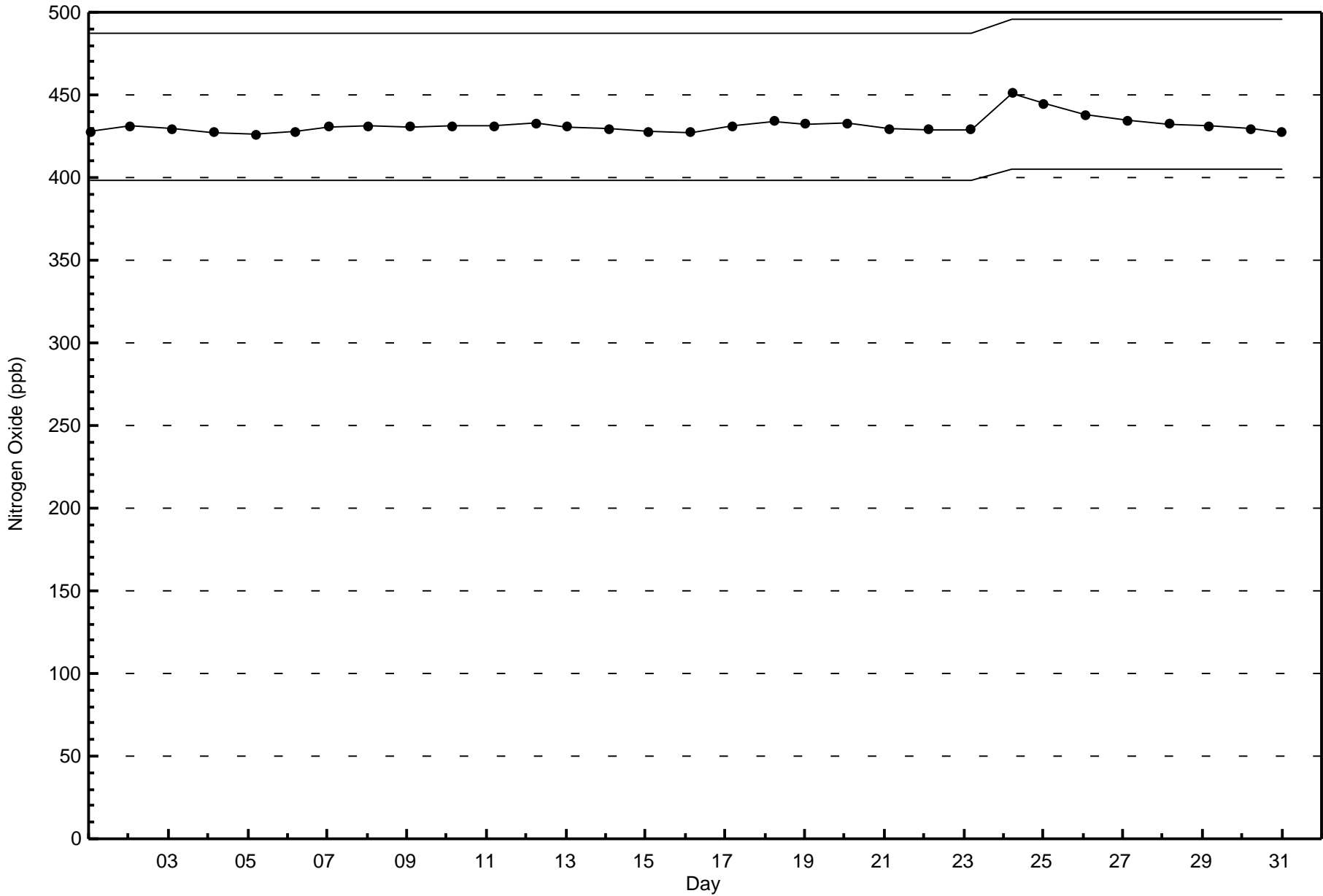


Classes (ppb)



Total Number of Valid Hours: 697







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

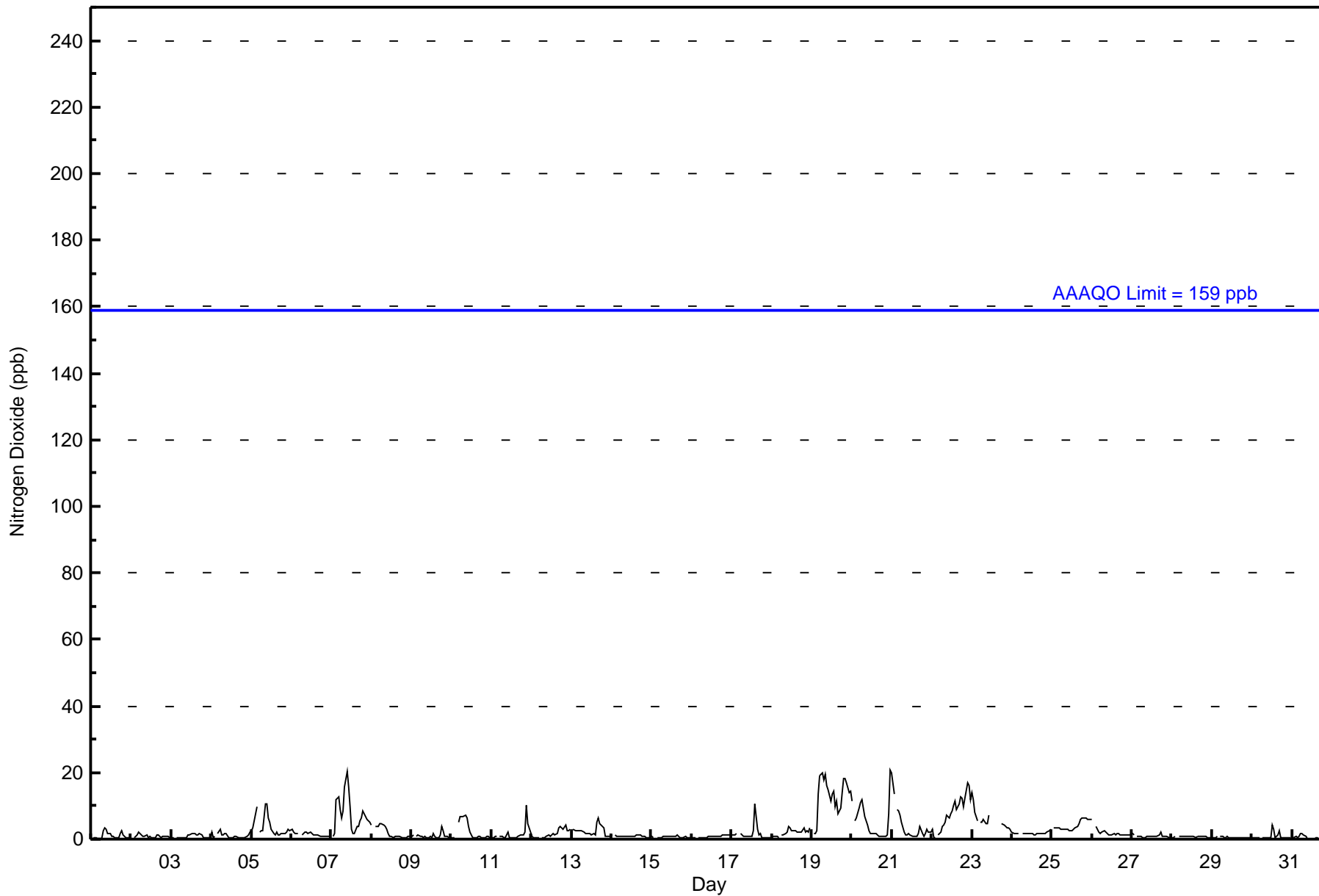
Brion MacKay River - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 21 ppb on Jan 21 00:00										Maximum Daily Average: 13.0 ppb on Jan 19										Hours of Data: 706						
Minimum Value: 0 ppb on Jan 31 10:00										Minimum Daily Average: 0.5 ppb on Jan 29										Hours of Missing Data: 38						
Maximum Diurnal Average: 3.4 ppb at hour 6										Minimum Diurnal Average: 2.0 ppb at hour 13										Hours of Calibration: 38						
Monthly Average: 2.6 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 3 P ₉₀ = 7 P ₉₉ = 18										Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	Z	0	0	0	0	0	1	3	3	3	2	2	1	1	0	0	1	2	3	1	1	1	0	0	1.1	3
2-Jan	0	Z	0	1	2	2	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0.9	2
3-Jan	1	0	Z	0	0	0	1	1	1	1	1	2	2	2	1	1	2	1	1	0	0	0	0	0.8	2	
4-Jan	2	1	1	Z	2	3	1	1	2	2	1	0	1	1	1	1	1	0	0	1	1	1	2	1.0	3	
5-Jan	3	3	8	10	Z	2	3	2	11	11	6	5	3	2	1	2	1	1	2	2	2	3	3	3.7	11	
6-Jan	3	2	2	2	2	Z	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1.5	3	
7-Jan	Z	1	2	12	13	9	6	8	16	20	16	10	3	2	2	4	4	6	6	9	7	6	5	7.4	20	
8-Jan	4	Z	4	4	4	5	5	4	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	2.1	5	
9-Jan	1	1	Z	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	4	3	1	1	0	1.0	4	
10-Jan	0	0	0	Z	5	7	7	7	7	6	4	2	1	1	0	1	1	1	0	1	1	1	1	2.3	7	
11-Jan	1	1	1	1	Z	1	1	1	1	1	2	0	0	0	0	1	1	1	1	1	2	10	5	1.5	10	
12-Jan	1	1	1	0	0	Z	0	1	1	1	1	1	2	1	2	3	4	3	3	4	3	2	3	1.7	4	
13-Jan	Z	3	3	2	2	3	2	2	2	2	2	1	2	1	5	7	5	4	3	1	1	1	1	2.4	7	
14-Jan	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.9	1	
15-Jan	1	1	Z	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1	
16-Jan	0	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1	
17-Jan	1	1	1	2	Z	2	1	1	1	1	1	1	3	11	3	1	2	1	1	0	1	1	1	1.5	11	
18-Jan	1	1	1	1	1	Z	1	1	2	2	4	4	3	3	3	2	2	2	2	3	2	3	2	2.1	4	
19-Jan	Z	2	2	2	13	19	20	18	19	16	15	12	14	14	10	11	8	9	14	18	18	17	14	13.0	20	
20-Jan	11	Z	6	7	10	11	12	9	7	4	3	2	2	2	1	1	1	1	1	1	1	1	8	5.3	21	
21-Jan	20	14	Z	9	9	7	5	2	1	1	2	1	1	1	1	1	2	4	2	1	2	3	2	4.0	20	
22-Jan	3	1	1	Z	1	2	4	4	5	7	7	8	8	10	12	9	11	13	12	10	12	17	16	8.0	17	
23-Jan	14	12	8	6	Z	5	5	6	5	5	7	C	C	C	C	C	C	C	5	4	4	4	3	--	14	
24-Jan	2	2	2	2	2	Z	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2	3	3	1.8	3	
25-Jan	Z	3	3	4	3	3	3	3	3	3	3	3	3	3	4	5	6	6	6	6	6	6	6	4.1	6	
26-Jan	6	Z	4	3	2	2	2	2	2	2	1	1	1	2	2	1	1	1	1	1	1	1	1	1.9	6	
27-Jan	2	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	0.9	2	
28-Jan	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.7	1	
29-Jan	0	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	0.5	1	
30-Jan	1	0	0	0	0	Z	0	0	0	0	1	1	4	3	1	1	3	1	0	0	1	1	0	0.8	4	
31-Jan	Z	0	1	1	1	2	2	1	1	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0.6	2	
																								Diurnal Average		
																								Diurnal Maximum		
3.1 2.0 2.0 2.7 3.0 3.4 2.9 2.8 3.3 3.3 2.8 2.2 2.0 2.0 2.0 2.1 2.1 2.4 2.5 2.5 2.5 2.8 2.7 2.9																										
20 14 8 12 13 19 20 18 19 20 16 12 14 14 12 11 11 13 14 18 18 17 16 21																										
Z - zerospan C - Calibration																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Brion MacKay River - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Brion MacKay River - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	705	99.86	99.86
21 - 40	1	0.14	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Brion MacKay River - January 2017

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	12	72	32	0	2	4	16	55	82	117	62	88	87	26	15	26	696
21 - 40	0	0	1	0	0	0	0	0	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
Totals	12	72	33	0	2	4	16	55	82	117	62	88	87	26	15	26	697

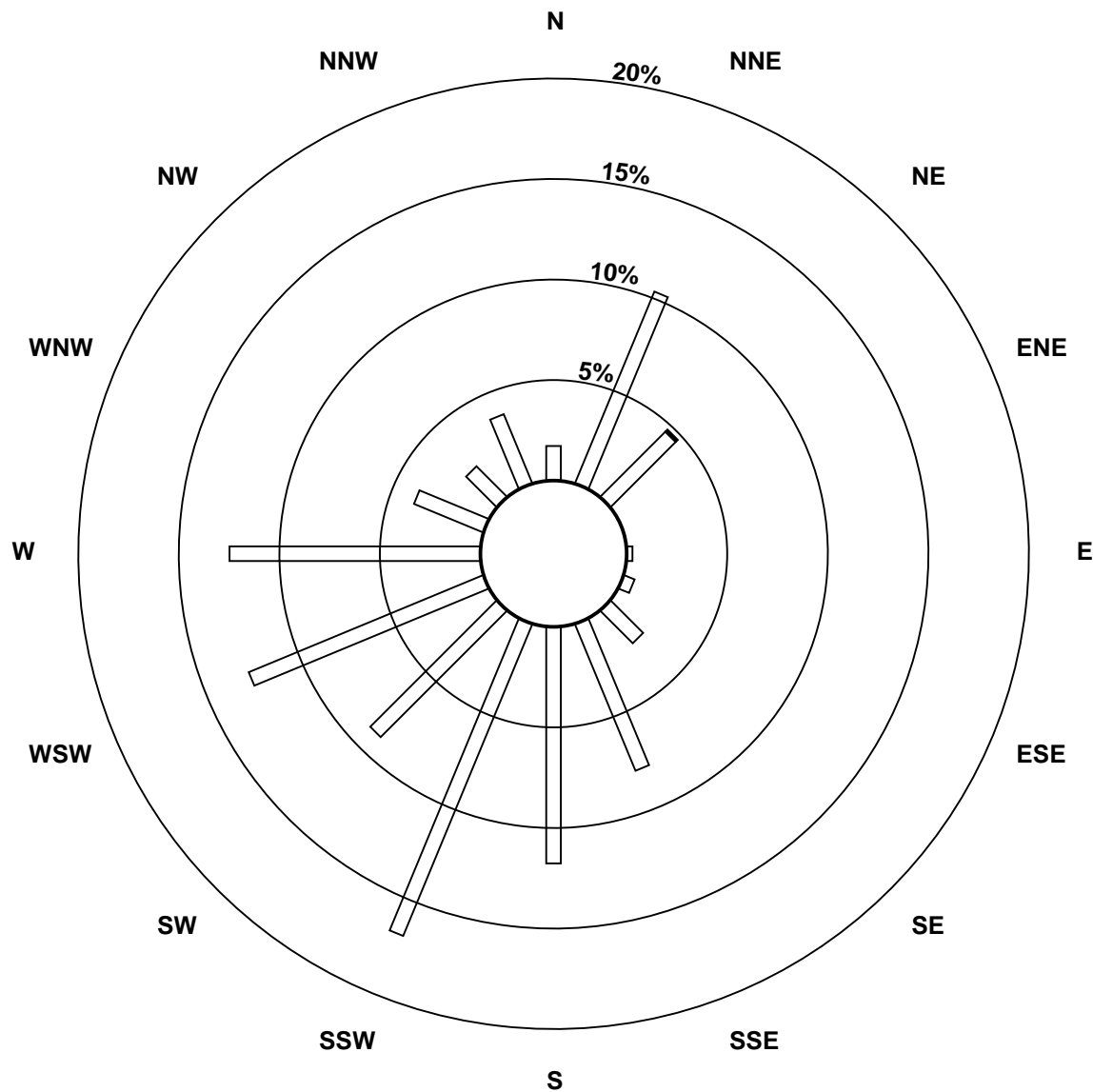
Total Number of Valid Hours: 697

Total Number of Hours: 744

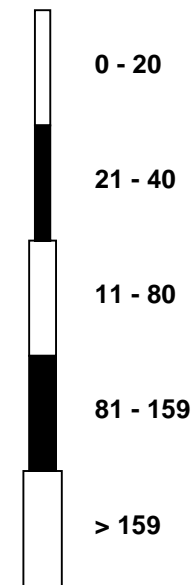


Wood Buffalo Environmental Association
Wind Rose Jan 2017

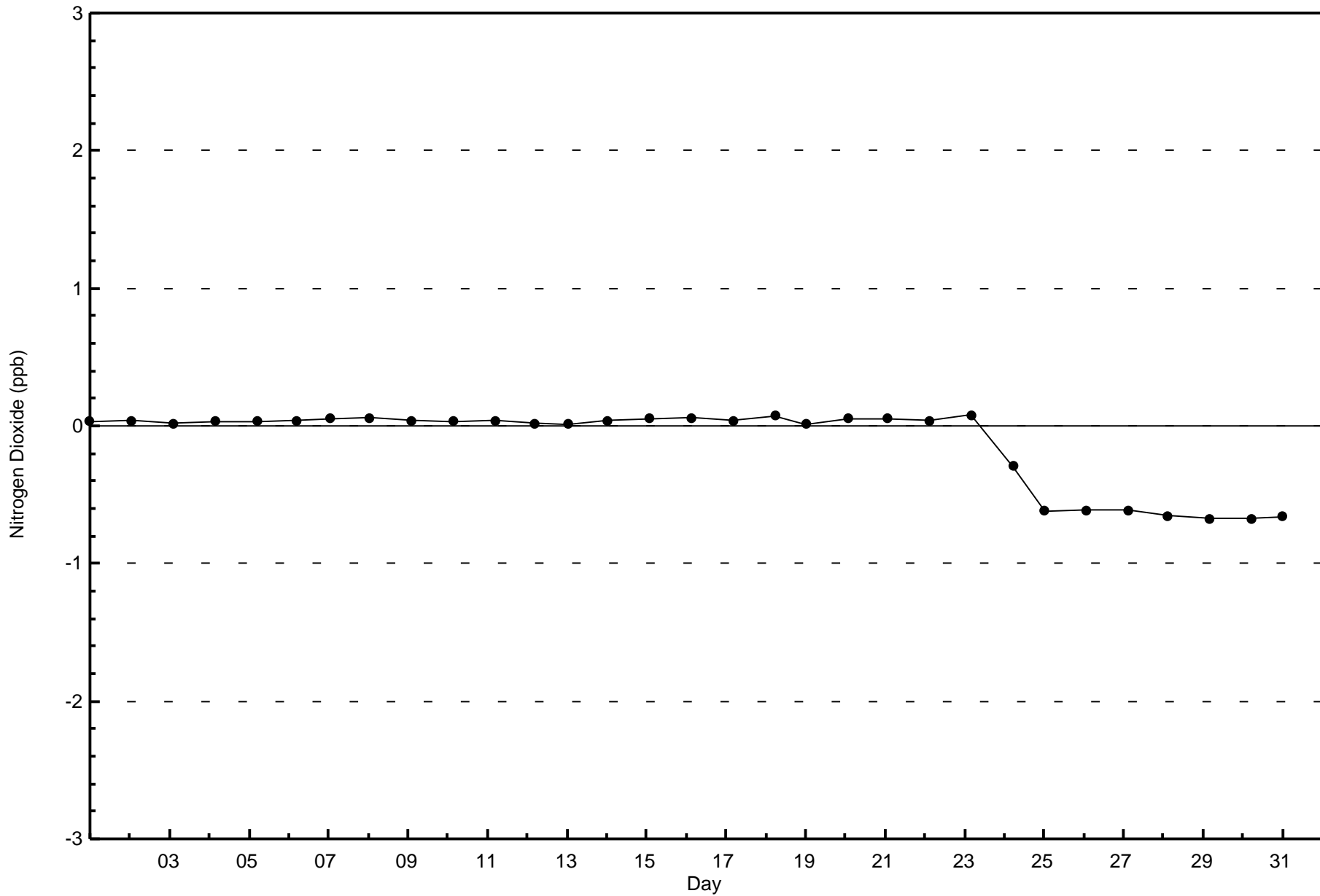
Nitrogen Dioxide (NO₂) - ppb
Brion MacKay River (AMS 20)

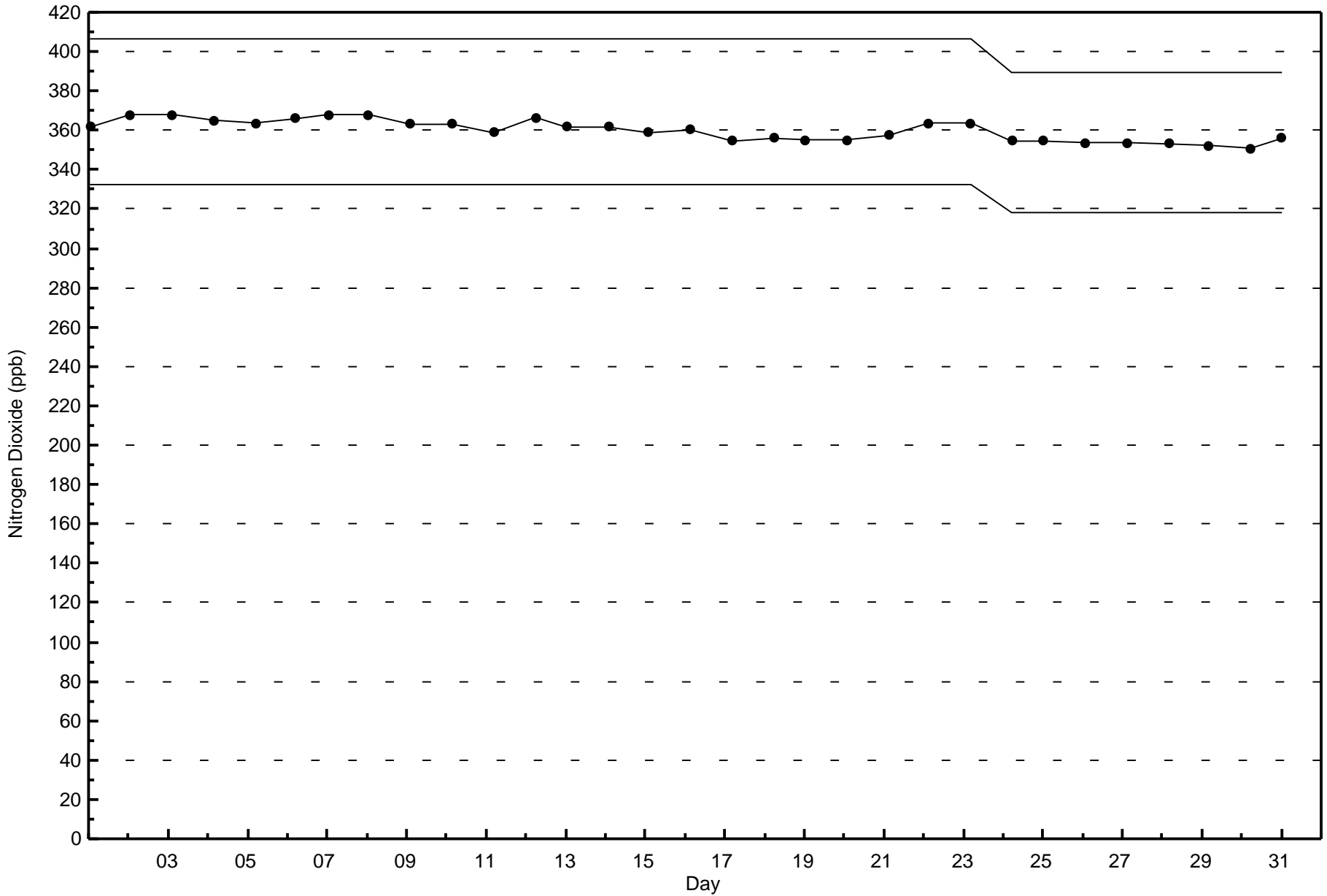


Classes (ppb)



Total Number of Valid Hours: 697



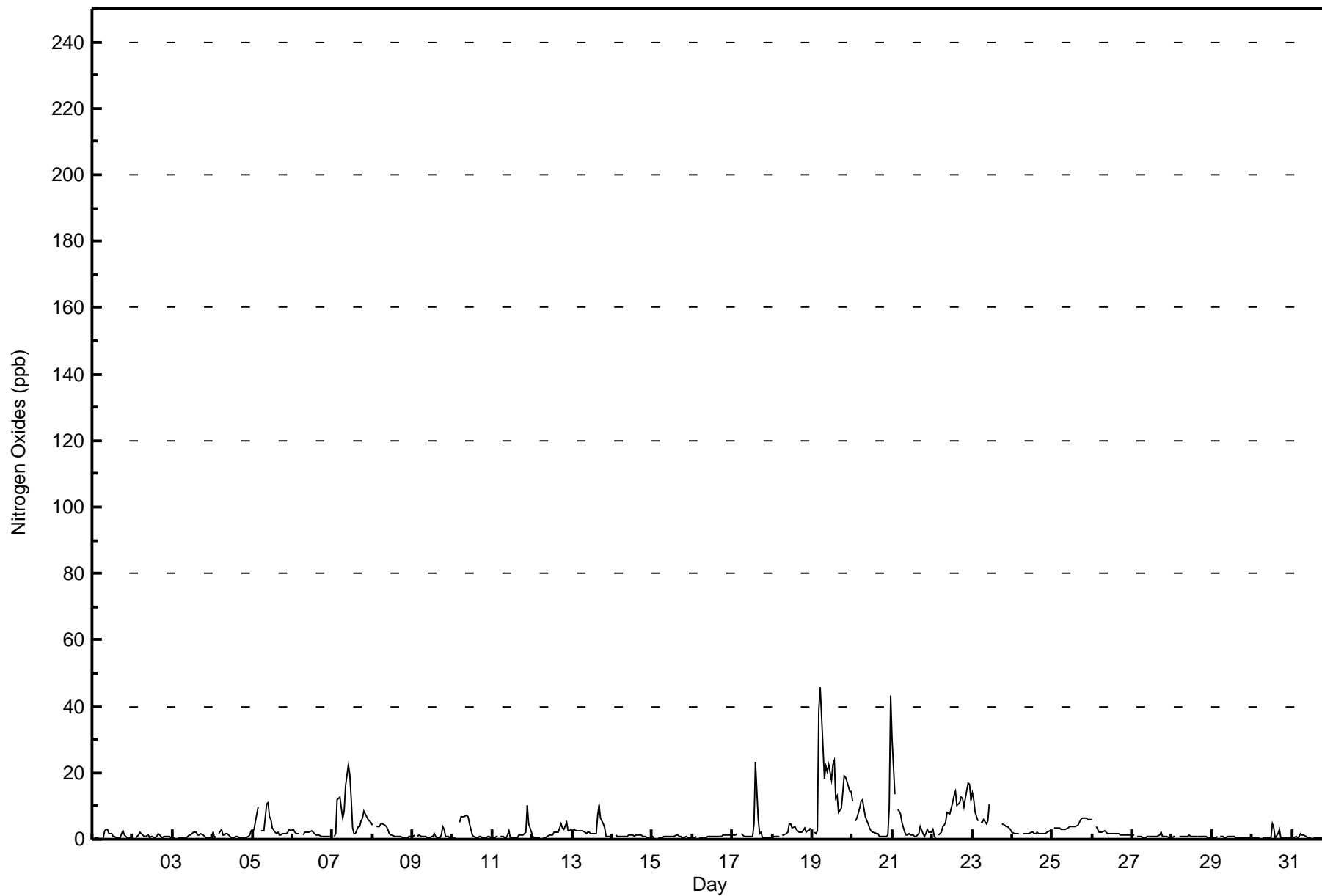




Wood Buffalo Environmental Association
Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb
Brion MacKay River - January 2017

Maximum Value: 46 ppb on Jan 19 06:00		Maximum Daily Average: 17.6 ppb on Jan 19		Hours in Service: 744																						
Minimum Value: 0 ppb on Jan 1 05:00		Minimum Daily Average: 0.5 ppb on Jan 29		Hours of Data: 706																						
Maximum Diurnal Average: 4.5 ppb at hour 6		Minimum Diurnal Average: 2.0 ppb at hour 3		Hours of Missing Data: 38																						
Monthly Average: 2.9 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 3 P ₉₀ = 7 P ₉₉ = 23		Hours of Calibration: 38																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	Z	0	0	0	0	0	1	3	3	3	2	2	1	1	0	0	1	2	3	1	1	1	0	0	1.1	3
2-Jan	0	Z	0	1	2	2	1	1	1	1	1	1	0	1	2	1	1	1	1	1	1	1	1	1	0.9	2
3-Jan	0	0	Z	0	0	0	0	1	1	1	1	1	2	2	1	1	2	1	1	0	0	0	0	0.9	2	
4-Jan	2	1	1	Z	2	3	1	1	2	2	1	0	1	1	1	1	1	0	0	1	1	1	2	1.0	3	
5-Jan	3	3	7	10	Z	2	2	2	11	11	7	6	3	2	1	2	1	1	2	2	2	3	3	3.9	11	
6-Jan	3	2	2	2	2	Z	1	2	2	2	2	3	2	2	1	1	1	1	1	1	1	1	1	1.6	3	
7-Jan	Z	1	2	12	13	9	6	8	16	23	19	12	4	2	2	4	4	6	6	8	7	6	5	7.8	23	
8-Jan	4	Z	4	4	4	5	5	4	4	3	2	1	1	1	1	1	1	1	0	0	1	1	1	2.1	5	
9-Jan	1	1	Z	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	4	3	1	1	0	1.1	4	
10-Jan	0	0	0	Z	5	7	7	7	7	7	5	3	1	1	0	1	1	1	0	1	1	1	1	2.5	7	
11-Jan	1	1	1	1	Z	1	1	1	1	1	2	0	0	0	0	0	1	1	1	2	2	10	5	1.5	10	
12-Jan	1	1	1	0	0	Z	0	0	1	1	1	1	1	2	2	2	3	4	3	3	5	3	2	1.9	5	
13-Jan	Z	3	3	2	2	3	2	2	2	2	2	1	2	2	7	10	6	5	3	1	1	1	1	2.8	10	
14-Jan	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1.0	1	
15-Jan	1	1	Z	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1	
16-Jan	0	1	1	Z	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1	
17-Jan	1	1	1	2	Z	2	1	1	1	1	1	1	5	23	6	2	2	1	0	0	0	1	0	2.4	23	
18-Jan	1	1	1	1	1	Z	1	1	2	2	5	5	3	4	3	3	2	2	2	3	2	3	2	2.3	5	
19-Jan	Z	2	2	2	39	46	28	18	22	20	22	18	22	24	12	13	8	9	14	19	19	17	14	17.6	46	
20-Jan	11	Z	6	6	9	11	12	9	7	5	3	2	2	2	2	2	1	1	1	1	1	1	10	6.5	43	
21-Jan	30	14	Z	9	9	8	5	2	1	1	2	1	1	1	1	1	2	4	2	1	2	3	2	4.5	30	
22-Jan	3	1	1	Z	1	2	4	4	5	8	8	10	11	13	15	10	11	13	12	10	12	17	16	8.6	17	
23-Jan	14	12	8	6	Z	5	5	6	5	6	11	C	C	C	C	C	C	C	5	4	4	4	3	--	14	
24-Jan	2	2	2	2	2	Z	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	1.9	3
25-Jan	Z	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	5	6	6	6	6	6	6	6	4.4	6
26-Jan	6	Z	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	2.0	6	
27-Jan	1	1	Z	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	2	1	1	1	1	0.9	2	
28-Jan	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1	
29-Jan	0	0	1	1	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.5	1	
30-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	1	5	3	1	2	3	0	0	0	1	1	0.9	5	
31-Jan	Z	0	1	0	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0.6	2	
		3.6	2.0	2.0	2.7	3.9	4.5	3.1	2.8	3.4	3.6	3.6	2.8	2.6	2.7	2.8	2.4	2.3	2.5	2.5	2.6	2.5	2.8	2.8	3.6	Diurnal Average
		30	14	8	12	39	46	28	18	22	23	22	18	22	24	23	13	11	13	14	19	19	17	16	43	Diurnal Maximum
Z - zerospan		C - Calibration																								





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Brion MacKay River - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	695	98.44	98.44
21 - 40	9	1.27	99.72
41 - 80	2	0.28	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Brion MacKay River - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	11	68	28	0	2	4	16	55	82	116	62	88	87	26	15	26	686
21 - 40	1	4	3	0	0	0	0	0	0	1	0	0	0	0	0	0	9
11 - 80	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	12	72	33	0	2	4	16	55	82	117	62	88	87	26	15	26	697

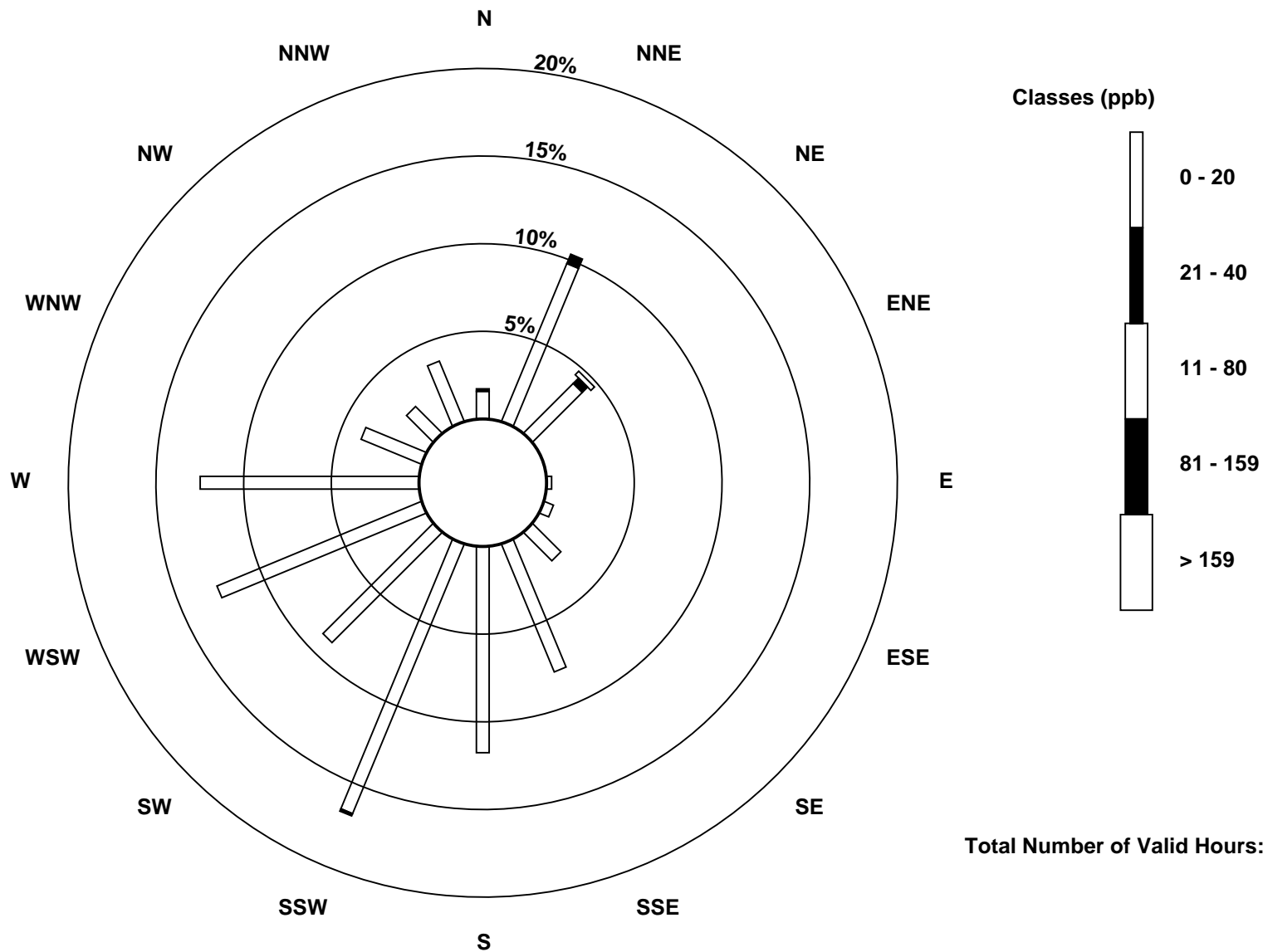
Total Number of Valid Hours: 697

Total Number of Hours: 744

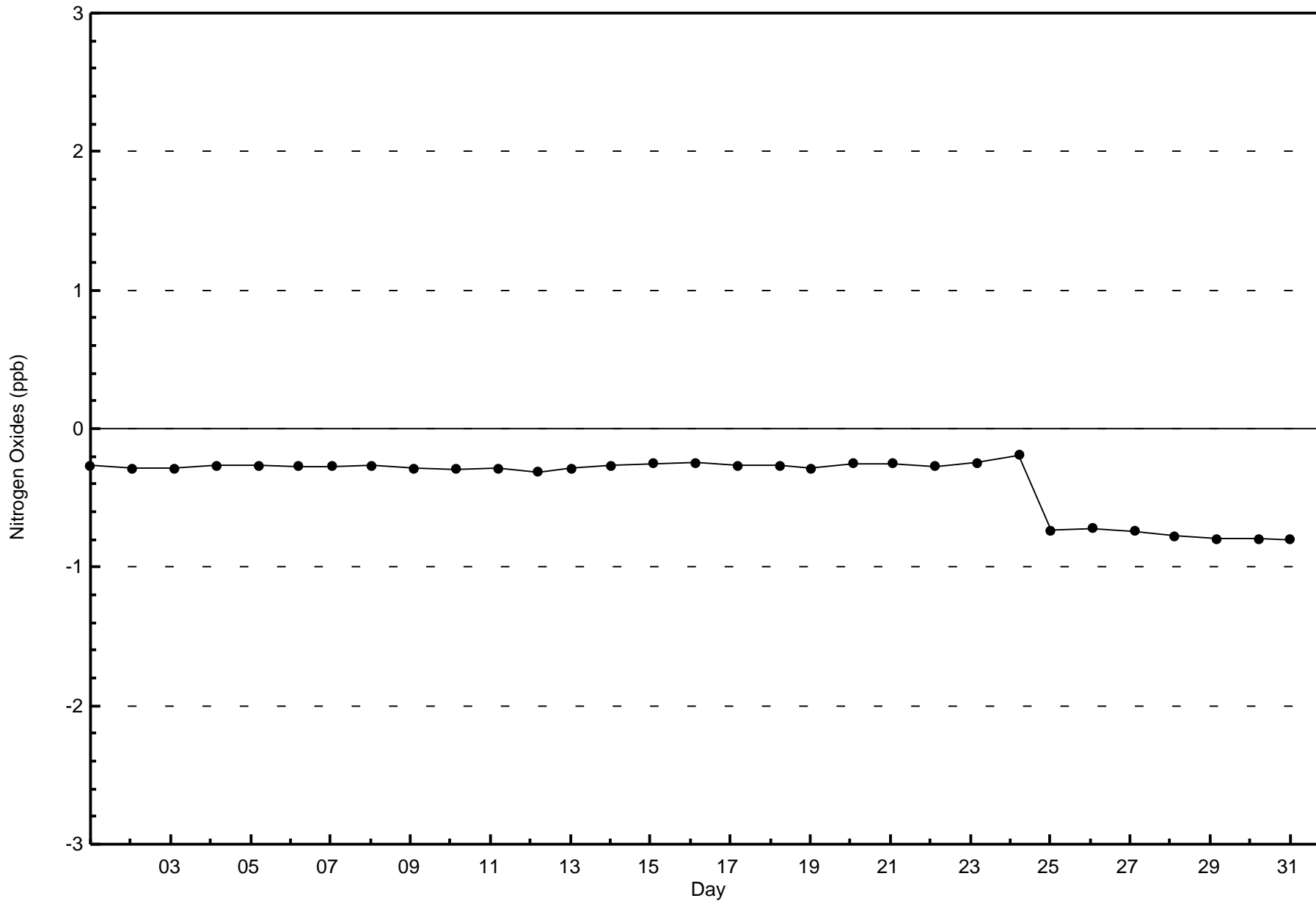


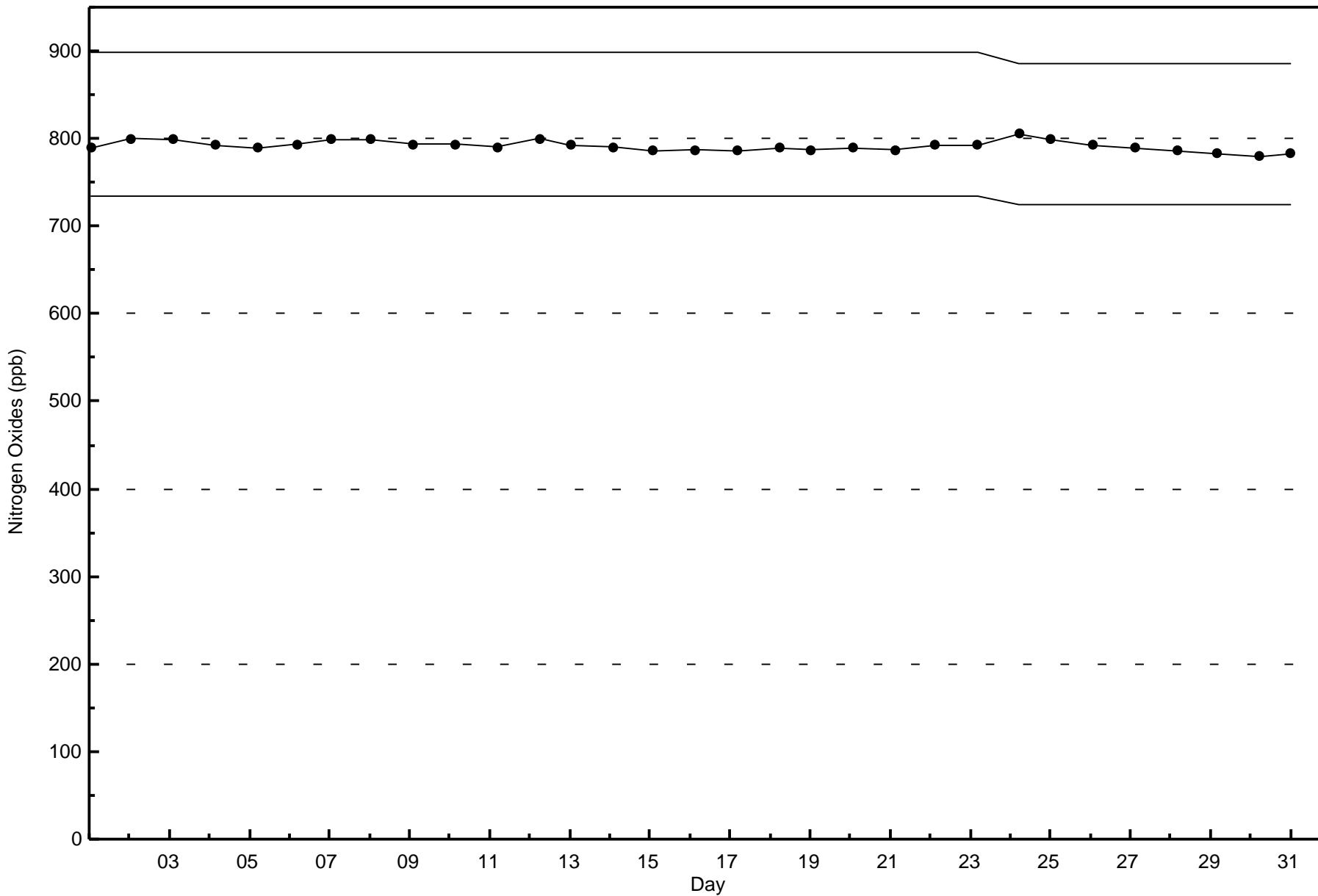
Wood Buffalo Environmental Association
Wind Rose Jan 2017

Nitrogen Oxides (NO_x) - ppb
Brion MacKay River (AMS 20)



Total Number of Valid Hours: 697



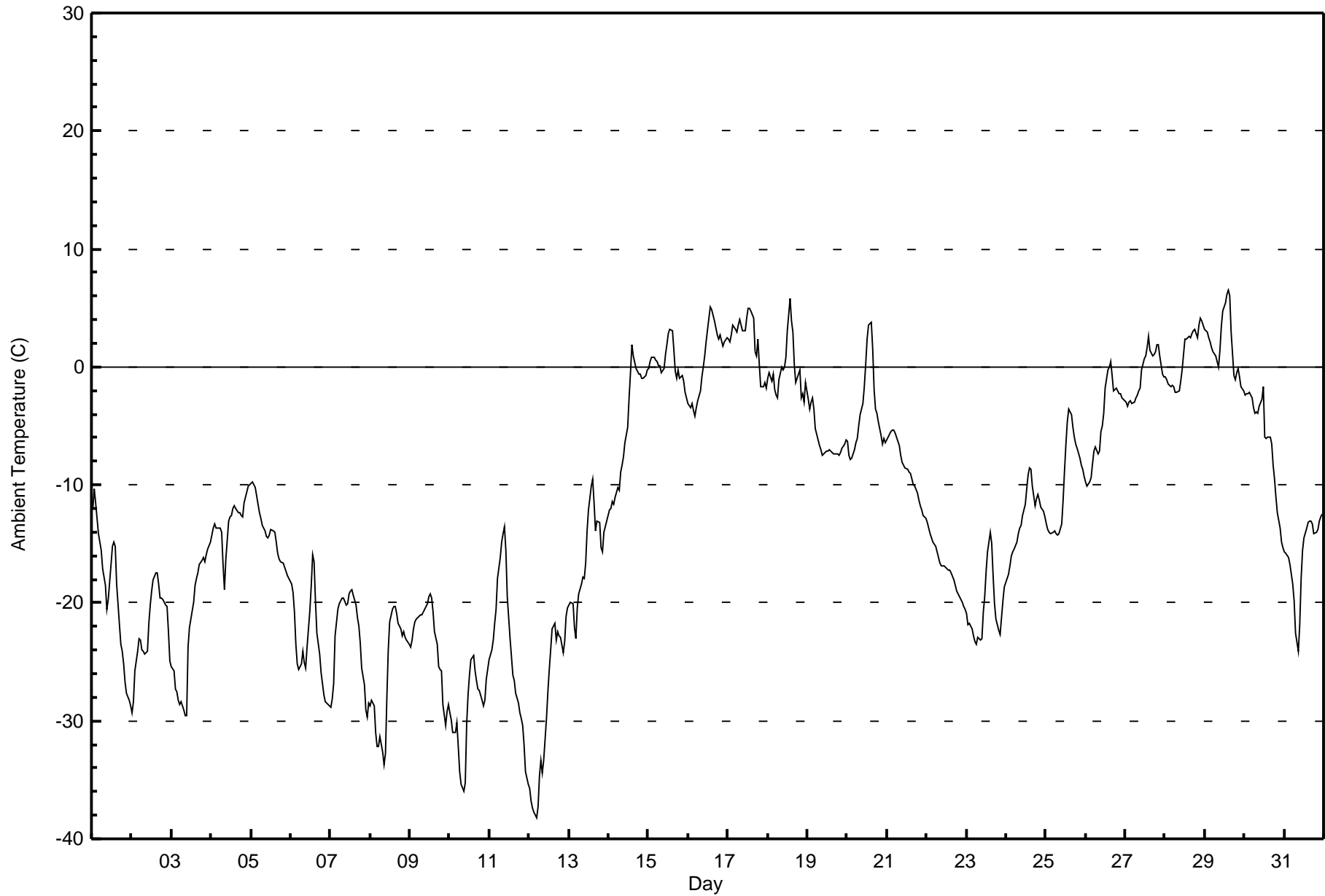




Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature (AT) - C
Brion MacKay River - January 2017

Maximum Value: 6.5 C on Jan 29 15:00 Maximum Daily Average: 2.3 C on Jan 17		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Minimum Value: -38.2 C on Jan 12 05:00 Maximum Diurnal Average: -9.1 C at hour 15 Monthly Average: -12.56 C		Minimum Daily Average: -29.3 C on Jan 10 Minimum Diurnal Average: -14.1 C at hour 9 Percentiles: P ₁ = -35.4 P ₁₀ = -27.0 Q ₁ = -20.6 Median = -13.1 Q ₃ = -2.6 P ₉₀ = 1.3 P ₉₉ = 4.9																								
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-Jan	-12.0	-10.3	-11.5	-12.9	-14.1	-15.6	-17.1	-17.9	-18.5	-20.5	-19.7	-16.8	-15.1	-14.8	-15.3	-18.5	-21.9	-23.5	-24.1	-25.2	-26.7	-27.7	-28.3	-28.8	-19.0	-10.3
2-Jan	-29.3	-28.3	-25.7	-24.1	-23.0	-23.2	-24.0	-24.1	-24.3	-24.1	-21.8	-20.2	-19.0	-18.0	-17.5	-17.4	-18.4	-19.6	-19.5	-19.7	-20.2	-20.3	-22.4	-24.9	-22.1	-17.4
3-Jan	-25.4	-25.8	-27.3	-27.6	-28.3	-28.6	-28.4	-29.1	-29.6	-29.6	-23.8	-22.0	-20.7	-19.9	-18.5	-17.9	-17.5	-16.7	-16.4	-16.2	-16.5	-15.9	-15.4	-14.8	-22.2	-14.8
4-Jan	-14.2	-13.7	-13.3	-13.6	-13.7	-13.7	-14.0	-16.8	-18.9	-16.3	-13.1	-12.7	-12.6	-11.9	-11.8	-12.0	-12.4	-12.4	-12.6	-12.7	-11.5	-10.6	-10.1	-9.9	-13.1	-9.9
5-Jan	-9.9	-9.8	-10.3	-10.9	-11.6	-12.3	-12.8	-13.4	-14.0	-14.3	-14.5	-14.3	-13.8	-13.9	-14.0	-14.8	-15.8	-16.3	-16.5	-16.7	-17.0	-17.4	-17.7	-18.0	-14.2	-9.8
6-Jan	-18.4	-19.2	-20.8	-23.6	-25.2	-25.7	-25.2	-24.1	-25.1	-25.6	-23.7	-20.6	-18.6	-15.9	-16.6	-19.8	-22.6	-24.3	-25.8	-26.8	-27.8	-28.3	-28.6	-28.8	-23.4	-15.9
7-Jan	-28.8	-28.2	-26.8	-22.8	-20.5	-20.1	-19.8	-19.6	-19.6	-20.2	-20.0	-19.2	-19.0	-18.9	-19.4	-20.2	-21.2	-21.9	-23.4	-25.5	-27.0	-29.1	-29.7	-28.5	-22.9	-18.9
8-Jan	-28.7	-28.3	-28.8	-31.0	-32.2	-32.1	-31.3	-32.7	-33.7	-32.7	-28.1	-24.0	-21.7	-20.6	-20.2	-20.3	-21.0	-21.7	-22.1	-22.8	-22.5	-23.0	-23.1	-23.5	-26.1	-20.2
9-Jan	-23.8	-23.1	-22.2	-21.6	-21.4	-21.1	-21.0	-21.0	-20.8	-20.5	-20.1	-19.5	-19.3	-19.6	-20.8	-22.4	-23.5	-25.4	-25.7	-25.7	-28.6	-30.4	-29.2	-28.6	-23.1	-19.3
10-Jan	-29.3	-30.0	-31.0	-31.0	-30.1	-32.2	-34.3	-35.4	-36.0	-35.3	-30.2	-27.7	-26.1	-24.8	-24.5	-25.8	-26.5	-27.3	-27.4	-28.3	-28.7	-28.3	-26.5	-25.6	-29.3	-24.5
11-Jan	-24.8	-24.0	-23.2	-21.8	-20.6	-17.9	-16.1	-14.8	-14.1	-13.5	-15.6	-19.5	-23.1	-24.6	-26.1	-26.5	-27.6	-28.5	-29.3	-29.7	-30.3	-32.1	-34.3	-35.4	-23.9	-13.5
12-Jan	-35.7	-36.8	-37.4	-37.8	-38.2	-37.2	-34.7	-33.3	-34.4	-33.4	-29.8	-27.6	-25.7	-24.0	-22.2	-21.7	-23.1	-22.4	-22.8	-23.0	-24.2	-23.3	-21.1	-20.5	-28.8	-20.5
13-Jan	-20.2	-19.9	-20.0	-22.1	-23.0	-20.5	-19.2	-18.4	-17.9	-17.9	-16.6	-13.9	-12.1	-10.1	-9.5	-11.6	-13.9	-13.1	-13.2	-15.4	-15.6	-14.0	-13.5	-13.0	-16.0	-9.5
14-Jan	-12.1	-12.0	-11.4	-11.7	-11.1	-10.3	-10.5	-8.9	-8.3	-7.6	-6.4	-5.1	-2.7	-0.5	1.9	1.0	-0.1	-0.3	-0.6	-0.6	-1.0	-0.9	-0.7	-0.3	-5.0	1.9
15-Jan	-0.2	0.4	0.8	0.8	0.6	0.4	0.0	0.1	-0.4	-0.1	1.1	1.9	2.9	3.2	3.1	1.4	-0.4	-0.9	-0.3	-1.0	-0.7	-1.2	-2.1	-2.6	0.3	3.2
16-Jan	-3.1	-3.4	-3.1	-3.7	-4.2	-3.5	-2.8	-2.0	-0.8	0.0	0.9	2.1	4.1	5.0	4.8	4.3	3.9	2.7	2.3	2.7	2.3	1.7	2.1	2.5	0.6	5.0
17-Jan	2.3	2.1	2.8	3.6	3.2	3.0	3.5	4.0	3.6	3.0	3.0	4.1	4.9	4.9	4.8	4.1	1.3	1.0	2.4	0.2	-1.7	-1.7	-1.3	-1.8	2.3	4.9
18-Jan	-0.9	-0.5	-1.2	-0.6	-1.9	-2.4	-2.7	-1.1	0.0	-0.3	0.0	0.8	3.1	5.8	4.0	3.0	0.2	-1.3	-0.9	-0.2	-2.6	-2.2	-2.9	-1.3	-0.3	5.8
19-Jan	-2.8	-3.5	-3.0	-2.7	-3.5	-5.2	-6.1	-6.7	-7.1	-7.5	-7.4	-7.2	-7.1	-7.1	-7.1	-7.2	-7.4	-7.4	-7.4	-7.5	-7.3	-6.9	-6.6	-6.2	-6.2	-2.7
20-Jan	-6.3	-7.5	-7.8	-7.8	-7.0	-6.4	-6.0	-5.0	-4.0	-3.1	-1.7	0.3	2.4	3.5	3.7	1.6	-2.0	-3.5	-4.0	-4.7	-5.8	-6.6	-6.1	-6.4	-3.8	3.7
21-Jan	-6.2	-5.7	-5.5	-5.3	-5.3	-5.5	-6.0	-6.6	-7.5	-8.0	-8.3	-8.6	-8.7	-8.9	-9.1	-9.5	-10.0	-10.1	-10.7	-11.3	-11.7	-12.1	-12.6	-12.8	-8.6	-5.3
22-Jan	-13.2	-13.6	-14.1	-14.5	-14.9	-15.2	-15.7	-16.2	-16.6	-16.9	-16.9	-17.0	-17.1	-17.2	-17.2	-17.4	-18.1	-18.6	-18.9	-19.2	-19.5	-19.9	-20.3	-20.6	-17.0	-13.2
23-Jan	-20.9	-21.9	-21.7	-22.3	-22.9	-23.3	-23.5	-22.9	-23.1	-23.0	-20.8	-19.5	-17.3	-15.7	-14.1	-15.0	-17.7	-20.1	-21.4	-22.4	-22.6	-21.2	-19.9	-18.7	-20.5	-14.1
24-Jan	-18.3	-17.6	-16.9	-16.0	-15.7	-15.4	-14.8	-14.1	-13.7	-13.4	-12.6	-11.6	-10.4	-9.2	-8.5	-8.7	-10.1	-11.8	-11.2	-10.8	-11.3	-11.9	-12.3	-12.7	-12.9	-8.5
25-Jan	-13.3	-13.7	-14.1	-14.2	-14.0	-13.9	-14.1	-14.2	-14.2	-13.3	-11.3	-8.8	-6.5	-4.7	-3.5	-4.1	-5.1	-5.9	-6.6	-6.9	-7.7	-8.3	-8.7	-9.3	-9.8	-3.5
26-Jan	-9.7	-10.0	-9.7	-9.4	-8.2	-7.2	-6.8	-7.4	-7.1	-5.5	-5.0	-3.9	-1.8	-0.3	0.0	0.5	-0.8	-2.0	-1.8	-2.0	-2.3	-2.3	-2.6	-2.8	-4.5	0.5
27-Jan	-2.9	-3.4	-3.0	-2.9	-3.1	-3.0	-2.7	-2.4	-2.0	-1.8	-0.2	0.7	0.9	1.7	2.6	1.4	1.0	1.1	1.3	1.8	1.9	0.9	-0.6	-0.8	-0.6	2.6
28-Jan	-0.9	-1.1	-1.5	-1.7	-1.6	-1.6	-2.1	-2.1	-2.0	-1.2	-0.2	1.1	2.4	2.4	2.6	2.5	2.8	3.1	3.2	2.4	3.5	4.2	3.9	3.6	0.9	4.2
29-Jan	3.2	2.9	2.5	2.1	1.6	1.3	0.9	0.4	0.0	1.4	3.4	4.8	5.5	6.2	6.5	6.0	2.9	-0.7	-1.0	-0.5	-0.1	-0.9	-1.6	-2.1	1.9	6.5
30-Jan	-2.4	-2.2	-2.3	-2.1	-2.7	-3.4	-3.9	-3.9	-3.9	-3.3	-2.8	-1.7	-5.9	-6.1	-6.0	-6.0	-6.6	-8.3	-9.5	-11.1	-12.3	-13.6	-14.8	-15.3	-6.3	-1.7
31-Jan	-15.7	-15.8	-16.2	-16.7	-17.5	-18.4	-19.8	-22.5	-24.1	-21.9	-17.9	-15.5	-14.5	-13.7	-13.2	-13.1	-13.0	-13.2	-14.2	-14.0	-13.8	-13.1	-12.7	-12.5	-16.0	-12.5
	-13.7	-13.7	-13.7	-13.7	-13.9	-13.9	-13.9	-13.9	-14.1	-13.8	-12.3	-11.0	-10.1	-9.3	-9.1	-9.8	-11.1	-11.9	-12.2	-12.7	-13.2	-13.4	-13.5	-13.6	Diurnal Average	
	3.2	2.9	2.8	3.6	3.2	3.0	3.5	4.0	3.6	3.0	3.4	4.8	5.5	6.2	6.5	6.0	3.9	3.1	3.2	2.7	3.5	4.2	3.9	3.6	Diurnal Maximum	





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Brion MacKay River - January 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	209	28.09	28.09
-20 - 0	433	58.20	86.29
0 - 10	102	13.71	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



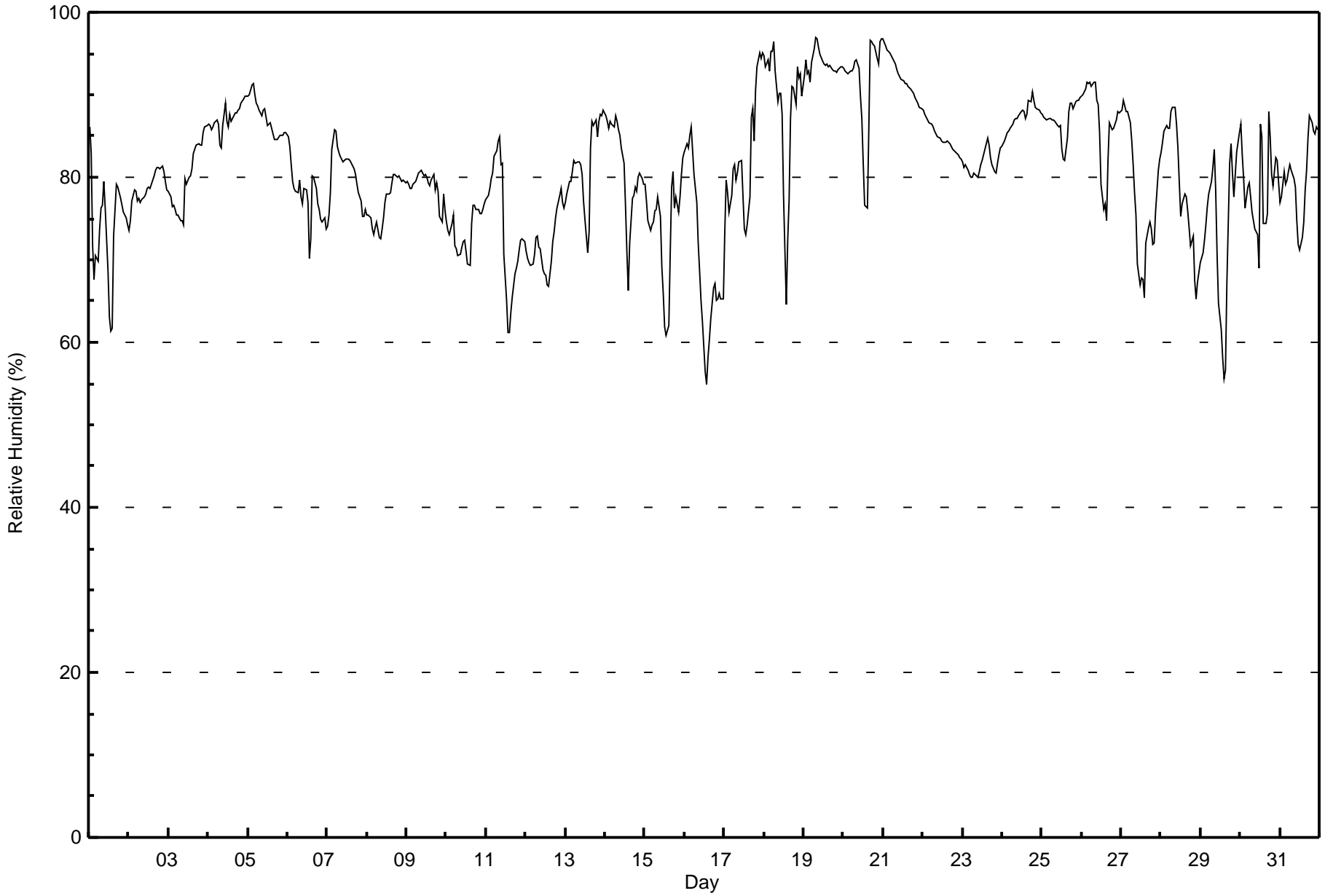
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Brion MacKay River - January 2017

Maximum Value: 97 % on Jan 19 08:00														Maximum Daily Average: 93.8 % on Jan 19														Hours in Service: 744	
Minimum Value: 55 % on Jan 16 14:00														Minimum Daily Average: 70.2 % on Jan 16														Hours of Data: 744	
Maximum Diurnal Average: 83.0 % at hour 7														Minimum Diurnal Average: 75.2 % at hour 14														Hours of Missing Data: 0	
Monthly Average: 81.1 %														Percentiles: P ₁ = 61 P ₁₀ = 71 Q ₁ = 76 Median = 81 Q ₃ = 87 P ₉₀ = 91 P ₉₉ = 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-Jan	86	83	72	68	70	70	74	76	77	80	76	69	63	61	62	73	79	79	78	77	77	76	75	74	73.9	86			
2-Jan	74	75	77	78	78	77	77	77	77	78	78	79	79	79	80	80	81	81	81	81	81	81	80	79	78.6	81			
3-Jan	78	78	76	77	76	75	75	75	74	80	79	80	80	81	83	83	84	84	84	84	86	86	86	86	80.0	86			
4-Jan	86	86	86	86	87	87	86	84	84	86	89	87	86	88	87	87	88	88	88	88	89	90	90	90	87.1	90			
5-Jan	90	90	91	91	90	89	89	88	87	88	88	87	86	87	86	85	85	85	85	85	85	85	86	85	87.2	91			
6-Jan	85	84	82	79	79	78	78	80	78	77	79	78	77	70	73	80	80	79	77	76	75	75	74	74	77.7	85			
7-Jan	74	75	78	83	86	86	84	83	83	82	82	82	82	82	82	81	81	80	79	78	77	75	75	76	80.3	86			
8-Jan	75	75	75	74	73	74	75	73	72	74	75	77	78	78	78	79	80	80	80	80	80	80	80	79	76.9	80			
9-Jan	79	79	79	79	79	80	80	80	81	81	80	80	80	79	79	80	80	78	79	78	75	75	78	76	79.0	81			
10-Jan	75	74	73	74	75	72	71	71	71	71	72	72	71	69	69	74	77	77	76	76	76	76	77	77	73.6	77			
11-Jan	77	78	79	80	80	83	83	84	85	82	82	71	65	61	61	64	65	68	69	70	71	72	73	72	74.0	85			
12-Jan	71	70	70	69	69	71	73	73	72	71	69	68	68	67	67	70	72	73	75	76	78	79	77	76	71.8	79			
13-Jan	77	78	79	80	81	82	82	82	82	82	80	77	75	71	73	84	87	86	87	85	87	88	88	88	81.6	88			
14-Jan	88	87	86	87	87	86	87	87	86	85	84	82	77	71	66	72	77	78	79	78	80	81	80	79	81.2	88			
15-Jan	79	77	75	74	74	75	76	76	78	75	69	66	62	61	62	71	79	81	76	78	76	78	80	82	74.1	82			
16-Jan	83	84	84	85	86	83	80	77	72	69	65	63	56	55	58	60	63	67	67	65	65	66	65	65	70.2	86			
17-Jan	73	80	78	76	78	81	82	80	81	82	82	78	74	73	74	78	87	88	84	91	93	95	94	95	82.4	95			
18-Jan	95	93	94	93	95	95	96	93	89	90	90	88	78	65	72	77	87	91	91	89	93	92	93	90	88.7	96			
19-Jan	92	94	93	93	92	94	96	97	97	96	95	94	94	94	94	93	94	93	93	93	93	93	93	93	93.8	97			
20-Jan	93	93	93	92	93	93	93	94	94	93	90	87	82	77	76	86	97	96	96	96	94	94	96	97	91.5	97			
21-Jan	97	96	95	95	95	95	94	94	93	93	92	92	92	91	91	91	91	91	90	90	89	89	89	88	92.2	97			
22-Jan	88	88	87	87	87	86	86	86	85	85	85	84	84	84	84	84	84	84	83	83	83	83	82	82	84.8	88			
23-Jan	82	81	81	81	80	80	80	81	80	80	81	82	82	83	84	85	84	82	81	81	81	82	83	84	81.6	85			
24-Jan	84	84	85	85	86	86	86	87	87	87	87	88	88	88	87	88	89	89	90	89	89	88	88	88	87.3	90			
25-Jan	88	87	87	87	87	87	87	87	87	86	86	86	83	82	82	85	88	89	89	88	89	89	90	90	86.9	90			
26-Jan	90	90	91	91	91	91	91	92	92	89	89	85	79	76	77	75	82	87	86	86	87	87	88	88	86.6	92			
27-Jan	88	89	89	88	88	87	84	81	78	75	69	67	68	68	65	72	74	75	74	72	72	76	81	82	77.6	89			
28-Jan	83	84	86	86	86	86	88	89	88	86	84	79	75	77	78	78	76	74	72	73	68	65	67	69	79.0	89			
29-Jan	70	71	72	74	76	78	80	81	83	78	71	65	61	58	56	57	67	82	84	81	78	80	83	85	73.8	85			
30-Jan	86	83	80	76	79	79	78	76	75	74	73	69	86	85	74	74	76	88	85	80	79	82	82	79	79.1	88			
31-Jan	77	78	81	79	80	81	81	81	80	79	75	72	71	73	75	79	81	85	88	87	86	85	86	86	80.1	88			
	82.7	82.7	82.3	82.2	82.7	82.8	83.0	82.6	82.1	81.6	80.5	78.5	76.9	75.2	75.3	78.2	81.1	82.5	82.1	81.8	81.6	81.9	82.5	82.4	Diurnal Average				
	97	96	95	95	95	95	96	97	97	96	95	94	94	94	94	93	97	96	96	96	94	95	96	97	Diurnal Maximum				





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Brion MacKay River - January 2017

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	6	0.81	0.81
60 - 80	325	43.68	44.49
80 - 100	413	55.51	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

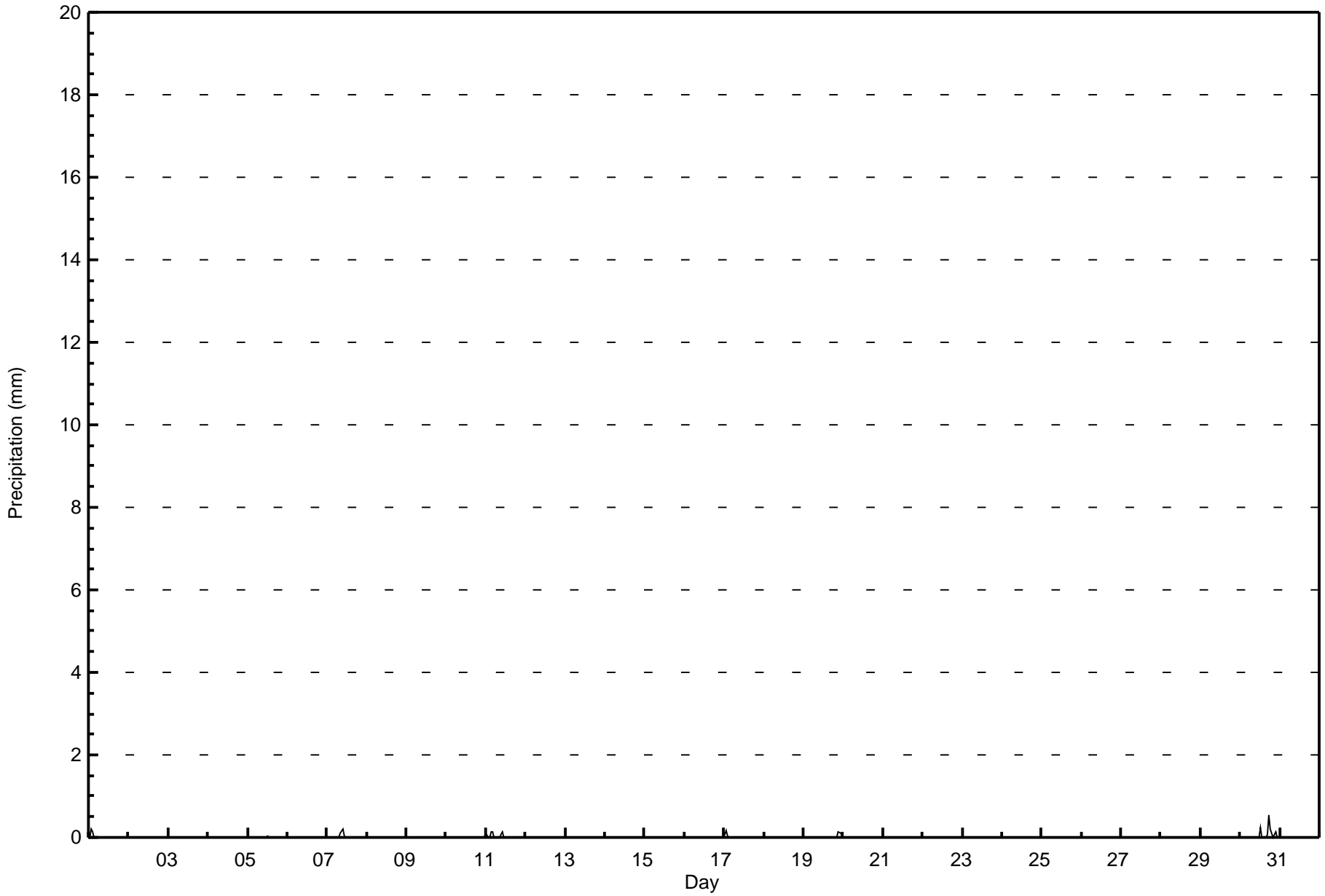


Maximum Value: 0.5 mm on Jan 30 18:00		Maximum Daily Total: 1.3 mm on Jan 30		Hours in Service: 744																							
Minimum Value: 0.0 mm on Jan 1 01:00		Minimum Daily Total: 0.0 mm on Jan 2		Hours of Data: 742																							
Maximum Diurnal Total: 0.5 mm at hour 18		Minimum Diurnal Total: 0.0 mm at hour 6		Hours of Missing Data: 2																							
Monthly Total: 3.16 mm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.1		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-Jan	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	
2-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
6-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.3
8-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.1	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.2	0.6
12-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.3
18-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.3	0.1	0.3
20-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	M	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Jan	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	0.0	0.1	0.5	0.2	0.1	0.0	0.1	0.0	0.0	1.3	0.5	1.3	0.5
31-Jan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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			
M - Maintenance																											



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Brion MacKay River - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Precipitation (PC) - mm
Brion MacKay River - January 2017

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	741	99.87	99.87
0.4 - 0.5	1	0.13	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



Maximum Speed: 24 km/h on Jan 11 14:00	Maximum Daily Speed Average: 11.4 km/h on Jan 16	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jan 20 00:00	Minimum Daily Speed Average: 1.3 km/h on Jan 2	Hours of Data: 732
Maximum Diurnal Speed Average: 3.5 km/h at hour 12	Minimum Diurnal Speed Average: 1.9 km/h at hour 16	Hours of Missing Data: 12
Monthly Average Velocity: 2.5 km/h 236.6 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 4 Median = 6 O ₃ = 8 P ₉₀ = 10 P ₉₉ = 15	Percent Operational Time: 98.4

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jan	W8	NW16	NNW17	NNW14	N11	NNW11	NNW6	NW8	NW6	WNW2	W2	WNW4	WNW5	NNW7	NNW5	NNW1	SE1	SSE2	SSE2	SSE2	SSE3	SSE3	SSE3	SSE2	NNW4.1	NNW17	
2-Jan	SSE2	SSE1	SSW1	WSW1	SW1	SSE1	WSW2	SSW2	S1	W1	WSW2	SSW2	WSW3	WSW2	SW2	W1	S1	SSE1	SSW2	S1	SSE3	SE2	SSE2	SSE3	SSW1.3	SSE3	
3-Jan	SSW3	S3	SSE4	S4	SSW4	SSW3	SSW3	S3	SSW3	SSW3	W6	W5	WNW5	W5	W5	W5	W6	W6	W6	WNW7	W6	W7	W7	W6	WSW3.7	W7	
4-Jan	WNW7	WNW8	NW6	NNW4	NNW4	NNW3	NW1	SSE1	S2	SW2	SW4	WSW5	WSW5	SW7	SW6	SSW5	SSW6	SSW6	SSW5	SSW6	WSW4	W4	WNW4	NW4	WSW3.0	WNW8	
5-Jan	NNW4	NNE5	NE8	NE8	NNE9	NNE10	NNE6	NNE6	NE6	NE8	NNE7	N4	NNE7	NNE9	NE8	NNE8	NNE8	NNE5	NNE5	NE3	NE3	NE3	WSW1	S2	NNE5.6	NNE10	
6-Jan	SW3	SW3	SW3	SW2	SW2	S2	SSW2	WSW2	SSE1	SSW1	WSW2	WSW2	SW3	SW2	S2	SSE2	S2	SSE2	SE2	SSE2	SSE2	SSE3	SE3	SE2	S1.7	SW3	
7-Jan	SE2	SE1	NNE2	NE5	NE6	NE7	NE8	NE7	NE5	N4	N5	NNE7	NNE8	NNE6	NNE6	NNE6	NE5	NE4	NE3	NE3	SE1	SSE1	SSE2	SSE2	NE3.9	NE8	
8-Jan	S2	S2	S2	S2	AF	SSW4	SSW3	S2	SSW3	S4	SSW4	SW4	WSW5	WSW5	WSW5	SW5	SSW5	SSW6	SSW5	SSW5	SW6	SW4	WSW4	WSW4	SSW3.7	SW6	
9-Jan	W4	W6	WSW5	WSW5	W5	W5	WNW4	W4	W3	W3	W2	WNW5	WNW5	NW6	WNW3	W3	W3	WNW3	WNW4	NW3	W2	W2	W3	WSW1	W3.6	NW6	
10-Jan	SW0	SE1	E1	NNE2	NE3	SSW0	SW1	WSW1	WSW1	W2	WNW3	WNW3	WNW4	W3	W3	WSW3	SW3	WSW4	WSW4	SW4	SSW5	SSW5	SSW6	SSW6	WSW2.0	SSW6	
11-Jan	SSW7	SSW8	SSW8	SSW8	SSW6	WSW7	W8	WSW6	W5	NNW9	N10	NNW22	NNW23	NNW24	NNW17	NNW16	NNW12	NNW10	NW8	NW9	NW6	W3	SW2	WSW1	NW6.5	NNW24	
12-Jan	SSE2	SSE2	SSE3	SSE3	SSE4	S6	S6	S6	SSE5	SSE6	SSE9	S11	S9	SSE8	SSE9	SE8	SE8	SE7	ESE3	SSE4	SE2	S4	SSW8	SSW8	SSE5.4	S11	
13-Jan	SSW7	SSW6	SSW5	S2	SW4	SW5	SW5	SSW5	SSW6	S5	SSW4	SSW5	SSW4	SW5	SW4	S3	S5	S6	S7	S5	S6	S7	S7	S8	SSW5.1	S8	
14-Jan	S10	S9	S10	S8	S10	S9	S7	S10	SSW11	SSW11	SSW11	SSW10	SSW10	SW9	SW9	SW7	SW7	SW7	SW8	SW9	SSW8	SSW9	SSW10	SSW11	SSW8.8	SSW11	
15-Jan	SW8	WSW8	WSW9	WSW10	W10	W8	WSW6	WSW7	SW9	SW9	WSW9	WSW10	WSW10	WSW9	WSW7	SW4	SSW6	SSW8	SW9	SW7	SW7	SSW7	SSW7	SSW8	SSW7.4	WSW10	
16-Jan	SSW10	SSW10	SSW9	S10	SSW11	SSW11	SSW11	SSW12	SSW12	SSW12	SSW13	SSW15	SSW14	SSW13	SSW12	SSW12	SSW12	S10	S10	S11	SSW12	S11	S11	S13	SSW11.4	SSW15	
17-Jan	S11	SSW10	SSW11	SSW11	SSW11	SSW10	SW8	WSW9	WSW8	SW7	SW7	WSW6	WSW6	WSW6	SSW7	SSW5	S3	S5	SSW6	S3	SSE4	S6	S6	S6	SSW6.6	S11	
18-Jan	SSE6	SSE6	SSE5	SSE5	SE4	ENE3	E2	ESE5	SE4	ESE2	NNW2	ESE2	SSW4	SW5	SSW4	S4	SSW2	SSE3	S4	S6	SSE4	S6	SSE4	S8	SSE3.5	S8	
19-Jan	SE2	S4	SSE4	NE2	NNE8	NE8	NE8	NE6	NNE7	NNE7	NE8	NE6	NNE7	NNE6	NNE6	NNE6	NE6	NE4	NNE5	NNE6	NE2	WNW3	N4	NE0	NNE4.3	NE8	
20-Jan	W3	SW2	SW3	S4	S5	S5	SSW7	SSW8	SSW9	SSW8	SW6	SW4	S5	S5	S5	SSE5	SSE3	SE4	SSE5	SSE5	SE4	SSE3	NNE5	NE8	S3.5	SSW9	
21-Jan	NE8	NNE10	NNE10	NNE8	NE8	NNE8	NNE7	NNE7	NNE8	NNE7	NNE6	NNE6	NNE6	NNE5	NNE5	NNE6	NNE6	NNE4	NNE5	NNE5	NNE4	NNE5	NNE5	NNE5	NNE5	NNE6.4	NNE10
22-Jan	NNE5	NNE5	NNE5	NNE4	NNE4	NNE4	NNE4	NE4	NE3	NE3	NNE3	NE4	NNE4	NNE3	NNE3	NNE3	NNE3	NNE3	NNE3	NNE3	NNE3	NNE3	NNE3	NNE3	NNE3.5	NNE5	
23-Jan	NNE1	AF	N1	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	WSW3	SW3	WSW2	SW2	AF	SSE2	SSE2	SSE2	SSE2	SSE1	S4	S4	----	S4
24-Jan	SSE3	S4	S5	S5	S5	S4	SSW4	SSW5	SSW5	SW5	SSW5	SW4	SSW4	SW5	SSW6	S6	S5	S5	SSW6	SSW7	SSW7	S8	SSW8	SSW8	SSW5.3	SSW8	
25-Jan	S8	SSW7	S8	S8	S8	SSW9	S8	S9	S9	S9	S8	SSW9	SSW8	SSW8	SSW7	SSW8	S8	SSW11	SSW11	SSW11	S10	SSW10	SSW10	SSW9	SSW8.7	SSW11	
26-Jan	SSW9	SSW7	SW6	WSW6	WSW7	WSW6	WSW7	WSW6	W8	W8	WSW7	WSW7	WSW7	WSW7	WSW7	WSW7	SW6	SW6	WSW7	WSW7	WSW7	WSW7	WSW6	WSW6	WSW6.6	SSW9	
27-Jan	W6	W6	W8	W9	W9	W10	W10	W9	W9	WSW8	W9	WSW9	WSW8	WSW7	WSW6	WSW4	W6	W6	W6	W8	W8	W6	W5	W6	W7.3	W10	
28-Jan	WSW5	WSW6	SW5	SW5	WSW6	W5	WSW6	WSW6	WSW7	WSW7	W5	W3	SW2	SSE4	SSE6	S7	SSW10	SSW10	SSW11	SW8	W8	W9	W9	W9	SW5.6	SSW11	
29-Jan	WSW9	WSW8	WSW9	WSW7	WSW7	WSW7	SW7	SW6	SW6	SW5	WSW9	WSW10	W12	W10	WNW10	WNW9	W4	WSW4	SW5	SW6	WSW6	W7	W6	WSW6	WSW6.9	W12	
30-Jan	WSW7	WSW7	W7	W9	W9	W7	W7	WSW10	W9	W9	W9	WNW11	NNE9	N9	NNW10	NW10	NW13	N12	N13	N13	NNW12	NNW12	NNW10	NNW12	NW7.5	N13	
31-Jan	NNW11	NNW8	N7	NNW8	NW8	NW6	WNW4	SW2	WSW2	W3	W5	W6	W6	W6	W7	W5	W4	W4	W4	WNW6	W6	WNW7	WNW7	WNW8	WNW4.9	NNW11	

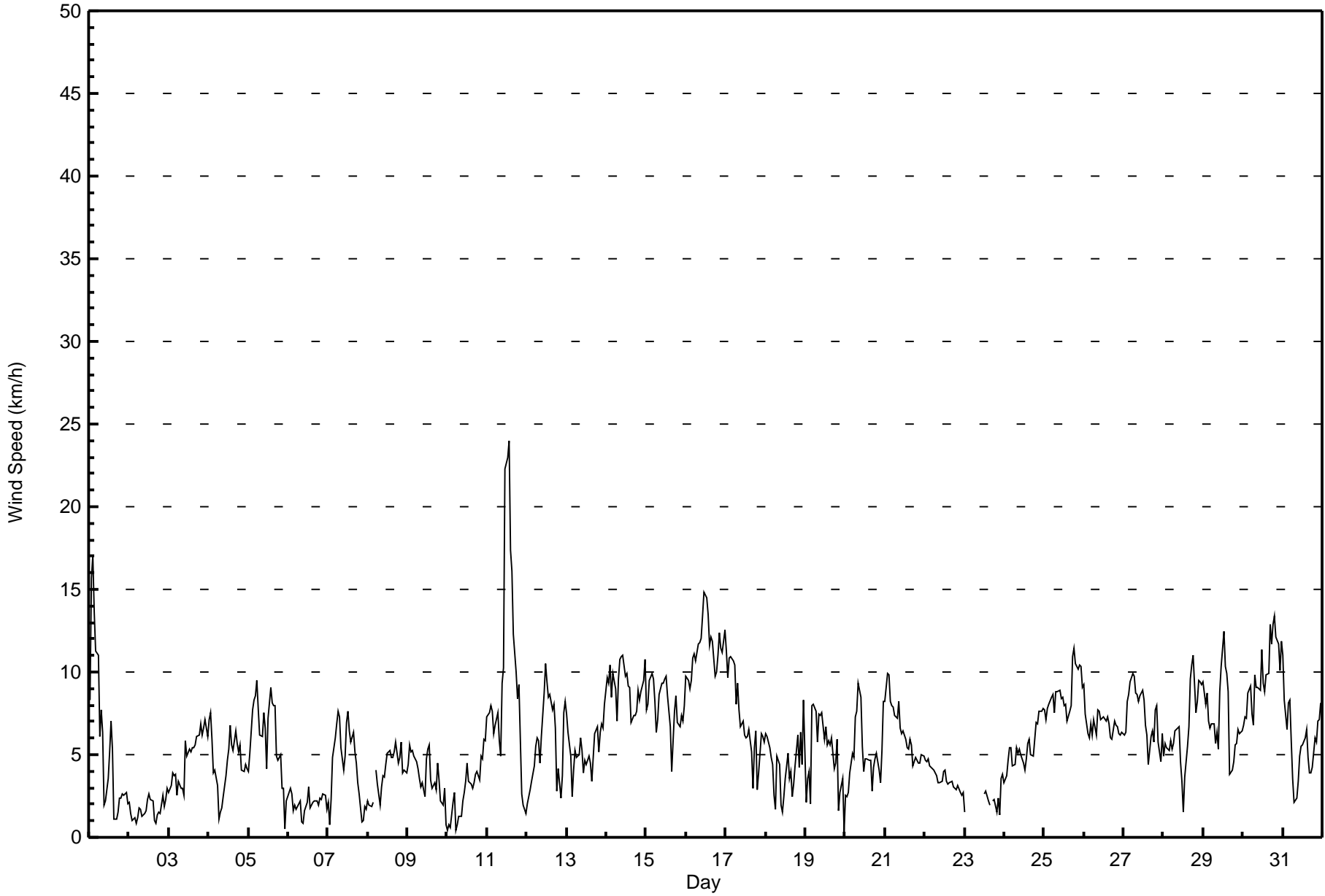
SW3.0 SW2.7 SW2.2 SW1.9	WSW2.1 WSW2.1 WSW2.4 SW2.6 SW2.8 SW2.7	WSW2.9 WSW3.5 W3.0 W3.0	WSW2.5 WSW1.9 SW2.0 SW2.1 SW2.4 SW2.3 SW2.6 SW2.9 SW2.8 SW3.0	Diurnal Average
S11 NW16	NNW17 NNW14 N11 SSW11 SSW11 SSW12 SSW12 SSW12 SSW13	NNW22 NNW23 NNW24 NNW17 NNW16 NW13 N12 N13 N13	SSW12 NNW12 S11 S13	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Brion MacKay River - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Brion MacKay River - January 2017

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	350	47.81	47.81
6 - 11	353	48.22	96.04
12 - 19	26	3.55	99.59
20 - 28	3	0.41	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 732

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Wind Speed (WS) - km/h
Brion MacKay River - January 2017

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	5	38	17	1	2	4	15	51	44	38	39	33	37	16	3	7	350
6 - 11	4	38	16	0	0	0	3	7	44	72	27	60	52	10	10	10	353
12 - 19	3	0	0	0	0	0	0	0	1	11	0	0	1	0	2	8	26
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	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
Totals	12	76	33	1	2	4	18	58	89	121	66	93	90	26	15	28	732

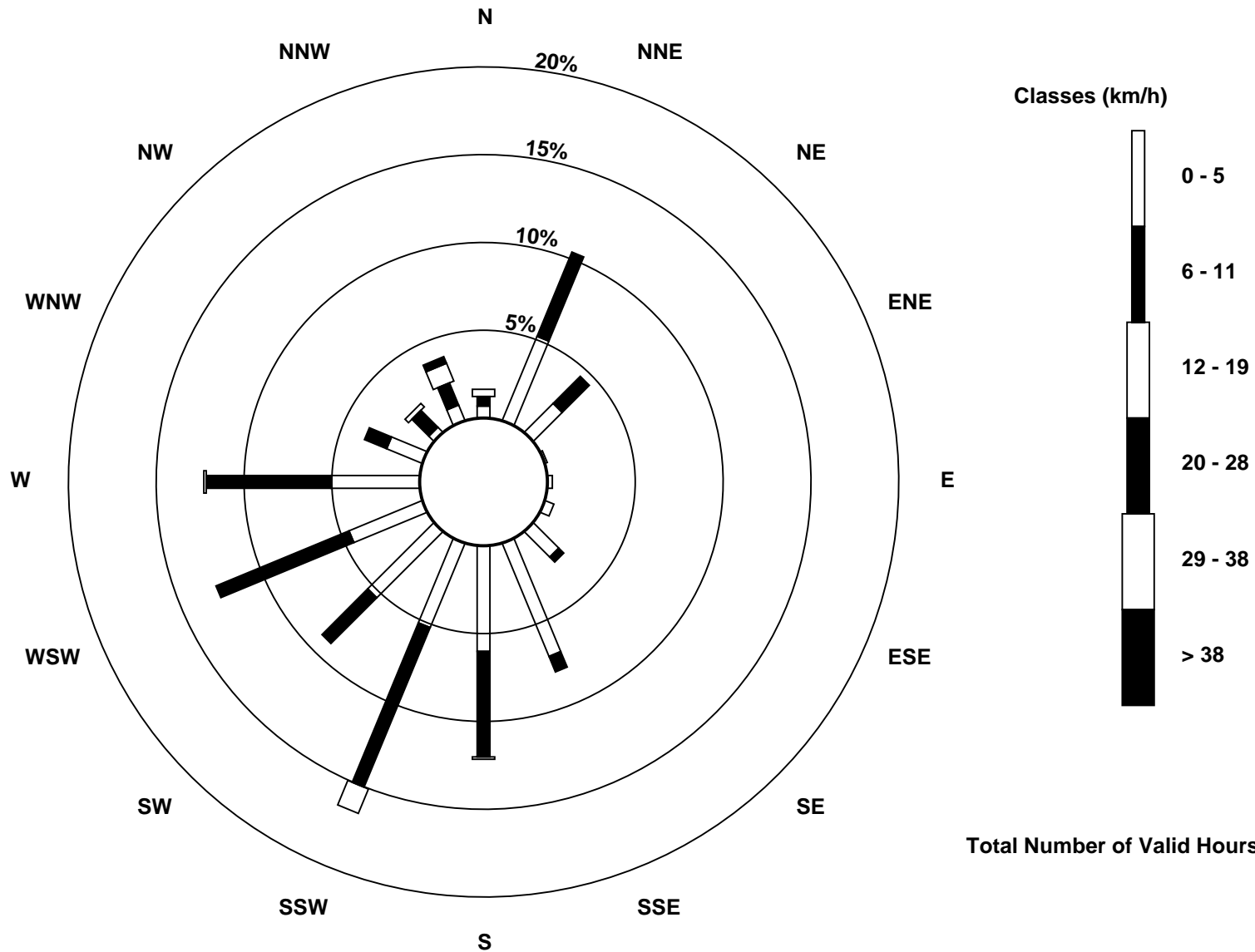
Total Number of Valid Hours: 732

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Wind Speed (WS) - km/h
Brion MacKay River (AMS 20)



Total Number of Valid Hours: 732



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Brion MacKay River - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Jan 11 12:00 Minimum Value: 0 km/h on Jan 6 21:00 Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 2 P ₉₀ = 3 P ₉₉ = 5																	Hours in Service: 744 Hours of Data: 732 Hours of Missing Data: 12 Hours of Calibration: 0 Percent Operational Time: 98.4								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jan	3	6	5	5	4	3	2	3	1	1	1	2	2	2	1	1	1	2	1	1	1	1	1	1	6
2-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3-Jan	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	3	3	3	3	
4-Jan	2	2	2	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	1	1	1	1	2	
5-Jan	1	2	2	3	3	3	2	2	2	2	2	1	3	3	3	3	3	2	2	2	2	1	1	3	
6-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	0	1	
7-Jan	1	2	1	2	2	2	3	3	2	1	2	2	2	2	2	2	2	1	1	1	1	1	1	3	
8-Jan	1	1	1	1	AF	1	1	0	1	1	1	2	2	2	1	1	1	1	1	1	2	1	1	2	
9-Jan	2	2	2	2	2	2	2	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	2	
10-Jan	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	2	2	1	1	1	1	2	
11-Jan	2	2	2	2	2	3	3	2	2	4	7	8	7	7	6	5	4	3	2	2	2	1	1	8	
12-Jan	0	1	1	1	1	1	1	2	1	2	3	3	3	3	3	3	2	3	2	2	1	2	2	3	
13-Jan	2	1	2	1	1	2	2	2	2	2	2	1	1	2	2	1	2	1	1	1	1	1	2	2	
14-Jan	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	2	2	2	2	3	2	2	3	3	
15-Jan	3	3	4	4	4	4	2	3	3	3	4	4	4	4	3	1	1	2	2	2	2	2	2	4	
16-Jan	2	2	2	2	3	3	3	3	4	4	4	5	4	4	4	3	3	2	2	3	3	3	3	5	
17-Jan	3	3	3	3	3	3	3	4	3	2	2	3	3	2	2	2	1	2	1	1	1	2	1	4	
18-Jan	1	1	1	2	1	2	1	2	2	1	2	2	2	2	2	1	1	1	2	1	1	2	1	3	
19-Jan	1	2	2	1	3	3	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	1	1	3	
20-Jan	1	1	2	1	1	1	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	2	3	
21-Jan	3	3	3	3	3	2	3	2	2	2	2	2	2	2	1	2	2	1	1	1	1	1	1	3	
22-Jan	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	
23-Jan	1	AF	1	AF	AF	AF	AF	AF	AF	AF	AF	M	1	1	1	1	AF	0	1	1	0	1	1	1	
24-Jan	1	1	1	1	1	1	2	2	1	2	2	1	2	1	2	2	1	1	1	2	2	2	2	2	
25-Jan	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2	3	3	3	2	2	2	3	
26-Jan	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	2	2	3	3	3	3	3	3	
27-Jan	2	3	4	4	4	4	4	3	3	3	4	4	3	3	3	2	2	2	2	3	3	2	2	4	
28-Jan	2	2	2	2	2	2	2	2	2	3	2	1	1	1	1	2	2	3	3	2	4	4	4	4	
29-Jan	4	3	4	3	3	3	2	2	2	2	4	4	5	5	4	3	2	1	1	2	2	2	2	5	
30-Jan	3	3	3	3	4	3	3	4	4	3	4	5	3	3	3	3	5	4	4	4	3	4	3	5	
31-Jan	3	3	2	2	2	2	1	1	1	2	2	2	2	2	3	2	2	1	2	2	2	2	2	3	
4 6 5 5 4 4 4 4 4 4 4 7 8 7 7 6 5 5 4 4 4 4 4 4 4																								Diurnal Maximum	
M - Maintenance AF - Analyzer Failure																									



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Brion MacKay River - January 2017

Direction of Maximum Speed: 343 deg on Jan 11 14:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 198.2 deg on Jan 16	Hours of Data: 732
Direction of Minimum Speed: 43 deg on Jan 20 00:00	Hours of Missing Data: 12
Direction of Minimum Daily Speed Average: 1.3 deg on Jan 2	Percent Operational Time: 98.4
Monthly Average Direction: 235.6 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-Jan	281	317	336	345	352	348	336	325	319	290	266	283	297	335	344	341	143	162	154	155	154	149	152	159	326.6
2-Jan	160	160	208	242	224	152	251	196	191	260	251	209	244	239	236	273	170	168	203	171	162	136	148	167	198.5
3-Jan	197	176	153	178	194	194	202	181	203	212	259	261	288	274	275	276	279	280	282	269	272	271	276	254.3	
4-Jan	289	293	318	348	332	344	317	153	169	224	234	243	245	236	223	208	197	203	197	237	267	291	310	251.4	
5-Jan	330	21	38	40	32	26	18	26	46	48	13	0	25	30	35	33	22	24	20	15	37	49	257	185	27.6
6-Jan	219	233	223	214	224	176	198	241	166	212	240	237	225	217	170	148	183	160	138	157	150	151	145	131	191.0
7-Jan	124	124	14	44	48	41	43	43	37	358	9	21	19	14	19	29	35	36	36	39	132	151	152	155	34.7
8-Jan	181	189	176	174	AF	193	204	169	195	190	208	230	237	241	237	221	202	200	204	206	218	231	239	250	213.2
9-Jan	266	260	244	253	264	267	282	278	270	279	276	291	300	309	285	270	274	284	296	306	262	263	270	242	276.1
10-Jan	216	143	88	28	47	204	216	245	252	275	283	289	292	275	260	244	232	249	254	220	201	204	200	199	239.0
11-Jan	200	201	200	205	210	258	272	250	271	331	1	335	348	343	344	338	329	334	324	323	310	263	230	240	317.0
12-Jan	152	153	159	152	154	180	189	186	152	149	165	172	176	162	159	143	136	136	117	150	128	178	204	204	164.3
13-Jan	201	193	201	175	236	228	231	210	209	191	204	206	197	223	235	185	178	187	188	175	180	182	175	181	197.4
14-Jan	185	187	190	182	186	191	181	187	194	193	195	206	205	220	234	232	228	233	220	221	209	203	197	216	202.9
15-Jan	236	255	256	254	259	270	250	238	233	235	242	247	253	247	241	227	205	204	214	214	221	203	194	192	235.1
16-Jan	193	195	201	187	194	194	197	197	203	210	202	211	208	210	208	205	205	187	185	191	192	188	187	190	198.2
17-Jan	190	193	207	205	201	210	235	254	247	216	215	237	248	241	205	201	188	187	196	190	151	175	182	178	208.5
18-Jan	168	156	154	149	141	70	89	120	128	110	339	118	196	222	198	178	195	164	179	184	165	183	158	187	164.5
19-Jan	139	169	150	35	15	35	40	45	27	27	35	35	25	18	27	24	34	35	23	29	38	300	353	43	31.5
20-Jan	259	226	220	189	191	187	202	192	202	207	215	222	180	181	174	168	153	143	158	148	140	152	12	40	183.7
21-Jan	39	29	30	32	34	28	30	28	23	21	18	16	17	18	19	23	23	17	22	16	14	15	12	18	24.0
22-Jan	14	23	27	25	29	28	28	38	36	39	29	39	18	24	22	26	25	33	33	29	32	20	18	21	27.2
23-Jan	20	AF	6	AF	AF	AF	AF	AF	AF	AF	AF	M	258	230	253	230	AF	165	162	153	148	148	171	173	--
24-Jan	166	171	179	179	187	176	203	210	210	216	207	214	213	222	197	184	185	183	192	196	194	189	192	194	194.5
25-Jan	191	194	188	189	191	193	189	190	190	191	189	194	207	204	203	203	188	193	197	194	191	196	198	199	194.2
26-Jan	199	210	215	238	241	246	255	258	259	260	258	254	247	246	240	244	232	234	243	246	254	257	249	260	243.3
27-Jan	271	262	261	269	266	265	266	263	259	251	260	257	252	240	245	251	281	280	260	265	270	271	267	260	262.2
28-Jan	250	242	233	220	239	262	252	248	246	243	268	261	232	161	162	176	196	202	208	217	264	270	266	264	234.0
29-Jan	252	251	258	255	247	243	225	218	221	235	251	257	260	274	284	294	267	255	232	232	255	265	260	253	254.1
30-Jan	251	255	259	267	267	269	264	254	265	273	277	287	22	355	336	326	316	353	350	355	340	338	341	340	311.0
31-Jan	336	343	1	333	324	317	300	233	238	259	275	264	260	273	270	263	260	263	275	282	278	293	295	292	295.1

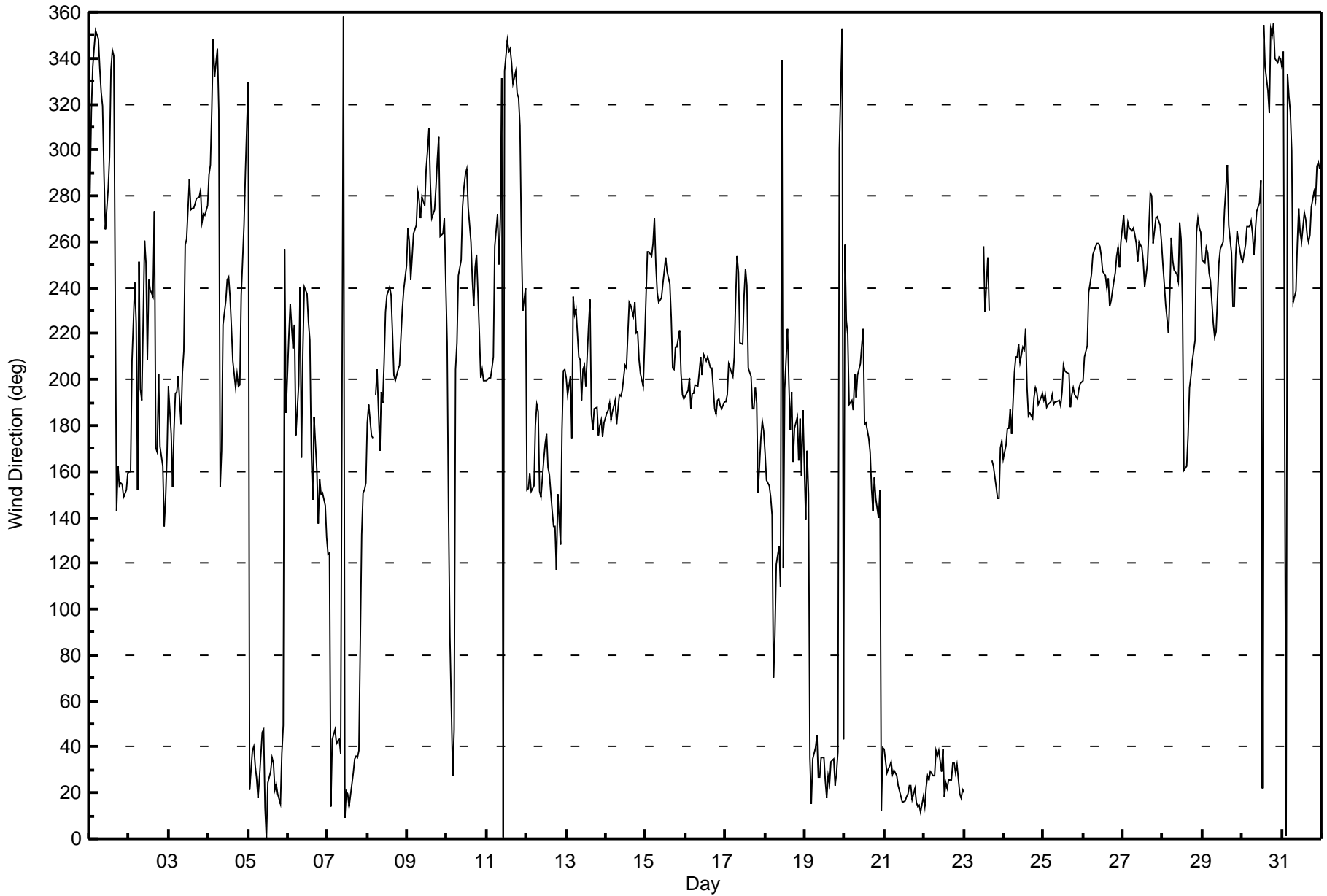
224.8 231.2 232.2 233.4 241.4 246.9 243.0 227.1 228.2 234.2 245.5 257.0 264.5 266.6 256.5 245.5 232.0 217.6 223.0 225.9 224.0 224.5 224.4 222.4
 Diurnal Average

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Brion MacKay River - January 2017





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Brion MacKay River - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 100 deg on Jan 5 23:00	Hours in Service: 744 Hours of Data: 732 Hours of Missing Data: 12 Hours of Calibration: 0 Percent Operational Time: 98.4
Minimum Value: 7 deg on Jan 1 23:00	
Percentiles: P ₁ = 12 P ₁₀ = 17 Q ₁ = 21 Median = 27 Q ₃ = 41 P ₉₀ = 47 P ₉₉ = 73	

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-Jan	37	30	22	23	24	22	20	16	17	49	43	39	32	21	20	59	48	66	19	22	21	9	7	31	66
2-Jan	47	76	66	72	47	33	32	35	41	34	44	44	42	44	45	36	50	41	38	53	30	65	17	19	76
3-Jan	34	35	15	19	21	37	16	23	28	39	46	52	39	49	45	52	41	38	36	34	50	40	41	49	52
4-Jan	27	22	35	23	18	24	70	19	41	36	37	36	40	36	33	25	20	20	19	19	41	45	28	21	70
5-Jan	18	36	25	25	25	24	25	27	24	28	30	26	27	27	28	26	24	24	26	28	47	47	100	60	100
6-Jan	42	30	23	34	35	33	28	24	56	35	23	30	30	43	31	42	26	19	20	21	18	12	22	41	56
7-Jan	13	97	20	25	29	29	30	28	27	24	24	26	25	25	23	23	26	24	20	19	55	58	28	27	97
8-Jan	14	29	48	24	AF	17	23	28	19	18	21	30	33	42	35	26	19	17	19	18	22	26	34	40	48
9-Jan	45	43	47	47	42	46	41	38	44	41	47	30	27	23	34	31	31	25	20	21	19	24	25	72	72
10-Jan	62	54	60	26	26	79	35	35	46	20	28	37	32	51	56	37	31	42	45	27	18	20	19	20	79
11-Jan	18	20	20	23	26	48	45	46	43	39	27	23	25	24	23	22	19	19	16	16	24	31	26	45	48
12-Jan	23	23	22	13	12	15	14	17	19	24	25	25	27	26	27	26	22	32	54	27	41	33	21	22	54
13-Jan	21	19	20	20	30	24	32	28	26	27	46	39	24	31	31	23	15	12	13	13	15	14	18	15	46
14-Jan	16	17	15	16	15	16	19	16	15	16	19	21	21	27	32	32	28	30	22	22	20	18	18	24	32
15-Jan	39	48	49	44	50	48	44	40	31	31	38	45	45	51	44	36	19	18	20	22	27	18	18	16	51
16-Jan	16	16	18	17	17	19	19	19	23	23	20	24	23	25	24	21	22	18	18	20	19	18	18	18	25
17-Jan	17	17	21	22	20	23	35	44	43	33	28	39	48	42	21	25	33	15	16	41	21	14	13	15	48
18-Jan	14	14	12	23	20	47	45	29	32	63	86	66	41	46	28	23	39	25	25	11	21	15	22	19	86
19-Jan	49	23	41	65	21	26	23	29	22	23	24	28	27	29	30	32	27	35	38	28	98	52	40	99	99
20-Jan	42	45	57	20	23	19	21	18	19	21	23	33	21	21	18	17	35	12	13	10	10	15	33	24	57
21-Jan	25	23	25	25	25	26	26	25	25	25	25	25	25	26	25	25	24	26	25	24	23	26	26	24	26
22-Jan	26	27	28	27	26	25	26	27	30	28	32	29	25	30	31	30	27	26	32	28	28	29	26	25	32
23-Jan	30	AF	23	AF	AF	AF	AF	AF	AF	AF	AF	M	46	51	48	34	AF	31	18	21	17	45	16	19	51
24-Jan	19	20	20	21	24	27	34	22	22	26	29	30	31	27	22	18	12	12	14	16	16	15	18	19	34
25-Jan	18	20	18	16	16	16	18	18	18	18	20	22	25	22	21	20	16	18	17	17	17	17	18	19	25
26-Jan	18	22	22	34	36	42	45	46	44	41	47	50	43	43	31	37	26	30	42	40	49	47	44	48	50
27-Jan	45	47	46	46	47	45	46	42	47	45	43	44	42	42	47	35	30	35	51	47	44	42	37	42	51
28-Jan	45	35	31	27	38	45	39	41	43	37	42	50	71	30	22	22	17	19	21	21	45	44	44	47	71
29-Jan	46	49	47	47	46	37	26	22	27	33	44	49	45	47	38	30	32	20	22	28	41	45	44	42	49
30-Jan	42	45	47	45	45	41	46	43	47	46	42	45	25	24	24	20	29	23	24	25	21	21	21	22	47
31-Jan	21	23	25	22	20	23	24	38	18	45	48	52	47	45	44	46	41	40	32	24	30	25	24	23	52
	62	97	66	72	50	79	70	46	56	63	86	66	71	51	56	59	50	66	54	53	98	65	100	99	

Diurnal Maximum

M - Maintenance AF - Analyzer Failure



Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 23, 2017	Last Calibration	December 15, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Reason:	Routine		
Start Time (MST)	11:25	End Time (MST)	12:15
Gas Cert Reference	EY0000372	Station temp.	22 Deg C
Cal Gas Concentration	50.7 ppm	Cal Gas Exp Date	June 10, 2016
Calibrator Make/Model	API T700	Serial Number	1220
ZAG Make/Model	API 701	Serial Number	4766
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9627

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-634	-634
Analyzer IP address	192.168.1.43		Lamp voltage	842	842
Calculated slope	0.997186	0.993374	Chamber temp	45	45.0
Calculated intercept	2.054889	-0.208609	Pressure	673.5	664.7
Analyzer Background	12.8	12.8	Flow	0.490	0.484
Analyzer Coefficient	0.942	0.942	Intensity	88	88

Analyzer make Thermo 43i Analyzer serial # 1501301450

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	79.9	810.2	815.8	0.993
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	79.9	810.2	815.8	0.993
second point					
third point					
as left zero					
as left span					
Average Correction Factor					0.993

Corrected As found 815.6 Previous response 810.4 % change -0.6%

Notes:

No adjustments made. Will be replacing blend gas cylinder.

Calibration Performed By: Asad Hidayat



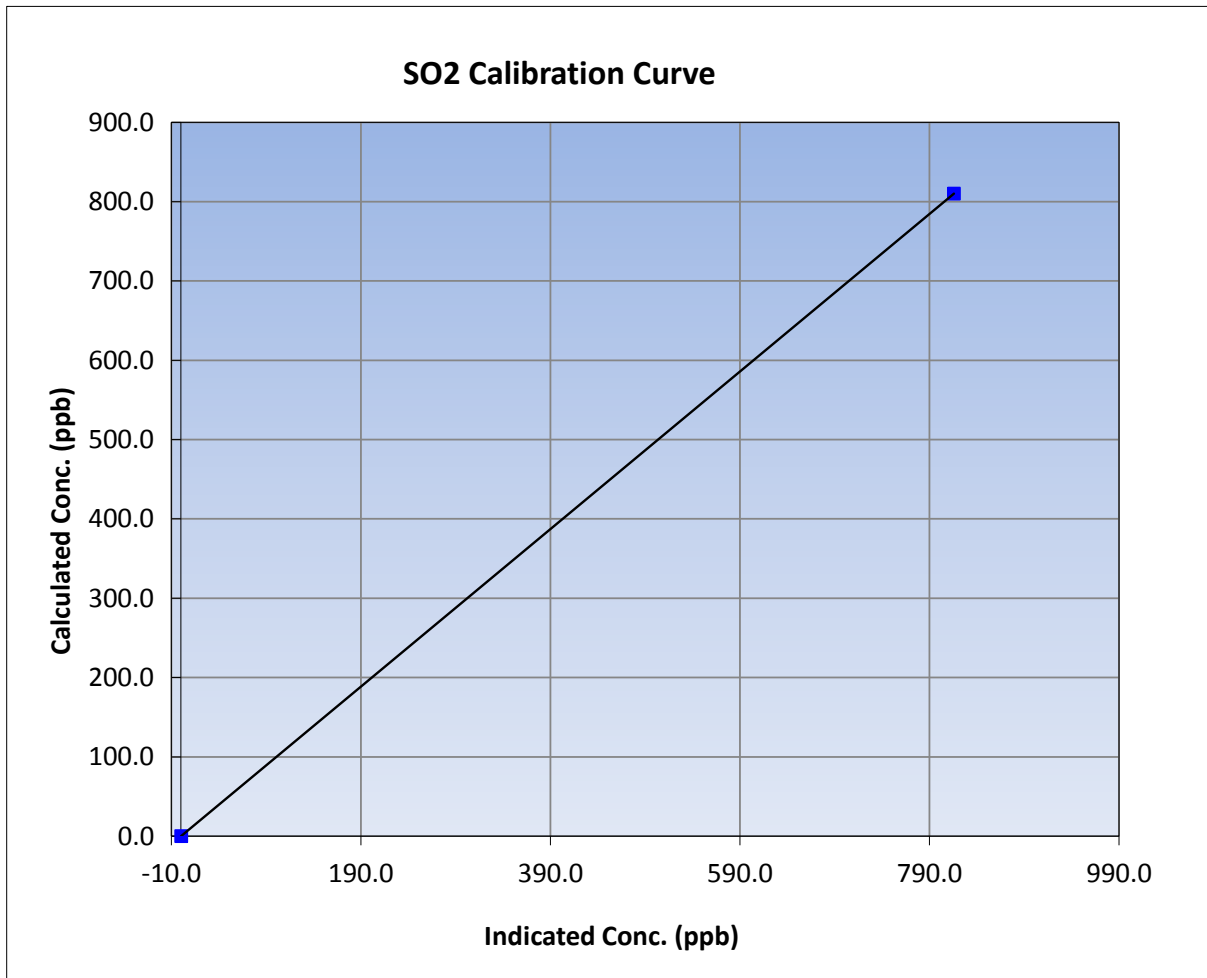
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 23, 2017	Previous Calibration	December 15, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	11:25	End Time (MST)	12:15
Analyzer make	Thermo 43i	Analyzer serial #	1501301450

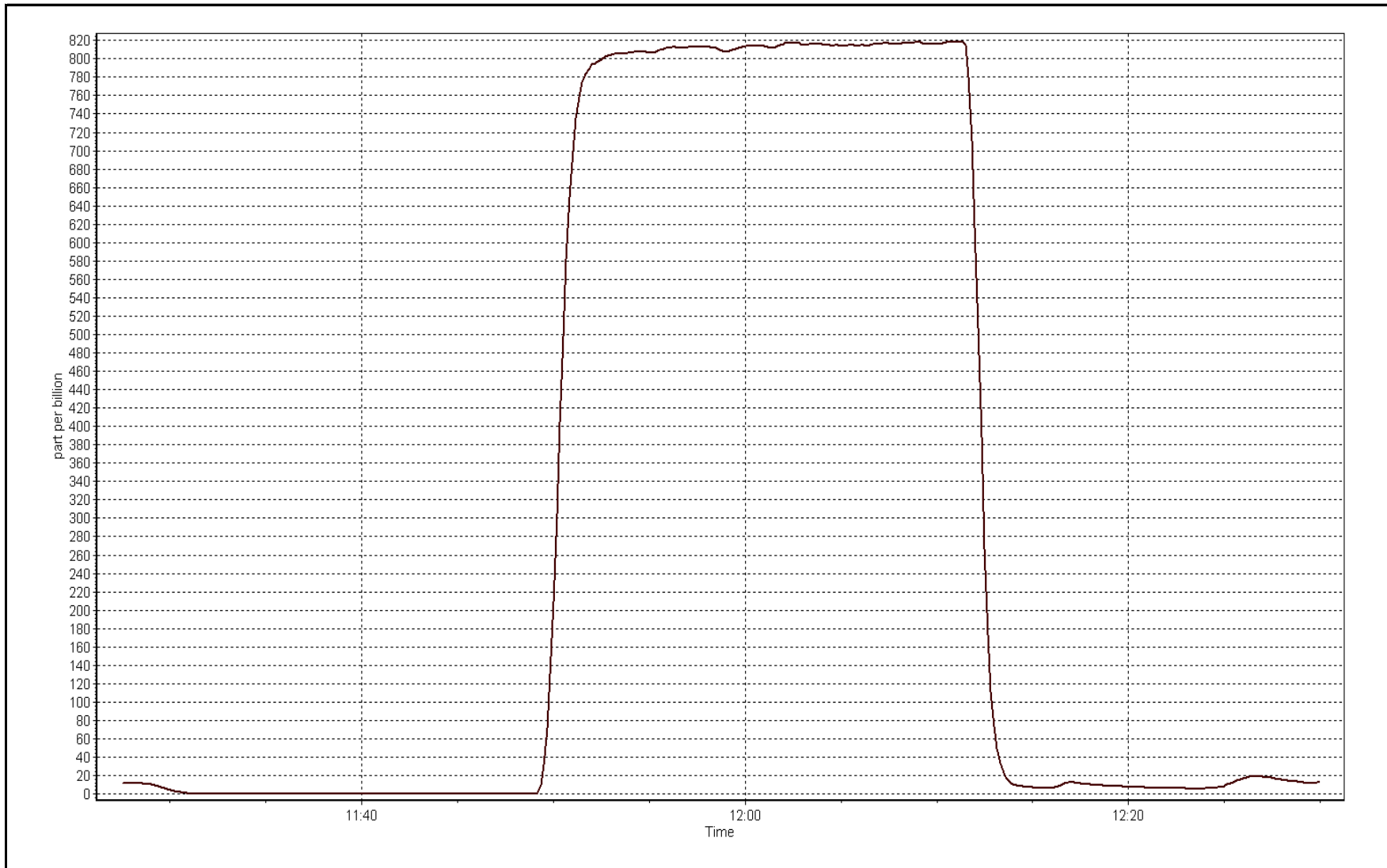
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	1.000000
810.2	815.8	0.9931		
			Slope	0.993374
			Intercept	-0.208609



SO2 Calibration Plot

Date: January 23, 2017





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	January 23, 2017	Last Calibration	December 15, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Reason:	Routine		
Start Time (MST)	13:15	End Time (MST)	17:30
Gas Cert Reference	EY0000657	Station temp.	22 Deg C
Cal Gas Concentration	48 ppm	Cal Gas Exp Date	November 4, 2019
Calibrator Make/Model	API T700	Serial Number	1220
ZAG Make/Model	API 701	Serial Number	4766
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9627

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-634	-634
Analyzer IP address	192.168.1.43		Lamp voltage	842	842
Calculated slope	0.993374	0.995803	Chamber temp	45	45.2
Calculated intercept	-0.208609	0.667880	Pressure	664.7	665.3
Analyzer Background	12.8	12.4	Flow	0.484	0.483
Analyzer Coefficient	0.942	0.912	Intensity	88	88

Analyzer make Thermo 43i Analyzer serial # 1501301450

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	78.6	754.6	783.6	0.963
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	78.6	754.6	757.8	0.996
second point	5000	39.3	377.3	376.9	1.001
third point	5000	19.6	188.2	188.0	1.001
as left zero	5000	0.0	0.0		----
as left span	5000	78.6	754.6		
Average Correction Factor					0.999

Corrected As found 783.4 Previous response 759.8 % change -3.0%

Notes:

Sample inlet filter replaced after as founds. Blend gas cylinder replaced after as founds. Instrument was pulling room air from 11:15-12:45 MST, while blend cylinder was being purged. Sample pump replaced after doing as founds with the new cylinder. Adjusted span to correct concentration. As lefts were not completed due to lack of time.

Calibration Performed By: Asad Hidayat



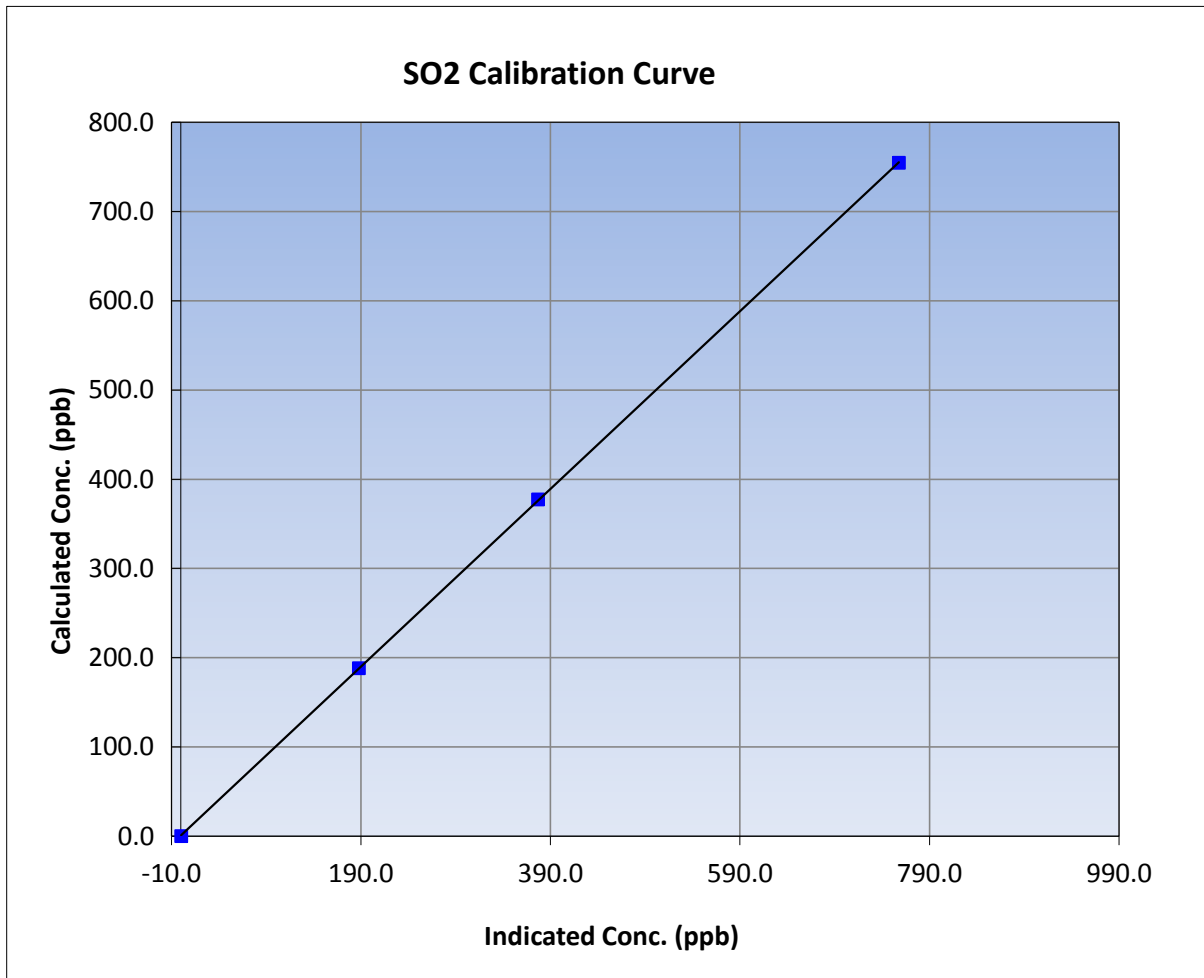
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 23, 2017	Previous Calibration	December 15, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	13:15	End Time (MST)	17:30
Analyzer make	Thermo 43i	Analyzer serial #	1501301450

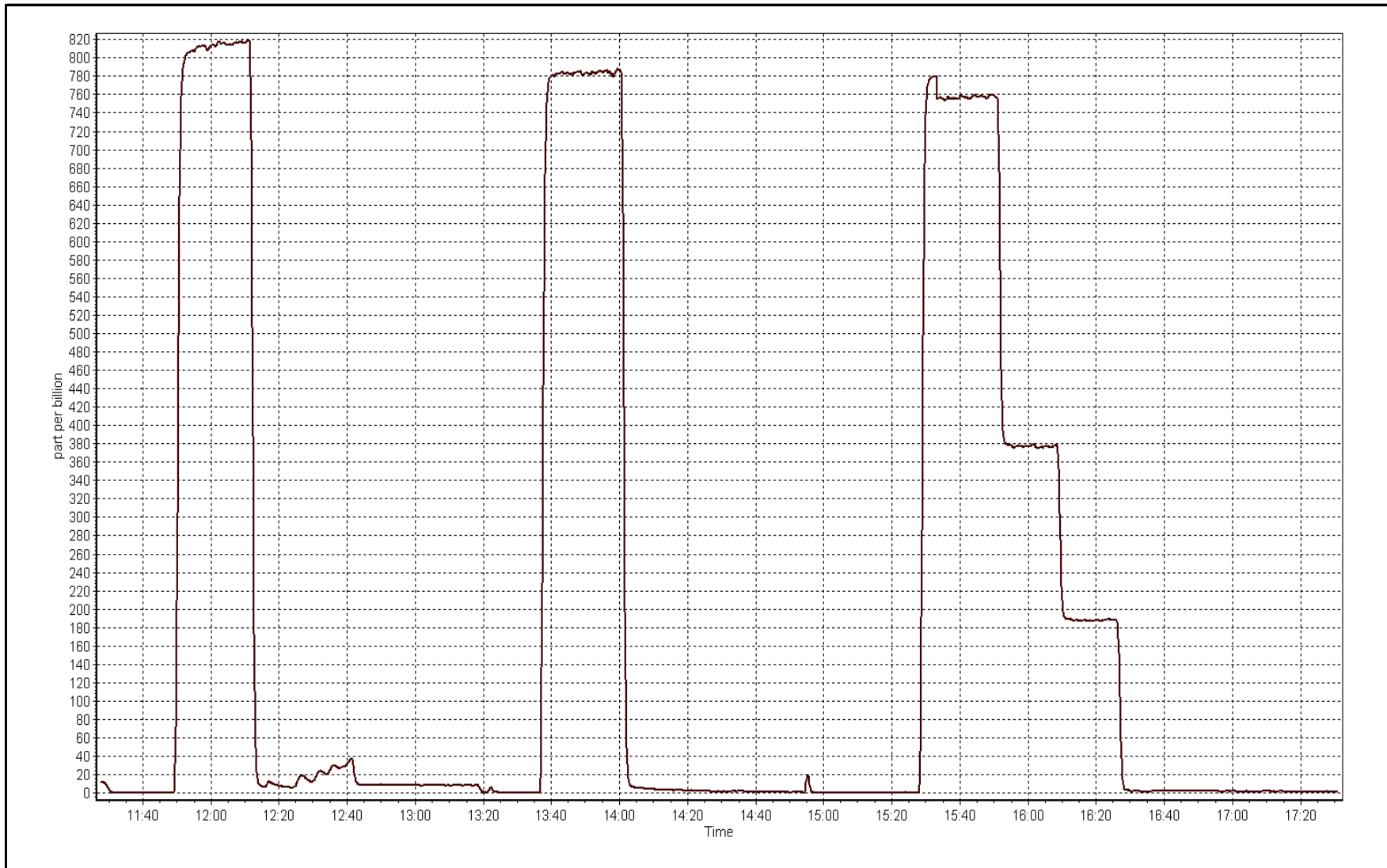
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999990
754.6	757.8	0.9957		
377.3	376.9	1.0010	Slope	0.995803
188.2	188.0	1.0011		
			Intercept	0.667880



SO2 Calibration Plot

Date: January 23, 2017





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	January 16, 2017	Last Calibration	December 15, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Reason:	Routine		
Start Time (MST)	11:21	End Time (MST)	13:55
Gas Cert Reference	LL119508	Station temp.	22 Deg C
Cal Gas Concentration	5.35 ppm	Cal Gas Exp Date	February 13, 2018
Calibrator Make/Model	API 700	Serial Number	1220
ZAG air Make/Model	API 701	Serial Number	4766
DACS make/model	Campbell Scientific CR3000	Serial Number	9627
SO2 gas concentration	50.7 ppm	SO2 gas cert/exp	EY0000372 June 10, 2016

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	505	505
Analyzer IP address	192.168.1.75		Lamp voltage	2567	2528
Calculated slope	0.990099	0.999356	Chamber temp	50	50
Calculated intercept	0.093235	-0.071887	Pressure	23.4	22.6
Analyzer Background	24.8	24.8	Flow	0.626	0.595
Analyzer Coefficient	1.014	0.986	Intensity	63	63
			Converter temp.	315	316

Analyzer make/model	API T101	Analyzer serial #	196
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	75.6	80.9	83.3	0.971
SO2 scrubber check	5000	19.8	200.8	3.6	----
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	75.6	80.9	81.1	0.998
second point	5000	37.8	40.4	40.5	0.999
third point	5000	18.9	20.2	20.3	0.996
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	75.6	80.9	80.5	1.005
Average Correction Factor					0.998

Corrected As found	83.2	Previous response	81.6	% change	-1.9%
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Notes:

Sample inlet filter replaced after as founds. Sox scrubber test completed after 3rd point. Adjusted span.

Calibration Performed By: Asad Hidayat



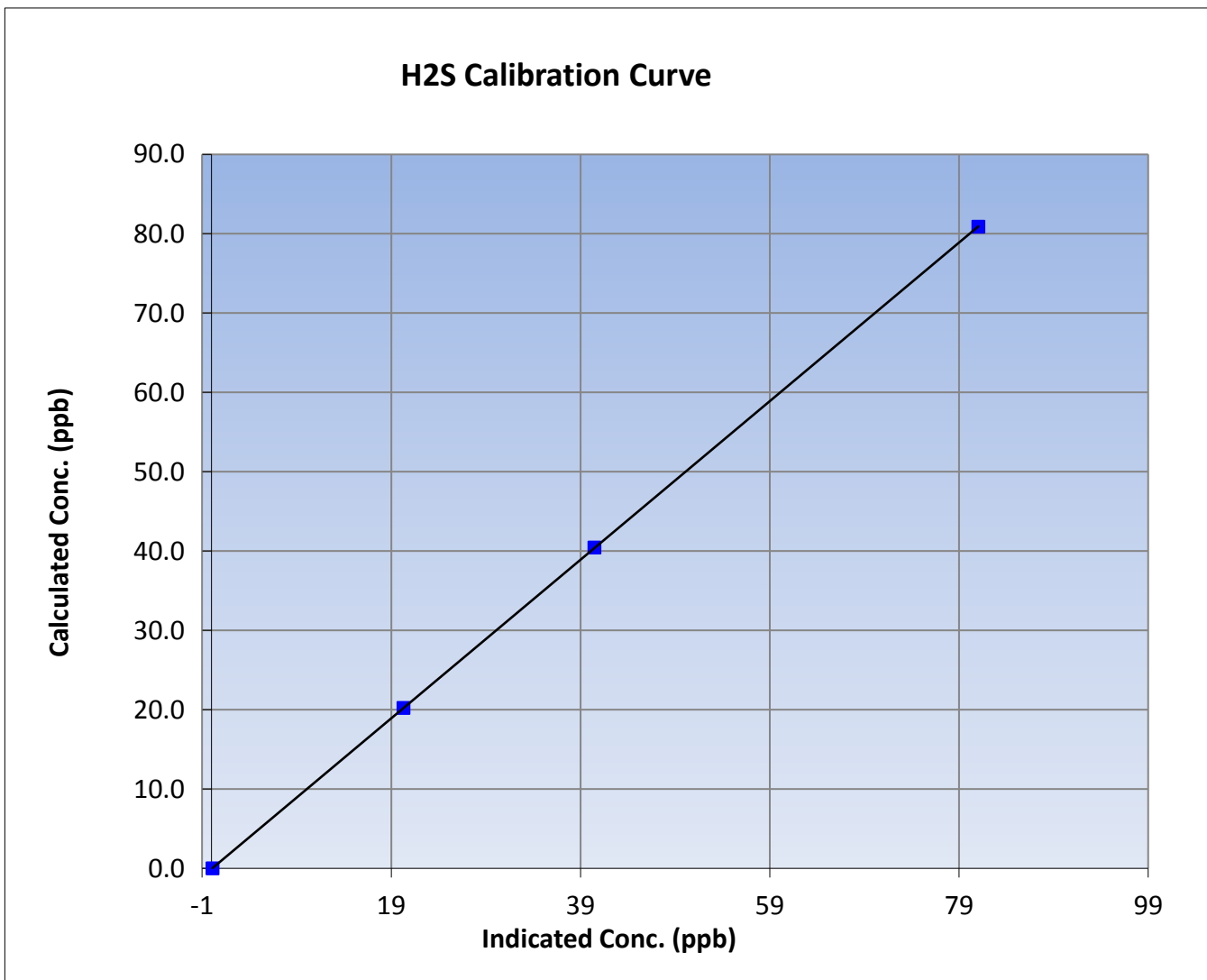
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	January 16, 2017	Previous Calibration	December 15, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	11:21	End Time (MST)	13:55
Analyzer make	API T101	Analyzer serial #	196

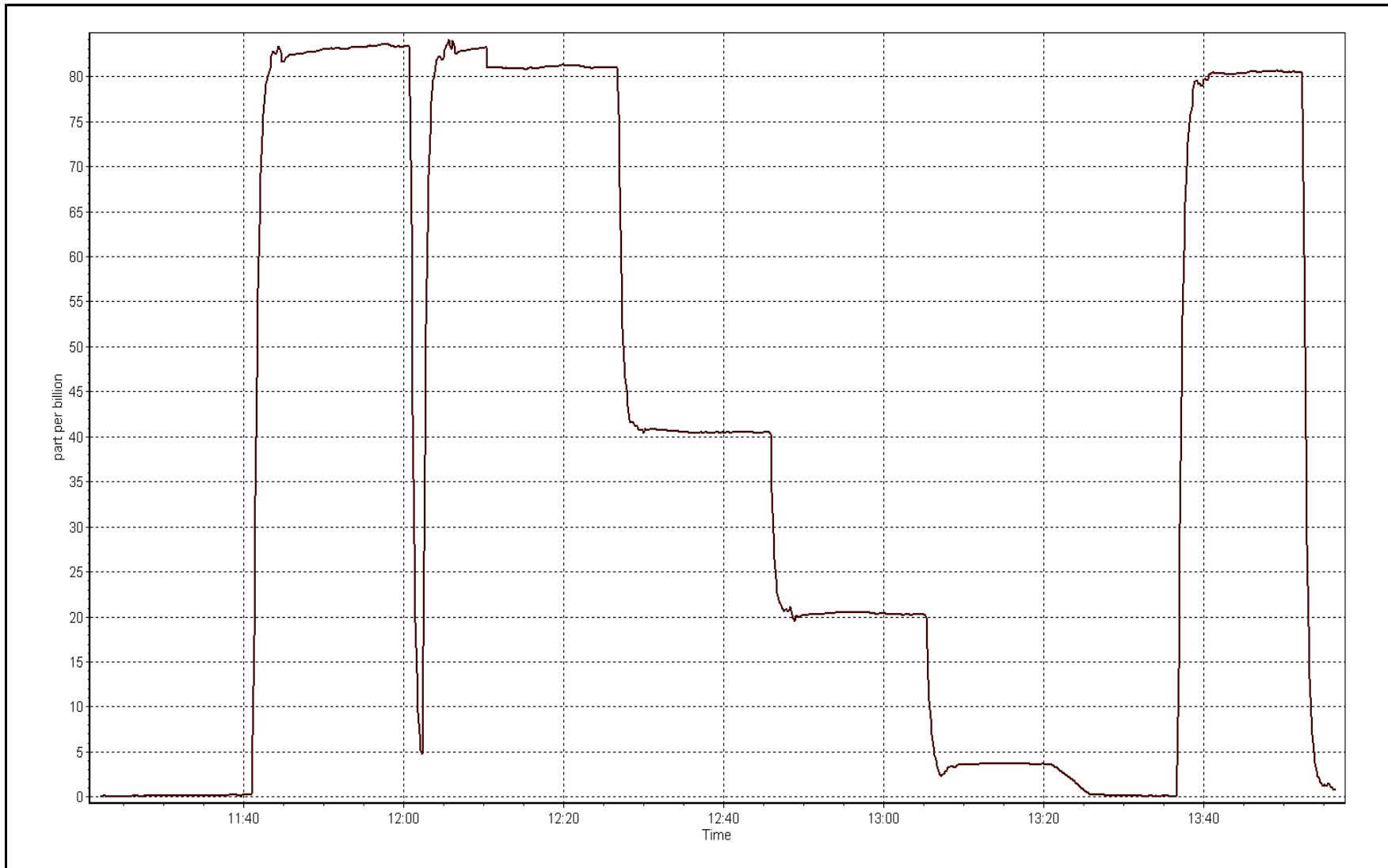
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999998
80.9	81.1	0.9981		
40.4	40.5	0.9992	Slope	0.999356
20.2	20.3	0.9962		
			Intercept	-0.071887



H2S Calibration Plot

Date: January 16, 2017





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	January 23, 2017	Last Calibration	December 15, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Reason:	Routine		
Start Time (MST)	11:25	End Time (MST)	12:15
Gas Cert Reference	EY0000372	Cal Gas Expiry Date	June 10, 2016
CH4 Cal Gas Conc.	517 ppm	CH4 Equiv Conc.	1072.5 ppm
C3H8 Cal Gas Conc.	202 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	1220
ZAG make/model	Teledyne API 701	Serial Number	4766
DACS make/model	Campbell Scientific CR3000	Serial Number	9627

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.6	8.6
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.3	34.3
Calculated slope	0.997517	1.024420	Fuel Pressure	23.9	23.9
Calculated intercept	0.091337	-0.133175	Analyzer Coeff	4.3	4.3
			Analyzer BKG	1.920	1.920

Analyzer make	51i-LT	Analyzer serial #	1501663727
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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	0.13	----
as found span	5000	79.9	17.14	16.86	1.017
calibrator zero	5000	0.0	0.00	0.13	----
high point	5000	79.9	17.14	16.86	1.017
second point					
third point					
as left zero					
as left span					
Average Correction Factor					1.017

Corrected As found	16.73	Previous response	17.09	% change	2.2%
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Notes:

No adjustments. Replacing blend gas cylinder.

Calibration Performed By:

Asad Hidayat



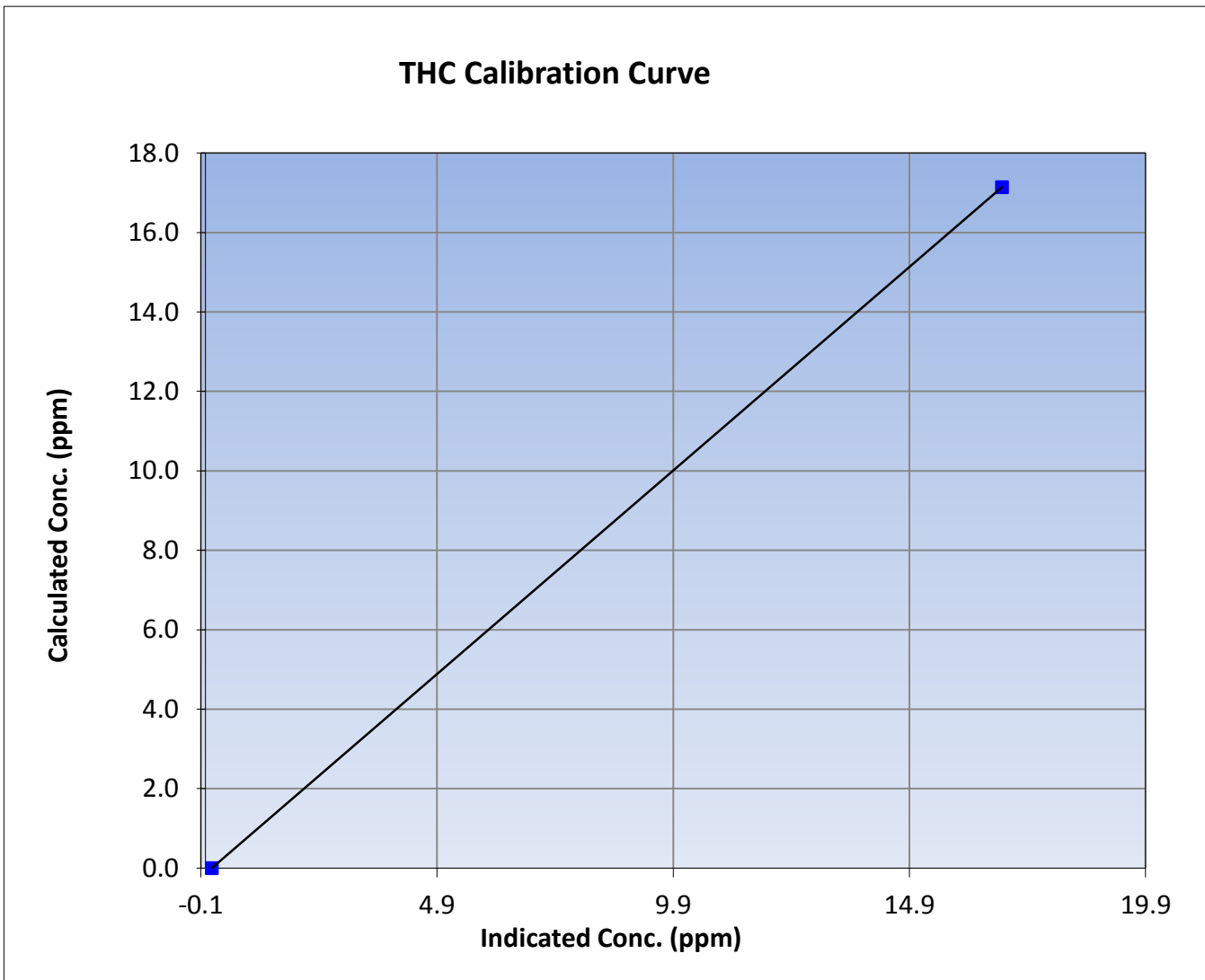
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	January 23, 2017	Previous Calibration	December 15, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	11:25	End Time (MST)	12:15
Analyzer make	51i-LT	Analyzer serial #	1501663727

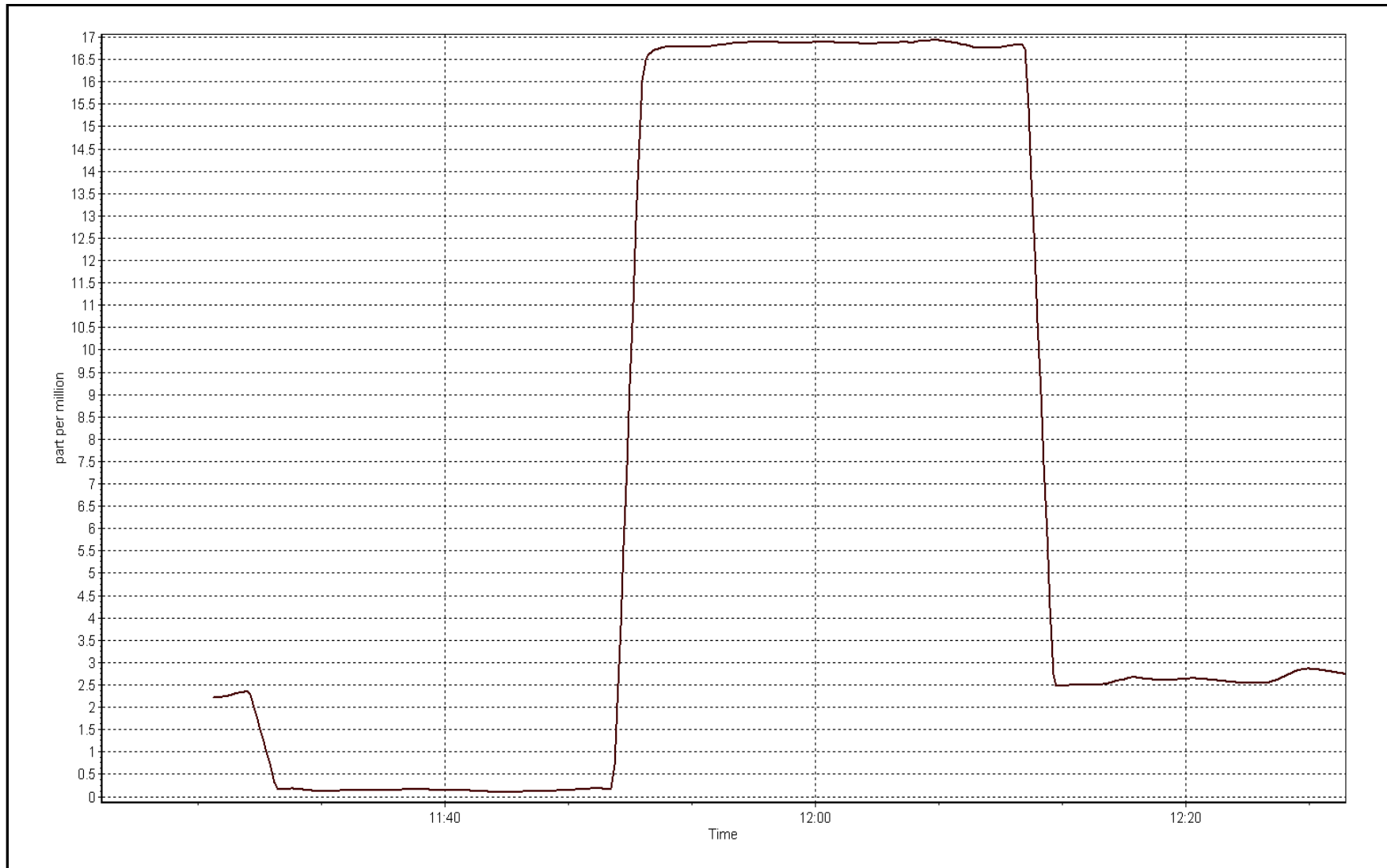
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.13	----	Correlation Coefficient	1.000000
17.14	16.86	1.0165		
			Slope	1.024420
			Intercept	-0.133175



THC Calibration Plot

Date: January 23, 2017





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	January 23, 2017	Last Calibration	December 15, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Reason:	Routine		
Start Time (MST)	13:15	End Time (MST)	17:30
Gas Cert Reference	EY0000657	Cal Gas Expiry Date	November 4, 2019
CH4 Cal Gas Conc.	513 ppm	CH4 Equiv Conc.	1060.3 ppm
C3H8 Cal Gas Conc.	199 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	1220
ZAG make/model	Teledyne API 701	Serial Number	4766
DACS make/model	Campbell Scientific CR3000	Serial Number	9627

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.6	8.6
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.3	34.3
Calculated slope	1.024420	1.001431	Fuel Pressure	23.9	23.9
Calculated intercept	-0.133175	0.013820	Analyzer Coeff	4.3	4.4
			Analyzer BKG	1.920	2.100

Analyzer make	51i-LT	Analyzer serial #	1501663727
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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	0.17	----
as found span	5000	78.6	16.67	16.34	1.020
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	78.6	16.67	16.64	1.002
second point	5000	39.3	8.33	8.29	1.005
third point	5000	19.6	4.16	4.13	1.006
as left zero					
as left span					
Average Correction Factor					1.004

Corrected As found	16.17	Previous response	16.40	% change	1.4%
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Notes:

Sample inlet filter replaced after as founds. Blend gas cylinder replaced after as founds. Instrument was pulling room air from 11:15-12:45 MST, while blend cylinder was being purged. Pump replaced after doing as founds with new cal gas cylinder. Adjusted both zero and span. As lefts were not completed due to lack of time.

Calibration Performed By:

Asad Hidayat



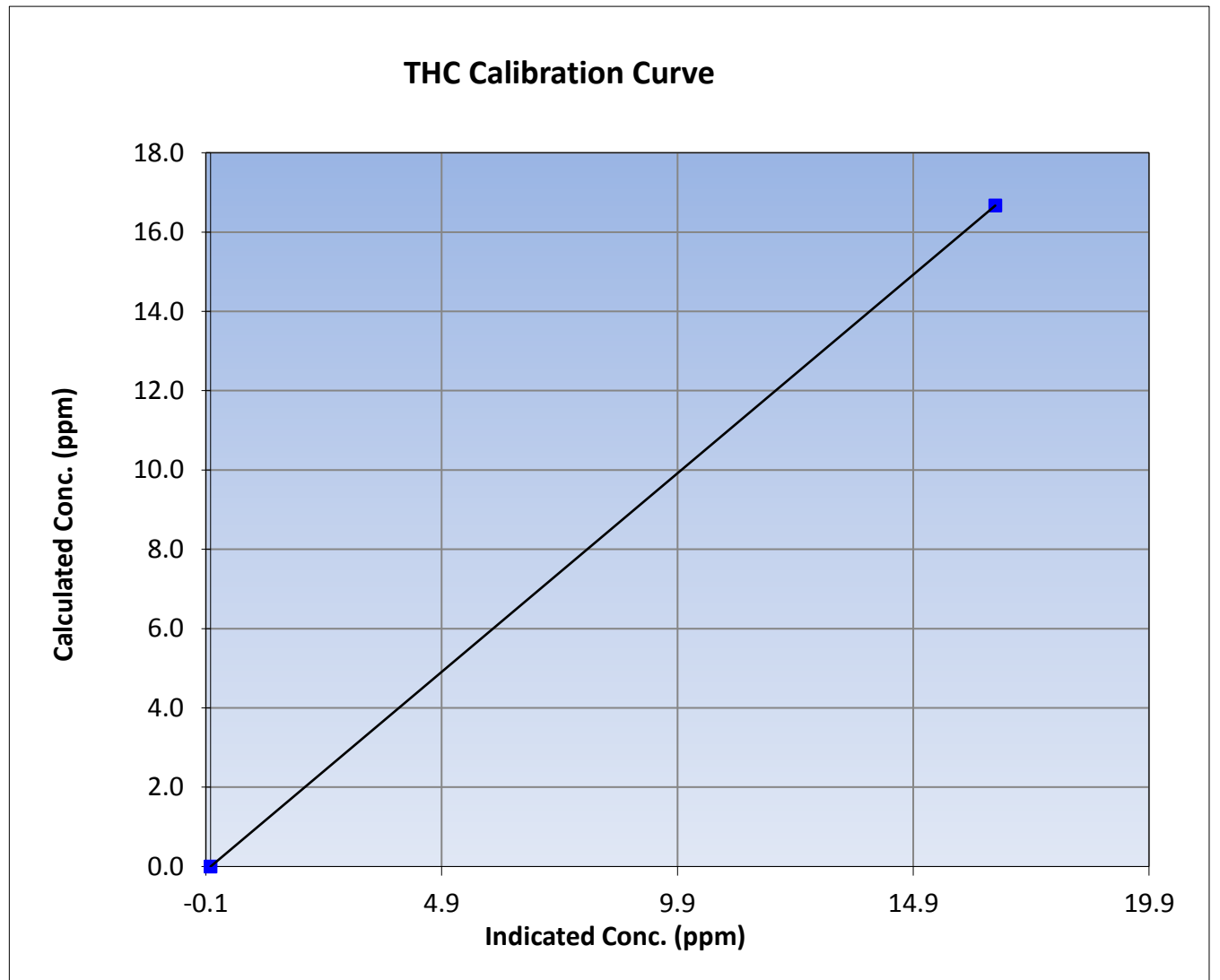
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	January 23, 2017	Previous Calibration	December 15, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	13:15	End Time (MST)	17:30
Analyzer make	51i-LT	Analyzer serial #	1501663727

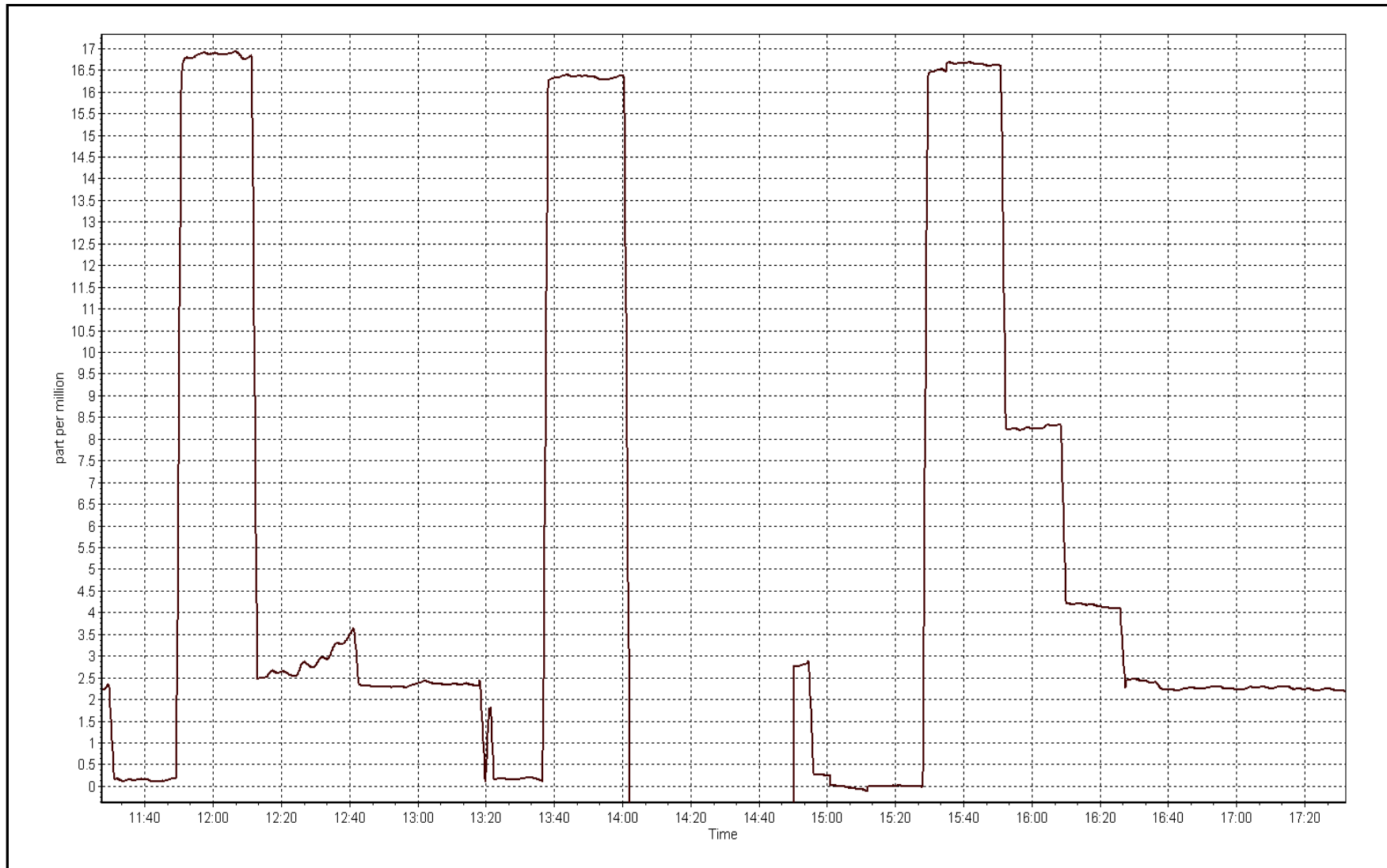
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999996
16.67	16.64	1.0016		
8.33	8.29	1.0053	Slope	1.001431
4.16	4.13	1.0063		
			Intercept	0.013820



THC Calibration Plot

Date: January 23, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 23, 2017	Previous Calibration	December 15, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Reason:	Routine		
Start Time (MST)	11:25	End Time (MST)	12:15
NO Cal Gas Conc	50.1 ppm	Gas Cert Reference	EY0000372
NOX Cal Gas Conc	50.4 ppm	Cal Gas Expiry Date	June 10, 2016
Calibrator	API T700	Serial Number	1220
Zero air Generator	Teledyne API T701	Serial Number	4766

DACS Information

DACS make & model	Cambell Scientific CR3000	DACS serial No.	9627
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.997952	0.995987	0.994293
	Data Offset	0.500620	0.950697	0.162890
Current Calibration	Data Slope	1.008555	1.007536	
	Data Offset	0.161369	0.322411	

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1505164379
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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	1.090		1.090	
NOX coefficient	1.003		1.003	
NO2 coefficient	0.995		0.995	
NO bkgrnd	3.2		3.2	
NOX bkgrnd	3.2		3.2	
Chamber Temp	50.6	Deg C	50.6	Deg C
Moly Temp	324.2	Deg C	322.6	Deg C
PMT voltage	-767	V	-767	V
PMT Temp	-3.1	Deg C	-3.1	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	172.6	mmHg	170.2	mmHg
R Cell Press Nox	172.1	mmHg	170.2	mmHg
NO sample flow	0.816	lpm	0.801	lpm
Nox sample Flow	0.814	lpm	0.801	lpm

Notes:

No adjustments. Replacing blend gas cylinder.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: January 23, 2017 Station Number: AMS 20

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	-0.3	0.2	----	----
as found span	5000	79.9	805.4	800.6	4.8	798.4	794.3	4.1	1.0088	1.0079
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.3	0.2	----	----
high point	5000	79.9	805.4	800.6	4.8	798.4	794.3	4.1	1.0088	1.0079
second point										
third point										
as left zero										
as left span										
Average Correction Factor									1.0088	1.0079

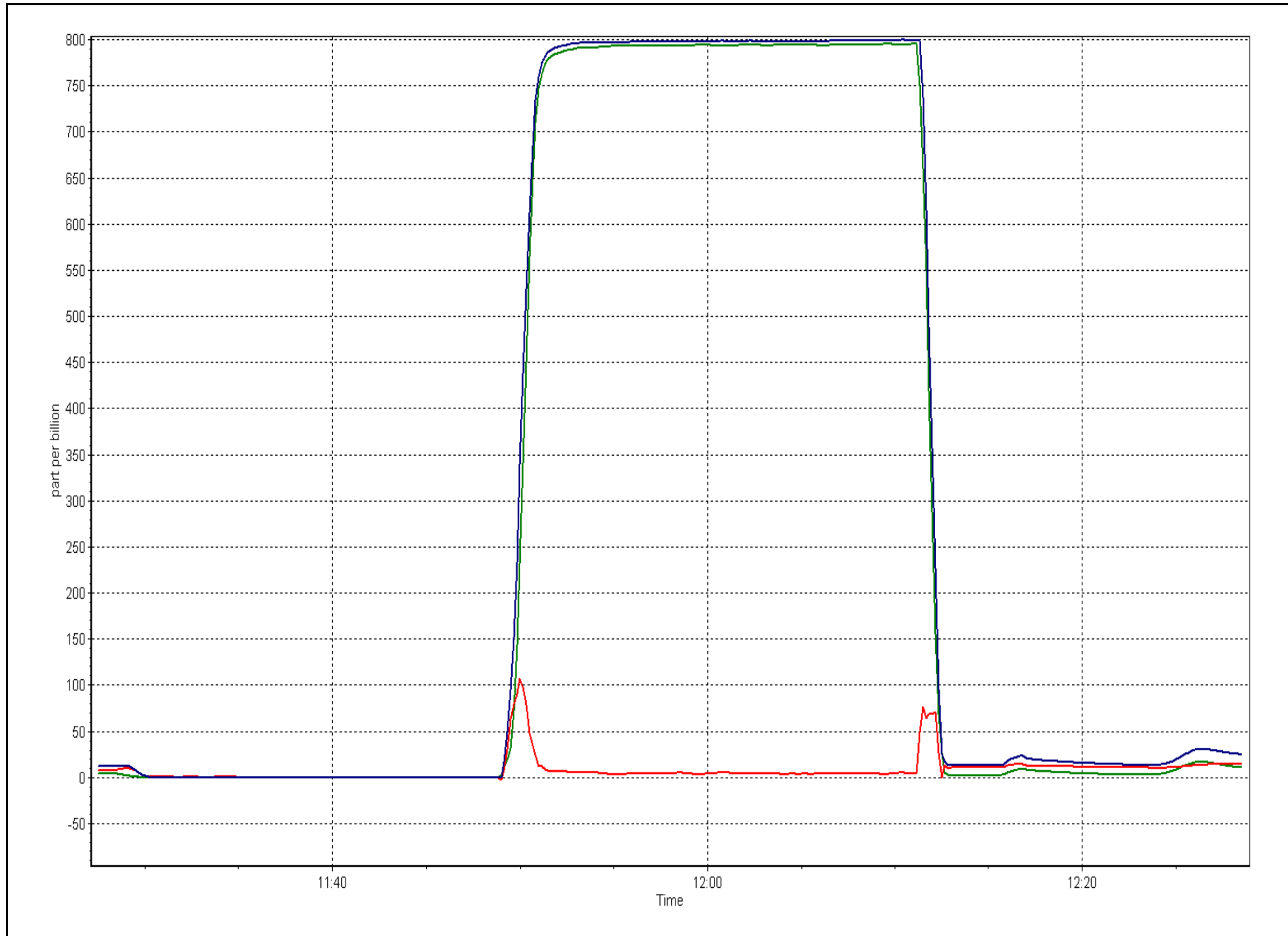
Corrected As found NO_x= 798.6 NO= 794.6 Percent Change NO_x= 1.0% NO= 1.0%
 Previous Response NO_x= 806.5 NO= 802.9

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 79.90 ccm NOx ref calc conc = 805.4 ppb NO ref calc conc = 800.6 ppb

O3 Setpoint (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
1st NO ref point		4.8			0.2			----	
1st NO2 (300)									
2nd NO2 (200)									
3rd NO2 (100)									
2nd NO ref point		4.8							
Average Correction Factor									

Calibration Performed By: Asad Hidayat





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 23, 2017	Previous Calibration	December 15, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Reason:	Routine		
Start Time (MST)	13:15	End Time (MST)	17:45
NO Cal Gas Conc	50.9 ppm	Gas Cert Reference	EY0000372
NOx Cal Gas Conc	50.9 ppm	Cal Gas Expiry Date	June 10, 2016
Calibrator	API T700	Serial Number	1220
Zero air Generator	Teledyne API T701	Serial Number	4766

DACs Information

DACs make & model	Cambell Scientific CR3000	DACs serial No.	9627
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Calibration Statistics

Parameter	NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.008555	1.007536
	Data Offset	0.161369	0.322411
Current Calibration	Data Slope	0.999281	0.999369
	Data Offset	1.388385	1.350169
			0.989632
			-0.143243

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1505164379
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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	1.090		1.045	
NOx coefficient	1.003		0.999	
NO2 coefficient	0.995		0.995	
NO bkgrnd	3.2		2.9	
NOx bkgrnd	3.2		3.6	
Chamber Temp	50.6	Deg C	50.3	Deg C
Moly Temp	322.6	Deg C	323.3	Deg C
PMT voltage	-767	V	-767	V
PMT Temp	-3.1	Deg C	-2.8	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	170.2	mmHg	166.9	mmHg
R Cell Press Nox	170.2	mmHg	166.9	mmHg
NO sample flow	0.801	lpm	0.831	lpm
Nox sample Flow	0.801	lpm	0.831	lpm

Notes:

Sample inlet filter replaced after as founds. Mix blend gas cylinder replaced after as founds. Instrument was pulling room air from 11:15-12:45 MST, while the blend gas cylinder was being purged. Sample pump was replaced for preventative maintenance after doing as founds with the new cal gas cylinder. Adjusted both zero and span. As lefts were not completed due to lack of time.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: January 23, 2017 Station Number: AMS 20

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	-0.2	0.2	----	----
as found span	5000	78.6	800.1	800.1	0.0	813.0	809.3	3.7	0.9841	0.9887
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.1	-0.2	----	----
high point	5000	78.6	800.1	800.1	0.0	800.3	800.4	-0.1	0.9999	0.9997
second point	5000	39.3	400.1	400.1	0.0	397.3	397.1	0.2	1.0070	1.0075
third point	5000	19.6	199.5	199.5	0.0	197.9	197.9	0.1	1.0080	1.0085
as left zero										
as left span										
Average Correction Factor									1.0050	1.0052

Corrected As found NO_x= 813.1 NO= 809.5 Percent Change NO_x= -2.4% NO= -1.9%
 Previous Response NO_x= 793.2 NO= 793.8

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 78.60 ccm NOx ref calc conc = 800.1 ppb NO ref calc conc = 800.1 ppb

O3 Setpoint (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
1st NO ref point		0.0	793.3	791.5	-0.2	1.0087	1.0109	----	----
1st NO2 (300)	443.1	348.4	795.2	443.1	352.1	1.0063	----	0.9896	101.0%
2nd NO2 (200)	554.3	237.2	794.0	554.3	239.7	1.0078	----	0.9895	101.1%
3rd NO2 (100)	670.7	120.8	793.6	670.7	122.8	1.0083	----	0.9832	101.7%
2nd NO ref point		0.0	793.5	792.0	1.4	1.0084	1.0103	----	----
Average Correction Factor						1.0077		0.9875	101.3%

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

NO_x Calibration Summary

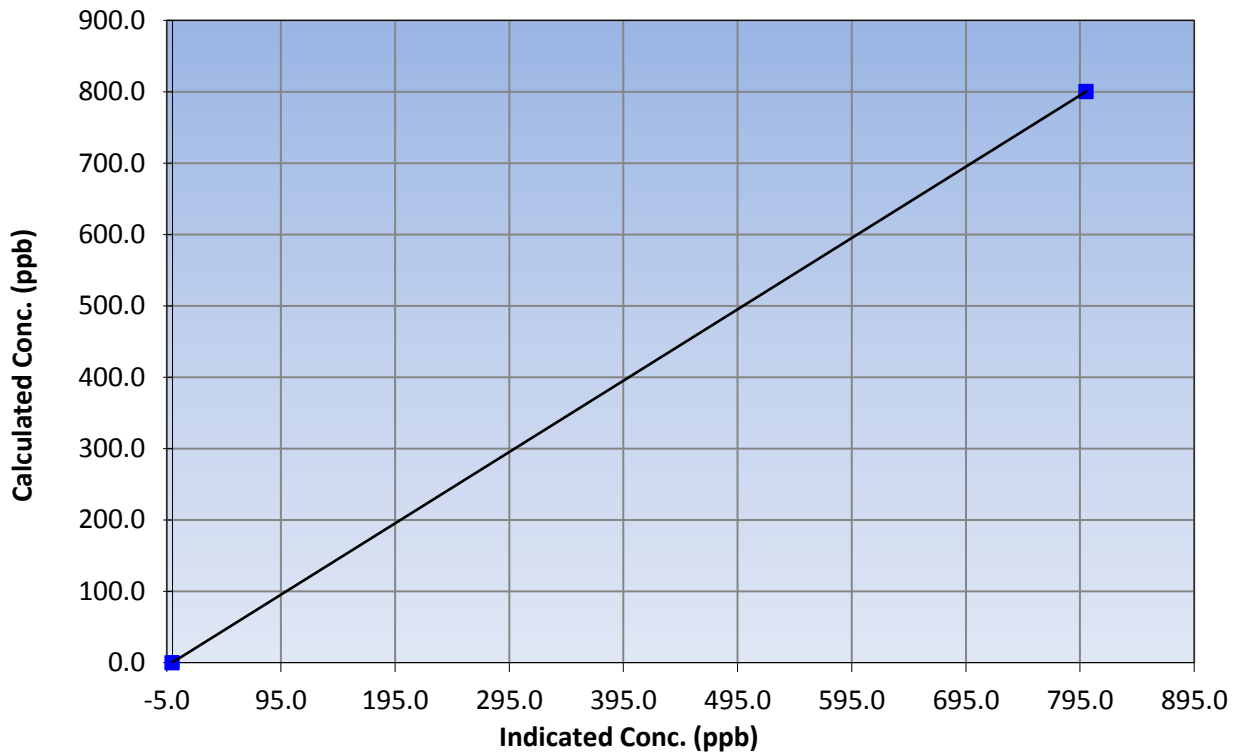
Station Information

Calibration Date	January 23, 2017	Previous Calibration	December 15, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	13:15	End Time (MST)	17:45
Analyzer make	Thermo 42i	Analyzer serial #	1505164379

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999986
800.1	800.3	0.9999		
400.1	397.3	1.0070	Slope	0.999281
199.5	197.9	1.0080		
			Intercept	1.388385

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

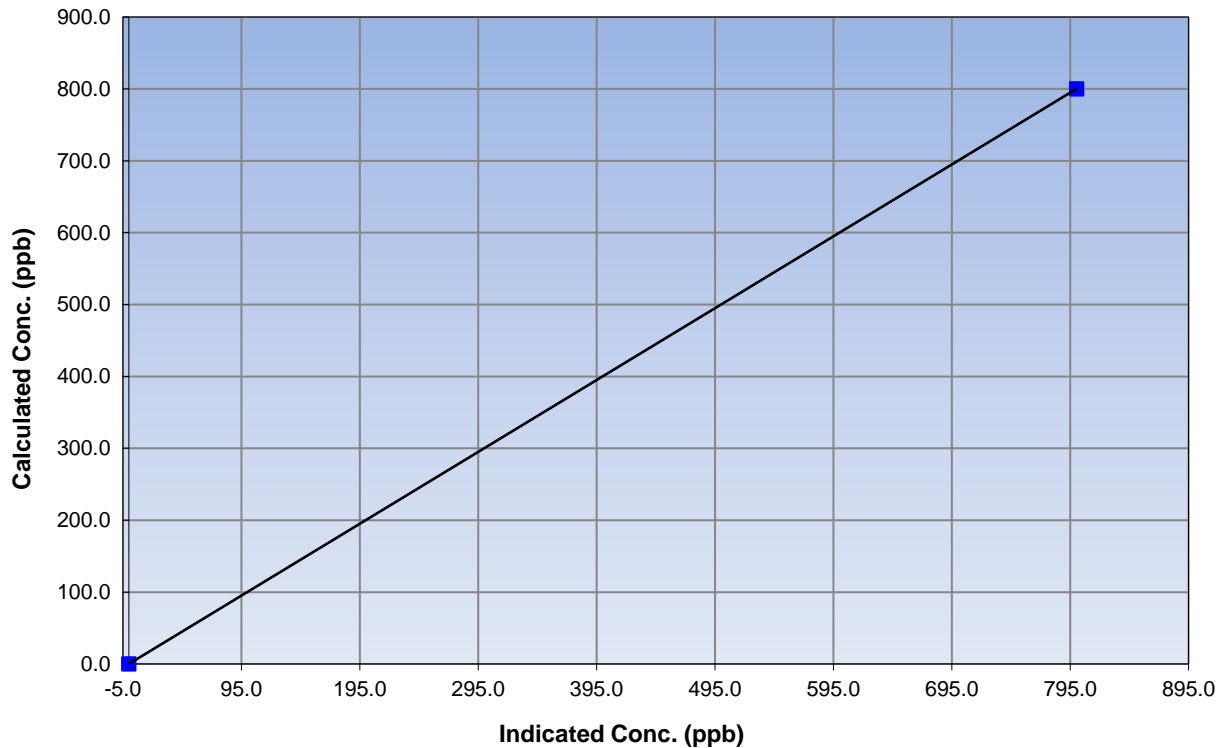
Station Information

Calibration Date	January 23, 2017	Previous Calibration	December 15, 2016
Station Name	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	13:15	End Time (MST)	17:45
Analyzer make	Thermo 42i	Analyzer serial #	1505164379

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999981
800.1	800.4	0.9997		
400.1	397.1	1.0075	Slope	0.999369
199.5	197.9	1.0085		
			Intercept	1.350169

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

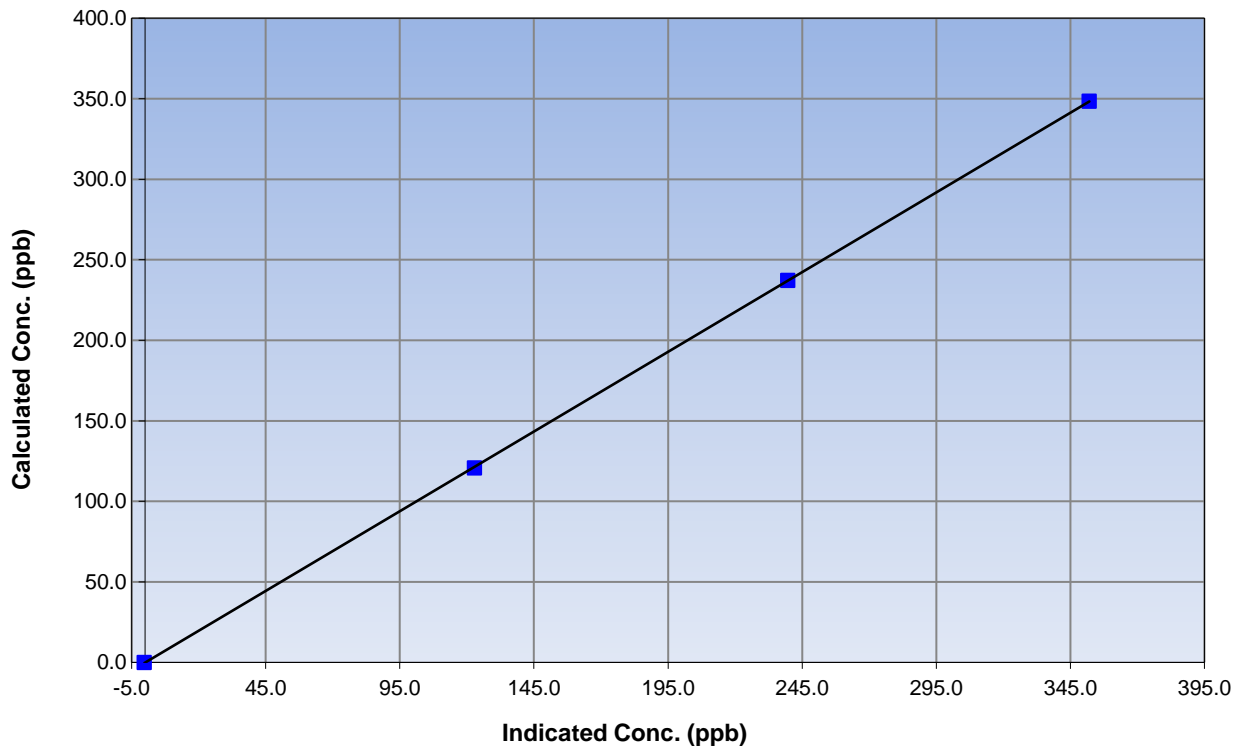
Station Information

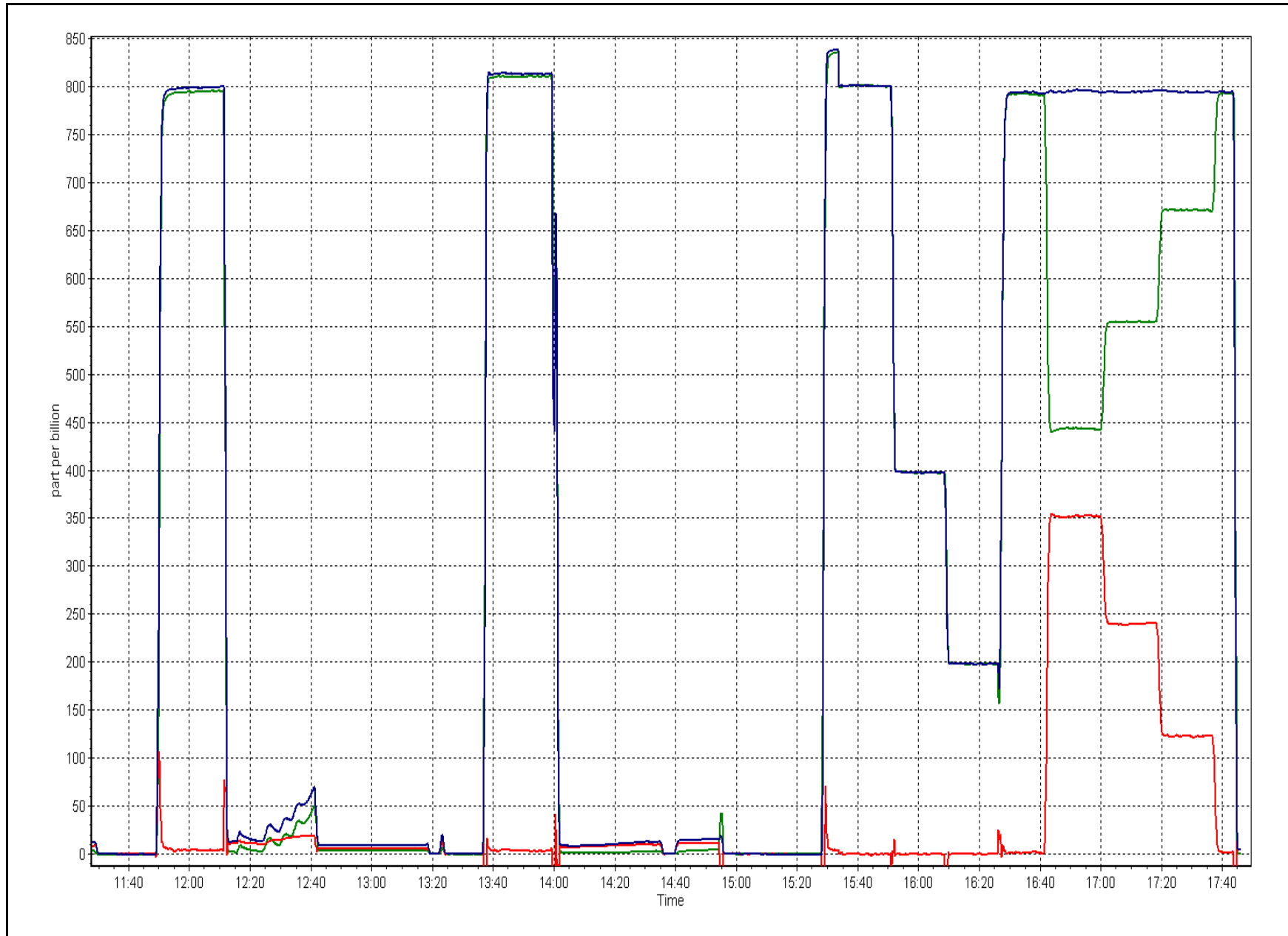
Calibration Date	January 23, 2017	Previous Calibration	December 15, 2016
Station Number	Brion Mackay River	Station Number	AMS 20
Start Time (MST)	13:15	End Time (MST)	17:45
Analyzer make	Thermo 42i	Analyzer serial #	1505164379

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999991
348.4	352.1	0.9896		
237.2	239.7	0.9895	Slope	0.989632
120.8	122.8	0.9832		
			Intercept	-0.143243

NO₂ Calibration Curve







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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 21
CONKLIN COMMUNITY
JANUARY 2017**

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

February 27, 2017



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN (AMS 21)
 JANUARY 2017

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	707	37	37	100.00	4	0	1	0
TRS(ppb) Average	710	34	34	100.00	1	0	0	0
THC(ppm) Average	707	37	37	100.00	2.4	-	2.2	-
NMHC(ppm) Average	707	37	37	100.00	0.102	-	0.006	-
CH4(ppm) Average	707	37	37	100.00	2.4	-	2.2	-
O3 (ppb) Average	710	34	34	100.00	47	0	44	-
NO2 (ppb) Average	708	36	36	100.00	23	0	8	-
NO (ppb) Average	708	36	36	100.00	18	-	2	-
NOX (ppb) Average	708	36	36	100.00	40	-	9	-
PM2.5 (ug/m3) Average	740	1	4	99.60	29.2	-	15.6	0
Wind Speed 10 m (km/h) Average	741	0	3	99.60	28	-	14	-
Wind Direction 10 m (deg) Average	741	0	3	99.60	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100.00	7.2	-	3.6	-
Relative Humidity (%) Average	744	0	0	100.00	95	-	91.0	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN (AMS 21)
 JANUARY 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile							
					Min	P10	Q1	Median	Q3	P90	Max	
SO2 (ppb) Average	707	0.4	0	-	0	0	0	0	0	0	1	4
TRS (ppb) Average	710	0.4	0	-	0	0	0	0	0	0	0	1
THC (ppm) Average	707	1.99	0.1	-	1.9	1.9	1.9	2	2	2	2.1	2.4
NMHC(ppm) Average	707	0	0.005	-	0	0	0	0	0	0	0	0.102
CH4(ppm) Average	707	1.99	0.1	-	1.9	1.9	1.9	2	2	2	2.1	2.4
O3 (ppb) Average	710	31.6	10	-	3	15	25	34	40	44	44	47
NO2 (ppb) Average	708	3.4	3	-	0	1	2	3	4	7	7	23
NO (ppb) Average	708	0.7	1	-	0	0	0	0	1	2	2	18
NOX (ppb) Average	708	4.1	4	-	0	1	2	3	5	9	9	40
PM2.5 (ug/m3) Average	740	3.96	3.7	-	0.2	1.2	1.9	2.7	4.9	7.5	7.5	29.2
Wind Speed 10 m (km/h) Average	741	7.2	5	-	0	2	3	7	10	14	14	28
Wind Direction 10 m (deg) Average	741	-	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	-11.65	10.7	-	-37.6	-26.2	-20.3	-12.6	-1.8	2.3	2.3	7.2
Relative Humidity (%) Average	744	76.7	10	-	50	63	71	77	85	88	88	95

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONKLIN (AMS 21)
 JANUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
PM2.5	02 Jan 2017 02:00	02 Jan 2017 02:00	1	Unstable operation - excessive baseline drift
PM2.5	02 Jan 2017 04:00	02 Jan 2017 04:00	1	Unstable operation - excessive baseline drift
PM2.5	07 Jan 2017 01:00	07 Jan 2017 01:00	1	Unstable operation - excessive baseline drift
Wind Speed, Wind Direction	06 Jan 2017 18:00	06 Jan 2017 18:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	21 Jan 2017 01:00	21 Jan 2017 01:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	24 Jan 2017 03:00	24 Jan 2017 03:00	1	Flat line in sensor output signal - Sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

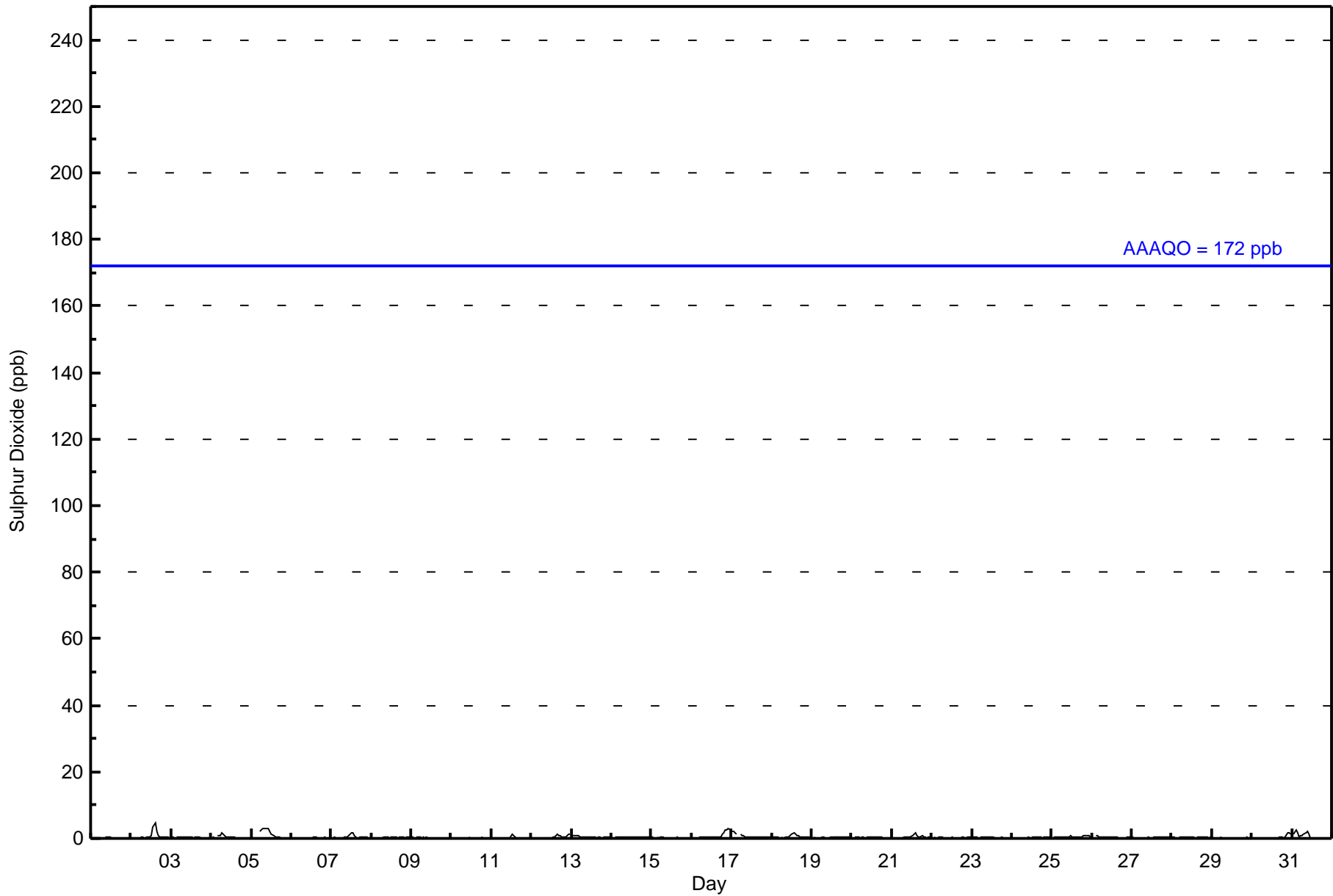
Conklin Community - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 744																																			
Maximum Value: 4 ppb on Jan 2 15:00														Maximum Daily Average: 1.0 ppb on Jan 5										Hours of Data: 707																									
Minimum Value: 0 ppb on Jan 10 01:00														Minimum Daily Average: 0.2 ppb on Jan 1										Hours of Missing Data: 37																									
Maximum Diurnal Average: 0.5 ppb at hour 14														Minimum Diurnal Average: 0.3 ppb at hour 5										Hours of Calibration: 37																									
Monthly Average: 0.4 ppb														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 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-Jan	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
2-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	1	3	4	2	1	0	0	0	0	0	0	0	0.7	4																							
3-Jan	0	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																							
4-Jan	0	0	0	Z	1	1	2	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.4	2																							
5-Jan	0	0	0	0	Z	2	3	3	3	3	3	2	1	1	0	0	0	0	0	0	0	0	0	0	1.0	3																							
6-Jan	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																							
7-Jan	Z	0	0	0	0	0	0	0	0	0	1	1	2	2	1	0	0	0	0	0	0	0	0	0	0.4	2																							
8-Jan	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																							
9-Jan	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
10-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	--	0																							
11-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.2	1																							
12-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1	1	1	0.4	1																							
13-Jan	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
14-Jan	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
15-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
16-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	3	2	0.8	3																							
17-Jan	2	2	2	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2																							
18-Jan	0	0	0	0	0	Z	0	0	0	0	0	1	1	2	1	1	1	1	0	0	0	0	0	0	0.5	2																							
19-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1																							
20-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.3	1																							
21-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	2	1	1	0	1	0	0	0	0	0	0.5	2																							
22-Jan	0	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																							
23-Jan	0	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																							
24-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
25-Jan	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	1	0.5	1																							
26-Jan	1	Z	1	1	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
27-Jan	0	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																							
28-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
29-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
30-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	0.3	2																						
31-Jan	Z	1	3	2	1	1	1	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	3																							
																								0.3	0.3	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	Diurnal Average	
																								2	2	3	2	1	2	3	3	3	3	3	2	2	3	4	2	1	1	1	1	2	2	2	3	2	Diurnal Maximum
Z - zerospan C - Calibration																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																																																	



WBEA Data PC
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Conklin Community - January 2017





WBEA Data PC
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Conklin Community - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	707	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: 707

Total Number of Hours: 744



WBEA Data PC
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Conklin Community - January 2017

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	46	31	4	1	4	4	27	45	38	100	143	31	53	60	46	71	704
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	46	31	4	1	4	4	27	45	38	100	143	31	53	60	46	71	704

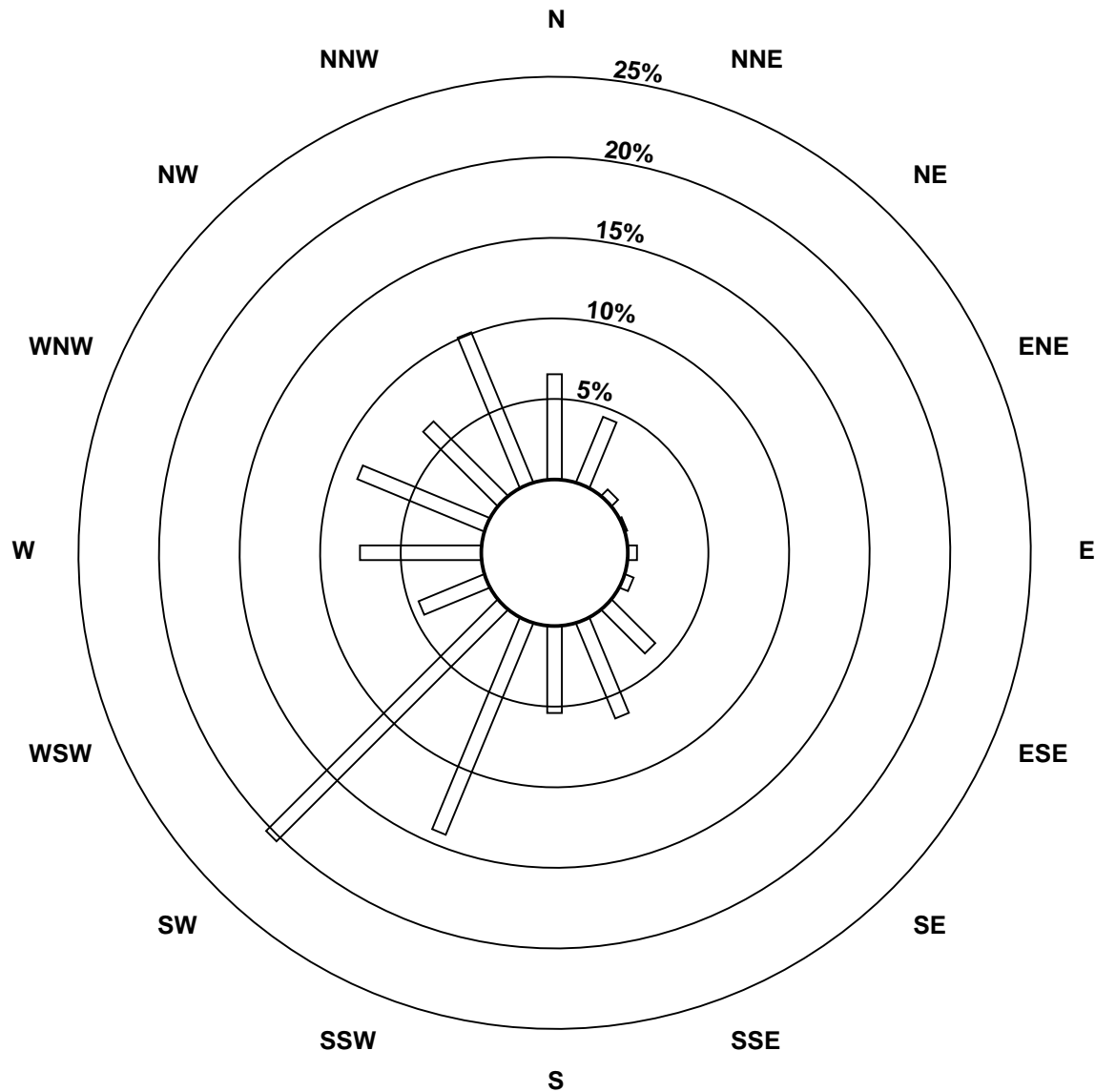
Total Number of Valid Hours: 704

Total Number of Hours: 744

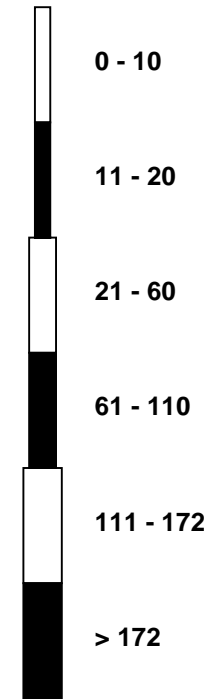


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Sulphur Dioxide (SO₂) - ppb
Conklin Community (AMS 21)



Classes (ppb)

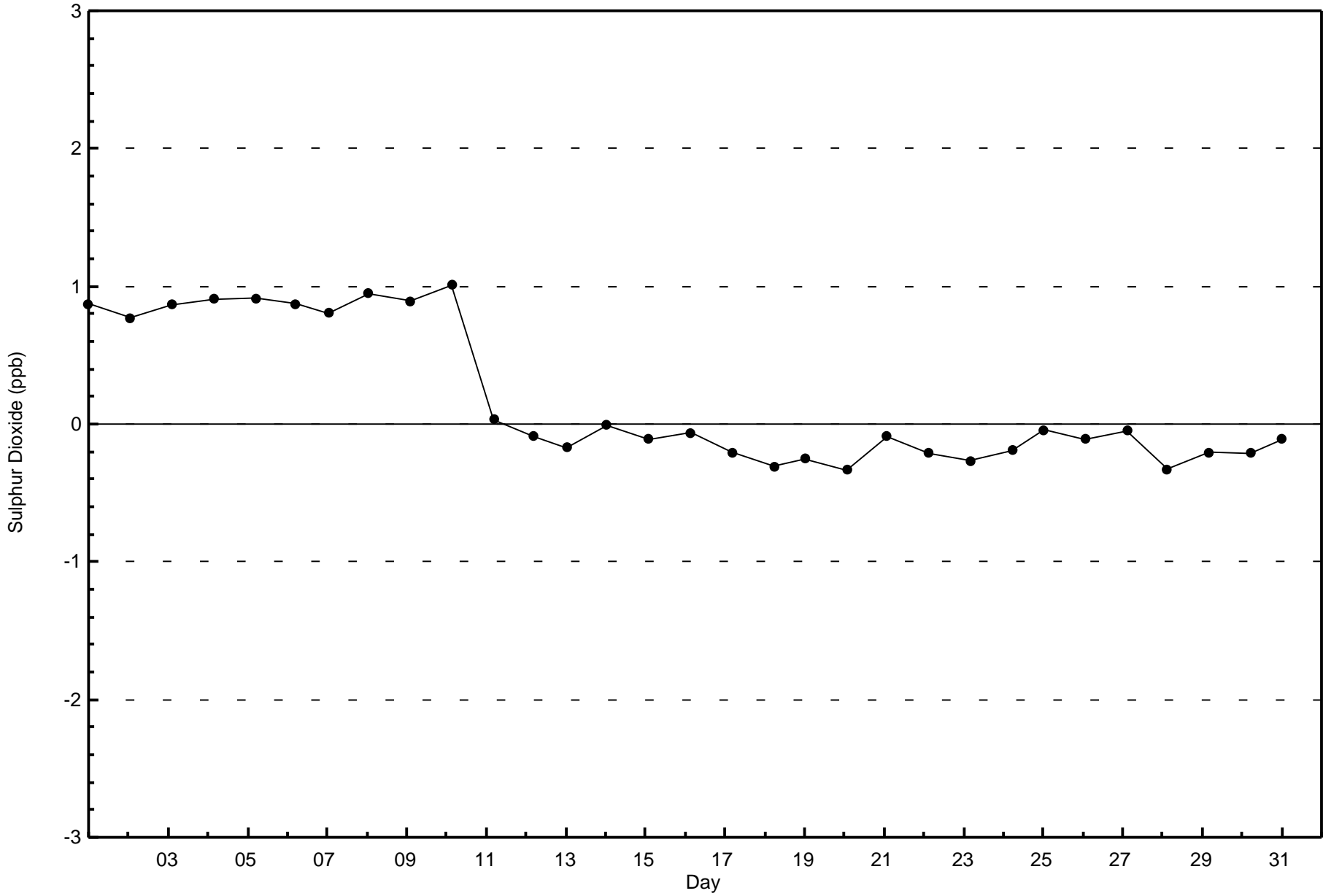


Total Number of Valid Hours: 704



WBEA Data PC
Zero Responses

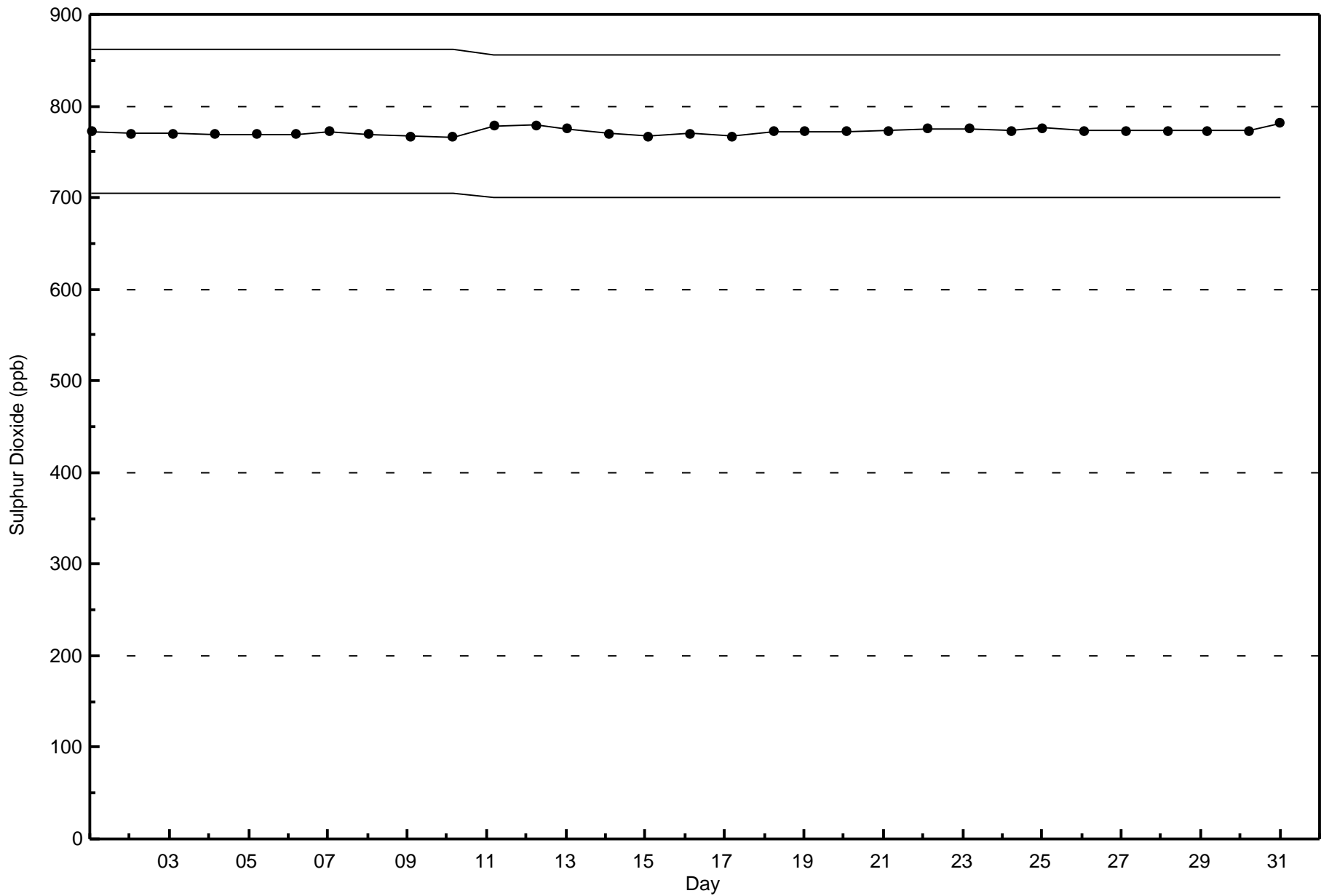
Sulphur Dioxide (SO₂) - ppb
Conklin Community - January 2017





WBEA Data PC
Span Responses

Sulphur Dioxide (SO₂) - ppb
Conklin Community - January 2017





Wood Buffalo Environmental Association
Summary of Hour Averages

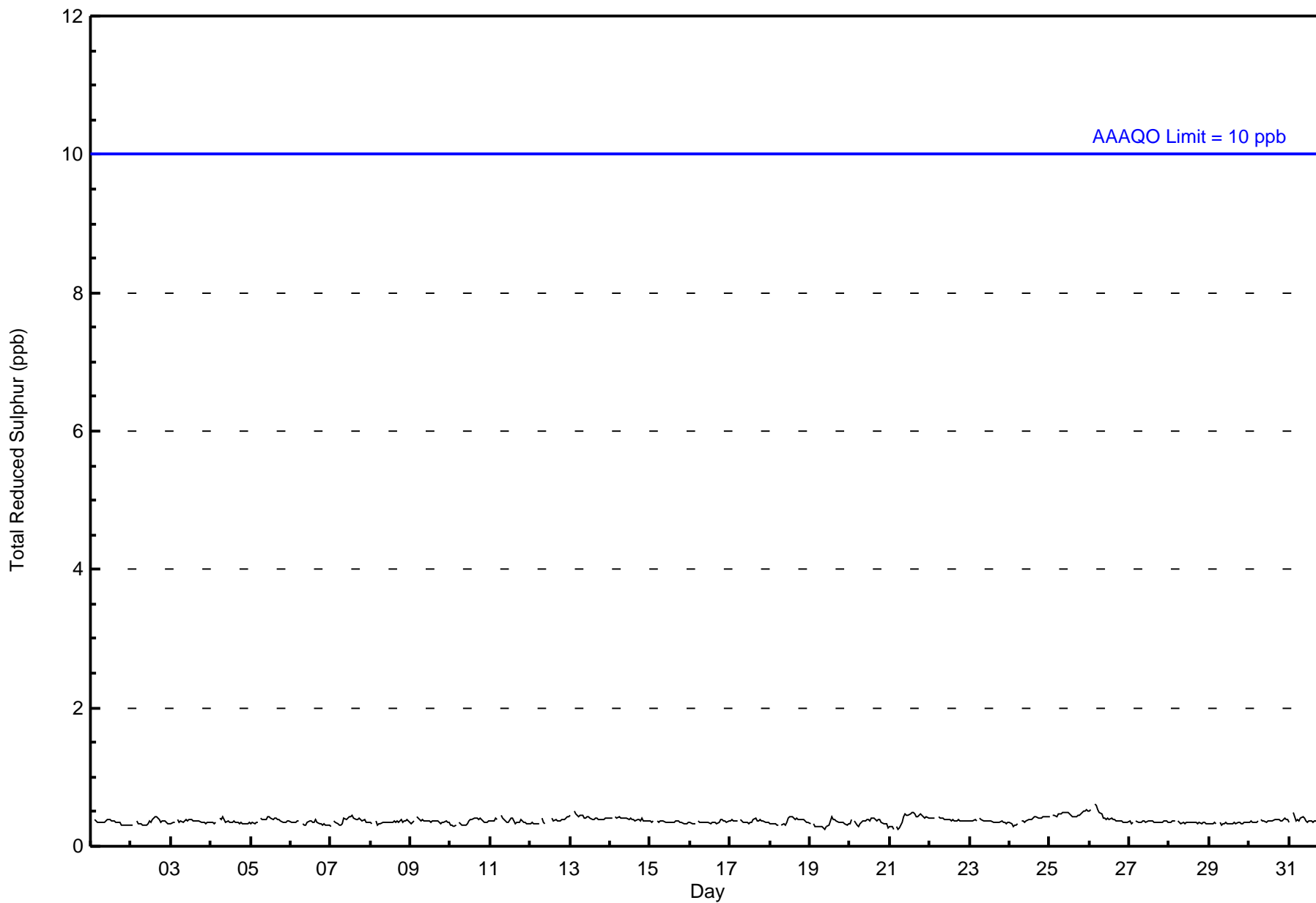
Total Reduced Sulphur (TRS) - ppb
Conklin Community - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 1 ppb on Jan 26 04:00 Maximum Daily Average: 0.5 ppb on Jan 25														Hours in Service: 744 Hours of Data: 710 Hours of Missing Data: 34 Hours of Calibration: 34 Percent Operational Time: 100.0																																					
Minimum Value: 0 ppb on Jan 21 06:00 Minimum Daily Average: 0.3 ppb on Jan 19 Maximum Diurnal Average: 0.4 ppb at hour 14 Minimum Diurnal Average: 0.4 ppb at hour 2 Monthly Average: 0.4 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1																																																			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																											
1-Jan	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																									
2-Jan	0	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																									
3-Jan	0	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																									
4-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0																									
5-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0																									
6-Jan	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																									
7-Jan	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																									
8-Jan	0	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																									
9-Jan	0	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																									
10-Jan	0	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																									
11-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0																									
12-Jan	0	0	0	0	0	0	Z	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.4	0																									
13-Jan	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																									
14-Jan	0	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																									
15-Jan	0	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																									
16-Jan	0	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																									
17-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0																									
18-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0																									
19-Jan	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																									
20-Jan	0	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																									
21-Jan	0	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																									
22-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0																									
23-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0																									
24-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0																									
25-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0.5	1																									
26-Jan	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																									
27-Jan	0	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																									
28-Jan	0	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																									
29-Jan	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																									
30-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0																									
31-Jan	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																									
																								0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	Diurnal Maximum
Z - zerospan C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																																																			



WBEA Data PC
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Conklin Community - January 2017





WBEA Data PC
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Conklin Community - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
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



**WBEA Data PC
Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb
Conklin Community - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	45	31	4	1	3	3	25	44	39	104	144	28	52	62	51	71	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
Totals	45	31	4	1	3	3	25	44	39	104	144	28	52	62	51	71	707

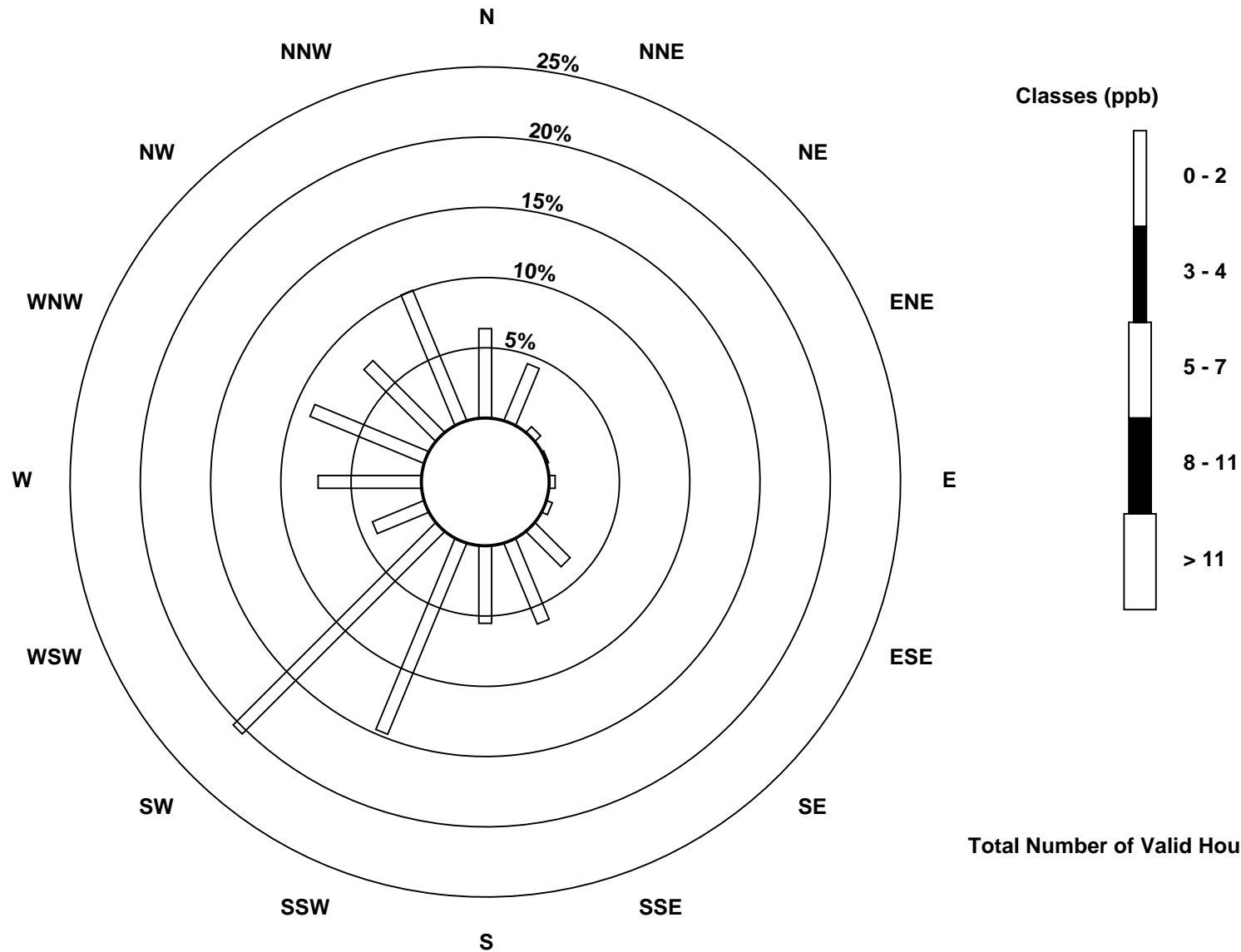
Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Total Reduced Sulphur (TRS) - ppb
Conklin Community (AMS 21)

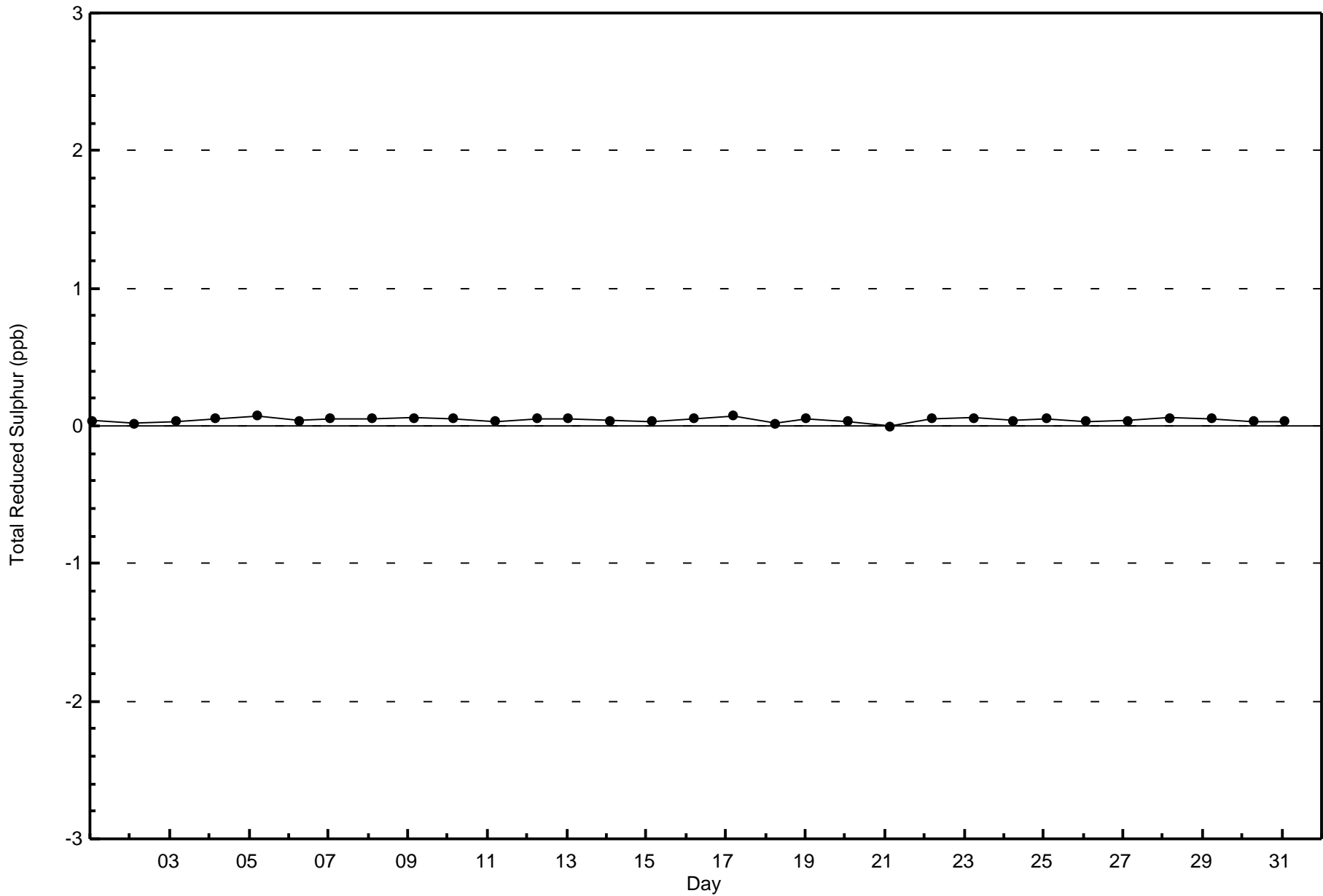


Total Number of Valid Hours: 707



WBEA Data PC
Zero Responses

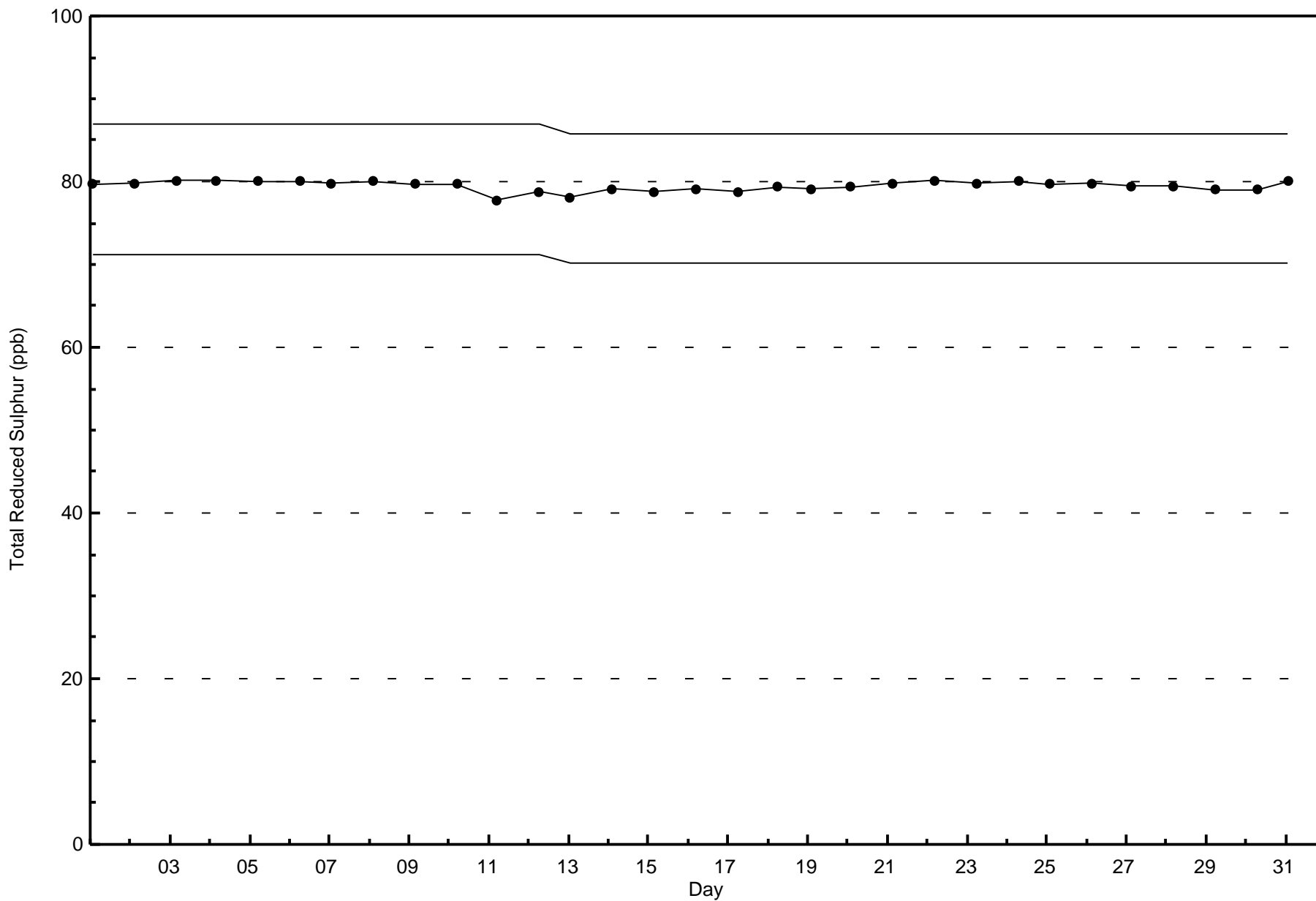
Total Reduced Sulphur (TRS) - ppb
Conklin Community - January 2017





WBEA Data PC
Span Responses

Total Reduced Sulphur (TRS) - ppb
Conklin Community - January 2017





Wood Buffalo Environmental Association
Summary of Hour Averages

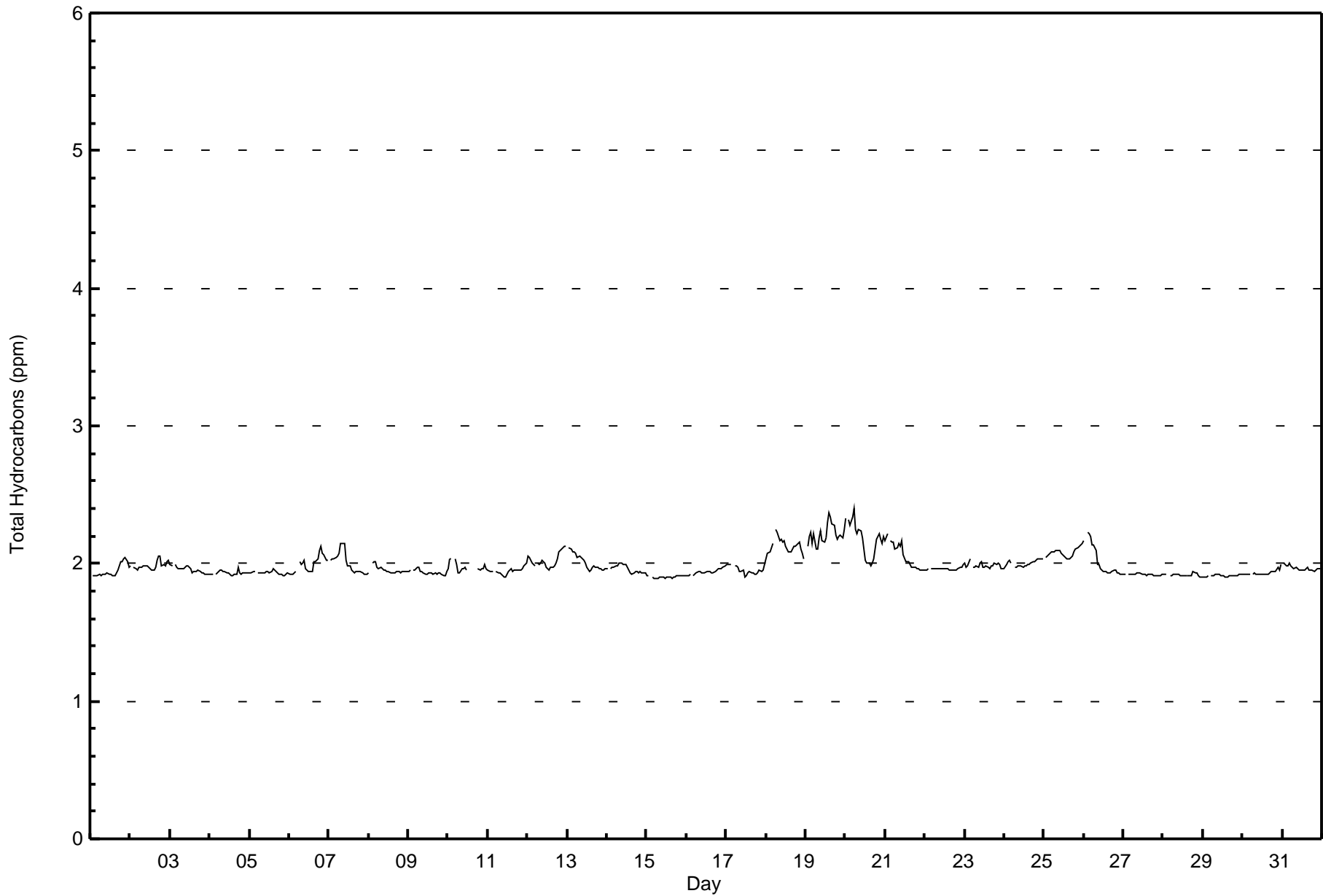
Total Hydrocarbons (THC) - ppm
Conklin Community - January 2017

Maximum Value: 2.4 ppm on Jan 20 06:00 Maximum Daily Average: 2.2 ppm on Jan 19		Hours in Service: 744 Hours of Data: 707 Hours of Missing Data: 37 Hours of Calibration: 37 Percent Operational Time: 100.0																									
Minimum Value: 1.9 ppm on Jan 15 08:00 Minimum Daily Average: 1.9 ppm on Jan 15 Maximum Diurnal Average: 2.0 ppm at hour 4 Minimum Diurnal Average: 2.0 ppm at hour 14 Monthly Average: 1.99 ppm Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 2.0 Q ₃ = 2.0 P ₉₀ = 2.1 P ₉₉ = 2.3																											
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-Jan	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	2.0	2.0	2.0	1.9	2.0	
2-Jan	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	1.9	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
3-Jan	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	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
4-Jan	1.9	1.9	1.9	Z	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
5-Jan	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	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
6-Jan	1.9	1.9	1.9	1.9	1.9	Z	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1
7-Jan	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.1	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	2.1
8-Jan	1.9	Z	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
9-Jan	1.9	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
10-Jan	2.0	2.0	2.0	Z	2.0	2.0	1.9	1.9	2.0	2.0	2.0	1.9	C	C	C	C	C	C	2.0	2.0	2.0	2.0	2.0	2.0	--	2.0	
11-Jan	2.0	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	2.0	1.9	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	
12-Jan	2.1	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	2.1	2.1	2.1	2.1	2.1	2.0	2.1	
13-Jan	Z	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	
14-Jan	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	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
15-Jan	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	
16-Jan	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	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	
17-Jan	2.0	2.0	2.0	2.0	Z	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	1.9	2.0	2.0	2.0	2.0	
18-Jan	2.0	2.1	2.1	2.1	2.1	Z	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	2.1	2.2	2.1	2.1	2.0	2.1	2.2	
19-Jan	Z	2.1	2.2	2.2	2.1	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	
20-Jan	2.3	Z	2.3	2.3	2.3	2.4	2.3	2.2	2.2	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.1	2.2	2.2	2.4	
21-Jan	2.2	2.2	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	
22-Jan	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	
23-Jan	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
24-Jan	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	
25-Jan	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	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	
26-Jan	2.2	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	2.0	2.2	
27-Jan	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	
28-Jan	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	
29-Jan	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	
30-Jan	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	2.0	2.0	1.9	2.0	
31-Jan	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	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration																											



WBEA Data PC
Hourly Averages

Total Hydrocarbons (THC) - ppm
Conklin Community - January 2017





WBEA Data PC
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Conklin Community - January 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	587	83.03	83.03
2.1 - 3.0	120	16.97	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



WBEA Data PC
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Conklin Community - January 2017

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	45	30	3	1	3	3	13	24	25	70	133	30	51	57	37	60	585
2.1 - 3.0	1	1	1	0	1	1	14	21	13	30	10	1	2	3	9	11	119
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
Totals	46	31	4	1	4	4	27	45	38	100	143	31	53	60	46	71	704

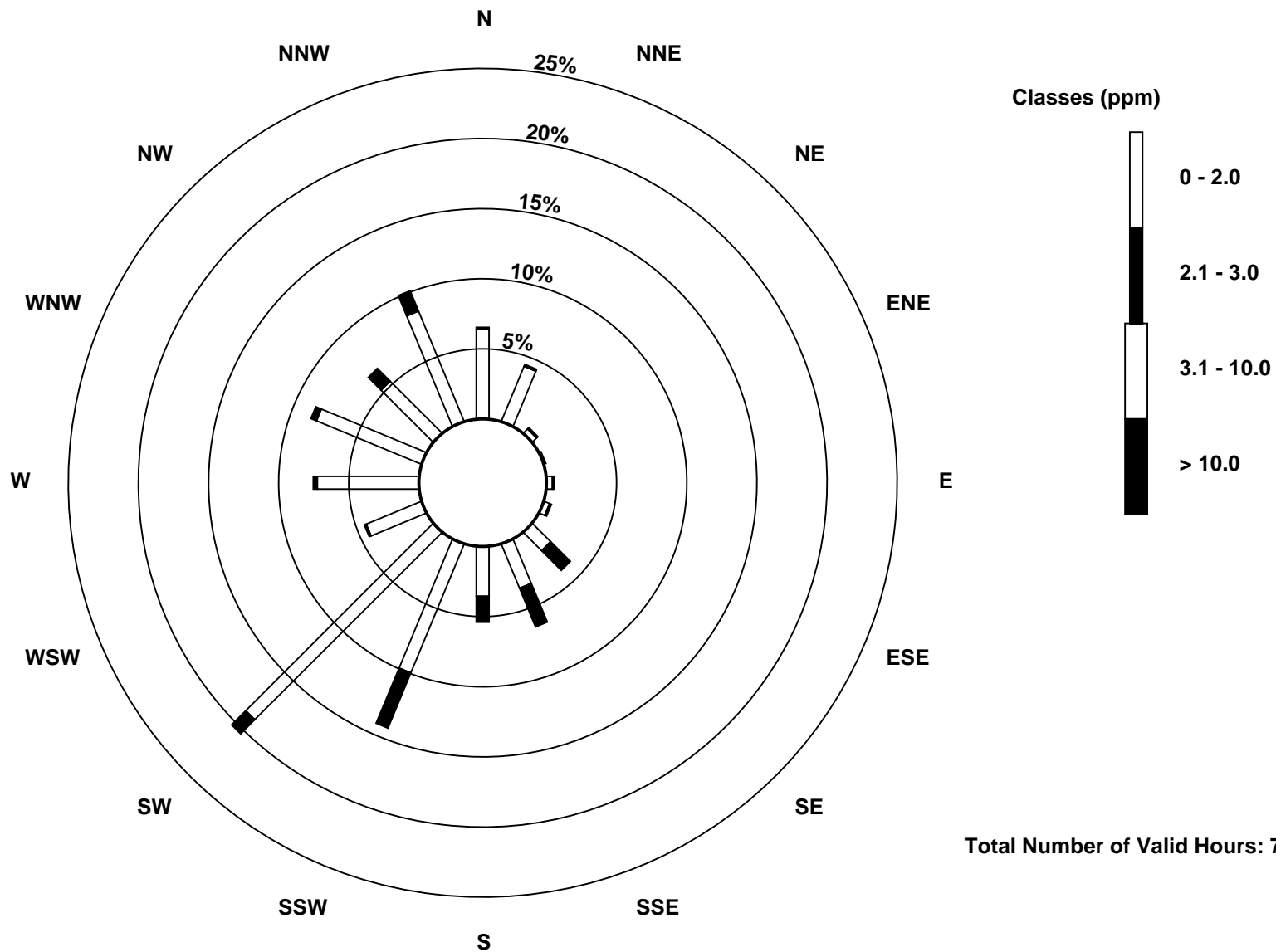
Total Number of Valid Hours: 704

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Total Hydrocarbons (THC) - ppm
Conklin Community (AMS 21)

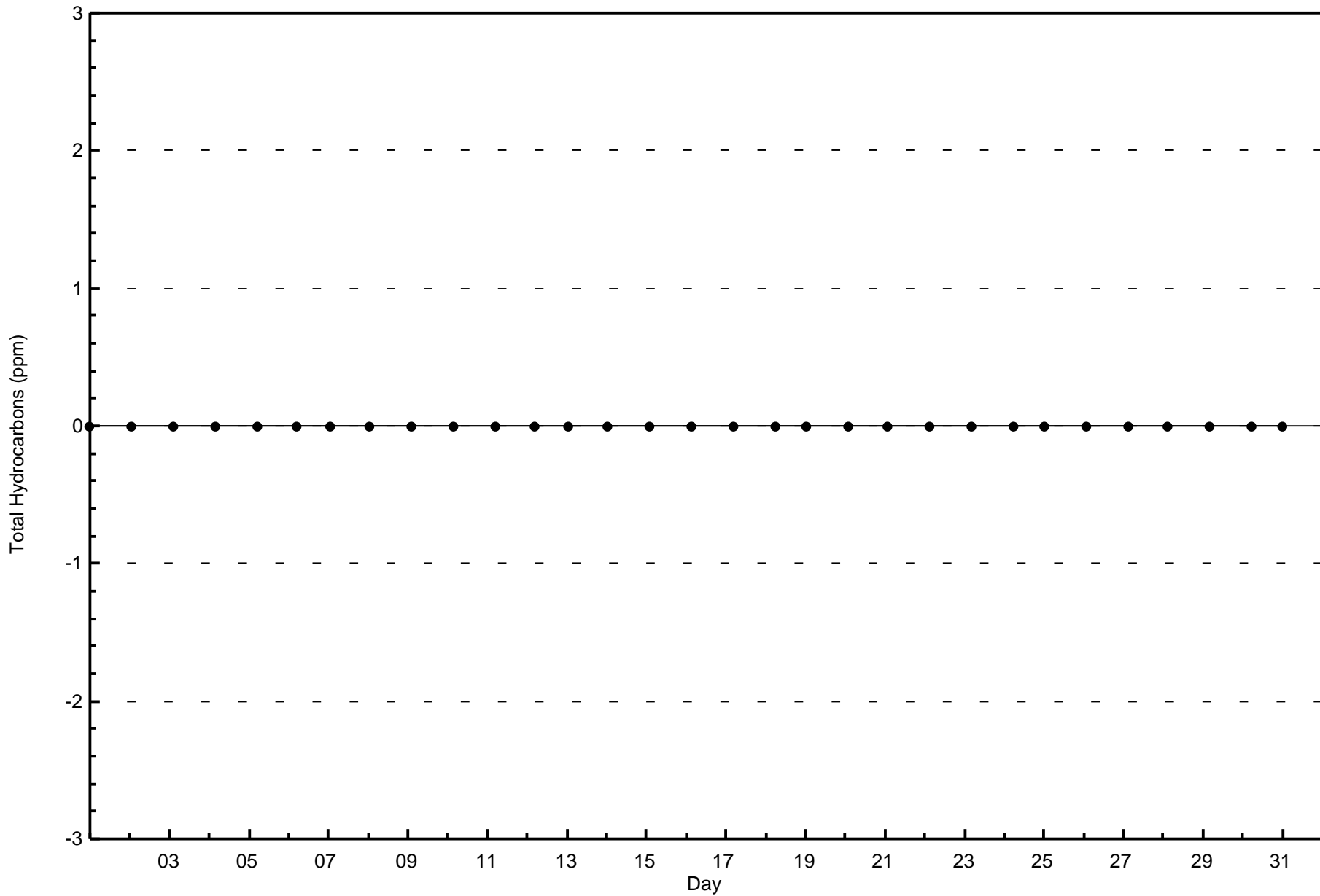


Total Number of Valid Hours: 704



WBEA Data PC
Zero Responses

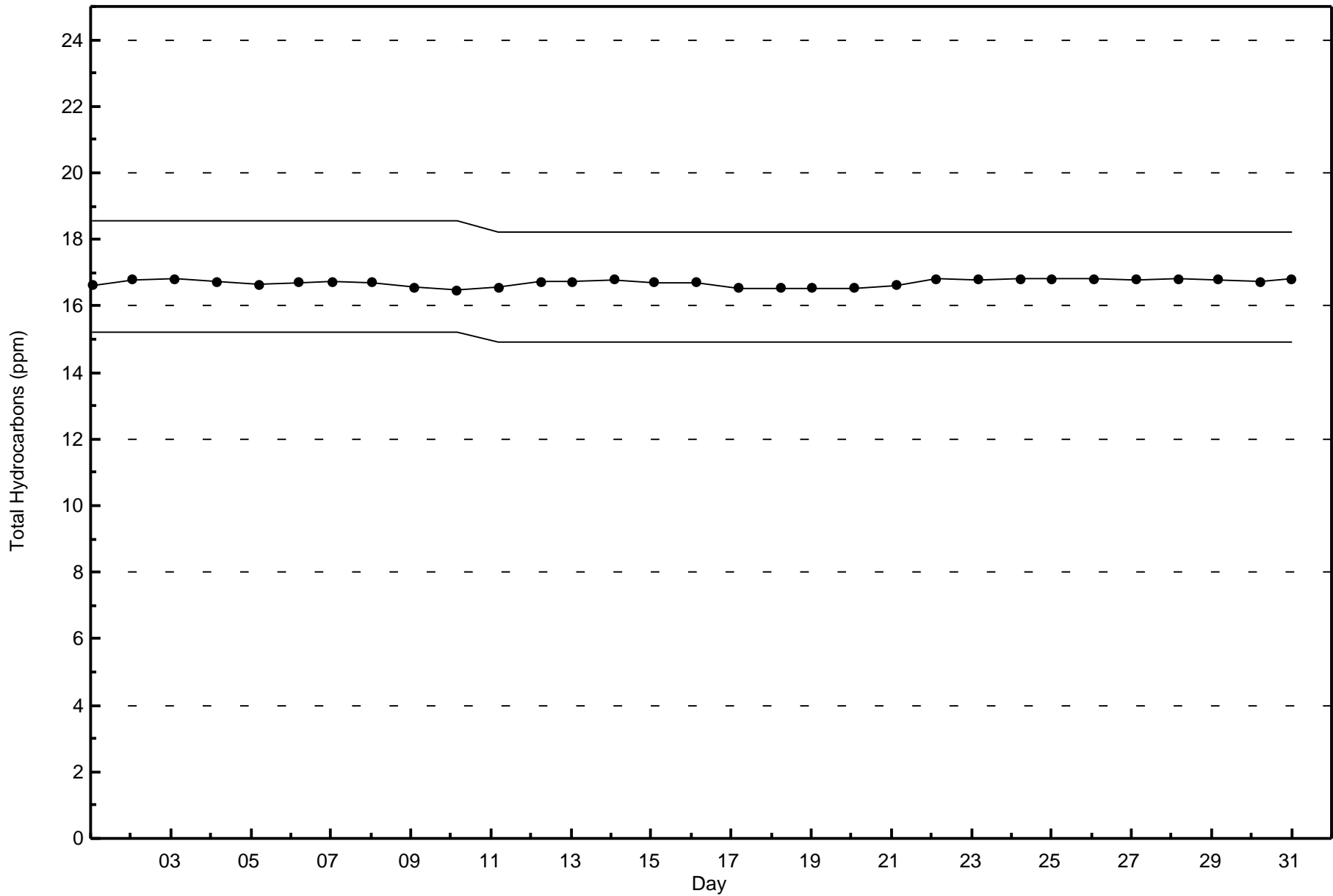
Total Hydrocarbons (THC) - ppm
Conklin Community - January 2017





WBEA Data PC
Span Responses

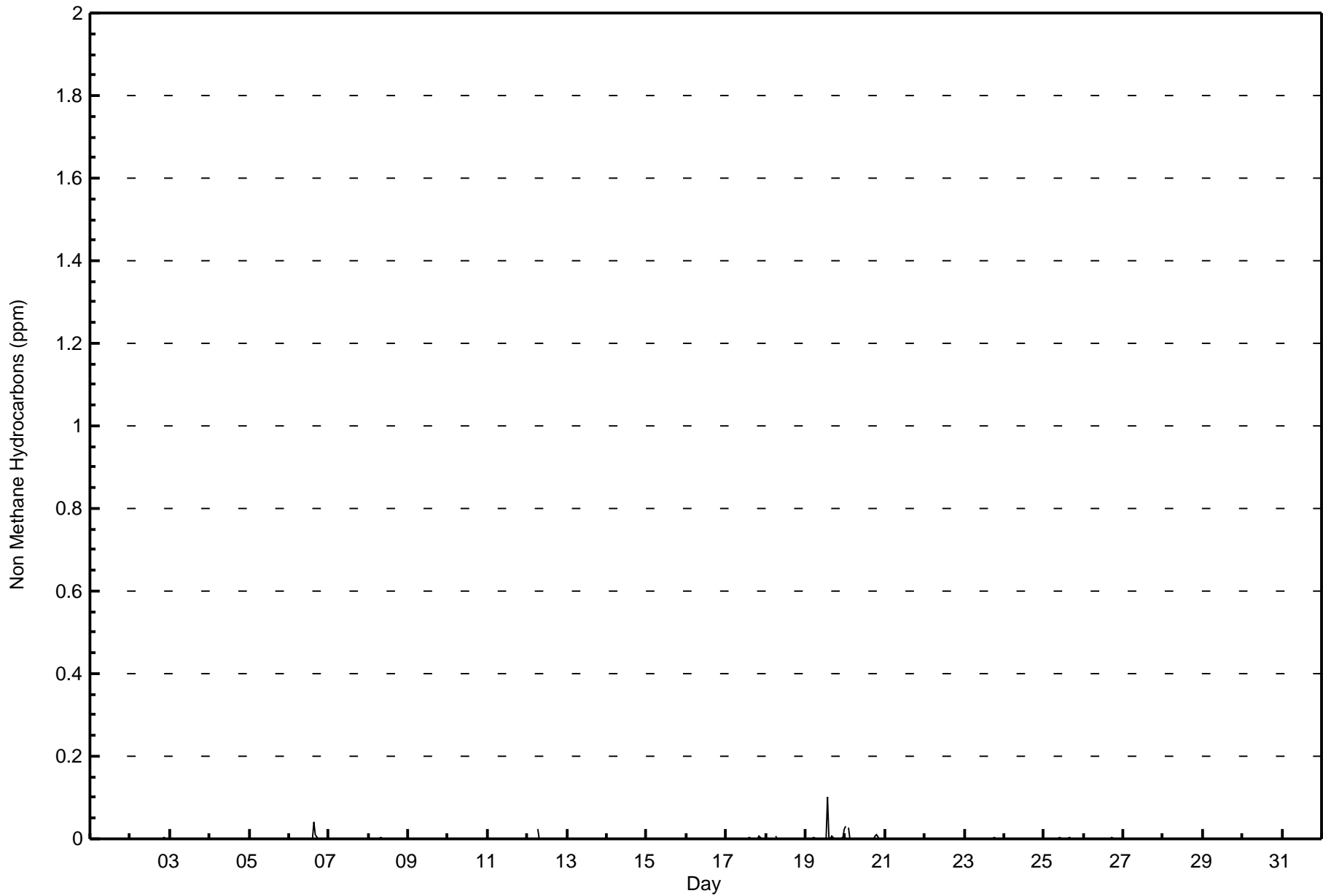
Total Hydrocarbons (THC) - ppm
Conklin Community - January 2017





WBEA Data PC
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm
Conklin Community - January 2017





WBEA Data PC
Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Conklin Community - January 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	695	98.30	98.30
0.006 - 0.05	11	1.56	99.86
0.06 - 0.1	1	0.14	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA Data PC
Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Conklin Community - January 2017

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	46	31	3	1	4	4	24	44	36	97	143	31	53	60	44	71	692
0.006 - 0.05	0	0	1	0	0	0	3	1	2	3	0	0	0	0	1	0	11
0.06 - 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	46	31	4	1	4	4	27	45	38	100	143	31	53	60	46	71	704

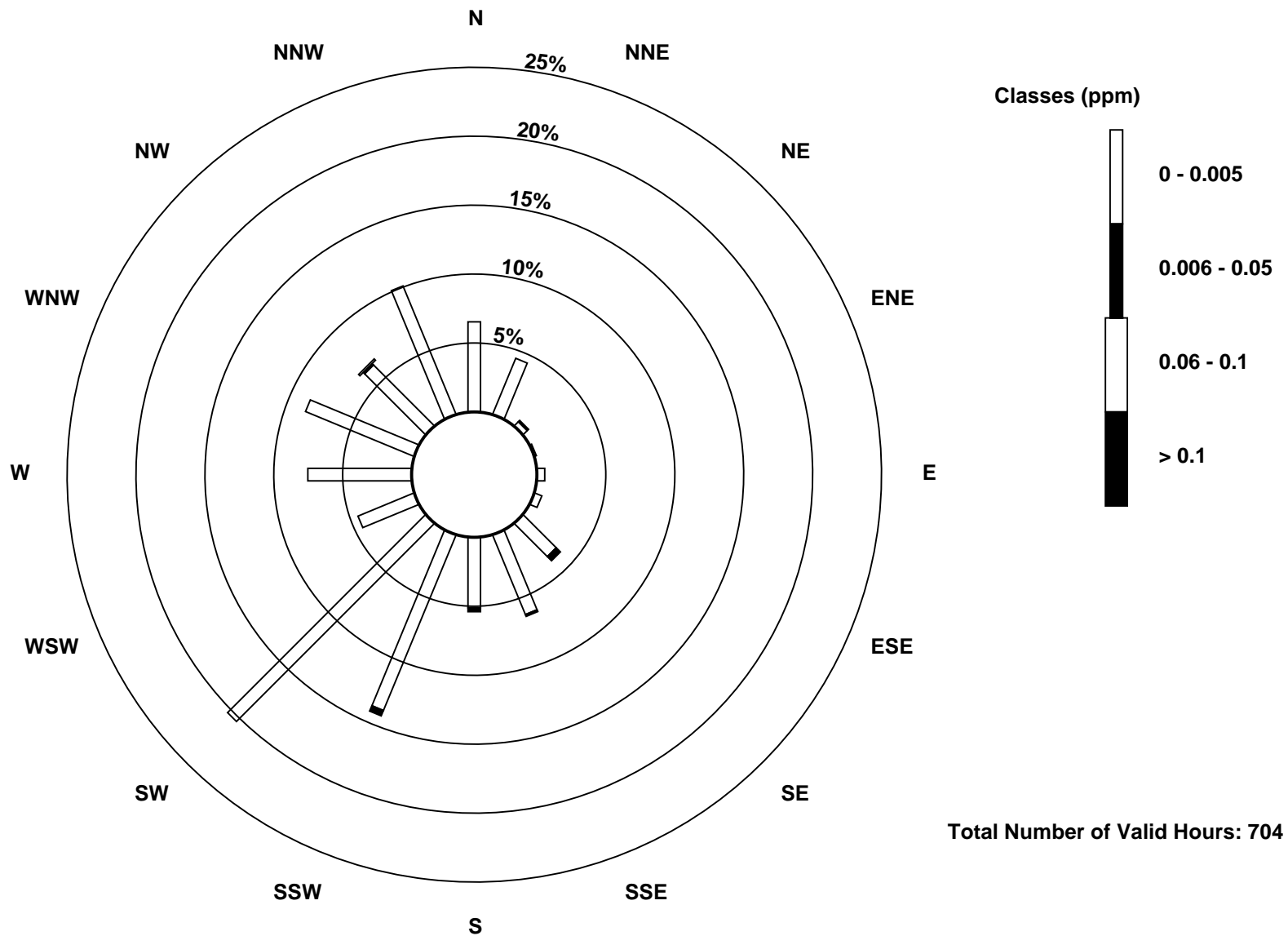
Total Number of Valid Hours: 704

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

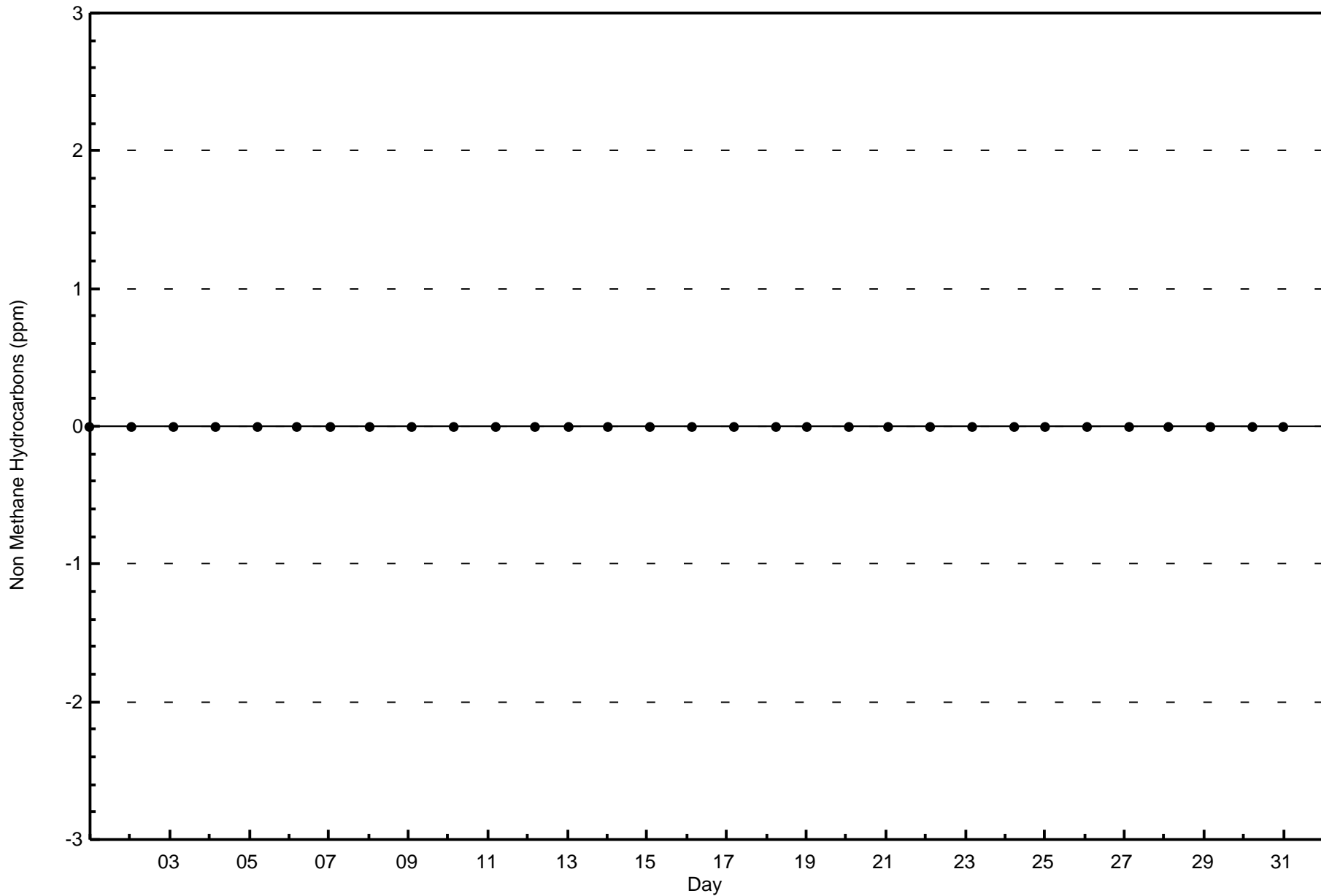
Non Methane Hydrocarbons (NMHC) - ppm
Conklin Community (AMS 21)





WBEA Data PC
Zero Responses

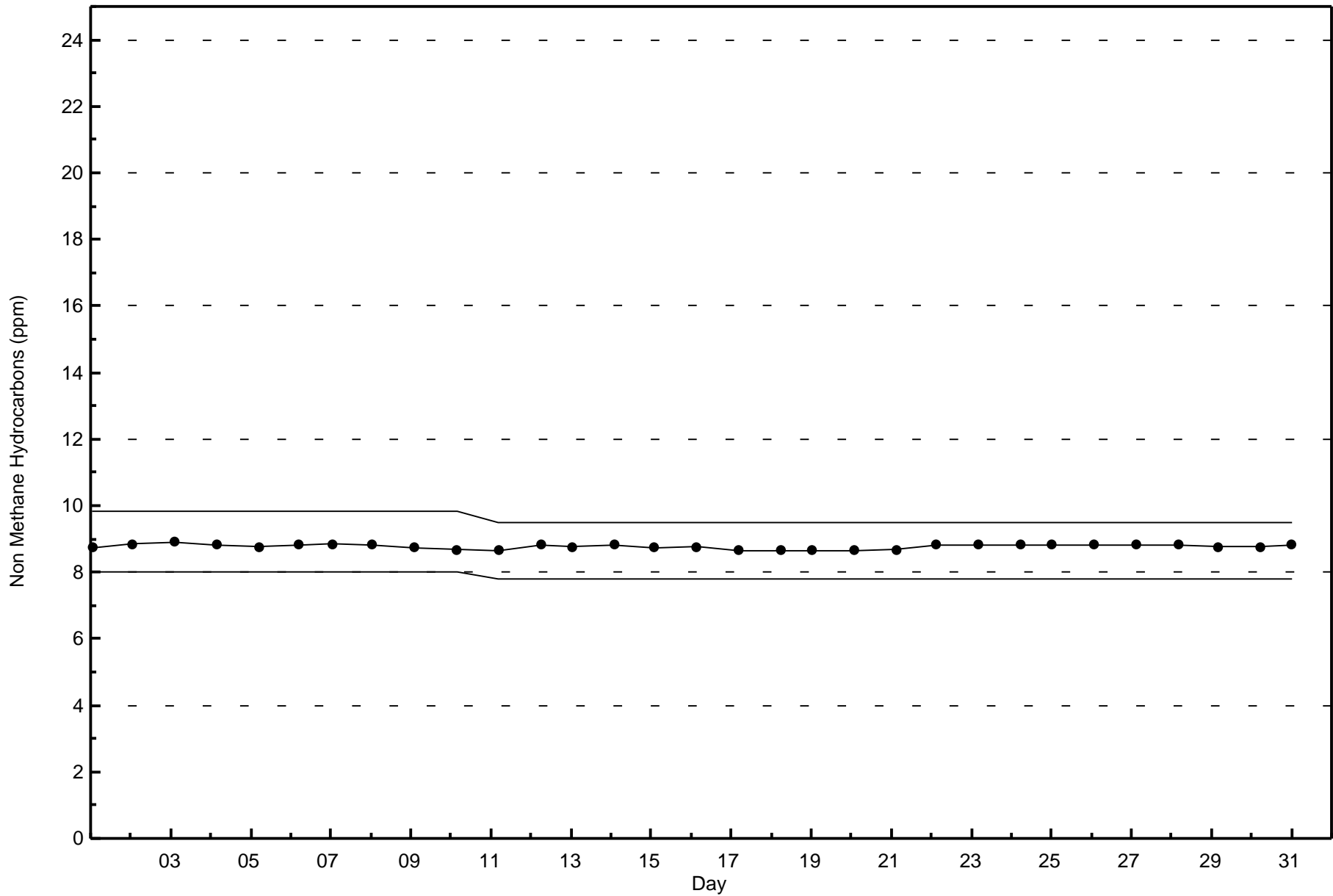
Non Methane Hydrocarbons (NMHC) - ppm
Conklin Community - January 2017





WBEA Data PC
Span Responses

Non Methane Hydrocarbons (NMHC) - ppm
Conklin Community - January 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm

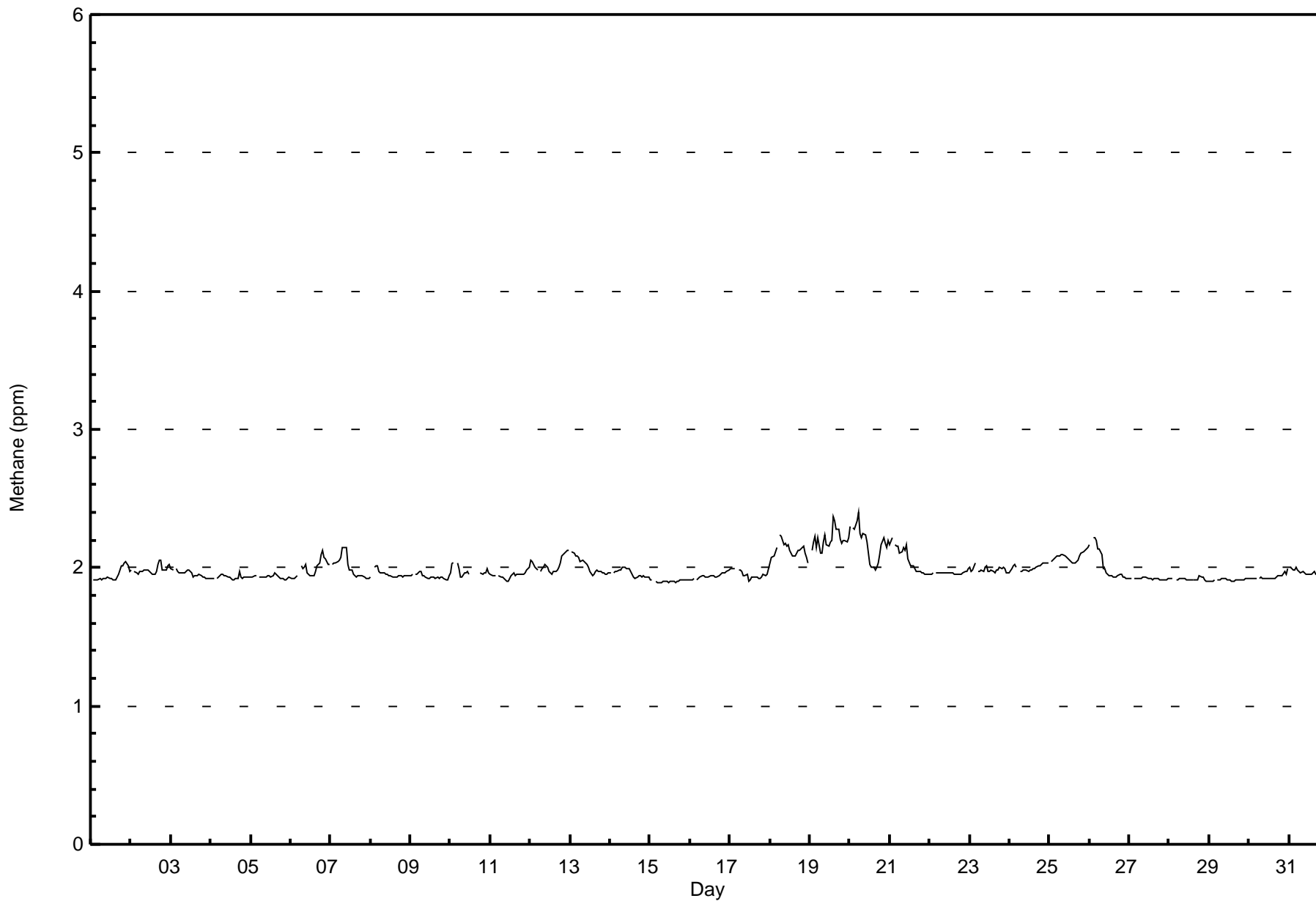
Conklin Community - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 744													
Maximum Value: 2.4 ppm on Jan 20 06:00														Maximum Daily Average: 2.2 ppm on Jan 19													
Minimum Value: 1.9 ppm on Jan 15 08:00														Minimum Daily Average: 1.9 ppm on Jan 15													
Maximum Diurnal Average: 2.0 ppm at hour 4														Minimum Diurnal Average: 2.0 ppm at hour 14													
Monthly Average: 1.99 ppm														Percentiles: P ₁ = 1.9 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 2.0 Q ₃ = 2.0 P ₉₀ = 2.1 P ₉₉ = 2.3													
														Hours of Data: 707													
														Hours of Missing Data: 37													
														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-Jan	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	2.0	2.0	2.0	1.9	2.0	
2-Jan	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	1.9	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
3-Jan	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	1.9	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
4-Jan	1.9	1.9	1.9	Z	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
5-Jan	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	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
6-Jan	1.9	1.9	1.9	1.9	1.9	Z	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1
7-Jan	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.1	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	2.1
8-Jan	1.9	Z	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
9-Jan	1.9	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
10-Jan	2.0	2.0	2.0	Z	2.0	2.0	1.9	1.9	2.0	2.0	2.0	1.9	C	C	C	C	C	C	2.0	2.0	2.0	2.0	2.0	2.0	--	2.0	
11-Jan	2.0	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	2.0	1.9	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
12-Jan	2.1	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	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
13-Jan	Z	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
14-Jan	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
15-Jan	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
16-Jan	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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
17-Jan	2.0	2.0	2.0	2.0	Z	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	1.9	1.9	2.0	2.0	2.0	2.0	2.0
18-Jan	2.0	2.1	2.1	2.1	2.1	Z	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	2.1	2.2	2.1	2.1	2.0	2.1	2.2	2.2
19-Jan	Z	2.1	2.2	2.2	2.1	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	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
20-Jan	2.3	Z	2.3	2.3	2.3	2.4	2.3	2.2	2.2	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.1	2.2	2.2	2.4	2.4
21-Jan	2.2	2.2	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2
22-Jan	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
23-Jan	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
24-Jan	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	2.0
25-Jan	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	2.0	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
26-Jan	2.2	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	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	2.0	2.2
27-Jan	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
28-Jan	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
29-Jan	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
30-Jan	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	2.0	2.0	2.0	2.0	2.0
31-Jan	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	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration																											



WBEA Data PC
Hourly Averages

Methane (CH₄) - ppm
Conklin Community - January 2017





WBEA Data PC
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Conklin Community - January 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	587	83.03	83.03
2.1 - 3.0	120	16.97	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



WBEA Data PC
Frequency Distribution

Methane (CH₄) - ppm
Conklin Community - January 2017

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	45	30	3	1	3	3	13	24	25	70	133	30	51	57	37	60	585
2.1 - 3.0	1	1	1	0	1	1	14	21	13	30	10	1	2	3	9	11	119
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
Totals	46	31	4	1	4	4	27	45	38	100	143	31	53	60	46	71	704

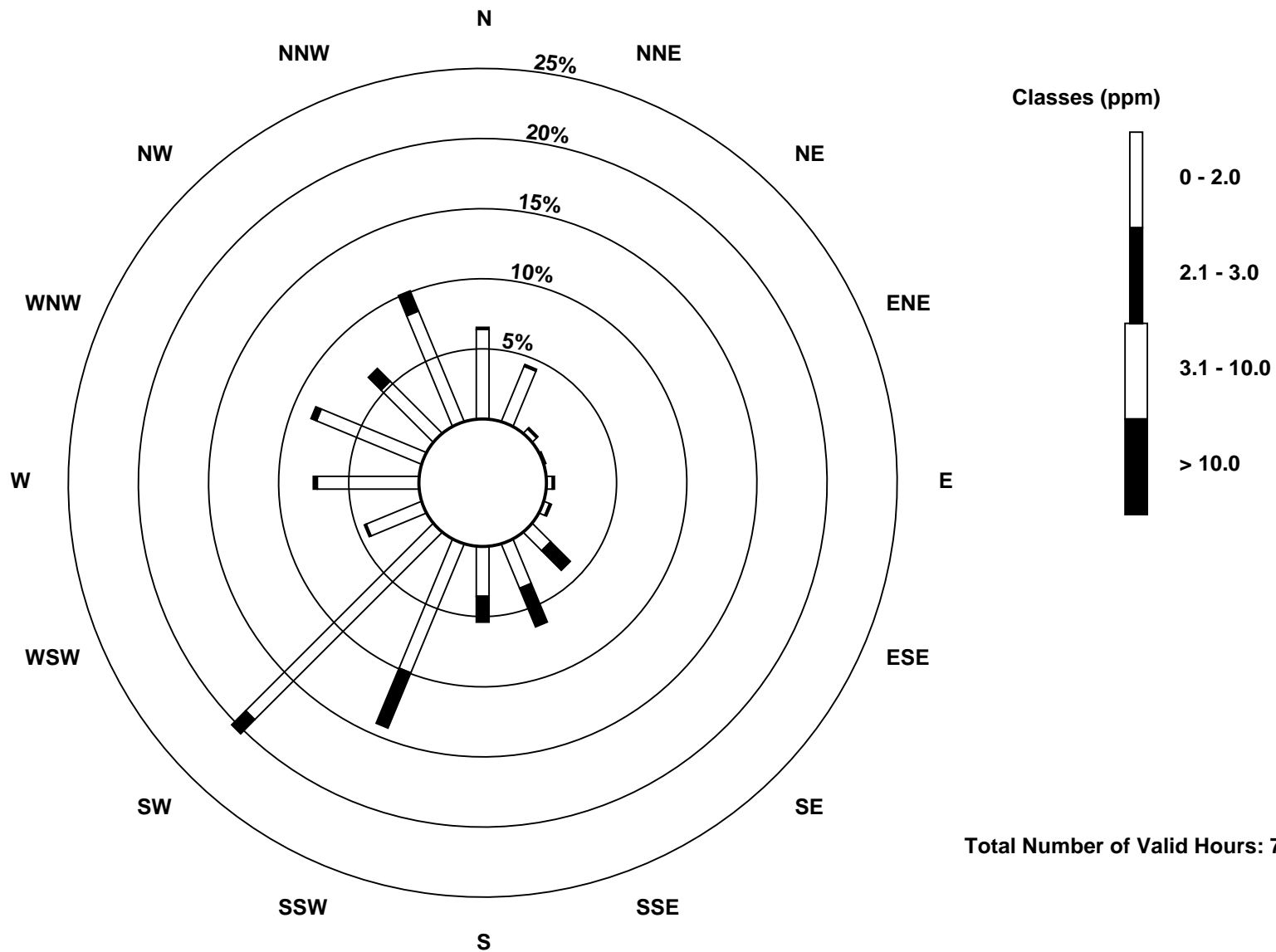
Total Number of Valid Hours: 704

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

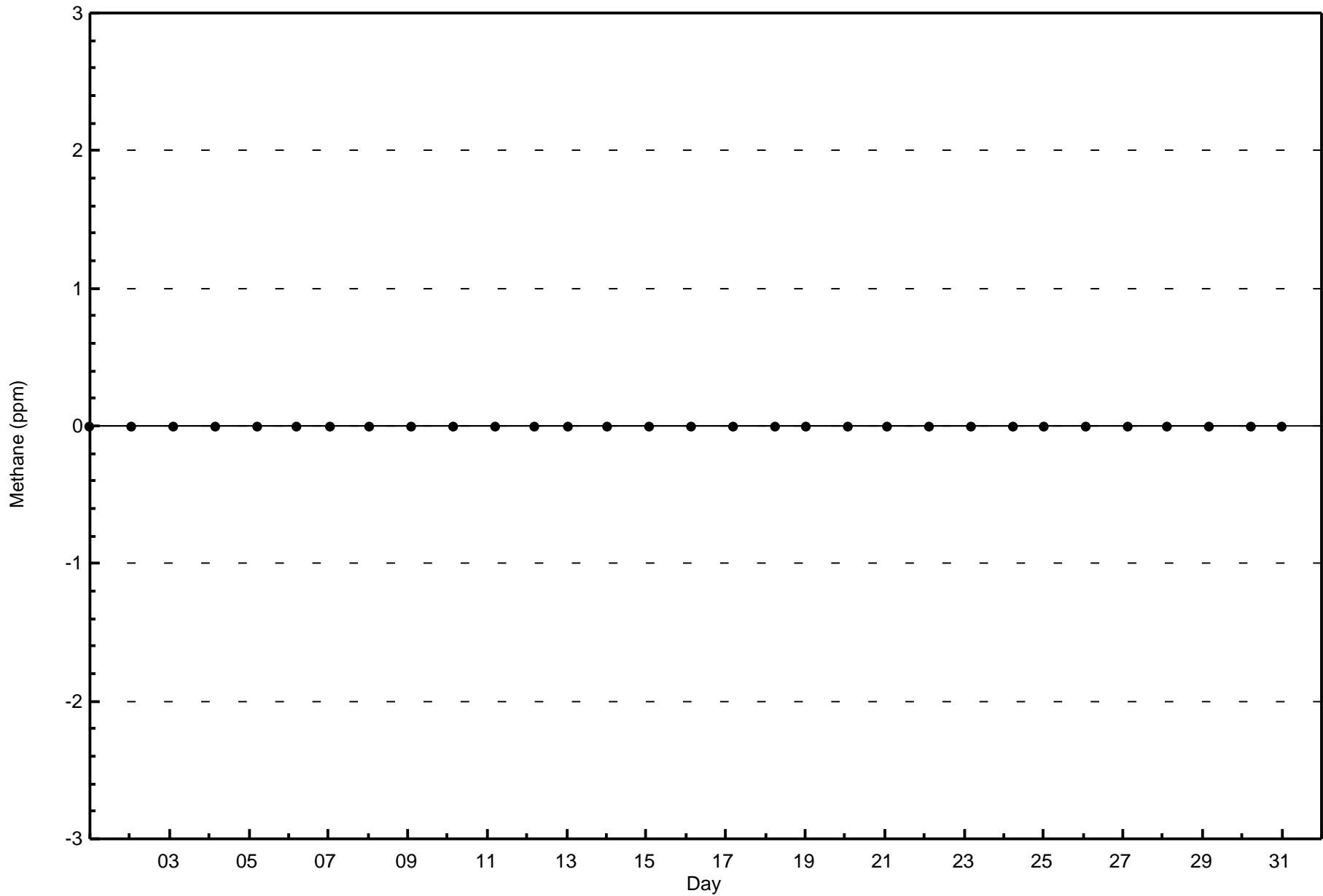
Methane (CH₄) - ppm
Conklin Community (AMS 21)





WBEA Data PC
Zero Responses

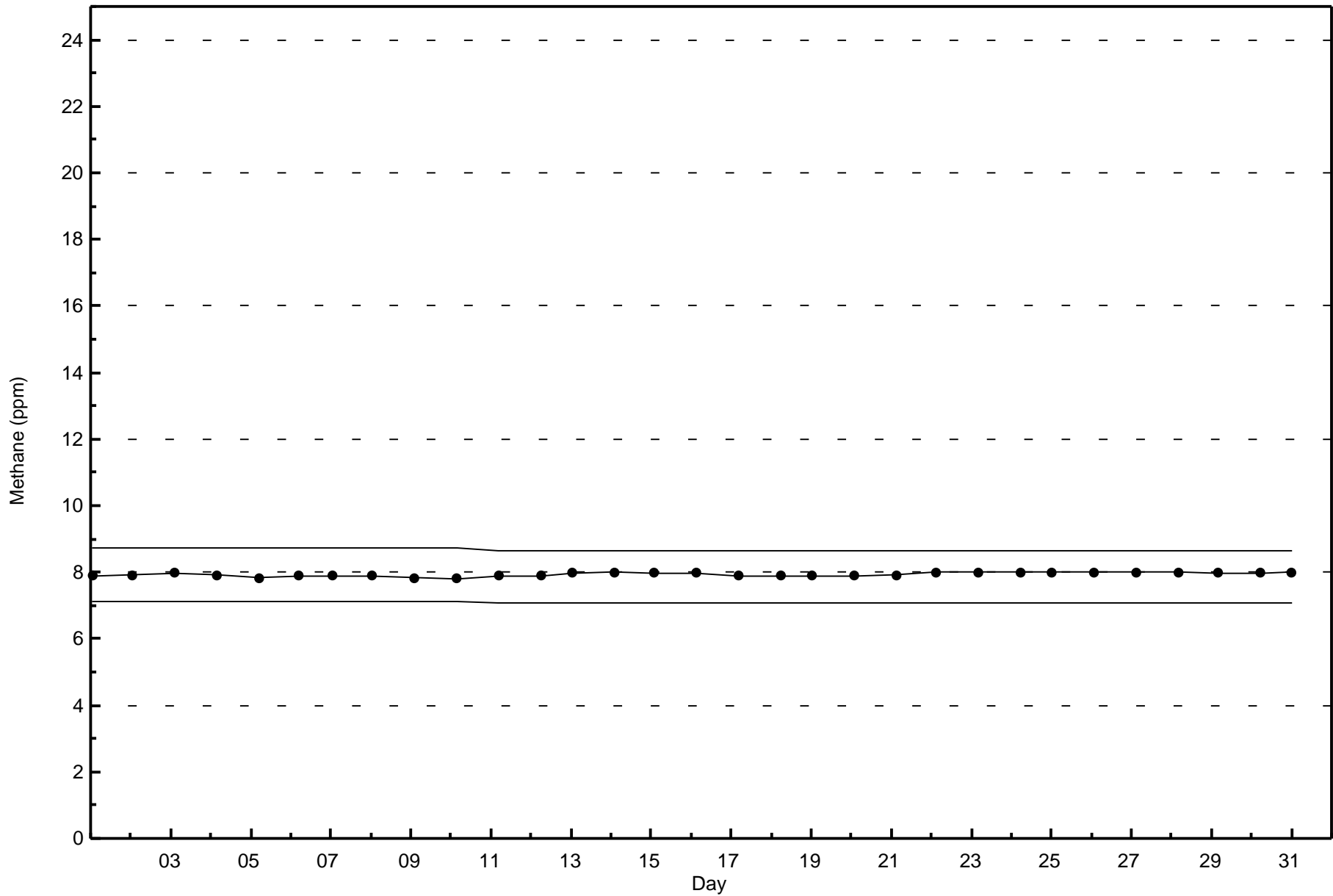
Methane (CH₄) - ppm
Conklin Community - January 2017





WBEA Data PC
Span Responses

Methane (CH₄) - ppm
Conklin Community - January 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

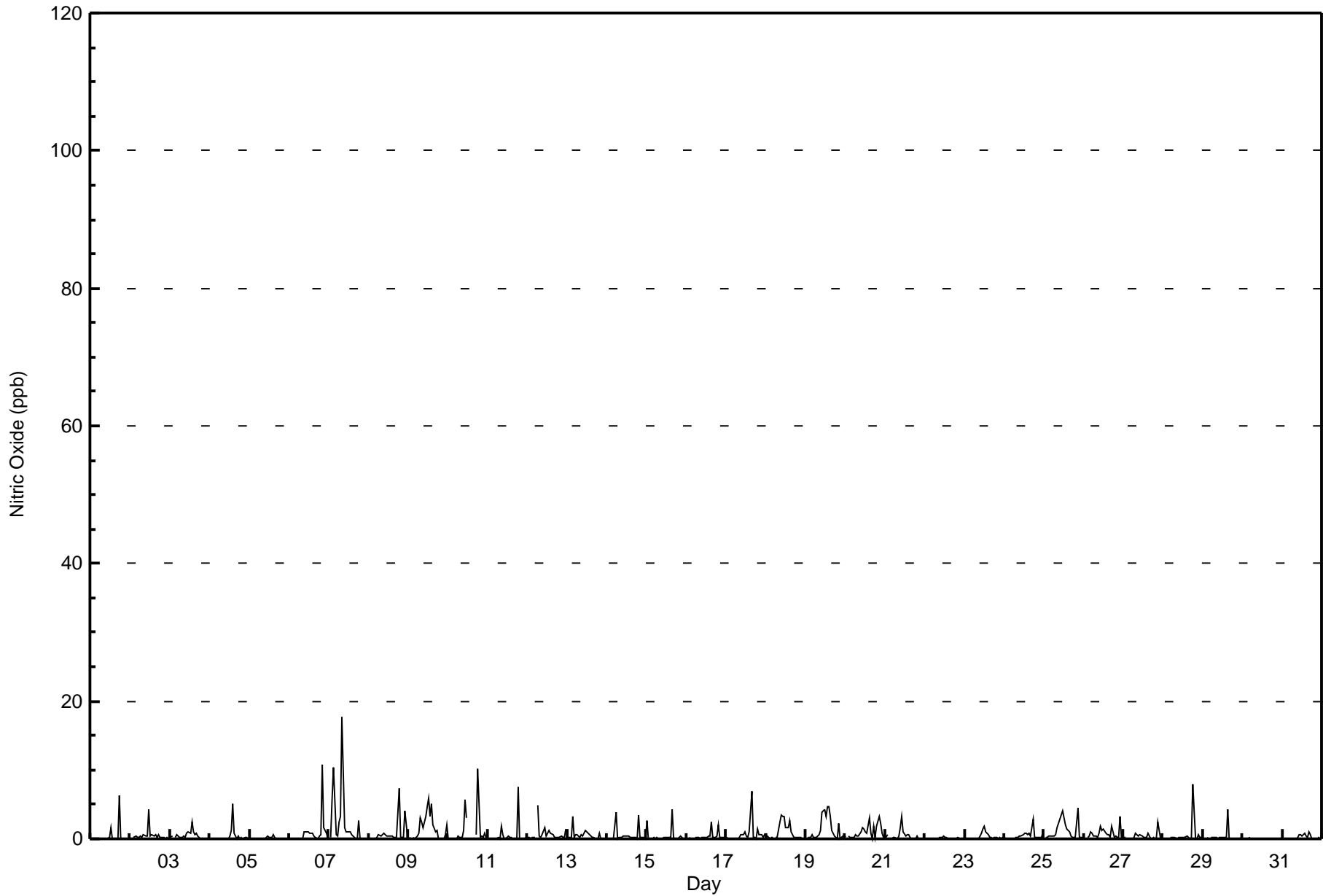
Conklin Community - January 2017

Maximum Value: 18 ppb on Jan 7 09:00																		Maximum Daily Average: 2.2 ppb on Jan 7						Hours in Service: 744			
Minimum Value: 0 ppb on Jan 1 02:00																		Minimum Daily Average: 0.0 ppb on Jan 30						Hours of Data: 708			
Maximum Diurnal Average: 1.3 ppb at hour 19																		Minimum Diurnal Average: 0.1 ppb at hour 2						Hours of Missing Data: 36			
Monthly Average: 0.7 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 7						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-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	6	0	0	0	0	0	0	0	0.4	6
2-Jan	0	Z	0	0	0	0	0	0	1	0	0	4	0	1	0	1	0	1	0	0	0	0	0	0	0	0.5	4
3-Jan	0	0	Z	0	1	0	0	0	0	0	1	1	1	2	1	1	1	0	0	0	0	0	0	0	0	0.5	2
4-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	5	1	0	0	0	0	0	0	0	0	0	0.4	5
5-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.1	1
6-Jan	0	0	0	0	0	Z	0	0	0	1	1	1	1	1	1	0	0	0	0	1	11	2	1	0	0.9	11	
7-Jan	Z	0	6	10	1	0	2	3	18	2	1	1	1	1	1	0	0	0	3	0	0	0	0	0	2.2	18	
8-Jan	0	Z	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0	0	7	0	0	0	4	0	0.8	7	
9-Jan	0	0	Z	0	0	0	1	3	3	2	3	5	6	3	5	2	1	1	0	0	0	0	1	2	1.7	6	
10-Jan	0	0	0	Z	0	0	0	0	0	1	6	3	C	C	C	C	C	1	10	0	0	0	1	0	1.3	10	
11-Jan	0	0	0	0	Z	0	0	0	2	1	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0.5	8	
12-Jan	0	0	0	0	0	Z	5	0	0	1	2	0	1	1	1	1	0	0	0	0	0	0	0	1	0.7	5	
13-Jan	Z	0	0	3	0	1	1	0	1	0	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0.5	3	
14-Jan	0	Z	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0.5	4	
15-Jan	3	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0.4	4	
16-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	2	0	0	0	0	0.4	3	
17-Jan	0	0	0	0	Z	0	0	0	0	1	1	1	0	0	1	7	0	0	0	1	1	1	0	1	0.7	7	
18-Jan	0	0	0	0	0	Z	0	0	2	3	3	3	2	2	3	1	1	0	0	0	0	0	0	0	1.0	3	
19-Jan	Z	0	0	0	1	0	0	0	1	1	4	4	3	5	5	3	1	0	0	0	2	0	0	0	1.4	5	
20-Jan	0	Z	0	0	0	0	1	0	1	1	2	1	1	1	3	1	0	2	0	2	3	2	1	0	1.0	3	
21-Jan	0	1	Z	0	0	0	0	0	0	2	3	1	0	1	1	0	0	0	0	0	0	0	0	0	0.4	3	
22-Jan	0	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	
23-Jan	0	0	0	0	Z	0	0	0	0	0	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0.3	2	
24-Jan	0	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	0	3	0	0	0	0	0	1	0.5	3	
25-Jan	Z	0	0	0	0	0	0	1	2	3	4	4	3	2	1	1	0	0	0	0	4	0	0	0	1.2	4	
26-Jan	0	Z	0	0	1	1	0	0	0	1	2	1	1	1	1	1	0	2	0	0	0	0	3	0	0.8	3	
27-Jan	0	0	Z	0	0	0	0	1	1	0	1	0	0	0	0	1	0	0	0	0	0	2	0	0	0.4	2	
28-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	1	0	0	0.5	8	
29-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0.3	4	
30-Jan	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	
31-Jan	Z	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	1	0	0	0	0	0	0	0.2	1	
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration																											



WBEA Data PC
Hourly Averages

Nitric Oxide (NO) - ppb
Conklin Community - January 2017





WBEA Data PC
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Conklin Community - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
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



WBEA Data PC
Frequency Distribution

Nitric Oxide (NO) - ppb
Conklin Community - January 2017

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	46	31	4	1	4	4	27	45	38	100	144	31	53	60	46	71	705
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
Totals	46	31	4	1	4	4	27	45	38	100	144	31	53	60	46	71	705

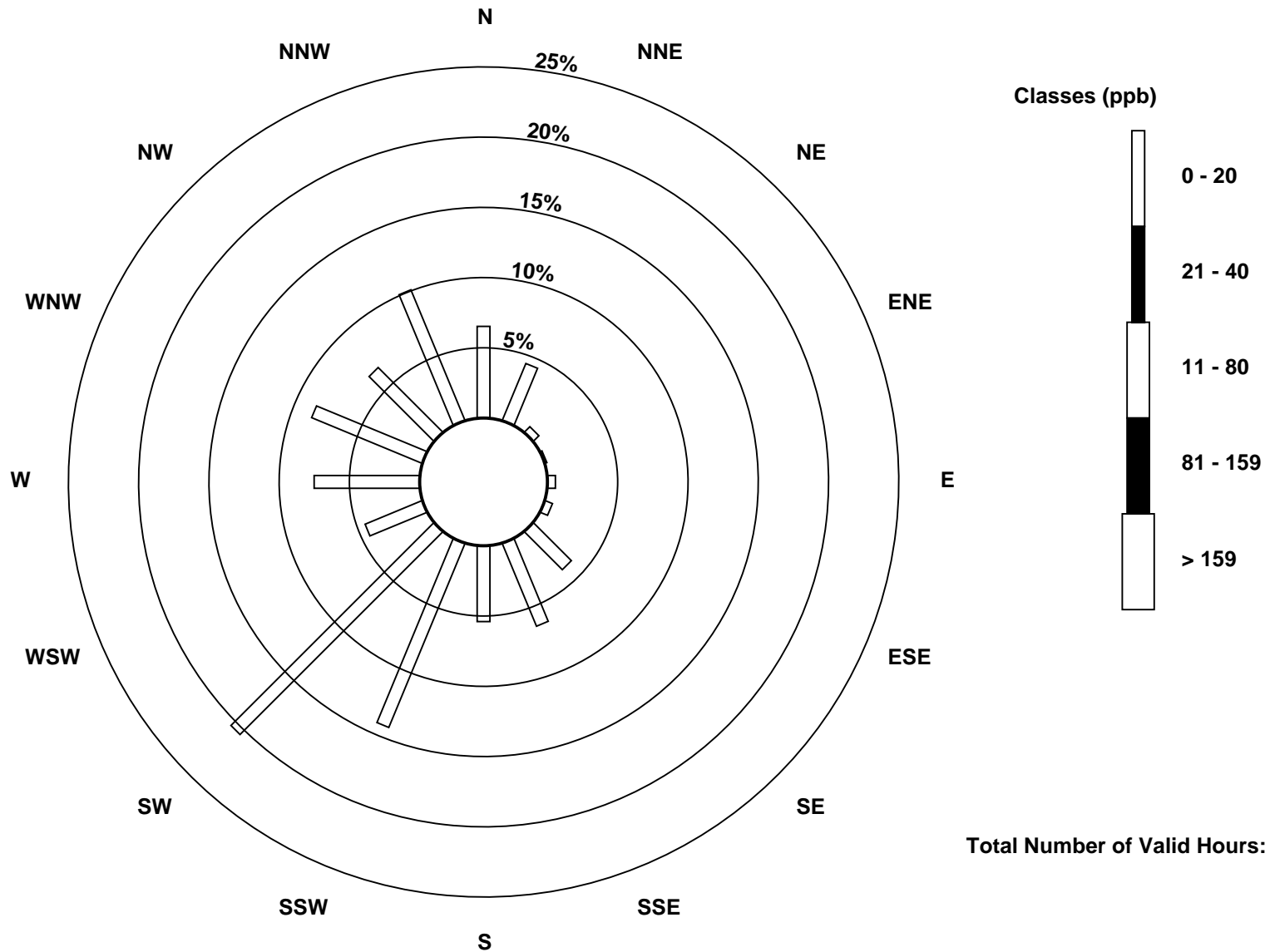
Total Number of Valid Hours: 705

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Nitric Oxide (NO) - ppb
Conklin Community (AMS 21)

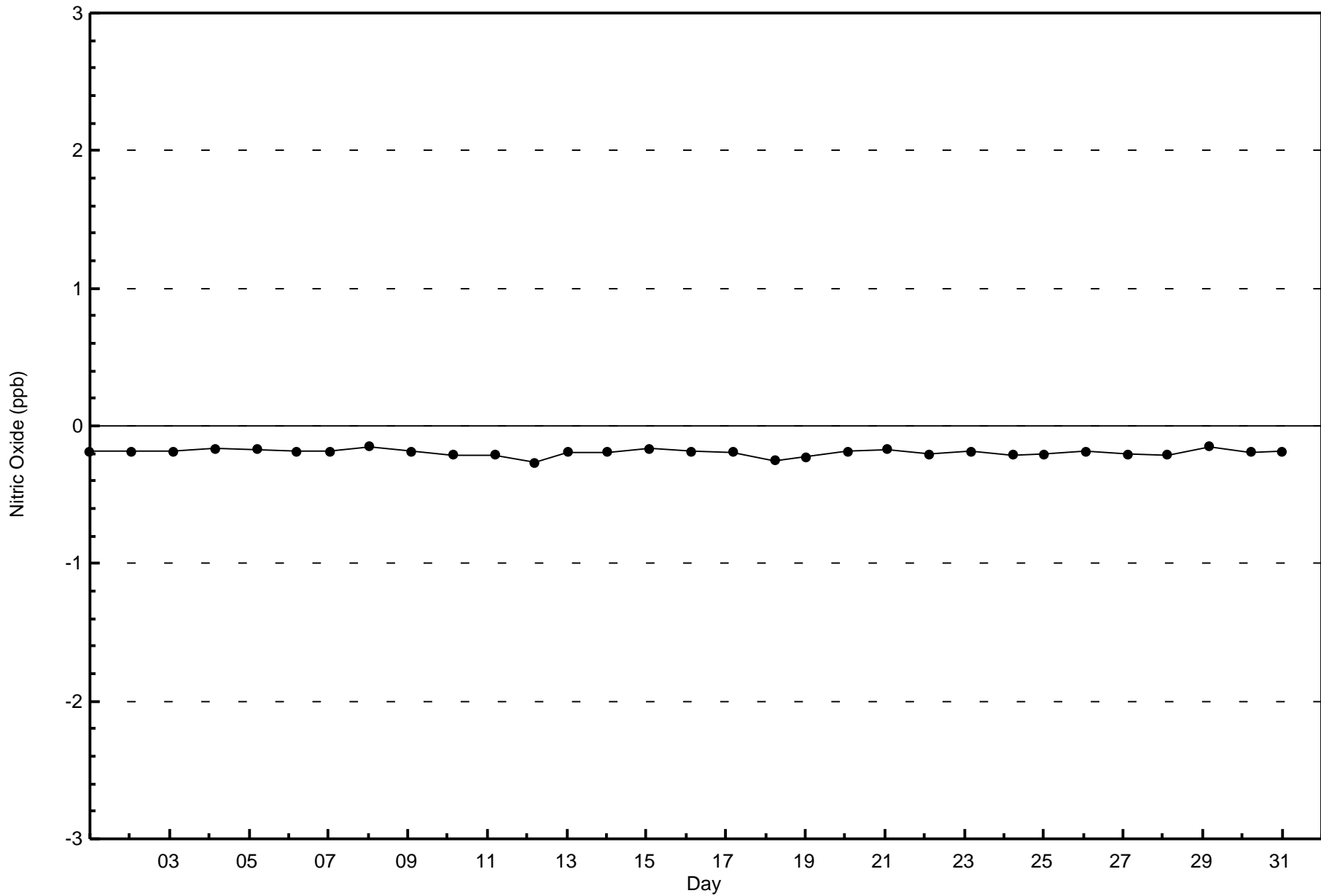


Total Number of Valid Hours: 705



WBEA Data PC
Zero Responses

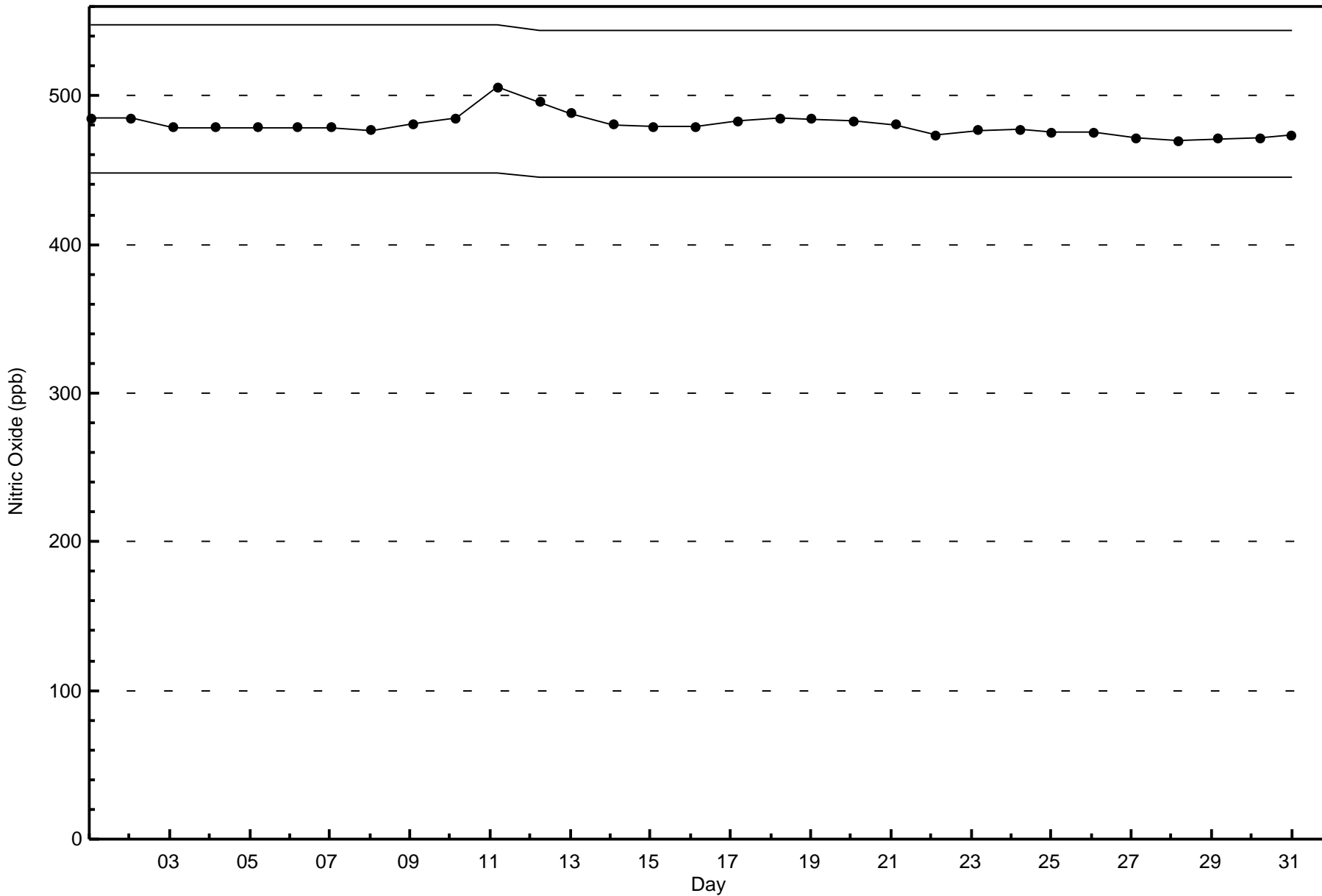
Nitric Oxide (NO) - ppb
Conklin Community - January 2017





WBEA Data PC
Span Responses

Nitric Oxide (NO) - ppb
Conklin Community - January 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Conklin Community - January 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 23 ppb on Jan 7 09:00	Maximum Daily Average: 7.9 ppb on Jan 25		Hours of Data:	708
Minimum Value: 0 ppb on Jan 11 19:00	Minimum Daily Average: 1.1 ppb on Jan 29		Hours of Missing Data:	36
Maximum Diurnal Average: 4.2 ppb at hour 18	Minimum Diurnal Average: 2.3 ppb at hour 2		Hours of Calibration:	36
Monthly Average: 3.4 ppb	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 7 P ₉₉ = 14		Percent Operational Time:	100.0

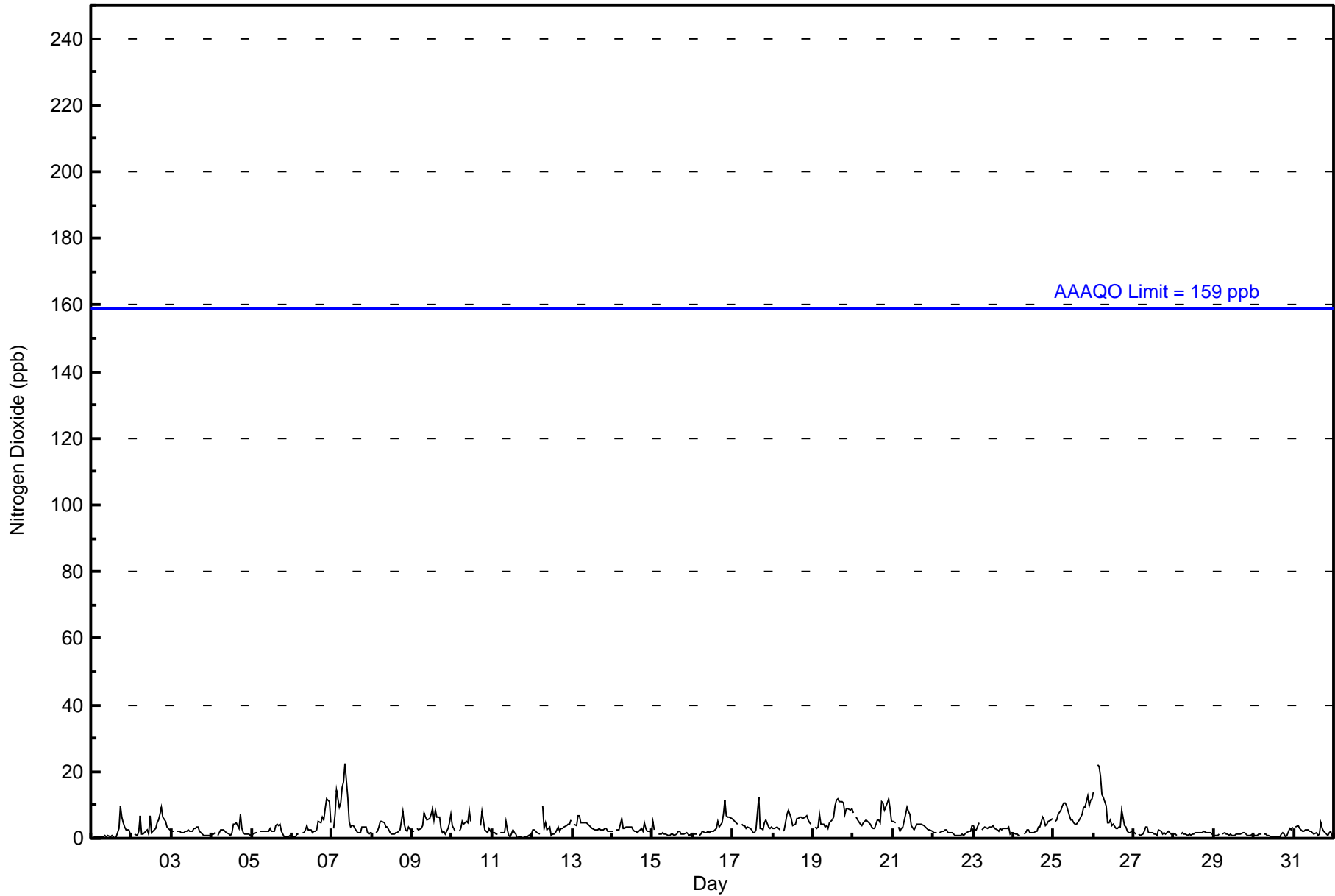
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	Z	0	0	0	1	1	0	1	1	1	1	1	0	0	1	3	10	7	5	3	2	2	1	1.8	10	
2-Jan	1	Z	1	1	2	7	1	1	2	3	1	7	2	2	3	5	6	7	9	7	5	3	3	3	3.5	9
3-Jan	2	2	Z	2	2	2	2	2	2	2	2	2	3	3	3	3	2	1	1	1	1	1	1	2.0	3	
4-Jan	1	1	2	Z	1	2	3	2	2	2	1	1	2	4	4	5	3	7	3	2	1	1	1	2.3	7	
5-Jan	1	1	2	2	Z	2	2	2	2	2	2	3	2	2	4	4	4	4	2	0	0	0	0	2.0	4	
6-Jan	1	0	1	1	1	Z	2	2	2	4	3	2	2	2	2	2	5	5	6	6	9	12	11	5	3.7	12
7-Jan	Z	3	7	14	9	11	15	17	23	12	5	4	4	4	3	2	2	2	4	3	3	2	1	2	6.5	23
8-Jan	2	Z	2	2	3	5	5	5	3	3	3	2	1	1	2	2	2	3	8	4	3	2	3	2	3.0	8
9-Jan	2	2	Z	3	2	3	4	8	7	5	6	7	9	5	8	7	7	3	2	2	1	3	5	7	4.7	9
10-Jan	4	3	2	Z	2	3	5	4	5	5	8	5	C	C	C	C	C	4	8	3	2	2	3	2	3.9	8
11-Jan	2	2	1	1	Z	2	2	2	5	2	1	1	3	2	1	0	0	0	0	0	0	0	1	1	1.3	5
12-Jan	3	3	2	2	1	Z	10	3	5	3	3	1	1	1	2	3	2	3	3	4	4	4	4	5	3.1	10
13-Jan	Z	4	4	7	7	5	5	5	5	4	4	3	3	3	2	3	3	3	3	3	3	2	2	2	3.6	7
14-Jan	2	Z	3	3	3	6	3	3	4	3	3	3	2	2	2	2	2	3	2	5	3	2	2	2	2.8	6
15-Jan	5	3	Z	1	1	1	2	1	1	1	1	1	1	1	1	2	2	1	1	1	2	1	1	1	1.5	5
16-Jan	1	1	1	Z	1	1	2	2	2	2	2	2	2	3	3	5	4	5	7	11	7	6	7	6	3.6	11
17-Jan	6	5	5	4	Z	4	4	4	3	3	3	3	2	2	2	12	3	3	2	5	6	4	3	3	3.9	12
18-Jan	3	3	3	3	3	Z	2	3	7	9	7	6	4	4	6	6	6	6	6	6	7	6	5	4	5.0	9
19-Jan	Z	3	3	3	7	4	4	4	4	3	5	6	6	10	11	12	11	11	11	7	9	9	8	9	6.9	12
20-Jan	8	Z	7	5	4	4	5	5	6	5	4	3	3	3	5	6	5	11	11	8	11	12	9	5	6.2	12
21-Jan	5	5	Z	3	2	3	3	7	9	8	7	4	3	4	4	4	4	4	4	4	3	3	3	2	4.3	9
22-Jan	2	2	2	Z	2	2	2	2	3	2	2	2	1	1	1	1	1	1	1	1	2	2	2	4	1.7	4
23-Jan	4	2	3	5	Z	3	3	3	3	3	3	4	4	3	2	2	3	2	3	3	3	4	1	2	2.9	5
24-Jan	2	1	1	1	1	Z	1	2	2	3	2	2	2	2	2	4	4	6	6	4	4	5	5	6	2.9	6
25-Jan	Z	5	6	7	8	10	11	11	10	7	6	6	5	4	4	6	6	7	9	9	13	10	11	12	7.9	13
26-Jan	14	Z	22	22	19	13	12	10	5	5	5	4	4	3	3	4	4	8	4	3	2	2	2	2	7.4	22
27-Jan	2	1	Z	1	1	1	2	4	3	2	2	2	1	1	1	3	2	1	2	1	2	2	1	1	1.7	4
28-Jan	1	1	1	Z	1	2	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	1	1.4	2
29-Jan	1	1	1	1	Z	1	2	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1.1	2
30-Jan	1	1	1	1	1	Z	1	1	1	1	1	0	1	1	0	1	1	2	1	1	1	3	3	4	1.2	4
31-Jan	Z	4	4	3	3	2	2	3	3	2	2	2	1	2	1	1	5	3	2	1	1	2	2	1	2.1	5
																								Diurnal Average		
																								Diurnal Maximum		

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



WBEA Data PC
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Conklin Community - January 2017





WBEA Data PC
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Conklin Community - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
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



WBEA Data PC
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Conklin Community - January 2017

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	46	31	4	1	4	4	27	45	38	98	144	31	53	60	45	71	702
21 - 40	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	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
Totals	46	31	4	1	4	4	27	45	38	100	144	31	53	60	46	71	705

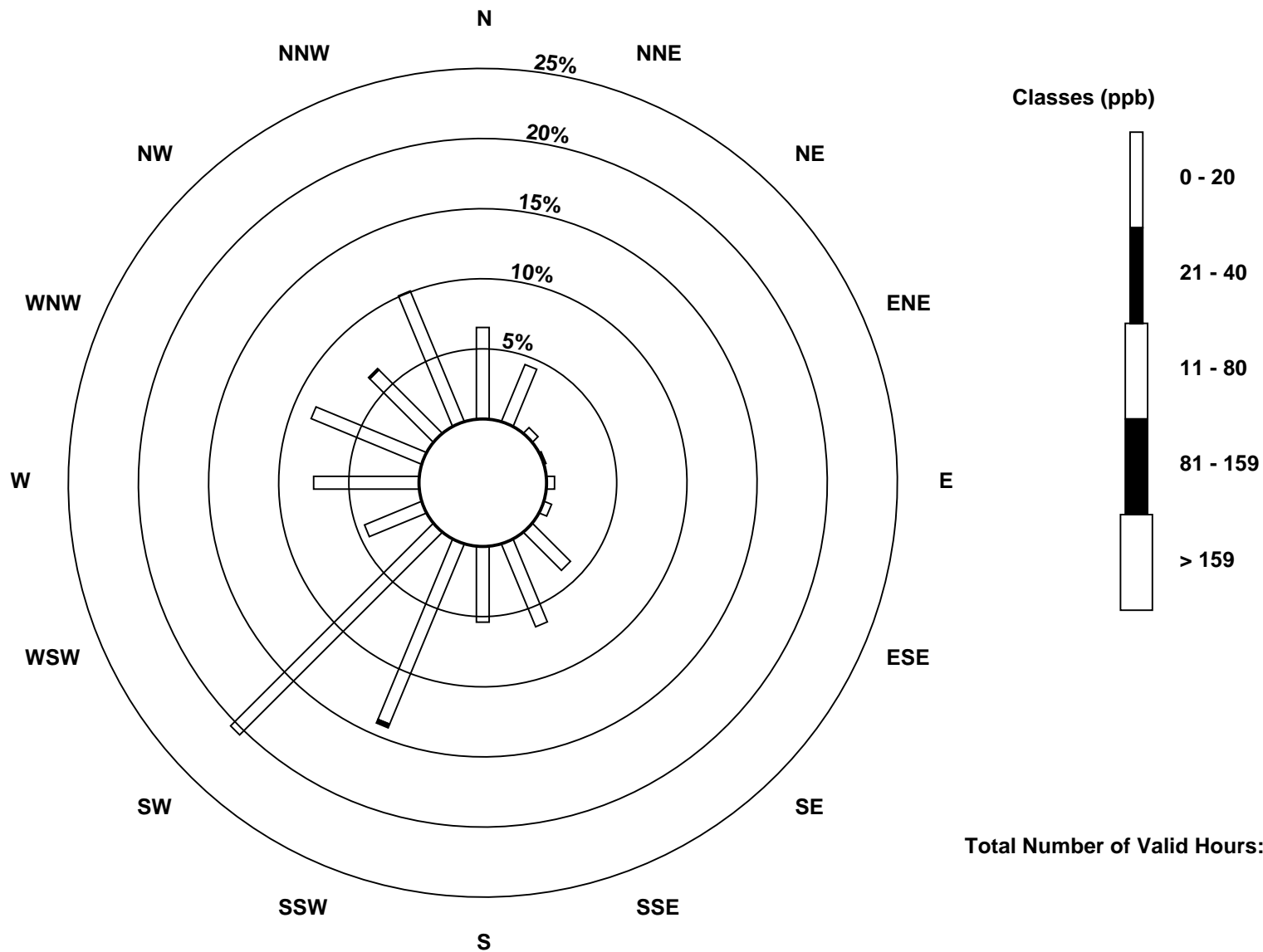
Total Number of Valid Hours: 705

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Nitrogen Dioxide (NO₂) - ppb
Conklin Community (AMS 21)

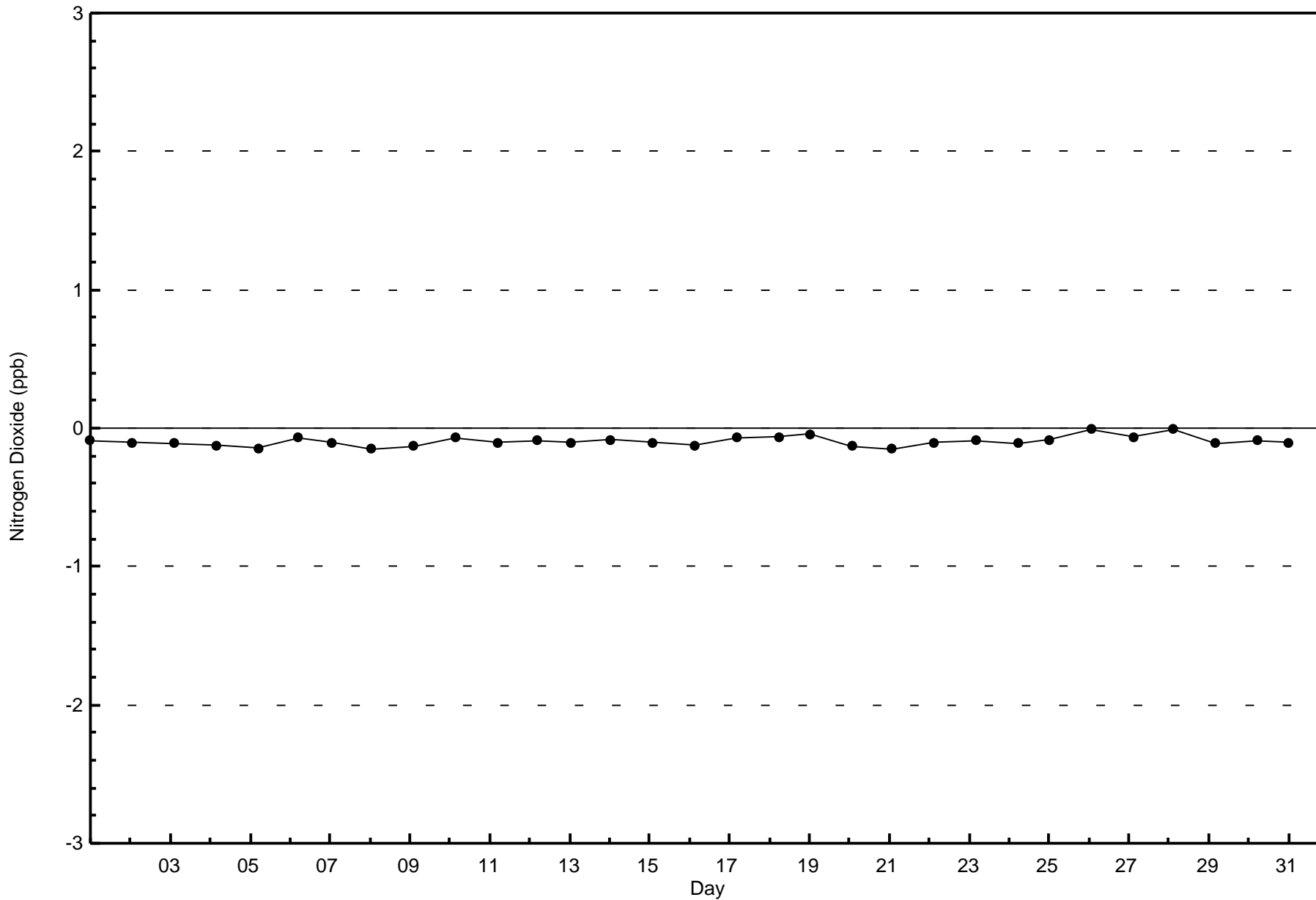


Total Number of Valid Hours: 705



WBEA Data PC
Zero Responses

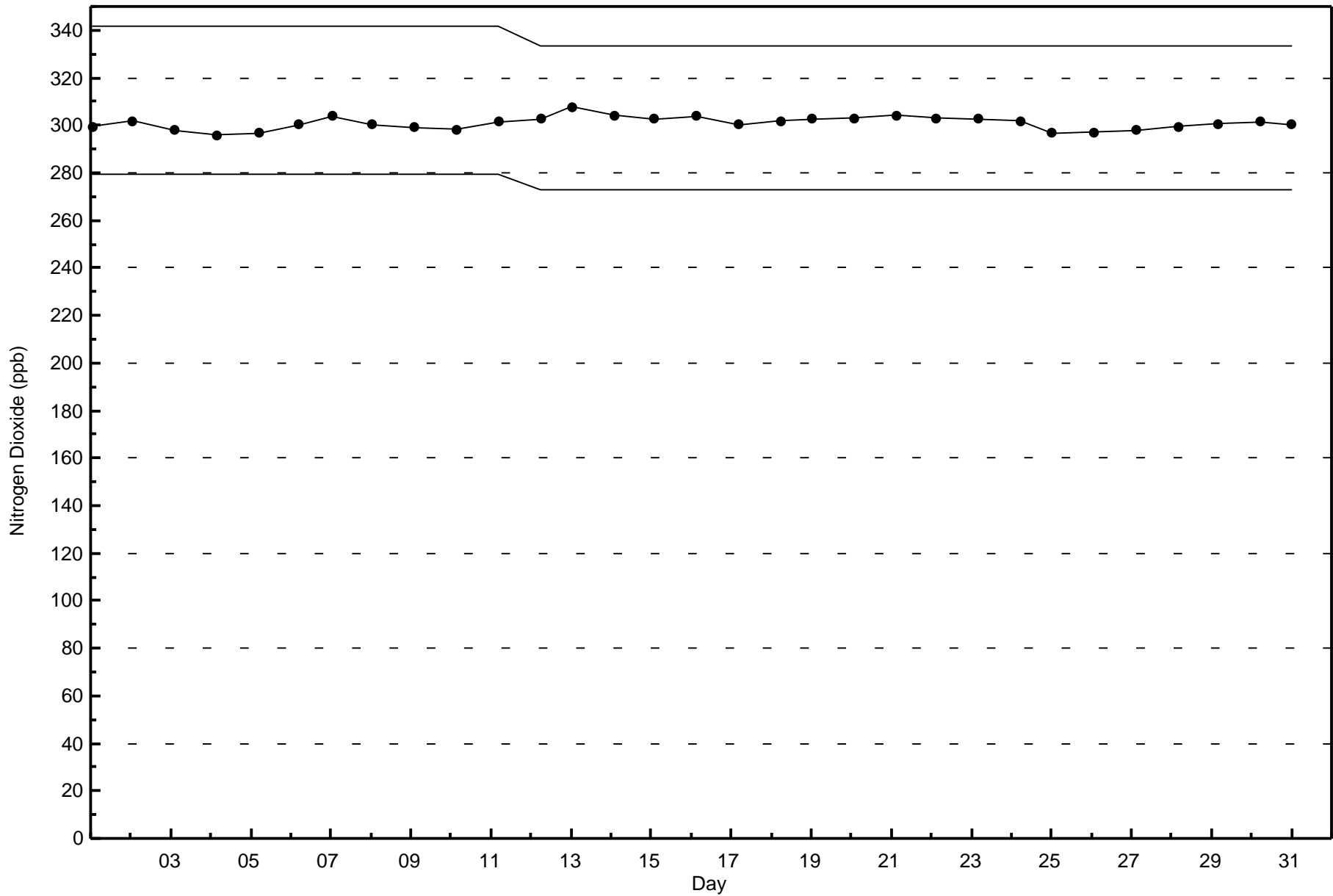
Nitrogen Dioxide (NO₂) - ppb
Conklin Community - January 2017





WBEA Data PC
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Conklin Community - January 2017





Wood Buffalo Environmental Association
Summary of Hour Averages

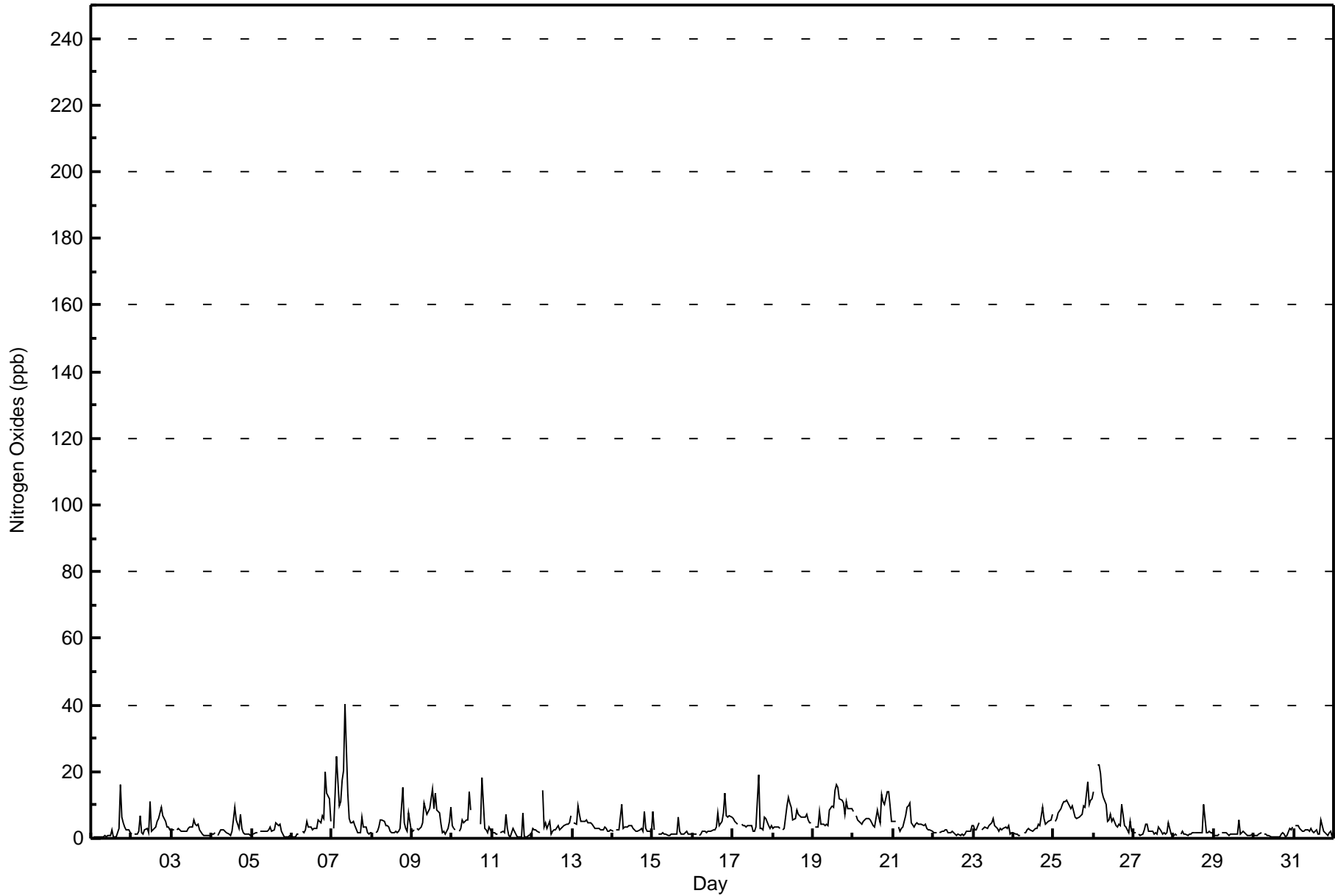
Nitrogen Oxides (NO_x) - ppb
Conklin Community - January 2017

Maximum Value: 40 ppb on Jan 7 09:00																		Maximum Daily Average: 9.1 ppb on Jan 25						Hours in Service: 744		
Minimum Value: 0 ppb on Jan 11 16:00																		Minimum Daily Average: 1.2 ppb on Jan 30						Hours of Data: 708		
Maximum Diurnal Average: 5.5 ppb at hour 19																		Minimum Diurnal Average: 2.4 ppb at hour 2						Hours of Missing Data: 36		
Monthly Average: 4.1 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 5 P ₉₀ = 9 P ₉₉ = 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-Jan	Z	0	0	0	0	1	0	1	1	1	1	2	0	0	1	3	16	6	5	3	2	2	1	2.2	16	
2-Jan	1	Z	1	1	2	7	2	1	2	3	2	11	2	3	3	5	6	8	9	7	5	3	3	3	4.0	11
3-Jan	2	3	Z	2	3	2	2	2	2	2	3	3	5	4	4	4	2	1	1	1	1	1	1	2.5	5	
4-Jan	1	1	1	Z	1	2	3	2	2	2	1	1	2	6	9	5	3	7	3	2	1	1	1	2.7	9	
5-Jan	1	1	2	2	Z	2	2	2	2	2	2	3	2	2	5	4	4	4	2	0	0	0	1	2.1	5	
6-Jan	0	0	0	1	1	Z	2	2	3	5	4	3	2	3	3	3	5	4	7	6	20	14	12	5	4.6	20
7-Jan	Z	3	13	25	10	11	17	20	40	14	6	4	5	5	4	2	2	2	6	3	3	2	1	2	8.7	40
8-Jan	2	Z	2	2	3	5	6	5	4	4	3	2	2	2	2	2	3	15	5	3	2	8	2	3.8	15	
9-Jan	2	2	Z	3	3	4	5	11	9	7	9	12	15	9	13	9	8	4	2	2	1	3	5	9	6.3	15
10-Jan	4	3	2	Z	2	3	6	5	5	6	14	8	C	C	C	C	C	4	18	3	3	2	4	3	5.2	18
11-Jan	2	2	1	1	Z	2	2	2	7	3	1	1	3	2	1	0	0	0	8	0	0	0	1	1	1.8	8
12-Jan	3	3	2	2	2	Z	14	3	5	3	5	1	2	2	2	4	2	3	3	4	4	4	5	7	3.8	14
13-Jan	Z	5	4	10	7	5	5	5	5	5	5	4	3	3	3	3	3	3	2	3	3	2	2	2	4.1	10
14-Jan	2	Z	3	3	3	10	3	3	4	4	4	4	3	3	2	2	3	3	2	8	3	2	2	2	3.3	10
15-Jan	8	3	Z	1	1	1	2	1	1	1	1	1	1	1	1	6	2	1	1	1	2	1	1	1	1.9	8
16-Jan	1	1	1	Z	1	1	2	2	2	2	2	2	2	3	3	8	4	5	7	14	7	7	7	6	4.0	14
17-Jan	6	5	5	4	Z	4	4	4	3	4	4	4	2	2	3	19	3	3	3	6	6	4	3	4	4.6	19
18-Jan	3	3	3	3	3	Z	2	3	10	12	10	9	6	6	8	7	7	6	6	7	7	6	5	4	6.0	12
19-Jan	Z	4	3	4	8	4	4	4	4	4	9	10	9	14	16	15	12	11	11	7	11	9	9	9	8.3	16
20-Jan	8	Z	7	6	5	4	5	6	6	6	6	5	4	4	9	6	5	13	11	10	14	14	10	5	7.2	14
21-Jan	5	5	Z	3	2	3	3	7	10	10	11	5	3	4	5	4	4	4	4	4	3	3	3	2	4.7	11
22-Jan	2	2	2	Z	2	2	2	2	3	2	2	2	2	1	1	1	1	1	1	1	2	2	2	4	1.8	4
23-Jan	4	2	3	5	Z	3	3	3	3	4	4	5	6	4	3	2	3	2	3	3	3	4	1	2	3.2	6
24-Jan	2	1	1	1	1	Z	1	2	3	3	2	2	3	3	3	4	4	9	6	4	5	5	6	7	3.4	9
25-Jan	Z	5	6	8	9	10	11	11	11	10	9	10	8	6	6	6	7	7	10	10	17	10	12	12	9.1	17
26-Jan	14	Z	22	22	20	14	12	10	5	6	7	5	6	4	3	4	4	10	4	4	2	2	5	2	8.2	22
27-Jan	2	2	Z	1	1	1	3	4	4	2	2	2	1	2	1	3	2	1	2	1	2	5	1	1	2.0	5
28-Jan	1	1	1	Z	1	2	1	1	1	1	1	2	2	2	2	2	2	2	10	2	2	2	2	2	1.9	10
29-Jan	1	1	1	1	Z	2	2	2	1	1	1	1	1	1	1	5	1	2	2	1	1	1	1	1	1.4	5
30-Jan	1	1	1	1	2	Z	1	1	1	1	1	0	1	0	0	1	1	2	1	0	1	3	2	4	1.2	4
31-Jan	Z	4	4	3	3	2	2	3	3	2	3	2	2	2	1	1	6	4	2	1	1	2	2	1	2.4	6
																		Diurnal Average								
																		Diurnal Maximum								
Z - zerospan																		C - Calibration								



WBEA Data PC
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Conklin Community - January 2017





WBEA Data PC
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Conklin Community - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	704	99.44	99.44
21 - 40	4	0.56	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



WBEA Data PC
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Conklin Community - January 2017

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	46	31	4	1	4	4	26	45	38	98	144	31	53	60	45	71	701
21 - 40	0	0	0	0	0	0	1	0	0	2	0	0	0	0	1	0	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
Totals	46	31	4	1	4	4	27	45	38	100	144	31	53	60	46	71	705

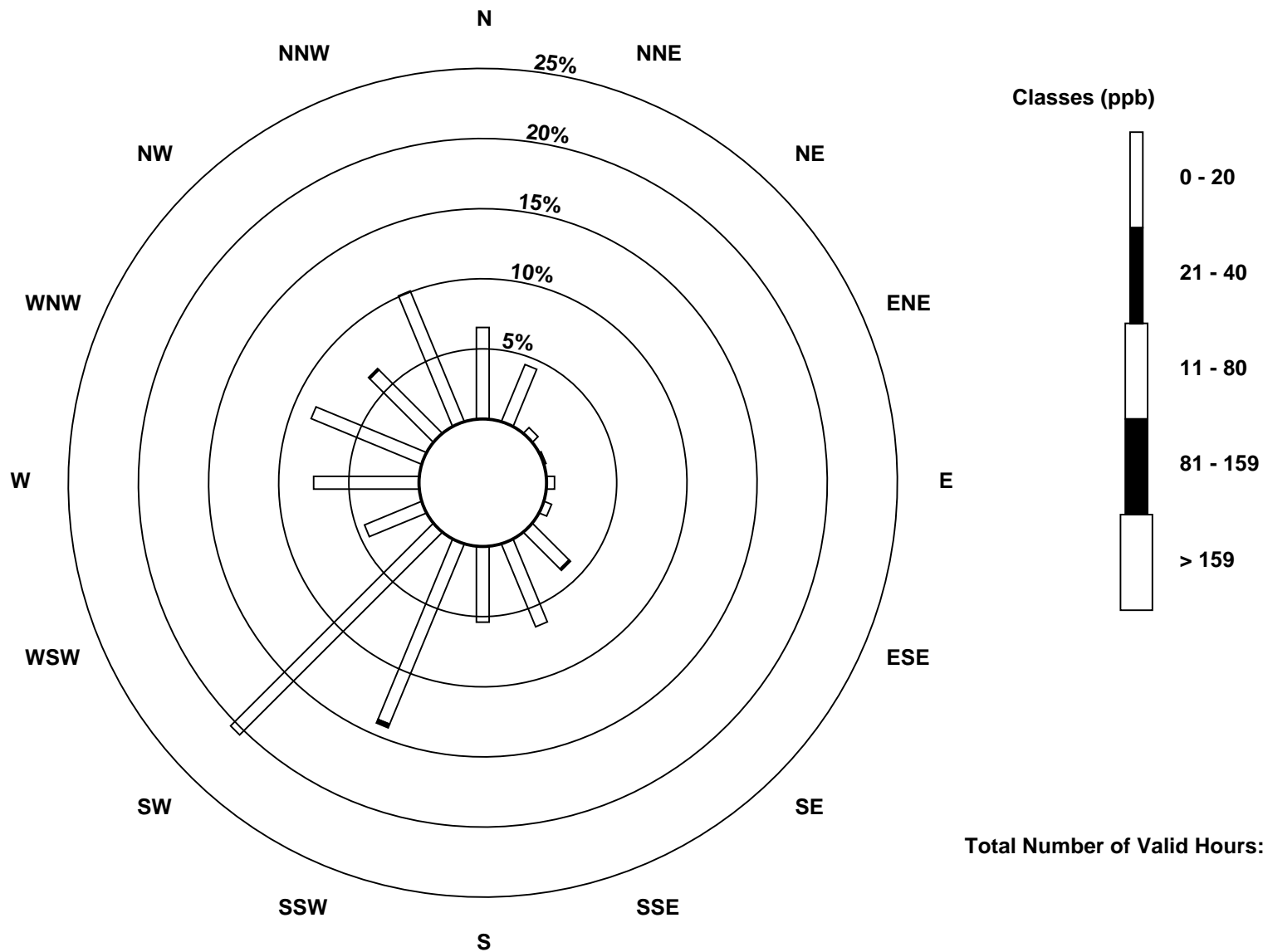
Total Number of Valid Hours: 705

Total Number of Hours: 744

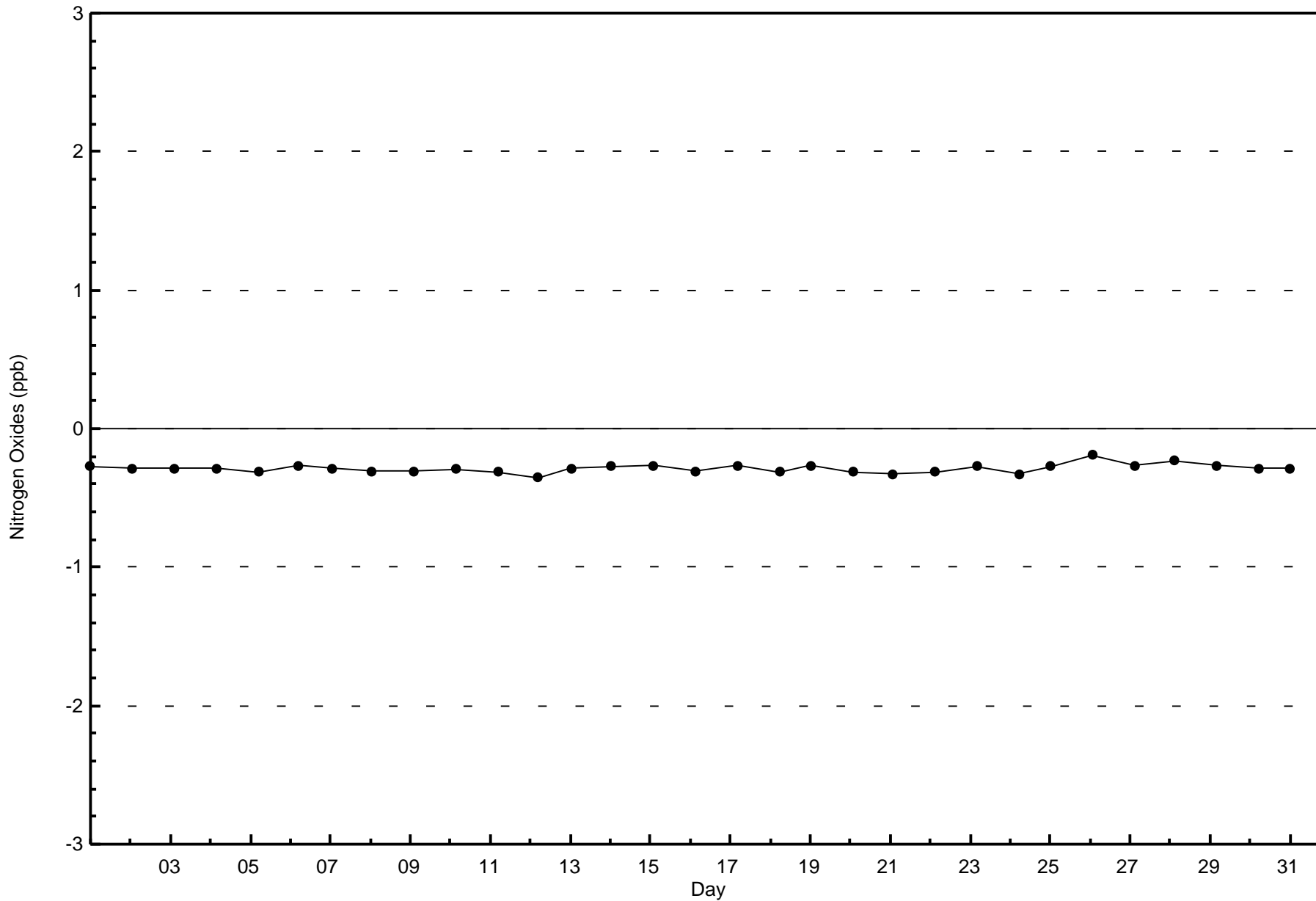


Wood Buffalo Environmental Association
Wind Rose Jan 2017

Nitrogen Oxides (NO_x) - ppb
Conklin Community (AMS 21)



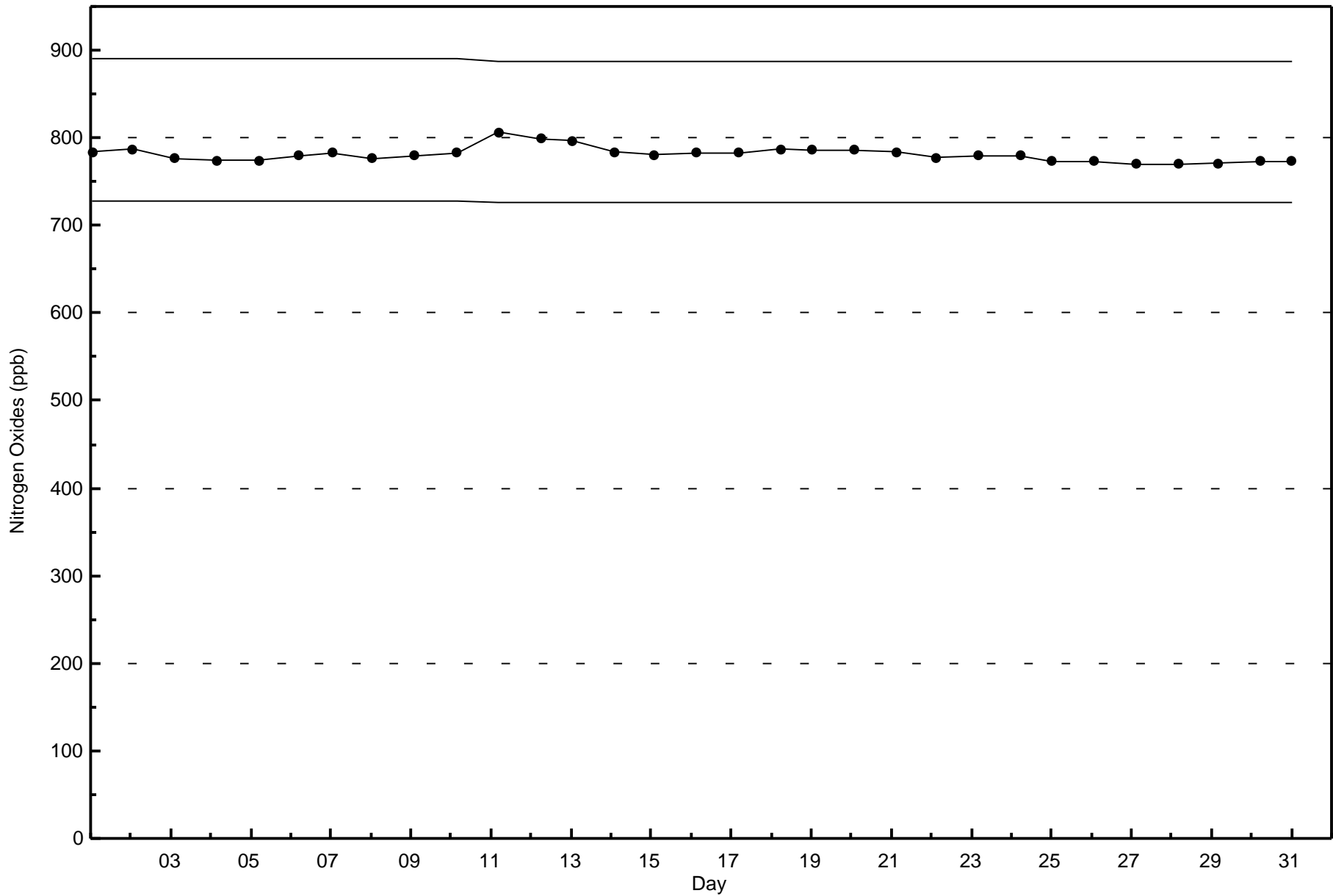
Total Number of Valid Hours: 705





WBEA Data PC
Span Responses

Nitrogen Oxides (NO_x) - ppb
Conklin Community - January 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

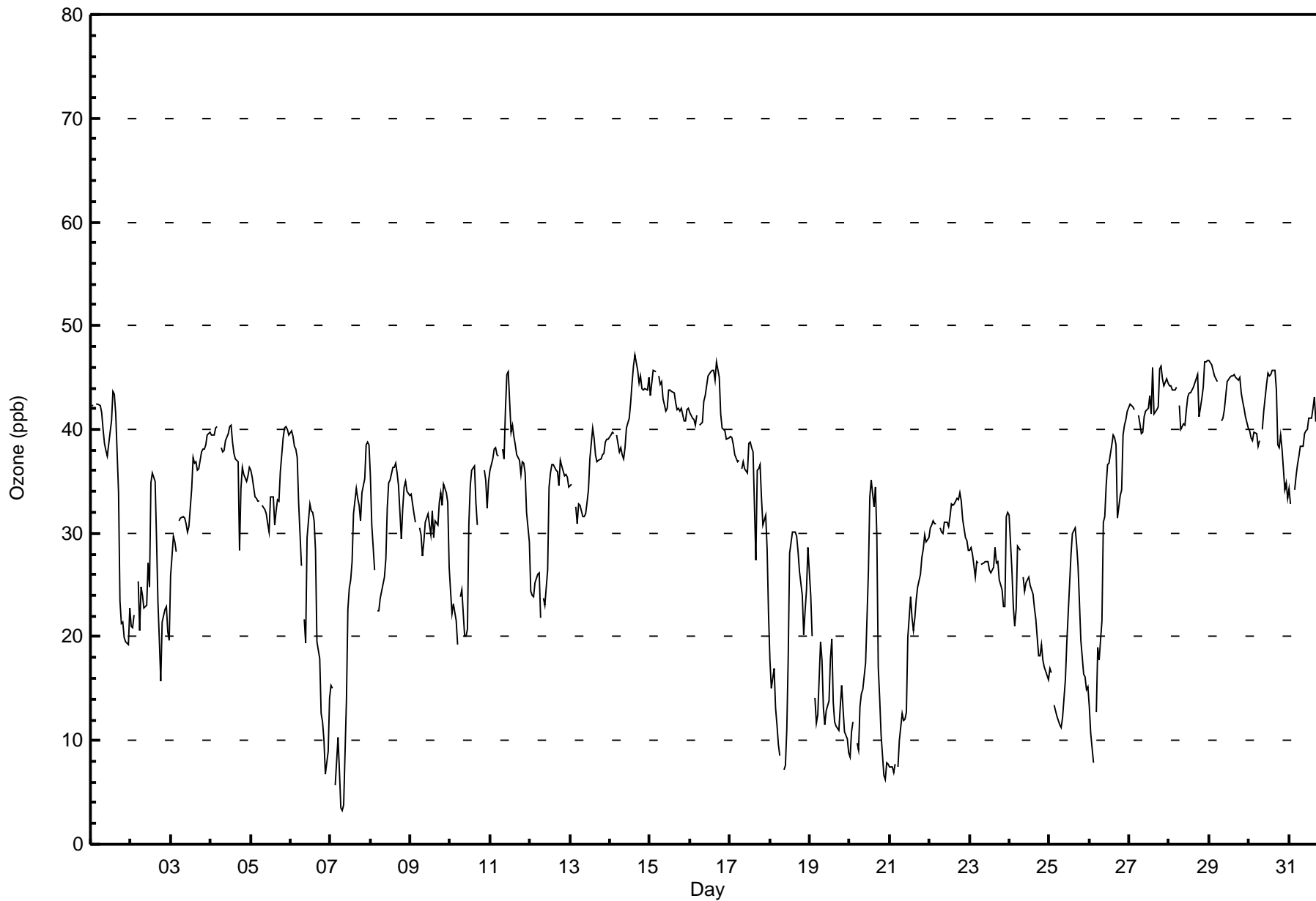
Conklin Community - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 47 ppb on Jan 14 16:00										Maximum Daily Average: 43.9 ppb on Jan 29										Hours of Data: 710						
Minimum Value: 3 ppb on Jan 7 08:00										Minimum Daily Average: 14.3 ppb on Jan 19										Hours of Missing Data: 34						
Maximum Diurnal Average: 36.0 ppb at hour 14										Minimum Diurnal Average: 27.7 ppb at hour 7										Hours of Calibration: 34						
Monthly Average: 31.6 ppb										Percentiles: P ₁ = 7 P ₁₀ = 15 Q ₁ = 25 Median = 34 Q ₃ = 40 P ₉₀ = 44 P ₉₉ = 46										Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	42	42	Z	42	42	42	42	40	39	38	37	40	41	44	43	42	34	23	21	21	20	19	19	23	34.7	44
2-Jan	21	21	22	Z	25	21	25	24	23	23	27	25	35	36	35	29	23	20	16	21	23	23	20	20	24.2	36
3-Jan	26	30	29	28	Z	31	31	32	32	31	30	31	34	37	37	36	36	38	38	38	39	39	40	33.9	40	
4-Jan	39	39	39	40	40	Z	38	38	38	39	40	40	40	39	38	37	37	28	34	36	36	35	36	36	37.6	40
5-Jan	36	35	33	33	33	33	Z	33	32	32	31	30	33	33	31	32	33	33	36	39	40	40	40	40	34.5	40
6-Jan	40	39	38	38	37	33	27	Z	22	19	30	33	32	32	31	28	19	18	13	12	10	7	9	14	25.3	40
7-Jan	15	15	Z	6	10	7	4	3	4	14	23	25	25	27	32	34	33	33	31	34	35	38	39	39	22.9	39
8-Jan	36	31	26	Z	22	22	24	25	26	27	32	35	35	36	36	37	36	35	29	32	34	35	34	34	31.3	37
9-Jan	34	33	32	31	Z	30	30	28	29	31	32	31	30	32	30	31	31	33	34	33	35	34	33	27	31.4	35
10-Jan	24	22	23	22	19	Z	24	25	20	20	21	31	35	36	36	33	31	C	C	C	36	35	32	35	28.0	36
11-Jan	36	37	38	38	38	37	Z	38	37	42	45	45	40	40	39	38	38	37	36	37	37	36	32	29	37.9	45
12-Jan	24	24	24	25	26	26	22	Z	24	23	26	34	36	37	37	36	36	35	37	36	36	36	35	34	30.8	37
13-Jan	35	35	Z	33	31	33	33	32	32	32	33	34	37	40	39	38	37	37	37	38	38	39	39	39	35.6	40
14-Jan	39	40	40	Z	39	38	38	38	37	38	40	41	43	44	46	47	46	44	45	44	44	44	44	45	42.0	47
15-Jan	43	44	46	46	Z	45	44	45	43	42	42	44	44	44	44	43	42	42	42	42	41	41	42	42	43.1	46
16-Jan	42	41	41	40	41	Z	40	41	43	43	44	45	46	46	46	45	47	45	42	40	40	40	39	39	42.4	47
17-Jan	39	39	39	38	37	37	Z	36	37	36	36	39	39	38	38	27	36	36	37	33	31	32	28	22	35.2	39
18-Jan	18	15	17	13	12	10	9	Z	7	8	11	18	28	30	30	30	30	28	26	24	20	23	25	29	20.0	30
19-Jan	24	20	Z	14	12	12	19	18	13	11	13	14	18	20	14	12	11	11	13	15	13	11	10	9	14.3	24
20-Jan	8	11	12	Z	10	9	13	14	15	18	22	26	34	35	33	34	30	17	14	11	7	6	8	8	17.1	35
21-Jan	8	8	7	8	Z	8	10	13	12	12	13	20	24	22	21	22	24	25	26	28	29	30	29	30	18.4	30
22-Jan	30	31	31	31	31	Z	31	30	30	31	31	31	32	33	33	33	33	33	34	33	31	30	29	28	31.3	34
23-Jan	28	29	28	26	27	27	Z	27	27	27	27	27	26	26	27	29	27	27	25	25	23	23	32	32	27.1	32
24-Jan	32	26	23	21	23	29	28	Z	26	24	25	26	25	24	24	23	22	18	18	19	18	17	16	16	22.8	32
25-Jan	17	17	Z	13	12	12	11	11	12	16	19	22	25	28	30	30	29	27	23	20	16	16	15	15	19.1	30
26-Jan	13	11	8	Z	13	19	18	22	31	32	35	37	37	38	39	39	38	31	34	34	39	40	41	42	30.0	42
27-Jan	42	42	42	42	Z	41	41	40	40	41	42	42	43	41	46	41	42	42	46	46	45	44	45	45	42.7	46
28-Jan	44	44	44	44	44	Z	42	40	41	40	42	43	43	44	44	44	45	45	41	43	44	47	46	47	43.6	47
29-Jan	47	46	46	45	45	45	Z	41	41	42	43	45	45	45	45	45	45	45	45	44	43	42	41	40	43.9	47
30-Jan	40	39	39	40	40	38	39	Z	40	42	44	45	45	45	46	46	44	38	38	40	38	34	35	33	40.4	46
31-Jan	34	33	Z	34	36	37	37	38	38	40	40	40	41	41	42	43	41	41	41	41	40	38	36	38	38.7	43
30.9 30.3 30.7 30.4 28.7 27.8 27.7 29.6 28.7 29.5 31.5 33.5 35.2 36.0 35.8 35.0 34.0 32.2 31.7 32.0 31.6 31.4 31.3 31.2																								Diurnal Average		
47 46 46 46 45 45 44 45 43 43 45 45 46 46 46 47 47 45 46 46 45 47 46 47																								Diurnal Maximum		
Z - zerospan C - Calibration																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																										



WBEA Data PC
Hourly Averages

Ozone (O₃) - ppb
Conklin Community - January 2017





WBEA Data PC
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Conklin Community - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	117	16.48	16.48
21 - 50	593	83.52	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



WBEA Data PC
Frequency Distribution

Ozone (O₃) - ppb
Conklin Community - January 2017

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	1	2	1	0	0	1	16	23	11	23	8	1	2	5	10	11	115
21 - 50	46	28	3	1	3	3	11	18	28	83	134	27	51	57	39	60	592
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
Totals	47	30	4	1	3	4	27	41	39	106	142	28	53	62	49	71	707

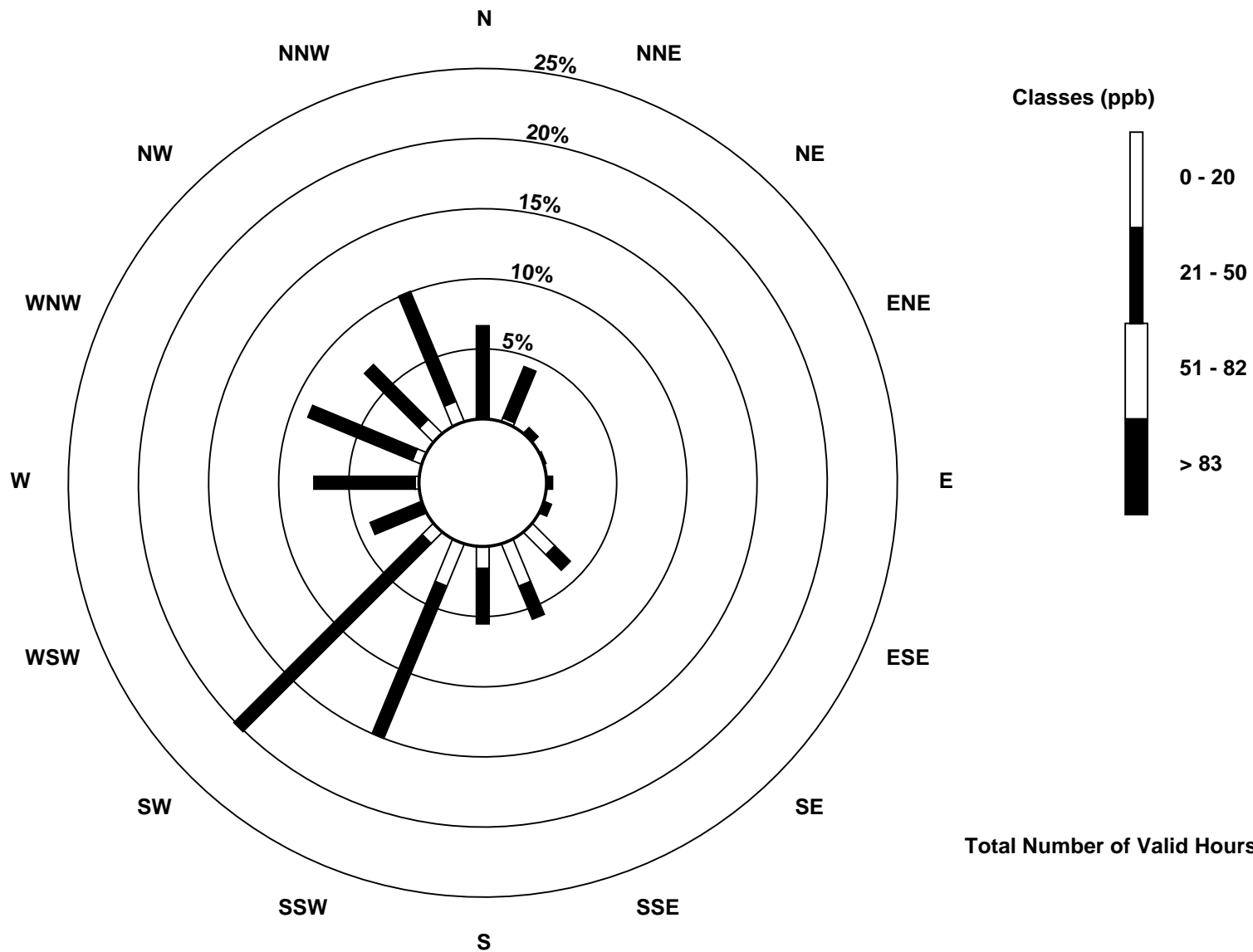
Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Ozone (O₃) - ppb
Conklin Community (AMS 21)

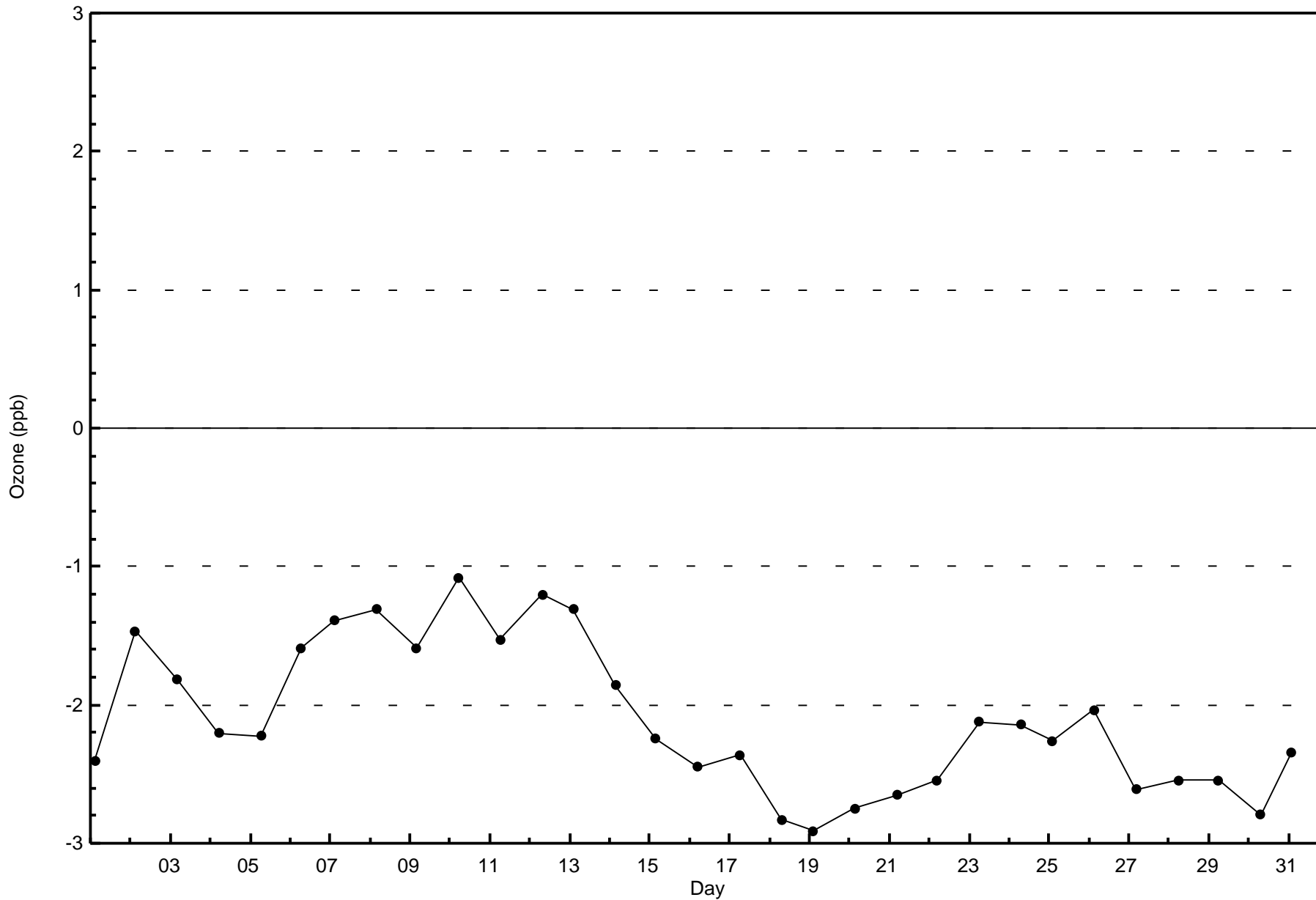


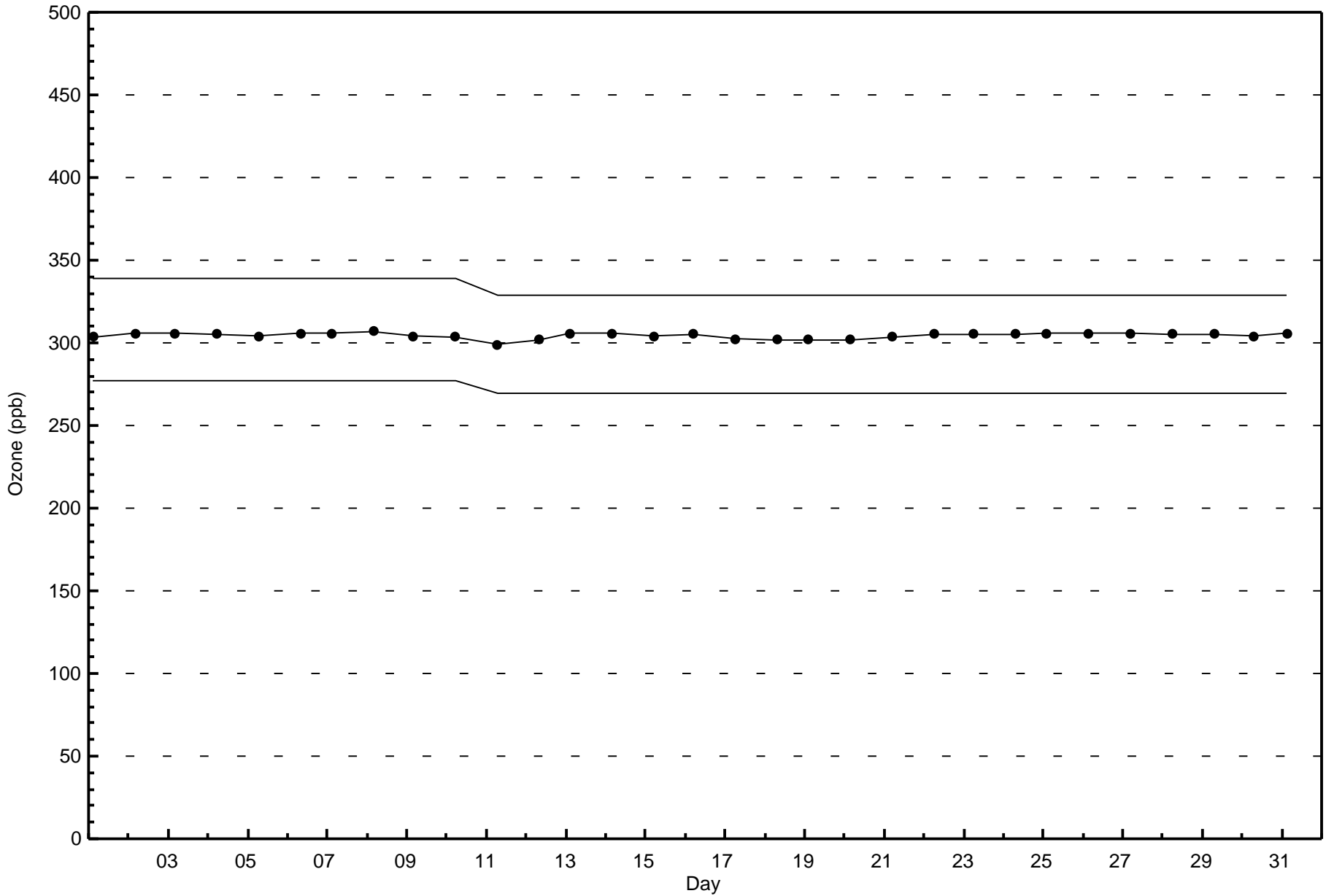
Total Number of Valid Hours: 707



WBEA Data PC
Zero Responses

Ozone (O₃) - ppb
Conklin Community - January 2017





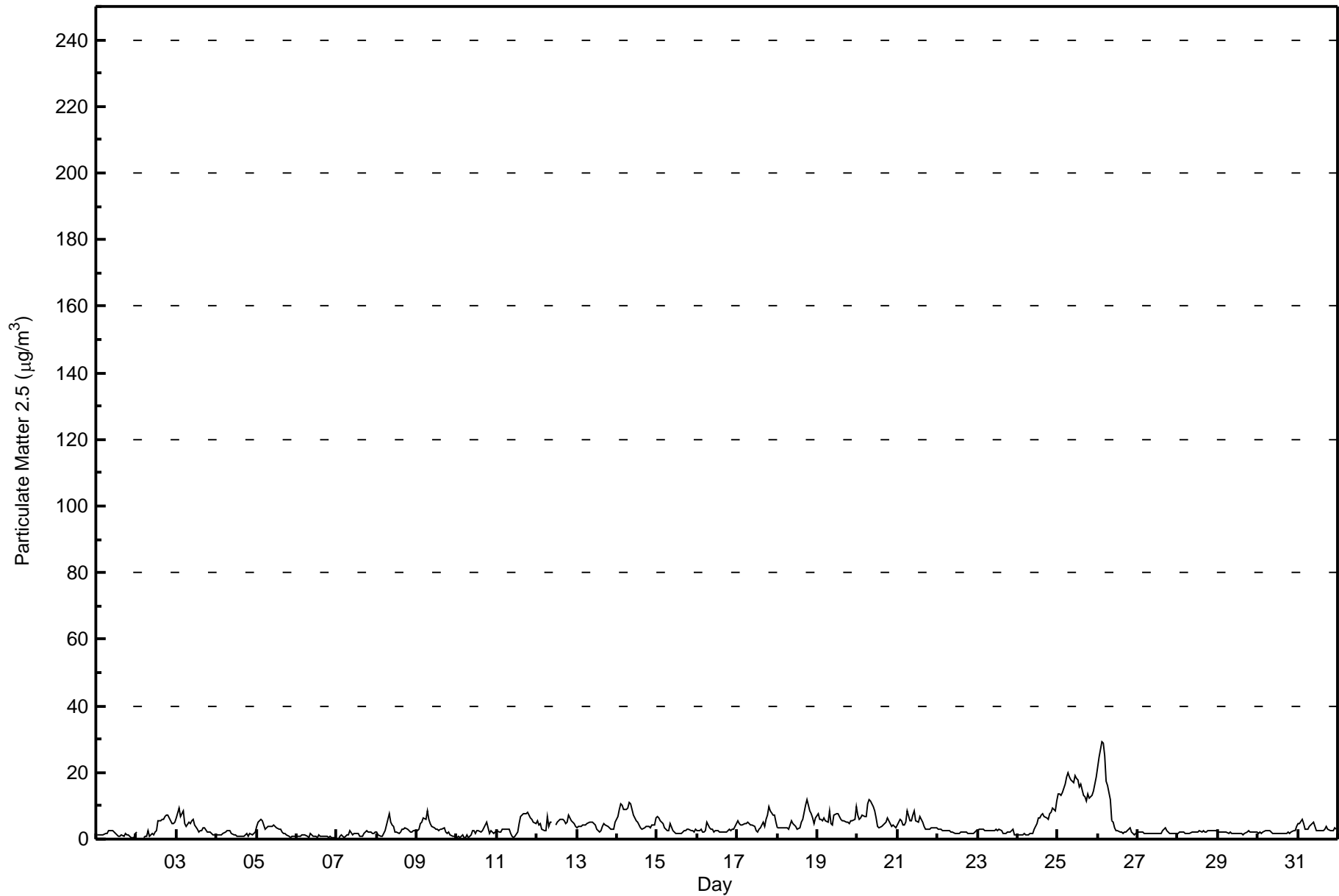


Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 29.2 µg/m ³ on Jan 26 03:00 Minimum Value: 0.2 µg/m ³ on Jan 7 02:00 Maximum Diurnal Average: 4.7 µg/m ³ at hour 7 Monthly Average: 3.96 µg/m ³		Maximum Daily Average: 15.6 µg/m ³ on Jan 25 Minimum Daily Average: 0.9 µg/m ³ on Jan 6 Minimum Diurnal Average: 3.3 µg/m ³ at hour 13 Percentiles: P ₁ = 0.4 P ₁₀ = 1.2 Q ₁ = 1.9 Median = 2.7 Q ₃ = 4.9 P ₉₀ = 7.5 P ₉₉ = 18.1		Hours in Service: 744 Hours of Data: 740 Hours of Missing Data: 4 Hours of Calibration: 1 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-Jan	1.5	1.2	1.1	1.1	1.4	1.7	1.8	2.3	2.4	2.4	2.5	1.8	1.3	0.9	0.9	1.1	0.9	1.9	1.1	1.1	0.8	0.4	0.6	1.5	1.4	2.5
2-Jan	2.0	UO	0.2	UO	0.4	0.8	0.7	2.6	0.9	1.7	1.2	2.3	2.4	5.4	5.7	5.9	6.0	6.9	7.3	7.2	5.5	4.9	4.6	4.9	3.6	7.3
3-Jan	6.2	9.3	6.9	7.8	8.5	4.5	3.9	5.1	4.8	5.4	5.7	4.4	3.1	2.2	2.4	2.5	3.4	3.3	2.3	2.2	2.1	1.6	1.2	1.3	4.2	9.3
4-Jan	1.4	1.4	1.2	1.4	1.7	2.2	2.7	2.6	2.3	1.7	1.5	1.1	0.9	0.8	0.8	0.6	0.7	1.3	1.9	0.9	1.6	1.5	1.5	2.1	1.5	2.7
5-Jan	3.7	4.9	5.8	5.4	4.2	3.2	3.2	3.9	4.0	3.9	4.2	3.7	3.5	3.1	3.1	2.2	1.8	1.7	1.1	0.6	0.6	0.7	0.8	0.9	2.9	5.8
6-Jan	0.9	1.0	1.0	1.3	1.2	1.2	1.0	0.4	1.7	1.5	0.9	1.0	0.6	1.4	1.0	0.9	0.8	0.7	0.7	0.4	1.0	0.2	0.5	0.4	0.9	1.7
7-Jan	UO	0.2	0.7	1.2	0.6	0.9	1.4	1.2	2.6	1.3	1.6	1.8	1.8	1.8	0.9	0.8	1.6	2.3	2.5	2.3	1.9	1.7	1.9	2.2	1.5	2.6
8-Jan	2.0	1.4	1.0	0.9	1.6	2.4	4.1	7.5	5.2	4.4	3.7	2.3	2.2	1.8	2.0	2.8	3.1	3.3	2.8	2.4	2.3	2.3	2.5	2.5	2.8	7.5
9-Jan	2.4	3.2	4.5	4.9	6.6	5.9	8.7	6.1	4.7	3.9	3.2	3.1	2.9	2.7	2.8	2.9	3.5	2.0	1.7	2.1	1.2	0.9	0.8	0.8	3.4	8.7
10-Jan	0.3	0.8	0.5	1.4	0.6	0.4	1.2	0.4	1.2	2.7	2.7	1.7	2.7	2.5	2.3	2.6	3.4	4.3	5.2	1.8	2.4	2.1	1.8	2.1	2.0	5.2
11-Jan	2.5	2.1	2.3	2.9	2.9	3.1	2.9	3.1	1.8	0.9	0.6	0.7	2.1	4.7	6.8	7.2	7.6	7.8	8.3	7.3	6.4	6.1	5.0	4.7	4.2	8.3
12-Jan	5.4	4.3	4.5	3.1	2.7	2.7	7.0	3.7	4.9	5.0	C	4.4	5.2	5.7	6.1	5.8	5.4	4.5	5.1	7.3	5.5	5.1	4.5	3.9	4.9	7.3
13-Jan	3.4	3.7	3.8	4.1	4.3	4.2	4.7	5.2	5.2	5.0	4.8	4.2	3.1	2.0	2.7	3.9	4.7	4.2	3.9	3.4	3.0	2.8	2.8	5.0	3.9	5.2
14-Jan	6.9	9.0	10.8	10.0	8.8	9.0	9.1	10.8	10.6	8.9	7.0	5.6	5.2	4.3	3.4	2.9	3.5	4.0	3.7	3.9	3.5	4.1	4.1	6.4	6.5	10.8
15-Jan	6.7	6.4	5.6	4.6	3.5	2.9	2.6	2.4	4.5	2.7	2.3	1.6	1.7	1.8	1.7	2.3	2.3	2.7	2.9	2.8	2.5	2.4	2.3	3.0	3.1	6.7
16-Jan	2.6	2.6	3.0	2.2	2.1	2.6	5.0	3.3	3.1	2.9	2.3	2.5	2.3	2.2	2.2	2.0	1.9	2.1	2.3	3.0	2.5	3.1	2.9	4.5	2.7	5.0
17-Jan	5.6	4.8	4.3	4.1	4.7	4.8	5.0	4.7	4.1	4.1	3.8	2.6	2.1	3.1	3.2	5.2	3.7	6.1	7.3	9.9	8.4	7.1	7.3	5.1	5.0	9.9
18-Jan	3.4	3.5	3.4	3.5	3.3	3.4	3.2	3.1	5.4	4.6	4.1	3.7	2.9	3.4	5.0	5.9	8.3	10.1	11.8	8.4	7.7	6.5	4.8	6.2	5.2	11.8
19-Jan	7.6	6.1	5.8	5.5	6.5	5.7	5.1	8.3	4.5	4.3	7.3	7.8	7.7	6.6	6.1	5.7	5.5	5.2	4.9	4.8	5.4	5.6	6.0	9.6	6.1	9.6
20-Jan	7.1	6.1	6.3	7.1	6.7	6.6	10.8	11.9	11.6	9.7	8.4	6.4	3.7	3.4	3.9	4.4	4.7	4.9	6.2	5.5	3.9	4.2	3.8	3.3	6.3	11.9
21-Jan	4.0	6.0	5.4	4.3	4.2	4.9	8.5	5.6	5.4	7.1	8.4	5.7	4.9	6.8	6.1	4.9	3.8	3.0	3.1	2.8	3.2	3.3	3.4	3.3	4.9	8.5
22-Jan	3.0	3.0	2.8	2.5	2.3	2.5	2.5	2.4	2.1	2.0	1.9	1.9	1.8	1.8	2.0	2.0	1.9	2.1	1.8	1.9	1.8	1.9	2.2	2.7	2.2	3.0
23-Jan	2.4	2.9	2.9	2.8	2.7	2.7	2.6	2.7	2.7	2.3	2.5	2.8	2.7	2.9	2.5	1.9	1.8	1.9	2.0	2.3	2.7	3.0	1.5	1.4	2.4	3.0
24-Jan	1.3	1.3	1.2	1.4	1.6	1.3	1.2	1.9	1.6	1.9	3.0	4.5	6.5	6.2	7.1	7.7	6.9	6.2	5.9	7.6	8.2	9.4	8.7	11.5	4.8	11.5
25-Jan	13.7	13.6	13.0	14.0	16.7	18.7	19.7	18.5	17.6	17.0	18.9	18.3	17.6	15.6	16.5	12.9	12.6	11.5	13.6	12.1	13.0	14.5	16.7	18.8	15.6	19.7
26-Jan	21.5	24.5	29.2	28.6	24.8	17.5	16.0	11.9	5.7	5.3	3.3	2.7	2.6	2.3	2.1	1.8	2.1	1.9	2.8	3.4	2.1	1.7	1.5	1.8	9.0	29.2
27-Jan	2.1	2.3	2.3	2.0	1.8	1.8	1.8	1.7	1.7	1.7	1.7	1.6	1.6	1.9	1.8	2.6	3.4	2.5	2.0	1.7	1.8	1.8	1.7	1.7	2.0	3.4
28-Jan	1.7	2.2	2.3	2.2	1.8	1.7	1.7	1.9	2.0	2.1	2.1	2.2	2.1	2.4	2.2	2.4	2.1	2.1	2.5	2.5	2.6	2.5	2.5	2.4	2.2	2.6
29-Jan	2.2	2.1	2.0	2.1	2.2	1.9	1.8	2.2	1.9	1.6	1.7	1.6	1.7	1.8	1.5	1.3	1.6	2.0	2.6	2.1	2.1	2.2	2.2	2.1	1.9	2.6
30-Jan	1.9	1.9	1.8	1.9	2.5	2.7	2.4	2.4	2.1	1.8	1.6	1.6	1.6	1.6	1.7	1.7	1.8	1.7	2.0	1.8	2.0	2.7	2.6	3.8	2.1	3.8
31-Jan	4.8	4.5	6.1	4.7	3.2	3.0	3.1	3.9	4.5	5.3	3.9	2.5	2.5	2.7	2.7	2.7	3.1	4.0	2.8	2.6	2.6	2.7	3.3	2.8	3.5	6.1
																								Diurnal Average		
																								Diurnal Maximum		
4.3 4.5 4.6 4.6 4.4 4.1 4.7 4.6 4.3 4.0 3.9 3.5 3.3 3.4 3.5 3.5 3.7 3.8 4.0 3.8 3.6 3.5 3.4 4.0 21.5 24.5 29.2 28.6 24.8 18.7 19.7 18.5 17.6 17.0 18.9 18.3 17.6 15.6 16.5 12.9 12.6 11.5 13.6 12.1 13.0 14.5 16.7 18.8																										
C - Calibration UO - Unstable Operation Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																										



WBEA Data PC
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Conklin Community - January 2017





WBEA Data PC
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Conklin Community - January 2017

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	536	72.43	72.43
6 - 15	126	17.03	89.46
16 - 25	18	2.43	91.89
26 - 80	2	0.27	92.16
> 81.0	0	0.00	92.16

Total Number of Valid Hours: 740

Total Number of Hours: 744



WBEA Data PC
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Conklin Community - January 2017

Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	39	29	3	1	3	3	15	24	15	65	108	27	50	59	41	52	534
6 - 15	3	0	1	0	0	1	6	15	15	26	32	3	2	3	3	16	126
16 - 25	0	0	0	0	0	0	0	0	2	10	6	0	0	0	0	0	18
26 - 80	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	42	29	4	1	3	4	21	39	32	103	146	30	52	62	44	68	680

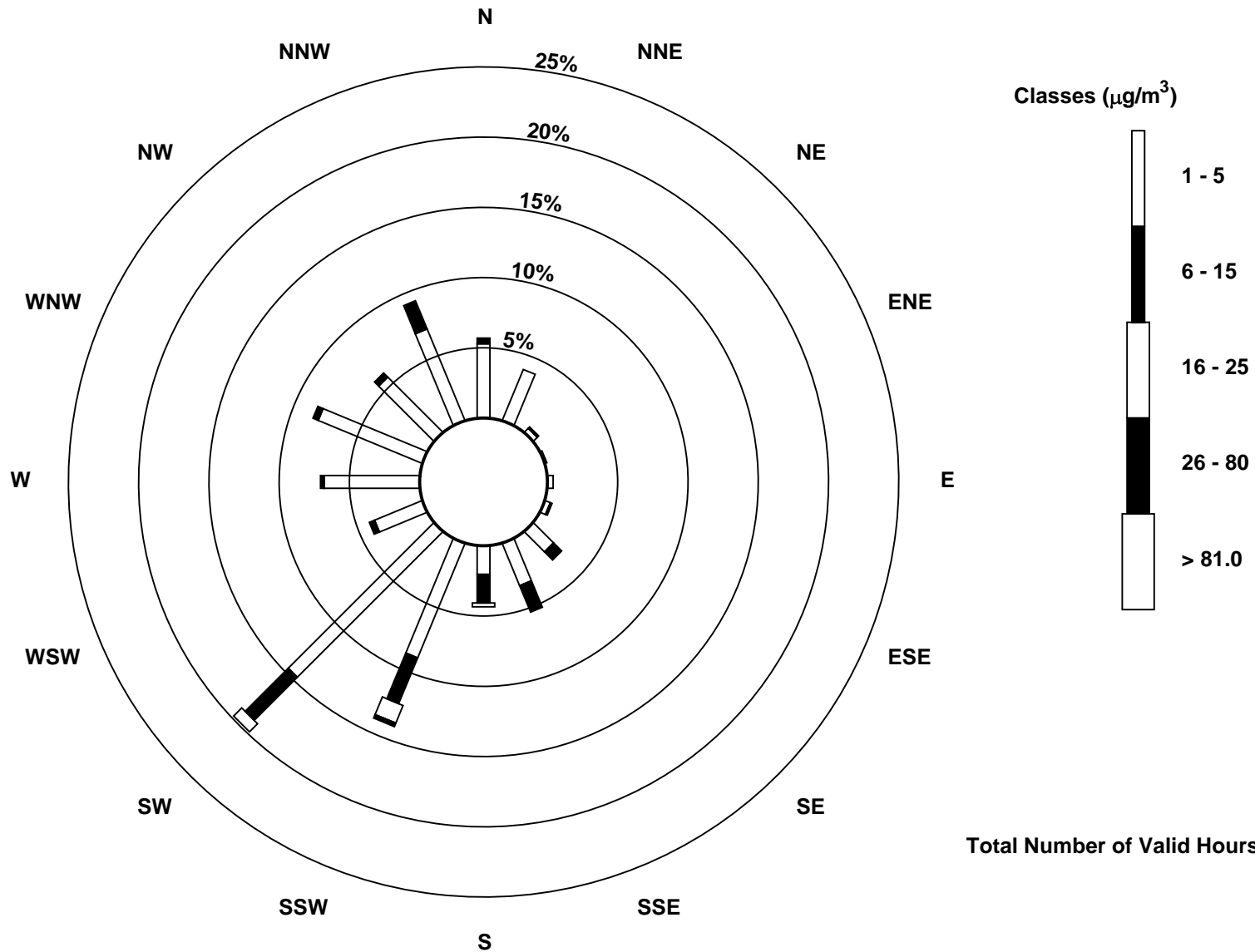
Total Number of Valid Hours: 737

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Conklin Community (AMS 21)



Total Number of Valid Hours: 737



Wood Buffalo Environmental Association
Summary of Hour Averages

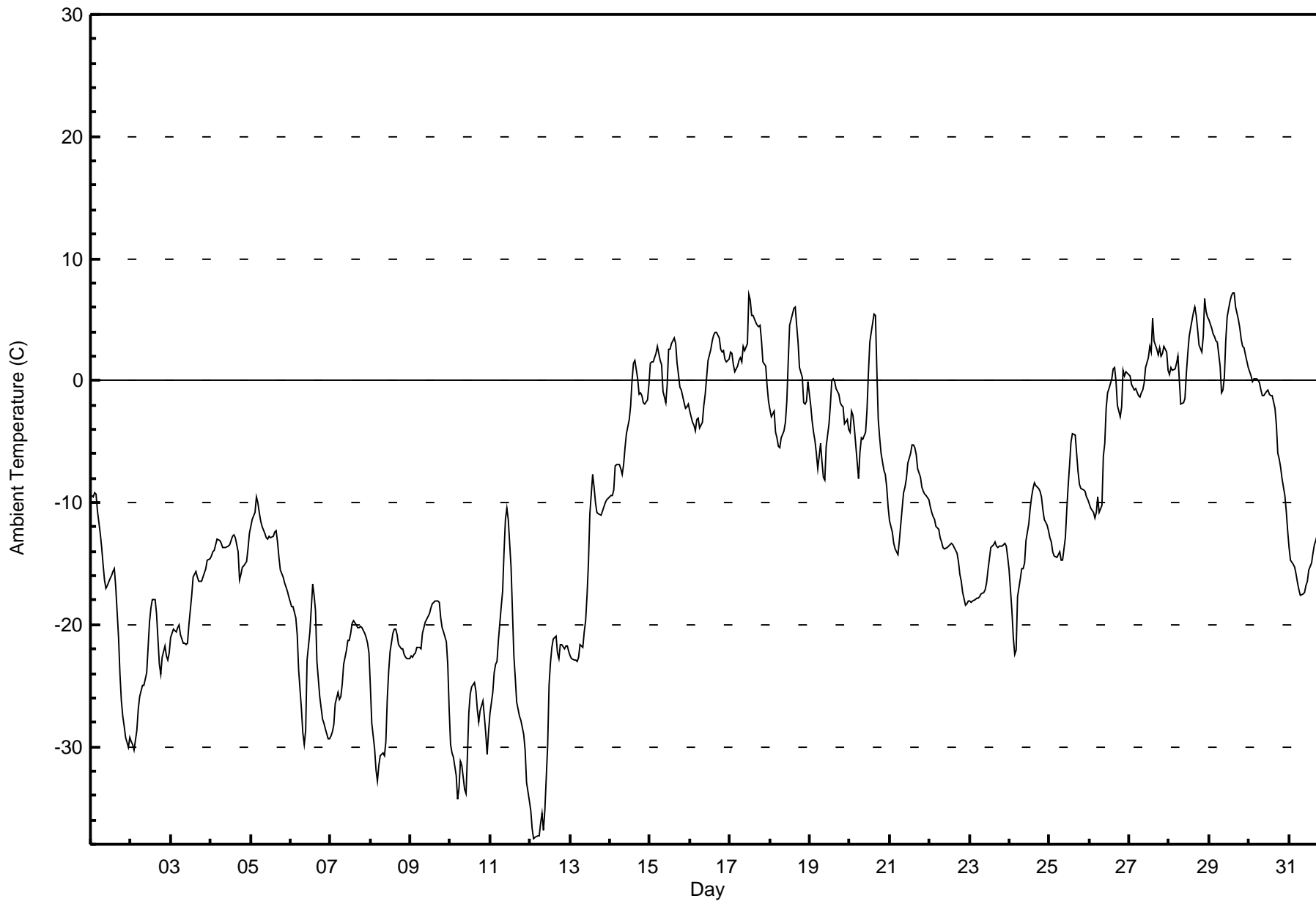
Ambient Temperature (AT) - C
Conklin Community - January 2017

Maximum Value: 7.2 C on Jan 29 15:00 Maximum Daily Average: 3.6 C on Jan 29		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																									
Minimum Value: -37.6 C on Jan 12 03:00 Minimum Daily Average: -29.3 C on Jan 10 Maximum Diurnal Average: -7.9 C at hour 15 Minimum Diurnal Average: -13.8 C at hour 8 Monthly Average: -11.65 C Percentiles: P ₁ = -35.5 P ₁₀ = -26.2 Q ₁ = -20.3 Median = -12.6 Q ₃ = -1.8 P ₉₀ = 2.3 P ₉₉ = 6.4																											
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-Jan	-9.4	-9.6	-9.2	-9.3	-10.7	-12.5	-13.7	-15.1	-16.4	-17.0	-16.8	-16.2	-16.0	-15.6	-15.4	-16.9	-21.1	-24.1	-26.2	-27.5	-28.3	-29.3	-30.0	-29.3	-18.1	-9.2	
2-Jan	-29.6	-29.9	-30.3	-28.7	-26.9	-26.0	-25.5	-25.0	-25.0	-24.0	-21.9	-19.8	-18.7	-17.9	-17.9	-19.1	-21.2	-23.3	-24.1	-22.6	-21.7	-22.6	-22.9	-22.3	-23.6	-17.9	
3-Jan	-21.1	-20.4	-20.5	-20.6	-20.3	-20.0	-20.8	-21.5	-21.5	-21.7	-21.5	-20.1	-17.6	-16.1	-15.8	-15.7	-16.1	-16.4	-16.5	-16.1	-15.8	-15.4	-14.8	-14.6	-18.4	-14.6	
4-Jan	-14.4	-14.1	-13.9	-13.4	-13.0	-13.1	-13.3	-13.6	-13.7	-13.7	-13.6	-13.5	-13.1	-12.7	-12.6	-12.9	-12.8	-12.4	-12.9	-14.0	-16.4	-15.8	-15.3	-15.2	-14.9	-13.8	-12.6
5-Jan	-11.9	-11.4	-10.8	-9.5	-10.0	-10.8	-11.5	-12.0	-12.6	-12.9	-13.0	-12.7	-12.9	-12.8	-12.4	-12.3	-13.2	-14.5	-15.5	-16.1	-16.6	-16.9	-17.3	-17.7	-13.2	-9.5	
6-Jan	-18.5	-18.6	-19.0	-19.5	-20.8	-23.7	-27.0	-28.9	-29.8	-28.7	-22.9	-20.6	-18.7	-16.6	-17.6	-18.8	-23.0	-25.9	-26.8	-27.7	-28.0	-28.5	-29.3	-29.4	-23.7	-16.6	
7-Jan	-29.1	-28.7	-28.2	-26.5	-25.5	-26.2	-25.9	-24.9	-23.2	-22.1	-21.3	-21.3	-20.8	-19.9	-19.6	-20.1	-20.3	-20.2	-20.1	-20.3	-20.7	-21.1	-21.5	-22.3	-22.9	-19.6	
8-Jan	-25.1	-28.0	-30.2	-31.9	-32.8	-31.6	-30.8	-30.5	-30.8	-29.6	-26.1	-23.8	-22.2	-20.7	-20.4	-20.3	-20.9	-21.7	-22.0	-22.0	-22.4	-22.6	-22.8	-22.8	-25.5	-20.3	
9-Jan	-22.5	-22.6	-22.4	-22.3	-21.8	-21.9	-21.9	-20.7	-20.3	-19.8	-19.4	-19.0	-18.7	-18.3	-18.2	-18.0	-18.1	-18.1	-19.4	-20.3	-20.6	-21.4	-23.2	-27.0	-20.7	-18.0	
10-Jan	-29.8	-30.5	-30.9	-32.4	-34.3	-33.4	-31.2	-31.6	-33.5	-33.9	-30.6	-27.2	-25.7	-25.1	-24.8	-25.4	-26.9	-27.9	-27.1	-26.2	-27.5	-28.9	-30.6	-28.8	-29.3	-24.8	
11-Jan	-27.3	-25.5	-24.0	-23.3	-23.0	-21.2	-18.5	-17.2	-14.0	-11.4	-10.4	-11.3	-15.3	-19.0	-22.5	-24.4	-26.4	-27.5	-27.9	-28.5	-29.0	-30.3	-32.9	-34.4	-22.7	-10.4	
12-Jan	-35.2	-36.7	-37.6	-37.4	-37.3	-37.3	-36.2	-35.5	-36.8	-35.2	-29.9	-25.0	-23.1	-21.9	-21.2	-20.9	-22.3	-22.8	-21.6	-21.6	-22.0	-21.7	-21.7	-22.2	-28.5	-20.9	
13-Jan	-22.5	-22.8	-22.9	-22.9	-23.0	-22.7	-21.6	-21.9	-20.6	-19.6	-17.6	-14.9	-10.9	-7.7	-8.7	-10.1	-10.8	-11.0	-11.1	-10.7	-10.4	-10.0	-9.8	-9.7	-15.6	-7.7	
14-Jan	-9.5	-9.5	-8.9	-7.0	-6.9	-6.9	-7.3	-7.7	-6.9	-5.5	-4.3	-3.2	-2.0	0.0	1.4	1.7	0.2	-1.1	-1.0	-1.2	-1.8	-1.9	-1.6	-0.3	-3.8	1.7	
15-Jan	1.5	1.5	1.6	2.2	2.8	2.2	1.6	1.3	-0.9	-1.8	-0.3	2.6	2.6	3.0	3.5	3.1	1.4	0.5	-0.6	-0.8	-1.8	-2.3	-2.1	-2.0	0.8	3.5	
16-Jan	-2.5	-3.4	-3.7	-4.1	-3.2	-3.1	-3.9	-3.4	-2.0	-1.1	0.2	1.7	2.6	3.2	3.7	4.0	4.0	3.5	2.5	2.3	2.5	1.8	1.5	1.8	0.2	4.0	
17-Jan	2.4	2.2	1.3	0.8	1.1	1.7	1.9	1.5	2.8	2.5	3.0	7.0	6.6	5.4	5.3	4.8	4.5	4.4	4.5	3.2	1.5	1.2	-0.4	-1.7	2.8	7.0	
18-Jan	-2.4	-2.9	-2.5	-4.2	-4.7	-5.4	-5.5	-4.6	-4.1	-3.4	-1.7	1.5	4.5	5.5	6.0	6.0	4.6	3.1	1.0	0.3	-1.8	-1.9	-1.7	-0.1	-0.6	6.0	
19-Jan	-2.0	-3.3	-4.2	-4.9	-5.9	-7.2	-5.1	-6.6	-7.9	-8.1	-5.4	-3.5	-1.9	0.0	0.1	-0.1	-0.7	-1.1	-1.8	-2.0	-2.2	-3.5	-3.2	-3.9	-3.5	0.1	
20-Jan	-4.3	-2.4	-2.8	-3.9	-6.6	-8.0	-5.9	-4.7	-4.9	-4.2	-2.4	0.6	3.1	3.9	5.4	5.3	0.8	-3.2	-4.7	-6.0	-7.4	-7.7	-8.7	-10.3	-3.3	5.4	
21-Jan	-11.4	-12.4	-13.3	-13.8	-14.0	-14.2	-13.1	-10.4	-9.2	-8.7	-8.0	-6.8	-6.0	-5.3	-5.3	-5.5	-6.0	-7.2	-8.0	-8.8	-9.1	-9.4	-9.4	-9.8	-9.4	-5.3	
22-Jan	-10.3	-10.7	-11.1	-11.4	-11.9	-12.2	-12.8	-13.3	-13.7	-13.8	-13.6	-13.6	-13.4	-13.4	-13.4	-13.7	-14.2	-14.9	-15.9	-16.5	-17.3	-18.4	-18.3	-18.1	-14.0	-10.3	
23-Jan	-18.1	-18.2	-18.1	-18.0	-17.8	-17.8	-17.7	-17.5	-17.4	-17.1	-16.5	-15.5	-14.7	-13.7	-13.4	-13.2	-13.5	-13.7	-13.6	-13.5	-13.5	-13.3	-13.5	-14.5	-15.6	-13.2	
24-Jan	-15.5	-18.8	-21.1	-22.5	-22.1	-17.7	-16.2	-15.5	-15.4	-15.0	-13.1	-11.7	-10.4	-9.6	-8.8	-8.4	-8.6	-8.8	-9.1	-9.5	-10.5	-11.4	-11.9	-12.2	-13.5	-8.4	
25-Jan	-12.8	-13.3	-14.0	-14.3	-14.5	-14.3	-14.1	-14.8	-14.7	-12.9	-10.6	-8.6	-6.9	-5.1	-4.3	-4.5	-5.9	-7.5	-8.5	-8.9	-8.9	-9.1	-9.6	-9.8	-10.3	-4.3	
26-Jan	-10.1	-10.4	-10.8	-11.3	-10.8	-9.5	-10.8	-10.2	-6.2	-5.2	-2.3	-1.0	-0.7	0.2	0.9	1.1	-0.1	-2.0	-2.9	-2.1	0.8	0.3	0.7	0.6	-4.2	1.1	
27-Jan	0.3	-0.3	-0.6	-0.7	-0.7	-1.2	-1.3	-1.0	-0.8	-0.2	1.1	1.9	2.8	2.3	5.1	3.3	2.6	2.1	2.7	2.0	2.2	2.8	2.3	0.9	1.1	5.1	
28-Jan	0.5	1.1	0.8	1.0	1.4	2.0	0.0	-1.9	-1.8	-1.4	0.6	2.3	3.6	4.3	5.5	6.0	5.4	4.2	2.9	2.4	3.6	6.7	5.7	5.3	2.5	6.7	
29-Jan	4.9	4.3	3.9	3.7	3.2	3.1	1.2	-1.0	-0.7	0.3	3.3	5.3	6.5	6.9	7.2	7.2	6.0	5.0	4.3	3.3	2.8	2.7	2.1	1.0	3.6	7.2	
30-Jan	0.8	0.4	-0.1	0.1	0.2	0.0	-0.2	-0.8	-1.3	-1.3	-0.9	-0.8	-1.2	-1.3	-1.2	-2.3	-3.7	-6.0	-6.4	-7.1	-8.0	-9.4	-10.7	-12.4	-3.1	0.8	
31-Jan	-13.6	-14.7	-15.1	-15.3	-15.9	-16.6	-17.2	-17.6	-17.5	-17.4	-16.8	-16.4	-15.5	-14.9	-14.2	-13.5	-13.2	-12.7	-13.0	-13.6	-13.2	-13.8	-13.9	-12.5	-14.9	-12.5	
																								Diurnal Average			
																								Diurnal Maximum			



WBEA Data PC
Hourly Averages

Ambient Temperature (AT) - C
Conklin Community - January 2017





WBEA Data PC
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Conklin Community - January 2017

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	190	25.54	25.54
-20 - 0	414	55.65	81.18
0 - 10	140	18.82	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

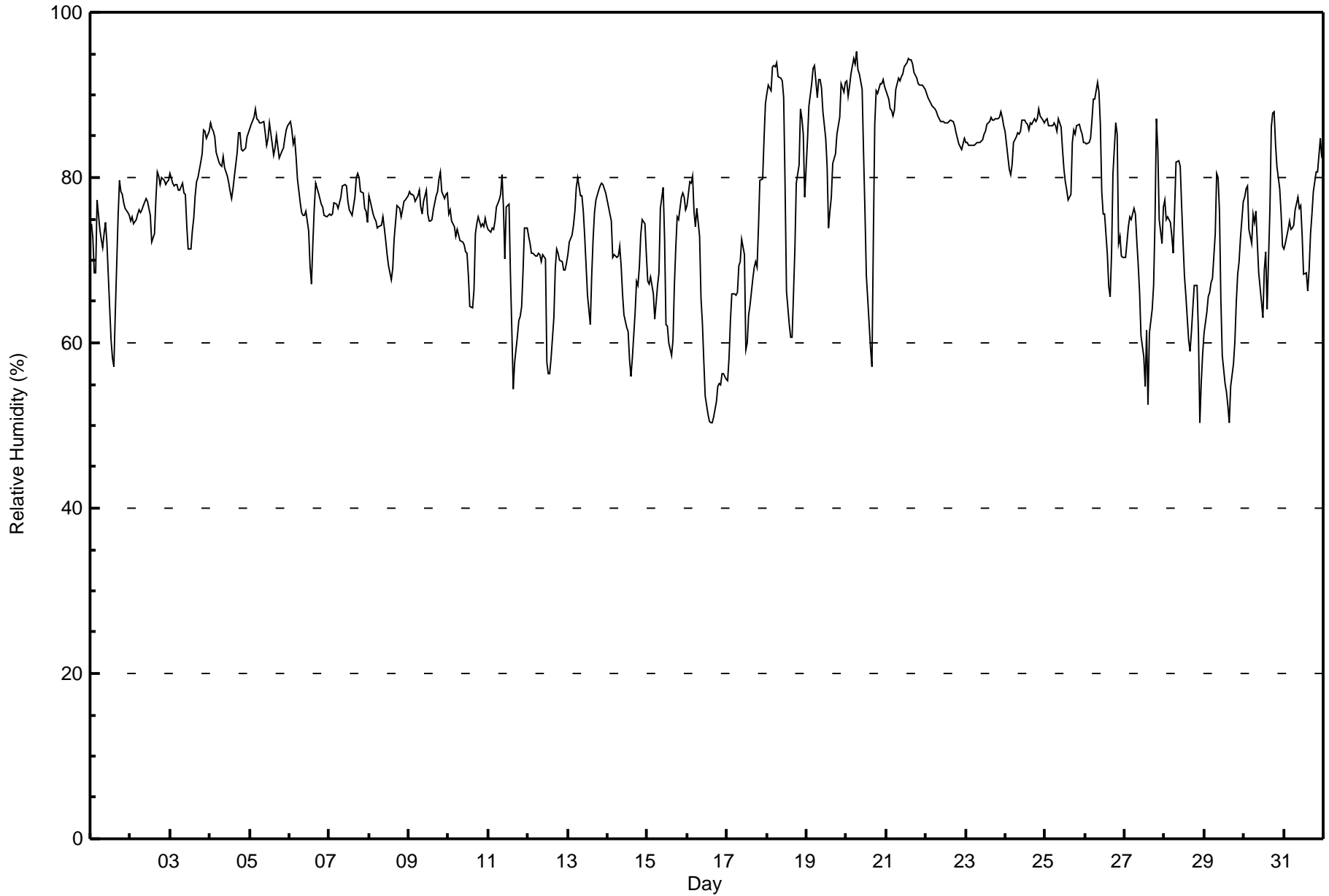
Conklin Community - January 2017

Maximum Value: 95 % on Jan 20 07:00														Maximum Daily Average: 91.5 % on Jan 21														Hours in Service: 744											
Minimum Value: 50 % on Jan 16 16:00														Minimum Daily Average: 62.2 % on Jan 16														Hours of Data: 744											
Maximum Diurnal Average: 79.7 % at hour 8														Minimum Diurnal Average: 68.7 % at hour 15														Hours of Missing Data: 0											
Monthly Average: 76.7 %														Percentiles: P ₁ = 52 P ₁₀ = 63 Q ₁ = 71 Median = 77 Q ₃ = 85 P ₉₀ = 88 P ₉₉ = 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-Jan	74	73	68	68	77	74	73	72	73	75	72	64	60	58	57	63	75	80	78	78	77	76	76	75	71.6	80													
2-Jan	75	75	74	75	76	76	76	76	77	77	77	76	75	72	73	77	81	80	79	80	80	79	79	80	76.9	81													
3-Jan	80	79	79	79	79	78	78	79	78	78	74	71	71	74	75	78	79	80	82	83	86	86	85	86	79.1	86													
4-Jan	87	86	86	85	83	82	81	81	82	81	80	79	78	77	79	80	83	85	85	83	83	84	85	85	82.6	87													
5-Jan	86	86	87	88	87	87	87	87	87	85	84	85	87	84	83	84	85	84	82	83	84	85	86	86	85.3	88													
6-Jan	87	86	84	85	83	80	77	76	75	75	76	73	69	67	72	76	79	78	78	77	77	76	75	75	77.3	87													
7-Jan	76	76	76	77	77	76	77	78	79	79	79	77	76	76	75	78	80	80	80	78	78	76	76	75	77.2	80													
8-Jan	78	77	76	75	75	74	74	74	75	74	72	71	69	68	69	73	75	77	76	75	76	77	77	78	74.3	78													
9-Jan	78	78	78	78	77	78	78	76	76	77	79	76	75	75	75	76	78	78	80	81	78	78	78	78	77.4	81													
10-Jan	76	76	75	74	73	74	73	72	72	72	71	71	68	64	64	66	73	74	75	74	74	74	75	74	72.4	76													
11-Jan	74	73	74	74	75	76	77	78	80	76	70	76	77	68	62	54	58	61	63	63	64	69	74	74	70.4	80													
12-Jan	73	72	71	71	71	71	71	71	70	71	70	58	56	56	58	63	69	71	71	70	70	69	69	70	67.9	73													
13-Jan	71	72	73	74	76	79	80	78	78	76	73	69	66	62	68	73	76	77	78	79	79	79	79	78	74.7	80													
14-Jan	76	76	75	70	71	70	70	72	69	66	63	62	61	58	56	58	64	67	67	69	73	75	74	71	68.1	76													
15-Jan	67	67	68	66	63	65	67	68	76	79	73	62	62	60	58	60	67	71	75	75	78	78	78	76	69.2	79													
16-Jan	77	79	79	80	76	74	76	73	65	62	58	53	51	50	50	51	53	55	55	55	56	56	56	62.2	80														
17-Jan	55	58	63	66	66	66	66	69	70	73	71	59	60	63	65	68	69	70	69	74	80	80	85	89	68.9	89													
18-Jan	90	91	90	93	94	93	94	92	92	92	90	79	66	62	61	61	66	71	79	81	88	87	85	78	82.4	94													
19-Jan	85	89	90	91	93	94	90	92	92	91	88	85	81	74	76	78	82	83	85	86	87	91	90	91	86.8	94													
20-Jan	92	90	91	93	94	94	95	93	93	91	83	76	68	65	59	57	73	86	91	90	91	91	92	91	85.0	95													
21-Jan	91	89	88	88	87	88	91	92	92	92	93	93	94	94	94	94	94	93	92	91	91	91	91	91	91.5	94													
22-Jan	90	90	89	89	89	88	88	88	87	87	87	87	87	87	87	87	87	86	86	85	84	83	84	85	86.9	90													
23-Jan	84	84	84	84	84	84	84	84	84	84	85	85	86	86	87	87	87	87	87	87	87	88	87	86	85.6	88													
24-Jan	86	83	81	80	82	84	85	85	85	86	87	87	87	87	86	87	86	87	87	87	88	88	87	87	85.5	88													
25-Jan	87	87	86	86	86	87	86	86	87	86	83	81	79	79	77	78	84	86	85	86	87	86	85	84	84.4	87													
26-Jan	84	84	84	85	87	89	90	92	90	86	78	76	76	71	67	66	71	81	87	85	72	73	70	70	79.7	92													
27-Jan	70	72	74	75	75	76	76	72	70	66	61	58	55	62	53	61	64	67	75	87	83	75	72	76	69.8	87													
28-Jan	77	75	75	75	73	71	76	82	82	81	77	72	68	66	60	59	61	64	67	67	61	50	55	59	68.9	82													
29-Jan	61	64	66	66	67	68	73	80	80	76	65	58	55	54	52	50	55	58	60	65	68	70	73	77	65.1	80													
30-Jan	78	79	79	74	72	76	75	76	72	69	65	63	69	71	64	76	86	88	88	84	81	79	76	72	75.4	88													
31-Jan	71	72	74	75	74	74	74	76	78	76	77	73	68	69	66	69	73	76	78	81	81	83	85	82	75.2	85													
														78.6	78.7	78.6	78.7	78.7	78.9	79.3	79.7	79.6	78.7	76.1	72.8	71.0	69.6	68.7	70.6	74.5	76.8	78.1	78.8	78.8	78.4	78.7	78.6	Diurnal Average	
														92	91	91	93	94	94	95	93	93	92	93	93	94	94	94	94	94	93	92	91	91	91	92	91	Diurnal Maximum	



WBEA Data PC
Hourly Averages

Relative Humidity (RH) - %
Conklin Community - January 2017





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Conklin Community - January 2017

Maximum Speed: 28 km/h on Jan 11 14:00	Maximum Daily Speed Average: 13.8 km/h on Jan 16	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jan 20 00:00	Minimum Daily Speed Average: 0.3 km/h on Jan 19	Hours of Data: 741
Maximum Diurnal Speed Average: 5.2 km/h at hour 14	Minimum Diurnal Speed Average: 3.0 km/h at hour 8	Hours of Missing Data: 3
Monthly Average Velocity: 3.9 km/h 254.5 deg	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 3 Median = 7 Q ₃ = 10 P ₉₀ = 14 P ₉₉ = 18	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-Jan	NW13WNW10	NW13	NW14	NNW15	NNW12	NNW10	NNW12	NNW10	NW5	NNW7	NW10	NW12	NNW12	NNW9	NW5	W0	SW1	S1	SSE1	SSE2	SE1	S1	SSW4	NW6.6	NNW15	
2-Jan	SW1	SSW2	SSW2	S4	SW2	S2	SSW3	SSW3	S3	SW2	SW3	WNW1	NW6	NW6	NNW4	SSE2	SE0	SSE1	SW2	SSW1	SSW1	SSE1	SSE2	SSE2	SW1.2	NW6
3-Jan	S2	SSW3	SSW3	SSW4	S6	SSW3	S4	SSW4	SW9	SW9	SW8	WSW7	W7	W9	WNW7	WNW9	WNW8	NW8	NW8	WNW7	WNW7	NW8	NW9	W4.7	SW9	
4-Jan	NW8	NW8	NW8	NNW12	NNW14	N13	NNW12	N9	NNW9	NNW9	NNW9	NNW8	NW6	WNW5	W7	W6	WSW4	SSW3	WSW5	SW6	WSW7	SW6	SSW6	SW7	NW5.4	NNW14
5-Jan	SW6	SW5	SSW1	NNW6	N7	N8	NNE8	NNE8	NNE6	NNE8	NE6	NE9	NNE9	NNE7	N6	N5	NNE6	NNE10	N7	N7	NNE7	N6	NNW5	N3	NNE5.3	NNE10
6-Jan	NNE4	NNE2	N2	SW3	SW4	SSW3	N1	NNW1	SW1	SE1	SSE3	S2	SE3	SSE1	SE5	SE3	SSW1	AF	SE2	S2	SE3	SSE3	S1	S3	SSE1.1	SE5
7-Jan	SSE3	SSE2	S1	SE2	SSE2	NNW1	NNW3	NNW3	NW2	NNW4	N8	N8	N8	N9	N7	N3	N5	N4	N6	N5	NNE7	N7	NNE5	N3.7	N9	
8-Jan	N3	NNW2	NNW1	NW1	SSW1	SSW2	S4	S3	S4	S5	SW8	SW10	SW8	SW9	SSW9	SSW7	SW6	SSW5	SSW10	SSW10	SSW9	SW9	SW8	SW9	SSW5.4	SW10
9-Jan	SW12	SSW8	SW6	SW6	SW7	SW5	SW4	W4	WNW4	W6	W6	WNW7	WNW6	NW6	NW5	W5	W4	NW6	NW5	NW5	NW4	NW6	NW3	NW3	W4.2	SW12
10-Jan	NNW2	S1	SSW1	S2	SW0	SSE1	SSW3	SW1	WNW0	WNW0	NNW2	NW4	NW7	NW7	NW7	WNW5	W4	SW5	WSW8	WSW9	SW7	SSW5	S6	SW9	WSW2.7	SSW9
11-Jan	SW13	SW12	SW12	SW14	SW15	WSW13	WSW13	SW11	W11	WNW12	NW18	NNW18	N20	NNW28	NNW26	NNW25	NNW23	NNW14	NNW15	NNW12	NNW11	NNW5	NNW3	NNW2	NW9.6	NNW28
12-Jan	SSE1	S2	SSE2	SSE3	SSE3	S5	S5	SSE3	E2	ESE2	E1	ESE4	SSE7	SSE11	SSE12	SSE9	SE7	SE7	SSE11	S12	S11	SSW11	SSW8	SSW8	SSE5.5	SSE12
13-Jan	SSW13	SSW8	SW11	SSW10	SSW9	SSW6	SSW8	SW9	SSW8	SW14	SSW18	SW12	SW10	SW8	SW7	SW9	SW11	SW13	SW12	SW14	SW15	SW15	SW14	SW13	SW11.0	SSW18
14-Jan	SW14	SW13	SW13	SW14	SW15	SW13	SW13	SSW12	SW12	SW15	SW17	SW16	SW16	SW15	SW16	SW14	SSW12	SSW10	SW11	SW11	SSW9	SSW9	SSW9	SSW9	SW12.7	SW17
15-Jan	SW12	SW13	SW12	WSW16	W19	W13	W13	W11	SW8	SW9	SW10	WSW16	W14	W12	W11	W10	SW7	SW9	SW8	SW9	SW10	SW9	SW10	SW11	WSW10.7	W19
16-Jan	SW10	SW8	SW8	SSW8	SW11	SW16	SSW12	SSW14	SW16	SSW15	SSW17	SW16	SW18	SSW19	SSW19	SSW19	SSW17	S14	S14	SSW13	SSW15	SSW16	SSW14	SSW10	SSW13.8	SSW19
17-Jan	S11	SSW17	SSW16	SW14	SW17	SW15	SW16	SW13	SW10	SSW8	SSW9	WSW12	SW9	SW9	SW8	SSW8	SW9	SW8	SW10	SSW9	SSW7	SSW8	SSE4	SE5	SW10.0	SSW17
18-Jan	SE2	SSE3	SE4	SSE1	SSE2	SSE2	SE1	E0	SE1	SE2	SE1	NNE2	SW8	SW8	WSW8	SSW6	SSW8	S6	S2	SSE4	SSE3	SE1	S5	SSW4	S2.8	SSW8
19-Jan	S2	SE3	SSE4	SSE2	NW1	SSE5	SSE6	ESE5	SE4	SSE2	NNW2	W0	WNW0	NW1	NNW3	NNW3	NW3	NNW4	NW2	NNW3	NW1	WNW1	NW2	NE0	SSE0.3	SSE6
20-Jan	SE4	SW5	S3	SSE4	SE4	SSE4	S5	S6	S5	SSW9	S5	SE4	SSW6	SSW6	SSW5	WSW4	E1	NNE0	SSW1	SSE4	SSW2	SE3	SSE3	SSE4	S3.4	SSW9
21-Jan	AF	SSE1	NW1	SSE1	SSW2	W1	NW1	NNW6	NW3	NNW4	NNW5	N7	N7	N6	N7	NNE7	N6	NNW9	NNW8	NNW8	N7	N7	N8	N7	N4.5	NNW9
22-Jan	N8	N7	NNE7	NNE6	NNE5	NNE6	NNE6	NNE6	NNE6	NNE7	NNE5	N6	N6	N6	NNE5	NNE5	NNE5	NE5	NNE5	NNE5	N3	NNE2	NNW3	NNW4	NNE5.4	N8
23-Jan	NNW3	NNW3	NNW3	N3	N2	N2	N3	N3	N2	NNW2	NNW2	WNW1	NW2	NW1	NNW2	N1	ENE2	ESE2	SE1	SSE1	SE1	SW1	SW2	SW2	NNW1.1	NNW3
24-Jan	SW2	NW1	AF	NNE0	SSE1	SSW2	SW2	SW2	S1	S1	SW2	SW3	SW3	WSW3	SW3	WSW3	SW4	SSW3	SSW6	SSW5	S2	SW5	SW5	SSW4	SW2.6	SSW6
25-Jan	SSW2	WSW3	SSE3	SSW3	S3	S5	SSW5	SSW3	SW3	SSW4	SW6	SW6	SW8	SW10	SW9	SW7	SSW4	SSW6	SSW13	SSW12	SSW14	SSW15	SSW16	SSW16	SSW7.0	SSW16
26-Jan	SW17	SSW17	SSW15	SW10	SSW9	SSW7	SSW6	SW5	SW6	WSW5	WNW7	W8	WNW8	WNW10	W9	W7	W5	SW4	SW7	SW10	W14	WNW12	WNW12	W12	WSW7.7	SSW17
27-Jan	WNW9	WNW8	WNW7	WNW8	WNW8	WNW6	WNW8	W9	WSW8	WSW11	W11	WSW9	WSW12	WSW9	W11	SW8	WSW7	SW7	W11	WNW9	WNW7	W12	WNW9	WNW5	W8.1	WSW12
28-Jan	WNW6	WNW8	WNW8	WNW9	W10	W13	SW9	SW9	SW10	SW10	WSW11	WSW13	WSW12	WSW10	SW7	WSW6	SW9	SSW10	SW13	SW15	WSW13	W17	W14	W12	WSW9.5	W17
29-Jan	WNW11	WNW10	WNW10	W12	WNW11	W11	SW8	SSW8	SW9	SSW9	SSW8	WSW8	W12	WSW13	W12	W8	W8	W9	W9	WNW7	WNW6	W8	WNW7	WNW5	W8.2	WSW13
30-Jan	WNW6	WNW6	WNW6	W9	W11	W14	W11	WNW8	WNW11	WNW11	WNW13	NW14	WNW13	WNW11	NW14	WNW13	NW11	NNW10	NNW8	NNW11	NNW11	N15	NNW15	NNW17	NW10.1	NNW17
31-Jan	NNW15	NNW14	NNW13	NNW14	NNW14	NNW13	NNW10	NNW9	NNW7	NNW9	NW6	WNW7	WNW7	W9	W11	WNW8	W7	W6	NW4	WNW4	NW7	NW6	WNW4	NW6	NW7.9	NNW15

WSW4.1 WSW4.0 WSW3.7 WSW3.9 WSW4.1 WSW4.0 WSW3.5 WSW3.0 WSW3.3 WSW3.6 WSW4.1 W4.6 W5.1 W5.2 W5.1 W4.2 WSW3.4 WSW3.0 WSW3.9 WSW3.9 WSW3.7 WSW3.9 WSW3.6 WSW3.6 WSW3.6 WSW17 SSW17 SSW16 WSW16 W19 SW16 SW16 SSW14 SW16 SSW15 NW18 NNW18 N20 NNW28 NNW26 NNW25 NNW23 NNW14 NNW15 SW15 SSW15 W17 NNW15 NNW17

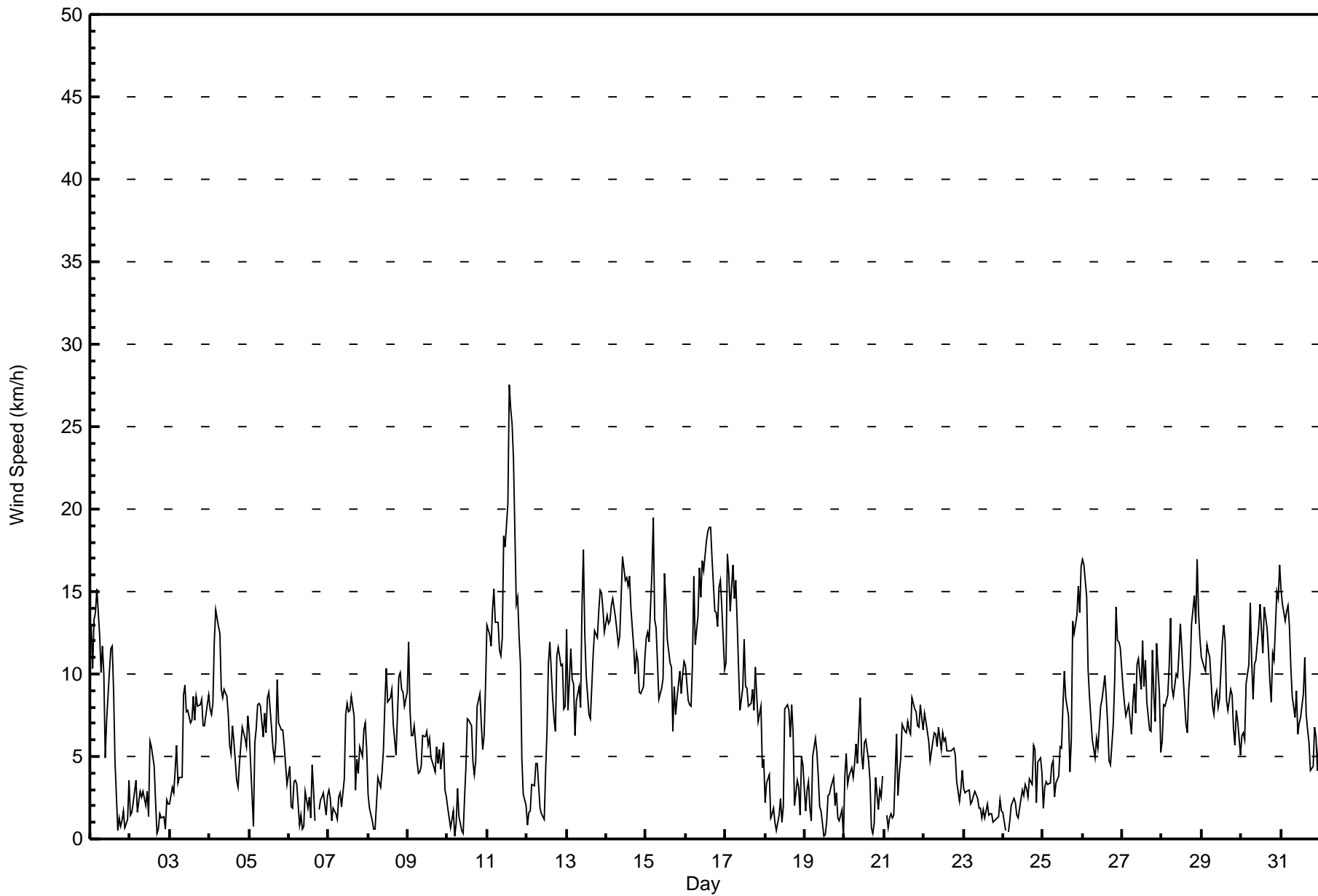
Diurnal Average
Diurnal Maximum

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



WBEA Data PC
Hourly Averages

Wind Speed (WS) - km/h
Conklin Community - January 2017





WBEA Data PC
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Conklin Community - January 2017

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	290	39.14	39.14
6 - 11	311	41.97	81.11
12 - 19	135	18.22	99.33
20 - 28	5	0.67	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 741

Total Number of Hours: 744



WBEA Data PC
Frequency Distribution

Wind Speed (WS) - km/h
Conklin Community - January 2017

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	17	14	2	1	4	4	25	41	32	36	33	7	8	14	24	28	290
6 - 11	29	18	2	0	0	0	2	5	6	45	73	14	31	44	20	22	311
12 - 19	1	0	0	0	0	0	0	1	3	27	44	10	16	6	7	20	135
20 - 28	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	5
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
Totals	48	32	4	1	4	4	27	47	41	108	150	31	55	64	51	74	741

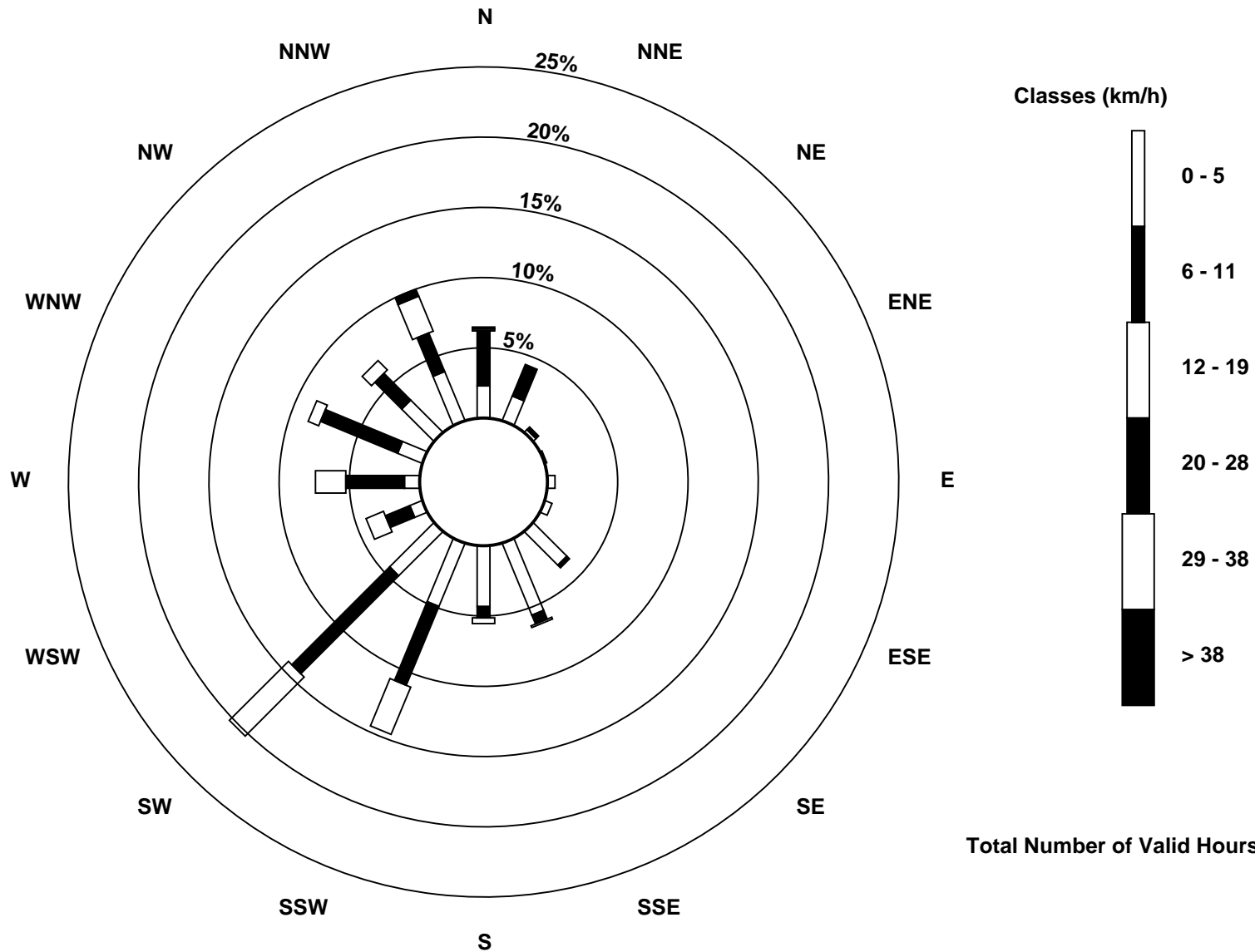
Total Number of Valid Hours: 741

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose Jan 2017

Wind Speed (WS) - km/h
Conklin Community (AMS 21)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Conklin Community - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 8 km/h on Jan 11 15:00	Hours of Data: 741
Minimum Value: 0 km/h on Jan 23 17:00	Hours of Missing Data: 3
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6	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-Jan	5	4	4	5	5	4	3	4	3	3	2	3	4	3	3	2	1	1	1	1	1	1	1	1	5
2-Jan	2	1	1	2	1	1	1	1	1	1	1	2	2	2	3	1	1	1	1	1	1	1	1	1	3
3-Jan	1	1	2	2	1	1	2	2	3	3	2	2	3	3	3	3	3	3	3	3	2	2	2	3	3
4-Jan	3	2	2	5	4	4	4	3	3	3	3	2	2	2	3	3	2	1	2	2	2	3	1	2	5
5-Jan	1	2	1	2	2	2	2	2	2	3	2	2	3	3	2	2	2	4	2	2	2	2	2	1	4
6-Jan	1	2	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	AF	1	1	1	1	1	1	2
7-Jan	1	1	1	1	1	1	1	1	1	2	2	2	3	2	2	4	1	1	1	1	1	2	2	2	4
8-Jan	1	1	1	1	1	1	1	1	1	1	3	2	2	2	3	2	2	1	3	2	2	2	2	3	3
9-Jan	3	3	2	1	2	1	2	2	2	2	2	2	2	2	2	2	1	1	2	2	1	2	2	1	3
10-Jan	1	1	1	1	1	1	2	1	1	1	3	2	3	3	2	2	2	1	3	3	2	2	1	3	3
11-Jan	4	4	3	5	5	4	4	3	4	5	6	6	7	8	8	8	7	4	4	4	3	2	1	1	8
12-Jan	1	1	1	1	1	2	1	1	1	1	1	1	2	3	3	3	1	1	3	4	4	4	4	3	4
13-Jan	5	3	4	3	2	2	2	2	2	4	4	4	3	2	2	3	3	3	3	4	4	4	3	3	5
14-Jan	4	3	3	3	4	3	3	3	3	4	4	4	4	4	5	4	3	3	3	3	2	2	2	3	5
15-Jan	3	3	3	6	5	5	3	4	2	2	2	5	5	4	4	2	2	2	2	3	2	3	3	3	6
16-Jan	3	2	2	2	3	5	3	3	4	4	4	4	5	4	4	5	4	4	3	3	4	4	3	4	5
17-Jan	3	4	5	4	4	4	4	3	3	2	2	4	2	2	2	2	3	2	3	2	1	1	1	1	5
18-Jan	2	1	1	2	1	1	1	2	2	2	3	1	3	3	2	2	2	2	2	2	1	2	3	4	4
19-Jan	2	2	1	2	1	2	2	1	1	1	1	1	1	1	2	1	1	1	2	1	2	1	2	1	2
20-Jan	1	2	1	1	1	1	1	2	1	3	3	1	2	2	2	1	1	1	1	1	2	1	1	1	3
21-Jan	AF	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
22-Jan	2	2	2	2	1	2	2	2	2	2	1	2	2	2	2	1	1	2	2	2	1	1	1	1	2
23-Jan	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	0	1	1	0	1	1	0	1	1
24-Jan	1	1	AF	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	1	2	2	1	3
25-Jan	2	2	1	1	1	2	2	1	1	1	2	2	2	3	3	3	2	2	4	3	4	4	3	4	4
26-Jan	4	4	4	3	2	1	2	2	2	2	3	3	3	4	3	3	3	1	2	4	5	4	5	4	5
27-Jan	4	3	3	3	3	2	3	4	3	4	4	3	5	3	4	2	2	2	4	4	3	5	4	2	5
28-Jan	3	3	3	3	4	4	3	2	3	2	3	3	2	2	2	2	4	3	3	3	5	7	5	5	7
29-Jan	4	4	4	4	5	4	3	2	2	2	2	4	5	4	4	4	2	2	3	3	2	3	3	2	5
30-Jan	3	2	2	3	3	4	4	3	4	4	5	5	5	4	5	5	4	3	2	3	4	4	4	4	5
31-Jan	4	4	4	4	4	4	3	3	2	3	2	3	3	3	4	3	3	2	1	2	2	2	2	2	4
	5	4	5	6	5	5	4	4	4	5	6	6	7	8	8	8	7	4	4	4	5	7	5	5	

Diurnal Maximum

AF - Analyzer Failure



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Conklin Community - January 2017

Direction of Maximum Speed: 344 deg on Jan 11 14:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 207.9 deg on Jan 16	Hours of Data: 741
Direction of Minimum Speed: 41 deg on Jan 20 00:00	Hours of Missing Data: 3
Direction of Minimum Daily Speed Average: 0.3 deg on Jan 19	Percent Operational Time: 99.6
Monthly Average Direction: 261.8 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jan	307	303	308	318	335	337	335	338	332	322	330	321	320	330	335	317	260	225	189	164	156	139	181	194	322.0
2-Jan	215	200	207	188	226	187	205	199	185	220	214	287	319	319	332	157	140	162	216	205	212	165	159	157	222.1
3-Jan	189	200	199	204	191	209	189	199	214	228	217	220	243	277	272	289	289	301	304	309	298	303	309	310	260.7
4-Jan	308	307	312	335	341	349	347	353	343	345	341	331	307	298	274	270	254	200	240	223	244	228	213	221	310.1
5-Jan	217	235	199	335	6	9	19	14	16	32	37	39	28	13	356	4	22	26	11	8	27	7	347	10	13.4
6-Jan	13	15	3	225	215	207	354	339	214	132	149	177	129	150	141	144	210	AF	127	172	142	168	176	169	162.6
7-Jan	157	163	169	130	151	319	339	337	321	329	350	354	359	349	353	359	0	358	355	2	9	13	6	15	358.4
8-Jan	353	337	337	322	201	208	183	176	180	179	215	222	219	216	212	210	221	213	209	209	209	216	222	223	213.0
9-Jan	222	213	220	220	231	215	233	267	295	268	280	300	303	312	306	274	270	317	319	324	317	319	309	304	271.8
10-Jan	337	175	192	169	233	161	205	225	285	297	330	313	317	311	306	296	274	223	250	253	231	203	178	214	255.0
11-Jan	222	219	215	228	228	238	238	235	269	300	319	333	353	344	344	331	338	335	332	331	334	329	327	333	306.4
12-Jan	150	171	162	165	154	173	187	155	87	114	87	109	156	160	168	155	138	143	167	178	186	192	199	203	167.6
13-Jan	201	206	215	213	210	197	203	215	198	217	212	215	222	231	220	224	220	227	223	227	230	225	220	220	217.2
14-Jan	224	216	218	222	224	217	216	213	215	222	215	218	230	236	235	229	209	209	224	225	207	211	208	223	220.4
15-Jan	227	231	234	250	260	269	263	264	232	214	215	257	260	271	262	259	230	234	223	225	217	214	217	220	242.5
16-Jan	218	223	214	208	228	233	206	208	215	206	210	217	221	211	207	208	207	191	191	192	193	195	197	193	207.9
17-Jan	187	205	209	220	221	227	227	225	220	201	209	244	234	220	220	208	226	229	229	206	193	197	155	146	215.1
18-Jan	137	147	143	150	165	158	132	83	124	138	146	19	222	232	249	210	200	183	173	152	149	140	174	197	187.8
19-Jan	181	136	158	165	305	168	151	122	135	165	342	277	294	323	331	342	319	332	318	330	321	292	315	41	168.7
20-Jan	145	226	180	157	137	166	180	177	181	198	188	145	194	213	206	237	93	20	204	160	203	142	167	153	181.1
21-Jan	AF	155	313	154	199	278	304	338	324	334	341	5	4	3	6	18	6	336	336	336	0	357	1	4	352.2
22-Jan	358	3	12	17	24	21	17	16	16	18	16	353	2	9	16	16	29	35	19	23	358	16	344	348	12.2
23-Jan	340	337	335	349	359	352	357	349	352	344	336	302	317	310	340	355	75	123	132	158	143	222	226	214	339.4
24-Jan	230	322	AF	24	165	192	217	225	182	172	235	236	228	240	226	245	232	233	211	210	190	234	230	211	221.5
25-Jan	197	240	162	196	176	179	194	192	227	197	220	227	230	218	235	231	207	210	202	207	212	210	208	212	210.7
26-Jan	214	212	213	214	195	205	206	223	233	242	287	275	288	295	277	276	259	216	216	235	276	285	284	274	245.8
27-Jan	286	287	294	302	293	301	296	276	255	254	263	254	254	237	276	227	237	228	278	289	287	274	289	299	271.9
28-Jan	292	289	303	299	280	265	232	223	233	230	238	241	243	241	225	239	229	210	217	217	237	275	275	279	249.3
29-Jan	286	289	287	277	285	277	233	205	214	211	212	250	262	257	263	278	271	262	272	287	283	280	293	293	265.0
30-Jan	289	286	293	269	266	263	277	300	302	300	297	305	302	293	308	302	313	333	331	331	338	352	339	348	307.9
31-Jan	339	348	340	344	345	342	338	337	337	333	304	303	293	275	271	299	275	281	305	291	312	316	302	304	320.7

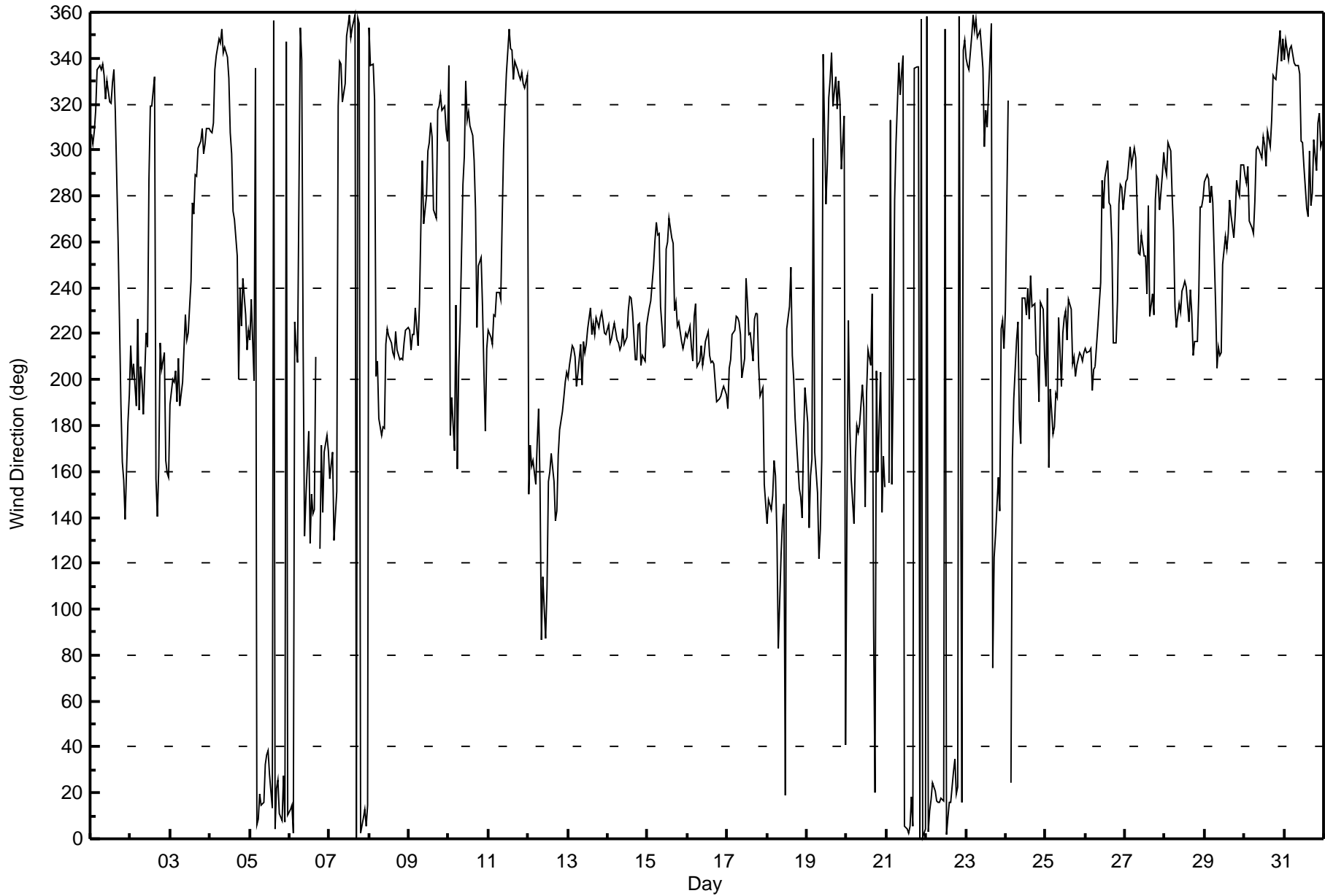
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 Diurnal Average

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



WBEA Data PC
Hourly Averages

Wind Direction (WD) - deg
Conklin Community - January 2017





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Conklin Community - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 104 deg on Jan 18 11:00 Minimum Value: 10 deg on Jan 12 17:00 Percentiles: P ₁ = 13 P ₁₀ = 17 Q ₁ = 19 Median = 24 Q ₃ = 30 P ₉₀ = 58 P ₉₉ = 93																			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-Jan	25	29	24	21	19	18	18	17	17	21	19	20	20	20	18	19	58	56	88	90	53	85	76	22	90
2-Jan	66	54	42	45	77	55	29	41	50	71	46	62	18	24	27	33	84	95	63	81	59	93	23	46	95
3-Jan	61	39	63	30	19	53	48	83	22	21	18	19	28	31	26	30	28	28	29	24	30	29	24	23	83
4-Jan	24	23	20	20	18	17	18	17	18	22	21	26	28	28	26	27	31	20	25	23	24	28	18	17	31
5-Jan	19	30	92	20	21	23	20	21	23	23	24	23	28	25	20	17	19	23	25	30	29	27	20	45	92
6-Jan	34	51	31	28	30	24	74	25	70	88	36	61	40	79	15	23	59	AF	43	19	24	18	55	33	88
7-Jan	16	39	76	48	66	72	17	18	49	15	18	20	24	22	17	19	18	18	21	20	18	18	20	20	76
8-Jan	35	24	14	30	80	48	23	24	23	20	33	18	18	21	21	22	25	30	19	17	18	22	21	22	80
9-Jan	20	19	20	22	18	20	37	35	37	26	29	29	31	26	26	25	30	15	15	16	19	14	20	12	37
10-Jan	16	75	84	61	74	92	30	26	68	96	79	23	24	23	23	29	26	28	27	24	28	30	16	26	96
11-Jan	21	21	23	24	24	21	19	17	26	28	21	20	21	21	20	19	20	17	18	18	17	18	32	69	69
12-Jan	83	33	36	19	18	22	19	30	32	54	59	26	30	19	15	13	10	13	16	19	30	29	51	35	83
13-Jan	25	31	22	19	13	23	16	19	19	19	17	22	22	25	21	21	20	19	19	19	19	19	18	19	31
14-Jan	19	18	18	19	19	19	18	19	18	19	18	19	22	18	18	20	20	20	19	17	17	17	18	21	22
15-Jan	21	17	17	20	16	21	17	22	18	16	19	18	20	24	23	18	23	16	18	19	19	20	19	19	24
16-Jan	18	19	19	18	20	19	16	16	19	16	15	19	20	16	15	15	17	17	16	16	16	16	17	27	27
17-Jan	20	17	20	20	19	19	19	20	24	17	17	23	19	18	19	16	19	20	18	17	14	15	33	22	33
18-Jan	54	22	26	87	82	65	94	88	94	80	104	70	27	26	24	27	21	23	75	58	70	89	60	72	104
19-Jan	89	51	44	90	58	23	26	13	24	78	11	85	67	45	33	44	34	30	43	43	70	55	56	100	100
20-Jan	23	37	34	38	19	18	31	35	35	33	55	31	25	28	28	46	92	93	67	18	67	20	37	14	93
21-Jan	AF	73	18	85	74	65	73	12	16	15	14	25	22	22	24	21	23	19	18	17	21	21	21	23	85
22-Jan	20	21	24	24	21	23	25	22	24	23	24	22	23	25	27	26	21	24	24	26	21	27	17	15	27
23-Jan	27	21	21	15	21	19	21	16	20	28	23	42	25	29	23	33	30	18	34	26	29	39	29	26	42
24-Jan	32	38	AF	25	70	36	35	34	38	49	53	25	28	23	26	31	24	26	21	35	72	28	35	50	72
25-Jan	98	67	37	44	46	39	32	44	29	23	26	29	24	26	32	33	64	42	19	20	22	17	18	17	98
26-Jan	16	16	19	19	15	18	38	42	30	39	36	31	33	30	31	30	42	27	17	28	27	29	30	25	42
27-Jan	30	29	30	30	30	26	30	28	33	24	24	19	24	27	26	22	21	22	29	29	27	24	28	29	33
28-Jan	32	29	26	28	30	18	24	20	17	18	15	15	13	12	20	21	21	21	20	18	24	24	26	28	32
29-Jan	29	29	29	28	29	27	39	19	18	19	21	34	23	20	22	32	18	15	23	27	26	26	29	28	39
30-Jan	28	29	30	19	18	16	28	28	28	28	29	28	27	30	25	27	35	19	18	18	24	20	17	18	35
31-Jan	18	18	17	17	18	17	18	18	17	19	29	29	28	27	25	27	26	28	21	27	22	19	25	25	29
98 75 92 90 82 92 94 88 94 96 104 85 67 79 33 46 92 95 88 90 72 93 76 100																									
Diurnal Maximum																									
AF - Analyzer Failure																									



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	January 10, 2017	Last Calibration	December 7, 2016
Station Name	Conklin Community	Station Number	AMS 21
Reason:	Routine		
Start Time (MST)	12:00	End Time (MST)	17:13
Gas Cert Reference	EY0000359	Station temp.	22 Deg C
Cal Gas Concentration	51.4 ppm	Cal Gas Exp Date	February 9, 2018
Calibrator Make/Model	API T700	Serial Number	1221
ZAG Make/Model	API 701	Serial Number	5611
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9628

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-655	-655
Analyzer IP address	192.168.1.43		Lamp voltage	849	851
Calculated slope	1.001201	1.001469	Chamber temp	45.0	45.2
Calculated intercept	-0.582164	-0.156222	Pressure	672.5	652.8
Analyzer Background	20.9	22.4	Flow	0.494	0.480
Analyzer Coefficient	0.904	0.908	Intensity	92	92

Analyzer make Thermo 43i Analyzer serial # JC1428701363

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	0.8	----
as found span	5000	76.5	786.4	779.3	1.009
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	76.5	786.4	785.0	1.002
second point	5000	38.2	392.7	393.4	0.998
third point	5000	19.1	196.3	195.7	1.003
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	76.5	786.4	785.2	1.002
Average Correction Factor					1.001

Corrected As found 778.5 Previous response 786.1 % change 1.0%

Notes:

Sample inlet filter replaced after as founds. Adjusted both zero and span. NMHC preventative maintenance completed; hence long "calibrator zero" point. As lefts began at 16:42 MST.

Calibration Performed By: Asad Hidayat



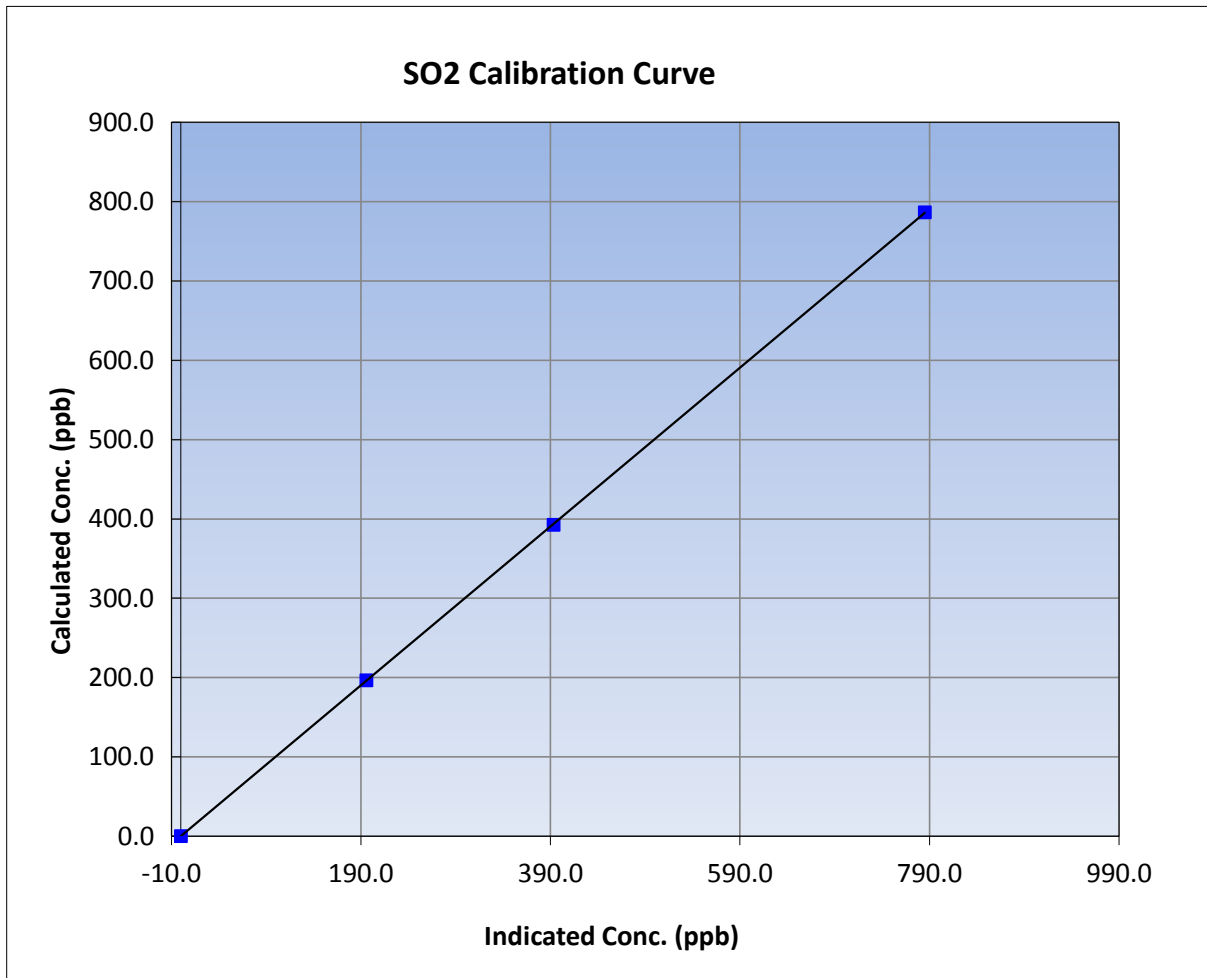
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 10, 2017	Previous Calibration	December 7, 2016
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	12:00	End Time (MST)	17:13
Analyzer make	Thermo 43i	Analyzer serial #	JC1428701363

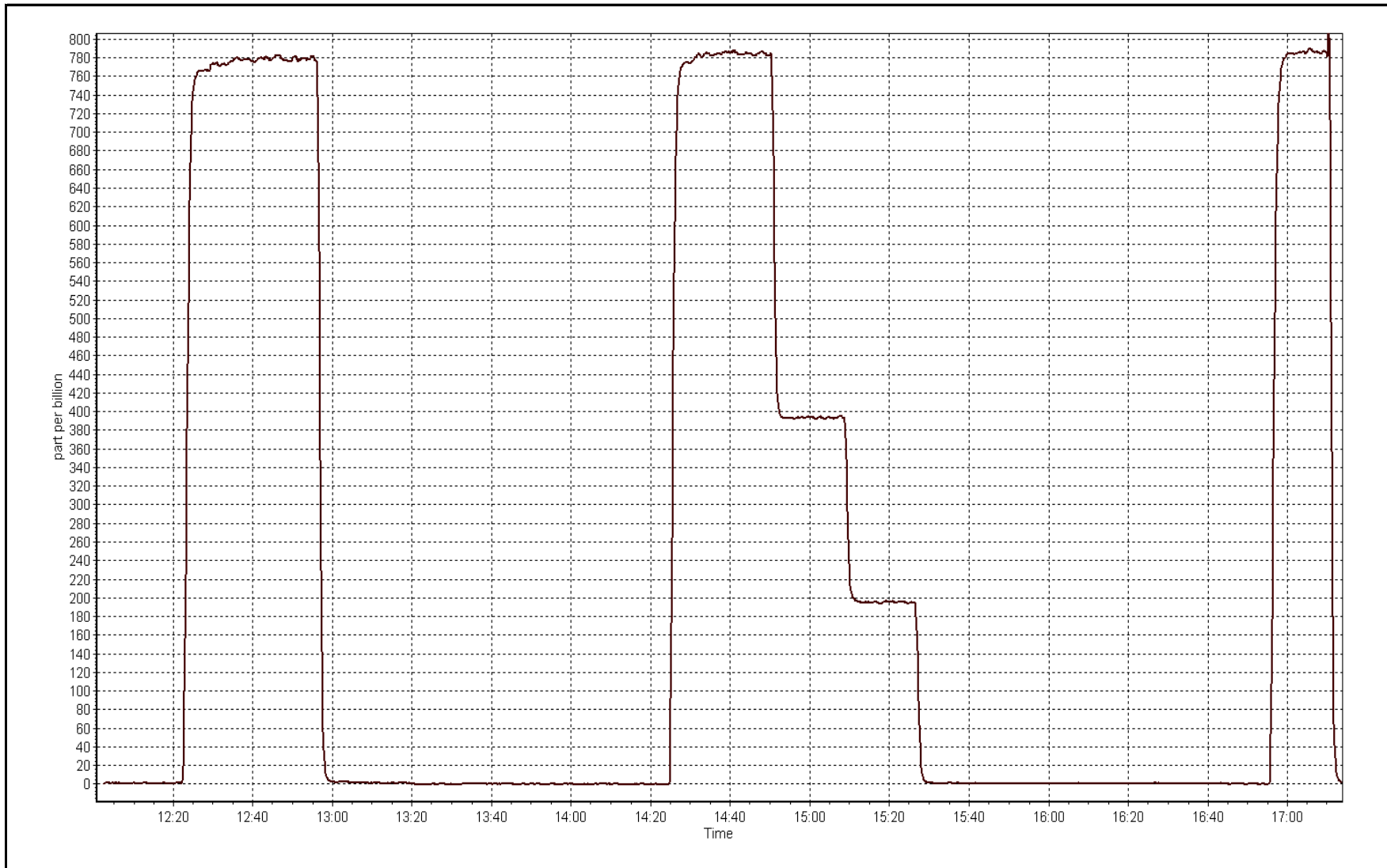
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999995
786.4	785.0	1.0018		
392.7	393.4	0.9982	Slope	1.001469
196.3	195.7	1.0032		
			Intercept	-0.156222



SO2 Calibration Plot

Date: January 10, 2017





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	January 12, 2017	Last Calibration	December 7, 2016
Station Name	Conklin Community	Station Number	AMS 21
Reason:	Routine		
Start Time (MST)	9:53	End Time (MST)	12:15
Gas Cert Reference	LL119411	Station temp.	22 Deg C
Cal Gas Concentration	4.97 ppm	Cal Gas Exp Date	February 12, 2019
Calibrator Make/Model	API T700	Serial Number	1221
Dil air Make/Model	API 701	Serial Number	5611
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9628
SO2 gas concentration	51.4 ppm	SO2 gas cert/exp	EY0000359 February 9, 2018

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-732	-732
Analyzer IP address	192.168.1.44		Lamp voltage	1033	1048
Calculated slope	0.990332	0.997164	Chamber temp	45	45
Calculated intercept	0.057688	-0.039380	Pressure	680.4	660.0
Analyzer Background	1.44	1.47	Flow	0.437	0.427
Analyzer Coefficient	0.992	0.992	Intensity	92	92
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1236656116	
Converter make/model	CDN-101		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	80.6	80.1	80.3	0.998
SO2 scrubber check	5000	19.5	200.5	1.0	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	80.6	80.1	80.3	0.998
second point	5000	40.4	40.2	40.5	0.992
third point	5000	20.2	20.1	20.1	0.999
as left zero	6000	0.0	0.0	0.2	----
as left span	5000	80.6	80.1	79.3	1.011
Average Correction Factor					0.996

Corrected As found	80.2	Previous response	80.8	% change	0.8%
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Notes:

Sample inlet filter replaced after as founds. SO2 scrubber check completed after 3rd point. No adjustments made.

Calibration Performed By:

Asad Hidayat



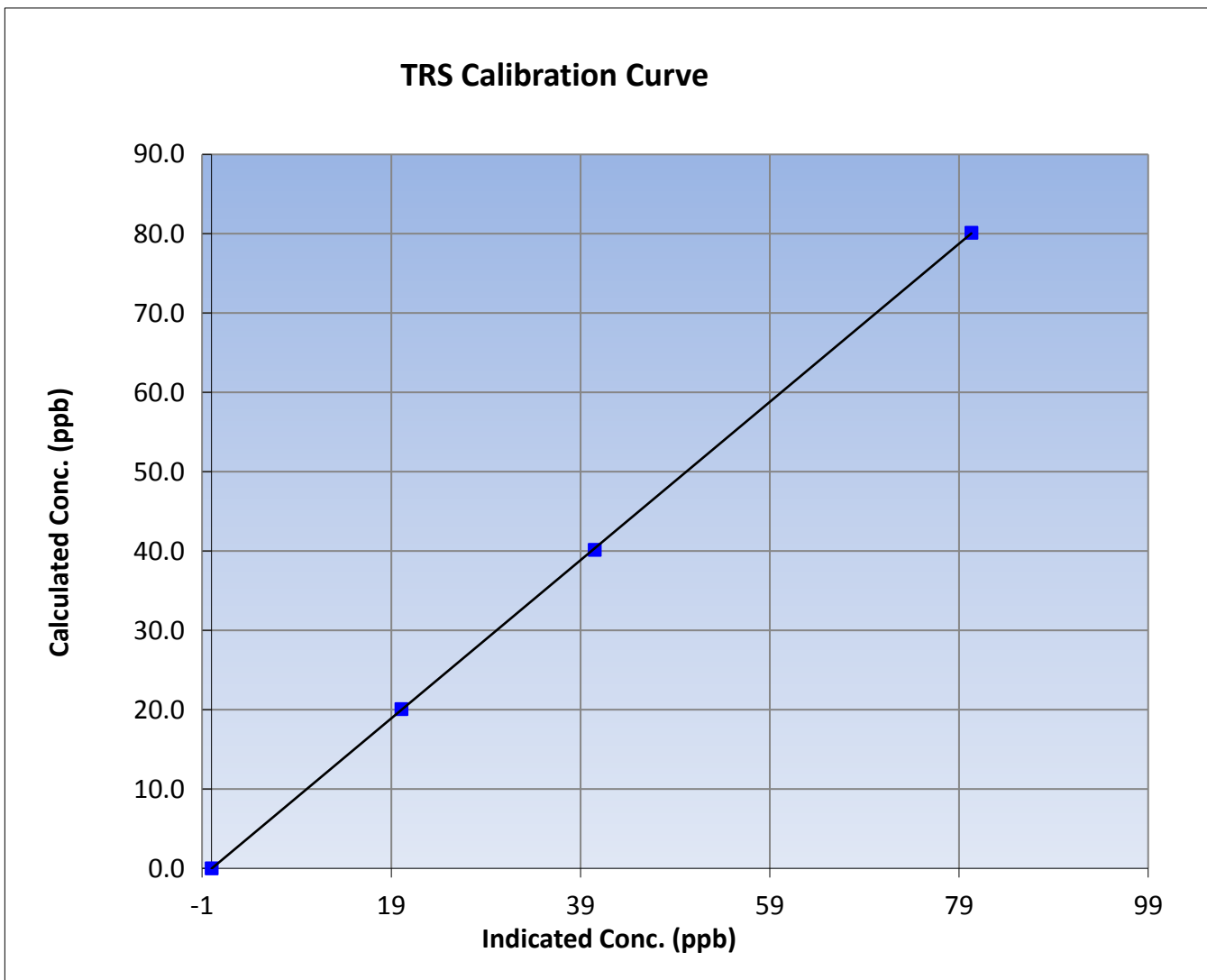
Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	January 12, 2017	Previous Calibration	December 7, 2016
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	9:53	End Time (MST)	12:15
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1236656116

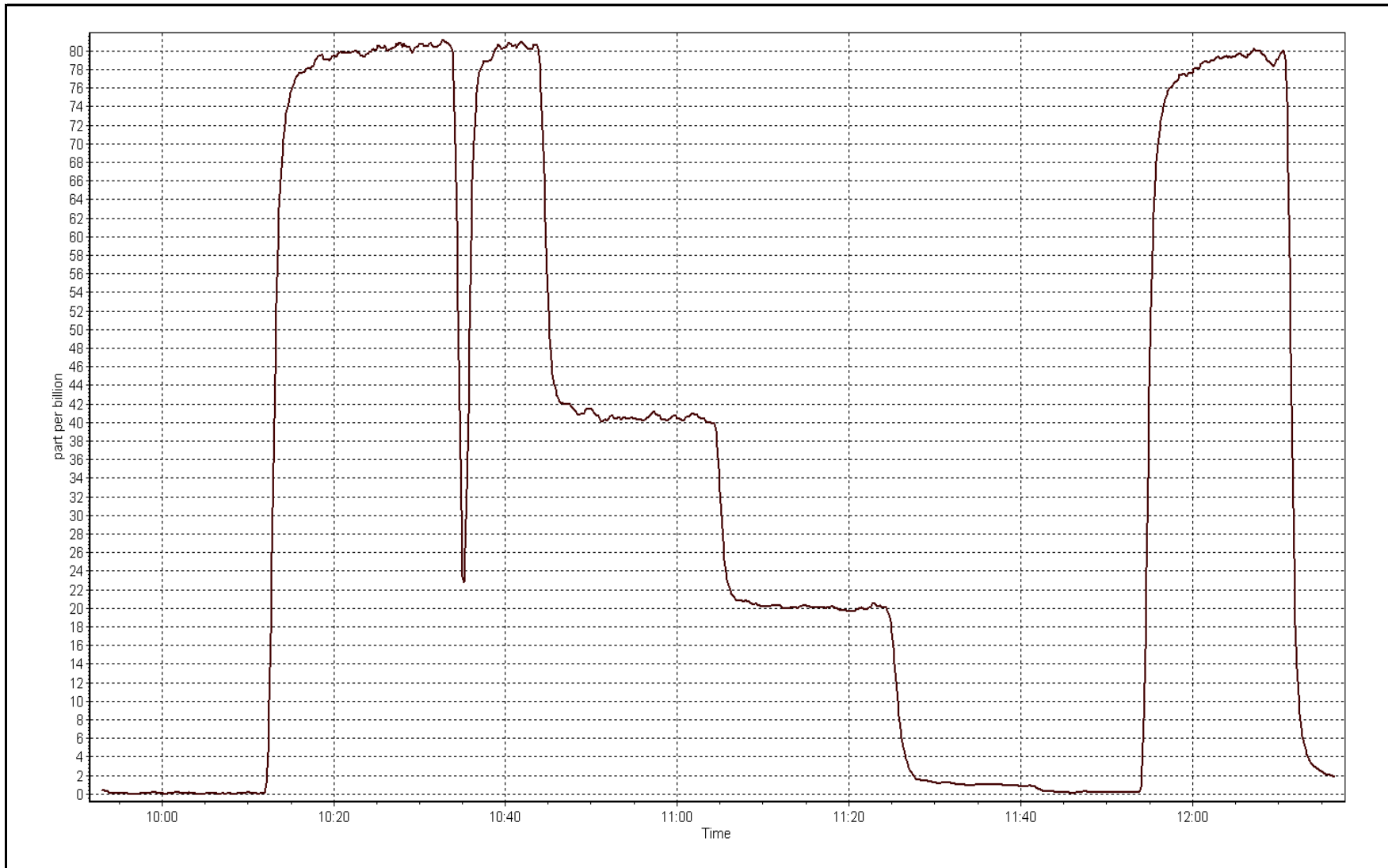
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999986
80.1	80.3	0.9976		
40.2	40.5	0.9915	Slope	0.997164
20.1	20.1	0.9994		
			Intercept	-0.039380



TRS Calibration Plot

Date: January 12, 2017





Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	January 10, 2017	Last Calibration	December 7, 2016
Station Name	Conklin Community	Station Number	AMS 21
Reason:	Routine		
Start Time (MST)	12:00	End Time (MST)	17:13
Gas Cert Reference	EY0000359	Cal Gas Expiry Date	February 9, 2018
CH4 Cal Gas Conc.	512.0 ppm	CH4 Equiv Conc.	1084.0 ppm
C3H8 Cal Gas Conc.	208.0 ppm	Station temp.	21 Deg C
Calibrator Model	API T700	Serial Number	1221
ZAG make/model	Teledyne API 701	Serial Number	5611
DACS make/model	Campbell Scientific CR3000	Serial Number	9628

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	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	0.986778	0.996624	Carrier Pressure	37.0	37.0
THC Calc intercept	0.063281	0.053846	Fuel Pressure	49.6	49.7
NMHC Calc slope	0.984102	0.997850	Air Pressure	34.3	34.3
NMHC Calc intercept	0.035427	0.036347			

Analyzer make Thermo 55i Analyzer serial # 1152430011

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	76.5	16.59	16.49	1.006
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	76.5	16.59	16.61	0.999
second point	5000	38.2	8.28	8.24	1.005
third point	5000	19.1	4.14	4.04	1.025
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	76.5	16.59	16.67	0.995
Average Correction Factor					1.010

Corrected As found 16.49 Previous response 16.74 % change 1.5%

Notes:

Nitrogen cylinder replaced after stable 15 mins of "as found span" point. Sample inlet filter replaced after as founds. Sample pump replaced after as founds as well for preventative maintenance. Adjusted span.

Calibration Performed By: Asad Hidayat



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	0.00	0.00	----
as found span	5000	76.5	8.75	8.71	1.005
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	76.5	8.75	8.75	1.000
second point	5000	38.2	4.37	4.33	1.009
third point	5000	19.1	2.19	2.11	1.034
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	76.5	8.75	8.75	1.000
Average Correction Factor					1.014

Corrected As found 8.71 Previous response 8.86 % change 1.7%

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	0.00	0.00	----
as found span	5000	76.5	7.83	7.78	1.007
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	76.5	7.83	7.86	0.997
second point	5000	38.2	3.91	3.91	1.000
third point	5000	19.1	1.96	1.94	1.008
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	76.5	7.83	7.93	0.988
Average Correction Factor					1.002

Corrected As found 7.78 Previous response 7.89 % change 1.4%



Wood Buffalo Environmental Association

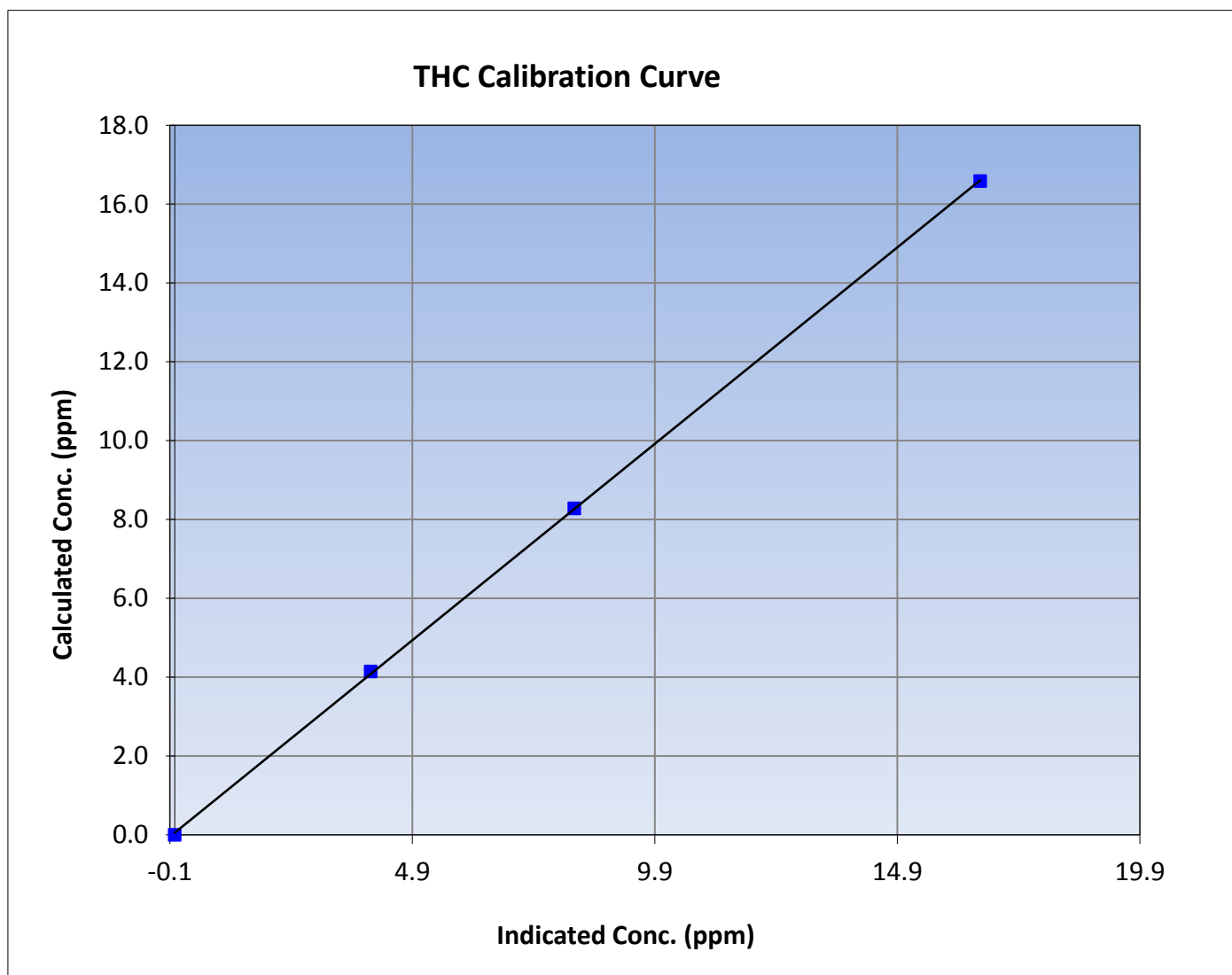
THC Calibration Summary

Station Information

Calibration Date	January 10, 2017	Previous Calibration	December 7, 2016
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	12:00	End Time (MST)	17:13
Analyzer make	Thermo 55i	Analyzer serial #	1152430011

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999951
16.59	16.61	0.9985		
8.28	8.24	1.0051	Slope	0.996624
4.14	4.04	1.0250		
			Intercept	0.053846





Wood Buffalo Environmental Association

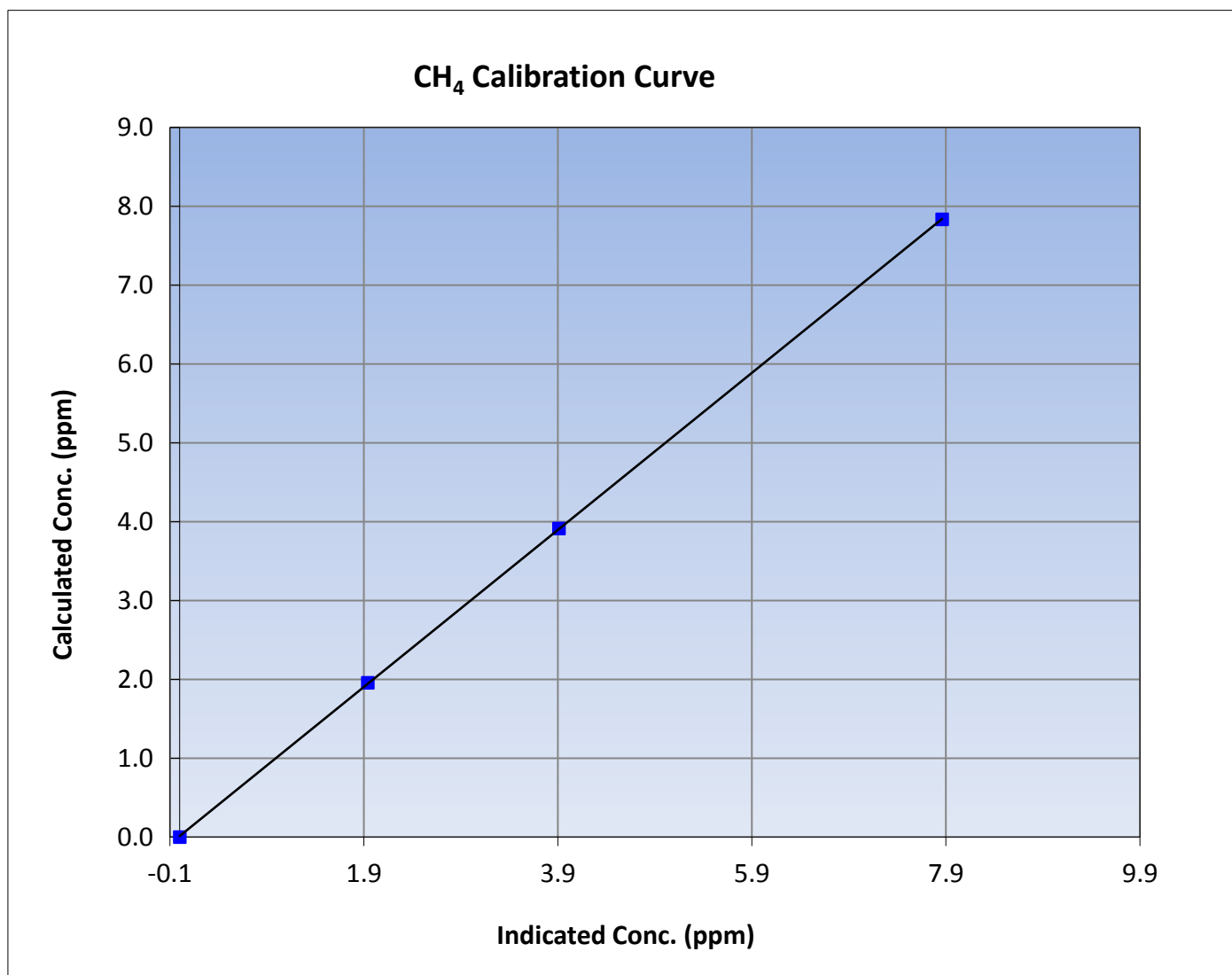
CH₄ Calibration Summary

Station Information

Calibration Date	January 10, 2017	Previous Calibration	December 7, 2016
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	12:00	End Time (MST)	17:13
Analyzer make	Thermo 55i	Analyzer serial #	1152430011

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999989
7.83	7.86	0.9966		
3.91	3.91	1.0004	Slope	0.995870
1.96	1.94	1.0082		
			Intercept	0.011936





Wood Buffalo Environmental Association

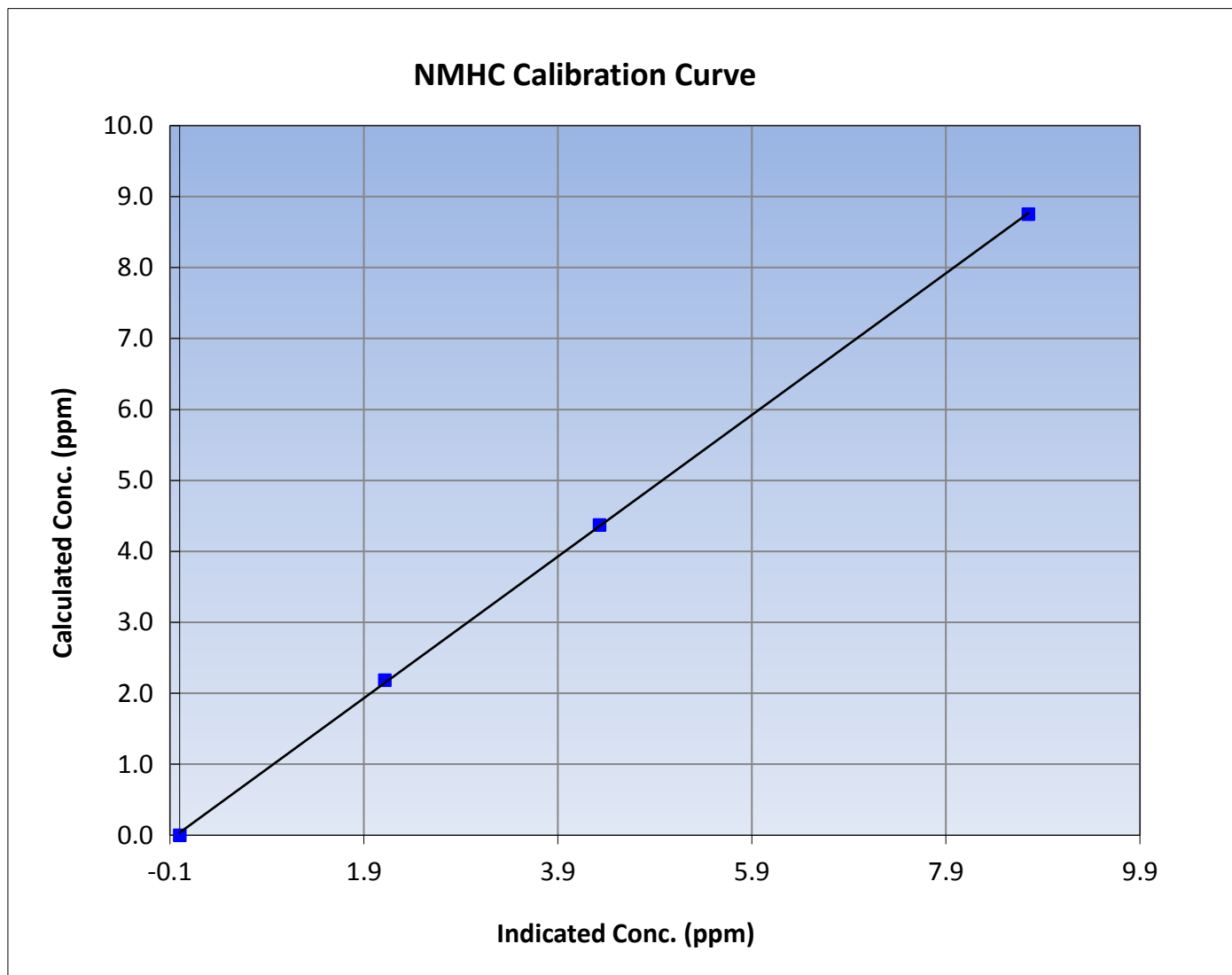
NMHC Calibration Summary

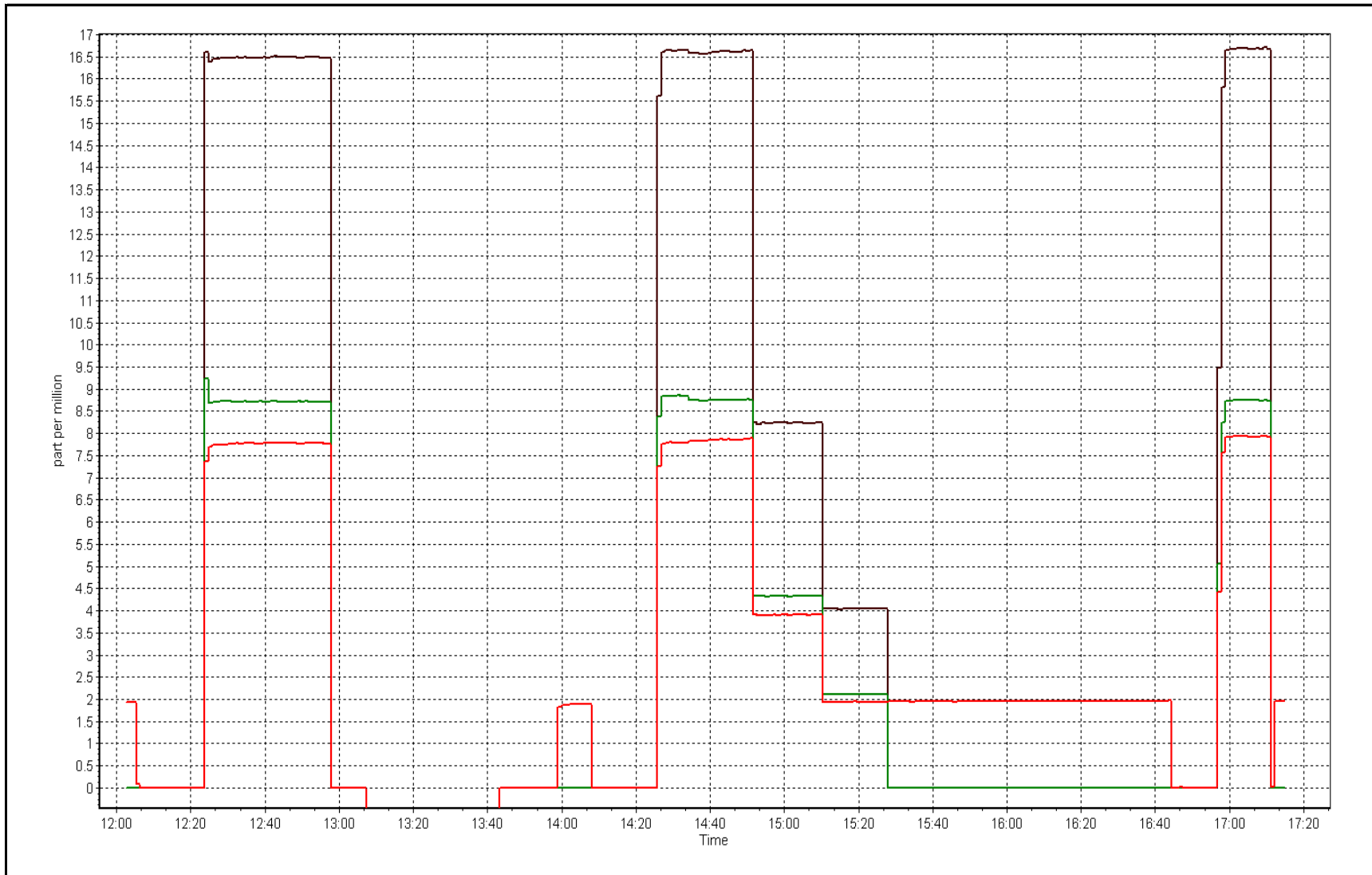
Station Information

Calibration Date	January 10, 2017	Previous Calibration	December 7, 2016
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	12:00	End Time (MST)	17:13
Analyzer make	Thermo 55i	Analyzer serial #	1152430011

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999922
8.75	8.75	1.0002		
4.37	4.33	1.0093	Slope	0.997850
2.19	2.11	1.0336		
			Intercept	0.036347







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	January 10, 2017	Previous Calibration	December 7, 2016
Station Name	Conklin Community	Station Number	AMS 21
Reason:	Routine		
Start Time (MST)	17:10	End Time (MST)	19:30
NO2 GPT Ref date	January 10, 2017	Transfer Standard	NO2
		Station temp.	21 Deg C
Calibrator Make/Model	Teledyne API 700	Serial Number	1221
ZAG make/model	Teledyne API 701	Serial Number	5611
DACS make/model	Campbell Scientific CR3000	Serial Number	9628

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	26.8	27.4
Analyzer IP address	192.168.1.49		Lamp temp.	53.4	53.4
Calculated slope	0.995135	0.994530	Pressure	667.3	645.2
Calculated intercept	-0.037539	0.487031	Flow cell A	0.751	0.733
Analyzer Background	-1.3	-1.3	Flow cell B	0.741	0.726
Analyzer Coefficient	1.033	1.026	Cell A Intensity	71185	70951
			Cell B Intensity	69005	68249

Analyzer make	Thermo 49i	Analyzer serial #	1501663734
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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	187.6/800	0.0	-0.1	----
as found span	5000	569.10/1001.8	298.8	302.8	0.987
calibrator zero	5000	187.6/800	0.0	-0.1	----
high point	5000	569.10/1001.8	298.8	300.2	0.995
second point	5000	381.9/913.1	199.3	199.9	0.997
third point	5000	190.4/802.7	101.6	101.2	1.005
as left zero	6000	187.6/800	0.0	0.4	----
as left span	5000	569.10/1001.8	298.8	302.5	0.988
Average Correction Factor					0.999

Corrected As found	302.9	Previous response	300.3	% change	-0.8%
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Notes:

Sample inlet filter replaced after as founds. Adjusted span.

Calibration Performed By: Asad Hidayat



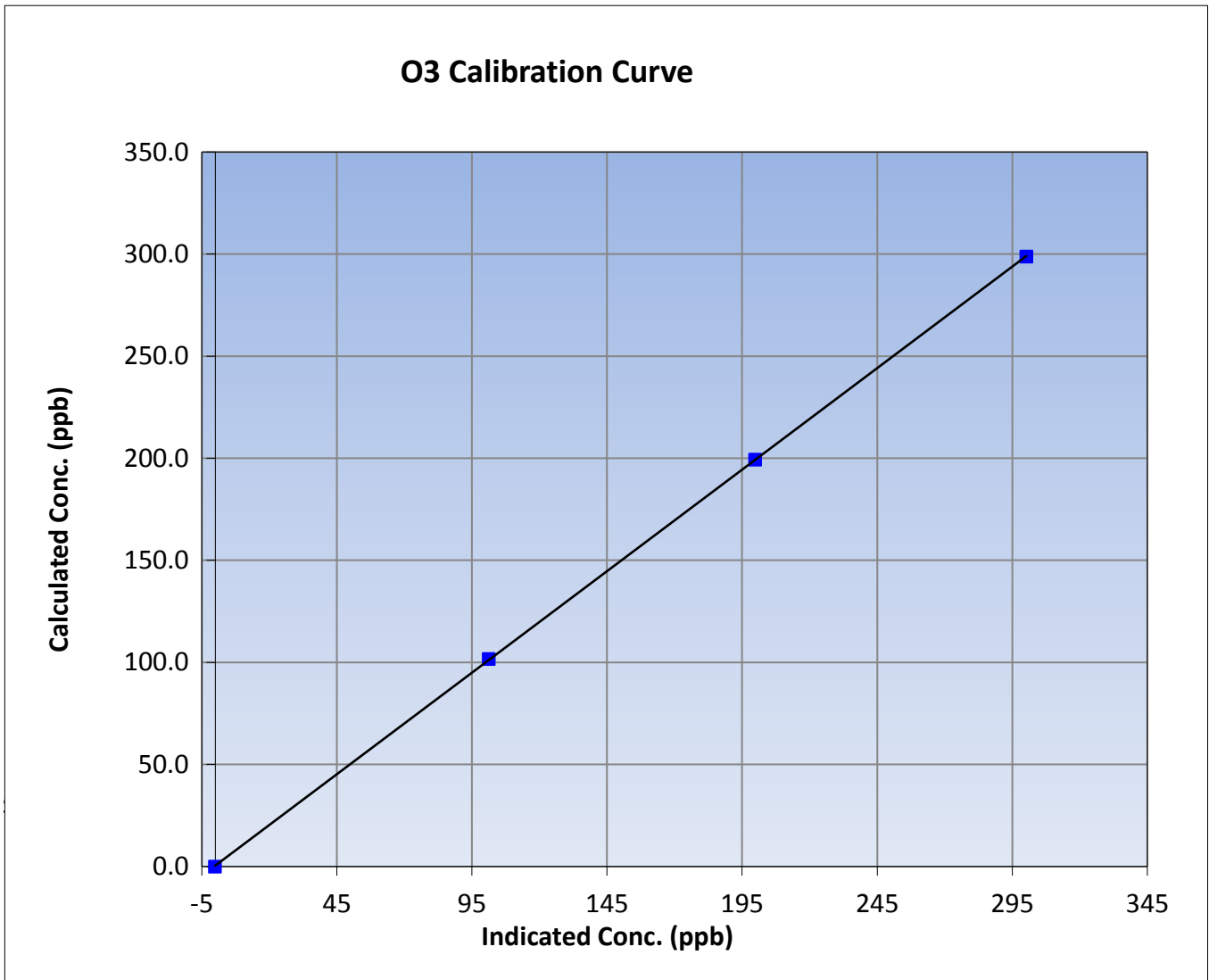
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	January 10, 2017	Previous Calibration	December 07, 2016
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	17:10	End Time (MST)	19:30
Analyzer make	Thermo 49i	Analyzer serial #	1501663734

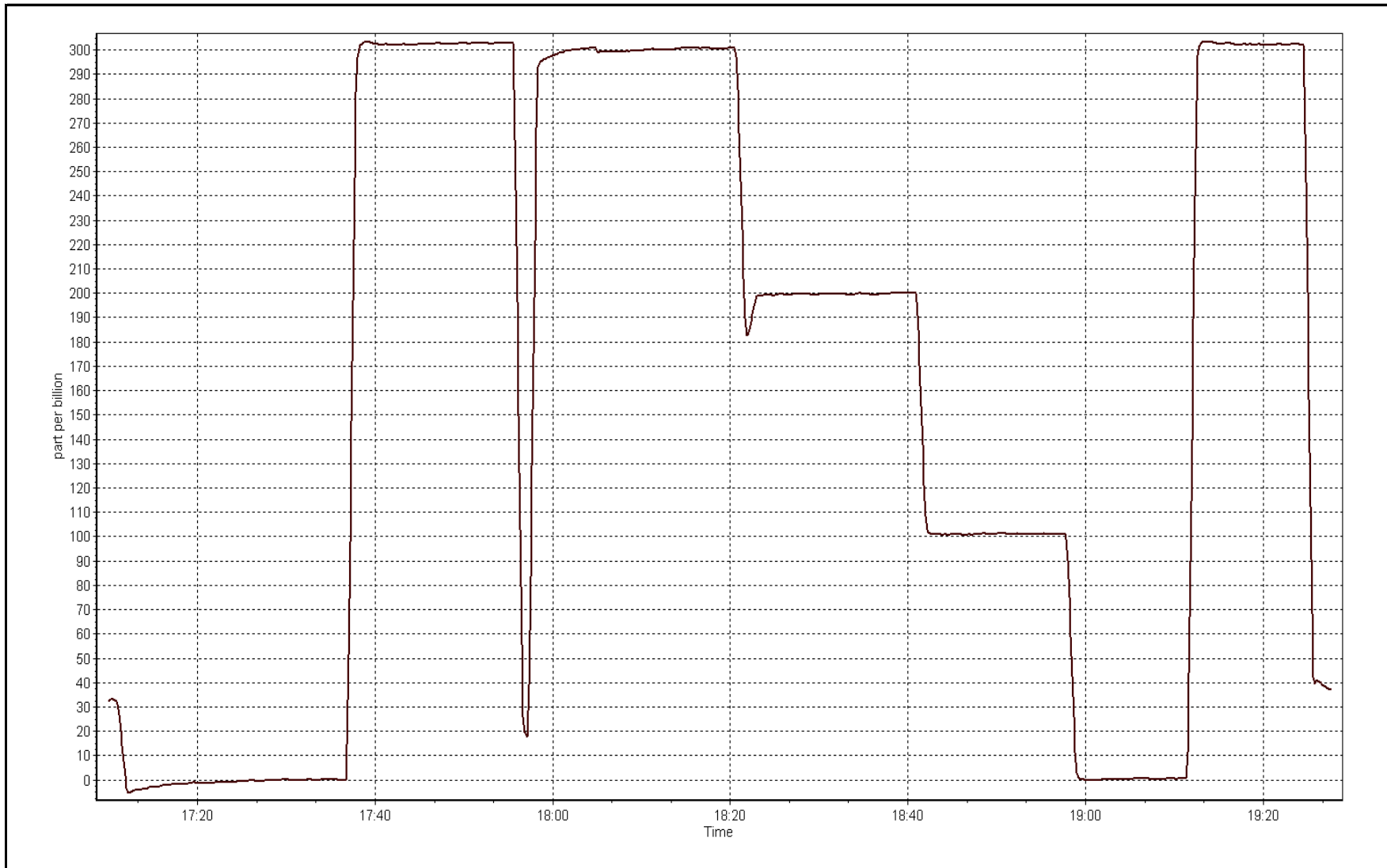
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999990
298.8	300.2	0.9954		
199.3	199.9	0.9974	Slope	0.994530
101.6	101.2	1.0045		
			Intercept	0.487031



O3 Calibration Plot

Date: January 10, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 10, 2017	Previous Calibration	December 7, 2016
Station Name	Conklin Community	Station Number	AMS 21
Reason:	Routine		
Start Time (MST)	12:00	End Time (MST)	17:13
NO Cal Gas Conc	52.4 ppm	Gas Cert Reference	EY0000359
NOx Cal Gas Conc	52.4 ppm	Cal Gas Expiry Date	February 9, 2018
Calibrator	API T700	Serial Number	1221
Zero air Generator	API 701	Serial Number	5611

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9628
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.994433	0.993281	0.999262
	Data Offset	-0.660479	-0.285577	0.020423
Current Calibration	Data Slope	0.998453	0.997524	1.002144
	Data Offset	-0.370305	0.063428	0.948734

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1501663731
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000 ppb		0-1000 ppb	
Analyzer IP	192.168.1.42		192.168.1.42	
NO coefficient	1.357		1.376	
NOx coefficient	0.998		0.997	
NO2 coefficient	1.000		1.000	
NO bkgrnd	8.8		8.9	
NOx bkgrnd	8.9		9.0	
Chamber Temp	49.8	Deg C	49.9	Deg C
Moly Temp	325	Deg C	322.9	Deg C
PMT voltage	-840.6	V	-840.6	V
PMT Temp	-3.1	Deg C	-2.9	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	165.8	mmHg	160.5	mmHg
R Cell Press Nox	165.8	mmHg	160.5	mmHg
NO sample flow	0.719	lpm	0.697	lpm
Nox sample Flow	0.719	lpm	0.698	lpm

Notes:

Sample inlet filter replaced after as founds. Adjusted span. NMHC's preventative maintenance completed; hence longer points.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: January 10, 2017 Station Number: AMS 21

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	-0.2	-0.1	----	----
as found span	5000	76.5	801.7	801.7	0.0	792.7	792.6	0.1	1.0114	1.0115
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.2	-0.1	----	----
high point	5000	76.5	801.7	801.7	0.0	802.4	803.0	-0.6	0.9991	0.9984
second point	5000	38.2	400.3	400.3	0.0	403.4	403.0	0.5	0.9923	0.9934
third point	5000	19.1	200.2	200.2	0.0	200.3	199.6	0.7	0.9994	1.0028
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
as left span	5000	76.5	801.7	499.1	302.6	799.9	495.1	304.2	1.0023	1.0082
Average Correction Factor									0.9969	0.9982

Corrected As found NO_x= 792.9 NO= 792.8 Percent Change NO_x= 1.8% NO= 1.8%
 Previous Response NO_x= 806.9 NO= 807.4

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 76.50 ccm NOx ref calc conc = 801.7 ppb NO ref calc conc = 801.7 ppb

O3 Setpoint (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
1st NO ref point		0.0	798.7	798.0	-0.1	1.0037	1.0047	----	----
1st NO2 (300)	499.1	298.8	797.3	499.1	298.1	1.0056	----	1.0024	99.8%
2nd NO2 (200)	598.6	199.3	795.7	598.6	197.1	1.0075	----	1.0114	98.9%
3rd NO2 (100)	696.4	101.6	796.0	696.4	99.6	1.0072	----	1.0202	98.0%
2nd NO ref point		0.0	796.7	795.4	1.5	1.0063	1.0079	----	----
Average Correction Factor						1.0067		1.0113	98.9%

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

NO_x Calibration Summary

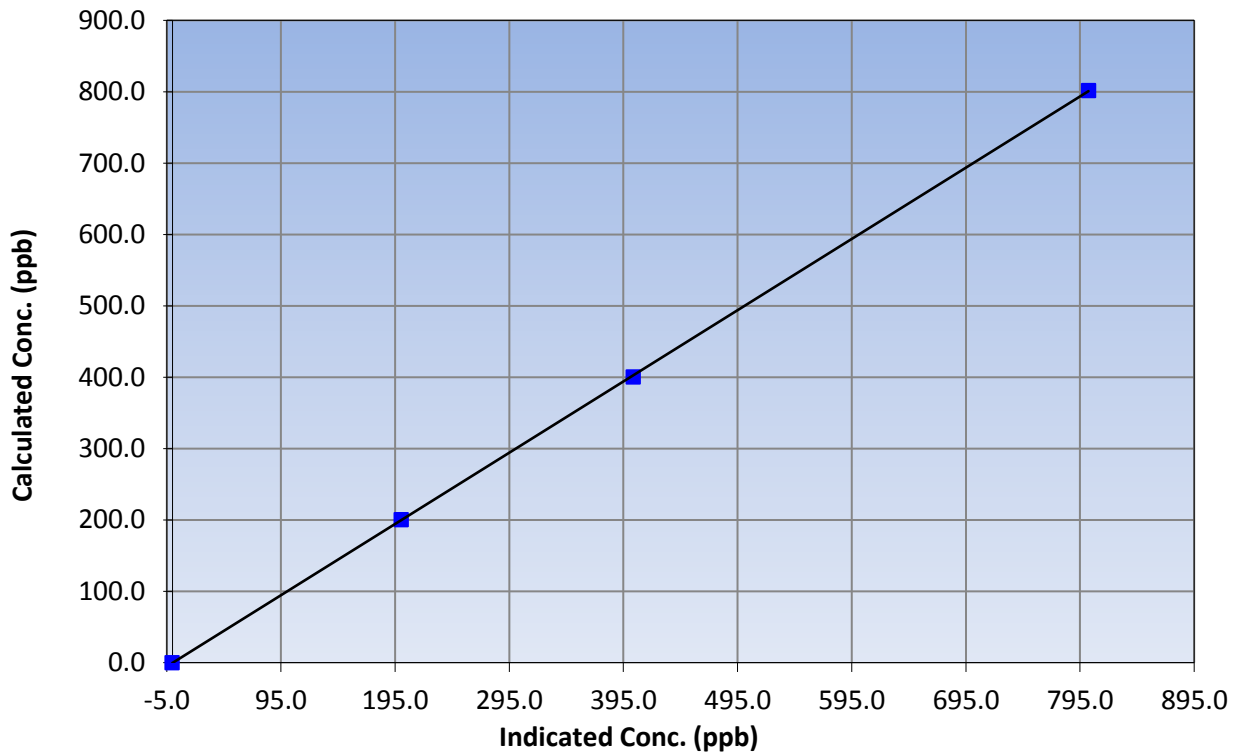
Station Information

Calibration Date	January 10, 2017	Previous Calibration	December 7, 2016
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	12:00	End Time (MST)	17:13
Analyzer make	Thermo 42i	Analyzer serial #	1501663731

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999983
801.7	802.4	0.9991		
400.3	403.4	0.9923	Slope	0.998453
200.2	200.3	0.9994		
			Intercept	-0.370305

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

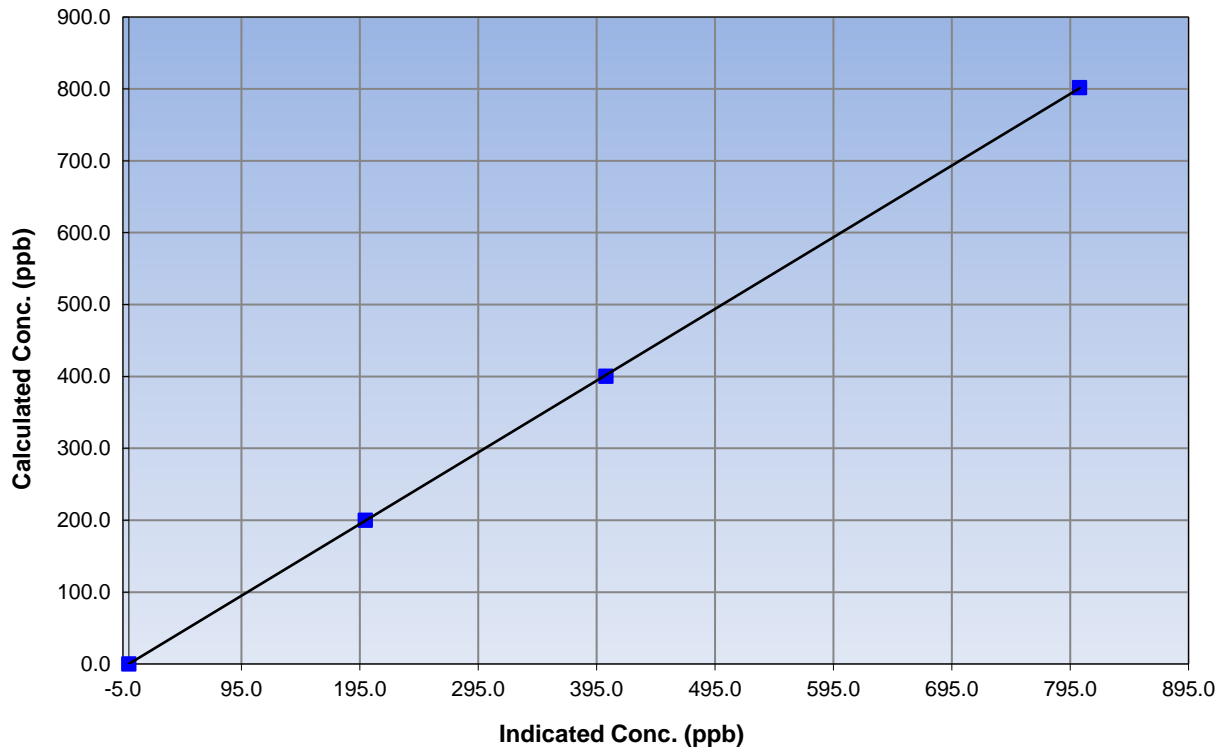
Station Information

Calibration Date	January 10, 2017	Previous Calibration	December 7, 2016
Station Name	Conklin Community	Station Number	AMS 21
Start Time (MST)	12:00	End Time (MST)	17:13
Analyzer make	Thermo 42i	Analyzer serial #	1501663731

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999988
801.7	803.0	0.9984		
400.3	403.0	0.9934	Slope	0.997524
200.2	199.6	1.0028		
			Intercept	0.063428

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

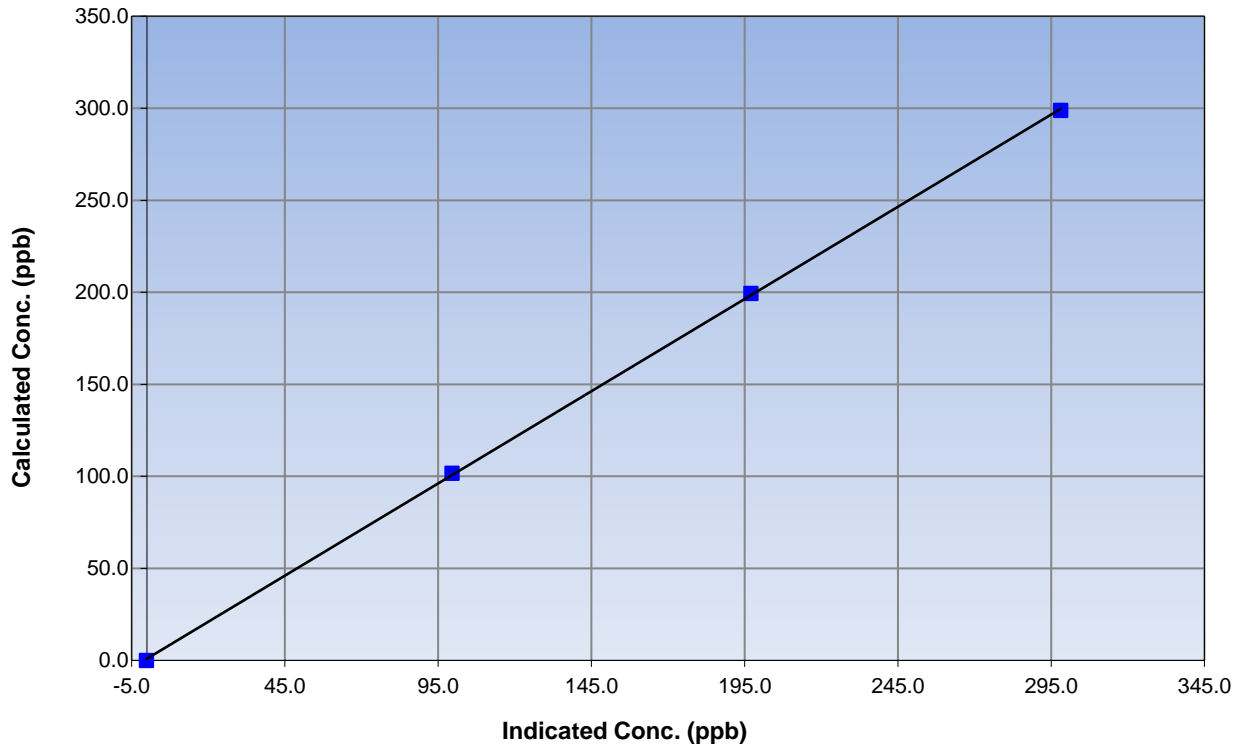
Station Information

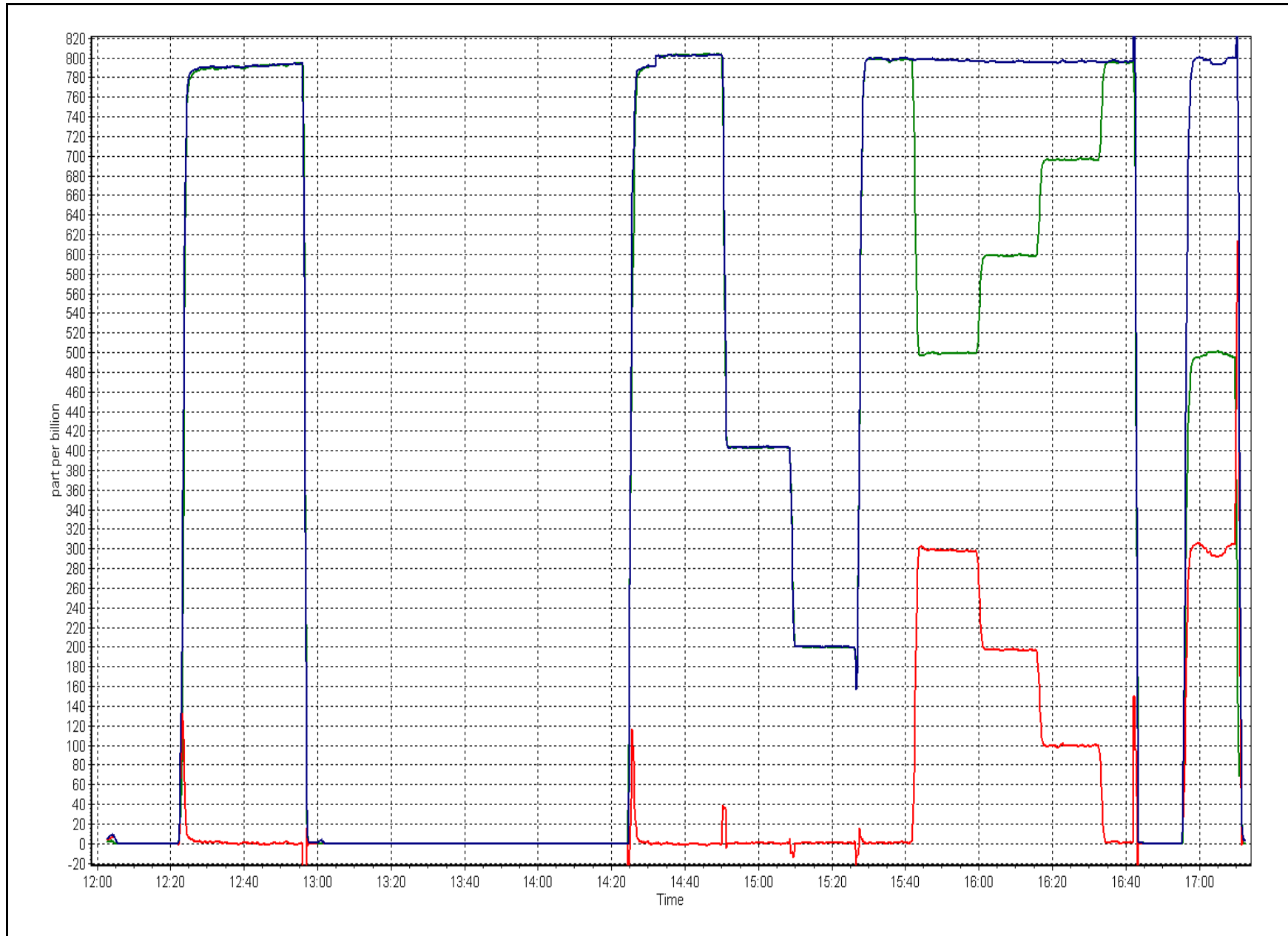
Calibration Date	January 10, 2017	Previous Calibration	December 7, 2016
Station Number	Conklin Community	Station Number	AMS 21
Start Time (MST)	12:00	End Time (MST)	17:13
Analyzer make	Thermo 42i	Analyzer serial #	1501663731

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999940
298.8	298.1	1.0024		
199.3	197.1	1.0114	Slope	1.002144
101.6	99.6	1.0202		
			Intercept	0.948734

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-08-2016

Station Information

Station Name:	Conklin Community	Station number:	AMS 21
Calibration Date:	January 12, 2017	Last Cal Date:	December 7, 2016
Start time (MST):	10:15	End time (MST):	11:08
Sharp Model:	5030	S/N:	7494
Particulate Fraction:	PM2.5	C14 Source S/N:	CM-0404
Flow Standard Model:	Delta Cal	S/N:	1019
Temp/RH standard:	Delta Cal	S/N:	1019

Monthly Calibration Test

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<u>Tolerance</u>
T1 (°C)	-25	-25.6	-25	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	949	943	949	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1001	1005	1001	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	-0.3	-----	-0.3	<input type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified	<input checked="" type="checkbox"/>			
Cyclone cleaning :	PM10 Cyclone	<input checked="" type="checkbox"/>	PM2.5 Cyclone	<input checked="" type="checkbox"/>	
Filter Tape Installed:	<input type="checkbox"/>				

Quarterly Calibration Test

			<u>Tolerance</u>
Leak Test:	Date of check: <u>October 12, 2016</u>	Last Cal Date: <u>September 22, 2016</u>	
	Flow w/o adaptor: <u>16.95</u>	Flow w/ adaptor: <u>16.91</u>	0.4 LPM

Annual Calibration Test

Foil Calibration	Foil Mass: <u>1265</u>	S/N: <u>2598</u>
	Date of check: <u>October 12, 2016</u>	Last Cal Date: <u>June 14, 2016</u>
	New Correction Factor: <u>7119</u>	Previous Correction Factor: <u>5603</u>

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<u>Tolerance</u>
T2 (°C)	14		14	<input type="checkbox"/>	+/- 2 °C
T3 (°C)	18		18	<input type="checkbox"/>	+/- 2 °C
T4 (°C)	16		16	<input type="checkbox"/>	+/- 2 °C
RH (%)	3		3	<input type="checkbox"/>	+/- 10%

Notes: Cyclone head cleaned. No adjustments made.

Calibration by: Asad Hidayat



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 22
JANVIER
JANUARY 2017**

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

February 27, 2017



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - JANVIER (AMS 22)
 JANUARY 2017

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	707	35	37	99.73	5	0	1	0
TRS(ppb) Average	708	34	36	99.73	0	0	0	0
THC(ppm) Average	703	35	41	99.19	2.2	-	2.1	-
NMHC(ppm) Average	703	35	41	99.19	0.027	-	0.002	-
CH4(ppm) Average	703	35	41	99.19	2.2	-	2.1	-
O3 (ppb) Average	709	34	35	99.87	47	0	44	-
NO2 (ppb) Average	707	36	37	99.87	14	0	7	-
NO (ppb) Average	707	36	37	99.87	9	-	2	-
NOX (ppb) Average	707	36	37	99.87	15	-	8	-
PM2.5 (ug/m3) Average	712	4	32	96.24	54.7	-	14.3	0
Wind Speed 10 m (km/h) Average	743	0	1	99.87	16	-	11	-
Wind Direction 10 m (deg) Average	743	0	1	99.87	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100.00	8.1	-	3.5	-
Relative Humidity (%) Average	744	0	0	100.00	96	-	92.0	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - JANVIER (AMS 22)
 JANUARY 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	707	0.3	0	-	0	0	0	0	0	1	5
TRS (ppb) Average	708	0.2	0	-	0	0	0	0	0	0	0
THC (ppm) Average	703	2	0.1	-	1.9	1.9	2	2	2	2.1	2.2
NMHC(ppm) Average	703	0	0.003	-	0	0	0	0	0	0	0.027
CH4(ppm) Average	703	2	0.1	-	1.9	1.9	2	2	2	2.1	2.2
O3 (ppb) Average	709	33	9	-	7	19	29	35	40	43	47
NO2 (ppb) Average	707	2.9	2	-	0	1	1	2	4	6	14
NO (ppb) Average	707	0.5	1	-	0	0	0	0	1	1	9
NOX (ppb) Average	707	3.3	3	-	0	1	1	3	4	7	15
PM2.5 (ug/m3) Average	712	4.32	4.2	-	0	1.4	2	3.1	4.9	9.4	54.7
Wind Speed 10 m (km/h) Average	743	6.6	3	-	0	2	4	7	9	11	16
Wind Direction 10 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	-11.32	10.3	-	-35.9	-24.6	-19.8	-12.4	-1.5	2.2	8.1
Relative Humidity (%) Average	744	76.1	10	-	50	63	71	76	83	88	96

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - JANVIER (AMS 22)
JANUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, TRS, THC	12 Jan 2017 15:00	12 Jan 2017 15:00	1	Maintenance to zero/span solenoids
AIR QUALITY ANALYZERS	13 Jan 2017 16:00	13 Jan 2017 16:00	1	Station power failure
NMHC, CH4, THC	10 Jan 2017 09:00	10 Jan 2017 12:00	4	Unstable operation - excessive baseline drift
PM2.5	13 Jan 2017 23:00	13 Jan 2017 23:00	1	Unstable operation - excessive baseline drift
PM2.5	14 Jan 2017 01:00	14 Jan 2017 02:00	2	Unstable operation - excessive baseline drift
PM2.5	14 Jan 2017 16:00	14 Jan 2017 23:00	8	Unstable operation - excessive baseline drift
PM2.5	15 Jan 2017 03:00	15 Jan 2017 15:00	13	Unstable operation - excessive baseline drift
PM2.5	17 Jan 2017 12:00	17 Jan 2017 15:00	4	Unstable operation - excessive baseline drift
Wind Speed, Wind Direction	21 Jan 2017 03:00	21 Jan 2017 03:00	1	Flat line in sensor output signal - Sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

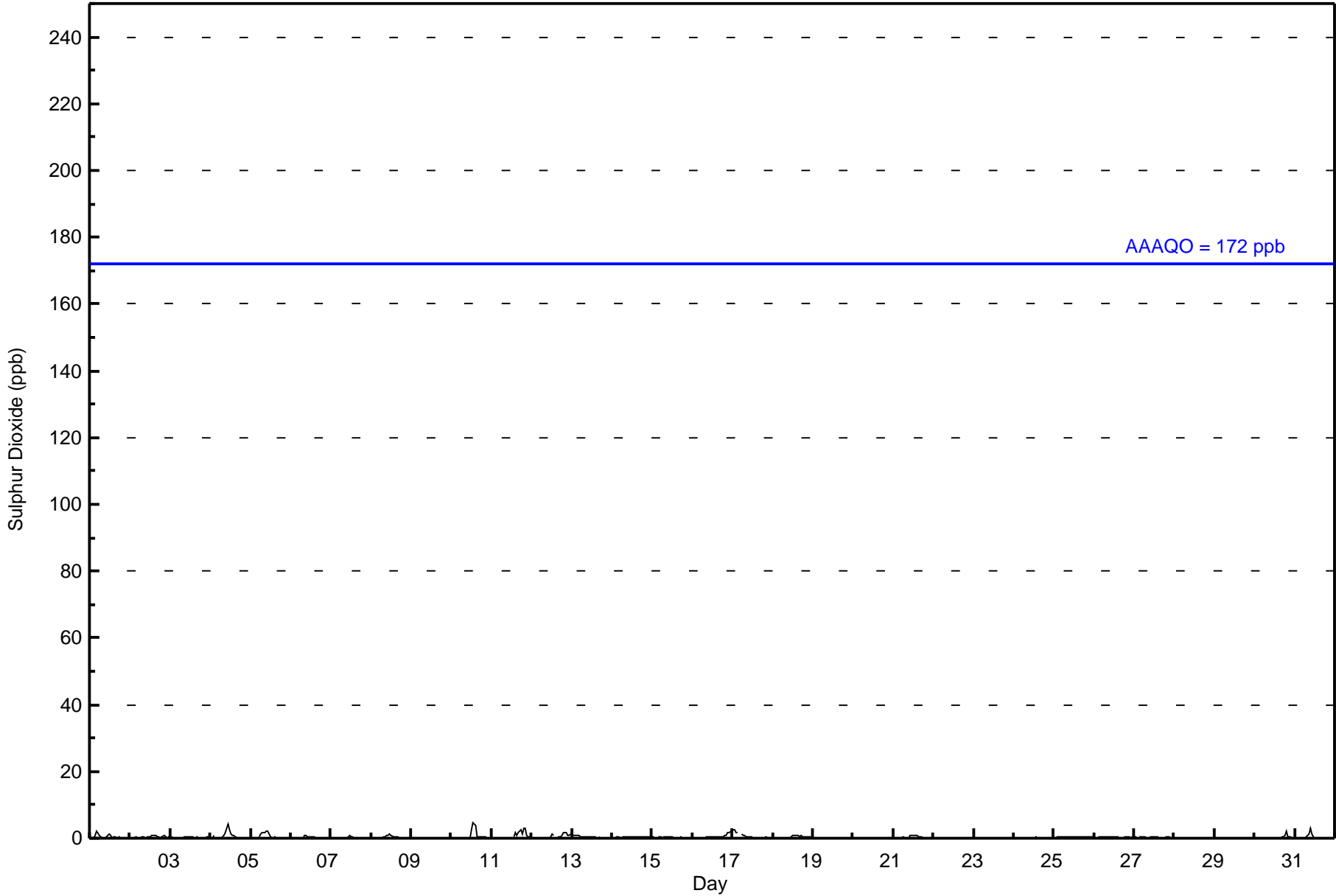
Janvier - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 5 ppb on Jan 10 14:00 Maximum Daily Average: 0.9 ppb on Jan 11																	Hours in Service: 744 Hours of Data: 707																																
Minimum Value: 0 ppb on Jan 4 22:00 Minimum Daily Average: 0.0 ppb on Jan 22 Maximum Diurnal Average: 0.5 ppb at hour 11 Minimum Diurnal Average: 0.2 ppb at hour 7																	Hours of Missing Data: 37 Hours of Calibration: 35																																
Monthly Average: 0.3 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 3																	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-Jan	Z	0	0	1	2	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2																						
2-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	1	0	0	0	0.4	1																							
3-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
4-Jan	0	0	1	Z	0	0	0	0	1	2	4	3	1	1	1	0	0	0	0	0	0	0	0	0	0.6	4																							
5-Jan	0	0	0	0	Z	0	1	2	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2																							
6-Jan	0	0	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																							
7-Jan	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.1	1																							
8-Jan	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1																							
9-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
10-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	2	5	4	0	0	0	0	1	0	0	0	0	0.6	5																							
11-Jan	0	0	0	0	Z	0	0	0	0	C	C	C	C	1	2	1	2	2	1	3	3	1	0	0	0.9	3																							
12-Jan	0	0	0	0	0	Z	0	0	0	0	0	1	1	1	M	1	0	0	1	2	2	1	1	1	0.5	2																							
13-Jan	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	PF	0	0	0	0	0	0	0	0	0.4	1																							
14-Jan	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																							
15-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
16-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	0.5	2																							
17-Jan	2	2	2	2	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2																							
18-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0.3	1																							
19-Jan	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																							
20-Jan	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																							
21-Jan	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0.3	1																							
22-Jan	0	0	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																							
23-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
24-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
25-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.4	1																						
26-Jan	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																							
27-Jan	0	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																							
28-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
29-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
30-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0.2	2																							
31-Jan	Z	0	0	0	0	0	0	0	1	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	3																							
																								0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.5	0.4	0.4	0.5	0.4	0.2	0.2	0.3	0.2	0.4	0.3	0.2	0.2	0.2	Diurnal Average	
																								2	2	2	2	2	1	1	2	2	3	4	3	2	5	4	1	2	2	2	1	3	3	2	2	2	Diurnal Maximum
Z - zerospan C - Calibration M - Maintenance PF - Power Failure Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																																																	



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Janvier - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Janvier - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	707	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: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Janvier - January 2017

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	64	62	5	2	4	7	13	18	141	230	45	49	31	11	12	13	707
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
Totals	64	62	5	2	4	7	13	18	141	230	45	49	31	11	12	13	707

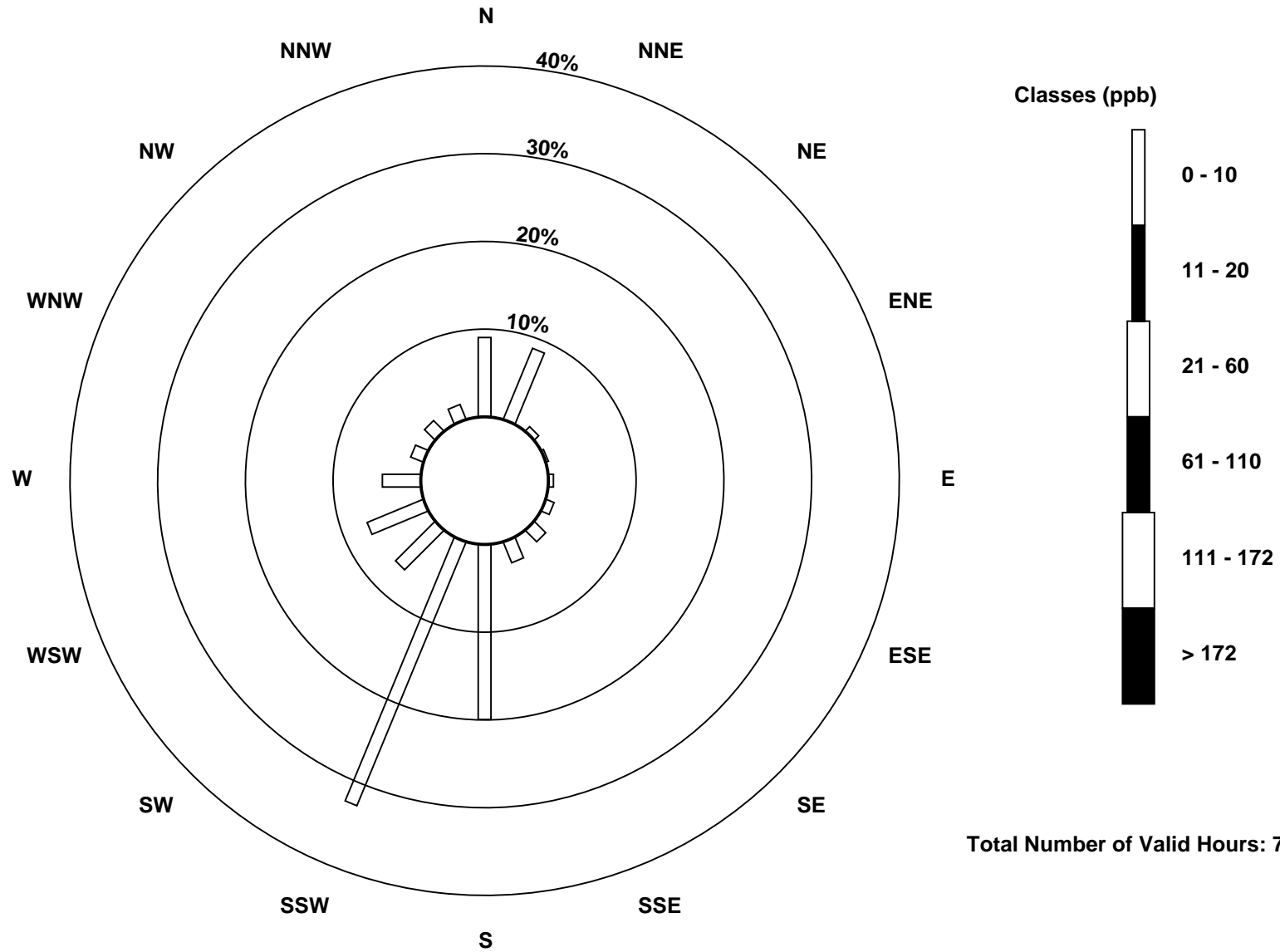
Total Number of Valid Hours: 707

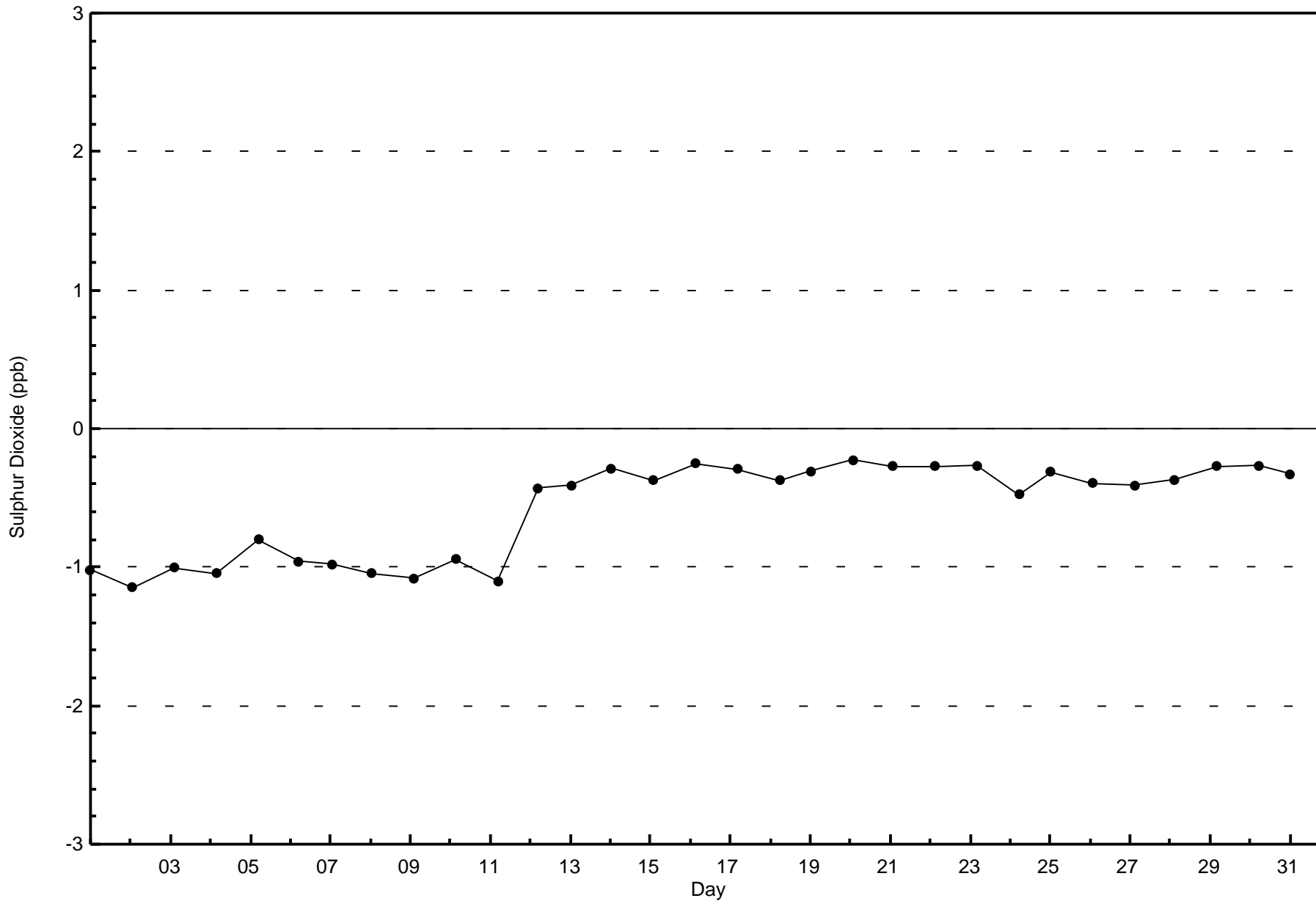
Total Number of Hours: 744

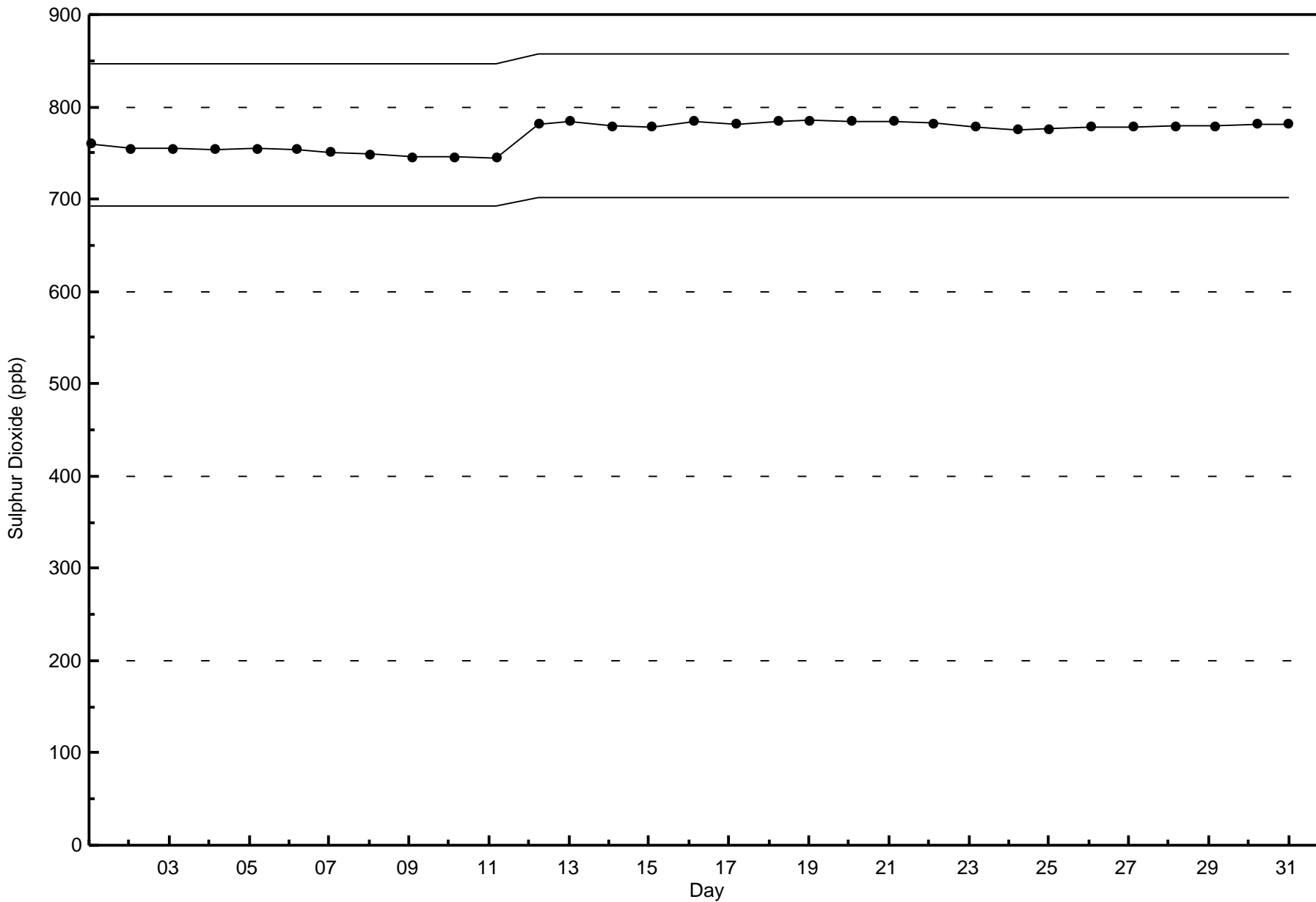


Wood Buffalo Environmental Association
Wind Rose 2016

Sulphur Dioxide (SO₂) - ppb
Janvier (AMS 22)









Wood Buffalo Environmental Association

Summary of Hour Averages

Total Reduced Sulphur (TRS) - ppb

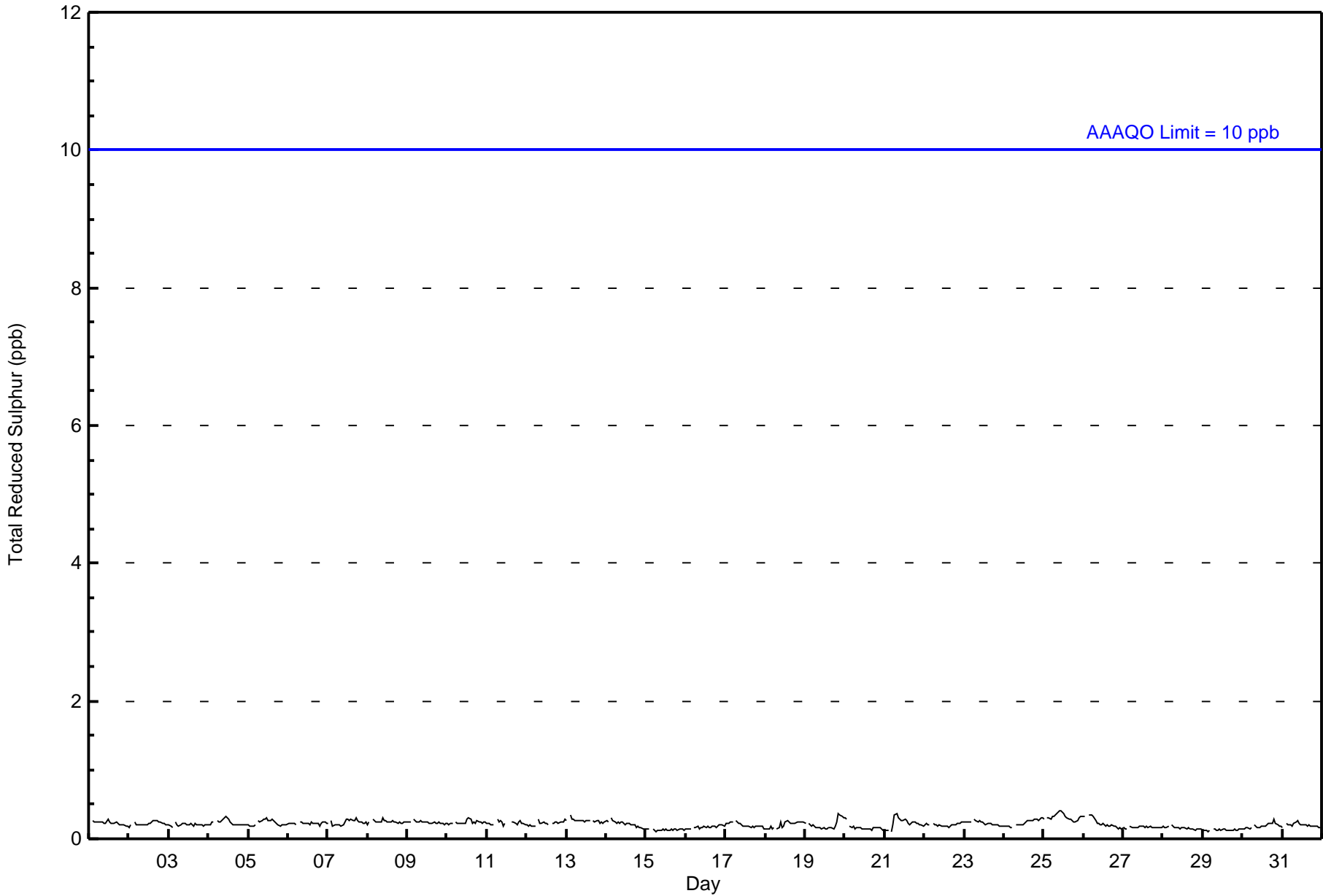
Janvier - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744										Daily Average		Daily Maximum				
Maximum Value: 0 ppb on Jan 25 10:00										Maximum Daily Average: 0.3 ppb on Jan 25										Hours of Data: 708						
Minimum Value: 0 ppb on Jan 29 04:00										Minimum Daily Average: 0.1 ppb on Jan 29										Hours of Missing Data: 36						
Maximum Diurnal Average: 0.2 ppb at hour 10										Minimum Diurnal Average: 0.2 ppb at hour 2										Hours of Calibration: 34						
Monthly Average: 0.2 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 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-Jan	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
2-Jan	0	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
3-Jan	0	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
4-Jan	0	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
5-Jan	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
6-Jan	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
7-Jan	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
8-Jan	0	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
9-Jan	0	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
10-Jan	0	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
11-Jan	0	0	0	0	0	Z	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0.2	0
12-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0.2	0
13-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	PF	0	0	0	0	0	0	0	0	0.3	0
14-Jan	0	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
15-Jan	0	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
16-Jan	0	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
17-Jan	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
18-Jan	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
19-Jan	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
20-Jan	0	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
21-Jan	0	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
22-Jan	0	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
23-Jan	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
24-Jan	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
25-Jan	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
26-Jan	0	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
27-Jan	0	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
28-Jan	0	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
29-Jan	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
30-Jan	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
31-Jan	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
0.2																								Diurnal Average		
0																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance PF - Power Failure																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Janvier - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Janvier - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
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
Janvier - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	61	64	6	2	4	7	13	19	139	228	46	49	32	11	13	13	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
Totals	61	64	6	2	4	7	13	19	139	228	46	49	32	11	13	13	707

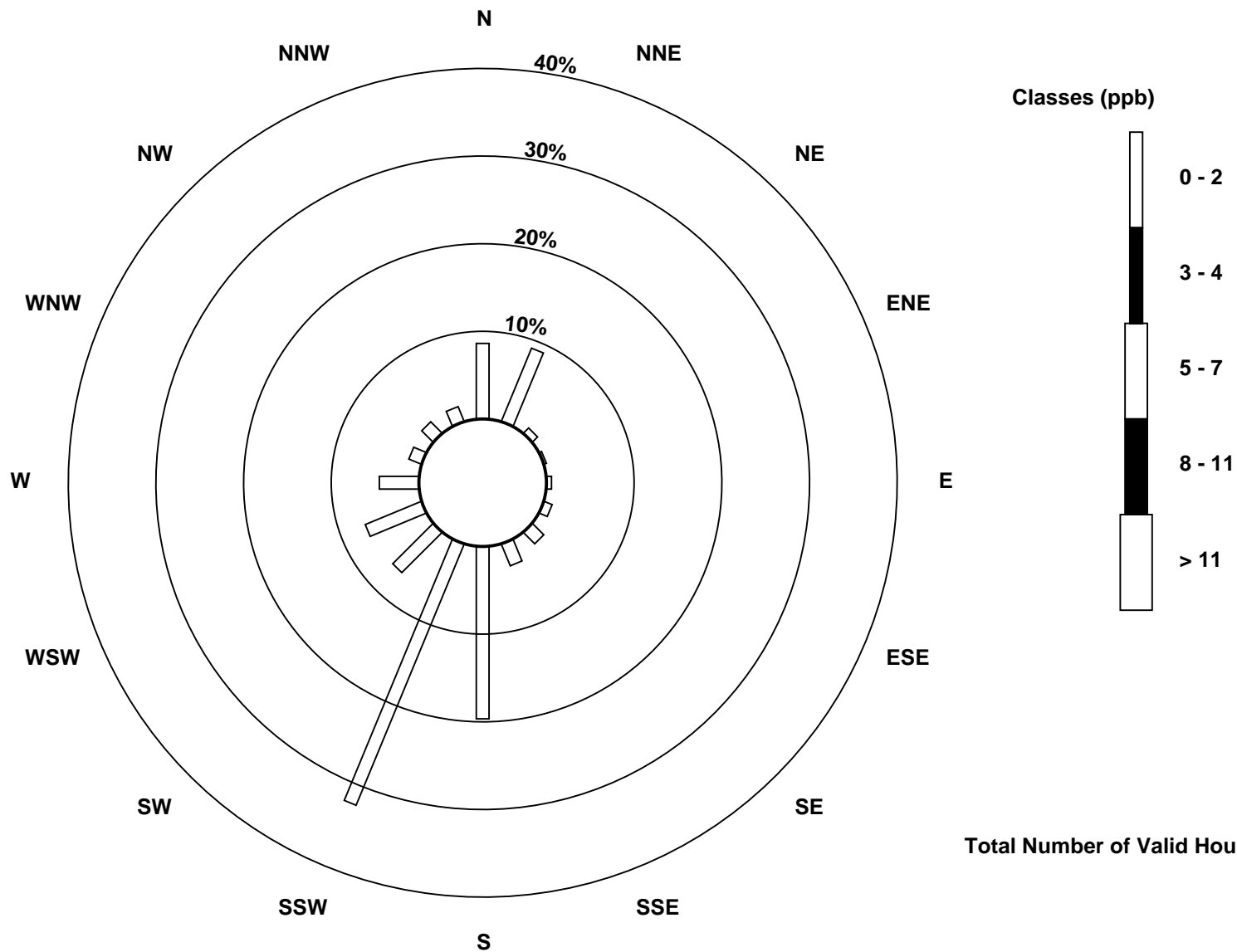
Total Number of Valid Hours: 707

Total Number of Hours: 744

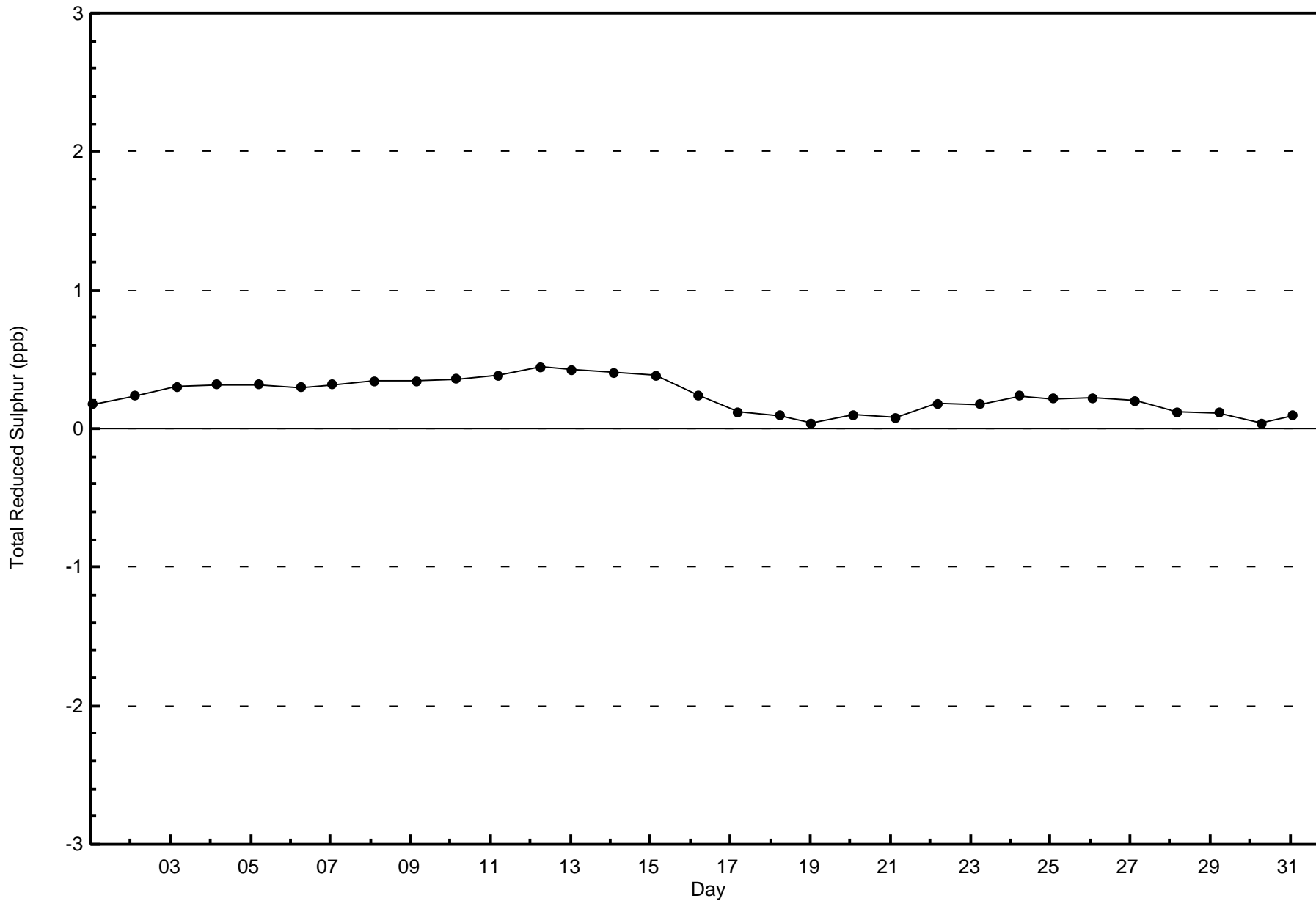


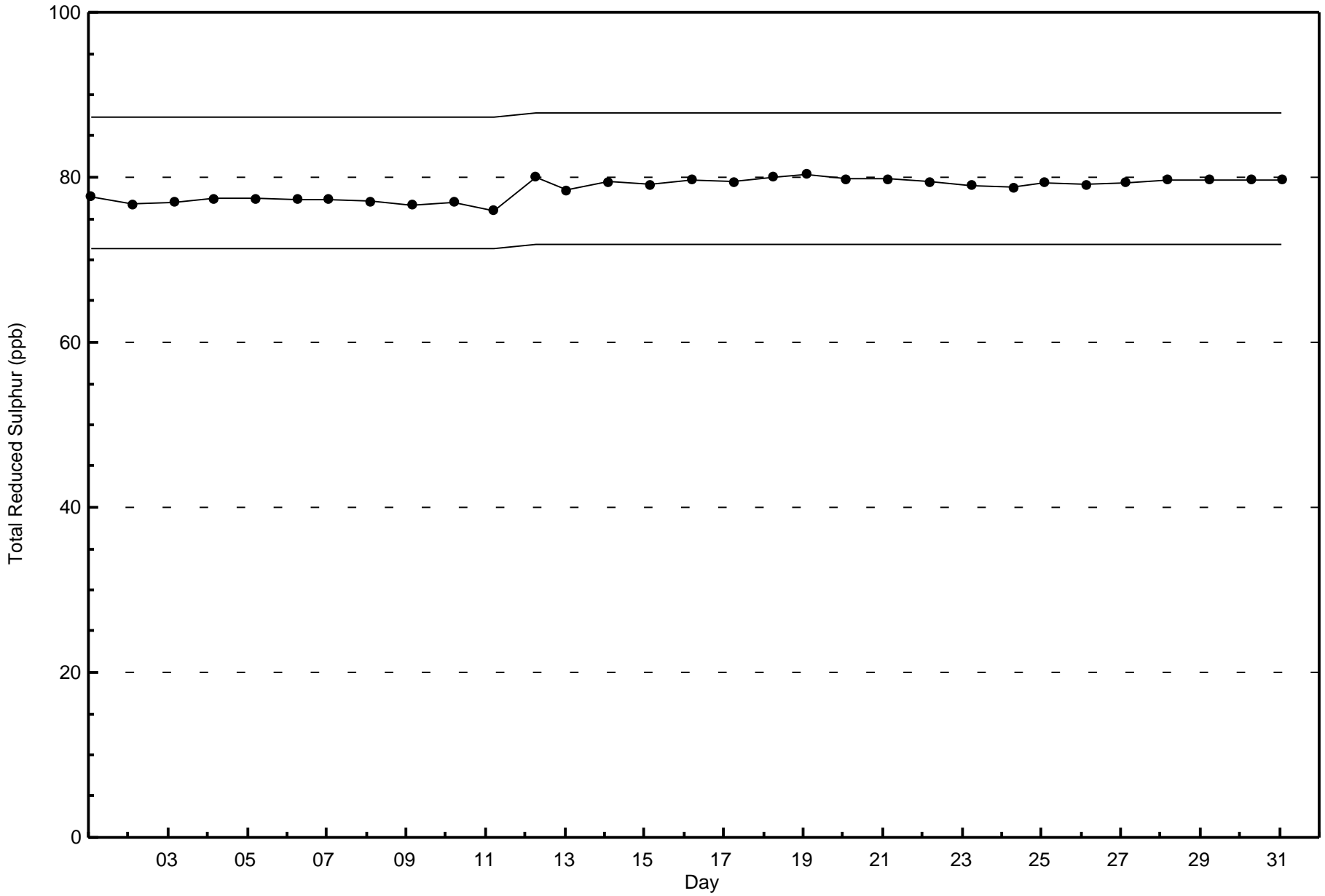
Wood Buffalo Environmental Association
Wind Rose 2016

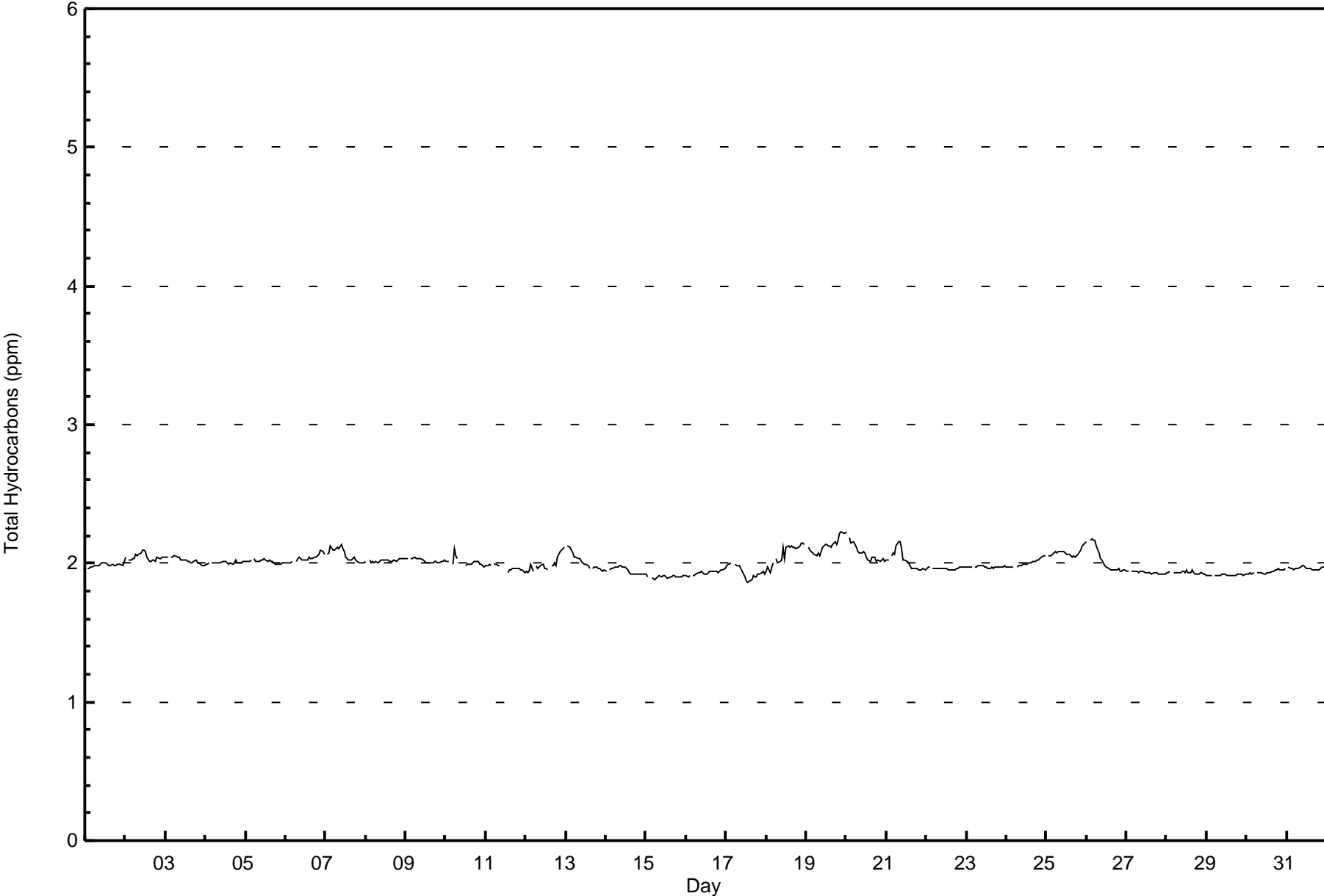
Total Reduced Sulphur (TRS) - ppb
Janvier (AMS 22)



Total Number of Valid Hours: 707









Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Janvier - January 2017

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	584	83.07	83.07
2.1 - 3.0	119	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: 703

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Janvier - January 2017

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	56	53	4	1	3	7	9	14	106	180	44	48	29	11	10	9	584
2.1 - 3.0	8	9	0	1	1	0	4	3	35	48	1	1	2	0	2	4	119
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
Totals	64	62	4	2	4	7	13	17	141	228	45	49	31	11	12	13	703

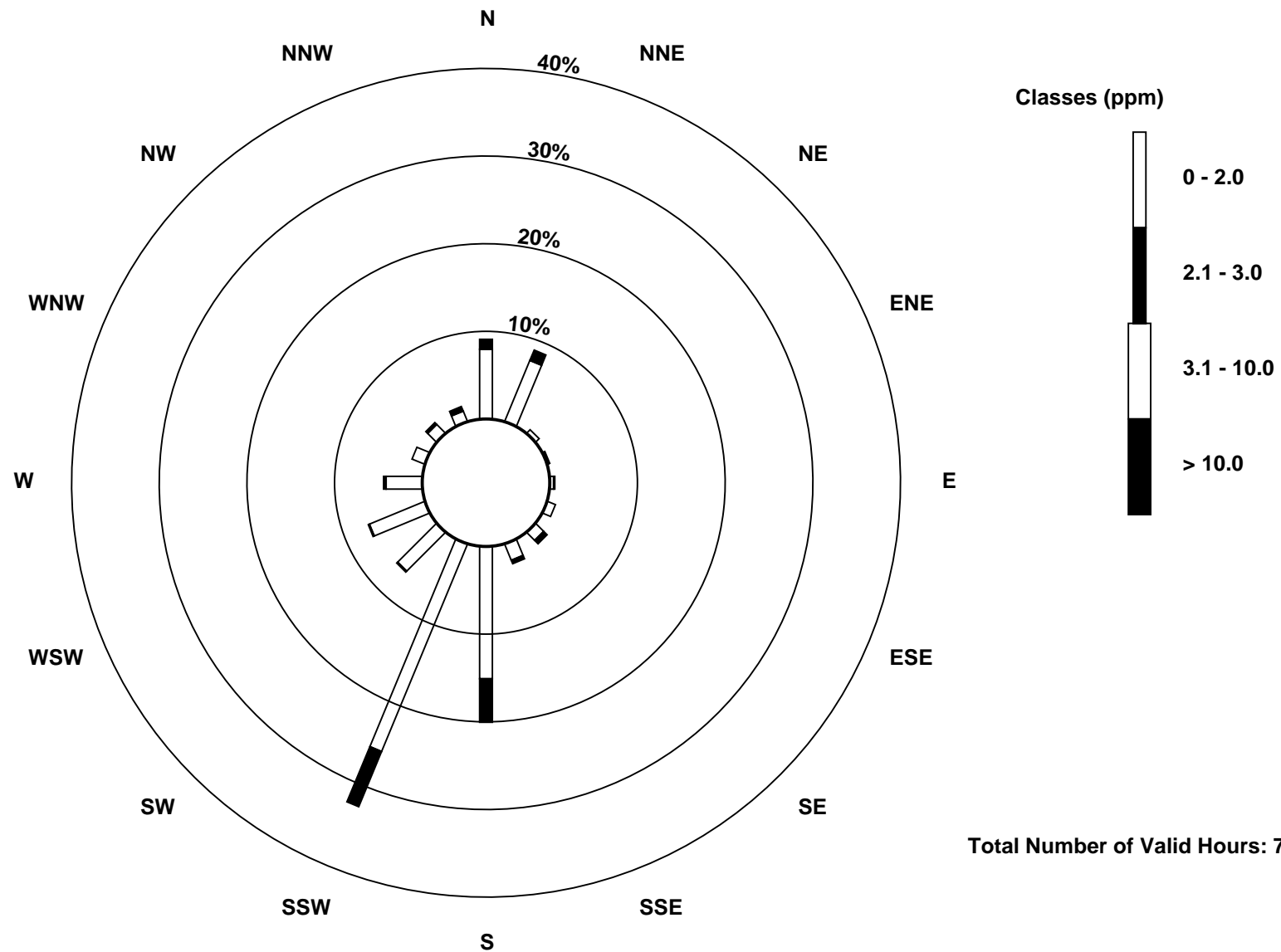
Total Number of Valid Hours: 703

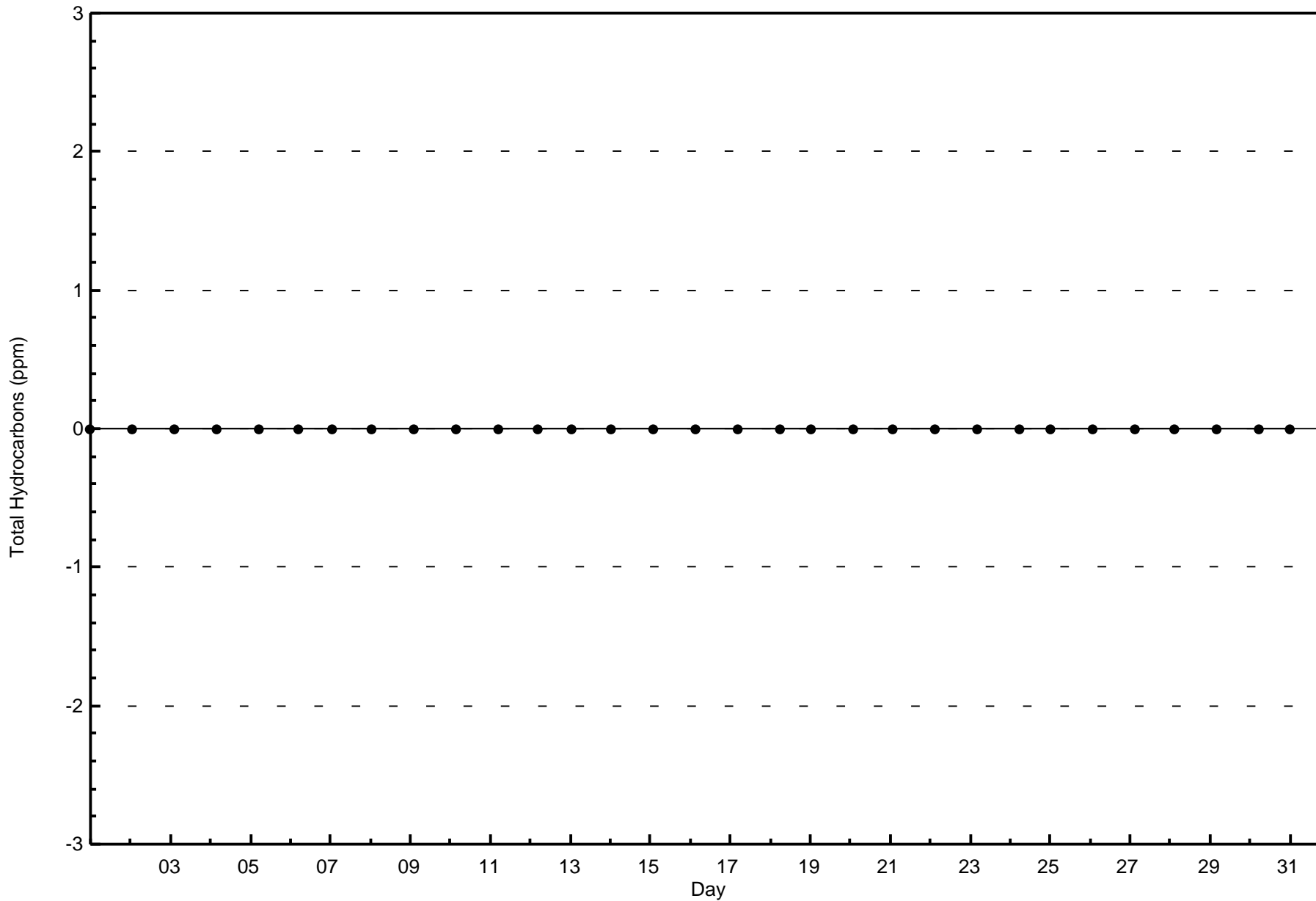
Total Number of Hours: 744

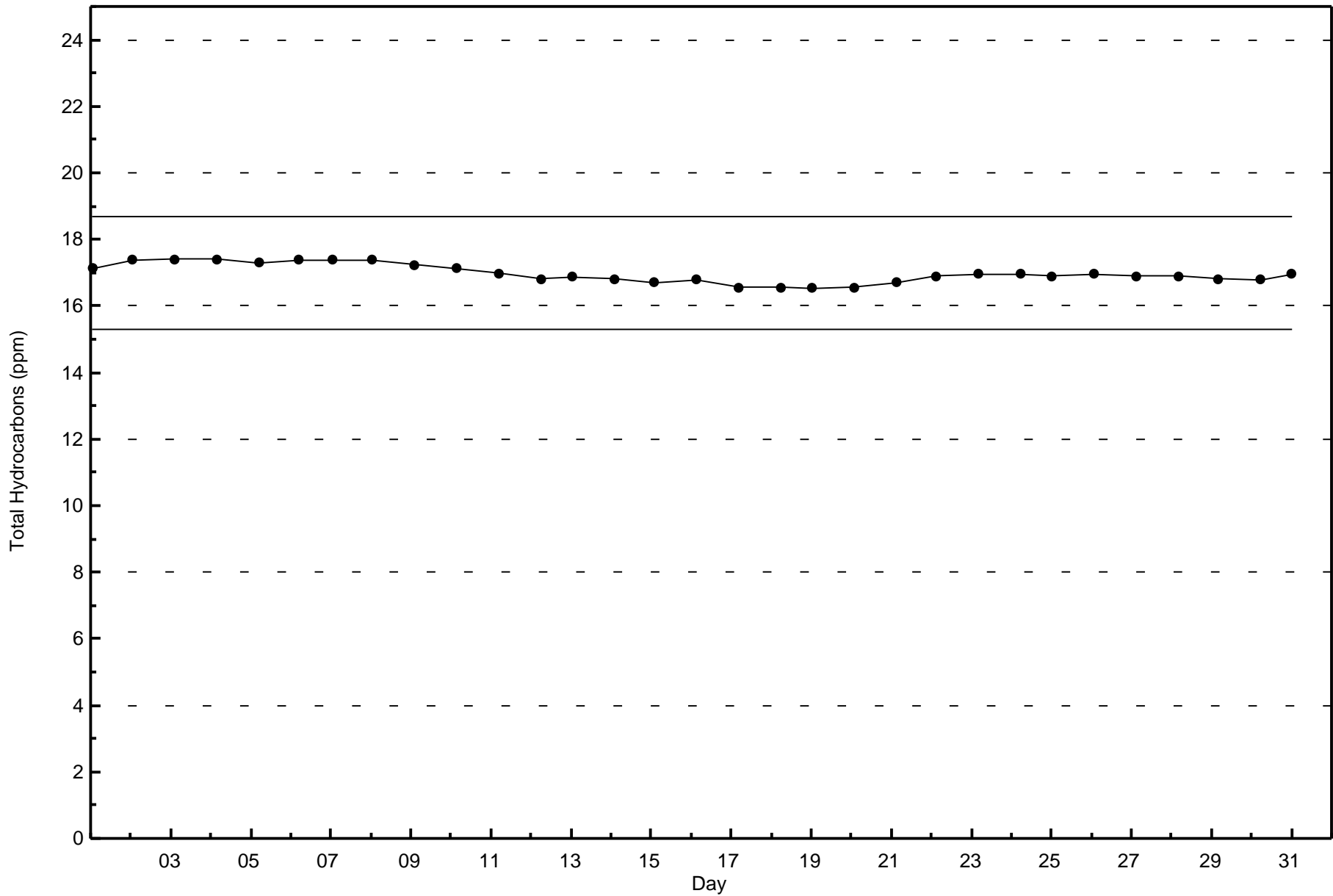


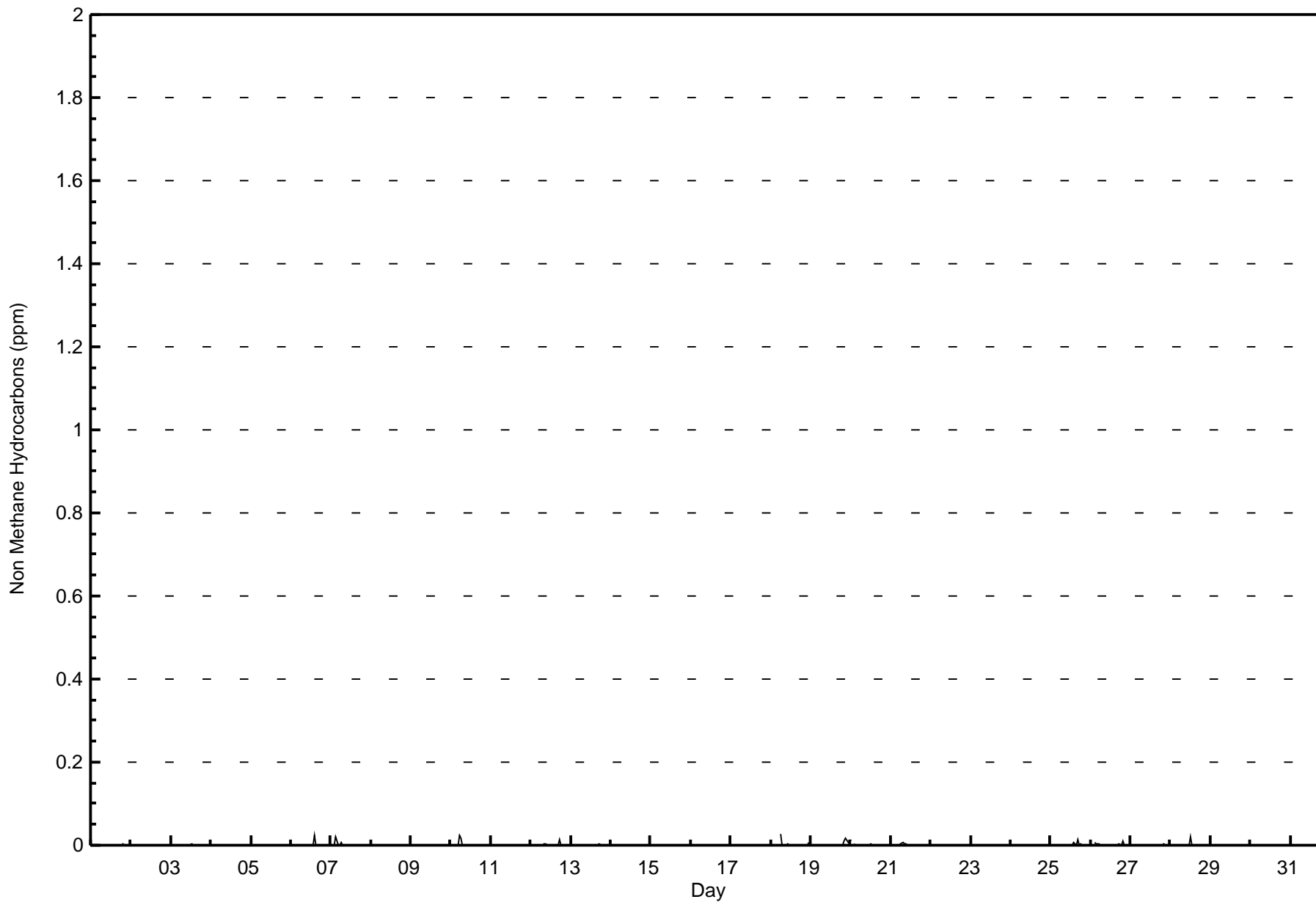
Wood Buffalo Environmental Association
Wind Rose 2016

Total Hydrocarbons (THC) - ppm
Janvier (AMS 22)











**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm
Janvier - January 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	686	97.58	97.58
0.006 - 0.05	17	2.42	100.00
0.06 - 0.1	0	0.00	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



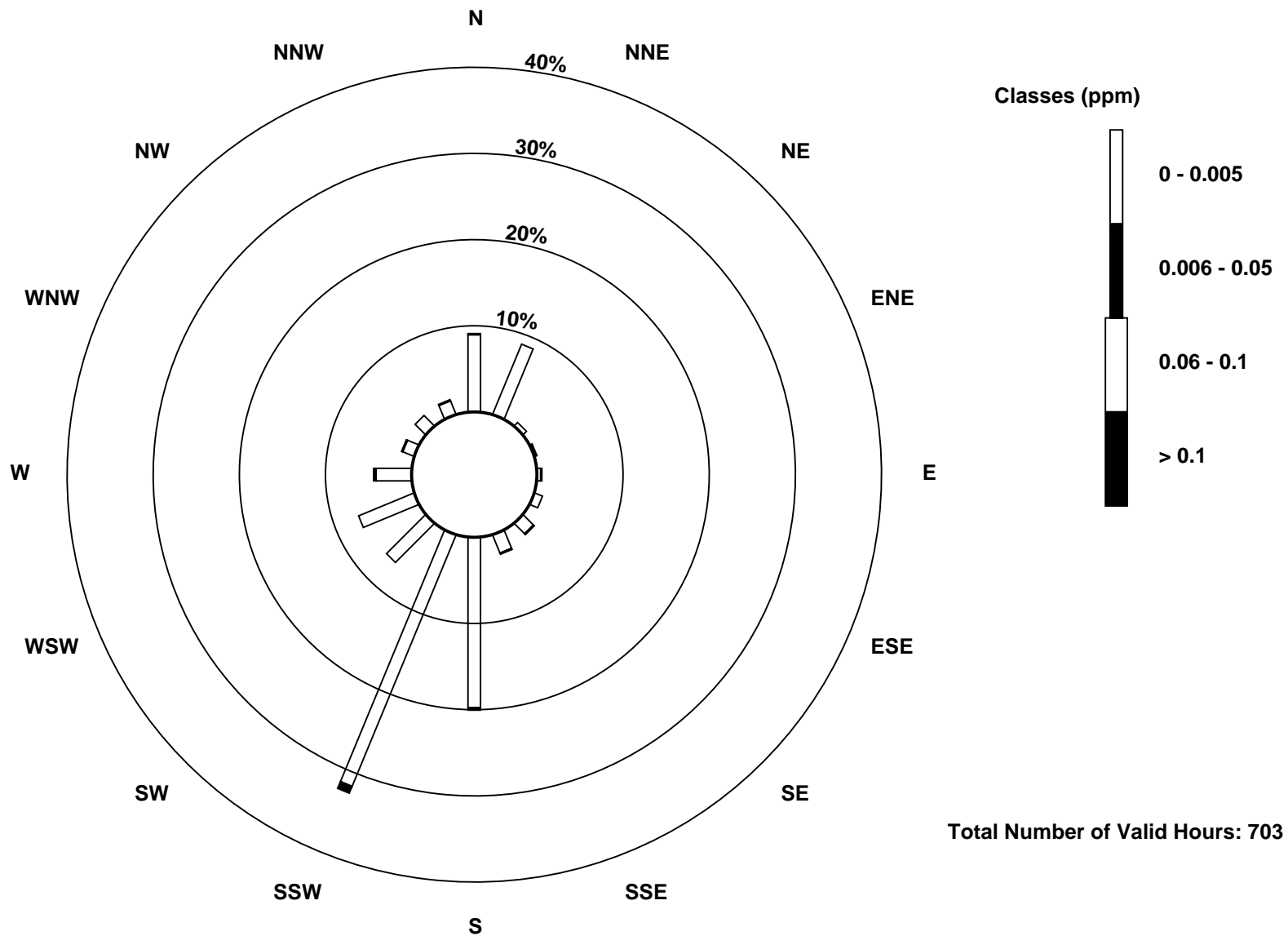
**Wood Buffalo Environmental Association
Frequency Distribution**

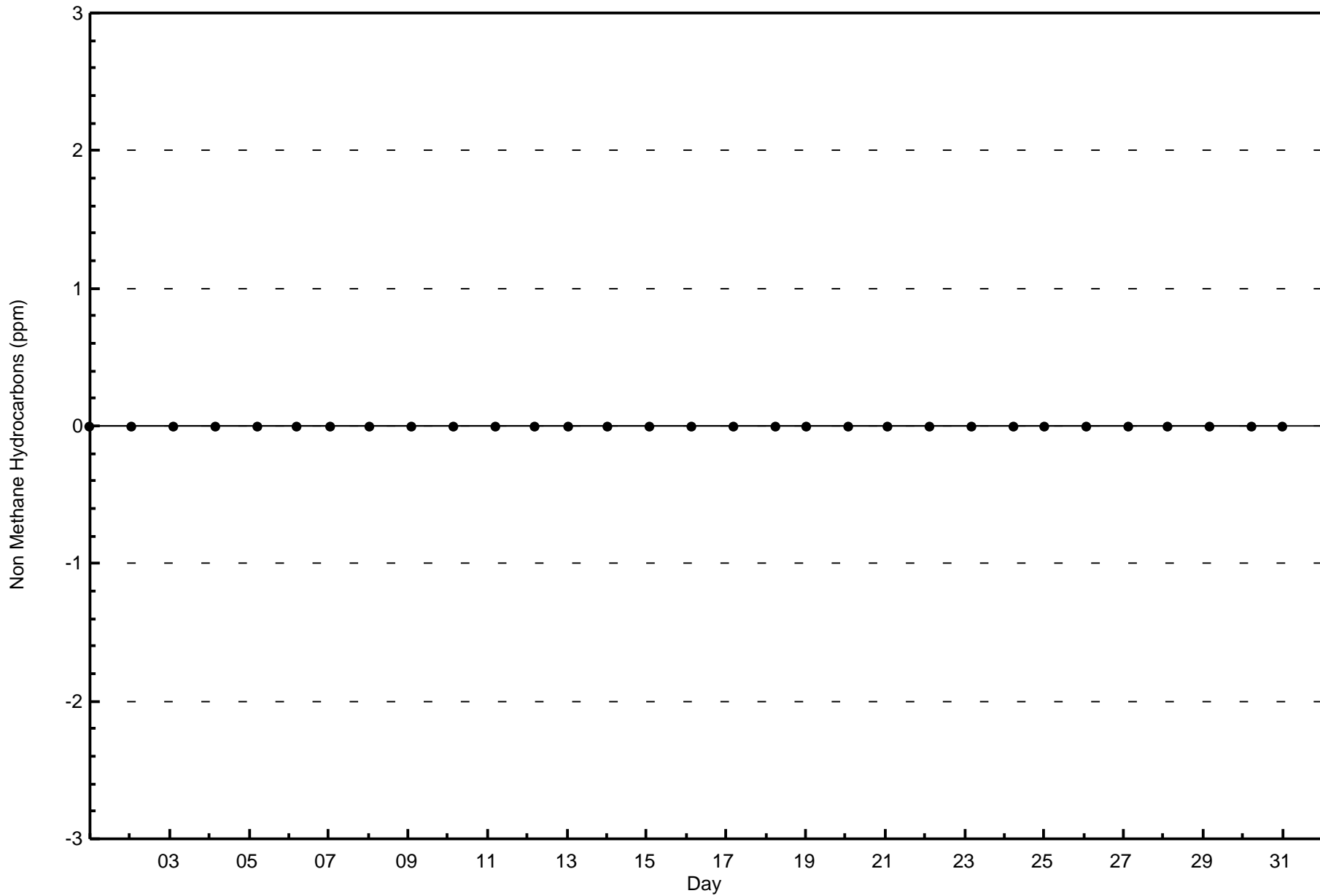
**Non Methane Hydrocarbons (NMHC) - ppm
Janvier - January 2017**

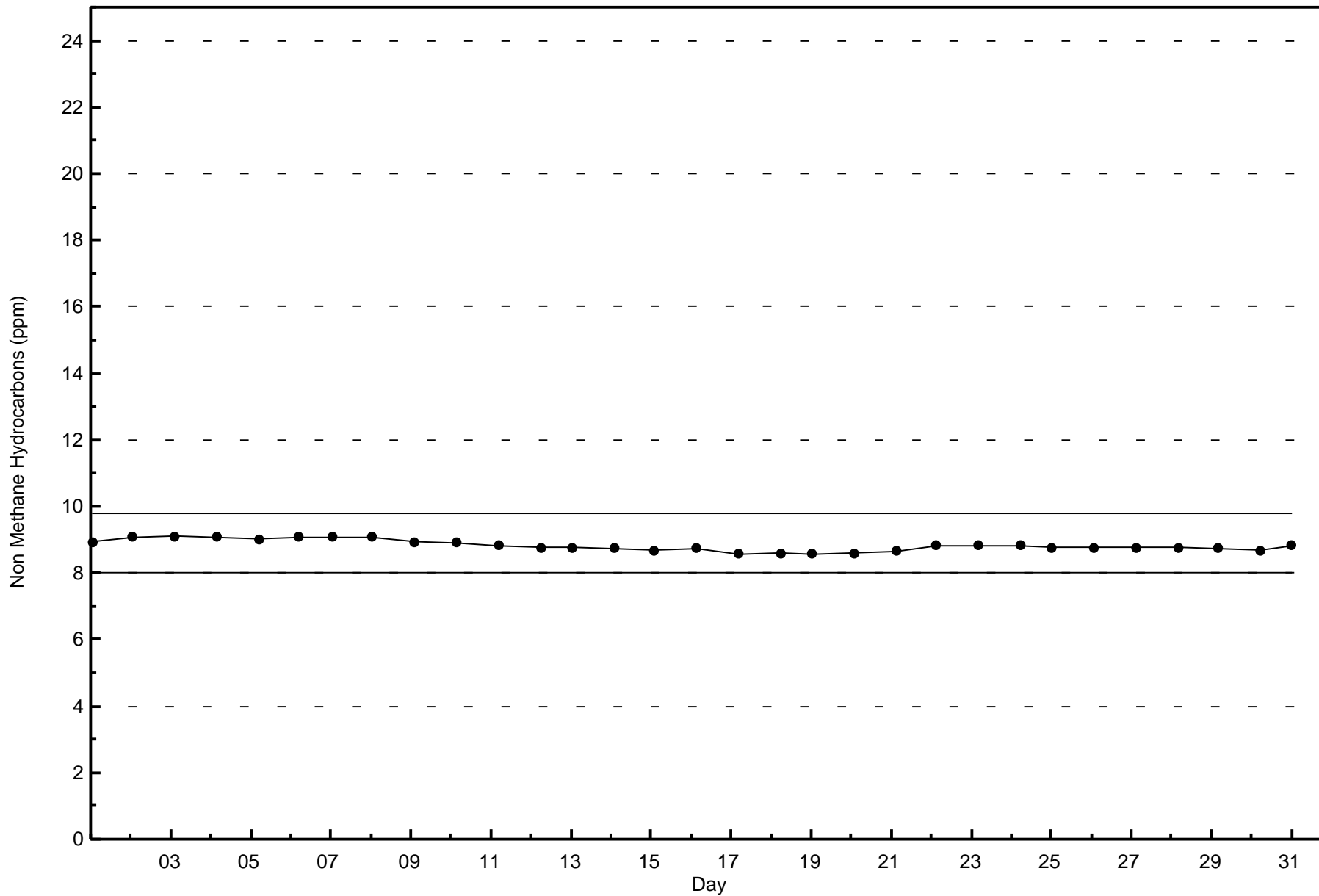
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	63	62	4	1	3	7	12	16	139	222	45	49	29	10	12	12	686
0.006 - 0.05	1	0	0	1	1	0	1	1	2	6	0	0	2	1	0	1	17
0.06 - 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	64	62	4	2	4	7	13	17	141	228	45	49	31	11	12	13	703

Total Number of Valid Hours: 703

Total Number of Hours: 744



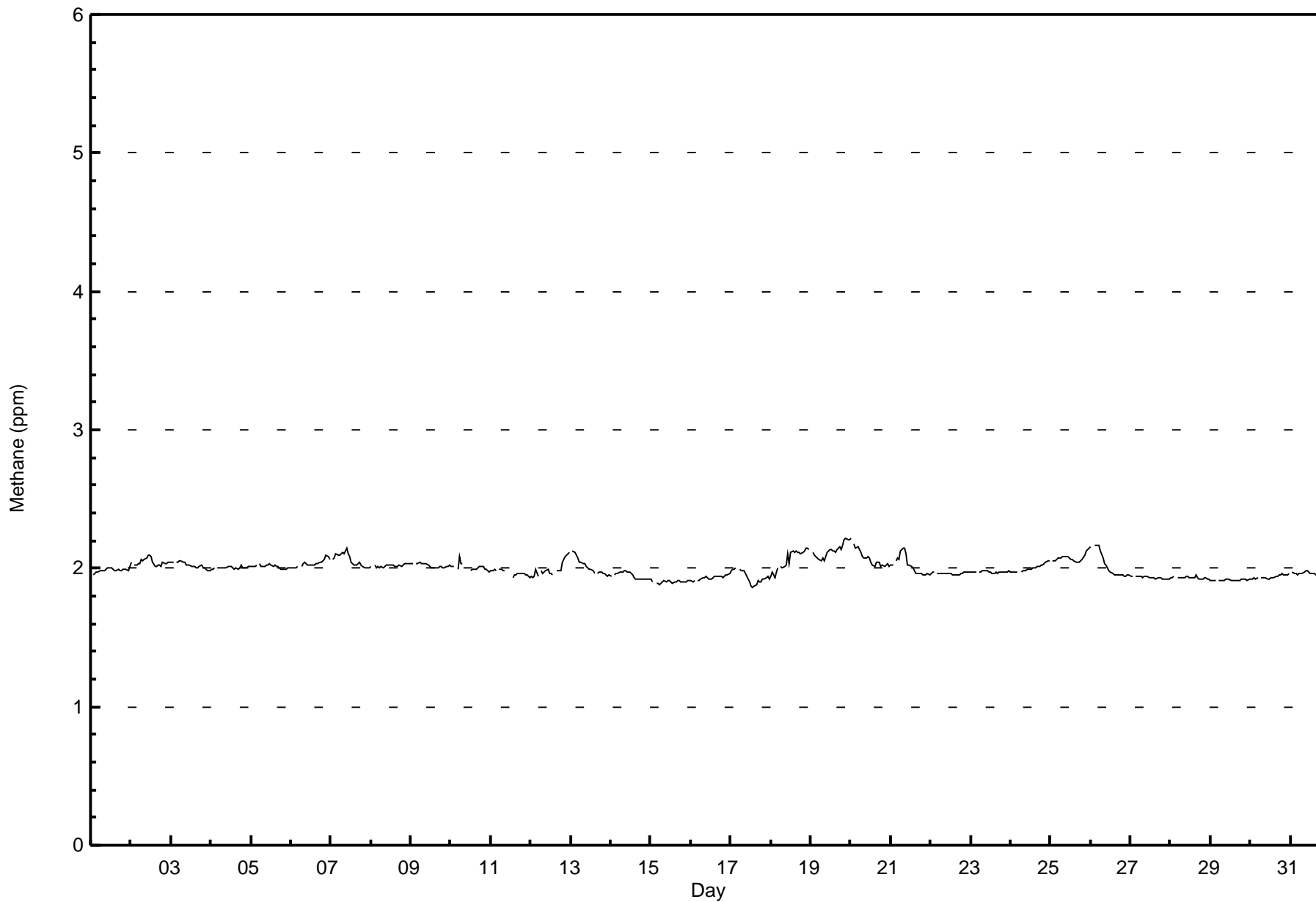






Wood Buffalo Environmental Association
Hourly Averages

Methane (CH₄) - ppm
Janvier - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Methane (CH₄) - ppm
Janvier - January 2017**

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	586	83.36	83.36
2.1 - 3.0	117	16.64	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Methane (CH₄) - ppm
Janvier - January 2017**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	56	53	4	1	3	7	9	14	106	182	44	48	29	11	10	9	586
2.1 - 3.0	8	9	0	1	1	0	4	3	35	46	1	1	2	0	2	4	117
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
Totals	64	62	4	2	4	7	13	17	141	228	45	49	31	11	12	13	703

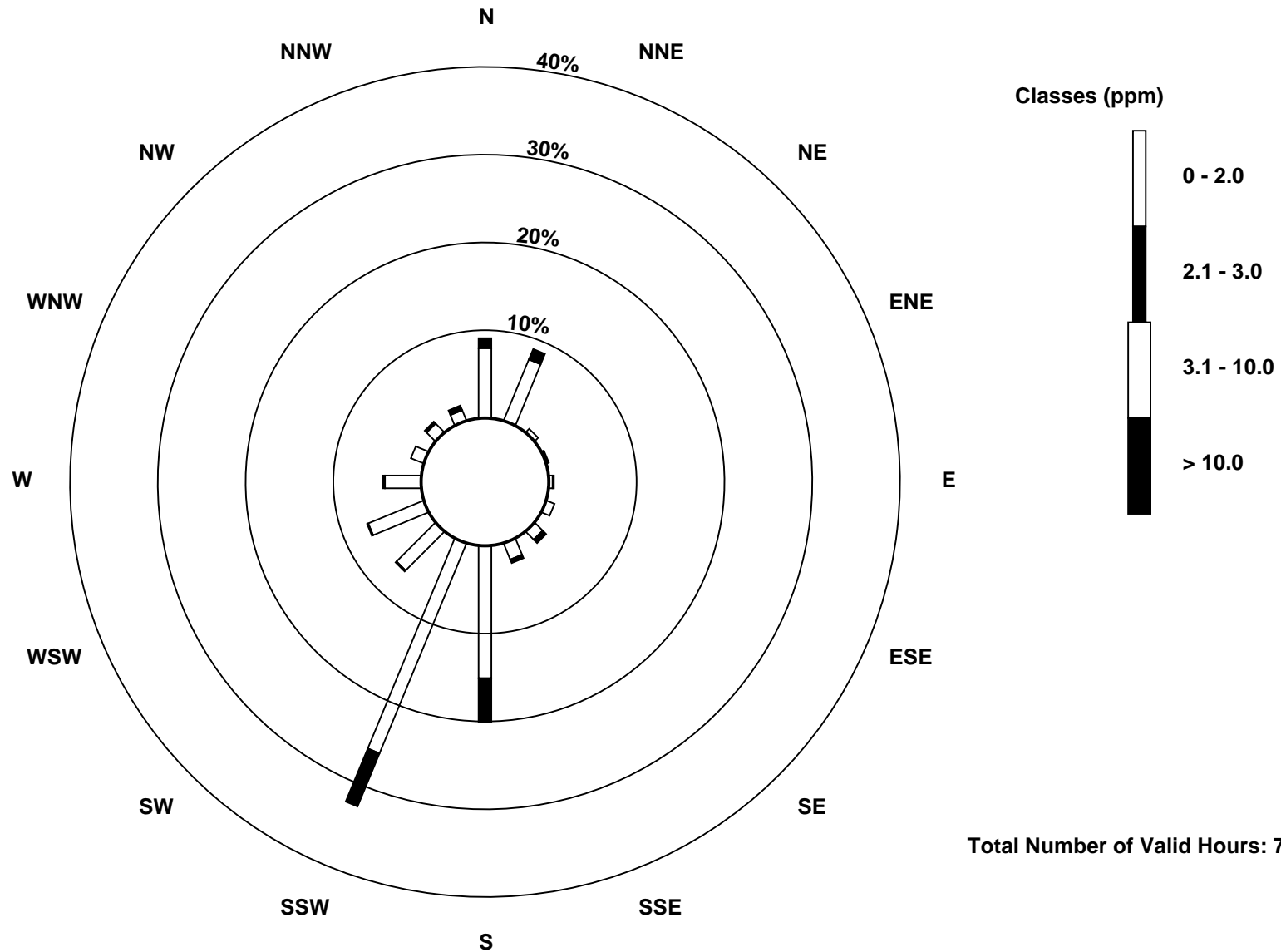
Total Number of Valid Hours: 703

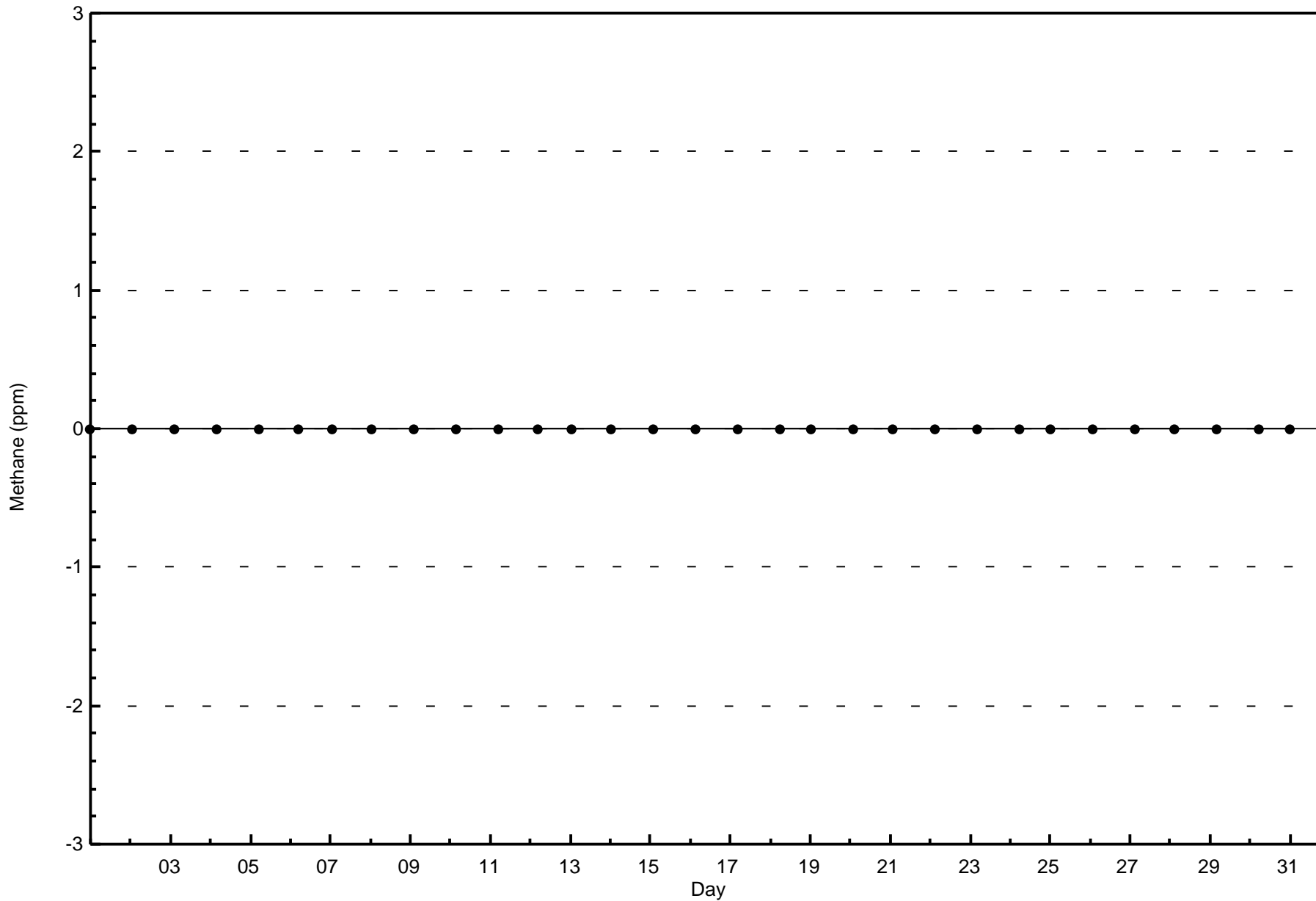
Total Number of Hours: 744

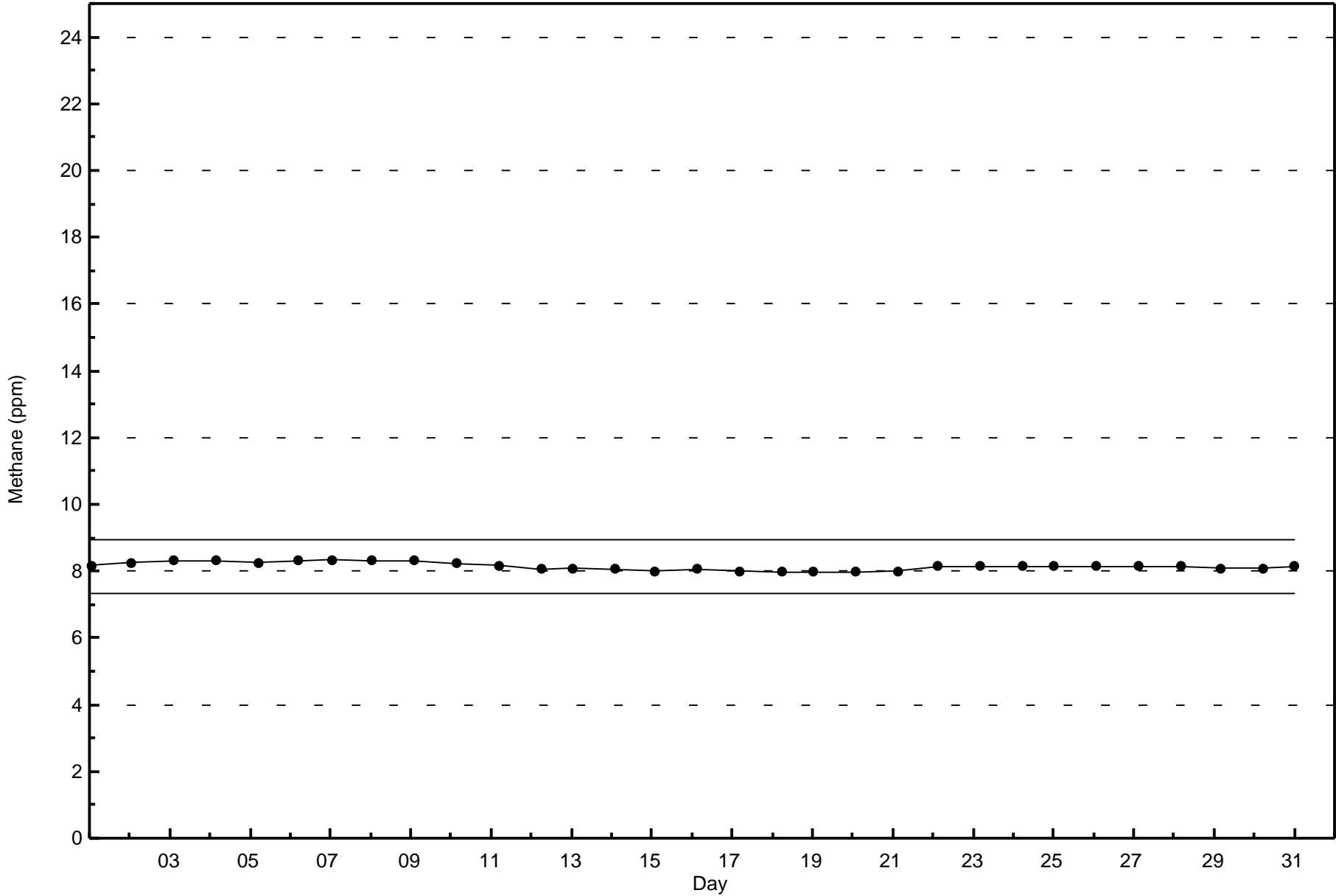


Wood Buffalo Environmental Association
Wind Rose 2016

Methane (CH₄) - ppm
Janvier (AMS 22)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

Janvier - January 2017

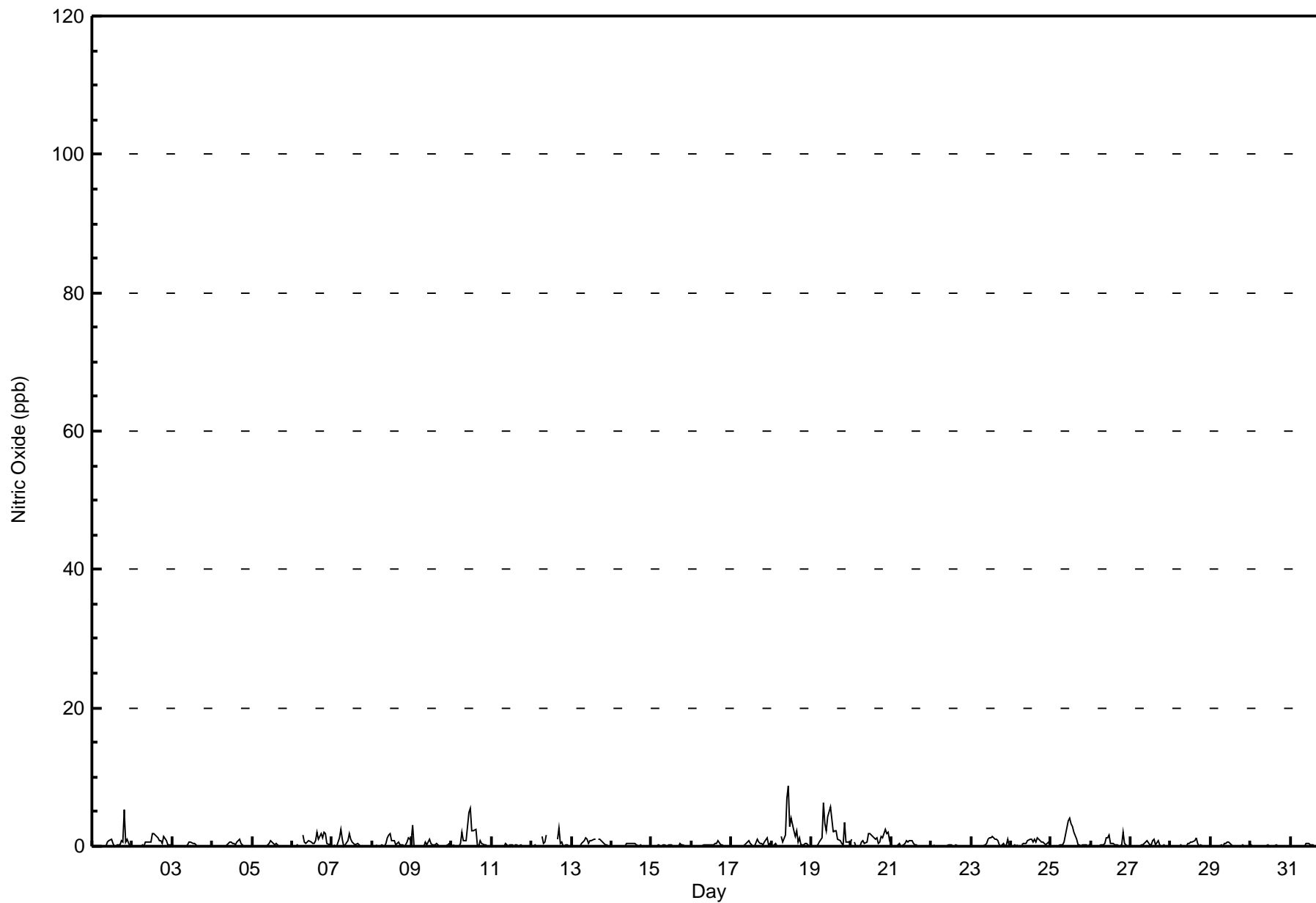
Maximum Value: 9 ppb on Jan 18 11:00																	Maximum Daily Average: 1.8 ppb on Jan 19																	Hours in Service: 744	
Minimum Value: 0 ppb on Jan 2 04:00																	Minimum Daily Average: 0.1 ppb on Jan 22																	Hours of Data: 707	
Maximum Diurnal Average: 1.3 ppb at hour 11																	Minimum Diurnal Average: 0.0 ppb at hour 4																	Hours of Missing Data: 37	
Monthly Average: 0.5 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 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-Jan	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	1	5	1	1	0	0	0.5	5									
2-Jan	0	Z	0	0	0	0	0	0	1	1	1	1	2	2	1	1	1	1	1	1	1	0	0	0	0.6	2									
3-Jan	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1									
4-Jan	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0.2	1									
5-Jan	0	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0.1	1									
6-Jan	0	0	0	0	0	Z	2	1	0	1	1	1	0	0	1	2	1	2	1	2	2	0	0	1	0.8	2									
7-Jan	Z	0	0	0	1	2	1	0	0	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0.5	2									
8-Jan	0	Z	0	0	0	0	0	0	0	1	2	2	1	1	0	0	1	0	0	0	0	1	1	1	0.5	2									
9-Jan	3	0	Z	0	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0.3	3									
10-Jan	0	0	0	Z	0	0	2	1	1	3	5	6	2	2	2	0	0	1	0	0	0	0	0	0	1.2	6									
11-Jan	0	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									
12-Jan	0	0	0	0	0	Z	1	0	1	2	C	C	C	C	C	1	3	0	1	0	0	0	0	0	0.5	3									
13-Jan	Z	0	0	0	0	0	0	1	1	1	0	1	1	1	1	PF	1	1	1	0	0	0	0	0	0.5	1									
14-Jan	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									
15-Jan	0	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									
16-Jan	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									
17-Jan	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	1	1	0	1	0	1	1	0	0	0.3	1									
18-Jan	0	0	0	0	0	Z	1	1	2	7	9	3	4	2	1	2	1	1	0	0	0	0	0	0	1.6	9									
19-Jan	Z	0	0	0	0	1	1	6	3	2	4	6	4	2	2	2	1	1	0	0	4	1	1	0	1.8	6									
20-Jan	1	Z	1	0	0	0	1	1	0	1	2	2	2	1	1	1	1	1	1	1	2	2	2	1	1.0	2									
21-Jan	0	0	Z	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1									
22-Jan	0	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									
23-Jan	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	1	0	0.5	1									
24-Jan	0	0	0	0	0	Z	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0.5	1									
25-Jan	Z	0	0	0	0	0	0	0	1	3	4	4	3	3	2	1	0	0	0	0	0	0	0	0	1.0	4									
26-Jan	0	Z	0	0	0	0	0	0	0	1	1	2	0	0	0	0	0	0	0	2	0	0	0	0	0.4	2									
27-Jan	0	0	Z	0	0	0	0	0	0	1	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0.3	1									
28-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0.2	1									
29-Jan	0	0	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1									
30-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
31-Jan	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									
																	Diurnal Average		Diurnal Maximum																
																	0.2		3																
																	0.0		0																
																	0.1		1																
																	0.0		0																
																	0.1		1																
																	0.2		2																
																	0.4		2																
																	0.4		6																
																	0.5		3																
																	0.9		7																
																	1.3		9																
																	1.2		6																
																	0.9		4																
																	0.7		3																
																	0.7		2																
																	0.6		2																
																	0.5		3																
																	0.4		2																
																	0.3		1																
																	0.5		5																
																	0.4		4																
																	0.3		2																
																	0.2		2																
																	0.1		1																

Z - zerspan C - Calibration PF - Power Failure



Wood Buffalo Environmental Association
Hourly Averages

Nitric Oxide (NO) - ppb
Janvier - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb
Janvier - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
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
Janvier - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	65	63	5	2	4	7	13	18	139	228	45	49	32	12	12	13	707
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
Totals	65	63	5	2	4	7	13	18	139	228	45	49	32	12	12	13	707

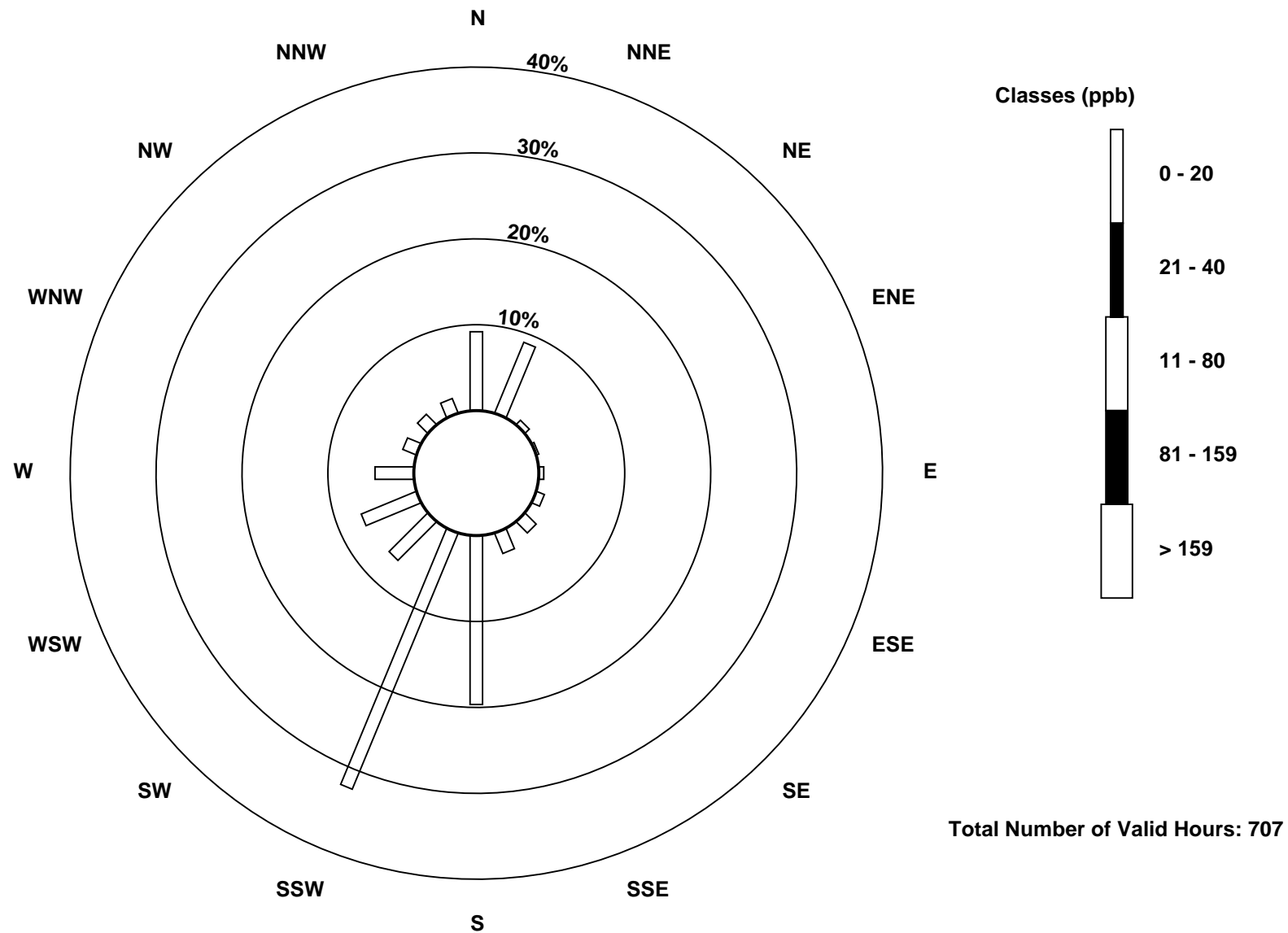
Total Number of Valid Hours: 707

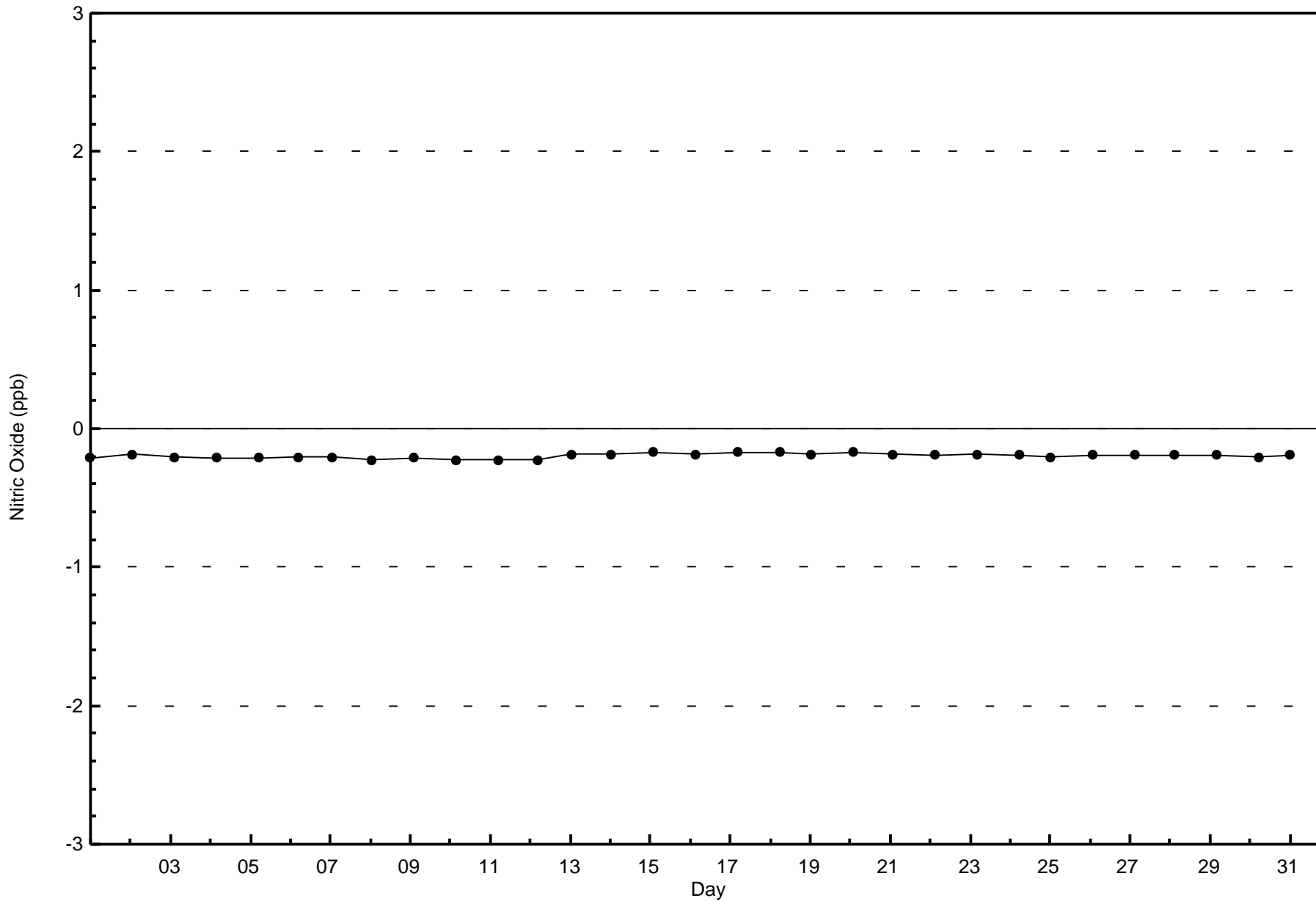
Total Number of Hours: 744

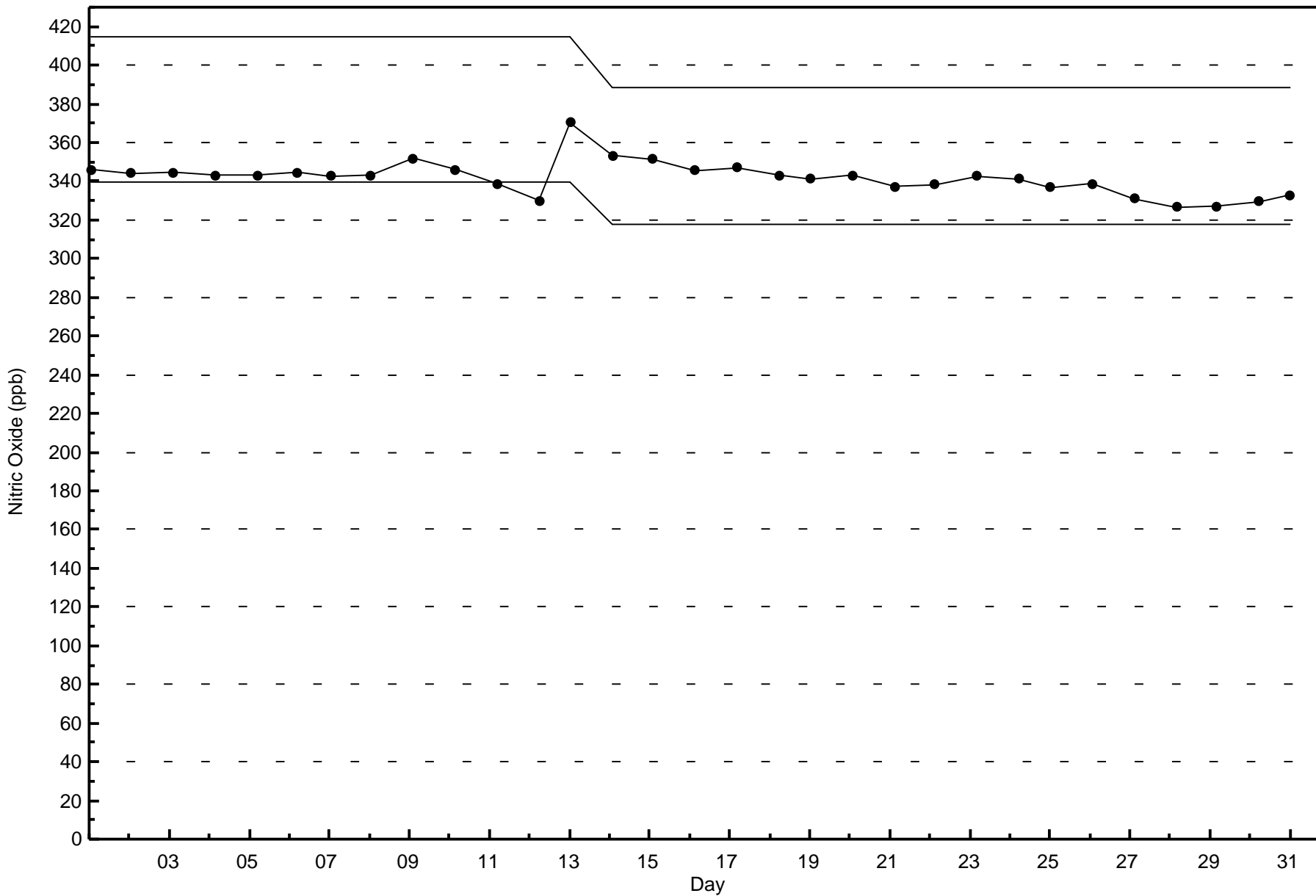


Wood Buffalo Environmental Association
Wind Rose 2016

Nitric Oxide (NO) - ppb
Janvier (AMS 22)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

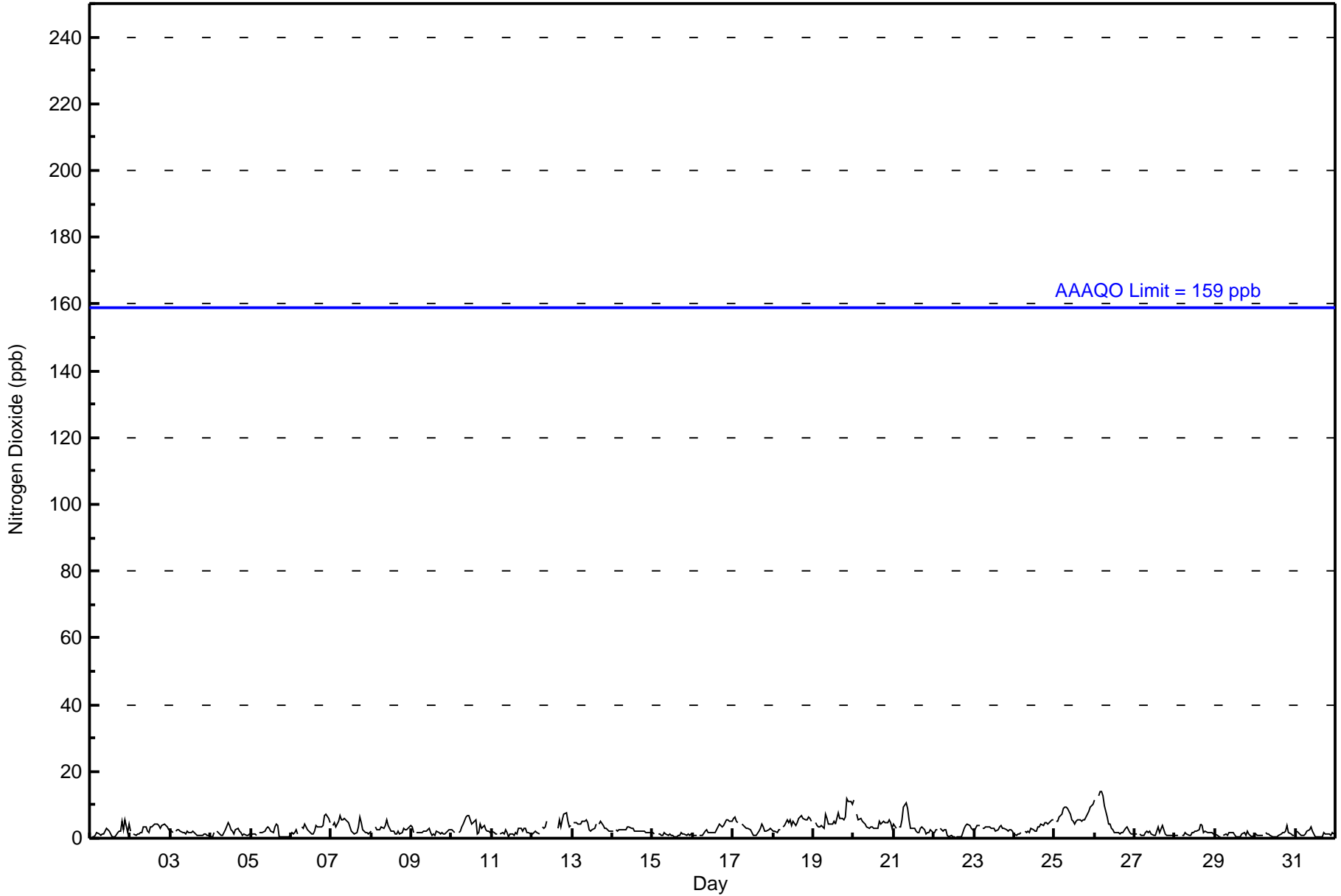
Janvier - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 14 ppb on Jan 26 05:00										Maximum Daily Average: 6.9 ppb on Jan 25										Hours of Data: 707						
Minimum Value: 0 ppb on Jan 22 14:00										Minimum Daily Average: 1.1 ppb on Jan 29										Hours of Missing Data: 37						
Maximum Diurnal Average: 3.3 ppb at hour 9										Minimum Diurnal Average: 2.0 ppb at hour 14										Hours of Calibration: 36						
Monthly Average: 2.9 ppb										Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 4 P ₉₀ = 6 P ₉₉ = 11										Percent Operational Time: 99.9						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	Z	0	0	1	2	1	1	1	1	2	3	2	1	1	1	1	2	2	2	5	3	6	2	4	1.9	6
2-Jan	2	Z	1	1	1	1	2	2	3	3	2	2	4	4	4	4	4	4	3	4	4	4	4	3	2.8	4
3-Jan	2	2	Z	2	3	3	2	2	2	1	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1.6	3
4-Jan	0	1	2	Z	2	1	1	1	2	3	5	4	3	2	1	3	3	2	2	1	1	1	1	1	1.8	5
5-Jan	1	1	1	1	Z	2	2	2	2	3	4	3	2	2	4	4	4	1	0	1	0	0	0	1	1.7	4
6-Jan	2	1	2	3	1	Z	4	3	4	4	2	2	1	1	2	4	3	4	4	4	7	7	6	5	3.2	7
7-Jan	Z	4	5	4	5	7	5	6	6	5	5	3	2	2	1	2	3	6	5	3	2	2	1	2	3.7	7
8-Jan	2	Z	3	3	3	3	3	3	4	6	4	3	2	2	1	1	2	1	2	3	2	3	3	4	2.7	6
9-Jan	4	2	Z	2	2	2	2	2	2	2	3	2	1	1	1	2	2	1	2	1	1	2	2	2	1.9	4
10-Jan	2	2	2	Z	2	2	3	4	6	7	7	6	4	5	5	1	2	4	3	4	3	2	2	2	3.5	7
11-Jan	2	2	1	1	Z	1	2	1	3	2	1	1	1	1	2	1	3	3	2	3	3	2	2	1	1.7	3
12-Jan	1	2	2	2	1	Z	4	3	4	5	C	C	C	C	C	3	6	3	5	7	8	5	4	4	3.7	8
13-Jan	Z	5	5	4	4	4	5	5	5	5	3	2	3	3	4	PF	4	5	4	3	3	3	2	2	3.8	5
14-Jan	2	Z	2	2	3	3	2	3	3	4	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2.3	4
15-Jan	2	1	Z	1	1	1	1	2	3	2	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1.1	2
16-Jan	1	1	1	Z	1	1	1	2	3	2	2	2	2	2	3	3	4	3	4	5	5	6	5	5	2.7	6
17-Jan	6	6	5	5	Z	4	4	3	3	3	3	2	1	1	1	2	3	4	3	2	2	3	3	2	3.1	6
18-Jan	2	2	2	3	3	Z	3	4	6	5	5	4	5	4	5	6	6	7	6	5	6	6	6	5	4.5	7
19-Jan	Z	5	4	4	4	4	3	7	6	4	4	4	5	4	6	8	6	6	5	6	12	11	11	10	6.1	12
20-Jan	12	Z	7	6	6	5	5	4	3	3	4	3	3	3	3	5	4	5	5	5	5	5	5	3	4.7	12
21-Jan	4	3	Z	3	4	6	9	11	9	6	3	3	3	2	2	2	3	4	2	1	2	2	3	2	3.8	11
22-Jan	2	3	2	Z	3	2	3	3	1	0	1	0	0	0	0	1	1	2	3	4	4	4	3	2	1.9	4
23-Jan	2	3	4	4	Z	3	3	3	4	3	3	3	3	2	3	3	4	3	3	3	2	3	3	2	3.0	4
24-Jan	1	1	1	1	2	Z	2	2	2	3	3	3	2	2	3	4	4	4	5	5	4	5	6	5	3.0	6
25-Jan	Z	5	5	6	7	9	9	9	9	7	6	5	4	5	6	5	5	6	6	7	8	9	10	10	6.9	10
26-Jan	11	Z	13	14	14	13	10	6	4	4	3	3	2	2	2	1	2	2	3	3	2	2	1	1	5.1	14
27-Jan	1	1	Z	1	1	1	2	2	2	2	1	1	1	2	3	2	4	3	1	1	1	1	1	1	1.5	4
28-Jan	1	1	1	Z	1	1	2	1	1	1	2	2	2	2	3	4	4	2	2	2	2	2	2	1	1.7	4
29-Jan	1	1	1	1	Z	1	1	1	2	2	2	2	1	1	1	1	1	2	1	2	1	1	1	1	1.1	2
30-Jan	1	1	1	1	1	Z	2	1	1	1	0	0	0	0	1	1	2	2	2	4	2	1	1	1	1.2	4
31-Jan	Z	2	1	1	1	1	1	2	3	3	2	1	1	0	1	0	1	2	1	1	1	1	2	1	1.3	3
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration PF - Power Failure																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Janvier - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Janvier - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
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 (NO₂) - ppb
Janvier - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	65	63	5	2	4	7	13	18	139	228	45	49	32	12	12	13	707
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
Totals	65	63	5	2	4	7	13	18	139	228	45	49	32	12	12	13	707

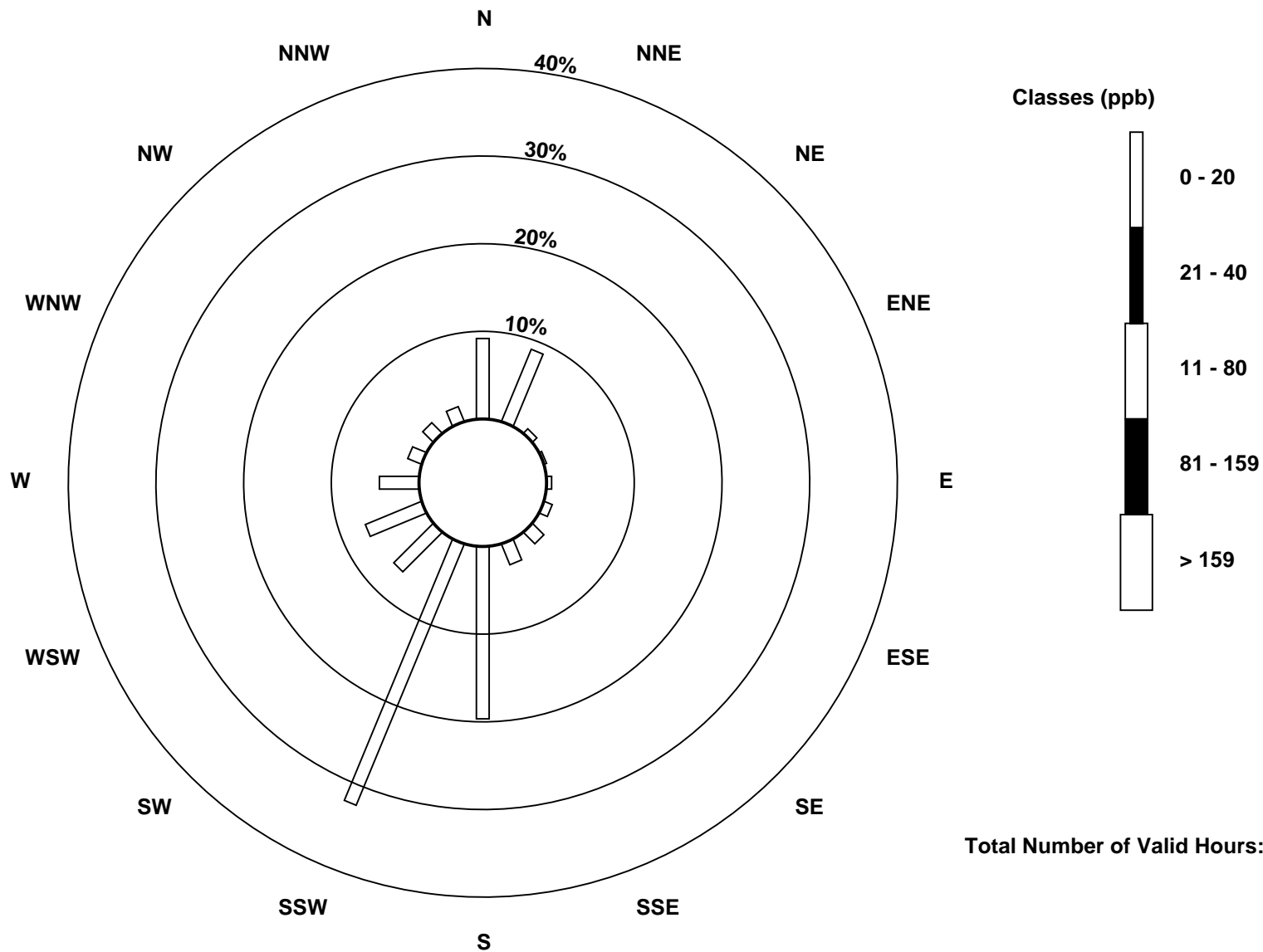
Total Number of Valid Hours: 707

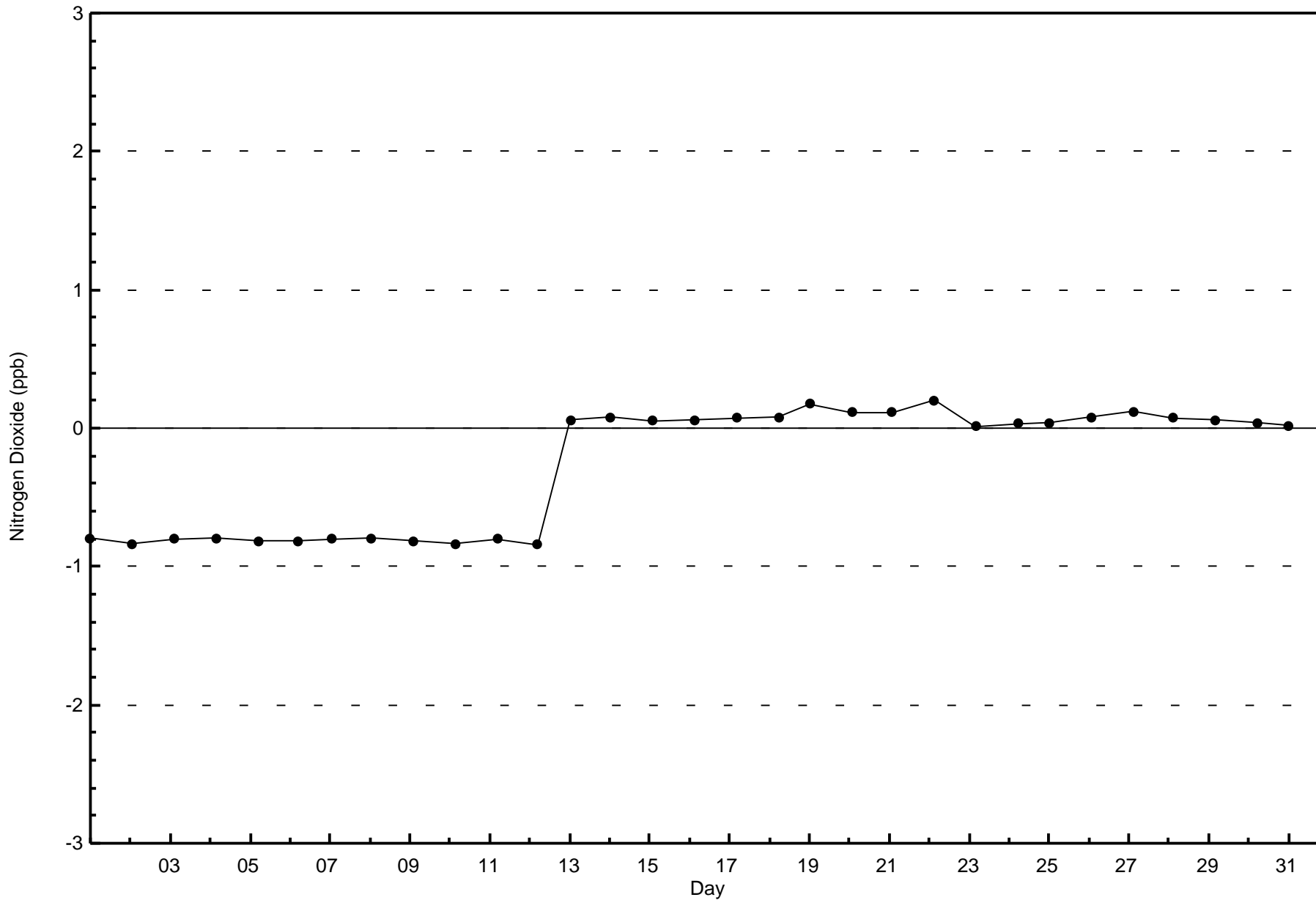
Total Number of Hours: 744

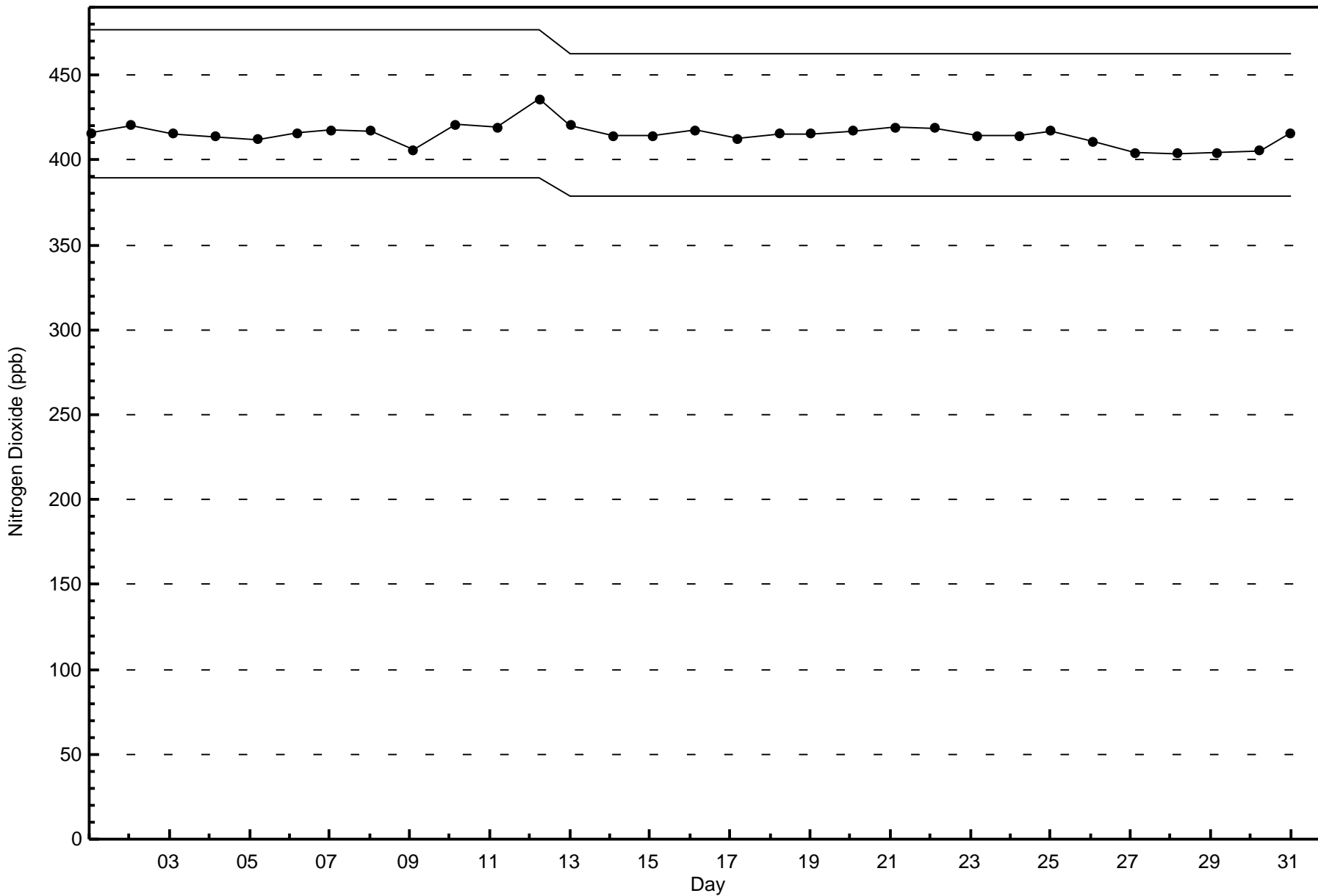


Wood Buffalo Environmental Association
Wind Rose 2016

Nitrogen Dioxide (NO₂) - ppb
Janvier (AMS 22)





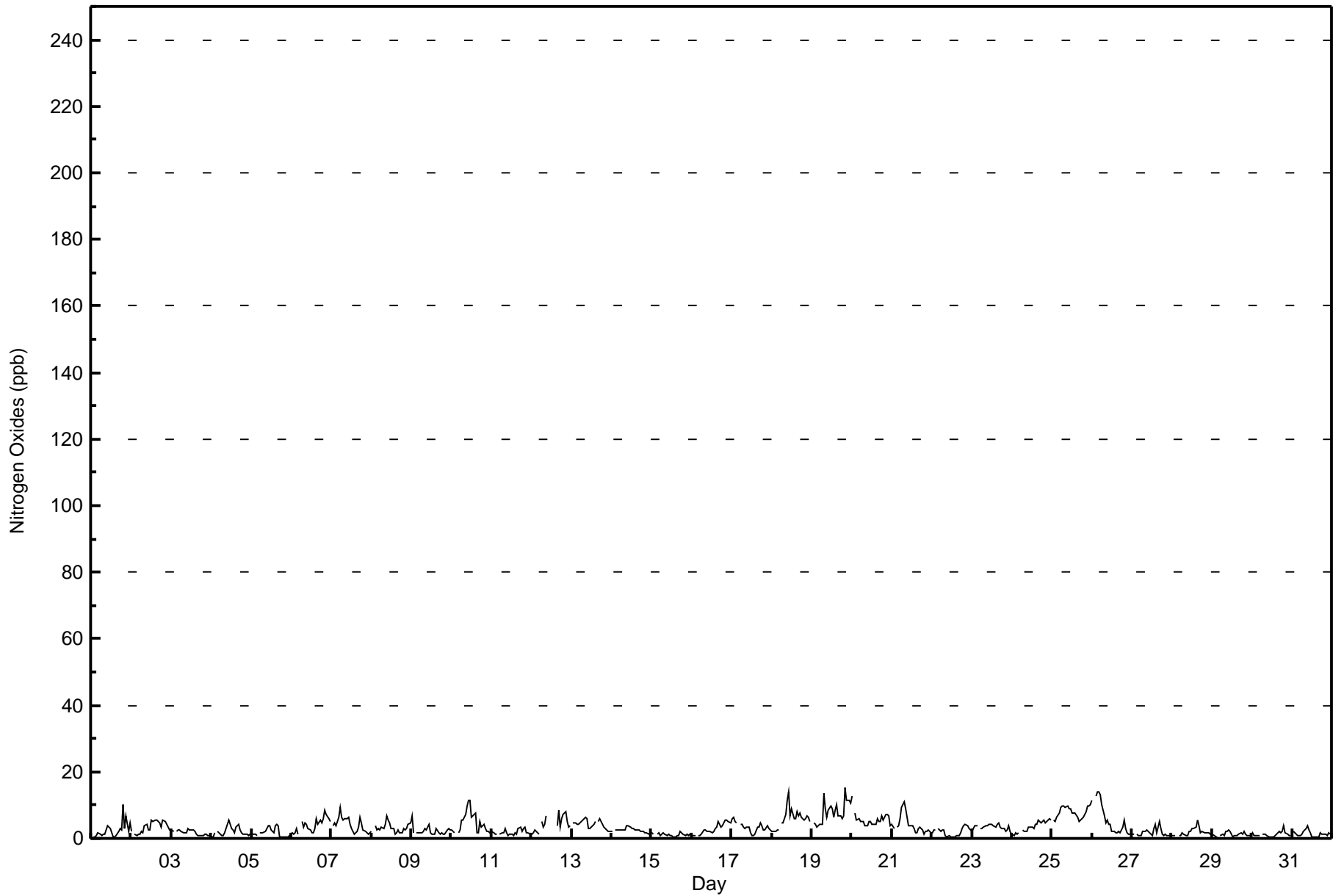




Wood Buffalo Environmental Association
Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb
Janvier - January 2017

Maximum Value: 15 ppb on Jan 19 21:00																		Maximum Daily Average: 7.9 ppb on Jan 19																		Hours in Service: 744																																																																									
Minimum Value: 0 ppb on Jan 5 23:00																		Minimum Daily Average: 1.2 ppb on Jan 15																		Hours of Data: 707																																																																									
Maximum Diurnal Average: 4.2 ppb at hour 11																		Minimum Diurnal Average: 2.2 ppb at hour 2																		Hours of Missing Data: 37																																																																									
Monthly Average: 3.3 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 3 Q ₃ = 4 P ₉₀ = 7 P ₉₉ = 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-Jan	Z	0	0	1	2	1	1	1	1	3	4	3	2	1	1	1	2	3	3	10	3	7	2	5	2.4	10																																																																																			
2-Jan	2	Z	1	1	1	1	2	2	4	4	3	2	5	5	5	5	5	4	3	5	5	4	4	3	3.4	5																																																																																			
3-Jan	2	2	Z	2	3	3	2	2	2	2	3	2	2	2	1	1	1	1	1	1	1	1	1	1	1.7	3																																																																																			
4-Jan	0	1	2	Z	2	1	1	1	1	3	5	4	3	3	2	3	4	3	2	1	1	1	1	1	2.0	5																																																																																			
5-Jan	1	1	1	1	Z	2	2	2	2	3	4	4	3	2	4	4	4	1	0	0	0	0	0	1	1.8	4																																																																																			
6-Jan	2	1	2	3	1	Z	5	4	5	4	3	2	2	2	3	6	4	5	5	6	9	7	6	5	3.9	9																																																																																			
7-Jan	Z	4	5	4	6	9	6	6	6	6	6	4	3	2	1	2	3	6	5	3	2	2	1	2	4.1	9																																																																																			
8-Jan	2	Z	4	3	3	3	3	3	4	7	6	5	3	3	1	1	3	2	2	3	3	3	4	4	3.2	7																																																																																			
9-Jan	7	2	Z	2	2	2	2	2	3	2	4	2	1	1	1	3	2	1	2	1	1	2	3	3	2.2	7																																																																																			
10-Jan	3	2	2	Z	1	3	5	5	7	10	11	11	6	7	8	2	2	5	3	4	3	2	2	2	4.6	11																																																																																			
11-Jan	2	2	1	1	Z	1	2	2	3	2	1	1	1	1	2	1	3	3	2	3	3	2	2	1	1.8	3																																																																																			
12-Jan	1	2	2	2	1	Z	5	4	4	7	C	C	C	C	C	4	8	4	6	7	8	5	4	4	4.2	8																																																																																			
13-Jan	Z	5	5	4	4	4	5	6	7	6	3	3	3	4	5	PF	5	6	4	3	3	3	2	2	4.3	7																																																																																			
14-Jan	2	Z	2	2	3	2	2	3	3	4	4	3	3	3	3	2	2	2	2	2	2	1	1	2	2.5	4																																																																																			
15-Jan	2	1	Z	1	2	1	1	2	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1.2	2																																																																																			
16-Jan	1	1	1	Z	1	1	1	2	3	2	2	2	2	2	3	3	5	4	4	5	5	6	5	5	2.9	6																																																																																			
17-Jan	6	6	5	4	Z	4	4	3	3	3	3	2	1	1	1	3	3	5	4	2	3	4	3	3	3.4	6																																																																																			
18-Jan	2	2	2	3	3	Z	5	5	7	11	14	7	9	6	6	8	7	8	6	6	6	7	6	5	6.1	14																																																																																			
19-Jan	Z	5	4	4	4	4	4	14	9	6	9	10	9	6	8	10	7	7	6	7	15	12	12	11	7.9	15																																																																																			
20-Jan	13	Z	8	6	6	5	5	5	4	4	5	5	4	4	4	6	5	5	7	6	7	7	7	4	5.7	13																																																																																			
21-Jan	4	3	Z	3	4	6	10	11	9	7	4	4	4	3	2	2	3	4	2	1	2	2	3	2	4.0	11																																																																																			
22-Jan	2	3	3	Z	3	2	3	3	1	1	1	0	0	0	0	1	1	2	3	4	4	4	3	2	1.9	4																																																																																			
23-Jan	2	3	4	4	Z	3	3	3	4	4	4	4	4	3	4	5	3	3	3	3	2	3	4	2	3.4	5																																																																																			
24-Jan	1	1	2	1	2	Z	2	2	2	2	4	3	3	3	4	4	5	5	5	5	5	5	6	6	3.4	6																																																																																			
25-Jan	Z	5	5	6	7	9	10	10	9	10	9	7	8	8	8	6	5	6	6	7	8	10	10	10	7.8	10																																																																																			
26-Jan	11	Z	13	14	14	13	10	7	5	5	4	4	2	2	2	2	2	2	3	6	3	2	1	1	5.6	14																																																																																			
27-Jan	1	1	Z	1	1	1	2	2	2	3	2	1	1	3	4	2	5	3	1	1	1	1	1	1	1.8	5																																																																																			
28-Jan	1	1	1	Z	1	1	2	1	1	1	2	2	3	3	3	5	4	2	2	2	2	2	2	1	1.9	5																																																																																			
29-Jan	1	1	1	0	Z	1	1	1	2	2	3	2	1	1	1	1	1	2	1	2	1	1	1	1	1.2	3																																																																																			
30-Jan	2	1	1	1	1	Z	1	1	1	1	1	0	0	0	1	1	2	2	2	4	2	1	1	1	1.2	4																																																																																			
31-Jan	Z	2	1	1	1	1	1	2	3	4	2	2	1	1	1	0	1	2	1	1	1	1	2	1	1.4	4																																																																																			
																		Diurnal Average				Diurnal Maximum																																																																																							
2.9																		2.2				2.9				2.9				3.0				3.3				3.5				3.7				3.8				4.1				4.2				3.6				3.0				2.7				3.0				3.2				3.6				3.4				3.2				3.6				3.6				3.5				3.2				2.9			
13																		6				13				14				14				13				10				14				9				11				14				11				9				8				8				10				8				8				7				10				15				12				12				11			
Z - zerospan																		C - Calibration				PF - Power Failure																																																																																							





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Janvier - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
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_x) - ppb
Janvier - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	65	63	5	2	4	7	13	18	139	228	45	49	32	12	12	13	707
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
Totals	65	63	5	2	4	7	13	18	139	228	45	49	32	12	12	13	707

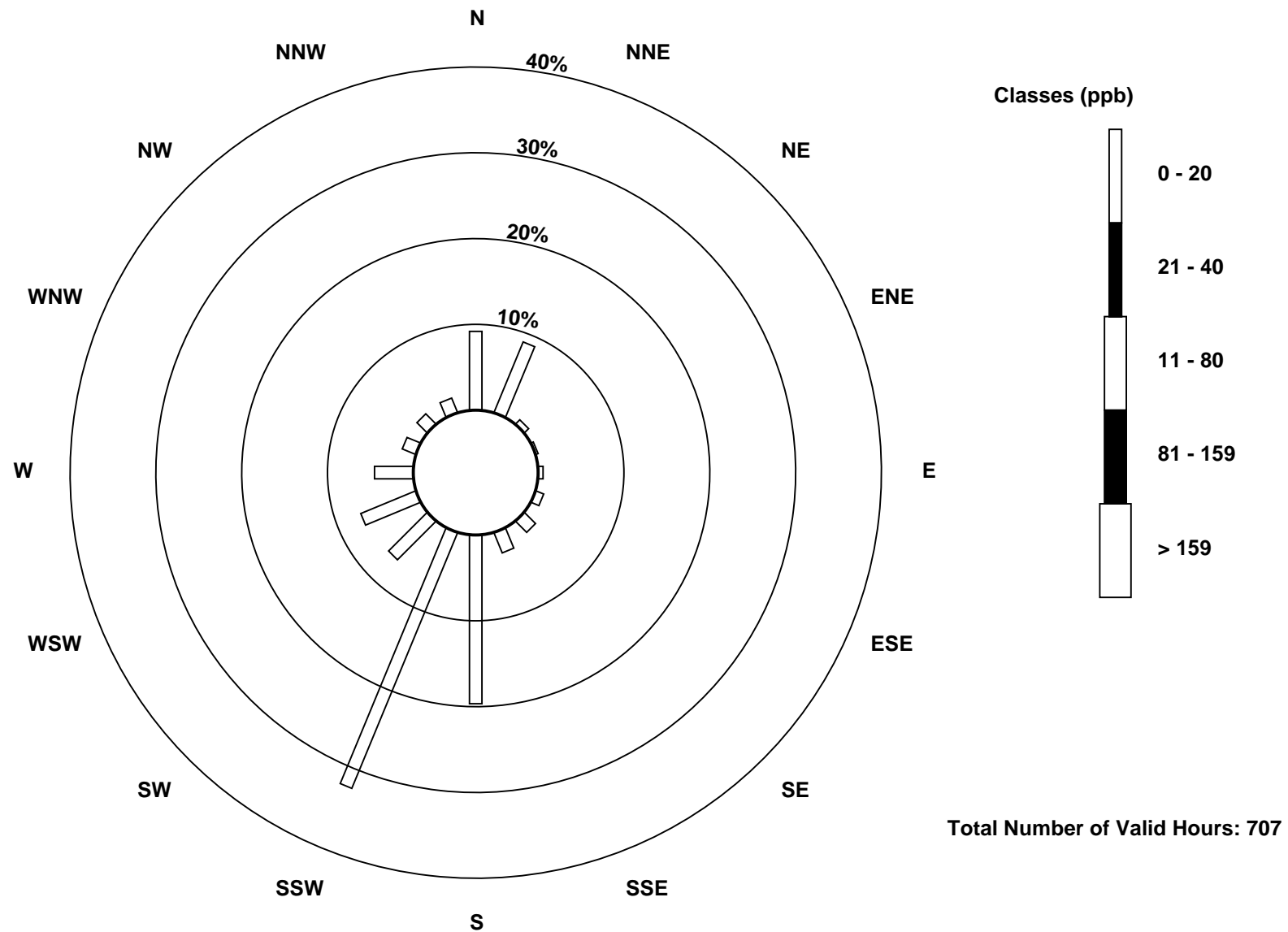
Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose 2016

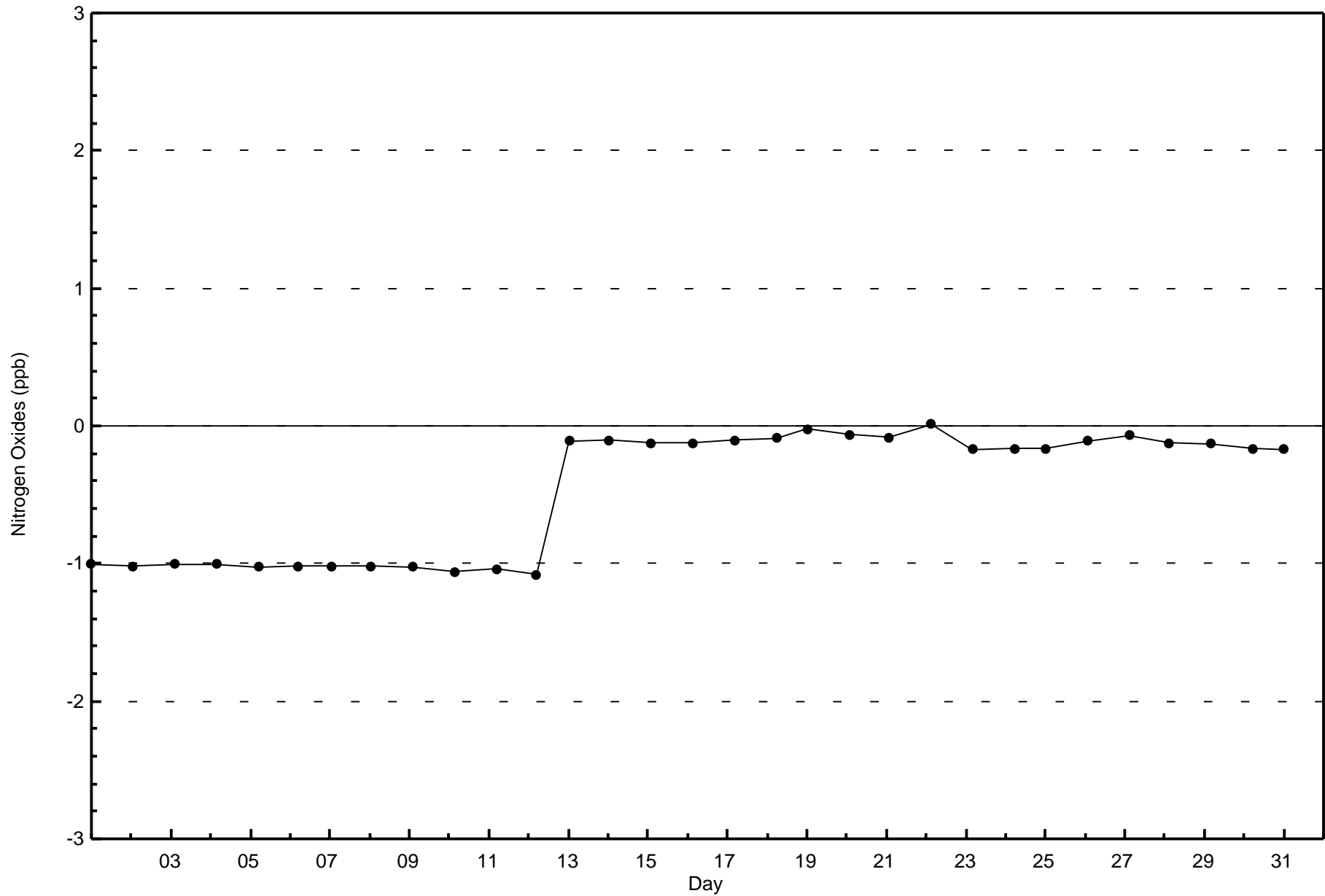
Nitrogen Oxides (NO_x) - ppb
Janvier (AMS 22)

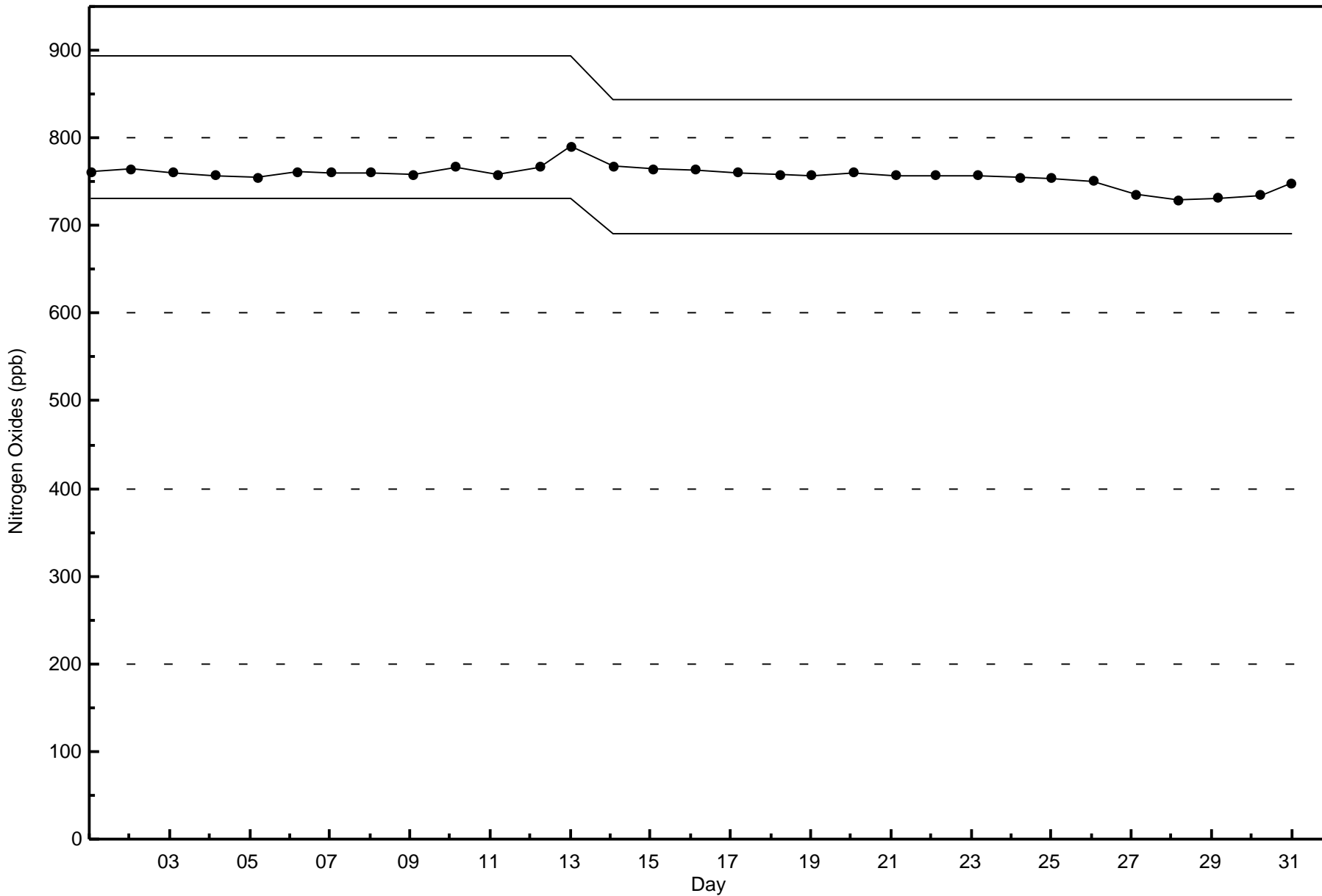




Wood Buffalo Environmental Association
Zero Responses

Nitrogen Oxides (NO_x) - ppb
Janvier - January 2017







Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

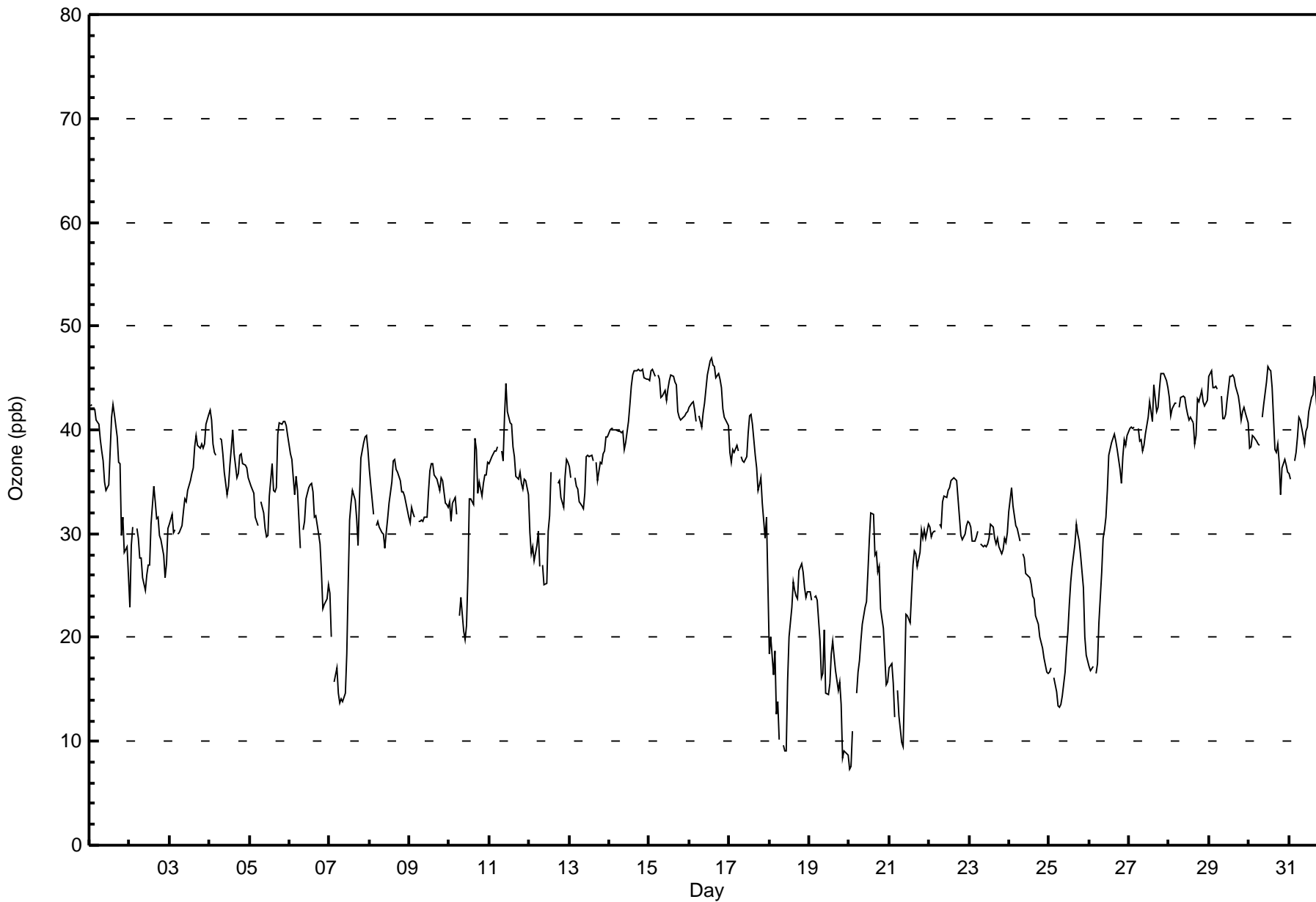
Janvier - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 47 ppb on Jan 16 14:00										Maximum Daily Average: 43.6 ppb on Jan 15										Hours of Data: 709						
Minimum Value: 7 ppb on Jan 20 01:00										Minimum Daily Average: 16.9 ppb on Jan 19										Hours of Missing Data: 35						
Maximum Diurnal Average: 36.3 ppb at hour 15										Minimum Diurnal Average: 29.4 ppb at hour 7										Hours of Calibration: 34						
Monthly Average: 33.0 ppb										Percentiles: P ₁ = 9 P ₁₀ = 19 Q ₁ = 29 Median = 35 Q ₃ = 40 P ₉₀ = 43 P ₉₉ = 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-Jan	42	42	Z	42	41	41	39	38	37	35	34	35	38	41	42	42	39	37	37	30	32	28	29	26	36.8	42
2-Jan	23	29	31	Z	31	30	28	28	26	25	26	27	27	31	35	33	31	32	30	29	28	26	27	30	28.7	35
3-Jan	31	32	30	30	Z	30	30	31	32	33	33	34	35	36	36	38	39	39	38	39	38	39	41	41	35.1	41
4-Jan	42	41	39	38	38	Z	39	39	38	36	34	35	37	38	40	38	35	36	38	38	37	37	36	35	37.4	42
5-Jan	35	35	34	32	31	31	Z	33	32	31	30	30	34	37	34	34	34	40	41	40	41	41	40	40	35.1	41
6-Jan	38	37	35	34	35	34	29	Z	30	31	33	34	35	35	34	32	32	30	29	26	23	23	24	25	31.2	38
7-Jan	24	20	Z	16	17	15	14	14	14	15	18	25	31	33	34	33	31	29	33	37	39	39	39	38	26.5	39
8-Jan	36	35	32	Z	31	31	31	30	30	29	30	32	33	35	37	37	36	36	35	34	34	34	33	32	33.1	37
9-Jan	31	33	32	32	Z	31	31	31	31	32	32	34	36	37	37	36	35	35	34	35	35	33	33	32	33.4	37
10-Jan	33	31	33	34	32	Z	22	24	21	20	21	26	33	33	33	39	38	34	35	34	35	36	36	37	31.2	39
11-Jan	37	37	38	38	38	38	Z	38	37	41	44	42	41	41	38	37	36	35	36	35	34	35	35	34	37.6	44
12-Jan	30	28	29	27	29	30	27	Z	27	25	25	30	32	36	C	C	C	35	35	34	33	36	37	37	31.1	37
13-Jan	36	35	Z	35	35	34	33	33	32	34	37	38	37	38	37	PF	37	35	37	37	38	38	39	39	36.2	39
14-Jan	40	40	40	Z	40	40	40	40	40	38	39	41	42	44	45	46	46	46	46	46	46	45	45	45	42.5	46
15-Jan	45	46	46	45	Z	45	45	43	43	44	43	44	45	45	45	44	42	41	41	41	41	42	42	42	43.6	46
16-Jan	42	43	43	42	41	Z	41	40	42	43	44	45	47	47	46	46	45	45	45	44	42	41	41	40	43.3	47
17-Jan	38	37	38	38	39	38	Z	37	37	37	37	40	41	41	41	38	36	34	35	35	33	30	32	25	36.4	41
18-Jan	18	20	16	19	13	14	10	Z	10	9	9	16	20	23	25	25	24	24	26	27	26	25	24	24	19.4	27
19-Jan	24	24	Z	24	24	24	20	16	17	21	15	14	16	18	20	18	17	15	16	14	8	9	9	9	16.9	24
20-Jan	7	8	11	Z	15	17	18	20	21	23	23	26	29	32	32	28	28	26	27	23	21	18	15	16	21.0	32
21-Jan	17	18	16	12	Z	15	12	10	10	15	22	22	21	24	27	28	28	27	28	30	30	30	30	31	21.9	31
22-Jan	31	30	30	30	30	Z	31	31	33	34	33	34	34	35	35	35	35	33	32	30	29	30	31	31	32.1	35
23-Jan	31	31	29	29	30	30	Z	29	29	29	29	29	30	31	31	30	29	30	29	28	28	30	29	30	29.5	31
24-Jan	32	34	33	32	31	31	29	Z	28	28	26	26	26	25	24	24	22	21	20	20	19	18	17	17	25.3	34
25-Jan	17	17	Z	16	15	13	13	14	14	17	19	21	23	25	27	29	31	30	29	28	25	20	18	18	20.8	31
26-Jan	17	17	17	Z	17	18	21	26	30	30	32	34	38	39	39	40	39	38	36	35	37	39	38	39	31.2	40
27-Jan	40	40	40	40	Z	40	39	39	38	38	40	41	43	42	41	44	42	42	44	45	45	45	44	44	41.7	45
28-Jan	43	41	42	43	43	Z	42	43	43	43	43	42	42	41	41	39	39	43	43	44	43	42	43	43	42.1	44
29-Jan	45	46	44	44	44	44	Z	43	41	41	42	43	45	45	45	45	44	43	42	41	42	42	42	41	43.2	46
30-Jan	38	38	39	39	39	39	38	Z	41	42	45	46	46	46	44	38	38	39	37	34	36	37	37	36	39.7	46
31-Jan	36	35	Z	37	38	39	41	41	40	39	40	40	42	43	43	45	43	42	42	42	40	38	37	37	40.0	45
32.3 32.2 32.7 32.6 31.3 30.4 29.4 31.2 30.4 30.8 31.5 33.1 34.7 36.0 36.3 35.9 35.2 34.5 34.7 34.0 33.5 33.1 33.0 32.7																								Diurnal Average		
45 46 46 45 44 45 45 43 43 44 45 46 47 47 46 46 46 46 46 46 46 45 45 45																								Diurnal Maximum		
Z - zerospan			C - Calibration			PF - Power Failure																				
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Ozone (O₃) - ppb
Janvier - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Janvier - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	82	11.57	11.57
21 - 50	627	88.43	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 (O₃) - ppb
Janvier - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	8	6	1	2	1	0	2	2	23	22	2	1	2	2	3	4	81
21 - 50	58	55	5	0	3	7	7	16	121	204	46	48	28	10	10	9	627
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
Totals	66	61	6	2	4	7	9	18	144	226	48	49	30	12	13	13	708

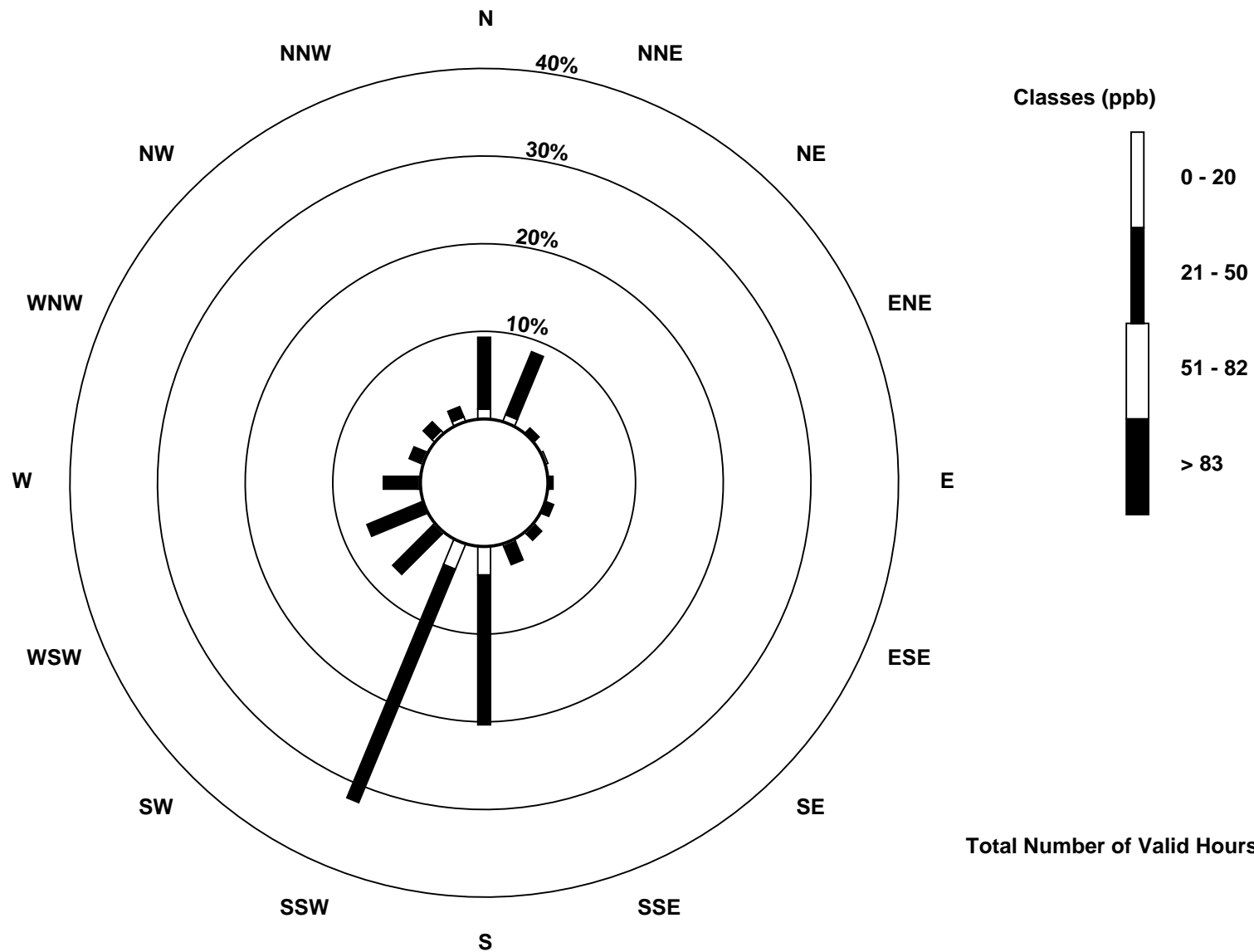
Total Number of Valid Hours: 708

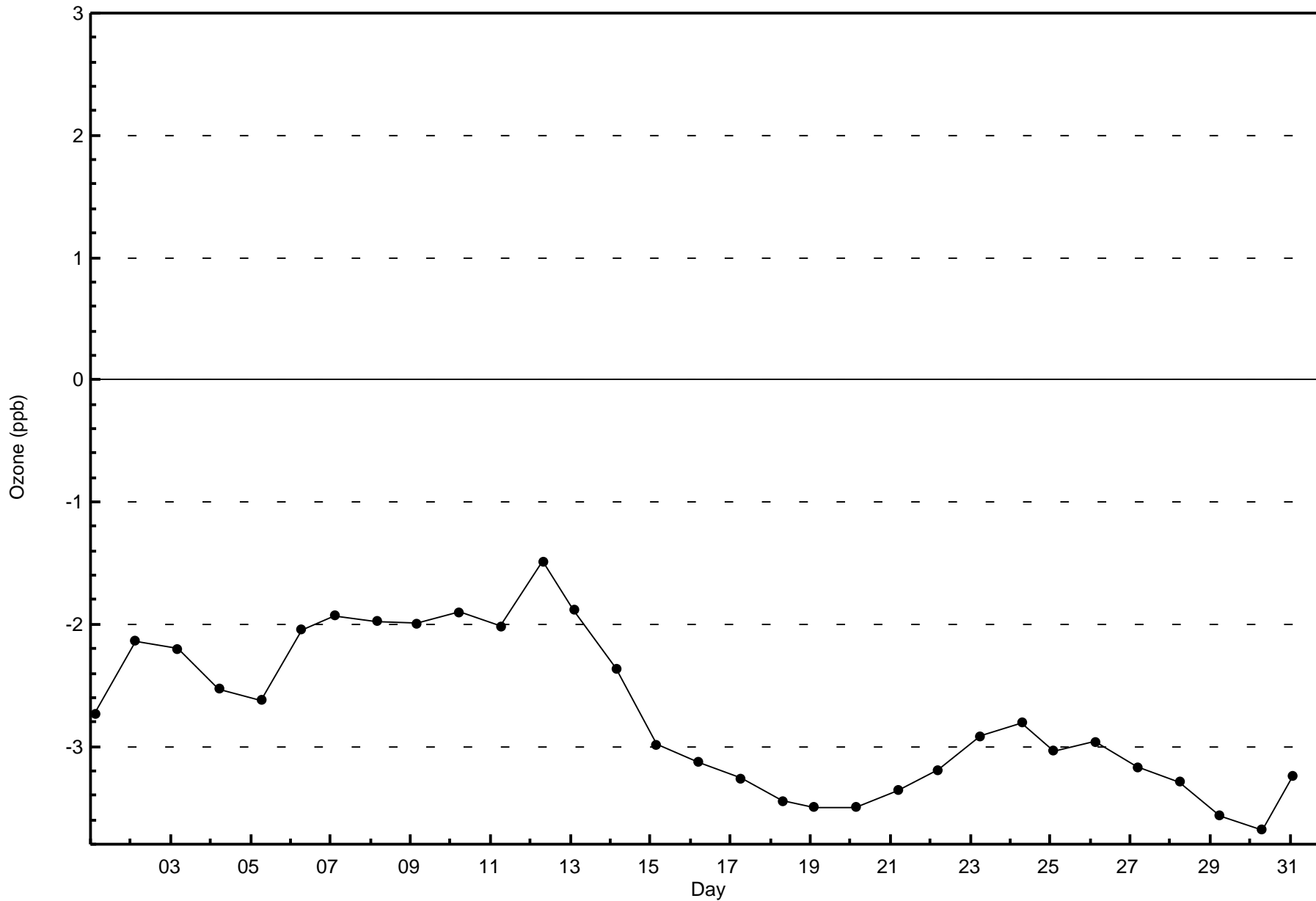
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose 2016

Ozone (O₃) - ppb
Janvier (AMS 22)

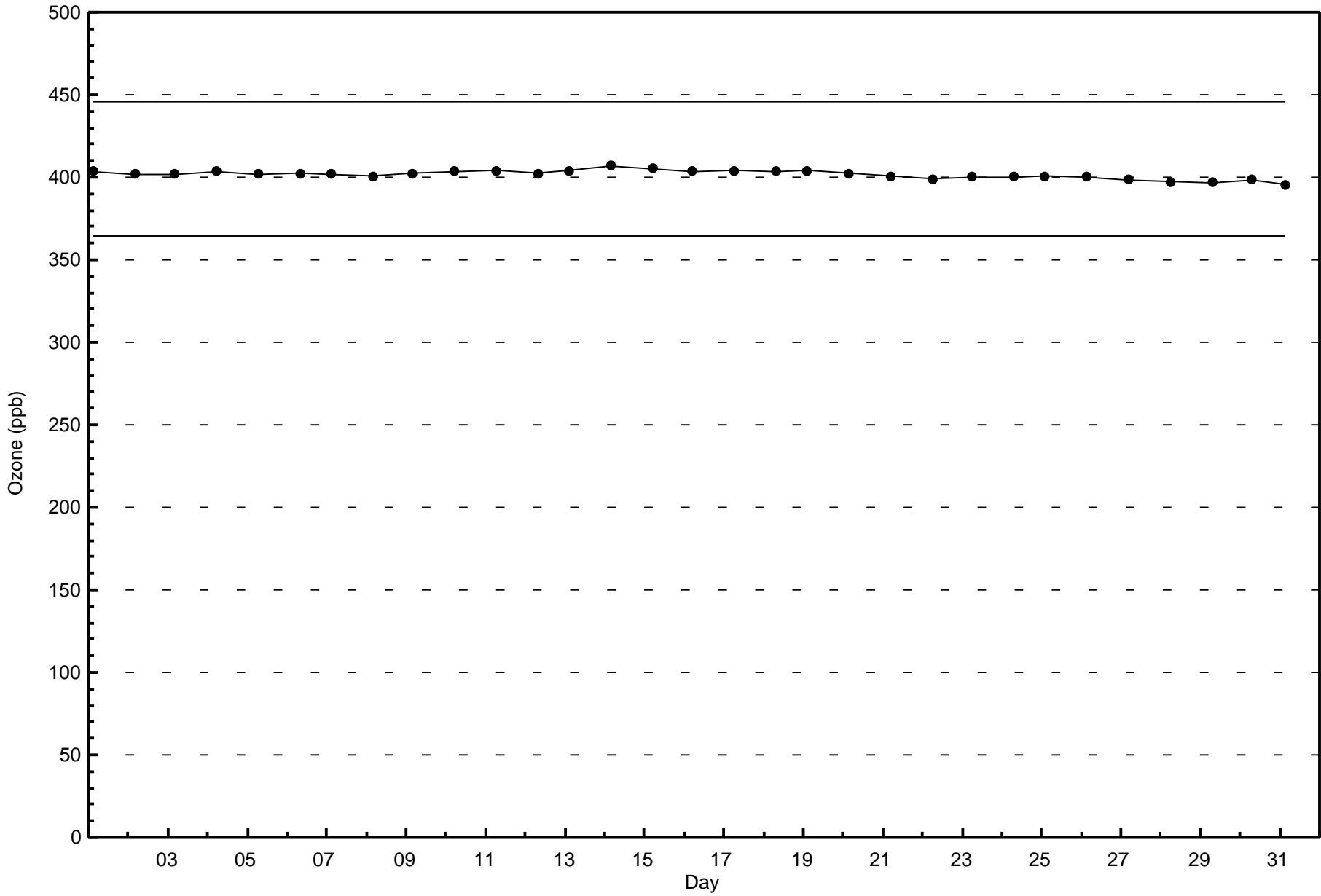






Wood Buffalo Environmental Association
Span Responses

Ozone (O₃) - ppb
Janvier - January 2017





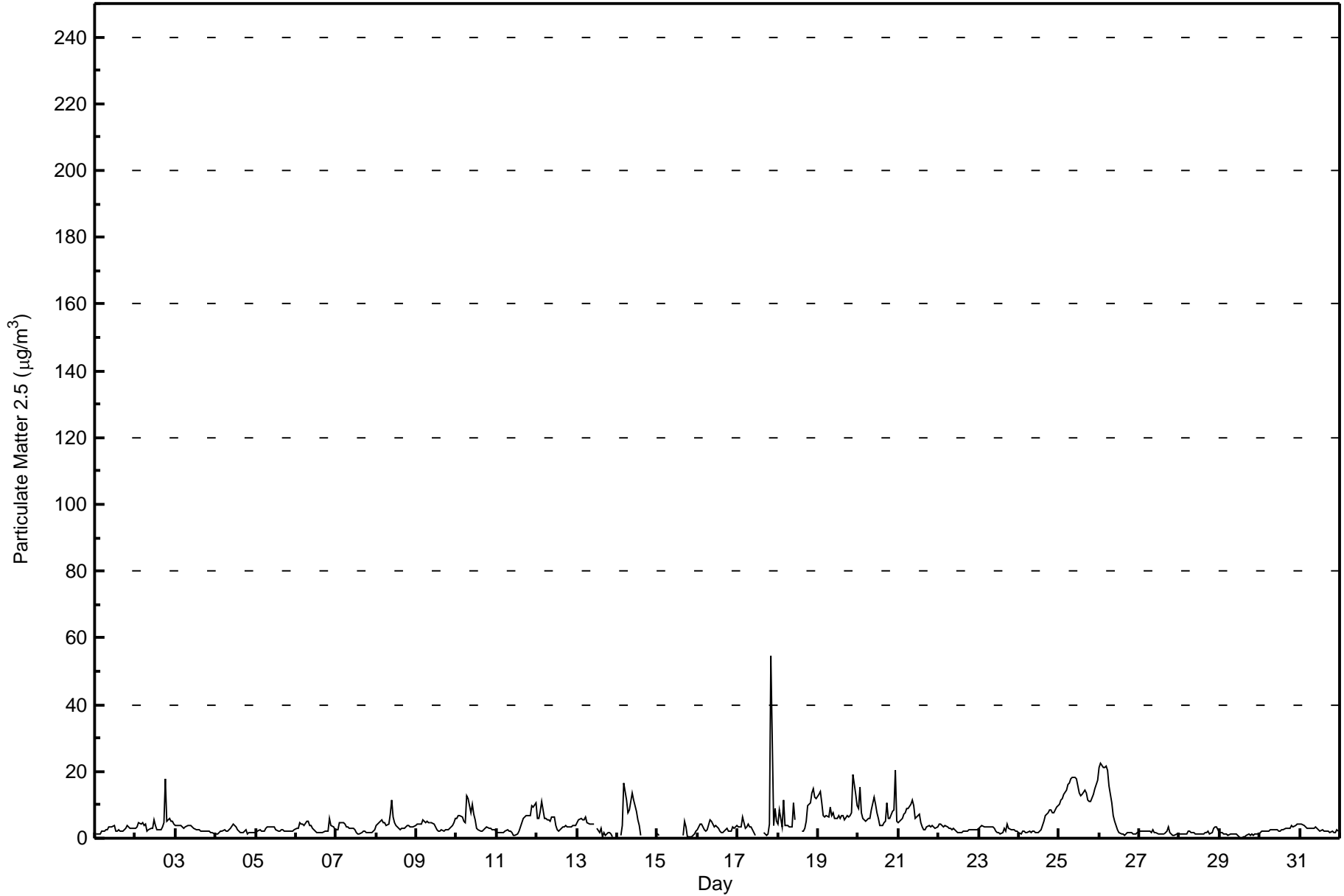
Wood Buffalo Environmental Association

Summary of Hour Averages

Particulate Matter 2.5 (PM_{2.5}) - µg/m³

Janvier - January 2017

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 54.7 µg/m ³ on Jan 17 21:00 Maximum Daily Average: 14.3 µg/m ³ on Jan 25		Hours in Service: 744 Hours of Data: 712 Hours of Missing Data: 32 Hours of Calibration: 4 Percent Operational Time: 96.2																																														
Minimum Value: 0.0 µg/m ³ on Jan 29 13:00 Maximum Diurnal Average: 5.7 µg/m ³ at hour 21 Monthly Average: 4.32 µg/m ³		Minimum Daily Average: 1.0 µg/m ³ on Jan 29 Minimum Diurnal Average: 2.7 µg/m ³ at hour 15 Percentiles: P ₁ = 0.5 P ₁₀ = 1.4 Q ₁ = 2.0 Median = 3.1 Q ₃ = 4.9 P ₉₀ = 9.4 P ₉₉ = 20.0																																														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Jan	1.3	1.2	1.2	1.4	2.2	2.2	2.4	2.7	3.2	3.5	3.5	3.9	2.3	2.3	2.5	2.3	2.3	2.6	3.0	3.7	3.2	3.2	3.0	2.8	2.6	3.9																						
2-Jan	3.1	3.4	4.6	4.4	4.7	3.8	4.2	2.3	2.5	2.8	3.1	5.7	3.9	2.5	2.6	2.7	3.3	4.5	17.7	4.9	5.9	5.1	5.2	4.3	4.5	17.7																						
3-Jan	3.6	3.7	3.6	3.7	3.5	3.1	3.5	3.7	3.8	3.8	3.6	2.9	2.7	2.7	2.6	2.1	2.2	2.1	2.1	2.1	2.0	1.8	1.6	1.4	2.8	3.8																						
4-Jan	1.4	1.4	1.7	2.0	2.2	2.4	2.2	2.1	2.3	2.8	4.1	3.7	3.2	2.5	2.0	1.6	1.8	2.1	2.5	1.5	1.8	1.7	1.6	1.6	2.2	4.1																						
5-Jan	1.8	2.2	2.5	2.2	2.2	2.3	2.8	3.4	3.4	3.3	3.4	3.4	2.7	2.0	2.1	2.3	2.4	1.9	2.1	2.0	2.0	2.1	2.1	2.5	2.5	3.4																						
6-Jan	2.8	2.9	4.7	4.4	4.3	3.8	5.2	5.3	3.7	3.6	3.1	2.2	1.5	1.7	1.7	1.7	1.8	2.3	2.2	2.3	6.1	3.8	3.3	2.7	3.2	6.1																						
7-Jan	2.6	2.7	4.5	4.6	4.5	4.1	3.6	3.2	2.9	2.9	3.0	2.6	1.7	1.5	1.5	1.7	1.9	1.9	1.8	1.7	1.7	1.8	1.9	2.5	2.6	4.6																						
8-Jan	3.7	4.4	5.0	5.3	4.9	4.7	3.9	4.2	7.0	11.5	6.5	4.9	3.7	3.1	2.6	2.8	2.9	3.1	3.6	3.9	3.3	3.3	3.5	3.6	4.4	11.5																						
9-Jan	4.4	4.1	4.1	4.4	5.4	4.7	5.2	4.8	4.7	4.8	4.4	3.3	2.7	2.2	1.9	2.3	2.2	2.4	2.4	2.7	3.0	3.6	4.7	5.8	3.8	5.8																						
10-Jan	6.1	6.7	6.7	6.4	5.2	4.6	12.8	12.1	7.6	10.2	7.1	5.6	3.0	2.5	2.1	2.0	2.4	3.1	3.3	2.8	2.9	2.6	2.7	2.6	5.1	12.8																						
11-Jan	1.9	1.8	1.7	1.9	1.8	2.0	2.4	2.1	2.0	1.7	0.8	1.0	1.1	1.9	3.4	4.6	6.0	6.7	6.8	6.7	6.9	9.5	9.4	10.7	4.0	10.7																						
12-Jan	6.1	5.9	8.1	10.9	6.0	5.8	5.5	5.4	5.2	6.3	6.2	3.9	2.7	2.3	2.4	3.2	3.4	3.9	3.5	3.5	3.5	3.6	3.8	3.9	4.8	10.9																						
13-Jan	4.7	5.4	6.1	5.5	5.6	6.4	4.6	4.4	4.4	4.0	C	2.8	1.9	3.1	0.3	1.5	1.0	1.5	1.7	1.1	0.6	UO	1.7	3.3	6.4																							
14-Jan	UO	UO	0.7	3.8	16.4	11.3	7.7	8.3	10.9	13.6	11.4	8.0	5.5	4.0	0.7	UO	UO	UO	UO	UO	UO	UO	UO	0.7	--	16.4																						
15-Jan	1.4	0.8	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	1.0	5.0	3.2	0.4	0.5	0.5	0.7	1.4	2.0	--	5.0																						
16-Jan	2.5	4.0	4.0	3.3	2.4	2.0	2.6	5.6	4.9	4.2	3.4	3.6	3.1	2.3	1.8	1.7	1.9	3.2	2.0	2.0	2.3	3.2	3.0	3.6	3.0	5.6																						
17-Jan	3.4	3.4	3.4	6.5	2.8	3.6	4.4	3.4	3.5	2.4	0.7	UO	UO	UO	UO	1.9	1.4	1.0	1.5	4.1	54.7	3.7	8.7	5.2	6.0	54.7																						
18-Jan	4.4	8.5	3.5	11.3	3.9	3.9	3.6	3.4	3.6	10.8	5.4	C	C	C	2.0	2.2	3.0	5.0	9.8	10.7	13.8	14.9	12.5	12.0	7.1	14.9																						
19-Jan	12.9	14.2	10.4	6.8	6.3	6.8	6.3	9.3	7.0	7.6	5.8	6.0	6.8	6.1	6.6	6.9	5.7	6.6	6.5	6.8	7.5	19.1	13.2	9.8	8.4	19.1																						
20-Jan	9.1	15.1	7.7	6.0	5.1	5.6	5.9	5.9	8.5	12.1	10.3	7.4	5.8	4.0	3.8	4.6	5.0	10.5	5.9	5.8	7.9	8.5	20.4	5.0	7.7	20.4																						
21-Jan	4.6	5.5	6.1	7.4	7.5	8.8	8.9	10.3	11.6	9.8	5.9	6.5	7.0	4.9	3.4	2.5	2.7	3.4	4.0	3.4	3.7	3.3	3.1	3.5	5.7	11.6																						
22-Jan	4.1	4.3	3.8	3.5	3.7	3.2	3.1	3.0	2.5	3.1	2.0	1.8	1.8	1.7	1.8	1.9	2.0	2.2	2.4	2.6	2.6	2.3	2.4	2.5	2.7	4.3																						
23-Jan	3.0	3.5	3.6	3.4	3.4	3.5	3.4	3.5	3.4	3.1	2.3	1.8	1.7	1.5	1.6	2.9	2.3	4.0	3.0	2.7	2.7	2.4	2.3	2.0	2.8	4.0																						
24-Jan	1.5	1.4	1.9	2.0	1.7	1.8	2.0	1.9	2.2	1.9	1.8	1.8	2.2	2.7	3.9	5.2	6.8	7.5	8.5	8.3	7.7	7.8	9.4	9.9	4.2	9.9																						
25-Jan	10.1	11.3	11.9	13.1	14.4	16.2	16.5	17.7	18.3	18.3	17.6	15.6	13.4	12.6	13.3	14.4	13.7	11.5	10.9	11.0	13.3	14.8	16.3	17.5	14.3	18.3																						
26-Jan	21.2	22.4	21.1	21.4	21.7	20.2	15.5	10.5	6.9	5.2	3.6	2.6	1.8	1.2	1.1	1.0	1.4	1.6	1.6	1.6	1.4	1.5	1.1	1.8	7.9	22.4																						
27-Jan	2.2	2.3	2.2	2.3	2.1	2.1	2.0	1.9	2.4	1.7	1.9	1.3	1.1	1.1	1.3	1.3	1.9	3.3	1.6	1.2	1.0	0.8	1.1	1.5	1.7	3.3																						
28-Jan	1.2	1.1	1.2	1.2	1.4	2.0	1.9	1.7	1.6	1.5	1.4	1.3	1.2	1.2	1.4	1.8	1.6	2.1	1.4	1.8	2.9	3.5	3.2	2.5	1.8	3.5																						
29-Jan	1.5	1.6	1.3	1.3	1.4	1.0	1.1	1.1	1.3	1.1	1.3	1.0	0.0	0.2	0.3	0.3	0.9	1.2	1.1	1.1	1.0	1.2	1.1	1.2	1.0	1.6																						
30-Jan	1.5	2.0	2.2	2.1	1.9	2.0	2.4	2.5	2.6	2.4	2.4	2.3	2.3	2.4	2.6	3.1	3.1	2.9	3.0	3.7	3.4	3.8	4.1	4.2	2.7	4.2																						
31-Jan	4.2	4.4	3.8	3.4	3.0	3.0	2.8	2.8	2.9	3.5	2.8	2.5	2.3	2.3	2.3	2.2	2.1	2.0	1.9	1.9	1.8	1.7	2.5	2.1	2.7	4.4																						
																								4.4	5.1	4.8	5.2	5.0	4.9	5.0	4.9	4.9	5.5	4.4	3.9	3.2	2.8	2.7	2.8	3.2	3.6	3.9	3.6	5.7	4.5	5.1	4.3	Diurnal Average
																								21.2	22.4	21.1	21.4	21.7	20.2	16.5	17.7	18.3	18.3	17.6	15.6	13.4	12.6	13.3	14.4	13.7	11.5	17.7	11.0	54.7	19.1	20.4	17.5	Diurnal Maximum
C - Calibration																								UO - Unstable Operation																								
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																																																





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Janvier - January 2017

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	537	75.42	75.42
6 - 15	132	18.54	93.96
16 - 25	20	2.81	96.77
26 - 80	1	0.14	96.91
> 81.0	0	0.00	96.91

Total Number of Valid Hours: 712

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Janvier - January 2017

Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	56	57	5	0	3	5	9	13	95	156	37	36	32	10	11	12	537
6 - 15	11	9	1	2	0	1	4	5	42	44	5	2	1	1	2	1	131
16 - 25	0	0	0	0	1	0	0	1	4	14	0	0	0	0	0	0	20
26 - 80	0	0	0	0	0	1	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
Totals	67	66	6	2	4	7	13	19	141	214	42	38	33	11	13	13	689

Total Number of Valid Hours: 711

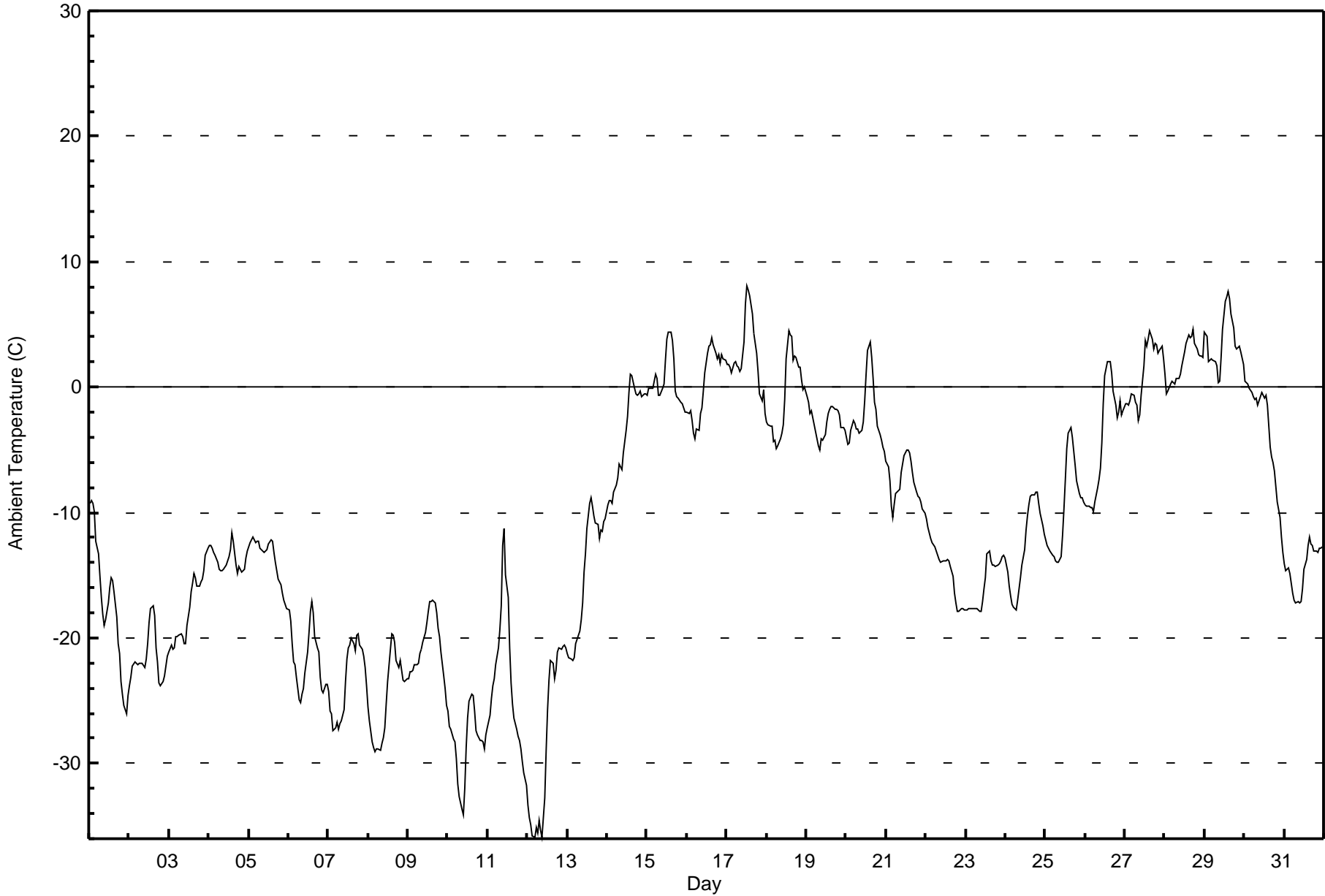
Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature (AT) - C
Janvier - January 2017

Maximum Value: 8.1 C on Jan 17 13:00 Maximum Daily Average: 3.5 C on Jan 29		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Minimum Value: -35.9 C on Jan 12 10:00 Maximum Diurnal Average: -7.9 C at hour 15 Monthly Average: -11.32 C		Minimum Daily Average: -28.4 C on Jan 10 Minimum Diurnal Average: -13.3 C at hour 7 Percentiles: P ₁ = -34.6 P ₁₀ = -24.6 Q ₁ = -19.8 Median = -12.4 Q ₃ = -1.5 P ₉₀ = 2.2 P ₉₉ = 6.6																								
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-Jan	-9.3	-9.1	-9.3	-10.0	-12.3	-13.2	-15.0	-16.8	-18.1	-19.0	-18.5	-17.2	-15.9	-15.2	-15.4	-16.3	-18.3	-20.4	-21.3	-23.4	-24.5	-25.4	-26.0	-24.6	-17.3	-9.1
2-Jan	-23.8	-23.1	-22.2	-21.9	-22.0	-22.1	-22.0	-22.0	-22.1	-22.4	-21.7	-20.5	-18.7	-17.7	-17.4	-18.2	-20.7	-21.9	-23.5	-23.8	-23.5	-23.0	-22.3	-21.5	-21.6	-17.4
3-Jan	-21.1	-20.6	-20.9	-20.8	-19.9	-19.9	-19.8	-19.7	-19.9	-20.4	-20.4	-19.0	-17.5	-16.3	-15.6	-14.9	-15.1	-15.8	-15.8	-15.5	-15.3	-14.6	-13.4	-12.9	-17.7	-12.9
4-Jan	-12.6	-12.7	-12.8	-13.2	-13.4	-13.9	-14.5	-14.6	-14.6	-14.5	-14.2	-13.8	-13.5	-13.0	-11.6	-12.2	-14.2	-14.8	-14.3	-14.5	-14.7	-14.5	-13.7	-13.1	-13.7	-11.6
5-Jan	-12.7	-12.4	-12.0	-12.1	-12.4	-12.3	-12.3	-12.9	-13.0	-13.2	-13.0	-12.9	-12.5	-12.2	-12.3	-13.2	-13.9	-14.6	-15.3	-15.7	-16.4	-17.0	-17.3	-17.6	-13.7	-12.0
6-Jan	-17.8	-18.7	-20.5	-21.9	-22.1	-23.2	-24.9	-25.1	-24.4	-24.0	-22.8	-21.2	-19.6	-17.8	-17.1	-18.0	-19.9	-20.8	-21.2	-23.1	-24.1	-24.4	-23.7	-23.7	-21.7	-17.1
7-Jan	-24.3	-25.8	-26.1	-27.3	-27.1	-26.7	-27.3	-26.9	-26.6	-25.7	-23.5	-21.6	-20.8	-20.6	-20.0	-20.5	-21.0	-19.7	-19.7	-20.6	-20.9	-21.4	-22.4	-23.8	-23.3	-19.7
8-Jan	-25.5	-26.6	-28.3	-28.8	-29.1	-28.8	-28.8	-28.9	-28.3	-28.0	-27.2	-25.2	-23.5	-20.9	-19.6	-19.8	-20.4	-21.8	-22.3	-21.8	-22.6	-23.4	-23.5	-23.3	-24.8	-19.6
9-Jan	-23.2	-22.7	-22.7	-22.5	-22.1	-22.1	-22.0	-21.3	-20.9	-20.4	-19.6	-18.8	-17.9	-17.1	-17.1	-16.9	-17.2	-18.0	-19.2	-19.9	-21.1	-23.0	-24.1	-25.4	-20.6	-16.9
10-Jan	-25.8	-27.1	-27.2	-28.1	-28.3	-29.6	-31.7	-32.7	-33.6	-34.1	-32.0	-28.7	-26.4	-25.1	-24.5	-24.6	-25.9	-27.4	-27.8	-28.1	-28.1	-28.2	-28.8	-27.8	-28.4	-24.5
11-Jan	-27.2	-26.1	-24.8	-23.8	-23.3	-22.1	-20.8	-19.4	-17.4	-12.7	-11.3	-15.0	-16.7	-20.8	-23.6	-25.3	-26.4	-27.2	-27.8	-28.1	-28.8	-29.9	-30.7	-31.7	-23.4	-11.3
12-Jan	-33.3	-34.3	-34.9	-35.8	-35.8	-35.1	-35.6	-34.6	-35.3	-35.9	-32.8	-28.9	-25.8	-23.3	-21.8	-22.0	-23.3	-22.6	-21.2	-20.8	-20.8	-20.6	-20.6	-20.8	-28.2	-20.6
13-Jan	-21.2	-21.5	-21.7	-21.8	-21.6	-20.5	-20.1	-19.5	-18.6	-17.2	-14.8	-13.3	-11.3	-9.3	-8.8	-9.4	-10.2	-10.8	-10.9	-12.1	-11.4	-11.5	-10.7	-10.5	-14.9	-8.8
14-Jan	-9.4	-9.0	-9.0	-9.3	-8.4	-7.8	-7.3	-6.2	-6.4	-6.6	-5.2	-3.5	-2.3	-0.4	1.1	0.9	-0.1	-0.5	-0.6	-0.5	-0.3	-0.7	-0.6	-0.6	-3.9	1.1
15-Jan	-0.7	0.0	-0.1	-0.1	0.5	1.0	0.7	-0.7	-0.6	-0.1	0.2	2.2	3.8	4.4	4.4	3.7	2.3	-0.3	-0.7	-0.8	-1.3	-1.3	-1.7	-2.0	0.5	4.4
16-Jan	-1.9	-2.1	-1.8	-2.6	-3.7	-4.1	-3.4	-3.4	-2.2	-1.6	-0.3	1.2	2.7	3.3	3.4	3.9	3.3	2.7	2.3	2.6	1.9	2.6	2.3	2.1	0.3	3.9
17-Jan	1.8	1.8	1.6	1.1	2.0	2.1	1.7	1.6	1.3	1.4	3.6	6.6	8.1	7.7	7.2	5.8	4.3	3.5	2.8	1.2	-0.5	-1.1	-0.2	-2.1	2.6	8.1
18-Jan	-2.8	-3.0	-3.1	-3.1	-4.3	-4.3	-4.9	-4.7	-4.1	-3.7	-3.0	-1.0	2.3	4.4	4.1	4.1	2.2	2.4	2.4	1.6	1.6	0.6	-0.2	0.0	-0.7	4.4
19-Jan	-0.8	-1.2	-2.1	-1.8	-2.4	-3.0	-4.1	-4.6	-5.0	-4.2	-4.3	-3.8	-2.8	-2.1	-1.7	-1.5	-1.6	-1.7	-1.7	-1.9	-2.3	-3.2	-3.2	-3.5	-2.7	-0.8
20-Jan	-4.0	-4.6	-4.5	-3.4	-2.7	-2.9	-3.4	-3.3	-3.7	-3.5	-2.8	-1.1	1.1	2.9	3.6	2.3	0.7	-1.2	-1.7	-3.1	-3.8	-4.2	-4.7	-5.2	-2.2	3.6
21-Jan	-5.9	-6.4	-7.4	-9.5	-10.4	-9.4	-8.5	-8.2	-8.2	-6.8	-6.2	-5.5	-5.0	-5.0	-5.3	-5.9	-6.8	-7.6	-8.4	-8.7	-8.8	-9.2	-9.7	-10.1	-7.6	-5.0
22-Jan	-10.5	-11.1	-11.6	-12.0	-12.4	-12.7	-13.1	-13.4	-13.7	-14.0	-13.8	-13.8	-13.8	-13.7	-13.8	-14.3	-15.1	-16.4	-17.2	-17.9	-17.9	-17.6	-17.6	-17.7	-14.4	-10.5
23-Jan	-17.8	-17.8	-17.7	-17.6	-17.6	-17.7	-17.7	-17.7	-17.9	-17.8	-17.1	-16.1	-15.2	-13.3	-13.1	-13.8	-14.2	-14.2	-14.3	-14.2	-14.0	-13.9	-13.5	-13.4	-15.7	-13.1
24-Jan	-13.7	-14.7	-15.8	-16.7	-17.3	-17.5	-17.8	-17.0	-16.1	-15.2	-14.2	-12.9	-11.4	-10.3	-9.4	-8.7	-8.6	-8.6	-8.4	-8.4	-9.3	-10.0	-11.0	-11.7	-12.7	-8.4
25-Jan	-12.2	-12.7	-12.8	-13.1	-13.4	-13.5	-13.9	-14.0	-13.9	-13.5	-11.8	-9.7	-7.3	-5.0	-3.7	-3.2	-4.0	-5.2	-6.2	-7.5	-8.5	-8.8	-8.9	-9.2	-9.7	-3.2
26-Jan	-9.3	-9.5	-9.4	-9.6	-9.6	-9.9	-9.2	-8.1	-7.4	-6.5	-4.4	-1.3	0.9	2.0	2.1	2.1	1.1	-0.4	-1.4	-2.5	-2.0	-1.1	-2.2	-1.9	-4.1	2.1
27-Jan	-1.3	-1.3	-1.4	-1.1	-0.6	-0.7	-1.3	-1.4	-2.7	-2.2	-0.7	1.7	3.7	3.3	3.8	4.5	3.8	3.1	3.5	3.4	2.8	3.0	3.3	2.2	1.1	4.5
28-Jan	1.0	-0.5	-0.4	0.2	0.5	0.4	0.3	0.7	0.7	1.0	1.7	2.3	2.9	3.5	4.1	3.9	4.1	4.6	3.5	3.0	2.6	2.5	2.5	2.4	2.0	4.6
29-Jan	4.4	4.0	2.0	2.2	2.3	2.1	2.0	1.6	0.3	0.4	2.3	4.6	6.8	7.2	7.6	7.1	5.8	4.8	3.3	3.0	3.1	3.3	2.8	1.8	3.5	7.6
30-Jan	0.5	0.3	0.3	-0.1	-0.4	-0.8	-1.0	-0.9	-1.5	-1.1	-0.4	-0.7	-0.9	-0.7	-1.4	-4.8	-5.5	-6.0	-6.7	-7.9	-9.1	-10.4	-11.9	-13.2	-3.5	0.5
31-Jan	-14.0	-14.7	-14.5	-14.9	-15.6	-16.4	-17.0	-17.2	-17.1	-17.2	-17.0	-16.0	-14.6	-13.8	-12.6	-12.0	-12.5	-12.7	-13.1	-13.1	-13.2	-12.8	-12.8	-12.8	-14.5	-12.0
	-12.1	-12.3	-12.6	-12.9	-13.0	-13.1	-13.3	-13.3	-13.3	-12.9	-11.8	-10.4	-9.1	-8.2	-7.9	-8.3	-9.3	-10.0	-10.4	-10.9	-11.3	-11.6	-11.8	-12.0	Diurnal Average	
	4.4	4.0	2.0	2.2	2.3	2.1	2.0	1.6	1.3	1.4	3.6	6.6	8.1	7.7	7.6	7.1	5.8	4.8	3.5	3.4	3.1	3.3	3.3	2.4	Diurnal Maximum	





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Janvier - January 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	181	24.33	24.33
-20 - 0	436	58.60	82.93
0 - 10	127	17.07	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



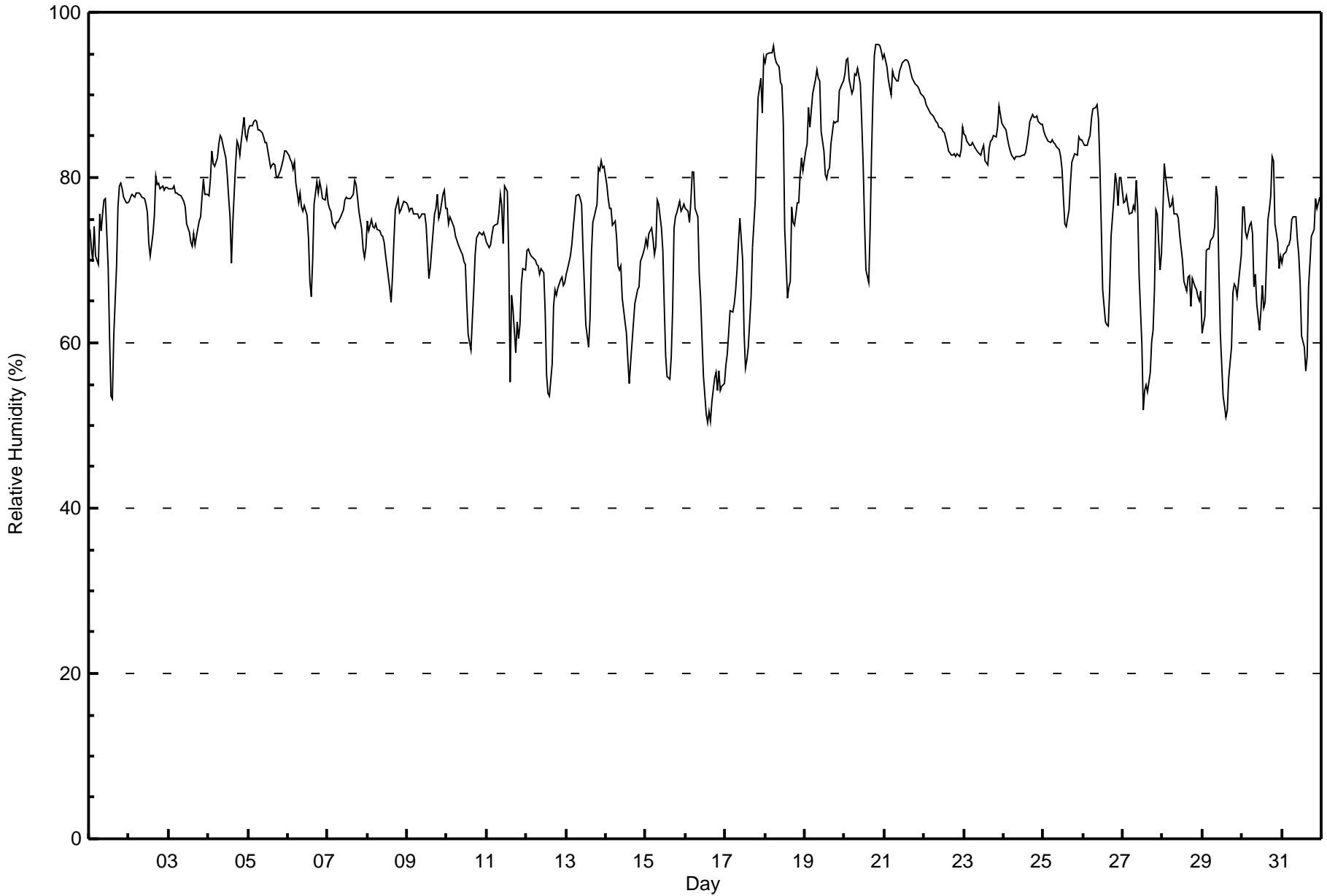
Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

Janvier - January 2017

Maximum Value: 96 % on Jan 20 21:00 Maximum Daily Average: 92.3 % on Jan 21																	Hours in Service: 744 Hours of Data: 744																																																							
Minimum Value: 50 % on Jan 16 14:00 Minimum Daily Average: 62.9 % on Jan 16 Maximum Diurnal Average: 79.2 % at hour 7 Minimum Diurnal Average: 66.7 % at hour 15 Monthly Average: 76.1 % Percentiles: P ₁ = 52 P ₁₀ = 63 Q ₁ = 71 Median = 76 Q ₃ = 83 P ₉₀ = 88 P ₉₉ = 95																	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-Jan	74	72	70	74	70	70	76	74	76	77	77	69	61	53	53	61	69	76	79	79	79	78	77	77	71.7	79																																														
2-Jan	77	78	78	78	78	78	78	78	78	77	77	76	72	71	73	75	80	79	79	79	79	78	79	79	77.2	80																																														
3-Jan	79	79	79	79	78	78	78	78	77	77	76	74	73	72	73	72	73	75	75	78	80	78	78	76.3	80																																															
4-Jan	78	80	83	82	81	82	84	85	85	84	82	80	78	75	70	75	82	84	84	83	84	87	85	85	81.6	87																																														
5-Jan	86	86	86	87	87	87	86	86	85	85	84	84	83	81	82	82	82	80	80	81	81	82	83	83	83.7	87																																														
6-Jan	83	82	82	81	82	79	77	78	76	76	77	75	73	67	66	70	77	79	78	79	79	78	77	79	77.1	83																																														
7-Jan	77	76	76	75	74	75	75	75	75	76	77	78	77	77	78	78	80	79	78	76	74	71	70	72	75.7	80																																														
8-Jan	75	74	75	74	74	74	74	74	74	73	73	72	71	69	67	65	68	72	76	77	76	76	77	77	73.3	77																																														
9-Jan	77	76	76	76	76	76	76	75	75	76	76	74	71	68	69	71	76	76	78	75	76	78	79	76	75.0	79																																														
10-Jan	76	74	75	74	74	73	72	72	71	71	70	69	65	61	59	63	66	71	73	73	73	73	73	73	70.7	76																																														
11-Jan	72	71	72	73	74	74	74	76	78	77	72	79	78	70	55	66	64	59	63	61	62	67	69	69	69.8	79																																														
12-Jan	71	71	71	70	70	70	70	69	68	69	68	64	56	54	54	57	64	66	66	67	68	68	67	67	66.1	71																																														
13-Jan	68	69	71	72	74	76	78	78	77	77	71	67	62	59	63	71	75	75	77	81	81	82	81	81	73.6	82																																														
14-Jan	79	77	76	76	74	75	73	69	69	69	66	63	61	58	55	58	62	65	66	66	67	70	71	72	68.2	79																																														
15-Jan	73	72	73	74	73	71	72	77	77	74	71	65	59	56	56	58	64	74	75	76	77	76	76	77	70.6	77																																														
16-Jan	76	76	75	77	81	81	76	75	68	65	60	56	51	50	52	51	53	56	56	54	57	54	55	55	62.9	81																																														
17-Jan	57	59	61	64	64	65	66	69	72	75	70	61	57	58	59	66	72	74	77	84	90	92	88	95	70.6	95																																														
18-Jan	94	95	95	95	95	96	95	94	93	91	91	87	74	65	67	67	76	74	74	77	77	80	82	81	84.1	96																																														
19-Jan	83	84	89	86	88	90	92	93	92	92	86	83	80	80	81	81	84	87	87	87	87	91	91	92	86.9	93																																														
20-Jan	93	94	94	92	90	91	93	92	93	91	87	82	75	69	67	74	83	90	95	96	96	96	95	94	88.4	96																																														
21-Jan	95	93	92	91	90	93	92	92	92	93	93	94	94	94	94	94	93	92	91	91	91	91	90	90	92.3	95																																														
22-Jan	89	89	88	88	88	88	87	87	87	86	86	86	85	85	84	83	83	83	83	83	83	83	83	86	85.5	89																																														
23-Jan	85	85	84	84	84	84	84	84	83	83	83	83	84	82	84	84	85	85	85	86	89	88	87	87	84.4	89																																														
24-Jan	86	86	85	84	83	83	82	82	83	82	83	83	83	83	84	85	87	88	87	87	87	87	86	86	84.7	88																																														
25-Jan	86	85	85	84	84	85	84	84	84	83	83	81	78	74	74	76	79	82	82	83	83	85	85	85	82.2	86																																														
26-Jan	84	84	84	85	85	87	88	88	89	87	82	74	66	63	62	62	66	73	78	81	79	77	80	80	78.5	89																																														
27-Jan	77	77	78	77	76	76	77	76	80	77	68	60	52	54	55	54	56	60	62	67	76	76	69	71	68.6	80																																														
28-Jan	76	82	80	77	76	77	78	76	76	75	73	72	70	67	66	68	68	64	68	67	66	66	65	66	71.6	82																																														
29-Jan	61	63	71	71	71	72	73	74	79	78	69	61	54	52	51	52	56	60	66	67	67	66	67	71	65.5	79																																														
30-Jan	76	76	73	73	74	75	73	67	68	65	61	64	67	64	65	75	76	78	83	82	74	72	69	70	71.7	83																																														
31-Jan	70	71	71	72	72	73	75	75	75	73	71	67	61	60	57	58	67	70	73	74	77	76	77	78	70.4	78																																														
																	78.5		78.6		79.0		78.9		78.7		79.0		79.2		79.1		79.2		78.5		76.2		73.6		70.0		67.5		66.7		69.5		73.2		75.1		76.6		77.1		77.7		78.2		77.9		78.4		Diurnal Average							
																	95		95		95		95		95		96		95		94		93		93		93		94		94		94		94		94		94		94		94		93		92		95		96		96		96		95		95		Diurnal Maximum	





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Janvier - January 2017

Maximum Speed: 16 km/h on Jan 30 12:00	Maximum Daily Speed Average: 10.9 km/h on Jan 25	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jan 5 04:00	Minimum Daily Speed Average: 0.6 km/h on Jan 19	Hours of Data: 743
Maximum Diurnal Speed Average: 4.5 km/h at hour 10	Minimum Diurnal Speed Average: 2.1 km/h at hour 17	Hours of Missing Data: 1
Monthly Average Velocity: 3.6 km/h 212.8 deg	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 4 Median = 7 Q ₃ = 9 P ₉₀ = 11 P ₉₉ = 15	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-Jan	W14	W15	W14	NNW10	N8	N6	N8	N9	N5	ESE1	SSW4	W6	WNW6	NW5	NW4	NW3	NE1	SSE2	SE2	S2	S2	SSW2	S2	S2	NW3.0	W15
2-Jan	SSW1	S3	SSW3	SSW3	SSW2	SSW3	S3	SSW4	SSW3	SSW4	SSW4	SW2	NNE1	NNE6	NE4	SE3	SE2	SE2	SSE2	S4	S5	S4	S4	S5	S2.2	NNE6
3-Jan	S6	S6	S5	SSW6	SSW7	SSW8	SSW8	SSW8	SSW8	SSW8	SSW8	SSW9	SSW8	SW7	SSW7	WSW8	W10	W8	W6	WSW7	WSW6	WSW7	W6	W6	SSW6.2	W10
4-Jan	WNW7	NW4	N7	N10	N8	NNE9	NNE8	NNE6	NNE3	NNE4	NNE5	NNW3	WNW3	WSW4	SW3	S4	SSE3	S6	SSW8	SSW10	SSW8	SSW7	S5	S6	WNW0.7	SSW10
5-Jan	SSW6	SSW5	SSW2	WSW0	NW1	NNE3	NNE7	N5	NNE9	NNE8	NNE7	NNE9	NNE9	NNE6	NNE6	NNE10	NNE10	NNE10	NNE11	NNE7	NNE5	NNE3	NNW2	NNW2	NNE4.8	NNE11
6-Jan	NNW2	WNW2	SW2	SSW4	SSW5	SSE2	S2	SSW5	SSW6	SSW6	SSW7	SSW5	SW4	SSW5	S7	S5	SSE3	S5	S4	SSE2	S3	S4	S6	S7	SSW4.0	S7
7-Jan	S5	SSW3	SE1	W1	S2	SE1	NNW1	NNW1	NW0	NNW1	NNE5	NNE6	NNE8	NNE7	NNE7	NNE4	NNE4	N5	N6	N6	N7	N8	N7	N6	NNE3.2	NNE8
8-Jan	NNE4	NNE5	S2	SE2	S3	S4	SSW6	SSW6	SSW7	SSW8	SSW9	SSW8	SSW9	SSW8	SW10	SSW8	S8	S6	SSW8	SSW10	SSW7	S6	S8	SSW7	SSW5.7	SSW10
9-Jan	SSW9	SSW11	SSW9	SW6	SSW8	SSW8	SSW7	SSW5	S6	SSW4	SSW5	SW4	WSW3	WNW2	WSW1	SSE2	WSW4	W3	NW2	NNW3	NW2	S2	SW4	SSW4	SSW4.1	SSW11
10-Jan	SSW3	SSE3	SSW4	SSW4	S2	SSW0	SSW1	S1	SSE1	SSW1	SSW1	NE2	NE4	NE2	WSW1	W7	W7	SSW5	SSW6	SSW7	SSW8	SSW9	SSW9	SSW11	SSW3.1	SSW11
11-Jan	SSW11	SSW12	SSW12	SSW13	SSW14	SSW13	SSW10	SSW11	SSW8	W13	WNW13	NNE11	N15	N16	N15	N13	N10	N8	NW6	N8	WNW4	WSW3	WSW3	SW3	W3.2	N16
12-Jan	S3	S3	S2	S3	S5	S6	S5	S8	S3	SSW3	SSW4	S4	SSW3	S11	S8	SSE6	SE4	SSE4	S10	S12	S10	SSW12	SSW13	SSW14	S6.2	SSW14
13-Jan	SSW12	SSW9	SSW11	SSW11	SSW10	SSW10	S8	S7	S7	SSW7	SSW11	SSW12	SSW11	SSW9	SSW7	SSW6	SSW6	SSW10	S9	S8	S10	S11	SSW10	SSW9	SSW9.1	SSW12
14-Jan	SSW9	SSW10	S12	SSW10	SSW10	SSW9	SSW10	SSW11	SSW9	SSW10	SSW12	SSW13	SSW13	SSW11	SSW11	SSW10	SSW9	SSW11	SSW10	SSW10	SSW10	SSW9	SSW10	SSW11	SSW10.5	SSW13
15-Jan	SSW11	SSW10	SSW8	SSW7	SW6	WSW9	SW8	S6	SSW8	SW9	SSW7	SW11	WSW12	WSW12	WSW9	SW8	SW5	S7	S8	SSW10	S11	SSW11	SSW10	SSW9	SSW8.3	WSW12
16-Jan	SSW10	SSW10	SSW11	SSW8	SSW7	S8	SSW10	SSW8	S12	SSW11	SSW13	SSW13	SSW14	SSW14	S13	S11	S9	S7	S9	SSW9	SSW9	SSW11	SSW10	SSW9	SSW10.1	SSW14
17-Jan	S8	SSW9	S8	S8	SSW13	S12	SSW11	SSW12	S9	S9	S8	SW8	WSW11	WSW9	SW6	S6	S5	SSW4	SSW4	SSE4	ESE3	S5	SE3	ESE2	SSW6.5	SSW13
18-Jan	WNW1	ENE1	SSE3	S2	S0	NE1	WNW1	WSW2	NW1	SW1	WSW1	SSW4	S5	S4	SSW7	S6	S5	S6	SSW8	S8	SSW11	SSW7	S9	SSW9	SSW3.9	SSW11
19-Jan	S6	S3	SE3	S3	S5	S1	S4	S2	SSE3	SSE3	S1	NW1	N2	N2	NNE4	N3	N3	N1	NNE5	N2	W1	E1	NNW0	SE2	SE0.6	S6
20-Jan	ENE0	SW2	S6	SSW6	SSW7	S8	SSW7	S8	S8	S9	S10	S8	S7	SSW6	SSW2	SE2	ESE4	ESE3	SE1	SSE2	S1	S2	SSW2	S3	S4.4	S10
21-Jan	SSW5	S4	AF	SSW1	NNE1	NNE9	NNE7	N3	N3	NNE5	NNE7	NNE5	NNE7	NNE8	NNE7	N6	N6	N6	N5	N4	NNE5	NNE6	N5	N5	NNE4.3	NNE9
22-Jan	N5	N5	NNE6	N6	N5	N6	N5	NNE5	NNE5	NNE6	NNE6	NNE6	NNE7	NNE7	NNE6	NNE6	N5	N4	N4	N2	N3	N4	N3	N2	N4.9	NNE7
23-Jan	N3	NNW2	NNW2	NNE3	NNE3	NNE4	NNE3	NNE3	NNE2	N1	WNW1	WNW1	S0	SSE1	SSE1	ESE2	E2	E1	E1	ESE1	SSW1	S2	SSW2	SSW3	NNE0.6	NNE4
24-Jan	SW3	SSW3	SSW2	S3	S4	S4	S3	S3	SSW4	SSW4	S4	S4	S5	S5	S5	S4	S4	S5	S5	S6	S7	SSW8	S6	S9	S4.6	S9
25-Jan	S9	S9	S9	S10	S10	S10	S11	S11	SSW12	SSW11	SSW10	SSW10	SSW11	SSW13	SSW11	SSW12	SSW12	SSW13	SSW11	SSW11	SSW11	SSW11	SSW11	SSW13	SSW10.9	SSW13
26-Jan	SSW12	SSW12	SSW12	SSW11	SSW12	SSW10	S11	SSW11	S11	S9	S9	SSW9	WSW7	SW8	SW9	SW9	WSW8	SW8	SSW6	SSW8	SSW9	SW7	S6	SSW7	SSW8.8	SSW12
27-Jan	SSW7	SW6	SW7	SW7	W10	WSW9	SSW8	SW9	SSW8	SSW12	SSW12	SW10	SW10	WSW5	SW4	WSW5	WSW4	SW5	WSW8	W10	WSW9	WSW8	WSW9	SW7	SSW7.4	SSW12
28-Jan	SSW8	S6	SSW7	SW8	SSW9	SSW8	S5	SW8	WSW9	SW11	SW8	SSW5	S6	S6	S6	S5	SSW7	SSW10	SSW8	SSW10	SSW9	SSW10	SW8	SW9	SSW7.4	SW11
29-Jan	WSW10	SW8	SSW9	SSW9	SSW9	SSW8	SSW8	SSW8	SSW12	S14	S11	SSW10	WSW11	WSW9	WSW12	WSW11	WSW7	SW6	WSW1	WSW7	WSW10	W11	WNW5	W4	SSW7.8	S14
30-Jan	SW4	SW5	WSW7	SW8	SW10	WSW8	WSW9	W11	W11	W15	W15	W16	W15	W15	NW11	N11	N6	NW5	NNE6	N10	N12	N11	N10	N9	WNW6.2	W16
31-Jan	N9	N8	N8	N10	N9	N8	N7	N7	NNW3	W6	W6	WSW7	WSW9	WSW10	W9	W11	W8	WSW5	W5	WSW5	WSW5	W6	SW5	WSW6	WNW4.4	W11

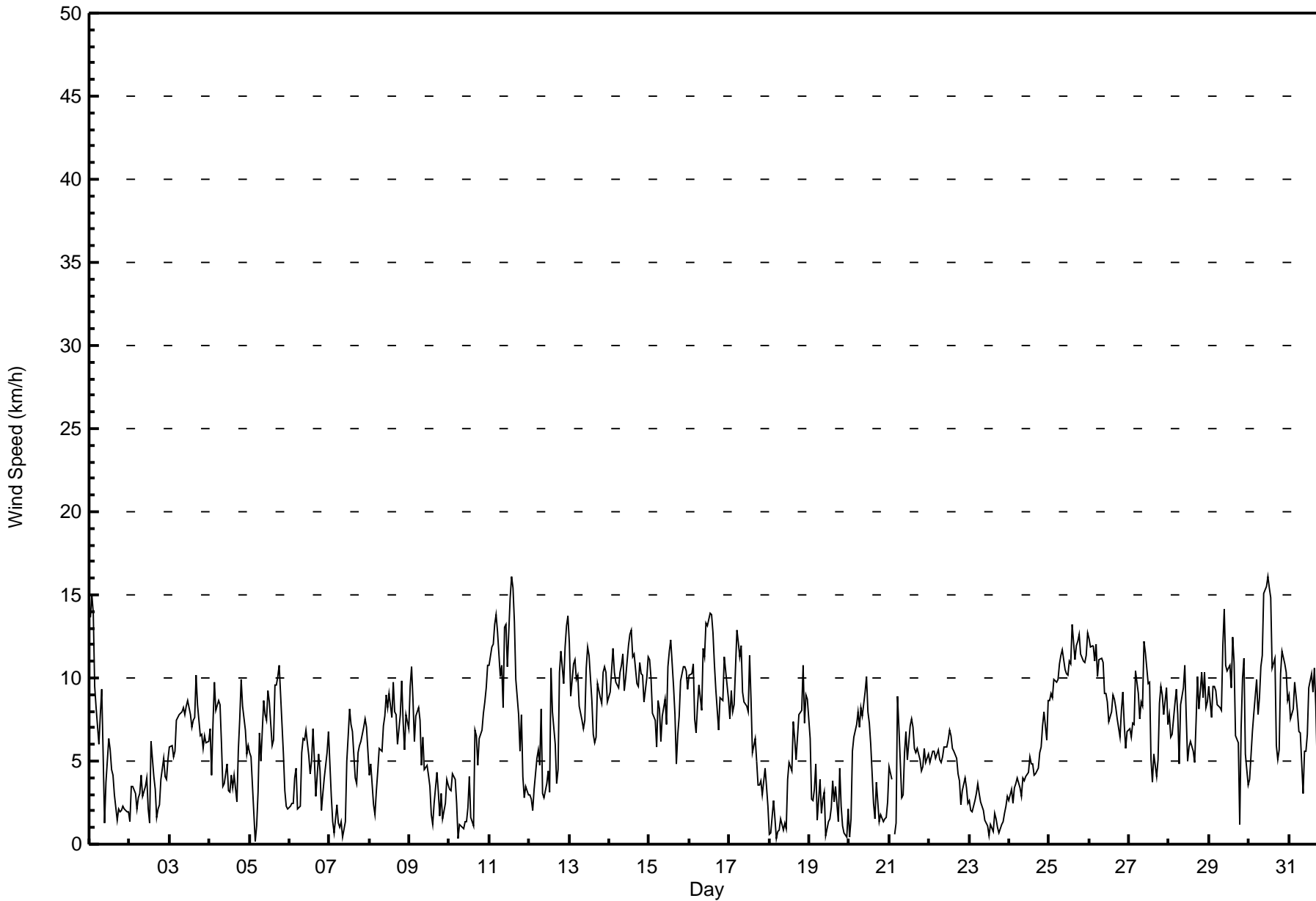
SSW4.4SSW4.4SSW4.5SSW3.8SSW4.2SSW3.5SSW3.4SSW3.8SSW4.1SSW4.5SSW4.3	SW3.9	SW3.7	SW3.5	SW2.9	SW2.3	SW2.1	SSW2.7	SSW2.9	SSW3.4	SSW3.9	SSW4.1	SSW4.0	SSW4.4	Diurnal Average										
W14	W15	W14	SSW13	SSW14	SSW13	SSW11	SSW12	SSW12	W15	W15	W16	W15	N16	N15	N13	SSW12	SSW12	SSW13	S12	N12	SSW12	SSW13	SSW14	Diurnal Maximum

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



Wood Buffalo Environmental Association
Hourly Averages

Wind Speed (WS) - km/h
Janvier - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h
Janvier - January 2017**

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	295	39.70	39.70
6 - 11	392	52.76	92.46
12 - 19	56	7.54	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: 743

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Janvier - January 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	29	26	6	2	4	7	13	18	71	49	16	17	5	9	11	12	295
6 - 11	33	40	0	0	0	0	0	1	73	159	32	30	19	2	2	1	392
12 - 19	5	0	0	0	0	0	0	0	5	33	0	3	9	1	0	0	56
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
Totals	67	66	6	2	4	7	13	19	149	241	48	50	33	12	13	13	743

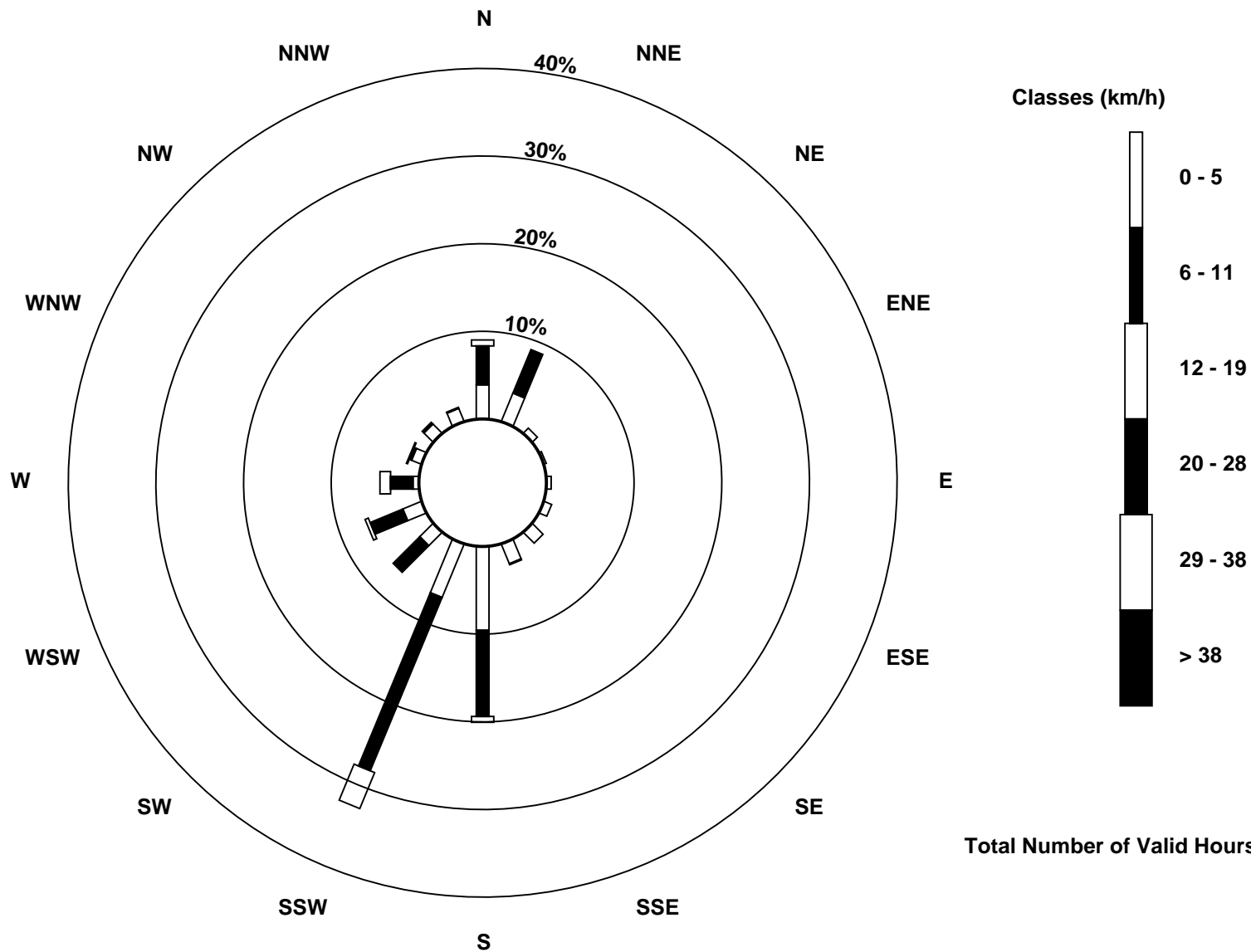
Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose 2016

Wind Speed (WS) - km/h
Janvier (AMS 22)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Janvier - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Jan 11 11:00 Minimum Value: 0 km/h on Jan 23 16:00 Percentiles: P ₁ = 1 P ₁₀ = 1 O ₁ = 1 Median = 2 O ₃ = 2 P ₉₀ = 3 P ₉₉ = 5																	Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9									
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	4	5	4	5	4	3	2	3	2	1	1	2	2	3	3	2	1	1	1	1	1	1	1	1	5	
2-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	0	1	1	1	1	1	2	
3-Jan	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	2	2	1	2	2	2	3	
4-Jan	2	2	3	4	3	2	2	2	1	2	2	1	1	1	1	1	1	1	2	2	2	2	1	1	4	
5-Jan	1	1	1	1	1	1	2	1	2	2	2	2	3	2	2	4	4	4	3	2	2	3	1	1	4	
6-Jan	1	1	1	1	1	1	1	1	1	2	1	2	1	2	1	2	1	2	2	1	1	1	2	1	2	
7-Jan	2	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	3	2	2	2	3	2	2	3	
8-Jan	1	2	1	1	1	1	1	1	2	2	2	2	2	2	3	2	1	2	2	3	2	2	1	2	3	
9-Jan	3	2	2	2	2	2	2	1	2	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1	3	
10-Jan	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	3	2	1	1	2	2	2	2	3	3	
11-Jan	3	3	3	4	3	4	3	3	2	6	7	4	6	7	6	5	4	4	3	4	3	1	1	1	7	
12-Jan	1	1	1	1	1	2	2	2	2	1	1	1	2	3	3	2	1	2	4	3	2	3	3	4	4	
13-Jan	3	3	3	3	2	2	2	2	2	2	3	3	3	3	2	2	2	2	3	3	2	2	2	2	3	
14-Jan	2	2	2	2	2	2	3	3	3	2	3	3	3	3	3	3	3	3	3	2	3	2	2	3	3	
15-Jan	3	3	2	2	2	3	2	2	2	3	3	3	4	4	4	3	2	2	2	2	2	2	2	2	4	
16-Jan	2	2	2	2	1	2	3	2	3	2	3	3	4	3	3	3	2	2	2	2	2	2	3	2	4	
17-Jan	2	2	2	2	3	3	3	3	2	2	2	2	4	3	2	2	2	2	1	1	1	2	1	1	4	
18-Jan	1	1	1	1	1	1	1	1	1	1	1	2	2	1	2	2	1	2	2	2	2	2	2	2	2	
19-Jan	1	2	1	1	2	1	1	1	2	1	1	1	1	1	1	2	2	1	2	1	1	1	1	1	2	
20-Jan	1	1	2	1	2	2	1	2	2	2	2	2	2	2	1	1	1	1	1	1	0	1	1	1	2	
21-Jan	1	1	AF	1	1	3	2	2	1	2	2	2	2	2	3	2	2	2	2	1	2	2	2	2	3	
22-Jan	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	2	
23-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	0	1	1	1	1	
24-Jan	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	2	
25-Jan	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	2	3	3	3	3	3	2	2	3	3	
26-Jan	3	3	3	3	3	2	2	2	2	1	2	2	2	3	3	3	2	2	2	2	2	2	2	2	3	
27-Jan	2	2	3	3	4	3	2	3	3	3	3	3	3	3	2	2	1	2	3	3	2	2	3	2	4	
28-Jan	2	2	2	2	3	2	1	5	3	3	3	2	2	2	2	1	2	3	2	3	2	2	2	2	5	
29-Jan	3	2	1	2	2	2	2	2	2	3	2	3	4	3	4	4	2	2	1	2	3	3	3	2	4	
30-Jan	1	1	2	3	3	2	2	3	3	4	5	5	5	5	5	4	2	3	5	4	4	4	4	3	5	
31-Jan	4	3	3	4	4	3	2	3	2	2	2	2	3	3	3	3	3	1	2	1	2	1	1	1	4	
																	Diurnal Maximum									
AF - Analyzer Failure																										



Wood Buffalo Environmental Association
Summary of Hour Averages

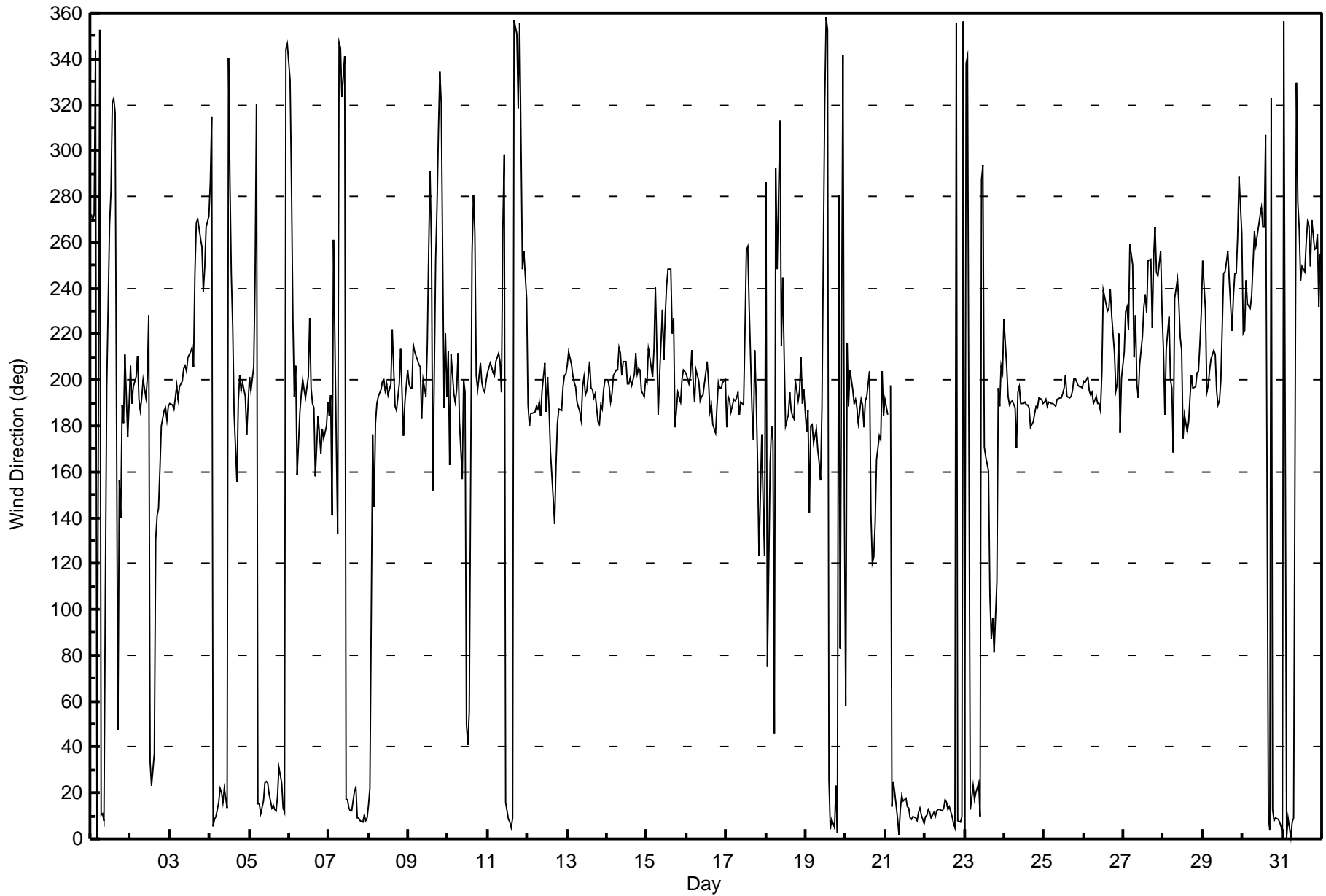
Wind Direction (WD) - deg
Janvier - January 2017

Direction of Maximum Speed: 275 deg on Jan 30 12:00																							Hours in Service:	744	
Direction of Maximum Daily Speed Average: 194.0 deg on Jan 25																							Hours of Data:	743	
Direction of Minimum Speed: 246 deg on Jan 5 04:00											Direction of Minimum Daily Speed Average: 0.6 deg on Jan 19												Hours of Missing Data:	1	
Monthly Average Direction: 213.8 deg																							Percent Operational Time:	99.9	
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jan	272	270	272	344	1	353	11	11	8	107	197	268	282	321	323	317	48	156	140	189	181	211	175	189	303.8
2-Jan	206	190	197	202	210	192	187	192	200	192	200	228	33	23	37	131	141	144	161	180	187	188	182	189	182.1
3-Jan	190	189	188	192	197	192	197	200	205	206	204	210	212	214	206	247	269	270	262	258	238	249	267	272	222.0
4-Jan	286	315	6	9	10	16	22	20	16	22	13	341	288	246	223	185	156	191	202	195	199	193	176	190	298.0
5-Jan	201	196	206	246	321	15	15	11	17	25	25	24	20	13	14	13	12	18	31	24	14	12	344	346	16.9
6-Jan	331	285	227	193	206	158	186	194	200	196	192	201	227	196	190	188	158	184	176	168	179	175	180	190	193.3
7-Jan	184	193	141	261	173	133	347	345	323	341	17	17	13	12	12	21	23	9	9	8	7	11	8	9	12.7
8-Jan	15	22	176	145	181	189	193	196	199	200	195	198	193	198	222	205	189	187	198	213	194	176	190	204	196.7
9-Jan	199	197	197	216	212	209	207	206	183	200	193	215	256	291	257	152	253	277	309	334	320	188	220	193	211.3
10-Jan	212	163	211	194	190	196	212	182	157	200	194	50	41	55	256	281	265	202	196	208	199	196	195	199	205.4
11-Jan	203	207	205	203	202	208	211	208	194	265	299	16	9	7	5	9	357	351	318	356	303	248	256	236	277.0
12-Jan	189	180	186	186	186	189	187	190	184	195	207	186	201	188	169	148	137	163	181	187	187	197	202	203	187.0
13-Jan	207	212	207	202	199	197	190	186	182	197	201	193	195	208	196	196	192	194	182	180	189	188	196	200	195.9
14-Jan	200	197	190	194	202	204	205	214	212	202	208	208	198	198	201	198	202	211	202	205	205	195	193	200	201.8
15-Jan	199	213	210	201	214	240	215	185	202	231	209	228	241	248	248	221	227	180	186	195	190	200	204	204	213.2
16-Jan	202	199	202	213	199	191	204	200	191	193	193	198	208	199	186	189	181	177	189	199	196	196	199	200	196.2
17-Jan	180	193	191	186	192	191	192	195	185	190	189	221	256	258	232	187	174	213	193	164	123	176	146	123	195.9
18-Jan	286	75	164	180	173	46	292	248	313	215	244	210	180	185	195	186	184	183	200	191	195	210	190	196	194.2
19-Jan	178	186	142	180	181	172	179	170	164	156	188	321	358	352	26	4	9	5	23	2	281	83	342	146	145.2
20-Jan	58	216	189	204	196	190	192	188	181	191	189	179	191	193	204	142	120	123	137	165	176	174	204	184	185.4
21-Jan	192	185	AF	198	14	25	20	9	2	13	19	17	18	14	14	9	8	10	9	8	12	14	10	7	13.9
22-Jan	10	10	13	11	9	11	10	12	13	13	12	14	17	16	13	14	10	7	5	356	8	7	10	356	10.9
23-Jan	2	338	341	13	18	23	17	20	24	10	287	293	171	167	160	106	87	97	81	112	196	189	206	203	24.4
24-Jan	226	205	193	189	190	191	188	170	195	197	190	190	190	189	188	179	182	186	188	188	192	191	190	190	190.0
25-Jan	190	191	189	190	190	190	189	189	192	192	192	194	196	202	193	192	193	195	201	201	198	197	197	197	194.0
26-Jan	199	199	201	195	193	195	190	193	190	190	187	203	239	233	230	231	240	228	212	195	198	220	177	201	204.3
27-Jan	212	230	232	222	259	250	210	228	198	192	207	219	232	237	229	252	253	223	254	267	247	245	256	229	232.0
28-Jan	213	185	213	228	200	197	169	236	244	234	218	213	175	185	177	182	193	202	196	197	203	204	216	229	207.1
29-Jan	252	231	195	197	205	209	213	211	196	189	191	200	247	247	251	256	243	221	237	246	247	263	288	264	225.9
30-Jan	221	222	244	233	231	237	251	265	259	263	271	275	267	266	307	9	4	322	13	8	9	8	8	6	289.9
31-Jan	2	356	0	9	5	0	8	9	329	278	266	243	250	247	260	269	267	250	270	257	258	264	232	255	295.8
213.8 211.7 208.9 207.4 207.1 206.6 203.5 207.8 202.9 211.4 213.0 220.3 235.2 234.8 230.3 224.3 222.7 209.3 205.8 211.1 208.6 209.8 208.2 208.5																							Diurnal Average		
AF - Analyzer Failure																									
All monthly, daily, and diurnal averages have been calculated using vector methods																									



Wood Buffalo Environmental Association
Hourly Averages

Wind Direction (WD) - deg
Janvier - January 2017





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Janvier - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 96 deg on Jan 18 02:00 Minimum Value: 0 deg on Jan 20 19:00 Percentiles: P ₁ = 9 P ₁₀ = 13 Q ₁ = 16 Median = 20 Q ₃ = 31 P ₉₀ = 53 P ₉₉ = 92																	Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jan	21	18	22	58	59	54	23	22	26	56	31	26	49	79	80	77	65	20	55	43	38	32	38	68	80
2-Jan	74	33	49	32	44	39	43	26	45	49	30	40	90	19	31	13	13	15	16	10	13	29	22	48	90
3-Jan	10	10	12	17	15	11	13	15	16	17	17	18	18	20	18	22	19	22	19	19	18	18	21	20	22
4-Jan	32	60	39	37	38	20	17	17	35	21	25	48	55	27	37	17	24	11	16	13	15	15	16	16	60
5-Jan	19	15	32	86	45	24	17	19	16	13	14	13	17	28	22	25	22	22	14	19	24	60	53	65	86
6-Jan	64	59	18	13	14	49	36	10	13	16	11	22	27	25	9	16	15	19	16	38	35	22	14	7	64
7-Jan	15	14	46	82	33	51	60	43	78	63	14	20	20	23	20	20	15	26	38	34	27	24	29	27	82
8-Jan	21	12	52	26	21	15	11	13	13	14	14	18	15	19	23	21	11	10	18	18	16	22	12	17	52
9-Jan	14	13	13	21	19	18	17	23	13	22	17	26	30	70	70	37	26	51	92	90	84	32	16	21	92
10-Jan	30	23	20	20	24	93	32	51	60	28	53	66	17	65	94	31	21	15	17	16	13	12	11	15	94
11-Jan	17	18	17	16	16	19	22	20	19	28	49	25	30	40	47	33	53	66	63	62	74	51	32	42	74
12-Jan	20	16	31	16	10	10	16	13	23	10	22	22	54	16	25	25	18	22	15	14	14	16	18	17	54
13-Jan	19	21	19	15	14	13	15	16	13	16	18	19	19	22	18	17	19	13	20	19	11	10	14	13	22
14-Jan	13	13	10	14	15	16	17	19	19	15	18	19	16	19	16	17	17	19	16	17	17	12	13	15	19
15-Jan	14	19	18	21	27	20	21	21	25	20	26	19	25	24	25	25	33	14	17	12	10	15	16	14	33
16-Jan	14	13	14	15	9	11	18	15	12	13	13	18	18	16	13	16	16	21	17	14	12	13	16	15	21
17-Jan	19	20	18	16	14	14	14	13	14	17	18	23	20	18	22	19	19	51	26	19	40	25	21	41	51
18-Jan	74	96	37	28	95	69	69	13	66	63	94	55	31	34	19	15	20	13	15	15	13	22	10	18	96
19-Jan	17	56	34	36	14	77	24	84	27	28	84	46	55	34	14	45	41	70	31	49	64	93	92	64	93
20-Jan	96	72	17	19	14	10	11	12	16	13	14	20	17	26	36	19	9	13	0	30	43	39	19	20	96
21-Jan	13	14	AF	90	61	13	14	30	31	21	19	21	19	24	27	37	43	42	44	41	36	31	33	32	90
22-Jan	32	33	28	28	34	24	33	29	23	26	25	27	20	23	28	25	26	23	28	29	28	26	28	47	47
23-Jan	39	45	49	33	24	16	21	21	15	58	57	66	84	61	43	27	20	26	54	32	45	33	28	22	84
24-Jan	26	19	18	13	12	14	19	20	16	19	16	16	16	14	13	16	15	13	14	11	13	12	9	26	26
25-Jan	11	12	12	13	13	12	11	12	12	14	14	15	17	20	14	13	12	13	15	16	16	14	14	14	20
26-Jan	16	16	17	16	12	13	10	11	9	9	10	21	26	26	25	21	21	22	20	13	15	27	30	39	39
27-Jan	22	26	22	33	27	25	23	27	29	13	19	21	27	35	43	19	17	23	32	18	19	19	23	25	43
28-Jan	21	18	30	25	20	25	43	46	24	20	29	30	19	16	21	20	17	16	13	16	16	15	19	19	46
29-Jan	19	20	10	12	16	16	17	19	12	12	17	21	26	23	22	19	24	28	88	17	19	21	45	50	88
30-Jan	32	26	27	22	19	23	16	18	18	17	25	23	22	22	54	30	45	71	65	31	28	34	39	45	71
31-Jan	51	59	49	36	46	49	34	38	59	26	31	30	25	25	23	23	18	17	19	17	19	20	19	17	59
96 96 52 90 95 93 69 84 78 63 94 66 90 79 94 77 65 71 92 90 84 93 92 68																								Diurnal Maximum	
AF - Analyzer Failure																									



Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	December 5, 2016	Last Calibration	November 3, 2016
Station Name	Janvier	Station Number	AMS 22
Reason:	Routine		
Start Time (MST)	12:00	End Time (MST)	16:50
Gas Cert Reference	LL107937	Station temp.	22 Deg C
Cal Gas Concentration	49.7 ppm	Cal Gas Exp Date	September 8, 2018
Calibrator Make/Model	API T700	Serial Number	2462
ZAG Make/Model	API T701	Serial Number	135
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2586

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-636	-637
Analyzer IP address	192.168.1.43		Lamp voltage	786	787
Calculated slope	0.995878	0.996808	Chamber temp	45.0	45.0
Calculated intercept	0.499551	-0.292275	Pressure	709.0	708.0
Analyzer Background	16.1	16.4	Flow	0.508	0.504
Analyzer Coefficient	0.961	0.975	Intensity	91	91

Analyzer make Thermo 43i Analyzer serial # 1152430006

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	-1.0	----
As Found Span	5000	78.6	781.3	767.1	1.018
calibrator zero	5000	0.0	0.0	-0.5	----
high point	5000	78.6	781.3	784.3	0.996
second point	5000	39.3	390.6	390.7	1.000
third point	5000	19.6	194.8	197.8	0.985
as left zero	5000	0.0	0.0	-0.2	----
as left span	5000	78.6	781.3	791.1	0.988
Average Correction Factor					0.994

Corrected As found 768.2 Previous response 784.0 % change 2.1%

Notes:

Zero and span required slight adjustment after as founds.

Calibration Performed By: Zack Eastman



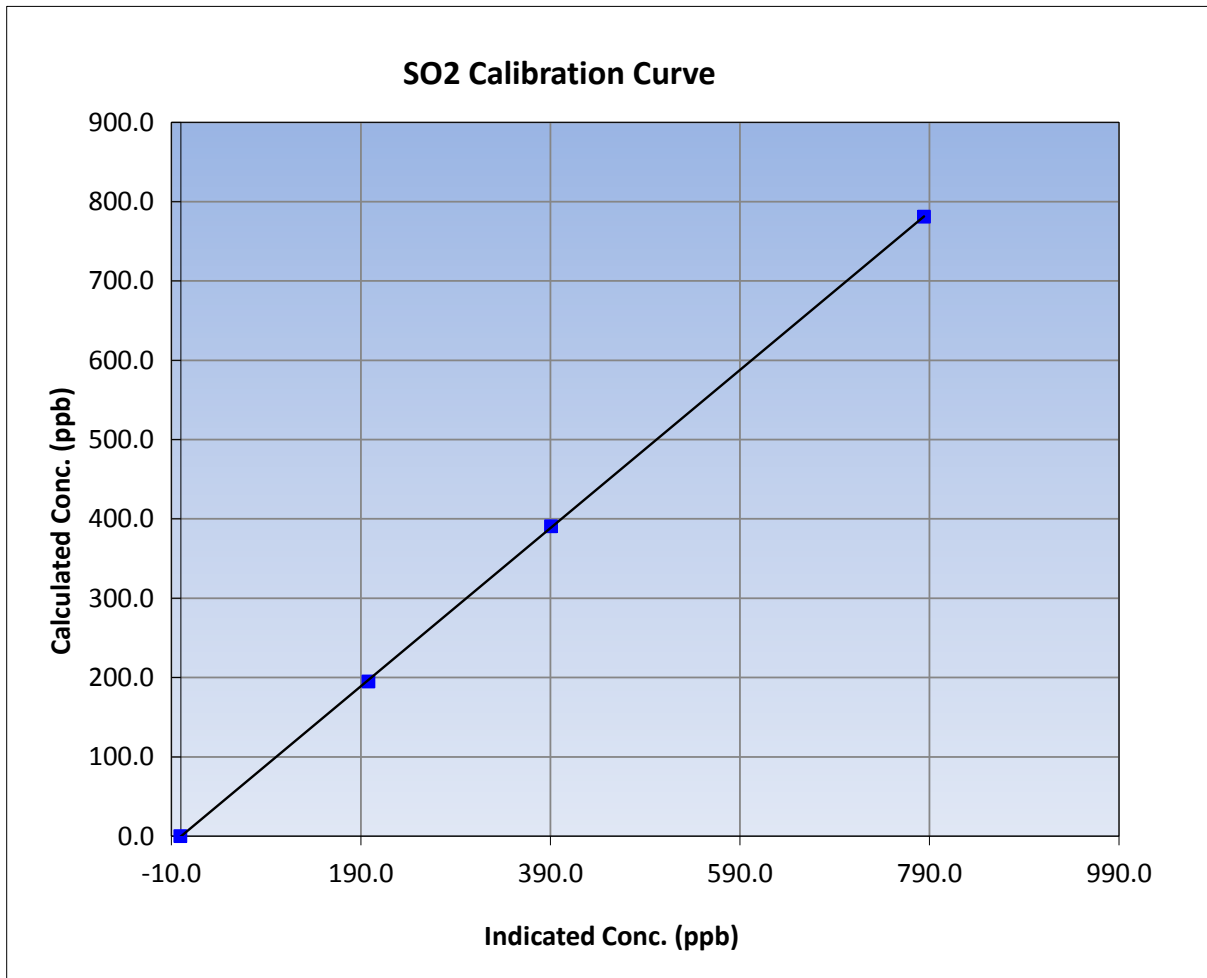
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	December 5, 2016	Previous Calibration	November 3, 2016
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	12:00	End Time (MST)	16:50
Analyzer make	Thermo 43i	Analyzer serial #	1152430006

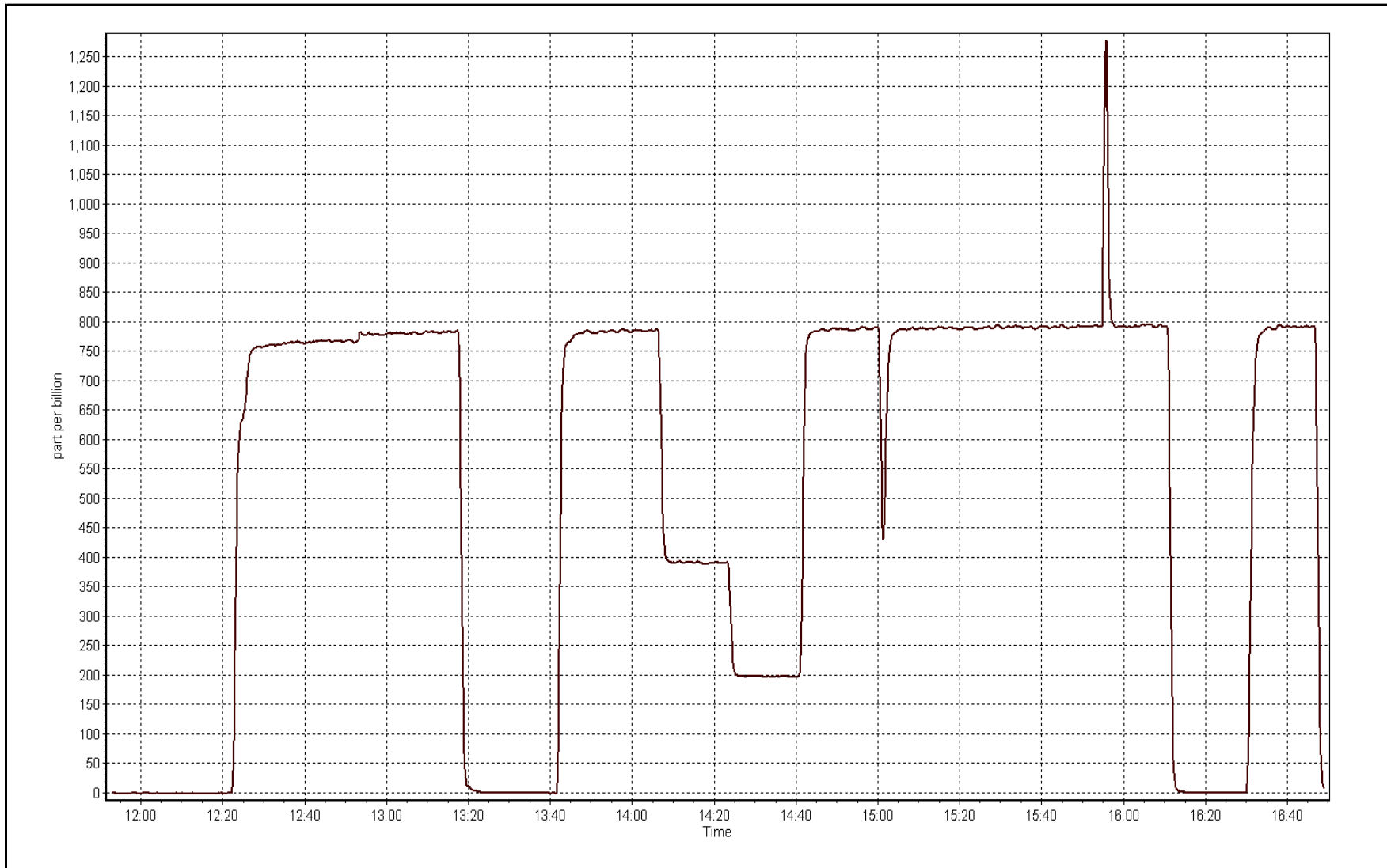
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.5	----	Correlation Coefficient	0.999979
781.3	784.3	0.9962		
390.6	390.7	0.9999	Slope	0.996808
194.8	197.8	0.9850		
			Intercept	-0.292275



SO2 Calibration Plot

Date: December 5, 2016





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 11, 2017	Last Calibration	December 5, 2016
Station Name	Janvier	Station Number	AMS 22
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	12:15
Gas Cert Reference	LL107937	Station temp.	22 Deg C
Cal Gas Concentration	49.7 ppm	Cal Gas Exp Date	September 8, 2018
Calibrator Make/Model	API T700	Serial Number	2462
ZAG Make/Model	API T701	Serial Number	135
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2586

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-637	-637
Analyzer IP address	192.168.1.43		Lamp voltage	790	790
Calculated slope	0.996808	1.002333	Chamber temp	45.0	45.0
Calculated intercept	-0.292275	-0.789798	Pressure	688.2	688.2
Analyzer Background	16.4	16.3	Flow	0.488	0.488
Analyzer Coefficient	0.975	0.999	Intensity	91	91

Analyzer make Thermo 43i Analyzer serial # 1152430006

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	78.6	781.3	753.1	1.037
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	78.6	781.3	780.1	1.002
second point	5000	39.3	390.6	390.1	1.001
third point	5000	19.6	194.8	196.6	0.991
as left zero	5000	0.0	0.0	-0.1	----
as left span	5000	78.6	781.3	782.1	0.999
Average Correction Factor					0.998

Corrected As found 754.2 Previous response 784.1 % change 4.0%

Notes:

Zero and span adjusted after as founds.

Calibration Performed By: Zack Eastman



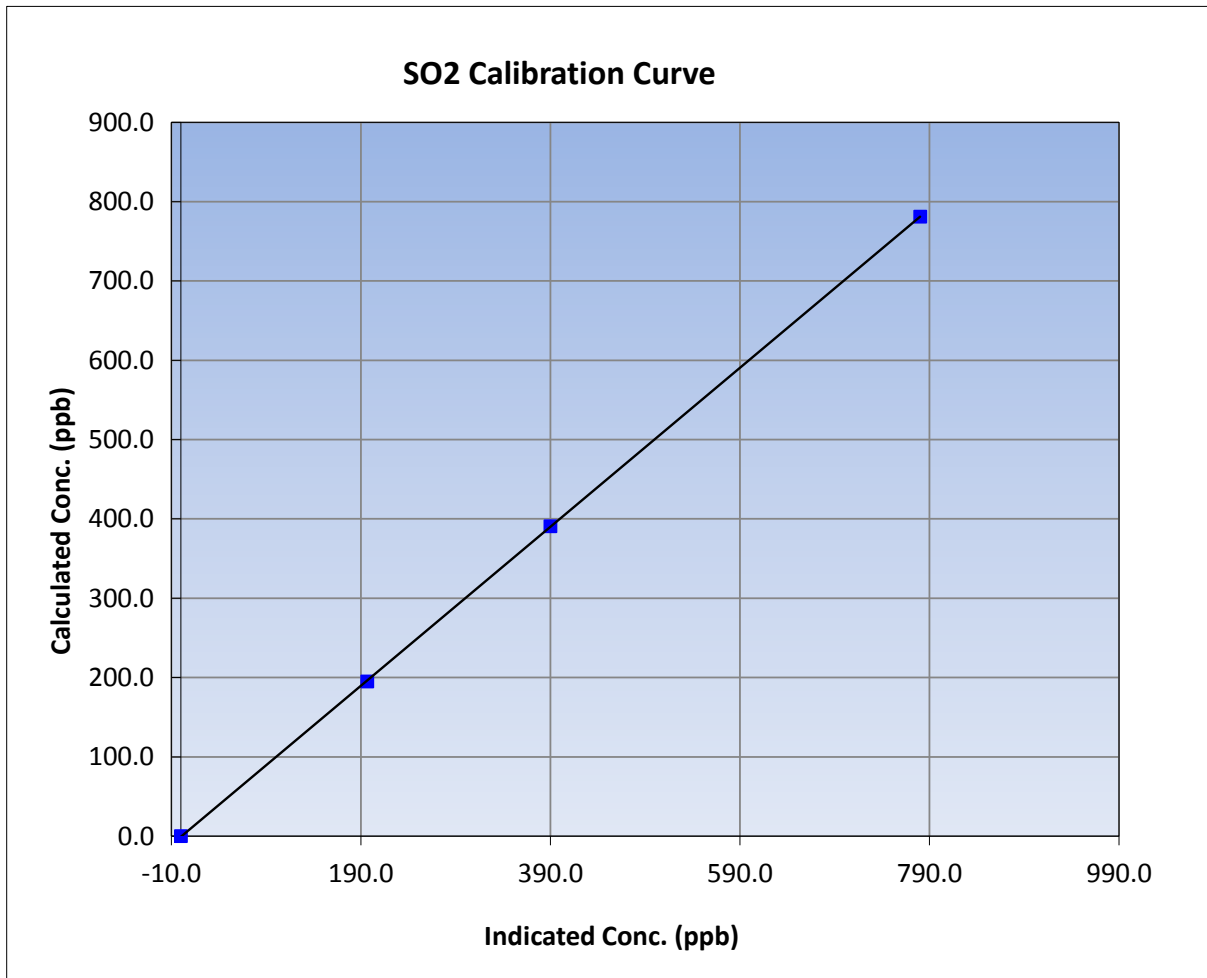
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 11, 2017	Previous Calibration	December 5, 2016
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	9:15	End Time (MST)	12:15
Analyzer make	Thermo 43i	Analyzer serial #	1152430006

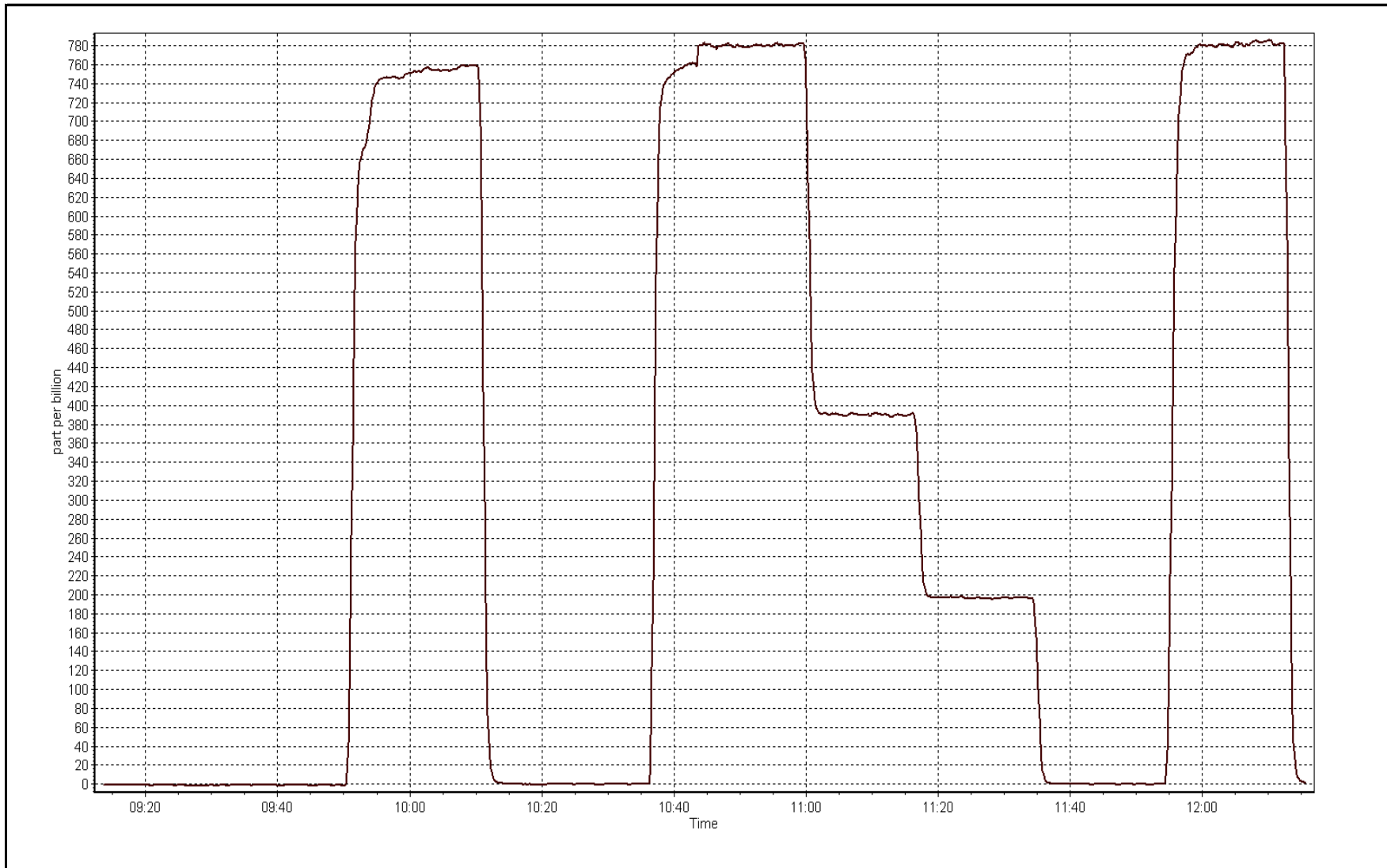
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999991
781.3	780.1	1.0015		
390.6	390.1	1.0014	Slope	1.002333
194.8	196.6	0.9910		
			Intercept	-0.789798



SO2 Calibration Plot

Date: January 11, 2017





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	December 6, 2016	Last Calibration	November 22, 2016
Station Name	Janvier	Station Number	AMS 22
Reason:	Routine		
Start Time (MST)	7:14	End Time (MST)	10:13
Gas Cert Reference	LL36481	Station temp.	22 Deg C
Cal Gas Concentration	5.35 ppm	Cal Gas Exp Date	2/13/2018
Calibrator Make/Model	API T700	Serial Number	2658
Dil air Make/Model	API T701	Serial Number	135
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2586
SO2 gas concentration	49.7 ppm	SO2 gas cert/exp	LL107937 09/08/2018

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-648	-649
Analyzer IP address	192.168.1.44		Lamp voltage	990	992
Calculated slope	0.989588	0.992001	Chamber temp	45	45
Calculated intercept	-0.060190	-0.021737	Pressure	689.0	682.0
Analyzer Background	3.65	3.76	Flow	0.434	0.430
Analyzer Coefficient	1.237	1.281	Intensity	90	90
			Converter temp.	800	800

Analyzer make/model	Thermo 43i-TLE	Analyzer serial #	1151680031
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	5000	0.0	0.0	0.0	----
As Found Span	5000	74.8	80.0	77.1	1.039
SO2 Scrubber	5000	10.0	99.4	0.3	----
calibrator zero	5000	0.0	0.0	0.0	----
High point	5000	74.8	80.0	80.7	0.992
Second point	5000	37.4	40.0	40.3	0.992
Third point	5000	18.7	20.0	20.3	0.987
As Left Zero	5000	0.0	0.0	0.2	----
As Left Span	5000	74.8	80.0	81.4	0.983
Average Correction Factor					0.990

Corrected As found	77.1	Previous response	80.9	% change	5.0%
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Notes:

Span response time improved from install, around 10mins to reach stable span point. Further system conditioning may be required, span adjusted slightly, no zero adjustment performed.

Calibration Performed By: Zach Eastman



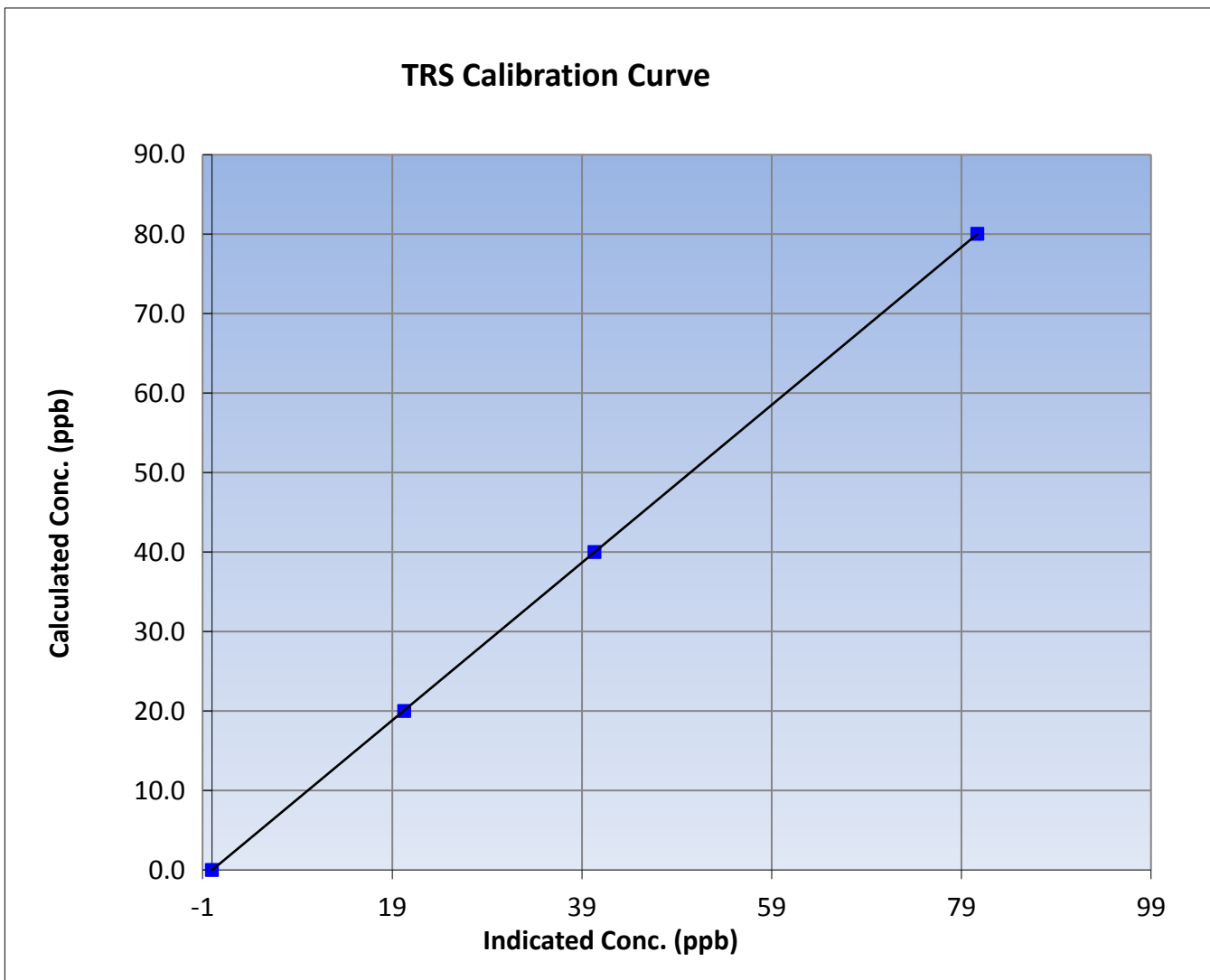
Wood Buffalo Environmental Association TRS Calibration Report

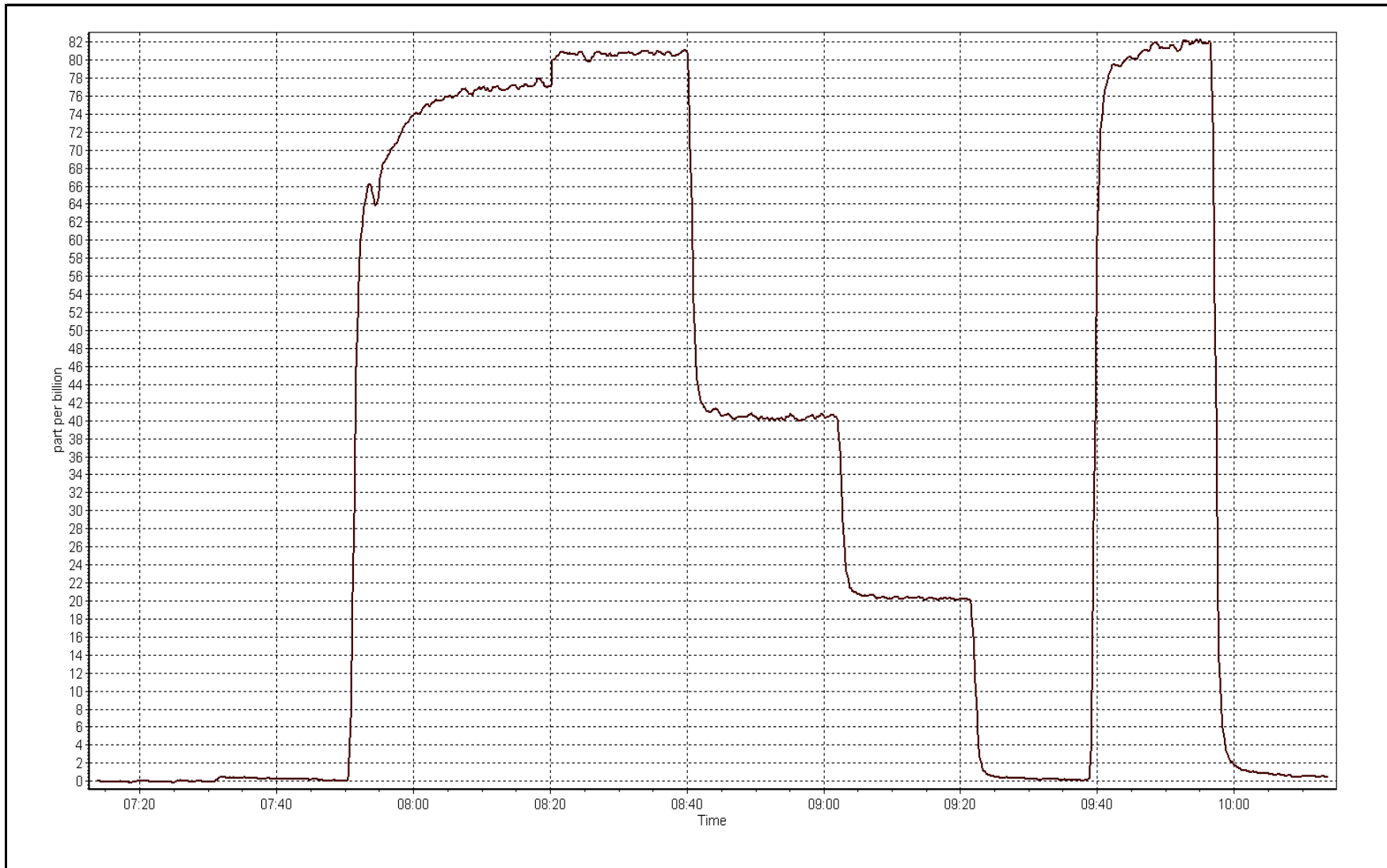
Station Information

Calibration Date	December 6, 2016	Previous Calibration	November 22, 2016
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	7:14	End Time (MST)	10:13
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1151680031

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999998
80.0	80.7	0.9918		
40.0	40.3	0.9923	Slope	0.992001
20.0	20.3	0.9871		
			Intercept	-0.021737







Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	January 11, 2017	Last Calibration	December 6, 2016
Station Name	Janvier	Station Number	AMS 22
Reason:	Routine		
Start Time (MST)	12:13	End Time (MST)	14:41
Gas Cert Reference	LL36481	Station temp.	22 Deg C
Cal Gas Concentration	5.35 ppm	Cal Gas Exp Date	2/13/2018
Calibrator Make/Model	API T700	Serial Number	2658
Dil air Make/Model	API T701	Serial Number	135
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2586
SO2 gas concentration	49.7 ppm	SO2 gas cert/exp	LL107937 09/08/2018

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-647	-647
Analyzer IP address	192.168.1.44		Lamp voltage	1002	1002
Calculated slope	0.992001	1.003308	Chamber temp	45	45
Calculated intercept	-0.021737	-0.401007	Pressure	669.2	669.2
Analyzer Background	3.8	3.8	Flow	0.423	0.423
Analyzer Coefficient	1.281	1.281	Intensity	91	91
			Converter temp.	800	800

Analyzer make/model	Thermo 43i-TLE	Analyzer serial #	1151680031
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	5000	0.0	0.0	0.3	----
As Found Span	5000	74.8	80.0	80.1	0.999
SO2 Scrubber	5000	10.0	99.4	0.6	----
calibrator zero	5000	0.0	0.0	0.3	----
High point	5000	74.8	80.0	80.1	0.999
Second point	5000	37.4	40.0	40.4	0.991
Third point	5000	18.7	20.0	20.4	0.981
As Left Zero	5000	0.0	0.0	0.6	----
As Left Span	5000	74.8	80.0	80.8	0.991
Average Correction Factor					0.990

Corrected As found	79.8	Previous response	80.7	% change	1.2%
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Notes:

No adjustments made.

Calibration Performed By: Zach Eastman



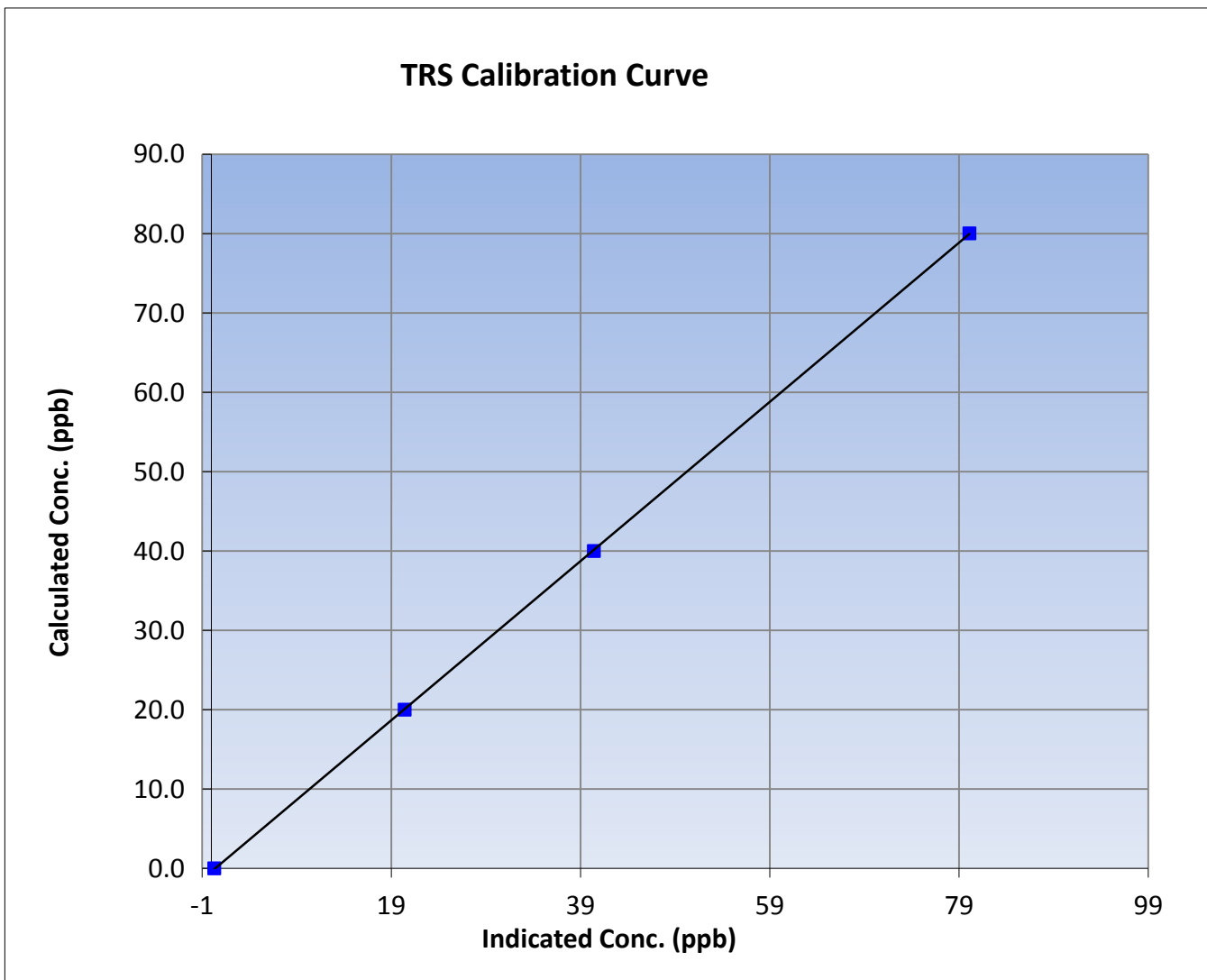
Wood Buffalo Environmental Association TRS Calibration Report

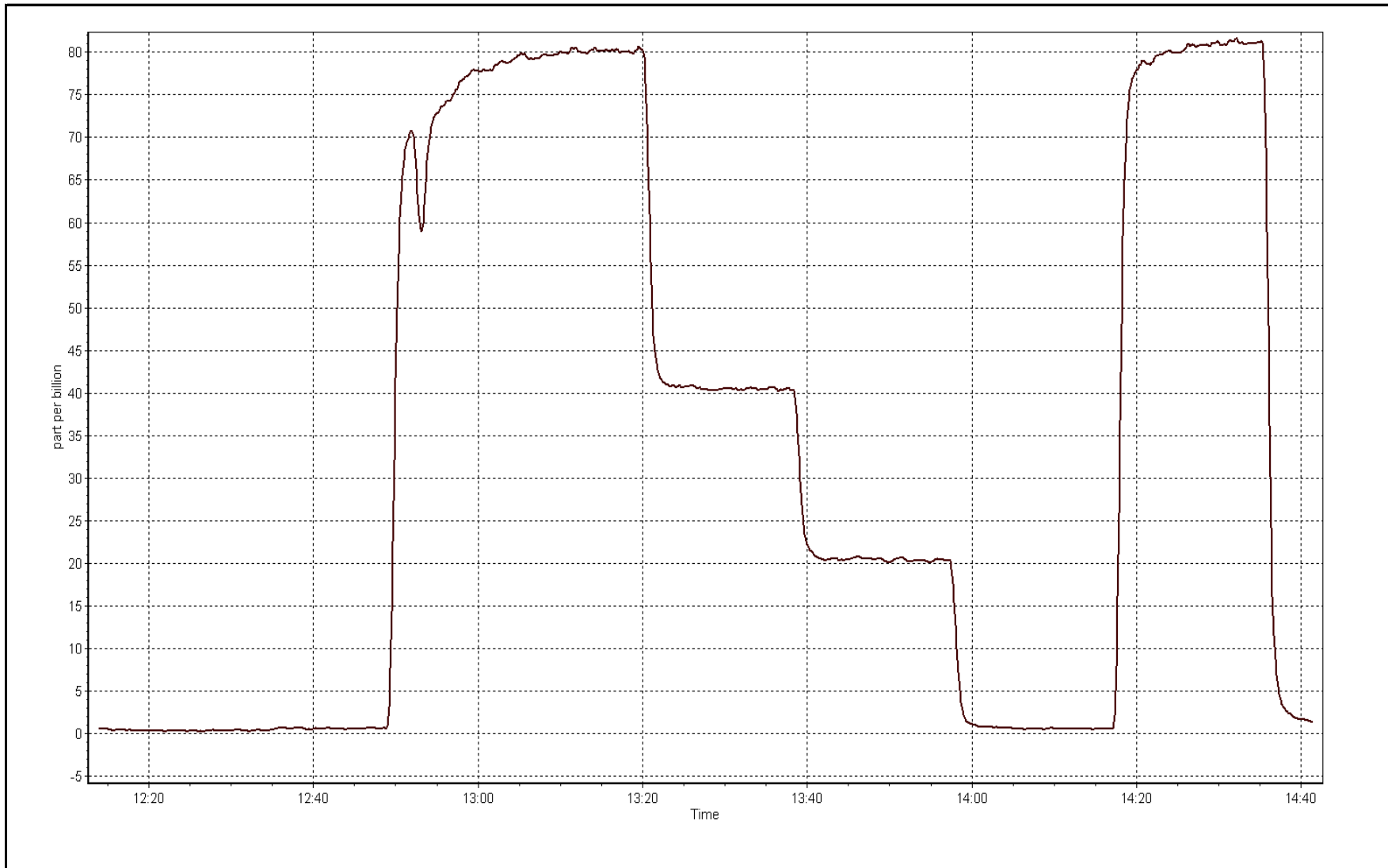
Station Information

Calibration Date	January 11, 2017	Previous Calibration	December 6, 2016
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	12:13	End Time (MST)	14:41
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1151680031

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999991
80.0	80.1	0.9992		
40.0	40.4	0.9905	Slope	1.003308
20.0	20.4	0.9808		
			Intercept	-0.401007







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	December 13, 2016	Last Calibration	NA
Station Name	Janvier	Station Number	AMS 22
Reason:	Install		
Start Time (MST)	13:20	End Time (MST)	15:23
Gas Cert Reference	LL107937	Cal Gas Expiry Date	Sept 8 2018
CH4 Cal Gas Conc.	509.0 ppm	CH4 Equiv Conc.	1056.3 ppm
C3H8 Cal Gas Conc.	199.0 ppm	Station temp.	21 Deg C
Calibrator Model	Teledyne API T700	Serial Number	2447
ZAG make/model	Teledyne API T701	Serial Number	135
DACS make/model	Campbell Scientific CR3000	Serial Number	2586

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	NA	75.0
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	NA	175.0
Analyzer IP address	192.168.1.55		Flame Temp	NA	405.0
THC Calc slope	NA	0.993702	Carrier Pressure	NA	36.7
THC Calc intercept	NA	0.039992	Fuel Pressure	NA	44.9
NMHC Calc slope	NA	0.990126	Air Pressure	NA	33.7
NMHC Calc intercept	NA	0.009767			

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)
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	78.6	16.60	16.71	0.994
second point	5000	39.3	8.30	8.23	1.009
third point	5000	19.6	4.14	4.13	1.003
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	78.6	16.60	16.74	0.992
Average Correction Factor					1.002

Corrected As found NA Previous response NA % change NA

Notes:

Baseline has some noise, which seems to present itself as around 0.05ppm during span points. Span adjusted slightly, calibration passes criteria.

Calibration Performed By: Zach Eastman



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)
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	78.6	8.60	8.69	0.990
second point	5000	39.3	4.30	4.31	0.998
third point	5000	19.6	2.15	2.16	0.993
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	78.6	8.60	8.75	0.983
Average Correction Factor					0.994

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)
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	78.6	8.00	8.02	0.998
second point	5000	39.3	4.00	3.92	1.021
third point	5000	19.6	2.00	1.96	1.018
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	78.6	8.00	7.99	1.001
Average Correction Factor					1.012

Corrected As found NA Previous response NA % change NA



Wood Buffalo Environmental Association

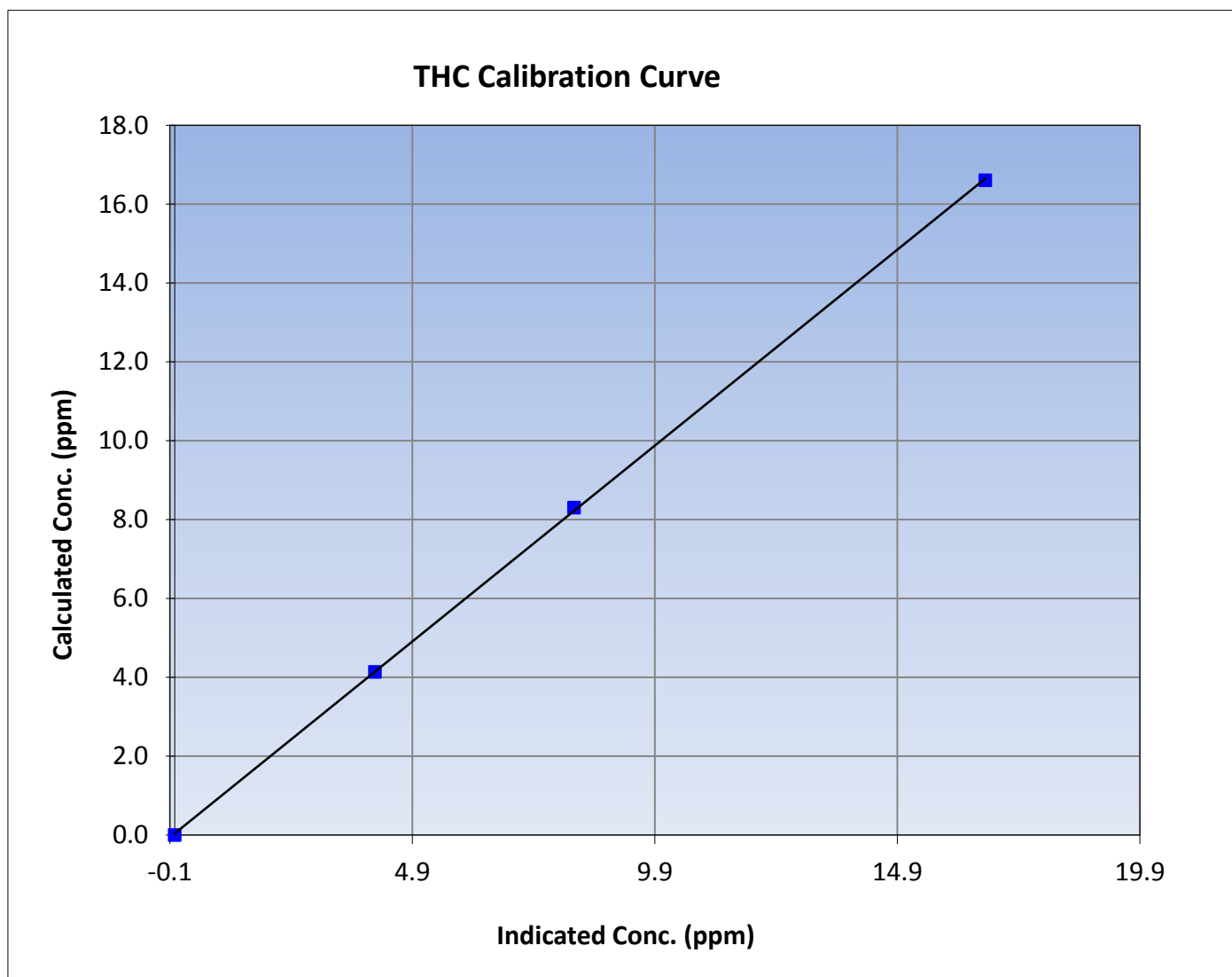
THC Calibration Summary

Station Information

Calibration Date	December 13, 2016	Previous Calibration	NA
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	13:20	End Time (MST)	15:23
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	0.999932
16.60	16.71	0.9937		
8.30	8.23	1.0088	Slope	0.993702
4.14	4.13	1.0025		
			Intercept	0.039992





Wood Buffalo Environmental Association

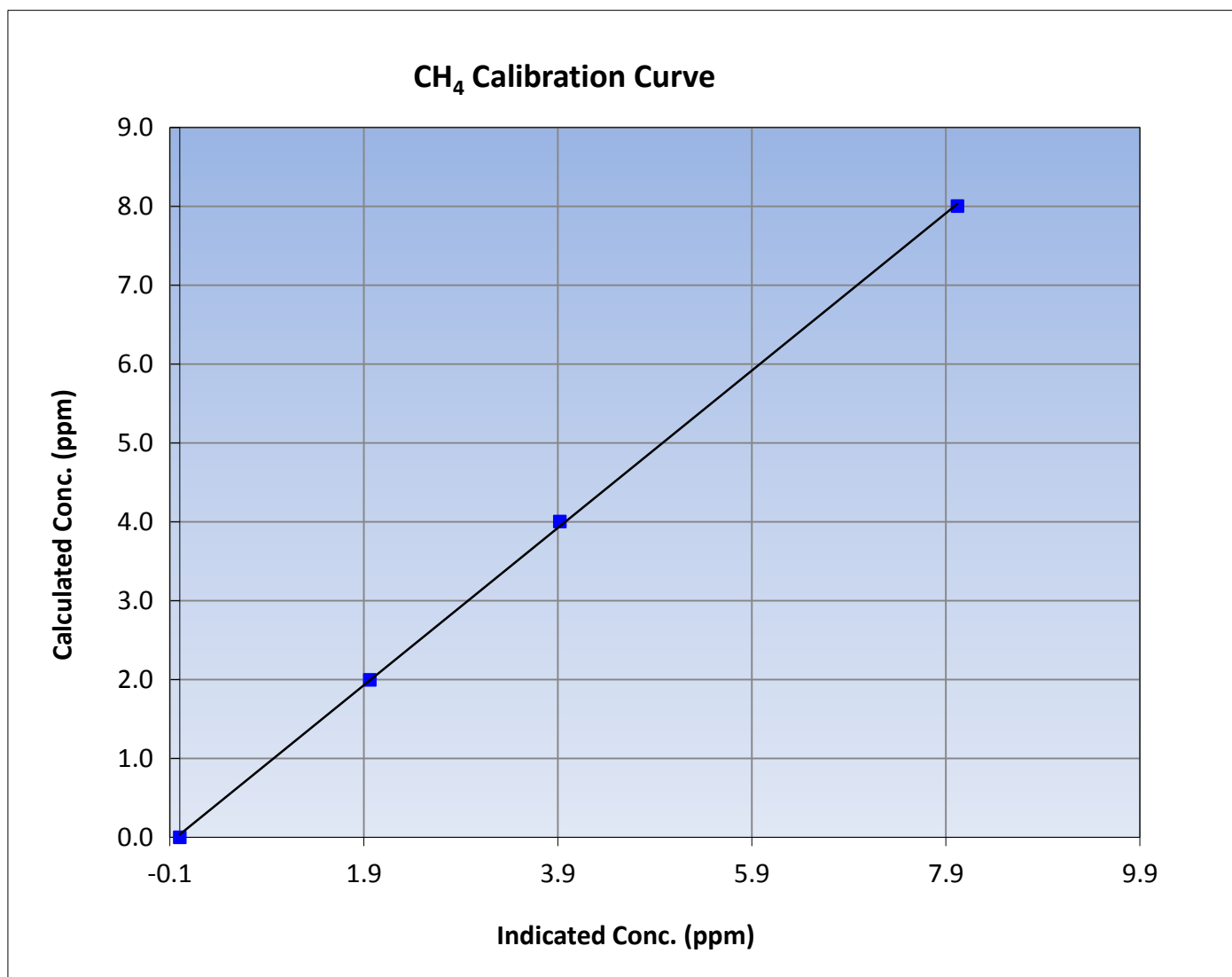
CH₄ Calibration Summary

Station Information

Calibration Date	December 13, 2016	Previous Calibration	NA
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	13:20	End Time (MST)	15:23
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	0.999845
8.00	8.02	0.9977		
4.00	3.92	1.0206	Slope	0.997113
2.00	1.96	1.0180		
			Intercept	0.034407





Wood Buffalo Environmental Association

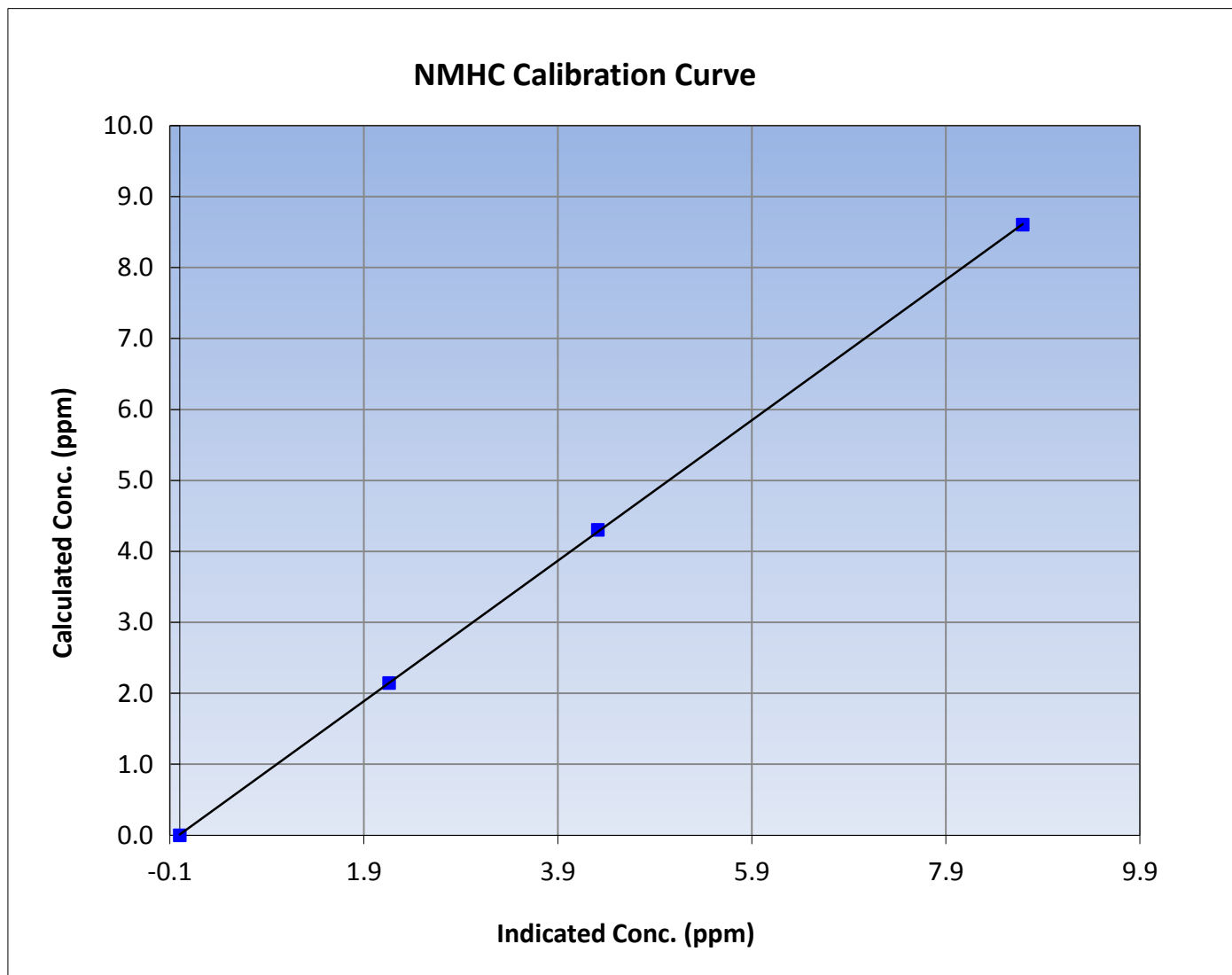
NMHC Calibration Summary

Station Information

Calibration Date	December 13, 2016	Previous Calibration	NA
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	13:20	End Time (MST)	15:23
Analyzer make	Thermo 55i	Analyzer serial #	1501663728

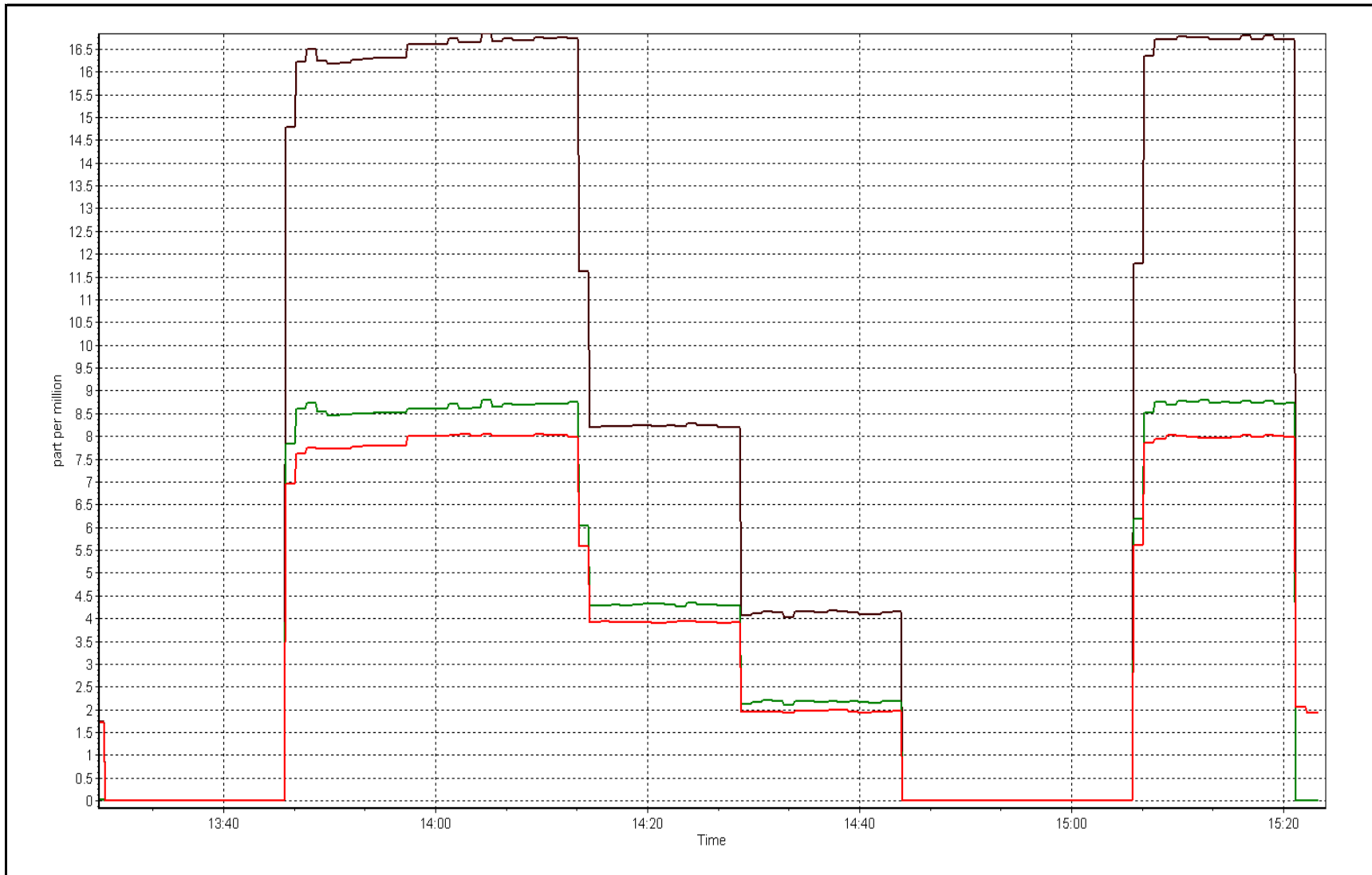
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999980
8.60	8.69	0.9900		
4.30	4.31	0.9980	Slope	0.990126
2.15	2.16	0.9932		
			Intercept	0.009767



THC Calibration Plot

Date: December 13, 2016





Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	January 11, 2017	Last Calibration	December 13, 2016
Station Name	Janvier	Station Number	AMS 22
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	12:15
Gas Cert Reference	LL107937	Cal Gas Expiry Date	Sept 8 2018
CH4 Cal Gas Conc.	509.0 ppm	CH4 Equiv Conc.	1056.3 ppm
C3H8 Cal Gas Conc.	199.0 ppm	Station temp.	21 Deg C
Calibrator Model	Teledyne API T700	Serial Number	2447
ZAG make/model	Teledyne API T701	Serial Number	135
DACS make/model	Campbell Scientific CR3000	Serial Number	2586

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	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	0.993702	0.998920	Carrier Pressure	36.7	36.7
THC Calc intercept	0.039992	0.022048	Fuel Pressure	44.9	44.9
NMHC Calc slope	0.990126	0.999451	Air Pressure	33.7	33.7
NMHC Calc intercept	0.009767	-0.008086			

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	5000	0.0	0.00	0.00	----
As Found Span	5000	78.6	16.60	16.89	0.983
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	78.6	16.60	16.63	0.998
second point	5000	39.3	8.30	8.22	1.010
third point	5000	19.6	4.14	4.14	1.000
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	78.6	16.60	16.64	0.998
Average Correction Factor					1.003

Corrected As found 16.89 Previous response 16.67 % change -1.3%

Notes:

Span adjusted after as founds.

Calibration Performed By: Zach Eastman



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)
	5000	0	0.00	0.00	----
	5000	78.6	8.60	8.75	0.983
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	78.6	8.60	8.62	0.998
second point	5000	39.3	4.30	4.29	1.003
third point	5000	19.6	2.15	2.18	0.984
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	78.6	8.60	8.62	0.998
Average Correction Factor					0.995

Corrected As found 8.75 Previous response 8.68 % change -0.8%

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)
	5000	0	0.00	0.00	----
	5000	78.6	8.00	8.14	0.983
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	78.6	8.00	8.00	1.000
second point	5000	39.3	4.00	3.93	1.018
third point	5000	19.6	2.00	1.96	1.018
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	78.6	8.00	8.01	0.999
Average Correction Factor					1.012

Corrected As found 8.14 Previous response 7.99 % change -1.8%



Wood Buffalo Environmental Association

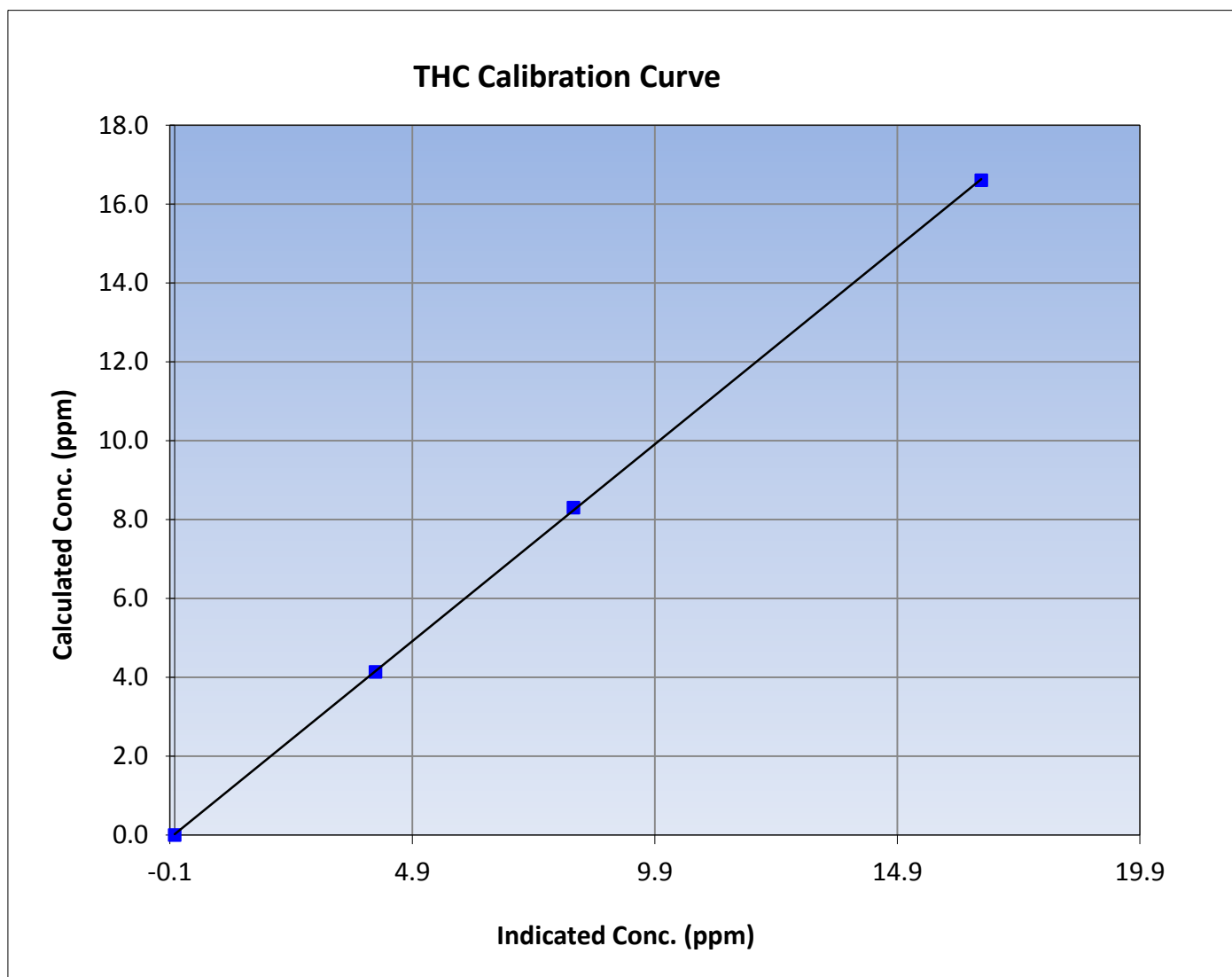
THC Calibration Summary

Station Information

Calibration Date	January 11, 2017	Previous Calibration	December 13, 2016
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	9:15	End Time (MST)	12:15
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	0.999957
16.60	16.63	0.9985		
8.30	8.22	1.0100	Slope	0.998920
4.14	4.14	1.0001		
			Intercept	0.022048





Wood Buffalo Environmental Association

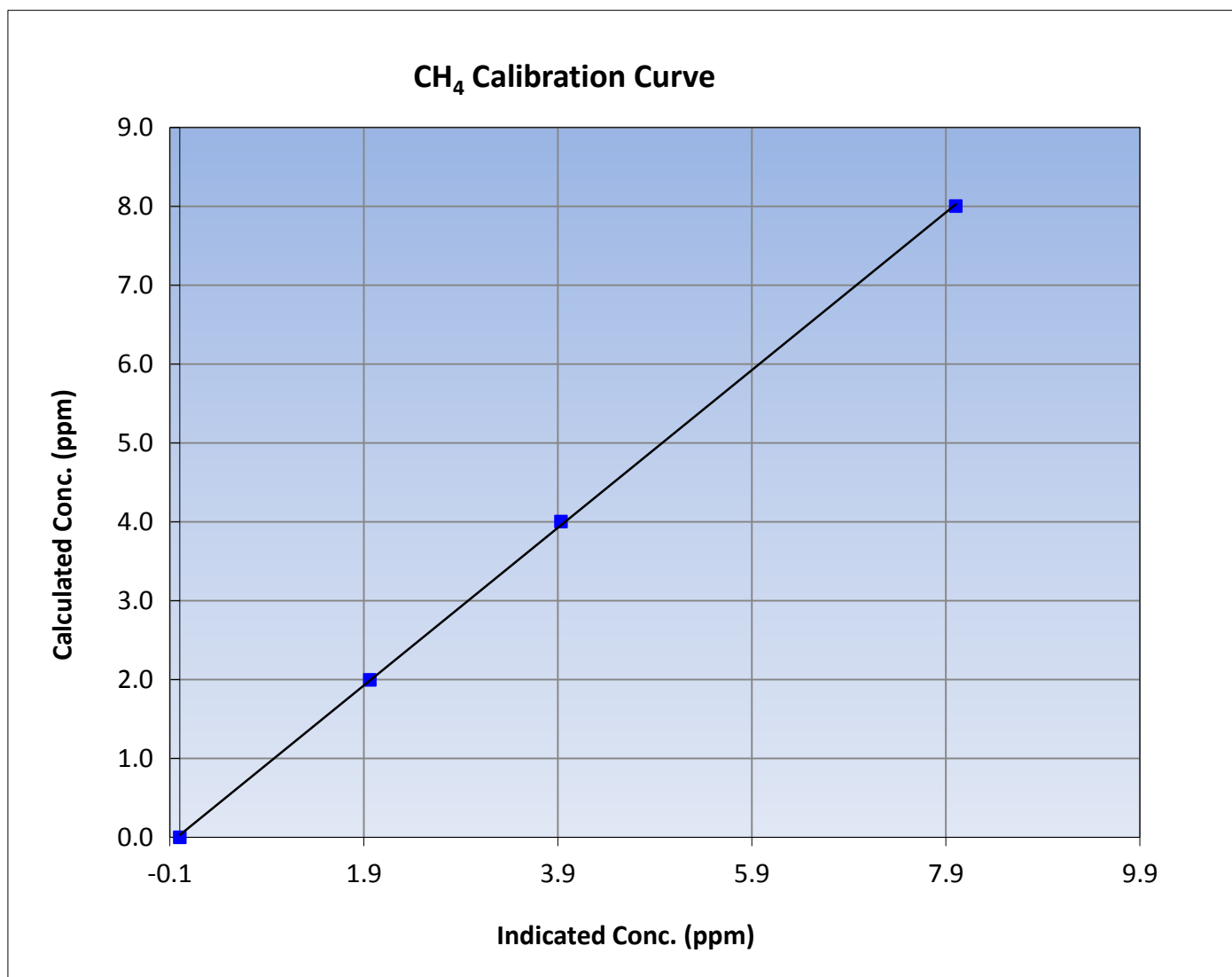
CH₄ Calibration Summary

Station Information

Calibration Date	January 11, 2017	Previous Calibration	December 13, 2016
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	9:15	End Time (MST)	12:15
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	0.999904
8.00	8.00	1.0002		
4.00	3.93	1.0180	Slope	0.999592
2.00	1.96	1.0180		
			Intercept	0.028291





Wood Buffalo Environmental Association

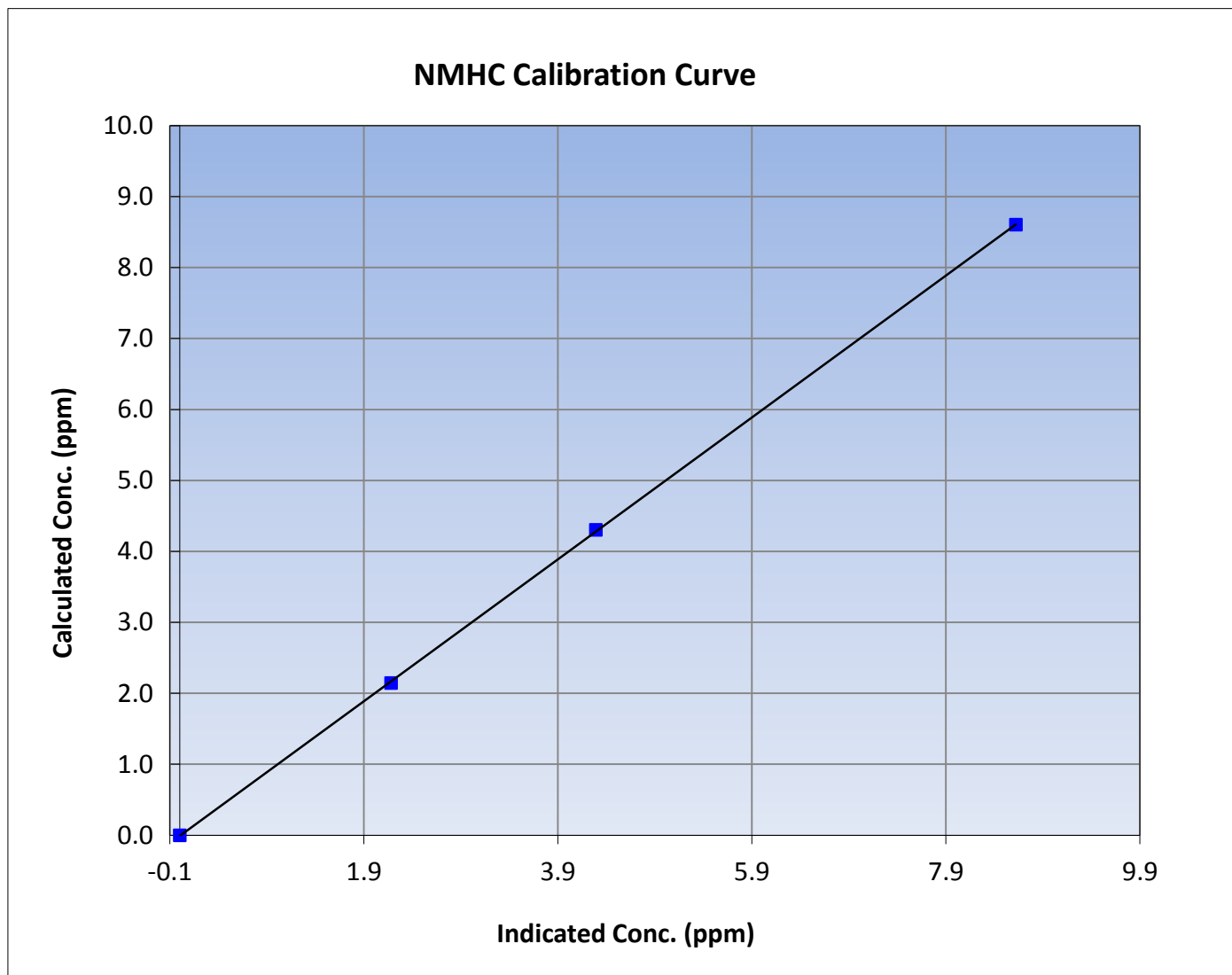
NMHC Calibration Summary

Station Information

Calibration Date	January 11, 2017	Previous Calibration	December 13, 2016
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	9:15	End Time (MST)	12:15
Analyzer make	Thermo 55i	Analyzer serial #	1501663728

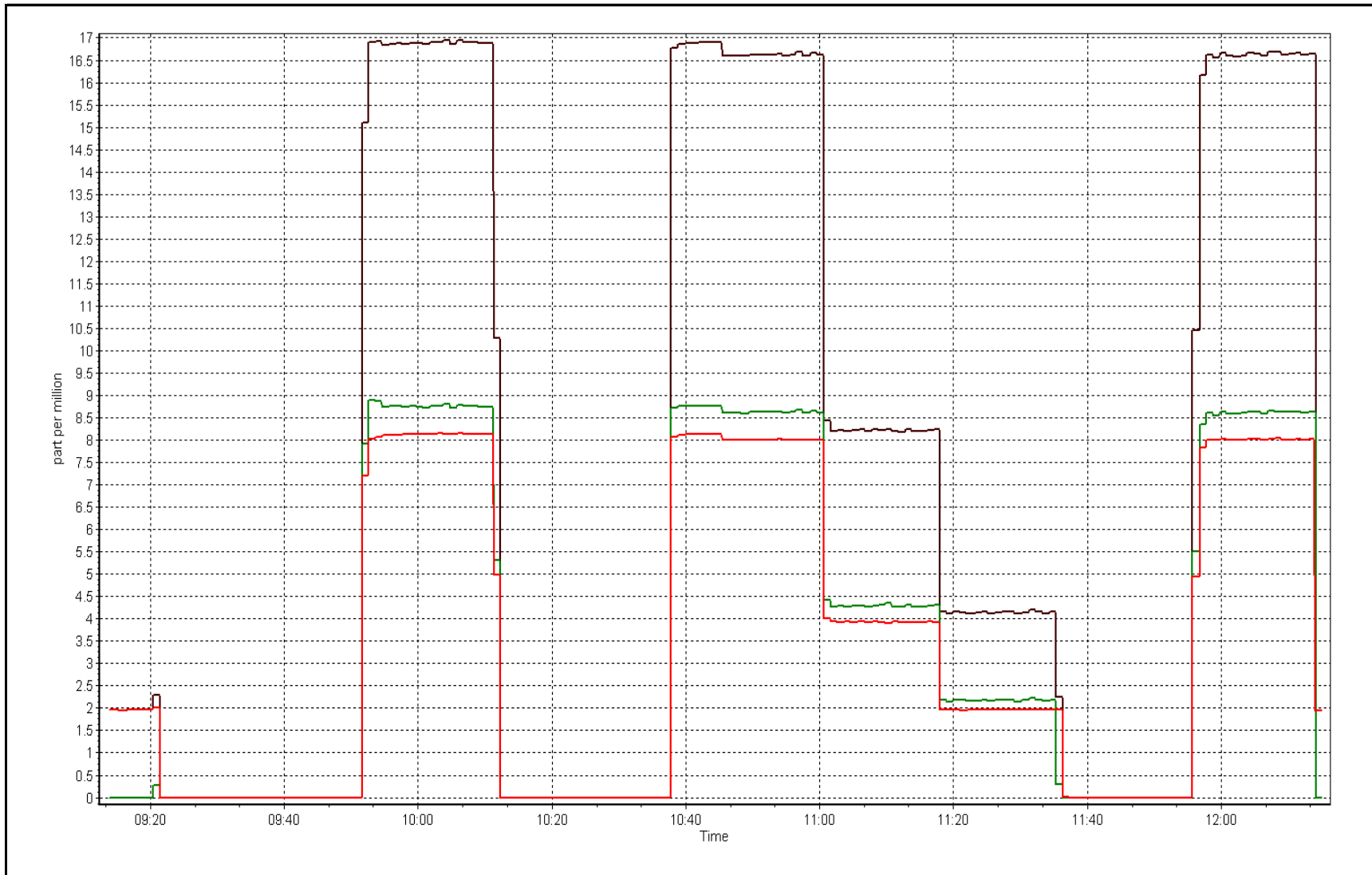
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999970
8.60	8.62	0.9980		
4.30	4.29	1.0027	Slope	0.999451
2.15	2.18	0.9840		
			Intercept	-0.008086



THC Calibration Plot

Date: January 11, 2017





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	December 6, 2016	Previous Calibration	November 19, 2016
Station Name	Janvier	Station Number	AMS 22
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	12:30
O3 Source	T700 Calibrator (W/P)	Last O3 Gen Cal	Oct 31 2016
Reference GPT Date:	NA	Station temp.	22 Deg C
Calibrator Make/Model	Teledyne API T700	Serial Number	2462
ZAG make/model	Teledyne API T701	Serial Number	135
DACS make/model	Campbell Scientific CR3000	Serial Number	2586

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	26.0	26.0
Analyzer IP address	192.168.1.48		Lamp temp.	53.0	53.0
Calculated slope	0.993268	0.998633	Pressure	709.0	709.0
Calculated intercept	-0.502703	-1.483503	Flow cell A	0.778	0.778
Analyzer Background	-2.6	-2.5	Flow cell B	0.752	0.752
Analyzer Coefficient	1.088	1.033	Cell A Intensity	99xxx	99xxx
			Cell B Intensity	93xxx	93xxx

Analyzer make	Thermo 49i	Analyzer serial #	1227254861
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp O3 Gen Drive	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	1007	400.0	421.5	0.949
calibrator zero	5000	0.00	0.0	-0.2	----
high point (300ppb)	5000	1007	400.0	401.2	0.997
second point (200ppb)	5000	851	200.0	202.5	0.988
third point (100ppb)	5000	742	100.0	103.4	0.967
As Left Zero	5000	0.00	0.0	1.3	----
As Left Span	5000	1008	400.0	404.9	0.988
Average Correction Factor					0.984

Corrected As found	421.7	Previous response	403.2	% change	-4.4%
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Notes:

November install cal performed with a different calibrator than this months cal. Install cal O3 values based on GPT. O3 values of this cal based on this calibrators reference photometer. Span adjusted. Cal passes, however cal values are a little high on each point. As left zero and span also a little high.

Calibration Performed By: Zach Eastman



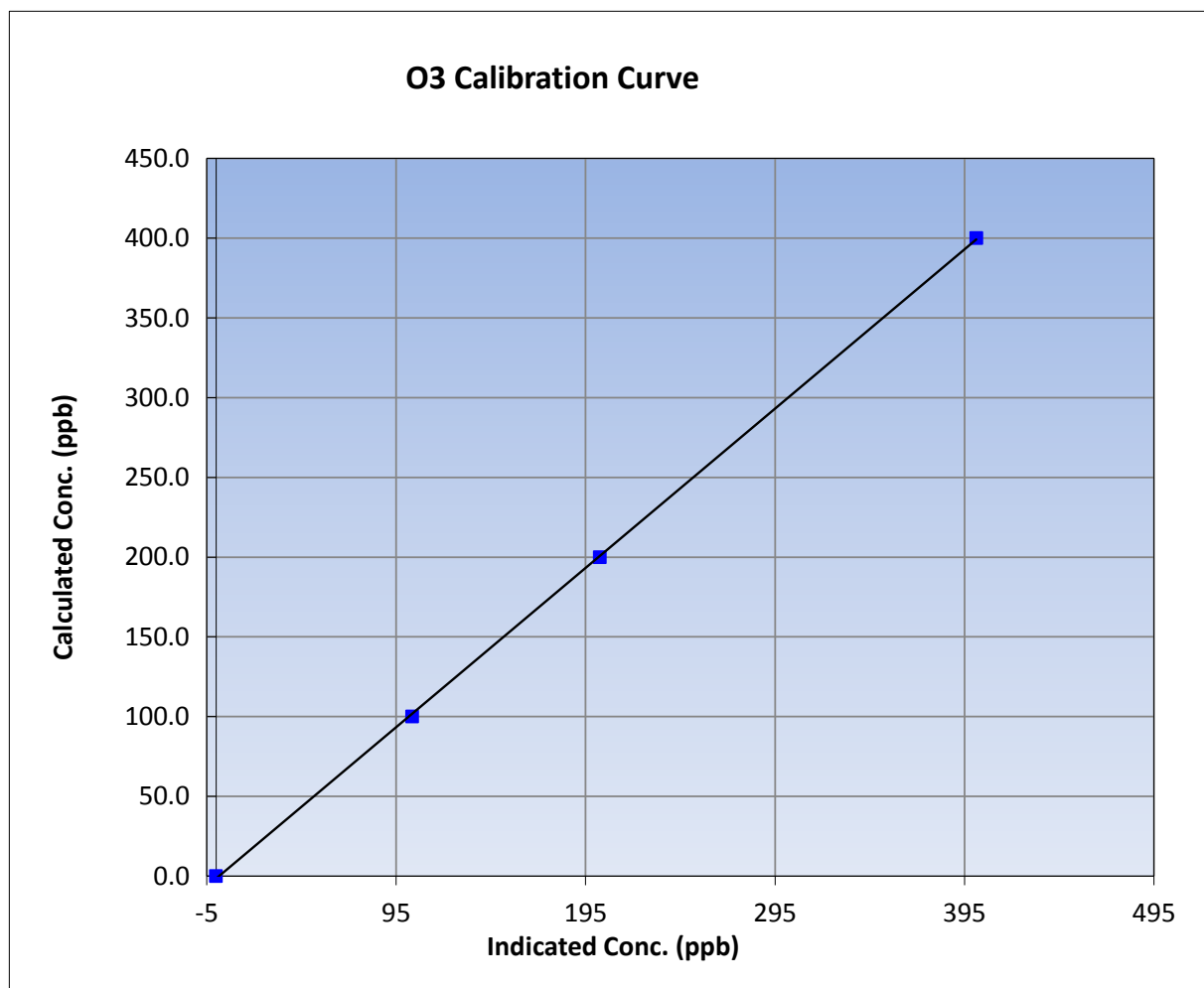
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	Tuesday, December 06, 2016	Previous Calibration	November 19, 2016
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	10:00	End Time (MST)	12:30
Analyzer make	Thermo 49i	Analyzer serial #	1227254861

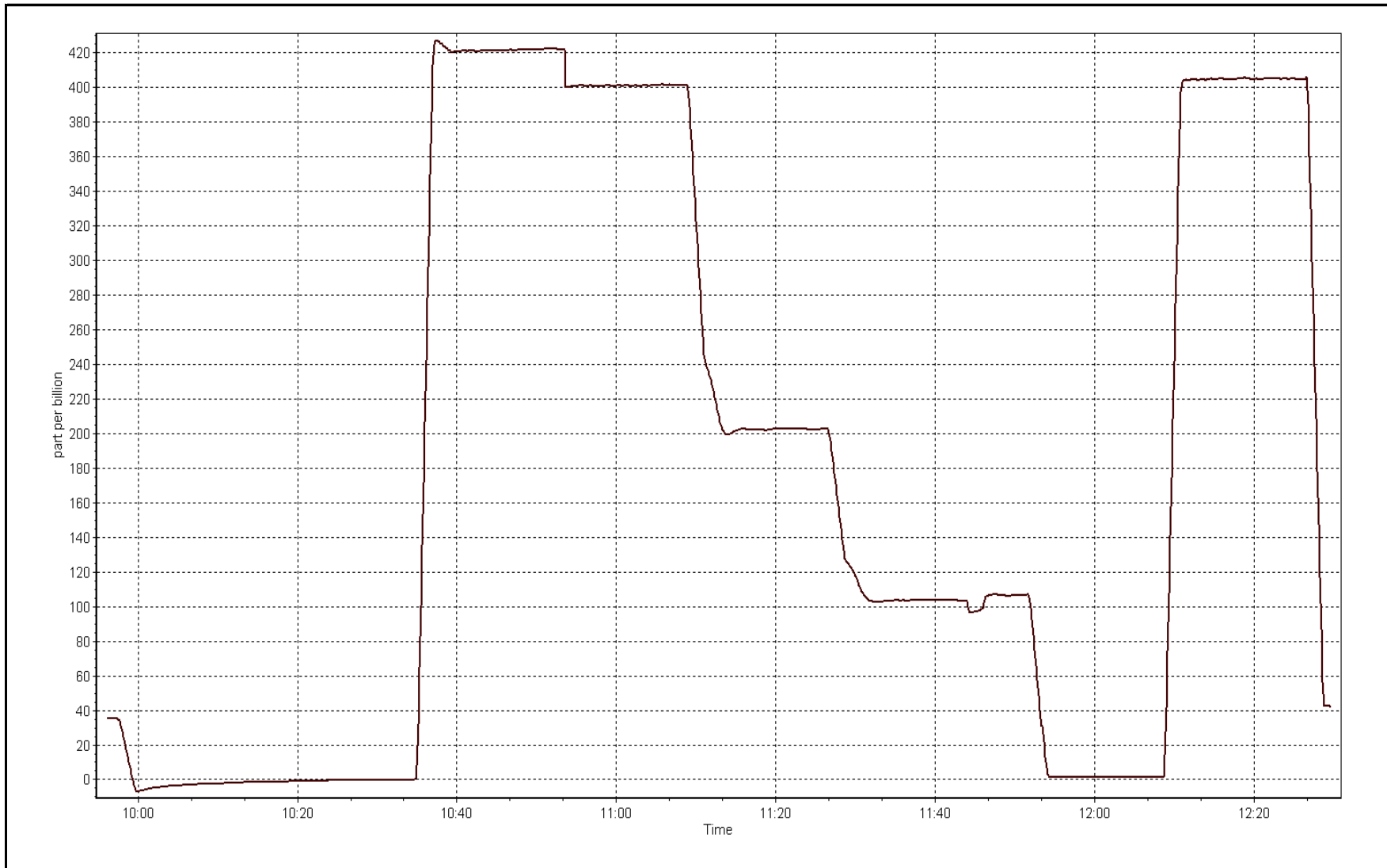
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999917
400.0	401.2	0.9970		
200.0	202.5	0.9877	Slope	0.998633
100.0	103.4	0.9671		
			Intercept	-1.483503



O3 Calibration Plot

Date: December 6, 2016





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	January 12, 2017	Previous Calibration	December 6, 2016
Station Name	Janvier	Station Number	AMS 22
Reason:	Routine		
Start Time (MST)	14:40	End Time (MST)	16:45
O3 Source	T700 Calibrator (W/P)	Last O3 Gen Cal	Oct 31 2016
Reference GPT Date:	NA	Station temp.	22 Deg C
Calibrator Make/Model	Teledyne API T700	Serial Number	2462
ZAG make/model	Teledyne API T701	Serial Number	135
DACS make/model	Campbell Scientific CR3000	Serial Number	2586

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	27.0	27.0
Analyzer IP address	192.168.1.48		Lamp temp.	53.0	53.0
Calculated slope	0.998633	1.003720	Pressure	694.0	694.0
Calculated intercept	-1.483503	-1.617073	Flow cell A	0.767	0.767
Analyzer Background	-2.5	-2.5	Flow cell B	0.742	0.742
Analyzer Coefficient	1.033	1.033	Cell A Intensity	94xxx	94xxx
			Cell B Intensity	87xxx	87xxx

Analyzer make Thermo 49i Analyzer serial # 1227254861

Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp O3 Gen Drive	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	1004	400.0	399.1	1.002
calibrator zero	5000	0.00	0.0	-0.3	----
high point (300ppb)	5000	1004	400.0	399.1	1.002
second point (200ppb)	5000	850	200.0	202.1	0.990
third point (100ppb)	5000		100.0	103.0	0.971
As Left Zero	5000	0.00	0.0	1.4	----
As Left Span	5000	1004	400.0	405.5	0.986
Average Correction Factor					0.988

Corrected As found 399.4 Previous response 402.0 % change 0.7%

Notes:

No adjustments, calibration went well, slight issue with linearity but within parameters. Intensities between cells could be better balanced to possibly improve linearity during next routine calibration.

Calibration Performed By: Zach Eastman



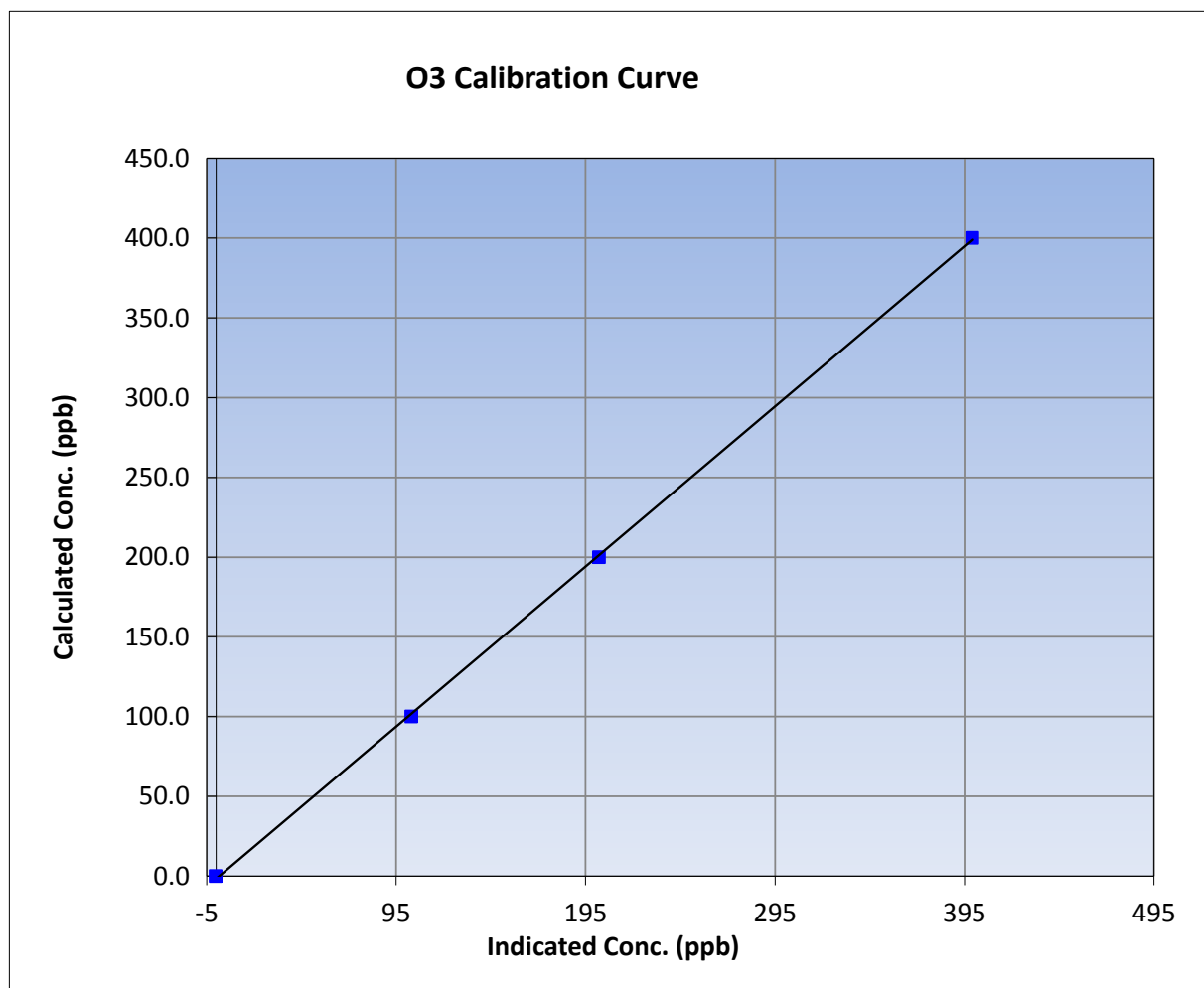
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	Thursday, January 12, 2017	Previous Calibration	December 6, 2016
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	14:40	End Time (MST)	16:45
Analyzer make	Thermo 49i	Analyzer serial #	1227254861

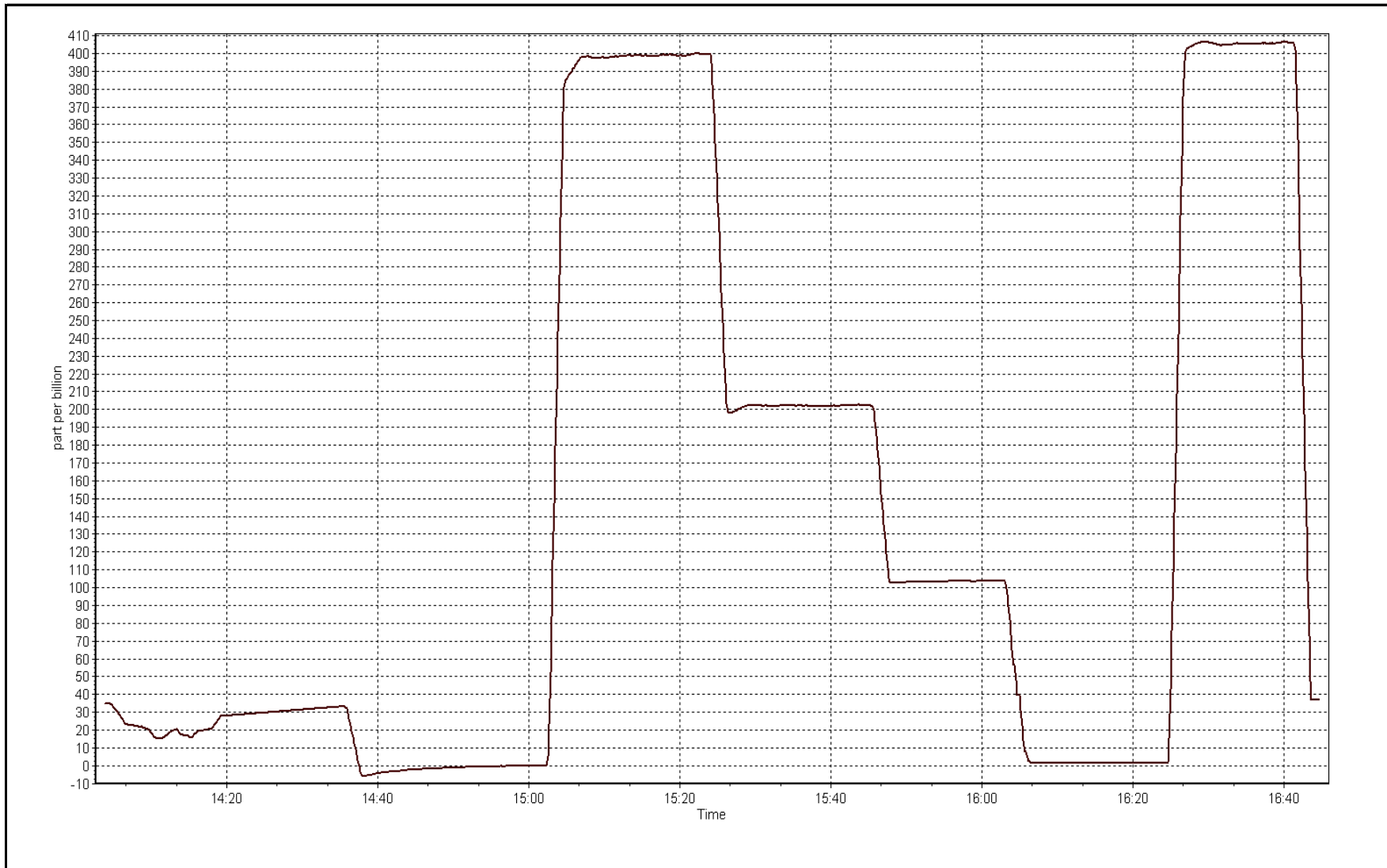
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999891
400.0	399.1	1.0024		
200.0	202.1	0.9896	Slope	1.003720
100.0	103.0	0.9709		
			Intercept	-1.617073



O3 Calibration Plot

Date: January 12, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	December 5, 2016	Previous Calibration	November 17, 2016
Station Name	Janvier	Station Number	AMS 22
Reason:	Routine		
Start Time (MST)	12:00	End Time (MST)	16:51
NO Cal Gas Conc	50.9 ppm	Gas Cert Reference	LL107937
NOx Cal Gas Conc	50.9 ppm	Cal Gas Expiry Date	September 8, 2018
Calibrator	API T700	Serial Number	2462
Zero air Generator	Teledyne API T701	Serial Number	135

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2586
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.001810	0.999314	1.032539
	Data Offset	-0.317786	0.677425	-0.742881
Current Calibration	Data Slope	0.999769	0.999823	1.001942
	Data Offset	-0.756314	-0.615386	0.103092

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1229254994
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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	0.582		0.855	
NOX coefficient	0.995		0.998	
NO2 coefficient	0.995		0.995	
NO bkgrnd	2.200		2.5	
NOX bkgrnd	2.400		3.3	
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	342.2	Deg C	342.2	Deg C
PMT voltage	-810.0	v	-762.2	v
PMT Temp	-2.0	Deg C	-2.0	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	185.2	mmHg	186.0	mmHg
R Cell Press Nox	185.2	mmHg	186.0	mmHg
NO sample flow	0.878	lpm	0.867	lpm
Nox sample Flow	0.874	lpm	0.860	lpm

Notes:

NO Correction coefficient is quite low, PMT adjusted slightly to bring coefficient up. Adjustment performed as found span, before inlet filter change. Zero and span adjusted slightly after inlet filter changed. Some slight drift in Nox during GPT, second GPT point used as reference. Results pass with first point, second point provides a better result.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: December 5, 2016 Station Number: AMS 22

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	78.6	800.1	800.1	0.0	793.2	791.8	1.3	1.009	1.011
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.8	0.0	-0.1	----	----
high point	5000	78.6	800.1	800.1	0.0	800.7	801.1	-0.5	0.999	0.999
second point	5000	39.3	400.1	400.1	0.0	400.5	399.5	1.0	0.999	1.001
third point	5000	19.6	199.5	199.5	0.0	202.7	201.9	0.8	0.984	0.988
as left zero	5000	0.0	0.0	0.0	0.0	-0.7	0.0	-0.7	----	----
as left span	5000	78.6	800.1	381.9	418.2	810.2	386.9	423.3	0.988	0.987
Average Correction Factor									0.994	0.996

Corrced As found NO_x= 793.4 NO= 791.8 Percent Change NO_x= 0.7% NO= 1.0%
 Previous Response NO_x= 799.0 NO= 800.0

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 78.60 ccm NOx ref calc conc = 800.1 ppb NO ref calc conc = 800.1 ppb

O3 Setpoint (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
1st NO ref point		0.0	808.9	810.0	-0.1	0.9892	0.9878	----	----
1st NO2 (400)	381.9	428.1	809.0	381.9	427.2	0.9891	----	1.002	99.8%
2nd NO2 (200)	556.6	253.4	809.5	556.6	252.9	0.9884	----	1.002	99.8%
3rd NO2 (100)	677.2	132.8	809.5	677.2	132.4	0.9884	----	1.003	99.7%
2nd NO ref point		0.0	808.9	810.0	-1.2	0.9892	0.9878	----	----
Average Correction Factor						0.9888		1.003	99.7%

Calibration Performed By: Zach Eastman



Wood Buffalo Environmental Association

NO_x Calibration Summary

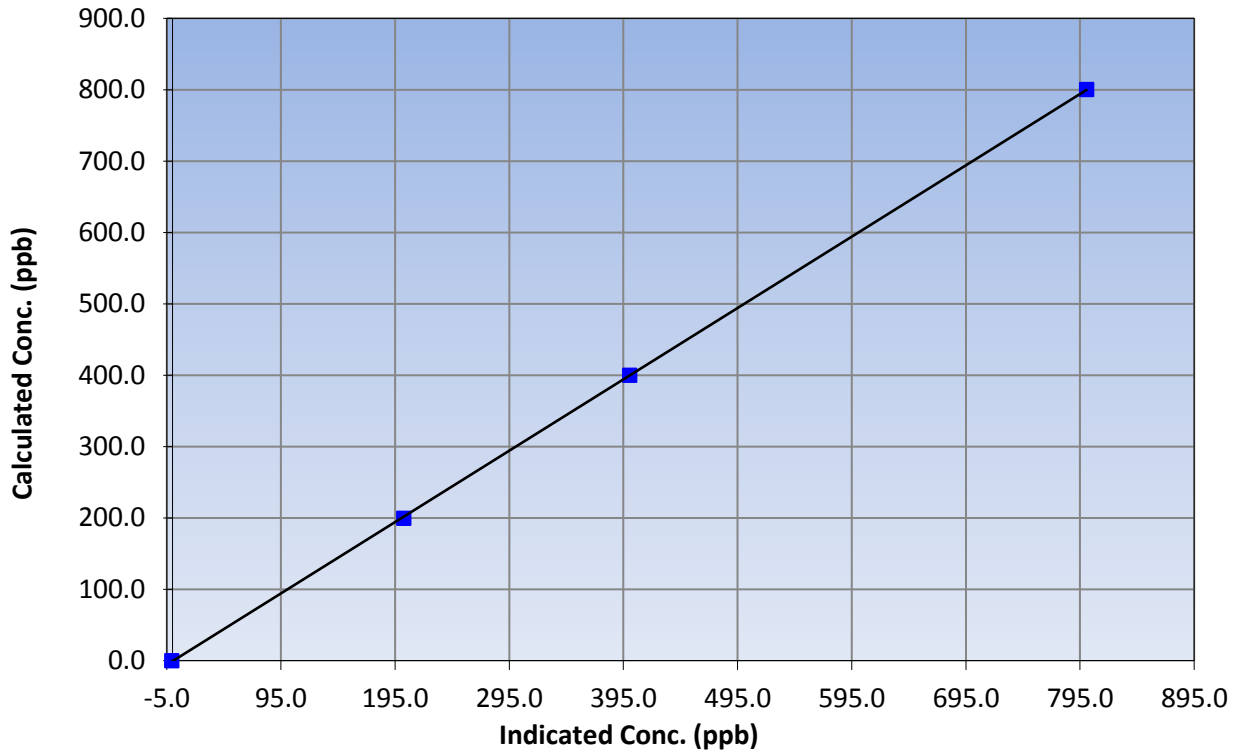
Station Information

Calibration Date	December 5, 2016	Previous Calibration	November 17, 2016
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	12:00	End Time (MST)	16:51
Analyzer make	Thermo 42i	Analyzer serial #	1229254994

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.8	----	Correlation Coefficient	0.999976
800.1	800.7	0.9993		
400.1	400.5	0.9989	Slope	0.999769
199.5	202.7	0.9844		
			Intercept	-0.756314

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

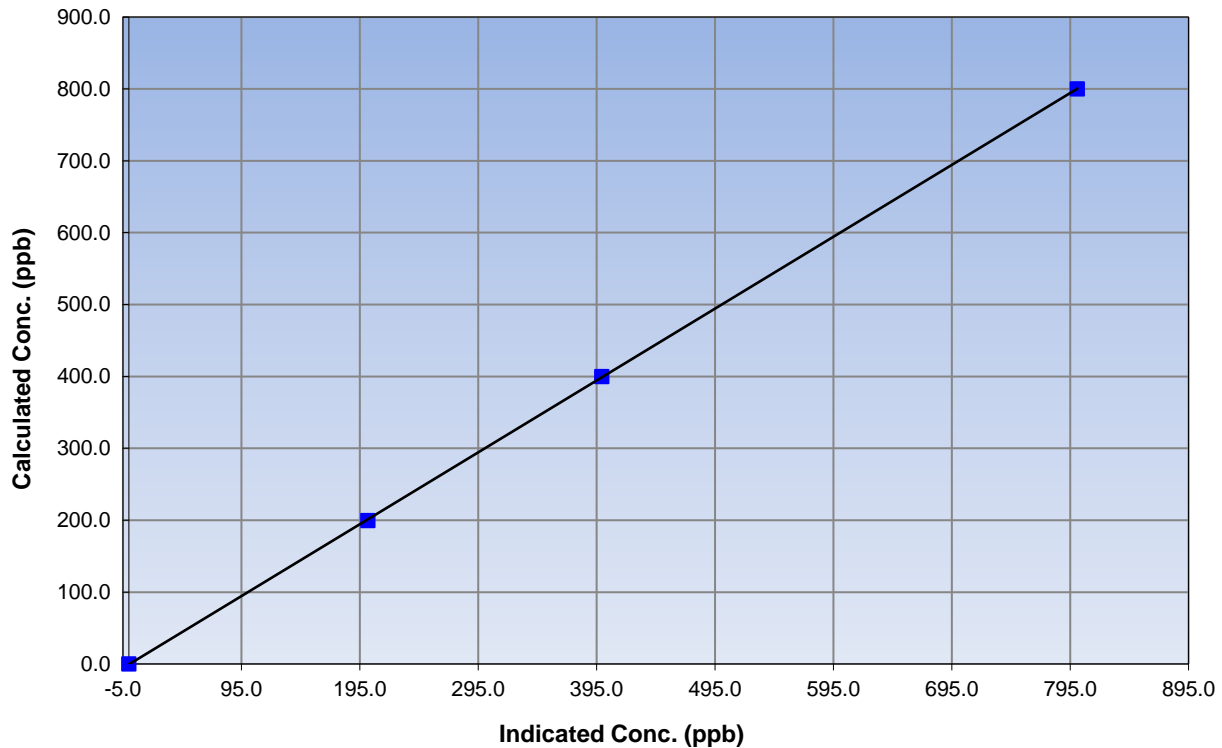
Station Information

Calibration Date	December 5, 2016	Previous Calibration	November 17, 2016
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	12:00	End Time (MST)	16:51
Analyzer make	Thermo 42i	Analyzer serial #	1229254994

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999986
800.1	801.1	0.9988		
400.1	399.5	1.0014	Slope	0.999823
199.5	201.9	0.9883		
			Intercept	-0.615386

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

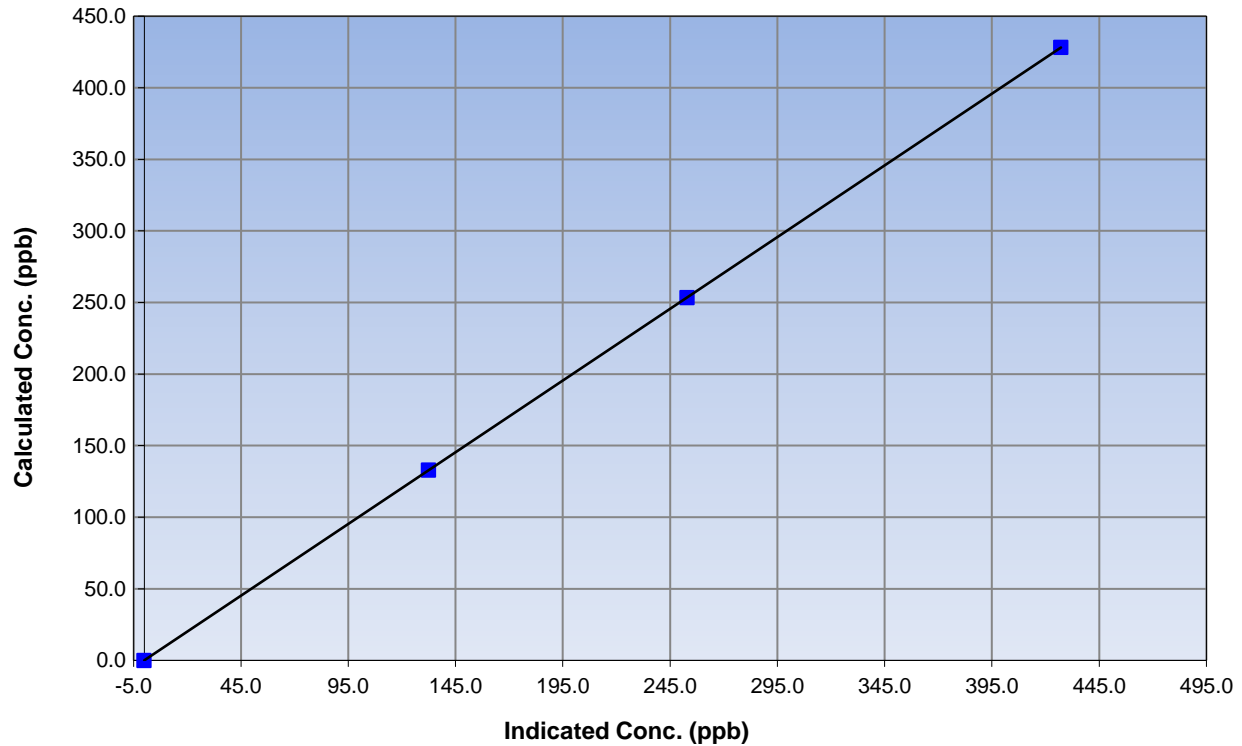
Station Information

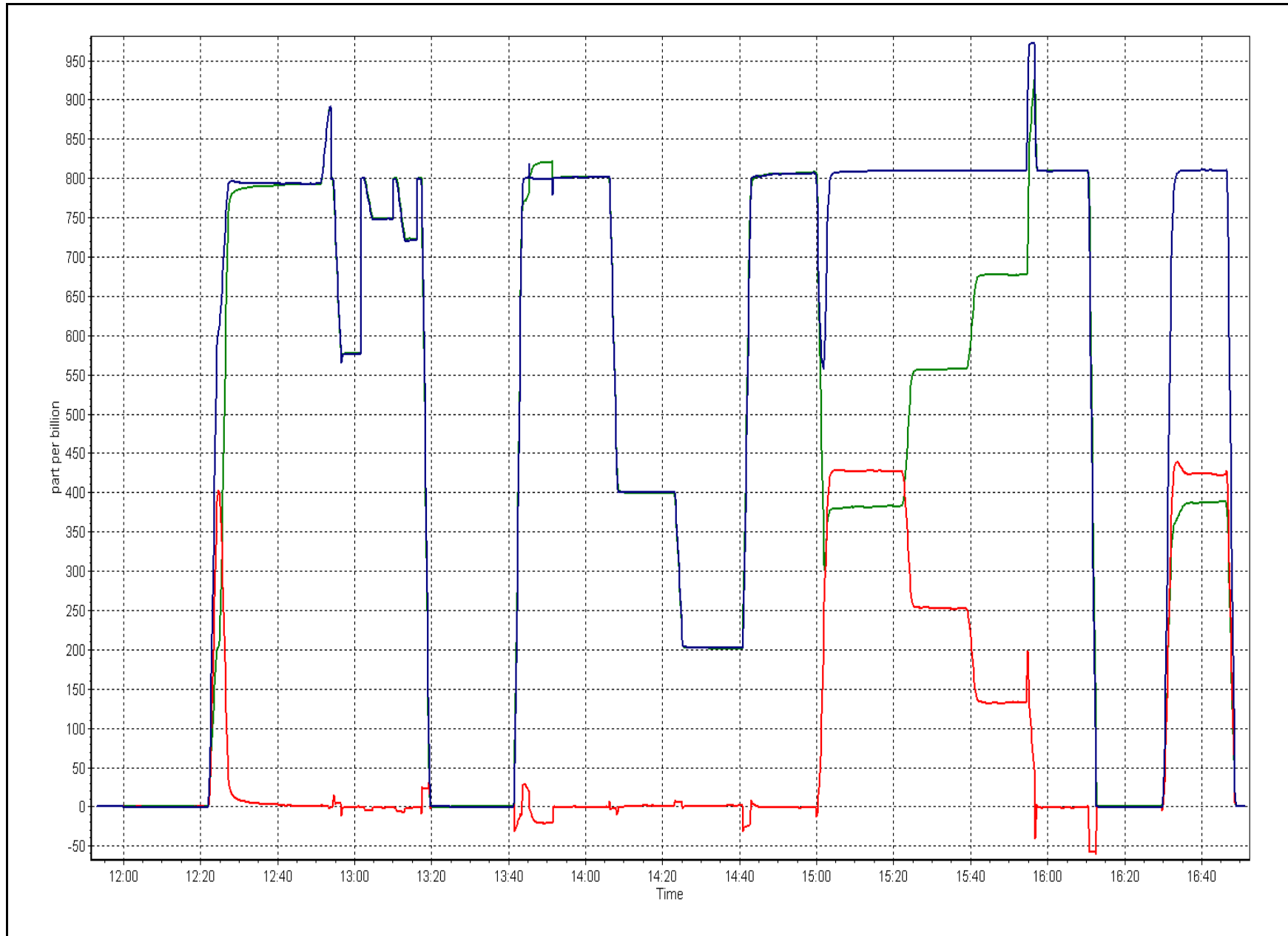
Calibration Date	December 5, 2016	Previous Calibration	November 17, 2016
Station Number	Janvier	Station Number	AMS 22
Start Time (MST)	12:00	End Time (MST)	16:51
Analyzer make	Thermo 42i	Analyzer serial #	1229254994

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
428.1	427.2	1.0022		
253.4	252.9	1.0021	Slope	1.001942
132.8	132.4	1.0033		
			Intercept	0.103092

NO₂ Calibration Curve







Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 12, 2017	Previous Calibration	December 5, 2016
Station Name	Janvier	Station Number	AMS 22
Reason:	Routine		
Start Time (MST)	10:10	End Time (MST)	14:39
NO Cal Gas Conc	50.9 ppm	Gas Cert Reference	LL107937
NOx Cal Gas Conc	50.9 ppm	Cal Gas Expiry Date	September 8, 2018
Calibrator	API T700	Serial Number	2462
Zero air Generator	Teledyne API T701	Serial Number	135

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2586
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.999769	0.999823	1.001942
	Data Offset	-0.756314	-0.615386	0.103092
Current Calibration	Data Slope	0.999865	0.998048	0.999373
	Data Offset	-0.712549	0.353887	1.466980

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1229254994
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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	0.855		0.874	
NOX coefficient	0.998		0.996	
NO2 coefficient	0.995		0.995	
NO bkgrnd	2.5		2.5	
NOX bkgrnd	3.3		2.5	
Chamber Temp	50.7	Deg C	50.7	Deg C
Moly Temp	338.0	Deg C	338.0	Deg C
PMT voltage	-762	v	-762	v
PMT Temp	-3.0	Deg C	-3.0	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	186.7	mmHg	186.7	mmHg
R Cell Press Nox	187.0	mmHg	187.0	mmHg
NO sample flow	0.831	lpm	0.831	lpm
Nox sample Flow	0.840	lpm	0.840	lpm

Notes:

As found zero and span showed an imbalance between NO and Nox. Diagnostics do not show a significant difference in pressures or flows between channels. PMT adjustment performed last month and settling in of new station most likely explanation for the imbalance. Zero and span adjustment resolved the issue. Calibration passed. Noted a leak on the NC port on ZS valve that caused some instability with the AL Span, issue resolved and AL Span went well.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: January 12, 2017 Station Number: AMS 22

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	4.2	0.1	4.1	----	----
as found span	5000	78.6	800.1	800.1	0.0	785.8	782.9	2.8	1.018	1.022
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
high point	5000	78.6	800.1	800.1	0.0	801.1	802.1	-1.0	0.999	0.998
second point	5000	39.3	400.1	400.1	0.0	399.6	398.6	0.9	1.001	1.004
third point	5000	19.6	199.5	199.5	0.0	202.2	200.5	1.7	0.987	0.995
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.1	----	----
as left span	5000	78.6	800.1	386.6	413.5	797.6	393.9	403.7	1.003	0.981
Average Correction Factor									0.996	0.999

Corrcted As found NO_x= 781.6 NO= 782.8 Percent Change NO_x= 2.5% NO= 2.3%
 Previous Response NO_x= 801.1 NO= 800.9

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 78.60 ccm NOx ref calc conc = 800.1 ppb NO ref calc conc = 800.1 ppb

O3 Setpoint (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
1st NO ref point		0.0	797.9	798.9	0.0	1.003	1.0016	----	----
1st NO2 (400)	386.6	412.3	798.5	386.6	411.8	1.002	----	1.001	99.9%
2nd NO2 (200)	587.3	211.6	797.0	587.3	209.7	1.004	----	1.009	99.1%
3rd NO2 (100)	687.6	111.3	795.9	687.6	108.3	1.005	----	1.028	97.3%
2nd NO ref point		0.0							
Average Correction Factor						1.0038		1.013	98.8%

Calibration Performed By: Zach Eastman



Wood Buffalo Environmental Association

NO_x Calibration Summary

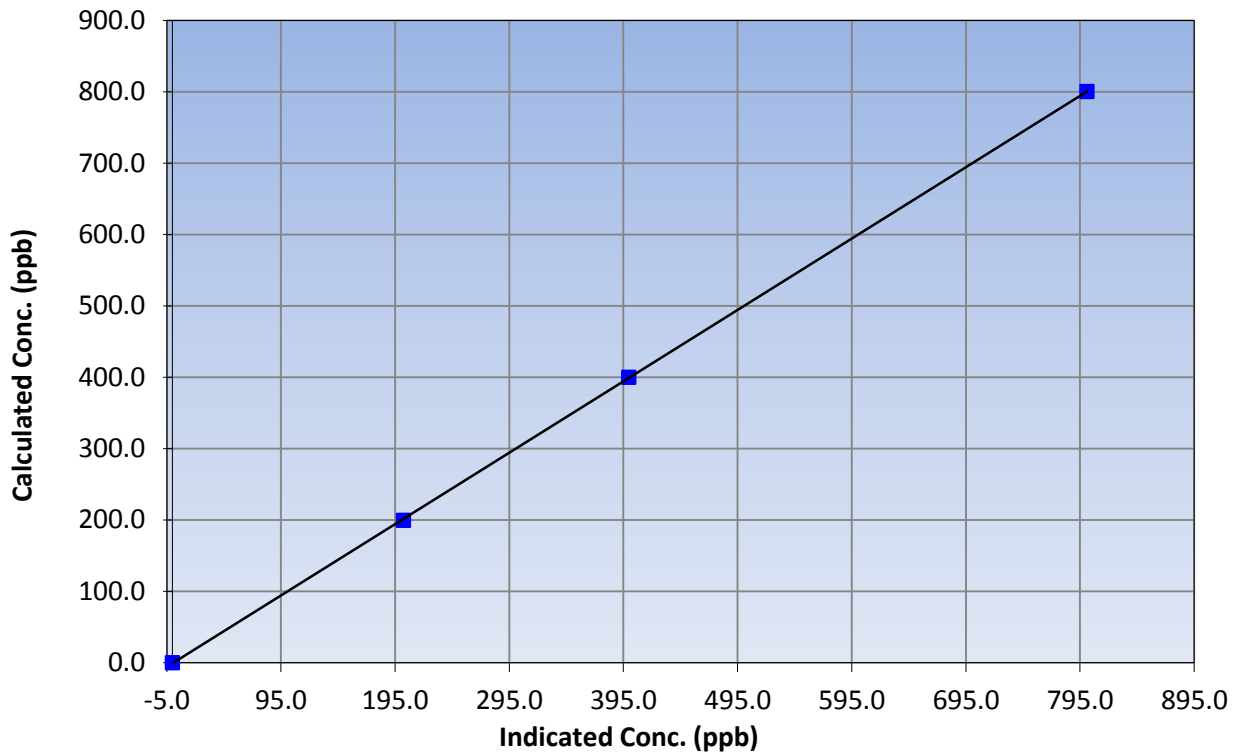
Station Information

Calibration Date	January 12, 2017	Previous Calibration	December 5, 2016
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	10:10	End Time (MST)	14:39
Analyzer make	Thermo 42i	Analyzer serial #	1229254994

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999983
800.1	801.1	0.9988		
400.1	399.6	1.0012	Slope	0.999865
199.5	202.2	0.9868		
			Intercept	-0.712549

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

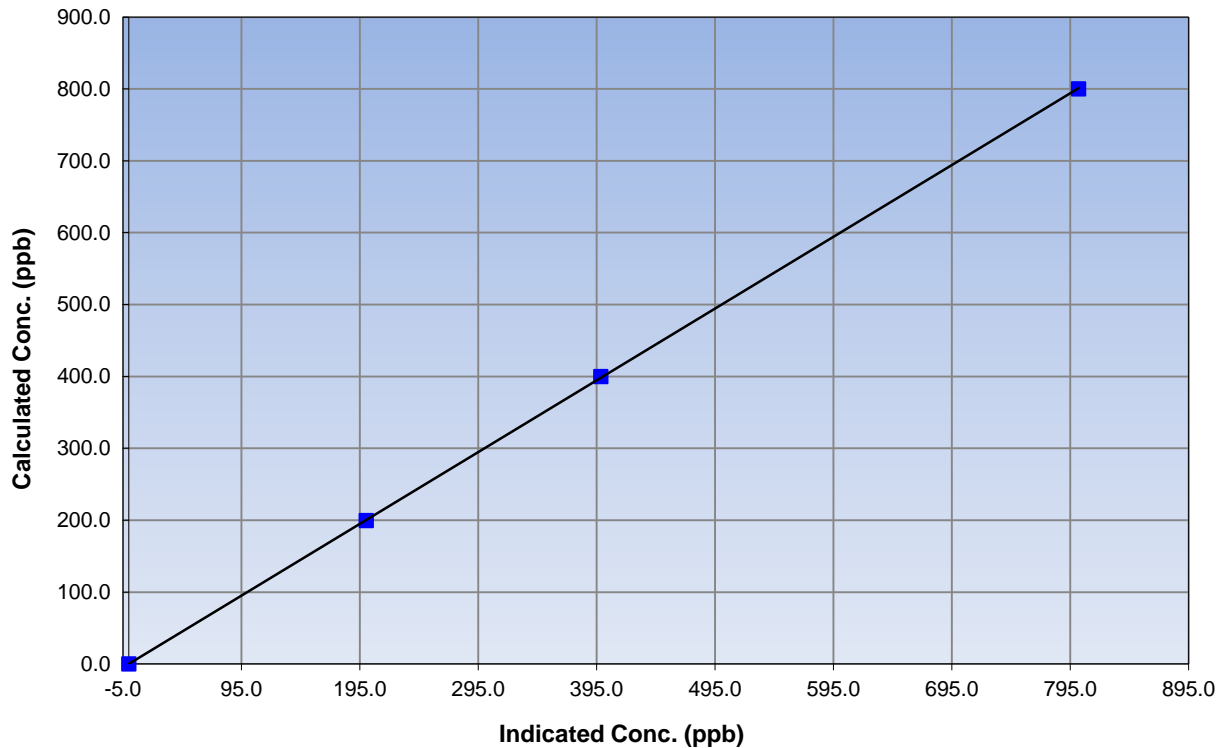
Station Information

Calibration Date	January 12, 2017	Previous Calibration	December 5, 2016
Station Name	Janvier	Station Number	AMS 22
Start Time (MST)	10:10	End Time (MST)	14:39
Analyzer make	Thermo 42i	Analyzer serial #	1229254994

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999986
800.1	802.1	0.9976		
400.1	398.6	1.0037	Slope	0.998048
199.5	200.5	0.9952		
			Intercept	0.353887

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

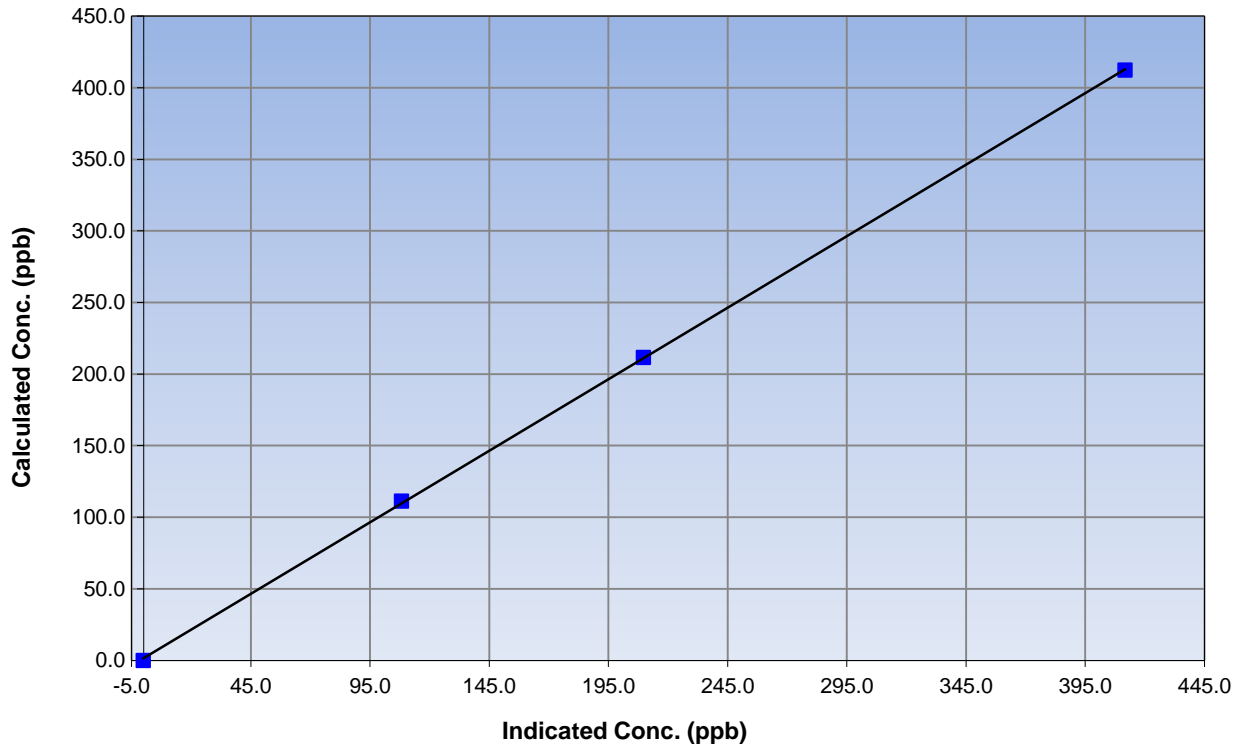
Station Information

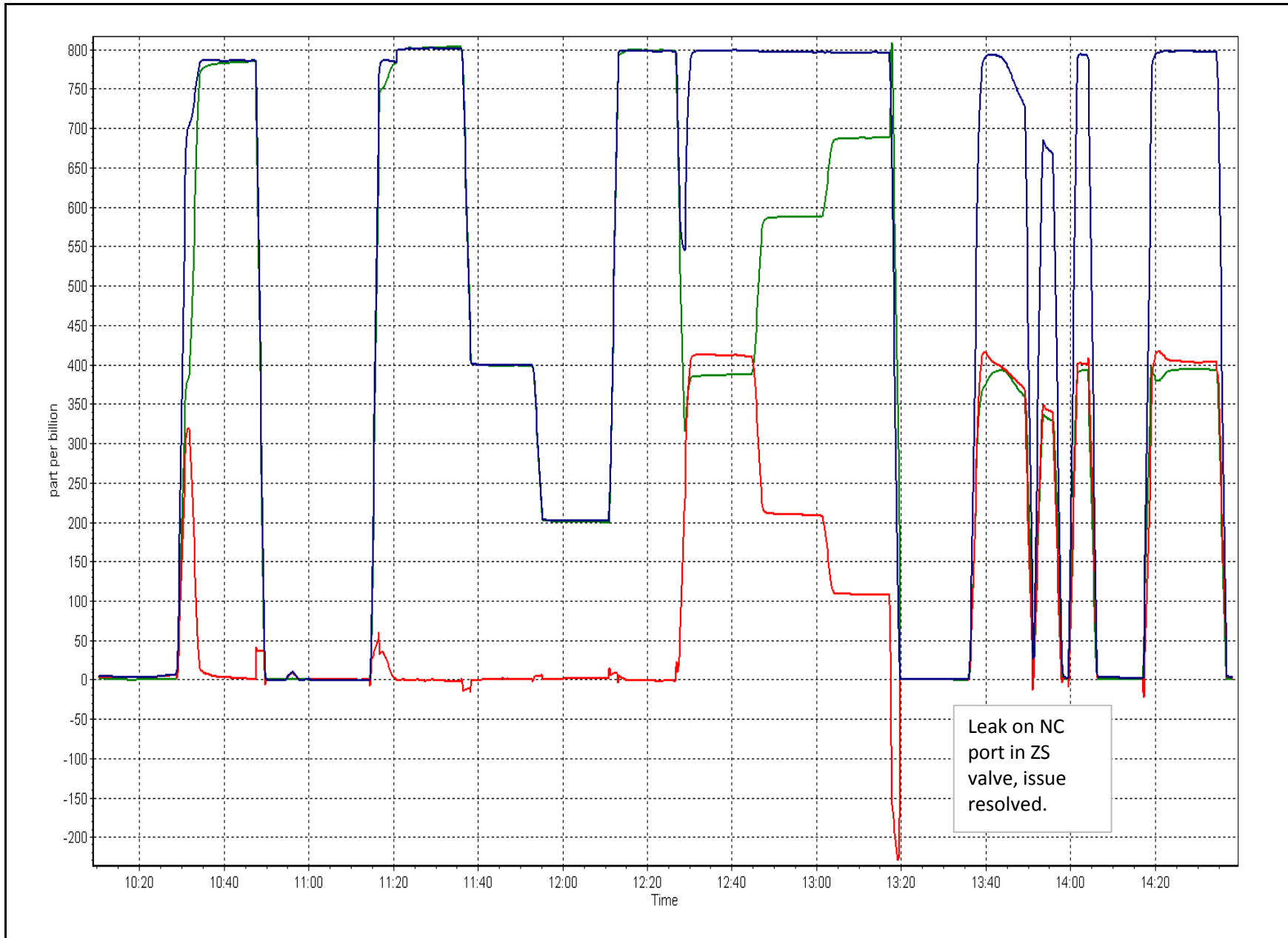
Calibration Date	January 12, 2017	Previous Calibration	December 5, 2016
Station Number	Janvier	Station Number	AMS 22
Start Time (MST)	10:10	End Time (MST)	14:39
Analyzer make	Thermo 42i	Analyzer serial #	1229254994

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999940
412.3	411.8	1.0012		
211.6	209.7	1.0091	Slope	0.999373
111.3	108.3	1.0277		
			Intercept	1.466980

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-08-2016

Station Information

Station Name:	Janvier	Station number:	AMS 22
Calibration Date:	December 6, 2016	Last Cal Date:	November 17, 2016
Start time (MST):	9:10	End time (MST):	10:00
Sharp Model:	Thermo 5030 SHARP	S/N:	E-1333
Particulate Fraction:	PM2.5	C14 Source S/N:	5341
Flow Standard Model:	Delta-Cal	S/N:	954
Temp/RH standard:	Delta-Cal	S/N:	954

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	Tolerance
T1 (°C)	-17	-18	-17	<input checked="" type="checkbox"/>	+/- 2 °C
P3 (hPa)	965	961	965	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1001	982	1000	<input checked="" type="checkbox"/>	+/- 50 LPH
Nephelometer zero	2.3	-----	-0.1	<input checked="" type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified <input checked="" type="checkbox"/>				
Cyclone cleaning:	PM10 Cyclone <input checked="" type="checkbox"/>		PM2.5 Cyclone <input checked="" type="checkbox"/>		
Filter Tape Installed:	<input type="checkbox"/>				

Quarterly Calibration Test

				Tolerance
Leak Test:	Date of check:	<u>Nov 17 2016</u>	Last Cal Date:	<u>NA</u>
	Flow w/o adaptor:	<u>16.53</u>	Flow w/ adaptor:	<u>16.4</u> 0.4 LPM

Annual Calibration Test

Foil Calibration	Foil Mass:	<u>1202</u>	S/N:	<u>5332</u>
	Date of check:	<u>Nov 17 2016</u>	Last Cal Date:	<u>NA</u>
	New Correction Factor:	<u>7065</u>		<u>7036</u>

Parameter	As found	Measured	As left	Adjusted	Tolerance
T2 (°C)	15	NA	15	<input type="checkbox"/>	+/- 2 °C
T3 (°C)	17	NA	17	<input type="checkbox"/>	+/- 2 °C
T4 (°C)	10	NA	10	<input type="checkbox"/>	+/- 2 °C
RH (%)	8	NA	8	<input type="checkbox"/>	+/- 10%

Notes: T1, flow and NEPH zero adjustments made. No issues noted with instrument.

Calibration by: Zach Eastman



Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-08-2016

Station Information

Station Name:	Janvier	Station number:	AMS 22
Calibration Date:	January 13, 2017	Last Cal Date:	December 6, 2016
Start time (MST):	11:00	End time (MST):	11:49
Sharp Model:	Thermo 5030 SHARP	S/N:	E-1333
Particulate Fraction:	PM2.5	C14 Source S/N:	5341
Flow Standard Model:	Delta-Cal	S/N:	954
Temp/RH standard:	Delta-Cal	S/N:	954

Monthly Calibration Test

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<u>Tolerance</u>
T1 (°C)	-13	-12.5	-12.5	<input type="checkbox"/>	+/- 2 °C
P3 (hPa)	956	953	956	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1000	1008	1000	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	2.3	-----	0.1	<input checked="" type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified <input checked="" type="checkbox"/>				
Cyclone cleaning:	PM10 Cyclone <input checked="" type="checkbox"/>		PM2.5 Cyclone <input checked="" type="checkbox"/>		
Filter Tape Installed:	<input type="checkbox"/>				

Quarterly Calibration Test

				<u>Tolerance</u>
Leak Test:	Date of check: <u>Nov 17 2016</u>	Last Cal Date: <u>NA</u>		
	Flow w/o adaptor: <u>16.53</u>	Flow w/ adaptor: <u>16.4</u>		0.4 LPM

Annual Calibration Test

Foil Calibration	Foil Mass: <u>1202</u>	S/N: <u>5332</u>
	Date of check: <u>Nov 17 2016</u>	Last Cal Date: <u>NA</u>
	New Correction Factor: <u>7065</u>	<u>7036</u>

<u>Parameter</u>	<u>As found</u>	<u>Measured</u>	<u>As left</u>	<u>Adjusted</u>	<u>Tolerance</u>
T2 (°C)	16	NA	16	<input type="checkbox"/>	+/- 2 °C
T3 (°C)	18	NA	18	<input type="checkbox"/>	+/- 2 °C
T4 (°C)	12	NA	12	<input type="checkbox"/>	+/- 2 °C
RH (%)	10	NA	10	<input type="checkbox"/>	+/- 10%

Notes: NEPH zero was adjusted.

Calibration by: Zach Eastman



Wood Buffalo Environmental Association

SHARP PM_{2.5} CALIBRATION

Version-08-2016

Station Information

Station Name:	Janvier	Station number:	AMS 22
Calibration Date:	January 18, 2017	Last Cal Date:	January 13, 2017
Start time (MST):	11:20	End time (MST):	13:20
Sharp Model:	Thermo 5030 SHARP	S/N:	E-1333
Particulate Fraction:	PM2.5	C14 Source S/N:	5341
Flow Standard Model:	Delta-Cal	S/N:	954
Temp/RH standard:	Delta-Cal	S/N:	954

Monthly Calibration Test

Parameter	As found	Measured	As left	Adjusted	Tolerance
T1 (°C)	1	3.1	3	<input checked="" type="checkbox"/>	+/- 2 °C
P3 (hPa)	929	929	929	<input type="checkbox"/>	+/- 13 hPa
flow (LPH)	1001	1009	1001	<input type="checkbox"/>	+/- 50 LPH
Nephelometer zero	-0.4	-----	-0.4	<input checked="" type="checkbox"/>	+/- 0.5 ug/m3
Instrument Clock:	Verified <input checked="" type="checkbox"/>				
Cyclone cleaning:	PM10 Cyclone <input checked="" type="checkbox"/>		PM2.5 Cyclone <input checked="" type="checkbox"/>		
Filter Tape Installed:	<input type="checkbox"/>				

Quarterly Calibration Test

				Tolerance
Leak Test:	Date of check:	<u>Jan 18 2017</u>	Last Cal Date:	<u>NA</u>
	Flow w/o adaptor:	<u>16.83</u>	Flow w/ adaptor:	<u>16.64</u> 0.4 LPM

Annual Calibration Test

Foil Calibration	Foil Mass:	<u>1202</u>	S/N:	<u>5332</u>
	Date of check:	<u>Jan 18 2017</u>	Last Cal Date:	<u>Nov 17 2016</u>
	New Correction Factor:	<u>7038</u>	Old Correction factor:	<u>7035</u>

Parameter	As found	Measured	As left	Adjusted	Tolerance
T2 (°C)	19	NA	19	<input type="checkbox"/>	+/- 2 °C
T3 (°C)	20	NA	20	<input type="checkbox"/>	+/- 2 °C
T4 (°C)	15	NA	15	<input type="checkbox"/>	+/- 2 °C
RH (%)	24	NA	24	<input type="checkbox"/>	+/- 10%

Notes: NEPH zero adjustment attempted, unable to adjust above -0.5 ug/m3. No indication of an issue with the instruments performance, all checks were good, only T1 required a minimal adjustment.

Calibration by: Zach Eastman



Wood Buffalo Environmental Association

WS/WD Calibration Report

Station Information

Calibration Date	November 17 2016	Previous Calibration	NA
Station Name	Janvier	Station Number	AMS 22
Reason:	<input type="checkbox"/> Routine <input checked="" type="checkbox"/> Installation <input type="checkbox"/> Removal <input type="checkbox"/> REPAIR		
Start Time (MST)	13:45	End Time (MST)	14:45
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 #	U11126
DACS make	Campbel Scientific CR3000	DACS serial No.	2586
DACS voltage range	5000	DACS channel #	P2
	<u>Before</u>		<u>After</u>
Calculated slope	NA	Calculated slope	0.994833
Calculated intercept	NA	Calculated intercept	0.128345

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	1.0031
400	39.4	39.4	0.9990
600	58.6	58.4	1.0027
800	77.8	78.3	0.9930
Average Correction Factor			0.9994

WIND DIRECTION

Sensor make/model	Met One 020C-1	Sensor serial #	U11346
DACS make	Campbel Scientific CR3000	DACS serial No.	2586
DACS voltage range	5000	DACS channel #	SE 24
	<u>Before</u>		<u>After</u>
Calculated slope	N/A	Calculated slope	0.991361
Calculated intercept	N/A	Calculated intercept	-1.495778
As Found Declination (west of North)	14	As Left Declination (west of North)	14

Wind Direction Calibration Data

Physical Direction (Degrees)	Indicated Direction (Degrees)	Correction factor
0	2.0	n/a
90	92.3	0.9751
180	182.0	0.9890
270	274.0	0.9854
350	355.0	0.9859
Average Correction Factor		0.9839

Notes: Install checks, no issues noted, orientation of wind head is correct and is aligned with true north.



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 500
CENOVUS
CHRISTINA LAKE
JANUARY 2017**

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

February 27, 2017



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CENOVUS CHRISTINA LAKE (AMS 500)
 JANUARY 2017

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	708	36	36	100	13	0	3	0
H2S (ppb) Average	709	35	35	100	1	0	0	0
NO2 (ppb) Average	708	36	36	100	35	0	16	-
NO (ppb) Average	708	36	36	100	32	-	7	-
NOX (ppb) Average	708	36	36	100	67	-	23	-
Temperature 2 m (C) Average	744	0	0	100	8.3	-	4.2	-
Relative Humidity (%) Average	744	0	0	100	95	-	92	-
Wind Speed 10 m (km/h) Average	737	0	7	99.06	33	-	19	-
Wind Direction 10 m (deg) Average	737	0	7	99.06	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CENOVUS CHRISTINA LAKE (AMS 500)
 JANUARY 2017

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	0.6	1	-	0	0	0	0	1	1	13
H2S (ppb) Average	709	0.2	0	-	0	0	0	0	0	0	1
NO2 (ppb) Average	708	6.4	5	-	0	2	3	5	8	14	35
NO (ppb) Average	708	2	4	-	0	0	0	1	2	5	32
NOX (ppb) Average	708	8.4	8	-	0	2	3	6	10	19	67
Temperature 2 m (C) Average	744	-10.87	10.4	-	-35.1	-24.6	-19.5	-12.6	-0.6	2.7	8.3
Relative Humidity (%) Average	744	76.2	10	-	46	63	70	77	84	88	95
Wind Speed 10 m (km/h) Average	737	9.2	6	-	0	2	4	9	13	16	33
Wind Direction 10 m (deg) Average	737	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CENOVUS CHRISTINA LAKE (AMS 500)
JANUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	19 Jan 2017 14:00	19 Jan 2017 14:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	24 Jan 2017 23:00	24 Jan 2017 23:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	25 Jan 2017 01:00	25 Jan 2017 01:00	1	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	25 Jan 2017 03:00	25 Jan 2017 06:00	4	Flat line in sensor output signal - Sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Cenovus - Christina Lake - January 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 13 ppb on Jan 1 01:00	Maximum Daily Average: 2.8 ppb on Jan 30		Hours of Data:	708
Minimum Value: 0 ppb on Jan 5 21:00	Minimum Daily Average: 0.1 ppb on Jan 22		Hours of Missing Data:	36
Maximum Diurnal Average: 1.0 ppb at hour 1	Minimum Diurnal Average: 0.4 ppb at hour 20		Hours of Calibration:	36
Monthly Average: 0.6 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 7		Percent Operational Time:	100.0

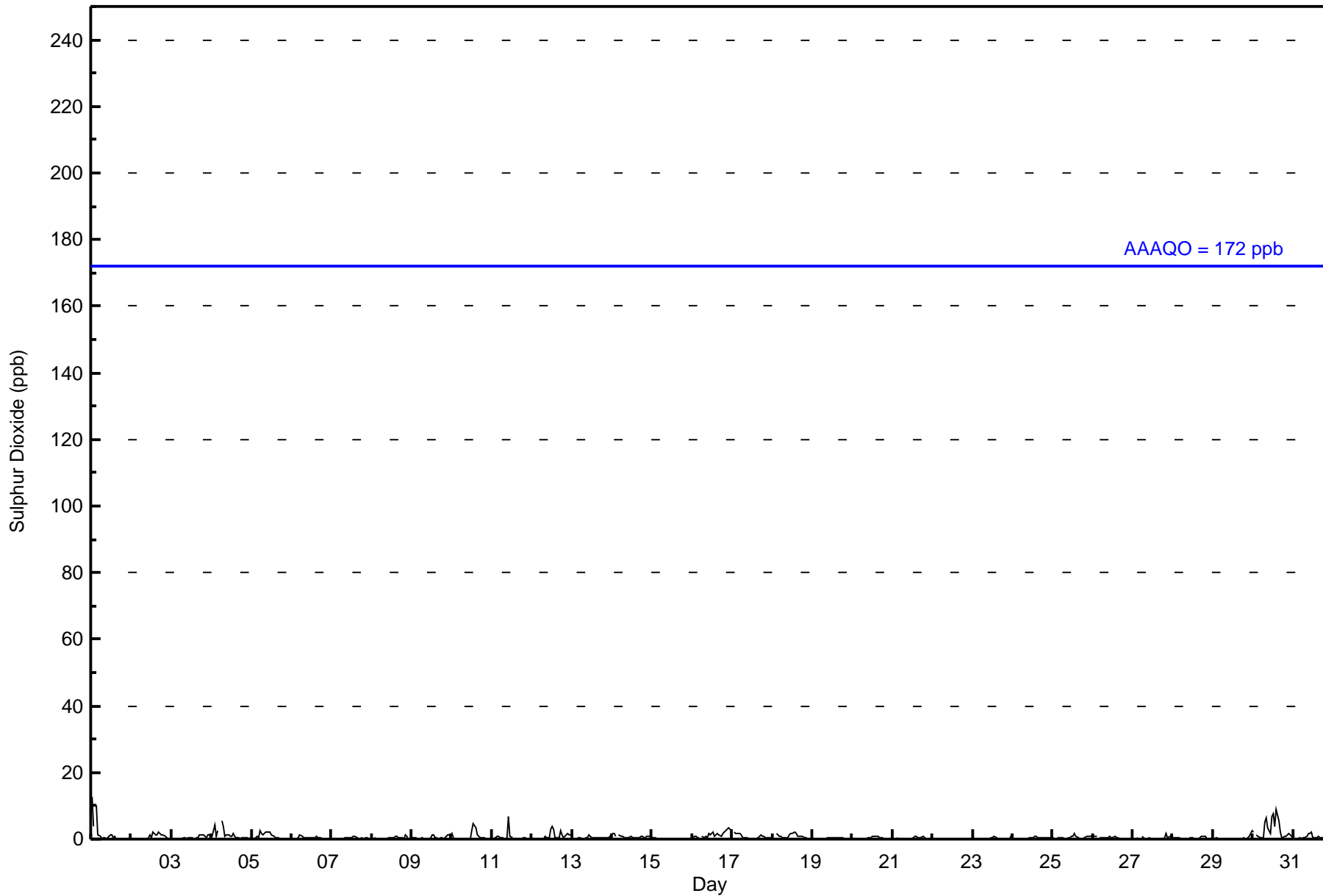
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	13	4	Z	10	1	1	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1.5	13
2-Jan	0	0	0	Z	0	0	0	0	0	0	0	1	1	2	1	1	2	2	1	1	1	0	0	0	0.7	2
3-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0.5	1
4-Jan	1	2	4	1	3	Z	5	4	1	1	1	1	2	1	0	0	0	0	0	1	0	0	0	0	1.3	5
5-Jan	Z	0	1	1	0	2	2	1	2	2	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0.9	2
6-Jan	0	Z	0	0	1	1	1	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0.3	1
7-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1
8-Jan	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	1	1	0	1	0	0	1	1	0	0	0.4	1
9-Jan	1	0	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	1	1	1	0.5	1
10-Jan	2	0	0	0	0	Z	0	0	0	0	0	0	2	5	3	1	1	0	0	0	0	0	0	0	0.7	5
11-Jan	Z	1	1	1	1	1	0	0	0	0	7	1	0	C	C	C	C	C	1	0	0	0	0	0	0.7	7
12-Jan	0	Z	0	0	0	0	0	0	1	0	0	3	4	3	1	0	0	2	1	1	1	2	1	1	1.0	4
13-Jan	1	1	Z	1	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	1	0.5	1
14-Jan	2	2	1	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	0	0	1	1	1	0.7	2
15-Jan	0	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
16-Jan	0	1	1	0	1	Z	1	0	1	0	2	1	2	1	1	2	1	1	2	2	3	3	3	2	1.3	3
17-Jan	Z	2	2	1	2	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0.7	2
18-Jan	0	Z	2	1	1	1	0	0	0	0	1	2	2	2	2	1	1	1	1	0	0	0	0	0	0.8	2
19-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.2	1
20-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0.3	1
21-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	0	0	1	0	0	0	0	0	0.3	1
22-Jan	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
23-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0.1	1
24-Jan	2	Z	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0.4	2
25-Jan	0	0	Z	0	0	0	0	0	0	0	0	1	1	2	1	0	0	0	0	0	0	1	1	1	0.5	2
26-Jan	1	1	1	Z	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0.4	1
27-Jan	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	1	0.3	2
28-Jan	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
29-Jan	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0.3	3
30-Jan	2	Z	1	1	0	0	1	5	7	3	2	7	8	4	9	6	2	1	1	1	1	2	1	1	2.8	9
31-Jan	0	0	Z	1	0	0	0	0	1	2	2	2	0	0	0	1	0	0	0	0	3	9	2	1	1.2	9
	1.0	0.6	0.6	0.8	0.5	0.4	0.5	0.5	0.5	0.5	0.8	0.9	1.0	1.0	0.9	0.6	0.5	0.5	0.5	0.4	0.6	0.7	0.5	0.5	Diurnal Average	
	13	4	4	10	3	2	5	5	7	3	7	7	8	5	9	6	2	2	2	2	3	9	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 (SO₂) - ppb
Cenovus - Christina Lake - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Cenovus - Christina Lake - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	707	99.86	99.86
11 - 20	1	0.14	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Cenovus - Christina Lake - January 2017

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	61	36	11	5	15	13	20	35	73	97	101	124	34	20	30	26	701
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	61	36	11	5	15	13	20	35	73	97	101	124	34	21	30	26	702

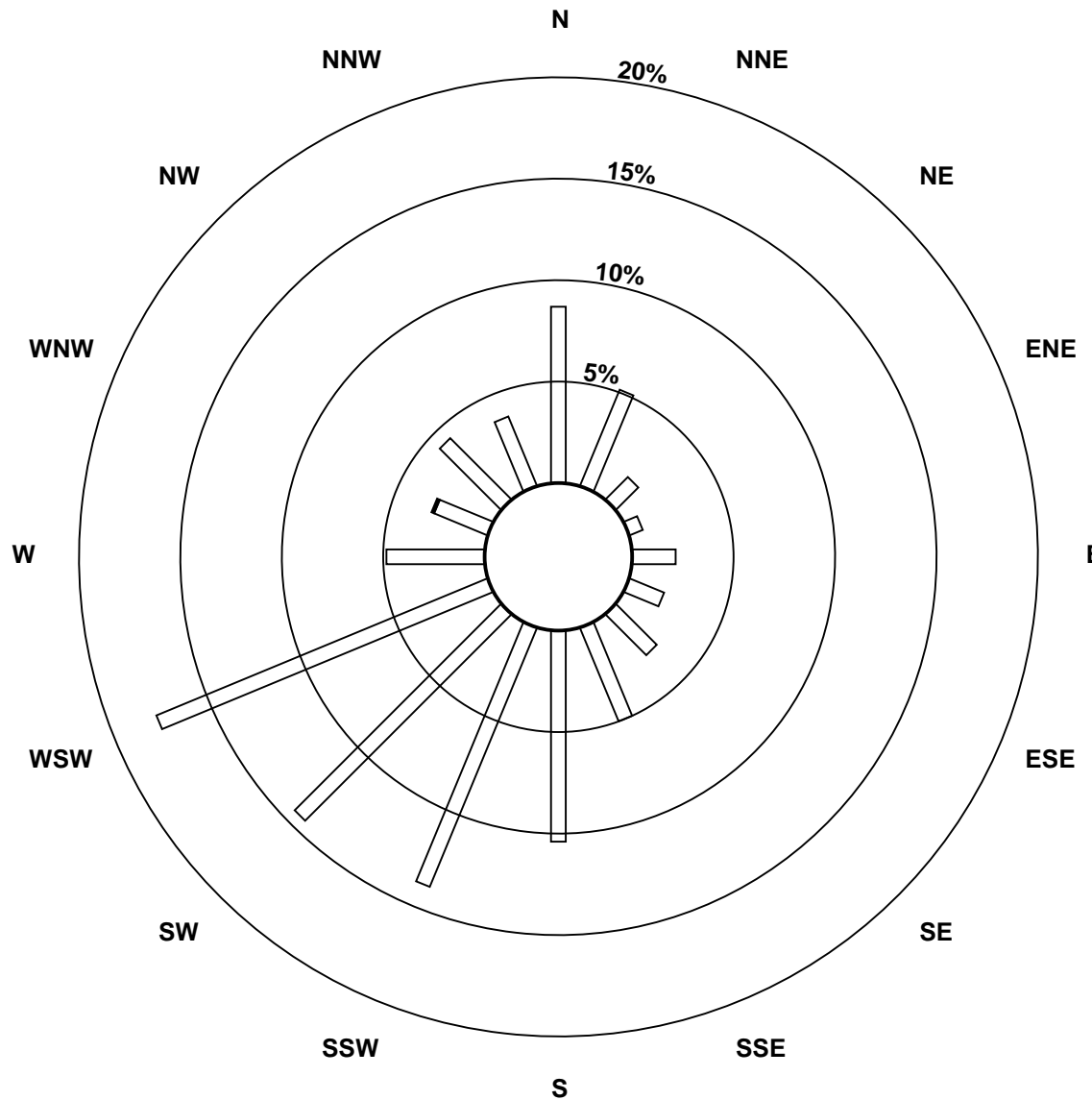
Total Number of Valid Hours: 702

Total Number of Hours: 744

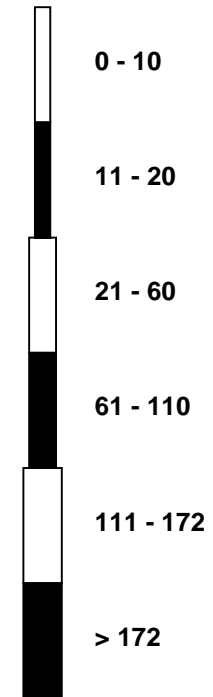


Wood Buffalo Environmental Association
Wind Rose 2012-2017

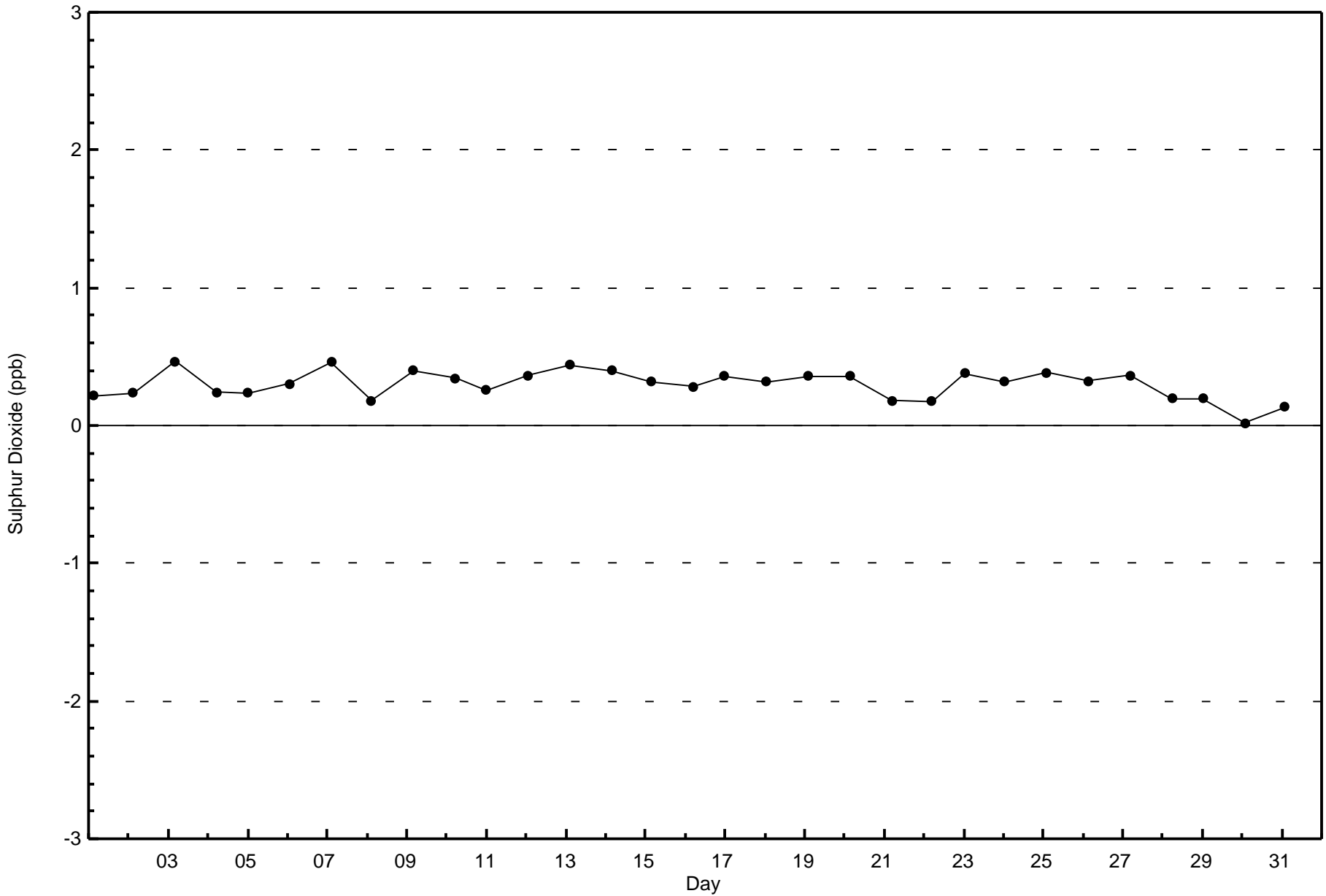
Sulphur Dioxide (SO₂) - ppb
Cenovus - Christina Lake (AMS500)

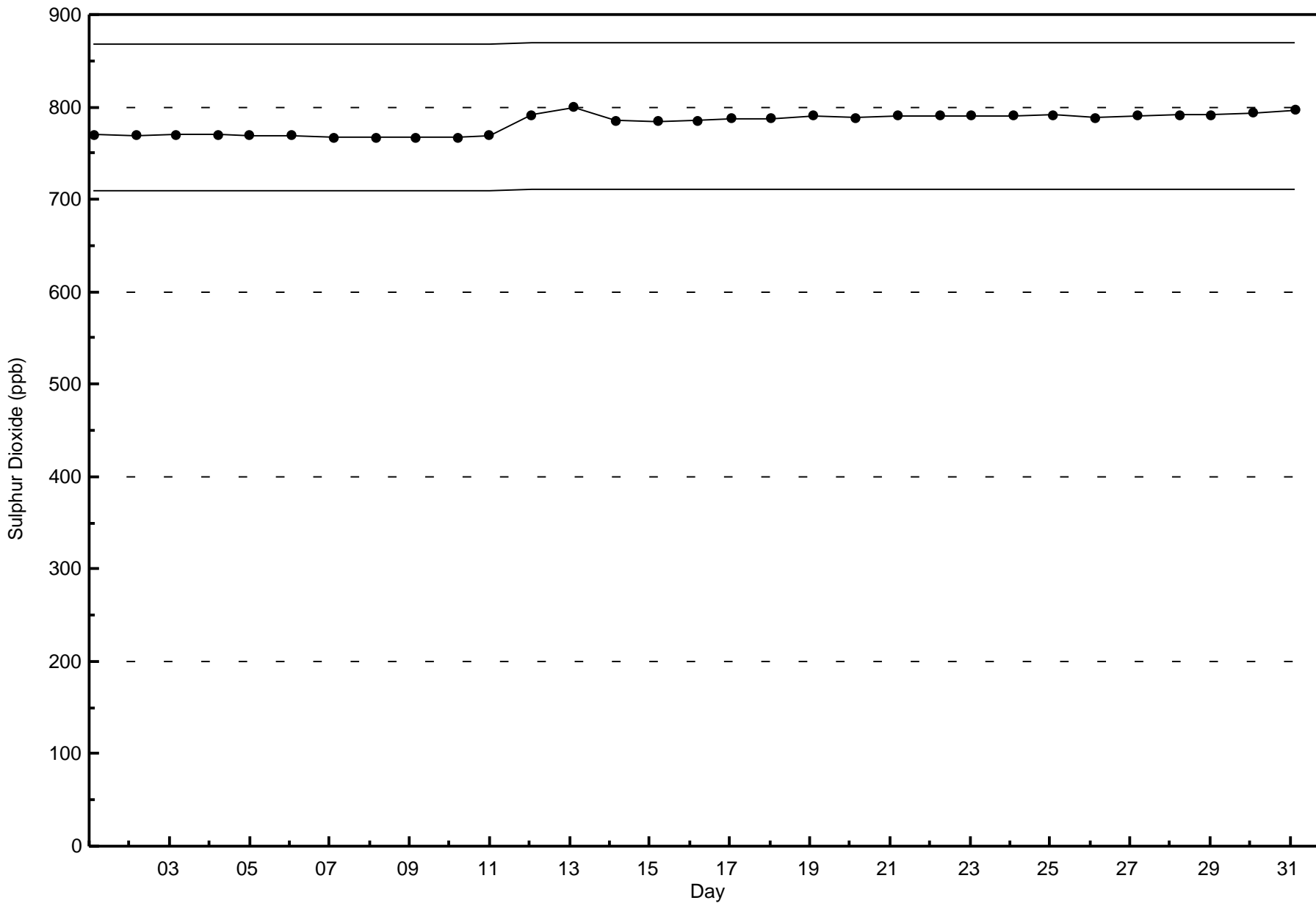


Classes (ppb)



Total Number of Valid Hours: 702







Wood Buffalo Environmental Association

Summary of Hour Averages

Hydrogen Sulphide (H₂S) - ppb

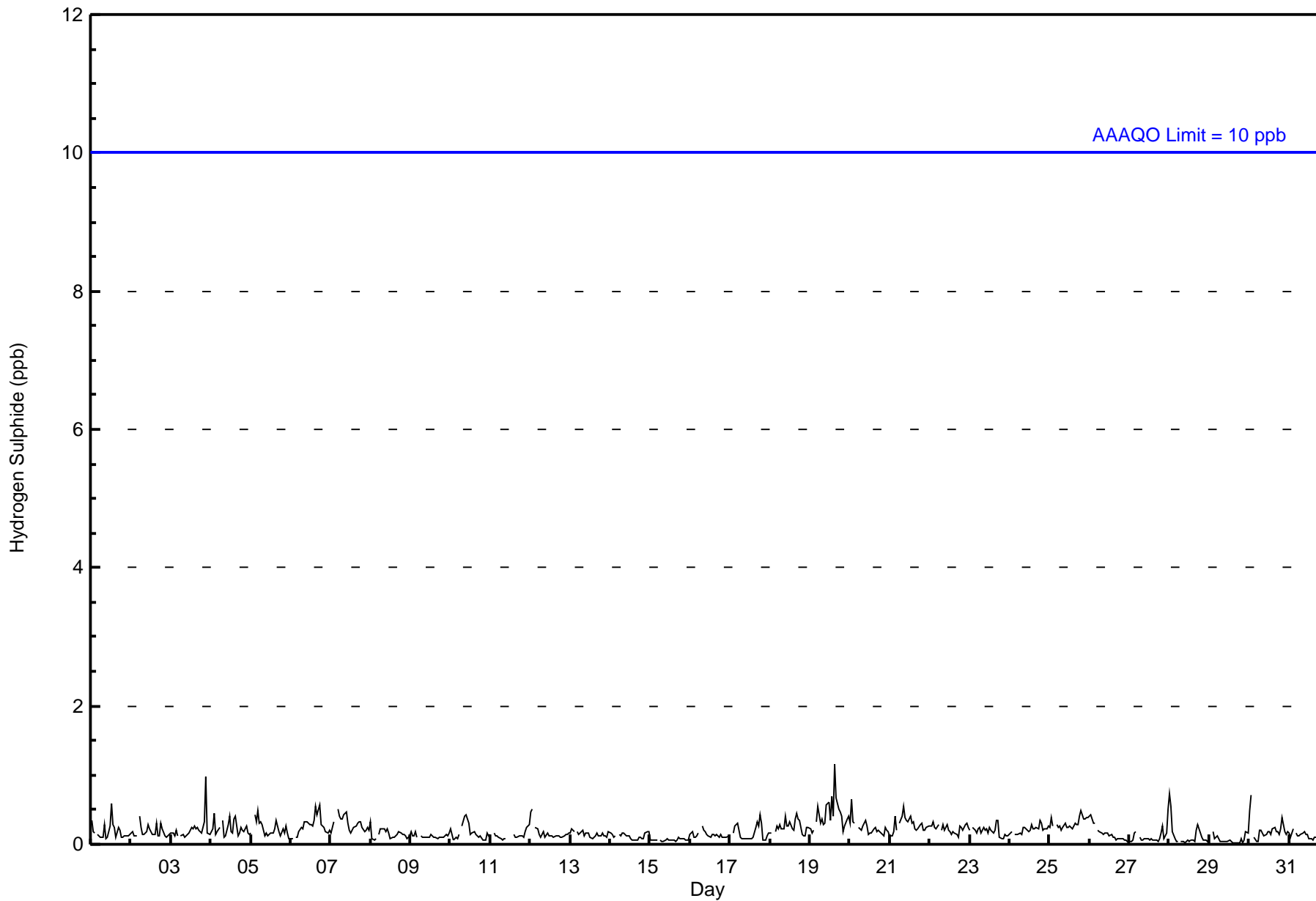
Cenovus - Christina Lake - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 1 ppb on Jan 19 16:00 Maximum Daily Average: 0.4 ppb on Jan 19														Hours in Service: 744 Hours of Data: 709 Hours of Missing Data: 35 Hours of Calibration: 35 Percent Operational Time: 100.0												
Minimum Value: 0 ppb on Jan 29 18:00 Minimum Daily Average: 0.1 ppb on Jan 15 Maximum Diurnal Average: 0.2 ppb at hour 2 Minimum Diurnal Average: 0.2 ppb at hour 21 Monthly Average: 0.2 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1
2-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
3-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	1
4-Jan	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
5-Jan	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
6-Jan	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0.3	1
7-Jan	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
8-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
9-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
10-Jan	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
11-Jan	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.1	0
12-Jan	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
13-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
14-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
15-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
16-Jan	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
17-Jan	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
18-Jan	0	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
19-Jan	0	0	0	Z	0	1	0	0	0	0	1	1	0	1	0	1	1	1	0	0	0	0	0	0	0.4	1
20-Jan	0	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
21-Jan	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
22-Jan	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
23-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
24-Jan	0	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
25-Jan	0	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
26-Jan	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
27-Jan	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
28-Jan	1	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
29-Jan	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
30-Jan	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
31-Jan	0	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
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



Wood Buffalo Environmental Association
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Cenovus - Christina Lake - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Hydrogen Sulphide (H₂S) - ppb
Cenovus - Christina Lake - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
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 (H₂S) - ppb
Cenovus - Christina Lake - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	60	36	11	5	16	14	20	36	72	94	102	124	34	20	31	28	703
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
Totals	60	36	11	5	16	14	20	36	72	94	102	124	34	20	31	28	703

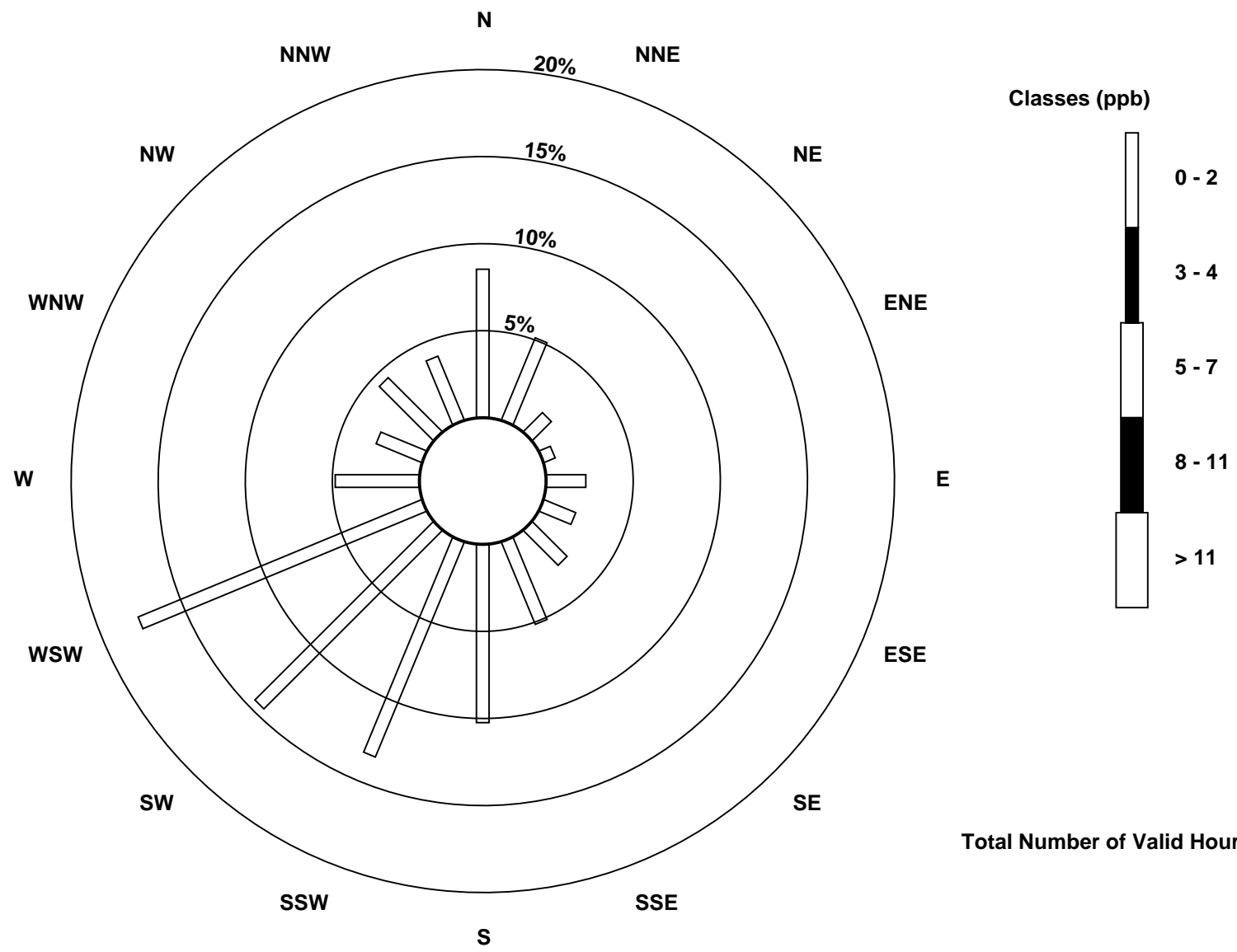
Total Number of Valid Hours: 703

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose 2012-2017

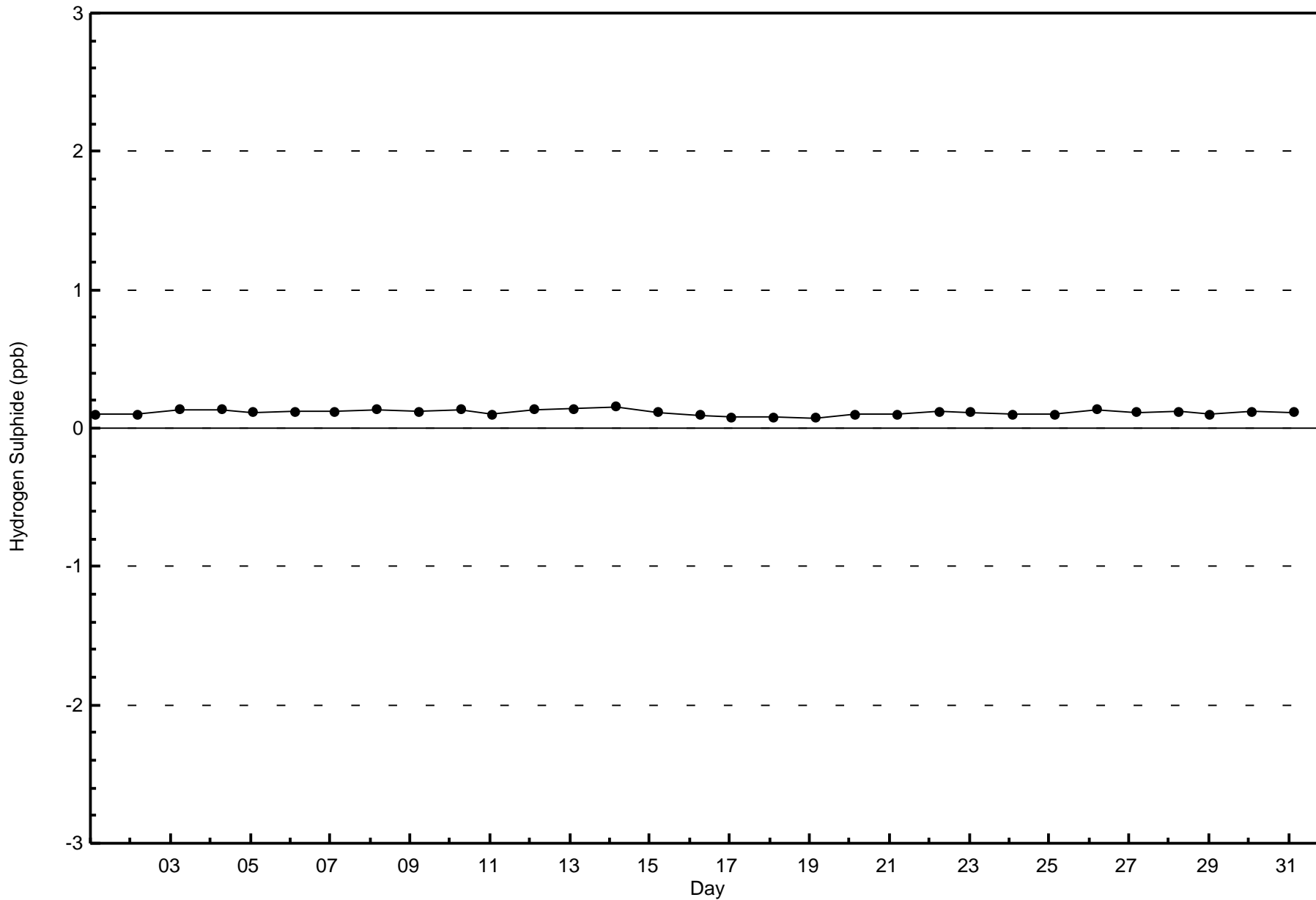
Hydrogen Sulphide (H₂S) - ppb
Cenovus - Christina Lake (AMS500)

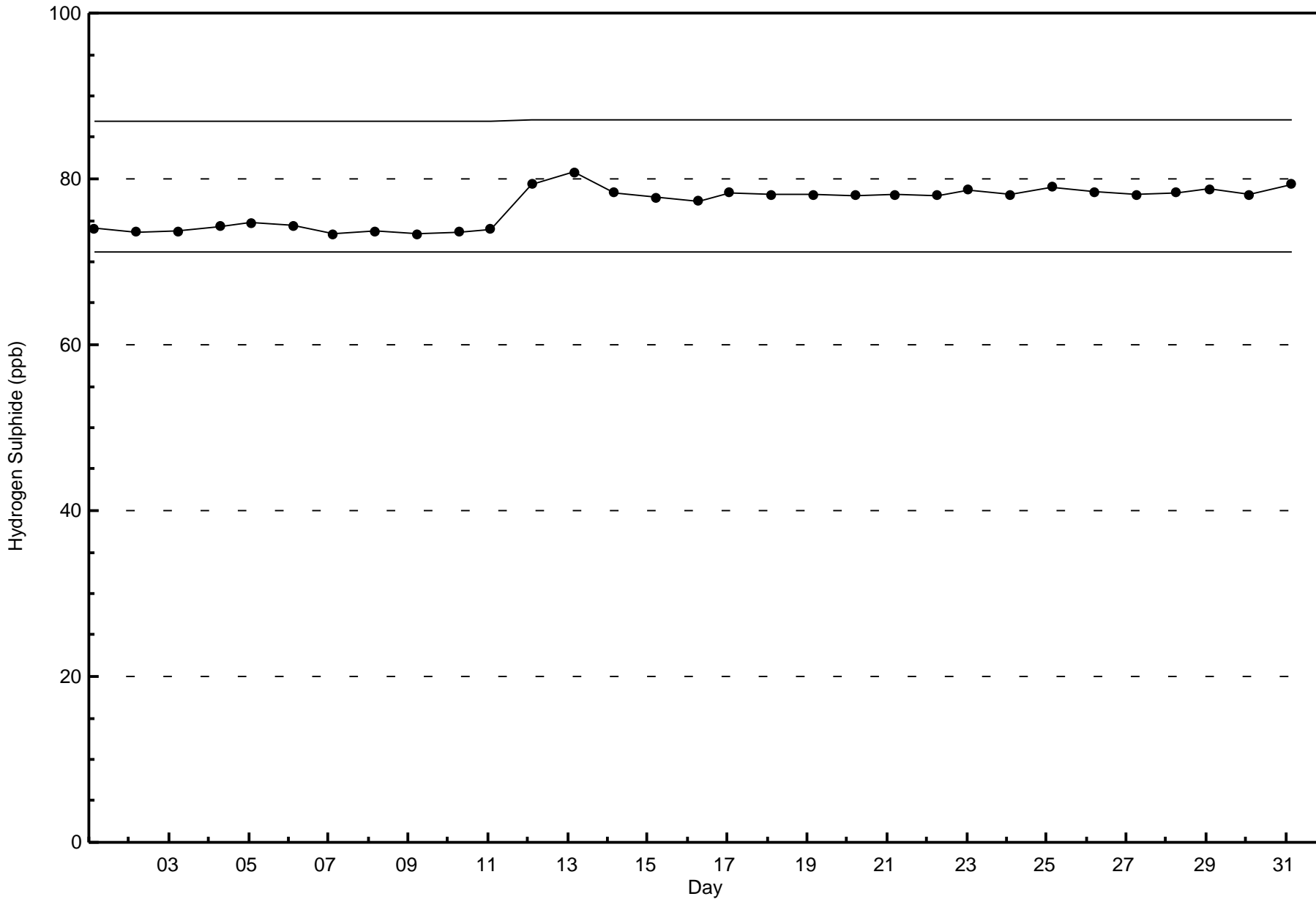




Wood Buffalo Environmental Association
Zero Responses

Hydrogen Sulphide (H₂S) - ppb
Cenovus - Christina Lake - January 2017







Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxide (NO) - ppb

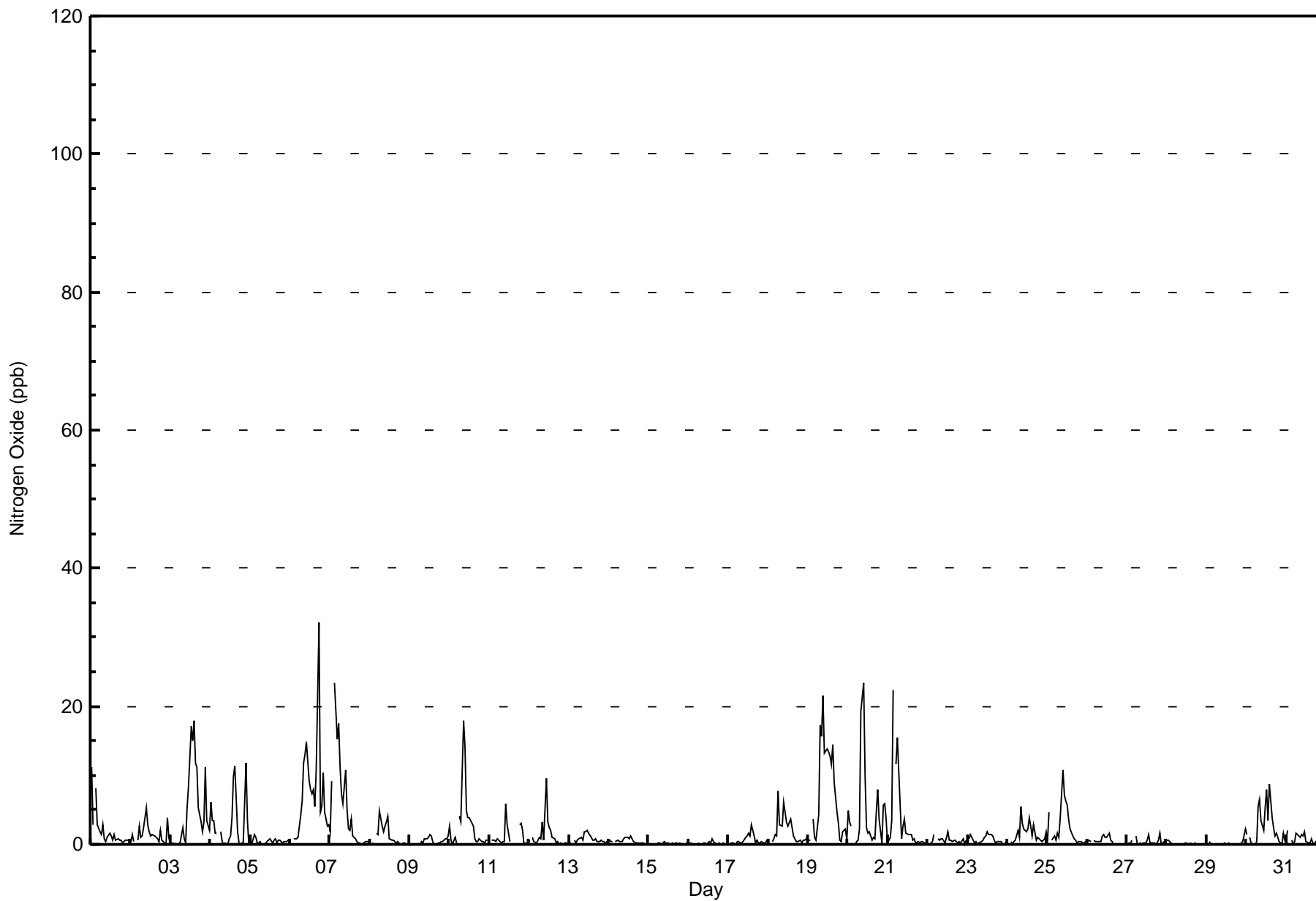
Cenovus - Christina Lake - January 2017

Maximum Value: 32 ppb on Jan 6 18:00																	Maximum Daily Average: 7.3 ppb on Jan 19																	Hours in Service: 744	
Minimum Value: 0 ppb on Jan 3 03:00																	Minimum Daily Average: 0.1 ppb on Jan 15																	Hours of Data: 708	
Maximum Diurnal Average: 4.1 ppb at hour 10																	Minimum Diurnal Average: 0.7 ppb at hour 20																	Hours of Missing Data: 36	
Monthly Average: 2.0 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 2 P ₉₀ = 5 P ₉₉ = 17																	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-Jan	11	3	Z	8	3	2	1	3	1	0	1	2	1	1	1	1	1	1	1	0	0	1	1	1	1.9	11									
2-Jan	0	1	0	Z	1	3	1	1	3	5	3	2	1	1	1	1	1	0	2	1	0	0	4	1	1.5	5									
3-Jan	0	0	0	0	Z	0	0	2	1	0	5	8	17	15	18	12	11	5	3	2	3	11	3	2	5.3	18									
4-Jan	6	3	3	2	2	Z	2	0	0	0	0	1	1	4	10	11	2	0	0	0	0	12	3	0	2.8	12									
5-Jan	Z	0	1	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	1	0	0	0	0	1	0.5	1									
6-Jan	1	Z	1	1	1	1	4	6	12	13	15	9	8	7	8	6	11	32	5	5	10	5	3	3	7.2	32									
7-Jan	2	9	Z	23	15	17	11	7	6	11	5	2	2	4	1	1	0	0	0	0	0	1	0	0	5.2	23									
8-Jan	0	0	0	Z	2	1	5	3	2	3	3	4	1	1	1	0	0	0	0	0	0	0	0	0	1.2	5									
9-Jan	0	0	0	0	Z	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	0.5	1									
10-Jan	3	1	0	1	0	Z	4	3	18	14	5	4	4	3	3	1	0	0	1	0	0	0	1	1	2.9	18									
11-Jan	Z	1	1	1	0	1	0	0	0	0	6	3	0	C	C	C	C	C	3	3	2	0	0	0	1.2	6									
12-Jan	1	Z	1	0	0	1	1	1	3	1	10	3	3	2	1	1	0	0	0	0	0	0	0	0	1.3	10									
13-Jan	0	0	Z	1	0	1	1	1	1	2	2	2	2	1	1	1	1	1	0	1	0	0	0	0	0.8	2									
14-Jan	1	0	0	Z	0	1	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1									
15-Jan	0	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									
16-Jan	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.1	1									
17-Jan	Z	0	0	0	0	0	0	0	0	0	1	1	2	1	3	1	0	1	0	0	0	0	0	1	0.6	3									
18-Jan	1	Z	0	1	1	1	8	3	3	6	5	3	3	4	2	1	1	0	0	1	0	1	1	1	2.0	8									
19-Jan	1	1	Z	4	1	1	4	17	16	22	13	14	13	13	12	14	9	5	3	1	0	2	2	1	7.3	22									
20-Jan	5	3	3	Z	0	0	1	2	19	23	10	2	2	2	1	1	1	5	8	4	0	6	6	4	4.6	23									
21-Jan	0	1	4	22	Z	12	15	6	1	3	4	2	1	1	1	1	1	0	0	0	0	0	0	0	3.3	22									
22-Jan	0	0	0	0	1	Z	1	1	1	1	0	1	2	1	1	0	1	0	0	0	0	1	0	1	0.6	2									
23-Jan	Z	1	1	1	0	0	0	0	0	1	1	1	2	1	1	1	1	0	0	0	0	0	0	0	0.7	2									
24-Jan	0	Z	0	0	0	1	2	1	6	3	2	2	2	4	3	1	3	1	1	1	1	0	1	2	1.6	6									
25-Jan	1	5	Z	1	1	1	2	1	4	11	7	6	6	4	2	1	1	1	0	0	0	0	0	0	2.4	11									
26-Jan	0	1	0	Z	1	0	0	0	0	1	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0.5	2									
27-Jan	0	0	0	1	Z	1	0	0	0	0	0	0	1	1	0	0	0	0	0	1	2	0	0	0	0.4	2									
28-Jan	1	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1									
29-Jan	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.2	2									
30-Jan	1	Z	1	0	0	0	0	5	7	Z	3	2	5	8	3	9	4	2	1	2	1	0	0	2	1	2.6	9								
31-Jan	1	2	Z	1	0	0	2	1	1	1	1	2	0	0	0	1	0	0	0	0	0	2	5	1	0	1.0	5								
																	Diurnal Average																		
																	Diurnal Maximum																		
Z - zerospan		C - Calibration																																	



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxide (NO) - ppb
Cenovus - Christina Lake - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Cenovus - Christina Lake - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	703	99.29	99.29
21 - 40	5	0.71	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
Cenovus - Christina Lake - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	61	36	11	4	14	12	20	35	72	96	101	124	34	21	30	26	697
21 - 40	0	0	0	1	1	1	0	0	1	1	0	0	0	0	0	0	5
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
Totals	61	36	11	5	15	13	20	35	73	97	101	124	34	21	30	26	702

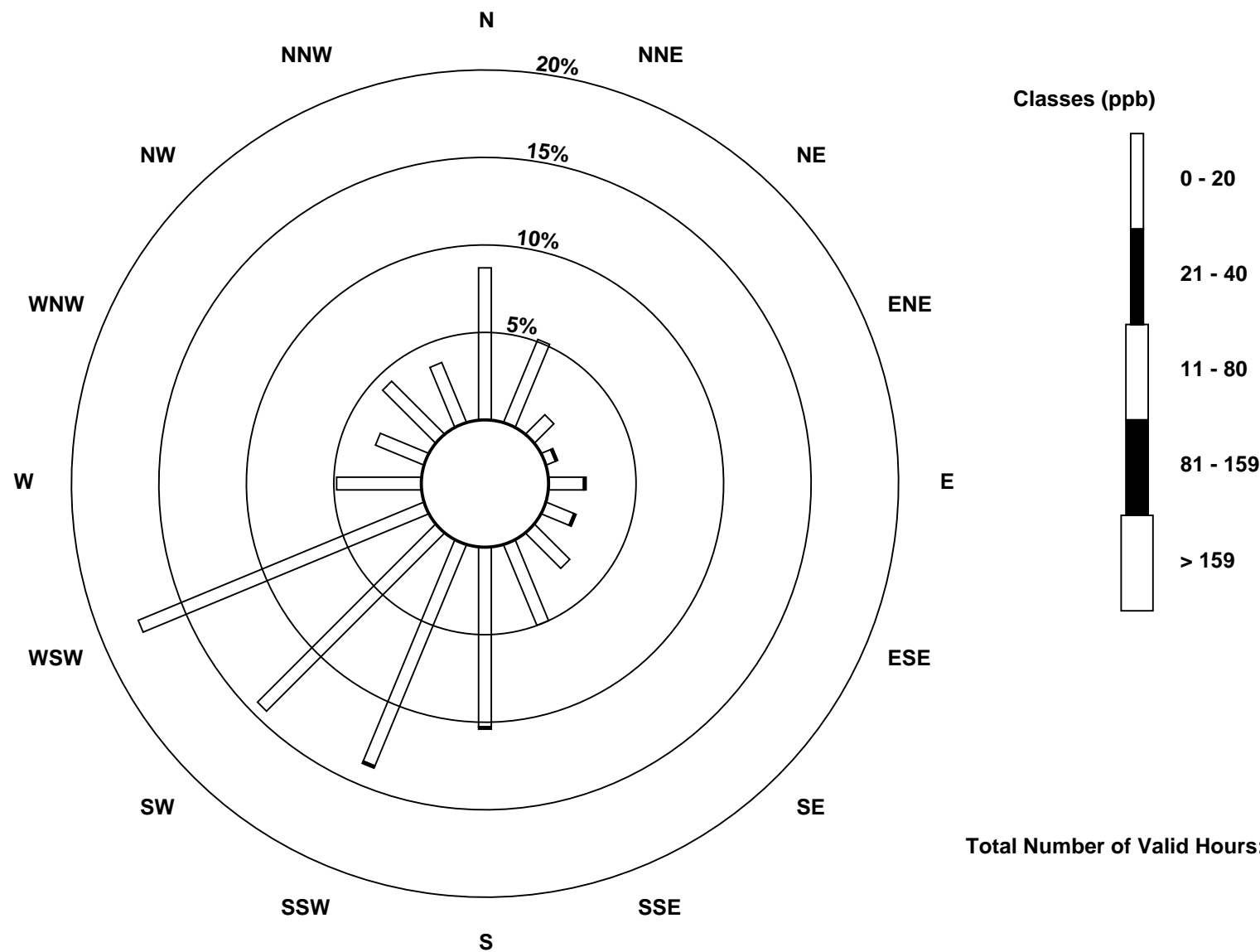
Total Number of Valid Hours: 702

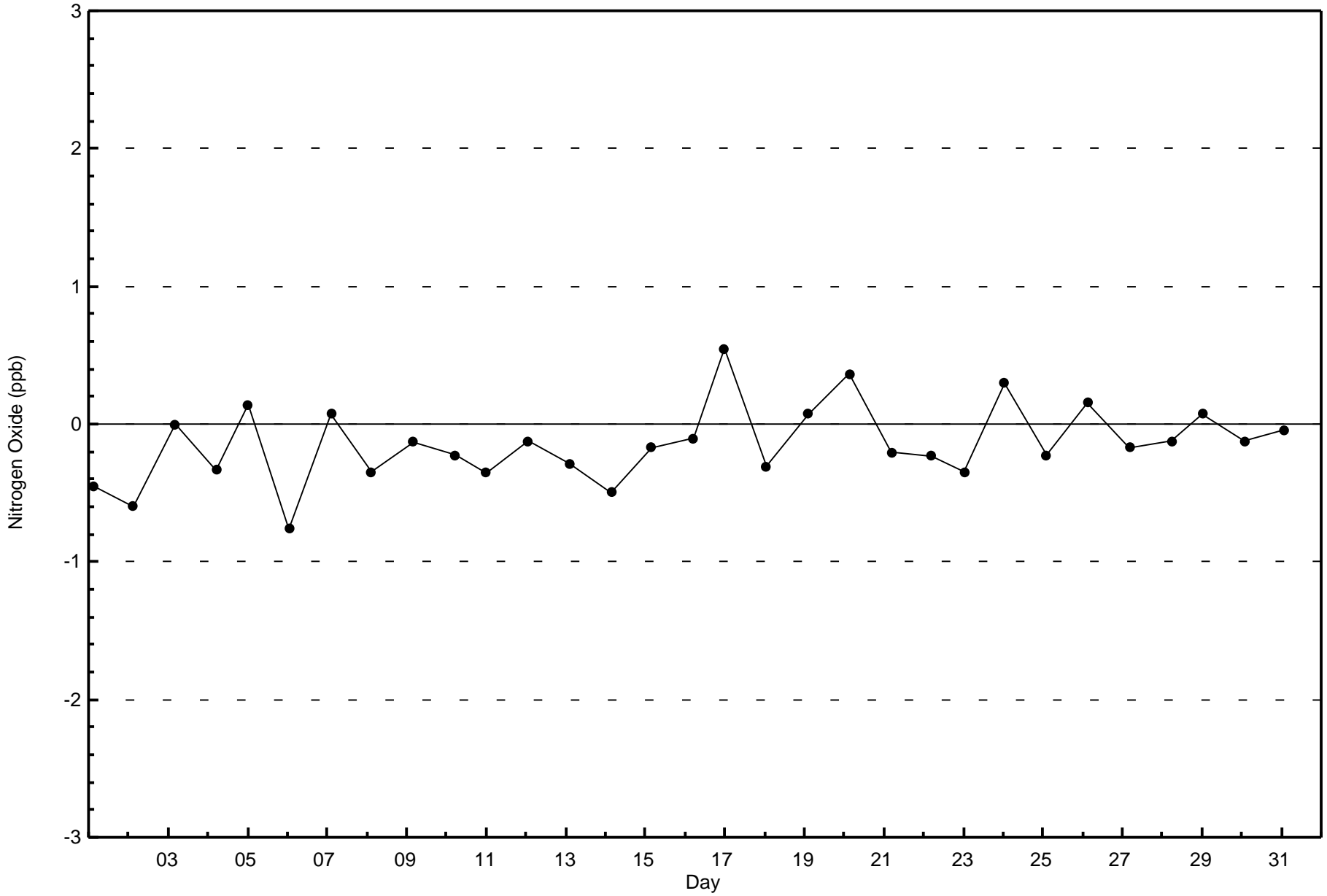
Total Number of Hours: 744

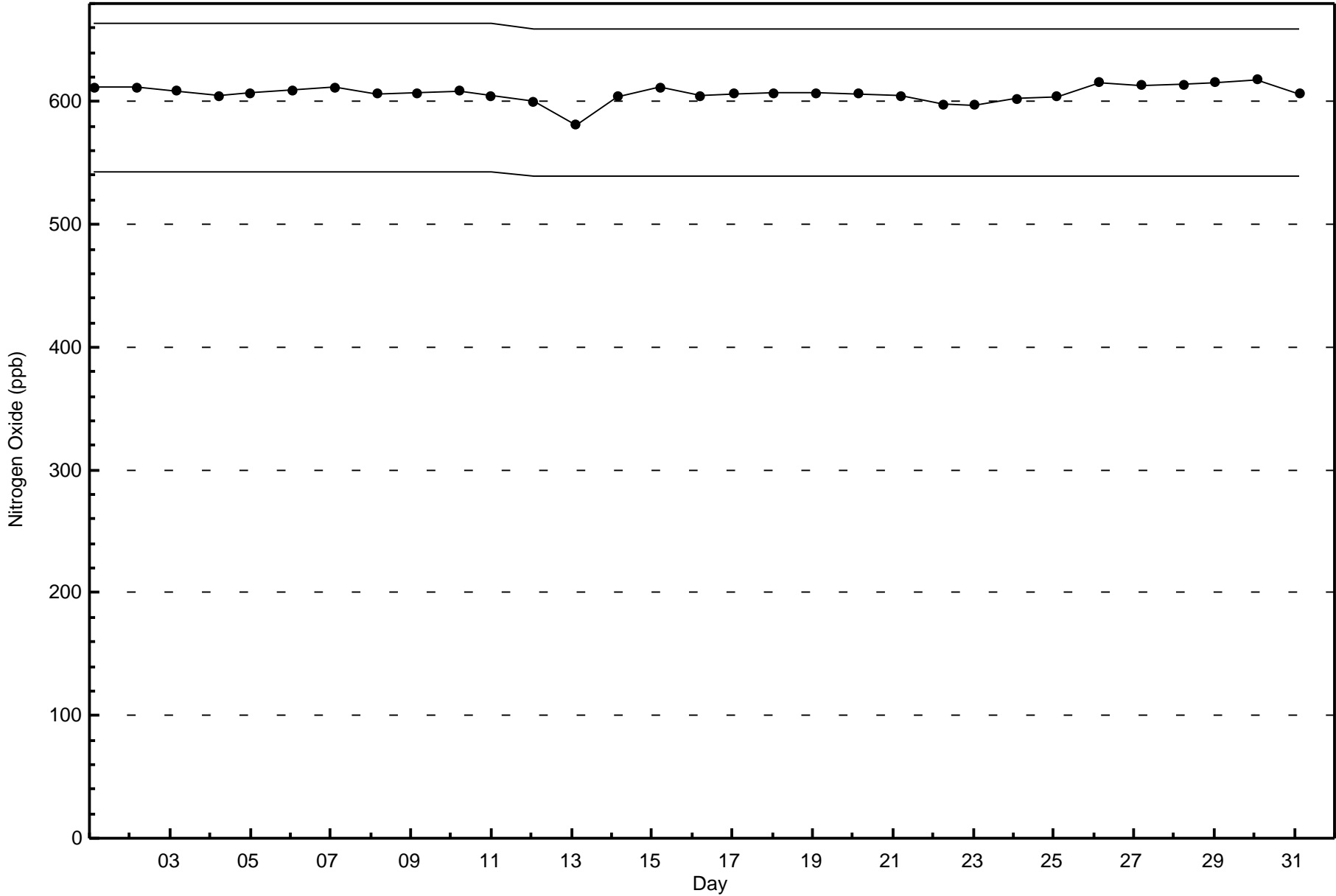


Wood Buffalo Environmental Association
Wind Rose 2012-2017

Nitrogen Oxide (NO) - ppb
Cenovus - Christina Lake (AMS500)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Cenovus - Christina Lake - January 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 35 ppb on Jan 6 18:00	Maximum Daily Average: 16.0 ppb on Jan 6		Hours of Data:	708
Minimum Value: 0 ppb on Jan 5 21:00	Minimum Daily Average: 2.0 ppb on Jan 22		Hours of Missing Data:	36
Maximum Diurnal Average: 8.2 ppb at hour 7	Minimum Diurnal Average: 4.8 ppb at hour 13		Hours of Calibration:	36
Monthly Average: 6.4 ppb	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 5 Q ₃ = 8 P ₉₀ = 14 P ₉₉ = 23		Percent Operational Time:	100.0

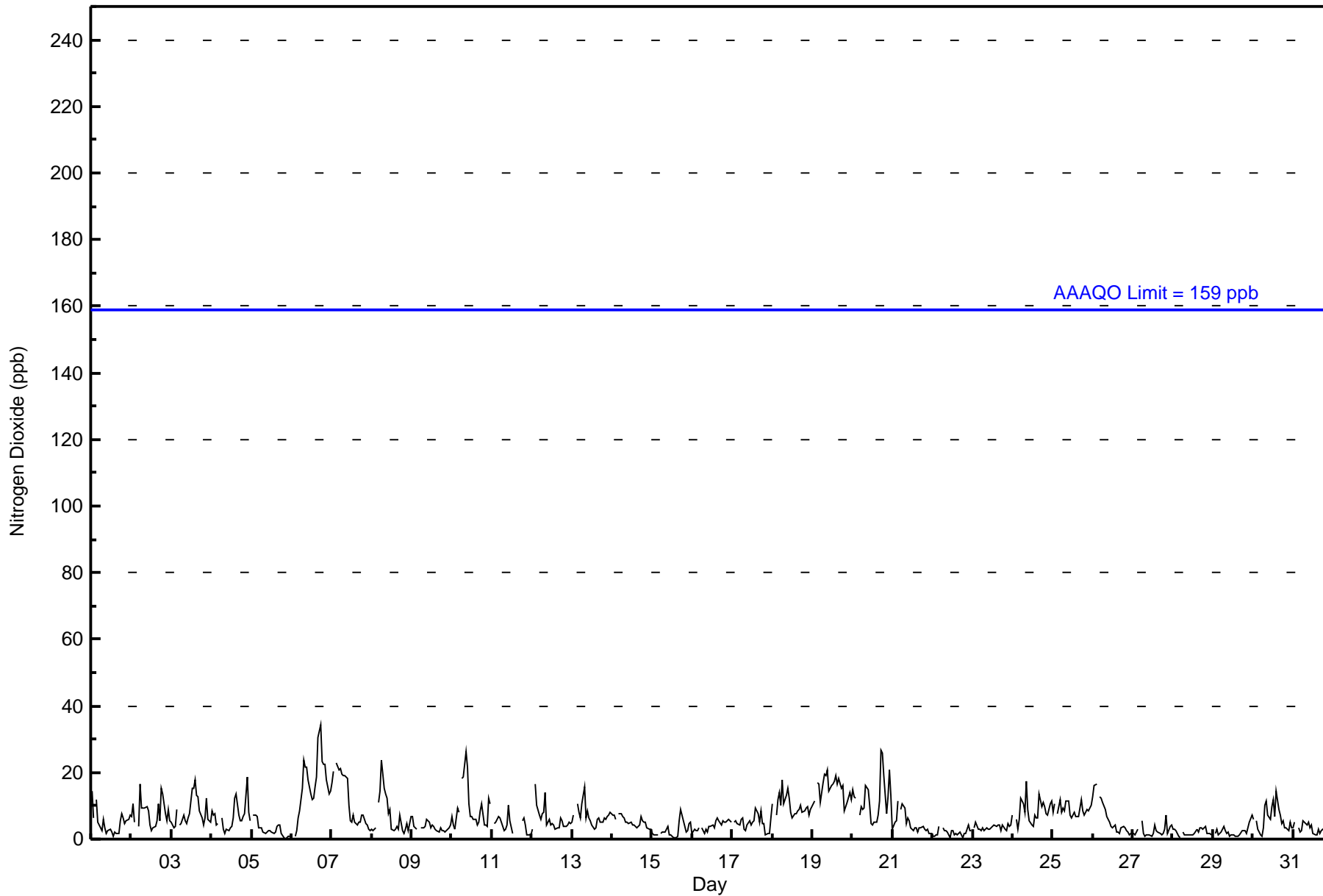
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Jan	14	6	Z	12	5	3	3	6	3	2	3	3	2	1	2	2	2	6	8	6	5	5	6	7	4.8	14
2-Jan	7	11	5	Z	4	17	9	9	9	10	9	4	3	3	4	6	11	6	15	14	8	6	9	6	7.9	17
3-Jan	5	4	4	9	Z	4	5	7	5	5	6	8	15	15	18	13	13	8	6	4	6	12	6	5	8.0	18
4-Jan	8	7	8	4	5	Z	7	3	2	3	3	3	4	6	12	14	7	6	6	7	8	19	8	6	6.7	19
5-Jan	Z	7	7	7	3	4	3	2	2	2	3	3	2	2	2	4	4	4	2	0	0	0	1	1	2.8	7
6-Jan	1	Z	1	3	6	8	15	24	22	22	18	13	12	12	16	19	30	35	23	23	23	18	13	14	16.0	35
7-Jan	17	20	Z	23	21	21	19	19	19	18	10	6	5	7	5	4	5	5	7	7	5	4	3	2	11.0	23
8-Jan	3	3	3	Z	11	14	24	15	14	12	8	9	3	3	3	4	3	7	3	2	3	5	3	7	6.9	24
9-Jan	7	4	3	3	Z	4	4	3	4	6	5	3	4	4	3	3	2	4	3	3	2	3	3	4	3.6	7
10-Jan	7	4	3	10	8	Z	18	19	26	22	10	7	7	6	6	4	5	9	11	4	4	4	12	10	9.4	26
11-Jan	Z	5	5	6	7	6	4	3	3	4	10	6	2	C	C	C	C	C	6	6	4	1	1	1	4.4	10
12-Jan	3	Z	17	10	7	6	8	8	14	4	6	4	5	4	3	3	3	6	6	4	4	4	5	5	6.1	17
13-Jan	5	7	Z	11	8	6	11	16	6	9	6	5	4	3	3	6	6	5	5	6	6	7	7	8	6.8	16
14-Jan	7	7	6	Z	8	8	7	7	5	5	5	4	4	4	3	4	7	6	5	5	3	3	3	3	5.2	8
15-Jan	2	1	1	1	Z	2	2	2	2	4	1	1	1	1	1	1	6	9	7	6	2	2	5	5	2.8	9
16-Jan	2	3	3	2	4	Z	4	2	3	2	4	4	4	4	6	6	6	4	6	5	5	6	6	5	4.1	6
17-Jan	Z	5	5	5	4	6	7	3	2	4	5	4	5	5	9	8	5	8	5	5	1	2	2	7	4.9	9
18-Jan	10	Z	7	12	14	10	18	11	13	15	12	8	6	8	8	9	9	10	8	9	10	10	7	9	10.1	18
19-Jan	11	11	Z	17	17	11	17	19	19	21	15	16	16	17	19	17	18	15	16	9	10	11	14	12	15.1	21
20-Jan	15	13	12	Z	7	10	9	9	16	15	10	5	4	5	5	7	12	27	26	19	8	13	21	13	12.1	27
21-Jan	3	5	5	12	Z	9	10	9	5	6	6	3	3	4	4	2	3	3	4	3	3	3	2	2	4.7	12
22-Jan	1	1	1	1	4	Z	3	2	3	2	1	3	3	1	2	1	2	1	0	2	2	4	3	2	2.0	4
23-Jan	Z	4	5	3	3	3	3	3	4	3	3	3	4	4	4	4	3	4	3	3	5	4	4	4	3.5	5
24-Jan	7	Z	6	3	6	12	10	8	17	9	5	4	4	7	6	6	13	10	11	10	8	7	11	12	8.4	17
25-Jan	8	11	Z	8	12	8	9	8	12	11	7	6	7	8	7	7	10	12	8	7	9	8	9	10	8.8	12
26-Jan	13	16	17	Z	13	12	11	9	7	6	5	4	3	4	2	2	2	3	4	4	3	2	1	2	6.3	17
27-Jan	2	1	2	3	Z	6	2	1	1	1	1	1	2	4	3	2	2	1	2	3	7	2	4	4	2.5	7
28-Jan	3	3	3	1	0	Z	2	1	1	1	1	1	1	2	3	2	3	3	3	4	2	2	2	1	2.0	4
29-Jan	Z	2	3	1	2	2	4	3	2	2	1	1	1	1	1	1	1	2	3	2	2	3	5	7	2.2	7
30-Jan	6	Z	5	3	1	1	3	10	11	7	6	10	12	7	14	9	7	5	6	4	4	3	5	3	6.1	14
31-Jan	3	5	Z	3	2	2	5	5	4	5	4	4	2	1	1	3	2	3	3	2	6	13	6	4	3.9	13

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



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Cenovus - Christina Lake - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
Cenovus - Christina Lake - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	690	97.46	97.46
21 - 40	18	2.54	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 (NO₂) - ppb
Cenovus - Christina Lake - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	61	36	10	5	13	10	18	32	68	96	101	124	34	21	29	26	684
21 - 40	0	0	1	0	2	3	2	3	5	1	0	0	0	0	1	0	18
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
Totals	61	36	11	5	15	13	20	35	73	97	101	124	34	21	30	26	702

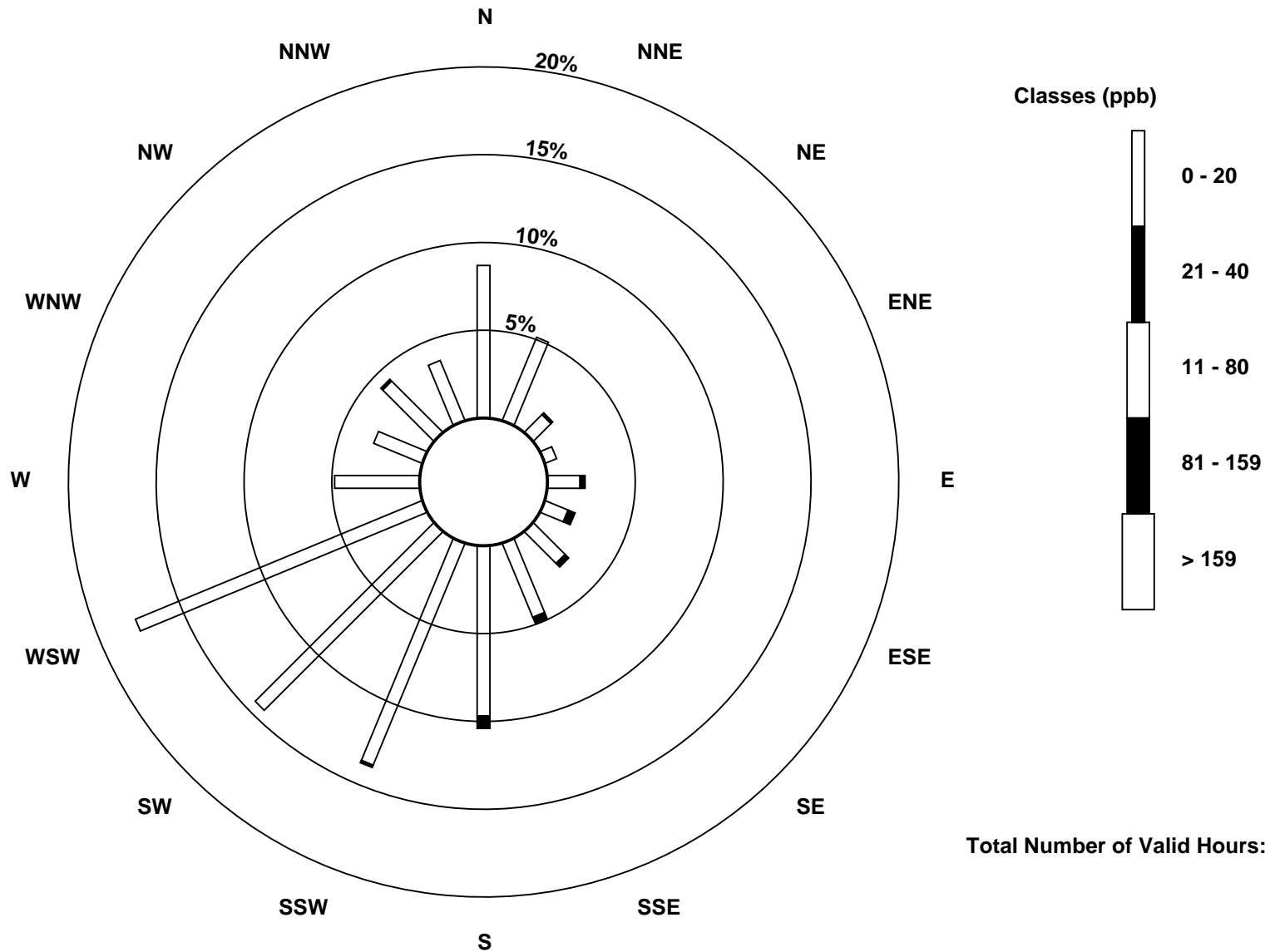
Total Number of Valid Hours: 702

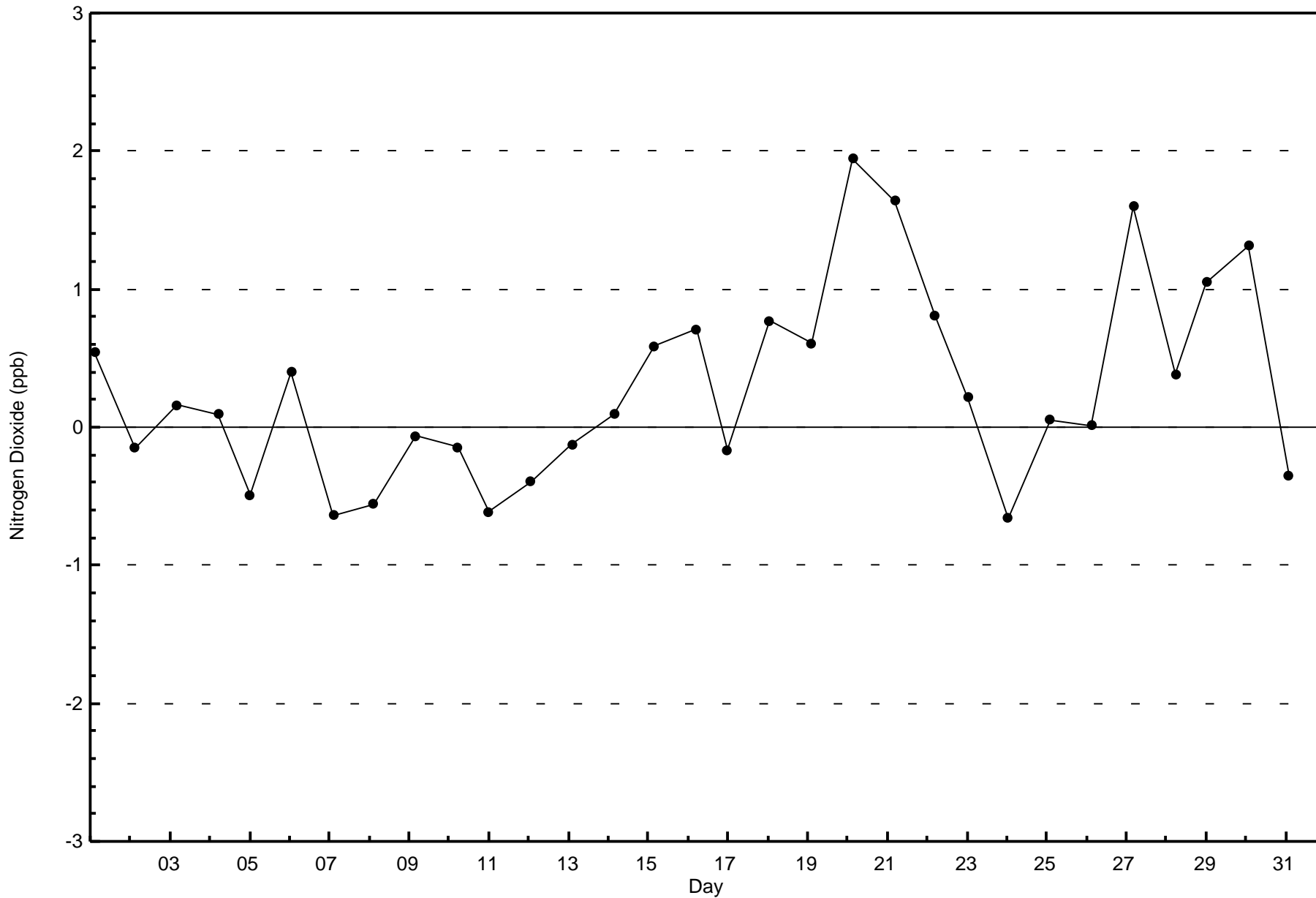
Total Number of Hours: 744

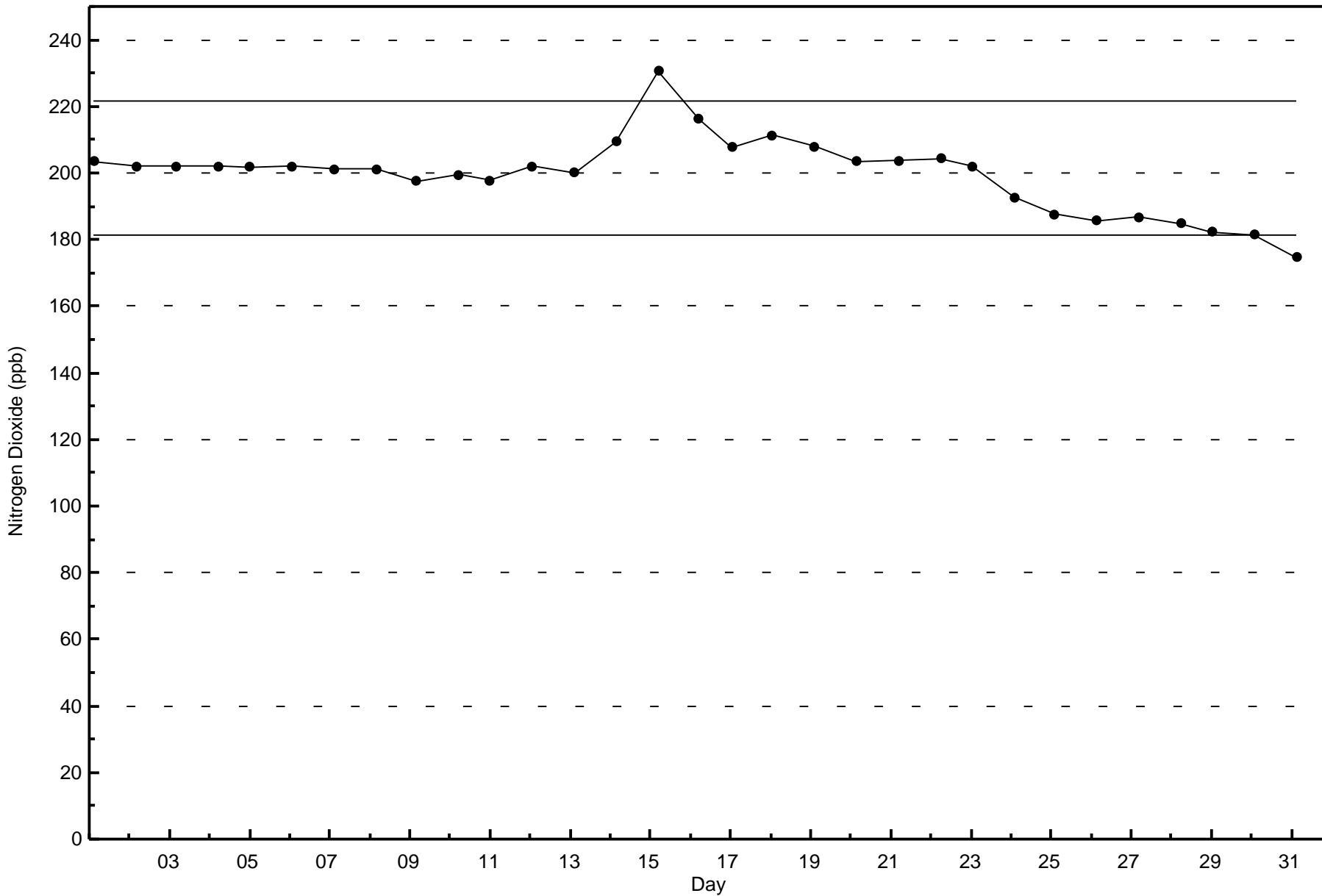


Wood Buffalo Environmental Association
Wind Rose 2012-2017

Nitrogen Dioxide (NO₂) - ppb
Cenovus - Christina Lake (AMS500)







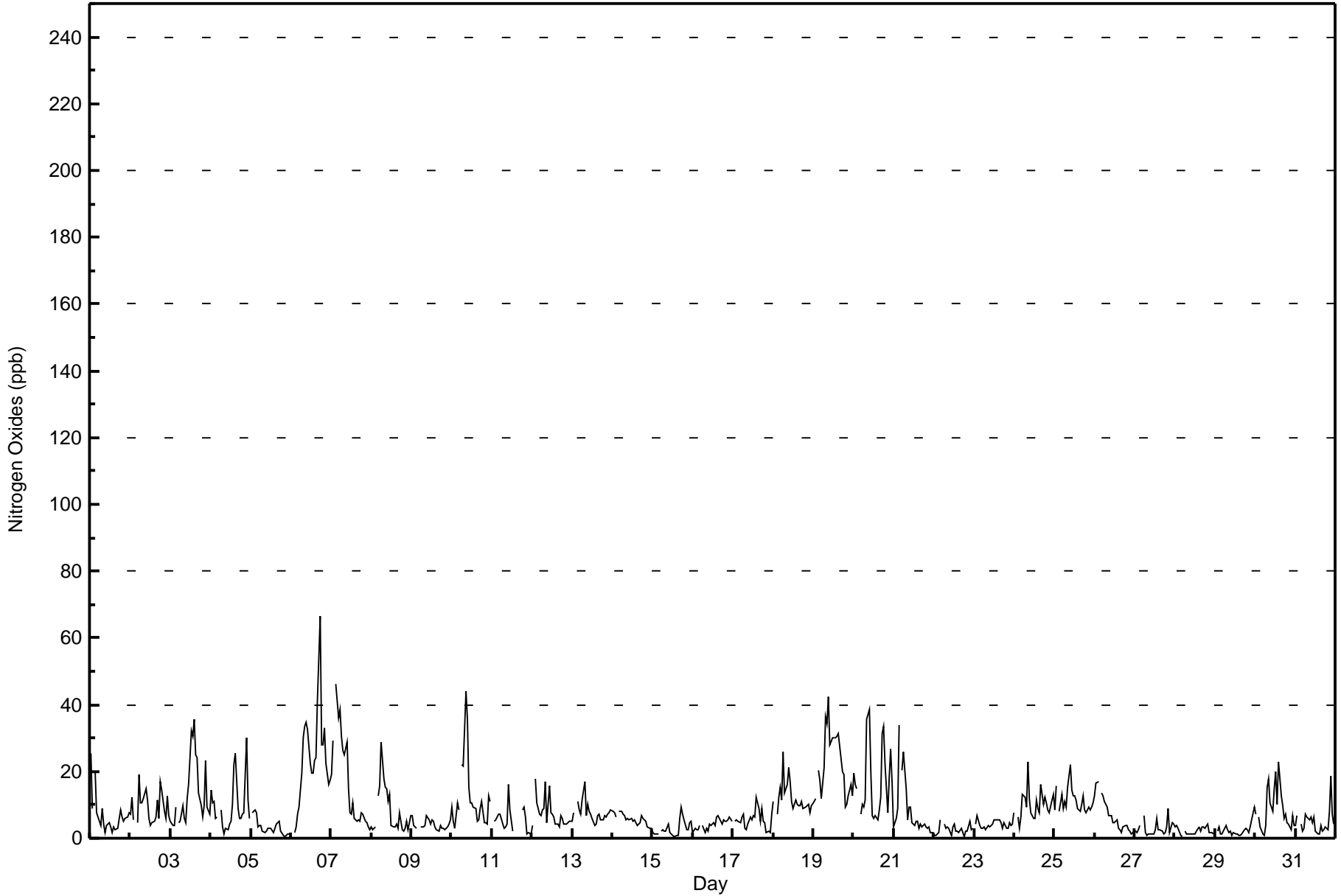


Maximum Value: 67 ppb on Jan 6 18:00																	Maximum Daily Average: 23.2 ppb on Jan 6																	Hours in Service: 744			
Minimum Value: 0 ppb on Jan 28 05:00																	Minimum Daily Average: 2.1 ppb on Jan 28																	Hours of Data: 708			
Maximum Diurnal Average: 11.8 ppb at hour 10																	Minimum Diurnal Average: 6.2 ppb at hour 21																	Hours of Missing Data: 36			
Monthly Average: 8.4 ppb																	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 6 Q ₃ = 10 P ₉₀ = 19 P ₉₉ = 38																	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-Jan	26	9	Z	20	8	5	4	9	4	2	4	5	3	2	3	3	3	6	8	6	5	6	6	8	6.7	26											
2-Jan	7	12	6	Z	5	19	11	10	12	15	11	6	4	5	5	6	11	6	17	14	8	6	13	7	9.4	19											
3-Jan	5	4	4	9	Z	5	5	10	6	5	12	16	32	30	36	25	24	14	10	6	10	23	9	7	13.3	36											
4-Jan	14	10	11	6	6	Z	8	4	1	3	3	4	5	10	22	25	9	6	6	7	8	30	12	6	9.4	30											
5-Jan	Z	7	9	8	4	4	4	2	2	2	3	3	3	2	3	4	5	5	2	1	1	1	1	1	3.3	9											
6-Jan	1	Z	2	4	7	9	19	30	34	35	33	23	20	19	23	24	41	67	28	28	33	22	16	17	23.2	67											
7-Jan	19	29	Z	46	36	39	31	26	25	29	15	8	7	11	6	5	5	5	7	7	5	5	3	3	16.2	46											
8-Jan	3	3	4	Z	13	16	29	18	15	15	11	13	4	3	3	4	3	8	3	2	3	5	2	7	8.1	29											
9-Jan	7	4	3	3	Z	4	3	4	4	7	6	4	6	5	4	3	2	4	3	3	3	4	4	6	4.1	7											
10-Jan	9	5	3	10	8	Z	22	22	44	36	15	11	11	9	9	5	5	9	11	5	5	4	13	11	12.3	44											
11-Jan	Z	5	6	6	7	7	4	3	3	4	16	8	2	C	C	C	C	C	9	9	6	1	2	1	5.6	16											
12-Jan	4	Z	18	10	7	7	9	9	17	5	16	8	7	6	4	4	3	7	6	4	4	5	5	5	7.3	18											
13-Jan	5	8	Z	11	8	7	11	17	7	10	8	7	6	4	4	7	7	6	6	7	6	7	7	8	7.6	17											
14-Jan	8	8	6	Z	8	8	7	7	5	6	5	6	5	5	5	4	5	7	6	5	5	3	3	3	5.7	8											
15-Jan	2	1	1	1	Z	2	2	2	2	4	2	1	1	1	1	1	6	9	7	6	2	2	5	5	2.9	9											
16-Jan	2	3	3	2	4	Z	4	2	3	2	4	4	5	4	6	7	6	4	6	5	5	6	6	5	4.2	7											
17-Jan	Z	5	6	5	4	6	7	3	3	4	6	5	7	7	12	9	5	9	5	5	2	2	2	7	5.5	12											
18-Jan	11	Z	7	12	15	12	26	14	16	21	17	11	9	11	10	10	10	11	9	9	10	10	8	10	12.1	26											
19-Jan	11	12	Z	20	18	12	21	37	35	42	28	30	30	30	31	31	27	20	19	9	10	13	16	13	22.4	42											
20-Jan	20	16	15	Z	7	10	9	12	35	38	20	7	6	7	5	8	12	31	34	23	8	18	27	17	16.7	38											
21-Jan	3	6	9	34	Z	20	26	15	6	9	9	5	4	5	5	3	4	4	4	3	3	3	2	2	8.0	34											
22-Jan	1	1	1	2	5	Z	4	3	3	3	1	3	4	2	2	2	3	2	1	2	2	5	3	3	2.5	5											
23-Jan	Z	4	7	4	3	3	3	3	4	4	4	4	6	6	5	5	5	3	4	3	3	5	4	4	4.2	7											
24-Jan	7	Z	6	3	6	13	12	9	23	12	8	6	6	11	9	7	16	10	12	11	8	8	12	13	10.0	23											
25-Jan	9	16	Z	8	13	9	11	9	15	22	14	13	13	12	9	8	10	13	9	7	9	8	9	11	11.2	22											
26-Jan	13	17	17	Z	14	13	11	9	7	7	7	5	4	6	3	3	2	3	4	4	3	2	1	1	6.7	17											
27-Jan	2	2	2	4	Z	7	2	1	1	1	1	1	2	6	3	2	2	1	2	3	9	1	4	4	2.8	9											
28-Jan	3	4	3	1	0	Z	2	1	1	1	1	1	1	2	3	2	3	4	3	4	2	2	2	1	2.1	4											
29-Jan	Z	2	3	1	1	2	4	2	2	2	1	2	1	1	1	1	1	2	3	2	2	3	6	9	2.4	9											
30-Jan	7	Z	6	3	1	1	4	15	18	11	8	15	20	10	23	13	10	6	7	5	4	3	7	4	8.7	23											
31-Jan	4	7	Z	4	2	3	7	6	5	6	5	6	2	1	1	4	2	3	3	2	8	19	7	4	4.9	19											
7.8 7.7 6.3 9.2 8.2 9.3 10.4 10.1 11.6 11.8 9.5 7.8 7.6 7.8 8.6 7.9 8.3 9.4 8.1 6.7 6.2 7.5 7.0 6.6																								Diurnal Average													
26 29 18 46 36 39 31 37 44 42 33 30 32 30 36 31 41 67 34 28 33 30 27 17																								Diurnal Maximum													
Z - zerospan C - Calibration																																					



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Cenovus - Christina Lake - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Cenovus - Christina Lake - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	648	91.53	91.53
21 - 40	55	7.77	99.29
41 - 80	5	0.71	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
Cenovus - Christina Lake - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	59	35	7	2	9	6	15	28	64	94	101	116	34	19	28	26	643
21 - 40	2	1	4	3	5	5	5	7	8	2	0	8	0	2	2	0	54
11 - 80	0	0	0	0	1	2	0	0	1	1	0	0	0	0	0	0	5
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	61	36	11	5	15	13	20	35	73	97	101	124	34	21	30	26	702

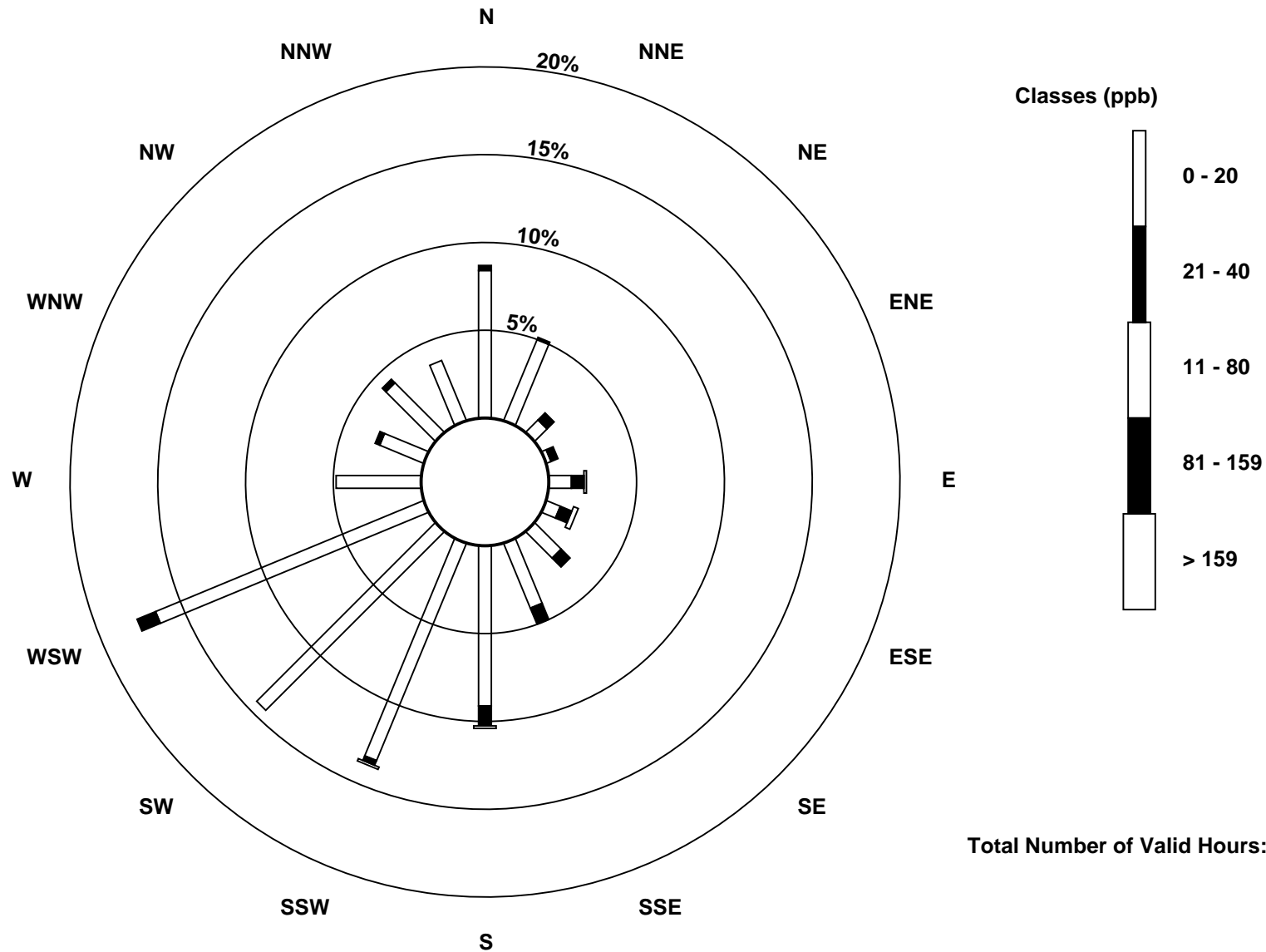
Total Number of Valid Hours: 702

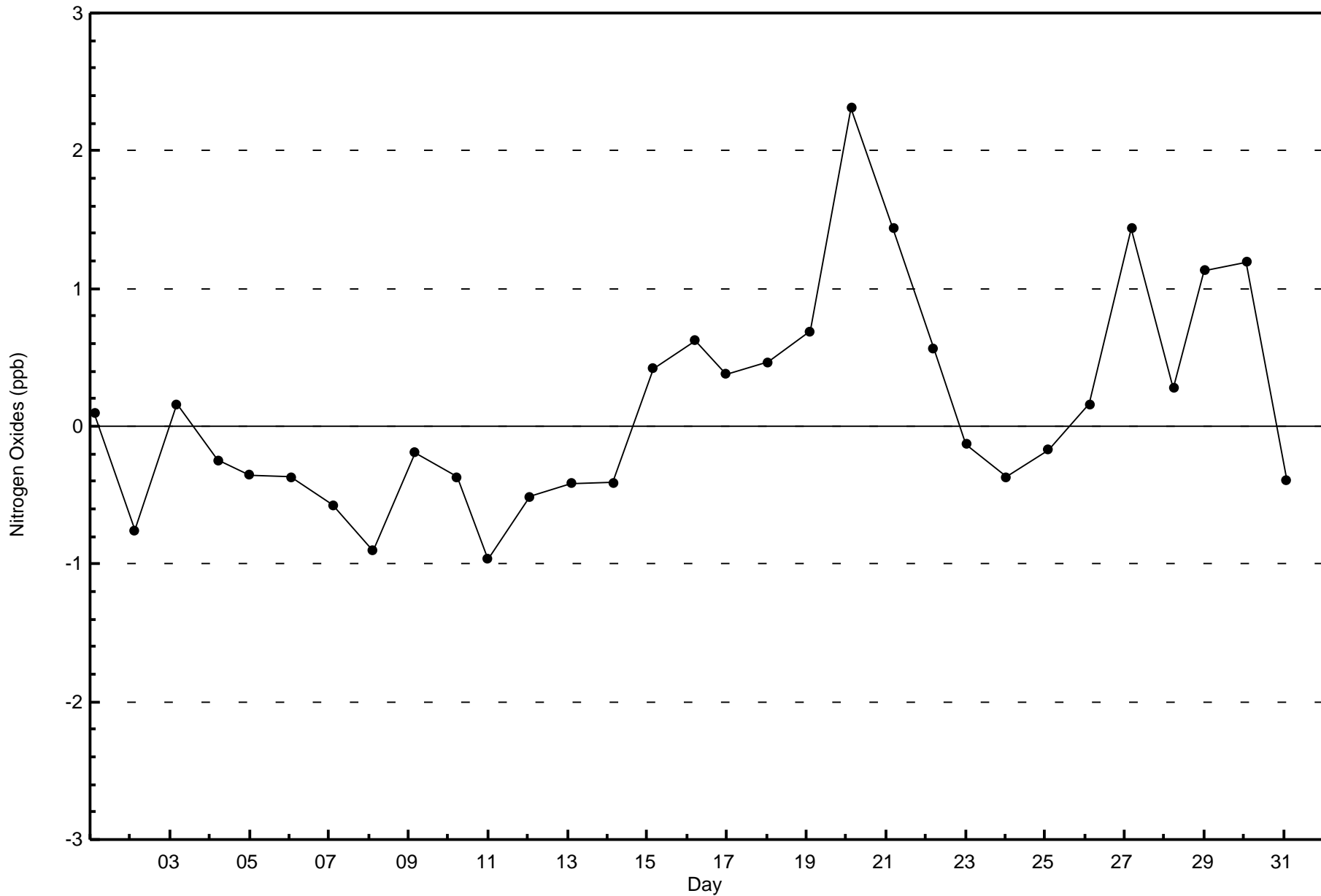
Total Number of Hours: 744

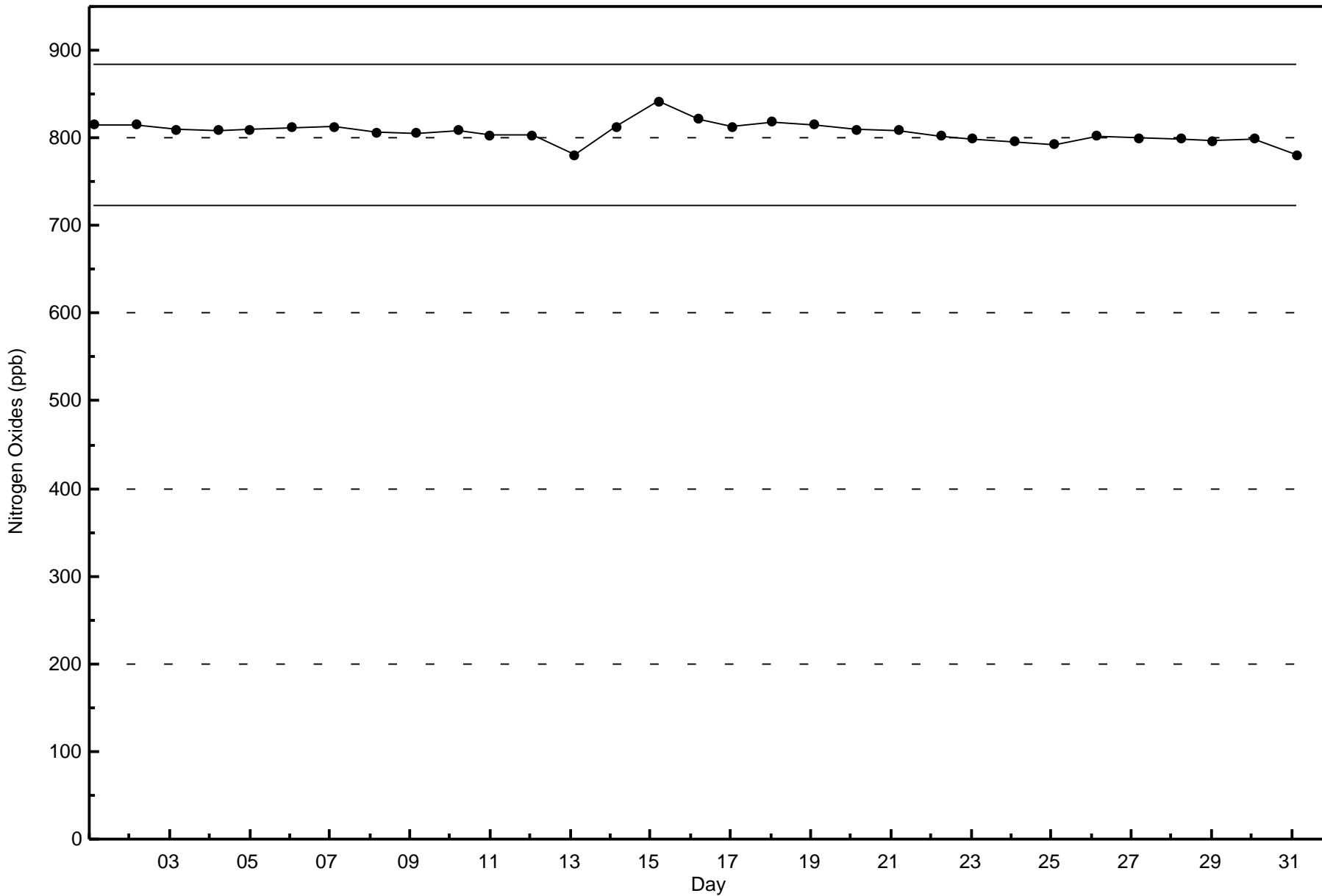


Wood Buffalo Environmental Association
Wind Rose 2012-2017

Nitrogen Oxides (NO_x) - ppb
Cenovus - Christina Lake (AMS500)





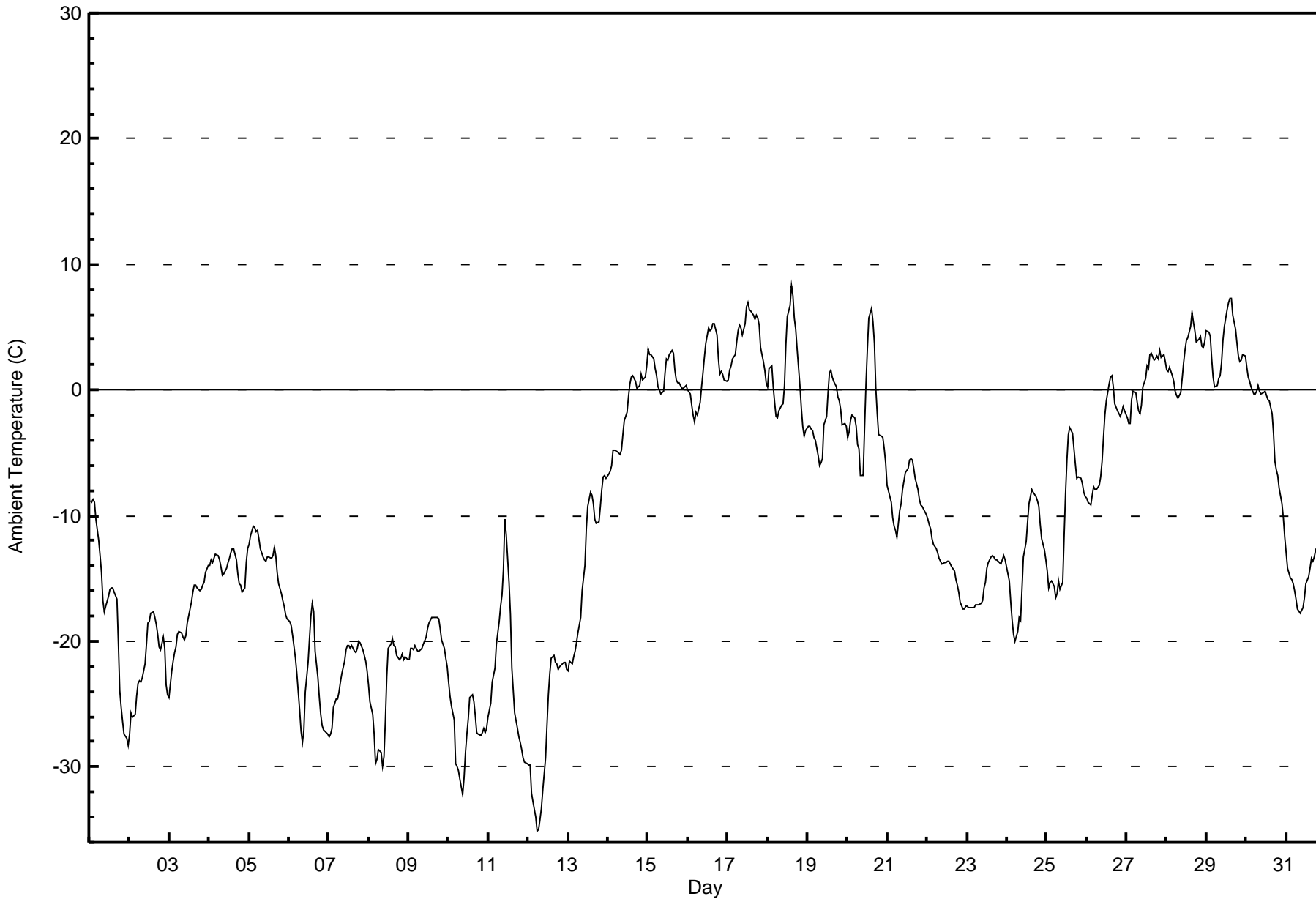




Wood Buffalo Environmental Association
Summary of Hour Averages

Ambient Temperature (AT) - C
Cenovus - Christina Lake - January 2017

Maximum Value: 8.3 C on Jan 18 15:00		Maximum Daily Average: 4.2 C on Jan 17		Hours in Service: 744																						
Minimum Value: -35.1 C on Jan 12 06:00		Minimum Daily Average: -27.3 C on Jan 10		Hours of Data: 744																						
Maximum Diurnal Average: -7.7 C at hour 15		Minimum Diurnal Average: -12.9 C at hour 9		Hours of Missing Data: 0																						
Monthly Average: -10.87 C		Percentiles: P₁ = -32.1 P₁₀ = -24.6 Q₁ = -19.5 Median = -12.6 Q₃ = -0.6 P₉₀ = 2.7 P₉₉ = 6.5		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-Jan	-8.8	-8.9	-8.7	-8.9	-10.3	-11.9	-13.2	-14.5	-16.8	-17.7	-17.2	-16.4	-15.9	-15.7	-15.7	-16.1	-16.6	-20.1	-23.9	-25.3	-26.4	-27.4	-27.8	-28.3	-17.2	-8.7
2-Jan	-27.4	-25.7	-26.1	-25.8	-24.3	-23.4	-23.1	-23.2	-22.9	-21.8	-20.2	-18.6	-18.4	-17.8	-17.6	-18.1	-18.7	-19.4	-20.4	-20.6	-19.7	-20.6	-23.5	-24.2	-21.7	-17.6
3-Jan	-24.5	-22.4	-21.5	-20.9	-20.5	-19.5	-19.3	-19.4	-19.6	-19.9	-19.5	-18.6	-17.4	-16.9	-16.1	-15.5	-15.6	-15.8	-16.0	-15.9	-15.5	-15.3	-14.5	-14.0	-18.1	-14.0
4-Jan	-14.0	-13.5	-13.7	-13.4	-13.0	-13.2	-13.5	-14.1	-14.8	-14.7	-14.2	-13.7	-13.4	-12.9	-12.6	-13.5	-14.6	-15.5	-15.6	-16.0	-16.0	-15.8	-13.7	-12.7	-13.9	-12.6
5-Jan	-12.3	-11.6	-10.8	-11.0	-11.2	-11.1	-11.8	-12.7	-13.3	-13.6	-13.3	-13.3	-13.4	-13.1	-12.5	-13.2	-14.5	-15.4	-16.2	-16.7	-17.2	-17.9	-18.3	-13.7	-10.8	
6-Jan	-18.4	-18.8	-19.5	-20.4	-21.4	-22.6	-25.4	-27.2	-28.0	-27.0	-24.0	-21.7	-19.8	-18.0	-17.0	-17.7	-20.8	-22.9	-24.4	-25.9	-26.7	-27.1	-27.3	-27.4	-22.9	-17.0
7-Jan	-27.6	-27.4	-27.0	-25.3	-24.6	-24.6	-24.0	-23.2	-22.5	-21.6	-20.7	-20.3	-20.4	-20.5	-20.3	-20.8	-20.9	-20.6	-20.0	-20.2	-20.7	-21.2	-21.6	-22.3	-22.4	-20.0
8-Jan	-23.5	-24.8	-25.8	-27.4	-29.7	-29.4	-28.6	-28.8	-29.9	-29.2	-26.3	-22.8	-20.5	-20.2	-19.8	-20.3	-20.5	-21.1	-21.5	-21.3	-21.0	-21.4	-21.2	-21.4	-24.0	-19.8
9-Jan	-21.5	-20.6	-20.6	-20.7	-20.4	-20.8	-20.8	-20.7	-20.6	-20.2	-19.6	-18.9	-18.5	-18.3	-18.2	-18.1	-18.2	-18.2	-18.2	-19.0	-19.9	-20.5	-21.4	-22.0	-19.8	-18.1
10-Jan	-23.2	-24.4	-25.2	-26.3	-29.7	-29.9	-30.3	-31.0	-32.2	-30.9	-28.8	-27.4	-26.2	-24.5	-24.3	-24.8	-25.9	-27.3	-27.4	-27.5	-27.3	-26.9	-27.3	-27.0	-27.3	-23.2
11-Jan	-26.1	-24.9	-23.2	-22.7	-22.2	-20.2	-18.5	-17.2	-16.3	-14.3	-10.3	-11.6	-15.3	-17.8	-22.1	-23.9	-25.7	-27.0	-27.6	-28.0	-28.6	-29.3	-29.6	-29.8	-22.2	-10.3
12-Jan	-29.9	-29.9	-32.1	-32.8	-34.0	-35.1	-35.0	-34.2	-33.3	-31.9	-29.3	-26.7	-24.2	-22.6	-21.4	-21.1	-21.7	-21.8	-22.2	-22.0	-21.8	-21.7	-21.7	-22.2	-27.0	-21.1
13-Jan	-22.4	-21.6	-21.8	-21.2	-20.7	-20.1	-19.4	-18.2	-16.0	-15.0	-13.9	-11.1	-9.3	-8.1	-8.4	-9.0	-10.2	-10.6	-10.5	-9.2	-7.9	-6.9	-6.8	-7.0	-13.6	-6.8
14-Jan	-6.6	-6.5	-6.0	-4.8	-4.8	-4.9	-5.0	-5.2	-4.7	-3.6	-2.5	-1.7	-0.5	0.4	1.1	1.1	0.7	0.1	0.2	0.4	1.2	0.8	1.1	2.0	-2.0	2.0
15-Jan	3.2	2.8	2.8	2.5	1.7	1.1	0.3	0.1	-0.4	-0.1	1.4	2.4	2.3	2.8	3.2	2.9	1.5	0.8	0.6	0.6	0.1	0.1	0.2	0.4	1.4	3.2
16-Jan	0.1	-0.4	-1.2	-2.0	-2.6	-1.8	-2.0	-1.0	0.3	1.4	2.5	3.7	4.9	4.7	4.9	5.3	5.3	4.3	2.5	1.2	1.4	1.3	0.8	0.7	1.4	5.3
17-Jan	0.8	1.6	1.9	2.5	2.8	3.8	4.8	5.1	5.0	4.4	5.2	6.6	7.0	6.3	6.3	5.9	5.6	6.0	5.8	5.2	3.4	2.3	1.6	0.6	4.2	7.0
18-Jan	0.2	1.7	2.0	0.2	-1.0	-2.1	-2.3	-1.7	-1.2	-1.1	0.4	3.6	5.9	6.7	8.3	7.5	5.7	4.8	3.2	0.3	-1.4	-2.9	-3.7	-3.2	1.2	8.3
19-Jan	-2.8	-2.9	-3.1	-3.2	-3.8	-4.0	-5.2	-6.0	-5.8	-5.5	-2.8	-2.1	-0.3	1.3	1.5	1.1	0.7	0.2	-0.6	-0.9	-1.5	-2.8	-2.7	-2.8	-2.3	1.5
20-Jan	-3.8	-3.3	-2.4	-2.0	-2.2	-2.9	-4.3	-4.7	-6.8	-6.8	-3.0	0.4	3.2	5.7	6.5	5.4	3.7	0.2	-1.8	-3.6	-3.7	-3.8	-4.6	-5.8	-1.7	6.5
21-Jan	-7.6	-8.4	-9.0	-10.1	-10.9	-11.2	-11.7	-9.7	-9.0	-7.9	-7.3	-6.6	-6.2	-5.6	-5.5	-5.6	-6.2	-7.1	-7.9	-8.7	-9.2	-9.3	-9.5	-10.0	-8.3	-5.5
22-Jan	-10.3	-10.7	-11.1	-11.8	-12.3	-12.7	-13.0	-13.4	-13.6	-13.8	-13.7	-13.7	-13.6	-13.7	-13.8	-14.1	-14.4	-15.0	-15.6	-16.1	-16.9	-17.4	-17.4	-17.3	-14.0	-10.3
23-Jan	-17.2	-17.3	-17.3	-17.4	-17.3	-17.1	-17.1	-17.0	-17.0	-16.7	-15.8	-15.3	-14.2	-13.8	-13.3	-13.2	-13.3	-13.5	-13.5	-13.7	-13.9	-13.5	-13.2	-13.5	-15.2	-13.2
24-Jan	-14.0	-15.2	-16.8	-18.4	-19.5	-20.0	-19.2	-18.1	-18.3	-15.9	-13.3	-12.0	-10.5	-9.1	-8.4	-8.0	-8.2	-8.5	-8.9	-9.2	-10.7	-11.8	-12.7	-13.5	-13.3	-8.0
25-Jan	-14.4	-15.7	-15.3	-15.2	-15.7	-16.6	-16.2	-15.2	-15.9	-15.4	-11.6	-8.2	-5.6	-3.6	-3.0	-3.5	-4.7	-6.0	-7.0	-7.0	-7.0	-7.5	-8.2	-8.4	-10.3	-3.0
26-Jan	-8.6	-8.9	-9.1	-8.3	-7.7	-8.0	-7.9	-7.5	-6.9	-5.7	-3.8	-2.0	-0.9	0.5	1.1	1.1	0.2	-1.1	-1.6	-1.9	-2.1	-1.7	-1.3	-1.7	-3.9	1.1
27-Jan	-2.2	-2.6	-2.7	-0.7	-0.1	-0.2	-1.0	-1.6	-1.9	-1.2	0.3	0.9	1.9	1.7	2.8	2.9	2.4	2.5	2.7	2.4	3.1	2.5	2.9	2.2	0.7	3.1
28-Jan	1.6	1.5	1.8	1.2	0.6	-0.1	-0.4	-0.6	-0.2	0.9	2.2	3.2	4.0	4.2	5.1	6.2	5.4	4.8	3.8	4.0	4.3	3.5	3.3	3.8	2.7	6.2
29-Jan	4.7	4.6	4.3	2.5	1.0	0.2	0.4	1.0	1.1	2.2	3.9	5.0	6.4	7.0	7.3	7.3	6.0	4.8	3.7	2.7	2.2	2.4	2.8	2.7	3.6	7.3
30-Jan	1.9	1.0	0.7	0.3	-0.3	-0.3	-0.1	0.3	-0.1	-0.3	-0.2	-0.1	-0.5	-0.8	-0.8	-1.8	-3.4	-5.7	-6.3	-6.8	-7.8	-9.1	-10.2	-11.7	-2.6	1.9
31-Jan	-12.9	-14.2	-15.0	-15.1	-15.4	-16.0	-16.7	-17.4	-17.8	-17.5	-17.4	-16.5	-15.5	-14.8	-14.2	-13.4	-13.6	-13.3	-12.7	-13.2	-13.0	-12.7	-12.7	-12.2	-14.7	-12.2
																								Diurnal Average		
																								Diurnal Maximum		





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
Cenovus - Christina Lake - January 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	176	23.66	23.66
-20 - 0	401	53.90	77.55
0 - 10	167	22.45	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

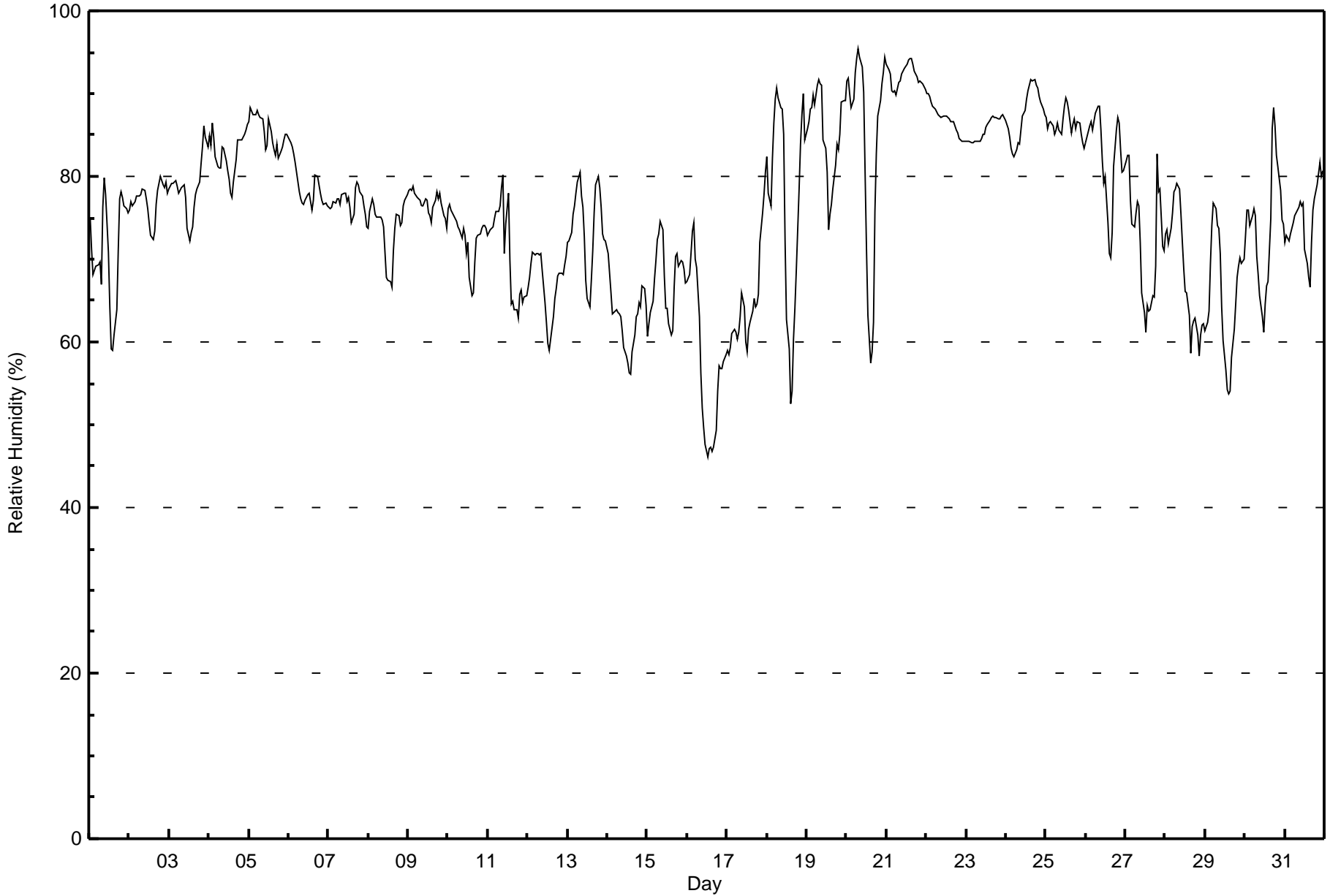


Maximum Value: 95 % on Jan 20 08:00														Maximum Daily Average: 92.1 % on Jan 21														Hours in Service: 744																				
Minimum Value: 46 % on Jan 16 13:00														Minimum Daily Average: 57.8 % on Jan 16														Hours of Data: 744																				
Maximum Diurnal Average: 78.7 % at hour 7														Minimum Diurnal Average: 69.7 % at hour 15														Hours of Missing Data: 0																				
Monthly Average: 76.2 %														Percentiles: P ₁ = 49 P ₁₀ = 63 Q ₁ = 70 Median = 77 Q ₃ = 84 P ₉₀ = 88 P ₉₉ = 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-Jan	75	71	68	69	69	69	70	67	76	80	78	71	64	59	59	61	64	71	77	78	78	76	76	76	70.9	80																						
2-Jan	76	77	77	77	78	78	78	78	78	78	77	76	74	73	72	73	77	78	79	80	79	79	79	78	77.0	80																						
3-Jan	78	79	79	79	79	79	78	79	79	79	77	74	72	73	74	76	78	78	79	81	84	86	85	84	78.8	86																						
4-Jan	85	84	86	85	82	81	81	81	84	83	82	81	80	78	77	79	82	84	84	84	85	86	86	86	82.8	86																						
5-Jan	87	88	87	87	87	88	87	87	87	85	83	84	87	85	84	83	83	84	82	83	84	84	85	85	85.4	88																						
6-Jan	84	84	84	83	82	80	78	77	77	77	77	78	78	77	76	77	80	80	79	78	77	77	76	78.9	84																							
7-Jan	76	76	76	77	77	77	77	77	78	78	78	77	77	76	74	75	79	79	79	78	78	76	75	74	76.9	79																						
8-Jan	74	76	77	77	75	75	75	75	75	74	71	68	68	67	67	71	74	75	75	74	74	76	77	78	73.7	78																						
9-Jan	78	79	78	79	78	77	77	77	77	76	77	77	76	75	74	76	77	78	77	78	77	75	75	74	76.8	79																						
10-Jan	76	77	76	75	75	75	74	74	73	74	73	71	72	68	66	66	70	73	73	73	74	74	74	74	72.7	77																						
11-Jan	73	73	74	74	75	76	76	76	79	80	71	74	78	70	65	65	64	64	63	66	66	65	65	66	70.7	80																						
12-Jan	67	68	70	71	71	71	71	71	71	69	65	62	60	59	60	63	65	66	68	68	68	68	69	70	67.1	71																						
13-Jan	72	72	73	75	76	78	79	81	78	76	73	67	65	64	67	71	76	79	80	79	76	73	72	72	74.0	81																						
14-Jan	71	68	66	63	64	64	64	63	63	61	59	58	57	56	59	61	63	63	65	64	67	66	64	62.8	71																							
15-Jan	61	62	63	65	68	70	72	73	75	74	68	64	64	62	61	61	67	70	71	69	70	70	69	67	67.3	75																						
16-Jan	67	68	71	73	74	70	69	63	56	52	50	48	46	47	47	47	49	54	57	57	57	58	58	57.8	74																							
17-Jan	59	58	59	61	62	61	60	61	63	66	64	60	59	62	62	64	65	64	65	66	72	76	78	81	64.5	81																						
18-Jan	82	78	76	82	86	89	91	89	88	88	85	72	63	59	53	54	60	64	69	79	84	87	90	84	77.3	91																						
19-Jan	86	87	88	88	90	89	91	92	91	91	84	83	80	74	75	77	79	81	84	83	85	89	89	89	85.2	92																						
20-Jan	92	92	90	88	89	93	94	95	94	93	90	80	71	63	57	59	62	76	83	87	89	91	93	94	84.1	95																						
21-Jan	94	93	92	90	90	90	90	91	91	92	93	93	94	94	94	94	94	93	92	91	91	91	91	90	92.1	94																						
22-Jan	90	90	90	89	88	88	88	88	87	87	87	87	87	87	87	87	87	86	86	85	85	84	84	84	87.0	90																						
23-Jan	84	84	84	84	84	84	84	84	84	85	85	85	86	86	87	87	87	87	87	87	87	87	87	87	85.7	87																						
24-Jan	87	86	85	83	83	82	83	84	84	86	87	88	89	90	91	92	91	92	91	91	90	89	88	87	87.5	92																						
25-Jan	87	86	87	87	86	85	86	86	86	85	87	88	90	89	88	85	86	87	86	87	86	85	84	83	86.3	90																						
26-Jan	84	85	86	87	86	87	88	89	89	86	82	79	80	74	71	70	73	81	86	87	87	83	81	81	82.4	89																						
27-Jan	82	82	82	77	74	74	76	77	76	72	66	64	61	64	64	64	66	65	69	83	78	78	71	71	72.4	83																						
28-Jan	73	73	72	74	76	78	78	79	79	75	72	69	66	66	63	59	62	63	63	61	58	61	62	62	68.5	79																						
29-Jan	61	62	64	69	74	77	76	74	74	71	64	60	57	54	54	54	58	62	65	68	69	70	69	70	65.7	77																						
30-Jan	73	76	76	74	75	76	75	70	68	66	63	61	65	67	67	75	86	88	86	83	81	78	75	74	74.1	88																						
31-Jan	72	73	72	73	74	74	75	76	76	77	76	77	71	69	68	67	72	76	77	79	80	82	80	81	74.9	82																						
																								77.6	77.7	77.7	78.0	78.3	78.6	78.7	78.5	78.5	77.9	75.6	73.5	72.2	70.7	69.7	70.7	73.2	75.4	76.5	77.7	77.8	78.1	77.8	77.5	Diurnal Average
																								94	93	92	90	90	93	94	95	94	93	93	93	94	94	94	94	94	94	92	91	91	91	93	94	Diurnal Maximum



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
Cenovus - Christina Lake - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Cenovus - Christina Lake - January 2017

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	43	5.78	5.78
60 - 80	438	58.87	64.65
80 - 100	263	35.35	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

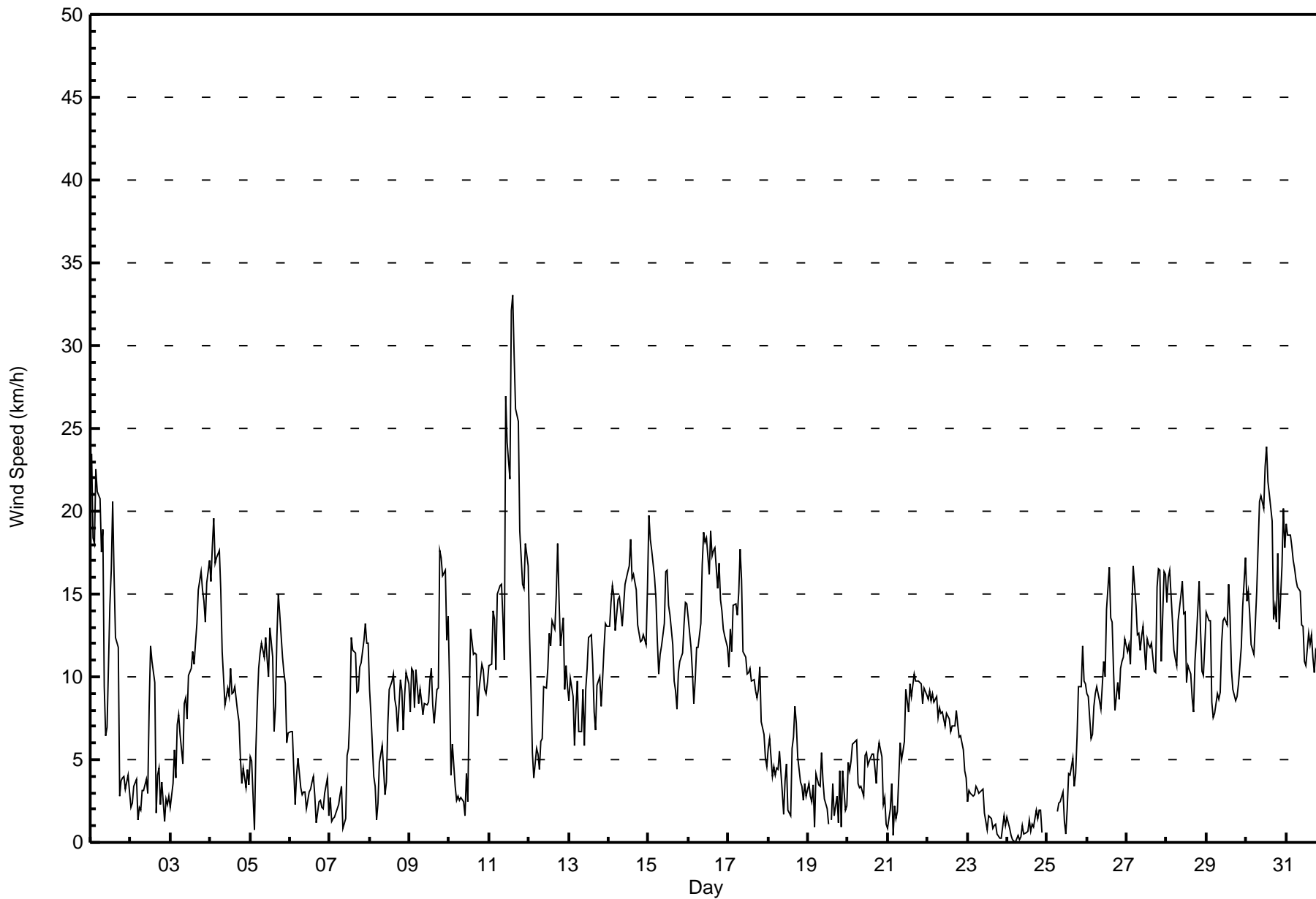


Maximum Speed: 33 km/h on Jan 11 15:00	Maximum Daily Speed Average: 14.6 km/h on Jan 30	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jan 24 06:00	Minimum Daily Speed Average: 0.8 km/h on Jan 24	Hours of Data: 737
Maximum Diurnal Speed Average: 7.3 km/h at hour 14	Minimum Diurnal Speed Average: 3.6 km/h at hour 9	Hours of Missing Data: 7
Monthly Average Velocity: 4.8 km/h 253.5 deg	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 4 Median = 9 Q ₃ = 13 P ₉₀ = 16 P ₉₉ = 23	Percent Operational Time: 99.1

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Jan	WNW23	W18	W18WNW23	NW21	NW21	NNW18	NNW19	NNE9	NE6	NNW7	NW14	NW16	NW21	NW16	NW12	NW12	S3	S4	S4	S4	SSW3	S4	SSW3	NW9.9	WNW23		
2-Jan	SSE2	SSE2	SSW3	S4	S1	SSW2	ESE2	SSE3	S3	SSW4	SW3	WNW8	NW12	NW11	NW10	N2	S4	S4	S2	E4	ESE1	S3	SSW2	S3	SW1.4	NW12	
3-Jan	SSE2	S4	S6	S4	S7	SSW8	SSW7	SW5	SW8	SW9	SW7	WSW10	WSW10	WSW11	WSW11	WSW12	WSW13	W15	W16	WNW15	W15	WSW13	W16	W17	WSW8.7	W17	
4-Jan	W16	W18	NW20	NW17	NNW17	NNW18	NNW15	NNE12	NE10	NE8	NNE9	NNW9	NNW11	W9	WSW9	WSW9	SW8	SSW7	SSW5	SSW4	SE5	SSW3	S4	SE3	NW5.6	NW20	
5-Jan	SE5	S5	S1	N6	N8	N11	N11	N12	NNE11	NNE12	NNE10	NNE13	NNE11	NNE7	N8	N12	NNE15	NNE14	N11	NNE10	N10	N6	NE7	NNE8.5	NNE15		
6-Jan	NNE7	NE7	NE4	E2	SSW4	S5	SSE3	SSE3	S3	S3	E2	E3	S3	S4	SSE4	NE3	S1	SSW2	SSE3	SE2	SSE2	S3	S4	SSE2	SE1.7	NNE7	
7-Jan	S3	ESE1	ESE1	E2	NE2	S2	ENE3	N3	SE1	NW1	NNW5	NNE6	NNW8	NW12	N12	N11	N9	N9	N11	N11	N12	N13	N12	N12	N5.8	N13	
8-Jan	N9	NNE8	E4	E3	S1	S2	S5	S6	SSE4	S3	S4	SW7	WSW9	WSW10	SW10	SW9	SSW8	SSW7	SSW10	SSW9	SSW7	SW9	SW10	SW10	SSW4.6	SW10	
9-Jan	SW8	SW11	WSW10	WSW8	WSW10	WSW8	WSW9	WSW9	SW8	SW8	WSW8	W8	WNW10	NNW11	W8	WSW7	SW9	WSW9	NW18	NW17	NW16	NW16	WNW12	W14	W9.0	NW18	
10-Jan	W10	W4	SW6	S3	S3	SSE3	S3	S3	ESE2	NW2	WNW4	NNW2	NW8	NW13	WNW11	WSW11	WSW11	SW8	WSW9	WSW11	WSW10	SW9	SSW9	SW10	WSW5.3	NW13	
11-Jan	SSW11	SSW11	SSW14	SW13	SW10	SW15	WSW15	WSW16	WSW14	WSW11	NW27	NNW24	N22	NNW32	NNW33	NNW29	NW26	NNW25	NW19	NW17	NW16	WNW15	WNW18	NNW17	WNW13.2	NNW33	
12-Jan	NW12	NW9	SSW5	S4	S6	S5	SSW4	S6	SSE6	S9	S9	SSE11	SSE13	SSE12	SSE13	SSE13	SSE15	SSE18	S15	S12	S14	S9	S11	SSE9	S8.4	SSE18	
13-Jan	S9	SSW10	SSW9	SW6	SW8	WSW10	SW7	SW7	WSW9	SW6	SSW9	SW11	SW12	WSW13	WSW11	SW8	SSW7	SSW9	S10	SSW8	SSW10	SW12	SW13	SSW13	SW8.9	SW13	
14-Jan	SW13	SW15	SW16	SW15	SW13	SSW15	SW15	SSW14	SSW13	SSW14	SSW16	SW16	SW17	SW18	SW16	SW16	SW15	SW13	SW13	SW12	SW12	SSW13	SSW12	SW15	SW14.3	SW18	
15-Jan	WSW20	WSW18	WSW18	WSW16	WSW15	WSW12	WSW10	WSW11	WSW12	SSW13	WSW16	WSW16	WSW16	WSW14	WSW12	WSW10	SW9	SW8	SW10	SW11	SW11	SW13	SW14	SW14	WSW13.1	WSW20	
16-Jan	SW14	SSW12	S10	SSW8	S10	SSW12	SSW12	SSW13	SW17	SSW19	SW18	SW18	SW16	SSW19	SSW17	SSW18	SSW18	SSW15	S17	S15	S14	SSW13	SSW12	S12	SSW14.2	SSW19	
17-Jan	S11	S13	SSW12	SSW14	SSW14	SW14	SW15	WSW18	WSW16	SW12	SW11	SW10	SW10	SW10	SW11	SW10	SW10	SSW9	SW9	SSW9	SSW11	S7	S7	S5	ESE5	SSW10.1	WSW18
18-Jan	SSE6	SSE6	S4	E5	ENE4	E4	ESE4	E6	ENE3	E2	SSE4	SSW5	WSW2	SSW2	SW6	SSW6	SSW8	SSW7	S5	SE4	SE3	SE3	SSW4	E3	SSE2.9	SSW8	
19-Jan	E4	SE3	E2	SE3	WNW1	SSW4	SE4	SSE3	E5	ESE4	NE3	NE2	SSW1	AF	ENE1	NNE4	N2	N3	WSW1	N4	SSW1	ESE4	SW2	SSE2	ESE1.3	E5	
20-Jan	SSE5	SSW4	SSW5	SSW6	SW6	SW6	SSE4	SE3	ESE3	S3	E5	SSE5	SE5	SSE5	SSW5	S5	SE4	ESE4	SE5	SSE6	S5	SSE2	E3	SE1	SSE3.7	SW6	
21-Jan	SSE1	S2	SSW4	ENE0	S2	SSE1	ESE2	N6	N5	NNW5	N6	N9	N8	NNE10	N9	N9	N10	N10	N10	N10	N10	N10	N8	N9	N9	N5.5	N10
22-Jan	N9	N9	N9	N9	NNE9	NNE9	NNE8	NNE8	NNE8	NNE8	N7	NNE8	NNE8	NNE7	NNE7	NNE7	NNE7	NNE8	N7	N6	N6	N6	N4	N4	N7.3	N9	
23-Jan	NNW2	NNW3	NNW3	N3	NNE3	NNE3	N3	N3	NNE3	NNE3	N2	WSW1	NNE1	NE2	N1	N1	N1	NNE1	NE0	ESE0	SE0	SSW1	WSW2	SW1	N1.4	NNE3	
24-Jan	SW2	SW1	SSW0	S0	SE0	ESE0	SSW0	SE0	SE0	SSW1	S1	S1	S1	SSW1	SW1	SSW1	SW2	SW1	SSW2	S2	SSW1	AF	S1	SSW0.8	S2		
25-Jan	AF	SSW1	AF	AF	AF	AF	S2	SSW2	S2	SSE3	SSE1	SE1	S2	SW4	SW4	SW5	SSW3	SSW4	SSW6	SSW9	SW9	SSW12	SSW10	SSW10	SSW4.7	SSW12	
26-Jan	SSW9	SSW9	SSW6	SW6	WSW8	WSW9	WSW9	WSW9	WSW8	WSW10	WSW11	WSW10	WSW14	W17	WSW14	WSW13	WSW10	WSW8	WSW10	WSW9	WSW10	WSW11	WSW11	WSW12	WSW9.8	W17	
27-Jan	WSW12	WSW12	SW11	WSW14	WSW17	W14	WSW13	WSW13	WSW12	WSW12	WSW13	WSW10	WSW12	SW12	SW12	SW12	WSW10	WSW10	WSW15	W17	W16	WSW11	W16	W16	WSW12.8	WSW17	
28-Jan	WSW14	W16	W16	WSW13	WSW12	WSW11	WSW11	WSW13	WSW15	WSW16	WSW14	WSW14	WSW10	SW11	SW10	SW9	SSW8	SSW11	SSW12	SW16	WSW13	WSW10	WSW10	WSW12	WSW12.0	W16	
29-Jan	WSW14	WSW13	WSW13	SSW8	SSW8	SW8	SW9	WSW9	WSW9	SW12	SW13	WSW14	WSW13	WSW16	WSW14	WSW10	SW9	WSW9	WSW9	WSW10	SW11	WSW12	W14	W17	WSW11.0	W17	
30-Jan	W15	W15	W14	WSW12	WSW11	WSW13	WSW15	W18	WNW21	W21	W20	WNW23	W24	W22	WNW21	WNW19	WNW14	NNW14	NNW13	NW17	NNW13	N17	NNW20	N18	WNW14.6	W24	
31-Jan	NNW19	NNW19	NNW19	NNW18	N17	NNW17	NNW16	NW15	NNW15	NNW13	NW13	WNW11	WSW11	WSW13	WSW12	W13	WSW11	WSW10	WSW12	WSW11	W11	WNW14	W11	W13	WNW10.7	NNW19	

WSW5.2	WSW5.5	WSW5.4	WSW4.4	WSW4.3	WSW4.7	WSW3.9	WSW4.3	WSW3.6	WSW4.2	WSW4.8	W5.3	W5.9	W7.3	W6.2	W5.4	WSW4.9	WSW3.9	WSW4.3	WSW4.6	WSW4.3	WSW4.5	WSW5.4	WSW4.8	Diurnal Average
WNW23	NNW19	NW20	WNW23	NW21	NW21	NNW18	NNW19	NNW21	W21	NW27	NNW24	W24	NNW32	NNW33	NNW29	NW26	NNW25	NW19	NW17	W16	N17	NNW20	N18	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
Cenovus - Christina Lake - January 2017

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	228	30.94	30.94
6 - 11	262	35.55	66.49
12 - 19	224	30.39	96.88
20 - 28	20	2.71	99.59
29 - 38	3	0.41	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 737

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
Cenovus - Christina Lake - January 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	14	7	7	5	16	14	21	25	55	35	13	4	1	2	2	7	228
6 - 11	37	25	5	0	1	0	0	6	16	39	50	64	6	6	4	3	262
12 - 19	9	5	0	0	0	0	0	6	6	27	41	61	24	8	20	17	224
20 - 28	1	0	0	0	0	0	0	0	0	0	0	1	4	5	6	3	20
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	61	37	12	5	17	14	21	37	77	101	104	130	35	21	32	33	737

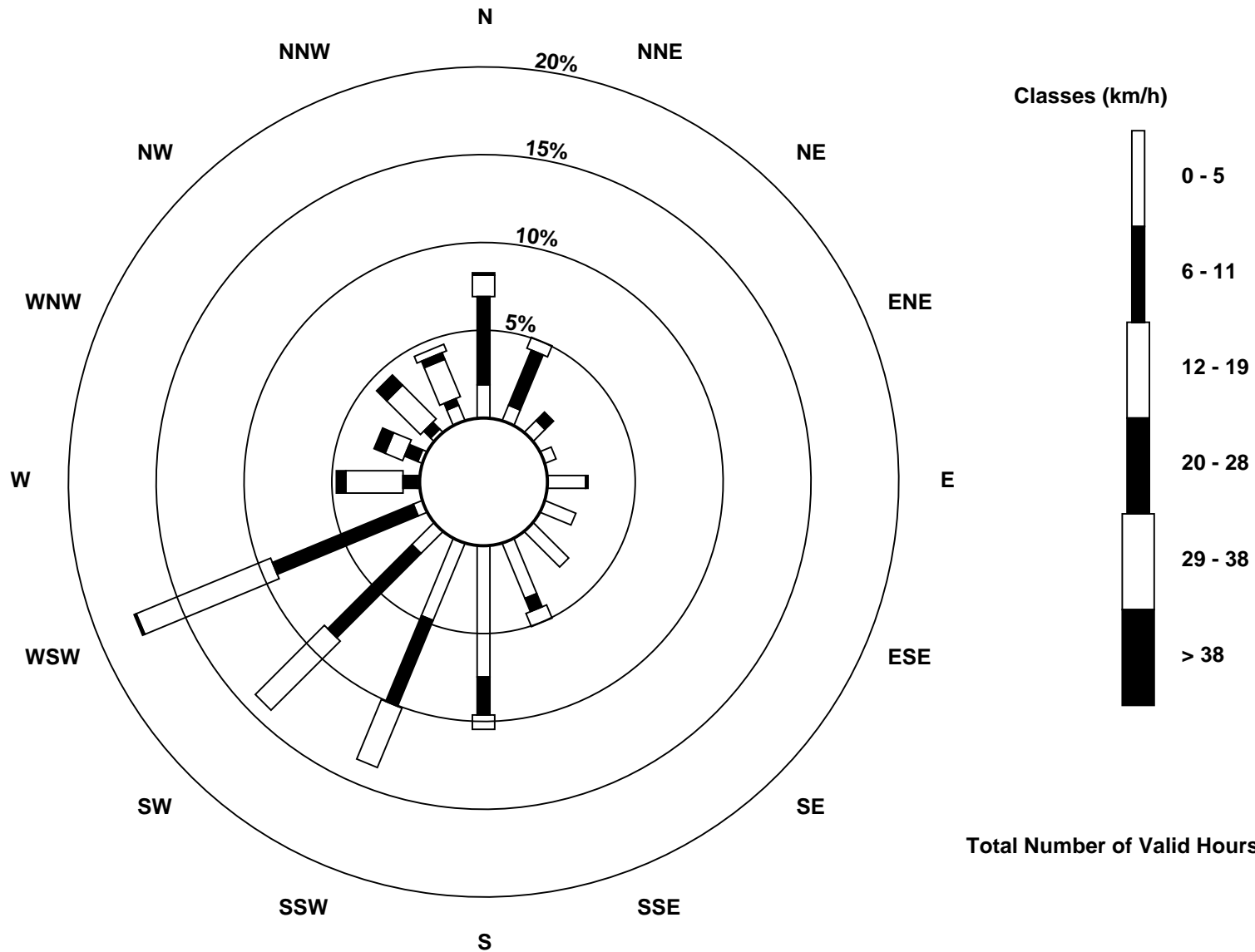
Total Number of Valid Hours: 737

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose 2012-2017

Wind Speed (WS) - km/h
Cenovus - Christina Lake (AMS500)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Cenovus - Christina Lake - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 9 km/h on Jan 11 14:00	Hours of Data: 737
Minimum Value: 0 km/h on Jan 24 06:00	Hours of Missing Data: 7
Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6	Hours of Calibration: 0
	Percent Operational Time: 99.1

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-Jan	6	5	5	6	5	5	5	4	2	2	4	3	4	3	4	3	2	2	1	1	1	1	1	2	6
2-Jan	1	1	1	2	2	1	1	1	2	2	2	6	2	2	3	3	2	1	2	1	1	2	2	1	6
3-Jan	1	1	1	1	1	2	2	1	2	2	2	2	3	3	3	4	4	4	4	4	4	3	4	5	5
4-Jan	4	4	4	4	4	4	4	3	1	1	2	2	3	4	2	2	2	1	1	1	1	2	1	1	4
5-Jan	1	1	2	3	2	2	2	2	2	2	3	2	2	3	2	2	3	3	3	2	2	2	3	1	3
6-Jan	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2
7-Jan	1	1	1	1	1	2	1	1	1	1	2	2	3	2	2	3	2	2	2	3	2	2	3	2	3
8-Jan	2	1	1	1	1	2	2	1	1	1	1	3	3	3	3	2	2	1	2	3	2	2	3	2	3
9-Jan	2	3	2	2	3	2	2	2	2	2	2	3	3	3	2	2	2	2	4	3	3	3	3	4	4
10-Jan	5	2	3	2	1	2	1	1	1	2	2	2	3	3	3	3	2	2	3	3	2	2	2	3	5
11-Jan	3	3	4	4	3	5	5	4	4	4	7	6	5	9	7	7	6	6	5	4	3	3	3	3	9
12-Jan	3	2	2	1	2	1	1	1	2	3	2	3	2	2	4	4	3	4	4	3	3	4	3	2	4
13-Jan	2	3	2	2	2	3	3	2	3	2	2	3	3	3	3	2	2	2	1	2	2	3	3	3	3
14-Jan	3	3	4	4	3	3	4	3	3	3	4	4	5	5	5	4	4	3	3	3	3	3	3	4	5
15-Jan	5	5	4	4	4	3	3	3	3	3	4	5	4	4	3	2	2	2	2	3	3	3	3	3	5
16-Jan	3	3	2	1	1	2	2	3	4	5	5	6	5	4	4	5	4	4	4	4	4	3	3	4	6
17-Jan	3	4	3	4	3	4	4	5	5	3	3	3	3	3	2	2	2	2	2	3	1	1	1	1	5
18-Jan	1	2	1	1	1	2	1	2	2	2	2	2	2	2	3	2	2	2	1	2	1	2	1	2	3
19-Jan	2	2	1	2	2	2	1	2	1	1	2	1	2	AF	1	1	2	2	1	2	2	1	2	2	2
20-Jan	1	1	2	2	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	2	1	2	2	2	2
21-Jan	1	2	1	2	1	2	1	2	1	1	1	1	2	2	2	2	2	2	2	2	2	1	2	2	2
22-Jan	2	2	2	2	1	2	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
23-Jan	1	1	0	1	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1
24-Jan	1	1	1	0	0	0	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	AF	1
25-Jan	AF	1	AF	AF	AF	AF	1	1	0	0	1	1	1	1	2	2	2	1	3	3	3	3	2	2	3
26-Jan	2	2	2	2	2	2	2	2	2	2	2	3	4	5	4	4	3	2	3	2	2	2	2	3	5
27-Jan	2	2	2	3	4	3	3	3	3	3	3	3	4	3	3	4	3	3	5	4	5	3	4	4	5
28-Jan	3	5	4	3	3	2	3	3	4	4	4	4	3	3	3	3	2	3	3	4	4	3	3	3	5
29-Jan	3	3	3	3	2	2	2	3	3	3	4	4	4	5	4	3	3	2	1	2	2	3	4	4	5
30-Jan	4	3	3	3	3	4	4	5	5	5	6	6	6	6	6	6	5	3	3	4	3	4	4	4	6
31-Jan	4	4	4	4	4	4	3	3	3	3	3	4	3	3	3	4	3	3	3	2	3	2	3	4	4
	6	5	5	6	5	5	5	5	5	5	7	6	6	9	7	7	6	6	5	4	5	4	4	5	

Diurnal Maximum

AF - Analyzer Failure



Wood Buffalo Environmental Association
Summary of Hour Averages

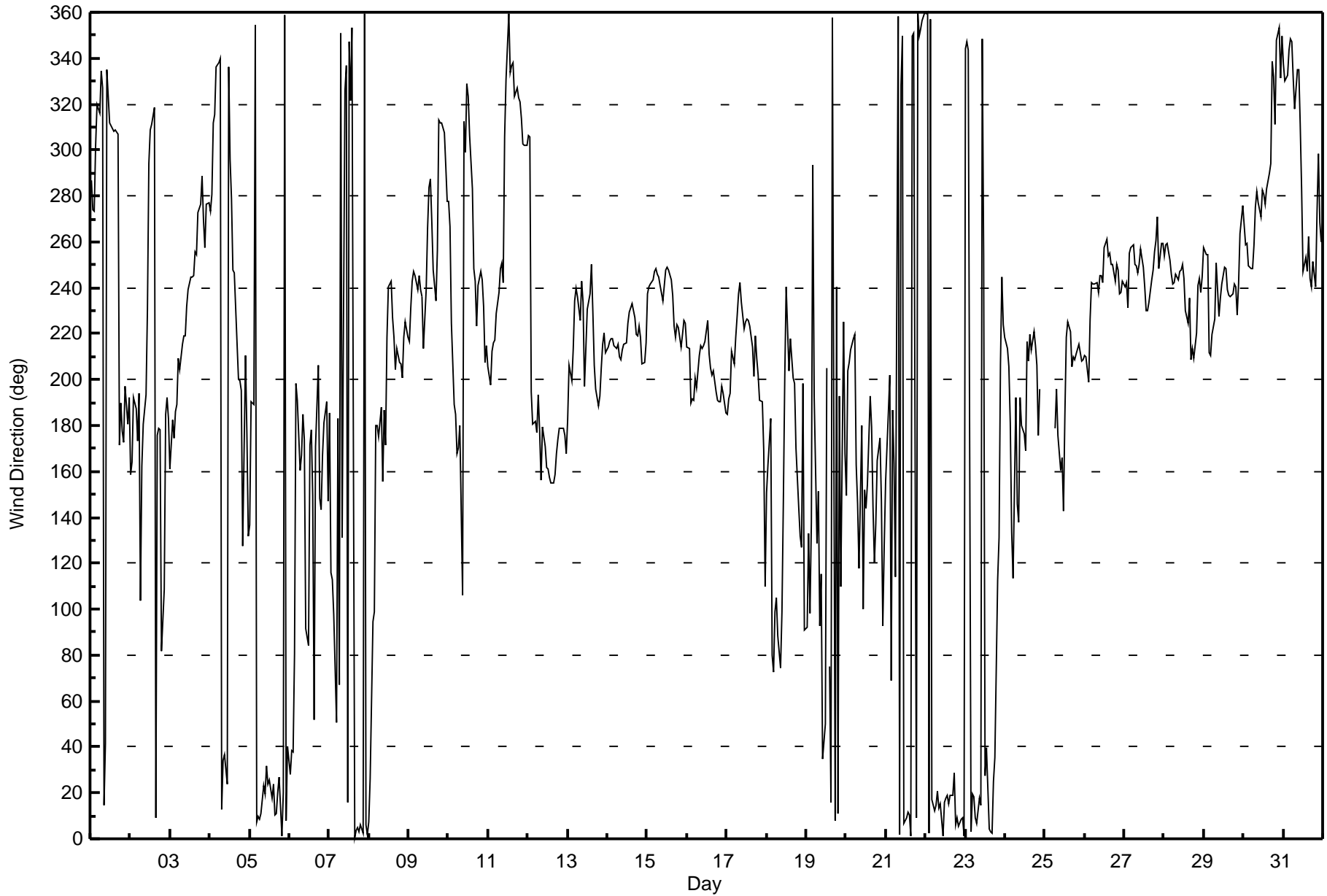
Wind Direction (WD) - deg
Cenovus - Christina Lake - January 2017

Direction of Maximum Speed: 337 deg on Jan 11 15:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 289.3 deg on Jan 30	Hours of Data: 737
Direction of Minimum Speed: 114 deg on Jan 24 06:00	Hours of Missing Data: 7
Direction of Minimum Daily Speed Average: 0.8 deg on Jan 24	Percent Operational Time: 99.1
Monthly Average Direction: 239.8 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Jan	287	274	273	302	319	316	334	327	15	42	335	312	311	310	308	309	307	171	190	178	172	197	180	192	305.6
2-Jan	159	164	192	187	173	194	104	162	180	194	231	294	309	311	319	9	176	179	178	82	108	185	192	183	236.0
3-Jan	161	182	175	186	189	209	204	215	219	219	232	239	244	245	245	256	254	273	276	289	270	257	276	277	249.3
4-Jan	273	281	312	315	336	338	340	13	34	37	24	336	296	279	247	246	215	200	200	195	128	210	176	132	308.3
5-Jan	137	191	189	355	7	10	8	11	23	20	32	24	26	18	24	10	11	20	27	1	20	359	8	40	17.9
6-Jan	28	38	38	81	198	191	160	167	185	174	91	84	171	178	150	52	171	206	148	143	167	181	191	147	142.7
7-Jan	186	116	113	98	51	183	67	351	131	326	337	16	347	321	353	0	4	5	3	6	2	360	6	2	0.4
8-Jan	7	26	95	99	180	180	175	188	156	187	171	219	240	243	227	218	204	213	207	207	201	218	225	218	210.9
9-Jan	216	232	243	247	245	239	245	239	236	214	239	266	284	287	269	248	235	256	313	312	312	308	293	278	267.9
10-Jan	278	267	225	189	185	168	170	180	106	312	299	329	324	306	283	249	243	223	241	247	244	232	208	215	249.0
11-Jan	206	198	213	216	217	229	238	248	251	242	306	331	359	334	337	338	323	327	323	321	314	303	302	302	302.1
12-Jan	306	306	194	181	182	177	193	177	156	179	171	162	161	158	155	155	159	168	174	179	179	179	175	168	173.8
13-Jan	183	206	199	214	234	240	236	226	243	234	197	214	231	237	250	230	206	196	189	193	205	215	220	212	217.3
14-Jan	214	217	218	218	215	213	215	210	208	213	215	216	225	229	231	233	227	220	219	223	218	207	207	216	218.3
15-Jan	237	241	242	244	247	248	246	245	241	234	241	248	249	248	243	237	223	218	224	223	214	220	226	224	236.9
16-Jan	214	213	189	192	191	201	196	210	215	213	215	217	226	211	205	202	204	194	191	190	190	197	194	186	203.6
17-Jan	185	191	194	212	207	219	228	237	242	234	222	225	226	226	223	214	201	219	209	202	191	190	169	110	213.7
18-Jan	150	163	183	80	73	99	105	89	74	99	147	201	241	204	218	209	201	198	170	144	132	127	198	91	157.0
19-Jan	92	133	98	138	294	193	129	152	92	115	35	50	205	AF	75	16	357	8	241	11	193	110	225	168	104.0
20-Jan	149	204	207	213	218	219	163	146	118	180	100	152	144	155	193	179	145	120	137	165	175	147	93	128	166.1
21-Jan	155	186	202	69	187	163	114	358	2	328	350	7	9	12	10	1	350	351	9	360	350	353	356	360	359.0
22-Jan	359	360	3	357	17	12	15	20	13	15	1	16	18	19	16	19	19	29	6	9	5	8	9	1	11.2
23-Jan	344	347	343	3	19	18	9	7	18	15	349	254	27	40	5	3	2	25	36	113	131	207	245	224	1.9
24-Jan	218	214	206	181	134	114	192	146	138	192	180	176	169	217	208	220	213	221	215	206	176	196	AF	171	201.1
25-Jan	AF	194	AF	AF	AF	AF	179	196	176	161	166	143	185	219	225	221	206	210	209	211	215	212	208	209	207.1
26-Jan	211	210	199	226	242	242	242	238	245	245	242	258	261	254	255	250	250	243	250	248	237	238	243	242.9	
27-Jan	241	242	231	255	258	259	250	250	247	250	257	249	241	230	230	234	244	248	255	260	271	249	260	260	250.0
28-Jan	254	259	259	252	246	242	242	246	243	247	248	250	244	230	225	235	209	213	209	220	241	244	238	245	240.7
29-Jan	257	254	255	212	211	220	226	251	239	228	236	242	249	248	239	237	236	237	242	240	228	242	264	276	242.9
30-Jan	267	259	260	250	248	248	258	275	282	277	271	283	281	277	283	290	294	339	332	311	348	353	331	350	289.3
31-Jan	337	330	332	344	349	347	331	318	335	335	311	283	247	253	247	262	244	240	251	240	273	298	269	260	301.3

251.2 246.4 242.2 250.2 253.0 249.9 250.5 257.1 249.9 243.0 258.4 264.2 268.5 268.4 262.2 259.6 246.4 243.4 245.8 251.7 249.9 251.5 250.8 251.2
 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
Cenovus - Christina Lake - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 99 deg on Jan 19 05:00	Hours of Data: 737
Minimum Value: 6 deg on Jan 25 10:00	Hours of Missing Data: 7
Percentiles: P ₁ = 9 P ₁₀ = 13 Q ₁ = 15 Median = 17 Q ₃ = 23 P ₉₀ = 44 P ₉₉ = 84	Hours of Calibration: 0
	Percent Operational Time: 99.1

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-Jan	15	16	16	14	14	15	16	12	15	31	52	15	12	10	12	11	10	59	15	27	32	24	13	30	59
2-Jan	55	40	33	31	96	69	73	42	43	57	72	55	11	15	18	84	50	21	67	34	81	68	37	29	96
3-Jan	43	25	12	18	11	14	17	26	19	16	22	17	18	17	18	19	17	18	16	23	16	17	15	15	43
4-Jan	16	17	10	14	17	17	19	20	8	10	12	30	26	29	19	17	17	11	10	22	21	45	31	34	45
5-Jan	25	25	89	63	16	15	15	14	9	13	10	12	14	17	16	14	15	15	14	18	21	15	38	17	89
6-Jan	14	19	21	41	18	8	41	42	51	36	54	43	25	31	10	36	68	72	39	36	30	19	20	40	72
7-Jan	23	38	58	54	49	28	24	36	71	58	25	25	38	16	20	15	13	15	15	16	16	16	15	14	71
8-Jan	14	7	34	38	38	38	26	13	32	26	37	43	21	20	17	19	15	15	15	18	17	18	17	17	43
9-Jan	18	17	17	16	17	17	15	17	17	16	21	28	23	22	26	24	14	30	11	10	11	14	16	18	30
10-Jan	32	53	71	58	64	37	54	46	43	85	37	80	24	20	24	16	14	14	17	15	15	18	13	16	85
11-Jan	18	16	17	19	21	21	20	19	17	21	13	25	20	19	15	15	15	12	15	13	15	10	8	7	25
12-Jan	10	11	33	38	17	14	17	19	14	13	12	14	13	12	12	14	11	13	18	17	15	20	13	12	38
13-Jan	17	22	14	22	18	17	23	20	20	41	17	20	19	17	18	23	18	11	9	14	17	16	16	15	41
14-Jan	14	14	15	15	16	15	15	15	15	16	16	17	18	18	18	18	18	16	16	17	17	17	16	17	18
15-Jan	17	17	17	17	17	15	16	15	16	17	16	17	17	18	17	17	14	14	15	16	14	16	16	16	18
16-Jan	14	15	11	11	11	14	14	16	16	16	16	18	20	17	16	15	16	15	13	14	15	15	16	18	20
17-Jan	18	16	17	18	15	17	18	17	17	18	18	19	17	15	16	14	14	15	15	14	11	11	16	19	19
18-Jan	16	22	39	35	20	35	22	14	36	87	51	40	83	74	39	20	13	14	34	32	46	61	29	55	87
19-Jan	44	44	36	58	99	49	39	22	18	29	36	62	62	AF	72	21	90	84	89	40	85	26	77	61	99
20-Jan	21	30	24	22	21	14	29	27	12	27	48	11	10	28	14	12	23	23	16	9	22	26	21	56	56
21-Jan	81	43	19	80	53	78	65	23	23	22	19	17	16	16	16	19	16	17	16	17	15	17	16	17	81
22-Jan	17	16	16	17	14	15	17	15	16	16	16	15	15	16	18	16	15	14	16	18	17	17	17	23	23
23-Jan	31	19	16	21	19	18	18	20	14	15	56	54	41	32	53	66	55	22	27	12	20	34	25	28	66
24-Jan	21	14	19	10	45	49	49	35	22	25	37	17	17	19	17	18	13	17	14	21	15	65	AF	57	65
25-Jan	AF	45	AF	AF	AF	AF	15	11	10	6	7	10	35	18	23	26	27	17	19	17	19	15	15	15	45
26-Jan	17	16	15	26	18	17	17	16	16	18	18	20	16	17	16	17	14	16	18	17	14	14	13	14	26
27-Jan	12	14	11	17	15	16	14	14	15	16	16	19	17	18	19	19	18	16	18	17	17	16	15	15	19
28-Jan	14	16	15	15	15	14	15	15	17	16	17	18	19	18	17	17	16	17	17	17	20	17	17	15	20
29-Jan	16	15	16	30	15	17	14	19	23	18	18	20	21	19	18	18	16	15	12	17	12	16	18	15	30
30-Jan	19	15	17	16	15	16	18	18	15	16	18	16	18	17	16	21	48	20	18	14	28	16	14	19	48
31-Jan	16	14	16	17	15	18	12	16	20	21	20	30	20	19	19	21	16	15	16	14	31	15	23	19	31
	81	53	89	80	99	78	73	46	71	87	72	80	83	74	72	84	90	84	89	40	85	68	77	61	
	Diurnal Maximum																								

AF - Analyzer Failure



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	January 11, 2017	Last Calibration	December 6, 2016
Station Name	Cenovus - Christina Lake	Station Number	AMS 500
Reason:	Routine		
Start Time (MST)	13:30	End Time (MST)	14:43
Gas Cert Reference	LL107928	Station temp.	22 Deg C
Cal Gas Concentration	50.0 ppm	Cal Gas Exp Date	September 8, 2018
Calibrator Make/Model	API T700	Serial Number	451
ZAG Make/Model	API 701	Serial Number	4604
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2575

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-698	-698
Analyzer IP address	192.168.1.43		Lamp voltage	843	847
Calculated slope	1.002794	0.998151	Chamber temp	45.0	45.3
Calculated intercept	0.722668	0.429532	Pressure	683.5	674.9
Analyzer Background	13.3	13.7	Flow	0.594	0.590
Analyzer Coefficient	1.036	1.061	Intensity	92	91

Analyzer make Thermo 43i Analyzer serial # 1118148497

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	79.3	793.0	774.8	1.023
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	79.3	793.0	794.7	0.998
second point	5000	39.7	397.0	395.8	1.003
third point	5000	19.8	198.0	198.1	1.000
as left zero	5000	0.0	0.0	0.6	----
as left span	5000	79.3	793.0	794.9	0.998
Average Correction Factor					1.000

Corrected As found 774.6 Previous response 790.1 % change 2.0%

Notes:

Sample inlet filter replaced after as founds. Sample pump replaced after as founds as well for preventative maintenance.
Adjusted span.

Calibration Performed By: Asad Hidayat



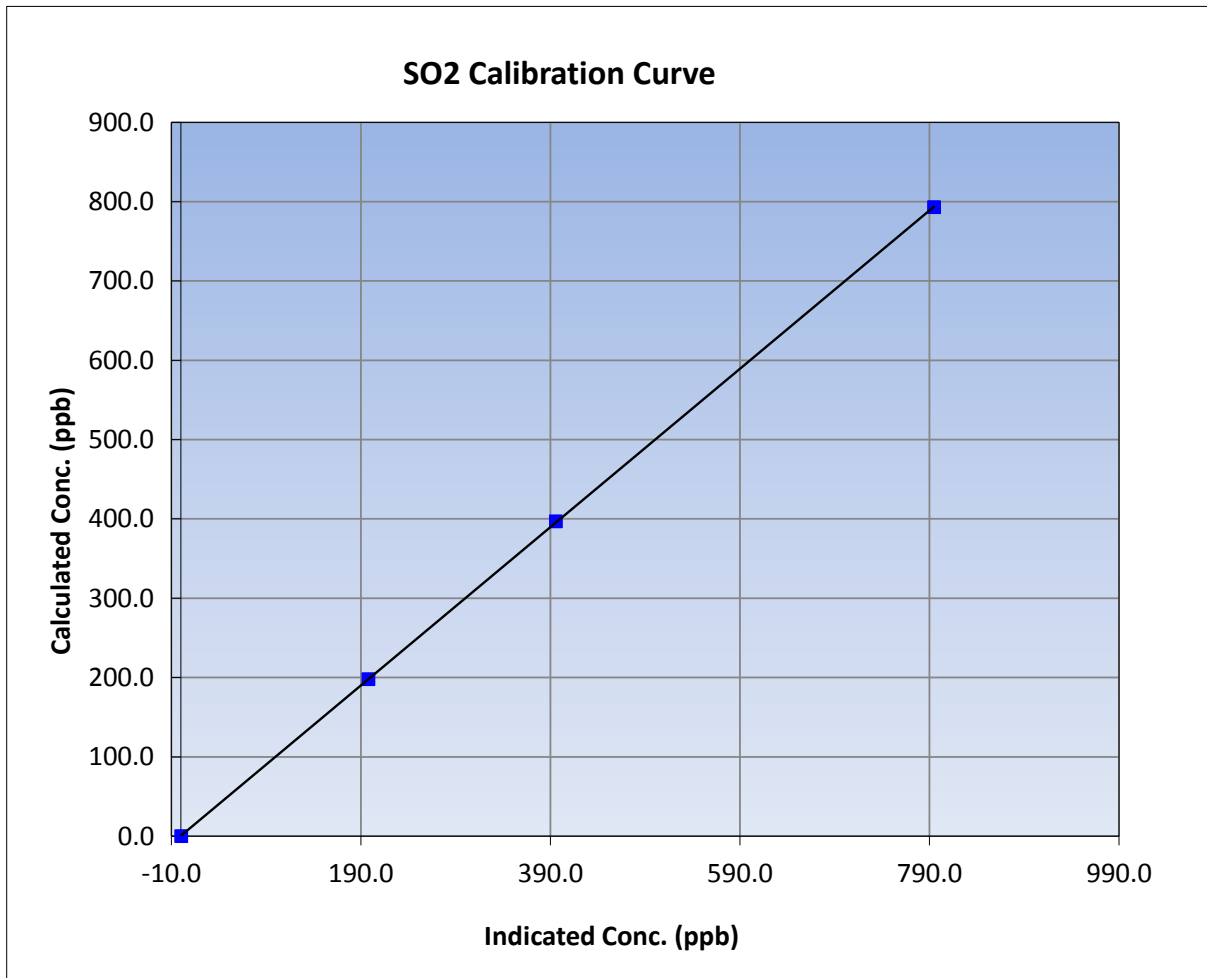
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 11, 2017	Previous Calibration	December 6, 2016
Station Name	Cenovus - Christina Lake	Station Number	AMS 500
Start Time (MST)	13:30	End Time (MST)	14:43
Analyzer make	Thermo 43i	Analyzer serial #	1118148497

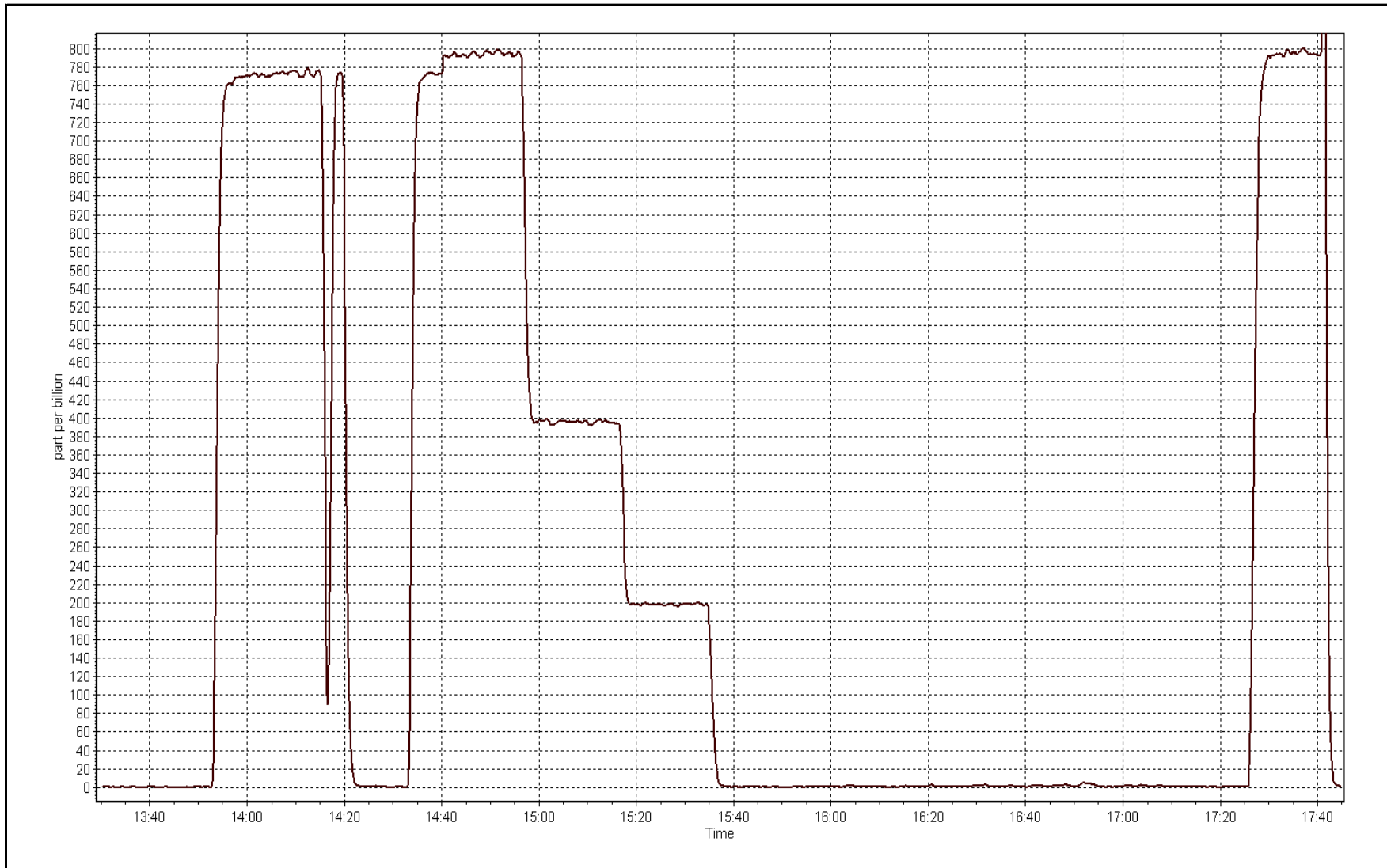
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999991
793.0	794.7	0.9978		
397.0	395.8	1.0029	Slope	0.998151
198.0	198.1	0.9997		
			Intercept	0.429532



SO2 Calibration Plot

Date: January 11, 2017





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	January 11, 2017	Last Calibration	December 6, 2016
Station Name	Cenovus	Station Number	AMS 500
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	13:31
Gas Cert Reference	LL30650	Station temp.	22 Deg C
Cal Gas Concentration	5.1 ppm	Cal Gas Exp Date	February 12, 2019
Calibrator Make/Model	API 700	Serial Number	2445
ZAG air Make/Model	API 701	Serial Number	4604
DACS make/model	Campbell Scientific CR3000	Serial Number	2575
SO2 gas concentration	50 ppm	SO2 gas cert/exp	LL107928 September 8, 2018

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-680	-680
Analyzer IP address	192.168.1.35		Lamp voltage	978	981
Calculated slope	1.013807	0.992524	Chamber temp	45	45
Calculated intercept	-0.137034	-0.127440	Pressure	664.1	646.3
Analyzer Background	1.49	1.58	Flow	0.444	0.431
Analyzer Coefficient	0.849	0.886	Intensity	92	92
			Converter temp.	310	310

Analyzer make/model	Thermo 43i-TLE	Analyzer serial #	1008841400
Converter make/model	Thermo 340	Converter serial #	328702539

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	78.5	80.1	76.6	1.046
SO2 gas test	5000	20.0	200.0	190.3	1.051
SO2 scrubber check	5000	20.0	200.0	1.8	----
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	78.5	80.1	80.7	0.992
second point	5000	39.3	40.1	40.7	0.985
third point	5000	19.7	20.1	20.3	0.990
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	78.5	80.1	80.9	0.990
Average Correction Factor					0.989

Corrected As found	76.5	Previous response	79.1	% change	3.5%
--------------------	------	-------------------	------	----------	------

Notes:

Sample inlet filter changed and SO2 scrubber test completed after as founds. Bypassed the converter to see how it would response to SO2 gas; with 200 ppb of SO2 being generated, the analyzer would read 190.3 ppb. The correction factors were very similar between H2S as found span and SO2 gas test. No maintenance being done at this point. Only adjust span.

Calibration Performed By: Asad Hidayat



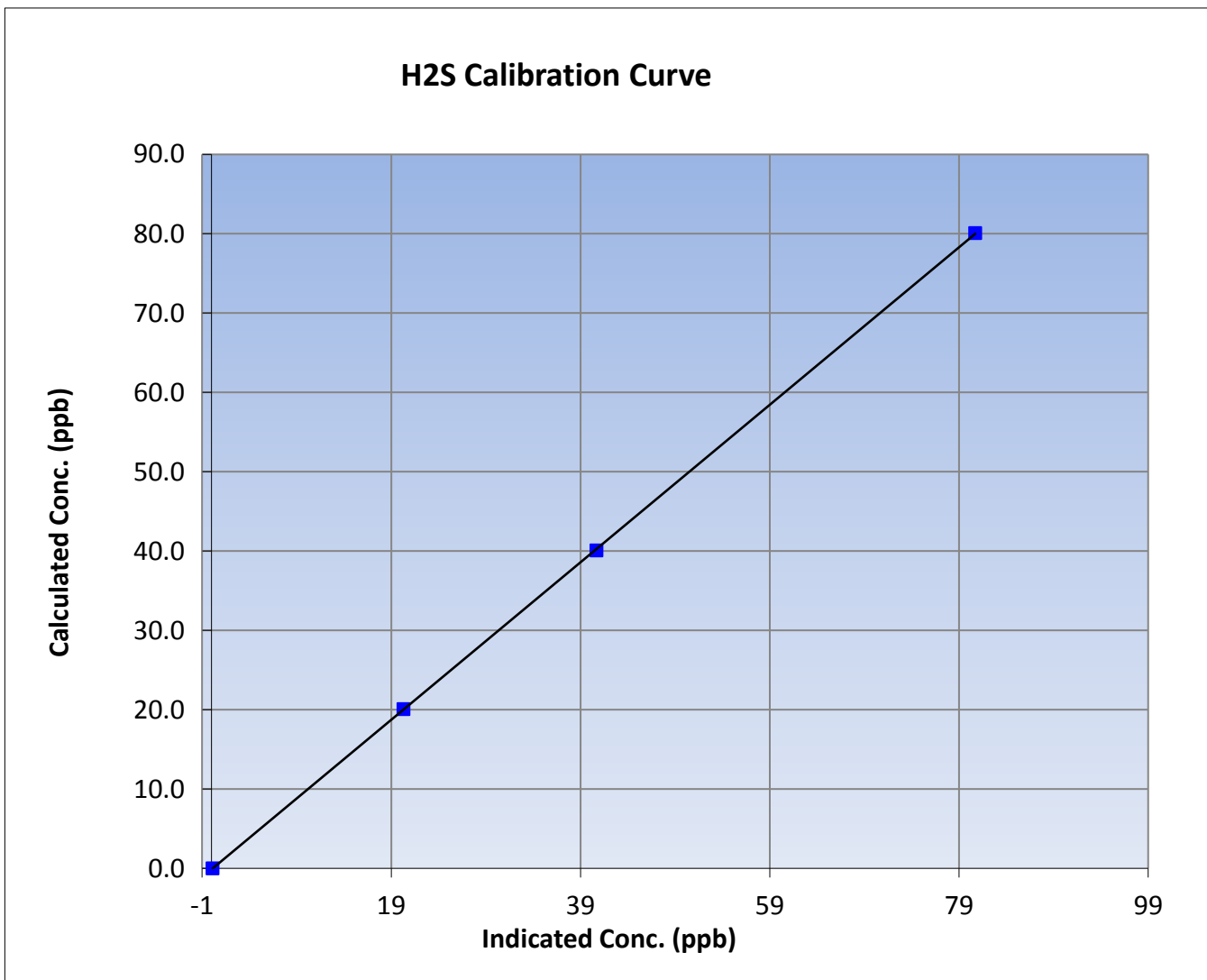
Wood Buffalo Environmental Association H2S Calibration Report

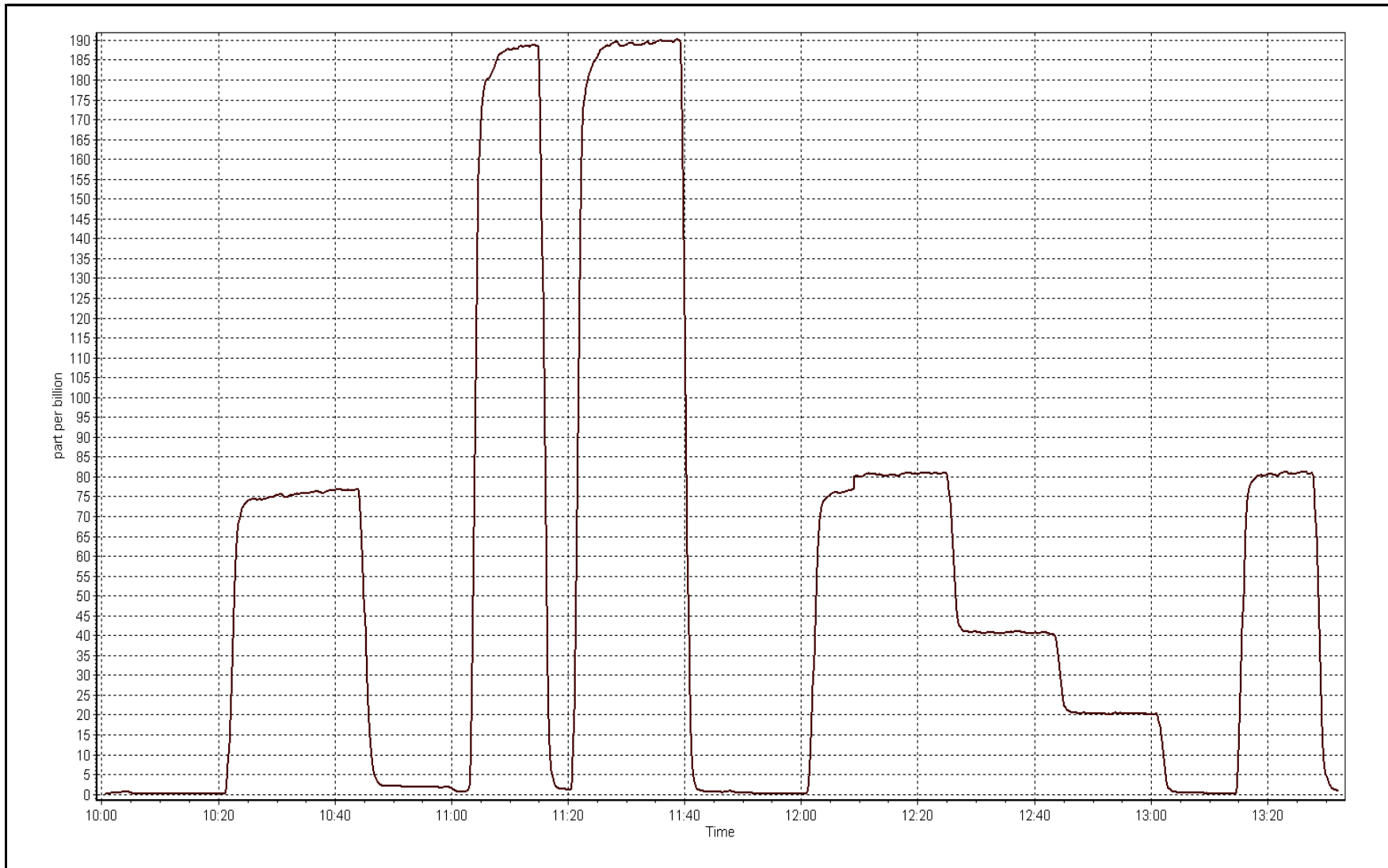
Station Information

Calibration Date	January 11, 2017	Previous Calibration	December 6, 2016
Station Name	Cenovus	Station Number	AMS 500
Start Time (MST)	10:00	End Time (MST)	13:31
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1008841400

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999987
80.1	80.7	0.9918		
40.1	40.7	0.9849	Slope	0.992524
20.1	20.3	0.9903		
			Intercept	-0.127440







Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 11, 2017	Previous Calibration	December 6, 2016
Station Name	Cenovus	Station Number	AMS 500
Reason:	Routine		
Start Time (MST)	13:30	End Time (MST)	14:43
NO Cal Gas Conc	50.5 ppm	Gas Cert Reference	LL107928
NOx Cal Gas Conc	50.8 ppm	Cal Gas Expiry Date	September 8, 2018
Calibrator	API T700	Serial Number	451
Zero air Generator	Teledyne API T701	Serial Number	4604

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2575
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.996901	0.998184	0.980730
	Data Offset	1.894655	1.185111	0.940417
Current Calibration	Data Slope	0.997068	1.001996	0.983975
	Data Offset	2.174968	1.941293	1.465658

Analyzer Information

Analyzer make/model	API T200	Analyzer serial #	723
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
Analyzer IP	192.168.1.72		192.168.1.72	
NO coefficient	1.030		1.038	
NOx coefficient	1.037		1.049	
NO2 coefficient	1.000		1.000	
NO bkgrnd	0.4		0.4	
NOx bkgrnd	1.4		1.4	
Chamber Temp	50	Deg C	50	Deg C
Moly Temp	314.5	Deg C	316.2	Deg C
PMT voltage	826	V	826	V
PMT Temp	6.9	Deg C	6.9	Deg C
O3 flow	86	ccm	85	ccm
R Cell press NO	6.3	mmHg	5.6	mmHg
R Cell Press Nox	6.3	mmHg	5.6	mmHg
NO sample flow	0.492	lpm	0.483	lpm
Nox sample Flow	0.492	lpm	0.489	lpm

Notes:

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



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: January 11, 2017 Station Number: AMS 500

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	-0.6	-0.4	-0.2	----	----
as found span	5000	79.3	805.7	800.9	4.8	801.0	795.4	5.6	1.0059	1.0070
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.6	-0.4	-0.2	----	----
high point	5000	79.3	805.7	800.9	4.8	806.6	798.3	8.4	0.9988	1.0033
second point	5000	39.6	402.3	400.0	2.4	400.7	396.2	4.5	1.0042	1.0096
third point	5000	19.8	201.2	200.0	1.2	197.9	196.3	1.6	1.0165	1.0188
as left zero	5000	0.0	0.0	0.0	0.0	-0.5	0.1	-0.6	----	----
as left span	5000	79.3	805.7	611.2	194.5	803.1	599.5	203.6	1.0032	1.0196
Average Correction Factor									1.0065	1.0106

Corrcted As found NO_x= 801.6 NO= 795.7 Percent Change NO_x= 0.6% NO= 0.7%
 Previous Response NO_x= 806.3 NO= 801.2

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 79.30 ccm NOx ref calc conc = 805.7 ppb NO ref calc conc = 800.9 ppb

O3 Setpoint (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
1st NO ref point		4.8	814.7	805.2	-0.2	0.9890	0.9947	----	----
1st NO2 (600)	611.2	198.7	814.0	611.2	202.7	0.9898	----	0.9806	102.0%
2nd NO2 (400)	671.9	138.1	807.8	671.9	135.9	0.9973	----	1.0162	98.4%
3rd NO2 (200)	730.9	79.1	809.3	730.9	78.4	0.9956	----	1.0093	99.1%
2nd NO ref point		4.8	804.9	794.7	10.2	1.0010	1.0079	----	----
Average Correction Factor						0.9959		1.0020	99.8%

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

NO_x Calibration Summary

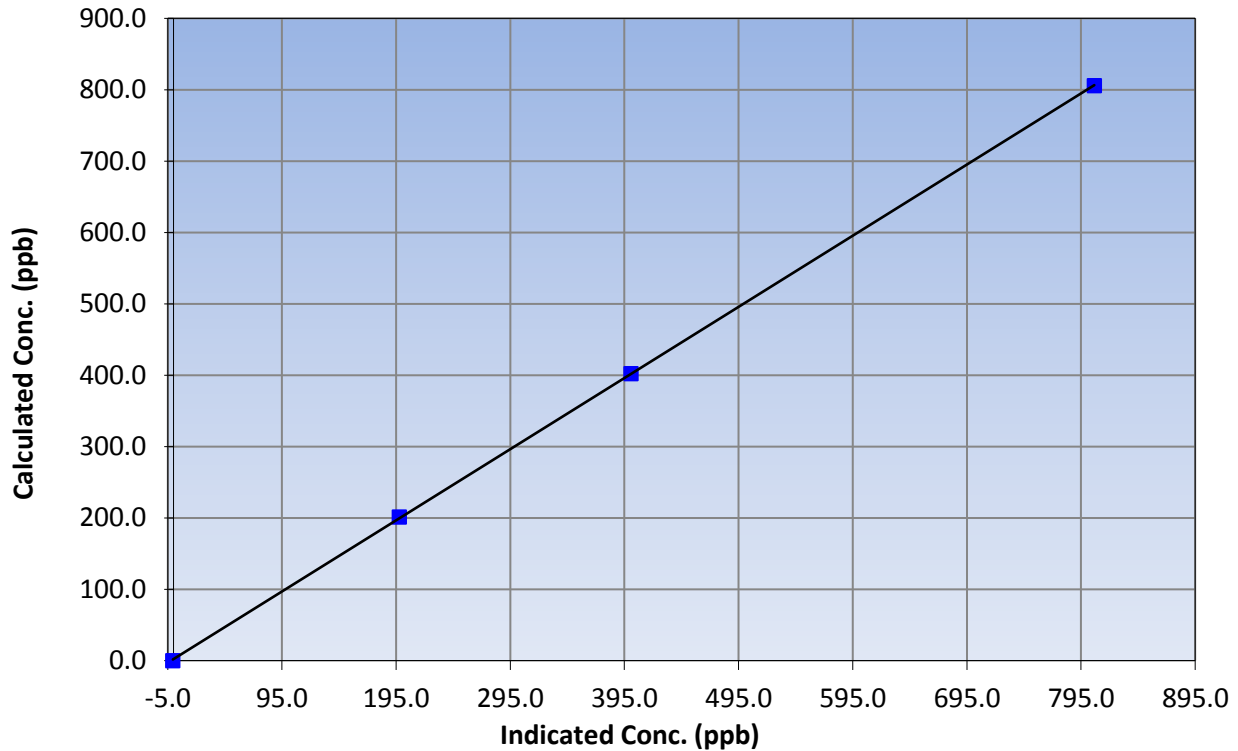
Station Information

Calibration Date	January 11, 2017	Previous Calibration	December 6, 2016
Station Name	Cenovus	Station Number	AMS 500
Start Time (MST)	13:30	End Time (MST)	14:43
Analyzer make	API T200	Analyzer serial #	723

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.6	----	Correlation Coefficient	0.999982
805.7	806.6	0.9988		
402.3	400.7	1.0042	Slope	0.997068
201.2	197.9	1.0165		
			Intercept	2.174968

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

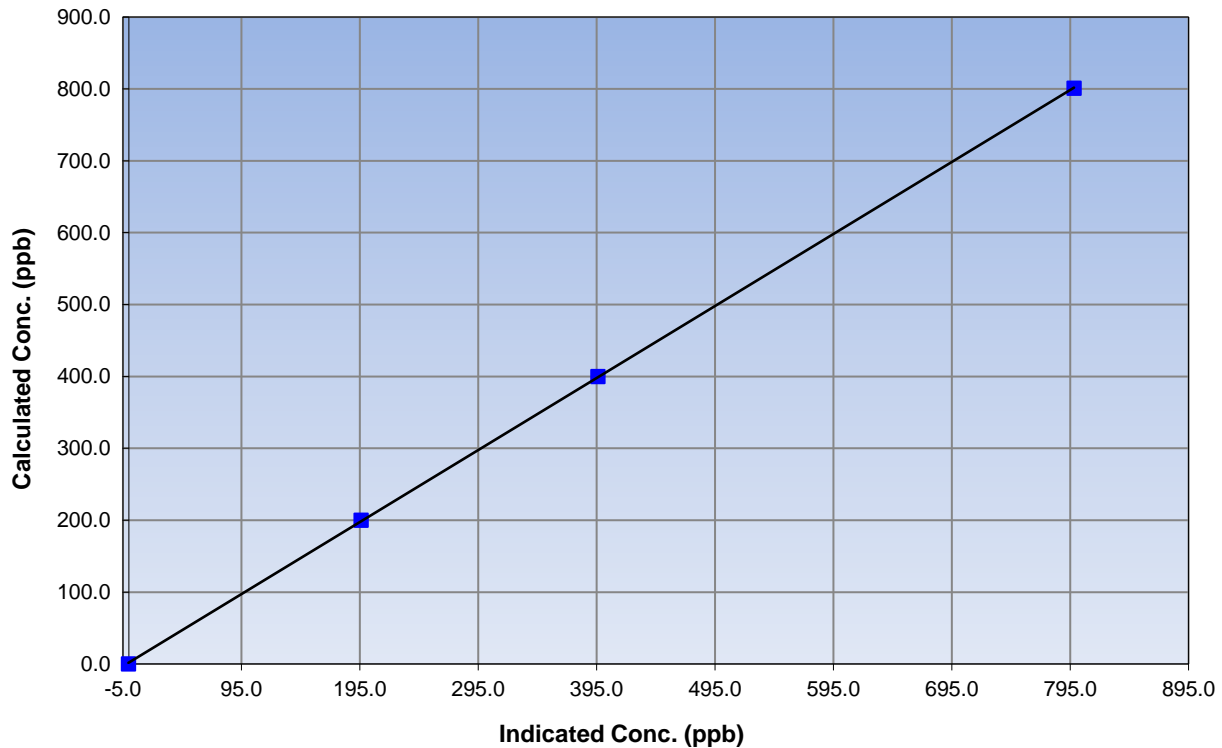
Station Information

Calibration Date	January 11, 2017	Previous Calibration	December 6, 2016
Station Name	Cenovus	Station Number	AMS 500
Start Time (MST)	13:30	End Time (MST)	14:43
Analyzer make	API T200	Analyzer serial #	723

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999982
800.9	798.3	1.0033		
400.0	396.2	1.0096	Slope	1.001996
200.0	196.3	1.0188		
			Intercept	1.941293

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

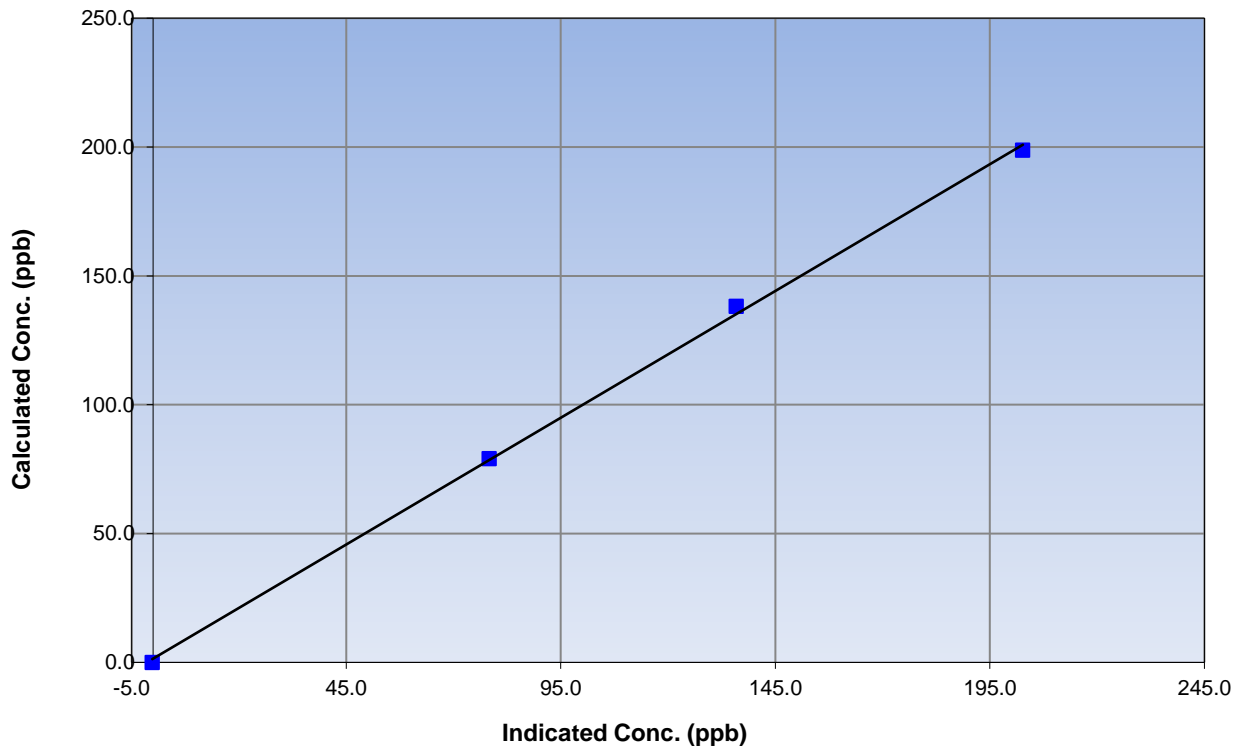
Station Information

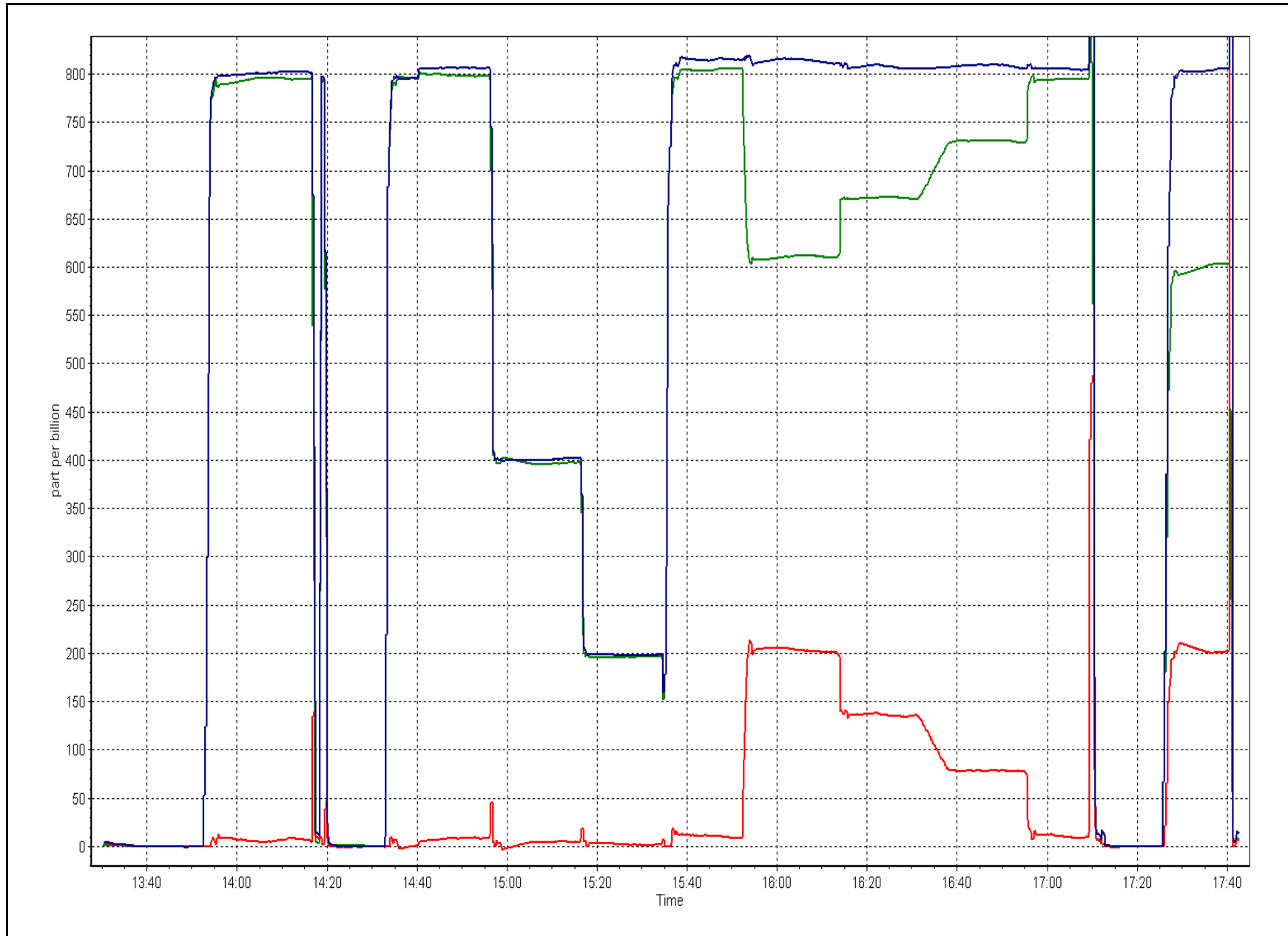
Calibration Date	January 11, 2017	Previous Calibration	December 6, 2016
Station Number	Cenovus	Station Number	AMS 500
Start Time (MST)	13:30	End Time (MST)	14:43
Analyzer make	API T200	Analyzer serial #	723

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999300
198.7	202.7	0.9806		
138.1	135.9	1.0162	Slope	0.983975
79.1	78.4	1.0093		
			Intercept	1.465658

NO₂ Calibration Curve







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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 502
CONOCOPHILLIPS
SURMONT
JANUARY 2017**

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

February 27, 2017



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
 JANUARY 2017

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	706	36	38	99.73	24	0	2	0
H2S (ppb) Average	710	34	34	100.00	2	0	1	0
NO2 (ppb) Average	706	36	38	99.73	28	0	13	-
NO (ppb) Average	706	36	38	99.73	66	-	19	-
NOX (ppb) Average	706	36	38	99.73	94	-	28	-
Temperature 2 m (C) Average	744	0	0	100.00	6.7	-	4.5	-
Relative Humidity (%) Average	744	0	0	100.00	95	-	91	-
Wind Speed 10 m (km/h) Average	709	0	35	95.30	36	-	28	-
Wind Direction 10 m (deg) Average	709	0	35	95.30	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
 JANUARY 2017

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2, NO2	08 Jan 2017 10:00	08 Jan 2017 10:00	1	Maintenance - reinitiated daily QA check
SO2, NO2	09 Jan 2017 16:00	09 Jan 2017 16:00	1	Maintenance - zero air unit replaced
Wind Speed, Wind Direction	21 Jan 2017 12:00	22 Jan 2017 12:00	25	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	23 Jan 2017 17:00	23 Jan 2017 17:00	1	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	23 Jan 2017 19:00	23 Jan 2017 19:00	1	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	23 Jan 2017 23:00	23 Jan 2017 23:00	1	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	24 Jan 2017 11:00	24 Jan 2017 14:00	4	Flat line in sensor output signal - sensor frozen
Wind Speed, Wind Direction	24 Jan 2017 16:00	24 Jan 2017 18:00	3	Flat line in sensor output signal - sensor frozen



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

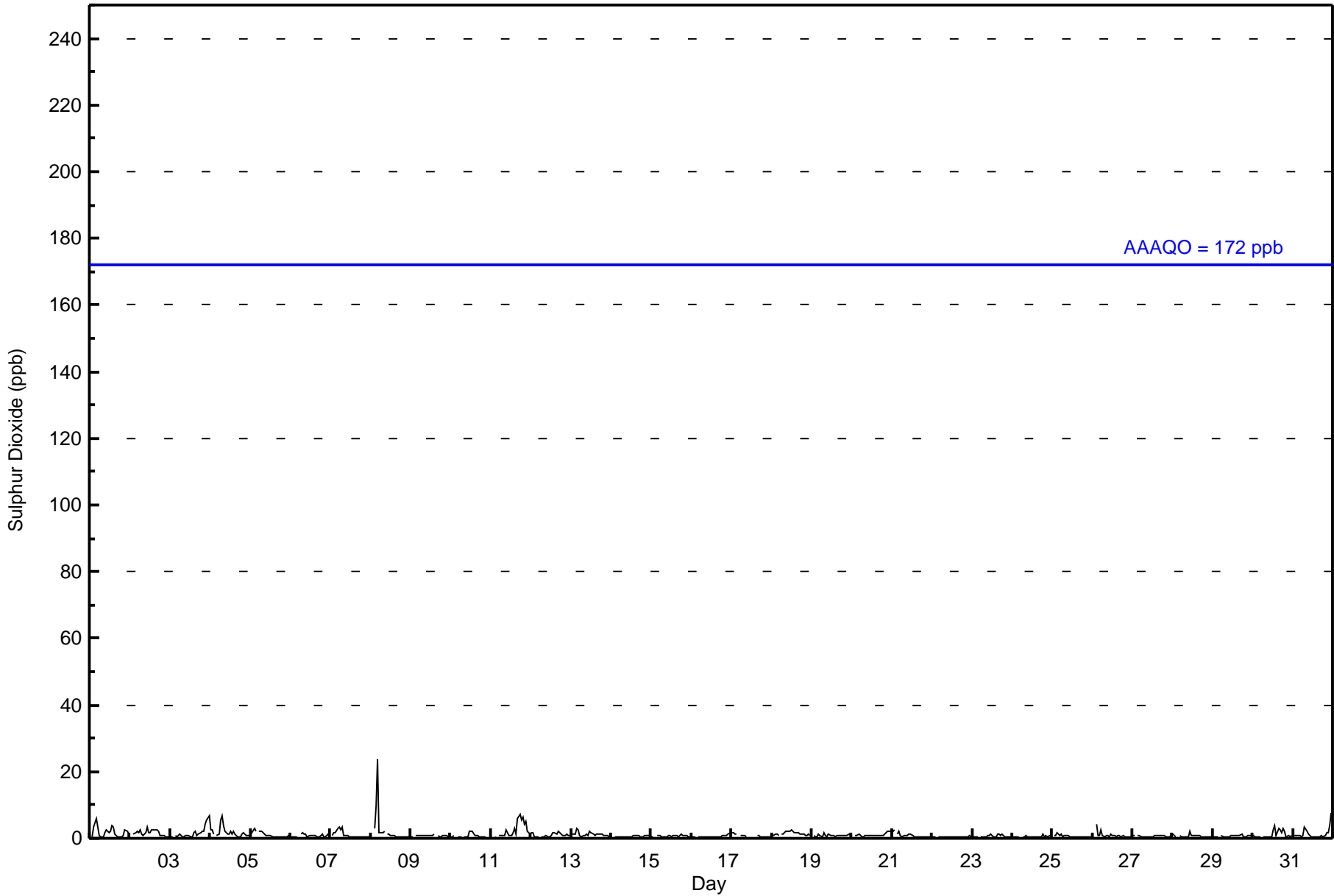
ConocoPhillips - Surmont - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 24 ppb on Jan 8 05:00										Maximum Daily Average: 2.4 ppb on Jan 8										Hours of Data: 706						
Minimum Value: 0 ppb on Jan 11 03:00										Minimum Daily Average: 0.4 ppb on Jan 22										Hours of Missing Data: 38						
Maximum Diurnal Average: 2.0 ppb at hour 5										Minimum Diurnal Average: 0.8 ppb at hour 1										Hours of Calibration: 36						
Monthly Average: 1.1 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 6										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-Jan	Z	0	3	5	6	1	0	0	1	2	2	2	2	4	3	1	0	0	0	0	1	3	2	1	1.8	6
2-Jan	1	Z	1	2	2	2	2	1	1	1	3	2	2	3	3	3	3	2	1	1	1	0	0	0	1.6	3
3-Jan	0	0	Z	1	1	1	1	1	0	1	1	1	1	1	2	2	1	1	2	2	2	4	5	7	1.6	7
4-Jan	2	2	1	Z	1	1	5	7	4	2	1	1	2	1	0	2	1	0	0	1	1	1	1	1	1.9	7
5-Jan	1	2	3	2	Z	2	2	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1.0	3
6-Jan	0	0	1	1	0	Z	1	2	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	0	0.8	2
7-Jan	Z	1	2	2	3	3	3	3	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	1.0	3
8-Jan	1	Z	3	10	24	2	2	2	2	M	1	1	1	1	1	0	0	0	0	0	0	0	1	1	2.4	24
9-Jan	1	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	M	1	0	1	1	1	1	0	1	0.8	1
10-Jan	0	1	1	Z	1	0	0	0	0	0	0	2	2	2	1	1	1	1	1	1	1	0	0	0	0.6	2
11-Jan	0	0	0	0	Z	1	1	1	1	2	2	1	1	2	3	1	6	7	5	6	4	5	2	1	2.3	7
12-Jan	2	2	1	0	0	Z	0	1	0	1	0	1	1	2	2	1	2	2	1	1	1	1	1	1	1.0	2
13-Jan	Z	1	1	3	3	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	0	1.2	3
14-Jan	0	Z	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
15-Jan	1	1	Z	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0.7	1
16-Jan	0	0	0	Z	0	1	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	2	0.6	2
17-Jan	2	2	1	1	Z	1	1	1	1	1	C	C	C	C	C	1	1	1	1	1	1	0	0	1	0.8	2
18-Jan	1	1	1	1	1	Z	1	1	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1.4	2
19-Jan	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
20-Jan	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1.0	2
21-Jan	2	2	Z	1	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.8	2
22-Jan	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.4	1
23-Jan	0	0	0	0	Z	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.6	1
24-Jan	0	0	0	0	0	Z	0	0	1	1	1	0	1	0	0	1	0	1	0	1	1	1	1	1	0.5	1
25-Jan	Z	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0.7	2
26-Jan	1	Z	4	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	4
27-Jan	1	1	Z	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
28-Jan	1	1	1	Z	1	1	0	1	0	0	2	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	2
29-Jan	1	1	1	1	Z	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
30-Jan	1	1	1	1	1	Z	1	1	0	0	0	0	3	4	1	3	2	2	3	2	1	1	1	1	1.2	4
31-Jan	Z	1	1	1	1	1	1	4	2	1	1	1	1	1	1	1	1	1	1	1	2	2	4	8	1.4	8
										0.8 0.9 1.2 1.5 2.0 1.0 1.0 1.1 0.9 0.9 1.0 1.0 1.0 1.1 1.0 1.0 1.0 1.0 1.0 0.9 1.0 0.9 1.0 1.1 1.2										Diurnal Average						
										2 2 4 10 24 3 5 7 4 2 3 2 3 4 3 3 3 6 7 5 6 4 5 5 8										Diurnal Maximum						
Z - zerospan										C - Calibration										M - Maintenance						
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb										24-hr 48 ppb																



Wood Buffalo Environmental Association
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - January 2017

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	705	99.86	99.86
11 - 20	0	0.00	99.86
21 - 60	1	0.14	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



Wood Buffalo Environmental Association
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - January 2017

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	30	9	3	2	1	5	3	4	19	33	69	138	132	98	28	97	671
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	1	0	0	0	0	0	1
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	30	9	3	2	1	5	3	4	19	33	70	138	132	98	28	97	672

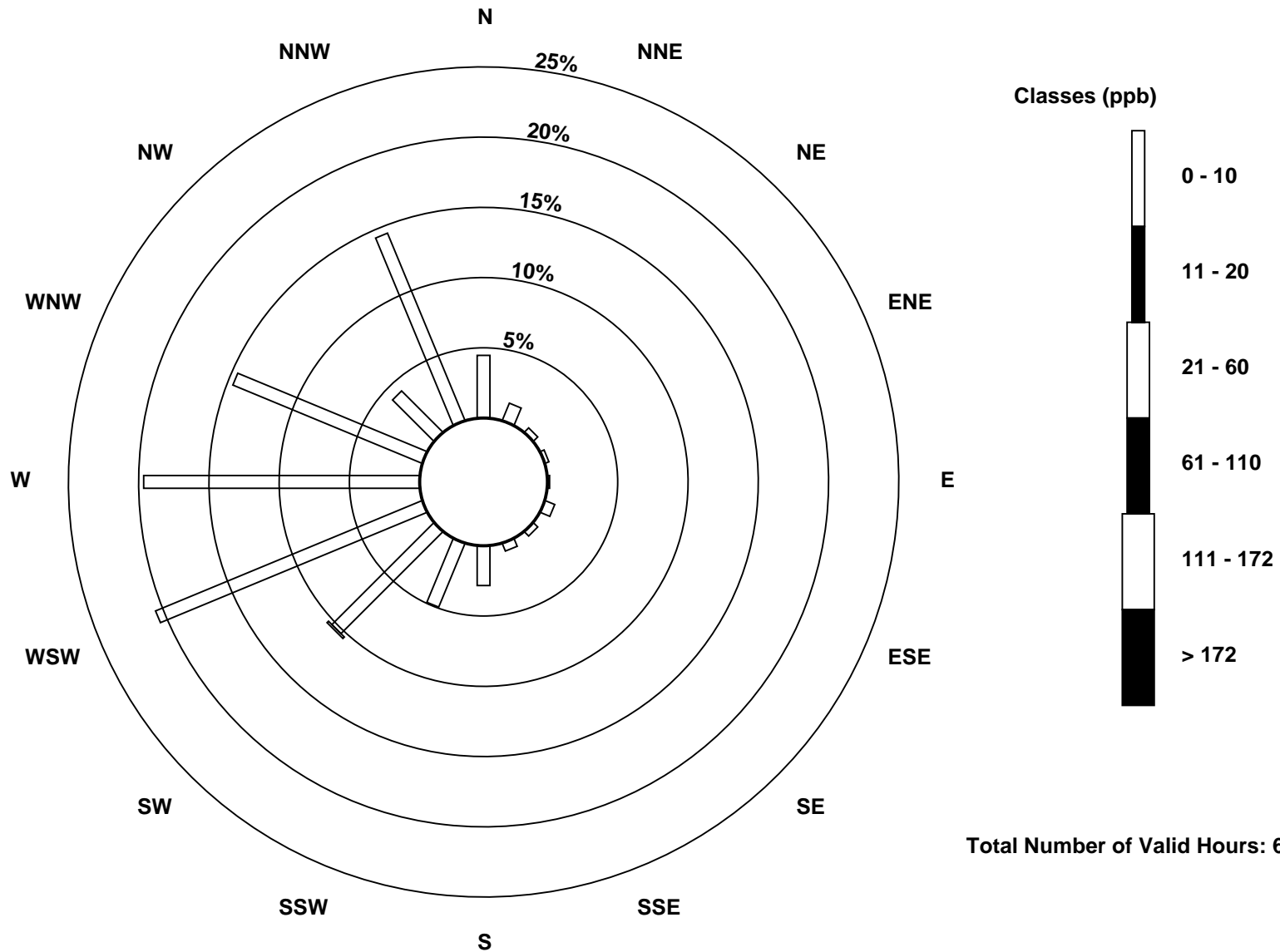
Total Number of Valid Hours: 672

Total Number of Hours: 744

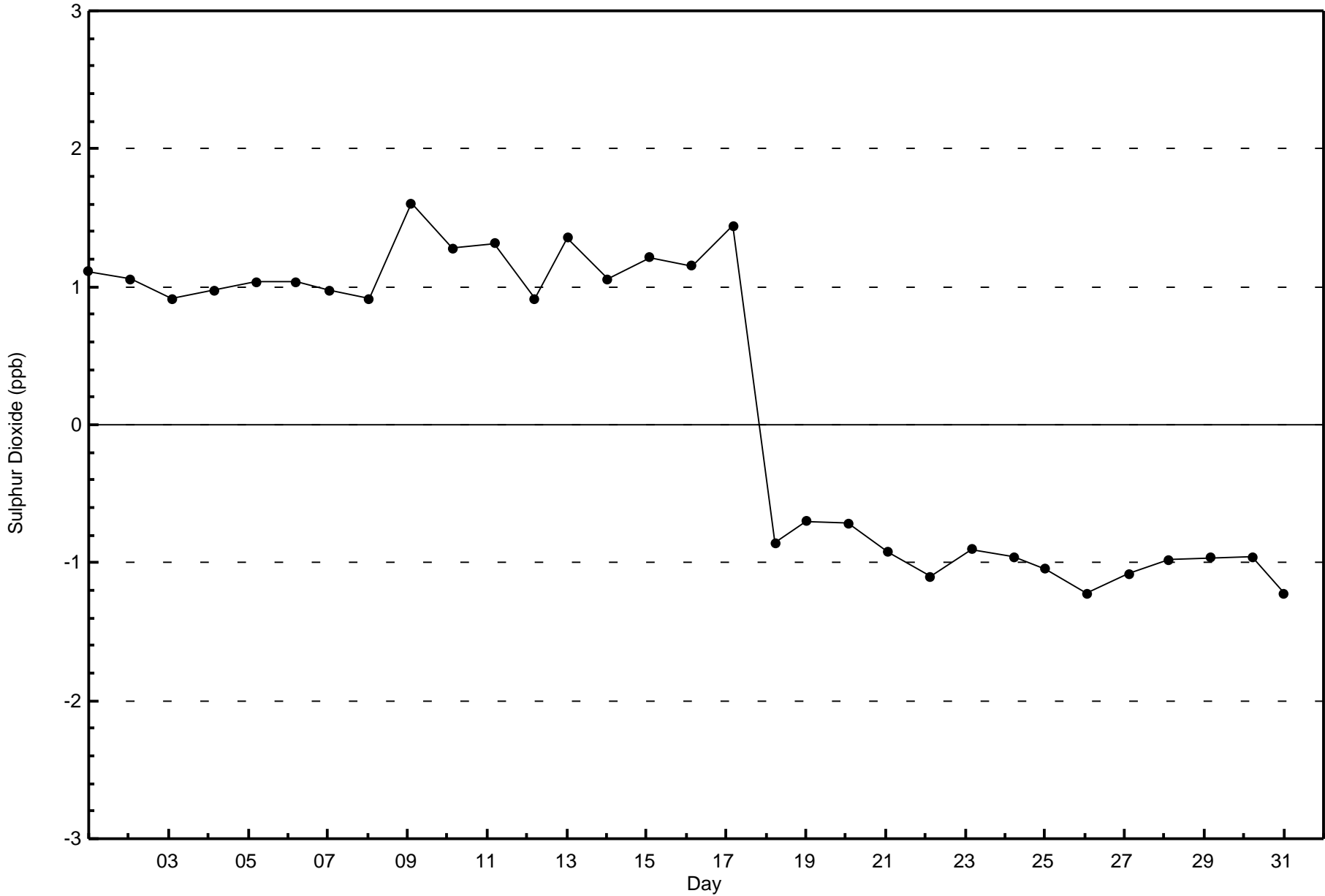


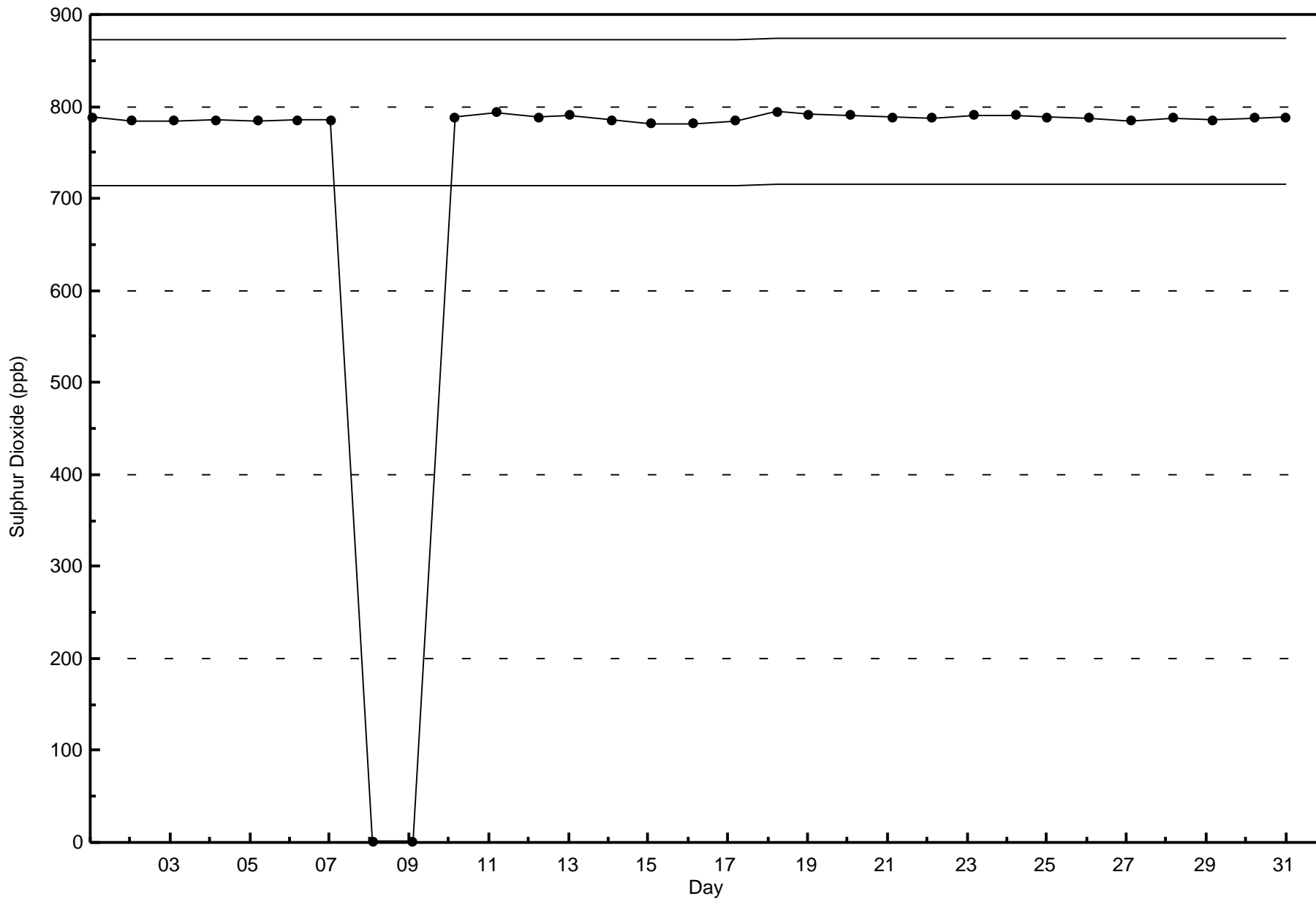
Wood Buffalo Environmental Association
Wind Rose 2012-2017

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont (AMS502)



Total Number of Valid Hours: 672





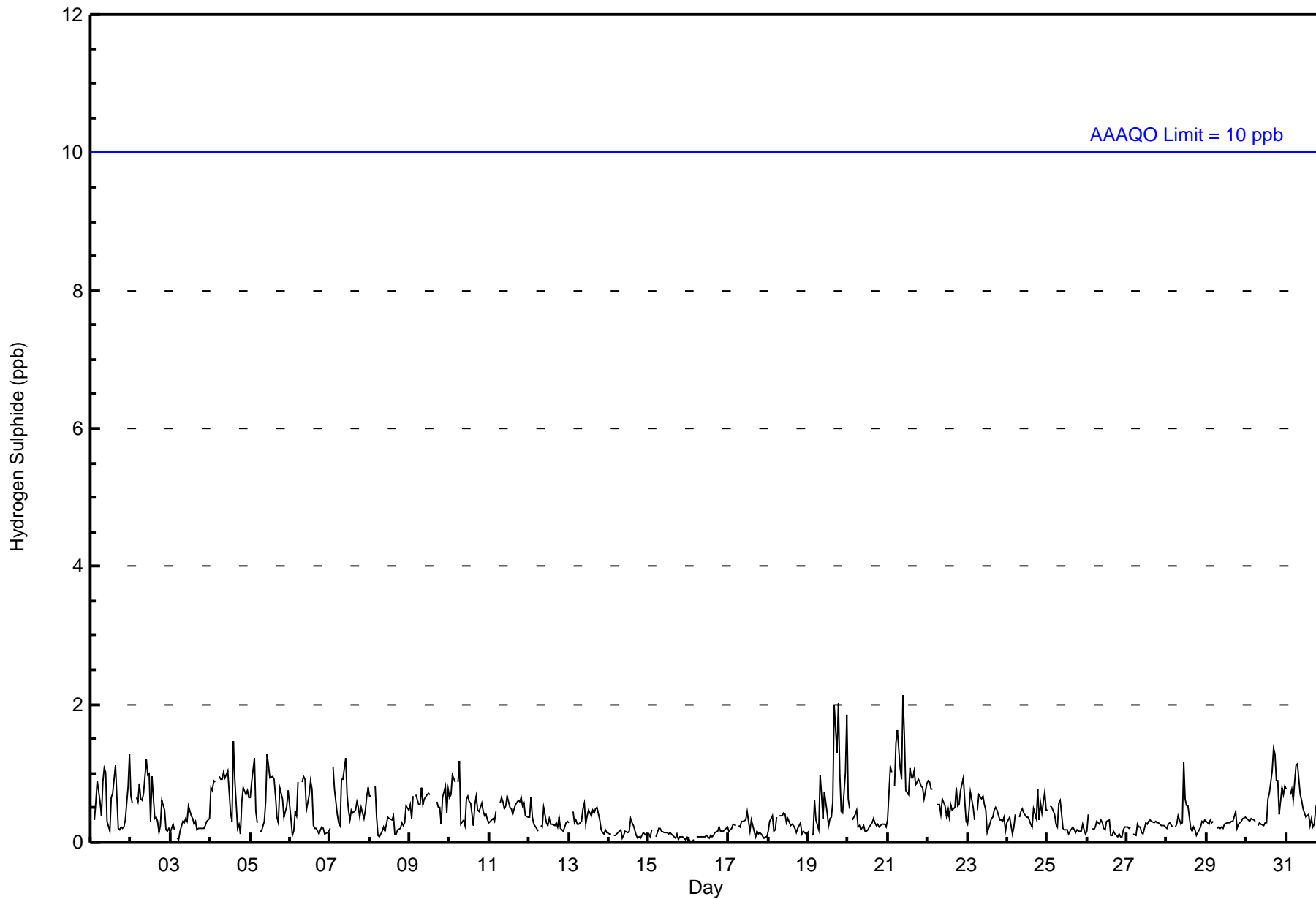


Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 2 ppb on Jan 21 10:00	Maximum Daily Average: 1.0 ppb on Jan 21		Hours of Data:	710
Minimum Value: 0 ppb on Jan 16 02:00	Minimum Daily Average: 0.1 ppb on Jan 16		Hours of Missing Data:	34
Maximum Diurnal Average: 0.5 ppb at hour 10	Minimum Diurnal Average: 0.3 ppb at hour 21		Hours of Calibration:	34
Monthly Average: 0.4 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 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-Jan	0	Z	0	1	1	1	0	1	1	1	0	0	1	1	1	1	0	0	0	0	0	0	1	1	0.6	1
2-Jan	1	1	Z	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	1	0	0	0	0	0.6	1
3-Jan	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
4-Jan	1	1	1	1	Z	1	1	1	1	1	1	0	0	1	1	0	0	0	0	1	1	1	1	1	0.7	1
5-Jan	1	1	1	0	0	Z	0	0	0	1	1	1	1	1	1	1	1	0	0	1	1	0	0	1	0.6	1
6-Jan	0	0	0	0	0	1	Z	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1
7-Jan	0	Z	1	1	0	0	0	1	1	1	1	0	0	0	0	0	1	1	0	1	0	0	1	1	0.6	1
8-Jan	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1
9-Jan	1	0	1	Z	1	1	1	1	1	1	1	1	1	C	C	C	1	1	1	0	1	1	0	1	0.6	1
10-Jan	1	1	1	1	Z	1	1	0	0	0	1	1	1	1	0	1	1	0	0	1	0	0	0	0	0.6	1
11-Jan	0	0	0	0	0	Z	1	1	1	0	1	1	1	0	0	0	1	1	1	1	1	1	0	0	0.5	1
12-Jan	0	1	0	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
13-Jan	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
14-Jan	0	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
15-Jan	0	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
16-Jan	0	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
17-Jan	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
18-Jan	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
19-Jan	0	Z	0	0	1	0	0	1	1	0	1	0	0	0	0	1	2	1	2	1	0	0	1	2	0.7	2
20-Jan	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
21-Jan	0	1	1	Z	1	1	2	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	2
22-Jan	1	1	1	1	Z	1	1	1	0	1	1	0	1	0	1	0	1	1	1	1	1	1	1	0	0.6	1
23-Jan	0	0	1	1	0	Z	0	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0.4	1
24-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0.4	1
25-Jan	0	Z	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
26-Jan	0	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
27-Jan	0	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
28-Jan	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1
29-Jan	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
30-Jan	0	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0.6	1
31-Jan	1	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1

0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.4	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	0.3	0.3	0.4	0.4	Diurnal Average
1	1	1	1	1	1	1	2	1	1	2	2	1	1	1	1	1	2	1	2	1	1	1	1	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 (H₂S) - ppb
ConocoPhillips - Surmont - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
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 (H₂S) - ppb
ConocoPhillips - Surmont - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	29	9	3	2	1	5	3	4	19	34	70	138	135	100	28	96	676
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
Totals	29	9	3	2	1	5	3	4	19	34	70	138	135	100	28	96	676

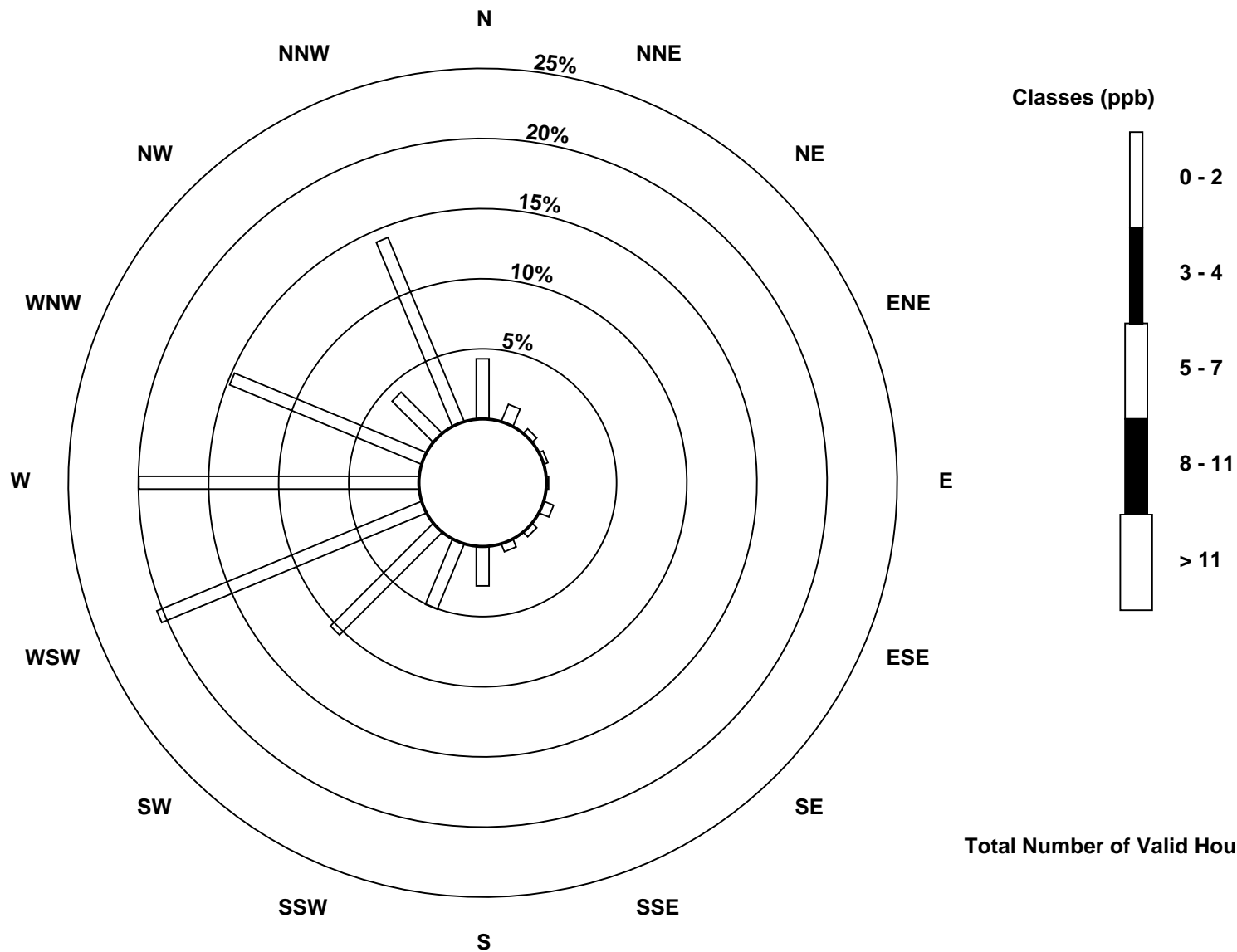
Total Number of Valid Hours: 676

Total Number of Hours: 744

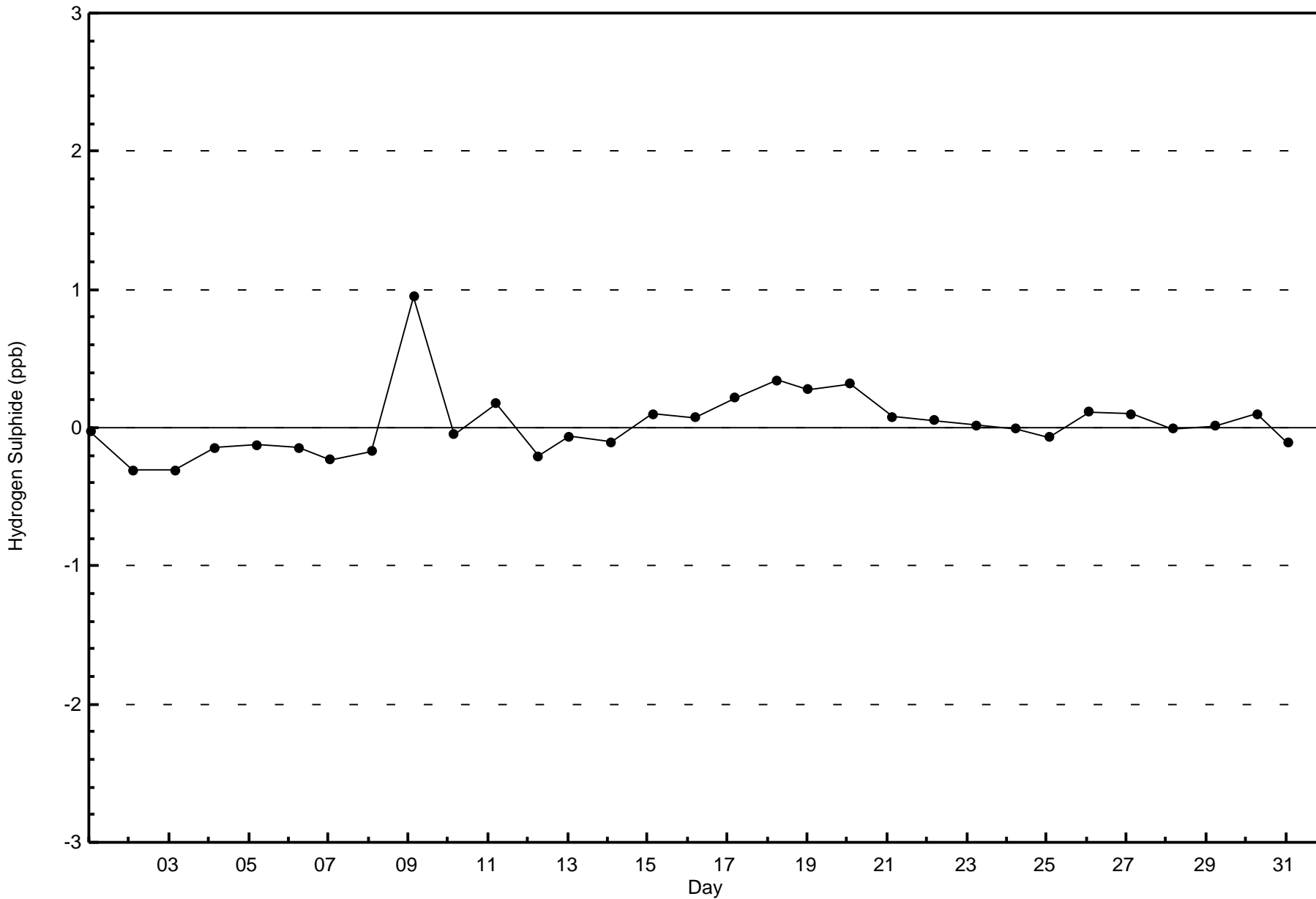


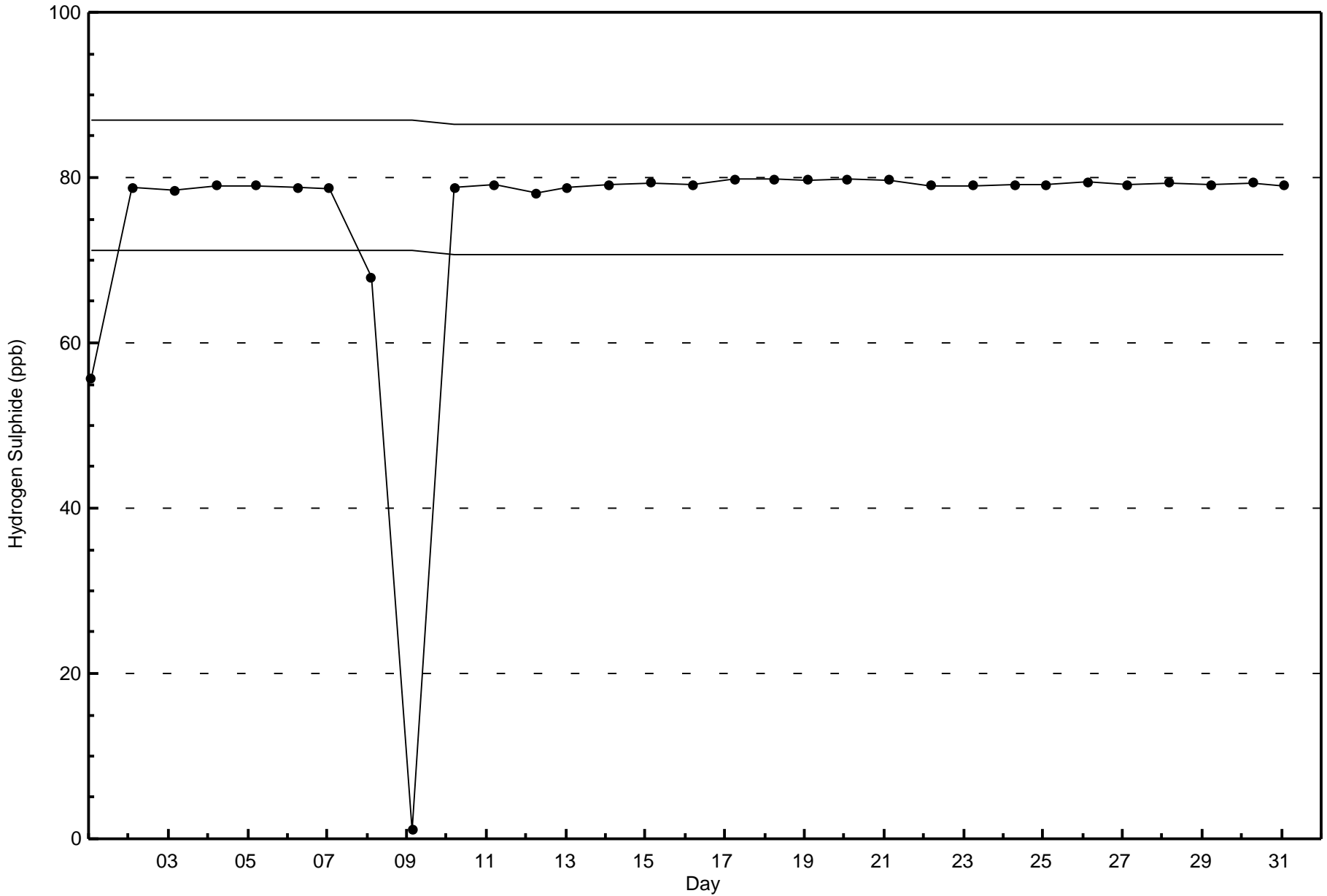
Wood Buffalo Environmental Association
Wind Rose 2012-2017

Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont (AMS502)



Total Number of Valid Hours: 676







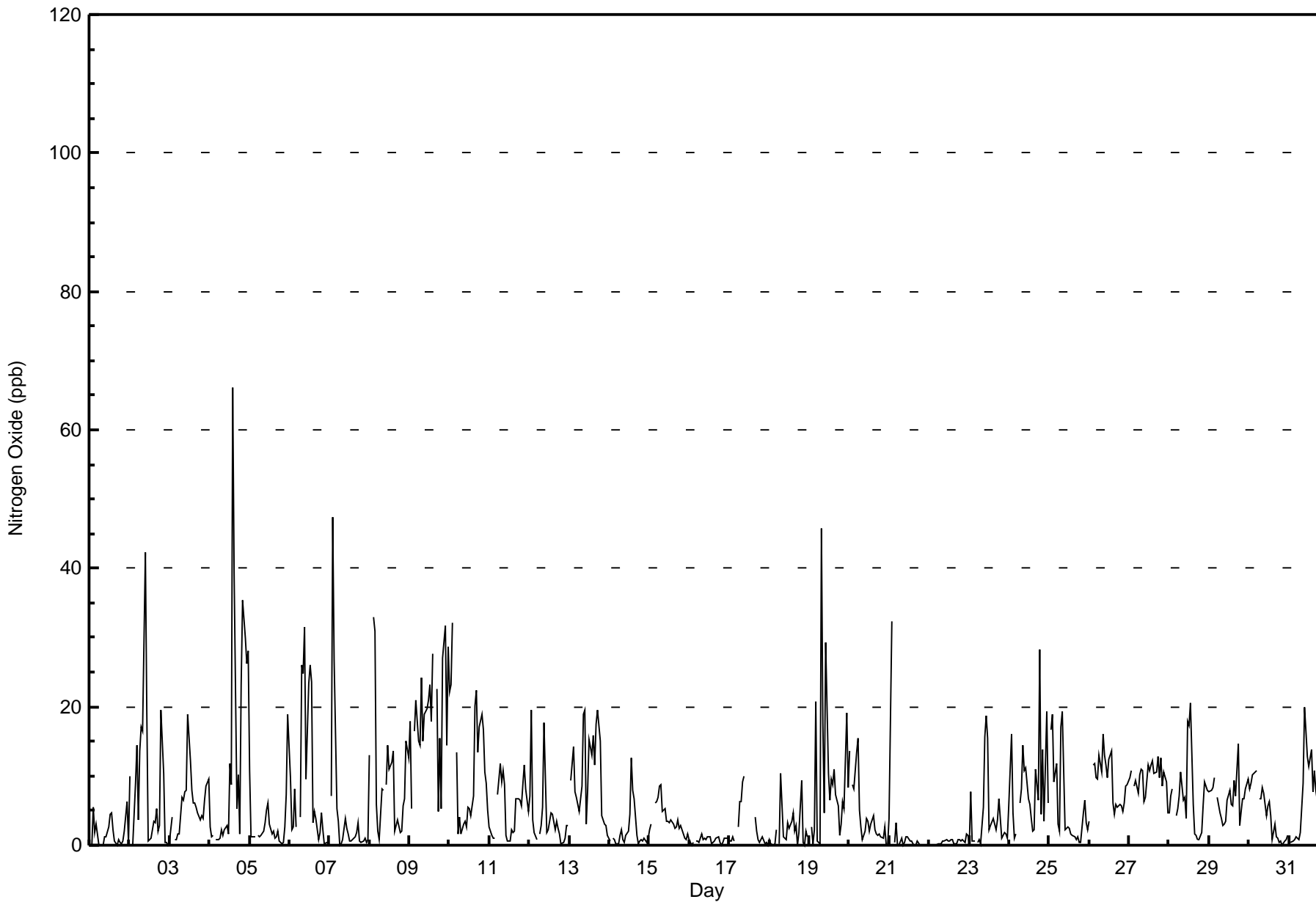
Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxide (NO) - ppb

ConocoPhillips - Surmont - January 2017

Maximum Value: 66 ppb on Jan 4 15:00																		Maximum Daily Average: 18.5 ppb on Jan 9																		Hours in Service: 744	
Minimum Value: 0 ppb on Jan 1 02:00																		Minimum Daily Average: 0.5 ppb on Jan 22																		Hours of Data: 706	
Maximum Diurnal Average: 9.1 ppb at hour 10																		Minimum Diurnal Average: 4.0 ppb at hour 6																		Hours of Missing Data: 38	
Monthly Average: 6.4 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 4 Q ₃ = 9 P ₉₀ = 16 P ₉₉ = 32																		Hours of Calibration: 36	
																																				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-Jan	Z	0	5	2	3	0	0	0	0	1	1	3	4	5	2	1	0	1	0	0	1	2	6	0	1.7	6											
2-Jan	10	Z	0	9	14	4	14	17	17	42	19	1	1	1	3	3	5	2	3	20	10	0	0	0	8.5	42											
3-Jan	0	4	Z	1	1	2	2	7	7	8	8	19	12	8	6	6	5	5	4	4	4	6	8	10	5.9	19											
4-Jan	3	1	1	Z	1	1	1	2	1	2	3	2	12	9	66	39	5	10	2	23	35	30	26	28	13.2	66											
5-Jan	11	1	1	1	Z	2	1	1	2	3	5	6	3	2	2	1	1	2	1	0	0	3	7	19	3.3	19											
6-Jan	10	2	3	8	3	Z	4	26	25	32	10	23	26	24	3	5	4	1	2	5	2	0	0	0	9.4	32											
7-Jan	Z	7	47	27	5	3	0	0	1	4	2	2	1	1	1	1	2	3	1	0	1	1	0	1	4.8	47											
8-Jan	13	Z	33	31	6	2	1	8	8	M	9	14	11	12	14	2	3	4	2	2	6	7	15	13	9.7	33											
9-Jan	18	5	Z	17	21	15	14	24	15	19	20	21	23	18	28	M	23	5	15	5	27	32	15	29	18.5	32											
10-Jan	22	23	32	Z	13	2	4	2	3	4	3	5	5	4	7	20	22	13	17	19	17	11	9	5	11.4	32											
11-Jan	3	1	1	1	Z	7	12	9	11	9	1	1	1	2	2	2	7	7	7	6	9	12	8	5	5.3	12											
12-Jan	7	20	4	2	1	Z	2	3	6	18	2	2	3	5	4	2	3	2	2	0	0	1	3	3	4.1	20											
13-Jan	Z	9	14	8	7	6	5	9	19	20	3	8	15	13	16	11	18	20	15	4	4	3	3	1	10.0	20											
14-Jan	1	Z	1	1	0	0	1	2	1	0	1	2	4	13	8	7	2	0	1	1	1	1	0	1	2.1	13											
15-Jan	2	3	Z	6	6	7	9	9	5	5	3	3	4	3	2	3	4	2	3	2	1	1	2	2	3.8	9											
16-Jan	1	0	0	Z	1	1	0	2	1	1	1	1	1	0	0	1	1	1	0	0	0	1	1	1	0.8	2											
17-Jan	1	1	1	1	Z	3	6	6	9	10	C	C	C	C	C	4	2	1	0	1	1	0	0	0	2.6	10											
18-Jan	1	0	0	0	2	Z	0	10	1	1	1	3	2	3	5	2	3	0	2	9	0	0	2	1	2.2	10											
19-Jan	Z	3	0	2	21	1	0	46	18	5	29	10	7	10	9	11	7	6	1	3	6	5	19	8	9.9	46											
20-Jan	14	Z	9	8	13	15	5	3	1	2	4	3	2	3	4	2	2	1	2	1	1	3	0	0	4.3	15											
21-Jan	4	32	Z	0	3	0	0	1	0	0	1	1	1	1	0	0	0	1	0	0	0	0	0	0	2.0	32											
22-Jan	0	0	0	Z	0	0	0	0	1	1	1	1	1	1	1	0	0	1	1	1	1	0	2	1	0.5	2											
23-Jan	0	8	1	1	Z	1	1	0	6	16	19	16	2	3	4	3	2	4	7	1	1	2	2	1	4.2	19											
24-Jan	6	16	5	1	2	Z	6	8	15	11	11	7	6	4	2	2	11	7	28	5	14	3	19	6	8.4	28											
25-Jan	Z	17	19	9	12	3	2	17	19	2	2	3	3	2	1	1	1	1	0	0	5	6	3	2	5.7	19											
26-Jan	3	Z	12	12	10	9	13	11	16	13	12	10	12	14	6	5	6	5	6	6	5	6	9	9	9.1	16											
27-Jan	10	11	Z	9	9	8	10	11	11	6	7	12	11	12	12	10	11	13	10	13	8	10	9	5	9.8	13											
28-Jan	5	7	8	Z	4	5	7	11	7	7	4	18	17	20	6	2	1	1	1	2	6	9	9	8	7.1	20											
29-Jan	8	8	8	10	Z	7	5	4	3	3	3	6	8	6	6	9	7	15	3	5	7	7	8	10	6.7	15											
30-Jan	8	9	10	10	11	Z	7	7	8	8	4	6	6	4	1	3	1	1	0	1	0	1	1	1	4.7	11											
31-Jan	Z	0	1	1	1	1	1	2	9	20	17	13	11	14	8	11	8	7	14	5	6	5	7	7	7.3	20											
6.3																		7.3																		Diurnal Average	
22																		32																		Diurnal Maximum	
8.4																		6.8																			
47																		31																			
6.6																		4.0																			
15																		4.3																			
14																		8.3																			
46																		7.8																			
25																		9.1																			
42																		6.9																			
29																		7.4																			
23																		7.2																			
26																		7.2																			
66																		7.7																			
39																		5.7																			
23																		5.3																			
20																		4.6																			
28																		4.8																			
23																		4.7																			
35																		5.8																			
32																		5.4																			
26																		6.2																			
29																		5.7																			
Z - zerspan																		C - Calibration																		M - Maintenance	





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	670	94.90	94.90
21 - 40	32	4.53	99.43
41 - 80	4	0.57	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	30	9	3	2	1	5	3	3	17	33	68	138	114	87	26	97	636
21 - 40	0	0	0	0	0	0	0	1	2	0	2	0	17	8	2	0	32
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	4
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
Totals	30	9	3	2	1	5	3	4	19	33	70	138	132	98	28	97	672

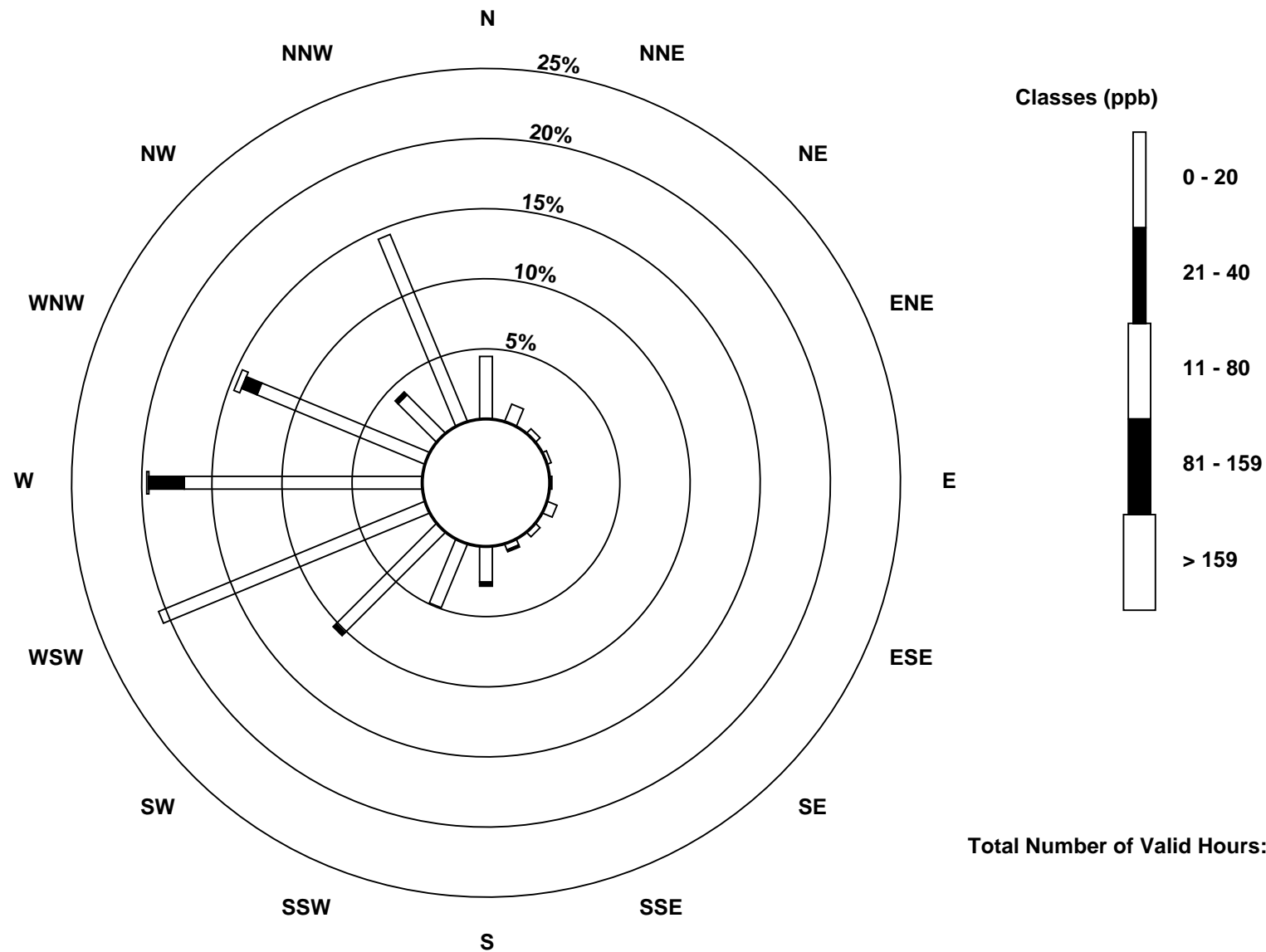
Total Number of Valid Hours: 672

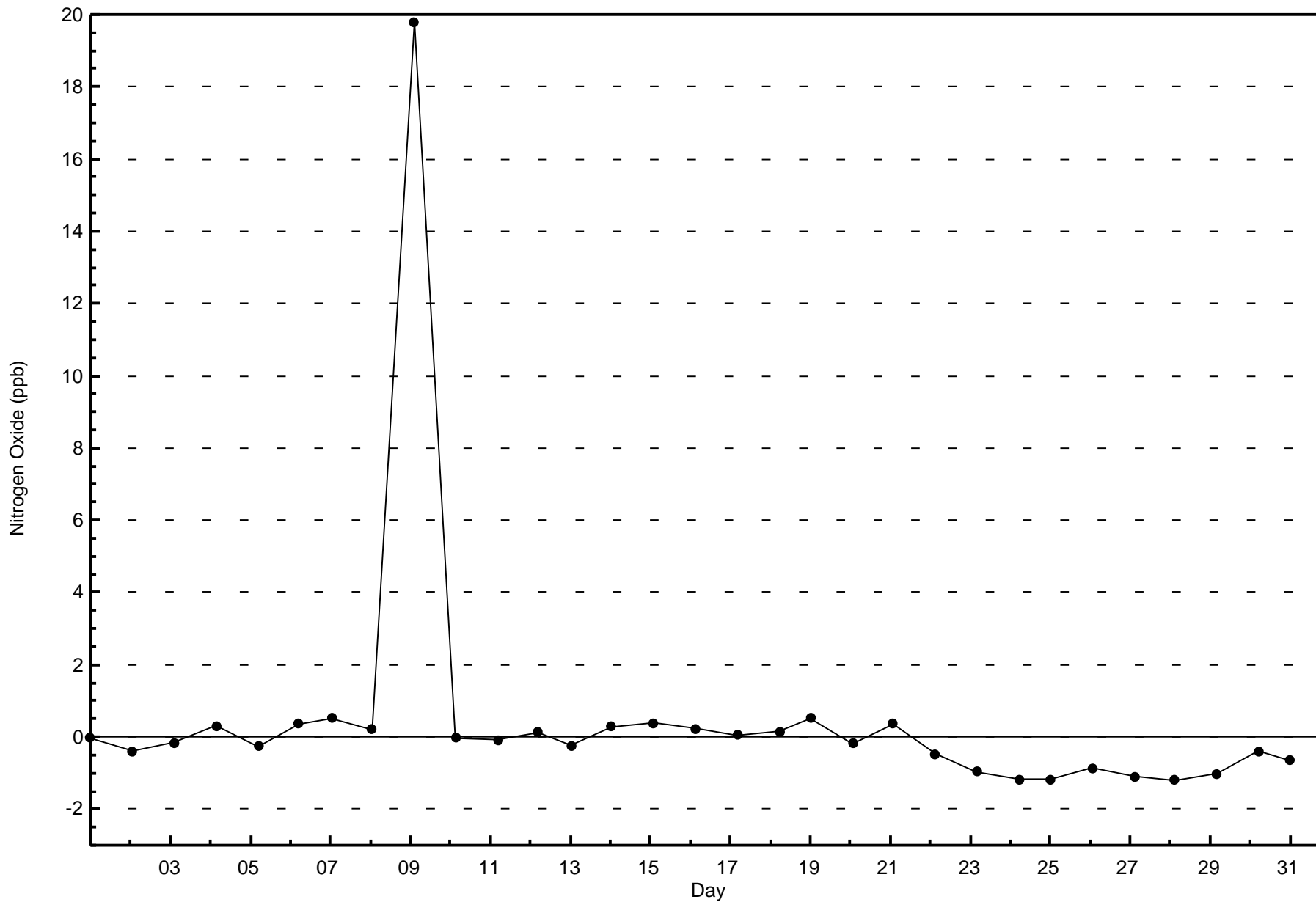
Total Number of Hours: 744

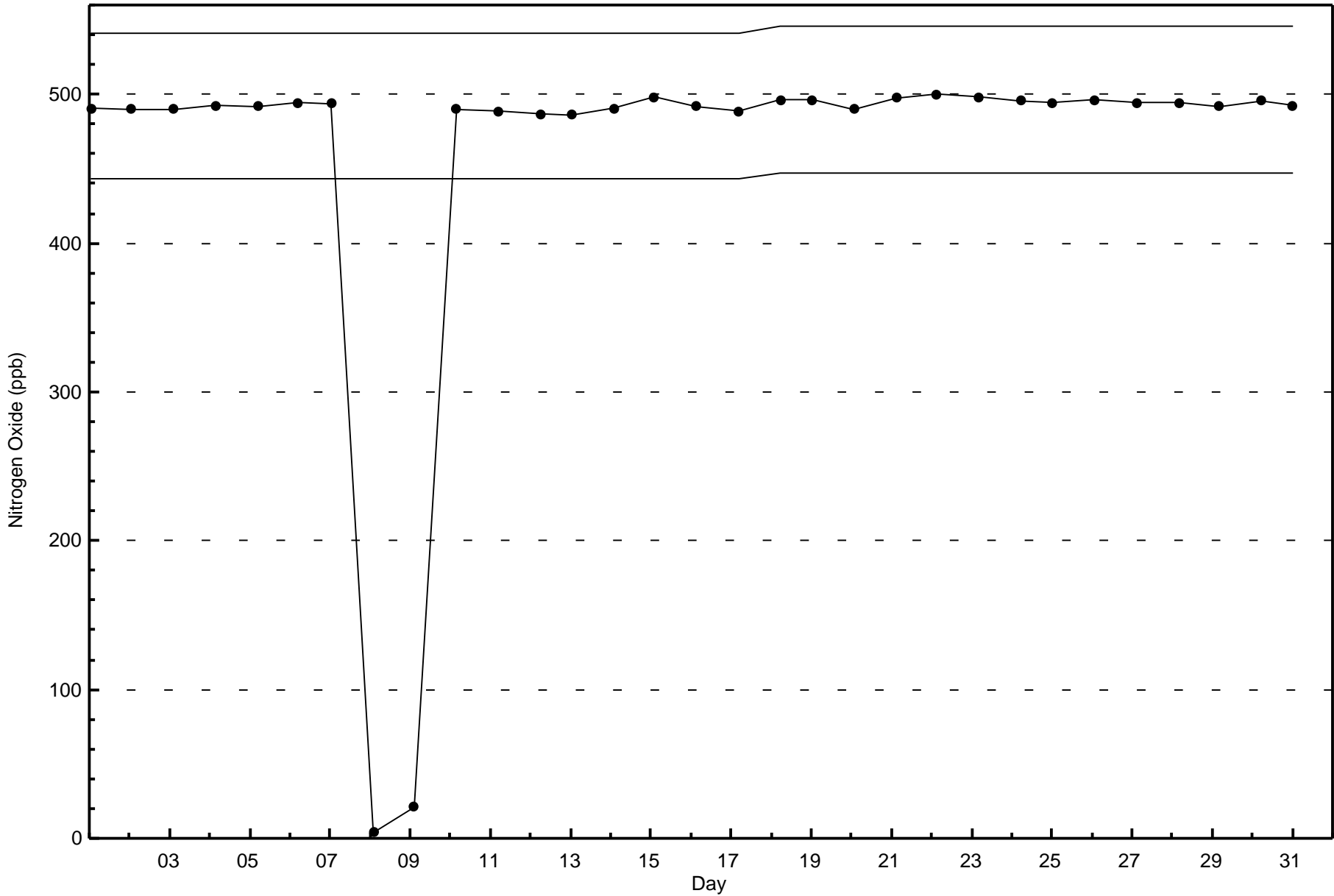


Wood Buffalo Environmental Association
Wind Rose 2012-2017

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont (AMS502)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

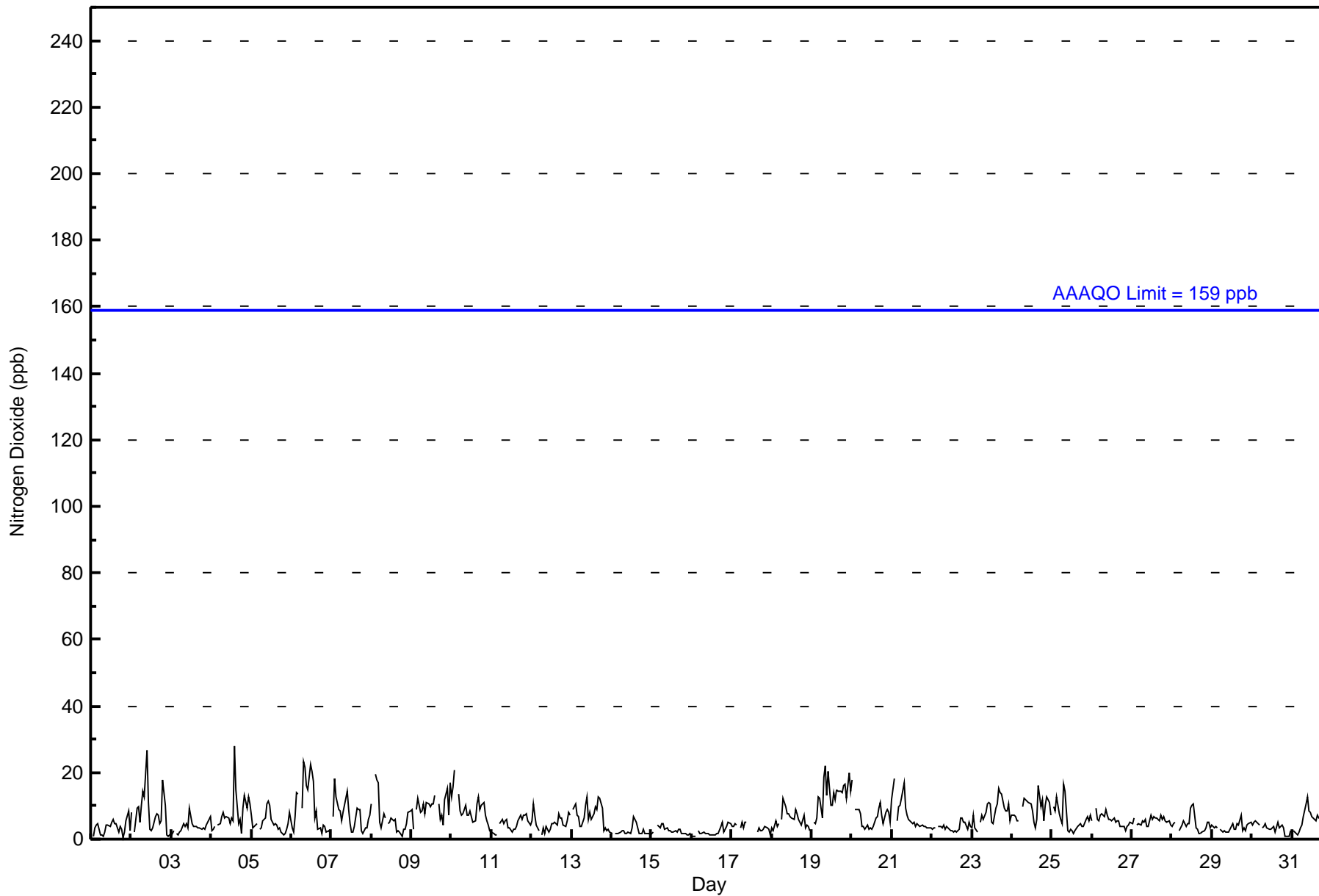
ConocoPhillips - Surmont - January 2017

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 28 ppb on Jan 4 15:00	Maximum Daily Average: 13.3 ppb on Jan 19		Hours of Data:	706
Minimum Value: 1 ppb on Jan 1 20:00	Minimum Daily Average: 2.2 ppb on Jan 16		Hours of Missing Data:	38
Maximum Diurnal Average: 7.7 ppb at hour 8	Minimum Diurnal Average: 5.0 ppb at hour 6		Hours of Calibration:	36
Monthly Average: 6.0 ppb	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 5 Q ₃ = 8 P ₉₀ = 12 P ₉₉ = 20		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-Jan	Z	1	4	4	5	1	1	1	2	4	4	4	5	6	5	5	2	4	3	1	2	6	8	2	3.4	8
2-Jan	8	Z	2	10	10	5	10	15	13	27	11	3	3	4	7	8	7	5	5	18	10	1	1	1	7.9	27
3-Jan	1	3	Z	2	1	2	2	5	4	5	3	10	5	4	4	4	4	4	3	3	3	4	5	7	3.7	10
4-Jan	3	3	4	Z	4	5	7	8	6	7	6	5	6	5	28	15	5	6	2	10	13	10	13	11	7.8	28
5-Jan	7	3	4	5	Z	3	3	6	6	11	11	10	6	4	5	4	3	3	2	1	2	3	5	8	5.0	11
6-Jan	3	2	7	14	13	Z	9	23	22	16	15	23	20	17	7	8	3	3	2	4	4	2	3	2	9.7	23
7-Jan	Z	7	18	13	9	8	5	8	10	15	9	5	2	2	4	9	9	9	2	2	3	3	6	7	7.2	18
8-Jan	11	Z	20	18	17	5	3	8	6	M	5	5	7	5	6	2	3	2	1	3	3	5	8	9	6.8	20
9-Jan	9	3	Z	9	12	8	8	11	8	11	11	10	11	11	13	M	11	6	7	4	12	15	7	17	9.7	17
10-Jan	13	16	21	Z	14	8	7	8	10	7	7	9	7	5	6	11	13	9	10	11	7	5	4	3	9.1	21
11-Jan	2	2	1	1	Z	5	6	5	5	6	3	3	2	3	3	4	6	7	6	7	7	8	6	4	4.4	8
12-Jan	6	10	7	4	2	Z	1	3	2	4	2	3	5	5	5	4	8	7	7	4	4	6	8	7	4.9	10
13-Jan	Z	9	11	7	7	4	4	6	10	13	6	8	6	8	10	9	13	12	9	3	3	3	3	2	7.2	13
14-Jan	2	Z	2	2	2	2	3	3	2	2	2	2	3	7	6	5	2	2	2	3	2	2	2	1	2.5	7
15-Jan	2	2	Z	4	4	4	5	5	3	3	3	2	2	2	3	2	3	3	2	2	2	1	1	2	2.6	5
16-Jan	1	1	1	Z	2	2	2	2	2	2	2	1	1	1	1	2	2	4	5	2	3	4	5	5	2.2	5
17-Jan	4	4	5	4	Z	3	5	4	5	5	C	C	C	C	C	2	3	3	3	3	4	3	3	1	3.6	5
18-Jan	3	2	6	4	5	Z	6	12	10	8	8	7	6	6	9	8	6	5	4	7	4	4	4	3	5.9	12
19-Jan	Z	5	5	7	13	12	6	19	22	13	21	10	10	14	12	15	15	15	14	16	17	12	20	15	13.3	22
20-Jan	18	Z	9	9	9	8	4	4	3	4	3	3	3	4	6	7	9	11	7	5	8	9	8	5	6.8	18
21-Jan	12	18	Z	5	10	10	12	17	9	7	6	6	5	5	4	5	4	4	4	4	4	3	3	3	7.0	18
22-Jan	3	3	3	Z	4	4	4	4	3	4	3	2	2	2	2	2	3	6	6	5	5	3	5	4	3.6	6
23-Jan	3	7	3	2	Z	5	7	6	8	11	11	11	5	5	9	10	15	14	14	10	8	8	10	6	8.2	15
24-Jan	7	7	7	6	6	Z	10	12	12	12	11	11	9	5	3	6	16	10	12	6	10	13	11	7	9.0	16
25-Jan	Z	10	9	13	8	6	5	16	14	3	2	3	3	2	2	4	4	5	4	4	6	7	6	7	6.1	16
26-Jan	6	Z	9	6	6	7	8	7	9	7	6	6	6	6	5	6	6	4	4	4	3	4	4	5	5.7	9
27-Jan	5	6	Z	4	5	4	5	5	6	4	4	7	6	7	7	6	5	7	6	7	5	5	6	4	5.5	7
28-Jan	4	5	5	Z	3	4	4	6	4	5	5	9	10	11	3	3	2	2	2	3	4	5	5	4	4.5	11
29-Jan	4	3	4	4	Z	3	2	2	2	2	2	3	5	3	3	5	4	7	3	4	3	4	5	5	3.6	7
30-Jan	4	5	5	5	4	Z	4	4	5	4	3	3	4	4	2	5	4	4	4	3	1	1	1	2	3.5	5
31-Jan	Z	3	2	1	2	3	4	7	11	13	8	8	7	6	6	7	6	6	8	4	3	4	5	6	5.7	13

5.6	5.4	6.6	6.2	6.7	5.0	5.3	7.7	7.5	7.7	6.4	6.3	5.7	5.6	6.1	6.0	6.2	6.0	5.3	5.1	5.3	5.2	5.8	5.3	Diurnal Average
18	18	21	18	17	12	12	23	22	27	21	23	20	17	28	15	16	15	14	18	17	15	20	17	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 (NO₂) - ppb
ConocoPhillips - Surmont - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	699	99.01	99.01
21 - 40	7	0.99	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: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	30	8	3	2	1	5	3	3	19	33	69	138	130	97	27	97	665
21 - 40	0	1	0	0	0	0	0	1	0	0	1	0	2	1	1	0	7
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	30	9	3	2	1	5	3	4	19	33	70	138	132	98	28	97	672

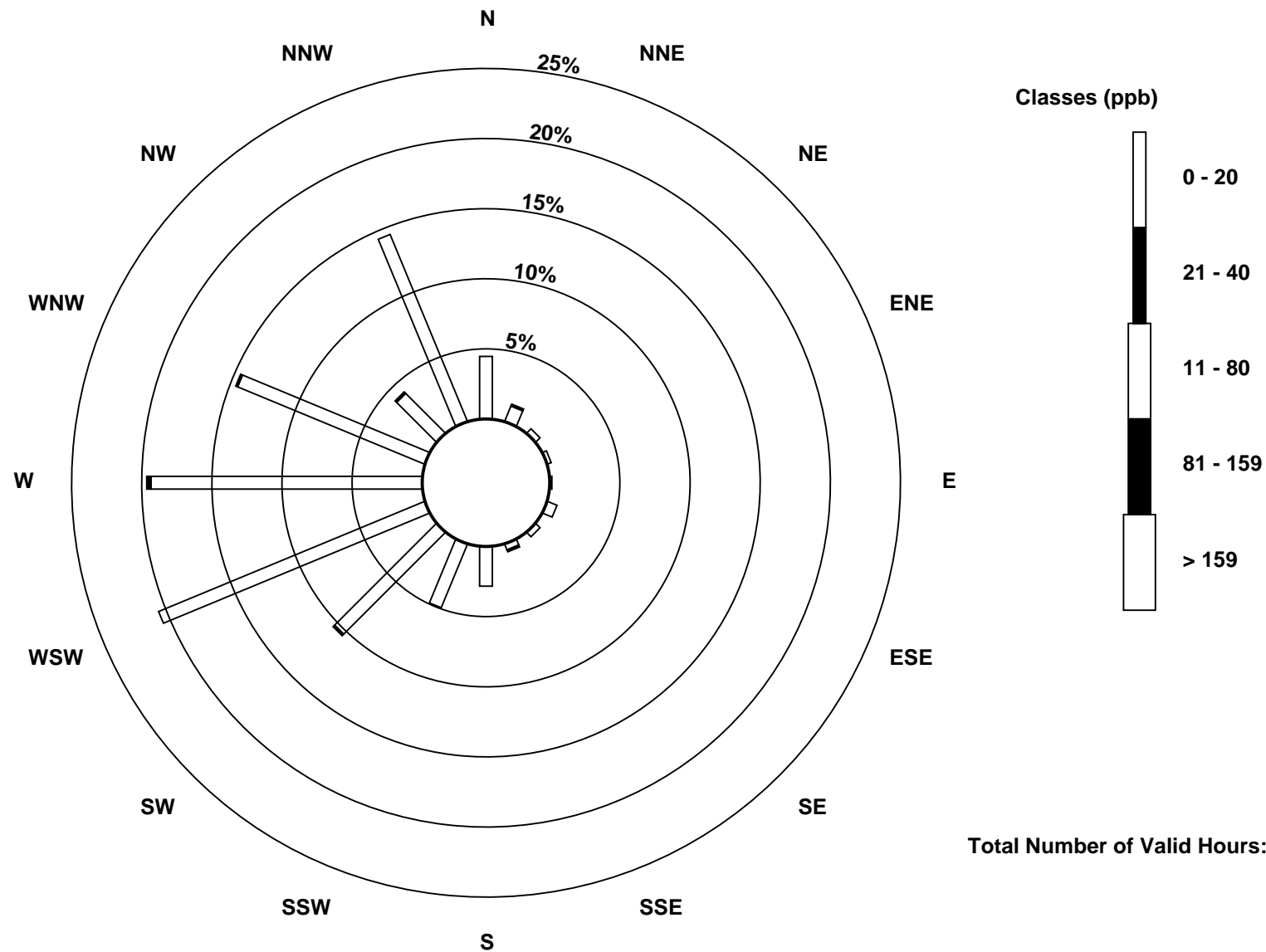
Total Number of Valid Hours: 672

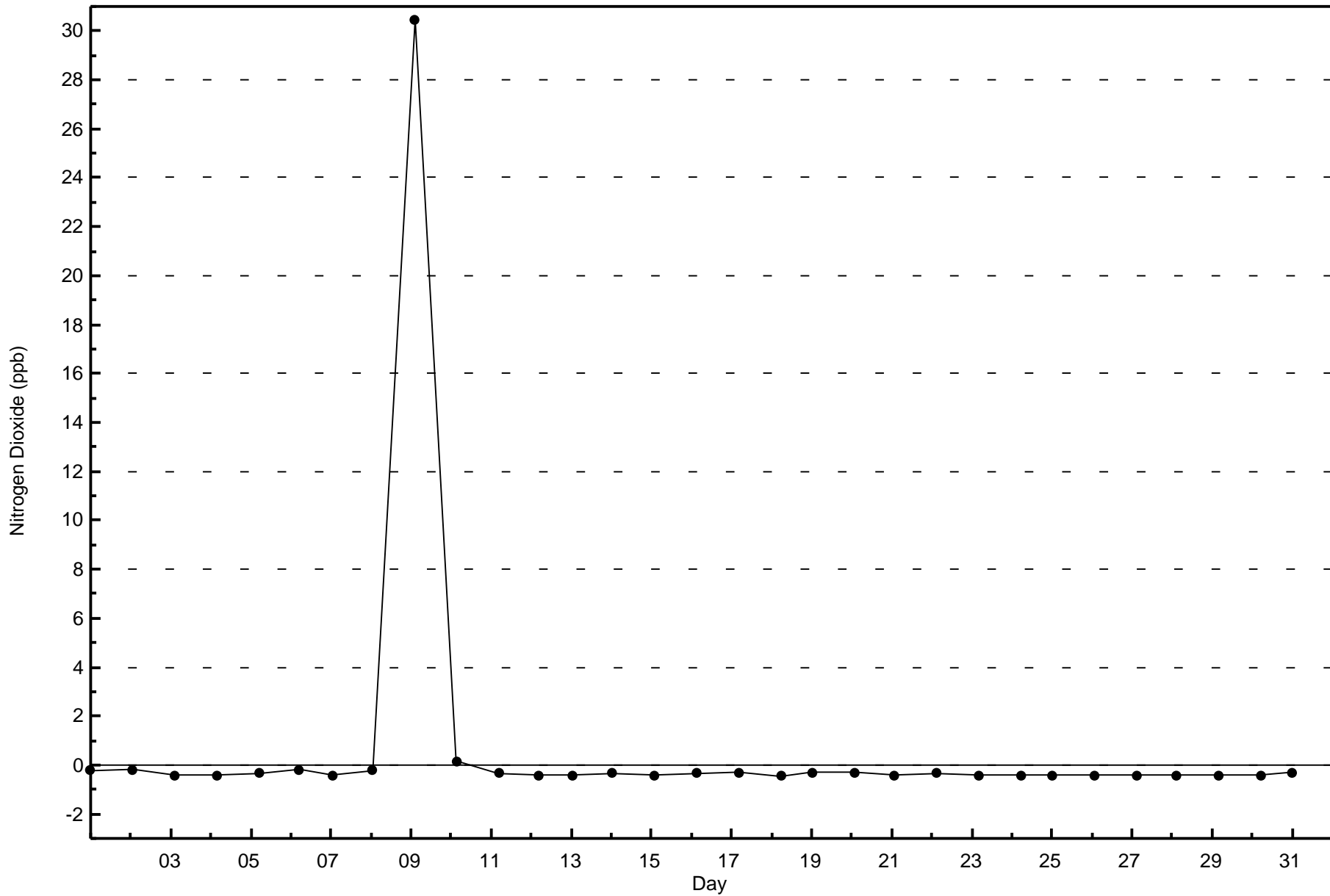
Total Number of Hours: 744

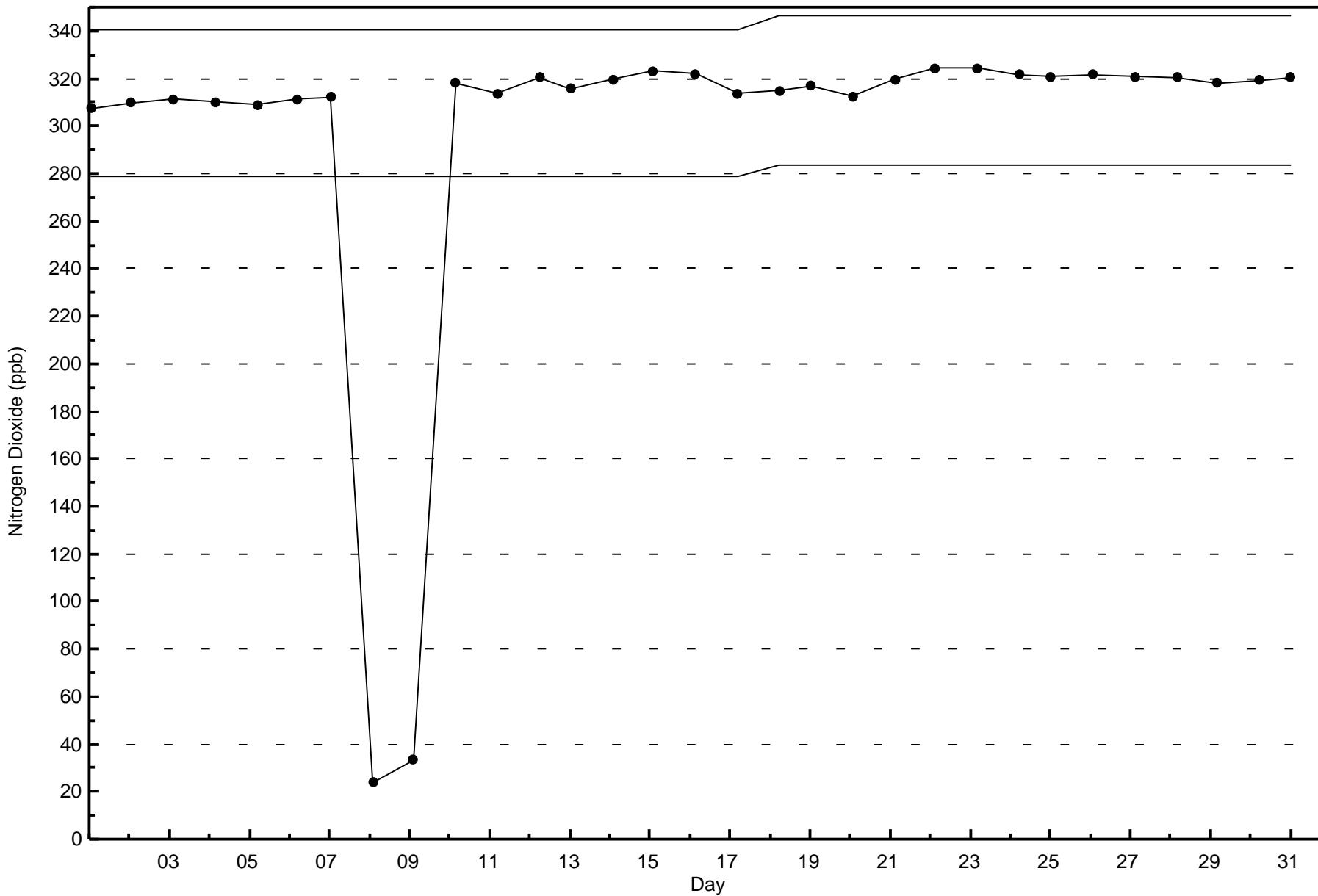


Wood Buffalo Environmental Association
Wind Rose 2012-2017

Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont (AMS502)









Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Oxides (NO_x) - ppb

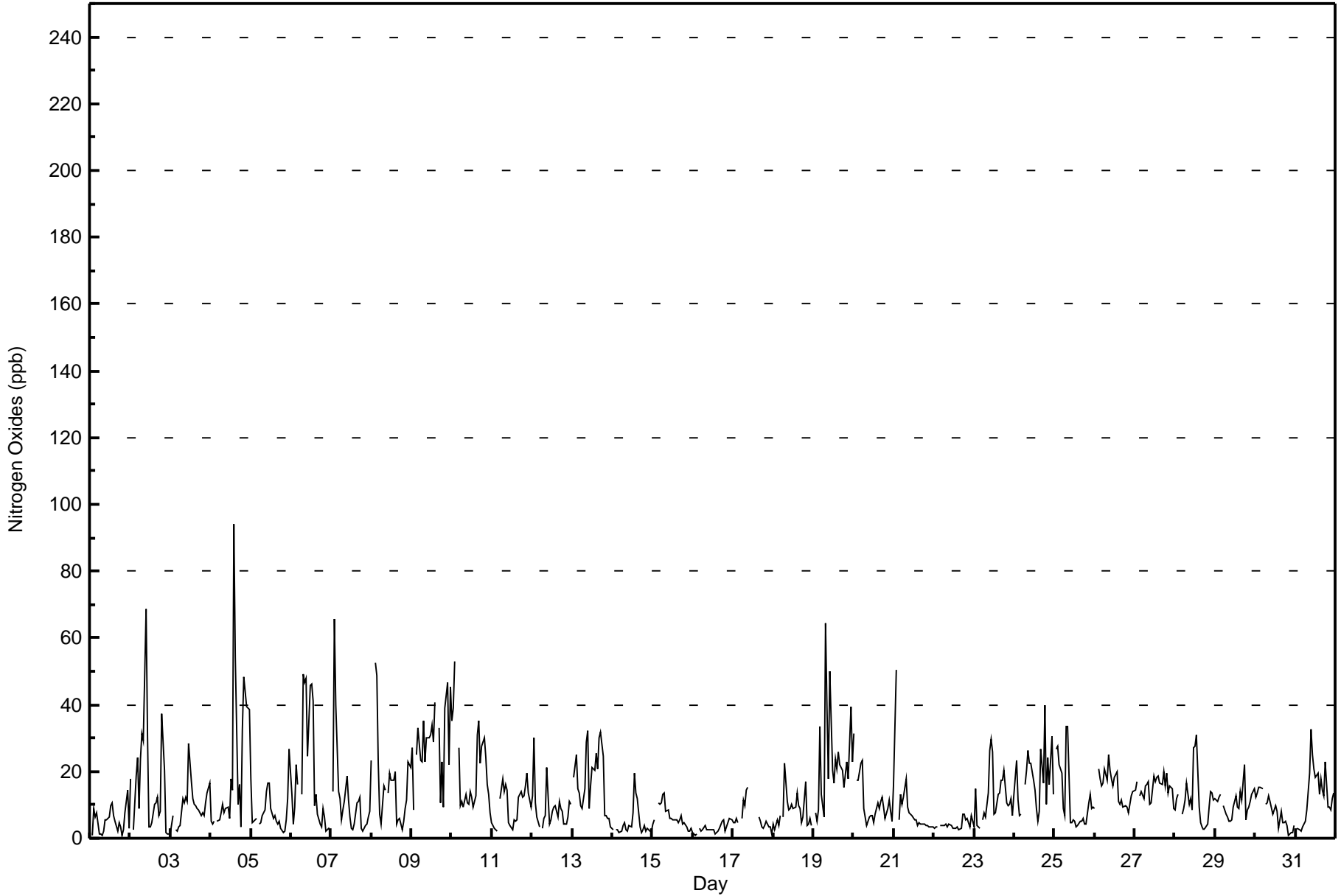
ConocoPhillips - Surmont - January 2017

Maximum Value: 94 ppb on Jan 4 15:00																	Maximum Daily Average: 28.2 ppb on Jan 9																	Hours in Service: 744			
Minimum Value: 1 ppb on Jan 1 20:00																	Minimum Daily Average: 3.0 ppb on Jan 16																	Hours of Data: 706			
Maximum Diurnal Average: 16.7 ppb at hour 10																	Minimum Diurnal Average: 9.0 ppb at hour 6																	Hours of Missing Data: 38			
Monthly Average: 12.4 ppb																	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 9 Q ₃ = 16 P ₉₀ = 26 P ₉₉ = 53																	Hours of Calibration: 36			
																																		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-Jan	Z	1	9	6	8	1	1	1	2	5	5	6	10	11	7	5	2	5	3	1	3	8	15	3	5.1	15											
2-Jan	18	Z	2	18	24	9	24	31	29	69	31	3	3	5	10	11	12	7	8	37	20	2	1	1	16.4	69											
3-Jan	1	7	Z	3	2	3	4	12	10	12	11	29	17	12	10	10	9	8	7	8	7	10	14	17	9.6	29											
4-Jan	5	4	5	Z	5	5	8	10	8	9	9	6	18	14	94	54	10	16	4	33	48	39	39	39	21.0	94											
5-Jan	18	5	6	6	Z	4	5	7	8	14	16	16	9	6	7	5	4	5	3	2	2	5	12	27	8.4	27											
6-Jan	13	4	9	22	16	Z	13	49	46	48	24	46	46	41	10	13	7	4	4	9	6	2	3	2	19.1	49											
7-Jan	Z	14	66	40	14	12	5	8	11	18	11	6	3	3	4	11	11	12	3	2	4	4	7	8	12.1	66											
8-Jan	23	Z	53	49	23	7	4	16	14	M	13	19	17	17	20	4	6	6	3	5	9	11	23	21	16.5	53											
9-Jan	27	8	Z	25	33	23	23	35	23	30	30	31	34	29	41	M	33	11	23	10	39	47	22	46	28.2	47											
10-Jan	35	39	53	Z	27	10	11	9	13	11	10	14	12	9	13	31	35	22	27	30	24	16	13	8	20.5	53											
11-Jan	5	3	2	2	Z	12	18	14	16	14	4	4	3	5	5	6	12	14	12	13	16	19	14	9	9.7	19											
12-Jan	13	30	11	6	3	Z	3	6	7	21	4	5	8	9	10	6	11	9	8	4	4	7	11	10	9.0	30											
13-Jan	Z	18	25	15	14	10	9	15	29	32	9	16	21	20	26	21	30	32	24	7	7	6	6	4	17.2	32											
14-Jan	2	Z	3	3	2	2	4	5	3	2	4	4	8	19	14	12	3	2	3	4	2	3	2	2	4.6	19											
15-Jan	4	5	Z	11	10	11	13	13	8	9	6	6	5	6	6	5	5	7	4	4	3	2	2	3	6.5	13											
16-Jan	2	1	1	Z	3	2	2	4	2	3	2	3	2	1	2	2	3	5	5	2	3	5	6	6	3.0	6											
17-Jan	5	4	6	5	Z	6	11	10	14	15	C	C	C	C	C	6	5	3	3	4	5	3	4	1	6.2	15											
18-Jan	4	3	6	4	7	Z	6	22	11	9	9	10	9	9	14	10	9	5	6	17	4	4	6	4	8.1	22											
19-Jan	Z	8	5	9	33	13	6	64	40	18	50	20	17	24	21	26	22	20	15	19	23	18	39	23	23.1	64											
20-Jan	31	Z	18	17	22	23	9	6	4	6	7	7	5	7	11	9	11	12	9	6	9	11	8	5	11.1	31											
21-Jan	16	51	Z	6	13	10	12	18	9	7	7	7	5	6	4	5	4	4	4	4	4	3	3	3	9.0	51											
22-Jan	3	3	3	Z	4	4	4	4	4	4	4	3	3	3	3	3	3	7	7	5	6	4	7	5	4.2	7											
23-Jan	3	15	4	3	Z	6	8	6	14	26	30	26	7	7	13	14	18	18	20	10	10	12	7	12.4	30												
24-Jan	13	23	12	7	7	Z	16	21	26	22	22	17	15	9	5	8	27	16	40	10	24	16	31	13	17.4	40											
25-Jan	Z	26	27	22	19	9	7	34	34	5	5	5	5	3	4	5	5	6	4	4	10	13	9	9	11.8	34											
26-Jan	9	Z	21	18	16	17	21	17	25	20	18	16	18	20	11	10	11	9	10	9	8	10	13	14	14.8	25											
27-Jan	14	17	Z	13	14	12	16	16	17	10	10	19	17	18	19	17	16	20	15	19	14	16	15	9	15.3	20											
28-Jan	9	12	13	Z	7	9	11	16	10	12	8	27	27	31	9	4	3	3	3	4	9	14	13	12	11.7	31											
29-Jan	12	11	12	13	Z	10	7	6	5	5	6	10	13	9	9	14	12	22	5	9	9	11	13	15	10.3	22											
30-Jan	12	14	15	15	15	Z	10	11	13	11	7	9	10	8	3	8	5	5	5	4	1	2	1	4	8.1	15											
31-Jan	Z	3	3	2	3	4	5	8	20	33	25	21	18	20	13	18	14	13	23	9	9	9	12	13	13.0	33											
11.9 12.7 15.0 13.0 13.3 9.0 9.5 16.0 15.3 16.7 13.3 13.7 12.9 12.8 13.8 11.7 11.6 10.6 10.1 9.8 11.1 10.7 12.1 11.0																	Diurnal Average																				
35 51 66 49 33 23 24 64 46 69 50 46 46 41 94 54 35 32 40 37 48 47 39 46																	Diurnal Maximum																				
Z - zerospan			C - Calibration			M - Maintenance																															



Wood Buffalo Environmental Association
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont - January 2017**

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	590	83.57	83.57
21 - 40	96	13.60	97.17
41 - 80	19	2.69	99.86
81 - 159	1	0.14	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont - January 2017**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	30	5	2	2	1	4	2	3	17	32	66	130	80	68	21	95	558
21 - 40	0	4	1	0	0	1	1	0	0	1	2	8	43	26	5	2	94
11 - 80	0	0	0	0	0	0	0	1	2	0	2	0	8	4	2	0	19
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	30	9	3	2	1	5	3	4	19	33	70	138	132	98	28	97	672

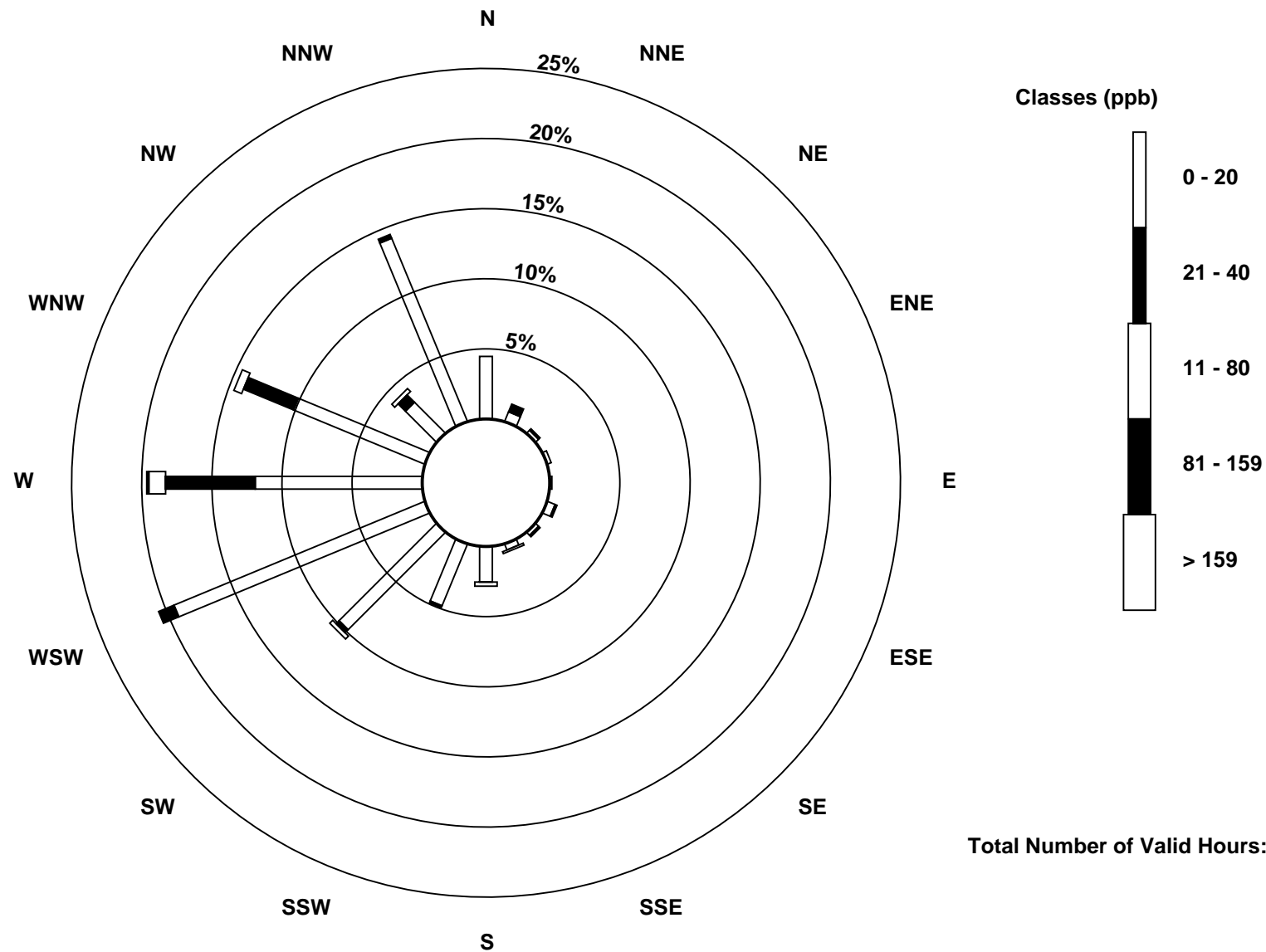
Total Number of Valid Hours: 672

Total Number of Hours: 744

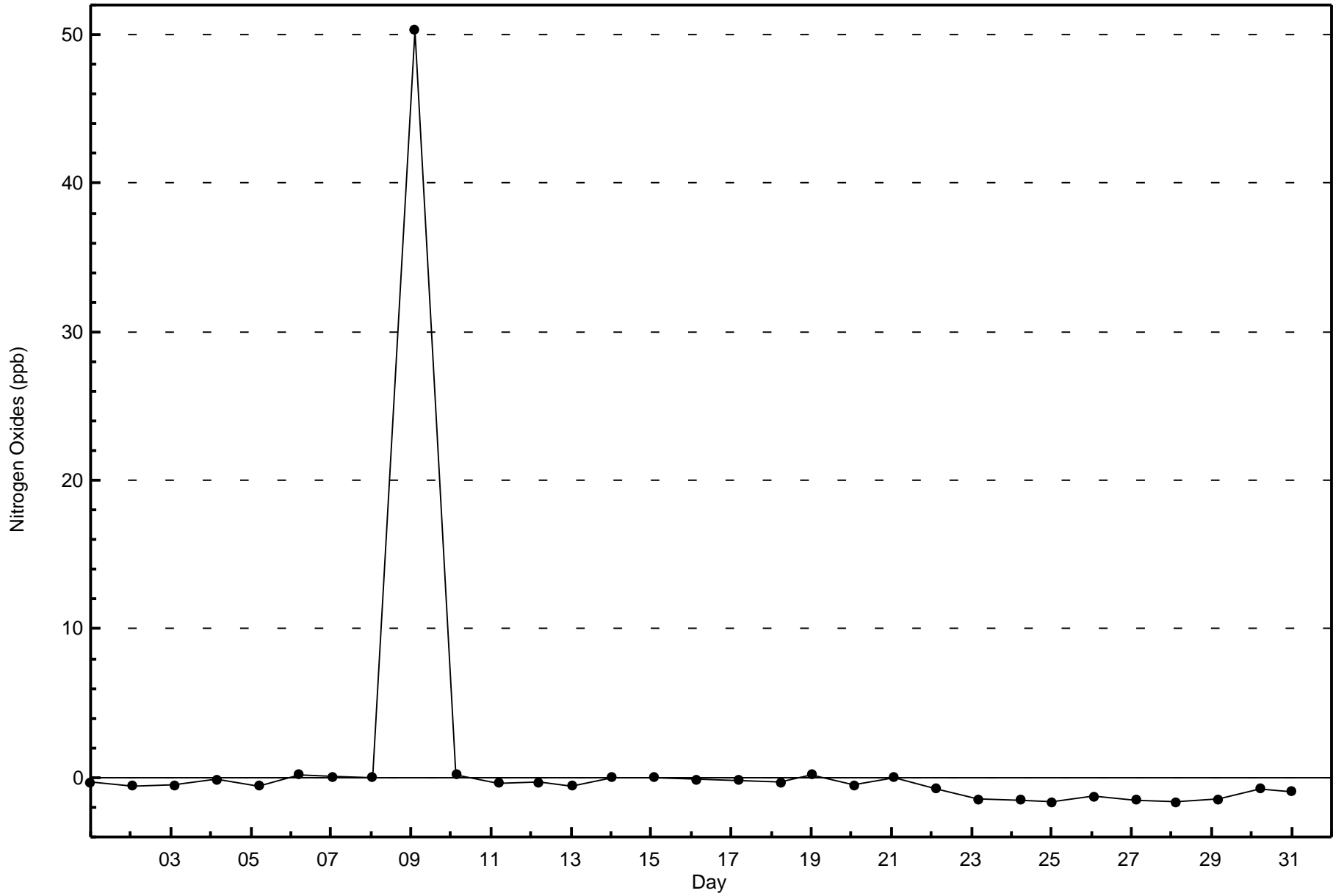


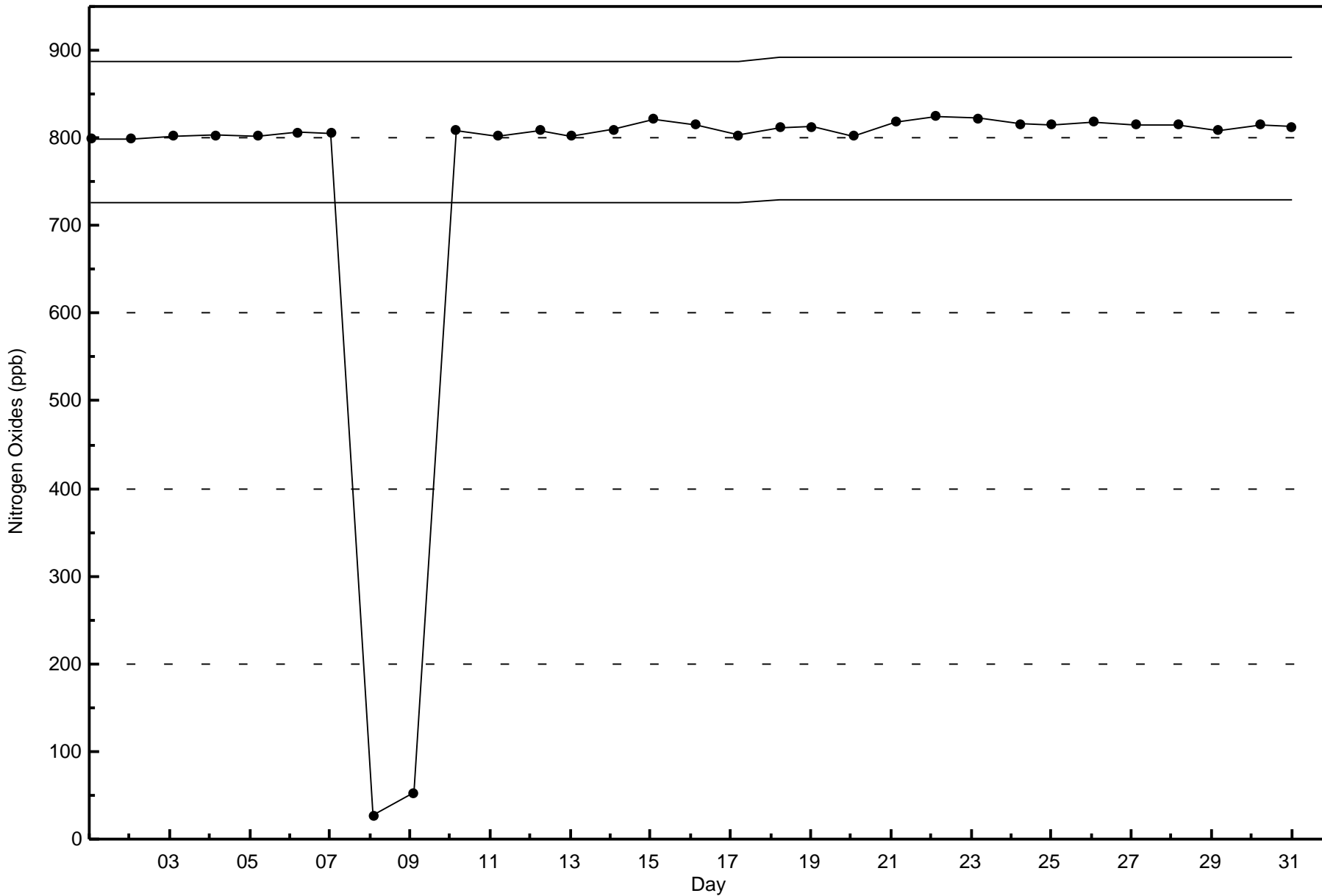
Wood Buffalo Environmental Association
Wind Rose 2012-2017

Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont (AMS502)



Total Number of Valid Hours: 672







Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

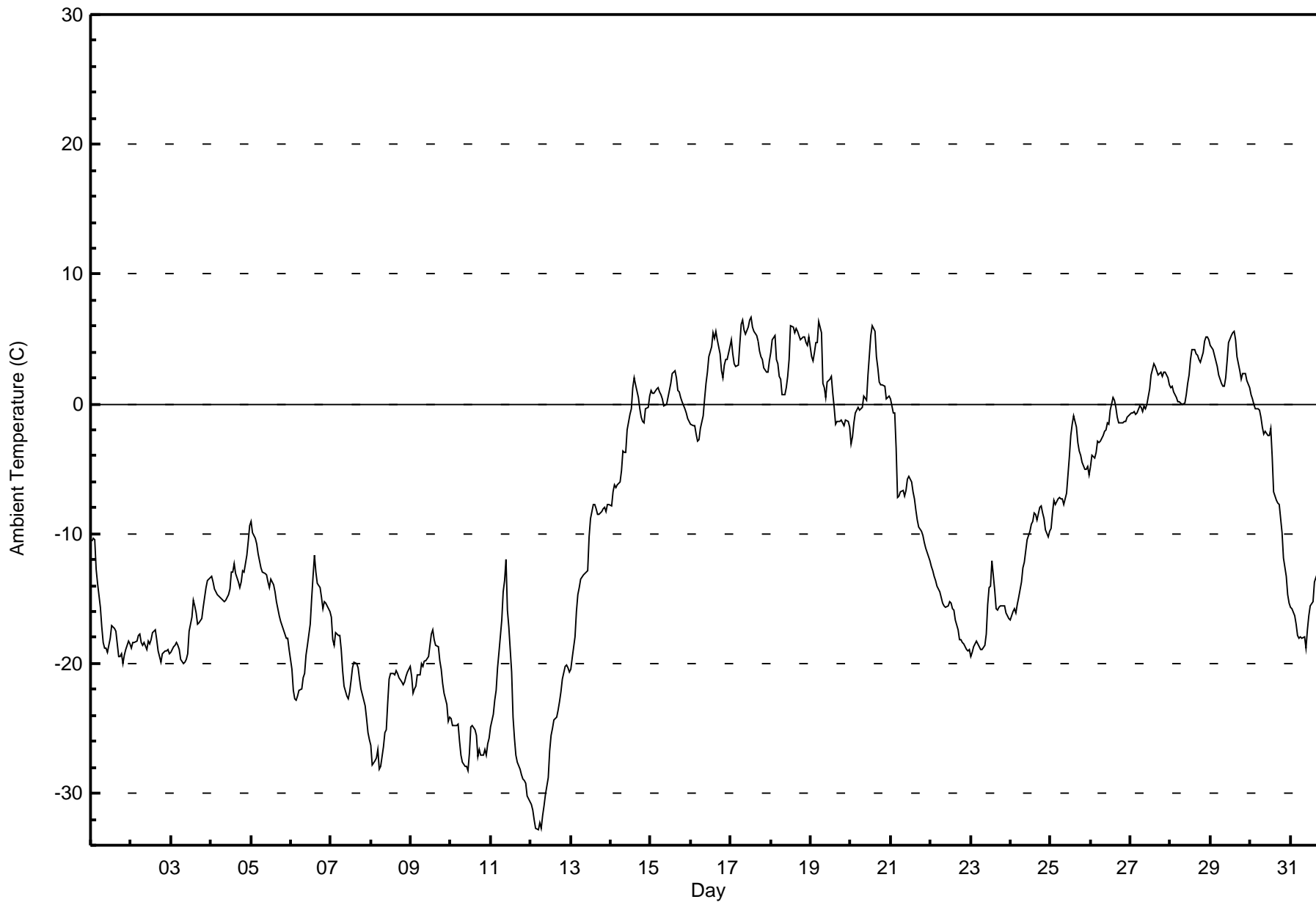
ConocoPhillips - Surmont - January 2017

Maximum Value: 6.7 C on Jan 17 13:00		Maximum Daily Average: 4.5 C on Jan 17		Hours in Service: 744																							
Minimum Value: -32.8 C on Jan 12 05:00		Minimum Daily Average: -26.8 C on Jan 12		Hours of Data: 744																							
Maximum Diurnal Average: -8.2 C at hour 14		Minimum Diurnal Average: -10.9 C at hour 8		Hours of Missing Data: 0																							
Monthly Average: -10.06 C		Percentiles: P₁ = -30.9 P₁₀ = -22.8 Q₁ = -18.6 Median = -11.7 Q₃ = -0.1 P₉₀ = 3.4 P₉₉ = 6.0		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-Jan	-10.5	-10.4	-10.4	-12.8	-13.9	-15.6	-17.2	-18.4	-18.8	-18.8	-19.2	-18.0	-17.1	-17.1	-17.3	-17.5	-19.4	-19.4	-19.2	-20.0	-19.4	-18.9	-18.3	-18.5	-16.9	-10.4	
2-Jan	-18.8	-18.4	-18.4	-18.3	-17.8	-17.7	-18.3	-18.6	-18.4	-18.9	-18.3	-18.5	-18.2	-17.6	-17.4	-18.1	-19.0	-19.4	-19.9	-19.3	-19.0	-19.0	-18.9	-19.2	-18.6	-17.4	
3-Jan	-19.1	-18.7	-18.6	-18.4	-18.6	-18.9	-19.7	-20.0	-19.9	-19.7	-19.2	-17.5	-16.4	-15.2	-15.5	-16.2	-16.9	-16.8	-16.5	-15.6	-14.9	-14.1	-13.6	-13.4	-17.2	-13.4	
4-Jan	-13.3	-13.8	-14.2	-14.4	-14.7	-14.9	-15.0	-15.1	-15.2	-15.1	-14.7	-14.2	-13.0	-13.0	-12.3	-13.0	-13.7	-14.2	-13.8	-12.9	-13.0	-11.7	-10.6	-9.3	-13.5	-9.3	
5-Jan	-9.0	-9.9	-10.3	-10.8	-11.5	-12.1	-12.7	-13.0	-13.1	-13.2	-13.7	-14.1	-13.5	-13.9	-14.5	-15.2	-15.8	-16.3	-16.7	-17.4	-17.7	-18.1	-18.0	-18.9	-14.1	-9.0	
6-Jan	-20.5	-22.1	-22.7	-22.8	-22.5	-22.0	-21.9	-21.1	-20.7	-19.3	-18.6	-17.0	-15.0	-13.2	-11.6	-12.9	-13.8	-14.1	-14.9	-15.7	-15.3	-15.4	-15.8	-16.0	-17.7	-11.6	
7-Jan	-16.4	-18.2	-18.6	-17.6	-17.9	-17.9	-18.9	-20.5	-21.8	-22.5	-22.7	-22.1	-21.3	-20.4	-19.9	-20.0	-20.4	-21.2	-21.9	-22.4	-23.3	-24.2	-25.3	-25.9	-20.9	-16.4	
8-Jan	-26.3	-27.8	-27.5	-27.3	-26.6	-28.1	-27.9	-26.4	-25.3	-25.1	-23.1	-21.3	-20.7	-20.7	-20.8	-20.5	-20.8	-21.1	-21.4	-21.7	-21.4	-21.0	-20.6	-20.2	-23.5	-20.2	
9-Jan	-21.0	-22.2	-21.9	-21.7	-20.9	-20.9	-20.0	-20.2	-19.8	-19.8	-19.5	-18.7	-17.8	-17.4	-18.1	-18.6	-18.8	-19.8	-20.4	-21.5	-22.3	-23.1	-24.5	-24.1	-20.5	-17.4	
10-Jan	-24.2	-24.8	-24.8	-24.7	-24.6	-26.0	-27.1	-27.6	-27.9	-27.9	-28.2	-26.9	-24.9	-24.8	-25.1	-25.5	-27.2	-26.6	-27.1	-27.0	-26.6	-27.1	-26.2	-25.7	-26.2	-24.2	
11-Jan	-24.9	-24.0	-22.8	-22.1	-20.3	-19.1	-16.7	-14.5	-13.6	-11.9	-15.9	-17.2	-20.7	-24.2	-25.7	-27.0	-27.6	-28.1	-28.6	-28.9	-29.0	-29.2	-30.2	-30.6	-23.0	-11.9	
12-Jan	-30.8	-31.3	-32.0	-32.7	-32.8	-32.3	-32.7	-31.7	-30.9	-30.1	-28.8	-26.7	-25.5	-25.0	-24.4	-24.2	-23.6	-22.9	-22.2	-21.2	-20.2	-20.1	-20.3	-20.7	-26.8	-20.1	
13-Jan	-20.4	-19.5	-17.9	-16.0	-14.7	-14.1	-13.5	-13.2	-13.1	-13.0	-12.8	-10.2	-8.9	-7.7	-7.8	-8.1	-8.5	-8.5	-8.3	-8.0	-8.0	-8.3	-7.8	-7.7	-11.5	-7.7	
14-Jan	-7.8	-6.8	-6.3	-6.5	-6.2	-6.1	-5.2	-3.6	-3.8	-3.7	-2.0	-0.8	-0.4	1.2	2.0	1.5	0.5	-0.4	-1.0	-1.3	-1.5	-0.4	-0.2	0.7	-2.4	2.0	
15-Jan	1.0	0.8	0.8	1.1	1.2	0.9	0.7	0.4	-0.1	-0.1	0.5	1.1	1.6	2.4	2.6	2.0	1.1	1.0	0.5	1.3	-0.4	-0.7	-1.1	-1.3	0.7	2.6	
16-Jan	-1.6	-1.7	-1.7	-2.4	-2.9	-2.7	-1.9	-0.9	0.4	1.6	2.5	3.6	4.4	5.5	5.0	5.6	4.9	3.8	2.5	2.0	2.9	3.4	3.4	4.4	1.7	5.6	
17-Jan	5.0	3.8	3.1	2.9	3.0	4.6	6.1	6.5	5.7	5.4	5.9	6.5	6.7	5.9	5.5	5.2	4.8	4.1	3.7	3.4	2.8	2.4	2.5	3.4	4.5	6.7	
18-Jan	4.0	4.9	5.3	3.4	3.1	2.1	1.9	0.7	0.7	1.2	2.1	3.4	6.0	5.9	5.5	5.8	5.6	5.3	5.0	5.1	5.2	4.8	4.5	5.2	4.0	6.0	
19-Jan	3.6	3.4	4.0	4.7	4.8	6.3	5.5	1.5	1.2	0.5	1.7	1.9	2.1	0.9	-0.3	-1.6	-1.3	-1.3	-1.3	-1.5	-1.7	-1.3	-1.4	-1.8	1.2	6.3	
20-Jan	-3.0	-2.5	-1.5	-0.7	-0.3	-0.4	-0.4	-0.3	0.6	0.3	2.3	3.7	5.3	6.1	5.6	3.6	2.8	1.7	1.5	1.5	1.4	0.3	0.5	0.6	1.2	6.1	
21-Jan	0.4	-0.7	-0.7	-3.4	-7.2	-7.1	-6.7	-6.6	-7.1	-6.7	-5.8	-5.6	-6.0	-6.8	-7.3	-8.2	-9.0	-9.5	-9.8	-10.2	-10.7	-11.1	-11.4	-12.0	-7.1	0.4	
22-Jan	-12.5	-12.9	-13.2	-13.6	-14.0	-14.5	-14.9	-15.4	-15.6	-15.7	-15.5	-15.2	-15.4	-15.7	-15.9	-16.6	-17.4	-18.2	-18.2	-18.4	-18.5	-19.0	-19.1	-18.9	-16.0	-12.5	
23-Jan	-19.4	-19.2	-18.7	-18.3	-18.5	-18.8	-18.9	-19.0	-18.5	-17.7	-15.4	-14.1	-14.1	-12.0	-14.4	-15.8	-15.8	-15.7	-15.6	-15.5	-15.6	-16.1	-16.3	-16.5	-16.7	-12.0	
24-Jan	-16.6	-16.0	-15.8	-16.1	-15.5	-14.9	-13.7	-12.7	-12.2	-11.3	-10.5	-9.8	-9.3	-9.0	-8.4	-8.5	-8.9	-8.0	-7.9	-8.4	-8.9	-9.7	-10.2	-9.8	-11.3	-7.9	
25-Jan	-9.6	-8.4	-7.4	-7.7	-7.3	-7.2	-7.3	-7.4	-7.8	-6.9	-5.5	-4.1	-2.5	-1.6	-0.9	-1.8	-3.0	-3.6	-3.9	-4.5	-5.0	-5.0	-4.8	-5.5	-5.4	-0.9	
26-Jan	-4.9	-3.9	-4.1	-3.7	-2.9	-2.9	-2.9	-2.4	-2.1	-2.0	-1.4	-1.5	-0.5	0.5	0.3	-0.2	-1.0	-1.4	-1.5	-1.4	-1.3	-1.4	-1.0	-0.9	-1.9	0.5	
27-Jan	-0.7	-0.7	-0.6	-0.8	-0.7	-0.1	-0.3	-0.6	-0.2	-0.4	0.0	1.2	2.3	2.7	3.1	2.9	2.2	2.4	2.5	2.1	2.5	2.5	2.0	1.5	1.0	3.1	
28-Jan	1.3	1.4	0.9	0.5	0.1	0.2	0.1	-0.1	0.1	0.8	1.5	2.2	3.4	4.2	4.2	3.9	3.7	3.5	3.3	4.0	4.8	5.2	5.2	4.9	2.5	5.2	
29-Jan	4.5	4.2	3.7	3.3	2.9	2.3	1.6	1.4	1.3	2.0	3.3	4.7	5.3	5.5	5.6	4.9	3.6	2.6	1.9	2.3	2.4	2.4	1.8	1.2	3.1	5.6	
30-Jan	0.7	0.4	-0.1	-0.4	-0.4	-0.5	-1.1	-1.8	-2.3	-2.1	-2.4	-2.5	-1.9	-4.0	-6.7	-7.4	-7.7	-7.8	-8.9	-10.0	-11.9	-13.3	-14.7	-15.4	-5.1	0.7	
31-Jan	-15.6	-15.8	-16.3	-17.0	-17.8	-18.0	-17.9	-18.1	-17.9	-18.8	-17.4	-16.3	-15.6	-15.2	-13.8	-13.4	-13.1	-13.4	-13.8	-13.2	-12.7	-12.7	-12.1	-11.7	-15.3	-11.7	
		-10.5	-10.7	-10.6	-10.8	-10.8	-10.9	-10.9	-10.9	-10.8	-10.6	-10.0	-9.2	-8.4	-8.2	-8.3	-8.9	-9.5	-9.8	-10.1	-10.2	-10.2	-10.3	-10.4	-10.4	Diurnal Average	
		5.0	4.9	5.3	4.7	4.8	6.3	6.1	6.5	5.7	5.4	5.9	6.5	6.7	6.1	5.6	5.8	5.6	5.3	5.0	5.1	5.2	5.2	5.2	Diurnal Maximum		



Wood Buffalo Environmental Association
Hourly Averages

Ambient Temperature (AT) - C
ConocoPhillips - Surmont - January 2017





**Wood Buffalo Environmental Association
Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C
ConocoPhillips - Surmont - January 2017**

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	128	17.20	17.20
-20 - 0	434	58.33	75.54
0 - 10	182	24.46	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

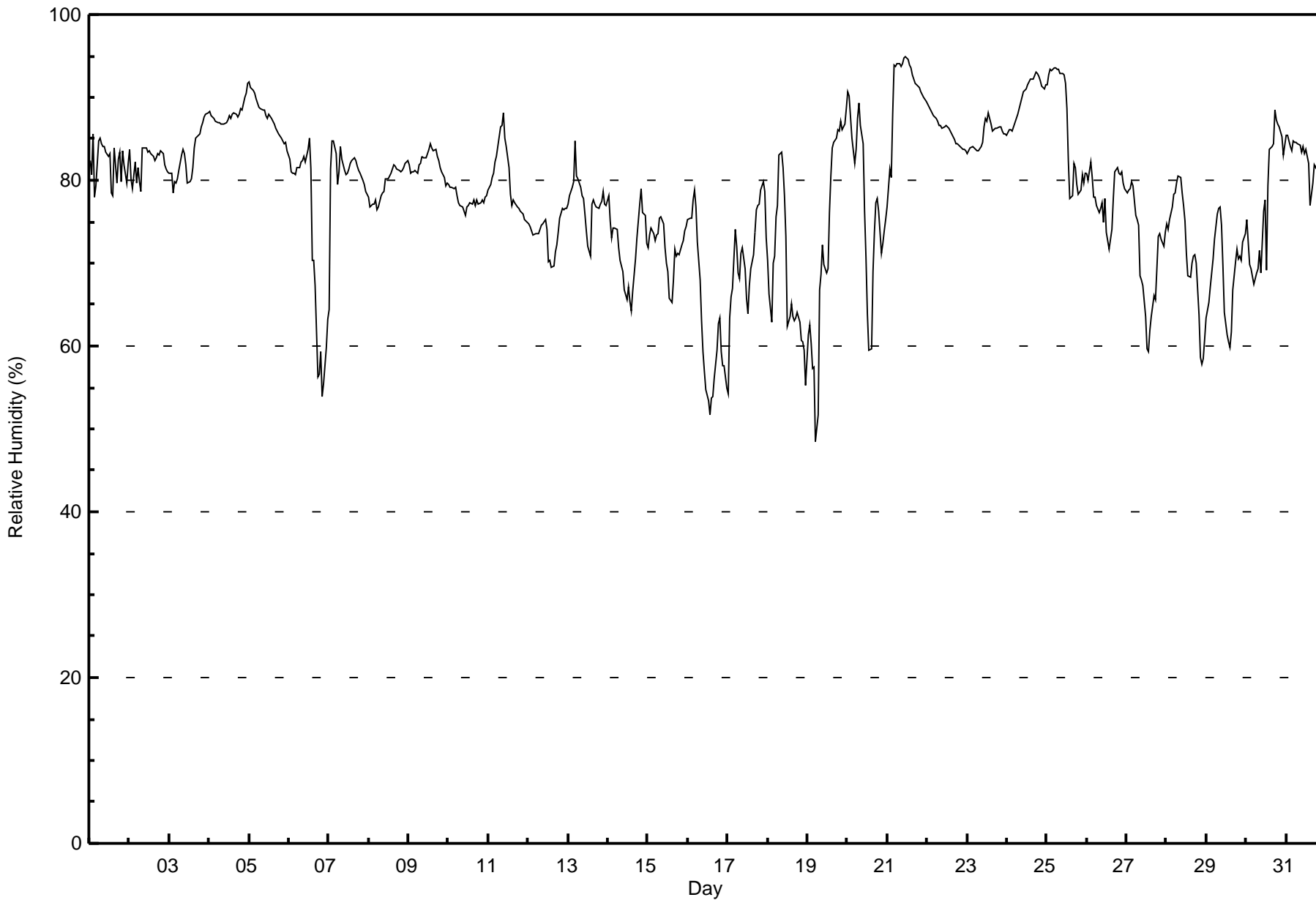
ConocoPhillips - Surmont - January 2017

Maximum Value: 95 % on Jan 21 12:00														Maximum Daily Average: 90.9 % on Jan 21														Hours in Service: 744	
Minimum Value: 48 % on Jan 19 06:00														Minimum Daily Average: 63.2 % on Jan 16														Hours of Data: 744	
Maximum Diurnal Average: 80.4 % at hour 8														Minimum Diurnal Average: 75.9 % at hour 15														Hours of Missing Data: 0	
Monthly Average: 78.5 %														Percentiles: P ₁ = 54 P ₁₀ = 66 Q ₁ = 74 Median = 80 Q ₃ = 84 P ₉₀ = 88 P ₉₉ = 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-Jan	82	81	86	78	79	85	85	84	84	84	83	83	83	78	78	84	80	83	83	80	83	82	80	82	82.1	86			
2-Jan	84	80	79	82	80	82	80	79	84	84	84	83	83	83	83	82	83	83	83	84	83	82	81	81	82.2	84			
3-Jan	81	81	79	80	80	80	81	83	84	83	82	80	80	80	82	84	85	85	86	86	87	88	88	88	83.0	88			
4-Jan	88	88	88	87	87	87	87	87	87	87	87	87	88	87	88	88	88	88	88	89	89	90	91	92	87.9	92			
5-Jan	92	91	91	90	90	89	89	89	89	88	88	88	87	88	87	87	86	86	86	85	85	84	85	84	87.6	92			
6-Jan	83	81	81	81	81	82	81	82	82	83	82	84	85	81	70	70	67	56	57	59	54	55	60	63	73.4	85			
7-Jan	64	81	85	85	83	80	81	84	83	81	81	81	81	82	82	83	82	82	81	81	80	79	79	78	80.8	85			
8-Jan	78	77	77	77	78	76	77	78	79	79	80	80	80	81	81	82	82	81	81	81	81	82	82	82	79.7	82			
9-Jan	82	81	81	81	81	81	82	82	83	83	83	83	84	84	84	84	84	83	82	82	81	80	79	80	82.0	84			
10-Jan	80	79	79	79	79	78	77	77	77	76	76	77	77	77	77	78	77	78	77	77	78	77	78	78	77.6	80			
11-Jan	79	79	80	81	82	83	85	87	87	88	85	84	82	78	77	78	77	77	77	76	76	76	75	75	80.2	88			
12-Jan	75	74	74	73	73	74	74	74	75	75	75	74	70	70	70	70	71	72	74	75	77	76	77	77	73.7	77			
13-Jan	77	78	79	80	85	80	80	79	78	78	76	74	72	71	77	78	77	77	77	77	79	77	77	77	77.5	85			
14-Jan	78	75	73	74	74	74	72	70	70	69	67	66	67	65	64	67	71	73	75	77	79	76	76	72	71.8	79			
15-Jan	72	73	74	74	73	73	73	75	76	75	72	70	69	66	65	68	72	71	71	71	72	73	74	74	71.9	76			
16-Jan	75	75	75	78	79	77	72	68	63	59	57	55	53	52	54	54	56	59	63	63	59	58	58	55	63.2	79			
17-Jan	54	63	66	67	74	72	69	68	71	72	69	66	64	67	69	71	74	77	77	79	80	79	73	73	70.7	80			
18-Jan	70	66	63	70	71	76	77	83	83	81	78	73	62	64	65	63	63	64	63	61	60	60	55	55	68.2	83			
19-Jan	61	63	60	57	57	48	52	67	69	72	70	69	69	76	81	84	85	85	86	86	87	86	87	89	72.7	89			
20-Jan	91	90	88	85	82	84	87	89	87	84	76	71	64	59	60	69	74	77	78	76	71	72	74	75	77.7	91			
21-Jan	77	81	80	88	94	94	94	94	94	94	95	95	95	94	93	93	92	92	91	91	91	90	90	89	90.9	95			
22-Jan	89	89	88	88	88	87	87	87	87	86	86	87	87	86	86	86	85	84	84	84	84	84	84	84	86.1	89			
23-Jan	83	84	84	84	84	84	84	84	84	85	86	87	87	88	87	86	86	86	86	86	86	86	86	86	85.4	88			
24-Jan	85	86	86	86	87	87	88	89	89	90	91	91	92	92	92	92	93	93	93	92	91	91	92	92	90.0	93			
25-Jan	92	93	93	93	94	94	93	93	93	93	93	92	89	82	78	78	82	81	80	78	79	81	80	81	86.8	94			
26-Jan	81	80	82	80	78	78	77	76	77	77	75	78	74	72	73	74	78	81	81	81	81	81	80	79	78.0	82			
27-Jan	78	79	79	80	79	76	75	75	68	68	67	64	60	59	62	64	66	66	69	73	73	73	72	74	70.8	80			
28-Jan	75	74	75	77	78	78	80	81	80	78	77	75	71	69	68	70	71	71	70	64	59	58	59	61	71.6	81			
29-Jan	63	65	67	69	70	73	76	77	77	75	70	64	61	61	60	62	67	70	72	71	71	70	72	74	69.0	77			
30-Jan	75	73	70	69	67	68	69	69	72	69	76	78	69	79	84	84	84	89	87	87	86	85	83	84	77.4	89			
31-Jan	85	86	84	83	85	85	84	84	84	83	84	83	84	82	77	78	80	82	81	82	86	86	85	83	83.3	86			
																												Diurnal Average	
78.4														78.9														78.9	
92														93														93	
																												Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Relative Humidity (RH) - %
ConocoPhillips - Surmont - January 2017





Wood Buffalo Environmental Association
Cumulative Frequency Distribution

Relative Humidity (RH) - %
ConocoPhillips - Surmont - January 2017

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	34	4.57	4.57
60 - 80	345	46.37	50.94
80 - 100	365	49.06	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

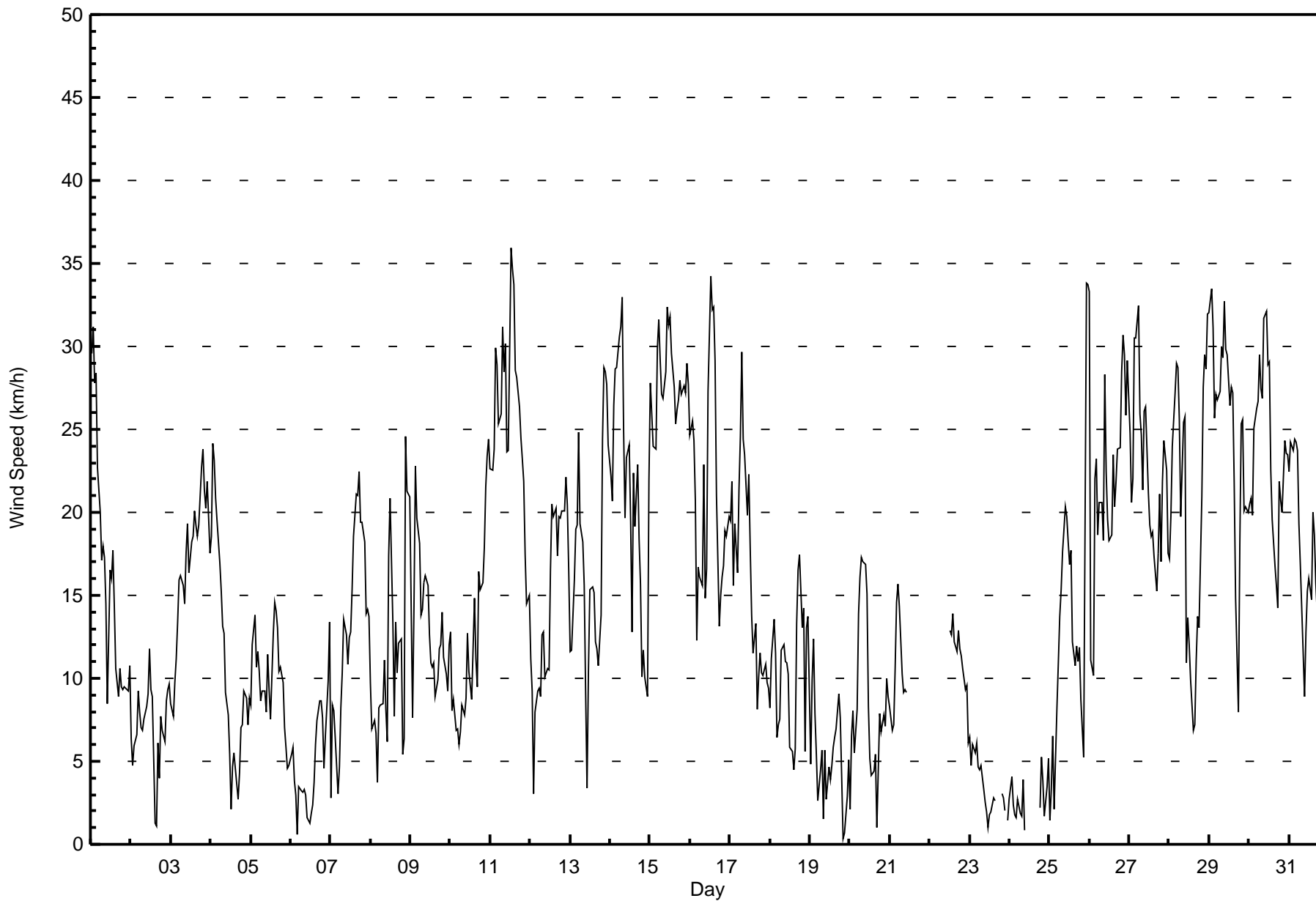


Maximum Speed: 36 km/h on Jan 11 13:00	Maximum Daily Speed Average: 27.9 km/h on Jan 15	Hours in Service: 744
Minimum Speed Value: 0 km/h on Jan 19 21:00	Minimum Daily Speed Average: 1.6 km/h on Jan 19	Hours of Data: 709
Maximum Diurnal Speed Average: 13.5 km/h at hour 23	Minimum Diurnal Speed Average: 9.0 km/h at hour 18	Hours of Missing Data: 35
Monthly Average Velocity: 11.5 km/h 274.6 deg	Percentiles: P ₁ = 1 P ₁₀ = 5 Q ₁ = 8 Median = 14 Q ₃ = 21 P ₉₀ = 28 P ₉₉ = 33	Percent Operational Time: 95.3

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-Jan	W30WNW31	NW28	NNW28	NNW23	NNW20	NNW17	NNW18	NNW17	NNW14	W8WNW17	NW16	NW18	NNW14	NW11	WSW9WNW11WNW10	W9WNW10	WNW9	NW9	NNW11							
2-Jan	WNW6	NW5	N6	WNW7	WNW9	NW8	W7	W7	WNW8	WNW8	NW9	N12	N9	N9	NNE1	SSE1	WSW6	W4	W8	W7	WSW6	WSW9	WSW9	WSW10		
3-Jan	WSW8	WSW8	WSW10	WSW11	WSW13	WSW16	WSW16	WSW16	WSW14	WSW18	WSW19	W16	W18	WNW19	WNW20	WNW19	WNW19	WNW19	WNW23	WNW24	WNW21	WNW20	WNW22	NW18		
4-Jan	NNW19	NNW24	NNW23	NNW21	NNW20	NNW17	NNW15	NNW13	NNW13	NNW9	NNW8	NNW5	WNW2	WSW5	W6	W5	SW3	WSW4	WSW7	W7	W9	W9	W7	W9		
5-Jan	NW8	NNW12	NNW14	N11	N12	N10	N9	NNE9	NNE9	N8	NNW11	NNW9	NNW8	NNW13	NNW15	NNW14	N13	N10	NNW11	N10	N7	N6	NNW5	WNW5		
6-Jan	W5	WSW6	SW4	W3	WSW1	WNW3	SW3	SW3	NW3	NW3	ESE2	SSE1	S2	S2	SSW4	SW6	SW7	SSW9	SW9	SW8	SSW5	SW7	SW10	SW13		
7-Jan	WSW3	NW8	WNW8	WNW6	WNW3	N5	N8	NNW10	NNW14	NNW13	NNW11	NNW12	NNW13	NNW15	NNW19	NNW21	NNW21	NNW22	NNW19	NNW19	NNW18	NNW14	NNW14	NNW14		
8-Jan	NW10	W7	W7	W7	SW4	SW8	SW8	WSW9	WSW11	SW8	WSW6	W17	W21	WSW13	WSW8	WSW13	SW10	WSW12	WSW12	SSW5	SW6	WSW25	W21	W21		
9-Jan	W14	WSW8	W14	W23	W20	W18	WNW14	W14	WNW16	W16	W16	WNW13	WNW11	WNW11	W11	W9	WNW10	WNW12	WNW12	WNW14	WNW11	W10	W9	W12		
10-Jan	W13	WNW8	W9	WNW7	NW7	NNW6	NNW7	NW8	NW8	NW9	NNW13	NW10	NW10	NNW9	WNW15	WNW11	W9	W16	W15	W16	W18	W22	W23	WSW24		
11-Jan	WSW23	WSW23	WSW24	WSW30	WSW29	WSW25	W26	W31	W28	WNW30	N24	NNW24	NNW36	NNW35	NNW34	NNW29	NNW28	NNW26	NNW24	NNW23	NNW22	NW17	WNW15	WNW15		
12-Jan	WNW11	W9	SW3	SW8	SW9	SSW9	SSW9	SW13	SSW13	SSW10	S11	S11	S17	S20	S20	S20	S17	S20	S20	SSW20	SSW20	SSW22	SW20	SW16		
13-Jan	SW12	WSW12	W16	WNW19	WNW19	WNW25	WNW19	WNW18	W16	W9	E3	WNW10	W15	W16	W15	WNW12	W12	W11	W14	WSW24	WSW29	WSW28	WSW28	WSW24		
14-Jan	WSW22	WSW21	WSW26	WSW29	WSW29	WSW31	WSW31	WSW33	WSW25	SW20	WSW23	WSW24	WSW19	W13	W22	WSW19	WSW23	WSW18	WSW16	SW10	SW12	WSW10	SW9	WSW22		
15-Jan	WSW28	WSW26	WSW24	WSW24	W30	W32	W29	W27	WSW27	WSW28	WSW32	WSW31	WSW32	WSW30	WSW28	WSW25	WSW26	WSW27	WSW28	WSW27	WSW28	WSW27	WSW29	WSW28		
16-Jan	WSW25	WSW26	WSW24	WSW21	SW12	SW17	SW16	SW16	SW23	SW15	SW17	WSW27	WSW34	WSW32	WSW32	WSW29	SW21	SSW13	S15	SSW16	SW17	SW19	SW19	SW20		
17-Jan	WSW20	WSW22	SW16	SW19	SW16	WSW21	W25	W30	W24	W23	W20	W22	W18	W14	WSW12	WSW13	SW8	SSW10	SW12	SW10	SW10	SW11	SW10	SSW9		
18-Jan	SSW8	SSW11	S14	SSW12	SSW6	SSW7	S8	SE12	SSE12	S11	SSW11	SW10	SSW6	ESE6	SSW4	SSW6	WSW13	WSW17	WSW17	WSW13	WSW14	SSW6	WSW13	WSW14		
19-Jan	S5	SW10	SW12	WSW8	WNW5	ESE3	SSE4	WNW6	NNE2	S6	SW3	ESE5	NE4	NNE5	NNE6	NNE6	NW7	NNW9	NNW8	N4	NE0	W1	NNW3	NNW5		
20-Jan	WNW2	SSW7	SSW8	SW6	WNW8	W14	WSW16	WSW17	WSW17	WSW17	WSW15	SW8	S5	S4	SE4	SE5	WSW1	S4	SSW8	SSW7	SW8	SW7	SW10	SW9		
21-Jan	SW8	WNW7	NW7	NNW11	NW15	NNW16	NNW14	N10	NNW9	NNW9	NNW9	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF		
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	N13	N13	NNW14	N12	N12	N13	NNW12	N11	NNW11	NNW9	NNW10		
23-Jan	N6	NW5	N6	N6	N6	N5	N5	N5	NNW3	NW3	W2	WNW1	NNE2	NNE2	ENE3	ENE3	AF	AF	NE1	AF	SSW3	SSW3	SSW2	AF		
24-Jan	SW3	WSW4	WSW2	SW2	SW2	WSW3	WSW2	SW2	WSW4	WSW1	AF	AF	AF	AF	AF	AF	AF	AF	AF	W2	SW5	W4	ESE2	W3	WSW5	
25-Jan	WNW1	WSW3	WSW6	WNW2	WSW8	WSW11	WSW14	WSW15	WSW18	WSW20	WSW18	WSW17	WSW18	SW12	SW11	SW12	SW11	SSW12	SSW9	SSW5	WSW19	WSW34	WSW34	WSW34		
26-Jan	W33	WNW11	WNW10	W22	WNW23	WNW19	W21	WNW21	W18	W28	W22	WNW20	WNW18	W19	W23	WSW20	WSW22	WSW24	W24	W28	W31	W30	W26	W29		
27-Jan	W25	WNW21	WNW22	W31	W31	WNW32	WNW26	W25	W21	W26	W26	W21	W19	W19	W17	W15	W18	WNW21	WNW17	WNW22	W24	WNW23	WNW18	WNW18		
28-Jan	WNW17	WNW20	W24	W27	W29	W29	W26	W20	W25	W26	NNW11	W14	WNW12	WNW10	WSW7	SW7	SW11	SW14	SW13	WSW21	W28	W30	W29	W32		
29-Jan	W32	W33	W31	W26	W27	W27	W27	W30	W29	WSW33	WSW30	W29	W26	W28	W27	W22	W15	WNW8	W18	W25	W26	WNW20	WNW20	WNW20		
30-Jan	WNW21	WNW21	WNW20	W25	W26	WNW27	WNW30	WNW27	WNW27	WNW32	WNW32	WNW29	WNW29	NNW23	NNW20	NNW17	NNW16	NNW14	NNW22	NNW21	N20	NNW24	NNW24	NNW23		
31-Jan	NNW22	NNW24	NNW24	NNW24	NNW24	NNW24	NNW19	NNW17	NW12	W9	WNW13	W15	W16	W15	WNW20	WNW19	WNW16	WNW14	WNW15	WNW18	WNW21	WNW21	NW20	NNW20		

W12.3	W11.6	W11.4	W12.5	W12.3	W12.5	W12.1	W12.5	W12.3	W12.8	W11.0	W12.2	W11.1	WNW10	NNW9.9	W9.3	W9.7	W9.0	W10.3	W10.5	W11.2	W12.3	W13.5	W13.3		Diurnal Average
WSW33	W33	W31	W31	W31	WNW32	WSW31	WSW33	WSW29	WSW33	WSW32	WSW31	NNW36	NNW35	NNW34	WSW29	NNW28	WSW27	WSW28	W28	W31	W30	WSW34	WSW34		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
ConocoPhillips - Surmont - January 2017

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	94	13.26	13.26
6 - 11	193	27.22	40.48
12 - 19	193	27.22	67.70
20 - 28	173	24.40	92.10
29 - 38	56	7.90	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



**Wood Buffalo Environmental Association
Frequency Distribution**

**Wind Speed (WS) - km/h
ConocoPhillips - Surmont - January 2017**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	4	5	3	2	1	4	2	3	6	9	13	14	8	8	6	6	94
6 - 11	18	4	0	0	0	1	0	0	5	19	32	24	25	27	16	22	193
12 - 19	8	0	0	0	0	0	1	1	4	5	23	37	39	32	6	37	193
20 - 28	2	0	0	0	0	0	0	0	5	3	5	48	49	29	2	30	173
29 - 38	0	0	0	0	0	0	0	0	0	0	0	23	21	8	0	4	56
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	32	9	3	2	1	5	3	4	20	36	73	146	142	104	30	99	709

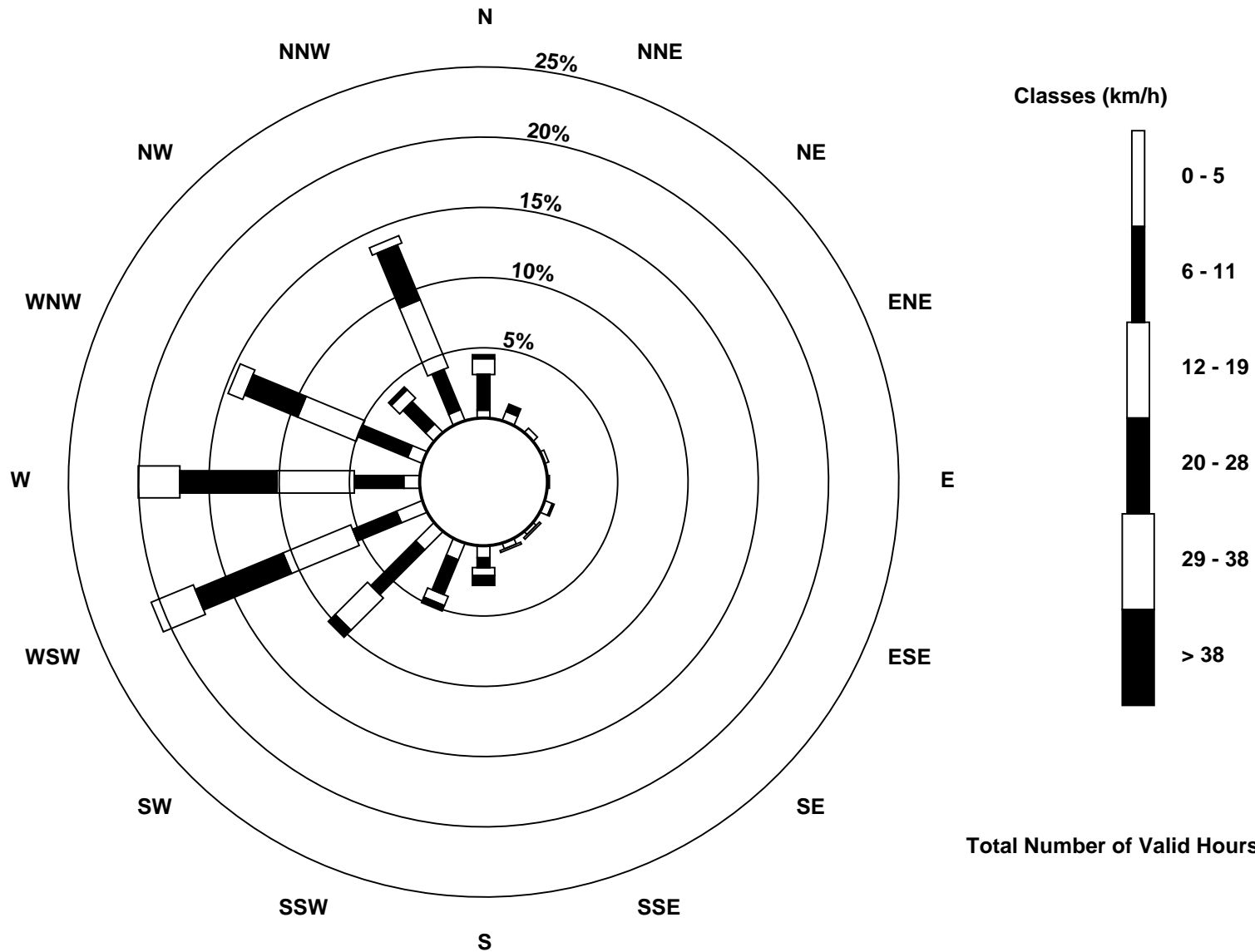
Total Number of Valid Hours: 709

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose 2012-2017

Wind Speed (WS) - km/h
ConocoPhillips - Surmont (AMS502)





Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
ConocoPhillips - Surmont - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 8 km/h on Jan 25 22:00	Hours of Data: 709
Minimum Value: 0 km/h on Jan 23 15:00	Hours of Missing Data: 35
Percentiles: P ₁ = 1 P ₁₀ = 1 O ₁ = 2 Median = 3 O ₃ = 4 P ₉₀ = 5 P ₉₉ = 7	Hours of Calibration: 0
	Percent Operational Time: 95.3

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-Jan	5	6	6	7	4	4	3	4	3	4	2	4	4	4	3	3	1	1	2	1	2	2	3	2	7
2-Jan	2	3	2	2	2	2	1	1	1	1	2	2	2	3	1	1	1	1	2	1	2	1	1	1	3
3-Jan	2	3	1	1	2	2	2	3	2	4	3	4	4	4	4	4	3	4	4	3	4	3	4	3	4
4-Jan	5	4	4	4	4	3	3	2	3	2	2	2	1	2	1	1	1	1	1	1	3	2	2	1	5
5-Jan	1	3	2	2	2	2	2	2	2	2	2	2	3	2	3	3	3	2	2	2	2	2	1	3	
6-Jan	1	1	2	2	1	1	1	2	2	2	1	1	1	1	2	1	1	1	2	1	2	1	2	2	2
7-Jan	3	3	1	1	1	1	2	2	2	2	2	2	2	3	3	4	4	4	4	3	3	3	2	2	4
8-Jan	3	2	1	1	1	2	2	2	2	2	3	4	6	4	2	4	3	3	3	3	4	5	4	4	6
9-Jan	5	2	5	4	4	4	3	3	3	3	2	2	2	3	2	2	2	2	2	3	2	1	2	2	5
10-Jan	2	1	2	1	1	1	2	2	2	2	2	2	3	3	2	2	2	3	3	3	3	4	4	3	4
11-Jan	4	4	6	5	5	5	5	6	5	6	7	8	8	8	8	6	7	6	6	6	5	4	3	2	8
12-Jan	2	2	2	2	2	2	2	4	4	2	3	3	3	4	4	4	4	4	4	5	5	5	6	6	6
13-Jan	4	4	4	4	3	4	4	3	3	3	3	6	5	5	4	3	3	5	4	5	4	4	4	4	6
14-Jan	3	4	4	4	4	4	4	5	6	4	4	5	5	5	5	4	3	4	4	2	4	3	3	6	6
15-Jan	5	4	4	4	5	5	4	5	4	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4	5
16-Jan	3	3	4	5	2	4	5	4	7	4	5	7	6	6	6	6	5	3	3	3	4	4	4	4	7
17-Jan	6	6	4	4	4	5	7	6	6	5	4	5	4	3	3	3	2	2	3	2	2	2	1	7	
18-Jan	2	2	3	2	2	2	2	3	3	2	2	4	2	1	3	1	4	2	3	3	2	2	5	3	5
19-Jan	2	2	2	4	2	1	2	2	1	2	2	1	1	1	1	1	2	2	2	1	2	1	1	1	4
20-Jan	2	3	2	2	5	2	2	3	2	3	3	5	2	2	2	3	2	1	2	1	1	2	3	1	5
21-Jan	2	2	2	3	3	3	2	2	2	1	2	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	3
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2	2	3	2	3	2	2	2	2	2	2	2	3
23-Jan	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	AF	1	AF	1	1	1	AF	1	1
24-Jan	1	1	1	1	1	1	2	1	1	1	AF	AF	AF	AF	2	AF	AF	AF	1	1	1	1	1	1	1
25-Jan	2	1	2	2	2	2	2	2	3	3	3	3	4	4	3	3	3	3	3	3	3	8	5	5	8
26-Jan	6	4	5	4	6	4	4	4	4	5	4	4	4	4	4	3	3	4	4	5	5	4	4	5	6
27-Jan	5	4	5	6	5	6	4	4	4	4	4	4	5	3	4	3	2	3	4	3	4	4	4	3	6
28-Jan	3	4	5	4	4	5	5	4	4	4	4	3	2	2	2	2	2	3	3	5	5	5	5	6	6
29-Jan	6	6	5	4	4	4	5	4	4	6	5	6	6	6	8	4	5	1	4	4	4	4	3	3	8
30-Jan	4	4	3	4	5	5	5	6	5	6	6	6	6	6	4	4	3	4	5	4	6	5	5	5	6
31-Jan	5	5	5	4	4	4	3	4	3	1	3	3	3	4	4	4	3	3	3	3	3	4	4	4	5
Diurnal Maximum																									

AF - Analyzer Failure



Wood Buffalo Environmental Association
Summary of Hour Averages

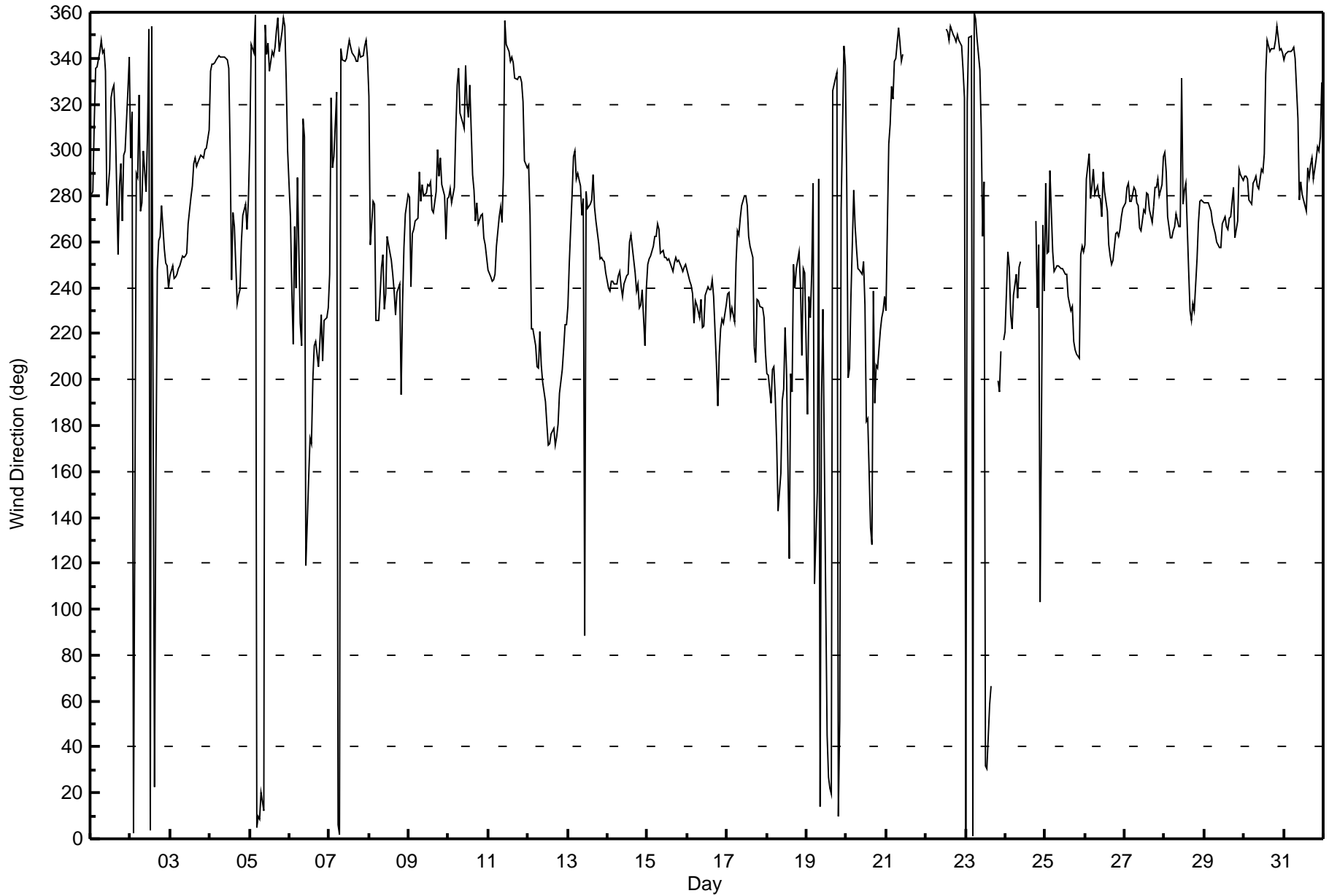
Wind Direction (WD) - deg
ConocoPhillips - Surmont - January 2017

Direction of Maximum Speed: 343 deg on Jan 11 13:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 254.0 deg on Jan 15	Hours of Data: 709
Direction of Minimum Speed: 51 deg on Jan 19 21:00	Hours of Missing Data: 35
Direction of Minimum Daily Speed Average: 1.6 deg on Jan 19	Percent Operational Time: 95.3
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-Jan	281	282	312	336	337	343	348	342	344	334	276	292	323	326	328	313	255	284	294	269	298	300	326	340	314.6
2-Jan	297	317	2	290	288	324	273	277	300	282	307	353	4	354	23	157	248	261	263	276	257	251	250	240	292.7
3-Jan	245	250	244	245	246	249	249	254	253	254	255	268	279	285	294	297	293	295	298	297	297	300	301	309	277.9
4-Jan	335	338	338	338	339	341	341	340	340	341	339	336	298	243	273	267	233	237	239	260	272	276	266	278	320.4
5-Jan	304	346	342	359	5	10	9	20	12	355	342	347	334	343	341	345	352	357	343	352	357	354	330	300	349.7
6-Jan	271	239	215	267	240	288	224	215	314	305	119	157	175	172	200	215	217	206	217	228	208	226	227	231	226.4
7-Jan	246	323	292	297	325	6	2	344	340	339	340	344	348	345	342	340	339	339	343	340	341	346	348	340	339.6
8-Jan	323	259	278	277	226	226	226	249	254	231	237	262	259	252	246	238	228	238	241	193	233	258	272	281	253.8
9-Jan	280	241	264	265	269	270	291	278	285	280	281	285	285	286	274	273	282	300	289	296	285	280	261	279	278.3
10-Jan	279	283	277	284	309	328	336	316	312	309	337	320	314	328	290	282	269	277	268	271	272	261	259	253	284.8
11-Jan	248	244	243	244	246	258	271	275	268	289	357	346	343	339	341	338	331	331	332	332	329	321	295	293	302.6
12-Jan	294	272	222	222	215	206	205	221	206	199	190	181	172	172	176	179	171	175	180	194	204	213	224	224	198.5
13-Jan	232	251	281	297	299	287	290	285	272	279	89	282	275	277	278	289	275	269	259	253	253	252	252	247	269.6
14-Jan	240	238	243	243	242	242	245	247	240	236	241	245	246	260	263	258	247	239	242	231	232	239	215	240	243.4
15-Jan	250	252	254	258	262	263	268	266	255	256	253	253	252	253	249	247	251	253	251	252	249	247	249	250	254.0
16-Jan	247	243	241	237	224	234	233	227	235	223	223	237	240	239	239	243	236	207	189	211	222	226	224	232	232.6
17-Jan	238	238	228	231	225	251	265	263	271	276	280	280	276	263	258	253	214	207	235	234	232	231	227	212	250.8
18-Jan	202	202	190	205	206	192	172	143	160	191	196	223	204	122	203	195	250	240	249	256	240	210	248	247	213.4
19-Jan	185	236	227	246	285	111	151	287	14	191	231	105	45	27	22	19	326	331	334	10	51	274	345	337	300.3
20-Jan	286	201	205	236	282	267	257	248	248	246	251	232	182	183	136	128	239	190	206	205	221	227	230	236	234.2
21-Jan	230	303	311	328	322	339	340	353	347	339	342	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	353	351	348	354	350	349	347	350	348	345	335	323	--
23-Jan	4	321	349	350	1	360	357	349	335	309	262	286	32	31	59	67	AF	42	AF	199	195	212	AF	217	349.5
24-Jan	221	256	249	228	222	237	246	236	249	252	AF	AF	AF	AF	199	AF	AF	AF	269	231	259	103	267	239	--
25-Jan	286	255	256	291	256	247	248	249	249	249	248	247	246	246	236	230	232	217	213	211	210	254	258	256	245.6
26-Jan	259	287	298	279	284	292	280	284	279	279	271	290	282	273	259	254	250	252	264	264	262	266	271	274	271.3
27-Jan	277	284	285	277	278	284	282	277	276	266	265	274	272	281	281	274	268	275	284	284	287	280	285	297	278.8
28-Jan	299	290	271	262	261	265	267	272	267	266	331	276	283	286	248	230	226	233	230	253	269	277	278	278	268.9
29-Jan	277	277	277	275	273	268	263	260	259	257	257	268	271	266	265	270	271	284	262	265	269	292	289	287	270.0
30-Jan	289	288	287	278	277	286	287	289	284	283	292	291	298	333	348	343	344	344	344	348	354	343	344	342	308.8
31-Jan	339	342	343	343	343	343	345	340	314	278	286	281	278	273	292	288	293	296	288	296	302	299	306	330	314.2

271.5 273.1 274.5 275.3 277.6 278.5 277.6 275.8 272.4 270.0 274.5 276.1 280.3 284.3 281.6 277.4 271.1 271.3 270.4 271.3 271.9 271.6 271.5 271.9
 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
ConocoPhillips - Surmont - January 2017

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 103 deg on Jan 19 22:00	Hours of Data: 709
Minimum Value: 6 deg on Jan 2 23:00	Hours of Missing Data: 35
Percentiles: P ₁ = 7 P ₁₀ = 9 Q ₁ = 10 Median = 13 Q ₃ = 18 P ₉₀ = 32 P ₉₉ = 80	Hours of Calibration: 0
	Percent Operational Time: 95.3

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-Jan	9	11	22	13	12	12	14	12	10	17	17	11	20	17	20	22	14	11	14	7	13	15	29	13	29
2-Jan	38	54	22	36	20	28	20	12	22	8	28	15	16	19	81	70	17	39	20	14	38	7	6	7	81
3-Jan	9	15	14	8	8	7	7	10	10	10	9	12	10	11	13	10	9	10	9	8	8	9	9	13	15
4-Jan	15	12	11	11	10	10	11	14	11	16	18	24	62	31	12	17	27	20	10	17	12	12	14	12	62
5-Jan	27	16	12	16	15	15	17	13	17	23	12	14	25	11	11	15	16	17	13	17	19	28	39	42	42
6-Jan	30	12	67	35	96	37	47	33	44	52	81	67	46	39	36	10	8	10	14	11	34	9	12	12	96
7-Jan	83	22	18	20	43	31	13	14	8	9	13	14	14	13	11	11	10	10	13	11	10	12	11	15	83
8-Jan	31	24	14	15	34	16	11	13	9	16	32	14	14	15	22	14	17	14	14	61	60	12	10	11	61
9-Jan	15	19	12	10	11	16	15	10	11	9	10	10	10	16	13	16	11	20	10	11	10	12	12	11	20
10-Jan	10	13	11	13	24	22	27	17	18	17	13	21	26	30	10	9	12	9	10	8	10	9	9	8	30
11-Jan	9	9	10	8	9	12	11	10	10	14	19	17	15	15	15	12	13	13	14	13	13	16	12	9	19
12-Jan	12	20	62	18	11	16	19	16	18	18	19	18	12	13	14	14	17	14	15	16	16	14	17	17	62
13-Jan	21	19	14	12	11	9	9	10	9	19	79	59	25	20	14	21	16	20	17	9	8	8	8	9	79
14-Jan	8	9	8	8	8	8	8	8	10	11	10	10	15	17	12	12	8	10	10	12	15	14	19	11	19
15-Jan	9	8	10	10	8	9	9	9	9	9	8	9	8	8	9	9	7	8	8	7	7	8	7	7	10
16-Jan	7	7	8	9	13	12	13	16	13	16	17	12	9	10	10	9	12	24	16	14	14	14	14	13	24
17-Jan	12	11	15	13	14	13	12	11	11	11	11	11	14	13	13	10	23	15	11	10	10	10	12	11	23
18-Jan	27	11	14	14	31	32	27	11	21	17	16	33	36	30	52	28	9	7	7	15	10	33	11	11	52
19-Jan	54	21	10	57	28	33	44	28	72	32	75	18	32	17	12	17	23	20	22	31	93	103	52	35	103
20-Jan	74	46	18	39	57	10	7	7	7	8	10	52	31	32	41	37	99	28	23	9	11	11	13	12	99
21-Jan	28	23	19	21	15	11	8	15	14	9	12	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	28
22-Jan	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	15	15	13	15	14	12	13	13	14	12	24	30	30
23-Jan	16	34	20	24	15	19	17	14	31	38	17	41	23	28	19	17	AF	23	AF	22	23	21	AF	31	41
24-Jan	27	18	19	58	46	18	76	63	10	43	AF	AF	AF	AF	15	AF	AF	AF	39	18	22	54	24	17	76
25-Jan	78	27	16	75	11	10	9	9	10	10	10	11	12	11	15	18	15	16	18	20	65	19	8	8	78
26-Jan	8	25	33	11	14	15	9	10	10	10	10	13	13	12	9	9	8	8	9	8	8	8	9	9	33
27-Jan	10	10	10	9	9	10	9	8	11	8	9	9	12	10	10	11	9	10	11	10	10	9	9	11	12
28-Jan	10	13	12	8	9	9	9	11	9	9	30	9	11	12	20	15	14	13	13	14	9	9	9	9	30
29-Jan	9	9	9	10	9	9	8	8	8	8	10	11	10	12	11	10	17	17	7	8	8	12	9	10	17
30-Jan	9	10	11	9	9	9	10	10	9	10	11	11	11	25	15	18	13	16	13	16	15	12	13	13	25
31-Jan	13	12	12	11	12	12	11	16	26	11	12	14	14	16	11	11	10	10	9	10	10	10	11	16	26
Diurnal Maximum																									
83 54 67 75 96 37 76 63 72 52 81 67 62 39 81 70 99 39 39 61 93 103 52 42																									

AF - Analyzer Failure



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	January 17, 2017	Last Calibration	December 13, 2016
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	10:15	End Time (MST)	14:40
Gas Cert Reference	LL104215	Station temp.	21 Deg C
Cal Gas Concentration	48.3 ppm	Cal Gas Exp Date	February 12, 2018
Calibrator Make/Model	API T700	Serial Number	622
ZAG Make/Model	API 701	Serial Number	196
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9035

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	518	518
Analyzer IP address	192.168.1.73		Lamp voltage	1549	1501
Calculated slope	0.994953	0.997075	Chamber temp	50.0	50.0
Calculated intercept	1.741373	1.713046	Pressure	21.5	20.6
Analyzer Background	22.5	26.8	Flow	0.527	0.501
Analyzer Coefficient	1.027	1.037	Intensity	38	37
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	1.5	----
as found span	5000	83.2	803.7	798.8	1.006
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	83.2	803.7	805.5	0.998
second point	5000	41.6	401.9	399.5	1.006
third point	5000	20.8	200.9	198.9	1.010
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	83.2	803.7	797.0	1.008
Average Correction Factor					1.005

Corrected As found 797.3 Previous response 806.0 % change 1.1%

Notes:

Sample inlet filter replaced after as founds. Adjusted both zero and span. As lefts began at 14:10 MST.

Calibration Performed By:

Asad Hidayat



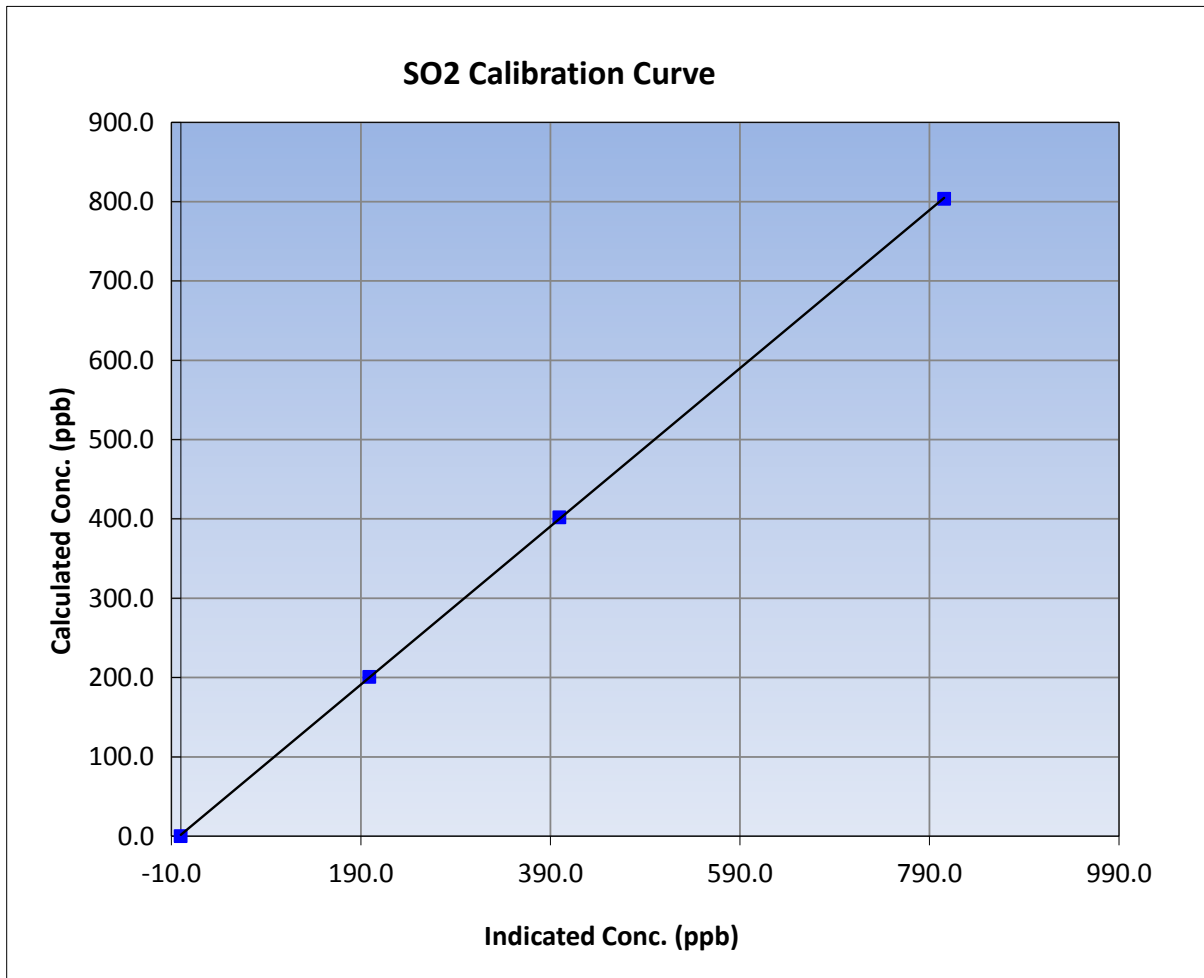
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	January 17, 2017	Previous Calibration	December 13, 2016
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Start Time (MST)	10:15	End Time (MST)	14:40
Analyzer make	API T100	Analyzer serial #	598

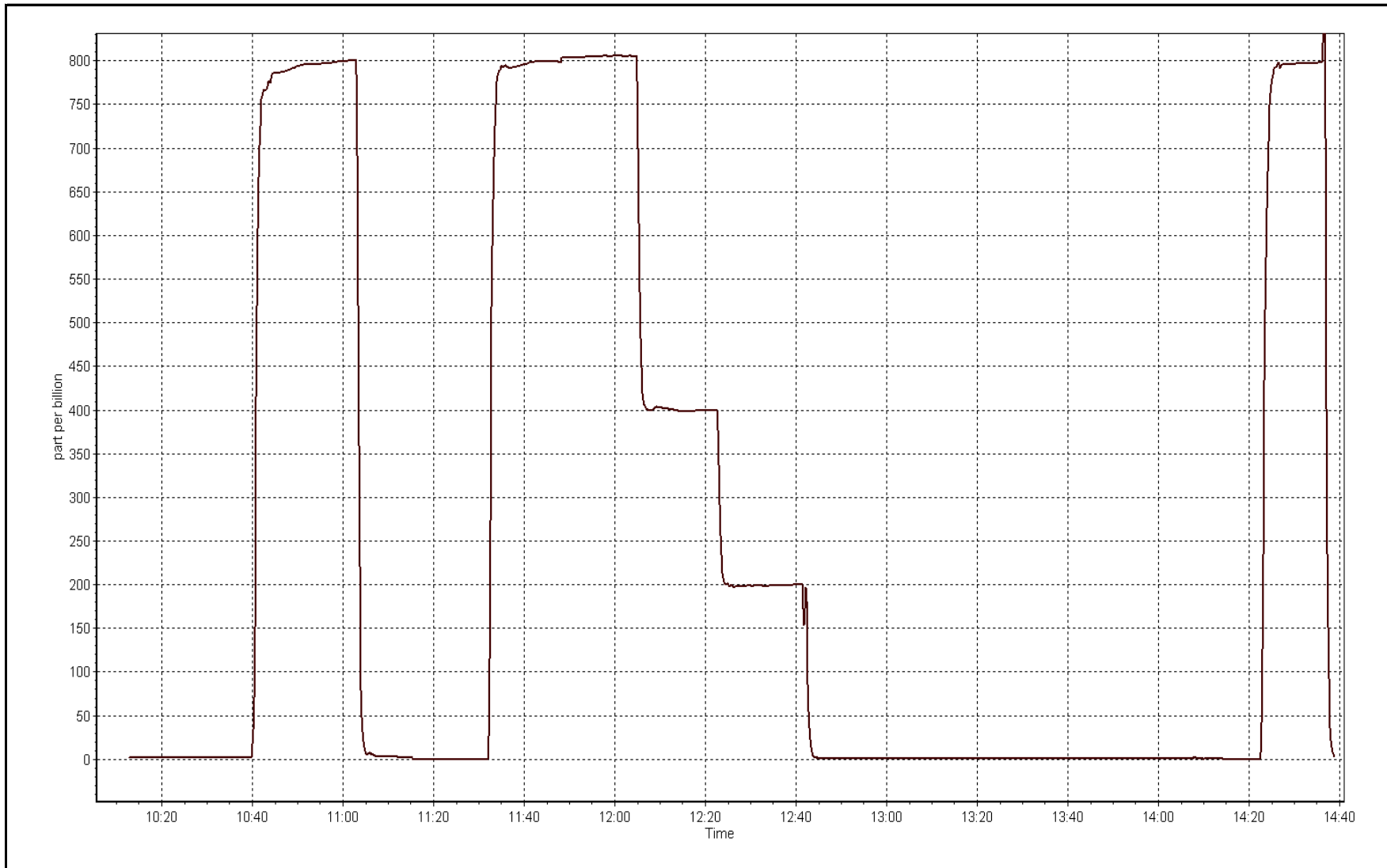
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999977
803.7	805.5	0.9978		
401.9	399.5	1.0059	Slope	0.997075
200.9	198.9	1.0103		
			Intercept	1.713046



SO2 Calibration Plot

Date: January 17, 2017





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	January 9, 2017	Last Calibration	December 5, 2016
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	13:00	End Time (MST)	15:25
Gas Cert Reference	LL34303	Station temp.	21 Deg C
Cal Gas Concentration	10.4 ppm	Cal Gas Exp Date	May 30, 2016
Calibrator Make/Model	API T700	Serial Number	622
ZAG air Make/Model	API 701	Serial Number	196
DACS make/model	Campbell Scientific CR3000	Serial Number	9035
SO2 gas concentration	48.3 ppm	SO2 gas cert/exp	LL104215 February 12, 2018

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	497	497
Analyzer IP address	192.168.1.75		Lamp voltage	2322	2305
Calculated slope	1.005900	1.001662	Chamber temp	50.0	50.0
Calculated intercept	-0.099994	0.183592	Pressure	23.5	23.1
Analyzer Background	21.1	21.1	Flow (SLPM)	0.604	0.592
Analyzer Coefficient	0.982	0.982	Intensity	52	51
			Converter temp.	314	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	-0.1	----
as found span	5000	38.5	80.1	79.5	1.007
SO2 scrubber check	5000	20.7	200.0	3.5	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	38.5	80.1	79.8	1.004
second point	5000	19.3	40.1	39.9	1.007
third point	5000	12.0	25.0	24.7	1.011
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	38.5	80.1	79.4	1.009
Average Correction Factor					1.007

Corrected As found	79.7	Previous response	79.7	% change	0.1%
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Notes:

Sample inlet filter replaced after as founds. Scrubber check done after 3rd point. No Adjustments. Took new average for "high point" after replacing the filter.

Calibration Performed By: Asad Hidayat



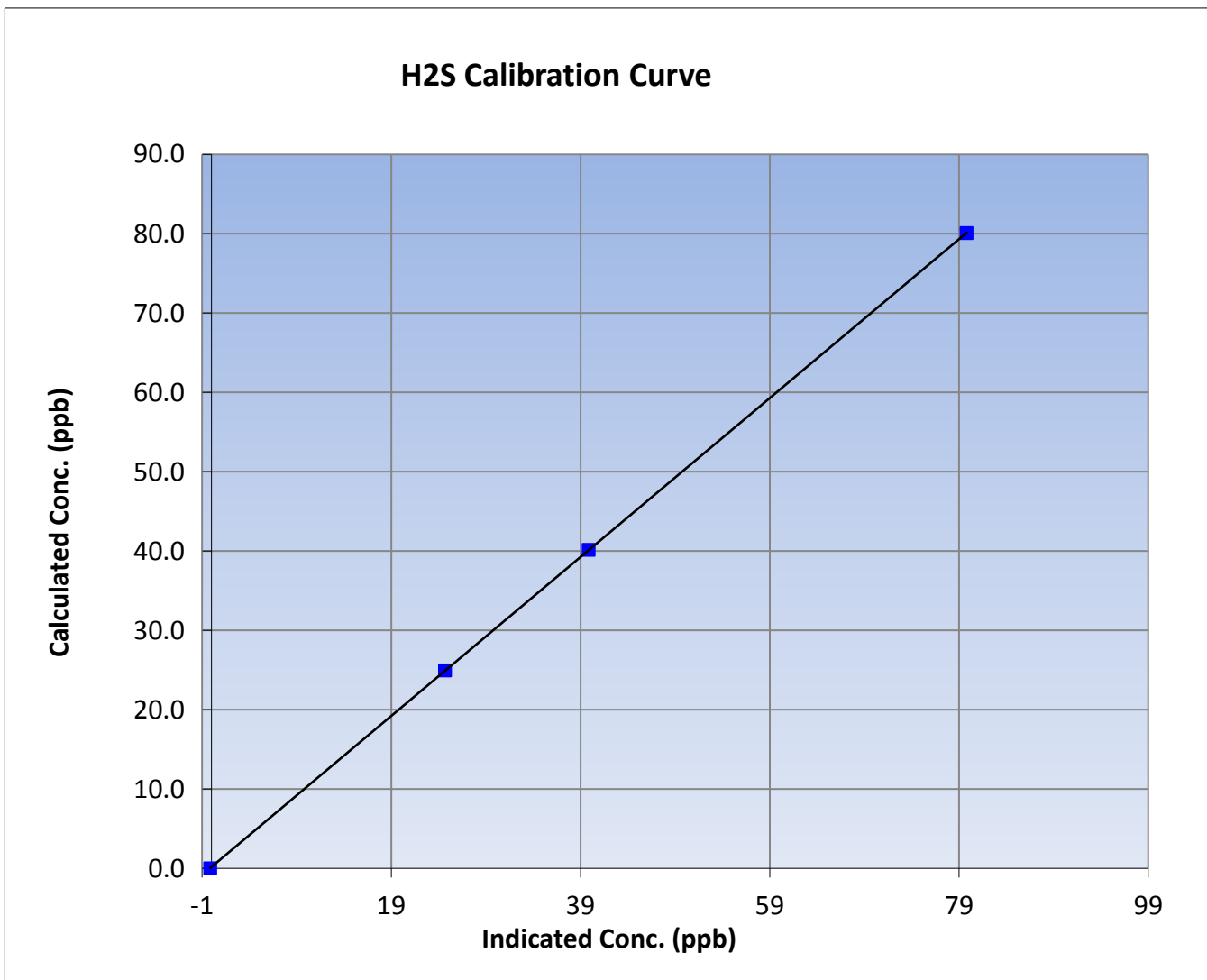
Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	January 9, 2017	Previous Calibration	December 5, 2016
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	13:00	End Time (MST)	15:25
Analyzer make	API T101	Analyzer serial #	197

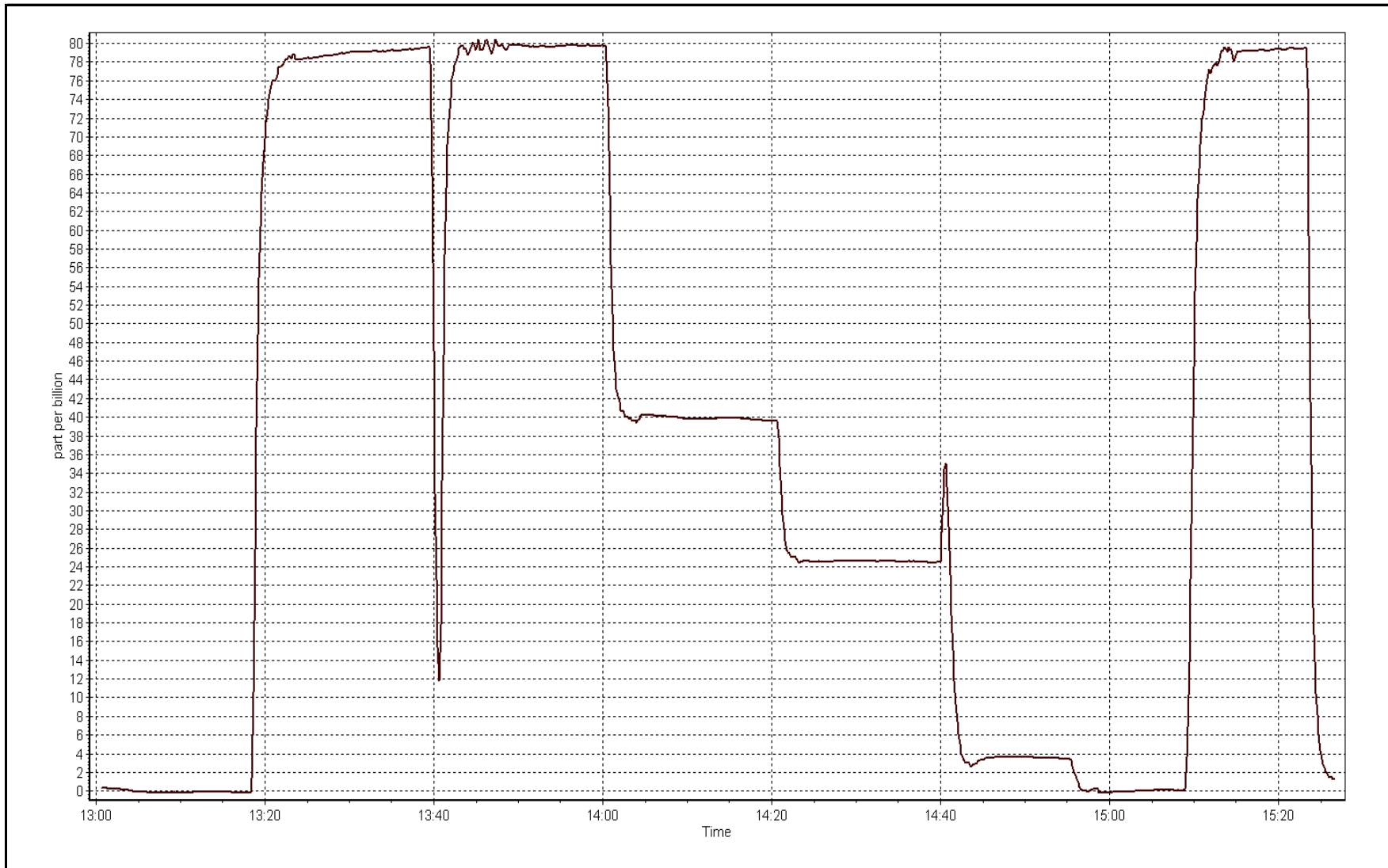
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999998
80.1	79.8	1.0035		
40.1	39.9	1.0074	Slope	1.001662
25.0	24.7	1.0109		
			Intercept	0.183592



H2S Calibration Plot

Date: January 9, 2017





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	January 17, 2017	Previous Calibration	December 13, 2016
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	10:15	End Time (MST)	14:40
NO Cal Gas Conc	48.1 ppm	Gas Cert Reference	LL104215
NOX Cal Gas Conc	48.1 ppm	Cal Gas Expiry Date	February 12, 2018
Calibrator	API T700	Serial Number	622
Zero air Generator	Teledyne API T701	Serial Number	196

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	0.998822	0.999687	0.998903
	Data Offset	2.031060	1.769688	0.190504
Current Calibration	Data Slope	1.002342	1.002157	0.994133
	Data Offset	1.317767	1.184320	0.245043

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153356
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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	0.946		0.969	
NOX coefficient	1.001		1.000	
NO2 coefficient	1.000		1.000	
NO bkgrnd	5.3		5.4	
NOX bkgrnd	5.8		5.9	
Chamber Temp	50.6	Deg C	50.4	Deg C
Moly Temp	322.6	Deg C	322.1	Deg C
PMT voltage	-866.1	V	-866.5	V
PMT Temp	-3.1	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	159.1	mmHg	156.7	mmHg
R Cell Press Nox	159.1	mmHg	156.9	mmHg
NO sample flow	0.688	lpm	0.671	lpm
Nox sample Flow	0.687	lpm	0.670	lpm

Notes:

Sample inlet filter replaced after as founds. Adjusted span.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: January 17, 2017 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	0.0	0.1	-0.1	----	----
as found span	5000	83.2	800.4	800.4	0.0	785.4	783.7	1.7	1.0191	1.0214
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	----	----
high point	5000	83.2	800.4	800.4	0.0	798.5	798.7	-0.2	1.0023	1.0021
second point	5000	41.6	400.2	400.2	0.0	395.3	395.6	-0.3	1.0124	1.0116
third point	5000	20.8	200.1	200.1	0.0	198.3	198.5	-0.2	1.0091	1.0080
as left zero	5000	0.0	0.0	0.0	0.0	-0.3	0.0	-0.3	----	----
as left span	5000	83.2	800.4	495.1	305.3	800.5	493.5	306.9	0.9999	1.0032
Average Correction Factor									1.0079	1.0072

Corrected As found NO_x= 785.4 NO= 783.6 Percent Change NO_x= 1.8% NO= 2.0%
 Previous Response NO_x= 799.3 NO= 798.9

GPT Calibration Data

Dilution Flow (total) 5000 ccm Source Gas Flow 83.20 ccm NOx ref calc conc = 800.4 ppb NO ref calc conc = 800.4 ppb

O3 Setpoint (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
1st NO ref point		0.0	800.9	799.5	-0.1	0.9994	1.0011	----	----
1st NO2 (300)	495.1	304.5	801.0	495.1	305.9	0.9992	----	0.9953	100.5%
2nd NO2 (200)	590.0	209.5	801.0	590.0	210.9	0.9993	----	0.9933	100.7%
3rd NO2 (100)	687.2	112.3	799.5	687.2	112.2	1.0011	----	1.0009	99.9%
2nd NO ref point		0.0	802.0	801.0	0.8	0.9980	0.9992	----	----
Average Correction Factor						0.9994		0.9965	100.4%

Calibration Performed By: Asad Hidayat



Wood Buffalo Environmental Association

NO_x Calibration Summary

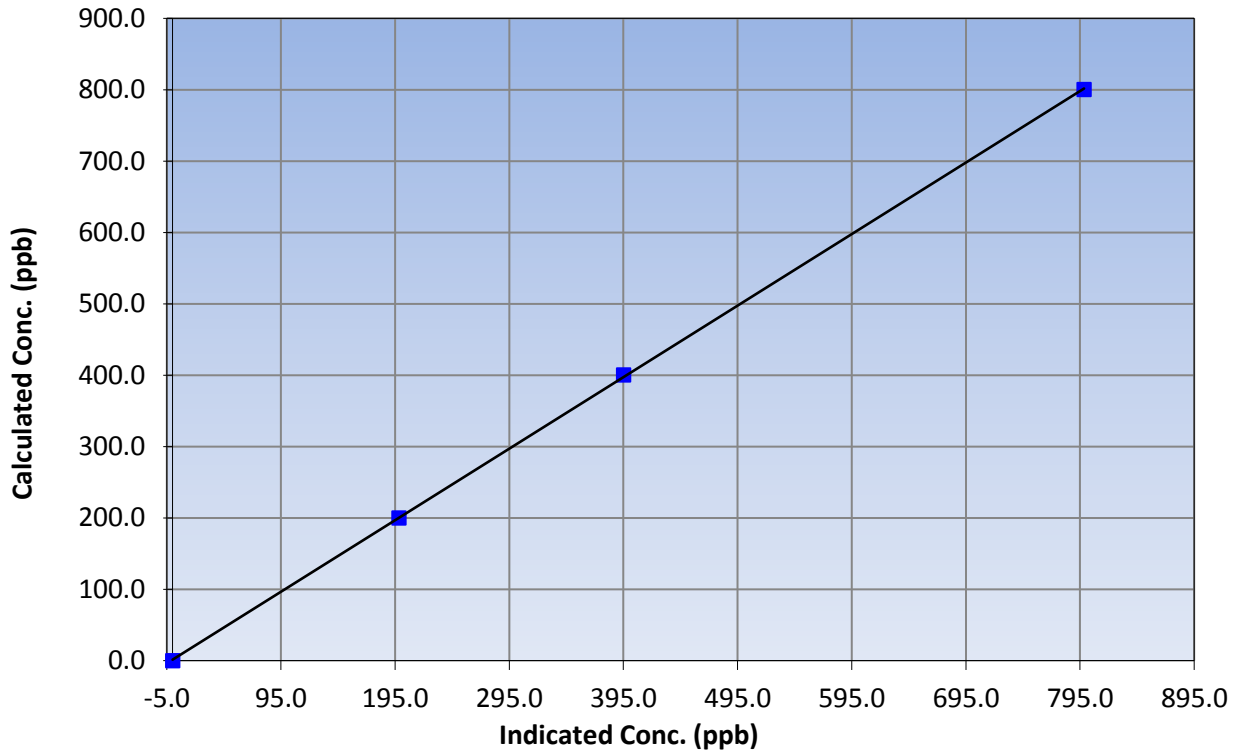
Station Information

Calibration Date	January 17, 2017	Previous Calibration	December 13, 2016
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	10:15	End Time (MST)	14:40
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	0.0	----	Correlation Coefficient	0.999969
800.4	798.5	1.0023		
400.2	395.3	1.0124	Slope	1.002342
200.1	198.3	1.0091		
			Intercept	1.317767

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

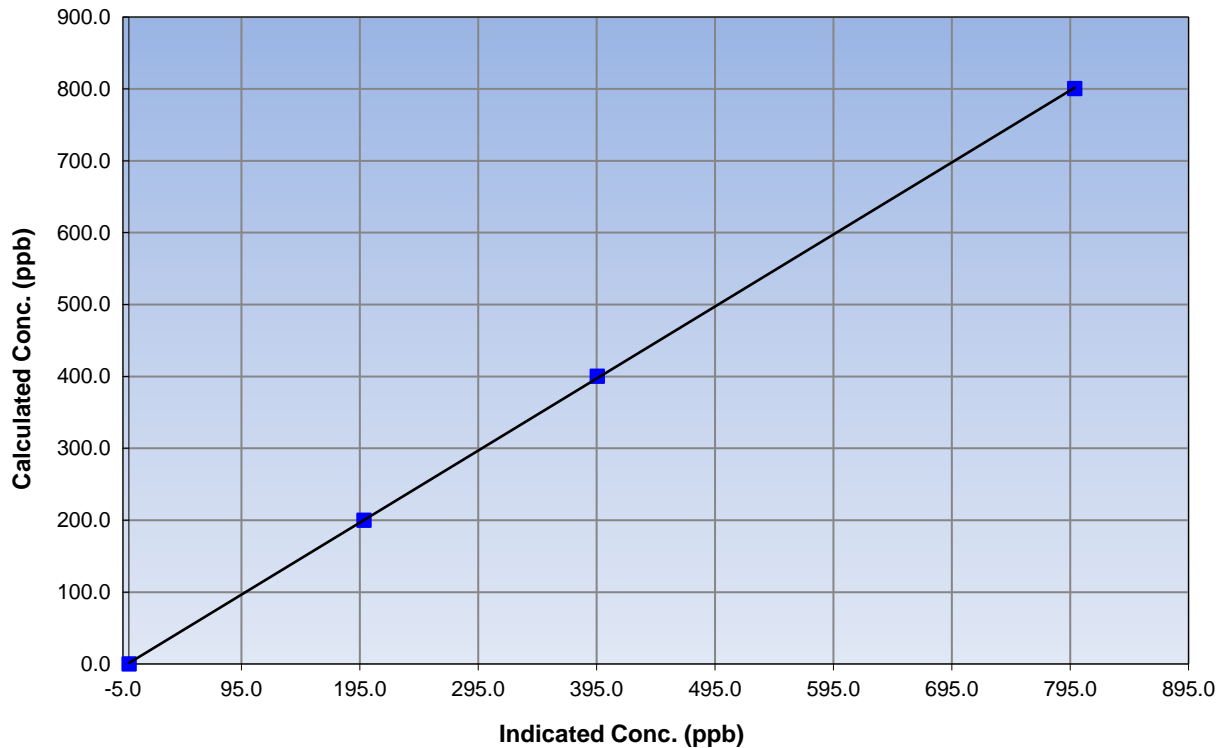
Station Information

Calibration Date	January 17, 2017	Previous Calibration	December 13, 2016
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	10:15	End Time (MST)	14:40
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	0.999972
800.4	798.7	1.0021		
400.2	395.6	1.0116	Slope	1.002157
200.1	198.5	1.0080		
			Intercept	1.184320

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

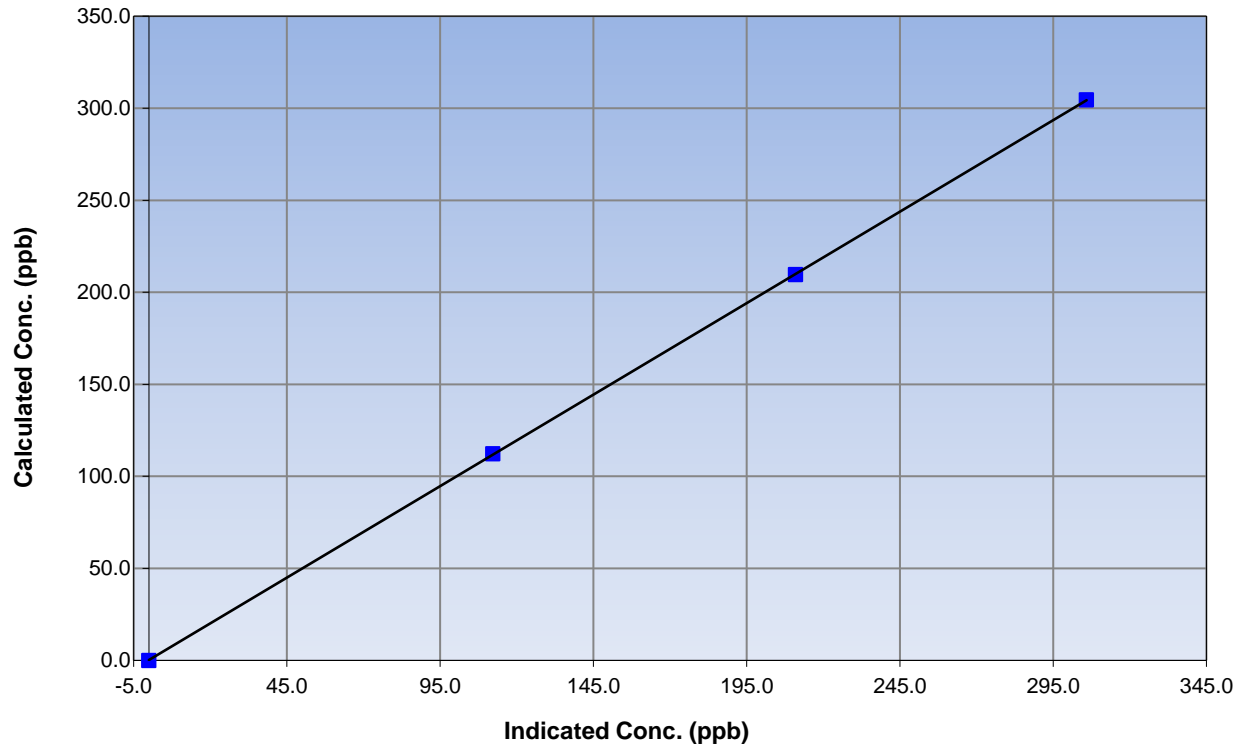
Station Information

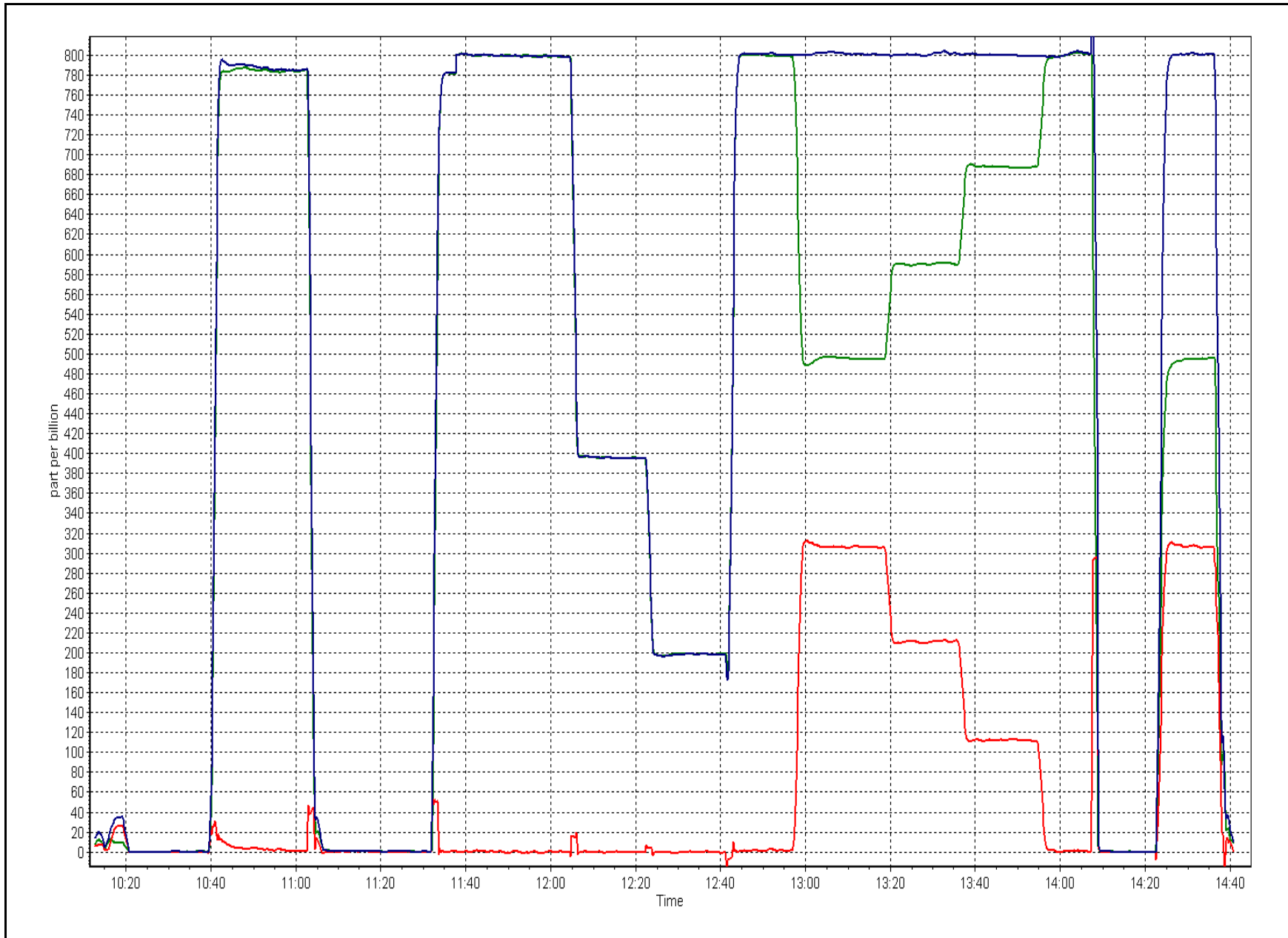
Calibration Date	January 17, 2017	Previous Calibration	December 13, 2016
Station Number	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	10:15	End Time (MST)	14:40
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999990
304.5	305.9	0.9953		
209.5	210.9	0.9933	Slope	0.994133
112.3	112.2	1.0009		
			Intercept	0.245043

NO₂ Calibration Curve







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